FOREWORD

I remember being slightly surprised when I first heard that a second edition of the *Encyclopedia of Language and Linguistics* (ELL2) was in the works: I wondered if it wasn't premature, a bit too soon after the first edition. But now that I see the result, it is clear that this new edition is both timely and a major advance over the very successful ELL1. Linguistics is a fast-moving field.

Theoretical controversies continue and develop; linguistic and sociolinguistic data collection has increased rapidly over the past 10 years or so, stimulated in large part by linguists' awareness of the critical problem of language endangerment; the greatly expanded role of digital resources is making huge bodies of data available to all scholars; and interdisciplinary outreach by linguists and to linguistics has made our discipline a bit more visible beyond the in-group. We and our students still hear the same old question all too often – "What is linguistics, anyway?" – but within academia, at least, colleagues in other disciplines now tend to be embarrassed to ask it, even if they don't know the answer.

All these developments make this encyclopedia an invaluable reference work. By 1990 it was already impossible (as I know all too well from my years as editor of a general linguistics journal) for any linguist to have expert knowledge of the entire range of the discipline, much less of the interdisciplinary areas that were beginning to take on new prominence. The past 15 years have seen remarkable developments, so that it is now difficult to imagine being familiar with more than a smallish fraction of the many advances in our understanding of language and linguistics. Having access to a quick survey of current issues and sources on language and the brain, morphological theory, statistical methods in language processing, categorial grammars, the classification of Austronesian languages, dialects in bird songs, second-language attrition, bilingual education, the CHILDES database, and hundreds of other topics will delight and inform linguists and, I predict, a great many non-linguists as well. The numerous articles on interdisciplinary topics should be especially valuable for linguists with limited knowledge of the other disciplines as well as for non-linguists with an interest in interface issues.

Another feature of ELL2 struck me as I began to prepare to teach a new course on social, political, and economic implications of multilingualism: this encyclopedia will be an excellent resource for my students, because it has a whole range of articles on relevant topics, including a set on the language situation in countries all over the world and another set on language education policies in the world's major regions. Other course instructors will surely also be happy to send their students to this work, for courses on language and the brain, animal communication, second-language acquisition, and any number of other general topics.

From people who enjoy browsing through encyclopedias to specialists who want some basic orientation in an area near their own, readers will find ELL2 to be an outstanding source of information.

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INTRODUCTION

The first edition of the *Encyclopedia of Language and Linguistics* (ELL1), with R. E. Asher as Editor-in-Chief and J. M. Y. Simpson as Coordinating Editor, was published in 1994. It was intended to be 'authoritative, comprehensive, international and up-to-date.' The reviews show that it largely succeeded in these aims.

When in 2002 I was invited by Chris Pringle (Publisher, Elsevier Social Sciences), to be Editor-in-Chief of a new edition of ELL, I assumed that what Elsevier had in mind was a revision of ELL1. However it soon became clear in discussions with Chris and with Sarah Oates (Linguistics Publishing Editor) that this was not at all what was intended. In the 10 years since the first edition was published, linguistics had grown explosively, both in its own specializations and in interdisciplinary fields. We decided that ELL2 should reflect this growth and be an entirely new work, with new and expanded sections, new topics, new editors, new authors, and newly commissioned articles. At the same time, we wanted to retain the broad vision of ELL1 as an encyclopedia concerned both with languages and with linguistics. We have therefore sought to deal comprehensively with the current state of the fundamental linguistic disciplines, with their applications to the study of language, and with the interdisciplinary relationships between linguistics and the other disciplines from which it draws inspiration and to which it contributes expertise. We have also sought to retain, and indeed expand on, ELL1's coverage of the languages of the world.

We also planned to publish the Encyclopedia in two versions, a 14-volume print version and, in parallel, an online version available at http://www.sciencedirect.com. The two versions have the same text, but the online version supplements the written text with additional illustrative material that is only possible in an electronic version – samples of spoken or signed language, videos of the use of language in context, and the like.

Our first task was to set up an Editorial Board. This consisted of the Editor-in-Chief and six Coordinating Editors, each having general oversight over a particular area of the encyclopedia. We were fortunate in being able to recruit as Coordinating Editors Jim Miller and Laurie Bauer (who between them covered the fundamental linguistic disciplines of phonetics, phonology, morphology, syntax, semantics, pragmatics, and discourse), Anne Anderson (psychololinguistics and cognitive science), Graeme Hirst (computational applications of linguistics), and Margie Berns (applied linguistics and applications of linguistics in education, the law, politics, the media, and so on). We had hoped that Seumas Simpson, who had been Coordinating Editor for ELL1, would be able to join us as Coordinating Editor for languages, writing systems, biographies, and the history of the subject, but unfortunately that turned out not to be possible, so I took on the task of the sixth Coordinating Editor. The first meeting of this editorial board and Elsevier was at Woodstock in 2002. By good fortune, both Ron Asher and Seumas Simpson also attended this meeting, so we were able to draw on their experience of ELL1. At this meeting we determined the overall architecture of ELL2, drew up the list of sections, set the general scope of each, and began to think about Section Editors.

The six Coordinating Editors were invited to find an editor for each of the sections in their general area, and these Section Editors, as they were recruited, were invited to take primary responsibility for a particular subject area. They were also invited to join an Executive Editorial Board. ELL1 had 34 editors, ELL2 has 45; full details of the board are included in the front matter. The names of many of the ELL1 sections have been retained – pragmatics, semantics, syntax, morphology, phonetics, phonology, and so on – but in all cases the structure of the sections and their contents have been rethought and articles freshly commissioned. Some ELL1 sections in

which there have been substantial recent developments or that we felt were rather scantily covered in ELL1 have been considerably expanded, and new sections have been added. In the area of syntax and morphology there is a new section on typology and universals; in the area of psycholinguistics there are new sections on language acquisition and on cognitive science, and the ELL1 section on language pathology has been expanded into a section on brain and language dealing not only with language disorders but also with the contemporary developments in neurolinguistics. In the area of text linguistics and discourse there are now separate sections on written and spoken discourse and a set of new sections on discourse in particular fields – medicine, the law, the media, politics, etc. The section on computational linguistics and natural language processing has been expanded in line with recent developments, and there is a new section on speech technology. New developments in pragmatics have likewise been taken into account: intercultural pragmatics, pragmatics of reading, pragmatic acts, and others. There is increased coverage of biographies and of languages.

In 2003 we held a meeting of all the editors. For this meeting, each of the Section Editors was asked to articulate the coverage of their section, to draw up lists of article titles, and to begin to think of authors. As a group we scrutinized the Section Editors' proposals, examined their lists of articles, proposed further titles, and attempted to identify gaps in coverage and to plug them. This process of determining the coverage of the encyclopedia did not, of course, end with this meeting, but was continually negotiated over several more months. Finally, we also proposed a small international Honorary Editorial Advisory Board to scrutinize our plans and comment on them: Barry Blake (La Trobe), Yukio Otsu (Keio), Sally Thomason (Michigan), Yueguo Gu (Beijing), and Nigel Vincent (Manchester). We are grateful for their help and advice. The extent to which the encyclopedia meets its aims of being comprehensive and authoritative is due to the expertise and dedication of the members of the editorial boards, the Coordinating Editors and Subject Editors, the international advisors, and of course the authors. We are particularly pleased that the authorship is truly international. Our authors come from more than 70 different countries: some 45% are from Europe and some 40% from North America. A full list can be found in the list of contributors.

The large number of editors and sections gave rise to a general structural problem. Some division of editorial responsibility was necessary in order to cover a subject so wide-ranging and interdisciplinary as linguistics. It will be clear from the list of section editors and their commissioning responsibilities, and from the subject classification, that our sections correspond largely to the traditional partitioning of linguistics into syntax, semantics, pragmatics, etc., and also recognizes the customary applications in psycholinguistics, sociolinguistics, comparative linguistics, computational linguistics, and so forth. In many of the proposed sections, even within the more centrally linguistic disciplines, the phenomena that we are dealing with are not readily classifiable as belonging exclusively to one area. Consequently, there is on the one hand the possibility of overlap, and on the other, the possibility of gaps in coverage. Overlap, where it does not involve repetition, is not necessarily vicious because it can offer revealingly different perspectives on particular issues, and in a project as large as this, it is difficult to avoid. We have tried our best to minimize any gaps. All the editors were involved in scrutinizing the list of articles to try and identify and fill gaps, and it was a general editorial policy that there was no strict demarcation between the responsibilities of the various editors, who were encouraged to negotiate their area of responsibility with other neighboring areas to ensure that the coverage was as complete as possible.

In a fast-changing and developing field like linguistics it is important for a work called an encyclopedia both to be up-to-date and to remain in contact with its traditions. In the central areas of linguistics it is probably the case that many of the fundamentals have remained much as they were 10 years ago, but they should be reinterpreted in the light of new data or new theoretical positions. They need to be restated for a new generation to inform the student and offer suitable background information to the researcher or professional from a related area who seeks to understand linguistics.

The various subdisciplines have developed rapidly. Linguistics, like other disciplines in the arts and social sciences, is driven by both theory and data and the interaction between the two. So in the 10 years since ELL1 we have seen the arrival of new theories and the fading of old ones in the fundamental linguistic disciplines as well as in interdisciplinary areas. It is interesting to see how work in the linguistic disciplines increasingly draws insights from interdisciplinary cooperation, and it is striking how different the bibliographies in ELL2 are from those in ELL1.

In the same period, we have also seen a considerable increase in the amount of data available. There is more data on individual languages, which is reflected in the language articles, and substantially more on basic linguistic phenomena of both typological and universal issues: on topics such as the word, complementation, case, tense, aspect, and modality, and on functional domains such as possession and comparison. Data feeds

theory, and these phenomena are as likely to be covered in the interdisciplinary sections as they are, for example, in the sections on morphology or syntax.

Another area of substantial change since ELL1 is the development of new technologies. Developments in computer technology have made it possible to assemble substantial corpora of spoken and written text, and analysis tools have improved beyond measure so that in many areas corpus linguistics has had a substantial impact on both description and theory. The Internet, text-messaging on mobile phones, online chat groups, and the like bring new dimensions to the use of language in the media and to the study of discourse in general. Similarly, new technologies for investigating speech and neural activity open up new insights on the mental storage and processing of language.

All these developments have led to a considerable increase in the amount of interdisciplinary work in linguistics. For example, developments in psycholinguistic theory have been influential in many areas – so much so that linguistic investigations are now likely to be conducted in departments other than Departments of Linguistics – as can be seen by looking at the departmental affiliations of the Section Editors and authors. This renders the distinction between the 'core' and the 'periphery' of linguistics, which was still being drawn in ELL1, no longer as viable as it once may have seemed.

ELL2 has attempted to address some of these issues by systematically including articles on interfaces between disciplines and, in the subject classification, by listing individual articles under more than one classification. This also implies that the classification does not entirely correspond to the commission responsibilities of individual Section Editors.

We have tried to be comprehensive in our coverage. The articles are ordered alphabetically by title, so the reader who wishes to see the coverage in a particular area will find it helpful to consult the subject classification. What follows is a brief explication of the classification and the coverage of each section.

Foundations of linguistics explores fundamental linguistic concepts as they relate to linguistic theories and to the collection and organization of data. Many of these foundational issues are also discussed, from a philosophical point of view, in the section on philosophy and language and from other perspectives in other sections. The section also broaches issues relating to the origin and evolution of language.

The section on **animal communication** discusses the complex communicative signals that non-human individuals across the animal kingdom have evolved to communicate information about themselves, their age, their individual identity, their social status, etc., and also their capacity for referential signaling about external objects such as the location of food sources or specific information about predators. Animal communication is a greatly expanding field of research by biologists and psychologists that can make a significant contribution to understanding human language. In the online version there are multimedia annexes that give a wide range of examples of animal communication, from the bee dance to fish communication.

The section on issues in **semiotics** deals with theories of the sign as they apply both to linguistics and to other communicative activities and other modalities such as music.

It is to be expected that an encyclopedia of linguistics should pay major attention to the fundamental disciplines at the heart of all linguistic investigations: phonetics, phonology, morphology, syntax, semantics, pragmatics, and discourse. In each of these areas there are articles on fundamental concepts of the discipline, on models within the discipline, and on interfaces with other linguistic disciplines as well as on interdisciplinary links.

Phonetics is the study of the way speech sounds are produced and interpreted. This includes the articulation and perception of speech sounds and investigations into the character of and the explanation for the universal constraints on the structure of speech sound inventories and speech sound sequences. It increasingly encompasses the design of mechanical systems to code, transmit, synthesize, and recognize speech. It also includes the study of how speech sounds vary in different styles of speaking, in different phonetic contexts, over time, and over geographical regions; how children first learn the sounds of their mother tongue; how best to learn to pronounce the sounds of another language; and investigations into the causes of and the therapy for defects of speech and hearing. These issues are relevant to more than one section. In the online version many of the articles are accompanied by audio files.

The boundary between phonetics and **phonology,** the study of the more abstract, more functional, and more psychological aspects of speech, is under constant debate. Phonology is the study of sound systems in language and was the first subdiscipline in which the view of language as a system was developed successfully. The section discusses the nature of phonological units and processes, both at the segmental and at the prosodic level and illustrates this with descriptions of the phonological systems of a number of typologically different languages.

Morphology is concerned with the relationship between the form of a word and its meaning. Since morphology is interested in the forms of words, it is related to phonology for the study of the sound shapes of words and to syntax both for the study of the composition of words and for their syntactic function. And because morphology is concerned with meaning, it is related to the study of semantics and of the lexicon. These many relationships mean that morphological theorizing has been much influenced by phonological and syntactic theories, as well by changing ideas about the nature of the lexicon. Morphological processes, inflection, derivation, and so on remain at the heart of morphology and are fully covered in the encyclopedia, as are more recent developments in morphological typology and the study of morphology within psycholinguistics.

Linguistics has always been concerned with developing a general theory of the structure and nature of language while making its theorizing as empirically viable and as explanatory as possible. Nowhere has this aim been more rigorously pursued than in the field of syntax. **Syntax** is concerned with modeling the combination of words and morphemes to build more complex meanings. The encyclopedia takes no party line with respect to syntactic theory, and there are articles covering the main ideas of various syntactic theories, thus, for example, ideas underlying generative grammar are explored in the article 'History of Linguistics: Discipline of Linguistics,' those underlying relational grammar in the article 'Grammatical Relations and Arc-Pair Grammar,' and the principles underlying cognitive grammar are explored in a number of articles. The syntax section of the subject classification contains an overview of the syntactic theories explored in the encyclopedia: it includes articles on theories that were prominent a decade ago but are falling out of the spotlight, on those that remain the subject of vigorous development, and on those that have come to prominence over the last decade.

These sections inevitably raise questions about linguistic and typological universals. The section on **typology and universals** concentrates on these issues and is concerned mainly, but not exclusively, with research findings made in the course of the last decade, deriving either from functionally oriented research or from generative paradigms. There are articles reflecting recent findings on the typology of linguistic categories in, for example, grammatical domains such as evidentiality, reference marking, and serial verb construction. This section also covers 'areal' linguistics, a field of increasing interest; since areal linguistics has a historical dimension, these articles intersect with the section on historical and comparative linguistics.

I remarked earlier that phonology was the first subdiscipline in which the contemporary view of language as a system was developed successfully. In the middle of the 20th century the spotlight turned from phonology and morphology to syntax, and latterly **semantics** has become increasingly prominent. In morphology, syntax, and typologically oriented studies, perhaps especially in 'grammatical semantics,' semantics has made a considerable contribution to our understanding of verbal categories like tense or aspect, nominal categories like case or possession, clausal categories like causatives, comparatives, or conditionals, and discourse phenomena like reference and anaphora. Similarly, the study of lexical semantics and its relation to syntax, pragmatics, and cognitive linguistics has grown vastly; and it goes without saying that the study of logical semantics has developed and thrives, often in interaction with computational linguistics.

One view of **pragmatics** is that sees itself as involving the study of human language use as it is exercised in a community of social practice. The exercise is, however, not limited to verbal signs: other communicative means are also included, as becomes clear when one studies 'pragmatic acts' as well as the traditional 'speech acts.' In addition, emphasis is placed on the way communication itself is organized socially, not just as envisaged in the earlier speaker-oriented models due to Austin, Searle, and Grice, but extending also to comprise more recent advances, especially in our understanding of notions of inference and implicature, including a recent expansion into the domains of optimality theory and relevance theory. Pragmatic thinking has also advanced in what used to be called the 'hyphenated disciplines' – sociolinguistics, psycholinguistics, and so on – and more recently in the study of humans in interaction with computers, the teaching of first and second languages, literary studies, the theory of discourse, intercultural studies, cognitive research, and a host of other practically and theoretically oriented fields of study, such as conversation analysis.

Underpinning much of the study of linguistic semantics and pragmatics are issues in **philosophy.** One way of understanding the contribution of philosophy to the study of language is to see it as giving fairly sweeping answers to questions such as 'What do the parts of language (e.g., words of various kinds) mean? What do linguistic complexes, including sentences of various kinds, mean? What rules relate the part-meanings to the whole meanings?' Philosophy then goes on to ask: 'What are we talking about when we talk about meaning? What kind of thing is a linguistic rule? What form should the statement of a linguistic rule take, including especially a semantic rule?' We can then enquire into the potential implications for philosophy itself of the answers to these questions – for example, the implications of linguistic arguments for anti-realism for

metaphysics, of the discussion of language rights for ethics, of linguistic notions relating to mentalese or concepts for philosophy of mind, or of issues relating to non-standard logics or notions of logical form for logic.

The study of discourse is another expanding area of linguistic enquiry. As a general term, 'discourse' applies to both spoken and written language, and spoken and written discourse have crucial characteristics in common. The recent explosion of language corpora of all kinds and the tools to analyze them make this a burgeoning area of linguistic investigation. The linguistic traditions of the study of written and spoken discourse are different, however, and this is reflected in ELL2 by focusing on written and spoken discourse in separate sections and devoting a suite of sections to the discourse of particular genres.

Text analysis and stylistics concerns aspects of written discourse with particular emphasis on stylistics. A text is clearly more than a random set of utterances: it shows connectedness, and a central objective is to characterize this connectedness. This could be done either through looking at overt linguistic elements and structures or by seeing connectedness as a characteristic of the mental representation rather than of the text itself. This section explores both these approaches. It also considers various features of text, metaphor, and figures of speech in general and the properties of different text genres, and contains articles on stylistics and literary theory.

Since ELL1, research on **spoken discourse** has brought new and interesting insights to the broader field of linguistics through the analysis of stretches of spontaneous spoken language produced in more natural contexts. This has also pushed forward the awareness that new models for describing and interpreting speech processes are required in phonetics, in syntax, and in the broader domain of textual relations. Although the sentential and extra-sentential syntax of spoken discourse has always been part of grammars of languages with a predominant oral dimension, only recently has it gained momentum as an autonomous subject, interesting per se, especially with respect to those languages with a long history of written and spoken dimensions running in parallel or influencing each other. Detailed descriptions of the syntax and discourse of individual spoken languages have brought into focus the differences between written and spoken structures and opened a theoretical debate over the nature of such differences and the best models to deal with them. In the online version, some of the phonetic and phonological characteristics of spoken language are illustrated by audio files.

Law and language addresses issues and problems that arise from the nature of the language used in the legal system, and since the law is an overwhelmingly linguistic institution, language is implicated in many of the issues and problems associated with the legal system. An obvious issue is that the written technical language of the law is extraordinarily complex and can be virtually impossible for non-legal specialists to understand. Spoken legal language can similarly raise social issues since some social groups may not understand the language and culture of the law and may be disadvantaged as a consequence. Applied forensic linguists addresses issues and problems in the legal system that are language based, attempting to describe, and where possible explain, those features that distinguish the language used in legal settings from everyday language.

The mass media increasingly influence the way we understand other societies and cultures and the section **media and language** follows contemporary debates about the nature of media language itself as it changes in relation to changing industrial and social pressures. It notes the increasing use of conversational style by journalists and interviewers in traditional media, and explores the growing influence of emerging technologies, the most obvious of which are related to internet communication channels with enhanced opportunities for audience interactivity.

Politics and language deals with different aspects of the relation between language and politics, notably different approaches to the analysis of 'political language' in its broadest sense. Research in this area received an impetus in the latter half of the past century with the analysis of National Socialist language as an important starting point. There is also considerable research into 'language policies and language planning' more generally. This section concerns itself not only with political rhetoric in the 'classic' tradition but also with recent work involving new analytical methodologies, particularly with respect to multimodality and the impact of the visual.

Religion and language looks at 'religious language' in its wide range of manifestations. The scriptures of all religions show a vast range of genres, including myth, narrative, law, prophecy, and poetry. In some religions, written liturgical forms are normally elevated in style, sometimes poetic, often veering toward the archaic; statements of doctrine and academic theological writings share features with scientific writing such as consistent use of technical vocabulary, while the language used in private prayer may be more likely to reflect the usage of everyday language. Particular modalities of religious activity may exhibit their own stylistic features. In common parlance, 'religious language' is often taken to mean liturgical language. However, in scholarly contexts the term is nowadays often used to cover both discourse about religion (including academic theological writing and statements of doctrine) and its relation to other types of discourse, and discussion of how religious texts should be interpreted.

Medicine and language focuses on two aspects of medical discourse: the oral and the written. The oral papers address issues related to patient–doctor communication (e.g., illness narratives, psychiatric interviews, medical conferencing, medical specialty encounters). Most articles that deal with the written aspect of medical discourse focus on the medical scientific 'research article' considered both from a generic, diachronic and a synchronic perspective. Some of these articles also analyze the socio-historical construction of medical discourse and the evolution of the socio-pragmatic phenomenon of hedging.

Psycholinguistics is concerned with understanding mental processes, so psycholinguists are interested in how linguistic units are processed and represented internally. The psycholinguistics section reviews the field since it emerged as a distinct discipline in the 1950s and reviews the major research topics over the last 50 years – sentence processing, speech production, speech recognition, discourse processing, reading, visual word recognition, dialogue, and gesture – and the research methods used, from experimental to computational modeling of language processes.

Language acquisition surveys the timetable of language development from infancy to adulthood, dealing with infant sensitivity to linguistic form, and the development of phonology, words, morphology, grammar, pragmatic, and metalinguistic skills. Other articles covers the topics of bilingual development, the acquisition of sign language, and some atypical developments. The articles deal with relevant theoretical issues, relating them to other sections.

The **Brain and language** section covers current developments in research on the brain and language processing. It includes accounts of studies of language disorders and language impairments from speech motor processes to narrative and discourse impairments and their remediation. It is also concerned with the effect on language of specific neurological diseases such as schizophrenia, Williams' syndrome, autism, Asperger's syndrome, etc. And it describes recent developments in neuropsychology, psychiatry, neurology, and neurosurgery insofar as they affect language and current models of language processing.

Cognitive science assumes the human mind to be a computational device containing representations and seeks to develop cognitive models of language processing. It draws on concepts from artificial intelligence and computer science, linguistics, psychology, philosophy, the neurosciences, and anthropology.

The section on **computational linguistics and natural language processing** reflects the fact that the past 10 years has seen the explosive growth of the World Wide Web, electronic mail, Internet publishing, and the cellular phone used for fun, business, and academic enquiry. This mass connectivity has greatly increased the demand for software tools and appliances for processing unstructured and semi-structured natural language text, and has led to a consequential growth in information accessories. Web browsers, search engines, and personal digital assistants have become ubiquitous and commonplace, and new modes of behavior have developed around such everyday activities as purchasing goods, accessing entertainment, and conducting business. There have also been considerable developments in the field of machine translation. This has led to developments in language technology and has been facilitated by two technical breakthroughs. The first is conceptual, and represents a new emphasis upon empirical approaches to language processing that rely more heavily upon corpus statistics than linguistic theory (often referred to as corpus linguistics). The second is computational, and consists of more powerful, networked machines that are capable of processing millions of documents and performing the billions of calculations that the statistical profiling of large corpora requires. This section discusses these new application areas and some recent advances.

While the previous section is largely concerned with the manipulation of text, the **speech technology** section is concerned with the computational processing and generation of speech. It thus focuses on issues concerned with the computer understanding of speech, such as speaker recognition, the computer generation of speech, and applications surrounding these.

Translation is another rapidly expanding academic field of study, which now includes a substantial body of theoretical writing. This draws on insights from a variety of related disciplines: philosophy, linguistics, literary studies and criticism, stylistics, sociology, anthropology, psychology, and computational linguistics, and, increasingly, it feeds insights back into those other disciplines. There are a number of different approaches to translation, including linguistic approaches, philosophical approaches, cultural/gender-oriented approaches, the relevance theoretic approach, Skopos theory, functional approaches, and the so-called descriptive approach, each of which adopts a particular point of view of the areas referred to above. In addition, there are well-established translation theoretic notions such as translational equivalence, translation purpose, translation functions, the unit of translation, and, of course, the concept of translation itself. There is also an increasingly finely defined field of interpreting studies, aspects of which hold particular relevance for a work dedicated to linguistics. This field also covers sign language interpreting.

The section on **sign languages** shows the central place language has in human culture since it demonstrates that in any human social group the emergence of language is inevitable, and if the auditory channel is not available, language materializes in the manual-visual modality instead. Although transmitted in a radically different physical modality, natural sign languages share key linguistic properties with spoken languages, for example, the existence of both a meaningless 'phonological' level and a meaningful morpho-syntactic level of structure, derivational and inflectional morphology, and syntactic recursion. Sign languages are acquired by children without instruction and according to the same timetable as spoken languages, and they are also controlled primarily by the left hemisphere of the brain. Yet modality does matter, and comparing languages in each modality allows us to isolate the effect of the physical medium on the content, structure, and organization of natural language, be it spoken or signed. In the online version there are illustrations of signing.

Linguistic theory needs constant refreshment from language data, and it would be surprising if an encyclopedia on languages and linguistics did not pay major attention to the **languages of the world.** There are, of course, abundant language data in the articles themselves, but in addition, the languages of the world section presents a set of 400 articles on specific languages or language families. The 15th (2005) edition of *Ethnologue* identifies 7299 languages. Given this large number, the encyclopedia can clearly present only a sample. We have tried to include articles on languages from all the major language families. Each language article gives a brief description of the language and its speakers, plus any known or hypothesized genetic relationships, and highlights interesting phonological, semantic, or syntactic features. In the online version many of the articles are accompanied by video or audio files.

There is an alphabetical list of these languages in the subject classification, and appended to the article 'Classification of Languages' is a taxonomy of all the languages distributed into their 'families.' The article itself explains the basis of the classification. There are articles on a number of languages now no longer spoken and numerous articles on endangered languages. The language articles are all cross-referenced to the relevant article in the countries and languages section that describes the language situation in the country where the language is spoken. Through this cross-referencing, readers are referred to a map showing the geographical distribution of the particular language.

The section **countries and languages** contains a set of articles outlining the language situation in most of the countries of the world. The aim is to provide up-to-date information about the languages spoken in the country, about numbers of speakers for each language, how these languages are used in society and communication, and about social, cultural, or political aspects that are of interest for both general and specialist linguistic audiences. This information comes from public sources, such as censuses or education statistics, from the specialist literature, or from personal experience in the country. Where possible we have found authors with first-hand knowledge of the countries concerned, and in these cases the articles are signed. For a few countries and territories this has not proved to be possible, and for those we have been fortunate to be able to rely on a small 'editorial team': Lutz Marten (SOAS); Boban Arsenijević (University of Leiden), Mark de Vos (University of Leiden), Nancy Kula (University of Leiden), Anikó Lipták (University of Leiden), Anna McCormack (SOAS), and Laura Mutti (SOAS). These articles are unsigned. Many of the articles in this section are associated with multimedia annexes in the online version of ELL2.

Ethnologue has kindly permitted us to reprint their **language maps.** These are collected in the last volume. Articles in the countries and languages section are associated with one or more of these maps. Individual languages are cross-referenced to countries and thence to the relevant language map.

All the languages mentioned in the articles in the countries and languages section together with the languages noted in the current edition of *Ethnologue* are collected into a **list of languages**. This list records the name of a language, alternative names, a brief summary of its genetic affiliation, a list of the country or countries where it is spoken, and the number of speakers. The identification of a 'tongue' as a distinct language is a well-known difficulty; naming languages is another. Both issues are explored in the article 'Ethnologue.' In ELL2 we have decided to standardize on Ethnologue names to achieve consistency across the encyclopedia since there is no other source of information about languages that is as comprehensive. In the list of languages, Ethnologue names are used as headwords. In language articles, languages appear under the name preferred by the author, and typically where this differs from the Ethnologue name there is also a 'dummy entry' under the Ethnologue name cross-referring to the entry under the non-Ethnologue name. This is because even though a particular author may prefer not to use an Ethnologue name, there will be other scholars who do use Ethnologue names (and indeed there could be other articles in the encyclopedia that use them), so both names need to be included in the encyclopedia somewhere. In the list of languages, languages are also identified by the three-letter language identifiers of the Draft International Standard codes of ISO/DIS 639–3, identifiers that are also used in Ethnologue.

Lexicography is a discipline with a long history in most cultures. Typically, it aims at breadth of coverage rather than depth. Depth is achieved in the related discipline of lexicology, through detailed studies of key elements in the lexicon. The aim of lexicography is the systematic collection and explication of 'all' the words of a language (more strictly speaking, all the lexical items of a language, including idioms, multi-word expressions, and bound morphemes, as well as individual words). This encyclopedia contains articles on the history, current state of the art, and available lexicographic resources of the world's major languages, complementing the corresponding articles on individual languages and language situations. In the past two decades, the practice of lexicography has been transformed by the evidence of usage that is now to be found in large electronic corpora, so that the traditional historical-cultural focus of lexicography is beginning to be matched by empirically well-founded accounts of the dynamic nature of the lexicon and the relationship between word meaning and word use. This section also contains articles on some key aspects of onomastics.

Writing systems traces the history of writing and writing systems throughout the world's languages. It traces the development of writing in Mesopotamia, the Aegean, and Asia and the development of Chinese, Japanese, and Korean scripts and of Mesoamerican writing systems. The section also has a set of articles on general issues to do with notation of various kinds and on the mechanics and aesthetics of writing.

Applied linguistics is an interdisciplinary area that attempts to describe, explain, and work out solutions to social issues and problems related to real-world language problems, the more prominent among them associated with language learning and teaching. In this context it has long been interested in theoretical issues and also in the practicalities surrounding learning and teaching. The section contains a set of regional studies of these issues around the world. This develops into a concern for a wide range of issues relating to language and language use in general: bi- and multilingualism, language contact, language policy and planning, and the professional and occupational use and misuse of language. In recent years, research in applied linguistics has also interested itself in general issues in the nature and psychology of second language acquisition and the contribution this can make to linguistic theory in general. Applied linguistics also contributes to research in corpus linguistics, lexicography, literacy, sociolinguistics, and teacher preparation.

The starting point of **educational linguistics** is always the practice of education, and the focus is squarely on the role of language in learning and teaching. Educational linguistics has been characterized as 'transdisciplinary' in that it brings together aspects of linguistics with the research tools and methodologies of other social sciences, most often anthropology, psychology, and sociology, to investigate the totality of issues related to language acquisition, language use, and sociolinguistic context in formal and informal education. This section explores these issues and particularly the different approaches to language in education developed in Britain, Australia, and America.

The field of **sociolinguistics** is a broad one that focuses on the use of language in its social contexts. These contexts may be physical, or at least, institutional, as in the study of domain-related registers or styles of language; interactional, as in the study of the dialogic nature of speech; or social, pertaining to characteristics of individuals or groups along the lines of gender, class, ethnicity, age, etc. A central concern of the field is how language varies according to these contexts. But some studies also focus on how language itself forms part of the social context, emphasizing that language is not just reflective or characteristic of certain contexts, but may help shape, sustain, and reproduce those contexts. Other concerns of this field include the cultural dimensions of language and issues pertaining to individual and social identity; many of these issues are also discussed, from another angle, in the pragmatics section.

The **variation and language** section is concerned with variation within speech communities with shared linguistic systems as they are affected by social norms of use and interpretation and by social attitudes toward language. Dialect variation has long been the subject of academic exploration, joined in recent years by studies of the effects on language use of age, sex and gender, ethnicity, and other variables. The relevance of such studies for social science has long been clear, and there is an increasing appreciation of the relevance of such variationist studies for linguistic theory more generally. A number of the articles focus on methods for studying variation, and we hope these will be useful practical guides for readers undertaking their own research. The section also includes a set of articles on variation in different language communities.

Linguistic anthropology is the study of language in culture, and of linguistic practices as part of culture. The field of linguistic anthropology takes linguistic practices to be culturally significant actions that constitute social life. Indeed, the situated use of language is the exemplary case of how culture, as a meaning-making process, constructs and shapes the social world. That world is invariably saturated with contrasting values and contested interests, with opposed political positions and identities, with variable access to resources and power. Linguistic anthropology examines the role of discursive interaction – and the semiotic processes on which it relies – in

making and mediating those differences. Aspects of context enter into this process through the linguistic form itself, as it signals presuppositions and projections that are called into play during discursive interaction. Presuppositions can draw on any cultural realm: categories of contrasting selves and identities, notions of truth, space, time, cosmological order, nature, morality. Such notions are invariably linked to culturally specific conceptions about language itself. These are metadiscourses about language and its role in social life and thus relate to advances made in the study of discourse and pragmatics-related areas.

During the 19th century the dominant mode of study of languages was **historical and comparative,** and the ELL2 section both expounds the historical bases of the discipline and outlines new directions in thinking about the subject. Central to the discipline is, of course, the notion of language change, and there are articles on both the traditional approach to such matters and more recent developments in thinking about phonological, morphological, and syntactic change. The reconstruction of previous stages in the development of languages forms part of the discipline's basic methodology, and the section includes articles on a variety of proposed proto-languages.

There are few societies in which there has been no speculation about the nature and origin of language. The section on schools and traditions in the **history of linguistics** section testifies to this. This section includes articles on the major traditions of linguistic enquiry worldwide, including those of Babylon, China, India, Japan, Greece, and Rome, as well as accounts of linguistic thought and practice from the Middle Ages up to the 20th century.

The history of linguistics is closely tied to the lives of individual scholars, and for this reason ELL2, like ELL1 before it, has a substantial section of 700 **biographies.** These cover lives from the times of the earliest records and from all parts of the world. In this area, the selection of names is far from easy, and the issue is particularly difficult where it concerns living linguists. We have tried to be adequately representative and have taken particular care to record the contribution to linguistic scholarship of women linguists. Many of the biographies are accompanied by a portrait, especially in the online version.

The **glossary** is intended as a quick reference point for terminology met within the body of the encyclopedia.

The articles are arranged in alphabetical order. All are signed except for a few in the countries and languages section that were compiled by the editorial team as explained above. In order to assist those who wish to pursue a particular subject beyond the individual article, all but the very shortest articles have a **bibliography** that carries bibliographical details of all works referred to in the article itself and, where this is relevant, items for further reading. In preparing these bibliographies, authors have been asked to give preference to works that are reasonably accessible, to books rather than to articles, and in general to publications in European languages, particularly English, the language of the encyclopedia. Where relevant, the bibliography also lists URLs of pertinent websites. All but the shortest articles contain **cross-references,** usually at the end of article, to other articles in the encyclopedia. In the last volume there is a **subject classification**, which groups articles together according to their subject matter, and a general **subject index.**

ELL2 owes a special debt of gratitude to Diane Cogan (Publishing Director, Social Sciences), Chris Pringle (Publisher, Social Sciences) and Sarah Oates (Publishing Editor, Language and Linguistics), who conceived the idea of a new edition of the encyclopedia and drove the project through the initial stages of getting Elsevier approval. Bob Donaldson (Developmental Manager), Mark Sheehan (Local Application Manager), and other members of the Social Sciences editorial team contributed to the 2004 planning meeting, which Jo Gartside (Secretary, Social Sciences) organized the great efficiency. As the project grew, Natalia Kennedy (Developmental Editor) and her team were responsible for the complexities of contracting authors and managing the inflow of manuscripts; Stacey Penny (Senior Production Project Manager) and her team were responsible for seeing articles into proof and subsequently into the final form of the encyclopedia; Ann-Helen Lindeholm (Senior Marketing Manager) has been in charge of publicity; and there are many others in the Elsevier Major Reference Works team whose professional skills have been invaluable.

Keith Brown

PUBLISHING HISTORY

The first edition of the *Encyclopedia of Language and Linguistics,* edited by Ron Asher, was published by Elsevier under the Pergamon imprint in 1993. It received universally enthusiastic reviews and has been without question the outstanding reference work in its field for over a decade.

Choice, 1994

The editors intend their work simply to be the most authoritative, up-to-date, comprehensive, international reference source in the field. There can be little doubt of its having achieved that goal. It owes its authority to its distinguished editorial boards and the 1,000 specialists who contributed articles . . . .

Wilson Library Bulletin, 1994

This does exactly what a specialized encyclopedia should . . . Readable, comprehensive, and current, The Encyclopedia of Language and Linguistics will be the field's standard reference for a generation.

Journal of Linguistics, 1994

This is now the definitive and indispensable scholarly reference publication, on all branches of linguistics . . . .

Journal of Pragmatics, 1994

. . . an ambitious and much-needed work, surpassing in its extent as well as in quality all previous encyclopedias . . . makes its treatment of language and linguistics complete par excellence, and interdisciplinary to an extent which has never been achieved before.

Diachronica, 1994

. . . the coverage of the field is impressive, especially if compared to similar recent encyclopedic works of so-called "state-of-the-art" surveys of linguistic science.

Excerpta Medica, 1995

. . . the most comprehensive and ambitious work of its kind ever produced . . . .

Computational Linguistics, 1994

Since it arrived, it has been used as an oracle whenever a linguistic question arose that I couldn't answer from my own knowledge . . . . Everyone who is a linguist of any flavor at all should have a copy of this encyclopedia . . . .

Times Literary Supplement, 1995

> The want of a proper encyclopedia of language studies has been felt for many years. It need be felt no longer. The lacuna has now been filled by these ten volumes from Pergamon Press, and – it must be said straight away – filled more solidly and satisfactorily than one had any right to expect. Every serious university library should have a copy, or else its students have a reasonable case for saying that the librarian and library committee ought to be sacked en masse.

Pergamon Press, in the form of its subsidiary, Aberdeen University Press, began discussions about the encyclopedia in the mid-1980s under the directorship of Colin MacLean. Ron Asher was called upon for his expertise in the discipline; he shared Pergamon's view of the importance of extensive coverage of both the core areas of linguistics and their relationships with other disciplines. The fundamental, and ambitious, aim was to be as interdisciplinary as possible. This approach, as the reviews attest, is what has truly set the encyclopedia apart from its competitors over the years.

In 1988, under the chairmanship of Ron Asher, a three-day meeting of 30 specialists took place in Jersey. As a result of this meeting, both the Honorary Editorial Advisory Board and the Executive Editorial Board were created. Seumas Simpson assumed the role of Coordinating Editor. The Executive Editorial Board was composed of 34 experts in their field who each took responsibility for a specific subject area. Their aim was to commission articles that could be understood by experts and non-experts alike, to ensure that the contributors were international (75 countries were represented by authors), and to ensure that there were no gaps in coverage. Ron Asher and Seumas Simpson dedicated themselves to the latter in particular, and with the input from the Honorary Editorial Board, under the chairmanship of Angus McIntosh, they created the most comprehensive reference work in its field.

The first edition continued to sell until its final copy was dispatched in 2004. Although the second edition builds on the foundations laid by the first as far as its intellectual approach is concerned, it is an entirely new work in terms of content and editorial direction. The second edition, under the editorship of Keith Brown, takes the fullest possible account of advances in the discipline in the past 10 years and allows new authors to bring additional insights to enhance the coverage the original articles gave to their topics. The second edition, though entirely new, is the intellectual successor to the first edition.

Sarah Louise Oates
Publishing Editor, Language & Linguistics
Elsevier

EDITOR-IN-CHIEF

Keith Brown, *University of Cambridge, UK*

Keith Brown, ELL2 Editor-in-Chief, read English at Cambridge, joined the British Council, and worked in Uganda. He then taught at the University College of Cape Coast in Ghana before moving to Edinburgh, where he took his Ph.D. in linguistics and subsequently taught in the Department of Linguistics. In 1984 he moved to the University of Essex, where he was Research Professor in the Department of Linguistics, and then to the University of Cambridge, where he was Senior Research Fellow in the Research Centre for English and Applied Linguistics. He is now an Associate Lecturer in the Faculty of English at Cambridge. He has held visiting professorships at the Universities of Heidelberg, Vienna, and Düsseldorf. From 1990 to 1994 he was President of the Linguistics Association of Great Britain, and he has been a member of Council of the Philological Society since 1998. He is Chairman of the Linguistics Committee of the Subject Centre for Languages, Linguistics and Area Studies. He is co-editor of *Transactions of the Philological Society* and sits on other editorial boards. He is author of *Linguistics Today* (Fontana, 1984) and co-author, with Jim Miller, of *Syntax: A Linguistic Introduction to Sentence Structure* and *Syntax: Generative Grammar* (Hutchinson, 1981). He was syntax editor for the first edition of the *Encyclopedia of Language and Linguistics* and was joint editor, with Jim Miller of *A Concise Encyclopedia of Linguistic Theories* and *A Concise Encyclopedia of Grammatical Categories* (Pergamon Press, 1997 and 1998). He was joint editor of *Common Denominators in Art and* Science (Aberdeen University Press, 1983) and *Language, Reasoning and Inference* (Academic Press, 1986).

COORDINATING EDITORS

Anne Anderson, *University of Glasgow, Scotland*

Professor Anne H. Anderson, M.A. Ph.D. O.B.E, is a psycholinguist interested in communication, notably in dialogue and the impacts of new communication technologies on communication. Her research over several years has investigated how people communicate in dialogue and how communication systems do or do not replicate the advantages of face-to-face interactions. She has held many research grants on communication and the impacts of communication technologies and has published widely in the scientific literature with over 45 major scientific publications on human communication.

Professor Anderson was a principal investigator in the Human Communication Research Centre funded from 1990 to 2000 by ESRC. She has held a chair in psychology since 1997 at the University of Glasgow. The department was awarded the highest grade, a 5*, in the recent Research Assessment Exercise. From 1995 to 2000 she was director of the ESRC Cognitive Engineering programme, an initiative that funded projects across the UK on topics concerned with people and information technology. In 2000 she was appointed director of the People at the Centre of Information and Communication Technologies (PACCIT) programme, which is funded by ESRC, EPSRC, and the DTI and seeks to build research collaborations between universities and industry. She is also a section editor for Psycholinguistics.

Laurie Bauer, *Victoria University of Wellington, New Zealand*

Laurie Bauer was born in the north of England, attended Edinburgh University, from where he got a Ph.D. in 1975, and since then has worked in Odense, Denmark, and Wellington, New Zealand. He holds a personal chair in linguistics at Victoria University of Wellington. He has published widely in the fields of morphology and international varieties of English (particularly New Zealand English), and has also published in the fields of phonetics, language change, and dialectology. His most recent books are *Morphological Productivity* (CUP, 2001) and *An Introduction to International Varieties of English* (Edinburgh UP, 2002); a second edition of his *Introducing Linguistic Morphology* is currently in press. He is on the editorial boards of *Linguistics*, the *Yearbook of Morphology*, and *English World-Wide*, as well as the editorial boards for three book series. He was the subject editor for Morphology in the first edition of the encyclopedia and is also a section editor for Morphology.

Margie Berns, *Purdue University, USA*

Margie Berns is a Professor of English Language and Linguistics and Director of the Program in English as a Second Language at Purdue University (Indiana, USA). Her areas of specialization are English in the global context, language policy and planning, and second language studies. Among her publications on these and related topics are *Contexts of Competence: Social and Cultural Considerations in Communicative Language Teaching* (Plenum, 1990), *Initiatives in Communicative Language Teaching* (Addison Wesley, 1984), and

Initiatives in Communicative Language Teaching II (Addison Wesley, 1987). Articles and reviews have appeared in *TESOL Quarterly, World Englishes, International Journal of Applied Linguistics*, and *English Today.* A member of the International Association for World Englishes (IAWE), International TESOL, and the American Association for Applied Linguistics (AAAL), she has served in such capacities as IAWE Conference and Program Chair, and AAAL President, Conference and Program Chair, and Member-at-Large. She is also a section editor for Applied Linguistics.

Keith Brown, *University of Cambridge, UK*

Keith Brown, ELL2 Editor-in-Chief, read English at Cambridge, joined the British Council, and worked in Uganda. He then taught at the University College of Cape Coast in Ghana before moving to Edinburgh, where he took his Ph.D. in linguistics and subsequently taught in the Department of Linguistics. In 1984 he moved to the University of Essex, where he was Research Professor in the Department of Linguistics, and then to the University of Cambridge, where he was Senior Research Fellow in the Research Centre for English and Applied Linguistics. He is now an Associate Lecturer in the Faculty of English at Cambridge. He has held visiting professorships at the Universities of Heidelberg, Vienna, and Düsseldorf. From 1990 to 1994 he was President of the Linguistics Association of Great Britain, and he has been a member of Council of the Philological Society since 1998. He is Chairman of the Linguistics Committee of the Subject Centre for Languages, Linguistics and Area Studies. He is co-editor of *Transactions of the Philological Society* and sits on other editorial boards. He is author of *Linguistics Today* (Fontana, 1984) and co-author, with Jim Miller, of *Syntax: A Linguistic Introduction to Sentence Structure* and *Syntax: Generative Grammar* (Hutchinson, 1981). He was syntax editor for the first edition of the *Encyclopedia of Language and Linguistics* and was joint editor, with Jim Miller of *A Concise Encyclopedia of Linguistic Theories* and *A Concise Encyclopedia of Grammatical Categories* (Pergamon Press, 1997 and 1998). He was joint editor of *Common Denominators in Art and* Science (Aberdeen University Press, 1983) and *Language, Reasoning and Inference* (Academic Press, 1986).

Jim Miller, *University of Auckland, New Zealand*

Jim Miller is Professor of Cognitive Linguistics in the University of Auckland. Before going to Auckland he was Professor of Linguistics and Spoken Language in the Department of Theoretical and Applied Linguistics in the University of Edinburgh. He graduated from the University of Edinburgh in 1965 with a degree in Russian with French, and his first and abiding research interests are aspect, case and transitivity, and Russian. A large part of his first 20 years in linguistics was devoted to the study of various models of generative grammar. In the late 1970s he and Keith Brown carried out an investigation into the syntax of Scottish English. This work led him to investigate the syntax and discourse organization of spontaneous spoken language (Russian and French as well as English) and to the relationship between spoken and written language, literacy, language and education, language and politics and language, and identity. Regina Weinert and he published *Spontaneous Spoken Language* in 1998. He is currently working on speaking, writing, and language acquisition and on spoken language, non-standard language, and typology.

Graeme Hirst, *University of Toronto, Canada*

Graeme Hirst (Ph.D., Brown University, 1983) is a Professor of Computer Science at the University of Toronto, specializing in computational linguistics and natural language processing. Hirst's research has covered a broad but integrated range of topics in computational linguistics, natural language understanding, and related areas of cognitive science. These include the resolution of ambiguity in language understanding; the preservation of author's style in machine translation; recovering from misunderstanding and non-understanding in human–computer communication; and linguistic constraints on knowledge-representation systems. His present research includes the problem of near-synonymy in lexical choice in language generation; computer assistance for collaborative writing; and applications of semantic distance in intelligent spelling checkers. From 1994 to 1997, Hirst was a member of the Waterloo-Toronto HealthDoc project, which aimed to build intelligent systems for the creation and customization of health-care documents. Hirst is a member of the editorial boards of *Machine Translation* and *Computational Linguistics,* and has been book review editor of the latter since

1985. He is the author of two monographs: *Anaphora in Natural Language Understanding* (Springer-Verlag, 1981) and *Semantic Interpretation and the Resolution of Ambiguity* (Cambridge University Press, 1987). He is the recipient of two awards for excellence in teaching. He has supervised post-graduate students in more than 35 theses and dissertations, four of which have been published as books. He is also a section editor for Natural Language Processing and Machine Translation.

SECTION EDITORS

Animal Communication – Marc Naguib, *University of Bielefeld, Germany*

Marc Naguib is Associate Professor at the University of Bielefeld, Germany. He received his Ph.D. in 1995 at the University of North Carolina at Chapel Hill. His research addresses mechanistic and functional questions in animal communication, focusing on vocal communication in song birds, with interests ranging from song development to the evolution of signal structures and signaling strategies. He has published numerous research articles on auditory distance perception of song birds under natural field conditions, categorization of signals, and strategies of vocal interactions in dyadic interactions and communication networks. He is Associate Editor for *Advances in the Study of Behaviour* and on the Editorial Board of *Animal Behaviour.*

Applied Linguistics – Margie Berns, *Purdue University, USA*

Margie Berns is a Professor of English Language and Linguistics and Director of the Program in English as a Second Language at Purdue University (Indiana, USA). Her areas of specialization are English in the global context, language policy and planning, and second language studies. Among her publications on these and related topics are *Contexts of Competence: Social and Cultural Considerations in Communicative Language Teaching* (Plenum, 1990), *Initiatives in Communicative Language Teaching* (Addison Wesley, 1984), and *Initiatives in Communicative Language Teaching II* (Addison Wesley, 1987). Articles and reviews have appeared in *TESOL Quarterly, World Englishes, International Journal of Applied Linguistics*, and *English Today.* A member of the International Association for World Englishes (IAWE), International TESOL, and the American Association for Applied Linguistics (AAAL), she has served in such capacities as IAWE Conference and Program Chair, and AAAL President, Conference and Program Chair, and Member-at-Large. She is also a section editor for Applied Linguistics.

Biographies – Kurt R Jankowsky, *Georgetown University, USA*

Kurt R. Jankowsky is Professor of German at Georgetown University, Washington, DC. He obtained an M.A. (*Staatsexamen*) in German and English, and a Dr.Phil. in German, English, and philosophy from the University of Münster. For four years he taught German language and linguistics at Poona University, India before joining Georgetown. His principal research interest is the field of Germanic linguistics, specifically the numerous dimensions of the history of language, which resulted in eight book publications and approximately 100 journal articles. He has also taught and published on semantic theory, e.g., the interrelation of language and thought, and mentored numerous M.S. theses and about 20 Ph.D. theses that specialized on various linguistic aspects. His hobbies include teaching linguistic summer courses in Tokyo and participating in international conferences, so far on five continents.

He was recently appointed Honorary President of the English Philological Society of Japan, Tokyo, and elected Fellow of the RSA, London.

Brain and Language – Harry Whitaker, *Northern Michigan University, USA*

Harry Whitaker is Professor and Head of the Department of Psychology, Northern Michigan University. His Ph.D. in linguistics (University of California at Los Angeles) was directed by the late Prof. Victoria A. Fromkin. In 1974 he founded *Brain and Language* (Elsevier) and continues as Editor; in 1982 he founded *Brain and Cognition* (Elsevier), for which he functioned as Editor through 2002. Included in books he has authored or edited are *On the Representation of Language in the Human Brain* (Linguistic Research, 1971), *Studies in Neurolinguistics,* Volumes 1–4 (Academic Press, 1976–1979), *Dyslexia: A Global Issue*. (with R. N. Malatesha; Martinus Nijhoff, 1984), *Neuropsychological Studies of Non-focal Brain Damage: Dementia and Trauma* (Springer-Verlag, 1988), *Phonological Processes and Brain Mechanisms* (Springer-Verlag, 1988), *Contemporary Reviews in Neuropsychology* (Springer-Verlag, 1988), *Agrammatism* (Singular Press, 1997), and *Handbook of Neurolinguistics* (with B. Stemmer; Academic Press, 1988). His current editorial board appointments include *Neuropsychiatry, Neuropsychology and Behavioral Neurology: A Journal of Clinical Neuroscience*, *Psychologie et Histoire*, *Journal of the History of the Neurosciences*, and *Brain and Cognition*. He is a Fellow of the American Psychological Association and past President of the International Society for the History of the Neurosciences.

Cognitive Science – Jon Oberlander, *University of Edinburgh, Scotland*

Jon Oberlander is Reader in Cognitive Science at the University of Edinburgh and Director of the Informatics Graduate School at Edinburgh. He studied philosophy at Cambridge and cognitive science at Edinburgh. His research lies at the intersection of computational linguistics and cognitive science, and covers both automatic discourse generation and diagrammatic reasoning and communication. He has a particular interest in individual differences in communicative strategies and technologies for catering for them.

Computational Linguistics – Allan Ramsay, *University of Manchester, UK*

Allan Ramsay is a Professor in the School of Informatics in the University of Manchester where he works on developing systems that can understand natural language. Such systems have a wide range of applications, from machine translation through information extraction to computer-based tools for language learners. His current research covers development of grammars for a range of languages (currently English, French, German, Spanish, Greek, Arabic, and Persian). This work is underpinned by a novel approach to the problems raised by 'free word order' languages. It also covers application of theorem proving techniques for higher-order logics in order to extract the information that is implicit in what someone actually says or writes. This involves the development of appropriate inference techniques, since higher-order logic is extremely difficult to work with, and of appropriate meaning representations.

Countries and Language – Lutz Marten, *School of Oriental and African Studies, University of London, UK*

Lutz Marten studied English language, philosophy, African studies, and linguistics in Hamburg and London. He received his Ph.D. in linguistics in 1999 from the School of Oriental and African Studies, University of London, where he is now a lecturer in Southern African Languages.

His main research interests are linguistic theory (syntax, semantics, pragmatics, formal models of interpretation), African languages and linguistics, and language and society. He has conducted fieldwork in East, Central, and Southern Africa, working on Swahili, Luguru, Bemba, Herero, and other Bantu languages. He is involved in the Dynamic Syntax project and is working together with Ruth Kempson (King's College London) on an AHRB-funded project on pronominal reference and agreement in Bantu and Romance languages.

His publications include *At the Syntax-Pragmatics Interface: Verbal Underspecification and Concept Formation in Dynamic Syntax* (2002, OUP), *A Grammatical Sketch of Herero* (with Wilhelm Möhlig and Jekura Kavari, 2002, Köppe), *Colloquial Swahili* (with Donovan McGrath, 2003, Routledge), and *The Dynamics of*

Language (with Ronnie Cann and Ruth Kempson, 2005, Elsevier). He is a member of the editorial board of the *Journal of African Languages and Linguistics*, and he is the Honorary Secretary of the Philological Society. His homepage, with more information, can be found at http://mercury. soas.ac.uk/users/lm5.

Education and Language – Bernard Spolsky, *Bar-Ilan University, Israel*

Bernard Spolsky is Professor Emeritus in the English Department at Bar-Ilan University and Senior Associate at the National Foreign Language Center at the University of Maryland. Educated in New Zealand and with a Ph.D. from Université de Montréal, he taught at the Hebrew University of Jerusalem, McGill University, Indiana University, and the University of New Mexico (where he was Professor of Linguistics, Anthropology and Elementary Education and Dean of the Graduate School) before his appointment at Bar-Ilan in 1980, where he also served as Dean of Humanities and Director of the Language Policy Research Center.

His research has been in applied and educational linguistics (including language testing), sociolinguistics, and language policy. He was a founding co-editor of *Applied Linguistics* and is Editor-in-Chief of *Language Policy.* His books include *Conditions for Second Language Learning* (Oxford University Press, 1989), *The Languages of Jerusalem* (Clarendon, 1991, with Robert Cooper), *Measured Words: The Development of Objective Language Testing* (Oxford University Press, 1995), *Sociolinguistics* (Oxford University Press, 1998), *The Languages of Israel* (Multilingual Matters, 1999, with Elana Shohamy), *Concise Encyclopedia of Educational Linguistics* (Pergamon, 1999), and *Language Policy* (Cambridge University Press, in press). He is currently preparing a compendium of national language policies.

Foundations of Linguistics – Billy Clark, *Middlesex University, UK*

Billy Clark is Programme Leader and Senior Lecturer in Communication and English Language Studies at Middlesex University. He studied English language and literature at Aberdeen and has a Ph.D. in linguistics from University College London. His research interests are in semantics, pragmatics, particularly relevance theory, philosophy of language, and stylistics. He is also a member of several groups interested in linguistics in education.

Glossary Editors – Philip Durkin, *Oxford English Dictionary, UK*

Philip Durkin studied the history of the English language and medieval literature at the University of Oxford, completing a doctorate on late Middle English prose texts and their manuscript contexts in 1994. In the same year he joined the staff of the Oxford English Dictionary. He is now Principal Etymologist at the OED, leading a team of specialist editors revising the existing etymologies in the dictionary and also preparing etymologies for newly added words. He speaks and publishes widely on etymology and historical lexicography, and has since 2000 been a member of the council of the Philological Society.

Glossary Editors – Kathryn L. Allan, *University of Salford, UK*

Kathryn L. Allan is a Lecturer in English Language at the University of Salford in Greater Manchester; previously she has lectured in the Universities of Oxford and Glasgow and worked on projects including the *Historical Thesaurus of English*, the *Scottish Corpus of Texts and Speech* and the *Middle English Grammar Project*. Her research is in the field of lexical semantics; specifically she is interested in cognitive theories of metaphor and in the interface between cognitive theories of language and traditional strands of language study.

Grammatical Semantics – Östen Dahl, *Stockholm University, Sweden*

Östen Dahl received his Ph.D. in Slavic languages from the University of Göteborg, Sweden, where he then taught linguistics for about 10 years. Since 1980, he has been Professor of General Linguistics at Stockholm University. His early work focused on logically based approaches to grammar. Later on, his research was mainly typologically oriented with a strong interest in diachronic approaches to grammar. A focal area has been tense and aspect: in 1985, he published the monograph *Tense and Aspect Systems* (Blackwell), and he was coordinator of the Tense and Aspect group within the EUROTYP project, resulting in the edited volume *Tense and*

Aspect in the Languages of Europe (Mouton de Gruyter) in 2000. Together with Maria Koptjevskaja Tamm, he edited *The Circum-Baltic Languages: Typology and Contact* (2 volumes, Benjamins, 2002). He is a member of the Editorial Board of *Linguistics* and a consulting editor of several other journals. He is a co-author of the CUP textbook *Logic in Linguistics* and has also written textbooks in Swedish. Together with Pieter Seuren, he edited the Semantics section in ELL1.

Historical and Comparative Linguistics – Mark Hale, *Concordia University, Canada*

Mark Hale is Associate Professor at Concordia University. His research interests are diachronic linguistic methodology, with special reference to its relationship to theoretical work in phonology and syntax, Indo-European linguistics, and Austronesian (especially Oceanic) linguistics. He received his B.A. from the University of Michigan in 1976, his M.A. from Indiana University in 1980, and his Ph.D. from Harvard University in 1987. Some representative publications are "Neogrammarian Sound Change," in the *Handbook of Historical Linguistics* (Blackwell); "Marshallese Phonology, the Phonetics–Phonology Interface, and Historical Linguistics," in *Linguistic Review*; and "Diachronic Syntax," in *Syntax*.

History of Linguistics – Andrew Linn, *University of Sheffield, UK*

Andrew Linn is Professor of the History of Linguistics and Head of the Department of English Language and Linguistics at the University of Sheffield. He was educated at the University of Cambridge, where he studied English and linguistics and wrote his Ph.D. thesis on 19th-century grammar-writing and the codification of Norwegian Landsmaal. This research resulted in his 1997 book, *Constructing the Grammars of a Language: Ivar Aasen and Nineteenth-Century Norwegian Linguistics*; other books include *Standardization: Studies from the Germanic Languages* (with Nicola McLelland, 2002, Benjamins) and *Johan Storm – dhi grétest pràktikal liNgwist in dhi werld* (2004, Blackwell).

In 2006 he will be editor of *Transactions of the Philological Society*; he is former editor of the *Bulletin of the Henry Sweet Society*. He is one of the founders of the Worldwide Universities Network history of linguistics consortium. While he has published widely on topics in the history of English and Scandinavian linguistics, and on issues of historiographical theory and practice, his current principal research interests concern language reform and language policy.

Language Acquisition – Elena Lieven, *Max Planck Institute for Evolutionary Anthropology, Germany*

Elena Lieven is a Senior Scientist at the Max Planck Institute for Evolutionary Anthropology in Leipzig and a Professor in the Department of Psychology at the University of Manchester, where she is Director of the Max Planck Child Study Centre. She is Editor of the *Journal of Child Language*. Her doctoral training was at the University of Cambridge, where she also taught for four years before moving to the University of Manchester in 1979. She took up the position in Leipzig in 1998. Her research is on children's language development and, in particular, the development of grammar. Within this, she has worked on strategies for constructing multiword utterances; the relationship between these strategies and cross-linguistic variation; variations in the input that children receive and how this relates to language development; and the increasing abstraction of children's linguistic representations. She has published widely in a range of journals and edited volumes.

Languages of the World – Sarah Ogilvie, *Oxford University Press, UK*

Sarah Ogilvie is an Editor at the Oxford English Dictionary, specializing in words that have come into English from world languages (outside Europe). She is a descriptive linguist, did her graduate work at the Australian National University, and has conducted fieldwork in the Umagico Aboriginal Community. She has written a grammar and dictionary of the Morrobalama language of Cape York Peninsula, Australia, and her other publications include articles on language description, sociolinguistics, lexicography, and World English.

Law and Language – Dennis Kurzon, *University of Haifa, Israel*

Dennis Kurzon, Associate Professor in English Linguistics at the University of Haifa (Israel), attained his B.A. in Slavonic studies from Sheffield University (UK), his M.A. in linguistics from Manchester University (UK), and his Ph.D. in English linguistics from the Hebrew University of Jerusalem. He has carried out extensive research into the field of legal language, especially in pragmatics of the law and language, publishing two books on different areas: *It is Hereby Performed: Explorations in Legal Speech Acts* (1986) and *A Tale of Two Remedies: Equity, Verb Aspect and the Whorfian Hypothesis* (1998), as well as many articles. He has also examined the meaning of silence, including the meaning of a suspect's silence during police investigation in *Discourse of Silence* (1997), as well as several articles.

He has published, too, in the fields of discourse analysis, and prepositions, co-editing the book *Prepositions in their Syntactic, Semantic and Pragmatic Context* (2002). He has recently entered the field of Indian sociolinguistics, and his book *Where East Looks West: Success in English in Goa and on the Konkan Coast* was published in 2003. He is now examining the historical and sociological background to the use of scripts in India, especially in Bengal.

Law and Language – John Gibbons, *Hong Kong Baptist University, Hong Kong*

Professor John Gibbons teaches in the English Department at Hong Kong Baptist University. He has wide and varied experienced of language and law issues, including working with the New South Wales Police on their language procedures. He has worked as an expert witness in more than 30 cases. He has published widely in the field of language in the law, including *Language and the Law* (Longman, 1994), *Forensic Linguistics: An Introduction to Language in the Justice System* (Blackwell 'Language in Society' series, 2003) and, as Chief Editor, with H. Nagarajan, V. Prakasam and K. V. Thirumalesh, *Language in the Law* (Orient Longman, 2004). His most recent book (with E. Ramirez) is *Maintaining a Minority Language: A Case Study of Hispanic Teenagers* (Multilingual Matters, 2004).

He is on the editorial board of the journals *Forensic Linguistics, Journal of Multilingual and Multicultural Development,* and the *International Journal of Applied Linguistics*. He is President of the International Association of Forensic Linguists.

Lexicography – Patrick Hanks, *Berlin-Brandenburgische Akademie der Wissenschaften, Germany*

Patrick Hanks was Chief Editor of Current English Dictionaries at Oxford University Press from 1990 to 2000. Before that he was Chief Editor of Collins English Dictionaries and a Research Fellow at Birmingham University, where he was the Managing Editor for the Cobuild project. His work on computational analysis of the lexicon is well known, and he has been a visiting scientist at AT&T Bell Laboratories, Digital Equipment Corporation (Systems Research Center), the University of Sheffield, the Masaryk University in Brno, and other institutions.

He is currently working on a computational lexicology research project ("Corpus Pattern Analysis") at Brandeis University in Waltham, MA. He is also a consultant to the German Language Collocations Research Project (Electronic Dictionary of the German Language) at the Berlin-Brandenburg Academy of Sciences and to other European dictionary publishers. He has written widely on the English lexicon, also on names and naming. His latest publication is a *Dictionary of American Family Names* (Oxford University Press, New York, 2003).

Linguistic Anthropology – Michael Silverstein, *University of Chicago, USA*

Michael Silverstein (Ph.D., linguistics, Harvard, 1972) is the Charles F. Grey Distinguished Service Professor in the Departments of Anthropology, Linguistics, and Psychology, and in the Committee on Interdisciplinary Studies in the Humanities at the University of Chicago, where he has been on the faculty since 1971. He studies

language structure and function, language history and prehistory, the anthropology of language use, sociolinguistics, semiotics, language and cognition (and their development), and history of linguistics and anthropology as intellectual enterprises. His fieldwork in northwestern North America and northwestern Australia has been the basis of various descriptive, theoretical, and generalizing contributions. Professor Silverstein is also investigating language use and textuality as sites of contestation and transformation of cultural values in contemporary American society, rereading social and rhetorical theory in light of the anthropology of communication. From this last line of research, he has published a popular book, *Talking Politics: The Substance of Style from Abe to "W."* (Prickly Paradigm Press, 2003).

Media and Language – Susan McKay, *University of Queensland, Australia*

Susan McKay has taught in the School of English, Media Studies and Art History (formerly the Department of English) at the University of Queensland since 1989. She is co-author (with Lloyd Davis) of *Structures and Strategies: An Introduction to Academic Writing* (1996), and has published papers on a range of media representations. She holds a degree in pharmacy (as well as a B.A. and Ph.D. in English) and has used this health background, together with her academic interest in language in the media, in much of her recent research. She has worked on media representations of health issues (including breast cancer and aging). In 2001–2002, she was part of a task force formed by the International Association of Language and Social Psychology to review aspects of research into language and communication in adolescence. She is currently investigating the discursive frameworks used in the media for men's health issues.

Medicine and Language – Françoise Salager-Meyer, *Universidad de los Andes, Merida, Venezuela*

Françoise Salager-Meyer was born in France, attended the University of Lyon, from where she got a M.A. in Russian language and literature, and later attended the University of Texas at Austin (USA), from where she got a Ph.D. in 1977. Since then, she has worked at the University of the Andes (Mérida, Venezuela) and at several Spanish universities as a visiting scholar. She has published widely in the field of scientific (mainly medical) discourse analysis, with over 60 major scientific publications. She is on the editorial boards of *English for Specific Purposes: An International Journal, The Journal of Research in Reading, Reading in a Foreign Language, The ESPecialist,* and other major journals in the field. She created the Research Group on Scientific Discourse Analysis, which she is currently coordinating.

Morphology – Laurie Bauer, *Victoria University of Wellington, New Zealand*

Laurie Bauer was born in the north of England, attended Edinburgh University, from where he got a Ph.D. in 1975, and since then has worked in Odense, Denmark, and Wellington, New Zealand. He holds a personal chair in linguistics at Victoria University of Wellington. He has published widely in the fields of morphology and international varieties of English (particularly New Zealand English), and has also published in the fields of phonetics, language change, and dialectology. His most recent books are *Morphological Productivity* (CUP, 2001) and *An Introduction to International Varieties of English* (Edinburgh UP, 2002); a second edition of his *Introducing Linguistic Morphology* is currently in press. He is on the editorial boards of *Linguistics*, the *Yearbook of Morphology*, and *English World-Wide*, as well as the editorial boards for three book series. He was the subject editor for Morphology in the first edition of the encyclopedia and is also a section editor for Morphology.

Natural Language Processing & Machine Translation – Graeme Hirst, *University of Toronto, Canada*

Graeme Hirst (Ph.D., Brown University, 1983) is a Professor of Computer Science at the University of Toronto, specializing in computational linguistics and natural language processing. Hirst's research has covered a broad but integrated range of topics in computational linguistics, natural language understanding, and related areas of

cognitive science. These include the resolution of ambiguity in language understanding; the preservation of author's style in machine translation; recovering from misunderstanding and non-understanding in human–computer communication; and linguistic constraints on knowledge-representation systems. His present research includes the problem of near-synonymy in lexical choice in language generation; computer assistance for collaborative writing; and applications of semantic distance in intelligent spelling checkers. From 1994 to 1997, Hirst was a member of the Waterloo-Toronto HealthDoc project, which aimed to build intelligent systems for the creation and customization of health-care documents. Hirst is a member of the editorial boards of *Machine Translation* and *Computational Linguistics,* and has been book review editor of the latter since 1985. He is the author of two monographs: *Anaphora in Natural Language Understanding* (Springer-Verlag, 1981) and *Semantic Interpretation and the Resolution of Ambiguity* (Cambridge University Press, 1987). He is the recipient of two awards for excellence in teaching. He has supervised post-graduate students in more than 35 theses and dissertations, four of which have been published as books. He is also a section editor for Natural Language Processing and Machine Translation.

Philosophy and Language – Robert J. Stainton, *University of Western Ontario, Canada*

Dr. Robert J. Stainton began his study of language and linguistics in the 1980s as an undergraduate at Toronto's York University, working under Prof. Michael Gregory in the systemic functional tradition. His doctoral training was at the Department of Linguistics and Philosophy at MIT, where he pursued course work in both domains and wrote a 1993 dissertation, *Non-Sentential Assertion*, that straddled the boundary between generative linguistics and philosophy of language. Stainton has authored or co-authored about 35 major journal articles and two books: *Philosophical Perspectives on Language* (Broadview, 1996) and *Knowledge and Mind* (MIT, 2000). His previous editorial work includes edited volumes from Blackwell, Broadview, Editions du GREF, Kluwer, University of Calgary Press, and Westview. He also currently serves as Philosophy of Language and Mind Editor for *The Canadian Journal of Philosophy.* At present, he is Canada Research Chair in Cognitive Science at Carleton University, in Ottawa, Canada.

Philosophy and Language – Alex Barber, *The Open University, UK*

Dr. Alex Barber has been interested in philosophical aspects of language and linguistics since his undergraduate studies. His doctoral thesis at McGill University dealt with some ramifications for philosophy of the shift toward cognitivism in linguistics, specifically the implications for received notions of knowledge in epistemology. His research has continued to focus on topics thrown up along the fault lines running between epistemology, philosophy of language, and philosophy of mind. He has contributed numerous articles in major philosophy journals and edited *Epistemology of Language* (Oxford, 2003). He has held teaching posts at the University of Bristol and the University of Sheffield, and is currently based in the Philosophy Department of The Open University.

Phonetics – John Esling, *University of Victoria, Canada*

John H. Esling is Professor of Linguistics at the University of Victoria, former Secretary of the International Phonetic Association (1995–2003), member of the IPA Council and of the Permanent Council for the Organization of ICPhS, and currently Editor of the *Journal of the International Phonetic Association*. He has a Ph.D. in phonetics from the University of Edinburgh, where he studied with David Abercrombie, John Laver, and James (Tony) Anthony, and he taught at the University of Leeds before moving to the University of Victoria in British Columbia, Canada, in 1981. His research is in auditory and articulatory phonetics, particularly the categorization of voice quality, vocal register, and the phonetic production of laryngeal and pharyngeal sounds.

He is director of the Phonetics Laboratory at the University of Victoria, the Laryngoscopic Phonetic Research Project, and the Infant Speech Acquisition Project, an international collaboration based in Victoria and funded by the Social Sciences and Humanities Research Council of Canada, with research teams

in Canada, France, Morocco, and China, to establish how infants first acquire the modality of phonetic production. He is the author of the *University of Victoria Phonetic Database* and an editor of the *Handbook of the IPA*.

Phonology – Richard Wiese, *University of Marburg, Germany*

Richard Wiese is a Professor of Linguistics in the Department of German Linguistics, Philipps-Universität Marburg, Germany. Before that, he held posts at a number of German universities, including those of Düsseldorf, Stuttgart, Kassel, Berlin, and Leipzig. His early work is on psycholinguistics (including his doctoral dissertation, *Psycholinguistische Aspekte der Sprachproduktion,* Buske 1983), while his more recent work focuses on theoretical phonology and morphology and on the description of German and Chinese (*Silbische und Lexikalische Phonologie. Studien zum Chinesischen und Deutschen,* Niemeyer, 1988; *Phonology of German,* OUP, 1996/2000; *Phonology and Morphology of the Germanic Languages,* Niemeyer, 1998, edited with Wolfgang Kehrein). He also conducts research on morphology and the mental lexicon and serves as co-editor of the book series *Linguistische Arbeiten* (Niemeyer).

Politics and Language – Ruth Wodak, *University of Lancaster, UK*

Ruth Wodak is Professor of Discourse Studies at Lancaster University since January 2004 (personal chair). She has just moved from Vienna, Austria, where she had been Full Professor of Applied Linguistics since 1991. She still commutes to Vienna to supervise her Ph.D. students there nearly every month. She has also stayed director of the Centre "Discourse-Politics-Identity," located at the University of Vienna (see http://www.univie.ac.at/discourse-politics-identity for research projects located there) and co-director of the Austrian National Focal Point (NFP) of the European Monitoring Centre for Racism, Xenophobia and Anti-Semitism (see http://www.eumc.eu.int for more information on the work of the EUMC and the NFPs).

Besides various other prizes, she was awarded the Wittgenstein Price for Elite Researchers in 1996, which made six years of continuous interdisciplinary team research possible. Her research is mainly centered on critical discourse analysis (CDA). Together with her colleagues and Ph.D. students in Vienna, she elaborated the "Discourse-Historical Approach in CDA," which is interdisciplinary and problem-oriented, and analyzes the change of discursive practices over time and in various genres. Her research agenda focuses on the development of theoretical approaches in discourse studies (combining ethnography, argumentation theory, and rhetoric and functional systemic linguistics); gender studies; language and/in politics; and prejudice and discrimination. Most recently, she started investigating debate forums in the Internet, such as http://www.europa.eu.int.

She is member of the editorial board of a range of linguistic journals, co-editor of the journal *Discourse and Society,* and editor of *Critical Discourse Studies* (together with Norman Fairclough, Phil Graham, and Jay Lemke) and of the *Journal of Language and Politics* (together with Paul Chilton). Together with Paul Chilton, UEA, Norwich, she edits the book series DAPSAC (Benjamins). She is also section editor of Language and Politics for the second edition of the *Encyclopedia of Language and Linguistics*.

She has held visiting professorships in Uppsala, Stanford University, University of Minnesota, and Georgetown University, Washington, D.C. In spring 2004, she was awarded a Leverhulme Visiting Professorship at the University of East Anglia, Norwich, UK.

Her current research projects include EMEDIATE (EU-funded project, STREP programme, starting in October 2004), XENOPHOB (EU-funded project), and "The Construction of European Identities – The Debates at the European Convention" (funded by the Austrian National Bank) (for more information on the research projects see http://www.univie.ac.at/ discourse-politics-identity/projects).

Pragmatics – Jacob L. Mey, *University of Southern Denmark, Denmark*

Jacob L. Mey is Professor Emeritus of Linguistics at the University of Southern Denmark. Previous appointments include the University of Oslo, Norway, the University of Texas at Austin, Georgetown University, Washington, D.C., Yale University, New Haven, Conn., Tsukuba University, Japan, Northwestern University, Evanston, Ill., City University of Hong Kong, Goethe University, Frankfurt am Main, Universidade Estadual de

Campinas, S.P., Brazil, Universidade de Brasília, Brasília, DF, the University of Haifa and Haifa Technion, Israel, as well as numerous other institutions of research and higher learning.

Mey's research interests concern all areas of pragmatics, with an emphasis on the social aspects of language use, the pragmatic impact of computer technologies, and the pragmatic use of literary devices. Among his publications in these areas are *Pragmalinguistics: Theory and Practice* (The Hague: Mouton, 1979); *Whose Language? A Study in Linguistic Pragmatics* (Amsterdam and Philadelphia: Benjamins 1985), *Pragmatics: An Introduction* (Oxford and Boston: Blackwell, 1993; second revised edition, 2001). This book has been translated into Japanese and Korean; a Chinese translation is about to appear (2002). His most recent publication is *As Vozes da Sociedade* (The Voices of Society; in Portuguese; Campinas, S.P.: Mercado de Letras 2002).

As to the computer-related aspects of pragmatics, a recent development is a new field, cognitive technology (CT), which he is among the first to have developed; he has written and edited numerous articles and books in the area, co-organized several international conferences, and founded (together with Barbara Gorayska) the *International Journal of Cognition and Technology* (Amsterdam: Benjamins; 2002). Among Mey's other main interests are the theory of literature and poetics. These interests have recently culminated (following many earlier articles) in his book: *When Voices Clash: A Study in Literary Pragmatics* (Berlin: Mouton de Gruyter, 2000).

Mey is Founder (with Hartmut Haberland) and Chief Editor of the monthly *Journal of Pragmatics* (Oxford: Elsevier Science). He also edits *RASK: International Journal of Languages and Linguistics* for Odense University Press, and co-edits (with Barbara Gorayska) the new *International Journal of Cognition and Technology* (Amsterdam and Philadelphia: Benjamins, from 2002). Among his other edited volumes are two readers on *Cognitive Technology* (1996, 1999), and the 1100-page *Concise Encyclopedia of Pragmatics* (1998), all published by Elsevier Science.

Mey holds an honorary Dr.Phil. degree from the University of Zaragoza, Spain. He is a member of various professional organizations, such as the Linguistic Society of America, the Copenhagen Linguistic Circle, and the International Pragmatics Association (of which he is a member of the Consultative Board). He is Editor or Member of the Advisory Board of a number of series and journals, such *as Pragmatics and Beyond* (Amsterdam), *Anthropological Linguistics* (Berlin), *Discourse and Society*; *Text*; *Language and Literature* (Liverpool); *Miscelánea* (Zaragoza); *Psyke og Logos* (Copenhagen); *Sémantique et Pragmatique* (Orléans), *Cadernos de Linguagem e Sociedade* (Brasília); and others. In 1998, he was elected to the office of Vice-President of the newly founded Society for Cognitive Technology.

Psycholinguistics – Anne Anderson, *University of Glasgow, Scotland*

Professor Anne H. Anderson, M.A. Ph.D. O.B.E, is a psycholinguist interested in communication, notably in dialogue and the impacts of new communication technologies on communication. Her research over several years has investigated how people communicate in dialogue and how communication systems do or do not replicate the advantages of face-to-face interactions. She has held many research grants on communication and the impacts of communication technologies and has published widely in the scientific literature with over 45 major scientific publications on human communication.

Professor Anderson was a principal investigator in the Human Communication Research Centre funded from 1990 to 2000 by ESRC. She has held a chair in psychology since 1997 at the University of Glasgow. The department was awarded the highest grade, a 5*, in the recent Research Assessment Exercise. From 1995 to 2000 she was director of the ESRC Cognitive Engineering programme, an initiative that funded projects across the UK on topics concerned with people and information technology. In 2000 she was appointed director of the People at the Centre of Information and Communication Technologies (PACCIT) programme, which is funded by ESRC, EPSRC, and the DTI and seeks to build research collaborations between universities and industry. She is also a section editor for Psycholinguistics.

Religion and Language – Erik Fudge, *University of Reading, UK*

Erik Fudge was Professor of Linguistics at the University of Hull, and is now Professor Emeritus of Linguistic Science at the University of Reading. After 30 years as a Lay Reader in the Church of England, he was ordained

priest in 1994. His first degree was in mathematics and modern and medieval languages at the University of Cambridge. After teaching in schools for 3 years, he took up research in linguistics at Cambridge, spending some time as Assistant Director of the Linguistics Research Project, Indiana University. He lectured in phonology at the University of Edinburgh (1965–19–68), and in phonetics and phonology at the University of Cambridge (1968–19–74), before taking up Chairs at Hull (1974–19–88) and Reading (1988–19–99). He was Editor of the *Journal of Linguistics* (1979–19–84), and was Section Editor for Phonology for the first edition of the Pergamon *Encyclopedia of Language and Linguistics*.

Semantics (Logical and Lexical) – Keith Allan, *Monash University, Australia*

Keith Allan, MLitt, Ph.D. (Edinburgh), FAHA, is Reader in Linguistics at Monash University. His research interests focus mainly on aspects of meaning in language, with a secondary interest in the history and philosophy of linguistics. Books include *Linguistic Meaning* (two volumes, Routledge and Kegan Paul, 1986), *Euphemism and Dysphemism: Language Used as Shield and Weapon* (with Kate Burridge, OUP, 1991), *Natural Language Semantics* (Blackwell, 2001). He is Semantics Editor for *International Encyclopaedia of Linguistics* (1994, second edition, 2003). His homepage with more information can be found at http://www.arts.monash.edu.au/ling/ka.html.

Semiotics – Marcel Danesi, *University of Toronto, Canada*

Marcel Danesi is Full Professor of Semiotics and Linguistic Anthropology at the University of Toronto. He is also cross-appointed as Professor of Communication Sciences at the University of Lugano. His research interests include semiotic theory, youth language, and mathematical puzzles. His most recent books in these three areas, respectively, are *Understanding Media Semiotics* (London: Arnold, 2003), *Forever Young: The "Teen-Aging" of Modern Culture* (Toronto: University of Toronto Press, 2003), and *The Puzzle Instinct: The Meaning of Puzzles in Human Life* (Bloomington: Indiana University Press, 2003). He is editor of the "Signs and Semaphores" book series with St. Martin's Press, and co-editor of the "Toronto Studies in Semiotics and Communications" Series with University of Toronto Press.

Sign Language – Bencie Woll, *University College London, UK*

Professor Bencie Woll came to the Department of Language and Communication Science at City University in 1995 to take up the newly created Chair in Sign Language and Deaf Studies, the first chair in this field in the UK. Professor Woll pioneered deaf studies as an academic discipline; her research and teaching interests embrace a wide range of topics related to sign language, including the linguistics of British Sign Language (BSL) and other sign languages, the history and sociolinguistics of BSL and the Deaf community, the development of BSL in young children, and sign language and the brain. She is the co-author of *The Linguistics of BSL: an Introduction* (CUP), the winner of the 1999 Deaf Nation Award and 2000 BAAL Book Prize.

Society and Language – Raj Mesthrie, *University of Cape Town, South Africa*

Rajend Mesthrie is Professor of Linguistics at the University of Cape Town. His work is on sociolinguistics generally, with a main focus on language contact and variation, with special reference to South Africa. He is currently the President of the Linguistics Society of Southern Africa. He has a long association with the Pergamon encyclopedia, having contributed seven articles to the first edition and having visited Ron Asher and Seamus Simpson in Edinburgh during its gestation. He edited the spinoff volume *Concise Encyclopedia of Sociolinguistics* (2001).

Among his recent publications are *Introducing Sociolinguistics*'(Edinburgh University Press, 2000, with J. Swann, A. Deumert, and W. Leap) and *Language in South Africa* (Cambridge University Press, 2002), of which he was editor.

Speech Technology – Jennifer Lai, *IBM Research, USA*

Jennifer Lai is a Senior Researcher in the Pervasive Computing Department at the IBM T.J. Watson Research Center in New York. Her expertise is in the design of human–computer interfaces, specializing in the use of speech recognition and synthesis technologies. Her research has covered a broad range of topics related to speech technologies and their integration into applications. These include the perception of synthetic speech; productivity applications for mobile workers; smart spaces; and multimodal interaction on pervasive computing platforms, as well as awareness servers; however, she is probably best known for her work defining design principles for effective conversational systems.

Lai has been a guest lecturer at MIT, Michigan University, and Pace University, and is a National Science Foundation panellist. She is a member of the Editorial Board for the *International Journal of Speech Technology*, the author of two book chapters, *Speech User Interface Evolution* (Kluwer, 1999), *Conversational Speech Interfaces* (LEA, 2002), and is widely published in the areas of speech interface design, perception of synthetic speech, and language model creation. She also holds seven patents related to interface design and has participated in numerous conferences as a program committee member, keynote speaker, session chairman, and panellist.

Spoken Discourse – Rosanna Sornicola, *Università di Napoli Federico II, Italy*

Rosanna Sornicola is Professor of General Linguistics at the Department of Modern Philology of the University of Naples Federico II, where she is also the Director of the European Master's Degree in Linguistics. She graduated in linguistics and modern philology at the University of Naples in 1975. She was Visiting Fellow at Wolfson College (Cambridge) in 1983 and 1987, Visiting Researcher at the Department of Linguistics of the University of California at Berkeley (1985), and Visiting Researcher at the Department of Italian of the University of California at Los Angeles (1988). She is a member of Wolfson College of the University of Cambridge. She was Visiting Professor at the Universities of California at Los Angeles (1990), Manchester (1990), Girona (1996), and Gand (1999), and has lectured in many other European Universities. She is a member of the scientific board of the reviews *Cahiers de linguistique romane*, *Lingue e Linguaggi*, *Revue de linguistique romane*, and is co-editor of the journal *Bollettino Linguistico Campano*. She has been a member of the Executive Committee of the International Society for Historical Linguistics and the Scientific Bureau of the Societé Internationale de linguistique et philologie romanes, and since 1999 has served as President of the Società di Linguistica Italiana.

Her research interests concern phonetic, phonology, syntax and pragmatics of spoken language, the relationship between spoken and written discourse, Italian and Romance sociolinguistics and dialectology, synchronic and diachronic typology, and history of linguistics (especially the history of European functionalism). Her publications include the following books: *La competenza multipla* (Napoli, Liguori, 1977), *Sul parlato* (Bologna, Il Mulino, 1981), *Il campo di tensione. La sintassi della Scuola di Praga* (co-editor with Aleš Svoboda, Napoli, Liguori, 1992), *The Virtues of Language. History in Language, Text and Literature* (co-editor with Dieter Stein, Amsterdam, Benjamins, 1998), *Stability, Variation and Change of Word Order Patterns over Time* (editor with Erich Poppe and Ariel Shisha Ha-Levy, Amsterdam, Benjamins, 2000), *Langue écrite, langue parlée dans le passé et dans le present* (co-editor with Rika van Deyck and Johannes Kabatek, Tübingen, Narr, forthcoming). She is also author of many articles published in books and journals.

Syntax – James P. Blevins, *University of Cambridge, UK*

James Blevins received his Ph.D. in linguistics from the University of Massachusetts, Amherst in 1990. After working on natural language processing at the Microelectronics and Computer Technology Corporation in Austin, he taught in the Linguistics Programme and coordinated the Cognitive Science Programme at the University of Western Australia, before moving to the Research Centre for English and Applied Linguistics in the University of Cambridge.

He has held visiting positions at the Universities of California, Texas, and Alberta, and is on the editorial board of *Languages in Contrast*. His main research interests fall within the domain of syntax and morphosyntax.

Recent publications in the area of syntax and syntactic theory include 'Markedness and agreement' (*Transactions of the Philological Society*, 98, 2000), 'Nontransformational grammar' (*The Linguistics Encyclopedia*, K. Malmkjaer, ed., Routledge, 2002), 'Passives and impersonals' (*Journal of Linguistics* 39, 2003), 'Feature-based grammar' (*Non-transformational syntax*, R. D. Borsley and K. Borjars, eds., Blackwell, 2003), and 'Remarks on gerunds' (*Morphology and the Web of GRAMMAR: Essays in memory of Steven G. Lapointe*, O. Orgun and P. Sells, eds., CSLI, 2003).

Text Analysis and Stylistics – Catherine Emmott, *University of Glasgow, Scotland*

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Typology and Universals – Bernd Heine, *University of Cologne, Germany*

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Variation and Language – Miriam Meyerhoff, *University of Edinburgh, Scotland*

Miriam Meyerhoff teaches sociolinguistics at the University of Edinburgh, Scotland. She is interested in different aspects of language variation and change and has conducted research on structural change in creole languages in the Pacific (Vanuatu and Hawai'i) and the Caribbean (Bequia). She has also worked on changes taking place in New Zealand English, and has investigated the role variation plays in understanding the social construction of gender. She is the author of *Constraints on Null Subjects in Bislama (Vanuatu)* (2000) and co-editor of *The Handbook of Language and Gender* (2003).

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Peter T. Daniels is one of the world's few scholars specializing exclusively in the study of writing systems. With degrees in linguistics from Cornell University and the University of Chicago, he has taught at the University of Wisconsin–Milwaukee and Chicago State University and has presented invited lectures on three continents. His

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NOTES ON THE SUBJECT INDEX

The following abbreviations have been used:

F0 – fundamental frequency

IPA – International Phonetics Alphabet

L2 – second language

PIE – Proto Indo-European language

NOTES ON THE GLOSSARY

The glossary is based on the glossary from the first edition of the *Encyclopedia of Language and Linguistics*. It has been revised throughout, and has benefited greatly from input from a number of the Section Editors and other contributors to the encyclopedia.

Small capitals refer to fields or subfields in the main encyclopedia. Terms in bold type refer to other entries within the glossary.

NOTES ON THE LIST OF LANGUAGES

Data in this list are reproduced with permission from the 15th edition (2004) of *Ethnologue: Languages of the World* (Dallas: SIL International), edited by Raymond G. Gordon Jr.

Please note: All the data in this list of languages are reproduced from Ethnologue data. In some cases there may be differences between this data and the information presented in articles: in particular, the names and alternative names of languages and dialects; the identification and classification of dialects; the estimates of the number of speakers of a particular language or dialect. These discrepancies are due to the uncertain state of knowledge about many of these matters and to conflicts between information sources themselves. Readers who find gross discrepancies should check both the Ethnologue references and the references in the various articles in the Encyclopedia.

The entries are set out in three lines:

Line 1: the name of the language (in bold); followed by the three letter ISO language identifier enclosed by square brackets, followed by alternative names for the language, if there are any.
Line 2: the genetic affiliation of the language.
Line 3: the total number of speakers; followed by the countries where the language is spoken and the number of speakers in each country.

Thus:

Abaza [abq]: Abazin, Abazintsy, Ahuwa, Ashuwa, Tapanta.
North Caucasian, West Caucasian, Abkhaz-Abazin.
44,895: Russia 34,800; Turkey 10,000.

Abkhaz [abk]: Abxazo.
North Caucasian, West Caucasian, Abkhaz-Abazin.
105,952: Georgia 101,000; Turkey 4,000 [ethnic population: 39,000].

The list contains 7,299 **language names** as head words. There are three or four times that many alternative language names: those listed are derived from Ethnologue and may or may not correspond to alternative language names used in the various articles in the encyclopedia. The identification of a "tongue" as a distinct language is a well-known difficulty, and naming languages is another. The Ethnologue approach to these issues is explored in the article "Ethnologue" in the encyclopedia. In ELL2 we have decided to standardize on Ethnologue names to achieve consistency across the encyclopedia since there is no other source of information about languages that is as comprehensive. In the list of languages, Ethnologue names are used as headwords. However, in articles on particular languages and in the articles in the Countries and Languages section languages appear under the name preferred by the author, which may or may not be the Ethnologue name. Typically where this name differs from the Ethnologue name there is a "dummy entry" under the Ethnologue name cross-referring to the entry under the non-Ethnologue name.

The **ISO language identifier** codes are three-letter language identifiers that aim to provide identifiers for all known languages. They were first adopted as an American National Standard in 1987 and have been subject to revision since then. The codes used here are the most up-to-date. They are used in Ethnologue and are the Draft International Standard codes of ISO/DIS 639–3. The article "Ethnologue" contains further details.

The **genetic affiliation** shows the language family under which it is currently classified in Ethnologue from the most comprehensive, top-level grouping (North Caucasian in the examples above) down to the smallest (Abkhaz-Abazin in the examples). The genetic classifications identify 94 different top-level language families and in some cases have six or seven levels of grouping. It should be noted that the classification used in the articles in this encyclopedia, explained in the article "The Classification of Languages," is compatible with that used by Ethnologue, but is less fine grained.

It is not possible to give precise figures about the **number of speakers** of particular languages since the

data sources are not always reliable and may differ from each other. The speaker numbers in the list of languages are taken from Ethnologue, which also provides summaries of speakers in particular countries, the distribution of populations within language families, etc. Speaker numbers given in articles in the encyclopedia sometimes differ from those given in this list, depending on the source of the data. The annotation "Ethnic population" in the Abkhaz entry relates to the fact that whereas the estimated ethnic population of Abkazians is 39,000, the number of speakers is 106,000.

A list of articles in the encyclopedia dealing with individual languages can be found in the subject classification, as can a list of countries discussed in individual articles.

LANGUAGE MAPS

Appendix I: Language Maps

These language maps are reproduced with permission from the 15th Edition of *Ethnologue: Languages of the World* (Dallas: SIL International), edited by Raymond G. Gordon Jr.

There is a map associated with every article in the 'Countries and Languages' section – that is, with every article with a title in the format of 'Country name: Language Situation.' Every article in the 'Languages of the World' section is cross-referenced to the corresponding language situation article, and hence to the relevant language map. Thus, every language discussed in this encyclopedia is associated with a map.

A

A Priori Knowledge: Linguistic Aspects

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Immanuel Kant made two divisions between types of knowledge. He distinguished between the *a priori* and the *a posteriori* and also between analytic and synthetic judgments. *A posteriori* claims are the most simple to categorize: They include all empirical knowledge. Everything we learn about the world through our senses falls under this category. *A priori* knowledge is knowledge the ultimate justification of which is independent of experience. However, to call a piece of knowledge *a priori* is not to claim that the knowledge is literally prior to all experience (innate). For instance, mathematical knowledge is widely taken to be *a priori*. That is not to say that no experience is necessary to learn mathematical truths. When one claims that mathematics is *a priori,* this means that experience plays no role in the *justification* of a mathematical proposition. The justification and what led one to believe a proposition (the cause of the belief) need to be carefully distinguished. One may require paper and pencil to convince oneself that a certain mathematical proposition is provable. However, once proven, it is the proof and not the experience of the written proof that is the ultimate justification for the proposition.

A proposition is analytic according to Kant if it is true by virtue of meaning. For instance, the claim that all bachelors are unmarried is an analytic proposition because 'bachelor' just means unmarried man. For Kant and most of the analytic tradition in philosophy, all analytic truths are *a priori*. Because analytic claims are true in virtue of meaning, their justification is nonempirical.

Kant was of course familiar only with Aristotelian logic in which the only logical relation is that of containment between subject and predicate. He therefore equated the property of being true by virtue of meaning with being a logical truth in this sense. In the example above, for instance, it is true because the class of unmarried things includes the class of bachelors. A proposition is analytic according to Kant therefore if and only if the subject concept is contained in the predicate concept.

Whereas all analytic claims are trivial, a synthetic claim is any claim that genuinely extends knowledge. All empirical claims are of this sort, but Kant argued that there were also nontrivial *a priori* truths. Kant held that the class of synthetic *a priori* truths included both geometry and mathematics. Mathematics is synthetic because, for instance, 12 is nowhere contained in the concepts of 7, addition, and 5. Mathematics is also *a priori* because it does not depend for its justification on experience. To show that (Euclidean) geometry must be *a priori,* Kant provided an argument that he called the 'transcendental esthetic.' Here Kant argued that geometrical relations cannot be learned through experience, because to understand something as located in space, we must have already organized our sensations spatially. That is to say, if our minds did not organize sensations spatially, we could not learn anything concerning the structure of space though sensation. This faculty of ours to organize sensations into a single Euclidean space Kant called our form of spatial intuition. That it is our minds that organize experience into a three-dimensional Euclidean space allows Kant to claim that even though geometrical claims are synthetic, they are nonetheless *a priori*. The structure of space is not learned from experience; it is known through the pure intuition of space. Our pure intuition of space is what allows us to have nontrivial *a priori* knowledge in geometry. Kant also argued that we must have a pure intuition of time because if we did not organize our sensations temporally we could not learn of temporal relations through sensation. It is this pure temporal intuition that Kant believed allows us to have synthetic *a priori* knowledge in mathematics.

Kant thought he had established that the laws of Euclidean geometry were synthetic *a priori* truths about empirical space. Yet, even as Kant was writing the arguments just presented, work was being done on the development of non-Euclidean geometries. Later, Hermann von Helmholtz showed that it is possible to imagine a set of experiences that would

lead one to believe that space is non-Euclidean. By the end of the 19th century, the geometry of our space was considered an open question. In Bertrand Russell's fellowship thesis, he argued that which geometry applies to our space is an empirical question.

Henri Poincaré took issue with Russell's assertion that the geometry of our space is a straightforwardly empirical question. If, for instance, we construct a large triangle out of light rays and then measure the angles and find that they do not sum to 180 degrees, we cannot yet say that the geometry of space is non-Euclidean. This is because, as Poincaré stressed, we require the further assumption that light travels in a straight line. Poincaré argued that, to preserve the simplicity of Euclidean geometry, we are free to postulate that the path of the light rays is not a straight line. He believed that we are free to hold either that light travels in a straight line and space is non-Euclidean or that space is Euclidean and light does not travel in a straight line. Given this situation, it is incorrect to say that space has a certain geometry. The question of the geometry of space is as meaningful as the question of whether space ought to be measured in inches or centimeters. The various geometries are purely abstract theories that say nothing about empirical space until certain stipulations have been made concerning the types of things that are to count as straight lines.

In 1915, Albert Einstein produced his general theory of relativity. This theory, which asserts that the curvature of space depends on the distribution of matter, is well confirmed. Furthermore, there is no flat space-time theory that makes the same predictions as general relativity. Given this situation, we are no longer free, as Poincaré assumed, to retain Euclidean geometry, come what may. However, Poincaré's point that, without intervening assumptions, geometrical propositions say nothing about empirical space still holds. We need to specify that the straight lines through space-time are the paths of freely falling bodies. It now seems clear that what Kant took to be synthetic *a priori* truths about empirical space are actually false. Hence, Einstein's famous quote: "As far as the laws of mathematics refer to reality, they are not certain; and so far as they are certain, they do not refer to reality."

The reaction in the philosophical community – especially the logical positivists in the early 20th century – to the situation just described was to reject the synthetic *a priori*. All *a priori* truths were taken to be analytic. This was motivated not only by the considerations above but also by the development of modern logic that expanded the class of logical truths significantly. Such a statement as 'if there is someone who knows everyone, then every one is known by at least one person' can now be shown to be a logical truth, but it is certainly not a case of the subject being included in the predicate. Thus, the category of analytic *a priori* truths is expanded, and the class of synthetic *a priori* truths is eliminated entirely. The logical positivists also relativized the *a priori*. Any statement that we wish to hold as a matter of stipulation gains the status of an *a priori* truth. Definitions of theoretical terms or relations between theoretical terms can be taken to be *a priori*. If the theory that they are part of is modified or abandoned, they are no longer taken to be *a priori*. So, the class of *a priori* propositions is revised as we revise our theories.

According to the positivists, the model of scientific theories is as follows. Scientific theories are composed of a certain class of purely theoretical sentences that are taken to be analytic and *a priori*. Given that these claims are purely theoretical, they make no assertions about things that can actually be observed. This independence from anything observable explains their *a priori* status. These sentences are seen as true in virtue of meaning. However, there will also be a class of sentences that relate this theoretical vocabulary to things that can be observed. These are called 'correspondence rules.' These correspondence rules serve to give an empirical interpretation to the theoretical vocabulary.

This positivistic theory of theories came under heavy attack by W. V. O. Quine in the middle of the 20th century. In particular, Quine attacked the division of sentences into analytic and synthetic. For the positivists, given their rejection of the synthetic *a priori*, the rejection of the analytic/synthetic distinction amounts to a rejection of the *a priori/a posteriori* distinction as well. Quine thought that the difference between analytic and synthetic sentences is a matter of degree, rather than a difference in kind. His view was based on two observations. First, the distinction between observational and theoretical vocabulary is itself a difference of degree. Second, because we can reject highly theoretical sentences on the basis of making certain observations (if the theory as a whole is rejected), then it does not seem reasonable to claim that these sentences are independent of experience. For the positivists, such sentences as 'force equals mass times acceleration' function as a definition of force in Newtonian physics and are thus true in virtue of meaning, and hence, *a priori*. Yet, this claim, according to the positivists, says nothing about the world.

Quine stressed that individual sentences do not have identifiable content, but rather, it is theories as wholes that make assertions about the world. Thus, the definition of force, as part of Newtonian physics, does make an assertion about the world

(in this case, that the world is Newtonian). Quine's view that there are no analytic or *a priori* sentences was widely influential; however, there is now renewed interest in making the distinction between *a priori* and *a posteriori* assertions to better understand how scientific theories function.

Quine's attack on the analytic/synthetic distinction eventually faced empirical scrutiny. Linguists such as Noam Chomsky and Ray Jackendoff have shown that there are empirical reasons to hold that there is an analytic/synthetic distinction. Certain sentences seem to show analytic connections with one another. For instance, upon hearing the sentence 'Jane was convinced to leave' one will assume that Jane decided to leave. An analytic sentence is one whose truth is given by the existence of such a connection. Analytic sentences in this sense are true in virtue of meaning. They are also knowable independent of experience and thus *a priori*. However, that they are knowable independently of experience is not itself knowable *a priori* but known though empirical investigation of natural language. Kant imagined that we could identify *a priori* truths *a priori*. Here we have a case of *a priori* truths that are dicovered empirically. On this view *a priori* truths can have no foundational epistemological status.

It had been almost universally believed that all analytic claims were *a priori*. This position is shared by Kant and the positivists (the positivists went further in claiming that all *a priori* claims were analytic). However, on the basis of work by Saul Kripke and Hilary Putnam, a case can be made that certain claims are both analytic and *a posteriori*. That is, there are claims that are true in virtue of meaning, but are not knowable independently of experience. For instance, part of the meaning of the term 'water' is that it is composed of H_2O. So the sentence 'water is H_2O' is true in virtue of meaning, and thus analytic. However, this sentence is nonetheless a substantial claim about the world and certainly not knowable independently of experience, and thus it is *a posteriori*.

See also: Analytic Philosophy; Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; Logic and Language: Philosophical Aspects.

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His first major publications dealt with the history of Latin gerund and gerundive (1949) and Greek infinitive (1953). After the death of his teacher G. J. Ramstedt in 1950, Aalto edited Ramstedt's main work, a comparative grammar of the Altaic languages (1952–1966), and many of his unpublished papers. Aalto's own critical edition of the Mongolian version of the Buddhist text *Pañcarakṣā*, translated from Tibetan, appeared in 1961. Together with his student, the Latinist Tuomo Pekkanen, Aalto published an important collection (1975–1980) of Latin sources on the peoples of Northeast Asia, spanning from antiquity to the times of Charles the Great. Aalto wrote (1971–1987) the history of Oriental, classical, and modern language studies in Finland during the period of the Russian rule. A selection of the hundreds of articles and reviews written by Aalto was published in 1987.

Rieber R W (1965). 'Introduction.' In Amman J C (ed.) *A dissertation on Speech* [repr. of the English translation of 1873]. Amsterdam: North-Holland Publishing Company. v–ix.

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A-Morphous Morphology

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A-Morphous Morphology (Anderson, 1992) is a framework for the analysis of complex words (including inflection, derivation, compounding, and other types of word formation). It is a realizational framework in the sense that it sees morphology as establishing a many-to-many correspondence between aspects of a word's form and aspects of its content rather than as concatenating a series of purely local sound-meaning correspondences (morphemes). It is a lexicalist and postsyntactic view in that it maintains that the content and internal form of words are neither accessible to nor manipulated by principles of the syntax. The only interface between words and the syntax is an informationally minimal morphosyntactic representation, comparable in most respects to the complex symbols of Chomsky (1965).

The most distinctive aspect of this point of view is its rejection of the classical morpheme, traditionally the cornerstone of morphological analysis. Word structure is built up through modifications to a basic stem, including affixation as one among several formal possibilities. Once an affix is associated with a stem, however, the result is not presumed to have internal structure of a nonphonological sort. Some complex words (particularly compounds) generally **do** have such a structure, but the mere fact that a word's form is motivated in part by relations to other words does not in itself establish that.

Reasons to Reject the Classical Morpheme

The starting point of morphological analysis is what de Saussure referred to as the partially motivated sign, in which the relation between the form of a word and its (complex, analyzable) content can be decomposed into parts, some of which it shares with other words. Content here refers both to the lexical meaning of the word and to the morphosyntactic categories that influence its form. In sets of morphologically complex words, similarities of form correlate with similarities of meaning. For structuralist theory, these similarities inhere in structural units, morphemes, which have the character of Saussurean minimal signs. A morpheme is a "linguistic form which bears no partial phonetic-semantic resemblance to any other form" (Bloomfield, 1933: 161), or a "minimal same of form and meaning."

On that view, words are taken to be exhaustively analyzable into a sequence of such minimal signs or morphemes. Because the basis of the sign is the indissoluble unity of sound and meaning (and [morpho]-syntax), there should then be a one-to-one association between elements of form and elements of content. That is, every chunk of form ought to correspond to exactly one chunk of meaning, and vice versa. Only in unsystematic instances of accidental homophony or synonymy should we find exceptions to this.

In fact, however, the notion that the elemental building blocks of words can be discovered by looking for recurrent relations between form and meaning is falsified in both directions. One problem is the existence of phonæsthemes. In sets of words such as *glimmer, glitter, gleam, glow*, . . . ; *slide, slip, slither, slink, slippery*, . . . we find a shared aspect of meaning and a similarity of form, but (whatever the etymological source of such relations) speaker intuitions reject the notion that *glimmer*, for example, is composed of two elements, *gl-* and *-immer*, in the way *bookish* is composed of *book* and *-ish*. It will not do to say that only one of the parts here (presumably *gl-*) has a separable meaning because the same could be said for words such as *raspberry*, in which only the *-berry* part has a meaning apart from the combination but speakers do not hesitate to see the word as internally complex.

The other side of this coin is the existence of word-internal structure in which neither formal component of a complex word can be regarded as having distinct content. This is the case with sets of English verbs composed of a prefix and a stem (e.g., *deceive, receive, defer, refer*), neither of which makes a consistent contribution to the content of combinations including them (Aronoff, 1976).

Even ignoring such problems that arise when we attempt a parallel division of the form and content of

words, other difficulties appear within the domain of form itself. Consider a word such as English *amorphous* 'having no definite form', for which we can represent the relation between form and content roughly as follows (where a μ represents a morpheme, and an X represents a segmental position in phonological structure):

(1)

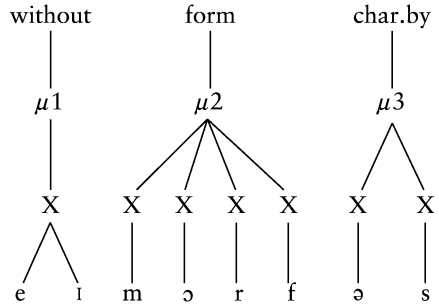

The classical hypothesis that words can be exhaustively decomposed into a linear concatenation of morphemes can be regarded as making several distinct claims about structures such as that in (1):

1. Each part of the content is linked to exactly one μ.
2. Every X is linked to exactly one μ.
3. Every μ is linked to at least one X and to some part of the content.
4. Lines do not cross.

Problems in the Relation between Form and Content

As has been well known at least since the discussion in Hockett (1947), these claims are falsified in the general case by phenomena that are quite uncontroversial. For instance, circumfixes (e.g., Indonesian *kebisaan* 'capability') present morphological units that are not continuous and for which the linking lines in a representation such as (1) would have to cross, violating claim 4. The same is true for infixes, for example, Sunda (Sundanese) *ɲaraian* 'to wet (pl.)', whose presence in a word renders the stem discontinuous.

Problems of a slightly different sort arise when some aspect of content is connected not with an entire segment (or sequence of segments) but only with a subset of the features of a segment (e.g., Irish Gaelic *asal* [asəl] 'donkey', *asail* [asəl'] 'donkey.GEN'; *bád* [ba:d] 'boat', *báid* [ba:d'] 'boats'). Here the required modification of the picture in (1) is straightforward, however, given modern notions of phonological structure.

A somewhat different problem is presented by the existence of empty morphs, or structural units with no content (thus violating claim 3), such as the underlined portions in English *crime/criminal*, *page/paginate*; or *sense/sensuous, habit/habitual/habituate*. Similar elements are found in Spanish *madre/madrecita* 'mother'/'mother DIM' (cf. *comadre/comadrita* 'god mother'/'god mother DIM') and Russian *slog* 'syllable', *slogovoj* 'syllabic' (cf. *odno-složnyj* 'monosyllabic'). In Menomini *ketōs* 'my canoe' the initial *ke* represents 'my' and *os* is 'canoe'; the *t* that separates them is a meaningless element that appears in possessive constructions with vowel-initial stems.

In some ways even more problematic is the case of superfluous morphs. In words such as *lengthen, strengthen*, or French *doucement* 'softly', the underlined element is one to which we can assign a sense (in English *-th* forms nouns from adjectives, and in French the medial schwa and associated consonant is the mark of the feminine), but that sense is inappropriate to these forms. *Strengthen* does not mean 'to make strength' but 'to make strong', and there is no role for the feminine agreement in the adverb *doucement*.

Just as words may contain elements of form with no (appropriate) content, there may be elements of content that correspond to no unit of form, again violating claim 3. In *The deer are running away*, we say that *deer* is a plural, but there is no overt representation of that. This is typically described by positing a zero morph to represent the plural here, analyzing the word's content as *deer* + PL and its form as /dir+0/. In general, however, there is no evidence for a structural element in such cases apart from the need to preserve parallelism between the analyses of meaning and form. The notion of a zero morph, then, is not a solution to this difficulty but merely a name for it.

The notion that components of meaning are related in a one-to-one fashion to elements of form (claims 1 and 2) is similarly falsified in both directions. Instances of cumulative morphs or multiple exponence (e.g., Chickasaw *hilhali* 'I'm dancing' vs. *akhi'lho* 'I'm not dancing', in which four distinct components of the second form all correspond to the single content element NEGATIVE) show that several quite distinct parts of a form can all be part of the realization of a single component of its meaning; whereas portmanteaux such as French *au* [o] (= *à le*) show that a single unitary and indecomposable element of form can correspond to more than one structurally significant aspect of its content.

In general, the relation between components of form and components of the meaning of a word is many-to-many rather than one-to-one and, in mathematical terms, not onto in either direction. The

many-to-many nature of this relation is illustrated in the analysis of the Icelandic verb *hafðir* 'you (sg.) had' in (2), where the relations between phonological form and components of content are indicated by lines.

(2)

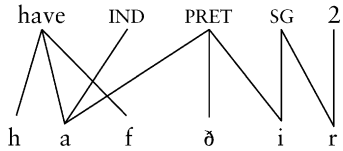

Problems in the Analysis of Morphological Form

In the traditional morpheme-based view of word structure, the relation between a base and a (complex) word derived from it consists exactly in the addition of one or more minimal sound-meaning complexes. As a result, sign composition within such a theory must always be strictly monotonic (additive, concatenative), on the model of (3), in terms both of sound and of meaning.

(3)

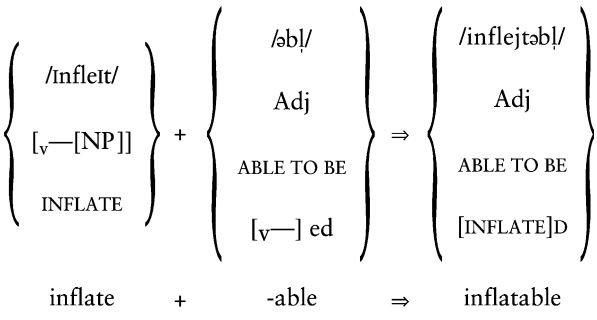

A *prima facie* problem for such a principle is the existence of numerous sorts of apophony (including umlaut, ablaut, and gradation), as illustrated in English sets such as *sing, sang, sung, song*; *dive, dove*; *(wo)man, (wo)men*; *sell/sale*; *blood/bleed, food/feed* and *believe/belief, prove/proof, speak/speech*; *bath/bathe, breath/breathe, glass/glaze* (provide with glass), *refuse* (noun)/*refuse* (verb). In all these types, some additional morphological content is signaled not by the addition of formal material to the base but rather by a (nonmonotonic) change in some vowel or consonant of the base. There is no natural way to treat the added element of meaning in the derived forms as the result of an additional morpheme of the classical sort.

Exchange rules (e.g., Diegueño (Kumiái) *ɬʸap* 'burn (sg.)' vs. *ɬʸa:p* 'burn (pl.)', *sa:w* 'eat (sg.)' vs. *saw* 'eat (pl.)', where plurality is marked by lengthening a short vowel or by shortening a long vowel in the base) represent a kind of apophonic relation that is particularly difficult to analyze in terms of morphemes. Whatever might be treated as the marker of the category in question (vowel lengthening as a marker of plurality, in the Diegueño example) in some instances is precisely what must be **undone** in the others. No single formal element can serve both purposes.

A similar (if not even more acute) problem is presented by instances in which a derived morphological category is built through a formal operation of subtraction, as in Icelandic *hamr* 'hammering' from *hamra* 'to hammer'; Huichol *nepizeiya* 'I saw him IMPERF' *nepizei* 'I saw him PERF'; *pïtiuneika* 'he was dancing', *pïtiunei* 'he was dancing PERF'.

Metathesis of segments as a way to encode morphological information (e.g., Clallam *čkʷú-t* 'shoot' vs. *čúkʷ-t* 'shooting', where the second or nonactual form is derived from a basic actual form by inverting the order of a vowel and a consonant) is also inconsistent with the classical notion of the morpheme. In such cases, no new formal material is added; rather, the material in the base is reorganized as a way of marking a morphological category.

Morphological types of the sort just surveyed, in which the possibility of a concatenated formal marker of a morphological category is apparently problematic, have been widely discussed in the literature. What is less often remarked is that similar problems arise on the content side. Morphology, that is, may be semantically as well as formally nonconcatenative. An example is provided by the category of Icelandic middle voice verbs derived by the addition of the ending *-st*. Compare *gleðja* 'gladden (TRANS)', *gleðjast* 'rejoice'; *lýja* 'tire (someone) out', *lýjast* 'get tired, worn out'; *opna* 'open (TRANS)', *opnast* 'open (INTRANS)'; *heyra* 'hear', *heyrast* 'be audible'; and *týna* 'lose', *týnast* 'be, get lost'. In each case, the semantics of the base verb can be represented roughly as in (4).

(4) (CAUSE x, (BECOME (P y))) (e.g., 'SUBJ causes OBJ to become joyous, tired, open, etc.')

The effect of adding the ending *-st* is to delete the highest predicate (CAUSE x,y) from this structure while also deleting the corresponding argument position and/or θ-role from the syntax. Formally additive morphology, that is, is accompanied by subtractive semantics – again, a situation that is quite incompatible with the notion that morphological information is carried exclusively by a set of minimal sound-meaning pairs, or morphemes.

The conclusion must be that morphology involves relations between forms, not simply the concatenation of primitive units of sound and meaning. These relations in the general case can be represented

as realizational processes (Word Formation Rules, functions from words to other words). This is more general than the affixation view because although affixation can always be expressed as a process ('Add *-able*'), not all processes can be coherently expressed as affixes.

The Relation between Morphology and Syntax

Apart from its rejection of the traditional morpheme as the basis of morphological structure, A-Morphous Morphology is distinguished from other views of word structure in terms of the way it views the interaction of morphology and syntax. Although these matters are logically separable from the issues of the preceding section, they cohere with the realizational picture of word formation in the assumptions made about the nature of linguistically significant representations.

Implications of Lexicalism for Morphology

Work within the framework of A-Morphous Morphology is based on a particular interpretation of the Lexicalist Hypothesis: the syntax neither manipulates nor has access to the internal form of words. Taken in its strictest sense, this implies that nothing in the syntax can affect the forms of words or be based on the morphological information they contain. Such a position is clearly too restrictive because a number of types of morphology clearly interact with the syntax. These can be grouped into four overall types.

Configurational properties are assigned on the basis of the larger syntactic structure within which a word appears. For instance, in English, the genitive is assigned to nominals in the determiner position within another nominal, as in [$_{DP}$ [$_{det}$ [$_{DP\ [+gen]}$ John's]] hat].

Agreement properties are assigned to words by reference to the value on the same dimension of some other item within the same syntactic structure *The cat sleeps on the bed* vs. *The dogs sleep on the floor.*

Phrasal properties are assigned to larger constituents within a structure (typically, maximal projections – full phrases), but they may be realized on individual words that constitute only part of those structures, such as the genitive in *the king of England's crown*.

Inherent properties are lexical characteristics of individual words such as gender or word class that must be accessible to syntactic principles of agreement and the like.

These properties are all, of course, subtypes of what is traditionally called inflection. This suggests the hypothesis that inflection is exactly the morphology that is accessible to and/or manipulated by rules of the syntax. Because all traditional attempts to define inflection seem to fail (Anderson, 1992), such a theory-internal definition seems the only way to give substance to this standard subdivision of morphology.

Other ways of resolving the apparent conflict between the Lexicalist Hypothesis and the demands of inflectional morphology exist, but they have problems of their own. It might be, for example, that the Lexicalist Hypothesis is simply wrong and should be rejected. Eliminating it altogether, however, potentially opens the floodgates for many kinds of interaction between morphology and syntax that are not actually observed. The four property types just noted seem to exhaust the cases in which syntax and morphology must be allowed to affect one another.

Alternatively, we might propose that inflectional marking of the types identified in the Lexicalist Hypothesis is not actually done in the syntax; rather, the formal marking all takes place in the lexicon and the morphological marking of individual words is then checked elsewhere (in the syntax, in some Minimalist work; or in the semantics). This checking is not as simple as it may appear, however, and a thoroughgoing application of this approach in morphologically complex languages forces the description to redundantly duplicate morphological structure in two parts of the grammar: On the one hand the form must be properly constructed in the lexicon, while on the other the surface result must be deconstructed according to the same generalizations in the syntax so as to ensure that it is correct. It seems better to assume that the theory of inflection is exactly a theory of the ways in which the scope of the strong form of the Lexicalist Hypothesis must be refined and circumscribed.

The Interface between Syntax and Morphology

In order for words to be inflected in ways appropriate to the syntactic positions in which they appear, there must clearly be some interchange of information between syntactic and morphological principles. As discussed in the previous subsection, this is precisely the way in which the scope of the Lexicalist Hypothesis must be restricted. But this leads us to ask what form the interface between the two domains of grammar should take.

The classical view is that the information shared between syntax and morphology about a word is a (structured) division of the word into its constituent morphemes, with a gloss for each, such as the analysis of the Georgian verbal form in (5).

(5) mo-g-k'lav-s
PVB-2.OBJ-kill-3.SUBJ
'he will kill you'

(where PVB stands for preverb). When considered in detail, however, there are a number of problems for this apparently commonsense view.

One large class of problems is directly related to the issues raised previously. Morphologically relevant information about a word is often carried by nonaffixal morphology, such as apophony (ablaut, umlaut, etc.), consonantal mutations, subtraction, and the like. Whenever that is the case, however, there is no isolable morphemic constituent in an analysis similar to that in (5) with which the corresponding content can be identified.

Further, some relevant information may not be conveyed by any overt constituent of the form. For instance, the Georgian verb in (6) is entirely parallel to the one in (5), except that there is no overt marker of the first-person subject, because the marker we would expect (a prefixed *v-*) is mutually exclusive with the second-person object marker *g-*.

(6) mo-g-k'lav
PVB-2.OBJ-kill
'I will kill you'

Despite the lack of a formal marker, however, this verb must be considered to agree with a first-person subject. Apart from the unambiguous interpretation of (6), this can be seen from the fact that pronouns need not be phonologically overt in sentences with verbs that agree with them – including verbs for which that agreement is not itself represented by an overt marker.

The problem of nonovert markers of morphosyntactically relevant information is typically solved by positing a zero morph in the analysis of the form and then claiming that the information in question is carried by this element. In the specific case of the Georgian verb in (6), this move is actually ruled out by factors internal to the language's verbal morphology (discussed in Anderson, 1992). But in any event, as previously discussed, positing zero morphs is simply a name for this problem rather than a solution to it. The point is that there is morphosyntactic information associated with the form that is not reflected in any overt way in its phonological shape. This implies that the representation of such morphosyntactic information is more abstract than a mere analysis of its formal composition.

Such an analysis of the overt form of a word shows itself to be inadequate in other ways as well. For instance, the analysis in (5) obviously represents not only which formal components appear in the word but their linear positions relative to one another as well. If linear position is not correctly represented, the surface shape of the word cannot be produced correctly; but it is a general principle that the linear position of formatives is never relevant in itself for syntactic purposes. For instance, in the Choctaw verbs *hilha-li-h* 'I danced' vs. *ish-hilha-h* 'he danced' the subject marker appears as a suffix if it is first person but as a prefix if it is third person. No rule of syntax in any language, as far as is known, is ever sensitive to such differences; we do not find, for example, that a potentially preverbal subject pronoun can be omitted if it is third person (because linearly adjacent to the agreement marker) but not if it is first person. Where linear order appears to be syntactically relevant, as in the cases discussed by Baker (1985) as the Mirror Principle, what is really at stake is derivational scope rather than linear position itself, although these two are typically closely correlated, as Baker's paper establishes.

A morphological analysis of the overt form of a word also contains other information that is systematically irrelevant to its value as far as the syntax is concerned, such as the presence of empty morphs (e.g., the /-t-/ in Menomini *ke-t-ōs* 'your-Ø-canoe' or 'your canoe' and Romance thematic vowels) and multiple instances of the same material (as in the Dargwa *b-ī̄k'a-zi-b qalč'e* 'little bird,' where the lexical class of the head noun is reflected more than once in the adjective). The systematic irrelevance of such material for the syntax suggests that information about it should not be present at the interface between word structure and sentence or phrase structure.

The appropriate conclusion appears to be that this interface between morphology and syntax is a somewhat abstract structure: a morphosyntactic representation of the properties expressed by a word rather than a representation of its formal makeup. A-Morphous Morphology proposes that the formal nature of these structures is quite simple: essentially, they are unordered (but potentially recursive) structures composed solely of simple morphosyntactic features. The principles by which such structures are composed and referred to in grammar form an important area of inquiry within the theory.

See also: Morpheme.

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Analytic Philosophy

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'Analytic philosophy' is the name that is given to what is now generally regarded as the dominant philosophical tradition in the English-speaking world and increasingly in the rest of the world. In its widest sense, it might be taken to mean any kind of philosophy in which analysis plays a central role. But there are all sorts of kinds of analysis, and analysis – in one form or another – has been part of philosophy since the time of the ancient Greeks. Sometimes it is characterized in terms of the emphasis placed on clarity, rigor, and careful argumentation, often involving logical formalization. This might distinguish it from some types of 'continental' philosophy (as it is misleadingly called), to which analytic philosophy is frequently seen as opposed. But the best way to understand analytic philosophy is historically, as a movement that had its roots in developments around the turn of the 20th century and evolved in various directions in response to them.

The origins of analytic philosophy lie in the work of Gottlob Frege (1848–1925), Bertrand Russell (1872–1970), G. E. Moore (1873–1958), and Ludwig Wittgenstein (1889–1951). In many ways, early analytic philosophy can be seen as comprising two main strands, one developing from Frege's logical analyses of number statements and Russell's theory of descriptions, and the other from Moore's concern with conceptual analysis in ethics and epistemology, the two strands synthesised to some extent by Wittgenstein in the *Tractatus* (1921).

Frege's Analysis of Number Statements

Central to Frege's logical analysis of number statements is the idea that number statements are assertions about concepts. A statement such as *Jupiter has four moons* is to be understood, not as predicating of Jupiter the property of having four moons, but as predicating of the concept 'moon of Jupiter' the second-level property 'has four instances,' which can be logically defined (cf. Frege, 1884: § 57). The philosophical significance of this idea can be illustrated by taking the case of negative existential statements (number statements involving the number 0), which have caused problems throughout the history of philosophy. Consider the following statement:

(U) Unicorns do not exist.

This statement is true, so it must clearly have a meaning. But what is it for (U) to have a meaning? If we analyze it in subject-predicate terms, in accord with its surface grammatical form, then 'unicorns' is the subject and 'do not exist' the predicate. But how can we say anything meaningful if 'unicorns' does not refer to anything? If unicorns do not exist, then what is it to which we are predicating the property of nonexistence? Should we posit – as Meinong and the early Russell did – the 'subsistence' of nonexistent objects to act as the subjects of statements about them? On Frege's account, however, such a statement is to be understood as asserting something, not about unicorns but about the concept of 'unicorn.' (U), in other words, really means what is better expressed as:

(U*) The concept 'unicorn' is not instantiated.

Interpreted like this, it can then be readily formalized in modern logic:

(U#) $\neg \exists x\, Fx$.

On Frege's view, existence should not be seen as a (first-level) predicate, but instead, existential statements are to be analyzed in terms of the (second-level) predicate *is instantiated*, represented by the existential quantifier. To say that something does not exist is to say that the relevant concept is not instantiated.

Russell's Theory of Descriptions

A similar strategy is employed by Russell in his theory of descriptions (1905). Consider Russell's famous example:

(K) The present King of France is bald.

(in this case, that the world is Newtonian). Quine's view that there are no analytic or *a priori* sentences was widely influential; however, there is now renewed interest in making the distinction between *a priori* and *a posteriori* assertions to better understand how scientific theories function.

Quine's attack on the analytic/synthetic distinction eventually faced empirical scrutiny. Linguists such as Noam Chomsky and Ray Jackendoff have shown that there are empirical reasons to hold that there is an analytic/synthetic distinction. Certain sentences seem to show analytic connections with one another. For instance, upon hearing the sentence 'Jane was convinced to leave' one will assume that Jane decided to leave. An analytic sentence is one whose truth is given by the existence of such a connection. Analytic sentences in this sense are true in virtue of meaning. They are also knowable independent of experience and thus *a priori*. However, that they are knowable independently of experience is not itself knowable *a priori* but known though empirical investigation of natural language. Kant imagined that we could identify *a priori* truths *a priori*. Here we have a case of *a priori* truths that are dicovered empirically. On this view *a priori* truths can have no foundational epistemological status.

It had been almost universally believed that all analytic claims were *a priori*. This position is shared by Kant and the positivists (the positivists went further in claiming that all *a priori* claims were analytic). However, on the basis of work by Saul Kripke and Hilary Putnam, a case can be made that certain claims are both analytic and *a posteriori*. That is, there are claims that are true in virtue of meaning, but are not knowable independently of experience. For instance, part of the meaning of the term 'water' is that it is composed of H_2O. So the sentence 'water is H_2O' is true in virtue of meaning, and thus analytic. However, this sentence is nonetheless a substantial claim about the world and certainly not knowable independently of experience, and thus it is *a posteriori*.

See also: Analytic Philosophy; Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; Logic and Language: Philosophical Aspects.

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Pentti Aalto, born in 1917 in Pori (Finland), took his M.A. in Latin, Greek, Sanskrit, and Altaistics at the University of Helsinki in May, 1939. During World War II, he served in the Finnish Army as an officer charged with decoding enemy ciphers. After the war, he continued his studies, partly in Sweden, and defended his doctoral thesis in Helsinki in 1949. Aalto was Docent of Comparative Linguistics from 1949 to 1958 and Professor of Comparative Linguistics from 1958 to 1980 at the University of Helsinki.

His first major publications dealt with the history of Latin gerund and gerundive (1949) and Greek infinitive (1953). After the death of his teacher G. J. Ramstedt in 1950, Aalto edited Ramstedt's main work, a comparative grammar of the Altaic languages (1952–1966), and many of his unpublished papers. Aalto's own critical edition of the Mongolian version of the Buddhist text *Pañcarakṣā*, translated from Tibetan, appeared in 1961. Together with his student, the Latinist Tuomo Pekkanen, Aalto published an important collection (1975–1980) of Latin sources on the peoples of Northeast Asia, spanning from antiquity to the times of Charles the Great. Aalto wrote (1971–1987) the history of Oriental, classical, and modern language studies in Finland during the period of the Russian rule. A selection of the hundreds of articles and reviews written by Aalto was published in 1987.

See also: Altaic Languages; Ramstedt, Gustaf John (1873–1950).

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Ivar Aasen is an iconic figure in Norwegian cultural history, regarded as one of the architects of Norwegian national identity in the 19th century. A substantial amount has been written about Aasen, much of which has been of a rather bland hagiographical nature. Three substantial biographies appeared in the centenary year of 1996 (Krokvik, 1996; Venås, 1996; Walton, 1996), which witnessed a variety of celebrations in honor of Aasen and clearly demonstrated his standing within Norwegian culture.

Although he lacked a formal education, Aasen presented himself effectively in intellectual and cultural circles, securing a grant from the Norwegian Academy of Sciences and later one from the state to pursue his investigations of Norwegian. His travels in rural parts of the country to collect dialect forms resulted in a dialect grammar, *Det norske Folkesprogs Grammatik* (1848), and a dictionary, *Ordbog over det norske Folkesprog* (1850). These works led to a later grammar (*Norsk Grammatik*, 1864) and dictionary (*Norsk Ordbog med dansk Forklaring*, 1873), which provided the basis for the written variety of Norwegian, initially known as Landsmaal and renamed Nynorsk in 1928. Although he continued to write Danish for most purposes, Aasen exemplified the use of Landsmaal himself, first in the 1849 *Conversation between two farmers* and then in book form in the 1853 *Prøver af Landsmaalet i Norge*. Far from providing a new model written variety around which Norwegians could rally, Aasen's example unleashed a variety of competing models based on different dialects, and it was not until 1901 that a standard for Landsmaal (based on Aasen) was finally sanctioned.

Aasen's skill as a dialectologist is undoubted, although his methods soon appeared dated with the emergence in Scandinavia during the 1870s of the new dialectology based firmly on phonetic principles. The collections he made, which are currently being published in a series of volumes by the Ivar Aasen Society, are an invaluable resource for the study of variation in Norwegian in the mid-19th century. It is clear that his descriptive work was based from the outset on the notion of a standard underpinning the surface variety (Walton, 1996), and his presentation of the material, particularly in the 1864 grammar, is characterized by the clever use of stylistic devices to reinforce that impression (Linn, 1997).

Although brought up in rural western Norway, Aasen spent the bulk of his adult life in the capital city, where he remained on the margins of academia, never taking up a university post. As well as various programmatic writings, he produced among other things a collection of Norwegian proverbs (*Norske Ordsprog*, 1st ed. 1856), an onomasiological dictionary (*Norsk Maalbunad*, published 1925), and a variety of literary works.

See also: Dialects: Early European Studies; Norwegian.

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See also: Dialects: Early European Studies; Norwegian.

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Abduction

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In addition to the traditional division of inferential reasoning into two categories, *deduction* and *induction*, Charles S. Peirce has added a third term – that of *abduction*. For Peirce, deduction is a logical inferential matter, much as tradition had it, and induction involves the process we would ordinarily term confirmation of deduced hypotheses through observation of particular cases. But how is it that hypotheses come about in the first place? Peirce surmised that there must be some process of insight, or abduction, which then leads to some hypothetical plausibility that precedes the actual logical construction of a hypothesis. This insight, he believed, must follow some style of reasoning and inference of which deductive reasoning knows little (Peirce, 1958: 7.218).

Inference can in general be *explicative* or *ampliative*. If explicative, it is analytical, involving deduction of the necessary consequence leading from a hypothesis. If ampliative, it is synthetic, involving the creation of a hypothesis by abductive inference and the subsequent confirmation of the hypothesis by means of experience in the physical world (Peirce, 1931–1935: 2.776). Abductive inference initially emerges when there is a surprise, because something other than what was expected occurred. From the surprise, creation of a plausible explanation emerges (abduction); the plausible explanation gives rise to a hypothesis to the effect that in case certain conditions were to inhere, in all such cases a certain consequence would likely ensue (deduction); and if a particular instance of that case confirms the hypothesis, then the confirmation would become what should be expected in all such cases (induction). In this sense, abduction proceeds from a present surprise to what might happen in future instances comparable to the present, deduction passes from the feeling that what might happen should happen in future instances when certain conditions are in place, and induction proceeds from what actually happened in past and present instances toward a general idea regarding all comparable instances (Peirce, 1931–1935: 2.636).

On merging abduction with his belief that feeling has its own style of reasoning, Peirce occasionally suggested that the abductive act is an instinctive capacity of the sufficiently prepared mind for informed guesses, for the mind has "a natural bent in accordance with nature" (Peirce, 1931–1935: 6.478). Can there indeed be a 'logic' for creating hypotheses? Tradition responds with an emphatic 'No.'

Karl Popper, a critic of the idea of a logical process for hypothesis making, wrote that the act of conceiving a hypothesis is not logical; it is the result of blind guesses (Popper, 1959: 20–21). Peirce, in contrast, argued that guesses are informed by the instinctive mind that has been able to get in tune with nature. Only in this manner, he believed, can we abduce what might be, from a virtually infinity of possibilities, with a remarkable degree of wisdom. Abducing what might be, then, is more a matter of instinctive cunning than mere chance. After the abductive act, the 'reasoning' mind can take over in determining what should be and what actually **is**.

See also: Creativity in Language; Inference: Abduction, Induction, Deduction; Presupposition.

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Abercrombie, David (1909–1992)

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David Abercrombie, a British phonetician, was responsible for establishing and directing the Department of Phonetics at the University of Edinburgh, a major European center of work in the discipline during the latter half of the 20th century.

Abercrombie was born in Birkenhead, Cheshire. After study under Daniel Jones at University College, London, and at the Institut de Phonétique in Paris, he worked briefly at the London School of Economics and then in an English teaching post with the British Council, which took him to Greece and Egypt during the years of World War II. On his return to Britain, a short spell at the University of Leeds led to his move to Edinburgh in 1948 to take up the headship of the newly founded Department of Phonetics. He was to spend the rest of his career in Edinburgh, retiring as Professor of Phonetics in 1980, and it was there that he died.

His department was just one of a number of establishments in the university dedicated to the language sciences that were brought into being during the years following World War II. Others were a Department of General Linguistics, a School of Applied Linguistics, and the Linguistic Survey of Scotland. The theoretical outlook of all of these was unified to quite a considerable degree since many members of their staffs had been students in London under J. R. Firth. Abercrombie himself had come under Firth's influence when a student at University College, where Firth held his first London teaching post between 1928 and 1938; and the Edinburgh Phonetics Department was to include other teachers who had studied either at University College or at the London School of Oriental and African Studies. By the time of Abercrombie's retirement, the three teaching departments had amalgamated.

Abercrombie saw his subject as in no way an adjunct to language teaching and learning, a position to which it could sometimes be relegated in universities, but as an independent discipline of long pedigree with manifold connections into, and implications for, other disciplines and a wide range of applications in everyday life and in the world of work. The sets of courses that he designed for his department reflected his interests and convictions. He had an unrivaled knowledge of several centuries of work in phonetics, gathered from assiduous reading in the British Museum during his student days, and was often able to point out in discussion that this or that 'new' idea, technique, or technical term was not, in fact, all that new. From this early study arose his belief that some knowledge of the history of the subject was an indispensable part of the

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Another important area of his department's teaching at both the under- and postgraduate levels was the laying down of a solid base of practical phonetic skills. The first-year undergraduate course of 5 hours a week included 1 hour each of performance and ear-training and a weekly transcription exercise. Students were expected to transcribe their own English, and the staff paid much attention to helping them elaborate valid transcriptions, especially necessary given the wide range of Scots accents represented in the student body.

Research and teaching in Abercrombie's department always proceeded on the understanding that phonetics and phonology were two sides of the same coin, a stance common throughout the development of a linguistics tradition in Britain, and well personified in Firth, who was probably more a mentor to Abercrombie than was Jones. Postgraduate students were routinely sent to undertake supervised work on the Survey of Scottish Dialects, an experience meant to stretch and benefit them in their capacities as both phoneticians and phonologists. Despite this emphasis in the department, though, and rather surprisingly given his London University training, Abercrombie himself rarely ventured into serious work in any area of phonology.

His writings, though not abundant, are notable for concision and clarity, and reflect the wide range of his interests. In addition to publications on the history of the subject, there are papers on speech rhythm and stress, terminology, transcription theory, English accents, and various matters of practice in phonemic phonology. Abercrombie always included some first-year undergraduate teaching among his commitments as a matter of principle; and his *Elements of general phonetics* derives from his teaching of the department's first-year undergraduate course. It is too idiosyncratic and selective to make an ideal textbook, but displays well the lucid and uncluttered prose style, quite free of jargon, that makes his writing attractive and accessible.

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Abkhaz

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deemed to be part of Georgia still. For most of the Soviet period it was an autonomous republic.

A wave of migrants out of Abkhazia after the Mongol incursions (14th century) removed the most divergent dialect, T'ap'anta, to the northern Caucasus (Karachay-Cherkessia). Consolidated there by Ashkharywa dialect speakers (17th and 18th centuries), today's Abaza population descended from them. Following Russia's conquest of the northwest Caucasus in 1864, most North West Caucasian speakers (including the now extinct Ubykhs) migrated to Ottoman lands, where the diaspora-communities (predominantly in Turkey) vastly outnumber the homelanders; even so, the surviving languages are endangered in all locations. The dialects of Sadz, Akhch'ypsy, and Ts'abal are no longer attested in Abkhazia; only northern Bzyp and southern Abzhywa remain. Of the 102 938 Soviet Abkhazians recorded in 1989, 93 267 resided in Abkhazia, constituting 17.8% of the population. The single largest ethnic group in Abkhazia in 1989 were the Mingrelians; Abazas totalled 33 801. Though 93.3% of Abkhazians claimed fluency in Abkhaz, younger generations tend to use Russian (or Turkish).

The 17th-century, half-Abkhazian traveller Evliya Çelebi provided the first linguistic evidence. P. Uslar produced the first grammar (1862–1863), devising a Cyrillic-based script. An adaptation of this alphabet served the Abkhazians when the Soviets assigned them literary status (1921), though two different roman orthographies were tried during the infant USSR's *latinizatsija*-drive. A Georgian orthography was imposed in 1938 and replaced by another Cyrillic alphabet in 1954. This one is still used, albeit with a recent reform to regularize labialization-marking. Abaza acquired literary status only in 1932; the Abkhaz and Abaza Cyrillic scripts diverge markedly.

A comprehensive list of phonemes appears in Table 1.

Certain idiolects have /f'/ only in /ɑ.ˈf'ɑ/ 'thin' (otherwise /ɑ.ˈp'ɑ/). Bzyp boasts 67 phonemes by adding /ʧ͡ ʤ͡ ʧ͡' ɕ ʑ ɕʷ ʑʷ/ to the alveolo-palatals and /χˤ χˤʷ/ to the back fricatives. A glottal stop, apart from possibly realizing intervocalic /q'/, is also heard in /ʔɑj/ 'no' (cf., /ɑːj/ 'yes'). Open vowel /ɑ/ contrasts with close /ə/; /ɑː/ might also be phonemic. Stress is distinctive.

Abkhaz(-Abaza) is unique among Caucasian languages in not employing case-markers for the verb's major arguments, relying purely on pronominal crossreferencing within the polysynthetic verb; this patterning with three sets of affixes confirms the family's ergative nature. Some preverbs distinguish directionality via an a-grade (essive/illative/allative) vs. a reduced/zero grade (elative/ablative) for the specified location.

Table 1 Consonantal phonemes for literary (Abzhywa) Abkhaz

p	b	p'			m		w
		(f')	f	v			
t	d	t'			n	r	
tʷ [ʧ͡p]	dʷ [ʤ͡b]	tʷ' [ʧ͡p']					
ʧ͡	ʤ͡	ʧ͡'	s	z			
ʧ͡ʷ [ʧ͡ɕᶠ]	ʤ͡ʷ [ʤ͡ʑᵛ]	ʧ͡ʷ' [ʧ͡ɕᶠ']					
ʃ	ʒ	ʃ'	ʃ	ʒ			
			ʃʷ [ɸ͡ç]	ʒʷ [β͡j]			
ʈ͡ʂ	ɖ͡ʐ	ʈ͡ʂ'	ʂ	ʐ			
						l	
							j
							ɥ
k	g	k'					
kʲ	gʲ	kʲ'					
kʷ	gʷ	kʷ'					
		q'	χ	ʁ			
		qʲ'	χʲ	ʁʲ			
		qʷ'	χʷ	ʁʷ			
			ħ				
			ħʷ [ħᵘ]				

The Stative-Dynamic opposition, verbal complexity, the relative strategy, the potential/involuntary constructions, and the preverbal grade-system are illustrated below:

(1) ɑ-pˈħʷəs ɑ-mɑˈq'ɑ ø-ˈlə-mʁɑ-w-p'
the-womanII the-beltI itI-sheII-wear-Stat-Fin.Pres
'The woman is wearing the/a belt'

(2) ɑ-pˈħʷəs ɑ-mɑˈq'ɑ
he-womanII the-beltI
ø-ˈlə-mʁɑ-l-ʧ͡s'ɑ-ø-r.tʷ'
itI-herII-Prev-sheIII-put-Past.N/F.Aor-Res
ø-sə-z-ˈlə-r-q'ɑ-ʧ͡s'ɑ-wɑ-m / ø-sə-ˈzə-q'ɑ-ʧ͡s'ɑ-wɑ-m
itI-II-Pot-herII-Caus-Prev-do-Dyn-not.Pres itI-II-Pot-Prev-do-Dyn-not.Pres
'I cannot make the woman put on (herself/some other woman) the belt'

(3) ɑ-pˈħʷəs ɑ-mɑˈq'ɑ
he-womanII the-beltI
ø-ˈlə-mʁə-l-χə-ø-r.tʷ'
itI-herII-Prev-sheIII-take-Past.N/F.Aor-Res
Ø-ˈs-ɑmχɑ-lə-r-q'ɑ-ʧ͡s'ɑ-ø-jt' / ø-ˈs-ɑmχɑ-q'ɑ-ʧ͡p'ɑ-ø-jt'
itI-II-unwilling-herII-Caus-Prev-do-Past-Fin.Aor itI-II-unwilling-Prev-do-Past-Fin.Aor
'I unwillingly/involuntarily got the woman to remove the belt (from herself/some other woman)'

(4) ɑ-mɑˈq’ɑ ø-ˈzə-mʁə-z-χə-ø-z ɑ-pˈħʷəs
the-beltI itI-whoII-Prev-whoIII-take-Past-N/F.P/I the-womanI
d-ˈsə-pʃʷmɑ-w-p’
sheI-myII-wife-Stat-Fin.Pres
‘The woman who took off her belt is my wife’

The lexicon reveals Iranian, Turkish, Russian, and Kartvelian (mainly Mingrelian) influences.

See also: Caucasian Languages; Georgia: Language Situation; Georgian.

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Abraham, Roy Clive (1890–1963)

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Roy Clive Abraham (1890–1963), born in Melbourne, Australia, was a major figure in the study of African languages during the 20th century, publishing dictionaries and grammars on a wide range of languages within the Afroasiatic and Niger-Congo families. Educated at Balliol College, University of Oxford, he was awarded a first-class honors degree in Oriental Languages in 1924 (Arabic and Persian), followed by a certificate in Anthropology from University College, London, and a diploma in Classical Arabic from the School of Oriental and African Studies (SOAS), University of London.

Abraham’s first experience of sub-Saharan Africa was in 1925, when he entered the administrative service of the northern provinces of Nigeria. He continued in the colonial service until 1944. In 1926, he conducted his first independent research on an African language, working on Bole (Bolanci), a small West Chadic (Afroasiatic) language closely related to Hausa. He then assisted G. P. Bargery in the preparation of the latter’s colossal *Hausa-English dictionary* (1934). Abraham had learned about the contrastive function of tone in West African languages from Bargery, and in his *The principles of Hausa* (1934) he simplified Bargery’s erroneous 6-tone system to Hausa’s correct 3-tone system. During this especially productive period he also completed grammars on two Niger-Congo languages spoken in Nigeria: *The grammar of Tiv* (1933) and *The principles of Idoma* (1935). In 1949 he was awarded a D.Litt. by the University of Oxford on the basis of three of his publications on Tiv. Subsequent works included his *Dictionary of the Hausa language* (1949, with Mai Kano), and *The principles of Somali* (1951, with Solomon Warsama).

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Although suffering from poor health in later years, Abraham’s drive and scientific predisposition led him to turn his attention to yet another Nigerian

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language, Igbo, and he was preparing a dictionary and grammar on the language when he died at his home in London on June 22, 1963, at the age of 72. He was survived by his wife Sadie and son Donald. A commemorative volume in recognition of his outstanding contribution to the study of African languages was published in 1992.

See also: African Lexicography; African Linguistics: History; Afroasiatic Languages; Chadic Languages; Lexicography: Overview; Niger-Congo Languages.

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Abstraction

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Abstraction in linguistics is very common and is pervasive not only at high levels of theoretical analysis but also, and crucially, at basic levels of description. This is because as soon as one generalizes from/over data or recurrent patterns, one is bound to want to use abstract features as shorthand. In other words, this is abstraction as methodology.

To give a definition of abstraction, we can say that it is the process of recognizing among a number of entities some common feature and, on that basis, forming the concept or the generalization of that feature. As a way of illustration, consider the following examples:

(1) Rufus loves Candice.

(2) Michelle loves Brent.

(3) Knut loves Pim.

(4) Alicia loves Fleur.

The verb *love* in English (and in other languages) involves a relation between a lover and a 'lovee.' We say that the lover and the loved one are arguments of the verbs, and as they can be arbitrary (all sorts of people can love each other – Rufus, Candice, Michelle, Brent, Knut, Pim, Alicia, and Fleur in our case), we can abstract away from Rufus and his friends and simply write (5), in which x = any lover and y any 'lovee.' Thus, here we already attained a certain degree of abstraction.

(5) love (x, y)

Noticing further that a relation between x and y does not have to be about love but could be about other predicates such as *hate*, *admire*, or *kill*, we can go even farther in the degree of abstraction for the representation of verbs and their arguments. We can have P standing for predicate, as illustrated in (6):

(6) $P(x, y)$

What the formula (6) says is that there is a predicate P (i.e., any predicate) that takes two arguments. The terms P, x, and y are called variables, or in other words, abstractions of instantiations of entities. Note that the variables x and y in (6) are free. There is one way to bind these variables in linguistics and logic that is quite useful – by λ abstraction. Adding the λ operator to predicate logic makes it possible to construct predicates from formulae with free variables. Suppose we know John is in love; the example in (7) means that we have a predicate that denotes the property of being loved by John.

(7) λx [love (John, x)]

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(7) λx [love (John, x)]

If, however, we leave the variable corresponding to John in the formula in (7) free, and we let the λ operator bind it, as in the formula in (8), then the expression denotes the property of 'John being loved,' which is equivalent to the passive form, 'John is loved' (i.e. 'by someone'; we don't know whom exactly). On λ abstraction, see Heim and Kratzer (1998) and the references cited therein.

(8) λx [love (x, John)]

It is easy to see from examples such as (7) and, especially, (8) that we use abstract entities all the time. When we use a passive instead of an active form, it is because we do not know to who or what the entity is referring exactly (as in 'John is loved,' 'Sam was attacked'). We can thus refer to abstract entities, which do not necessarily have any concrete objects in relation to them. This is useful for thinking and communication, as one is not tied to the world of concrete things.

In generative grammar, examples of abstract entities include subjects of infinitives, represented by PRO as in sentence (9), abstract Case as in sentence (10), and abstract Infl as in sentence (11).

(9) John wanted PRO to go shopping.

(10) John bought a book.

(11) I love tennis.

In this case, PRO is taken to be the subject of an infinitival verb. In the case of sentence (9), PRO refers to the subject of the main clause 'John.' The person who is doing the wanting and who is doing the shopping is the same. In sentence (10), the constituent 'a book' receives the accusative Case. In English, it is assumed that although there is no morphological realization of case, it is nevertheless present abstractly. Sentence (11) shows that English does not exhibit inflection (agreement) on verbs such as 'love' with the first-person singular. However, as many other languages do, abstract inflection (agreement) is postulated for languages like English.

Evidence for the claim that subjects of infinites are represented by empty categories such as PRO comes from the distribution of the *want + to* contraction in English (on *wanna* contraction see early work by Lakoff (1970) and Selkirk (1972), and then Van Riemsdijk and Williams (1986) and Lasnik and Uriagereka (1988), and for experimental research on the topic, see Crain and Lillo-Martin (1999), together with the references cited therein). In many dialects of English, either sentence (12a) or sentence (12b) is possible:

(12a) I want to go shopping.
(12b) I wanna go shopping.

However, when we ask a question, such as in sentence (13b), corresponding to the statement in sentence (13a), and in which *who* is extracted from the embedded clause, it is impossible to contract *want + to*, as shown in sentence (13c). This has often been taken to indicate that there is an empty category without phonological realization, but with full syntactic status, intervening between *want* and *to* (namely, PRO).

(13a) I want John to go shopping.
(13b) Who do you want to go shopping?
(13c) *Who do you wanna go shopping?

Turning now to case, although (as has been already mentioned) the constituent *a book* in sentence (10) bares no overt case (as it would, say, in German), it is a general consensus in generative grammar that the direct object bears abstract Case (in this instance, accusative Case, with the capital C being a special notation for the abstract nature of the case). Evidence for the hypothesis that even in English the direct object receives accusative from the verb comes from the fact that it is not possible to split the verb from the object in that language. On the assumption that the accusative case, and cases in general, are assigned by the relevant elements in the grammar in a strict local fashion (i.e., the notion of government, found in traditional grammar and in the government and binding framework of Chomsky [1981]), the blocking effect is explained by the fact that the verb in this instance cannot assign a Case to its object:

(14a) *John buys never socks.
(14b) John never buys socks.

Finally, evidence for the idea that abstract inflection is present in examples such as sentence (11) comes from the fact that an alternative to sentence (11) is available and illustrated in sentence (15):

(15) John does love tennis.

In the right context, sentence (15) would be used for emphasis. Here, we note that a third-person singular inflection surfaces in the form of *does* (the other form of *do* being simply *do*, as in *we do love tennis* or *I do love tennis*). On the inflection and parametric variation, see Pollock (1989).

It is one thing to postulate that abstract entities or symbols are representations of real-life entities for ease of data description or presentation of generalizations; it is another to claim that abstraction is at the core of human language and that the object of study in linguistics is an abstraction from real language data. However, this is exactly what both structuralists and generativists have done. It must be noted that generative models place heavy emphasis on the

reality of these abstractions. Abstract patterns are supposed to be psychologically real and present in the mind–brain. This is very different from the traditional or classical structuralist stance, according to which language is not tied to any psychological reality.

See also: Argument Structure; Case; Chart Parsing and Well-Formed Substring Tables; Control and Raising; Data and Evidence; E-Language versus I-Language; Formalism/Formalist Linguistics; Generalization; Generative Grammar; Idealization; Linguistic Reality; Minimalism; Objects, Properties, and Functions; Principles and Parameters Framework of Generative Grammar; Tense; Tense, Mood, Aspect: Overview.

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Academies: Dictionaries and Standards

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National language academies had their beginning in the Renaissance, when the first such academy, the Italian Accademia della Crusca, was founded in 1584. The Académie Française followed in 1635, and the Real Academia Española in 1713, establishing a tradition which has continued into the 20th century; the Hebrew Language Academy was, for example, founded in 1953. Academies of this kind have typically been constituted as influential and authoritative bodies that have, as part of their remit, the maintenance and regulation of individual languages. The production of a dictionary has frequently been given as a major objective in their foundation, particularly since dictionaries (especially in the past) have often been seen as a central means by which issues of language maintenance could be realized. Academy dictionaries are, as a result, characteristically engaged in the conscious processes of standardization and the codification of preferred norms of usage.

The Accademia della Crusca and the First Academy Dictionary

The origin of the move to establish national language academies can be located in the Italian Accademia della Crusca. Its remit was explicitly prescriptive, and the dictionary which it eventually published in 1612 – the *Vocabulario degli accademicia della Crusca* – embodied these aims; the words it recorded are those which can be supported by the written authority of great works, rather than by the evidence of then-current usage (especially spoken usage). Lexical innovation was tolerated only where it was felt to be unavoidable, and both patriotism and purism informed the principles of lexical selection which were employed. The dictionary was particularly inspired by the attempt to remedy perceived 'degeneration,' which had taken place since the 'Golden Age' of the 14th century by means of the unwarranted processes of linguistic change. Significantly, it also sought to reflect a new concept of the vernacular as a language in its own right, rather than Italian being seen as merely a debased form of Latin. Its linguistic concerns were therefore both normative and conservative; the *Vocabulario* was felt to be the preserve only of the best usage and, more specifically, the best literary usage.

The French Academy

The methodological principles of the Académie Française also endorsed the role of the academy dictionary as linguistic exemplar. One of its founding tenets was the intention "to labour with all possible diligence to give definite rules to our language, and to

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The French Academy

The methodological principles of the Académie Française also endorsed the role of the academy dictionary as linguistic exemplar. One of its founding tenets was the intention "to labour with all possible diligence to give definite rules to our language, and to

render it pure." Its own dictionary, published in 1640, is shaped by these concerns for linguistic propriety; it recorded only those usages felt to be truly representative of *le bel usage*. Like the *Vocabulario*, the French Academy dictionary is above all a lexicon of the written and formal language. Literary authority (of the best authors) was used to sanction and legitimize the introduction of words, with the result that archaic terms were often admitted to the exclusion of newer ones. As the preface to the seventh edition of 1877 records, "A word is not dead because we no longer employ it, if it lives on in the works of a Molière." Many of the founding authoritarian principles were maintained throughout the various editions of the dictionary (though see further below); the preface to the second edition of 1718, for example, made explicit its decision to exclude words such as *fichu*, *ratafia*, *bizarre*, and *sabler*; that of 1877 likewise noted that words which seem ill-composed or contrary to the 'genius of the language' had not been admitted. In this way, the academy dictionary can become not a dictionary of the language in itself, but instead a dictionary of the words felt to merit existence in that language.

Proposals for an English Academy

The standardizing ideals which were prominent in the French and Italian academies naturally exerted their influence upon England too. Writers such as Simon Daines (1640) publicly lamented the linguistic neglect that the absence of a corresponding academy in England seemed to suggest. Daniel Defoe, in his *Essay upon projects* (1697), urged the creation of a legislative body that would "polish and refine the English tongue, and advance the so much needed faculty of correct language ... to purge it from all the irregular additions that ignorance and affectation have produced." Though much debated, and endorsed by writers such as Jonathan Swift, Defoe's plan was never realized. Samuel Johnson's two-volume *Dictionary of the English Language* of 1755 was hailed by many (such as the actor David Garrick) as the English equivalent of the *Dictionnaire* of the Académie Française. Nevertheless, the *Dictionary* itself was tempered by Johnson's own understanding of the futility that underpins the aims of academies to control linguistic change. As he stated in the preface: "With this hope, however, academies have been instituted, to guard the avenues of their language, to retain fugitives, and to repulse intruders; but their vigilance and activity have hitherto been in vain; ... to enchain syllables, and to lash the wind, are equally the undertakings of pride, unwilling to measure its desires by its strength."

Academies in the Modern Period

The rise of descriptive linguistics in the 19th century and afterwards led to the recognition that language change cannot be halted, nor can a cordon be drawn around an individual language to protect it from undue influence from elsewhere. Lexicographical developments during the 20th century have regularly reflected this fact, though academy dictionaries can still lag behind in line with their intended regulatory function. The preface to the French *Dictionnaire* of 1935, for example, still noted that while new words had been admitted, they were only those which had been judged to be of sufficient dignity to merit such inclusion. The ninth edition of the dictionary is currently in preparation, with *A–Enzyme* being published in 1992, and *Éocène–Mappemonde* in 2000. While distancing itself from earlier attempts to fix linguistic usage, the emphasis of the Academy now falls onto maintaining the distinctive qualities of French and, in particular, to resisting the influx of anglicisms, especially in the spheres of new technologies and science. As a result, *baladeur* is preferred to *walkman*, and *logiciel* is to be used instead of *software*, while *computer* is to be rendered as *l'ordinateur*. Purism of this kind becomes the new prescriptivism in the stated aim "to defend the French language" from the incursions of the Anglophone world. Other academies, such as that of Spain, can likewise still receive criticism for their perceived elitism and conservatism in matters of usage.

Language academies, and the dictionaries they produce, are often normative and regulatory, seeking to sanction preferred usages (traditionally those based in formal, literary contexts) and to proscribe others which, for various reasons, may be seen as less favored. Beginning in the Renaissance with the Italian Accademia della Crusca and extending to many nation-states (though not Great Britain), the role of the academy has often been explicitly interventionist, especially in terms of the legitimization of new words and meanings or, as with the current concerns of the Académie Française, in the attempt to restrain the influence of the Anglophone world in the lexis of science and technology.

See also: English Lexicography; French Lexicography; Hebrew Lexicography; Italian Lexicography; Johnson, Samuel (1709–1784); Spain: Lexicography in Iberian Languages; Standardization.

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Accent

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Accent refers to speakers' segmental and nonsegmental phonetics and phonology. As a technical term, accent thus refers to the way in which people pronounce when they speak. Speaking necessarily involves pronouncing, so everybody by definition speaks with an accent, although it is common in everyday lay use to employ the term as if it applied only to people other than oneself.

Accents are most often recognized as distinct, named varieties, spoken by particular groups of people, such as Cockney (London), Scouse (Liverpool), Australian, or New York City. These four terms relate to where their speakers come from geographically, but accents may also be perceived as relating to a speaker's social background. For example, speakers may be said to have lower-class accents or aristocratic accents. In fact, however, accents are generally simultaneously both social and geographical. And, in the case of both geography and social background, in spite of the perception that named accents constitute distinct varieties, what linguistic analysis most usually reveals are continua of geographical and social accents, with no sharp dividing line between them.

An accent may also relate to whether or not someone is a native speaker of a language. Someone speaking English might be said to be doing so with a French accent, or simply with a foreign accent. This happens because the vast majority of adult and adolescent foreign language learners transfer phonetic features from their native language to the foreign language.

British linguists typically distinguish accent from dialect, where dialect may refer to pronunciation but crucially also to grammar and vocabulary (Wells, 1982; Trudgill, 2000). Normally, accent and dialect go together, so that, say, Yorkshire dialect is always spoken with a Yorkshire accent. But in Britain it is helpful to make the distinction because the highest status dialect, Standard English, is not always combined with the highest status accent, Received Pronunciation (RP). RP speakers always speak Standard English, but the reverse is by no means necessarily the case. RP is highly unusual in that, in England, it is entirely nonregional. A speaker with an RP accent cannot be identified as coming from any particular locality.

Accent, a typically group phenomenon, should be distinguished from voice, an individual phenomenon. The quality of an individual's voice depends on his or her anatomy and physiology, which is why it is possible to recognize speakers from their voices alone. However, there is a complication here. Speakers do have some control over how they use the vocal apparatus they are born with, and there is a link between accent and voice in that some regional and social accents are spoken with a recognizably particular type of voice setting. Some conservative RP speakers, for example, speak with depressed larynx voice, which means that they habitually and unconsciously lower their larynx from the neutral position when they are speaking.

See also: Language Attitudes; Standard and Dialect Vocabulary; Subjective and Objective Measures of Variation.

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Accessibility Theory

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Natural discourse does not start from scratch. Speakers routinely integrate new information with contextual assumptions, roughly, information that they can take for granted, and so they need not assert it (Sperber and Wilson, 1986/1995). Referring to discourse entities, an inherent feature of human interactions, is no different. Although some discourse entities are (treated as) new (*a kiss* in [1]), most are (treated as) identifiable (e.g., *the review, Helen, her* in [1], and *her heart*, a first-mention, in [2]). Thus, part of the nonasserted material is information about discourse entities that the speaker would like the addressee to retrieve (for citations of SBC [Santa Barbara corpus], see Du Bois *et al.,* 2000, 2003. [...] = a short fragment deleted):

(1) LORI: when you were reading **the review**,
you talked about **the affair between Helen and Paul**, [...]
all that happened was,
LINDA: was **a kiss**. [...]
LORI: **He** kissed **her**, (SBC: 023).

(2) DORIS: they had an autopsy done on her.
And **her heart**,
was just hard, (SBC: 001).

Accessibility Theory (Ariel, 1985a, 1985b, 1988a, 1990, 2001), in effect a development of Sanford and Garrod (1981) and Givón (1983) (and see also Chafe, 1994), assumes a logically prior distinction between identifiable/Given entities (coded as definite) and nonidentifiable/Given entities (coded as indefinite). Identifiable entities are ones for which the addressee is assumed to be able to access mental representations (see Du Bois, 1980; Heim, 1982). Accessibility theory seeks to account for the selection and interpretation of all definite referring expressions. The theory does not assume (as fundamental) the first versus subsequent mention distinction, and provides one and the same account for expressions considered referential (e.g., proper names), often used for discourse first-mentions, as well as for expressions considered anaphoric (e.g., pronouns), often used for subsequent mentions (Ariel, 1990, 1994, 1996). It also does not view references to the speech situation (e.g., by deictics) as special (Ariel, 1998a). All definite referring expressions in all languages are analyzed as accessibility markers, as instructions to the addressee on how to access specific mental representations. In fact, the theory handles other types of Given materials as well, most notably whole propositions (see Ariel, 1985a, 1985b, 1988b).

Using a definite NP, the speaker signals to her addressee to access some mental representation based either on his encyclopedic knowledge, his awareness of the speech situation, or his discourse model of the interaction so far (Clark and Marshall, 1981). The definite referring expression also provides information about the intended entity, which the addressee is to rely on when zeroing in on the intended referent (e.g., *her* is a singular female). This is as far as the definiteness aspect takes us, but speakers can be even more helpful. Mental representations are not equally accessible to us at any given stage of the discourse. Some are highly activated, others are mildly activated, and yet others, although potentially identifiable, are not currently activated at all. Speakers refer to discourse entities at all activation levels. This is where accessibility theory plays a crucial role. It helps the addressee pick the correct mental representation by indicating to him the degree of accessibility with which the mental representation is currently entertained. The claim is that each referring expression specializes for a specific degree of mental accessibility, hence the term *accessibility markers* for referring expressions. On this view, addressees search mental representations not only based on the content of the referring expression, but also based on the degree of accessibility indicated by the speaker.

Since mental accessibility comes in a rich array of degrees, accessibility markers can be graded on a scale of accessibility marking, some indicating very low degrees of mental accessibility, others indicating various intermediate and high degrees of accessibility. The following partially grammaticized (see Ariel, 2001) accessibility marking scale, starting with very low accessibility markers and ending with extremely high accessibility markers, has been proposed in Ariel (1990), but the list is not intended to be exhaustive:

(3) Full name + modifier > full name > long definite description > short definite description > last name > first name > distal demonstrative + modifier > proximate demonstrative + modifier > distal demonstrative + NP > proximate demonstrative + NP > distal demonstrative (-NP) > proximate demonstrative (-NP) > stressed pronouns + gesture > stressed pronoun > unstressed pronoun > cliticized pronoun > verbal person agreement markers > zero.

For example, *the affair between Helen and Paul* in (1) is a long definite description. The prediction is that it indicates a mental representation that is not as accessible as the shorter *the review* or *he*. Indeed, *the review* is what the interlocutors have been

discussing. But the affair, as such, was not explicitly mentioned in the conversation, and in fact, according to Lori, it's not even clear that there was one. *He* (a pronoun) refers to the highly accessible Paul, who was just mentioned.

Now, the correlations between specific referring expressions and specific degrees of mental accessibility are not arbitrary. This is why (3) is virtually a universal. By and large, the accessibility marking scale is governed by three coding principles: informativity, rigidity, and attenuation. Informativity predicts that more informative expressions be used when the degree of accessibility is relatively low. It is only reasonable for the speaker to provide the addressee with more information if the mental representation is not (highly) activated, so he can better identify the intended entity from among the many he entertains at a low degree of accessibility. Rigidity predicts that a (more) uniquely referring expression (such as a proper name), rather than a relatively nonrigid expression (such as a pronoun), should be used when degree of accessibility is low (cf. *Helen*, *Paul* with *her*, *he* in [1]). Finally, attenuation predicts that greater phonological size (including the presence of stress) correlates with lower degrees of accessibility, whereas smaller phonological size correlates with higher degrees of accessibility (cf. definite descriptions vs. pronouns, and even more so with zero).

The three principles overlap to a large extent. Quite often, informative expressions are also relatively rigid and unattenuated. However, this is not invariably so. *The newspaper* and *United States of America* are as informative and rigid as *the paper* and *US*(*A*), respectively, but they are not as attenuated. Accordingly, the lower accessibility markers are found in contexts where a lower degree of accessibility is the case (see Ariel, 2001, *inter alia*). Similarly, in languages with verbal person agreement, there is no difference in the informativity and rigidity between independent pronouns (e.g., Hebrew *ani*, 'I') and the corresponding agreement marker (+*ti* for past tense). But distributional patterns show that the independent pronoun (less attenuated) is used when the speaker is less accessible. Finally, for Western names, it's usually the case that first and last names are equally informative and attenuated, but they are not equally rigid. Last names tend to pick a referent more uniquely than first names (simply because there is a greater variety of last names). Accordingly, Ariel (1990: 45) correlates the two types of names with different textual positions, showing that anaphoric first names mostly find their antecedents within the same paragraph, but last names have three times as many cross-paragraph anaphoric relations. This points to the lower degree of accessibility indicated by last names.

Distance between a previous and a current mention of the entity (recency) is indeed one important factor determining degree of accessibility. Naturally, the longer the time elapsed between the previous and the current reference, the less activated the representation, so that relatively lower accessibility markers are called for. Note that the relationship between the antecedent and the anaphor, their Unity, is not simply measured in number of words (only), but rather, syntactic boundaries (e.g., the clause), textual boundaries (the paragraph, the episode), and pragmatic boundaries (units more vs. less cohesively linked to each other) define the closeness between a potential antecedent and its anaphor, dictating higher or lower accessibility markers depending on how 'distant' the two are from each other. When a discourse entity is inferred based on another, we similarly see differences according to how automatic/stereotypic the inference connecting the two is (cf. *her heart* in [2], which is easily inferred from *her*, given that humans have hearts, with *his sense of character values* based on *his* referring to *Mister Forster* – SBC: 023, where we don't automatically assume that people have a "sense of character values"). Empirical evidence for these Unity claims can be found in Clancy (1980), Sanford and Garrod (1981), Givón (1983), and Ariel (1985a and onward).

Unity features mostly pertain to anaphoric references. Referent salience is important for all types of reference, first-mention referential expressions included. Some discourse entities are inherently more salient: the speaker and addressee (vs. third persons), humans (especially vs. inanimates), and famous personalities (vs. anonymous people). Other discourse entities have a prominent *ad hoc* status, mostly because they constitute discourse topics. The predictions are then that higher accessibility markers will serve these more salient discourse entities. Competition over the role of intended referent between potential mental representations may, however, lower the degree of accessibility of each, mainly of nontopics. It then calls for lower accessibility markers:

(4) MARY: What I have to do,
is take off **the distributor wire**$_i$,
and splice **it**$_i$ in with **the fuel pump wire**$_j$.
Because **my** . . . **fuel pump**$_j$ is now electric, (SBC: 007).

(5) In the reference, each author is referred to by name and initials. There is a single exception – to avoid the possibility of confusion, first names are always included for **David Payne**, **Doris Payne**, **John Payne**, **Judith Payne** and **Thomas Payne** (Dixon, 1994: xvi–xvii).

In (4), the more topical entity is coreferred to by *it*, the nontopic by an informative lexical NP (*my fuel pump*). In (5), presumably equally accessible entities are all referred to by lower accessibility markers (full names), because they compete with each other (initial + *Payne* is not rigid enough in this context).

It is important to remember, however, that accessibility theory makes claims about correlations between referring expressions and degree of accessibility, measured as a total concept, rather than by any one of its components (e.g., topic, distance, or competition). In other words, the prediction is that accessibility marker selection is determined by weighing together a whole complex of accessibility factors, which together determine what the degree of accessibility of a given discourse entity is at the current stage of the discourse (see Toole, 1996; Ariel, 1999). This is why, for example, even speakers are not invariably referred to by the highest accessibility markers (zero in Hebrew). Although the speaker is a highly salient discourse entity, if she's not topical or if it's competing with another antecedent, it may be referred to by an independent pronoun.

Finally, accessibility theory is universal (see Ariel, 1990: 4.2), although not all languages have exactly the same set of referring expressions, and even when these seem to be identical, they may rate differently for the three coding principles (informativity, rigidity, and attenuation, e.g., cf. English and Japanese pronouns). Provided they are comparable, all referring expressions are predicted to indicate the same relative, though not absolute, degrees of accessibility. Thus, in all languages zeroes indicate a higher degree of accessibility than pronouns, but not all languages allow cross-sentential zero anaphora. Accessibility theory applies to all genres/registers (see Ariel, in press). In fact, because accessibility related discourse patterns are so common in diverse registers and languages, we can account for various cross-linguistic grammaticization paths. For example, the recurrent creation of verbal person agreement markers for first/second persons, but not for third persons (via the cliticization of the high accessibility markers used for the very salient speaker and addressee; see Ariel, 1998b, 2000), as well as universal constraints on the use of resumptive pronouns (see Ariel, 1999). At the same time, accessibility constraints may be violated to create special pragmatic effects (e.g., *Jamie the old lady* (SBC: 002) is too low an accessibility marker, when used by Jamie's husband in her presence).

See also: Articles, Definite and Indefinite; Deixis and Anaphora: Pragmatic Approaches; Demonstratives; Pronouns.

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Achumawi-Atsugewi *See:* Hokan Languages.

Acquired Impairments of Written Language

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Introduction

An adult individual who acquired normal reading and spelling skills may lose these abilities after cerebral damage. Reading and spelling may be impaired either in isolation after a lesion to the brain areas that are specifically involved in storing or processing orthographic representations, or in accompaniment with aphasia, i.e., in association with more general language disorders.

Phylogenetic Observations

Language is a function that has developed during the natural evolution from the primate to the human species. The phylogenetic and ontogenetic development underlying language acquisition is based on neuroanatomical and functional units that are genetically determined. This assumption is clearly demonstrated for the acquisition of oral language, but the generalization to the functional units specifically devoted to the processing of written language is more difficult to maintain. In fact, the use of written language has emerged much more recently, i.e., not much earlier than 6000 years ago, and – even more crucially – part of the human population is still illiterate or has become literate only during the last few generations. Despite that, every child has the identical capacity of acquiring the ability to read and write, irrespective of the degree of literacy achieved by his/her social and ethnic group.

Writing Systems

Populations from different parts of the world developed different systems for transcribing oral language representations in a sequence of written symbols. Even if such a distinction is clearly too simplistic, the writing systems adopted all around the world may be distinguished along the major dichotomy of ideographic and alphabetic writing systems. In ideographic writing systems, symbols correspond to the meaning of words. In alphabetic writing systems, each symbol (or set of symbols) corresponds to a sound (or set of sounds).

The major advantage of alphabetic systems derives from their regularity and from the possibility of combining few (usually 20–50) symbols in strings of letters. However, it must be kept in mind that, in particular for languages whose orthography has been codified several centuries ago (such as French or English), the correspondence between symbols and sounds (graphemes and phonemes) may not be regular anymore.

The major advantage of ideographic systems (e.g., the Chinese one) derives from the possibility that a unique written code may be shared (i.e., may be understood) by many populations speaking fully different dialects or languages. However, most ideographic writing systems are in fact intermediate systems, where ideograms are mixed with characters

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An adult individual who acquired normal reading and spelling skills may lose these abilities after cerebral damage. Reading and spelling may be impaired either in isolation after a lesion to the brain areas that are specifically involved in storing or processing orthographic representations, or in accompaniment with aphasia, i.e., in association with more general language disorders.

Phylogenetic Observations

Language is a function that has developed during the natural evolution from the primate to the human species. The phylogenetic and ontogenetic development underlying language acquisition is based on neuroanatomical and functional units that are genetically determined. This assumption is clearly demonstrated for the acquisition of oral language, but the generalization to the functional units specifically devoted to the processing of written language is more difficult to maintain. In fact, the use of written language has emerged much more recently, i.e., not much earlier than 6000 years ago, and – even more crucially – part of the human population is still illiterate or has become literate only during the last few generations. Despite that, every child has the identical capacity of acquiring the ability to read and write, irrespective of the degree of literacy achieved by his/her social and ethnic group.

Writing Systems

Populations from different parts of the world developed different systems for transcribing oral language representations in a sequence of written symbols. Even if such a distinction is clearly too simplistic, the writing systems adopted all around the world may be distinguished along the major dichotomy of ideographic and alphabetic writing systems. In ideographic writing systems, symbols correspond to the meaning of words. In alphabetic writing systems, each symbol (or set of symbols) corresponds to a sound (or set of sounds).

The major advantage of alphabetic systems derives from their regularity and from the possibility of combining few (usually 20–50) symbols in strings of letters. However, it must be kept in mind that, in particular for languages whose orthography has been codified several centuries ago (such as French or English), the correspondence between symbols and sounds (graphemes and phonemes) may not be regular anymore.

The major advantage of ideographic systems (e.g., the Chinese one) derives from the possibility that a unique written code may be shared (i.e., may be understood) by many populations speaking fully different dialects or languages. However, most ideographic writing systems are in fact intermediate systems, where ideograms are mixed with characters

or parts of characters bearing morphological and/or phonological information.

Reading and Spelling Impairments in Classical Aphasiology

The first model of reading and spelling and of the cerebral implementation of written language was developed by Carl Wernicke (1874) based on the reading and spelling deficits observed in aphasic patients.

A few years later (1883), Charcot developed his famous anatomofunctional model in which he represented oral and written input and output modalities as symmetric and independent processing units (Figure 1).

A symmetric independent organization of written language with respect to oral language was rejected by Lichtheim (1885), who proposed a dependent asymmetric model (see Figure 2) in which a reading (O) and a spelling center (E) both depend upon a center of auditory images of words (A). In a later study, Wernicke (1885–1886) partly accepted Lichtheim's diagram, but suggested a reanalysis of the operations underlying the processing of written language: he first excluded a symmetrical organization with respect to oral language, but he also refuted the notion of a complete subordination of written to oral language. In his final model, he opposed a diagram of written language in which letters are the atomic processing units to a model of oral language in which words are the atomic units (*wir sprechen nicht buchstabierend*, 'we do not speak letter-by-letter [in fact sound-by-sound]'). To support his hypothesis, he introduced an abstract unit (gamma), which is neither sensory nor motor, but allows the mapping of oral lexical units to the corresponding letter strings and the mapping of letter strings to the corresponding (oral) words (for an extensive discussion of Wernicke's [1885–1886] thought, see De Bleser and Luzzatti, 1989). (It must be underlined that at that time, the linguistic theory did not conceive yet of a segmentation of words into further abstract units of representation, i.e., the phonemes.)

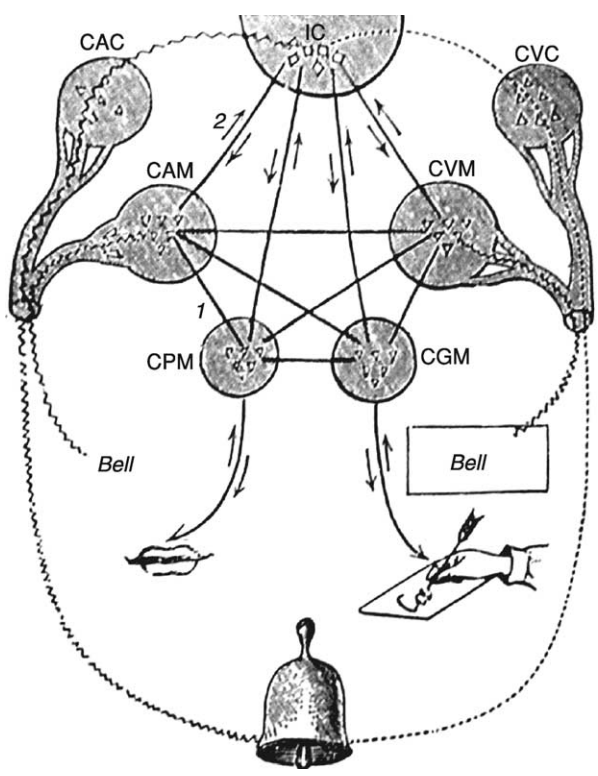

Figure 1 Charcot's diagram (1883). The sound of a bell is identified through the common auditory center (CAC); the spoken word *bell* is identified through the center of auditory memory of words (CAM); the image of a bell is identified through the common visual center (CVC); the written word *bell* is identified through the center of visual memory of words (CVM); the word *bell* is pronounced through the center of articulatory movements (CPM); the word *bell* is written through the center of graphic movements (CGM); the concept of a bell is stored in the ideatory center (IC).

Pure Forms of Reading and Writing Disorders

On the basis of clinical descriptions and later autopsy of two patients suffering from isolated impairment of written language, Déjerine (1891, 1892) developed an anatomofunctional model of reading and spelling that remained unchallenged until the second half of the 20th century. In the first patient, suffering from a reading and spelling disorder in absence of any deficit of oral language (alexia with agraphia), the lesion causing the impairment was confined to the left angular gyrus. The second patient suffered from right hemianopia and complete alexia with the exception of single digits (pure alexia, i.e., alexia without agraphia); the lesion in this case involved the left occipital lobe, extending to the splenium of the corpus callosum.

On the basis of his clinical observations, Déjerine developed an anatomical model of written language. In his diagram (see Figure 3) the angular gyrus is considered to be the store of all acquired orthographic representations (using his terminology,

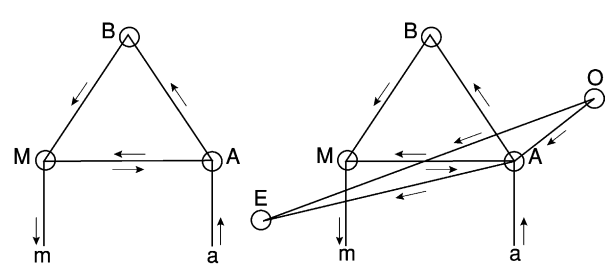

Figure 2 Lichtheim's (1885) model of oral and written language. Left, oral language. Right, oral + written language: dependent asymmetric model in which a reading (O) and a spelling center (E) depend both on the center of auditory images of words (A).

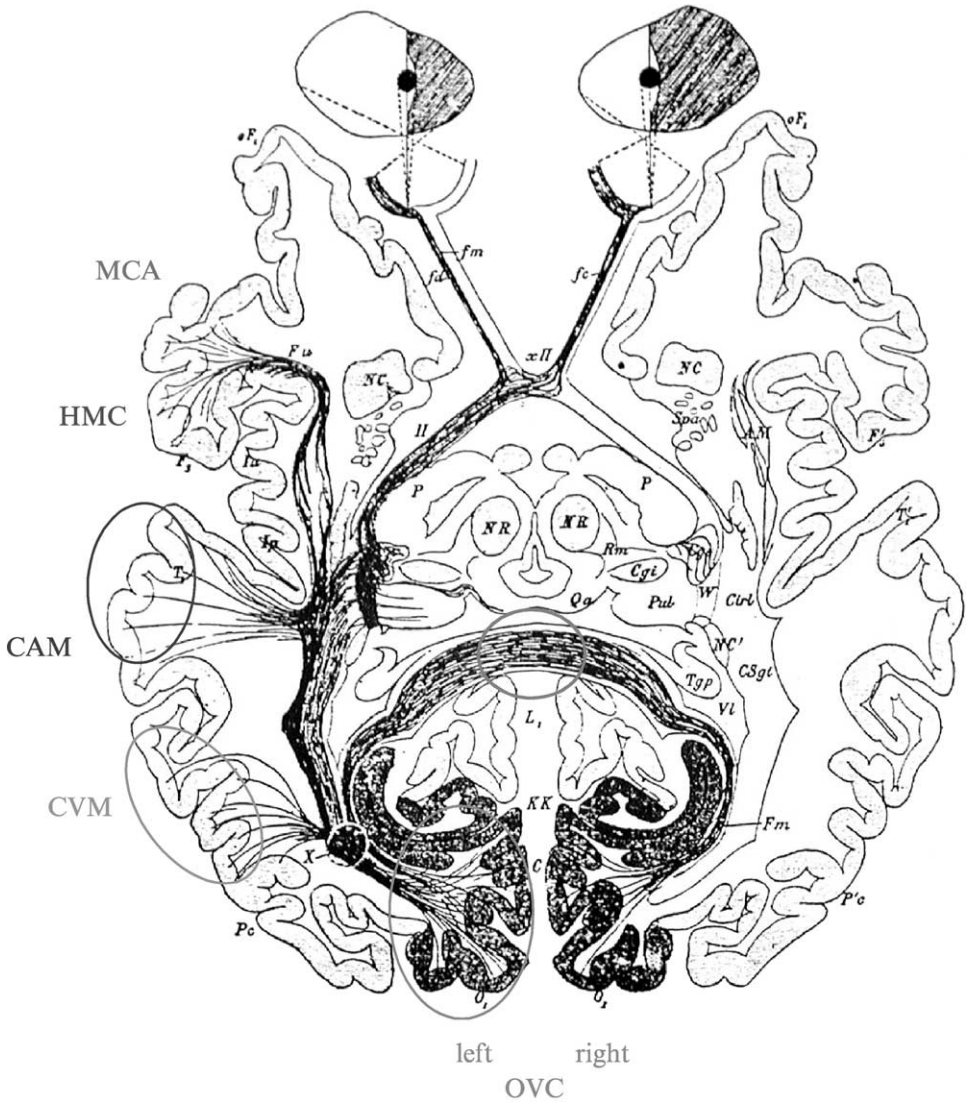

Figure 3 Déjerine's anatomical model of written language. CVM: center of visual memories; OVC: occipital visual center; CAM: center of auditory memories (i.e., the Wernicke's area); MCA: motor center of word articulation (i.e., Broca's area); HMC: hand motor center. Alexia with agraphia would be caused by a damage to CVM, while pure alexia by damage to the left OVC and isolation of CVM from the controlateral right OVC.

the center of visual memories, CVM). The visual images of letters and words are perceived either in the left or the right occipital visual center (OVC) and projected to CVM for identification and further on to the center of auditory memories (CAM, i.e., Wernicke's area) for lexical (and semantic) access. Letter and word naming would require the further connection to the motor center of word articulation (MCA, i.e., Broca's area). On the contrary, written spelling would flow from CAM to CVM and further on to the hand motor center (HMC) where the graphic motor patterns of letters are stored.

Following Déjerine functional-anatomical model, alexia with agraphia would be caused by a damage to the CVM, while pure alexia by damage to the left OVC and isolation of CVM from the contralateral right OVC, due to the splenial lesion of the corpus callosum.

Cognitive Models of Reading

Déjerine's anatomical and functional model remained for many decades the standard reference for the analysis and explanation of reading and writing impairments. However, the qualitative analysis of the reading performance of some aphasic patients (Marshall and Newcombe, 1966, 1973) pointed out that none of the classical models could account for several of the phenomena, such as the emergence of semantic substitutions, grammatical class effects

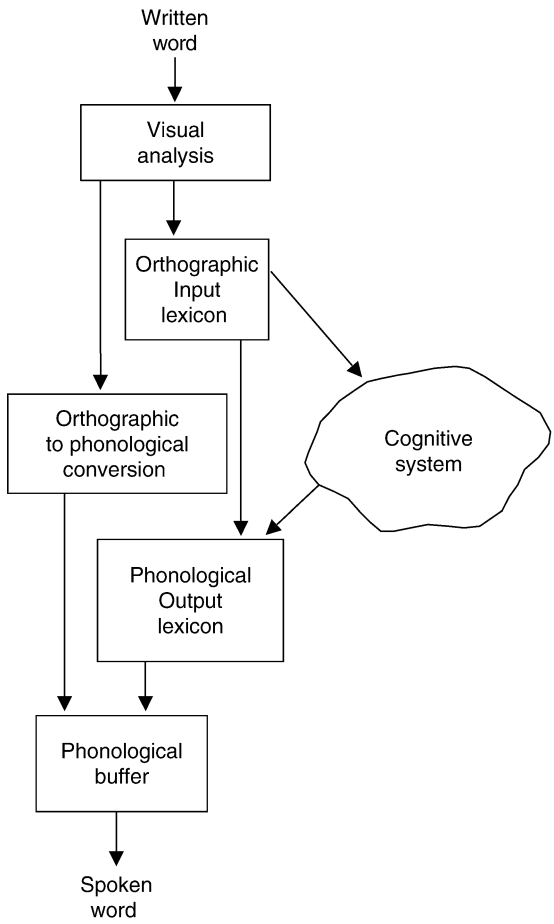

Figure 4 Dual-route model of reading. Lexical and subword-level routes of reading.

(better performance on nouns than on function words), imageability effects (better performance on concrete words), and word frequency effects (better performance on higher frequency words). Furthermore, the classical models did not consider some aspects of reading performance such as selective damage of irregular words or the inability of some patients to read regular nonwords (possible but nonlexical orthographic strings). These observations were consistent with the model of reading (the logogen model) developed in this period by Morton (1969, 1980).

Dual Route Models of Reading

The ability a normal subject has to read regular nonlexical strings as well as words with irregular or unpredictable orthography (e.g., *yacht*, *pint*, or the ambiguous pronunciation of the letter string EA in *dear*, *bear*, *heart*, or *steak*) suggest two complementary reading procedures, a subword level and a lexical level (Figure 4).

The subword-level procedure allows the conversion of a string of graphemes into their corresponding phonemic string. The route is based on basic sublexical orthographic-to-phonological conversion rules, and accounts for reading regular words (i.e., words with fully predictable pronunciation such as *dog* or *cake*) and nonlexical but possible orthographic strings (nonwords), such as *balt* or *mable*.

The lexical procedure assumes the existence of two lexical stores listing the orthographic and phonological representations of words whose orthography and/or phonology have already been learned by an individual. Naming a written word requires the activation of its orthographic form in an orthographic input lexicon. This lexical unit activates the underlying conceptual knowledge and later on the corresponding phonological representation from a lexical mental store (the phonological output lexicon).

The lexical route is quicker than the subword-level procedure and automatically activates word meaning, but can be used only for words whose orthography is already known by a subject, and not for nonlexical orthographic strings, and is finally the only possible route to read words with irregular or unpredictable orthography.

The phonemic string generated along either reading route is further conveyed to the phonemic buffer, a short-term store interfacing the phononogical representations with those devoted to the articulatory planning.

Lexical Analogy Models

In English, words containing letter strings with ambiguous pronunciation (*veal*, *deaf*, *steak*) are named more slowly than words with no ambiguity (Glusko, 1979). This difference has been explained as an interaction of subword-level procedures even when reading highly frequent words, and indicates that both word and nonwords are read accessing the phonological lexical representations of known words. Words stored in the orthographic lexicon would be linked for orthographic similarity. A written string (word or nonword) would activate all linked lexical strings. This would allow, by analogy, pronunciation of nonwords.

Reading Impairments in a Cognitive Neuropsychological Frame

The dual route information processing model described so far predicts the possible impairment of either reading route, namely selective damage to either the subword level, or the lexical reading procedure. In fact, some patients suffering from acquired language impairments show exactly the predicted pattern of damage.

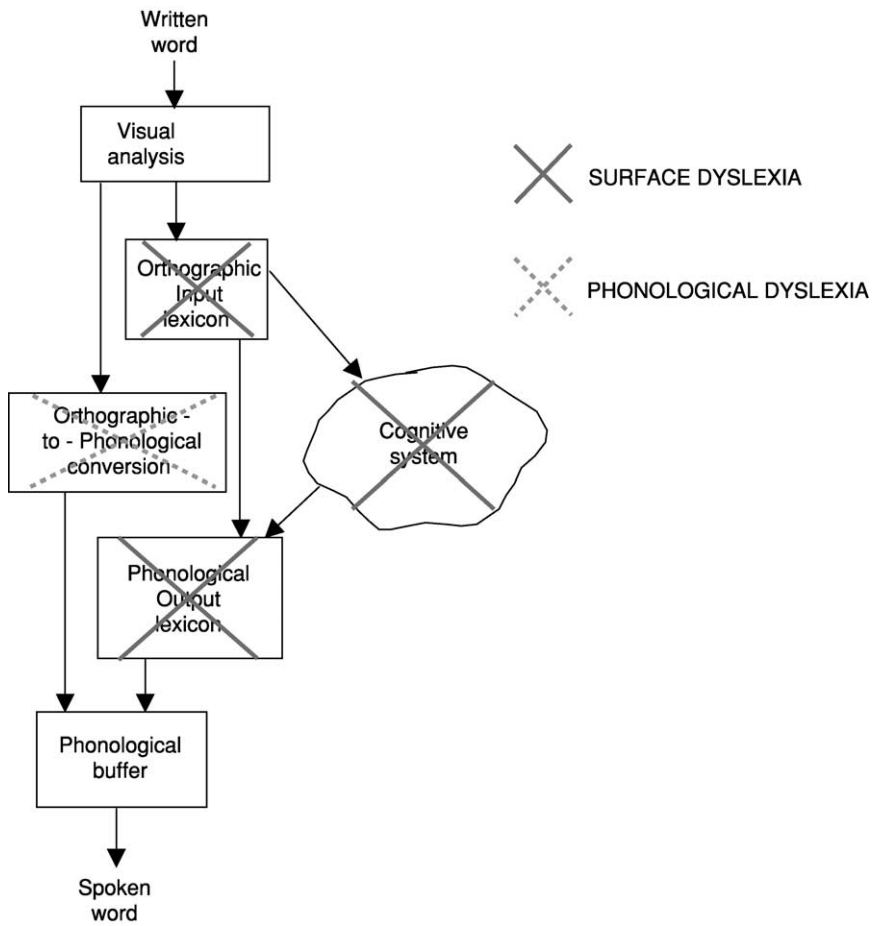

Figure 5 Dual-route model of reading. Functional lesions causing phonological and surface dyslexia.

Table 1 Principal patterns of damage characterizing phonological and surface dyslexia[a]

	Phonological dyslexia	*Surface dyslexia*
Regular words	+	+
Irregular words	+	−(→regular)
Nonwords	−	+
Lexical effects (WF, Gram. class, Concr.)	yes	no
Length effect	no	yes

[a]The symbol + indicates no or mild disorder, the symbol − indicates more severe disorder. WF = word frequency; Gram. class = grammatical class; Concr. = concreteness; → regular = regularization of irregular words.

Phonological or Surface Dyslexia

Damage to the grapheme-to-phoneme conversion rules is usually called phonological dyslexia, while damage to the lexical route goes under the label of surface dyslexia (Figure 5). Table 1 summarizes the principal aspects of these two major types of reading impairment.

Direct Dyslexia

The observation of patients who could read irregular words but not understand them (e.g., the case W. L. P. of Schwartz *et al.*, 1980) suggested a direct connection of the orthographic input lexicon to the phonological output lexicon, by-passing the underlying conceptual knowledge.

Deep Dyslexia

As already mentioned, some patients make semantic reading errors (e.g., they read *dog* instead of *hound* or *tree* instead of *wood*). Semantic paralexia is a phenomenon observed in some cases presenting with the pattern of errors similar to that described for phonological dyslexia (selective damage to the subword-level reading route); this reading impairment may be associated with grammatical class effects (nouns are read better than verbs or function words) and imageability effects (concrete words are read better than abstract words). Together, this peculiar type of reading disorder is called deep dyslexia. It often characterizes the reading performance of severe agrammatic patients. One explanation for this is the emergence of

right hemisphere linguistic abilities after extensive damage to the left hemisphere language areas (Coltheart, 1980, 2000).

Letter-by-Letter Reading

This type of reading impairment usually appears in isolation from other language disorders and corresponds to the classical concept of pure alexia (Déjerine, 1892). Patients are unable to name a target word either through the lexical or the subword-level route. However, they may still be able to name the letters of words, but the procedure is typically slow and often ineffective. There is a strong word length effect, but no word frequency or word class effect (Patterson and Kay, 1982; Kinsbourne and Warrington, 1962; Coslett and Saffran, 1989).

Neglect Dyslexia

Another type of reading impairment arises in association with visuospatial neglect, due to a hemi-inattention and/or a left side representational impairment of the visual field, body, and extrapersonal space. In a word-naming task, patients neglect the left side of words. Reading errors may be either omissions (e.g., *race* for ***terrace***) or substitutions (e.g., *window* for ***meadow***). When reading a string of words, patients usually start from the middle of the string, leaving out the left side of it; they are often unaware of their impairment (anosognosia).

Diagnosis of Reading Impairments

To analyze the nature of an acquired reading impairment, three major tasks should be used: lexical decision, semantic judgment, and reading aloud. In a lexical decision task patients are asked to decide whether strings of letters are real words or nonwords. In a semantic judgment task, patients are asked to make decisions about the meaning of words they may not be able to read (e.g., whether a certain word refers to an edible or nonedible item). According to contemporary reading models, a reading task should include words with both regular and irregular letter-to-sound correspondence and nonwords. The second set of stimuli should only be read along the lexical route, the third along the grapheme-to-phoneme conversion route, while the first set may be read along both routes. Lists of words should also vary by grammatical class, word length, word frequency, and morphological complexity (cf. the PALPA test by Kay *et al.*, 1992). The National Adult Reading Test (NART; see Nelson, 1982) assesses the ability to read words with irregular letter-to-sound correspondence. It has been standardized on a large sample of English-speaking normal adults. As expected, the NART score correlates highly with the education level.

Clinical Neuropsychological Classification of the Spelling Impairments

During the first half of the 20th century, clinical neuropsychologists distinguished six types of spelling disorders: aphasic agraphia, alexia with agraphia (see Déjerine's model of written language), pure agraphia, apraxic agraphia, callosal agraphia, and visuospatial agraphia.

Aphasic Agraphia

The spelling impairment mirrors the clinical aspects of the oral language impairment. In addition to the deficit that arises from the right hand motor impairment that often co-occur with language dysfunction, most aphasic patients suffer from a widespread writing disorder with letter omissions, substitutions, perseverations, and spontaneous repairs. Severe fluent language impairments often assume the characteristics of a jargon agraphic output (neologisms), while nonfluent language impairments are often in association with a deficit in realizing the orthographic strokes of letters.

Alexia with Agraphia

See 'Pure forms of reading and writing disorders.'

Pure Agraphia

This is the type of spelling impairment predicted and described by Charcot (1883) in his early model under the label of motor aphasia of the hand. It is a damage to orthographic representations and therefore involves handwriting as well as oral spelling or writing on a keyboard. It has been described for left parietal and in some rare cases for left frontal lesions.

Apraxic Agraphia

In this type of writing impairment oral spelling and typing on a keyboard are spared. The inability to realize letter symbols may follow either a failure to retrieve letter forms from memory or to a difficulty in realizing these forms graphically and combining individual letter strokes appropriately. The disorder cannot be traced back to an ideomotor or constructional apraxic deficit, since both types of apraxia may not involve writing abilities and, vice versa, apraxic agraphia may emerge without any major apraxic deficit.

Callosal Agraphia

This type of impairment is usually caused by anteromedial damage to the corpus callosum. Agraphia appears in this case for the left hand only (due to a

disconnection from left-hemisphere writing centers). It is often associated with left-hand apraxia and left-hand tactile anomia.

Visuospatial (Neglect) Agraphia

By analogy to neglect dyslexia (see above), there is also a spelling disorder that may arise in association with left spatial neglect. Patients may produce writing and spelling errors that only involve the left side of words. This phenomenon was interpreted as a left-side neglect of mental orthographic representations (Baxter and Warrington, 1983).

Cognitive Models of Spelling

In analogy to the dual route models of reading, cognitive psychologists have also developed dual route models to describe the spelling performance of normal adult subjects. These models assume two independent procedures, a lexical route along which words are processed as a whole, and a subword-level routine based on phoneme-to-grapheme conversion rules (see Figures 6 and 7). A dual-route model offers the best account so far for the ability of a literate subject to spell both irregular words and legal nonwords. Once again, the major evidence for a dual-route model of spelling derives from the observation of aphasic patients suffering from acquired spelling disorders (Beauvois and Dérouesné, 1981; Shallice, 1981; Baxter and Warrington, 1985; Harris and Coltheart, 1986; Patterson, 1986).

As with the lexical route of word naming, the lexical route of writing (to dictation) implies two stores listing the phonological and orthographic lexical knowledge of a subject and another lexical semantic store. After auditory analysis, input words activate phonological lexical knowledge stored in the phonological input lexicon. Stored lexical knowledge spreads activation to the underlying conceptual knowledge, which in turns activates the orthographic output knowledge stored in the orthographic output lexicon.

This procedure allows one to spell regular and irregular words whose orthography had already been learned, but cannot be used when spelling new words or nonwords; it is the only procedure available for spelling irregular words.

Sub-word-level procedures permit one to convert a string of sounds into its corresponding orthographic string, following phoneme-to-grapheme conversion rules. This procedure allows one to spell regular words and nonlexical phonemic strings (nonwords).

The routine can be divided in several sequential components: after auditory analysis, the continuous flow of sounds has to be segmented and further translated into the underlying phonemic string

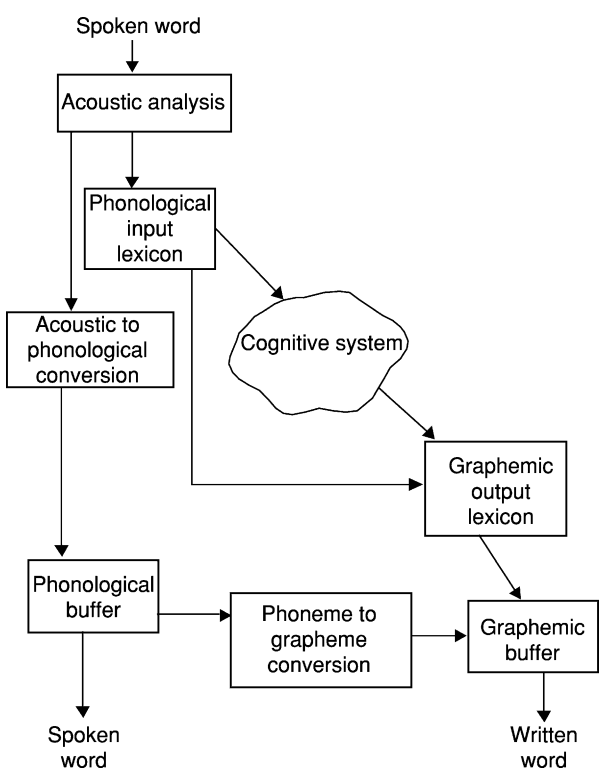

Figure 6 Dual-route model of spelling. Lexical and subword-level routes of spelling.

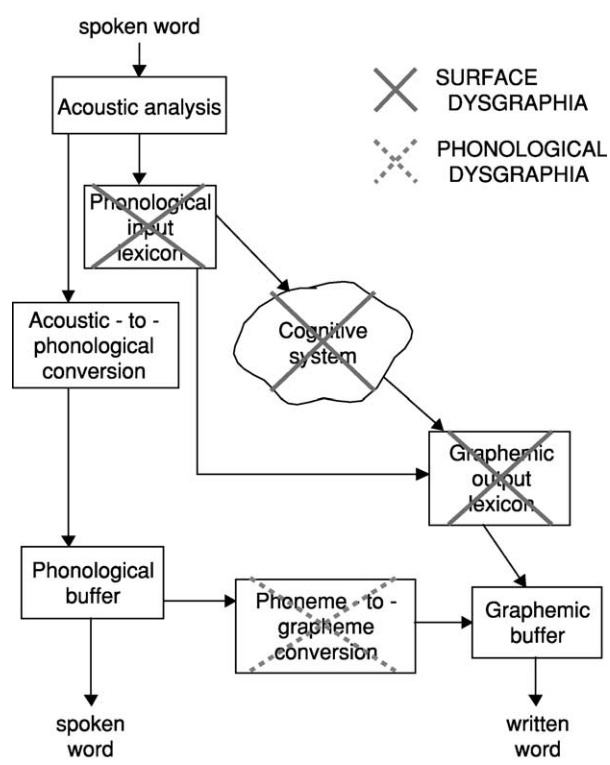

Figure 7 Dual-route model of spelling. Functional lesions causing phonological and surface dysgraphia.

(auditory-to-phonological conversion); the string is then reassembled in the phonemic buffer, and then conveyed to sequential translation by the phoneme-to-grapheme conversion rules into its appropriate graphemic string.

Both spelling procedures feed the graphemic buffer, a short-term memory store controlling the temporal sequencing of the selected graphemic string, and interfacing the abstract orthographic units with more peripheral processing units underlying different output modalities (handwriting, writing on a keyboard, and oral spelling).

Spelling Impairments in a Cognitive Neuropsychological Frame

The spelling disorder an adult subject may acquire after focal brain damage is caused by an impairment of the lexical and/or the subword-level spelling route.

Damage to phoneme-to-grapheme conversion procedures causes a spelling impairment that is usually called phonological dysgraphia. The alternate pattern of impairment is called surface dysgraphia and follows damage to the lexical route of spelling. Table 2 summarizes the contrasting phenomena characterizing these two types of dysgraphia.

Deep Dysgraphia

By analogy to reading impairments, there is a subtype of phonological dysgraphia called deep dysgraphia, which is characterized by the emergence of semantic errors. The spelling impairment in deep dysgraphia is usually associated with grammatical class (nouns are spelled better than verbs or function words) and imageability effects (concrete words are spelled better than abstract words).

Graphemic Buffer Disorders

This is a spelling disorder in which graphemic substitutions predominate. However, with respect to the previous types of dysgraphia, in graphemic buffer dysgraphia the orthosyllabic structure of the stimulus is preserved (vowels are substituted to other vowels, consonants are substituted by consonants, and the structure of clusters and doubled consonants is preserved). A comparable impairment emerges both for words and nonwords. This set of phenomena suggests that substitutions arise at an advanced stage of the spelling processes, i.e., in a phase where the orthosyllabic structure of the stimulus to be spelled has already been formed.

Table 2 Principal patterns of damage characterizing phonological and surface dysgraphia[a]

	Phonological dysgraphia	*Surface dysgraphia*
Regular words	+	+
Irregular words	+	−(→regular)
Nonwords		+
Lexical effects (WF, Gram. class., Concret.)	yes	no
Length effects	no	yes

[a] The symbol + indicates no or mild damage, the symbol − more severe impairment. WF = word frequency; Gram. class = grammatical class; Concr. = concreteness; → regular = regularization of irregular words.

Peripheral Dysgraphia (Allographic Dysgraphia)

This is a set of writing impairments originating at a peripheral stage with respect to the graphemic output buffer. It usually involves handwriting, leaving oral spelling and the ability to write on a keyboard unimpaired. Some patients are unable to distinguish lower- and upper-case letters, mixing these two sets of characters during handwriting.

This impairment must be distinguished from apraxic dysgraphia (see above), because the output observed in allographic dysgraphia may be fluent and letter shapes are typically well formed.

Diagnosis of Spelling Impairments

In analogy to reading tasks, writing tasks should contain several sets of items, i.e., words with regular spelling, words with irregular spelling, and nonwords. Words should vary for grammatical class, word length, word frequency and morphological complexity. Finally, patients should be tested for oral and written spelling, copying, delayed copying, and repetition. Cognitive neuropsychologists studying patients for their writing disabilities usually devise their own lists of items designed specifically to test certain aspects of the patient under study.

Spelling abilities may be assessed in English-speaking subjects using the PALPA test (Kay *et al.*, 1992). The test includes writing and spelling of regular and irregular words (from different grammatical classes and of variable length and frequency), writing and spelling of nonwords, and written naming of object pictures.

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Actantial Theory

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The term 'actant' was borrowed from the French linguist Lucien Tesnière by the semiotician Algirdas Julien Greimas (1917–1992), founder of the Paris School of semiotics who held a yearly research seminar for more than 30 years that is still active today (Coquet, 1982). Tesnière (1969: 102) defined actants as "beings or things that participate in processes in any form and in anyway whatsoever, be it only a walk-on part and in the most passive way." For him, the verbal nucleus of a sentence represented a sort of minor drama in the theatrical sense or a process expressed by the verb and whose dependents are substantives (actants that can be defined as that which undertake or undergo an act) and adverbs (circumstances of time, place, goal, cause, etc. in which the action unravels). At the structural syntactical level, actants designate the characters in the drama, the verb designates the process, and the circumstants designate the situation. The actant therefore designates a type of syntactic unit that is formal in character but in a distinct relationship to the predicate and the circumstants. Whereas the number of circumstants can vary greatly, there can only be three actants: the subject, the object of an active verb or the agent of a passive verb, and the beneficiary.

However, Greimas's definition of the term actant departed from Tesnière's and evolved over the course

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Actantial Theory

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The term 'actant' was borrowed from the French linguist Lucien Tesnière by the semiotician Algirdas Julien Greimas (1917–1992), founder of the Paris School of semiotics who held a yearly research seminar for more than 30 years that is still active today (Coquet, 1982). Tesnière (1969: 102) defined actants as "beings or things that participate in processes in any form and in anyway whatsoever, be it only a walk-on part and in the most passive way." For him, the verbal nucleus of a sentence represented a sort of minor drama in the theatrical sense or a process expressed by the verb and whose dependents are substantives (actants that can be defined as that which undertake or undergo an act) and adverbs (circumstances of time, place, goal, cause, etc. in which the action unravels). At the structural syntactical level, actants designate the characters in the drama, the verb designates the process, and the circumstants designate the situation. The actant therefore designates a type of syntactic unit that is formal in character but in a distinct relationship to the predicate and the circumstants. Whereas the number of circumstants can vary greatly, there can only be three actants: the subject, the object of an active verb or the agent of a passive verb, and the beneficiary.

However, Greimas's definition of the term actant departed from Tesnière's and evolved over the course

of the years. It was initially worked out in *Structural semantics* (1983) and must be situated within the general economy of his semiotic theory. Following the Danish linguist Louis Hjelmslev, Greimas stated that semiotic theory must be submitted to the principle of empiricism, which demands that it fulfill three hierarchically organized conditions: the condition of coherence (or of noncontradiction), the condition of exhaustibility, and the condition of simplicity.

Greimas's point of departure, which owes a great deal to Claude Lévi-Strauss and Roman Jakobson with respect to its methodological and theoretical underpinnings, was that the investigation of meaning is by definition a metalinguistic activity that paraphrases and translates words and utterances by means of other words and utterances. For him, the first step in describing signification resided in the transposition of one level of language into another level, of one language into another language. Since meaning could be described as this very possibility of transcoding, it was necessary to develop a new terminology and construct an adequate metalanguage that could account for the object in question. Thus, to uncover the 'mythological signified,' Greimas (1987: 3–16) endeavored to work out a rigorous methodology based on objective criteria of analysis partially adopted from structural linguistics, which had, at the time, more or less abandoned research in the area of semantics. Much in the same way that Lévi-Strauss overanalyzed the Oedipus myth, Greimas began by 'overanalyzing' Georges Dumézil's work on myth, considered as the translation of mythological language into ideological language. In short, he proposed a new formulation of Dumézil's analysis using the study of myth and the structural methodology borrowed from the social sciences to examine the superstructures of social ideologies. This constituted a major development from a semiotic point of view since in Hjelmslev's terms a 'connotative semiotics' was transformed into a 'denotative semiotics' that, for him, was a precondition for an adequate description of a text.

By reducing the problem of meaning to its minimal dimensions (i.e., to the transcoding of significations), 'scientific' activity in this domain consisted of establishing techniques of transposition. (For definitions and interdefinitions of terms, see Greimas and Courtés, 1982, 1986). The main feature in the analysis of Dumézil's work can be found in the conversion of the syntagmatic manifestation of myth into paradigmatic relations or, in other words, in the setting up of correlations between a limited number of units of the mythic signified distributed throughout the narrative. A relevant level was defined and a discourse, based on the principle of interdefinition, was constructed on the mythological object as a first important methodological step. However, this new formulation of Dumézil's text does not correspond *stricto sensu* to formalization, as defined, for example, by logicians in formal theory. From the outset, semiotics was not considered a formal language as such but, rather, an intermediary stage toward explanation – toward giving a more scientific account of meaning.

The conclusions of this study clearly pointed to the insufficiencies of Lévi-Strauss's paradigmatic definition of myth, despite the real gains made in adopting the preceding methodological perspective. The structural anthropologist considered the myth as a correlation of two pairs of units of the signified that are in significant opposition to each other and that exclude any syntagmatic relations. Greimas did use methodological procedures borrowed from structural anthropology and even refined major constituent units by breaking them down into distinctive features called semes that he defined as the minimal units of signification. Located at the level of content, a seme corresponds to the pheme, the unit at the level of expression. Hypothetically, a semantic system can account for the level of content of a semiotic system that is comparable to the phonological system at the level of expression or semic categories and archilexemes (sets of semic categories constituting pairs of lexemic oppositions making up the elementary structures of myth). However, he also made a case for the need to investigate syntagmatic structures that could be grounded in discourse analysis in addition to the Lévi-Straussian paradigmatic structures.

Greimas presented a syntactic and semantic (actantial) theory of discourse for the first time in *Structural semantics* (1983) (see Jameson (1972, 1987) and Schleifer's introduction to *Structural semantics* (Greimas, 1983) for a detailed account of the theoretical underpinnings of the first stages of the actantial model). In this essay, Greimas elaborated the elementary structure of signification, the notion of semantic axes and that of semic articulation, and defined semes in relationship to lexemes, along with the notion of isotopy that designates both the repetition of classemes and the recurrence of semic categories, be they thematic, abstract, or figurative. He established the categories of predicate and actant, logical syntax, and semantics in the description of signification while stressing the modal character of the actantial categories. He worked out the actantial model – composed of a Sender and a Receiver, a Subject and an Object, aided or hindered by a Helper or an Opponent – and gave a detailed example of the description, focusing on the semantic universe of the French 20th-century novelist, Georges Bernanos.

The investigation of the gestural domain of the natural world, through the description of relevant features at the level of content that are at the same time distinctive and significant, brings to the fore the anthropological dimension of Greimas's actantial theory at the core of his narrative semiotics. In his first major study (1987: 3–16), Greimas focused on the paradigmatic organization of text. On the contrary, in a second important study (1987: 19–47) he investigated the syntagmatic dimension of gesture, considered both as a 'discursive structure,' because it appears within the context of the subject/object relation, and as an 'utterance' constructed by the human subject and deciphered by another subject, within the context of a program of enunciation that is at the very origins of intersubjective relations. He examined the semiotic status of gestural signs, which were defined in terms of the semiotic relation between expression and content, in conjunction with the fundamental problem of identifying what actually constitutes gestural units. He viewed human beings as bodies but also as figures of the world and then as complex mechanisms that, through mobility, produce differential (positional) gaps at the level of the signifier by which signification can take place at the level of the signified. He explored gestural activity within the framework of the project defining it. Consequently, a programmed gestural project constituted the signified of gestural activity, whereas the gestural sequence was equated with its signifier. In this way, he was able to define the semiosis of a gestural program as the relation between a sequence of gestural figures taken as the signifier and the gesture project considered as the signified. However, the analysis of gestuality did raise problems regarding the functional nature of gestural semiotics.

One of the major obstacles that needed to be overcome in the general semiotic theory of the 1960s and 1970s was to free it from the theoretical constraints of structural linguistics. André Martinet (1960) proposed as general hypothesis that all languages were organized according the principle of the 'double articulation.' On the first articulation or first level, the utterance is articulated linearly by means of units having meaning (sentences, syntagma, words, etc.), the smallest of which he called morphemes: The sentence *The baby will sleep* is articulated by means of four morphemes (The [1] baby [2] will [3] sleep [4]), each of which can be replaced in a different environment by other morphemes on the paradigmatic axis or can end up in a different environment combined with other morphemes on the syntagmatic axis.

At the second articulation, or second level, each morpheme is articulated in turn at the level of the signifier by means of units having no meaning (distinctive units), the smallest of which are phonemes that are limited in number in every language. Hence, the morpheme sleep (sli:p) is made up of four phonemes, each of which can be replaced by another in the same environment or combined with others to form a different morpheme. The signified can also be broken down, but not linearly, into units of meanings or semes: *baby* = [human] + [very young]. Within this theoretical environment, Greimas identified the need to work out a level of analysis dealing specifically with the organization of content that would be part of a general functional semiotics also encompassing the semantic dimension of natural languages. He also hinted at the possible form it could take. The problem with the structural analysis of gesture is that there are no such things as gestemes or a small number of minimal units of gesture that can be combined to make up morphemes that inform all the gestural systems in all cultures.

Yet the cornerstone of Greimas's actantial theory and narrative semiotics was laid out in the study 'The interaction of semiotic constraints' (1987: 48–62), co-authored with François Rastier, and in 'Elements of a narrative grammar' (1987: 63–83). These two works openly acknowledged a debt both to Vladimir Propp (1968), who provided the syntactic component for the deep semionarrative grammar, and to Lévi-Strauss (1963), who furnished the idea of the semantic component. Greimas redefined Propp's 31 functions (designating syntagmatic units that remain constant despite the diversity of narratives, and whose ordered sequence makes up the structure of folktale) in terms of a limited number of actants. This made it possible to conceive of a principle of organization underlying whole classes of narratives. Thus, deep structures were defined as being the principle of organization not only of figurative discourses but also of abstract discourses (philosophical, political, scientific, etc.), as well as of other semiotic systems not necessarily expressed through natural languages (cinema, figurative painting, architecture, advertising, gesture, etc.). Moreover, following Jean Petitot-Cocorda (1985), I suggest that these structures are lived existentially in human passions, ideology, actions, and dreams, and that actantial and semionarrative structures, to borrow a phrase from Gilbert Durand (1963), can be thought of as 'the anthropological structures of the imaginary.' The goal then for Greimas was to work out a means, or a grammar, that could account for such structures. Indeed, the actantial and semionarrative grammar he elaborated established a specific relation between syntax and semantics, which Petitot-Concorda (1985: 48–49) described as the projection of the paradigmatic axis onto the syntagmatic axis, the understanding of which for him constituted

one of the central problems of structuralism, perhaps even its most central one.

Greimas then had to postulate the existence of a semantic universe that was defined as the set of the systems of values that can be apprehended as meaningful only if it is articulated or narrativized. Thus, any discourse was said to presuppose a semantic universe hypothetically made up of the totality of significations, postulated as such prior to its articulation, and which it actualizes in part. This he called a microsemantic universe that at the fundamental level articulates elementary axiological structures, such as life/death (individual universe) and nature/culture (collective universe). Situated at the deep semantic level, these basic structures were considered to be ad hoc universals that serve as starting points for the analysis of semantic universes, be they individual or collective. Their meaning is never apprehensible as such but, rather, only when they are manifested in the form of an articulated signification or, in other words, when they are converted into actantial structures. Petitot-Cocorda (1985: 50–51) clearly perceived the theoretical import of Greimas's semiotics when he situated the actantial and semionarrative structures within an anthropological framework. For him, the deep semantic categories were considered to be universals of the imaginary even though individuals were thought not to be conscious of them, as they exist only because they are both invested with values and ideologically invested in objects of value, whose quest governs the actions (actantial and narrative programs) of the subject actants. The deep semantic categories can be apprehended only through the circulation of object-values governed by actantial syntax. They cannot be subjectivized in themselves but only by means of a logic of actions. He noted that the role of actantial syntax is to convert the fundamental semantics that constitute the message into narrative and to determine its anthropological function. Finally, it is through this actantial and semionarrative syntax that one can grasp, through the simulacrum of the 'scene' that dramatizes them, the unconscious processes leading to subjectivity.

In 'The interaction of semiotic constraints' (Greimas and Rastier, 1987), Greimas suggested the possibility of a generative trajectory, beginning with a fundamental semiotic level that was then converted into an actantial syntax before ultimately being manifested through discourse, but focused especially on the first domain of the global trajectory. The main object of the theory of the semiotic square at the fundamental semiotic level was to articulate the substance of the content and thereby constitute the form of content. This elementary structure should be considered both as a concept uniting the minimal conditions for the apprehension and/or the production of signification and as a model containing the minimal definition of any language (or, more generally, of any semiotic system or process) and of any semiotic unit. The elementary structure appeared as a complex binary semic category that correlates two contrary semes by means of a relation of junction (conjunction/disjunction) and by a relation of reciprocal presupposition, prior to any semantic investment whatsoever. Petitot-Cocordat (1985: 51–52) argued that the constituent relations of contrariety and contradiction of the semiotic square

> are not logical in nature, but in the Jakobsonian sense are qualitative oppositions and privative oppositions and must be treated as such. The formal characteristics of the semiotic square are founded on a dynamic topology of places and connections and not upon a static logic of terms and connections.

Represented graphically in their entirety, the various components and the interrelationships of the first two levels of the theory of narrativity were worked out in Greimas (1987: 63–83). The semionarrative structures, constituting the most abstract level or starting point of the generative trajectory, are present in the form of a semiotic and narrative grammar. These grammars contain two components (syntactic and semantic) and two levels of depth – a fundamental semantics and a fundamental syntax on the deep level, and a narrative semantics and a narrative syntax on the surface level. Finally, less deep than the other two, the discursive structures take up the surface semiotic structures and set them into discourse. A discursive syntax was identified at this level composed of the subcomponents of actorialization, temporalization, and spatialization. The semantic component, or discursive semantics, was said to be made up of the subcomponents of themantization and figurativization.

The main theoretical problem that arose from this actantial and semionarrative model is related to the passage (conversion), on the one hand, from a paradigmatic relation, or a taxonomic morphology, to an operative syntax or syntagmatic relation and, on the other hand, the passage (conversion) from a fundamental abstract syntax to a narrative anthropomorphic surface syntax and ultimately to a discursive–figurative syntax. It can be said that two types of conversions exist in the theory: 'horizontal' conversions (dealing with the relations between the syntactic and semantic components of each level) and 'vertical' conversions (having to do with the relations between levels). At the deep level, the passage from the elementary morphology constituted by fundamental relations to an operative syntax, or horizontal

conversion, is ensured by the introduction of an actant subject. Equivalencies are established between the fundamental constituent relations of the taxonomic model and the projections of the same relations or operations by means of a horizontal anthropomorphic conversion at the deep level. The relation of contradiction at the taxonomic level as a contradictory operation at the syntactic level negates one of the terms and at the same time affirms its contradictory term.

The problem of vertical conversion, or the passage from the fundamental syntax to the surface anthropomorphic narrative syntax, in this transpositional model was resolved by establishing procedures that set up equivalencies between these two levels. Yet, the equivalencies posited here do not correspond to identity but, rather, are founded on the presupposition that "two or more syntactic forms (or two or more semantic formulations) can be referred to a constant topic" (Greimas and Courtés, 1982: 62). Moreover, insofar as meaning is transformed into signification when articulated, each new articulation can be considered as an enrichment or increase in meaning. Hence, in proceeding from the deep level to the surface levels, the surface must be considered as richer than the deep level and therefore any conversion must be viewed as equivalence and as a surplus of signification. As Greimas stated in an interview with Ruprecht (1984: 14), conversion is homotopic and heteromorphic:

> The forms pass from the deep structures (where operations take place on the semiotic square) to the semionarrative level (where there exists a surface narrative grammar). Both of these levels are concerned with the same thing but in a different way.

The conversion of the deep level into the surface level is ensured by the establishment of equivalencies between syntactic operations at the fundamental level and those occurring at the surface level. Thus, syntactic activity, having been converted from syntactic operation that was itself converted from taxic relations, provides the necessary mediation for the generation of a narrative utterance that is the major component of narrative grammar. The utterance NU = F(A) is seen as a process that is composed of a function, in the Proppian sense, and an actant. Conversion thus rests on the equivalence between the syntactic operation and syntactic activity, on the one hand, and between syntactic activity and an elementary utterance of actantial activity, on the other hand.

Greimas always claimed, and rightly so, that semiotics was not a science but, rather, a scientific project, still incomplete, and that what he was attempting to do was to establish theoretical principles that needed to be completed and transformed. However, we should not minimize the import of the theoretical problems related to the issue of conversion that was already alluded to previously. These are due to the generative conceptualization of the model, according to which various components are linked together along a trajectory that proceeds from the simplest to the most complex, from the most abstract to the most concrete. The problem of conversion and equivalencies is raised on numerous occasions by Greimas. In an interview with Fredéric Nef (1976: 24), Greimas admits,

> A theoretical construct, no matter how satisfying it appears at first view, runs the risk of remaining hypothetical as long as the problem of equivalencies between different levels of depth is not clearly formulated, as long as the procedures of conversion from one level to another have not been worked out.

In a special issue of *Le Bulletin* devoted to the semiotic square, Greimas (1981: 45–46) again stated that one of the urgent tasks facing semioticians was to undertake research on conversion. It is necessary to conceive of and construct procedures for passing from the deep level of semantic categorizations to the more surface ones of anthropomorphic narrative syntax and of its investments. The same awareness of the possible weak point in the theory was demonstrated in Greimas and Courtés (1982: 62) when they stated that the elaboration of conversion rules will constitute one of the fundamental tests of the coherence of semiotic theory.

It is especially on the issue of conversion and equivalencies within the framework of the narrative grammar just sketched that Paul Ricoeur (1989) voiced reservations about the actual coherence of the theory. Ricoeur took issue with the model on three counts. The first concerned the conversion of contradiction at the deep level into polemic at the surface level; that is, polemical negativity cannot be derived either from the taxonomic relations of contradiction–contrariety or from the syntactic operation of negation. The second was related to the fact that there exist syntagmatic supplements at the surface level that cannot be obtained from the conversion of the fundamental grammar to the surface grammar. The third was that the praxic–pathic dimension of narrative established a semantics of action that activates a syntax that is both phenomenological and linguistic. In his work on the morphogenesis of meaning, Petitot-Cocorda (1985) argued that for Ricoeur's critique to be truly pertinent, the implicit phenomenology of the praxic–pathic semantics of action would have to be formalized so that it could be integrated into a formal model. He concluded that the hypothesis of a syntagmatic

supplement that is irreducible to the paradigmatic is tenable only if one forced Greimas's thought and viewed conversion as a simple equivalence between metalanguages, but this was far from being the case (Petitot-Cocorda, 1985: 268). In the final analysis, the real problem in the theory that must be addressed is the one Greimas raised all along, namely the need to establish the actual procedures of conversion.

The anthropomorphic actantial dimension mentioned previously establishes relations between subjects and objects, subjects and antisubjects, and subjects and senders and receivers. The first relation, which is founded on the establishment of the subject as a wanting subject and of the object as an object of value, was described in terms of modal utterances. Wanting is the first of a series of determined semantic restrictions that specify actants as virtual operators of an act; the second restriction is having. Other semantic restrictions, the introduction of the modalities of being-able and knowing, constitute the being or the activity of the actant subject. The relation of subject and object was formulated syntactically in terms of utterances of state that are conjunctive or disjunctive in nature. The second relation between subject and antisubject was considered as the conversion of the paradigmatic relation.

The third relation between subject and sender, subject and receiver was reformulated in terms of a general structure of exchange. The attribution of an object of value was defined as a disjunctive operation (privation) and a conjunctive one (attribution). This reformulation made it possible to represent the previous operations as places of transfers of objects of value from one location to another. A topological syntax of objective values was established that, since it follows the logical operations at the level of deep grammar, organizes narration as a process creating values. However, by changing focus and examining the relations between operators – subject and sender or receiver – we can see that topological syntax governs the transfer both of the subject's capacity to do and of the values. Also, the topological syntax governs the institution of syntactic operators by subjects with the virtuality of doing. In a later, more complete version of the theory, the subject and sender were characterized by a dual contractual relation since not only will the subject actant have a contractual relation with the manipulating operator actant (sender) that institutes it as an operator subject but also performance is sanctioned by a final sender, whose absolute competence is presupposed (Perron and Fabbri, 1990).

In the surface narrative grammar, the object is one of the terms of the elementary utterance that when inscribed in a conjunctive or disjunctive relation with the subject guarantees the latter's semiotic existence. However, while remaining unknowable in itself, the object exists semiotically as a locus of fixation, a locus of clustering of the value determinations. Values invested in the object can only be accounted for syntactically, and it is in this syntagmatic unfolding that syntax joins semantics. Moreover, values can be apprehended as signification when they are converted from semantic into syntactic structures. Hence, conversion made it possible both to define narrativization as the syntagmatic emplacement of values and to perceive it as a discursive organization that manipulates the constitutive elements of the elementary utterance. Moreover, two broad categories of values – descriptive (consumable or storable objects, states and feelings) and modal (wanting-to-be/to-do, being-able-to-be/to-do, having-to-be/to-do, and knowing-how-to-be/to-do) – were defined. In turn, descriptive values can be divided further into subjective (essential values) and objective (accidental values), and in narrative programs base values were distinguished from instrumental ones that definitively fixed the first two stages of what has been defined as the 'standard theory' of the Paris School (Parret, 1989).

At the surface level, narrative was defined as the transformation of a series of utterances of state (conjunctive and disjunctive utterances) by a metasubject operator (utterance of doing). Such a syntactic organization made it possible to represent narrative as a series of virtualizations and actualizations of values. Values inscribed within a given axiological universe circulate in two ways. In the case of constant values between subjects in an isotopic and closed universe, they circulate as conflictual–polemic confrontation, whereas in the case of exchange, the presence of two objects of value is required, and this structure constituted a new virtualization and a new actualization. Simple exchange was then considered as a complex mode of value transfer at the level of surface syntax.

Nonetheless, cases in which exchange values are not identical for such an operation to take place require their preliminary identification by subjects, who, by fixing the exchange value of the objects of value, establish a fiduciary contract between themselves. When the objects of value are objects of knowing, or messages being communicated, and when the subjects are competent but unequally modalized, one of the fundamental organizing structures of narrative grammar, the polemic–contractual, is transposed into the very core of intersubjectivity. This is where, as Greimas (1983: 11) noted, "It seems to be able to account for the fiduciary, troubling and groping, but, at the same time, cunning and dominating nature of communication."

Within a closed universe, the contractual dimension of exchange in participatory communication is

ensured by a sender who guarantees the circulation of values. The latter corresponds to a mediating domain between an immanent universe and a transcendent universe that are manifested through the presence of actants at the surface level syntax. The source of the contract in discourse, the sender, is the disengaged representative of the paradigmatic system of the invested contents or the values that are the taxonomic constituents of the fundamental grammar (Courtés, 1976: 99). From this, it follows that the relation between the contractual sequence and the performance sequence is established by internalization of the conversion of the paradigmatic dimension in the narrative. If the subject–receiver accepts the contractual sequence as a narrative program, it is transformed into a performing subject if, and only if, it acquires modal competence that ensures the mediation between system and process, and realizes virtual values.

The narrative organization of values continues to be the foundation of narrativity insofar as it guarantees the semiotic existence of actants. The object of value – one of the terms of the elementary utterance previously defined as a semiotic simulacrum, representing our relation to the world in the form of a scene – is also a syntactic concept. The distinction between actants (considered initially as simple supports and then progressively invested by values through conjunctive and disjunctive relations) and actors (that can syncretize several actants) made it possible to explore the relations between elementary narrative structures and discursive structures.

As it progresses through its narrative trajectory, an actant can assume a certain number of narrative states or actantial roles that are defined by its position within the narrative trajectory (syntactic definition) and its modal investment (morphological definition). The subject actant will be endowed successively with the modalities of competence as a necessary step toward performance, and in this case the subject assumes those actantial roles that define the subject in terms of wanting-to-do, knowing-to-do, being-able-to-do, and having-to-do, which indicate the four states in the acquisition of its modal competence. Because they are defined morphologically by their modal content, and syntactically by the position of actant in the narrative trajectory, actantial roles are situated within narrative syntax. Nonetheless, when associated with thematic roles that structure the semantic component of the discourse, they allow for the construction of actors as loci where narrative and discursive structures converge and are invested (Greimas and Courtés, 1982: 6).

What first distinguishes an actantial role from an actor is that at the level of discourse an actor's semantic content is defined by the presence of the semes that are (i) figurative entity (anthropomorphic and zoomorphic order), (ii) animated, and (iii) subject to individuation. At the same level the actantial role appears, as a qualification, as an attribute of the actor. From a semantic point of view, this qualification is no more than the denomination subsuming a field of functions (i.e., behaviors actually noted in the narrative or simply implied). The minimal semantic content of role is identical to the concept of actor, despite the exception of a seme of individuation, which the former does not possess. Greimas (1970: 56) noted, "The role is an animated figurative entity, albeit anonymous and social. In turn, the actor is an individual integrating and assuming one or several roles." From this, it follows that there are three distinct levels of narrative interplay: Roles, which are elementary actanial units corresponding to coherent functional domains, are related to actants (elements of the narrative) and to actors (units of discourse).

The actor is thus seen as the point of investment of the syntactic and semantic components. To be designated as an actor, a lexeme must have both an actantial and a thematic role. To realize their potentialities, thematic roles in turn call into play the lexematic level of language and appear as figures that are integrated into discursive configurations. The final domain of the narrative trajectory or the figurative level of discourse is characterized by the investment of themes and values in figures. Figures, defined as figures of content that correspond to the figures of the expression plane of the natural semiotic system, when strung over sequences constitute their discursive configurations. The procedures of figurativization, the first of which can be described as figuration and the second as iconization, invest these figures with specificities that produce a referential illusion. One of the basic components of figurativization is the onomastic one. Figurativization specifies and particularizes abstract discourse. It is grasped in its deep structures and by the introduction of anthroponyms that correspond respectively to the procedures constitutive of discursivization, actorialization, spatialization, and temporalization on the plane of discursive syntax (Greimas and Courtés, 1982, 119–120).

While continuing to evolve a theory of narrativity in a further phase of his semiotic project, Greimas focused on constructing an actantial and semionarrative grammar developed as a modal and aspectual grammar. As he sensed the need to construct a better articulated elementary syntax, he abandoned the Proppian formulation of narrative in order to free the theory from concepts that remained too close to the manifest level of discourse. The first step consisted in reformulating surface narrative syntax in

terms of modalities. Starting with the definition of modality as that which modalizes a predicate of an utterance, modalization was then considered as the production of a modal utterance that overdetermines a descriptive utterance (Greimas and Courtés, 1982: 193). Defined in terms of the structure of the elementary utterance whose end terms are actant, utterances of doing or utterances of state were considered as the transformation of a conjunctive/disjunctive state. However, reformulating the act as that which causes to be permitted him to redefine it as a structure combining competence and performance, with performance presupposing competence, but not vice versa.

He then distinguished transitive relations defining the descriptive predicate between the subject and the utterance of doing both from veridictory relations established by a subject and an utterance produced by another subject and from factitive relations between the subject and object that already constitute an utterance of doing. These last two relations that occur between two hierarchical, distinct subjects – a cognitive subject and a pragmatic subject – constitute the simple modal structure. The advantage of reformulating the act in these terms is that it enabled him to develop a theory of performance in three directions: a semiotics of manipulation (or the manipulation of the subject by the sender), a semiotics of action (the acquisition of competence by the subject), and a semiotics of sanction (judgments on oneself and on other subjects).

When defining the Subject at the level of the organization of pragmatic competence, it was possible to identify four fundamental modalities: the modalities of having and wanting, which virtualize the process, and the modalities of being-able and knowing, which actualize it. However, because this canonical representation of competence does not always correspond to what happens at the level of manifestation, it was necessary to construct a model that could account for the fundamental modal structure by subsuming its diverse articulations through a series of interdefinitions. The criteria of interdefinition and classification of modalities is simultaneously syntagmatic and paradigmatic; each modality is defined both as a hypotactic modal structure and as a category that can be represented on the semiotic square.

Within the confines of a theory of modalities, another area of investigation mapped out focused on procedures leading to the epistemic act. When situated at the level of surface narrative (manipulation, action, and sanction), both persuasive and interpretative activity (doing) were defined as cognitive procedures that, in the first case, end up as causing-to-believe and, in the second, as an act of believing (i.e., as an epistemic act). The epistemic act was then defined as a transformation that, when articulated on the semiotic square (to affirm, to refuse, to admit, or to doubt), at the level of surface syntax appears as a series of hierarchically linked narrative programs. Epistemic modalizations can also be represented as modalities and junctive operations, and before becoming act, or operation (which is of the order of doing), a modal competence or the being of the doing is presupposed on the part of the subject. After noting that transactions engage the subjects in a fiduciary contract, communication was defined in terms of contract propositions, which in fact are presuppositions to communication. Situated within a semiotics of manipulation and sanction, cognitive space was considered to be the locus for manipulation based on knowing, whereby a subject transforms another into a convinced subject and submits it to judging epistemic activity on the part of a final subject.

However, since the initial definition of the epistemic act converted the elements of the square onto the surface syntax, not as contradictions but as linear gradations, Coquet (1985) noted that this type of semiotic square represented an important development in 'syntagmatic rationality.' Technical thinking of an algorithmic nature that was founded on objective modal necessity (i.e., on a/not-being-able-to-not-be/) was opposed to practical thinking of a stereotypical nature that depends on the co-occurrence, in temporal contiguity, of acts – or the utterances that describe them – whose succession was considered predictable and therefore plausible or even necessary. At the surface level of discourse, causal reason, or syntagmatic rationality, was further defined in terms of technical thinking and practical thinking. Yet, parallel thinking led to the discovery of the bi-isotopic nature of discourse based on the appearance of the implicit characterizing figurative discourses that, when dereferentialized, create a new referent or thematic level. (The concept of isotopy designates both the repetition of classemes and the recurrence of semic categories, be they thematic or figurative.) By projecting a double reference (one that moves deeper and creates a more abstract thematic isotopy, and one that moves laterally and develops a new parallel figurative isotopy), parallel discourse constitutes an original type of syntagmatic articulation. Figurative models such as parables, allusive in nature, were given as an example of figurative reasoning. Projected by the sender, these models, which are fiduciary by definition and of the order of subjective/having-to-be/, were opposed to homological thinking, which introduces mathematical proportion into the evaluation of the relations between isotopies presumed to be parallel. Greimas (1987: 179) further refined the theoretical foundations of modal grammar when he studied

the relations between the fiduciary and the logical within a cognitive universe. He defined this universe as a network of formal semiotic relations from among which the epistemic subject selects equivalencies it needs in order to receive veridictory discourses and thereby demonstrates that believing and knowing are part of the same cognitive universe.

Greimas turned to the modality of being after having analyzed the modality of doing. As Coquet (1985) noted, this analysis completed the study of the actions of the subject (modal competence) and set the way to the study of their passions (modal existence) within the context of a modal grammar reformulated along the lines of surface narrative syntax. Thymic space, which at the deep level represents the elementary manifestations of a living being in relation to its environment (animated), at the surface level is converted into modal space appearing as an overarticulation of the thymic (human) category. Yet, in any utterance, the subject's semiotic existence is determined by its relation to the object of value and the modalizing of being considered as the modifications of the status of the object of value. The modalities affecting the object (or, rather, the value invested therein) are said to be constituents of the subject of state's modal existence. A taxonomic network for modal syntax was worked out by projecting the modal utterances onto the semiotic square (wanting-to-be [desirable for the subject of state], having-to-be [indispensable], being-able-to-be [possible], and knowing-how-to-be [genuine]). The same interrelations that were discovered when analyzing the modalization of doing were discovered here, and a syntax of modalized values was worked out based on elementary narrative syntax.

It was shown that thymic values are converted from the deep level when invested with syntactic objects defined by conjunctive/disjunctive relations with subjects. As Parret and Ruprecht (1985) perceptively noted, this conversion profoundly affects value by placing it under subjectivity and its intentionality. At the theoretical level, it then became possible to pragmatize Greimas's semiotics by introducing tensivity and graduality in the deep structures. Also, the theory was freed up "from the notion that at the deep level values are economical (in the Saussurian sense) and at the surface level they are graduated and tensive" (xlvii). The introduction of modality theory and the working out of conversion procedures were decisive steps in establishing an integrated theory of narrativity.

It was suggested that the problematic of passions is linked to the study of the modal existence of the subject, and more precisely to the modal component of the actantial structures. Whether the object of investigation happens to be a lexeme-passion such as anger – considered as a virtual narrative trajectory – or, on the contrary, passional stories that are realized narrative syntagms, as Landowski (1979: 8) remarked, the exploration of the field of passions closely involves all of the levels of the articulations of the theory of narrativity:

> This includes not only the semionarrative structures proper (instances of passions being identifiable by their underlying modal and actantial structures), not only the discursive structures (aspectualization, actorialization, semanticization of the underlying syntagma), but also the deep level abstract structures.

In contradistinction to action, which was defined as a syntagmatic organization of acts, passions were considered as the syntagmatic organization of states of feeling or the discursive aspect of the modalized being of narrative subjects (Greimas and Fontanille, 1993). Passions, which are either simple or complex (a syntagmatic intertwining of states and of doing), are expressed through actors and, along with actions, determine the roles (actantial and thematic) they realize. Thus, the opposition between action and passion represents the "conversion on the discursive level of the deeper and more abstract opposition between being and doing, or more specifically between modalized being and modalized doing" (Greimas and Courtés, 1986: 162).

The subject's being, whether, for example, in simple or in fiduciary expectation, is first modalized by the modality of wanting, which actualizes (wanting-to-be-conjoined) in order then to be realized (i.e., to be conjoined with the object of value). It is this very conjunction that guarantees the subject's semiotic existence. Whether at the semiotic or at the discursive level, the notion of value, which we also saw with regard to the doing of the subject, is at the very heart of the theory. Thus, parallel to the trajectory of the subject of doing made up of the acquisition of competence and the accomplishment of performances, there exists a comparable trajectory of the subject of state, presented as successions of 'feeling states' made up of highs and lows. Consequently, the modalization of the subject's being has an essential role in the constitution of the competence of syntactic subjects, and the concept of passion is closely linked to that of actor. Passion thus becomes "one of the elements that contribute to actorial individuation, able to offer denominations for recognizable thematic roles ('the miser,' 'the quick-tempered,' 'the unconcerned,' etc.)" (Greimas and Courtés, 1986: 162–163). Moreover, the linking of passions to actors and the investigation of relations between thematic roles and actantial roles has opened up a new domain of research into passional typologies.

Within the framework of traditional theories of passions (i.e., Descartes, Spinoza, Leibniz, Nietzche, and Freud), Greimas's strategy was to work out semiotics of passions, a pathemic semiotics founded on his own previously elaborated semiotics of action. However, to ensure that the theory maintained its coherence by conforming to the principles of hierarchy and interdefinition, it was necessary to establish descriptive procedures that integrated all prior definitions of the actional dimension into the pathemic one. The reasons for adapting such descriptive strategies and tools were partially related to the fact that Greimas drew heavily on Husserl and Merleau-Ponty's works in phenomenology. For him, the subject's relation to the object was mediated by the body, which is at the same time part of the world and subject. Moreover, the body was also seen as an object situated between other objects and the world and at the same time the point of view from which the world is experienced. The body was defined as both action on the world and a perceiving, a sensing of the world. From this perspective, it is evident that Greimas greatly distanced himself from Ferdinand de Saussure, for whom the sign was a totally disembodied concept. For the latter, there was no place for perception, or for the body, nor did there exist a chasm between subject and object. Along these same lines, Greimas escaped from another common dualistic philosophical assumption of a separate subject and object, subject and world – the activity of the former being to understand that of the latter and nothing else. However, as was noted in discussing modalization, passion paradoxically is a phenomenon in which the object, in becoming a value for the subject, imposes itself on the subject. The action of the world on the subject and the action of subject preceding the world as value became crucial in pathemic configurations (Perron and Fabbri, 1993).

What Greimas and Fontanille attempted to do was to present a more or less coherent foundation to complete the semiotic theory begun approximately 25 years previous. To do this, they started from an intuition and imagined positions that made it possible for them to polarize the universe. This enabled them, on the one hand, to postulate a sort of prototype of an actant, linked by Hegel to intentionality and rearticulated by Husserl as the protensivity of the subject, a sort of minimal state of the subject who is not yet a subject but simply a subject striving for something. On the other hand, they envisioned a sort of potentiality of the object, which enabled them to consider the world as value. What now appears to be the thorniest issue in the theory is the issue of the object and not that of the subject. To understand subjects as being, as meaning, they must be defined by the values they acquire. From this viewpoint, the semiotics of passions became a semiotics of the values acquired, lost, suspended, and so on by the subject. What we are dealing with is a subject defined by its protensivity, faced with an object of value that is unformed, a shadow of the value that can be semanticized. In a later phase, the value became the valence, which then led to the question of the value of value. In brief, whether examining the semiotics of passions or the semiotics of aesthetics, the two main domains of current investigation, Greimassian semiotics has as its fundamental preoccupation the issue of value.

In concluding, it should be noted that Greimas found the inspiration and the sources of his work in two of the great 20th-century scholars of anthropology and folklore. Lévi-Strauss provided him with the paradigmatic cover of the theory and Propp with the syntagmatic or syntactic one. After working out the necessary theoretical mediations, he linked together two complementary models and constructed a theory that could be generalized in terms of a general narrative semantics. He then freed the theory from Propp's formula of the tale as a means of analyzing narrative, and an elementary syntax that could organize any types of discourse was developed. Propp's model was broken down into three successive sequences that correspond to the syntagmantic unfolding of the actantial model (paradigmatically articulated in a quest sequence (subject → object) and a communication sequence (sender → object → receiver)), in which two sequences of communication frame an action sequence. The mandate sequence and the evaluation sequence bracket the action sequence that transforms the states. From this, a semiotics of manipulation was established – how the sender manipulates the subject; then a semiotics of action – how competence is acquired to carry out performance; and finally a semiotics of evaluation or sanction.

At the same time, attempts were made to construct a model of meaningful actions in an intersubjective frame. Greimas first worked out a model of actions before introducing notions such as modalities and aspectualities that overdetermine the actants. He posited and interdefined four fundamental modalities (two virtual ones and two actualizing ones), as well as three aspectualities (inchoativity, durativity, and terminativity). Then, because folktales were considered as an intersection between two conflictual and contractual actions in progress, Greimas was able to transform the Proppian model into an interactional one. Instead of a subject, an object, and an opponent, two modally competent interacting subjects were postulated. Each subject, with its own modal organization, was situated in a polemicocontractual relation to

the other. Strategy became more important than rules. Moreover, in addition to the system of modalities, the actantial model was able to define the construction and transmission of meaning. Due to the work of Marcel Mauss and Lévi-Strauss, communication was rethought in terms of exchange and challenge, and the concept was extended from the circulation of objects and messages to the exchange of modal values within the framework of a fiduciary contract that must be maintained actively during interaction.

The opening of the fiduciary dimension introduced the subject matter of belief and adhesion in the cognitive dimension, which raises at least two orders of questions: the relevance of the figurative component and that of the passional one. Through the mediation of the enunciative instance, the virtual structures of action are realized and figurativized differently according to the categories of the natural world employed as forms of expression. Regarding the passional dimension, it became possible to give an operational account of the emotional systems and processes – in other words, the transformation of the states of feeling of the subject with respect to the actions that incite them and the actions they lead to (Greimas, 1987: 148–164, 1990: 160–174). When dealing with figurativity we encounter the problem of the typology of signs, especially nonlinguistic and nonarbitrary signs, and their efficacy. When dealing with passions we are basically concerned with the stringing of modalities, tensitivity, thymism, and in general with the dimension of bodily propioceptivity.

Throughout this article, in which the salient features of Greimas's semiotic were traced, an attempt was made to highlight the constructed and hypothetico-deductive aspect of a theory in which concepts are interdefined and hierarchically ordered. The anthropomorphic dimension of the global theory, conceived of as an ongoing scientific project founded on internal coherence as a precondition to formalization, was also emphasized. Furthermore, three major phases were identified (formulation, narrative grammar, and modal and aspectual grammar), the manner in which research began on deep structures was discussed, semionarrative structures were explored, and surface (discursive and figurative) structures were then analyzed. However, one should not conclude that the transpositional semiotic theory presented here is in any way a fully completed theory since research is currently being carried out on the pathemic, ethical, and aesthetic dimensions of discourse. This should contribute to the construction of the semionarrative grammar, and further work on aspectualities should lead to the development of an integrated and complementary discourse grammar.

See also: Narratology, Feminist; Paris School Semiotics; Semiotics: History; Sign Language: Interpreting.

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Action Sentences and Adverbs

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Action Sentences

Philosophers have a long-standing interest in the distinction between the things that people do and the things that merely befall them. This interest stems from a deeper concern with the concept of intentional action and the nature of human agency. Many distinguished philosophers have sought to illuminate this distinction by looking at how actions are described in natural language and what such descriptions imply about the agents of an action and the role of their intentions in the events described.

It is difficult to get at the distinction in a principled way. The problem is especially acute for sentences like (1):

(1) Phillip made Sally fall into the well.

Example (1) can be made true either by Phillip's deliberate pushing of Sally into the well or by his having accidentally done so. Likewise, a sentence such as:

(2) John's hand rose

does not imply that the raising of John's hand was the result of anything that John did. Compare this with:

(3) John raised his hand

which is true only if John intentionally raised his hand. Example (3), but not (2), implies that the raising of John's hand was an **action** of his, that he intended to raise his hand and that this intention was the reason why his hand rose when it did. But does this difference in how the truth conditions of (3) might be constituted reflect a corresponding semantic difference? Is (3) actually ambiguous?

I will look at two popular ways of capturing the properties of action sentences, starting with one rooted in philosophical logic, the other more closely related to natural language semantics. One of the main traditions is tied to the logic of the deontic modalities, i.e., the logic of obligation. Just as one might translate sentences of the form *α is obligated to Φ* with a special operator with *It is obligatory for α that α Φ*, so one might capture the agentive sense of a sentence of the form *α Φ-ed* with *It was intentional of α that α Φ-ed*. Some other proposals for paraphrasing are illustrated in examples (4) and (5).

(4a) John swam the channel.
(4b) John brought it about that he swam the channel.

(5a) Sam brought the pie.
(5b) Sam made it the case that he brought the pie.

One can still wonder whether these paraphrases really capture the agentiveness of these constructions. Looking just at (4a), there are a number of ways in which one can bring about the swimming of the channel, not all of them having to do with one's intentionally swimming the channel. Similar remarks apply to *making it the case that*. Not all of what I can intuitively be said to have made the case originates in something I intended to do.

A notable development in this area, one which appears to escape some of the problems of earlier views, is the work Nuel Belnap, along with several colleagues. They treat

(6) John opened the door

on its agentive reading as equivalent to

(7) John saw to it that the door opened.

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(6) John opened the door

on its agentive reading as equivalent to

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Adoption of a special operator *stit* (α sees to it that: p) also allows them to capture some of commonalities between action verbs and imperatives, e.g., the fact that imperatives can only be formed felicitously from action verbs. One might worry, though, about the relations the proposed paraphrases have to the meanings of natural language sentences.

Another, popular way of approaching action sentences comes from Donald Davidson. Rather than rendering action sentences in a notation specifically designed to capture the concept of intentional action, e.g., *stit* operators and the like, one seeks to illuminate the semantic properties of action sentences by looking at what a general theory of meaning for the language containing those sentences tells us.

More specifically, the signature move in Davidson's paper was to posit, alongside the overt arguments of the verb, an additional argument place whose value is an event. One natural way of capturing this thought is to look at ordinary ways of classifying objects. A common noun N predicated of an object x classifies x as an N – a chair, a book, etc. Likewise for verbs, if events are taken to be values of variables just as concrete objects are: a verb V predicated of an event e classifies e as a V-ing, e.g., as a pushing or a swearing, etc. The original formulation of Davidson's proposal, ignoring tense, is this:

(8a) John kissed Mary
(8b) $\exists e$[kiss(John, Mary, *e*)

The extra argument place in (8b) is for an event. An early modification of Davidson's view is to make (8b) a bit more complex.

(8c) $\exists e$[AGENT(John, *e*) & kiss(*e*) & PATIENT(Mary, *e*)]

Informally, what this says is that there is a kissing whose agent is John and whose patient is Mary, i.e., there is a kissing of Mary by John.

Davidson's views have been influential, both in inspiring further work and in attracting critical attention. For example, what does one say about sentences like:

(9) I haven't eaten breakfast.

Surely, one does not want an utterance of (9) to mean that there is no past event of my having eaten breakfast. Views taking Davidson's work as a point of departure include the work of Jennifer Hornsby (1980) and George Wilson (1989). Pietroski (1998) and Lombard (1986) discuss some of other criticisms, suggesting modifications.

Adverbs

Adding events to the toolkit of philosophers and philosophically minded linguists also enabled new treatments of adverbs. There is perhaps no single reason why philosophers have been interested in adverbs. But a good deal of what is of interest to philosophers has to do with the metaphysics of events or, in terms that partly overlap with talk of events, occasions, happenings, situations, and states of affairs. For example, a good many philosophers have wanted to acknowledge different classes of events, e.g., states, processes, achievements, and so on. See Vendler (1967), Bennett (1988), and Steward (1997). One way to approach these issues is by looking at how adverbs modify verbs that apply to these different sorts of events.

I will look at two families of theories of adverbs, beginning with an application of Davidson's view of action sentences. Just as adjectives modify nouns, so adverbs modify verbs. The following analysis is nearly unavoidable for many adjectives:

$[_{NP}$ Adj [N]] $\Rightarrow$ [Adj(x) & N(x)]

Thus, the denotation of, e.g., 'nice dog' is something that is both nice and a dog. Davidson's event analysis of action verbs gives a parallel, conjunctive analysis of adverbial modification:

$[_{VP}$ Adv [V]] $\Rightarrow$ [Adv(e) & V(e)]

The grammatical combination of an adverb with a verb is to be interpreted as the predication of two predicates about an event. The parallel with nominal modification is preserved. The theory also works for phrasal modification of verbs, e.g., for prepositional phrases such as *in the school*, *at five o'clock*, *after he took the kids to school*, etc. A sentence such as (10a) is represented as (10b):

(10a) Sam sang loudly in the shower
(10b) $\exists e$[AGENT(Sam, *e*) & sang(*e*) & loud(*e*) & in the shower(*e*)]

In words: there was a singing by Sam in the shower and it was loud.

Any theory of adverbial modification should show why the following inferences are valid:

(11) Sally broke the eggs quickly in the sink
(12) Sally broke the eggs quickly
(13) Sally broke the eggs in the sink
(14) Sally broke the eggs
(15) Sally broke something in the sink.

Example (11) logically implies (12) and (13), both of which imply (14). Additionally, (11) and (13), although neither (12) nor (14), imply (15) by themselves. A large number of adverbial modifiers permit detachment inferences. These inferences are immediate on the event-based theory.

Even with these virtues though, Davidson's theory does not readily extend to adverbs such as *halfway* or *partly*, e.g.,

(16) John walked partly to the store
(17) Alex halfway filled the glass with juice.

It does not seem to make any sense to talk about events that are, for example, halfway in and of themselves, although there are events that are halfway fillings of glasses. It seems as though the adverb forms up a complex predicate with the verb rather than standing alone as a predicate of an event. More seriously though, as easily as the theory handles cases such as *John swam quickly to the shore*, there is no obvious way of extending it to *John allegedly climbed the garden trellis*. There is no event that is both alleged as well as a climbing. See Larson (2001) and Taylor (1985) for further discussion.

Perhaps the most influential way of treating adverbs is to take them to be quantificational in some respect or as forming up intensional operators (Cresswell, 1986 Lewis, 1975). This helps with sentences such as (18) and (19).

(18) John probably left in a hurry.
(19) George frequently left a chocolate on his son's pillow.

Here, an adverbial appears to modify not the event picked out by the predicate, i.e., the leaving, but the whole proposition, i.e., John's leaving in a hurry. A theory having only events at its disposal is ill equipped to handle these cases. On the other hand, a theory incorporating propositions and intensions and quantification over possible worlds seems to be in comparably better shape to handle these kinds of contexts.

Further, if one treated adverbs as properties of events, it is much easier to treat sentences that contain negations such as the following:

(20) Rob cleverly didn't catch a fish.

Here, one might say that Rob's not catching a fish has the property of being clever. Another important advantage of a view like this is that it affords a nice treatment of indefinite noun phrases such as *a fish* or *a chocolate* in the scope of an adverb such as *frequent*. This can be seen in sentence (19) or in (21) and (22) below:

(21) Lisa often found a missing check in the Chairman's desk
(22) Alex repeatedly felt an odd tickle on his toe.

Example (21) is perhaps best read as implying that it is often enough the case that Lisa, when looking in the chairman's desk, found a check that was missing. And (22) is not best interpreted as implying that there is some one odd tickle that is felt repeatedly by Alex. Rather, what the sentence is most naturally understood as saying is that there was a set of odd tickles in Alex's toe that was repetitive. The quantificational view is further developed by Thomason and Stalnaker (1975) and by McConnell-Ginet (1982).

See also: Adverbs; Logical Form in Linguistics; Speech Acts; Verbs.

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Active/Inactive Marking

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Introduction and Definition

A marking system is said to be of the active/inactive type if subjects of transitives and of one subset of intransitives are associated with one marker, while direct objects and subjects of remaining intransitives are associated with a different marker. Verbs whose subjects pattern with those of transitives are often referred to as active intransitives, while those whose subjects pattern with direct objects may be called inactive intransitives.

For example, in Georgian, a language of the Kartvelian family, in one set of tense-aspect-mood paradigms, subjects of transitives and of active intransitives bear the *-ma* case marker, while subjects of inactive intransitives and direct objects bear the *-i* case.

(1) monadire-eb-ma nax-es irem-i
hunter-PL-ACT *saw-3*PL*S* *deer*-INACT
'The hunters saw a deer.'

(2) bavšv-eb-ma ičxub-es
child-PL-ACT *quarreled-3*PL*S*
'The children quarreled, fought.'

(3) bavšv-eb-i saxlši darč-nen
child-PL-INACT *house.in* *stayed-3*PL*S*
'The children stayed in the house.'

In order to treat all languages discussed in this article in a parallel way, the *-ma* case is here glossed 'active' (ACT), but it is usually called by the rather misleading name 'ergative' or by the relatively meaningless name 'narrative.' The *-i* case is usually called 'nominative' but here is glossed as 'inactive' (INACT). In the descriptions of other languages, a variety of terms are traditional.

What makes the pattern in (1–3) active/inactive marking is the fact that one case, the active, is used for the subject of the transitive (in (1)) and of the active intransitive (in (2)), while a different case, the inactive, is used for the subject of the inactive intransitive (in (3)), and for the direct object, *iremi* 'deer,' of the transitive (in (1)).

Notice that the subjects of the transitive verb in (1) and the active intransitive verb in (2) condition the third person plural subject agreement marker *-es*, while the subject of the inactive intransitive verb in (3) conditions the agreement marker *-nen* for the same person and number in the same tense. Although the two types of intransitives differ with respect to agreement, this agreement pattern does not satisfy the definition of active/inactive marking, since the marker *-nen* used for subjects of inactive intransitives is not also used for direct objects, as can be seen in (4).

(4) monadire-eb-ma nax-es irm-eb-i
hunter-PL-ACT *saw-3*PL*S* *deer*-PL-INACT
'The hunters saw some deer.'

The plural direct object in (4) does not condition the marker *-nen*, and thus agreement in Georgian is not active/inactive. In fact, most agreement in Georgian marks all subjects of a particular person and number combination without regard to verb type. Agreement in the aorist is presented in (5).

(5)

	Singular	Plural
1st	v–	v–t
2nd	–	–t
3rd	–a	–es/-nen

While case marking of NPs is active/inactive in (1–3), none of the agreement in this language is of the active/inactive type.

However, true active/inactive agreement is found in Creek (Muskogee), a member of the Muskogean family.

(6) Ci-hîic-ey-s (Martin, 1991: 96)
*2*INACT*-see.* FGR*-1*SACT*-*DCL
'I see you.'

(7) Tâask-ey-s (Martin, 1991: 97)
*jump.*FGR*-1*SACT*-*DCL
'I jumped.'

(8) Ca-tahópk-ii-s
*1*SINACT*-*BE*.*NIMBLE*-*DUR*-*DCL
'I'm nimble, limber.'

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'I'm nimble, limber.'

(AUX = auxiliary, FGR = falling tone grade, DCL = declarative, DUR = durative, HGR = h-grade, LGR = lengthened grade, SS = same subject.)

The suffix *-ey* marks the first person singular subject of the transitive in (6) and of the active intransitive in (7), while the prefix *ca-* marks the first person singular subject of the inactive intransitive in (8) and the first person singular direct object of transitives (not illustrated). The complete sets of markers of the first type (glossed with ACT) and of the second type (glossed with INACT) are given in (9) and (10), respectively.

(9) Set I (active)

	Singular	Plural
1st	-ay (-ey, -a)	-iy (-ii)
2nd	-íck (-ícc, ´-ck, ´-cc)	-áack (-áacc)

(10) Set II (inactive)

1st	ca- (aca-, acaa-)	po- (ipo-, ipoo-)
2nd	ci- (ici-, icii-)	

As indicated in (10), the second person marker of the inactive set (shown in (6)) does not distinguish singular from plural. Third person agreement is not marked by either set.

While verb agreement distinguishes an intransitive like that in (7) from one like that in (8), case marking in Creek does not make a parallel distinction. All subjects are marked the same, including subjects of transitives, (11), active intransitives, (12), and inactive intransitives (13).

(11) ma honanwa-**t** ifa-n nafêyk-it-oo-s
that man-NOM *dog*-ACC *hit*.HGR-SS-AUX-DCL
'That man hit the dog.'
(Martin, 1991: 116)

(12) ma honanwa-**t** taask-it-oo-s
that man-NOM *jump*.LGR-SS-AUX-DCL
'That man is jumping.'
(Martin, 1991: 106)

(13) ma honanwa-**t** áls-ii-t-ôo-s
that man-NOM *bashful*-DUR-SS-AUX-DCL
'That man is bashful.'

As we can see, in Creek, verb agreement follows the active/inactive pattern, but case marking does not.

Thus, we cannot say that a (whole) language is active/inactive; rather, some specific phenomenon may have active/inactive marking. In Creek, verb agreement is active/inactive, while case marking is nominative/accusative. In modern Georgian, case marking is active/inactive, while verb agreement is not.

While most of the active intransitives are always intransitive, some may have an optional direct object. An example from Georgian is given in (14).

Table 1 Comparison of major marking types

	Transitive subject	*Intransitive subject*		*Transitive object*
		Active	*Inactive*	
Nominative/ accusative	A		A	B
Active/ inactive	A	A	B	B
Ergative/ absolutive	A		B	B
Tripartite	A		B	C

(14) bavšv-eb-ma itamaš-es nard-i
child-PL-ACT *play*-3PLS *backgammon*-INACT
'The children played backgammon.'

Verbs of all types may cooccur with an indirect object, but the status of indirect objects differs from language to language. An example from Georgian of an indirect object with an inactive intransitive is given in (15), and an example with an active intransitive, in (16).

(15) merab-i m-elodeb-a
Merab-INACT *1SGIO-wait-3SGS*
'Merab is waiting for me.'

(16) merab-ma m-iq'vir-a
Merab-ACT *1SGIO-yell-3SGS*
'Merab yelled to me, at me.'

Thus, indirect objects are irrelevant to active/inactive marking.

Active/inactive is a marking type parallel to nominative/accusative, ergative/absolute, or tripartite marking. Table 1, adapted from Sapir (1917), compares these marking types; A, B, and C represent distinct cases, distinct agreement markers, or other marking.

As should be clear from Table 1, active/inactive is not a version of ergative/absolute marking, though it has sometimes been discussed in this way. In fact, one can still find active/inactive marking referred to as ergative following the tradition in some language families (such as Georgian), but not in languages where the tradition is different (such as Creek, other Muskogean languages, and indeed other languages of North America).

Variability in Case Marking

In general in the languages already described in this article, an intransitive verb form is strictly classified as requiring active or inactive marking, and use of alternative marking is ungrammatical. For example, if the case marking in the Georgian intransitives in (2)

and (3) is changed, the sentences are ungrammatical, whether or not the agreement markers are also changed. In contrast to this, there are some languages where, without special verbal morphology, some intransitives can be used either with the marking otherwise used for subjects of transitives ('active' marking) or with that used for direct objects ('inactive' marking). This is known as variable or fluid marking. For example, in northern Pomo, a Pomoan language of northern California, there is a set of intransitives whose sole argument is always in the inactive case, another set whose sole argument is always in the active case, and a third set whose subjects make use of both (O'Connor, 1992). The inactive intransitives include verbs such as *balay-banem* 'bleed', *xamal-c 'iko:m* 'feel upset', and *miboḥ* 'be bloated', while the set of active intransitives includes *k'otam* 'swim', *thaʔ* 'play', *habaša:čiʔ* 'make a verbal error, misspeak'. The verbs with variable marking include those illustrated in (17) and (18).

(17) ʔa: / to: šinu:-č-ade
1s.ACT *1s.INACT* *be.drunk-PROSP*
'I'm going to get drunk.'
(O'Connor, 1992: 209)

(18) ʔa: / to: diṭhal-e
1s.ACT *1s.INACT* *be.sick-PRES*
'I am/was sick.'
(O'Connor, 1992: 217)

In (17), when the active variant of the first person singular pronoun, *ʔa:*, is used, the sentence is a statement of intention; while when the inactive variant, *to:*, is used, the sentence is a "prediction about effects of current behavior" (O'Connor, 1992: 209). Thus, the difference in case seems to reflect a difference in volition and control (also referred to as agentivity). Yet in (18), the verb cannot be interpreted as agentive, and O'Connor argues that the first variant, with active case marking, is a neutral report, while the second is more expressive. (The northern Pomo facts are much more complex than these examples reveal; this description is based on only one set of formal contrasts.)

In some ways, the facts of Tsova-Tush (Bats), a language of the Nakh subgroup of the North East Caucasian family, are similar (see Holisky, 1984, 1987). Subjects of transitives are in the active case, and direct objects in the inactive. Third person subjects of intransitives are always in the inactive case, except with a tiny group of verbs. Thus, case marking of third person generally follows a strictly ergative pattern, but for first and second persons the facts are different in intransitives. First and second person subjects of one set of verbs are always in the active case; these include *egar* 'enter, mix with a group', *letxã ixar* 'dance', and *axar* 'bark.' First and second person subjects of another set are always in the inactive case, including *maicdar* 'be hungry,' *qerl'ar* 'be afraid,' and *daq'dalar* 'dry up.' First and second person subjects of some verbs can be in either case.

(19) (as) vuiž-n-as
1s.ACT *fell-AOR-1s.ACT*
'I fell down, on purpose.'
(Holisky, 1987: 105)

(20) (so) vož-en-sO
1s.INACT *fell-AOR-1s.INACT*
'I fell down, by accident.'

Holisky notes that differences between the forms of the stem and aorist suffix in the two examples are the effects of regular phonological processes. The parentheses indicate that the independent pronouns are generally dropped, but their case forms are reflected in the forms of the agreement suffixes, *-as* and *-sO* (with a reduced *o*).

The Relation to Unaccusativity

The Unaccusative Hypothesis, first proposed in Perlmutter (1978), is based on the observation that a number of languages make a distinction between two types of intransitives – unergatives and unaccusatives. The Unaccusative Hypothesis is a proposal that verbs of the latter type have a deep structure direct object but no deep structure subject, while unergative verbs have a deep structure subject and do not subcategorize a direct object (that is, they have a direct object optionally, if they have one at all). Perlmutter proposes in addition that the structural difference is semantically motivated. Harris (1981, 1982) suggests that active/inactive case marking in Georgian is one instantiation of the unergative/unaccusative dichotomy, and Davies (1986) makes a similar proposal for active/inactive agreement in Choctaw, a Muskogean language similar in this respect to Creek. This approach relates active/inactive marking to syntactic phenomena such as auxiliary selection in Italian and other languages.

Perlmutter (1978) draws attention to semantic subsets of verbs that seem to correspond cross-linguistically, and Levin and Rapaport Hovav (1995) and many others have continued to study cross-linguistic aspects of the lexical semantics of both types of intransitives (see the overview in Alexiadou *et al.*, 2004). Holisky (1981) explores in depth the lexical semantics of unergative verbs in Georgian, and she shows, for example, that Georgian verbs that express what light does (such as 'shine', 'sparkle', 'glitter') pattern with other verbs that occur with an active-case subject. Verbs with these semantics behave in the

same way in a number of languages with active/inactive marking. Levin and Rapaport Hovav (1995) explain the behavior of such verbs as examples of verbs of emission and show that they are part of a larger class of verbs expressing internally caused events.

In some languages it may be only the cross-linguistic semantic similarity that supports identifying inactive intransitives with unaccusative verbs on the one hand, and active intransitives with unergative verbs on the other. However, in other languages there are specific syntactic or morphological arguments for identifying the sole argument of an unaccusative as a direct object at some level. For example, Harris (1981, 1982) discusses Georgian evidence from number suppletion, preverb alternation, and number agreement, in which direct objects and the subject of unaccusatives pattern in the same way, and other evidence from syntax, where the subjects of transitives and unergatives pattern differently from the subjects of unaccusatives.

Different Semantic Bases

Mithun (1991) argues that active/inactive marking is determined on different semantic bases in different languages. For example, she states that Guaraní distinguishes between stative and event (nonstative) verbs, while Lakhota distinguishes agentive from nonagentive verbs. Mithun suggests that in central Pomo the distinction is based on an interaction of control and affectedness, much as O'Connor (1986, 1992) suggests for northern Pomo. Bowden (2001) has claimed that in Taba (East Makian), a language of the South Halmhera subgroup of the Austronesian family, agreement is determined on the basis of an interaction of two distinctions – one between humans and nonhumans and one between effector (much the same as agent) and noneffector. Much cross-linguistic work will be needed to sort out both terminological differences and potentially real differences between the criteria used in different languages to distinguish two types of intransitives for the purpose of marking.

See also: Case; Ergativity; Georgian; Lakota; Unaccusativity.

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Activity Theory

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Cultural-historical activity theory (CHAT) is a school of thought concerning itself with the relation and interaction between humans and their material and social environment. Originally a psychological tradition, it has been expanded into a more general, multidisciplinary approach, which is used (besides in psychology) in semiotics, anthropology, sociology, cognitive science, linguistics, and design research. Thus, it would be more suitable to call it a framework, an approach, or a research program. From another perspective, CHAT is one of the few research traditions in human sciences originating in the former Soviet Union that have been able to gain acceptance in the Western research.

Historical Background

Cultural-historical activity theory, CHAT, originated in attempts by psychologists, as early as the 1920s, to establish a new, Marxist-based approach to psychology. The foundation of Activity Theory was laid by L. S. Vygotsky during the 1920s and early 1930s. (*see* **Vygotskii, Lev Semenovich (1896–1934)**.) His work was continued by A. N. Leont'ev and A. R. Lurija, who both developed his ideas further and began to use the term 'activity.' (A good historical review of that development can be found in Leont'ev, 1989.) For a Marxist psychologist, who favors a monistic explanation of human mental processes, the Cartesian mind-body dualism is unacceptable. Thus, the starting point of CHAT is that human thinking has both phylogenetically and ontogenetically emerged and developed in practical action and social interaction in the world; there is no separate mind that could be studied in isolation from these actions; significantly, the individual person is thus not a real unit of the analysis of mind. In any such analysis, the purposefulness of actions must be taken into account, and therefore it is necessary to include a minimal context that makes the actions meaningful for the acting subject. This context, typically a purposeful, social system of actions, is called an activity. Certain general principles within this framework include object orientation; mediation by culturally and historically formed artifacts (tools and signs); hierarchical structure of activity; and zone of proximal development.

Object Orientation

The most central feature of CHAT is that activities are oriented towards a specific object and that different objects separate activities from each other. In this tradition, the concept of object is complex and loaded. Activities emerge when human needs find a way to be fulfilled in the world. The object here is the entity or state of the world, the transformation of which will hopefully produce the desired outcome. An object has, thus, a double existence: it exists in the world as the material to be transformed by artifactual means and cooperative actions, but also as a projection on to the future—the outcome of the actions. The object is not exactly given beforehand, but it unfolds and concretizes in the interactions with the material and the conditions. Being a constantly reproduced purpose of a collective activity that motivates and defines the horizon of possible goals and actions, the 'sharedness' of the object is present only in social relations across time and space, as well as embodied in terms of history. Locally, the sharedness of an object is a process of social construction with divergent views and creative uses of cultural and interactional resources. Activities are thus often multivoiced, and none of the existing perspectives on the object can be defined as right—such a definition can only be given within an activity.

Mediation

The notion of tool mediation is one of the central features of CHAT. Actions are mediated by culturally and historically constituted artifacts, an artifact being defined as something that has been manufactured by a human. Thus, our relation with the world is shaped not only by our personal developmental history and experiences from various interactions, but also by the history of the broader culture we are part of. The world has been concretized in the shape of tools, symbols, and signs that we use in our activities. The world does not appear to us *as such*, uncontaminated, but as a culturally and historically determined object of previous activities. Humans project both these earlier meanings and those that have arisen from the fulfillment of current needs on to their objects; at the same time, they envision the potential results to be achieved. (*see* **Cognitive Technology**.) Language is an essential part of this toolkit, a tool of tools. According to CHAT, all mediation has both a language side and a material character: symbols and signs, and tools and instruments are all integral parts in the same mediation process. The basic mediational structure is depicted in Figure 1.

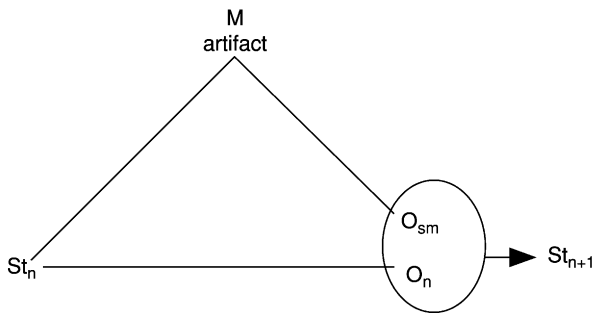

Figure 1 A model of the basic mediational structure. (S) subject, object (O), and medium (M) at the vertices of the triangle indicate the basic constraints of mind. The line S-O represents the 'natural,' (unmediated) functions; the line S-M-O represents the functions where interactions between subject and object are mediated by auxiliary means. St_n is the subject's state of knowledge at time n; O_{sm} is the object as represented via the medium; O_n, object at time n; St_{n+1}, emergent new state of the subject's knowledge at time n + 1 (Cole and Engeström, 1993: 5–7). Reprinted from Salomon (1993), *Distributed cognitions,* Figure 1.2, with permission from Cambridge University Press.

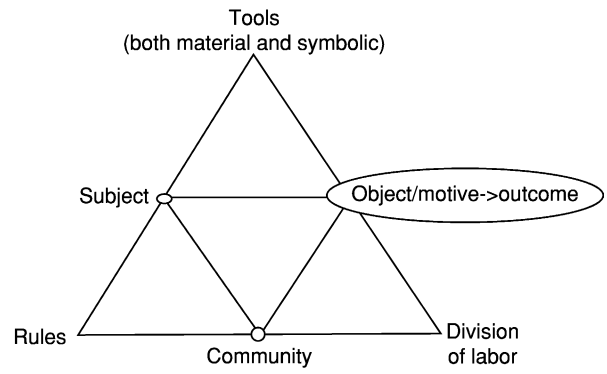

Figure 2 A model of an activity system (based on Engeström, 1987).The initial mediational triangle of individual actions is expanded to cover the social and cooperative dimension of an activity by adding a community sharing the same object and two new mediational relationships: social-cultural ('rules') between the subject and the community, and power/organizing ('division of labor') between the community and the shared object. The model is systemic in the sense that all elements have a relation with each other, but only the three main mediations are shown for the sake of clarity.

Thus the foundation of our actions is a continuous synthesis of two versions of the world: one directly given, the other culturally and historically mediated. Their synthesis enables us to plan our actions.

The Socio-Pragmatic Nature of the Sign

Activity Theory has paid much attention to semiotic mediation. Vygotsky's final work *Thought and Language* (1934) has contributed greatly to the understanding of human mental activity in socio-cultural terms, by assigning a crucial function to language as a psychological tool capable of mediating the development of the mind. Language as a tool calls for the use of artificial stimuli, that is, the use of culturally and historically construed sign systems. Signs serve to control the psyche and behavior of others and the Self, bringing to bear traces of social activities and social relations sedimented in language.

Vygotsky's socio-genetic approach to thought and language was developed originally in the research tradition of developmental psychology, aiming at understanding the child's mental growth. Later works of CHAT have continued with semiotic mediation and identity formation by focusing more on language use and utilizing notions such as the internal and external dialogicality of discourse. (*see* **Addressivity; Dialogism, Bakhtinian; Discourse, Foucauldian Approach; Discourse Processing.**) The interest is here in analyzing language from the viewpoint of sense-making, as it takes place within the contexts of the complex relationship between pragmatic activity and social processes. Sense-making is viewed as an active, culturally mediated process within and with which the external world is translated into a conceivable world and organized into objects of activities. Social change of language is explored with the help of developmental trends of sense-making through which new elements of meaning come into our social interests without leaving old meanings untouched.

Overall Structure of Activities

According to Leont'ev (1978), activities have a three-level hierarchical structure. Besides the activity level, which is a particular system of actions, and the action level itself, there is a third level, the lowest one, of operations. Operations are former actions that have become automated during personal development, and which are triggered within actions by specific conditions in the situation. Whereas in actions, there are always planning, execution, and control phases, operations are much more condensed, rapid, and smooth. To become skilled in something is to develop a collection of related operations. Operations are not, however, like conditioned reflexes: if the conditions do not fit, the operations return back to the action level.

In the tradition of the founders of CHAT, new forms for depicting activity have been elaborated. The most influential attempt to model an activity is due to Engeström. In his *Learning by expanding*, he aimed at defining a historically and concretely constituted system that has a timespan and internal transformations of its own. The model is presented in Figure 2.

In Figure 2, the model of individual action in Figure 1 has been complemented to depict the collective activity system. The model looks at the activity from the point of view of one actor, the subject, but the fact that subjects are constituted in communities is indicated by the point in the model labeled 'community.' The relations between the subject and the community are mediated, on the one hand, by the groups' full collection of 'tools' (mediating artifacts) and, on the other hand, by 'rules' that specify acceptable interactions between members of the community, and 'division of labor,' the continuously negotiated distribution of tasks, powers, and responsibilities among the participants of the activity system (Cole and Engeström, 1993: 7).

In an activity, the relation between individual actions and the outcome of the whole activity becomes mediated and indirect. Leont'ev (1978) explained the relation between individual actions and collective activity using an example of primitive hunters who, in order to catch a game, separate into two groups: the catchers and bush-beaters, where the latter scare the game in order to make them move towards the former. Against the background of the motive of the hunt—to catch the game to get food and clothing material—the individual actions of the bush-beaters appear to be irrational unless they are put into the larger system of the hunting activity.

Zone of Proximal Development

Activity systems are socially and institutionally composed entities exhibiting internal conflicts which develop through transformations. The characteristic feature of CHAT is the focus on such changes; it studies cognition, including language, as a dynamic, culture-specific, and historically changing phenomenon constituting activity systems. In this context, the zone of proximal development (ZPD) has became Vygotsky's most widely referenced notion. It concerns children's learning processes, and refers to

> the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (Vygotsky, 1978: 86)

Current activity theoretical studies extend from Vygotsky's dyadic pedagogical outline to potential horizons of different activities that will "mature tomorrow but are currently in an embryonic state." In the tradition of developmental work research, Vygotsky's ZPD indicates in outline the distance between present everyday actions and the historically new forms of the societal activity. In Engeström's model, contradictions in activity systems are "structural misfits within or between activities. The new forms of activity can be collectively generated as a solution to the double bind potentially embedded in everyday actions." (Engeström, 1987: 174). Contradictions may not be apparent or obvious, and they often appear as problems and disruptions in the flow of ordinary activities. In CHAT, new challenges of scientific concepts are also actively reflected in the ongoing research. Researchers in the areas of cognition and language studies are participating in the current development of discourse-based concepts.

The International Community

An international CHAT research community has been emerging, beginning from the late 1970s. In the early 1980s, there was a series of Northern European CHAT conferences on education; the first international CHAT conference was held in 1986 in Berlin, where the International Society for Cultural Research and Activity Theory (ISCRAT) was founded. This acronym was also the name used for a series of conferences: in Lahti, Finland, 1990; in Moscow, 1995; in Aarhus, Denmark, 1998; and in Amsterdam, 2002. A couple of these conferences have had their proceedings published as a selection of papers (Engeström *et al.*, 1999; Chaiklin *et al.*, 1998). In 2002, ISCRAT has joined forces with the Society of Socio-Cultural Studies (SSCS), resulting in a new society called International Society for Cultural and Activity Research (ISCAR), whose first joint world conference will be held in Seville, Spain, in 2005.

From 1994 on, the CHAT-oriented *Mind, Culture, and Activity. An International Journal* has been published by Lawrence Erlbaum.

See also: Addressivity; Cognitive Technology; Dialogism, Bakhtinian; Discourse, Foucauldian Approach; Discourse Processing; Marxist Theories of Language; Pragmatic Acts; Scaffolding in Classroom Discourse; Vygotskii, Lev Semenovich (1896–1934).

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Adamawa-Ubangi

J Bendor-Samuel, Summer Institute of Linguistics, High Wycombe, UK

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The languages grouped together as Adamawa-Ubangi belong to the Volta-Congo branch of the Niger-Congo family. These languages are spoken across central Africa in an area that stretches from northeastern Nigeria through northern Cameroon, southern Chad, the Central African Republic (CAR), and northern Zaire into southwestern Sudan.

The Speakers

In the absence of firm figures, the number of speakers of languages in this group can only be estimated at around eight to nine million people. Several languages with a million or more speakers belong to this group (e.g., Zande in CAR, Zaire, and Sudan; Ngbaka in North Zaire; and Gbaya in CAR and Cameroon).

Study of the Group

Little study of the languages in this group was undertaken before the 20th century. Westermann and Bryan (1952) treated them as individual units or clusters. Greenberg (1963) was the first to group them together as a branch of Niger-Congo. He used the name 'Adamawa-Eastern' for this group of languages. Samarin (1971) suggested the use of the name 'Ubangi' to replace 'Eastern.' Boyd (1989) has summarized recent studies on this language group, showing that for many of the languages there has been little detailed research. This is particularly true of the Adamawa languages. Knowledge of many of them is very sketchy.

Classification

The languages fall into two main groups – Adamawa and Ubangi. The Adamawa languages are found in northern Nigeria, Cameroon, and Chad, whereas the Ubangi languages are spoken in CAR, northern Zaire, and southwestern Sudan.

The Adamawa languages are divided into 16 groups: Waja (at least 6 languages), Leko (4 languages), Duru (18 languages), Mumuye (9 languages), Mbum (7 languages), Yungur (5 languages), Kam, Jen (2 languages), Longuda, Fali, Nimbari, Bua (9 languages), Kim, Day, Burak (6 languages), and Kwa.

Lexicostatistic studies show that the relationship among the groups is loose, but some of them can be grouped together so that two or perhaps three clusters emerge. The Leko, Duru, Mumuye, and Nimbari groups form a core of closely related languages. Another cluster comprises Mbum, Bua, Kim, and Day. Possibly a third cluster of Waja, Longuda, Yungur, and Jen can be formed.

The Ubangi languages show a much closer relationship to each other than do the Adamawa languages, and they fall into six main groups: Gbaya (4 languages), Banda, Ngbandi, Sere (6 languages), Ngbaka-Mba (9 languages), and Zande (5 languages).

Structural Features

Phonetics and Phonology

In Adamawa languages the set of initial consonants is much larger than the set of noninitial consonants, whereas in Ubangi languages there is little difference in size between the two sets of consonants. Most languages have either a five- or seven-vowel system.

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Two, three, or four contrastive tones are found. Downstep is not common.

Grammar and Syntax

Noun class systems are not universal and are found mainly in the Adamawa languages. Some only comprise paired singular and plural suffixes without concord markers.

Verb systems usually contrast perfective and imperfective forms. Verbal extensions mark iteration, intensive, benefactive, and causative. Generally, inflectional morphemes are prefixed, and derivational morphemes are suffixed.

The predominant sentence word order is SVO. Negative markers occur clause final, and interrogative markers and words occur sentence final.

See also: Benue-Congo Languages; Cameroon: Language Situation; Central African Republic: Language Situation; Chad: Language Situation; Dogon; Gur Languages; Kordofanian Languages; Niger-Congo Languages; Nigeria: Language Situation.

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Henri Adamczewski was born in France of Polish emigrants. As a child he already spoke three languages, Polish, Picard, and French, and it did not take him long to be fascinated by other languages as well, such as German, Russian, and Italian.

Adamczewski was a lecturer in, then a professor of, linguistics at the University of Paris 3, in the department of English studies, from 1970 to 1997.

In 1976 he defended his doctoral dissertation on the role of *be+-ing* in English grammar. The ideas he advanced did away with the traditional view of the 'progressive' or 'continuous' form and presented a novel approach in terms of the utterance-processing operations that reveal the discourse-implementing activity of the speaker.

For the last 30 years or so, the scope of his original concepts has been steadily extended, first to other fields of English grammar, then to a variety of other languages, irrespective of genealogical classification. The set of methods, concepts, and tenets underpinning the studies carried out by Adamczewski and by the linguists he trained is now referred to as Metaoperational Theory.

In 1995 Adamczewski turned to the question of child language acquisition, challenging the Generative views on the subject. Adamczewski has also been instrumental in the development of the didactic applications of theoretical linguistics in France. He is the author of two books presenting elements of his explicative grammar to French learners of English. He did not forget the educated layperson either, for whom two of his books are intended (one is in English: Adamczewski, 2002).

Adamczewski is considered one of the leading linguists in France and a pioneering figure in English linguistics, a field in which he is probably best known for his innovative views on *be+-ing* and on the auxiliary *do* in the context of the early 1970s. He has described the contrast between simple past or present sentences and *be+-ing* utterances in terms of structure (ternary vs. binary structure, the constituent [predicate]-*ing* being a preconstructed package applied to the grammatical subject); of orientation (right- vs. left-oriented utterances); and of pragmatic strategy (imparting new information vs. commenting on a state of affairs):

(1) *I leave tomorrow.*

(2) *I am leaving tomorrow.*

In (1) the speaker selects *tomorrow* instead of any other time marker available in the paradigm. In

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(1) *I leave tomorrow.*

(2) *I am leaving tomorrow.*

In (1) the speaker selects *tomorrow* instead of any other time marker available in the paradigm. In

(2) *tomorrow* belongs to the preconstructed predicate [*leaving tomorrow*], applied as a whole to the subject *I*, on whose situation the speaker comments.

Strongly opposing any analysis of *do* in terms of a 'dummy' auxiliary, he has demonstrated that whatever the context – emphatic, interrogative, or negative – *do* represents the linking operation of a subject and a predicate, insisting that English is probably the only language in the world that possesses an explicit marker of such an important operation.

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Adaptability in Human-Computer Interaction

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Introduction

In this article, two main themes will be touched upon: first, I will discuss the general topic of humans' adaptation to computers as tools, and conversely, how the computer tool can be adapted to human needs; and second, a particular instance of this adaptive process, in which both humans become (more) literate on and through the computer and computers are becoming more 'human,' will be discussed under the label of 'computer literacy.' In both cases, emphasis will be placed on the cognitive aspects of the problems, as embodied in the metaphors that are current in this particular discourse.

Adaptation and Adaptability

Adaptation

Earlier views on the computer as a tool (e.g., in human problem solving) have concentrated on the problem of *adaptation*: who or which is going to adapt to whom or which? (For a discussion of 'adaptability' vs. 'adaptivity,' where the latter is defined as a unilateral coercion on the human to conform to the patterns of behavior imposed by the computer, the former captures the necessity of letting the human decide to which degree, and to what purpose adaptation should be practiced, cf., Mey, 1998.)

Even though such efforts have their rationales in the context of computer modeling as it is usually understood, they do not touch upon the basic problem of adaptation, seen as a dialectic process of integrating two independent but interacting systems, the human and the computer (Mey and Gorayska, 1994). The case is analogous to that of perception; here, neither the senses nor the objects can be said, by themselves and unilaterally, to produce a sensation (e.g., of seeing). Perception is always perception of something, and it is always a perception by and in somebody. In the psychologist James J. Gibson's words, it is a "circular act of adjustment" (Gibson, 1979): "The activity of perception is not caused, nor is it an act of pure will" (Reed, 1988: 200).

An adaptability approach to computing thus endeavors to integrate two systems:

1. the human user, and
2. the computer tool.

In human-computer interaction, the human neither unilaterally 'acts' upon the computer, nor does the computer unilaterally prescribe the human some restricted form of activity. Rather, each system adapts to the other; their functional qualities, taken together, are what makes the use of the computer as a tool possible. In Gibsonian terms, tool making and tool using are tantamount to looking for and exploiting "affordances" (Gibson, 1979). To see this, consider the way our adaptation to, and interaction with, computers is characterized by our use of metaphors (*see* **Metaphor: Psychological Aspects**).

Computers and Metaphors

Like every other human activity, the use of computers has generated its own set of metaphors. We do our word processing using a 'mouse,' 'scroll' files up and down, 'chase' information on the Internet, get 'lost' in cyberspace, or trapped in the 'mazes' of the 'web'; and even if we have no idea what we are doing where in cyberspace, it can always be called 'surfing.'

(2) *tomorrow* belongs to the preconstructed predicate [*leaving tomorrow*], applied as a whole to the subject *I*, on whose situation the speaker comments.

Strongly opposing any analysis of *do* in terms of a 'dummy' auxiliary, he has demonstrated that whatever the context – emphatic, interrogative, or negative – *do* represents the linking operation of a subject and a predicate, insisting that English is probably the only language in the world that possesses an explicit marker of such an important operation.

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Adaptability in Human-Computer Interaction

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Introduction

In this article, two main themes will be touched upon: first, I will discuss the general topic of humans' adaptation to computers as tools, and conversely, how the computer tool can be adapted to human needs; and second, a particular instance of this adaptive process, in which both humans become (more) literate on and through the computer and computers are becoming more 'human,' will be discussed under the label of 'computer literacy.' In both cases, emphasis will be placed on the cognitive aspects of the problems, as embodied in the metaphors that are current in this particular discourse.

Adaptation and Adaptability

Adaptation

Earlier views on the computer as a tool (e.g., in human problem solving) have concentrated on the problem of *adaptation*: who or which is going to adapt to whom or which? (For a discussion of 'adaptability' vs. 'adaptivity,' where the latter is defined as a unilateral coercion on the human to conform to the patterns of behavior imposed by the computer, the former captures the necessity of letting the human decide to which degree, and to what purpose adaptation should be practiced, cf., Mey, 1998.)

Even though such efforts have their rationales in the context of computer modeling as it is usually understood, they do not touch upon the basic problem of adaptation, seen as a dialectic process of integrating two independent but interacting systems, the human and the computer (Mey and Gorayska, 1994). The case is analogous to that of perception; here, neither the senses nor the objects can be said, by themselves and unilaterally, to produce a sensation (e.g., of seeing). Perception is always perception of something, and it is always a perception by and in somebody. In the psychologist James J. Gibson's words, it is a "circular act of adjustment" (Gibson, 1979): "The activity of perception is not caused, nor is it an act of pure will" (Reed, 1988: 200).

An adaptability approach to computing thus endeavors to integrate two systems:

1. the human user, and
2. the computer tool.

In human-computer interaction, the human neither unilaterally 'acts' upon the computer, nor does the computer unilaterally prescribe the human some restricted form of activity. Rather, each system adapts to the other; their functional qualities, taken together, are what makes the use of the computer as a tool possible. In Gibsonian terms, tool making and tool using are tantamount to looking for and exploiting "affordances" (Gibson, 1979). To see this, consider the way our adaptation to, and interaction with, computers is characterized by our use of metaphors (*see* **Metaphor: Psychological Aspects**).

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Like every other human activity, the use of computers has generated its own set of metaphors. We do our word processing using a 'mouse,' 'scroll' files up and down, 'chase' information on the Internet, get 'lost' in cyberspace, or trapped in the 'mazes' of the 'web'; and even if we have no idea what we are doing where in cyberspace, it can always be called 'surfing.'

It's as if we were hanging out on the corners of our computational space – what one could call, using a novel metaphor, our 'cyber-hood,' our computerized neighborhood.

Among the various metaphors that currently characterize the computer and its use by humans, that of 'tool' has been one of the most pervasive. Just as tools help us execute certain activities better and faster, so too has the computer been considered a tool for performing certain operations (such as bookkeeping, accounting, tallying, registering, archiving, and so on) in a better, more efficient, and especially faster way. Among the attributes of this tool that have attracted most attention are, naturally, the ease with which it 'falls into' the human hand and routine; by extension, the computer is not even thought of as a tool any longer: enter the invisible, or 'transparent' tool (as I have called it; Mey, 1988), to be preferred over other, more visible and obtrusive kinds of instruments. The computer that adapts itself to the human user becomes an extension of the human body; conversely, the adaptable human user will treat the computer not just as any old tool, but rather as a crutch, a 'scaffolding' (in Bruner's terminology; Bruner, 1983), or even as a prosthesis, as we will see below (*see* **Scaffolding in Classroom Discourse**).

A Case in Point: The Computer as Prosthesis

It has been well known, ever since the pioneering work of people like Carroll (1991), that the tool we use to perform a particular task not only assists us in doing what we have to do, but also changes our understanding of the task itself and of a host of other things related to the task. It may change the very nature of the task altogether. For instance, to cite a classical case, the vacuum cleaner was originally introduced to alleviate and lessen a housekeeper's boring chores. In the end, it has increased the workload and made the work itself even more boring, because now it had to be performed more often and to a greater degree of perfection. The tool changes the task, and vice versa, in a never-ending "spiral" (Salomon, 1993).

With regard to computers, the tool has frequently been likened to a prosthesis. In the context of our discussion, this has had some profound effects. A prosthesis, one could say, is simply an augmentation of a human capability (either replacing a lost faculty or extending an existing one). But if we scratch this seemingly innocent surface, a host of hidden assumptions and unexpected problems turn up. First, there is the question of the augmentation itself: how far should we go, or be allowed to go, in the enhancing of the human sensory faculties? Using super-powered lenses and telecameras, we can spy upon the most intimate happenings in the lives of famous people like the late Princess Diana. But even though the majority of readers of the tabloid press would not be without their daily dose of lurid photojournalism, everybody agrees in condemning the excesses of the paparazzi when their need for media coverage directly or indirectly harms the celebrities they are pursuing, as it happened in the case of Princess Diana's death. "They are going too far," we hear people say. But what exactly is 'going too far' in what essentially is an adaptation of human goals and values to the possibilities of the tool? And how do we decide what is an acceptable limit for this adaptivity? On the one hand, more knowledge is more power; on the other, 'curiosity killed the cat' (and did irreparable damage to some notable humans and their progeny as well, as the case of Adam and Eve amply illustrates).

The Fragmented Body

The tool metaphor of the computer as a prosthesis carries with it yet another drawback. Since prostheses typically target one particular human capacity for augmentation, we come to think of our capacities as individually 'enhanceable.' There are two aspects to this enhancing: one, we consider only the individual agent, without taking his or her larger societal context into account; and two, we enhance single faculties in the individual, without taking into account the fact that these capacities form a unit, a human whole.

As to the first aspect, the societal character of our capacities, consider the 'paradox of success' that Kaptelinin and Kuutti (1999) have drawn attention to: what succeeds in one context may, by its very success, be expected to be a failure in another, seemingly similar environment. Thus, the very fact that, say, a decision-making computer tool has proven successful in the United States may warn us against trying to introduce it into a Japanese surrounding, where decisions among humans are made in ways that are very different from what is common practice in the U.S. (Kaptelinin and Kuutti, 1999: 152).

The other aspect relates to a currently popular notion of human capacities as being 'modularly replaceable.' Just as we are seeing the beginnings of 'surgical engineering,' in which techniques of replacement have substituted for old-fashioned operation and healing procedures, so we are witness to a trend toward substituting and augmenting not only parts of the body itself (such as is done in heart or kidney transplantation), but entire mental functions. A reasoning chip implanted in our brain relieves us from the headaches of going through the motions of filling in the trivial parts of a mathematical proof or a chain of syllogisms. A chip may replace a

person's worn-out or Alzheimer-affected memory capacities. In general, wetware can be replaced by more sturdy and robust electronic hardware, pre-wired to augment specific mental functions, and even tooled precisely to fit the needs of a particular individual. The potential for prosthetic innovations of this kind is virtually unlimited, up to the point where the whole person may end up being 'retooled' electronically (*see* **Cognitive Technology**).

The Effects of Adapting

Despite these problems, we are not exactly prepared to shut down our machines in the name of a return to basics, a kind of information-age Ludditism. We will have to live with the computer, even if our adaptation to it, as well as its role as an adaptive prosthesis, carries serious problems, generating side effects some of which were not intended. Here, it is useful to distinguish between primary and secondary effects. To take a well-known example, when Henry Ford wanted to put an automobile in everybody's front yard, the primary effect of this 'automotive revolution' was that people were able to travel farther and in ways not imagined before. But the secondary effects, not foreseen by Ford or anybody else at the time, included our adaptation to this new transportation device: our mind-set changed, the automobile becoming our premier status symbol, our 'escape on wheels,' for some even serving as an extra bedroom. In due course, these secondary effects (including the need to build more and more highways, in the process destroying entire rural and urban environments in the name of transportation, creating a new, 'suburban' life style for millions of people, and so on and so forth) were much more important than the simple primary effects in regard to our modes of transportation. The innovative tool re-creates that which it was only supposed to renew: the prosthetic tail wags the human dog.

Another problem with the prosthesis metaphor, when applied to the computer, is that of augmentation. The prosthetic tool, be it a crutch or a pair of binoculars, augments our motor or visual capacities. The notion of augmenting a human faculty presupposes the existence of something which is not augmented, or 'natural.' The trouble with humans, however, is that 'natural' behavior is a fiction; while we do have certain 'innate' functions (the faculty of speech, the ability to walk upright, and so on), these functions cannot be put to work 'naturally' unless we 'initialize' them, break them in socially and culturally. And in order to do this properly, we need tools. In particular, in any learning situation, we need what Bruner called a 'scaffolding': a total learning environment where the learner is gradually introduced to the next higher level of competency, all the way relying on the availability of physical and mental 'crutches'. And the more we enhance our human, culturally bound and socially developed functions, the less we rely on those crutches as external prostheses; we internalize the tools by making them part of ourselves, adapting and incorporating them, as it were, to the point where they are both 'invisible' and indispensable.

As an illustration, I will discuss the case of the word processor, thus leading into the second part of this article, which deals with the problems involved in computer literacy.

Computer Literacy

The Word Processor

A word processor is basically a tool for enhanced writing. Starting from the early, primitive off- and online text editors (such as RUNOFF or EDDY), modern word processors (such as the latest editions of Microsoft Word or WordPerfect) are highly sophisticated devices that not only help you write, but actually strive to improve your writing – and not just physically or orthographically. Text editors, for instance, will tell you that a sentence is ill formed or too long, or that a particular concept has not been properly introduced yet.

Computerized functions such as these may facilitate the ways in which we produce texts; on the other hand, the texts we produce are in many ways rather different from those that originated in a noncomputerized environment. Here, I'm not talking only about the outer appearances of a document (by which a draft may look like a final version of an article, and be judged on that count), but rather about the ways we practice formulating our ideas.

For instance, if we know that what we write may be disseminated across an international network, or abstracted in a database that is used by people from different walks of life and contrasting ethnic and cultural backgrounds, we will try to express ourselves in some kind of 'basic conceptualese,' shunning the use of metaphors and idiomatic expressions, thus sacrificing style to retrievability of information. As Oracle's Kelly Wical observed, such automated indexing of documents "will encourage people to write plainly, without metaphors . . . that might confuse search engines. After all, everyone wants people to find what they have written" (Wical, 1996; see also Gorayska, Marsh and Mey, 1999: 105 *ff.*).

In the following, I will examine some of these effects, and inquire into their desirability and/or inevitability.

Why Computer Literacy?

If literacy (no matter how we interpret this term) has to do with people's capacities for handling 'letters' (Latin: *literae*), then one may ask: What's so special about the computer that we need to define a special concept called 'computer literacy'? After all, people have been using the notion of literacy for ages, and there has never been a need to define a special kind of literacy for a particular tool of writing, such as a chisel, brush, or pen. Whereas 'penmanship' has become a synonym of 'high literacy' (no longer necessarily exercised by means of a pen), nobody has ever felt the need to define 'typewriter literacy' in terms other than in number of words per minute: a good ('literate,' if you want) typist can do at least 100 words per minute without committing too many errors, whereas a beginner or 'illiterate' person only can do 30 or 40 and will have to use a lot of time correcting his or her mistakes. In other words, there must be a difference, but what is it?

Writer and Tool

What makes a difference is in the relationship of the writer to his or her instrument: chisel and hammer, stylus and wax, quill and parchment, pen and paper, keyboard and screen. This relationship has not always been simple and straightforward; in particular, it has been known to influence the very way people write. The ancient Greek scribes who performed their craft in stone didn't bother to drag all their utensils back to the beginning of the line they just had finished: instead, they let the new line begin where the old one had stopped, only one level lower; thus, the script called *boustrophedon* (literally: 'the way the [plowing] oxen turn') came into being, with lines alternating in their direction of writing/reading. The medieval monks who wrote on parchment often tried to 'recycle' this precious and hard-to-get material by erasing earlier scripts and overwrite the deleted text, a technique known by the name of *palimpsest*. (By an irony of history, in due course the deleted text often turned out to be more valuable than the overwritten one. Many of the sources for our editions of the classical authors are due to the monks' parsimonious writing techniques.)

Undoubtedly, the invention of wood (later lead) letter type contributed greatly to the dissemination of written literature; yet, the effects on the scribe were never a matter of reflection. Much later, when the typewriter got naturally to be used for the purposes of office work, personal letters and literary 'works of art' still had to be composed by hand, if they were to be of any value. Even in a more practically oriented domain such as that of journalism, it is a known fact that the formidable Count Della Torre, in life chief editor of the Vatican daily *Osservatore Romano*, forbade the use of typewriters in his offices as late as 1948. His journalists had to write all copy by hand and then give it to a typist or typesetter.

The interaction between writer and tool changed dramatically with the advent of the computer. Not only is this writing instrument more perfect than any of its predecessors, but in addition it possesses a great number of qualities enabling people to approach their writing tasks in a different way. Accordingly, 'computer literacy' can be defined as: knowing how to exploit the various new uses to which the 'computer interface' between humans and letters can be put. Let's consider some of these uses.

How (Not) to Use a Computer

Here, I will not discuss the more specialized functions that computer writing has inherited from earlier technologies, merely perfecting but not changing them: bookkeeping and accounting (cf., the use of so-called 'spread sheets'), tabulating, making concordances, automated correspondence, and other office work (e.g., the automatic reminders one gets from one's credit card company or the local utilities services). The truly revolutionary aspect of computer literacy is in the effect it has on the writing process itself, that which earlier was thought of by some as sacrosanct, immune to any kind of mechanical implementation.

One could say that a truly 'computer literate' person is one who composes his or her literary production directly on the computer, without any interference except from the interface itself. This is a bit like composing directly on the piano, except that the keyboard there normally does not retain what has been played on it. In contrast, the conserving function of the computer is precisely what enables writers to enter into a totally new relationship with their tool.

Earlier work, being dependent on the paper medium, had to be meticulously corrected in the text itself, often with great problems of legibility and understanding (scratching or crossing out, 'whiting out,' overwriting, writing in between the lines and in the margins, cutting and pasting, and so on, with multiple versions often canceling out one another, or at least making perhaps better original lines impossible to retrieve). However, the computer allows the text producer to maintain near-complete independence of the material side of writing.

Paper has always been said to be 'patient' in that it did not protest against whatever the author put down on it, suffering great works of art and utterly trivial composition alike to be entered on its impartial surface. In comparison, the patience that the computer

exhibits is not just an inherent quality of the tool: it is transferred to, and located within, the computer 'literate' who knows that Pilate's age-old adage *Quod scripsi, scripsi,* "What I have written, I have written" (John, 19: 22) has been rendered null and void by this new medium. Here, it doesn't matter what is written, for everything can always be reformulated, corrected, transformed, and recycled at the touch of a keystroke or using a few specialized commands. In extreme cases, we even may see the computer generate near-automatic writing (in the sense of the surrealists), with fingers racing across the keyboard and authors failing to realize what's driving them on. Subsequently, the author who checks and goes over the results may often marvel at the 'inventions' that he or she has been guilty of producing, almost without being aware of the process by which they happened.

Perspectives and Dangers

I will conclude this entry by pointing to some of the perspectives that manifest themselves in a considered approach to the problem of adapting to/from the computer/human, especially as they appear in the context of computer literacy. In addition, I will say a few words about the possible dangers involved in the headlong embrace of new technologies (and their implied mental representations and ideologies) just because they are new. First, there is that age-old dilemma (going all the way back to Plato): Is the human just a kind of idealized entity coupled to a material reality ('a mental rider on a material beast of burden')? Or do we conceive of the union of the two in different ways, now that we have better metaphors to deal with these questions (especially the vexing problem of 'which is master': mind over matter or the other way around)?

Mind and Body Conceiving of the computer as a prosthesis may seem to finally resolve that ancient dichotomy: the mind-body split. If anything in the mind can be reproduced on a computer, then we don't need the body at all. Or, vice versa, if the computerized body can take over all our mental functions, why then do we have to deal with a mind?

There are indeed tendencies afoot that seem to advocate this kind of thinking. Some years ago, a book by Andy Clark (1997, frontispiece) proudly announced, in its subtitle, the ability to "put brain, body, and world together again". However, this synthesis is performed strictly on the basis of a computer-as-prosthesis informed philosophy: one describes the mental functions as (if need be, computerized) modules, united under a common ordering principle or joined loosely in some kind of mental republic, a 'society of mind' à la Minsky (1986), where the different mental functions, conceived of as semiindependent but jointly organized modules, cooperate to form an organized, governing whole.

In Clark's model, the emphasis is on the brain, not the mind, the latter being characterized as a "grab-bag of inner agencies." The "central executive in the brain – the real boss who organizes and integrates the activities" is said to be "gone." Also "[g]one is the neat boundary between the thinker (the bodiless intellectual engine), and the thinker's world." No wonder, then, that replacing this "comfortable image" puts us in front of a number of "puzzling (dare I say metaphysical?) questions" (Clark, 1997: 220–221). Leaving those questions aside in our context, let me briefly explore some possible practical consequences of this 'dementalization,' when seen as involving a decentralization of the individual's capacities.

Mind, Creativity, and Control While the acquisition of computer literacy as a condition for employment does not create much of a difference as compared with earlier situations (except for the extra cost and training it involves), the use of the computer in creative contexts represents a true breakthrough in the relationship of humans to their work, especially as regards their ways of creative production and reproduction. The interesting question here is not what the computer does to our hands, but in what ways it affects our mental ability to shape and reshape, to work out a thought, and then abandon it (but not entirely!). It is also in how it allows us to come back to earlier thoughts and scraps of insights that were jotted down in the creative trance, as it were – perhaps recombining these *disiecta membra* with other pieces of thought, all available at the drop of a keystroke. This qualitative change of our relationship with our creative tools is the true computer revolution; it defines 'computer literacy' as being qualitatively different from earlier, more primitive, creative and cognitive technologies.

The imminent danger of the spread of computer literacy is, of course, that any Tom, Dick or Emma who can handle a keyboard may consider themselves to be geniuses of writing, thus offsetting the positive effect of increased literacy through this reduction of the computer tool to an instrument of and for the inane and mindless. More importantly though, the danger exists that users, because of the apparent naturalness of their relationship to the computer, start considering themselves as natural extensions of the machine, as human tools. Being 'wired' becomes thus more than a facile metaphor: one has to be plugged into some network, both metaphorically and electronically, to be able to survive in today's 'wired' society. The wireless person just 'isn't there.'

To see this, consider the way most people are wired into the mass media of communication: their lives and thoughts are dictated by the media. Whoever doesn't plug into this immense network of 'infotainment' (information and entertainment), is 'out,' is an 'outsider,' in the strictest sense of the word; outside of the talk of the day at the workplace, outside of the discussions in the press, outside of the newscasts and television reports on current scandals and shootings. An 'insider,' on the other hand, does not (and cannot) realize to what extent the simple presence of thought and feelings, otherwise considered as 'naturally' arising within the mind, is due to his or her 'wiredness,' his or her connection to the networks. It takes the accidental 'black screen' (or some other temporary media deprivation) to make one fathom the depths of one's dependency, the extent of one's being 'hooked up' to the infotainment universe (and as a result, being 'hooked on,' not just 'wired into,' that universe).

'Big Brother' and the Mind's 'Holding Company'
A final issue is of a subtler, less technical, and for that reason all the more threatening, nature; it has to do with the nature of the mental prosthesis that the computer represents. The computer's special features (programs and functions that are distributed throughout the hardware rather than being encapsulated in neat, identifiable blocks of instructions, routines being divided into subroutines to be used independently and/or recursively, and so on) have led some of us to think of the brain as a similarly organized, distributed architecture (like Minsky's "society of mind," mentioned above). In particular, the currently popular 'connectionist' view of mental processing is based on this analogy; the prosthesis metaphor, if applied within this frame of thinking, transforms the individual mental features and functions into a set of independent, yet connected components (what Clark irreverently called a "grab-bag of inner agencies"; 1997: 221). The question is, and the problem remains, how to orchestrate all those brainy agencies into some kind of mental unit(y). For all practical purposes, one could replace the media outlets by some central instrument, have it wired directly into people's heads, and bingo, we're in business: the wired society becomes a frightening reality, with 'Big Brother' embodied in a central 'Holding Company,' a monster computer, controlling and directing our entire lives (cf. Big Brother and the Holding Company, 1968).

One frequently hears computer users employ expressions such as, "The computer is in a bad mood today" or "The computer doesn't want to cooperate"; one sees irritated users kick their machines, pound their keyboards, or scream at their screens, accusing these devices of lack of cooperation. Such expressions, when they are not caused by either the user's poor computer literacy, or by a particular hardware or software deficiency, may reflect either a lack of critical awareness of the computer's properties as an auxiliary tool, or a failure to distinguish between the respective roles of the partners in human-computer interaction and cooperation. The future of human computer interaction lies in the humanizing of the tool, not in the humans' becoming more tool-oriented and tool-like. And as to adaptation and adaptability, I repeat what I said earlier: the computer tail should never be allowed to wag the user dog.

See also: Cognitive Technology; Literacy Practices in Sociocultural Perspective; Pragmatics of Reading; Vygotskii, Lev Semenovich (1896–1934).

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Addressivity

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'Addressivity' (*obrashchennost'*) is a term coined by the Russian scholar Mikhail Bakhtin as part of his critique of traditional linguistics. It figures as well in the thinking of Bakhtin's colleague, Valentin Voloshinov, and it is helpful in understanding the approach to language and the psyche taken by Lev Vygotsky (*see* **Voloshinov, V. N. (ca. 1884/5–1936); Vygotskii, Lev Semenovich (1896–1934)**).

Bakhtin's work on language is best understood as part of his more general project to rethink the basis of the humanities and social sciences. Initially trained as a literary scholar, Bakhtin sought to reconceive the nature of ethics, psychology, literature, and language in such a way that choice, unpredictability, and open time were properly acknowledged. His work is suffused with the sense that the study of culture cannot be a science in the hard sense, a view that sets him apart not only from his Marxist contemporaries but also from numerous schools since the 17th century. Because Bakhtin believed that human thought takes place primarily in the form of inner speech, a new understanding of language proved essential to his larger project of humanizing the 'human sciences.'

Bakhtin reacted to the beginnings of formalist and structuralist linguistics, which he understood as methods of understanding human speech as an instantiation of rules. In this model, the linguist studies the rules, *langue*, and regards individual speech acts, *parole*, as entirely explicable in terms of the rules (*see* **Principles and Rules; Saussure, Ferdinand (-Mongin) de (1857–1913)**). This model and its attendant assumptions seemed to Bakhtin to exclude not only all that we think of as pragmatics and the social aspects of language but also everything that is truly creative in any dialogue between real people. Bakhtin wanted to formulate an alternative model that treated language, thought, and action as capable of genuine 'surprisingness' (*see* **Conspicuity**).

To this end, Bakhtin distinguished between sentence and utterance. The sentence is a unit of language understood as structuralists do. It does not take place at any specific point in time, and so is repeatable; the same sentence may be spoken on different occasions. The utterance, by contrast, is a specific act of speech that someone says to someone else on a specific occasion, and its meaning depends in part on the occasion. Each occasion is different, and so utterances are never repeatable. The utterance is a historical event and is part of a dialogue. Sentences provide resources for an utterance, but the utterance requires more than the sentence. Linguistics properly conceived should deal with utterances as well as sentences, but so long as language is understood in terms of sentences, we should call the discipline that studies utterances 'metalinguistics.'

What utterances contain that sentences do not is addressivity. Utterances are constituted by the fact that they are part of a specific dialogic exchange. Addressivity denotes all those aspects of the utterance that make it dialogic in the deepest sense (*see* **Dialogism, Bakhtinian**). Sentences contain only the potential to mean something, but utterances actually do mean something. In Bakhtin's terms, sentences have meaning (in Russian, *znachenie*) in the sense of dictionary-and-grammar meaning, but utterances have *smysl* (roughly, sense, or meaning in a real context).

One cannot solve the problem of context by writing a grammar for it. Although one can say many general things about context, no grammar of context could ever fully specify it, because context is as various as human purposes, which are irreducible to a set of rules. No matter how many helpful rules one may devise, there will always be a 'surplus' (*izbytok*). Bakhtin uses the same term, 'surplus,' to describe that aspect of human beings that is left over after all

Abstract:

Adaptation, in a computer context, is a two-way street: humans adapt to the computer, and computers are adapted to human needs. The two sides of the process are not to be seen as a simple reversal of direction, however; the need to prioritize the human in relation to the computer, weights the need for adaptable computers on human terms stronger than the need for computer-adapted humans. The thoughts developed on this general subject are then applied to the case of what is often called 'computer literacy,' currently one of the most important realizations of computerized technology, in particular as to its cognitive aspects.

Biography:

Jacob L Mey (b. 1926) is Professor Emeritus of Linguistics at the University of Southern Denmark. Previous appointments include the University of Oslo, Norway; the University of Texas at Austin; Georgetown University, Washington, D.C.; Yale University, New Haven, CT; Tsukuba University, Japan; Northwestern University, Evanston, IL.; City University of Hong Kong; Goethe University, Frankfurt am Main; Universidade Estadual de Campinas, S.P., Brazil; Universidade de Brasília, Brasília, DF; the University of Haifa and Haifa Technion, Israel; as well as numerous other institutions of research and higher learning.

Jacob Mey's research interests concern all areas of pragmatics, with an emphasis on the social aspects of language use, the pragmatic impact of computer technologies, and the pragmatic use of literary devices. Among his publications in these areas are *Pragmalinguistics: theory and practice* (The Hague: Mouton, 1979); *Whose language? A study in linguistic pragmatics* (Amsterdam & Philadelphia: Benjamins, 1985), *Pragmatics: an introduction* (Oxford & Boston: Blackwell, 1993; second revised edition, 2001). This book has been translated into Japanese and Korean; a Chinese translation is about to appear (2002). His most recent publication is *As Vozes da Sociedade* (*The voices of society*; in Portuguese) Campinas, S.P.: Mercado de Letras, 2002).

As to the computer-related aspects of pragmatics, a recent development is a new field, Cognitive Technology (CT), which he is among the first to have developed. He has written and edited numerous articles and books in the area, co-organized several international conferences, and founded (together with Barbara Gorayska) the *International Journal of Cognition and Technology* (Amsterdam: Benjamins, 2002). The main interest of CT is to study the effects of the computer on the human mind, and vice versa, how the mind determines the uses we make of the computer as a tool.

Among Jacob Mey's other main interests are the theory of literature and poetics. These interests have recently culminated (following many earlier articles) in his book *When voices clash: a study in literary pragmatics* (Berlin: Mouton de Gruyter, 2000).

Jacob Mey is founder (with Hartmut Haberland) and chief editor of the monthly *Journal of Pragmatics* (Oxford: Elsevier Science). He also edits *RASK: International Journal of Languages and Linguistics* for Odense University Press. Among his other edited volumes are two readers on Cognitive Technology (1996, 1999), and the 1100-page *Concise encyclopedia of pragmatics* (1998), all published by Elsevier Science.

Jacob Mey holds an honorary Dr. Phil. degree from the University of Zaragoza, Spain. He is a member of various professional organizations, such as the Linguistic Society of America, the Copenhagen Linguistic Circle, and the International Pragmatics Association (of which he is a member of the consultative board). He is Editor or Member of the advisory board of a number of series and journals, such as *Pragmatics and Beyond* (Amsterdam), *Anthropological Linguistics* (Berlin), *Discourse and Society; Text; Language and Literature* (Liverpool); *Miscelánea* (Zaragoza); *Psyke og Logos* (Copenhagen); *Sémantique et Pragmatique* (Orléans), *Cadernos de Linguagem e Sociedade* (Brasília) and others. In 1998, he was elected to the office of vice-president of the newly founded Society for Cognitive Technology. Jacob Mey has been married to Inger Mey since 1965, and has six children. He loves music, the outdoors, and animals, especially cats. He hates bad weather, pessimists, and bureaucrats. Since his retirement in 1996, he spends much of his time in Austin, TX, where his wife is pursuing a Ph.D. degree in anthropology.

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Addressivity

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'Addressivity' (*obrashchennost'*) is a term coined by the Russian scholar Mikhail Bakhtin as part of his critique of traditional linguistics. It figures as well in the thinking of Bakhtin's colleague, Valentin Voloshinov, and it is helpful in understanding the approach to language and the psyche taken by Lev Vygotsky (*see* **Voloshinov, V. N. (ca. 1884/5–1936); Vygotskii, Lev Semenovich (1896–1934)**).

Bakhtin's work on language is best understood as part of his more general project to rethink the basis of the humanities and social sciences. Initially trained as a literary scholar, Bakhtin sought to reconceive the nature of ethics, psychology, literature, and language in such a way that choice, unpredictability, and open time were properly acknowledged. His work is suffused with the sense that the study of culture cannot be a science in the hard sense, a view that sets him apart not only from his Marxist contemporaries but also from numerous schools since the 17th century. Because Bakhtin believed that human thought takes place primarily in the form of inner speech, a new understanding of language proved essential to his larger project of humanizing the 'human sciences.'

Bakhtin reacted to the beginnings of formalist and structuralist linguistics, which he understood as methods of understanding human speech as an instantiation of rules. In this model, the linguist studies the rules, *langue*, and regards individual speech acts, *parole*, as entirely explicable in terms of the rules (*see* **Principles and Rules; Saussure, Ferdinand (-Mongin) de (1857–1913)**). This model and its attendant assumptions seemed to Bakhtin to exclude not only all that we think of as pragmatics and the social aspects of language but also everything that is truly creative in any dialogue between real people. Bakhtin wanted to formulate an alternative model that treated language, thought, and action as capable of genuine 'surprisingness' (*see* **Conspicuity**).

To this end, Bakhtin distinguished between sentence and utterance. The sentence is a unit of language understood as structuralists do. It does not take place at any specific point in time, and so is repeatable; the same sentence may be spoken on different occasions. The utterance, by contrast, is a specific act of speech that someone says to someone else on a specific occasion, and its meaning depends in part on the occasion. Each occasion is different, and so utterances are never repeatable. The utterance is a historical event and is part of a dialogue. Sentences provide resources for an utterance, but the utterance requires more than the sentence. Linguistics properly conceived should deal with utterances as well as sentences, but so long as language is understood in terms of sentences, we should call the discipline that studies utterances 'metalinguistics.'

What utterances contain that sentences do not is addressivity. Utterances are constituted by the fact that they are part of a specific dialogic exchange. Addressivity denotes all those aspects of the utterance that make it dialogic in the deepest sense (*see* **Dialogism, Bakhtinian**). Sentences contain only the potential to mean something, but utterances actually do mean something. In Bakhtin's terms, sentences have meaning (in Russian, *znachenie*) in the sense of dictionary-and-grammar meaning, but utterances have *smysl* (roughly, sense, or meaning in a real context).

One cannot solve the problem of context by writing a grammar for it. Although one can say many general things about context, no grammar of context could ever fully specify it, because context is as various as human purposes, which are irreducible to a set of rules. No matter how many helpful rules one may devise, there will always be a 'surplus' (*izbytok*). Bakhtin uses the same term, 'surplus,' to describe that aspect of human beings that is left over after all

conceivable causal explanations have been applied. One's true selfhood begins where all possible categories and causes have been exhausted. In selfhood, the 'surplus' constitutes our humanness, and in utterances it constitutes the manifestation of humanness in language.

Addressivity involves everything that takes the resources of speech – dictionary meanings, grammar, syntax, rules of context – and turns them into an utterance. In practice, Bakhtin's work involved specifying features of context that were left out by structural linguistics, and so it overlaps strongly with pragmatics. It would be possible to absorb many of Bakhtin's insights into pragmatics without accepting his view of humanness, indeterminism, and the surplus (*see* **Pragmatics: Overview; Structuralism**).

Consider, for instance, the telegraphic model of language in which a speaker, intending to convey a message, instantiates the rules of language to produce a sentence. In that model, the message is then sent out through a medium to a listener, who decodes the sentence and so recuperates the original meaning. Speaking is encoding, and listening is subsequent decoding. The first problem with this model, in Bakhtin's view, is that nothing in this description would change if the listener were asleep, absent, or entirely different. But in real exchanges, the listener does not passively decode. Understanding is an active process in which the listener not only decodes, but also imagines how the utterance is meant to affect him or her, how it responds to past and potential utterances, and how third parties might respond. With all these factors in mind, the listener prepares a response that is revised as the utterance is being heard. Understanding is personal, processual, and active. Because every speaker counts on understanding of an active sort, the listener shapes the utterance from the outset. Speakers formulate their utterances with a specific listener or kind of listener in mind. This anticipation of a listener, which in ordinary speech is often guided by responses we sense **as** we are speaking, alters the tone, choice of words, and style of each utterance as a work in process.

Except in the purely physiological sense, each utterance is a co-creation of speaker and listener. It is essentially joint property. Bakhtin offers a series of examples, drawn from Dostoevsky's novels, of utterances whose whole point and stylistic shape would be missed without considering addressivity. In 'the word with a loophole,' for instance, the speaker deliberately exaggerates a self-characterization so that, if the response is undesired, the utterance allows him to pretend after the fact that it was parodic or unserious. The utterance builds into itself future utterances to more than one possible response.

Such utterances are not only common in daily speech, but also figure in our psyche. Because thought largely consists of inner dialogues, our minds are composed of the listeners that inhabit us – our parents or other figures whose responses count for us. We address them when we think, and so our very thought is shaped by imagined anticipated responses. We justify ourselves, or guide our thoughts by what significant internalized others might say. We grow and change as we absorb new listeners or learn to address old ones differently.

Within and without, we live dialogically. Addressivity, the dialogue of inner and outer speech, involves not only the 'second person' (the listener) but also what Bakhtin calls the 'third person.' In different studies, the term 'third person' has two distinct meanings, both of which are essential to addressivity. Sometimes the third person refers to all those who have already spoken about the topic in question. No one speaks about anything as if he or she were Adam, the first to break the silence of the universe. Every topic has been 'already spoken about' and the words referring to this topic implicitly 'remember' the earlier things said about it and the contexts in which they were said. It is as if words have glue attaching to them the evaluations and meanings of earlier speakers. Thus, when we speak, we implicitly take a stand in relation to those earlier speakers, and our words may be spoken as if with quotation marks, at a distance, with various tones indicating qualification. Some words come already 'overpopulated' with earlier utterances. Our speech therefore contains implicit elements of reported speech (direct or indirect discourse) in which the framing utterance takes a stance with respect to the framed one. Such effects may not be visible in the words when viewed as parts of a sentence, but they are nevertheless keenly sensed by speaker and listener. We are in dialogue with our predecessors, and addressivity refers to this historical aspect of utterances as well as to the present speaker-listener relationship. Whether we are considering the second or third person in addressivity, the utterance is shaped by others.

A second sense of 'third person' refers to what Bakhtin calls the 'superaddressee' (*nadadresat*). We never turn over our whole selves to a listener, because we cannot count on perfect understanding. Each utterance is partially constituted by the projection of an ideal listener, an invisibly present third person who would understand perfectly. We sometimes make the superaddressee visible when, in talking with one person, we gesture, as if to say, 'would you just listen to him!' But visible or invisible, the superaddressee is part of every utterance. The superaddressee may be personified as God or imagined as the voice of history,

but strictly speaking it is a constitutive factor of the utterance itself. We implicitly address this perfect listener as well as the real one before us. The super-addressee also figures in our inner speech, where again it may be personified.

The idea of addressivity allows Bakhtin to analyze a series of utterances that may look linguistically or stylistically simple but that are in fact complex when we consider them as part of a dialogue. Imagine a conversation in which one speaker's voice has been omitted but its intense effects have left their mark on the other speaker's utterance: some speech is shaped as if that process had taken place, as if it were one part of a tense exchange. Such speech takes 'sidelong glances' at the other's potential answer and may almost seem to cringe in anticipation of a response. Utterances may be 'double-voiced,' so that they seem to emerge from two speech centers simultaneously, each commenting on the other and addressing themselves to a third party. In extreme cases, such utterances may bespeak psychological disturbance, as in Dostoevsky. But double-voicedness also appears in simple form in parody. A vast variety of discourses become visible when we consider them from the perspective of addressivity (*see* **Narrativity and Voice**).

In contrast to such movements as 'reader reception' theory, Bakhtin sees the listener's response as active, not just after an utterance is made, but also while it is being made. Bakhtin is attentive to the formulation of an utterance as a shifting process. An utterance may change in the course of being said – in response to others, to circumstances, or even to the sound of itself. We are ourselves one listener of our speech acts, impersonating potential others. Bakhtin regards a culture's forms of addressivity as constantly changing in response to circumstances and the creativity of individuals. Some typical forms of addressivity may coalesce into speech genres, and to learn a language involves learning those genres. Speech genres differ from language to language and change over time (*see* **Genre and Genre Analysis**).

For Bakhtin, the idea that utterances may change as they are being made suggests that addressivity presumes a speaker truly 'present' and ethically 'responsible' (literally 'answerable' in the original Russian) for what he says and a listener present and responsible for how he listens. As speakers and listeners, we choose and may be held accountable for our choices. Nothing is already made or entirely explicable in terms of pre-given codes or prior causes. Thus, the concept of addressivity is closely connected with Bakhtin's insistence that ethics can never be a mere instantiation of rules; each situation requires real presence and judgment. In what we do as in what we say, we really accomplish something never done before. Or as Bakhtin liked to say, there is no 'alibi.' These broad implications of addressivity explain why its pragmatic aspects belong to Bakhtin's project of altering 'the human sciences.' He describes human beings as social to the core because even in our psyche we think by dialogue. Conversely, he describes society and language as possessing both surprisingness resulting from the creative aspects of each dialogue and ethical significance resulting from our answerability for each utterance with addressivity.

See also: Conspicuity; Genre and Genre Analysis; Narrativity and Voice; Pragmatics: Overview; Principles and Rules; Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism; Voloshinov, V. N. (ca. 1884/5–1936); Vygotskii, Lev Semenovich (1896–1934).

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Adelung, Johann Christoph (1732–1806)

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German Librarian, Lexicographer and Grammarian

Johann Christoph Adelung (see **Figure 1**) was born on the 8th of August 1732 at Spantekow, near Anklam, Pomerania, as the son of a vicar. After going to school in Anklam he studied theology from 1752 to 1756 in Halle. He then worked as a senior high school teacher in Erfurt (1758–1762). From this position, however, Adelung had to resign due to a confessional controversy. For the period 1762–1765 no certain details of his whereabouts are known; he was possibly a librarian at Gotha. The following years he spent at Leipzig, and, being unemployed, made a living as a translator and as an editor of various publications. In 1787, he was appointed head librarian of the electoral library of Dresden, whose organization he improved and developed. Adelung remained in Dresden until his death on the 10th of September 1806.

Figure 1 Portrait of Johann Christoph Adelung. Reproduced from Martin-Luther-Universitat, Halle-Wittenberg, with permission.

Adelung's work as a translator and as an editor of some 10 magazines and periodicals covered various fields, above all, history but also natural sciences, education, geography, and cultural history. This and, of course, his profession as a librarian gave him a very broad survey of the general state of the art of his time. In 1766, Adelung was commissioned by the publisher Breitkopf to continue the work on an extensive dictionary of the German language (German, Standard), which had only just been started by J. C. Gottsched. The five volumes with the title *Versuch eines vollständigen Wörterbuchs der hochdeutschen Mundart* were published between 1774 and 1786, and a second revised edition was published between 1793 and 1802 (*Grammatisch-kritisches Wörterbuch der hochdeutschen Mundart*), at the time the most extensive dictionary of the German language and its dialects. Henceforth the German language was Adelung's main field of interest as a scholar. Another commission by the Prussian Prime Minister, Baron von Zedlitz, was the starting point of his activities as a grammarian and resulted in the *Deutsche Grammatik* of 1781, followed by a simplified version intended for elementary schools that was also published in 1781. Very soon an extensive, explanatory version in two volumes (*Umständliches Lehrgebäude* and *Grundsätze der deutschen Orthographie,* 1782) of his school grammar appeared. Two previous publications on the history and origin of language (*Über die Geschichte der deutschen Sprache, 1780; Über den Ursprung der Sprache*, 1781) were included in the *Umständliches Lehrgebäude*. The latter also contains his theory of word formation, which he regarded as a historical process (etymology). In the periodical *Deutsches Magazin*, which appeared in two annual

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volumes in 1782 and 1783, Adelung reviewed books on linguistics and discussed and defended the theories he had presented in the *Versuch* and the *Umständliches Lehrgebäude*. His numerous publications also cover the field of stylistics (*Über den deutschen Stil*, 1785, 1786), orthography, and pronunciation (*Vollständige Anweisung zur deutschen Orthographie,* 1788; *Kleines Wörterbuch für die Aussprache, Orthographie, Biegung und Ableitung,* 1781). Adelung also devoted himself to Gothic, Old, and Middle High German literature. In 1806, the first volume of *Mithridates,* a collection of the prayer 'Our father' in about 450 Asian languages, was published. After Adelung's death in 1806, the orientalist J. S. Vater took over this project and published three more volumes on European, African, and American languages (1809, 1812, 1817).

Characteristic of Adelung as a linguist is the breadth of his knowledge, his immense industry and diligence, and his sober and pragmatic view on language. He was a great collector, summing up and adapting the achievements of his predecessors to his own time. To a much lesser degree he was an innovator and a theorist. He often wavered between different standpoints, and it is not difficult to find inconsistencies and contradictions in his texts. His approach to language as a grammarian was empirical and psychological rather than logical, contrary to contemporary rationalist grammarians such as J. M. Roth or A. F. Bernhardi. His ideas about the history of language were to a great extent influenced by J. G. Herder. Thus, he regarded language as an invention of man, not a gift of God, and the development of language as parallel to that of human civilization and culture. Adelung's theory of the origin of language was onomatopoetic: words had arisen from the need to imitate natural sounds, and, in accordance to the primitive state of its inventors, the first words were obscure in meaning and monosyllabic in form. He regarded the dialect of Meissen in Southern Saxonia, which in his opinion was the culturally most flourishing province of Germany, as a prototype and model of Standard High German, a view that not unexpectedly led to controversies with other scholars.

Adelung can be regarded as a link between the linguistics of the Enlightenment and of Romanticism. In his methodical ambition, only to draw conclusions based on empirical data and by bringing the history of language into the scope of lexicography and grammar, he was a forerunner of comparative and historical linguistics. His historical work, especially the *Mithridates*, contained a huge amount of linguistic data, which, however, he could not fully work up theoretically. He was therefore widely ignored by historical and comparative linguists such as J. Grimm. It is significant that Grimm, in the preface of his *Deutsche Grammatik* of 1819, severely criticizing school grammar, only mentioned Adelung as an author of this kind of grammar. As to the synchronic part of his studies, i.e., the lexicographic mapping and the dialectological and grammatical description of the German of his time, Adelung's influence and importance, however, are unquestionable. The great number of editions of his dictionaries and grammars and the number of works based on Adelung's corpus that followed in Germany and other countries after his death bear good evidence of this.

See also: Becker, Karl Ferdinand (1775–1849); Grimm, Jacob Ludwig Carl (1785–1863).

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Adjectives

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General

Like the two other major parts of speech, noun and verb, adjectives can be defined at various levels of the organization of language, in particular, at the levels of morphosyntax, semantics, and syntactic usage. Statements regarding the universality or nonuniversality of the category of adjective in the languages of the world will always have to be made in the context of these individual levels of language description. From a semantic point of view, adjectives can be said to exist in any one language; however, morphosyntactically based definitions reveal that many languages do not have an independent class of adjectives. Morphosyntactic approaches to parts of speech operate by determining which individual lexical items can be combined with what types of grammatical items when used in syntactic context, and by investigating the position of individual lexical items relative to other constituents in higher-order syntactic configurations, as well as any additional structural characteristics of the lexical items in question. On the basis of differences between individual lexical items with respect to these criteria, lexical items can be assigned to distinct structural classes.

Adjectival Morphosyntax

Many languages do not have a structurally separate class of adjectives; in these languages, the morphosyntactic properties of the semantic equivalents of English adjectives are more or less identical to those of either the nominal or the verbal class. Thus, in Latin, the lexical representations of concepts that semantically correspond to English adjectives, by and large, exhibit the morphosyntactic characteristics of Latin nouns: for instance, they are inflected for gender, number, and case by means of affixes, and, like nouns, they require the presence of a copula in predicate position.

(1) vi-a long-a est
road-NOM.SG.FEM *long-NOM.SG.FEM* *is*
'the road is long'

In contrast, in Lakota, the semantic equivalents of English adjectives display the morphosyntactic properties of verbs. For instance, they combine with the person, number, and tense affixes used in verbal morphology:

(2) ṵ-wáš'aka-pi-kte
1PL.PAT-strong-PL-FUT
'we will be strong'

Another domain in which considerable cross-linguistic variation can be observed concerns the size of the adjective class in languages that have a structurally independent class of adjectives. For instance, English and Japanese are equipped with large adjective classes comprising thousands of members. In contrast, according to Dixon (1977: 20–22), there are also languages with extremely small adjective classes: in Igbo there are eight adjectives, in Pengo there are 20 adjectives, in Sango there are 30 adjectives, and in Bantu languages the size of the adjective class ranges between 10 and 50 members. Large adjective classes may at least in part be due to the existence of derivational processes in the languages in question, which allow the formation of new adjectival lexemes. In

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English, for instance, adjectival lexemes can be created from various types of base lexemes by means of the highly productive derivational suffix *-y* (e.g., *fun* > *funny*, *to itch* > *itchy*). Other structural devices often used for the purpose of deriving adjectives include reduplication, internal modification, tone change, and compounding.

The inventories of the grammatical categories found in human languages differ considerably, both in complexity and with respect to the categories contained in them. For this reason, it is impossible to pin down an invariable, i.e., universal, set of grammatical categories that adjectives combine with in any language. However, certain morphosyntactic features tend to recur in the morphosyntactic profiles of adjectives at the cross-linguistic level. In what follows, a brief overview of the most important of these features is given.

Since gradability is an important semantic characteristic shared by many adjectival concepts (cf. 'Adjectival Semantics' below), grammatical devices for coding the semantic subcategories of gradation can be expected to be widely available in the languages of the world. This is indeed the case; the coding formats for concepts such as comparative, superlative, and elative include, among other things, affixes, adverbs, and more periphrastic construction types. Thus, English uses both affixation and adverbial modification to express the notions of comparative and superlative: *short-er*, *short-est* vs. *more intelligent*, *most intelligent*. In Bari, a construction involving a verb that can be translated by 'to exceed' is used to code the comparative.

(3) Körsuk a lokong to-tongun Jökö
K. is wise INF-exceed J.
'Körsuk is wiser than Jökö'

Further, in many languages, adjectives are combined with a copula in predicate position, as in Swahili:

(4) ki-su ni ki-kali
CL.SG-knife COP CL.SG-sharp
'the knife is sharp'

Adjectives often show agreement with the noun they modify, as in German:

(5) grün-e Bäum-e
green-NOM/ ACC.PL.MSC tree-NOM/ ACC.PL.MSC
'green trees'

There are languages in which a linker is inserted between a noun and an adjective that functions as an attribute of that noun, as in Indonesian:

(6) air yang dingin
water LK cold
'cold water'

Linker insertion may be either obligatory or optional in any attributive construction involving adjectival lexemes in a given language. However, there are also languages in which dispensability vs. strict requirement of a linker varies from lexeme to lexeme.

In some languages, such as Lakota, adjectival attributives form compounds with the noun they modify:

(7) thípi-ṡà ki
house-red the
'the red house'

In example (7), the adjectival attribute *-ṡà* 'red' receives secondary stress only (which is marked by `); consequently, the configuration of head noun and attribute is to be analyzed as a compound in this case.

Regarding the relative order of adjectives and other constituents within the noun phrase, Greenberg (1963: 87) notes that across languages, in configurations in which adjectival attributes, demonstratives, and numerals are present, when all of these noun phrase constituents either precede or follow the head noun, the adjectival attribute, rather than the modifying demonstratives and numerals, is the constituent that tends to be placed next to the head noun. The English example *these three red books* illustrates this.

Adjectival Semantics

According to the traditional semantic definitions of parts of speech, adjectives express property concepts. This distinguishes them from the two other major parts of speech, noun and verb, whose most prototypical representatives denote object concepts and event concepts, respectively. However, the semantic definition of 'adjective' as property concept, in many languages, merely captures the greater part of lexical items exhibiting the morphosyntactic features of adjectives (cf. 'Adjectival Morphosyntax' above). For instance, the lexeme *furious* must be classed as a member of the adjectival class of English on morphosyntactic grounds, but it designates a passing state rather than a property.

The notion of property concept can be further decomposed into semantic features. In this context, the features time-stability, stativity, and relationality (i.e., valence structure) turn out to be particularly salient and useful (Bhat, 1994; Croft, 1991; Givón, 1979; Pustet, 2000, 2003; Stassen, 1997; Wierzbicka, 1995). Prototypical adjectival concepts are characterized by:

1. intermediate time-stability (Givón, 1979: 321–322). Prototypical adjectival concepts are indeterminate as to the duration of the state of affairs they designate and thus cover either long or short time spans. For instance, the English adjective *gray* may be used to describe a house, but also the sky on a

particular day. When referring to a house, the state of affairs 'gray' is likely to have a long duration, which may extend over years or possibly decades. When referring to the sky, the state of affairs 'gray' is likely to change within days, hours, or even minutes.

2. stativity (Langacker, 1987; Wierzbicka, 1995). Prototypical adjectival concepts express static, rather than dynamic, states of affairs. For instance, a dynamic concept such as 'to go' involves changing internal states, such as movement of the feet, while the component states of a stative concept such as 'big' are identical to each other throughout the time span covered by the proposition 'big' in any given case.
3. a valence of 1, i.e., intransitivity (Croft, 1991: 62–63, 104–105; Langacker, 1987). Prototypical adjectival concepts require only a single valence slot to be filled when functioning as lexical heads of predicates. In many languages, the term 'subject position' is appropriate in referring to this valence slot. Thus, in order to use the English adjective *red* as the lexical head of a clausal predicate, the subject slot of the clause must be filled, as, for instance, in the example *the book is red*.

However, in any language, there may exist lexical items whose semantic feature profiles deviate from the above adjectival prototype even though they show adjectival morphosyntax. For instance, the English adjective *wooden* is maximally time-stable in semantic content; for an entity that consists of wood, according to the known physical laws of the universe, this property is impossible to change during the lifetime of that entity. *Dizzy*, on the other hand, is minimally time-stable in semantic content because a state of dizziness usually does not last very long.

Adjectival concepts that comply with the semantic prototype definition given above can be grouped into semantic classes. A well-known classification of the adjectival domain is given in Dixon (1977: 31). The classes listed by Dixon include dimension ('big', 'little', 'long', 'short', 'thick', 'thin', etc.), physical property ('hard', 'soft', 'hot', 'cold', 'sweet', 'sour', etc.), color ('black', 'white', 'red', etc.), human propensity ('happy', 'generous', 'clever', 'proud', etc.), age ('new', 'young', 'old', etc.), value ('good', 'bad', 'excellent', 'fine', etc.), speed ('fast', 'quick', 'slow', etc.). These semantic classes display cross-linguistically recurring properties with respect to the manifestation of the morphosyntactic patterns addressed in 'Adjectival Morphosyntax' above (Dixon, 1977: 56):

1. No matter how small the morphosyntactically, or structurally, defined adjective class in a given language may be, members of the semantic classes age, dimension, value, and color are likely to be contained in it.
2. In languages with small structural adjective classes, human propensity concepts tend to be realized in the structural class of nouns rather than in the adjectival class, while physical property concepts tend to be realized as structural verbs.

A semantic criterion that sets adjectival concepts apart from most nominal and verbal concepts is that they often imply the notion of scalar measurability. This characteristic is the conceptual basis for the grammatical feature of gradability: only concepts that exhibit scalar measurability in their semantic profile are gradable, and admit formation of antonym pairs such as 'big' vs. 'little'. There are, of course, adjectival concepts that are not scalar and thus not gradable. An example is 'empty'.

Syntactic Usage of Adjectives

Each of the major parts of speech – noun, verb, and adjective – can be assigned a preferred function in syntax. For adjectives, this function is that of attribute, as in *red book*. Needless to say, adjectives can also be used in their nonprototypical syntactic functions, i.e., in argument and predicate position. The latter functions are associated with nouns and verbs, respectively. These distributional patterns, which can be verified by means of discourse frequency counts, constitute a putative language universal (Croft, 1991: 36–98).

When used as attributes, adjectives frequently occur in the bare or structurally unmarked form (Croft, 1991: 36–98), although many languages are equipped with morphosyntactic elements that are used specifically with adjectives in predicate position. Examples include gender inflection in German (cf. [5]) and linker insertion in Indonesian (cf. [6]). When functioning as lexical heads of arguments or predicates, adjectives tend to combine with additional morphosyntactic material, which often merely contributes to marking the syntactic function in question. The contrast between the attributive and the predicative adjective constructions in *the red book* vs. *the book is red* illustrates this: a copula can be considered an example of such added morphosyntactic material that may be present when adjectives appear as lexical heads in a syntactic function in which they do not typically occur, in this case, in predicate position.

Further, syntactic function may impose restrictions on the use of adjectives in discourse. In many languages, certain adjectives are exempt from being used in specific syntactic functions. Takelma provides an

extreme example for such a restriction since in this language, all adjectives must be used attributively (Sapir, 1922). In English, there are adjectives whose occurrence is limited either to attributive or to predicative function (e.g., Bolinger, 1967; Quirk *et al.*, 1972: 234). Examples include *former* and *ready*; *former* is not acceptable as a predicate, while *ready* cannot occur as an attribute. Thus, *the former president* is grammatical, while **the president is former* is not; *the sandwich is ready* is grammatical, while **the ready sandwich* is not.

See also: Argument Structure; Noun Phrases; Nouns; Verbs; Word Classes/Parts of Speech: Overview.

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Adpositions

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Adposition is a cover term for both prepositions and postpositions. The grammatical treatment of adpositions has undergone considerable change over the last three decades or so. In traditional approaches, the adposition was viewed merely as a minor word class consisting of a small set of words; it was very often treated briefly within a page or so. The number of adpositions in languages that possess them tends to be in the range 20–30, although it is also possible to form compound adpositions, which may increase the number, for example, English *on account of*, French *à cause de*. Second, the traditional view sees the adposition as a word placed in front of the noun phrase (although adpositions may have other major phrase classes as objects or complements); hence, in such languages we identify a **pre**position (i.e., the word is placed before its complement). In other languages, an adposition is placed after the noun phrase, so we term it a **post**position. However, today, following advances in theoretical syntax, adpositions are considered in some treatments as one of the major word classes together with nouns, verbs, and adjectives/adverbs. In X-bar syntax, then, the adposition is the head of a phrase, a PP (which may be read as prepositional **or** postpositional phrase), followed by its complement (in the case of prepositions) or preceded by its complement (in the case of a postposition).

The two subclasses of adpositions may also reflect the distinction made in linguistic typology between head-first languages and head-last languages. In head-first languages, also known as SVO and VSO languages, which include languages in the western branches of Indo-European (e.g., the Celtic and

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Slavonic languages), major Semitic languages (e.g., Arabic and Hebrew), and African language families, we normally find prepositions, as illustrated in the following examples.

- English *on,* as in: on the table
- French *à,* as in: *à la maison* 'in the house/at home'
- Russian *v,* as in: *v dome* 'in the house'
- Welsh *ar,* as in: *ar y bwrdd* 'on the table'
- Arabic *'ala,* as in: *'ala iT-Taawilla* 'on the table'

Head-last languages, on the other hand, tend to be SOV languages. This set of languages includes languages belonging to the eastern branches of Indo-European (e.g., Persian), Indian languages (e.g., Hindi and Bengali), and languages in other families (e.g., Turkish, Japanese, and Korean). In these languages, we usually find postpositions. Hindi *par,* as in:

ghar	par		
home	on	=	'at home'

Turkish *için,* as in:

benim	için		
1.GEN	for	=	'for me'

and Turkish *(i)le/la,* as in:

trenle		
train.by	=	'by train'

The relationship between the position of the adposition and the type of language (SVO/VSO or SOV) may be seen only in terms of relative frequency. SVO languages, for example, may have one or two postpositions or may have a unique postpositional phrase. English, for example, has one postposition, the temporal adposition *ago* as in *three years ago*. German, an SOV language in many accounts, has prepositions only, with the exception of *nach*, a preposition that functions as a postposition in one expression only, *meiner Meinung nach* 'in my opinion'. Other languages that do not have the normally expected typological order include Finnish, an SVO language that has more postpositions than prepositions, and Persian, an SOV language that has prepositions only.

In Amharic, a Semitic SOV language spoken in Ethiopia, there are both prepositions and postpositions. There are a handful of very frequent prepositions, for example, *bä* 'with, by', *kä* 'from, out of', *wädä* 'toward, into', but most adpositions are postpositions, for example, *wəst* 'in', *lay* 'on'. Most postpositions derive from nouns and several derive from verbs, which is not the case with prepositions. There are also several mixed adpositions that use both a preposition and a postposition, for example, *lay* 'the top' becomes *ə . . . lay* 'on, at, of'; *kä . . . lay* 'down from, from above'. However, in colloquial Amharic, the tendency is to omit the preposition; thus speakers use the predicted word order Complement + Postposition of an SOV language.

In many languages with an overt case system, the adposition governs the case of the complement NP. For example, in Russian the preposition *iz* 'from' governs the genitive case, as in *iz komnaty* 'from the room'. In Slavonic languages, and also in German and Latin, some locative adpositions may govern more than one case depending on whether the meaning is locative or directional. So in German, the preposition *in* in *in das Haus* 'into the house', governs the accusative case, whereas in *in dem* (or *im*) *Haus* 'in the house' the same preposition governs the dative. In Standard (Classical) Arabic, all prepositions but one (*'ila'* 'except') govern the genitive case, for example, in *kilu min as-sukari* 'a kilo of sugar', the noun *as-sukar* is in the genitive (suffix-*i*). In modern spoken Arabic dialects, however, cases are no longer found. In English, five of the personal pronouns have retained an originally extended system of case endings: *she* becomes *her* as in *to her.*

In terms of morphology, it may be said that in most Indo-European languages, the adposition, whether it is a preposition or postposition, is indeclinable—it remains constant in form. So, we have in English *in*, *from*, *because of*, French *de* 'of, from', and *pour* 'for', Russian *iz* 'from', *dlya* 'for', Hindi *par* 'in', *tak* 'until, by'. However, in some Celtic languages we find a group of prepositions that are inflected when the complement of the preposition is a pronoun. In Welsh, for example, the preposition *er* 'for' is inflected according to person, number, and, in the third person, gender, for example, *erof* 'for me', *eroch* 'for you (plural)', *erddo* 'for him', *erddi* 'for her'. In Semitic languages, we find the same phenomenon, for example, in Arabic *min* 'from' gives *minhu* 'from him', and in Hebrew *le* 'to' gives *lanu* 'to us'.

The presence in some languages of inflected adpositions may be linked to the historical development of this word class in these languages. In some SOV languages, we find a form of inflected postposition, presumably because the postposition is often derived from a noun, which is subject to inflection. In Turkish there is a set of postpositions such as *için* 'for' and *doğru* 'toward', but there are also many adpositions that derive from nouns and have been termed 'fake' postpositions. For example, the noun *üst* 'top', is inflected as a normal noun:

üstünde		
top.GEN.LOC	=	'on top of, on'
üstünden		
top.GEN.from	=	'from the top'

To express 'on the table' and 'off the table,' this noun in the appropriate inflected form functions as a

postposition following the genitive form of the noun *masa* 'table':

masanin üstünde
table.GEN top.GEN.LOC = 'on the table'
masanin üstünden
table.GEN top.GEN.from = 'off the table'

A similar structure with a noun may be found in Vietnamese, where there are relator nouns; for example, *tren* means 'the top, higher point' and may function as a preposition, as in: *cái bút o tren bàn* 'the pen is on the table'.

As reflected in the examples from Turkish and Vietnamese, it may be said that in many languages we do not find adpositions as a separate word class but, rather, that adpositionlike structures are formed by combining words of different word classes and affixes. In the East African Bantu language Swahili, the *-a* of association (pronominal concord meaning 'of, for') is used to create phrases that have meanings found regularly with adpositions, as in *karibu na* 'near', in *karibu na ziwa* 'near a lake'. In Japanese, an SOV language, we find a similar structure with *no* as the relational particle and *ni* as a locational particle:

heya	no	naka	ni
room	RELPART	middle	LOC

'in the room'

We may examine the history of adpositions not only through their grammar but through their semantics, too. The semantic range of adpositions initially covered temporal and spatial locations (e.g., *in*, *on*, *after*, *until*), but over many centuries languages have extended the meanings of these adpositions to cover more abstract concepts; for example, the meaning of *after*, with its original temporal meaning 'following in time' and locative meaning 'behind,' has been extended to 'according to' or 'in imitation of', as in *The portrait was painted after Vermeer*. The meaning of *to* has been extended from its directional meaning to, among others, its use in the idiomatic phrasal verb *be up to something*.

Although we find adpositions in languages from all corners of the world, their occurrence may not be universal. In languages that have serial verbs, such as Akan and the Melanesian pidgins, we often find that the second verb may have the syntactic and semantic attributes of an adposition; for example, in Akan:

Kofi	fa-a	ntoma	ma-a	me
Kofi	take-PERF	cloth	give-PERF	me

'Kofi took a cloth for me'

Languages in which nouns have extensive inflection patterns seem to have less need of a separate adposition word class. The major (temporal and spatial) locatives are expressed by morphological patterns.

The center of attention as far as adpositions are concerned is without doubt their semantics. The multiple meaning of adpositions may be seen in terms of monosemy, homonymy, or polysemy. The first approach suggests that an adposition has a highly abstract meaning, but does not take into account how the context operates in attributing the correct meaning in any one case. Homonymy suggests that a different word derives from each meaning of an adposition. This approach ignores the historical development of adpositions; as mentioned previously, adpositions had far fewer meanings in the past. In terms of polysemy, the adposition is semantically underdetermined. The meaning in any given context may be understood through pragmatic means, for example, Grice's conversational implicatures, background knowledge, and relevance theory. This may be illustrated by the meaning of *over* in the sentence: *The athlete jumped over the hurdle*. In this sentence, *over* means 'starting from one side, making an arc, and landing on the other side' of the hurdle. But *over* in a sentence such as *The bird was hovering over the house* means 'above.' The basis on which the speaker decides which meaning applies to a particular sentence is not only linguistic knowledge but also cognitive processes, including background information. After the verb *jump,* some trajectory is expected, not a static location because we know from our experience in this world that athletes do not stay up in the air no matter how great their prowess in jumping. It should not be assumed, however, that without a context the preposition *over* is meaningless. After all, the difference between *The athlete jumped over the hurdle* and *The athlete jumped next to the hurdle* derives directly from the contrast between *over* and *next to*.

Highly polysemic adpositions have been termed colorless (or abstract or empty). Their meaning may be ascertained only from the context, whereas a colorful adposition has a short list of more precise meanings. In French, for example (the first language that was studied within this paradigm), the colorless prepositions are *à*, *en,* and *de* 'in/at', 'of', whereas colorful prepositions include *sans* 'without' and *durant* 'during'. In addition to colorless and colorful prepositions, French has a number of mixed prepositions, for example, *pour* 'for' and *par* 'by', which have their meaning extended according to context but in a more restrained way than the colorless prepositions.

If, then, the semantics of adpositions in natural languages leads to polysemy, either the meaning of

an adposition must be understood from the context, as illustrated, or the meaning is so vague that the adposition becomes meaningless. When this occurs, all that may be said about it is that it is the head of a prepositional (or postpositional) phrase. This occurs very conspicuously in pidgins and creoles. The preposition *long* in the Melanesian pidgin Bislama not only has a host of temporal and locative meanings determined by the context, for example, 'in, on, at, to', but plays, too, an important syntactic role in which it is semantically meaningless. *Long* marks the second object of a ditransitive verb, although this second object is often the indirect object, which in English and many other European languages may be marked by the preposition *to* or its equivalent. However, in

hem	i	tijim	mifala	long	matematik
he	PRED	teach	us	PREP	mathematics

'he teaches us mathematics'

it is clear that the prepositional phrase *long matematik* is not the equivalent of the English *to mathematics*, a prepositional phrase functioning as goal or recipient (indirect object), but is marked as the second complement in terms of word order.

A further example of an adposition becoming a syntactic marker is the English *to* when it functions as the marker of the verb infinitive (labeled in some syntactic theories as a complementizer). This function is similar in some respects to *à* and *de* in French, although in this language further morphological means are found (viz. suffixes such as *-er*, *-re*, *-ir*). This may be contrasted to languages such as Russian and Spanish, in which the infinitive is marked by suffix only, for example, *-at'/-it'* in Russian and *-ar/-ir* in Spanish.

See also: Semantics of Spatial Expressions; Word Classes/Parts of Speech: Overview.

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Adverbs

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Introduction

Adverbs easily constitute the most heterogeneous of all word classes; they often are described as a 'dustbin' category to which items will be assigned that do not fit into other word classes. Semantically and morphologically, adverbs are most closely related to adjectives, from which they are often derived.

The earliest attempts at defining adverbs reflect the etymology of the word (cf. Latin *ad-verbium*): adverbs are "used in construction with a verb" (Appolonios Dyscolos). Even today, manner adverbs are typically considered the core group of adverbs. One definition commonly encountered in linguistic textbooks is more general than the one proposed by scholars in classical antiquity: adverbs modify verbs, adjectives, or other adverbs. Apart from its patent circularity, the traditional textbook definition does not apply to countless items that are commonly classified as adverbs (e.g., words that usually relate to whole sentences, such as *fortunately*). Many linguists have tried to remedy the shortcomings of traditional accounts by assigning some putative 'adverbs' to other word classes (cf. 'Semantics versus syntax').

Semantic Categories

Of the many semantic classifications of adverbs that have been suggested, the following semantic subclasses seem to have the widest currency in the

an adposition must be understood from the context, as illustrated, or the meaning is so vague that the adposition becomes meaningless. When this occurs, all that may be said about it is that it is the head of a prepositional (or postpositional) phrase. This occurs very conspicuously in pidgins and creoles. The preposition *long* in the Melanesian pidgin Bislama not only has a host of temporal and locative meanings determined by the context, for example, 'in, on, at, to', but plays, too, an important syntactic role in which it is semantically meaningless. *Long* marks the second object of a ditransitive verb, although this second object is often the indirect object, which in English and many other European languages may be marked by the preposition *to* or its equivalent. However, in

hem	i	tijim	mifala	long	matematik
he	PRED	teach	us	PREP	mathematics

'he teaches us mathematics'

it is clear that the prepositional phrase *long matematik* is not the equivalent of the English *to mathematics*, a prepositional phrase functioning as goal or recipient (indirect object), but is marked as the second complement in terms of word order.

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See also: Semantics of Spatial Expressions; Word Classes/Parts of Speech: Overview.

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Semantic Categories

Of the many semantic classifications of adverbs that have been suggested, the following semantic subclasses seem to have the widest currency in the

pertinent literature (examples and classification from Ramat and Ricca, 1994: 307f):

1. predicate adverbs (*quickly*, *already*, *repeatedly*, *again*)
2. degree adverbs (*very*, *extremely*)
3. sentence adverbs (*unfortunately*, *strangely*, *probably*, *allegedly*, *frankly*)
4. setting adverbs of space and time (*today*, *now*, *here*, *recently*)
5. focalizers (*only*, *also*, *even*)
6. text adverbs (*firstly*, *consequently*, *however*, *hence*).

Following Ramat and Ricca, predicate adverbs modify verbs or verb phrases, whereas degree adverbs modify adjectives and other adverbs. The class of sentence adverbs includes many different types of items. Their defining characteristic is that their scope extends over more than one constituent. Setting adverbs and focalizers lack many characteristic features of adverbs (cf. below). Text adverbs "give textual coherence to a sequence of sentences," and thus are similar in function to conjunctions (Ramat and Ricca, 1994: 308). It is not always easy to differentiate between text adverbs and conjunctions. One crucial difference is that the former function as adverbials. Moreover, conjunctions create a higher-order syntactic unit by joining two smaller syntactic units. By contrast, text adverbs merely connect units (viz. complete sentences) that remain syntactically independent.

Syntactic Functions

Typically, adverbs and adverb phrases have either of two syntactic functions (cf. Quirk *et al.*, 1985: 439f): They can occur as adverbials (e.g., *never* in *Tom never loses his temper*) or as premodifiers of adjectives (***extremely*** *sad*), adverbs (***extremely*** *quickly*), and (according to some definitions) nouns or noun phrases (***even*** *George*). According to some linguists, adverbs and adverb phrases can also function as arguments (e.g. as subject in *Tomorrow will be fine*; Quirk *et al.*, 1985: 440). It is not clear, however, whether *tomorrow* in this example should be counted as an adverb in the first place (cf. Semantics vs. syntax).

Coherence of the Word Class: Defining Criteria

The heterogeneity of the class of items commonly labeled *adverbs* prompts the question how to justify the postulation of a single category covering all these lexemes. The basis for such a justification should be the iconicity hypothesis, according to which "the concepts that fall into the same grammatical category are cognitively similar in some respects" (Croft, 2003: 204). This similarity may be reflected in the presence of necessary or sufficient semantic or syntactic features shared by all items classified as adverbs. Alternatively, it may be reflected in the presence of prototypical adverbs, to which the more marginal members of the class bear a sufficient similarity – although what counts as 'sufficient' similarity is a matter of debate. The following morphosyntactic features have been suggested as unifying characteristics of all or at least the prototypical adverbs in English: (i) adverbs are invariable; (ii) adverbs are optional; (iii) adverbs can be modified by items such as *very* or *quite*; (iv) adverbs are used as modifiers of categories other than nouns (e.g., Ramat and Ricca, 1994; Tallerman, 1998; Huddleston and Pullum, 2002). The first two features are at best necessary criteria (because prepositions and conjunctions, for example, also are invariable; and adjectives also often are optional). In a sense, the second criterion does not invariably apply even to typical adverbs. Certain verbs do require the presence of adverbs or other items functioning as adverbials (e.g., *The job paid us handsomely*; **The job paid us*; Jackendoff, 1972: 64), but these are exceptional cases. The third criterion only applies to prototypical adverbs. The fourth criterion is a good candidate for a defining feature, but it entails that certain items discussed below are excluded from the class of adverbs.

Semantics versus Syntax

In light of these four morphosyntactic criteria, close scrutiny of the six semantic categories of adverbs mentioned above reveals that some of these categories are problematic. For example, focalizers (group 5) should not be classified as adverbs, primarily because they serve to modify nouns (e.g., *only/even George*); also, they do not combine with typical adverbial modifiers like *very* or *quite*. Similar problems arise with setting adverbs (group 4). There is some evidence, though, that some of the examples which Ramat and Ricca group under this heading are more akin to (pro)nouns than to adverbs proper. For instance, items such as *today* or *tomorrow* can be found in argument positions usually occupied by noun phrases (e.g., they can function as subjects or complements of prepositions, as in *She'll be ready by tomorrow*). Furthermore, *today* and similar lexemes behave like nouns in that they can take the possessive *'s* (cf. Tallerman, 1998: 48f). In contrast to typical adverbs, these lexemes do not permit modifiers such as *very* or *quite,* and may even be obligatory (e.g., *here* in *put it here*). Most important, setting 'adverbs' do not

always act as modifiers: *here* in *put it here* does not really **modify** the verb (for a parallel argument relating to *outside*, cf. Huddleston and Pullum, 2002: 564). There are thus quite a few features that warrant excluding items such as *today* or *tomorrow* from the class of adverbs.

Other setting adverbs do not qualify as nouns but, rather, as prepositions. Thus, lexemes such as *there* can be plausibly reanalyzed as prepositions, primarily because they take modifiers that usually only modify prepositions, like *right* in *right there* (cf. Aarts, 2001: 184f for a number of arguments). Some setting adverbs, however, do seem to be clear adverbs (e.g., *recently* does not exhibit most of the above-mentioned 'deviant' features). The example of setting adverbs shows that the semantic subcategories traditionally posited for adverbs have to be subjected to careful analysis. Moreover, it is not always easy to draw the boundary between adverbs and nouns, or between adverbs, prepositions and conjunctions. Some scholars also argue that there is a certain overlap between adverbs and adjectives (cf. Quirk *et al.*, 1985: 403–409).

In light of the foregoing discussion, a definition of adverbs along the lines of Huddleston and Pullum (2002: 563) seems particularly promising. The authors capture "the most important defining property of adverbs" as follows: "Adverbs characteristically modify verbs and other categories except nouns." This definition is an improvement on the traditional textbook definition – adverbs modify verbs, adjectives, or other adverbs – because it also covers lexemes that modify larger syntactic units such as clauses (e.g., *perhaps*). Furthermore, it specifically excludes nouns as the only category that cannot be modified by adverbs and thus allows us to draw a relatively neat distinction between adjectives and adverbs. Note that this definition does allow for adverbs that modify noun **phrases**, as opposed to mere nouns. More specifically, "adverbs do not occur as attributive modifiers within a nominal" (**his almost success*), although they may modify a noun phrase (*almost the whole season*; Huddleston and Pullum, 2002: 563). Attributive modifiers within nominals are always adjectives; thus, *only* in *only his child* is an adverb, *only* in *his only child* is an adjective. Huddleston and Pullum's definition holds out the promise for a more succinct conception of adverbs for the following reason: those items that by this definition should be excluded from the category of adverbs (e.g., *tomorrow*) also usually fail to exhibit many other typical features of adverbs. For the same reason, a definition that requires that adverbs function as modifiers may be preferable to conceptions that additionally allow for a predicative use or other uses of adverbs (e.g., Huddleston and Pullum themselves or Hengeveld, 1992).

Semantics Complements Syntax: A Prototype Approach

A syntactic definition of adverbs should be complemented by a semantic characterization. Such a characterization necessarily focuses on prototypical adverbs, as it seems impossible to capture the common denominator of all adverbs in semantic terms. A compelling approach to defining parts of speech in semantic terms has been put forward by Croft (2001), who argues that a universally applicable definition of parts of speech has to be framed in terms of prototypes (for another intriguing explanation, cf. Sasse, 1993). Croft proposes a scheme based on pairings of semantic class (object, action, property) and propositional act functions (reference, modification, predication). The author suggests the following definitions: noun = 'reference to an object'; adjective = 'modification by a property'; verb = 'predication of an action.' Croft's original scheme only covers modification of a referent, but, as noted by the author himself, can be expanded to cover adverbial modification, which he captures as "modification of a predicate" (Croft, 2001: 94). Prototypical adverbs, much like prototypical adjectives, could then be defined as items that provide 'modification by a property,' the difference being that prototypical adjectives modify referents and prototypical adverbs modify predicates. This definition reflects the close link between adjectives and adverbs: Many adverbs are formed from adjectives (e.g., by means of *–ly* in English); and numerous languages do not even make a formal distinction between adjectives and adverbs. For example, non-standard varieties of English generally dispense with the typical adverb ending *–ly*. According to Hengeveld's Part-of-speech hierarchy (Verb > Noun > Adjective > Adverb), "a category of predicates is more likely to occur as a separate part of speech the more to the left it is in this hierarchy" (Hengeveld, 1992: 70).

Items that qualify as prototypical adverbs by Croft's definition (viz. manner adverbs) exhibit all the previously mentioned syntactic criteria of adverbs. Manner adverbs are invariable and almost always optional; they act as modifiers (but never modify nouns), and they can be modified by words like *very* or *quite*. In contrast to problematic items like *today* or *aboard*, they can never follow a copular verb. Most members of the remaining subcategories lack at least one of these features (e.g., they cannot be modified by degree adverbs). Our approach is cognitivist in spirit, as word classes are seen as having a

"prototype structure, with central members sharing a range of both syntactic and semantic attributes. Failure of an item to exhibit some of these attributes does not of itself preclude membership" (Taylor, 1995: 196). Such an approach is not at odds with the idea that all adverbs have at least one feature in common.

See also: Adjectives; Adpositions; Grammatical Meaning; Nouns; Prototype Semantics; Word Classes/Parts of Speech: Overview.

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Aegean Scripts

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Introduction

In the 2nd millennium B.C.E., literacy spread from Mesopotamia and Egypt to adjacent parts of the eastern Mediterranean area. There can be little doubt that the Semitic consonantal alphabet (*abjad*) was directly inspired by Egyptian logoconsonantal writing. In the case of the essentially logosyllabic Sumero–Akkadian cuneiform writing system, it is, however, not entirely clear whether the creation of several logosyllabic and syllabic writing systems in the 2nd millennium B.C.E. was directly inspired by the principles behind the cuneiform script or only very loosely so.

Three such logosyllabic and syllabic writing traditions are known: the Byblos (pseudohieroglyphic) script of Phoenicia (*see* **Scripts, Undeciphered**), the Cretan–Mycenean–Cypriot scripts (Cretan hieroglyphic, Linear A, Linear B, the Phaistos Disk script, Cypro–Minoan, and the Cypriot syllabary), and the Anatolian hieroglyphs (a.k.a. Hittite hieroglyphs or Luwian hieroglyphs). Of these, only Linear B, the Cypriot syllabary (both mainly used to write Greek), and the Anatolian hieroglyphs (mainly used to write the Luwian language) have been wholly or largely deciphered.

General Characteristics of Open Syllabaries

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"prototype structure, with central members sharing a range of both syntactic and semantic attributes. Failure of an item to exhibit some of these attributes does not of itself preclude membership" (Taylor, 1995: 196). Such an approach is not at odds with the idea that all adverbs have at least one feature in common.

See also: Adjectives; Adpositions; Grammatical Meaning; Nouns; Prototype Semantics; Word Classes/Parts of Speech: Overview.

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Aegean Scripts

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Introduction

In the 2nd millennium B.C.E., literacy spread from Mesopotamia and Egypt to adjacent parts of the eastern Mediterranean area. There can be little doubt that the Semitic consonantal alphabet (*abjad*) was directly inspired by Egyptian logoconsonantal writing. In the case of the essentially logosyllabic Sumero–Akkadian cuneiform writing system, it is, however, not entirely clear whether the creation of several logosyllabic and syllabic writing systems in the 2nd millennium B.C.E. was directly inspired by the principles behind the cuneiform script or only very loosely so.

Three such logosyllabic and syllabic writing traditions are known: the Byblos (pseudohieroglyphic) script of Phoenicia (*see* **Scripts, Undeciphered**), the Cretan–Mycenean–Cypriot scripts (Cretan hieroglyphic, Linear A, Linear B, the Phaistos Disk script, Cypro–Minoan, and the Cypriot syllabary), and the Anatolian hieroglyphs (a.k.a. Hittite hieroglyphs or Luwian hieroglyphs). Of these, only Linear B, the Cypriot syllabary (both mainly used to write Greek), and the Anatolian hieroglyphs (mainly used to write the Luwian language) have been wholly or largely deciphered.

General Characteristics of Open Syllabaries

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The genesis of the Sumero–Akkadian and Egyptian-Semitic writing systems is critically connected to certain characteristics of the underlying languages (Sumerian and Egyptian, respectively). The invention of the concept of writing itself (i.e., the use of pictures and symbols to denote language sounds) can most naturally occur if the underlying language is predominantly monosyllabic (as is the case in Sumerian). The resulting writing system will be logosyllabic, with syllabic signs for all the possible word/syllable structures of the original language (V, CV, VC, and CVC, in the case of Sumerian). The evolution of a logoconsonantal system such as the Egyptian one, and the subsequent development of a monoconsonantal script such as the Semitic *abjad*, also depends crucially on certain phonotactic and structural characteristics of the underlying languages, such as the lack of vowel-initial words and the alternation within a semantic group or a grammatical paradigm of forms with different vowels (or no vowel at all) but in a fixed consonantal framework, as can be found in Afroasiatic languages such as Egyptian and Semitic.

Open syllabaries, however, based on the use of pictograms to acrophonically denote the initial vowel or consonant + vowel of the object depicted, seem to represent a very intuitive and practical concept generally, provided the concept of writing itself has already been discovered. The creation of such writing systems does not appear to depend on the specific characteristics of the underlying language; in particular, it does not depend on the language having exclusively open syllables. It may, therefore, have been invented at several times and in several places independently, which may well be the case for the three traditions (Byblos, Aegean, and Anatolian) previously described.

If an open syllabary is used for a language that does not exclusively have syllables of the type V or CV, as is the case in Greek and Luwian, certain conventions need to be used in order to render those speech patterns of the language that cannot be written straightforwardly, such as consonant clusters and final consonants. Some of these conventions are quite universal. Geminate consonants are written as single consonants and, if another vowel follows after a consonant cluster, the sequence is written using an echo of that following vowel (e.g., Linear B **ku-ru-so** for /k^{h}rusos/ 'gold'). Final consonants can be written using an empty or 'dead' vowel, the nature of which depends on convention: Hieroglyphic Luwian uses **Ca** signs (e.g., **wa-wa-sa** = /wawas/ 'cow)' whereas the Cypriot syllabary uses **Ce** signs (e.g., **a-to-ro-po-se** = /ant^{h}ro:pos/ 'man'). If the syllable-final consonant is not a stop but a sonorant or fricative, it can be omitted altogether. In Linear B, this is the norm for all syllables ending in *-j*, *-n*, *-l*, *-r*, and *-s* (e.g., **po-me** = /poime:n/ 'shepherd,' **a-to-ro-qo** = /ant^{h}ro:k^{w}os/ 'man,' **ka-ko**/k^{h}alkos/, **ko-wo** /korwos/ 'boy,' **pe-ma**/spermal/ 'seed') An exception are diphthongs in *-w*, which are written with the sign **u** (e.g., **e-u-ke-to** /euk^{h}etoi/ '(s)he swears'), and sometimes syllables ending in *-m* (e.g., **a-mi-ni-so**/amnisos/ 'Amnisos'). In the Cypriot syllabary (Cypr.) and in Hieroglyphic Luwian (HLuw.), the practice of completely omitting the syllable-final consonant is only applied to nonfinal syllables ending in *-n* (e.g., Cypr. **a-to-ro-po-se** /ant^{h}ro:pos/ 'man,' HLuw. DEUS-TONITRUS-**hu-za** /tarxunts/ '(the god) Tarḫunt'), although in some Luwian inscriptions the practice is extended to all final consonants.

We may assume that all symbols started out as pictograms/logograms. But in a predominantly polysyllabic language, the signs could also be used to denote the first vowel or consonant + vowel of the word (e.g., Luwian 𔓐 is logographically *targasna* 'donkey' or syllabically *ta*). As the writing systems developed, some symbols became specialized as logograms, others became specialized as syllabograms, and yet others could be used in both functions. The purely syllabic signs naturally had a tendency to become less pictorial and more linear or 'cursive' over time, both because of the loss of association with the object originally depicted and because of their heavy use as syllables. Another tendency was to reduce the number of symbols that could be used to write a single syllable, ultimately to one – the Hieroglyphic Luwian syllabograms cannot be put into a neat syllabic grid as the Linear B syllabograms can (although in Linear B there are still a handful of alternative signs for certain syllables), and the Cypriot syllabary follows the principle of 'one syllable, one sign' almost exclusively. Another common characteristic of the ancient Aegean and Anatolian open syllabaries is the tendency for the logographic element of the scripts to become less prominent over time. This is most readily seen in the history of the Anatolian hieroglyphs, in which the oldest inscriptions often use only a logogram or a logogram with a phonetic complement used to specify the case or verbal form. Later, the normal spelling adds more syllables of the root or becomes completely syllabic, as shown in Table 1.

It is difficult to say how large the logographic component was in Cretan hieroglyphic (the probable ancestor of Linear A, Linear B, and Cypro–Minoan), but it is likely that many of the signs had an exclusively or partially logographic value. Linear A and B, on the other hand, use logograms only in conjunction with numerals, to denote what is being counted. For instance (tablet PY Eb297):

Table 1 Anatolian Hieroglyphs – Logogram with phonetic complements

Hieroglyphs	*Transliteration*	*Word*
	BOS	/*wawas*/'cow'
	BOS-sa	
	BOS-wa-sa	
	wa-wa-sa	

wa-na-ka-te-ro te-me-no
wanakteron temenos
'the estate of the king'

to-so-jo pe-ma WHEAT **30**
tossojo sperma: PUROS *30*
'so much seed: 30 units of wheat'

ra-wa-ke-si-jo te-me-no WHEAT **10**
la:wa:gesion temenos PUROS *10*
'the estate of the lawagetas: 10 units of wheat'

A millennium later, the Cypriot syllabary uses no logograms at all.

Linear B

The Linear B script was used on Crete and the Greek mainland (Mycenae, Pylos, etc.) for the purpose of keeping palace records from ca. 1550 to 1200 B.C.E. Most of the surviving texts were inscribed on clay tablets that got accidentally burnt. The first tablets were found in 1900 by Arthur Evans at the site of the Minoan palace of Knossos, on Crete. Not many of them, however, were published right away, and it was not until the discovery by Carl Blegen in 1939 of a large number of Linear B tablets at the site of Pylos, on the Greek mainland, and after their subsequent publication by Emmett L. Bennett in 1951 that a decipherment of the script became possible.

Decipherment

In order to decipher an unknown script in an unknown language when no bilinguals are available, it is necessary to have a sufficient amount of accurately described data so that statistical analyses can be performed and patterns can be discovered. Some of the ground-breaking work in the case of Linear B had already been done by Alice E. Kober in the years between 1943 and 1950. She had discovered that Linear B used two different forms for the totaling formula: one for women and female animals, another for men and male animals. She also discovered the so-called 'Kober triplets' – words that occurred in one short form, as well as in two derived forms, with the final syllabogram of the basic form replaced systematically by a couple of others, forming several patterns:

A	-𐀲	-𐀲𐀀	-𐀲𐀍
B	-𐀍	-𐀍𐀀	-𐀍𐀍
C	-𐀏	-𐀏𐀀	-𐀏𐀍
D	-𐀊	-𐀊𐀀	-𐀊𐀍
E	-𐀁	-𐀁𐀀	-𐀁𐀍

The system of numerals, measures and weights was elucidated by E. L. Bennett in 1950. The complete decipherment was achieved by the architect Michael Ventris in 1952. In reaching his solution, Ventris had combined several statistical and combinatorial clues. For instance, in an open syllabary, the signs for pure vowels occur mainly at the beginning of a word (fortunately, the Linear B scribes were careful to mark word division consistently). At the end of the word, some suffixes (consonant-initial ones) are found as syllabic signs that may or may not be found appended to the basic stem (a very common one in Linear B is -𐀆, which we now know to be $-k^{w}e$ 'and'). Other suffixes manifest themselves as variations of the final syllabogram(s), as for instance in the case of Kober's triplets, and such variant syllabograms can thus be interpreted as representing the same consonant followed by different vowels. Other clues can be found in spelling errors and spelling variants, indicating that the signs in question share a common consonant or a common vowel. Putting all these clues together, Ventris started to elaborate a grid, listing all the probable vowel and consonant combinations in tabular form. By February 1952, Ventris's grid (see **Figure 1**) was already largely correct. All that was required now was to guess at the appropriate sound values (a couple of them, such as C12 = /l/ ~ /r/, C8 = /n/, C3 = /p/, C7 = /s/ and C5/6 = /t/ ~ /d/ readily suggested themselves by comparison with the Cypriot shapes) and see whether the resulting readings made sense in any known language. Ventris himself had always believed (with Evans) that the underlying language could not possibly be Greek and would prove to be a pre-Greek Aegean language, perhaps distantly related to Etruscan. However, in May/June 1952, Ventris started to investigate some of the words forming part of Kober's triplets. By guessing that the words of this category that occurred both at Pylos and Knossos must be the names of corporations, and those that occurred at Knossos alone or at Pylos alone would be place names, he succeeded in isolating the Cretan place names **ko-no-so** (Knossos) and the nearby

harbor town of **a-mi-ni-so** (Amnisos), the latter with Kober variants **a-mi-ni-si-jo** and **a-mi-ni-si-ja**. Ventris noted that these corresponded exactly with the Greek adjectival forms masc. *amnisios*, fem. *amnisia:*, provided the spelling rules for final *-s* differed from those of Cypriot. This was further confirmed by the genitives: masc. **-jo-jo**, as expected, but fem. **-ja**, identical to the nominative, for what would have been the Greek fem. genitive *-ja:s*. A similar 'abbreviation in the spelling' was also found by Ventris in the words for 'boy' and 'girl,' which were expected to have been **korwos* and **korwa:* in archaic Greek. Having identified the sign **ko** in **ko-no-so**, the words for 'boy' and 'girl' (already identified thanks to the logograms accompanying them) now read **ko-ʔo** and **ko-ʔa**. Filling in the syllables **wo** and **wa**, that yielded **ko-wo** = *ko(r)wo(s)* 'boy' and **ko-wa** = *ko(r)wa:* 'girl.' Now, if C2 in Ventris's grid was /w/, that immediately suggested a solution for the group of words that declined as -Ce-𐀳, -Ce-𐀲, and -Ce-𐀱, which Ventris had already looked into before. They must be the well-known category of Greek words in *-eus* (e.g., Grk. *basileus*, gen. *basile:[w]os*, 'king,' etc.), and the Linear B paradigm could be read as *-eu*, *-ewo(s)*, *-ewe*. Similarly, the totaling formula could now be read as masc. **to-so**, fem. **to-sa**, corresponding with Greek *tossos*, *tossa:*. The Greek solution was now inescapable. Ventris, in collaboration with John Chadwick, published his results in the 1953 *Journal of Hellenic Studies* under the title 'Evidence for Greek dialect in the Mycenaean archives.'

Before the correctness of Ventris's solution had had the time to become a matter of hot academic dispute, evidence was unearthed at Pylos by Blegen that

Vowels	I (=i?)	II (=o?)	III (=e?)	IV	V (=a?)	unknown
0	𐀀	--	--	--	𐀁	--
C1	--	--	𐀂	--	𐀃	--
C2	𐀄	𐀅	𐀱	𐀲	𐀳	--
C3=p?	𐀴	--	𐀴?	--	𐀵	𐀶
C4	𐀷	𐀸	𐀷?	--	𐀹?	--
C5=t	--	𐀺		--	𐀻,𐀼	--
C6=t	𐀽	𐀾	𐀿?	--		𐁀
C7	𐁁	𐁂	𐁃	--	𐁄	--
C8=n	𐁅	𐁆	𐁇	--	𐁈	--
C9	𐁉	𐁊	𐁋?	--	𐁌	--
C10	--	𐁍	𐁷,𐁎?	--	𐁏?	𐁐?
C11=r/l	𐁑	--	𐁒?	--	𐁓	𐁔?
C12=l	𐁕	𐁖	𐁗	--	𐁘	𐁙
C13	𐁚	--	𐁛	--	𐁜?	--
C14	--	--	𐁝	--	--	--
C15	--	𐁞	𐁟	--	𐁠?	𐁡
C?	𐁢? 𐁣?	--	𐁤? 𐁥?	--	--	--

	consonant or vowel wrong
	consonant and vowel wrong

Figure 1 Ventris's grid (February 1952).

convinced all but those few who had made up their minds not to be convinced. Tablet PY Ta 641, found just after Ventris's decipherment, reads as follows:

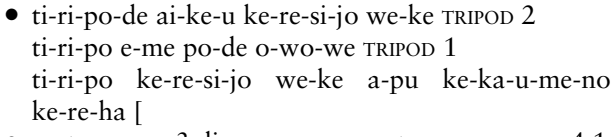

- ti-ri-po-de ai-ke-u ke-re-si-jo we-ke TRIPOD 2
  ti-ri-po e-me po-de o-wo-we TRIPOD 1
  ti-ri-po ke-re-si-jo we-ke a-pu ke-ka-u-me-no ke-re-ha [
- qe-to PITHOS 3 di-pa me-zo-e qe-to-ro-we DEPAS-4 1
  di-pa-e me-zo-e ti-ri-o-we-e DEPAS-3 2
  di-pa me-wi-jo qe-to-ro-we DEPAS-4 1
- di-pa me-wi-jo ti-ri-jo-we DEPAS-3 1
  di-pa me-wi-jo a-no-we DEPAS-0 1

This fully confirmed Ventris's solution; we find the Greek words *tripode* (dual) and *tripo:s* (singular) next to what are described ideographically as two and one tripod, and pictures of vessels with, respectively, four, three, and no ears are accompanied by the corresponding archaic Greek words *k^{w}etro:we:s*, *tri(j)o:we:s*, and *ano:we:s* (cf. Classical *amp^{h}o:e:s* 'two-eared').

The Syllabary

The sound values and shapes of the Linear B syllabary are given in Figure 2. Some of the common ideograms can be found in Figure 3.

There are five vowels; vowel length is not marked. The consonants show a number of peculiarities. In the stops, **p**-, **k**-, and **q**- can denote any labial, velar, or

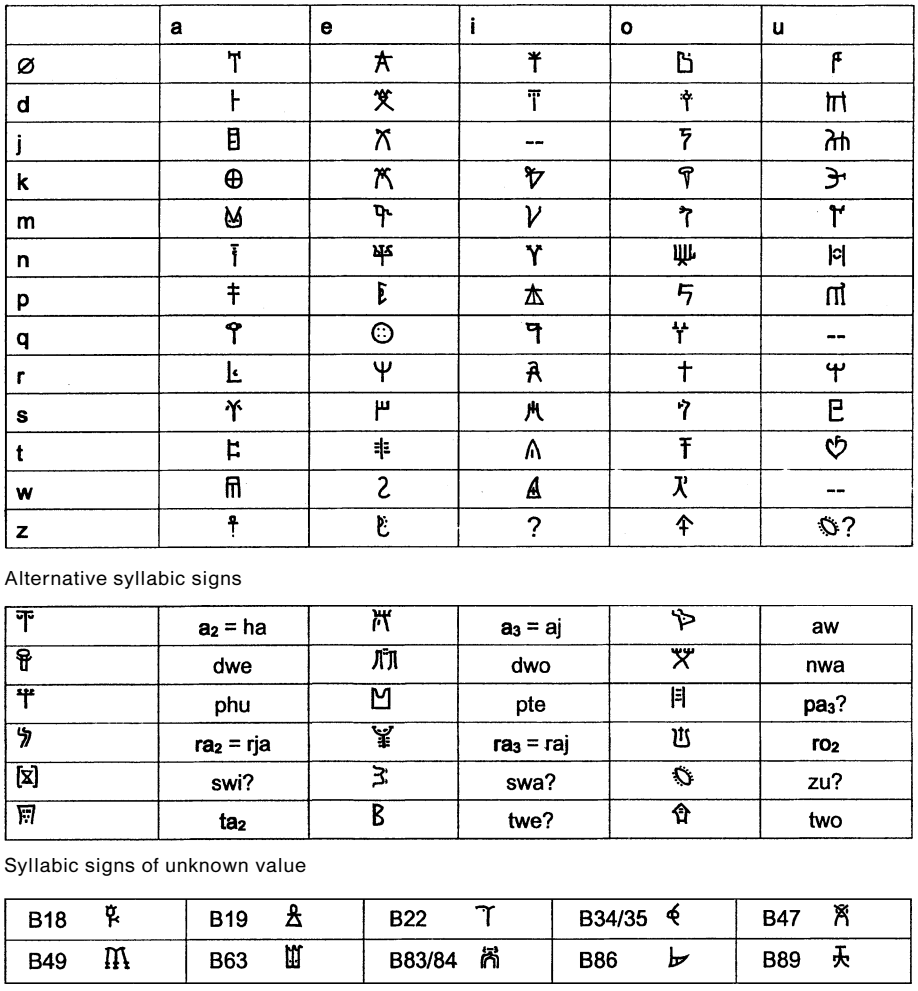

Figure 2 The Linear B Syllabary.

Value	*Sign*
MAN AND ANIMALS	
WOMAN	
MAN	
PIG	
SOW	
BOAR	
BOVINE, OX	
COW	
BULL	
SHEEP	
EWE	
RAM	
GOAT	
SHE-GOAT	
HE-GOAT	
EQUID	
MARE	
STALLION	
DEER	
PLANTS AND FOODS	
BARLEY	
CYPERUS	
FRUIT	Ligature of ⊕ **ka** + 𐀩 **po** = Grk. *karpos* "fruit"
HONEY	Ligature of 𐀨 **me** + 𐀬 **ri** = Grk. *meli* "honey"
CHEESE	Ligature of 𐀵 **tu** + 𐀳 **ro₂** = Grk. *turos* "cheese"
OIL	
OLIVE	
SAFFRON	1) Ideogram, syllabic value */rai/* (probably non-Greek). 2) Ligature of ⊕ **ka** + 𐀢 **na** + ⊕ **ko** = Grk. *kna:kos* "yellowish"
SPICE	
TREE	
WHEAT	
WINE	
OTHER	
ARMOUR	
ARROW	
BATHTUB	
BRONZE	
CHARIOT	
WHEELED CHARIOT	
CHARIOT FRAME	

Value	*Sign*
CLOTH	
DART	
DIPTE	
FOOTSTOOL	
GARMENT	
GOLD	
HELMET	
MONTH	
OINTMENT	
SPEAR	
SWORD	
SWORD₂	
THORN	
VESSEL 155	
VESSEL 200	
VESSEL 201	
VESSEL 202	
VESSEL 203	
VESSEL 204	
VESSEL 205	
VESSEL 206	
VESSEL 207	
VESSEL 208	
VESSEL 209	
VESSEL 210	
VESSEL 211	Ligature of vessel and syllable 𐀩 **po**
VESSEL 212	
VESSEL 213	
VESSEL 214	
VESSEL 215	
VESSEL 216	
VESSEL 217	
VESSEL 218	
VESSEL 219	
VESSEL 221	
VESSEL 222	
VESSEL 226	
VESSEL 227	
VESSEL 228	
VESSEL 229	
VESSEL 250	
WHEEL	
WOOL	Ligature of 𐀧 **ma** + 𐀱 **ru** (non-Greek, but cf. Grk. *mallos* "flock of wool"?)

Figure 3 Some Linear B ideograms.

labiovelar stop, voiced, voiceless, or aspirated. In other words, the sign **pa** can stand for /ba/, /pa/, /p^{h}a/ (and, because of the spelling rules, also /bal/, /pal/, /p^{h}al/, /bar/, /par/, /p^{h}ar/, /bam/, /pam/, /p^{h}am/, /ban/, /pan/, /p^{h}an/, /bas/, /pas/, /p^{h}as/, /bai/, /pai/, and /p^{h}ai/, as well as /ba:/, /pa:/, /pha:/, /ba:l/, /pa:l/, /p^{h}a:l/, etc.). The exception is the **t** series, which can denote syllables beginning with /t/ or /t^h/; syllables beginning with /d/ have their own symbols. Why this is so is a mystery. We can attribute it to a phonetic/phonotactic peculiarity of (one of) the pre-Greek language(s) of Crete. This inconsistency has been corrected in the Cypriot syllabary, which does not distinguish a separate **d** series anymore. Also attributable to the non-Greek origin of the Linear B script is the fact that /l/ and /r/ are not distinguished, another thing that was set right in Cypriot.

The optional syllabic signs include a number of signs denoting dental + /w/, as well as three variants of the main syllabic signs, apparently without any difference in pronunciation: **ro$_2$**, **ta$_2$**, and **pa$_3$**. (The last is not **pa$_2$** because of the historical circumstance that the sign **qa** was at first erroneously identified by Ventris and Chadwick as **pa$_2$**.) The existence of such variant signs is a remnant of a situation comparable to what we find in the Anatolian syllabary, in which many syllables have two or more alternative spellings. In addition to signs denoting diphthongs (**ai, au, rai, rja**), it is surprising to find a notation for **ha** and **phu**, with the aspiration marked explicitly, and for **pte**, the only CCV sign in the syllabary in which both consonants are stops and where the cluster /pt/ is quite characteristic for the Greek language.

A few signs function both as syllabograms and as ideograms, as shown in Table 2. As can be seen, the acrophonic principle fails for Greek, which again confirms that the syllabary was designed for some pre-Greek language of Crete. However, the sound–meaning pairs in Table 2 do not immediately suggest any other candidate language. Nor do the phonetic clues provided by the syllabic grid, although there we must proceed with caution. To find the 'Minoan language,' or one of its close relatives, it does not follow that we should look for a language that does not distinguish /l/ and /r/, /b/ and /p/, and /g/ and /k/ but that **does** distinguish /d/ and /t/. In the first place, it is only required by the acrophonic principle that those sounds not be distinguished in **word-initial** position. Greek itself at some stage did not distinguish /l-/ from /r-/ (more accurately, it had eliminated all cases of initial *r*-), although by Mycenean times, the initial sequence **sr*- had become *rh*-, which would presumably have been written **r**-, had a separate sign for it been available. Voiced and voiceless stops are not generally distinguished in the Indo–European Anatolian languages (which only had voiceless stops initially) or in ancient Iberian (which had only voiced stops initially). Both language groups incidentally also lack initial *r*-. As to initial *d*-, things also need not be so simple. It is possible that the 'Minoan language' distinguished two kinds of initial dental stops (*d*- and *t*- in Linear B) but also two kinds of initial velar stops (*q*- and *k*- in Linear B), and that the system was in fact not **p*-; **t*-, **d*-; **k*-, **k*^{w}- but conceivably something like **p*-; **t*-, **t′*-; **k*-, **k′*-.

Table 2 Linear B signs functioning as syllabograms and ideograms

Sign	*Syllabic value*	*Logogram*	*Greek phonetic value*
𐀚	**ju**	FLOUR	*aleuron*
𐀩	**mu**	OX	*g^{w}o:us*
𐀨	**ni**	FIG	*sukos*
𐀦	**qi**	SHEEP	*owis*
𐀧	**sa**	FLAX	*li:non, bussos*
𐀬	**au**	PIG?	*su:s, hu:s*
𐀭	**rai**	SAFFRON	*krokos*
𐀫	**?**	GOAT	*aix*

The Cypriot Syllabary

The Cypriot syllabary was used on the island of Cyprus until Hellenistic times, mainly to write the local Greek dialect, although a few poorly understood inscriptions also exist in a non-Greek local language called Eteo–Cypriot.

The roots of the Cypriot syllabary go back to the Bronze Age. At Enkomi, and elsewhere on Cyprus, inscriptions have been found from the 15th to 12th centuries B.C.E. in a script (or scripts) known as Cypro-Minoan. There is not enough material to allow a decipherment, but there can be little doubt that the script is an offshoot of the Cretan linear scripts, in particular of Linear A. An inscription on a bronze dagger from the 11th century can be read using the Cypriot syllabary sign values as **o-pe-le-ta-u** (/op^{h}el-ta:o/ 'of Opheltes'), but otherwise the earliest inscriptions in the Cypriot syllabary date from the 8th century B.C.E., and they do not become abundant until the 6th century. The best-known Cypriot inscription is a very well preserved 5th-century bronze tablet from Idalion, containing a long text in the ancient Cypriot dialect of Greek. There are also a number of Cypriot–Alphabetic Greek and Cypriot–Phoenician bilinguals, which played an important role in the decipherment of the script.

Decipherment

The Cypriot syllabary was deciphered in 1872 by the Assyriologist George Smith after the discovery in 1869 of a Cypriot–Phoenician bilingual inscribed for King Milkiyaton of Idalion and Kition.

[𐠀𐠌𐠈𐠎𐠊𐠀.𐠀𐠊𐠀.𐠊𐠌𐠊.]𐠊𐠊𐠀.𐠊𐠌𐠊.𐠊𐠌𐠊

lmlk mlkytn [mlk kty wʔdly]

𐠋𐠎𐠈𐠊𐠎𐠀𐠊𐠀 · 𐠋𐠎𐠀𐠊𐠎 · 𐠊𐠀𐠊𐠎𐠈𐠀𐠊𐠀𐠈 · 𐠊𐠀𐠊𐠎𐠀𐠊𐠀

pa-si-le-wo-se mi-li-ki-ja-to-no-se ke-ti-o-ne ka-e-ta-li-o-ne

. . . basilewos milkijatonos ketion ka edalion . . .

The passage allowed Smith to isolate the names of the king and of the two cities, and a (correct) guess that the first word was the genitive of *basileus* 'king' allowed him to identify the language as Greek. The subsequent discovery of more material, including Greek–Greek bilinguals (with the *Koine* text in alphabetic Greek and the Cypriot dialect in syllabic script) served to further refine and complete the decipherment.

The Syllabary

The Cypriot syllabary is a purely syllabic script; there are no logograms. In contrast with the Cretan linear scripts, it is written from right to left (perhaps under Semitic influence). The inventory of signs can be found in Figure 4. The Cretan roots of the syllabary are evident from a number of sound-shape correspondences, as shown in Table 3.

Apart from the direction of writing, the Cypriot syllabary differs structurally from Linear B in the following points:

	a	*e*	*i*	*o*	*u*
∅	𐠀	𐠀	𐠀	𐠋	𐠊
j	𐠌			𐠎	
k	𐠈	𐠉	𐠊	𐠋	𐠀
l	𐠋	𐠎	𐠊	𐠈	𐠌
m	𐠌	𐠌	𐠋	𐠌	𐠌
n	𐠎	𐠎	𐠋	𐠎	𐠎
p	𐠈	𐠊	𐠋	𐠊	𐠋
r	𐠋	𐠋	𐠋	𐠋	𐠋
s	𐠊	𐠊	𐠋	𐠋	𐠋
t	𐠈	𐠋	𐠋	𐠈	𐠈
w	𐠀	𐠀	𐠀	𐠋	
x/z	𐠋	𐠋		𐠋	
(g)	𐠀				

Figure 4 The Cypriot syllabary.

Table 3 Cypriot-Cretan shape-sound correspondences

Cypriot		*Linear B*	
lo	𐠈	*ro*	𐠈
na	𐠎	*na*	𐠎
pa	𐠈	*pa*	𐠈
po	𐠋	*po*	𐠋
sa	𐠊	*sa*	𐠊
se	𐠊	*se*	𐠊
ta	𐠈	*da*	𐠈
to	𐠈	*to*	𐠈

- The *d* series and *t* series have been merged.
- The *l/r* series of Linear B has been split into distinct *l* and *r* series.
- The labiovelars have been lost in Cypriot, as in all later Greek dialects, and the *q* series is therefore no longer required.

The first change makes sense considering that voiced, voiceless, and aspirated consonants are otherwise not distinguished in either Linear B or the Cypriot syllabary. In this context, the (localized) existence of a special sign to denote /ga/ in Cypriot is unexpected. An important difference is that the Cypriot spelling conventions require that all consonant clusters (except internal syllables ending in a nasal) be written in full. Thus, Linear B 𐠀𐠈𐠈𐠋 **a-to-ro-qo**, pronounced /ant^{h}ro:k^{w}os/ (nominative) or /ant^{h}ro:k^{w}on/ (accusative) corresponds to Cypriot 𐠊𐠋𐠈𐠊𐠋 **o-a-to-ro-po-se** /ho ant^{h}ro:pos/ or 𐠋𐠋𐠈𐠈𐠈 **to-na-to-po-ro-ne** /ton ant^{h}ro:pon/.

Anatolian (Luwian) Hieroglyphs

Anatolian hieroglyphs were in use in most of Anatolia and parts of modern Syria during most of the 2nd millennium B.C.E. and in the 1st millennium up to ca. 700 B.C.E. The early material from Hattusas and other centers of the Hittite Empire (largely inscribed on seals) makes heavy use of logograms, making it impossible to say in which language they were written: Most of the syllabograms are consistent with Luwian but Hittite cannot be excluded, and sometimes the signs are to be read using Hurrian sound values. The later texts (ca. 900–700), mainly inscriptions on rock and stone, but also some letters and records on lead strips, are from the 'Neo-Hittite' (Luwian) principalities of Southeastern Anatolia and northern Syria and are written in the Luwian language. A number of *pithoi* found at Altintepe use Anatolian hieroglyphs to write the Urartian language (a language related to Hurrian that was spoken around Lake Van in modern Armenia).

	a	i	u
∅	á à	i/ja í	u(wa)
j	ja já		–
w	wa/i wá/wí wa_x wa_x/ta_x?		–
p	pa	pi	pu
t	ta tá tà ta_4/tì ta_5/ti_4 ta_6	ti tí	tu tú tù tu_4
k	ka kà	ki ki?	ku
z	za zá zà,zì za_4	za/i > zi zí zi_4	zu zu(wa)/zù zú(?)
s	sa sá sà sa_4 sa_5 sa_6 sa_7	si sí(?)	su sú
h	ha há	hi	hu hu_x hu_x?
m	ma ma_x(?)	mi,má mí mì	mu(wa)
n	na ná na_5(?)	ni ní ni_x	nu nú
l	la lá/í, lu la_x	li lì li_4? li_x	lu/lá/lí
r	+ra/i		ru rú

Figure 5 The Luwian Syllabary (after Marazzi).

(C)VC(V) signs

ara/i							
hal		har					
ka+r							
kwi		hwi					
para/i							
tal		tár		tana		t(a)ra/i	
ur(a/i)		us(?)					

Figure 5 Continued.

Decipherment

The first inscriptions were discovered in 1812 by J. L. Burckhardt in Syria. The connection with the Hittites, whose importance as the third major power in the ancient Near East could only have been guessed at by the references to them in the Old Testament texts but which had become clear after the decipherment of Egyptian hieroglyphics and Assyro–Babylonian cuneiform, was first established at the end of the 19th century by William Wright and Archibald Sayce, who were the first to use the term 'Hittite hieroglyphs' for the script. Sayce (1880) was also the first to make some progress with the decipherment by studying the *Tarkondemos* seal and other Hittite seals that contained brief texts in both cuneiform and hieroglyphs. Thus, he was able to identify the logograms for 'king' and 'land' and to identify some syllabograms. Similar analyses by Campbell Thomson (1913), based on identifying the names of kings, cities, and gods, led to the establishment of some more logographic and phonetic values.

With the discovery in 1906–1907 of the cuneiform archives of the Hittite Empire at Hattusas (Boğazköy, since 1936 Boğazkale) and the discovery by Bedřich Hrozný (1915) that they were largely written in an Indo–European language, Hittite (Nesian, Hitt. *nesili*), with other documents in the related Luwian language (Hitt. *luwili*), the decipherment of the 'Hittite hieroglyphs' entered its second phase. The language of the hieroglyphic inscriptions could now be checked against the documents in Hittite and Luwian, and in the 1930s substantial progress was made by a group of scholars, among them Piero Meriggi, Emil Forrer, I. J. Gelb, Helmuth Th. Bossert, Hans Gustav Güterbock, and Emmanuel Laroche. By the 1940s, many of the more common syllabic and logographic signs had been correctly identified, so that when the first substantial bilingual text (the Karatepe inscriptions in Phoenician and Hieroglyphic Luwian) was discovered in 1946 by Bossert, its impact was merely to confirm what had already been discovered the hard way. Laroche's *Les hiéroglyphes hittites* (1960) and Meriggi's *Hieroglyphisch-hethitisches Glossar* (1962) culminate this phase of the research. Since then, work on the reading and understanding of the Luwian hieroglyphic texts and their grammar has continued, and, in 1974, J. David Hawkins, Anna Morpurgo-Davies, and Günter Neumann, based in part on earlier research by Bossert, Hermann Mittelberger, and Mustafa Kalaç, reevaluated the readings of a small, but important, number of signs. They also established the convention to transcribe the ideograms and determinatives using Latin translations and suggested abandoning Sayce's old denomination 'Hittite hieroglyphs' in favor of the more accurate 'Luwian hieroglyphs.'

The Syllabary

For the syllabic signs, see Figure 5. For some common logograms, see Figure 6.

The inscriptions consist of horizontal rows, to be read in *boustrophedon* fashion, with the signs facing towards the beginning of the line, as in ancient Egyptian writing. The rows themselves are divided into 'panels' in which two or more signs are arranged vertically from top to bottom, although strict reading order is sometimes abandoned in favor of aesthetics, that is, to ensure that all available space is filled. There is a sign to mark a word-break (⟩|⟩), but it is not frequently used. The script is a mix of logograms, determinatives, and syllabic signs. As some of the signs do double duty as logogram and syllabogram, there is, as in Egyptian hieroglyphics, a special notation to mark the logographic use of a sign (it is put in

Value	*Sign*
1	
3	
4	
8	
9	
ANIMAL	
ANNUS "year"	
AQUA/FLUMEN "water/river"	
ASCIA "axe"	
ASINUS "donkey"	
AUDIRE "to hear"	
AVIS "bird"	
AVUS "grandfather"	
BIBERE "to drink"	
BONUS "good"	
BONUS$_2$ "good"	
BOS "ox"	
BRACCHIUM "arm"	
CAELUM "heaven, sky"	
CANIS "dog"	
CAPERE "to take"	
CAPUT "head"	
CASTRUM "fortress"	
CENTUM "100"	
CERVUS "deer"	
CORNU "horn"	
CRUS "leg"	
CULTER "knife"	
CURRUS "wagon"	
DARE "to give"	
DELERE (MINUS+DOMUS) "to destroy"	

Value	*Sign*
DEUS "god"	
DIES "day"	
DOMINA "lady"	
DOMINUS "lord"	
DOMUS "house"	
EDERE "to eat"	
EGO "I"	
EQUUS "horse"	
EXERCITUS "army"	
FEMINA "woman"	
FILIA "daughter"	
FONS "fountain"	
FORTIS "strong"	
GAZELLA "gazelle"	
HEROS "hero"	
INFANS/FILIUS/FRATER "child/son/brother"	
INFANS+REX "child+king = prince"	
INFRA/SUB "under"	
IUDEX, IUSTITIA "judge, justice"	
LECTUS "bed"	
LEO, BESTIA "lion, beast"	
LEPUS "hare"	
LIBARE "to libate"	
LINGERE "to lick"	
LINGUA "tongue"	
LITUUS "staff"	
LONGUS "long"	
LOQUI "to speak"	
LUNA "moon"	
MAGNUS "great"	
MAGNUS.DOMINA "great.lady (queen)"	
MAGNUS.DOMUS "great.house (palace)"	

Figure 6 Some Luwian ideograms.

Value	*Sign*
MAGNUS.FILIA "great.daughter(princess)"	
MAGNUS.REX "great.king"	
MALUS "bad"	
MANUS "hand"	
MINUS "less"	
MONS "mountain"	
MURUS "wall"	
NEG (negation)	
NEPOS "nephew /grandson"	
OCULUS "eye"	
OMNIS "all"	
OVIS "sheep"	
PANIS "bread"	
PES, PES$_2$ "foot"	
PINCERNA "cup-bearer"	
PITHOS "jar"	
POCULUM "drinking cup"	
PONERE "to set"	
PORTA "door"	
POST "after"	
PRAE "before"	

Value	*Sign*
PUGNUS "fist"	
REGIO "region"	
REL (relative pronoun)	
REX "king"	
SACERDOS "priest"	
SCALPRUM "chisel"	
SCRIBA "scribe"	
SCUTUM "shield"	
SIGILLUM "seal"	
SOL "sun"	
SUPER "above"	
TERRA/LOCUS "land/place"	
TONITRUS "thunder"	
TURRIS "tower"	
URBS "city"	
VAS "vase"	
VIA "road"	
VINUM "wine"	
VIR "man"	
VIS "force"	
VITA "life"	
VITELLUS "calf"	

Figure 6 continued.

between 'quotes,' e.g.,)𐄀('foot'). The syllabic signs are mainly V or CV (open syllabary), although there are perhaps two VC signs and some others have a more complex CVC(V) reading. Unlike Linear B or Cypriot, there is a rather large number of homophonic signs (transcribed in Sumerological/Assyriological fashion as *ta*, *tá*, *tà*, *ta*$_4$, etc.). There is no polyphony as there is in cuneiform, in which a single sign can have multiple unrelated phonetic values, but, especially in the early texts, some of the signs can have an indeterminate vocalic value. In particular, the same sign can be used for C*a* and C*i* (more rarely also C*u*). In the later texts, there is a tendency to modify signs in order to mark the quality of the vowel explicitly (e.g., 2nd millennium: ↑ = *za/i*, 1st millennium: ↑ = *za*, ↑ = *zi*). Apart from the double underscore, the 'staff' sign LITUUS could probably also be used to modify the reading of a syllabogram (e.g., = /i/, = /ja/). However, the other uses of the LITUUS sign remain largely mysterious. Another way to modify the reading of syllabograms was by using ligatures. For instance, the sign <u(wa)> was

Sign	*Syllabic value*	*Luwian word*	*Logographic value*
	pi	*piya-* "to give"	DARE
	tà	*ta-* "to take"	CAPERE
	ni	*niya-* "to turn"	
	la	*lala/i-* "tongue"	LINGUA
	t(a)ra/i	*t(a)ri-* "three"	3
	má	*mawa* "four"	4
	nu	*nuwa* "nine"	9
	ma₄	*massani-* "god"	DEUS
	zí	*ziti-* "man"	VIR
	ta	*targasna-* "donkey"	ASINUS
	rú	*karuwar* "antler"	CERVUS₂
	sú	*surna-* "horn"	CORNU
	wi	*wiyana/i-* "wine"	VINUM
	lu	*lukk-* "to shine"	
	pa	*pattar* "basket"	
	tù	*tuppi-* "tablet"	SCRIBA
	sa₅	*sasanza* "seal"	SIGILLUM
	hú	*huppar* "a vessel"	VAS

Figure 7 Acrophony in Luwian (after Zinko).

modified to <mu(wa)> by adding the four marks of the numeral *mawa* 'four.'

The vowels /*e*/ and /*o*/ are never marked separately and probably did not exist in the language. Long vowels (/*a:*/, /*i:*/, and /*u:*/) probably did exist but are left unmarked in the script (*plene* spellings such as -*tu-u* occur, but they are merely an aesthetic device to avoid gaps in the inscription). The script is also deficient in not marking the difference between voiced and voiceless stops, with the exception of the signs *ta₄* and *ta₅*, which always seem to stand for /da/. Crucially for a writing system that evolved by acrosyllabic interpretation of pictograms, the Luwian language (and Anatolian languages in general) did not distinguish the voicing of stops in initial position. The lack of initial /r/ in Anatolian also explains why the *r* series is so poorly represented in the script: There are a couple of signs for /ru/, but for /ra/, /ri/, as well as /r/ at the end of a syllable, the 'thorn' diacritic ◡ is used, which is not properly a letter but modifies the sign to which it is attached. In the most recent Luwian inscriptions, the 'thorn' takes the place of what was written earlier using signs of the *t* series, but this reflects a change in the language, namely the rhotacism of /d/ > /r/. As in the Aegean syllabaries, /n/ at the end of a syllable is always left unmarked:

DEUS-TONITRUS-**hu-za** /tarxunts/ '(the god) Tarḫunt'

Consonant clusters and final consonants are written using 'empty vowels,' and geminate consonants (assuming they existed in Luwian) are written as if they were single consonants. For evidence of the Luwian acrophonic origin of the script, see **Figure 7**.

The most radical change in the interpretation of the signs came with the joint article by Hawkins, Morpurgo-Davies, and Neumann in 1974. Meriggi and Laroche, in their fundamental works of the early 1960s, had established the values of the vowel signs as follows: ∩ = /a/, = /i/, and or = /u/. In addition to these, some other pure vowel signs were recognized (á = , à = , a_4 = , ì =). The variants with double underscores were tentatively thought to represent long vowels (ā = , ī = , $ā_3$ =), although other proposals had been made (e.g., Gelb suggested nasalized vowels). But, as Hawkins *et al.* showed, the true value of the sign ∩ was /i/, alternating with /ja/, the latter reading being distinguished in the 1st-millennium texts by writing it . This also implied that the signs and were not /i/ and /ī/ but, as Bossert and Kalaç had already suggested, /zi/ and /za/, respectively. The net result of these and other reevaluations of the readings was to bring the language lexically and morphologically closer to Cuneiform Luwian (CLuw.); for example, the demonstrative pronoun could now be read as *za-*, the plural endings as *-(n)zi* and *-(n)za* (the only equation that had to be given up was that of CLuw. *a-a-ja-* 'to make' with HLuw. **a-i-a-*, now to be read as *i-zi-ja-*, but this was a minor price to pay).

See also: Akkadian; Ancient Egyptian and Coptic; Greek, Ancient; Hittite; Scripts, Undeciphered.

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Ælfric (fl. 987–1010)

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Recognized as the greatest Old English prose stylist, Ælfric is also the author of the first grammar in English. In 987 he went as master of novices to the monastery of Cernel (modern Cerne Abbas, Dorset), already in orders, and thus he was at least 30 years of age. He had been a pupil of the reforming Bishop Æthelwold in the school at Winchester. With his contemporary Wulfstan, Archbishop of York (obit. 1023), he was one of the two most prominent literary figures of the Benedictine Reform. His production of the *Catholic Homilies* belongs to the period 990–995, that of the *Lives of Saints* was no later than 998, and he became the first Abbot of Eynsham, near Oxford, in 1005.

His work in language education includes the grammar, a glossary, and the *Colloquy on the Occupations*. The first of these works is the *Excerptiones de arte grammatica anglice*, designed to introduce junior students to the Latin grammar. It is based on the *Excerptiones de Prisciano*, a Latin treatise of the 9th century, compiled from the 6th century *Institutiones grammaticae* of Priscian, and like it concentrates on Latin syllabification, graphology, phonology, parts of speech, and morphology. The *Glossary* is a compilation of Latin vocables with Old English glosses. The *Colloquy* is an imaginary Latin dialogue between a master and his pupils, who represent themselves as having various occupational roles, the ploughman, the huntsman, the fisherman, and so forth. Each describes the habits and rigors of the occupation, sometimes sympathetically.

Ælfric's other extant works include the *Catholic Homilies*; the *Lives of Saints*; a *De temporibus anni*; and a collection of letters, most notably one to the bishop of Sherborne, Wulfsige, and two to Archbishop Wulfstan, designed as expert responses to theological questions. His prose is remarkably lucid in comparison with that of some authors of the period. Parts of his work are rendered in a heightened style that has been called *rhythmic prose*, which in its metrical regularity shares some of the characteristics of Old English verse but is distinct from it. His work has long been taken as the exemplar of the Late West Saxon historical and regional dialect.

The *Catholic Homilies* were produced in two series that together comprise alternate English sermons for Sundays and saints' days. Like the grammar, however, they are based on a Latin exemplar, the late 8th century *Homiliary* of Paul the Deacon, which was created for reading in the monastic offices. The *Lives of Saints* are English versions of lives and martyrdoms for saints celebrated in the monastic liturgy, mainly taken from a 9th century Latin collection. The *De temporibus anni* inculcates the chronology necessary for the calculation of the Easter date.

See also: Christianity and Language in the Middle Ages; Christianity, Catholic; English, Old English; Grammar, Early Medieval; Language Education: Grammar; Language Education: Vocabulary; Language Teaching: History; Latin Lexicography; Latin; Learners' Dictionaries; Priscianus Caesariensis (d. ca. 530); Roman *Ars Grammatica*; Traditional Grammar.

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Affixation

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Definition

An affix is a bound morph that (1) is not a root and (2) is a constituent of a word rather than of a phrase or sentence. Some examples that follow illustrate the implications of (1) and (2). The next section surveys the kinds of affixation that occur, and the last sections discuss theoretical issues.

In most complex words, identifying a root (or roots, if the word is a compound) presents little difficulty. For example, in the words *misfortunes* and *premeditated*, the roots are clearly *fortune* and

medit- because these morphs make the most concrete and distinctive contributions to the meanings of these words; furthermore, *fortune* is free, as most English roots are. (The root of *premeditated* is *medit-*, not *meditate*, because *-ate* is a verb-forming affix that occurs also in *generate*, *vibrate*, and many other words.) Only rarely do we encounter a morph whose status seems unclear or dependent on context. One such example is `/fu:l/`, which might be considered the same morph in *fullness* (where it is a root) and *spoonful* (where it is an affix). These certainly have the same historical origin. However, most analysts of contemporary English prefer to distinguish three morphs: a root in *full* and *fullness*, a noun-forming affix in *spoonful*, and an adjective-forming affix in *peaceful* and *cheerful*. A similar problem is posed by some of the morphs indicating case in Hungarian nouns and pronouns. The bound morph *-nek* seems clearly to be an affix in when attached to *ember* 'person' in *embernek* 'to (a) person', but that is less clear in *nekem* 'to me', where it is attached to another bound morph *-em,* which normally means 'my.' The word form *nekem* thus arguably consists of two affixes with no root.

In *misfortunes* and *spoonful*, the nonroot morphs *mis-*, *-s,* and *-ful* are clearly parts of words rather than parts of phrases. But that is not so clearly true of the bound morphs *-'ll* and *-'s* in *she'll come tomorrow* and *the man next door's car.* These are generally classified as clitics (*see* **Clitics**) rather than affixes because what they are attached to grammatically is not a word (or part of a word) but a phrase: *come tomorrow* and *the man next door.* (Phonologically, *-'ll* is attached more closely to *she* than to *come tomorrow*, but that does not affect its grammatical status.) Clitics constitute a third kind of bound morph, alongside bound roots and affixes. Occupying a kind of no-man's-land between morphology and syntax, their analysis is controversial.

Types of Affix

Affixation is the process whereby an affix is attached to a base, which may be simple (as in *full*, the base to which *-ness* is attached to yield *fullness*), or complex (like *meditate*, the base to which *pre-* is attached to yield *premeditate*). Languages that make no use of affixation at all are hard to find. In Vietnamese, where most morphs are free, bound morphs with relatively abstract meanings such as 'not' or 'agent' appear in some complex words of Chinese origin (Nguyen, 1987). But these complex words are structurally just like others that are classified as compounds (containing only roots); besides, abstractness of meaning is not generally regarded as sufficient reason by itself to classify a bound morph as an affix. Vietnamese is thus arguably a language with no affixation.

Logically, an affix could be attached after, before, or inside its base. All these possibilities in fact occur, although not with equal frequency. Other morphological processes have been brought under the umbrella of affixation too, as will be illustrated.

Suffix

A suffix is an affix that follows its base. English examples so far presented are *-s* in *misfortunes*, *-ate* and *-(e)d* in *premeditated*, and *-ful* in *spoonful* and *cheerful*. In English, words with as many as three suffixes (e.g. *organ-iz-ation-al*, *profess-or-ship-s*, *authent-ic-at-ing*, *lead-er-less-ness*) are unusual. However, in a language such as Turkish, with an elaborate morphology that is almost entirely suffixal, much longer strings of suffixes are possible, as in the word transcribed phonemically at (1) (Lewis, 1967: xx):

(1) avrupa-li- laş-tir-il- amij-an-lar-
Europe-an become-CAUS-PASS unable-being-PL
dan-sin-iz
among-you-PL
'you are among those who cannot be Europeanized'

Here the root /avrupa/ 'Europe' is followed by 10 suffixes.

Words with similar long strings of morphs are characteristic of polysynthetic languages such as Inuktitut (Eskimo). In these languages, complex word forms often correspond in meaning and function to phrases and even sentences in other languages.

Prefix

A prefix is an affix that precedes its base. English examples so far presented are *mis-* in *misfortunes* and *pre-* in *premeditated*. In English, all prefixes are derivational; thus, *un-* in *unhappy*, *de-* in *decontaminate*, *counter-* in *countersignature,* and so on create new lexemes rather than inflected forms of *happy*, *contaminate,* and *signature*. In Bantu languages such as Zulu, on the other hand, many prefixes are inflectional; on verbs, they can signal tense, polarity, and agreement with both subject and object, as in (2) and (3) (Doke, 1973; Rycroft and Ngcobo, 1979):

(2) si- ya- zi- fún- a izin- cwâdí
we- PRES- them- want- POSITIVE PL. 10- book
'we want the books'

(3) a- sí- zi- fún- i izin- cwâdí
not- we- them- want- NEG PL.10- book
'we don't want the books'

Here, the verbal prefix *zi-* agrees in gender (or class) and number with the noun form *izincwâdí*, whose

class (10) and number (plural) are indicated by the prefix *izin-*. The subject 'we' is indicated by a prefix *si-*. The acute accent indicates a high tone and the circumflex a falling tone; unmarked syllables have a low tone.

Circumfix

Whereas the terms prefix and suffix are well established, the term circumfix has less currency. This is at least partly because the phenomenon itself is less common and less straightforward to identify. A circumfix is a combination of a prefix and a suffix that cooccur (at least with bases of specified type) to fulfill a joint function. One example is the Italian affixal combination *in-…-are,* which can derive infinitive forms of verbs meaning 'to become X' from adjective roots, for example, *invecchiare* 'to age' from *vecchio* (root *vecchi-*) 'old.' A reason for calling this a circumfix, rather than just a combination of a prefix and a suffix, is that there is at first sight no basis in Italian morphology for either choosing *invecchi-* as a base to which *-are* is suffixed or choosing *-vecchiare* as a base on to which *in-* is prefixed. (For discussion, see Scalise, 1984: 146–150.)

Other candidates for circumfix status are *ge-…-t* and *ge-…-en* as markers of the past participle in German verbs, for example, *gereist* from *reisen* 'to travel' and *gebrochen* from *brechen* 'to break.' The case is not entirely solid, however. That is because, although one or other of the suffixes *-t* or *-en* appears on all German past participle forms, the prefix *ge-* is absent from those with a inseparable prefix, for example, *verreist* from *verreisen* 'to go on a journey', and also from verbs whose first syllable does not have primary stress, for example, *telefoniert* 'telephoned' from *telefonieren* 'to telephone' (primary stress is on the syllable *-nie-)*. In Dutch, the case for circumfixal status for the corresponding combinations *ge-…-d* and *ge-…-en* seems stronger because, although *ge-* is incompatible with inseparable prefixes (as in German), it is compatible with verbs that lack initial stress, for example, *getelefoneerd* 'telephoned' from *telefoneren*. Even here, however, the fact that *-d* can appear without *ge-* points toward treating them as separate affixes.

These examples illustrate the difficulty of establishing that a circumfixal analysis is the only one possible for a given body of data. In some models of morphological structure, circumfixal analyses are ruled out in principle. If the elements of a purported circumfix are treated instead as distinct affixes, then they constitute an example of multiple synonymous affixation.

An alternative term for circumfix, sometimes encountered, is ambifix. The phenomenon of circumfixation is sometimes called parasynthesis.

Infix

An infix is an affix that is inserted inside its base. An example is the Tagalog affix *-um-*, which on verbs indicates that an accompanying trigger noun phrase denotes an actor (Schachter, 1987), as in *tumakbo* from the base *takbo* 'run.' (The corresponding form from *abot* 'reach for' is *umabot*, where it looks as if *-um-* is prefixed rather than infixed; but this is only because the initial glottal stop of /ʔabot/ and /ʔumabot/ is not represented in the spelling.)

In recent years, infixation has attracted a considerable amount of interest because it is typologically unusual and it seems somehow unnatural for an affix to interrupt its base rather than be concatenated with it. Various suggestions have therefore been made about limits on the circumstances in which infixation can occur. With complex words as bases, it has been suggested that infixes may occupy four morphologically defined positions: before or after the root, after the initial morph, and before the final morph (Anderson, 1993). A suggested instance of morphs being infixed so as to appear before a final morph occurs in Icelandic. There, tense and person-number suffixes are attached to verb roots. Therefore they always precede a verb-final suffix *-st* (historically derived from a reflexive pronoun), whose main current function is passive or reflexive, for example, *köll-uðum-st* '(we) were called'.

According to an approach developed in Optimality Theory (Kager, 1999), infixation is often if not always a phonological rather than a morphological phenomenon. That is, an infix is an affix that is inserted close to, rather than at, one end of its base so as to promote observance of phonological well-formedness constraints. Thus, in the Tagalog word form *t-um-akbo* 'run' the affix *um-* is not prefixed to the base *takbo* but infixed after the initial consonant so that its consonant [m] can constitute the onset of a syllable [ma] rather than the coda of a syllable [um]. This is because a word form with the syllabification [$tu_\sigma mak_\sigma$-bo_σ], with only one consonant [k] in coda position, is preferable in Tagalog to a word form such as [$um_\sigma tak_\sigma bo_\sigma$], with two consonants [m] and [k] in coda position.

Suprafix

Suprafix is a term sometimes used for a morphological process involving suprasegmental factors such as changes in stress or pitch. For example, in English, the noun *tórment* and the verb *tormént* are distinguished by the position of the stress. Assuming that the noun is derived from the verb, we might analyze it as involving a suprafix of first-syllable stress, manifested in a substantial class of nouns including *prótest*,

tránsfer, and *pérmit*. Similarly, in Attic Greek, in some nominal and adjectival compounds with a verbal second element, this verbal element receives an active interpretation if it carries a high pitch accent (e.g. *patro-któnos* 'father-killer, parricide') but a passive interpretation if the high pitch is on the first element instead (*patró-ktonos* 'killed by his/her father') (Vendryès, 1945: 195). If stress and pitch are seen as lying on a distinct phonological tier from segmental features (*see* **Autosegmental Phonology**), such changes can be seen as involving an affix whose sole phonological content lies on that tier.

The suprafix notion can be extended to include all morphemes that are represented on separate autosegmental tiers. This has been proposed as one way of analyzing the vocalic alternations that are prominent in Semitic languages such as Arabic and Hebrew (*see* **Internal Modification**). On the other hand, we may argue that this brings under the umbrella of affixation phenomena so diverse as to render the term 'affix' virtually synonymous with 'morphological process,' obscuring real differences between different processes.

Relative Frequency of Different Types of Affixes

Suprafixation is common; on the other hand, it is doubtful whether this should be classified as affixation at all, for the reason previously given. Infixation has a peculiarly uneven incidence – in many of the languages that exhibit it (e.g., Austronesian languages such as Tagalog), it is used widely, but in the vast majority of languages it is not used at all. Clear examples of circumfixation are rare or nonexistent. That leaves prefixation and suffixation, which between them account for the vast bulk of affixation. Of these two, suffixation is by far the commoner. Many languages use suffixation only, but relatively few make exclusive or predominant use of prefixation (although Central Khmer (Cambodian) and other Mon-Khmer languages are often cited as examples).

It is conceivable that the predominance of suffixation is a historical accident, with nothing in grammatical or psycholinguistic theory to explain it. But it seems more likely that it has to do with the way in which complex words are analyzed by the brain. There is evidence that it helps to identify the root of a word at an early stage in its processing. If that is so, then prefixes, which delay the appearance of the root, will be disfavored (Cutler *et al.,* 1985).

Affix Order and Morphological Structure

Derivational affixes usually appear closer to the root than inflectional ones. For example, in the English word *sing-er-s*, the inflectional suffix *-s* follows the derivational suffix *-er*. Plausible reasons for this are not hard to find. Derivational affixes often change word class (as *-er* does here, converting the verb *sing* into a noun), and it would be surprising if in this instance an inflectional affix appropriate to nouns were attached to the verbal base *sing* before such conversion had taken place, so as to yield a hypothetical form **sing-s-er*. (It is true, however, that a form such as **sing-s-er* could in principle be formed by infixing *-s-* between the root and the affix of *sing-er*.)

This objection does not apply with such force if the derivational affix in question does not change word class. The actual plural of *book-let* is *book-let-s*, but in a hypothetical form *book-s-let* the base *book* to which the inflectional affix is added is at least a noun, hence suitable for pluralization by means of this affix, unlike the verbal base *sing*. So it is not surprising to find that in some languages derivational affixes that do not change word class, such as diminutive affixes, can indeed sometimes appear outside inflectional affixes (Stump, 1993). Examples involving derived verbs can be found in Classical Attic Greek and Georgian. In those languages, derivational prefixes that precede verb roots can be separated from the root by inflectional material, as illustrated in the Greek examples (4) and (5).

(4)	syn-	tatt-	omen
	together-	arrange-	1.PL

'we are drawing up' (e.g., an army for battle)

(5)	syn-	e-	tatt-	omen
	together-	IMPERF-	arrange-	1.PL

'we were drawing up'

The inflectional prefix *e-*, used in forming the imperfect tense (which has a past progressive meaning), is prefixed to a verb root as its base, as in *e-tatt-omen* 'we were arranging' versus *tatt-omen* 'we are arranging.' But in (5) this *e-* intervenes between the root and the derivational prefix *syn-* 'together.' (This prefix is related to the preposition *syn* 'with,' so they arguably constitute another instance of a morph that is sometimes an affix and sometimes a root.)

The attachment of inflectional affixes outside morphological ones seems to suggest that complex words have a nested hierarchical organization like this (in a purely suffixing language): [[[root(s)] derivational affixes] inflectional affixes]. (In a language with some prefixation, the linear order will not be so consistent, but the nesting will be similar.) Many morphologists have argued that this kind of hierarchical organization works in such a way that for every affix there is a layer of structure in which that affix and the base to which it is attached are sisters. Thus the words *lead-er-less-ness* and *pre-medit-ate-d* are not just strings of morphs but have a structure as follows:

[[[lead] -er] -less] -ness], [[pre- [[medit-] -at-]] -ed]. This kind of binary branching, or nesting, is characteristic of syntax too, at least in configurational languages. It is not surprising, therefore, that a fair number of morphologists have argued that morphological and syntactic structure are basically similar (Selkirk, 1982; Lieber, 1992; and, with qualifications, Halle and Marantz, 1993). Such a view is broadly compatible with how complex words are structured in those languages where affixation predominates over other modes of morphological expression and where each affix has a clear-cut and distinct meaning or function. This theoretical approach therefore provides an impetus for attempts to subsume under affixation superficially nonaffixal processes (*see* **Internal Modification** and previous discussion).

Morphologists differ on how far other supposed parallels between morphology and syntax should be pressed. One term that has a respectable pedigree of application in both domains is head. In syntax, uncontroversially, the head of a noun phrase is a noun, the head of a verb phrase is a verb, and so on, the nonhead material being modifiers of various kinds such as complements, adjuncts, and specifiers. However, what constitutes the head of a complex word is less clear (Zwicky, 1985; Bauer, 1990). According to one view, the head is the root, so the head of *booklet* and *singer* are *book* and *sing,* respectively. This entails that the head of a word may belong to a different word class than the word itself (as *sing* does in relation to *singer*). A more influential view in recent years has been that the head is the rightmost element (whether root or affix), which is often the one that determines the word class of the whole word (see Williams, 1981, on the Right-Hand Head Rule). The head of *singer* is then *-er*, which not only contributes the meaning 'agent' but also determines the word's status as a noun. This also implies, however, that the head of the Greek verb form *syn-e-tatt-omen* in (4) is not the verbal root *tatt*-but the person-number suffix-*omen*; and it implies that the head of the English verb *enthrone* is not the prefix *en-* (which has a verb-forming role also in *empower* and *enrich*) but the root *throne*, which is a noun. Some linguists have consequently argued that different parts of a word may count as the head for different purposes; but then it becomes unclear how helpful this notion is.

The view of word structure as basically similar to sentence structure is less easy to reconcile with internal modification and with phenomena of the kind outlined in the next section. Therefore, those morphologists who draw attention to such phenomena tend to reject the view of morphological structure as universally hierarchical (Anderson, 1992; Stump, 2001).

As regards the order in which affixes are attached within the broad domains of derivation and affixation, Bybee (1985) has argued that a principle of relevance applies: An affix A will be closer to the root than an affix B if affix A's contribution to the meaning of the word more directly affects the lexical content of the root than affix B's does. It is for this reason, she says, that aspect and tense markers on verbs are generally closer to the root than person and number markers are (for example).

Multiple Synonymous Affixation

Consider again the Zulu examples at (2) and (3). Example (3) is the negative counterpart of (2), so it is natural to expect to find in it a morph meaning 'not.' Indeed there is one: the initial prefix *a-* on the verb form. However, negativity is also signaled by a suffix *-i*, on the basis of which, in the corresponding active verb form, the final *-a* is analyzed as a suffix meaning 'positive.' In the verb form *a-sí-zi-fún-i* 'we do not want them,' there are thus two synonymous affixes. But the signaling of 'negative' does not end there. In (3), the tense marker *-ya-* 'present' is missing, so it could be construed as marking not just 'present' but 'present active'; and the prefix *si-*, which bears a low tone in (2), has a high tone in (3) (indicated by an acute accent). It is usual in Zulu, in fact, for corresponding positive and negative verb forms to differ tonally.

There is nothing freakish about this Zulu example. A similar point can be made by reference to the Greek examples at (4) and (5), slightly adapted:

(6)	syn-	tatt-	o:
	together-	arrange-	1.SG
	'I am drawing up' (e.g., an army for battle)		

(7)	syn-	e-	tatt-	on
	together-	IMPERF-	arrange-	1.SG
	'I was drawing up'			

Here, first-person singular forms replace first-person plural ones. But in (7) the tense contrast with (6) is signaled not merely by the prefix *e-* but also by the choice of *-on* rather than *-o*: as the first-person singular suffix. However, we cannot simply ascribe to *-on* the combination of meanings 'first-person singular imperfect' because *-o*: and *-on* (and similar pairs of affixes for other person-number combinations) are distributed around the verbal paradigm in a fashion that defies any such straightforward correlation.

The terms multiple exponence and extended exponence have been applied to situations such as this, in which one meaning or function (such as 'negative' or 'imperfect') is realized in more than one place in a

word form, not always affixally. Often, as here, this exponence overlaps with that of some other meaning or function. Because such situations of many-to-many form-meaning relationships are common, some morphologists (e.g., Anderson, 1992; Stump, 2001) argue that it is misleading to assign to affixation a central place in morphological theory and deny that complex words have a syntaxlike structure (*see* **A-Morphous Morphology**).

Diachronic Issues

At the beginning of this article, we encountered an affix that is historically derived from a free form, namely *-ful* as in *spoonful* and *peaceful*. The passive-reflexive suffix *-st* of Icelandic, also discussed previously, is also clearly derived from a free form, a reflexive pronoun *sig* or *sik*. The suffix *-st* illustrates phonological reduction through the loss of a vowel (and also a change in the place of articulation of the last consonant). In the modern peninsular Scandinavian languages Norwegian, Swedish, and Danish, this suffix is further reduced to *-s*. This illustrates one aspect of a widespread kind of historical change often called grammaticalization or grammaticization, the process whereby free forms with lexical content become clitics or affixes with derivational or grammatical functions (Hopper and Traugott, 2003).

Could this be the way in which all affixes originate, not just some? This view has been widely held. But, if it is correct, it has implications not just for the contemporary human capacity for language but also for the origin of that capacity. The implication is that the existence of morphology calls for explanation in a way that the existence of syntax does not and that this explanation lies in saying that, even if morphology and syntax are today distinct, all affixes originated as items whose behavior was to be accounted for syntactically, not morphologically (Comrie, 1992). A radical alternative is the suggestion that regular alternations in the shape of morphs (*see* **Internal Modification**) may have originated for phonological reasons, thus establishing morphology as a mode of grammatical organization quite independent of syntax and perhaps even historically prior to it (Carstairs-McCarthy, 2005). Whether or not this is correct, it seems certain that our understanding of the relationship of affixation (and morphology in general) to syntax will benefit from research on the biological basis of the language capacity.

See also: A-Morphous Morphology; Autosegmental Phonology; Clitics; Distributed Morphology; Grammatical Relations and Arc-Pair Grammar; Inflection and Derivation; Internal Modification; Morpheme; Optimality-Theoretic Lexical-Functional Grammar; Paradigm Function Morphology; Syntax of Words.

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Afghanistan: Language Situation

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Main Language Families

In this rugged, thinly populated region much of the population is nomadic and therefore languages are not always discretely distributed. Also surprising relics and pockets exist. Although mainly an Indo-European speech area, Altaic impinges along the Oxus plain in the north. Of the former, Pashto spans the country east to west across the center, bounded by Persian (Farsi) (called locally Dari or Tadjik (Tajiki)) to the north and Baluchi (Balochi) to the south, while a wedge of Dardic, Nuristani, and Pamir languages occurs from Kabul northeastward to the Chinese frontier, and Ormuri and Parachi are found in islands eastward. Of the latter, Uzbek, Turkoman (Turkmen), and Khorasani Turkish overlap with Persian (Farsi) on the northern plain, and a dialect of Mongolian is spoken south of Herat. Semitic is represented by outlying pockets of Central Asian Arabic in four villages on the Oxus plain, while pockets of the Dravidian Brahui language, which has infiltrated from Pakistan, occur within the Baluchi (Balochi) area to the south. The main languages have coexisted for a long period and much mutual assimilation of phonology and lexis has occurred. In the north, for instance, *mayda* 'small,' *māldār* 'nomadic pastoralist,' and *qūš* 'migrate' are shared by Pashto, Tadjik (Tajiki), Uzbek and Arabic. Here as in Iran language, racial origin, and political grouping do not always correspond. Thus the Mongolian-descended Hazaras speak Persian (Farsi), much of the 'Arab' population speaks Tadjik (Tajiki) or Uzbek, and many Pathans are of Dardic racial origin. Conversely language is an important correlate of tribal affiliation among Pathans and Baluchis and the assimilation of ex-Pathan elements to Baluchi tribal units has resulted in the encroachment of Baluchi (Balochi) northward into Pashto territory. Similarly the Dravidian-speaking Brahuis nomadize within the Baluchi area and are organized along Baluchi tribal lines. The main languages are part of larger groups outside Afghanistan and result from incursion into the area. Pashto spreads east and south into Pakistan around Peshawar and Quetta, Persian (Farsi) spreads west and north to Iran and Tajikistan, while Baluchi (Balochi) spreads south to Baluchistan. All of these have written forms using the Arabic script. The smaller relic languages of the Dardic, Nuristani and Pamir groups probably covered larger areas in earlier times. Partial bi- or multilingualism is the norm in many areas and the similarity of phonology and great dialect diversity means that minority languages can exist undetected for long periods. Therefore new languages may yet await discovery.

Minor Indo-European Languages

Afghanistan is a gold mine of unwritten Indo-European relics of a type transitional between Indian and Iranian which have borrowed freely from both groups. Although often spoken by only small numbers of people they are sufficiently different to be termed languages rather than dialects. Ormuri and Parachi in the east belong to the southeast Iranian group. Indic languages include Jatti or Gypsy (Jakati) and Gunjuri. The rest are found in the mountainous region stretching from Kabul northeastward to the Pamirs in the Wakhan corridor, which separates Pakistan from Tajikistan. Just to the northeast the Dardic group includes Pashai (Pashayi), Gawarbati (Gawar-Bati), Ningalami, Savi, Wotapuri, and Tirahi. Beyond them the languages of Nuristan (çi-devant Kafiristan from *kāfir* 'unbeliever', the population being pagan until recently) include Kati, Waigali, Ashkuni (Ashkun), Prasuni, and Tregami. Beyond them still the Pamir group includes Ishkashemi-Sanglechi (Sanglechi-Ishkashimi), Shughni-Roshani, Mundji (Munji), and Wakhi. The region resembles other mountainous regions such as the Caucasus and the western mountain belt of North America in its linguistic diversity and high incidence of relic and outlying forms. Many of these languages also exhibit types of ergative systems characteristic of relic areas. The present political boundaries narrowly miss including Burushaski, a language of the Pamirs to the south of the Wakhan corridor bordering on Wakhi, unrelated to any other known tongue.

See also: Formalism/Formalist Linguistics; Indo–Iranian; Kyrgyzstan: Language Situation; Pashto; Turkmen; Turkmenistan: Language Situation; Uzbek; Uzbekistan: Language Situation.

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Africa as a Linguistic Area

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On Linguistic Areas

A number of different definitions of linguistic areas have been proposed; what is common to most of them are the following characteristics:

1. There are a number of languages spoken in one and the same general area.
2. The languages share a set of linguistic features whose presence can be explained with reference to neither genetic relationship, drift, universal constraints on language structure or language development, nor to chance.
3. This set of features is not found in languages outside the area.
4. On account of (2), the presence of these features must be the result of language contact.

Among the linguistic areas (or Sprachbunds) that have been proposed, perhaps the most widely recognized are the Balkans and Meso-America. The African continent has been said to form a linguistic area, but so far there is no conclusive evidence to substantiate this statement.

Earlier Work

While there were a number of studies on areal relationship in Africa in the earlier history of African linguistics, Greenberg (1959) constitutes the first substantial contribution to this field. In an attempt to isolate areal patterns both within Africa and separating Africa from other regions of the world, he proposed a number of what he called 'special' features of African languages. The properties listed by Greenberg include in particular a number of lexical polysemies, such as the use of the same term for 'meat' and '(wild) animal,' the use of the same term for 'eat,' 'conquer,' 'capture a piece in a game,' and 'have sexual intercourse,' and the use of a noun for 'child' as a diminutive or of 'child of tree' to denote 'fruit of tree.' Another noteworthy contribution to areal relationship within Africa appeared in 1959: Larochette (1959) presented a catalog of linguistic properties characteristic of Congolese Bantu (Kikongo [Kituba], Luba, and Mongo [Mongo-Nkundu]), an Ubangi language (Zande), and a Central Sudanic language (Mangbetu), but many of the properties proposed by him can also be found in other regions and genetic groupings of Africa. A catalog of properties characterizing African languages was also proposed by Welmers (1974) and Gregersen (1977). Building on the work of Greenberg (1959) and Larochette (1959), Meeussen (1975) proposed an impressive list of what he called 'Africanisms,' that is, phonological, morphological, syntactic, and lexical properties widely found in African languages across genetic boundaries.

Another seminal publication on areal relationship was published by Greenberg in 1983. Noting that there are no areal characteristics found everywhere in Africa but nowhere else, he proceeded to define areal properties "as those which are either exclusive to Africa, though not found everywhere within it, or those which are especially common in Africa although not confined to that continent" (1983: 3). As an example of the former, he mentioned clicks; as instances of the latter, he discussed in some detail the following four properties: (1) coarticulated

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Table 1 Relative frequency of occurrence of 11 typological properties in African languages[a]

Properties used as criteria	*Number of languages having that property*	*Percentage of all languages*
1. Labiovelar stops	39	39.4
2. Implosive stops	36	36.4
3. Lexical and/or grammatical tones	80	80.8
4. ATR-based vowel harmony	39	39.4
5. Verbal derivational suffixes (passive, causative, benefactive, etc.)	76	76.7
6. Nominal modifiers follow the noun	89	89.9
7. Semantic polysemy 'drink/pull, smoke'	74	74.7
8. Semantic polysemy 'hear/see, understand'	72	72.7
9. Semantic polysemy 'animal, meat'	40	40.4
10. Comparative constructions based on the schema [X is big defeats/surpasses/ passes Y]	82	82.8
11. Noun 'child' used productively to express diminutive meaning	50	50.5

[a]Sample: 99 languages. Parameters 3, 7, and 8 have two options; if one of the options applies, this is taken as positive evidence that the relevant property is present.

labiovelar stops, (2) labiodental flaps, (3) the use of a verb meaning 'to surpass' to express comparison, and (4) a single term meaning both 'meat' and '(wild) animal.' He demonstrated that these four properties occur across genetic boundaries and, hence, are suggestive of being Pan-African traits, especially since they are rarely found outside Africa.

Greenberg (1983) went on to reconstruct the history of these properties by studying their genetic distribution. He hypothesized that (1), (3), and (4) are ultimately of Niger-Kordofanian origin, even though they are widely found in other African families, in particular in Nilo-Saharan languages. For (2), however, he did not find conclusive evidence for reconstruction, suggesting that it may not have had a single origin but rather that it arose in the area of the Central Sudanic languages of Nilo-Saharan and the Adamawa-Ubangi languages of Niger-Congo.

Search for areal properties across Africa is associated not the least with creole linguistics. In an attempt to establish whether, or to what extent, the European-based pidgins and creoles on both sides of the Atlantic Ocean have been shaped by African languages, students of creoles pointed out a number of properties that are of wider distribution in Africa, perhaps the most detailed study being Gilman (1986).

Table 2 Distribution of 11 typological properties according to major world regions[a]

Region	*Total of languages*	*Total of properties*	*Average number of properties per language*
Europe	10	11	1.1
Asia	8	21	2.6
Australia/ Oceania	12	37	3.0
The Americas	14	48	3.4
Africa	99	669	6.8
Pidgins and creoles	6	14	2.3
All regions	*149*		

[a]Sample: 99 African and 50 non-African languages.

Pan-African Properties

The term 'Pan-African properties' refers to linguistic properties that are (1) common in Africa but clearly less common elsewhere, (2) found at least to some extent in all major geographical regions of Africa south of the Sahara, and (3) found in two or more of the four African language families. The following catalog of selected properties is based on previous work on this subject (especially Greenberg, 1959, 1983; Larochette, 1959; Meeussen, 1975; Gilman, 1986).

A general phonological property that has been pointed out by a number of students of African languages is the preponderance of open syllables and an avoidance of consonant clusters and diphthongs. Furthermore, tone as a distinctive unit is characteristic of the majority of African languages, in most cases on both the lexical and grammatical levels.

Ignoring click consonants, which are restricted to southern Africa and three languages in East Africa (Sandawe, Hadza, and Dahalo), there are a number of consonant types that are widespread in Africa but uncommon elsewhere. This applies among others to coarticulated labiovelar stops, (especially *kp* and *gb*), which occur mainly in a broad geographical belt from the western Atlantic to the Nile-Congo divide. Perhaps even more characteristic are labiodental flaps, produced by the lower lip striking the upper teeth; although restricted to relatively few languages, they are found in all families except Khoisan. A third type of consonants that is widespread in Africa but rarely found outside Africa can be seen in voiced implosive stops.

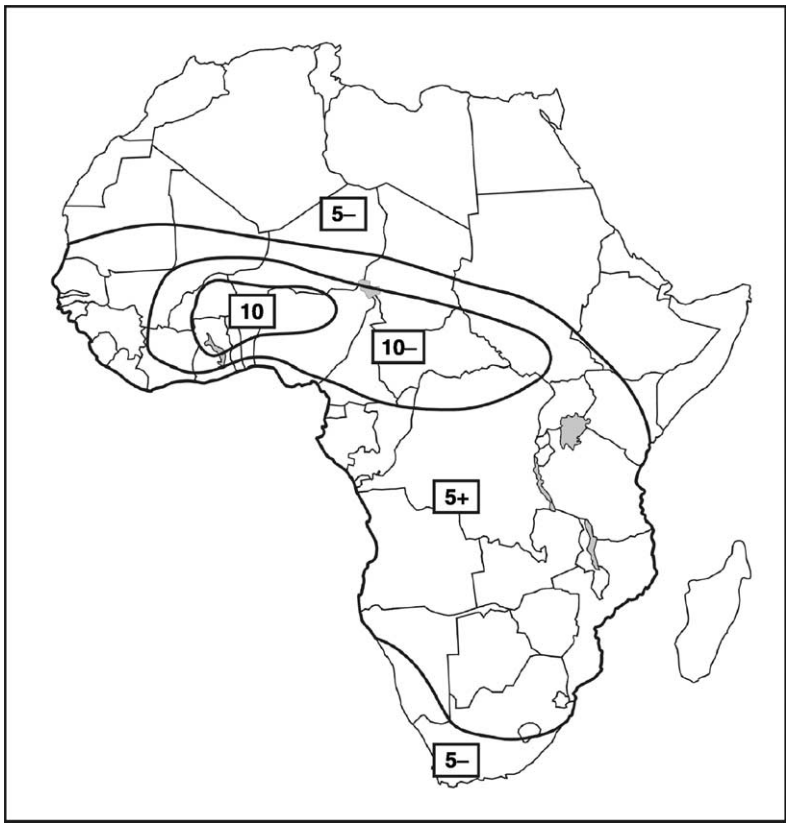

Figure 1 An isopleth sketch map of Africa based on 11 properties (sample: 99 languages).

In their arrangement of words, African languages of all four families exhibit a number of general characteristics such as the following: While on a worldwide level languages having a verb-final syntax (SOV) appear to be the most numerous, in Africa there is a preponderance of languages having subject-verb-object (SVO) as their basic order: Roughly 71% of all African languages exhibit this order. Furthermore, the placement of nominal modifiers after the head noun appears to be more widespread in Africa than in most other parts of the world. Thus, in Heine's (1976: 23) sample of 300 African languages, demonstrative attributes are placed after the noun in 85%, adjectives in 88%, and numerals in 91% of all languages.

Logophoric marking appears to constitute a specifically African construction type. Logophoric pronouns indicate coreference of a nominal in the nondirect quote to the speaker encoded in the accompanying quotative construction, as opposed to its noncoreference indicated by an unmarked pronominal device (concerning the areal distribution of these pronouns, see Güldemann, 2003).

Perhaps the most conspicuous area where one might expect to find Pan-African properties can be seen in lexical and grammatical polysemies. A number of examples of polysemy, such as 'meat'/'animal,' 'eat'/'conquer,' and so on, were mentioned earlier. Furthermore, there are some grammaticalization processes that are common in Africa but rare elsewhere, examples being the grammaticalization of body parts for 'stomach/belly' to spatial concepts for 'in(side),' or of verbs meaning 'surpass,' 'defeat,' or 'pass' to a standard marker of comparison (Heine, 1997: 126–129).

Quantitative Evidence

Being aware that for many of the Pan-African properties that have been discussed in the relevant literature there is only sketchy cross-linguistic information, Heine and Zelealem (2003) use a quantitative approach to determine whether Africa can be defined as a linguistic area. For each of the 149 languages of their sample, of which 99 are African languages and 50 are languages from other continents, they apply 11 criteria that have figured in previous discussions on the areal status of African languages. The criteria and main results of their African survey are listed in Table 1, and those of their worldwide sample in Table 2. What Table 2 suggests is the following:

1. Africa clearly stands out against other regions of the world in having on average 6.8 of the 11

properties, while in other regions clearly lower figures are found.
2. Outside Africa, no language has been found to have as many as five properties, while African languages have between 5 and 10 properties.

Isopleth Mapping

To study the internal structure of linguistic areas, isopleth mapping has been employed in linguistic areas such as South Asia (Masica, 1976), the Balkans (van der Auwera, 1998), and Meso-America (van der Auwera, 1998). Isopleth maps are designed on the basis of the relative number of features that languages of a linguistic area share: languages having the same number of properties, irrespective of which these properties are, are assigned to the same isopleth and, depending on how many properties are found in a given language, the relative position of that language within the linguistic area can be determined.

Applying isopleth mapping to Africa yields the following results: The most inclusive languages, having nine or more properties, are found in West Africa, including both Niger-Congo and Afro-Asiatic languages. A secondary isopleth center is found in the Cameroon–Central Africa area, where up to nine properties are found. Clearly less central are languages farther to the west and south, that is, Atlantic and Mande languages on the one hand, and Bantu languages on the other, where around six properties are found. Peripheral Africa consists of the Ethiopian Highlands (*see* **Ethiopia as a Linguistic Area**) and northern (Berber) Africa, where less than five properties are found. Figure 1 is based on an attempt to reduce the complex quantitative data to an isopleth map.

Conclusion

While there is no linguistic property that is common to all of the 2000-plus African languages, it seems possible on the basis of the quantitative data presented to define Africa as a linguistic area: African languages exhibit significantly more of the 11 properties listed in Table 1 than non-African languages do, and it is possible to predict with a high degree of probability that if there is some language that possesses more than five of these 11 properties, then this must be an African language. Not all of the properties, however, are characteristic of Africa only; some are equally common in other parts of the world.

See also: African Linguistics: History; Areal Linguistics; Balkans as a Linguistic Area; Ethiopia as a Linguistic Area.

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African Linguistics: History

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The first grammar of an African language appeared in 1659, when the Italian Capuchin Giacinto Brusciotto published a 98-page work on the Bantu language Kikongo (Kongo). As a distinct field, however, African linguistics developed only in the 19th century, when European missionaries studied African languages in some detail. By the end of that century there was a wealth of grammatical descriptions and dictionaries of African languages, some of which are still reference works today. Salient typological properties of African languages, such as complex tone structures and noun class systems, were identified and described in these works.

Comparative work also began in the 19th century; the first major genetic classification of African languages was published in 1854 by Sigismund Koelle. This classification served as a basis for later classifications by the Egyptologist Richard Lepsius in 1880 and, around the turn of the century, the German missionaries Carl Meinhof and Diedrich Westermann. The latter two became the leading figures of African linguistics, establishing African linguistics as an academic discipline. Meinhof and Westermann classified African languages into three major stocks: the 'Hamitic' languages of northern and northeastern Africa, the 'Sudanic' languages (*Sudansprachen*), spoken in a broad belt extending from Senegal in the west to Ethiopia in the east, and the Bantu languages of the southern half of Africa. This classification was based to quite some extent on 19th century language typology, in that the 'Hamitic' languages were said to belong to the inflectional type, whereas the Bantu languages were classified as agglutinating and the 'Sudanic' languages as isolating in structure.

Comparative African linguistics entered a new era when Joseph Greenberg (1963) proposed an alternative genetic classification. Pre-Greenbergian comparative African linguistics had suffered from the fact that no systematic distinction between different kinds of relationship was made, that is, it remained for the most part unclear whether the linguistic classifications proposed were intended to be genetically, typologically, or areally defined or, more commonly, were an amalgamation of all three kinds of relationship. According to Greenberg, the languages of Africa can be divided exhaustively into four families (or phyla): Niger-Kordofanian (including Niger-Congo), Afroasiatic, Nilo-Saharan, and Khoisan. Apart from minor revisions, this classification is now generally accepted, even if the evidence for the genetic unity of the last two families is not entirely satisfactory.

The question of areal relationship among African languages has been raised in a number of works, but so far no major results have emerged, apart from the fact that the Ethio-Eritrean highland region of northeastern Africa stands out as a linguistic area.

There is little information on the role of language in society in early studies of African linguistics. It is only since the 1960s, when the majority of African states attained their independence, that an interest in problems relating to multilingualism, language policy, etc. arose, resulting in a wide range of studies devoted to sociolinguistic problems of the African continent.

See also: Africa as a Linguistic Area; Ethiopia as a Linguistic Area.

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African Lexicography

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Introduction

This article focuses on only a few aspects of the current state of affairs in lexicography on the African continent. The emphasis is not on a comprehensive account of all the lexicographic activities, but rather on a few topics portraying some significant changes and developments in African lexicography.

Scholarly Work Reflecting on Some Lexicographic Activities in Africa

Hartmann (1990a), a publication resulting from a workshop hosted at Exeter in March 1989 by the Dictionary Research Unit of the University of Exeter, can be regarded as one of the most important contributions dealing with lexicographic activities in Africa. The topics in this book are discussed with specific reference to the major geographic regions of Africa (i.e., Western Africa, Central Africa, Northern Africa, Eastern Africa, and Southern Africa). In the different chapters these regions are linked with a discussion of, respectively, the historical background (Kidda Awak, 1990), the user perspective (Busane, 1990), Arabic lexicography (El-Badry, 1990), the impact of computer technology (Mann, 1990b), and the information categories in dictionaries (Gouws, 1990). These chapters are preceded by a chapter presenting a linguistic map of Africa (Mann, 1990a) and followed by a chapter focusing on the organization of lexicography in Africa (Hartmann, 1990b). Albeit a relatively restricted study, the groundbreaking value of Hartmann (1990a) should not be underestimated.

The most comprehensive work on lexicography (i.e., the three-volume *Wörterbücher. Dictionaries. Dictionnaires: An international encyclopedia of lexicography*, Hausmann *et al.*, 1989–1991) also gives an account of lexicographic activities in Africa. A lengthy section entitled 'Lexicography of Individual Languages' has a subsection on 'The Languages of Black Africa,' which focuses briefly on three of the "four generally accepted African language phyla" (Bender, 1991: 2643), that is, the lexicography of Nilo-Saharan (Bender, 1991), the Niger-Kordofanian languages (Polomé, 1991), and the Khoisan languages (Hamp, 1991).The lexicography of the fourth of these phyla (the Afrasian languages) is not treated in this subsection, but the subsection on the lexicography of the Hamito-Semitic languages includes articles on Arabic lexicography (Haywood, 1991), lexicography of the Semitic languages of Ethiopia (Leslau, 1991), Berber lexicography (Bounfour, 1991), the lexicography of the Chadic languages (Newman and Newman, 1991), and the lexicography of the Cushitic languages (Gragg, 1991). Besides these contributions, Afrikaans lexicography is briefly discussed in an article on Dutch and Afrikaans lexicography (Heestermans, 1990), included in the subsection on the lexicography of the Germanic languages. Focusing primarily on language families and groups, the discussions are not really a realization of the section title ('Lexicography of Individual Languages'), but this publication does give a broad and general overview of some significant lexicographic projects on the African continent. A major contribution is the comprehensive selected bibliographies presented in each article. These bibliographies, with their listing of dictionaries and other literature, give a good indication of the nature and extent of the lexicographic practice of the respective languages and language groups. A supplementary fourth volume is currently being prepared and will include a substantial additional section on the lexicography of the languages of Africa.

Because of the dynamics of language and lexicographic activities and the ever-changing African scene, the factual component of publications like Hartmann (1990a) and Hausmann *et al.* (1989–1991) may currently perhaps not be as valid and correct as at the time of publication, but they remain authoritative reference sources, and any person interested in lexicographic activities on the African continent will be well advised to consult these books.

Moving Toward Dictionaries for Africa

Externally Motivated Lexicographic Endeavors

An overview of the lexicographic practice on the African continent and the dictionaries compiled

during the previous centuries emphasizes the profound influence of the colonial era and the extent of the lexicographic work performed by missionaries. Kidda Awak (1990: 9) maintains that the development of lexicography in Africa reflects three major events – the Christian missions, colonial expansion, and the development of modern linguistics and anthropology. According to Polomé (1991: 2647) the second half of the 19th century witnessed a great expansion of missionary work in sub-Saharan Africa. This resulted in many dictionaries compiled by the missionaries, displaying various degrees of sophistication and extent of coverage. The importance of the lexicographic work performed by missionaries should always be appreciated because of its pioneering nature. For many African languages, the missionaries and colonial administrators were responsible for the first dictionaries published in those languages (cf. Mavoungou, 2001; Mavoungou *et al.,* 2003; Mihindou, 2001). Although the dictionaries compiled by the missionaries and colonial administrators formed the basis for further lexicographic projects, these dictionaries were not really intended to benefit mother-tongue speakers of these African languages or to promote these languages. As Kidda Awak (1990: 10) states, they were not compiled for use by Africans but to assist the European explorers as expeditionary guides or to be used by missionaries in their attempts to learn the African languages for the purpose of evangelization. As instruments of linguistic and communicative empowerment, these dictionaries were not aimed at the speakers of the African languages but rather at European or non-African users. These lexicographic activities can be regarded as externally motivated, that is, although they were compiled and published in Africa, the motivation for their compilation was to assist users from outside Africa in their attempts to communicate with members of the local speech communities. Externally motivated dictionaries relied on a user profile not compatible with the user profile of the members of the speech community whose language constituted the subject matter of the dictionary. Externally motivated dictionaries may be planned and compiled in a multifunctional way to assist both mother-tongue and non-mother-tongue speakers of the treated language(s), but the typical missionary dictionary had a monofunctional character, being directed at the user who is not a mother-tongue speaker of the language of the local speech community treated in the dictionary.

Externally motivated dictionaries often are bilingual products, and in Africa these dictionaries often coordinated a local African language with a European language, typically the first language of the missionaries or the colonialization officials. The contributions in Hartmann (1990a) and Hausmann *et al.* (1989–1991) give evidence of such a situation of externally motivated bilingual dictionaries. These dictionaries were often not compiled to improve, document, or enhance the quality of the treated language but rather to strengthen the missionary or colonialization efforts.

Externally motivated dictionaries were also compiled in Africa for other reasons, and they were not only bilingual dictionaries. The external motivation sometimes did have a linguistic aim, albeit not the enhancement of the local non-European language. One such example comes from early Afrikaans lexicography. One of the first Afrikaans dictionaries was the *Proeve van Kaapsch taaleigen,* cf. Changuion (1844). Although this small dictionary had Afrikaans as a treated language, it was not compiled for the benefit of Afrikaans. The practical aim of Changuion was to rid Dutch spoken in South Africa from the 'corrupt' words and expressions that signaled the beginning of the new language, Afrikaans, which the lexicographer encountered in South Africa. This external motivation was a typical Eurocentered approach to African lexicography.

Some externally motivated dictionaries had also been compiled to benefit the local language of African speech communities. In 1884 the Dutch academic Mansvelt published an Afrikaans dictionary, *Proeve van een Kaapsch-Hollandsch idioticon met toelichtingen en opmerkingen betreffende land, volk en taal.* The macrostructure of this dictionary consisted of lemmata representing Afrikaans lexical items, and the primary treatment allocated to each lemma was a brief explanation of meaning presented in Dutch. The external motivation of this dictionary does not only stem from the fact that the lexicographer came from outside Africa but also that the target users of this dictionary, although the dictionary was published in South Africa, were not primarily members of the Afrikaans speech community but rather Dutch speakers in South Africa and in the Netherlands. Mansvelt compiled this dictionary to prove to these target users that Afrikaans differs sufficiently from the then-standard Dutch to be regarded as an emerging language and not merely as a dialect of Dutch. In this case, an externally motivated dictionary was compiled to benefit the local language.

Looking at different externally motivated dictionaries compiled in Africa during the early development of African lexicographic practice, major distinctions can be made with regard to the genuine purpose of these dictionaries and their lexicographic functions. The genuine purpose of a dictionary, cf. Wiegand (1998), implies that it is produced so that the target dictionary user in a typical context will have an

instrument to assist in reaching the goals that motivated the search. The genuine purpose of a dictionary is codetermined by, among others, its intended target user group. The genuine purpose of some of the externally motivated dictionaries had been directed at the needs of users, especially non-African users, whereas the genuine purpose of others had been directed at the subject matter of the dictionaries, that is, the language treated in the specific dictionary, aiming either to promote or to stigmatize this subject matter.

Internally Motivated Lexicographic Endeavors

One of the characteristic features of the linguistic situation of postcolonial Africa has been the reality of emerging indigenous languages. According to Mann (1990a: 5), the majority of countries in sub-Saharan Africa still have the language of the former colonial power as the language of administration and postelementary education. Although these colonial languages are still used and often remain the official language in many African countries, other countries have seen the indigenous languages coming to the fore to take their rightful position as language of general communication on a regional or national level, for instance, in Tanzania, where Swahili is the only official language. Even in some of the countries where the colonial language is the sole official language, recent decades have witnessed an increased interest in the local indigenous languages. This is the case in Gabon. After independence, French was declared to be the only official language. This was in line with the linguistic situation in the pre- independence era but differed from the rigid implementation of French as the official language during the colonialization era. Since independence the functional value of the indigenous languages has been acknowledged, and currently there is a strong movement toward the introduction of mother-tongue education at school and a much more lenient approach toward the multilingual reality.

Mann (1990a: 7) argued that the principal focus of lexicographic practice in Africa is the foreign learner, resulting in a situation where relatively few languages have monolingual dictionaries designed for the mother-tongue speaker. This is still a result of the colonial era and the work done by the missionaries. According to Polomé (1991: 2647), despite better linguistic training resulting in the production of lexical works of a higher quality, dictionaries compiled by missionaries are the only lexicographic products available in many African languages. This imbalance between monolingual and bilingual dictionaries can be seen quite clearly in the bibliographies of dictionaries given in Hartmann (1990a) and Hausmann *et al.* (1989–1991).

From a linguistic perspective, the ongoing dominance of colonial languages and the lack of dictionaries functioning as instruments for mother-tongue speakers may be regarded as slightly depressing. However, from a lexicographic perspective, given the situation in which colonial powers had such a tremendous influence for such a long time, a much more positive approach can be taken to the current situation. One of the most telling changes in African lexicographic practice is the switch from externally motivated to internally motivated projects due to an acknowledgment of the value of dictionaries as instruments in communication. Although a similar pattern is often still followed in the compilation of bilingual dictionaries (i.e., with the former colonial language and an indigenous African language selected as a language pair), as was followed in the dictionaries compiled by the missionaries, the current projects are internally motivated, whereas the missionary dictionaries were externally motivated. In practice it boils down to a different user profile, a different genuine purpose, different lexicographic functions, and a different selection of data to be included in the dictionaries. Important in this regard is that the switch from externally motivated to internally motivated dictionaries was initiated by a need to enhance the communicative performance of the members of the local speech communities. Whereas, for example, a French–Fang dictionary compiled by missionaries in Gabon had an external motivation, directed at the needs of the non-African missionary who wanted to communicate in Fang, a bilingual dictionary currently planned, treating the same language pair, has an internal motivation, directed at the needs of the Fang community in Gabon. In the preface of the Tanzanian *TUKI English–Swahili dictionary* (cf. Mlacha, 1996), it is stated that this dictionary was compiled to help the user comprehend English texts. Although this dictionary is not aimed at the local language but at an international language, the international language is coordinated with the official local national language to assist speakers of Swahili with the comprehension of English. The dictionary is directed at African users, illustrating an internally motivated project.

The switch from externally motivated to internally motivated dictionaries resulted in the present situation, where the majority of new lexicographic projects in Africa are characterized by an Afrocentered approach that deviates from the Eurocentered approach that prevailed, especially in the second half of the 19th and the first half of the 20th centuries.

A Stronger Theoretical Base

As indicated earlier, Polomé (1991: 2647) argued that better linguistic training has resulted in the production of lexical works of a higher quality. Better linguistic training did play a role, but a far greater role was played by a better understanding of lexicographic theory and a more aggressive application of this theory to lexicographic practice. Although metalexicography has not yet had a widespread influence on the African continent, it did make an impact on the work in a number of countries. In Africa, academic interest in theoretical lexicography reaches from as far north as Tunis to as far south as Stellenbosch (South Africa), with the Arab Lexicographic Association in Tunis and PROLEX, the Programme for Lexicography, in Stellenbosch. In this regard, university courses in lexicography play an important role in the training of theoretical and practical lexicographers as well as in creating an awareness of lexicography as a field of research and an independent discipline with its own job-creating possibilities.

The internally motivated principles identified with regard to the planning and compilation of dictionaries in Africa finds a parallel when it comes to theoretical training. A preference is often noted to undergo lexicographic training in Africa rather than elsewhere in the world. Gabon and its lexicographic interest can once again serve as a case in point. Traditionally many postgraduate students from Gabon further their studies, especially on doctoral level, abroad, for example in France or Belgium. The awakening of indigenous languages in Gabon and the realization of the need for the introduction of the heritage languages in the education system also resulted in an awareness of the need for dictionaries and trained lexicographers. Having heard of the practical training offered at the Bureau of the Woordeboek van die Afrikaanse Taal (the *Woordeboek van die Afrikaanse taal* being the comprehensive multivolume dictionary of Afrikaans) in Stellenbosch and the doctoral program in lexicography offered by the University of Stellenbosch, students from the Omar Bongo University in Libreville, Gabon, opted to enroll for their doctoral studies in lexicography at the University of Stellenbosch and to complement the theoretical work with practical training at the Bureau of the Woordeboek van die Afrikaanse Taal, instead of going to Europe. Their typical research focuses on theoretical models for various dictionaries needed in Gabon, and in this research the needs of the various Gabonese speech communities and their often unique situations of dictionary use play a decisive role. This once more illustrates a stronger Afro-centered approach instead of the traditional Euro-centered approach.

Lexicographic Associations, Institutes, and Publications

A striking feature of modern-day lexicography is the interactive relationship between theory and practice. On an international level, the establishment and activities of lexicographic associations have done a lot to encourage this development, cf. the role of leading associations like EURALEX in Europe and the DSNA in America. Hartmann (1990b: 73) argued that a regional or Pan-African lexicography society is urgently needed in Africa. Since Hartmann (1990a) lexicography has not only expanded in Africa but its development has also witnessed a much stronger relationship between the theoretical and practical components. In this regard, newly established lexicographic associations and other lexicographic institutes played a decisive role.

In 1995 AFRILEX, the African Association for Lexicography, was founded, and this association strives to promote all aspects of lexicography on the African continent. AFRILEX was founded in South Africa, and because the majority of its members are South Africans, many of its activities are in South Africa. However, the last few years have seen an increasing number of members from other African countries and from abroad joining AFRILEX. Since 1996 this association has hosted an annual international conference. The first seven conferences were in South Africa, but in 2003 the annual conference was held in Windhoek, Namibia, and in 2004 in Libreville, Gabon. By reaching out to other African countries, AFRILEX tries to realize its dream of becoming a truly pan-African association. Besides its annual conferences, AFRILEX has also hosted a number of regional seminars, specialized lexicographic workshops, and training sessions. Since 1991 the Bureau of the Woordeboek van die Afrikaanse Taal has published the annual journal *Lexikos,* and since 1996 *Lexikos,* still published by the Bureau of the Woordeboek van die Afrikaanse Taal, has been the official mouthpiece of AFRILEX. Over the last decade *Lexikos* has established itself as a leading international lexicography journal, and lexicographers from all over the world submit contributions to this journal. Africa now offers the rest of the world yet another platform for lexicographic publications. *Lexikos* has also done a lot to promote lexicographic discussion in Africa, and in each volume contributions from African scholars and lexicographers stimulate the ongoing development of lexicography in Africa.

At the University of Zimbabwe a new lexicographic journal, the *Journal of African Lexicography*, has recently been founded, illustrating the extent of

the internally motivated interest in lexicography on the African continent. The University of Zimbabwe has been one of the focal points in African lexicography. ALRI (the African Languages Research Institute) accommodates ALLEX (the African Languages Lexical Project). Within this project a variety of dictionaries of Zimbabwe's two main languages (Shona and Ndebele) have been compiled. The focus in ALLEX is on both general and terminological dictionaries.

At the University of Dar es Salaam the Institute of Kiswahili Research has been actively involved in lexicographic activities. Theoretical research has been complemented by practical lexicography, which resulted in the publication of the leading English-Swahili dictionary, the *TUKI English–Swahili dictionary.*

In North Africa the Arab Lexicographic Association in Tunis has played an active role in the development of Arabic lexicography, both on a practical and a theoretical level. One of the significant contributions of this association has been the International Symposium on Linguistic and Specialist Dictionaries, jointly organized with the University of Kuwait and hosted at this university in 2000. The proceedings of this symposium (Heliel *et al.,* 2000) can be regarded as an important point of departure for the further development of Arabic lexicography.

At the Omar Bongo University in Libreville, Gabon, GRELACO (the Research Group for Languages and Oral Cultures) has identified lexicography as one of its fields of specialization. According to its director, the policy of GRELACO is "to institute lexicography as a philosophy of work, of scientific co-operation and of a meeting platform for people who have the same will to advance man in his perpetual self-search through language, the most expensive attribute of man" (Emejulu, 2004). The lexicographic initiatives of GRELACO also resulted in the publication of a new book series, *Elements de lexicographie Gabonaise* (cf. Emejulu, 2001, 2002). These books do not only focus on Gabonese lexicography. Prominent international lexicographers also participate with Gabonese lexicographers to introduce a wide range of topics and to emphasize the active development of lexicography in Africa and its relation with general international metalexicographic trends.

The planning of lexicographic activities in Gabon has emphasized another aspect of lexicography that is becoming extremely relevant to the African continent – the financial aspect. In the *Gabonese Journal of the Language Sciences,* published by GRELACO, Emejulu (2000) argued that lexicography should be treated as an economic and commercial variable, governed essentially by market laws. It is a job-creating activity and should be deliberately oriented toward generating money. This illustrates an approach toward lexicography that had been unknown in the missionary and colonial era and emphasizes again the results of an internally motivated lexicographic momentum that has established itself in Africa. The commercial perspective on lexicography has already been introduced at an earlier stage when the Bureau of the WAT in Stellenbosch, South Africa, hosted a symposium in 1996 with the topic 'Lexicography as a financial asset in a multilingual South Africa.'

Focusing on lexicography as a financial asset raises the question of where a lexicographic process (cf. Wiegand, 1998) should be initiated and where the responsibility should reside for the planning and publication of dictionaries. The early African dictionaries, especially those published by missionaries and colonial administrators, were not planned as major commercial undertakings. Since then, however, publishers in Africa have gained quite adequately from the dictionary market, with a number of dictionaries being commercial successes. The language position in Africa does not allow viable commercial undertakings within the lexicography of every language or even every country, and to sustain the multilingual character of the majority of African countries governmental support is needed. In this regard, various models exist with the system of national lexicography units in South Africa as one of the most ambitious and innovative attempts.

Since 1994 South Africa has had eleven official languages. The Pan South African Language Board (PanSALB) was appointed by the South African government to implement and facilitate the policy of multilingualism. In the previous political dispensation South Africa had only two official languages, Afrikaans and English, with the nine indigenous Bantu languages functioning on a regional basis. The lexicographic development and the governmental support for dictionaries showed disparities. PanSALB embarked on a project to establish and fund a national lexicographic unit (NLU) for each of the official languages. This project has been completed, and currently these NLUs are working toward the compilation of a variety of dictionaries. Prior to the establishment of the NLUs, PanSALB hosted a number of seminars and training sessions to equip potential lexicographers with the necessary skills. These training sessions continued once the NLUs had been established, and PanSALB also employed experts in the field of lexicography to visit the NLUs on a regular basis for in-house training, focusing on both theoretical lexicography and the demands of the lexicographic practice, with reference to general issues as well as African-language-specific issues. To assist with the

ongoing training, a special publication will soon be available (cf. Gouws and Prinsloo, in press), in which aspects from the general theory of lexicography are applied to and illustrated with regard to the relevant African languages. This is an attempt to establish a closer link between theoretical lexicography and African lexicographic practice.

A very important aspect of the NLU project has been the emphasis on planning and management, and a number of training sessions were presented for the editors in chief as well as the members of the boards of directors of all the NLUs to equip them with the necessary managerial skills. The compilation of any dictionary is part of an overall lexicographic process, and the formulation of both a dictionary conceptualization plan and an organization plan constitutes an important phase in the lexicographic process. The organization plan covers all the administrative, logistic, and managerial aspects, but unfortunately lexicographic literature, research, conferences, and training very seldom pay attention to the crucial aspects of planning and managing lexicographic projects. In this regard, the South African initiatives are exemplary, helping not only with a sure footing for lexicography in Africa but also setting standards for lexicographic projects elsewhere in the world.

User Friendliness and a Dictionary Culture

According to Hausmann (1989: 13), user friendliness in lexicography implies that lexicography is adapted to society, whereas a dictionary culture implies society adapting to lexicography. A major challenge facing lexicographers and educationalists in Africa is to establish and maintain a dictionary culture. On a continent plagued by famine, drought, AIDS, and political instability, it is not always easy to convince politicians that a dictionary culture is a prerequisite for an environment of lifelong learning in which the community utilizes sources of reference to retrieve information successfully. Whereas lexicographers need to embark on lexicographic processes aimed at the compilation of user-friendly dictionaries, they should also join hands with educationalists to ensure that a dictionary culture can be established. In this regard, it is important that learners at the primary school level be targeted. Programs need to be developed so that learners can acquire dictionary use skills and become familiar with the spectrum of dictionary types available and the relevant data categories presented in these dictionaries, so as to satisfy their specific needs.

An advantage of internally motivated lexicographic projects is that the resulting dictionaries are compiled with specific target users, their needs, reference skills, and specific situations of usage in mind. In Africa there is neither a default user profile nor a default situation of dictionary use, and the lexicographer has to be cognizant of this situation when planning a dictionary. Lexicographers should, therefore, negotiate the physical environment of the user because these situations of usage can have a definite influence on the successful retrieval of information. Users of dictionaries in Africa may be in a position to consult the dictionary under either extremely favorable or extremely unfavorable circumstances. It may be consulted in a library, at home, or in an office within an environment supported by a well-established dictionary culture. Or it may be consulted by a user with no advantage of an existing dictionary culture. When planning a school dictionary, for instance, the African lexicographer has to realize that the dictionary might be used in a classroom with/without assistance of a teacher and/or at home with/without assistance of parents.

'Home' does not necessarily refer to a well-equipped study or working room. It may be under a tree or in a shanty house in a squatter camp without electricity. If a situation of usage is foreseen with little or no assistance from teachers or parents, the data presented in the dictionary and the way in which the data is presented should be adapted to assist the user in the best possible way. If the genuine purpose of the dictionary is to be achieved, the planning of the dictionary has to negotiate a wide spectrum of criteria.

In Conclusion

Lexicography in Africa has experienced lean times but is currently developing rapidly. This is due to the fact that the need for dictionaries compiled for the people of Africa motivates numerous lexicographic projects, and these dictionaries display a much stronger theoretical base. An interactive relation between theory and practice is stimulated by vibrant lexicographic associations, relevant publications, and a variety of training courses and opportunities directed at the real and often unique needs of lexicography in Africa.

See also: Afrikaans; Arabic Lexicography; Bilingual Lexicography; Lexicography: Overview; Shona; South African Lexicography; Swahili.

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African Linguistics: History

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The first grammar of an African language appeared in 1659, when the Italian Capuchin Giacinto Brusciotto published a 98-page work on the Bantu language Kikongo (Kongo). As a distinct field, however, African linguistics developed only in the 19th century, when European missionaries studied African languages in some detail. By the end of that century there was a wealth of grammatical descriptions and dictionaries of African languages, some of which are still reference works today. Salient typological properties of African languages, such as complex tone structures and noun class systems, were identified and described in these works.

Comparative work also began in the 19th century; the first major genetic classification of African languages was published in 1854 by Sigismund Koelle. This classification served as a basis for later classifications by the Egyptologist Richard Lepsius in 1880 and, around the turn of the century, the German missionaries Carl Meinhof and Diedrich Westermann. The latter two became the leading figures of African linguistics, establishing African linguistics as an academic discipline. Meinhof and Westermann classified African languages into three major stocks: the 'Hamitic' languages of northern and northeastern Africa, the 'Sudanic' languages (*Sudansprachen*), spoken in a broad belt extending from Senegal in the west to Ethiopia in the east, and the Bantu languages of the southern half of Africa. This classification was based to quite some extent on 19th century language typology, in that the 'Hamitic' languages were said to belong to the inflectional type, whereas the Bantu languages were classified as agglutinating and the 'Sudanic' languages as isolating in structure.

Comparative African linguistics entered a new era when Joseph Greenberg (1963) proposed an alternative genetic classification. Pre-Greenbergian comparative African linguistics had suffered from the fact that no systematic distinction between different kinds of relationship was made, that is, it remained for the most part unclear whether the linguistic classifications proposed were intended to be genetically, typologically, or areally defined or, more commonly, were an amalgamation of all three kinds of relationship. According to Greenberg, the languages of Africa can be divided exhaustively into four families (or phyla): Niger-Kordofanian (including Niger-Congo), Afroasiatic, Nilo-Saharan, and Khoisan. Apart from minor revisions, this classification is now generally accepted, even if the evidence for the genetic unity of the last two families is not entirely satisfactory.

The question of areal relationship among African languages has been raised in a number of works, but so far no major results have emerged, apart from the fact that the Ethio-Eritrean highland region of northeastern Africa stands out as a linguistic area.

There is little information on the role of language in society in early studies of African linguistics. It is only since the 1960s, when the majority of African states attained their independence, that an interest in problems relating to multilingualism, language policy, etc. arose, resulting in a wide range of studies devoted to sociolinguistic problems of the African continent.

See also: Africa as a Linguistic Area; Ethiopia as a Linguistic Area.

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African Lexicography

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Introduction

This article focuses on only a few aspects of the current state of affairs in lexicography on the African continent. The emphasis is not on a comprehensive account of all the lexicographic activities, but rather on a few topics portraying some significant changes and developments in African lexicography.

Scholarly Work Reflecting on Some Lexicographic Activities in Africa

Hartmann (1990a), a publication resulting from a workshop hosted at Exeter in March 1989 by the Dictionary Research Unit of the University of Exeter, can be regarded as one of the most important contributions dealing with lexicographic activities in Africa. The topics in this book are discussed with specific reference to the major geographic regions of Africa (i.e., Western Africa, Central Africa, Northern Africa, Eastern Africa, and Southern Africa). In the different chapters these regions are linked with a discussion of, respectively, the historical background (Kidda Awak, 1990), the user perspective (Busane, 1990), Arabic lexicography (El-Badry, 1990), the impact of computer technology (Mann, 1990b), and the information categories in dictionaries (Gouws, 1990). These chapters are preceded by a chapter presenting a linguistic map of Africa (Mann, 1990a) and followed by a chapter focusing on the organization of lexicography in Africa (Hartmann, 1990b). Albeit a relatively restricted study, the groundbreaking value of Hartmann (1990a) should not be underestimated.

The most comprehensive work on lexicography (i.e., the three-volume *Wörterbücher. Dictionaries. Dictionnaires: An international encyclopedia of lexicography*, Hausmann *et al.*, 1989–1991) also gives an account of lexicographic activities in Africa. A lengthy section entitled 'Lexicography of Individual Languages' has a subsection on 'The Languages of Black Africa,' which focuses briefly on three of the "four generally accepted African language phyla" (Bender, 1991: 2643), that is, the lexicography of Nilo-Saharan (Bender, 1991), the Niger-Kordofanian languages (Polomé, 1991), and the Khoisan languages (Hamp, 1991).The lexicography of the fourth of these phyla (the Afrasian languages) is not treated in this subsection, but the subsection on the lexicography of the Hamito-Semitic languages includes articles on Arabic lexicography (Haywood, 1991), lexicography of the Semitic languages of Ethiopia (Leslau, 1991), Berber lexicography (Bounfour, 1991), the lexicography of the Chadic languages (Newman and Newman, 1991), and the lexicography of the Cushitic languages (Gragg, 1991). Besides these contributions, Afrikaans lexicography is briefly discussed in an article on Dutch and Afrikaans lexicography (Heestermans, 1990), included in the subsection on the lexicography of the Germanic languages. Focusing primarily on language families and groups, the discussions are not really a realization of the section title ('Lexicography of Individual Languages'), but this publication does give a broad and general overview of some significant lexicographic projects on the African continent. A major contribution is the comprehensive selected bibliographies presented in each article. These bibliographies, with their listing of dictionaries and other literature, give a good indication of the nature and extent of the lexicographic practice of the respective languages and language groups. A supplementary fourth volume is currently being prepared and will include a substantial additional section on the lexicography of the languages of Africa.

Because of the dynamics of language and lexicographic activities and the ever-changing African scene, the factual component of publications like Hartmann (1990a) and Hausmann *et al.* (1989–1991) may currently perhaps not be as valid and correct as at the time of publication, but they remain authoritative reference sources, and any person interested in lexicographic activities on the African continent will be well advised to consult these books.

Moving Toward Dictionaries for Africa

Externally Motivated Lexicographic Endeavors

An overview of the lexicographic practice on the African continent and the dictionaries compiled

Afrikaans

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Introduction

Afrikaans is the youngest fully standardized member of the West Germanic branch of the Indo-European language family. A daughter of Dutch (*Afrikaans* = the Dutch adjective meaning 'African'), it is primarily spoken in South Africa, where it is one of 11 official languages. Currently, it boasts the third largest speaker population, with only Zulu and Xhosa being more widely spoken (1996 Census). Afrikaans also represents a minority language in Namibia and, increasingly, in expatriate communities, notably in Britain, Australia, New Zealand, and Canada.

History

The precise circumstances surrounding the development of Afrikaans as a language in its own right have been energetically disputed. What is uncontroversial is that the Dutch East India Company's establishment of a refreshment station in 1652 led to the introduction of various varieties of 17th-century Dutch at the Cape. During the next 150 years, these Dutch speakers came into contact with indigenous Khoekhoe, with slaves imported from Asia (India, Indonesia, Sri Lanka), East Africa, and Madagascar, and also, more sporadically, with French- and German-speaking Europeans. Written records reveal that a distinctive local variety of Dutch – so-called Kaaps Hollands (Cape Dutch), which was also variously described at the time as geradbraakte/gebroke/onbeskaafde Hollands ('mutilated/broken/uncivilized Hollandic'), verkeerde Nederlands ('incorrect Dutch') and kombuistaal ('kitchen language') – already existed by the mid-18th century. There are three main positions on how this extraterritorial variety became a distinct, structurally simplified and reorganized language: the superstratist, variationist/interlectalist, and creolist positions. On the superstratist view, Afrikaans is essentially the product of the normal linguistic evolution that typically occurs in the absence of strong normative pressures, with the influence of Khoekhoe and the slave languages (i.e., Malay and Creole Portuguese) being confined to the lexical domain (see below). The variationist/interlectalist position similarly downplays the role of the non-Germanic languages interfacing with Dutch at the Cape, identifying dialect-leveling/convergence as the impetus behind the emergence of a new Dutch-based language. By contrast, the creolist view analyses Afrikaans as a semicreole, the product of interaction between the 'creolizing' and 'decreolizing' influences of the matrilectal Cape Dutch(es) and the Dutch-based pidgin(s) spoken respectively by the Cape's European and non-European populations. Exactly when Afrikaans was 'born' is also disputed, but official recognition of its distinctness came in 1925 when it was finally standardized following two Taalbewegings ('language movements') and recognized, alongside English, as one of South Africa's two official languages. The Bible was translated into Afrikaans in 1933 and a rich literary and cultural heritage accrued during the 20th century, with two major annual arts festivals now being dedicated solely to Afrikaans (the Klein Karoo Kunstefees/'Little Karoo Arts Festival' and Aardklop/'Earth-beat'). Because of its unfortunate association with the apartheid policy pursued between 1948 and 1994, there are, however, concerns about Afrikaans's future in post-apartheid South Africa and there has, in recent years, been a move to promote it as the only South African language which is both European *and* African.

Varieties of Afrikaans

The three basic varieties of Afrikaans traditionally identified are Kaapse Afrikaans (Cape Afrikaans) spoken in the western Cape, Oranjerivier–Afrikaans (Orange River Afrikaans) spoken in the northwestern Cape, and Oosgrens–Afrikaans (Eastern Cape Afrikaans), the variety that provided the basis for standard Afrikaans, spoken in the rest of the country (see Figure 1). Kaapse and Oranjerivier Afrikaans are both spoken by people of color, the former reflecting particularly strong Malay and English influences, and the latter, that of Khoekhoe. Various subvarieties are discernible within these regional boundaries, one example being the Arabic-influenced Afrikaans spoken by Cape Muslims. Additionally, Afrikaans also forms the basis of a number of special group languages. Of these, Bantu-influenced Flaaitaal ('Fly-language'), a township argot spoken mostly by black migratory workers in urban areas, represents the best-studied case. During the apartheid era, normative pressures promoting suiwer Afrikaans ('pure Afrikaans') were strong and often directed against Anglicisms. Sociopolitical changes and attempts to promote Afrikaans as more 'inclusive' have, however, led to a more relaxed attitude in many contexts, with many younger speakers frequently speaking and writing Afrikaans, which is lexically heavily influenced by South Africa's other languages, particularly English. In its turn, Afrikaans has also left its mark on the other languages spoken in South Africa, with South African English featuring lexical items such as *braai* ('barbecue'), *veld*

Figure 1 Map of South Africa showing the nine provinces created in 1994 and the areas in which the three main regional varieties of Afrikaans are spoken. Key: dark grey, Cape Afrikaans; light grey, Orange River Afrikaans; mid grey, Eastern Frontier Afrikaans.

('bush'), and *stoep* ('verandah'); Xhosa with *ispeki* (> *spek* = 'bacon'), *isitulu* (> *stoel* = 'chair'), and *ibhulukhwe* (> *broek* = 'trousers'); and Sotho, with *potloto* (> *potlood* = 'pencil'), *kerese* (> *kers* = 'candle'), and *sekotelopulugu* (> *skottelploeg* = 'disc-plough').

Formal Features

Many aspects of Afrikaans's formal structure represent simplifications of their Dutch counterparts, but the language also features a number of structural innovations. Phonologically, striking differences between Afrikaans and Dutch are that Afrikaans features:

- apocope of /t/ after voiceless consonants – cf. Afrikaans *lig* ('light') and *nag* ('night') versus Dutch *licht* and *nacht*
- syncope of intervocalic /d/ and /g/ – cf. Afrikaans *skouer* ('shoulder') and *spieël* ('mirror') versus Dutch *schouder* and *spiegel*
- fricative devoicing – cf. Afrikaans *suid* ('south') versus Dutch *zuid*
- diphthongization of long vowels – cf. Afrikaans [bruət] versus Dutch [bro:t] for *brood* ('bread').

There are also consistent orthographic differences, with Dutch *ij* and *sch* being rendered in Afrikaans as *y* and *sk*, respectively.

Morphologically, Afrikaans is characterized by extreme deflection: it lacks both Dutch's gender system and its system of verbal inflection, pronouns being the only nominals exhibiting distinct forms, although fewer than in Dutch (cf. Afrikaans *ons,* which corresponds to both Dutch *wij* – 'we' and *ons* – 'us'), and all lexical verbs taking the same form, regardless of their person, number, and finiteness specifications. Afrikaans also differs from Dutch in employing reduplication – cf. *gou-gou* ('quick-quick'), *stuk-stuk* ('piece-piece,' i.e., bit by bit), and *lag-lag* ('laugh-laugh,' i.e., easily).

Afrikaans's retention of West Germanic's distinctive word-order asymmetry (main clauses being verb–second/V2 and embedded clauses, verb–final) distinguishes it from Dutch-based creoles, which are exceptionlessly SVO and undermines extreme creolist accounts of its origins. Among the syntactic peculiarities that distinguish Afrikaans from Dutch are:

- its negative concord system – cf. Afrikaans *Ons lees nie hierdie boeke nie* ('Us read not here – the books NEGATIVE') and Dutch *Wij lezen niet deze boeken* ('We read not these books')
- verbal hendiadys – cf. Afrikaans *Ek sit en skryf* ('I sit and write') versus Dutch *Ik zit te schrijven* ('I sit to write,' i.e., I sit writing)

- use of *vir* with personal objects – cf. *Ek sien vir jou* ('I see for you') versus Dutch *Ik zien je* ('I see you')
- *dat*-dropping in subordinate clauses – cf. *Hy weet ek is moeg* ('He knows I am tired'), which alternates with *Hy weet dat ek moeg is* ('He knows that I tired am'), whereas standard Dutch permits only the latter
- retention of main-clause ordering in subordinate interrogatives – cf. *Hy wonder wat lees ek* ('He wonders what read I') versus *Hy wonder wat ek lees* ('He wonders what I read'), which is the only permissible structure in Dutch.

Lexically, Afrikaans differs substantially from Dutch in featuring borrowings from Khoekhoe, Malay, and Creole Portuguese (see 'Lexical Borrowing' section), and also, as a consequence of the 'suiwer Afrikaans' policy, in respect of many neologisms, which were created to avoid adopting an English expression – cf. *skemerkelkie*, *rekenaar,* and *trefferboek* or *blitsverkoper* whereas Dutch uses *cocktail*, *computer,* and *bestseller,* respectively.

The Taalmonument

Afrikaans is unique in being the only language with its own monument (see Figure 2). The *Taalmonument* ('language-monument') in Paarl was erected to celebrate the 100-year anniversary of the 1875 *Eerste Taalbeweging* ('First Language-movement') at which the first concerted calls for the elevation of Afrikaans to the status of written language were made. The monument was inspired by the writings of two prominent Afrikaans writers, C. J. Langenhoven (1873–1832) and N. P. van Wyk Louw (1906–1970). Langenhoven visualized the growth potential of Afrikaans as a hyperbolic curve, whereas van Wyk Louw conceived of Afrikaans as "the language that links Western Europe and Africa … form[ing] a bridge between the enlightened west and magical Africa" (1961, 'Laat ons nie roem'/'Let us not extoll' in *Vernuwing in die Prosa/Renewal in prose*. Cape Town: Human and Rousseau). The monument symbolizes these ideas as follows:

- it features two curves (A and B) representing the influences of Europe and Africa respectively
- A, which starts as a colonnade, flows into the main column symbolizing Afrikaans (D), signifying the direct manner in which Afrikaans grew out of Dutch
- B, which features three semispherical mounds symbolizing the indigenous languages and cultures of

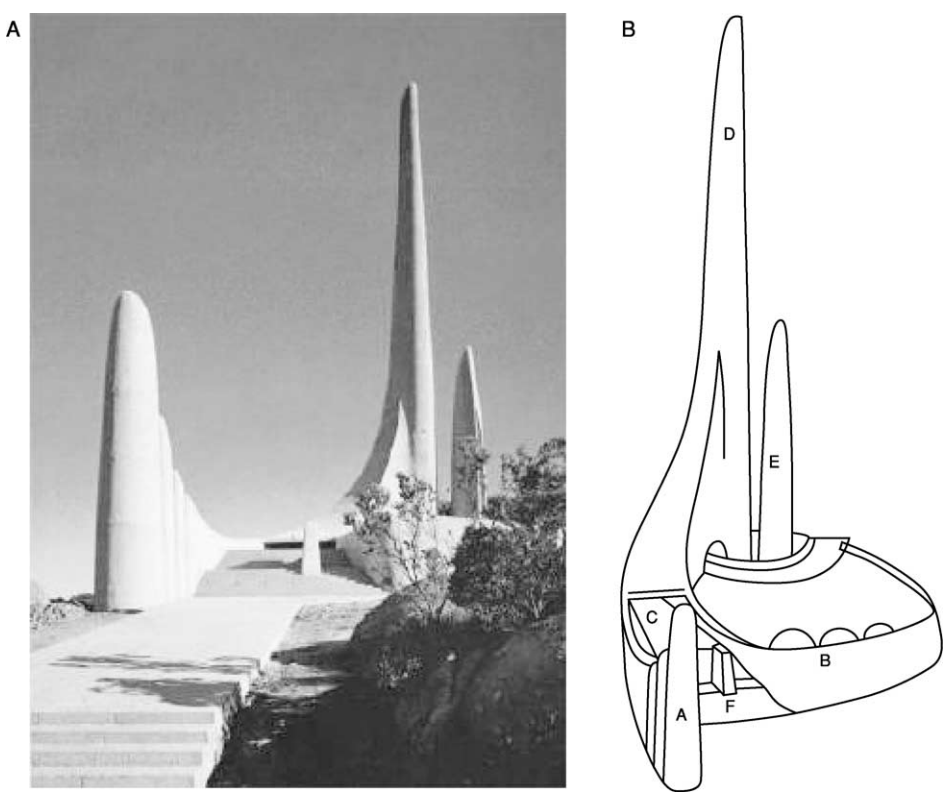

Figure 2 (A) The Afrikaans Language Monument (*Taalmonument*) in Paarl, South Africa. Reprinted by kind permission of the Afrikaans Language Museum, Paarl. (B) Diagrammatic representation of the structure of the Afrikaans Language Monument. A, The Enlightened West; B, Magical Africa; C, the bridge between the two; D, Afrikaans; E, The Republic of South Africa; F, Malay. Adapted from *Die Afrikaanse Taalmonument,* the official brochure of the Afrikaans Language Museum, Paarl, with permission.

South Africa, also flows into the main column via a lesser curve
- at the base of the column, A and B form a bridge (C) symbolizing the confluence of linguistic and cultural influences from Europe and Africa
- a low wall (F) located between A and B symbolizes the contribution of Malay
- column E represents the Republic of South Africa, the political entity established in 1961, within which Afrikaans was well established as one of two official languages.

Afrikaans was Written in Arabic

By the mid-19th century, Afrikaans was being used by the Cape Muslim community in the exercise of their religion and some of the *imams* were beginning to translate holy texts into Afrikaans using Arabic script. The first of these **ajami** (Arabic–Afrikaans) manuscripts, the *Hidāyat al-Islām* ('Instruction in Islam'), is said to have been prepared in 1845 but is no longer extant. The first ajami text to be published, the *Bayānu ddīn* ('Exposition of the religion'), was written by Abu Bakr in 1869 and published in Constantinople in 1877. Seventy-four texts, written between 1856 and 1957, survive today.

Lexical Borrowings

Afrikaans has drawn on the lexical resources of a wide variety of languages with which it has been in contact during the course of its history. Here are some examples of the range and nature of this borrowing:

- From Khoekhoe: animal names such as *geitjie* ('lizard'), *kwagga* (a zebra-like creature), and *gogga* ('insect'); plant names like *dagga* ('cannabis'); place names such as *Karoo* and *Knysna*; and also miscellaneous items such as *kierie* ('walking-stick'), *abba* ('carry') and *kamma* ('quasi/make-believe')
- From Malay: *baie* ('very/much'), *baadjie* ('jacket'), *baklei* ('fight'), *piesing* ('banana'), *rottang* ('cane'), *blatjang* ('chutney')
- From languages spoken on the Indian subcontinent: *koejawel* ('guava'), *katel* ('bed')
- From Creole Portuguese: *mielie* ('corn/maize'), *kraal* ('pen/corral'), *tronk* ('jail')
- From Bantu languages spoken in South Africa: *malie* ('money'), *aikôna* ('no'), *hokaai* ('stop'), *babelas* ('hangover').

See also: Dutch; Germanic Languages; Indo–European Languages; Krio; Namibia: Language Situation; South Africa: Language Situation.

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Afroasiatic Languages

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Introduction

The Afroasiatic languages are spoken by more than 250 million people living in northern Africa, the Horn of Africa, and in South West Asia. The Afroasiatic language phylum (or superfamily) contains more than 200 languages, even 372 according to Grimes (2000). In addition, a number of languages are documented only literally. With the exception of the extinct Sumerian, Afroasiatic has the longest documented history of any language phyla in the world: Egyptian was recorded as early as 3200 B.C., while the documentation of Semitic languages goes back to 2500 B.C. The name Afroasiatic was established by Greenberg (1952), replacing the inappropriate term Hamito-Semitic (or rarely Semito-Hamitic) that is still used by a few scholars. Other terms with little acceptance are Afrasian, Erythraic, and Lisramic.

Classification and Geographical Origin

The Afroasiatic languages are divided into six branches, namely Berber, Chadic, Cushitic, Egyptian, Omotic, and Semitic. Whereas Egyptian (Arabic, Egyptian Spoken) is a single language with four stages (Old-, Middle-, and New-Egyptian and Coptic), the other five branches are families. Chadic encompasses the largest number of languages – namely 195 according to Grimes (2000) or approximately 140 according to Newman (1992) – followed by Semitic (74), Cushitic (47), Omotic (28), and Berber (26), the latter four numbers as stated by Grimes (2000). These six branches are considered 'sister families,' i.e., they are equal, flat, and parallel. However, there are attempts to connect these branches to larger units. Semitic and Berber are relatively closely related, and both are somehow connected to Cushitic (Zaborski, 1997). Bender (1997) calls this group of branches macro-Cushitic and speculates on its connection with Indo-European.

According to Diakonoff (1988) and Bender (1997), the original homeland of the speakers of Afroasiatic languages was in the southeast of today's Saharan desert, while Militariev and Shnirelman (1984) believe it was in Asia. The former scenario seems likely because – except for Semitic – all families of the Afroasiatic phylum are spoken exclusively in Africa. The latter scenario is also possible, however, because parts of the lexis are shared by the Afroasiatic languages, the Sumerian language, and the Caucasian languages (Hayward, 2000: 95).

History of the Investigation of Afroasiatic Languages

In the Middle Ages, the genetic relationship between the Semitic languages Arabic (Standard Arabic) and Hebrew was discovered only after the study of Afroasiatic languages had already begun. Likewise, only after Egyptian was deciphered in the 19th century did the affinity of Egyptian to Semitic became apparent. A short time later, Berber and Cushitic were recognized as belonging to this phylum. The Chadic languages as a whole were classified as Afroasiatic

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History of the Investigation of Afroasiatic Languages

In the Middle Ages, the genetic relationship between the Semitic languages Arabic (Standard Arabic) and Hebrew was discovered only after the study of Afroasiatic languages had already begun. Likewise, only after Egyptian was deciphered in the 19th century did the affinity of Egyptian to Semitic became apparent. A short time later, Berber and Cushitic were recognized as belonging to this phylum. The Chadic languages as a whole were classified as Afroasiatic

languages by Greenberg in the 1950s. The sixth branch, Omotic, was regarded as a branch of Cushitic until the end of the 1960s, and while some scholars still consider this to be true (Lamberti, 1991; Zaborski, 1986, 1997), most believe that Omotic is an independent branch of Afroasiatic (Fleming, 1969). A few scholars even regard it as the first family that split off from Proto-Afroasiatic, the reconstructed ancestor of all Afroasiatic languages (Fleming, 1983; Ehret, 1995).

Finally, it should be mentioned that Hetzron (1980) sees Beja (Bedawi) – generally regarded as the only representative of North Cushitic – as another family of Afroasiatic, but Zaborski (1984) does not agree with this view.

For a long time, the structure and features of Semitic determined which languages belonged to the Afroasiatic language phylum. Most likely this was because Arabic and Hebrew were the first languages European scholars knew. Also, for a significant period of time, racial, even racist prejudices dominated classification suggestions of the Afroasiatic languages. In the mid–19th century, the idea of a language family, of which Semitic is one branch, was born. The term Hamitic, derived from the name Ham, the second son of Noah, was created in opposition to Sem, the name of the first son of Noah, who was the eponym of the Semitic languages. All Afroasiatic languages related to Semitic, but considered to be non-Semitic, were classified as Hamitic, the second branch of 'Hamito-Semitic.' These criteria were a mixture of linguistic (genetic and typological), physical anthropological, and partly geographical features.

Lepsius (1863), the first important exponent of this theory, classified the Hamitic branch into four groups, namely (1) Egyptian; (2) Ethiopic (Ge'ez), i.e., mostly Cushitic languages spoken in the Horn of Africa; (3) Libyan, i.e., Berber and the Chadic language Hausa; and (4) Hottentottan (Nama), i.e., languages of the Khoisan phylum of southern and southwestern Africa. In 1880 he included even Maasai – a language of the Nilosaharan phylum – in the Hamitic branch. Lepsius's main criterion for his classification was grammatical gender. African languages possessing the masculine vs. feminine gender distinction were classified Hamitic, while African languages without gender distinction were called 'Negersprachen,' i.e., 'languages of the negros.'

The most famous exponent of the Hamitic theory was Meinhof (1912), who tried to work out the features of the Hamitic languages by considering genetic, typological, and physical anthropological features. Meinhof was of the opinion that one must distinguish more 'primitive' from more 'highly developed' languages, a criterion that he believed correlated with the mental abilities of the speakers of the respective languages. In the tradition of Schleicher, he believed that inflecting languages reflect the highest level of linguistic evolution. This typological feature of the Hamitic languages derived from a race called 'Hamites' who had white skin, curled hair, and other physical anthropological features considered prototypical of the old Egyptian and Ethiopide types.

Besides grammatical gender, ablaut and other typological features of the Indo-European and Semitic languages were the main linguistic criteria Meinhof took into consideration. He classified as Hamitic not only Afroasiatic languages (except Semitic) but also languages like Ful (Fulfulde, Adamawa) (an Atlantic language of the Niger Congo phylum), Maasai, and other Nilotic languages of the Nilosaharan phylum and languages of the Khoisan phylum, earlier excluded by others from the Afroasiatic languages.

The first opponents of the Hamitic theory were Beke (1845) and Lottner (1860–61), later followed by Erman (1911) and Cohen (1933) who considered – as did the aforementioned scholars – the branches of this phylum to be 'sister families.' According to Sasse (1981: 135), the final breakthrough of this theory and the beginning of a new era in the study of Afroasiatic languages was marked by Cohen (1947). Greenberg (1952, 1955) finally provided evidence that a number of languages had to be excluded from the Afroasiatic language phylum, and he created the Chadic family by unifying the former 'chadohamitic' language Hausa with the rest of the Chadic languages that until then had been classified as non-Afroasiatic languages.

Shared Features

The genetic relationship among the six branches of Afroasiatic is shown best by some shared morphological features (cf. Hayward, 2000: 86ff; Sasse, 1981: 138ff). These are case marking, plural formation on nouns, gender marking, pronouns, verb inflection, and verb derivation.

The basic nominal form of Proto-Afroasiatic, functioning as the direct object of a verb, is termed 'absolutive,' marked by the suffix *-*a*. In Cushitic and – as Sasse (1984) claims – in Semitic and Berber, its function is more widespread, so it can be treated as the functionally unmarked form. The nominative, marked by *-*u*, is used for subject NPs. A similar morphology can be assumed for Egyptian and Omotic, the latter having a reconstructed accusative marking system (Hayward and Tsuge, 1998), i.e., the unmarked form is the nominative and not – as reconstructed for Semitic, Berber, and Cushitic – the absolutive. Chadic, however, is not concerned here since it generally lacks case marking. Modern languages with a marked

nominative case system occur mainly in central and southwestern Ethiopia and adjacent areas where this system of case marking is an areal feature found not only in several Cushitic and Omotic languages, but also in languages of the Nilosaharan phylum.

Complex plural formation of nouns is another characteristic of many Afroasiatic languages. A likely pattern of Afroasiatic plural formation is the "ablaut to *a*, usually in the last stem syllable of a noun ... [partly] accompanied by reduplication, and sometimes trigger[ing] dissimilation or assimilation of other stem vowels of the plural" (Hayward, 2000: 92; cf. Greenberg, 1955). Other reconstructed plural markers are a suffix containing a labial-velar glide and a suffix *-t*, the latter not easy to disentangle from the *-t* of the feminine gender marker. Such a gender marker is found, in all six branches of Afroasiatic. In addition gemination of consonants marking nominal and verbal plurality is widespread.

Two formally distinct sets of pronouns must be set up for Afroasiatic, the first for the absolutive, the second for the nominative case. Due to the shift of a marked nominative to a marked accusative system, the absolutive pronouns often were converted to nominative pronouns, e.g., in Berber and Chadic, so consequently, the subject pronouns of these languages just happen to look like object pronouns of other languages. Gender markers **n-* and **k-* for masculine and **t-* for feminine are often derived from demonstrative elements. These gender markers may be combined with the pronominal gender marker **-uu* for masculine and **-ii* for feminine and function as demonstrative pronouns, especially of the near deixis. This applies exactly to the Highland East Cushitic language K'abeena, in which the demonstrative pronouns have an additional morpheme *n* – probably a definite marker – that results in the forms *kuun* and *tiin*.

Subject agreement on the verb may be marked in two ways, either by a so-called prefix conjugation or by a suffix (or stative) conjugation. Some languages make use of both, e.g., most modern Semitic languages; others have only the suffix conjugation, e.g., Egyptian and many Cushitic languages. The reconstructed subject-agreement morphemes of the prefix conjugation are **'-* (1S), **t-* (2S, 3Sf, 2P), **y-* (3Sm), and **n-* (1P). Suffixes differentiate number and partly gender.

Some morphemes used for verb derivation are found in many Afroasiatic languages, so most probably those are a feature of Proto-Afroasiatic. The transitivizing/causativizing **s-* ~ **-s* and the intransitivizing/passivizing **m-* ~ **-m*, **n-*, and **t-* ~ **-t* belong to these morphemes.

Furthermore, hundreds of lexical items have been reconstructed for Proto-Afroasiatic by Ehret (1995) and Orel and Stolbova (1995) of which a small number "seem unlikely to be disputed" (Hayward, 2000: 94), e.g., **dim-/*dam-* 'blood', **tuf-* 'to spit', **sum-/*sim-* 'name', **sin-/*san-* 'nose', **man-/*min-* 'house', and **nam-/*nim-* 'man'.

The rich consonant inventory of Proto-Afroasiatic – Orel and Stolbova 1995: xvi reconstruct 32, Ehret 1995: 72, even 42 consonants – includes three obstruents, namely, a voiceless, a voiced, and a glottalized sound "not only for most places of articulation but also for certain other articulatory parameters, for example, among lateral obstruents, sibilants and labialised velars" (Hayward, 2000: 94). Furthermore, two pharyngeals, two glottals, and four uvulars are reconstructed by Orel and Stolbova (1995).

Typologically, there is a contrast between Berber, Egyptian, and Semitic on the one hand and Chadic, Cushitic, and Omotic on the other. According to Bennett (1998: 22), the first three languages "generally have (or can be reconstructed as having had) three underlying vowels, no tonal contrasts ... and typically triconsonantal roots that at least in the verbal system seem not to include vowels." He writes that the latter three, however, are characterized by "relatively full vowel systems, tonal contrasts, and roots of varied length that normally include a vowel" (Bennett, 1998: 22). Concerning word order, Afroasiatic languages can be divided as follows: Berber, Chadic, and Semitic languages outside Ethiopia have VO word order, while Cushitic, Omotic, and Ethiosemitic languages generally have OV word order.

Finally, two hypotheses must be mentioned. Diakonoff (1965) is of the opinion that Proto-Afroasiatic was an ergative language, a hypothesis adopted by Bender (1997) and for Semitic by Waltisberg (2002). The second hypothesis concerns the possible substrate influence of Afroasiatic languages on the Celtic languages (cf. Adams, 1975; Gensler, in press).

See also: Akkadian; Amharic; Ancient Egyptian and Coptic; Arabic; Berber; Chadic Languages; Cushitic Languages; Eblaite; Ethiopia as a Linguistic Area; Ethiopian Semitic Languages; Ge'ez; Hausa; Hebrew, Biblical and Jewish; Hebrew, Israeli; Maltese; Omotic Languages; Oromo; Somali; Tigrinya.

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Af-Soomaali *See:* Somali.

Age: Apparent Time and Real Time

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During the 1960s linguists working in the structuralist tradition and in the evolving generative paradigm tended to treat the individual speaker of a language as the natural locus of linguistic inquiry. The field had inherited the traditional Saussurean dichotomies separating language from speech and synchronic from diachronic linguistics. The grammar of the individual, conceptualized as an abstract, internalized, mental construct, was construed as having a systematic character. Speech communities, if considered at all, were characterized as epiphenomena – nothing more than the sum of individual idiolects.

The first research to show how synchronic evidence can be used to reconstruct the history of language change also pointed the way to understanding the systematic character of the speech community. In 1961 Labov carried out sociolinguistic interviews with 69 residents of Martha's Vineyard for his study of the (ay) and (aw) diphthongs (1963). He calculated an index value for the height of the vowel nucleus for each speaker for each diphthong, discovering that the nuclei of both diphthongs were progressively higher with each younger age cohort (although those under 30 reversed the trend, an effect explained by other criteria). There were two possible explanations for the general age-related pattern. The older speakers might have started out life with the high index values (more centralized diphthongs) typical of the younger speakers of 1961, then progressively lowered their nuclei decade by decade, as they grew older. Labov referred to this interpretation as 'age grading.' On the other hand, perhaps the pattern was attributable to the oldest speakers having learned the language at a time when the community as a whole had lower values, and their speech reflected the state of the language at that earlier date. Under this interpretation, the regular increase across the four age cohorts would represent a generational change in progress. Labov referred to this as the 'apparent time' interpretation. How did he decide which interpretation was the most plausible?

The most important piece of evidence came from earlier records. In 1933 the four informants interviewed for the Linguistic Atlas of New England (LANE) were between 56 and 82 years old. They showed "only moderate centralization of (ay)" and a rating for (aw) that was "for all practical purposes, zero" (Labov, 1972). In comparing the older speakers of thirty years earlier to the older speakers in the 1961 interviews, Labov felt confident that the apparent time interpretation was correct. However, he noted as a caveat in this first study of apparent time that "the effect of age [grading] . . . may indeed be a secondary factor in this distribution" (1972).

The Martha's Vineyard study was a prelude to Labov's New York City study (1966) that served as the primary example of how synchronic and diachronic linguistics could be reintegrated (Weinreich *et al.*, 1968). There followed an avalanche of convergent research by sociolinguists, dialectologists, historical linguists, and, recently, corpus analysts in the ensuing four decades. Although space does not permit a survey of the hundreds of studies involved (a more complete listing of research through 2001 can be found in Sankoff, 2005), this review will be concerned mainly with what recent research has revealed about the relationship between apparent and real time.

Most of the studies that have examined gradient age distributions for potential evidence of change in progress have seriously entertained both of the alternative interpretations originally proposed by Labov. Most researchers have tried to find, and many have succeeded in finding earlier evidence that might provide a point of comparison with the modern data. In addition to his own use of the LANE data, Labov (1965) cited Hermann's use of Gauchat's 1905 observations on the dialect of Charmey, Switzerland, and sources dating back to 1896 on New York City. In their study of the change from alveolar to velar/uvular /r/ in Montreal French, based on data collected in 1971, Clermont and Cedergren (1981) were able to refer to a survey from the late 1940s that showed clearly that alveolar [r] was then the dominant variant. This corroborated the apparent time interpretation of the 1971 data, which patterned according to the classic S curve typical of changes in progress, as depicted in Figure 1. If the majority of studies attempted to carefully weigh both interpretive options, it must also be noted that most eventually came down on the side of apparent time. Two studies whose results were interpreted as age grading were Guy and Boyd's investigation of (t,d) deletion in final consonant clusters (1990), and Macaulay's study of glottal stop alternating with [t] in Glasgow (1977).

Guy and Boyd found that although rates of (t,d) deletion were stable across the age spectrum for both monomorphemic words (like *mist, raft*) and past tense (*missed, laughed*), another grammatical category showed a regular progression: the final clusters in semi-weak verbs (*kept, swept, told*). Their

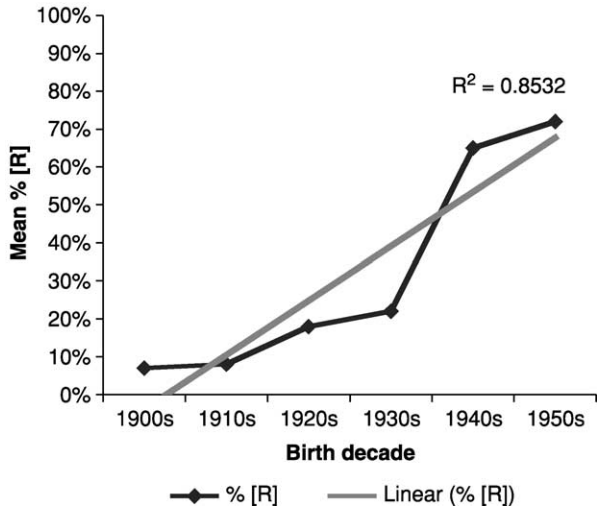

Figure 1 Mean percentage use of the innovative velar [R] by 119 Montreal French speakers in 1971, grouped by decade of birth (adapted from Clermont and Cedergren, 1979).

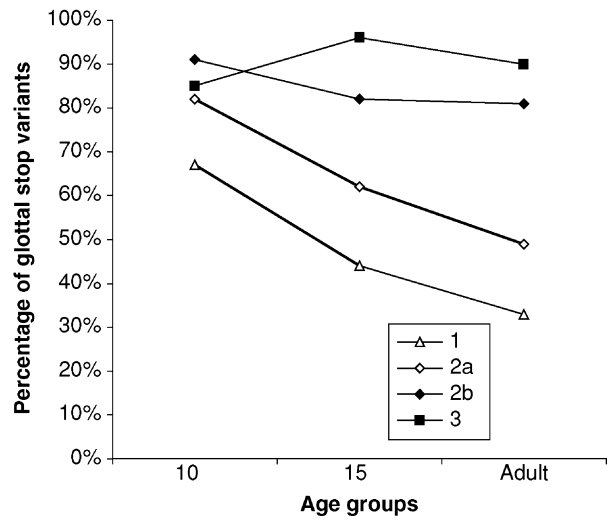

Figure 2 Percentage of glottal stop variants of /t/ used by female speakers in Glasgow (adapted from Macaulay, 1977).

interpretation was that although younger speakers analyzed the vowel alternation in the stem as the indicator of past tense, treating final clusters in semi-weak verbs like those in monomorphemic words, older speakers had reanalyzed final (t,d) in these clusters as carrying past tense information.

In the case of glottal stops, both Chambers (1995) and Sankoff (2005) proposed the age grading interpretation to account for the differences Macaulay found among 10 year olds, 15 year olds, and adults. Results for female speakers are shown in Figure 2. Speakers were drawn from four occupational groups (ordered such that 1 is the highest status group), and the adults selected were parents of the children. Whereas the younger children of groups 2a and 2b showed the high level of use of glottals typical of both adults and children in the two lowest status groups, the adolescents in the two highest status groups (1 and 2a) diverged toward the adult norms for their groups, with much lower levels of use of glottals. Noting that his interpretation is an inference about how this synchronic data can be understood in terms of life stages, Chambers commented, "Although the norm-enforcement mechanisms cannot prevent the class-insensitive youngsters from learning to use the glottal stop variant, they can prevent its perpetuation into adolescence" (Chambers, 1995).

In these two studies in which age grading seemed the most likely interpretation of synchronic data, it was easiest to see how age grading might fit into the picture when the variable was stable. We know historically that English final consonant cluster simplification has been stable for some time, and Guy and Boyd's results also showed no age effect for the two major word classes – only in the minority 'semi-weak' verbal category did the effect appear. In the case of glottal stop, the age grading interpretation was somewhat more adventurous, and we will follow that adventure in the light of a new study below.

Looking at age grading and apparent time as alternative interpretations of data gathered at one point in time, Labov's summary of the various possibilities is presented in Table 1. If the age distribution is flat, either no change is happening (Interpretation 1), or the whole community, young and old, are changing at the same rate and therefore show no age differences (Interpretation 4). Interpretations 2 and 3 are those that interest us more particularly. The same pattern depicted, for example, in Figure 1, where the likelihood of using velar [R] is related to a speaker's decade of birth, may mean that all these speakers have been

Table 1 Patterns of change in the individual and the community[a]

Synchronic Pattern	*Interpretation*	*Individual*	*Community*
Flat	1 Stability	Stable	Stable
Regular increase/decrease with age	2 Age grading	Unstable	Stable
Regular increase/decrease with age	3 Generational change (apparent time)	Stable	Unstable
Flat	4 Communal change	Unstable	Unstable

[a]Adapted from Labov, 1994.

unstable, decreasing their use of [R] as they aged. The community overall would be stable; the language would not be changing; and the correct inference would be Interpretation 2: age grading. This same S curve, however, might produce the inference that the community was unstable – a change was going on in the language, but individual speakers, once they had acquired language as children, were stable across their life spans. This is Interpretation 3: apparent time.

As long as we consider clear-cut cases – change or no change – it seems that age grading is a strong alternative interpretation for gradient age distributions where no change is occurring. But what if we look at age not in the demographic sense (as a gradient variable having to do with year of birth), but rather in terms of the lifespan of people for whom different periods may involve very different sociolinguistic relationships? In addition to the important fact that children have greater plasticity in their capacity for language learning (Lenneberg, 1967; Sankoff, 2004), sociolinguists have pointed to the fact that, for example, different periods of people's lives involve them differentially in their relationship to the standard language (Eckert, 1997) and possibly also in their contacts with the opposite sex (Cameron, 2000).

Two earlier observations now become relevant. First, Labov's caveat that perhaps both apparent time and age grading were relevant to correctly interpreting the Martha's Vineyard data has been proven to be true in many subsequent real-time studies. This was abundantly clear by 1994, when Labov reviewed several such studies, finding a combination of age grading and real language change in longitudinal work by Trudgill in a restudy of Norwich (1988), in Cedergren's (1987) restudy of Panama City, and in Fowler's restudy of (r) in New York City (Labov, 1994). The interrelationship between age grading and apparent time seems to show two different patterns. If a change is ongoing, older speakers as they age may change their speech, to some extent, in the direction of the change. In the case of sociolinguistic variables known to be stable, however, there may be a curvilinear pattern associated with age as well as with social class, whereby speakers in their mid-adult years, more implicated in the 'linguistic market' (Sankoff and Laberge, 1978) may show a greater use of standard variants than is typical of the oldest and youngest speakers.

Second, ever since researchers began using the research design pioneered by Labov, there has been broad agreement that the best way to disambiguate the two interpretations is by examining actual language history. Early researchers tried to find reference points in the past; researchers now can carry out replications of a number of previous sociolinguistic and dialect surveys, adding a real-time component to the study of language change and variation.

Two kinds of longitudinal studies shed light on the relationship among age, apparent time, and real time. All longitudinal research involves comparisons at two points in time, but whereas **trend** studies require resampling the community, **panel** studies follow the same individuals across time. If the goal is to assess language change, trend studies are the only sure way to confirm change. Panel studies, however, are the only way to discover how individual speakers of different ages are involved in linguistic change. Though restudying a community, or following a group of speakers across time, might seem to be a straightforward affair, in fact both kinds of research can involve serious methodological complexities and ensuing problems of interpretation (Tillery and Bailey, 2003). Many researchers have attempted to overcome these problems by combining trend and panel design in various ways.

Two dimensions that are important in determining the course of change are (1) whether we are dealing with change from above or change from below, and (2) the status of the variable within the linguistic system. In Labov's first discussion of the two types of change, he characterizes both stigmatized and prestige features as being relatively simple examples of the pressure of society upon language. These forces are applied from above – they are the product of overt social pressures consonant with the social hierarchy. The process is out in the open for us to observe, in public performances, in the attitudes of teachers in the schools, and in the conscious reactions of some middle class speakers (Labov, 1966).

Change from below, on the other hand, is expressed as a gradual shift in the behavior of successive generations, well below the level of conscious awareness of any speakers. In most cases the shift begins with a particular group in the social structure and is gradually generalized in the speech of other groups. Usually the initiating group has low status in the social hierarchy – otherwise the change would be transformed into overt pressure from above (Labov, 1966).

As far as the linguistic status of the variable or changing feature is concerned, once again this may make a big difference in how it diffuses through the speech community. Whereas isolated features (individual words, perhaps also phonetic innovations that have no implications for the rest of the sound system) may be relatively easy to learn and thus able to diffuse even among older speakers, features that are more structurally implicated (involving more complex constraints and relationships with other elements) may

be much more difficult for older speakers to learn. A preponderance of recent studies deal with changes from above, often in the form of the influence from other dialects (or the standard language). Such features may be more available to adults, who typically have a wider range of contacts than do children.

As in other studies of language variation, the quantitative work reviewed here adopts a model of change that envisages an innovative form such as alternating, or being in competition with an older form. It is worth considering for a moment how this alternation is modeled in the grammar. Quantitative sociolinguistic analysis that is relevant to the diffusion of language change deals with linguistic production, whether in speech or writing. Language that people produce is considered to be based on or generated in accordance with their internalized grammars. If grammars are modeled to include only the information that alternation is possible, then from this qualitative point of view, whether a speaker uses the innovative variant, say, 10% of the time or 90% of the time, the speaker's grammar is the same. In contrast, quantitative sociolinguistic research shows that the use of the variants is governed by constraints, both linguistic and social, that are probabilistic in nature, and holds that these constraints should be modeled in the grammar, that is, there is *inherent variability* in grammars. In studies following Kroch's model of competing grammars (1989), now widely used in corpus-based studies of historical syntax, constraint values have been found to be *constant factors* across the entire course of change, with the only change being in the increased probability of use of the innovative grammar over time. In a sociolinguistic study of the acquisition of the stable sociolinguistic variables (t,d) and (ING), Labov (1989) showed that children as young as five years closely model their parents' constraint probabilities by a process of *probability matching*. In the transmission of variables involved in change, children appear also to attend closely to the constraints of the adult system, but (in the case of sound change) are able to surpass their adult models both phonetically, by going beyond the adult target, and by extending environments in which the innovative variants are used (Roberts, 1997). My conclusion is that changing frequencies, whether on the individual or on the community level, are fundamental to change.

Since 1995 we have seen an increasing number of real-time studies (most frequently, re-studies of sociolinguistic or dialectological research of the 1960s and 1970s). Many of the original studies made apparent time inferences, and for researchers carrying out restudies, it has been tempting to treat these inferences as predictions. However, we should note that there are, in the historical sense, not two but four possible further developments to be observed in the subsequent studies. First, if the original age distribution is repeated at the same level, we interpret the outcome as static age grading. Second, when we note a repeated age gradient but at a higher overall frequency of the change, we interpret the result as a real-time change. The third possibility is that all age groups display the same high level of the variable, which we interpret as the last phase of change going to completion. In this case the trend study should show no further increase on the part of a new generation of young speakers. Since eventually all changes are completed, it may be unreasonable to think that the absence of continuing change constitutes a failed prediction. The fourth possibility is that change is reversed, usually as the effect of stigmatization from above.

In the remainder of this review, we will see how trend and panel studies jointly contribute to a better understanding of what apparent time actually tells us. Table 2 documents the results of all the trend studies I have located in which the original studies found gradient age distributions. Spanning ten countries and seven languages; all but the first were carried out in the last decades of the twentieth century. The first seven studies used strictly trend methodology, whereas studies 8 through 13 included both trend and panel components. Of these, only the trend results are summarized in Table 2 (panel results from these same studies will be discussed below).

Although changes may have been completed, and although we may find a combination of age grading and real time change, in none of the follow-up studies do we find age grading alone. The most important implication of this conclusion is that apparent time is a truly powerful concept in locating the presence of change. In other words, a researcher who locates a gradient age distribution in a new community under study is virtually assured of having identified change, whether or not age grading is also involved.

A thorough discussion of the early-20th-century work of Gauchat and Hermann in Charmey, Switzerland, is found in Labov (1994). Most of the changes identified by Gauchat were verified in real time by Hermann. The longitudinal perspective on Martha's Vineyard is less clear. Whereas a restudy by Pope (2002) found a continuation of the trends discerned by Labov, Blake and Josey (2003) conclude that socio-economic and ideological change on the island has led to different patterns. These differing results serve to underscore how different sampling methods in restudies may lead to interpretive difficulties in discerning longitudinal trends. In any case, neither of these restudies found a replication of the same

Table 2 Results of trend studies on the interpretation of earlier inferences

Study location; variables; date of original study; source of trend information	*Interpretation at Time 1*	*Real Time (Time 2 findings)*
1 Charmey, Switzerland: 5 phonetic changes; 1905; (Labov, 1994)	Apparent time; change from below	Four changes, one stable variable
2 Martha's Vineyard: (ay) nucleus raising; (1961); (Labov, 1965, 1994)	Apparent time; change from below	Possible reversal (Blake & Josey, 2003); possible continuation (Pope, 2002)
3 New York City; (r); (1963); (Labov, 1966, 1994)	Apparent time; change from above	Change plus age grading
4 Norwich; *beer/bear* merger; backing of (e); [ʔ] for /t/; (1968); (Trudgill, 1988)	Apparent time; change from below	Continuing change
5 Norwich; *moan/mown* merger; (1968); (Trudgill, 1988)	Apparent time; change from above	Continuing change
6 Panama City; (ch)-lenition; (1969); (Cedergren, 1987)	Apparent time; change from below	Change; age grading (young adult 'spike')
7 Glasgow; glottal stop; (1970s); (Macaulay, 1977; Stuart-Smith, 1999; (Chambers, 1995)	Age grading	Age grading; continuing change (1990s)
8 Eskilstuna, Sweden; 7 morpho- and morphophonological variables; (1960s); (Sundgren, 2002)	Apparent time; social class effects; change from above	Slower continuing change; age, class and gender effects (1990s)
9 Hanhijoki, Finland; [r] → [d]; (1960s); (Kurki, 2004)	Apparent time; change from above	Continuing change (1989, 1999, 2002)
10 Montreal [r] → [R]; (1971); (Clermont & Cedergren, 1979; Sankoff *et al.*, 2001)	Apparent time; change from above	Continuing change (1984, 1995)
11 Tours, France; *ne*-deletion; (1976); Ashby (2001)	Apparent time; change from below	Continuing change (1995, 1998)
12 Rio de Janeiro, Brazil; several morphological and phonological variables; (1970s); (DePaiva & Duarte, 2003)	Apparent time; change from above and change from below	Continuing change (1990s)
13 Springville, Texas; verbs of quotation; (1987); (Cukor-Avila, 2002)	Apparent time	Continuing rapid change

age gradient isolated by Labov, so there is no suggestion that Labov's initial results were the result of age grading alone.

Trudgill's restudy of Norwich was a strict replication, adding a generation of younger speakers. In addition to verifying the continuing status of the four changes listed in Table 2, Trudgill found two new changes that had barely been present in the community in his original research. Cedergren's restudy of Panama (1987) found both age grading and real time change, as did Fowler's restudy of Labov's New York City department store survey, both discussed extensively in Labov (1994).

In the last pure trend study of Table 2, Stuart-Smith (1999, cited in Marshall, 2003) returned to Glasgow to study the continuing increase in t-glottaling. Marshall's figure 4 (p. 98), which depicts Stuart-Smith's combined results by age and sex, shows an overall increase in glottals as well as a reduction of the difference between adolescents and adults. Apparently both change and age grading were there from the beginning.

In addition to the seven studies of Table 2 that combine trend and panel components, there are others that concentrate on panel comparisons. Several of these deal with change from above, often the impact of other-dialect or standard language features on particular speech communities. To Sundgren's study of Eskilstuna, Sweden (Sundgren, 2002) and Kurki's study of Hanhijoki, Finland (Kurki, 2004) can be added Nahkola and Saanilahti's research on the small town of Virrat in southeastern Finland (2004), and Hernandez-Campoy's (2003) report on a panel study that showed increasing influence of Standard Castilian phonological features. The numerous studies in De Paiva and Duarte (2003) contain a wealth of information on trend and panel comparisons of many sociolinguistic variables in Brazilian Portuguese.

In most panel studies, researchers have found that when there is a change in progress as measured by a trend study, grouped data from the panel shows a modest increase in the direction of the change. When researchers have been able to study individual panelists, this result can typically be decomposed into a majority of speakers who remain quite stable, and a minority who change, often substantially. Those individuals who change in later life are usually in their

20s and 30s, sometimes up to the age of 50, but very rarely have older speakers been found to register significant changes. In our follow-up study of the [r] → [R] change in Montreal French, one older speaker significantly reduced his frequency of use of this change from above after he retired, became ill, and was largely confined to staying at home (Sankoff *et al.*, 2001). Ashby's important research documents another such case with respect to a change from below.

Ashby's trend and panel study deals with the loss of the negative particle *ne* in the metropolitan French dialect of Tours. In his 1976 study Ashby (1981) had established a clear age differential in *ne* deletion, which he interpreted in terms of apparent time, i.e., as a change in progress. Of the 35 speakers distributed according to three socio-professional groups, sex, and age (14–22 vs. 51–64), all three social factors were significant. Whereas the older group used *ne* in 52% of its potential occurrences, the younger speakers used it only 19% of the time. In his 1995 restudy, Ashby (2001) provided real-time corroboration of this interpretation, discovering that the change had accelerated. With a new sample of 29 speakers structured in the same way as the previous one, he discovered that the 51–64 age group now registered only 25%, and the usage of young speakers in 1995 had declined to 14%. Consonant with its status as a change, *ne* deletion was being led by women in 1976 (30% *ne* use vs. 42% for men). However, the sex difference had disappeared by 1995, with the women only three percentage points in the lead (17% vs. 20%, a difference revealed as insignificant by Ashby's multivariate Goldvarb analysis). The panel component of the study comprised ten speakers from 1976 were re-recorded in 1995. As with most other panel studies to date, Ashby found that a majority of speakers (6 of the 10), were quite stable across the 19-year period, registering within 10 percentage points of their previous scores. Of the four who changed, one was anomalous in terms of having gone in the direction opposite to the change: a schoolteacher who registered an increase from 6% to 23% after her marriage to a professional man. The other three speakers were anomalous in a different way: whereas other panel studies have shown that of adult speakers who change, most are younger than 50, Ashby's three were all retired and over 65 by the time of the second study. He attributes their significant declines to the more relaxed style that may be adopted by speakers who are no longer in the world of work (Ashby, 2001).

Panel studies provide a clear overall result: as they age, people register lesser differences from their earlier selves than does the community over the same time interval, as measured by a trend study. This means first, that it must be younger speakers who are in the vanguard of change. Those adult speakers who change are (a) in the minority; (b) concentrated in the younger-age cohorts of adults and (c) make less significant advances than the community as a whole. The second implication of this result is that apparent time must consistently underestimate the rate of change. I will exemplify this last point by considering the real time trajectories from [r] → [R] for 31 Montreal French speakers between 1971 and 1984. Though a majority were stable, a minority of 11, mostly younger, speakers changed over this period in the direction of the change. If the 1971 data were not available and we interpreted the 1984 values according to apparent time, we would assume that, for example, those speakers registering 90%–100% of the innovative variant had begun their lives as children with those same values. However, we know that approximately 1/3 of those speakers had significantly lower values thirteen years earlier, and thus they actually changed over the period. Similarly to the results reported in Nahkola and Saanilahti (2004), those speakers most likely to change were those in the midrange of the change, as opposed to those initially registering close to categorical use of the conservative variant.

Together, trend and panel studies of the past decade have confirmed the validity and usefulness of apparent time as a powerful conceptual tool for the identification of language change in progress. Far from misleading us about the existence of change, apparent time generally underestimates the rate of change. Though the field will continue to be surprised by the light that trend and panel studies can shed on the mechanism of language change – especially as it intersects with speaker life spans – our present synchronic methodology is a powerful lens for interpreting the past.

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Aging and Language

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This article examines changes in language comprehension and production in normal aging, the ways in which lay conceptions of older adults' abilities influence speech directed towards older people, and the effects of that speech on older recipients. Important changes that occur in language as a function of age-related pathology (e.g., Alzheimer's disease) are covered elsewhere (e.g., Kemper and Mitzner, 2001).

Considerable work has focused on language comprehension problems in aging, with a particular focus

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This article examines changes in language comprehension and production in normal aging, the ways in which lay conceptions of older adults' abilities influence speech directed towards older people, and the effects of that speech on older recipients. Important changes that occur in language as a function of age-related pathology (e.g., Alzheimer's disease) are covered elsewhere (e.g., Kemper and Mitzner, 2001).

Considerable work has focused on language comprehension problems in aging, with a particular focus

on the role of working memory capacity. Correlational evidence suggests that age is associated with problems in understanding complex syntactic structures, and that those problems are largely accounted for by parallel declines in working memory capacity (Norman *et al.*, 1991). Complementary patterns are apparent in language production. Older adults produce less complex syntax, and again, such declines are largely accounted for by declines in working memory (Kemper *et al.*, 1992). Particular problems are experienced with left-branching clauses, and with utterances that include multiple clauses – syntactic structures that put particular strain on working memory. Fast speech rate also results in decreased comprehension for older adults more than for younger adults (Stine and Wingfield, 1987).

Recent research suggests that the association of communication problems with working memory is not a result of the immediate processing in working memory, but rather a function of "postinterpretative processing" (Caplan and Waters, 1996). That is, older adults demonstrate equal initial understanding and processing of language, but demonstrate deficits in the storage and integration of linguistic material into memory for future retrieval and use.

Attention has been paid to older adults' ability to inhibit irrelevant or intrusive thoughts and the implications of this for language production and comprehension. Harsher and Zacks (1988) suggest that a decline in inhibitory ability is part of normal aging, and that it accounts for communication problems in older adulthood. Other scholars assign the association between inhibitory capacity and language use to pathological conditions. For instance, Pushkar, Gold and Arbuckle (1995) suggest that "off target verbosity" in older adulthood is a result of declines in frontal lobe functioning occurring among a minority of older adults. This debate is ongoing.

Less controversy is apparent in examinations of older adults abilities to recall proper names. Considerable evidence indicates problems in this area (Cohen, 1994). Proper names appear to present a particular challenge given their uniquely arbitrary and semantically unelaborated character. Nussbaum, Hummert, Williams, and Harwood (1995) point out that proper nouns have no synonyms, which removes one retrieval route that is used in other situations of retrieval difficulty.

While not strictly language-related, considerable communication problems for older adults are also caused by presbycusis – the normal age-related decline in upper-frequency hearing. While research into other communication problems has generally attempted to control for hearing declines, presbycusis is a somewhat specific pattern of hearing loss that may contribute to some of the problems observed in other research (Schnieder *et al.*, 1994).

The work described above has revealed important problems for older adults' communication, as well as developing theoretical understanding of psycholinguistic processes. However, it has also sometimes conformed to more general notions that aging is about decline, and thus may serve to reify stereotypical notions of aging (Coupland and Coupland, 1990). In the remaining sections, some less pessimistic messages concerning communication and aging are emphasized.

First, the scholars described above are generally careful to note that, many findings reflect small effects that are observable in the laboratory, but have only minor effects in everyday communication (Ryan, 1991). In addition, research has revealed multiple ways older adults compensate for specific deficits, such as by relying more heavily on prosody or processing at a more global level (Stine and Wingfield, 1987, Stine-Morrow *et al.*, 1996). Also, findings of deficits among a group of older adults may be due to some subset of that group who are actually experiencing the early (undetected) stages of some form of dementia, rather than a general pattern of decline across all participants (e.g., note that longitudinal work sometimes shows little age-related change, except among those who experience working memory decline: Kemper *et al.*, 1992). Related to this, many negative effects begin around age 80: Discriminating among age groups within the 'older adult' population is therefore essential.

Second, language and aging research has paid scant attention to what might improve, or remain unchanged, with age as compared with what might decline. Normal aging has no effect on lexical availability or semantic memory (Kemper and Mitzner, 2001), vocabulary increases into old age (Salthouse, 1988), and narrative production improves with age (Kemper *et al.*, 1989). We have little systematic knowledge of older adults' abilities in group decision-making, public speaking, or emotional expression, yet each of these seems open to improvement into late old age. The creative writing skills of older people might also merit investigation as a potential area of improvement in language (Sternberg and Lubart, 2001).

Third, a focus on 'decrement' causes inattention to the positive functions that may be served by what are apparently aberrant behaviors. For instance, Coupland, Coupland, Giles, Henwood, and Wiemann (1988) describe a pattern of "painful self-disclosure" (PSD) among older people – e.g., disclosure to relative strangers about personal issues such as illness or bereavement. It would be possible to interpret this as a sign of egocentrism or a decline in conversational skill. However, Coupland *et al.* (1988) illustrate the

functional nature of PSD for managing age-related face threat.

Fourth, research has begun to pay attention to the social construction of decline and decrement in old age, i.e., decline is created by language use concerning age and language directed towards older adults. Levy (1996) shows that making negative age stereotypes salient leads to less competent behavior (e.g., memory problems). These stereotypes are likely to be activated when older adults are addressed with stereotype-driven language strategies. For instance, patronizing talk to older people (in various manifestations called overaccommodation, elderspeak, secondary baby talk) is documented in numerous settings (Kemper, 1994), particularly institutional settings (Caporael, 1981), and is driven by stereotyped conceptions of aging (Ryan *et al.,* 1986; Hummert *et al.*, 2004). Patronizing speech can result in 'blame the victim' effects (recipients of such speech are perceived to be impaired, even if they are not: Hummert and Ryan, 2001). Varieties of this speech are associated with dependency in institutional environments (Baltes and Wahl, 1996), and older adults in institutional settings become accepting of such speech despite initially viewing it negatively (O'Connor and Rigby, 1996). Ironically, certain elements of the patronizing style (particularly semantic elaboration and reduced syntactic complexity) are helpful to older adults' comprehension, but other elements are harmful, such as prosodic adjustments and reduced sentence length (Kemper and Harden, 1999).

This brief review does not touch on all aspects of language and aging (e.g., paralinguistics of older people's speech, critical approaches, etc.). As noted by Coupland (2004), aging has received less attention than race/ethnicity, gender, class, and regional variation within the sociolinguistic literature on group variation. This is, however, beginning to change, and attention to aging issues is now common in psycholinguistics (Kemper and Mitzner, 2001) and communication (Nussbaum and Coupland, 2004). The theoretical and practical implications of this work are tremendous.

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Agrammatism I: Process Approaches

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Agrammatism is a disorder that leads to difficulties with sentences. These difficulties can relate both to the correct comprehension and the correct production of sentences. That these difficulties concern sentences is evident from the fact that word comprehension and production can be relatively spared. Agrammatism occurs in many clinical populations. For Wernicke's aphasia, for instance, this has been established for both comprehension and production. Agrammatic comprehension has been demonstrated in Parkinson's patients, Alzheimer patients, and children with specific language disorders. However, agrammatism has been studied most systematically in patients with Broca's aphasia, and it is this group that is the focus of this article.

Agrammatism in Comprehension

The large majority of studies on agrammatism in Broca's aphasia have been on comprehension. An important impetus to these studies was the claim made by Zurif and Caramazza in the early 1970s that Broca's aphasics lack all knowledge of syntactical rules. It appeared that these patients were unable to comprehend reversible sentences such as 'the cat that the dog chased was black' (Caramazza and Zurif, 1976). The hypothesis that Broca's aphasics were 'asyntactic' led to three different reactions. The first was that this global characterization ignores the possibility that these patients may all be classifiable as Broca's aphasia but that their underlying deficits may be very different (Badecker and Caramazza, 1985). In support of the claim that agrammatism is not a unitary phenomenon, a number of studies have demonstrated that problems in comprehension can dissociate from problems in production (Miceli *et al.*, 1983); that in production, problems with grammatical morphology can dissociate from problems with syntax *per se* (Miceli *et al.*, 1983); and that there is large variation in the type of morphological errors within a group of patients (Miceli *et al.*, 1989). (It should be noted that the latter findings were obtained from a large group of unselected aphasic patients, both fluent and nonfluent. However, grammatical deficits may manifest themselves very differently in fluent and nonfluent aphasia.) The critique by Badecker and Caramazza has widely been taken as a critique on neuropsychological group studies as such and has led to a substantial shift from group to case studies, particularly in the areas of reading, writing, and naming. Many researchers still insist on the usefulness of group studies in the case of agrammatism, maintaining that these patients share a number of important symptoms that need to be accounted for. A second reaction came from aphasiologists with a linguistic background. It held that instead of a loss of all syntax, only specific subsets of linguistic competence could be lost. In particular, when patients have to understand sentences with noncanonical word order, such as the ones employed by Caramazza and Zurif, they perform at chance, whereas they seem relatively unimpaired with canonical sentences (Grodzinsky, 1989). This approach has led to a large number of linguistically motivated studies of agrammatism, which are discussed in **Agrammatism II: Linguistic Approaches**.

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The Mapping Hypothesis

A third type of reaction to the claim that 'grammar was gone' in agrammatism was that it is not so much the knowledge of grammatical rules that is impaired but the processing of this knowledge. The processing approach started with the seminal study by Linebarger *et al.* (1983), who observed that a number of agrammatic patients who performed at chance in comprehending reversible sentences with noncanonical word order were unimpaired in judging the grammaticality of the sentence. This dissociation led the authors to conclude that there could not be a loss of competence in agrammatism, as proposed by Caramazza and Zurif. Two possible accounts were suggested. The first was that the deficit did not relate to syntax as such but to the operations by which the syntactic level of representation (S-structure in transformational theory) was mapped onto the semantic level (D-structure) in order to assign thematic roles. Such mapping would be necessary for comprehension but not for grammaticality judgment; hence the dissociation. A second account had to do with mental resources. It is a well-known empirical phenomenon that carrying out two tasks simultaneously is more difficult than performing either task by itself – the so-called 'dual-task effect.' Comprehension can be regarded as a double task because it involves both syntactic and semantic processing, whereas grammaticality judgment presumably only depends on syntactic processing. A follow-up study provided evidence against the resource hypothesis (Schwarz *et al.*, 1987). In this study, patients were asked to judge the plausibility of sentences. A comparison was made between simple actives, complex active sentences, and sentences with a noncanonical word order (e.g., passives and object gaps). Simple actives elicited relatively few errors, indicating that the problem was not with mapping as such. Sentences with a noncanonical word order elicited substantially and significantly more errors. This was attributed to the lack of syntactic transparency: Argument position in D- and S-structure is not the same, so mapping is complicated. Surprisingly, although complex sentences were somewhat more difficult than simple ones, the difference was not significant. This led to authors to reject the possibility that the dissociation between comprehension and grammaticality judgment was due to the cognitive resources of these patients being too limited to carry out two language tasks at once. The mapping hypothesis would therefore be the most appropriate account of agrammatic comprehension.

Kolk and Weijts (1996), however, argued that the way complexity was defined in the Schwartz *et al.* (1987) study may be less appropriate. To obtain a maximal complexity difference with a simple sentence, one should embed a relative clause between the agent noun phrase (NP) and the verb of this simple sentence, and this rarely occurred in the Schwartz *et al.* (1987) materials. When single-clause sentences were compared to sentences with center-embedded clauses, a significant complexity effect was obtained. It was concluded that (1) the resource hypothesis could not be rejected, and (2) in addition to word order, embedding is an important factor in agrammatic comprehension.

Of course, the mapping hypothesis was not ruled out by these results either. If one could think of the mapping process becoming more error prone, not only in the case of a noncanonical word order but also in the case of embedding, a mapping hypothesis could account for Kolk and Weijts's results. Such an hypothesis would be a resource limitation hypothesis, not a general one, as originally proposed, but a specific one related to the process of mapping syntactic structure onto thematic roles. Further research with the plausibility paradigm indeed led to such an hypothesis. Saffran *et al.* (1998) found that even single-clause sentences could pose serious difficulties to agrammatic patients. In particular, the patients found it very difficult to reject a sentence such as 'the painting disliked the artist,' performing just above chance. This is all the more remarkable since these sentences are nonreversible and active. Active nonreversible sentences generally produce very low error rates in a sentence picture matching task. It was argued that with these sentences, there is a strong bias to accept the interpretation indicated by the individual word meanings (an artist disliking a painting). Unimpaired individuals escape from this bias because syntactic analysis eliminates the interpretation that is inconsistent with the syntactic structure. In aphasics, this correcting influence is reduced "because of a pathological decrease in the spread of activation from the syntactic constituents to the units that represent syntactic roles" (Saffran *et al.*, 1998, p. 290). [Kolk *et al.* (2003) present an event-related potential (ERP) study with normal persons, which represents a follow-up of the Saffran *et al.* (1998) study. The results of this study indicate that in normal persons semantic factors can overrule syntactic ones, even in unambiguous sentences.] Therefore, the authors maintained that the locus of the impairment is in the mapping stage. The nature of the impairment is conceived of differently: It has to do with resources. With this hypothesis, it is possible to account not only for the semantic bias effect observed in this experiment but also for the greater difficulty of sentences with a noncanonical word order in the traditional sentence picture matching tasks. Due to the fact that the first

NP frequently carries the agent role, there is a bias both in normal and in aphasic people to interpret the first NP as an agent. As a consequence of their resource limitation, agrammatic patients have an even stronger bias to take the first NP as the agent of the verb, hence the canonicity effect.

The Resource Limitation Hypothesis

If indeed some sort of resource limitation is the underlying cause of agrammatism, as suggested by the outcome of the Saffran *et al.* (1998) study, it becomes interesting to again consider grammaticality judgment. Hartsuiker and Kolk (1998) used a word monitoring paradigm to study the detection of grammaticality and found that patients were able to detect ungrammaticalities in simple but not complex sentences. The normal participants did not show this complexity effect. In a recent ERP study, however, with subject and object-relative sentences, an effect of complexity on grammaticality detection was observed in normal participants (Kolk *et al.*, 2003).

Further evidence for the presence of a resource limitation in agrammatism comes from studies on the interpretation of pronouns. For the proper interpretation of pronouns, it is essential that proper reference is made to persons, places, objects, or events in the contextual environment. This can only occur by means of integration of syntactic and discourse-related operations. From a resource-limitation standpoint, this means that pronoun interpretation should pose difficulties for agrammatic patients, particularly if the discourse operations are relatively complex (for a review, see Avrutin, 2000). In one study, it was found that sentences such as 'Who did the tiger chase?' were much less impaired than sentences such as 'Which lion did the tiger chase?' This contrast was explained by assuming that in the second sentence, reference is made to items, presupposed in the context, whereas in the first sentence there is no such presupposition. Difficulties with pronouns can also be demonstrated in sentences that, unlike the ones presented previously, do not involve argument movement. For instance, patients are much impaired when they have to establish reference for a pronoun in the presence of two possible antecedents: for example, 'First John hit Bill and than Mary hit him.' Similarly, more errors are made on nonreflexive (e.g., 'Is Mama Bear touching her?') than on reflexive pronouns (e.g., 'Is Mama Bear touching herself?'). The argument here is that with the reflexives, reference is to a unit present in the sentence itself – Mama Bear – and is therefore a purely syntactic operation. In the case of nonreflexive pronouns, on the other hand, reference has to be made to units present in the discourse and therefore requires syntax–discourse integration (Avrutin, 2000).

The Timing Hypothesis

Regarding the nature of the resource limitation, the most frequent approach has been to characterize it in terms of time (for a review, see Kolk, 1995). This means that the underlying deficit would relate either to a fast decay or to a slow retrieval of syntactic information. Either of these deficits would lead to a reduced period of time in which syntactic information is available for processes such as tree building the assignment of thematic roles, referential operations, and so on. This proposal has been implemented in a computational model that simulated the effects of varying degrees of fast decay or slow retrieval on tree building, assuming that a disruption of tree building would also negatively affect role assignment (mapping) and reference operations (syntax–discourse integration). The model was able to simulate the effects of variation in degree of severity and syntactic complexity on agrammatic error profiles, obtained in two earlier studies. Simulation was only successful when the timing disorder was assumed to affect syntactic phrasal categories and not when it affected function word categories alone. When phrasal categories were involved, it did not matter whether decay or retrieval rates were affected. The model bears close resemblance to the model of agrammatic comprehension by Haarmann *et al.* (1997). In this model, a limitation in the size of a pool of activation is responsible for agrammatic comprehension. This limitation leads to either a 'reduced efficiency,' which amounts to slower computation, or a reduced maintenance, comparable to fast decay. [Outside the sentence domain, Dell *et al.* (1997) simulated word production deficits in fluent aphasia using a similar contrast. The simulated deficits could consist of either 'a reduced connection strength,' leading to slower activation spreading, or fast decay. Interestingly, a later version of the model assumed only a single deficit – reduced connection strength – affecting either the phonological or the semantic level (Foygel and Dell, 2000).] The Haarmann *et al.* (1997) model constitutes an elaboration of the capacity model for normal sentence comprehension of Just and Carpenter (1992). [This model has been criticized by Caplan and Waters (1999), who argued for a subdivision of verbal working memory into one for automatic (e.g., structure building and role assignment) and one for controlled language processing (pragmatic and discourse related). Broca's aphasics should suffer from an impairment in the first type of working memory. From the evidence reviewed previously, it seems clear that

Broca's aphasics are impaired on both syntactic and discourse-related operations. Furthermore, Kolk *et al.* (2003) present ERP evidence from normal people against this subdivision.] This model is about differences in the size of the activation pool within the normal population, between persons with a high versus a low working memory capacity. This implies that according to this theory, the agrammatic patients are not qualitatively but only quantitatively different from normal language users: They are at the lower end of a normal distribution of language capacity. Support for this hypothesis was provided by Miyake *et al.* (1994), who showed that when normal persons are presented with a large set of sentences of varying complexity at a very rapid rate, the error profile is highly similar to what has been found with aphasics.

A number of experimental studies have provided evidence for the timing hypothesis, particularly for the notion that syntactic processing is slowed down. This was done by means of various on-line techniques in which stimulus-onset asynchrony was manipulated, such as the syntactic priming paradigm (Kolk, 1995) and the crossmodal priming paradigm. Swinney *et al.* (1996) employed a crossmodal priming paradigm to study reactivation of moved arguments at their canonical site. They found that Broca's aphasics failed to show evidence for such reactivation. This failure is important because it could underlie the difficulties these patients have in comprehending sentences with moved arguments. Research, however, suggests that the failure is only a temporary one. When probed at later points in time, it appeared that patients did not show evidence for reactivation at the canonical site, nor at 300 ms after this site; at 500 ms, however, they did demonstrate reactivation of moved arguments.

Other support for the timing hypothesis comes from studies on ambiguity resolution. Research with normal persons has demonstrated that the interpretation of an ambiguous word is affected by the context in which it occurs. Therefore, in a sentence such as 'He made a phone call to the bank,' only the money-related meaning is activated. In an ERP study with Broca's aphasics, however, evidence was found for activation of both the appropriate and the inappropriate meaning (in the example given, the meaning related to river) at an interstimulus interval of 100 ms. After 1,250 ms, however, only the appropriate meaning was still active.

Two studies employed a word-monitoring paradigm and failed to find evidence for slow activation. This failure may have something to do with the nature of the word-monitoring paradigm. The priming results presented previously suggest that the delay may be as small as 500 ms. Given the fact that in these two studies, one or two other words intervened between the word containing the violation and the word to be monitored, the word-monitoring paradigm may not be sensitive enough to pick up a delay of this size.

Agrammatism in Production

Symptoms of agrammatic production have traditionally been assessed by means of analysis of spontaneous speech (Goodglass and Kaplan, 1983). Three main types of symptoms of spontaneous speech have been established in this way. The first is a reduced variety of grammatical form. The sentences that are produced have little subordination or phrasal elaboration. Because these symptoms relate to sentence form, we call them syntactic symptoms, where the term 'syntactic' is used in a purely descriptive way. Second is the omission of function words – articles, pronouns, auxiliaries, copulas, prepositions, and the like – and inflections. All these symptoms relate to grammatical morphology and are therefore referred to as morphological. The third is a slow rate of speech or nonfluency, referred to as the rate symptom. Whereas the previous symptoms have been established for English-speaking patients, similar symptoms occur in many other languages (Menn and Obler, 1990).

There has been some discussion in the literature on whether syntactic symptoms and morphological symptoms are caused by two independent deficits. This discussion was instigated by the case study of Miceli *et al.* (1983), who described an Italian-speaking patient as having "an almost pure morphological disorder" (p. 75), with syntax being almost entirely spared. Such a dissociation would indicate the existence of two independent deficits, a morphological and a syntactic one. However, the speech of this patient was characterized by a high number of nonfinite clauses, in which either the verb was lacking or the verb was used in the form of an infinitive or a past participle. For such clauses, it is difficult to argue that they are syntactically 'normal.' At least for languages such as English, Dutch, and German, a normal sentence must contain an inflected verb. In a further effort to find support for this double-deficit hypothesis, Rochon *et al.* (2000) conducted a large-scale factor analytic study that failed to support the hypothesis. Instead of a dissociation between syntactic and morphological symptoms, there was a dissociation between syntactic symptoms and symptoms related to inflection omission, on the one hand, and symptoms related to function word omission, on the other hand. It seems that the case for the existence of two

independent grammatical deficits has not been made in a convincing way.

Variability of Symptoms

It is important to realize that these symptoms do not appear in an all-or-none fashion. Some patients show these symptoms slightly more often than a normal speaker, whereas other patients have them in almost all their utterances. A study of 22 Dutch-speaking Broca's aphasics examined the frequency of syntactic, morphological, and rate symptoms. With respect to syntactic symptoms, a mean percentage of embedded clauses of 6% was observed compared to 22% in a normal control group, but the frequency of this syntactic symptom varied from 0 to 21%. The same variability was apparent in the omission rate of grammatical morphology: It varied from 98 to 10%, almost as low as that for the control group, who omitted 8%. Finally, variability was also present in the rate symptom, which ranged from 23 to 90 words per minute, with the control group producing an average of 145 words per minute. Later work with a group of 37 English-speaking patients demonstrated similar variability (Rochon *et al.*, 2000). As Rochon *et al.* (2000) indicated, there appears to be continuity on syntactic, morphological, and rate symptoms, both within the patient group and between the patient group and the normal controls. The implications of these observations are twofold. First, there is between-patient variation in the degree to which symptoms are present in individual patients. Second, because very few patients exhibit a particular symptom 100% of the time, there is within-patient variation: A symptom may be present on one occasion and fail to appear on other occasions. This probabilistic character of aphasic symptoms is not limited to sentence production. As noted by Goodglass (1993), inconsistency is the hallmark of aphasic behavior: A word that is appropriately produced or understood at one time will go wrong the next time and vice versa. At the same time, inconsistency is not a necessary outcome of brain dysfunction. It is not present in Alzheimer's disease, for instance, in which if a particular word is no longer understood, it will remain so on subsequent trials. This means that the variability of aphasic symptoms needs to be accounted for, as much as the symptoms.

The Timing Hypothesis

The most natural way to account for both within-patient and between-patient variability is to assume a resource limitation rather than a loss of some specific operation or set of operations. [Note that Friedmann and Grodzinsky (1997) made an attempt to account for between-patient variability (severity) by assuming loss of nodes at various heights in the syntactic tree. A loss at the level of tense or agreement node would lead to difficulties with inflection, whereas a loss at the level of the complementizer node would leave the ability to inflect intact but would make it possible for the patients to produce embedded clauses. This hypothesis predicts that when the agreement node is damaged, patients would only produce infinitives, in the case that their language has such infinitives. Data from Hofstede and Kolk (1994), however, indicate that the number of infinitives in the spontaneous speech of Dutch-speaking Broca's aphasics varies continuously: There is no bimodal distribution of patients who produce infinitives with a normal frequency and patients who produce infinitives in every utterance.]

As noted previously, to account for agrammatic comprehension, the resource limitation hypothesis has typically been worked our in terms of time, and this is also the case for agrammatic production. According to this hypothesis, fast decay or slow retrieval of grammatical information would disrupt the buildup of a syntactic tree. Such a disruption would harm not only comprehension but also production of sentences.

How does the temporal window hypothesis deal with variability? Between-subject variability was successfully implemented in the computer model referred to previously (Kolk, 1995) by making average decay or retrieval rates differ between simulated patients. Within-patient variability was simulated by making these rated vary stochastically around a mean.

To test applicability of the timing hypothesis to agrammatic production, Hartsuiker and Kolk (1998) employed a syntactic priming paradigm. In this paradigm, the participants repeated a sentence (e.g., 'The church was struck by the lightning'). After this, they were presented with a picture that they had to describe in one sentence (e.g., a picture of a cat chasing a dog). Normal participants tended to do this by employing the sentence form just presented to them. They did so despite the fact that they were unaware of the purpose of the experiment since they were told they were engaged in a study meant to test their memory for pictures. In a study of 12 Dutch-speaking agrammatics, the investigators found normal, and in one condition even better than normal, priming. Of particular interest are the results obtained with the production of passives. In the spontaneous speech of these patients, passives were extremely rare. In a picture description pretest, there was only a single occurrence of a passive construction in the whole group. After priming, however, passives appeared to be deblocked: 7 of 12 patients produced one or more passive constructions. These results fit the timing

hypothesis quite well. If the computation of the constituent structure is delayed, priming speeds up this computation because the structural units have already reached a certain level of activation due to the previous repetition of this structure and it will generally take less time to bring these units to threshold.

According to the timing hypothesis, all operations that are necessary for planning a grammatical sentence have to be carried out within a limited amount of time. This means that not only syntactic but also conceptual or message-level operations could reduce the chance of computational simultaneity. Hartsuiker *et al.* (1999) carried out two experiments with Dutch agrammatic speakers in which they studied agreement inflection production. They drew upon a paradigm in which participants were presented with sentence fragments that had to be repeated and completed (e.g., 'The king of the colonies-was powerful'). One manipulation concerned the conceptual number of the head noun. This could be singular, as its grammatical number (e.g., 'the baby on the blankets'), or it could be plural (e.g., 'the label on the bottles'), unlike its grammatical number. In the latter example, although the head noun is grammatically singular, it is in fact referring to a multitude of labels, one on each bottle. Experiments with normal participants have demonstrated effects of conceptual plurality. In particular, they observed that in sentences with a head noun, which is grammatically singular but conceptually plural (e.g., 'the label on the bottles'), more agreement errors were made than in sentences without such a mismatch (e.g., 'the baby on the blankets'). This indicates that normal speakers take conceptual information into account when constructing subject–verb agreement. In two experiments with agrammatic speakers and normal controls, Hartsuiker *et al.* (1999) replicated this conceptual number effect in Dutch for the normal but not for the agrammatic speakers. In fact, in the second experiment, which was better controlled, the agrammatics made fewer agreement errors in the mismatch condition than the normal controls. A subsequent comprehension test showed normal sensitivity in the agrammatics to the conceptual number variable. It was concluded that agrammatic speakers do not take into account conceptual information while constructing subject–verb agreement. They are unable to reach computational simultaneity of conceptual and syntactic information. This result parallels the difficulties agrammatic patients have with the interpretation of pronouns, which were discussed previously. Both appear to stem from the necessity to integrate two levels of representation: the syntactic and the discourse level in the case of comprehension and the syntactic and the message level in the case of production.

The Ellipsis Hypothesis

Ellipsis refers to well-formed incompleteness. So when a normal speaker utters 'everybody out,' he or she does not make a speech error. Linguistically, ellipsis can be defined by the absence of tense or finiteness. This means that in these utterances either a verb is lacking or an uninflected verb is used. Indefrey *et al.* (2001) studied the production of these constructions by German-speaking participants in a positron emission tomography study. Compared to complete sentences, the ones lacking finiteness elicited less brain activation. The area in which the blood flow response varied was the operculum in the left hemisphere, but in a replication the variation was observed in Broca's area. The ellipsis hypothesis holds that agrammatics overuse these little demanding elliptical constructions, presumably because they lack the capacity to generate sufficient brain activation to produce their complete counterparts. Various kinds of evidence support this hypothesis (Kolk, 1995). First, features of normal ellipsis – related to word order, subject omission, inflection omission, and so on – are also characteristic of the nonfinite constructions of agrammatic speakers. Second, categories of nonfinite constructions obtained from normal speakers, aphasics, and 2- and 3-year-old children have very similar distributions (Kolk, 2001). Third, substantial task effects are observed when spontaneous speech is compared to various kinds of picture description tasks, with the general trend being fewer omissions and more substitutions of grammatical morphology.

Task effects can be very large. For instance, a Dutch-speaking patient was observed who omitted finiteness in approximately 80% of his utterances in his spontaneous speech, and this omission rate decreased to almost zero not only in a picture description task but also in a condition in which the patient was requested to 'speak in complete sentences.' However, this shift to more complete sentences had a cost: It led to an increase in rate symptoms, as the patient paused longer between words and repeated more words. It may seem, therefore, that the rate symptoms are related to both the syntactic and the morphological symptoms. They would reflect a process of corrective adaptation to the timing deficit: A representation that is too complex disintegrates prematurely and the patient attempts to covertly repair the representation (for a further test of this hypothesis, see Oomen *et al.*, 2001).

Conclusion

Studies on agrammatic comprehension indicate the existence of a processing bottleneck at the syntactic level. Effects of this bottleneck manifest themselves

in tasks that primarily depend on the syntactic level but also in tasks that require the integration of this level with discourse and message levels of representation. The processing bottleneck appears to relate to temporal aspects of language processing.

See also: Agrammatism II: Linguistic Approaches.

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Agrammatism II: Linguistic Approaches

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Introduction

The term agrammatism is used in a rather general way in the following discussion to refer to syntactic deficits of a sort that have been observed in Broca's aphasia. The term is used only to pick out certain phenomena as a focus of inquiry, without implying any exclusionary criteria or limitations on what counts as agrammatism or what does not. Agrammatic data form one piece of the neurolinguistic enterprise and are most useful only in conjunction with other data (from neuroimaging, from behavioral studies, and so forth).

The phenomena that constitute the focus of inquiry here are specific attempts to characterize the patterns of sparing and loss in Broca's aphasia in terms of linguistic theory. Although it may seem self-evident that any understanding of language sparing and language loss can only be as good as our theory of language, the fact is that the majority of researchers who have investigated agrammatism have ignored linguistic theory or have simply been unaware of its existence. Partly this is because many of those interested in agrammatism have primarily medical or clinical interests, partly because agrammatism predates linguistic theory by about a century, and partly because of sundry pragmatic considerations that need not detain us. Despite neglect in some quarters, linguistic theory nevertheless has been brought to bear on agrammatic phenomena, and a number of models have been proposed.

Before looking at some of these models, first it is necessary to consider what the nature of the enterprise is. Let us say that we have two bodies of knowledge that we may refer to, in broad terms, as brain theory and linguistic theory. In what ways can the study of agrammatism help to unify these two bodies of knowledge? Agrammatism involves abnormal brains and abnormal language, so we may rephrase the question as two related questions: (1) Do we expect to learn more about normal brains by looking at agrammatism?; and (2) Do we expect to learn more about the normal language faculty by looking at agrammatism? Answering either question in the affirmative would inevitably involve linking the two bodies of knowledge.

A sample of linguistic models of agrammatism is described in the next section, and thereafter this article returns to discussing these basic questions.

Linguistic Models of Agrammatism

Comprehension and production have been treated separately in research on agrammatism. This is because a number of Broca's aphasics who are impaired in their production but reportedly unimpaired in their comprehension have been identified. Therefore, this distinction is maintained here.

Comprehension

Quite a number of models of agrammatic comprehension have been proposed (Caplan and Futter, 1986; Druks and Marshall, 1995; Friederici and Gorrell, 1998; Grodzinsky, 1995; Hickok and Avrutin, 1995; Hickok *et al.*, 1993; Linebarger *et al.*, 1983; Mauner *et al.*, 1993; Piñango, 2000; among others). More or less overtly, most of these models seek to partition the sentences that Broca's aphasics are good at from those sentences that they have difficulty with along a divide suggested by linguistic theory. The idea is that this will be informative about which aspects of language the impaired brain can no longer process, information that can potentially feed into both brain theory and linguistic theory. Just two of these models are discussed: the Trace-Deletion Hypothesis (Grodzinsky, 1995) and the Double-Dependency Hypothesis (Mauner *et al.*, 1993).

This is not a random selection. The selection is intended to contrast a model that is constrained by linguistic theory and one that introduces nontheoretical components. This will serve to clarify what is important in the effort to find links between two bodies of knowledge, keeping our eyes on the prize.

Caramazza and Zurif (1976) showed that Broca's aphasics suffer from certain selective impairments in comprehension. At the time, this was a surprising finding because it had been believed for over a century that their comprehension was unimpaired. The fact that the disorder was selective is what made it potentially interesting from the perspective of linguistic theory. Caramazza and Zurif reported that on reversible sentence–picture matching tasks, Broca's aphasics did not know who was doing what to whom (who was the Agent and who was the Theme) in passive constructions and object-relative constructions – their performance was random. By contrast, they knew who was doing what to whom in active sentences and subject-relatives, where their performance was above chance. This pattern has since been observed very frequently in Broca's aphasics, such that it is now considered 'core' (though there is controversy regarding just how uniform this is).

One of the first attempts to characterize this core agrammatic pattern was the Trace-Deletion Hypothesis.

The Trace-Deletion Hypothesis (TDH)

The TDH is in two parts. The first specifies that in an agrammatic representation that is otherwise normal, traces in Θ-positions are deleted. This has the consequence that moved referential NPs lack information about thematic roles (like Agent or Theme) since that information is carried by the trace. The second part of the TDH indicates how NPs that lack a thematic role are assigned a role. The claim is that they are assigned a role by way of a default strategy: assign a referential NP a role by its linear position (e.g., first NP = Agent) if it does not already have a Θ-role (Grodzinsky, 1995). To see how this works, consider the following passive sentence:

1. $[\text{The boy}]_i$ was chased t_i by the girl
   Theme Agent

In an unimpaired representation, the NP (*the boy*) moves from the object position to the front of the sentence. This movement leaves a trace (*t*) behind, in the object position. The role of Theme is assigned to the position occupied by the trace and conveyed to the moved NP via a chain shown by the coindexations (*i*) in (1). Now, let us turn to what happens in an agrammatic representation:

2. [The boy] was chased * by the girl
   Default agent Syntactic agent

Lacking trace (*), the chain is disrupted and the moved NP (*the boy*) is assigned the Agent role by the default strategy. The NP in the *by* phrase, which is not thought to have undergone movement, is assigned the Agent role in the normal way, syntactically. The upshot is that the representation contains two NPs, each competing for the role of Agent. On a standard sentence–picture matching task, the patient must guess which NP is Agent, and random performance follows, consistent with fact.

The TDH has been subject to severe criticism. A major flaw is that the deletion of trace does not, in fact, divide spared and impaired structures. Traces occur in virtually every sentence, but agrammatics do not have problems with virtually every sentence. To effect the division, in every instance, requires the effective agency of the totally atheoretical default strategy. There is no theory of strategies, and strategies do not form part of linguistic theory. The deletion of trace, on its own, has no consequences, yet trace is the only part of the TDH that is motivated by linguistic theory. Relevant consequences (i.e., partitioning the data into sentences agrammatics can understand and those they cannot) arise only by virtue of the atheoretical default strategy. Thus, if the aim of the study of agrammatism is to contribute to the linking of two bodies of knowledge, brain theory and linguistic theory, the problem is that, under the TDH, linguistic theory does not in fact do much work.

The Double-Dependency Hypothesis (DDH)

Partly motivated by the shortcomings of the TDH, the DDH (Mauner *et al.*, 1993) sought to do away with any reliance on atheoretical strategies to partition agrammatic data and to account for those data entirely in terms of linguistic theory. At the heart of the proposal is the observation that there is a class of dependency relations, namely, those obtaining in syntactic chains that are assigned only one Θ-role, and that in relations of this kind, in agrammatism, the dependency between a referential NP and the foot of the chain is disrupted. This amounts to a loss of a constraint on coindexation. In sentences where there are **two** such dependencies, confusion arises over which NP is coindexed with what. Because the coindexation is semantically ambiguous, thematic role assignment is also ambiguous. This has the consequence that agrammatics must guess who is doing what to whom. By contrast, where there is only **one** such dependency, there is no possible ambiguity, so agrammatic interpretation should be normal. For an example with two dependencies, consider the following passive sentence:

3. $[\text{The dog}]_i$ was $\text{bitt}[\text{en}]_k$ t_i by $[\text{the cat}]_k$

In this sentence, the two dependencies correctly coindexed in a normal representation are $<[\text{the dog}]_i, t_i>$ and $<\text{en}_k, [\text{the cat}]_k>$. The referential NP, *the dog*, and the foot of its chain, the trace *t*, form one dependency. The second dependency is between the referential NP, *the cat*, and the foot of its chain, the passive morphology *–en*. In an agrammatic representation, however, the ambiguous interpretation would permit not only the correct coindexations, as above, but would also allow the anomalous coindexations: $<[\text{the dog}]_i, \text{en}_k>$ and $<t_i, [\text{the cat}]_k>$.

The DDH succeeds in accounting for the core data (actives, passives, subject-relatives, and object-relatives) and a wide range of other data without resorting to strategies. Interestingly, this model survives stern crosslinguistic tests, with a variety of reversals of canonical word order, where all other

models that incorporate linear-based strategies fail (Beretta, 2001).

Production

Traditional accounts of production deficits in agrammatism focus on the reduction in the range of syntactic forms that are available for deployment, the slow, effortful speech that is typically observed, and the loss or substitution of morphology (particularly function words and bound inflectional morphemes). Only the morphological deficit has received sustained attention in linguistic models, so here I describe two recent attempts to capture those phenomena: Hagiwara's (1995) model and Friedmann's (2001) tree-pruning hypothesis, both very similar models. The initial insight is due to Ouhalla (1993), who proposed that agrammatics lack all functional categories. Functional categories form the higher branches of the syntactic tree and Ouhalla's view was that nothing above VP survived in agrammatism. This turned out to be too all-or-nothing a characterization to accommodate the frequently observed sparing in many agrammatics of some functional categories. The models of Hagiwara and Friedmann are more flexible.

Hagiwara's Model Like Ouhalla, Hagiwara's (1995) model locates agrammatic impairment in functional categories, but rather than lopping off all of the syntactic tree above VP, the model identifies a level for each agrammatic subject. Wherever in the tree that level is found to be for an individual, all elements dependent on nodes above it are lost and those dependent on nodes below it are spared. For example, Hagiwara reported Japanese subjects who had lost NegP but who retained the higher CP node. The model is framed in terms of increased processing costs for each application of a structure-building operation known in current linguistic theory as Merge (Chomsky, 1995).

Friedmann's Model The tree-pruning hypothesis, like Hagiwara's, finds the level in the tree indicated by each individual agrammatic subject's performance on a range of tests. Friedmann (2001) reported a group of Hebrew-Arabic-speaking agrammatic subjects who made many errors of Tense but relatively few of subject–verb agreement. She argues that other studies in a range of languages offer a degree of support for this finding. She explains these findings by reference to a syntactic tree in which agreement (AgrP) is below Tense (TP). Agrammatics, it is suggested, cannot project to the higher Tense node.

What Does the Study of Agrammatism Tell Us about Brains or about Language?

What Does Evidence Organized by Linguistic Models of Agrammatism Reveal about Brains?

Brain theory deals with how brains get to accomplish the work they must do, from autonomic and somatic function to cognitive function. This work is accomplished by, among other things, patterns of firing of assemblies of feature-tuned neurons in particular regions. These patterns, it is thought, may constitute a neural code. The effort is to discover what the spatio-temporal neural codes are for any given function and how they instantiate behaviors. How can the study of agrammatism help with this? To the extent that we have a coherent theory of the normal language faculty, and to the extent that we have characterized abnormal agrammatic language correctly, then, whatever spatial and temporal neural information we find that produces observed behaviors should be relevant.

As a simple example, if someone acquires brain damage to a specific area, and if there are certain selective language deficits that we can observe in this person and which we can characterize properly, then this suggests that the lesioned area is implicated in the processing of those specific aspects of language that are compromised.

In this light, let us consider a contribution that comprehension models of the sort described above might reasonably make. Experiments testing these models involve Broca's aphasics who have lesions minimally encompassing Broca's area and its vicinity. Aspects of linguistic theory have been shown in some of these experiments to yield the requisite partitioning of data. The relevant aspects are a class of referential dependency relations (which involve more than trace–antecedent relations). Processing these dependency relations is problematic in agrammatism and is responsible for the observed pattern of sparing and loss. Therefore, it might be posited that Broca's area is implicated in the processing of these dependency relations. To the extent that this claim is justifiable, it constitutes an initial attempt to link something of what we know about brains (function is localized) and something of what we know about language (it involves the processing of a broad class of dependency relations).

The neuroimaging record lends some support to this view (e.g., Caplan *et al.*, 1999; Stromswold *et al.*, 1996; Just *et al.*, 1996), though the picture is, unsurprisingly, far more complex (Caplan *et al.*, 2001). The processing of dependencies apparently also implicates other areas of cortex. In addition, many other linguistic (and nonlinguistic) processes implicate the left inferior frontal cortex. Thus, whereas

functional neuroimaging experiments suggest that a broad range of linguistic processing involves many brain regions, functional magnetic resonance imaging (fMRI) and positron-emission tomography (PET) studies coupled with the data from agrammatism confirm the importance of Broca's area and environs in the processing of relevant dependency relations.

The combination of data from well-motivated fMRI and PET experiments and data from principled studies of impaired subjects may be seen as preliminary, but it holds out promise for the future.

Apart from localization, agrammatic data, coupled with magnetoencephalography (MEG) and electroencephalography (EEG) experiments, ought to be revealing about some aspects of the temporal coding of language.

In principle, finding out more about brains by investigating agrammatism is at least possible. If we wish to know how a brain computes language, we must examine it computing language – and selectively failing to compute language in the normal ways.

What Does Evidence Organized by Linguistic Models of Agrammatism Reveal about Language?

It is quite common to read in the literature on agrammatism that agrammatic data provide a constraint on linguistic theory. Linguistic theory, it is asserted, must be compatible with the evidence from agrammatism. This is an interesting point of view, but one that needs to be thought through carefully. For instance, what happens if there is clear evidence from an agrammatic subject that conflicts with clear grammaticality judgment evidence? Is one form of evidence to be privileged over the other? Often, it is assumed that agrammatic data should be privileged because it is in some undefined sense more 'real' than grammaticality judgment data. But this view lacks merit. Any reasonable scientist will take evidence wherever it is to be found, and judgment data are the most obvious data presenting themselves to linguists. Grammaticality judgments are controlled experiments every bit as much as experiments with agrammatics. Any given experiment, whether it uses judgments of grammaticality, reaction times, or neuroimaging technologies, may yield findings that are either relatively clear or not, or may be based on predictions that follow from theory or not, or may suffer from methodological problems or not. Thus, experiments yielding different kinds of data may be well designed and executed or not, but there is nothing more real about one kind of data than another.

If agrammatic data ordered by linguistic theory are to be used to constrain linguistic theory, it is axiomatic that the agrammatic data actually **be** ordered by linguistic theory (and not by an atheoretical strategy, for example). Some models of agrammatism honor this simple logical requirement, but not all of them do. To the extent that this requirement is observed, agrammatic data can, in principle, be useful in testing linguistic theory, but it is worth stressing that the value of any experiment, involving agrammatic subjects or not, must be evaluated in the normal ways and weighed against other data.

An illustrative example is in order. The tree-pruning hypothesis makes a specific claim that agrammatic data act as a constraint on linguistic theory. It is argued that Pollock's (1989) ordering of functional nodes, with TP above AgrP, should be preferred to other accounts since because the agrammatic data favor this ordering. No mention is made of the arguments and evidence that have led linguists since Pollock to posit AgrP above TP, but even with the agrammatic evidence alone there are reasons to be cautious. First, it is not the case that subjects always make tense errors and never agreement errors. Rather, there is a statistically significant dissociation. In a verb completion test, Hebrew subjects made 41% errors on tense and 4% errors on agreement (Friedmann, 2001). However, as has been pointed out, this means that despite the supposed pruning of tense, "it is available more often than not" (Edwards and Lightfoot, 2000: 32). In a sentence completion task, Benedet *et al.* (1998) found very different percentages: 85% errors on tense and 58% errors on agreement among English-speaking agrammatics. In this case, even though agreement is supposedly intact, it is available **less** often than not. And Penke (2000) describes data from German, Italian, French, and Dutch that she interprets as being inconsistent with the tree-pruning hypothesis. In Korean, too, there are anomalous data. On the face of it, the agrammatic data do not seem consistent or clear enough to warrant an adoption of Pollock's hierarchy. In any case, however clear the agrammatic data may or may not be, they must be weighed against the linguistic evidence before it is possible to appraise their potential contribution.

However, it should not escape our attention that, in this case, the data are actually organized in syntactic terms and that this at least means that it is **possible** to assess the value of the data to linguistic theory.

Conclusion

In principle, the idea that the study of agrammatism might contribute to theories of brain and of language is an appealing one. In practice, perhaps unsurprisingly given current preliminary levels of understanding, it turns out to be very hard to make very precise contributions.

The study of agrammatism to map out cerebral localization of specific language function is best seen as complementary to imaging research. Lesions in agrammatic subjects tend to be too large to permit precise characterizations of the relation between location and aspects of language, but if careful attention is paid to the extent of the lesions and if this is informative about differences in performance patterns, as has been shown in studies by, for example, Baum *et al.* (1990) and Blumstein *et al.* (1994), then progress is possible. In combination with imaging studies, if these are more consistently motivated by linguistic theory than has typically been the case, an increased understanding of the spatial organization of language may emerge.

The study of agrammatism to find out more about temporal aspects of cortical language processing is also an area of inquiry that holds out considerable promise. On-line methods with agrammatics coupled with EEG/MEG studies of normal subjects are likely to be particularly useful.

Finally, although the two bodies of knowledge that are of interest in neurolinguistics (including agrammatism) are brain theory and linguistic theory, it is evident that the relationship between linguistic theory and language processing will need to be clarified if more rapid progress is to be made. After all, any task that agrammatic subjects or normal subjects in neuroimaging or electrophysiological studies can complete must be a performance task involving some sort of processing, and linguistic theory has traditionally been agnostic with regard to such processing. If it can be shown that the grammar and the parser are one and the same thing, as some have proposed, then it will make the whole neurolinguistic enterprise immeasurably more tractable. For an intriguing effort in this direction, see Phillips (2004), whose proposal is not just programmatic but is supported by a growing set of empirical data. Processing issues in agrammatism, clearly critical to the neurolinguistic enterprise, are addressed in **Agrammatism I: Process Approaches.**

See also: Agrammatism I: Process Approaches; Aphasia Syndromes; Evoked Potentials; fMRI Studies of Language; Generative Grammar; Linguistic Universals, Chomskyan; Magnetoencephalography; Psycholinguistics: Overview.

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Agrell, Sigurd (1881–1937)

B Sigurd, Lund, Sweden

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Per Sigurd Agrell, slavist, runologue, and poet, was born on January 16, 1881 and died on April 19, 1937. He became licentiat in Slavic languages in 1907 and received his Ph.D. in 1908. He was appointed lecturer at Lund University in 1909 (after some academic fighting), and was given the new chair in Slavic languages at Lund in 1921. He was known for his unconventional lifestyle, humor, and ready wit, which was admired by many students and friends. As a linguist, he was very creative and took on fundamental linguistic problems in new ways, which made him famous but also drew criticism.

Agrell's Ph.D. thesis (1908) dealt with Polish verbs, to which he applied the concepts of *Aspekt* and *Aktionsart*. Another difficult problem that Agrell treated is the varying stress in Russian verbs (1917).

Agrell moved in the literary circles of Sweden and wrote several poems, mostly sonnets. He published six collections of poems and translated works from French (Beaudelaire) and Russian (Tolstoy and Bunin).

In his later years, Agrell focused his mind on the runic alphabet, its use and origin, as in *Zur Frage nach dem Ursprung der Runennamen* (1928). He suggested that the runes were first used for magic purposes and assumed that the runes were associated with numbers, as were the letters of other alphabets at the time dominated by the Mithra mystery religion; see *Runornas talmystik och dess antika förebild* (1927) and *Senantik mysteriereligion och nordisk runmagi* (1931). His publications in this field inspired much discussion. Agrell suggested that the names of the runes had to do with their place numbers and assumed that the original name of the runic alphabet was *uthark* (not *futhark*). The runic alphabet would then begin with the Germanic name for ox (*urr*) like the Phoenician and Greek alphabets begin with *alpha*. The names of the second and third runes were interpreted accordingly. Agrell even associated the runes with the magical activities of the Lapps as published in a work on Lapp drums and Lapp magic (1934). He devoted much work to prove these theories and speculations, and they will always be associated with his name.

See also: Aspect and Aktionsart; Runes; Slavic Languages.

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Alexandra (Sasha) Aikhenvald was born in Moscow, Russia on September 1, 1957. She was educated at the Department of Structural and Applied Linguistics, Philological Faculty, Moscow State University, where she received her B.A. in Linguistics in 1978. She began her graduate studies in Balto-Finnic languages before switching over to Hittite and the Anatolian family of languages for her master's degree, which she received in 1979 for her work on relative clauses in Anatolian languages. She earned her doctorate in 1984 from the Institute of Oriental Studies of the Academy of Sciences of the USSR in Moscow for dissertation research on the structural and typological classification of Berber languages. She then went on to work in the Middle East section of the Department of Languages in the Institute of Oriental Studies before moving to Brazil in 1989. While in Russia, she was a member of a team working on comparative grammars of Afroasiatic languages under the stimulating leadership of Igor M. Diakonoff. In Brazil, she took up the post of visiting Professor at the Universidade Federal de Santa Catarina, eventually reaching the rank of Full Professor with tenure in 1992. She remained in Brazil until 1994, during which time she also took up visiting positions at the State University of Campinas, Brazil, in 1992, and the Australian National University in 1993. In 1994, Aikhenvald moved to Australia, where she was appointed ARC Senior Research Fellow and Associate Director of the Research Centre for Linguistic Typology at the Australian National University. She is currently Professor of Linguistics and Associate Director of the Research Centre for Linguistic Typology at La Trobe University. In addition, she has served as Institute Professor at the Australian Linguistic Institutes in 1996 and 2002, and at the Linguistic Institute of the Linguistic Society of America in 2001.

Aikhenvald is most widely known for her work on aspects of (endangered) languages of the Arawak family from northern Amazonia, and has published grammars of Baré, Warekena (Guarequena), and Tariana (from northwest Amazonia). Her efforts to document languages that are on the verge of becoming extinct is motivated not only by a strong desire to preserve the cultural identity of a people but also by a belief in the role of linguistic diversity in providing crucial insights into the workings of the human mind. Her research focuses on making inductive generalizations about the categories in human language on the basis of exhaustive, crosslinguistic data and examining the role of linguistic categories in human cognition. Using extensive data from a range of typologically diverse languages, she has published substantial monographs on noun classification devices and on evidentiality, the linguistic marking of information source. In collaboration with R. M. W. Dixon, she has also edited a number of volumes that take a linguistic typological perspective on topics such as transitivity, adjectives, and the notion of 'word.'

Aikhenvald's wide-ranging research interests additionally span the fields of sociolinguistics, historical linguistics, and language maintenance and decay. She has investigated issues of areal diffusion and genetic inheritance to account for the grouping of North Arawak languages in the Amazon basin. Aikhenvald's scholarly contributions also include a monograph based on detailed fieldwork-based investigation of language contact in Amazonia, in which she explores the mechanisms of language contact and change in two languages from genetically and typologically unrelated families (North Arawak and Tucano). Using oral histories and primary observations of language use among the Tariana people of Santa Rosa and Periquitos, Aikhenvald considers the impact of language contact between East Tucanoan languages and Tariana at a number of levels including phonology, morphology, syntax, and discourse, as well as the diglossic relation between Portuguese and Tariana.

Aikhenvald's extensive fieldwork experience includes work in Tashelhit, Kabyle, and Tamachek (Berber languages), Baniwa, Warekena, Baré, Tariana (Arawak family), Paumarí (Arawá family), and Ngala and Manambu (Ndu family, New Guinea, Papuan). In addition to work in Berber and the Amazonian languages, Aikhenvald has also published a grammar of Modern Hebrew and has a grammar of Biblical Hebrew (Hebrew, Ancient) in press (in Russian). She has worked on a number of translations, including Katona József's *Bank Ban* from Hungarian into Russian (with a poet, Yuri A. Aikhenvald), Hungarian poetry into Russian, and Lucacs's philosophical works from German into Russian. She is a polyglot, with fluency in a range of languages including English, Russian, Portuguese, French, German, Manambu, Tariana, and Estonian and also has a reading knowledge of Hebrew, Latin, Italian, Spanish, Eastern Yiddish, Hungarian, Finnish, Lithuanian, and Tucano. For her contributions to the field of linguistics, Aikhenvald has been honored with a number of awards, including the first prize in national competitions for publications on Oriental languages

in 1988 and 1990, and the Centenary medal for service to Australian society and the humanities in linguistics and philology in 2003.

See also: Dixon, Robert M. W. (b. 1939); Language Families and Linguistic Diversity.

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Ainu

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Ainu is a near-extinct language that was once spoken widely in the northern part of the main Japanese island of Honshu as well as the Hokkaido island, in Sakhalin, and in the Kurile Islands. The current Ainu population, concentrated mainly in Hokkaido, is estimated to be around 24 000, but as a result of intermarriage between Ainu and Japanese, pure-blood Ainu are said to number less than 1% of that figure. Ainu is no longer used as a means of daily communication, and is remembered to a varying extent only by a handful of people of advanced age.

Ainu has not developed a writing system, but it is endowed with a rich tradition of oral literature. In addition to various kinds of songs, e.g., love songs and boating songs, Ainu oral literature contains both verse and prose. The verse forms, generally called *yukar* in Ainu, are recited epics that relate to the experiences of gods or to the experiences of love and war of heroes. The language of *yukar* differs significantly from the spoken language; it is more conservative and has less dialectal variation as compared with the colloquial language. The two types of language show differences in both syntax and vocabulary, although there is a great deal of overlap. The most salient difference between the two is that the language of *yukar* tends to be more strongly polysynthetic than its colloquial counterpart. The language of *yukar* will be referred to as Classical Ainu, but the difference between this type of language and the colloquial form is more a difference in genre than in chronology.

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In terms of genetic affiliation, Ainu is best considered as a language isolate. Although there have been suggestions that Ainu is related to such language families as Paleo–Asiatic, Ural–Altaic, Indo–European, and Malayo–Polynesia or to individual languages such as Gilyak and Eskimo, none of these suggestions has progressed beyond the level of speculation. Hypotheses relating Ainu to Japanese have also been entertained by many scholars, but other than the similarities due to lexical borrowing and typological characteristics rooted in the shared basic word order (Subject–Object–Verb), no strong evidence has been uncovered to relate the two languages. Indeed, Ainu has a number of morphological characteristics that distinguish it from Japanese, e.g., extensive use of personal affixes and a polysynthetic character as well as absence of verbal inflections.

Ainu has a rather simple phonological system, with five vowel phonemes (/i, e, a, o, u/) and 12 consonantal phonemes (/p, w, m, t, s, c, y, n, r, k, ʔ, h/). Syllable-initial vowels are preceded by a glottal stop, e.g., *aynu* [ʔajnu] 'person,' and this fact makes Ainu syllables conform to one of the following types: CV, CVC (for Hokkaido Ainu) or CV, CVV (long vowel), CVC (for Sakhalin Ainu).

According to the pitch accent system of the language, Ainu syllables are pronounced with either high or low pitch. In words consisting of stems and affixes, the stems have high pitch, e.g., *nú-pa* 'to hear-pl.OBJ.' In other two- and three-syllable words, high pitch falls on the first syllable if it is a heavy syllable, i.e., a diphthong or a closed syllable, e.g., *áynu* 'person.' In all other words, high pitch occurs in the second syllable, e.g., *kirá* 'to flee.'

Among the small number of phonological processes, the most notable are assimilatory and dissimilatory processes of the following type: *akor nispa* → *akon nispa* 'our chief,' *pon-pe* → *pompe* 'small thing,' (assimilation); *kukor rusuy* → *kukon rusuy* 'want to have' (dissimilation).

Both nominal and verbal morphologies are characterized by extensive use of affixes. In nominal morphology perhaps the most notable are deverbal nominal suffixes that derive nominal expressions from verbs. The suffix *-p(e)* derives a noun that denotes a person or things characterized by the meaning of the original verb, e.g., *pirka* 'good' → *pirka-p* 'good thing,' *wen* 'bad' → *wen-pe* 'poor man.'

Two other noun-forming derivational affixes are the suffixes *-i* and *-ike*. The former yields nouns having the meaning 'X-place' or 'X-time,' and the latter produces nouns with the meaning 'thing' or 'person,' e.g., *esan* 'go out there' → *esan-i* 'place that is protruded, i.e., peninsula,' *poro* 'big' → *poro-ike* 'bigness, big thing/person.'

One notable feature of these suffixes with theoretical significance is that they, especially *-p(e)* and *-i*, also attach to phrases and clauses, functioning as both lexical and phrasal nominalizing suffixes, e.g., *a-koyki rok-pe* (1sg-strike PERF-SUF) 'the one I have fought,' *a-yanene-p ya-kotan-oro esina-p* (1sg-dislike-SUF REFL-village-from hide-SUF) 'what I dislike is hiding one's village (from which one came).'

Possession is expressed by the use of personal affixes that, when attached to verbs, index the subject of transitive clauses, e.g., *a-maci* (1sg-wife), *e-maci* (2sg-wife) 'young wife,' *maci* 'his wife.'

In both Classical and colloquial Ainu, intransitive and transitive verbs each have distinct sets of personal affixes indicating person and number of the subject and object, e.g., Classical Ainu intransitive affixes: *itak-an* (speak–1sg) 'I speak,' *e-itak* (2sg-speak) 'you (sg) speak,' *itak* 'he/she speaks'; Classical Ainu transitive affixes: *a-kor* (1sg-have) 'I have,' *e-kor* (2sg-have) 'you (sg) have,' *kor* 'he/she has.' These subject-indexing affixes combine with object-indexing affixes, yielding forms such as *a-e-kore* (1sg–2sg-give) 'I give you,' *e-i-kore* (2sg–1sg-give) 'you give me.'

Ainu verbs – Ainu makes no distinction between verbs and adjectives – also index the plurality of the subject and object. The plural verb forms typically co-occur with a plural subject when the verb is intransitive and with a plural object when it is transitive. However, Ainu also shows cases of plural verbs co-occurring with plural transitive subjects. Plural verbs are of either suppletive type (*arpa* 'go,' *paye* 'go.pl') or productive-suffixed type (*kor* 'have (sg)': *kor-pa* 'have (pl)'); e.g., *An-an* (be-1sg) 'I was (there)': *Oka-an* (be.pl-1pl) 'We were (there)'; *Icen poronno kor-pa* (money lot have-pl) 'They had a lot of money' (Ishikari dialect); *Sisam sokor goza sinep hok-pa wa arki* (Japanese from mat one buy-pl and come.pl) 'They bought one mat from a Japanese and came' (Ishikari dialect).

Plural verb forms are also used as honorifics, e.g., *Kane rakko a-res-pa kamuy ronnu* (golden otter 1pl-raise-pl god kill.pl) 'Our honorable god, whom we have raised, killed the golden sea otter'.

The most notable feature of Ainu verbal morphology is incorporation of various elements – the feature that contributes to the polysynthetic character of Ainu, especially Classical Ainu. Nouns corresponding to intransitive subjects and those corresponding to transitive objects are incorporated, though many instances of the former type appear to be frozen expressions, e.g., *Sir-pirka* (weather-good) 'It's fine.' Typical noun incorporation is of the following type, where incorporation of a noun corresponding to an object results in an intransitive expression with

concomitant change in the personal affix: *Cise ci-kar* (house 1pl-make) 'We make a house': *Cise-kar-as* (house-make-1pl) 'We make a house' (Ishikari dialect).

In addition, Ainu verbs incorporate adverbs, e.g., *Toyko a-kikkik* (thoroughly 1sg-beat) 'I beat (him) up thoroughly': *A-toyko-kikkik* (1sg-thoroughly-beat). While no more than one noun can be incorporated into the verb at a time, a noun and an adverb can be incorporated into one verb base at the same time, e.g., *Pinne kamuy kiraw-rik-kur-roski* (male god horn-high-EXPL-raise) 'The male (dragon) god raised the horns high.'

Moreover, Ainu verbal morphology permits applicative extension, thereby exhibiting the following paraphrases between postpositional expressions and the corresponding applicative expressions: *Poro cise ta horari* (big house at live) 'He lives in a big house': *Poro cise e-horari* (big house APPL-live) 'He lives in a big house'; *kaya ari terke* (sail with run) 'run by a sail': *kaya e-terke* (sail APPL-run) 'run by a sail.'

A combination of noun incorporation and applicative extension yields an expression such as *Nea cep a-pone-ko-kuykuy* (that fish 1sg-bone-APPL-bite) 'I bit that fish with its bone.'

Ainu syntax is consistently head-final, thereby exhibiting word order patterns similar to those observed in other head-final languages such as Japanese and Korean. Thus, the basic word order is SOV: *Kamuy aynu rayke* (bear person kill) 'The bear killed the man.' Postpositions are used rather than prepositions: *cise ta* (home at) 'at home,' and modifiers precede the heads they modify: *pirka kewtum* (good heard) 'good heart,' [*beko respa*] *sisam* ([cow raise] Japanese) 'a Japanese who raises cows,' *sapo ninkarihi* (sister earrings) 'sister's earrings,' *toan seta* (that dog) 'that dog,' *sine aynu* (one person) 'one person,' *turasno paye* (quickly go) 'go quickly,' *a-e rusuy* (1sg-eat want) 'want to eat,' *menoko kasuno okirasunu* (woman than strong) 'stronger than a woman.'

Subordinating conjunctions occur after subordinate clauses, which come before main clauses, e.g., *E-eh kusu anekiroro-an* (2sg-came because happy-1sg) 'Because you came, I am happy' (Sakhalin dialect).

Auxiliary verbs are not generally marked by personal affixes, which are attached to the main verbs. And finally, question sentences are marked by the final particle *ya*, or are simply indicated by rising intonation alone. Like many other head-final languages, interrogative pronouns need not move to sentence-initial position. The following final example illustrates the use of auxiliary verbs and interrogative sentence pattern: *Eani hemanta e-e rusuy ya* (you what 2sg-eat want Q) 'What do you want to eat?'

See also: Japan: Language Situation.

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Ajdukiewicz, Kazimierz (1890–1963)

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Kazimierz Ajdukiewicz, Polish logician and philosopher, was born at Tarnapol and educated at Cracow and Lvov. He studied philosophy under Twardowski and logic under Lukasiewicz. After the war Ajdukiewicz became one of the leading members of the Lvov–Warsaw school. Other members of this school were Twardowski, Łukasiewicz, Leśniewski, Kotarbiński and Tarski. From 1928 until 1952, Ajdukiewicz taught logic and philosophy at the universities of Warsaw, Lvov and Poznan. Until his death he was the chief editor of Studia Logica.

Ajdukiewicz devoted a great deal of his time and energy to the study of the relationship between language and knowledge. According to him the theory of knowledge is the science of cognitive acts and results. Cognitive acts are inseparably connected with language and he identified their products with the meaning of sentences. It was as a part of his theory of knowledge that Ajdukiewicz developed a theory of language.

Ajdukiewicz thought that to speak a language L is to have the disposition to accept all and only the sentences that the speakers of L accept. In his study of language he tried to describe the kind of rules that

concomitant change in the personal affix: *Cise ci-kar* (house 1pl-make) 'We make a house': *Cise-kar-as* (house-make-1pl) 'We make a house' (Ishikari dialect).

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Ajdukiewicz thought that to speak a language L is to have the disposition to accept all and only the sentences that the speakers of L accept. In his study of language he tried to describe the kind of rules that

govern the acceptance of sentences of L. Among these rules he distinguished three kinds: axiomatic, deductive, and empirical rules. The axiomatic rules demand the unconditional acceptance of certain sentences. For example, the following sentences should be accepted without having recourse to experience: 'Every man is a man'; 'Every square has four sides.' A person who rejects the sentence 'Every man is a man' or 'Every square has four sides' shows that he does not understand the meaning of these sentences in the way speakers of English do. The deductive rules, on the other hand, require the conditional acceptance of sentences. If one sentence is accepted, then the deductive rules dictate that another sentence must also be accepted. Who accepts the sentences 'If today is Sunday then tomorrow is Monday' and 'Today is Sunday' must also accept 'Tomorrow is Monday.' If a person accepted both 'If today is Sunday then tomorrow is Monday' and 'Today is Sunday' but rejected 'Tomorrow is Monday,' this behavior would show that he understands those sentences in an idiosyncratic way. Finally, the empirical rules demand that certain sentences have to be accepted in the face of certain experience, for example the sentence 'It hurts' should be accepted when one is in pain.

It was one of Ajdukiewicz's most cherished beliefs that 'since the languages studied by logicians are in many respects modeled on natural languages, it seems that logicians may be able to make some contribution to general linguistics.' Inspired by the treatment of formal languages common among Hilbert and his disciples, Ajdukiewicz noticed that a deductive system can be characterized, first by the rules that select the set of its well-formed expressions, secondly, by the rules that select certain expressions as axioms and, finally, by the rules that determine a logical consequence relation.

Above what has been described is the role played by the last two rules in the mechanism of sentence acceptance. However, Ajdukiewicz's most celebrated contribution to the study of language is related to the first feature of deductive systems: the rules that select the class of well-formed expressions. On the basis of certain ideas of Leśniewski and Husserl, Ajdukiewicz developed a categorial grammar that specifies which combinations of expressions are admissible as well-formed expressions of a given language. This grammar is used to distinguish loose strings of expressions from connected strings.

Ajdukiewicz's categorial grammar is a language recognition device that works as follows. We have at our disposal primitive categories and a category functor, '/'. Complex categories are built from two basic categories n (proper names) and s (sentences) and a recursive procedure: If β and α are categories, then so is (β/α).

The recognition work starts with assigning each word to a category. To determine the category of a complex expression we write first the categories of its elements. After this, we read the string of categories from left to right. When the first substring of the form $(\beta/\alpha)\ \alpha$ we replace this substring by β. This yields a new string of categories. The new string can then be rescanned, applying the reduction rule wherever possible. The complex expression belongs to the category γ only if successive applications of the procedure finally lead to the string γ.

Ajdukiewicz's original formulation of categorial grammar was mainly focused on the formal languages of logic. To give an example of his recognition mechanism applied to such a language, consider the categorial analysis of the language of oral logic (in note form). The following initial categorization can be taken as a starting point:

a. Propositional letters belong to the category s.
b. Unary connectives belong to the category s/s.
c. Binary connectives belong to the category (s/s) /s. Then it is dictated that
d. A string Σ belongs to the set of well-formed expressions if the successive applications of the reduction procedure ends in s.

Consider now the string $\wedge\ p\ \neg\ \vee\ qr$ (in infix notation: $(p \wedge \neg (q \vee r))$). This string is a well-formed Polish formula since the reduction procedure reduces the categories of their elements to s, as appears from the reduction tree shown below:

$\wedge$	p	$\neg$	$\vee$	q	r	
(s/s)/s	s	s/s	(s/s)/s	s	s	initial categorization
(s/s)/s	s	s/s	s/s		s	result first scanning
(s/s)/s	s	s/s	s			result second scanning
(s/s)/s	s	s				result third scanning
s/s						result fourth scanning
s						result fifth scanning

Ajdukiewicz's categorial grammar is a language recognition device driven by semantics. This is illustrated by his discussion of the proper categorization of the quantifier symbols of predicate logic. He contemplates the possibility of assigning the quantifiers to the category s/s, but rejects this on semantic grounds: this assignment is semantically inadequate as there are only four functions available that map truth-values onto truth-values, none of these providing an adequate semantics for the quantifiers. (The correct category for the (Russellian) quantifiers is s/ (s/n): they are second-order unary predicates over sets.)

Although Ajdukiewicz's main interest was devoted to logical languages, categorial grammar has proved to be a fruitful mechanism for the study of natural languages as well. In Ajdukiewicz's view, certain words in

natural languages may be regarded as functors which, when combined with one term, form a sentence. Words with this property are called 'one-term (or: unary) sentence-forming functors.' Intransitive verbs, for example, belong to this category. So does the negation operator, since it forms a (new) sentence when combined with a (sentential) term. Then there are two-term (binary) sentence-forming functors, such as transitive verbs (*build, push, lift*, etc.). Here, too, truth-functional operators such as 'and' or 'or' count as two-term sentence-forming functors, since they take two (sentential) terms to form a (new) sentence. The expressions to which a functor applies are called its arguments. Given the expression 'Abélard wanders,' it can be said that 'wanders' is its functor and 'Abélard' its argument.

According to Tarski the resulting categorial grammar, when applied to natural language, is the grammatical counterpart of the logical theory of types developed by Russell. Bar-Hillel (1953), Lambek (1958), and Geach (1962) developed categorial grammar further as a natural language recognition device. Their efforts culminated in the construction of categorial grammars that are more flexible than Ajdukiewicz's original version. The intimate relationship between categorial grammars and natural language established in Thomason (1974) is the topic of many of the articles collected in Buszkowski *et al*. (1988), and Oehrle *et al*. (1988). Van Benthem (1991) contains a systematic discussion of several logical aspects of categorial grammars that were already adumbrated in Tarski's remark about categorial grammar and the theory of types.

See also: Categorial Grammars: Deductive Approaches; Combinatory Categorial Grammar.

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Akan

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The Akan language is spoken throughout the central portion of Ghana. It is the most widely spoken member of a family of about 20 languages known as Tano or Volta-Comoe spoken in Ghana and the eastern Ivory Coast. Formerly the entire group was referred to as Akan. These languages belong to the Niger-Congo family. Within Niger-Congo they are part of the Kwa grouping.

Dialects and Their Distribution

The name 'Akan' is not generally used by speakers of the language, who refer to their language as Fante, Twi, or Brong. These Akan speech forms constitute a dialect continuum running from north to south in Ghana. 'Fante' refers to the dialects spoken in those regions that reach the sea, in the Central Region and parts of the Western Region of Ghana. 'Twi' is the most general term, referring to a wide range of dialects, of which the best known are Akuapem, the main tongue of the Eastern Region, and Asante, the dialect of the Ashanti Region. Others are Akyem and Kwahu. In genetic terms, Akuapem is more closely related to Fante than to the other dialects, but all of these dialects are mutually intelligible. The Brong dialect group of the Brong-Ahafo Region to the north of Ashanti is mutually intelligible with Asante Twi, but there is less mutual intelligibility with the dialects spoken farthest south.

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History and Development

Lists of several hundred words in Fante were published in Europe during the 17th and 18th centuries, but the language became a written language with a printed literature in the first half of the 19th century. The first written form was based on the Akuapem dialect, and was the work of members of the Basel Mission, which became established in the Eastern Region in the 1830s. The major names connected with this work are H. N. Riis, who published the first grammar in German in 1853 and in English in 1854, and Johann Gottlieb Christaller, whose grammar and dictionary appeared in 1875 and 1881, respectively. His collection of 3,600 Akan proverbs appeared in 1879. Christaller's work was important not only for Akan but for West African linguistics generally, because he analyzed the characteristic vowel harmony system and the tone system (see later), and their significance for the grammar.

The Akuapem-based orthography was used in schools of the Basel Mission, and later throughout the Twi-speaking areas until an Asante orthography was established in the 1950s. Since then, three orthographies, Fante, Asante, and Akuapem, have been used in the schools. A Unified Akan Orthography was developed in 1978 and published, but has not been put into practice by publishers or teachers. Nevertheless, more works have been published in Akan than in any other Ghanaian language, more than half of them in the Akuapem orthography.

Sociolinguistic Situation

As mother tongue of about 43% of the population of Ghana (7 550 405 out of about 18 million) and spoken as a second language by many more, Akan is indisputably the most commonly spoken Ghanaian language. Asante, with 2 578 829 speakers, is the largest dialect, Fante coming second with 1 723 573 speakers (figures are based on the report of the 2000 Census). Exactly how many speak Akan as a second language is not known, but there are very few places in Ghana where a speaker cannot be found. The Asante dialect seems to be the most widely known, and is expanding. Although Accra, the capital of Ghana, historically is not an Akan town, there are strong indications that today Akan is more widely spoken there than any other Ghanaian language.

From the 17th century until British conquest in the 20th century, Akan was the language of expanding kingdoms, of which the Ashanti became the largest and most famous. The resulting impact on the other languages of Ghana was considerable, especially in the south. Virtually all southern Ghanaian languages have borrowed Akan words related to war, government/state, the arts (especially music), and personal names and appellations. Akan is the source of several English words and proper names, especially in the Caribbean. The most well-known English word of Akan origin is probably the name of the Jamaican folktale character, Anancy, from Akan *ananse* 'spider'. Another is okra, from Akan *ŋ-koro-ma*.

Akan is the language most used after English in the electronic public media, and in some areas is used more than English. This is most noticeable on the FM radio stations distributed throughout Akan-speaking regions and in Accra. It is fairly often heard on television and is very commonly used in both television and radio advertising. However, there is little if any print journalism in Akan, although there has been more in the past.

Akan is a school subject in Akan-speaking regions, in many Accra schools, and in teacher training colleges. It can be studied to degree level at the University of Ghana and the University of Cape Coast, and is an area of specialization at the University College of Education at Winneba.

Aspects of the Ethnography of Speaking

Formal speech is very important in Akan culture. Every chief or king has an *ɔkyeame*, or spokesman, whose function is to speak for the chief on all formal occasions. This man is highly regarded as a master of the language. Elegant speech, especially that used at court, is profuse and indirect. Mastery of proverbs and their appropriate use are important aspects of this style.

Major Linguistic Features

The Sounds of Akan

This section is based mainly on Dolphyne's (1988) *The Akan (Twi-Fante) language*, which should be consulted for more detail.

Consonants The Akan consonants p, b, t, d, k, g, m, n, f, s, h, w, l, r, and y are usually pronounced much as they are in English, although n is pronounced [ŋ] in some contexts, e.g., in *nkwan* 'soup'. The spellings ky, gy, and hy, however, are pronounced similarly to English ch, j, and sh, respectively. Akan also has rounded consonants with no comparable English sounds, because the inner parts of the lips are rounded and the sound is also palatalized. These sounds include tw [tɕɥ], dw [dʑɥ], and hw [ɕɥ]. The syllabic

nasals *m n* (representing both [n] and [ŋ]) always have the same position of articulation as the following consonant, thus *mpaboa* 'shoes' but *nsuo* 'water'.

The most obvious difference between Fante and the other dialects is that in Fante, t and d are pronounced [ts] and [dz] before front vowels. Thus Fante has *dzi*, meaning 'eat', whereas other dialects have *di*, and *itsir* 'head', whereas other dialects have *etire* (or *eti*). Also before front vowels, n in Fante is pronounced as ny; for example, *nye* 'and' is *ne* in other dialects. The sound [l] occurs mainly in loanwords from English, although it exists in both Asante and Fante dialects as an alternative pronunciation for [r] or [d] in some words.

Vowels and Vowel Harmony Akan has nine oral vowel phonemes, /i ɪ e ɛ u ʊ o ɔ a/, and five nasal vowels, /ĩ ɪ̃ ũ ʊ̃ ã/. The vowels [ɪ] and [ʊ] are spelled e and o, respectively. Asante and Akuapem have a tenth vowel, [ɑ]. These vowels pattern according to the rules of cross-height or advanced tongue root vowel harmony. This means that any of the vowels except [ɑ] can be the vowel of a stem syllable, but for prefixes and some suffixes the vowels fall into two sets. These are /a ɪ ɛ ʊ ɔ ĩ ʊ̃ ã/ and /ɑ i e u o ĩ ũ/. A prefix to a word must have a vowel from the same set as the stem vowel. Thus, for example, the pronoun prefix meaning 'he, she' is pronounced [o] in *odi* 'she eats', but [ɔ] in *ɔhwɛ* 'he looks at it', because the verb stem vowels /i/ and /ɛ/ belong to different sets.

The Fante dialects also have rounding harmony, whereby the prefix vowels are rounded if the stem vowel is. Thus, in Fante, the expression meaning 'I am going' is pronounced [mʊ-rʊ-kɔ], because the stem *kɔ* has a rounded vowel, but in other dialects it is pronounced [mɪ-rɪ-kɔ].

Tone Every syllable carries contrastive tone. There are two contrastive tone levels, high and low. In a sentence or phrase the pitch of high tones is lowered after a low tone, so that in a sentence such as *Pàpá Kòfí rèfré nè bá* 'Papa Kofi is calling his child', each high tone syllable is pronounced at a lower pitch than the earlier high tone syllables. Tone is not reflected in any of the Akan orthographies.

Word Formation

Nouns Most nouns consist of a stem with a singular or a plural prefix. The common singular prefixes are created using the vowels o, e, and a (varying according to the vowel harmony rules), and the common plural prefixes use the vowel a (only if there is a different vowel prefix in the singular) or a syllabic nasal. Thus we have *ɔ-hene* 'king', plural *a-hene*, and *ɔ-kwasea* 'fool', plural *n-kwasea*. Some nouns have no singular prefix, only a plural: thus *gyata* 'lion', plural *a-gyata*, and *kuku* 'pot', *n-kuku* 'pots'. Some adjectives also have singular and plural forms, but there is no noun class agreement of the Bantu type.

Nouns referring to persons often have a suffix *-ni* in the singular, which is replaced by *-fo* in the plural. Thus, *o-buro-ni* 'European person', in the plural is *a-buro-fo*. Kinship terms are usually formed with a suffix *-nom* with no change in the prefix, e.g., *ɛna* 'mother', *ɛna-nom* 'mothers'.

Verbs With slight variations among the dialects, the Akan verb is inflected principally for aspect: completive with a suffix with a form that depends on the final stem vowel, perfect with the prefix *á-*, progressive with the prefix *re-*, and habitual and stative forms that have no prefix or suffix and differ only in the tone of the verb. There is also a future marker *bé-*. The consecutive form has a prefix *a-* and is used only in serial verb constructions. The negative is expressed by a prefix consisting of a syllabic nasal before the verb stem, and the imperative also by a syllabic nasal prefix but with high tone.

Syntax

Word Order Akan has subject-verb-object word order. In a noun phrase, adjectives and determiners follow the noun but possessives precede it, as shown in the following examples:

Abofra	no	re-	n-	noa	bi
child	the	PROG-NEG-cook			some

'the child will not cook any'

Kwasi	kyɛ-ɛ	abofra	no	paanoo
Kwasi	give-COMPL	child	the	bread

'Kwasi gave the child bread'

Amma	sika
'Amma's	money'

Postpositions Locations are represented by a special class of nouns called postpositions at the end of the locative phrase. An example is *so* 'top, on', as in the following sentence:

Sekan	bi	da	ɔpon no so
knife	some	lie	table the on

'a knife is lying on the table'

There is only one preposition, wɔ 'at'.

Serial Constructions Serial verb constructions, in which two or more verbs and their objects occur in sequence with a single subject and no conjunctions to form a complex clause, are a characteristic feature of Akan syntax. For example:

Kwasi de	paanoo kyɛ-ɛ	abofra no
Kwasi took	bread give-COMPL	child the

'Kwasi gave bread to the child'

ɔ-bɛ-tɔ	nwoma no	a-	kan
she-FUT-buy	book	the	CONSEC-read

'she will buy the book and read it'

See also: African Linguistics: History; Ghana: Language Situation; Kwa Languages; Niger-Congo Languages; Phonetics of Harmony Systems; Serial Verb Constructions; Tone: Phonology.

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Akiriyo *See:* Krio.

Akkadian

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Akkadian is an extinct Semitic language spoken in ancient Mesopotamia, the 'land between the rivers' (Tigris and Euphrates), in an area that roughly corresponds to today's Iraq. In the later second millennium B.C., Akkadian was also a lingua franca throughout the Near East. Akkadian was written on clay tablets in the cuneiform script in a system that combined syllabic and logographic signs. It is one of the earliest and longest attested languages, with a history that starts around 2500 B.C. and spans more than two thousand years. The ancient name of the language, Akkadûm, derives from the city of Akkade, founded by King Sargon as his capital around 2300 B.C.

From the second millennium B.C., two distinct dialects of Akkadian emerged: Babylonian and Assyrian. Babylonian was spoken in the southern part of Mesopotamia, and Assyrian was spoken in the northern part. During the first millennium B.C., Aramaic gradually ousted Akkadian as the language of the region, and Akkadian ceased to be spoken sometime around 500 B.C. Some texts in Akkadian continued to be written even until the first century A.D., but the language then fell into oblivion, and was rediscovered only in the nineteenth century, when the cuneiform writing system was deciphered. Today, hundreds of thousands of Akkadian texts have been discovered, encompassing many different genres, including poetry (such as the epic of Gilgamesh), religious compositions, royal and monumental inscriptions, histories, monolingual and multilingual dictionaries (word-lists), grammatical texts, astronomical and mathematical texts, legal documents (such as the Code of Hammurabi), private and diplomatic correspondence, and an endless quantity of economic and administrative documents.

The history of the Akkadian language is conventionally divided into four main chronological periods: Old Akkadian (2500–2000 B.C.), Old Babylonian/Old Assyrian (2000–1500 B.C.), Middle Babylonian/Middle Assyrian (1500–1000 B.C.), and Neo-Babylonian/Neo-Assyrian (1000–500 B.C.). The conventional name 'Old Akkadian' for the earliest attested period is based on the (probably mistaken) assumption that no dialectal variation between the Babylonian and Assyrian idioms existed before the second millennium. The Old Babylonian dialect was considered the classical stage of the language by later generations of Babylonians and Assyrians, and it was the language towards which the later literary idiom (sometimes known as 'Standard Babylonian') aspired.

Kwasi de	paanoo kyɛ-ɛ	abofra no
Kwasi took	bread give-COMPL	child the

'Kwasi gave bread to the child'

ɔ-bɛ-tɔ	nwoma no	a-	kan
she-FUT-buy	book	the	CONSEC-read

'she will buy the book and read it'

See also: African Linguistics: History; Ghana: Language Situation; Kwa Languages; Niger-Congo Languages; Phonetics of Harmony Systems; Serial Verb Constructions; Tone: Phonology.

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Grammatical Sketch

During the third millennium B.C., speakers of Akkadian were in prolonged and intimate contact with speakers of the unrelated and typologically dissimilar Sumerian (ergative, agglutinating, verb-final). In consequence, the structure of Akkadian shows an interesting mixture between inherited Semitic features (nominative-accusative alignment, synthetic non-concatenating morphology, noun-modifier order in the NP) with features acquired through convergence (*see* **Language Change and Language Contact**). Such 'Sprachbund' effects are evident especially in the phonology and the syntax, as well as in massive lexical borrowing.

The phonemic system of Akkadian underwent a considerable reduction from the putative Proto-Semitic inventory, with the loss of most of the laryngeal and pharyngeal consonants, probably because of contact with Sumerian. Morphology is the area which shows the least evidence of convergence (although even here, some features, such as the 'ventive' suffix *-am* may be due to Sumerian influence). Nouns have two genders (masculine, feminine), three cases (nominative, accusative, genitive), and show a distinction between singular, plural, and a partly productive dual.

As in the other Semitic languages, verbal morphology is highly synthetic, and based on a system of mostly three-consonantal roots and internal vowel patterns, combined with prefixing, suffixing, infixing, and gemination. The root **p-r-s** 'cut', for instance, appears in forms such as *i-prus* (3SG-cut.PAST), *purs-ā* (cut.IMPERATIVE-2PL), *a-parras* (1SG-cut.-NON PAST), *pars-at* (cut.STATIVE-3FSG), *i-pparis* (3SG-cut.PAST.PASSIVE), *nu-šapras* (1.PL-cut.NON PAST.CAUSATIVE).

Where Akkadian morphology diverges significantly from the other (and later attested) Semitic languages, especially in its so called 'stative conjugation,' Akkadian seems to present an earlier situation. The 'stative' has its origin in conjugated forms of the predicative adjective, but it gradually acquired verbal features. In Akkadian, the stative had not yet become a fully verbal form, but in the other Semitic languages, it was fully integrated in the verbal paradigm (as the 'perfect'), and this led to a restructuring in the tense-aspect system. The morphology of Akkadian remained fairly stable until the first millennium B.C., when the weakening and loss of final syllables led to the disintegration of the case system on nouns, and to the loss of some distinctions on verbs, and so to the appearance of more periphrastic constructions.

Akkadian is nominative-accusative in both morphology and syntax, and generally has dependent marking, although the verb has obligatory subject agreement as well as direct and indirect object pronominal suffixes. Akkadian word order is interesting, because it can be considered highly 'inconsistent.' Akkadian must have inherited a VSO word-order from Proto-Semitic, and this order is still reflected in archaizing personal-names, especially from the earliest period, such as *Iddin-Sin* (gave:3MSG-Sin – '(the god) Sin gave').

However, undoubtedly because of contact with Sumerian, Akkadian acquired a strict verb-final word order, which is attested from the earliest documents. Both SOV and OSV orders are common, but the only constituents that can follow the verb are the bound object pronoun suffixes (and in later periods finite complement clauses). Nevertheless, inside the noun phrase, Akkadian has retained the characteristic Semitic 'VO' characteristics: prepositions, Noun-Genitive, Noun-Relative, Noun-Demonstrative, Noun-Adjective orders. These apparently inconsistent word-order patterns showed no signs of instability, and were maintained intact for two thousand years.

Sources

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See also: Ergativity; Language Change and Language Contact; Mesopotamian Cuneiform Script; Sumerian.

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Al-Jurjāni, Abd Al-Qāhir (10th Century A.D.)

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Al-Jurjāni is ʔabu Bakr ʕabdu ʔal-qāhir bin ʕabdu ʔal-raħmān bin Muħammad Al-Jurjānī. He was born in Al-Jurjān, a town between Tabaristan and Khurasan in Persia (400?–471H/1007–1078 A.D.). A man of broad erudition, his writing extended to many fields including language, linguistics, eloquence, Qurʔānic studies, and metrics. He composed substantive treatises on each of these topics and was sought after as a teacher in his day. Among his compositions are those on eloquence like *ʔasrār ʔal-balāγah* 'Secrets of eloquence' and *dalāʔil ʔal-ʔiʕdʒāz* 'The proofs of the inimitability (of the Qurʔān)'; and, on Qurʔānic studies, his *ʔal-risālah ʔal-šāfiyah* 'The healing message' and *Šarħ ʔal-fātiħah* '*Explanation of the fātiħah* (the first sura of the Qurʔān)'. On literature, he wrote a book on three Arab poets, and composed six books on linguistic matters. We turn to some of these for brief comments as they recapitulate and exemplify what was established by Al-Khalīl and Sībawayh as the pillars of the study of Arabic.

Al-Khalīl had set in writing his dictionary *Kitāb ʔal-ʕayn* 'the book of *ʕayn*', the pattern for subsequent analyses of Arabic lexica. He had isolated the roots into their radicals and determined that the *ʔasmāʔ* 'names/nouns' and *ʔafʕāl* 'actions/verbs' are limited to not less than three and not more than five radicals for native Arabic words. This has been the key to the analyses of Arabic ever since. It is this fundamental insight that Al-Jurjānī developed in his book called *Kitāb ʔal-miftāħ fiy ʔal-sˤarf* 'The book on the key to derivation'. He takes the forms, like *ʔasmāʔ* 'names/nouns', that derive from them and provides all the roots that are associated with them using the variation on the tri- quadri- quinque-radical stems. In his analysis the tri-radical roots have 10 variations, like *faʕl, faʕal, faʕul*, etc., with examples from *ʕasmāʔ* 'names/nouns' and *sˤifāt* 'descriptions/adjectives'. This is followed by patterns that pertain to *ʔafʕāl* 'actions/verbs' which are limited to the tri-radicals and quadri-radicals and each pattern is determined by the variations that obtain in it, e.g., the tri-radical is limited to seven patterns, but within these variations are included the doubled, the roots with *hamzah* [ʔ] or one of the weak letters, as one of the radicals. This is followed by the tri- quadri- quinque-radicals of which there is only one pattern with its three variants. These basic patterns and their exemplifications are followed by sections on the meaning of the *ʔafʕāl* 'actions/verbs', with more definitions and exemplifications and with a brief mention of some of the phonological processes.

The book *ʔal-dʒumal* 'The sentences' is a treatise that takes the theory of *ʕāmil* 'operator' which Sībawayh had proposed as the basis of desinence. It is in a way a summary and application of his booklet called the *ʔal-ʕawāmil ʔal-miʔah* 'The hundred operators'. In this short treatise he takes the *ʕawāmil ʔal-ʔafʕāl* 'operators of actions/verbs', *ʕawāmil ʔal-ħuruwf* 'operators of particles', and *ʕawāmil ʔal-ʔasmāʔ* 'operators of names/nouns', and exemplifies their operations, with other individual issues like masculine and feminine, etc. Al-Jurjānī was a versatile *savant* and any one of the mentioned areas of expertise he delved into would have been a sufficient occupation for a scholar for a lifetime.

See also: Al-Khalil (8th Century A.D.); Sibawayhi (8th Century A.D.).

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Al-Khalīl (8th Century A.D.)

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Al-Khalīl is ʕabdu ʔal-Raħmān ʔal-khalīl ʔibn ʔaħmad ʔal-Farāhīdī, known simply as Al-Khalīl (100–175H/ 719–791 A.D.). Al-Khalīl is a name that is respectfully recognized by Arab scholars as an exemplar of scholarship, citizenship, and fidelity to one's faith. He was born in ʕumān, but lived and taught in Basrah. In his travels to Mecca, almost every other year, he came in contact with a variety of dialects.

By the accounts of the chroniclers, he was an ascetic and a creative genius who devised many ways of looking into the Arabic language and its structure. The metrics of Arabic owe their formulations to him. He contemplated the classical pre- and post-Islamic Arabic poetry and captured its varied rhythms by reducing them to 14 basic meters with their proper identities and proper labels. It is called the science of *ʔal-ʕaruwdˤ*. Although this prosodic feat is enough to immortalize him, Al-Khalīl is also known for other linguistic innovations. One of the most significant innovations is the design of the Arabic lexicon. He found the key to the morphology of Arabic. He proposed that the root system in Arabic was constrained to roots of between two and five radicals, and the roots that went beyond these limits either were made up or were borrowed lexical items. By means of the anagrammatic permutations of the radicals, he considered all the possible permutations of a root in order to capture all the words that might be derived from them, words to which are added the proper inflectional or derivational modifications, for example, the root KTB with all its six possible permutations: ktb, kbt, tkb, tbk, bkt, btk. Some of the results of such permutations were used, others were ignored. A second innovation he introduced was to arrange the dictionary not in the traditional *ʔalif, bāʔ*, *tāʔ*, etc., sequence but phonetically (see Table 1), that is, starting with the throat letters, [ʕ], [ħ], etc., and ending with the lip letters [b], [m], and in the process he systematized the phonology of Arabic. His lexicon is called *Kitāb ʔal-ʕayn* 'the book of *ʔal-ʕayn*'. This lexicon became the model and inspiration for subsequent lexicographers, who copied, incorporated, modified, summarized, and found other ways of accounting for the lexical items of Arabic found in it, but they never overlooked the work of Al-Khalīl.

Khalīl was also a grammarian. He included much phonological, morphological, syntactic, and dialectal material in his lexicon. We have no book on grammar attributed to him, except, some claim, *kitāb ʔal-ʤumal fiy ʔal-naħw*. Many grammatical theories and insights, beyond what is in his lexicon, have found their way into the work of his most prominent student, Sībawayh. Sībawayh is the most revered name among the grammarians of Arabic. In his book, called simply *ʔal-kitāb*, he quotes many of the former and contemporary linguists. The man most frequently quoted in this book is Al-Khalīl. He is quoted over 600 times on various topics of grammar. This bespeaks not only of the close relationship between master and disciple, but of the weight that Sībawayh gave the enduring ideas and grammatical analyses of his master. Al-Khalīl's summation of the life of the mind is expressed in a statement attributed to him, which says: If scholars are not God's saints, then God has no saints.

Table 1

Letter */ħarf/*	Locale */ħayyiz/*	Exit */maxrag/*
S	Throat */ħalq/*	ʕ, ħ, h, x, γ
	Uvula */lahāh/*	q, k
T	Soft-palate */šagr/*	g, š, dˤ
R	Apex */ʔasalah/*	Sˤ, s, z
O	Alveolum */nitˤ ʃ/*	ṭ, d, t
N	Gingiva */liθθah/*	ðˤ, θ, ð
	Laminae */ðalaq/*	r, l, n
G	Lips /ʃ afah/	f, b, m
/Sˤ *ahīħ/*		
W E A K */muʕtal/*	Cavity/air */hawāʔ/*	w, A, y, ʕ

See also: Arabic Lexicography; Arabic Linguistic Tradition; Sibawayhi (8th Century A.D.).

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'Al-Zajjājiy, Abu Al-Qasim (10th Century A.D.)

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ʔal-Zajjajiy is ʔabu ʔal-Qāsim Ibn ʔisħāq ʔal-Zajjajiy. He was born in sˤaimarah, a town in Khuzistan, Persia. He traveled to Baghdad and studied with some of the more prominent linguists from the Baghdad school of linguistics. They included members from both the Basrah school and the Kuwfah school orientations. To mention just a few of the Basrah school adherents, like Ibn ʔal-Sarrāj (-316H/928), the Younger ʔaxfaš (-315H/927 A.D.), ʔabu ʕaliy ʔal-fārisiy (288–377H/901–987 A.D.), and his teacher ʔal-Zajjāj. Here one comes across a curious twist in nomenclature. He is known by ʔal-Zajjājiy as a reference to and in deference to his teacher ʔal-Zajjāj (241–311H/855–923 A.D.), with whom he studied for a long time. Of the teachers of the Kuwfah school orientation one may mention ʔabu Bakr ʔal-ʔanbāriy (271–328H/884–940 A.D.) and ʔabu Bakr Ibn šuqayr (-317H/929 A.D.). ʔal-Zajjājiy also traveled to Damascus and Makka where he taught and wrote. He died in Tiberias (-340 H/951 A.D.).

Of about 15 books on different aspects of Arabic grammar, his most well known book, and the one that received much attention in his time and later, is *ʔal-ʤumal* 'The sentences' which was much used as a textbook for teaching and learning grammar. It is a simplified grammar of Arabic, not on the scale of Sībawayh, but a clear listing, definition, and exposition of grammatical facts in an orderly fashion with clear examples. Over the years it received a large number of commentaries, over 120, in a variety of ways of exposition or analysis of the whole or a part of it.

One may also mention in this context the often repeated account given in ʔal-Zajjājiy's *Maʤālis ʔal-ʕulamāʔ* 'Scholars' Sessions', session #4, as a source of its authenticity, of the celebrated encounter between Sībawayh the spokesperson for the Basrah school of linguistics and ʔal-kasāʔi the spokesperson of the Kuwfah school before the Caliph ʔal-Rašiyd for a linguistic/grammatical disputation, referred to in the literature as *ʔal-mas ʔalah ʔal-zunburiyyah* 'the hornet's question'. *Gad kuntu ʔaðˤunnu ʔanna ʔal-ʕaGraba ʔašaddu las ʕatan mina ʔal-zunbuwri fa-ʔiða huwa hiyā ʔaw fa-ʔiða huwa ʔiyyāhā* [I thought for sure that the scorpion is of stronger sting than the hornet, then he is she [she being on the subjective case], or then he is her [her being on the objective case]. Sībawayh chose 'she' the subjective case. In all the accounts, ʔal-kasāʔi and his followers faulted Sībawayh to the degree that a bedouin speaker was brought in to resolve the alleged manner of speaking. The informant sided with ʔal-kasāʔi's claim and thus Sībawayh lost the argument. He departed the scene of the debate disappointed.

He was a grammatical analyst, looking for causes of changes and variation in Arabic. He subdivided the syntactic causes into three categories: those that are concerned with teaching, those that are concerned with analogy, and those that are concerned with argumentation, i.e., *ta ʕliymiyyah, qiyāsiyyah*, and *ʤadaliyyah*, respectively. As the case above showed, he delved into the disputes between the two schools of linguistics, Basrah and Kuwfa, and tried to bring understanding to arguments where the two schools differed, for example, whether the *ʔism* 'name/noun' or *fiʕl* 'action/verb' is primary, why there is *ʔiʕrāb* 'desinence' in Arabic and its foundation in *ʔasmāʔ* 'names/nouns' *ʔafʕāl* 'actions/verbs', and what does it mean for the same word to be in *rafʕ*, ending with '[u]', *nasˤb* ending '[a]', and *ʤarr* ending with '[i]' in different contexts, and the whole idea of *θiql* 'heaviness' and *xiffah* 'lightness' in speech. He frequently sided with the Basran opinion. These questions were raised in Sībawayh's book. ʔal-Zajjājiy probed the perennial issues of the day in Arabic linguistics.

See also: Arabic Linguistic Tradition; Ibn as-Sarra-j, Muhammad ibn al-Sari- (d. 929); Sibawayhi (8th Century A.D.).

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Alabama *See:* Muskogean Languages.

Alarcos Llorach, Emilio (1922–1998)

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Emilio Alarcos Llorach was born in Salamanca, Spain, on April 22, 1922, and he died in Oviedo, on January 26, 1998. He started his academic studies in Valladolid where his father Emilio Alarcos García was a professor and continued them in Madrid with the master Dámaso Alonso. He graduated in 1947, with a thesis on the *Libro de Aleixandre* (1948). After teaching in Avilés in 1944, his sojourn in Bern and Basel (1946–1947) where he worked as a lector of Spanish had a decisive influence on his linguistic formation. He became acquainted with scientific approaches that were not well received in Spain, and he contributed to their dissemination in his native country. The full integration of Spanish linguistics into the global field was one of Alarcos's accomplishments. This was manifest, for example, in his meeting with Chomsky in Oviedo in 1992.

After a short period of teaching in Cabra (Córdoba) and Logroño, he was appointed to the chair of historical grammar of Spanish at the University of Oviedo in 1950. Alarcos Llorach continued teaching and living in this city for half a century, until the end of his life.

The numerous disciples he trained in Oviedo and the foundation of the journal *Archivum* testify to the fruitfulness of his activities. In 1972 he was elected to a chair (the sillón B) at the Spanish Academy (Real Academia Española), and he joined this institution a year later. At the time of his death he was the president of the association for the history of the Spanish language (Asociación de Historia de la Lengua Española).

Alarcos Llorach contributed considerably to the dissemination of European structuralism in Spain. First, in his phonology (1950) he used ideas from the Prague school, then, in his structural grammar (1951) by using Hjelmslev's glossematics of the Copenhagen school. Finally, his *Estudios de gramática funcional del español* (1970) were influenced by Martinet. Alarcos put into practice an eclecticism that did not consist of a mixture of different doctrines, but rather one that surged out of his conviction that different approaches to a complex reality such as language were necessary. The highlight of his legacy is his *Gramática de la lengua española* (1994), in which he presented his ideas about the description and explanation of parts of Spanish grammar that were never treated before in monographs.

At the same time Alarcos worked on philological topics and proved that a parallel interest in language and literature could be productive. He demonstrated remarkable literary criticism: *La poesía de Blas de Otero* (1966; first published as a university speech given in Oviedo, 1955) and *Ángel González, poeta* (1969). He could well have spoken with consummate ease about language, but he opted for a literary subject for his inaugural speech at the Spanish Academy (*La lucha por la vida* [1973]; republished in 1982 together with works on García Pavón, Delibes, and Martín Santos). In addition, he published several miscellaneous books, for example the *Ensayos y estudios literarios* (1976) and his booklet *El español, lengua milenaria* (1982); also various works on dialects, mainly on the Asturian and Catalan language, which was his second language, fluently spoken by his mother.

Alarcos emphasized the importance of the study of the history of language. As a disciple of the Menéndez Pidal School, he knew that there could not be any philology without linguistic study, and no complete linguistics without aesthetics or literary studies. In his view, science had to be related to human life.

Alarcos's attitude toward language and its linguistic description was characterized by wise tolerance. He rejected prescriptive or clearly purist judgments on idiomatic facts and on the use of language in contemporary society. He repeatedly ascertained that the only unchanging languages are dead languages.

See also: Chomsky, Noam (b. 1928); Functional Grammar: Martinet; Martinet, André (1908–1999); Phonology: Overview; Structuralism.

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Alarm Calls

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Introduction

Animals commonly vocalize when threatened by a predator. These signals, usually termed alarm calls (from old Italian *all arme* 'to arms' on the approach of an enemy), have continued to bewilder and fascinate for a number of reasons, the first of which is mainly practical. In animal research, it is often difficult to break down the continuous behavioral stream into discrete and meaningful units, which can be studied systematically. Alarm calls are a rare and noticeable exception. They are highly discrete and easy to identify, making it possible to systematically study both the causes and consequences of behavior. A second motivation, related to the previous one and significant for the evolution of linguistic abilities, relates to the fact that alarm calls provide a unique tool for accessing the cognitive mechanisms underlying an animal's behavior. Finally, alarm calls are interesting because they seem to pose a problem for evolutionary theory. They are often among the most prominent and noticeable signals in a species' repertoire, and it seems paradoxical for individuals to behave conspicuously in the presence of a predator, thereby revealing their presence and location (e.g., Shalter, 1978).

Following these considerations, this article has the following objectives. First, it summarizes research that has dealt with the problem of why animals produce seemingly maladaptive behavior in the presence of a predator. What are the evolutionary processes that have provided a selective advantage to individuals who behave this way? Second, from a cognitive–linguistic perspective, the article seeks to seize the unique opportunity that alarm calls offer, that is, to try to describe the cognitive processes that underlie call production. Several empirical studies are discussed that have aimed to investigate the relationship between the occurrence of an external event (i.e., the appearance of a predator) and the production and comprehension of these signals, particularly in the nonhuman primates. No attempt is made to provide a systematic overview of alarm calling in the various taxonomic groups, however. Instead, a handful of empirical studies have been selected, particularly those that are likely to inform the linguistically interested reader about core cognitive phenomena in nonhumans and their potential relevance for the evolution of linguistic capacities in humans.

The Evolution of Alarm Calls

Three main groups of evolutionary hypotheses have been put forward to explain why animals produce conspicuous vocalizations in the presence of a predator. First, attention-grabbing behavior in the presence of a predator can provide a selective advantage to the signaler if it increases the survival chances of closely related kin (Maynard Smith, 1965). Calling may be risky, but under this hypothesis, the costs are outweighed by the benefits of increased survival of recipients who carry a proportion of the caller's genes (the kin selection hypothesis). Second, alarm calling is beneficial to a signaler if it increases the reproductive success of the caller (the sexual selection hypothesis). Third, alarm calling is beneficial if it elicits behavior in others that decreases the vulnerability of the caller directly (the individual selection hypothesis). Within this third hypothesis, two scenarios have been proposed. The first one considers the effects of alarm calling on conspecific recipients (the prey manipulation hypothesis). Here, calling is costly at the beginning of a predator–prey interaction, but quickly

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becomes outweighed by the benefits accrued by other individuals' antipredator responses. A good example is the turmoil caused by individuals escaping when hearing an alarm call, creating a cloud of confusion for the predator from which the caller can benefit. However, in some cases animals give alarm calls in the absence of a conspecific audience, suggesting that the behavior has evolved for other purposes. A popular idea here is that some predators are affected by the alarm calls directly, without the intermediate step of other prey behavior (the perception advertisement hypothesis). This is especially the case for predators who depend on unprepared prey. Particularly in the bird literature, the term 'mobbing call' is sometimes used, mainly to refer to cases where alarm calls are part of more elaborate displays, involving conspicuous locomotory behavior in the presence of the predator.

It is important to point out that the three hypotheses are not mutually exclusive but may operate alongside each other in various ways. In the following sections, selected empirical findings that support one or several of the selective forces underlying the evolution of alarm calling are discussed.

Alarm Calls Favored by Kin Selection

One recurrent finding is that alarm callers are susceptible to the type of audience present (e.g., Karakashian *et al.*, 1988). A first solution to the apparent alarm call paradox is, therefore, that individuals call preferentially when close genetic relatives are nearby. Under such circumstances kin selection theory can explain the evolution of conspicuous signaling in the presence of predators. The reasoning is that costly alarm calling can still be beneficial if it improves the survival of individuals that share a certain proportion of the caller's own genes. One testable prediction is that individuals produce alarm calls as a function of the number of close relatives in the audience. The empirical evidence for the kin selection hypothesis is strongest for the parent–offspring relation (e.g., Blumstein *et al.*, 1997), and alarm calling in this context may be conceptualized as a form of altruistic parental care.

A related but empirically more challenging endeavor is based on the assumption that callers inevitably share high degrees of genetic relatedness with some other nondescendent kin, such as brothers and sisters. If kin selection operates as a selective force, then individuals should be just as willing to engage in risky alarm call behavior if it increases the survival chances of closely related nondescendent kin, apart from that of their own offspring, as long as they are sufficiently closely related to one another. Much empirical effort has been devoted to this topic, particularly in various rodent species, but the overall picture is incoherent. Males and females often differ in their alarm calling in the presence of nondescendent kin, suggesting that kin selection may have affected individuals in sex-specific ways. For example, in Gunnison's prairie dogs, *Cynomys gunnisoni*, females with nearby nondescendent kin call more often to a ground predator than females without nondescendent kin. Males commonly produce alarm calls, but calling is unrelated to kinship of nearby listeners (Hoogland, 1996). A nondescendent kin audience may enhance alarm calling to particular predator types only, but patterns vary from one species to the next. For example, Belding's ground squirrels, *Spermophilus belding,* show kin-sensitive response to terrestrial but not to aerial predators, where the caller's own exposure appears to be the main factor (Sherman, 1977, 1985). Conversely, the opposite pattern was found in Columbian ground squirrels (*Spermophilus columbianus*) (Macwhirter, 1992). In this species, females with offspring were more likely than other females to give alarm calls in response to a ground predator, but females did not behave nepotistically toward other nondescendent kin. However, females were more likely to emit alarm calls in response to aerial predators if close nondescendent kin were in the colony.

Kin selection has also been put forward as an explanation for the evolution of alarm calls in nonhuman primates, although the overall evidence is weak, at least for benefiting nondescendent kin. For example, spider monkeys alter their alarm call behavior as a function of the number of kin in the vicinity (Chapman *et al.*, 1990). Similarly, Kloss's gibbons produce alarm calls that can be heard in neighboring home ranges, which are often occupied by the callers' close relatives, suggesting that these calls may warn not only members of the immediate family, but also neighboring relatives (Tenaza and Tilson, 1977).

The emerging picture of the role of kin selection is that (a) alarm calling is clearly affected by the presence of descendent kin, and as such is a common aspect of parental care, and (b) in some species, kin selection may have additionally favored alarm calling to benefit a nondescendent kin audience, but no general patterns have emerged. In cases in which individuals' alarm calls appear to warn nondescendent relatives, kin selection seems to have acted in various idiosyncratic ways.

Alarm Calls Favored by Sexual Selection

Animals often give alarm calls when no kin are nearby, requiring a different set of evolutionary explanations. One set is built on the idea that alarm calls are sexually selected signals produced by males as part of

their attempts to increase their reproductive success (Zuberbühler, 2002). According to Darwin (1871), sexual selection "... depends, not on the struggle for existence, but on a struggle between the males for possession of the females; the result is not death of the unsuccessful competitor, but few or no offspring." In these cases, however, sexual selection must have acted as a secondary evolutionary force on communication systems in which alarm calls have already been present.

The sexual selection hypothesis is currently supported by a number of observations relating to alarm call structure and usage. In some species, males are more likely to produce alarm calls while in the presence of unrelated females than to other audiences (e.g., Evans *et al.*, 1994), suggesting that alarm calls may be part of a mating strategy to enhances the caller's reproductive success. Similarly, male vervet monkeys (*Cercopithecus aethiops*) alarm call at higher rates in the presence of adult females than adult males (Cheney and Seyfarth, 1990). In some species, not only do adult males differ from other age/sex classes in terms of call usage, but their alarm calls are also structurally different from those of the adult females. For example, it has long been known that the adult males in many forest monkey species produce conspicuous loud calls in response to predators, which carry over remarkable distances (e.g., Gautier and Gautier, 1977). Recent research on West African Diana monkeys, *Cercopithecus diana,* and other forest primates has shown that these calls function as predator alarm calls (Zuberbühler, 2002, 2003). Diana monkeys live in small but stable social groups with one adult male and several adult females with their offspring (Uster and Zuberbühler, 2001). The monkeys are hunted by leopards (*Panthera pardus*) and crowned eagles (*Stephanoaetus coronatus*), and both the adult male and the females produce conspicuous alarm calls to these two predators. However, the calls of the males are structurally different from those of the females. They are low-pitched, high-amplitude signals given in repeated bursts, which carry over long distances through dense tropical forest habitat, sometimes up to one kilometer (Zuberbühler, 2003) (**Figure 1**).

A number of observations support the hypothesis that these male alarm calls have been under pressure by sexual selection. Polygynous social systems, in which one adult male mates with several adult females, are notorious for sexually selected conspicuous male traits, including vocalizations (Clutton-Brock and Albon, 1979). In these social systems, male competition over females is especially high, which typically leads to the evolution of male traits that are useful in male–male competition or that females find attractive (Anderson, 1994). In polygynous monkeys, such as the Diana monkey, males typically try to take over a group of females and mate with them for some time until replaced by another male. If females are able to exert some choice over tenure length of a particular male, then one might expect to see a relation between female tolerance toward the male and how committed he is to engaging in antipredator behavior, such as producing costly alarm calls in the presence of a predator (Eckardt and Zuberbühler, 2004). An alternative explanation is that sexual selection has usurped male alarm calls and transformed them into signals effective in male–male competition. The fact that the male alarm calls carry over very long distances suggests that the intended recipients are not just the male's own group members (which are usually within about 100 m), but also single males roving through the forest or subadult males in neighboring groups. By making their presence and vigor known, tenured males may avoid costly encounters with these males in search of a group of females.

It is interesting to note that during puberty several developmental changes occur in the vocal behavior of male Diana monkeys and other guenons, specifically a drop in pitch and the loss of some of the juvenile vocal repertoire (Gautier and Gautier, 1977). In the Taï forest, Ivory Coast, subadult male Diana monkeys go through a phase in which their alarm shows remnants of a female alarm call as well as the first emerging elements of a fully developed male loud call, suggesting that males go through a transition phase when their calls develop from female alarm calls to male loud calls (Zuberbühler, 2002), a further sign that sexual selection has acted secondarily on the structure and usage of male monkey alarm calls.

Strong evidence for the sexual selection hypothesis is not yet available, although the hypothesis makes various testable predictions. For example, for females to be able to exert a choice, male alarm calls must be individually distinctive, perhaps more so than their own calls. In Diana monkeys, this is certainly the impression one gets after listening to various recordings. Another prediction might be that after a new male takes over, he ought to be especially eager to demonstrate his commitment to antipredator defense by producing large numbers of alarm calls. One such case has been documented in putty-nosed monkeys (*Cercopithecus nictitans*; Eckardt and Zuberbühler, 2004).

Alarm Calls Favored by Individual Selection

Both kin selection and sexual selection suggest that alarm calling provides a net benefit to the caller because it increases the survival chances of close genetic relatives or the reproductive success of the caller. However, in some cases callers may also

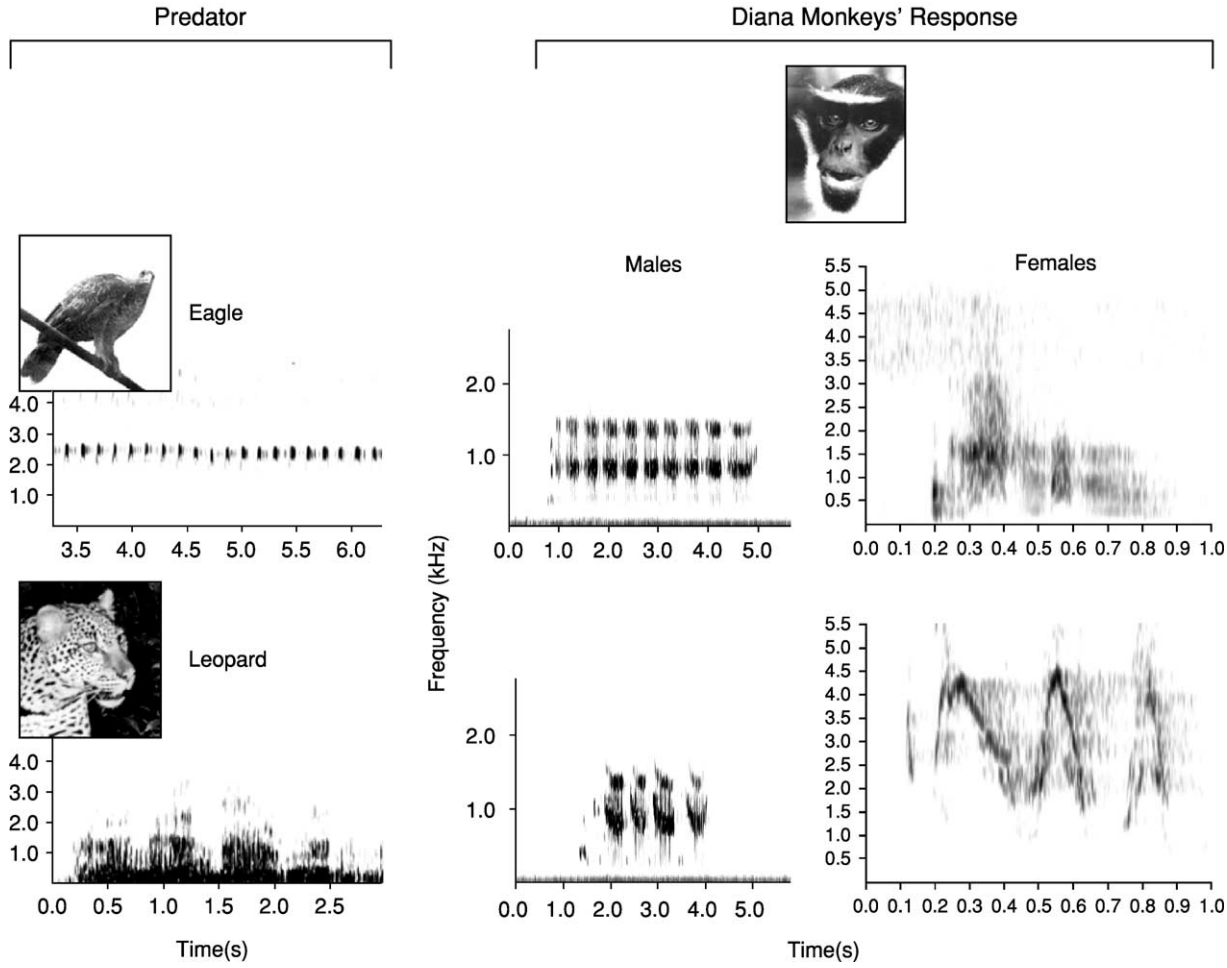

Figure 1 Spectrographic representations of the predator alarm calls of male and female Diana monkeys in the Taï Forest, Ivory Coast. Reprinted from Zuberbuhler K, Cheney D L & Seyfarth R M (1999). *Journal of Comparative Psychology 113*, p. 33–42. Copyright 1999 by the American Psychological Association. Reproduced with permission.

enjoy direct benefits from their actions in terms of their own survival. This is the case if alarm calls elicit collective antipredator behavior in nearby recipients, which confuses or disorients the predator (the prey manipulation hypothesis) (e.g., Charnov and Krebs, 1975).

An alternative idea is that alarm calls directly interfere with the predator's hunting tactic, for example, if predators depend on unwary prey (the perception-advertisement hypothesis), (e.g., Bergstrom and Lachmann, 2001). Recently, this version of the individual selection hypothesis has received some empirical attention. Work on free-ranging Diana monkeys has shown that some primate alarm calls function to advertise perception to predators that rely on unprepared prey, such as leopards (Zuberbühler and Jenny, 2002) and crowned eagles (Shultz and Noë, 2002). Playback experiments have demonstrated that the presence of crowned eagles and leopards reliably elicited high rates of conspicuous alarm calls in Diana monkeys, whereas playbacks of two other equally dangerous predators, chimpanzees (*Pan troglodytes*) and human poachers, never did (Zuberbühler, 2003). The most likely explanation for these striking differences in alarm call usage is that chimpanzees and humans, but not leopards or eagles, are able to pursue monkeys in the trees, which greatly increases the costs of conspicuous alarm calling. A follow-up study involving most other primate species in the Taï Forest indicated that the pattern described for the Diana monkeys is also accurate for other monkey species (Zuberbühler, 2003; Figure 2).

But are these alarm calls really effective in deterring monkey-hunting leopards? To investigate whether or not this is the case, the hunting behavior of a number of wild leopards in the Taï forest has been monitored with the help of radio-tracking equipment (Zuberbühler, 2003; Zuberbühler and Jenny, 2002). Results have shown that forest leopards hunt monkeys by approaching unwary groups and hiding in their vicinity, presumably to wait for individuals to descend to the ground. Once the monkeys detected a

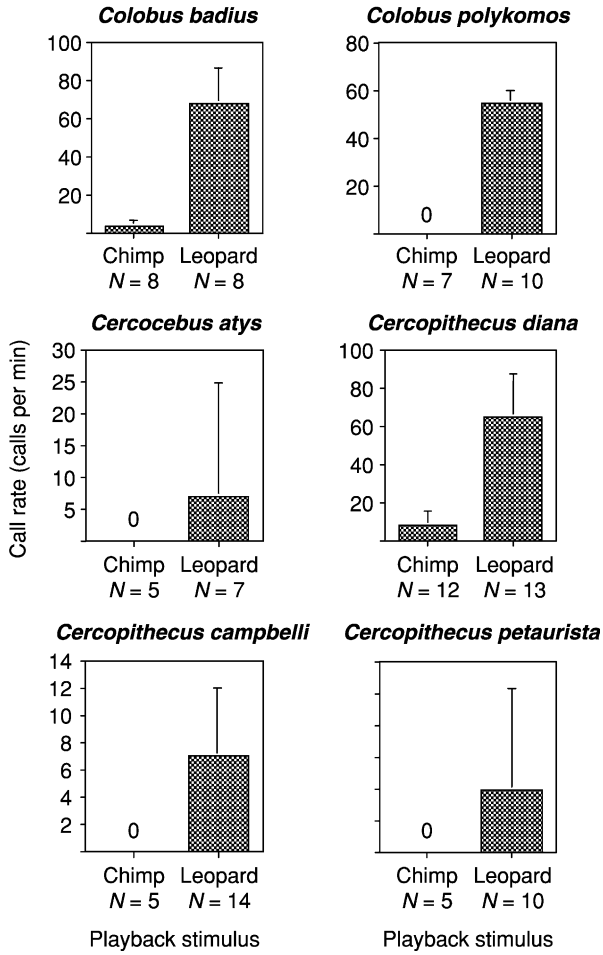

Figure 2 Alarm call behavior of six Taï monkeys in response to chimpanzee pant hoots and leopard growls. Reprinted from Zuberbuhler K, Jenny D & Bshary R (1999). *Ethology 105*, 477–490. Blackwell Publishing Ltd. Reproduced with permission.

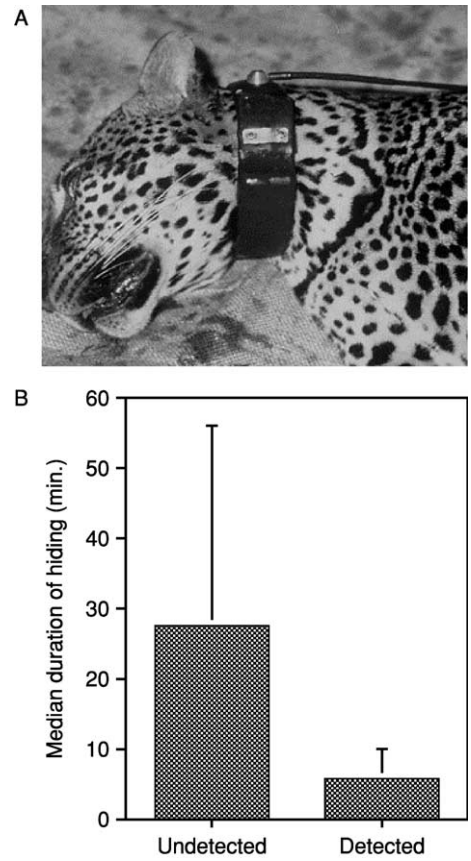

Figure 3 (A) Immobilized forest leopard is being equipped with a radio-tracking collar. (B) Average duration of hiding behavior of Taï leopards before and after detection by a group of monkeys. Reprinted from Zuberbuhler K, Jenny D & Bshary R (1999). *Ethology 105*, 477–490. Blackwell Publishing Ltd. Reproduced with permission.

hiding leopard, however, they invariably began to produce alarm calls at very high rates, which typically caused the leopard to leave the area (Figure 3), showing that these alarm calls function to advertise perception and to deter the stalking leopards.

The Cognitive Bases of Alarm Calls

The previous section addressed the problem of why animals produce conspicuous alarm calls in the presence of a predator; the remainder of the article deals with the cognitive processes involved in alarm call production and perception. The focus is on empirical evidence that is perhaps most relevant for the linguistically interested reader: the kinds of cognitive abilities nonhuman primates recruit when processing their own vocalizations. Results are relevant to assess whether or not these abilities are akin to those involved in speech processing in humans. Theories of language origins have to explain how the highly complex and sophisticated cognitive capacity required for language processing has evolved in an extremely short period of time. Several lines of evidence suggest that humans did not have the anatomical and neural prerequisites to produce modern speech until very recently (Lieberman, 2000; Enard *et al.*, 2002). One implication is that many of the cognitive capacities required for language are phylogenetically much older, having evolved in the primate lineage long before the advent of modern humans and for reasons other than language production. An empirical investigation of the cognitive capacities of our closest living relatives, the nonhuman primates, is therefore of particular interest, because they may shed light on the evolutionary origins of cognitive processes underlying speech. Of particular interest are semantic and syntactic abilities, as they are central to virtually every definition of language (Crystal, 1997). Three aspects are dealt with: (a) the structure of alarm calls, (b) how they are being used in particular circumstances, and (c) the kinds of mental processes that recipients activate when responding to them.

Alarm Call Structure

The fact that an animal produces different types of alarm calls alone is not a particularly exciting finding; it has been demonstrated in many groups of animals, primates and nonprimates alike (e.g., *nonprimates*: Slobodchikoff *et al*., 1991; Blumstein and Arnold, 1995; Gyger *et al*., 1987; e.g., *primates*: Struhsaker, 1967; Macedonia and Evans, 1993; Fichtel and Kappeler, 2002; Eckardt and Zuberbühler, 2004). In primates, and probably most other groups, alarm call production appears to be under relatively tight genetic control, with callers having little flexibility for structural modification (see Blumstein, 1999). For example, infant vervet monkeys rarely produce alarm calls, but if they do, their alarm calls are acoustically similar to those of adult animals (Seyfarth and Cheney, 1997). Their vocal stiffness is the product of very limited control over the articulators, particularly the tongue (Riede *et al*., 2005). Although some flexibility is possible, nonhuman primates simply do not have sufficient command over the geometry of their vocal tracts to deliver the extensive array of phonemes that bring about human speech.

How exactly the different acoustic structures emerge in the different animal species may not be a random affair. Marler (1955) has argued that some animals have evolved alarm calls with acoustic features that make it hard for predators to detect the caller. The classic example is a passerine aerial predator alarm, the "seeet" call, which humans find hard to locate. However, experimental work has shown that several raptors are able to accurately orient toward the source of playback recordings of passerine "seeet" calls, although the response rates were somewhat lower compared to other alarm call types (Shalter, 1978). Whether this was a result of the raptors' experiencing perceptual difficulties, as Marler argued, or whether the raptors were simply less motivated to orient toward "seeet" calls because they indicated that the prey was alert, as Shalter argued, is an unresolved issue.

Another line of reasoning refers to the idea that there is an inherent relation between an individual's psychological state and the acoustic structure of the vocalizations it produces, the so-called motivational-structural rules (Morton, 1977). Here, the proposition is that individuals give low-frequency atonal vocalizations when prepared to assail an opponent. High-frequency tonal vocalizations, in turn, are more likely to be linked with an intention to withdraw. As predators differ in the kinds of threat they pose, and the most adaptive strategies to counteract them, this line of reasoning may also explain some acoustic patterns in alarm calls (see following discussion).

Alarm Call Usage

From a comparative cognitive perspective, studies of call usage are of some interest because it is sometimes possible to determine what aspects of the environment an individual responds to when giving alarm calls. Particularly enlightening work has been conducted on domestic chickens (*Gallus domesticus*). Cockerels produce acoustically distinct alarms to raptors and ground predators, suggesting that these alarm calls might function as labels for certain predator classes. However, experiments have shown that callers mainly respond to a predator's direction of attack, regardless of its biological class. For example, when a picture of a raccoon, a typical ground predator, is moved across an overhead video screen, cockerels respond with aerial alarm calls, which they normally give to raptors (Evans *et al*., 1994). Similarly, although some species of squirrels produce acoustically distinct alarm calls, they also appear not to respond to the predator category *per se,* but instead to the relative distance and threat imposed by the predator (e.g., Leger *et al*., 1980). The squirrels' alarm call system is hence capable of encoding the degree of urgency that a caller assigns to a particular event. Similar findings have been reported from other species, such as Arabian babblers (*Turdoides squamiceps*; Naguib *et al*., 1999) and yellow-bellied marmots (*Marmota flaviventris*; Blumstein and Armitage, 1997), both of which produce acoustically distinct alarm calls but do not assign them systematically to particular types of predators.

This naturally raises the question of whether or not it is appropriate to assume that monkey alarm calls are labels for different types of predators, in the sense that they encode the biological class of predators. Similar to chickens or marmots, monkeys may simply respond to the momentary threat imposed by a predator, regardless of its biological class. Here, alarm calls may be reflections of a caller's momentary perceived threat, rather than true labels of external events. To distinguish between the two hypotheses, the following playback experiment was conducted with Diana monkeys. Recordings of eagle shrieks or leopard growls were broadcast from a concealed speaker to various wild groups throughout the Taï forest. The position of the speaker was altered systematically such that groups differed in how they encountered the alleged predator. In some cases, the predator vocalizations, either eagle shrieks or leopard growls, were either close or far, or played from below or from above, resulting in eight different playback conditions. Monkeys consistently responded to the predator category represented by the playback stimuli, regardless of immediate threat or direction of

attack. Similar findings were later reported from closely related Campbell's monkeys, *Cercopithecus campbelli*, suggesting that nonhuman primates generally label the biological class of a predator, regardless of momentary discrepancies in degrees of threat (Zuberbühler, 2003).

How does an individual monkey learn to use the leopard alarm call to leopards, but not to snakes? Not much is known about how monkeys learn to use their alarm call repertoire. Some observational data are available from free-ranging vervet monkeys. Although monkeys come in contact with over 150 species of birds and mammals, only a small proportion of these species pose a threat (Seyfarth and Cheney, 1997). One intriguing observation has been that infant vervet monkeys do not appear to apply their innately encoded set of alarm calls randomly to these various groups of animals. Instead, infants give eagle alarm calls only to birds and objects in the air, but never to terrestrial animals (Cheney and Seyfarth, 1990). Similarly, infants initially give leopard alarm calls to a variety of species on the ground, most of which do not pose any danger to them. One interpretation has been that primates are predisposed from birth to divide other animals into a few main groups and then learn to restrict call usage to a small number of relevant predator classes (Seyfarth and Cheney, 1997). Thus, alarm calls appear to be the output of certain psychological states, which are invoked by certain types of events. During maturation monkeys learn to restrict call use to those few species that pose a threat to them. This may also explain why alarm call production is so uniform across various populations in a given species.

In this sense, alarm call production might be analogous to nonlinguistic human utterances, such as laughing. Whether or not an event is perceived as amusing is the result of a cognitive process that draws on various memories. Once it qualifies, people will inadvertently experience amusement, and laughing will be difficult to suppress.

The following observation may illustrate the point. In a group of Campbell's monkeys, housed at the Paimpont Primate Research Station of the University of Rennes, a captive-born adult male was observed to produce eagle alarm calls during an aggressive interaction with a group of DeBrazza's monkeys (*Cercopithecus neglectus*), housed in the adjacent cage (Zuberbühler, unpublished data). During the interaction, the male was vigorously shaking the fence, trying to assault the neighboring individuals, a behavior regularly seen in free-ranging males interacting with predatory crowned eagles. Eagle alarm calls, in other words, may be the vocal manifestation of an extremely aggressive motivation on behalf of the male, which in the wild is typically elicited by the appearance of a crowned eagle. The captive male, having never had the opportunity to interact with an eagle, produced the calls during an aggressive interaction with another monkey species.

Alarm Call Comprehension: Conspecific Calls

What kinds of mental representations do individuals activate as recipients of alarm calls, that is, when hearing another individual's calls? One answer comes from a classic study conducted on East African vervet monkeys. In this species, individuals produce acoustically different alarm calls to at least five different types of predators: large terrestrial carnivores, eagles, snakes, baboons, and unfamiliar humans (Seyfarth and Cheney, 1997; Struhsaker, 1967). Playback experiments have demonstrated that some of these calls elicit in other monkeys antipredator responses that resemble their natural response to the corresponding predators. For example, playbacks of eagle alarm calls cause monkeys to look up into the air or run into a bush (Seyfarth *et al.*, 1980; Struhsaker, 1967). In the meantime, similar findings have been reported from other monkey species. As mentioned previously, Diana monkey males and females produce acoustically different alarm calls to crowned eagles and leopards. When hearing a male's alarm calls, nearby females respond with their own corresponding alarm calls, suggesting that the calls contain information about the type of predator present (**Figure 4**).

What kinds of mental representations are responsible for the monkeys' behavior? A cognitively simple model might suggest that the females' response is based on rather superficial processing: individuals respond to the physical features of alarm calls without accessing any of their potential associated meanings. Alternatively, alarm call processing might be more akin to that of linguistic information processing. In human language, speech sounds are not just processed at the peripheral acoustic level, but in relation to the types of cognitive structures they refer to, which are shared by both the signaler and the recipient (e.g., Yates and Tule, 1979).

Under field conditions, questions concerning mental processes are difficult to address, mainly because the choice of experimental techniques is so limited. One paradigm has turned out to be of significant value: the prime-probe technique. It is a variant of the habituation–dishabituation procedure initially developed for prelinguistic children (Eimas *et al.*, 1971), but differs from it because it does not have a long habituation phase. Instead, animals are provided with a one-time exposure to some critical information

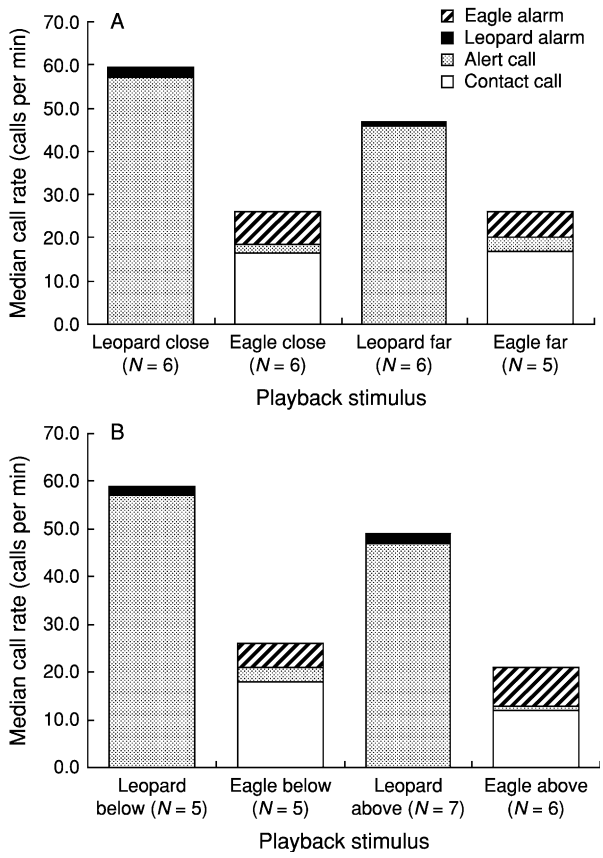

Figure 4 Diana monkey responses to playbacks of predator vocalizations presented with varying degrees of threat: (A) distance, (B) direction of attack. Reproduced from Zuberbuhler K (2000). *Animal Behaviour 59(5)*, 917–927, with permission of Elsevier.

and then tested on the effect of this manipulation of their subsequent response to an experimental probe stimulus. Figure 5 illustrates the design used to investigate whether Diana monkeys process alarm calls by accessing mental representations of associated predator classes.

In each trial, the playback speaker was positioned in the vicinity of a monkey group. Monkeys were primed with either predator vocalizations (baseline) or alarm calls (test and control). After a five-minute period of silence, the probe stimulus was broadcast. Baseline, test, and control conditions differed in the types of changes between prime and probe stimulus. In the baseline condition, both the acoustic and semantic features were alike. The prediction was that subjects would produce many alarm calls to the prime stimulus but only few calls to the probe stimulus because both the acoustic and the semantic information were repeated. In the test condition, subjects heard alarm calls followed by vocalizations of the *corresponding* predator. In this condition, the semantic features remained the same, whereas the acoustic features changed. Subjects were expected to respond to the probe by producing (a) many alarm calls (if they attended to the acoustic-perceptual features) or (b) few alarm calls (if they attended to the semantic-conceptual information). Finally, in the control condition, both the acoustic and the semantic features changed. Subjects heard an alarm call followed by the call of the *noncorresponding* predator. Because both the acoustic and the semantic features changed, subjects were expected to produce many alarm calls to both the prime and the probe stimuli, regardless of how they processed the calls.

Results showed that the semantic content of the prime stimuli, not their acoustic features alone, explained the response patterns of the monkeys to the probe stimuli (Zuberbühler, 2003). That is, both eagle shrieks and leopard growls, two very powerful stimuli, lost their effectiveness in eliciting alarm calls when subjects were primed with the corresponding male alarm calls. Figure 6 illustrates the effect in response to the crowned eagle.

In conclusion, this experiment suggests that only variation in the semantic properties mattered to the monkeys when reacting to the vocalizations. Primates, in other words, appear be able to process alarm calls on a conceptual–semantic rather than a perceptual–acoustic level (Cheney and Seyfarth, 1990).

Alarm Call Comprehension: Eavesdropping

Primates are highly attentive to the alarm calls of other species. Vervet monkeys (*Cercopithecus aethiops*), for example, respond to superb starlings' (*Spreo superbus*) terrestrial and raptor alarm calls as a function of the calls' referential space – the natural range of predators that typically elicit the alarm calls. Young vervet monkeys need several months to learn to fully interpret starling alarm calls (Cheney and Seyfarth, 1990). Taï forest monkeys respond to the alarm calls of several nonprimate species that are hunted by leopards, such as various species of squirrels and duikers. One interpretation is that the monkeys have a fairly sophisticated understanding of the causes that determine another species' alarm call behavior. Interspecies communication, in other words, may provide additional valuable opportunities to investigate the cognitive mechanisms underlying monkey alarm call processing.

To investigate whether monkeys are able to attend to the most likely cause of an alarm call, as opposed to responding directly to the alarm call itself, the following experiment was conducted. Crested guinea fowls (*Guttera pucherani*), a gregarious ground-dwelling forest bird, produce alarm calls to a series of ground predators, including humans and leopards. When hearing guinea fowl alarm calls, Diana monkeys typically respond with leopard alarm calls,

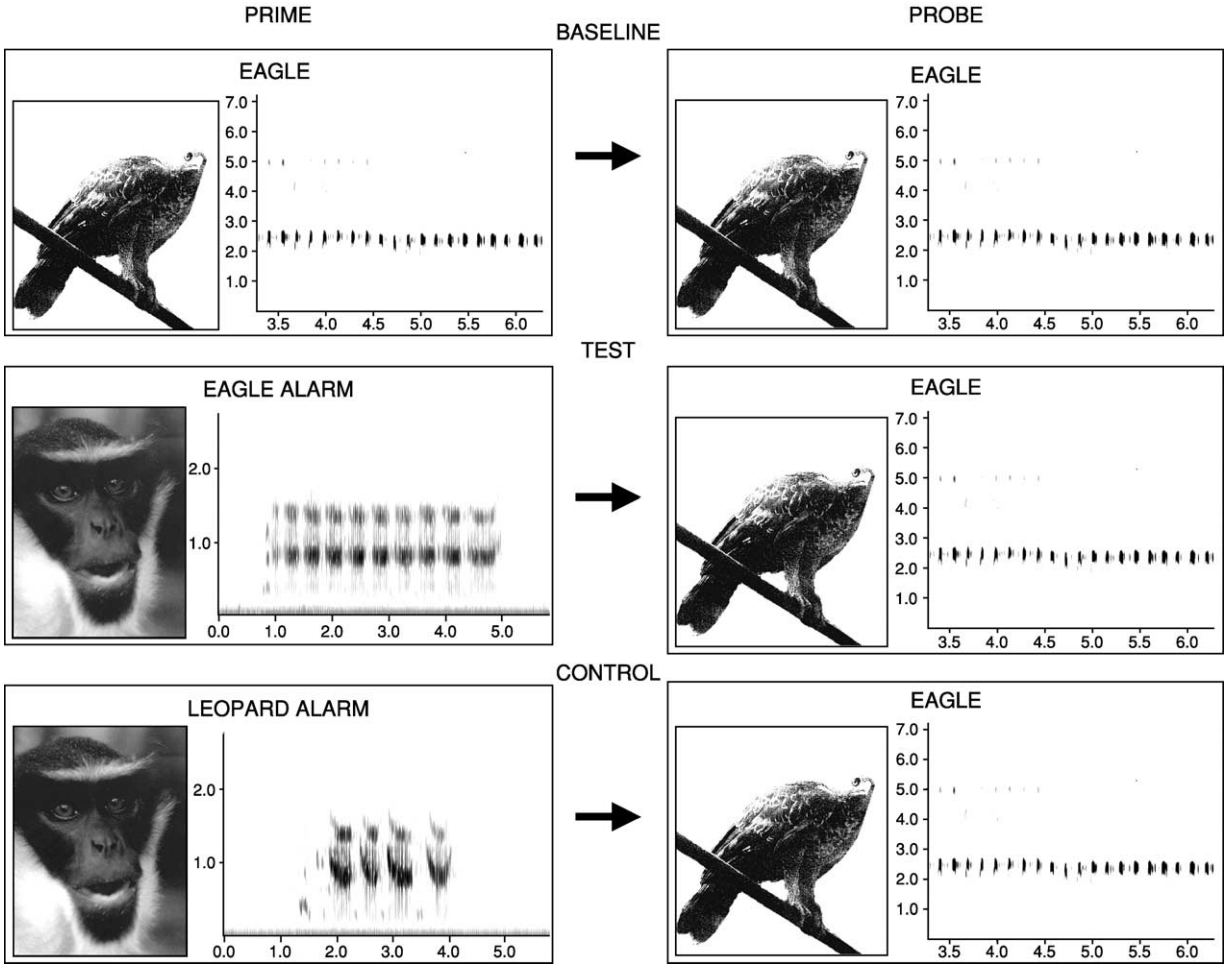

Figure 5 Design of the playback study: Monkey groups are primed with eagle- or leopard-related stimuli and then tested with eagle shrieks. Baseline, test, and control condition differ in the acoustic and semantic similarity of the prime and probe stimuli. X-axes of spectrograms represent time(s), y-axes represent frequencies (kHz). Reprinted from Zuberbuhler K, Cheney D L & Seyfarth R M (1999). *Journal of Comparative Psychology 113*, 33–42. Copyright 1999 by the American Psychological Association. Reproduced with permission.

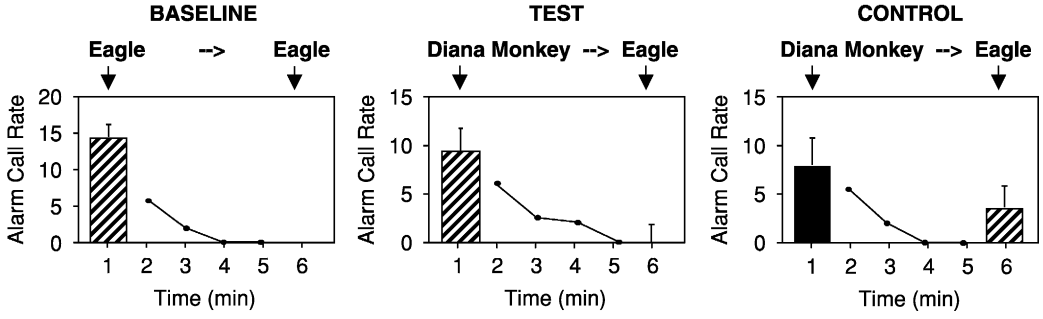

Figure 6 Results of the prime-probe experiments using eagle shrieks as probe stimuli. Histograms represent the median number of eagle alarm calls (hatched) or leopard alarm calls (solid) given in the first minute after a playback stimulus. Error bars indicate the values of the third quartile of the data set. The points connected by lines between them represent the median alarm call rate during the five-minute period of silence in between two playback stimuli. Using leopard growls as a probe stimulus yielded analogous results. Reprinted from Zuberbuhler K, Cheney D L & Seyfarth R M (1999). *Journal of Comparative Psychology 113*, 33–42. Copyright 1999 by the American Psychological Association. Reproduced with permission.

suggesting that the monkeys associate guinea fowl alarm calls with the presence of a leopard. However, crested guinea fowls sometimes give the same alarm calls to humans, which appears to place the monkey in a behavioral dilemma: the best antipredator response to humans is to remain silent to avoid detection, whereas the best response to leopards is produce a large number of alarm calls to advertise perception.

To make the appropriate decision, Diana monkeys have to be able to draw some inferences about the possible causes of the birds' alarm calls. To investigate the monkeys' level of causal understanding, different groups of Diana monkeys were primed to the presence of a leopard or a human poacher by playing back brief recordings of either leopard growls or human speech in the vicinity of a monkey group. Then, after a five-minute period of silence, the same group was exposed to playbacks of guinea fowl alarm calls. If the monkeys are able to draw inferences about the potential causes of guinea fowl alarm calls, then they should response with alarm calls after being primed with leopard growls, but not after being primed with human speech. However, if the monkeys have simply learned to associate guinea fowl alarm calls with the presence of a leopard (as their natural response seems to suggest), then their response to guinea fowl alarm calls should not differ between the two conditions. Results revealed significant differences in the way leopard-primed and human-primed Diana monkey groups responded to guinea fowl alarm calls, suggesting that the monkeys' response was not driven by the guinea fowl alarm calls themselves, but by their momentary beliefs of the type of predator most likely to have caused the birds to give alarm calls (Zuberbühler, 2003).

A similar problem exists when the monkeys are confronted with a nearby group of chimpanzees, a dangerous predator (Boesch and Boesch-Achermann, 2000). But chimpanzees are occasionally attacked and preyed upon by leopards themselves (Boesch and Boesch-Achermann, 2000; Zuberbühler and Jenny, 2002). When this happens they give loud and conspicuous alarm calls, the 'SOS' screams (Goodall, 1986). When chimpanzee SOS screams were broadcast to different groups of Diana monkeys, about half of all the groups tested switched from a chimp-specific cryptic response to a leopard-specific conspicuous response (see Figure 2), suggesting that in some groups individuals assumed the presence of a leopard when hearing the chimpanzee alarm screams. Interestingly, Diana monkey groups with a home range in the core area of a resident chimpanzee community were significantly more likely to do so than peripheral groups, which were more likely to respond cryptically, suggesting that Diana monkey groups differ in semantic knowledge of chimpanzee vocal behavior (Zuberbühler, 2003; Figure 7).

Interspecies communication not only occurs between predator and prey but also between different species of primates. For example, ring-tailed lemurs (*Lemur catta*) respond appropriately not only to their own alarm calls but also to playbacks of the alarm calls of sympatric sifakas (*Propithecus verreauxi*; Oda and Masataka, 1996). The Taï monkeys regularly forage in mixed species groups to improve their protection against predation, and it is therefore not surprising that individuals of mixed species groups respond to each other's alarm calls, such as in the case of the Diana monkey–Campbell's monkey association (Wolters and Zuberbühler, 2003). Male Campbell's monkeys produce two acoustically different alarm calls to crowned eagles and leopards. Playbacks of Diana monkey alarm calls to Campbell's monkeys and vice versa reliably elicited the appropriate alarm responses in the other species (Zuberbühler, 2003). This ability, however, may not be a uniquely primate capacity. Recent playback experiments with yellow-casqued and black-casqued hornbills showed that these birds readily distinguish between Diana monkey eagle and leopard alarm calls (Rainey *et al.*, 2004).

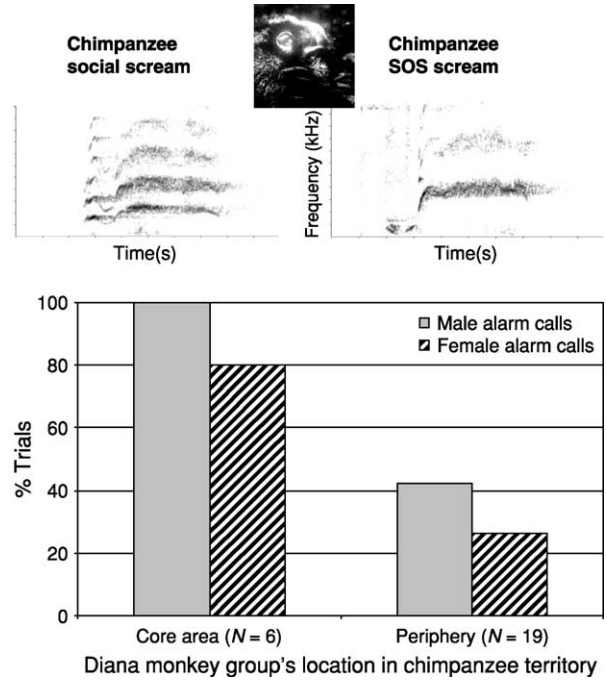

Figure 7 Relationship between a Diana monkey group's tendency to respond with leopard alarm calls to chimpanzees' SOS screams and the location of their home range within the resident chimpanzees' territory. Chimpanzee social screams did not elicit any alarm calls. Reproduced from Zuberbuhler K (2000). *Animal Behaviour 59(5)*, 917–927, with permission from Elsevier.

However, primates may be unique in their abilities to attend to the semantic properties of other species' alarm calls. For example, in a prime-probe experiment similar to the one presented earlier (Figure 5), Diana monkeys have been shown to process the semantic features of the Campbell's alarm calls analogous to how they process their own calls (Zuberbühler, 2003). Further work on the Campbell's–Diana monkey system showed that alarm calls undergo semantic adjustments in the minds of the recipients, depending on the sequencing of alarm

calls. As mentioned earlier, Campbell's monkey males give acoustically distinct alarm calls to leopards and crowned eagles, and Diana monkeys respond to these calls with their own corresponding alarm calls. However, in less-dangerous situations, Campbell's males often emit a pair of low, resounding 'boom' calls before their alarm calls. Playbacks of boom-introduced Campbell's eagle or leopard alarm calls no longer elicited alarm calls in Diana monkeys, indicating that the booms have affected the semantic specificity of the subsequent alarm calls, suggesting that monkeys are able to attend to simple syntactic cues when responding to each other's alarm calls (Zuberbühler, 2003).

Is it reasonable, therefore, to liken these animal signals to human words? After all, they share one of the most fundamental properties, the ability to transmit accurate acoustic information about an external event, which is subsequently decoded by insightful recipients. Still, most researchers have remained cautious when interpreting these kinds of data, even in the case of primates. The reason for that stems from a fundamental discrepancy between the cognitive processes driving alarm call production and those governing their perception. There is simply no evidence that, when producing an alarm call, nonhumans are actively trying to inform each other about the events they have just witnessed. Instead, primate behavior appears to be the result of a caller's egocentric interaction with the world, although in some cases the signals happen to reliably and uniquely denote an external event. For this reason, it has been argued that animal alarm calls are merely functionally referential (or semantic), in contrast to true or intentional referentiality, which presumably underlies human speech. Nevertheless, it would be interesting to know how ubiquitously human speech production is intentionally guided, as opposed to speakers' simply knowing which bits of language are used appropriately in which circumstances.

Conclusions

Alarm calling is found in a large number of species, demonstrating its adaptive value in predation avoidance. It is also intriguingly absent in others, such as some nocturnal prosimians (E. Bramley, personal communication), suggesting that alarm calls are a product of sociality. There is evidence that alarm calls are or have been under the influence of all major selective forces (i.e., individual, kin, and sexual selection), although it is difficult to identify general patterns concerning the importance of these forces.

In nonhuman primates, alarm calling is the result of complex cognitive processes, particularly in the mind of the recipient. Nonhuman primates are highly attentive to stimuli that predict the presence of a predator, and they have demonstrated astonishing skills in solving predation-related problems. This is interesting because predation is an ecological force usually thought to have led rather basic and rigid behavioral patterns, but not to higher cognitive abilities (Humphrey, 1976). For nonhuman primates, this might have been a misconception because in many of the experiments discussed here, monkeys were showing behavior that resulted from seemingly higher cognitive processes, such as inference making, causal understanding, semantic and syntactic processing, and rapid association learning. Predation, in other words, might have provided a strong selection pressure to favor the evolution of higher intellectual faculties in nonhuman primates. The way they produce, use, and interpret their own and other species' alarm calls is a clear manifestation of this intelligence.

Acknowledgments

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See also: Animal Communication: Deception and Honest Signaling; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Categorical Perception in Animals; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Development of Communication in Animals; Individual Recognition in Animal Species; Nonhuman Primate Communication; Production of Vocalizations in Mammals; Traditions in Animals.

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Albania: Language Situation

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See also: Albanian; Macedonia: Language Situation; Serbia and Montenegro: Language Situation.

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Antoni Maria Alcover i Sureda was born in Manacor (Majorca) on February 2, 1862. In 1877, he started studying in the Seminary of Palma de Mallorca. There, he discovered his interest in literature and languages. Beginning in 1880, he collaborated in *L'Ignorancia*, and in 1882 he won his first literary award. In 1886, he took Holy Orders.

Parallel to his priestly work, Alcover was the author of an enormous body of work – apologies, polemics, history, archaeology, and, especially, folklore and linguistics. The most valued manifestations of his folklorist work are his *Contarelles* (1885, 1915) and *Rondayes* or *Rondalles* (from 1896), published under the pseudonym 'Jordi des Recó.' Undoubtedly, the work that became essential to the history of Catalan and Romance lexicography is the *Diccionari català-valencià-balear* (1980), for which the author wrote a public invitation to collaborators (*Lletra de convit*) in 1901 (published in 1902). The scholars' acceptance of this ambitious enterprise transcended the local ambit. This generated the need for a means of communication among the contributors to the dictionary: the *Bolletí del Diccionari de la Llengua Catalana,* the first linguistic journal of the Catalan-speaking areas.

At the same time and until 1928, Alcover took what he called *eixides filològiques*, these being 'philological leaves,' consisting of: (1) training journeys: as a self-taught person, and aware of his limited linguistic knowledge, he visited European countries to learn scientific methodology on dialectological research; and (2) fieldwork journeys around the Catalan-speaking countries, in order to explore the state of Catalan and also to extend his work.

His research incorporated a new approach into Catalan dialectal variation, based on the exploration of speakers' pronunciations. His results were published in the *Bolletí*: *Una mica de dialectologia catalana* (1914–1915) and in *Questions de llengua i literatura catalana* (1902–1903).

In 1911, Alcover was named president of the Catalan Language Institute (*Secció Filològica de l'Institut d'Estudis Catalans*). However, strong differences in character and in working objectives with the institute members made him leave. After this association broke off, the Spanish government subsidized the *Diccionari* from 1920 to 1926. When the subsidy was cut off, Alcover did his utmost to ensure the continuity of the dictionary, and he even went into debt. The dictionary became a reality at the end of 1926. Nowadays it is a useful 10-volume lexical inventory of 160 000 Catalan words obtained from more than 300 localities. It was written first by Alcover and then by Francesc de Borja Moll, and later, with the collaboration of Manuel Sanchis Guarner and Aina Moll. By Alcover's death, on January 8, 1932, the first installment of the second volume of the *Diccionari català-valencià-balear* had been published.

See also: Lexicography: Overview; Sanchis Guarner, Manuel (1911–1981).

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Algeria: Language Situation

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This article is a brief presentation of the current linguistic situation in Algeria following the language planning policies implemented by successive Algerian governments since 1962.

Algeria (Al Djazair in Arabic) is situated in Northern Africa, bordering the Mediterranean Sea, between four other nations of the Maghreb: Morocco and Mauritania to the west and Tunisia and Libya to the east. Its 1200 km of northern coastline runs along the Mediterranean Sea, and it stretches some 2000 km south to the borders of Niger and Mali. It is Africa's second largest country, covering an area of 2 381 741 sq km. Two mountain ranges divide Algeria into three geographical zones. In the north is a fertile coastal lowland strip, which has a temperate Mediterranean climate and a high plateau zone, where the vast majority of the population (87%) is concentrated. In the south, the Sahara Desert accounts for four-fifths of the country's territory. It is arid and sparsely populated but contains the fifth largest reserves of natural gas in the world. Algeria is the world's second largest gas exporter. The oil and gas industry is the backbone of the economy, accounting for 95% of export earnings.

Language Conflict

Immediately after achieving independence from France in 1962, Algeria launched a series of measures to re-Arabize the country. This policy, referred to as 'Arabization', was largely a reaction against the cultural and linguistic domination of France. It had three principal objectives. First, it would reverse the dominance of the French language and impose the use of Arabic on all the sectors that used to be the exclusive domain of French – education, law, the media, and the government. Second, it would replace a foreign language (French) by what was seen as the national language (Arabic). Third, Arabization aimed to eliminate all vernaculars, i.e., spoken varieties of Arabic and Tamazight, to ensure national unity around a central government whose working language would be Arabic. All four Algerian constitutions (1963, 1976, 1989, and 1996) reject multiculturalism and multilingualism, stating that Arabic is the sole official and national language.

However, today, Algeria is still a multilingual country where at least three languages are in competition: Arabic, Tamazight, and French.

The Arabic Language

Arabic is a diglossic language whose high variety has been declared constitutionally the national and official language of the country. The term 'Arabic' refers to several language varieties that exist side by side throughout the community, each with a definite functional distribution. These varieties can be divided into three main categories. The first is Classical Arabic, which is the most prestigious variety. It has a long literary tradition and, as the language in which the Koran is written, it is considered to be a model of linguistic excellence.

The second is Modern Standard Arabic or literary Arabic, a form that has evolved from efforts to modernize high Arabic and make it better able to meet the demands of modern life. It is the official language of government, the courts, education, science, and the media. It is also the medium of oral communication used by educated Arab people across nations, with different spoken varieties. Its prestige also stems from the fact that it is recognized as an official language of various international organizations and is used in all the Arab countries, stretching from the Persian Gulf in the east to the Atlantic Ocean in the west.

The third is the low variety, which is also known as Dialectal, Colloquial, or Algerian Arabic. It is spoken by the majority of the population, for whom it is the mother tongue (except for Tamazight speakers). It consists of a number of regional varieties, including rural and urban forms (Algerian Saharan spoken and Algerian spoken), which are not normally used for written communication. The low variety is viewed as a degraded form of pure Arabic and therefore has no official status. Like Tamazight, it is classed under the derogatory category of 'dialects.'

Tamazight

The policy of Arabization met with resistance from the Tamazight-speaking populations, who saw it as a negation of their national cultural heritage. Tamazight, which is the language of the indigenous people (Berbers) of North Africa, is mentioned in none of the country's constitutions.

Statistics concerning the number of Tamazight speakers vary, because Algerian censuses do not take linguistic factors into consideration. They are estimated to make up between 25% and 30% of the total population.

The main Berber varieties are Taqbaylit (Kabyle) spoken in the Northern area of Kabylia, which hosts the largest Berber population. The second biggest language group is Chaouia (Shawiya) in central

eastern areas of Algeria. The third language group can be found in the Saharan areas of the countries and consists of varieties such as Tumzabt, Taznatit, and Tamahaq.

There have also been some moves to recognize the validity of Tamazight. The Haut Commissariat à l'Amazighité (High Commission for Amazighity) was created in 1995 to promote and develop Tamazight, with a view to introducing it in the educational system. Some level of official recognition has been achieved with the broadcast of a news summary on national television and the opening of undergraduate and postgraduate courses in Tamazight linguistics, literature, and culture at the universities of Tizi-Ouzou and Bejaia in the Kabylia region.

In October 2001, after widespread unrest in Kabylia, Tamazight was recognized as Algeria's second national language. Nevertheless, it is still not an **official** language and continues to be a matter of contention in such areas as education. The current government, led by President Bouteflika, has stated that the recognition of Tamazight as an official language would require a change in the constitution – a change they were not about to make.

The French Language

French is Algeria's linguistic inheritance from the colonial period. It has been under attack, and its status as the main foreign language was under threat in the 1990s, when it was in competition not only with Arabic but also with English as the language of access to science, technology, and international business. However, the 2004 reform of the educational system reinstated French as the first foreign language to be taught as a compulsory subject from the second year of the primary education cycle.

The language-planning process in Algeria has resulted in a language shift, with Arabic replacing French to a certain degree in various areas of social life. However, paradoxically, owing to the policy of compulsory education for all, more people nowadays have a working knowledge of French than during the colonial period.

A number of factors reinforce the presence of French in Algerian society. First, a large community of Algerian immigrants (600 000, excluding citizens with dual nationality; or 2 million, counting those with French nationality and members of the second and third generations) lives in France, maintaining strong links with their families and friends in Algeria. As a result of these sociocultural links, France is the most popular destination for Algerian tourists. Furthermore, improved telecommunications and the ready availability of satellite dishes have introduced all the French television channels into Algerian homes.

On the global scene, the country had refused to associate itself with the campaigns to promote the use of French internationally. The francophone movement had previously been dismissed as nothing more than a neocolonial instrument of domination. However, despite the fact that Algeria is not a member of the francophone movement, the current president attended the 1999 and 2004 francophone summits. Following his election in 1999 and his re-election in 2004, President Bouteflika dealt with issues that had hitherto been squashed by major taboos linked to Algerian history, religious practices, and the linguistic reality of the country. He praised the Jewish and Christian heritage of Algeria (Benrabah, 2004, p. 51) and he was eager to re-establish a strong bilateral relationship with France by restoring technical and cultural education (Naylor, 2000, p. 288).

Conclusion

Language planning in Algeria has been extremely controversial, representing as it does an attempt to reconcile authenticity, national identity, and modernization and eliminate any legacy of the country's colonial past. To date, the language policy implemented by Algeria has ignored the other languages used by Algerians on the grounds that they were either a threat to national unity (Tamazight) or a legacy of a colonial past that needed to be eliminated (French).

See also: Arabic; Berber; French; Language Planning and Policy: Models; Multiculturalism and Language; Politics and Language: Overview.

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Algonquian and Ritwan Languages

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More than 30 languages of the Algonquian family were formerly spoken along the east coast of North America from about 34°N (Cape Fear, North Carolina) to about 56°N (Davis Inlet, Labrador), around the upper Great Lakes, and west to the foothills of the Rocky Mountains. They were the first North American languages encountered by French and English explorers; by the end of the 17th century several languages had already been described in detail. Three centuries later, however, two-thirds of the languages are no longer spoken, with only English loanwords such as *moccasin*, *skunk*, and *squaw* to reflect their former existence. The 'Ritwan' languages (Wiyot and Yurok) of California are distantly related. Pilling (1891) provides a nearly exhaustive inventory of the earlier sources; later publications are listed by Pentland and Wolfart (1982), but the only comprehensive bibliography of the most recent literature is in Nichols (1981–).

Classification

The only widely accepted genetic subgroup within the Algonquian family is Eastern Algonquian, consisting of the languages which descended from Proto-Eastern Algonquian (Goddard, 1978b). It includes the languages of the Maritime provinces, southern Quebec, and the northern New England states – Micmac (several dialects), Malecite-Passamaquoddy, Etchemin, Eastern and Western Abnaki (two languages, each with several dialects), and Pocumtuck or 'Loup B' – and those formerly spoken in the Hudson and Delaware River basins of New York, Pennsylvania, and New Jersey – two dialects of Mahican, and the two 'Delaware' languages, Munsee (including the divergent Wappinger dialect) and Unami (three dialects). The languages of southern New England and Long Island – Nipmuck ('Loup A'), Massachusett (Wampanoag), Narragansett, Pequot-Mohegan-Montauk, and Quiripi-Unquachog – and those of the southeastern states – Nanticoke, Conoy (Piscataway), Powhatan (Virginia Algonquian), and Roanoke-Pamlico (Carolina Algonquian) – may also be part of the Eastern subgroup, but since all are extinct, the crucial phonological details depend on interpretations of early written records.

The so-called 'Central' languages were located between Hudson Bay and the Ohio River valley; each shares many features with its neighbors, but there are no ancient subdivisions.

Cree-Montagnais-Naskapi is a dialect chain extending across central Canada from Labrador to Alberta, conventionally subdivided according to the reflex of Proto-Algonquian **l*: Plains Cree (Nêhiyawêwin), the dialect with *y* < **l*, in Alberta and Saskatchewan; three varieties of Woods Cree (with ð) in northern Saskatchewan and Manitoba, one of which probably continues the extinct Missinipi dialect (with *r*; cf. Pentland, 2003); three or more varieties of Swampy Cree (with *n*) in Manitoba and northern Ontario; Moose Cree (with *l*) on the southwest coast of James Bay; and Atikamekw (or Tête de Boule, with *r*), in southwestern Quebec, cut off from the others by a dialect of Ojibwa. In the eastern dialects Proto-Algonquian **k* has palatalized to *č* before front vowels: Eastern Montagnais (Innu-aimun) and Eastern Naskapi (with *n* < **l*), in Labrador and southeastern Quebec; Southern Montagnais (with *l*), at Lac St-Jean, Quebec; and the extinct dialect of Tadoussac, Quebec (with *r*). The several varieties of East Cree and Western Naskapi in northern Quebec (all with *č* < **k* and *y* < **l*) are considered transitional between the eastern and western dialects (MacKenzie, 1980), or as varieties of a Western Montagnais dialect (Pentland, 1978); some East Cree speakers understand Moose Cree, but speakers of the nonpalatalized dialects generally find East Cree and (other) Montagnais dialects completely unintelligible.

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Relevant Website

http://www.ons.dz/ – Algeria's National Office of Statistics.

Algonquian and Ritwan Languages

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More than 30 languages of the Algonquian family were formerly spoken along the east coast of North America from about 34°N (Cape Fear, North Carolina) to about 56°N (Davis Inlet, Labrador), around the upper Great Lakes, and west to the foothills of the Rocky Mountains. They were the first North American languages encountered by French and English explorers; by the end of the 17th century several languages had already been described in detail. Three centuries later, however, two-thirds of the languages are no longer spoken, with only English loanwords such as *moccasin*, *skunk*, and *squaw* to reflect their former existence. The 'Ritwan' languages (Wiyot and Yurok) of California are distantly related. Pilling (1891) provides a nearly exhaustive inventory of the earlier sources; later publications are listed by Pentland and Wolfart (1982), but the only comprehensive bibliography of the most recent literature is in Nichols (1981–).

Classification

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Saskatchewan. The Algonquin dialect of southwestern Quebec is separated by a large number of isoglosses from its immediate neighbors (Rhodes and Todd, 1981), but shares a number of features with Northern (or Severn) Ojibwa, in northwestern Ontario. A quite different dialect, also usually called Algonquin, is spoken at Maniwaki, Quebec; it apparently is the result of a large migration of Eastern Ojibwa speakers from Lake Nipissing into an originally Algonquin-speaking community at Oka. The Eastern Ojibwa dialect of southern Ontario and the Ottawa (or Odawa) dialect of Michigan and southwestern Ontario have both reduced or lost all unstressed vowels. According to Rhodes and Todd (1981), the other dialects are Central Ojibwa, in northeastern Ontario; Northwestern Ojibwa, between Lake Superior and Lake Winnipeg; Southwestern Ojibwa (Chippewa), in northern Michigan, Wisconsin, and Minnesota; and Saulteaux (Plains Ojibwa) in southern Manitoba and eastern Saskatchewan.

Potawatomi, originally spoken in southern Michigan, was once a part of the Ojibwa dialect chain; it separated before Ojibwa merged **ye·* with *i·*, prior to the first contact with Europeans, but shares with some southern Ojibwa dialects the complete loss of unstressed vowels. Menomini (or Menominee), in Wisconsin, has many Ojibwa loanwords and shares some sound changes (including **ye· > i·*), but is in other respects quite different from other Algonquian languages.

Four dialects of a single language were formerly spoken in southern Michigan: Fox (or Mesquakie), Sauk, Kickapoo, and the extinct Mascouten dialect. The three surviving varieties are probably still mutually intelligible, but Kickapoo has some significant differences.

The states of Illinois and Indiana were the home of the Miami-Illinois language, which contained a number of dialects, including Kaskaskia, Peoria, Tamaroa, Wea, Piankashaw, and Miami; by the 1870s there were only two groups, known as Peoria and Miami, but they may not correspond to older dialect divisions. In the early 18th century the Michigamea spoke a dialect of Illinois (cf. Masthay, 2002: 26), but earlier may have spoken an unrelated language (Goddard, 1978a: 587).

The Shawnee originally lived in southern Ohio, but during the historic period they often split into widely scattered bands, eventually merging into three politically independent groups, the Eastern Shawnee, Cherokee Shawnee, and the Absentee Shawnee, all now resident in Oklahoma. Neither early nor recent dialect differences have yet been examined in detail.

In addition to Plains Cree and Plains Ojibwa (Saulteaux), there were at least six other Algonquian languages spoken on the Great Plains (Goddard, 2001). Blackfoot is spoken in Alberta by the Blackfoot (Siksika), Blood, and Northern Peigan, and in Montana by the Southern Peigan (or Blackfeet) with only slight differences. Arapaho (including the extinct Besawunena dialect, in Wyoming and Oklahoma) is closely related to Atsina or Gros Ventre (in Montana). Some Arapaho formerly spoke Ha'anahawunena, an unrecorded language said to have been very different from Arapaho; the Southern Arapaho originally spoke Nawathinehena, a distinct Algonquian language of which only a few words were recorded in 1899.

The two modern Cheyenne communities in Montana and Oklahoma speak almost identical dialects; the Sutaio, who joined the Cheyenne in the 19th century, spoke a different dialect or language, but little reliable information about it was ever recorded.

In 1913 Edward Sapir showed that Wiyot and Yurok, two languages of northwestern California which had just been assigned to a new linguistic family called Ritwan, are related to the Algonquian languages.

Sapir extended the name Algonkin (i.e., Algonquian) to the larger group. This unfortunate relabeling was misunderstood by Truman Michelson, who argued (correctly) that Wiyot and Yurok are not 'Algonquian' in the same sense as Fox or Cree; he was wrong, however, to deny the more distant relationship, which later work has amply confirmed.

The family consisting of the Algonquian languages plus Wiyot and Yurok is now called Algic; the name Ritwan is reserved for Wiyot and Yurok, should it turn out that they form a single branch within the Algic family: the question is still undecided. The last speaker of Wiyot died in 1962; fieldwork continues with the last few speakers of Yurok.

The extinct Beothuk language of Newfoundland may have been related to the Algonquian family, but the early 19th-century vocabularies are poorly transcribed and very inconsistent (Hewson, 1978); some words and inflections appear to be cognate, but others bear no resemblance to their Algonquian counterparts, even allowing for the usual kinds of transcription errors. It is unlikely that the relationship (if there is one) will ever be demonstrated satisfactorily.

Edward Sapir placed Algonquian in a stock with Kutenai and the Salishan, Chimakuan, and Wakashan families, but the similarities he noted are probably ancient loans or areal features. The few resemblances between single morphemes in Proto-Algonquian and the languages of the Gulf coast are probably coincidental.

Demography

No accurate census of Algonquian speakers exists. According to the 2001 Canadian census there were 72 680 Cree people, but 102 185 speakers of the Cree language; Grimes (1992) estimated 42 725 speakers, but even this number may be too high. An additional 14 000 people speak the 'palatalized' dialects, East Cree, Naskapi, and Montagnais.

There are at least 20 890 speakers of Ojibwa in Canada (2001 census) and perhaps 30 000 in all; earlier estimates ranged above 50 000 speakers. About 40–50 fluent speakers of Potawatomi remain, although 200–500 were estimated 30 years ago. A few dozen elderly people still speak Menomini. Perhaps 200 people still speak Fox or Sauk, but Kickapoo has well over 1000 speakers. Shawnee is said to have 200–250 speakers; the Miami-Illinois language became extinct about 50 years ago.

Of the Eastern Algonquian languages, only Micmac and Malecite-Passamaquoddy are still viable. There may be as many as 8000 speakers of Micmac in the Maritime provinces and southern Quebec, and more than 1000 speakers of Malecite-Passamaquoddy in New Brunswick and Maine. The last speaker of Penobscot (Eastern Abenaki) died in 1993; a few elderly people may still speak Western Abnaki. Perhaps a dozen people in southern Ontario speak Munsee Delaware, but Unami, in Oklahoma, is virtually extinct.

The 2001 Canadian census reported 2740 Blackfoot in Canada, but 4495 speakers of the language; there may be 5000 speakers in all, including a few children. Arapaho is estimated to have several hundred fluent speakers (Goddard, 2001), but there are only two speakers of Atsina (Gros Ventre) left. Cheyenne is spoken by about 2500 people.

Since the number of speakers of many Algonquian languages has declined rapidly in recent years, many communities have sought to revitalize their traditional language by introducing language programs in the local schools. A few programs have been very successful, but many others have failed to increase the use of the language outside the classroom.

Recent attempts to revive extinct languages such as Miami-Illinois and Pequot-Mohegan cannot yet be evaluated.

Typological Characteristics

Algonquian languages are polysynthetic, hierarchical, nonconfigurational head-marking languages with discontinuous constituents and relatively free word order.

Phonology

The parent language, Proto-Algonquian (PA), was reconstructed by Leonard Bloomfield (1925, 1946), in part to demonstrate that the comparative method can be applied successfully to 'unwritten' languages as well as those with ancient records. PA probably had 13 consonants (*p, t, k, k^w, s, $š$, h, θ, l, m, n, w, y) and four short and four long vowels (*a, e, i, o; *$a{\cdot}$, $e{\cdot}$, $i{\cdot}$, $o{\cdot}$). Bloomfield also reconstructed *$č$, but it occurs only before *$i(\cdot)$ and *y (where it does not contrast with *t); however, *$č$ may also have replaced *t in words with diminutive consonant symbolism. He did not reconstruct *k^w, but it probably contrasted with the sequence *kw. Consonant clusters could not occur word initially, and every word ended in a vowel (usually, but not always, a short vowel).

In PA, stress was predictable, with all long vowels and every second short vowel receiving a stress; this stress system is preserved with little change in Ojibwa, and underlies the vowel length alternations in Menomini, but some languages (e.g., Plains Cree, Montagnais) have replaced it with systems which count syllables from the end of the word, and Miami-Illinois reflects both types. Arapaho-Atsina and Cheyenne have developed pitch accent systems (largely from the old length contrast), while others (Eastern Montagnais, Kickapoo, and Malecite-Passamaquoddy) have acquired pitch contrasts from the loss or contraction of certain syllables.

Almost all the daughter languages have merged PA *θ and *l, and some have a further merger with *n (as in Massachusett and in modern Ojibwa, Menomini, and Fox) or with *y (as in Pequot-Mohegan); although the PA phonetic values of the consonants Bloomfield labeled *θ and *l are debated, the reflexes in Table 1 clearly show that they were distinct phonemes in PA. In morpheme-final position, *t and *θ still contrast in Cree, and *θ and *l still contrast in Shawnee.

Inflectional Morphology

Nouns are classified as animate (NA) or inanimate (NI), the animate category including not only all

Table 1 Intervocalic reflexes of five Proto-Algonquian consonants in selected languages

	*t	θ	n	l	y
Plains Cree	t	t	n	y	y
Swampy Cree	t	t	n	n	y
Ojibwa, Fox	t	n	n	n	y
Shawnee	t	l	n	l	y
Pequot-Mohegan	t	y	n	y	y
Arapaho	t	θ	n	n	n

living things but also some plants and their products, a few body parts, and miscellaneous other items such as snow, kettles, and snowshoes; all other nominals, including most body parts and the personal pronouns, are grammatically inanimate.

Possession is indicated by a pronominal prefix; plurality of the possessor is marked by a suffix. Most kinship terms and body parts, and a very few other noun stems, are 'dependent' (inalienably possessed); a special 'unspecified possessor' prefix is used with body part nouns when there is no actual possessor (e.g., **me-sit-i* 'someone's foot'), but to express 'a daughter' Algonquian languages must resort to a verbal derivative, literally '(one that) someone has as a daughter.'

Nominals are obligatorily specified as singular (PA **-a* NA, **-i* NI) or plural (PA **-aki* NA, **-ali* NI), but with the loss of final vowels singulars have no overt marking in most of the daughter languages. The third person distinguishes between proximate (central, in focus) and obviative, but only animate nouns have separate obviative inflections (PA **-ali* obv. sg., **-ahi* obv. pl.); otherwise, obviation is evident only in verb agreement. Some languages have a second set of endings to indicate inaccessibility or absence (PA **-a·* NA sg., **-e·* NI sg., etc.).

The vocative has distinct singular and plural suffixes. A locative (in **-[e]nki*) may be derived from any possessed or unpossessed noun stem (as well as a few other initial elements), but it is an uninflected 'particle' which does not distinguish number or obviation.

Intransitive verbs have distinct stems for animate and inanimate subjects, transitive verbs for animate and inanimate objects: e.g., Cree *kisiso-* 'be hot (ANIM)', *kisite-* 'be hot (INAN)', *kisisw-* 'heat (ANIM)', *kisisam-* 'heat INAN'. Animate intransitive (AI), inanimate intransitive (II), and transitive inanimate (TI) stems have similar inflections; transitive animate (TA) stems have more complicated paradigms, since they may distinguish almost any combination of subject and (animate) object.

Verb inflections are divided into three formally distinct sets of paradigms ('orders'). The PA forms of the basic endings were reconstructed by Bloomfield (1946); Goddard (1979) provided much additional information.

The independent order, used primarily in main clauses, employs the same personal prefixes as possessed nouns, to indicate the highest-ranking argument of the verb (as determined by the hierarchy 2nd person > 1st > unspecified > anim. 3rd > anim. obv. 3rd > inan. 3rd > inan. obv. 3rd) if this is not otherwise marked; suffixes indicate direction (direct when the agent of a TA verb outranks the patient, inverse when the agent is not the highest-ranking argument), plurality and obviation, negation, and various modal categories (Pentland, 1999).

The conjunct and imperative orders employ only suffixes to indicate the same categories, but some forms in the conjunct order (such as participles) also have 'initial change' or ablaut of the vowel of the first syllable of the verb complex (Costa, 1996).

Derivational Morphology

Most Algonquian words can be described as consisting of an initial, an optional medial, and a final, each of which may itself be derived from shorter elements (Goddard, 1990). Roots (unanalyzable initials) are typically adjectival or adverbial rather than nominal or verbal, e.g. **melw-* 'good, well' (as in **melwa·kamyi-* II 'be good water, taste good [of a liquid]', **melwa·pam-* TA 'like to look at someone', **melwenkʷa·m-*AI 'sleep well') and **wel-*'properly arranged' (as in **welenam-* TI 'arrange something by hand, place something in readiness', **welešam-* TI 'cut something to shape'). The final determines the word class; thus beside the TI stem **welešam-* (with final **-[e]šam-* 'cut-INAN') there is a corresponding TA stem **welešw-* 'cut someone to shape' (with **-(e)šw-* 'cut-ANIM'), and further derivatives **welesamaw-* TA 'cut something to shape for someone' (with benefactive final **-aw-*), **welešama·swi-* AI 'cut something to shape for oneself' (with reflexive final **-[e]swi-*added to the benefactive), and **welešama·sowen-* NI '(act of) cutting something to shape for oneself' (with noun-final **-wen-* added to the reflexive). The addition of an additional final almost always changes the word class.

Medials are nominal elements incorporated between the initial and final. Some are classifiers, such as **-a·xkʷ-* 'wooden', **-a·peθk-* 'stone or metal', and **-a·pye·k-* 'stringlike', in the II stems **kenwa·xkʷat-* 'be long [of something wooden]', **kenwa·peθkat-* 'be long [of a stone or metal object]' and **kenwa·pye·kat-* 'be long [of something stringlike]'. Others correspond to the direct object of the English equivalent, such as **-neθk-* 'hand, arm' in **kenwineθke·-* AI 'have a long hand or arm' or **-eθkʷe·w-* 'woman' in **nɔ·teθkʷe·we·-* AI 'pursue women', but noun incorporation is not very productive and does not interact with agreement.

Syntax

As many as four noun phrases may occur in a single clause, but no more than two arguments can be marked on the verb by inflectional affixes (Thomason, 2004). All verbs obligatorily take a subject, and may take an instrumental argument. TA

stems obligatorily take an animate object; both AI and TI stems may also take an animate object, and TA stems may take a second object. Instrumentals, AI objects, and TA second objects may be of either gender.

Word order is very free: almost all permutations of constituents are grammatical. A noun phrase may be discontinuous, with part before the verb and the remainder after (Reinholtz, 1999); in Fox, compound verbs may also be discontinuous, with other parts of a clause inserted between a preverb and the remainder of the verb complex, as in (1):

(1) ne-kehkeˑnem-ekw-a ni·na eˑh = pwaˑwi-
1ST-know-INV-3RD.ANIM.SG I COMP = not-
keˑkoˑhi -ašeno-ni-ki
something be.absent-OBV-3RD.INAN.SG
'he knows that as for me, nothing is missing'
(Dahlstrom, 1995: 9)

The topic of the subordinate clause, *ni·na* 'I', has been raised to the left-hand edge of the clause; the subject of the II verb *ašeno-* 'be absent' has been moved into the verb complex following the complementizer clitic *eˑh* (which bears the 'initial change') and a negative preverb.

In example (1) the topic has also been copied as the direct object of the matrix verb, which is therefore the TA stem *kehkeˑnem-* 'know someone' rather than TI *kehkeˑnetam-* 'know something'; subjects and (some) objects can also be copied, and the verb of the subordinate clause may be incorporated into the matrix verb, as in the Fox example in (2):

(2) ke-kiˑši = meko yoˑwe
2ND-already = EMPH in.the.past
nepow-eˑnem-ene-pena
die-think-2ND.OBJ-1ST.PL
'we had thought you were already dead'
(Goddard, 1988: 71)

The preverb of the incorporated clause *kiˑši-nep-*'have already died' has been moved to the preverb position of the matrix clause (where it is followed by an emphatic clitic and an adverb) but semantically still modifies only the lower verb.

Mixed Languages

Blackfoot may be descended from a precontact creole: it has (for the most part) normal Algonquian morphology and cognates of many individual morphemes, but few complete words are reconstructible.

A number of pidgins arose during the contact period, based on Powhatan (Virginia, early 17th century), Unami (New Jersey, 17th century), Cree (Hudson Bay, 18th century), and Ojibwa (Lake Superior, 19th century). An early Micmac–Basque pidgin in Nova Scotia was the source of a few Basque loanwords in modern Micmac, such as *elekeˑwit* '(one who is) king' < Basque *errege*.

Métchif or Michif, a French-Cree mixed language, is still spoken in some Metis communities in North Dakota, Manitoba, Saskatchewan, and Alberta (Bakker, 1997), and a remarkably similar French-Montagnais mixed language has developed at Betsiamites, Quebec. In these languages, the noun phrase is mainly French lexical items with French phonology and morphology, while the remainder of the clause is Plains Cree or Southern Montagnais.

Philology and Documentation

With more than four centuries of records on various languages available, philological studies have long played a role in Algonquian linguistics. The earlier English sources have been utilized by many scholars, notably in a study of the historical phonology of Powhatan (Siebert, 1975). The early French records have not been as thoroughly studied, but editions of older grammars (e.g., Daviault, 1994) and dictionaries (e.g., Masthay, 2002) have increased interest in the use of older materials to elucidate various details in the development of the modern languages.

One problem with the early sources is that they tend to provide individual words and partial paradigms rather than connected sentences; most early textual material is based on European originals, and was probably translated by the missionaries themselves. One notable exception is the collection of Massachusett documents edited by Goddard and Bragdon (1988). Since the beginning of the 20th century many texts written or dictated by native speakers have been published, but many more remain in manuscript.

Grammars and dictionaries of many Algonquian languages have been published, but much remains to be done: syntax is seldom treated at length, and some of the dictionaries are pitifully small. Leonard Bloomfield showed the way with a grammar (1962) and an 11 000-word dictionary (1975) of Menomini; notable later productions are the Montagnais-French dictionary compiled by Lynn Drapeau (1991), with nearly 24 000 entries, and the 1100-page reference grammar of Ojibwa by J. Randolph Valentine (2001). Mithun (1999: 328–337) provides a brief survey of the sources available for each of the languages.

See also: Bloomfield, Leonard (1887–1949); Canada: Language Situation; Dialect Chains; Discontinuous Dependencies; Gender, Grammatical; Incorporation; Morphological Typology; Polysynthetic Language: Central Siberian Yupik; Proto-Algonkian Phonology and Morpho-Syntax; United States of America: Language Situation.

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Alonso, Amado (1896–1952)

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Internationally known as a great linguist and literary critic of the 20th century, Amado Alonso García was born in Lerin, Spain on September 13, 1896. Alonso's published works in Europe, South America, and in the United States, include his excellent studies regarding Spanish grammar, Romanic linguistics, linguistic theory, language politics, and several essays on literary language. Alonso developed his basic studies in Pamplona (1911–1914) and later managed to follow the courses of Philosophy and Letters (1914–1918). In 1917, Alonso entered as an undergraduate the Historical Studies Center in Madrid, Spain where he studied phonetics with Navarro Tomás.

During the years 1922–1924, Alonso while in Germany, decided to introduce his phonetic studies with University of Hamburg Professor Panconcelli-Calzia. Alonso's first texts treat the Basco dialects sibilant consonants' problem and some varieties of *r* and *rr* in American Spanish. At the end of 1924, Amado Alonso returned to Madrid to work as a teacher at the Historical Studies Center. In 1927, Alonso moved to Buenos Aires, Argentina as he was designated by D. Ramón Menéndez Pidal (*see* **Menéndez Pidal, Ramón (1869–1968)**) to assume the directive chair at the University Philology Institute. Alonso's identification with the great South American nation was very close, and in 1939 he adopted Argentine nationality. Alonso worked as a visiting professor at several foreign universities including the University of Puerto Rico (1927), University of Chile (1936–1941), and at the University of Chicago (1942) where he was honored with a Ph.D. in the Humanities.

Alonso decided to remain permanently in the United States after being invited in 1946 to teach Spanish language and literature at Harvard University located in Cambridge, Massachusetts. While teaching at Harvard, he answered for the Smith Catedra until his death on May 16, 1952 in the United States in Arlington, Massachusetts.

See also: Menéndez Pidal, Ramón (1869–1968).

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Altaic Languages

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A common designation for the typologically related languages of the Turkic, Mongolic, and Tungusic families is 'Altaic languages'; according to some scholars, this designation also includes Korean and Japanese. The common typological features of these languages include an agglutinative and exclusively suffixing word structure, sound harmony, verb-final word order, with dependents preceding their head, and use of numerous nonfinite verb constructions.

Altaic as 'Ural-Altaic'

The term 'Altaic' was first used by M. A. Castrén in the middle of the 19th century for a supposed family comprising Finno-Ugric, Samoyedic, Turkic, Mongolic, and Tungusic. This group of languages was later called 'Ural-Altaic.' The Ural-Altaic hypothesis, which was largely based on general typological criteria such as agglutination and vowel harmony, was widely accepted in the 19th century. Later on, this hypothesis was seriously doubted. The works on 'Altaic' languages by W. Schott, M. A. Castrén, J. Grunzel, H. Winkler, and others contain abundant incorrect data. Castrén, however, rejected the purely typological approach and applied linguistic criteria of lexical and morphological comparison. There are not sufficient materials to establish a Ural-Altaic protolanguage.

Scholars of the following period, e.g., J. Németh and J. Deny, who took a more cautious attitude, published detailed works on phonology, word formation, etc. Syntactic typological arguments for the unity of Ural-Altaic were, however, discussed as late as 1962, by Fokos-Fuchs.

Altaic as 'Micro-Altaic'

Scholars such as G. J. Ramstedt and N. Poppe argued for a 'Micro-Altaic' family (Comrie, 1981: 39) that at least consisted of Turkic, Mongolic, and Tungusic, three well-established genealogical groups. Ramstedt is the founder of Altaic linguistics in a scientific sense, though his works contain many problematic details. His introduction to Altaic linguistics was published posthumously (1952–1957). Poppe's contributions to Altaic linguistics are not less important. His comparative phonology, planned as the first part of a comparative grammar, appeared in 1960. An example of phonological correspondences according to Ramstedt and Poppe is the supposed development of the initial Altaic stop **p-* into Korean *p-* and *ph-*, into Tungusic *p-* (Nanai), *f-* (Manchu), and *h-* (Evenki), into Mongolic **p-* (Proto-Mongolic), *h-* (Middle Mongolian), *f-* (Monguor), and Ø- (Buriat, Oirat, Kalmyk, etc.), and into Turkic *h-* (Proto-Turkic, some modern languages) and Ø- (most modern languages). Ramstedt's and Poppe's arguments were largely accepted until they were challenged by G. Clauson (1956, 1962). Opponents such as J. Benzing and G. Doerfer expressed doubts even against this Micro-Altaic unit as a valid genealogical family.

Whereas the Altaicists regarded certain similar features as a common heritage from a protolanguage, others claimed that the similarities were the result of contact processes. Thus certain common features in Mongolic and Chuvash could go back to Proto-Altaic or had been borrowed into Mongolic from a language of the Chuvash type. Clauson had criticized the lack of evidence for a common basic vocabulary in Altaic. In his huge work on Turkic and Mongolic loanwords in Iranian, Doerfer (1963–1975) refuted the Altaic etymologies presented by Ramstedt, Poppe, and others, arguing that similarities that can be attributed to general typological principles or to areal diffusion must be excluded from genealogical comparisons.

A possible Altaic unity must have been dissolved about 3000 B.C. The crucial question in Altaic comparative studies is by which methods common elements due to early contacts can be distinguished from elements inherited from a protolanguage. One problem is the scarcity of early data. Whereas Indo-European is attested already in the second millenium B.C., there are no real Turkic sources prior to the 8th century (East Old Turkic inscriptions in the Orkhon valley, Inner Asia). The first Mongolic materials are found in *The secret history of the Mongols* (believed to be written around 1240 A.D., partly based on older materials). The first substantial materials documenting Tungusic emerge centuries later.

The Turkic–Mongolic–Tungusic Relationship

As for the relationship between Turkic and Mongolic, it has been possible to establish a number of convincing sound laws on the basis of words with similar sound shape and content, and to find certain corresponding derivational and grammatical suffixes. The question is how to judge these similarities. The earliest Turkic and Mongolic sources hardly show any common features except for intercultural words such as *qaγan* 'supreme ruler' and *teŋri* 'heaven.' Middle Mongolian displays a number of words

with similar Turkic equivalents. The few pairs of corresponding words do not, however, relate to the most significant parts of the vocabulary, i.e., numerals, kinship terms, and basic verbs, nouns, and adjectives. A few common elements are found in morphology. On the other hand, it is obvious that later Mongolic languages have converged with Turkic by giving up some old features, e.g., an inclusive vs. exclusive distinction in pronouns and verbs, grammatical gender in verb forms, agreement between the adjectival attribute and its head, and the option of postposed adjectival attributes.

Many similarities may thus be due to contact processes. There were close ties between Turkic and Mongolic as early as the middle of the first millennium B.C. Borrowings in both directions had taken place since early times. With the rise of the Chingisid Empire in the 13th century, many Turkic varieties came under strong Mongolic influence. The impact lasted longer in areas of intensive contact, such as South Siberia and the Kazakh steppes. The lexical influence is particularly strong in Tuvan, Khakas, Altay Turkic, Kirghiz, Kazakh, etc. Look-alikes that occur only in typical contact zones cannot easily be used as evidence for genealogical relatedness.

Mongolic displays early layers of loanwords from several Turkic languages and has developed many structural traits under Turkic influence. Words common to Turkic and Mongolic, e.g., Bulgar-Mongolic correspondences, are regarded by Altaicists as true cognates and by non-Altaicists as Turkic loans in Mongolic. Some scholars consider the possibility that correspondences between Turkic and Mongolic go back to a common adstrate, some 'language X' that might have delivered loans to both groups. Tungusic words considered by Altaicists as Altaic are rather regarded by non-Altaicists as loans from Mongolic in certain contact areas. Similar derivational and grammatical suffixes are very scarce. Mongolic and Tungusic had been in contact for a long time prior to the first documentation of Tungusic. Except for recent Yakut loans in North Tungusic, there are hardly any plausible lexical correspondences between Turkic and Tungusic. In a non-Altaicist perspective, the overall Turkic–Mongolic–Tungusic relationship thus appears to be due to diffusion rather than to genealogical relatedness. According to this view, words common to all groups may have wandered along the path Turkic → Mongolic → Tungusic.

After decades of discussions, the nature of the relationship between the Altaic languages is still controversial. Many common features are the result of recent contact, often limited to certain languages within the groups. The question is what reliable correspondences remain to justify the recognition of Altaic as a family in the sense of Indo-European or Semitic. There is no consensus as to whether the relatedness is proven, still unproven, or impossible. Some scholars argue that too few features are common to all three groups, and only to these groups. There are clear lexical and morphological parallels between Turkic and Mongolic, and between Mongolic and Tungusic, but not between Turkic and Tungusic. All three groups exhibit a few similar features, e.g., in the forms of personal pronouns, but similarities of this kind are found in different unrelated languages, in the rest of northern Eurasia and elsewhere. Today, however, compared to the 1960s, the fronts between Altaicists and non-Altaicists are not always as rigid. For example, the pronounced non-Altaicist Doerfer, who had criticized the proposed Altaic sound laws as being construed less strictly or even *ad hoc*, has accepted the above-mentioned development of **p-* into Turkic *h-* and Ø-: e.g., **pat* 'horse,' *hat* (Khalaj, etc.), *at* (most Turkic languages). Doerfer expresses his appreciation of the achievements of the Altaicist Ramstedt in the following way: "We must be grateful to the ingenious founder of Altaistics as a science for discovering so many sound laws which are valid to this date" (Doerfer, 1985: 135).

Korean and Japanese

The most controversial point in recent discussions has been whether Korean and Japanese (with the closely related Ryukyuan language) should be regarded as members of an Altaic family. G. J. Ramstedt (1939, 1949) was the first scholar to attempt to prove a remote relationship beween Turkic–Mongolic–Tungusic and Korean. Though his comparisons have been heavily criticized in more recent studies, N. Poppe considered Ramstedt to have identified at least 150 incontestable Korean–Tungusic–Mongolic–Turkic cognates.

Japanese has often been taken to consist of an Austronesian substratum and an Altaic superstratum. E. D. Polivanov (1924) argued that it is of hybrid origin, containing both Austronesian elements and continental elements that are also found in Korean and Micro-Altaic. In an early study, Ramstedt (1924) investigated possible links between Japanese and Altaic without reaching a clear final conclusion. Forty-two years later, S. E. Martin (1966) provided 320 etymologies relating Japanese to Korean on the basis of regular sound correspondences, which allowed him to reconstruct Proto-Korean–Japanese forms. R. A. Miller (1971), who established a set of sound correspondences to the Proto-Altaic phonemes reconstructed by Poppe (1960), clearly claimed

Japanese to be one branch of the Altaic family. K. H. Menges (1975) took up a number of Miller's arguments and elaborated further on them. In his book on the Altaic problem and the origin of Japanese (1991), S. A. Starostin established sound correspondences between Japanese, Korean, and Altaic on the basis of numerous lexical comparisons of Turkic, Mongolic, Tungusic, Korean, and Japanese lexical items. J. Janhunen (1992, 1994), however, pointed out some problems with the Altaic affiliation of Japanese, which he considers premature. He takes Japanese and Ryukyuan to form a distinct family of its own and the Old Koguryŏ language, once spoken on the Korean peninsula, to be a close relative of Japanese.

See also: Chuvash; Japanese; Korean; Mongolic Languages; Ryukyuan; Tungusic Languages; Turkic Languages; Uralic Languages.

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Altay Turkic *See:* Turkic Languages.

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In the 20th century, Spanish linguistics, or more precisely, the philology, was dominated by two great scholars: Ramón Menéndez Pidal in the first half and Manuel Alvar (López) in the latter half.

Between his birth on July 8, 1923 in Benicarló (Castellón) and his death in Madrid on the August 13, 2001, Manuel Alvar had a brilliant academic career, which got off to a swift start. One year after he finished his degree in romance philology at the University of Salamanca (1945), he received his Ph.D. from the University of Madrid, and in 1948, still only in his mid-20s, he became the Chair of Historical Grammar of the Spanish Language at the University of Granada. From then on he was an enthusiastic teacher and a prolific researcher, who taught in every Spanish university and in almost all of the universities on the South American continent. As a visiting professor he worked in more than 15 universities outside the Spanish-speaking world; in Albany (NY) he taught until 1998. He created several courses on Spanish philology, among them the famous *Curso Superior de Filología de Málaga*, which, from 1966 to 1997, was given every summer for 6 weeks. In 1975 he joined the Real Academia Española, which he directed from 1989 to 1991.

During his long academic career Alvar supervised about 250 Ph.D. dissertations, and over 850 titles can be found in the list of his publications, excluding his contributions to some newspapers, some of them on a regular basis. Also among his publications are 10 books of poetry. The quantity and diversity of his publications illustrate what a diligent and indefatigable academic he came to be. His studies cover an enormous variety of subjects such as phonetics, sociolinguistics, toponymy, history of the language, etymology, medieval literature, and folk poetry. He gathered hundreds of linguistic materials, rescued many examples of Sephardim poetry, and wrote on Sephardim language and literature and on many other philological issues. However, the field in which he distinguished himself the most as a researcher was dialectology, more precisely, geographical linguistics along the academic lines of Karl Jaberg. Without exaggeration it can be said that Manuel Alvar was the foremost Spanish dialectologist of the 20th century and a world expert on Spanish linguistics. His work is widely recognized, which is attested to by the many chairs, institutes, and literary prizes named after him, for example, the Cátedra de Lingüística Manuel Alvar (Universidad Zaragoza, 1985), the Instituto de Investigaciones Lingüísticas y Filológicas 'Manuel Alvar' (Universidad Nacional de San Juan, Argentina, 1992), and the Premio Manuel Alvar Humanidades by the Fundación José Manuel Lara of Sevilla. More than 25 universities from all over the world bestowed on him the title of Doctor Honoris Causa.

Alvar's principal achievement concerning dialectology was indubitably the coordination and elaboration of linguistic atlases of certain regions of Spain and of some countries of South America. The first was the atlas of Andalusia (1962, 6 volumes), and the one with the broadest geographical scope was the *Léxico de los marineros peninsulares* (LMP, 4 volumes, 1985–1988). He wrote detailed studies on other Spanish varieties, such as Aragonese, Andalusian, as well as different South American varieties. His study *El Español hablado en Tenerife* (1955) has a pioneering character and earned him the *Premio Antonio de Nebrija*. Later on this work was complemented by another study, this time about the Canaries dialect spoken in Louisiana.

Typically, Alvar's atlases have a strong ethnographic character. They incorporate, alongside the linguistic features of the language, the mental, social, cultural, and religious dimensions of the speaker, thus giving a detailed cartographical synthesis of the most striking aspects that characterize life in a specific region in all its facets. In this elaboration of the atlases, stressing the relation between the word and the referent it names, he followed closely the theoretical principles laid out by Karl Jaberg and Jacob Jud, as well as the method of Wörter and Sachen. Accordingly, the material is not presented in alphabetical order, but instead refers to notional and semantic fields such as agriculture and connected industries, vegetables, wild animals, stockbreeding, cattle industries, domestic animals, apiculture, the weather and topography, the human body, from the cradle to the grave, popular beliefs and superstitions, religion, games and hobbies, and clothing.

The published results are almost all based on the meticulous fieldwork accomplished by a team, supervised by Alvar's typical determination, and guided by his thorough and personal knowledge of the most distant Spanish-speaking villages in Spain or South America. The density of the number of enquiries per region in his atlases is very high, considerably surpassing the other linguistic atlases produced before his day. In total he supervised six atlases in Spain, five

on Spanish regions and one on the sailors of the Iberian Peninsula. He also had planned two of a more general nature: one on the region of Murcia and one with a peninsular scope, including all the languages of the Iberian region, which would be called *Atlas Lingüístico de España y Portugal*. In South America he intended to elaborate the *Atlas Lingüístico de América,* a major project to which he would contribute studies already published, *El Español en Venezuela: estudios, mapas textos* (2001) and *El Español en el sur de Estados Unidos: estudios, encuestas, textos* (2000). His last book, *Español de dos mundos,* published posthumously, testifies to his keen interest in and great liking for American Spanish.

The work of Manuel Alvar was deeply rooted in his own cultural background and his ardent love for the Spanish cultural heritage in all its aspects and geographical manifestations. Leafing through the hundreds of pages of the atlases he published, we discover the human face of linguistics, how people speak and think, and the intricate bond that exists between language and culture.

See also: Spanish; Variation and Language: Overview.

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American Lexicography

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The Beginnings: Noah Webster

Before and for some decades after the American Revolution, British dictionaries (particularly that of Samuel Johnson) were used in the United States, usually in pirated form. The first dictionary produced by an American was *A school dictionary* (1798) by Samuel Johnson, Jr. (not related to the great English lexicographer). This dictionary was short and had only brief (and often flawed) definitions that were considered appropriate for students. Its pronunciation system was inadequate even by the standards of the time (as Johnson himself acknowledged), and it included no Americanisms. About all that can be said for it is that it existed, as the first natively produced dictionary in the United States. The pirated British dictionaries were sometimes better, but their coverage of American English was haphazard. They had occasional but irregular American spelling variants but few genuinely American terms. American English was not recognized as a separate regional standard of English. All this changed with Noah Webster (1758–1843).

Noah Webster began his lexicographic career in 1783 with the publication of the *American spelling book*, also known as *The blue-backed spelling book*. This phenomenally popular work went through many editions and hundreds of printings during Webster's lifetime, and by the end of the 19th century it had sold an estimated 100 million copies. Webster's efforts to combat piracy had an influence on the establishment of federal copyright laws in 1790. In contrast to the exclusively religious leanings of earlier works, the *Spelling book* was marked by a strong patriotic and moral tenor: "A good child will not lie, swear, nor steal," went a typical reading passage, "He will be good at home, and ask to read his book; when he gets up he will wash his hands and face clean." Its spellings adhered to a British model, but in subsequent works Webster changed his mind and argued in favor of spelling reform. He thought deeply about spelling throughout his life, and in mid-life he advocated more radical reforms than those that he eventually adopted in his major dictionaries.

Webster's first dictionary was *A compendious dictionary of the English language* (1806). Less important than his later works, it nonetheless included

several innovations. It was based on John Entick's *Spelling dictionary* of 1764, which had been published in London. Webster added several thousand new entries (many of them Americanisms), explicitly showed inflected forms for strong verbs, and included several encyclopedic appendixes listing, for example, international currencies and U.S. populations and exports. The *Compendious dictionary* adopted a moderately American view of orthography. In it, Webster rejected some of the more radical reforms he had advocated in previous works (after *The blue-backed spelling book*), such as *bred* and *tuf* for *bread* and *tough* (both spellings originally promoted by Benjamin Franklin). But it did include a variety of spelling changes that now mark American spelling as distinct from British: for example, *-er* endings for *theater* and *meter*, and *-or* in *honor* and *favor*. He also adopted spelling reforms that had already been accepted by other lexicographers (British and American), such as the simplification of terminal *-ck* to *-c* in words such as *music* and *logic* and of *-que* to *-k* in *mask* and *check*.

It was with his 1828 *American dictionary of the English language* that Webster truly made his mark. Published in two volumes, it included about 70 000 entries, much larger than other dictionaries of the time. It contains many scientific and technical terms that were not in any other contemporary dictionary, as well as many terms unique to American English, such as *caucus, wampum, tomahawk,* and *skunk*.

Webster devoted particular attention to etymologies. One of his major aims, expressed in his 1810 *Prospectus of a new and complete dictionary of the English language*, was "to deduce words from their primitive roots . . . This part of the work will be new, and will offer results singularly novel and interesting." After some preliminary work, he realized his knowledge was unsatisfactory, so he put aside the project to spend years studying other languages. Unfortunately, his prejudices were too strong to allow him to accept any opposing theories, and his etymologies as a result were too often speculative and (we now know) incorrect. The findings of Jakob Grimm and other European scholars, who at this time were devoting their energies to the comparative method in historical linguistics, were only just becoming known in America; Webster had the misfortune of timing to prevent him from appreciating the importance of their work, as well as an obstinacy of spirit that prevented him from recognizing those revelations he could have accepted. Webster preferred to believe that English words were derived from 'Chaldee' and promoted this view with many fanciful speculations.

The American patriotism that Webster had demonstrated in his earlier writings continued in the 1828 dictionary, with further refinements to the spelling system and additional American entries, as well as new senses for British words that had mutated in America. He defined plantation as "a cultivated estate; a farm" and added a long discursive explanation and discussion of regional usage of the term in different parts of America. Webster stressed the importance of a specifically American dictionary in his Preface: "It is not only important, but, in a degree necessary, that the people of this country, should have an *American dictionary* of the English Language; for, although the body of the language is the same as in England, and it is desirable to perpetuate that sameness, yet some differences must exist."

He chose illustrative quotations from prominent American authors, although he included relatively few, believing them to be an unnecessary luxury. In cases where he felt that an example was necessary, he also felt free to invent one. In this, he differed from Samuel Johnson, all of whose examples are citations from literature and who believed that "the solution of all difficulties, and the supply of all defects, must be sought in the examples." While the number of new Americanisms in Webster's 1828 dictionary was in fact smaller than implied by his rhetoric in the preface, his insistence on the distinctiveness of American English was justified by a myriad of details in the entries. For pronunciations, Webster used his own New England dialect, which he regarded as pure, believing that all other dialects were simply wrong.

Webster's definitions were particularly good; James Murray in 1900 called him "a born definer of words," and more recent critics have praised his "brilliance," "clearness," and "soundness." Where Johnson was terse, Webster was relatively full, and not just by adding needless encyclopedic bulk. For example, Johnson's entire definition of *laboratory* says only "a chymist's workroom." Webster's definition begins with "1. A house or place where operations and experiments in chimistry [*sic*], pharmacy, pyrotechny, &c., are performed" and continues with two additional senses. For *label,* Johnson provided a succinct but vague definition: "1. A small slip or scrap of writing," while Webster gave "1. A narrow slip of silk, paper or parchment, containing a name or title, and affixed to any thing, denoting its contents. Such are the *labels* affixed to the vessels of an apothecary." (The *Oxford English dictionary* [OED] shows this sense to have arisen the 17th century, with quotations from Dryden and Defoe's *Moll Flanders*, among others; so it was not obscure.)

Though Webster was critical of much in Johnson's dictionary, he also used it heavily as a source. Many of his definitions and sense divisions were close or exact copies of Johnson. Webster acknowledged as much in his Preface: "When his definitions are

correct and his arrangement judicious, it seems to be expedient to follow him."

The *American dictionary* was viewed by some people as overly innovative, with many educated Americans being relatively conservative and unwilling to challenge the authority of Johnson. However, in the course of the 19th century, it gradually established itself as the standard work of American lexicography and was the foundation for several revised editions (most recently in 1961) and derivatives.

The 'Dictionary War' of the Mid-19th Century

Only two years after the publication of Webster's *American dictionary,* Joseph E. Worcester published a *Comprehensive pronouncing and explanatory dictionary* (1830), a much smaller and more practical dictionary of about 40 000 entries.

Worcester had been one of Webster's assistants, and under the direction of Webster's son-in-law Chauncey A. Goodrich had produced a revised version of the *American dictionary.* Webster himself disapproved of the changes in this revision, and Worcester published his *Comprehensive dictionary* under his own name only one year after his work on revising Webster's work. Webster accused Worcester of plagiarism, but it must be said that the resemblance is no more striking than the usual similarities between dictionaries with similar goals defining the same language.

Worcester's next major work was the *Universal and critical dictionary of the English language* (1846). Coming not long after a major revision of Webster's *American dictionary* in 1841, it intensified an already virulent publicity battle between their respective publishers, who outdid each other in their accusations, exaggerated press releases, and none-too-scrupulous business practices. Worcester's dictionary had a considerably better pronunciation system, better etymologies, and a scholarly treatment of English grammar and the history of English lexicography. It was generally preferred by conservatives who favored the British standards of usage and spelling that Worcester's book reflected. In 1860 Worcester published his *Dictionary of the English language,* which included more than 104 000 entries. Among its features were thousands of lists and discussions of synonyms, etymologies for given names, and illustrations. It was generally recognized as an excellent dictionary. However, in 1864, a new edition of Webster's dictionary was published, edited by Noah Porter (later the president of Yale University). Its etymologies were revised and vastly improved by the German scholar C. A. F. Mahn. In many ways it adopted the more staid, scholarly treatment characteristic of Worcester; as Landau (2001) observed, "It ended the war of the dictionaries, ironically by abandoning everything characteristic of Webster and adopting Worcester's virtues."

The Century Dictionary

The *Century Dictionary,* first published in six volumes from 1889 to 1891, is generally regarded as one of the great achievements in American lexicography. It was based on Charles Annandale's 1882 revision of John Ogilvie's four-volume *Imperial dictionary* of 1850 (itself based on Webster 1828). Its editor was William Dwight Whitney, a Sanskrit scholar at Yale who had contributed to the 1864 edition of *Webster's New International dictionary* and had written other important language books. The *Century* was intended to cover the language from Middle English onward and included a large number of encyclopedic entries. There were many historical citations. Its coverage of technical terms was especially good, and the OED editors heavily borrowed these (Richard Bailey reported that the OED explicitly cites the *Century* 2118 times and argued convincingly that James Murray was more highly influenced by it than even this figure suggests). Even British reviewers were much impressed by the work, though Murray was originally extremely jealous of the dictionary's success, and made some intemperate remarks in print about it before calming down.

The *Century* was praised, among other things, for its elegant typography, designed by Theodore De Vinne. It was widely used for decades to come, and the book is still not only readable but fresh-looking today. The illustrations were plentiful (about 6000) and beautiful (the dictionary's publisher was also responsible for the admired illustrated *Century magazine*). Definitions were excellent, and the sense divisions were particularly extensive. The noun *matter*, for example, has 17 numbered senses in the *Century,* with three further subdivided, while the 1864 Webster has 10 senses, with none subdivided. Later spinoffs and versions include a supplement of names (1894), an atlas (1897), a partially revised edition in ten volumes (1901), and a greatly reduced two-volume work, the *New Century dictionary of the English language* (1927). The dictionary served as a source for the *American College dictionary,* discussed later in this article, and its citation files were incorporated into and thus served as a basis for the *World Book dictionary.*

Funk and Wagnall

The *Standard dictionary of the English language*, published by Funk and Wagnall in 1893, was a new and

major entrant into the American dictionary market. The publishing firm had been formed only in 1890, and the *Standard dictionary,* containing over 304 000 entries, was assembled in an astonishingly short 3 years, thanks to a huge team of editors and consultants. The book was heavily advertised and was a commercial success. Isaac Kaufman Funk, the editor, explicitly wanted to produce a populist dictionary, and the *Standard* introduced many innovative practices that are still widely followed by practical dictionaries today. Etymologies, previously placed at the start of entries so that a word's history would inform the definitions, were now placed at the end of each entry. Where previous dictionaries had given the definitions in historical order, the *Standard* put the most common meaning of each word first and obsolete or archaic definitions at the end. Modern British dictionaries now use this approach, typically using corpus evidence to determine the comparative frequency of different meanings, but some modern American dictionaries, including *Merriam-Webster* and *Webster's New World*, still use historical order or a slightly modified form of it. Pronunciations in the *Standard* were listed twice: once using a basic key and once using a more precise, though more complicated one. Spelling was a problem: Funk was a member of the Simplified Spelling Board; the emphasis on spelling reform in the Funk and Wagnall dictionaries was not reflected by public acceptance or enthusiasm, and it ended up alienating readers. A second edition, the *New Standard dictionary,* with 450 000 entries, appeared in 1913. Successful at the time, the *New Standard* was never seriously revised, and Funk and Wagnall gradually declined in importance, despite the appearance of a good college dictionary under the imprint in 1963. The dictionary range was broken up, with different Funk and Wagnall copyrights being sold to various mail-order and other marketing organizations, bringing an end to serious lexicographical work on this once great family of dictionaries.

Unabridged and College Dictionaries

After the publication of the so-called Webster–Mahn dictionary of 1864 (discussed in the section "The 'dictionary war' of the mid-19th century"), the next major dictionary from Merriam (who had taken over publishing rights to the Webster dictionaries in the 1840s) was the *Webster's International dictionary* of 1890, which was, like the Webster–Mahn, edited by Noah Porter. This had about 175 000 entries, a large total that was shortly overtaken by the Funk and Wagnall *Standard*. Merriam expanded the *International* in 1900 and in 1909 released *Webster's New International dictionary of the English language,* edited by William Torrey Harris and F. Sturges Allen, which had 350 000 entries. Many of the new terms were technical, reflecting the large number of additions to the vocabulary in the later Industrial Revolution. In 1934, with Funk and Wagnall on the wane, Merriam released the *Webster's New International dictionary of the English language,* second edition (known as Webster's second or W2, though it was in fact the seventh in the line of large Webster dictionaries), edited by William Allan Neilson and Thomas A. Knott. Webster's second remains the largest English dictionary ever published (based on entry count), with over 600 000 entries. It was strong in both new words and archaic or rare ones, which were relegated to a separate section running along the bottom of the page.

The publication of *Webster's third New International dictionary, unabridged* (Webster's third, or W3) in 1961, brought about a remarkably intense and public debate about the nature and purpose of dictionaries. Its editor, Philip B. Gove, had made some idiosyncratic editorial decisions that, combined with an intense and somewhat misleading marketing campaign on Merriam's part, brought broad condemnation upon the dictionary from many critics.

Though much of W3 was not in fact tremendously innovative, it had a number of noteworthy features. The pronunciation system was very detailed but rather difficult for many people to understand; in particular, variations were listed by using symbols to indicate words or parts of words that were previously described. Encyclopedic entries were dropped entirely, and a cutoff date of 1755 (the date of Johnson's dictionary) was adopted for obsolete words. There were many fewer illustrations than in W2. The definitions were written in an idiosyncratic style, with the entire definition presented as a single "completely analytical one-phrase definition" (Preface, page 6a) with commas used only to separate words in a series. The key information was given first, followed by logical groupings of related information. This resulted in some unwieldy entries, particularly for nouns, where a definition sometimes ran on to great length, with no distinction between essential and supplementary explanatory information. Much of the information presented in W3 was in fact taken from W2, where, however, it was presented more readably in a number of separate sentences. An example condemned by critics was the entry for *door.* The main definition in W2 was "The movable frame or barrier of boards, or other material, usually turning on hinges or pivots or sliding, by which an entranceway into a house or apartment is closed and opened." W3 expanded this definition to:

> A movable piece of firm material or a structure supported usu. along one side and swinging on pivots or hinges, sliding along a groove, rolling up and down, revolving as one of four leaves, or folding like an accordion by means of which an opening may be closed or kept open for passage into or out of a building, room, or other covered enclosure or a car, airplane, elevator, or other vehicle.

Similarly, the definition for *flame* extended for 20 lines, and that for *hotel* continued for 11 lines.

The most extensive debate, however, concerned W3's treatment of usage issues. Philip Gove made a number of decisions that came to be harshly criticized. Register labels were few; the 'informal' and 'colloquial' labels were dropped entirely, and 'slang' and 'nonstandard' were notably uncommon. There were very few usage notes or other forms of explicit usage guidance. The dictionary examined uses of poorly educated users of English, not just writers of high-style literature. All of these were supportable on scholarly grounds, but were felt by the critics to be an abdication of the dictionary's purposes of being a 'supreme authority' on the language, as earlier Merriam publicity material had bragged. Harsh reviews appeared in many prominent periodicals and by notable authors, including Jacques Barzun in the *American Scholar,* Dwight Macdonald in *The New Yorker,* and Wilson Follett in *The Atlantic Monthly.* Many of their objections were erroneous, some were misleading, and most were based on a fundamental disagreement about the purpose of a scholarly dictionary. Typical was the reaction to the entry for *ain't*. The first sense, covering the meanings 'are not/is not/am not,' carried no usage label, although it did have a note reading "though disapproved by many and more common in less educated speech, used orally in most parts of the U.S. by many cultivated speakers." The second sense, 'have not/has not,' was labeled 'substandard.' Although this assessment accurately reported the findings of scholarly studies of American speech, it was widely held to be insufficiently damning of the use of the word.

The first so-called 'college' or 'collegiate' dictionary (this last word is a trademark of Merriam-Webster) was Merriam Webster's *Collegiate dictionary* of 1898. This was in effect nothing more than a medium-sized general-purpose dictionary, explicitly abridged from larger Merriam works.

It was Clarence Barnhart's *American College dictionary* (ACD) of 1947 that established this kind of dictionary as a distinctive genre. Based broadly on the *Century dictionary*, the ACD was compiled with the aid of specialists in many fields and included explanations of many technical and scientific terms of a kind that could be expected to be useful to college students. It also reflected (or purported to reflect) work in American linguistics: ACD's Editorial Advisory Committee included Leonard Bloomfield, Charles C. Fries, W. Cabell Greet, Irving Lorge, Kemp Malone, and other prominent linguists of the day. It was the first dictionary to include a schwa in pronunciations, but otherwise the pronunciations used a 'spelling–rewrite' system, with accented vowels, rather than the International Phonetic Alphabet (IPA). Instead of the historical ordering of senses, the ACD arranged its definitions with the most common current meaning in first position, so that early but obsolete senses were shuffled to the bottom (as we have seen, this practice was pioneered in the Funk and Wagnall *Standard dictionary* but had not spread to college dictionaries).

The ACD also incorporated all entries, including foreign terms and biographical and geographical listings, into a single alphabetical word list. The ACD was the basis of later Random House dictionaries, and in turn spawned the 1971 *Hamlyn encyclopedic World dictionary* in England, which was itself used as the basis for the *Macquarie dictionary* family in Australia.

Webster's New World dictionary, college edition (WNWD) was first published in 1953 under the editorship of David Guralnik and Joseph H. Friend. A second edition, edited by Guralnik, appeared in 1970. As in the Merriam dictionaries, the senses in WNWD were historically ordered, but unlike Merriam and like ACD, it included all terms in a single alphabetical list. In other words, names of famous people and places, abbreviations, foreign phrases, etc., were included in the main word list, rather than being relegated to supplements. The definitions of WNWD, especially its technical terms, were notably clear and easy for the nonspecialist to read; its etymologies, too, were full and clear. This practice has been maintained in later editions, edited by Victoria Neufeldt (1988) and Michael Agnes (1999). WNWD has long been the dictionary of choice of some leading news organizations, e.g., the *New York Times* and the Associated Press.

The Post-*Webster's Third* Dictionaries

The reaction to Webster's third led directly to the publication of two major dictionaries. Random House decided to produce an expanded version of the *American College dictionary.* Edited by Jess Stein Laurence Urdang, the *Random House dictionary of the English language, unabridged* (RHD) appeared in 1966. It retained most of the lexicographic practices of the ACD, including organization of senses with the modern meaning first and a unified alphabetical list incorporating biographical and

geographical names. The RHD also added encyclopedic features, such as a color atlas and short bilingual dictionaries of French, Spanish, German, and Italian. However, it is not truly an unabridged dictionary but rather a bulked-up college dictionary. Definitions were considerably easier to read than those of Webster's third but were still relatively thorough. The coverage of technical vocabulary and slang was particularly good. In 1968 a cut-down version of this work appeared as the *Random House College dictionary,* taking the place in the market of the ACD. This, too, was noted for its excellent attention to technical vocabulary and slang. A second edition of the RHD appeared in 1987, edited by Stuart Berg Flexner, adding some 50 000 entries. It also added more substantial encyclopedic entries, including names of important literary works, and the etymologies were heavily reworked and quite thorough. Like the more recent Merriam dictionaries, RHD2 etymologies indicated the earliest known date of a word's use, although unlike Merriam it printed this as a range of dates, such as '1950–55' or '1830–40,' to suggest the impossibility in most cases of knowing the exact coinage date.

Also as a direct result of the W3 furor, the American Heritage publishing company tried to buy Merriam outright. Its president called Merriam "atrociously managed," thought that "Merriam's great scholarly reputation ha[d] become tarnished in recent months through the publication of the radically different Third edition," and announced his intention to put the third edition out of print while working on a new edition. When these efforts failed, American Heritage began work to produce a new dictionary to compete with W3. Originally planned as an unabridged dictionary, when the *American Heritage dictionary* (AHD) finally appeared in 1969 it turned out to be closer in scope to a typical college dictionary than to an unabridged dictionary. Physically, though, it was much larger than other college dictionaries, not because it contained more text but to make room for many photographic illustrations, which appeared in a side column in the margins of each page. This feature was always a hallmark of this dictionary line, while other dictionaries had used line drawings incorporated into the text. Color photographs first appeared in the fourth edition of AHD.

One of AHD's most notable features was the establishment of a 'usage panel,' whose members' comments on various disputed or debatable aspects of American English usage were reported at the dictionary's entries for the relevant words. The panel was composed chiefly of older, conservative male writers, some of whom had been deliberately chosen for their hostility to W3. Though linguists criticized the panel on many grounds, it was a major publicity boon for the dictionary. In more recent editions of the dictionary, the Usage Panel has been chaired by Stanford linguist Geoffrey Nunberg, who moved AHD's many usage notes away from the yes/no style of earlier editions to a more balanced, descriptive discussion of usage problems, with the usage panel – itself more balanced – adding an extra dash of opinion, rather than forming the entire basis of entries. For example, the usage note for *hopefully* in AHD1 read, in its entirety:

> *Hopefully,* as used to mean "it is to be hoped" or "let us hope," is still not accepted by a substantial number of authorities on grammar and usage. The following example of *hopefully* in this sense is acceptable to only 44 percent of the Usage Panel: *Hopefully, we shall complete our work in June.*

The usage note for this word in AHD3 (1992) goes on for a half-column, discussing syntactic parallels, potential ambiguity, the changing acceptance of the usage by the Usage Panel (it was significantly less acceptable in 1992 than it had been in 1969), and the issues facing the writer who chooses to use it.

Another distinguishing characteristic of the AHD was its extensive appendix of Indo–European roots contributed by the Harvard linguist Calvert Watkins. The appendix was highly appreciated by a small community of scholars and serious word buffs and helped establish AHD as a serious dictionary. It was also very long and not considered helpful for the more typical reader. It was therefore removed from the second edition and published separately, but was reinserted into later editions.

Although the AHD was established for linguistically conservative motives, it was, ironically, the first general American dictionary to include an entry for the word *fuck*. Its definitions and sense divisions were on a par with other contemporary dictionaries. As in other American dictionaries, comparatively little attention was paid to lexical syntagmatics and collocations, so that, for example, the verb *put* is labeled *v.t.* (verb transitive), with no mention of the obligatory adverbial argument (e.g., *put it down, put it on the table*).

The AHD was also the first dictionary to make any use of an electronic corpus, with the 1-million-word Brown Corpus assembled in the 1960s. However, this did not have a serious impact on the dictionary, as a 1-million-word corpus is simply too small to enable a lexicographer to distinguish significant co-occurrences of words from chance cooccurrences (*see* **Corpus Lexicography**). Still, the dictionary's interest in and support for corpus-based lexicography was manifested in principle by devoting three pages

of the front matter to an article on 'Computers in language analysis and in lexicography' by Henry Kučera. The company later published the *American Heritage word frequency book* (1971), based on a 5-million-word corpus of school texts, and used it in thepreparation of the *American Heritage School dictionary.*

The 1990s: The Emphasis on New Words

The first important American dictionary of the 1990s was *Random House Webster's College dictionary* (RHWCD; 1991), a successor to the *Random House College dictionary* of 1968 but based on RHD2. The RHWCD was attacked on various grounds following publication. Merriam-Webster sued Random House for trademark infringement. In the 19th and early 20th centuries the Merriam-Webster company had neglected to register the name *Webster* as a trademark. In the early 1950s they had sued the publishers of *Webster's New World dictionary* for using the name *Webster* and lost. The use of the name *Webster's* was judged to be generic for dictionaries. Now, however, Merriam-Webster argued that the use of *Webster's* in a similar typeface on a red cover was confusing to customers of their *Collegiate dictionary.* Although a court found in favor of Merriam, a federal appeals court then reversed this ruling. Random House had, in the meantime, altered the cover design of the RHWCD to be less similar to that of Merriam-Webster's.

With regard to its content, the RHWCD was published at a time when interest in so-called political correctness was high. It was the first dictionary to include a definition for the term *politically correct* itself, defining it as "marked by or adhering to a typically progressive orthodoxy on issues involving esp. race, gender, sexual affinity, or ecology." It was the first dictionary to include entries for such terms as *womyn, herstory, waitron,* and *chairpersonship,* and it also had an essay titled "Avoiding sexist language" (later expanded and retitled to "Avoiding insensitive and offensive language"). The dictionary was attacked in the press for these steps, although the entries were based on real evidence and the usage advice given was sound, straightforward, and uncontroversial.

For a few years, the RWHCD took advantage of its computerized editing system to produce frequent heavy updates. In the past, new editions of college-sized dictionaries had appeared at roughly 10-year intervals, with changes in the intervening period being limited to very small corrections. The RHWCD produced new versions almost annually, with each containing several hundred new entries. The marketing bonanza that this provided – a guarantee of heavy press coverage at each new release – proved too tempting to resist, and soon most other college dictionaries began to do the same.

American Dialect Lexicography

The American Dialect Society (ADS) was founded in 1889 with the intention of creating a comprehensive dictionary of American dialects that would serve as a counterpart to Joseph Wright's *English dialect dictionary.* The publication series *Dialect notes* was started in 1890 as a basis for this effort. The glossaries published therein were minimalist, but it was never the intention for them to be built up into an actual dictionary – rather to get people started on the work of data collection. *Dialect notes* continued to be published for several decades, but eventually World War I and then the Great Depression drained away both the energy and the funding for the completion of the larger project.

Eventually, Harold Wentworth, with the encouragement of the ADS's Louise Pound, decided to publish his own dialect dictionary, the *American dialect dictionary* (ADD), which appeared in 1944. The ADD was less than satisfactory – a single, medium-sized volume that included only 15 000 terms. It heavily mined *Dialect notes* and added some poorly referenced quotations from other sources. The illustrative quotations are almost uselessly short. There are no general regional or social labels and no etymologies.

For some time, Frederic G. Cassidy had been pushing the ADS to resume serious work on its dictionary. Trained at the University of Michigan, Cassidy had been an editor on the *Early Modern English dictionary* (publication of which was eventually abandoned), the *Middle English dictionary,* and the *Linguistic atlas of the Great Lakes.* Eventually, with his enthusiasm showing no signs of waning, the ADS appointed Cassidy the editor of its dictionary, the *Dictionary of American Regional English* (DARE).

The DARE was a scholarly work devoted to the collection, mapping, and explication of American regionalisms. Four volumes, covering the range from A to the middle of S, had been published by 2004. The DARE was based primarily on fieldwork undertaken between 1965 and 1970. Fieldworkers interviewed informants in more than 1000 communities, with an extensive questionnaire including nearly 2000 questions covering all aspects of daily life. Cassidy modeled the questionnaire on one for the *Wisconsin English language survey,* which he had designed in the 1940s, incorporating many improvements after seeing how people responded to it.

The survey results were supplemented with many additional quotations from other sources, including other historical dictionaries, the records of the *Linguistic atlas of America*, a dedicated reading program, and a variety of published and unpublished research in American dialectology. The DARE also has extensive coverage of certain areas neglected in other dictionaries, for example, natural history terms (variations of plant and animal names are astonishingly fully covered) and children's games. Details of regional pronunciations are given, based on tape recordings or close phonetic transcriptions made of many of the interviews.

The DARE results were presented in the familiar form of a historical dictionary, with the notable addition of maps to illustrate certain entries. These maps showed the location of individual responses and were distorted to show the population density of each state, rather than its area. The DARE was also notable for basing its geographical and social labels on a statistical analysis of the actual survey data, rather on subjective impressions. The project made extensive use of computers to process this data and generate the maps, at a time when humanities computing was in its infancy. Frederic Cassidy died in 2000, after the publication of three volumes of DARE; Joan Hall, who had been Associate Editor under Cassidy, took over as Chief Editor.

Dictionaries of Americanisms

The fact that American English and British English had differences was apparent as early as the 17th century, when travelers – British ones – began to observe that American English speakers had words not in use in Britain and that some existing words were used with different meanings. The stigmatization of American English is attested from 1735, when a British traveler to Georgia referred to *bluff,* an Americanism for 'a cliff,' as 'barbarous.'

Though the first suggestion of a separate dictionary or glossary of American English is found in 1754, when a Londoner anticipating the 1755 publication of Johnson's *Dictionary* proposed that it should have a supplement devoted to Americanisms, it took quite a bit more time for this suggestion to be realized. The first separately published dictionary of Americanisms was John Pickering's 1816 *A vocabulary, or collection of words and phrases which have been supposed to be peculiar to the United States of America.* (It had been published a year earlier as part of the collections of the American Academy of Arts and Sciences.) Pickering, who came of a prosperous and well-established New England family, was highly educated. He worked as a lawyer, but had turned down the professorship of Hebrew and Oriental Languages at Harvard, and later Harvard's professorship of Greek; he published works on several Native American languages and an important Greek–English lexicon for school use. Pickering's attitude toward American English was hostile; he strongly supported the authority of England, and his motive in collecting American words was to show Americans what words should be avoided. The *Vocabulary* contained only about 500 words, comprising genuinely new forms, new senses, and American survivals of obsolete British words. The work was well received by much of educated America but intensely disliked by the linguistically patriotic Noah Webster.

In 1848, John Russell Bartlett – better known for his dictionary of quotations – published his *Dictionary of Americanisms.* Though Bartlett had gotten started on this work by making marginal comments in a copy of Pickering, he soon realized that his notes were more extensive than the original. Unlike Pickering, Bartlett gloried in the American tongue, becoming particularly entranced by the frontier narratives of or attributed to Davy Crockett. His dictionary was filled with words regarded as provincial or vulgar, and was illustrated with citations from appropriate sources, such as backwoods tales or letters from rural folk. The book became very popular, going through four editions through 1877, each with significant revisions and additions; in particular, its coverage of slang increased notably.

Other dictionaries of Americanisms include Alfred L. Elwyn's 1859 *Glossary of supposed Americanisms,* a short work devoted to archaic Briticisms surviving in the United States; Maximilian Schele de Vere's 1872 *Americanisms,* a somewhat discursive book organized by the source language, giving emphasis to borrowings from French, Dutch, Spanish, and Native American languages; John S. Farmer's 1889 *Americanisms old and new,* by an Englishman, which contained citations and relatively full definitions for many American terms; and Richard H. Thornton's *American glossary,* an extensive book (two volumes as published, with substantial additional material appearing in a later volume of *Dialect notes*) based on a vast amount of citation evidence.

There are two great scholarly dictionaries of American English, both of which focus on vocabulary differences between Great Britain and the United States. The *Dictionary of American English* (DAE) was begun in 1925 under the editorship of William Craigie, one of the editors of the OED. In 1919 Craigie had proposed a range of dictionaries based on historical principles devoted to different regional and temporal varieties of English, giving more detail than OED could. The DAE was the first of these.

(Craigie was also the founding editor of the *Dictionary of the older Scottish tongue*; *see* **Scots Lexicography**.) He was appointed a professor of English at the University of Chicago to start work on the DAE, and kept his OED role at the same time. An extensive reading program was established under the direction of George Watson, who had followed Craigie from the OED. The DAE appeared in four volumes from 1938 to 1944 and included words and senses that arose or were particularly common in the United States, as well as those with some special connection to American life. A cutoff date of 1900 for citations was adopted as the latest date for inclusion.

In 1951 Mitford M. Mathews, one of Craigie's assistants on the DAE, published the two-volume *Dictionary of Americanisms* (DA). This dictionary was limited to words and senses that had originated in America (in contrast to words used there), giving more detail of such terms than DAE, and paid special attention to foreign borrowings. The DA had no date cutoff, and its coverage of early 20th-century English is thus especially important, not duplicating OED or DAE material, and especially good on slang. Since DA was focused so strongly on origins, it occasionally led to somewhat unexpected absences: terms used exclusively in America were excluded if they had been originally British even if they had become obsolete in Great Britain.

Current and Future Trends in American Lexicography

It must be acknowledged that American lexicography is currently in a state of comparative stagnation. As we have seen, for 140 years, from 1830 (Webster and Worcester) to 1969 (American Heritage), competition in the marketplace encouraged imaginative innovations in American lexicography, but from 1970 on these same market forces discouraged innovation. Leading dictionary publishers, having achieved market supremacy, concentrated on keeping prices down rather than on creating expensive (and commercially risky) new departures or responding to advances in linguistic theory and exploiting new potentials. The publishers have been unconsciously abetted by the focus on syntactic abstractions and consequent neglect of actual usage and cultural norms that was characteristic of mainstream American linguistic theory from the 1960s to the 1990s. The result has been a difficult commercial situation for everyone, with publishers being unwilling to risk the significant investment required for new work to produce dictionaries that might turn out to be of potentially limited popular acceptance, while investing heavily in maintaining the status quo was hardly more attractive. In 2001, the publisher Random House disbanded its entire reference department, putting a sad end to an important strand in the American lexicographical tradition and following Funk and Wagnall into oblivion.

Most current American English dictionaries still make little use of corpora, preferring introspection, sporadic citation collection, or unsystematic use of databases as ways of obtaining evidence. The focus on explaining meanings, rather than showing how words are used, is very striking when comparing American dictionaries with dictionaries of European languages such as German or Greek, where more space is devoted to illustrating words in use than to explaining their meaning. An exception is the *New Oxford American dictionary* (NOAD; 2001), an Americanization of a British dictionary, the *New Oxford dictionary of English* (NODE, 1998; *see* **English Lexicography**), which cites corpus evidence extensively as well as using traditional sources such as citations from literature and scientific textbooks, and which offers a more delicate account of word grammar than is usual in American dictionaries. The NOAD copied the style of NODE but adapted certain features to make it more suitable for an American audience. For example, in pronunciations, the IPA of the British dictionary was replaced by a respelling system with diacritics. Some of the more complicated grammatical explanations were simplified or omitted; the word *determiner* was dropped as a part-of-speech label. Illustrations (line drawings and photographs) were added and the number of encyclopedic entries was increased. In all, NOAD, though based on a British work, represents an interesting departure in American lexicography. It remains to be seen whether other U.S. dictionary publishers will respond in any significant way.

Academic research projects such as WordNet (*see* **WordNet(s)**) and FrameNet (*see* **Frame Semantics**) point the way forward, in the sense that they exemplify the potential of computer technology for lexicography, but neither is a dictionary. WordNet is a collection of synonym sets that are linked together to show semantic relations among concepts. It has wide coverage, but the lexicography leaves much to be desired, and it owes nothing to empirical analysis of the actual use of words. FrameNet relates word usage and potential word usage to a number of semantic 'frames.' It proceeds frame by frame rather than word by word; thus, it only describes word uses that are relevant to particular semantic frames. It does not attempt systematically to discover how many different senses a word has, and indeed the concept 'word sense' does not play much of a part in FrameNet's theoretical apparatus. Perhaps its greatest importance

is that it shows how corpus evidence can be linked to linguistic theory. The field is wide open for a new initiative, inspired by such developments, that will take advantage of computer technology, corpus linguistics, and cognitive linguistics to create an empirically well-founded, corpus-based study of current American English usage, showing how each word in the language is used and how the meanings are related to usage.

See also: Corpus Lexicography; English in the Present Day (since ca. 1900); English Lexicography; Frame Semantics; Lexicography: Overview; Scots Lexicography; Slang Dictionaries, English; Webster, Noah (1758–1843); Whitney, William Dwight (1827–1894); WordNet(s).

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Amharic

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Introductory Remarks

Amharic (self-name *amariṇṇa*) is the largest member of the South Ethiopic branch of Ethiopian Semitic languages. Amharic is spoken, according to the most recent estimate (1999), by around 17.4 million people as a first language and between 5 and 7 million more as a second language, making it the second largest Semitic language after Arabic, and the fourth largest language of sub-Saharan Africa after Swahili, Hausa, and Yoruba, although some estimates suggest that Oromo may have more speakers in total. Amharic is the main lingua franca of Ethiopia and is the constitutionally recognized working language of the country. As such it forms the language of instruction of public education at primary and secondary level, including from the third grade upwards in areas where it is not the first language. It is also the majority language of most urban-dwelling Ethiopians except where Tigrinya (Tigrigna) is the first language. The current status and wide distribution of Amharic are due especially to the amharization policies of previous Ethiopian governments in the 20th century. Until the change in language policy after the Ethiopian revolution of 1974, Amharic was the only Ethiopian language used in state education and the official media. The earliest records of Amharic date to the rise of the Amhara or Solomonid dynasty in the 14th century, and the spread of the language over an ever-increasing area of the Ethiopian highlands accompanied the expansion of the Christian kingdom up to modern times.

Modern Amharic shows some dialectal variation, though perhaps less than might be supposed for a language with such a wide distribution. This may in fact be due to the way in which the language has spread over the last 700 years, as part of a deliberate process of amharization, and it is notable to this extent that the dialect areas that are generally

American Linguistics before Whitney

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Language study in North America from the early colonies to 1860 was founded on three discourses: 'Americanisms' – the divergence of U.S. from British English; 'Federal English' – the politics of English as a nation language; and 'Indian languages' – questions of language typology, evolution, and genetic classifications. By the mid-19th century language study was becoming increasingly professionalized, and the discourse on Indian languages and linguistic typology helped place U.S. language study on a global footing with 'scientific' German scholarship.

Colonial Period to 1812

The principal European backgrounds for North American language studies were British rhetoric and prescriptivism (Beattie, Lowth), French Ideologues' rationalist thought (Destutt de Tracy, Volney), compendia of vocabularies (e.g., Pallas's *Linguarum totius orbis vocabularia comparativa*, 1787–1789), and later, German philology (Grimm, Rask, Bopp).

In England, Robert Lowth (*A short introduction to English grammar*, 1762) railed against vulgarisms perpetrated by uneducated speakers and writers and against the wrongheaded usage at court and on the stage. Lowth and V. J. Peyton claimed that English grammar should be governed by the received categories of Latin grammar, and they proscribed such forms as multiple negation and *which* for animate references. Samuel Johnson hoped to purge English's idiosyncratic usages (*A dictionary of the English language*, 1755), symptoms of "the boundless chaos of a living speech" (Preface, 4th ed., 1774).

French linguistic relativism and a rationalist, secular approach to grammar and usage, as presented in Volney's *Ruines* (1791) and Destutt de Tracy's *Idéologie* (1803–1818), were favorably received among colonial intellectuals such as Franklin and Jefferson. Volney based his project to understand "reason equally distributed in each human being" on a taxonomy of "the history of peoples on the basis of the history of their language" (1819). Jefferson owned works by Destutt de Tracy and Volney; the British etymologist and parliamentary reformer Horne Tooke's influential *ΕΠΕΑ ΠΤΕΡΟΕΝΤΑ or, The diversions of Purley* (1789–1805) (*see* **Tooke, John Horne (1736–1812)**); Old English grammars; and studies of Bengali, Persian, and other non-European languages. Franklin loaned Webster his copy of Tooke's *Diversions*. Early U.S. language study enfolded the egalitarian principle of universal reason and ethnology's evolutionary study of human society through language history within a revolutionary democratic nationalism.

Prescriptivism

In pre-Revolution America, few English grammars were available for vernacular education, despite the popularity of Lowth and other prescriptivists. The *New England primer* (1680–1690) and Thomas Dilworth's *A new guide to the English tongue* (1747) were primarily spellers with little grammatical material. These early textbooks adopted the traditional definition of grammar as "the art of speaking and writing correctly" but provided little in the way of actual grammatical analysis or terminology.

When the American Revolution ended in 1783, grammar and grammar education were divided between prescriptive and national language ideologies. The most influential continuer of the prescriptive tradition was Lindley Murray, a Quaker and Tory supporter who fled to England after the Revolution. Murray modeled his *An English grammar, adapted to the different classes of learners* (1795) on Lowth's grammar and argued that ideal usage in the new United States should be a middle commonsense style, avoiding both affected court usage and lower class barbarisms. Noah Webster's (1758–1843) career reflected the shift from modified prescriptivism to 'Federal English' in the United States (*see* **Webster, Noah (1758–1843)**). Webster distinguished between acceptable educated and uneducated usage and noted that U.S. English's divergence from British English was politically inevitable and necessary. Generally, he subordinated prescriptive grammar to usage: "It is our business to find what the English language *is*, and not, how it *might have been made*" (*A grammatical institute of the English language*, part 1, 1783).

Divergence

Long before Webster, colonial observers had noted differences between British and American English usage. Many eagerly described the distinctiveness, creativity, and innovation rather than the vulgarity of English usage in North America. In a series of articles in *The Pennsylvania journal* (1781), Rev. John Witherspoon (1722–1794), Scots clergyman and president of the College of New Jersey (later Princeton University), claimed to have coined the term *Americanisms* ("ways of speaking peculiar to this country") analogous to the term *Scotticisms*.

Witherspoon organized his list of vocabulary and usages according to vulgarisms, local terms, common blunders, ignorance, cant phrases, personal blunders, and new technical terms. However, Witherspoon criticized specific usages on both sides of the Atlantic and thought many Americanisms diminished the English language. Relying on the authority of the 'best' English writers, he proscribed local phrases from people of all ranks, including such Americanisms as *bison, once in a while, raw salad, chunks, occasion* ('opportunity'), *tot(e)* ('carry,' identified as a Southern regionalism), and *bluff*. *Bluff*, meaning either a 'steep river bank' or 'misleading someone with a false front,' became a stock marker of American speech in 19th-century literature (Cooper, Lewis and Clark, Tennyson). Witherspoon also proscribed the spread of cant phrases or slang among mainstream speakers, including distinctive American expressions such as *taken in, bilked, the thing* ('quite the thing'), *bamboozle, mob, vastly* (adv. from *vast*), *topsy turvy,* and *upside down*.

Nonetheless, Witherspoon also situated U.S. English within a distinctly American national project for intellectual independence. He recommended "a pure and, as it may be called, classic simplicity," enhanced by linguistic independence and nation building: "Time and accident must determine… whether we will continue to consider the language of Great-Britain as the pattern upon which we are to form ours: or whether, in this new empire, some center of learning and politeness will not be found, which shall obtain influence and prescribe the rules of speech and writing to every other part" (1802).

Witherspoon's wordlists sparked others. David Humphrey's (1752–1818) very popular glossary of Americanisms ("new-coined American, obsolete English, and low words in general") was appended to his published play *The Yankey in England* (1815). Humphrey's glossary was used by later writers on Americanisms, including John Pickering (*Vocabulary*, 1816) and John Russell Bartlett (*Dictionary of Americanisms,* 1848). Humphrey noted three levels of usage based on education: college, middle-class grammar school, and limited schooling in free public schools. He paid special attention to loan words and non-English languages in America: German, Dutch, Spanish, French, and Indian languages. Humphrey's citations sometimes reflect regional pronunciations, not new Americanisms *per se* – *ax* (ask), *berrying* (burying), *cuss* (curse) – and he is critical of low-class vulgar speech. Moreover, his explanations are not always reliable. He incorrectly interprets *Ant I* as probably from *and I*, when in context the phrase is clearly the tag question *ain't I*.

The recognition of differences between U.S. and British English and the politics of establishing a national Federal English constrained rationalist language reforms. Webster's spelling reforms (*iland* instead of *island*) based on pronunciation were only partly accepted. John Adams (1735–1826) proposed a U.S. language academy "for refining, correcting, improving, and ascertaining the English language" (letter to Congress, Sept 5, 1780), but the plan was never accepted. As a rationalist reformer, Adams believed a national language academy would produce "a public standard for all persons in every part of the continent to appeal to, both for the signification and pronunciation of the language." However, Jefferson, Webster, and others associated language change and variation with freedom and democratic ideals and strongly opposed the establishment of an official body to regulate language usage in the United States (Heath, 1977).

American Indian Languages

Triggered by language contact, many European colonists showed great interest in North American Indian languages, not only for cross-linguistic communication and survival in the New World but also because of the humanist belief in language as constitutive of reason, civilization, and social order. Before sailing for North America, Thomas Harriot learned 'Algonkian' (East Carolina Cherokee) from two Indians in England, who in turn learned English from Harriot (*A briefe and true report of the new found land of Virginia,* 1588). His wordlist included observations about grammatical structure (e.g., genders of number words) and syntactic rules. Roger Williams (*A Key into the language of America*, 1642) and John Eliot (*The Indian grammar begun*, 1666; *The Holy Bible: containing the Old Testament and the new translated into the Indian language*, 1663) described Narraganset and Massachuset vocabulary, idioms, and pragmatics as keys to the tribes' cultures, myths, narrative traditions, and customs. Williams posited rules for Narraganset plurals and sentence formation and praised Narraganset's "copiousness" (multiple words for one thing), although he claimed the language lacked abstract nouns. He also suggested that Indians' religious practices had affinities with the ancient Hebrews', although their languages more resembled Greek. Other colonial writers included Indian vocabulary lists with their ethnographic and geographic accounts of the New World. Loan words from Indian languages were limited, but some were given high profile in early American literature, especially placenames and words from Algonkian (Algonquian) languages (*moccasin, papoose, squaw, toboggan, tomahawk, moose,*

opposum, pecan, squash, skunk, terrapin, woodchuck).

Many European scholars described the American colonies as the New Eden and thought the continent's original non-European inhabitants might provide a link to the lost universal language spoken before Babel. In an evolutionary model, linguists and compilers such as Wilhelm von Humboldt had claimed that Indian languages were less complex than European ones and therefore historically more 'primitive.' But more informed colonial observers, such as the Plymouth colony's Edward Winslow, recognized that Indian languages were "copious, large, and difficult" (*Good newes from New England,* 1624). Williams realized that the language the Indians taught to the colonists was often not their "complex" native language but a pidgin variety. Indians in turn acquired pidgin Englishes in their interactions with the colonists and sometimes used pidgin English in their exchanges with other tribes (Christopher Levett, *A voyage unto New England*, 1624; Jonas Michaëlius, 'Letter,' 1628).

Early colonists were puzzled as to how to transcribe Indian languages. Many Indian language phonemes were unfamiliar to them, and travelers noted that Indian languages were difficult for Europeans to pronounce. Observers recorded Indian speech with whatever phonetic spelling they could produce. Williams was the first to recognize the phonological variation among *n, l,* and *r* in several Algonkian languages, and he used special diacritical marks to indicate pronunciation features of Narraganset (Williams, 1642/1973). But his analysis did not extend to the entire Narraganset sound inventory. Searching for a more scientific representation of linguistic sounds, Harriot invented 'An universall Alphabet conteyninge six & thirty letters,' one character for each sound. He transcribed 'Algonkian' (Cherokee) language in the Carolinas so that any reader could pronounce the words properly (*Briefe and true report*). Harriot's transcription/notation system did not become well known – Williams was unaware of it – but his work may have influenced Samuel Hartlib's phonetic notation system (1635).

Federal English and Language Study, 1783–1830

After the American Revolution, the U.S. struggles over national identity were played out in language politics and linguistic discourse as well as in political, cultural, and military arenas. The independence of American English was an important topic in public discourse as well as in linguistic writing, dictionary publishing, and school texts. In addition, new ethnographic research on Indian languages and genetic relationships based on language typology set the stage for a U.S.-inflected comparative linguistics. By 1830 American philologists and ethnographers were energetically undertaking worldwide comparative linguistic and ethnographic research and elaborating theoretical and analytic vocabularies for comparative-historical linguistics.

Noah Webster celebrated the variety in American usage while also promoting a strong American language tradition for national stability: "Custom, habits, and *language*, as well as government should be national." Linking language and revolution, Webster rejected British authority in English usage: "As a nation, we have a very great interest in opposing the introduction of any plan of uniformity with the British language, even were the plan proposed perfectly unexceptionable." Webster's ideal U.S. speakers were the "American yeomanry . . . masters of their own persons and lords of their own soil. These men have considerable education." With myopic idealism, Webster reiterated colonial accounts of American speech as a linguistic Eden: "The people of America, in particular the English descendants, speak the most *pure English* now known in the world. There is hardly a foreign idiom in their language" (*Dissertations,* 1789).

Many of Webster's proposed spelling reforms were distinctly phonetic and sometimes at odds with accepted mainstream literate usage: use single consonants where British spelling uses double consonants (*traveled,* not *travelled*), eliminate silent letters (*crum, iland*) or silent final vowels (*determin, ax* for *axe*), and respell borrowed words as English morphemes (*controller*, not *comptroller*). He approved the U.S. pronunciation of *lieutenant* ([lutənənt]) and recommended *aluminum* instead of the British *aluminium* (*American Dictionary*, 1828). Webster recognized that historically and geographically languages and dialects drift, so that "in a course of time, a language in North America, [will be] as different from the future language of England, as the modern Dutch, Danish, and Swedish are from the German, or from one another" (*Dissertations,* 1789). Departing from prescriptivism, Webster privileged speech over writing. He argued that the alphabet should serve orality and that phonetic spelling reforms would reduce regional and class differences among English speakers, enabling the "plain unlettered man" to have more access to written texts: "It is important that the same *written words* and the same *oral sounds* to express the same ideas, should be used by the whole nation" (*American dictionary*, 1828).

Conceptually, Webster's *Compendious dictionary of the English language* (1806) and later his *American Dictionary* (1828) furthered his Federal English

project by including as many distinctive Americanisms (e.g., *appreciation, subsidize*) as possible while historically linking current U.S. English usage to Anglo-Saxon roots. Webster's etymological strategies justified current usage or sometimes reconstructed the originary proper word that should supersede contemporary usage. Some of Webster's derivations and etymologies, especially those modeled on Tooke's, were criticized by Pickering, and in post-1860 editions of his *American dictionary* many etymologies were purged by a German-trained linguist (Andresen, 1990). But Webster's commentary on the different pronunciations of *ask* (*ask, aks*) reflects a more nuanced mix of pronunciation, spelling, and usage: "The latter is the true pronunciation of the original word; the Saxon verb being written *acsian* or *axian*. The transposition of letters which gives the present orthography and pronunciation is a modern innovation by writers; but it has not changed the primitive pronunciation among the body of our people, and it is doubtful whether a complete change can ever be effected" (*Compendious dictionary,* 1806). For Webster, modern, polite speech is a literate intervention irrationally creating greater distance between pronunciation and spelling, while the Saxon etymon supports a more 'original' (pure) pronunciation, even though it had become stigmatized as nonstandard, 'provincial' speech (e.g., Adiel Sherwood, in *Gazetteer of the state of Georgia*, 1837).

John Pickering's *Vocabulary of words and phrases which have been supposed to be peculiar to the United States of America* (1816) challenged Webster's account of English origins and distinguished true Americanisms from those of "doubtful authority," based partly on Pickering's observations of British usage in London. Pickering referred to his text as not a dictionary but a "glossary of provincialisms," not all of which would be legitimate for a real dictionary. With modified prescriptivism and intellectual nationalism, Pickering aimed to preserve "the English language in its purity" throughout the United States as a service to the "literature and science" of the nation. He adopted the written standard of 'classic' British writers (Milton, Pope, Swift, Addison) for written English in the United States and recommended that if the new nation was to attain international legitimacy, American writers must use a written English that "Englishmen can read with pleasure." However, Pickering also accepted regional spoken English as part of American identity, different from the current British standard. Pickering's views on etymology and written standard English infuriated Webster. Pickering also criticized grammatical improprieties and 'vulgar' usage (*a[i]n't, see* for *saw*) while noting distinctive U.S. forms or phrases (*mighty* for *very*, *attain* without *to*, *averse to* rather than *from*).

By 1830, Witherspoon, Adams, Webster, and Pickering's modified linguistic prescriptivism was no longer the dominant discourse. Even Pickering, in his article 'Americanisms' (*Encyclopedia Americana*, 1830), wrote, "Authority, in regard to language, will go far, but never can withstand for a long time the energies and wants of a free, industrious and thinking people." More and more, U.S. language researchers turned their attention to compiling data of English usage and Indian languages and to developing theories of grammatical structure.

Antebellum Linguistics

After 1819 a new generation of philologists and ethnographers investigated Indian languages in North America and used their research to reconfigure comparative grammar and linguistic typological-historical studies. In the United States, philologists and ethnographers debated genetic, structural, and evolutionary approaches to language typology, chiefly with regard to Indian languages and linguistic relativism.

American Indian languages

A year after Sir William Jones's famous 'Third anniversary discourse to the Asiatic Society of Calcutta' (1786), Jonathan Edwards (d. 1801), an amateur language observer, addressed the Connecticut Society of Arts and Sciences and argued that comparative analysis of vocabulary showed that the languages of the Delaware, Ojibwa, and Mohegans were genetically related: "It is not to be supposed, that the like coincidence is extended to all the words of those languages. Very many words are totally different. Still the analogy is such as is sufficient to show, that they are mere dialects of the same original language" (1787). Like Jones, Edwards proposed that language typologies be revised according to lexical comparative analysis. It was decades, however, before U.S. linguists took up Edwards's insight and constructed better accounts of the genetic and historical relations among languages and peoples.

Just as Europeans sometimes labeled American English as barbarous, so they sometimes referred to Indian languages as primitive, simple, or barbaric speech, simultaneously idealizing and infantilizing Indian languages and speakers. But North Americans' close association with Indians offered more linguistically sophisticated views of indigenous languages. As noted earlier, Roger Williams and Edward Winslow had regarded Algonkian languages as complex and copious. Benjamin Barton's (1766–1815) *New views*

on the origins of the tribes and nations of America (1797) used wordlists compiled by Williams, David Zeisberger, and others to posit (incorrectly) a genetic relation between Cherokee and Iroquois. Barton specifically used his comparisons to criticize European dictionaries and comparative grammars for lacking any real knowledge of or acquaintance with Indian languages.

In 1819, John Heckewelder (1743–1823) published his important *Account of the history, manners, and customs of the Indian nations, who once inhabited Pennsylvania and the neighboring states*, based on observations while living with the Delaware. In the chapter 'Languages,' Heckewelder laid the groundwork for a more detailed account of the genetic relations among Indian languages. He claimed that Delaware was a kind of "universal language, so much admired and so generally spoken by the Indian nations." Heckewelder, echoing Williams, wrote that "the Indians are not so poor, so devoid of variety of expression, so inadequate to the communication even of abstract ideas, or in a word, so *barbarous*, as had been generally imagined" (1819). He analyzed Delaware vocabulary and grammar in detail, while lamenting the lack of an adequate notation system for transcribing Indian languages. (In 1820, John Pickering did try to develop such an alphabet for Indian languages, *An essay on a uniform orthography* . . ., but his project foundered because he based his notation system on the Roman alphabet and European vowel values.) Linking language and cultural politics, Heckewelder idealized Indian culture and behaviors as purer and more authentically human when compared with the corrupted languages and behaviors of contemporary white societies.

Within the discourse of comparative philology, American antebellum philologists and ethnographers used their analysis of Indian languages to augment typological categories and reconfigure the discipline of linguistics. The most important heirs to Heckewelder's project were Pierre-Etienne [Peter Stephen] Duponceau (*see* **Duponceau, Pierre Etienne (1760–1844)**), John Pickering, and in their fieldwork, Albert Gallatin and Henry Schoolcraft. These scholars debated theory and method in philology and linguistics, in particular whether comparative analysis should focus on vocabulary or grammar. In his programmatic essay, 'Philology' (*Encyclopedia Americana* , 1830), Duponceau subdivided the discipline into phonology, etymology (language history), and ideology (grammar) (Robins 1987). Vocabulary, he argued, is not sufficient to show all the genetic (etymological) relations among languages, nor are word histories necessarily the most interesting aspect of language study from the universal rationalist perspective. A true philology would be "a science as vast in its extent as interesting in its details" and "requires to be subjected to some methodical order, in order that a comprehensive view may be taken of its whole extent, and a regular system pursued in the study of its component parts." In the first half of the 19th century U.S. linguists were concerned not only with data collection and typology but also with metatheoretical questions of philology and linguistics and with establishing a particularly American version of Germanic philology distinct from British language study.

Duponceau was a gentleman scholar and lawyer who immigrated to the United States in 1777. His linguistic writings focused on English and Indian languages, especially Algonkian. His first published linguistics paper, 'English Phonology' (1818) emphasized the variety of English dialect pronunciations worldwide and contrasted English pronunciation with other languages, including Indian languages. Duponceau framed U.S. English within the context of North American languages when he began by noting the distinctive *W* sound ("a soft whistling") in Lenni-Lenape and its syllable constraint: "[*W*] is a consonant, the sound of which is produced by a soft whistling; however barbarous this sound may appear to one who has never heard it, when pronounced, or rather whistled has a pleasing and delicate effect on the ear, although it is frequently followed by the consonant *d* or *t*, as in *Wdanis*, daughter, *Wtehim*, Strawberries, *Wtellsin*, to do so, &c." (Duponceau, 1818).

Duponceau also advanced general linguistic hypotheses and metaterminology. He identified the synchronic study of language sounds as "the curious and interesting science, which, until a better name can be devised, I would denominate the *Phonology of Language*" (1818). With his synchronic approach to phonology, he tried developing an "alphabet of sounds" to transcribe the speech of any language, and he gave new arbitrary names to seven English vowels (*aulif, arpeth, airish, azim, elim, oreb, oomin*). In language typology, Duponceau added the category *polysynthetic* to the existing matrix of morphological forms (*analytic*, *synthetic*, *agglutinating*) to better identify the morphology characteristic of Indian languages. In polysynthetic languages, "words can be compounded to any extent," so that "the languages [are] essentially polysyllabic, and . . . monosyllables are rarely to be found" (1832). Unlike Benjamin Barton (*New views on the origins of the tribes and nations of America*, 1797), Duponceau wrote that Indian languages display "a wonderful organization which distinguishes the languages of the aborigines of this country from all other

idioms of the known world." He added that language typologies should be based on grammatical, not lexical, comparisons, "those comprehensive grammatical forms which appear to prevail with little variation among the aboriginal native of America, from Greenland to Cape Horn" (1819).

John Pickering also did extensive comparative work on ancient and classical languages (he declined offers of the chairs of Hebrew and Greek at Harvard University) and on Americanisms, Indian languages (Cherokee), and South Pacific languages. He corresponded and debated with Webster, Duponceau, Bopp, Humboldt, and others on linguistic matters, and he contributed foundational arguments for a new 'science' of philology, based on German models for scholarship.

While something of a prescriptivist, especially in his early discussions of American English (*A vocabulary or collection of words*, 1816), most of Pickering's linguistic work was based on the humanist principle that the study of human beings in their social, cultural, and historical contexts should be taken up "through the medium of his [*sic*] noblest and peculiar faculty of speech" (1819). Pickering grafted this humanist ideal of language onto the 19th century's rationalist principle for language study and the development of "a *new science*," "the *comparative science of languages*." Applying models of German comparative philology and historical-typological grammar to the study of U.S. languages, Pickering sharply criticized Webster's lexicography and etymology for what he called the dictionary maker's weak scholarship (i.e., his amateurism) and for his use of Horne Tooke-style 'Saxon' analyses: "the works of the modern German scholars rise to a still higher degree of importance; and yet, strange to tell, none of the philologists in England [i.e., Tooke and his followers], or in our own country, appear to have derived any benefit from them. To judge from the labor of lexicographers in our language, the reader would hardly know that such men as Adelung . . . Humboldt, Grimm, Bopp, Rask, and others, of our own times, ever existed" (1837; Read, 1966).

In his 'Indian languages of America' (*Encyclopedia Americana*, 1830–1831), Pickering criticized previous European linguistic studies (notably Humboldt's) for not directly comparing Indo-European languages with Indian languages and for asserting without good evidence that Indian languages did not possess "genuine grammatical forms." His article focused primarily on the grammar of Cherokee verbs and reprinted Sequoyah's Cherokee syllabary, first developed in 1821. Pickering was the first European linguist to identify Cherokee's *inclusive* and *exclusive* plural pronouns prefixed to verbs (*in-*, I and you/we; *s-d-*, you two [not speaker], *o-s-d-*, I and another/we) (1830–31; cf. Pickering's annotated edition of John Eliot's [1666] *The Indian grammar begun*, 1822).

Pickering's contemporary, Albert Gallatin (1761–1849), was instrumental in the development of early American comparative linguistics and in the formation of linguistics as a profession. He helped establish the American Ethnological Society (1842, later the Anthropological Society of New York); he was founding president of the New York Historical Society (1843). Methodologically, Gallatin emphasized genetic, historical (etymological) relations and lexical comparisons among languages, especially Indian languages. But unlike Duponceau and Pickering, Gallatin had a more negative view of Indian peoples, calling them 'Savage Tribes.'

Gallatin's "A Synopsis of the Indian Tribes of North America" (1836) deployed a Humboltian-evolutionary approach to language change and vocabulary, but he adopted a more uniformitarian theory of grammatical processes as "natural causes," "resorted to in the most ancient times by other nations." Gallatin theoretically distinguished the lexicon, whose expansion marks the "great progress of knowledge," from grammatical forms, whose processes remain relatively constant (uniform) from the earliest state of a language to the present. Gallatin's wordlists for Indian languages were important resources for later ethnographers and field linguists.

By 1848 Gallatin had developed an important taxonomy of 32 distinct families of North American Indian languages (Introduction to *Hale's Indians of North-West America, and vocabularies of North America*), based on genetic relations among vocabulary alone. Revising his 1836 uniformitarian theory, he argued that some Indian languages' vocabularies "abound in distinct names for every particular species of tree, for every variety of age, sex, or peculiarity, in certain species of animals, and in degrees of consanguinity" (1848). Gallatin thus offered an early argument for the *advanced* cultural state of seemingly *primitive* peoples, based on comparisons of linguistic taxonomies and conceptual categories. But Gallatin's semantic analyses clashed with his evolutionary account of human cultures, where he described Indian tribes as historically and culturally more primitive than European or Asian cultures.

Henry Schoolcraft (1793–1864) linked the study of Indian languages' vocabulary with a national language project. "American speech," Schoolcraft argued, should reflect the diversity of languages in the United States, principally English and Indian languages. Like Lewis and Clark's expedition and James Fenimore Cooper's fiction, Schoolcraft's

linguistics linked Indian names and physical geography in American consciousness: "there is nothing in the geography of America, which impresses the observer more than the Indian names" (1827). Schoolcraft proposed that wherever possible in New York City original Indian names should be restored or replace those 'foreign' names imposed by colonists, none of whom could claim to be 'national' (1860). Schoolcraft hoped that the United States' growing independence from British political and linguistic domination would be the beginning of a new awareness of Indian languages and an opportunity to construct a more multicultural America by blending English and Indian naming practices. However, Schoolcraft's dream of a proactive study of North American Indian languages disappeared with the ascendance of Manifest Destiny (1845) and its Anglo-Euro racial focus.

The writings of Heckewelder, Pickering, Duponceau, Gallatin, and Schoolcraft map out the principal threads of typological and comparative-historical linguistics in the United States from 1815 to 1860. Their research dovetailed with popular autobiographies and narratives of Spanish and Indian languages and cultures and accounts of frontier speech (e.g., George Ruxton's *Life in the far west among the Indians and the mountain men 1846–47* [1849]). Through their fieldwork and grammatical and lexical analyses of Indian languages, Heckewelder, Gallatin, and Schoolcraft challenged European philologists' claims that Indo-European language categories are the only cognitive tools for organizing knowledge of a complex world and that Indians are 'primitive' because their languages lack such terms. Their data collection also provided key information to support a general theory of linguistic relativity. Duponceau and Pickering adopted German models of comparative philology as a counter to British linguistic ideas and used the grammars of Indian languages to expand the metadiscourse of language 'science.'

Around 1842: Global Linguistic Relativism

The year 1842 was a major turning point in the history of U.S. linguistics (Andresen, 1990). U.S. research on Indian languages motivated the foundation of the first professional linguistic society in North America, the American Oriental Society (1842), and its *Journal of the American Oriental Society* (1849). By 1842 Francis Lieber had completed the first edition of the *Encyclopedia Americana*, and the study of world languages was considered the foundation of the discipline of a scientific philology. Shortly afterward, in the summer of 1845, war with Mexico loomed (1846–1848) and the phrase Manifest Destiny created a public name for the national ideology that the United States was entitled to become a nation of predominantly white Europeans from the Atlantic to the Pacific.

In his presidential address at the founding of the American Oriental Society, Pickering outlined the scheme for American linguistics for the next 50 years. Philology, he said, is "a science, comparatively, of recent date, and the ultimate results of which, in ascertaining the relationship and history of nations – even of those which are not known to have ever had *written* languages – can hardly yet be justly appreciated" (1842/1849). Pickering argued the society's goal should be "to extend our inquiries beyond the Eastern *Continent* to the uncivilized nations, who inhabit the different groups of islands in the Indian and Pacific Oceans, from the eastern coast of Asia to the western coast of America; comprising that region of the globe which has been called Polynesia" (1842/1849). Pickering's global research program emphasized vocabulary and grammar as evidence for structural typology and genetic relations among languages.

As Pickering addressed his colleagues, the U.S. Exploring Expedition of 1838–1842 was concluding its voyages to South America and the South Pacific. The expedition's ethnographer and philologist was a 19-year-old Harvard student, Horatio Hale, recommended by Pickering and Duponceau (Mackert, 1994). The expedition's goal was to compile data of human diversity and experience. Following evolutionary (Humboldt) and American Indian languages studies, the organizers regarded language as a key to the migrations and genetic connections among peoples. Duponceau explained to Congress that the philologist should analyze languages "as to the words of which they are composed" and "as to their Structure or Grammatical Forms" (1836). Both Pickering and Duponceau believed that the tasks of the ethnographer and the philologist overlapped, and the U.S. Exploring Expedition implemented their disciplinary and theoretical views.

Hale published the results of his study of the peoples and languages of the North American Northwest Coast, Polynesia, South Pacific Islands, and Australia with the title *Ethnography and Philology* (1846). He modified Pickering's phonetic alphabet to transcribe languages and included research on migrations, trade languages, and grammars and vocabularies of Austronesian, Australian, and Northwest Amerindian languages. The U.S. Exploring Expedition and Hale's study foregrounded U.S. linguistics as a worldwide intellectual endeavor, as Webster and Pickering envisioned, and aligned the study of Indian languages with those of the Pacific Rim. After the expedition and publication of his *Ethnography and*

Philology, Hale did no ethnographic or linguistic work until the mid 1870s, when he concentrated on Iroquois and supervised Franz Boas's early fieldwork on the Northwest American coast.

Though not well known, Francis (Franz) Lieber's (1800–1872) work also focused on theories of linguistic relativity and the professionalization of linguistics. Born in Berlin, Lieber immigrated to the United States in 1827. He held academic posts at South Carolina College and Columbia College (New York City) and published widely on international law and political hermeneutics. Lieber's research and writing on language mark one of the earliest influences of the new German scholarship on U.S. linguistics.

Lieber edited the *Encyclopedia Americana* (1829–33), modeled on German scholarly lexicons. He wrote many of the articles and also enlisted Duponceau, Pickering, and others as contributors. Pickering certainly wrote the article 'Americanisms,' though it is unsigned, and Duponceau probably wrote 'Language' and 'Philology' (Andresen, 1990; Robins, 1987). The article 'Language' curiously defines *language* as "God-given" but a few pages later gives a more functional definition based on linguistic relativity: "Languages were made for the purpose of communication between men, and all are adequate to that end" (1830/1831).

Many of Lieber's published writings elaborate on linguistic relativity. In 'On the study of foreign languages' (1837) he compares different languages (Greek, Latin, French, German, English, Mohegan) to show their different cognitive and semantic structures: "These interesting inquiries into the division of ideas, and the difference of this division in different languages, by which we discover a different affinity and affiliation of thoughts and notions, a different perception of things, and a consequently different ramification of ideas; in short, a different logic of nations, may be continued without end" (1880/1837). Lieber contrasted Mohegan *holophrasis*, "words which express a complex of ideas" or "words which express the whole thing or idea, undivided, unanalyzed," with other languages' *polyphrasis*. Aesthetically, Lieber argued, holophrastic words display the "energy of style" which poets desire, thus ideologically linking Indian languages with heightened creativity. Later, Sapir compared Algonquian languages' words formed through polysynthesis to "tiny imagist poems."

Lieber developed his analysis of holophrasis in Indian languages in his "Plan of thought of the American languages" (1851–1857), included in Schoolcraft's *Archives of aboriginal knowledge* (1860). But when Lieber contrasted polysynthetic Indian languages, principally Mohegan, with analytic languages such as French, his linguistic relativism became evolutionary: "as man begins with *perceiving* totalities, and then generalized in his *mind*, so do children and early nations show the strongest tendency to form and use . . . *bunch words*" (1860). In Lieber's structural typology, linguistic relativism competes with linguistic evolutionary anthropology.

Lieber's 'Vocal Sounds of Laura Bridgman' (1850) reports on his case study of a child rendered blind and deaf by scarlet fever. Bridgman was the first U.S. deaf-blind child known to have been educated to speak and use visible language; she read and communicated with fluent finger spelling (Davis). Lieber outlined the sixty vocal sounds Bridgman used as names for people she knew well and their phonetic features (monosyllabic, mostly labial). But archival research shows that Lieber never published his much larger work on Laura Bridgman, in which he analyzed her communication in a broad linguistic-semiotic context (Davis). In the unpublished work, composed as nine letters to his son Oscar, Lieber reported on Bridgman's post-illness language acquisition and what it suggests about human language and cognition. For example, Lieber argued that Bridgman did not have access to the largely unconscious modes by which hearing-sighted people acquire words' nuances of meaning, tone, and context. Analysis and abstract words, he theorized, are part of higher cognition acquired through ordinary speech.

Most of Lieber's writing on linguistic topics remains unpublished, including work on Indian languages, American–British English divergence, African American speech, linguistic relativism, sociolinguistics (pidginization, language contact, language change, code switching), and the important text on Laura Bridgman's acquisition of signed English (see *Notes on language,* 10 volumes, Huntington Library, San Marino, CA). For Lieber, language is an arbitrary system of signs, organized by hearing and nonhearing users primarily to communicate information and exchange ideas, impressions, and desires. Language, he wrote, is organized by general laws and comprised of sensuous material (sound). In several works Lieber contrasted languages according to his holophrastic-paraphrastic typology. Lieber's linguistic relativism and theory of language as a sign system were themes later developed by Charles S. Peirce, William Whitney, Edward Sapir, Roman Jakobson, and modern semioticians.

See also: Algonquian and Ritwan Languages; Duponceau, Pierre Etienne (1760–1844); Evolutionary Theories of Language: Previous Theories; Polysynthetic Language: Central Siberian Yupik; Tooke, John Horne (1736–1812); Webster, Noah (1758–1843).

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American Lexicography

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The Beginnings: Noah Webster

Before and for some decades after the American Revolution, British dictionaries (particularly that of Samuel Johnson) were used in the United States, usually in pirated form. The first dictionary produced by an American was *A school dictionary* (1798) by Samuel Johnson, Jr. (not related to the great English lexicographer). This dictionary was short and had only brief (and often flawed) definitions that were considered appropriate for students. Its pronunciation system was inadequate even by the standards of the time (as Johnson himself acknowledged), and it included no Americanisms. About all that can be said for it is that it existed, as the first natively produced dictionary in the United States. The pirated British dictionaries were sometimes better, but their coverage of American English was haphazard. They had occasional but irregular American spelling variants but few genuinely American terms. American English was not recognized as a separate regional standard of English. All this changed with Noah Webster (1758–1843).

Noah Webster began his lexicographic career in 1783 with the publication of the *American spelling book*, also known as *The blue-backed spelling book*. This phenomenally popular work went through many editions and hundreds of printings during Webster's lifetime, and by the end of the 19th century it had sold an estimated 100 million copies. Webster's efforts to combat piracy had an influence on the establishment of federal copyright laws in 1790. In contrast to the exclusively religious leanings of earlier works, the *Spelling book* was marked by a strong patriotic and moral tenor: "A good child will not lie, swear, nor steal," went a typical reading passage, "He will be good at home, and ask to read his book; when he gets up he will wash his hands and face clean." Its spellings adhered to a British model, but in subsequent works Webster changed his mind and argued in favor of spelling reform. He thought deeply about spelling throughout his life, and in mid-life he advocated more radical reforms than those that he eventually adopted in his major dictionaries.

Webster's first dictionary was *A compendious dictionary of the English language* (1806). Less important than his later works, it nonetheless included

is that it shows how corpus evidence can be linked to linguistic theory. The field is wide open for a new initiative, inspired by such developments, that will take advantage of computer technology, corpus linguistics, and cognitive linguistics to create an empirically well-founded, corpus-based study of current American English usage, showing how each word in the language is used and how the meanings are related to usage.

See also: Corpus Lexicography; English in the Present Day (since ca. 1900); English Lexicography; Frame Semantics; Lexicography: Overview; Scots Lexicography; Slang Dictionaries, English; Webster, Noah (1758–1843); Whitney, William Dwight (1827–1894); WordNet(s).

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Amharic

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Introductory Remarks

Amharic (self-name *amariṇṇa*) is the largest member of the South Ethiopic branch of Ethiopian Semitic languages. Amharic is spoken, according to the most recent estimate (1999), by around 17.4 million people as a first language and between 5 and 7 million more as a second language, making it the second largest Semitic language after Arabic, and the fourth largest language of sub-Saharan Africa after Swahili, Hausa, and Yoruba, although some estimates suggest that Oromo may have more speakers in total. Amharic is the main lingua franca of Ethiopia and is the constitutionally recognized working language of the country. As such it forms the language of instruction of public education at primary and secondary level, including from the third grade upwards in areas where it is not the first language. It is also the majority language of most urban-dwelling Ethiopians except where Tigrinya (Tigrigna) is the first language. The current status and wide distribution of Amharic are due especially to the amharization policies of previous Ethiopian governments in the 20th century. Until the change in language policy after the Ethiopian revolution of 1974, Amharic was the only Ethiopian language used in state education and the official media. The earliest records of Amharic date to the rise of the Amhara or Solomonid dynasty in the 14th century, and the spread of the language over an ever-increasing area of the Ethiopian highlands accompanied the expansion of the Christian kingdom up to modern times.

Modern Amharic shows some dialectal variation, though perhaps less than might be supposed for a language with such a wide distribution. This may in fact be due to the way in which the language has spread over the last 700 years, as part of a deliberate process of amharization, and it is notable to this extent that the dialect areas that are generally

recognized are geographically defined within the regions where Amharic either originated or has been spoken the longest. The dialect of Shoa and, in particular, Addis Ababa has become the prestige dialect, forming a *de facto* standard. This is the form of Amharic that is used in the media as well as in the areas of administration and education.

Like all the modern Ethiopian Semitic languages, Amharic has been heavily influenced by the Cushitic languages alongside which it has developed, initially the now minority Central Cushitic languages and then, as it spread, Highland East Cushitic and later Oromo. This influence can be seen not only in the lexicon, but also in syntax and typology. As the language of the ruling elite and thus the inheritors of Ethiopian Christian culture from Aksum, Amharic was also open to borrowing from Geez, the classical or liturgical language of the Ethiopian Orthodox Church, which in more recent times has provided a rich source for the expansion of the Amharic lexicon to satisfy the need for technical, political, and other vocabulary.

Amharic is written in the Ethiopic syllabary, the script used for Geez and developed in Ethiopia probably sometime during the 4th century C.E. out of the South Arabian consonantal alphabet. The Ethiopic syllabary, or *fidäl*, used for Amharic has 33 primary symbols, which indicate C + vowel /ɐ/, each of which is further modified in some way to indicate C + one of the remaining six vowels: በ /bɐ/, ቡ /bu/, ቢ /bi/, ባ /ba/, ቤ /be/, ብ /bɨ/, ቦ /bo/, in the traditional sequence, giving 231 basic letters. Whilst some of the modifications are more or less regular across the whole system, others are not. For instance C + vowel /e/ is always marked by a loop attached to the bottom right-hand of the basic letter, but there are 16 different ways of marking C + vowel /ɨ/. The whole structure is traditionally displayed in a grid with consonants on the vertical axis and vowels on the horizontal. The sixth column of the grid indicates both C + vowel /ɨ/ and C without a following vowel: ብ = both /bɨ/ and /b/. The contrast between C + /ɐ/ and C + /a/ is mostly neutralized where C is a guttural /ʔ/ or /h/: graphemes ሀ {hɐ} and ሃ {ha} are both /ha/. Whilst there are 33 base letters, these correspond to 27 consonant phonemes, as there is a certain amount of redundancy: for example, the letters ሀ, ሐ, ኀ, and ኸ all mark the consonant /h/; ኧ and ዐ mark a lack of consonantal onset, or /ʔ/ depending on analysis. The labialized gutturals /kʷ/, /gʷ/, /k'ʷ/, and /hʷ/ are indicated by additional vowel symbols attached to the corresponding nonlabialized consonant signs: ቍ = /k'ɐ/, ቋ = /k'ʷɐ/. In addition to these, a number of other consonant bases have a special symbol for C + /wa/: ጕ = /dʒɐ/, ጓ = /dʒwa/. There is lastly one other place where the Ethiopic syllabary does not correspond exactly to the phonemic structure of the language; consonantal length is phonemic in Amharic but is not marked at all in the script: thus /alɐ/ 'he said' and /allɐ/ 'there is' are both written አለ, i.e., {ʔa} + {lɐ}. As an example of a piece of continuous text, consider the following, which is the last example cited in this article:

ይህ ነገር ብዙ ጊዜ ስለሚያስፈልግ አስከ
ምሽት ነው መሥሪያ ቤት የሚቆዩት ።
{jɨ + hɨ nɐ + gɐ + rɨ bɨ + zu gi + ze
sɨ + lɐ + mi + ja + sɨ + fɐ + lɨ + gɨ ʔt + sɨ + kɐ
mɨ + ʃɐ + tɨ nɐ + wɨ mɐ + sɨ + ri + ja be + tɨ
jɐ + mi + k'ʷɐ + ju + tɨ}
/jɨh nɐgɐr bɨzu gize sɨlɐmmijasfɐllɨg ɨskɐ mɨʃʃɐt dɨrɐs
nɐw mɐsrija bet jɐmmik' ojjut/
'because this thing needs a lot of time, they'll stay
behind at work until evening'

Phonology

Amharic has a system of 30 consonant (see Table 1) and 7 vowel phonemes. Distinctive are the glottalized consonants, which have parallels in other languages of the Ethiopian language area. Also notable are the labialized gutturals /kʷ/, /k'ʷ/, /gʷ/, and /hʷ/; indeed, labialization of other consonants occurs, but only before the vowel /a/, and is contrastive as for instance in the nearly minimal pair /mʷ atʃ/ 'deceased' – /mɐtʃe/, /mɐtʃ/ 'when?' The addition of phonemic units such as /mʷ/ would increase the number of consonant phonemes. Consonant length is also phonemic; only /h/ and the glottal stop, whose phonemic status in Amharic is debatable, do not have lengthened counterparts. The vowel system is distinguished by the presence of two central vowels, high /ɨ/ and low-mid /ɐ/, which together with low /a/ are the most frequent vowels in the language. Vowel length is not phonemic.

Table 1 The consonant phonemes of Amharic

	bilabial	*alveolar/ dental*	*palatal*	*velar*	*glottal*
Plosive/affricate	b p	d t	dʒ tʃ	g k	(/ʔ/)
Glottalized plosive/ affricate/ fricative	p'	t'	tʃ' s'	k'	
Labialized			gʷ kʷ k'ʷ		hʷ
Fricative	f	z s	ʒ ʃ		h
Nasal	m	n	ɲ		
Lateral		l r			
Approximant	w		j		

The vowels of Amharic are /i/, /ɨ/, /u/, /e/, /o/, /ɐ/, and /a/. The phonemic status of the vowel /ɨ/ has been the matter of some discussion, and certainly its occurrence as a default epenthetic vowel in the application of syllable structure rules is predictable: the consonantal strings/s-n-t/, /m-l-kk-t/being resolvable only as /sɨnt/ 'how much?' and /mɨlɨkkɨt/ 'sign,' respectively. Contrast /d-n-g-l/, which surfaces predictably as /dɨngɨl/ 'virgin.' Indeed, the Ethiopic syllabary uses the same set of symbols for a consonant alone and a consonant + /ɨ/. However, forms such as /jɨs'ɨfall/ 'he writes' rather than the predicted /*jɨs'fall/ indicate that /ɨ/ does have phonemic status.

Ethiopianist convention occasionally employs different symbols from the IPA ones used here; thus, š = ʃ, ž = ʒ, č = tʃ, q = k', ṭ = t', č̣ = tʃ', ǧ = dʒ, ṣ = s', p̣ = p', ñ = ɲ, y = j, ä = ɐ, ə = ɨ.

Syllable structure is [C]V[C][C], with no more than one consonant permitted in syllable onset position, and no more than two in syllable coda or, indeed, word medially and finally, with a lengthened consonant counting as two, as in the example of /mɨlɨkkɨt/ above.

Accent in Amharic has been the subject of only a few studies, and its nature is still somewhat a matter of discussion. Generally, whilst Amharic accent is essentially a weak stress accent, it seems that word accent is subordinate to phrasal or sentence accent.

Morphology

Amharic has a complex inflectional morphology, particularly in the verbal system, employing not only prefixes and suffixes but also internal modification of the typical Semitic consonantal root-and-pattern type. In general, the morphology of Amharic has been less influenced by the Cushitic substratum than, for instance, syntax or the lexicon. The inflectional morphology of nouns, on the other hand, is relatively simple. Like other South Ethiopic languages, Amharic has mostly lost the heterogeneous system of noun plural formation by internal modification, the so-called broken plurals that are so common in North Ethiopic languages such as Geez and Tigrinya, and in some other Semitic languages such as Arabic. Noun plurals in Amharic are for the most part formed by means of the suffix /-otʃtʃ/. Nouns also show two genders, though these are mostly manifest only in concord, chiefly between subject and verb predicate. Nouns further show definite marking by means of suffixes: masc. /-u/~/-w/ and fem. /-wa/, which are in origin 3rd person pronominal suffixes: /bet-u/ is thus both 'the house' and 'his house.' Amharic does not have a true case system, adverbial functions being expressed variously by prepositions, or postpositions, or interestingly by a combination of the two: /kɐ-sɐwɨjje-w gar/ 'with the man,' where /kɐ-/ and /gar/ together gloss 'with.' Of the primary relational case functions, the subject is unmarked, a definite direct object is usually marked by the clitic /-n/, which occurs after the marker of definiteness within the noun phrase, and the possessive or adjunct function is indicated by the bound preposition /jɐ-/, which is in form and origin identical to the adjunct or relative marker on verbs:

leba	jɐ-gɐbɐre-w-n	lam	sɐrrɐk'-ɐ
thief	*of-farmer-DEF-OBJ*	*cow*	*steal.PAST-3MASC.PAST*

'a thief stole the farmer's cow'

abbat-e	gomɐn-u-n	b-atakɨlt	bota	zɐrra-[Ø]
father-my	*cabbage-DEF-OBJ*	*in-vegetable*	*place*	*sow.PAST-[3MASC.PAST]*

'my father sowed the cabbages in the garden'

The verb is inflected for voice or valency, tense–mood–aspect (TMA), and person. Negation is also marked within the inflected verb, as is to a large extent the distinction between main and subordinate verbs. In addition to the base stem, typically with active function, there are three fundamental voices or derived stems formed by prefixes: causative /a-/, passive-reflexive /tɐ-/, and factitive or (double) causative /as-/. There are other less productive formatives of more restricted occurrence, such as /astɐ-/, which also has a causative function, and /an-/ and /tɐn-/, with transitive-causative and stative-passive functions on verbs with expressive meaning (movement, sound, emotion, etc.). Internal changes in the various formations of TMA stems, however, combine with these prefix formatives and sometimes obscure them: /tɐ-sɐrrɐk'-ɐ/ 'it was stolen' but /jɨ-ssɐrrɐk'-all/ 'it will be stolen,' where the imperfective or nonpast stem corresponding to /tɐsɐrrɐk'-/ is /-ssɐrrɐk'-/. The occurrence of derived stem formatives is also to some extent lexical: /tɐ-k'ɐmmɐt'-ɐ/ 'he sat down' is active and does not contrast with a base stem /*k'ɐmmɐt'-/.

Other derived stem patterns involve internal modification such as a change of vocalization, or reduplication of syllables, often in combination with the prefixes described above: /a-nnɐgaggɐr-u/ 'they engaged one another in conversation' from the basic /nɐggɐr-u/ 'they spoke.'

TMA marking is done by internal changes in the verb stem together with variations in person marking. Most notable here is the use of one set of personal suffixes for the past in contrast to a quite different set of prefixes, or prefixes and suffixes combined, for the nonpast stem: /wɐddɐk'-ɐtʃtʃ/ 'she fell' but /tɨ-wɐdk'-all-ɐtʃtʃ/ 'she falls, is falling,' /a-t-wɐdk'-ɨmm/ 'she isn't falling,' /tɨ-wdɐk'/ 'let her fall,' /bɨ-t-wɐdk'/ 'if she falls,' etc., where the stems are past /wɐddɐk'-/,

nonpast /-wɐdk'-/, and jussive-imperative /-wdɐk'-/, and the person markers for the 3rd feminine are past /-ɐtʃtʃ/, nonpast and jussive/t[ɨ]-/, and the other elements are variously /-all-/ main verb affirmative nonpast, /a- . . . -[ɨ]mm/ main verb negative nonpast, and /b[ɨ]-/ 'if.'

In addition to subordinate verbs formed by prefixes such as the conditional formative above, Amharic also possesses an inflected all-purpose adverbial subordinate verb, called the gerundive in much of the literature, though the term 'converb' (CONVB), which is occasionally used, is a better label: /wɐdk'-a/ 'she having fallen,' but from /sɐmma-tʃtʃ/ 'she heard' /sɐmt-a/ 'she having heard.' The gerundive/converb is typically used in describing a sequence of events:

ɨnnantɐ ɨzzih k'ɐrt-atʃtʃɨhu zɨmm
you.PL here remain.CONVB-2PL 'quiet'
bɨl-atʃtʃɨhu tɐ-k'ɐmɐt'-u
say.CONVB-2PL sit.IMP-PL
'you, stay here and sit quietly' ('. . . being quiet')

t'ɐlat ʃɐʃt-o tɐmɐllɐs-ɨn
enemy flee.CONVB-3MASC return.PAST-1PL
'they enemy fled and so we returned'

The gerundive/converb in combination with the main verb marker (MVM) /-all/, etc., also forms the basis of a second past tense main verb form which generally indicates a recent past event or situation resulting from a past event: /alk'-o-all/>/alk'^{w}all/ 'it is finished.'

The formal distinction between main and subordinate verb forms is not carried through the whole TMA system. The past tense form, such as /wɐddɐk'-ɐ/ 'he fell' occurs in both positions and has no MVM as such, whilst the simple nonpast form /jɨ-wɐdk'/ 'he falls, will fall' occurs only in subordinate position, either with an auxiliary as in /jɨ-wɐdk' nɐbbɐr/ 'he was falling,' or more usually with a subordinating element: /jɐmm-i-wɐdk'/ '(he) who falls,' /s-i-wɐdk'/ 'when he falls/fell.' When used in main verb position, it requires the partially inflecting MVM if affirmative: /jɨ-wɐdk'-all/ 'he falls,' /tɨ-wɐdk'-all-ɐtʃtʃ/ 'she falls,' or the main verb form of the negative marker if negative: /a-j-wɐdk'-ɨmm/ 'he doesn't fall.'

In addition to the elements discussed so far, the verbal complex may also contain pronoun object markers. These are of two kinds, essentially direct object pronouns and pronominal object pronouns, which involve an element /-ll-/ or /-bb-/ clearly associated with the simple nominal prepositions /lɐ-/ 'to, for' and /bɐ-/ 'in, with':

ajt-ɐn-ɐw-all
see.CONVB-1PL-him-MVM
'we have seen him'

adrɨg-o-ll-ɨŋŋ-all
do.CONVB-3MASC-for-me-MVM
'he has done [it] for me'

Syntax

Word order in Amharic is generally subject-object-verb (SOV), with subordinate clauses preceding the main clause. Noun phrases are also generally head final with modifiers, including relative clauses, preceding the noun. Whilst a large part of Amharic syntax is influenced by Cushitic language patterns and is in accord with the typology of verb-final languages, there are still structures such as prepositions alongside postpositions which betray the older 'classical' Semitic syntax. Like most languages of the Ethiopian language area, Amharic makes considerable use of focus marking, which is here expressed by a construction involving the copula, which 'highlights' the focused item, and the relative verb, the so-called cleft clause construction:

zɐmɐd-otʃtʃ-wa n-atʃtʃɐw bal
relative-PL-her COP-3PL husband
jɐ-mɐrrɐt'-u-ll-at
REL-choose.PAST-3PL-for-her
'it is her relatives who have chosen a husband for her'

jɨh nɐgɐr bɨzu gize
this thing much time
sɨlɐ-mm-ij-asfɐllɨg
because-REL-3MASC-need.NONPAST
ɨskɐ mɨʃʃɐt dɨrɐs n-ɐw mɐsriya-bet
until evening until COP-3MASC work-place
jɐmm-i-k'ojj-u-t
REL.NONPAST-3(PL)-stay.NONPAST-PL-DEF
'because this thing needs a lot of time, it's until evening that they'll stay behind at work'

See also: Afroasiatic Languages; Ethiopia as a Linguistic Area; Ethiopia: Language Situation; Semitic Languages.

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Amman, Johann Conrad (1669–1730)

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Amman, who earned his reputation as a speech therapist and as a pioneer in the field of the teaching of the deaf and dumb, was a German-speaking Swiss. Born in Schaffhausen, he studied in Basel, where he graduated as a medical doctor in 1687. He moved to the Netherlands, where he did most of his work. First he settled in Amsterdam; later on he lived in Haarlem. He died in Warmond, near Leiden, in November 1724.

Having taught several pupils in Schaffhausen and Amsterdam to speak, Amman spent the years 1690–1692 engaged in the instruction of the daughter of a Haarlem merchant. His approach was described in *Surdus loquens* ('The talking deafman,' 1692), a work showing that Amman advocated spoken language as the most important means of communication for the deaf. In 1700 his *Dissertatio de loquela* appeared, a 'Dissertation on speech.' An extended and improved version of *Surdus loquens,* it had a more general phonetic basis than his previous work. Moreover, its preface contains some correspondence between Amman and John Wallis; their works have various points in common. Among Amman's other publications are translations of dialogues by Plato (1709) and of a contemporary medical work (1692); in cooperation with a Dutch classicist he edited the text of a 5th-century medical work (1704).

Amman's dissertations, in which important advances in describing the anatomy and physiology of the speech mechanism are made, are divided into three parts. Amman first deals with speech and voice in general, and subsequently expounds on the nature of the 'letters' and the various modes to form them. Finally, he explains how he taught his pupils to speak, viz. by making them familiar with the position and the movement of the lips, tongue, etc., that are specific to each vowel and consonant. Reflecting upon the process of articulation, Amman came to the conclusion that the large variability of sounds could in fact be reduced to 24 'letters,' a sort of natural alphabet that is common to all languages. Thus, an instructor could concentrate on the sounds that belong to this alphabet, abstaining from dialectal variants.

Amman made the acquaintance of the cabbalist F. M. van Helmont (1614–1699), who had witnessed his teachings at Haarlem. In 1667 van Helmont had published on an 'alphabet of nature,' a Dutch translation of which appeared in 1697, jointly with a Dutch version of *Surdus loquens*. This connection may explain some metaphysical notes in Amman's work.

Although his method remained virtually unnoticed in the Netherlands, Amman's ideas concerning the primacy of speech and speech reading were followed by Samuel Heinicke (1723–1790), the founder of the so-called German school. There was a difference of opinion between Heinicke and the French Abbé de l'Epée (1712–1789), who founded a school for the education of the deaf in Paris in 1760 based on sign language and the manual alphabet, a dispute that continued for more than a century. Be that as it may, today Amman is still considered one of the distinguished pioneers on the subject.

See also: Wallis, John (1616–1703).

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A-Morphous Morphology

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A-Morphous Morphology (Anderson, 1992) is a framework for the analysis of complex words (including inflection, derivation, compounding, and other types of word formation). It is a realizational framework in the sense that it sees morphology as establishing a many-to-many correspondence between aspects of a word's form and aspects of its content rather than as concatenating a series of purely local sound-meaning correspondences (morphemes). It is a lexicalist and postsyntactic view in that it maintains that the content and internal form of words are neither accessible to nor manipulated by principles of the syntax. The only interface between words and the syntax is an informationally minimal morphosyntactic representation, comparable in most respects to the complex symbols of Chomsky (1965).

The most distinctive aspect of this point of view is its rejection of the classical morpheme, traditionally the cornerstone of morphological analysis. Word structure is built up through modifications to a basic stem, including affixation as one among several formal possibilities. Once an affix is associated with a stem, however, the result is not presumed to have internal structure of a nonphonological sort. Some complex words (particularly compounds) generally **do** have such a structure, but the mere fact that a word's form is motivated in part by relations to other words does not in itself establish that.

Reasons to Reject the Classical Morpheme

The starting point of morphological analysis is what de Saussure referred to as the partially motivated sign, in which the relation between the form of a word and its (complex, analyzable) content can be decomposed into parts, some of which it shares with other words. Content here refers both to the lexical meaning of the word and to the morphosyntactic categories that influence its form. In sets of morphologically complex words, similarities of form correlate with similarities of meaning. For structuralist theory, these similarities inhere in structural units, morphemes, which have the character of Saussurean minimal signs. A morpheme is a "linguistic form which bears no partial phonetic-semantic resemblance to any other form" (Bloomfield, 1933: 161), or a "minimal same of form and meaning."

On that view, words are taken to be exhaustively analyzable into a sequence of such minimal signs or morphemes. Because the basis of the sign is the indissoluble unity of sound and meaning (and [morpho]-syntax), there should then be a one-to-one association between elements of form and elements of content. That is, every chunk of form ought to correspond to exactly one chunk of meaning, and vice versa. Only in unsystematic instances of accidental homophony or synonymy should we find exceptions to this.

In fact, however, the notion that the elemental building blocks of words can be discovered by looking for recurrent relations between form and meaning is falsified in both directions. One problem is the existence of phonæsthemes. In sets of words such as *glimmer, glitter, gleam, glow*, . . . ; *slide, slip, slither, slink, slippery*, . . . we find a shared aspect of meaning and a similarity of form, but (whatever the etymological source of such relations) speaker intuitions reject the notion that *glimmer*, for example, is composed of two elements, *gl-* and *-immer*, in the way *bookish* is composed of *book* and *-ish*. It will not do to say that only one of the parts here (presumably *gl-*) has a separable meaning because the same could be said for words such as *raspberry*, in which only the *-berry* part has a meaning apart from the combination but speakers do not hesitate to see the word as internally complex.

The other side of this coin is the existence of word-internal structure in which neither formal component of a complex word can be regarded as having distinct content. This is the case with sets of English verbs composed of a prefix and a stem (e.g., *deceive, receive, defer, refer*), neither of which makes a consistent contribution to the content of combinations including them (Aronoff, 1976).

Even ignoring such problems that arise when we attempt a parallel division of the form and content of

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Analytic Philosophy

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'Analytic philosophy' is the name that is given to what is now generally regarded as the dominant philosophical tradition in the English-speaking world and increasingly in the rest of the world. In its widest sense, it might be taken to mean any kind of philosophy in which analysis plays a central role. But there are all sorts of kinds of analysis, and analysis – in one form or another – has been part of philosophy since the time of the ancient Greeks. Sometimes it is characterized in terms of the emphasis placed on clarity, rigor, and careful argumentation, often involving logical formalization. This might distinguish it from some types of 'continental' philosophy (as it is misleadingly called), to which analytic philosophy is frequently seen as opposed. But the best way to understand analytic philosophy is historically, as a movement that had its roots in developments around the turn of the 20th century and evolved in various directions in response to them.

The origins of analytic philosophy lie in the work of Gottlob Frege (1848–1925), Bertrand Russell (1872–1970), G. E. Moore (1873–1958), and Ludwig Wittgenstein (1889–1951). In many ways, early analytic philosophy can be seen as comprising two main strands, one developing from Frege's logical analyses of number statements and Russell's theory of descriptions, and the other from Moore's concern with conceptual analysis in ethics and epistemology, the two strands synthesised to some extent by Wittgenstein in the *Tractatus* (1921).

Frege's Analysis of Number Statements

Central to Frege's logical analysis of number statements is the idea that number statements are assertions about concepts. A statement such as *Jupiter has four moons* is to be understood, not as predicating of Jupiter the property of having four moons, but as predicating of the concept 'moon of Jupiter' the second-level property 'has four instances,' which can be logically defined (cf. Frege, 1884: § 57). The philosophical significance of this idea can be illustrated by taking the case of negative existential statements (number statements involving the number 0), which have caused problems throughout the history of philosophy. Consider the following statement:

(U) Unicorns do not exist.

This statement is true, so it must clearly have a meaning. But what is it for (U) to have a meaning? If we analyze it in subject-predicate terms, in accord with its surface grammatical form, then 'unicorns' is the subject and 'do not exist' the predicate. But how can we say anything meaningful if 'unicorns' does not refer to anything? If unicorns do not exist, then what is it to which we are predicating the property of nonexistence? Should we posit – as Meinong and the early Russell did – the 'subsistence' of nonexistent objects to act as the subjects of statements about them? On Frege's account, however, such a statement is to be understood as asserting something, not about unicorns but about the concept of 'unicorn.' (U), in other words, really means what is better expressed as:

(U*) The concept 'unicorn' is not instantiated.

Interpreted like this, it can then be readily formalized in modern logic:

(U#) $\neg \exists x\, Fx$.

On Frege's view, existence should not be seen as a (first-level) predicate, but instead, existential statements are to be analyzed in terms of the (second-level) predicate *is instantiated*, represented by the existential quantifier. To say that something does not exist is to say that the relevant concept is not instantiated.

Russell's Theory of Descriptions

A similar strategy is employed by Russell in his theory of descriptions (1905). Consider Russell's famous example:

(K) The present King of France is bald.

This too might tempt us to suppose that a king of France must somehow exist – or 'subsist' – in order to be the subject of such a statement. According to Russell, however, (K) is to be analyzed as (K*), which can then be formalized as (K#):

(K*) There is one and only one King of France, and whatever is King of France is bald.

(K#) $\exists x\ (Kx\ \&\ \forall y\ (Ky \rightarrow y = x)\ \&\ Bx)$.

Here there is no commitment implied to any nonexistent objects. All that is needed to understand the statement is a grasp of the relevant concepts and logical constants (including the quantifiers). Definite descriptions, such as 'The present King of France,' on Russell's view, are to be 'analyzed away': they do not have meaning in isolation (by standing for some object) but only in the context of the sentences in which they appear (sentences that have a complex, quantificational structure).

F. P. Ramsey called Russell's theory of descriptions a 'paradigm of philosophy' (1931: 263), a view shared by both Moore and Wittgenstein. As Wittgenstein put it in the *Tractatus* (1921: 4.0031): "It was Russell who performed the service of showing that the apparent logical form of a proposition need not be its real one." What both Frege's and Russell's logical analyses open up is a gap between grammatical (or apparent logical) form and (real) logical form. On the surface, both (U) and (K) seem to have a simple subject-predicate structure, but their underlying structure is more complex, revealed in (U#) and (K#). Generalizing, this suggests a whole program of analysis, the aim being to uncover the real logical form of the various statements we make, especially those that are philosophically significant or are liable to lead us astray. On Frege's and Russell's conception, then, analysis involves the rephrasing of problematic statements into 'correct' logical form.

Moore's Conception of Analysis

Although Moore and Russell are often closely associated, and Moore endorsed Ramsey's praise of Russell's theory of descriptions (Moore, 1959: 195), Moore was less concerned than either Frege or Russell with the development of a logical system as a means to 'correct' ordinary language. Like the early Russell, in his own early work Moore assumed a crude decompositional conception of analysis. Propositions, for the early Moore, were complex concepts, and their 'analysis' simply involved their decomposition into their constituent concepts. But alongside this decompositional conception was a looser conception of analysis as clarification. This comes out in *Principia ethica*, in which Moore talks of 'analysis' as involving the distinguishing of questions that are misleadingly conflated, remarking that "the more clearly distinct questions are distinguished, the better is our chance of answering [them] correctly" (1903: 27; cf. vii). His later work is characterized by the careful and detailed – indeed, pedantic – attention he pays to the subtle distinctions of ordinary language in an attempt to resolve certain traditional philosophical puzzles, such as the problem of the external world (Moore, 1959: chapter 7).

Wittgenstein's *Tractatus*

In the *Tractatus* (1921), Wittgenstein expresses his great debt to Frege and Russell but shares Moore's view that ordinary language is in perfect logical order as it is and does not need 'correcting' (cf. 1921: 5.5563). What was needed was not an ideal language but an ideal notation, revealing the underlying semantic structure of ordinary propositions no longer obscured by their surface syntactic form. The aim of analysis was to uncover the necessary presuppositions of our use and understanding of ordinary language. Notoriously, on Wittgenstein's early view, the logic of our language required the necessary existence of simple objects, a view he was later to repudiate as part of his general critique of the Tractarian picture theory of language and logical atomism.

Logical and Metaphysical Analysis

The early 1930s marked the heyday of the form of analysis embodied in Wittgenstein's *Tractatus*. During this period an important distinction came to be drawn between what was called 'logical' or 'same-level' analysis and 'metaphysical' or 'reductive' or 'directional' or 'new-level' analysis. The first translates the proposition to be analyzed into better logical form, while the second exhibits its metaphysical presuppositions. Take Russell's theory of descriptions again. In offering (K#) as the analysis of (K), the definite description is 'analyzed away': this is logical analysis, revealing the underlying structure of the statement. But once we have (K#), we must still explain the commitments that remain – to the relevant logical constants and concepts. This may in turn require further analysis to 'reduce' them to things of our supposed immediate acquaintance – such as the 'sense data' to which Russell himself appealed.

Ordinary Language Philosophy

During the 1930s, however, metaphysical analysis came under increasing fire, the assumptions of logical

atomism being found unsupportable – in particular, the commitment to such things as simple objects or sense data. But this still left logical analysis – combined now with conceptual or linguistic clarification rather than metaphysical reduction. Wittgenstein himself gave up the idea that Fregean logic provided 'the' logic of ordinary language, but he continued to explore the 'logic' – or what he now tended to call the 'grammar' – of our concepts. In this he influenced a whole generation of philosophers, particularly those dominant in Oxford during the 1950s and 1960s: Gilbert Ryle (1900–1976), J. L. Austin (1911–1960), Paul Grice (1913–1988), R. M. Hare (1919–), and Peter Strawson (1919–). Ryle, for example, explored what he called the 'logical geography' of our mental concepts in *The concept of mind* (1949), in which he introduced the important idea of a 'category-mistake.' According to Ryle, Descartes made a category-mistake in treating the mind as some kind of spiritual substance, in just the same way as a tourist who asks where Oxford University is in Oxford makes a category-mistake. Austin, even more than Moore, saw philosophical clarification as requiring close attention to the subtle nuances of ordinary language, and his distinction between locutionary, illocutionary, and perlocutionary acts played a key role in the creation of speech-act theory. Grice's conception of conversational implicature, too, might be singled out as influential in the development of speech-act theory and, more generally, in the recognition of the pragmatic alongside syntactic and semantic dimensions of language use.

Strawson is perhaps the best-known representative of the ordinary language movement in 20th-century philosophy. His critique of Russell's theory of descriptions in 'On referring' (1950) is as much a classic as Russell's original 1905 paper. Even though Strawson's *Individuals* (1959) marked a return to metaphysics, it was a form of metaphysics that Strawson called 'descriptive' rather than 'revisionary,' aimed at clarifying our basic conceptual frameworks. In a much later work (1992), Strawson talked of 'connective' rather than 'reductive' analysis as being the methodology of philosophy, illustrating just how far 'analytic' philosophy has evolved since the heyday of logical atomism.

Logical Positivism and the Quinean Tradition

But ordinary language philosophy, rooted in the work of Moore and Wittgenstein, represents only one wing of 20th-century analytic philosophy. As indicated above, the other main wing is the tradition that has its roots in Frege's and Russell's logic and extends through the work of Rudolf Carnap (1891–1970), Alfred Tarski (1901–1983), Kurt Gödel (1906–1978), and the other logical positivists and mathematical logicians, to W. V. O. Quine (1908–2000), Donald Davidson (1917–2003), Saul Kripke (1940–), and others. In this branch of analytic philosophy, there is greater concern with technical matters of logic and with its further development and use in understanding basic semantic concepts such as truth, logical consequence, and necessity. Possible world semantics, originating in Kripke's early seminal papers on modal logic, is perhaps the best example of recent work in this tradition, although Davidson's development of Tarski's work has been crucial in the huge interest that there now is in theories of meaning. On the more informal side, Quine's critique of Carnap's analytic/synthetic distinction has been both influential and controversial (Quine, 1951). Quine made this critique to show the essential continuity of philosophy and science, with a consequent rejection of the view that there is something distinctive about conceptual analysis. But recent years have seen various defenses – albeit in new contexts – of conceptual analysis, most notably by Frank Jackson (1998).

Analytic Philosophy Today

The two wings of analytic philosophy identified here represent, perhaps, the most important divide within analytic philosophy, a divide that was debated in Richard Rorty's classic collection of papers, *The linguistic turn* (1967). The tension between those who see philosophical progress as lying in ever more sophisticated logical, metaphysical, and scientific theories and those who see the task of philosophy as one of conceptual clarification rooted in ordinary linguistic practices has been a persistent theme throughout the history of analytic philosophy. If there is one insight that might be singled out as lying at the heart of analytic philosophy, then it is this: that our use of language is often 'systematically misleading,' to use Ryle's (1932) phrase. But responses to that insight have varied considerably. Analytic philosophy today is a broad-ranging and complex set of intertwining subtraditions whose unity is constituted lessby any distinctive set of doctrines than by their shared history. Understood like this, despite suggestions by some that we have now entered a 'postanalytic' age, analytic philosophy can be regarded as stronger and healthier today than it has ever been in the past.

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Logic and Language: Philosophical Aspects; Logical Form in Linguistics; Meaning: Overview of Philosophical Theories; Ordinary Language Philosophy;

Possible Worlds: Philosophical Theories; Reference: Philosophical Theories.

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Analytic/Synthetic, Necessary/Contingent, and *a Priori/a Posteriori*: Distinction

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Three distinctions – necessary/contingent, *a priori/a posteriori*, and analytic/synthetic – mark three different contrasts. The *a priori/a posteriori* distinction marks an epistemological contrast between two different ways of knowing some proposition or two different ways of being justified in believing a proposition. The necessary/contingent distinction marks a modal contrast between different propositions. The analytic/synthetic distinction marks a semantic contrast between different sentences. Until the work of Immanuel Kant, the prevailing view was that either every truth is strictly necessary, *a priori*, and analytic, or it is contingent, *a posteriori*, and synthetic. Suffice it to say that things have gotten a lot more complicated since Kant. Many philosophers are even dubious about the reality of some or all of these distinctions. In this article, I will sketch the main ideas behind each dichotomy and note some points of controversy.

Necessary/Contingent Distinction

Necessity and contingency are said to be metaphysical properties of propositions, primarily *de dicto* modality. (For some general sources on the metaphysics of modality, see: Driver, 2002; Gendler

Possible Worlds: Philosophical Theories; Reference: Philosophical Theories.

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Necessary/Contingent Distinction

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and Hawthorne, 2002; Linsky, 1977; Loux, 1979; Lycan, 1994; Melia, 2003.) A proposition P is necessarily true just in case P is true and would have been true no matter how things might have been – the world could not have been such as to render P false. P is necessarily false just in case P is false, and it would have been false no matter how things might have been – the world could not have been such as to render P true. (Notice that we defined *de dicto* necessity in terms of possibility and negation: necessarily P $=_{\text{defn}}$ ¬Possibly ¬P. We could just as well have defined *de dicto* possibility in terms of necessity and negation: possibly P $=_{\text{defn}}$ ¬Necessarily ¬P. There is a sense, then, in which one cannot give a definition of an alethic modality that goes beyond this circle.) A proposition P is contingently true/false just in case P is true/false but could have been false/true (if the world had been otherwise in certain respects). The necessary/contingent distinction is therefore jointly exhaustive and mutually exclusive of every proposition that has a truth-value.

Sentences (1a), (2a), (3a), and (4a) are examples of necessary truths:

(1a) $12 \times 2 = 24$.

(2a) Gold has atomic number 79.

(3a) Biological parents have at least one offspring.

(4a) All dogs are dogs.

Sentences (1b), (2b), (3b), and (4b) are necessary falsehoods:

(1b) $12 \times 2 = 25$.

(2b) Gold is not an element.

(3b) Some biological parents have no offspring.

(4b) Some dogs have fleas and no dog has any fleas.

Sentences (1c) and (2c) are contingent propositions:

(1c) Al Gore won the 2000 U.S. Presidential Election.

(2c) Water freezes below 32°F.

Although (1c) is false, it might have been true if only Gore had received more electoral votes than Bush from the state of Florida. By the same token, although (2c) is true, it might have been false. After all, the laws of physics and chemistry might not have held to the extent and degree that they do. If they hadn't, then it would not have been true that water freezes below 32 °F.

Not all necessary truths are of the same kind. For example, (2a) is a metaphysically necessary truth – it is metaphysically impossible that the atomic number of gold not be 79, i.e., nothing could possibly be gold unless it is an element whose atomic number is 79. Mathematical Platonists who regard numbers as mind-independent abstract objects view (1a) as being a metaphysically necessary truth. According to them, the number 24 could not possibly have been distinct from the number that is the product of 12 and 2, which is the number 24 itself, since nothing can possibly be diverse from itself. The basic idea is the same in both cases: certain statements about a mind-independent reality must be true because of certain metaphysical facts about that reality (as opposed to facts about how we think about it).

Sentence (3a) is said to be a conceptually necessary truth because the concept of being a biological parent includes, as one of its conceptual components, the concept of having a biological offspring. Sentence (3a) is not so much a truth about the world as it is a truth about the concepts we use in thinking about the world. On this view, conceptual necessity is determined solely by the inferential relations that are (allegedly) constitutive of the contents of concepts that are so related. If lexical concepts have internal definitional structure, then (3a) is true by definition and thus, for that reason alone (according to philosophers like A. J. Ayer), it is a necessary truth (see Ayer, 1946).

Sentence (4a) is an example of a logically necessary truth, since it is an instance of the tautological schema 'All Fs are Fs,' which admits of no possible counterexample. A counterexample to that schema would be a case involving some F that was simultaneously non-F, which is a flat-out contradiction and thus impossible. Because they are not made true by any metaphysical facts about the world, logically necessary truths aren't metaphysically necessary. Nor are they conceptually necessary, since they are not made true by any facts about the (nonlogical) concepts we use to think about the world. They are necessarily true simply by virtue of their logical form.

The *a Priori/a Posteriori* Distinction

The *a priori/a posteriori* distinction is an epistemological distinction: it characterizes the way a proposition is known or the way a person is justified in believing the proposition. (For more discussion on the *a priori/a posteriori* distinction, see: Boghossian and Peacocke, 2000; Bonjour, 1998; Casullo, 1999; Casullo, 2003.) As Kant presents it, *a priori* knowledge is knowledge that one has independently of all possible sense experience. What makes *a priori* knowledge *a priori* for Kant is its universality – it is knowledge of that which constitutes the formal constraints on *all* possible human experiences – and its necessity. For Kant, knowing that every event has

a cause is a case of *a priori* knowledge. By contrast, *a posteriori* knowledge is only possible through experience or introspection. For example, knowing that several hurricanes caused massive destruction throughout Florida in 2004 is a case of *a posteriori* knowledge; you couldn't know that proposition is true merely on the basis of rational reflection.

The evidential source of *a priori* knowledge is neither sensory perception, nor introspection, nor memory. For you to be justified *a priori* in holding a belief, it is enough that you rightly recognize the truth of your belief given only your conceptual grasp or understanding of the content of your belief. Your reason for belief has to emerge from rational reflection or from rational insight, assuming that you have a nonempirical faculty of intellection. *A priori* knowledge may require experience to provide the relevant concepts, but, given possession of the concepts, no further role for experience is required for having *a priori* knowledge, except insofar as it can play a preservative role in the transmission of *a priori* justification from one source to another, e.g., testimony.

If *a priori* knowledge is genuine, then propositions (5a), (6a), and (7a) are examples of *a priori* knowable truths:

(5a) The relation *x is taller than y* is asymmetrical and transitive.

(6a) Whatever is colored is extended.

(7a) Whatever is red all over is not blue.

In each case, you can know the truth of the proposition simply by grasping its content, reflecting on what would have to be the case for it to be true, and then coming to recognize that the proposition must be true given your understanding of its content. Empirical observation plays no justificatory role in one's being warranted in believing (5a), (6a), and (7a). Knowledge of propositions (1a), (3a), and (4a) above would also be *a priori*.

By contrast, knowledge of (5b), (6b), and (7b) is *a posteriori*, since one's intellectual grasp of their contents is insufficient to secure epistemic warrant; moreover, one needs empirical evidence in order to be justified in believing them:

(5b) Yao Ming (the famous Chinese NBA basketball player) is taller than Danny DeVito (the popular film actor and comedian).

(6b) That car has a black exterior and is compact.

(7c) Some of these cardboard shapes are painted red on the facing side.

Whether there really is *a priori* knowledge is a matter of great debate. Rationalists and Kantians contend that some knowledge is *a priori*, while Quineans, who adopt a naturalistic approach to epistemology, deny the reality of *a priori* knowledge. (For more on this topic, see: Boghossian and Peacocke, 2000; Bonjour, 1998; Casullo, 1999, 2003; Devitt, 1994; Moser, 1987.)

It is quite natural to think that all and only *a priori* knowable propositions are necessary truths. For example, A. J. Ayer presents the following argument for their identification in Ayer (1946). First, if a proposition is *a priori*, then it can be known to be true independently of any experience of the world. But if that's true, then the truth of an *a priori* proposition must not depend on any contingent features of the world; otherwise, one would have to determine whether those features actually obtained in order to know whether the proposition is true – and then it would be an *a posteriori* proposition. Thus, an *a priori* proposition must be true no matter how things might have turned out in the world, which is the mark of a necessary truth. Second, if a proposition is a necessary truth, then it is true independently of the way things are. In which case, sense experience cannot play any role in explaining how we can know that proposition since experience can only furnish information about how things actually are, and not about how things must be. So, a proposition is *a priori* if it is a necessary truth.

Although Ayer's arguments contain some questionable steps, his arguments are not wildly implausible. More importantly, they set up a major challenge to his empiricism. If, as he and Carnap (1956) claim, mathematical and logical truths are necessary, and hence *a priori*, then we can have nonempirical knowledge; but then we can have some nonexperiential access to certain substantive facts about the world. That conflicts with Ayer's and Carnap's view that sentences, including sentences that express the contents of our knowledge, can have meaning only by being verifiable in principle. Ayer and Carnap thought they could solve this problem by explaining an *a priori* and necessary truth in terms of a linguistic notion of analyticity, namely, a sentence that is true by definition (Ayer) or by linguistic convention (Carnap). The idea is that any sentence that is true by definition must be necessary because, contrary to appearance, it contains no information about the world anyway. At the same time, it must also be *a priori*, because to know the proposition that such a sentence expresses is simply to know the definitional meanings of the terms that make up the sentence, which is enough to know that the sentence is true; experience plays no additional justificatory role. As we shall see later, Quine argued that the Ayer-Carnap gambit ultimately fails. Let us turn,

though, to Saul Kripke's view on the connection between the necessary/contingent and the *a priori/a posteriori*.

Kripke on the Necessary *a Posteriori* and the Contingent *a Priori*

As noted in the last section, the prevailing view among philosophers until the 1970s was that all and only necessary truths are *a priori* and that all and only contingent truths are *a posteriori*. Most philosophers have now abandoned the view, thanks largely to Kripke (1972/1980). According to Kripke, metaphysical necessity is not a criterion for the *a priori* since they track entirely different kinds of properties (alethic modal properties and epistemic properties, respectively) of different kinds of things (propositions/sentences and ways of knowing a proposition, respectively). So it should come as no surprise that both can sometimes come apart.

Kripke's example of a sentence that expresses a necessary *a posteriori* truth is 'Water is H_2O.' According to him, the terms 'water' and 'H_2O' are each **rigid designators**: they refer to their bearers in every possible world. Thus, 'water' rigidly designates water, and 'H_2O' designates rigidly the chemical substance that is composed of H_2O molecules. Given that water is chemically composed of H_2O molecules, the two terms co-refer in every possible world. There is no possible world in which something is identical to H_2O but isn't water, so 'Water is H_2O' is true in every metaphysically possible world. It therefore expresses a metaphysically necessary truth.

According to Kripke, that water is H_2O is *a posteriori* knowable. First, it is *a priori* and necessarily true that a substance's chemical composition is essential to it. Hence, anything that has the same chemical nature as water must of necessity be identical to water. However, we can't deduce anything about the actual particular nature of water from the concept of its being a chemical substance or from the concept of its having an empirical nature that is essential to water. We have to do some empirical investigation instead. Only when our best scientific theories have confirmed that the chemical nature of water is H_2O can we then be justified in believing that water is H_2O. Therefore, our knowledge that water is H_2O, which is a necessary truth, is *a posteriori*. In general, all true scientific identities are, for Kripke, necessary *a posteriori* truths. If Kripke was correct, then a proposition's being a metaphysically necessary truth doesn't entail that it is an *a priori* truth. (Some of Kripke's followers deny that necessarily true scientific identities are *a posteriori* knowable; see Salmon, 1993.)

Kripke also holds that some contingent propositions are *a priori*. He gives the example of a speaker who introduces the measurement term 'one meter' to pick out the actual length of a certain stick kept in the science museum in Paris at time t (call the stick 'Stick S'). The speaker stipulates, "Let 'one meter' designate the length of Stick S." In Kripke's example, the speaker uses 'the length of Stick S at t' to designate the actual length that S has at time t, (where t is the time of the speaker's utterance of her stipulation). The description used determines the reference of 'one meter' but not its meaning. Although 'one meter' rigidly designates a certain length in all possible worlds, which in the actual world happens to be the length of Stick S at t, 'the length of S at t' does not designate anything rigidly. For there are possible worlds in which, when heat is applied to Stick S at t, S is not one meter long at t. Hence, the stipulative definition, properly interpreted, does not say that 'one meter' is to be synonymous with 'the length of S at t.' Rather, says Kripke, the speaker fixes the reference of 'one meter' by stipulating that 'one meter' is to be a rigid designator of the length that is the actual length of Stick S at t. Imagine now that the speaker goes on to assert, 'Stick S is one meter long.' According to Kripke, the sentence 'Stick S is one meter long' is true but not necessarily true, since S could have had a different length at t under appropriate stresses and strains, heatings or coolings. Consequently, the proposition expressed is contingent rather than necessary.

Kripke next argued that, since the actual length of Stick S was used to fix the reference of 'one meter,' the speaker knows automatically and without empirical evidence that S is one meter long. The speaker's very act of fixing the term's reference constitutes her non-empirical justification for her knowledge of said proposition; she does not have to appeal to any experience in order to know that the proposition she expressed is true. This is something, then, that the speaker who introduced 'one meter' in that way knows *a priori*. Thus, on Kripke's view, the speaker's utterance of 'Stick S is one meter long' expresses a contingent *a priori* truth. If Kripke is right, then a proposition's being a contingent truth doesn't entail that it is an *a posteriori* truth. (Not everyone agrees that Kripke's example is an example of a contingent *a priori* truth; see: Casullo, 1999; Moser, 1987; Soames, 2003.)

The Analytic/Synthetic Distinction

Immanuel Kant, who first coined the analytic/synthetic distinction in Kant (1781/1998), defined an analytic judgment as one whose predicate-concept is

contained in its subject-concept. Analytic judgments are 'explicative' in the sense that they add nothing new through the predicate to the subject, e.g., 'all bodies are extended.' A synthetic judgment is one whose predicate-concept is not contained in its subject-concept. Synthetic judgments are 'ampliative' in the sense that they add information to the subject concept that is new and that no analysis could possibly extract from it, e.g., 'all bodies are heavy.'

Although Kant held that all analytic truths are *a priori* and necessary, he didn't think that all *a priori* truths are analytic in his sense, e.g., truths of arithmetic. For instance, according to Kant, in judging that 12 is the sum of 7 and 5, one does not think of 12 when one thinks of the sum of 7 and 5. To affirm that 12 is the number that 7 and 5 sum to, one must also imagine certain changes in time, namely, the successive addition of units, which (for Kant) was an intuition of time. Consequently, the judgment that 12 is the sum of 7 and 5 is ampliative and is thus synthetic. It is also *a priori*, since the judged proposition is known independently of sense experience.

As many commentators have pointed out, Kant's characterization of the analytic/synthetic distinction excluded judgments that appear to be analytic even though they are not of the subject-predicate form, e.g., 'If Mary *persuaded* Susan to attend college, then Susan *intends* to attend to college.' A more inclusive account was therefore needed. (For a discussion of the history of the analytic/synthetic distinction, see: Coffa, 1991; Pap, 1958.)

Metaphysical Analyticity

Since Kant, philosophers have viewed the analytic/synthetic distinction as a semantic distinction between sentences rather than as a distinction between judgments of the subject-predicate form. The standard definition of analyticity is this: *A sentence is analytic if and only if it is true solely by virtue of the meanings (in other words, definitions) of its constituent terms*. Any true sentence that is not analytic is *synthetic*. For example, sentence (8) below is analytic because its truth-value is supposedly fixed entirely by its meaning and structure. By contrast, sentence (9) is synthetic because its truth-value is not fixed by its meaning and form alone; it also depends on how things are in the world it describes.

(8) All vixens are female foxes.

(9) All vixens are nocturnal predators.

Following Boghossian (1997), I will call the standard definition of analyticity 'metaphysical analyticity', since it is a metaphysical thesis about what constitutes a sentence's having the truth-value that it has. (There are some excellent out-of-print anthologies on the analytic/synthetic distinction: Sleigh, 1972; Sumner and Woods, 1969. Pap, 1958, is still one of the best sources on this topic even though it is dated.)

By our definition, an analytic sentence owes its truth-value entirely to its meaning and form irrespective of any worldly facts. Consequently, no such sentence can undergo a change in truth-value, from truth to falsehood, unless it also undergoes a prior meaning-change. If the sentence were to undergo a shift in meaning, then it would not be expressing the same true proposition as before, since any meaning-change would necessitate a change in the proposition it expresses. Therefore, no analytic sentence could ever be empirically refuted (assuming that there is no change in its meaning).

In his famous 1951 study, W. V. O. Quine argued that no sentence is immune to error (see also Quine, 1991). On the contrary, every sentence is open to possible refutation without any prior change of meaning. Thus, Quine denied that there are any analytic sentences in the metaphysical sense defined above. Let us, then, turn to his argument.

Quine's Belief-Revisability Argument

To set the stage for Quine's argument, I will briefly review the main points at the end of Quine (1951). In that article, Quine took aim against the traditional empiricist's 'dogma' that each meaningful sentence has its own experiential confirmation conditions apart from any background theory. For the empiricists, most notably Ayer (1946) and Carnap (1956), all substantial knowledge comes from experience. For them, confirming a sentence is just a matter of having the appropriate sensory experiences, ones that would confirm the sentence to some degree of probability. Having the appropriate sensations is enough, then, to verify a single sentence; you don't need to assume the truth of any other sentence in order to verify it.

Quine rejected that last claim, since he agreed with Pierre Duhem that our beliefs make contact with experience as a whole, not individually; see Duhem (1914/1954). Call that the Quine-Duhem Thesis. Verifying a single sentence presupposes, then, a massive background of beliefs and default assumptions, which brings us to Quine's Confirmation Holism: *the evidential status of any one belief is fixed by its evidential relations to other beliefs, and their evidential status is in turn fixed by their evidential relations to many other beliefs, and so on for all of one's beliefs*. Thus, no single experience or group of experiences could ever refute or confirm a sentence

independently of its evidential connections to many other sentences.

It follows from the Quine-Duhem Thesis and Quine's Confirmation Holism that revising any one belief will necessitate a wholesale revision of one's belief-system. Quine presented his famous "web of belief" metaphor in Quine (1951) to explain this idea more fully. The beliefs that form the center of the 'web' are the ones that are almost impossible to give up (classical truths of logic, mathematical truths). The ones at the extreme ends of the web are the ones that are very easy to give up (observational beliefs), and the ones in between are relatively easy/hard to give up (scientific theoretical beliefs). Still, any belief can be rationally given up or revised for the right price and, by the same token, any belief can be held tenaciously, come what may, but at a cost. What to revise will depend on how much it will cost to preserve the system with respect to its coherence, simplicity, predictive power, and elegance. Belief-change, then, is solely a function of practical utility: change those beliefs that will require the least amount of changes in the rest of your belief-system while maximizing coherence, simplicity, etc.

Quine's Belief-Revisability Argument against the reality of analytic truths consists of just three premises. First Premise: Quine's Confirmation Holism – there are sentences that you hold true and sentences that you hold false, but in each case the support of your belief is a complex matter of the holistic evidential relations your sentence bears to many other sentences. Second Premise: if Quine's Confirmation Holism is true, then no belief or sentence is completely immune to revision; every sentence can be rejected under pressure from empirical evidence plus a concern for overall coherence. (Putnam, 1983, is an interesting objection to this premise.) Third Premise: if there are any analytic sentences as traditionally conceived, then they must be unresponsive to the world's input, and so immune to revision. Therefore: there are no analytic sentences as traditionally conceived.

Frege-Analyticity

A different conception of analyticity can be found in Frege (1968) and is one that is also discussed in Quine (1951): *A sentence is analytic if and only if either (i) it is a logical truth, or (ii) it can be converted into a logical truth by substitution of* ***synonymous*** *expressions*, salva veritate, *and formally valid inferences*. Clause (i) mentions a logical truth, which, according to Quine, is any true sentence that remains true under every uniform semantic interpretation and reinterpretation of its component, nonlogical, descriptive terms. Consider, for example, sentence (10):

(10) Every brother is a brother.

The nominal 'brother' is the only nonlogical descriptive term occurring in (10); (10) is true and it remains true under every possible, uniform, (referential) interpretation of the two occurrences of 'brother.' It is therefore a logical truth and thus analytic by clause (i).

Consider now sentence (11):

(11) Every brother is a male sibling.

Although (11) is true, it is not a logical truth, since one could consistently reinterpret 'brother' and 'male sibling' differently by assigning different extensions to them, resulting in a reading under which (11) is false. Still, it can be transformed into a logical truth by replacing 'male sibling' in (11) with its synonym 'brother,' which then yields (10). Thus, (11) is analytic by clause (ii) of our definition even though it is not a logical truth.

Nothing in this account entails anything about what constitutes the truth-value of an analytically true statement. Nor does it entail any unrevisability claim. Thus, Quine's Belief-Revisability Argument does not apply to this form of analyticity, at least not in any obvious way. Again, following Boghossian (1997), I will call this general account of analyticity 'Frege-analyticity.'

Is there a connection between the *a priori* and Frege-analyticity? If *a priori* knowledge is genuine, then logical truths like (10) are *a priori* knowable. Having the appropriate sense experiences is necessary for acquiring the concept of dog, but beyond that no empirical evidence is needed to know that if something is a dog, then it is a dog. Grasping the conditions under which (10) is true suffices for knowing that it is true, regardless of whether there are dogs and regardless of whether one has observed any dog. (11) would also be *a priori* since mere rational reflection and understanding of what the two synonyms mean provides one with the sufficient warrant needed to be justified in believing (11), and hence in knowing (11) *a priori*. Generally speaking, if there are any *a priori* knowable truths at all, then all Frege-analytic truths are *a priori* knowable for the kinds of reasons just mentioned.

Not all *a priori* knowable truths are Frege-analytic, however. For example, we said earlier that (5a), (6a), and (7a) are *a priori* knowable:

(5a) The relation *x is taller than y* is asymmetrical and transitive.

(6a) Whatever is colored is extended.

(7a) Whatever is red all over is not blue.

None of them is a Frege-analytic truth since none is a logical truth, nor can any of them be transformed into

one by substitution of synonyms, *salva veritate*. If anything, (5a), (6a), and (7a) are examples of synthetic *a priori* truths, assuming that the distinction between Frege-analytic and Frege-synthetic truths is genuine, exhaustive, and mutually exclusive. This notion of analyticity won't be useful, then, to logical positivists who attempt to reductively explain all *a priori* truths in terms of analyticity.

There are Frege-analyticities if there are logical truths, which Quine admitted there are. That is important for two reasons. For one thing, as we saw, Quine thinks that any logical truth is revisable. If he is right, then some Frege-analytic truths are rationally revisable; in that case, his Quine's Belief-Revisability Argument won't apply to this kind of analytic truth. For another, Quine himself admits in Quine (1951) to having a clear idea of a logical truth whose meaning, but not its truth-value, is implicitly fixed by stipulative definition, even though he thinks that logical truths are open to possible rational revision. It would be inaccurate to say, then, that Quine thought there were no analytic truths in any sense whatsoever. However, he did think that were sense in which there are analytic truths, namely, logical truths, is philosophically uninteresting and trivial, and is certainly not robust enough to erect a substantive epistemology of the sort that rationalists envision.

Quine also denies that there are Frege-analyticities of the second variety: sentences that can be transformed into logical truths by substitution of synonyms by synonyms. These are the ones that overlap with the conceptually necessary truths that Ayer and Carnap claimed we can know *a priori*, and quite cheaply, without sacrificing empiricism's main tenets about meaning or empirical content. Quine was dubious of conceptually necessary truths of any sort, so we should present his general argument for the denial of Frege-analytic truths of the second kind. (I count the following, along with Frege, as defenders of Fregean-analyticity, with their own nuanced views about synonymy and belief-revision: Chomsky, 1988, 2000; Katz, 1967, 1972, 1990; Putnam, 1962, 1965. Gilbert Harman and William Lycan are opponents of Frege-analyticity for largely Quinean reasons; see Harman, 1967a, 1967b; Lycan, 1994.)

Quine's Objections to Frege-Analyticity of the Second Kind

For Quine, the crucial question is whether we can explain synonymy without presupposing, either directly or indirectly, any notion of analyticity, given that we are trying to explain analyticity. In his 1951 study, Quine considers five analyses of synonymy and argues that they fail on independent grounds or they violate his noncircularity constraint.

The first proposal he considers was that two expressions are synonymous if and only if they have the same meaning. The problem is that the notion of two expressions having identical meanings is just as obscure and in need of explanation as the notion of analyticity. An account of synonymy that doesn't appeal to such mysterious entities as meanings is preferable to one that posits them.

The second proposal is that two expressions are synonymous just in case they can be mutually interchanged in any simple, **extensional**, sentence without changing its truth-value. This account fails to give a sufficient condition for synonymy. The predicates 'is a (normal healthy) creature with a heart' and 'is a (normal healthy) creature with a kidney' are true of exactly the same things. So, one could replace the former with the latter in sentence (12), resulting in sentence (13), without a change in truth-value:

(12) Every creature with a heart is a creature with a kidney.

(13) Every creature with a heart is a creature with a heart.

However, the two predicates are not synonymous, since (13) is supposedly analytic and *a priori* but (12) is neither.

The third proposal is that two expressions are synonymous just in case they can be interchanged in any **intensional** sentence without changing its truth-value. As Quine points out, the restrictive interchangeability criterion fails his first constraint. Consider sentences (14) and (15):

(14) Necessarily, all and only brothers are brothers.

(15) Necessarily, all and only brothers are male siblings.

According to the criterion, if 'brother' is synonymous with 'male sibling,' then (15) has to be true since (14) is. However, we can't determine whether (15) is true unless we first know whether the sentence 'all and only brothers are male siblings' is analytic. After all, the only reason one would have for thinking that (15) is true is if one believed that its embedded sentence expressed a conceptual truth. But to say that it is a conceptual truth that all and only brothers are male siblings is tantamount to saying that it is an analytic truth, which violates Quine's noncircularity constraint.

The final criterion for synonymy that Quine considered is this: two expressions are synonymous if they are interdefinable. Appealing to definitions is unhelpful since, as Quine noted, there are different

kinds of definitions. For example, dictionary definitions are reports of prior synonymies, in which case the final criterion is circular, and thus trivial. Nor will it do to say, as Ayer and Carnap have, that a definition is simply a semantic rule or meaning postulate. By that understanding, two expressions are synonymous if and only if they are correlated with one another in virtue of some (non-empirical) semantic rule of the language. The label 'semantic rule' is arbitrary, implying only the appearance of a particular sentence (or a schema) under the heading 'Semantic Rules.' At best, a semantic rule of a language L can only specify which sentences (if any) of L have the honorific status of being analytic-in-L if there are any, but it won't help explain the absolute, nonrelativistic, sense of analyticity. Moreover, different sets of truths could have appeared under that heading without a change in the total set of truths in the language. Not only is the appeal to semantic rules and meaning postulates arbitrary and unmotivated, but also it cannot settle decisively the question of whether a sentence like 'everything that is green is extended' is true by definition, or whether it expresses an important empirical truth about the world. Presumably it is one or the other, and it cannot be both. Since there are many borderline cases of just this sort, the Fregean analytic/synthetic distinction is unprincipled. On the assumption that his 'divide-and-conquer' strategy is successful, Quine concluded (Quine, 1951) that the notion of Frege-analyticity is empty and thus can serve no useful theoretical explanatory purpose.

Grice and Strawson (1956) is a famous response to Quine's argument; cf. Putnam (1965, 1970). According to Grice and Strawson, the terms 'analytic' and 'synthetic' must mark a genuine distinction, since they have a determinate philosophical use. Generations of philosophy students have learned these terms, and many of them can instantly recognize the real differences between the standard examples. Moreover, those who are adept in applying the distinction will agree about new cases. No doubt there will be difficult cases, as in 'everything that is green is extended' or perhaps 'all cats are animals,' but it does not follow that the analytic/synthetic distinction is not genuine. (Chomsky, 2000, makes a similar point.) The fact that there are borderline cases doesn't show that there are no clear cases of the distinction. Suppose there is no genuine difference in semantic status between analytic and synthetic sentences. Then there couldn't be any clear cases of analytic and synthetic truths or any agreement on the application of these terms to new cases. And yet, as they point out, even Quine would admit that a logical truth (e.g., 'all dogs are dogs') is analytic and not synthetic in some intuitive sense. According to Grice and Strawson, Quine's adequacy constraints on any plausible account of analyticity or synonymy are too stringent, unreasonable, and arbitrary; they have the undesired effect of rendering any linguistic elucidation of a group of family-related concepts impossible. In their view, Quine has only shown that no satisfactory analysis of analyticity has yet been provided, and not that no such distinction could be made. (Grice and Strawson never said what analyticity amounts to; nor did they show that the analytic/synthetic distinction is exhaustive.)

Until the late 1990s, much of the "analytic/synthetic" literature since the 1950s focused on the question of whether Quine succeeded in undermining the distinction. The prevailing view since Quine (1951) is that Quine did indeed win the battle, and that he also won the war against logical positivists, who tried to salvage empiricism while granting that we have knowledge of certain *a priori* necessary truths; see Soames (2003). Since the 1990s, there has been a resurgence of rationalism, and thus a reaction against Quine's epistemology and his arguments against the tenability of any substantive analytic/synthetic distinction. The writings of Bealer, Boghossian, Bonjour, Katz, and Peacocke helped fuel this resurgence. I will conclude this article with Boghossian's main contribution to the analytic/synthetic debate.

Epistemological Analyticity

Paul Boghossians defends an epistemic notion of analyticity in the spirit, if not the letter, of Ayer (1946) (see Boghossian, 1996, 1997): *A sentence is analytic if and only if grasping what the sentence means suffices in one's being justified in believing in the truth of the proposition that the sentence expresses.* Ayer and Boghossian differ in their emphasis: Ayer explained the *a priori* in terms of a linguistic notion of analyticity, whereas Boghossian explains analyticity in terms of *a priori* justification. They also differ as to whether implicit definitions can literally determine the truth-value of a sentence: Ayer thought they can, but Boghossian does not. Boghossian's motivation for defending an epistemic account of analyticity was that he thought it had the best chance of explaining our having nonempirical knowledge of logical truths and logically valid inferences – assuming that the meaning of a logical constant is fixed by its conceptual role in formally valid patterns of logical inference, which may be something we can grasp by means of an implicit definition. (Boghossian thinks that, regardless of how one conceives of analyticity, one has no choice but to take analyticity as a genuine substantive property of certain sentences if one is a realist about meaning, which he is. For space

constraints, I will sidestep the meaning/realism issue in this article.)

Suppose that you utter (16) and you go on to assert (17) (the example is from Lycan, 1994, although the main idea goes back to Ayer and Kripke):

(16) By 'veline' I shall henceforth mean 'a vegetarian cat.'

(17) All veline cats are vegetarians.

Then, just by virtue of grasping the content of your utterance of (16), which fixes the meaning of 'veline' in your idiolect, you are justified in believing that the proposition you expressed by your utterance of (17) is true. Hence, (17) (as tokened by you) is epistemically analytic.

Notice that, on Boghossian's epistemic account of analyticity, one can explain why such statements as (5a), (6a), (7a), (10), and (11), are *a priori*:

(5a) The relation *x is taller than y* is asymmetrical and transitive.

(6a) Whatever is colored is extended.

(7a) Whatever is red all over is not blue.

(10) Every brother is a brother.

(11) Every brother is a male sibling.

In each case, we have a *prima facie a priori* warrant to believe the proposition expressed because we have, in each case, a sufficient grasp of an implicit definition of an expression's meaning – either tacitly in our behavioral use of the expression or by way of an explicit stipulative definition. According to Boghossian, and apparently Kripke, our grasp of an implicit definition, which creates a semantic fact, constitutes our justification for believing the proposition expressed by the sentence containing the expression.

As Boghossian notes, Quine had no qualms about stipulative definitions if they are just arbitrary rules that implicitly define the meaning of a symbol. Thus, Quine could not object to the use of stipulative definitions *tout court*. He would object to the suggestion that stipulative definitions can literally create – by linguistic fiat or by linguistic convention – factual **truths** and **valid** inferences that are **unrevisable in principle**; see Quine (1935, 1960, 1966). However, Boghossian never claimed that implicit definitions determine the truth-value of a sentence or that they determine the validity of a logical inference. Rather, he claimed that implicit definitions literally create meaning-constituting facts the cognitive grasp of which sufficiently warrants semantic belief. If anything, they determine the proposition expressed but not the proposition's truth-value. Thus, as far as Boghossian is concerned, Quine's arguments (1935 and 1966) at best show that, contra Ayer and Carnap, implicit definitions cannot literally create truths by convention or by speaker intention. They don't show, argued Boghossian, that implicit definitions cannot have a meaning-constituting-factual role or an epistemic role in an explanation of *a priori* knowledge of logic.

Gilbert Harman, who defends the Quinean view, rejected Boghossian's epistemic account of analyticity and the role of implicit definitions in an explanation of *a priori* knowledge; see Harman (1996). According to Harman, grasping the contents of one's stipulative linguistic intentions can never warrant semantic belief. The reason is that meaning stipulations are just working assumptions that can easily be given up and, as such, they provide no evidence for anything. They can no more create epistemic warrant for semantic claims than they can create truth-values from scratch. See also Lycan (1994) for objections to Boghossian's view.

Readers can be assured that this debate will continue. We can look forward to more interesting discussions on the three distinctions discussed in this article.

See also: A Priori Knowledge: Linguistic Aspects; *De Dicto* versus *De Re*; Definitions: Uses and Varieties; Empiricism; Holism, Semantic and Epistemic; Indeterminacy, Semantic; Meaning: Cognitive Dependency of Lexical Meaning; Meaning: Overview of Philosophical Theories; Meaning Postulates; Possible Worlds: Philosophical Theories; Radical Interpretation, Translation and Interpretationalism; Realism and Antirealism; Rigid Designation.

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Anaphora and Coreference Resolution, Statistical

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Introduction

Anaphora (*see* **Discourse Anaphora; Anaphora, Cataphora, Exophora, Logophoricity**) are an important linguistic device for the speaker or writer to signal the cohesion or local coherence (*see* **Cohesion and Coherence: Linguistic Approaches**) of a discourse. Anaphoric expressions comprise mainly personal and possessive pronouns (*see* **Pronouns**), demonstratives (*see* **Demonstratives**), proper names (*see* **Proper Names: Semantic Aspects**), and definite noun phrases (*see* **Descriptions, Definite and Indefinite: Philosophical Aspects**) when they are used to refer to something previously mentioned in the discourse. The linguistic expression realizing the previous mention is called the antecedent. In order to construct a coherent representation of the discourse, hearers or readers have to interpret or resolve anaphoric expressions. This task is difficult, because most anaphoric expressions are referentially ambiguous (i.e., they can potentially be used to refer to more than one antecedent). Their unambiguous resolution requires a considerable amount of linguistic and world knowledge.

From a linguistic point of view, anaphora resolution is defined as the task of finding the antecedent for an anaphoric expression. In the area of Natural Language Processing (*see* **Natural Language Processing: Overview**) the task early on was considered as identifying the entity a referring expression is used to refer to, the discourse entity. If multiple referring expressions are used to refer to the same entity, they are said to corefer (*see* **Coreference: Identity and Similarity**). Based on those theoretical assumptions, the task of anaphora resolution has been redefined as coreference resolution (i.e., to assign a referring expression the discourse entity it is used to (co)refer to). The discourse entity then may be viewed as a representation of the set of referring expressions that are used to refer to it, or as a representation of a coreference chain.

Definition of the Task

For applications like information extraction (*see* **Information Extraction, Automatic**) or automatic summarization (*see* **Summarization of Text, Automatic**), determining the antecedent of an anaphoric expression is not relevant. Hence, coreference resolution is the task most statistical approaches attempt to solve. In order to express coreference resolution as a machine learning task (*see* **Language Processing: Statistical Methods**), most often it is transformed into a binary classification task. During data generation, pairs of potential anaphors and potential antecedents are created as data instances. In the abstract text representation in Figure 1, three referring expressions that are used to refer to the same discourse entity are marked by dashes. Nine referring expressions used to refer to different discourse entities are marked by solid lines. If we consider only the last referring expression as a potential anaphor, this results in 11 instances (i.e., pairs of a potential anaphors and potential antecedents). This data generation strategy creates a very large number of instances.

The classification task then can be formulated as follows: given a pair of potential anaphor and potential antecedent, classify as positive if anaphor and antecedent are in fact coreferent (i.e., both referring expressions are used to refer to the same discourse entity). Classify as negative otherwise. This is shown in Figure 2, where a dashed arrow indicates a positive classification, solid arrows negative ones. This results in two positive instances and nine negative ones. This data generation strategy, which was used successfully by Aone and Bennett (1995), may lead to a problem with the distance feature (i.e., the feature which captures the distance in words or sentences between anaphor and antecedent) in the case of long coreference chains.

In order to avoid that problem, the learning task can be formulated as follows: given a pair of potential anaphor and potential antecedent, classify as positive if the antecedent is in fact the closest antecedent, and as negative otherwise (i.e., label transitive positives as negative as shown in Figure 3). For positive instances, the distance feature should reflect the intuition that anaphors and their antecedents are rather close. However, this data-generation strategy leads to a highly skewed distribution of positive and negative instances. In Figure 3 there are ten negative instances and only one positive instance. Applied to real data, this strategy may yield more than 99% negative instances.

A strategy for reducing the large number of negative instances can be formulated as follows: given a

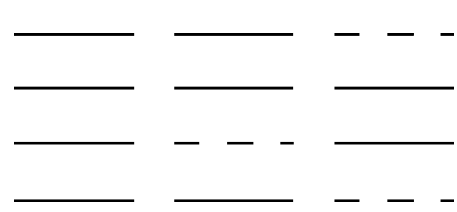

Figure 1 Abstract text representation.

pair of potential anaphor and potential antecedent, classify as positive if the antecedent is in fact the closest antecedent. Classify as negative only if the potential (wrong) antecedent is closer than the closest (correct) antecedent. Exclude all instances where the potential antecedent is farther away than the closest (correct) antecedent (i.e., exclude transitive positives and distant negatives; see Figure 4). However, this strategy is rather unintuitive. Intuitively, anaphor and antecedent should be rather close. Following this strategy, however, the distance between anaphor and antecedent in positive instances is always the maximum distance. Consequently, in Soon *et al.* (2001) the distance feature proved to be not important for solving the task.

Data

The most important prerequisite for statistical approaches is annotated data (*see* **Treebanks and Tagsets**). There exist several corpora annotated with information about coreference, e.g., the MUC-6 and MUC-7 corpora (available through the Linguistic Data Consortium (LDC)) (see 'Relevant Websites'). However, those corpora are rather small and idiosyncratic. A subset of the Penn TreeBank (*see* **Treebanks and Tagsets**) has been extended with information on pronouns and their antecedents by Ge *et al.* (1998) (available from them on request). The ACE corpus (Automatic Content Extraction) is available through the LDC. This corpus is substantially bigger than the MUC corpora, but only anaphoric relations relevant to the ACE program are marked.

If a statistical approach is to be applied to a new genre, domain, or language, data have to be annotated with information about anaphoric relations. This can be done manually or semiautomatically, using annotation tools (e.g., the annotation tool MMAX) (see 'Relevant Websites').

Evaluation

The evaluation (*see* **Natural Language Processing: System Evaluation** of the anaphora resolution task is straightforward. In the key (i.e., the data representing the solution for the task), each anaphor has exactly one antecedent. The response (i.e., the output of the anaphora resolution system) also contains exactly one antecedent for an anaphor. The performance of a system then can be measured in terms of the success rate and in terms of precision, recall, and F-measure (see Table 1 for a list of those terms and their abbreviations).

The success rate just compares the number of correctly resolved anaphors with the number of all anaphors in the document or corpus (Mitkov, 2002):

$$S = \frac{Nc}{Na}$$

An evaluation that reports precision, recall, and F-measure may prove more realistic, since a high recall, low precision system may still achieve a high success rate, though it may be not desirable for most applications.

$$P = \frac{Nc}{Nh}$$

$$R = \frac{Nc}{Na}$$

$$F = \frac{2PR}{(P+R)}$$

Problems with those measures arise because researchers often do not report exactly which types of anaphoric expressions are relevant for the evaluation, which types are filtered out manually, and which types their systems attempt to resolve. Therefore, the

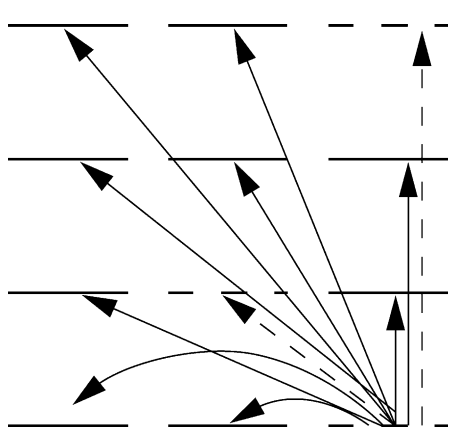

Figure 2 Positive, if anaphor and antecedent are coreferent.

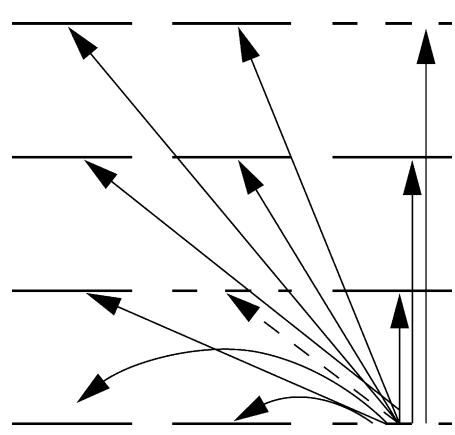

Figure 3 Exclude transitive positives.

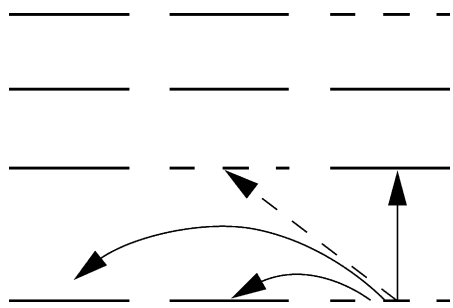

Figure 4 Exclude transitive positives and distant negatives.

reported results are often not comparable (Byron, 2001).

Though there exists an established evaluation metric for the coreference resolution task introduced for MUC-6 by Vilain *et al.* (1995), this topic is still controversial.

Vilain *et al.*'s (1995) evaluation metric partitions the set of referring expressions into sets of coreferring expressions by computing the minimal number of links needed to create those sets. Both key and response consist of those sets. The difference between key and response is given by computing the minimal number of links to be deleted or created in order to transform the response into the key. Finally, precision, recall, and F-measure are reported on the basis of those numbers. This metric abstracts from the task of finding 'the' antecedent of an anaphoric expression. It reports a result which is very close to the task of coreference resolution as needed in real-world applications.

Notes on the Development of the Field

Research in the area of Natural Language Processing about anaphora resolution started out by modeling linguistic knowledge algorithmically (*see* **Anaphora Resolution: Centering Theory Approach**). Early work on pronoun resolution used the syntactic structure to define constraints and search procedures for determining pronouns' antecedents (Hobbs, 1978). Building upon refinements in linguistic theory, e.g. Binding Theory (*see* **Binding Theory**) and Discourse Representation Theory (*see* **Discourse Representation Theory**), pronoun and anaphora resolution algorithms were implemented within syntactic and semantic parsers.

Constraints or filters provided by those theories are only one part of the knowledge needed by an anaphora resolution algorithm. Constraints can only reduce the set of potential antecedents of anaphoric expressions. They cannot select the most likely antecedent. Hence, it is necessary to provide knowledge about preferences for certain candidates. Preferences are provided either by linguistically and psychologically motivated models, e.g., the centering model (*see* **Anaphora Resolution: Centering Theory Approach**), or by heuristics, e.g., Lappin and Leass, 1994. Most centering and heuristics-based algorithms rely on complete syntactic analysis. Since there are no parsers that provide a complete analysis robustly on unrestricted input (*see* **Parsing: Statistical Methods**), those algorithms were evaluated either only manually or automatically on a very restricted set of documents. However, in the mid-1990s the need to apply anaphora resolution algorithms to unrestricted input grew. This led to three important developments in the area of anaphora resolution. First, corpora were annotated with information about anaphoric relations, in particular due to the series of Message Understanding Conferences (MUC) (*see* **Text Retrieval Conference and Message Understanding Conference**). Second, heuristics were adapted such that their preprocessing demands decreased. Hence, anaphora resolution algorithms based on heuristics became more robust and could be applied to unrestricted input (e.g., Kennedy and Boguraev, 1996). Third, statistical and machine learning techniques were applied (Aone and Bennett, 1995; McCarthy and Lehnert, 1995).

Table 1 Terms used for evaluation

Na: number of all anaphors in a document or corpus
Nc: number of correctly resolved anaphors
Nh: number of resolutions attempted
S: success rate
P: precision
R: recall
F: equally weighted F-measure

State-of-the-Art Approaches

Decision Trees

Most work in statistical coreference resolution uses standard machine-learning algorithms (*see* **Language Processing: Statistical Methods**). The following description of a state-of-the-art technique in decision tree–based coreference resolution follows Soon *et al.* (2001).

Soon *et al.* used the corpora that were created for the coreference task of MUC-6 and MUC-7. The input to their system consists of raw data, i.e., data stripped from all kinds of linguistic information (annotation). Hence, a sequence of preprocessing components is needed to determine the extent of referring expressions and assign them values for the features shown in Table 2 (possible values of the features are given in parentheses). The preprocessing components

Table 2 Features used by Soon *et al.* (2001)

1. Distance	Distance between **ana** and **ante** in sentences (0, 1, 2, . . .)
2. i-Pronoun	Is **ante** a pronoun? (T, F)
3. j-Pronoun	Is **ana** a pronoun? (T, F)
4. String match	Are **ana** and **ante** identical (T, F)
5. Definite noun phrase	Is **ana** definite noun phrase? (T, F)
6. Demonstrative NP	Is **ana** a definite NP with demonstrative determiner? (T, F)
7. Number agreement	Do **ana** and **ante** agree with respect to number? (T, F)
8. Semantic class agreement.	Do **ana** and **ante** agree with respect to semantic classes which are arranged in a **isa**-hierarchy: **female, male, person, organization, location, date, time, money, percent, object**? (T, F)
9. Gender agreement	Do **ana** and **ante** agree with respect to gender? (T, F)
10. Both-proper-names	Are both **ana** and **ante** proper names? (T, F)
11. Alias	Are **ana** and **ante** similar (**substring match**, abbreviations, etc.)? (T, F)
12. Appositive	Is **ana** appositive of **ante**? (T, F)

used by Soon *et al.* are tokenization and sentence segmentation, morphological processing, part-of-speech tagging (*see* **Part-of-Speech Tagging**), noun phrase identification, named entity recognition (*see* **Named Entity Extraction**), nested noun phrase extraction, and semantic class determination.

Soon *et al.* then generated training data following the strategy already shown in Figure 4. Each instance in the training data is a feature vector describing the relation between a potential anaphor and a potential antecedent by means of the 12 features given in Table 2. Then, a standard decision-tree classifier is trained. The learned model is applied to testing data which are fed into the evaluation algorithm according to Vilain *et al.* (1995). The model can also be integrated into an NLP application.

Maximum Entropy

Lappin and Leass's (1994) heuristic algorithm for pronoun resolution proved to be popular among researchers implementing shallow approaches (e.g., Kennedy and Boguraev, 1996). However, Lappin and Leass's algorithm has the great disadvantage that the weights assigned to features have to be determined manually. An approach that allows the expression of the Lappin and Leass algorithm in statistical terms is the maximum entropy framework (Berger *et al.*, 1996), which learns the weights from the data automatically.

Applied to coreference resolution, the maximum entropy framework also requires generation of training and testing data in terms of binary classification (Morton, 2000). It relies on a set of binary features that define constraints on the statistical model that is learned. Given a set of those constraints, the model with the maximum entropy has to be identified (i.e., the model with the least amount of information beyond the constraints). The maximum entropy framework has been applied to coreference resolution by Kehler (1997) and Morton (2000), and to pronoun resolution by Kehler *et al.* (2004).

Statistical Modeling

Ge *et al.* (1998) described a statistical approach to pronoun resolution. In contrast to the work described above, they did not use preprocessing components. Instead they derived the following features from the Penn TreeBank enriched by them by anaphoric information: distance between pronoun and potential antecedent, gender, number, and animaticity of the potential antecedent, selectional restrictions of the head of the pronoun, and the number of times a discourse entity was referred to in a document. Given this information, Ge *et al.*'s statistical approach can be described as a function from pronouns to antecedents. Then they collected the relevant statistics from training examples and ran the program on test data. They computed probabilities for each potential antecedent and selected the one with the highest probability.

Unsupervised and Semisupervised Machine Learning

The approaches described above are supervised (i.e., they require data annotated with the target concept as input). Since this annotation is expensive in terms of cost and labor, unsupervised and semisupervised approaches are much sought after.

Cardie and Wagstaff (1999) presented an unsupervised approach to coreference resolution. They started out with the observation that all referring expressions in a coreference chain define an 'equivalence class.' Therefore, it would be natural to view

the coreference resolution task as clustering. Since all members of a coreference chain should be similar, their conceptual distance should be small. Given a method for measuring this distance, a clustering algorithm could group referring expressions together, such that coreferent ones end up in the same cluster.

Cardie and Wagstaff's system uses preprocessing components to assign values to features in vectors describing referring expressions (**not** pairs of potential anaphors and potential antecedents). Initially, each referring expression is assigned its own cluster. Then the algorithm works backward through the document, where each referring expression is compared with all preceding ones. If the distance between two referring expressions is less than the clustering radius *r*, they are considered for possible merging into one cluster. Cardie and Wagstaff evaluated their approach on the MUC-6 data. They reported a performance comparable to other systems presented at the MUC-6 conference. Their system outperforms the only machine-learning-based system presented there.

Unsupervised machine learning of natural language tasks is almost too difficult. Hence, semisupervised machine learning meta algorithms, e.g., Co-training (Blum and Mitchell, 1998), were applied. A Co-training classifier consists of two simple classifiers, which, initially, are trained separately using a small set of labeled training data.

Each of them is trained on a different subset of features (i.e., on different views of the data). The views have to be disjoint or even conditionally independent. The Co-training algorithm bootstraps by gradually extending the training data with self-labeled instances. It utilizes the two classifiers by letting them in turn label the best positive and best negative instances from the set of unlabeled training data. Instances labeled by one classifier are then added to the other's training data, and vice versa. After each turn, both classifiers are retrained on their augmented data sets. This process is repeated either for a given number of iterations or until all the unlabeled data have been labeled.

Co-training was applied to coreference resolution by Müller *et al.* (2002) and later by Ng and Cardie (2003). One result of this work was that the amount of training data needed to achieve reasonable performance on the coreference resolution task is rather small (Müller *et al.*, 2002).

Recent and Future Developments

Overcoming Problems with Binary Classification

Most state-of-the-art approaches to statistical coreference resolution redefine the task as binary classification. While this helps to apply standard classification-based machine learning algorithms, it has the following serious drawbacks:

1. Even for small documents, the binary classification approach generates very large training and testing data sets, which may prevent researchers from concluding experiments in a reasonable amount of time.
2. Each decision is independent from all other decisions. This may lead to contradictory results ($A = B$, $B = C$, $A \neq C$). This may also lead to unnecessary competition between compatible results ($A = B$, $B = C$, $A = C$; there is no need to resolve A twice).
3. Training instances do not have knowledge about the context of referring expressions. They do not have knowledge about other referring expressions used to refer to the same or a different discourse entity.

In order to avoid problem (1), a few modifications have been proposed. Though the testing data set must not be modified using the information about the target concept, the training data set can be minimized considerably (see **Figure 4** and a variation in Ng and Cardie, 2002).

In order to avoid the conflicts described in (2), different strategies can be applied. Most often, only one instance per anaphoric expression is allowed to be classified as positive. The standard approach is to select only the positive instance which contains the closest antecedent for an anaphoric expression. Ng and Cardie (2002) do not select the instance with the closest antecedent but the one with the highest confidence value returned by the classifier.

The most serious problem is given in (3). Yang *et al.* (2003, 2004) tried to address that problem. Yang *et al.* (2003) presented a competition learning approach (similar to the one by Connolly *et al.*, 1997), where each anaphoric expression is paired with two antecedents, a correct one and an incorrect one. The concept to be learned is which of the potential antecedents is the correct one. During classification, the algorithm is given initially one instance. It determines which of the potential antecedents is the better one. The loser is discarded. The winner is paired with some other candidate. This new instance is given to the classifier, which again determines the better one. That way the overall best antecedent for an anaphoric expression can be determined. The results reported by Yang *et al.* (2003) (on MUC-6 and MUC-7 data) indicate that this strategy outperforms state-of-the-art systems.

Yang *et al.* (2004) described another method of incorporating more contextual information into a pronoun resolution algorithm. In addition to

potential anaphor and potential antecedent, they extended the representation of each instance by a third referring expression, the closest antecedent of the potential antecedent (the set of features describing this referring expression is set to nil if there is no such expression). Yang *et al.* claimed that they are able to include knowledge similar to centering approaches (*see* **Anaphora Resolution: Centering Theory Approach**) and reported increased performance over baseline systems.

Luo *et al.* (2004) described a more general approach to make knowledge about the context accessible to a coreference resolution algorithm. They proposed the Bell tree as representation for the search space. The leaves in the Bell tree contain all possible outcomes (which is a very large number). The task of coreference resolution then is to find the best path from the root to the leaf nodes in the Bell tree. Nodes in the tree are made up of partial solutions. They contain sets of referring expressions representing coreference chains and singletons, which are not coreferent. Luo *et al.* (2004) used a maximum entropy framework (Berger *et al.*, 1996) to assign a referring expression to an existing set (coreference chain) or to create a singleton set. That way, they provided access to knowledge about other referring expressions in a coreference chain and to competing candidates. Luo *et al.* reported encouraging results on ACE and MUC data. Efficient search heuristics are necessary to implement this approach.

Integrating Linguistic and Extra-Linguistic Knowledge

Most of the work mentioned relies on a rather small set of linguistically simple features. There have been early attempts to include knowledge about predicate–argument structure by Dagan *et al.* (1995). Recently Kehler *et al.* (2004) evaluated the contribution of this knowledge to pronoun resolution. They found no significant improvement.

Some researchers also tried to include world or domain knowledge in statistical coreference resolution. Harabagiu *et al.* (2001) reported an improvement in performance by including knowledge from WordNet (*see* **WordNet(s)**).

Covering More Linguistic Phenomena

Most of the research on statistical coreference resolution is focused on English-language texts, either taken from MUC or from the Penn TreeBank. Aone and Bennett (1995) applied their approach to Japanese texts. Müller *et al.* (2002) worked with German (German, Standard) texts. Only when annotated data in other languages become accessible, can statistical methods be applied to more languages.

Existing approaches focus either on pronoun resolution in texts or on noun phrase coreference resolution in texts. Strube and Müller (2003) made the first attempt to apply machine learning methods to pronoun resolution in spoken dialogue. Nissim and Markert (2003) presented a statistical approach to metonymy (*see* **Metonymy**) resolution, and Modjeska *et al.* (2003) presented one to *other*-anaphora resolution. Due to sparse data, the latter two approaches first needed to identify relevant cases in large corpora. Then they applied standard machine learning techniques.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Anaphora Resolution: Centering Theory Approach; Binding Theory; Cohesion and Coherence: Linguistic Approaches; Coreference: Identity and Similarity; Demonstratives; Descriptions, Definite and Indefinite: Philosophical Aspects; Discourse Anaphora; Discourse Representation Theory; Frame Analysis; Information Extraction, Automatic; Language Processing: Statistical Methods; Metonymy; Named Entity Extraction; Natural Language Processing: Overview; Natural Language Processing: System Evaluation; Parsing: Statistical Methods; Part-of-Speech Tagging; Pronouns; Proper Names: Semantic Aspects; Summarization of Text, Automatic; Text Retrieval Conference and Message Understanding Conference; Treebanks and Tagsets; WordNet(s).

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Relevant Websites

http://www.ldc.upenn.edu – Linguistic Data Consortium (LDC).

http://mmax.eml-research.de – Download the annotation tool MMAX.

Anaphora Resolution: Centering Theory Approach

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Anaphora Resolution with Centers of Attention

Anaphora resolution in discourse – a coherent sequence of utterances – is the task or process of identifying the referents of expressions that we use to denote discourse entities, i.e., objects, individuals, properties, and relations that have been introduced and talked about in the prior discourse. The importance of modeling this process cannot be overstated. Computing the meaning of a discourse is commonly understood as partly the process of connecting the information in the upcoming utterance with the information contained in the prior discourse. Before we can do this, however, we need to assign an interpretation to all the elements of the utterance and then to the utterance as a whole. In many cases, the interpretation of some elements in the sentence can only be assigned relative to the prior discourse context – *anaphoric expressions* comprise one such class of elements.

In early approaches to anaphoric reference in AI and linguistics, the task of anaphora resolution was relegated to syntax, which provided filters, such as grammatical agreement constraints, and open-ended semantic inference that drew on, among other things, world knowledge and inference procedures to identify the appropriate referent. However, it was soon recognized that while syntactic constraints were very limited in constraining the search for anaphoric referents on the one hand, the mechanism of open-ended semantic inference, on the other hand, was too knowledge intensive and complex – requiring reasoning over the entire space of discourse at once – and therefore computationally unfeasible.

In 1977, a different view to anaphora resolution arose out of the work of Barbara Grosz (Grosz, 1977) that rests on a fundamental and singularly important assumption regarding the attentional status of discourse entities: at any given point of the discourse, the discourse participants' attention is centered on a set of entities, a proper subset of all the entities being talked about in the discourse. In addition, for a given utterance, the discourse participants' attention is centered on a singleton entity, and the rest of the utterance makes a predication about this entity. The notion of the center of attention specific to utterances is very similar to the notion of 'topic' in linguistics, where it is defined as what is 'talked about' in the utterance. The approach for anaphora resolution with this Centering view is that the search for the referents of anaphoric expressions should be restricted to the set of centered entities, the assumption being that in discourse, it is these entities that we are most likely to continue to talk about and refer to with the use of anaphoric expressions. Furthermore, a partial ordering is imposed on the elements of the set, so that some entities are more centered than others. Such a preference ordering on the possible candidate referents for anaphoric expressions significantly simplifies the 'nature' of inference that would be needed and at the same time minimizes the 'amount' of inference. Another significant proposal was that the set of centered entities can be partially determined by the linguistic structure of the utterance itself. The consequences for all these ideas were tremendous, because the view meant that it was possible to set aside, to a significant extent, the role of open-ended inferencing for anaphora resolution and look instead to more easily identifiable surface features of the utterance, such as the solution and explanation, for at least part of the problem.

While Grosz laid out the general framework for the Centering process, her work did not suggest the exact mechanisms whereby the centered entities could be identified. Candy Sidner (1979) extended Grosz's framework by precisely defining the notion of the utterance-based center linguistically and also provided a mechanism for using centers to identify referents of pronouns.

Sidner invoked several Centering structures – singleton sets called 'discourse focus' and 'actor focus,' and a set called the 'potential foci,' which can contain one or more elements. The 'discourse focus' is equivalent to the center of the utterance, i.e., the entity about which some predication is made by the utterance. The 'actor focus' is the discourse entity that is predicated as the agent of the event in the utterance. The 'discourse focus' is identified by using a set of rules that refer to the linguistic structure of the utterance as well as the state of the existing data structures when the utterance containing the pronoun is processed. A referent for a pronoun is identified primarily with the actor focus or the discourse focus, unless it is ruled out by some specified criteria, in which case an alternate candidate referent is considered from the set of 'potential foci,' which contains entities other than the two primary foci. A significant aspect of Sidner's work is that she did not rule out the role of inference in pronoun interpretation, but instead only constrained it in nature and amount. The nature of inference needed is different from earlier, open-ended inference systems in that it only involves

checking for contradictions once a candidate referent is chosen by using the structurally determined preference ordering: this allows for a much simpler knowledge base and reasoning procedures. The amount of inference needed is also reduced because of the preference ordering, so as soon as an entity is identified for which no contradictions arise, no other inferencing is needed.

Centering Theory: Modeling Local Coherence with Centers of Attention

Centering Theory (CT) arose from the work of Aravind Joshi and Steve Kuhn (Joshi and Kuhn, 1979), where the concepts of the 'center' and 'Centering' were first introduced as a way to specify an almost monadic calculus approach to discourse interpretation. Joshi and Kuhn showed that inferences of a certain class are more easily computed by using a monadic representation for utterances. However, they were also interested in computing the difficulty of deriving the necessary inferences.

While not explicitly stated by Joshi and Kuhn, the Centering process was assumed to be a local phenomenon operating over successive utterances. In the meantime, Grosz's work on global and local discourse processing had also been formalized by Grosz and Sidner (1986), and it was possible to place CT in its proper place in a complete theory of discourse processing. Grosz and Sidner provided a framework for discourse structure as a composite of three interacting constituents: a linguistic structure, an intentional structure, and an attentional state. The linguistic structure is determined by the intentional structure and comprises the utterances of the discourse grouped together hierarchically into discourse segments. The attentional state is an abstraction of the discourse participants' center of attention as the discourse unfolds. Each discourse segment is associated with a fixed attentional state relevant to the overall discourse – the global attentional state. A local attentional state is associated with each utterance within the segment. The local attentional state is inherently dynamic and can remain constant or can change from utterance to utterance within the segment.

Centering Theory (Grosz *et al.*, 1983, 1995) was proposed as a model of the local attentional state, i.e., of the dynamic attentional state within the discourse segment. Following up on the concerns of Joshi and Kuhn, it explicated more clearly and formally the particular linguistic and attentional state factors that contribute to the ease or difficulty of interpreting a discourse segment. The notion of inferential complexity or difficulty was recast as the term of 'coherence.' The first factor that contributes to coherence was given as a further explication of Joshi and Kuhn's 'change of center' rule and accounts for the difference in coherence between the discourse segments (1) and (2).

(1a) John went to his favorite music store to buy a piano.
(1b) He had frequented the store for many years.
(1c) He was excited that he could finally buy a piano.
(1d) He arrived just as the store was closing for the day.

(2a) John went to his favorite music store to buy a piano.
(2b) It was a store John had frequented for many years.
(2c) He was excited that he could finally buy a piano.
(2d) It was closing just as John arrived.

Discourse (1) is intuitively more coherent than discourse (2). This difference may be seen to arise from the number of changes in the center. Discourse (1) centers a single individual, 'John,' describing various actions he took and his reactions to them. In contrast, discourse (2) seems to flip back and forth between 'John' and 'the store.' These 'changes in aboutness' or 'changes of centers' makes discourse (2) less coherent than discourse (1).

The second observation that CT captures with discourses (1) and (2) establishes the correlation of center changes and the degree of coherence with the linguistic form of the utterances. Both discourses convey the same information but in different ways. They differ not in content or what is said but in expression or how it is said. The variation in 'changes of attentional state' that they exhibit arises from different choices of the way in which they express the same propositional content. The different linguistic choices further engender different inference demands on the hearer or reader, and these differences in inference load underlie certain differences in coherence between them.

In addition to the different linguistic choices pertaining to the realization of the propositional content of the utterance as a whole, CT also identifies different linguistic choices made for realizing particular elements within the propositional content of the utterance. These are choices in referring expression form. Pronouns and definite descriptions are not equivalent with respect to their effect on coherence. CT characterizes the perceived coherence of the use of pronouns and definite descriptions by relating different choices to the inferences they require the hearer or reader to make. In (3), the variations of a discourse illustrate this relationship.

(3a) Terry really goofs sometimes.
(3b) Yesterday was a beautiful day and he was excited about trying out his new sailboat.
(3c) He wanted Tony to join him on a sailing expedition.
(3d) He called him at 6 A.M.
(3e) He was sick and furious at being woken up so early.
(3e′) Tony was sick and furious at being woken up so early.
(3f) He told Terry to get lost and hung up.
(3g) Of course, he hadn't intended to upset Tony.
(3g′) Of course, Terry hadn't intended to upset Tony.
(3g″) Of course, Terry hadn't intended to upset him.

In discourse (3), it is the use of the pronoun in utterance (3e) that is in question. While we can tell that the pronoun *He* refers to 'Tony,' the use of the pronoun here is potentially confusing. CT claims that this is because until utterance (3d), 'Terry' has been the 'center of attention' and therefore the most likely referent of the pronoun. This claim rests on the assumption that hearers expect speakers to continue talking about the entity that is in the 'center of attention.' The confusion results because we tend to assign the reference of the pronoun to the center of attention as soon as we encounter it but have to backtrack (a phenomenon called 'garden path') when we process the rest of the sentence and find something that contradicts our assumption. In this particular example, we backtrack when we get to the work *sick* and, from the prior utterances in the discourse, reason that it must be 'Tony' and not 'Terry' who is sick. As the careful reader will have noticed, the assumed preferences for determining the referents of pronouns in CT are reminiscent of Sidner's model. We return to this comparison at the end of this section, where we discuss the relation between anaphora resolution and Centering theory.

The confusion arising from (3e) is removed if the pronoun is replaced with the full noun phrase 'Tony,' as shown in (3e′). The conjecture in CT, therefore, is that when the center of attention shifts to another entity, the form of referring expression used to denote the new centered entity has consequences for the processing load required for interpreting the utterance. A pronoun used to refer to the new centered entity increases the processing load, because it causes backtracking from the interpretation of the old centered entity and thus from the interpretation of the utterance itself. A full noun phrase, on the other hand, shifts the center of attention before the rest of the utterance is processed and therefore entails less processing.

The three variants (3g), (3g′), and (3g″) provide an illustration of yet another type of difference in coherence due to the form of referring expression. This arises when multiple entities are talked about from one utterance to the next. By the time (3f) is processed, the center has shifted from 'Terry' to 'Tony,' so that in (3g) we expect 'Tony' to be the center of attention. This expectation is borne out in (3g), since 'Tony' is indeed mentioned again. However, what makes this sentence very odd and hard to process is that 'Terry' is also mentioned in (3g), but while the centered 'Tony' is referred to with a full noun phrase, the noncentered 'Terry' is referred to with a pronoun. This increased processing is reduced when a full noun phrase is used for 'Terry' instead of the pronoun, as in (3g′) or (3g″), so that we are able to shift the center before processing the rest of the utterance, thus avoiding any backtracking. The type of coherence variation found in these utterances is due to the fact that both the centered entity in (3f) and another entity are mentioned again in (3g) and its variants, but in (3g) it is the noncentered entity from (3f) that is referred to with a pronoun.

CT provides a set of definitions, constraints, and rules to formalize the three-way relationship discussed above, i.e., the relationship between attentional state, the degree of coherence, and linguistic form (for the realization of full propositional content as well as for the realization of discourse entities). The CT definitions, constraints, and rules are given here.

Definitions:

D1. Each utterance U in a discourse segment is assigned a set of *forward-looking centers*, C_f (U), where *centers* are discourse entities realized in the utterance.
D2. Each utterance other than the segment-initial utterance is assigned a single *backward-looking center*, C_b (U).
D3. The *backward-looking center* of utterance U_{n+1} connects with one of the *forward-looking centers of* U_n.
D4. The elements of C_f (U_n) are partially ordered to reflect relative prominence or salience in U_n. In English, the C_f is ordered according to grammatical role.
D5. The more highly ranked an element of C_f (U_n), the more likely it is to be C_b (U_{n+1}).
D6. The most highly ranked element of C_f (U_n) is called the *preferred center*, C_p (U_n).
D7. A transition relation holds between each utterance pair U_n and U_{n+1} in a segment. There are four types of transitions, which describe center continuation, center retention, and two types of center shifting. The transitions are shown in Table 1.

Table 1 Centering transitions

	$C_b(U_{i+1}) = C_b(U_i)$ OR $C_b(U_i) = [?]$	$C_b(U_{i+1}) \neq C_b(U_i)$
$C_b(U_{i+1}) = C_p(U_{i+1})$	CONTINUE	SMOOTH-SHIFT
$C_b(U_{i+1}) \neq C_p(U_{i+1})$	RETAIN	ROUGH-SHIFT

Constraints:

C1. There is precisely one backward-looking center $C_b(U_n)$.

C2. $C_b(U_{n+1})$ is the highest-ranked element of Cf (U_n) that is realized in U_{n+1}.

Constraint C1 says that there is one central discourse entity that the utterance is about. Constraint C2 states that the ranking or ordering of the forward-looking centers in U_n determines which of them realized in U_{n+1} will become the backward-looking center of U_{n+1}.

Rules:

Rule 1. If some element of $C_f(U_n)$ is realized as a pronoun in U_{n+1} then so is $C_b(U_{n+1})$.

Rule 2. With respect to Table 1, sequences of the CONTINUE transition are preferred to sequences of the RETAIN transition, which are preferred to sequences of the SMOOTH-SHIFT transition, which are preferred to sequences of the ROUGH-SHIFT transition.

Rule 1 is often called the 'Pronoun Rule.' It is important to note that the inference load due to Rule 1 is not part of the inference load characterized by the transitions. Rule 1 is thus independent of the transitions. This independence of Rule 1 is an important consideration when one thinks of the relation between CT and anaphora resolution. The inference load due to Rule 1 can be regarded as a binary measure that simply states whether or not Rule 1 has been violated. With this rule, we can now explain the varying degrees of coherence for utterances (3g), (3g′), and (3g″) in discourse (3). The Centering analysis for this discourse is shown in Table 2. After 'Tony' is established as the center (the C_b) in (3e), this center continues in (3f), but with the reintroduction of 'Terry' as a potential center. In (3g), both 'Tony' and 'Terry' are mentioned, but since 'Tony' is higher ranked than 'Terry' in (3f), it is 'Tony' that is retained as the C_b in (3g). However, this utterance creates a Rule 1 violation, because the C_b, 'Tony,' is not realized with a pronoun, whereas 'Terry,' which is not the C_b, is. The only difference between (3g) and (3g′ and 3g″) is that the latter do not violate Rule 1, as the transitions remain the same. The oddness of (3g) is therefore explained by Rule 1.

Table 2 Centering analysis for discourse (3)

(3a)	Terry really goofs sometimes. C_f = {Terry}, C_p = Terry, C_b = ?, Transition = undef.
(3b)	Yesterday was a beautiful day and he was excited about trying out his new sailboat. C_f = {Terry, sailboat}, C_p = Terry, C_b = Terry, Transition = Continue
(3c)	He wanted Tony to join him in a sailing expedition. C_f = {Terry, Tony, expedition}, C_p = Terry, C_b = Terry, Transition = Continue
(3d)	He called him at 6 A.M. C_f = {Terry, Tony}, C_p = Terry, C_b = Terry, Transition = Continue
(3e)	He was sick and furious at being woken up so early. C_f = {Tony}, C_p = Tony, C_b = Tony, Transition = Smooth-shift
(3e′)	Tony was sick and furious at being woken up so early. C_f = {Tony}, C_p = Tony, C_b = Tony, Transition = Smooth-shift
(3f)	He told Terry to get lost and hung up. C_f = {Tony, Terry}, C_p = Tony, C_b = Tony, Transition = Continue
(3g)	Of course, he hadn't intended to upset Tony. C_f = {Terry, Tony}, C_p = Terry, C_b = Tony, Transition = Retain
(3g′)	Of course, Terry hadn't intended to upset Tony. C_f = {Terry, Tony}, C_p = Terry, C_b = Tony, Transition = Retain
(3g″)	Of course, Terry hadn't intended to upset him. C_f = {Terry, Tony}, C_p = Terry, C_b = Tony, Transition = Retain

Rule 2 provides a formal characterization of the perceived differences in coherence for discourse segments in terms of an ordering on transition sequences. The less frequent the shifts in a discourse, the more coherent it is. Discourse (1) above is characterized by CONTINUE transitions throughout the segment (CONTINUE, CONTINUE, CONTINUE; see Table 3) describing a highly coherent discourse, whereas discourse (2) is characterized by switches between RETAIN and CONTINUE (RETAIN, CONTINUE, RETAIN; see Table 4), describing a less coherent discourse.

Centering Theory and Anaphora Resolution

As stated right in the beginning of this article, the main goal of CT is to characterize certain aspects of local coherence. Differences in coherence result from changes in the center of attention, captured by the Centering transitions and transition ordering, and from the different expressions in which centers are realized. In particular, pronouns and definite descriptions engender different inference demands

Table 3 Centering analysis for discouse (1)

(1a)	John went to his favorite music store to buy a piano. C_f = {John, store, piano}, C_p = John, C_b = ?, Transition = undef.
(1b)	He had frequented the store for many years. C_f = {John, store}, C_p = John, C_b = John, Transition = Continue
(1c)	He was excited that he could finally buy a piano. C_f = {John, piano}, C_p = John, C_b = John, Transition = Continue
(1d)	He arrived just as the store was closing for the day. C_f = {John, store}, C_p = John, C_b = John, Transition = Continue

Table 4 Centering analysis for discourse (2)

(2a)	John went to his favorite music store to buy a piano. C_f = {John, store, piano}, C_p = John, C_b = ?, Transition = undef.
(2b)	It was a store John had frequented for many years. C_f = {store, John}, C_p = store, C_b = John, Transition = Retain
(2c)	He was excited that he could finally buy a piano. C_f = {John, piano}, C_p = John, C_b = John, Transition = Continue
(2d)	It was closing just as John arrived. C_f = {store, John}, C_p = store, C_b = John, Transition = Retain

on the hearer. CT, however, is not to be seen as a theory of anaphora resolution. The incorporation of referring expressions in the account of local coherence has led many researchers to use the CT as part of anaphora resolution algorithms. This has led to some interesting research. At the same time, it has led to some confusion in the literature associated with CT.

The first point to appreciate is that there is undoubtedly a very relevant connection between CT and anaphora resolution. As the careful reader will have deduced, the garden-path effect with the interpretation of the pronouns illustrated in discourse (3) is reminiscent of the preference ordering utilized by Sidner for the reference resolution of pronouns. In Sidner's model, the 'center of attention' is equivalent to the 'discourse focus,' and like Sidner, CT utilizes this preference for the 'center of attention' to continue over successive utterances. The relative preference of the 'actor focus' as the next center of attention is also captured with the 'preferred center' in CT. At a first look, it may seem that Sidner's use of the 'center of attention' to determine the referents of pronouns and CT's use of the same to explain how incorrect referents are assigned to pronouns result in a paradox. But a closer look shows that it isn't really so, because like CT, Sidner also allows for garden paths on the referents of pronouns by further invoking inference procedures (albeit unspecified) to check for contradictions. So Sidner's goals and CT's goals are very much alike, in that both assume similar preference for the 'initial' resolution of pronouns, which can be contradicted with further information. The difference between the two is that CT goes further to formalize the nature and difficulty of the contradictory inferences in terms of utterance pair transitions and uses the formal system as a way to compute the degree of coherence of a discourse segment.

Anaphora resolution algorithms that want to obviate the need for inference procedures and want to model the preferential rules for pronoun resolution should use the common part underlying the two described models. Sidner's inference rules for computing contradictions should be left out (or at least relegated to another interacting component), as should the part in CT that deals with the computation of coherence with the transitions and transition orderings. More formally, the common aspect of Sidner's model and CT are captured in CT with (i) the list of *forward-looking centers*, (ii) the *backward-looking center*, (iii) the *preferred center*, and (iv) Rule 1, the 'Pronoun Rule.' These data structures and rules are sufficient to set the initial preference for the referents of pronouns. Furthermore, corpus studies and studies of naturally occurring data of the form of referring expressions have shown that to a large extent speakers adhere to the preference orderings and Rule 1, so that much mileage can be achieved by building these preferences into anaphora resolution algorithms, as Sidner conjectured. However, while some anaphora resolution algorithms have used these very data structures and shown good results, others have used CT in totality, i.e., together with the transitions and transition orderings, to compute the referents of pronouns (for example, the Centering algorithm – called the BFP algorithm – for pronoun resolution in Brennan *et al.*, 1987). In addition to being theoretically misguided, the latter approach also yields contradictory results for the initial preferential resolution of pronouns (Kehler, 1997). An Optimality theory-based version of the BFP algorithm and a comprehensive overview of Centering, together with a historical development of Centering Theory and its applications, can also be found in Beaver (2004).

Unspecified Aspects of Centering

Some parameters and constants in Centering, from the perspectives of both anaphora resolution and local coherence, were left unspecified in the original

models. Two of these in particular have led to a great deal of research.

The first is determination of the preference ordering on the list of forward-looking centers or determination of relative salience of discourse entities in an utterance. This is crucial for the initial interpretation assignments for pronouns. Crosslinguistic investigation of the mechanisms that languages use to realize discourse functions like 'topic' shows that different ranking criteria need to be used for different languages. In English, relative salience is largely predicted by grammatical role, as was correctly assumed in CT. Other languages use other mechanisms. In Japanese, which uses the morphemes *wa* and *ga* to distinguish topics and subjects and special forms of the verb for marking empathy, topic- and empathy-marked entities are ranked higher than subjects. German uses word order in some syntactic contexts to indicate salience, positioning higher-ranked entities before lower-ranked ones. Other languages on which such research has been conducted include Finnish, Greek, Hindi, Italian, Russian, and Turkish.

The second is the specification of what constitutes the *utterance*, which in CT is the linguistic locus of the local attentional state. Discourse centers, both backward looking and forward looking, are computed for each utterance. That is, each utterance serves as a center update unit. In attempts to characterize the linguistic encoding of a center update unit, complications arise from complex sentence structures. Up-to-date research on this issue has suggested that complex sentences may project different center update units, depending on their internal structure.

In early theoretical work on characterizing the center update unit in Centering, it was suggested that complex sentences be broken into clauses each of which forms an autonomous center update unit, with the possible exception of relative clauses and complement clauses. Treating adverbial clauses as autonomous center update units predicts that a pronoun in a fronted adverbial clause, as in (4c), is anaphorically dependent on an entity already introduced in the immediately prior discourse and not on the subject of the main clause it is attached to.

(4a) (Jim) Kern$_i$ began reading a lot about the history and philosophy of Communism
(4b) but never 0$_i$ felt there was anything he as an individual could do about
(4c) When he$_i$ attended the Christina Anti-Communist Crusade school here about six months ago
(4d) Jim$_i$ (Kern) became convinced that he as an individual could do something constructive in the ideological battle
(4e) and 0$_i$ set out to do it

This view on backward anaphora was also professed in earlier work by Kuno, who asserted that there was no *genuine* backward anaphora: the referent of an apparent cataphoric pronoun must have appeared in the previous discourse. Empirical data later showed that this view of backward anaphora could not be maintained. Corpus studies have shown that cataphoric pronouns can appear discourse-initially.

Experimental work focusing on complex sentences of the type that includes adverbial clauses has suggested that adverbial clauses are processed as a single unit with the matrix clause. Specifically, native speakers of English tend to interpret the ambiguous subject pronoun in (5) as *the groom*, i.e., the subject of the preceding clause, even when the adverbial in the second main clause is semantically varied (*however*, *as a result*, *moreover*, *then*, etc.). This pattern contrasts with the interpretation of the subject pronoun (6), for which no consistent tendency is identified, indicating that in this case the interpretation of the pronoun is most likely determined by the semantics of the predicates of the main and adverbial clause and the relation between them.

(5) The groom hit the best man. *However*, he ...

(6) The groom hit the best man *although* he ...

Other experimental work on the interpretation of a subject pronoun following a complex sentence indicates that referents in subject position in adverbial clauses are not favored for the interpretation of a subsequent pronoun. In (7) and (8), for example, the subject pronoun is interpreted as *the conductor*, i.e., the referent of the matrix clause, even when the adverbial clause is postposed with respect to the main clause.

(7) After the tenor opened his music score the conductor sneezed three times. He ...

(8) The conductor sneezed three times after the tenor opened his music score. He ...

Data such as (5) and (6) would be a challenge for a Centering-based anaphora resolution algorithm, which processes one clause at a time, because there is no way of distinguishing between them. At the same time, these data are consistent with Centering and Centering's Pronoun Rule, under the assumption that adverbial clauses are not processed as independent update units. Under this assumption, Centering would predict the pattern observed in (5), (7), and (8). Centering's Pronoun Rule would not make a prediction for (6) with respect to the entities introduced in the main clause, because they belong to the same unit as the pronoun. Additional evidence for treating the

entire sentence as a single update unit comes from corpus work exploring various parameters that can be set for Centering and the number of Centering rules that they would violate. This type of work suggests that treating the whole complex sentence as a center update unit leads to fewer violations of the Pronoun Rule.

Studies of Centering in relative clauses present conflicting results, which need further research to be reconciled. On the one hand are discourses, like (9), that suggest that entities mentioned in relative clauses (9b) are less salient than in the main clause (9a), as indicated by the use of the subsequent use of noun phrase in (9c). In fact, a pronoun used instead of the full noun phrase would probably be interpreted as Mr. Taylor, i.e., the entity in the main clause.

(9a) Mr. Taylor$_i$, 45 years old, succeeds Robert D. Kilpatrick$_j$, 64,
(9b) who$_j$ is retiring, as reported earlier.
(9c) Mr. Kilpatrick$_j$ will remain a director.
(9d) He$_i$ . . . #He$_j$ . . .

On the other hand are discourses, like (10), that show the opposite pattern from that in (9). Such data have come from work that looked at different types of relative clauses, specifically nonrestrictive and restrictive with a definite or an indefinite head. Complementary patterns in the use of pronouns and definite descriptions shows that nonrestrictive clauses and restrictive clauses with an indefinite head pattern alike and form an autonomous (but embedded and accessible) center update unit. In (10), the subject pronoun in (10c) refers, without any garden-path effects, to the subject referent of the preceding relative clause and not to the subject referent of the main clause, indicating that in this case the relative clause probably introduces a new update unit that is accessible to (10c) for center establishment.

(10a) This Moses$_i$ was irresistible to a man like Simkin$_j$
(10b) who$_j$ loved to pity and to poke fun at the same time.
(10c) He$_j$ was a reality-instructor.

Applications of Centering Theory as a Model of Local Coherence

Some research has illustrated the appropriate and correct application of Centering Theory. The four Centering transitions shown in Table 1 define four degrees of coherence within a discourse segment. A textual segment characterized by a sequence of CONTINUE transitions demonstrates the highest degree of coherence and is perceived as a segment focusing on a single entity. Topic retains and smooth shifts to new topics are captured in the RETAIN and SMOOTH-SHIFT transitions. Indeed, numerous corpus studies have identified CONTINUE, RETAIN, and SMOOTH-SHIFT transitions. As expected, ROUGH-SHIFT transitions are rarely identified in corpora of written text, which presumably maintain a high level of coherence. An exception to this pattern has been observed in texts whose coherence is under evaluation and therefore cannot be assumed. A typical kind of this type of text is student essays. Indeed, in a study of essays written by students, it was shown that excessive number of ROUGH-SHIFT transitions per paragraph in students' essays correlated with low essay scores provided by writing experts.

A closer analysis of the essays revealed that the incoherence detected by a ROUGH-SHIFT measure was not due to violations of Centering's Pronoun Rule or other infelicitous uses of pronominal forms. The distribution of nominal and pronominal forms over ROUGH-SHIFT transitions revealed that in fact pronominal forms were avoided in ROUGH-SHIFT transitions. This observation indicates that the incoherence found in the student essays was not due to the processing load imposed on the reader to resolve anaphoric references. Instead, the incoherence in the essays was due to discontinuities caused by the introduction of a rapid succession of new, undeveloped topics with no links to the prior discourse. In other words, ROUGH-SHIFTS picked up textual incoherence due to topicx discontinuities.

Studies such as the one just described are supportive of the formulation of Centering as a model of local discourse coherence. They also show that the Centering model can be used successfully for practical applications, e.g., to improve automated systems of writing evaluation in testing and education. In fact, it has been shown that adding a Centering-based metric of coherence to an existing electronic essay scoring system (the system *e-rater* and developed at the Educational Testing Service) improved the performance of the system by better approximating human expert scores. In addition, a Centering-based system of writing evaluation has exceptional pedagogical value. This is because the model offers the capability of directing students' attention to specific locations within an essay where topic discontinuities occur. It can illuminate broken topic and focus chains within the text of an essay by drawing the student's attention to the noun phrases playing the roles of C_b's and C_p's. Supplementary instructional comments could guide the student into revising the relevant section by paying attention to topic discontinuities.

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Anaphora, Cataphora, Exophora, Logophoricity

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Defining Anaphora, Cataphora, and Exophora

The term 'anaphora/anaphor/anaphoric' has three distinct senses in contemporary linguistics. In the first place, it can be used for reference to a relation between two linguistic elements, in which the interpretation of one (called an anaphor) is in some way determined by the interpretation of the other (called an antecedent) (Huang, 2000a; Huang, 2004). Linguistic elements that can be employed to encode an anaphoric relation in this general sense range from gaps (or empty categories) through reflexives to various reference-tracking systems like gender/class, switch function and switch reference. Second, the term can be used in Chomsky's generative syntax to refer to an NP with the features [+anaphor, −pronominal], as against a pronominal, an NP with the features [−anaphor, +pronominal]. Thus the reflexive in (1) is treated as an anaphor, and the (other-referring) pronoun in (2) as a pronominal in the Chomskyan sense.

(1) Russell$_1$ admired himself$_1$.
(2) Russell$_1$ admired him$_2$.

Third, the term can be used to refer to an anaphor whose antecedent comes earlier, as in (3), as opposed to 'cataphora/cataphor/cataphoric,' where the antecedent comes later (4).

(3) After John$_1$ got promoted, his$_1$ salary went up.
(4) After he$_1$ got promoted, John's$_1$ salary went up.

Both anaphora and cataphora in this sense can be subsumed under the term 'endophora/endophor/endophoric,' referring to the relation in which the anaphor/cataphor and its antecedent are within what is said or written. In contrast, by the term 'exophora/exophor/exophoric' is meant that the 'antecedent' of an anaphor, or more accurately a deictic expression, lies outside what is said or written. This is illustrated in (5).

(5) (Referents in the physical context, and with selecting gestures) He$_1$'s not the managing director. He$_2$ is.

NP-Anaphora

In terms of syntactic category, anaphora can be divided into two main categories: NP-including $\overline{\text{N}}$-anaphora, and VP-anaphora. In an NP-anaphoric relation, both the anaphor and its antecedent are NPs, and both are potentially referring expressions, as in (6). NP-anaphora can be expressed by gaps, pronouns, reflexives, names, and descriptions. By contrast, in an $\overline{\text{N}}$-anaphoric relation, both the anaphor and its antecedent are an $\overline{\text{N}}$ rather than an NP, and neither is a potentially referring expression, as in (7). Linguistic elements that can be used as an $\overline{\text{N}}$-anaphor include gaps, pronouns and nouns.

(6) Alain Robert$_1$ said that he$_1$ enjoyed scaling the world's skyscrapers with no safety net.
(7) John's brother is an anti-war campaigner, and Bill's Ø is an anti-globalization activist.

Anaphora can be intrasentential, in which case the anaphor and its antecedent occur within a single simplex or complex sentence. It can also be discoursal, in which case the anaphor and its antecedent cross sentence boundaries (see Huang, 2000a, 2000b for discussion of discourse anaphora). Regarding intrasentential NP-anaphora, three main theoretical approaches can be identified: syntactic, semantic, and pragmatic.

The Syntactic Approach

The central idea underlying a syntactic analysis is that anaphora is largely a syntactic phenomenon, and as such references must be made to conditions and constraints that are essentially syntactic in nature. This approach is best represented by Chomsky's (1981, 1995) binding theory within the principles-and-parameters theory and its minimalist descendant.

Chomsky distinguishes two types of abstract feature for NPs: anaphors and pronominals. An anaphor is a feature representation of an NP which must be referentially dependent and which must be bound within an appropriately defined minimal syntactic domain; a pronominal is a feature representation of an NP which may be referentially dependent but which must be free within such a domain. Interpreting anaphors and pronominals as two independent binary features, Chomsky hypothesizes that one ideally expects to find four types of NP in a language – both overt and nonovert.

(8) Chomsky's typology of NPs

	Overt	Empty
a. [+anaphor, −pronominal]	reflexive/ reciprocal	NP-trace
b. [−anaphor, +pronominal]	pronoun	*pro*

c. [+anaphor, +pronominal]	–	PRO
d. [−anaphor, −pronominal]	name	*wh*-trace

Of the four types of overt NP listed above, anaphors, pronominals, and r[eferential]-expressions are subject to binding conditions A, B, and C respectively.

(9) Chomsky's binding conditions
A. An anaphor is bound in a local domain.
B. A pronominal is free in a local domain.
C. An r-expression is free.

Binding is defined on anaphoric expressions in configurational terms, appealing to purely structural concepts like c-command, government, and locality. The binding theory accounts for the syntactic distribution of anaphoric expressions in (10). It is also applicable to three of the four empty categories listed in (8): NP-trace, *pro*, and *wh*-trace, but that work will not be reviewed here (cf. Huang, 1992, 1995).

(10) a. Russell$_1$ admired himself$_1$.
b. Russell$_1$ admired him$_2$.
c. Russell$_1$ admired Russell$_2$.

There are, however, serious problems at the very heart of Chomsky's binding theory. Cross-linguistically, the distribution of reflexives violates binding condition A in both directions: on the one hand, a reflexive can be bound outside its local domain (the so-called long-distance reflexive or anaphor), as in Chinese, Russian and Telugu (see 11); on the other, it may not be bound within its local domain, as in Dutch and Norwegian (see 12).

(11) (Chinese) (Modern Chinese)
Xiaoming gaosu Xiaohua Xiaolan bu xihuan ziji.
Xiaoming tell Xiaohua Xiaolan not like self
'Xiaoming$_1$ tells Xiaohua$_2$ that Xiaolan$_3$ does not like self$_{1/*2/3}$.'

(12) (Norwegian) (Hellan, 1988)
*Jon foraktet seg.
Jon despises self
'Jon despises himself.'

Binding condition B is also frustrated, for in many of the world's languages (such as Catalan [Catalan-Valencian-Balear], Gumbaynggir [Kumbainggar] and Haitian Creole [Haitian Creole French]), a pronominal can be happily bound in its local domain. Next, given Chomsky's formulation of binding conditions A and B, it is predicted that anaphors and pronominals will be in strict complementary distribution, because the two binding conditions are precise mirror images of each other. But this predicted complementarity cannot be maintained. Even in a 'syntactic' language such as English, it is not difficult to find syntactic environments where the complementarity breaks down (see 13).

(13) a. Blair$_1$ saw a picture of himself$_1$/him$_1$ in the *Times*.
b. Mary$_1$ saw a snake near herself$_1$/her$_1$.
c. [Pavarotti and Domingo]$_1$ adore each other's$_1$/their$_1$ performances.
d. Pavarotti$_1$ said that tenors like himself$_1$/him$_1$ would not sing operas like that.

Finally, even a cursory inspection of languages such as English, Korean, and Vietnamese indicates that binding condition C cannot be taken as a primitive of grammar, either (see Huang, 1996, 2000a, 2004 for further discussion).

The Semantic Approach

In contrast to the 'geometric,' syntactic approach, the semantic approach views anaphora as essentially a semantic phenomenon. Accordingly, binding is defined in argument structure terms. Reinhart and Reuland's (1993) theory of reflexivity, for example, belongs to this camp.

(14) Reinhart and Reuland's binding conditions:
A. A reflexive-marked syntactic predicate is reflexive.
B. A reflexive semantic predicate is reflexive-marked.

(15) Reinhart and Reuland's typology of overt NPs

	SELF	SE	pronoun
Reflexivizing function	+	−	−
Referential independence	−	−	+

SELF = a morphologically complex reflexive, e.g., *himself*, *zichzelf*
SE = a morphologically simplex reflexive, e.g., *ziji*, *zich*, *seg*.

In Reinhart and Reuland's view, reflexivity is not a property of NPs but of predicates. The binding theory is designed not to capture the mirror image distribution of anaphors and pronominals, but to regulate the domain of reflexivity for a predicate. More specifically, what the theory predicts is that if a predicate is lexically reflexive, it may not be reflexive-marked by a morphologically complex SELF anaphor in the overt syntax. On the other hand, if a predicate is not lexically reflexive (that is, if it contains a semantic predicate), it may become reflexive only via the marking of one of its coarguments by such an anaphor. This explains why (12) is ungrammatical. Since the predicate in (12) is not lexically reflexive, it

must be reflexive-marked in order to comply with Reinhart and Reuland's binding condition B. But the SE-anaphor *seg* is not a reflexivizer, and consequently cannot reflexive-mark the predicate, hence the ungrammaticality of (12).

Reinhart and Reuland's theory, however, is not without problems of its own. First, cross-linguistic evidence has been presented that marking of reflexivity is not limited to the two ways identified by Reinhart and Reuland. In addition to being marked lexically and syntactically, reflexivity can also be indicated morphologically. Secondly, more worrisome is that the central empirical prediction of the reflexivity analysis, namely, only a reflexive predicate can and must be reflexive-marked, is falsified in both directions. On the one hand, a predicate that is both syntactically and semantically reflexive can be nonreflexive-marked in the sense of Reinhart and Reuland, as in (16); on the other, a nonreflexive predicate can be reflexive-marked, as in (17) (see Huang, 2000a, 2004 for further discussion).

(16) (Icelandic)
Jon elskar sig.
Jon loves self
'Jon loves himself.'

(17) (Chinese) (Mandarin Chinese)
Xiaoming shuo taziji hen xihuan yinyue.
Xiaoming say 3SGself very like music
'Xiaoming says that he likes music very much.'

Note also that neither Chomsky's binding theory nor Reinhart and Reuland's reflexivity theory is designed to say anything about the anaphoric relations in examples like (3), (4), and (6).

The Pragmatic Approach

As an alternative to the syntactic and semantic approaches, there is the pragmatic approach. The most influential of the pragmatic analyses is the neo-Gricean pragmatic theory of anaphora developed by Levinson (1987, 1991, 2000)and Huang (1991, 1994, 2000a, 2000b, 2004). Central to this theory is the assumption that anaphora is essentially pragmatic in nature, though the extent to which anaphora is pragmatic varies typologically. Consequently, anaphora can largely be determined by the systematic interaction of some general neo-Gricean pragmatic principles such as Levinson's (2000) Q-, I-, and M-principles (18), depending on the language user's knowledge of the range of options available in the grammar, and of the systematic use or avoidance of particular anaphoric expressions or structures on particular occasions.

(18) Levinson's Q-, I- and M-principles (simplified)
a. The Q-principle
Speaker: Do not say less than is required (bearing I in mind).
Recipient: What is not said is not the case.
b. The I-principle
Speaker: Do not say more than is required (bearing Q in mind).
Recipient: What is generally said is stereotypically and specifically exemplified.
c. The M-principle
Speaker: Do not use a marked expression without reason.
Recipient: What is said in a marked way is not unmarked.

Applying the Q-, I-, and M-principles to the domain of anaphoric reference, we can derive a general neo-Gricean pragmatic apparatus for the interpretation of various anaphoric expressions in (19).

(19) Huang's (2000a, 2004) revised neo-Gricean pragmatic apparatus (simplified)
i. The use of an anaphoric expression x I-implicates a local coreferential interpretation, unless (ii) or (iii).
ii. There is an anaphoric Q-scale $<x, y>$, in which case the use of y Q-implicates the complement of the I-implicature associated with the use of x in terms of reference.
iii. There is an anaphoric M-scale $\{x, y\}$, in which case the use of y M-implicates the complement of the I-implicature associated with the use of x, in terms of either reference or expectedness.

Needless to say, any interpretation generated by (19) is subject to the general consistency constraints applicable to Gricean conversational implicatures. These constraints include world knowledge, contextual information, and semantic entailments.

Substantial cross-linguistic evidence has been presented to show that empirically the revised neo-Gricean pragmatic theory of anaphora is more adequate than both a syntactic and a semantic approach. Regarding (10), on this account, Chomsky's binding conditions B and C can be reduced to pragmatics. In somewhat simplified terms, this can be achieved in the following way. If binding condition A is taken to be either grammatically constructed (as in English-type, syntactic languages) or pragmatically specified (as in Chinese [Mandarin Chinese]-type, pragmatic languages), then binding condition B is the direct result of the application of the Q-principle. Given this principle, the use of a semantically weaker pronoun where a semantically stronger

reflexive could occur gives rise to a conversational implicature which conveys the negation of the more informative, coreferential interpretation associated with the use of the reflexive, as in (10b). By the same reasoning, binding condition C can also be eliminated. Wherever a reflexive could occur, the use of a semantically weaker proper name Q-implicates the non-applicability of the more informative, coreferential interpretation associated with the use of the reflexive. This is exactly what has happened in (10c). Moreover, the revised neo-Gricean pragmatic theory can provide an elegant account of many of the anaphoric patterns that have always embarrassed a generative analysis, such as the cases where a pronoun is bound in its local domain. It can also accommodate examples like (3), (4), and (6), which lie outside the scope of either Chomsky's binding theory or Reinhart and Reuland's reflexivity theory. Next, from a conceptual point of view, the revised neo-Gricean pragmatic theory of anaphora has important implications for current thinking about universals, innateness, and learnability.

VP-Anaphora

A Typology of VP-Anaphora

There are five types of VP-anaphora. First, VP-ellipsis, in which the VP of the second and subsequent clauses is somewhat elided, as in (20). Second, gapping, in which some element (typically a repeated, finite verb) of the second and subsequent conjuncts of a coordinate construction is dropped, as in (21). Third, sluicing, which involves the deletion of an IP within an embedded CP, resulting in an elliptical construction where an IP contains an embedded interrogative CP consisting only of a *wh*-phrase, as in (22). Fourth, stripping – an elliptical construction in which the ellipsis clause usually contains only one constituent, as in (23). And finally, there is null complement anaphora – an elliptical construction in which a VP or IP complement of a verb is omitted, as in (24).

(20) John adores his girlfriend, and Peter does, too.
(21) Reading maketh a full man; conference a ready man; and writing an exact man. (Bacon)
(22) Nigel wrote something about the internet, but I don't know what.
(23) Pavarotti will sing *Nessun Dorma* again, but not at Covent Garden.
(24) Lucy wanted to sit on a tree overhanging the river, but her mother didn't approve.

VP-Ellipsis: Properties, Issues, and Analyses

Of the five types of VP-anaphora listed above, VP-ellipsis has attracted the most attention.

Properties VP-ellipsis has a number of distinct properties, notably: it can occur either in a coordinate or subordinate clause; it engenders a sloppy reading; it exhibits the locality effect on the sloppy reading; the sloppy reading is subject to the c-command condition; VP-ellipsis may operate across sentence boundaries; it may take a pragmatic antecedent; and it may have a split antecedent.

Issues Two issues are of particular interest in the analysis of VP-ellipsis. The first and more traditional one is concerned with the availability and distribution of the strict and sloppy interpretations. This can be illustrated by a consideration of (20) above. In (20), the second, elided conjunct is ambiguous. It can be understood either in the manner of (25a) – the so-called strict reading, or in the manner of (25b) – the so-called sloppy reading.

(25) a. John adores John's girlfriend, and Peter adores John's girlfriend.
b. John adores John's girlfriend, and Peter adores Peter's girlfriend.

Second, there are what Fiengo and May (1994) called the eliminative puzzles – the question of why VP-ellipsis reduces the number of possible interpretations of sentences relative to their nonelided counterparts. Of particular concern here are three types of eliminative puzzle: the many-pronouns puzzle, as in (26), the many-clauses puzzle, as in (27), and the Dahl puzzle, as in (28).

(26) John said that he adored his girlfriend, and Peter did, too.
(27) John adores his girlfriend, Peter does, too, but David doesn't.
(28) John thinks that he is intelligent, Peter does, too, but his girlfriend doesn't.

Analyses Two general approaches can be identified, syntactic and semantic. Central to the syntactic analyses is the claim that VP-ellipsis can best be resolved at some level of syntactic structure. On this view, the interpretation of VP-ellipsis involves the reconstruction of the target clause on the basis of the syntactic structure of the source clause. Semantic representations which are derived syntactically are then assigned to the elided VP in a manner parallel to the antecedent VP. Currently this approach is best represented by Fiengo and May (1994). By way of contrast to the syntactic, reconstructionist approach, the semantic approach takes the view that VP-ellipsis can best be resolved at a purely semantic level of representation. Under this approach, the interpretation of VP-ellipsis bears on the identification of a property

of the antecedent VP and the assignment of this property to the elided VP. Dalrymple, Shieber and Pereira (1991), for instance, belong to this camp.

Also noteworthy is a second distinction in the study of VP-ellipsis that is independent of the syntactic/semantic approach distinction we have just seen. Dalrymple, Shieber and Pereira (1991) noted that a distinction can be made between those analyses which trace the strict/sloppy dichotomy to an ambiguity in the representation of the source clause and those which attribute it to the process of recovering a property or relation for the target clause. Let us call the first type the source ambiguity analysis, and the second type the process ambiguity analysis. Next, regarding the source ambiguity account, within the syntactic camp, the ambiguity of interpretation can be derived in a partially interpretative way either by deleting the phrase structure of the target clause under the condition of identical semantic interpretation, or by copying the syntactic structure of the source clause to the target clause but requiring identical semantic representation for the two VPs. Within the semantic camp, the multiplicity of interpretation can be obtained in a purely interpretative manner by assuming an unambiguous syntactic analysis of the source clause (see Huang, 2000a for further discussion).

In addition to the syntactic and semantic approaches mentioned above, Kehler (2002) has recently put forward an analysis which is based on the notion of discourse coherence. According to this analysis, VP-ellipsis can partially be accounted for in terms of various neo-Humean coherence relations such as resemblance, cause–effect, and contiguity.

Logophoricity

Defining Logophoricity

Logophoricity can be regarded as a special case of NP-anaphora. The term 'logophoricity' is used for reference to the phenomenon whereby the point of view of an internal protagonist of a sentence or discourse, as opposed to that of the current, external speaker, is being reported using some morphological and/or syntactic means (e.g., Huang, 2000a, 2002). The term 'point of view' is employed here in a technical sense and is intended to encompass words, thoughts, knowledge, emotion, and perception. The concept of logophoricity was introduced in the study of African languages such as Aghem, Ewe and Tuburi (Tupuri) (see Hagège, 1974; Clements, 1975), where there is a separate paradigm of logophoric pronouns which is used for such a purpose. By way of illustration, consider (29) and (30) from Donno Sɔ, taken from Culy (1994).

(29) Oumar Anta inyemɛñ waa be gi.
Oumar Anta LOG-ACC seen AUX said
'Oumar$_1$ said that Anta$_2$ had seen him$_1$.'

(30) Oumar Anta woñ waa be gi.
Oumar Anta 3SG-ACC seen AUX said
'Oumar$_1$ said that Anta$_2$ had seen him$_3$.'

In (29) the use of the logophoric pronoun encodes a coreferential reading between it and the matrix subject, thus reporting Oumar's speech from his perspective. By contrast, in (30) the employment of the regular pronoun indicates a disjoint reference, hence reporting Oumar's speech from the point of view of the current, external speaker.

Cross-Linguistic Marking of Logophoricity

Cross-linguistically, logophoricity may be morphologically and/or syntactically expressed by one or more of the following mechanisms: (i) logophoric pronouns, as in (29) above; (ii) logophoric addressee pronouns, as in (31); (iii) logophoric verbal affixes, as in (32); and (iv) long-distance reflexives, as in (11) above.

(31) Logophoric addressee pronouns (Mapun, Frajzyngier, 1985)
n- sat n-wur taji gwar dim n Kaano.
I say BEN-3SG not ADDR go PREP Kano
'I told him$_1$ that he$_1$ may not go to Kano.'

(32) Logophoric verbal affixes (Gokana; Hyman and Comrie, 1981)
à nyíma kɔ aè dɔ-ɛ.
he know that he fell-LOG
'He$_1$ knows that he$_1$ fell.'

Logophoric marking devices (i)–(iii) are found largely in African languages, and logophoric marking mechanism (iv) is located in a wide range of languages throughout the world. Furthermore, these devices can be ranked according to the following hierarchy (Huang, 2000a, 2002).

(33) Hierarchy of grammatical mechanisms for logophoric marking
a. Logophoric pronouns/addressee pronouns/verbal affixes [+logophoric, +coreference]
b. Long-distance reflexives [±logophoric, +coreference]

What (33) basically says is this: for logophoric marking, a logophoric pronoun, addressee pronoun, or verbal affix will be used if there is one; otherwise, a long-distance reflexive will be used. A second point to be borne in mind is that logophoricity and coreference are two distinct, though closely related, notions; logophoricity entails coreference, but not vice versa.

A Typology of Languages with Respect to Logophoricity

Following suggestions made by von Roncador (1992) and Culy (1994), languages can be grouped into three types with respect to logophoricity: full or pure logophoric languages – languages which have special morphological and/or syntactic forms that are employed only in logophoric domains (e.g., Babungo [Vengo], Pero, and Ekepeye [Ekpeye]); nonlogophoric languages – languages which have no such morphological and/or syntactic forms (e.g., Arabic, English, and Mambar); and semi- or mixed logophoric languages – languages which either allow logophors to be used for nonlogophoric purposes (e.g., Igbo, Idoma, and Yoruba) or allow the extended use of reflexives in logophoric contexts (e.g., Bangla [Bengali], Icelandic, and Japanese). It is particularly interesting, as Culy (1994) observed, that while logophoric languages are found in many places throughout the world, full or pure logophoric languages seem to be found only in Africa. Furthermore, while full or pure logophoric languages are not in a contiguous area, logophoric languages as a whole are in a contiguous area. This geographic distribution of logophoric languages is fascinating as well as surprising, and for the time being, remains unexplained.

Some Implicational Universals with Respect to Logophoricity

In Huang (2000a, 2002), a number of implicational universals with respect to logophoricity are proposed. The first of these is concerned with the person distinction of logophoric pronouns.

(34) Person hierarchy for logophoric pronouns
3 > 2 > 1
First-person logophoric pronouns imply second-person logophoric pronouns, and second-person logophoric pronouns imply third-person logophoric pronouns.

Given (34), it is predicted that in all languages with logophoric pronouns, logophoric pronouns can be third-person; in some, they can also be identified as second-person; in a few, they can be distinguished as first-person as well (see also Hyman and Comrie, 1981; Wiesemann, 1986). This pattern of person distinction holds also for logophoric long-distance reflexives. As pointed out in Huang (2000a, 2002), there is a functional/pragmatic explanation for (34): for referential disambiguity, the third-person distinction is the most, and the first-person distinction the least, useful, with the second-person distinction lying in between, for third-person is closer to nonperson than either first- or second-person. It follows therefore that the fact that first-person logophoric pronouns are rare in languages is hardly surprising, given that logophoric pronouns are one of the (most common) devices that the current, external speaker (which is encoded usually in terms of a first-person pronoun) utilizes in reflecting the perspective of anyone else (usually an internal protagonist) but him- or herself.

Second, there is the implicational universal for the number distinction of logophoric pronouns.

(35) Number hierarchy for logophoric pronouns
Singulars > plurals
Plural logophoric pronouns imply singular logophoric pronouns.

The implicational universal in (35) summarizes the general pattern of number specification for logophoric pronouns. While all languages with logophoric pronouns allow singular logophoric pronouns, only some permit plural logophoric pronouns as well (see also Hyman and Comrie, 1981; Wiesemann, 1986). This pattern of number specification holds also for logophoric long-distance reflexives.

Next, mention should be made of logocentric triggers, namely those NPs that can act as an antecedent for a logophoric pronoun or logophoric long-distance reflexive. First, logocentric triggers are generally constrained to be a core argument of the logocentric predicate of the matrix clause. Secondly, they are typically subjects. However, logocentric triggers can also be some other, nonsubject argument, provided that this argument represents the 'source' of the proposition or the 'experience' of the mental state that is being reported. Two types of construction are particularly common in African logophoric languages. The first involves the predicate 'hear from.' The second involves 'psychological' predicates expressing emotional states and attitudes, of which the 'experiencer' serves as direct object or object of preposition. (36) is the implicational universal for logocentric triggers.

(36) Hierarchy for logocentric triggers
Surface structure: subject > object > others
Semantic role: agent > experiencer/benefactive > others

The higher an NP is on the hierarchy, the more likely it will function as an antecedent for a logophoric pronoun or a logophoric long-distance reflexive (see also Hyman and Comrie, 1981). Given that the subject of the matrix clause is typically the NP that is the highest on the hierarchy (and, incidentally, the most animate), it is hardly surprising that it is the typical antecedent for a logophoric pronoun or a logophoric long-distance reflexive.

Taken together, the above three hierarchies predict that the most basic, unmarked pattern of logophoric

marking is one which encodes logophoricity by the use of a third-person, singular, logophoric pronoun which refers to a human subject.

Finally, it should be pointed out that logophoric pronouns or logophoric long-distance reflexives usually occur in a logophoric domain, that is, a stretch of discourse in which the internal protagonist's perspective is being represented. The logophoric domain is commonly created by a logocentric licenser, which consists mainly of a logocentric predicate. Logocentric predicates can be distinguished largely on a semantic basis. The most common types of logocentric predicates are predicates of speech and thought. But other types of predicates, such as those of mental state, knowledge, and direct perception, can also trigger a logophoric domain. While languages differ in allowing precisely which type of predicate to function as a logocentric licenser, cross-linguistically there exists an implicational universal for logophoric predicates (see also Stirling, 1993; Culy, 1994; Huang, 1994, 2000a).

(37) An implicational universal for logocentric predicates
Speech predicates > epistemic predicates > psychological predicates > knowledge predicates > perceptive predicates

What (37) basically states is this: if a language allows (some) predicates of one class to establish a logophoric domain, then it will also allow (some) predicates of every class higher on the hierarchy to do the same. Thus, if a language has logophoric marking with predicates of, say, psychological state, then it will necessarily have it with predicates of thought and communication.

See also: Anaphora and Coreference Resolution, Statistical; Anaphora: Philosophical Aspects; Anaphora Resolution: Centering Theory Approach; Deixis and Anaphora: Pragmatic Approaches; Discourse Anaphora; Ellipsis; Logophoric Pronouns.

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Anaphora: Philosophical Aspects

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Anaphora is the phenomenon whereby an expression, which is called a **proform** (e.g., 'he' [pro**noun**], 'so' [pro**adjective**]), is interpreted in light of another expression in its immediate linguistic context, which is called the proform's **antecedent**. In this article, I will confine my attention to anaphoric pronouns, since they are the instances of anaphora that are of most interest to philosophers and linguists. A simple example of an anaphoric pronoun is the following (where 'Rebecca' is the antecedent of 'she'):

(1) Rebecca left and she was angry.

Simple instances of anaphora such as (1), in which an anaphoric pronoun has a referring expression as its antecedent, are not of much interest to philosophers and linguists. The reason is that such cases seem easy to understand. The anaphoric pronoun simply refers to whatever its antecedent does.

Another sort of case in which the behavior of an anaphoric pronoun is well understood, and hence not of much current interest to philosophers and linguists, is a case of the following sort (on the reading on which 'she' has 'Every professor' as its antecedent):

(2) Every professor believes she is smart.

In such cases, it is widely held that the pronoun is functioning as a variable bound by its quantifier antecedent. Thus, (2) could be represented more perspicuously as:

(2a) [Every professor: x][x believes x is smart]

where the third occurrence of 'x' corresponds to the pronoun. Since the pronoun behaves like a variable in predicate logic, and since the behavior of such variables is well understood, most philosophers and linguists do not worry about such cases.

The interest of linguists and philosophers in anaphora derives from the fact that there are instances of anaphora in which the anaphoric expression cannot be understood as an expression referring to whatever its antecedent does (as in [1]) nor as a variable bound by its quantifier antecedent (as in [2]). Let's call such cases instances of **puzzling anaphora**. The question then arises as to how puzzling anaphora should be understood semantically. As will be seen, there are a number of competing proposals. We shall discuss two kinds of puzzling anaphora here. The first instance of puzzling anaphora is a case in which a pronoun has a quantifier antecedent in another sentence. Anaphora of this sort is often called **discourse anaphora**. Here are two examples:

(3) Few students passed the exam. They studied hard.

(4) A woman is following Glenn. She is from the IRS.

For the moment, let's concentrate on (3). There are at least two reasons for thinking that the pronoun in (3) is not a variable bound by its quantifier antecedent. Both reasons are discussed by Evans (1977). The first is that such a treatment clearly yields the wrong truth conditions for examples like (3). If 'they' is a bound variable in (3), the two sentences of (3) together should be equivalent to:

(3a) Few students: x (x passed the exam and x studied hard)

But this is obviously incorrect, since (3) entails that few students passed the exam, but (3a) does not (it would be true if many students passed, but few both passed and studied hard).

Second, it is generally thought that the scope of a quantifier cannot extend beyond the sentence in which it occurs. If that is correct, then the pronoun in (3) falls outside of the scope of its quantifier antecedent and so cannot be bound by it.

Further, the pronoun in (3) cannot be understood as referring to whatever its antecedent does, since its antecedent is a quantifier and not a referring term at all. Since the pronoun cannot be understood as a bound variable nor as an expression that refers to whatever its antecedent does, the question arises as to how we should understand it semantically.

A second kind of puzzling anaphora is called **donkey anaphora** and it comes in two varieties. The first I will call **conditional donkey anaphora**:

(5) If Sarah owns a donkey, she beats it.

(where 'it' is anaphoric on 'a donkey'). The second I will call **relative clause donkey anaphora**:

(6) Every woman who owns a donkey beats it.

(where 'it' is anaphoric on 'a donkey'). On the readings we are concerned with, neither (5) nor (6) is talking about any particular donkey, and so the pronoun 'it' cannot be a term referring to a particular donkey. Further, in the case of (5), all independent evidence available suggests that a quantifier cannot take wide scope over a conditional and bind variables in its consequent (*'If John owns every donkey$_i$, he beats it$_i$'). This suggests that the (apparent) quantifier 'a donkey' in (5) cannot bind the pronoun in the consequent. In addition, even if 'a donkey' could magically do this in

(5), assuming it is an existential quantifier, we still would not get the intuitive truth conditions of (5), which require that Sarah beat every donkey she owns. Similarly, the independent evidence available suggests that quantifiers cannot scope out of relative clauses (*'A man who owns every donkey$_i$ beats it$_i$'), and so again the pronoun in (6) is not within the scope of its quantifier antecedent and so is not bound by it. Thus, the pronouns in both conditional and relative clause donkey anaphora cannot be understood as referring expressions nor as bound variables.

So we have two kinds of puzzling anaphora, discourse anaphora and donkey anaphora. In neither case can the anaphoric pronouns be understood as bound variables or as expressions referring to whatever their antecedents refer to. The question is: how should we understand such cases of anaphora semantically? A number of theories have been developed to answer this question. Sketches of four prominent theories of puzzling anaphora are given here. Because the theories are technical and sophisticated, only the barest sketch can be given of them. Readers interested in more detail should consult papers cited in the bibliography.

The first theory of puzzling anaphora we will consider is **Discourse Representation Theory** or **DRT**. Though this name for the view comes from Kamp (1981), Heim (1982) independently developed a very similar view. Here I will be neutral between the somewhat different Heim and Kamp formulations. DRT claims that the indefinites in discourse anaphora like (4) ('A woman') and donkey anaphora like (5) and (6) ('a donkey') are not quantifiers. Instead they are really predicates that introduce free variables. The anaphoric pronouns are variables in such cases too. The apparent existential force of the indefinite in (4) results from default existential quantification over free variables. In (5), the semantics of the pronoun interacts with the semantics of the conditional to yield the result that the sentence is true iff Sarah beats every donkey she owns. In (6), the quantifier 'Every woman' 'unselectively binds' both the woman variables in logical form and the variables introduced by 'a donkey' and 'it'. So in (6), the anaphoric pronoun is bound after all, but not by its antecedent ('a donkey').

Descriptive Approaches to anaphora have been formulated by Evans (1977), Parsons (1978), Davies (1981), Neale (1990), and Heim (1990). On approaches of this sort, anaphoric pronouns in puzzling anaphora in some sense are interpreted as definite descriptions. Thus, the pronoun in (4) is interpreted as 'the woman following Glenn'. Similar remarks apply to the pronouns in (5) and (6). Here different accounts are given as to why and how (5) an (6) are true iff Sarah/Every woman beats every donkey she owns. For example, Neale (1990) claims that in such cases, the pronouns are interpreted as 'numberless descriptions,' which are essentially universal quantifiers. This yields the truth conditions mentioned. For a different approach, see Heim (1990).

The Context-Dependent Quantifier Approach (CDQ) is formulated and defended by King (1987, 1991, 1994, 2005) and Wilson (1984). On this approach, pronouns in instances of puzzling anaphora are themselves quantifiers. The forces (universal or existential), restrictions (what the quantifiers range over – e.g., 'every student' ranges over students) and relative scopes are determined by features of their linguistic contexts. Thus, according to CDQ, the anaphoric pronouns in puzzling anaphora are contextually sensitive devices of quantification. The precise natures of the quantifiers they express are determined by features of their linguistic contexts. In (4), CDQ holds that the pronoun expresses the existential quantifier normally expressed outside of any context by the indefinite 'a woman following Glenn'. Similar remarks apply to (5) and (6), except that the semantics of the conditional interacts with the pronoun *qua* quantifier to get the proper reading of (5) (see King, 2005); and in (6), the pronoun *qua* quantifier takes narrow scope with respect to the universal quantifier 'Every woman' (because its antecedent does as well).

Finally, there are **Dynamic Logic Accounts (DL)** of puzzling anaphora, originally formulated by Groenendijk and Stokhof, (1991), with different versions put forward by Chierchia (1995) and Kanazawa (1994a and 1994b). The key claim of such accounts is that quantifiers can semantically bind pronouns even if those pronouns do not occur in their syntactic scopes. So, despite appearances, the pronouns in (4), (5), and (6) are semantically bound by their quantifier antecedents. DL also makes novel claims about the semantics of conditionals and universal quantification to get the truth conditions of (5) and (6) to come out right.

At this stage of inquiry, it is fair to say that there is no consensus on which of the above-mentioned theories is correct. Each of the theories faces some difficulties and it is difficult to determine which theory is most successful. It is to be hoped that future research will shed more light on the proper theory of puzzling anaphora.

See also: Anaphora Resolution: Centering Theory Approach; Deixis and Anaphora: Pragmatic Approaches.

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Anatomical Asymmetries Versus Variability of Language Areas of the Brain

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Introduction

Significant individual variability in the volume, weight, and morphology of the human brain has been recognized since the first detailed studies were performed as early as a century ago. Attempts to relate such variability in the size of the brain to functional properties have generally been predicated on the phrenological principle that a larger brain is a better brain. Despite improvements in the methods used for quantifying brain volume, evidence in support of this hypothesis remains weak. In addition to variability in overall brain volume, there is also variability in the degree of asymmetry between the two hemispheres of the brain. Mild asymmetry of paired structures is a common feature of all aspects of human anatomy, including the well-documented differences between the left and right hemispheres of the brain. Asymmetries favoring regions of the dominant (left) hemisphere known to be important for speech and language functions have been interpreted to reflect some as yet to be defined morphological marker of cerebral language dominance. The presence of similar asymmetries in nonhuman primates, however, has led some to question the relevance of such anatomical asymmetries for language functions. Anatomical differences between the left and right hemispheres of the brain have also been identified for regions not involved with speech and language functions. Such differences are present at multiple levels, including differences in overall volume and weight between the two hemispheres, and more regional asymmetries including specific subdivisions of the four major lobes of the brain, as well as in subcortical regions.

Individual Variability

Overall Brain Volume

Most earlier studies of the individual variability in the size, weight, and morphology of the human brain were based on autopsy materials. Such data were limited by several factors, including an autopsy bias towards older and less healthy individuals. With the advent of magnetic resonance imaging (MRI), recent studies of individual variability of the anatomy of the human brain have avoided these limitations. On the basis of volumetric MRI measures, the average total brain volume (excluding cerebrospinal fluid and the meningeal coverings) has been in the range 1250 to 1290 cm^3 for well-nourished males of predominantly European ancestry. For women, average brain volumes are approximately 130 cm^3 less. These MRI-based whole-brain volume estimates are generally smaller than previous measurements based on post-mortem materials. Overall brain volume is closely related to body weight or body mass index. Although

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Anatomical Asymmetries Versus Variability of Language Areas of the Brain

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brain sizes at the extremes of the normal distribution (macro- and microcephaly) may be associated with cognitive abnormalities, the evidence that variations **within** the average range are correlated with intelligence or other cognitive functions remains difficult to interpret. Modest positive correlations between full-scale IQ and total gray matter volume have been reported in some studies (Bernard *et al.*, 1993), suggesting that greater volume of brain tissue may be associated with higher level of intellectual functioning. It is not clear, however, how to reconcile such findings with reports that individuals with profound developmental disorders, such as autism, have larger brains than appropriate control subjects (Piven *et al.*, 1996). Other investigations have focused more on regional microscopic anatomy in brains of gifted individuals in attempts to account for possible relationships between brain structure and mental skills (Bentivoglio, 1998; Witelson *et al.*, 1999).

The volumes of individual lobes and other subdivisions of the brain are generally highly correlated with overall brain size. One notable exception to this rule is the occipital lobe. This may be because the occipital lobe is one of the regions of the brain that shows the greatest individual variability in both men and women. When adjusting for overall brain volume, there is a negative correlation between the frontal lobe and parietal lobe volume, which has been interpreted by some to suggest that the evolutionary expansion of the frontal lobes in humans may have come at the expense of a reduction in parietal lobe volume.

The volume of the lateral ventricles is highly variable, and in general is not associated with overall brain size. Attempts to correlate variability in the size of various brain regions with specific cognitive profiles, such as reading disability, have met with only variable degrees of success (Pennington *et al.*, 1999).

Gyral Patterns and Regional Variability

The most striking individual differences in the gross morphology of the human brain are in the patterns of gyri and sulci. Although the subject of multiple investigations, the behavioral significance of this variability remains unknown (Whitaker and Selnes, 1976). There is some, although not complete, correspondence between the gyral pattern and the boundaries of cytoarchitectonic fields. While the greatest degree of individual differences is observed for the minor sulci and gyri, there is also considerable interindividual variability in the configuration of the Rolandic and Sylvian fissures. The gyral patterns of the cingulate region are likewise subject to a wide range of configurations (Paus *et al.*, 1996; Ide *et al.*, 1999).

The variability in configuration and size of specific brain regions involved in language was pointed out by early anatomists such as Constatin von Economo (1876–1931). For example, the planum temporale, which is located adjacent to the primary auditory cortex on the posterior portion of the supratemporal plane, shows particularly striking variability across individuals. The potential functional significance of such variability can best be evaluated in the context of the overall variability of the brain. There is considerable evidence that brain regions not related to language, such as the striate cortex, show a similar, if not greater, degree of variability.

White Matter Tracts

Considerable individual variability has been reported in the size of the corpus callosum, apparently related, at least in part, to variability in overall brain volume. There is no consensus regarding the relationship between callosal size and handedness. On the assumption that a larger volume of the corpus callosum may relate to improved interhemispheric integration, some studies have attempted to correlate overall callosum size with overall intellectual performance. A modest correlation between performance on some neuropsychological tests and callosal size has been found for women, but not for men (Davatzikos and Resnick, 1998). Interpretation of these findings is somewhat unclear because other investigators have reported a larger volume of the corpus callosum in dyslexic adults than in age-matched controls (Robichon and Habib, 1998). The results of studies attempting to correlate corpus callosum volume to measures of cerebral laterality, such as dichotic listening, have yielded somewhat conflicting results. There is some evidence, however, suggesting that a greater degree of asymmetry of perisylvian language regions is associated with a smaller volume of the corpus callosum. This may imply that as the degree of asymmetry between the two hemispheres has evolved, the degree of interhemispheric connectivity has gradually reduced. The development of the myelin of the corpus callosum is not complete until after age 10 years, which appears to coincide with the so-called critical period for language development. After this period, acquisition of phonological skills with a degree of competence comparable to that of a native speaker is no longer possible. Developmental studies have shown that the volume of the corpus callosum continues to increase until the middle of the second decade of life (Pujol *et al.*, 1993). The high prevalence of bilateral language representation in individuals who are born without a corpus callosum has suggested to

some that it may play a role in the development of unilateral language representation (Selnes, 1974).

Brain Asymmetries

The possibility of identifying regional brain structural correlates of language dominance was first introduced by the studies of Geschwind and Levitsky (Geschwind and Levitsky, 1968). They reported that in a sample of 100 autopsy brains, the planum temporale, located behind Heschl's gyrus on the supratemporal plane of the temporal lobe, was approximately one-third larger in the left hemisphere. This discovery stimulated considerable interest in defining the degree and pattern of language-related interhemispheric asymmetries, and subsequent autopsy and volumetric MRI studies have confirmed that the planum temporale is larger in the left hemisphere of the brain in 65% to 95% of cases.

Anatomical asymmetries involving the lateral aspect of the frontal cortex, including the anterior speech regions, have also been reported. Volumetric MRI of the third inferior frontal gyrus (Broca's area), have shown that this region is larger in the left hemisphere for most individuals. Broca's area is made up of two distinct subregions, the pars triangularis and the pars opercularis. Whereas the pars triangularis shows a consistent leftward asymmetry regardless of handedness, the directionality of the asymmetry of the pars opercularis appears to be predicted by handedness. It is larger on the left in right-handers, but larger on the right in left-handers (Foundas *et al.*, 1998). Asymmetries at the microscopic level have also been demonstrated for both the posterior and anterior language areas (Amunts *et al.*, 1999).

The functional significance of the structural asymmetry of the brain regions involved in language remains unclear. Most early studies hypothesized that the larger left planum temporale was a 'marker' of the left hemisphere specialization for language functions. The close proximity of the planum temporale to brain regions involved in comprehension of language (Wernicke's area) supported this argument. There is no direct evidence, however, that the planum temporale plays a specific role in language comprehension (Binder *et al.*, 1996). Lesions restricted to this area do not appear to result in any linguistic deficits. There is also a mismatch between the approximate 65% prevalence of leftward anatomical asymmetry and the 95% prevalence of left hemisphere language dominance.

More recent studies have demonstrated that cortical asymmetries may be present even in the absence of any known asymmetry or lateralization at the functional level. Moreover, it has become increasingly clear that regional hemispheric asymmetries can best be interpreted in the context of overall hemisphere asymmetries. The overall volume of the right hemisphere is greater than that of the left, suggesting that, for most individuals, there is more brain tissue in the right than left hemisphere.

The right hemisphere on average extends further anteriorly, while the left hemisphere extends further posteriorly. Asymmetries involving the volume of white matter in the two hemispheres have also been described. For the frontal and temporal lobes, the volume of white matter is greater in the left hemisphere than the right (Pujol *et al.*, 2002).

Subcortical Asymmetries

The roles of subcortical structures in speech and language functions have long been somewhat controversial. Current data suggest that subcortical lesions may influence the function of cortical regions through mechanisms of hypoperfusion (Hillis *et al.*, 2004). Anatomical asymmetries at the subcortical level have been reported for the caudate nucleus, which shows a consistent right-greater-than-left volume. The volume of the insular cortex, which has been implicated in language functions, also shows an asymmetry in favor of the right being larger than the left (Watkins *et al.*, 2001).

Although the hippocampus is not traditionally thought of as being part of the human language system, verbal memory is nonetheless an integral part of language. The vast majority of studies that have reported on asymmetries in the volume of the hippocampus have concluded that the right is larger than the left. This is perhaps somewhat surprising since we traditionally think of verbal memories as being more highly developed than visual memory systems.

White Matter Tract Asymmetries

Recent imaging techniques such as diffusion tensor imaging (DTI) allow more detailed quantification of specific white tracts of the brain. One recent study found an asymmetry of the arcuate fasciculus favoring the left hemisphere (Buchel *et al.*, 2004). The arcuate fasciculus has long been thought to be involved in language functions, specifically in the ability to repeat auditory information. A lesion of the arcuate fasciculus was once believed to be the principal mechanism underlying the syndrome of conduction aphasia. However, more recent studies have questioned the role of the arcuate fasciculus in repetition (Selnes *et al.*, 2002), and the significance of a more prominent left-hemisphere arcuate fasciculus is therefore unclear.

Asymmetry in Nonhumans

Although it was originally believed that the asymmetries of the temporal lobe regions involved in language were unique to man and not present in the great apes, more recent studies suggest that this may not be the case. Interpretation of these newer findings has been the subject of considerable debate, however. In the case of humans, the distribution of the asymmetry of the planum temporale involves approximately 65% with greater left than right, symmetry in 24%, and a larger volume on the right in 11%. In one series of great apes, 17 out of 18 were found to have a larger left than right planum temporale (Gannon *et al.*, 1998). This has led some to suggest that the volume and degree of this particular region of the brain may not be directly related to the human capacity for language.

Conclusions

Considerable individual variability has been documented for both the macro- and microscopic anatomy of the brain. Asymmetries between the two hemispheres, with some favoring the left hemisphere, are also well documented. The functional significance of asymmetries involving language areas remains unknown. In many cases, regional variability is greater than that of interhemispheric asymmetries. While larger volumes of brain tissue have often been equated with greater functional propensities, the evidence for this remains controversial. Asymmetries at the gross morphological level can reflect differences in underlying neuronal or glial density, white matter tracts, or other components, and it is not known how each of these factors may contribute to the brain's overall cognitive capacity.

See also: Diffusion and Perfusion Imaging; Electrical Stimulation of Cortex and Language; fMRI Studies of Language.

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Anatomical Nomenclature: History

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A History of Anatomical Nomenclature

The origins of anatomy, the systematic study and description of the structure of the body, lie submerged in remote antiquity. Like other branches of ancient learning, anatomy had both a practical side, serving the needs of physicians, surgeons, augurs, and embalmers, and a purely speculative one of seeking knowledge for its own sake.

Anatomy underlies much of the study and practice of medicine, surgery, dentistry, and nursing. Gross anatomy deals with the form, location, and relations of body parts, external and internal, that are visible to the naked eye. Collateral disciplines include histology, which is the microscopic study of cells and tissues, and embryology, which traces the development of the body from a fertilized oocyte. In addition to its role in the health sciences, anatomy supplies critical data for the design of clothing, furniture, passenger vehicles, tools, and living and working spaces and supports the graphic and plastic arts.

If science consists in the collection and classification of data, the formulation of hypotheses, the performance of experiments to test those hypotheses, and the establishment of general principles or laws, then anatomy barely makes the grade as a science. Its purely descriptive character has strongly influenced the development of its technical language. In such a field of inquiry, a precise and orderly system of nomenclature is of critical importance.

Just as the history of a culture becomes imbedded and memorialized in its language, the history of an art, craft, or scientific discipline lives in its technical nomenclature or jargon. In addition to creating new terms as needed, anatomists at each succeeding stage in the development of the science have retained and adapted terms inherited from their predecessors.

This article surveys the evolution of anatomical nomenclature against the background of the history of human anatomy in Western science, beginning with unsystematic lay terminology and ending with modern international codifications. With this focus, the emphasis must be on terms derived from Greek and Latin, but the parallel development of anatomical nomenclature in English will also be noted.

Classical Period (800 B.C.–200 A.D.)

Greek

The earliest anatomical lore was crude, inaccurate, disorganized, and limited by its goals and uses, whether butchering animals, treating the wounded, or embalming the dead. When Homer (9th century B.C.) composed his epics, there was no scientific discipline of anatomy and hence no anatomical nomenclature as distinct from the general vocabulary. If we begin our study at so early a date, it is because even in the *Iliad* and the *Odyssey* we find terms that survive to this day in the standard language of Western anatomy and medicine, at least as stems for adjectives or as combining forms incorporated into compound words.

In homeric words such as *brakhiōn* 'arm', *derma* 'skin', *haima* 'blood', *ophthalmos* 'eye', *osteon* 'bone', *pneumōn* 'lung', and *sōma* 'body' the reader will recognize components of modern biomedical language. The precision of a nomenclatural system seldom exceeds that of the fund of knowledge that it supports and illuminates. The freedom with which Homer uses some anatomical words has its close parallel in modern colloquial English. Thus, *gastēr* can mean 'stomach' as the organ of digestion, 'abdomen' in general, or even 'uterus, womb'. Like his contemporaries, Homer made no distinction between arteries and veins, using the word *phleps* for both.

As early as Homer, the collarbone had acquired the figurative name *kleis* 'key'. In modern medical terminology, the Greek word survives only as a combining form (*cleidocostal, cleidotomy*). Meanwhile, a Latin version, *clavicula* 'little key' (English *clavicle*), has replaced the Greek noun. The history of this word

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foreshadows the evolution of many other anatomical terms in current use, by its origin in a Greek metaphor, its eventual replacement with a translation into Latin, and the use of a diminutive suffix to form the Latin term.

Honored as the Father of Medicine because he was the first Western medical authority to distinguish clearly between medicine and religion, Hippocrates (460–370 B.C.) asserted that diseases have physical causes, stressed the importance of observation in diagnosis, and relied strongly on diet, exercise, and the healing powers of nature.

The writings that make up the voluminous hippocratic corpus cannot all be the work of one man. Differing in language, style, and viewpoint, they represent an ancient medical library, whose preservation through 25 centuries is little short of miraculous. If most of the hippocratic writings, even including the celebrated *Oath*, were probably not composed by the Hippocrates of history, most of them at least represent the teachings and traditions of his school.

Hippocrates was a physician, not an anatomist. In *On the sacred disease*, he reports having dissected the brains of goats, but it is virtually certain that he did not practice human dissection. His knowledge of anatomy is uneven, sometimes garbled by the humoral physiology that he borrowed and adapted from Empedocles.

According to that system, everything in the physical universe can be reduced to four elements: earth, air, fire, and water. The properties of material substances depend on their relative proportion of heat and cold, dryness and wetness. Translated to the realm of physiology, this cosmologic system yielded a rigidly foursquare scheme according to which health depends on a due balance among four humors: blood, phlegm, yellow bile, and black bile (the last a pure invention).

Hippocrates sometimes distinguished veins (*phlebes*) from arteries (*artēriai*) but believed, like most of his contemporaries, that arteries contained or transported air rather than blood. The very word *artēria* (in the Ionic dialect used by Hippocrates and later medical writers, *artēriē*) means 'air passage', and in some of the hippocratic writings it refers specifically to the trachea or bronchi. In fact, our word *trachea* derives from the Greek phrase, later than Hippocrates, *artēria trakheia* 'rough air passage' (rough because, unlike true blood vessels, it is reinforced by incomplete rings of cartilage).

In Hippocrates, *neuron* can mean either 'tendon' or 'nerve', and what we know as the urethra he calls indifferently either *ourētēr* or *ourēthrē*. The use of *mus* 'mouse' to refer to a muscle, although unknown to Homer, had become standard by Hippocrates's time. This is another Greek anatomical noun based on a figure of speech that was eventually replaced in anatomical terminology by a Latin translation (*musculus*) incorporating a diminutive suffix.

In his surgical and orthopedic works, Hippocrates, like some other early medical writers, displays an exact knowledge of the human skeleton. The bones being the least perishable parts of the body, a full set of them might be acquired and thoroughly studied at leisure with no need to dissect a corpse. Hippocrates refers to the larger extremity of a bone as its *head* (*kephalē*), a usage that continues to this day. But he neither inherited a complete anatomical nomenclature from his forebears nor attempted to invent one. Thus, he has no specific terms by which to distinguish the bones of the forearm (radius and ulna) or those of the leg (tibia and fibula).

Many hippocratic terms illustrate the freedom with which classical Greek formed compound words by joining two or more stems. Thus, *akrōmia* (modern *acromion*), referring to the topmost part of the shoulder, is a fusion of *akros* 'highest' and *ōmos* 'shoulder'. In *haimorrhoides phlebes* 'hemorrhoidal veins' (from *haima* 'blood' and *rheō* 'to flow'), we have an anatomical term based on a disease or abnormal condition to which the parts named are subject.

Dozens of other hippocratic words survive, including *epidermis, epiphusis* 'epiphysis, bony process', *kanthos* 'canthus, corner of the eye', *karpos* 'carpus, wrist', *kondulos* 'condyle, bony knob', *kubiton* 'cubitum, elbow', *kustis* 'cyst, bladder', *masētēr* 'masseter, muscle of mastication', *meninges*, *peritonaion* 'peritoneum, lining membrane of the abdominal cavity', and *zugōma* 'zygoma, cheekbone'. Some have undergone marked changes of sense. Hippocrates's *brogkhos* is what we call the *trachea*, whose branches we call *bronchi*. His *stomachos* is our *esophagus*, which conducts swallowed materials into what we call the *stomach*.

During the generations that followed Hippocrates, the gradual development of anatomy as a systematic science demanded a specialized lexicon including words for numerous body structures not known to the generality of mankind.

Aristotle (384–322 B.C.), perhaps the most fertile and versatile intellect of antiquity, was certainly the most exact observer and perspicuous biological writer whose works have come down to us from before our era. Taking all nature as his province, he dissected numerous animals and founded the sciences of embryology and comparative anatomy. He was the first to refer to scientific dissection as *anatomē* 'cutting up'. His writings also contain the earliest use of the term *aorta* (*aortē*). Not Aristotle's coinages, but

unknown to Hippocrates, are *epiglōttis*, still the name for the membranous flap that closes the respiratory tract during swallowing, from *epi* 'on' + *glōtta* 'tongue', and *ōlekranon* (more properly *ōlenokranon*) 'olecranon, point of the elbow', from *ōlenē* 'elbow' + *kranon* 'hard place'.

We have only indirect records of the work of the Alexandrian physician Herophilus of Chalcedon (ca. 300 B.C.), the earliest known practitioner of human dissection, to whom we are indebted for such terms as *prostate* [Greek *adenoeideis prostatai* 'glandlike structures standing before (the outlet of the bladder)'] and *duodenum* [Latin '12-fold', based on Herophilus's *enteron dōdekadaktulon* '12-inch (part of the) bowel'].

Latin

The Romans of the late Republic and early Empire borrowed their science and philosophy wholesale from the Greeks. Most of the physicians in imperial Rome were Greek immigrants, slaves, or freedmen.

The Grecian provenance of Roman medical lore accounts for the presence in medical Latin of many Greek anatomical terms, some of them simply transliterated (*colon, thorax, meninges*), others equipped with Latin inflectional endings (*bronchus, cranium, stomachus*), and still others translated by obvious Latin cognates: *pulmo* 'lung', *tendo* 'tendon', and *trochlea* 'pulley', akin respectively to Greek *pleumōn, tenōn*, and *trokhilia*.

The Latin *vena cava* is a verbatim rendering of Hippocrates's *koilē phleps* 'hollow vein'. Terms for various parts of the intestine are also Latin versions of Greek terms, *jejunum, caecum*, and *rectum*, translating respectively the hippocratic *nēstis* 'starved, fasting' and the aristotelian *tuphlon* 'blind', and *euthu* 'straight'.

When the Latin poets of the Augustan age (Virgil, Horace, and Ovid) used terms such as *bilis* 'bile', *jecur* 'liver', *pituita* 'phlegm', and *stomachus* 'stomach', they were usually referring, more or less in earnest, to the doctrine according to which emotions such as anger, courage, and sexual passion depend on the relative preponderance of the humors.

Although the names applied by these writers and their contemporaries to other parts of the body were not components of a formal or specialized nomenclature but only of the vernacular, many of them later became essential elements of anatomical terminology and survive today in that setting: *cerebrum* 'brain', *dens* 'tooth', *femur* 'thigh', *gingiva* 'gum', *inguen* 'groin', *labium* 'lip', *lingua* 'tongue', *lumbus* 'loin', *medulla* 'marrow', *naris* 'nostril', *pectus* 'chest', *talus* 'heel, ankle', *unguis* 'nail', *vesica* 'bladder'.

The most valuable record of Roman anatomical language in the first century of our era is the work of Aulus Cornelius Celsus, who wrote during the reign of Tiberius (14–37 A.D.). Not a medical practitioner himself, Celsus composed encyclopedic treatises on various topics, but only his *De Medicina* has survived in a single incomplete manuscript. Even that was lost for centuries until Pope Nicholas V discovered it in the Vatican library in approximately 1450.

Celsus' vocabulary includes familiar anatomical Latin words such as *abdomen, anus, humerus, occiput, patella, radius, scrotum, tibia, uterus*, and *vertebra*. For structures without Latin names, he used Greek: *diaphragma*, *karōtidēs* (*carotid*), *kremastēr* (*cremaster*), *parōtis* (*parotid*), and *pyloros* (*pylorus*).

Greco-Roman

Even with the spread of Roman sociopolitical dominance, Greek words and word elements continued to make up a significant part of Western scientific terminology, as they still do today. The Greek-speaking physician Rufus of Ephesus, who practiced in Rome during the reign of Trajan (98–117 A.D.), compiled the first book of anatomical nomenclature, *On the naming of the parts of the body*. Only fragments of that work have come down to us. The suffix *-oeidēs* (English *-oid*) 'having the form of, resembling', was already productive at the time of Hippocrates. Among anatomical adjectives noted by Rufus are *arakhnoeidēs* 'like a spider web' (*arachnoid*), *hualoeidēs* 'glassy' (*hyaloid*), *keratoeidēs* 'horny' (later, Latin *cornea*), *khoroeidēs* 'like a placenta' (*choroid*), and *lambdoeidēs* 'like the letter lambda (Λ)' (*lambdoid*).

Some of Rufus' material is preserved in a later and more general dictionary–thesaurus, the *Onomasticon* of Julius Pollux (134–192 A.D.), which itself survives only in incomplete abridgments dating from the 9th century. Anatomical terms recorded by Pollux from his era include such modern survivors as *amnion* 'little lamb'; *atlas* 'god who supports pillars of universe', hence 'first cervical vertebra, which supports the skull'; *kleitoris* (*clitoris*); *tragos* 'goat; tragus, the hairy tab in front of the opening of the ear'; and *trochantēr* 'running apparatus', referring to either of two processes near the upper end of the thigh bone, to which muscles are attached.

In the brilliant work and voluminous writings of the Greco-Roman physician Galen (Claudius Galenus, 129–199 A.D.), classical medicine reached both a pinnacle and a dead end. A native of Pergamum in Asia Minor, Galen studied medicine with Greek teachers

but spent much of his professional life in Rome, where he lived during the reigns of Hadrian, the Antonines, Commodus, and Severus.

The interval between Hippocrates and Galen was more than 500 years, half again as long as that which separates us from William Harvey (1578–1657), the discoverer of the circulation of the blood. Although he revered Hippocrates as a supreme authority, Galen did much original and painstaking research. He showed that arteries as well as veins carry blood. His anatomy, particularly his description of the brain, muscles, and nerves, is detailed and accurate, although he sometimes arrived at wrong conclusions by dissecting apes rather than human subjects.

Galen's comprehensive, articulate, and practical medical writings held sway in the Western world for approximately 1500 years. Anatomical terms used by Galen that survive in modern use include *allantois, anastomosis, aponeurosis, azygos, epididymis, iris, pancreas, psoas*, and *symphysis*.

Middle Period (200–1700 A.D.)

The social upheaval, moral collapse, and political fragmentation of the Roman empire that followed the earliest centuries of the Christian era led inevitably to a decline in science and scholarship. During the period we call the Dark Ages, the rich heritage of Greek culture and science gradually faded, to be replaced by an artificial and distorted facsimile. A rigid dogmatism stifled the spirit of inquiry and creative research by exalting the ancient authorities Aristotle, Hippocrates, and Galen, who were often known only through inaccurate Latin translations, abridgments, and commentaries.

While spoken Latin slowly evolved and differentiated into the Romance languages and dialects, the classical tongue survived as the universal medium of scholarship, jurisprudence, and Christian doctrine and worship. But even though anatomical and medical works were written in Latin, they contained many latinized forms of Greek words retained from antiquity.

Despite the general climate of intellectual torpor, a few original workers contributed to the gradual accretion of anatomical knowledge and also to an increasingly voluminous and unsystematic lexicon. Many of their terms survive and illustrate linguistic patterns that still largely determine the structure of anatomical nomenclature.

A purely descriptive term might be based on the shape of an anatomical feature (*ligamentum teres* 'round ligament', *musculus rectus* 'straight muscle'), its size (*foramen magnum* 'large aperture', *musculus longissimus cervicis* 'longest muscle of the neck'), its position (*arteria subclavia* 'artery beneath the clavicle', *vena circumflexa femoris lateralis* 'vein winding around the outer side of the thigh'), its shape or course (*musculus biceps* 'two-headed muscle', *nervus vagus* 'wandering nerve'), or its function (*adductor hallucis* 'adductor of the thumb', *levator scapulae* 'elevator of the shoulder blade').

Latin descriptive adjectives containing the suffix *-formis* 'in the form of, resembling' followed the model of Greek terms in *-oeidēs*, sometimes latinized as *-oideus*. Surviving English derivatives of these terms include *cuneiform* 'like a wedge', *falciform* 'like a sickle', and *pampiniform* 'like a tendril'.

A few frank metaphors have already been noted among early Greek anatomical terms. Further examples are *amygdala* 'almond' for 'tonsil', *gastroknemiē* 'gastrocnemius, belly (i.e., calf) of the leg' (a hippocratic word), *khitōn* 'tunic' for 'layer of a structure', *kokkuks* 'cuckoo' for 'tailbone, coccyx', and *lēnos* 'winepress', denoting the confluence of venous sinuses at the rear of the cranial cavity.

In anatomical Latin, metaphor proved to be a far more fertile process. A structure might be named after another body part (*crus* 'leg', *genu* 'knee', *os* 'mouth'), often with a diminutive suffix (*auricula* 'little ear', *capitellum* 'little head', *ventriculus* 'little belly'); an animal (*cochlea* 'snail', *hippocampus* 'seahorse', *vermis* 'worm') or animal part (*ala* 'wing', *cornu* 'horn', *cauda* 'tail'); a plant or plant part (*arbor* 'tree', *glans* 'acorn' and *glandula* 'little acorn', *ramus* 'branch'); a topographic feature (*crista* 'ridge', *fovea* 'pit', *fossa* 'ditch'); a man-made structure (*atrium* 'forecourt', *pons* 'bridge', *tectum* 'roof'); a household article (*acetabulum* 'vinegar bowl', *infundibulum* 'funnel', *pulvinar* 'pillow'); or a tool or other familiar object (*fibula*, 'brooch', *malleus* 'hammer' and *malleolus* 'little hammer', *vomer* 'plowshare').

Medieval anatomists borrowed from contemporary Latin some words that had been unknown in classical times, such as *cerumen* 'earwax', *stapes* 'stirrup', and *soleus* 'pertaining to the sole of the foot' (from *solea* 'sandal', from *solum* 'the ground').

In some patterns of word formation, we can see the results of early efforts at systematization. Aristotle applied the term *mesenterion* to the membrane that anchors the intestine to the body wall and through which it receives its blood supply, a structure known to this day by the English word *mesentery*. Mondino of Luzzi (1275–1326) called it by the latinized form *mesenterium*. That term has spawned a numerous progeny, all based on the analogic sense of *meso-* as 'supporting or anchoring membrane'. Words in this family formed with Greek stems include *mesometrium* (from *mētra* 'uterus') and *mesorchium* (*orkhis*

'testicle'), and, without suffix, *mesocolon* and *mesosalpinx* (*salpigks* 'uterine tube'); from Latin, *mesopulmonum* (*pulmo* 'lung') and *mesotendineum* (*tendo* 'tendon'), and, without suffix, *mesoappendix* and *mesoduodenum*; from English, *mesocord* and *mesosigmoid*.

Several instances of the Greek practice of joining the stems of two nouns to form a third have already been noted. Unlike Greek, Latin preferred to name composite ideas with phrases. As advancing knowledge permitted finer discrimination among similar entities, anatomical nomenclature evolved almost inevitably into a taxonomy or classification. Many structures thus came to be designated by phrases on the pattern of genus + species: *cornu majus* 'larger horn', *cornu minus* 'smaller horn'; *ventriculus dexter* 'right ventricle', *ventriculus sinister* 'left ventricle'.

Pursuing another natural line of development, anatomical language employed a hierarchical system of naming to reflect the repeated branching of structures, such as blood vessels and nerves. The following partial tabulation of the branches of the external carotid artery, containing English terms in use during the 19th century, illustrates some of the features of such a scheme (Table 1).

Table 1 Branches of the external carotid artery

External carotid artery	
Superior thyroid artery	
	Hyoid branch
	Superficial descending branch
	Superior laryngeal branch
	Cricothyroid branch
Lingual artery	
	Hyoid branch
	Dorsal branch
	Sublingual branch
	Ranine branch
Facial artery	
Cervical division	
	Inferior branch
	Tonsillar branch
	Submaxillary branch
	Submeatal branch
	Muscular branches
Facial division	
	Muscular branches
	Inferior labial branch
	Inferior coronary branch
	Superior coronary branch
	Lateral nasal branch
	Angular branch
Occipital artery	
	Muscular branches
	Sternomastoid branch
	Mastoid branch
	Auricular branch
	Meningeal branch
Posterior auricular artery	
	Stylomastoid branch
	Auricular branch
	Mastoid branch
Ascending pharyngeal artery	Prevertebral branches
	Tympanic branch
	Meningeal branch
Superficial temporal artery	
	Transverse facial branch
	Middle temporal branch
	Anterior auricular branch. . . etc.

Note that whereas *lingual artery* and *posterior auricular artery* are unique designations, each of the descriptive adjectives in italics is used more than once to name branches. Although this recycling of a basic vocabulary of qualifying words contributes in a way to the overall economy of the system, it also requires the use of cumbersome phrases to distinguish, for example, the *hyoid branch of the superior thyroid artery* from the *hyoid branch of the lingual artery*, and the *muscular branch of the cervical portion of the facial artery to the stylohyoid muscle* from the *muscular branch of the facial portion of the facial artery to the stylohyoid muscle*.

Additional evidence of increasing systematization appears in the emergence of Latin compound adjectives in which the linkage of two terms (often with coupling *o*) signifies a physical relationship. Thus, *ligamentum calcaneonaviculare*, 'ligament joining the calcaneal and navicular bones', *musculus coracobrachialis* 'muscle between the coracoid process of the scapula and the bone of the arm', and *valva ileocaecalis* 'valve between the ileum and the cecum'.

In the absence of any central or unifying authority, the language of anatomy grew increasingly cluttered with synonyms referring to the same body parts and with terms that meant one thing to one writer and something else to another. One source of confusion was the parallel use of Greek and Latin words for the same structures. Modern anatomical language still reflects some of this duplication. Thus, we have *dermal* and *cutaneous*, 'pertaining to the skin'; *ethmoid* and *cribriform*, 'sievelike'; *peroneal* and *fibular*, 'pertaining to the fibula'; *scaphoid* and *navicular*, 'boatlike'; *sphenoid* and *cuneiform*, 'wedge-shaped'; *xiphoid* and *ensiform*, 'swordlike'.

The spelling of some terms became permanently distorted through confusion between similar, often cognate, words in the two languages. Many instances of such confusion arose from mishandling of the Greek letter upsilon (*Y*, which in this article is consistently transliterated by Roman *u*). Pronounced in classical times like modern French *u* and German *ü*, but never like the Latin *u*, *Y* was borrowed by speakers of Latin to spell Greek loan-words in which it occurred.

Under the influence of Greek *dakruma* 'tear', the cognate Latin word *lacrima* was re-spelled *lacryma* and even *lachryma*. *Lympha* 'pure water' is a fusion of Greek *numphē* 'water sprite', hence 'water', with Latin *limpida* 'clear, limpid'. Latin *piriformis* 'pear-shaped' (from *pirum* 'pear') was re-spelled *pyriformis* through confusion with Greek *pur* 'fire', and the mistake survives in English *pyriform*. Greek *stulos* 'pillar, post' caused Latin *stilus* 'pointed stake, writing implement' to be rewritten *stylus*, thus eventually determining the spelling of English *style* 'manner of writing'. In each case, the phonetic and orthographic blending was favored by a similarity of meaning (for example, pears and flames are roughly similar in shape).

Although medieval Arabian physicians did little original research – human dissection being forbidden by Islam – they performed an invaluable service to Western medicine by preserving and disseminating Greek medical works in Arabic versions. As these writings were further translated into Latin, words of Arabic origin, such as *alcohol, alkali, antimony, camphor, elixir, sugar*, and *syrup*, became a permanent part of the Western scientific vocabulary.

The anatomical term for the nape of the neck, *nucha*, comes from Arabic *nuḫḫ* 'marrow', and the saphenous veins are so called from their Arabic name, *sāfin*. *Dura mater* and *pia mater*, anatomical Latin terms for the membranes (meninges) covering the brain and spinal cord, mean literally 'tough mother' and 'gentle mother'. These are calques based respectively on Arabic *'umm ad-dimāḡ assāfigah* and *'umm raqīqah*, which might be more aptly translated 'thick envelope' and 'thin envelope'.

Dissection of the dead for anatomical study was first permitted by secular authorities in Italy early in the 14th century. During the following decades, scores of meticulous workers across Europe advanced the science of anatomy by discovering or rediscovering parts of the body and refining the understanding of their structure and relations. The names of many of these pioneering anatomists became attached to parts they had described. Although Rufus, Galen, and others had observed the uterine tubes, they came to be called *fallopian* after Gabriele Falloppio (1523–1562), who wrote the first complete and accurate description of them. His contemporary, Bartolommeo Eustachio (1524–1574), is honored for his rediscovery of the pressure-regulating passages (eustachian or pharyngotympanic tubes) leading from the middle ears to the throat, which had been described by Alcmaeon and Aristotle 2000 years earlier.

By the middle of the 15th century, printed broadsheets and books containing descriptions and woodcuts of human anatomy had begun to appear. Andreas Vesalius (1514–1564), a Flemish-born professor of anatomy at Padua, was among the first to practice human dissection extensively. His great work, *On the structure of the human body* (1543), was a milestone in the history of the science not only for its detailed, exact, and artistic illustrations but because it corrected many of the errors of his predecessors, particularly Galen.

In addition to expanding and improving the science of anatomy, Vesalius sought to reform its nomenclature, purging it of superfluous synonyms and of Greek, Arabic, and post-classical Latin words. Thus, he opted for Latin *auriculae cordis* 'auricles of the heart' instead of Greek *kardias ōta*, *os sacrum* 'holy bone' instead of *ieron osteon*, and *vena portae* 'portal vein' instead of *pulēs phleps*. But although these reforms have survived, others (*meatus urinarius* instead of *ureter*, *processus mammillaris* for *processus mastoideus*, and *rotator magnus* for *megas trochantēr*) have not.

From the 17th century onward, the proliferation of eponyms such as *the ampulla of Vater, Bartholin's glands, Hunter's canal, Poupart's ligament*, and *the sinus of Valsalva* further complicated an already vast and chaotic vocabulary. In addition, the invention of the microscope by Anton Leeuwenhoek (1632–1723) and its application to anatomy by Marcello Malpighi (1628–1694) and others set off an explosion of new information and created a need for hundreds of new terms.

Modern Period (1700 A.D.–Present)

Nowadays, as in the past, anatomical lore and its terminology serve chiefly as foundations for the study and practice of the healthcare professions. While modern anatomists probe ever more deeply, by means of the electron microscope and histochemical methods, into the fine structure and molecular function of cells and tissues, physicians, surgeons, nurses, and physical therapists deal chiefly with gross structures – bones, muscles, arteries, veins, nerves, and internal organs.

The nomenclature of gross anatomy, in addition to providing labels for those structures, also supplies a stock of combining forms with which to name abnormal conditions (*appendicitis, nephrolithiasis* 'stone formation in the kidney', *spondylolisthesis* 'slipping of a vertebra'), surgical procedures (*adenoidectomy, colostomy, laparoscopy*), and other medical entities and concepts.

Because little has been added to our fund of knowledge in gross anatomy since the 17th century, the nomenclature of the science has expanded only

slightly. But a persistent and increasing lack of pattern and uniformity has added to the burden of students who must not only learn the shapes, positions, and relations of thousands of structures but also memorize their names.

In 1886, when anatomists from several European countries met in Berlin to form an international Anatomical Society (*Anatomische Gesellschaft*), they gave high priority to the compilation of an international lexicon of anatomy that would eliminate many of the complexities and inconsistencies of the existing system and do away with semantically opaque eponyms. Their first convention was held the following year in Leipzig. From a corpus of some 50 000 Latin terms, they chose approximately 4500, which were published in 1895 in Basel, Switzerland, and became known as the *Basel Nomina Anatomica* (*BNA*).

The new system was gradually adopted in areas that were already using anatomical Latin – western Europe and the English-speaking countries. But *BNA* never won universal acceptance. Major revisions were approved at conventions in Birmingham (United Kingdom) in 1933 and (after reorganization of the society in the wake of World War II) in Paris in 1950.

Meanwhile, the International Federation of Associations of Anatomists (IFAA), founded in 1903, was also working toward the establishment of a uniform nomenclature for the anatomical sciences. This body made periodic revisions of *BNA*, but it was not until 1955, at the Sixth Federative International Congress of Anatomy in Paris, that a version was approved that went on to achieve nearly universal acceptance. This nomenclatural system, now known as *Nomina Anatomica* (*NA*), was officially revised in 1961, 1966, 1977, and 1983.

In 1989, the 13th Federative Congress of Anatomy appointed an international Federative Committee on Anatomical Terminology (FCAT) to undertake a thorough overhaul of *NA*. The result of their efforts, the most extensive revision of international nomenclature for human anatomy in several decades, was published as *Terminologia Anatomica* (*TA*) in 1997. Of its 7500 terms, approximately 1000 were new to official nomenclature, although many of them had long been in unofficial use. Approximately 10% of the terms that had appeared in the 6th revision of *NA* were either altered or rejected in *TA*.

Modern workaday anatomical language displays most of the quirks and irregularities that can be found in any living speech system. Outmoded terms, such as *auricles* for the cardiac atria, and eponymous ones, such as *fallopian tubes* for the uterine tubes, persist in speech and writing despite quasi-official efforts to expunge them. Terms long known to be based on erroneous beliefs are retained, partly because few now understand their etymology but chiefly because of the inconvenience of replacing them. Thus, we still refer to the superficial *cephalic veins* of the upper limbs as if we continued to believe that they drain blood directly from the head. The term *cardia* (Greek *kardia* 'heart') 'upper part of the stomach' reflects a primitive confusion between the two organs.

Other words and stems retain dual meanings despite occasional misunderstandings. Because Greek *muelos* 'pith, marrow' denotes both the spinal cord and the marrow of long bones, a *myelogram* is 'a radiographic image of the spinal cord', whereas *myelocyte* means 'a cell formed in bone marrow'. The adjective *tarsal*, from Greek *tarsos* 'wicker frame', refers to both the ankle joint and the connective tissue framework of the eyelid. *Cervical glands* can be either lymph glands in the neck or mucous glands of the uterine cervix.

For more than 1000 years, Latin served as the natural medium of anatomical discourse because, by an accident of history, it had become the international language of scholarly and technical communication. When Latin ceased to be spoken as a vernacular, it gained the additional appeal of no longer being subject to the phonetic, semantic, and orthographic instability of a living language.

But with shifts in educational objectives and methods, Latin began to drop out of the basic academic curriculum throughout most of the Western world approximately a century ago. Even before that time, words from national vernaculars had begun to replace Greek and Latin not only in speech but also in published works. As English gradually assumed the role of an international language in science and other fields, anatomical terms from that language gained international currency. Although *TA* is a strictly Latin vocabulary, it includes an English equivalent for each term.

Modern health professionals who speak English employ a mixture of classical and vernacular anatomical terms. Body parts that have familiar English names (*brain, eye, kidney, liver, wrist*) are commonly so designated. (Physicians do, however, occasionally resort to a Greek word such as *hepar* 'liver' or a Latin one such as *cor* 'heart' when discussing a grave prognosis in the presence of a patient.)

Often a structure is named with an English noun, whereas the corresponding adjective is based on a Latin stem, and related medical and surgical nouns are derived from Greek: *brain – cerebral – encephalogram, kidney – renal – nephrectomy, tongue – lingual – glossitis*. Many of the English terms in general use are anglicized Greek (*diaphragma* > *diaphragm*, *splēn* > *spleen*) or Latin (*ligamentum* > *ligament, ventriculus* > *ventricle*).

For other structures, it is usual to use Greek (*epiglottis, larynx, pancreas*) or Latin (*occiput, tibia, vertebra*), particularly when their names are single words. Latin is preferred for body parts that have no polite names in the vernacular (*anus, penis, vulva*). Some parts have current names in both languages: *astragalus/talus* 'ankle bone', *pharynx/fauces* 'throat'.

For structures with phrasal names in anatomical Latin, direct translations into English are usual: *arteria meningea media* > *middle meningeal artery, nervus ilioinguinalis* > *ilioinguinal nerve*. Often such a phrase is not only replaced, at least in speech, by an English translation, but is also further abridged by suppression of its noun: *musculus deltoideus* > *deltoid muscle* > 'the deltoid'; *os sphenoidale* > *sphenoid bone* > 'the sphenoid'. Latin phrases undergo other forms of shortening as well, as when *membrana mucosa* becomes simple *mucosa* and *tunica cornea* 'horny layer [of the eye]' becomes *cornea*. The phrase *os humeri* 'bone of the shoulder' has been replaced by simple *humerus, os femoris* 'bone of the thigh' by *femur*.

Classical Latin has undergone various orthographic, phonetic, and grammatical modifications and depredations on being put to the service of modern anatomy. American spelling eliminates certain diphthongs from Latin and latinized Greek, changing *caecum* to *cecum* and *oesophagus* to *esophagus*. The plural noun *praecordia* '[structures lying] before the heart' is now the singular *praecordium* (American *precordium*) and *calvaria* 'dome of the skull' has changed its gender to become *calvarium* (not accepted by purists). Variant spellings of Latin words (*annulus* versus *anulus*, *antebrachium* versus *antibrachium*) and of English words derived from classical ones (*disc* versus *disk, mamillary* versus *mammillary*) flourish to generate uncertainty and discord.

During the 19th century and much of the 20th century, linguistic purists vehemently opposed any mixture of Greek and Latin lexical elements in the same compound word. This unreasoning prejudice is now largely a thing of the past, not because pedants and cranks no longer abound but mainly because most of those belonging to the present generation cannot distinguish between Latin and Greek.

Few modern physicians have studied classical languages and almost none have acquired, much less retained, a working Latin vocabulary or a mastery of Latin accidence. Mistakes in sense, grammar, and pronunciation are therefore commonplace. The *portio vaginalis* 'vaginal portion' of the uterine cervix, so named in contradistinction to the *portio supravaginalis*, is commonly called simply 'the portio' by physicians who seem to think the word means 'porch' or 'portico'.

As in lay speech, the plurals of classical nouns are a fertile source of error. Those who mistake *biceps* and *triceps* for plural forms create illegitimate subtraction singulars, *bicep* and *tricep*. *Phalanx* and *meninx* are apt to be replaced by *phalange* and *meninge* (three syllables each), derived by back-formation from the plurals *phalanges* and *meninges*. The incorrect plurals *ducti* and *plexi* for the fourth-declension nouns *ductus* and *plexus* are frequently formed by analogy with more numerous second-declension nouns such as *musculus* (*musculi*) and *nervus* (*nervi*).

Those who miss the point of the genitive inflectional endings in *tensor fasciae latae* 'tightener of the broad fascia' pronounce it *tensor fascia lata*. Speakers often misplace syllable stresses, for example, saying *glúteus* instead of *glutéus* but *pharyngéus* instead of *pharýngeus*. The latinized Greek word *raphe* 'seam' is so often mispronounced as if it were French that the blunder was even enshrined in the 6th edition of *NA* with a wholly inappropriate acute accent: *raphé*.

Held together by broad patterns of analogy and regularity, modern anatomical nomenclature serves the needs of its users despite its complexities. Its evolution, paralleling the development of anatomy as a scientific discipline, has brought it increasingly closer to three of the ideal qualities of a scientific nomenclature – exhaustiveness, consistency, and economy. It remains to be seen how much longer a nomenclatural system based on Latin, a language increasingly foreign even to the educated, can continue to meet the fourth ideal – ease of intelligibility.

See also: Medical Discourse: Developments, 16th and 17th Centuries; Metaphors in English, French, and Spanish Medical Written Discourse.

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Anchieta, José de (1534–1597)

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Father José de Anchieta, who is known as the Apostle of Brazil, was born in San Cristóbal de la Laguna, Canary Islands, on March 19, 1534. Anchieta studied in Coimbra starting in 1548; in 1551, he entered the Jesuit order in that city. In 1553, the young priest went to Brazil in order to join the catechism indoctrination and began to teach Latin at the Piratininga School. Considering that the mission of Catholic indoctrination could only be successful if the priests could talk with the natives in their language, Anchieta managed to learn by himself, the Tupi language spoken by the coastal population of the new land. The result was the handbook, *Art of grammar of the most spoken language in the Brazilian coast* (1595). This work became a useful manual for the other Jesuits learning Tupi; nowadays, it is historiographically considered the first linguistic paper written in Brazil. Although, according to the Brazilian philologist Augusto Magne, "its manuscript was being used as a handboolk of Tupi at least in 1556" (Magne, 1946: 4–5), Anchieta's grammar obtained permission for its first edition 40 years later, in 1595. The work is structured on the basis of the Latin grammar, as well as all Romantic vernacular grammars of that time, such as Antonio de Nebrijas's and Fernão de Oliveira's. Anchieta's goal was for students to learn Tupi in his grammar by using previous knowledge that they brought from their study of other grammars. In the literary field, the Jesuit priest devoted his time to writing poems, letters, and dramatic pieces, following the planning of Gil Vicente's 'autos.' This magnificent body of work was produced in Tupi, Portuguese, Spanish, and Latin. Due to his familiarity with the literary language, Anchieta established a new pedagogical order, using plays to educate the young natives. On June 9, 1597, José de Anchieta died in the city of Reritiba, today renamed Anchieta, in the state of Espírito Santo, Brazil.

See also: Tupian Languages.

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Ancient Egyptian and Coptic

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The Ancient Egyptian language is first attested a little before 3000 B.C., when the earliest inscriptions in hieroglyphic make their appearance. Connected texts of some length are found from about 2700 B.C., and these develop into a considerable literature, which forms one of our major sources of information about the ancient Near East. The language survived the downfall of the Roman Empire and the transition to Christianity, and in its latest form, written in a modification of the Greek alphabet, it is known as Coptic. Coptic survived until well after 1000 A.D. Egyptian therefore has the longest attested history of any language, and this makes it uniquely important to linguistics. The language is a member of the Afro-Asiatic family (sometimes referred to as Hamito-Semitic), although its exact place within this family is disputed. Many of the related languages were not written down until modern times, and several 'missing links' may never have been recorded at all. Egyptian shares the preference of most of this family for triconsonantal roots, from which whole families of words may be formed, normally through variations on the internal vowels and the use of some affixes. It may be this feature that encouraged the Egyptians to omit the vowels from their writing system. The language recognizes two genders, conventionally termed masculine and feminine; neuter meanings are expressed in the early stages of the language by the feminine, later by the masculine. It is possible that case endings, similar to those in some Semitic languages, existed at a very early stage of Egyptian, but they are not written and soon fell away. Traces may remain in the so-called construct state, where a direct genitive relationship is expressed by two nouns apparently in apposition. Grammatical function is marked by strict word order. A dual number is recognized alongside singular and plural.

The Egyptian verb has unique features. A stative tense, known in Coptic as the qualitative, seems to be inherited from an early stage of Afro-Asiatic, and has cognates in Akkadian (Egyptian). This tense expresses the result of a verbal action, and is often best rendered by an adjective or an adverbial phrase: 'open, continuous, far away, already knowing,' or the like. The narrative tense system, on the other hand, is peculiar to Egyptian, and appears to consist of various verbal nouns with possessive suffixes for subject ('his hearing' developing into 'he hears'). Other forms include a possessive construction with parallels to modern perfects ('hearing to him' developing into 'he has heard'), and an infixed series which expresses past, present, and future contingency. There is also a set of so-called active participles, which are really epithets or nouns of agent ('a hearer'), and a sequence of relative tenses formed from passive participles ('his heard one' developing into 'the one which he heard'). Participles and relative forms show two aspects, perfective and imperfective, depending on whether the action is envisaged as completed or not; there are also traces of a prospective, which has future or subjunctive force. Aspect also features in the narrative tenses, where prospective and probably circumstantial forms also occur. The language is VSO in narrative contexts, but stative constructions take the form SV. A remarkable feature is that four uses of the English verb 'to be' – existential, predicative, identifying, and partaking of a quality – are rendered by distinct constructions. On the other hand, there is no verb 'to have,' which is conveyed by periphrases such as 'there is to me.' A welcome omission is comparative inflection of adjectives: 'she is better than I' is expressed simply as 'she is good against/in respect to/ me.'

This is the form taken by Egyptian in its classic period, Middle Egyptian, during the early second millennium B.C. This canonical stage was recognized by the Egyptians themselves, and was retained in formal inscriptions until the end of Pharaonic history. However, after about 1400 B.C., pressure from the spoken language, which was constantly changing, began increasingly to affect the written texts. The result is Late Egyptian, which took over many of the functions of its predecessor. Late Egyptian, which is the direct ancestor of Coptic, stands to Middle

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Ancient Egyptian and Coptic

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Egyptian rather as Italian does to Latin, although phonetic changes are often concealed by the continuity of the script. Word order is noticeably freer. The most obvious innovations are in the verb, where the old patterns are replaced by analytic expressions derived from obsolescent verbal forms. This process – which is strikingly similar to the development of modern English – leads to greater emphasis on time distinction and modal subtleties. The number of compound 'tenses' in such a system is almost limitless, although one distinction present in the last phase of Late Egyptian – that between preterite and present perfect – is lost in Coptic. One unusual feature of Late Egyptian is the existence of a second series of tenses, which throw emphasis on an adverbial adjunct. These may have originated in the relative forms ('what he heard (is) yesterday' developing into 'it was yesterday that he heard'). This system is foreshadowed in Middle Egyptian, although the details are not yet understood. The development of the verbal system makes Coptic appear an SVO language, although this is historically accidental. Coptic also dispenses with most adjectives, the passive voice, and most plurals, preferring stative paraphrases, using active third-person plural constructions, and marking the plural of nouns merely by the forms of the article, possessive adjective, or demonstrative. Late Egyptian contains many Semitic loanwords; Coptic, on the other hand, is almost as full of Greek words as modern English is of French or Latin.

Egyptian throughout its history deserves the epithet *lingua geometrica*, given to it in the 19th century, when the regularity and elegance of its constructions were first appreciated. The following examples may illustrate this. (Egyptian is conventionally transliterated into Romanized consonants.)

Middle Egyptian:

ḫ'.n	*ḥ3b.n*	*wỉ*	*ḥm.f*	*r*
arise+pa	send+pa	me	embodiment+his	to
K3š	*r*	*sn-nw*	*sp*,	*ỉb.f*
Cush	for	two+ord	occasion,	heart+his
3w	*ỉm.ỉ*	*r*	*ḫt*	*nbt*
content+stat	in+me	against	thing	any+f/sg

'As a result his majesty sent me to Nubia for a second time, his heart being pleased with me more than anything.'

Late Egyptian:

wn.ỉn		*Pr-'3*	*ḥr*	*ḥ3b.ỉ*	*r*
exist+pa	contingency	Pharaoh	upon	sending+me	to
p3	*t3*	*Nḥs*	*n*	*p3*	
the+m/sg	land	Nubian	in	the+m/sg	
sp	*mḥ-sn,*	*ỉw*	*ḥ3ty.f*		
time	filling+two,	situation	heart+his		
mtry	*ỉm.ỉ*	*m*	*šsr*		
content+stat	in+me	in	abundance		

Coptic:

ⲁϥϫⲟⲟⲥ ⲛ̄ⲥⲓ ⲟⲩⲁ ⲛ̄ⲛⲉⲥⲛⲏⲩ ϫⲉ ⲁⲛⲟⲕ
ⲛ̄ϯⲙ̄ⲡⲱⲁ ⲁⲛ ⲉⲛⲁⲩ ⲉⲡⲁⲓⲣⲉϧⲟⲥ, ⲉⲁⲓⲱⲛϩ
ϩⲛ̄ⲛⲟⲃⲉ ⲛⲁϩⲟⲟⲩ ⲧⲏⲣⲟⲩ

afjoos	nci	oua	n ne	snēu
pa+he+say+it	namely	one+m/sg	of the+pl	brother+pl

je	anok	n	ti	m	p	ša
saying	myself	not[1]	1/sg	in	the+m/sg	value

an	e	nau	e	p	angelos, eai	
not[2]	to	look	at	the+m/sg	angel, situation+pa+I	
ōnh	hn	n	nobe	na	hoou	tērou
live	in	the+pl	sin	my+pl	day	entirety+their

'One of the brethren said, "For my part, I am not worthy to see the angel, having lived in sin all my days."'

See also: Egypt: Language Situation.

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Ancient Near-Eastern Religions

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The geographical setting of Hittite civilization is the high plateaus of Asia Minor. Excavations carried out by H. Winckler at Boğazköy at the beginning of the 20th century have shown these tablelands to be the site of the ancient Hittite capital, Hattusa. This was determined by the translation of the archives of the Great Kings. In 1915, the Czech scholar Hrozny managed to decipher the Hittite language and to establish its inclusion within the family of Indo-European languages. Hittite history extends over a period of more than a millennium (from the 19th to the 8th centuries B.C.E.). Hittite religion is polytheistic; ancient Hittite texts and even present-day people speak of a 'thousand gods,' the number no doubt being a symbolic representation of an infinite number. Although the names of only 800 deities have been recorded, such a large figure emphasizes the ever-present nature and ubiquity of gods in both private and public Hittite life, and the important part the gods played. A prayer dating to the 13th century, entitled 'The Prayer to the Weather God of *pihassassi*,' contains 55 paragraphs, each describing the pantheon of a specific place in the empire during the period of its maximum extent. Each city possessed its own pantheon, yet beyond this apparent diversity it is possible to observe a basic structure, a unity of sorts within diversity: each pantheon was constituted of a main god, his consort, his mountain (which could be a simple place where divinity would be revealed), and his river or his spring. The sacralization of mountains and sources reflects the geopolitical structure of the Hittite city, which included the town, with the sacrificial altar of the main deity's temple at its center, and the countryside, its mountain, and its spring. The mountain is a masculine deity and the spring is essentially feminine. All four components – town, countryside, mountain, and spring – constitute the four elements of the Hittite city.

Beyond the basic structure, the apparent diversity among local pantheons may be explained by the linguistic background of Anatolia in the Bronze Age. In the early days of the empire, at least five languages were spoken in Asia Minor: Hattian in the bend of the Kızıl İrmak near Hattusa, Hittite in Cappadocia, Palaite in the northwest (the area that would later become Paphlagonia), Luwian in regions to the south and west, and Hurrian in the southeast. As stressed by E. Laroche, what is remarkable is the long-lasting use of each of these languages. As the Hittite realm expanded, foreign deities, despite the process of syncretism, were still honored and were continually worshipped using the original language.

The Hittite chancellery created a state cult that was hierarchically above local pantheons. This is known through records of diplomatic treaties that Hittite kings made with foreign rulers or with Anatolian vassals. These treaties referred to a list of deities that played the part of witnesses, who guaranteed the application of the treaty's clauses. The list of gods that act as witnesses named 80 deities: deities 1–22, the sun gods and the storm gods; deities 23–29, protective gods; deities 39–44, Telipinu (the founding god) and his subordinates; deities 45–51, gods of war; deities 52–60, goddesses ruling over town; deities 61–64, synopsis; deities 65–76, ancient gods; and deities 77–80, sacred elements (mountains, streams, the sky and earth, winds, and clouds). This pantheon is generally what is described as the Hittite state cult. From the days of the treaty of Suppiluliuma I with Hukkana of Huyasa (Suppiluliuma: 1344–1322 B.C.E., according to T. Bryce), deities were enumerated in almost unchanging order. This reflects a deliberate choice of the gods listed.

The Hittite pantheons, characterized by their diversity and their heterogeneity, allowed coexistence of deities of various origins. The pantheons were created during the course of Hittite history and during the various stages of Hittite expansion in Anatolia. However, due to this very diversity, a strong tendency toward organizing the mixed groups is apparent: the deities that were retained following mixing of culture groups were not selected just by chance.

Substantial portions of the examined records discovered at Hattusa (the Hittite capital) or in provincial archives (as at Masat Hüyük) concern religious tablets, and especially cultic texts. Shrines were located both in the cities and in the surrounding countryside. Places of worship were of varied nature (*É.DINGIR*, ^{NA4}: *hekur*, *sinapsi*, *hila*), and their sizes could differ considerably. The great temples of Boğazköy (Nos. 5 and 6) extended over 1200–1500 m^2, whereas the size of smaller shrines would be somewhere between 400 and 600 m^2. Some temples were surrounded by a walled-off area, or *temenos*, that acted as a sanctuary. The size of the temples and their great number of rooms indicate that they included areas with an economic function, areas that served as storage magazines, or even rooms for taking part in the preparation of cultic ceremonies (Boğazköy temple No. 4). Some shrines, such as Yazilikaya, were in the open, whereas others, such as the temples of the Hittite capital, were built with cyclopean walls.

In most sanctuaries, the deity was represented by an anthropomorphic statue. Descriptions of these statues are numerous in cultic inventories, which were reported by officials who were sent throughout Anatolia in order to collect information on local cults during the reign of Tudhaliya IV. Previously, a god would have been represented by a symbol or a stela (*huwasi*), and not in anthropomorphic form (this explains texts references to sacrifices to stelae). These stelae (monuments) were inscribed or carved with the god's image. The transition from symbolic to physical representation dates to the period of Tudhaliya IV. The storm god is depicted in the form of a gold statue holding a mace in his right hand, and another symbol in his left hand; he is standing on two mountains. The storm god could also be depicted as a bull both before and after Tudhaliya's religious reform: such is the case at Alaca Höyük (temple No. 8), where a bull is the god himself.

Some locations within a sanctuary and some cultic objects were subject to particular veneration, and for this reason played an important part in the cult. The importance of the altar is apparent in that, just like the temple, it possessed its own foundations. It was on the altar that deities' statues would stand and cultic objects would be placed. Thus, by no means can the altar be identified as being equivalent to an offering table.

The temple's windows or doors, marking the edge of the sacred and secular areas, were particularly important. Due to their function, they would be places of sacrifice, just like other sacred locations. The window is mentioned in Hittite texts as a place of communication and exchange, and is the passage through which life and death penetrate. In the myth of Illuyanka (see later), Hupasiya, the lover of the goddess Inara, was killed by her because he had looked through the window despite her warning. In a foundation myth, the king is requested to pull his children out of the window, which obviously symbolizes the promise of numerous offspring. Doors were, generally speaking, considered to be sensitive locations of the utmost importance. The essential part played by city gates in Hittite urban architecture and planning is well known (temple Nos. 9, 10, and 11), and several deities or groups of gods were in charge of their protection. Temple doors were particularly honored during rituals; specific parts, such as the wooden bolt (or *aska*), were frequently mentioned.

The temple's most crucial object was the sacrificial altar. Both unmovable and mobile/portable types of hearths are known. The unmovable hearth represents the very center of the temple and symbolizes the union between gods and human beings. It is therefore easy to understand why great care was taken in its construction. A text concerning the foundation ritual, focusing on the building of a palace, describes in detail the making of the hearth.

Among ritual objects that were particularly honored, the *kursa* (aegis?) specifically deserves mention. It was made of sheepskin and was sometimes decorated. Until recently, its was considered to be a sacred aegis/fleece, but is now seen as a hunter's bag. Nevertheless, this object's warlike character is quite obvious, thus its categorization among defensive weaponry. The *kursa* became the attribute of several gods, and it was itself divine and was worshipped in sanctuaries by priests attached to its cult. Ritual vessels for libations and for drinking in honor of the gods should also be mentioned. Many cultic vessels have been discovered in excavations (temple No. 12). Their shapes are related to the deity with whom they were associated (for instance, a bull, in the case of the storm god). They could also represent human body parts (the penis, the arm, the foot, etc.; e.g., temple No. 13). The temple was the house of the god. All things useful to him were stored there. The cult took place in part in the deity's sanctuary, i.e., in the *cella*, or in an independent building. In this room were placed the god's statue and eventually those of the deities of his 'inner circle,' or *kaluti*, as well as sacred furniture, such as his throne, his bed, or ritual objects.

The priesthood was made up of people in charge of taking care of the god. Each day, prayers would respond to the needs of the deity of whom the priests were in charge. The deity had to be washed and dressed, and food and abundant and varied drink had to be offered to him. Priests had to be clean and ritually immaculate. Some of the specific obligations of the priests to the deity are known from the lines of a text that specified the duties of priests (translation by E. H. Sturtevant):

> Then may those who prepare daily bread be pure
> May they wash and clean themselves (and) their hair
> And fingernails. May they wear pure clothes.
> If this is not the case, may they not prepare the bread.

Priests and assistants were a stratified group and were subjected to a very strict hierarchy. Men predominated among the priesthood; priestesses were relatively rare, but could play important roles, such as that of 'mother of the God,' and were attached essentially to the cult of feminine deities. Next to this priest class was a group of people who were not considered priests or priestesses, but who could be described as belonging to this category (such as the palace magician, as well as the *halliyares* and *hunepisa* (in charge of singing and chanting prayers)). Other clergy

members appear to have been assistants in the cult, including the prince's cooks, the virgins of the city of Kasha, the actor, and the wrestlers that would perform simulated fights in order to entertain the god.

Gods were not only the owners of their sanctuaries but also of the land, which did not belong to the Hittite king. The ruler was only the administrator of lands, the gods' favorite (*Tabarna*). The god's presence in his temple was the guarantee of a land's prosperity. When the king would fulfill his obligations toward the gods, the land would be rich, he would be respected by his subjects, and would impose his law and might over his foes. However, if he did not correctly carry out his obligations toward the gods, they would leave the sanctuary and take refuge in an inaccessible location. Their absence would have dramatic consequences for the land, as is described in the *Story of Telipinu*. Hence, the ruler and the clergy's first obligation was to keep the god within his temple by faithfully following obligatory procedures. The ruler had to respect ritual, keep purity and cleanliness within the god's sanctuaries, celebrate the latter's festivals by following ceremony and well-established cultic tradition, and regularly offer sacrifice. The land's first fruits and the first animal offspring of the year were specifically dedicated to the gods, and it was thought that lavish sacrifice could ensure their safeguard and generosity. Food and drink were regularly offered to them. A great number of Hittite festivals are known to have been celebrated. These could take place either simultaneously or successively in sanctuaries or places of worship in the city. Some of these festivals were itinerant and would last several days: the *AN.TAH.SUM*^{SAR} festival ('the festival of the crocus flower') went on for 38 days in several cities (e.g., Hattusa, Matilla, and Arinna).

See also: Hittite; Indo–European Languages; Prayer and Meditation; Ritual and Religious Language; Sturtevant, Edgar Howard (1875–1952).

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Andean Languages

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'Andean languages' is a cover term for the native indigenous languages spoken in the western part of South America, more precisely in the Andean mountain ranges and the adjacent Pacific coastal strip. Genealogically, the Andean languages do not constitute a unity. They comprise some language families, most of which have a limited geographical importance, as well as several linguistic isolates (languages without proven relatives or languages that have been left unclassified so far). An 'Andean' language family proposed by Greenberg (1987) covers only part of the Andean languages and has not been generally accepted. From a typological point of view, Andean languages are also highly diverse. Many Andean languages have become extinct and cannot be classified because of a lack of data.

From north to south, the following families and isolates are encountered. In the northern and eastern parts of the Colombian Andes, several languages belong to the Chibchan family, which extends further into Central America: Barí (Motilón; also in Venezuela), Chimila, Cuna (Kuna), Damana, Ika (Aruaco), Kogui (Cogui), and Tunebo (Uwa). The Muisca (Chibcha) and Duit languages, which have been extinct since the late 18th century, also belonged to the Chibchan family. Muisca, originally spoken in the surroundings of Bogotá, was a language of administration during the colonial period. Chibchan languages share a common lexical base, but are highly diverse structurally. Some of them (Barí, Chimila) are tonal.

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From north to south, the following families and isolates are encountered. In the northern and eastern parts of the Colombian Andes, several languages belong to the Chibchan family, which extends further into Central America: Barí (Motilón; also in Venezuela), Chimila, Cuna (Kuna), Damana, Ika (Aruaco), Kogui (Cogui), and Tunebo (Uwa). The Muisca (Chibcha) and Duit languages, which have been extinct since the late 18th century, also belonged to the Chibchan family. Muisca, originally spoken in the surroundings of Bogotá, was a language of administration during the colonial period. Chibchan languages share a common lexical base, but are highly diverse structurally. Some of them (Barí, Chimila) are tonal.

Chocoan, a small family comprising two languages, Waunana and Emberá, has its largest concentration in the Pacific regions of Colombia and Panama. It is one of the rare language groups in the Americas featuring ergative case. The Emberá, who occupy an expanding territory, are locally known under different names (Catío, Sambú, Saija, etc.).

Cariban, a large family with its center of gravity in the Amazonian region and in the Guyanas, is represented in the northeast of Colombia and in adjacent Venezuela by Opón-Carare (extinct), Yukpa (Motilón), and Japreria. Several extinct languages of the Magdalena valley received Cariban influence (Muzo, Colima, Panche, Pijao), although their exact classification remains undecided.

The Arawakan family, also one of the major Amazonian groupings, is represented on the Guajira peninsula, west of Lake Maracaibo, by two verb-initial languages, Guajiro (Wayuu) and Paraujano (Añú), a rarity for the Andean region. The Guajiro, with a population of about 300 000, are one of the fastest-growing indigenous groups in South America. Two small families, both extinct – Timote-Cuica and Jirajaran – were confined to the Venezuelan part of the Andes and its Caribbean foothills.

In the southern Andes of Colombia and adjacent Ecuador, the Barbacoan language family has five living members: Cayapa (Cha'palaachi, Chachi), Colorado (Tsafiki), Cuaiquer (Awa Pit), Guambiano, and Totoró. Several extinct languages (Cara, Pasto) may have belonged to this family, which extended from the highlands to the Pacific Coast. In addition, several linguistic isolates are found in southern Colombia: Kamsá (Sibundoy), Páez (Nasa Yuwe), and the extinct Yurumanguí. On the coast of northwestern Ecuador, the extinct Esmeraldeño (Atacame) language was also an isolate.

The central Andean region, which comprises the highlands and coast of Ecuador, Peru, and Bolivia, as well as northern Chile and northwestern Argentina, is dominated by two language families: Quechua(n) (*see* **Quechua**) and Aymaran (*see* **Aymara**). Both language groups are very similar from a phonological and structural point of view, and they share more than 20% of their lexicon. The Quechumaran hypothesis, which rests on these similarities, assumes that the two groups developed from a common source. However, nearly all the similarities can be explained by intensive contact (convergence), leaving the genealogical classification of both groups undecided. Quechua has about 8 000 000 speakers and is divided into numerous dialects with a limited degree of mutual intelligibility. Its territory extends from southern Colombia to northwestern Argentina with several interruptions. Aymaran comprises two, possibly three languages: Aymara (with over 2 000 000 speakers in Bolivia, Chile, and Peru), Jaqaru, and Cauqui (both in Peru). The typically agglutinating ('Altaic') structure based on suffixation of these languages has been considered characteristic for Andean languages, but the other languages in the region do not seem to share it in all respects. The Uru-Chipaya family, with one surviving language in Bolivia (Chipaya), has a different structure with some prefixation (along with suffixes) and extensive gender agreement.

The remaining languages of the central Andean region are all presumably extinct. They include (partly) documented languages, such as Atacameño (in northern Chile), Mochica (on the coast of northern Peru), and Puquina (in the border region of Bolivia and Peru). Some Puquina vocabulary (combined with Quechua morphology) survives in a professional language used by the Callahuaya herb doctors in Bolivia. Atacameño (Kunza) and Mochica are isolates, but Puquina may be distantly related to Arawakan. There is ample evidence of other, minimally documented languages: Panzaleo and the Puruhá-Cañar group in highland Ecuador, the Tallán-Sechura group (on the coast of northern Peru), Chacha and Culli (in the highlands of northern Peru), Quingnam (on the coast of central-northern Peru), Diaguita (in northwestern Argentina and in Chile), and Humahuaca (in northwestern Argentina). In addition, in Argentina the Lule or Tonocoté language (extinct but documented) presumably had its origin in the Chaco region.

In the southern Andes, Mapuche (Mapudungun; also known as Araucanian) is the native language with the largest distribution. Originally the dominant language of Chile, it is now confined to an area in southern Chile (Biobío, Malleco, Cautín, Arauco, etc.) and several locations in the Argentinian pampas and in Patagonia. Its number of speakers may be close to 500 000 (no reliable count is available). The closely related Huilliche (Tsesungun) language, originally spoken in Osorno Valdivia and on the isle of Chiloé, is nearly extinct. Mapuche is an agglutinating, suffixing language, as are Quechua and Aymara, but it differs from these languages in that it has practically no nominal morphology. By contrast, its verbal morphology is exceptionally rich. Some of its characteristics (interdental consonants, lack of case, noun incorporation) cause the Mapuche group to stand alone among the Andean languages. It has no known relatives. In the Argentinian region of Cuyo (Mendoza, San Juan), the unrelated Huarpean group (with the languages Allentiac and Millcayac) was spoken until the 17th century.

In the southern tip of Chile, the isolates known as Kawesqar (Qawasqar) or Alacaluf (in the

archipelago west of the mainland) and Yahgan or Yamana (on the islands south of Tierra del Fuego) are both close to extinction. A third language, Chono (north of Kawesqar), has long been extinct. The Chon family, which comprises Ona or Selknam (on Tierra del Fuego), Tehuelche, Teushen, and Gününa Yajich (all in southern Argentina), is now only represented by Tehuelche, which is also nearly extinct.

An issue under debate is the affiliation of languages or language families situated on the eastern fringe of the Andes. From a genealogical viewpoint, this area is exceptionally diverse. Some of these languages share characteristics with Amazonian groups (e.g., 'Amazonian' classifiers, extensive prefixation, loose morphology, rich vowel systems, nasal harmony), whereas others are closer to Andean languages and seem to have had some relationship to the languages spoken in the highlands. Among the latter are Betoi and Cofán in Colombia (the latter also in Ecuador), the Jivaroan languages and the Candoshi group (in Ecuador and northern Peru), the Cahuapanan and Hibito-Cholón groups (in northern Peru), and a series of isolates on the Andean slopes of northern and eastern Bolivia (Leco, Mosetén, Movima, Yuracaré). Amuesha (Yanesha) found in Peru is an Arawakan language with a heavy Quechua admixture.

Because of massive language extinction, many Andean languages have disappeared during the last 500 years, leaving an incomplete picture of the original situation. It is not easy to link known languages to specific cultures established by archaeologists. Most of the extinct languages were replaced by expanding local languages, such as Quechua, Aymara, and Mapuche, or by Spanish (now spoken by a majority of the population).

See also: Arawak Languages; Argentina: Language Situation; Aymara; Bolivia: Language Situation; Cariban Languages; Chibchan; Chile: Language Situation; Colombia: Language Situation; Peru: Language Situation; Quechua; Peru: Language Situation.

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Andorra: Language Situation

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Andorra is in southwestern Europe, situated in the eastern Pyrenees between France and Spain. It is a very small principality, only 464 km^2, with a population of 72 320 inhabitants (Ministry of Finance, 2002). Andorra was once an isolated piece of land, but nowadays it is a prosperous and rich country mainly because of tourism, as it is a well-known center for winter sports, and its status as a tax heaven between Spain and France.

It has been said that Charlemagne founded Andorra in 805 in recognition for its inhabitants' support in his campaigns in Northern Spain. The political power over the Andorran territory was passed eventually to the bishop of Urgell (in Catalonia). In the 11th century, a dispute arose between the bishop and his northern French neighbor over Andorra. In 1278, the conflict was resolved by the signing of two arbitration

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See also: Arawak Languages; Argentina: Language Situation; Aymara; Bolivia: Language Situation; Cariban Languages; Chibchan; Chile: Language Situation; Colombia: Language Situation; Peru: Language Situation; Quechua; Peru: Language Situation.

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judgments, known as the *Pariatges*, between the bishop of Urgell and the count of Foix (in Occitania). The *Pariatges* established the co-sovereignty of the two rulers over Andorra, recognizing equality of rights, and thus gave the small principality its territory and political form. Andorra continues nowadays to be a co-principality, with the bishop of Urgell and the president of the French Republic as the co-princes by personal title and in absolute equality. Therefore, not only its geographical situation but also its history explain the influence of the Spanish and the French languages in Andorra.

Catalan (Catalan-Valencian-Balear) is the only official language of Andorra. Catalan is a Romance language of the Western Branch that is also spoken in Catalonia (Spain), North Catalonia (France), and in Sardinia (Italy). Catalan is the only language used in administrative and official affairs. In the streets, however, Spanish is widely spoken, followed by Portuguese and French. This is not surprising if one realizes that Andorrans constitute a minority in their own country; only 33% of the Andorran population are Andorran nationals. The largest group of foreign nationals are Spanish (43%), followed by Portuguese (11%) and French (7%).

The linguistic situation in Andorra is as follows: although Catalan is the official language, it is possible to live in Andorra without speaking it. However, only 3% of the population in 1995 admitted not understanding Catalan at all. Catalan is not being used in the commercial sector or in tourist activities. Other languages have taken over in non-administrative affairs. The Spanish language plays a huge role in this country. There is a large community of Spanish speakers, but they are not the only ones who use Spanish in public: many Catalan speakers use Spanish whenever they leave their homes (in shops, restaurants, etc.). French is still of great cultural importance, and the educational system is built on the French model. In the areas that border France, French is the predominant language in commerce. Portuguese is spoken in family circles, but Portuguese speakers often switch to Spanish as soon as they leave their homes, even if they are addressing another Portuguese speaker.

In January 2000 a new law was passed that installed the linguistic rights and duties of the Catalan language and regulated the situations in which Catalan should be used, addressing a perceived need to regulate and normalize the use of Catalan in Andorra.

See also: French; Spanish.

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Angola: Language Situation

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Languages of Angola

Documentation of the complex language situation in Angola is very scarce. The unstable political situation that prevailed in the country from its independence in 1975 (and even before that) until the first half of 2002 has been blamed for the lack of up-to-date data. The estimates of the population of Angola range from 11 million (2004 est., CIA) to 13.6 million (2003 est., UN). Language statistics presented in this article are largely based on the information to be published in the 15th edition of the *Ethnologue*.

According to the *Ethnologue*, Angola has 41 languages belonging to three different language families. The Institute for National Languages in Luanda (Instituto de Línguas Nacionais, ILN) gives a list of 11 language groups, each with a number of subgroups. Angola shares many languages with its neighboring countries, Congo, the Democratic Republic of Congo (DRC), Zambia, and Namibia.

Bantu Languages

The Angolan Bantu Languages with the largest number of speakers are given in **Figure 1.** It is estimated that four million people speak Umbundu (belonging to the language group R.10 according to the referential classification by Malcolm Guthrie) as their mother tongue, mainly in the central plateau and along the central section of the coast. The fact that Umbundu was extensively used by the political party UNITA made it an important second language for people in close contact with UNITA on one hand, and may well

judgments, known as the *Pariatges*, between the bishop of Urgell and the count of Foix (in Occitania). The *Pariatges* established the co-sovereignty of the two rulers over Andorra, recognizing equality of rights, and thus gave the small principality its territory and political form. Andorra continues nowadays to be a co-principality, with the bishop of Urgell and the president of the French Republic as the co-princes by personal title and in absolute equality. Therefore, not only its geographical situation but also its history explain the influence of the Spanish and the French languages in Andorra.

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Figure 1 Angolan Bantu languages with the largest number of speakers.

have restricted its usage in the areas governed by the MPLA on the other. Loanda Mbundu or Kimbundu (H.20) is usually taken as the second largest language in Angola, with about three million speakers. However, figures produced by the Angolan National Institute for Statistics (Instituto Nacional de Estatística, INE, 1999, as cited in Hodges, 2001) show that the percentage of Loanda Mbundu speakers has decreased from 23 in the 1960 census to only 15 in the survey of 1996. Loanda Mbundu is spoken in the northern part of Angola, in the capital, Luanda, and its surroundings. Linguistic varieties closely related to Loanda Mbundu include Nsongo, Sama, and Bolo. The third widely spoken Angolan language is Kongo or Kikongo (H.10), with more than one million speakers in northern Angola. The *Ethnologue* has separate entries for Kongo San Salvador and Yombe, both spoken in the enclave of Cabinda. In Angola, the people of Cabinda are often referred to as speakers of Fiote, which is given in the *Ethnologue* as an alternative name for West Kongo, a dialect of Kongo.

Chokwe (K.10 in Guthrie's and K.20 in SIL's classification) has about half a million speakers from the northeastern corner to the central and southern parts of Angola. In addition to Chokwe, the *Ethnologue* lists eight other languages for Angola belonging to this language group: Luchazi, Nyemba, Mbwela, Luvale, and Mbunda, each with an estimated 100 000–250 000 speakers, and Luimbi, Nkangala and Nyengo, each with fewer than 50 000 speakers in Angola. Fleisch (2000) added Yauma to this group and claimed that most of these dialects are mutually intelligible. These languages have speakers in the central and southeastern parts of Angola. In Angolan official contexts this language cluster (with the exception of Chokwe) has been referred to as Mbunda or Ngangela.

According to Ntondo (1998: 75), Kwanyama (R.20) has about 350 000 mother-tongue speakers in southern Angola near to the Namibian border. The other two Wambo varieties listed by the *Ethnologue*, Ndonga and Ngandyera, are hardly spoken in Angola. The Wambo variety in the western part of Kunene province, near Xangongo, is Mbandja. All of the Wambo languages are mutually intelligible.

Languages of the southwestern part of Angola include Nyaneka (R.10), Nkhumbi (R.10), and Zemba (R.30). Nyaneka and its closely related varieties Mwila, Humbe, and Ngambwe are spoken by about

300 000 people. Nkhumbi is spoken by an estimated 150 000 people in Angola, along the Kunene River. Zemba, Twa, Hakavona and Himba are part of an extended dialect continuum, where the last mentioned is closest to Herero, spoken in Namibia.

Lunda (K.20 Guthrie, K.30 SIL) and Ruund, closely related to Lunda, have approximately 200 000 speakers in Angola, in the northwestern province Lunda Norte and in the very eastern part of the province of Moxico. Holu (H.30 Guthrie, K.10 SIL), with fewer than 30 000 speakers, is spoken in the north in the Cuango River area on the border with the DRC. Yaka (H.30), together with a related variety, Mbangala, are estimated by SIL to be spoken by more than 200 000 people in the north central part of the country. Meeuwis (2003) reported that Lingala, a lingua franca widely spread in the DRC and Congo, has mother-tongue speakers also in Angola. Kwangali (K.30 Guthrie, K.40 SIL), Mbukushu (K.40) and Diriku (K.60 Guthrie, K.70 SIL), languages of Okavango and Caprivi, are spoken along the Namibian border.

Portuguese

A survey made by the INE in 1996 (as reported by Hodges, 2001) claims that Portuguese is the mother tongue of 26% of the Angolan population. One should be cautious in drawing conclusions on these statistics, since although the survey was conducted in all 18 provinces, more attention was probably given to the urban than to the rural areas with restricted accessibility. Also the language that was used as a medium of interaction while conducting the survey may have skewed the statistics. However, it is clear that the number of mother-tongue speakers of Portuguese is increasing, and it is far greater than 57 600, an estimate from 1993.

The long interaction between Portuguese and the other languages of Angola has led to lexical borrowings (in both directions) as well as adoption of phonological and syntactic features from African languages in Portuguese.

Khoisan Languages

Most of the people speaking Khoisan languages live in the southeastern part of the country. Kung-Ekoka or !Kung, which is estimated to have fewer than 2000 speakers in Angola, !O!ung, with more than 5000 speakers, and Maligo, with more than 2000 speakers, belong to the Northern Khoisan language family, whereas Kxoe or !Hukwe, with some 100 speakers in Angola, north of Caprivi, belongs to the Central Khoisan language family.

Languages in Angolan Society

Official Status

Portuguese is Angola's only official language. After independence, the Angolan government named six national languages to be studied, developed and promoted. These languages were Kongo, Loanda Mbundu or Kimbundu, Mbunda (which was later changed to Ngangela), Umbundu, Chokwe and Kwanyama.

The constitutional law that dates from November 11th, 1975, with the latest revision from 1992, does not include any statement about languages. The Constitutional Commission declared in 2000 as one of its fundamental principles in preparing the new constitution to value the national languages and their promotion, study, teaching, and usage, as well as to define Portuguese as the official language.

In June 2004 a proposal for a statute on national languages was being discussed in Angola. The proposed law states that any language historically used by Angolan peoples is to be regarded as a national language, irrespective of the number of speakers. It aims at institutionalizing the usage of the national languages and emphasizes the need for their development and promotion (Gourgel, 2004).

Language Standardization and Formal Education

The ILN works for the standardization and promotion of the national languages. Language-engineering tasks have also been performed by churches and NGOs that promote literacy. The United Nations Development Programme (UNDP) has assisted the institute in organizing research projects with the aim of creating alphabets for the national languages (ILN, 1980; Ntondo, 1998: 78). The ILN has produced grammars and vocabularies for the six selected languages, although not always of the best scientific quality. Most of the languages of Angola still lack a standardized norm.

Portuguese is the only language used as a medium of instruction in the formal education system of Angola. The Ministry of Education organized a national consultation on education (the UNESCO program Education for All) in Luanda in April 2004. The participants identified the following problems related to language and learning: the poor knowledge of Portuguese by learners and of local languages by teachers, and the nonuse of the local languages and sign language in the education system. It is planned to implement the national languages in primary education in 2005 (Amélia Mingas, personal correspondence, 2004). Both the Catholic University of Angola and the Agostinho Neto University are prepared to assist in teacher training together

with the Ministry of Culture, which is also engaged in producing didactic material in the national languages.

The literacy rate was estimated at 49% in 2000. Literacy projects are operated in Portuguese and in eight national languages, including Ibinda and Nyaneka-Humbi (Nyaneka) (UNESCO, 2003).

Literature, Press, and Broadcasting

The churches have been active in printing in African languages. In the colonial time all books and leaflets were either bilingual or exclusively in Portuguese, because it was strictly prohibited to have any publication in an African language without having the same content printed in Portuguese.

Most modern Angolan literature is in Portuguese. However, there are books, or parts of books, in the national languages. All Angolan daily and weekly newspapers at the national level use exclusively Portuguese.

The Televisão Pública de Angola (TPA) broadcasts most of the time in Portuguese. It produces informative programs in Kongo, Loanda Mbundu or Kimbundu, Ngangela, Umbundu, Chokwe, Kwanyama, and Fiote. These languages, together with Luvale, Nsongo, Lunda, Mbangala, and Nyaneka, are the languages of broadcasting on the radio channel N'gola Yeto. It is a separate channel of the Rádio Nacional de Angola (RNA) for the national languages. Three other channels of the RNA and the catholic Rádio Ecclesia broadcast nationwide in Portuguese.

The Angolan Language Situation in Change

About a million people died as a consequence of the Angolan civil war, which lasted for almost 30 years. According to the United Nations Office for the Coordination of Humanitarian Affairs, 4.29 million people were internally displaced in Angola in January 2002. Two years later, nearly all of them had either returned to their areas of origin or resettled in their host communities. At the beginning of 2004, half of the refugees, estimated at 450 000, had returned home from the countries bordering Angola. These migratory movements have certainly affected the language situation. Further, the accelerated urbanization led to an increase in the number of mother-tongue speakers of Portuguese.

In the colonial time, the national languages were said to be 'languages of dogs.' The acquisition of Portuguese was a prerequisite for Angolans to become citizens with full rights. Portuguese has remained the language of the elite after independence. Mufwene (2002) claimed that "shifting to a particular language is typically associated with particular benefits to be derived from its usage, especially economic benefits." This is true for many Angolan families where the parents do not see any point in passing their mother tongue to their children. Although Portuguese still is the key to economic success, the national languages are also being valued more and more, and attitudes are changing to the benefit of multilingualism at both national and personal levels (Matondo Tomalela, personal correspondence).

See also: Bantu Languages; Education in a Former Colonial Language; Identity and Language; Khoesaan Languages; Language and Dialect: Linguistic Varieties; Language Attitudes; Language Education Policies in Africa; Language Maintenance and Shift; Mother Tongue Education: Standard Language; Mozambique: Language Situation; Portuguese; Society and Language: Overview; Standardization.

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http://www.angola.org.

Anguilla: Language Situation

Editorial Team

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The official language of Anguilla is English and 8000 of the 13 008 inhabitants speak it. It exists in a continuum with the other language of the island, Leeward Caribbean Creole English. This has 13 000 speakers although many villagers deny using it. Leeward Caribbean Creole English, although mainly spoken in Antigua and Barbuda, exists in a dialect continuum across the entire region and there are also significant numbers of speakers in Dominica, Montserrat, and St. Kitts-Nevis. The creole is partly mutually intelligible with Jamaican (Southwestern Caribbean Creole English) and possibly with the Bahamas creoles (Bahamas Creole English). Literacy is 95%.

Unlike many other islands in the Leeward group, Anguilla was found to be unsuitable for sugar cane production (*see* **Antigua and Barbuda: Language Situation**). This meant that the island was spared some of the immense social and linguistic changes wrought by the importation of slaves and the deprivations of the plantation system (*see* **Antigua and Barbuda: Language Situation** and **Barbados: Language Situation**).

See also: Antigua and Barbuda: Language Situation; Barbados: Language Situation; Pidgins and Creoles: Overview.

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Animal Communication Networks

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In nature, animals communicate, produce and receive signals, in an environment containing many other animals simultaneously producing and receiving signals, an environment that can be characterized as a network. A 'communication network' describes any system having at least one of two defining properties: (1) a given signal can be potentially received by more than one individual and (2) receivers can potentially receive more than one signal at a time. A network thus consists of several individuals that at any one time may be signaling or receiving signals and whose roles (signaler or receiver) may change dynamically. Examples that clearly fit these properties include dense aggregations of communicating individuals such as frog and insect choruses or social grouping systems. Here, the obvious proximity of signaling individuals means that studies have long incorporated the idea of communication in a network environment. However, even systems in which individuals are less densely distributed may be characterized as communication networks as many signals are adapted to transmit over long distances. For example, in territorial songbirds where individuals defend exclusive areas, the transmission range of signals used (songs) frequently extends over a number of territories; thus, a given signal can potentially be received by many conspecifics. In such systems, a network approach to the evolution of signals and signaling behavior, although potentially equally important, is much less widely used.

The explicit consideration of communication occurring in networks is a relatively recent one that arose from the dissatisfaction felt by some researchers with the limitations of theoretical models based on a simple dyadic communication system. The majority of models of communication (and hence the majority of empirical research) characterize communication as being a process of information transfer between a single signaler and receiver – a signaler–receiver dyad. Thus, the costs and benefits of signaling or responding to signals are considered only within the dyad; costs and benefits accruing due to the wider social environment are rarely considered explicitly. There are two main reasons for this: (1) the problem of many signalers and receivers acting simultaneously and switching roles dynamically is mathematically difficult and (2) the practicalities of measuring simultaneously the signaling outputs of a large number of individuals in the field have only recently been addressed with the advent of affordable, portable multichannel recording devices, and analysis time is considerable and experimental design complex. Practical problems have been tackled more

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successfully than theoretical ones; hence, empirical work demonstrating network effects is far advanced over theory.

Within networks, benefits and costs to both signalers and receivers appear that are not apparent in dyadic considerations. These costs and benefits are detailed separately here for receivers and signalers, although in practice they operate simultaneously within a network.

Receivers in Networks

Receivers surrounded by signaling individuals face problems in locating a particular signal or signaler in a noisy environment. Such problems may be overcome by perceptual or behavioral adaptations. A commonly cited example is that of an adult penguin returning from the sea and attempting to find his or her chick in a crèche of several hundred similar chicks. Both parent and offspring vocalize extensively during the searching progress and can locate the signals of the other, even when embedded in high levels of background noise.

A potential benefit to receivers in networks arises because several signals may be received at the same time (network property 2, above). This presents an enhanced opportunity to gather information for at least two reasons. First, the fact that many signalers are operating simultaneously means that information from a number of sources can be compared directly. Many features of signalers correlate with aspects of their signaling behavior; so, for example, a female attempting to find a mate could reduce searching time by directly comparing the signals of surrounding males. Second, at any one time, some signalers will be involved in direct interactions with one another involving the exchange of signals, e.g., during aggressive or mating encounters. Signals used in this context are likely to provide particularly reliable information due to the need for signalers to perform effectively when confronted directly by a rival or a potential mate. The extraction of information from signaling interactions by third-party receivers has been termed eavesdropping and provides a means of assessing the abilities of future rivals or mates without the costs (e.g., metabolic costs, threat of harassment or direct injury) involved with direct interaction. Eavesdropping allows the extraction of information from interactions, above that available in the individual outputs of those involved; the way signals are used during interactions provides information not simply contained in the signals used. The phenomenon of eavesdropping has become central to the communication network idea largely because it provides the most compelling empirical support for the importance of a network view of animal communication.

In songbirds, the evidence is particularly strong as acoustic playback allows songbirds to be presented with acoustic signals in isolation from other potentially confounding aspects of morphology or behavior (difficult to achieve within a visual signaling system). In order to show that an animal has eavesdropped, it is necessary to show that the behavior of individual receivers is dependent on information available only in an interaction. By simulating singing interactions in the field between two loudspeakers, it has been shown that male nightingales respond more strongly to the leaders of interactions than followers. Similar experiments have involved simulating interactions outside the territory boundary of male great tits in which songs from one loudspeaker overlapped songs of the other (a highly aggressive singing strategy). The response of subject males to subsequent intrusion (again simulated by playback) showed that subjects paid close attention to the interactions and followed the roles of individual performers. In both experiments, 'interactants' differed only in the timing of songs relative to one another. This information is available only in the interaction as a whole; i.e., the timing information cannot be deduced from the individual outputs of interactants alone; thus, subjects must have eavesdropped.

In the natural situation, male great tits likely have prior knowledge of the qualities of neighboring males due to repeated encounters. One experiment gave subjects prior experience with an individual (A) using interactive playback to simulate intruders either more or less aggressive than the subject. An interaction between this known male (A) and an unknown male (B) was then simulated by playback outside the subject's territory, potentially allowing the subject to use A as a yardstick against which to measure the performance of B. Subjects indeed integrated this information, demonstrating that wild birds have the ability to perform some form of simple reasoning to deduce the status of a territorial intruder relative to itself.

Not all such experiments have focused on males as receivers. Experiments have examined the extrapair behavior of mated females when given the opportunity to eavesdrop on interactions staged using playback on their mates and neighbors. Female great tits presented with information that the neighbor was better at expelling intruders than their mate were more likely to subsequently investigate those neighbors' territories. Female black-capped chickadees have been shown to base reproductive decisions on information gathered in this way. Females mated to dominant males that lost to simulated intruders were found to

have a higher proportion of offspring in the nest sired by fathers other than their mate. Thus, the costs of being eavesdropped on may be high.

These experiments demonstrate that songbirds are capable of eavesdropping, but say little about whether birds actually do eavesdrop. A recent study followed the movements of radio-tagged male nightingales while neighboring males interacted with intruders simulated by playback. Tagged males intruded onto the territories of neighbors during these interactions, intruding sooner when interactions were more intense, strongly suggesting that males do indeed eavesdrop.

Similar experimental approaches have been used to investigate the extent of eavesdropping on visual signals used during aggressive interactions in teleost fish. In this case, fish are allowed to witness interactions between others and the subsequent response to winners and losers compared with the response shown to winners and losers that had not been seen. Both male and female fish respond differently to seen winners and losers while showing no response difference to unseen winners and losers; thus, information was extracted from the interaction. These results are consistent with eavesdropping, but are not conclusive due to the difficulties of removing potential sources of information not related to communication (e.g., physically aggressive behaviors).

Signalers in Networks

The most immediate problem for signalers is in getting their message across to the intended receiver(s). An environment containing many signalers competing for attention limits the effective transmission range of the signal and requires signaling strategies that enable signals to be transmitted successfully, e.g., timing signals carefully, raising signal production as competition increases, or directing signals to particular receivers.

Given the potential importance of information transmitted to eavesdroppers (see above), one might expect individuals involved in interactions to either enhance (when performing well relative to opponents) or reduce (if performing badly) information transferred to potential eavesdroppers. Indeed, there are examples of behaviors that reduce or enhance information transfer to others during aggressive encounters. In a number of songbird species, interactants engaged in particularly intense song duels switch from loud aggressive signals to quiet signals that transmit only short distances as the intensity increases; this reduces information transfer during times when interactants are particularly vulnerable. In other species, loud, visually obvious 'victory' displays may be produced by the winner of a contest, leaving surrounding individuals in no doubt as to the outcome. In this case, the intended receivers of the victory display are those individuals that may have been eavesdroppers during the interaction. The changes in behavior of interacting individuals aware of the presence of potential eavesdroppers have been termed 'audience effects'. Audience effects in this context have yet to be investigated experimentally in songbirds, but the presence of potential eavesdroppers can have marked effects on the behavior of interacting fish. In the presence of watching females, interacting male Siamese fighting fish decrease directly aggressive behaviors and increase conspicuous aggressive visual displays. In the presence of a male audience, males 'winning' an interaction do not change their behavior, but those 'losing' reduce display intensity, reducing information transfer to the audience. The influence of social environment on communication may be more complex, however, as recent studies suggest that these types of experiments may have overestimated audience effects due to preexposure of interactants to audiences, causing increased aggressive motivation.

Implications of Networks

Recognition of the fact that communication occurs in a social environment is not new; social context is implicit in a number of models of communication and a major consideration in the design of field experiments. However, empirical studies that explicitly explore the social environment within which communication naturally occurs are a new development and provide compelling evidence for its importance in the evolution of communication systems. Despite this evidence, the current theoretical framework rarely considers the social environment explicitly. For example, there are currently no models that enable us to make predictions about when, where, and how the extraction of information by eavesdroppers is favored or to predict the effects of eavesdroppers on the use of particular aggressive strategies. A recent game theory model that included an eavesdropping strategy found that eavesdropping was stable at only a low level as eavesdroppers were unable to predict how other eavesdroppers would behave; this represents a limitation of the model rather than an accurate representation of the world but highlights the difficulties of including such strategies effectively. In some areas, specific models that fit well with empirical data have been developed, for example, models that predict calling strategies in

dense frog choruses. Similar models are being developed for other taxa and it is likely that such an approach will be of great benefit in understanding all aspects of the evolution of communication.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication: Overview; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Bats: Communication by Ultrasound; Bee Dance; Birdsong; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Traditions in Animals.

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Animal Communication: Deception and Honest Signaling

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The Problem

Evolutionary theory has a very clear and precise view on the function of communication: the sender emits signals to manipulate receiver behavior to the sender's benefit (Dawkins and Krebs, 1978). If there is no signaling benefit to the sender, no signaling takes place. This insight raises two important questions that are intimately linked to each other: (1) Why should receivers ever pay attention to signals if their response supposedly benefits someone else? (2) How accurate is the information transferred by the signaler? For example, could a weak male emit deceptive signals to pretend that he is the biggest shot in town to attract females for mating? If not, what mechanisms keep signals honest so that it may pay receivers to extract information relevant for their own fitness? As outlined below, evolutionary biologists have come up with a variety of answers to these problems.

No Conflict between Sender and Receiver

Under a variety of circumstances, the benefits for the signaler coincide with benefits for the receiver, so there is no conflict of interest. The signal should be honest and the receiver should respond appropriately to its meaning. Conflict is often absent (or at least reduced) if sender and receiver are genetically related (Hamilton, 1964). A parent giving an alarm call when spotting a predator to make its offspring and other relatives move into shelter still signals according to evolutionary theory (it increases its fitness by manipulating the behavior of someone else) but it is clearly also in the interest of the relatives to respond to the alarm call.

Also between unrelated individuals, there may be situations where there is no conflict between sender and receiver. To stay with the example of alarm calls (references in Bshary and Noë, 1997), it may pay individuals to give alarm calls to warn unrelated group members if (a) the response increases movement activity that may make it difficult for a predator to single out any individual prey, including the signaler ('confusion effects'), (b) the response is that one or several alerted individuals protect group members, including the signaler, against the predator, or (c) by increasing the survival probability of group members, the alarming individual might receive default future benefits through group augmentation (Kokko *et al.*, 2001). For example, larger groups may have more helpers to raise offspring of the signaler or may be more likely to defend resources against neighboring groups.

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See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication: Overview; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Bats: Communication by Ultrasound; Bee Dance; Birdsong; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Traditions in Animals.

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An intriguing argument for conflict-free honest signaling in the context of mate choice uses the following logic (Wedekind *et al.*, 1995): Sexual recombination serves to get optimal allele diversity on the major histocompatibility complex (MHC), the region of the genome that codes for defense against all sorts of parasites and diseases. Therefore, there might not be a single ideal partner for all members of the opposite sex but the best partner has complementary alleles. In that case, the best strategy would be to advertise one's own allele composition honestly in order to get the most suitable partner.

Potential Conflicts of Interest between Signaler and Receiver

Investigating communication becomes most interesting when interests between sender and receiver can be sometimes coinciding and sometimes conflicting. Consider an interaction between a cleaner fish and a predatory client (Figure 1). The predator opens its mouth as a signal to invite mouth inspection by the cleaner, which removes parasites and remaining food particles. As long as the signal is honest, both sides benefit. The predator gets its mouth cleaned and the cleaner fish gets a meal. However, the predator might sometimes be so hungry that eating the cleaner would yield a higher benefit than ectoparasite removal ('eating is cheating'). Under such circumstances, the cleaner might be better off ignoring the invitation for mouth inspection.

From an evolutionary perspective, no relationship is free of conflicts unless individuals are genetically identical. Even between parents and offspring, conflicts may occur, e.g., over parent food provisioning rates or how parents distribute food among siblings (Trivers, 1974). Whenever the interests of sender and receiver are different, the sender would profit from sending deceptive signals that elicit the receiver's best response for the sender's fitness. But deceptive signals would select for receivers that simply ignore the signals, and communication would eventually break down. So what forces keep signals honest? Zahavi (1975) found a simple and powerful solution, which was mathematically formalized by Grafen (1990): signals have to be costly to be honest. For example, among male peacocks, only those of high genetic quality and/or with access to good food resources will be able to put a lot of resources into growing a big tail with plenty of eyes to impress females enough to achieve mating. A male in poor body condition would find it too risky to grow an equally spectacular tail because it would lose resistance against parasites or might be easily caught by a predator (Petrie, 1994). The male peacock's tail thus functions as an anatomical handicap, and the costs involved in growing and keeping it make the tail an honest signal of male quality. The handicap principle has become the most widely acknowledged explanation for honesty in signals (Johnstone, 1995).

Figure 1 Two cleaner wrasses, *Labroides dimidiatus*, inspecting a potato grouper, *Epinephelus tukula*. The open mouth of the grouper signals the 'wish' to have the mouth inspected for the removal of parasites and food leftovers.

Deception and Tactical Deception

Animals often try to deceive other individuals (see some examples below). So how does this fact influence receiver behavior? Particularly in conflict situations, the solution is that everybody tries to cheat as much as possible, but the signals still reveal important information as the possible amount of cheating is physically constrained. Fish erect their fins to appear larger than they are to impress opponents by size, and birds and mammals spread their plumage or fur for the same reasons. The apparent size is nevertheless constrained by the real size, so animals can still assess relative sizes when matching for a conflict. Similarly, body size may constrain the production of low-frequency calls, and a small individual therefore cannot pretend to be bigger than it really is.

The observation that animals may be able to produce signals out of context, eliciting context-specific responses from receivers to their own benefit and to the receiver's cost, has attracted particular attention. Such an ability fits the functional definition of tactical deception (Hauser, 1998). Tactical deception in humans implies high cognitive abilities, such as planning, insight, and theory of mind, and evolutionary psychologists have tried to link tactical deception in animals, particularly primates, to the same mechanisms (Byrne and Whiten, 1988). However, the phenomenon can be produced with a relatively simple mechanism: operant conditioning (Heyes, 1998). All that is needed is that an initial error gets rewarded to start the story. For example, an individual may give an alarm call but immediately realize that it has made an error. However, as everybody else gets distracted, the individual may get increased access to a food source (the reward) and hence associate the alarm call with a food reward. Further studies are needed to find out what mechanisms underlie functional tactical deception in different animal species. Currently, there is evidence for functional tactical deception in mammals (Byrne and Whiten, 1988), birds (Munn, 1986), and fish (Bshary, 2002).

How frequently deceptive signals can be produced so that they still fool observers has to be evaluated. While verbal arguments have predicted low frequencies (Dawkins and Krebs, 1978), game theory models indicate that that is not necessarily the case (Johnstone and Grafen, 1993; Szamado, 2000). In particular, if the benefits of reacting appropriately to an honest signal largely outweigh the cost of reacting inappropriately to a cheating signal, tactical deception may occur at pretty high frequencies. Predator calls are again a good example: rather respond too often to a false alarm and miss out on foraging opportunities than ignore an alarm call when a predator attacks.

Signaling in Communication Networks

Communication often takes places not just between signaler and receiver but in a communication network (McGregor, 1993): bystanders may eavesdrop on the communication and extract valuable information about the participants (aggressiveness, fighting ability, cooperative tendencies, etc.). This fact may have important implications for the honesty of signals. Rather than just trying to optimize payoffs in their current interaction, individuals have to adjust their behavior according to its consequences on future interactions with eavesdroppers (Dutreland *et al.*, 2001; Bshary, 2002). As a consequence, individuals may be more aggressive in agonistic situations to deter potential future opponents (Johnstone, 2001). Eavesdropping may also open up new possibilities for tactical deception. For example, individuals could cooperate or be altruistic in the presence of eavesdroppers to gain a positive image. Eavesdroppers may then seek cooperative interactions with them but will be exploited as the 'deceivers' switch to cheating. This pattern has been observed in cleaning mutualisms where cleaner fish cooperate with small clients to attract bigger clients that the cleaner will cheat by feeding on mucus rather than removing ectoparasites (Bshary, 2002).

A New Element: Costs to the Receiver to Evaluate Signal Information

An interesting question is why humans often tell the truth, given that language is so prone to giving false information, as words are virtually cost free to produce: saying 'I am very rich' takes as much effort as saying 'I am currently unemployed.' There are certainly several components that promote honest signaling. Humans typically interact over long time periods and have very good memories. Hence, they may remember very well if someone cheated them and hold grudges for long time periods. A very interesting component has recently been modeled by Koops (2004). Often, the receiver may not be able to decode a signal without incurring some costs. For example, an alarm call may be without much value as long as the receiver does not know where the predator is. So the receiver has to put in some effort to find this additional important information himself. The more effort the receiver has to put in to achieve relevant information in addition to a signal, the more valuable

the signal must be so that it still pays receivers to listen. As a consequence, signals have to become more reliable the more effort it takes the receiver to decode the signal or to add additional information. A particular feature about humans might be that we tend to verify plenty of information that is given so cheaply by signalers. This effort has two consequences. First, we might find out at some point whether a signaler was lying to us and take appropriate action (usually to the disadvantage of the cheater). Second, we might stop decoding signals if the signal quality is expected to be poor or unreliable. Both consequences promote honesty in signals that are more or less cost free to produce.

See also: Alarm Calls; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Birdsong; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication.

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Animal Communication: Dialogues

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Animals, like humans, often use signals to interact with each other in a dialogue-like manner. Dialogues in animal communication, like in human communication, are signaling interactions in which two individuals take turn in signaling. Such dialogues are most evident in acoustic communication systems, but many of the conspicuous visual displays in contests or mate acquisition also can be viewed as dialogues. Dialogues in animal communication systems can vary enormously in the degrees of freedom with respect to the signaling reply a signal elicits. In the simplest form, a reply to signal A will always be a specific signal, such as A′ or B, i.e., a very stereotyped form of a 'dialogue' with degrees of freedom restricted to minor variation in signal structure and to the temporal relation between the signals. Such

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See also: Alarm Calls; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Birdsong; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication.

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dialogue forms are typical in insects and frogs or toads, whose complete vocal repertoire is made up of either a single signal or a few signals, and in some dueting bird species, in which the signals of two singers (usually a paired male–female dyad) follow each other in a fixed sequence. In species with more elaborate vocal repertoires, such as in many songbirds and marine mammals, the choice of replies to a specific signal is much larger so that dialogues are characterized by a high dynamic to the time and pattern relations between a signal and its reply. These complex interactions fit best the complex dialogues in human communication, which are characterized by high flexibility in use of vocalizations as replies and counterreplies. In particular, birdsong has become a key biological system to study and reveal the principles of vocal interactions. Similar patterns of communication are now evident in marine mammals, but interestingly much less so in most nonhuman primates.

Many birds and marine mammals are outstanding in the versatility and flexibility with which they interactively use vocal signals. Individuals might answer each other with the same signal pattern, called signal matching, which has been shown to be common in some marine mammals and birds. The signals concurrently may have specific time relations, which is another means of addressing another individual and of signaling motivation – e.g., overlapping the signal of the other animal often is used as and perceived as a form of aggression. Male territorial songbirds use their songs to interact with territorial neighbors, a striking phenomenon that can be observed easily in spring, when singing activity peaks. The frequent countersinging between two or more neighboring males can be highly complex, with high versatility in how songs from the interactants relate to each other. These complex and flexible interactions are probably the best comparison to dialogues in human language. During these dialogues, individuals negotiate about access over resources by signaling their quality, signal their motivation to escalate, or transmit other aspects of their individual states. Often more than two individuals interact in a communication network, but the nature of possible dialogues within such complex settings remains to be shown. The situation is altogether different in another vocally outstanding group of birds, the duet singers, which are frequently found in the tropics. Males and females coordinate their song patterns with astoundingly high precision. The function of these duets can be manifold, and many hypotheses – including cooperative and competitive functions – have been put forward to explain this vocal behavior.

Taken together, vocal interactions in animal communication are strikingly diverse, ranging from very simple forms of signal exchanges to highly complex and dynamic vocal signaling interactions. The functions commonly are related to competition over resources, such as food, space, or mates, but it also appears that specific forms of dueting are associated with cooperative aspects, such as the maintenance of group cohesion and the strengthening of pair bonds. In all these cases, signal patterns emitted by two individuals also have clear relations to each other in the way they are timed. Information content is varied by the use of specific signal patterns and their temporal relation to those of the counterpart. Thus, even though the nature of information in human dialogues differs from that in dialogues in animals, they do share basic principles, suggesting that dialogues have a long evolutionary history and central biological importance in communication and language evolution.

See also: Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Apes: Gesture Communication; Birdsong; Communication in Grey Parrots; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication.

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Animal Communication: Long-Distance Signaling

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Many animals communicate acoustically, without words or syntax. A solitary male gorilla (*Gorilla gorilla*) in Cameroon once shouted at me from approximately 90 m away (see **Figure 1A**). His message, the presence of an impressive creature that did not like me there, was well received. Additionally, I figured out the species and the sex of the animal without seeing it, and (to my relief) I could also tell by the acoustic change in subsequent calls that it was moving away from me. Animals familiar to their habitat and perceptually tuned into the details of conspecific signals potentially pick up even more information. Monkeys and birds, for example, are known to detect and respond appropriately to acoustic cues related to social status, motivation to fight or to have sex, and group or individual identity (e.g., Cheney and Seyfarth, 1990; Collins, 2004). Although the gorilla had been loud and impressive at a relatively short distance, none of the other researchers in the area had noticed his calls: the sound had been unable to penetrate the dense forest very far.

Constrained by the Environment

Animals that use sound to communicate over long distances often try to convey a message that is related to reproduction. Howling monkeys, singing birds, and calling frogs are all usually trying to attract potential mates or deter mating competitors. Reasons for this are that sound can be relatively easy to produce, can be switched on and off, and often works

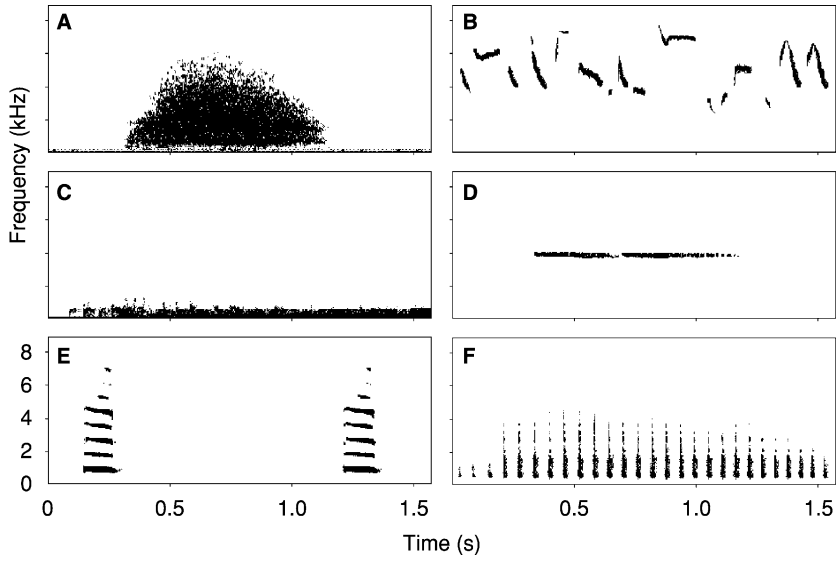

Figure 1 Acoustic signal design for six animal species, sonographically displayed with time on the *x*-axis, frequency on the *y*-axis, and the relative amplitude reflected in the darkness of the signal trace. (A) Gorilla shout, a very loud sound but the noisy structure with energy spread over a broad frequency range makes it not very suitable for long-distance transmission through dense rainforest (recording contains two shouts plus echo). (B) Winter wren song notes, with a relatively high and wide frequency range; heavy degradation with transmission limits information transfer but allows ranging; estimation of distance to the sound source (recording is a full song without much degradation). (C) Elephant rumble, very low and loud, including sound inaudible to humans (infrasound) and a seismic component, the ultimate long-distance signal (the audible part of the recording is best listened to with headphones on). (D) Green hylia song, two simple notes at one pitch avoiding problems of spectral degradation and exploiting the benefits of reverberations (recording is filtered, which eliminated ambient noise). (E) Tree-hole frog call, with its spectral distribution adjusted to exploit burrow resonance effects (recording has a natural longer interval between subsequent calls compared to the sonogram). (F) Black-backed woodpecker (*Picoides arcticus*) drum, generated using a tree as instrument.

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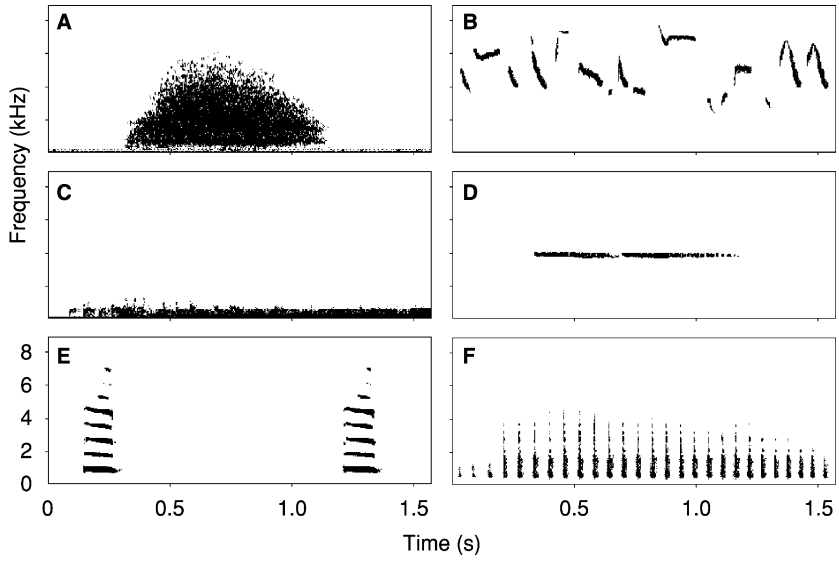

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better to reach other individuals than visual and chemical stimuli. Furthermore, sound can convey messages through vegetation, in the dark, and around corners. However, acoustic signals also have their limitations: when traveling from sender to potential receivers, acoustic signals lose energy and the original acoustic fine structure becomes distorted. In short, successful detection and recognition over a long distance depend on the amplitude of the signal as produced by the sender, the auditory sensitivity for the signal characteristics of the receiver, the amount of interference by ambient noise at the receiver, and the level of attenuation and degradation that accrues during transmission through the environment (Brenowitz, 1982; Wiley and Richards, 1982; Slabbekoorn, 2004). This implies that communication potential varies dramatically among animal species, because the transmission distance of successfully conveyed messages heavily depends on body characteristics that allow production of loud sounds, and on the typical environment in which a species lives.

A case study on a tiny bird like the winter wren (*Troglodytes troglodytes*) has shown that its song of many distinct clear notes spread over a relatively wide frequency range (see Figure 1B) indeed suffers dramatically during transmission through their usual habitat with dense vegetation (Holland *et al.*, 1998). Many scattered echoes result in reverberations producing a 'tail' of sound, thereby filling originally silent pauses and masking subsequent notes. Reverberations alter the original temporal and amplitude modulation pattern and together with frequency-dependent attenuation this may render the wren songs difficult to decode. However, there are several ways in which signal and signaling behavior may evolve to counteract such challenging habitat conditions. Winter wrens are exemplary for having a very loud song despite their relatively small body size of approximately 10 g. They are also known to climb up in the shrubs when producing or hearing song and this affects potential communication distance positively by preventing ground absorption as well as high attenuation and degradation rates in usually dense low leaf layers (Mathevon *et al.*, 1996). Interestingly, birds, like humans, are able to estimate the distance of a singing conspecific based on the predictable pattern of degradation and attenuation with transmission distance (Naguib and Wiley, 2001). Thus, on the one hand, signal distortion inevitably leads to information loss, but at the same time several counterstrategies may help animals to cope and the distortion level itself may even provide information of another kind.

Shaped by the Environment

Environments vary in both noise interference patterns and sound transmission characteristics: it makes a difference whether you signal acoustically in a silent and tree-less desert or a noisy and densely foliated rainforest. Given a certain environment, however, the acoustic design of the signal itself also affects effective communication distance. The signal design may therefore evolve to fit local conditions best as another counterstrategy for coping with the environmental constraints. The environment may be noisier in one part of the spectrum than another and there are several examples of animal species that utter their signals exactly within a relatively silent frequency range. The calls of pygmy marmosets (*Cebuella pygmaea*), for example, have frequencies that coincide with relatively quiet spectral regions in the ambient noise of the Amazonian rain forest in Ecuador (De la Torre and Snowdon, 2002). Coqui frogs (*Eleutherodactylus coqui*) of Puerto Rica call within a relatively narrow frequency channel, which is different from those used by other noisy and closely related species in the same forest. In this way, the chorusing males of a diverse frog community avoid interference, with each species tuning into a 'private' frequency channel (Narins, 1995). Recently, a common urban songbird, the great tit (*Parus major*), was found to leave out low-frequency song components in territories with a great deal of low-pitched traffic noise (Slabbekoorn and Peet, 2003). Apart from ambient noise spectra, low frequencies transmit further than high frequencies and are less affected by vegetation, and rapidly repeated frequency-modulated notes do better than long narrow-band notes in turbulent air of open space (Brown and Handford, 2002). As a consequence of all these factors, habitat-dependent acoustics are partly responsible for the evolutionary shaping of the signals present in a particular habitat. Consistent acoustic variation associated with habitat type is found especially in birds and, for example, stereotypically low and slow bird songs are well known to be widespread in dense tropical forests across avian taxa and across continents (Slabbekoorn *et al.*, 2002; Slabbekoorn, 2004).

As one needs low pitch to get far and a large instrument to play a low tune, success stories of long-distance transmission typically come from large-bodied animals. Australian cassowaries (*Casuarius casuarius)* are flightless birds of up to 58 kg and they can produce sounds with fundamental frequencies at approximately 20 Hz, which makes them well designed for their dense rainforest habitat (Mack and Jones, 2003). African elephants (*Loxodonta africana*) can

generate rumbles with fundamental frequencies around 10 Hz (see Figure 1C) and under optimal weather conditions they should be able to communicate with such calls over distances of 10 km or more (Garstang *et al.*, 1995; Larom *et al.*, 1997). The optimal weather for sound transmission is a relatively cold and humid layer of air near the ground and low wind velocities causing little air turbulence. Interestingly, the extremely low elephant calls may also generate a seismic signal component that travels through the ground and which may be picked up by elephants 2 km away. In bad weather, dry and windy, or wet and noisy, seismic signals could even be more reliable than acoustic signals (O'Connell-Rodwell *et al.*, 2000).

Exploiting the Environment

Many animals use sound signals adapted to put up with suboptimal environmental conditions, but some even exploit acoustical phenomena in their surroundings. The reed warbler (*Acrocephalus scirpaceus*), for example, is a common European songbird and lives among dense stands of reed stalks. Transmission experiments revealed that sound above 6 kHz attenuates very fast, but below 4 kHz it transmits relatively well, and below 2 kHz sound may even attenuate less after transmission through reed compared to transmission through the open (Heuwinkel, 1982). The relatively modest and sometimes even so-called 'negative excess' attenuation for some frequencies may be due to resonance properties of reed stalks. Stalks and surroundings may be set oscillating depending on the pitch, modifying frequency-dependent sound transmission, and thereby favoring the relatively low reed warbler songs. The green hylia (*Hylia prasina*) is another small bird beaming its territorial song through dense layers of leaves and twigs in rainforest of Central Africa (Slabbekoorn *et al.*, 2002). Unlike most acoustic designs, its two-note song that remains at the same pitch of approximately 4 kHz (see Figure 1D) hardly suffers from the dramatic reverberations in this habitat. No spectral degradation occurs as all echoes remain at the same frequency, and the temporal pattern is affected by the accumulation of echoes in such a way that it makes the notes longer and louder. So, in contrast to the complex winter wren song, the simple hylia song may actually benefit from reverberations. Playbacks with experimentally manipulated note durations have confirmed that longer notes lead to stronger responses by green hylia territory holders (Slabbekoorn *et al.*, 2002).

The position of signaling individuals within their habitat can be crucial for efficient communication as mentioned above for the wren. This may be especially true for small animals like frogs, for which call radiation has been shown to benefit from sitting on large leaves (Wells and Schwartz, 1982). Similarly, many frog species call from a hole or burrow where they benefit from wall reflections and resonance amplification. Bornean tree-hole frogs (*Metaphrynella sundana*) call from tree holes containing water (see Figure 1E). These egg-deposition sites vary in depth and water level, and the male frogs seem to actively match their call pitch to the associated variation in resonance frequencies (Lardner and bin Lakim, 2002). Burrow resonance can amplify outgoing as well as incoming calls. The call amplitude of a South American frog species (*Eusophus emiliopugini*) was found to be strongly affected by this phenomenon: calls of neighbors were considerably louder inside the burrow of a receiving frog than levels just outside the burrow (Penna and Solis, 1996).

Woodpeckers are also well known to exploit acoustic phenomena in their environment. They advertise their territory by drumming through rapid series of strikes with their bill against a part of a tree (see Figure 1F). Species vary in the rate of strikes, the duration of a series, and in whether rates incline or decline over the series. Consequently, many species can be distinguished by the human ear, and as shown for North American species, together with nonoverlapping distributions and seasonally shifted drumming activity, confusion about drummer identity among woodpeckers themselves is very unlikely (Dodenhoff *et al.*, 2001). The sound spectrum and amplitude level of woodpecker drums are both dependent on the substrate chosen. A study on drumming in yellow-bellied sapsuckers (*Sphyrapicus varius*), using an artificial drumming device to investigate substrate characteristics, showed that the substrate selected for drumming produced louder sounds than nearby sites on the same or different trees (Eberhardt, 1997). Not only woodpeckers use drumming to generate long-distance signals. Chimpanzees (*Pan troglodytes*) are also known to use drumming to communicate over at least a kilometer in their forested habitat, hitting buttresses of trees with hand and feet in combination with vocal 'pant hoot' calls (Arcadi *et al.*, 1998). Furthermore, a variety of smaller mammals 'foot drum' or 'head bang' to communicate with seismic signals; likely, the best option for communication with subterranean lifestyles (for a review see Randall, 2001).

Long-Distance Communication in Humans

I hope it has become clear from the above that many animals that exchange important messages acoustically over relatively long distances are constrained

by their environment. As conveying a message successfully can have important fitness consequences, habitat-dependent sound transmission can direct the evolution of animal signals. Therefore, specific environmental conditions can often at least partly explain the acoustic design of long-distance calls and some animal species have evolved some smart solutions to optimize transmission.

People are also known to use drumming on hollow logs to communicate over long distances though forest or over the African savanna. Furthermore, several human cultures use special whistle repertoires to communicate in montane areas, where walking distances between hilltops can be long, whereas sound can travel as the crow flies (Busnel and Classe, 1976). The acoustic design of these whistles, very similar to the green hylia song, is well adapted for long-distance transmission and may reach others up to 5 km away. However, are any of the phenomena discussed for animal signals relevant to the human voice when used to communicate outdoors? Is the acoustic structure of human language affected by environmental conditions? Interestingly, a comparative study of indigenous languages across the world found a strong correlation between climate and some acoustic features that affect audibility over a distance (Fought *et al.*, 2004). Languages spoken in warm climate zones were shown to have higher sonority levels compared to languages from cold climate zones. Sonority level is determined by the nature and rate of occurrence of phonetic segments and typical consonant-to-vowel ratios. One explanation for the correlation between climate and sonority level may be that depending on climate, people may talk more or less often over a relatively large distance while being outdoors (Fought *et al.*, 2004). Languages with a low sonority score, such as English, must be spoken louder to be audible at the same distance as, for example, highly sonorous Tongan (Nettle, 1994) and these are typical examples from a relatively cold and a warm climate.

Long-distance communication in humans without real words is known from cow- and goat-herding cultures in montane areas. Scandinavian women traditionally use a specific calling technique called 'kulning,' whereas both men and women are known to 'yodel' to communicate among widely dispersed herders in the Alps. Kulning can be described as a kind of loud singing of relatively high-pitched tones, produced with unusually high subglottal pressure and lip, mouth, and throat adjustments for optimal use of vocal tract resonance or formants (Tellenbach Uttman, 2002). The reason for an incline in frequency associated with an effort to become loud (see, e.g., Vilkman *et al.*, 2002) may be that it is easier to produce a higher tone at a high amplitude, but it may also exploit best transmission channels for a target distance, or avoid masking by the usually low-pitched ambient noise of rumbling wind and mountain streams. Yodels are also relatively high and the typically repeated alternation between normal chest voice and head voice or falsetto may also have evolved through proven efficiency in long-distance detection and recognition. Abrupt frequency changes are very common in animal long-distance calls and are, for example, known to convey important information in doves. Whether the outcome of call evolution in humans communicating through forest would yield exactly the same acoustic design as found in open areas is not clear, but Tarzan's well-known long-distance call is technically also a yodel and must have reached much further than the wide-band noisy calls of his gorilla friends.

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See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Signal Detection; Birdsong; Communication in Marine Mammals; Dialects in Birdsongs; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication.

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Animal Communication: Overview

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Animals, like humans, communicate with one another, often in strikingly complex ways. Despite obvious differences between human communication and communication in animals, there are many fundamental similarities in the underlying principles. Anticipating how and why animals communicate makes an important comparison to human communication and provides a broader background for understanding human speech and language. Communication in animals and humans has a shared evolutionary history and thus understanding animal communication also helps to elucidate the biological basis of human language. Communication in animals has deep implications for their social life, survival, and fitness; thus,

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Animals, like humans, communicate with one another, often in strikingly complex ways. Despite obvious differences between human communication and communication in animals, there are many fundamental similarities in the underlying principles. Anticipating how and why animals communicate makes an important comparison to human communication and provides a broader background for understanding human speech and language. Communication in animals and humans has a shared evolutionary history and thus understanding animal communication also helps to elucidate the biological basis of human language. Communication in animals has deep implications for their social life, survival, and fitness; thus,

communication systems are among the key research models to elucidate biological processes from within a mechanistic and an evolutionary perspective. It allows the integration of questions raised in, for instance, psychology and very different biological fields, including physiology, neurobiology, genetics, development, and cognition as well as population biology and evolution. Communication, in general, is one of the most fundamental issues in life, as it is crucial at all organismal levels. Cells must communicate within an organism and there are specific adaptations for signals, such as hormones and transmitters, that act as information carriers at these levels. When talking about animal communication, however, we refer to communication among individuals, which is the topic of this article.

Definitions

In many cases such as the melodious song of songbirds and whales and the fascinating body patterns and color traits that are displayed during social interactions, it is undebated that animals communicate. However, there are cases such as a mouse rustling in the leaves and by this behavior attracting a predator that we generally do not interpret as meaning that the mouse is communicating with the predator despite influencing its behavior. For such cases, definitions are helpful and necessary to set the stage even though one must keep in mind that there are numerous definitions that differ in subtleties and in their focus and that it is more important to deal with the issues and questions of interest rather than with coarse definitions. The most common and most widely accepted definition is that animal communication is behavior involving signals as information carriers. Signals in animal communication are understood as behaviors or traits that have evolved **specifically** to provide information from a sender to one or more receivers. Thus, birdsong or frog calls are signals, whereas coughing is not a signal (unless it becomes ritualized to act as signal) even though it provides information about the signaler (e.g., possibly its health status). If information is derived from traits that are not signals, these traits are usually referred to as cues. Signals also cause a change in the state of the receivers without providing the physical energy for this change, another definition that is frequently used. Pushing someone off a cliff is not a signal; telling him or her to jump off is a signal. The nature of a specific communication system then is characterized by a broad range of factors, such as the species, the social system and context in which communication takes place, the function of signals, the interests by senders and receivers (which commonly differ between them), and the sensory modalities used as well as the abilities to produce signals and to perceive and to process them.

What Is Communicated

One of the central questions in animal communication is related to the information that is communicated. Animals communicate information often by using complex signals that simultaneously carry different kinds of information or by using compound signals that carry information in several sensory modalities. In general, animals communicate information about themselves, such as their individuality, species and population identity, age, motivation, genetic background, developmental history, physiological condition, and intentions. In contrast, evidence that animals communicate about external events (referential signaling) is limited to some very specific cases. The best evidence that animals use referential signals comes from honeybees (*Apis melifera*), presumably the most famous case, where the waggle dance on the hive provides information to group members about the location and direction of a food source. Also, alarm and warning calls by birds and primates have been shown to be functionally referential, i.e., that specific signals are used in response to specific types of predators. In general, when dealing with communication, the message, as coded by a sender, must be distinguished from the meaning, as decoded by a receiver, of a signal. A sender codes information in a signal and the signal as information carrier then will carry this information as a specific message. The meaning of a signal, however, depends not only on the sender and the coded information but also on the receiver. For different receivers, a signal that carries the same message may have a different meaning, or even no meaning at all (**Figure 1**).

An advertisement signal by a male may attract a female, as the meaning to a female may be *I am a high-quality and attractive male*, whereas the same signal with the same message may mean to a rival male *I'd better stay away as this is a strong male* and to an individual of a different species that signal may have no meaning at all.

Sensory Modalities

Animals have evolved an enormous variety of highly specialized communication systems across all sensory modalities, such as acoustic signals, visual signals, chemical signals, electric signals, and tactile signals. Each sensory modality has its own advantages and disadvantages in information transfer and there are many intrinsic and extrinsic factors that have favored and shaped the particular communication system in a

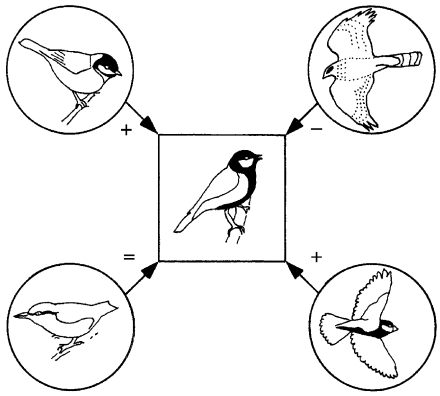

Figure 1 Schematic illustration of the message and the meaning of a signal. A visual or acoustic signal by a sender (center) contains a message to its conspecifics. For a rival male (bottom right), the meaning will be different than for a female (top left). Rivals may be repelled by the signal, whereas females may be attracted. The message is not directed at individuals of other species and may have no meaning to such an individual (bottom left). However, even though the signals and its message are not directed at individuals of other species, the signal may have meaning to a predator that uses such a signal to localize its prey. Drawn after Slater (1999), *Essentials in Animal Behaviour*, Cambridge University Press, Cambridge.

given sensory modality within a species. Among these factors, there are phylogenetic and morphological constraints, and constraints imposed by the environment through which the signals must travel from a sender to a receiver. Which sensory modality is used obviously also depends on the kind of information that is signaled and its biological significance. Advertisement signals for mate attraction need to transmit far and omnidirectionally, e.g., acoustic signals. They also need to be conspicuous, e.g., acoustic signals or visual signals when the habitat does not constrain sight; signals need to be persistent, even in the absence of the sender, e.g., chemical signals used in many mammals for territorial marking. Short-range interactions, such as communication between close group members or parent–offspring communication during feeding or nursing, require a different set of signals that often are soft and subtle. Many of the basic principles of communication apply in one form or another to several sensory modalities. For those interested in language and linguistics, vocal communication presumably will be of most interest. Thus, this article, in addition to focusing on general issues and providing an overview about the three best studied sensory modalities, draws several examples from vocal communication as well because it provides key examples of major issues in animal communication. Despite separate treatment of the sensory channels, it should be mentioned that often communication involves a

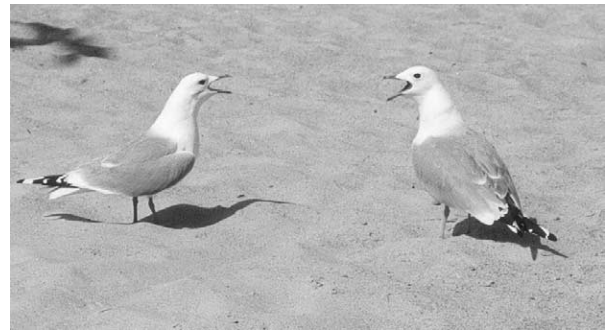

Figure 2 Communication often involves concurrent and compound signaling in different sensory modalities, as in these common gulls, in which calling is associated with specific body postures.

simultaneous combination of different modalities (Figure 2).

Acoustic Communication

Acoustic communication is found across the animal kingdom and in most cases is characterized by its conspicuousness, even though acoustic signals can also be subtle and soft. Some animals even communicate acoustically outside our hearing range, such as bats or rats, which use ultrasound, or elephants, which communicate in the infrasonic range. Birds and whales sing, frogs and insects call, deer roar, and there are many other examples making us wonder what the functions of these complex and diverse behaviors are. In most cases, the loud and conspicuous signals are advertisement signals used for resource defense, such as a food source or a nesting place, or to attract a social mate or a mate for extrapair copulations. Acoustic signals are ideal for such advertisement as they allow rapid coding of complex information and most importantly the signal with its information transmits almost omnidirectionally. Thus, acoustic communication is less 'private' than visual or even tactile communication, as in most cases the signal cannot be sent exclusively to a specific receiver. In long-range communication, which often occurs over distances of 100 m or more in birds or even occurs over distances of kilometers in whales or elephants, the signals degrade and attenuate over a distance, leading to signals being different in structure at the position at which a receiver makes a decision compared to the signal structure at the source. Thus, the information available to a receiver, the transmitted information, can differ from the coded information, an issue of increasing interest in studies on animal acoustic communication. Selection by conspecific receivers has led to signals being adapted to the acoustic properties of the habitat by favoring lower frequencies and slower repetition rates of similar

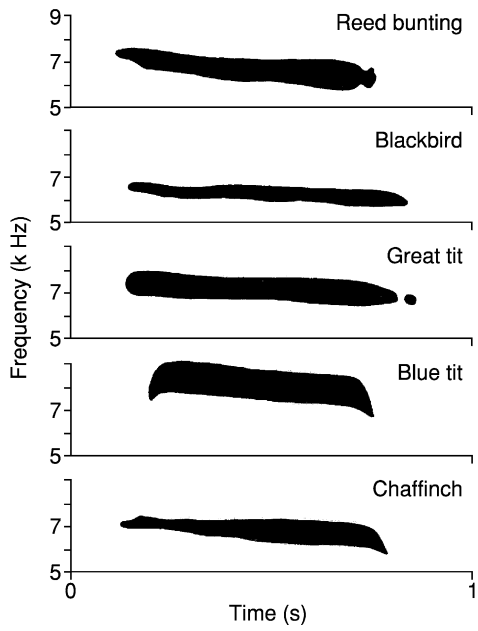

Figure 3 Sound spectrograms of alarm calls of five different species of European songbirds. Calls are very similar in structure. Due to the narrow frequency bandwidth and the lack of strong frequency modulation, the caller will be difficult to localize by a predator. High frequencies also do not travel very far so that they are well suited to warn nearby conspecifics without alerting distant predators. Drawn after Slater (1999), after original source in Thorpe (1961), *Bird song*, London: Cambridge University Press.

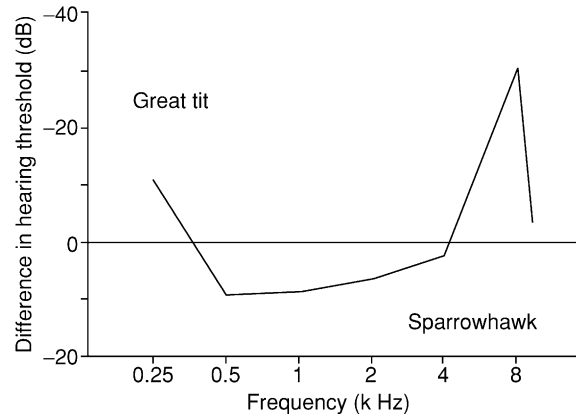

Figure 4 Differences in the hearing curves of great tits and sparrow hawks. The lines above the *x*-axis indicate that the hearing of great tits is superior to that of a sparrow hawk. The alarm calls are centered in the frequency range where hearing by great tits and other songbirds is most superior to that of sparrow hawks. Thus, the high pitch is well adapted to warn nearby conspecifics by minimizing the risk of being heard by a predator. Drawn after Klump *et al.* (1986), *Behavioural Ecology and Sociobiology* 18, 317–323.

frequencies in closed habitats that lead to strong attenuation and reverberation compared to those of signals of species that settle in open fields. Such adaptations reduce ambiguities and increase the efficiency of communication over long distances. Striking examples of adaptations of acoustic signals to the acoustic properties of the environment and receivers' hearing and perception are the high-pitched 'seep' alarm calls given by many songbirds in response to predators (Figure 3). The lack of strong frequency modulation makes the signal difficult to localize and as high-pitched sounds they do not transmit far and thus the sender avoids the risk of being heard and attacked by a predator while still warning nearby group members. A classic study on this topic has shown that songbirds hear significantly better in the frequency range of these calls than do predators (Figure 4).

In addition to alarm calls and advertisement signals, there are many other, often subtle, vocal signals, such as contact calls, food calls, or begging calls.

For those interested in language and linguistics, it is of particular interest that acoustic signals make the best and most direct comparison to human language. Like human language, acoustic signals permit rapid coding of information and thus varying information content rapidly over time. Most interestingly, acoustic communication systems in some animals bear striking similarities to human language even though this may not be evident at first sight. Birdsong makes the best comparison. Like language, it develops under the influences of vocal learning with a key sensory period early in life and it requires a period of vocal practice. There is striking geographic variation, even with discrete dialect boundaries, similar to that which occurs in human language. Birdsong is also learned without specific instruction being required and on a neurobiological level, song is controlled by specific brain regions that are lateralized, as is known for the regions for speech production and comprehension. Birds, like humans, even assess the distance to a source of sound using the same set of cues provided by environmental attenuation and degradation resulting from sound propagation.

Visual Communication

As in humans, vision in general is a key sensory modality in the behavior of many species so that communication is also of central importance in this sensory modality. Transmission distance and direction of visual signals obviously depend on the structure of the habitat. In dense vegetation, such signals are suitable only for short-range communication, whereas in open habitats, they may well be used for long-range communication, even though communication distance in general will be shorter than if using acoustic signals. Visual signals also are more directional than acoustic signals so that they are well suited to address a specific individual but are less well suited to general

omnidirectional advertisement. Two kinds of visual signals need to be distinguished: Those that are always 'on' and those that can be turned 'on' and 'off' like acoustic signals. Visual signals that are always on, such as specific body coloration, allow the individuals to signal continuously with these markings without making a specific active signaling investment in addition to having produced the signal and maintaining it. Such signals that are always on are thus not suitable for transmitting information about any aspect of an individual that varies on a short time scale, such as motivational aspects of behavior. Well-known examples of such visual signals are fur marks in mammals, colorful feather ornaments in birds, and antlers in deer. Other kinds of visual signals can be turned on or off and such signals are visual displays, such as the waggle dance in bees, the zigzag mating display in sticklebacks, and the peacock's train. Such visual behavioral displays in which specific body postures are used to transmit information, or in which specific color or body patterns are displayed actively, can be used to signal additional information that varies on a short time-scale, i.e., motivational aspects of behavior, as the peacock does with its train or some butterflies do by opening their wings when detected by a predator. The information transmitted by visual signals can be directed more specifically at certain receivers. Such directional signaling can be advantageous as it reduces the probability that unintended receivers intercept and extract information that is not in the sender's interest. In addition, directed signaling can attract and maintain attention by intended receivers, leading to specific signaling interactions as is well known for the classic example of mating displays in sticklebacks. Of course, acoustic signals also can be used to specifically address an individual but here it is more difficult to exclude other individuals from receiving the signal. Visual signals may code information about the nutritional state of an individual when the colors or metabolic precursors that are deposited in the fur or the feathers are not easily obtained. Visual signals also may reveal information about age, such as antlers in deer, or developmental history, as has been reported for symmetric ornaments, such as tail streamers in birds. Such signals may be used in decisions on mate choice as they are linked to current nutrition or the nutritional history during development, revealing honest information about aspects of an individual's quality.

Olfactory Communication

Olfactory signals are widespread in the animal kingdom. Even though they are generally less variable and complex than acoustic and visual signals, there are situations in which the use of olfactory signals is advantageous to the signaler. Olfactory signals that are produced specifically to provide information to other individuals are called pheromones but animals can also obtain information about other individuals by perceiving odors from body glands or urine that are not classified as pheromones. Olfactory signals have the major advantage over other signaling modalities in that they can be present even when the sender is absent. Thus, they seem to be ideal for marking territories or home ranges that are too large to be patrolled continuously. Many mammals have specific glands to produce pheromones that they deposit on the vegetation to mark a site as being part of their home range or territory. Compared to acoustic and visual signaling, such marking is considerably cheaper in terms of the energy invested, both in producing the signal and in the time spent signaling. Once the chemical is produced, a persistent pheromone can be used as a marker that is effective for many days and subsequent decay can give a measure of time. Acoustic signals and visual displays, in contrast, require continued signaling and thus are time- and energy-consuming. Furthermore, olfactory signals are important in mating decisions as females can signal their receptivity to males and recent research has shown that olfactory signals are used to assess genetic similarity on which decisions on mate choice are based. Chemical signals that are not deposited on vegetation or on the ground may be released into the air and attract mates. One of the most striking examples here is the wax moth, which releases a pheromone called bombycol, even single molecules of which can be detected by males. Thus, even though chemical signals do not permit coding of highly complex information that can vary rapidly over time, as is the case for acoustic signals and visual displays, they are an important sensory modality for communication in certain contexts.

Cognition and Communication

Cognitive capabilities in communication are among the most fascinating areas in animal communication. The complexity of animal signaling and the range of response strategies to signals clearly show striking cognitive capabilities in animals. Famous examples are the comprehensive capabilities of apes, dolphins, and parrots when being trained with sign language or spoken language. Animals possibly withhold information and may use signals to mislead others, which requires complex information processing that goes far beyond simple stimulus–response systems, as animal communication sometimes was seen in early psychological studies. Animals must continuously update their information about their social environment

and by doing so memory also plays a key role. The information that an animal extracts from a signal then may be processed by integrating it with previous information to even generate specific expectations about future communication events. Recent studies have shown that animals often establish communication networks in which they not only extract information from single signals directed to them but also through transitive inference extract information by attending to others' interactions (eavesdroppers). Combining their own information obtained through signaling interactions with information obtained by observing signaling interactions among others requires a sophisticated system of information processing. In social animals, individual recognition on the basis of signals often is fundamental to enable complex relations and again there is evidence that long-term memory is involved, so that animals remember specific individuals and their relation to them even after a year or more of separation. Animals also have striking capabilities in production, usage, and comprehension learning of communication signals, and examples again are found in the well-studied songbirds, parrots, and marine mammals.

Cooperation and Deception in Communication

Often, superficial observations of animals and their communication behavior suggest that communication serves to bring about cooperation, for instance, in defending a territory, as duetting bird species do, where males and females jointly sing complex and melodious songs, or in animals where parents communicate in raising their young, or when groups of animals peacefully move along without any form of aggression being noticeable. Such apparent cooperation in reality often involves a strong conflict between the communicating individuals. Individuals often have conflicting interests as selection will favor those individuals that maximize their reproductive fitness. Cooperation thus is stable in those communication systems in which both interacting individuals have a benefit on their own. Males that signal to attract a female benefit by appearing better and more attractive than they are, whereas females benefit by not being fooled and from using honest indicators of male quality in their assessment. Selection by receivers is thus a leading force in making communication systems on average honest as receivers will be selected to not respond to signals carrying false information. However, as with any system of information transmission, there is uncertainty and noise and thus the probability of correctly rejecting a signal with false information must be traded off with the probability of incorrectly rejecting a signal with accurate information. These basic features of signal detection theory open room for error and deception in animal communication.

Costs and Benefits of Signaling

Animal signals can carry substantial costs to a sender. The costs may lie in the energetic or other physiological costs of producing the signals, in the time devoted to signaling, or in the social costs when signals elicit specific responses by other members of the species or even attract predators. There are often conflicting interests in communication between an animal emitting a signal and those animals that are receiving the signal and that must decide whether or not and how to respond. This conflict of interest is especially evident in signals that are used to advertise and defend resources, such as food, space, or mates. Also, in parent–offspring communication, there can be substantial conflict of interest. An individual offspring that begs for food will have a different interest than that of its parents, which must invest time and energy to provision the offspring and may have to feed several offspring at the same time. As a result, selection on signalers in such a case will favor signals that exaggerate the quality or need of the signaler (cheating or deception), whereas selection on receivers will favor them to extract accurate information from the signal about the sender, i.e., not to be cheated. Thus, if signals consistently provide misleading information, receivers should stop responding to such signals. As the effectiveness of a signal will depend on the receiver's response, communication systems at equilibrium are expected to be honest on average but at least some cheating can persist. This principle was first coined by Zahavi (1975) as handicap signaling, which is meant to indicate that receivers should respond only to those signals or signal components that carry costs to the sender. Such costs would ensure honesty as only those individuals in good quality will be able to produce such a signal or only for them it will pay to produce such a signal. There is ample evidence in the animal kingdom that signal expression indeed is costly and is linked to an individual's quality. But it also needs to be noted that not all signals can be viewed as handicaps, in particular when they are cheap to produce and when the cost/benefit ratio of a signal is low.

Functions of Signals

Animals communicate, like humans, in many contexts. Information signaled will be different in different contexts and different contexts also impose

different constraints on information transfer. As a result, signals can differ strikingly depending on the context in which they have evolved. Advertisement signals are loud and conspicuous, whereas other signals may be soft and subtle and thus inherently more difficult to study. The best studied signaling systems in animals are those that are linked to resource defense, such as territorial advertisement; mate attraction; parent–offspring communication; and alarm calling. Signals in these contexts are usually not only of central biological relevance but also are conspicuous, which permits good access for scientific investigations. Apart from the specific context of alarm calling, signals in these contexts contain information about an individual's state, motivation, or quality. Thus, by and large, animals communicate information about themselves and evidence for referential signaling, i.e., signaling about external environmental events, is limited mainly to some specific examples, such as some cases of alarm calling.

Mating Signals

Many of the most conspicuous signals used in animal communication are mating signals, i.e., signals that are used to attract a partner for reproduction. Many of the loud vocal and visual displays found in birds, insects, frogs, toads, and primates are related to mating. In these cases, commonly only the males display and they do so often to attract females and to repel rival males. Also, many color displays, such as feather ornaments in birds or colors in fish, are related to mating contexts. Why have mating signals evolved to be elaborate and conspicuous? First, animals are often spaced far apart so that advertising individuals need to be conspicuous to attract potential mates from a distance. Second, mating and reproduction provide material for natural selection to work on and those individuals that are most successful in reproduction will leave more and often better offspring to the next generation. Individuals, and in particular the males, compete for access to reproduction so that selection should favor those individuals that are most successful in gaining reproductive partners of high quality or in large numbers. Thus, signals that are used to make reproductive decisions should provide information about the quality of the signaler. The resulting sexual selection leads to signals that are largely resistant to cheating, i.e., that do not allow an individual to signal better condition than it actually has. Elaborate signals have been shown often to carry costs in terms of production and maintenance as well as the likelihood of attracting predators. Such costly signals maintain the average honesty of a communication system.

Communication for Defending Resources

A second key issue in animal behavior and thus animal communication is the defense of resources. Key resources are space, such as territories, nesting sites, or food sources (and also mates, as discussed above). In order to defend resources, animals often need to signal aspects of their quality, e.g., fighting ability or resource-holding potential. As the same information is often important in mate choice, in many cases we find signals with dual functions – on the one hand, to serve to attract and maintain mates and, on the other hand, to repel rivals. Within this broad classification of signal functions, there are, however, important subtleties in the use of different signals that are relevant in only one or the other context. A male bird sings to attract a mate and to repel rival males but it then may sing differently depending on which function predominates. It may sing a soft complex song at a slow rate to a female nearby and a loud simple song at a high rate to rivals that threaten the territory. It may sing differently when nondirectionally advertising a territory but suddenly may switch to a very different singing mode with different singing patterns and timing of song once his territory is threatened by a rival. Siamese fighting fish (*Betta splendens*) may use the same signaling behaviors when courting a female as they do when trying to evict a rival. The way the pattern is displayed and integrated with other traits in behavior and communication then affects the value of the signal so that it is effective in either context.

Responses to Predators: Alarm and Mobbing Calls

Many animals produce loud and conspicuous vocalizations when they detect a potential predator. These warning signals can be either alarm calls that are given without approaching the predator (usually such calls are given immediately before a flight response) or so-called mobbing calls, which are used in combination with an approach to a predator. Both kinds of calls are interesting from an information theoretical perspective as they have been used as key models to investigate referential aspects of animal communication. Alarm and mobbing calls usually encode information about the urgency of the situation, such as the kind, threat, or distance of the predator. In addition, there is growing evidence that they are functionally referential, i.e., that specific call types or variants are given with high probability in response to specific predators. The classic example for such predator-specific calling is vervet monkeys, which use different calls in response to different types of predators and which also respond differently to the different calls in adaptive ways to avoid particular types of predators (**Figure 5**).

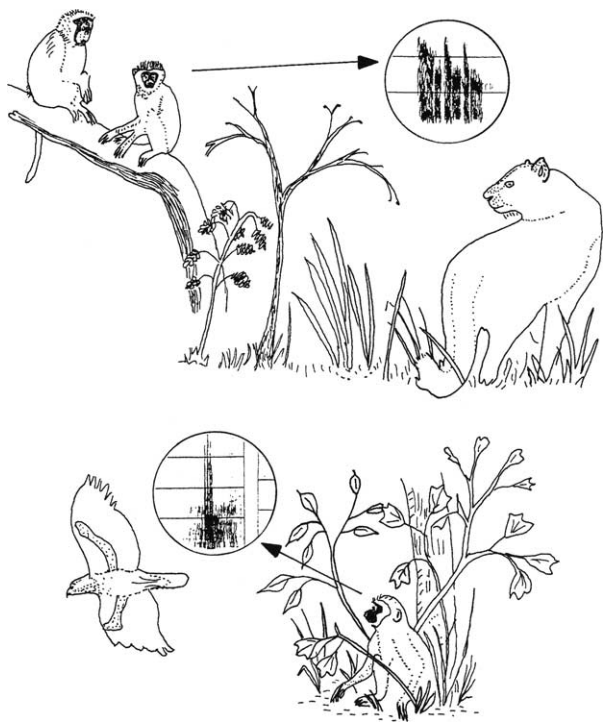

Figure 5 Alarm calling of vervet monkeys. Different calls (shown as sound spectrograms) are given in response to different predators. Playback studies have shown that the different calls elicit different flight reactions that are adaptive with respect to the type of predator for which the calls are given. Drawn after Slater (1999), *Essentials in Animal Behaviour*, Cambridge University Press, Cambridge.

In vervet monkeys, calls given in response to aerial predators elicit hiding responses, calls given in response to mammalian ground predators, such as leopards, elicit flight up into trees, whereas calls given in response to a snake elicit attention to the ground. In other species that do not have separate flight reactions to different predators, the evidence for functionally referential calls is less clear and current evidence suggests that calls vary with differences in urgency rather than differences in type of predator even though these two possibilities are not fully mutually exclusive.

Studying Animal Communication

The information available about all aspects of animal communication is in part constrained by the techniques that allow us to study these communication systems. Animals cannot be asked directly which information they have coded in a signal and which information they have extracted from a signal so we must rely either on inferences from descriptive studies on animal communication systems or on experiments. From these, we then can obtain insights into the information signaled, received, and evaluated by the animal's behavior under controlled experimental conditions. Depending on the questions involved, data are collected in the field either through observational studies or by conducting field experiments. Laboratory studies in general allow much better control of the context but these studies are often limited by animals not communicating in the laboratory as they would under natural conditions in the field. Laboratory studies using operant conditioning regimes, for instance, are ideal to test 'just noticeable differences' in signal structures, an issue that is important to obtain insights into the perceptual capabilities of animals. Field studies in natural settings, in contrast, test for 'just meaningful differences' in signals or signaling strategies, as animals may respond similarly to signals that they perceive as being different but that still have equal salience to them. Playback techniques using sound, or increasingly also video, have been among the most powerful experimental tools in experimental research on animal communication. Often, animals readily react to such stimuli in a natural manner and by clever experimental designs and manipulation of stimuli, responses of animals to playback reveal insights into the information and its biological value decoded from the signal. The continuous refinement of possibilities to digitally manipulate signals (visual and acoustic) opens up exciting areas for future research, which should allow the unraveling of subtleties in animal communication that in many cases still remain a secret.

Comparison to Human Language

In general, finding a unique and specific difference between communication in humans and animals is not easy. Most of the traits that were believed for decades to be unique to human language have been shown to be part of one or another communication system in animals. Animals may communicate intentionally and they may withhold information on purpose even though these aspects remain difficult to study empirically. They can cheat and mislead one another. Animal signals can provide information about the past (signals reflecting quality) and the future (signals indicating intentions) and be functionally referential (alarm calls). On the other hand, the complexity of message coded in human language and its flexibility clearly go beyond what we know about animal communication. As such, human communication differs from animal communication not so much in specific traits but rather in its complexity and flexibility. Moreover, even though animals have been shown to produce referential signals, i.e., signals that label external objects, the examples are restricted mainly to certain contexts and are of limited

flexibility. A striking aspect is that our closest relatives, the apes, are very restricted in their vocal communication. Their sound repertoire is limited and calls in primates in general are not acquired under the influence of vocal learning as is the case in humans and other animals, such as songbirds or some marine mammals.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Apes: Gesture Communication; Bats: Communication by Ultrasound; Bee Dance; Birdsong; Categorical Perception in Animals; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Development of Communication in Animals; Dialects in Birdsongs; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Production of Vocalizations in Mammals; Traditions in Animals; Vocal Production in Birds.

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Animal Communication: Parent–Offspring

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Communication between parents and offspring ensures offspring survival, growth, and successful development to independence. Parents invest time and provide food, protection, and – in endothermic organisms – warmth. This costly brood-care behavior can evolve only if the donor obtains fitness benefits for its actions. Such benefits arise if the receivers of parental care share genes with the care-giving individual. Consequently, care should be expended only on own offspring or those of close relatives, and not on unrelated individuals. This is ensured by recognition mechanisms.

Beyond recognition, parental care should be allocated in such a way that the costs incurred lead to maximal benefits (fitness) achieved through offspring. This makes communication about the needs of offspring necessary. However, offspring compete for the limited, precious resource of parental care whether directly with siblings in a brood or indirectly with

flexibility. A striking aspect is that our closest relatives, the apes, are very restricted in their vocal communication. Their sound repertoire is limited and calls in primates in general are not acquired under the influence of vocal learning as is the case in humans and other animals, such as songbirds or some marine mammals.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Apes: Gesture Communication; Bats: Communication by Ultrasound; Bee Dance; Birdsong; Categorical Perception in Animals; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Development of Communication in Animals; Dialects in Birdsongs; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Production of Vocalizations in Mammals; Traditions in Animals; Vocal Production in Birds.

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Communication between parents and offspring ensures offspring survival, growth, and successful development to independence. Parents invest time and provide food, protection, and – in endothermic organisms – warmth. This costly brood-care behavior can evolve only if the donor obtains fitness benefits for its actions. Such benefits arise if the receivers of parental care share genes with the care-giving individual. Consequently, care should be expended only on own offspring or those of close relatives, and not on unrelated individuals. This is ensured by recognition mechanisms.

Beyond recognition, parental care should be allocated in such a way that the costs incurred lead to maximal benefits (fitness) achieved through offspring. This makes communication about the needs of offspring necessary. However, offspring compete for the limited, precious resource of parental care whether directly with siblings in a brood or indirectly with

potential siblings of future broods. In this competitive situation, individual offspring might try through exaggerated signals to manipulate parents into providing more than a just share to the signaling individual. As such an unequal distribution will not be optimal for the parent, conflict might arise about the distribution of care between parent and offspring as well as among siblings and between broods (Mock and Parker, 1997). Conflicts result because selection favors different optima for parent and offspring regarding the extent of brood care due to the asymmetry that parents are equally related to all offspring and potentially gain the same fitness returns via each one of them, whereas offspring are selected to value their own well-being more highly than that of their siblings (Trivers, 1974). Parent–offspring communication therefore takes place in a field of conflicting interests. We here concentrate on parent–offspring communication in birds and mammals. Recognition and communication between parents and offspring in invertebrates are largely based on chemical (and tactile) cues. Readers interested in these communication systems are referred to Hölldobler and Wilson (1990) and Trumbo (1996).

Signaling for Parent–Offspring Recognition

Among species, offspring vary in developmental stage at hatching or birth. Young may be altricial, characterized by complete nutritional and thermoregulatory dependence on parents, closed ears and eyes, and very limited locomotory ability, or they may be precocial, that is, they appear like miniature adults, with much further developed sensory, locomotory, and thermoregulatory abilities than altricial young. Recognition might be based on location if young are immobile as in most altricial birds and mammals. However, individual recognition or recognition of specific social categories is needed with precocial young, which are mobile soon after hatching or birth. Consequently, the probability of errors in identification of own parent or offspring might be high. To achieve recognition, animals use auditory, visual, and chemical cues. Such recognition may be one-sided, parent to offspring, or mutual, between parent and offspring.

As the example of the altricial bank swallow (*Riparia riparia*; Beecher *et al*., 1981) demonstrates, recognition might be based on different cues at different stages in the ontogeny. During the first 15 days, parents use the nest site as a cue to identify their offspring. At this stage, experimental brood exchange causes no disruption of parental care in bird species with altricial young. This leaves parents vulnerable to brood parasitism, be it intraspecific or interspecific, as by cowbirds and cuckoos. Only just before chicks leave the nest, bank swallow parents learn to recognize offspring individually by their begging calls, which develop individual signatures, thus ensuring selective feeding of own offspring after fledging. In bank swallows, recognition errors account for only 0.5% misfeeding of alien young after fledging (Beecher *et al*., 1981).

In high-density colonies of many seabirds, mutual individual recognition is essential from the very beginning. Mutual recognition can become established even before hatching, as in guillemots (*Uria aalge*; Tschanz, 1968), where parents recognize their own eggs by color and pattern. Toward hatching time, parents emit a contact call to which the chick in the egg reacts by uttering sounds. Chicks about to hatch do not react to calls of other adults, demonstrating their ability to recognize parental calls. In the extremely dense colonies of emperor penguins (*Aptenodytes forsteri;* Jouventin *et al*., 1979), parents and chicks memorize their respective calls, which allow individual identification later on. This becomes vital when parents leave the young for extended foraging excursions at sea. A parent arriving back from its foraging trip repeatedly emits the call while wandering through the colony. When the chick recognizes its parent's voice, it vocalizes in response. On reunion, the parent requires the young to vocalize and may run off, forcing the chick into a feeding chase to elicit repeated calling and thereby ensuring that it is feeding its own chick. Only after correct recognition has been firmly established does feeding follow. In a similar manner, vocal recognition combined with strong site fidelity and olfactory confirmation of individual identity ensures mother–offspring recognition in colony-living sea lions and fur seals.

Some mammals give birth to precocial young that are mobile right after birth, for example, horses, sheep, deer, and, among smaller mammals, guinea pigs. In these species, recognition must be established within the first few hours after birth. Recognition can be achieved through chemical labeling by licking and nursing of young after birth. Applying her own chemical label initially helps the mother to distinguish her own offspring from alien young. For chemical cues specific to the offspring, an imprinting-like process in the mother has been documented, for example, in sheep (Lévy *et al*., 1996). Later in the ontogeny, further mechanisms are often added, such as long-distance recognition by voice cues that enable parent and offspring to identify each other. Use of multiple cues might be quite common to ensure proper recognition but has only rarely been demonstrated.

In precocial birds, such as many shorebirds and geese, acoustical cues play the major role in parent–offspring recognition. Long-term bonds may be forged that maintain family cohesion even over periods of long-distance migration in large flocks, for example, in swans and geese, where families migrate together to the winter quarters and may stay together as a family unit until the next breeding season.

Communication in Brood Care Transactions

Quite often, recognition will guide actions much more reliably in parents than in offspring, because the former would incur a major cost if expending care on alien young, whereas offspring might benefit from approaching and inducing parental care in alien parents as long as these do not act dangerously aggressive toward foreign offspring.

In addition to ensuring that parental care is given to their own offspring, parents should be able to adjust their care to the needs of their offspring. Young vary in needs and condition and parents must assess these parameters to provide optimal care. Young should therefore communicate their needs to the parents to extract care. Begging signals potentially convey information about the offspring's immediate needs (hunger) and longer term state (body condition). Parents should act on these signals and communicate the offering of care to offspring. A variety of begging behaviors and offering strategies have evolved to meet these functional demands. Both sides use specific and complex signals in this interchange. Much thought has been given to the question that parent and offspring are under differing selection over the amount and duration of care provided, and the present state of modeling usually assumes that signals of need must be costly to maintain honesty (*see* **Animal Communication: Deception and Honest Signaling**).

Offering Strategies

Special signals evolved to signal the location of the food source in mammals as well as in birds. Lactating rabbits visit the young once per day for a few minutes only. Mothers secrete a special chemical to signal to the young the location of the teats, an absolute necessity in the dark burrow to enable pups to find the teats and suckle during the brief presence of the mother. The chemical signal eliciting this response has been well characterized (Schaal *et al.*, 2003) and was shown to be sufficient and necessary for successful nipple attachment. This chemical (2-methylbut-2-enal) is produced only in the nipple area by nursing females, thus proving its specific signal character. In precocial offspring such as lambs, mothers tend to offer the udder to the offspring by positioning themselves and opening up the access to the udder by moving the leg outward. In many species, such mechanical, chemical, and visual signals might be supported by acoustic signaling. Acoustic signals might also help to attract the offspring's attention and maintain proximity between mother and pup. In pigs, the grunts of the sow signal to her many piglets to gather at the teats to obtain milk at milk ejection. Piglets must be synchronized because milk ejection lasts for only 10–20 s. The sow produces a milk ejection reflex after sufficient stimulation through massage of the teats by the piglets but is unable to nurse again for some time after milk ejection. Similarly, many bird parents announce their arrival at the nest by a call and they touch the young's beak to encourage begging and opening of the mouth. In species with more precocial offspring, such as gulls, parents offer food by bending down to the chick and repeatedly moving the bill in front of them to attract attention. Finally, in independently feeding chicks, such as chicken, mothers point to food items, thus showing the chicks what can be eaten and where to find it.

In bird nests, shuffling to obtain the best position and sometimes violent sibling conflict to keep siblings from competing for food are often noticeable attributes of begging. Surprisingly, parents quite often pay no detectable attention to squabbles and aggressive encounters among chicks but apparently allow sibling competition to run its course even if one or more chicks die in the process. This is particularly surprising when observing the recently hatched cuckoo chick evicting its nest-mates in front of the passively on-looking parent's eyes. Similarly, in some eagles, herons, and boobies, parents may watch one sibling driving off or directly killing another one (see Mock and Parker, 1997 for a review of sibling conflict).

Whereas many parents appear rather passive in their attention to offspring, essentially feeding the one that begs most intensely by calling or stretching its neck highest, in some bird species closer observation has shown that male and female follow different strategies, paying attention to different aspects of chick needs. In the budgerigar, females feed the smallest chick preferentially, whereas the father feeds all chicks indiscriminately. Such favoritism has not been demonstrated in mammals, where mothers may find it more difficult to influence offspring position at suckling. However, in several large mammals, such as red deer (*Cervus elaphus*) and Galápagos fur seals

(*Arctocephalus galapagoensis*), females will aggressively drive off offspring from a previous year once the next offspring is born.

More chronic signals serve to maintain parental care. In the rat, via pup-typical smell and actions such as sucking, pups mediate prolactin release in the mother and thereby keep her in the maternal state so that she is motivated to warm, lick, and nurse young. By repeatedly fostering young pups to a mother, researchers were able to maintain the maternal state inclusive of lactation far beyond normal weaning. Conversely, a mother rat is characterized by an odor that is not specific to the individual but signals maternal state and thereby makes her attractive to pups.

Alarm calls are another important type of signal used by parents to communicate with their offspring. In many species, these calls seem to be recognized from birth. Depending on the state of development of locomotory abilities, young may respond by hiding or quieting immediately, thus reducing the risk of being detected by a predator.

Begging Strategies

Parallel to the provisioning strategies of parents, offspring behaviors that enable the communication of their state have evolved. Newborn young or freshly hatched chicks soon learn to attend to many subtle features of the feeding situation, thereby becoming more and more active participants in the transaction. They communicate their needs by the intensity of begging in terms of behavioral cues such as calling frequency, stretching of the neck, and opening of the mouth in altricial birds. Generally, hungrier young tend to beg more intensely and a high calling frequency is needed to maintain a high feeding rate by parents. Thus, communication acts at two levels: within a brood, hungrier offspring might beg more intensively due to variation in hunger (short-term needs) among young, and in addition, begging intensity of the whole brood may vary according to the body condition (long-term needs) of young. Acoustic signals can be supported by visual signals of hunger as in canaries, where hungry young present more orange mouths to parents. As chicks grow up, the signal is intensified by the increasingly larger gape area of the brood. This signaling system is usurped by the cuckoo nestling, which, lacking a sufficient gape area, makes up for it by an extreme frequency of begging calls. Begging signals are not only used to obtain food but can also be presented when in need of other commodities. For example, young pelicans squawk when they get cool and thereby induce a parent to brood. As warmth is essential to the normal development of a young endotherm, begging for brooding is also a highly important aspect of parent–offspring communication in many precocial animals.

At present, we understand the complexities of the interaction between parental offering strategies and offspring begging behavior only to a limited degree. One interesting observation showing the close and subtle interdependence between the food provisioning rate of the parents and the begging intensity of chicks was made by Hussell (1988). In tree swallows, young tend to beg chronically more when the provisioning rate is low than when parents feed at higher rates, even at the same hunger state. This finding demonstrates that parent–offspring communication is finely tuned to the abilities of parents as well as to the state of offspring. Often, begging rates increase when parental care decreases: in tropical jays, the begging rate peaks 11 days later than the peak of parental provisioning and call rates in vervet monkeys increase between 8 and 10 weeks of age, associated with a decrease in maternal responsiveness.

Parents limit their investment in offspring and signal unwillingness to continue care when further demand of offspring would decrease their own future fitness gains. In such cases, parents may become outright aggressive against offspring and forcefully keep them away from continued lactation or food provisioning despite offspring signaling. In effect, they increase the cost of further care to the offspring to the point where it does not pay to insist. Thus, toward the end of parental care, a change in the state of parents ends the effectiveness of a previously smoothly functioning communication system even though individual recognition might persist for much longer.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Vocal Learning; Birdsong; Communication in Marine Mammals; Development of Communication in Animals; Individual Recognition in Animal Species; Non-human Primate Communication; Traditions in Animals.

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Animal Communication: Signal Detection

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Introduction

Signal detection theory (SDT) addresses the problem of identifying signals in noise. SDT derives from a fundamental feature of any mechanism for detecting signals, whether sensory, electronic, or otherwise – signals and noise cannot be differentiated with certainty. Signals (patterns of energy or matter with significance for the detector) are not distinct from noise (random or irrelevant energy or matter impinging on the detector from outside or arising in the detector itself).

Imagine a territorial bird in a forest singing its own songs and listening for its neighbors 50 to 200 m away. Some neural mechanism must distinguish between a neighbor's song at an appropriate distance and innumerable other possibilities – a neighbor's song close enough to indicate a territorial encroachment, a song of a newcomer looking for a place to settle, a song of another species with similar notes or frequencies, other sounds in the forest, and even random sounds produced by wind and turbulence. At a distance, any song arrives at the listener distorted by attenuation, reverberation, random amplitude fluctuations, and masking by sound of similar frequencies (Wiley and Richards, 1982). All signals are degraded during transmission, and all mix with background energy. In practice, absolute differentiation of signals from external noise cannot occur in real life. The degree to which signals and external noise are separable in actual (as opposed to theoretical) situations varies widely but is never complete. Furthermore, any mechanism for identifying signals generates its own internal noise and confusions.

Principles of Signal Detection

To analyze this situation quantitatively, SDT assumes that any such detectors can be represented by some combination of simple channels, each of which has two possible responses: go and no-go. The output from such a channel depends on the level of the input. It further assumes that noise is normally distributed energy in the same channel as the signal. In this case, the problem of signal detection is represented by the overlap of the probability density functions of the noise and the signal plus noise. The detector uses some threshold of input for a response: A level of input below the threshold results in no response (no-go); a level above the threshold results in a response (go) (**Figure 1**).

This formulation separates two aspects of signal detection. The inherent detectability of the signal is represented by the normalized distance between the peaks of the probability distributions for noise and signal plus noise. The bias of the detector is represented by the position of the threshold for response. By quantitatively separating the detectability of a signal from the subject's bias, SDT has made an important contribution to the study of sensory thresholds in psychophysics (Macmillan and Creelman, 1991; Macmillan, 2002).

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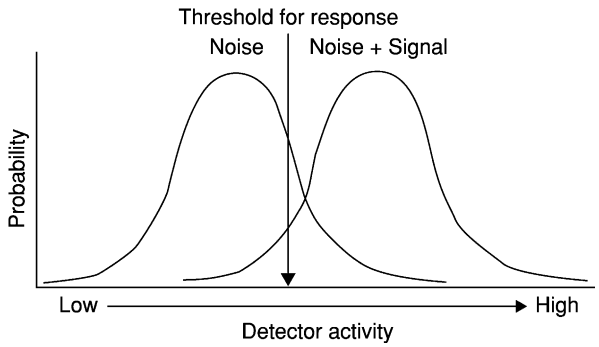

Figure 1 Representation of the general problem addressed by Signal Detection Theory. Noise (random or irrelevant energy in a channel) produces a measurable level of activation of a detector. A signal is added to this noise to produce a higher level of activation. The detector responds or not, depending on whether or not the level of activation exceeds some threshold, which can be adjusted to higher or lower levels of activity.

Applications to Animal Communication

Signal detection creates some serious problems for animals in natural situations. Communication between widely separated individuals, as just described, often requires receivers to deal with heavily degraded signals. Communication in large groups of conspecific individuals requires receivers to identify signals (for instance, a mate's or offspring's call) in a background of other similar signals. This latter situation is traditionally called the Cocktail-Party Problem.

The attraction of female frogs to calls of potential mates in large choruses provides an example (*see* **Frog and Toad Communication**). A gravid female frog in a quiet environment usually approaches a loudspeaker playing a conspecific male's call. If the male's call is mixed with the sounds of a natural chorus of hundreds of males or with random noise in the same frequency band, the female approaches the speaker only if the signal/noise ratio (SNR) is sufficiently great. Apparently, below some SNR, the male's call is not differentiated from the background. If we now imagine a female in a natural chorus, listening to hundreds of males, we can calculate how many of those males' calls exceed the critical SNR for detection by the female. Because sound spreads approximately spherically from a frog, and thus attenuates approximately 6 dB for every doubling of distance from the source, only calls from nearby males exceed the critical SNR. The density of males in the chorus thus determines how many of them a female can hear distinctly from any one point. Two such studies have suggested that females can hear only two or three individual males in a chorus at a time (Gerhardt and Klump, 1988; Wollerman, 1999). The hundreds of others become indiscriminable noise. Although immersed in hundreds of potential mates, a female actually has only a few choices at any one moment. She must move around and thus take risks of predation to sample more than these few.

When presented with two loudspeakers and two males' calls, a female (at least in some species) usually approaches the one with the lower dominant frequency, an indication of its larger body mass. When these males' calls are mixed with background sound from a natural chorus, females do not make this discrimination so easily. Again there is a SNR below which the female no longer prefers the call with the lower dominant frequency. Apparently, her nervous system no longer distinguishes the difference. As predicted by SDT, this more complex task of discriminating between two signals of interest requires a higher SNR than the simpler task of detecting the presence or absence of a signal (Wollerman and Wiley, 2002). There are thus levels of SNR that allow detection of a signal but not discrimination among similar signals. A female frog in a chorus is even more constrained in choosing an optimal mate than she is in finding any mate.

Theoretical treatments of direct mate choice (discrimination) as a factor in sexual selection should consider these constraints on signal detection in real situations (Wiley and Poston, 1996).

Implications for the Evolution of Communication

Signal Detection Theory offers a way to address the effects of these constraints on the evolution of communication (Wiley, 1994, 2000). The inability of detectors, neural as well as others, to separate signals from noise in real situations leads to the inevitability of error in communication. Every time a detector samples its input and either responds or does not respond, there are four possible outcomes: a correct detection (when a signal is present and the detector responds), a false alarm (when the detector responds but no signal is present), a missed detection (when a signal is present but the detector does not respond), and a correct rejection (when no signal is present and no response occurs). The probabilities of each of these outcomes depends on both the inherent detectability of the signal and the bias (threshold) of the detector.

The idea of error in animal communication can cause confusion, but evolutionary adaptation provides a clear framework for thinking objectively about error. If a response to a signal is evolutionarily advantageous for a receiver in a particular situation (in other words, if it results in greater survival or reproduction of such receivers and ultimately in the

spread of alleles associated with this response), then false alarms and missed detections represent errors by the receiver.

The fundamental conclusion from Signal Detection Theory is that receivers must compromise between decreasing their chances of false alarms and missed detection. If a receiver raises the threshold for its detector in order to decrease the chance of false alarms, it thereby increases its chance of missed detections (Figure 1). These two probabilities cannot be simultaneously minimized.

By combining SDT with Decision Theory, we can calculate the optimal threshold for a receiver in a particular situation. Decision Theory calculates an expected utility for any decision (such as any level of threshold for response by a detector) as a linear combination of the payoffs for each outcome times their probabilities of occurrence. The probability of a correct detection when a detector samples its input equals the probability that a signal is actually present times the probability that the detector will respond when a signal is present. The probability of each of the other three outcomes is calculated in an analogous way. In the end, the expected utility for a particular threshold for response depends on the payoffs of all four possible outcomes, the frequency of encountering a signal (the probability that a signal is present at any moment), and the effect of the threshold on the probabilities of response when a signal is present and when one is not.

Theoretical treatments of the evolution of various features of communication have sometimes included the possibility of error by receivers. Often, error is included by making the probability of response to a signal less than 1.0. Sometimes, formulations include the payoffs of two alternative responses (or response and no response). Few, though, have included all of the complexity of the expected utility of a receiver's performance.

Adaptive Gullibility and Fastidiousness

One application of expected utilities to the behavior of receivers reached the conclusion that receivers could evolve either adaptive gullibility (allowing relatively more false alarms but fewer missed detections) or adaptive fastidiousness (allowing fewer false alarms but more missed detections), depending on the payoffs of the possible outcomes and the frequencies of signals (Wiley, 1994).

Responses to alarm calls might often evolve adaptive gullibility. Mate choice might often evolve adaptive fastidiousness. Adaptive gullibility is a situation in which receivers are inevitably vulnerable to deception. Adaptive fastidiousness is a situation in which receivers are usually unresponsive even to appropriate signals.

Signal detection also has consequences for the evolution of signalers. The expected utility of producing a signal depends on the probabilities and payoffs of responses by the intended receiver and by any unintended receivers (such as rivals, predators, or parasites). One consequence is that signalers must compromise between the advantages and disadvantages of more exaggerated (and thus more inherently detectable) signals as a result of responses by intended and unintended receivers.

Another consequence is that fastidious receivers (in the sense just described) favor signalers that produce inherently more detectable signals. Evolutionary exaggeration of signals to increase detectability can thus result from evolution of fastidiousness in receivers. Because mate choice often evolves toward fastidiousness, adaptations for signal detection can explain the exaggeration of signals for mate choice. In this way, signal detection theory provides an important complement to sexual selection as an explanation for the evolution of many signals in animal communication (Wiley and Poston, 1996).

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Vocal Learning; Bats: Communication by Ultrasound; Birdsong; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Nonhuman Primate Communication.

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Animal Communication: Vocal Learning

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That we learn many of the sounds that we produce is clearly one of the most striking features of our own species. This learning is the basis of our rich language, which has no equal in any other animal, and it also leads to the differences in space and time that are a striking feature of language: languages, dialects, and accents differ across the globe, and they also change with time so that new words spring up while others fall from use. Curiously, although all of these phenomena have their animal equivalents, to find them, at least in the vocal domain, one must search beyond our closest relatives. Among the apes, gibbons (Hylobatidae) have the most striking vocal repertoires, with pairs singing wonderful duets that resound through the forest at dawn. The members of a pair learn to coordinate the sounds that they produce, but do not learn the sounds themselves: Hybrids even produce songs intermediate between those of their parent species. Efforts to 'teach chimpanzees to speak' met some success using sign language, but were an almost total failure when the animals were called on to use their voices. Although the vocal repertoires of chimpanzees in different localities do appear to differ, and dialects are most likely to arise through learning, this sort of evidence is equivocal: animals recorded under different conditions, as, for example, when disturbances or provisioning differs between sites, may use different parts of their repertoires or call more excitedly in one place than another. Thus, the samples may differ without vocal learning necessarily being involved. The best evidence to date of vocal learning in nonhuman primates is probably in marmosets, where the calls of animals placed in pairs or groups show subtle modifications to match those of their cage-mates.

When we talk of vocal learning, we are concerned with animals learning to modify the form of sounds they produce as a result of experience, and this is sometimes called production learning. We must distinguish between this and two other processes. Usage learning is learning to produce sounds in a particular context, perhaps novel or simply more limited, as, for example, when a young animal initially produces a call in many different situations but gradually comes to link it only to that situation in which it is appropriate. Comprehension learning is learning to understand the meaning of sounds, so that over time an animal comes to respond to them in an appropriate manner. As a result of these two processes, a dog may learn to bark when it wants a door to be opened and that the word 'food' is a good sign that it should go to the kitchen. But there is no evidence that dogs can modify the sounds they produce. They are not therefore 'vocal learners.' Animals that do alter the sounds they make as a result of experience may, as many do, make precise copies of sounds they hear, or they may achieve individual distinctiveness by avoiding matching the sounds of others, or they may innovate, generating a whole variety of sounds that are different from any they have heard or produced before.

In what species is there evidence of vocal learning in this sense? Among mammals, apart from ourselves, it occurs in three groups: seals (Pinnipedia), bats (Chiroptera), and whales and dolphins (Cetacea). In seals and bats, the evidence is not extensive, but nonetheless convincing. A harbor seal (*Phoca vitulina*) in the United States, reared by a couple in Maine and transferred when a few months old to Boston aquarium, could produce various phrases including his own name, Hoover, all apparently uttered in an impeccable local accent. In bats, it has been found that the young of greater horseshoe bats (*Rhinolophus ferrumequinum*) have echolocation calls that match in frequency those of their mothers. The calls of mothers become lower with age, but the calls that the young develop are those appropriate to the age of the mother, giving strong evidence that these are learned from her. In greater spear-nosed bats (*Phyllostomus hastatus*), calls are group specific and

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change when membership of the group changes. The evidence in whales and dolphins is more extensive. Bottlenose dolphins (*Tursiops truncatus*) have been trained in captivity to mimic computer-generated sounds. In the wild, young animals develop a call (referred to as a signature whistle) that is more or less peculiar to themselves. Those of young males, which leave their natal group, are often similar to their mothers' calls, whereas those of young females tend to diverge. As females stay together, this suggests that they are modifying their calls to be different from others in their group, whereas males need not do so as the group they move to is different. In humpback whales (*Megaptera novaeangliae*), the evidence concerns lengthy songs rather than whistles. These animals produce songs that consist of a long series of elements lasting many minutes. All of those in an area sing identical songs at any one time, but the songs slowly shift during the season and between years. The songs of two animals in a particular year are more similar than the songs of one animal in two successive years. Given that these are very long-lived animals, such rapid shifts in song matched between individuals could be achieved only by learning.

Some of the best examples of vocal learning come from birds. Parrots (Psittaciformes) are an obvious example, with the well-known capacity of those kept as pets to imitate human speech and many of the other sounds in their everyday environment. Though they have not been extensively studied in the wild, this ability seems to emerge from their need to imitate the calls of others of their own species. It has been used in laboratory studies to explore their cognitive capacities: unlike chimpanzees, they can learn to produce many words, and will, for example, use them in the right context and recombine them in appropriate ways.

Two other groups of birds show vocal learning, the hummingbirds (Trochilidae) and the songbirds (Oscine passerines). Hummingbirds sing and there is evidence that they learn their songs, though they have been studied relatively little. On the other hand, an enormous amount of work has been devoted to the study of vocal learning in songbirds. These comprise approximately half (~4000) of all bird species. Many of them have elaborate songs and are easily kept and bred in captivity, so that their vocal development can be studied experimentally in great detail. In every case where such a study has been carried out, and this has now involved some hundreds of species, learning has been found to play a part in the development of their song. In most cases, this learning involves the accurate copying of the songs of others, but in some cases, songs are also generated *de novo* without copying from others. Songs are often long and complicated and this may be one reason that they are learned, but generating complexity cannot be the only answer as learning often also plays a part in the development of simple call notes such as those that birds use to keep in contact with one another.

Because birdsong has been so extensively studied, it is worth going into some detail on how it develops: This is well illustrated by the case history of the chaffinch (*Fringilla coelebs*) outlined in **Figure 1**. In the tropics, females often sing and may join their mates in remarkable coordinated duets. But, at least in temperate parts of the world, elaborate songs are almost entirely a male prerogative and tend to be restricted to the breeding season as their main functions are to attract mates and to repel rivals. Field observations show that neighbors often have closely similar songs, whereas those of males some distance apart may be very different, sometimes forming clear dialects. A good example here is the white-crowned sparrow (*Zonotrichia leucophrys*) in California, in which each male has a single short and simple song that is shared over quite an extensive area. Such observations suggested that songs might be learned, but experiments were required to show that they were. The clinching evidence comes from hand-rearing experiments. Young birds taken from the nest at a few days old develop very rudimentary songs if kept in isolation so that they could not hear any adults; on the other hand, if the young were played the taped songs of adults, they copied them very precisely. A more extreme form of deprivation is deafening: in this case, the young birds were not only unable to hear adults but could not hear their own efforts either, and the outcome was little more than a screech.

Birds do not generally learn the songs of species other than their own and this suggests that they hatch with a predisposition to copy sounds of one sort rather than another. Young white-crowned sparrow chicks memorize sounds well before they sing themselves and, at this early stage, they respond by chirping more to their own species' song than to songs of other species. Social interaction may, at least to some extent, override such channeling of preferences, so that young birds reared by, or in close contact with, another species may learn its song rather than their own species song. But this varies a great deal. In cases where song is rather stereotyped, it is most likely if the song of the foster species is like that of the bird's own, as, for example, when a zebra finch (*Taeniopygia guttata*) will copy the song of a Bengalese finch (*Lonchura striata*). On the other hand, there are cases where not even interaction is required for young birds to learn a great variety of sounds from many other species around them, as in mockingbirds and starlings. Some, such as thrushes that imitate

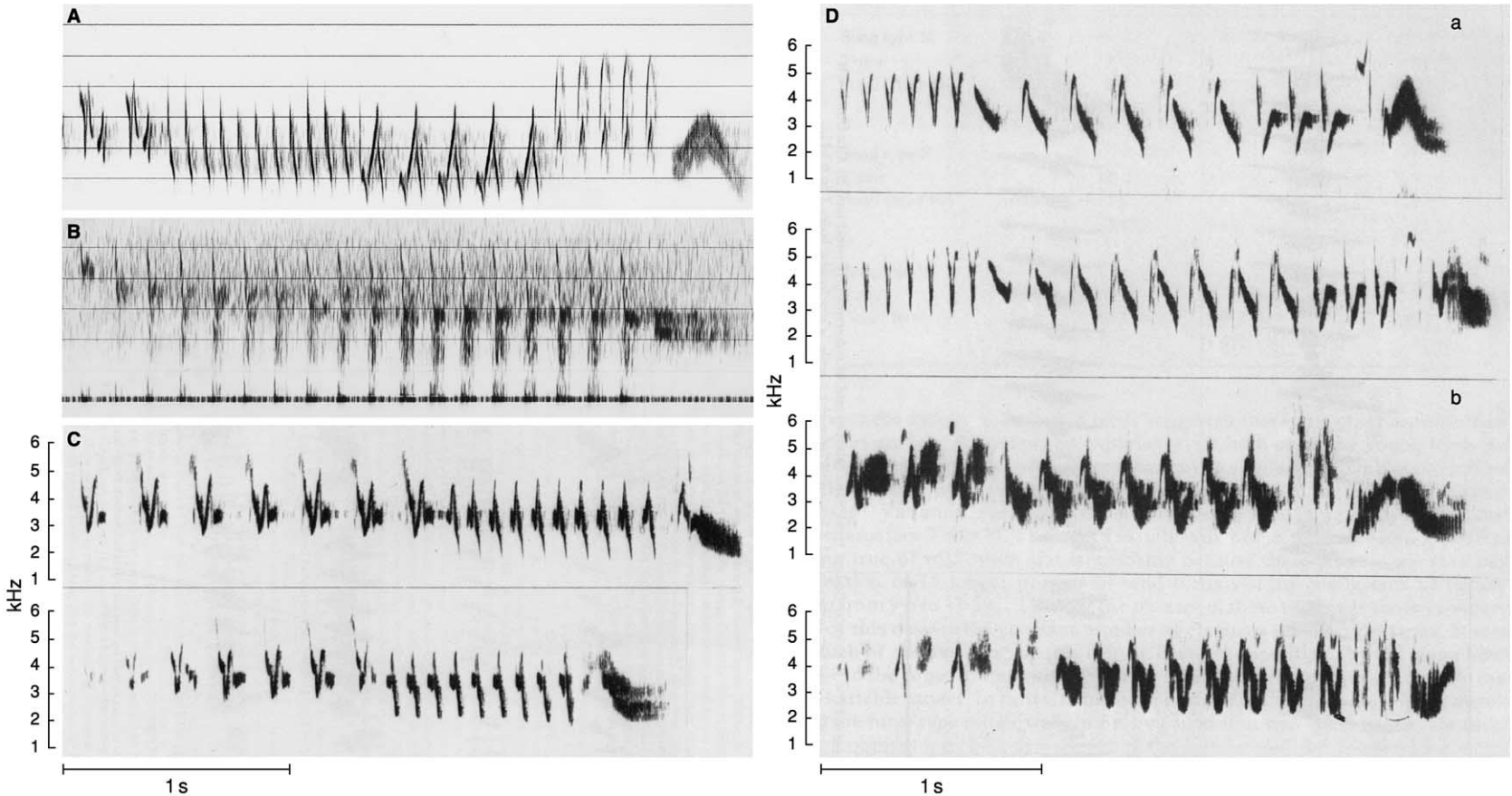

Figure 1 Chaffinch song development: a case history. Chaffinches provide a good example of how nature and nurture interact during the course of song development in songbirds. (A) An example of a typical adult male song. All chaffinch songs have this general structure, consisting of a series of phrases within which the same element is repeated a number of times, followed by a 'flourish' of unrepeated elements. If a young bird is hand-reared without any opportunity to hear adult song, the song he develops is much simpler (B). It is approximately the same length and frequency as normal and also consists of a series of elements, but these do not fall into clear phrases, tending instead to drift in structure from one to the next. The flourish is often short or absent. This pattern acts as a constraint on what chaffinches will learn, and they seldom copy from other species. However, if a young male hears the song of an adult, he will often copy it with great fidelity, provided that he experiences it in the first few months of his life, before he comes into full song himself, which he does in the spring after he hatches. (C) The top song was played to a young male when he was a fledgling, and the bottom song is the copy of it that he produced the following spring, several months later. The number of elements in a phrase differs, as it does from one song to the next within a bird, but the copy is exact. Birds will also copy in the following spring as they start to sing themselves and will build up a repertoire of up to five song types. (D) Examples of two tape-recorded songs played to a young male in this first spring (top trace of each pair) and beneath them the copies that he produced. The songs in the first pair are near identical, but there are differences between the bottom songs. For example, the flourish on the tutor tape is longer and rises and falls, whereas that of the young bird is short and lacks the down-sweep at the end. That copying is not always totally accurate leads to a song changing over time and also varying in space, and in some species this can lead to quite distinct dialects.

telephones and lyrebirds that copy chainsaws, do not even draw the line at birds' sounds.

Whatever they copy, birds often memorize it well before they start to sing themselves, as shown for the chaffinch in Figure 1. The process of memorization is frequently restricted to a 'sensitive phase,' most often when the bird is a fledgling or young adult, and once in full song it is unusual for any change to take place. Young adults sing highly varied 'subsong' when they first start to sing and this later crystallizes into full song, which is much more stereotyped. There is evidence in several species that they memorize many songs, and produce these in subsong, but that only some survive into the adult repertoire. Those that persist are often songs that match those of neighbors, with which they can therefore countersing across their territory boundaries. This phenomenon, of memorizing more than they subsequently sing, is referred to as 'action-based learning.' Whereas the original songs are memorized in the same way as in normal production learning, their subsequent selection is a matter of usage learning, as defined above. At an even greater extreme is song learning in brown-headed cowbirds (*Molothrus ater*). These are brood parasites, so that the chicks have no opportunity to hear adult song. But they form flocks after fledging and the males develop their songs at this stage. They then produce many different sounds and the females they are with show a display to those phrases that attract them; this then stimulates the males to repeat these particular sounds. They thus end up with songs that are well matched to the preferences of females in their group. The females themselves do not sing, but their displays appear to condition the males to develop songs that they prefer.

We know a great deal about the mechanism of vocal learning, particularly in songbirds, but one question to which there is as yet no clear answer is: Why do they learn? Many learned sounds are simple calls, and some quite complex songs, like those of gibbons and of suboscine birds, are not learned. Thus, the answer does not simply lie in the generation of complexity. It may nevertheless be the case that song learning is essential for the generation of the large song repertoires that are found in the males of some species. There is evidence that females prefer these large repertoires and one reason this may be the case is that only well-nourished and healthy males that have withstood the stresses of development can generate the brain mechanisms necessary to achieve such large repertoires. Beyond this, there is evidence in some species that learning may help to match the sound to the habitat, and in others that males may learn from their fathers and that females may avoid inbreeding by choosing mates that sing differently. Learning may also lead to individuality and so assist in processes of vocal recognition. But these and other ideas that have been put forward cannot account for more than a few cases. The fact that song learning is widespread among songbirds yet almost totally absent among their closest relatives suggests that it evolved near the origin of that group and has been retained by them all. It is possible that it does not even have a function in itself, but that any male that was to lose the ability and any female that preferred a male with such a more restricted unlearned song might be at a disadvantage because they had a more limited choice of mates. In other words, learning of song may persist because those that show it are caught in a 'cultural trap.'

See also: Alarm Calls; Animal Communication: Long-Distance Signaling; Animal Communication: Parent–Offspring; Birdsong; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Development of Communication in Animals; Dialects in Birdsongs; Individual Recognition in Animal Species; Non-human Primate Communication; Traditions in Animals.

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Annadurai Conjeevaram (1909–1969)

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Annadurai, popularly known as *Ariñar Anna* 'intellectual elder brother,' was born on September 15, 1909, as the son of Natarajan, a poor weaver in Conjeevaram. He died on February 3, 1969 in Chennai, as the chief minister of Tamil Nadu. He completed his university studies (1934) at Pachaiyappa's College, Chennai, majoring in economics and politics. As a disciple and lieutenant of E. V. Ramaswamy, an atheistic social reformer, he matured into a radical opponent of Brahmin supremacy, religious superstitions, and Hindi imposition. In 1949, he founded his own political party, DMK (Federation for the Progress of Dravidians). He served as a member of the Indian Parliament (Rajya Sabha) from 1962 to 1966, opposing the imposition of Hindi and advocating the cause of the Tamils. In 1967, he led DMK to a landslide victory over the mighty Congress party and became the chief minister of Madras state. During the two years that followed, he initiated reforms that have substantially affected the linguistic map of India and Tamil Nadu.

Annadurai was not an active linguist, but a linguistic activist, who held Tamil language, literature, and culture in high esteem and strove to create an environment where Tamil could flourish without succumbing to Hindi (Sivaswamy, 1968; Ramachandran, 1985; Ganesan, 2003). Although he was a prodigious writer of letters, essays, stories, novels, plays, and movies (see Santaanam, 1992), he rarely wrote on language or linguistics as such. He contributed to the Indian language debate mainly by eloquent speeches (see Moorthy, 1975a, 1975b; Ramachandran, 1975), administrative ordinances, and political activism, having been jailed several times for his protests against the imposition of Hindi.

Annadurai's lasting language-related contributions are: (1) He had the name of the state changed from Madras to Tamil Nadu in 1968, so that the state was identified by the language spoken in the region, instilling pride among the Tamils and stimulating planned and unplanned development of the language; (2) In a similar vein, he introduced numerous Tamil equivalents for all state-related offices and enterprises, such as *Tamilaka Aracu Talaimai Ceyalakam* 'Chief Secretariat of Tamil Nadu Government,' creating a remarkable growth in the vocabulary of Tamil; (3) He efficiently blocked Hindi from becoming the sole official language of India and indirectly helped English survive in India, by introducing a two-language formula (Tamil and English) in Tamil Nadu. He argued his case by pointing out that Tamils would face the burden of having to learn two foreign languages compared to the one or none learned by Hindi natives, and that Tamils would be at a great disadvantage nationally, unable to communicate in Hindi like the natives; (4) He fueled the growth of Tamil by encouraging Tamil scholars to modernize the language and establish centers of Tamil learning; (5) He stirred up a passion for Tamil by his own highly appreciated oral and written discourses, leading a large number of youths to imitate his oratorical and rhetorical styles and to study the language and culture; (6) Since 1967, Tamil Nadu has been governed by different offshoots of DMK, and each has contributed to the growth of Tamil in varying degrees, driven by the linguistic policies Annadurai had set.

Annadurai, as the chief minister, hosted the Second International Tamil Conference in January 1968 in Chennai, and he visited Yale University in May 1968 as the first non-American recipient of the Chubb fellowship. He was awarded an honorary doctorate by Annamalai University in September 1968. The Indian government issued a stamp in his honor in 1970 and published a formal biography in the series *Builders of modern India* (Ganesan, 2003). Tamil Nadu has erected thousands of statues and named many bridges, squares, and streets in his honor.

See also: Tamil.

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Antarctica: Language Situation

Editorial Team

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Mostly uninhabitable, Antarctica has a terrain of which 98% is a thick continental ice sheet and 2% is barren rock. It is the fifth largest continent, which with its 14 million sq km surpasses in size both Australia and the European subcontinent. Notwithstanding its considerable mass, Antarctica was long believed to be made up of a group of islands, an idea that was dispelled only in 1840. After World War II, scientists took an increasing interest in Antarctica and year-round research stations started appearing on the continent. A much needed legal framework was set up in the late 1950s in order to regulate the activities of the different nations carrying out research in Antarctica. The Antarctic Treaty, which entered into force in 1961, continues to govern the actions of the people in Antarctica. Even though Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom have made, at times overlapping, territorial claims – neither recognized nor denied by the Treaty – no single nation controls Antarctica. The continent is in fact administered through meetings of the 27 Antarctic Treaty consultative member nations, which together with the 18 nonconsultative nations constitute the 45 Treaty members (in 2003). Although the latter represent about two-thirds of the world's entire population, the number of persons present in Antarctica varies from approximately 4000 in summer to 1000 in winter, with an additional 1000 carrying out research in the waters of the Treaty region. It is not unusual for Treaty nations to be represented by a single person in Antarctica; all the individuals on the continent come under the jurisdiction of their own countries, although certain laws of the United States, such as the Antarctic Conservation Act, have a direct application in Antarctica. The Treaty itself has been drafted in English, French, Russian, and Spanish, each version being equally authentic; similarly, the meetings are held in the four languages of the treaty system.

Anthropological Linguistics: Overview

H E Manelis Klein, State University of New York, Stony Brook, NY, USA

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Introduction

Anthropological linguistics is a subdiscipline within the discipline of anthropology. It grew out of the anthropological concern for unwritten exotic languages and was and remains firmly grounded in both field linguistics and linguistic methodology. The intellectual basis for anthropological linguistics in the United States derives from Boas (1911), whose interests and concerns led to the anthropological view of language, which is that language is an integral part of culture and, therefore, to be a good anthropologist one needs to understand and/or speak the language of the culture one is studying. It is this view of language that is most relevant to the definition of anthropological linguistics. In other words, one approaches language from an anthropological view, which includes the uses of language and the uses of silence, as well as the cultural problems involved in silence and speech. Anthropological linguistics is Boas's concept of getting language to work with culture.

History of Anthropological Linguistics

Anthropological linguistics is not attributable only to Boas, but rather we have to go back further in time to a variety of influences. In the United States, Boas was mentored by John Wesley Powell and encouraged to work on the indigenous languages of North America. Powell's agenda was to be able to work out the genetic relations of these indigenous languages, so that their classification could be accomplished – a task which the Bureau of American Ethnology wanted to see done because of their interest in equating language

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with culture. Boas felt that a practical reason for linguistic studies was for ethnological purposes; that is, language provided a better understanding of cultural phenomena which on the surface appear to have no connection with language, but which without language cannot be understood. He noted that there were unconscious concepts in the mind which remained covert, never surfaced, but were clearly related to the culture, e.g., religion and table manners. However, it is important to note that Boas essentially refuted Powell. He did not think of language or culture in evolutionary terms, as Powell did, but rather he introduced the concept of cultural relativity. Both cultural and linguistic relativity are expressed in the statement that all languages are equal but not the same, that is, one language is as good as another. Furthermore, the earlier concerns of Humboldt had an important impact on the European interest in the field and certainly Boas and his followers were aware of their predecessors' interest in exotic languages.

Boas believed that there was no correlation between language and culture and also none between language and race. He focused on what is known as 'salvage anthropology,' that is, documenting languages spoken by fewer and fewer people so as to have a record of those languages before they disappeared. His approach to documenting these languages was more rigorous than earlier efforts and he trained a number of scholars to follow his intellectual lead. Languages were important to study because they encouraged field workers to be closer to the data they were collecting as well as because they provided insight into the culture through the linguist's ability to get at the "categories and rules of language" (cf. Duranti, 2003).

The philosophical underpinnings of anthropological linguistics became more complicated after Boas. Voegelin (1965: 484–485) noted that "research concerned with eliciting relevantly in linguistics is the concern of anthropological linguistics." The rest of Voegelin's program, however, was not the same as that of Boas's followers. Actually, in the United States two schools appeared, both with anthropological linguistics as the name for the discipline: Boas, Sapir, and Whorf on the one hand and Bloomfield, Kroeber, and Voegelin on the other. From these two schools anthropological linguistics emerged as a serious part of humanistic inquiry. Anthropology became the discipline within which to study linguistics. Students in the formative part of the discipline were students of either Leonard Bloomfield or Edward Sapir. Their orientation was towards field linguistics and not towards historical linguistics, which had been the prior focus of the field. This was the result of their view that language represented culture, both present and past.

Bloomfield, who became known as the father of American descriptive linguistics, focused primarily on linguistic form, pushing function and meaning to the periphery. Sapir, on the other hand, noted that although cultural behavior was patterned in both form and function, it was largely unconscious patterning. Elaborating on this position, Sapir (1927) remarked upon the lack of awareness of speakers about their language behavior and tied it to gestures, which are also culturally covert, and even to human economic behavior.

For several generations after Boas's period of fieldwork and training students, the Boasian view of linguistics as the mechanism by which anthropological fieldwork could be better accomplished was the primary motivation for the field of anthropological linguistics. In other words, anthropological linguistics was defined as a construct of anthropologists to explain the relationship of language and culture. As time went on, however, other theoreticians, linguists, and anthropologists came to focus on identifying the discipline differently and began to challenge the earlier foci.

Main Currents of Anthropological Linguistics

In order to understand the evolution of anthropological linguistics, one also needs to understand the works of Sapir, a student of Boas, who is thought to have provided the line of thinking about language that led ultimately to Noam Chomsky's works. Chomsky's influence on linguistics has perhaps been, as some have said (Duranti, 2003), the diminution of interest in anthropological linguistics.

In 1957, with the publication of Noam Chomsky's *Syntactic structures*, the focus on language was different. Prior to this pivotal point, the major linguistics approach in the United States was identified as American descriptivism or structuralism. It was the methodology that arose primarily from the need to describe languages that had not been previously analyzed. But, due to the Chomskyan approach, which signaled that description or classification of the various linguistic systems was not sufficient, and which was rule based, people began to focus on the rules by which a speaker of a language produces sentences and therefore understands them. The interest in language then turned from language description to the the rules that produce sentences, which were thought to reflect natural mental processes. It was thought that understanding the nature of the rules would help explain the inner workings of the human mind.

The early period of anthropological linguistics, the natural outgrowth of Boas's four-field approach to

anthropology (cultural anthropology, physical anthropology, archaeology, and linguistics), was especially important for the way in which anthropologists tried to interpret one culture to another. In order to accomplish this, it was important to learn the language and not use an interpreter. Thus, field linguistics was a natural outgrowth of that approach. The focus was on understanding, not just producing language. Techniques were developed for learning to understand exotic languages and a focus on conscious awareness of language learning was evident. Of course, there have been some anthropological linguists who have indicated that the best way to learn the target language was just to listen, to learn about the society, and then to try to speak (Burling, 1970). But, on the whole, as a result of Boasian efforts, the field linguistics approach has predominated.

Tasks of Anthropological Linguists

Anthropological linguists study human languages. As noted earlier, this focus developed because of the immediate need to describe large numbers of unwritten languages. However, in addition to language description and as a direct result of involvement in languages with structures so different from the Indo-European languages known to investigators, several other lines of inquiry emerged. One of these areas of interest was the relevance of language to the study of human behavior and incidentally to the various fields of anthropology. In the process of following this stream of interest, several themes became prominent. One is the focus on linguistic meaning and how it affects behavior. Related to that focus is a recurring discussion of what is known as the Sapir–Whorf hypothesis. In its strongest version it is stated that language, especially grammatical structure, directs perceptions; however, it is generally agreed that that is not so. This hypothesis attributes language, especially grammatical structures, to be the determiner of human perception.

Furthermore, it is important to clarify that Whorf never used the term 'hypothesis' for his attempts at understanding the relationship between language and thought. Nor did he espouse any form of linguistic determinism. In fact, Whorf's work has been seriously distorted by linguists and philosophers. Rather, he was focusing on what has been called linguistic relativity. But even this term does not express what Whorf was really trying to say about language and thought and culture. Whorf was trying to discuss the interconnectedness of language and thought and culture and wanted to understand that each of these aspects were interconnected – but they did not determine each other.

Nevertheless, a few scholars went along with Whorf's hypothesis at its most abstract. Harry Hoijer felt that the only way to understand the Navajo mind was through understanding and learning the Navajo language. He claimed that there was a correlation between the world view implied by the Navaho verb system and the passivity and general restlessness or fatefulness of Navajo mythology. This position is not widely accepted.

The issue still remains as to how to get at the thoughts of the speakers of a language. Thus, anthropological linguists maintain their interest in the connections between language and the rest of culture.

Related to the issues of language, thought, and behavior are important factors in dealing with the differences between different cultures speaking the same language and different languages spoken by essentially the same culture. Also, the putative relationship between language and physical type has been shown to be nonexistent (for example, the Athabaskan family of languages, which is spoken by people of different physical types, and the obverse, that is, one physical type speaking many different languages, as is the situation in New Guinea).

Related to the basic issues that have grown out of an attempt to understand the relationship between language and perception is the discussion of the character of linguistic categories, namely that they are an unconscious part of language use. Thinking along these lines has led to an attempt to figure out the methodology for determining how people think about their world of experience from the way in which they talk about it. This in turn has led to classification efforts and terminological systems. Taxonomies, segregate sets, discovery procedures, and attributes were part and parcel of the focus on the unconscious use of linguistic categories.

Much of the discussion about the relation between language and thought, as a result of the statement, restatement, and analysis of the tradition of the Whorfian view in the United States, was due to the strangeness of the languages that the linguists were studying in the Americas. There was a clear relation between exoticism and the focus on language and thought. The interest in exoticism together with Boas's determination to seriously study the native languages of the United States led to the focus on field linguistics and the importance of good linguistic elicitation techniques. Unlike first-language acquisition, which is primarily unconscious, learning a second language, especially in a field situation, is a different matter. In other words, the description of a foreign language is part of ethnographic fieldwork. The anthropological linguist is concerned primarily with this aspect of ethnography, but any anthropologist

studying a foreign culture must know the techniques of learning a language with which he or she is totally unfamiliar.

There are certain basic assumptions of the anthropological linguist in the field. One starts by assuming knowledge of nothing. Fieldworkers usually are academics trained in the general procedures of the discipline and know about language structure in general. They have a general knowledge of the technical processes by means of which they can learn a particular language, but compared to other disciplines which operate under a set of assumptions, anthropologists start with a blank slate. Optimally, fieldworkers have no specific theory that they want to test, but rather are aware that they are human and have certain predispositions from their own culture which can and must be overcome by working with someone from the 'other' culture. Furthermore, by using a consistent methodology, anthropological linguists have tried to lead the way for cultural anthropologists also to achieve both consistent and valid results in their research, which is a very hard undertaking. Nevertheless, social science disciplines recognize the contribution that anthropological linguistics has made especially to field linguistics. The most common example of this is provided by Lévi-Strauss, who noted that the discovery procedures utilized by anthropological linguistics allowed researchers to arrive at conscious or surface manifestations of cultural items from unconscious or underlying or deep structures. The concept then of underlying or unconscious structures for cultural anthropologists was an approach taken directly from linguistics, which in its analysis of language noted that all language is basically unconscious and automatic behavior, that one can't talk about one's automatic behavior, but that one can, through deductive methodology, generalize about automatic behavior from observable or surface behavior. Thus, cultural anthropologists borrowing these concepts perceived that the unconscious behavior as noted in phonemics and the conscious behavior that results in phonetic systems could be generalized to discuss cultural behavior, that is, the 'etic' or surface behavior which Lévi-Strauss called 'cooked' and the 'emic' or underlying behavior which he called 'raw.' This methodology is useful for the cultural anthropologist because it signifies that meaning can be deduced from overt responses by checking one's first possible perceptions in different environments. The conclusion by scholars then was that cultural differences can be studied essentially the same way that linguistic differences are studied.

As noted earlier, one of the distinguishing features of anthropological linguistics is its importance to the field of cultural anthropology. Nowhere is this more obvious than in the way in which ethnographic studies rely on linguistic methodology. The cultural anthropologist relies on language in order to be able to translate the significant categories of the culture. Frake (1972) commented that we understand culture because of the way that people speak about their experiences. In other words, a culture is like a grammar in that it has a set of rules that enables members of the culture to interact with each other and understand and be understood. Thus, an ethnography can provide the guidelines for behavior in the same way that a linguistic grammar provides the guidelines for proper language behavior.

The relationship of linguistic structure and theory to cultural systems is that which is emphasized in anthropological linguistics. This is done by utilizing the basic knowledge of linguistic systems and by then relating the linguistic forms to their analogues in cultural systems. By utilizing field method techniques, one gains ability in interviewing and in interpreting verbal communication to gain both linguistic and cultural information.

During the period when anthropological linguistics was the most significant approach to studying unwritten languages, the question would arise about the methodological correctness of the investigator. How to ensure that every analysis could be replicated became one of **the** issues of anthropological linguistics and one that ultimately led to the further division of anthropological linguistics during the transformational revolution attributed to Noam Chomsky. The effort to avoid contradictory results, especially in phonetics and phonology, was a challenge that led to analyses all of which, even if different, were convertible. And, just as cultural anthropologists begin their training by learning something about the diversity of human customs, anthropological linguists have to learn about the incredible variety of sounds and their meaning in the languages of the world.

Part of one's knowledge of one's native language includes knowing what sound sequences occur in the language. But how does someone who studies less well-known languages figure that out? The early part of fieldwork requires concentrating on the sounds that native speakers of the field language utilize. This aspect of study is called phonetics, which is the scientific study of speech sounds and includes the study of the physiology of speech production and the physical signals that emerge from the speaker (studied with the aid of computers and other machines), as well as the mechanisms of speech perception. Articulatory phonetics, one branch of phonetics, deals with the ways in which sounds are classified and is the area of phonetics that is of most interest to anthropological linguists. It is a tool which is most useful to them

because they often work with unwritten languages and need a way to write down what their language consultants are saying. Articulatory phonetics provides the means.

After listening and recording some segments of natural speech in the field language, the trained field linguist begins to analyze the symbols which are used to find out the inventory of vowels and consonants. The sounds that these symbols represent do not occur in the abstract. In fact, they usually occur only in particular positions within words. So, the process involves figuring out what kinds of word structures or canonical forms occur in the language. From that one works on ascertaining larger units and figuring out the meaning of stress and nasalization, checking to see if either is significant. One component of phonetic analysis involves determining what are the phonetic features of the particular language. This involves analyzing the airstream mechanism, voicing, nasal vs. oral sounds, articulatory modifications of the sounds, and the manners of articulation, as well as the specific features of the vowels. Some languages are pitch languages, which, for the speaker of English, are harder to analyze, while other languages are intonation languages, like English, and therefore easier for English speakers to process. Once the anthropological linguist has gathered the raw phonetic data, another technique is used to process that data in order to decide what are the important units of sound (phonemes), and then to symbolize them so that the native speaker of the language can learn to read them. A clear advantage to doing this is that once one can identify the significant sounds of a language, one can easily identify whether the series of sounds can be a possible utterance in the language one is studying. So, given a sequence of sounds, a speaker/hearer can accept or reject it as a possible utterance because of what she or he knows about the structure of that language. One's phonological knowledge allows one to distinguish possible from impossible words. It is also productive, because it helps the speaker or analyst to create new words.

Linguists have known for a long time that every person is a native speaker of at least one language and that by the time children reach the age of five or six, those children are proficient speakers of their native language. On the other hand, when a child or an adult learns a second language, they usually encounter some kind of problem, often with the phonology of the new language. Anthropological linguists often deal with the issues that surround speakers' imperfect abilities in the new language and mediate the social stereotypes that arise from these problems.

Another aspect of anthropological linguistics that is clearly a part of the study of unwritten or less known languages is the issue of what is the meaning of the string of sounds one hears. In analyzing languages, the linguist is interested in both the smallest units of meaning as well as the larger meaning units. The minimal unit of meaning is called a morpheme and the study of these units is called morphology or the morphemic structure of words. Morphemes can be independent words, also called free morphemes, or they can be parts of a word, also called bound morphemes.

Syntax or the way in which words are combined to form grammatical phrases and sentences is another aspect of language study. Syntactic knowledge enables a speaker to distinguish, for example, between a noun and a verb, between a future tense and a past tense, or between a genitive and an ablative case.

Still another aspect of study for the anthropological linguist is semantics, which broadly means the study of linguistic meaning. Another way of stating this is that semantics consists of the rules which tell a speaker how to choose the right meaning of a word to correlate or connect with the other words in a sentence. It helps the speaker decide which words can cooccur in a sentence; that is, it enables one to choose the right meaning of a word to cooccur with other words. The relation between sound and meaning is complicated. Once anthropological linguists have done some analysis of a language, they are able to understand different sentences which show new combinations of the categories they have arrived at. In other words, sentences can be formed and recombined, following a limited number of rules. This allows for the flexibility which is the hallmark of human creativity and indicates one of the ways that human speech is different from the means of communication of any other species.

Finally, narratives or discourse or pragmatics are also in the purview of anthropological linguistics. Field linguists know they have done their research well when they are able to analyze a body of textual material.

Wider Concerns of Anthropological Linguistics

When we begin to study a language, using an anthropological linguistic approach, we focus on what phenomena are important to the speakers of the language and also how they organize those phenomena into coherent rules. These rules, semantic in nature, can only be discovered by undertaking a systematic study of the system of meanings that each language deems important. Analyzing a language is the easiest and fastest way to discover the system of meanings of a culture. The linguistic tool most used to do this is

classification or categorization. Classification is a way in which humans can deal with the complexity of their environment by identifying things and happenings quickly and thereby making their lives more efficient.

The relevance of linguistic methods to ethnographic studies, especially in terms of eliciting meaning, is that anthropological linguists want to discover the native categories, the classification system, of their informants, thereby gaining an understanding of the items and events that are important to that culture. The notion of classification as being important is first clearly noted when one is trying to learn the sound system of a language and so anthropological linguists must first discover the native categories of sound through phonological analysis. Anthropological linguists must also study semantic categories because they must know how to speak the language. Once they have a speaking knowledge of the language, they must discover the higher-order categories the language encodes. This can be done by looking for the names of things and how the culture organizes these names into larger groupings. In fact, the names that a culture gives things are an indication of the importance that those things have to the culture. This type of research or analysis is called ethnographic semantics. Although it was an important part of the tool kit of anthropological linguists in the middle of the 20th century, now it is more often the purview of cognitive linguists. Ethnographic semantics, which has also been called ethnoscience or the 'new' ethnography, used the models of grammatical analysis. It was concerned with discovering native categories and also with stating the rules for generating these categories. Underlying this method was the fact that anthropological linguists could not necessarily expect the native categories that were revealed to correspond to their own native categories. The discovery and use of semantic categories is considerably more difficult than discovering phonological and morphological categories.

Although ethnographic semantics was one of the approaches that anthropological linguistics used to get a better understanding of the meaning systems of a language, there were and are other approaches of interest to the investigations of language that anthropological linguists like to use, such as that of searching for semantic universals.

Once anthropological linguists have established what they believe to be the language norms and gained some understanding of the overall cultural norms of the people who speak the language under study, a finer-grained type of analysis often emerges. Questions then arise as to how people differ in their language behavior. This can be studied both synchronically and diachronically, as we note that language change is slower than cultural change and largely unconscious. Because cultural change is faster we note that in languages, the most cultural part is the vocabulary and so vocabulary or lexemes change faster than other parts of the grammar.

Yet another related area of interest to anthropological linguists is that of dialect differentiation. Different subgroups within a culture have different systems of speaking. Two dialects are two different ways of speaking which are basically similar in their whole grammatical system, but which only slightly differ from each other. The differences are not simple ones such as a difference of pronunciation, but rather include a cluster of features which follow a predictable pattern. Regional dialects often evolve which show that one differs from another by a set of phonological, grammatical, lexical, and/or semantic features. Many cultures also have different dialects that are utilitarian, used for ritual purposes compared to nonritual language. Furthermore, dialect differentiation also evolves as a result of the development of different social classes education, occupations, and generations.

Because different dialects cross national boundaries, anthropological linguists become involved in the area where language and politics overlap. Their expertise enables them to discuss language as a system of communication that exists without borders. Dialect studies owe much to Indo-European studies. They first became an interesting area of study because linguists were trying to test the regularity of the sound change laws for Indo-European languages. Rather than accept an early premise that languages were, like biological entities, subject to the laws of evolution, scholars operated under the assumption that languages were organic systems, such that empirical studies could be undertaken to trace regular changes from one dialect area to another.

In the same way, issues surrounding linguistic diversity and social mobility are viewed by anthropological linguists as field situations no different than other field situations. Since language *per se* does not have a value attached, although society may attach a value to certain dialects, anthropological linguistics is able to study and analyze the differences between dialects and often keep antagonistic social responses and social stereotypes from burgeoning. In other words, dialects also have social significance.

Still another aspect of language as communication is what happens between two cultures. When people from two different cultures come into contact and want to or need to communicate there are several possible ways that this can be accomplished:

through sign language; a third language which is common; speakers can be bilingual in the two languages; or a mixed language can develop from the communicative act. This fourth way of communicating is also of special interest to the anthropological linguist.

Pidgins and creoles, which are mixed languages, develop when the status or power of one of the languages and/or its speakers is higher than the other. Pidgins are developed as the native language of none of the speakers. A creole is the native language of a group of speakers and develops from a pidgin when children begin to learn the pidgin as their first language and the vocabulary increases. Pidgins and creoles are also of concern because they can be used to study of the evolution of language.

Changes in a language are systematically connected to changes in the culture of its speakers. Thus, it is not surprising that anthropological linguistics is also concerned with the history of language change and with understanding why there are similarities and differences among all human languages. To achieve this understanding it is necessary to do systematic comparisons among languages. These changes are based on the assumption that changes in one part of the grammar are generalized to other parts of the language. The changes can be anywhere in the grammar, but are often studied in the phonological system, where, for example, changes in the place or manner of articulation occur, sounds are assimilated or dissimilated, or metathesis can take place. Of course, changes in languages can be studied by comparing different languages that seem to be related. We can study the geographic distribution of lexical items or of grammatical elements. We can also look at the grammatical and lexical characteristics of language groups that we are sure are related and see how the languages have diffused. Edward Sapir, in particular, discussed ways in which the analyst could deal with the age of linguistic features. And although he is rarely looked to in contemporary times for his suggestions, they had a significant impact on the study of the geographical distribution of numeral classifiers and classifiers in general.

On the other hand, we should note that many cultures, especially up until the first half of the 20th century, had no writing system and no written histories. And so, once the anthropological linguist had completed a grammar of the contemporary forms of speaking, there was often the challenge of trying to determine what the earlier stages of the language were like. By using the techniques of linguistic reconstruction we have been able to make inferences about earlier stages of a contemporary language. This is possible because it is understood that languages are constantly changing and that these changes occur in a regular systematic way.

The paths of anthropological linguistics also lead to diachronic type of questions. Thus, while studying a language spoken by a very small number of people, the question arises about where the population came from. Were they always in the same geographic territory? When did the group come into existence? Where did their language come from? And then, ultimately, there are questions about the origin of language anywhere. Another issue of interest to anthropological linguists is that of language typologies. One kind of typology is a functional typology of languages based on their evolutionary characteristics. Nineteenth-century scholars classified languages, not along a scale, but rather into three basic groupings: analytic, synthetic, and polysynthetic. Languages whose words consisted of only one morpheme were called analytic. Languages with more than one morpheme per word were considered synthetic (and these were basically the European languages), but then when Native American languages were discovered, languages which had a very high number of morphemes per word, the term 'polysynthetic' was coined. Another type of morphological classification, especially popular in the late 19th century, categorized the languages of the world according to four groups: isolating (a morpheme is also a word, contains one syllable, rarely has affixes), agglutinating (several morphemes combine into one word and may include affixes), inflecting (similar to agglutinating but adds inflection to indicate grammatical functions), and incorporating (the words in a sentence are all fused into one long word). The value of these classifications is limited, but in relative terms, one can talk about some languages being relatively more synthetic than other languages, or more polysynthetic than others. As a result of this typology, many errors have crept into the folklore about languages spoken by peoples whose cultures are thought of as being less advanced than those of the developed part of the world. And so, anthropological linguists analyze the languages of their consultants, not only in terms of describing and explaining the intricacies of those languages, but also to show that all languages are on an evolutionary par, and that every language spoken can discuss any aspect of life in First, Second or Third World cultures, but always in different ways. More recently, a third type of morphological typology has emerged which is based on the order of the grammatical entities of subject (S), verb (V) and object (O).

Because language and human communication is unique, anthropological linguists are especially interested

in human speech acquisition. Children's language learning has been studied by many anthropologists eager to study the stages of acquisition in cultures they themselves are just being introduced to. What appear to be fairly universal are the stages of speech acquisition, but what may be quite different is the relationship between language and cultural acquisition. Children learn that it is very important for them to learn how to use their language and that effective use is crucial to successful communication. For some cultures, child acquisition of the native language is not an important issue, whereas for other cultures, parents and caretakers invest a great deal of time and energy in insuring that the child learns proper verbal etiquette while learning how to speak. Language acquisition and the importance of language in child socialization has long been of interest to anthropological linguists. This is not surprising because as a field linguist one becomes aware of crosscultural trends in the acquisition of communicative competence. The more data one collects, the greater the chance of making significant generalizations about both the process of language acquisition and that of cultural acquisition. Although in large part the study of child language acquisition has been done by psycholinguists, psychologists, neuroscientists, and cognitive scientists, the individual studies done by anthropological linguists as part of their uncovering the grammars of different languages has added considerable data for others to utilize.

See also: Cognitive Linguistics; History of Linguistics: Discipline of Linguistics; Language Development: Overview; Phonetics, Articulatory; Pragmatics: Overview; Society and Language: Overview; Structuralism; Understanding Spoken Discourse.

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Anthropology and Pragmatics

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Introduction

To see how anthropology and pragmatics are interrelated, we may start with the following observation: pragmatics concerns, first and foremost, actions and events that necessarily take place in context as actual happenings, that is, sociohistorically contextualized unique happenings. Such happenings, however, may be seen as tokens of virtual regularities such as action types, event types, or even illocutionary types (*see* **Speech Acts**; **Mood, Clause Types, and Illocutionary Force**). Hence, pragmatics may be approached from two different points of departure, either the sociohistoric context or the decontextualized regularities. This condition has given rise to the two distinct scientific traditions dealing with 'what we do' (i.e., our praxis): either the social science of actions and events, such as sociology and anthropology, or the logico-linguistic science of propositionally centered regularities of speech acts. Both of these trends originated in (neo)Kantian philosophy (see later); they may be characterized as the pragmatic and the semantic tradition, respectively (*see* **Kant, Immanuel (1724–1804)**). Note, however, that the term 'pragmatics' is, by historical accident, attached to a branch of the semantic tradition. This tradition includes analytic logic, linguistics, and parts of psychology, anthropology, and pragmatics (e.g., ethnoscience, cognitive linguistics, and the theories of speech acts, implicature, and relevance). In contrast, the pragmatic tradition includes the social sciences, sociology, anthropology, critical philosophy, and parts of contemporary pragmatics such as critical discourse analysis and social pragmatics. In the following sections, the genealogies of these two post-Kantian traditions are elucidated, illustrating how linguistic anthropology is related to pragmatics (*see* **Critical Applied Linguistics**; **Critical Discourse Analysis**; **Cognitive Linguistics**; **Speech Acts**; **Implicature**; **Discourse, Foucauldian Approach**; **Pragmatics: Overview**).

The Semantic Tradition

Let us start with the semantic tradition, which harkens back to the critical philosophy of Kant (1724–1804), in which the problematic of 'language' and 'meaning' still lurked behind that of '(re)cognition' and 'judgment.' The return-to-Kant movement of the late 19th century included not only the neo-Kantians in the narrow sense, such as Charles Peirce (see below), but also Gottlob Frege (1848–1925), who launched predicate logic and thereby started to reduce the (neo) Kantian problematic of 'judgment' and 'value' to questions of logical language (*see* **Peirce, Charles Sanders (1839–1914)**; **Frege, Gottlob (1848–1925)**). In particular, the notion of judgment, especially that of 'synthetic' judgment, became eclipsed by the analytic *Satz* (sentence, proposition), which was split into *Kraft* (e.g., assertoric, imperative, interrogative force) and *Sinn* (propositional content); the latter, again, was subdivided into categories and subcategories that could be characterized in formal-linguistic fashion, such as subject, predicate, and so on (*see* **Chart Parsing and Well-Formed Substring Tables**). Thus was born modern logic (analytic philosophy), to be pursued by Bertrand Russell (1872–1970), Rudolf Carnap (1891–1970), John von Neumann (1903–1957), and others who studied formal-structurally encoded meanings outside the context of language use. Such studies, which later came to include work in Artificial Intelligence, became the main staple of 20th-century Anglophone philosophy. This analytic 'linguistic turn' (Rorty, 1967) was also taken by the linguists of that period, especially the formalists of the neo-Bloomfieldian and Copenhagen Schools (*see* **Bloomfield, Leonard (1887–1949)**. Like the logicians, they saw the essence of language, as well as the essence of the science of language, in formal regularities (rules) and clear and distinct analysis, in a decontextualized environment. Eventually, the trends in logic and linguistics converged and gave rise to generative linguistics, led by Noam Chomsky (b. 1928), who learned neo-Bloomfieldian formalism from Zellig Harris (1909–1992) and logico-linguistic derivation from Carnap. Even granted that Carnap was an empiricist, like Charles Morris (see below)

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Let us start with the semantic tradition, which harkens back to the critical philosophy of Kant (1724–1804), in which the problematic of 'language' and 'meaning' still lurked behind that of '(re)cognition' and 'judgment.' The return-to-Kant movement of the late 19th century included not only the neo-Kantians in the narrow sense, such as Charles Peirce (see below), but also Gottlob Frege (1848–1925), who launched predicate logic and thereby started to reduce the (neo) Kantian problematic of 'judgment' and 'value' to questions of logical language (*see* **Peirce, Charles Sanders (1839–1914)**; **Frege, Gottlob (1848–1925)**). In particular, the notion of judgment, especially that of 'synthetic' judgment, became eclipsed by the analytic *Satz* (sentence, proposition), which was split into *Kraft* (e.g., assertoric, imperative, interrogative force) and *Sinn* (propositional content); the latter, again, was subdivided into categories and subcategories that could be characterized in formal-linguistic fashion, such as subject, predicate, and so on (*see* **Chart Parsing and Well-Formed Substring Tables**). Thus was born modern logic (analytic philosophy), to be pursued by Bertrand Russell (1872–1970), Rudolf Carnap (1891–1970), John von Neumann (1903–1957), and others who studied formal-structurally encoded meanings outside the context of language use. Such studies, which later came to include work in Artificial Intelligence, became the main staple of 20th-century Anglophone philosophy. This analytic 'linguistic turn' (Rorty, 1967) was also taken by the linguists of that period, especially the formalists of the neo-Bloomfieldian and Copenhagen Schools (*see* **Bloomfield, Leonard (1887–1949)**. Like the logicians, they saw the essence of language, as well as the essence of the science of language, in formal regularities (rules) and clear and distinct analysis, in a decontextualized environment. Eventually, the trends in logic and linguistics converged and gave rise to generative linguistics, led by Noam Chomsky (b. 1928), who learned neo-Bloomfieldian formalism from Zellig Harris (1909–1992) and logico-linguistic derivation from Carnap. Even granted that Carnap was an empiricist, like Charles Morris (see below)

and Willard Quine (1908–2000), whereas Chomsky worked in a rationalist paradigm, these philosophers and linguists represented two sides of the same semantic tradition. Subsequently, with the success of what became known as the Chomskyan revolution, the dominance of the semantic tradition in linguistics and its subfields was confirmed in the 1960s (*see* **Chomsky, Noam (b. 1928); Quine, Willard van Orman (1908–2000)**).

Yet, this 'revolution' was just an evolution of an earlier condition. That is, in tandem with the advocates of 'unified science' such as Carnap and Morris, who tried to integrate all kinds of science on the basis of modern formal logic, using the method of modern physics, the neo-Bloomfieldians had elaborated and advanced a linguistic formalism that was meant to replace the humanistic, cosmographic concerns of philology and anthropological linguistics with the investigation into the formal regularities of language and mechanical analytic procedures. Doing this, they successfully turned linguistics into a model human science in the eyes of many. Thus, the semantic tradition evolved from logico-linguistics into the more empirical sciences of anthropology and cognitive psychology. As an instance, consider the mid-20th-century flourishing of ethnoscience, which was characterized by mechanical elicitation procedures, with anthropologists trying to identify the semantic categories of fauna, flora, kinship, color, etc., as emically apperceived by natives and etically described by 'universal' semantic categories (*see* **Ethnoscience**). Eventually, ethnoscientific studies – such as those of color terms conducted by Berlin and Kay (1969), who were originally inspired by the Saussurean/Hjelmslevian formal-structural analysis – yielded to the more empirically oriented 'prototype' semantics developed by Eleanor Rosch and her school in the 1970s (cf., Blount, 1995). Similar empiricist orientations gained acceptance even in logic and linguistics; compare the rise of fuzzy logic (or, more generally, multivalued logic) and generative semantics. The three lines then converged to form cognitive linguistics, pursued by George Lakoff (b. 1941), Ronald Langacker (b. 1942), and their followers. Thus, the birth of an empirical semantic science, i.e., cognitive linguistics, which constitutes a branch of pragmatics today, has its origin in the Fregean analysis of decontextualized propositional content (*Sinn*), which gradually, yet increasingly, became accommodated to the empirical contexts of referential cognition and language use (*Bedeutung*).

But the Fregean legacy includes more. Recall that Frege reduced judgment to sentence, consisting of not only propositional content, but also force. This notion came to the attention of John Austin (1911–1960), a phenomenologically minded translator of Frege's *œuvre* into English (compare Frege's notions of propositional content vs. force with Austin's notions of constative vs. performative and locution vs. per-/illocution) (*see* **Austin, John Langshaw (1911–1960); Mood, Clause Types, and Illocutionary Force; Speech Acts and Grammar**). This move led to the emergence of what is often called modern pragmatics, as pursued by John Searle and his followers (formally, this trend can be captured by the expression F(p), where p and F stand for proposition and illocutionary force, respectively). Others, such as H. Paul Grice (cf. 'what is said' vs. 'what is meant') and the post- and neo-Griceans, followed suit (cf. the success of Daniel Sperber and Deirdre Wilson's theory of relevance) (*see* **Grice, Herbert Paul (1913–1988); Neo-Gricean Pragmatics; Relevance Theory**). Clearly, this post-Fregean trend also belongs to the semantic tradition and constitutes, with cognitive linguistics, its empirical development (*see* **Cognitive Linguistics**) Notwithstanding the label 'pragmatics' that is commonly attached to it, this trend is little more than a branch of empirical semantics, inasmuch as it attempts (as do cognitive linguistics and linguistic functionalism) to relate, if not reduce, the meanings encoded in language (i.e., in lexico-grammar: sentence, clause, phrase; words, clitics, and morphemes) to empirical matters such as function, language use, and understanding. This brand of pragmatics thus excludes such contextual phenomena as cannot be transparently related to propositional meanings or grammatical rules; that is, most human practices, which occur contingently and largely independently of linguistically encoded meanings (cf. Mey, 2001).

In this connection, the following three points are worth observing: (1) the grammarians called 'generative semanticists,' such as George Lakoff and James McCawley, found post-Austinean pragmatics useful; (2) Dan Sperber and Deirdre Wilson's (neo)-Gricean relevance theory remains a highly abstract account based on *a priori* assumptions (economy, eufunctionalism, cooperation, and logico-rationalistic computation), while remaining impervious to the contextual and historic contingencies that lie at the heart of matters pragmatic; and finally (3) the current popularity of trends such as relevance theory and cognitive linguistics may be in part due to their eclectic, quasi-pragmatic, and quasi-semantic character, in line with their emergence at the transitional point where contemporary pragmatics is moving from more semantically oriented theories (such as those of speech acts or generative semantics), which are primarily concerned with linguistically encoded meanings, toward more robustly pragmatic theories, such as social pragmatics and critical discourse analysis, which are primarily concerned with contingent actual happenings in a

sociohistorical context (*see* **Speech Acts; Generative Semantics; Critical Discourse Analysis; Pragmatics: Overview**).

Thus far, we have seen how the two post-Fregean semantic trends have led to cognitive linguistics and pragmatics. In the following discussions, we follow the genealogy of a nonsemantic, yet truly pragmatic tradition, derived not from Frege, but from other neo-Kantians, such as Peirce, Franz Boas, and Max Weber, and ultimately going back to Kant himself.

The Social-Scientific Tradition of Pragmatics

The genuinely pragmatic tradition, often known as the social sciences, includes anthropology and sociology, the origin of which goes back to Bronislaw Malinowski (1884–1942), Weber (1864–1920), Georg Simmel (1858–1918), Emile Durkheim (1858–1917), Boas (1858–1942), Karl Marx (1818–1883), Alexander Humboldt (1769–1859), and ultimately the Enlightenment philosophers such as the Marquis de Condorcet (1743–1794), Voltaire (1694–1778), and perhaps even the earlier Giambattista Vico (1668–1744). However, the most important figure in the current discussion is Johann Herder (1744–1803), a student of Kant who critically accepted Kant's critical philosophy and, in doing this, launched a metacritique of the latter, especially of its claim to human (and even 'anthropological' – the term is Kant's own) universality. In Herder's view, such alleged universality is no more than an ideology, conditioned by the historic, geographic, and cultural (that is, contextual) factors peculiar to the Idealist philosopher Kant and his times, i.e., the modern era of the German (secularized Lutheran) Enlightenment. Note that the idea of metacritique was already contained in Kant's critical philosophy, which tried to show, at the transcendental (second-order, or meta-) level, the valid limits of all philosophizing, including its own. Herder in turn elaborated on this theme, attacking Kant's claim to universality by appealing to the cultural diversity of the empirical world(s). Since the validity of such a metacritique can be assessed only by actual investigations into the empirical world, Herder's move led to the birth of the modern social sciences, especially in Germany, as attested by the works of Marx, Boas, and Weber, in which various eras and cultures were methodically compared. In so doing, these authors interpretively identified the sociohistoric uniqueness and contingent conditions of particular cultures and periods and demonstrated the historic/cultural limits and relativity of modern western thought and its 'products' (including the social sciences and their ethnocentric universalism). Such was the underlying theme of Boasian anthropology, to be described shortly, following a brief look at the development of the 'new' science of sociology (*see* **Boas, Franz (1858–1942)**).

In the 19th century, between Kant's and Durkheim's times, rapid modernization, urban immigration, and capital formation progressed in England, France, and then Germany, leading to the emergence of social problems such as dire poverty, overpopulation in urban environments, and terrifying labor conditions. As the masses came into being in cities, society became a visible entity, to be investigated through demographic, statistical, and analytical means by reformers in the spirit of Henri de Saint-Simon (1760–1825) and scholars such as Auguste Comte (1798–1857) and Durkheim himself, who created a science called 'social physics' (which later became sociology) to measure, analyze, and control (i.e., 'tame') the social problems. Henceforth, sociology would develop around the two axes of Weberian interpretive, historical sociology (see earlier) and Durkheimian functionalist or statistical macrosociology. However, in the Anglophone world, the latter axis was much stronger, compared to the European continent; this can be seen exemplified in the works of British structural functionalism (social anthropology) and in Talcott Parsons's (1902–1979) systemic sociology in the United States. Such was the contextual background of what came to be known as, on the one hand, the sociology of language, as practiced by scholars such as Joshua Fishman, Charles Ferguson, and others (cf., Giglioli, 1972), and as, on the other hand, Labovian sociolinguistics (*see* **Labov, William (b. 1927)**); the latter squarely belonged to the mainstream Anglophone tradition of structural-functional sociology, giving preference to macrosocial facts and regularities over interpretations and microsocial, contingent happenings.

In conflict with the latter tradition, the sociologist Erving Goffman (1922–1982) paved the way for a minute descriptive analysis of the dynamics of discourse at the microsocial level, and thus helped to revive the interpretive sociology of Weber, Simmel, Edward Sapir (1884–1939), G. H. Mead (1863–1931), and the Chicago School of sociology, known for its ethnographic and symbolic-interactional approaches (cf. Blount, 1995). This revival, often called the 'hermeneutic turn,' came to put its mark on various social sciences, including cultural anthropology, where Clifford Geertz (b. 1926), in the mid-1970s, successfully criticized the semantic orientation of ethnoscience (see earlier) for its neglect of interpretation and context. Similarly, in sociology, the phenomenological movement developed in the wake of the German sociologist Alfred Schutz's (1899–1959) works represented a long-awaited renaissance in ethnomethodology, originally advanced by Harold

Garfinkel (b. 1917), who tried to base the entirety of sociology on the microsocial phenomena of lived worlds, especially their everyday interpretations and dynamic contextualization. Yet, the positivist standard of formal rigor and the phobia of interpretive ambiguity in sociology were such that ethnomethodology quickly lost its contextual flexibility, critical reflexivity, and comprehensive scope, and underwent formalization and miniaturization, thus turning into an independent sociological practice, namely, conversation analysis. This school (often thought to be associated with pragmatics) subsequently incorporated some of Goffman's insights and ideas of post-Fregean pragmatics, as evidenced in Penelope Brown and Stephen Levinson's types of conversational activity and theories of polite behavior (considered as face-maximizing rational decision-making). These theories, due to their eclectic nature, enjoyed popular acclaim especially during the transitory phase when modern pragmatics moved from the semantic to the social-scientific tradition, i.e., in the late 1970s and early 1980s (*see* **Activity Theory**; **Face**; **Politeness**).

The preceding discussion outlines a general genealogy of the microsociological theories of pragmatics. Yet, as regards the crux of the social-scientific tradition, which can be said to lie in the exploration of the sociocultural mechanisms by which language contextually indexes power relations, authorities, and identities, it is missing in most of these theories. In contrast, there are Goffman's microsocial analyses of interaction ritual, frame, and symbolic self-presentation later incorporated into the French sociologist Pierre Bourdieu's (1930–2002) macrosocial theory of 'reproduction through habitus,' the field of practice, and symbolic capital. In Britain's class-stratified society, Basil Bernstein (1924–2000) also struggled with this problematic, especially when it came to determining the role that language plays in formal education. These three figures thus anticipated the coming of a truly social-scientific kind of pragmatics, i.e., critical pragmatics, as pursued in the 1980s by social semioticians, by Norman Fairclough and his Lancaster School, and others, such as Mey (1985, 2001), whose works share more and more traits with the paradigm elaborated by the anthropological tradition (*see* **Codes, Elaborated and Restricted (Bernstein)**; **Social Semiotics**).

Although the above-mentioned groups have distinct genealogies, networks, and theoretical foci, all of them are nonetheless actively engaged in the social critique of language in education, medicine, and other kinds of controlling social instances; they also share among them many sources of critical inspiration and much theoretical weaponry, including the works of Peirce, Boas, Sapir, Benjamin Whorf, Roman Jakobson, Dell Hymes, and John Gumperz in North America (see later), as well as the traditions embodied in the writings of Malinowski, J. R. Firth, M. A. K. Halliday, Raymond Williams, E. P. Thompson, and Stuart Hall in Britain; Émile Benveniste, Roland Barthes, Louis Althusser, Jacques Derrida, Michel Foucault, and Gilles Deleuze in France; Marx, Weber, Theodor Adorno, Walter Benjamin, and Jürgen Habermas in Germany; Antonio Gramsci in Italy; and Mikhail Bakhtin and Valentin Voloshinov in the former Soviet Union. All of these traditions can be seen as unified from a social-scientific perspective, focusing on language use as discourse, i.e., language in social context, and seeing pragmatics, located at the core of language, as praxis, involving social conflicts, power struggles, and identity (re)formations (*see* **Austin, John Langshaw (1911–1960)**; **Foucault, Michel (1926–1984)**; **Grammatology**). And, if pragmatics is worthless unless it is concerned with contextualized linguistic practice, that is, with what is done by peoples and individuals living in particular societies and particular times – i.e., not just with 'what is said' (linguistic meaning), but with 'what is done' in a contextually situated, sociohistorical practice – then a genuine pragmatics must be a social science of praxis, of actions and events in culture, society, and history. Such a pragmatics has been emerging since the 1980s; it erases the disciplinary division between linguistic anthropology and pragmatics and enables seeing classic, post-Austinean pragmatics as a transitory phenomenon in the historic drift moving from the semantic tradition, or the logico-linguistics of decontextualized regularities, toward the genuinely pragmatic social science of contextualized actions and events (*see* **Pragmatic Acts**).

In the following sections, we take a genealogical look at the North American 'cosmographic' school of linguistic anthropology, starting with Boas, in order to get a better idea of the social-scientific tradition, where, if the current drift continues, the future of pragmatics lies. We start out with Peirce, the neo-Kantian whose semiotic Pragmati(ci)sm was comprehensive enough to bridge the gap between the Fregean semantic and Boasian anthropological traditions, as witnessed by Jakobson's (1896–1982) synthesis of the two trends under the rubric of Peircean semiotics (*see* **Jakobson, Roman (1896–1982)**).

Pragmatics, Pragmati(ci)sm, and the Social Semiotics of Praxis

As is well known, the term 'pragmatics' has come from a tradition that is located in between semantics and social science, namely, American Pragmati(ci)sm.

In Charles Morris's (1901–1979) triadic formulation, we speak of syntax (form), semantics (meaning), and pragmatics (context) – terms that are derived from the semiotic Pragmati(ci)sm of the neo-Kantian Peirce (1839–1914) and thus properly indicate the origin of pragmatics as being located in Kant's second *Critique*, or more generally, in the latter's critical philosophy.

Peirce, who shared much with other neo-Kantians (such as the phenomenologists), articulated what he called a semiotic 'phaneroscopy' (phenomenology), in which actions and events constitute the basis of knowledge, aesthetics, and historic evolution (teleology). Most importantly, actions and events are signs that point to objects in context, such as agents (stimuli) and experiencers. Therefore, the basic mode of signification is indexicality, which is based on the principle of contextual contiguity; the other empirically oriented mode of signification, iconicity, is based on the principle of contextual similarity between signs and their objects. In addition, there are empirically unmotivated, albeit contextually indexed and/or iconically signaled, kinds of signs, i.e., symbols; these comprise conventional ideas (ideologies) and denotational codes, as they are presupposed by the speech participants involved in actions and events. These three kinds of signs interact with one another to constitute the human cosmology, as it is anchored on the (inter)actions and events taking place at the *hic et nunc* of human activity.

Eventually, this cosmographic theory of signs was adopted by Jakobson, who, in his comprehensive theory of communication (cf., Jakobson, 1990; Lee, 1997), articulated the empirical, indexically anchored universal matrix of grammatical categories and distinctive features, envisioned as the systematic interlocking of symbolic (formal and semantic) *langue* and indexical (phonetic and pragmatic) *parole* (*see* **Jakobson, Roman (1896–1982)**). The Jakobsonian legacy successfully integrated Peircean semiotics and Boasian linguistic anthropology; it has been the guiding thread of North American linguistic anthropology ever since, from Hymes's ethnography of speaking all the way to Michael Silverstein's social semiotics (cf. Blount, 1995). In the beginning, however, there was Boas, to whom we now turn.

The Genealogy of Linguistic Anthropology: The Boasian Cosmographic Tradition

We now try to reconstruct the cosmographic theories due to Boas, Sapir, and Whorf; these early 20th-century theories have become somewhat obscured by the hegemonic dominance of the semantic tradition in linguistics and anthropology, which gained strength in mid-20th century.

As already noted, like Peirce, Boas was a neo-Kantian who had come to understand the human mind in terms of the three processes of similarity, contiguity, and abstraction, in close resemblance with the Peircean triad of iconicity, indexicality, and symbolicity. Unlike Peirce, however, Boas was a social scientist who fought evolutionism and institutionalized racism. In these efforts, he undertook the task of showing the existence of grammatical structures in every known language, especially (Native) American languages, and used his findings to prove the universality of a symbolic "faculty of forming abstract ideas" (Blount, 1995: 26), common to all human beings. In the process, Boas moved on to empirical studies of diverse languages in a universal framework, including hypothetical universal grammar.

Boas came close to discovering the notion of the phoneme, which harkens back, via the German *Völkerpsychologen* such as Heymann Steinthal (1823–1899), to Wilhelm von Humboldt's (1767–1835) idea of *innere Sprachform* and, ultimately, to Kant's notion of 'the inner and formative power of life forms,' as he articulated it in his third *Critique*. Coming to the cultural, idiographic, or cosmographic sciences (in the sense of Alexander Humboldt) such as geography, anthropology, and linguistics, from a background in nomothetic sciences such as (psycho)physics and experimental psychology (cf., Stocking, 1996: 9–16), Boas was naturally impressed by the diversity of human phenomena he observed in culturally and historically situated contexts. He saw the two kinds of sciences as being connected via the faculty of categorical perception, i.e., the human capacity and tendency to impose categorical forms (such as sound patterns) on empirical substance or diverse unique (idiographic) phenomena (such as phones and sensations). In this, Boas anticipated 20th-century structuralism, phenomenology, and Gestalt psychology, and their practitioners, whose battle-cry against 19th-century positivists' preoccupation with sensations was precisely 'the primacy of (categorical) human (ap)perception.' Moreover, and perhaps more importantly, Boas (as did the later structuralists) maintained that linguistic perceptions were decisively conditioned by the unconscious structure of the mind; moreover, this unconscious structure could, no less importantly, be rigorously investigated using a set of techniques not uncritically adopted from the physical sciences, in what came to be called 'structural analysis' (cf., Boas, 1989: 72–77; Sapir, 1949: 166).

Boas understood categorical phonemic perception essentially as a linguistic, structurally and unconsciously conditioned distortion in the conscious perception of phonetic and pragmatic (i.e., empirical)

phenomena. In his critique of logico-linguistic reason (of the kind earlier articulated by Herder and Max Müller (1823–1900), and later by Ludwig Wittgenstein (1889–1951)), Boas made a critical empiricist departure from the Cartesian understanding of the mind, centered around the conscious reflection that rationalists were considered to be the key to the reality and verity. Boas stressed the value of empirical data (i.e., phonetic representations and unadulterated texts), gathered through fieldwork, as being critically important to his effort to show the relativistic plurality of cultures and the invalidity of the *a priori* armchair theories of Eurocentric universalism and rationalism, especially evolutionism (cf., Stocking, 1982: 195–233, 1996: 215–256).

Boas indeed was able to show that similar processes of rationalization underlay both evolutionist reasoning and what was called the primitive, 'savage mind' (cf., Lévi-Strauss, 1962), and hypothesized that such pragmatic processes of conscious rationalization (as opposed to universally valid, logico-semantic reason) were similar across diverse cultures, although their specific contents (which could be empirically investigated through the study of cultural myths and folklore, including modern sciences and philosophy) varied cross-culturally and showed distinct, so-called 'geniuses' of peoples. Thus, Boas, as Marx had done before him, understood theoretical reason and consciousness as a veil, or a mirror that produced distorted reflections of empirical phenomena such as cultural practices. For Boas, conscious behaviors distort and change these practices, which are otherwise unconsciously and habitually carried out and historically preserved. It is in this context that Boas underlined the methodological significance of linguistic structure, a largely unconscious phenomenon, which was assumed to provide a crucial key to the historical reconstruction of past practices (see Blount, 1995: 23–26; cf., Sapir, 1949: 432–433; Silverstein, 1979).

It may be useful to further unfold Boas's argument, in particular as it was later elaborated by Sapir (1949: 26–27, 156). First, both conscious and unconscious elements of the human mind are theorized as essentially reactive in relation to the sociohistorical practices (pragmatics) that are represented by, and give rise to, them. Yet, the agentive awareness (consciousness) of practices is limited, and when human agents act in accordance with such limited and distorted awareness, they precipitate the transformation of these very practices, and history starts unfolding (in Weberian terms, this is the dialectics between conscious ideology, such as Protestant ethic, and actual practice, such as capital formation and labor). On the other hand, the unconscious mind, which comprises linguistic structure, more transparently reflects human practices (at time t_0); but, since practices quickly change, along with consciousness, in a dialectic movement, the unconscious is left behind (at time t_1), and the correspondence with synchronic practices (at t_1) becomes opaque, even though it remains more transparently related to the diachronically prior practices (at t_0). Therefore, both consciousness and the unconscious (where linguistic structure is mostly located) end up being only opaquely related to synchronic practices. Thus, for Boas and his followers, 'synchronic structure' is both synchronic (inasmuch as it is used 'here and now') and diachronic (inasmuch as it points to past practices). This synchrony is made up of both static and dynamic facets, the former (i.e., linguistic structure) relatively transparently pointing to the past and the latter being 'where the action is' (viz., pragmatics and phonetics); the Weberian dialectic interaction between the two, contingently creates the historic conditions for the structures and actions that are yet to come (*see* **Phonetics and Pragmatics**). Thus, the discovery of the phoneme (and of linguistic structure in general) was directly linked to the rebuttal of 19th-century neogrammarians' genetico-causal determinism (itself a further derivate of the Newtonian–Laplacean deterministic worldview), according to which the posterior condition is mechanically determined by the anterior, and faultlessly derivable from it. The discovery of synchrony (vs. achrony) also was instrumental in Saussure's discovery of the historic dialectics of *langue* and *parole* (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**), as noted by the dialectician Maurice Merleau-Ponty (1908–1961), who properly stressed the importance of the latter's discovery of *parole* (and, implicitly, of pragmatics).

No less important, given the opacity between structure and practice in the synchronic phase, is the following corollary: from the preceding premises, it deducibly follows that phonetic acts do not transparently match the phonemic categories they correspond to – a mismatch that provides part of the conditions 'distorting' phonemic apperceptions. Similarly, pragmatic acts (say, commands) do not uniquely match grammatical categories (say, the imperative mood, as becomes clear when we study the so-called indirect speech acts) (*see* **Pragmatic Acts**). In other words, the irreducibility of linguistic structure to pragmatics, a phenomenon that Chomsky sees as having its origin in the human innate faculty of reason, is shown to be deducible as a consequence of historical dialectics, generated by the very limits of consciousness or reason (cf., Sapir, 1949: 100–103). Further, just as phonetic phenomena are misperceived through our unconscious phonemic patterning (which escapes reason), pragmatic practices and referents are often incorrectly apperceived by the native mind due to an unconscious grammatical patterning (that is, due to

the language-specific structural pattern found to exist in the morphosyntactic encoding of grammatical categories) (*see* **Speech Acts and Grammar**). This is the crux of the argument that has come to be known as the linguistic relativity hypothesis (cf., Blount, 1995: 26–28; Cowan *et al.*, 1986: 455–477; Whorf, 1956: 134–159) (*see* **Sapir, Edward (1884–1939); Whorf, Benjamin Lee (1897–1941)**).

Examining the linguistic relativity hypothesis requires us to undertake empirical studies of linguistic structures and practices across languages and cultures, which again necessitates the hypothetical construction of universal inventories of structurally significant sounds and grammatical categories (as these indeed were presented by Boas (1911)). Clearly, the typological works of Sapir (1921) and Whorf (1956: 87–101) – as well as Jakobson's (1990) theories of distinctive features and verbal categories, which may be marked 'overtly' or 'covertly' (Whorf, 1956: 87–101) in particular languages – were further elaborations of this non-Eurocentric 'universal grammar,' based on emically significant categories in the languages of the world, and suggesting the possible existence of a universal human reality underlying the particular worlds of diverse cultures (cf., Sapir, 1949: 160–166; Whorf, 1956: 147, 207–232).

The basic framework of the Boasian cosmographic tradition, as it was shared by Sapir and Whorf, became the context in which Sapir's twin notions of drift and psychological reality are to be understood. That is, in contradistinction to the neogrammarians' mechanical, genetico-causal 'blind change,' drift, vaguely and holistically perceived as *Sprachgefühl*, refers to historical structural changes caused by the dialectic interaction between structure, language use, nonlinguistic practice, and metalinguistic rationalization. Sapir, a social scientist, understood that ideal patterns (Sapir, 1921: 147; 1949: 23, 83–88, 533–543) in structure were necessarily realized not in their pure forms, but in contextualized and varied, i.e., idio-, dia-, and sociolectal, form-tokens. Some of these variations may become saliently social-indexical and directly involved in the social struggles for cultural hegemonies, as well as in processes of normative rationalizations. In such cases, the interaction between language and society often results in structural changes (cf., Blount, 1995: 513–550). Also, some of the variations may become privileged when language users feel they are being formally correct, that is, actualizing potential regularities implicitly suggested by the synchronic state of language. In such a case, the variations analogically deducible from the structure's dominant pattern may become part of the structure that will arise from the interaction between language and the *Sprachgefühl* of the language users (cf., Sapir, 1921: 147–191; Whorf, 1956: 134–159; Lucy, 1992). (Sapir hypothesized in addition that such analogies were drawn and actually implemented because of unconscious human strivings for formal beauty; on this, see below.)

Sapir's (1949: 16, 33–60) 'psychological reality' may be similarly reconstructed in the following way. Sapir (1949: 433) started out from the Boasian thesis that linguistic consciousness was opaque to practices, partly because it was influenced by unconscious structural (sound) patterns. This implies, Sapir noted, that there is some transparent linkage between consciousness and 'inner forms' (the sound patterns). Of course, native language users cannot consciously articulate the structure of their language, but they can 'feel,' half- or sub-consciously, such inner forms, which are beyond the realm of phonetic behaviors directly perceived by outsiders of the linguistic community. In other words, native language users (insiders) 'click with' (Sapir, 1949: 48, 159) the linguistic structure at the intersection of their consciousness and unconscious, i.e., at the level of feelings. And such an inarticulate, yet immediately sensed *Sprachgefühl*, and with it, the unconscious structural patterns, are manifested even in overt linguistic behaviors such as the categorical apperceptions of sounds, actions, and referents (cf., Sapir, 1921: 55, 1949: 46–60, 150–159; Whorf, 1956: 134–159). These attested behaviors would remain unexplained if it were not for the phenomenological reality of the phoneme and other form-patterns in the unconscious. Moreover, Sapir noted that allophones of a phoneme often historically developed into different phonemes. In his view, this meant that phonemic inner forms often transparently correspond to the historically reconstructed phonetic (allophonic) behaviors of users in the past (cf., Cowan *et al.*, 1986: 67–106). In this way, the linguistic history of a community was discovered to be alive (phenomenologically, psychologically real, or 'organic') in the *Sprachgefühl* and innermost unconscious of the language users. The individual mind, in short, is communal and historical in its subconscious core. Hence, Sapir noted, there is no need to oppose the individual to the social (collective), to hypostatize a 'super-organic' collectivity existing independently of individuals, or to reify culture or language.

In Sapir's cosmographic theory, the psychological reality had other important implications for the cultural nature of the human mind. That is, unconscious, historical, and communal symbolic forms are ideologically projected onto the chaotic reality of discursive practices, precipitating the chaotic, rhapsodic, and romantic "flux of things into tangible forms, beautiful and sufficient to themselves" (Sapir,

1949: 348), as they are found in poetically structured discursive texts and rituals. In and by themselves, the symbolic forms constitute an artwork of classicism, often referred to as 'the poetry of grammar,' created by the human striving for an aesthetic totality, *un système où tout se tient* (compare the notion of drift, referred to previously) (cf., Sapir, 1949: 344; Cowan *et al.*, 1986: 455–477; also consider Jakobson's (1990) 'poetic function'). Thus, in Sapir's view, the very regularity of linguistic structure – a regularity necessary in order to operate with decontextualized denotational and cognitive significations – is constituted by our aesthetic, expressive, and ideological strivings for formal completeness. Cognition, aesthetics, emotion, history, society, and the individual are thus intertwined in Sapir's cosmographic theory.

Unfortunately, the inroads made during the 1940s and 1950s by the semantic tradition into the sciences of language almost altogether eclipsed Sapir's cosmographic science, except in the narrow circle of linguistic anthropologists. This process started with the neo-Bloomfieldians, to be followed by the ethnoscientists in anthropology, the Chomskyans in (psycho)linguistics, and the cognitive scientists of diverse obediences, who all operated in this tradition. Nevertheless, Sapir's students, such as Stanley Newman (1905–1984) and Mary Haas (1910–1996), successfully passed the torch to the next generation, whose representatives included John Gumperz and Dell Hymes, who succeeded in firmly integrating the Boasian and Peircean–Jakobsonian (semiotic) approaches (cf., Gumperz and Hymes, 1986). Subsequently, Hymes's theory of communication, called the 'ethnography of speaking,' gained momentum in the 1970s (cf., Bauman and Sherzer, 1974), a decade that saw the hermeneutic (i.e., interpretive, contextual, or (neo-)pragmatic) turn in the social sciences and Anglophone philosophy (as pointed out previously). This turn provided the historic conditions for a revival of the Boasian tradition in contemporary North American linguistic anthropology, locating language squarely at the intersection of history, ideology, and practice (see Blount, 1995; Brenneis and Macaulay, 1996; Duranti, 2001; Kroskrity, 2000; Lee, 1997; Lucy, 1992, 1993; Schieffelin *et al.*, 1998; Silverstein and Urban, 1996). Here, the historic, ideological, and pragmatic aspects of language, including not only grammar, but also (con)textualization, language change and variation, Bakhtinian voicing, standardization, rationalization, modernization, linguistic nationalism and imperialism, language purism, feminism and gender, literalism, and other cultural ideologies and practices, seen in their sociohistoric context, are cosmographically studied in a social-scientific framework. Their discovery of the (re)formations of group identities and power relations and sociocultural conflicts as happening in, and being constituted by, language as the central element thus converges with the social drift of contemporary critical pragmatics.

See also: Activity Theory; Austin, John Langshaw (1911–1960); Bakhtin, Mikhail Mikhailovich (1895–1975); Bloomfield, Leonard (1887–1949); Boas, Franz (1858–1942); Chart Parsing and Well-Formed Substring Tables; Chomsky, Noam (b. 1928); Cognitive Linguistics; Critical Applied Linguistics; Critical Discourse Analysis; Discourse, Foucauldian Approach; Ethnoscience; Foucault, Michel (1926–1984); Frege, Gottlob (1848–1925); Generative Semantics; Grammatology; Grice, Herbert Paul (1913–1988); Implicature; Jakobson, Roman (1896–1982); Kant, Immanuel (1724–1804); Mood, Clause Types, and Illocutionary Force; Neo-Gricean Pragmatics; Peirce, Charles Sanders (1839–1914); Phonetics and Pragmatics; Politeness; Pragmatic Acts; Pragmatics: Overview; Quine, Willard van Orman (1908–2000); Relevance Theory; Sapir, Edward (1884–1939); Saussure, Ferdinand (-Mongin) de (1857–1913); Social Semiotics; Speech Acts and Grammar; Speech Acts; Whorf, Benjamin Lee (1897–1941).

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Anthroposemiotics

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Anthroposemiotics is the science that studies the 'semiotic animal,' i.e., man. The semiotic animal is not only capable of using signs (i.e., of semiosis), but also of reflecting on signs through signs.

Anthroposemiotics today has freed itself from two traditional limitations: 'anthropocentrism' and 'glottocentrism.'

With regard to the first, anthroposemiotics does not coincide with general semiotics, but is a part of it. Semiotics is far broader than a science that studies signs solely in the sphere of socio-cultural life. Semiotics also studies the signs of unintentional communication (semiology of signification); before this, it was limited by exclusive preference for the signs of intentional communication, Saussure's *sémiologie* (semiology of communication). In contrast, semiotics following Thomas A. Sebeok and his 'global semiotics' studies communication not only in culture, but also in the universe of life generally. From this perspective, biosemiotics provides the broader context for anthroposemiotics or semiotics of culture and is not separate from the latter. Anthroposemiosis as a cultural process is at the intersection between nature and culture.

With regard to the second aspect, getting free from glottocentrism, critique of glottocentrism in anthroposemiotics must be extended to all those trends in semiotics that refer to linguistics for their sign model. Anthroposemiotics insists on the autonomy of nonverbal sign systems from the verbal and also studies human sign systems that depend on the verbal only in part, despite the prejudicial claim that verbal language predominates in the sphere of anthroposemiosis.

To get free from the anthropocentric and glottocentric perspective as it has characterized semiotics generally, implies taking other sign systems into account beyond those specific to mankind. These signs are not alien to the human world, but they are not specific to it. They concern the encounter between human communication and the communicative behavior of non-human communities and with the environment; they also concern the sphere of endosemiotics, cybernetic systems inside the body on both the ontogenetic and phylogenetic level.

Anthroposemiotics now avoids biologism that occurs when human culture is reduced to communication systems traceable in other species, just as it avoids the anthropomorphic reduction of nonhuman animal communication to distinctive features and models specific to mankind.

Anthroposemiotics focuses on signs studied by specialists from different fields, viewing them at once in their specificity and interrelationship. These signs range from the signs of 'nature' to the signs of 'culture,' from verbal signs to nonverbal signs, from natural languages to artificial languages, from highly plurivocal and dialogical signs to univocal and monological signs, or better signals, signs endowed with varying degrees of indexicality, symbolicity, and

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iconicity, signs of conscious and unconscious life. The anthroposemiosic universe includes the life of signs and the signs of life as they appear today in the biological and human sciences; signs of animal life and of specifically human life; human verbal signs and nonverbal signs; signs of adult life and signs of infants; signs of the human body both in its more culturally dependent and its natural-biological manifestations; signs of normal or pathological forms of dissolution and deterioration of communicative capabilities; signs that depend on natural languages and signs that, in contrast, have nothing to do with natural languages and, therefore, are refractory to the categories of linguistics; human intentional signs controlled by the will, and unintentional, unconscious signs in all forms of ideology, false consciousness, lying, deceit, and good faith.

See also: Biosemiotics; Nonverbal Communication; Sebeok, Thomas Albert (1920–2001); Semiology versus Semiotics; Semiosphere versus Biosphere; Semiotics: History.

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Antigua and Barbuda: Language Situation

Editorial Team

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The official language of Antigua and Barbuda is English, with 67 000 speakers. Literacy is 89%. Significant minorities include North Levantine Spoken Arabic and Portuguese. The English spoken on Antigua and Barbuda is Leeward Caribbean Creole English, also spoken on Anguilla, St. Kitts, Montserrat, and Nevis.

The inhabitants of Barbuda have traditionally been small-scale farmers and fisherman with the result that sociolinguistic changes caused by slavery and the expansion of the sugar plantation system had relatively few direct effects on the island and the population of Barbuda remained more mixed for longer (*see* **Anguilla: Language Situation**).

In contrast, Antigua was a sugar island with the concomitant sociolinguistic effects exerted by slavery and the plantation system (*see* **Barbados: Language Situation**). The development of English on Antigua parallels that of Barbados. The production of sugar, being capital and labor intensive, required the establishment of large plantations, which forced small farmers off the land. Many emigrated to Jamaica. On Antigua, as on many sugar islands, the forced resettlement of slaves, stringent social control, short working life-spans – caused by poor conditions and epidemics – and the continuous influx of new slaves simultaneously stimulated the development of a stable Creole as well as preventing decreolization from occurring. Decreolization only began in earnest with emancipation in the 19th century and the spread of popular education.

See also: Pidgins and Creoles: Overview.

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Antikirinya *See:* Pitjantjatjara.

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Antonymy and Incompatibility

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Incompatibility is the semantic relation in which two expressions have necessarily different reference. So, for example, *bottle* and *overture* are incompatible because nothing can be a bottle and an overture simultaneously. Often, *incompatibility* is used more particularly to mean incompatible items within a **semantic field**, such as *bottle/can/box*. In some traditions, the term ***contrast (set)*** is used for this relation. **Antonymy** involves special binary cases of incompatibility. These lexical-semantic relations are further defined below, and then main research issues are outlined. Slashes symbolize these relations – e.g., *cold/hot*.

Incompatibility and Contrast

Logical incompatibility (*bottle/overture* as well as *bottle/can/box*) is a semantic, rather than a lexical, relation. That is, the meanings are incompatible, rather than the words themselves, because the relation holds between specific senses of the word (so *bottle* 'container' and *bottle* 'courage' are incompatible with each other and with different items generally) and because formal properties of the words involved (such as pronunciation or register) are irrelevant to the relation. Logical incompatibility is rarely a focus of lexicological study, which usually concerns semantic paradigms, because no paradigm can be found in a group such as *argon/bottle/Democrat/overture*.

This logical sense of *incompatible* contrasts with another sense that is specifically used for incompatibility within a semantic field, as for *club/diamond/heart/spade*. We can further distinguish the logical-semantic *incompatibility* from a more pragmatic notion of *contrast*. *Incompatibility* definitionally includes no cases with referential overlap, but *contrast* can. For instance, if *green* and *blue* can both describe a particular shade of turquoise, then they are not incompatible, but do contrast, because they refer to categories with different, partly incompatible boundaries in the color field. In this sense, the opposite of *contrast* is *inclusion*: *blue/green* contrast, while *loden* and *lime* do not contrast with *green* but are included in its sense (*see* **Hyponymy and Hyperonymy**).

Antonymy and Opposition

The term *antonymy* is used in two ways. Some people (Lyons, 1977; Lehrer and Lehrer, 1982) use it specifically to refer to contrast between gradable predicates, so that *cold/hot* are antonyms, but *aunt/uncle* are not. Others (Jones, 2002; Murphy, 2003) use it to refer to any lexical pairs that constitute semantic **opposites**. In this general sense, *antonymy* can be defined as a relation in which two words share all relevant properties except for one that causes them to be incompatible. This is called **minimal difference**. For example, *aunt* and *uncle* share all semantic properties (parent's sibling[-in-law]) except sex, and *cold/hot* share all (extreme of temperature scale, neutral as to what it modifies) except which extreme is denoted. Antonymy contrasts with relations such as synonymy and hyponymy in its binarity and in that it is frequently argued to relate words as well as senses. For example, while *hot* and *freezing* are semantically incompatible, *freezing* is not the antonym of *hot* – only *cold* is.

Several logical antonym types have been identified. Antonym taxonomies vary in which types they include, but the three below occur in most taxonomies.

Gradable Contrariety (Classical Antonymy, Polar Opposition)

As noted, some theorists use *antonym* to refer only to contrasting gradable predicates such as *cold/hot*, *bad/good*, *big/little*. Such predicates are **gradable** in that they can hold to varying degrees (e.g., *hardly/very cold*, *hotter than*), and their relation is **contrary** in that the assertion of one entails the negation of the other (if something is hot, then it is not cold), but not *vice versa* (if something is not hot, it's not necessarily the case that it's cold – it could be tepid). Thus, there is some neutral semantic ground between the two antonyms. Gradable contraries are particularly interesting because they often exhibit **markedness** phenomena (Lehrer, 1985).

Complementarity (Contradiction)

Complementary (also called **contradictory**) antonyms are those whose senses completely bisect some domain (and thus are non-gradable). For example, every integer is either odd or even, so *even/odd* is a complementary pair. The assertion of one entails the negation of the other and *vice versa*: *X is odd* contradicts *X is even*, and *X is even* is synonymous with *X is not odd*. Complementarity is comparable to many cases of non-binary incompatibility that exhaust their referential domain (e.g., *animal/mineral/vegetable*). In this case, the entailment and contradiction relations are between the assertion or negation of one member of the set and the disjunction of the others. For instance, *X is an animal* contradicts *X is*

a vegetable or a mineral, and *X is not an animal* entails *X is a vegetable or a mineral.*

So-called **gradable complementaries**, such as *dishonest/honest*, lie between complementarity and contrariety. They seem to contradict each other (*X is not honest* entails *X is dishonest*, and *vice versa*), but a middle ground seems to exist, because we can assert that a person is *neither honest nor dishonest*. Even classic examples of complementarity, such as *dead/alive*, sometimes take on gradable qualities (e.g., *he's more dead than alive*). One solution to the problem of categorizing gradable complementaries is to treat the words involved as polysemous, having relative and absolute senses in contrary and complementary relations, respectively.

Directional Antonyms

Most taxonomies include at least one more type of antonym, which covers all or some of the following subtypes. **Converse** antonyms follow the pattern if X is *p* to Y, then Y is *q* to X. This covers examples such as *give* (*to*)/*receive* (*from*), *child/parent*, and *above/below*, in which each member describes the same relation or activity from a different perspective (e.g., using either X or Y as the landmark). For instance, *X gives Y to Z* entails *Z received Y from X*. **Reversive** opposites involve the undoing of some action: *tie/untie*, *build/demolish*. Both of these types are sometimes collected, along with other miscellaneous examples (e.g., *left/right*, *come/go*) in a general category of **directional** antonyms.

Other Types of Opposition

Many words that are considered to be opposites do not fit the above categories. For example, *learn/teach* seem to go together in a converse-like way, but they are not different perspectives on the same action, but rather two actions that typically co-occur. Gender opposites (*female/male, aunt/uncle*) are often considered to be complementary, but the existence of hermaphrodites calls that judgment into question. Other binary opposites are seemingly part of larger contrast sets, for example *happy/sad* (rather than *happy/angry* or *angry/sad*), raising the question of whether they are true contraries (on the same scale) or not (Ogden, 1967). Other pairs of words that go together, such as *gin/tonic* can be argued to be minimally different (they are similar in being part of the same drink, but different in being alcoholic/non-alcoholic), but many definitions of antonymy would not include such pairings. Still others, such as *Heaven/Hell*, contrast on so many levels (reward/punishment, ecstasy/agony, up/down, cool/hot) that they seem to flout the definition of antonyms as *minimally* different (Cruse, 1986; Murphy, 2003).

Research Issues

Interest in antonymy and incompatibility has shifted away from the logical properties of the relations and their subtypes and toward their roles in lexical organization and discourse. In part, this shift has been fueled by corpus methodology, which makes large-scale studies of antonym distribution possible.

Contrast and Lexical Development

Contrast relations are often seen as constraining lexical development, both at the individual (lexical acquisition) and the community (semantic change) levels. In the structural semantics tradition (Lyons, 1977; Coseriu and Geckeler, 1981; Cruse, 1986), meaning is often defined as at least partly dependent on the relations between words. The very existence of two words in the same lexical field forces their meanings to differentiate, and the existence of contrast relations between words makes it likely that they will referentially drift apart and their contrast relation will be extended to other senses for those words. For example, *black/white* are contrasted as color names, but also as racial terms that represent a complex of physical, genotypical, and cultural characteristics, and also mean 'evil/good' (*black/white magic*). These findings suggest that language users appreciate the relation as a relation between *words,* not just between senses, as discussed next.

A Lexical Relation?

As noted, incompatibility is a semantic relation among words' senses, but it can be argued that antonymy is a relation between words. In this case, we can use **opposite** to refer to the semantic relation of binary incompatibility (or contrast) and *antonym* to refer to the conventionalized pairing of two particular words with opposite meanings. The effects of such conventionalized pairing can be seen in several ways. First, some of the strongest associations in word association tests are anonymous stimulus-response pairs. If asked to respond with the first word that comes to mind, most people respond *white* to *black* and *sad* to *happy*, but have less consistent or non-antonymous responses for words without clear antonyms, such as *grey* or *joy*. Second, people use antonyms together in discourse at greater than chance rates and at greater rates than they use other possible semantic opposites. So, *weak* is more likely to be paired with *strong* in text than with another of its semantic opposites,

powerful (Charles and Miller, 1989). One might argue that such preferred pairings arise because they are semantically more perfect opposites, but a completely semantic explanation is not sufficient, because there is evidence that word form plays a role, too. For example, *homosexual* was established before *heterosexual,* but none of its semantic opposites gained status as an antonym for *homosexual* until a morphologically analogous term was invented (Murphy, 2003).

Acknowledging the conventionalization of antonym pairs raises several questions: How are such pairs established in the language, how are they acquired by individuals, and how are they mentally represented? Corpus studies have been a major tool in answering these questions and raising new ones. For example, Fellbaum (1995) has shown that the pairing of antonyms is not a strictly paradigmatic matter in which nouns have noun antonyms and verbs have verb antonyms, etc. So while the nouns *death* and *life* co-occur in sentences at higher than expected rates, so do the morphologically related pairs *deadly* (Adj) and *life* (N), *dead* (N) and *live* (V), and *die* (V) and *live* (Adj). Because antonyms co-occur and because their opposition is somewhat insensitive to part-of-speech, they defy traditional definitions of a 'paradigmatic' relation, leading some to claim that antonymy is a syntagmatic relation (while the semantic relation of opposition can still be classified as paradigmatic).

Discourse Functions and Constructions

Corpus studies of antonym co-occurrence also allow for the examination of how and where antonyms are used in discourse. The most comprehensive work on this to date has been Jones's (2002) description of discourse functions of antonyms, each of which is associated with particular morpho-syntactic frames, or constructions. The two major functions account for about 70% of antonym use. In **coordinated antonymy** (e.g., *X and Y*; *neither X nor Y*), the contrast between the antonyms is suspended in order to say something that is true of both X and Y. In sentence (1), the difference between *indoors/outdoors* is rendered irrelevant (for the use of the lights) in context.

(1) These lights can be used **indoors** or **outdoors**.

In the other major type of antonym, **ancillary antonymy**, one antonym pair creates or underscores a second opposition. For example, in sentence (2), the use of the conventionalized pair *long/short* heightens the contrast between *acquaintances* and *friends*.

(2) He was **long** on *acquaintances* but **short** on *friends*.

Jones' other seven types of antonyms may be more or less common in different genres of text and speech. Because the corpora searched contained formal writing, a remaining question is whether antonymy is used similarly in speech to create emphasis, cohesion, and interest.

Defining Antonymy

Finally, attention to antonymy as an arguably syntagmatic relation with particular discourse uses has brought into question earlier definitions that rely on logical notions such as incompatibility and entailment. The broader use of the term *antonym* to include all types of opposite relations raises questions regarding how the relation as a whole can be defined: What counts as opposition? Is antonymic opposition a semantic or pragmatic issue? How can we account for perceptions that some antonym pairs seem 'more antonymous' than others? Cruse (1994) has suggested that *antonym* is a prototype category, and that the prototypical antonym pair is diametrically opposed, symmetrical and binary, and exhausts the superordinate domain. This predicts that pairs such as *alive/dead* will be perceived as 'better antonyms' than examples such as *happy/sad* or *short/tall*, but that these others are still close enough to the prototype to count as antonyms in most contexts. Murphy (2003), on the other hand, has proposed that antonym relations are based on a pragmatic principle of contrast by minimal difference, and so, theoretically, almost any two words could count as opposites, if used in an appropriate context.

See also: Hyponymy and Hyperonymy; Lexical Fields; Lexicon: Structure; Markedness; Negation: Semantic Aspects; Paradigm versus Syntagm; Synonymy.

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Apalachee *See:* Muskogean Languages.

Apes: Gesture Communication

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Apes use movements of the limbs, head, and body to communicate with conspecifics. The repertoire size varies between 20 and 30 gestures depending on the species (see papers in Call and Tomasello, 2004, for additional information). In addition to gestures, apes have a small repertoire of facial expressions and vocalizations (*see* **Nonhuman Primate Communication**). Apes use gestures in a variety of circumstances, including feeding, sexual, agonistic, grooming, travel, and play contexts. For instance, they extend their arm to beg for food, slap the ground to call attention to themselves, and put their arm around their mother's back to request to travel to a different location. These gestures fall within three basic sensory modalities: visual, auditory, and tactile. Visual gestures rely solely on visual information, auditory gestures rely mainly on sound production (although they also have an important visual component), and tactile gestures depend mainly on establishing physical contact with the recipient (see **Figure 1**).

Acquisition and Transmission

Unlike facial expressions and vocalizations, whose production seems tightly hardwired and not open to important modifications (see Snowdon, this volume), there is good evidence that apes can produce new gestures as needed. Although in general the gestural repertoires across groups of the same species overlap to a great extent, several studies have described a number of idiosyncratic gestures used by a single individual only (Goodall, 1986; Tomasello *et al.*, 1985). Tanner and Byrne (1993, 1996) also report much individual variability in the gestures used by gorillas. These idiosyncratic gestures are interesting because it is unlikely that they could have been either genetically determined or socially learned.

Chimpanzees (and probably other apes as well) learn their gestural signals via a process of ontogenetic ritualization (Tomasello, 1996). In ontogenetic ritualization two organisms essentially shape one another's behavior in repeated instances of a social interaction. This type of learning takes the following general form: (1) individual A performs behavior X; (2) individual B reacts consistently with behavior Y; (3) subsequently B anticipates A's performance of X, on the basis of its initial step, by performing Y; and (4) subsequently, A anticipates B's anticipation and produces the initial step in a ritualized form (waiting for a response) **in order to** elicit Y. The main point is that a behavior that was not at first a communicative signal becomes one by virtue of the anticipations of the interactants over time. There is no evidence that chimpanzees, or any other ape species, acquire gestural signals by means of imitative learning (Tomasello and Call, 1997). In fact, there is even a study reporting negative results (Tomasello *et al.*, 1997).

Flexibility

As noted previously, apes use multiple gestures in multiple contexts, but there is not a one-to-one correspondence between gestures and contexts. Thus, apes use a particular gesture in multiple contexts, and a particular context is served by multiple gestures. This dissociation between gestures and contexts is what allows subjects to change 'tactics' and try alternative

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Figure 1 Three gestures corresponding to three sensory modalities: (A) visual: hand-begging, (B) auditory: hand-clapping, and (C) tactile: arm-on.

gestures when those that they already have used are ineffective. On the one hand, this ability to try different gestures toward the same goal is analogous to their ability to produce multiple solutions to achieve a certain goal. For instance, presented with a problem in which an out-of-reach food reward is hanging from the ceiling, apes can, among other things, climb a box to reach the reward, throw objects at the reward, or hit the reward with a stick to knock it down. On the other hand, the use of gestures is quite different from the use of vocalizations, in which there is usually a one-to-one correspondence between signals and contexts (indeed, a one-to-one correspondence is probably a necessary condition for those signals to be effective). For instance, alarm calls are specific to the detection of predators, and recruitment calls are specific to enlisting help from allies in agonistic contexts.

Apes also can use combinations of gestures – be they repetitions of the same gesture or combinations of different gestures. In chimpanzees, approximately 30% of the gestures appear in combinations. There is no evidence, however, that these combinations acquire a different meaning from that of their constituent gestures or that they modify the meaning of single gestures. In other words, there is no evidence of syntactic rules in gestural communication. It is more likely that these combinations are used to emphasize the message or as a way to try a different approach to a problem when a single gesture is not producing its desired outcome.

Audience Effects

Several observational studies have shown that individuals of all ape species adjust their gestures to the attentional state of the recipient. This means that apes use gestures from each sensory modality (i.e., visual, auditory, and tactile) differentially depending on the spatial orientation of the recipient. In particular, individuals use visual gestures preferentially when the recipient is facing them. In contrast, they do not show such a specificity for auditory, and especially for tactile, gestures (Call and Tomasello, 2004). For instance, chimpanzee juveniles give only a visual signal to solicit play (e.g., 'arm-raise') when the recipient is already oriented appropriately, but they use their most insistent attention-getter, a physical 'poke-at,' most often when the recipient is socially engaged with others.

Several experimental studies have confirmed and extended this result by showing that apes are specially attuned to the face orientation of the recipients, not just their presence/absence or their overall body orientation. Apes will beg food from a human who is oriented toward and looking at them rather than from one who is oriented toward them but with the face turned away (Kaminski *et al.*, 2004). Furthermore, when competing for food, chimpanzees avoid taking food from the side toward which the human has the face, but not the body, turned (Hare *et al.*, submitted). Moreover, chimpanzees and bonobos show special sensitivity, compared with gorillas and orangutans, to the attentional state of recipients. When begging food from a human who has turned the back and face away from them, they move around to face the human and then gesture, even if doing so entails abandoning the location of the potential food source (Liebal *et al.*, in press). Chimpanzees can also produce sounds or will touch a human who is not paying attention in order to request food (Gómez, 1996; Hostetter *et al.*, 2001).

As noted previously, chimpanzees have a rich natural repertoire of gestural signals and can also acquire novel gestures. Some of the most compelling cases that demonstrate the ability to acquire novel gestures involve the acquisition of human gestures. Two prominent examples are pointing and sign language.

Pointing

Using an extended index finger (or the whole hand) is not a gesture that apes use to direct the attention of

their conspecifics. Some authors argue that the lack of pointing with an extended arm and finger is actually not surprising at all because chimpanzees point with their body orientation (Menzel, 1974). In other words, chimpanzees do not display pointing (with an extended arm) because they already have other ways to point. Moreover, de Waal and van Hooff (1981) observed that during recruitment episodes following an aggressive incident, chimpanzees use 'side-directed' behavior to indicate enemies to their potential allies. They do this by using an extended arm toward the aggressors. Although this behavior could be construed as pointing at the enemies to inform potential allies, it is also true that chimpanzees use an extended arm toward their potential allies. Therefore, it is not clear whether pointing with the body or side-directed behavior constitutes genuine cases of intentionally directing attention as opposed to behaviors that the other can read but that the sender does not intend to send as referential acts.

Despite the lack of pointing gestures among apes, it is clear that they can spontaneously develop this gesture when they interact with humans. There are numerous examples of language-trained apes' acquiring this gesture in the company of humans (Savage-Rumbaugh *et al.*, 1986; Krause and Fouts, 1997; Miles, 1990; Patterson, 1978). Most apes acquire the whole-hand point, but a minority of individuals use the index-finger point. For instance, Krause and Fouts (1997) systematically studied the pointing of two language-trained chimpanzees and found that they were capable of pointing very accurately to various targets. In this study humans could reliably locate the position of rewards on the basis of the information provided by the chimpanzee gestures. In contrast, pointing behavior has not been documented either in the wild or in groups of captive chimpanzees interacting with other chimpanzees. Recently, Leavens and Hopkins (1998; see also Leavens *et al.*, 1996) have shown that even non-language-trained chimpanzees can develop pointing gestures to direct the attention of humans. These authors found that 40% of the chimpanzees they studied pointed with the whole hand (with 5% using an index finger extension) to indicate the location of food to humans. These pointing gestures were accompanied with gaze alternation between the human and the food, and the chimpanzees persisted in using this gesture until they received the food. These features suggest that pointing gestures were both intentional and referential. These gestures were observed only when chimpanzees interacted with humans, not with other chimpanzees. Since captive chimpanzees (both mother- and human-reared) interact with humans extensively, and humans are especially attuned to the pointing gesture, it is not surprising that chimpanzees can quickly capitalize on this and develop pointing gestures. So the current evidence indicates that chimpanzees, regardless of their rearing history, can develop the pointing gesture to direct the attention of humans to locations or objects that they desire.

Sign Language

Apes can be trained to use some aspects of human sign language (e.g., Fouts, 1975; Gardner *et al.*, 1989; Miles, 1990; Patterson, 1978). Most studies have used American Sign Language or some version of it. Apes can acquire nouns, verbs, adverbs, pronouns, and adjectives. In some cases, these signs are iconic (i.e., their topography is reminiscent of the referent they represent), but in other cases they are truly symbolic. By using these signs, apes are capable of displaced reference, that is, they can refer to things that are not currently perceptually available. Some theorists have proposed that the use of symbolic systems allows apes to solve certain problems such as analogies in a qualitatively different way from non-language-trained apes (Premack, 1983). However, non-language-trained apes can also solve these problems if certain slight modifications are implemented. Moreover, it is often hard to know whether this putative superiority of language-trained apes is a result of language *per se* or the rearing environment (so-called enculturation) that the apes in these projects experience (Call and Tomasello, 1996; Tomasello and Call, 2004). Signing apes can combine multiple signs to request things like food or play, to answer queries, or to ask questions. These combinations do not appear to follow syntactic rules. Most studies have reported a repertoire size of about 200 words or more. Apes use signs to communicate with humans and also among each other. There are even some reports of apes' learning signs from other apes without human intervention (Fouts, 1975). They even use signs toward themselves when they are reading magazines on their own.

Summary

Apes have a gestural repertoire of 20 to 30 gestures, which they use mainly in social contexts such as play, grooming, and nursing, and during sexual and agonistic encounters. Apes can produce novel gestures, including some typical human gestures such as pointing, or even learn the rudiments of sign language. Although the gestural repertoires across groups of the same species overlap to a great extent,

some individuals display idiosyncratic gestures. It is hypothesized that ontogenetic ritualization, not imitative learning, is one of the main mechanisms of acquisition of gestures in apes. Apes use a single gesture in multiple contexts, and a single context is served by multiple gestures. These gestures can be used alone or in combinations of the same or different gestures. Apes adjust their gestures to the attentional state of the recipient. This means that they use visual gestures preferentially when the recipient's face is visible to them. This flexibility in acquisition and use suggests that gestural communication has played an important role in the evolution of language.

See also: Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication Networks; Cognitive Basis for Language Evolution in Non-human Primates; Individual Recognition in Animal Species; Non-human Primate Communication.

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Aphasia Syndromes

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Throughout recorded history, there has been documentation of the loss of speech due to brain injury. Research in the 19th century demonstrated that language impairment was likely to occur with injury to the peri-Sylvian region of the left cerebral hemisphere. Goodglass and Kaplan (1983: 5) defined aphasia as "...the disturbance of any or all of the skills, associations and habits of spoken or written language produced by injury to certain brain areas that are specialized for these functions."

Research on language impairments, studying many numbers of patients and considering reoccurring locations of injury to the brain, has demonstrated that language functions are relatively localized and typically lateralized. The left hemisphere's involvement in language focuses on the formation and production of words, whereas the right hemisphere's involvement is related more to aspects of discourse (Caplan, 2000). The core language system is primarily situated in the left hemisphere and comprises four 'centers,' which can be associated and distinguished by relatively identifiable impairments. These include the superior–posterior temporal lobe, usually referred to as Wernicke's area, the supramarginal gyrus and its surrounding cortex, the angular gyrus and its surrounding cortex, and the inferior–posterior frontal lobe, usually referred to as Broca's area.

In an earlier approach to aphasia syndromes, language disorders were divided into two categories based on speech output (Goodglass and Kaplan, 1983), the fluent and nonfluent aphasias. Fluent aphasias are typically caused by lesions posterior to the rolandic fissure, often leaving Broca's area intact; the typical qualities of fluent aphasia include an ease of articulation, long fluent runs of words formed with a variety of grammatical constructions accompanied by a difficulty in finding the proper words for substantives and imaginable action words (Goodglass and Kaplan, 1983). Nonfluent aphasia is marked by difficulties with articulation, with the initiation of speech, and with the production of well-formed grammatical sequences (Goodglass and Kaplan, 1983). Nonfluent aphasia typically occurs with anterior lesions, usually in Broca's area, or larger lesions involving the supra-Sylvian cortex.

There are other descriptive systems for classifying aphasia syndromes, some based more on linguistic characteristics and others based more on clinical features. In general, the classical aphasia syndromes discussed in this article are widely applied in clinical as well as research settings, even though they are insufficiently detailed to encompass every single observable form of language disorder. Although linguistically highly selective language disorders are uncommon, they can still be found; such patients are not easily classified in the core aphasia categories.

Although everyone today would agree that aphasia is a language impairment that is due to brain injury, there are well-known controversies in the descriptions of aphasia because of debate over the definition of language (Benson and Ardila, 1996) and what linguistic system, if any, should be used to describe language disorders. Some interpret aphasic impairment for the purpose of analyzing linguistic structures, others examine aphasic language as a cognitive function, and still others work at a neurophysiological or neuroanatomical level (Benson and Ardila, 1996). Debate also arises as to whether the descriptions of aphasia support syndromes based purely on anatomical criteria or purely on linguistic or psychological theories (Goodglass, 1993). Correlating these different approaches to aphasia with tasks of verbal output, verbal interpretation, neuoroanatomical correlates, and behavioral dimensions can be daunting. However, there are a few agreed-upon core aphasia syndromes that incorporate a reasonable proportion of aphasia symptomatology and suffice to describe the majority of patients with aphasia; in addition, it seems to be the case that a significant proportion of aphasia research still employs these core aphasia syndromes as descriptors of research subjects. The syndromes discussed next were originally outlined

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Throughout recorded history, there has been documentation of the loss of speech due to brain injury. Research in the 19th century demonstrated that language impairment was likely to occur with injury to the peri-Sylvian region of the left cerebral hemisphere. Goodglass and Kaplan (1983: 5) defined aphasia as "...the disturbance of any or all of the skills, associations and habits of spoken or written language produced by injury to certain brain areas that are specialized for these functions."

Research on language impairments, studying many numbers of patients and considering reoccurring locations of injury to the brain, has demonstrated that language functions are relatively localized and typically lateralized. The left hemisphere's involvement in language focuses on the formation and production of words, whereas the right hemisphere's involvement is related more to aspects of discourse (Caplan, 2000). The core language system is primarily situated in the left hemisphere and comprises four 'centers,' which can be associated and distinguished by relatively identifiable impairments. These include the superior–posterior temporal lobe, usually referred to as Wernicke's area, the supramarginal gyrus and its surrounding cortex, the angular gyrus and its surrounding cortex, and the inferior–posterior frontal lobe, usually referred to as Broca's area.

In an earlier approach to aphasia syndromes, language disorders were divided into two categories based on speech output (Goodglass and Kaplan, 1983), the fluent and nonfluent aphasias. Fluent aphasias are typically caused by lesions posterior to the rolandic fissure, often leaving Broca's area intact; the typical qualities of fluent aphasia include an ease of articulation, long fluent runs of words formed with a variety of grammatical constructions accompanied by a difficulty in finding the proper words for substantives and imaginable action words (Goodglass and Kaplan, 1983). Nonfluent aphasia is marked by difficulties with articulation, with the initiation of speech, and with the production of well-formed grammatical sequences (Goodglass and Kaplan, 1983). Nonfluent aphasia typically occurs with anterior lesions, usually in Broca's area, or larger lesions involving the supra-Sylvian cortex.

There are other descriptive systems for classifying aphasia syndromes, some based more on linguistic characteristics and others based more on clinical features. In general, the classical aphasia syndromes discussed in this article are widely applied in clinical as well as research settings, even though they are insufficiently detailed to encompass every single observable form of language disorder. Although linguistically highly selective language disorders are uncommon, they can still be found; such patients are not easily classified in the core aphasia categories.

Although everyone today would agree that aphasia is a language impairment that is due to brain injury, there are well-known controversies in the descriptions of aphasia because of debate over the definition of language (Benson and Ardila, 1996) and what linguistic system, if any, should be used to describe language disorders. Some interpret aphasic impairment for the purpose of analyzing linguistic structures, others examine aphasic language as a cognitive function, and still others work at a neurophysiological or neuroanatomical level (Benson and Ardila, 1996). Debate also arises as to whether the descriptions of aphasia support syndromes based purely on anatomical criteria or purely on linguistic or psychological theories (Goodglass, 1993). Correlating these different approaches to aphasia with tasks of verbal output, verbal interpretation, neuoroanatomical correlates, and behavioral dimensions can be daunting. However, there are a few agreed-upon core aphasia syndromes that incorporate a reasonable proportion of aphasia symptomatology and suffice to describe the majority of patients with aphasia; in addition, it seems to be the case that a significant proportion of aphasia research still employs these core aphasia syndromes as descriptors of research subjects. The syndromes discussed next were originally outlined

as part of the Boston Diagnostic Examination for Aphasia (BDEA) (Goodglass and Kaplan, 1983).

Broca's Aphasia

Broca's aphasia, also referred to in some syndrome classifications as verbal aphasia, expressive aphasia, efferent motor aphasia, or motor aphasia, typically results from a lesion to the left posterior and lower frontal lobe and the subjacent white matter, often extending back through the lower precentral and postcentral gyri, and possibly including the inferior anterior parietal lobe, a rather wider geographical region than the region known as Broca's area, generally Areas 44 and 45 of the left hemisphere. Paraphrasing from Goodglass (1993: 210), a continuing Broca's aphasia would typically involve a lesion encompassing Broca's area (pars opercularis and pars triangularis) in the left frontal lobe cortex, usually extending posteriorly to include the lower portion of the motor strip. A lesion causing Broca's aphasia typically extends downward to the periventricular white matter, because a purely cortical or shallow lesion produces only a transient disorder.

Broca's aphasia is a common variant of the category nonfluent aphasia. Patients with Broca's aphasia tend to produce poorly articulated words and commonly transpose phonemes, and there is usually difficulty in initiating speech. Vocabulary is often limited and grammatical output tends to be confined to basic and overlearned speech elements. The production of speech tends to be in short phrases with a fewer number of words than expected, with many pauses. Overall linguistic ability seems to rely on the familiarity of the message that is spoken (Goodglass, 1993). It is common to observe agrammatism in patients with Broca's aphasia; agrammatism is a term used to describe speech output in which elements of grammatical structure are omitted, typically the so-called function words or grammatical functors (Benson and Ardila, 1996). Anomia is also fairly common; anomia causes patients to struggle with finding the appropriate word, both in conversational speech and in confrontational naming (e.g., what is this?). Many patients with Broca's aphasia have difficulty comprehending both relational words and varying syntactic structures (Benson and Ardila, 1996), although most demonstrate the ability to comprehend single nouns, verbs, or adjectives (Goodglass, 1993). Errors may occur in the ordering of words, although strictly speaking, word order errors would be called paragrammatism. Nouns appear to be preserved best in Broca's aphasia, whereas grammatical functors are the most impaired (Benson and Ardila, 1996). Usually there are also prosodic changes, including changes in inflection, pitch, and rhythm, that may distort speech output; this is commonly referred to as dysprosody (Benson and Ardila, 1996). Repetition often shows the same impairments as in conversational speech.

The writing ability of patients with Broca's aphasia tends to be affected in a manner analogous to speech output, but reading ability may be only mildly impaired (Benson and Ardila, 1996; Goodglass and Kaplan, 1983). Certain lesions giving rise to Broca's aphasia can also affect 'nonspeech oral movements' (Goodglass and Kaplan, 1983). A large majority of parients will show weakness of right-sided motor movements (Benson and Ardila, 1996). Writing ability tends to be affected with misspellings, letter omissions, and poor formation of letters occurring (Benson and Ardila, 1996).

People affected with Broca's aphasia are generally aware of their language impairment and will often struggle to produce the correct response. Once such patients begin to recover, they are often able to name objects at a functional level, whereas the syntactic structure of speech production is still limited. Current research shows that the lesions typically leading to Broca's aphasia most often affect both the inferior frontal lobe and the anterior inferior portion of the parietal lobe; thus, research suggests that both these areas are the probable sites for the production of language output and thus are an essential component of the so-called language core.

Wernicke's Aphasia

The most common fluent aphasia is Wernicke's aphasia, which has also been referred to as syntactic aphasia, acoustic aphasia, sensory aphasia, or receptive aphasia. The responsible lesion is predominantly found in the posterior portion of the first temporal gyrus of the left hemisphere and frequently includes the middle temporal gyrus; such lesions often continue back to the occipital lobe and inferior parietal–temporal lobe in the vicinity of the supramarginal and angular gyri. From Goodglass (1993: 211), we learn that "lesions that extend posteriorly to include the region of the angular gyrus are likely to produce severe reading and writing disorders in addition to the effects on speech comprehension. When damage to this temporal region occurs, patients are typically inflicted with an impaired ability to comprehend auditory stimuli. Their own speech often appears to be fluent but is typically produced in a paraphasic manner."

As in Broca's aphasia, syntax is often affected, but in Wernicke's aphasia, function words, rather than being omitted, are often used improperly or added extraneously; grammatical word order constraints may

be violated as well. This sort of syntactic impairment is called 'paragrammatism.' Sentence production in Wernicke's aphasia is often devoid of complex verb tenses and embedded subordinate clauses, exemplifying a simple declarative word order (Goodglass and Kaplan (1983: 80). Although not common in all patients with Wernicke's aphasia, many such patients show an excessive output even to the point of adding additional syllables, words, or phrases to sentences; in addition, jargon aphasia is more characteristic of the early stages of Wernicke's aphasia (Benson and Ardila, 1996). Most classification schemas consider jargon aphasia a subtype of Wernicke's aphasia, with verbal output substitutions that are literal (at the phonemic level), verbal (at the word level but recognizable), or neologistic (also at the word level but unrecognizable) (Benson and Ardila, 1996).

The writing ability of patients with Wernicke's aphasia is often motorically intact, but will normally reflect the patient's fluent paraphasic speech, demonstrating a frequently disorganized and rambling style, with occasional-to-frequent repetitions of words or phrases and a dearth of substantives and concrete action words. Reading tends to be impaired as well, although the greater deficit is in auditory comprehension. Patients with Wernicke's aphasia typically exhibit a 'press of speech' and, concomitantly, appear to be unaware of their deficits. As noted above, comprehension, particularly in the auditory modality, shows a severe deficit, regardless of whether the words are high frequency or the objects are common (Goodglass, 1993).

Conduction Aphasia

Wernicke's and Broca's aphasias affect the posterior or anterior portion of the rolandic fissure, respectively; on the other hand, by some accounts, it is the cortices supplied by the upper and lower divisions of the middle cerebral artery that are affected. There is greater agreement that the lesions causing conduction aphasia tend to be located predominantly in the vicinity of the arcuate fasciculus, the pathway connecting the temporal lobe to the frontal lobe. There are also reports that lesions causing conduction aphasia may be located in the superior temporal gyrus or within the insula. As reported in Goodglass (1993), "a large proportion of Conduction aphasics have a lesion in the supramarginal gyrus"; however, lesions elsewhere along the border of the Sylvian fissure, extending to the white matter below, may be seen. The size of the lesion in conduction aphasia is usually smaller than in either Broca's or Wernicke's aphasia; as noted above, a patient with an extensive lesion of the posterior Sylvian zone will typically exhibit the features of Wernicke's rather than conduction aphasia. Because the lesions are more centrally located, conduction aphasia has also been termed central aphasia, repetition aphasia, or afferent motor aphasia. Although the speech output may be similar to that in Broca's aphasia, the paraphasic output symptomatology is characteristically similar to that in Wernicke's aphasia. The difference is that patients with conduction aphasia are able to comprehend language and produce a relatively fluent speech output, with their most notable impairment being difficulty with repetition (Goodglass and Kaplan, 1983). In addition to the repetition deficit, patients with conduction aphasia are often afflicted with anomia; "literal paraphasias (phonemic substitutions) may contaminate both spontaneous verbal output and attempts to repeat spoken language" (Benson and Ardila, 1996: 130).

Conduction aphasia is usually characterized by fluent, literal conversational speech and typically decent comprehension skills (Benson and Ardila, 1996), and, as noted above, the most distinctive characteristic is the abnormality found in repetition (Benson and Ardila, 1996). Within short phrases, articulatory fluency is usually quite good but patients with conduction aphasia may show a form of phonemic paraphasia (Goodglass, 1993). Although within-phrase syntactic patterns are normal, most patients show some difficulty with sentences containing pronouns and grammatical functors as well as polysyllabic words. Other characteristics that may be found include difficulties in writing, showing some forms of agraphia and ideomotor apraxia (Benson and Ardila, 1996). Writing ability is often parallel to the poor speech output, showing deficits in spelling and letter omissions or substitutions. Patients with conduction aphasia are generally aware of their speech and language deficits.

Anomia

Anomia is a form of aphasia that has also been called amnesic or amnestic aphasia, nominal aphasia, or semantic aphasia. Anomia is also an impairment that may be found in any variety of aphasia and for that reason, no specific localization for the causative lesion has been or is likely to be documented. Several aspects of anomia share features with Wernicke's aphasia; one main difference is in the absence of literal (phonemic) paraphasias and, since anomia is described by the failure to name or to retrieve names and/or nouns, auditory comprehension is unaffected, unlike in Wernicke's aphasics.

Many anomic patients are fully competent in speech, but lack the substantive words related to concepts. As a result, their speech is often described as 'empty.' Speech rate, articulation, and syntactic

form are generally normal with the exception of the pauses that signal deficits in word finding, especially nouns or words of informational content (Goodglass, 1993). Object recognition is usually good; however, many anomic aphasics are unable to comprehend nouns or verbs in isolation. In general, reading and writing are preserved, except for severe cases in which an anomic alexia or anomic agraphia is also involved; in such cases, then, reading and writing skills will appear similar to speech output. Anomia is often the first language disturbance to be manifested from brain tumors (Goodglass and Kaplan, 1983) and it may be an early sign of a developing language disorder in adults.

Alexia with Agraphia

Both the location and the size of the lesion will strongly influence the manifestation of any aphasia, but these are particularly relevant in the impairment described as alexia with agraphia (Arbib *et al.*, 1982). Alexia with agraphia is also known as parietal–temporal alexia, central alexia, semantic alexia, or angular alexia (Benson and Ardila, 1996) and may overlap the syndrome known as letter blindness. The causative lesions are predominantly found in the region of the angular gyrus. Patients suffering from alexia with agraphia display impairments in both reading and writing skills. In general, their ability to copy words tends to be better preserved than their spontaneous writing ability (Benson and Ardila, 1996). The inability to read and write extends into domains other than visual language: numbers, musical notation, and chemical formulas can also be impaired (Benson and Ardila, 1996). Speech output and auditory comprehension may be somewhat impaired but typically only in a mild form of anomia.

The Transcortical Aphasias

In many of the classic descriptions of language–brain relationships, there was the notion of the language core, the temporo-parieto-frontal cortex of the language-dominant hemisphere, in which resides the ability to repeat what is heard. The term 'transcortical' originally explained the ability to reproduce the phonological representation of a word without being able to construct its meaning (Benson and Ardila, 1996), analogous to the ability to repeat a word in a foreign language that one does not understand. The various forms of transcortical aphasias are, of course, not literally 'transcortical.' The putative causative lesions are extra-Sylvian in location, that is, outside the classic language core, which is the predominant anatomically distinguishing feature of these aphasias (Benson and Ardila, 1996; Gonzales-Rothi, 1997). The following briefly describes the generally accepted classical forms of transcortical aphasias.

Transcortical Sensory Aphasia

This is a relatively rare form of aphasia that occurs when a lesion functionally isolates Broca's and Wernicke's areas from the rest of the brain, leaving these two areas sufficiently unimpaired such that repetition is preserved but neither comprehension nor spontaneous speech is intact. Goodglass (1993) suggested that transcortical sensory aphasia is commonly produced by deep lesions, inferior to the angular gyrus, between the posterior end of the fissure of Sylvius and the temporal–occipital junction. Such a lesion allows information to project only from Wernicke's area into Broca's region, causing an "isolation which inhibits knowledge and perception to interact with the rest of the brain" (Goodglass and Kaplan, 1983). Another way of describing transcortical sensory aphasia is to consider it a form of Wernicke's aphasia, i.e., a severe comprehension deficit, in which repetition, and thus articulation, is well preserved. Despite intact articulation, repetition speech may be paraphasic, neologistic, anomic, and even echolalic (Goodglass and Kaplan, 1983; Benson and Ardila, 1996). Typical output may appear to be 'uninhibited' (Benson and Ardila, 1996). Patients tend to be unaware of their impairment (Goodglass, 1993) and their speech can occasionally be misinterpreted as a psychogenic problem, such as schizophrenia (Benson and Ardila, 1996). Writing ability is usually disturbed as well and is similar to the writing style seen in patients with Wernicke's aphasia (Benson and Ardila, 1996).

Transcortical Motor Aphasia

Another form of the transcortical aphasias is transcortical motor aphasia, sometimes known as dynamic aphasia or anterior isolation syndrome. The causative lesions are typically found on the mesial face of the anterior left frontal lobe, in the region of the supplementary motor cortex, or along the lateral aspect of the left frontal lobe, thus outside of what is traditionally thought of as Broca's area. Goodglass (1993) pointed out that lesions causing transcortical motor aphasia are usually smaller than those associated with Broca's or Wernicke's aphasia. Presumably they impinge on an anterior subcortical site that may form part of a circuit linking the motor speech area with the supplementary motor area and certain limbic structures considered essential for the initiation of speech. It has not been established whether cortical

involvement of the lateral surface, as in Broca's area, affects the symptom picture (Goodglass, 1993: 213). Functionally, the causative lesion separates the processing of speech from the mechanisms for initiating the action to talk. Patients with transcortical motor aphasia tend to be mute and may have an associated general akinesia (Benson and Ardila, 1996).

Although transcortical motor aphasia is an impaired ability to initiate speech, once such a patient begins talking, speech output is typically relatively intact. Comprehension can be fairly normal and so can repetition. Prosody, articulation, and grammar remain well preserved even when verbal output is delayed and/or interrupted by false starts, incomplete sentences, or verbal paraphasias (Benson and Ardila, 1996). When asked to say something, or otherwise initiate a response without cues, these patients have difficulty responding. However, when asked to repeat words, phrases, or sentences, performance is characteristically flawless (Goodglass, 1993). Regarding word retrieval, there is a range in ability, with some patients, for example, being able to perform well on tasks such as object naming. Verbal output may improve if related to common, repetitious material (Goodglass, 1993).

Mixed Transcortical Aphasia

Often associated with Pick's disease or carbon monoxide poisoning, mixed transcortical aphasia, also known as the isolation syndrome, appears to functionally isolate the peri-Sylvian speech areas, the so-called language core. The primary remaining language ability is a striking ability to repeat words, phrases, and sometimes whole sentences, the opposite of the conduction aphasic patient. Although articulatory fluency is generally well preserved, the quasiautomatic repetition, often a frank echolalia, is prominent in the context of few other intact language functions. There is typically a complete alexia and agraphia, with an occasional ability to scribble meaninglessly. As pointed out by Benson and Ardila (1996), other than the ability to repeat, patients with mixed transcortical aphasia exhibit the characteristics common to global aphasia.

Auditory Agnosia

In auditory agnosia, otherwise known as pure word deafness, patients are unable to recognize speech sounds, but are able to hear other nonlanguage sounds. Nonlanguage sounds, such as environmental noises, animal sounds, or music, can be relatively well distinguished and recognized. Other language abilities – speech production, reading and writing – generally remain intact. In most cases, Wernicke's area is undamaged, but the lesion destroys Heschl's gyrus (primary auditory cortex) in the language hemisphere and destroys or compromises the afferent auditory pathways from the opposite hemisphere. The result is that Wernicke's area is functionally isolated from auditory input; the patient can hear but cannot understand or repeat speech sounds. These patients do not reflect any of the symptoms common to Wernicke's aphasia except for the impaired ability to recognize speech sounds or repeat them.

Agraphia

Agraphia is the loss of the ability to produce written language, caused by specific brain lesions. There are three main forms of agraphic disorders. The first is phonological agraphia, which is an impairment in writing pronounceable pseudo-words to dictation, with a much better preserved ability to write real words and occasional difficulties with grammatical functors and abstract words (Kaplan *et al.,* 1998: 315). A second form is semantic agraphia, which can occur with focal lesions but is more commonly found in the early stages of senile dementia of the Alzheimer's type; such patients may write real words and pseudo-words normally to dictation, but they make frequent semantic errors in written confrontation naming or written descriptions (Kaplan *et al.,* 1998: 315–316). A third form is lexical agraphia; these patients preserve the phonological form of the word when writing, but produce spelling errors that normalize spelling to approximate to how the word sounds (Kaplan *et al.*, 1998). Because written language so often mirrors spoken language, agraphia is typically associated with a specific variety of aphasia (Benson and Ardila, 1996). But, because writing also includes visuospatial skills, as well as motor skills that differ from speech, impairments in spatial orientation or visual discrimination can cause agraphia without aphasia (Benson and Ardila, 1996). Patients with pure agraphia frequently have damage within the frontal lobe, but a few cases have also shown damage within the left superior parietal lobe (Benson and Ardila, 1996).

Alexia (Dyslexia)

In the literature, some authors reserve dyslexia for developmental reading problems and alexia for adult acquired reading problems; here we simply use the terms as in the source literature: as above, the focus is on adult impairments caused by brain damage. Without signs of a writing disorder, alexia is diagnosed as a disturbance in the ability to recognize words and/or

letters (Kaplan *et al*., 1998). We recognize several varieties of alexia including literal alexia (also referred to as letter blindness), verbal alexia (or word blindness), general alexia (reading impairments that may be of a grammatical or semantic nature or something else), and hemialexia (the ability to attend to only half of a word or line) (cf. Benson and Ardila, 1996, or Goodglass and Kaplan, 1983, for more clinical descriptions). In forms of pure alexia, patients are able to visually see written language stimuli, but are unable to recognize them as letters, words, or both. In these cases, the lesion tends to destroy the visual association cortex in the language hemisphere together with the callosal afferent fibers projecting from the other hemisphere, effectively isolating the language core from visual input. A variant of pure alexia is known as 'letter-by-letter' reading, as patients seem to process one letter at a time, read aloud, before identifying a word (Kaplan *et al*., 1998). For many pure alexic patients, words may be successfully comprehended if they are spelled out loud or traced on the palm, thus bypassing visual input to access the language core (Kaplan *et al*., 1998).

Three dyslexias (or alexias) have been defined in terms of the putative locus in a psycholinguistic model of reading: deep dyslexia, surface dyslexia, and phonological dyslexia (Coltheart *et al.,* 1980; Coltheart, 1996; Patterson *et al.,* 1985). These are defined as follows:

Patients with deep dyslexia usually have sustained a lesion sufficiently large to produce an aphasia, commonly a Broca's aphasia; their reading is characterized by semantic errors in reading aloud (the error is semantically related to the target word) and may also show visual errors (the error is visually similar but otherwise unrelated to the target word), morphological errors (the error is a morphological variant of the target word), a concreteness effect (concrete words are easier to read than abstract ones), a difficulty in reading grammatical functors, and a pronounced inability to read nonword letter strings that could be possible words in the native language (e.g., for English, the string *vib* or *phite*).

Patients with surface dyslexia have a reading impairment characterized by their **ability** to read orthographically regular words (approximately 75% of the English lexicon is orthographically regular, e.g., words such as *top, jelly,* and *sing*) but a pronounced difficulty reading orthographically irregular words (in English, words such as *pint, come,* and *bury* are orthographically irregular). Errors made by surface dyslexic patients on irregular words tend to be regularizing errors; that is, patients pronounce them as though they were orthographically regular. Surface dyslexic patients are able to read pronounceable nonwords, e.g., HEAF would be read to rhyme with the word *leaf*, which is regular, but not *deaf,* which is irregular.

Phonological dyslexic patients can read real words but have difficulty reading pronounceable nonwords, as is the case with deep dyslexic patients; however, patients with phonological dyslexia do not make the semantic errors that deep dyslexic patients do. Otherwise, the boundary between deep and phonological dyslexia is not always sharp and some patients seem to have characteristics of both types.

In conclusion, the main recommendations for continued use of the aphasia syndromes discussed above are convenience and consistency. A great deal of modern research in neurolinguistics, clinical neuropsychology, and the cognitive neurosciences employs the classical aphasia syndromes for identifying patient groups, notwithstanding the research in the late 20th century that casts doubt on the validity of the location of causative lesions, other research that questions the logical coherence of the symptomatology of syndromes, and still other research that questions the possibility of studying groups of patients classified in terms of these syndromes. The most widely used test battery in the United States, the BDAE (Goodglass and Kaplan, 1983), from which the major aphasia syndrome typology originates, claims to be able to classify only approximately three-fourths of all patients with language impairments. One may still argue, and many contemporary publications will attest, that the patients who can be so classified into syndromes can, sensibly and statistically, be grouped under these headings for research purposes. *Caveat emptor.*

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Apollonius Dyscolus and Herodian

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Lives

We know little about the lives of the great grammarians Apollonius Dyscolus and Herodian. Herodian is said to have moved from Alexandria to Rome, where he enjoyed the patronage of Emperor Marcus Aurelius (161–180 A.D.), to whom his *General Prosody* is dedicated. Apollonius was Herodian's father and is therefore thought to have been active in the reign of Antoninus Pius (138–161 A.D.). Apollonius lived all his life in Alexandria, where he appears to have taught and to have had a role in grammatical debates and competitions. The ancient *Life* of Apollonius explains his cognomen ('Grouchy') by appeal to his crabbed style, his ill temper, or the difficulty of the problems he posed in competition. It also states that Apollonius was so poor that he had to write on potsherds and that he educated his son Herodian so well that he broke with his father (or else that a break occurred because Herodian disliked his stepmother), but this is presumably a supposition from Herodian's many grammatical disagreements with his father.

Works

Apollonius is the only Greek grammarian before late antiquity some of whose works survive in their original form. Three of Apollonius' extant treatises are on individual parts of speech: *Pronouns, Adverbs,* and *Conjunctions*. Each of these falls into broad sections on the 'sense' and 'form of the vocal sound' of the part of speech in question. Under the first are discussed the name and definition of the part of speech, its kinds, and questions about the assignment of certain words to it: all these questions are decided on the basis of the sense. The second part discusses the forms and prosody of individual words in the class, including dialect and 'corrupt' forms, for none of these changes affects the sense. The most important, and latest, of Apollonius' surviving works is his *Syntax*, the four books of which survive almost in their entirety. This work studies the way in which each of the parts of speech may be combined with the noun and verb—"the most vital parts"—to form a complete sentence. Many of Apollonius' other works survive only in fragments. Among these are highly influential treatises on *Names* and *Verbs*, books on *Orthography* and *Dialects*, as well as the philological subject of false stories in literature, and a series of works that, together with the others, seems to build a study of language from the ground up: *Elements* (i.e., letters and letter sounds), *Prosodic Markings, Forms, Division of the Parts of Speech, Voice*.

Herodian's works survive only in excerpts and epitomes, although in one papyrus (Wouters, 1979: 223–224) and two palimpsests (Hunger, 1967; Reitzenstein, 1897: 302; Alpers, 1969: 13 ff.), we obtain a glimpse of something closer to his original arrangement. The only exception is the extant brief work *Uniquely Declined Words*. Herodian is most closely associated with studies of the prosody of individual words, beginning with books called *Iliadic*, *Odyssean*, and *Attic Prosody*, and leading to his great *General Prosody*. These works treated the proper accentuation and aspiration of words in the Homeric or Attic dialects and in general usage, respectively. He also wrote important works on *Corruptions* (*sc.* of word forms), *Derivations*, *Orthography*, *Nominal Declension*, and a *Symposium*, which perhaps portrayed a learned conversation about etymologies, Attic words, and other questions.

Method

Apollonius and Herodian conceived of the Greek language as an ordered system: just as the alphabet had an order, so did the parts of speech, both in their listing (first noun, second verb, etc.) and in their roles in the construction of the sentence. At all levels, from letters to syntactic construction, the language was subject to corrupting processes or *pathê*, such as repetition, ellipse, syncopation, reduplication,

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We know little about the lives of the great grammarians Apollonius Dyscolus and Herodian. Herodian is said to have moved from Alexandria to Rome, where he enjoyed the patronage of Emperor Marcus Aurelius (161–180 A.D.), to whom his *General Prosody* is dedicated. Apollonius was Herodian's father and is therefore thought to have been active in the reign of Antoninus Pius (138–161 A.D.). Apollonius lived all his life in Alexandria, where he appears to have taught and to have had a role in grammatical debates and competitions. The ancient *Life* of Apollonius explains his cognomen ('Grouchy') by appeal to his crabbed style, his ill temper, or the difficulty of the problems he posed in competition. It also states that Apollonius was so poor that he had to write on potsherds and that he educated his son Herodian so well that he broke with his father (or else that a break occurred because Herodian disliked his stepmother), but this is presumably a supposition from Herodian's many grammatical disagreements with his father.

Works

Apollonius is the only Greek grammarian before late antiquity some of whose works survive in their original form. Three of Apollonius' extant treatises are on individual parts of speech: *Pronouns, Adverbs,* and *Conjunctions*. Each of these falls into broad sections on the 'sense' and 'form of the vocal sound' of the part of speech in question. Under the first are discussed the name and definition of the part of speech, its kinds, and questions about the assignment of certain words to it: all these questions are decided on the basis of the sense. The second part discusses the forms and prosody of individual words in the class, including dialect and 'corrupt' forms, for none of these changes affects the sense. The most important, and latest, of Apollonius' surviving works is his *Syntax*, the four books of which survive almost in their entirety. This work studies the way in which each of the parts of speech may be combined with the noun and verb—"the most vital parts"—to form a complete sentence. Many of Apollonius' other works survive only in fragments. Among these are highly influential treatises on *Names* and *Verbs*, books on *Orthography* and *Dialects*, as well as the philological subject of false stories in literature, and a series of works that, together with the others, seems to build a study of language from the ground up: *Elements* (i.e., letters and letter sounds), *Prosodic Markings, Forms, Division of the Parts of Speech, Voice*.

Herodian's works survive only in excerpts and epitomes, although in one papyrus (Wouters, 1979: 223–224) and two palimpsests (Hunger, 1967; Reitzenstein, 1897: 302; Alpers, 1969: 13 ff.), we obtain a glimpse of something closer to his original arrangement. The only exception is the extant brief work *Uniquely Declined Words*. Herodian is most closely associated with studies of the prosody of individual words, beginning with books called *Iliadic*, *Odyssean*, and *Attic Prosody*, and leading to his great *General Prosody*. These works treated the proper accentuation and aspiration of words in the Homeric or Attic dialects and in general usage, respectively. He also wrote important works on *Corruptions* (*sc.* of word forms), *Derivations*, *Orthography*, *Nominal Declension*, and a *Symposium*, which perhaps portrayed a learned conversation about etymologies, Attic words, and other questions.

Method

Apollonius and Herodian conceived of the Greek language as an ordered system: just as the alphabet had an order, so did the parts of speech, both in their listing (first noun, second verb, etc.) and in their roles in the construction of the sentence. At all levels, from letters to syntactic construction, the language was subject to corrupting processes or *pathê*, such as repetition, ellipse, syncopation, reduplication,

lengthening, shortening, and transposition. The basic method employed by Apollonius and Herodian, 'pathology', involved tracing these alterations: first, a rule was established by observation of the preponderance of cases or by analogy with similar formations; then deviations from the rule were explained by showing which corruptive processes occurred, and in which order, to produce the deviant form from the original 'correct' or 'full' form. This process was known as 'establishing' a form, or 'canonizing' it, bringing it into conformity with a rule, not by altering it to fit, but by showing how it derived from the rule-following form; if more than one form was found in the tradition or advocated by grammarians, the same process could indicate the preferable form. Establishing a form required application of a set of criteria or 'canons' of the discipline: analogy, dialect, etymology, and history or tradition. Of these, analogy, the comparison of relevantly similar words or constructions, was clearly the most important for Apollonius and Herodian and it lies behind Herodian's establishment of inflectional classes governed by rules or canons.

For Apollonius, syntax was the manipulation of intelligible items – such as gender or number – subsisting in dependence on word forms, so that their combination produced the 'congruence' or 'regularity' (*katallêlotês*) of a complete sentence. Only the intelligibles, not the words themselves, could be in harmony or conflict with one another, but only the words, not the intelligibles themselves, could be manipulated directly. Thus, 'Socrates walk' would be ungrammatical or 'incongruent' (*akatallêlon*) because placing these two word forms together also juxtaposes two conflicting intelligibles, the singularity and plurality, subsistent on the forms of their respective endings. Apollonius (*Syntax* 51.11) calls his *Syntax* an investigation of *katallêlotês* and in it he sets out the norms for producing such congruence in a sentence, while tackling questions that arose from particular, especially poetic, constructions by showing how they arose from the normal prose syntax.

Influence

Apollonius' works were mined by later grammarians and fragments appear frequently in the early Byzantine commentaries on Dionysius Thrax's *Art of Grammar* and the works of George Choeroboscus (early 9th century A.D.). His *Syntax* was the principal source of Priscian's (6th century A.D.) syntactical studies in the *Institutes*, as well as those of the Byzantine Maximus Planudes (ca. 1216–1310 A.D.).

Herodian's prosodic studies on Homeric words were excerpted in the late antique commentaries on the poems and became thus an important part of the Byzantine commentaries on Homer. The first 19 books of the *General Prosody* survive in two epitomized versions and their influence is present in all Byzantine work on accent and aspiration, and Herodian's *Orthography* had a similar influence on Byzantine spelling manuals. His works on nominal inflection formed the basis of later work systematizing the canons of inflection.

See also: Dionysius Thrax and Hellenistic Language Scholarship; Planudes, Maximus (1260–1310); Priscianus Caesariensis (d. ca. 530).

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Applicational Grammar

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In linguistics, as in all other areas of intellectual activity, ideas catch on not just because they are good but also because they arrive at the right time and in the right place. Developed at the wrong time and in the wrong place, Applicational Grammar (AG) is nonetheless a remarkable, if ultimately unsuccessful, achievement.

Background

Applicational Grammar (AG) was developed between the early 1960s and the mid-1970s by Sebastian Konstaninovich Shaumjan of the Institute of Russian Language at the Soviet Academy of Sciences. The first versions of the model were phonological; a detailed account of the model applied to syntax was published in Shaumjan (1965).

In 1965, Chomskyan transformational generative grammar was becoming the major formal model in North America and was beginning to spread to the UK and other countries. Montague's categorial grammar would not be published until 1970 (Montague, 1970a,b). Shaumjan's work from the early 1960s was not well received by North American generativists, and the translation of his 1965 book (Shaumjan, 1971) went unnoticed in the excitement over Montague Grammar. Nonetheless, Shaumjan's theory is no less rigorous than Montague's; he draws on a wider range of logical and linguistic theory, and his model is informed by knowledge of a number of languages in addition to English. His treatment of certain constructions is interesting; for example, Shaumjan (1965) proposes an analysis of complement clauses that anticipates Thomason (1976).

Shaumjan (1977) extends AG to handle semantic structures and the mapping of semantic structures onto syntactic structures. This later version of the grammar is influenced by generative semantics and the work of Fillmore on lexical decomposition, and also by Kilby (1977). Shaumjan (1977) was really innovative, however, in attempting to combine categorial grammar and what is now known as Situation Semantics.

The focus here is on Shaumjan (1965, 1971), because that model exhibits most clearly the properties distinguishing it from other generative models.

The Properties of Applicational Grammar

The Basic Units

The basic units are *term* and *sentence*, as is usual in categorial grammar. *Term* is represented by α, *sentence* by β. Other units, derived by combining the two basic ones, are interpreted thus: e.g., $\alpha\beta$ – a unit

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or category applying to a term (α) to yield a sentence (β), i.e., a verb; $\alpha\alpha$ – a category applying to a term to yield a term, e.g., an adjective; $\alpha\beta.\alpha\beta$ – a category applying to a verb to yield a verb, e.g., an adverb; $\alpha\alpha.\alpha\alpha$ – a category applying to an adjective to yield an adjective, e.g., an adverb such as *very*.

Shaumjan extends the categorial treatment to the structure of words, adopting Kuryłowicz's view that syntactic and morphological relations are parallel – e.g., that a change in syntactic function from predicate to attribute is paralleled by the change from finite verb to participle: *The child slept* vs. *the sleeping child* (examples are Russian and English).

He also accepts Kuryłowicz's view that different word classes have different primary and secondary functions. For adjectives, the modifying function is primary: they map terms into terms, and include more than the traditional adjectives. For instance, they include derivational affixes deriving nouns from nouns (or terms from terms) – *hood* in *childhood*, and the diminutive suffix *-ik* in Russian *domik* ('little house') – and nouns in the genitive case or with the English possessive affix. *Fiona's* added to *house* yields the term *Fiona's house*. In Russian, a noun in the genitive case – e.g., *studenta* ('of the student') – combines with a noun in the nominative case – e.g., *kniga studenta* ('the book-of the student') – to yield a term. This is a secondary function of the noun *student*, which is signaled by the genitive case. The primary function of nouns is to be a basic term to which verbs apply to yield sentences. This function is signaled by the Russian nominative case.

Other items belonging to the category adjective are prepositional phrases – *about gardening* combines with the term *books* to yield the term *books about gardening* – and participles, such as English *sleeping* from *sleep* and Russian *igrajushchij* ('playing') from the stem *igra-*. The primary function of verbs is to apply to a noun to yield a sentence. One secondary function is to act as an adjective, which is signaled by the participial suffix.

Derivations

Combinations of items are generated by a single operation called 'application' – whence the title 'applicational grammar.' Application, from Curry's work – cf. Curry (1963), involves an operator applied to an operand. The notation – typical categorial notation – indicates, for a given case, the operator, the operand and the result of the application. Thus, for the item $\alpha\beta$, β labels the category of the operator, α labels the category of the operand and $\alpha\beta$ labels the category into which the operand is mapped. Suffice it to say here that the derivational system is rigorously defined, with a set of primitives and a rule for deriving new items from the primitives or from other derived items.

Different Levels of Category

To treat *Fiona*'s, etc., merely as instances of a general category $\alpha\alpha$ would be to ignore differences between them: *igrajushchij* derives from a verb, *studenta* is a noun in the genitive and *about gardening* is a prepositional phrase. Moreover, *-ik* in *domik* and -α in *studenta* are part of the internal structure of words. Another problem, as mentioned in 'The Basic Units,' is that while being an adjective is the primary function for, e.g., *small*, it is a secondary function for the participle *igrajushchij*.

AG solves these difficulties by having a top level of 'episemions,' the general categories presented in 'The Basic Units,' and a lower level of 'semions,' which are narrower categories in that a given semion has a structure showing its derivation. Shaumjan captures that structure by means of a 'relator notation' and language (one possible actual 'calculus' of semions.)

Relators: Derivational Morphology and Syntactic Function

There are five relators, R_1 to R_5. R_1 represents the category $\alpha\beta$, R_2 – α, R_3 – $\alpha\alpha$, R_4 – $\alpha\beta.\alpha\beta$, and R_5 – $\alpha\alpha.\alpha\alpha$. They apply to an empty root 0, or to any combination of relators and 0, or to an entire phrase, i.e., to some sequence of R_n0s. If 0 is the root *uch-*, R_1 applies to yield $R_1$0, corresponding to finite forms of the verb: *uchit* ('teaches'), *uchim* ('we teach'), etc. In turn, R_2 applies to $R_1$0 to yield $R_2R_1$0, corresponding to nouns derived from the verbal stem, such as *uchenie* ('teaching') and *uchitel'* ('teacher').

The sequences of relators correspond to stages in the derivational morphology of a given word. If 0 is *zim-*, R_2 applies to yield $R_2$0 – *zima* ('winter'). R_1 applies, yielding $R_1R_2$0, corresponding to a finite verb form – say, *zimuem* ('we pass the winter (somewhere)'). R_2 applies to yield $R_2R_1R_2$0, corresponding to *zimovka* ('the act of wintering'), and the formula corresponding to *zimovochnyj* ('winter' as in 'winter quarters') is derived by applying R_3 to yield $R_3R_2R_1R_2$0.

Unlike the last Russian example, *winter* can be noun, verb or adjective without derivational affixes. Nonetheless, the adjective *winter* in *winter quarters* would correspond to the formula $R_3R_2R_1R_2$0, R_3 signaling its modifying function.

Russian has various cases. Only nouns in the nominative case correspond to R_2, because only they combine with a verb to form a sentence. Nouns in the genitive case correspond to R_3, because they have

an adjective function: they map terms onto terms. Nouns in other cases correspond to R_4, because they map verbs onto verbs: the accusative case form *kartu* ('map') combines with *chitaet* ('reads') to yield *chitaet kartu*, which combines with the nominative noun *soldat* ('soldier') to yield the sentence *Soldat chitaet kartu* ('The soldier reads the map'). English has no case, but nouns do have different syntactic functions and correspond to different formulae: in *The soldier is reading the map, the map* is R_4 because it maps the verb *is reading* into the verb *is reading the map*, and the *soldier* corresponds to R_2 because it combines with that verb to yield a sentence.

Other Primitives in the Relator Calculus

In addition to relators and 0, the relator calculus has 'adnectors,' 'connectors,' and 'propositors.' Adnectors are identity elements interpretable as, e.g., negation and interrogation, which apply to a given linguistic element leaving it identical with itself. Connectors correspond to conjunctions such as *i* ('and'). Propositors convert phrases and clauses into the *determiners* of clauses. Thus, *if* converts the clause *it is raining* into a subordinate clause acting as determiner to another clause: *If it is raining, I am going to stay at home*. The phrase *according to the instructions* can function as an R_4 in, e.g., *We prepared the vegetables according to the instructions*; it can function as a determiner of a clause, as in *According to the instructions, you were to wait there till help arrived*. Subordinating conjunctions such as *if* always function as propositors, whereas phrases such as *according to the instructions* may or may not function as a propositor.

Sentences and Transformational Fields

0 with one or more relators corresponds to a word in English or Russian. In turn, an element R_n0 can apply to another R_n0 to create a more complex element. R_30 applied to R_20 generates R_30R_20, which can be interpreted as *splendid parties*. As it stands, R_30R_20 cannot be interpreted as having any particular syntactic function, but the relator R_4 can be applied to generate $\|R_4|\ R_30R_20$, i.e., an $\alpha\beta.\alpha\beta$ mapping a verb onto a verb. $\|R_4|\ R_30R_20$ applies to an R_1 item, say R_10 to generate $\|R_4|\ R_30R_20R_10$, interpretable as *gives splendid parties*. The above sequence, an instance of $\alpha\beta$, maps a term into a sentence, applying, say, to R_20, to generate $\|R_4|\ R_30R_20R_10R_20$ – *Gatsby gives splendid parties*.

AG can generate, quite independently of each other, the 'analogs' of *Gatsby ruined that party* and *That party was ruined by Gatsby*. In the relator analog of the active sentence *Gatsby* corresponds to R_20, a term looking for a verb to map it into a sentence. In the analogue of the passive sentence, *Gatsby* corresponds to R_4R_20, an item mapping a verb into a verb. These remarks apply, vice versa, to *that party*.

Transformational Fields

Generative grammar expresses relationships between different constructions, but the independent analogs of active and passive sentences do not. To overcome this defect, AG generates the analogs of sets of sentences by means of graphs.

Down the left-hand side of a given graph are the relators, ordered from top to bottom in the sequence R_5, R_3, R_2, R_1, R_4. This order reflects possible applications: an R_5 item applies to an R_3 item, an R_4 item to an R_1 item, and so on. Across the top of the graph is the expression to be transformed, the 'base,' which can be the analog of a sentence or the analog of a phrase. Each relator is applied to each R_n0 in the expression across the top of the graph and the result is written in the column below the R_n0.

The set of R_n0s generated constitutes a 'transformational field,' represented by a graph with the R_n0s arranged in columns and rows. Two restrictions can be placed on the generative process: (a) the graph is connected; and (b) head-modifier links between items in the base expression are preserved in the derived expressions. If (a) and (b) are both imposed, the transformational field is *bound*; if (a) alone is imposed, the field is *semibound*; if neither is imposed, the field is *free*. (NB: Head-modifier links relate to phrases only: the subject–predicate link is not one of head and modifier.)

For example, if the base is $R_30\ R_20$ – *striking beauty*, one transform is $R_5R_30\ R_3R_20$ – *strikingly beautiful*, which maintains the head-modifier links. Suppose that the base is $R_20\ R_10\ R_4R_20$ – *The train arrived from Moscow*. One transform is $R_3R_4R_20\ R_2R_20\ R_1R_10$ – *The Moscow train arrived. From Moscow* is a modifier of the verb in the base expression, but a modifier of the subject noun in the transform: i.e., the head-modifier links are altered.

The base can be a more complex expression, say $\|R_2|\ R_30R_20$ (*imaginative students*) R_10 (*write*) $\|R_4|\ R_30\ R_20$ (*interesting essays*). The initial R_2 applies to the adjective–noun block, and the R_4 applies to the final adjective–noun block. The graph generates, inter alia, $R_4\|R_2|\ R_30\ R_20\ R_1R_10\ R_2\|R_4|\ R_30\ R_20$, which is the analog of *Interesting essays are written by imaginative students*.

Genotype and Phenotype Grammars

The model described above is a 'genotype' grammar; i.e., a grammar handling the generic properties of

language. The sequences of semions are mapped onto sequences of, e.g., Russian, English, or Georgian morphs by 'phenotype' grammars which assign word order, morphological categories and phonological shape.

The Later Model

Shaumjan (1977) extends the model to semantics. The derivational apparatus is essentially the same, but the relator genotype language represents the analog of semantic structures: the relators correspond to the relations of 'predicate logic,' with the restriction that they are all 'two-place' in the axioms. The axioms belong to the category β, i.e., are sentences, and correspond to components of situation models.

The situation models are 'localist,' that is, based on the assumption that the semantic representation of any situation has as its central components a predicate of location or movement, the case relations of location, movement from or movement to, and the case relation 'objective,' which corresponds to the entity conceived of as being located somewhere or moving somewhere. For instance, *Fiona gave Bill his essay* is derived from a semantic structure which has an event coming from Fiona – represented by a 'two-place predicate' – and the event is the essay coming-to-be-located at Bill, which event is also represented by a two-place predicate.

The axioms state the possible relationships between entities: $R_{oa}T^1T^2$ represents a 'two-place relator,' and the two terms correspond to two entities, one of which moves away from the other. The subscript letters on R represent the case relations and at one stage in the derivation are copied onto the terms. The order is important, since it indicates that the *theme* is ablative and the *rheme* objective: that is, the entity from which the other entity moves away corresponds to the surface subject, and the other entity is in the rheme of the surface sentence. For example, R might correspond to *sent*, T^1_a to *Bill*, T^2_o to *telegram*, and the whole axiom to *Bill sent a telegram*. In contrast, $R_{ao}T^1T^2$ corresponds to *A telegram was sent by Bill*.

Rules of derivation generate surface sentences from the sequence of semions representing the semantic structure. One semion, **B**, triggers the fusion of semions: e.g., the mapping of *cause-be-located* into the single lexical item GIVE. Another semion, labeled C, causes terms to be permuted, as in the derivation of the relator expression corresponding to *They loaded the barges with timber* from the relator expression corresponding to *They loaded timber on the barges*. The reordering rules with C, like the matrix graphs in the 1965 model, express relations among different constructions.

As in the 1965 AG, once relators and terms have been fused and ordered, a phenotype grammar maps the expressions onto sentences of a given language. The phenotype mappings are organized around particular groups of lexical items. For instance, the general lexeme GIVE_{ola} is a cover term for verbs with a particular valency, such that the theme term corresponds to the giver, the second term (here the direct object) – to the person at whom something comes to be located, and the third term – to the entity that moves, i.e., GIVE_{ola} is a cover term for Z EQUIP X WITH Y, Z PROVIDE X WITH Y, Z PRESENT X WITH Y, Z REWARD X WITH Y, and so on. Each group of lexical items has its own order of nouns, its own prepositions and, for Russian, its own case endings. The valency is crucial: an item with two valencies – Z PRESENT X WITH Y and Z PRESENT Y TO X – is treated in the phenotype grammar as two different items, although the two valencies correspond to one item in the genotype grammar. The corresponding basic relator in the genotype grammar is R_{loa} (Z PRESENT Y TO X), but the order of terms is changed by a derivational rule with C. Even passives and constructions with reflexive verbs (in Russian) are derived by rules with C.

A Critique of Applicational Grammar

Like the classical transformational model, the 1965 AG model focuses on syntax while the 1977 model, possibly reflecting generative semantics of the late 1960s, maps semantic expressions onto surface sequences where morphological categories are much in evidence but syntax is absent.

The 1965 model was to contribute to grammatical synonymy and to typology. Given a base expression and the expressions derived from it, two properties could be measured: within a single language, the degree of synonymy between any two of the derived expressions could be measured by the number of subexpressions they shared; with respect to typology, any two languages could be compared according to which derived formulas are interpretable in both languages and which only in one.

Although AG is remarkable for its rigor and formal consistency, the claim concerning typology highlights a fundamental weakness. The elementary semions are based on certain characteristics of natural languages, but the derivational procedure was devised by Curry to generate completely abstract uninterpreted objects capable of being put in correspondence with any appropriate entities, linguistic or mathematical or whatever. The derivational procedure is defined with great rigor, but, apart from the

basic combinatory possibilities, is so remote from natural language that the advantages of the model are outweighed by its limited scope. Offering little for dependency relations and nothing for constituent structure, AG is irrelevant to language acquisition and to typological studies of dependency relations, the order of heads and modifiers, the question of flat vs. hierarchical constituent structure, and the question of clause-embedding vs. clause-chaining.

AG reflects a fundamental tension in formal linguistics: the difficulty of developing a formally rigorous model that expresses interesting and exploitable hypotheses about linguistic structure. Formal rigor comes with systems borrowed from metamathematics, and Shaumjan adopts the notion of a metalanguage formulated so precisely that its reasonings could be seen as derivations according to precise rules, whose correctness of application can be seen by inspecting the symbols of the metalanguage regardless of any meaning they might have. The trouble is that, outside mathematics, the axioms of a given system must have a degree of truth or falsity with respect to a given subject-matter, and a degree of interest. Shaumjan's axioms are true insofar as his categories are not without linguistic support. There is formal rigor in plenty, but in linguistic theory and its major applications the axioms have hitherto failed to arouse excitement.

Shaumjan left the Soviet Union in the late seventies. Political problems led to the disbanding of the then Institute of Russian Language, and Shaumjan's model disappeared (undeservedly) from the map of linguistic theory.

See also: Combinatory Categorial Grammar; Semantics in Categorial Grammar; Situation Semantics.

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Applied Forensic Linguistics

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Forensic Lingustics attempts to describe, and where possible explain, those features that distinguish the language used in legal settings from everyday language. *Applied Forensic Linguistics* addresses issues and problems in the legal system that are language based. Some of these applied forensic linguistic problems and issues arise from the nature of the language used in the legal system. The written technical language of the law is extraordinarily complex and can be virtually impossible for nonlegal specialists to understand (*see* **Language of Legal Texts; Legal Genres**). The social issue is that there is a contradiction between (a) the fact that most people cannot be expected to understand the language of the law, and (b) the legally enforced principle that ignorance of the law is no defense. The first contribution of applied forensic linguistics is to demonstrate that ordinary people cannot understand legal language. The majority of the work in this area has been done by psycholinguists (see in particular Felker *et al.*, 1981). Some notable work has also been done by sociolinguists (Labov and Harris, 1994). Solutions to these problems have been sought mainly by the Plain Legal Language movement, including document design specialists.

Spoken legal language can similarly be a social issue. Court proceedings have often been described

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Spoken legal language can similarly be a social issue. Court proceedings have often been described

as a battle between two competing accounts of the issue under litigation. Heffer mentions that aggressive competition between counsel may negatively affect a jury's ability to adequately assess the evidence and reach a decision, an applied linguistics challenge. One consequence of competing versions is that during the legal process, a police officer or lawyer will often try to impose a particular version of events upon witnesses by using a range of linguistic devices. The following lawyer's question is an example.

> Lawyer: According to your writing the events last year, that during the break, you were handed some car magazines to read? Is that correct?

The first thing to note is that like much courtroom examination, this is not question, but a statement. It is harder to answer "no" to a statement than a question. Second, the statement is followed by a confirmation tag "is that correct?" Third, the core information, that the witness was handed some car magazines to read, is embedded as a form of projection or report of the witness's own writing? "According to your writing . . . " The accumulation of such linguistic devices puts considerable pressure on the witness to agree. There is now a substantial literature that confirms that witnesses on occasion agree to information that they know to be false and with which they disagree, as a consequence of this type of linguistic pressure. The social issue that emerges is whether this type of language is ethically justified. Furthermore, the question given above was directed to a 15-year-old testifying that she had been sexually assaulted at the age of 13. It is hard to justify this type of questioning of victim witnesses and vulnerable witnesses (*see* **Interviewing and Examining Vulnerable Witnesses**).

Apart from the issue of linguistic pressure on witnesses, there is evidence from many contexts that certain social groups are in danger of being disadvantaged as a consequence of the language used in the legal system, since they may not understand the language and culture of the law. There is extensive documentation of miscommunication with indigenous minorities (see Eades, 1994; Walsh, 1994; Stygall, 1994), the deaf (Brennan and Brown, 1997), children (Walker and Warren, 1995), and second language speakers (Jensen, 1995).

Various ways of addressing these problems have been proposed; most involve courtroom procedure. In the court where the question given above was asked, rules of procedure were in place that should have prevented the question from being used, but there are many cases where judges do not enforce such procedural rules. This points to another means of addressing the problem: lawyer training, both pre-service and in-service. Other aspects of courtroom and police procedure can involve the presence of a support person for the witness, the use of an intermediary between lawyer or police officer and witness, or the use of distance technology. There is also a strong argument for access to interpreters to assist in communication whenever there is a possibility that they can make a useful contribution.

A related area is police language, particularly the formulaic cautions or warnings given by police officers, which tend to be written in a legalese that is difficult to understand. The applied linguistic work done here involves working with police to clarify their wording (Gibbons, 2001).

Legal interpreting and translation also constitute applied forensic linguistic challenges. One major challenge is translating legal documents into a language that does not share a legal concept with the source language. The extreme complexity of legal language is in itself a translation challenge. Solutions include the education of legal professionals in such issues, specialized training for legal translators, and establishing bilingual legal language databases to facilitate the search for equivalents. Legal interpreting demands a high level of accuracy in real time. Such interpreting is also mainly consecutive, which places a further demand, that of memory. Research has found that in the courtroom context, interpreters tend to prioritize the interpreting of factual information and may poorly interpret interpersonal and discourse aspects (see also Hale and Gibbons, 1999). The quality of legal interpreting may also be threatened by inadequate resources. Solutions include actions to improve funding and appropriate training for interpreters and others working in the legal system with the challenges of legal interpreting.

Another applied forensic linguistic concern is law on language. An important case is that of national languages and minority language rights, which fall into the applied linguistic area of language planning and policy (*see* **Language Planning and Policy: Models**). Arriving at solutions that both respect rights and are practicable is a substantial challenge. Decisions concerning languages that may be used or interpreted in legal systems is even more central to forensic linguistics: permission to use one's mother tongue or strongest language in court is a social rights issue, but may be difficult to implement in practice. The paradigm case is where a witness speaks a language that has only a small number of speakers, and few or no fluent bilingual speakers capable of managing legal issues, including interpreting and translation.

Another law on language issue, particularly in Common Law, the right to silence is an issue (Kurzon, 1998). More applied linguistics research is needed on

where and why silence is chosen (it is not necessarily an admission of guilt: if charged with a serious offense many people would claim the right to silence until a lawyer is present) and on the consequences of this choice on legal communication.

Other areas in which the law regulates language are offensive language, slander and libel, and vilification. Linguistic analysis may reveal the language resources that are used to commit these offenses, and inform applied linguistic decisions on where banning is likely to be effective and in the interest of the individual and/or society. It may also enable linguists to present evidence in court as to whether one of these offenses has been committed. Shuy (1993) discusses the presentation of such evidence, and also the nature of a range of other language crimes such as threats, bribery, perjury, and broken promises.

The most widely discussed area of applied forensic linguistics is that of language evidence. This can be divided broadly into areas of identification and communication. One form of identification is speaker profiling, which often entails the use of phonetic data, and sometimes computer-based analysis of speech sounds (Hollien, 2001). Other forms of identification are the identification of writers, sometimes through vocabulary and grammatical patterns, which may also use computers. It may involve the comparison of two or more language samples, to see if they were produced by the same person. The detection of plagiarism similarly involves forensic linguistic analysis. In profiling, language behavior may give clues to a range of identificatory features, including sex, sexual preference, age, social class, geographic origin, and level of education. On other occasions, forensic linguists may be called upon to determine whether a particular person did or did not produce a particular piece of writing or speech. Once more, a whole range of linguistic levels may be involved such as phonetic evidence on individual pronunciation, social variation, and lexical, grammatical, and discourse evidence.

Evidence on communication includes the source and nature of misunderstanding, particularly among people of different linguistic or cultural backgrounds. There are many studies where linguists have shown that people cannot understand legal texts (Levi, 1994). There is also a substantial literature on miscommunication between lawyers or police and linguistic minorities (see, for instance, Gumperz, 1982). Evidence on communication may also include the decoding of various types of secret language, including pig latin and other codes (for examples, see Gibbons, 2003: 294–295). It also includes the question of trademarks because there is an issue of what trademarks communicate, as well as deciding how similar trade names are.

One problem area for linguistic evidence is that of reliability and admissibility. It can be very difficult for a linguist to provide an exact measure of the reliability of evidence; sometimes broad categories such as 'fairly likely' are used in linguists' judgments. Having the testimony of applied linguists accepted as evidence in court is a continuing problem, particularly in the United States.

The final area of applied forensic linguistics is that of the language training of legal professionals. In countries such as India, the legal system operates mainly in English, a second language for almost all Indians, and the same issue arises in much of Africa (whether the language be French, English, or Portuguese). Indeed, a substantial proportion of the world's legal systems operate in a language that is for local lawyers a second language or a distantly related dialect. Given the complexity of legal language mentioned above, teaching the language of the legal system to lawyers is an important and difficult matter. Solutions involve careful needs analysis of legal language and the development of tailored curricula.

Since the law is an overwhelmingly linguistic institution, language is implicated in many of the issues and problems associated with the legal system. Applied forensic linguists have made a substantial contribution to addressing these issues and problems, and as their work becomes more recognized, there is every likelihood that their contribution will expand.

See also: Language Planning and Policy: Models.

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Applied Linguistics in Africa

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Within a framework of postmodern and postcolonial theory, much applied linguistic work in Africa today is in response (and resistance) to the erstwhile creations of the colonial period. There is an underlying tension between the legacy of colonialism in the form of the excolonial languages, which carry status and economic opportunity, and the need to protect and develop the indigenous African languages in the face of rapid globalization. For applied linguists working in these contexts, this translates into the need for effective, high-quality language teaching programs in the excolonial languages, from early literacy to professional contexts, while simultaneously contributing to the development of multilingualism through research into and development of the indigenous languages.

Language issues in Africa have been the focus of vigorous ideological debates, some of which are underscored by an increasingly Africanist perspective. What is missing in the Western-based discourses about African language development is an **African** perspective, drawn from the local communities themselves, and represented and researched by **African** applied linguists. For example, the construct of *indigenous languages* is perceived as an arbitrary division of a natural continuum. A term that reflects language use across boundaries, such as *communitarian languages*, is considered preferable (Makoni and Meinhof, 2003: 7). Further information on ideological debates in the African context can be found in Alexander (1989), Bamgbose (1991), and Blommaert (1999). However, what internationally is classified as applied linguistics is often hidden or euphemized under labels such as language education, African Languages and Literatures, Applied Language Studies, among others. For a fuller discussion of the recharacterization of applied linguistics, see Young (2001).

Multilingualism and the Role of the Excolonial Languages

Applied linguistic research and practice on the African continent has to deal with complex sociolinguistic profiles and ideologically and logistically complex language issues. Most African countries are multilingual in that the majority of the populations speak more than one language, and often three or more. However, in many of these multilingual societies, the official business of the country is carried out on a monolingual basis, usually through the medium of an excolonial language, such as French, English, or Portuguese. For example, in fifty-six African countries, twenty-two have French as an official language; seventeen, English; eleven, Arabic; five, Portuguese; and one, Spanish (Webb and Kembo, 2000). In Nigeria, there is also rivalry between English and French as official languages, as there was in South Africa between English and Afrikaans. Webb and Kembo (2000: 312) provide a bird's-eye view of the language profiles of the African states, including their population figures, number of languages spoken, main languages spoken, official languages, and literacy rates.

A number of African countries have proclaimed an African language as an official language, for

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example: KiSwahili in Tanzania and Kenya; Amharic in Ethiopia; Sesotho in Lesotho, and Tigrinya in Eritrea. Some countries, such as Eritrea and South Africa, recognize more than one African language as official languages (Constitution of the Republic of South Africa, 1996). Although these policies may give greater recognition to **all** indigenous languages, the trends are toward convergence and language shift, often from the local languages to other major African languages, such as Sesotho for Tshivenda and Xitsonga speakers in South Africa, or toward Swahili in Kenya and Tanzania (Abdulaziz, 2000). The functions of these local African languages are still subsidiary, being used for instruction in lower primary school, adult literacy, local and regional administration, and in informal contexts (Bamgbose, 1991). In Mauritius, French-based Creole is the popular lingua franca, while French is the prestige lingua franca, and English is the language of education, business, and government. This situation engenders major language-of-instruction difficulties in schooling and tertiary education (Owodally, 2004).

The use of the excolonial languages, or a major African language, as languages of instruction and official communication, limits access to information for the majority of speakers of local languages. This situation serves to maintain an educated minority, and has serious consequences for literacy (Moyo, 2003). The response to this has been the establishment of various language development initiatives on the continent, some of which entail interstate collaboration. Applied linguistic research in Africa is thus moving from a preoccupation with the teaching of the excolonial languages, to advocacy work and development of the African languages to ensure equitable access to resources. Information on the roles of various languages and new urban varieties in African countries appears in Muthwii and Kioko (2003) and Mesthrie (2002).

Language Development: Some African Initiatives

A number of initiatives established in various African states aim to increase the status and functions of the indigenous African languages, with special emphasis on crossborder languages, to strengthen relationships between the peoples of Africa, and to promote literature and the oral tradition. In Nigeria, the Language Development Center promotes standard orthographies for local Nigerian languages, and the River Readers project has helped to increase their status (Abdulaziz, 2000). In Cameroon, a Language Committee has been established to research and support the status of local languages at the regional level (Tadadjeu, 2004). Two further initiatives are the establishment of the African Academy of Languages (ACALAN) by the President of the Republic of Mali (ACALAN, 2002: 17) in 2001, and the Pan South African Language Board (PanSALB, 2000) in 1995, to promote multilingualism in South Africa and to develop nine of the eleven official South African languages (SiSwati, isiNdebele, isiZulu, isiXhosa; Sepedi, Sesotho, Setswana, Xitsonga, and Tshivenda). Their work involves accelerating the introduction of African languages into the education system, the legal system, and in administration. They also have links with bodies such as the African Association of Lexicography (Afrilex), established in 1995 to promote research and teaching in lexicography and terminology, especially in the fields of science and technology.

An important area of concern are the problems experienced by learners and local communities in understanding and using newly coined terms which are experienced as artificial, or as belonging to a deep, often rural, variety of the language, which is unfamiliar to the more urban population (Anthonissen and Gough, 1998). An analysis of existing terminology is needed to evaluate its efficiency in the current educational context, coupled with a more participatory approach to language development. Such an approach is discussed with reference to corpus development of Chichewa in Malawi (Banda, 2001). The opinions of first language speakers influenced key decisions regarding the inclusion in the corpus of certain consonants that were applied variably by different native speakers. Banda (2001) provides further information on corpus development of African languages across borders.

Translation and Interpretation

A much-neglected area of applied linguistic work concerns the training of translators and interpreters to give substance to national language policies that call for language equity and multilingual language development. In South Africa, the Unit for Language Facilitation at the University of the Free State successfully trained interpreters for the Truth and Reconciliation Commission in Cape Town, 1995–1998. However, without foreign aid, this work cannot be sustained. There is also a need for extensive training of court interpreters, as many South African court proceedings are conducted in English and/or Afrikaans only, putting African language-speaking plaintiffs and accused at severe disadvantage. Judge J. Hlophe, in a public address, underscored the need for individuals to "receive justice in their own languages." It remains to be seen whether governments

can meet the demand for effective training of translators and interpreters in the African languages.

Language Learning and Teaching

The teaching of the excolonial languages in Africa has tended toward linguistic and cultural assimilation (Bamgbose, 1991). However, this has been largely unsuccessful due to inappropriate and ineffective Western-based teaching methods. These languages are often taught as if they were first languages, especially in Francophone and Lusophone Africa, with a heavy focus on grammar and with little regard for developing communicative ability (Webb and Kembo, 2000). This situation is exacerbated by the lack of natural exposure to these languages outside the formal teaching context. The communicative language teaching approach, introduced in Anglophone Africa, still has a Western bias in terms of expected behavioral norms, which are inappropriate and irrelevant in African contexts, with a disregard for "African discourse conventions and patterns of communication in language teaching approaches" (Webb and Kembo, 2000: 306).

Case studies of teachers in Eritrea, Namibia, South Africa, and Mozambique show that teachers use grammar-translation methods to teach the excolonial languages, with the emphasis on grammatical explanations and translation, often in the form of code-switching to the learners' home language. Where teachers have been exposed to more communicative methods in their pre- and in-service training, they tend to construe communicative activities as further exercises for oral work (Weideman, 2003), thereby fostering dependence on repetitious choral work, and rote learning (Macdonald, 1990; Taylor and Vinjevold, 1999). Resistance to an alternative language teaching methodology has been ascribed to various factors, including collusion to mask lack of proficiency (Chick, 1985); entrenched habits; and resistance to change through attitudinal factors (Weideman, 2003; Wildsmith, 1992). Despite interventions to increase exposure to the languages, such as *Learning English by Radio: The Mozambique Project,* in collaboration with *Radio Mozambique* in 1994, learners do not learn these languages sufficiently well to use them either as languages of instruction or to increase access to information in the public domain.

Because the ideology behind the learning of the excolonial languages in Africa, and English language teaching (ELT) in particular, has generally been assimilationist, one standard variety has been accepted as the norm to be attained. However, this may not always be an appropriate target for African learners of English, where students and teachers often bring their own Africanized variety to the learning experience. This variety tends to be transferred from teachers to learners in formal learning contexts where there is seriously reduced target language input. South African researchers have identified such a variety of English as Black South African English (BSAfE), and vigorous debates have ensued as to its acceptance as a language of learning (De Klerk and Gough, 2002; Anthonissen and Gough, 1998). This has a number of implications.

First, accepting BSAfE in the classroom might be perceived as a further form of disempowerment, as learners would not be encouraged to master the standard variety. Second, it would challenge the status of the African languages, which are currently being developed as languages of learning in South Africa. Third, there are many localized varieties subsumed under the label BSAfE, some of which are being developed into sub-corpora (e.g., isiXhosa), to eventually form a comprehensive corpus of BSAfE (De Klerk and Gough, 2002). There is thus no single variety known as BSAfE which could be restandardized (Wright, 1996) for educational purposes. Further information on the linguistic composition of BSAfE and the standards debate is provided in De Klerk (1996) and Mesthrie (2002). Research into attitudes toward English, its forms and its functions in various African countries, is covered by Schmied (1991).

Language Learning and Teaching: African Languages

The question of a standard variety also applies to the learning and teaching of African languages. It is a complex issue, as their development reflects different histories and different methods of standardization across the continent. In South Africa, the initial development of these languages was done by the erstwhile language boards, which often adopted a purist rather than a pragmatic approach to the development of a standard variety, which has been challenged as contrived, as it does not reflect actual community language use (Anthonissen and Gough, 1998). This adherence to a standard variety also affects language teaching methods, as a rigid, grammar–translation approach is commonly used, resulting in a sound knowledge of linguistic rules but little or no communicative proficiency. This seems to be the *status quo* in many African classrooms (Webb and Kembo, 2000).

In South Africa, there have been attempts to revise mainstream African language curricula and teaching methodology at both secondary and tertiary levels to reflect a more communicative orientation. However, the problems encountered with this type of innovation are similar to those encountered for English language teaching. In addition to resistance

to new methods by African language-teachers in schools, non-African language teachers, who are professionally trained to use these methods, often do not have the level of language proficiency required (Wildsmith-Cromarty, 2003). However, various universities in South Africa have mounted language courses to teach African languages for basic functional purposes in the workplace, using communicative methods. One such course is run by the University of KwaZulu-Natal in partnership with Yale University, for foreign students from America who take isiZulu as a credit toward their degree. A course in Northern Sotho, offered at the University of the North, includes a teacher training component for the language tutors, which requires them to critically reflect on their praxis, as well as to teach the language. This need for greater reflexivity on the part of language teachers is in line with a postmodern perspective on language learning and teaching, and is becoming more evident in teacher education courses in South Africa.

Academic Literacy Development in Higher Education

Much applied linguistic work has been directed toward English language and academic literacy development at tertiary institutions in Southern Africa. In the postmodern era, there seems to have been a shift from a problem-oriented, deficit approach, where non-English speaking students were perceived as limited in English proficiency and underprepared (Chimbganda, 2001), to a more constructivist approach which takes account of the student's own subject positioning and voice *vis-à-vis* academic discourse (Thesen, 1997; de Kadt and Mathonsi, 2003). The deficit perspective resulted in skills-based programs that were mainly adjunct, and packaged as language-bridging courses. The focus was on developing academic reading and writing skills for learning in other course subjects, so that assessment in these courses was mostly formative. The problem with these courses is the perceived lack of relevance by students, especially where the content does not form part of the mainstream curriculum (Chimbganda, 2001).

More recent South African approaches to teaching academic literacy include an integrated approach in which reading and writing skills are no longer decontextualized, but linked, instead, to the content of the disciplines. This is the approach taken at the University of KwaZulu-Natal where the scaffolding is done collaboratively between the academic literacy specialists and the subject specialists. The other approach works within a critical discourse analysis (CDA) framework (Janks, 1992; Thesen, 1997) and takes an academic-literacies perspective which locates research and practice within the ideological context of the particular institution. Crucial issues considered within this framework are "ownership of knowledge construction" (De Kadt and Mathonsi, 2003), identity, where discourse is perceived as contributing to the construction of social identities and subject positions, and voice (Thesen, 1997; Angelil-Carter, 1998). This approach is learner-centered, focusing more on the reader's role in interpreting texts. Students are encouraged to use their own experience as a base for critical commentary, and to construct their own interpretation of texts, which, in turn, creates a sense of agency. This is a move toward a more politically engaged applied linguistics in Southern Africa (Kapp, 2001: 14). Further information on writing practices at tertiary level, academic discourse and cultural diversity, accessing and acknowledging sources, feedback and assessment, writing pedagogy, and critical reading practices can be found in Leibowitz and Mohamed (2000) and Angelil-Carter (1998).

Because students bring to the learning experience a primary language or a variety of English not normally used for instructional purposes, they experience alienation from the discourses of the institution and of the disciplines. Yet, they wish to learn through the medium of English, even though the provision of academic literacy modules in English only runs counter to the expression of an African identity and voice within African tertiary institutions. Allowing students to learn and express themselves through their primary languages allows them to access sociocultural ways of knowing that are deeply embedded. It also constructs the primary languages as rich sources of knowledge, which can facilitate learning. This has major implications for the development of the African languages to carry academic content, and is an area that needs serious engagement by African applied linguists in the future.

There is still, however, a wide gap between the demands of the school curriculum and those of the university. Language teaching at school level does not provide learners with adequate cognitive academic language proficiency in either English or the primary languages. It is difficult to encourage critical reflection without the basic ability to read and write. This is one of the main areas of weakness in applied linguistics research in Africa.

Literacy

Literacy is crucially important for social emancipation, especially in African countries, which, until

the 20th century were more preliterate than most Western counterparts.

Reading Levels and Literacy Measures

Country-by-country valid and reliable literacy measures and estimates of reading levels in Africa are not available in data that would characterize, generally, continental African literacy levels. Data from three reliable sources, however, give some indication of reading and language proficiency levels within the context of overall educational quality assessment surveys. The Program Analysis of Educational Systems of the Conference of Education Ministers of Francophone Countries (PASEC), the Monitoring Learning Achievement Project (MLA), and the UNESCO-based Southern African Consortium for Monitoring Educational Quality (SACMEQ) all independently found overall low levels of reading and language proficiency in both Anglophone and Francophone African countries.

The PASEC study revealed language proficiency in French to be 65.1% in Cameroon, 43.5% in Senegal, with Burkina Faso, Cote d'Ivoire, and Madagascar scoring in the range 50–58%. In Madagascar, good performance in Mathematics and French "seem to confirm the hypothesis that learning in the native language . . . (Malagasy) . . . acts as a real accelerator in learning foreign languages" (Sylla, 2004).

The MLA study found "significant variations among countries and disciplines in reading levels, life skills, and arithmetic, with Year 4 performances generally low" (Saito, 2004). For example, the average pupil reading scores in 12 Southern and Eastern African Countries against a SACMEQ norm of 500 (SACMEQ Study II, 2000) reveal that only seven (Seychelles, Kenya, Tanzania, Mauritius, Swaziland, Botswana, and Mozambique) scored minimally higher than the SACMEQ norm, the Seychelles scoring the highest at 582. The other five countries (Uganda, Lesotho, Namibia, Zambia, and Malawi) scored below 500, with the lowest, Malawi, at 429.

The above scores were derived from 8-level reading tests, which measured pupil reading levels at Grade 6 against minimum skills levels, as defined "independently by the authorities in each country." (ADEA, 2004, 10). In effect, these results show that a large number of pupils at Grade 6 level were reading *de facto* at Grade 3 or 4 levels only.

Adult Literacy

The low educational levels of many adult Africans and the current high attrition rate from schooling together contribute to high levels of adult illiteracy. The PASEC survey referred to above found that the proportion of adults who can read easily after six years of schooling is generally low throughout Francophone Africa. If this is true of Africa generally, there would seem to be a high regression from school-achieved literacy. Retention of school pupils to Grade 12 is an ideal not easily achieved in Africa as yet, and literacy levels will remain low until this ideal is attained. The question of adult literacy, especially in the workplace, is considered in depth by Prinsloo and Brier (1996).

Early Literacy Development

Western cultural agencies and publishing interests have ensured a good promotion and supply of reading and learning materials which privilege the Western languages. This has served to devalue the status and currency of the few materials written in the indigenous languages. Control over one's mother tongue is more likely to ensure successful control over an additional language. However, this has been largely ignored in many African contexts, with the result that many African preschool and primary level children are denied the basic right to acquisition of literacy in their mother tongue (Bloch, 1999).

Enliteration: Challenges and Responses

Both early childhood and adult literacy development present high priority challenges to applied linguists wishing to contribute to language development and effective, communicative, multilingual use of languages, both primary and additional (Western) languages. This requires urgent attention to the role of the mother tongue in first and second language enliteration processes. Three Southern African-based responses are worth mentioning here.

The Molteno project, based in Johannesburg, has achieved considerable success in training and retraining teachers using an additive bilingualism model that draws on teachers' first language resources to enable them to teach English as an additional language.

Concept literacy is the goal of a major project involving the Universities of Cape Town, KwaZulu-Natal, and Rhodes. Based at the Center for Applied Language and Literacy Studies and Services in Africa (CALLSSA), this project seeks to provide a textual resource base of mother tongue equivalents of English medium core concepts in Math and Science at Grades 1–9 levels, to assist teachers and learners to overcome the barriers of language and concept formation in the new South African curriculum.

Finally, the Project for the Study of Alternative Education in South Africa (PRAESA), working in multilingual education, has initiated a program of biliteracy at Grade 2 level. Children learn to read and write in both isiXhosa and English simultaneously,

so that they do not lose the emotional creativity and potential for literacy that comes with learning through the mother tongue (Bloch, 1999). In addition, there is a move to revive the strong African oral tradition, with its rich folklore and story genres, so that literacy practices may arise naturally from orality.

Conclusion

At the turn of the millennium, applied linguistics in Africa was becoming indigenized, in keeping with the ideological focus on linguistic diversity, language development, and multilingualism. There is a strong call for community participation in research at all levels – an emic perspective which will help inform decisions on language varieties versus language standardization, pedagogic practices, and language practices in key domains. Linguistic and sociocultural diversity is being foregrounded, as the hegemony of excolonial languages is increasingly challenged, giving rise to research truly characteristic of an African postmodern context. In keeping with the emphasis on social justice and equity, Africa needs to promote expertise in African language development, including translation, lexicography, terminology, interpreting, creative writing, and journalism. There is need for a focus on bilingual and multilingual language learning in teacher education programs, and increased professionalization of language teachers at all levels of education. Finally, there is a need for more research into legal, medical, and business discursive contexts, where intercultural communication is so crucial. This needs to happen, however, from an *African* applied linguistic perspective, in support of the formation of a truly African identity and the need for social accountability.

See also: African Lexicography; Assessment of Second Language Proficiency; Communicative Language Teaching; Corpora in Studies of Variation; Corpus Studies: Second Language; Education in a Former Colonial Language; Education in a Multilingual Society; Educational Linguistics; English: World Englishes; Identity: Second Language; Language Education Policies in Africa; Language Education: Standards Movement; Language of Tertiary Education; Language Teaching Traditions: Second Language; Languages of Wider Communication; Lingua Francas as Second Languages; Mother Tongue Education: Nonstandard Language; Nonnative Speaker Teachers; Translation: Pedagogy; Translation: Profession.

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Applied Linguistics in Australasia and the Pacific

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The Domain of Applied Linguistics in the Region

The domain of applied linguistics is contested worldwide; the region of Australia and the Pacific is no different. Applied linguistics is seen in a variety of different ways, the broadest view being that of the Australian Applied Linguistics Association, whose website states its goal as the application of linguistics to

- the methodology of teaching, learning, and testing languages (mother tongue and foreign languages);
- multicultural education in Australian society, including aboriginal, migrant, and other groups;
- language teaching technology;
- problems of language and the individual (including language acquisition and dysfunction);
- problems of language and society (including language planning and language standardization);
- the theory and practice of translation;
- the analysis and interpretation of spoken and written discourse (including stylistics, poetics, and pragmatics);
- the study of language in relation to other semiotic systems (including film and theatre, mime and dance, codes and ciphers, costume and ornament, mythology and folklore).

A scan of university departments and their degrees offers a different perspective. Macquarie University, for example, offers a Masters degree in applied linguistics, with four strands: general, literacy, TESOL (teaching English to speakers of other languages), and language program management, while other degrees cover many of the topics above. For example, language dysfunction is the subject matter of a number of degrees in speech and hearing, while interpreting and translation have degrees under their own name. The University of Melbourne, on the other hand, includes four different strands under the rubric of applied linguistics: computer-assisted language learning, English language, language testing and language program evaluation, and TESOL. The University of Auckland has a Department of Applied Language Studies and Linguistics, with programs in

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linguistics, language teaching and learning, and TESOL.

If applied linguistics is concerned with applying our knowledge about language to real-world decision making, then the discipline includes the broad areas of language in education, language in the workplace, and language in social life. While language, and therefore its study, linguistics, appears to be the core knowledge base of applied linguistics, it is necessarily interdisciplinary in nature, drawing on disciplines as different as psychology, education, sociology, computer science, and philosophy. However, it is neither linguistics nor an interdisciplinary mélange that is the emphasis of applied linguistics; rather, it concerns issues and the research on and solution to language-related problems that people encounter in the real world, whether those people be policy makers, lawyers, doctors, teachers, or interpreters. Further, applied linguistics is not simply the application of knowledge of language to issues of language use; increasingly, applied linguists study the very practice of language in use in real-world situations, leading to theorizing that itself contributes back to linguistics and other fields. This article then takes the view that applied linguistics is itself a discipline that uses a variety of disciplinary tools to analyze language in use, constructs theories from such research, and contributes to new knowledge in linguistics and other disciplines. It looks, therefore, at both the research/theory building and the practice of applied linguistics within the region. This position is not uncontroversial, as linguists within Australia, working in the systemic functional linguistics paradigm, have asserted that linguistics by its very nature is social, responsive to community need, and interventionist and so there is no need for the term applied linguistics (Painter and Martin, 1986). While this article is organized under the three broad issues mentioned above, they do, of course, overlap. All three areas by their very nature of referring to real-world problems require an understanding of the professional practice under investigation. Therefore, "If applied linguistics is truly problem driven, then it needs to be equally outcome focused, and collaboratively undertaken with professional practitioners" (Candlin and Candlin, 2003: 146). As we discuss below, much of the applied linguistics research in Australasia has been collaborative and focused on problem solution.

The World of Australasia and the Pacific

The Macquarie Dictionary, the authoritative source of Australian-English usage, defines Australasia as "Australia, New Zealand, and neighbouring islands of the South Pacific Ocean" (Delbridge *et al.*, 2001: 117). In one sense, this definition makes the title of this article repetitive; however, for those not familiar with the term, it may explain the region under discussion. For the purposes of this article, the region is confined to the Macquarie Dictionary definition of Australasia, that is, islands in the Pacific region not in the neighborhood of Australia and Aotearoa/New Zealand will not be included (for example, Guam).

The World of Applied Linguistics in the Region

Research and practice of applied linguistics in the region, as in any other region, draw on a variety of research and linguistics paradigms; however, this region is unique in that one particular theory of language has dominated the discipline in the latter half of the 20th century, namely, systemic functional linguistics. This framing began with the appointment of Michael Halliday to the Chair of Linguistics at Sydney University in the late 1970s and the subsequent development of the Sydney school of genre, which has been influential in applied linguistics throughout the region and beyond (for example, Singapore and Hong Kong SAR (Special Administrative Region)).

Language in Education

In many journals and articles, applied linguistics is synonymous with second language teaching; however, the real-world language-related problems in education include literacy, mother-tongue education, language teacher preparation, and languages for specific purposes, as well as additional language education (whether as a second or foreign language). While accepting that the dichotomy between second and foreign language cannot be upheld either theoretically or descriptively, it is a useful shorthand (*see* **Second and Foreign Language Learning and Teaching**).

The influence of systemic functional linguistics can especially be seen in research and practice in language and education, an influence that cuts across all levels of education. One of the primary characteristics of this approach is the description of genres, that is, the culturally typical ways of engaging rhetorically with recurring situations. The Sydney school, as well as following a specific, social model of language, has promoted pedagogical approaches to provide access to the genres of power for learners other than the brightest, middle-class monolingual students (Martin, 1989). This has led to explicit instruction in the features of specific genres for specific learner

groups, for example, recount for young learners and adults new to English or even literacy, or report for secondary science students, or thesis writing for tertiary students. This instruction follows a teaching–learning cycle with the following characteristics:

- building the context, during which teacher and learner explore the sociocultural context of the text type or genre being studied
- modeling, during which teacher and learner read sample texts and analyze and discuss their language and structure
- joint negotiation of text, during which teacher and learners construct a text together
- independent construction of text, during which learners write their own texts, consult with their teacher, and finally redraft and edit
- linking to other texts, during which teacher and learners explore other texts in similar or different contexts (Callaghan and Rothery, 1988).

Literacy Literacy within applied linguistics has been variously defined; however, the approach taken here is one that goes beyond reading and writing as skills but that includes the sociocultural construction of literacy, including visual literacy. Literacy has been extensively researched in the region at primary, secondary, adult, and tertiary levels; however, the research has not always been conducted by applied linguists and, in Australia in particular, there has been considerable tension between literacy researchers and applied linguistics researchers, between proponents of process writing and whole language and proponents of explicit modeling, and between views of literacies as socioculturally constructed, as cognitive-psychological skills, as reading and writing, or as entailing four competencies, namely, coding, semantic, pragmatic, and critical. The cognitive-psychological approach (for example, Coltheart, 1980) has had particular research application in the area of reduced literacy skills in children and adults with cognitive dysfunction, with particular focus on reading of individual words. Work in second language learning has also shown that growth of vocabulary is one of the more, if not most, important aspects of second language learning. In contrast, a study in Fiji, where reading for pleasure is not part of the culture, found that immersing learners in a 'flood' of extensive reading positively affected reading and listening comprehension, as well as related skills (Elley and Mangubhai, 1981). However, literacy education remains a key priority in Fiji, as in other Pacific nations that have jointly signed on to the Basic Education and Literacy Support Program, in conjunction with the United Nations Educational, Scientific and Cultural Organization (UNESCO) and other aid agencies. Delivery of such programs is complicated in Fiji because of its history of local, community-based, controlled education system. While Fiji is often praised for its decentralized system because it meets local needs, attempting to implement a nation-wide program is difficult. The 1991 policy document that established the Australian Language and Literacy Policy (ALLP) (Department of Employment Education and Training, 1991) defined literacy in such a way that it became equated with English, language, or even oracy and defined literacy as merely functional. Across education sectors, English as a second language (ESL) teachers considered themselves to be language teachers, and that language included literacy. However, these practitioners acknowledged the important distinctions between mother tongue and additional language acquisition, a distinction lost in the ALLP definition and subsequent provision. The view that second language education and literacy are distinct fields has also been advocated in New Zealand. This conflation of terms led to disputes over research funding and service delivery, but more importantly, has also led to the almost invisibility of ESL (and English as a second dialect (ESD)) in many sectors, as it is subsumed into generic literacy programs, although many states in Australia still maintain Intensive English Programs as centers specializing in English as an additional language (EAL) instruction for recent arrivals of high school age. Most recently, there has been a move to change qualifications of teachers teaching in the technical and further education sector (largely vocational education) within Australia, so that the qualification for teaching a second language be a diploma in language, literacy and numeracy, and that holders of such a diploma be able to teach ESL as well as literacy and numeracy to native English speaker adults. Currently, Australia and Aotearoa/New Zealand have no official literacy policy on which to draw.

Within the vocational and training sector in Australia, there has been recent discussion about appropriate models of delivery of literacy (and numeracy): fully integrated, isolation, and shared responsibility. Fully integrated models are those in which there are no specialized literacy instructors or curriculum, but literacy is embedded in training packages. In the isolation model, literacy specialists provide support for learners through independent programs and curricula. The shared responsibility model, the one favored by the sector, blends the two extremes so that literacy specialists provide specialized literacy instruction, but vocational subject matter instructors also share some of the

responsibility for the literacy development and referral of their students.

In Aotearoa/New Zealand, while there is debate between whole language and a more cognitive approach to early literacy, literacy has a wide definition within the schooling sector – not merely reading and writing, but also uses of language valued by society, individuals, and communities. New Zealand research has found that some groups (for example, Samoan and other Pasifika communities) are not well served by schools because there is a mismatch between community and schooling literacy practices (McNaughton, 1995). Others have found that non-English speaking background (NESB) learners were behind their peers in literacy, mathematics, and logical problem solving (Wylie *et al.*, 2001) and that teachers perceive that it is students' own characteristics that affect their ability to learn English (Kennedy and Dewar, 1997).

Mother Tongue Education While literacy may be subsumed under mother tongue education, it was dealt with separately above because of its salience in public discourse. Because the region under discussion includes countries with multiple languages, either indigenous or immigrant, the language of education is a contested issue. Papua New Guinea, for example, with over 850 languages, has embarked upon education reform, with the children's vernacular used in the early primary years, a transition period during which both the vernacular and English are used, and upper primary, where English is the language of instruction. However, research (Honan, 2003) has shown that, because of the number of languages and the mobility of families, the vernacular taught in a child's school may not be the vernacular used by the child. The child's home language may in fact be Tok Pisin, one of the three official languages of Papua New Guinea, not the vernacular of either parent. Additionally, while the vernacular may be the home language for some communities, it may not be the language for literacy practices. The language planning assumption seems to be that through mother tongue education, a community of literacy practice will develop in that mother tongue; however, the only opportunity for literacy practices may be in one of the official languages – for completing forms, reading the contents of packaged goods, and so on. While education has used the vernacular in Papua New Guinea and several other former British colonies such as Fiji (initially by missionaries for evangelism), Samoa, and the Kingdom of Tonga, English was used for education in the Solomon Islands during the colonial period, supposedly because of the large number of languages (today around 80) used by the small population (today about one-third of a million), and today is the official language, although Solomon Islands Pijin is a *lingua franca*. In the Solomon Islands, the Pijin word for 'one language' is used to describe one's extended family, all being speakers of the same language. Tonga maintains a strong tradition of literacy in Tongan and English as an additional language and, unique among Pacific Island nations, has universal primary education. Its strong religious focus as a nation has encouraged Tongan literacy for Bible reading and English as a language for wider communication. Almost all Tongans are literate in either or both languages. In Samoa, Samoan is the national language and children are educated in it; English is used officially for business, a result of its long association with New Zealand, having been a mandated and then trust territory of New Zealand for almost 50 years after World War I.

In Australia, English-only instruction was policy for Australia's indigenous peoples, Aboriginals and Torres Strait Islanders, until the early 1970s (except for some Christian Mission schools), when the government of the time considered that every Australian should be literate in their first language (L1) first, leading to bilingual schools in a number of states and territories. However, by the 1990s, the only extant bilingual programs for indigenous peoples were some run by individual states. What is important to note is that Aboriginal languages were not written until the 19th or 20th centuries, so the transition from an oral to a literate culture has been quite recent in comparison to the cultures from which the majority of Australians come. Additionally, most Aboriginal adults in remote communities speak English as a second (or more) language, while their children start school speaking an indigenous language. These children therefore acquire literacy first at school in English. In cities and rural centers, children (and adults) will often be speakers of Aboriginal English so that acquisition of standard Australian English, with its different linguistic features at the word, sentence, and text levels, needs to be explicitly taught; this is not always the case, however. Additionally, language and literacy education needs to be culturally appropriate and to use learning strategies compatible with indigenous learning styles. One such effective and well-researched program has been operating in Western Australia for several years as a collaboration between university-based and community-based researchers (Malcolm *et al.*, 1999).

In Aotearoa/New Zealand, grass-root (usually called flax-root after flax, a native plant in Aotearoa/New Zealand) initiatives in the early

1980s led first to the development of Te Kohanga Reo, preschools in Maori in which grandparents transmitted language and culture to their grandchildren, bypassing parents who are mostly not native Maori speakers. Later, the Kura Kaupapa Maori movement developed strict criteria for their schools, which included only teachers who are fluent native speakers of Maori and immersion for youngsters for 6 years. Research has shown that Maori and Pasifika languages are supported at early childhood level and there are some immersion and bilingual classes in primary schools but virtually no support at the secondary level (David *et al*., 2001).

For mother tongue education for students whose families use community languages (community language is used in Australia for the languages of immigrant communities), this education has primarily relied on community language schools, although many community languages are taught in schools and, in Australia, increasingly in the primary school. Many state governments provide financial support and free access to government school premises for community language schools. In Australia, many of these languages are examinable at end-of-high-school gate-keeping examinations so that learners from different community languages can count their mother tongue competence for graduation requirements. Bilingual education is not as prevalent in Australasia as it is in the United States, for example, largely because there is seldom a critical mass of learners of the same language at the same age level. The exception is Australian Sign Language (Auslan), for which there are schools specifically for learners with hearing loss. However, as more and more children have cochlear implants and are mainstreamed, there is some fear that Auslan is becoming an endangered language.

Language Teacher Preparation and Professional Development While there are many language teacher preparation programs in the region, there is no coherent body of research into teacher knowledge and skills required for effective language instruction. Some recent research has focused on the role of the non-native teacher and teacher candidate. There has, however, been a long tradition, especially in the adult ESL field in Australia, of teacher-conducted action research (for example, Burns and de Silva Joyce, 2001), which has examined a variety of different teaching and learning issues, from vocabulary instruction to using computer-mediated communication in the language classroom to learner-centered curriculum, always with the goals of both the professional development of teacher–researchers and the improvement of instruction in mind.

Languages for Specific Purposes While English for specific purposes, especially at the tertiary level, is well researched in the region, there is little research on the use of languages other than English (LOTE) for specific purposes, largely because English is the primary medium of communication in the region. Much of the work has been completed using the systemic functional linguistics model of language to describe the discourse of disciplines such as sociology, geography, science, and social studies (for example, Halliday and Martin, 1993). Other work includes English for academic purposes (EAP) (Kaldor *et al*., 1998), contrastive rhetoric, scaffolding, and genre studies.

Additional Language Education As a result of Australia's 1987 *National Policy on Languages* (Lo Bianco, 1987), Australia developed initiatives for the teaching of LOTEs, both languages of ethnic communities and languages of trade or tradition. Since their introduction, research has been conducted to examine all aspects of the use and learning of these languages. Such studies have shown that different levels of attainment are reached for different languages (Brown *et al*., 2000), that participation affects acquisition (Brown *et al*., 2000), that mother tongue affects classroom management (Clyne *et al.,* 1997), and that computer-based instruction may facilitate learning (Felix, 2001).

One thrust of research and practice in both LOTE and English language education in Australia has been the inclusion of culture in language teaching – not high culture or popular culture, but rather the way culture is transmitted through language. This has led to theories about and research into intercultural competence, an expansion of Hymes's communicative competence (Liddicoat and Crozet, 2000). This work has posited the notion of an intercultural space that educators need to help their learners develop, a space that other researchers refer to as fault lines or contact zones. This intercultural space is complex, requiring tolerance of ambiguity and negotiation of meaning.

Another theoretical thread through the research in both additional languages and language (especially English) for specific disciplinary purposes has been scaffolding, a strategy based on Vygotsky's zone of proximal development (1978). Research into scaffolding has identified both contingent and planned scaffolding (Hammond, 2001), that is, scaffolding that occurs *in situ*, as students interact with the teacher and jointly construct spoken and written texts, and scaffolding that is at the macro level, occurring through pre-planned selection and sequencing of activities and strategies.

While the genre approach discussed above under language in education focuses on language as text, written or spoken, considerable research has also been conducted in both Australia and New Zealand into the teaching and learning of individual skills, such as casual conversation, vocabulary, grammar, and pronunciation.

Although Aotearoa/New Zealand is an immigrant nation, most immigrants came from English-speaking countries, except for a large wave of Pacific Islanders in the 1960s and 1970s and Chinese and refugees in the last few years. For the former group, the Pasifika Education Plan was recently developed to cover all education sectors, with a focus on improving early literacy and provision of bilingual education. Recently, as a result of the growing numbers of second language learners in grade K–12, the New Zealand Ministry of Education commissioned research into best practices for delivering ESOL services to new immigrants and developed an adult ESOL strategy (Ministry of Education, 2003).

Language in the Workplace

Language in the workplace encompasses workplace communication as well as the discourse of the profession, extending even to forensic linguistics. There is a strong tradition of research into health care communication, especially in intercultural contexts (for example, Dowell *et al.,* 2001), and more general language use in the workplace, especially targeted for immigrants. In Australia, this included a televised program with accompanying workbooks. Forensic linguistics is a strong application of linguistic work in Australia (see, for example, Gibbons, 2003) and New Zealand and includes work on Aboriginal and NESB clients in the courts.

Language in Social Life

While language in social life could be a broad-ranging area covering many topic areas, within the region, language planning has had the most impact. However, translation and interpretation and language assessment have also been prominent in the region. While language assessment may appear to apply largely to language and education, within the region it has been used for broader social decision making, such as immigration and professional accreditation. Language education policies could arguably fall into language in education; however, since such policies involve interventions that affect the broader society, that is, not only educationalists and learners, it is best categorized and discussed under language planning more generally. Because another article considers language education policies in the Pacific (*see* **Language Education Policies in the Pacific**), this article is confined to language education policies in Australasia.

Translation and Interpretation Translating and interpreting became a recognized profession in Australia in the 1970s, with the establishment of the National Authority for the Accreditation of Translators and Interpreters Ltd. (NAATI), a company that determines the levels of competence expected of professionals and that also accredits training programs, from which graduates are automatically certified. NAATI is the official organization for such testing and accreditation in both Australia and New Zealand.

Language Assessment Language assessment covers a broad range of both achievement assessment of language learning and high-stakes tests for accreditation, immigration, and placement into educational programs. In Australia, within the Adult Migrant English Program (AMEP), there has been more than a decade of research and development of assessment of adult migrants' competency as a result of instruction in AMEP language programs. This research has investigated task comparability and difficulty, rater consistency, washback, and task moderation (for example, Brindley, 2000). The overall goal of the program has been to provide professional development for teachers to be able to assess their learners themselves reliably. Within the school sector, there has been research into oral assessment of NESB adolescents.

One line of research has been into the IELTS (International English Language Testing System) examination, the test used for university entrance of international students, immigration, and entrance to some professions. Research covers most areas of test design and implementation, from task difficulty to predictive validity to reliability.

Another form of assessment has been the benchmarking projects in Australia, projects designed to determine learner pathways for NESB learners in Australian schools (McKay *et al.,* 1994). More recently, the government has developed a national Literacy and Numeracy Plan, with reports on all learners against benchmarks, disaggregated for language background. There is no equivalent in Aotearoa/New Zealand; however, there are the New Zealand Curriculum statements of expected achievement and NESB assessment guidelines. Both, however, are benchmarked against native speaker students.

Language Planning and Policy Australia is unique in the English-dominant world in having developed an extensive and inclusive national policy on languages

in 1987 (Lo Bianco, 1987). This policy included policies in three main language arenas:

1. English for all
2. Aboriginal and Torres Strait Islander languages
3. A language other than English for all.

It thereby affirmed English as the national language with three types of provision: first language acquisition, acquisition by immigrant adults and children, and English as a foreign language (EFL), which was to include Aboriginals who have little exposure to English use in their daily lives learning English, assistance in the form of foreign aid, and a regional provider for international students and guests. In the arena of Aboriginal and Torres Strait Islander languages, the policy provided for bilingual education programs, translating and interpreting services, English and literacy programs, national awareness of these languages, and support for and revitalization of these languages. In the arena of LOTEs, languages to be taught included community languages for both maintenance (such as Maltese) and new learning (for example, Greek), as well as programs for languages of importance to Australia for trade (for example, Japanese and Indonesian) or historical reasons (for example, French).

Prior to the adoption of the National Policy, Australia had legislated a national program for the teaching of English to adult immigrants and refugees. This national program (see Martin, 1999 for a history of this program), begun in 1949, is a settlement program, funded through the Department of Immigration and Multicultural and Indigenous Affairs. Unlike the teaching of the official language to immigrants in many other nations (for example, the United States, Great Britain, and New Zealand), Australia's program is both national and highly integrated, containing features unique to Australia, such as a national curriculum framework, a national research center to coordinate and conduct research and professional development across the program, highly professional teachers, and a collaborative approach between the Commonwealth and organizations providing the program.

In Aotearoa/New Zealand, the 1987 Maori Language Act established both English and Maori as official languages, with the Maori Language Commission established to oversee programs promoting indigenous language. In the early 1990s, Aotearoa/New Zealand attempted to develop a national language policy and in 1992 published a draft document, which was, however, never ratified or implemented. In the meantime, various government documents created a *de facto* if not a *de jure* language policy. Such documents include ones referred to above for language in education, as well as statements within the New Zealand Curriculum Framework, which recognizes English as the language of national and international communication, but also acknowledges that students from language backgrounds other than English (LBOTE) should initially use their first language and move between it and English, and that such students should also develop and use their own language as part of their schooling.

One of the more interesting language-planning initiatives in the region has been in East Timor, since its liberation. Like much of the region, the language situation is highly complex, with 15 indigenous languages (Tetum [Tetun], the vernacular of the Belu who united central Timor under their rule, being the most widely spoken), two colonial languages (Portuguese and Indonesian), and one language of wider communication, English. The new government chose Portuguese as the national language of the new nation, because the Portuguese influence on East Timor is reflected in their views of themselves as a nation and their common ethnic consciousness and unity.

See also: Applied Forensic Linguistics; Assessment of Second Language Proficiency; Australia: Language Situation; Australian Languages; Education in a Multilingual Society; Fiji: Language Situation; Foreign Language Teaching Policy; Genre and Genre Analysis; Intercultural Pragmatics and Communication; Language Education of the Deaf; Language Education Policies in the Pacific; Language Education: Teacher Preparation; Language Planning and Policy: Models; Maori; Migration and Language; Mother Tongue Education: Standard Language); New Zealand: Language Situation; Nonnative Speaker Teachers; Papua New Guinea: Language Situation; Second and Foreign Language Learning and Teaching; Sign Language: Interpreting; Solomon Islands: Language Situation; Systemic Theory; Teacher Preparation: Second Language; Teaching of Minority Languages.

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Applied Linguistics in China

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Introduction

The People's Republic of China (PRC) is a country in which 56 ethnic groups (or nationalities) are officially recognized. The majority ethnic group, the Han Chinese, accounts for 91.6% of the total population, which is estimated to be approximately 1.27 billion on the China mainland alone and 1.3 billion for the 'Greater China' region, which includes the populations of Hong Kong, Macao, and Taiwan (National Bureau of Statistics of the People's Republic of China, 2001). On the China mainland, around 8% of the population are members of 55 minority groups, many of which have retained their own languages. The Han Chinese people speak two main groups of dialects: the northern dialects and the southern dialects. The northern dialects can be subdivided into seven subgroups, and the southern dialects into six subgroups (Huang, 1987: 33–45). Among the 55 minorities, it has been reported that as many as 80–120 languages are spoken (of which 60 are officially recognized) (Zhou, 2003: 23), and that these minority languages also show a significant amount of dialectal variation.

After the establishment of the People's Republic of China in 1949, it took a few years for an official language policy to be formulated, but since 1956, the government language policy has been the 'unification of the Chinese language' and the promotion of *Putonghua*, the 'common language' based on the northern dialect and the Peking pronunciation. Other language-planning aims have included the removal of illiteracy, the propagation of simplified characters, and the promotion of the official romanization system of pinyin. Following the establishment of the republic, ethnic minorities were initially allowed to use and develop their languages, but their languages were suppressed during the Cultural Revolution (1966–1976); afterward, they were encouraged to become bilingual in their own languages and Chinese. Since 1949, various foreign languages have been taught in China at different times, and the learning of Russian has been considered to be of prime importance. Since the late 1950s, however, with the exception of during the Cultural Revolution, English has been regarded as the most important foreign language to learn. Other foreign languages of secondary importance include Japanese, German, French, and other languages for diplomatic purposes. At Beijing Foreign Studies University (BFSU), for example, over 30 foreign languages are currently taught.

Although applied linguistics can be dated back to the 1940s in the United States (Kaplan, 2002: vii), applied linguistics as a recognized discipline did not begin to establish itself in China till the late 1970s, at the end of the Cultural Revolution. Nevertheless, it can be claimed that applied linguistic issues and practices were part of the Chinese experience long before the term *yingyong yuyanxue* ('applied linguistics') came into use. This article begins with a brief review of the recent history of China and a summary of the development of linguistics in China. It then proceeds to a discussion of applied linguistics, with reference to the study of three types of language issues in China, concerning the Chinese language, minority languages, and foreign languages.

Historical Background

It is generally accepted that the Chinese have one of the oldest language traditions in the world, with a number of written texts dating back some 3000 years. Issues related to language have been at the heart of many of the key philosophical debates in Chinese intellectual history (Hansen, 1983). In addition, China has had a long history of classical lexicography dating from the work of Hsü Shen in the 1st century A.D. to the present (Wang and Asher, 1994). When the first Catholic missionaries under Matteo Ricci began to visit China from the late 16th century on, they were immediately impressed by the intellectual culture they encountered. The first pioneers of modern dialectology were arguably the Protestant missionaries who arrived from the early 19th century on. They were fired by the desire to map the dialects of China in the service of their churches and were keenly concerned with learning and codifying the vernacular languages of their constituencies, including the Canton dialect, Hokkien, and the Amoy (Xiamen) dialect (Bolton and Luke, 2005). A number of the Protestant missionaries were also convinced of the need for language reform, and their proposals included the vernacularization of the Chinese writing system, and the use of various romanized writing systems alongside or instead of Chinese characters.

Such early dialectological work was accompanied by the incursion of Western traders, diplomats, and missionaries into China. After the First Anglo-Chinese War (1839–1842) and the Second Anglo-Chinese War (1856–1862), a number of 'treaty ports' were established at such locations as Canton (Guangzhou), Amoy (Xiamen), Foochow (Fuzhou), Ningpo (Ningbo), and Shanghai. A system of missionary

schools was established in these and other locations, in which pupils were often taught English, which fast gained popularity as a language of commercial value. The Chinese authorities also began teaching English themselves and founded an interpreters' college, the *Tongwen Guan*, in Peking in 1862, followed by other foreign language schools elsewhere. Somewhat later, by the beginning of the 20th century, a system of English-medium colleges and universities had been established across China (Bolton, 2003).

Late-19th-century China was a time and place of rapid social and political change, as the country attempted to come to terms with social disturbances, the pressures of modernization, and contact with the West. In 1911, the last emperor of China was deposed, and a republic was declared the following year. The decades that followed were politically chaotic, with various nationalist (*Guomingdang*) and communist factions competing for power. In 1931, Japanese forces occupied Manchuria, and throughout the 1930s they fought against both the communists and nationalists for control of the country. After the defeat of the Japanese in 1945, the communists gained control, and the PRC was established on October 1, 1949.

The new government faced immense problems in rebuilding the economy and infrastructure of the country and in formulating its foreign policy. Initially, China's leaders aligned themselves with the Soviet Union, but from the late 1950s and early 1960s on, they began to move away from this stance. Following this distancing, there was renewed interest in English, but this was cut short by the Cultural Revolution (1966–1976). During this period, education was made subservient to politics at a time when economic and political turmoil resulted in a tremendous loss of lives. At the end of the Cultural Revolution, however, a number of important policy changes took place, including the resumption of university education and the launching of Deng Xiaoping's policy of 'Four Modernizations,' which soon evolved into a "reform and opening policy" (Dillon, 1998: 109). In the 1980s and 1990s, China industrialized rapidly and economic growth has now created substantial pockets of new wealth (at least for certain sectors of the population) and has assisted in the formation of a new middle class. On the international front, China joined the World Trade Organization (WTO) in December 2001 and will host the Olympics in 2008.

Modern Linguistics in China

According to Branner (1997: 244), before the late 19th century, the Chinese linguistic tradition was "almost entirely philological" in the sense that "it was concerned with how to read received classical texts (especially rhyming texts), how to read rare characters, how to manage the great wealth of canonical alternate readings for individual characters, and how to explain the graphic structures of characters." By the early 20th century, however, comparative linguistics in China had been advanced by the work of British scholars such as the missionary Joseph Edkins (1823–1905) and the consular official Edward Harper Parker (1849–1926), who was a pioneer in the collection of dialectological data (Branner, 1999). Such Western linguists contributed to the debates that took place on modernizing and reforming the Chinese language in the late nineteenth and early 20th century. After the establishment of the Chinese Republic in 1912, various groups of Chinese scholars pressed for the reform of the written language, which eventually resulted in the *baihua* movement of the 1920s and 1930s and in the emergence of modern standard Chinese (De Francis, 1950).

By the 1930s, a domestic tradition in linguistics and dialectology began to be established, associated with such scholars as Yuen Ren Chao (1892–1982), Fang Kuei Li (1902–1987), and Wang Li (1900–1986). By this time, linguists also began to classify Chinese dialects according to seven or eight major groups. Varieties such as the 'Shanghai dialect,' 'Amoy vernacular,' and 'Canton dialect' now came to be referred to as the *Wu*, *Min*, and *Yue*, a system of classification credited to Fang Kuei Li (Chan and Tai, 1989). All three scholars studied at Western universities: Chao took a Ph.D. in philosophy at Harvard (but also had extensive contacts with Edward Sapir, as well as Leonard Bloomfield and Roman Jakobson), Fang Keui Li studied linguistics in Chicago with Edward Sapir, and Wang Li read general linguistics and phonetics in Paris (Chan and Tai, 1989; Shen, 1994). In the 1920s and 1930s, many Chinese linguists, including Chao, became keenly involved in discussions on language reform and on such issues as a national phonetic alphabet, simplifying characters, and promoting literacy. Among nationalist politicians in the 1930s, however, the issue was how to 'unify' the language and the need for "one state, one people, one language" (De Francis, 1950: 84). After the establishment of the People's Republic in 1949, such goals resurfaced in various language planning initiatives, as discussed in the next section.

Linguistics Applied and Applied Linguistics in Contemporary China

In contemporary China, applied linguistics is broadly associated with three types of linguistic activities: Chinese language education, developing minority

languages, and the teaching of foreign languages, including English.

Applied Linguistics and the Chinese Language

In the post-1949 period, as noted above, a central tenet of official language policy has been the promotion of the spoken standard, Putonghua, and the codification and teaching of a standardized Chinese script. In 1954, the government initiated discussions on the simplification of Chinese characters, and in 1956, the First Character Simplification Scheme was implemented. After the Cultural Revolution, some attempt was made to increase the number of simplified characters, but it was not well received. In 1986, the 1964 list with 2235 simplified characters and 14 radicals (or parts of a character) was reaffirmed for general use. In tandem with the teaching of simplified characters, Putonghua has also been promoted as the standard spoken dialect in all official domains. In February 1956, the State Council issued a directive requiring all primary schools and secondary schools, except those in ethnic minority regions, to include the teaching of Putonghua in Chinese lessons from the autumn of 1956. If Chinese was taught in minority schools, then Putonghua should be used as a standard. To facilitate the learning of Putonghua, a romanized script, *Hanyu Pinyin*, was finalized in 1958. Training workshops were organized for teachers, but this initiative was interrupted by political events and the Cultural Revolution. From the mid-1980s, much effort was spent in developing assessment instruments, culminating in the *Putonghua Shuiping Ceshi* (PSC or Putonghua Proficiency Test) for native speakers of Chinese, which was implemented widely from 1994 and formally endorsed again in 1997 by the State Language Commission. Another test designed for nonnative speakers of Chinese, the *Hanyu Shuiping Kaoshi* (HSK or Chinese Proficiency Test of China) was also established by 1988. The Hanyu Shuiping Kaoshi is now internationally accepted as the standard test for Chinese as a Foreign Language (Gu, 1997; Lam, 2005).

Another notable area of applied Chinese linguistics has been that of machine translation. As early as 1956, a machine translation project team was established at the Chinese Academy of Sciences. The initial work involved translation between Chinese and Russian. The focus was later changed to multilingual systems based mainly on translation protocols between Chinese and English. This machine translation research group later evolved into the Applied Linguistics Research Laboratory: Chinese Academy of Social Sciences, 2002.

Although the effect of linguistics on language planning and Chinese studies can be traced back to the late 19th century, as mentioned earlier, it was not until 1980 that the *Zhongguo Yuyan Xuehui* (Society of Chinese Linguistics) held its inaugural meeting. In January 1984, the *Yuyan Wenzi Yingyong Yanjiusuo* (Applied Linguistics Research Institute) was established under the auspices of the Chinese Academy of Social Sciences and the *Zhongguo Wenzi Gaige Weiyuanhui* (Commission on Language Planning of China), and in September of the same year, the institute held its inaugural conference. In 1985, at the first international conference on the 'Teaching of Chinese,' held in Beijing, it was proposed that an association for the teaching of Chinese should be established worldwide. In 1990, a symposium was held jointly by the Applied Linguistics Research Institute and Suzhou University to explore issues such as the scope of applied linguistics and its relevance for language teaching and language standardization. Two leading journals in applied Chinese linguistics are *Yuyan Wenzi Yingyong* (Applied Linguistics), which was first published in 1992, and *Zhongwen Xinxi* (Chinese Information Processing), which appeared in 1984 (Fei, 1997).

Applied Linguistics and Minority Languages

The 55 minority ethnic groups occupy a sensitive position within China's officially multicultural state, as their speakers represent some 8% of the population but are located in approximately 64% of the total land area (Dai, Teng, Guan and Dong, 1997: 10). The ten largest minority groups in China are the Zhuangs (16.2 million speakers), the Mans (10.7 million), the Huis (9.8 million), the Miaos (8.9 million), the Uygurs (8.4 million), the Tujias (8.0 million), the Yis (7.8 million), the Mongols (5.8 million), the Zangs or Tibetans (5.4 million), and the Buyeis (3.0 million) (Population Census Office, 2002).

The official language policy toward minorities is inscribed in the section of the Chinese constitution that states that "every ethnic minority is to use and develop their language" (Zhou, 1992: 37). The official educational directive on this issue further states that:

> In schools where the majority of students belong to an ethnic minority, the language of textbooks and instruction should be in the language of that minority, if conditions permit. The Chinese language … should be taught in the last two years of primary school and in middle school to promote the national language. (Article 37 of the Program for the Implementation of Regional Autonomy for Ethnic Minorities, cited and translated in Zhou, 1992: 37.)

In the post-1949 drive to eliminate illiteracy, a number of literacy programs for the minorities have

been organized. Before 1949, excluding the Huis and the Mans who use Chinese, 20 of the 55 minorities already had a written form for their languages; from the 1950s to the 1980s, orthographies were developed for nine other minority groups (Chinese Academy of Social Sciences, 1992; Ministry of Education, People's Republic of China, n.d.). In some regions, the government and schools are now adopting a bilingual language policy aimed at preserving minority languages, yet simultaneously promoting Chinese, although the balance between languages varies greatly from region to region (Zhou, 1992: 38–40).

At present, a particular concern for both Chinese linguists and international concern groups is the plight of a number of endangered languages. Huang (2003) notes that 22 languages in China currently have fewer than ten thousand speakers, and that a process of intergenerational language shift toward Chinese is firmly underway in many regions. Huang (2003: 4) adds that "the minority nationalities lack confidence in their own mother tongues" and believe that "mastery of Chinese will help them secure more opportunities," and he comments that "[t]his has brought the minority nationalities to a crisis with respect to their mother tongues and . . . to lose confidence in the future of their mother tongues". Huang finally reports that since 2002, the Chinese Academy of Social Sciences has been working with the State Commission of Minority Affairs and UNESCO on "programs aimed at rescuing and documenting these endangered languages" (Huang, 2003: 5), but given the powerful economic and political dynamics at work, documentation rather than rescue may have more success.

Perhaps the most direct application of linguistics in relation to minority languages in China has been in the phonological and grammatical descriptions of these languages, a whole series of which have been published by the Central University of Nationalities Press in Beijing. Minority language or minority education issues are explored in journals such as *Minzu Jiaoyu Yanjiu* (*Journal of Research on Education for Ethnic Minorities*), *Minzu Yuwen* (*Ethnic Languages*) and *Guangxi Minzu Yanjiu* (*Studies of Ethnicity in Guangxi*).

Applied Linguistics and Foreign Language Teaching

To understand the role of applied linguistics in foreign language education, it is necessary to also consider the history of China's international relations and foreign policy. In broad terms, one can identify six phases of foreign language education since 1949 (Lam, 2002, 2005) and these are illustrated in Table 1 below.

Russian lessons were first broadcast in Beijing in 1949, and in the early 1950s, in line with its political orientation, China promoted Russian in education. In 1950, Russian departments were established in 19 higher-education colleges, and Russian training courses were organized in several party, government, and military sections. By the following year, these courses had been set up in at least 34 universities and colleges. The emphasis on Russian continued until 1956–1957 when China's foreign policy moved away from the Soviet Union. From that point onward, English replaced Russian as the most important foreign language in China's schools. In 1957, a draft syllabus for teaching English in junior secondary school was distributed, and in 1960, the Beijing Foreign Language School piloted the teaching of English from Primary 3. In 1961, the syllabus for English majors at university level was designed, and in 1962, the first English syllabus for non-English majors in science and technology was published.

The promotion of English at this time might have continued unabated but for the Cultural Revolution, which broke out in 1966 and swept throughout the country. During this period, all academic learning (including foreign language learning) was condemned, although Zhou Enlai, China's Premier from 1949 to 1976, managed to deploy a small number of students to jobs requiring foreign languages. In 1971, in the midst of the Cultural Revolution, China was recognized as a member of the United Nations, and in 1972 Richard Nixon, then President of the United States of America, visited China, establishing a new era of United States–China diplomacy. The biggest breakthrough in foreign language teaching, however, came after the Cultural Revolution, when Deng Xiaoping announced his policy of the Four Modernizations in 1978. In the same year, plans to teach foreign languages from primary school were announced, and the recruitment of foreign teachers to China resumed. Throughout the 1980s, much work was done in drafting or revising syllabi, developing materials and tests, and training teachers at various educational levels, including universities.

To support these developments after 1978, there was an urgent need for educators trained in linguistics, and it was at this time that 'applied linguistics' for foreign language teaching was established as an academic discipline. According to Wang (personal communication, 2003), Guangdong University of Foreign Studies (GUFS) was the very first institution to offer a Master's program in Applied Linguistics in 1978, followed by a Diploma in Applied Linguistics in 1980 and a Doctor of Philosophy in Applied Linguistics in 1986. The first conference on 'Applied Linguistics and English Language Teaching (ELT)'

Table 1 Six phases in foreign language education in China after 1949

Historical period	*Phase in foreign language education*	*Years*
Before the Cultural Revolution	1. The interlude with Russian	Early 1950s
	2. The back-to-English movement	1957–1965
During the Cultural Revolution	3. Repudiation of foreign learning	1966–1970
	4. English for renewing ties with the West	1971–1976
After the Cultural Revolution	5. English for modernization	1977–1990
	6. English for international stature	From 1991

was held at Guangzhou Foreign Language Institute (the predecessor to GUFS) in 1980, with participants from 22 higher-education institutions in China and three institutions from Hong Kong (the University of Hong Kong, the Chinese University of Hong Kong, and the Hong Kong Polytechnic). In the same year, foreign language specialists from China visited the Hong Kong Examinations Authority for advice on test design, and materials development teams in various foreign languages were set up at many universities. In 1984, research projects on various aspects of learning English at university level were conducted. In 1985, an ELT conference at the Guangzhou Foreign Language Institute attracted applied linguists such as Michael Halliday, Henry Widdowson, Peter Strevens, and Alan Maley. Around this time, English specialists from China also began to travel abroad more frequently, and in 1986, the first official delegation from China attended the Teaching English to Speakers of Other Languages (TESOL) conference in Anaheim, California, and presented the 'College English' syllabus for China. In the same year, Fu Ke (1986) published his influential history of foreign language teaching in China (see Sichuan Foreign Language Institute [1993] for a chronology of events in foreign language teaching).

By the early 1990s, applied linguistics had been established as a field of academic activity in China, and a number of Chinese scholars sent overseas for training in the 1970s had returned with new perspectives on foreign language education (Gui, 2002: 2). The disintegration of the Soviet Union in 1991 also provided an opportunity for China to adopt an increasingly international outlook and further expand foreign language education, especially with reference to English. While work on English language curricula at tertiary level continued, attention now turned to English teaching in schools. In May 1990, new guidelines for teaching English in primary school were issued, followed in 1992 by a new syllabus for junior secondary school and, in 1993, for senior secondary school (later revised in 1996). Further international links have also been recently established, and in 2000, the International Association of Teachers of English as a Foreign Language (IATEFL) endorsed the establishment of a China branch. In August 2002, the first IATEFL China conference was held in Tonghua in Jilin province. The year 2002 also saw China joining the International Association of Applied Linguists (AILA) under the aegis of the Chinese English Language Education Association (CELEA).

In China, it is common practice for the government to seek advice from several institutions in different cities to draft syllabi and to develop and pilot materials before they are adopted nationally. In recent decades, key institutions from throughout China have contributed to the national initiatives in the teaching of English and other foreign languages, and thus to 'applied linguistics' in the context of foreign language teaching. Individual institutions have also played an important role in this process, including Guangdong University of Foreign Studies, as mentioned above. GUFS now houses the nationally recognized Center for Linguistics and Applied Linguistics. A key role has also been played by Beijing Foreign Studies University (BFSU) and the Shanghai International Studies University. Beijing Foreign Studies University houses the Foreign Language Teaching and Research Press (FLTRP), the leading publisher of foreign language and applied linguistics materials. The press also sponsors and organizes national conferences on English language teaching in collaboration with the BFSU and the CELEA. Beijing Foreign Studies University is also the home of the National Research Center for Foreign Language Education, which was established at BFSU in March 2000 to conduct research on foreign language education and bilingualism.

Although Chinese 'applied linguistics' in the arena of foreign language teaching did not achieve academic recognition until the late 1970s, it has been professionalizing very rapidly, both through domestic innovations as well as through the education of many linguists overseas. A number of major universities in China now recognize applied linguistics as a distinct academic field. Major journals based in China dealing with foreign language education include *Foreign Language Teaching and Research*, *Modern Foreign Languages*, *Foreign Language Research*, and *Journal of the Foreign Language World* (Gao, Li, and Lu, 2001).

Conclusion

In the sections above, we have attempted to locate our discussion of applied linguistics in China with reference both to the long tradition of Chinese language study and to the recent history of Chinese politics and society. The survey of issues we present in this article indicates that, in recent decades, there have been three broad areas where the influence of applied linguistics (in theory, practice, or both) has been felt: applied linguistics and the Chinese language; applied linguistics and minority languages; and applied linguistics and foreign language education.

With reference to Chinese, initiatives in applied linguistics have focused on the teaching and assessment of *Putonghua* and Standard Chinese to speakers of other dialects and languages and have also involved advances in Chinese information technology. With reference to minority language studies, linguistics has been applied to the description and archiving of such languages, as well as to issues of bilingualism, linguistic description, and language maintenance and loss. At present, applied linguistics in the field of English language teaching displays the greatest international orientation in terms of theory and practice, as might be expected. In the decades ahead there may be increased contacts between these three strands of 'applied' activities as interest in both linguistics and applied linguistics is likely to remain strong in an era of increasing internationalization. Whether that proves to be the case is likely to depend substantially on the degree of institutional support and 'academic space' granted by the educational authorities (in what is still a largely centrally organized educational system) for linguistics, both 'pure' and 'applied.'

See also: Chao Yuen Ren (1892–1982); China: Language Situation; Chinese; Endangered Languages; Language Education Policy in China; Language Planning and Policy: Models; Lingua Francas as Second Languages; Minorities and Language; Wang Li (1900–1986).

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Applied Linguistics in Europe

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One limitation should be mentioned here: The research discussed is basically mainland European. Applied linguistics in Great Britain and Ireland has a long history and a very active present, and it would be impossible to include the specific issues from that context into the larger European picture.

Applied linguistic research has been carried out on a wide range of topics. In order to give some structure to this overview, the research is presented under the following headings:

- Language planning and policy
- Sociolinguistic aspects of multilingualism
- Psycholinguistic aspects of multilingualism

Language Planning and Policy

The end of World War II also meant the beginning of the Cold War and the division of Europe into two zones of influence: the western part that organized itself strategically in NATO and the eastern part that became dominated by the USSR and Warsaw Pact. Linguistically this meant that these two zones came under different influences: although in the western part English and, to a lesser extent, French dominated the scene, in the eastern part Russian became the language of wider communication and the language taught widely in education. German continued to play an important role in Eastern Europe, in particular in academia, whereas its role was very limited in Western Europe. Rannut and Rannut (1995) discuss the specific problems of setting up a language policy in Estonia after the Soviet era. Estonia is faced with the difficult task of strengthening the position of the Estonian language, while at the same time taking into account the needs of the monolingual Russian speakers in Estonia. As Leontiev (1995) mentions, similar problems occur in the autonomous republics of the former USSR to where large numbers of Russians migrated, often driven by force. They now face problems in the republics in which they have been living for a long time: "Because of their monolingualism, they are excluded from the cultural life of the state. They cannot understand the media or official documents, unless Russian is the second official language

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of the new state. Many of them do not want to learn a 'new' language: They have no real experience of being bilingual or multilingual, as for instance citizens of Switzerland have" (Leontiev, 1995: 199–200).

Language in the European Union

In multilingual Europe, linguistic differences have always played a role. Languages typically were regarded as the core of national identity and therefore they were and are highly symbolic of developments in Europe. In this respect, it is interesting that is was a French politician, Jean Monnet, who became the main actor in the development of several associations between western European countries that led to the emergence of the European Economic Community (EEC) and later the European Union (EU), which has recently grown from 15 members to 25 members. The impact of the development of the EU on almost all aspects of language and language policy can hardly be overestimated. Here we will focus on a number of developments that are directly or indirectly related to the emergence of the EU and discuss some of the research that has been done in relation to this.

A number of issues have to be discussed here:

- Language policies in the EU
  - Content and language integrated learning
  - An early start for foreign languages
  - The development of the European common Framework of Reference
- The choice of languages in the EU.

The main aim of the EU is the formation of a united Europe with open borders and active communication between residents. To achieve this, various policy measures have been enacted, in particular with respect to learning foreign languages. In a 1998 meeting of the EU ministers of education, a long list of intentions was presented aimed at the development of multilingualism in the EU. These intentions aimed to enable "all Europeans to communicate with speakers of other mother tongues, thereby developing open-mindedness, facilitating free movement of people and exchange of information and improving international cooperation" (Recommendation R (98) 6 of the European Council). Among the recommendations listed are the learning of more than one foreign language by all citizens, the use of foreign languages in the teaching of nonlinguistic subjects (for example, history or mathematics), an early start for the teaching of foreign languages, the promotion of lifelong learning of foreign languages, and a focus on learner autonomy. Although the last point has not attracted much attention in the European research community, there has been more research undertaken on various forms of content-based instruction, or what in the European context has become known as CLIL: Content and Language Integrated Learning (Marsh, 2002). In many European countries, this form of language teaching has become popular, although it also should be mentioned that in the vast majorities of schools the foreign language taught is English and only a few schools offer CLIL with any of the other EU languages.

An Early Start for Foreign Languages

In the literature on early bilingualism there are numerous studies on children who have been brought up in two languages. There is a long European tradition that began with the seminal work of Ronjat (1913) on his son Louis, who was brought up in French and German, and Leopold (1939–1949), who made careful analyses of his daughter Hildegardt's development in German and English. More recent work on simultaneous bilingualism includes work by Arnberg (1987), De Houwer (1990), Meisel (1990), and Lanza (1997). One of the main research questions is when and to what extent young children develop separate systems for their different languages and to what extent the well-known principle of one parent–one language is really necessary for full bilingual development.

There is much less research on early consecutive bilingualism (Kielhöfer and Jonekeit, 1983), but there is growing interest in the development of bilingualism through early bilingual schooling that is becoming more popular because of the EU's policy to promote an early start for foreign language learning (Leman, 1991; Housen and Baetens Beardsmore, 1993). In policy documents on early foreign language teaching, the distinction between early simultaneous acquisition and early language teaching in schools is not always made, and some of the findings showing high levels of proficiency in children that have been brought up bilingually are too easily used to claim equally positive outcomes for foreign language teaching in primary education.

The Common European Framework of Reference (CEFR)

One of the problems in defining a language policy with respect to the teaching and learning of languages in the EU was how to define levels of proficiency in a foreign language. The need for a common framework of reference became one of the spearheads of language policy in Europe. North and Schneider (1998) report on a large project set up to compare systems of reference for various national and commercial language tests and examinations and present a system that is primarily based on self-evaluation

through the use of so-called can-do statements ("I am able to understand a conversation between native speakers when they speak at a normal speed about non-specialist topics": 1 = not at all . . . 5 = without problems). The resulting Common European Framework of Reference (CEFR; Council of Europe, 1996) has become the standard for both national examinations and commercial placement tests, such as the Cambridge Exams for English. Although the use of the can-do scales is not without problems, they have now become the standard in research that aims at comparing foreign language proficiency between countries (see, for instance, the evaluation of English proficiency at the end of compulsory education in different countries reported on by Bonnet, 2004).

The Choice of Languages in the EU

Inevitably, questions arose following the establishment of the EEC and the EU based on various aspects of the emergence of language as a political issue: What should the language or languages of the EU be; How many languages should inhabitants of member states be able to speak; How can we test language proficiency over countries through a unified system?

In the EU in its pre-May 2004 form there were 13 official national languages, ranging from German with 63 million speakers to Letzebuergesh with 0.4 million speakers. In addition, there were several so-called autochthonous languages, ranging from Catalan with 10 million speakers to Gaelic with 0.1 million speakers (Ammon *et al*., 1991). Of the national languages, 11 languages were official and working languages for the EU. For the running of the EU as an organization, this large number of working languages has become a heavy financial burden, because all documents have to be made available in all working languages; in all meetings, all languages can be used, and so there has to be simultaneous interpreting for all possible language combinations. With the enlargement of the EU this problem will become even more pressing, not only because the number of languages and, accordingly, the number of possible combinations will grow dramatically but also because it will be very difficult to find sufficient numbers of translators and interpreters for all language combinations. Van Els (2004), in his analysis of the use of languages in the EU and its institutions, considers various models to simplify the language regime in the EU. The language issue is a very sensitive one, because giving up a language as one of the official languages is seen as a serious devaluation of and threat to the position of a language nationally and internationally. Defendants of national languages urge their representatives in all committees and working groups to insist on the presence of interpreters, whereas in the daily running of the EU at the lower levels the general practice is that only English and French are used. Van Els discusses various options, which broadly fall into two groups: restrictive (not all languages as working languages) and nonrestrictive (all languages allowed). He rejects the financial argument related to the costs of translation and interpreting, observing that the EU falling apart because of the language issue would be far more costly. For the restrictive options he mentions various choices, such as a smaller number of languages (German, French, English), the use of an international language (Esperanto), and English only. Van Els concludes that in the end the last choice, only English, is the only feasible one, if not because it causes less damage than any of the other options, then because no politician will be brave enough to really try to solve the issue, and doing nothing means that in practice English becomes the working language in most meetings. The use of the other languages will become more or less symbolic.

Sociolinguistic Aspects of Multilingualism

The Position of English and Other Languages in Europe

It is one of those curious developments in European history that English has become the dominant language in Europe although its country of origin has played a marginal political role on the European scene. For quite some time, Great Britain was not accepted as a member of the EU. At first, then French president Charles the Gaulle opposed the entry of Great Britain, fearing it would weaken the German–French axis; later, entry was opposed because Great Britain did not meet the economic criteria for new members. As a consequence, the English language was never actively promoted by the British, or at any rate not nearly as much as French was defended by the French government, which wanted to maintain French as the language of diplomacy (Willingham-McLain, 1997).

With the extension of the EU (an addition of 13 new member states), the linguistic scene is changing dramatically. Holdworth (2003) mentions statistics on foreign language skills that show that the majority of the people in the new member states are bilingual or multilingual and that in those countries Russian is the most widely spoken foreign language, followed by German. If we look at language skills in the enlarged EU as compared to the present situation an interesting picture emerges. Table 1 contains the percentages of

Table 1 Percentages of inhabitants of EU with basic knowledge of a foreign language

	EU of 15 states	*EU of 28 states*
English	40%	35%
German	18%	16%
Russian	>1%	11%
French	16%	10%

people that claim that they can hold a conversation in that foreign language.

These figures show that the position of English and German – and, in particular, French – is weakened. The Russian language still holds a strong position, but it is not clear whether that will last, because the call for English in the new states on all levels of society will inevitably grow at the expense of Russian.

Graddol (2004) presents data on proficiency in English in the present EU showing that in Denmark, Sweden, and the Netherlands more than 75% of the people interviewed claim to be able to hold a conversation in English. In Luxembourg, Finland, Belgium, Germany, and Greece, 40 to 50% can hold a conversation in English, whereas fewer than 30% can do so in Italy, Portugal, and Spain. These figures show that the knowledge of English may not be as widespread as is sometimes assumed, and that its dominant position might not be as overwhelming as previously thought. As Graddol (2004, 1330) puts it:

> Any look into the future must entertain the idea that soon the entire world will speak English. Many believe English will become the world language to the exclusion of all others. But this idea, which first took root in the 19th century, is past its sell-by date. English will indeed play a crucial role in shaping the new world linguistic order, but its major impact will be in creating new generations of bilingual and multilingual speakers across the world.

From Bilingualism to Multilingualism

A typical European issue is the growing interest in trilingualism and multilingualism. In German-speaking countries in particular, the interest in what is basically 'English plus x' has led to a range of projects on trilingualism from both a theoretical perspective (Dewaele, 1998; Jessner, 2000) and a language teaching perspective (Dentler *et al*., 2000). One of the most important outcomes of this research is that, in multilingualism, all language systems interact: The mother tongue can affect and also be affected by the second or third language. In some bilingual regions in Europe, such as the Basque country and the Province of Friesland in the Netherlands, English is taught as a third language.

Sociolinguistic Aspects of Multilingualism

SLA and Migration

The booming of the economy in Western Europe that first came about as a result of American support for the rebuilding of Europe (under the Marshall Plan) and later on the development of trade and agriculture led to the rapid growth of labor migration from countries in southern Europe, North Africa, and Turkey to Germany, France, the Low Countries, and the Nordic Countries. This migration quickly turned from temporary stay into permanent residence and family formation in the immigrant countries. This led to a number of language-related problems. Because of low proficiency in the language of the immigrant country, many migrant workers never integrated; in particular, their children suffered from low educational achievements, and accordingly there were higher risks of educational dropout and unemployment. In many countries, initiatives were taken to improve language skills of the migrants and their children and a number of large-scale projects were set up to study the language development of those groups. Probably the best-known example was the ESF project, "Second Language Acquisition by Adult Immigrants," coordinated by Wolfgang Klein and Clive Perdue in 1992. In the project, the acquisition of different languages by speakers with different L1s was studied in a then well-known "saw-tooth" pattern:

English German Dutch French Swedish
Punjabi Italian Turkish Arabic Spanish Finnish

So, for example, the acquisition of German by Italian and Turkish learners was compared to the learning of English by Italian learners and Dutch by Turkish learners, enabling a cross-linguistic comparison between both source and target language. One of the outcomes of this research was the development of what became known as 'the basic variety': "One of our findings is that all our learners, irrespective of the source and target language, develop a particular way of structuring their utterances which seems to present a natural equilibrium between the various phrasal, semantic and pragmatic constraints" (Klein and Perdue, 1992: 311).

Languages in Contact

There are many national languages, minority languages, regiolects, and dialects in Europe, and therefore language contact is a common phenomenon. There is also a long-standing interest in this. Weinreich's well-known *Languages in contact* (1953) is an early example of research that takes into account linguistic, sociolinguistic, and – to a certain extent – even psycholinguistic

aspects of language contact. There are few examples of language contact situations in which the two languages live in peace alongside each other. In most cases, there is a difference in status and this implies that the weaker language is in danger to being overtaken by the stronger one. Nelde (1987) aptly described this: Language contact is language conflict. As we will see later, in the discussion on maintenance and loss of minority languages, this is the reality for many languages, and, as some argue, even all languages except English.

At the same time, we see the development of new varieties resulting from language contact, along the lines of Graddoll (2004). In Germany, in particular, there is a growing group of researchers who are interested in the contact languages that develop in multiethnic cities. For some, those new varieties pose serious threats for young people with a migrant background, because the kind of input they need for their education and their position on the job market is limited when they only speak these youth varieties. Schlobinski *et al.* (1993: 9) cites several very negative comments on such youth language, but not all comments have this sombre tone. For many linguists, the development of such 'wild' varieties is a sign of the ability of languages to renew themselves and to adapt to new situations. Youth language often has a sort of 'secret language' function aimed at the exclusion of outsiders in the communication and it clearly reflects the interests of the age group of 12- to 18-year-olds. Varieties are typically unstable, and being able to joggle with the language and be creative with new words adds prestige.

Maintenance and Loss of Minority Languages

Because of the changes taking place in Europe, two trends in language contact have emerged: the migration to Western Europe by various groups from Southern Europe, North Africa, and Turkey, and the growing impact of national languages on nonmigrant minorities. Both trends have been investigated in terms of the maintenance and loss of minority languages in various parts of Europe. The loss of language skills in migrant languages has been studied in many European countries. Fase *et al.* (1995) and Ammerlaan *et al.* (2001) present many examples of this line of research.

Regionalization

The tendency of larger and more powerful languages to dominate the smaller ones has led to a strong reaction in various countries to support and strengthen the position of smaller languages. Within the EU, several resolutions have been adopted aimed at protecting regional minority languages. These actions have led to the foundation of the European Bureau for Lesser Used Languages (EBLUL) and a very active MERCATOR network in which representatives from most regional minority languages cooperate. The European Charter for Regional or Minority Languages (1992) was a milestone, because all member states that ratified the Charter had to take positive action to protect and support their regional minority languages. This clearly strengthened the position of those languages, although there are important differences between the various regions.

The almost comfortable position of regional languages in Europe stands in sharp contrast with the weak position of migrant languages in those countries. In that sense, there is an uneasy relation between proponents of migrant languages and other minority languages in Europe. Extra (1989) points to the fact that the arrangements for local or regional minority languages (such as Frisian and Basque) are generally much more supportive for language maintenance than the arrangements for migrant languages. In more recent publications, the defenders of the rights of the two minority communities – regional and migrant – seem to have found a common interest in campaigning for the rights of minority languages. In an aptly titled edited volume, *The other languages of Europe*, Extra and Gorter (2001) argue for the provision of teaching for both migrant and regional minority languages.

Psycholinguistic Aspects of Multilingualism

Although the interest in psycholinguistic aspects of multilingualism is not a typically European topic, it certainly is a field in which European researchers have been key players. The focus has been on the lexicon as well as on the role of cognitive processing in language acquisition and use. The central question most of the research is concerned with is language specific versus nonspecific access. In other words, when we are confronted with a word, e.g., in a lexical decision task, do we first access the lexicon from one language and then the next, or is there a parallel search through all languages, with words not being organized primarily through language, but, e.g., through frequency. In the past, the language selective position was favored but in the last two decades research has accumulated to support the nonselective view. A number of experimental paradigms have been used to study this question, these include various forms of lexical decision with or without priming (Dijkstra and van Heuven, 1998), translation (de Groot *et al.*, 2000) and word naming (Hermans *et al.*, 1998). Overall, the evidence in support of the nonselective access hypothesis is

substantial, and much stronger than for the selective access hypothesis.

There is a large body of research on psycholinguistic aspects of language acquisition and language attrition. Again, even a global overview of that research would take more space than is available here. There is a strong tradition in various European countries to apply the Chomskian generative framework to second language acquisition. More functionally or cognitive linguistically oriented studies also have been carried out. The ESF project mentioned earlier falls within this category. A direct link between cognitive processing and SLA is made in work by Hulstijn (e.g., Hulstijn, 2002) and Pienemann (1998). Their main claim is that language acquisition is constrained not so much by the linguistic characteristics of the language but, rather, by the cognitive processing mechanisms. Good overviews of the study of linguistic aspects in SLA can be found in the EUROSLA yearbooks that contain articles based on the annual EUROSLA conferences.

Language Attrition

One specific line of research that has a firm European basis is the study of language attrition, i.e., the decline of language skills in individuals over time. Research on attrition has proven to be relevant, both from a language policy perspective ('Why teach a language if you forget it quickly?') and from a psycholinguistic perspective ('How is knowledge stored and lost?'). Research on this topic has been carried out over the last 20 years in several European countries (see Weltens *et al*., 1986, for an account of early studies, and Schmidt and Köpke, 2004, for more recent ones). There is also some research using more advanced neuro-imaging techniques to study language attrition: Pallier *et al*. (2003) used such techniques to study the attrition of the first language among adopted Korean children living in France.

Final Remarks

In this article, an attempt has been made to provide a sketch of what has been going on in applied linguistics in Europe. The focus has been on the relationship 'between language in use and the complex sociolinguistic situation in Europe rather than the specific contributions to applied linguistics made by European researchers.

What might be the direction of future developments for applied linguistics in Europe? A number of issues are likely to gain further prominence in the near future. These include the following:

- Further expansion of EU: What other languages, how many, what are the costs?
- Growth of English at the expense of other languages in all walks of life, and the detrimental effect this will have on the learning of other foreign languages.
- Language and aging in migrants: The first wave of migrants is now reaching old age, and with that come problems related to physical and cognitive decline. Few countries are ready to take appropriate measures to deal with this problem.
- The role of national language/local language/ English: One scenario is that English will become the language of wider communication for all Europeans, but that Europeans will stick to their local language as the language of comfort and solidarity. This may mean that the role of national languages is undermined, because there will be no role for them to play.
- The future of foreign language teaching: Will there still be foreign language learning and teaching other than English?
- Neuro-imaging studies of second language use, learning, and forgetting: These new techniques offer very interesting opportunities to get to the basics of multilingual processing.

See also: Aging and Language; Bilingualism; Content Teaching and Learning and Language; Language Education Policy in Europe; Language Policy in Multilingual Educational Contexts; Minorities and Language; Second Language Attrition.

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Applied Linguistics in North America

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Applied linguistics has been, and continues to be, a very active academic field in North America. Over the past 30 years, applied linguistics has gained steady recognition as an academic discipline. There are more than 45 academic departments and programs in applied linguistics at North American universities, and applied linguists work in English departments, modern languages departments, education departments, linguistics departments, and communications departments. There are more than 20 national and international academic journals in applied linguistics with major contributions by North American researchers. The American Association for Applied Linguistics (AAAL) has 1500 members, and its annual meeting regularly attracts approximately 1000 participants. Large groups of applied linguists are also in regular attendance at the meetings of the Modern Language Association (MLA), Teachers of English to Speakers of Other Languages, Inc. (TESOL), and the American Council of Teachers of Foreign languages (ACTFL). Moreover, applied linguists dominate the Second Language Research Forum (SLRF) and the Language Testing Research Colloquium (LTRC) at their annual meetings. Conservatively, there are a few thousand applied linguists in North America, not counting the many thousands of second and foreign language teachers.

The AAAL is the leading organization for applied linguists in North America with strong executive board representation from both Canada and the United States. AAAL provides one fairly objective way to interpret the nature and scope of applied linguistics in North America through the categories established in their annual call for paper abstracts. This listing of categories defines the broad, inclusive nature of the field without making very strong claims to represent allied disciplines (e.g., English, rhetoric, education, communications, speech pathology). We provide a 3-year synthesis of this 'call for papers,' adjusting the list for slight variations in subfield labels that arise from year to year. It is important to recognize that these categories, for the most part, apply to second-language contexts, though many issues of language policy, language socialization, discourse analysis, and dialect variation incorporate both second and foreign language (L2) and first language (L1) situations.

1. Assessment & Evaluation
2. Bilingual, Immersion, Heritage, Minority Language Learners
3. Critical Linguistics & Language Ideology
4. Discourse Analysis
5. Language Acquisition & Attrition
6. Language, Cognition, & the Brain
7. Language, Culture, & Socialization
8. Language Policy & Planning
9. Reading, Writing, & Literacy
10. Research Methods & Applied Linguistics
11. Second & Foreign Language Pedagogy
12. Sociolinguistics
13. Technology & Language
14. Translation & Interpretation

There are, in fact, several other ways to define and interpret the field of applied linguistics. We will briefly note this debate as a way to establish the rationale for the research that we review under various categories below.

A Brief History of Applied Linguistics in North America

There have been several discussions on the origins of applied linguistics. From a North American perspective, the first use of the term dates back to the English Language Institute at the University of Michigan in the 1940s. A group of professors and language teachers wanted to be identified with scientific concepts, rather than more casual humanistic and educational approaches to language learning. From this beginning also emerged the journal *Language Learning: A Journal of Applied Linguistics* in 1948.

In the 1950s and 1960s, applied linguistics expanded considerably, along with the great increase in the number of foreign students going to North American universities to study. In the mid-1950s, the Ford Foundation, based in New York, became heavily involved in establishing centers for applied linguistics in various parts of the world including Hyderabad, Cairo, Tunis, the West Indies, and Washington, D.C. The Center for Applied Linguistics in Washington, D.C. opened in 1959. In the 1960s, the professional teacher organization, TESOL, was formed and had its first annual conference in 1966. In 1967, *TESOL Quarterly* began publication, providing a second North American-based applied linguistics journal. By 1969, TESOL began to develop interest sections. The Applied Linguistics Interest Section constituted the primary (and for a time, the sole) venue for applied linguistics activity and research in the United States.

In the 1970s and 1980s, applied linguistics underwent a maturing process in North America. The first Ph.D. program specifically in applied linguistics was offered at the University of California, Los Angeles (UCLA) in 1977, with other programs following fairly quickly. The AAAL was formed in 1977. The late 1970s and early 1980s were also a time in which many new journals appeared to support and energize the growing field, including *Applied Linguistics*, *Annual Review of Applied Linguistics*, and *The ESP Journal*. By the 1980s, the field began a series of discussions that continues even to the present, concerning the nature and status of applied linguistics (Kaplan, 1980, 2002).

Defining and Delimiting Applied Linguistics

Over the past five years, there have been a number of publications that have explored the nature and status of applied linguistics, with both North American and European emphases (Candlin and Sarangi, 2004; Davies and Elder, 2004; Kaplan, 2002; Widdowson, 2003). There is no longer serious debate about the larger interdisciplinary scope of applied linguistics, as opposed to an earlier and more limited interpretation as a designation for language teachers, language-teacher trainers, and language testers. To be sure, the fields of language learning, language teaching, and language testing are still central components in applied linguistics, but the disciplinary discussions of the 1980s and 1990s have established applied linguistics as an interdisciplinary field that addresses real-world language problems of various types.

Applied linguistics is a field that centrally involves linguistic knowledge and training. That knowledge is combined with one or two other specialized concerns and is applied to problems that arise in the normal (and sometimes abnormal) course of daily life. These problems include needing to learn and use a second or third language; being taught in an L2 in an effective manner; being assessed and evaluated in an L2; negotiating services or health care in an L2; being impacted by language policies (whether planned or unplanned) that apply in educational, institutional, civic, or work settings; needing interpreter services for various reasons; and maintaining home languages in dominant L2 contexts. These problems, and several others like them, are the core of the field of applied linguistics.

Seeing the field from the perspective of language problems makes clear the fact that no one academic discipline is going to serve the needs of people facing such problems. No person trained in education or psychology will be able to work effectively with language problems if he or she does not also have a strong grounding in linguistic knowledge. Conversely, a linguist who is not also grounded in some other relevant discipline will not be able to approach language-based problems effectively. For example, a linguist with little education/pedagogical background will not be able to address major language-learning and language-teaching issues. To solve real-world language issues requires expert knowledge across specific disciplines; for this reason, 'linguistics applied' can never be an adequate substitution for applied linguistics.

Applied linguistics, in the broader context, encompasses second language learning and teaching, language assessment, language policy and planning, language use (and misuse) in professional and occupational settings, language contact and bi/multilingualism, and translation. It is also a major contributor to research in literacy, corpus linguistics, lexicography, teacher training, and sociolinguistics. Somewhat more distantly, it has linkages to allied disciplines such as education, cognitive psychology, English studies (stylistics, rhetoric, discourse studies, and literary studies), foreign languages (discourse, culture, and literary studies), speech pathology, and communications.

The goal of representing applied linguistics in these wider terms is to establish the taxonomy of applied linguistics research that we review in the following sections. Taking a broad view not only reflects the current nature of applied linguistics, at least as understood in North America, but also ensures that the work of applied linguistics from various backgrounds is reasonably represented in our overview. In covering research work over the past six to eight years, we will use the classification given below.

1. Second language acquisition
2. L2 reading and writing research
3. Language learning and teaching
   a. Second language teaching (English for Academic Purposes)
   b. Foreign language teaching
   c. Bilingual and language minority education
   d. Instructional approaches
4. Language assessment
5. Language policy and planning
6. Societal bilingualism and language contact
7. Language use in professional contexts
8. Corpus linguistics

These categories represent the core of applied linguistics and will be the focus of the remaining discussion.

Many of these subfields are large and complex. We will provide only some insights into the work being done in these areas.

Research in Applied Linguistics in North America

Second Language Acquisition

The greatest amount of applied linguistics research in North America is done in the area of second language acquisition (SLA). Detailed coverage of this work was well represented in the recent *Handbook of second language acquisition* (Doughty and Long, 2003). There are many subfields within SLA, and there is no agreed-upon taxonomy of areas within SLA. We have organized our comments on subfields in a way that is reasonable, but we make no claims to a definitive taxonomy. We will offer only a few comments on SLA since it is already well covered elsewhere in this encyclopedia.

Cognitive SLA, as a general cover term, is by far the largest grouping within SLA. It includes all areas that see second language learning as an individual developmental process, and it explores various alternative views on how learning occurs, in both the short- and long-term. One way to divide the territory is to distinguish functional (or descriptive) linguistic orientations from formal linguistic orientations; a second way is to distinguish representational orientations from processing orientations in research.

Functional linguistic orientations include the roles of input and output in learning, of attention and awareness, of negotiated interaction, of 'Focus-on-Form' as opposed to focus on forms (standard grammar instruction), of strategies, of motivation and affective responses, of individual differences in cognitive learning traits. It also focuses on the importance of transfer in learning, the impact of the critical period hypothesis and the limits of ultimate attainment for learning (Doughty and Long, 2003; VanPatten, 2003). More formal linguistic orientations include the role of hypothesized categories and constraints on performance, the status of the initial linguistic state on learning outcomes, and the impact of specific underlying structures on learning outcomes (White, 2004).

Other subfields that have gained in prominence over the years include: sociolinguistic, sociocultural, pragmatic, social-psychological, and neurolinguistic orientations. Sociolinguistic orientations cover learner-language variability, as well as variability in the linguistic input and the influence of cross-cultural factors on language use and communication. Sociocultural factors draw heavily on Vygotskian explanations for cognitive development, examine how social interactions trigger learning, and how peers and more knowledgeable partners in interaction provide the input and support for the transfer of learning. Pragmatic perspectives focus on the role of pragmatics in language learning, pragmatic cross-cultural miscommunication, and the nature of pragmatic transfer. Social-psychological views of SLA provide a hybrid perspective on SLA, focusing on how social factors impact psychological performance and, in this case, second language learning. In the North American setting, research focuses specifically on the relation between integrative motivation and language learning, the role of instrumental motivation, and the range of wider social factors that influence language learning. Neurolinguistic explorations in SLA are just beginning, but the potential is considerable. To date, most neurolinguistic work in SLA has examined the role of motivation and affect on learning performance (Schumann *et al.*, 2004). All of the subfields noted in this section could be the source for entire books (see Grabe, 2004 for more detailed overview).

L2 Reading and Writing Research

In any general understanding of language learning, one might consider research on reading and writing development to be part of SLA. However, this subfield is treated separately in this article because reading and writing are not seen as important aspects of SLA in North America; most books on SLA do not discuss reading, writing, or literacy development. While this is somewhat odd, given the many articles related to reading and writing in journals oriented to second language learning, it is, nonetheless, the case that much of the theorizing about SLA does not specifically take into account the learning of reading or writing abilities. For this reason, we comment on L2 reading and writing development separately.

A considerable amount of research in L2 reading has been carried out on specific processes involved in reading, including word recognition, morphological processing, and sentence processing. Research over the past decade has shown that all of these processing factors strongly influence reading abilities. A second area of importance for L2 reading is the role of language transfer, demonstrating that phonological processing, morphological awareness, and reading strategies are capable of transfer, though at differing times in the development of L2 reading abilities. Other research has focused on metalinguistic knowledge, metacognition, and reading strategies, arguing that metacognitive and metalinguistic awareness play

important roles in reading development (Cohen, 1998; Koda, 2005).

Writing research in L2 contexts is an area in which an extensive amount of research is done, much of which focuses on university and pre-university student writers. Several overview volumes on writing research cover a wide range of issues, including the role of feedback and responding to L2 writers, genre influences on writing, research in contrastive rhetoric and its criticisms, the use of corpus analysis to study L2 writing, and L2 writing assessment (Ferris and Hedgcock, 2004; Kroll, 2003).

Language Learning and Teaching

The category of language learning and teaching focuses more generally on the classroom contexts in which language are taught. Under this heading, North American scholars focus on second language teaching (with a very large emphasis on English for Academic Purposes), foreign language teaching, bilingual education and language minority education, and a range of instructional approaches that take on the status and purpose of curricular approaches for teaching.

Second Language Teaching (and English for Academic Purposes) Much like research on L2 reading and writing, there is a strong emphasis in research and scholarly articles focusing on second language teaching with university and pre-university students. In the United States, some of the most popular methodology texts by North American authors address the adolescent or adult learners. Celce-Murcia (2001) provides coverage for K–12 student contexts, but the majority of the book is aimed at older students and students learning English for academic purposes. K–12 research and resource texts are regularly produced by the Center for Applied Linguistics. In Canada, the ongoing work of language immersion programs has led to much greater study of L2 learning in K–12 contexts (Swain, 2000).

Foreign Language Teaching In North America, foreign language teaching has a lesser, but still important, role to play in student education. Unlike other regions of the world, where all students are exposed to one or more foreign languages for long periods in the educational curriculum, foreign language learning is not required at all in some secondary schools; most secondary school students have three years of one foreign language. In university settings, foreign language requirements are decreasing. In Canada, with its federal bilingual policy and 20-year history of language immersion programs, there is somewhat more emphasis on learning another language. Nonetheless, there are still a large number of students learning a foreign language in both the United States and Canada. Enrollments in foreign language courses in the United States are at about the same level in 2000 as they were in 1970 (approximately 1.1 million students in university courses). Aside from Spanish, however, many traditional foreign languages are in decline (e.g., French, German, Russian), and the number of university majors in recent years has declined by one-third (Klee, 2000).

Bilingual and Language Minority Education Bilingual education in both Canada and the United States is an issue that has led to much discussion and debate. In Canada, bilingual instruction, whether as immersion or as heritage language instruction, has been more widely accepted than in the United States. Much research on bilingual instruction and second language learning has emerged in this context. In the United States, where governmental and community groups are usually less supportive, bilingual education is on the defensive. One might expect more support for bilingual and foreign language instruction in a country where approximately 18% of the population speaks a language other than English in the home. However, social and political issues drive the discussion in the United States more than do educational issues (Crawford, 2003). A large part of the discussion on bilingual education in the United States is the debate over its effectiveness on student learning. Cummins (2000) and Valdez (2001) both provided an important overview of this issue.

Instructional Approaches Second language instruction at more advanced levels or with older students usually involves either communicative language teaching approaches or more traditional language skills approaches (see McGroarty, 2004). In non-academic and adult education contexts, communicative language teaching (CLT) dominates L2 instruction. Language skills instruction, in contrast, is more prevalent in academic-purposes settings. In K–12 settings, there is also an emphasis on whole language instruction (reading authentic texts, reading extensively, no reading-skills instruction, extended writing) in many L2 classes. Over the past 10 years, there has been greater emphasis placed on learning strategy instruction, task-based instruction (TBI), and content-based instruction (CBI). These last two curricular approaches have gained popularity in North America. TBI is an easily adaptable approach for CLT curricula, and it is a preferred orientation for much SLA research. CBI introduces students to specific content material, and through learning the material, language is learned as a result. CBI draws

heavily for thematic ideas on both L1 elementary instruction and also on EAP courses in academic settings. TBI and CBI are not conflicting curricular options, but complementary ones. Both focus on meaning and conveying information; both focus on language learning indirectly as part of learning and using other information; and both have the potential to engage learners in meaningful project work.

Language Assessment

Language assessment research has been an important part of applied linguistics over the past 20 years. Several testing issues have generated much discussion over the past decade: test validity, fairness in testing, performance assessment, evidence-centered design, language-skills constructs, and technology in language assessment. Validity in language assessment gained prominence as a driving concept for language test design and use (Bachman and Palmer, 1996). Validity discussions have generated much debate over fairness in testing and ethical testing practices.

Performance assessment has been the source of much discussion (drawing on workplace performance assessment and professional licensing examinations). Performance assessment ties in closely with TBI and the need to demonstrate successful outcomes on various language tasks. Another development in language testing in the past decade has been the movement for evidence-centered design in language assessment. This approach focuses on the evidence linking the tasks used in assessment to the constructs to be assessed and the inferences made from scores given. Two further developments have been the return to language-skills assessments and the increasing use of technology in assessment. Evidence for both of these trends was seen in the assessment volumes appearing in the past five years as the Cambridge University Press assessment series (e.g., Douglas, 2000; Read, 2000; series editors, Lyle Bachman and Charles Alderson), and in the research supporting the design of New TOEFL (TOEFL Research Monographs series, 28 volumes to date, Educational Testing Service: 1995–2004).

Language Policy and Planning

Language policy and planning has been another important part of applied linguistics in North America. Included among key issues are the debates around bilingual education, the English-only movement, government language policies in Canada, and the development of models for engaging in language policy and planning activities. Canada has formal language policies and an official bilingual policy at the federal level, and the federal and regional governments provide some support for minority and heritage languages.

The United States does not have a clearly articulated language policy, and many language policy debates are not worked out through rational and planned discussions. The Ebonics debate is a good case in point. The emotional arguments over African-American dialect use in school arose in the public media, and many competing, if ill-informed, perspectives prevented any rational discussion or effective policy development from being carried out. Similarly, many versions of English-only amendments are adopted by states based on emotional and racist arguments. These examples illustrate the many unforeseen consequences of political and adversarial language policies (or perhaps, nonpolicies; see chapters in Finegan and Rickford, 2004; see Kaplan and Baldauf, 1997 for general overview).

Societal Bilingualism and Language Contact

Bilingualism and language contact situations most commonly lead to analyses of new dialect formation, as well as examinations of language spread, maintenance, shift, and death. The spread of English in North America (and elsewhere) and the growth of immigrant populations in the United States and Canada have led to analyses and overviews on language contact situations in both countries (see Finegan and Rickford, 2004). In North American contexts, it has been very difficult to reverse language shift once it has taken hold in language minority communities. Canada, Mexico, and the United States all provide strong examples of the shift from L1 to English or to Spanish. In North American contexts, several authors have argued for the need to maintain and revitalize languages endangered by major languages (Fishman, 2001). To date, maintenance and revitalization efforts have not proven very successful, though considerable effort has gone into preserving specific minority and indigenous languages.

Language Use in Professional Contexts

Important work has been ongoing in the study of language use (and abuse) in professional and academic settings. Significant work has been undertaken in legal settings, medicine, and science (McGroarty, 2002). Legal language use has focused on evidence collection and interrogation, language practice in court settings, and bilingual interpreting. In medical settings, language issues focus on gaining appropriate services and support for language minority patients; the power differentials and the conversational interactions between patient and care provider; the role of oral narrative to explain a patient's situation; a care provider's interpretations; and the formation of new

identities as a result. Research on language and science focuses on the linguistic analysis of scientific writing and scientific genres. A second line of research involves the rhetorical analysis of scientific writing.

Corpus Linguistics

Corpus linguistics has emerged as an important area in applied linguistics over the past decade. A major direction for corpus linguistics has been the use of corpora in writing grammars and dictionaries, in exploring genre and register differences, and in language teaching resources (Conrad and Biber, 2001). Corpus linguistics has been used for a variety of specific purposes: the role of discourse markers, the nature of textbook language, the role of power and status in language, the study of lexis in texts, and the selection of text segments in teaching materials and assessment tasks. These activities can be carried out through the use of large corpora or of smaller corpora collected for specific purposes. Hinkel (2002) provided one excellent example of an analysis of L2 student writing development from a smaller corpus of student texts.

Critical Perspectives in Applied Linguistics

Over the past decade, the movement toward critical theories has migrated strongly from cultural studies, literacy criticism, and philosophy into applied linguistics. At present, one can find discussion of critical discourse analysis, critical pedagogy, critical language assessment, and critical policy and planning. These trends are also closely tied to issues of identity and language learning with respect to activism for the learner perspective. Over all, there is somewhat less activity in critical perspectives in North America than in Europe, but it is, nonetheless, growing in importance. Critical discourse analysis (CDA), the earliest of the critical approaches within applied linguistics, has not gained widespread recognition in North America. Its critical orientation and political activism has not influenced the strongly functional orientation to North American applied linguistics, and its stress on scientific methods by North American applied linguists does not resonate with critical theorists coming from cultural studies and composition backgrounds.

Two lines of critical orientations have been more influential in the United States: L2 writing instruction and L2 immigrant-education teaching methods. Kumaravadivelu (1999, 2001) was one of the few North American applied linguists to draw directly on CDA to interpret and then influence teaching methods and teacher actions directly. In the area of L2 writing instruction, a number of L2 writing theorists have drawn on postmodernist theory to assert the rights of students in the classroom to their own cultural, social, and political identity. Thus, there is a movement away from more pragmatic needs analysis to a critical-pragmatic view of the teaching and learning of writing, along with activism to change what are seen as oppressive institutional structures (Benesch, 2001; Canagarajah, 2002). A major criticism of critical orientations is that they cannot generally point to better learning outcomes and more effective outcomes with respect to real world language problems. However, in the area of ESL instruction, Benesch (2001) explained a number of course curricula that engaged and challenged student learners while promoting critical agendas (see also Canagarajah, 2002).

New Trends in Applied Linguistics in North America

The field of applied linguistics is constantly evolving. Space does not permit a full exploration of these emerging trends, but they should be noted in this conclusion. Sign languages are emerging as an important area in which major language problems deserve greater attention and this trend will grow. There is now a more general recognition for fairness and ethical responses to language issues, whether the issues involve instruction, assessment, policy, or appropriate access, and this recognition will grow in the coming decade.

Additional trends in applied linguistics include the growing recognition that linguistic theories may be important for some issues, but that descriptive linguistics (including the use of corpus linguistics) contributes more widely to addressing real-world language problems. Similarly, there is a growing recognition of the importance of language assessment as a means not only to measure student development in fair and responsible ways, but also as a resource for appropriate measurement in research studies and in the development of effective tasks that influence teaching and learning.

The interdisciplinary nature of applied linguistics continually brings in further research perspectives and methodologies from related fields. The interdisciplinarity of the field, the emerging trends in the field, and the increasing specializations in the major subfields of applied linguistics, raise important questions about the training of future applied linguists. It is inevitable that applied linguists, if they are to address real-world language problems in an increasingly complex world, will need more complex and specialized

training. It may perhaps be a requirement that major applied linguistics research and application efforts involve teams of applied linguists in order to marshal the necessary resources and expertise. How the training of future applied linguists will evolve to work in these more complex environments is a significant issue that will require greater attention in the coming decade.

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Relevant Website

http://www.cal.org – Center for Applied Linguistics.

Applied Linguistics in South America

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To write about what happens in a field of knowledge like applied linguistics in South America proves to be difficult, not so much because of the geographical distance among the countries but mainly because there does not seem to exist a tradition of intensive academic interchange in this part of the world. Geographical distance itself should not be a problem in this era of Internet communication. However, within a postcolonial perspective (Hall, 1996; Venn, 2000), this lack of interchange may be seen as part of our (i.e., South American's) naturalized colonial memory in postcolonial times. Otherwise, how could one explain that whenever considering going abroad to complement one's studies, taking such a journey meant (and to a certain extent still means) going North? Or how could one explain that many a time, it may be easier to find out about research being developed in the countries which constitute South America in conferences either in the United States or in Europe rather than in South America itself? In other words, each country seems to look 'North' instead of looking 'South' where our nearest and farthest neighbors are. This distinction between North and South (the ideological vision of the northern and southern hemispheres) is used here, as suggested by Santos (2004), the South being a metaphor for the consequences of capitalism and globalization to mankind.

To gather information about South American Applied Linguistics, to get a glimpse of the area on the continent, the first move was to go through an Internet search of universities and/or research institutes that listed Applied Linguistics as keywords. The second move was to look for journals in South America.

The first move resulted in a few references to university courses in Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, Venezuela, Uruguay, and Brazil and to one research institute in Argentina. (Quite a few language schools also came out in the search but were discarded, as the focus here is on research studies.) As it can be observed, the search left out countries such as Paraguay, Guyana, Surinam, and French Guyana. Another observation is that apart from Brazil, there was no mention of the theses and dissertations produced. Considering that the information available through the Internet depends on continuous feeding, no expectations were built that the search would be exhaustive or that it would reflect the state of the art in Applied Linguistics in South America. In any case, the first impression developed from this search was that Applied Linguistics is strongly taken in relation to the teaching of foreign languages. However, it should be recorded that there are also some applied linguistics links to translation studies, the teaching of Spanish as mother tongue, and bilingual studies, including language planning and language policy.

The second move resulted in only one potentially relevant URL (see the Relevant Websites section of this article). Having as a title *Latin America: subject resource*, the site describes itself as a 'Latin American–based resource interesting and useful as a Reference Librarian.' It has a link to the Association of Research Libraries Project, whose first item is the 'Latin American Periodical Table of Contents (LAPTOC).' However, closer scrutiny showed very general information about journals in South American countries. For example, there was no mention of specialized journals in Applied Linguistics in any country, not even in Brazil. Elsewhere (Cavalcanti, 2004), there is reference to seven Brazilian Applied Linguistics journals, four with AL as part of their titles. A more general list of journals, including Linguistics, Applied Linguistics, and Literature, can be found at the website of the Commission for the Upgrading of University Graduate Level Personnel (CAPES), Brazil.

Previous to the Internet search, a few publications on or related to Applied Linguistics had already been gathered and examined. These publications, which either have Applied Linguistics as part of their titles or which have chapters that can be placed in this field of knowledge, are examined below under two subtitles chosen to indicate whether they were published in or out of South America. As to be expected, they are also a very relevant source of other references to be pursued.

Some Publications in South America

This section includes publications originating in isolated countries in South America as well as publications which, although from single countries, have some micro or macro representation of countries in the continent. The micro representations refer to the ones that gather scholars within geographical delimited regions, as Jung *et al.* (1989) and López (1988) both in the Andes, and the macro representations indicate the attempts to put together scholars from different regions on the continent.

Three books published in Peru in the late 1980s, i.e., Jung, Urban, and Serrano (1989), López, Pozzi-Escot,

and Zuñiga (1989), and López (1988), focus on issues relevant to two related subareas of Applied Linguistics, namely indigenous bilingual education and language policy/planning for bilingual and monolingual contexts. The first and the second include Applied Linguistics in their titles: *Aprendiendo a mirar: una investigación de lingüística aplicada y educación* and *Temas de lingüística aplicada – primer congreso nacional de investigaciones lingüístico-filológicas*. In the first, Jung, Urban, and Serrano (1989), reported on the educational aspect and on research work developed in the well-known Puno Project, a bilingual education program in Peru. The second, López, Pozzi-Escot, and Zuñiga (1989), focused on monolingual and bilingual contexts in Peru with sections on language planning and policy. The third, Lopez (1988), collected papers on bilingualism and bilingual education. As Lopez (1988: 8) emphasized: "Pocas son las instituciones que aceptan y asumen la pluralidad lingüística y cultural del país. Resulta significativo la desatención secular de la población indígena . . ." [Few institutions accept and assume the linguistic and cultural plurality of the country. The result is the century long lack of attention towards the indigenous population . . .]. (Ten years later the same can be said about Brazil, as put forward by Cavalcanti, (1999: 387): ". . . there is a myth of monolingualism in the country . . . [which is] efficient to invisibilize minorities, for example, the indigenous groups, the immigrant communities . . .")

Also with a focus on bilingual education but covering a wider scope (see also Cavalcanti, 1999) ranging from elite bilingualism through deaf people's schooling to minority bilingualism, Mejía and Tovar (1999) edited a publication in Colombia. Curiously, there is no mention of Applied Linguistics in the chapters written by Colombian scholars. (Two chapters only are from non-Colombians, one of them by a South American.) In other words, many of the chapters in the publication could belong to an Applied Linguistics collection, and this state of affairs brings in an argument that people do AL after all but do not call themselves applied linguists.

It is important to emphasize that the publications above are portraits of specific locations in Spanish-speaking South America. It would be no different if some Brazilian publications were to be listed (see for example, Bohn and Vandresen, 1988; Paschoal and Celani, 1992; Signorini and Cavalcanti, 1998; Leffa, 2000). These books contain mainly reports of research undertaken in Brazil. It should be added that if they do have chapters from foreign scholars, they are ones from 'the North.' Some of the chapters in these books address epistemological issues in Applied Linguistics.

Besides local publications, there are ones that originated in one country but contain works by representatives from other countries, as for example, Trindade, Behares, and Fonseca (1995), Seki (1993), Zuñiga *et al.* (1987), *Trabalhos em lingüística aplicada* [Works in Applied Linguistics] (1989), *Anais da IX ALFAL* [Proceedings of the IX Congress of the Association of Linguistics and Philology of Latin America] (1992). All of these, with the exception of Trindade *et al.* (1995) are proceedings of (inter) national conferences. It should also be observed that only one of these publications is within the area of Applied Linguistics. The others come from Linguistics and Education (Trindade *et al.*, 1995), from Linguistics with some papers in Applied Linguistics (Seki, 1993), from Linguistics and Philology with a section in Applied Linguistics (*Anais da IX ALFAL,* 1992), from Education (Zuñiga *et al.*, 1987). These publications have chapters focusing on literacy, language education, language planning, language policy, mother tongue education, foreign language learning – that is, in subareas commonly found in Applied Linguistics publications.

It should be pointed out that in all of the publications above, (with the exception to the first one (Trindade *et al.*, 1995), which focuses on joint research developed by scholars from Uruguay and Brazil), the preferred reference seems to be Latin America and not South America. Actually, it is difficult to limit one's eye to South America when it is the adjective Latin that appears to have been the point of convergence in Latin America as seen below.

Four Publications outside South America

In the publications selected for this section, three focus on Latin America and one on the Americas. They all either have a special section on South America or include South American contributors.

The first publication presented, the fourth volume of *Current trends in linguistics*, published in the late 1960s, has a historical value regarding Applied Linguistics in its initial stages in the continent. The volume, which has a survey report on 'Foreign language teaching in Latin America,' was written by Gomes de Matos and Wigdorsky (1968). The survey is very comprehensive regarding South American (and also Latin American countries) and is in line with the equation Applied Linguistics equals foreign language teaching, which was current at the time.

With a gap in the 1980s, the reader is invited to land on the 1991 special issue on *Políticas del lenguage en América Latina* [Language policies in Latin America] of *Iztapalapa*, a journal from the area of social sciences published in Mexico. The issue puts

together linguists, applied linguists, and social scientists from Argentina, Brazil, Peru, and Uruguay, and also from Mexico and Canada.

Then, there is a jump to the 21st century with two publications, one from North America about the Americas, i.e., Hornberger (1997), and the other from Latin America (Mexico), i.e., Curcó, Colín, Groult, and Herrera (2002).

The focus of Hornberger (2000) was the indigenous literacies in the Americas, with a specific section on South America. The South American countries represented are Peru, Ecuador, Bolívia, i.e., Andean countries. The emphasis in this case is on indigenous contexts, as in some books already mentioned (Lopez, 1988; Jung *et al*., 1989). Actually, it should be noted that studies on indigenous contexts seem to be a strong point of convergence among South American (and also Latin American) scholars, as it can be seen in publications such as Seki, (1993) Zuñiga *et al*., (1987), *Trabalhos em lingüística aplicada* (1989: 14), and *Iztapalapa* (1993: 29).

The second publication from the 21st century came out in Mexico, a Latin American country that was originally set out of my scope of South America. However, the country seems to be the focus of interaction between South American countries like Brazil, Uruguay, Argentina, Bolivia, Peru, Ecuador, and Colombia, to mention a few. Brazil and Mexico, for instance, have had a long time partnership in matters of Applied Linguistics, which includes exchange of scholars and students and conference participation. Actually, conferences in Mexico seem to have been a place of academic encounter for South American scholars.

It should be emphasized that Mexico has thus pioneered getting together Latin American scholars, out of a conference context, in an assumedly Applied Linguistics publication: Curcó, Colín, Groult, and Herrera (2002): *Contribuiciones a la linguistica aplicada en América Latina* [Contributions to Applied Linguistics in Latin America]. When comparing the contents of this book, with its South American bias, with the results from the initial Internet search, two things are of note: a) that the list of countries represented, be they the contributor's place of work or place of origin, was very close to what came out of the Internet search (see above): Argentina, Brazil, Chile, Colombia, Peru, Venezuela, and Uruguay; and b) that the coverage of Applied Linguistics subareas was more pervasive than in the Internet search, i.e., beyond the strong focus on foreign language learning, there were contributions from South American authors under the following headings: mother tongue learning; teacher education; bilingualism, minority languages and language policy; contrastive analysis; interaction and discourse analysis in the Anglo-Saxon tradition. It should be highlighted that in this collection of papers, there is an addition of the subarea of minority languages in bilingual contexts, for example, indigenous communities (Brazil) on the one hand and deaf people (Colombia) on the other hand. Furthermore, Psycholinguistics and Sociolinguistics are also presented as Applied Linguistics (within the view of application of Theoretical Linguistics). However, this same book has chapters whose authors (Moita Lopes, 2002; Kleiman, 2002; Gabbiani, 2002) hold other views of Applied Linguistics, i.e., including that of another area of knowledge (Cavalcanti, 1999, 2004).

The Path of Applied Linguistics in South America: The Shadow Metaphor

A chapter by Gabbiani (2002), in the above mentioned Curcó, Colín, Groult and Herrera (2002), is the departure point for this section. In the chapter with a thought provoking title: 'Linguistica aplicada en Uruguai: trayectoria de una existencia anonima' [Applied Linguistics in Uruguay: The journey of an anonymous existence], the author (2002: 431) states:

> . . . the lack of a team of researchers who exchanged ideas about the theme and a strong positioning against the term applied linguistics resulted in the option of not using it. This way the investigation in this area remained concealed (one could say 'anonimized' . . .). I insist that this does not mean that this investigation does not exist. [Article author's translation of Spanish quotation. As an example of research developed in Uruguay, see Behares, 1982 and Gabbiani, 1994]

The journey of Applied Linguistics in Uruguay raises the question that perhaps the field has an anonymous existence not only there but also in the other South American countries. Nevertheless, to be fair to the diversity of approaches that may describe Applied Linguistics in South America, I would extend Gabbiani's metaphor of anonymity to a shadow metaphor. This extension would mean that to work in the shadow would encompass other situations besides the one pointed out by Gabbiani. In other words, the anonymity in Uruguay is related to doing AL within other disciplines when AL is not a preferred term. However, in other countries in South America, the work in AL may also be done in the shadow when researchers do not assume themselves as applied linguists and when they do AL under the label of other disciplines that they see as more prestigious. It should also be noted that even when we researchers position ourselves as applied linguists, we may also comply with working in the shadow when we take time to publish our research work within a very inefficient system of

circulation and distribution of publications outside (and sometimes inside) our own countries, when we all comply with little academic interaction among AL postgraduate programs, when the university websites are not updated to include new theses and dissertations immediately after they are approved, when there is lack of financial support for research and circulation of research results. In other words, what I mean by working in the shadow is related to the invisibility of the area of Applied Linguistics and therefore to the difficulty in getting information about the research work carried out.

About Brazil, an observation has to be made about the route of Applied Linguistics where the shadow metaphor would only be partially applicable. As I mention elsewhere (Cavalcanti, 2004: 27; Gabbiani, 2002), Applied Linguistics is a consolidated field of knowledge in the country:

> ...the late nineties indicate a consolidation of applied linguistics as an area of knowledge of its own [in Brazil]. This is reflected in the growth of research (see Leffa, 2000), publications and in the presentation of results in national conferences, in the recognition of the area by funding bodies, and in the evaluation from within the area which came out in papers (Celani, 1992; Kleiman, 1992; Moita Lopes, 1994; Signorini and Cavalcanti, 1998). Undoubtedly a consequence of the growth of human resources formed in the postgraduate programmes in the area, the growth of research was also shown in the submission of proposals to the national funding bodies and in the participation of scholars in academic forums.

The partial application of the shadow metaphor in the case of Brazil is related to some researchers carrying out AL research in other more prestigious areas like theoretical linguistics studies, thus not assuming themselves to be applied linguists, which may be an indicator of the importance given to Linguistics, Applied Linguistics thus occupying a subordinate position. The partial application may also be related to researchers complying with an inefficient system of distribution of publications and to the small interaction among postgraduate programs, which results in a poor circulation of information about theses and dissertations produced.

One last point in this section is illustrative of the point made about theses and dissertations written in Brazil. Both could be seen as additions to Trindade *et al.* (1995), the only case of crossborder publication in the references cited in the previous section. One, Orlando (2001) led to an M.A. thesis and the other, Pires Santos (2004), to a Ph.D. dissertation. Orlando focused on Brazilian university students learning Spanish as a foreign language in Uruguay, and Pires Santos looked at a minority context in Brazil, i.e., the *brasiguaios*, Brazilians who go to Paraguay in search of a better life and end up returning to Brazil. Other works like these are in the shadow, and sometimes may take a long time to surface.

Final Remarks

Although there is an AL movement in South America, the surface is hidden away by lack of academic interchange, be it in conferences, be it in the spreading of local publications, be it in the access to theses and dissertations. AL studies in the different countries in South America, Brazil excepted, are developed in other fields of research, for example, in education and in anthropology (See, for example, *Lenguas aborigenes de Colombia – memorias* [Aboriginal languages in Colombia: Proceedings 3, VII Anthropology Conference], 1995); or other departments such as Linguistics or Languages, by researchers who do not necessarily see themselves as applied linguists. Hence again the shadow metaphor represents Applied Linguistics in South America.

The field in this location seems to have found more room to consolidation (Cavalcanti, 2004) in Brazil (and in Latin America, Mexico would have to be included) within at least two views of AL, a field of knowledge in its own right and a locus for applying linguistic theories. The other countries in South America, as of today, apparently favor theoretical linguistic studies. Nevertheless, within publications in the area of theoretical linguistics, for example, it is possible to identify chapters reporting studies that could be placed within these different views of Applied Linguistics.

What theme or themes may be convergent in attempts to establish academic interchange? The answer to this question may be given from at least two different standpoints.

One of these views is within the Mercosul/Mercosur, the South American Common Market, which only includes Argentina, Brazil, Paraguay, and Uruguay, and has shown that job opportunities signal that people should know Spanish/Portuguese. In that case, research on language teaching and learning regarding Spanish and Portuguese are on the agenda. Actually, Spanish and Portuguese as foreign languages have been one point of convergence among teachers and researchers mainly in the countries that are part of the South American Common Market. However, publications that gather researchers from these different countries and record efforts made towards, for instance, reporting research in the area in South America, seem to be rare. Two publications should be mentioned here, Gabbiani (1995) and Almeida Filho (1995). Gabbiani (1995), is an article

in a conference proceedings and focuses on the teaching of Spanish and Portuguese as foreign languages in Uruguay. The other is a publication edited by Almeida Filho (1995) that puts together research on the teaching of Portuguese for Spanish speakers. The latter only has contributions from Brazilian scholars except for one chapter from a Mexican researcher.

The other view is related to the social problems the countries share in the 'South.' Among these problems, there are certainly many convergent issues that are potentially relevant for applied research. These issues range from literacy in urban and non-urban (rural and indigenous) contexts, for example. Within these contexts, there are a number of subcontexts. Just to name two: deaf people and schooling; and indigenous peoples and teacher education. Therefore, the publications' references to the indigenous populations may not have been gratuitous. Looking at the field of AL from within South America, there is an urgent need to establish partnerships in this South, to learn from and to exchange experience with one another.

See also: Bilingualism; Discrimination and Language; English in the Present Day (since ca. 1900); Ethnicity; Identity and Language; Language Education Policy in Latin America; Language Ideology; Language Politics; Linguistic Decolonization; Minorities and Language; Politics, Ideology and Discourse; Portuguese; Spanish.

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Applied Linguistics in South Asia

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Introduction

In the context of South Asia, applied linguistics can be defined as an area of activity pertaining to language-related concerns that go beyond the study of the forms and functions of language for their own sake. The discipline has developed new perspectives and frames of reference for various areas of language-related concerns, including language teaching, stylistics, literacy, translation, lexicography, language policy, and computational linguistics. Applied linguistics provides help to those who are in need of such new knowledge in their language-related practices. Although it is true that applied linguistics presupposes a knowledge of linguistics, it is also true that applied linguistics helps in developing linguistic theory. It does this not only by providing insights from other disciplines, but by also providing new and challenging data. The increasing scope of applied linguistics can be recognized from the presidential address delivered by Dwight Bolinger to the Linguistic Society of America on December 28, 1972 in which he stressed the fact that while subjects and verbs agree, linguists should also deal with the questions of whether statements and facts agree. Once we

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move in this direction, the 'big lie' becomes the proper object of study for linguistics – and a necessary one, especially when lying is cultivated as an art by governments, politicians, journalists, writers, and even linguists (Bolinger, 1973). In a similar context, Srivastava (1990: 11) in his 'Address to the Indian Linguists' viewed applied linguistics as a "socially meaningful academic activity, since here linguists are called to utilize their knowledge and skill to reveal the implicit assumptions made by speakers for the benefit of common users." This brings applied linguistics right into the center of language-related social concerns. The scientific perspective of linguistics, it is believed, will help in solving language-related social concerns.

Applied Linguistics in the Subcontinent

The term 'applied linguistics' came into use in the late 1940s and in the 1950s in both Britain and the United States, where it initially referred to the teaching and learning of second or foreign languages. However, it got prominence in India through the Linguistic Society of India (formed at the Fifth Oriental Conference held at Lahore in 1928 with its first journal, *Indian Linguistics* (*IL*), which commenced publication in 1931). In pre-independence and undivided India, the activities of the Society were mainly centered on descriptive and historical linguistics. Major activity in the growth of linguistics as an independent discipline began in 1951 after the meeting of the Society at Deccan College in Pune. Since the English language was supposed to cease functioning as the official language of India in January 1965, the meeting identified the fundamental need to apply knowledge of linguistics for the solution of the related problems of communication and for the development of regional languages. Subsequent political developments led to the amendment of the Constitution in 1967, whereby English was declared the "associate official language," which it continues to be until today. The Summer Institutes in linguistics came into existence in 1954, and departments of linguistics began to be set up in Indian universities (the department at Calcutta University was established in 1920). Linguistics as a major discipline was taught in 14 universities by 1982; the number rose to 20 in 1992, and today it is around 32. Applied linguistics is a major component of these programs.

Major publishing of works about applied linguistics began with *Some aspects of applied linguistics* by D. P. Pattanayak (1969) and *Aspects of applied linguistics* by A. M. Ghatage (1970). The Dravidian Linguistics Association was formed in 1971, and the first issue of *International Journal of Dravidian Linguistics* (*IJDL*) appeared in January 1972. With a high demand for publications in applied linguistics, Ujjal Singh Bahri founded the *Indian Journal of Applied Linguistics* (*IJOAL*) and the *Language Forum* (*LF*) in 1975. The biannual *South Asian Language Review* (*SALR*) under the editorship of O. N. Koul began publication in January 1991. While *IL, IJDL*, and *SALR* publish papers on theoretical as well as applied linguistics, the *IJOAL* caters only to applied linguistics, and *LF* publishes papers on applied linguistics and on literary studies. At present, there are a number of other significant publications, including *CIEFL Bulletin, Osmania Papers in Linguistics, The Yearbook of South Asian Languages and Linguistics, Psycholingua*, and *Applied Linguistics*. The creation of the Central Institute of English and Foreign Languages (CIEFL) in 1958, the Central Hindi Directorate (CHD) in 1960, the Central Hindi Institute (CHI) in 1961, and the Central Institute of Indian Languages (CIIL) in 1969 have further strengthened the work on applied linguistics through research and publications. The robustness of the field can also be seen in the numerous publications of Sage Publications, Bahri Publications, Creative Publications, Oxford University Press, and the CIIL. The range of publications on applied linguistics shows that the discipline initially equated with language teaching and language learning has expanded in scope to include other issues as well as issues related to multilingualism, language planning, language contact studies, second language acquisition, stylistics, translation studies, language disorders, and computational linguistics.

Multilingualism and Language-Related Concerns

South Asia provides a unique instance of the fusion and diffusion of linguistic traits across genetic boundaries between speakers of various Aryan, Dravidian, Austro-Asiatic, and Tibeto-Burman languages. As such, it leads to what Emeneau (1956) describes as the genesis of India, or even the whole of South Asia, as a 'linguistic area.' This linguistic area not only has common linguistic traits but also common sociolinguistic traits (Pandit, 1977). The sociolinguistic facts of South Asia can be different from those of countries in the west, e.g., Pandit (1977: 9) observes that second-generation speakers in the west give up their native language in favor of the dominant language of the region, showing thereby that "language shift is the norm and language maintenance an exception," while in South Asia, "language maintenance is the norm and shift an exception." Scholars like Pandit, Kachru, Srivastava, Pattanayak, and Khubchandani have tried to understand the multilingual and

pluricultural nature of the subcontinent, with its mosaic of linguistic heterogeneity and cultural complexity. They found bilingualism and multilingualism to be the natural state of verbal behavior and reacted sharply to earlier Western interpretation of bilingualism as a symbol of poverty and discrimination (see Pattanayak, 2004: 44–54). It may be appropriate to say that speakers in South Asia are endowed with a 'multilingual communicative competence.' Scholars have pointed out that the language ecology of the subcontinent consists of grassroots bilingualism. In this language situation, each major language acts merely as a link language; the linguistic reorganization of states converted the link languages into dominant official languages, i.e., languages of political power and prestige. As dominant languages, they begin to block upward social mobility of the members of other speech communities. This blocking sometimes creates major intergroup rivalries and language movements such as the one that led to the breakup of Pakistan in 1971 into Pakistan and Bangladesh. Other examples include the division of the Indian state of Punjab into Punjab and Haryana or the ongoing Tamil-Sinhala conflict in Sri Lanka. The linguists of the subcontinent, through application of their knowledge, have been able to understand the language-related problems of the subcontinent. Linguists have examined issues related to language policies and language in education, language teaching, language in contact situations, stylistics, translation studies, psycholinguistic issues related to language disorders, and so forth.

Language Policies: Scheduled and Nonscheduled Languages

The South Asia region, with minor variations, shows the hierarchical relationship between languages as established by language policies. This asymmetrical relationship leads to the empowerment of some languages at the expense of others. The cases of India and Pakistan can be taken as instances.

The Indian Constitution, adopted in 1950, recognized the multilingual nature of the nation and listed 14 languages with distinct literary traditions in its Eighth Schedule. These are termed 'scheduled languages.' The number of languages was increased to 15 in 1967, to 18 in 1992, and to 22 in 2004. Other languages are actively seeking to be listed as well, because of the political and economic benefits that accrue to speakers of scheduled languages.

The 1991 census lists 96 nonscheduled languages. Aside from Arabic, English, and Tibetan, there are 90 tribal languages that are distributed in the four language families of Indo-Aryan, Dravidian, Austro-Asiatic, and Sino-Tibetan (for details, see Khubchandani, 2001: 1–47). There is a fear that due to lack of support and due to apathy of the users, some of these may face extinction like Gutob and Bonda appear to have (Pattanayak, 2001: 48–49).

Tariq Rahman's (2003) paper reveals a similar situation in Pakistan. Pakistan has six major languages and over 59 minor languages in its multilingual profile. The policy of the state favors two languages, Urdu and English. Urdu is claimed by only 7.57% of the population as mother tongue, and it is projected as a symbol of ethnic identity. English is made to represent modernization and efficiency. These factors are leading to language shift, and languages like Aer (200 speakers reported in 1998), Gowro (200 speakers reported in 1990), Kundal Shahi (500 speakers reported in 2003), and others appear to be on the verge of extinction. Linguistics can help focus on the state of linguistic human rights in the region and suggest means of empowerment of minority languages.

Language and Education

The domain of education poses the greatest challenge for applied linguistics in the post-colonial phase of multilingual South Asia because of the role of English in affecting education and education policies.

Language and Educational Policy

Post-colonial South Asia had initially wanted the dominant regional languages to take over the function of education from the English language. Due to language confrontations and lack of political will, English has continued to be an increasingly potent medium of instruction in the countries of the region. For example, in India there have been numerous deliberations regarding the study of language at the school level as well as at the higher levels of education. Keeping in mind the multilingual profile of the country, the Central Advisory Board of Education (CABE) proposed the 'three language formula' for the Indian education system in 1957. It was formalized by the (Kothari) Education Commission (1964–6) (for extracts and recommendations, see Aggarwal, 1993: 175–193). Under this formula for school education:

- The first language to be studied must be the mother tongue or the regional standard.
- The second language:
  (i) In Hindi-speaking states, will be some other modern Indian language (MIL) or English

(ii) In non-Hindi-speaking states, will be Hindi or English.

- The third language in Hindi-speaking states will be English or an MIL and in non-Hindi-speaking states English or Hindi, i.e., a language not studied as the second language earlier.

The implication of this formula has been that while the teaching of the first language commenced from Class I, the teaching of the second language was recommended from Class VI or a bit earlier, from Class III, or at a convenient stage depending upon the resources of a state. The third language was also recommended to be taught from Class VI (for details, see Gargesh, 2002: 191–203). Since education is a subject under the state governments and not under the central government, the actual implementations have varied from state to state. However, presently there is an increasing trend toward beginning the teaching of English as a subject from the earliest possible class in schools.

Further, the three-language formula has created a situation where a child belonging to a linguistic minority may have to forgo instruction in the mother tongue due to lack of resources or infrastructure. The formula does not do justice to thinly spread out minorities. Further, as one goes higher on the educational ladder, only major languages are studied, while finally at the top (for science and technology) there is only English. Although there is space for English in present-day India, Agnihotri (2001: 187) rightly bemoans that "this space has largely been used to create a divide in society. The acquisition of English by a small elite and rich minority helps it to consolidate its power and perpetuate injustice and exploitation in society." The situation in Pakistan (Rahman, 2003: 4) and in Bangladesh (Shahed, 2001: 8–9) is similar. However, given the fact that the demand for education delivered in English is increasing, scholars have reviewed its role as well as the state of its teaching. What can be said of India is more or less representative of the whole of South Asia.

Role of English in Multilingual South Asia

Various conferences and committees have grappled with the question of English as a foreign language, library language, link language, second language, Indianized language, and so forth. The role assigned to a language reflects several implicit assumptions about the kind of bilingualism and the kind of language teaching that is required. Srivastava (1994: 94) identifies four distinct functional roles for the Other Tongue (OT):

a. Auxiliary Function: The OT is used for the sake of gaining knowledge rather than for communication. The learning of classical languages serves such an end, which produces 'passive' bilinguals.
b. Supplementary Function: The OT is used occasionally and sporadically for fulfilling the restricted needs of tourists, diplomats, and so forth. This creates 'partial' bilinguals with partial competence in the target language.
c. Complementary Function: The OT complements the first language when it is habitually used in restricted but well-defined sociological environments. This creates 'stable' bilinguals with partial competence in the target language.
d. Equative Function: The OT can be said to be equative when it is employed as an alternate language in all domains in which the first language is used. Such a situation creates 'ambilinguals.'

Elsewhere, Srivastava (1994: 297) looks at these functions in relation to the variables 'language type,' 'bilingualism,' 'bilingual,' and the 'teaching method' required as shown in Table 1.

English, due to its widespread use in the media and education, is largely a second language in South Asia. However, the teaching of English is not effective and lacks direction. Nonetheless, significant steps have been taken toward changing that.

Language Teaching in South Asia

Within South Asia, some changes in the teaching of English have emerged from the disciplines of linguistics and applied linguistics. The initial changes at an all-India level and their failure are reported in three documents: (1) *The Teaching of English in India* brought out by the National Council for Educational Research and Training (NCERT), Delhi, in 1963, (2) *The Study of English in India* brought out by the Ministry of Education, Government of India,

Table 1 Functional roles of the Other Tongue (OT) – a slightly modified version

Function	*Auxiliary*	*Supplementary*	*Complementary*	*Equative*
Language	Library language	Vehicular language	Link language	Alternant language
Bilingualism	Cultural	Isolated	Societal	Equative
Bilingual	Passive	Unstable	Stable	Ambilingual
Teaching method	Classical language	Foreign language	Second language	Bilingual education

in 1967, and (3) CBSE-ELT Project (1989–97), a report prepared by the *Central Board of Secondary Education* (CBSE), Delhi.

The first two reports inform us that initially in post-independent India, there was a shift from the grammar-translation method to the 'direct method.' This change resulted in an anomalous situation in which grammar ceased to be taught in the classroom. Oral drills, which were devised to replace the teaching of formal grammar and to habituate the learner to correct usage through actual practice, were not widely adopted. What remained of the teaching method was only the reading and translation of the prescribed literature-oriented textbook. To both meet the long-standing demand for making classrooms significant learning sites and reorient pre-service and in-service teacher training, the CBSE (in the third report) engaged in a major curriculum renewal project, CBSE-ELT Project (1989–97). The Project received British assistance through the British Council in India. The result was a new syllabus for Classes IX and X. The syllabus had a focus on the development of language skills in communicative situations and became a model for other boards of education in other parts of India. The problem generally confronted today is that students score well in exams but are not able to write a high-quality, lengthy discourse in English. Since the pedagogy employed in the teaching of English has also been a model for the teaching of other Indian languages, the future role of the applied linguist will always remain highly significant.

Research Related to Language Learning and Acquisition

Much research in the areas of applied linguistics in the 1960s and 1970s in South Asia focused on contrastive analysis and error analysis, which invariably involved English and a South Asian language. With the increase in focus on the Chomskyan paradigm, work also began to shift into the area of second language acquisition, where the role of applied linguistics was restricted to the validation of linguistic theory or (at best) helping to extend the database against which linguistic theory could be tested (Singh, 1991: 5–15). This led to an interest in the study of interlanguage and in identifying strategies that second language learners use in their communication (Singh, 1991: 17–38). The emphasis on theoretical aspects can be seen in a number of doctoral dissertations at the CIEFL Hyderabad that focus on the differences between a South Asian language like Hindi (or Malayalam, Telugu, Kannada, Oriya, Nepali, and so forth) and English, in terms of syntactic or phonological structures with "the larger vision of universal grammar, which renders all languages (past, present and future) equally possible" (Amritavalli, 2001: 245).

Another area of research has been the attitudes towards second language acquisition. The South Asian experience reveals that a second language like English is learned and is considered significant in the region not because of an 'integrative' function but largely due to the 'instrumental' function. It is a means for enhancing social mobility and individual personality (Agnihotri and Khanna, 1997: 85), and for providing better education and more information (Abbi *et al.*, 2000: 20, 22). The findings are similar for Pakistan (Mansoor, 2004: 355) and Bangladesh (Shahed, 2001: 131, 135).

Languages in Contact

The area of languages in contact in South Asia has also emerged as an important area of applied linguistics. This is because it is here that we find linguistic implications relating to economic, socio historical, and political factors. The study by Gumperz and Wilson (1971) of language use in Kupwar, a small Indian village on the border of Kannada (Dravidian language) and Marathi (Indo-Aryan language), reveals that the communicative needs of the people have led to a merging of the grammars of three languages: Kannada (used by Jains), Urdu (used by Muslims) and Marathi (used by the lowest strata). Some more recent work in the area covers languages used on the tea plantations of Assam and other contact languages like Silchar Bengali, Nagamese, and Sadri. Indian English and any other New World English could also be situated in similar circumstances. An interesting case is that of Nagamese, a variety that has come up as a code for interlingual communication among different linguistic groups of the Nagas in Eastern India. While Satyanath (1999) examines the Pidgin/Creole characteristics of the language, Kapfo (2001: 155–169) identifies the variety largely as a language of wider communication among the uneducated, with the educated using it mostly in ordinary domains like the marketplace. The work on contact languages addresses the questions of the sources of the lexicon and grammar, and the role of the processes of second- and first-language learning. The work also raises linguistic questions about the stripping of inflectional morphology and other complexities, which results in simple grammars, or about understanding how linguistic variation in such contact languages generates polylectal grammars.

A related area of great interest within the domain of contact languages has been South Asian English, a variety of English that takes into account Indian,

Pakistani, Sri Lankan, Bangladeshi, Nepali, and Bhutanese Englishes. In the context of India, Kachru calls the convergence process 'Indianization' (Kachru, 1983). While most work has been on the phonology and lexicon of these varieties, work on the presence of syntactic forms, such as on the use of the progressive verb for the nonprogressives used elsewhere, the use of reduplicative forms, the frequent use of the *isn't it*? in tag questions, and the peculiar use of negations and so forth, have been enumerated by Kachru (1965), Verma (1978), and Aitchison and Agnihotri (1994), and others. Kachru (1994) looks at the varieties of language in terms of configurations of discourse strategies in larger pragmatic and cultural contexts, e.g., a discourse strategy of South Asian writing is the 'mixing of styles' such as the 'ornamental' with 'impersonal' in expository prose.

Stylistics and the Teaching of Literature

Another significant area of research in applied linguistics on the subcontinent has been the domain of stylistics, which is largely viewed in terms of a linguistic approach to the study of literary texts. Its popularity can be gauged from the fact that the inaugural issue of the *Indian Journal Of Applied Linguistics* (*IJOAL*) (1975) was devoted to it. This was in tune with the major concern at that time: making literary studies more objective, scientifically rigorous, and language-oriented. This was necessary because the field was full of subjective and arbitrary studies. The application of linguistics to literary texts was seen as a challenge to the discipline of linguistics which had by and large shied away from literary data. Because all literature is manifested **in** and **through** language, it was felt that there was no need to draw a dividing line between the literary and the linguistic functions. From the first issue of *IJOAL* until now, much work has been done in the area of stylistics.

The work on stylistics, though varied, has largely been semiotically oriented. Some scholars, under the influence of Bloomfield, Hockett, and others, studied linguistic structures at the different levels of language organization (Kumar, 1977), while others linked linguistic structures to the aesthetic function (Prakasam, 1982). The work of Prakasam and his research students is largely within the Hallidayan 'systemic' model. However, a broad semiotic perspective emerged during this time that looked through language and concentrated more on the matrix of the sign, adopting both verbal and nonverbal sign systems as the axis of text production. Under the influence of Propp, Levi-Strauss, Barthes, Derrida, Benveniste, and so forth, three distinct semiotically oriented approaches were formulated on the subcontinent: Gill's 'anthropological semiotic' approach, Kelkar's 'semiosis' approach, and Srivastava's 'semiolinguistic' approach.

Gill's 'anthropological semiotic' model is motivated by the writings of the French structuralist school. He has applied his model to the analysis of legends, folk-tales, and literary works. In his *A phulkari from Bhatinda* (1981), Gill has attempted to explore the symbolic structure of Punjabi consciousness by integrating the symbolism of ritual life and the oral tradition of Punjabi folklore. He posits three distinct levels in the structuration of literary discourse: semiotics, semiology, and mediation. His first level follows the normal grammatical organization of a text, and syntactic devices of signifiers control the literary significance at this level. It is only at the plane of content that semiological significances emerge. At the second level of literary discourse, the semiological patterns are discerned through the analysis of the interplay of the psychic components of each human situation centering on a fundamental problematic or tension. The third level, mediation, emerges from the field of pragmatics, with significance coming into being from the associated field of ideology. Gill's approach is quite productive and provides fresh impetus to the study of enunciation and semantics of folklore and literary works.

Kelkar's 'semiosis' approach offers a very complex frame of reference. In his paper, 'The being of a poem' (1969), he examines, in relation to the concept of being, the capacity of a literary work to make its existence felt. In another paper, 'Some notes on language and literature' (1970), he puts forward his concept of literary style in verbal art, which for him "is the transformation of the material object (e.g., linguistic text) into the total work of art" (1970: 75). Kelkar is essentially motivated to promote the integration of linguistics, stylistics, and cultural anthropology into an overall framework of communication. In his monograph, *Prolegomena to an understanding of semiotics and culture* (published by CIIL, Mysore, in 1980), his main concern was to define, describe, and delineate semiotic events and bioethnic events by applying the formal universal approach and offering a phenomenological analysis of the forms of culture as prolegomena. In the process of evolving his complex overall framework, he has tried to integrate the world of gnosis (work, play), poesis (production, creation), and cathexis (love, loyalty).

Srivastava and his research students at the University of Delhi developed the 'semiolinguistic' approach. The semiolinguistic approach envisaged a broadening of linguistics, and at the same time a narrowing of other semiotic systems, to the pattern of linguistic signs. This approach analyzed stylistic

facts in terms of linguistic semiology by defining the nature and function of the sign, signifier, signified, and the signification process at different levels of language organization. The view promoted is that language used in literary or nonliterary discourse is a reflection on signs, and further, that language, specifically its grammars, serve as sense-making systems for all other sign systems. The semiolinguistic approach tries to show how a verbal construct with hierarchical, interlocking levels expresses the multileveled nature of a poem's signification. This is supposed to involve the principle of poetic construction as a process of semiosis that involves the transformation of one linguistic level into another, namely, the transformation of the first material level of the 'sentence symbol' into the second level of the 'symbols in art,' and further into the third level of the 'art symbol' and the 'aesthetic symbol' (see Gargesh, 1990: 57–58). The fact stressed is that all the levels and their corresponding sign-units are inherently verbal in nature. This model accepts literary communication as a social contract of the order *I – Thou* (rather than *I-It*) in its orientation. Hence, it rejects the sentence-level perspective for the study of literary texts and the formal linguistic approach that appears to suggest that there is some linguistic constant that can significantly characterize literary texts as distinct from nonliterary ones. This model has also been found practical and useful by over half a dozen research students between 1994 and 2004 through their study of style, figurative language, drama, poetry, and narrative.

It needs to be mentioned that many other scholars have also worked on the structuralist-semiotic approach in the study of various languages of India, including Marathi, Punjabi, Hindi, and so forth. Dhongde and Kelkar (1985) can be taken as a representative example. Further, efforts at establishing linkages between stylistics and the ancient Indian grammatical and critical tradition have been made by and Kapoor and Ratnam (1999).

Computational Linguistics

South Asia, particularly India, is one of the world's major software and information technology (IT) centers. A couple of decades ago, IT-related initiatives were taken in many technological institutes and universities, with funding coming from the Technology Development for Indian Languages (TDIL) program of the Ministry of Information and Technology of the Government of India. The University Grants Commission also funded many major and minor research projects. Significant achievements in the field were made by the Indian Institutes of Technology (IIT), the Indian Institute of Information Technology (IIIT), the Center for Development of Advanced Computing (C-DAC), the Indian Institute of Science, the Tata Institute of Fundamental Research (TIFR), and other universities and institutes. Researchers at the IIT at Kanpur have long been working on a project to design a machine translation system for intertranslation among major Indian languages using Sanskrit as an interlingua. They have developed a device called *Anusaaraka* that renders text from one Indian language into another in near-comprehensible form. The lexical resources being collected for Indian languages are used for the *Anusaaraka* multilingual transfer tool. Work on machine translation is also under way at the IIIT at Hyderabad. Work on Sanskrit and Hindi Corpora is going on at the Jawaharlal Nehru University and at the Mahatma Gandhi International Hindi University (MGIHU). The major thrust in this applied field can be said to be in the areas of machine translation and creating lexical resources.

Machine Translation

Major efforts in machine translation focus on translating either from one Indian language to another or on translating from English to Hindi; in Pakistan, the focus is on English and Urdu. In two *Anusaaraka* systems (Bharati *et al.*, 1995) developed in India, the load between the human readers and the machine is divided, i.e., language-based analysis of the text is carried out by the machine, and knowledge-based analysis or interpretation is left to the reader. The machine uses a dictionary and grammar rules to produce the output. *Anusaaraka* output follows the grammar of the source language. Among Indian languages, which share substantially vocabulary, grammar, pragmatics, and so forth, the task of rendering one language into another is relatively easy. However, if the two languages differ in grammatical constructions, either an existing construction in the target language that expresses the same meaning is used or a new construction is invented. *Anusaarakas* are available for use as e-mail servers.

The *Anusaaraka* system from English to Hindi follows the basic principle of information preservation. It uses the XTAG-based (Extensible Tree Adjoining Grammar) super-tagger and light dependency analyzer developed at the University of Pennsylvania for the analysis of a given English text. The system produces several outputs corresponding to the given input. The simplest possible output is based on the machine taking the load of lexicon and leaving the load of syntax to man.

Two additional systems – the *Mantra* System and the *MaTra* system – deal with machine translation

from English to Hindi. The *Mantra* system translates 'officialese' (office-related correspondence) from English to Hindi. It is based on the synchronous Tree Adjoining Grammar and uses tree transfer for translating from English to Hindi. Here, the lexicon is suitably restricted to deal with the meanings of English words as used in their subject domains. The *MaTra* system, on the other hand, is a tool for human-aided machine translation from English to Hindi for news stories. It has a text categorization component that determines the type of news (political, social, economic, and so forth) before operating on it. Depending on the type of news, the system uses the appropriate dictionary, e.g., the word 'party' is usually a 'political entity' and not a 'social event' in political news.

Lexical Resources

A number of bilingual dictionaries for Indian languages have been developed for the purpose of machine translation and are available under the GPL (General Public License). Creation of a very large English-to-Hindi lexical resource for the *Anusaaraka* system is currently under way. In Pakistan, lexical resource work is going on at the Center for Research and Urdu Language Processing at Lahore University.

Lexicon-related work in linguistics has been done by the Commission for Scientific and Technical Terminology, which is under the Ministry of Human Resource Development of the Government of India. This work is in the form of the revised Glossary of Linguistic Terms (1994) and the two-volume Definitional Dictionary of Linguistics [Vol. I (1990) deals with concepts of phonetics and phonology and Vol. II (1998) deals with concepts of morphology, syntax, and semantics]. Scholars from Delhi University, in collaboration with Iran Culture House, have created a Persian-Hindi dictionary on CD in which lexical equivalents and their grammatical forms can easily be accessed.

Language Disorders

Recent awareness of the widespread occurrence of learning disabilities (LD) in the subcontinent, both in urban and rural settings, has created another challenging area for applied linguistics in the 21st century. With the increase in data from South Asian multilingual contexts, the prevailing Western methods and materials may have to be significantly modified.

Fresh challenges lie in the area of language disorders, both developmental as well as acquired. The role of applied linguistics becomes crucial, because these disorders can be characterized at all levels of language structure and function, i.e., from articulatory and auditory speech signal-processing to problems of meaning, including all modalities of language use in production and comprehension as represented in speech and writing. The field also includes, after initial screening and diagnosis, assessment and intervention, which includes remedial teaching. Due to the large number of children going to school in South Asia, the focus at present is largely on learning disabilities rather than language disorders. This is the case for children who fail to develop age-appropriate syntax, phonology, lexicon, or pragmatics. Cross-linguistic studies related to acquired disorders (Karanth, 2003) have begun to focus on bilingualism/biscriptalism with regard to reading and with a focus on the nature of writing systems and their implications for understanding reading models. This has implications for language acquisition and language teaching as well as for the remediation of reading. Karanth has provided single case studies from the field of acquired dyslexias. All of the subjects reported were bilinguals or multilinguals who knew English and one or more Indian writing systems. The alphabetic writing system of English contrasts with the syllabic writing system of Indian languages, including the scripts of Bangladesh, Nepal, Sri Lanka, and Pakistan. Hence, the patterns of reading errors of the subjects in English, if contrasted with their reading errors in an Indian writing system, could lead to significant generalizations. The discussions of the three case studies of 'pure alexia,' 'surface dyslexia,' and 'deep dyslexia' lead to the conclusion that "in a bilingual individual a lesion that produces a particular type of dyslexia in one script need not necessarily produce a similar type of dyslexia in a different script" (Karanth, 2003: 149). The reasons include several factors related to acquisition and to the use of each language as well as the interplay between them at different stages in a bilingual's life.

It has been observed that the grapheme-phoneme correspondences that children, or even adult illiterates, make between phonology and orthography "depend on the orthography of the language being learned and the phonological units that this orthography makes salient rather than the other way round" (Karanth, 2003: 151). Further, the teaching of reading involves script-specific strategies, e.g., Indian languages are largely taught by exposure to graphemes as syllables, not as consonant and vowel components. Future studies can help create advanced remedial strategies to help children overcome their specific difficulties in spoken and written language or to help them with their attention spans in the context of traditional schools or even outside them, in literacy drives in developing countries.

In the field of learning disorders, much more work needs to be done on dyslexia, dysgraphia, and dyscalculia. Other areas that require attention from applied linguists, and are also under investigation by R C Sharma and his students at the Department of Linguistics, University of Delhi, include developmental language disorders such as those related to the communicative behavior of developmentally disabled children, language disorders in adults with aphasia and dysarthria, and dementia in the elderly.

Problems in Translation

The field of translation in the multilingual/pluricultural region of South Asia is another area of vital importance for the applied linguist. One of the cultural wings of the Government of India, the *Sahitya Akademi* (launched in 1954) has constantly promoted translation among Indian languages (and English). The *Akademi* has published over 2000 translations in 24 languages that cover the best of poetry, fiction, and drama written in the languages of India. The *Akademi* also awards each year 22 eminent translators for translating from and into an Indian language. Its journal, *Indian Literature*, now a bimonthly, has been in publication since 1957. The *Akademi* has also established four centers for translation-related activities at Bangalore, Ahmedabad, Delhi, and Shantiniketan. The center at Bangalore plans to produce translations of premodern classics in different languages of India under the series called *Prāčya*. The Sahitya Akademi holds a number of workshops for translators from different parts of the country, e.g., it has organized 19 workshops between 1999 and 2004. The aim of these workshops was to provide the translators a grounding in theoretical and practical aspects of translation so that they can meet the challenges posed by the act of translation in the context of the multilingual Indian reality. One of the dominant features of these workshops was the bringing into focus of linguistic equivalencies – lexical, syntactic, pragmatic, and cultural. Although translation is characterized as an activity whereby source language (SL) text is changed into text of the target language (TL) – while attempting to keep the meanings of the two texts equal – the fact that no two verbal systems are totally similar in representing the same sociocultural reality creates many disturbing problems for the translator in his or her efforts to maintain equivalence.

The problems of translation equivalence are varied – they may consist of untranslatable entities such as culture-specific lexicon, peculiar syntax, idioms, figurative language, and social style (see Gargesh, 1989: 63–73 for Hindi-English examples). These problems, when seen through the perspective of applied linguistics, could be resolved in the following way (Gargesh, 1989: 72):

i. Instead of performing a word-to-word translation, an attempt should be made to translate the encoded sense.
ii. In the case of poetic figures, it is advisable that an idiom for an idiom and a metaphor for a metaphor should be used, keeping in mind the sociocultural reality of the TL.
iii. Intention for intention in translation should be preferred.
iv. Transcreation is suggested, provided it doesn't embellish.

Conclusion

Language systems are central to all human behavior, and linguistics enjoys a privileged position among the sciences. Thus, it is imperative for the applied domain of linguistics to deal with issues concerning social responsibility. Applied linguistics is an interdisciplinary field where, apart from inputs from linguistics, language-related knowledge is developed and applied to language-specific practices and where language-related problems are solved in the sites of language use. Applied linguistics thus sits at the interface between linguistics and other areas of study, such as education, literary studies, literacy campaigns, media and communication studies, sociology, psychology, planning, and so forth. Issues concerning social responsibility and other related issues are frequently manifested in the areas of applied linguistics. Some of these issues have been dealt with in this article – language and education problems in a multilingual setting, problems of stylistic analysis, translation and computational linguistics, problems of linguistic changes arising out of languages in contact, psycholinguistical linguistics concerns, and so forth. Most of these issues in South Asia fall within the context of the multilingual situation. Therefore, there is a need to find out ways to make multilingualism work better so as to prevent violation of linguistic human rights and marginalization of minority languages. This effort also necessarily involves taking a critical look at the implementation and outcome of language planning and education planning so that educational structures have a firm multilingual base and output. There is also an urgent need to find effective ways of teaching languages to very large numbers of learners, which calls for harnessing and developing media-based programs via satellite. Further, fresh developments in the field need to be continuously integrated in order to make

language-related applications more realistic and intellectually stimulating.

See also: Applied Linguistics: Overview and History; Hindi; India: Language Situation; Second and Foreign Language Learning and Teaching; South Asia as a Linguistic Area; Southeast Asia as a Linguistic Area.

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Applied Linguistics in Southeast Asia

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Applied Linguistics and the Region of Southeast Asia: Definitions

For the purpose of this article, applied linguistics is defined as an interdisciplinary, practice-driven field that addresses language-related issues and problems arising in a range of real-world settings, such as the community as a whole, different educational institutions, and the workplace. To identify those relevant issues and topics in applied linguistics of significance to Southeast Asia, we examined the professional activities and the literature published in this region, not only in English but also in the local languages of the region. Much of this work has been abstracted in an extensive annotated bibliography (Ho and Wong, 2003).

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Brunei), Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Except for Thailand, all these countries experienced some form of Western colonial rule some time in the past. For example, Indonesia received its independence after four centuries of partial colonization by the Portuguese and full colonization by the Dutch. The Philippines experienced nearly as long a period of rule by Spain and then the United States. Cambodia, Laos, and Vietnam, the three states in Indochina, at one time firmly aligned with the Soviet Union, were originally French colonies. All the remaining countries, Brunei, Malaysia, Myanmar, and Singapore, were at one time colonies of the British Empire. In addition, during the Second World War, all of these countries experienced 3 years of occupation by Japan (1942–1945).

Examined closely, the countries covered in this article are vastly different in many ways – in size, for instance, with Singapore being the smallest, on the one hand, and Indonesia, on the other hand, covering thousands of islands and a total land area of approximately one quarter of the United States. Other factors making them different are, for example, their Gross Domestic Product and literacy rate. Most of the countries are heterogeneous in terms of ethnicity, culture, and language.

Southeast Asia as a Linguistic Region

The language ecology of the region comprises four 'families' of related languages, with which the national or official languages of the countries are associated. The four families, according to Comrie (1987: 12), are Austro-Asiatic (with Vietnamese and Khmer (Central Khmer) or Cambodian as its members), Tai (which includes Thai and Lao), Sino-Tibetan (which includes Chinese and Myanmar or Burmese), and Austronesian (to which Malay and Tagalog or Filipino belong). Over time, in each family, a kind of language continuum was interrupted by political boundaries.

The language mix found in Southeast Asia provides fascinating material for sociolinguistic studies. The policy of the colonial masters to impose their own languages on the colonized, together with migration of indigenous peoples across the region in search of a livelihood, has added to the complexity of Southeast Asia's linguistic profile. English remains one of two languages of instruction in the education systems of Brunei, Singapore, the Philippines, and more recently Malaysia, whereas French is taught as a second language in the Indochinese states. A good example of the diaspora of the Indian population from the early days of the British Empire is the fact that Indian languages such as Tamil, Hindi, Urdu, and Bengali are formally studied as mother tongues by some children in the Singapore education system.

Through their official language policies, in all the Southeast Asian countries, one indigenous language is accorded the status of a national language: Malay (in Brunei and Singapore), Bahasa Indonesia (in Indonesia), Bahasa Malaysia (in Malaysia), Khmer (in Cambodia), Laotian (in Laos), Filipino (in the Philippines), Thai (in Thailand), Myanmar or Burmese (in Myanmar), and Vietnamese (in Vietnam). Since Malay or a variety of it is the national or official language of Brunei, Indonesia, Malaysia, and Singapore, it is practically a *lingua franca* in the area known as the Malay Archipelago. However, at official meetings of the 10 countries as a group (ASEAN), only English is used. As will be explained, English, spoken at different levels of ability cross-nationally, is clearly the language of wider communication for the region. As a result, several countries have adopted a model of education and literacy to promote a higher level of proficiency in the English language. In the Philippines, the Bilingual Education Policy is one model, and Brunei's *Dwibahasa* (the two-language system) is another. In Singapore's bilingual education system, the medium of instruction is English. Students learn English as a first school language and the language of their ethnic group (e.g., Chinese, Malay, or Tamil) as their second school language for their cultural values.

From Nationalism to Nationism: The Adoption of National Languages

Whereas the study of language policies in this region has been a growing field of interest, the language policy literature in Southeast Asia had been rather scattered until the publication of Ho and Wong (2004a). Language policy-making involves [as Halliday (1990: 9) puts it] "formulating policies, getting them adopted and making provision – primarily educational provision – for ensuring they are carried out." It is commonly accepted that the national language is the main medium for the expression of a national identity. In all 10 Southeast Asian countries, the national and official languages are also the languages of instruction in schools. In the case of Malaysia, Indonesia, and the Philippines, there has been an institutional framework for the development and teaching of what was chosen as the national language. For most of the other countries, the agency that engages in this process is usually a department of the government or the Ministry of Education since much of language policy-making has to do with language acquisition planning. Table 1 provides a

Table 1 National languages and languages in education in Southeast Asia

Country	*National language*	*Other major languages or English as L2 or FL*	*Foreign language(s)*
Brunei	Malay	English	Arabic
Cambodia	Khmer	English	French, Chinese
Indonesia	Bahasa Indonesia	English	Arabic, Japanese, French, Dutch, German
Laos	Lao	English	French, Russian
Malaysia	Bahasa Malaysia	English, Chinese Tamil	Arabic, Japanese, French
Myanmar	Myanmar	English	
Philippines	Filipino	English	Chinese, Spanish
Singapore	Malay	English, Chinese, Malay, Tamil	Japanese, French, German
Thailand	Thai	English	French, German, Arabic, Japanese, Chinese
Vietnam	Vietnamese	English	Russian, French, Chinese

summary of the national or official and second or foreign languages of each of the 10 countries.

It is to be noted in Table 1 that each of the four countries – Brunei, Indonesia, Malaysia, and Singapore – adopted a variety of Malay as the national language. Whereas Brunei Malay predominates in that country, other varieties used in Brunei include Kampong Ayer, Royal Malay (with a social register showing respect to royalty), and Bazaar Malay (a pidginized variety). In its dual-language education system, implemented in 1984, English is used to teach some subjects in school.

In Indonesia in the early 1900s, nationalistic feelings favored the development of Malay to unite the Indonesian population, although it was not the mother tongue of the majority. Specifically, in 1928 (at the second meeting of the All-Indonesia Youth Congress), Malay was adopted as the national language (renamed Bahasa Indonesia). After the Japanese occupation (1942–1945), when independence was declared, Bahasa Indonesia was institutionalized as the official language. It has served as the medium of instruction in formal education ever since.

Among the multiethnic population of Malaysia (covering the Malay Peninsula and the states of Sarawak and Sabah in Borneo) of 19.4 million (approximately divided into 59% Malays, 32% Chinese, 8% Indians, and 1% Others), many languages and related dialects are spoken, but Malay (or Bahasa Malaysia) is the most important language, being both the national and official language, and serves as a *lingua franca*. Malaysia's language policy has moved the country from the postindependence era of establishing nationalism to one of pragmatism, in which English has been selectively used, since 2003, as one of the principal languages of instruction in schools.

In Singapore, there are four official languages: Malay, Chinese, Tamil, and English. Malay is also the national language. The composition of the Singapore population of 4 million (made up of approximately 78% Chinese, 14% Malays, 7% Indians, and 1% Others) does not reflect the actual complexity of the linguistic situation in Singapore because, in reality, the Chinese, Malays, and Indians speak a variety of languages and/or dialects. For example, among the ethnic Indians, Tamil (a major Indian language) is not necessarily the only mother tongue; there are others such as Hindi, Urdu, Gujarati, Malayalam, and Punjabi, attesting to the existence of a number of subgroups within the Indian community itself. The Chinese majority speak a mixture of Chinese dialects and, increasingly now, Mandarin. For interethnic communication, Malay (or Bazaar Malay) and English are used.

Although each of the three Indochinese states, Cambodia, Laos, and Vietnam, has its own national language, all three countries were strongly influenced by French and later Russian. In Cambodia, for instance, French was studied in public schools until the late 1960s, long after Cambodia had achieved independence.

In the remaining three countries, the national language of the Philippines is Filipino, which bears a remarkable resemblance to Tagalog. Tagalog is not the mother tongue of the largest linguistic group in the country but it met all the criteria for a national language. In the 1972 Philippine constitution, schools were charged with the responsibility of developing a "bilingual nation fully competent in the use of English and Philipino [sic]" (cited in Castillo, 2004: 268). Then, in the 1987 revision of the constitution, English and Filipino remained the official languages, but regional languages were considered official auxiliary languages in particular regions and could also serve as languages of instruction. In Myanmar with its many minority languages, Myanmar (the language) is used in administration and education. Thailand, with a population of 63.4 million and 80 languages, is not usually known as a linguistically heterogeneous society when it is so. The language that unifies Thailand is Standard Thai, which is accepted as the national and official language although, according to Brudhiprabha (1993: 16), there is no official

declaration to this effect. It is the language of education, administration, and the media and it is a symbol of identification for the Thai nation.

Given the linguistic diversity and the complexity of the language situation in Southeast Asia, any attempt at generalization must be performed with caution. What comes across very strongly is the fact that different cultural systems and historical experiences determine different linguistic profiles. In the transition from traditionalism to independence and a modern state, some countries have their own way of recognizing the legitimacy of ethnic group interests in preserving their language identity and so have made some provision for them in the school curriculum. This is a type of what Stewart (1968: 532) has called 'national multilingualism,' which exists in several countries in Southeast Asia.

The teaching of a country's national or official language(s) to eliminate illiteracy and to forge social cohesion is the most legitimate function of a country's education system. In today's fast-changing world setting, it is also expedient for the school-going population to learn another foreign or auxiliary language, such as English, if the country is to maintain contacts with the rest of the world. In the Southeast Asian setting, the fact that the national language can exist side by side with English is best seen in terms of what Fishman (1968) has called 'nationalism' and 'nationism.' In the case of nationism, English has been adopted for reasons of national efficiency.

Language Acquisition Planning in Multilingual Societies

Examples of very effective language acquisition planning through education can be observed in the region. In Malaysia, for instance, non-Malay-ethnic groups learned to master Standard Malay in a relatively short period of time. In Indonesia, Bahasa Indonesia was successfully acquired by groups who have other Indonesian languages as their mother tongues.

Perhaps the most recent success story of language acquisition planning (or language status planning) is Singapore's 'Speak Mandarin Campaign' initiated nationally for the Chinese community in 1979, in which a whole population of Chinese Singaporeans of some three generations was weaned away in approximately 10 years from dependence on Chinese dialects (technically their mother tongues) to using Mandarin (a learned language) in social interactions with family members and others. This is a major language acquisition exercise that has had no close parallel in Southeast Asia in recent times.

The success of the Speak Mandarin Campaign has put to the test notions traditionally held that language habits are slow to change. The goal of *deliberate* language change was to reduce the linguistic burden on Chinese 'dialect'-speaking children who, on introduction to formal schooling, had to learn English and Mandarin, official languages that they did not use at home. Since 1979, Mandarin has largely become an identifying characteristic of the ethnic-Chinese population instead of specific dialects. Today, the linguistically heterogeneous Chinese population in Singapore has been made more linguistically homogeneous, speaking Mandarin in intra-ethnic communication.

Language use in Multilingual Settings and the Question of Social Identity

In real-life settings, the use of many languages in different domains (workplace, home, places of worship, market-places, etc.) is now extensively documented (in particular, in Brunei, Malaysia, and Singapore) using different quantitative and qualitative methods of research. With many of these countries becoming bilingual, the question of language and identity remains a matter of concern.

How this issue of language and identity gets into public awareness has recently been demonstrated in Singapore by the study of Chinese as a school subject. To the Chinese in Singapore, the question was whether a deep knowledge of Chinese (or Mandarin) necessarily forms part of cultural identity. Although English is currently the language of interethnic communication in the social and business domains, some groups hope that English will not be cast as having value only in economic terms but also in the cultural sphere as well.

In multilingual Singapore, English probably serves as a 'focusing factor,' if we use Le Page and Tabouret-Keller's (1985: 181) concept of 'speech acts,' which are acts of projection – in which 'through language individuals project their identity, their inner universe and shape it according to the behavioral patterns of the groups with which they wish to identify.' Individuals may have several social identities. To illustrate this point, Kamwangamalu (1992), in a small-scale study, arrived at a conclusion about the relationship between language and identity in his sample, as shown in Figure 1.

Kamwangamalu's conclusion is framed by Le Page and Tabouret-Keller's (1985) ideas of 'diffusion' and 'focusing'. Under diffusion, speakers cluster based on the language that they consider their mother tongue or own language, a language that projects their own ethnic Chinese, Malay, or Indian identity, although

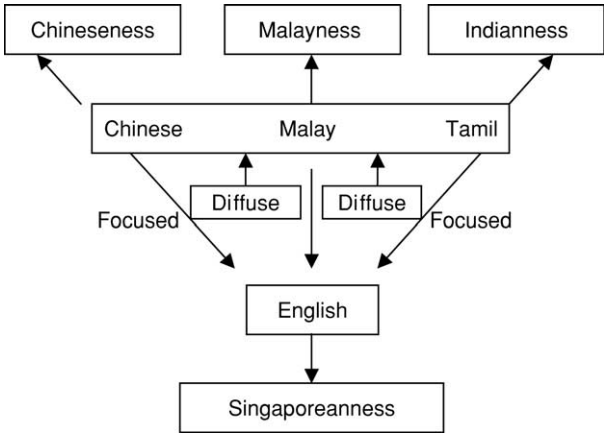

Figure 1 Language and identity in Singapore. Adapted from Kamwangamalu, N. (1992). 'Multilingualism and social identity in Singapore.' *Journal of Asian Pacific Communication 3*, 32–47. With kind permission from John Benjamins Publishing Company, Amsterdam/Philadelphia. http://www.benjamins.com.

they may not be proficient in that ethnic language. In other words, this diffusion, which separates the ethnic groups at one level, is seen in terms of language loyalty rather than language competence. Under focusing, English plays a supraethnic role reflecting a Singaporean identity. In other words, it is through English that speakers of it, at whatever level of competence, identify themselves as Singaporeans. As a broker language, English brings about a convergence of the different ethnic groups, hence focusing.

In Singapore and elsewhere in Southeast Asia, critics of the excessive dependence on exonormative English have expressed concern about how it may harm national identity (e.g., Tickoo, 1996: 44). Others (e.g., Denham, 1992; Samuel, 1997; Toh, 2003) note that the language pedagogy of the English textbooks shows the inappropriateness of relying too heavily on native-speaker models. With reference to the sale of English teaching materials in Vietnam, Denham (1992: 67) notes that "the USA is the top of the league in this respect, and Standard American English could eventually become the preferred model. It will be clear from these comments that Vietnam, like other Expanding Circle centres, is norm-dependent."

English: Its Expanding Role and Varieties

The expanding role of English and the varieties of English that have emerged are two issues that have often been researched and discussed in the applied linguistics literature. Held in turn in Singapore, Brunei, and Malaysia, over the past 5 years, a series of seminars under the title of *English in Southeast Asia* has been organized to discuss common concerns about emerging English varieties and the teaching of English. In Malaysia, Thailand, and the Philippines, in turn, a series of workshops provocatively entitled *English Is an Asian Language* has attempted to develop an understanding of standards in English by obtaining local responses to the acceptability of local words (in English) that grew out of their sociolinguistic and cultural environments.

In particular, policy makers and educationists in Singapore, Malaysia, the Philippines, and Brunei, as gatekeepers of language use in schools, are increasingly anxious to find out how teachers in English classrooms will be able to handle the varieties of English that have emerged in these four countries, although there is little agreement over what standard English is. Generally, as in Singapore, standard English is defined as the variety that is acceptable internationally, with reference to grammatical rules and pronunciation found in standard English (British or American) dictionaries and grammars. As one educationist in Malaysia puts it,

> If we recognize that there are varieties of Malaysian English at work in society, then we must ensure that teachers are able to handle not just the varieties of Malaysian English, but also be able to handle an internationally acceptable variety of English, too. Any teacher who has no command of a knowledge of standard English is short-changing his or her students (Gaudart, 1997: 55).

In Thailand, although a Thai variety of English exists, educationists (e.g., Prasithrathsint, 1996) accept that any discrepancy between what is standard English and the Thai variety should be attributed to the fact that English is only a foreign language in the country.

Currently, in the Southeast Asian countries where English is spoken quite extensively, a kind of diglossic situation exists, in which at least two (sub)varieties of English occur, each with a distinct range of social functions, corresponding broadly to the formal and informal/colloquial. Given this situation, a communicative strategy that is often observed in conversations in nonformal contexts in the urban areas is code-switching and/or code-mixing. In Brunei, for example, even among competent speakers of English, "when both speaker and interlocutor can also speak Brunei Malay, a great deal of code-mixing and code-switching occurs," according to Martin and Poedjosoedarmo (1996: 17). In a bilingual speech community, this happens irrespective of whether the host language is Malay, Chinese Mandarin, or Tamil, as long as the speaker and interlocutor share a common language such as English or Bazaar Malay. According to another report (Lau, 2004: 1), Malay

language experts in Malaysia are upset over the increasing number of English words entering the Malay lexicon, with popular culture "taking the cue from the government's emphasis on the importance of English."

English Language Teaching and Learning

Quite understandably, the topic of English language teaching (ELT) is the most dominant in the applied linguistics literature in this region, with a new ELT curriculum introduced in each of the 10 countries over the past 5 years. Although these countries have advocated the teaching of English from the early grades in primary school, this policy has not been fully implemented largely because of an inadequate supply of primary English teachers, in terms of both raw numbers and skill levels. To say the least, the conditions for learning English in several of the Southeast Asian countries are less than ideal, owing to underfunding, overcrowding of classrooms, a shortage or even lack of textbooks, and ill-equipped teaching areas.

Nonetheless, in most of the countries, there has been an attempt in the past 10 years to strengthen and improve the teaching of English through curriculum revision and development and other large-scale initiatives. In some of the countries, these initiatives include projects directed and funded by bilateral aid agencies such as the United Nations Development Program (UNDP). Table 2 below summarizes the more recent ELT developments in this region.

As expected, ELT objectives and targets and conditions of learning English vary among the 10 education systems. Table 3 shows that, on average, classes in Southeast Asia are large, with little opportunity for students to interact or 'communicate' in the language being learned. In most systems, the opportunity to learn and use the language is restricted by the amount of time allocated to it in the curriculum. The amount of assigned time varies from system to system, as Table 3 shows. The estimated time is distributed over a week with class duration varying from 30 to 40 minutes per class in primary schools and from 40 to 50 minutes in secondary classes. It is not possible to predict learning outcomes from the amount of time allocated alone because there are confounding variables (students' level of motivation to learn English and quality of instruction being the obvious ones).

In the past 10 years, the ELT curriculum in Southeast Asian countries appears to be driven, at least in intent, by the two concepts of 'communicative language teaching' (CLT) and 'skills integration.' CLT has become a dominant theoretical model since the 1980s in this part of the world. Translated into practical terms, the approach is usually taken to mean providing the teachers with communicative activities in their repertoire of teaching skills and giving learners the opportunity in class to practice the language skills taught. This is obviously an oversimplification but that is how CLT is generally interpreted. Most syllabuses would like to move toward CLT if conditions permit. Thailand, Indonesia, and Vietnam, to name a few countries, have set up CLT as their target for ELT. However, there is now much skepticism as to whether the kind of strategy advocated in CLT actually works in most Southeast Asian classrooms. This can be explained by a number of factors, such as teachers' inadequate command of English, poorly designed teaching materials, and the size of the typical classroom in Southeast Asian schools, which favors a particular type of teacher–pupil communication, in which the teacher asks a question and pupils respond (probably in chorus), followed by, inevitably, a comment from the teacher.

The other concept commonly adopted in the ELT curriculum is 'integration', which is linked to the idea of authenticity in CLT. The term as used in the ELT literature has several meanings but most often in ELT syllabuses, the word is used to mean integration of the four language skills. In the Singapore English Language curriculum and also in the Malaysian English syllabuses, integration of the four skills is to be carried out through a thematic approach; i.e., classroom teaching is structured across a series of language tasks in which the skills of listening, reading, speaking, and writing are used in turn. Carried out by a good teacher, the skills are not practiced in isolation, but in the hands of a poor teacher, one skill may still be taught quite independently of the others.

The issues of ELT in a number of the Southeast Asian countries may be summed up in terms of two dilemmas. On the question of supply and demand of English teachers in, for example, countries such as Thailand, Indonesia, and the Indochinese states of Cambodia, Lao PDR, and Vietnam, there is the quantitative versus qualitative dilemma. On the one hand, these countries face a dire shortage of teachers of English and, on the other, those currently teaching the language would need to improve qualitatively. So, limited resources must be distributed between recruiting and training more teachers of English and providing in-service training for those already teaching English in schools. In the area of teaching methodology in some countries, partly because of the lack of training for teachers of English, traditional practices such as text-centered grammar translation seem to remain. This is the traditional versus modern dilemma. So, although in all Southeast Asian countries

Table 2 Summary of recent developments in ELT in Southeast Asia

Country	*Recent developments*
Brunei	There has been a large-scale English language project [RELA (Reading and Language Acquisition)] to improve EL teaching and learning. Started in 1989 for lower primary, it continued in the 1990s into upper primary as Upper RELA. A new English Language Syllabus for Primary Schools was implemented in 1997 and a new series of Primary English textbooks was used in 1998. Both sets of materials incorporated features of ELT tried out and found useful in the RELA Project.
Cambodia	Since 1990, English has been officially recognized as a subject in the school curriculum. New textbooks have been developed and intensive training and retraining of English teachers provided. One such textbook was the *Cambodian English Course*, first used in 1994. It was replaced in 1997 by *English for Cambodia*.
Indonesia	English remains the most popular foreign language in Indonesian schools. Since 1995, ELT has been introduced from the fourth grade in public schools. With a reorientation of ELT objectives in the 1994 curriculum, the emphasis has been on listening and speaking skills in elementary schools and on speaking and reading skills in secondary schools.
Lao PDR	More recently, English has become the most popular foreign language in schools and at university. The emphasis of ELT is on reading, designed to help students keep abreast of developments in science and technology.
Malaysia	The English language curriculum was revised in 1993, giving emphasis to the integration of the language skills and to oracy. Further revisions were made in 2000 (for secondary schools) and 2001 (for primary schools). In the new secondary school syllabus, the emphasis is on the use of English in three areas: the interpersonal, the informational, and the aesthetic. Literature has been incorporated into the English curriculum for schools. In a dramatic change of language policy, since 2003 English has returned as a medium of instruction in schools for the teaching of science and mathematics for certain grade levels.
Myanmar	Since 1981, ELT has been introduced into all primary schools, and since 1986–1987, English has been used as a medium of instruction for science subjects and economics in schools and universities.
Philippines	ELT has moved toward the communicative, but teaching approaches remain largely eclectic. There have been several initiatives to improve the teaching of English [e.g., PELT (Philippines English Language Teaching)].
Singapore	A new English language curriculum came into effect in January 2001, the content of which is based on a model of language use, comprising language for information, language for social interaction, and language for literary response and expression. English grammar is taught more explicitly than it was in the 1991 curriculum as it is believed that students with a good knowledge of grammar should be able to use the language well in speaking and writing.
Thailand	With the National Education Act having come into force in 1997, ELT has been taught from primary one onward. There has also been a concerted effort to move away from teacher-centeredness to pupil-centeredness in ELT, and the principles of the communicative approach, although difficult to implement in Thai classes, still underpin the official thinking in ELT.
Vietnam	English language textbooks appropriate for Vietnamese learners, jointly co-authored by Vietnamese and native English speakers, have been produced. There has also been intensive training and retraining of English teachers.

Table 3 Estimates of time in school for ELT

Country	*Class size (range)*	*Time (hours)*	
		Primary	*Secondary*
Brunei[a]	40–50	3	3
Cambodia	45–60	3	4–5
Indonesia	40–50	2	3–4
Lao PDR	40–60	3–4	3–4
Malaysia[a]	38–45	4–6	3–4
Myanmar	40–60	3–5	3–5
Philippines[a]	40–60	3–4	3
Singapore[b]	35–45	4–6	4–9
Thailand	35–45	2–4	4
Vietnam	40–60	2–4	3–4

[a]English is also a medium of instruction for some school subjects.
[b]English is the medium of instruction for all subjects except the mother tongues and the subject of citizenship in primary schools.

there are strong aspirations for change and for making good progress in the teaching of English, many of the traditional conditions of teaching remain in some countries. In this sense, then, there is this unfortunate continuity between the past and the present.

The role of the Southeast Asian Ministers of Education Organization (SEAMEO) Regional Language Centre (RELC) in Singapore, in disseminating new ideas about ELT, must be acknowledged. Established in Singapore in 1968, RELC was the direct outcome of decisions made at the first meeting of the Southeast Asian Ministers of Education Council to train 'key personnel' in language education and to organize seminars on various issues of concern in the region on linguistic, psycholinguistic, sociolinguistic, and language education topics. RELC's regional (now international) seminars are widely known as important occasions, designed, among other objectives, "to exploit the results and to synthesize the efforts of an international community of scholars in related disciplines in an attempt to search for solutions to present-day language teaching and language learning problems in Southeast Asia" (SEAMEO RELC, 1977–1978).

Bilingualism in Multilingual Societies

Societal bilingualism in Southeast Asia is extremely complex even without considering the multilingual versatility of tribal minorities in the border areas of Thailand, Myanmar, and the three Indochinese states. Only two main types of societal bilingualism are outlined here. According to Tay (1985: 191), societal bilingualism may be classified according to the status of the languages, whether they are major, minor, regional, or international (or languages of wider communication). The two examples are as follows:

(a) a major language + language of wider communication (e.g., Tagalog–English; Bahasa Indonesia–English; Malay–English; and Thai–English);
(b) major language + national language + international language (e.g., Javanese/Madurese + Bahasa Indonesia + English; Mandarin + Malay + English).

The choice of an individual bilingual's repertoire in any one situation is governed by a variety of different factors: (1) the geographical area in which a language or dialect predominates, e.g., a bilingual Chinese speaker can expect to use Cantonese rather than Hokkien (two Chinese dialects) in certain towns in Malaysia because a particular town (e.g., Kuala Lumpur or Ipoh) is predominantly Cantonese-speaking; (2) domains, such as family, friendship, business transactions, employment, religion, and education. Domains may be classified along a range of formality or informality. Certain codes are typically used in certain domains; e.g., in Malaysia, Standard Malay is generally used in the more public and formal domains, whereas Bazaar Malay is used in interactions with the non-Malays in the market place. Similarly, the official languages are used in the educational domain in Singapore, but Chinese dialects continue to be used, to a lesser extent now, in family and friendship domains, especially in interactions with the elderly.

A few countries in Southeast Asia describe their education systems as bilingual, but the models of bilingual education in Singapore, Malaysia, Brunei, and the Philippines differ in many ways. Nonetheless, it is possible to argue that they are all bilingual to the extent that there are clear societal roles for the languages taught at school. Whereas Singapore and Brunei have a declared bilingual policy, the policy of Malaysia is not explicitly stated as being bilingual, although it now is for certain grade levels in schools. English has a special place in each of the four models, with the instruction time allocated to English varying from model to model. Probably, as a result of time provision and the different linguistic environments in the four countries, the outcomes of the different models have been different – Malay-dominant bilingualism for Malaysia and Brunei in the rural sector and English-dominated bilingualism in the urban areas among the non-Malay-ethnic speakers, whereas that of the Philippines may be described as Filipino-dominant bilingualism. Singapore's situation was described by Pakir (1992) as English-dominant bilingualism, although with the success of the Speak Mandarin Campaign in the past 25 years (1979–2004), there is now a greater proportion of Mandarin-dominated bilingualism. These terms for different patterns of bilingualism do not adequately recognize that the language situations in these four countries are diglossic in the sense that each major language serves different social functions.

Publications on Applied Linguistics in Southeast Asia

The field of applied linguistics in Southeast Asia is particularly active in Singapore, Indonesia, Malaysia, Brunei, and the Philippines. Each year, there are many conferences and seminars in the region, including an annual international seminar held at the RELC in Singapore, as mentioned above. There are numerous journals and reviews, such as the *RELC Journal*, *TEFLIN*, an EFL journal published in Indonesia, *ESP Malaysia*, a national journal in English for Specific Purposes, *Jurnal Persatuan Linguistik Malaysia* (*Journal of the Linguistic Association of Malaysia*, published in Malay), *Jurnal Bahasa Moden: Jurnal Fakulti Bahasa dan Linguistik Universiti Malaya* (also published in Malay), *Philippine Journal of Linguistics*, and *STETS Language and Communication Review*, published in Singapore. Journals on applied linguistics published in Chinese include *Journal of Chinese Studies, Contemporary Linguistics*, and *Linguistics and Philology*. New monographs appear on a regular basis on diverse aspects of applied linguistics, with many on different aspects of the teaching of English. Much of the substance of this article was drawn from what had been reported in these publications.

See also: Austroasiatic Languages; Austronesian Languages: Overview; Brunei Darussalam: Language Situation; Cambodia: Language Situation; Education in a Multilingual Society; English: World Englishes; Indonesia: Language Situation; Languages of Wider Communication; Laos: Language Situation; Lingua Francas as Second Languages; Malaysia: Language Situation; Philippines: Language Situation; Singapore: Language Situation; Sino-Tibetan Languages; South Asia as a Linguistic

Area; Southeast Asia as a Linguistic Area; Taiwan: Language Situation; Vietnam: Language Situation.

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Applied Linguistics: Overview and History

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Introduction

Applied linguistics can be described as a broad interdisciplinary field of study concerned with solutions to problems or the improvement of situations involving language and its users and uses. The emphasis on application distinguishes it from the study of language in the abstract – that is, general or theoretical linguistics. However straightforward this characterization of applied linguistics may be, it is not universally embraced. In fact, ever since the term 'applied' was attached to linguistics, language specialists identifying with this field of inquiry and activity have offered and continue to offer competing, sometimes contradictory definitions and descriptions of its scope, status, and significance. Lack of consensus on an issue as basic as the domains and limits of applied linguistics poses a particular challenge to an encyclopedia compiler: how to capture the nature of a complex, dynamic field without slighting a particular point of view, a pet project, or an entire area of study?

This situation is comparable to that of many other intellectual formations that arose in the mid–20th century – such as composition studies, cultural studies, environmental studies, and women's studies – in that applied linguistics defies the traditional, taxonomic view of disciplinarity that seeks to draw clear and unambiguous boundaries. This state of affairs is addressed in the following account of how applied linguistics came about and developed as an area of study and in a survey of some issues and areas of focus that occupy those who engage in the study of language problems that affect the lives of individuals, groups of individuals, or entire societies and cultures.

Overview

One approach to understanding a field is to review the scholarly journals devoted to research on the topic. In the case of applied linguistics, which at one time had one journal – *Language Learning: A Quarterly Journal of Applied Linguistics* – published in the United States by the University of Michigan, there are several: *Applied Linguistics*, *Annual Review of Applied Linguistics*, *International Journal of Applied Linguistics*, *Journal of Applied Linguistics*, *IRAL*, *International Review of Applied Linguistics in Language Teaching*, and *AILA Review*, to name only a small sample of those with international distribution. Locally produced and distributed journals dedicated to applied linguistics are also available but to a more limited audience, for example, the *Hong Kong Journal of Applied Linguistics*, *New Zealand Studies in Applied Linguistics*, *Indian Journal of Applied Linguistics*, *ITL*, *Review of Applied Linguistics*, *Canadian Journal of Applied Linguistics*, and, from Japan, *Tsukuba Journal of Applied Linguistics*.

The *AILA Review* is the journal of the International Association for Applied Linguistics (AILA). Founded in 1964, AILA, with a worldwide membership of 8000, represents not only the disciplinary and interdisciplinary inclusiveness of the field of applied linguistics but also the geographical, linguistic, and sociocultural diversity of its practitioners and the problems they address. The inclusiveness of AILA is represented in a set of 25 topic areas called Scientific Commissions, a list that often serves as a ready-made definition of the field. Topics may emphasize learner and user groups, as in Child Language, Adult Language Learning, and Sign Language, or analytical procedures or methods, as in Contrastive Linguistics and Error Analysis, Discourse Analysis, and Rhetoric and Stylistics. Issues in information transfer and interpersonal communication are highlighted in Language and Ecology, Language and Gender, and Language and the Media. Psycholinguistics and Second Language Acquisition focus on cognitive processes. Language problems in professional contexts are associated with Forensic Linguistics, Interpreting and Translating, and Communication in the Professions, whereas other areas explicitly emphasize instructional issues: Literacy, Immersion Education, Learner Autonomy in Language Learning, Foreign Language Teaching Methodology and Teacher Education, Educational Technology and Language Learning, and Mother Tongue Education. Language Planning, Language and Education in Multilingual Settings, and Language Contact and Language Change represent research on the interplay of language use, learning, and development.

However, this list of topic areas is identified with just one applied linguistics organization and its interpretation of the field – a field that changes as problems related to language factors change. Issues in need of attention vary in intensity from time to time, or solutions are found and applied linguists move on to new challenges or return to unsolved problems using new approaches. Much depends on localized views of what applied linguistics is at a particular time, in a particular place, and in a specific set of circumstances. Three issues seem to be more enduring

and ones that applied linguists, especially those working in Western contexts, deliberate and discuss with respect to the field's identity: the relationship of applied linguistics to linguistics proper, the scope of activities in the ambit of applied linguistics, and the meaning of the term 'applied linguistics.'

Linguistics and Applied Linguistics

The role and relationship of the field of linguistics within applied linguistics has been variously interpreted in large part due to the ambiguity of the term applied linguistics. What is applied? Is it only linguistics? What is it applied to? Who is (not) an applied linguist? Is a degree in linguistics assumed? Or is it enough to be working with language-related issues? Three positions present answers to these questions.

Applied linguistics, because linguistics is part of its name, is linked to linguistics, which is sometimes referred to as the 'parent' discipline. The literal interpretation of applied linguistics as 'linguistics applied' reinforces this view. From this perspective, linguistics is the authoritative source for all that is needed to meet the aims of applied linguistics. The description of language and the concepts and terms offered by linguistic inquiry apply directly and unilaterally. The process or activity of applied linguistics is carried out by taking the known research and theory of linguistics and applying a linguistic analysis to specific contexts outside linguistics proper (e.g., language teaching, interpreting and translating, or lexicography). This position is taken by those whose work is influenced by a functional view of language in the tradition of Roman Jakobson, Michael Halliday, and Dell Hymes. This view assumes that only linguists can participate in applied linguistic work, that practitioners need credentials as linguists before they can apply known research and theory.

Another view, 'autonomous applied linguistics,' sees applied linguistics as at least semiautonomous, if not completely autonomous, from linguistics or any source discipline and allows that anyone can be an applied linguist. While acknowledging that linguistics may be part of applied linguistics, practitioners do not rely exclusively on linguistics.

A third view is known as the 'applied linguistics' position, so called because applied linguists are linguists engaged in application. It is distinguished from other views in its recognition that the knowledge and skills of a linguist are inadequate to the task of solving problems related to the uses and users of language. To address this inadequacy, the applied linguist calls upon the skills and knowledge of other professionals both inside and outside the academic world. Holders of this view more or less agree on what the field is, but the question of who can claim to be an applied linguist remains open.

Each view, regardless of the role linguistics has within it, excludes much of modern linguistics, particularly that associated with the Chomskyan approach, which deals with language at an abstract, idealized level and largely ignores language as interaction, as performance. In fact, Chomsky does not argue for the relevance of his branch of linguistics to concerns identified with applied linguistics. The linguistics that does have relevance and is of utility for applied linguists needs to be broader in aim than a search for universal grammar, and it need not be associated with any canonical school or branch of linguistics. Rather, all understanding and knowledge of language as a means of human communication is relevant and useful in solving language issues of all kinds.

Whether adopting the linguistics applied or applied linguistics view, researchers in a number of areas draw upon the theoretical and methodological approaches of sociolinguist Michael Halliday and anthropological linguist Dell Hymes. Neither sees a strict boundary between linguistics and applied linguistics, perhaps because of their distinctive approach to language studies. Halliday, first in the United Kingdom and then in Australia, developed systemic-functional linguists, whereas in the United States Hymes was key in the establishment of sociolinguistics as a legitimate discipline and in the adaptation of research techniques from anthropology into language study, namely, the ethnography of communication. Significant about both Halliday and Hymes is that neither explicitly accepted a binary distinction between general linguistics and applied linguistics. In fact, Halliday holds the view that all linguistics is sociolinguistics; that is, the study of language is the study of language in use.

Interdisciplinarity and Applied Linguistics

For some time, language teaching – first, second, and foreign – has been synonymous with applied linguistics. Since the development and improvement of classroom acquisition and competence in languages is a central educational concern for society, it is not surprising that this is one area that has long had the attention of applied linguists. This, however, was not the intention of the founders of contemporary applied linguistics, whose public and published statements on the scope of the field insisted that language teaching was but one example of the areas in which theories and methods of linguistics (in its broadest sense as the study of language) have relevance. This broader and more flexible interpretation of applied linguistics not only recognizes the limitations of relying solely on

linguistics as a source field; it also recognizes that the language problems that applied linguists address are found in many areas of human life.

Although language teaching and learning remain primary concerns in many non-Western settings, elsewhere applied linguistic activity focuses on a range of language-related issues and often draws upon other disciplines in studying language problems. Engaging expertise from other professions (e.g., medicine and law) or fields of study (e.g., psychology, communication studies, or sociology) presupposes precise identification of the problem to determine its scope. Related disciplines are tapped for available facts, techniques, and theories that can aid in addressing the problem. In some cases, there may be close collaboration with practitioners from these disciplines.

A sampling of applied linguistic studies that involve other areas of specialization includes better diagnosis of speech pathologies, design of a new orthography, natural language processing, improvements in the training of translators and interpreters, development of valid language examinations, determination of literacy levels in a population, development of tools for text analysis, comparison of the acquisition of languages from two language families or age groups, consultation to a ministry of education on introducing a new medium of instruction, developing language teaching materials, providing workplace language training, or resolving communication differences between cultural groups.

Applied linguists not only seek out the expertise of others but also can be called upon as consultants. Consulting tasks can range from advising a defense lawyer on the authenticity of the transcript of a suspect's confession to evaluating a school language program. In this, they play an indirect role in any subsequent change, improvement, or amelioration of the problem. Rather than offer any definitive solution, they provide information to help those involved in the problem solving better understand the issues, provide an explanation of what is involved, set out options for resolution, and suggest implications. The applied linguist engaged in such situations has been described as a mediator between theory and practice who enables the contribution of one to the other.

Approaches to Making Knowledge

Applied linguists take various approaches to knowledge making. Modes of inquiry vary from area to area, from researcher to researcher, and from subfield to subfield. From the 19th to the mid-20th century, the research was predominantly empirical (specifically experimental) in methodology and based on the belief that the truth about reality could be discovered through observation alone. Today, interpretive methodologies are adopted as well, either alone or, as in some subfields, in tandem, depending on the particular language-in-use problem under study. This multimodal methodology represents the integration of empiricism (qualitative as well as quantitative) and hermeneutics (interpretation and dialogue) and the recognition that no human can fully, absolutely know physical reality because of the perceptual, cognitive, and social filters that influence the ways in which a person 'sees' the physical world.

Among the approaches to research that are adopted today, the following are the most common: correlational studies with statistical methods of analysis, case study, survey by means of questionnaires or interviews, ethnography and participant–observer techniques, experimental with control and treatment groups, and, for large-scale studies, multisite multimodal approaches that rely on a variety of collection and analytical instruments and techniques. An illustration is the investigation of second language acquisition through experimental tasks and observational techniques. The former could be a pre- and post-test design to determine whether a particular linguistic feature, for example, the past tense form of irregular verbs, has been acquired (faster, longer term, more accurately or consistently, and so on) through participation in a classroom activity by the experimental group of participants. The nonexperimental methods of learner diaries or participant–observer journals could be used during the period of the study to complement pre- and post-test scores.

Although the empirical approaches and methodologies outlined previously are well represented in applied linguistics research, interpretive (or hermeneutic) methodology is also represented, although less commonly. Relevant examples are sociolinguistic studies that profile the social and linguistic features of a language of wider communication in either a second or foreign language learning context. Sociolinguistic profiles of English in a particular country (e.g., India, Germany, or Colombia) or world region (Southeast Asia, Eastern Africa, or East Asia) done by world Englishes scholars are examples of this approach. The aim is not the determination of any cause-and-effect relationships but to make general sense of the role and status of English, to understand the situations in which it is present, and, through continuing dialectic with the researcher and the participants, to achieve a new construction of the sociolinguistic situation with respect to the functions of English, of linguistic innovation and change, and of users' motivation for learning and use in diverse social and cultural contexts.

History

The origin of applied linguistics is commonly attributed to the establishment in 1941 of the English Language Institute at the University of Michigan and the coinage of the term applied linguistics to the creation in 1948 of *Language Learning: A Quarterly Journal of Applied Linguistics*. Although these developments have been influential in the institutionalization of a version of applied linguistics in the mid-20th century, both the term and the concept of applied linguistics have longer histories.

Applied Linguistics in Ancient Times

The history of applied linguistics can be traced back to the studies of grammar and rhetoric in the ancient world. A distinction between the concept of applied linguistics and the formal study of language can be found in Greece, Babylonia, and India during the fourth, third, and second millennia B.C.E., respectively, where grammarians engaged in the analysis of language as well as its practical application in the realms of teaching and text preservation (Catford, 1998). Applied linguistics in its broader definition can be found in the study of rhetoric, which examined and taught language and language production in relation to its functions in the real (i.e., not abstract) world. Evidence of rhetorical terms and concepts can be found in India from the eighth millennium B.C.E., in China between the fourth and fifth millennium B.C.E., in Greece since the fifth millennium B.C.E., and in Egypt during the early part of the second millennium B.C.E. (Kennedy, 1998).

Thinkers in these ancient civilizations, working mostly in isolation from each other, were interested in various language-related issues and their real-world implications, including the development and style of discourse, the relationship between discourse and knowledge, the construction of logical argument, the construction of credibility in discourse, the consideration of the predispositions and affective responses of the audience, and the teaching of the art of discourse production. Because they arose in close relationship with the study of knowledge and truth, early Indian, Chinese, and Greek rhetorics focused in many ways on the creation and negotiation of knowledge through discourse, resembling the social constructivist view of language in contemporary thought.

Partly because of the dominance of the Greco-Roman intellectual tradition in many areas of the world, Western rhetoric has been studied most extensively. In as early as the 5th century B.C.E., a group of scholars known as the Sophists studied forms and functions of language in various domains of life. Like their Indian and Chinese peers, Greek Sophists approached the study of language in tandem with other subjects, such as politics, law, ethics, dialectics, and many others. The rise of the concept of rhetoric as an identifiable domain of intellectual activity can be traced back to Plato, whose preference for classifying intellectual subjects into discrete units led to the denouncement of his predecessors who saw rhetoric as transcending domains of knowledge. Greek rhetoric was developed most extensively by Aristotle, whose theory of persuasive discourse in legal, ceremonial, and political domains played an important role in language education and, in recent years, influenced the development of contemporary theories of rhetoric for speech and writing instruction. Applied linguists have begun to use the Aristotelian modes of persuasion – credibility, affective, and rational appeals – as a framework for the analysis of persuasive discourse and for the development of writing tasks.

The Greco-Roman tradition of rhetoric encompassed the study of the process of discourse production including the development of ideas, organization, style, memory, and presentation as well as the teaching of the effective use of language. Although the Renaissance brought a renewed interest in classical rhetoric, the rise of modern science and the taxonomic view of disciplines between the 17th and 18th centuries stripped rhetoric of its intellectual components, relegating it largely to the study of style and figures of speech. Although rhetoric continued to be a key subject of study until the early 20th century, it focused mostly on the presentation of knowledge rather than the creation of knowledge through language.

In the 20th century, the new rhetoric movement, which is closely tied to the development of communication as well as rhetoric and composition studies, not only restored but also expanded the original scope of rhetoric. However, the influence of the broader field of rhetoric on applied linguistics has been rather limited because of the persistence of the taxonomic view of disciplinarity.

The European Origins of Early Applied Linguistics

Although applied linguistics has a long history, the term is a more recent invention, but it is older than commonly believed. The term applied linguistics, which originally arose in relation to general linguistics, can be traced back to 19th-century Europe, when linguistics was gaining recognition as an autonomous and scientific discipline distinct from philology, the humanistic study of the areas of language, culture, and literature.

One of the earliest discussions of applied linguistics took place among Indo-Europeanists during the 19th

century. Rasmus Rask, an influential Danish Indo-Europeanist and the father of comparative linguistics, made a distinction between linguistics, which is concerned with the identification of linguistic rules, and applied linguistics, which is concerned with the production of dictionaries and with the teaching of grammar (Gregersen, 1991). Catford (1998) documented the uses of the term applied linguistics or its equivalent in Russian (*prikladnoe jazykovedenie*), German (*angewandte Sprachwissenschaft*), and French (*linguistique indo-européenne appliqué*) by Indo-Europeanists such as Jan Baudouin de Courtenay, Herman Hirt, and Paul Regnaud. The goal of applied Indo-European linguistics was to apply linguistics in the realm of other sciences as well as the acquisition of first and second languages. Baudouin de Courtenay also characterized the development of the so-called international auxiliary languages – such as Johann Martin Schleyer's Volapük in 1879 and Ludovic Lazar Zamenhof's Esperanto in 1887 – as deliberate attempts to apply linguistics.

Another strand of early applied linguistics can be traced back to the Reform Movement, particularly the efforts of Henry Sweet in England, Paul Passy in France, and Otto Jespersen in Denmark. Although the Reformists did not use the term applied linguistics, Sweet made the distinction between theoretical and practical language studies: the former was concerned with the historical studies of language and etymology and the latter with language learning. Sweet saw practical language study to be on a par with theoretical study and considered phonetics to be at the core of both theoretical and practical language studies. The Reformists' principles of language teaching were summarized in *La Phonétique et ses Applications* (*Phonetics and Its Applications*), published by the International Phonetic Association (Passy, 1929). Jespersen (1928) also applied his knowledge of linguistics to the development of an international auxiliary language called Novial [the acronym for Nov (New) International Auxiliary Language].

Another significant tradition of applied linguistics that emerged in early 20th-century England is associated with the work of C. K. Ogden, who is most well-known for his collaboration with I. A. Richards in developing Basic (British American Scientific International Commercial) English. One of the central features of Basic English was the use of a limited vocabulary – an approach that was also used by Henry Sweet, Charles Fries, Michael West, and others. What is probably the first use of the term applied linguistics in English occurred in *Word Economy: A Study in Applied Linguistics* by Leonora Wilhelmina Lockhart (1931), a publication sponsored by Ogden's Orthological Institute, where Lockhart was a staff member. She sought to provide further support for Basic English by studying the efficient use of language among shorthand specialists, scientists, grammarians, creative writers, and others. Using the term applied linguistics, Lockhart described her work as an attempt to legitimize the work of applied linguists by demonstrating the practical value of language research.

Significantly, all these traditions of early applied linguistics tried to distinguish themselves from philology, and its humanistic approach to the study of language, literature, and culture, while aligning themselves with the developing discipline of 'scientific' linguistics. It is also important to note that the scope of early applied linguistics was not necessarily limited to language teaching. One of the important common applications of linguistics among these traditions during this period was the development of international auxiliary languages (Novial), which grew in popularity as the need for international communication became increasingly clear. Another common application of linguistics at the time was spelling reform. As will be shown, however, it was the pedagogical work of the Reformists – particularly that of Henry Sweet and Otto Jespersen – that became influential in the development of early applied linguistics in the United States in the 1940s.

Early Applied Linguistics in the United States

Applied linguistics in early 20th-century North America was closely tied to the rise of American structural linguistics, which continued to dissociate itself from philology. In the early 20th century, applied linguistics was seen almost exclusively as linguistics applied. Furthermore, applied linguistics was an integral part of linguistics and had no separate disciplinary identity. Linguistic descriptions were applied to the translation of the Bible into Native American languages in an effort to convert Native Americans into Christians. During the 1940s, the applied linguistic approach to language teaching played an important role in training anthropologists for fieldwork. These activities, however, were integral to the development of structural linguistics. What came to be recognized as applied linguistics took place in the contexts of language teaching – specifically the teaching of English in schools, the teaching of foreign languages other than English, and the teaching of English as a second language.

In the United States, one of the earliest deliberate attempts to apply insights from linguistics to language teaching began in the context of the teaching of English in schools. This movement was spearheaded by Fred Newton Scott, the founding president of the National Council of Teachers of English

(NCTE), and his students – most notably Sterling Andrus Leonard and Charles C. Fries. By the time NCTE was established in 1911, English classrooms in the United States – from elementary school to college – had come to be characterized by strong emphases on mechanical correctness as well as prescriptive and rigid standards of grammar based largely on British literary usage and Latin grammar. Scott and his students in the Department of Rhetoric at the University of Michigan sought to replace this prescriptive grammar with a descriptive grammar of American English based on actual usage. The efforts of Fries and others in replacing a prescriptive grammar with a descriptive grammar of English had little effect in English classrooms. In fact, Fries's sustained effort to apply structural linguistics to the teaching of English was met by strong resistance from English teachers.

The efforts to apply linguistics also took place in the teaching of foreign languages. The foremost proponent of an applied linguistic approach to foreign language teaching was Leonard Bloomfield, who was strongly influenced by the Reform Movement. Although he began developing teaching materials in the 1930s, his view was slow to gain acceptance among foreign language teachers who had emphasized the importance of reading. Bloomfield's applied linguistic approach was adopted by the American Council of Learned Societies, which needed a way of preparing anthropologists for fieldwork, and by the Army Specialized Training Program (ASTP), which sought a way of providing language instruction for military personnel during World War II. Although these programs did not last long, Bloomfield's teaching program had a significant impact on foreign language teaching in the post-World War II era, as many colleges and high schools began to develop language programs modeled after the ASTP. Furthermore, following the launch of the Russian satellite Sputnik, the U.S. government generated renewed and intense interest in expanding and improving the teaching of foreign languages (as well as mathematics) for Americans. The National Defense Education Act of 1958 promulgated the Bloomfield approach through teacher preparation programs.

The most commonly recognized tradition of early U.S. applied linguistics arose in the context of teaching English as a second language. Beginning in the mid–1930s, Fries's interest shifted from the teaching of English as a mother tongue to the teaching of English as a second language. This shift coincided with U.S. foreign policy during this period that created projects and funding opportunities in second language teaching. In 1939, at an invitational conference cosponsored by the U.S. Department of State and the Rockefeller Foundation, Charles Fries and I. A. Richards proposed competing approaches to the teaching of English to Latin American students. Fries's applied linguistics approach, drawing heavily on the work of the Reformists, was chosen over Richard's approach rooted in Basic English, which he had developed with Ogden. An outcome of this discussion was the establishment of the English Language Institute (ELI) at the University of Michigan in 1941. The ELI and its applied linguistic approach to language teaching became influential throughout the United States and even throughout the world. The Michigan ELI became influential by creating the first professional preparation program of its kind. Many of the former students and staff members – including Harold B. Allen, H. Douglas Brown, Kenneth Croft, Edward Erazmus, Diane Larsen-Freeman, Larry Selinker, William Slager, and Ronald Wardhaugh – later moved to institutions where they created or taught in graduate programs.

The Growth of Applied Linguistics

The ELI's influence was also perpetuated by many of its theoretical and pedagogical publications, including *Language Learning: A Quarterly Journal of Applied Linguistics*, the first journal known to bear the term applied linguistics as part of its title. Created in 1948 by the Research Club in Applied Linguistics at the University of Michigan, *Language Learning* has played an important role in the initial development of applied linguistics as a field of inquiry. During the first 10 years of publication, the journal expanded its readership from 200 U.S. subscribers to 1200 subscribers in 76 countries. In the 1950s, applied linguistics began to move away from linguistics because mainstream linguists were increasingly uncomfortable with the idea of language studies with implications for everyday life. By the end of the decade, applied linguists had begun to identify itself not as a branch of linguistics but in what today would be called a separate discourse community at the intersection of linguistics and language teaching (Lado, 1960).

One of the first significant events in the institutionalization of applied linguistics after the Michigan ELI and *Language Learning* was the founding in 1950 of the Annual Round Table Meeting on Linguistics and Language Teaching (which later dropped 'Language Teaching' and became the Georgetown University Round Table on Languages and Linguistics), resulting in the publication of proceedings from these meetings. Stimulated by the developments of their peers in the United States, particularly the creation of *Language Learning* and the Georgetown Round Table, Edinburgh University, Scotland, in 1956 chartered the School of Applied Linguistics, a postgraduate

program in the field, with J. C. Catford as its first director. The program later produced the *Edinburgh Course in Applied Linguistics*, a four-volume textbook series, and many of its faculty members – including S. Pit Corder, Alan Davies, Peter Strevens, and Henry Widdowson – later contributed to the development of applied linguistics throughout the world. The interest in the study of language with applications to everyday language problems grew throughout the 1950s, and the discussion of the relationship between applied linguistics and language teaching began to appear in journals such as *Modern Language Journal*.

The growing interest in applied linguistics in both the United States and Great Britain led the Ford Foundation to fund the 1957 Conference on Linguistics and the Teaching of English as a Foreign Language in Ann Arbor, Michigan. The conference, cosponsored by the Linguistic Society of America and the Conference Board of Associated Research Councils (a British organization), prompted the creation in 1959 of the Center for Applied Linguistics (CAL) with Charles Ferguson as the founding director. Initially sponsored by the Modern Language Association of America, the center was incorporated in 1964 and became an independent organization. The initial mission of CAL was to serve as an international clearinghouse for the application of linguistics in solving practical language problems, including the teaching of English. Although, with the creation of CAL, applied linguistics was beginning to broaden its scope, the teaching of English outside Britain and the United States continued to serve as a vehicle for the spread of applied linguistics in various areas of the world. For example, CAL's early activities included cosponsoring a conference on the teaching of English abroad with the United States Information Agency and the British Council, contributing to the internationalization of applied linguistics.

In 1964, the International Association of Applied Linguistics [Association Internationale de la Linguistique Appliquée (AILA)] was created as an international association of various national organizations and liaison groups for applied linguists. Its official journal, *International Review of Applied Linguistics*, was first published in 1963 and, in the following year, AILA held its first international colloquium in Nancy, France. In 1967, the British Association for Applied Linguistics came into being, and it sponsored the second AILA meeting in 1969. By this time, AILA had affiliate organizations (national associations, working groups, and centers) in 18 European and North American countries, including Austria, Belgium, Canada, Czechoslovakia, Denmark, Federal Republic of Germany, Finland, France, German Democratic Republic, Great Britain, Hungary, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United States. Most of these countries were represented by a national or regional applied linguistics association, except Czechoslovakia, the German Democratic Republic, Hungary, and Switzerland, which were represented by working commissions, and Italy and the United States, which were represented by centers for applied linguistics.

As applied linguistics carved out its disciplinary niche outside of linguistics proper, it began to look to other fields, especially psychology and anthropology, for additional theoretical and methodological insights. As early as 1951, psychologist John B. Carroll (1951) explored the role of educational psychology in relation to the study and teaching of language at the second Round Table Meeting at Georgetown. In 1967, *Language Learning* officially announced its interest in publishing articles that drew on other disciplines.

The expansion of applied linguistics also meant that the language-related problem was now defined more broadly than just language teaching, encompassing first language acquisition, bilingualism, translation, sociolinguistics, psycholinguistics, writing systems, and language policy. Although the view of applied linguistics as the application of the theory of linguistics persisted, the sites of application had now expanded to include various other fields, such as geography, lexicography, medicine, and engineering as well as language teaching. The expanding scope of the field is evident in the 1969 meeting of AILA in England, which encompassed linguistic analysis of literary texts, computer analysis of texts, psychology of first language learning, psychology of second language learning, speech research, technology of language learning, language teaching materials, language teaching methodology, speech disorders and therapy, lexicography, language testing, error analysis, translation, contrastive linguistics, and sociolinguistics.

In 1973, when the editorial board of *Language Learning* considered publishing a survey of applied linguistics as a special issue, its members concluded that more than a journal issue was needed because of the broad scope of the field. Three years later, *A Survey of Applied Linguistics*, edited by Ronald Wardhaugh and H. Douglas Brown, was published. The volume covered a wide range of topics, including language development, first language teaching, orthography, reading, second language learning, second language teaching, bilingualism, dialectology, language and society, literature, language disorders, and language testing. Among other topics considered for inclusion, but omitted due to lack of space,

were translation, psycholinguistics, experimental phonetics, animal communication, extralinguistic communication, and language planning.

In the United States, Teachers of English to Speakers of Other Languages (TESOL) was created in 1966 to serve the needs of English language teaching professionals, and the publication of *TESOL Quarterly* began in the same year. In 1973, a group of applied linguists – including H. Douglas Brown, S. Pit Corder, Paul Holtzman, Robert B. Kaplan, Bernard Spolsky, Peter Strevens, Tony Robson, and G. Richard Tucker – gathered at the TESOL conference in San Juan, Puerto Rico, and began to discuss the creation of a separate organization. In the interim, the Linguistic Society of America created an applied linguistics subsection. In 1975, the constitution of TESOL was amended to allow special interest groups (SIGs), and an applied linguistics SIG (which later became the Applied Linguistics Interest Section) was created with Bernard Spolsky as its first chair. The 1977 TESOL convention in Miami sponsored a panel that explored the scope of applied linguistics, which led to the 1980 publication of *On the Scope of Applied Linguistics* edited by Robert Kaplan. Contributors were well-known and influential scholars from Great Britain and the United States – Edward M. Anthony, Thomas Buckingham, S. Pit Corder, David E. Eskey, Robert Kaplan, Stephen Krashen, John Oller, Joe Darwin Palmer, Peter Strevens, Bernard Spolsky, and Henry Widdowson – and one from South America, Francisco Gomes de Matos. In November 1977, the American Association for Applied Linguistics (AAAL) was created with Wilga Rivers as its first president.

In the same year, the Applied Linguistic Association of Australia, which had begun the publication of the *Australian Journal of Applied Linguistics* in 1976, came into being, with Ross Steele of the University of Sydney as the first president. Tim McNamara (2001) suggests that whereas U.S. and British applied linguistics in the early years tended to focus on the teaching of English to international students and to students in various areas of the world, the Australian tradition of applied linguistics, which began to arise in the 1960s, focused more on language education for its immigrant population and on foreign language education, especially French and German. Later, the emphasis shifted to the education of native English speakers and aboriginal children. In this tradition, in which linguistics was more broadly defined than in the United States, the work of linguists such as Michael Clyne and Michael Halliday continued to play an important role in applied linguistics, although other influential figures, such as Terry Quinn and Keith Horwood, brought a stronger teaching orientation to Australian applied linguistics.

As the field of applied linguistics continued to grow, the field expanded not only in its scope but also geographically. Toward the end of the 1970s and throughout the 1980s, new applied linguistics associations began to form in various areas of the World, including countries outside of continental Europe and North America. For example, the Irish Association for Applied Linguistics came into being in 1975, followed by the start up in 1978 of the Applied Linguistics Association of Korea. In 1980, the Greek Applied Linguistics Association and the Hong Kong Association for Applied Linguistics were established, and in 1982 the Japan Association for College English Teachers formed the Japan Association of Applied Linguistics. In Latin America, the Asociación Mexicana de Lingüística Aplicada and the Applied Linguistics Association of Brazil were established in 1986 and 1990, respectively. Today, AILA is a triennial congress of applied linguistic associations from throughout the world, serving applied linguistic organizations from 34 countries as well as 10 associate affiliates.

Applied Linguistics Today

The field of applied linguistics has extended in breadth and depth far beyond what anyone could imagine when the field, as it is known today, was named and recognized as an academic discipline. Researchers and scholars identifying themselves as applied linguists can be found on every continent and, as the affiliations to AILA attest, in many countries on each continent, and the number of new affiliates adds to greater international representation. Scholars in the member states of the European Union and North America, two long-standing centers of activity, are joined by colleagues in a range of global contexts.

Occupying many applied linguists in multilingual Europe are issues stemming from the development of the European Union and a pressing need for a language policy at the European level. The policy makers' goal was to respond in some equitable and practical way to the need for lingua franca communication among the member states at all levels of society and at the same time to keep other languages, particularly so-called smaller languages (spoken natively by a relatively small number of Europeans), from being devalued. This problem gains urgency with labor migration from various regions both inside and outside the European Union that adds to the multilingual mix. Thus, immigrant languages as well as the smaller

European languages (e.g., Dutch or Portuguese) or LWULTs (Less Widely Used and Lesser Taught) are the subject of investigations. Areas of focus include language attitudes, language policy, bilingual and multilingual programs and projects, teaching and learning materials, textbooks, teacher and school resources, methodological and analytical tools, and research perspectives.

Applied linguistics research is being enriched by work carried out in the Baltic States, Central and South America, the Middle East, Africa, China, South Asia, Southeast Asia, Australasia, and the Pacific region. Their contributions expand the number of new voices that document multiple sources of power in the interpretation, authentication, and representation of the concerns of applied linguistics and introduce other than Western perspectives on agendas and on feasible solutions to language-related problems.

At the regional or country level, applied linguistics is often characterized by a smaller set of specializations than presented and published at the international level. This set depends on a number of factors (e.g., urgency of language-related problems, the availability of qualified specialists, or sources of funding). A review of recent conference programs for annual meetings of the North American affiliate of AILA indicates that a large number of Canadians and Americans who attend the AAAL conference focus on second language acquisition, second/foreign language pedagogy, and discourse analysis. Members of the Russian affiliate focus on these areas as well but also have a long tradition of research in contrastive linguistics, error analysis, lexicography and lexicology – areas with a low profile, if represented at all, at the North American meeting. These differences in emphasis reveal as much about linguistic traditions as they do about the language problems that are identified as meriting consideration by applied linguistics.

Although applied linguistics in Europe and North America by and large encompasses more than language learning and teaching, many applied linguists elsewhere continue to be largely concerned with language teaching. Due to globalization of the world's economy and the attendant spread of English and its social values, considerable time, attention, and money are devoted to the teaching of English as a foreign or second language. In China, for example, although applied linguists have been engaged in activities associated with language standardization, the teaching and the computerization of the Chinese language, and the description and learning of minority languages, the teaching of foreign languages, particularly English, receives a large share of attention in current scholarship and governmental support. The recent surge in second language studies is in large part due to the modernization and economic development of China, with which English is closely associated. Reforms in English language teaching at all levels – from primary through tertiary – are a response to these social developments. The Chinese Ministry of Education has been promoting changes in teaching practice that move language teaching from a focus on intensive reading and close attention to the rules of sentence structure to the use of language for communicative purposes through spoken as well as written texts. For example, specialists in English language and teaching form the All-China Committee on the Reform of English Language Teaching at the College Level, whose charge is implementation of reforms in language teaching policies throughout China. The committee has been engaged in training teachers in new language teaching approaches and in writing textbooks reflecting advances in language teaching and language learning research that serve broad communicative goals. Regrettably, much of the research is published only in Chinese, although this is changing with postimplementation studies done outside China.

In other regions of Asia, studies investigate the challenges posed by the presence of, need for, and consequences of English, for example, in Malaysia, where the social, cultural, political, and educational challenges of English interface with Malay, also known as Bahasa Malaysia. In Korea, English language teaching's relationship to future employment prospects and financial security and parents' push for instruction at the earliest stages of schooling are prompting studies of the successes and failures of the teaching of English at all levels of education. Other topics and issues – some, but not all, relevant to Western contexts – dominate investigations, including the status of Southeast Asia as a linguistic region; adoption of national languages and the movement from nationalism to nationism (or pragmatism) in language education policy making; politics of language acquisition planning in multilingual societies; language use in multilingual settings (e.g., gatekeeping functions, code mixing and switching, and language and identity issues); the expanding role of English and the recently developed and developing varieties of English; teaching and learning of international, endangered, heritage, and less commonly taught languages; and societal bilingualism and models of formal bilingual education.

New Directions

Diverse interests and issues make up the research agenda of contemporary language-in-use research,

and it falls outside the scope of this article to discuss or describe them all. Three quite distinct directions in applied linguistic research serve to illustrate a sample of the theoretical, analytical, and ideological issues that have gained considerable attention in the past decade: critical applied linguistics, corpus analysis, and languages of wider communication.

Critical Applied Linguistics Applied linguists have been influenced by philosophical positions and intellectual activities carrying the label 'critical.' In the case of critical applied linguistics, the interest is addressing social problems involving language. Its proponents consider it an indispensable part of the intellectual activity that is applied linguistics, especially because applied linguistics claims as its mission the study of language with implications for everyday life, or the 'real world.' Critical applied linguists believe it is incumbent upon them to link language issues to general social issues (e.g., unemployment) and to be more than a student of language-related situations, namely to be an agent for social change. Generally, this is done within a broad political framework. Subsumed under this type of applied linguistics are critical literacy, critical pedagogy, and critical discourse analysis. Although this alternative approach has been the subject of a number of books, articles, and conference papers, it has yet to be widely accepted among applied linguists, many of whom are uncomfortable with the assumptions and implications of the critical position. It has, however, been widely discussed and debated, and its long-term effect on and place in the field is difficult to judge.

Corpus Analysis Corpus linguistics has been around a long time in the form of concordances used by lexicologists, lexicographers, and language syllabus designers. Its recent revival is linked to implementation of the computer in building corpora and for convenient data access. This has brought about the expansion of existing databases and the creation of new ones. A primary goal of corpus studies is identification of the linguistic characteristics and patterns associated with language use (both typical and atypical) in different contexts, for example, genres, settings, and audiences. The focus is empirical analysis, whereas the interpretation can be either qualitative or quantitative. Also new about contemporary corpus linguistics is the addition of such approaches as discourse analysis, intercultural communication, and conversational analysis to the applied linguists' tools and techniques.

Languages of Wider Communication Studies of languages of wider communication (LWC), languages that provide a mutually intelligible medium for speakers in multilingual societies, or lingua francas, are not new. However, advances in modern communication technology and travel have intensified a need for common languages. Subsequently, a variety of concerns have arisen that are relevant to areas of focus within applied linguistics, including language policy and planning, especially educational language planning; language variation and change; language teacher preparation; language and identity; and multilingualism and bilingualism. Given the role of English as a global lingua franca, it is the LWC with the lion's share of attention today. Much recent research, although not all, takes a sociolinguistic perspective and focuses on the uses and users, forms and functions, and models for learning and teaching in contexts outside of Great Britain and North America. Sociolinguistic profiles are one of the tools used to demonstrate the wide functional range, linguistic creativity, and status English has throughout the social layers of a given national or regional context. One of the more controversial aspects of this approach to the Englishes of Asia and Africa is its challenge to the ultimate authority of the native speaker. This orientation toward varieties of English is finding a place in studies of other languages of wider communication. Varieties of Spanish, both peninsular and colonial, for example, have been investigated with respect to their status among users. This is in part a response to the increased contact with, use, and learning of Spanish in the United States, conditions that make salient the choice of a variety to serve as classroom model and the status of the native speaker. The effects of the spread of languages such as English and Spanish and acknowledgment of the multiple norms their varieties provide are likely to keep applied linguists with interests in LWC engaged for some time in the solution of related language problems.

A Disciplinary Challenge

Although well represented as a discipline in established journals, book series, and conferences, consensus on a coherent theory or conceptual base for applied linguistics has not been reached. This is problematic if a goal of applied linguistics is to provide such a basis. Without a shared set of assumptions for analysis and interpretation, understanding the relationship between and among studies conducted in the various branches and subfields becomes difficult. For example, how do findings from studies in language policy relate to research in bilingual aphasia? What underlying base connects translation research to investigations of issues in second language identity?

An argument against a search for a unifying framework is that it is impossible to achieve. An applied

linguist, *per se*, does not actually exist in the sense that no one person is equally qualified or competent in the whole field. The introduction of new journals, a reflection of new areas of interest and orientation, tends to further fragment the field into specializations. This fragmentation makes it impossible to read all that is published under the rubric of applied linguistics or attend all the specialized conferences, symposia, or workshops that address these interests and specialties. The elaboration of new theoretical approaches, expansion in techniques and tools of the trade, and incorporation of an increasing number of subfields add to the challenge of defining applied linguistics as more than an umbrella term to cover a broad set of compartmentalized areas of study that are linked by a focus on language in use.

See also: Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Corpus Studies: Second Language; Critical Applied Linguistics; Educational Linguistics; English: World Englishes; Firth and the London School; Firth, John Rupert (1890–1960); Fries, Charles Carpenter (1897–1967); Halliday, Michael A. K. (b. 1925); Hirt, Hermann (1865–1936); Jakobson, Roman (1896–1982); Jespersen, Otto (1860–1943); Lado, Robert (1915–1995); Linguistics: Approaches; Modern Linguistics: 1800 to the Present Day; Ogden, Charles Kay (1889–1957); Passy, Paul Edouard (1859–1940); Plato and His Predecessorsx; Rask, Rasmus Kristian (1787–1832); Richards, Ivor Armstrong (1893–1979); Sweet, Henry (1845–1912).

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Applied Voice Input and Output Society

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The Applied Voice Input/Output Society was established initially as the *American* Voice Input/Output Society (AVIOS) and incorporated in the state of California in the early 1980s. Its headquarters is in San Jose. Although ostensibly a nonprofit, educational, member organization from its inception, AVIOS consisted, primarily, of a Board of Directors whose main focus was the organization and execution of an annual applied speech technology conference in the United States. The AVIOS mission in the early days was education. Speech technology was new, not well-established, and its potential and limitations were not well understood by the public. The goals of the annual AVIOS conference were to educate potential users about the many and varied applications of speech technology, and to provide technical information for companies venturing into this arena and for applied researchers developing the technology itself. Early AVIOS conferences consisted of papers describing applications of speech recognition and synthetic speech in consumer products, military operations, medical environments, assistive technologies, industrial, business, and financial tasks, and aviation, for example. When Interactive Voice Response (IVR) systems entered the marketplace in the late 1980s, IVR and other telecommunications-related papers were prominently featured in AVIOS conferences over the next decade.

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Applied Voice Input and Output Society

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Applying Pragmatics

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The term 'applying pragmatics' (AP) is coined in this entry in preference to 'applied pragmatics' to signal that AP is a dynamic, user-oriented activity. With a wide and evolving range of applications in the societal context, AP contrasts with the somewhat fossilized term 'applied linguistics', which is primarily associated with (foreign) language learning and teaching, although it does cover linguistic applications in other areas, such as speech pathology, translation, and lexicography. Applied pragmatics embraces practices rooted in a pragmatic perspective on language users, language use, and contexts of use, where the users and their complex of personal, social, cultural, and ideational contexts are seen as paramount. If pragmatics itself is a 'user-oriented science of language', AP is a problem-solving activity with an emphasis on using pragmatic knowledge critically, imaginatively, and constructively in the real-world context of the 'social struggle', rather than on rehearsing the tenets of canonical pragmatic theory (Mey, 2001: 308–319).

The relevance of pragmatics for the wider social agenda at the micro- and macro-levels of operation can be attributed in part to a series of developmental and formative tendencies: a concerted reaction to the syntactic formalism of Chomskyan linguistics and the preoccupation with language as system, where the language user and contexts of language use are disenfranchised; a 'social-critical' impetus, fueled by the desire to create a socially sensitive practice of language, typified for instance by the work of Basil Bernstein and the critical distinction he drew between restricted and elaborated code; a unique perspective on language as action and speech act theory, initiated by the work of J. L. Austin and the work of 'ordinary language philosophers'; and a perspective on language as communication rather than on language as grammar, deriving from the ethno-methodological tradition (Mey, 1998: 716) (*see* **Codes, Elaborated and Restricted (Bernstein)**; **Austin, John Langshaw (1911–1960)**; **Ethnomethodology**).

Levels of Application: Micro- and Macro-processes

Applying pragmatics operates at both the micro- and macro-levels of communication, although this distinction is approximate and more of a labeling convenience, since the two levels interpenetrate and synergize. 'Micro-pragmatics' looks at the day-to-day context of communication between individuals and groups situated in their local contexts. At the same time, local practices need to be seen against the societal backgrounds and institutional settings in which they occur (i.e., 'macro-pragmatics'). Micro- and macro-pragmatics are points in a continuum, each linking to the other and each serving as the focus according to the aim of the enquiry. Verschueren (1999: 220–224) cites Goodwin's (1994) analysis of the Rodney King trials as a case in point. While being arrested for a traffic violation in Los Angeles, King, an African-American, was subjected to a violent beating by police officers – an event that was filmed by an amateur video photographer and later broadcast on public television to public outrage. The police officers were subsequently put on trial and later acquitted. This led to street riots in Los Angeles and a subsequent retrial. As a communicative event, the courtroom proceedings can only be properly understood in relation to the macro-setting created by the institutional and social contexts in which they took place and through which they were mediated: the particular structure and participant roles and the associated verbal processes typical of the (U.S.) courtroom and a legal/trial setting; the actual and perceived social status of African-Americans within American society, as embodied by King at the time and subsequently; and the role of community and civil rights leaders and their adoption of the King case as a heuristic to draw attention to racism and police brutality. Thus, transcriptions of the trial process can be initially approached as instances of face-to-face linguistic interaction in a courtroom setting, but as the tale unfolds, the total event and its wide-reaching implications can only be properly understood in terms of how (U.S.) legal institutions reflect, endorse, and perpetuate particular societal practices and values.

Domains of Application: Micro- and Macro-pragmatics

As a perspective rather than a component of a linguistic theory, pragmatics can purposefully be applied in the investigation of all instances of language use, whether at the level of the individual, the group, the institution, or society as a whole, and whether at the level of the sentence/utterance or in relation to extended discourse (Verschueren, 1999: 203; Mey, 1998: 728). With its focus on the sentence/utterance level of discourse, micro-pragmatics is concerned primarily with the local constraints of the immediate

context, such as: deixis and the indexing of personal, temporal, and locative features; reference and the textually directive function of anaphora and cataphora; and word order and the sequencing/clustering of particles and their discourse function to modify illocutionary force, to facilitate the management of conversation, or to highlight salient parts in a stretch of discourse (*see* **Deixis and Anaphora: Pragmatic Approaches**; **Discourse Anaphora**; **Discourse Markers**). Yet, rooted as these linguistic features are in the immediate surroundings of an utterance, the link with the world becomes apparent as the focus shifts from the individual to the wider, institutionally and societally driven contexts in which humankind must necessarily operate. To quote Mey (2001: 177):

> The world in which people live is a coherent one, in which everything hangs together: none of its phenomena can be explained in isolation.

This is now the domain of macro-pragmatics. Institutional and institutionalized language practices figure prominently on the agenda (and often), where power asymmetries may arise as the result of gender difference, perceived social standing and social privilege, and (lack of) access to power. Typical research areas and domains of application include: medical discourse and the study of language use in doctor-patient interviews, psychoanalysis, and schizophrenic discourse; educational and pedagogical language practices, such as teacher-student interaction, language acquisition and the development of pragmatic competence, the articulation of language policy in relation to minority language instruction, wording of the learning/teaching curriculum, and, more generally, the sets of attitudes and beliefs propagated through the 'hidden curriculum'; the language of the workplace and its impact on management-worker relations; the language of the media, especially advertising discourse; the language of politics, government, and ideology, viewed as a force for linguistic manipulation and the engineering of human minds; and intercultural and international communication and the (lack of) understanding of cultural and communicative diversity, where what is pragmatically appropriate in the given context is at issue. In short, macro-pragmatics considers language use in terms of the totality of contexts in which the unique, dynamic, human activity of verbal communication takes place. It takes its cues from a variety of other related disciplines, such as (linguistic) anthropology, sociology, ethnology, and linguistic science itself. (*see* **Institutional Talk**; **Media and Language: Overview**; **Language in the Workplace: Different Approaches**; **Intercultural Pragmatics and Communication**; **Language Ideology**; **Social Aspects of Pragmatics**; **Language Politics**.)

Applying Pragmatics and the Language User

Applying pragmatics aims to develop an awareness of the crucial role that language plays in the construction of individual, group, and societal identities and the consequences of these 'constructed identities' for individual freedoms and the rights of individuals to participate fully in the communities of which they are a part. Exploration of the macro-context, in relation to which all language activity takes place, is the province of 'societal pragmatics', with its unique focus on the users of language and the prevailing conditions under which they use language. Applying pragmatics highlights problems of language use that arise in social contexts where the failure to communicate successfully may lead to social exclusion and disadvantage (*see* **Social Aspects of Pragmatics**).

The domain of education is often singled out as the main sphere of human activity in which social privilege and access to power are unevenly distributed. Education is mediated and perpetuated through language. Any departure from institutionally identified standards of linguistic behavior is stigmatized and faces sanction. Hence, talk of linguistic oppression may take place, as evidenced, for instance, by the opposition between 'low' and 'high' prestige dialects. The latter can be associated with the linguistic standards whose observance is dictated for wider use by a minority but dominant class of language user. This language oppression is nothing less than social control through language. The insights provided by AP enable us to develop an awareness of the insidious effects of language repression while calling for greater transparency in how society deals with the individual's linguistic behavior in the educational setting (Mey, 1998: 731–732) (*see* **Power and Pragmatics**).

Societal pragmatics is also concerned with other social contexts in which linguistic repression is at work and where individuals behave unwittingly, in a certain way, on account of an institutionalized power imbalance. Medical discourse and the instance of schizophrenic speech are a further case in point. Schizophrenic speech is associated with abnormal language. Such speech impoverishment represents a loss of humanness, because the 'nonlanguage' of the schizophrenic, as it is now defined, has become a symptom rather than a means of communication and thus a target for psychiatric manipulation and intervention. By raising questions about the nature of interactive norms in medical practice, AP can argue the need for informed intervention, where the relationships between humanness, language use, sanity, and institutional power are placed under public scrutiny (*see* **Psychoanalysis and Language**).

Matters of linguistic diversity and endangered languages are also fertile territory for pragmatic intervention. Language attrition, language loss, and language death are all issues on the pragmatic agenda, where description is seen only as an initial step to corrective action rather than as an end in itself (*see* **Minorities and Language; Endangered Languages**). Notwithstanding controversies over the global, cultural, political, and historical impact of English on smaller indigenous languages, AP can raise public awareness, help collate data, monitor linguistic policies and practices, seek to influence policymakers, and offer practical and professional support to speech communities actively wishing to preserve their languages. For instance, the Linguistic Society of America records that active intervention in this manner, as opposed to mere description and documentation, has shown highly promising results. Its website records that:

> Language loss is [often] far more directly a consequence of intolerance for diversity [than an inevitable result of progress], particularly when practiced by the powerful against the weak.

Applying Pragmatics and the Social Struggle

Applying pragmatics is explicitly concerned with situating the concerns of societal pragmatics in terms of a broad social-political agenda; it is interventionist rather than descriptive in its primary aims. Applying pragmatics is all about doing pragmatics. As a case in point, Mey (2001: 313–315) cites the success of the linguistic war against sexism and the now mostly abandoned use of generic pronoun *he* as a modest yet significant victory for nonsexist practice. Uprooting the hegemonic *he* is not just linguistic tinkering; it brings about a restructuring of stated social relationships, thereby facilitating gender equality (*see* **Gender and Language**).

Applying pragmatics shares common concerns with critical linguistics, whose aim is to expose the hidden relationships between social power and language use, against the backdrop of sociopolitical and cultural factors. Case studies include: political discourse, specifically the clichéd rhetoric of Britain's political parties; the language of labor disputes and their documentation in the media; the use of more critically aware pedagogies in (English) second-language teaching; and the characterization of social power as a given or natural phenomenon, legitimized through unquestioning acceptance by the public (*see* **Media and Language: Overview**).

Applying pragmatics has a crucial, empowering, and emancipatory role to play. It helps us understand the power of language to discriminate indiscriminately across a range of social contexts; it suggests an agenda for pragmatically informed intervention on behalf of the disenfranchised, underprivileged language user; and, last, it seeks to put language in the hands of the language user, wresting linguistic control from those who would undermine and deny the rights and freedoms of the individual (*see* **Pragmatics: Overview; Marxist Theories of Language**).

See also: Applied Linguistics: Overview and History; Austin, John Langshaw (1911–1960); Codes, Elaborated and Restricted (Bernstein); Context and Common Ground; Critical Discourse Analysis; Deixis and Anaphora: Pragmatic Approaches; Discourse Anaphora; Discourse Markers; Educational Linguistics; Endangered Languages; Ethnomethodology; Gender and Language; Institutional Talk; Intercultural Pragmatics and Communication; Language Ideology; Language in the Workplace: Different Approaches; Language Politics; Linguistic Anthropology; Marxist Theories of Language; Media and Language: Overview; Minorities and Language; Politics, Ideology and Discourse; Power and Pragmatics; Pragmatics: Overview; Schizophrenia and Language; Social Aspects of Pragmatics.

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Approaches to Translation, Linguistic

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Introduction

In this article, two senses in which it is possible to adopt a linguistic approach to translation are considered. In the first sense, the theorist adheres to something like John Catford's dictum:

> Translation is an operation performed on languages: a process of substituting a text in one language for a text in another. Clearly, then, any theory of translation must draw upon a theory of language—a general linguistic theory. [Catford, 1965: 1]

This type of linguistic approach to translation is explanatory in nature, the theorists' purpose being to account for the phenomenon of translation, and although, as the quotation from Catford makes plain, they will already have in mind a notion of what translation is (in this case 'an operation performed on languages'), it tends to be implied, if not always explicitly stated, that this application of linguistic theory is necessary for the production of a satisfactory theory of translation.

In the second sense, knowledge gained in linguistics is applied to translational phenomena, whereas the phenomenon of translation as such is theorized in its own right within the discipline known as translation studies. This is a descriptive, analytical approach, from which theoretical insights may of course very well arise, but within which the aim of applying insights from linguistics is primarily to achieve descriptive clarity.

Catford

Importance

One of the major developments in translation theory in the 20th century is Gideon Toury's (1980) reconceptualization of the notion of equivalence. Toury writes:

> Let us start our consideration of translation equivalence with a somewhat modified version of Catford's general definition (1965: 50), a modification which might be justified according to Catford's own treatment of the concept throughout his book, even if the exact formulation is not to be found in it: "Translation equivalence occurs when a SL and a TL text (or item) are relatable to (at least some of) the same relevant features". [Toury, 1980: 37]

By 'SL' and 'TL' in the quotation, Catford means 'source language' and 'target language'. The definition found in Catford (1965: 50) reads as follows (italics as in the original): "*Translation equivalence occurs when an SL and a TL text or item are relatable to (at least some of) the same features of substance*". (Catford's notion of substance will be discussed further below.) Toury (1980: 37) applies the notion of feature to "any linguistic and textual level, both in its material and functional aspects". His main addition to Catford's definition is the emphasis on relevance, of which he says (italics as in the original):

> [It] is a relative property in at least two respects: (1) it is to be regarded as an abbreviation for "relevant *for* something," or "relevant *from* a certain point of view," or the like; (2) since a text comprises various "features," on various levels (sounds, letters, syllables, morphemes, morpheme meanings, words, word meanings, compounds, meanings of compounds, syntactic patterns, sentences, sentence meanings, textual segments and principles of segmentation, etc.), all of which are – or at least may be – relevant for the totality of the text, the opposition relevant–irrelevant should be conceived of as polar, rather than binary, and we should speak in terms of *hierarchies of relevance*, rather than of absolute relevance. [Toury, 1980: 38]

When discussing translation equivalence, the relevance and selection of features (to be) shared by the two texts are central concerns. Features that are relevant when considered from the point of view of

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either source text (ST) or target text (TT) may not be considered relevant from the other's point of view, and this means that what *might* constitute and what *actually* constitutes translation equivalence may also differ from the two points of view:

> From ST's point of view, translation equivalence, i.e., the "similar relevant features" which both ST and TT are "relatable to" are determined by and proportionate to their degree of relevance for ST. In its ideal form, this relationship means the reconstruction of *all* the features relevant to ST . . . which means the interchangeability (or near-interchangeability) of TT and ST. It is precisely this (near) interchangeability which is usually postulated as a necessary condition for the occurrences of translation from ST's point of view. [Toury, 1980: 38]

From the point of view of target text, in contrast, "equivalence is not a postulated requirement, but an empirical fact, like TT itself: the *actual* relationships obtaining between TT and ST" (Toury, 1980: 39; italics as in the original).

Toury calls any theory that adopts the first point of view of equivalence an ST-oriented theory. Because such a theory approaches the question of equivalence with the ideal of optimal reconstruction of ST in TT in mind as a goal, whereas actual TTs rarely manifest this ST-oriented ideal (because it tends to be far from ideal from the point of view of TT and its readership and culture), ST-oriented theories are generally very poor at accounting for actual translations; Toury argues instead for a TT-oriented approach, which (1) accepts that texts that are *viewed* as translations, in the (literary) textual systems within which they function, *are* translations, and (2) seeks to account for TT–ST relationships in terms of norms governing translation in the target culture.

This 'target text' turn in translation studies liberated the discipline from the stultification that ST-oriented theories tend to promote because of the embarrassing gap they leave between theory (translation equivalence obtains very rarely, if ever) and fact (in all cultures, texts exist that are regarded as translations and, therefore, as, in some sense, equivalent to other texts, viewed as originals). For this reason, Toury's adoption and adaption of Catford's definition of translation equivalence was crucial to the development of the discipline of translation studies in its present form, though it is important to point out that the descriptive approach, when linguistically oriented (which it need not be) is of the second type mentioned in the introduction: it applies insights from linguistics to describe phenomena that are theorized within translation studies. Few translation theorists these days would agree with Catford (1965: 19) that "the theory of translation is essentially a theory of applied linguistics"; there is a good deal more to translation theory than that.

Detail

The linguistic theory that Catford draws on is Halliday's (1961) early version of systemic functional grammar, which is outlined in the first chapter of Catford (1965). Apart from explaining "the fundamental categories of linguistic theory . . . *unit*, *structure*, *class* and *system*" (Catford, 1965: 5), Catford also explains the notion of meaning with which he (following Firth, 1957) operates: language is a type of patterned behavior in which human beings, acting interchangeably as performers and addressees, interact in social situations (1965: 1). In order to account for this behavior, the theory adopts a number of abstractions at a number of levels. First, there are the extralinguistic levels of (1) medium substance (phonic substance for speech; graphic substance for written language and, presumably, movement, in the case of signing) and (2) situation substance. Second, there are the properly linguistic levels of medium form (phonology, graphology, grammar, and lexis) and "the relationship between (the units of) grammar/lexis and situation (substance) is that of contextual meaning, or *context*" (1965: 3).

However, in addition to contextual meaning, it is necessary to consider formal meaning "which is the way any linguistic item operates in the network of formal relations" (Catford, 1965: 5); meaning as such is defined as "the total network of relations entered into by any linguistic form" (1965: 35). Because "every language is ultimately *sui generis* – its categories being defined in terms of relations holding within the language itself" (1965: 27), no two languages can realize the same formal meanings; only approximate formal correspondence can be established. Formal correspondence occurs when a category in one language occupies as nearly as possible the same place in the 'economy' of its language as a category in another language occupies in the economy of its language. Contextual meaning is similarly language specific, since the grouping of relevant situational features that a linguistic item is related to is "rarely the same in any two languages" and is, in any case, "related to formal meaning" (1965: 36). Catford provides an example from the deictic systems of North East Scottish dialect and Standard English. In the Scottish dialect, a three-term system operates (*this*, *that*, *yon*), whereas in English, there are four terms (*this*, *these*, *that*, *those*). Then (Catford, 1965: 37):

> if we assume that both systems cover approximately the same total contextual field we can represent the

contextual meanings of the constituent terms diagrammatically as follows:

	S	P		
I	this	these	this	1
			that	2
II	that	those	yon	3
	ST.E.			N.E. Sco.

The Standard English system is represented here as contextually 2-dimensional: it embodies two degrees of deixis (I, II) and two numbers (Singular, Plural). The N.E. Scots system is unidimensional, embodying only deixis – 3 degrees this time (1, 2, 3). Numerosity is a contextually irrelevant feature of situations for the N.E. Scots system.

It is clear that if we translate from Standard English to Scots we cannot 'transfer meaning'. There is no way in which, for example, Scots *that* can be said to 'mean the same' as English *that* or *this* or *these* or *those*. On a given occasion it may refer to, or be relatable to, the same feature of the situation as one of the English deictics – but its formal and contextual *meaning* is clearly different.

In view of this, it is clear that the term 'equivalent' in Catford's definition of translation cannot mean 'equivalent in meaning'. For Catford, meaning is language specific: "An SL text has an SL meaning, and a TL text has a TL meaning", and translation equivalence is grounded in interchangeability of items in situations. Since "the sentence is the grammatical unit most directly related to speech-function within a situation", then "translation equivalence can nearly always be established at sentence-rank" (Catford, 1965: 35); but even if a pair of textual items are interchangeable in a given situation, it is rarely the case that both pair members will be relatable to all of the same features of the situation. Therefore, the aim has to be the selection of items in the translation that have "the greatest possible overlap of situational range" (1965: 49) with items in the source text.

Catford sees "the bundles of situational features which are contextually relevant to a text" as "bundles of *distinctive features*" analogous to distinctive features in phonology, and even though no general theory of situation substance is available, we can say (Catford, 1965: 50; italics as in the original) that "*translation equivalence occurs when an SL and a TL text or item are relatable to (at least some of) the same features of substance*".

Nida

Importance

Whereas Catford's influence on translation studies today is undoubtedly greatest in its indirect manifestation in Toury's work (the latter being seminal to the contemporary discipline), Eugene Nida's influence has been more direct. This may result in part from the obvious relevance of his work to a ready-made audience consisting of a clearly defined and influential group of people who share his interest in Bible translating (his book, published in 1964, was dedicated to colleagues in the Translations Department of the American Bible Society), and in part from the fact that the concepts of dynamic and formal equivalence that Nida developed, although (or because) they are less carefully elaborated and theorized than any of the concepts discussed by Catford, may have more direct and easy appeal to a broad readership. Perhaps the inclusion of a chapter on 'The tradition of translation in the Western World' (Nida, 1964: chap. 2) also helps, and Nida's book is without a doubt wider in scope than Catford's. In any case, influences from Nida may be perceived in functional and cultural approaches to translation (*see* **Functional Approaches to Translation: Skopos Theory**), whereas Catford's perceived preoccupation with linguistic equivalence has tended (somewhat unthinkingly, perhaps) to be dismissed as irrelevant or at least as secondary to other considerations.

Detail

Whereas Catford sets out with a descriptivist, surface-linguistic, structuralist-oriented linguistic theory in mind, Nida declares allegiance to Chomsky's (1957, 1961) generative view of language, which "seems particularly important for a translator, for in translating from one language into another he must go beyond mere comparison of corresponding structures and attempt to describe the mechanisms by which the total message is decoded, transferred, and transformed into the structures of another language" (Nida, 1964: 9). Nida draws on this theory to develop his 'decomposition and recomposition' model of translation, comprising (1) a reduction of ST to its "structurally simplest and most semantically evident kernels", (2) transference of the meaning of these to another language, and (3) generation of "the stylistically and semantically equivalent" expressions in that language (1964: 68).

Nida is more eclectic than Catford insofar as he draws on approaches to language other than Chomsky's, in particular when discussing the concepts of meaning (which is not surprising, given Chomsky's exclusive orientation at that time to syntax). Nevertheless, Nida's main inspiration here is Katz and Fodor's (1962, 1963) attempt to add a semantics to the generative framework. Meaning, according to Nida, is a tripartite phenomenon consisting of

linguistic, referential, and emotive meaning. Linguistic and referential meaning derive from intralinguistic relationships and from relationships between these and context, and can be dealt with using a dichotomy-and-contrast-based apparatus of markers and distinguishers in the Katz and Fodor mold. Emotive meaning, however, concerns "the responses of the participants in the communicative act" (Nida, 1964: 70) and needs to be considered in terms of "polar contrasts separated by a graded series with a high percentage of usages for most words clustering around the neutral position" (1964: 113). Different selections of such series would be appropriate for different words, and the resultant matrix for each word would be highly complex.

In addition to meaning as such, a translator also needs to pay attention to what Nida referred to as "the dynamic dimension in communication" (Nida, 1964: chap. 6). His list of components of the communicative act is strongly reminiscent of Jakobson's enumeration of the factors involved in verbal communication (Jakobson, 1960: 66), comprising (Nida, 1964: 120) (1) the subject matter, (2) the participants, (3) the linguistic act, (4) the code used, and (5) the message, that is "the particular way in which the subject matter is encoded into specific symbols and arrangements". Of these components, the participants and the message are especially important, since the many different types of translation that exist can generally be accounted for by means of reference to them (Nida, 1964: 156). Messages "differ primarily in the degree to which content or form is the dominant consideration" (1964: 156), although content and form can never be completely divorced from one another. The translator's purpose may be to inform equally about content and form, but may also involve much more than information and may differ from the original author's purpose. For example, the translator may want to give the audience an insight into an alien society by producing a text closely mirroring one that was originally produced, e.g., to amuse or to guide behavior; but whatever the translator's aim, the intended audience must be considered, for "audiences differ both in decoding ability and in potential interest" (1964: 158). At this point, Nida draws a 'polar' distinction (1964: 171) between formal and dynamic equivalence (1964: 159) that has become extremely well known within translation studies, in spite of the difficulties that inhere the "principle of equivalent effect", which plays a crucial role in the distinction:

> Formal equivalence focuses attention on the message itself, in both form and content. In such a translation one is concerned with such correspondences as poetry to poetry, sentence to sentence, and concept to concept. . . . In contrast, a translation which attempts to produce a dynamic rather than a formal equivalence is based upon "the principle of equivalent effect". . . . In such a translation one is not so concerned with matching the receptor-language message with the source-language message, but . . . that the relationship between receptor and message should be substantially the same as that which existed between the original receptors and the message. [Nida, 1964: 159]

A translation that aims for formal equivalence is basically source oriented whereas a translation that aims for dynamic equivalence is oriented toward receptor response, although, as a translation, it "must clearly reflect the meaning and intent of the source" (Nida, 1964: 166). When judging translations, therefore, there are three criteria to satisfy (1964: 182): efficiency of communication, comprehension of intent, and equivalence of response. Efficiency of communication is achieved when there is maximal reception given minimal decoding effort. Comprehension of intent and equivalence of response may both be understood from the point of view of either the source or the receptor culture, depending on whether the translation (to be produced) is intended to be primarily dynamically or primarily formally equivalent to the original. However, the extent to which intent can be interpreted in a cultural context other than the one in which the message was first formulated is directly proportional to the universality of the message (1964: 182–183). The three criteria interact, since "a translation which is exceedingly literal [a formal equivalence, or F-E, translation] contains numerous awkward expressions, and is hence "overloaded" as far as the prospective receptors are concerned" (Nida, 1964: 183–184). On the other hand, "a D-E [dynamic equivalence] translation may likewise fail to come up to a valid standard, if in the translator's concern for the response of the receptors he has been unfaithful to the content of the original message". On the whole, though, Nida favors dynamic equivalence translation, since the overload that results from formal equivalence translation easily becomes so great that the translation becomes incomprehensible. The worst that can happen in dynamic equivalence translating is that translators may conceal their 'slanting' (1964: 184).

It is interesting that Nida, who set out with Chomsky's essentially psychologically, or at least intraorganism-oriented, view of language, remains largely focused on mental categories in his elucidation of translation equivalence, whereas Catford, whose starting point is more sociolinguistically oriented, remains largely focused on the relationship between text and context in his exposition of the notion.

Developments

For historical reasons, it is not possible to pursue the interesting issue of how a theory of translation that is developed on the basis of a linguistic theory might adjust to developments in the theory from which it is derived. Catford seems not to have pursued an interest in translation theory beyond 1967, at least not publicly, and translation scholars who have drawn on later versions of systemic functional grammar have used it selectively as a source of descriptive categorization or in translator pedagogy. Nida's publications subsequent to 1969 (Nida and Taber (1969) elaborate on Nida (1964)) have not maintained any obvious allegiance to Chomsky, and the latter's later output has tended not to appeal to translation studies scholars generally. More recent linguistic approaches to translation, although they are obviously not completely divorced from those of Catford and Nida (especially Nida), tend to be grounded in later linguistic theories that are only indirectly related to those of Halliday and Chomsky.

Gutt

Ernst-August Gutt's (1991) application to translation of Sperber and Wilson's (1986) relevance theory is the first and only book-length, systematic attempt to subsume translation theory within linguistics since Catford (1965), and because translation studies had by 1991 developed into a buoyant, independent discipline, the point of Gutt's effort, and its nature, differ significantly from Catford's. Whereas Catford perceived a need to account for a previously untheorized phenomenon, by 1991, several theories of or approaches to translation were available, and scholars had identified a number of theoretical concepts, concerns, and questions generally felt to be central to the discipline, or at least to subareas within it.

Gutt perceives this multiplicity of theories of and approaches to translation as a weakness and considers his own task to be to demonstrate that relevance theory is able to account for all of the phenomena perceived to be central to translation studies, and that relevance theory, therefore, is all the theory that translation studies needs (Gutt, 1991: vii–viii). Having outlined relevance theory, Gutt proceeds to measure the achievements of a number of approaches to translation against what might be accomplished by the application to the phenomena that they cover of relevance theory. He looks first at House's (1981) model for translation quality assessment and the distinction that House draws between covert and overt translation. A covert translation is one that does not reveal itself to be a translation in any way and that is generally regarded as, or as having the same status as, a first-written (original) text in the receptor culture. Covert translations alone are able to achieve functional equivalence with their source texts, and functional equivalence is House's measure of translation quality. House means by 'function' the use that a text can be put to in particular situations (House, 1981: 37), but Gutt points out that it is often very difficult to be precise about what function a particular text or text-part fulfills, and that if a translation is created in such a way that it is able to fulfill one of the source text's functions, this may mean that another function has to be forsaken. Furthermore, preservation of functionality for the receptor culture often requires radical differences at other levels, as was pointed out by, e.g., Hönig and Kussmaul (1984), who want to maintain that an advertisement that differs from its 'source' in all respects except for the preservation of the appeal function (the advertiser wants to sell a product) is nevertheless a translation of that source. This makes it difficult to distinguish translation from other forms of derived text production, whereas relevance theory would be able to account for the difference in terms of the distinction between descriptive use and interpretive use and resemblance. Descriptive use of a text occurs when the text is intended to achieve relevance in its own right (regardless of its mode of coming into existence). Translation theory need concern itself only with texts that achieve their relevance in virtue of their interpretive resemblance to other texts.

Gutt (1991: chap. 4) discusses Nida's notion of dynamic equivalence, which, as previously mentioned, is achieved when readers of a translation respond to it in the same way that readers of the original responded. In relevance theoretic terms, this means that the readers of the translation must be able to retrieve the set of assumptions that the original communicator intended to convey, and for that to be possible, they need access to the contextual information that the communicator intended the receptors of the message to use as a basis for drawing the appropriate inferences, on the basis of the interaction of the context with the discourse. Since the original context is rarely accessible to the readers of a translation, the notion of dynamic equivalence is inadequate as a measure of translational success, and Gutt (1991: chap. 5) argues that the relevance theoretic framework can provide a more satisfactory account. Relevance theory constrains translation both in terms of what it should convey and how this should be expressed:

> If we ask in what respects the intended interpretation of the translation should resemble the original, the answer is: in respects that make it adequately relevant to the audience – that is, that offer adequate contextual effects;

> if we ask how the translation should be expressed, the answer is: it should be expressed in such a manner that it yields the intended interpretation without putting the audience to unnecessary processing effort. [Gutt, 1991: 101–102]

In order to minimize processing effort, a translation should be clear and natural in expression, and in order to be optimally relevant to its audience as a text in interpretive use, it must be faithful to the original with respect to features of interest to the new audience (cf. Toury's conception of relevance as variable according to point of view). It is, however, possible to achieve these goals by way of two modes of translating, the distinction between which derives from the distinction drawn in relevance theory, between direct and indirect quotation (Gutt, 1991: chap. 6). Indirect translation focuses more on what was said than on the manner of expression, whereas direct translation focuses on the use in the translation of "communicative clues" (1991: 127) or stylistic properties that will guide the receptors of the translation to the interpretation intended by the communicator.

The task of the translator, in relevance theoretic parlance, is outlined by Gutt as follows (italics as in the original):

> The translator's responsibility begins with the formation of his informative intention ... The translator needs to clarify for himself whether his informative intention is, in fact, communicable, that is, whether he can reasonably expect the audience to derive this interpretation in consistency with the principle of relevance. Thus, the translator is confronted not only with the question of *how* he should communicate, but *what* he can reasonably expect to convey by means of his translation.
>
> The answer to this question will be determined by his view of the cognitive environment of the target audience, and it will affect some basic decisions. It will, for example, have a bearing on whether he should engage in interpretive use at all or whether descriptive use would be more appropriate ... There are instances where the fact that the information given in the receptor language text interpretively resembles an original in another language is quite irrelevant – in which case the 'translator' would simply engage in descriptive use ....
>
> In other cases the translator may judge it relevant to the audience to recognize that the receptor language text is presented in virtue of its resemblance with an original in another language. In such situations he will have to consider further what degree of resemblance he could aim for, being aware that communicability requires that the receptor language text resemble the original 'closely enough in relevant respects' (Wilson and Sperber, 1988a, p. 137). To determine what is close enough resemblance in relevant respects, the translator needs to look at both the likely benefits, that is, the contextual effects, and also at the processing effort involved for the audience. Thus he will have to choose between indirect and direct translation, and also to decide whether resemblance in linguistic properties should be included as well. [Gutt, 1991: 180–181]

Gutt's reformulation of some of the concerns of translation scholars in relevance theoretic terms has not swayed the majority away from their own preferred theoretical leanings or approaches. In particular, the shift that Gutt hoped that his book would effect (1991: 20), away from preoccupations with translational behavior and description within translation studies, has not occurred. Research has continued in the area of translational behavior, involving both 'talk aloud protocols' and other research methods, and interest in descriptive translation studies has received a significant boost with the advent of electronic means for assembling and analyzing texts (*see* **Machine Readable Corpora** and **Translation Universals**). An application of a linguistic theory to translation that takes especial account of the phenomenon of translation universals, posited by some scholars who have drawn on findings produced within this descriptivist framework, is Sandra Halverson's (2003) application of Langacker's Cognitive grammar (*see* **Cognitive Grammar**).

Halverson

Halverson describes what happens in a translation task as follows:

> In a translation task, a semantic network is activated by lexical and grammatical structures in ST [source text]. Within this activated network, which also includes nodes for TL [target language] words and grammatical structures, highly salient structures will exert a gravitational pull, resulting in an overrepresentation in translation of the specific TL lexical and grammatical structures that correspond to those salient nodes and configurations in the schematic network. [Halverson, 2003: 218]

Halverson demonstrates how the types of translation generally discussed in the literature can be explained in terms of this type of overrepresentation.

Using Data and Theoretical Insights from Linguistics in Descriptive Translation Studies

Rather than attempting to subsume translation within linguistics, it is possible to use linguistics as a source of information and descriptive clarity in studies that concentrate on the language of translated texts, perhaps in comparison with their source texts.

This type of activity is clearly different in kind from Catford's and Gutt's use of a linguistic theory to derive a theory of translation. Rather, it is an attempt to attend in an informed manner to the language of texts and translation, and this, as has been argued elsewhere (Malmkjær, 2005: 69), is a way of adopting what Scruton (1974: 145) terms the aesthetic attitude to these objects: it is a way of seeking to understand one's own (and by extension, perhaps others') reactions to them. The descriptive clarity that may be derived in this way can then be fed back into linguistics, because observing the language of translations in comparison with their source texts often provides surprising insights into both languages, which monolingual linguistic study is less likely to bring to the analyst's attention. As Goethe remarked (quotation from Gutknecht and Rölle (1996: 211)), "Wer fremde Sprachen nicht kennt, weiss nichts von seiner eigenen" (roughly, "those who don't know foreign languages know nothing of their own"), or, as Jakobson puts it, in more scholarly terms:

> Equivalence in difference is the cardinal problem of language and the pivotal concern of linguistics ... No linguistic specimen may be interpreted by the science of language without a translation of its signs into other signs of the same system or into signs of another system. Any comparison of two languages implies an examination of their mutual translatability; the widespread practice of interlingual communication, particularly translating activities, must be kept under constant scrutiny by linguistic science. [Jakobson, 1959: 233–234]

Studies in this vein can be found in Malmkjær (1993, 1995a,b, 1996, 1997, 1999, 2002).

See also: Cognitive Grammar; Functional Approaches to Translation: Skopos Theory; Machine Readable Corpora; Translation Universals.

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Approaches to Translation: Relevance Theory

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Relevance theory (RT) is a cognition-based theory of communication developed by Sperber and Wilson in the mid-1980s (Sperber and Wilson, 1986) (*see* **Relevance Theory**). It was applied to translation soon afterward (Gutt, 1988, 1991).

Main Characteristics

Following the gist of relevance theory in general, its application to translation is primarily concerned with the explanation of translation as an act of communication. It addresses two central questions: (1) What is it in the human mind that makes it possible for people to express in one language what was said in another? and (2) What are the cognitive cause-effect relations (cognitive laws) on which the success or failure of translation depends? Unlike many other approaches, this theory is not concerned with describing or classifying translated texts by types or with prescribing how translation is to be done.

The general contribution of relevance theory to translation practice may be compared to that made by one of the natural sciences, such as physics, to some field of engineering. As a better understanding of the cause-effect relations in nature can lead to improved engineering practices, so a better understanding of the cognitive cause-effect relations in communication can improve translation work. One important feature of the RT approach is its focus on what translation can or cannot achieve. This perspective may help establish a new realism in translation practice.

In essence, translation is viewed as an act of communication about another act of communication. In this way it is seen as related to quotation, with the added difficulty of crossing a language boundary. However, RT research highlights the significance of contextual differences between original and translation readership. It shows that such differences can be a second major hurdle to successful translation, one that may even outweigh language problems.

Initial Approach

In RT the term 'utterances' refers both to oral and written communication. Utterances can be used in two distinct ways: descriptively or interpretively. An utterance is used descriptively when it is intended to provide information about the state of affairs to which it refers; it is used interpretively when it is intended to provide information about the meaning of another utterance. For this intention to succeed, the new utterance has to resemble the original utterance in meaning. For further details on this distinction, see Sperber and Wilson (1995).

Following this distinction, initially relevance theorists treated translation as an instance of interpretive use based on resemblance in the semantic representations (logical forms) of the utterances (Sperber and Wilson, 1986; Wilson and Sperber, 1988). Note that the RT account of translation should not be confused with the interpretive approach of the 'Paris school' of translation (Seleskovitch, 1978; Seleskovitch and Lederer, 1984).

Translation as Interpretive Use

However, an account of translation confined to resemblance in semantic representations (logical forms) is not adequate (Gutt, 1991, 2000). First of all, interpretive resemblance between utterances needs to be defined not in terms of their semantic representations (logical forms) but in terms of their interpretations.

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The interpretation of an utterance consists of the set of thoughts (RT: assumptions) it is intended to convey. Two interpretations resemble each other to the extent that they contain the same assumptions. Thus, interpretive resemblance between utterances forms a continuum ranging from no resemblance (= no assumptions shared) to complete interpretive resemblance (= all assumptions shared). Applying these insights to translation, then, translations are acts of the interlingual interpretive use of utterances based on the resemblance of their interpretations.

Using the maximal end-point of the resemblance continuum – complete interpretive resemblance – the notion 'direct translation' can be defined along the following lines. In intralingual communication, one of the unique features of direct quotation is that it allows, at least in principle, the full recovery of the originally intended interpretation – provided it is processed in the originally intended context. This crucial condition follows from the cause-effect interdependence of stimulus, intended interpretation, and context, due to the inferential nature of communication (Sperber and Wilson, 1986; Gutt, 1991).

Applied to cross-language situations, one can define a mode of interlingual communication that aims to convey the same intended interpretation as the original text – again with the crucial proviso that it is processed using the same contextual information as the original. This mode is called 'direct translation' (Gutt, 1991). Because contextual information is rarely ever exactly the same between two individuals, direct translation is better characterized in terms of a dependency relationship: The closer the context of a direct translation resembles that of the original, the closer its interpretation will resemble the original interpretation.

The demand that translations should convey the same meaning as the original (= achieve complete interpretive resemblance) has, of course, been voiced for centuries. The significance of the notion of 'direct translation' is the realization that the achievement of this goal depends a great deal on the use of the originally intended contextual information. To expect a translated text to communicate accurately the intended meaning of the original in a context significantly different from the original one goes against the basic laws by which communication works and is therefore unrealistic. This insight entails that readers of translations who are interested in getting as close to the meaning of the original as possible must familiarize themselves with the original context (Gutt, 1991). This is not an option, but a necessity conditioned by the cognitive laws of communication.

Regarding language differences, the achievement of interpretive resemblance in translation depends not so much on the sharing of concrete linguistic properties as on the possibility of replicating in the target language the more abstract communicative clues provided by those properties (Gutt, 1991). For example, the source language may have a special morpheme to indicate the heightened relevance of a text section; even though the target language may lack such a morpheme, other means, perhaps a combination of lexical and structural features, may have the same effect on the interpretation. In such cases, the translation would yield the same interpretation as the original – if processed with the original contextual information – by providing the same communicative clues, despite the linguistic differences.

Although the possibility of matching communicative clues is not generally guaranteed, the mode of direct translation does offer the highest possible degree of interpretive resemblance to the original, depending on how closely the context used resembles that of the original.

Any translation aiming at lower degrees of interpretive resemblance falls under the mode of 'indirect translation' (Gutt, 1991). Indirect translation does not require readers to familiarize themselves with the original context; in fact, it typically uses the current context of the target audience. This feature gives indirect translation the advantage of high spontaneous comprehensibility.

Significantly, according to the cognitive laws of communication, the nature of that particular context determines the degree to which its meaning can resemble that of the original. This explains why the popular demand that translations should give the full meaning of the original and be easily comprehensible cannot be fulfilled in situations where the context of the translation differs significantly from that of the original.

Thus, here is the answer to the question raised at the beginning of this article about the cognitive laws that determine the success of translation: The possibilities and limitations of translation are very much determined by the general human comprehension procedure, with its causal interaction of meaning, stimulus, and context. This highlights in a new way the crucial role that context plays in translation, quite apart from language differences.

The answer to the other question raised above – what characteristic of the human mind makes translation possible? – is that the phenomenon of translation can be explained in terms of the interaction of the general ability to communicate (as spelled out in relevance theory) and the language faculty. Taken

together, these two answers suggest that, from the cognitive point of view, no special theory of translation is needed, neither to explain the human ability to translate nor the success and failure of translations to communicate (Gutt, 1991).

This approach also explains the inconclusiveness of numerous attempts to define clearly the difference between translation and paraphrase, between literal and free translation, and the like in terms of the similarities or differences between original and target text. Interpretive resemblance being a continuum, it offers no nonarbitrary points for such demarcations.

In some cases, texts are based on information found in texts in some other language without, however, any intention of informing the target readership about those other texts. Examples are tourist brochures, instruction manuals, and advertisements. Traditionally, such texts have been dealt with by translation theory ('covert translations'; House, 1981). Yet, what ultimately accounts for the success or failure of such texts is not how closely they resemble the original, but whether the information they provide is correct and/or effective. Thus, they turn out to be instances of interlingual descriptive use and are quite different from translation (Gutt, 1991).

Criticisms

The RT approach to translation has found considerable attention worldwide (for a list of reviews, see Gutt, 2000). Responses have ranged from severe criticism to approval, application, and further development of the approach.

One major criticism is directed against the claim that no distinct theory of translation is required (Tirkkonen-Condit, 1992). This objection reflects, however, a failure to distinguish between two quite different notions of theory: explanatory theory on the one hand, which is concerned with the understanding of cause-effect relations in a particular domain, and descriptive theory on the other, which aims at the systematic description of phenomena seen as related in some way. The obsoleteness of a distinct translation theory is asserted with regard to cognitive explanation not with regard to the systematic compilation of knowledge about translation (see Gutt, 2000).

The lack of concrete translation rules and guidelines has been another source of criticism (Malmkjaer, 1992). It is not that these concrete rules are without value, but that their value is seriously limited. In essence, they are particular applications of the general laws of communication. Yet, because their limitations are rarely spelled out, they often fail to provide reliable guidance (Savory, 1957). Furthermore, they do not provide help to the translator for any problems they do not address. Understanding the basic laws of communication prepares translators for all situations and is therefore more helpful in the long term (for a further discussion of this issue, see Gutt, 2000).

The treatment of 'covert translation' as interlingual descriptive use rather than as translation proper has also been criticized (Chesterman, 2002). Yet, on the theoretical side, treating 'covert translation' as 'translation' obscures their fundamentally different nature. On the practical side, it tends to conceal that target language originals would often be much more effective than covertly translated texts. The translational approach is often used simply as a matter of convenience or cost reduction (for further discussion, see Gutt, 2000).

The neglect of the notion 'skopos' introduced by Reiss and Vermeer (1984) – that is, of the purpose for which a translation is made – has also come under criticism (Hatim, 1998). The RT response to this is twofold. First, the notion 'skopos' has largely arisen from the need to explain the often radical differences between original and target language texts occurring in covert translation. Because covert translations function as originals in their own right, 'skopos' is not needed to explain them as cases of translation. Second in translation proper (interlingual interpretive use), the success or failure of translated texts is already accounted for by the degree to which the intentions of the translator and the expectations of the target audience match up (Gutt, 1991, 2000).

Further Developments

Later developments in relevance theory have generalized the notion of 'interpretive use' by introducing the concept of 'metarepresentation' (Noh, 2000; Sperber, 2000; Wilson, 2000). Like interpretive use, metarepresentation occurs when one representation is used to represent another; for example, when quoting someone. In contrast to interpretive use, the two representations do not have to resemble each other in their meaning, but can share their formal linguistic properties – metalinguistic resemblance (Wilson, 2000). Wilson argued that metarepresentation captures all instances of "representation by resemblance," thus "leaving the way open to a unified account" (Wilson, 2000: 425).

Translation as Metarepresenational Use

Applying these insights, Almazán Garcia (2002: 175) reanalyzed the notion of translation as metarepresentational use: "Translation is an instance of the metarepresentational use of utterances where the metarepresented and the metarepresenting utterances

happen to be in different languages." This analysis naturally included a group of translation phenomena that had to be treated as exceptions, because they were based on similarities in linguistic structure, rather than on intended meaning (Gutt, 1991). Interlinear morpheme-by-morpheme translations are a case in point. Almazán Garcia (2002) also claimed that this approach had no need for the concept of "communicative clue".

Translation as a Higher-Order Act of Communication

Yet, utterances can be seen as ostensive stimuli, not representations (Gutt, 2005). The main reason for this approach is that mental representations inherently represent, but utterances do not. In fact, utterances 'represent' (= have representational content) only via their association with mental representations (Carston, 2002). If utterances do not represent, communication relying on formal linguistic resemblances between them does not fall under metarepresentational use.

Therefore, acts of communication about other acts of communication are not metarepresentations, but rather higher-order acts of communication (HOACs). Any such act can aim to provide information about either of the two key elements of the original communication: the stimulus used or the interpretation intended. HOACs that focus on the stimulus are said to be in 's-mode' (stimulus-oriented mode). They inform the target audience of the utterance used. Those focusing on the intended interpretation are said to be in 'i-mode' (interpretation-oriented mode); they inform the audience of what the utterance meant.

I-mode HOACs correspond very closely to the interpretive use of utterances. However, the concept 's-mode HOAC' is much more general in its coverage than the concept 'linguistic metarepresentation'. It is not restricted to resemblance in linguistic properties (metalinguistic resemblance), but applies to resemblance in any perceptible features. It therefore also naturally extends to nonverbal HOACs, currently not included in the metarepresentational framework.

Applied to cross-language communication, an i-mode HOAC corresponds quite straightforwardly to indirect translation. An s-mode HOAC covers all cases involving metalinguistic resemblance, as well as cases involving the sharing of properties other than linguistic ones.

Interestingly, direct translation turns out to be of a very special nature. As pointed out above, interlingually, complete interpretive resemblance (in the original context) requires the sharing not of the concrete properties of the original utterance but of its communicative clues. Communicative clues are, on the one hand, dependent on the properties of the original and on its intended interpretation, on the other hand. Thus, direct translation might be considered a sophisticated hybrid of s- and i-modes. This analysis might go a long way toward explaining why producing an authentic translation is such a challenging task, usually requiring special training. Work on this approach is still in progress.

See also: Communicative Principle and Communication; Context, Communicative; Functional Approaches to Translation: Skopos Theory; Human Reasoning and Language Interpretation; Inference: Abduction, Induction, Deduction; Intercultural Pragmatics and Communication; Modularity of Mind and Language; Relevance Theory: Stylistic Applications; Reported Speech: Pragmatic Aspects; Translation, pragmatics.

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Apraxia, Handedness and Language Laterality

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Introduction

The term 'apraxia' refers to a distinct category of acquired central nervous system disorders that are characterized by an inability to carry out symbolic or purposeful motor actions, despite the absence of primary sensory or motor deficits.

The first use of the word 'apraxia' is attributed to the German philosopher and psychologist Heymann Steinthal (1823–1899), who used the term in an 1871 publication, but the behavioral phenomenon may have been described by the 'father' of British neurology, John Hughlings-Jackson (1835–1911), about five years earlier. He noted that some patients with aphasia were unable to perform certain types of voluntary movements to command, such as coughing or protruding their tongue, even though there was no evidence of weakness or paralysis. Moreover, patients could easily protrude their tongue spontaneously, as part of for example licking their lips after drinking.

The first systematic clinical studies of patients with apraxia were performed by Hugo Karl Liepman (1863–1925), a student of Carl Wernicke. He published his first case description of a 48-year-old man with unilateral apraxia in 1900. Liepman's theories were well received, but had relatively little impact on the scientific community until revived by the behavioral neurologist Norman Geschwind (1926–1984). In his article 'Disconnexion syndromes in animals and man' published in 1965, Geschwind described apraxia and other neurological syndromes that he hypothesized could be explained on the basis of an interruption of specific white matter pathways that interconnect different regions of the brain (Geschwind, 1965). The verbal instruction for a motor command is first processed in Wernicke's area in the posterior superior temporal lobe. The information is then relayed to the ipsilateral motor association cortex, most likely via the arcuate fasciculus. Performance of movements with the right hand is made possible when the information reaches the left primary motor cortex. In order to perform a movement command with the left hand, the additional step of transferring the information via the corpus callosum to the right motor association and primary motor cortex is required. Geschwind's theoretical account of apraxia thus had many similarities with that proposed by Carl Wernicke to explain various syndromes of aphasia.

Definition

Strictly speaking, apraxia means 'no action.' Geschwind defined apraxia as an acquired impairment in the execution of purposeful, learned movements in the absence of weakness, inattentiveness, or lack of cooperation. The term has also sometimes been used to describe unexplained clumsiness or lack of coordination, as in 'gait apraxia.' 'Apraxia of speech' is sometimes used to describe nonarticulatory abnormalities of phoneme sequencing (paraphasias) that are common in patients with conduction aphasia as well as other aphasia syndromes. Apraxic agraphia is a condition in which the patient has difficulty with the actual formation of letters, in the absence of difficulties with spelling or grammar. Patients with apraxic agraphia can therefore type or use a word processor without difficulty.

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Testing for Apraxia

The bedside or clinic evaluation of apraxia relies on a set of semistandardized commands that are designed to explore the patient's ability to carry out specific movements involving the hands or face. A distinction between intransitive commands (not requiring an object), such as 'wave good-bye' or 'hitchhike,' and transitive commands ('use a hammer' or 'use a screwdriver') is typically made. Among the best-known standardized compilations of apraxia commands is the one included as part of the Boston Diagnostic Aphasia Exam (Goodglass and Kaplan, 1983). For research purposes, more detailed testing may include not only evaluating the patient's ability to carry out actions in response to verbal commands, but also the ability to imitate meaningful or meaningless movements or hand/finger postures performed by the examiner, and the ability to select the correct action from among multiple choices as demonstrated by the examiner (De Renzi, 1989). The most common errors in patients with apraxia include those of sequencing or timing, or using a body part as the tool (e.g., using the hand as a comb in response to 'show me how to comb your hair' instead of pretending to hold a comb.)

Subtypes of Apraxia

Several subtypes of apraxia are now recognized. First described by Arnold Pick (1851–1924), 'conceptual' or 'ideational apraxia' refers to the inability to perform commands that require multiple steps, such as folding a piece of paper, inserting it into an envelope and sealing the envelope. Although patients with ideational apraxia may be able to perform the individual components of the task, they have difficulties with the correct sequencing of the individual subcomponents. Ideational apraxia in its pure form is rare, and it may be more frequently observed in patients with diffuse cognitive impairment, such as dementia, than in patients with focal deficits secondary to stroke. 'Ideomotor apraxia' refers to an impairment of the timing, sequencing, and organization of gestures. Patients with this type of apraxia have difficulties demonstrating simple motor gestures, such as 'wave goodbye' and 'salute,' and the use of common tools, such as a hammer or screwdriver. This type of apraxia is usually associated with lesions involving the dominant parietal lobe.

A unique subtype of apraxia may occur with lesions that involve the anterior portions of the corpus callosum. It was first described by Liepman and Mass in 1907 and since that time, several case histories have been reported (Faglioni and Basso, 1985). Tumors, strokes, or traumatic lesions that interrupt the anterior portion of the corpus callosum can produce an apraxia that is limited to the left side of the body. No systematic case series have been published, and it is therefore not possible to determine how often such callosal lesions do not result in an apraxia (De Renzi, 1989). The presumed mechanism of callosal apraxia is that the lesion of the corpus callosum interrupts connections between language comprehension areas in the left hemisphere and motor areas controlling the left hand in the right hemisphere. In support of the verbal–motor disconnection hypothesis, a patient reported by Geschwind and Kaplan was unable to perform actions to verbal command, but was able to imitate gestures with his left hand (Geschwind and Kaplan, 1962). Other patients with callosal apraxia have not shown this dissociation between verbal and visual commands, however, but instead have shown left-hand apraxia regardless of stimulus modality. The hypothesis that a lesion of the corpus callosum by itself is sufficient to produce the syndrome of callosal apraxia has also been questioned in light of reports that patients with complete surgical lesions of this interhemispheric commissure (callosomectomy) typically do not show left-hand apraxia.

Patients with oral (sometimes also referred to as buccofacial) apraxia have difficulty performing movements involving the face, such as blowing out a match, sticking out their tongue, or whistling. Oral apraxia often coexists with Broca's aphasia, but it may also occur in the absence of aphasia. It is associated with lesions affecting the frontal operculum of the left hemisphere in right-handers.

Prevalence

Although apraxia is among the most common neuropsychiatric complications of stroke or other lesions involving the posterior left hemisphere in right-handers, the presence of the deficit is frequently overlooked for two reasons: first, the patient rarely complains of such symptoms, and second, because apraxia is most often associated with left hemisphere lesions, the symptoms may be masked or overshadowed by the co-occurring aphasia. The prevalence of apraxia among patients with a first left hemisphere stroke was reported to be 28% in one study (Donkervoort *et al.*, 2000). Other studies that have included patients with both left and right hemisphere stroke have reported a prevalence rate of only 7% (Pedersen *et al.*, 2001). This is consistent with the Liepman's original observation that apraxia occurs more frequently after left hemisphere stroke in right-handers.

Apraxia is also a common finding in some neurodegenerative disorders, including corticobasal degeneration and dementia with diffuse Lewy bodies. It

occurs less frequently in conditions such as closed head injury or demyelinating disorders of the central nervous system.

Cerebral Dominance for Motor Learning

Apraxia was initially thought to be secondary to a disconnection of verbal and motor areas of the brain. According to this hypothesis, verbal input could be processed in the traditional speech comprehension areas of the superior temporal lobe, but apraxia would result if a lesion prevented this information from reaching appropriate motor areas for execution. Consistent with this interpretation was the observation that performance to visual demonstration was often intact, and performance with real objects was also typically better preserved. It soon became clear, however, that the majority of cases of apraxia could not be explained by disconnection alone. To account for such cases, Liepman developed the concept of cerebral dominance for motor learning and control. According to his theory, as one hemisphere becomes dominant for language functions, one of the two hemispheres similarly develops into the dominant one for motor functions. On the basis of studies of both right- and left-handed patients with apraxia, Liepman also noted a strong relationship between hemispheric dominance for motor programming and handedness. The vast majority of right-handers develop apraxia after lesions of the contralateral (left) hemisphere, while left-handers most often develop apraxia after right hemisphere lesions.

Dissociation of Language and Praxis

Because of the overlapping representations of language and praxis in the posterior regions of the left hemisphere, the vast majority of right-handers develop both apraxia and aphasia after left hemisphere lesions. In some patients, however, the representation of language functions and praxis are in separate hemispheres. Although rare, such cases have been very important for our understanding of the complex interrelationships of praxis, handedness, and hemispheric dominance for motor and language functions.

One such patient was described by Heilman and his colleagues. The patient was a left-handed man who had suffered a large cerebral infarction in the anterior right hemisphere. The infarction involved brain regions that would have resulted in severe Broca's aphasia if the lesion had been in the left hemisphere. The patient did develop a left hemiparesis, but no aphasia, suggesting that the intact left hemisphere was in fact the language-dominant hemisphere. He did, however, develop a significant apraxia involving his (nonparalyzed) right arm. This could be explained if one hypothesized that the repository of skilled movements was in the right hemisphere, contralateral to his dominant **left** hand (Heilman *et al.*, 1973).

An opposite dissociation, apraxia but no aphasia after a large left hemisphere stroke in right-handers, is quite rare, but has been described in at least two cases. In one of these, the patient was a right-hander who suffered a massive left hemisphere stroke that involved most of the perisylvian language areas (Selnes *et al.*, 1982). Surprisingly, this produced only a transient aphasia but a long-lasting apraxia. These findings were interpreted as a rare case of mixed or right hemisphere language dominance in a right-hander, but with motor skill dominance in the left hemisphere, contralateral to the dominant hand. A second patient with a similar dissociation between praxis and language was reported by Selnes and colleagues (Selnes *et al.*, 1991). The patient was an 81-year-old right-handed male who suffered a massive left cerebral artery stroke. The radiological studies showed virtually complete destruction of the left hemisphere perisylvian language areas. Instead of the global aphasia that normally would have been associated with such a left hemisphere lesion in a right-hander, the patient developed a dense apraxia.

These cases of atypical language dominance in both right- and left-handers help demonstrate that aphasia and apraxia are dissociable, and provide support for the hypothesis that handedness is much more closely related to hemispheric laterality of motor control than to hemispheric laterality of language.

Anatomical Correlates

Although limb apraxia most often results from large lesions involving the dominant superior parietal lobe region, recent evidence suggests that apraxia may result from a spectrum of lesions affecting different nodes in a widely distributed network of higher-order motor functions. While frontoparietal regions may be the most crucial anchor points in this network, other nodes such as the supplementary motor area are now also recognized as being relevant for the neurological substrate of praxis.

See also: Anatomical Asymmetries versus Variability of Language Areas of the Brain; fMRI Studies of Language; Language in the Nondominant Hemisphere; Sodium Amytal Testing and Language.

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Arabic

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Arabic is the official language of 21 countries in the Middle East and North Africa, from Oman in the east to Mauritania in the west. This includes Israel, where Arabic is, after Hebrew, the second official language. Significant Arab minorities exist in Iran, Turkey, Chad, and Nigeria, as well as in western Europe and the Americas. With approximately 280 million native speakers, Arabic is by far the largest living representative of the Semitic language family. Because it is the language of the Koran and thus the liturgical language of Islam, Arabic also plays an important role for more than 1 billion Muslims worldwide.

History of the Language

Arabic is an offshoot of the Semitic branch of the Afro-Asiatic languages. According to the traditional classification of Semitic, Arabic is part of its southern subdivision and grouped with Ethiopic and South Arabian (by stressing the common $p > f$ shift and the internal plurals). In the 1970s, Hetzron proposed placing Arabic with Aramaic and Canaanite in a 'Central Semitic' group (stressing the imperfect pattern and the *t* as a marker for the first- and second-person singular perfect). The problem of the affiliation of Arabic within the Semitic languages continues to be discussed (see Faber, 1997).

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Arabic

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Arabic is the official language of 21 countries in the Middle East and North Africa, from Oman in the east to Mauritania in the west. This includes Israel, where Arabic is, after Hebrew, the second official language. Significant Arab minorities exist in Iran, Turkey, Chad, and Nigeria, as well as in western Europe and the Americas. With approximately 280 million native speakers, Arabic is by far the largest living representative of the Semitic language family. Because it is the language of the Koran and thus the liturgical language of Islam, Arabic also plays an important role for more than 1 billion Muslims worldwide.

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The expansion of Arab territory during the Islamic conquests (7th–8th centuries) made Arabic the language of communication, administration, and liturgy for an empire that stretched from central Asia to the Atlantic. The form of Arabic described, systematized, and canonized by the Arab grammarians and lexicographers between the 8th and 10th centuries is called Classical Arabic (CA). It remains the only universally accepted standard of the language. During the Golden Age of the Abbasid caliphate (9th–10th centuries) CA became the linguistic vehicle of a highly developed civilization that brought forth a rich literature, including *belles-lettres* and religious and scientific works. The hegemony of Arabic during the Middle Ages, and its prestige as the 'sacred' language in which the holy book of the Koran had been revealed to humankind, have influenced the languages of all Muslim people, written and unwritten. Thus, the lexicon of languages such as Persian (Western Farsi), Urdu, Turkish, or Swahili include numerous CA words. In many Muslim countries, Arabic has continued to be the language of religious treatises, and the teaching of it forms part of school curricula.

The Present Situation

Modern Standard Arabic

During Ottoman rule over most parts of the Arab world (from the 16th century onward), Arabic stagnated linguistically and literarily. Thus, in the early 19th century, when Arab intellectuals began to 'discover the West' and to translate European works into Arabic, they soon recognized its lexical shortcomings. This was the starting point of Modern Standard Arabic (MSA). MSA is practically identical in phonology, morphology, and syntax to CA, but it exhibits major differences from it in lexicon, phraseology, and style. After World War I, the modernization of Arabic continued in the language academies of Damascus, Cairo, and other capitals, which coined and still are coining thousands of neologisms. But not all the problems have been solved and, particularly in technical and scientific terminology, Arabic has not yet reached the standard of European languages. Competition among the academies frequently resulted in several terms for one and the same thing, and many academic neologisms have not been accepted by the speech community, which often prefers a loanword from English or French. In the standard language, loans play a remarkably minor role, but the phraseology and style of MSA is deeply influenced by English (and in the Maghreb by French), above all in the language of the media. Thus, it is justified to call MSA a register of Arabic clearly differentiated from the classical language. The importance of MSA is that, as the only accepted medium of written and formal oral communication, it constitutes the tie that linguistically binds the Arab world together. However, MSA has to be learned in school because the native tongue of every Arabic speaker remains his or her local dialect as used in everyday life by all social strata. Therefore, MSA is almost completely limited to written use and to highly formal speech (news, official speeches, and academic discourse). Actually, this diglossic situation has been inherent in Arabic for at least the past millennium. The two linguistic layers are, of course, in a state of permanent mutual influence, and between the extremes of 'pure standard' and 'plain colloquial' Arabic are levels such as 'educated colloquial.' During the past decades, active and, especially, passive knowledge of MSA has significantly increased because of better education and the media. This trend was recently reinforced by the establishment of pan-Arabic satellite channels, which enjoy great popularity. Thus, even if MSA remains restricted to the domain of written and formal speech, a continually growing portion of the speech community will be able to participate in it.

Arabic Dialects

The various dialects belong to a language type called 'New Arabic,' whereas both CA and (in spite of its label 'modern') present-day MSA are 'Old Arabic.' The term 'Middle Arabic' does not denote, as we might assume, an intermediate chronological stage but a form of written Arabic exhibiting deviations from the standard norm due to the influence of 'New Arabic', (i.e., the dialects; see Veerstegh, 1997: 114–129).

Although there are numerous typological differences, it is widely accepted, especially among Arabic speakers themselves, that the distinction between Old and New Arabic is the presence or absence of the case and mood endings (in Arabic, *'i'rāb*). The question of when and how the transformation from the old to the new type of Arabic happened is one of the most intriguing and discussed issues of Arabic studies (good summaries are Holes, 1995: 7–14; Versteegh, 1997: 93–113). There are indications from inscriptions that in the speech of the Nabateans the case system may have broken down as early as the 1st century C.E. If this is true, the new type of Arabic would have been spread along the trade routes of northern and western Arabia before the rise of Islam. Nevertheless, it seems very likely that in the time of Muhammad the structure of everyday Arabic was not identical, but quite close, to the language of the poetry and the Koran. Only the social and political turmoils during and after the conquests resulted in a rapid shift

to New Arabic. It should be emphasized, however, that Arabic developed along a line of internal linguistic trends common to all modern Semitic languages and clearly traceable before that time. The argument, often urged by the Arabs themselves, that these changes were mainly caused by so many non-Arabs using Arabic must be rejected.

The new type of Arabic spread among the urban centers of the Fertile Crescent and Egypt (the countryside had not yet been Arabicized) in the aftermath of the conquests. The language of the Bedouins, however, was not, or was only slightly, affected by these changes until approximately 2 centuries later. Ferguson (1959) explained the relative homogeneity of the urban dialects by the existence of a single koinè in the 7th–8th centuries. Although this theory is not tenable in its entirety, it was the starting point of a fruitful scientific discussion. From the present point of view, it seems very likely that the resemblances among the urban dialects are the consequence of continous convergence and the mutual leveling of several regional koinai (see the summary in Miller, 1986).

The greatest typological differences are found between the sedentary (urban and rural) dialects and the Bedouin dialects. Thus, the speech of a sedentary Bedouin living in the outskirts of Tunis, for example, typically is closer to that of a Bedouin of Mauritania living 2000 miles away than it is to the speech of his neighbors speaking the dialect of the city of Tunis. Another sharp division separates the North African or Maghrebi dialects (including Maltese) west of Egypt from those to the east. The eastern dialects themselves can be divided into four large groups: (1) Arabian Peninsula, (2) Mesopotamia, (3) Syria and Palestine, and (4) Egypt, Sudan, and Chad (see Fischer and Jastrow, 1980). Audio files of a great number of dialects are available on the Semitic Sound Archive website of the University of Heidelberg.

Structure of Arabic

Phonology

The Arabic vowel system consists of three vowels /a, i, u/, with a phonemic contrast of short and long, for example, [mudiːrunaː] 'our director' versus [mudiːruːnaː] 'our directors'. In contrast to this relatively small number of vowels, Arabic possesses 28 consonant phonemes (see Table 1), also with a phonemic short-long contrast, for example, [ħamaːm] 'pigeons' versus [ħamːaːm] 'bath' (as is usual, isolated Arabic nouns are cited without their case endings). The characteristic sound of Arabic is created mainly by a couple of consonants articulated in the velar and postvelar regions of the vocal tract and by the four velarized (also called 'emphatic') consonants that also have a lowering effect on adjacent vowels.

The realization of the consonant phonemes in MSA reflects almost completely the situation of Old Arabic. Exceptions are *j* [dʒ] (ج), which was most probably pronounced [ɟ], and the somewhat problematic sound *ḍ* [ɗ] (ض). There is an ongoing discussion on the original pronunciation of this consonant, which was so characteristic that Arabic was even called 'the language of the letter *ḍād*' (*lughat aḍ-ḍād*). Most likely it was either a velarized lateral fricative [ɬ] or a lateralized variety of *ḍ* [ɗˡ] (the latter perhaps reflected in such Spanish loans from Arabic as *alcalde* < *'al-qāḍī* 'the judge').

The present-day standard pronunciation of the consonants shows no regional variations other than the sound ẓ [ð̞] (ظ), which in many countries (e.g., Syria and Egypt) is pronounced ẓ [ɮ].

Except in religious utterances (i.e., the recitation of the Koran), other alterations are widely accepted, which make it quite easy to recognize the country of a given news broadcast. The most striking among these is the replacement of [dʒ] by [g] in Egypt or by [ʒ] in the Levant and large parts of North Africa.

The syllabic structure of CA is restricted to three types: CV, CVː, and CVC (under certain conditions also CaːC/CayC). However, in MSA final short vowels are often omitted, so CVːC and CVCC are also found. An Arabic word cannot begin with a vowel, and two vowels must be separated by no fewer than one consonant but by no more than two consonants.

Phonology of the Dialects Leaving aside the lexicon, the greatest difference among Arabic dialects is in

Table 1 The consonants of standard Arabic

	Bilabial	*Labiodental*	*Dental|Alveolar|Postalveolar*	*Palatal*	*Velar*	*Uvular*	*Pharyngeal*	*Glottal*
Plosive	b		ʈ d ɗ		k	q		ʔ
Nasal	m		n					
Trill			r					
Fricative		f	θ ð ð̞ | s ɮ z (ɮ)[a] | ʃ dʒ		x ɣ		ħ ʕ	h
Approximant		ʋ		j				
Lateral approximant			l					

[a]The sound /ɮ/ is used in some countries (e.g., Egypt, Syria, and Lebanon) instead of ð̞.

phonology. The following summary provides only a general overview. In all modern dialects (with negligible exceptions in Yemen) the non-initial [ʔ] is lost and the two sounds ð̣ (ظ) and ḍ (ض) are mingled into one sound [ð̣]. The consonants that most frequently exhibit changes compared to CA are (1) the three interdental fricatives [ð], [θ], and [ð̣] that, in the majority of the sedentary dialects, have been shifted to corresponding postdental stops (i.e., [d], [t], [ḍ]); (2) the affricate [dʒ], which is pronounced [ɟ] in Central Arabia and the Sudan, [ʒ] in large parts of North Africa and the Levant, [g] in Lower Egypt, and [j] along the Arab Gulf; and (3) the reflexes of CA *q* (usually indicates whether a dialect is of the Bedouin or the sedentary type), which in Bedouin dialects has a voiced pronunciation ([g], [dz], [dʒ]) but in sedentary dialects is usually unvoiced ([q] or, as a typical urban phenomenon, [ʔ]).

Excluding the few that have been lengthened, all final short vowels of CA have been lost. There is also an almost universal tendency toward eliding unstressed short vowels (especially [i] and [u]) in open syllables (e.g., Cairo (Egyptian Spoken Arabic): ['ʃirib] 'he drank' versus ['ʃirbu] 'they drank'). Many sedentary dialects exhibit a reduction of the inventory of short vowels from three to two (either a/ə or u/ə), whereas the majority of both Bedouin and sedentary dialects have developed a system of five long vowels [aː, eː, iː, oː, uː] as a result of the monophthongization of [ai] > [eː] and [au] > [oː].

Morphology

Derivational Morphology In all layers of Arabic, the bulk of the vocabulary is built on the principle of root and pattern. To express certain semantic terms (i.e., words), a purely consonantal root carrying the basic semantic information is combined with a limited set of patterns using a fixed sequence of consonants, vowels, and optional prefixes and suffixes. Most of the roots consist of three consonants called radicals. Those with four consonants are by no means rare, but are often merely extensions of triconsonantal roots. A few words of the most elementary vocabulary have only two radicals, for example, *'ab* 'father', *yad* 'hand', and *mā'* 'water'. Such words, and the numerous instances of triconsonantal roots with two common radicals expressing similar semantic concepts, have fueled speculations that the original system was built on a biconsonantal root system.

Many patterns are semantically and morphologically ambiguous; that is, one and the same pattern can serve for different semantic concepts and can be used for both verbs and nouns and for both singular and plural. Nevertheless, there are also patterns that are used exclusively for verbs or for certain semantic or morphological classes.

- CuCayC is the pattern of diminutives, for example, *kuwayt* 'small fortress'.
- maCCaC/-a is used for nouns of place, for example, *maktab* 'office', *maktaba* 'library' (root *k-t-b* 'writing').
- miCCaC/miCCāC is used for instruments, for example, *miṣ'ad* 'elevator' (root *ṣ-'-d* 'ascending'), *miftāḥ* 'key' (root *f-t-ḥ* 'opening').
- CaCCāC denotes professions, for example, *jazzār* 'butcher' (root *j-z-r* 'slaughtering').
- CaCCāCa is used for professions of females and instruments, for example, *ghassāla* 'washerwoman, washing machine' (root *gh-s-l* 'washing'), *barrāda* 'refrigerator' (root *b-r-d* 'cold').

As can be seen from *miṣ'ad* and *barrāda,* the system of derivation is widely used for the creation of neologisms. Although noun patterns are quite numerous (approximately 90 in CA) and are mostly not clearly related to semantic classes, the derivation of verbs is practically limited to 10 stems for triconsonantal roots and two for quadriconsonantal roots. Each stem has a set of five patterns reserved for the perfect and imperfect base, for the active and passive participle, and for a verbal noun (also called infinitive, lexicalized, i.e., not predictable, in stem I). As is shown in Table 2, certain functions can generally be attributed to each verb stem, although in detail the situation is highly complex (see the overview in Cuvalay-Haak, 1997: 95–108).

The principle is exemplified by the root *q-ṭ-'* 'cutting'.

- I: *qaṭa'-a* 'to cut (in two)'.
- II: *qaṭṭa'-a* 'to cut into pieces'.
- III: *qāṭa'-a* 'to dissociate'.
- IV: *'aqṭa'-a* 'to make cut'.
- V: *taqaṭṭa'-a* 'to be cut off'.
- VI: *taqāṭa'-a* 'to break off mutual relations'.
- VII: *'inqaṭa'-a* 'to be cut off'.
- VIII: *'iqtaṭa'-a* 'to take a part'.

Note that no root is combined with all 10 stems.

The root-pattern system of derivation is responsible for the remarkable uniformity of the Arabic lexicon. Only a very few types of roots, above all those containing the two weak consonants *w* and *y*, cause changes in most patterns; but, because even these follow certain rules, Arabic morphology is almost completely free of irregularities.

Noun Inflection The class of nouns comprises substantives, adjectives, and numerals; the categories gender, number, definiteness/indefiniteness, and case are

Table 2 Stems of triconsonantal verbs in Standard Arabic

Stem	*Perfect*	*Imperfect*	*Verbal noun*	*Active participle*[a]	*General functions*	*Frequency/MSA*[b]
I	CaCVC-	ya-CCVC-	CVCC/CVCVC[c]	CāCiC-	basic	40.07%
II	CaCCaC-	yu-CaCCiC-	taCCīC-	muCaCCiC-	causative/intensive	14.28%
III	CāCaC-	yu-CāCiC-	muCāCaC-at-[d]	muCāC:C	conative and others	5.14%
IV	'aCCaC-	yu-CCiC-	'iCCāC:C	muCCiC-	causative/factitive	10.56%
V	taCaCCaC-	ya-taCaCCaC-	taCaCCuC-	mutaCaCCiC-	reflexive/passive	10.80%
VI	taCāCaC-	ya-taCāCaC-	taCāCuC-	mutaCāCiC-	reciprocal	4.44%
VII	'inCaCaC-	ya-nCaCiC-	'inCiCāC-	munCaCiC-	intransitive/passive	2.93%
VIII	'iCtaCaC-	ya-CtaCiC-	'iCtiCāC-	muCtaCiC-	reflexive	6.94%
IX	'iCCaCC-	ya-CCaCC-	'iCCiCāC-	muCCaCC-	colors[e]	0.19%
X	'istaCCaC-	ya-staCCiC-	'istiCCāC-	mustaCCiC-	reflexive and others	4.67%

[a]The passive participle has an *a* instead of *i* in the last syllable, except in stem I, where the pattern maCCūC-is used.
[b]Relative frequency of the stems in a modern dictionary; from Cuvalay-Haak (1997: 88).
[c]Both occur also with the suffix-*at*; there are numerous other patterns, in CA approximately 40.
[d]And CiCāC-.
[e]For instance *'iḥmarr-a* 'to be red, to blush'.

differentiated. Arabic has two genders, masculine and feminine, the latter marked usually by the suffix-*a(t)* and in some noun patterns by *-ā'/-ā*. Among the unmarked feminines are nouns denoting beings of the female sex (e.g., *'umm* 'mother'), paired parts of the body (e.g., *'ayn* 'eye'), and some basic concepts of nature (e.g., *'arḍ* 'earth', *shams* 'sun', and *nār* 'fire').

The number system is trifold: singular (unmarked), dual (suffix *-āni*), and plural. The plural is formed either by suffixation (MASC PL *-ūna*; FEM PL *-āt*) or more frequently by a complete restructuring of the word (thus the term internal or 'broken' plural), for example, *bayt* 'house', *buyūt* 'houses'; *kitāb* 'book', *kutub* 'books'; *miftāḥ* 'key', *mafātīḥ* 'keys'. A number of patterns (especially those containing three vowels) are restricted to plurals, but many others are used for both numbers; the pattern CiCāC, for instance, is singular in *kitāb* 'book', but plural in *jibāl* 'mountains' (for broken plurals see, Murtonen, 1964). Indefiniteness is usually expressed by a final *-n*, for example, *bayt-u-n* 'a house'; definiteness is usually expressed by the proclitic article *'al-* (assimilated to dentals, sibilants, *n*, and *r*), by a pronominal suffix, or by a following genitive, for example, *'al-bayt-u* 'the house', *bayt-u-nā* 'our house', *bayt-u ḥasan-i-n* 'Hasan's house'.

Arabic has the three cases, nominative, genitive, and accusative, which are differentiated in the singular and in broken plurals by declensions marked by the final vowel, for example, NOM *'al-bint-u*, GEN *'al-bint-i*, ACC *'al-bint-a* 'the girl'. The dual and external plural have common forms for the genitive and accusative (DUAL *-ayni*, MASC PL *-īna*, FEM PL *-āt-i-n*), a feature that is shared by a second (called 'diptote') type of declension (NOM *-u*, GEN/ACC *-a*) used primarily in female or foreign personal names and in certain plural patterns (in indefinite status).

Pronouns In pronouns, and hence in verbal inflection, Arabic distinguishes between masculine and feminine in all but the first person and the dual (see Table 3). Independent personal pronouns exist only in the nominative; for the other cases, suffixed forms are used, for example, *'anti marīḍ-at-u-n* 'you (FEM SING) are ill', *bayt-u-ki* 'your (FEM SING) house', *qabbala-ki* 'he kissed you (FEM SING)'.

The relative pronouns and the two sets of demonstrative pronouns (for near and far deixis) also differentiate gender and number.

Verb Inflection Arabic has a twofold system for the inflection of finite verbs: a suffix-based conjugation, traditionally called 'perfect', and a prefix-based conjugation, called 'imperfect'. For both of these bases, a second set of vowel patterns exists to form a passive voice, for example, in stem I *ḍarab-a* 'he hit' versus *ḍurib-a* 'he was hit'; *ya-ḍrib-u* 'he hits' versus *yu-ḍrab-u* 'he is hit'. Usually the passive is used when the agent of a sentence is not mentioned or to express impersonality, for example, *ya-dkhul-u* 'he enters' versus *yu-dkhal-u* 'one enters'.

The imperfect has four moods, morphologically marked by different suffixes (the examples in parentheses are the forms of 'to write' in third-person singular masculine): indicative (*ya-ktub-u*), subjunctive (*ya-ktub-a*), jussive (*ya-ktub-Ø*), and the so-called energetic (*ya-ktub-anna*), which is used in CA to express very strong assertions but is almost obsolete in MSA. The imperative is basically a subset of the jussive without prefixes. The verb conjugation expresses person, gender, and number. The system is, except for an additional dual for third-person feminine, analogous to the pronouns given in Table 3.

Table 3 Personal pronouns

	Singular		*Dual*		*Plural*	
	Independent	*Suffixed*	*Independent*	*Suffixed*	*Independent*	Suffixed
1	ʼanā	-nī |-ī[a]			naḥnu	-nā
2 MASC	ʼanta	-ka	ʼantumā	-kumā	ʼantum	-kum
3 FEM	ʼanti	-ki	ʼantumā	-kumā	ʼantunna	-kunna
3 MASC	huwa	-hū/-hī	humā	-humā/-himā	hum	-hum/-him
3 FEM	hiya	-hā	humā	-humā/-himā	hunna	-hunna/-hinna

[a]*-nī* is used with verbs,*-ī* with nouns and prepositions.

Morphology of the Dialects Generally speaking, no radical structural changes appear in the morphology of the dialects as compared to CA. Morphological derivation by applying the principle of root and pattern has been slightly simplified (there are fewer patterns compared to CA), but has remained productive. The most striking morphological difference between CA/MSA and all dialects is the lack of a case system. The indefinite marker *-n* has not survived except in some Bedouin dialects where it is found in a few syntactical positions such as attribution (e.g., North Syrian Bedouin: *bēt-in chibīr* 'a big house'). Some dialects (e.g., Iraqi), however, have developed an indefinite article.

All dialects lack dual forms of the pronouns and verbs, and most sedentary dialects have given up gender distinctions in the plural and those in North Africa no longer have gender distinctions in the second-person singular, as well. Together with nouns, the category dual is fully productive in the east, but in the sedentary dialects west of Egypt the dual is usually expressed by the numeral 'two' followed by a noun in the plural.

For the verbs, the perfect conjugation has not changed significantly. In the imperfect, however, the category mood is not expressed by internal inflection (a result of the loss of final short vowels) but, instead, where not completely obsolete, by modifiers prefixed to the verb. For example, in Damascus *b-yəshrab* 'he drinks' roughly corresponds to the indicative and *yəshrab* to the subjunctive/jussive. The formation of an internal passive voice seems to be limited to a few Bedouin dialects. In other dialects, certain verbal stems (especially VII and VIII) are used to express passive voice, for example, Damascus: *ḥabas* 'he imprisoned' (stem I) versus *nḥabas* 'he was imprisoned' (stem VII).

Syntax

Tense and Aspect The verbal system of Arabic can be described as a combination of aspect and time reference. The suffix conjugation (called 'perfect') serves for the past and for the perfective (completed/factual) aspect, and the prefix conjugation serves for the nonpast (present/future) and for the imperfective (noncompleted/ongoing) aspect, including habituality, continuousness, and progressivity. An exception is the combination of the negation *lam* and the jussive mood, which indicates the negation of the perfect (e.g., *lam ya-ktub* 'he has not written').

The Arabic tense system is to a high degree a relative one. In main clauses, the temporal reference point is usually the moment of speaking, whereas in complement clauses the time has to be derived by reference from the main verb. Verbs in the perfect are also used in conditional clauses, in wishes and curses, and for assertions of factuality:

Allāh-u ʻazz-a wa-jall-a
God-NOM *was.mighty*-PERF *and-was.sublime*-PERF
'God, he is mighty and sublime'

Participles do not mark any particular time reference, but frequently serve for a resultant aspect; that is, they describe an action that bears relevance to the moment of speaking.

Word Order The basic neutral word order of Arabic is VSO, but thematization of the subject is achieved by SVO. The latter therefore is not possible if the subject is indefinite, in which case sometimes also VOS appears.

The foreground/background distinction also influences word order. Generally VS is used for foreground information and events, and SV for background information and descriptions.

An adjectival attribute follows its head noun and agrees with it in case, in definiteness, and – with restrictions – in gender and number:

bayt-u-n kabīr-u-n
house.MASC.SING-NOM-INDEF *big*.MASC.SING-NOM-INDEF
'a big house'

fī l-qalʻ-at-i l-kabīr-at-i
in the.DEF-*fortress*.SING-FEM-GEN *the*.DEF-*big*.SING-FEM-GEN
'in the big fortress'

Nominal annexations are in the genitive case and follow the head noun, which is morphologically determined (i.e., in the so-called *status constructus*). Indefinite/definite is therefore indicated solely by the noun annexed to it, for example, *bāb-u bayt-in* 'a door of a house' versus *bāb-u l-bayt-i* 'the door of the house'. Although the number of annexations is theoretically unrestricted, there can be only one head noun. In phrases such as 'the director and the teachers of the school' the second head noun follows the genitive and takes a suffix referring to it:

mudīr-u l-madras-at-i wa-mu'allim-ū-hā
director.MASC-NOM *the-school*-FEM-GEN *and-teachers*-NOM-PL-*her*.FEM
'the director and the teachers of the school'

Under the influence of European languages, this rule is frequently ignored in MSA.

Agreement Strict agreement in gender and number exists only in the singular. Nouns in the plural agree with feminine singular unless they denote human beings.

kutub-u-n qayyim-at-u-n
books.MASC.PL-NOM-INDEF *precious*-FEM.SING-NOM-INDEF
'precious books'

rijāl-u-n kirām-u-n
men.MASC.PL-NOM-INDEF *generous*.MASC.PL-NOM-INDEF
'generous men'

'ar-rijāl-u katab-ū
the-men.MASC.PL-NOM.DEF *wrote*-MASC.PL
'the men wrote'

'al-banāt-u ḍaḥik-na
the-girls.FEM.PL-NOM.DEF *laughed*-FEM.PL
'the girls laughed'

However, if the verb precedes its nominal subject, it agrees in gender but not in number:

katab-a r-rijāl-u
wrote-MASC.SING *the-men*.MASC.PL-NOM.DEF
'the men wrote'

ḍaḥik-at-i l-banāt-u
laughed-FEM.SING *the-girls*.FEM.PL-NOM.DEF
'the girls laughed'

A special case of agreement occurs with the cardinal numbers from 3 to 10, which take the opposite gender of the counted noun's singular, itself added in the genitive plural:

khams-u sanaw-āt-i-n [san-at-u-n]
five.MASC-NOM *years*-PL-GEN-INDEF [*year*-FEM.SING-NOM-INDEF]
'five years'

khams-at-u 'ayyām-i-n [yawm-u-n]
five-FEM-NOM *days*.PL-GEN-INDEF [*day*.MASC.SING-NOM-INDEF]
'five days'

Equational Sentences Positive equational sentences in the present have no copula:

'al-bayt-u kabīr-u-n
the-house.MASC.SING-NOM.DEF *big*.MASC.SING-NOM-INDEF
'the house is big'

'anti ṭabīb-at-u-n
you.FEM.SING.NOM *physician*-FEM.SING-NOM-INDEF
'you (FEM) are a physician'

For the negated present, the special verb *laysa* 'to be not' is used; in all other cases, appropriate forms of the verb *kān-a* 'to be' appear. Both verbs exhibit the pecularity that their nominal complement is in the accusative:

'al-bayt-u laysa/kāna kabīr-a-n
the-house-NOM *is-not/was* *big*-ACC-INDEF
'the house is not/was big'

Subordination Temporal, final, causative, and other clauses are usually introduced by subordinating conjunctions such as *lammā* 'when', *li-* 'in order to', and *li-'anna* 'because'.

Constructions with the conjunction *wa-* 'and' are frequently used to express simultaneousness of actions or events (in Arabic, called *ḥāl*, 'circumstance' sentence):

dakhal-a l-ghurfata
entered.PAST-3.SING *the-room*
wa-huwa yaḍḥak-u
and-he *laughs*.PRES-INDIC
'he entered the room laughing'

Relative Clauses In Arabic, relative clauses are complete sentences that are normally linked to their head by a personal pronoun referring to it. A relative pronoun, which agrees in number and gender, is used only if the head is definite:

'al-bint-u llatī hiya faqīr-at-un
the-girl-NOM REL.PRON.SING.FEM *she* *poor*
'the girl who is poor'

'al-bint-u llatī ra'ay-tu-hā 'amsi
the-girl-NOM REL.PRON.SING.FEM *saw-1*.SING-*her*.ACC *yesterday*
'the girl whom I saw yesterday'

’al-bint-u	llatī	māt-at
the-girl-NOM	REL.PRON.SING.FEM	*died-3*.FEM
’umm-u-hā		
mother-NOM-*her*.GEN		

‘the girl whose mother has died’

bint-u-n	māt-at	’umm-u-hā
girl-NOM-INDEF	*died-3*.FEM	*mother*-NOM-*her*.GEN

‘a girl whose mother has died’

Syntax of the Dialects In principle, most dialects have preserved the combined time aspect system, although there are tendencies toward a stricter tense system (perfect for past, imperfect for nonpast). Frequently found as a discourse mechanism, however, is the narrative imperfect, in which a single past-time reference gives the frame for a following series of imperfective verb forms describing past actions or events. The perfect aspect expressed by the participle has become a well-established category in many, particularly eastern, dialects.

A great variety of auxiliary verbs (also called aspectualizers) exists for emphasizing punctual, durative, ingressive, progressive, and other aspects (see, for Cairo, Eisele, 1999).

Regarding word order, recent studies (Dahlgren, 1998; Brustad, 2000) have shown that the alleged preference of the dialects for SV order is true only for some urban dialects. On the whole, the same principles of thematization and foreground/background distinction obtain in the spoken vernaculars: “VSO represents the dominant typology in event narration, while SVO functions as topic-prominent typology that is used to describe and converse” (Brustad, 2000: 361). Particularly in dialogs, OVS is very frequent in topic-prominent structures, in which case a pronominal suffix has to mark the original place of the object, for example, in the Cairene dialect:

ukht-ak	shuf-t-aha	mbāriḥ
sister-your	*saw-1*.SING-*her*	*yesterday*

‘I saw your sister yesterday’

Agreement of nonhuman plural with feminine singular is possible, but in nearly all dialects ‘logical’ agreement is widely found. In the dialect of Damascus, both of the following phrases are equally acceptable: *byūt ẓghīre* ~ *byūt ẓghār* ‘small houses’. Which of the two is used depends on semantic, idiomatic, and stylistic features insufficiently investigated in detail. In general, the word order has no influence on agreement; that is, a verb usually agrees with its nominal subject in number whether the noun precedes or follows the verb.

Many dialects have developed so-called ‘genitive exponents,’ particles that are used under certain conditions for an analytic linking of two nouns or a noun and a pronoun suffix instead of a direct annexation. For example, in Arab Gulf dialect:

mēz	māl	ṭa‘ām
table	GEN PRT	*meal*

‘dining table’

and in Cairo dialect:

il-baṣbōr	bitā‘-i
the-passport	GEN PRT-*my*

‘my passport’

Etymologically most of these particles can be traced back to a word meaning ‘property’ or ‘right’. The choice whether an analytic or a synthetic construction is preferred depends on stylistic, semantic, and syntactical principles (Eksell Harning, 1980).

See also: Algeria: Language Situation; Arabic Lexicography; Arabic as an Introflecting Language; Arabic Linguistic Tradition; Calligraphy, Islamic; Egypt: Language Situation; Iraq: Language Situation; Lebanon: Language Situation; Libya: Language Situation; Maltese; Oman: Language Situation; Palestine (West Bank and Gaza): Language Situation; Persian, Modern; Qatar: Language Situation; Saudi Arabia: Language Situation; Semitic Languages; Syria: Language Situation; Tense and Time: Philosophical Aspects; Tense; Turkish; Urdu; Word Order and Linearization; Yemen: Language Situation.

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Relevant Website

http://semarch.uni-hd.de.Semitic Sound Archive. University of Heidelberg.

Arabic as an Introflecting Language

J C E Watson, University of Oslo, Oslo, Norway

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In some languages, words are constructed or partially constructed not through the concatenation of linearly separable morphemes (e.g., English un-accept-able), but by the interdigitation of morphological forms which individually do not constitute self-standing phonological wholes. This type of morphology is variably termed in the literature introflectional, nonconcatenative (McCarthy, 1981), or transfixing (Bauer, 2003). It is a pervasive feature of the Semitic languages, and is particularly highly developed in Arabic. A simple example of introflection in Arabic is provided by *katab* 'wrote,' consisting of the root *k-t-b* {write}, the template CVCVC {PERF} and the vocalic melody a-a {ACT}.

Although introflection is a central feature of Arabic, most inflectional and some derivational categories are expressed through affixation; many derivational categories, which are expressed principally by introflection, take complementary prefixes or, less commonly, suffixes. This entry focuses on the morphology of Modern Standard Arabic, the formal written-based variety of the language, although many of the features outlined here are also found in the hundreds of Arabic dialects identifiable across the Arab world. The entry deals first with introflecting morphology in Arabic, sometimes in combination with affixation, and goes on to consider how introflection interacts with inflecting morphology.

Root and Pattern

Basic noun and verb stems in Arabic comprise a consonantal root and a pattern. The pattern can be further divided into two elements – a prosodic template and a vocalic melody. Most consonantal roots are triliteral. The root prototypically expresses the content meaning of the word, the pattern functional meaning. The association of the consonantal root and vocalic melody with the prosodic template is illustrated for the verb stem *katab* 'wrote.ACT' in **Figure 1**.

The consonantal root is always fully independent of the prosodic template; the vocalic melody, by contrast, shows independence for relatively few morphological categories; such examples include *katab* 'wrote.ACT' versus *kutib* 'wrote.PASS' in which the vocalic melody alone expresses voice. However, in the word *ʕilaaj* 'healing; treatment,' which comprises the consonantal root *ʕ-l-j* {heal; treat}, the prosodic template CVCVVC, and the vocalic melody *i-a*, the combination of the latter two expresses the category of verbal noun, rather than either the prosodic template or the vocalic melody independently.

Verbal Morphology

As illustrated in **Table 1**, Modern Standard Arabic has one basic verb form (form I) and nine derived

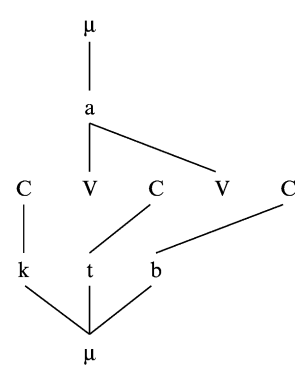

Figure 1 Association of consonantal root and vocalic melody.

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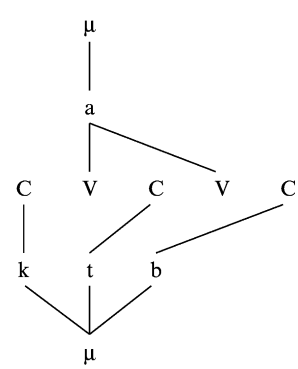

Figure 1 Association of consonantal root and vocalic melody.

Table 1 Verb forms I–X

Typical meaning extension	*Form*	*PERF ACT*	*Gloss*	*PERF PASS*	*IMPERF ACT*	*IMPERF PASS*
	I	katab	write	kutib	yaktub	yuktab
causative	II	kattab	make s.o. write	kuttib	yukattib	yukattab
attempt	III	kaatab	correspond with s.o.	kuutib	yukaatib	yukaatab
causative	IV	ʔaktab	dictate	ʔuktib	yuktib	yuktab
reflexive of II	V	takattab	NA	tukuttib	yatakattab	yutakattab
reflexive of III	VI	takaatab	write to e.o.	tukuutib	yatakaatab	yutakaatab
medio-passive	VII	inkatab	subscribe	unkutib	yankatib	yunkatab
reflexive	VIII	iktatab	be recorded	uktutib	yaktatib	yuktatab
be/come a color/defect (e.g., red/lame)	IX	iktabb	NA	uktibb	yaktibb	yuktabb
reflexive of IV	X	istaktab	ask s.o. to write	ustuktib	yastaktib	yustaktab

Table 2 Active and passive participles

Form	*PART ACT*	*PART PASS*
II	mukattib	mukattab
III	mukaatib	mukaatab
IV	muktib	muktab
V	mutakattib	mutakattab
VI	mutakaatib	mutakaatab
VII	munkatib	munkatab
VIII	muktatib	muktatab
IX	muktibb	muktabb
X	mustaktib	mustaktab

forms (forms II–X), each of which typically imposes a more specific sense on that of the basic form: forms II, III, and IV are derived from form I by extension of the stem; forms V and VI are derived by prefixation of *ta-* to forms II and III, respectively. Forms VII, IX, and X involve various types of prefixation, and form VIII is derived from form I by infixation of *t* after the left-most root consonant. No consonantal root in Modern Standard Arabic has all ten verb forms, and a few verbs have one or more derived forms but lack the basic form. The prosodic template expresses the verbal form, the vocalic melody voice and aspect. The imperfect is distinguished from the perfect by imperfect person prefixes, and, in the case of form I only, by a different prosodic template. The root *k-t-b* {write} is used to illustrate verb forms in Table 1. The prototypical meaning correlates of the derived forms are listed in column two, and the specific meanings associated with the root *k-t-b*, where attested for the form in question, in column four.

The vocalic melody *a-a* indicates perfect aspect active voice, *u-i* perfect aspect passive voice, and *u-a* imperfect aspect passive voice. Excepting forms I, V and VI, the vocalic melody is *(u)-(a)-i* for the imperfect aspect active voice, and *(u)-(a)-a* for the imperfect passive. The same vocalic melodies express voice in the verbal participles, which are distinguished from the verb forms by the complementary prefixation of *mu-* to the stem. Active and passive participles from verb forms II–X are illustrated in Table 2.

Nominal Morphology

In contrast to participles from forms II–X, participles from form I verbs are derived through prosodic change: lengthening of the left-most vowel for the active participle, and of the right-most vowel for the passive participle, which also takes the complementary prefix *ma-*. Thus, *katab* 'wrote' has the participles *kaatib* 'writing; writer' and *ma-ktuub* 'written; letter.'

Finite verb stems are marked prosodically by a final light syllable – CVC, as seen in Table 1. As shown in Table 3, verbal nouns of most derived verbs (all tokens of forms IV, VII, VIII, IX, X, some of III), and a number of form I verbs, are derived from finite verbs by lengthening of the stem-final syllable to CVVC and the vocalic melody *i-a*, the inverse of the vocalic melody for the active participle. Exceptions are form II, which has a complementary prefix *ta-* and the vocalic melody *a-i*, one form III variant (*mu-kaatab-ah*), and forms V and VI, both distinguished from the finite verb by umlaut of the stem-final vowel to *-u-*.

Singular Nouns and Adjectives

In contrast to verbs, singular nouns and adjectives take a vast array of different prosodic templates and vocalic melodies. Some, such as CaCCaaC, typically used for nouns of profession (e.g., *jazzaar* 'butcher'), and the typically adjectival CaCuuC (e.g., *ḥasuud* 'envious'), and CaCiiC (e.g., *kabiir* 'big; old'), have a restricted range of meanings. Other patterns, such as CaCC, have a large range of meanings, covering human (*jadd* 'grandfather'), non-human (*kalb* 'dog'), concrete (*baḥr 'sea'), abstract (ʕaql 'intelligence'), and adjectives (ḥayy 'alive').*

Table 3 Verbal noun patterns

Form	*Verbal noun*
I	kitaab-ah
II	taktiib
III	kitaab / mukaatab-ah
IV	ʔiktaab
V	takattub
VI	takaatub
VII	inkitaab
VIII	iktitaab
IX	iktaabb
X	istiktaab

Table 4 Verbal inflections

PERS/NUM/GEN	*PERF*	*IMPERF.JUSSIVE*
1 s.	katab-tu	ʔ-aktub
1 pl.	katab-naa	n-aktub
2 s.m.	katab-ta	t-aktub
2 s.f.	katab-ti	t-aktub-ii
2 pl.m.	katab-tum	t-aktub-uu
2 pl.f.	katab-tunna	t-aktub-na
3 s.m.	katab-a	y-aktub
3 s.f.	katab-at	t-aktub
3 pl.m.	katab-uu	y-aktub-uu
3 pl.f.	katab-na	y-aktub-na

Broken Plurals and Diminutives

Plurals are formed in Arabic in one of two ways: either through 'sound' plural suffixes or through the rich set of 'broken' plurals, wherein the plural is derived by mapping a portion of the singular to a plural prosodic template. McCarthy and Prince (1990a,b, 1998) have successfully analyzed broken plural derivation in moraic terms. The majority of singulars comprising three or more moras take predictable broken plural patterns. To derive the plural from such nonminimal singulars, the first two moras of the singular are mapped to an iambic template. *makaatib* 'offices' is derived from *maktab* 'office,' for example, as follows: the first two moras of the singular (*mak*) are mapped to an iambic template (*μ μμ*) to give *mμkμμ*. The vocalic melody *-a-* associates to the moraic slots to give *makaa*. The remainder of the singular (*-tab*) is suffixed to the iamb, and where this contains a vocalic slot, as here, *-i-* of the plural vocalic melody overrides the vowel of the remainder, to give *makaatib*. In the case of words comprising two moras and a number of non-minimal words, the plural cannot be predicted as easily from the singular form. Examples include *bayt* 'house' pl. *buyuut*, *bint* 'girl' pl. *banaat*, *kitaab* 'book' pl. *kutub*, *walad* 'boy' pl. *ʔawlaad*.

Whereas broken plural derivation is predictable in a proportion of cases, the diminutive is totally predictable and can, at least as far as Standard Arabic is concerned, be derived from almost any singular noun or adjective: the first two moras of the unmarked singular are mapped to an iambic template, as for the broken plural. From *walad* 'boy,' *wala* maps to *wμlμμ*. The vocalic melody *u-ai* associates to the moraic slots to give *wulai*; the remainder of the singular (*-d*) is added, to derive *wulaid* 'little boy'.

Elatives (Comparatives, Superlatives)

Elatives are derived predictably from most basic adjectives. The elative pattern is *ʔaCCaC* for triliteral roots. The vocalic melody (*-a-*) is dependent on the pattern. Examples include: *ʔakbar* 'bigger; older' (*kabiir* 'big; old'); *ʔaṣʔab 'more difficult' (ṣaʔb* 'difficult'); *ʔajban* 'more cowardly' (*jabaan* 'cowardly'); *ʔaḥsan 'better' (ḥasan 'good')*.

Inflectional Morphology

While stems are partially or wholly the product of introflection, grammatically complete words involve further affixation. Affixational elements include:

- Verbal pronominal prefixes and suffixes
- Object suffixes
- Possessive suffixes
- *-at-* feminine suffix
- Sound plurals
- Dual
- Case (nominative *-u*, accusative *-a*, genitive *-i*)
- *-n* suffix (indefinite/non-construct marker)
- Mood endings (indicative *-u*, subjunctive *-a*, jussive *-0*)

Pronominal prefixes and most suffixes, the feminine suffix, sound plurals and the dual comprise consonants and vowels, whereas all three case markers and indicative and subjunctive mood markers for the imperfect aspect are simple vowel endings. As seen in Table 4, pronominal subject markers are suffixal in the perfect aspect; in the imperfect aspect, pronominal markers are suffixal and/or prefixal. The jussive mood is given in Table 4 in the imperfect column. The indicative is expressed by suffixation of *-u* to forms ending in a root consonant (here *-b*) and suffixation of *-na* to forms ending in a vocalic suffix. The subjunctive is expressed by suffixation of *-a* to forms ending in a root consonant.

Sound Plural and Dual

Arabic has two nominal 'sound' plural suffixes: masculine and feminine. The sound feminine plural *-aat* takes the endings *-u* for nominative and *-i* for

accusative or genitive case, and, further, *-n* to express indefiniteness or non-construct, as in:

mudarris-aat-u-n
teacher-FEM.PL-.NOM-INDEF
'teachers FEM.PL'

The sound masculine plural has two main forms: nominative *-uuna* and accusative/genitive *-iina*. The dual morpheme, suffixed to masculine or feminine nouns or adjectives, also has two main forms – *-aani* for the nominative and *-aini* for the accusative/genitive case.

See also: Arabic; Arabic Lexicography; Arabic Linguistic Tradition; Autosegmental Phonology; Inflection and Derivation; Morphological Typology; Semitic Languages.

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Arabic Linguistic Tradition

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Origin of Arabic Grammar

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Arabic Lexicography

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In most but not all Arabic dictionaries, the main entries are roots, which consist of basic consonants without affixes. Patterns (vowels between the consonants) give the roots different meanings in different contexts. So, for example, the root entry (ك،ت،ب) K-T-B includes the noun كتاب (*kitâb* 'book') and its plural كتب (*kutub* 'books'), the agentive noun كاتب (*kâtib* 'scribe, writer'), the verb كتب (*kataba* 'to write'), the gerund or masdar كتابة (*kitâbat* 'writing'), the adjectival perfect participle مكتوب (*maktûb* 'written'), the derivative verb استكتب (*staktaba* 'to urge someone to write'), and the derivative nouns مكتب (*maktab* 'office'), مكتبة (*maktab-at* 'library'), مكاتبة (*mukâtab-at* 'correspondence', and اكتتاب (*iktitâb* 'subscription'). In addition, all products of inflectional morphology are not treated as a subentry of the root K-T-B, but as an integral subentry under the basic verbal or nominal form.

Medieval Dictionaries

There is a rich tradition of lexicography in Arabic, going back to the 8th century C.E. Medieval Arabic dictionaries have a variety of sophisticated methods of arranging entries and writing definitions. The medieval corpus is composed mainly of poetry and the Koran.

Typology and Methods

In the Arabic lexicographical tradition, there are three types of dictionaries corresponding to three lexicographical schools:

1. phonetic dictionaries
2. alphabetic dictionaries
3. notional dictionaries.

In the first type, lexical entries are ordered according to the mode of articulation, so that for example words starting with pharyngeals such as عين (ʿ), هاء (h), حاء (ħ) are listed before words that start with the plosives velars كاف (k) and قا ف (q). This technique was first applied in معجم كتاب العين (*Kitâb al-'ayn* 'The Book of Pharyngeal Sound') of Al-Xalîl Al-Farâhîdiyy (died 776), where the consonants are arranged in the following order: pharyngeals and uvulars (ʿ, ħ, h, kh, gh), plosives velars (q, k), postalveolar fricatives (j, sh, đ), dental fricatives (ṣ, s, z), dental plosives (ṭ, t, d), labiodentals fricatives (ż, th, dh), liquids (r, l, n), labials (f, b, m), and approximants (w, â, y, '). This organization was followed subsequently by Al-Azhariyy (died 981) in تهذيب اللغة (*tahdhîb al-lugha* 'Disciplining Language'), As-ṣâħibu bnu 'abbâd (died 986) in المزهر (*Al Muzhir* 'the Flowery Book'), and Ibn Sîdah (died 1066) in المحكم (*Al Muħkam* 'The Good Dictionary'). The phonetic order of consonants following Al-Farâhîdiyy is shown in Table 1.

The second type of dictionary is characterized by the alphabetic ordering of entries. There is a conventional order of letters in Arabic, just as in the Roman alphabet. The order is shown in Table 2.

Following this classification, as one would expect, باب (*bâb* 'door') is found under باء (b), كتاب (*kitâb* 'book') is found under كاف (k), نافذة (*nâfidha* 'window') under نون (n), and so on. The main dictionaries that organize entries alphabetically according to the first letter of the word are جمهرة اللغة (*Jamhar-at al-lugha* 'Generalities in the Language') of Ibn-u Durayd (died 921), مقاييس اللغة (*Maqâyîs-u llugha* 'Patterns of Language') of Ibn Fâris (died 1004), and أساس البلاغة (*Asâs-u al-balâgha* 'The Basis of Rhetoric') of Az-Zamakhshariyy (died 1154).

Presentation of entries according to the last letter of the word is the order adopted by Al-Jawhariyy (died 1004) in الصحاح (*Aş-şiħâħ* 'The Strong Dictionary'), by Ibn Manżûr (died 1311) in his monumental work لسان العرب (*Lisân al-ᶜarab* 'The Language of the Arabs'), and by Al Fayrûzâbâdiyy (died 1418) in القاموس المحيط (*Al qâmûs-u l-muħîṭ-u* 'The Comprehensive Dictionary'). In this arrangement, words such as كتب (*kataba* 'write') and سارق (*sâriq* 'thief') are in

Table 1 The phonetic order of consonants following Al-Farâhîdiyy

Order of consonants	Some phonetic features	Letters
1	pharyngeals and uvulars	غ, خ, ه, ح, ع (ʿ, ħ, h, kh, gh)
2	plosives velars	ك ق (q, k)
3	postalveolar fricatives	ض ش ج (j, sh, đ)
4	dental fricatives	ز س ص (ṣ, s, z)
5	dental plosives	ت د، ط (ṭ, d, t)
6	labiodentals fricatives	ذ ث ظ (ż, th, dh)
7	liquids	ن ل ر (r, l, n)
8	labials	م ب ف (f, b, m)
9	appoximants	ء ي أ و (w, â, y, ')

Table 2 The alphabetic order of letters in Arabic

ـ أ ب، ت، ث، ج، ح، خ، د، ذ ر، ز، س، ش، ص، ض، ط، ظ، ع، غ، ف، ق	
ك، ل، م، ن، ه، و، ء، ي	
a, b, t, th, j, h, kh, d, dh, r, z, s, sh, ṣ, ḍ, ṭ, ẓ, ', gh, f, q. k, l, m, n, h, w, ', y	

the section for **باء** (b) and **قاف** (q), respectively. This arrangement was adopted mainly for poetic purposes, as it groups rhyming words together.

In the third type of Arabic dictionary, 'conceptual' dictionaries, entries are organized by concepts or themes, rather than by lexical units. These specialized dictionaries deal with certain selected aspects of the lexicon. For instance, there are dictionaries of concepts in particular semantic domains (animals, plants, human body parts, characters of women, religion, etc.). Among dictionaries of this type, the most important are **المخصص** (*al Mukhaşşaş* 'The Specialized Dictionary') of Ibn Sîdah , **كتاب التعريفات** (*Kitâbu tta'rîfât* 'The Book of Definitions') of Ash-sharîf Al Jurjâniyy (died 1417), and **الكليات** (*al Kulliyyât* 'Universals') of Abu l-Baqâ' Al-Kafawiyy (died 1696). The latter contains terms from the Koran and hadiths. Also relevant here is a later scientific and technical dictionary, **كشاف اصطلاحات الفنون** (*Kashshâfu ṣṭilâh-ât-i l-funûn-i* 'Discoverer of Technical Terms') by At-tahânawiyy (died 1759).

Characteristics of Medieval Arabic Dictionaries

All the medieval dictionaries mentioned above show considerable systematization at the level of form and content. The efforts of lexicographers were focused on the organization of entries (**الوضع**: *al-wad'* : 'order of entries'), on the nature of the materials (the word, the root), and on the corpus of the lexicon (**الجمع** : *al jam'*, data derived from poetry and the Koran). In addition, the dictionaries were seen as having the function of conserving the purity of the Arabic language and safeguarding against foreign (*gharîb*), introduced (*dakhîl*), obsolete (*muhmal*), and informal words (*mubtadal*).

Approaches to definitions and explanations are highly diverse. Ibn Manżûr often explains the meanings of words by their antonyms. Thus, **لعب** (*la'ib* 'game') is explained in terms of its being an antonym of **الجد** (*al-jidd* 'seriousness'). **الحرب** (*al-harb* 'war') is explained as **ضد السلم** (*didd as-silm* 'antonym of peace'); **الجدب** (*al jadb* 'drought') is explained as **نقيض الخصب** (*naqîd al khişb* 'opposite of fertility').

In other cases, the entry word is placed in a verbal or situational context. So, for example, Az-Zamakhshariyy explains meaning by giving examples of usage. He also mentions metaphorical uses. For instance, **ضرب** means 'to hit', but in the sentential context **ضرب مثلا** the verb means 'he gives an example.'

Medieval Arabic lexicographers did not feel the need to waste effort defining terms familiar to every speaker of the language. A frequent technique in *Lisân al-'arab* is use of the word **معروف** (*ma'rûf* 'well known') in place of a definition at entries such as **باب** (*bâb* 'door') and **ذهب** (*dhahab* 'gold').

Dictionaries of Contemporary Arabic

In most modern Arabic dictionaries, the basic arrangement is alphabetical order of roots, so morphological knowledge of Arabic is required to find words. For example, the speaker who does not know Arabic and who looks for the word **مكتوب** (*maktûb* 'was written') will not find it under M. It is necessary to know that **ما** (*ma-*) is a past tense passive prefix. Then one can deduce that the root under which the entry will be found is K-T-B.

There are, however, some modern dictionaries that are based entirely on alphabetical order, for example **معجم عبد النور** Abd Annour's Dictionary (1983). In this dictionary, *maktûb* is found under M. For many years, the most popular Arabic dictionary was **المنجد** (*Al-Munjid* 'The Helpful One', 1908) of Louis Ma'louf. More recently, **المعجم الوسيط** (*Al Mu'jam al waşîṭ* 'The Median Dictionary', 1972), compiled by the lexicographers of *Majma' al-lughat al-'arabiyyat* (Academy of the Arabic language, in Cairo), has presented the Arabic language in its modern perspective, focusing on contemporary usage. A feature of this dictionary is the representation of idiomatic meanings. For example, at **قتل** (*qatala* 'kill'), the idiom **قتل الشيء علما** (*qatala ash-shay'a 'ilm-an* ('he kills something in science', i.e., 'he deepens his studies') is explained. Specialized dictionaries including new words and meanings in Arabic culture also are being compiled. At a theoretical level, El Khattab (2002) describes a projected dictionary of modern Arabic that draws on the insights of modern Cognitive Linguistics.

Arabic Computational Lexicography

Arabic computational lexicography is still in the embryonic stage. Quite large corpora of Arabic text in

machine-readable form (mostly newspaper archives) are available from the Linguistic Data Consortium (LDC), the European Language Resources Association (ELRA), and other sources, but there is as yet no Arabic dictionary based on analysis of these or other electronic resources. Zemanek and others (2004) are building a treebank of parsed Arabic sentences at The Charles University in Prague. Tim Buckwalter and colleagues at the Qâmûs project (Qâmûs) are planning a corpus-based Arabic lexicon. The DIINAR-MBC research program (Dichy *et al.,* 1998) also includes work on the Arabic lexicon.

Similarly, there are no complete linguistic resources for Arabic of the kind that have been developed for English, French, and other European languages on the basis of machine-readable dictionaries. Indeed, there are still few machine-readable Arabic dictionaries. An ambitious proposal is *Arabic WordNet* (Black and El Kateb, 2004), which aims to apply the method and content of the Princeton **WordNet** project to the Arabic lexicon. The design "enables [them] to store more language-specific lexical and conceptual relations than those in the original WordNet" (according to their website).

An on-line resource worth mentioning in this connection is *Ajeeb*: an encyclopedia with a collection of medieval and contemporary dictionaries such as *Al-Qâmûs al-Muħît*, *Lisân Al-'arab*. On the same website, we also find a dictionary of English, French, and Arabic literature and a dictionary in five languages.

See also: Al-Khalil (8th Century A.D.); Arabic; Arabic Linguistic Tradition; Computers in Lexicography; Definition; Dictionaries and Inflectional Morphology; Lexicography: Overview; Word; WordNet(s).

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Relevant Websites

http://lexicon.ajeeb.com – Ajeeb Lexicon.
http://literary.ajeeb.com – Ajeeb Literature.
http://www.elra.info – European Language Resources Association.
http://www.ldc.upenn.edu – Linguistic Data Consortium.
http://www.qamus.org – Qâmûs Project.

accusative or genitive case, and, further, *-n* to express indefiniteness or non-construct, as in:

mudarris-aat-u-n
teacher-FEM.PL-.NOM-INDEF
'teachers FEM.PL'

The sound masculine plural has two main forms: nominative *-uuna* and accusative/genitive *-iina*. The dual morpheme, suffixed to masculine or feminine nouns or adjectives, also has two main forms – *-aani* for the nominative and *-aini* for the accusative/genitive case.

See also: Arabic; Arabic Lexicography; Arabic Linguistic Tradition; Autosegmental Phonology; Inflection and Derivation; Morphological Typology; Semitic Languages.

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Origin of Arabic Grammar

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The first chapters of the *Kitāb Sībawayhi* lay down the main principles of Arabic grammar.

Principle of an Underlying Level of Analysis

In exegesis, the explanation of the text presupposed an underlying semantic level, the 'real' meaning of the text; grammarians used this principle of a level beneath the surface level of speech utterances in order to explain the grammatical form of these utterances, in particular the declensional endings. The grammarian's reconstruction of this underlying level was later called *taqdīr*, literally 'estimating, guessing', viz. of the underlying structure.

Principle of Resemblance

Linguistic elements that resemble each other come to share functions as well, or in the terminology of the Arab grammarians, they receive additional (syntactic) 'rights'. An example of the force of this principle is that of the imperfect verb. In Arabic there are two verbal forms, the perfect form *kataba*, which is regarded as indeclinable and which is combined with the pronouns of the agents, e.g, *katab-tu* 'wrote-I'; and the imperfect *yaktubu* 'he is writing', which is said to resemble the noun, since it can be used in some syntactic environments in which a participle (a nominal form) is used. This is why it receives case endings. In traditional Western grammar these are called modal endings: *yaktub-u* nominative (indicative), *yaktub-a* accusative (subjunctive) and *yaktub* apocopate, which is a special verbal case called 'jussive' in Western grammar.

Principle of Dependency

The primary aim of linguistic analysis is the explanation of the declensional endings in speech, in the nouns and the imperfect verbs. Each case-ending is thought to be the result of the action of an operator (*'āmil*), which is responsible for the change in the ending. This principle is the main operating force in all syntactic constructions. In some respects it is similar to the basic principle of modern dependency grammar (Owens, 1988: 31–88).

These three principles belong to the explanatory framework of Arabic grammar, which was never a purely descriptive discipline. The grammarian's task was to explain the forms of the language rather than simply describe them. Arabic grammar was not a normative discipline, either: since the authority of the native speaker was paramount, grammatical analysis could not prescribe any norms but had to follow the linguistic behavior of the native speaker. Obviously this native speech was an idealized principle, because after the Islamic conquests there were no more native speakers of the standard language, which had become the language of literature, religion, and administration.

The first chapters of the *Kitāb Sībawayhi* also introduce the most important categories of speech.

Division into Three Parts of Speech

Three parts of speech are recognized in Arabic grammar: noun (*ism*), verb (*fi'l*), and particle (*ḥarf*); pronouns and adjectives are counted as nouns, and so are verbal nouns and participles. Adverbs do not constitute a separate part of speech but are analyzed as nouns or particles used in adverbial phrases of time and place (*ẓarf*), a functional category. Particles are a rest category containing all indeclinable words that are not verbs, such as prepositions and conjunctions. Only verbs and particles can act as operators.

Basic Structure of the Simple Clause

Two main types of clauses are distinguished: nominal sentences, consisting of a topic (*mubtada'*) and a predicate (*xabar*); and verbal sentences, consisting of a verb (*fi'l*) and an agent (*fā'il*). The difference between these two types is formulated by Sībawayhi in purely syntactic terms. Within the framework of Arabic grammar the notion of 'subject' was not used.

Morphological Structure

Consonants are regarded as the basic carriers of lexical meaning: words consist of three or four radicals, brought together in a pattern consisting of additional consonants and vowels. These patterns are denoted with a scheme, devised by earlier grammarians, which encodes the three radicals of a words with the help of the letters *f-'-l*.

Phonological Analysis

The analysis is based strictly on the phonological shape, never on the written form. Consonants are regarded as the carriers of the semantic contents of the word, whereas short vowels indicate syntactic functions and morphological categories. Phonetically long vowels are analyzed as combinations of a vowel with a glide, thus [u:] is analyzed as /uw/, [i:] as /iy/, and [a:] as /a"/, in which /"/ indicates an abstract phonological element, called *'alif*, which serves as the related glide of the vowel *a*.

Overall, the most striking aspect of the *Kitāb* is its emphasis on linguistic form to the detriment of semantic considerations. The only exception is one chapter in the introduction in which Sībawayhi mentions the difference between homonyms and

synonyms, but he does not come back to this topic in any later chapter. Sībawayhi often refers to the intention of the speaker, which is needed to disambiguate different readings of a sentence. Semantic differences in themselves are never adduced, however, as causes for the changes in case endings, caused by the operators, and generally speaking, the semantic/pragmatic aspect of speech is more or less taken for granted.

The *Kitāb* also formed the model for the entire later tradition with respect to the question of which corpus of linguistic forms was to serve as the basis for linguistic analysis. Sībawayhi's examples stem from the collected poems of the pre-Islamic tradition, which had been handed down orally, but which were now brought together in large collections, and the text of the *Qur'ān*, which used to be transmitted orally as well, but which was codified under the first successors of the prophet Muḥammad after his death.

Because of Sībawayhi's reliance on a written corpus of speech, which formed the basic legitimization of the accuracy of his grammatical explanation, his grammar was synchronic in nature. The underlying level reconstructed by the grammarian for the purpose of elucidating the structure of the actual utterances does not have any diachronic dimension. From the earliest period of the expansion of Arabic during the Arab conquests in the 7th century, there was a large divergence between spoken and written language, similar to the present-day diglossia in the Arabic-speaking world. The grammarians only recognized the classical Arabic language (*fuṣḥā*), codified in the *Qur'ān* and poetry, as the legitimate object of linguistic research, and this form of the language was regarded as unchanging.

The vernacular languages (*'āmmiyya*), often called 'Arabic dialects', were ignored completely by the grammarians. It is true that there was a special genre, called *laḥn al- 'āmma* 'errors of the common people', but significantly these treatises do not deal with the structural differences between the spoken and the written language, but with the mistakes semi-literates make when they attempt to write classical Arabic. In general historical writings complaints about the 'corruption of speech' – even in the mouths of the Bedouin who are generally considered to be the purest speakers of classical Arabic – are a common topos, but there is no reflection of this in grammatical literature, which continued to operate with the fiction of a pure language, spoken by native speakers.

Organization of Grammar

The best way to illustrate the organization of Arabic grammar is by listing the contents of Sībawayhi's *Kitāb*. Although the text of the *Kitāb* is sometimes opaque (possibly because of the bad state of the existing editions, which do not reflect the text in the majority of the manuscript tradition, cf. Humbert 1995) and suffers from a certain terminological ambiguity, we have a rather clear picture of Sībawayhi's ideas and are in a position to compare it with the collected views of later grammarians. There is some truth to the saying that the entire tradition is nothing but a commentary on the *Kitāb*, since the basic presuppositions of the *Kitāb* remained on the whole unchallenged.

The *Kitāb* deals first with syntax, then with morphology, and finally, as an appendix, with phonological/phonetic issues. Most later grammars follow this order, with only slight variations. Some later grammarians took the subdivision into nouns, verbs, and particles as the basis for their descriptions, but even grammatical treatises for beginners usually follow Sībawayhi's order. In accordance with the dependency principle, the use of declensional endings was part of the syntactic treatment.

The first section is on syntax and discusses the following topics:

- accusative of the object, 8–42
- implicit operators, 50–60
- accusative of situation (*ḥāl*), 61–131
- topicalization (*ibtidā'*), 132–140
- accusative of specification (*tamyīz*), 141–145
- accusative in vocative clauses (*nidā'*), 146–174
- accusative after absolute negation, 175–184
- accusative in exceptive clause, 185–202
- pronominal forms, 203–232.

These chapters deal with verbal operators, which cause an accusative ending in the words upon which they operate. The remainder of the syntactic section deals with particles as operators:

- particles of the subjunctive, 233–244
- conditional sentences, 245–254
- complementizers, 261–276
- disjunctive sentences, 277–284.

The second section is on morphology. Sībawayhi's main concern is the establishment of the radical structure of the words. The following topics are dealt with:

- diptotic and triptotic words, 285–315
- relational adjectives, 318–341
- dual and plural, 343–355
- diminutives, 359–396
- broken plurals, 416–431
- verbal morphology, 432–476.

The chapters on diptotic and triptotic words deal with an idiosyncratic feature of Arabic grammar, the

merger of two case endings in some categories of nouns: for instance, proper names of foreign origin. In the remaining chapters on morphology, the emphasis is on those morphological patterns that are important for the reconstruction of the radical structure, for instance, on the formation of the diminutive, which crucially depends on the distinction between radical consonants and so-called additional consonants (*ḥurūf zā'ida*).

From chapter 477 on, the emphasis is on (morpho-) phonological and phonetic phenomena.

- *'imāla*, 477–482
- pausal forms, 490–500
- nominal patterns, 511–525
- weak verbs, 531–558
- reduplication, 559–564.

In these chapters the emphasis is on the phonetic changes affecting words. In the case of the *'imāla*, this is the raising of the vowel /a/, which is constrained by the category of the word. Likewise, pausal changes depend on the category of the word involved. The chapters that follow deal with changes that are caused by the presence of a weak consonant in the word. The behavior of the nouns and verbs with weak radicals is again an example of the importance of the tri-radical structure: if one of the radicals is a weak consonant, i.e., a glide (*w*, *y*, *'alif*), the surface structure of the word often exhibits only two radicals, occasionally only one. In the weak verbs **qawama* 'he stood up', **sayara* 'he rode', the combination of vowels and glides leads to a change /qa:ma/, /sa:ra/, which obliterates the middle radical; these forms are realized phonetically as [qa:ma], [sa:ra]. Grammarians treat the phonological reconstruction as underlying forms: later grammarians emphasized the fact that these were abstract reconstructions by the grammarian, not historically attested forms. The place of these chapters at this point of the *Kitāb* can be explained by the different behavior of the weak consonants in nouns and verbs.

The final chapters in this part deal with reduplication, not as a phonological phenomenon but as a feature of a number of roots containing identical second and third radicals, which are subject to a constraint against CvCv# sequences, so that a word like **radada* 'he returned, replied' changes into *radda*.

- phonetic issues, 565–574.

Strictly speaking, the phenomena studied in these chapters are not connected with morphology or syntax, and given the constraints within which the grammarians worked, they may seem on the surface not to contain any linguistically relevant information. Yet, closer examination reveals that issues such as assimilation and phonetic differences between the pre-Islamic dialects are relevant after all since these may lead to apparent exceptions to the rules – and besides, they may obscure the radical structure of the word.

Linguistics and Other Disciplines

Linguistics was regarded by the Arabs as an autonomous discipline in its own right. The extensive Arabic biographical literature lists the names of thousands of grammarians and the titles of their writings, together with anecdotes about their professional activities. The term used for this discipline is *naḥw* 'grammar', which was the domain of the *naḥwiyyūna* 'grammarians'. The term is also used to designate one of the two subsections of grammar, which in Western linguistics is called 'syntax', the other subsection being *ṣarf* 'morphology and morphophonology'. Grammar was distinguished from lexicography (*luġa*). Even though most grammarians also worked as lexicographers and vice versa, it was perfectly normal for someone to be excellent in one and weak in the other. Syntax and morphology, on the other hand, were more like subdomains of one discipline. As a matter of fact, although there are special treatises on syntax and morphology, most grammarians treated them together.

Traditionally, grammar and the study of poetry were a normal component of an intellectual's education, and most scholars at one stage followed lessons of a grammarian. Nonetheless, being a grammarian was not regarded as a profession in the same way as, for instance, being a theologian or legal expert was. As a rule, grammarians did not teach at universities, but worked as private teachers, living on the income they received for their lessons and often having a main job elsewhere, for instance, as a lawyer or a bookseller.

After the initial close connection between grammar and Qur'ānic exegesis, the two sciences drifted apart. In most introductions to grammatical treatises, grammarians paid lip service to the use of grammar for religious purposes, and grammar continued to be one of the *'ulūm 'islāmiyya* 'Islamic sciences', but in practice, linguistics was often studied for its own merits. The status of linguistics as one of the Islamic sciences was threatened by the introduction in the Islamic world of Greek logic and philosophy in the 9th and 10th centuries, when logicians and philosophers alike asserted that the study of meaning was their domain, which meant that the grammarians ought to confine themselves to the study of the form of the words. This led to a lively debate in the Arab world about the proper place for the foreign sciences, which

eventually were relegated to a separate category, that of the Greek sciences (*'ulūm yūnāniyya*). Grammar then resumed its customary position as ancillary to the study of the *Qur'ān*.

Some grammarians of this period attempted to reconcile grammar and logic by introducing logical methods in grammar. These grammarians were accused of 'mixing grammar with logic', although their works do not exhibit a great divergence from traditional grammar as it had been practiced since the days of Sībawayhi. It is true, though, that they took greater care to formulate explicit definitions and to arrange their works in a formal fashion. In this respect they differed from their predecessors, who had a tendency to use terms and notions without properly defining them, thus causing a certain ambiguity in their terminology.

The introduction of logic also affected the selection of topics that grammarians dealt with. In 10th-century writings, new questions were asked about the internal structure of language, the relationship between language and thought, and the origin of language. Because of the obvious connection with religious ideas, the topic of the origin of language was heavily debated for some time by linguists and theologians alike, but after the 10th century, this topic disappeared from the domain of linguistics. Almost all grammarians agreed that the question could not be solved by human beings, and it was therefore useless to discuss it.

After the initial period linguistics became an increasingly technical discipline. The traditional link with poetry became looser, and technical discussions on fine points of linguistic structure came to replace the connection with literature and style. From the 10th century on, some linguists attempted to reestablish this link by focusing on the semantic side of language. They asserted that linguistics had become overly focused on formal matters, thereby neglecting the semantic side of language. In this period efforts were made to establish a new link between the formal and the semantic sides of language. In one such scheme, the sciences of language are subsumed under the heading *'ilm al-'adab* 'science of literary culture', which is subdivided into the linguistic sciences of *naḥw* 'grammar' and *ṣarf* 'morphology', and the semantic sciences *'ilm al-ma'ānī*, roughly equivalent to rhetoric and stylistics, and *'ilm al-bayān*, roughly equivalent to the study of metaphorical language (Simon, 1993).

The original connection between linguistics and Qur'ānic exegesis was reestablished in a new paradigm that grew out of the *'ilm al-ma'ānī*, the main interest of which was in the pragmatic aspect of speech and its consequences for legal argumentation. This science was called *'uṣūl al-fiqh* 'the principles of law', even though its main thrust was linguistic in nature. Within this discipline the extensional and intensional meaning of speech was studied in order to establish the relationship between words and their denotata (Weiss, 1966).

Use of the Arabic Model for Other Languages

Arab grammarians hardly ever showed any interest in the structure of other languages. Apart from occasional references to the absence of certain traits in other languages, intended to demonstrate the superiority of Arabic (e.g., the absence of declension, or the uniqueness of certain Arabic consonants, supposedly lacking in the phonemic inventory of other languages), these languages were neither described nor compared with Arabic. Unlike the Hebrew grammarians, the Arabs apparently were not aware of the relatedness of the Semitic languages. Unless they were native speakers of other languages, most of them probably did not know any foreign languages. Sībawayhi himself likely spoke Persian as his first language, but he does not exhibit any interest in comparing that language with Arabic.

Not even the introduction of Greek logic in the 9th and 10th centuries brought any change in this disinterest: notwithstanding the universalist claims of the representatives of the new fashion of Greek logic, the acquaintance with Greek philosophy and logic was not accompanied by any curiosity about the structure of the Greek language, in spite of the presence of a considerable number of translators who knew not only Greek, but usually also Syriac. As for the Arab philosophers themselves, they were keenly interested in the difference between the two languages, pointing out, for instance, the absence of a copula like the Greek verb *éstin* in Arabic; they may even have had some understanding of the Greek grammatical tradition.

The only grammarian in the Arab tradition who is known for his interest in foreign languages is an Andalusian grammarian, 'Abū Ḥayyān al-ġarnāṭī (d. 1345). While in Egypt, he wrote a number of works about the language of the Turkic-speaking Mamluks who at that time were the rulers of Egypt. His approach is exactly the same as in his works on Arabic, but he has a keen eye for the difference between the two languages. One of the most interesting aspects of this analysis is the fact that he denies the presence of declensional endings in Turkic. The case endings that Western grammars distinguish in Turkic, for instance for the locative and the dative, are analyzed by him as *'alāmāt* '(semantic) markers'.

In Arabic grammar the term 'markers' is also used, for instance, to indicate the feminine ending *-t*. This means the semantic cases of Turkic are analyzed differently from the syntactic cases of Arabic. In terms of the Arab grammarians, there is no real declension since the endings are not assigned by an 'operator' (*'āmil*), which is a condition for declensional endings.

'Abū Hayyān's was not the only attempt to describe a foreign language with the help of the Arabic model, though he was the only one whose mother tongue was Arabic. After him, many treatises about the Turkic language were written by native speakers of Turkic. These authors follow his example in describing the Turkic language by using the categories of the Arabic grammatical model, for instance, by axiomatically assuming that Turkic, too, possessed three parts of speech, and by assuming that the formalism to describe word structure in Arabic with the help of the three radical system of *f-'-l* was also suitable for the description of Turkic (Ermers, 1999).

The analysis of Syriac by the Syrian grammarians is an interesting case of influence and counter-influence. In its formative period, Arabic grammar probably profited from the experience of Syriac grammarians, who based their analysis on the translation of Dionysios Thraxs' *Tékhnè*. The Arab grammarians probably borrowed from them the names of the vowels and the case endings. But later, in the 11th through 13th centuries, when Syriac had become a minority language in the Islamic empire, Syriac grammarians borrowed a new set of linguistic terms and notions from Arabic.

In Egypt, the speakers of Coptic never possessed a grammatical tradition of their own for the description of their language. After the conquest of Egypt in the 7th century, the Coptic language was soon replaced by Arabic, although it remained in use only for religious purposes in the Coptic church. In the 13th and 14th centuries however, a number of Coptic authors decided to adapt the Arabic grammatical framework for grammatical introductions to the Coptic language, written in Arabic (Bauer, 1972).

The grammar of Hebrew, too, was elaborated within the framework of Arabic linguistic theory. Building on the Hebrew exegetical tradition, the Hebrew grammarians borrowed the framework of Arabic grammar in order to analyze their holy language (Zwiep, 1995). Their treatises were usually written in Arabic, the mother tongue of the Jews in the Islamic empire. Some of them introduced the principle of tri-radicalism into Hebrew, even though the tri-radical structure is much less transparent in that language than in Arabic. In one respect the Hebrew grammarians differed from their Arabic model: they actively engaged in the comparison of Hebrew with other Semitic languages. Long before the advent of historical comparative linguistics in the 19th century, the Hebrew grammarians were already aware of the systematic relationship between the most important Semitic languages.

After the conquest of the Persian Empire, the Persian language had at first become marginalized, but in the 10th century a modern variety of the language was revived for cultural purposes at the court of the Persian dynasties, and it became the language of poetry again. The revival of Persian also led to a renewed interest in the language. For their study of the Persian language, Persian grammarians used the terminology of Arabic grammar. Their main interest was in lexicography, but in connection with this activity they also wrote grammatical treatises. One of the problems the Persian grammarians had to deal with in their attempts to adapt the Arabic model to the structure of Persian was the fact that Persian as an Indo-European language uses suffixes and prefixes rather than morphological patterns of the Semitic type. In order to accommodate such a different structure, Arabic terms like *ḥarf zā'id* 'additional consonant' came to be used in a derived sense (Jeremiās, 2000).

In the west of the Arab world, the Berber languages had never been completely replaced by Arabic. Berber remained a primarily spoken language, but after the 12th century a Berber literature arose, especially in the Sous. Arabic treatises were translated into Berber and original writings were composed in Berber, using Arabic script. The Arabic language was studied intensively, accompanied by the sporadic publication of grammatical notes about the Berber language, chiefly of a lexicographical nature (van den Boogert, 1997: 113–119). Naturally the Arabic tradition with which these scholars were familiar provided the framework to do so.

Outside the Arab world, wherever Arabic culture and literature were brought together with Islam, an Islamic book culture emerged, written in indigenous languages, but in Arabic script. In the process of transmission of Islamic knowledge, these languages borrowed a large number of Arabic words. Thus, for instance, in Southeast Asia, a special literary genre arose, sometimes called Kitap Malay, in which Arabic loanwords were introduced by the dozens. Most of this literature was in the field of theology or Islamic law, but in some cases the system of Arabic grammar was used to analyze the indigenous language. In the 19th century several Malay grammars appeared in which the language was analyzed with the help of Arabic terminology (Kapteijn, 2000).

The introduction of western science at the end of the 19th century meant the end of the indigenous

tradition in the Islamic world. Even though treatises in the traditional framework continued to be written in Arabic, the practice of linguistics at the university level came to be dominated by the prevalent trends in western linguistics, especially in Morocco and Egypt. In pre-university education, there was a drive to reform the old-fashioned grammatical system. Some linguists and teachers tried to remedy the deplorable state of education in classical Arabic by replacing the traditional grammatical system with newer categories and terminology, including the introduction of such categories from Greco-Latin school grammar as 'subject' and 'predicate'. One point that was particularly abhorrent to the reformers was the pervasive notion of 'operator' (*'āmil*), which became associated with the most sterile forms of Arabic grammar, in which the only issue had become the identification of the *'āmil* in increasingly complicated sentences. However, since the old terminology was often retained, the resulting hybrid system in teaching often suffered from a lack of consistency.

See also: Ancient Egyptian and Coptic; Arabic; Arabic Lexicography; Arabic as an Introflecting Language; Berber; Hebrew Linguistic Tradition; Malay; Persian, Old; Qur'an; Syriac; Turkic Languages; Sibawayhi (8th century A.D.).

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Aramaic and Syriac

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Origin and Expansion

Aramaic is the native name of a language that first manifests itself in inscriptions in Syria early in the 1st millennium B.C. but that in subsequent centuries, during the period of the Assyrian and Persian empires, was widespread throughout the Near East and is found as far afield as Egypt, Cilicia, and Iran. Following the conquests of Alexander the Great, and during the subsequent eras of Macedonian and Roman influence, it co-existed with Greek as a principal medium of written communication over this wide area. The conquest of the region by the Arabs in the 7th century A.D. eventually brought its dominant position to an end, but it remained significant for many years thereafter as a spoken and, especially, a literary language. Greek writers designated it Syriac, a term derived from *Assyrian*, and the Greek name was frequently preferred over the native one by Aramaic-speaking Jews and Christians, among whom *Aramaean* became a designation for their pagan neighbors. Over time, Aramaic developed a number of clearly distinct literary dialects, each evolving out of a local form of the language, and these were extensively employed by Jewish, Christian, and other religious communities. In contemporary usage, Syriac usually refers to the principal literary dialect employed by Christians, whereas Aramaic is retained as a generic term for the whole group. Spoken forms of the language have survived to this day among the religious communities that have preserved it in their liturgies and in a few places as an everyday language.

Aramaic belongs to the Semitic group of languages and, more particularly, to the northwest branch, which, according to prevalent opinion, contained in the 1st millennium B.C. two distinct strands, Canaanite (which includes Hebrew and Phoenician) and Aramaic. Despite its extensive use in the Assyrian and Persian empires, it has left few literary or epigraphic remains from these periods, although those that have survived are of considerable importance in the study of the history of the region and fresh discoveries are steadily adding to the stock. In the Hellenistic and Roman periods, the material becomes more abundant, and, especially from the 4th century onward, a large body of Christian literature is preserved in Syriac and a substantial body of Jewish literature in Palestinian and Babylonian Aramaic dialects. Smaller extant corpora in dialects employed by the religious communities in question stem from the Mandaeans, the Samaritans, and Syro-Palestinian Christians who adhered to the Orthodox confession of the Byzantine emperors.

Phases and Dialects

Over the 3000 years of its recorded history, the language has naturally undergone many developments. Three broad phases are easily discernible. In the first, represented mainly in inscriptions and papyri, the form of the language is surprisingly uniform, and the differences between documents from diverse times and places are relatively minor. In the second, represented in the literature (beginning in the 4th century A.D. or earlier) of Jews, Christians, Samaritans, and Mandaeans, more marked dialectal differences are apparent, with two broad groupings. The eastern group, of Mesopotamian provenance, comprises Syriac, Jewish Babylonian Aramaic, and Mandaic; the western group comprises Jewish Palestinian Aramaic, Samaritan, and Syro-Palestinian Christian Aramaic. A third phase of modern eastern and western dialects can be discerned from approximately the 17th century. Further differentiation beyond these three is less clear cut, but in recent years a fivefold classification has gained considerable support, with the period prior to the emergence of the literature in the eastern and western literary dialects divided into three. The distinction between the earliest of these, Old Aramaic, and its successor is relatively unproblematic. Old Aramaic inscriptions belong to the period of the independent Aramaean states (10th–8th centuries B.C.) and exhibit a number of distinctive grammatical features, some of them similar to those known in Canaanite. Texts in Aramaic from the subsequent period come from a vastly greater area, but despite their wide geographical and chronological range they exhibit a high degree of homogeneity. Many of them are administrative in nature, and the language in which they are composed was evidently employed as a formal means of communication in much of the Assyrian, Babylonian, and Achaemenid empires. Its adoption by the imperial chancelleries (a striking example of which is the presence of Aramaic ideograms in Pahlavi texts) is no doubt the reason for the high degree of standardization, and this phase is therefore commonly designated Official Aramaic. More problematic is the characterization of the Aramaic material originating between the end of the Achaemenid Empire and the beginnings of the extensive literature in the later Jewish dialects and classical (Christian) Syriac. In this period (roughly 200 B.C–200 A.D.), several different dialects emerge in a number of localities. These include

Palmyrene, Nabataean, Hatran, and Old Syriac (Edessan) inscriptions, and inscriptions and fragments of literary works from Palestine. Although all these dialects are quite similar to Official Aramaic and developed out of it, the influence of spoken local dialects or other languages (Arabic among the Nabataeans and Akkadian in Mesopotamia) led to a fragmentation and modification of the earlier fairly uniform Official Aramaic. In none of these areas, however, do we have evidence this early of the emergence of a vigorous or widespread new literary Aramaic. Although some scholars therefore consider this period as still belonging to the literary phase of Official Aramaic, others are sufficiently impressed by the differences to classify it as a new phase, Middle Aramaic, falling between Official Aramaic and the Later Aramaic of rabbinical Jewish and Christian Syriac literature. The expansion and consolidation of these religions was presumably responsible for the transformation of local dialects into significant and widespread means of literary expression.

Dialects and Religious Communities

The Aramaic inscriptions of Old, Official, and Middle Aramaic provide important information on deities worshipped in Syria and Mesopotamia in pre-Christian and early Christian times. Papyri from Egypt constitute the largest body of material in Official Aramaic, among which those of a Jewish military colony at Elephantine are of particular interest for the light they shed on the religious beliefs and practices of this group of Jews in the Achaemenid Empire. The language of the Aramaic sections of *Ezra* and *Daniel* also belongs to Official Aramaic and differs only slightly from that of the Elephantine papyri. Subsequent Jewish writings and inscriptions of Palestinian provenance belong to the Middle Aramaic phase and include fragments of a number of literary works preserved among the Dead Sea Scrolls. The problem of determining the form of spoken Aramaic current in 1st century A.D. Palestine has attracted much attention on account of its relevance to New Testament studies. Although the literary and epigraphic material from the period is consistent with the use of Middle Aramaic, the extant material is still fairly sparse, and some scholars still hold (as did most of those of earlier generations, to whom Middle Aramaic was unknown) that the Palestinian dialects of later rabbinical literature are a valuable source for the reconstruction of the spoken language of the 1st century A.D.

The rabbinical literature in Jewish Palestinian Aramaic comprises various Targumim (paraphraistic Aramaic versions of sections of the Hebrew Bible), Midrashim (commentaries on the biblical books), and parts of the Palestinian Talmud. The latter two are written partly in Hebrew and partly in Aramaic. The Targum on the Pentateuch attributed to Onkelos and that on the *Prophets* attributed to Jonathan were used in Babylonia and, unlike the Palestinian Pentateuch Targum, do not therefore represent a purely Palestinian form of Aramaic. Jewish Babylonian Aramaic is represented in the Aramaic sections of the Babylonian Talmud and in the Responsa literature of the 8th–10th centuries A.D., the replies of the heads of the Babylonian academies to legal questions from scattered Jewish communities. The famous 13th century mystical work from Spain known as the *Zohar* is also written partly in Hebrew and partly in an artificial Aramaic. Samaritan Aramaic is represented principally by the Samaritan Targum to the Pentateuch and the theological treatise known as *Memar Marqah*, an important source for the knowledge of Samaritan religion. The language of the Mandaean texts is Eastern Aramaic, but linguistic as well as historical arguments have been advanced in favor of a Palestinian origin contemporary with the beginnings of Christianity. Because, however, these are not decisive, and the Mandaeans are only known in Iraq and further east, a Mesopotamian origin of the religion and the texts is still widely accepted.

The largest extant corpus of Aramaic literature is that in Syriac. Originally the local dialect of Edessa (modern Urfa), Syriac was adopted as a literary language by Christians throughout the Near East. Once adopted, it remained remarkably stable in most respects, although two slightly differing dialects (eastern and western, using different scripts and differing in the pronunciation of some vowels) emerged around the 5th century. These were associated respectively with the East Syrian Church (in Sasanid domains) and the Syrian Orthodox Church (in the Roman domains). Syriac-speaking Christians were active in the translation of Greek writings into Syriac, not only the Bible and Greek patristic writers but also (from the 6th century) medicine (Galen) and logic (Aristotle). Their expertise in these secular subjects in the period of the ʻAbbasid caliphate, and their ability to read both the relevant Greek texts and the earlier Syriac translations of them, stimulated Muslim interest in these subjects and led to the Syrians being in great demand as translators from Greek to Arabic, such translations being frequently done through a Syriac intermediary. Greek loanwords, grammatical forms modeled on Greek, and Greek syntax all greatly influenced Syriac, increasingly so from the 6th century. By contrast, the influence of Arabic on the literary language was slight. In the earlier period, the most striking literature in Syriac

is the religious poetry of Saint Ephrem, which was much admired and imitated even beyond the Syriac language area. From the 10th century, Arabic replaced Syriac among Christians as the chief language of theology, philosophy, and medicine, but the 13th century saw a veritable West Syriac renaissance, embodied especially in the great polymath Bar Hebraeus, who wrote with equal facility in Syriac and Arabic. In contrast to the wide use of Syriac, Syro-Palestinian Christian Aramaic (alternatively designated Syro-Palestinian Syriac because it was written in the West Syriac script) was employed only in Palestine and Syria, and the extant texts (mostly biblical, liturgical, or hagiographical) are all translations from Greek.

Spoken Aramaic dialects have been in continuous use in a number of places right into modern times. Modern Western dialects of Aramaic are spoken, by Christians and Muslims, in three villages north of Damascus, namely Ma'lula, Bah'a, and Jubb 'Addin. Eastern dialects have been more extensively used by Christians in various localities. In the mountainous area of Southeast Turkey known as Tur 'Abdin, Turoyo ('the mountain language') is spoken by members of the Syrian Orthodox Church. Other Eastern Aramaic dialects have been spoken in modern times by the Jews of Kurdistan and Azerbaijan, most of whom have now emigrated to Israel, and a modern Mandaic dialect has survived in Iran. The greatest use of Aramaic in modern times, however, has been by East Syrian Christians, among whom a number of East Aramaic dialects have been employed. Modern literary Syriac (Swadaya) may be said to have begun with the printing of books in the local dialect by the American Presbyterian Mission at Urmia in Northwest Iran. Although the number of people currently using some form of Aramaic is small, their determination to keep it alive is a testimony to their pride in a language whose demonstrable lifespan extends to 3000 years.

See also: Ancient Near-Eastern Religions; Arabic; Bible; Bible Translations: Ancient Versions; Christianity in Central Asia and the Near East; Hebrew, Biblical and Medieval; Iran: Language Situation; Iraq: Language Situation; Israel: Language Situation; Judaism; Lebanon: Language Situation; Semitic Languages; Syria: Language Situation; Syriac; Translation: History; Turkey: Language Situation.

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Aranda *See:* Arrernte.

Araucanian *See:* Mapudungan.

Arawak Languages

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The Arawak language family contains the largest number of languages in Latin America. Geographically, it spans four countries of Central America – Belize, Honduras, Guatemala, Nicaragua – and eight of South America – Bolivia, Guyana, French Guiana, Surinam, Venezuela, Colombia, Peru, Brazil (and also formerly Argentina and Paraguay).

There are about 40 living Arawak languages. The first Native American peoples encountered by Columbus – in the Bahamas, Hispaniola, and Puerto

is the religious poetry of Saint Ephrem, which was much admired and imitated even beyond the Syriac language area. From the 10th century, Arabic replaced Syriac among Christians as the chief language of theology, philosophy, and medicine, but the 13th century saw a veritable West Syriac renaissance, embodied especially in the great polymath Bar Hebraeus, who wrote with equal facility in Syriac and Arabic. In contrast to the wide use of Syriac, Syro-Palestinian Christian Aramaic (alternatively designated Syro-Palestinian Syriac because it was written in the West Syriac script) was employed only in Palestine and Syria, and the extant texts (mostly biblical, liturgical, or hagiographical) are all translations from Greek.

Spoken Aramaic dialects have been in continuous use in a number of places right into modern times. Modern Western dialects of Aramaic are spoken, by Christians and Muslims, in three villages north of Damascus, namely Ma'lula, Bah'a, and Jubb 'Addin. Eastern dialects have been more extensively used by Christians in various localities. In the mountainous area of Southeast Turkey known as Tur 'Abdin, Turoyo ('the mountain language') is spoken by members of the Syrian Orthodox Church. Other Eastern Aramaic dialects have been spoken in modern times by the Jews of Kurdistan and Azerbaijan, most of whom have now emigrated to Israel, and a modern Mandaic dialect has survived in Iran. The greatest use of Aramaic in modern times, however, has been by East Syrian Christians, among whom a number of East Aramaic dialects have been employed. Modern literary Syriac (Swadaya) may be said to have begun with the printing of books in the local dialect by the American Presbyterian Mission at Urmia in Northwest Iran. Although the number of people currently using some form of Aramaic is small, their determination to keep it alive is a testimony to their pride in a language whose demonstrable lifespan extends to 3000 years.

See also: Ancient Near-Eastern Religions; Arabic; Bible; Bible Translations: Ancient Versions; Christianity in Central Asia and the Near East; Hebrew, Biblical and Medieval; Iran: Language Situation; Iraq: Language Situation; Israel: Language Situation; Judaism; Lebanon: Language Situation; Semitic Languages; Syria: Language Situation; Syriac; Translation: History; Turkey: Language Situation.

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There are about 40 living Arawak languages. The first Native American peoples encountered by Columbus – in the Bahamas, Hispaniola, and Puerto

Rico – were the Arawak-speaking Taino. Their language became extinct within a hundred years of the invasion. Spanish and many other European languages inherited a number of loans from Arawak languages. These include widely used words such as *hammock*, *tobacco*, *potato*, *guava,* and many other names for flora and fauna.

The creation of a mixed language of Arawak/Carib origin in the Lesser Antilles is one of the most interesting pieces of evidence on language history in preconquest times. Speakers of Iñeri, a dialect of the Arawak language now (misleadingly) called Island Carib, were conquered by Carib speakers. They developed a mixed Carib/Arawak pidgin that survived until the 17th century (Hoff, 1994). Speech of men and speech of women were distinguished in the following way. Women used morphemes and lexemes of Arawak origin, while men used lexical items of Carib origin and grammatical morphemes mostly of Arawak origin. The pidgin coexisted with Carib used by men and Iñeri used by women and children; it belonged to both parties and served as a bridge between them. This diglossia gradually died out with the spread of competence in Island Carib among both men and women. As a result, Island Carib, an Arawak language, underwent strong lexical and, possibly, grammatical influence from Carib.

The languages in areas settled by the European invaders soon became extinct. Those on the north coast of South America perished first, before 1700. When the search for gold and rubber extended up the Amazon and its tributary the Rio Negro, further languages succumbed, from the 18th century up until the present day. Sometimes the Indians retaliated, attacking settlements and missions; but the invaders always returned. Indian rebellions often provoked forced migrations which sometimes ended up creating a new dialect or even a language. For instance, in 1797 the British authorities removed the rebellious inhabitants of St. Vincent (an island in the Lesser Antilles) to Belize on the mainland. These were racially a mixture of black slaves and Indians, who spoke Island Carib. This resulted in the creation of a new dialect of Island Carib – known as Central American Island Carib, Kariff, Black Carib, or Garifuna – which by the 20th century had developed into a separate language, now spoken in Central America (Taylor, 1977).

The overwhelming majority of Arawak languages are endangered. Even in the few communities with more than 1000 speakers, a national language (Portuguese or Spanish) or a local lingua franca (Lingua Geral Amazônica, Quechua, or Tucano) is gaining ground among younger people. The few healthy Arawak languages are Guajiro in Venezuela and Colombia (estimates vary from 60 000 to 300 000 speakers) and the Campa languages (total estimate 40 000 to 50 000 speakers), one of the largest indigenous groups in Peru.

Most of the materials on Arawak languages collected during the second half of the 20th century are by missionary linguists. Their quality and quantity varies. Only three or four languages have full descriptions available.

The genetic unity of Arawak languages was first recognized by Father Gilij as early as 1783. The recognition of the family was based on a comparison of pronominal cross-referencing prefixes in Maipure, an extinct language from the Orinoco Valley, and in Moxo from Bolivia. Gilij named the family Maipure. Later, it was renamed Arawak by Daniel Brinton after one of the most important languages of the family, Arawak (or Lokono), spoken in the Guianas. This name gained wide acceptance during the following decades. The majority of Native South American scholars use the name Arawak (Aruák) to refer to the group of unquestionably related languages easily recognizable by pronominal prefixes such as *nu-* or *ta-* 'first person singular', *(p)i-* 'second person singular', prefix *ka-* meaning 'have', and negator *ma-*. A number of scholars, mainly North Americans, prefer to use the term Arawak(-an) to refer to a much more doubtful higher-level grouping, and reserve the term Maipuran (or Maipurean) for the group of undoubtedly related languages that are claimed to be one branch of Arawakan (see Payne, 1991). Here I follow the South American practice and use the name *Arawak* for the family of definitely related languages.

The limits of the family were established by the early 20th century. Problems still exist concerning internal genetic relationships within the family and possible genetic relationships with other groups. Reconstruction, internal classification, and subgrouping of Arawak languages remain matters of debate; further detailed work is needed on both the descriptive and comparative fronts.

The putative studies of Arawakan by Ester Matteson, G. Kingsley Noble, and others are deeply flawed. Unfortunately, these have been adopted as the standard reference for the classification of Arawak languages, especially among some anthropologists, archaeologists, and geneticists, influencing ideas on a putative proto-home and migration routes for proto-Arawakan' – see the criticism in Tovar and De Tovar (1984), Dixon and Aikhenvald (1999: 12–15), and Aikhenvald (1999a).

Little is known about a proto-home for the Arawak family. The linguistic argument in favor of an Arawak proto-home located between the Rio Negro and the Orinoco rivers – or on the Upper Amazon – is based on the fact that there is a higher concentration of structurally divergent languages found in this region.

This area has also been suggested as one of the places where agriculture developed. This is highly suggestive and corroborated by a few mythical traditions of northern origin by Arawak-speaking peoples south of the Amazon. The origin myths of the Tariana, in northwest Amazonia, suggest that they could have come from the north coast of South America.

Arawak languages are complicated in many ways. Words can be differentiated by stress in some languages, such as Baure and Waurá (south of Amazonas), and Tariana, Achagua, and Warekena (north of Amazonas). At least two have tones – Terêna in the South, and Resígaro spoken in the far northeast of Peru.

Each Arawak language has a few prefixes and numerous suffixes. Prefixes are typically monosyllabic, while suffixes can consist of one or more syllables. Roots usually contain two syllables. Prefixes are rather uniform across the family, while suffixes are not. What is a free morpheme in one language can be a grammatical marker in another language; for instance, postpositions become causative markers, and nouns become classifiers. An Apurina noun *maka* means 'clothing' – this is where the word for hammock comes from. In Baniwa of Içana, *-maka* is a classifier for stretchable thin extended objects, e.g., *tsaia* 'skirt' or *dzawiya* 'jaguar's skin', as in *apa-maka* (one-CLASSIFIER:CLOTHING) 'one piece of clothing'.

Most grammatical categories in Arawak languages are verbal. Cases to mark subjects and objects are atypical. Tariana, spoken in northwest Brazil, has developed cases for core grammatical relations to match the pattern in nearby Tucanoan languages (Aikhenvald, 1999b).

Arawak languages spoken south of the Amazon (South Arawak) have a more complex predicate structure than those north of the Amazon (North Arawak). South Arawak languages such as Amuesha or Campa have up to thirty suffix positions. North Arawak languages such as Tariana or Palikur have not more than a dozen suffixes. Suffixes express meanings realized by independent words in familiar Indo-European languages, e.g., 'be about to do something', 'want to do something', 'do late at night', 'do early in the morning', 'do all along the way', 'in vain', 'each other'.

Verbs are typically divided into transitive (e.g., 'hit'), active intransitive (e.g., 'jump') and stative intransitive (e.g., 'be cold'). All Arawak languages share pronominal affixes and personal pronouns. Pronominal suffixes refer to subjects of stative verbs and direct objects. Prefixes are used for subjects of transitive verbs and of intransitive active verbs, and for possessors. That is, most Arawak languages are of active-stative type. For instance, in Baniwa one says *nu-kapa* 'I see' and *nu-watsa* 'I jump', but *nu-kapa-ni* 'I see him' and *hape-ni* 'he is cold' (*nu-* refers to 'I' and *-ni* to 'him'). And 'my hand' is *nu-kapi*.

Table 1 Pronominal prefixes and suffixes in proto-Arawak

Person	*Prefixes*		*Suffixes*	
	Singular	*Plural*	*Singular*	*Plural*
1	*nu- or ta-*	*wa-*	*-na, -te*	*-wa*
2	*(p)i-*	*(h)i-*	*-pi*	*-hi*
3nf	*r i-, i-*	*na-*	*-r i, -i*	*-na*
3f	*thu-, ru-*	*na-*	*-thu, -ru, -u*	*-na*
'impersonal'	*pa-*	—	—	—

Some languages have lost the pronominal suffixes (and with them the morphological basis for an active-stative system); these include Yawalapiti (Xingú area, Brazil) and Chamicuro (Peru) to the south of the Amazon, and Bare, Resígaro, Maipure, and Tariana to the north. The form of the first person pronoun is *ta-* in the Caribbean (Lokono, Guajiro, Añun, Taino) and *nu-* in other languages. This is the basis for classification of Arawak languages into *Nu*-Arawak and *Ta*-Arawak.

Proto-Arawak must have had an unusual system of four persons: first, second, third, and impersonal. The forms of prefixes and suffixes reconstructed for proto-Arawak are given in Table 1.

Most Arawak languages distinguish two genders – masculine and feminine – in cross-referencing affixes, in personal pronouns, in demonstratives, and in nominalizations, e.g., Palikur *amepi-yo-* 'thief (woman)', *amepi-ye* 'thief (man)', Tariana *nu-phe-ri* 'my elder brother', *nu-phe-ru* 'my elder sister'. No genders are distinguished in the plural. The markers go back to proto-Arawak third person singular suffixes and prefixes: feminine *(r)u*, masculine *(r)i*. Some languages also have complicated systems of classifiers – these characterize the noun in terms of its shape, size, and function (Aikhenvald, 1999a). For instance, Tariana and Baniwa of Içana have more than 40 classifiers which appear on numerals, adjectives, verbs, and in possessive constructions. Palikur has more than a dozen classifiers which have different semantics and form depending on whether they are used on numerals, verbs, or on adpositions (Aikhenvald and Green, 1998). Pronominal genders have been lost from some languages, e.g., Terêna, Amuesha, Chamicuro, Pareci, Waurá (south of the Amazon), and Bahwana (north of the Amazon).

All Arawak languages distinguish singular and plural. Plural is only obligatory with human nouns. Plural markers are **-na/-ni* 'animate/human plural', **-pe* 'inanimate/animate non-human plural'. Dual

number is atypical. In Resígaro, markers of dual were borrowed from the neighboring Bora-Witoto languages.

Throughout the Arawak language family, nouns divide into those which must have a possessor (inalienably possessed) and those which do not have tohave a possessor (alienably possessed). Inalienably possessed nouns are body parts, kinship terms, and a few others, e.g., 'house' and 'name'. Inalienably possessed nouns have an 'unpossessed' form marked with a reflex of the suffix *-<*i* or *-*hV*, e.g., Pareci *no-tiho* 'my face', *tiho-ti* '(someone's) face'; Baniwa *nu-hwida* 'my head', *i-hwida-†i* (INDEFINITE-head-NON.POSSESSED) 'someone's head'. Alienably possessed nouns take one of the suffixes *-*ne/ni*, *-*te*, *-*re*, *-*i/-e* (Payne, 1991: 378), or *-*na* when possessed, e.g., Baniwa *nu-<inu-ni* (1sg-dog-possessive) 'my dog'.

The overwhelming majority of Arawak languages have a negative prefix *ma-* and its positive counterpart, prefix *ka-*, e.g., Piro *ka-yhi* (ATTRIBUTIVE-tooth) 'having teeth', *ma-yhi* (NEGATIVE-tooth) 'toothless'; Bare *ka-witi-w* (ATTRIBUTIVE-eye-FEMININE) 'a woman with good eyes', *ma-witi-w* 'a woman with bad eyes; a blind woman'.

The common Arawak lexicon (cf. Payne, 1991) consists mostly of nouns. There are quite a few body parts, fauna, flora, and artifacts. Only a few verbs can be reconstructed, e.g., **kau* 'arrive', **p^(da)* 'sweep', **po* 'give', **(i)ya* 'cry', **kama* 'be sick, die'; **itha* 'drink'. Most languages have just the numbers 'one' (proto-Arawak **pa-;* also meaning 'someone, another') and 'two' (proto-Arawak **(a)pi* and **yama*). A preliminary reconstruction is in Payne (1991). An up-to-date overview of the family is in Aikhenvald (1999a, 2001), and an overview of the proto-language is in Aikhenvald (2002).

See also: Belize: Language Situation; Bolivia: Language Situation; Brazil: Language Situation; Classifiers and Noun Classes: Semantics; Colombia: Language Situation; Evidentiality in Grammar; Gender, Grammatical; Guatemala: Language Situation; Honduras: Language Situation; Nicaragua: Language Situation; Peru: Language Situation; Venezuela: Language Situation.

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Architecture of Grammar

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A grammar of a language is by definition a formal model of the properties of language that are intrinsic to the words of the language and the way they can be combined. There are then a number of choices to make:

1. Should the explanation be defined solely to reflect structural properties of language, or should those properties in some sense be correlated with the way language is used in speaking or hearing?

This is the issue of language competence and its separation from language performance.

There is another criterion which a grammar might be required to meet, which might seem like just another way of putting the same question, but is taken as requiring a different answer:

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This is the issue of language competence and its separation from language performance.

There is another criterion which a grammar might be required to meet, which might seem like just another way of putting the same question, but is taken as requiring a different answer:

2. Is it enough to provide a formal account of language structure, or should a grammar reflect general cognitive underpinnings, with the theory of grammar seen as part of a theory of mind?

This is the question of language as formal system vs. language as part of cognitive psychology.

There are then two debates about the internal design of the grammar to be considered. The first concerns the status of semantics in the grammar; the second concerns the status of the lexicon and its relation to syntax:

3. Should the grammar define a direct relation between the expressions of the language, and the entities in the world they are used to talk about; or should interpretation for natural-language expressions be defined in terms of concepts that the words express?

4. Is there some central body of properties that constitute the syntactic system of language, to be defined independently of the words that make up the language, or is the entire body of structural properties of language expressible as statements about words and their combinatorial properties?

These issues are not unrelated, as will emerge; but the following discussion takes these issues in turn, keeping them separate in so far as possible.

The Competence-Performance Divide

Even though interpretation of utterances invariably depends on the context in which that sentence is uttered, in seeking to explain natural language, linguists generally restrict their attention to those properties of language that are intrinsic to the words of the language and their mode of combination, defining grammars for individual languages to capture those aspects of sound-interpretation correlation that are not subject to variation context by context. This separation of linguistic analysis from any direct reflection of language as used in context led to what are called competence models of language (Chomsky, 1965, 1986, 1995). These define principles that determine the limits on sound-meaning correspondences both for any one language and for language in general; and they are articulated without consideration of any application in language use. Models of performance are then defined to articulate the mechanisms necessary to use such models in parsing and production (Fodor, 1981; Garrett, 2000; Gorrell, 1995; Levelt, 1989) and are taken to be dependent on the prior and independent articulation of such competence models. There is an immediate consequence to this separation. In virtue of the lack of direct correspondence between competence models and data culled from language performance, grammars can only be evaluated relative to a relatively abstract concept of data; and these data are judgements of wellformedness of sentence plus interpretation pairs as made by competent speakers of the language.

Grammars: Formal-Language Theory vs. Psychology

Reflecting such string-interpretation judgements, the architecture defined is modular, with more than one level of representation defined, in order to capture the distinct forms of generalization needed. Minimally, there are three kinds of generalization – phonological, syntactic and semantic – reflecting the existence of mappings from phonological form onto interpretation via some projection of intermediate structure, with the lexicon listing words with their phonological, syntactic, and semantic specifications. (Since not all languages are written, spoken language is taken to be primary.) The number and nature of such levels and the relation between them is, however, subject to debate. The debate is founded in two distinct points of departure for defining a grammar formalism, two different ways, that is, of answering question (2), which require two different ways of answering question (3).

The Formal-Language Pattern

On the one hand lies the formal-language tradition in which an articulated purpose-built formal system devised for the formal study of some (natural) phenomenon has a defined syntax, with an associated mapping from each licensed string onto some subset of the phenomenon under analysis. In such systems, the commitment to defining a concept of denotational content for the expressions of the language is definitional: the expressions pick out the objects under analysis, their denotation, for that is what the formal language is designed to do. The concept of compositionality is also true by definition: the meaning of a compound expression of the language is exclusively determined by the meaning of the parts and their mode of combination. Natural languages have been treated in like manner, explicitly following the formal language pattern (Montague, 1974). Categorial grammars, in particular, are faithful advocates of this formal-language tradition. They add to the characterization of a grammar some presumed specification of phonological properties of the listed primitive terms, but otherwise preserve the general architecture of a pairing of strings and denotational contents. with syntax no more than a systematic procedure for constructing pairings of phonological complexes and denotational contents for progressively larger units from words to sentences, with syntax

and semantics essentially in tandem (Moortgat, 1997; Morrill, 1994; Ranta, 1994; Steedman, 1996, 2000). As might be expected given the adherence to the formal-language pattern, comprehensive accounts of anaphora and attendant concepts of underspecification of denotational content are commonly not provided (though see Ranta, 1994 for a proof-theoretic reconstruction of context and anaphoric dependency), and advocates of categorial grammar formalisms generally do not evaluate their formalisms relative to criteria of psychological reality (though see Morrill, 2002 for exploration of using categorial-grammar constructs in the study of acceptability). Consequently, the categorial grammarian's answer to question (2) is to reject the need for cognitive underpinnings. And the answer to question (3) is that a direct mapping from natural-language expression to denotational content is central to natural-language grammar formalism.

The Language Faculty as a Subpart of Central Cognitive Systems

On the other hand, there is the psychology-based tradition, committed to the stronger form of answer to (2), and denying the formal-language stance on (3). Within the general cognitive-science perspective, processing of input stimuli by a cognitive system (seeing, hearing, smelling, etc.) involve special-purpose devices that enable internal representations to be constructed on the basis of which such input stimuli are assigned interpretation by the cognitive system, the human agent then using these internally constructed representations to reason to conclusions about what it is that he has seen/heard/smelled, etc. Minimally, on this view, modeling operations of the cognitive system involves defining a mapping from representations of those stimuli onto representations that are formulae of a deductive logical system (or systems), the internalized "language(s) of thought" (Fodor, 1983). The representation thus constructed as interpretation of the input stimulus may have to be assigned some denotational content underpinning the constructed interpretation depending on one's theory of mind, but it is the representation itself that constitutes the interpretation of the processed stimulus. There is a second property of such input systems, which natural language illustrates well. In all cases of input to the cognitive system, there is a gap between the information derived directly from some low-level representation of the input stimulus and the interpretation assumed by the cognitive system to be derived from it. This gap, which is essential to the flexibility and finite resources of the cognitive system itself, is filled by some mode of so-called non-demonstrative reasoning using other information as made available in the context. This perspective on natural-language modeling provides a very different starting point from the formal-language tradition, presuming as it does on a mapping from one form of representation to another, of which the input forms are systematically less rich than the output forms. In natural languages, this is displayed by pronouns and elliptical constructions, which provide an input to the interpretation process that is systematically less specified than how they are understood on any occasion of their use, having to be enriched by information that context makes available, in order to establish what information the anaphoric/elliptical expression conveys.

Chomskian grammars are the major representative of grammars adopting the psychological tradition of representationalism broadly construed, with all concepts of interpretation for natural language string articulated only as logical form representations (at the defined level of LF, see Chomsky, 1986, 1995 and elsewhere). On this view, syntax is defined as the core computational system with the levels of phonological form (PF) and logical form (LF) constituting interfaces with external systems (phonetic and intensional/conceptual systems, respectively). Central to this system is the characterization of discontinuities observable in all natural languages in which some expression may be indefinitely far from some position in the string with which, for interpretation purposes, it needs to be paired. These are cited by Chomsky as evidence that natural languages are not perfect formal systems (Chomsky, 1995), this departure justifying the irreducibility in the grammar architecture of the computational (syntactic) system. In capturing the supposed independence of the language computational system from the external systems with which it is interfaced, the minimalist system nevertheless respects general cognitive assumptions in so far as the internal properties of the language module have to be defined to allow interaction with general cognitive processes through these interface levels. As we would expect, given these assumptions, the properties of anaphora and ellipsis construal that are articulated as within the grammar formalism are expressed as syntactic principles.

Combining Formal Language and Psychological Traditions

Outside the Chomskian tradition, the three major grammar formalisms, Head-Driven Phrase-Structure Grammars (HPSG; Sag *et al.*, 2003), Tree-Adjoining Grammars (TAG; Joshi, 1987; Joshi and Kulick, 1995) and Lexical Functional Grammar (LFG; Bresnan, 2001; Dalrymple, 2001), all adopt a mixed approach, articulating semantics in terms of denotational

content, but nevertheless preserving some form of cognitivist perspective.

On the one hand, they reflect the formal-language tradition in assuming that a specification of denotational semantics for sentence strings is part of the grammar formalism. Even while respecting this assumption, they nevertheless depart from the restrictiveness of the syntax-semantics correspondence defined for formal languages. Building on the presumed independence of phonological generalizations from the remainder, they allow the independence of syntactic generalizations from the combinatorial system required for other levels. Grammar formalisms may be defined to allow an n-tuple of levels, each articulated with independent vocabulary and forms of generalization (see Dalrymple, 2001; Jackendoff, 2002), leading to the consequent challenge of articulating adequately restrictive correspondence rules between these independent levels (Dalrymple, 1999). Despite the relaxation of the tight architecture of formal-language grammar formalisms, the assumptions of compositionality, broadly construed, are preserved, with each word being assigned some n-tuple of phonological, syntactic, semantic, morpho-syntactic, information-structure, etc. each of which is in the form of constraints on its combinatorial potential, which then unify with specifications assigned to its neighboring items according as their specifications are consistent. Hence the term "unification-based grammars."

Notwithstanding their conforming broadly to formal-language assumptions, such grammars lay claim to assumptions of psychological reality not dissimilar to those laid out by Chomsky. In so far as they invoke a level of denotational semantics as part of the grammar formalism, however, they fail to be commensurate with the representationalist methodology. And some of them blur the competence/performance distinction in allowing a pragmatic component within the grammar formalism (Sag and Ginzburg, 2003), a problematic move, since pragmatics is the study of the general cognitive principles underpinning successful communication, hence not part of a natural-language grammar.

Issues of Grammar Design

The Status of the Lexicon

The different status of the lexicon in the overall system reflects the different importance assigned to the lexicon in the two traditions. Following the formal language tradition, categorial grammars, HPSG, and LFG are fully lexicalized, with the lexicon providing a list of input triples of phonological, syntactic and semantic specifications for each lexical entry, these constraint sets dictating the mode of combination of adjacent or otherwise co-occurring expressions in the phonological, syntactic and semantic domains, respectively. Earlier Chomskian paradigms assigned a smaller role to the lexicon, with syntactic principles determining the core computational actions that induce structure, hence in principle reflecting the psychological distinction between stored information to be retrieved from memory vs. on-line construction. Phonological and semantic interpretation processes were merely interpretive, interface, mechanisms applying to the two distinct types of output from the central syntactic device. The central status of syntax led to the Chomskian Principles and Parameters model of language being described as the T-model:

phonology ← syntax → logical form

Between the two extremes of full lexicalist and nonlexicalist approaches, TAG formalisms project, for each word (lexical item) entered in the lexicon, a family of local structures is defined as a stipulated form of input, but the nesting of these into larger structures is the result of general tree-adjoining mechanisms. In minimalist approaches, the lexicon plays a greater role than in earlier Chomskian models, but nevertheless detailed lexical specifications are not formally articulated.

The Syntax–Semantics Debate and the Grammar–Parser Relation

The discussion so far has presumed on the distinctness of syntax and semantics. Upon the formal-language stance, these are by definition distinct, for one is a representation, the other, being denotational, is purely interpretive of such representations. Given the representationalist methodology, however, the question arises whether representations defined as the syntactic mechanism for natural-language grammars constitutes anything more than a mechanism for progressively building the conceptual representations that constitute an interpretation of the signal. With a shift of perspective to one in which grammar formalisms are defined to model the mapping from phonological signals onto a progressively richer conceptual representation following the time-linear dynamics of on-line processing (Kempson *et al.*, 2001; Phillips, 2003; Cann *et al.*, 2005), exactly this simpler stance becomes available, with the bonus of a much more direct reflection of language in use. What have been thought of as irreducibly syntactic generalizations, in particular the discontinuity effects made famous in Chomsky's work as motivation for movement processes in syntax, become expressible as part of the progressive time-linear construction of the emergent conceptual

representation. On this view, the architecture of the grammar formalism acquires a directional dynamics, with phonological specifications providing input to actions that induce the building up of conceptual representations, as determined jointly by contextually provided structure, lexical specifications, and general structure-building processes:

phonology → syntax → logical form

The syntactic mechanism becomes simpler because instead of inducing a distinct syntactic structure and articulating a mapping between syntactic and phonological representations on the one hand and between syntactic and semantic (i.e., conceptual) representations on the other (as in the T-model), there is only the progressive construction of conceptual representations from phonological input. But such a shift leads to a radical narrowing of the traditional competence-performance dichotomy, for the competence model reflects the dynamics needed to model performance, and becomes directly embeddable into psycholinguistic models of the general cognitive system.

Summary

As these snapshots indicate, the architecture of the language faculty as defined in the various grammar formalisms reflect different claims about the status of language within an overall theory of mind. The significance of a parsing-directed design for natural-language grammars, introduced as a recent departure from orthodox assumptions, is that it leads to re-evaluation of the role of language in the theory of mind: any property of the architecture intrinsic to all natural language grammars is by assumption not merely a design feature of language itself, but a subpart of a general theory of cognitive psychology and a reflection of the human capacity for language use.

See also: Chart Parsing and Well-Formed Substring Tables.

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Areal Linguistics

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Introduction: Defining the Concept

Areal linguistics is concerned with the diffusion of structural features across language boundaries within a geographical area. The term 'linguistic area' refers to a geographical area in which, due to borrowing and language contact, languages of a region come to share certain structural features – not just loanwords, but also shared phonological, morphological, syntactic, and other traits. The terms 'sprachbund,' 'diffusion area,' 'adstratum relationship,' and 'convergence area' are also sometimes used to refer to linguistic areas. The central feature of a linguistic area is the existence of structural similarities shared among languages of a geographical area, where usually some of the languages are genetically unrelated or at least are not all close relatives. It is assumed that the reason the languages of the area share these traits is because they are borrowed.

There are two sorts of linguistic area studies. The more common circumstantialist approach lists similarities found in the languages of a geographical area, allowing the list of traits to suggest diffusion, but typically without seeking the historical linguistic evidence which could demonstrate that the traits are indeed diffused. Circumstantialist areal linguistics has been criticized, since it does not eliminate chance, universals, and possibly undetected genetic relationships as alternative possible explanations for shared traits. The historicist approach seeks concrete evidence showing that the shared traits are diffused. The historicist approach is preferred because it is more rigorous and reliable, although the lack of clear evidence in many cases makes reliance on the circumstantialist approach necessary in some situations (Campbell, 1985).

Linguistic areas are often defined, surprisingly, by a rather small number of shared linguistic traits.

Examples of Linguistic Areas

A good way to get a solid feel for linguistic areas and how they are defined is to look at some of the better-known ones. In what follows, some of the best-known linguistic areas are inspected briefly together with the more important of the generally accepted defining traits shared by the languages of each area.

The Balkans

The Balkans is the best known of all linguistic areas. The languages of the Balkans are Greek, Albanian, Serbo-Croatian, Bulgarian, Macedonian, and Romanian (to which some scholars also add Romani and Turkish). Some salient traits of the Balkans linguistic area are the following:

1. a central vowel /ɨ/ (or /ə/) (not present in Greek or Macedonian);
2. syncretism of dative and genitive cases (dative and genitive merged in form and function); this is illustrated by Romanian *fetei* 'to the girl' or 'girl's', as in *am data o carte* ***fetei*** 'I gave the letter **to the girl**' and *frate* ***fetei*** 'the **girl's** brother';
3. postposed articles (not in Greek), for example Bulgarian *mə^{j}ət* 'the man' / *mə^{j}* 'man';
4. periphrastic future (future signaled by an auxiliary verb corresponding to 'want' or 'have,' not in Bulgarian or Macedonian), as in Romanian *voi fuma* 'I will smoke' (literally 'I want smoke') and *am a cínta* 'I will sing' (literally 'I have sing');
5. periphrastic perfect (with an auxiliary verb corresponding to 'have');
6. absence of infinitives (rather with constructions such as 'I want that I go' for 'I want to go');
7. double marking of animate objects by use of a pronoun copy, as in Romanian *i-am scris lui Ion* 'I wrote to John', literally 'to.him-I wrote him John', and Greek *ton vlépo ton Jáni* 'I see John', literally 'him.ACC I see him.ACC John' (Sandfeld, 1930; Schaller, 1975; Joseph, 1992).

South Asia (the Indian Subcontinent)

The South Asia linguistic area is composed of languages belonging to the Indo-Aryan, Dravidian, Munda, and Tibeto-Burman language families. Some traits shared among different languages of the area are the following:

1. retroflex consonants, particularly retroflex stops;
2. absence of prefixes (except in Munda);
3. presence of a dative-subject construction (that is, dative-experiencer, as in Hindi *mujhe maaluum thaa* 'I knew it' ['to me' + 'know' + PAST]);
4. subject-object-verb (SOV) basic word order, including postpositions;
5. absence of a verb 'to have';
6. 'conjunctive or absolutive participles' – a tendency for subordinate clauses to have nonfinite verbs (that is, participles) and to be preposed; for example, relative clauses precede the nouns they modify;
7. morphological causatives;

8. so-called 'explicator compound verbs,' where a special auxiliary from a limited set is said to complete the sense of the immediately preceding main verb, and the two verbs together refer to a single event, as for example Hindi *le jaanaa* 'to take (away)' ('take' + 'go');
9. sound symbolic forms based on reduplication, often with *k* suffixed (for example in Kota, a Dravidian language: *kad-kadk* '[heart] beats fast with guilt or worry'; *a:nk-a:nk* 'to be very strong [of man, bullock], very beautiful [of woman]').

Some of these proposed areal features are not limited to the Indian subcontinent, but can be found also in neighboring languages (for example, SOV basic word order is found throughout much of Eurasia and northern Africa) and in languages in many other parts of the world. Some of the traits are not necessarily independent of one another; for example, languages with SOV basic word order tend also to have nonfinite (participial) subordinate clauses, especially relative clauses, and not to have prefixes (Emeneau, 1956; Masica, 1976; Emeneau, 1980; Emeneau, 2000).

Mesoamerica

The language families and isolates which make up the Mesoamerican linguistic area are Nahua (a branch of Uto-Aztecan), Totonacan, Otomanguean, Mixe-Zoquean, Mayan, Xinkan (Xinca), Tarascan (Purépecha), Cuitlatec, Tequistlatecan, and Huave. Five areal traits are shared by nearly all Mesoamerican languages, but not by neighboring languages beyond this area, and these are considered particularly diagnostic of the linguistic area:

1. nominal possession of the type *his-dog the man* 'the man's dog', as in Pipil (Uto-Aztecan) *i-pe:lu ne ta:kat*, literally 'his-dog the man';
2. relational nouns (locative expressions composed of noun roots and possessive pronominal affixes), of the form, for example, *my-head* for 'on me', as in Tzutujil (Mayan) *č-r-i:x* 'behind it, in back of it', composed of *č-* 'at, in', *r-* 'his/her/its' and *i:x* 'back', contrasted with *č-w-i:x* 'behind me', literally 'at-my-back';
3. vigesimal numeral systems, based on combinations of 20, such as that of Ch'ol (Mayan): *hun-k'al* '20' (1 × 20), *č-aʔ-k'al* '40' (2 × 20), *uʃ-k'al* '60' (3 × 20), *hoʔ-k'al* '100' (5 × 20), *hun-bahk'* '400' (1 × 400), *č-aʔ-bahk'* '800' (2 × 400), etc.;
4. nonverb-final basic word order (generally no SOV languages) – although Mesoamerica is surrounded by languages both to the north and south which have SOV (subject-object-verb) word order, languages within the linguistic area have VOS, VSO, or SVO basic order;
5. a number of loan translation compounds (calques) shared by the Mesoamerican languages, including examples such as 'boa' = 'deer-snake,' 'egg' = 'bird-stone/bone,' 'lime' = 'stone(-ash),' 'knee' = 'leg-head,' and 'wrist' = 'hand-neck'.

Since these five traits are shared almost unanimously throughout the languages of Mesoamerica but are found almost not at all in the languages just beyond the borders of Mesoamerica, they are considered strong evidence in support of the validity of Mesoamerica as a linguistic area. Four of these five traits have essentially the same distribution, clustering at the borders of Mesoamerica. Such bundling is uncommon in linguistic areas.

A large number of other features are shared among several Mesoamerican languages, but are not found in all the languages of the area, while some other traits shared among the Mesoamerican languages are found also in languages beyond the borders of the area (for details see Campbell *et al.*, 1986).

The Northwest Coast of North America

The Northwest Coast, the best known North American linguistic area, includes Tlingit, Eyak, the Athabaskan languages of the region, Haida, Tsimshian, Wakashan, Chimakuan, Salishan, Alsea, Coosan (Coos), Kalapuyan (Kalapuya), Takelma, and Lower Chinook (Chinook). These languages are characterized by elaborate systems of consonants, which include series of glottalized stops and affricates, labiovelars, multiple laterals, and uvular stops in contrast to velars. There are typically few labial consonants (labials are completely lacking in Tlingit and Tillamook and are quite limited in Eyak and most Athabaskan languages); in contrast, the uvular series is especially rich in most of these languages. There are typically few vowels, only three (*i, a, o*, or *i, a, u*) in several of the languages, four in others. Several of the languages have pharyngeals (*ʕ, ħ*), and most have glottalized resonants and continuants. Shared morphological traits include: extensive use of suffixes; near absence of prefixes; reduplication (of several sorts, signaling iteration, continuative, progressive, plural, collective, distribution, repetition, diminutive, etc.); numeral classifiers; alienable/inalienable oppositions in nouns; evidential markers in the verb, and verbal locative-directional markers; masculine/feminine gender (shown in demonstratives and articles); visibility/invisibility opposition in demonstratives. Aspect is more important than tense. All but Tlingit have passivelike constructions. The

negative appears as the first element in a clause regardless of the usual word order. Overt marking of nominal plurals, as in many American Indian languages, is absent or limited. Northwest Coast languages also have lexically paired singular and plural verb stems (that is, a lexical root may be required with a plural subject which is entirely different from the root used with a singular subject).

Some other traits are shared by a smaller number of Northwest Coast languages (see Campbell, 1997: 333–334; cf. Sherzer, 1976).

The Baltic

The Baltic linguistic area includes at its core (Balto-) Finnic languages (especially Estonian and Livonian), Baltic languages (Indo-European), and Baltic German; however, all of the following have been included in different treatments of the Baltic linguistic area: Old Prussian (Prussian) (extinct), Lithuanian, and Latvian (Baltic languages); the ten Saami (Lapp) languages, Finnish, Estonian, Livonian, Vote (Votian), Vepsian (Veps), Karelian, and others (of the Finnic branch of Finno-Ugric); High German, Low German (Low Saxon), Baltic German, and Yiddish (Western Yiddish) (West Germanic); Danish, Swedish, and Norwegian (North Germanic); Russian, Belorussian, Ukrainian, Polish, and Kashubian (Slavic); Romani (Indo-Aryan, branch of Indo-European); and Karaim (Turkic).

Shared features of the Baltic area include the following:

1. first-syllable stress;
2. palatalization of consonants;
3. tonal contrasts;
4. partitive case/partitive constructions (to signal partially affected objects, equivalent to, for example, "I ate [some] apple") in Finnic, Lithuanian, Latvian, Russian, Polish, etc.;
5. direct objects in the nominative case in a number of constructions which lack overt subjects (Finnic, Baltic, North Russian);
6. evidential mood: "John works hard (it is said/reported/inferred)" (Estonian, Livonian, Latvian, Lithuanian);
7. prepositional verbs (as German *aus-gehen* [out-to. go] 'to go out'): German, Livonian, Estonian, Baltic, and others;
8. subject-verb-object (SVO) basic word order;
9. agreement of adjectives in number with the nouns they modify (all languages of the area except Saami languages and Karaim); they also agree in case in all except the Scandinavian languages (which have lost case distinctions for adjectives); they also agree in gender in Baltic, Slavic, and Scandinavian languages, as well as in German, Yiddish, and some others.

For a more complete list of traits attributed to the Baltic linguistic area, see Zeps, 1962; Koptjevskaja-Tamm, 2002; and especially Koptjevskaja-Tamm and Wälchli, 2001; compare also Jakobson, 1931.

Ethiopia

Languages of the Ethiopian linguistic area include: Beja (Bedawi), Awngi, Afar, Sidamo, Somali, etc. (Cushitic languages); Geez, Tigré, Tigrinya (Tigrigna), Amharic, etc. (Ethiopian Semitic languages); Wellamo (Wolaytta), Kefa (Kaficho), Janjero (Yemsa), etc. (Omotic languages); Anyuak (Anuak) and Gumuz (Nilo-Saharan languages); and others. Among the traits they share are the following:

1. SOV basic word order, including postpositions;
2. subordinate clause preceding main clause;
3. gerund (nonfinite verb in subordinate clauses, often inflected for person and gender);
4. a 'quoting' construction (a direct quotation followed by some form of 'to say');
5. compound verbs (consisting of a nounlike 'preverb' and a semantically empty auxiliary verb);
6. negative copula;
7. plurals of nouns not used after numbers;
8. gender distinction in second- and third-person pronouns;
9. reduplicated intensives;
10. a different present tense marker for main and subordinate clauses;
11. a form equivalent to the feminine singular used for plural concord (feminine singular adjective, verb, or pronoun is used to agree with a plural noun);
12. a singulative construction (the simplest noun may be a collective or plural and it requires an affix to make a singular);
13. shared phonological traits such as *f* but no *p*, palatalization, glottalized consonants, gemination, presence of pharyngeal fricatives (*ħ* and *ʕ*) (Ferguson, 1976; Thomason, 2001; cf. Tosco, 2000).

How Linguistic Areas Are Defined

The following criteria have at times been considered relevant for attempts to establish linguistic areas: (1) the number of traits shared by languages in a geographical area, (2) bundling of the traits in some significant way (for example, clustering at roughly the same geographical boundaries), and (3) the weight or complexity of different areal traits (some

are accorded more significance for determining areal affiliation on the assumption that they are more difficult to acquire than others).

To establish a linguistic area, the more shared features the better. Linguistic areas in which many diffused traits are shared among the languages are considered better established. Nevertheless, some scholars believe that even one shared trait is enough to define a weak linguistic area (Campbell, 1985). In any event, it is clear that some areas are more securely established than others because they are supported by more shared areal traits. In the linguistic areas described above, the number and kind of shared traits vary considerably.

The idea that greater weight or importance should be attributed to some traits for defining linguistic areas can be illustrated with the borrowed word order patterns in the Ethiopian linguistic area. Ethiopian Semitic languages exhibit a number of interconnected word order patterns which are borrowed from neighboring Cushitic languages. Several of these traits reflect the diffusion of the SOV basic word order typology of Cushitic languages into the formerly VSO Ethiopian Semitic languages. Typologically the orders noun-postposition, verb-auxiliary, relative clause-head noun, and adjective-noun are all correlated and tend to co-occur with SOV order cross-linguistically. Their presence in Ethiopian Semitic languages (some with all of these, others with somewhat fewer) might seem to reflect several different diffused traits (SOV counted as one, noun-postposition as another, and so on), and might be taken as several independent pieces of evidence supporting the existence of the linguistic area. However, from the perspective of expected word order co-occurrences, these word order arrangements are not independent traits, but reflect the diffusion of a single complex feature, the overall SOV word order type with its tendency for the various expected coordinated orderings in typologically interrelated constructions to co-occur. However, if borrowed SOV word order is counted as a single diffused areal trait, it must rank high in significance for defining a linguistic area, since it is much more difficult for a language to change so much of its basic structure under areal influence than it is to acquire less complex traits.

Some scholars had thought that the bundling of areal traits, clustering at the boundaries of a linguistic area, might be required for defining linguistic areas, though this has proven a poor criterion. Linguistic areas are similar to traditional dialects, where often one trait spreads across more territory than another trait, so that their boundaries (or territories) do not coincide (do not 'bundle'). Typically the geographical extent of individual traits may vary considerably. However, in the rare situation where the traits do coincide at a clear boundary, the definition of a linguistic area matching their boundary is relatively secure. As mentioned, several of the traits in the Mesoamerican linguistic area do have the same boundary, but typically in other areas the areal traits do not share the same geographical boundaries, offering no clearly identifiable outer border of the linguistic areas in question.

Implications of Areal Linguistics for Linguistic Reconstruction and Subgrouping

Areal diffusion can have important implications for comparative reconstruction and for subgrouping within known language families. Nootkan provides a good example which illustrates this. The sound correspondences upon which Nootkan subgrouping is based are given in Table 1.

Nitinat and Makah appear to share the innovation which changed nasals to corresponding voiced stops (in [1]–[4]), while Nitinat and Nootka appear to share the change of the glottalized uvulars to pharyngeals (in [5] and [6]). (Makah and Nitinat also share the retention of uvular fricatives, which Nootka has changed to a pharyngeal [in (7) and (8)]; however, shared retentions are not valid evidence for subgrouping.) Here, one innovation (denasalization) suggests a subgrouping of Makah and Nitinat together, with Nootka more distantly related, while the other innovation (pharyngealization) suggests Nitinat and Nootka together, with Makah less closely related. This seeming impasse is solved when we take into account the fact that the absence of nasals is an areal feature shared by several other languages of the area; it diffused into both Makah and Nitinat under areal influence and is thus not real evidence of a shared common development before the languages separated; rather, it reached these two languages independently from elsewhere in the linguistic area. The innovation shared by Nitinat and Nootka of

Table 1 Nootkan sound correspondences

	Makah	*Nitinat*	*Nootka*	*Proto-Nootkan*
1.	b	b	m	*m
2.	b'	b'	m'	*m'
3.	d	d	n	*n
4.	d'	d'	n'	*n'
5.	q'	ʕ	ʕ	*q'
6.	q'^{w}	ʕ	ʕ	*q'^{w}
7.	χ^{w}	χ^{w}	ħ	*χ^{w}
8.	χ	χ	ħ	*χ

(Haas, 1969).

glottalized uvulars changing to pharyngeals (in [5] and [6]) is real evidence of subgrouping – a true (nondiffused) shared innovation. So, Nitinat and Nootka together constitute one branch of the family, Makah the other branch. Moreover, with respect to areal implications for reconstruction, if we did not know about the areal diffusion in this case, we might be tempted to reconstruct the voiced stops in Proto-Nootkan, since they occur in more languages than the nasals do, and to postulate a change of these to nasals in Nootka (for [1]–[4]), getting it wrong in this case. Thus, areal linguistic traits can have important implications for classification (subgrouping) and for reconstruction.

Areal Linguistics and Proposals of Distant Genetic Relationship

Some similarities among languages which are due to areal diffusion are often mistakenly taken to be evidence of a possible distant family relationship among languages whose classification is in question. The Mosan hypothesis, which proposes a genetic relationship between the Salishan, Wakashan, and Chimakuan language families, illustrates this problem, which is common in many instances of long-range comparison. Several scholars noted structural similarities among these Northwest Coast languages, but the Mosan hypothesis was not found convincing because much of the evidence turned out to rely on areal traits widely borrowed in the Northwest Coast linguistic area. Swadesh (1953) presented 16 shared structural similarities in support of Mosan, but most of these are Northwest Coast areal features (some of the traits are also typologically commonplace, found independently in languages throughout the world), for example:

1. "Extensive use of suffixes."
2. "Nearly complete absence of functioning prefixes in Chimakuan and Wakashan, minor role in comparison to the suffixes in Salish." (Typologically it is not unusual for suffixing languages to lack prefixes.)
3. "Extensive use of stem reduplication, including initial reduplication . . . and . . . full stem reduplication."
4. "Aspect, including at least the dichotomy of momentaneous and durative."
5. "Tense is an optional category."
6. "Plural is an optional category."
7. "Dichotomy of non-feminine versus feminine gender shown in demonstratives and articles."
8. "Numeral classifier notions, shown by suffixes."
9. "Two alternate stems for number" (lexically paired distinct singular and plural verb stems).
10. "Lexical suffixes . . . referring to body parts and other space references."
11. "Predicative use of nouns."
12. "Demonstrative distinctions such as the present versus absent, or visible versus invisible."

As is clear, the traits which Swadesh listed as evidence for the Mosan hypothesis are better explained as the results of diffusion within the Northwest Coast linguistic area (see Campbell, 1997 for details.)

From this case, it is easy to see why the identification of areal traits is so important in historical linguistics. In this instance, failure to recognize the areal borrowings led to an erroneous proposal of genetic relationship among neighboring language families.

Kinds of 'Linguistic Area'

It is generally recognized that things that have been called linguistic areas include entities with widely divergent character and historical backgrounds, depending on the social, cultural, political, geographical, attitudinal, and other factors which correlate with diffusion of linguistic features in different regions (Dahl, 2001: 1458; Kuteva, 1998: 308–309). As Thomason (2001: 104) explained,

> [linguistic areas] arise in any of several ways – through social networks established by such interactions as trade and exogamy, through the shift by indigenous peoples in a region to the language(s) of invaders, through repeated instances of movement by small groups to different places within the area.

One finds in the literature many different sorts of linguistic areas, such as: incipient ones, only beginning to form and with as yet few shared traits; moribund and decaying ones, where, due to many changes after the area was actively formed, fewer traits are currently recognizable among the languages; overlapping ones, where different areas formed on top of or partially overlapping one another at different times for different reasons; multilateral (areal traits spreading from various languages of the region) versus unilateral areas (with the traits shared throughout the languages of an area stemming predominantly from one language); areas due to rapid conquest, population spread, and migration (traits moving with movement of speakers), others through home-grown, stay-in-place contact (movement of traits but not of peoples); and disrupted areas with "latecomers, earlier drop-outs, and temporary passers-by" (Stolz, 2002: 265). "In short, the notion 'linguistic area' does not refer to a uniform phenomenon, either socially or linguistically" (Thomason, 2001: 115). This array of different kinds of linguistic area raises questions about whether the notion of 'linguistic

area' is warranted, whether all these different 'objects' legitimately qualify as 'linguistic areas,' given their very different natures and composition and given the very different circumstances of their birth (and decay). The notion of 'linguistic area' offers little upon which these different sorts of linguistic areas can be united other than the fact that they all involve borrowing in some way, but borrowings of different sorts, for different reasons, in different settings, and at different times.

Linguistic Areas versus Borrowing Generally

It is generally acknowledged that linguistic areas are "notoriously messy," "notoriously fuzzy" things (Thomason and Kaufman, 1988: 95; Heine and Kuteva, 2001: 396; Tosco, 2000: 332), and that "what we understand about linguistic areas is depressingly meager" (Thomason, 2001: 99). A common perception is that the term 'linguistic area' is difficult to define (cf. Heine and Kuteva, 2001: 409). As Thomason (2001: 99) observed, "linguistics has struggled to define the concept ever since [Trubetzkoy, 1928], mainly because it isn't always easy to decide whether a particular region constitutes a linguistic area or not." Stolz (2002: 259) believed that "the search for clearcut definitions [of 'Sprachbund, linguistics area, and areal type'] has been largely futile and will probably never come to a really satisfying conclusion." In spite of prolonged efforts to define 'linguistic area,' there is no general agreement on its definition, and even for the most widely accepted linguistic areas, such as the Balkans, scholars do not agree wholly on which languages belong to the area, what linguistic traits characterize the area, and what its precise geographical extent is. This difficulty has been related to the lack of clear distinction between areal phenomena and borrowing generally (Campbell, in press). Thus Dahl (2001: 1458) asked:

> In the end, we are led to the following more far-going question about the notion of area: to what extent do areas . . . have a reality of their own and to what extent are they just convenient ways of summarizing certain phenomena? At the most basic level, linguistic contact relationships are binary: one language influences another. An area is then simply the sum of many such binary relationships.

Campbell (in press) argues that the various definitions of 'linguistic area' offered in the literature confirm that linguistic areas amount to just the study of local linguistic borrowing and its history. Every 'linguistic area,' to the extent that the notion has any meaning at all, arises from an accumulation of individual cases of 'localized diffusion'; it is the investigation of these specific instances of diffusion, and not the pursuit of defining properties for linguistic areas, that increases our understanding and explains the historical facts. With the focus rather on specific instances of borrowing, many of the unresolved issues and indeterminacies which have dogged areal linguistics from the outset cease to be relevant questions. It is the diffused linguistic changes themselves that count and not the attempt to seek meaning in the geography that secondarily is involved (Campbell, 2004). A linguistic area, to the extent that it many have a legitimate existence at all, is merely the sum of borrowings in individual languages in contact situations. If we focus rather on understanding borrowings, those contingent historical events, the difficulty of determining what qualifies as a legitimate linguistic area ceases to be a problem.

See also: Africa as a Linguistic Area; Balkans as a Linguistic Area; Ethiopia as a Linguistic Area; Incorporation; Southeast Asia as a Linguistic Area; Spatial Variation (Geolinguistics).

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Argentina: Language Situation

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Argentina is the largest Spanish-speaking country in South America. Its natural borders are the Atlantic on the east side and the Andes on the west side, which separate Argentina and Chile. Argentina also shares borders with Bolivia and Paraguay on the north, and with Uruguay and Brazil on the east. There are 40 million Argentineans; 12 million live in the capital, Buenos Aires.

Spanish is the official language in Argentina. Spanish colonializers arrived in 1516 and Argentina remained a colony until 1816, when it officially obtained its independence. The Spanish spoken in Argentina is remarkable in several ways, as several factors have influenced its dialectal differentiation. One factor is its contact with indigenous languages, which have had the greatest influence on the lexicon. Quechua in the northwest, Guaraní in the northeast, and Mapudungun in the south are languages that have contributed with numerous words to the everyday lexicon, above all regional, and in some cases they have left traces in pronunciation and morphosyntactic phenomena. Quechua is an indigenous language of the Andean region, spoken by approximately 13 million people in Argentina, Bolivia, Chile, Colombia, Ecuador, and Peru. It was the official language of the Inca Empire. Guaraní belongs to the Tupi-Guaraní language subfamily. There are approximately six million Guaraní speakers worldwide. Mapudungun is an Araucanian language spoken in Chile and Argentina by the Mapuche people. It is also known as Araucano and Mapuche. It has about 440 000 speakers, with about 40 000 in Argentina. The influence of these native languages explains part of the regional distinction of the Spanish in the Argentinean territory.

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also present in the Argentina of the beginning of the 20th century: Polish, Russian, French, and German.

Apart from the characteristics the Argentinean variety of Spanish shares with the rest of Latin America, Argentina has its own typical features. The most characteristic trait of this variety is the *voseo*: the use of the pronoun *vos* and its own verbal form for the second person singular of the present tense, instead of *tú*. This appears in the indicative and imperative modes. In the lexicon, there are more Anglicisms in the Spanish spoken in Argentina than in the rest of the Spanish-speaking world, for example, *barman, box, film, sandwich*.

The immigration of thousands of Italians to Buenos Aires and other large cities of the Río de la Plata in the first decades of the 20th century gave rise to a significant demographic change. The percentage of Italians in the overall population increased from 25% to more than 50%. Italians had the advantage of being understood by only minimally modifying their Italian speech. These modifications became a new way of talking: the Cocoliche. Cocoliche is the mixed Italic-Spanish speech used by the first generation of Italian immigrants; it was associated with the lowest social classes. Cocoliche was perceived as being laughable and funny, and almost immediately became a literary stereotype that appeared in comics, journalistic essays, novels, poems, and theatre plays. As soon as immigration decreased and the descendants of the first born immigrants had acquired Spanish as their first language, the Cocoliche started to disappear, and today it is remembered more as a creation of popular culture than as a form of speech that was used in the past by a large percentage of the population of Buenos Aires.

See also: Guarani; Mapudungan; Quechua.

Language Maps (Appendix 1): Map 49.

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Argument Structure

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Concept and Motivation

In order to predict the syntactic behavior of a predicate, such as a verb, we need to know at least:

1. how many syntactic dependents it takes,
2. what type of syntactic dependents it takes, for example, whether it takes a subject and an object, or a subject and a prepositional complement, etc.,
3. which of its semantic roles (or thematic roles) corresponds to each of its dependents.

Argument structure is the grammatical representation of a predicate needed to derive this information in all of the uses of the predicate, for example, in both its active and passive form, in both its verbal and nominal form, etc. The notion of argument structure can be thought of as replacing the concept of syntactic subcategorization.

The motivation for positing argument structure as a distinct level of representation is provided by various observations:

1. The observation that semantically similar verbs tend to pattern alike in terms of the syntactic dependents that they take suggests that there is a regularity in the correspondence between semantic structure and syntactic structure. It has often been noted that a predicate involving an agent and a patient normally has the agent expressed as the subject and the patient as an object, and never the other way around in languages like English. If we just stipulated the correspondence between semantic roles and grammatical functions for every predicate in the language, we would be missing important generalizations. We would also be unable to predict the behavior of newly coined words. For example, if we invented the verb *obliquate* meaning "to build or place in an oblique orientation," there would only be one way in which the arguments of this verb could be expressed: the causer or agent role would be expressed as the subject and the theme as the object, as in (1a), and the reverse assignment of semantic roles to grammatical functions, shown in (1b), would be impossible (Alsina, 1996a: 6).

(1) a. Jim obliquated the door of the closet.
b. *The door of the closet obliquated Jim.

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See also: Guarani; Mapudungan; Quechua.

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(1) a. Jim obliquated the door of the closet.
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This shows that the correspondence between semantic roles and grammatical functions is governed by principles that are active even with newly formed words. Furthermore, this correspondence does not seem to vary depending on all possible semantic differences among semantic roles, since verbs that have quite different semantic roles behave alike as far as this correspondence is concerned. For example, verbs such as *see* and *love*, which are usually said to take an experiencer role and a stimulus (or theme) role, pattern like causative verbs such as *cut* or *lift*, which take a causer and a patient, in that the experiencer role behaves like the causer role in being selected as the subject, whereas the other role is mapped onto the object. This suggests the need for an intermediate level of representation between the level that represents semantic information such as the semantic roles of predicates and the level that represents grammatical functions: this intermediate level – argument structure – distills semantic information into those distinctions that are relevant for assigning grammatical functions to arguments, as well as for other grammatical properties.

2. The fact that a given verb, with a fixed set of semantic roles, can appear with a different set of grammatical functions in different syntactic structures, depending on the morphology on the verb or other factors, suggests that there is an abstract representation of the grammatical dependents of the verb that is common to the various syntactic frames in which it appears. This gives rise to an alternation in the correspondence between semantic roles and grammatical functions. A clear example of this alternation occurs in causative structures, compared with their noncausative counterparts. In the Bantu language Chichewa, the agent role of the simple, noncausative verb *–lemb-a* is expressed as the subject, as in (2a); however, when this verb root combines with the causative morpheme, that semantic role is expressed as the object, as in (2b) (Alsina, 1997: 209).

(2) a. Mkângo u-ku-lémb-á ndakatūlo.
3.lion *3.SUBJ-PRES-write-INDIC* *9.poem*
'The lion is writing a poem.'

b. Mlīmi a-ku-lémb-éts-a
1.farmer *1.SUBJ-PRES-write-INDIC*
mkángó ndakatūlo.
3.lion *9.poem*
'The farmer is making the lion write the poem.'

If we assume that there is a fixed representation for the arguments of a verb root such as *-lemb-a*, we cannot assume that this representation is encoded in terms of grammatical functions or phrase structure positions, because these are different depending on whether the verb root combines with the causative morpheme or not.

3. The observation that certain properties of arguments are not reducible to grammatical functions, to constituent structure, or to semantic structure suggests that there is a different level of organization of arguments that is relevant to those properties. Some languages have reflexives that can be bound either by a grammatical subject or by the logical subject of a passive clause. This is the case in Hindi with the reflexive *apnaa*, as illustrated in (3) (Mohanan, 1994: 123): whereas the active clause (3a) has only one possible antecedent of the reflexive, the corresponding passive clause (3b) has two.

(3) a. vijay-ne ravii-ko apnii
Vijay-ERG *Ravi-ACC* *self-GEN*
saikil-par biʈʰaayaa.
bicycle-LOC *sit-CAUS-PERF*
'Vijay$_j$ seated Ravi$_i$ on self's$_{j/*i}$ bike.'

b. ravii vijay-se apnii saikil-par
Ravi-NOM *Vijay-INSTR* *self-GEN* *bicycle-LOC*
biʈʰaayaa gayaa
sit-CAUS-PERF *go-PERF*
'Ravi$_i$ was seated by Vijay$_j$ on self's$_{i/j}$ bike.'

A similar argument has been made on the basis of binding in ergative languages by Manning, 1996, Wechsler, 1999, and Wechsler and Arka, 1998. In these languages, the logical subject, or most prominent argument on argument structure, can bind a reflexive that is a less prominent argument, even though the latter may be the grammatical subject and the former may be a nonsubject of the same clause.

All of these facts point to the existence of a level of organization of the arguments of a predicate – argument structure – that interfaces between semantic structure and syntactic information about grammatical functions, case, binding, and other properties.

Argument structure is a theoretical construct and, as such, it varies in its content, formal representation, and function in the grammar depending on the larger theory of grammar of which it is part, as well as on many theoretical choices made by each author. One, therefore, cannot hope to give a theory-neutral presentation of argument structure. One can point to the main areas of divergence in theories of argument structure and to the ideas on which there is widespread consensus. In what follows, I will point to some differences in the treatment of argument structure, will present arguments that favor specific views about argument structure, and will provide an account of certain facts that relies on argument structure and a theory of the mapping between argument structure and morphosyntactic expressions.

Different Conceptions of Argument Structure

An important line of research in linguistics is the enterprise of deriving as much syntactic information about the patterning and distribution of verbs and their dependents as possible from the meanings of these verbs. The idea of argument structure is part of this enterprise, where it plays an intermediate role in the mapping from semantic information to morphosyntactic realization. Given this role, there is some division as to whether argument structure is a semantic level of representation or a syntactic one and as to how much semantic and syntactic information should be part of argument structure.

Argument Structure as a Semantic Representation

One of the clearest proponents of argument structure as a semantic level of representation is Jackendoff (1990). This work develops a representation for semantic structure, or Lexical Conceptual Structure (LCS), which represents the arguments of a predicate as positions in conceptual structure. LCS expresses distinctions among thematic roles, captures selectional restrictions, etc. It also provides a representation for argument structure as the set of constituents at LCS marked as arguments (Jackendoff, 1990: 252). Given the claim in Jackendoff (1990) that a single NP can be coindexed with more than one position at conceptual structure (i.e., have multiple theta-roles) and that a position at conceptual structure may not correspond to any syntactic expression (implicit argument), it sometimes has to be stipulated whether a position at conceptual structure has argument status or not. In addition, Jackendoff (1990) provides a set of linking rules for predicting the syntactic status of the arguments in an LCS.

Butt (1995) proposes a theory of argument structure based on Jackendoff's (1990) approach and assumes that semantic information should be represented at the argument structure level and not at a separate level (Butt, 1995: 136). In Butt's argument structure, there is a representation of the thematic tier, expressing distinctions such as actor, goal, or theme, a representation of the action tier, providing contrasts between agent and patient, and a representation of the aspectual tier, indicating whether the beginning, middle, and end of an event are lexically specified. These distinctions are relevant for explaining restrictions in complex predicate formation. Another approach that takes argument structure to be a semantic level is Pustejovsky (1995).

Argument Structure as a Phrase Structure Representation

Among the proponents of argument structure as a syntactic representation, there are some who take it to be a structure of the same type as that used for representing syntactic constituents and categories, namely, a phrase structure. In the theoretical framework of Principles and Parameters and the Minimalist Program, all syntactic information tends to be represented by means of phrase structure, including information about grammatical functions. Within this framework, it is natural to attempt to view argument structure also as a phrase structure, which is the approach taken by Hale and Keyser (1993, 1997, 2002). Not only do these authors view argument structure as syntax and as a syntactic structure of the same formal type as that used to represent grammatical functions and grammatical categories, but they assume it conforms to principles of syntax required independently of argument structure. They claim that "there are no linguistic mechanisms that are specific to argument structure" (Hale and Keyser, 1993: 93).

Among other phenomena, they attempt to explain contrasts such as the presence of the causative alternation with verbs such as *get* and its absence with verbs such as *put*. They propose to derive denominal verbs such as *corral* and *saddle* through incorporation of the homonymous noun from the complement of a preposition into this preposition and into the governing verb. According to the authors, the proposal to derive denominal verbs through head movement explains the range of meanings that these verbs have, such as the fact that the incorporated noun never corresponds to the agent or causer role, since that would not be allowed by the principles regulating syntactic movement (Hale and Keyser, 1993: 60). Despite the attractiveness of this approach, particularly for researchers in the framework of Principles and Parameters or Minimalist Program, Kiparsky (1997a) presents serious objections to the attempt to reduce argument structure to phrase structure categories and principles and argues that the syntactic behavior of verbs, such as whether they undergo the causative alternation or not, is best explained by appealing to semantic properties.

Argument Structure as an Autonomous Syntactic Representation

A prevalent approach to argument structure within various different theoretical frameworks is the assumption that argument structure is a syntactic level of representation that is different from the

representation of grammatical categories and grammatical functions not only in the substance that it expresses, but also in the formal design used for it. This is the position, among others, of Grimshaw (1990) and Levin and Rappaport (1995), within the framework of GB or Principles and Parameters; of Alsina (1992, 1996a, 1996b, 2001a, 2001b, 2003), Alsina and Mchombo (1993), Bresnan (2001), Bresnan and Kanerva (1989), Bresnan and Moshi (1990), Manning (1996), Mohanan (1994), within the framework of LFG; of Davis (2001), Manning and Sag (1998), Wechsler (1995, 1999), Wechsler and Arka (1998), within the framework of HPSG; of Goldberg (1995), within the framework of Construction Grammar; and of Ackerman and Moore (2001), Kiparksy (1997b, 2001), and Wunderlich (1997), within frameworks akin to the last three cited.

All of these theories of argument structure have certain ideas in common: argument structure is a list of arguments (or argument positions); these arguments are ranked by prominence; this ranking is constrained by the semantic properties of the arguments involved; the arguments are mapped (or linked) to morphosyntactic expressions by means of general correspondence principles. The hierarchical ranking of arguments, common to all of these theories, allows for the definition of the notion of logical subject, also referred to as argument structure subject or a-subject. This notion plays a prominent role in accounting for binding and control phenomena, as well as for linking, since the logical subject, as a default, maps onto the grammatical subject. Example (3) provides an illustration of the relevance of this notion to the binding of a reflexive in Hindi. According to Joshi (1993), the anaphor *apaṇ* in Marathi can only be bound by a logical subject, regardless of its grammatical function. In control structures in Tagalog, Kroeger (1993: 39, 99) shows that the control target or controlee must be a logical subject, whether it is a grammatical subject or not.

In some of these theories, no information is present on argument structure beyond the hierarchical ranking of arguments, whereas, in others, more information is specified. The notion of an external argument (the canonical subject of active transitive verbs and of unergative verbs such as *work*) is an added distinction among arguments that plays an important role in some theories, such as Grimshaw (1990). Theories that represent this notion at the level of argument structure represent the distinction between the two classes of intransitive verbs – unergative and unaccusative verbs – at this level, as those that have an external argument and those that do not, respectively.

Another element of divergence among these theories is whether the argument positions at the argument structure level are represented as the same type of formal object as the morphosyntactic expressions that realize those arguments or as a different type of formal object. Recent work within HPSG assumes that the argument structure is a list of syntactic categories, such as NP, PP, VP, etc., which are structure-shared with the appropriate elements filling the various grammatical functions that the predicate subcategorizes for. Other work does not assume structure-sharing between the elements at the level of argument structure and at the level of grammatical functions, but simply a correspondence or linking between them, which allows for the possibility of having different information at the different levels.

There is a split among the theories mentioned as to whether thematic role labels should be represented at the level of argument structure or not, given that some authors include labels such as agent, locative, and patient in the argument structure and others do not. However, this is more of an apparent split, since there is a general consensus that semantic information, such as thematic roles or semantic entailments about arguments, should be represented at a semantic level of representation, such as lexical conceptual structure. It would, therefore, be redundant to include this type of information at two different levels of representation. Those authors who use thematic role labels in the argument structure do so more for convenience (for identifying the arguments involved), than for a theoretical position.

Argument Structure: A Syntactic Structure with Unique Information

In what follows, I will present an argument for the claim that argument structure (a) contains syntactic information, as opposed to semantic information, and (b) that the arguments on argument structure are classified in a way that is unique to argument structure. This allows us to conclude that argument structure is not a semantic level of representation, but a syntactic one whose features are unique to this level.

The Distinction Between Primary and Secondary Objects

In certain languages, internal arguments in double object constructions show an asymmetrical behavior. I will illustrate this for the Bantu language Chichewa, where, in a given structure, at most one of the two internal arguments may have one of the following properties, which we can call primary object properties:

- be encoded as an object marker (a pronominal object affix);
- be promoted to subject in a passive clause;
- be bound to the logical subject in the reciprocal construction;
- the internal argument that can display these properties is constrained to precede the other object when both are NP objects following the verb.

In a construction where one of the internal arguments is thematically a beneficiary and the other one a patient, the beneficiary argument, as an object NP, is constrained to precede the patient object, as in (4a); the beneficiary argument must be the subject in the corresponding passive clause, as in (4b); in the reciprocal construction, the beneficiary must be bound to the logical subject so that there is a single NP corresponding to both bound roles, as in (4c) (from Alsina, 2001a: 81–91).

(4) a. Nkhāndwe zi-ku-mény-ér-a
10.foxes *10.SUBJ-PRES-hit-APPL-INDIC*
aná njōvu.
2.children *9.elephant*
'The foxes are hitting the elephant for the children.'
*'The foxes are hitting the children for the elephant.'

b. Ăna a-ku-mény-ér-edw-á
2.children *2.SUBJ-PRES-hit-APPL-PASS-INDIC*
njōvu (ndí nkhāndwe).
9.elephant *by 10.foxes*
'The elephant is being hit for the children (by the foxes).'
*'The children are being hit for the elephant (by the foxes).'

c. Nkhāndwe zi-ku-mény-ér-an-a njōvu.
10.foxes *10.SUBJ-PRES-hit-APPL-RECIP-INDIC* *9.elephant*
'The foxes are hitting the elephant for each other.'
*'The foxes are hitting each other for the elephant.'

The same contrast is revealed with respect to the ability to be encoded by means of an object marker: only the beneficiary object has this ability, as shown in Alsina (2001a, 2003), Alsina and Mchombo (1993), and Bresnan and Moshi (1990), among others. Thus, we see that a theme or patient object in a construction with a beneficiary internal argument is blocked from displaying any of the primary object properties: it cannot precede the other object, cannot be the passive subject, cannot be the target of reciprocalization, and cannot be encoded by means of an object marker. This is in contrast to what occurs in a structure where the theme or patient argument is the sole internal argument of the construction: it can be the passive subject, can be the target of reciprocalization, and can be expressed by means of an object marker. These properties are illustrated in (5), for the active/passive pair based on the verb stem *-meny-a* (Alsina, 2001a: 93):

(5) a. Nkhāndwe zi-ku-mény-á njōvu.
10.foxes *10.SUBJ-PRES-hit-INDIC* *9.elephant*
'The foxes are hitting the elephant.'

b. Njovu i-ku-mény-ëdw-a
9.elephant *9.SUBJ-PRES-hit-PASS-INDIC*
(ndí nkhāndwe).
by 10.foxes
'The elephant is being hit (by the foxes).'

The contrast between the ability of the patient argument to display primary object properties when it is the sole internal argument of the construction, as in (5), and the inability of the same argument to do so when it co-occurs with a beneficiary internal argument, as in (4), cannot be attributed to a semantic contrast for several reasons. In the first place, there is no difference in the semantic role of the patient internal argument of (5) and of (4). In the second place, in constructions in Chichewa where the patient or theme argument co-occurs with a goal argument that can be alternatively an oblique or an object (as with *-perek-a* 'hand' and its applicative form *-perek-er-a*, respectively), without any semantic difference correlating with the syntactic difference, the theme or patient argument can display primary object properties only when the co-occurring goal is an oblique, i.e., not an internal argument. In the third place, other languages, called symmetrical by Bresnan and Moshi (1990), allow both internal arguments in structures semantically equivalent to (4) to display primary object properties either alternatively or simultaneously. Since the presence or absence of the ability to display such properties cannot plausibly be explained by appealing to semantic contrasts, it has to be explained by positing a syntactic feature to distinguish an argument that can display these properties from an argument that cannot do so.

Bresnan and Moshi (1990) proposed to represent the contrast between these two types of argument at the level of argument structure (as well as at the level of grammatical functions), and Alsina (2001b) presented arguments for this position and for assuming that the distinction between the two types of internal argument is represented only in argument structure. The argument in Alsina (2001b) for representing the distinction between the two types of internal argument – restricted and unrestricted arguments, where only the latter have primary object properties – is as follows. First, examples like (4c) show that reciprocalization (the formation of a derived stem by attaching the reciprocal suffix

-an-a to a verb stem) is sensitive to the distinction between restricted and unrestricted arguments, since only unrestricted arguments can be bound to the logical subject in this word formation operation. Therefore, the distinction between these two types of arguments must be available at the word formation stage in which reciprocalization occurs. Second, reciprocal verb forms can undergo a highly productive word formation process that turns verbs into nouns through the affixation of the suffix *idwe/edwe* to a verb stem. Example (6) illustrates the use of a noun consisting of the reciprocal stem *si-an-a* 'leave-RECIP' and this nominalizing suffix in a sentence (Alsina, 2001b: 364):

(6) Ma-si-an-idwe a adani
6-leave-RECIP-NOM 6.ASSOC 2.enemies
a-ma-sangalats-a.
6.SUBJ-HABIT-please-INDIC
'The event of enemies leaving each other is pleasing.'

The nominalized reciprocal in (6) has a noun class marker (*ma-*), it takes a complement (*a adani*) that is expressed the way complements of nouns are expressed (introduced by an associative marker that agrees with the head noun of which it is a complement), and it functions as the head noun of the subject NP, all of which shows that it is a noun. Nominalization preserves the argument structure of the base stem, since the arguments of the reciprocal verb stem are still expressed in the nominal form. However, the grammatical function of these arguments is different depending on whether the predicate is verbal or nominal: the subject of the verbal form corresponds to an oblique (with the associative marker) of the nominal form. If we assume that the argument structure is the syntactic information about the arguments of a predicate that is common to the various realizations of a predicate (active, passive, nominal, etc.), it follows that the nominalization process accesses the argument structure, but not the associated grammatical functions, of the reciprocal verb stem.

Thus, we can conclude that the reciprocal morpheme performs an operation on the argument structure of the predicate it attaches to (see Alsina, 2001b for further evidence in support of this conclusion). Furthermore, if the reciprocal morpheme, which performs an operation on argument structure, is sensitive to the distinction between restricted and unrestricted object, it follows that this distinction is present at the level of argument structure. Since this distinction is not semantic, but syntactic, we conclude that argument structure is a syntactic structure, as it includes syntactic information.

Accounting for Morphosyntactic Alternations

One of the important roles of argument structure is in accounting for alternations in the morphosyntactic expression of arguments: for example, the fact that the patient argument in (5) can alternatively be expressed as an object NP or as an object marker in the simple active structure, as the subject of the passive form, and as the subject of the reciprocal form, or that, in contrast with this, the patient argument in (4) can only be expressed as an object NP, lacking all the alternative forms of expression just noted. For this purpose, a linking theory is needed, a theory that constrains the possible correspondences between arguments (at argument structure) and forms of expression, which includes grammatical functions, grammatical case features, position in phrase structure, etc. In what follows, I will illustrate how a theory of argument structure, combined with a linking theory (based on Alsina, 2001b, 2003), can account for alternations (or lack of alternations) such as we have seen in the previous paragraphs.

In accordance with what has been said so far, we can assume that argument structure is a list of arguments ordered by prominence. The external argument, of those verbs that have one, is distinguished from the rest of arguments by a specific feature: [Ext]. (Oblique arguments, those that are typically introduced by semantically contentful adpositions or case markers, are given a separate treatment and will not be considered here.) Internal arguments are those that are neither external arguments nor oblique arguments. The linking principles that associate arguments with grammatical functions can be formulated as follows:

(7) Linking principles:
a. Map an external argument onto a subject.
b. Map an internal argument onto a direct function.

The idea in (7b) that an internal argument maps onto a direct function, a class of grammatical functions that includes subject and object, is responsible for accounting for the subject/object alternation that we find in many constructions, as with active and passive. Passivization can be thought of as the operation specified by the passive morpheme (*-edw/idw*) in Chichewa that suppresses the logical subject, i.e., makes it unavailable to the linking principles (7); a suppressed argument (notated by the symbol Ø) either lacks an associated grammatical function or is expressed by means of an appropriate oblique expression. Thus, whereas the argument structure

and associated grammatical functions of an active form such as that for (5a) is as shown in (8a), the corresponding passive form, as in example (5b), is as in (8b):

```
(8) a. meny-a                 'hit < [Ext]  [ ] >'
                                      |      |
                                     subj   obj
    b. meny-edw-a (pass.)     'hit < [Ext]  [ ] >'
                                      ∅      |
                                            subj
```

The requirement that all clauses contain a unique subject (the subject condition of Bresnan and Kanerva, 1989 and others) regulates whether an internal argument maps onto a subject or an object. In the active form (8a), the internal argument cannot map onto a subject, since the structure contains another argument with the subject function. In the passive structure (8b), it must map onto the subject function, as, otherwise, the structure would lack a subject and be ill-formed.

The distinction between restricted and unrestricted arguments is represented as the presence or absence of the feature R (for restricted), respectively, on arguments at argument structure; so, a restricted argument is represented as [R] and an unrestricted argument as [ ]. This is a marked (or last resort) feature that is only used, in those languages that require it (such as Chichewa), by a principle such as the following:

(9) Restricted Argument Principle: if an argument structure contains two internal arguments with distinct mapping to morphosyntactic expressions, one of them must be [R].

The presence of the feature [R] on an argument prevents that argument from being referred to by morphologically encoded operations and requires the corresponding NP to linearly follow a sister NP. Morphologically encoded operations are specifications conveyed by a morpheme, such as agreement, pronominal incorporation, and operations on argument structure (e.g., reciprocalization or causativization). Taking the feature [R] to be a last resort feature, it follows that an argument structure with a single internal argument will not contain an [R] argument. Therefore, the structures in (8) lack such an argument. On the other hand, the argument structures corresponding to (4), which clearly have two internal arguments, have to include an [R] argument in order to comply with (9). Thus, the argument structure and associated grammatical functions of (4a) is as shown in (10), where, according to standard assumptions about the ranking of arguments, the most prominent argument is the agent, the second in prominence is the beneficiary and the lowest is the patient.

```
(10) meny-er-a (appl.)'hit < [Ext]  [ ]  [R] >'
                              |      |     |
                             subj   obj   obj
```

As a language-particular constraint, roles such as beneficiary, goal, and agent cannot be restricted arguments in Chichewa. Therefore, in (10) the beneficiary is the unrestricted argument and the patient is the [R] argument. In the presence of an external argument linked to the subject function, both internal arguments map onto object functions. Now, since they differ at the level of argument structure by the presence or absence of the feature R, their morphosyntactic properties will be different.

When both objects in (10) are expressed as NPs, the restricted argument is constrained to follow the other object NP, giving the result that the beneficiary NP precedes the patient NP, as seen in (4a). If the verb includes an object marker, it must correspond to the beneficiary (the unrestricted argument), given that restricted arguments cannot be referred to by a morphologically encoded operation such as that encoded by an object marker. If the verb is passivized, making the external argument unavailable for the subject function, only the beneficiary can map onto the subject function, as shown in (4b), since the subject is always referred to by some morpheme, be it an agreement or pronominal affix in finite forms or the nonfinite morphology in nonfinite forms which licenses a nonovert subject. The operation of reciprocalization, illustrated in (4c), involves the binding or co-linking of the logical subject and another argument of the same argument structure so that both bound arguments map onto the same grammatical function. As it is a morphologically encoded operation, it cannot involve the patient argument of (4c), since it is a restricted argument, as indicated in (10): the binding of the reciprocal morpheme must involve the beneficiary role.

See also: Binding Theory; Ergativity; Grammatical Relations and Arc-Pair Grammar; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Minimalism; Principles and Parameters Framework of Generative Grammar; Subjects and the Extended Projection Principle; Syntax-Semantics Interface; Thematic Structure.

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Aristotle and Linguistics

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The study of language has always had two kinds of practitioners, the practical and the theoretical linguists. Aristotle was no doubt the first theoretical linguist (in addition to being the first in many other subjects), but he also contributed essentially to the development of practical linguistics. His role in the history of linguistics has been highlighted in a few publications (e.g., Seuren, 1998; Allan, 2004).

Aristotle was born in Stagira, in Ancient Macedonia, in 384 B.C.E. His father was the personal physician and a close friend of the king of Macedonia, Amyntas II. An exceptionally gifted boy to begin with, Aristotle joined Plato's Academy in Athens at the age of 17, to remain there until Plato's death in 347. Having been passed over as Plato's successor, he left Athens to live, first, in Asia Minor and then in Lesbos. In 343–342, Amyntas' son and successor, Philip II of Macedonia, invited him to come and teach his son Alexander, then 14 years old. This he did for 2 years. In 336, Alexander succeeded his father and immediately conquered the whole of Greece. Under Alexander's political protection, Aristotle returned to Athens in 335 and founded his school of philosophy, the Lyceum. There he taught until 323, when news of Alexander's death reached Athens. No longer certain of Macedonian protection, he left Athens overnight and sought refuge in Chalcis, just north of Athens, where a Macedonian garrison was stationed. One year later, in 322, he died of an intestinal disease.

His first great contribution to the study of language—not often mentioned—is the fact that he demythologized language. Rather than seeing language as a magical instrument to cast spells, entrance people, and call up past, present, and future spirits, he saw language as an object of rational inquiry, a means of expressing and communicating thoughts about anything in the world. The 'semiotic triangle' of (a) language as the expression of (b) thoughts that are intentionally related with (c) elements in the world, famously depicted in Ogden and Richards (1923: 11), is due to Aristotle. This is Aristotle's most general and perhaps also his most important contribution to the study of language, even if it is not often mentioned by modern authors, for whom it has become a matter of course that language can be seen as a valid object of rational inquiry.

In a more analytical sense, Aristotle's role in the development of linguistics is in large part due to his theory of truth. For him, truth and falsity are properties of either thoughts or sentences. A classic statement is (*Metaphysics* 1027b25):

> For falsity and truth are not properties of actual things in the world (so that, for example, good things could be called true and bad things false), but properties of thought.

A few pages earlier, he defines truth as follows (*Metaphysics* 1011b26):

> We begin by defining truth and falsehood. Falsehood consists in saying of that which is that it is not, or of that which is not that it is. Truth consists in saying of that which is that it is, or of that which is not that it is not.

Here Aristotle introduces *not* as a simple truth-functional inverter of truth values: a toggle between true and false. This has momentous consequences.

Aristotle's truth theory is known as the correspondence theory of truth, in that it requires a correspondence between what is the case in the world on the one hand and what is said or thought on the other. To make this notion of correspondence more explicit, some form of analysis is needed. Aristotle made a beginning with that. He analyzes the 'world' as consisting of things that are named by any of the 10 categories substance, quantity, quality, relation, place, time, position, state, action, or affection (*Categories* 1b25–30). Within the category 'substance,' there is a hierarchy from the primary substances (individual existing entities) through a range of secondary substances, from species and genus to any higher order. The secondary substances together with the remaining 9 categories are properties or things that things are ("everything except primary substances is either predicable of a primary substance or present in it"; *Categories* 2a33).

On the other hand, he analyzes sentences as resulting from the application of a *katêgoroúmenon* (Latin *praedicatum*) to something. The something to which the predicate is applied he calls *hypokeímenon* (literally 'that which underlies'; Latin *subiectum* or *suppositum*). Primary substances (entities) can be the object only of predicate application – that is, can only be *hypokeímena* (*Categories* 2b39–40). All other things can be either *hypokeímena* or properties, denoted by a predicate. Yet in orderly talk about the universe, it is proper to take lower categories of substance as the things predicates apply to and reserve predicates themselves for the denoting of higher-order substances and other categories of being (*Categories* 3a1–5).

The combination of a predicate with a term denoting the *hypokeímenon* Aristotle calls *prótasis* (Latin *propositio*). A proposition is true just in case the property assigned to the *hypokeímenon* actually adheres to it; otherwise it is false. Moreover, a true proposition is made false, and vice versa, by the prefixing of *not* ("it is not the case that"). The term *prótasis* occurs for the first time on the first page of *Prior Analytics*, which contains his doctrine of syllogisms (*Prior Analytics* 24a16):

> A proposition (*prótasis*) is an affirmative or negative expression that says something of something.

A proposition is divided into terms (*Prior Analytics* 24b16):

> A term (*hóron*) I call that into which a proposition is analyzed, such as the predicate (*katêgoroúmenon*) and that to which the predicate is applied.

One notes that Aristotle lacked a word for what we call the subject term of a sentence. During the late Middle Ages, the Latin *subiectum* began to be used in that sense—an innovation that has persisted until the present time (Seuren, 1998: 121–124).

This was the first semantic analysis of sentence structure in history, presaged by, and probably unthinkable without, Plato's incipient analysis of sentence meaning in his dialogue *The Sophist*. It is important to note that Aristotle's analysis of the proposition does not correspond to the modern syntactic analysis in terms of subject and predicate, but rather to what is known as topic-comment analysis. The identification of Aristotle's sentence constituent for the denoting of a *hypokeímenon* with "grammatical subject," characterized by nominative case, and of Aristotle's predicate with "grammatical predicate," may have been suggested by Aristotle, as when he says that a morphological verb "always is a sign of something said of something else" (*On Interpretation* 16b7). But it was carried through systematically a few decades after Aristotle's death by the linguists of Alexandria, whose task it was to develop teaching material for the Egyptian schools where local children had to learn Greek in the shortest possible time (Seuren, 1998: 21–22). Unfortunately, this identification was, though convenient, rash and ill-considered. It persisted more or less unchallenged until the middle of the 19th century, when some, mostly German, scholars discovered that the Aristotelian subject–predicate distinction does not coincide with the syntactic subject–predicate analysis universally applied in linguistics. For in actual discourse, very often what should be the subject according to Aristotle's definition is not the subject recognized in grammatical analysis, and likewise for the predicate. Steinthal, for example, observed (1860: 101–102):

> One should not be misled by the similarity of the terms. Both logic and grammar speak of subject and predicate, but only rarely do the logician and the grammarian speak of the same word as either the subject or the predicate. . . .Consider the sentence *Coffee grows in Africa*. There can be no doubt where the grammarian will locate subject and predicate. But the logician? I do not think the logician could say anything but that 'Africa' contains the concept that should be connected with 'coffee grows'. Logically one should say, therefore, 'the growth of coffee is in Africa'.

Observations like this gave rise to a long debate, which lasted more than 80 years. At the end, it was decided to keep the terms subject and predicate for the syntactic analysis and speak of topic and comment for the semantic analysis in the Aristotelian sense (see Seuren, 1998: 120–133 for a detailed discussion).

Syntax, in the modern sense, is largely absent from Aristotle's writings. He does, however, distinguish between different sentence types (*On Interpretation* 17a1–12):

> Every sentence is meaningful, not in virtue of some natural force but by convention. But not all sentences are assertions, only those in which there is question of truth or falsity. In some sentences that is not so. Wishes, for example, are sentences but they are not true or false. We will leave all other sentence types out of consideration, as they are more properly studied in rhetoric or poetics. But assertions are the topic of the present study [i.e., logic]. The primary assertive sentence type is the simple affirmation, the secondary is the simple negation. All other, complex, assertions are made one by conjunction. Every assertion must contain a verb or a conjugated form of a verb. For a phrase like "man" is not yet an assertion, as long as no verb in the present, past, or future tense is added.

Some word classes are already there. Thus, at the outset of *On Interpretation*, he defines *ónoma* (noun) as "a stretch of sound, meaningful by convention, without any reference to time and not containing any internal element that is meaningful in itself" (*On Interpretation* 16a19–21). *Rhêma* (verb) is defined as "that which, in addition to its proper meaning, carries with it the notion of time, without containing any internal element that is meaningful in itself; it always is a sign of something said of something else" (*On Interpretation* 16b6–8). In his *Rhetoric*, at 1406a19, Aristotle uses the term *epítheton* for adjective. All other terms for word classes are of a later date, with many of them having been created by the Alexandrian linguists.

The term *ptôsis* is found relatively frequently, in the sense of nominal or verbal morphological modification, as in *Categories* 1a13–15: "Things are said to be named 'derivatively' when they derive their name from some other word that differs in morphological form (*ptôsei*), such as the grammarian from the word *grammar* or the courageous from the word *courage*." The literal meaning of *ptôsis* is 'fall' (Latin: *casus*). Its use in the sense of morphological modification is based on the metaphor that the word 'as such' stands upright (in the 'upright case' or *orthê ptôsis*; Latin: *casus rectus*). Its other falls are represented by forms that are modified morphologically according to some paradigm. The Alexandrians began to reserve the term *ptôsis* for the nominal cases of *nominative* (the form of your own name), *genitive* (the form of your father's name), *dative* (the name of the person you give something to), *accusative* (the name of the person you take to court), and *vocative* (the name of the person you call). These terms smell of the classroom, not of philosophy.

See also: Aristotle and the Stoics on Language.

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Aristotle and the Stoics on Language

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To be "subject to contradiction by scholars" is, as W. V. Quine warns us, "the penalty for attributions to Aristotle" (Quine, 1960: 199). A case in point are the views that have been attributed to Aristotle on the basis of the first chapter of his treatise *De interpretatione*, the first half of which – i.e., if we leave aside the opening lines of the chapter, the passage from 16 a 3 to 16 a 8 – has rightly been called "the most influential text in the history of semantics" (Kretzmann, 1974: 3). In 1974 two articles appeared, in one of which this text is alleged to be "the only passage of some length in the known works of Aristotle which contains a theory of meaning" (Gyekye, 1974: 71), whereas in the other we are told that "it is not even a sketch of a general theory of meaning" (Kretzmann, 1974: 5). It can be summarized as follows: The expressions of spoken language are symbolized by the expressions of written language and are themselves symbols, or signs, of certain "affections in the soul" (16 a 3–4, cf. 6–7; Ackrill, 1963: 43), which, for their part, are likenesses of things. While these mental affections, of which linguistic expressions are signs in the first instance, as well as the things they are likenesses of are the same for all men, linguistic expressions are not.

According to the traditional interpretation of the text in question (for which see Weidemann, 2002: 134–151; for other texts relevant to Aristotle's theory of language cf. Ax, 1992 and Weidemann, 1996), by saying that mental affections are what linguistic expressions are "in the first place signs of" (16 a 6; Ackrill, 1963: 43), Aristotle implies that linguistic expressions are in the second place signs of the things of which the mental affections they primarily signify are likenesses. Interpreted in this way, our text does indeed sketch out a semantic theory.

At first sight this theory might remind a modern reader of the sort of 'uncritical semantics' described by Quine as "the myth of a museum in which the exhibits are meanings and the words are labels" (Quine, 1969: 27). That Aristotle is not committed to this "mentalistic myth of the meaning museum" (Quine, 1969: 30), however, is shown by the way in which he explains what it is for spoken words to signify something. A spoken word, he points out in *De interpretatione* 3 (16 b 20–21), signifies something by virtue of the fact that "the speaker arrests his thought and the hearer pauses" (Ackrill, 1963: 45). As the passage in Plato's *Cratylus* to which Aristotle is alluding here (437 a 4–5) makes clear, it is the thing referred to by a word at which, according to Aristotle, "the speaker arrests his thought" and upon which "the hearer pauses." This answers the question in what sense the mental affections mentioned in the first half of *De interpretatione* 1, which in the second

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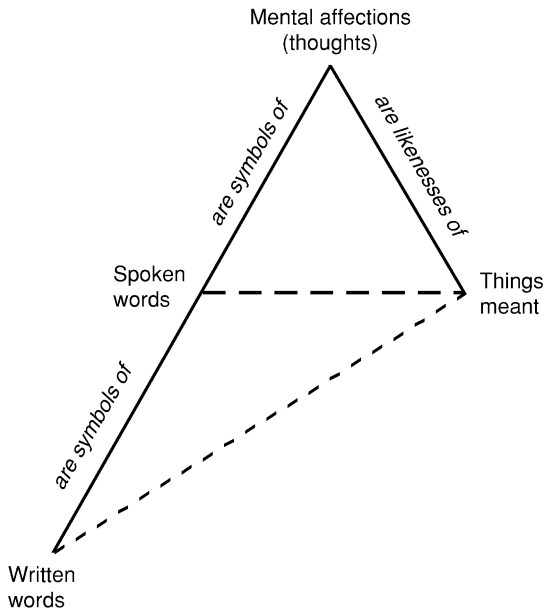

Figure 1 Semiotic triangle of Aristotle's theory of meaning. Adapted from Weidemann, 2002: 149 with permission.

half of this chapter are called thoughts (cf. 16 a 10, 16 a 14), are likenesses of things, on the one hand, and, on the other, that which is primarily signified – or symbolized – by linguistic expressions. The words we utter, Aristotle wants to say, refer to the things meant by them by expressing thoughts, which represent these things in our mind to the effect that to think these thoughts is nothing but to mean the things they represent (cf. Weidemann, 2001).

The semantic theory according to which words have a meaning insofar as thoughts are expressed and things are referred to by them so that to think the thoughts they express is to mean the things they refer to may be illustrated, following H.-H. Lieb (cf. Lieb, 1981: 148), by means of two interrelated semiotic triangles (**Figure 1**).

As for Aristotle's claim that, unlike things and mental affections, linguistic expressions "are not the same for all men" (*De interpretatione* 1, 16 a 5–6; Ackrill, 1963: 43), it has to be understood as underpinning his claim made in *De interpretatione* 2 (cf. 16 a 26–29) that linguistic expressions are symbols – i.e. conventional signs as opposed to natural ones – of what they signify. Being symbols, the expressions of spoken language can be written down, whereas non-linguistic sounds are "inarticulate" (Ackrill, 1963: 44) – *agrammatoi* (16 a 28–29) – in the sense of being "unwritable" (Kretzmann, 1974: 17) and "unspellable" (Arens, 1984: 40, 87). Aristotle's insistence on the identity of things and thoughts for all men must not be misunderstood. Far from taking the strange view "that all men meet the same things or have the same thoughts" (Ackrill, 1963: 113), he simply stresses the fact that the members of different linguistic communities can, using their different vocabularies, express the same thoughts and mean the same things.

In at least one respect Aristotle's theory is unsatisfactory. For his notion of thought is ambiguous in that on the one hand, being mental affections, thoughts are individually distinct acts of thinking, whereas on the other hand, being the same for all men, they are the objective contents of such acts of thinking. It is to the credit of the Stoics that in the semantic theory they developed such an ambiguity is consciously avoided.

Stoic semantics is centered on what the Stoics called – using as a technical term a word whose literal translation is 'sayable' (cf. Long and Sedley, 1987a: 195–202) – a *lekton*. As we know from Sextus Empiricus and Diogenes Laertius, who report identical definitions, the Stoics defined the notion of *lekton* by saying that a *lekton* is "what subsists in accordance with a rational impression" (ibid.: 196, §§ 33C, 33F), a "rational impression" being, as Sextus adds, "one in which the content of the impression can be exhibited in language" (ibid., § 33C). This report is supplemented by the information, also given by Sextus, that in the opinion of the Stoics "three things are linked together, what is signified (*to sēmainomenon*), that which signifies (*to sēmainon*), and the name-bearer (*to tynchanon*). That which signifies," Sextus continues, "is an utterance [...]; what is signified is the specific state of affairs revealed by the utterance, which we apprehend as it subsists in accordance with our thought, whereas it is not understood by those whose language is different, although they hear the utterance; the name-bearer is the external object [...]. Of these, two are bodies, the utterance and the name-bearer; but one is incorporeal, the state of affairs signified and sayable (*lekton*)" (ibid.: 195–196, § 33B; slightly modified following Long, 1971: 76–77).

As we can learn from the two texts just quoted, a *lekton* is the meaning of a linguistic expression in the sense of being the objective content of the respective acts of thinking performed by a speaker who utters the expression in question with the intention to say something, and a hearer who understands what the speaker intends to say.

It should be noticed that it is not linguistic expressions of any sort whatever that have a meaning in the sense of signifying a *lekton*, but only predicate (and perhaps also subject) expressions, which signify what is called an incomplete *lekton*, on the one hand, and sentences, which signify a so-called complete *lekton*, on the other hand. (Whether there are

incomplete *lekta* signified by subject expressions is a matter of dispute; cf. Gaskin, 1997 versus Long and Sedley, 1987a: 200–201.) Among the class of complete *lekta* the most important subclass is the class of those, named *axiōmata* by the Stoics and regarded as the bearers of truth and falsity, which are signified by statement-making sentences. Since an *axiōma* shares features of both the linguistic sense of a statement-making sentence and its propositional content, the Stoic term, which Long and Sedley have translated, *faute de mieux*, by "proposition" (cf. Long and Sedley, 1987a: 205–206), has no exact modern equivalent.

In relation to Aristotle, who lacks the notion of *lekton*, "the Stoics can be interpreted as filling a gap in his most celebrated doctrine of meaning" (ibid.: 201), thereby making an outstanding contribution to the development of the theory of language.

See also: Aristotle and Linguistics; Consciousness, Thought and Language; Evolution of Semantics; Intention and Semantics; Meaning: Overview of Philosophical Theories; Meaning: Pre-20th Century Theories; Meaning, Sense, and Reference; Propositions; Sense and Reference: Philosophical Aspects; Sign Theories; Thought and Language: Philosophical Aspects; Truth: Primary Bearers.

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Armenia: Language Situation

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Armenia is a highly homogenous country, with 98% of the population speaking the official language of the state, Armenian, as their native tongue. Eastern Armenian, the standard used as an official language, is characterized by a highly developed system of literary norms. The other literary standard of Armenian, Western Armenian, is spoken by the descendants of Armenians, who fled Western Armenia (now Turkey) during the genocide of 1915 and settled outside Armenia. Yet another literary standard, Grabar (the Old Written Armenian), is used in Armenian Church services.

Minority languages in Armenia (the speakers of which constitute 2% of the population) include Russian, with 29,500 speakers (more than 50% of whom are ethnic Armenians); Kurmanji, the dialect of Kurdish spoken by Yezidis (31 800) and Kurds (1300) (although the language spoken by Yezidis is technically a variant of Kurmanji, they prefer to call the language they speak Yezidian and distance themselves from Kurds both by ethnicity and language); Neo-Assyrian (Assyrian Neo-Aramaic), spoken by some of the 3500 Assyrians; Greek (1300 speakers); Ukrainian (818 speakers); and some others with even fewer speakers. Most of the minority ethnic groups immigrated into Armenia about two to three centuries ago and have been able to maintain and develop their language and culture, thanks to their compact settlement as well as the efforts of the Soviet government, whose policies greatly supported ethnic minorities. After Armenia achieved independence in 1991, despite its deteriorated economical potential, the Armenian government continued to make efforts to continue supporting the preservation of the languages and cultures of minorities, especially since three of them (Assyrian Neo-Aramaic, Yezidian, and Kurdish) are not principal languages/cultures in any country. Almost all the speakers of minority languages are bilingual, speaking Armenian, Russian, or both, besides their mother tongue, which frequently serves for home use.

The language situation in Armenia is marked by diglossia, whereby the standard Eastern Armenian is used for written communication, formal and official situations, and in education, while regional dialects, some of which can be mutually unintelligible, are used for everyday and domestic communication. Another characteristic of the language situation in Armenia is Russian-Armenian bilingualism, which involves about 90% of the adult population. Historically, Russian has had a special status in Armenia, as in all the former Soviet republics. In fact, the prestige and functionality of Armenian had been gradually declining before independence. Since independence, Armenian has become the main language of instruction at all levels of education as well as that of official communication and broadcasting.

Among foreign languages, Russian instruction is introduced in the second grade of elementary school, and English (less frequently French or German) is introduced in the third grade. Instruction in both foreign languages continues throughout the first years of college. In recent years, English has increasingly gained ground.

See also: Armenian; Minorities and Language; Russian.

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Armenian

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'Armenian' actually refers to several languages, including Standard Eastern and Western Armenian, Middle (/Medieval/Cilician) Armenian, and Classical Armenian, as well as Zok, formerly spoken by the Armenian inhabitants of southeastern Nakhichevan; Kistinək, spoken by the Armenian inhabitants of Musaler, Turkey; Kesbənuək, spoken by the Armenian inhabitants of Kesab, Syria; Homshetsma or Homshetsnak (referred to as Hemşince in Turkish), spoken by the Hemshinli of northeast Turkey and the Hamshen Armenians of the Black Sea coastal

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Armenian

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'Armenian' actually refers to several languages, including Standard Eastern and Western Armenian, Middle (/Medieval/Cilician) Armenian, and Classical Armenian, as well as Zok, formerly spoken by the Armenian inhabitants of southeastern Nakhichevan; Kistinək, spoken by the Armenian inhabitants of Musaler, Turkey; Kesbənuək, spoken by the Armenian inhabitants of Kesab, Syria; Homshetsma or Homshetsnak (referred to as Hemşince in Turkish), spoken by the Hemshinli of northeast Turkey and the Hamshen Armenians of the Black Sea coastal

regions of Abkhazia and Russia; and dozens of other mutually unintelligible variants of Armenian originally spoken in Turkey, Armenia, Azerbaijan, Iran, Georgia, Abkhazia, Russia, and Israel. Lomavren, the language of the Bosha (or Posha) gypsies of Turkey and Armenia, draws its grammar from the Erzerum dialect of Armenian but its lexicon is mostly of Indic origin; it therefore is not clear whether or not the language should be classified as a form of Armenian. All employ the Armenian alphabet (created by Mesrob at the beginning of the 5th century) except for the Turkish forms of Homshetsma, which normally appear only in oral contexts, but in recent years have begun to show up in Turkish orthography in collections of word lists from minority groups in Turkey, lyrics on CDs, and the like.

Armenian belongs to the Indo-European family, and is commonly believed to be most closely related to Greek and Indo-Iranian. (For instance, all three share a prohibitive particle **me:* (Greek *me:*, Sanskrit *ma:*, Armenian *mi*) and the imperfect third-person singular augment **e-* (as in Greek *e-pher-e*, Sanskrit *a-bhar-a-t*, Armenian *e-ber* '(s)he/it carried'). Many more such parallels are discussed in Clackson, 1994.) Because of its many loans from various Middle Iranian languages, especially Parthian, Armenian was thought to be an Iranian dialect until Heinrich Hübschmann demonstrated in 1875 that it was a distinct branch of the Indo-European family. Scholars disagree on how the Armenians came to historical Armenia, the eastern half of present-day Turkey centered around Lake Van and Mount Ararat; some believe they came southward from the Russian steppe, others believe they and the Hittites came eastward from Greece, and others suggest they moved only a short distance from an original Indo-European homeland in the Transcaucasus. It is most likely that this settlement occurred in the second millennium B.C. The earliest mentions of the Armenians occur in the inscriptions of the Achaemenid Persian king Darius (6th century B.C.) and the Greek historian Herodotus (5th century B.C.)

The earliest written records of the Armenian language date from the 5th century A.D. shortly after the conversion of the Armenians to Christianity in the 4th century led to the creation of an Armenian alphabet by Mesrob around 401 and a systematic program of translating the books of the Bible. The language of the earliest translations was Classical Armenian (also called *grabar*, 'written [language]'), which continued as the preferred literary form of Armenian until the 19th century, when it was supplanted by the three modern literary dialects.

In linguistic terms Armenian is notable for its significant divergences from Proto-Indo-European, particularly in terms of pronunciation and vocabulary. Some of the more striking phonological changes are the development of a rich set of affricates (*ts*, *dz*, etc.), the loss of final syllable rimes (e.g., PIE **worg^{j}om* 'work' > Classical Armenian *gorts*), the change of initial **dw* to *erk-* (e.g., PIE **dwo:* '2' > Classical Armenian *erku*), and the change of original **w* to *g*. Most striking in the vocabulary of Armenian is the rarity of words inherited from Indo-European and the overwhelming predominance of words of unknown origin. Unsurprisingly, native IE words survive primarily in the core vocabulary: *mayr* 'mother' < **ma:ter*, *hayr* 'father' < **pater*, *k^{h}oyr* 'sister' < **swesor*, *kov* 'cow' < **gwows*, *tun* 'house' < **domos*, *em* 'I am' < **esmi*. The remainder of the lexicon is drawn primarily from Parthian, and to a lesser extent Greek and Syriac (q.v. Hübschmann, 1895); several hundred and perhaps as many as several thousand words are of unknown origin, most likely having come from Urartian, Hurrian, and other now-extinct autochthonous languages. Armenian also incorporated large numbers of Arabic words following the expansion of the Arabs in the Middle East in the 7th century, and the spoken language absorbed thousands of Turkish words following the arrival of Turkic tribes in Anatolia beginning in the 11th century.

Though there are dozens of mutually unintelligible varieties of Armenian, all share certain features. Proto-Armenian had four verbal conjugations, characterized by theme vowels -e-, -i-, -ɑ-, and -u- (beɾ-e-m 'I carry', χawsim 'I speak', χndam 'I rejoice', zgen-u-m 'I wear'); most modern dialects (including the Western and Eastern literary languages) have completely or partially lost the -u- conjugation, and standard Eastern Armenian has merged the -i- conjugation into the -e- conjugation. There were originally three morphologically distinct sets of personal endings for verbs – present, imperfect, and aorist – which were used in combination with additional tense and aspect markers to form the various tenses and moods. The system of nominal morphology in Proto- and Classical Armenian was rich, preserving the IE nominative, accusative, genitive, dative, instrumental, ablative, and locative cases in both singular and plural (but the IE dual was lost); there were at least eight different declensions, distinguished primarily by different theme vowels. This system was significantly reduced by the medieval period; Middle Armenian and the modern varieties now use the singular endings for the plural as well, and have only one productive declension, formed from parts of the original -i- and -o- declensions. With the exception of pronouns, the inventory of cases has significantly reduced as well: the accusative has merged with the nominative, and the genitive with the dative. Proto-Armenian

had several participial forms, but only two of these survive into the modern period: the original past participle -eal is now -el in the Eastern dialects, and the original present participle -oʁ is now used as a present participle and for relativizing subjects of subordinate clauses, as in the following Standard Western Armenian example:

ɑjn	kʰiɾkʰ-ə	kʰən-oʁ	gin-ə
that	book-def.	buy-pres.ppl.	woman-def.

'the woman that is buying that book'

The Western dialects have replaced -eal with -ats (> -adz) for past participles; all modern dialects also use the -ats participle to relative non-subjects of subordinate clauses, as in the following Western example:

(kʰu)	kʰən-ɑdz	kʰiɾkʰ-ətʰ
2sg$_{GEN}$	buy-past.ppl.	book-2sg$_{POSS}$

'the book that you (have) bought'

Most of the changes between Classical and Modern Armenian first appear in the medieval period in Middle Armenian documents, associated with the Armenian kingdom of Cilicia, which flourished from the 11th to 15th centuries A.D. in what is now south-central Turkey. Middle Armenian is generally Western in character, though it shares many features with Eastern dialects as well. It inverts the pronunciation of the Classical Armenian plain voiced and voiceless stops (e.g., berem 'I carry' > perem, pat 'wall' > bad), a feature that is preserved in the modern Cilician dialects of Zeytun and Hadjin but differs from the Western and Eastern literary varieties (Eastern preserves the Classical system [bɛɾɛm]; Western devoices and aspirates the original voiced series [pʰɛɾɛm]). The Cilician kingdom was in close contact with several Crusader kingdoms; as a result, it borrowed a significant number of words from Crusader French, most famously what comes out as the standard Western form for 'mister', *baron*.

In the 19th century Armenian nationalists became interested in developing a literary form of the modern language. This was brought about by excising most Turkish forms from the regional dialects and replacing them with new borrowings from the classical language. The intellectual center around which the new Western literary language was organized was Constantinople (modern Istanbul), though many features of the standard dialect (including the pronunciation of the consonants) do not come from the Armenian dialect originally spoken there. The same holds for Eastern Armenian with respect to Erevan. The relationship between the two modern literary dialects is somewhat complicated; there are many grammatical differences (e.g., W gə siɾɛm vs. E sirum

Table 1 The Armenian alphabet, with IPA equivalents for eastern pronunciation

Ա	ɑ	Ծ	ts	Ձ	dʒ
Բ	b	Կ	k	Ռ	r
Գ	g	Հ	h	Ս	s
Դ	d	Ձ	dz	Վ	v
Եւ	(j)ɛ	Ղ	ʁ	Տ	t
Զ	z	Ճ	tʃ	Ր	ɾ
Է	ɛ	Մ	m	Ց	tsʰ
Ը	ə	Յ	j	Ւ	u
Թ	tʰ	Ն	n	Փ	pʰ
Ժ	ʒ	Շ	ʃ	Ք	kʰ
Ի	i	Ո	(v)o	Օ	ɔ
Լ	l	Չ	tʃʰ	Ֆ	f
Խ	χ	Պ	p		

ɛm 'I love', W bidi siɾɛm vs. E kəsiɾɛm 'I will love' (note that the same form is used for the present in W and the future in E) and lexical differences (e.g., W dʒɛɾmɑg vs. E spitɑk 'white'; W hɔs vs. E ɛstɛʁ 'here', W bɛdkʰɑɾɑn vs. E zukʰɑɾɑn 'bathroom', W hɑvgitʰ vs. E dzu 'egg'), and most Western speakers have difficulty understanding Eastern, but many Eastern speakers are relatively comfortable with the Western dialect. This asymmetry in mutual intelligibility most likely results from the fact that large numbers of speakers of Western dialects fled to Eastern Armenia following the Russo-Turkish war in 1828 and the Turkish Genocide in 1915–1920, whereas before the fall of the Soviet Union in 1991 most Western Armenians had little or no exposure to Eastern Armenian. The fact that there is some mutual intelligibility in both directions can also be linked to the fact that the literary dialects tend to borrow the same forms from Classical Armenian, and (at least in recent decades) employ the same newly coined words.

The destruction of the Armenian homeland and more than a million Armenians by the Ottoman government in 1915–1920 rendered most nonstandard varieties of modern Armenian moribund; with few exceptions the Armenians in the diaspora (primarily Lebanon, France, and notably in the Los Angeles area of the United States) speak only Standard Western Armenian. There were approximately 6.8 million speakers of Armenian in 1996, but all varieties of the language except for Standard Eastern Armenian are in immediate danger of extinction as very few diaspora Armenians under the age of 30 speak the language fluently.

Whereas Classical Armenian was relatively Indo-European in its syntactic and morphological structure, all varieties of Modern Armenian are typologically much closer to Turkish and the Balkan languages. Compare, for instance, the formation of relative clauses, exemplified by 'I saw the bird that was singing in

the tree': Classical – tesi əz-tʰərtʃʰun-ən oɾ eɾɡɛɾ i veɾaj tsaɾ-oj-n (I.saw specific-bird-definite that was.singing in on tree-genitive-definite), Western – dzaɾ-i-n vəɾa jɛɾkʰɔʁ tʰərtʃʰun-ə dɛsa (tree-gen.-def. on singing bird-def.I.saw). Western Armenian has undergone additional influence from Turkish and Greek (cf. sdɛpʁin 'carrot', istakʰɔz 'lobster', bantʰɔg 'hotel'), whereas Eastern Armenian has been heavily influenced by Russian (e.g., the standard form for 'potatoes' is kʰaɾtʰɔfli, and the word for 'gay' is ɡalubɔj, from the Russian word originally meaning 'sky blue'; the native word for 'blue', kapujt, cannot be used in this sense).

The Lord's Prayer in Different Varieties of Armenian, Rendered in the IPA

Classical Armenian (Eǰmiatsin ms. 229, 989 A.D.)

Հայր մեր որ յերկինս. սուրբ եղիցի անուն քո.
եկեցէ արքայութիւն քո. եղիցին կամք քո որպէս
յերկինս եւ յերկրի. զհաց մեր հանապազորդ
տուր մեզ այսաւր. եւ թող մեզ զպարտիս մեր.
որպէս եւ մեք թողումք մերոց պարտապանաց.
եւ մի տանիր զմեզ ի փորձութիւն. այլ՛ փրկեա
զմեզ ի չարէ. զի քո է արքայութիւն եւ զաւրութիւն
եւ փառք յաւիտեանս ամէն:

hajɾ meɾ oɾ jeɾkinəs. suɾb eʁitsʰi anun kʰo. ekets^h^ɛ aɾkʰajutʰiwn kʰo. eʁitsʰin kamkʰ kʰo oɾpɛs jerkinəs ew jeɾkɾi. əzhatsʰ meɾ hanapazoɾd tuɾ mez ajsawɾ. ew tʰoʁ mez əzpaɾtis meɾ. oɾpɛs ew mekʰ tʰoʁumkʰ meɾotsʰ paɾtapanatsʰ. ew mi taniɾ əzmez i pʰoɾdzutʰiwn. ajʁʲ pʰəɾkea əzmez i tʃʰaɾɛ. zi kʰo ɛ aɾkʰajutʰiwn ew zawɾutʰiwn ew pʰaɾkʰ jawiteanəs. amɛn.

Standard Eastern Armenian

Հայր մեր, վոր յերկնքում ես. սուրբ թող լինի
քո անունը. քո թագավորությունը թող գա. քո
կամքը թող լինի յերկրի վրա, ինչպես վոր յերկնքում է.
մեր հանապազորյա հացը տուր մեզ
այսօր. յեվ թող մեզ մեր պարտքերը, ինչպես յեվ
մենք ենք թողնում մեր պարտականներին. յեվ
մի տար մեզ փորձության, այլ փրկիր մեզ չարից.
վորովհետեվ քոնն է թագավորությունը յեվ
զորությունը յեվ փառքը հավիտյանս. ամեն:

hajɾ meɾ, vɔɾ jɛɾkənkʰum ɛs. suɾpʰ tʰɔʁ lini kʰɔ anunə. kʰɔ tʰagavɔɾutʰjunə tʰɔʁ ga. kʰɔ kamkʰə tʰɔʁ lini jɛɾkɾi vəɾa, intʃʰpɛs vɔɾ jɛɾkənkʰum ɛ. meɾ hanapazɔɾja hatsʰə tuɾ mɛz ajsɔɾ. jɛv tʰɔʁ mɛz meɾ paɾtkʰɛɾə, intʃʰpɛs jɛv mɛnkʰ ɛnkʰ tʰɔʁnum meɾ paɾtakanːɛɾin. jɛv mi taɾ mɛz pʰɔɾdzutʰjan, ajl pʰəɾkiɾ mɛz tʃʰaɾitsʰ. vɔɾɔvhɛtɛv kʰɔnː ɛ tʰagavɔɾutʰjunə jɛv zɔɾutʰjunə jɛv pʰaɾkʰə havitjanəs. amɛn.

Standard Western Armenian

Ով հայր մեր որ երկինքն ես, քու անունդ սուրբ
ըլլա. քու թագաւորութիւնդ գա. քու կամքդ ըլլա
ինչպէս երկինքը՝ նոյնպէս երկրի վրայ. մեր
ամէն օրուան հացը այսօր ալ մեզի տուր, մեզի ներէ
մեր պարտքերը ինչպէս մենք ալ կը ներենք մեր
պարտականներուն. ու մեզ փորձութեան մի
տանիր, հապա չարէն մեզ ազատէ. քանզի քուկդ
է թագաւորութիւնը եւ զօրութիւնը ու փառքը
յաւիտեանս: Ամէն:

ɔv hajɾ mɛɾ vɔɾ jɛɾɡinkʰn ɛs, kʰu anunətʰ suɾpʰ əlːa. kʰu tʰakʰavɔɾutʰjunətʰ kʰa. kʰu ɡamkʰətʰ əlːa intʃʰbɛs jɛɾɡinkʰə, nujnbɛs jɛɾɡɾi vəɾa. mɛɾ amɛn ɔɾvan hatsʰə ajsɔɾ al mɛzi duɾ, mɛzi nɛɾɛ mɛɾ baɾdkʰɛɾə intʃʰbɛs mɛnkʰ al gə nɛɾɛnkʰ mɛɾ baɾdaɡanːɛɾun. u mɛz pʰɔɾtsʰutʰjan mi daniɾ, haba tʃʰaɾɛn mɛz azadɛ. kʰanzi kʰugətʰ ɛ tʰakʰavɔɾutʰjunə jɛv zɔɾutʰjunə u pʰaɾkʰə havidjanəs. amɛn.

Zeytun Dialect (Cilicia, South-Central Turkey)

ɔv mɛj bobə ɔj ijɡinkʰn-is, kʰu anunət sujp tʰɔʁna. kʰu tʰɛkʰɛvyytʰynət tʰuʁ kɔ. kʰu ɡɔmkʰət tʰuʁ la, intʃʰbɛs ijɡinkʰə, indɛn ɛl ijɡɛjin vijɔ. mij amɛn œjvɛn hɔtsʰə ɛsœj miz tuj. jɛv miz nɛjɛ mij bɔjdkʰə, tʃʰɔtsʰ vɔɾ minkʰ ɛl gə nɛjinkʰ mij bɔjdkʰi dɛjɛɾun. jɛv miz pʰɔjtsutʰan mi danəj, habɔ tʃʰɔjɛn miz azadɛ. tʃʰunkʰi kʰinː ɛ tʰɛkʰɛvyjytʰynə jɛv zɔjutʰynə u pʰɔɾkʰə. havidjanəs havidɛnitsʰ. amɛn.

Kesab

œv mieɾ bybə, suɾp ɛʁni kʰɛ ænun, kʰɛtʰɛkʰɛvyɾutʰynə tʰəʁ kɔ, kʰɛ iɾadɛtʰət ənːɔ, tʃʰytsʰəɾ kʰi iɾɡænkʰə tʰərzɛn ɛl ikɛdinə, mieɾ amɛn ɛvyɾ hoətsʰə duɾ miez ɛs ɛvyɾ ɛl, mieɾ bɔɾdkʰə miezi baʁətʃʰlamuʃ əɾɔ tʃʰytsʰəɾ kʰi mienkʰ ginonkʰ mieɾontsʰə, vɛ zəzmiez pʰɔɾtsytʰjan mi danə, habɔ χaləsɔ i tʃʰaɾien, tʃʰynkʰi kʰɛ ɛ tʰɛkʰɛvyɾutʰynə, tʃʰɛɾɛfə, kʰuvɛtʰə, havidieinəs havidɔnitsʰ amɔn.

See also: Armenia: Language Situation; Indo–European Languages; Turkey: Language Situation.

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Armstrong, Lilias Eveline (1882–1937)

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Lilias Eveline Armstrong was born in Salford, England, in 1882, the daughter of a minister of religion. After taking her B.A. at Leeds in French and Latin, she went on to a highly successful career as a teacher of French. She abandoned school teaching in 1918 to join Daniel Jones's department of phonetics at University College London, initially as a temporary lecturer, but rapidly rising to become Senior Lecturer, and eventually Reader in Phonetics, before early death cut short her career. In 1926, Armstrong married the Russian linguist Simeon K. Boyanus (1871–1952), but continued to use her maiden name for her professional work.

Armstrong was a devoted follower of Jones, and his influence is apparent in all her writings, beginning with her *English phonetic reader* (1923). Together with her UCL colleague Ida Ward (1880–1949), Armstrong wrote a popular and influential student textbook, *Handbook of English intonation* (1926), drawing considerably on Jones's earlier theories and tone marking systems. Armstrong's interest in French bore fruit in her widely used *Phonetics of French* (1932), actually based in part on Jones's lecture notes (Collins and Mees, 1999: 278–281). Shortly afterward she co-operated with her colleague Hélène Coustenoble (1894–1962) on a more advanced work, *Studies in French intonation* (1934).

Early on, Armstrong began to show interest in non-European languages, particularly tone languages—an area of linguistics then still in its infancy. This was first evidenced by her co-authorship of *A Burmese reader* (Armstrong and Pe Maung Tin, 1925). Later she concerned herself mainly with African languages, publishing a significant description of Somali (1934) and producing the manuscript of a major work on Kikuyu (Gikuyu) (using as her informant a young student, Jomo Kenyatta, the future first prime minister of Kenya). This project was at an advanced stage, but still incomplete, when Armstrong was suddenly struck down by the illness that caused her death in 1937. The book, *Phonetic and tonal structure of Kikuyu* (1940), regarded as one of the best pioneering studies on African tone languages, was eventually completed by her London colleague Beatrice Honikman (1905–1997) and published posthumously.

Armstrong's importance in the history of British phonetics is clear from her many publications—in particular, her groundbreaking research on intonation and tone. Less obvious, but of at least equal significance, is her influence as Jones's second-in-command in the interwar years, during which she helped him build up the University College London department into what was, for a time, the most influential center of excellence worldwide for the study of phonetics.

See also: Coustenoble, Hélène Nathalie (1894–1962); French; Intonation; Jones, Daniel (1881–1967); Phonetic Pedagogy; Phonemics, Taxonomic; Somali; Ward, Ida Caroline (1880–1950).

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Lilias Eveline Armstrong was born in Salford, England, in 1882, the daughter of a minister of religion. After taking her B.A. at Leeds in French and Latin, she went on to a highly successful career as a teacher of French. She abandoned school teaching in 1918 to join Daniel Jones's department of phonetics at University College London, initially as a temporary lecturer, but rapidly rising to become Senior Lecturer, and eventually Reader in Phonetics, before early death cut short her career. In 1926, Armstrong married the Russian linguist Simeon K. Boyanus (1871–1952), but continued to use her maiden name for her professional work.

Armstrong was a devoted follower of Jones, and his influence is apparent in all her writings, beginning with her *English phonetic reader* (1923). Together with her UCL colleague Ida Ward (1880–1949), Armstrong wrote a popular and influential student textbook, *Handbook of English intonation* (1926), drawing considerably on Jones's earlier theories and tone marking systems. Armstrong's interest in French bore fruit in her widely used *Phonetics of French* (1932), actually based in part on Jones's lecture notes (Collins and Mees, 1999: 278–281). Shortly afterward she co-operated with her colleague Hélène Coustenoble (1894–1962) on a more advanced work, *Studies in French intonation* (1934).

Early on, Armstrong began to show interest in non-European languages, particularly tone languages—an area of linguistics then still in its infancy. This was first evidenced by her co-authorship of *A Burmese reader* (Armstrong and Pe Maung Tin, 1925). Later she concerned herself mainly with African languages, publishing a significant description of Somali (1934) and producing the manuscript of a major work on Kikuyu (Gikuyu) (using as her informant a young student, Jomo Kenyatta, the future first prime minister of Kenya). This project was at an advanced stage, but still incomplete, when Armstrong was suddenly struck down by the illness that caused her death in 1937. The book, *Phonetic and tonal structure of Kikuyu* (1940), regarded as one of the best pioneering studies on African tone languages, was eventually completed by her London colleague Beatrice Honikman (1905–1997) and published posthumously.

Armstrong's importance in the history of British phonetics is clear from her many publications—in particular, her groundbreaking research on intonation and tone. Less obvious, but of at least equal significance, is her influence as Jones's second-in-command in the interwar years, during which she helped him build up the University College London department into what was, for a time, the most influential center of excellence worldwide for the study of phonetics.

See also: Coustenoble, Hélène Nathalie (1894–1962); French; Intonation; Jones, Daniel (1881–1967); Phonetic Pedagogy; Phonemics, Taxonomic; Somali; Ward, Ida Caroline (1880–1950).

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Armstrong, Robert Gelston (1917–1987)

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Although Robert G. Armstrong began his research career as an anthropologist with a strong Marxist bent, he attenuated his theoretical concerns over time to become a fairly locally oriented researcher, restricting his scholarship after his thesis and subsequent events to Nigeria, where his contributions were considerable and probably underappreciated. The major focus of his work was on the Idoma people and their language, and he published significant works on Yoruba, Idoma, and related languages and cultures.

Born in Danville, Indiana, in 1917, Armstrong grew up in Cincinnati and graduated from Miami University in 1937. He began his graduate studies at the University of Oklahoma but transferred to the University of Chicago in 1939. His studies were interrupted by being drafted into the U.S. Army, where he served as a code clerk in Panama and in the United States for 3 years (1942–1945). He finished his dissertation in 1950, and in 1952 it was accepted. Basing himself on work by British social anthropologists (it was written during 1950 while he was at Oxford), he traced 'exploitation' in six African cultures, ranking them in an evolutionary order.

In 1953, Armstrong was set to assume a replacement position at Chicago, but his membership in the Communist Party (1939–1948) cost him the job. At the height of the McCarthy era, he lost the Chicago position at the last minute due to the direct intervention of the FBI (Stocking, 2002a, p. 9). After being denied the temporary appointment, he lived with his family and worked in his father's business for several years, during which period he was rejected for a half dozen jobs before he was finally hired in the fall of 1956 in Atlanta (where he had taught for a year in 1947–1948).

Armstrong returned to Nigeria in 1959, where he flourished, becoming closely involved with the Idoma people, with whom he had worked as part of his 1950–1952 thesis fieldwork. He came originally to study Yoruba language and law but soon expanded his study to law and performance among the Idoma, including traditional forms of verbal performance. Some of the Yoruba work resulted in publications of transcriptions of traditional oral performances, and he published widely in the area of Idoma descriptive and comparative linguistics.

From 1960 to 1962, Armstrong was field director of the West African Languages Survey and was heavily involved in its successor, the West African Linguistics Society. He served as research professor of linguistics at the University of Ibadan from 1962 to 1983, after which he went to the University of Nigeria, Nsukka, for 2 years. After his retirement, he continued his work on Idoma up until his death.

An anecdote reveals the nature of his work in Nigeria. Dancing with the young boys and girls in a rather erotic exchange, Armstrong was reproved by the more Westernized (and scandalized) members of the audience, saying that he was encouraging the old ways. Armstrong wrote in a private letter, "[T]his was my precise intention" (Stocking, 2002b: 5).

Encouraging the preservation of culture was perhaps Armstrong's greatest contribution, be it language or performance in the form of legal argumentation, song, drama, or dance. The Idoma honored him with full chiefly honors at his death with a 2-day celebration.

See also: African Linguistics: History; Yoruba.

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See also: African Linguistics: History; Yoruba.

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Arnauld, Antoine (1612–1694)

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Born in Paris on February 6, 1612, Antoine Arnauld was the son of a court lawyer. He studied philosophy, law, and theology in Paris; in 1635, he received a Bachelor's degree at the Sorbonne, and in 1641 received his degree of Doctor of Theology. He was ordained a priest in 1641. An adherent of Jansenism, Arnauld published a treatise in 1643, *De la fréquente communion*, in which he attacked Jesuit views on religion and religious practice; by that time Arnauld was commonly recognized as a leading Catholic theologian and philosopher. Arnauld went to live as a 'solitaire' in Port-Royal, where he organized teaching and where he himself taught philosophy. In 1653, Jansenism was condemned by Pope Innocent X. Arnauld replied with two pamphlets in defence of Jansenism. He lost his degree of Doctor of Theology, and left Port-Royal. In 1656, Jansenism was again condemned by Pope Alexander VII, and the French clergy drew up a formulary to be signed by all ecclesiastics. Arnauld refused and replied with three memoirs; in addition, he helped with the publication of Pascal's *Lettres provinciales*, directed against the Jesuits. In 1660, the anonymous general and rational grammar of Port-Royal (authored by Arnauld and Cl. Lancelot) appeared, testifying to Arnauld's continuing influence at Port-Royal. In 1661, Arnauld finally signed the formulary.

Under Pope Clement IX, tensions between Jansenists and Jesuits diminished, and Arnauld regained his influence in royal circles. In 1662, Arnauld published, with Pierre Nicole, the Port-Royal logic (*La Logique ou l'Art de penser*), and in 1664 he published a refutation of Calvinism (*La Perpetuité de la foy de l'Eglise catholique touchant l'Eucharistie*). Protestantism was also the target of Arnauld's 1672 book *Le Renversement de la morale de Jésus-Christ par les erreurs des calvinistes touchant la justification*. When Louis XIV started to persecute the Jansenists, Arnauld went to the Low Countries. He established himself in Brussels, where he published pamphlets against the Calvinists and the Jesuits, and where he stayed until his death on August 8, 1694. During this period of exile, Arnauld was philosophically very active; he polemicized with N. Malebranche and B. Lamy, corresponded with G. W. Leibniz, and wrote *Des Vraies et des fausses idées* (1683) and *Règles du bon sens pour bien juger des écrits polémiques dans les matières de science*. (For an overview of Arnauld's vast output, see Baudrillart, 1930: cols. 447–484.)

See also: Lancelot, Claude (1615–1695); Leibniz, Gottfried Wilhelm (1646–1716); Port-Royal Tradition of Grammar.

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Arrernte

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Arrernte, using the most common current spelling, is the name of what was for many years, if it is not still, the most well-known Aboriginal language name in Australia. The first widely used spelling was 'Arunta,' and this is the spelling that leads to the best approximation to the pronunciation of the name ([ɒˈrəɳɖə], often [ˈarəɳɖə]) by the general English-speaking reader. The early German Lutheran missionaries introduced the spelling 'Aranda.' The spelling 'Arrernte' is that of the practical orthography most used now by writers in the language, and has acquired wide currency, for example, in the print media. The (Lutheran) Finke River Mission now uses the spelling 'Arrarnta.'

At the time of European settlement, which reached the central part of Australia in the 1870s, the Arrernte speakers occupied a large area in the southeastern part of the present Northern Territory, spilling over into Queensland and South Australia (see Figure 1). The name Arrernte (with various qualifiers) is used for several dialects of what is generally regarded as a single language, called Upper Aranda by Hale (1962), and also for another closely related language that Hale called Lower Aranda. The Upper Aranda language group includes three main subgroupings: Western, Central, and Eastern Arrernte and Anmatyerr and Alyawarr as dialects, which have of the order of a 1000 speakers each and are still being learned by children; Southern Arrernte (or Pertame), many of whose speakers now use Western Arrernte; and extinct or nearly extinct varieties, Antekerrepenh and Ayerrereng. The relationship of modern Western Arrernte to an almost extinct dialect that has been called Tyurretye Arrernte (Breen, 2001) is not clear; it could be that the latter is the original western dialect and the former is essentially Southern Arrernte. Anmatyerr and Alyawarr do not identify as Arrernte. The other language, Lower Arrernte (Hale's Lower Aranda, called Lower Southern Arrernte/Aranda by some, but Arrernt Imarnt in the dictionary that is being compiled by the author at the time of writing), had in 2004 only a couple of moderately competent, elderly speakers. The two languages, Upper and Lower Arrernte, are grouped (but not uncontroversially) with the more distantly related Kaytetye under the name Arandic (see Koch, 2004), and this is classed as a subgroup of the Pama–Nyungan family (which, again, is not universally accepted).

Study of the Arrernte language was begun after 1877, by German missionaries, notably Carl Strehlow. Strehlow's son, T. G. H. Strehlow, continued his father's study of the language and amassed a vast quantity of data, the culmination of his work being the wonderful *Songs of Central Australia* (1971). Somewhat earlier, around 1960, the linguist Ken Hale (1934–2001) had collected excellent material in most dialects. The Summer Institute of Linguistics (SIL) and other mission linguists have also worked on the languages for many years; the first substantial Western Arrernte Bible portion appeared in 1925 and there have been many other, mostly smaller, works. Substantial theses on Arrernte phonetics and grammar have been written by David Wilkins (1989), John Henderson (1998), and Victoria Anderson (2000). One of the most extensive dictionaries of any Australian language to appear to date is that of Eastern and Central Arrernte by Henderson and Dobson (1994). Smaller dictionaries are those of Alyawarr (Green, 1992) and Western Arrernte (Breen, 2000); dictionaries of Anmatyerr (a work in progress, by Jenny Green) and Lower Arrernte (Breen) are to appear in the near future. No detailed grammar has been published. Indigenous writing is in its infancy.

Table 1 gives the consonant inventory of Central Arrernte, using orthographic symbols, as typical of these languages. The basic vowel system comprises a featureless vowel, written *e*, dependent for its quality on the surrounding consonants, and a low vowel, *a*. In most dialects there is also a high front vowel, with a comparatively small functional load, and in some there may also be a high back vowel, with a small functional load, which, however, may be better analyzed as due to the effect on *e* of roundness on a following consonant. Roundness, derived from an ancestral rounded vowel, may be associated with consonant positions. A seventh consonant position, prepalatalized apical (*yt*, *yn*, *ytn*, *yl*), postulated for some dialects, may be more correctly analyzed as a palatalization feature associated with the consonant position. In other dialects, prepalatalized apicals are an allophone of phonemes in the series called apical postalveolar.

Arrernte (and also Kaytetye) are a focus of attention for linguists because of the substantial sound changes that the languages have undergone in the not too distant past. These include loss of initial syllables or their replacement by a vowel; transfer of the feature 'roundness' from the vowel to an adjacent consonant (from which it might spread or migrate) – this resulted in the earlier three-vowel inventory being reduced to two, with later expansion, as noted previously; prestopping of certain nasals; and loss (or, as

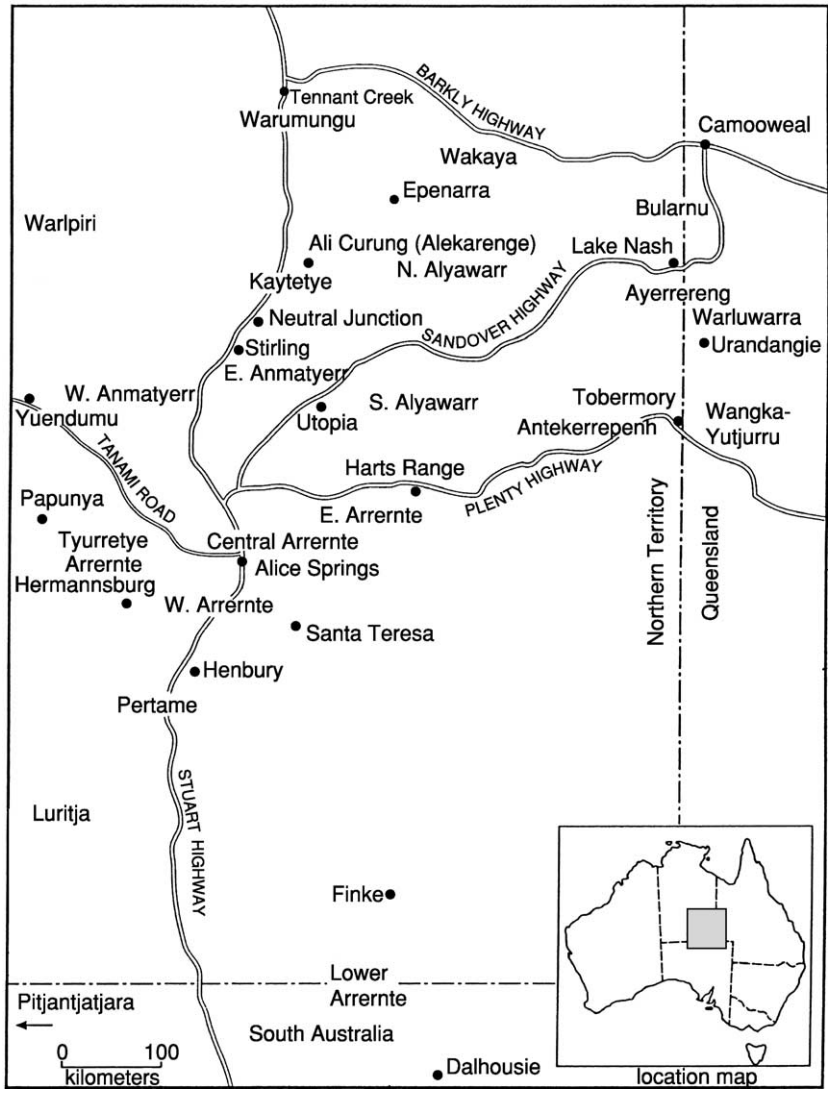

Figure 1 Locations in Australia where Arrernte and some neighboring languages are spoken. Reprinted from Green (1998), with permission.

Table 1 Central Arrernte consonants

Type	*Peripheral*		*Laminal*		*Apical*	
	Bilabial	*Velar*	*Dental*	*Alveolar*	*Alveolar*	*Postalveolar*
Stop	p	k	th	ty	t	rt
Nasal	m	ng	nh	ny	n	rn
Prestopped nasal	pm	kng	thn	tny	tn	rtn
Lateral			lh	ly	l	rl
Tap					rr	
Glide	w	h		y		r

Koch (1997) has it, neutralization) of final vowels. Orthographically, in some dialects, all words are written with final *e*, representing schwa, whereas in others, final (predictable, often optional) vowels are not written, except, as *a*, in short words, in which they may be the stressed or even the only vowel. Thus, for example, earlier **nyina-* 'sit' has become *n-* or *an-*; **ngali* 'we (dual, inclusive)' has become *il-*, *ayl-*, or

aly-; **wama* 'snake' has become *apme* or *apmwe*; and **munga* 'night' has become *ingwe*. Breen and Pensalfini (1999) have argued that, contrary to the supposed universal situation that all languages have consonant–vowel (CV) syllables and that VC syllables can occur only in a language that also has CV, CVC, and V syllables, the sole underlying syllable shape in Arrernte is VC(C). Words that are consonant-initial on the surface have an underlying initial schwa. (See Breen (2001) for a brief overview of the phonologies of the different dialects, and Koch (1997) for his view of the sound changes that have occurred.)

In phonotactics, Arrernte is atypical in Australia in that it allows monosyllabic words and (surface) word-initial consonant clusters (homorganic or heterorganic). In most dialects, the vast majority of words are vowel–initial, mostly *a*-initial (the remainder having the underlying initial schwa, which never appears utterance-initially). The definition of the concept 'word' in Arrernte is problematic; units that are clearly words, or even phrases, can be incorporated into words, dividing them into parts that are clearly less than words (see Henderson, 2003).

Grammatically, Arrernte is typical of languages of most of Australia in the following ways:

- Nouns operate in an absolutive/ergative paradigm but pronouns are nominative/accusative, except that first- and second-person singular in eastern and northern dialects distinguish intransitive subject, transitive subject, and object.
- Pronouns have three numbers – singular, dual, and plural – and in some dialects distinguish exclusive from inclusive in first-person dual and plural (whereas others have lost this distinction but retain, with no function, the old exclusive marker).
- Cases are marked by suffixation.
- There is no grammatical gender.
- The rich verbal morphology includes a variety of compound types; verb suffixation marks tense, mood, aspect, associated motion, and, optionally, number of subject.
- Reduplication, of various types, is prominent in the grammar of the major lexical categories.
- Preferred constituent order is subject-object-verb (SOV), but this is frequently varied by pragmatic factors.

There is a complex interaction between kinship and grammar, although much of this is being lost. Society was, in the recent past, organized into four sections (called 'skins' in Aboriginal English) based on a division into two patrilineal moieties superimposed on a division of alternating generations. Not long before European settlement, a further division to form eight subsections diffused from groups in the northwest, but did not reach to the easternmost or southernmost parts of the Arrernte area. Nonsingular pronouns can be marked according to the relationship of the persons concerned; thus, in Alyawarr, we have *ayla* 'we (dual, inclusive, same section),' *aylern* 'we (dual, exclusive, same section),' *aylak* 'we (dual, inclusive, same moiety but differing by an odd number of generations, as father and child),' *aylernak* (as *aylak*, but exclusive), *aylanth* 'we (dual, inclusive, different moiety, as mother and child or husband and wife),' and *aylernanth* (as *aylanth*, but exclusive). Kinship terms can be suffixed with morphemes derived from dative pronouns to indicate possessor; so, from *arreng* 'father's father and reciprocal' we can have *arrengaty* 'my father's father,' 'my son's child (I being male),' 'my brother's son's child,' and so on; *arrengangkw* 'your father's father,' etc.; *arrengikw* 'his or her father's father,' etc.; *arrengalyew* 'our father's father, we being siblings,' etc.; and *arrengalyewak* 'father's father of one of us (we being in the same moiety but differing by an odd number of generations, as father and child),' etc. This last term, *arrengalyewak*, can be used by some speakers in the singular ('father's father of one or other of us'), but others could use it only if, say, there were two people who were 'your and my father's fathers.' Each of the 27 possible suffixes can be used in this way. The following sentence is a relatively simple example in Antekerrepenh, translated by the speaker (SS means 'same section'; VOC, vocalic; ERG, ergative; 1DU, first-person dual; DAT, dative):

(1) Angkwer-ey antyeny ayn-el-ayl-ek
elder.sister-VOC old.man father-ERG-1DU.SS-DAT
aherr atw-ern.
kangaroo kill-PAST
'Well sister, old dad's killed a kangaroo.'

Another example, in Alyawarr, is from a children's story (Summer Institute of Linguistics, 1996); the stories were the result of a linguist showing the (adult) language workers a series of drawings and asking them to make a story about the drawings. The first story in the book, about three boys who got lost, had the following sentence (DM means 'different moiety'; 3PL, third-person plural):

(2) Am-ayn-ew-anth-err-then
mother-3PL-DAT-DM-PL-also
ayn-ayn-ew-anth-err-then
father-3PL-DAT-DM-PL-also
nthw-ew-anem ampa ikwer-rnem
look.for-PAST-then child 3SG.DAT-PL

This is translated as 'Their mothers and fathers looked for the children'; the boys could have been two brothers and their cross-cousin. The same kinship

terms were used with ergative marking on the following page of the story. Note that, there is no number marking, but the use of the complex kinship terms seems perfectly natural and efficient (these and other complexities of kinship grammar are as yet unpublished, but see Breen (1998) and Green (1998)).

See also: Australian Languages; Australia: Language Situation; Australian Lexicography.

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Articles, Definite and Indefinite

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In a narrow sense, articles can be said to be grammatical elements that in many, but by no means even most, languages encode as their core meaning the identifiability of a referent in a noun phrase. Hence, by using the English definite article *the*, the speaker implies that the recipient should be able to identify the intended referent, and by using the indefinite article *a*/~/*an,* the speaker implies that this is not necessarily the case.

In English, a noun phrase cannot simultaneously take the INDEF *a* and the DEF *the*. In this respect, the English articles behave as members of one grammatical category. The use of one member excludes the other, i.e., the members of a category are each other's paradigmatic alternatives in the same syntactic slot. In many languages, however, the two articles do not occupy the same syntactic slot, even though they may still be each other's alternatives. In, for example, Danish, the indefinite article precedes the noun as a free morpheme, whereas the definite article is suffixed to it as a bound morpheme, as shown in examples (1a) and (1b):

(1a) et barn
INDEF.NEUT child
'child'

(1b) barn-et
child-DEF.NEUT
'the child'

As with most grammatical categories, not all languages have articles – in fact, probably the majority of all languages make do without them. In those languages, a simple noun phrase can be interpreted as

terms were used with ergative marking on the following page of the story. Note that, there is no number marking, but the use of the complex kinship terms seems perfectly natural and efficient (these and other complexities of kinship grammar are as yet unpublished, but see Breen (1998) and Green (1998)).

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'the child'

As with most grammatical categories, not all languages have articles – in fact, probably the majority of all languages make do without them. In those languages, a simple noun phrase can be interpreted as

either definite or indefinite depending on the context. So, e.g., in Finnish:

(2) Anna lukee kirja-a
Anna reads book-PART
'Anna is reading the/a book'

Languages without articles are, of course, able to express the identifiability of a referent as well as other related senses. To achieve this, a number of strategies, including word order, stress, indefinite and definite pronouns, and morphological case, can be used.

Even though both definite and indefinite articles may belong to a common category of articles in some languages, they are treated separately in the following discussions. The reasons for this have already been hinted at: a language having one type of article does not necessarily have the other. Also, the two articles in languages that have both do not always occupy the same syntactic slot.

Definite Articles

Diachronically, the most common source for definite articles in the languages of the world is a distal demonstrative (Heine *et al.*, 2002; Greenberg, 1978), with which a definite article shares a number of usage contexts. Less commonly, definite articles may develop from possessive suffixes (Schroeder, 2005) or third-person personal pronouns. Of course, these two, in turn, share a number of features with demonstratives.

Following Hawkins (1978), Himmelmann (1998: 323) illustrated the historical and pragmatic overlap between demonstratives and definite and specific articles by listing the major contexts of use for what he calls D-elements (Table 1). In a situational use, the referent of the noun phrase (NP) is present in the situation: *Give me the/~/that, book*. Demonstratives and definite articles can both be used in this kind of context, regardless of whether the referent has been mentioned earlier. In discourse deictic uses, the antecedent of the referring NP consists of a longer stretch of discourse, as when, as it were, summarizing a lengthy discussion about the reasons for global warming by *the main problem*. . . . Both definite articles and demonstrative determiners also appear in anaphoric mentions of a referent already mentioned within the current discourse, i.e., they are used in a tracking function: *I met a man yesterday [. . .] and then two hours later I came across the/~/that, guy again*. The development of a deictic demonstrative toward more article-like uses is often thought to begin as an increase in frequency in anaphoric contexts. The use of the demonstrative may further spread into contexts in which the identification of the intended referent requires utilization of knowledge of the situation and/or of the world. In recognitional uses, the referent is supposed to be known to the interlocutor by way of specific knowledge. For example, if you gave your mother a new television set for Christmas, you can bring it into a conversation by *Is the TV working as it should?* Himmelmann proposes that demonstratives in general cannot be used in the remaining two functions, the larger situation use and the associative-anaphoric use. Hence, these functions could be used as a test case for articlehood. Larger situation use refers to uses in which an entity considered to be uniquely identifiable in a given speech community is referred to for the first time within the current verbal exchange, as when talking about *the sun*, or *the King*. Uttered in Sweden, in a nonscientific context, the former will uniquely identify the star closest to Earth and the latter will uniquely identify King Carl XVI Gustaf. The associative-anaphoric use refers to first mentions of new referents within a discourse such that the referent can be identified via another, already present referent, as in *I have a bicycle, but* ***the gears*** *are out of order.*

As a demonstrative grammaticalizes toward an expected and automatized part of a nominal construction, it usually gets phonetically reduced (the English *the* < *þat*), but also, void of its original deictic meaning, it begins to mean 'identifiable' in general. By now, the erstwhile demonstrative is often recognized as a full-blown definite article that can in turn develop to a marker of specificity, and further to a mere gender marker or general marker for 'nouniness' (Greenberg, 1978).

Languages with definite articles vary as to the functions in which these can be used. Most definite articles can be used in referring expressions, especially with singular count nouns, whereas they are less common in nonreferring, e.g., predicative, constructions. In some languages, they have just reached the stage of anaphoric use, for which uses the term

Table 1 Major contexts of use for D-elements. From Himmelmann (1998: 323)

	Demonstrative pronouns	*Definite articles*	*Specific articles*
Situational	+	+	+
Discourse-deictic	+	+	+
Tracking	+	+	+
Recognitional	+	+	+
Larger situation	−	+	+
Associative-anaphoric	−	+	+
Specific-indefinite	−	−	+

'anaphoric article' is occasionally used. In yet others, they are not only used in associative-anaphoric and larger situation uses, as in English, but also in generic expressions (French, Swedish) and/or with proper names (Portuguese ***o*** *João*, ***a*** *Céu*).

As already mentioned, definite articles also vary cross-linguistically both in form (free or bound morphemes) and in placement (pre- or postposed). In some languages, the definite article cannot co-occur with demonstratives; in yet others, as illustrated by Swedish in example (3), it can:

(3)	Den här	gaml-a	tidning-en	kan	du	slänga
	DEM.NON-NEUT here	old-DEF	newspaper-DEF.NON-NEUT	can	you	throw. away

'You can throw away this old newspaper'

Cross-linguistic variation is also found as to the number of articles and their morphological properties. So, for example, in several varieties of Danish, Frisian, and German, there are two definite articles, one of which is primarily anaphoric (Schroeder, 2005, and references therein).

As previously stated, definite articles may become void of their original deictic meaning in the course of time, but may also be able to mark other grammatical features such as gender and number. In spoken French, such development has led to a situation whereby articles often are the sole carriers of the number distinction, as exemplified in example (4):

(4)	written French	pierre	la pierre	les pierres
	spoken French	[pjɛʁ]	[la pjɛʁ]	[le pjɛʁ]
		'stone'	'the stone'	'the stones'

Indefinite Articles

In the preceding section, indefinite articles were characterized as being the grammatical elements that encode the identifiability of a referent in a noun phrase as not necessarily identifiable for the interlocutor. In the same way that definite articles can develop into specific markers, indefinite noun phrases are commonly analyzed in terms of their specificity. In this context, specificity concerns whether a specific individual or a specific group of individuals can be pointed out as the referent of a noun phrase by any participant within the current verbal exchange.

In languages worldwide, the numeral 'one' is the most common source of indefinite articles (Heine *et al.*, 2002), but indefinite pronouns may also develop into articles. According to Heine (1997: 72–76; see also Givón, 1981), the grammaticalization cline from the numeral 'one' to an indefinite article generally goes through the following stages, briefly characterized within parentheses:

Stage I: The numeral
Stage II: The presentative marker (Introduction of main participants)
Stage III: The specific marker (Singular nouns, specific to speaker)
Stage IV: The nonspecific marker (Singular nouns, nonspecific to speaker)
Stage V: The generalized article (Basically all nouns, including mass and plural nouns)

Most languages do not have an indefinite article (Dryer, 2005a), but almost all languages have numerals. Hence, many languages position themselves at the first stage in the cline. Once again, the decisive increase in frequencies of occurrence between the different stages may lead to the grammaticalization of an article, with the accompanying reduction in form (English *a*/∼/*an* < *one*) and the weakening of the original numeral meaning of the element. The cross-linguistic variation found in the use of the indefinite articles goes along the same lines as that for definite articles, i.e., there are examples of articles at different stages of development.

Whereas the English indefinite *a*/*an* is at stage IV, some languages have minified the numeral meaning of the article and it can be used with plural referents. This is the case, for example, in the Ibero-Romance languages, as seen in the following Spanish example:

(5a)	un-a	mujer
	INDEF-FEM	woman
	'a woman'	
(5b)	un-a-s	mujer-es
	INDEF-FEM-PL	woman-PL
	'some women'	

As is obvious from example (5), English must use *some* in this context. Hawkins (1991) has proposed that a phonetically reduced form *sm* indeed is an indefinite article in English, used with plural and mass nouns (much in the same way, thus, as the French partitive article).

Geographic Distribution

With regard to the absence or presence of grammaticalized articles, languages worldwide can be classified into four major types:

1. Languages without articles.
2. Languages with both DEF and INDEF articles.
3. Languages with only DEF articles.
4. Languages with only INDEF articles.

Languages without articles are found everywhere, but articles occur least frequently in the languages of Asia, South America, and the northern and eastern parts of North America. If a language has articles, it is

cross-linguistically more common to only a definite article, rather than both definite and indefinite articles; it is least common to have only an indefinite article (see Dryer, 2006). Languages with both DEF and INDEF articles are particularly common in Western Europe, in Meso-America, in the Pacific, and in a wide coast-to-coast belt across central parts of Africa. No particular tendencies as to geographical distribution can be found for languages of types 3 and 4 (having only one type of article, see Dryer (in press a,b)).

Concluding Remarks

As an effect of the gradual process of grammaticalization, the synchronic study of languages reveals great variation in the use of articles both between languages and within a language. An important parameter of this variation is degree of obligatoriness. Articles develop out of optional elements that undergo a dramatic increase in frequency as they gradually become obligatory, and are eventually totally predictable in certain contexts of use. For reasons of comparability, it is important to acknowledge the difference between optional and obligatory elements, or, grammaticalizing and grammaticalized constructions.

See also: Definite and Indefinite; Deixis and Anaphora: Pragmatic Approaches; Demonstratives; Descriptions, Definite and Indefinite: Philosophical Aspects; Grammaticalization; Indefinite Pronouns; Numerals.

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Artificial Languages

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An artificial language is a language that has been deliberately designed for a purpose by one person or a small group of people over a relatively short period of time. (Adapted with permission from a definition by Richard K. Harrison, personal communication, 2004.) This definition, while serviceable, does lead to uncertain cases, such as whether pidgins should be considered artificial, being developed by small groups for a purpose, but usually pidgins are not considered to be artificial languages and will not be treated as such within the scope of this article. There is additionally the question of whether reduced languages such as Basic English (1930) are artificial. Also, this article pertains only to languages for interhuman communication and therefore does not address such constructs as computer programming languages.

Constructors can operate from any of several motives for designing a language. Some language designers intend that eventually their languages will replace an entire family of languages, such as Tutonish (1902) for the Germanic languages, or Ro (1906) for the entire world, considering that their languages would confer some overwhelming advantage to warrant replacing other existing languages.

Perhaps the most common design goal of artificial languages is international auxiliary languages, languages intended for use among people who do not have (or do not choose to use) any other language in common. Auxiliary languages, of which the best known but by no means the only is Esperanto (1887), may be intended to serve among localized areas (e.g., Guosa in Nigeria, 1965) or for the whole world. (Some have questioned whether replacement and auxiliary languages should be considered real languages. The experience of Esperanto, among others, tends to show that at least some such languages are adequate for any level of discourse for which their users want to employ them. Also, there are individuals who have learned Esperanto from infancy in Esperanto-speaking homes. Therefore at least some auxiliary languages are real languages.)

There are authors who have designed languages, at highly varying levels of specification and completeness, for artistic use or to be part of a fictional or mythic world. Examples are the Elvish languages of J. R. R. Tolkien's Middle Earth and Klingon on the *Star Trek* series.

A few languages have been designed to test some or other linguistic hypothesis. The original motivation of James Cooke Brown's Loglan (1960) seems to have been to test the Sapir-Whorf Hypothesis.

From time to time, smaller or larger groups have constructed languages in order to communicate among themselves without their communications being readily intelligible to outsiders. Often such concealment languages, such as the Pig Latin of childhood, are modifications of existing languages.

Special communication needs are a sixth motivation for constructing languages. Some, such as a later adaptation of Blissymbolics (originally Semantography, 1949), are designed for communication needs of persons with physical and/or mental disabilities. Languages allegedly usable in psychoanalysis and psychotherapy, such as aUI (1962), are another venue. Additionally, intended communication, at least on a rudimentary level, with hypothesized extraterrestrial beings can give rise to a language.

Some individuals (and occasionally small groups) construct languages merely for enjoyment, as hobbies, just as some people construct model ships.

Finally, there may be miscellaneous occasions, such as altered religious and/or mental states, although one might question whether some such languages are constructed for a conscious purpose.

Artificial languages, and auxiliary languages especially, have various provenances. The Indo-European (IE) matrix of language designers seems to be the most common provenance of languages readily documented, that is, the designers themselves tend to be speakers of IE languages, and the products are heavily influenced by an IE substrate. In many instances, the languages have an intended primary audience of speakers of European languages, including speakers of non-IE European languages. However, some languages such as Afrihili (1970) have target audiences other than Indo-European speakers (although the languages themselves are often presented and described using an IE language). On the other hand, some auxiliary languages may have an IE base but have an intended audience worldwide.

The history of artificial languages, even in the West, is extensive, and only the briefest outline is possible, inasmuch as the number of auxiliary languages alone is in the hundreds spanning several centuries.

One of the earliest constructed languages in the West of which there is a record is the Lingua Ignota of St. Hildegard of Bingen (12th century). It comprised a 23-letter alphabet and about 1000 words. It is not entirely clear whether she intended it as an amusement, as an auxiliary language, or

to express certain religious assertions, such as mystical states.

In the 13th–14th centuries, Ramón Llull wrote his *Ars Magna*, which he conceived as a perfect and universal language, especially for the religious conversion of non-Christians.

It was during the 17th century (and later) that the so-called *a priori* philosophical languages came to the fore, especially with the Real Character (1668) of Bishop John Wilkins in Great Britain. Perhaps the most notable characteristic of the philosophical languages is their basis in a classificatory scheme of (supposedly) all knowledge. Knowledge is broken into categories, and the vocabulary follows in almost mathematically combinatorial form from the classification.

During the 18th and 19th centuries, a number of artificial language proposals surfaced, such as the rather eccentric Solresol (1827) by (Jean) François Sudre, based on a seven-note musical scale, which did, nonetheless, gather some interest.

Volapük, invented in 1879 by the Catholic priest Johann Martin Schleyer, was the first artificial language designed as an auxiliary language to gain any substantial following. It was an *a posteriori* language, i.e., one in which the grammar and (especially) vocabulary derive from one or more existing languages, although word forms of Volapük were greatly modified from readily recognizable forms. The language enjoyed considerable initial enthusiasm throughout Europe and North America, although that enthusiasm quickly waned due to what some considered to be shortcomings in the language itself, factional infighting within the movement, and the rise of Esperanto. (There were, however, some derivatives of Volapük itself, and the language, in a revised form, did have some slight revival in the 20th century.)

Esperanto (1887), the brainchild of Ludwig Lazarus Zamenhof (spellings vary), has become the most successful, in relative terms, of all the artificial auxiliary languages to date. It has a largely Indo-European grammar with a rather agglutinative word-formation system. Estimates of the number of Esperanto speakers differ widely and are controversial, ranging from a few tens of thousands to several million. Over the decades, people have raised various objections to Esperanto's structure, vocabulary, or orthography (which includes some accented letters unique to itself). Consequently, Esperanto has given rise to numerous derivatives, of which the only one to have any significant number of users at all has been Ido (1907).

Several artificial languages have the design goal of being naturalistic in terms of recognizability to speakers of west European languages. Notable among them have been Latino sine Flexione (1903) by Giuseppe Peano, a kind of Latin with most of the inflections stripped out, Occidental (1922) of Edgar de Wahl, and Interlingua (1951) of the International Auxiliary Language Association, Inc.

A few artificial languages have been known as logical languages, being based on predicate logic rather than on more common grammatical principles. Among these are Loglan (1960) and Lojban (1988) by the Logical Language Group, Inc.

Finally, there have been numerous artificial languages, too many and too varied to try to describe here even cursorily, that might be subsumed under the catch-all heading of just about anything under the sun. They have characteristics similar to those of languages all over the world.

Artificial languages have various features in both grammar and vocabulary, although the grammars of auxiliary languages (at least those developed by Westerners) often (although not always) tend to follow an Indo-European model.

A priori languages, first mentioned above, have two overlapping types. There are those, such as Wilkins's Real Character, Foster's Ro, or Elam's Oz (1932), which follow a classificatory system for vocabulary, as noted above. Such schemata are open to several criticisms:

- The totality of knowledge does not always fit neatly into a simple and single taxonomic schema.
- The taxonomic schema is dependent on the state of knowledge at the time of the creation of the schema.
- It can be difficult to fit new discoveries, taxa, and techniques into the schema, as the schema tends to be relatively closed.
- In practice there is a prodigious demand on the memory (and on the oral-aural channel) to retain the schema and to make fine distinctions (both semantic and oral).

Another use, however, of the term '*a priori*' is simply a reference to artificial languages whose vocabularies are made up *ad hoc* and not derived from the vocabularies of existing languages. Some languages of this type (many examples could be cited) may have some internal structure to the vocabulary, primarily for mnemonic value, but do not follow a classificatory scheme as such.

A posteriori languages have their grammar and vocabulary bases in existing languages. The degree to which the vocabulary items are deformed varies widely.

There are also logical languages, as mentioned above. Their vocabulary may be *a priori* or at least partially *a posteriori*.

Auxiliary languages in particular can have different intended audiences and purposes. Some designers target their products largely for informal, personal use, such as among travelers and correspondents. On a wider scale, commercial and professional applications may come into purview. IALA Interlingua has seen some professional use in the past, but few languages seem to have yet found much widespread use in the commercial realm. Intergovernmental use, such as diplomacy and treaties, may be encompassed within the design of a language, although none have yet made significant inroads into this area. Different members of target audiences may have different assessments of the ease with which adult learners can acquire and use an artificial language.

Artificial languages in general (and not just auxiliary languages) differ markedly in their division of semantic space. Some have a rich vocabulary, making fine semantic distinctions, and others have a much more restricted vocabulary, depending on periphrasis to convey distinctions. Languages differ widely in how they handle (or even allow) unassimilated or partly assimilated foreign terms.

The issue of idiom often tends not to be treated extensively in the construction of auxiliary (and other artificial) languages. As a result, many users often import native idioms, impeding ready communication, or make conscious efforts to avoid idiom entirely. Of course, there is nothing to prevent a body of users from developing over time idioms unique to the user base itself.

Just why an auxiliary language does or does not have much use (in terms of speaker base) may depend on several factors. Not all of these factors are linguistic characteristics in and of themselves. Among them are:

- Propitiousness of circumstances, or 'right place at the right time.' In some language milieux, there is simply little felt need for an auxiliary language.
- Perception by prospective learners and users that the language itself is adequate for the task and sufficiently easily acquired by adult learners. This factor, although highly subjective, is operative. This factor can be called 'good enough.'
- A proposed international auxiliary language must have a stable enough base so that it is not always moving under the feet, so to speak, of would-be users. (Some language designers continue indefinitely to make changes.)
- A language proposal must be sufficiently dispersed to the attention of prospective users, with didactic material available.
- Proponents must have sufficient enthusiasm to work against social inertia.
- Proponents must have at least a minimally sufficient organization at some time to assist propagation.
- External events, such as wars or government favorable (or disfavorable) attention, may work for or against the spread of an auxiliary language.

Although much material exists for individual artificial languages, there are few comprehensive studies of artificial languages in general. Most available material relates to international auxiliary languages, and some of that is on a popular level. Some of the works cited in the Bibliography contain further references for the interested reader.

See also: Dalgarno, George (ca. 1619–1687); Eco, Umberto (b. 1932); Esperanto; Languages for Specific Purposes; Sapir, Edward (1884–1939); Whorf, Benjamin Lee (1897–1941); Wilkins, John (1614–1672).

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Aruba: Language Situation

Editorial Team

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Aruba has been autonomous from the Netherlands Antilles since 1986 but remains part of the Kingdom of the Netherlands. Dutch is the official language, with 94 000, mostly second-language, speakers. The language situation in Aruba falls together with those in Bonaire, Curaçao, and the Netherlands Antilles. In Aruba, by far the most common language spoken in the home is Papiamentu (77%), followed by English (9%), Spanish (7%), and Dutch (5%). Papiamentu is an Iberian-based creole with 70 000 speakers in Aruba. It is also known as Papiam, Papiamento(e), Papiamen, Curaçoleño, and Curassese.

Papiamentu developed as a contact language used in the Dutch slave trade. Since the Dutch developed their trading routes and colonies in competition with, and frequently at the expense of, the Portuguese and Spanish, an Iberian-based contact language was used. A minority which played a significant role in the development of Papiamentu were Portuguese-speaking Sephardic Jews, who were persecuted by the Portuguese and consequently tended to settle in Dutch colonies. In Curaçao, about half the European population were Sephardic Jews. The oldest extant Papiamentu document is a letter written by a Curaçao Jew in 1776. Papiamentu reached Aruba by the end of the 18th century.

Nowadays, Papiamentu has considerable prestige in Aruba and seems to be approximating gradually to Spanish, which is a prestige language. This is apparently more pronounced in Aruba than in Curaçao. Papiamentu is taught during the first two years of primary school and has a published grammar, dictionary, and, since 1997, a translation of the Bible. The first newspaper texts printed in Papiamentu date from 1871, indicating that the language was widely accepted from an early stage. It is also the primary language in the informal sector, social life, and some political debate. The current debate around the status of Papiamentu reflects its increasing role as a language of national identity, although some separatist suggestions of a partitioning of the country could result in the formation of two different standardized varieties. Probable factors that have influenced the acceptance and standardization of Papiamentu include multilingualism, high literacy rates, and a high standard of living combined with ethnic leveling through intermarriage.

Despite, or perhaps because of, the widespread use of Papiamentu, there exist sociolects which are associated with prestige. In addition, the inability to use Dutch still hinders social and political mobility. Dutch is the language of jurisdiction and is dominant in the political, cultural, and economic spheres. Dutch and English are both taught in high school and are used with tourists, although Spanish is widely used with Spanish speakers.

See also: Netherlands Antilles: Language Situation; Papiamentu; Pidgins and Creoles: Overview.

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Arunta *See:* Arrernte.

Ascham, Roger (1515–1568)

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Roger Ascham [‘Askəm] was born in Kirby Wiske, Yorkshire, England in 1515 or 1516. He began his studies at St. John’s College in Cambridge, England in 1530, and was eventually appointed as university orator and tutor for the children of King Henry VIII, notably Mary and Elizabeth. Ascham obtained a B.A. degree in 1534 and an M.A. degree in 1537. Ascham began lecturing in Greek at St. John’s, but resigned his position due to ill health. In 1545 he published *Toxophilus: the schole of shootinge,* an essay on the English longbow, and dedicated it to King Henry VIII, an ardent archer, who subsequently awarded Ascham an annual pension for this work.

In 1550, as secretary to the English ambassador to Emperor Charles V, Ascham visited Continental courts and some of the scholars with whom he had corresponded, such as the reformers Philip Melanchthon and Johannes Sturm, who helped shape European classical education. Ascham returned to Cambridge in 1553, and accepted the position of Latin secretary to Queen Mary, even though he had Protestant leanings. After her sister’s death in 1558, Queen Elizabeth appointed Ascham as a prebendary at York. The position gave him the financial security to embark on his major work that is especially noteworthy in the history of education, as it was one of the first educational treatises in Europe written in the vernacular, and is known as *The Scholemaster*: *or plaine and perfite way of teachyng children the Latin tong*. He could not complete it due to illness, and his wife had it published two years after his death.

Ascham’s employment of the vernacular contributed much to its prestige. In *Toxophilus,* he expressed the hope that an English book would be “a thinge Honeste for me to write, pleasaunt for some to rede, and profitable for manie to follow.” Ascham’s use of the vernacular is no evidence that he admired it. In *The Scholemaster,* he wrote “next to the Greeke and Latin tong, I like and loue [Italian] aboue all others.” The study of classical literature was for him a fundamental principle necessary for a liberal education, and the study and use of Latin was very important for developing elegance of expression in the English language. Ascham used the method of ‘double translation’ (from Latin into English, and then from the English version into the Latin original) in teaching foreign languages. Ascham is credited with the ‘double translation’ invention. However, this method had been advocated long before him in bilingual collections of vernacular syntagms followed by their Latin counterparts; see Foster Watson, 1908.

See also: English, Early Modern; Language Education: Grammar.

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Ascoli, Graziadio Isaia (1829–1907)

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Ascoli (**Figure 1**) was born into a Jewish family in North Italian (Friaulian) Gorizia (*Görz* while belonging to Austria), today at the border with Slovenia. Consequently, the child Ascoli was confronted with several language systems. Ascoli did not need to attend public schools. He studied so immensely that—at the age of 16—he had the intellectual level to publish an essay on the affinity of Furlanic (Rhaeto-Romanic) and Valacan by Walachian (Rumanian). When he was 25, he began to publish books, first on Oriental languages. At the age of 32, in 1861, he accepted a chair for Comparative history of classical and neo-Latin languages at Milan University.

Ascoli was the founder of Romance studies in Italy. At first, however, he concentrated on Hebrew, Sanskrit and classical languages. Two descriptions of contemporary Romance languages were sensational: (1) on Ladin in 1873, (2) on Franco-Provençal,

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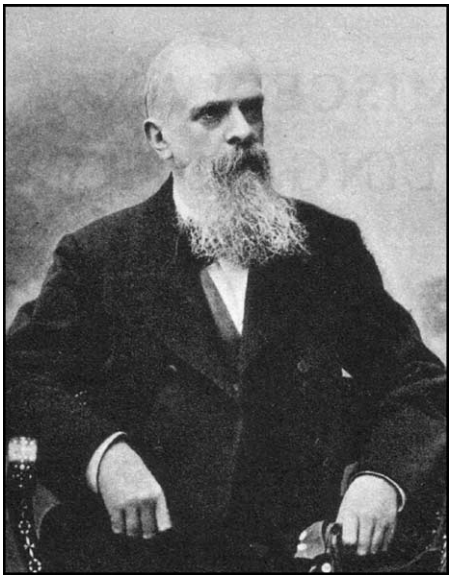

Figure 1 G. I. Ascoli. Photo from *AGI XX* (Sezione Neolatina 1926).

isolated and introduced as a term by Ascoli in 1878, which caused a polemic discussion with French linguists. In 1873, Ascoli founded the periodical *Archivio glottologico italiano* ('Archive on Italian language studies') essentially to offer monographs, articles and reviews on Italian dialects, their systematization in comparison with neighboring dialects and Latin as a reference. Some of Ascoli's publications also were a linguistic answer to the position of the novelist Manzoni in the 'questione della lingua.' He edited the *AGI* until 1901 and delivered numerous contributions (Terracini, 1923), as well as studies on the Irish and Celtic languages. These were the major fields of his last activities.

In his comparative studies, Ascoli assumed a structural similarity between Indo-European and Non-Indo-European, e.g., Semitic (cf. D'Ovidio, 1910). Ascoli's foresight, at that time met with opposition, was confirmed, e.g., by the Danish linguist Holger Pedersen and later independently by the nostratic theory. This view and also his preference for living languages over describing dead ones were arguments, besides others, against the Neogrammarians.

Ascoli explained many exceptions of today's Italian dialects by a supposed pre-Latin, e.g., Gallic, substratum. The term 'substratum' had been used since 1821 (cf. Francescato, 1970: 12) and meant 'underlying original language,' but it was Ascoli who brought the substratum theory to the attention of the contemporary linguists. The substantial linguistic terminology developed by him (cf. De Felice, 1954) reflects his various theoretical and methodological approaches to language and historical linguistics. In his opinion, linguistic change is considered under four aspects (cf. Tagliavini, 1998: 102): the ethnic influence, the chorographic (i.e., geographic) situation plus the inner congruence (i.e., the identity with the underlying substratum) and the outer congruence (i.e., the same linguistic change also appears in nonrelated systems).

See also: Italian; Pedersen, Holger (1867–1953); Romance Languages; Tagliavini, Carlo (1903–1982).

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Ron Asher was Editor-in-Chief of the first edition of *The Encyclopedia of Language and Linguistics* (ELL1) (1994).

He was educated at King Edward VI Grammar School, Retford, Nottinghamshire, and at University College London, where in 1950 he gained a B.A. in French. He stayed on at UCL as an assistant in the French Department and to work for a Ph.D. in Renaissance French. This was awarded in 1955, and a revised version of his thesis was eventually published in 1993 as *National myths in Renaissance France: Francus, Samothes and the Druids*. During the time that he was a graduate student at UCL, anxious to improve his spoken French, he studied for the UCL Certificate in the Phonetics of French, thus laying a firm practical and empirical foundation for the linguistic fieldwork he was soon to take up and starting a lifelong interest in phonetics and phonology that culminated in *Towards a history of phonetics* (1981), which he jointly edited with Eugénie Henderson.

In 1953 he took up a post in the School of Oriental and African Studies. It was intended that after a period of training in linguistic theory and the linguistic description of Dravidian languages, and practical courses on Tamil language in the Department of Phonetics and Linguistics, he would take up a lectureship in Linguistics and Tamil in the Department of India, Pakistan and Ceylon. At that time the Professor of Linguistics in SOAS was J. R. Firth, whose views on language had a profound influence on Ron Asher's attitude toward language and linguistics and the relation between them – an influence that was in time to be reflected in ELL1. He has written of his time in Firth's department:

> What immediately appealed to me... was that, no matter how abstract the theorising, there must always be the possibility of 'renewal of connection with experience' of actual language use. A strong impression left with me from my conversations with Firth and from listening to his lectures was that he did not see linguistic theory and the description of languages as belonging to two separate domains, with work in one being able to proceed in isolation from the other; good descriptive work is possible only in the context of a sound theoretical approach, and theorising is empty without some reference to descriptive material. (Asher, 2002: 31).

In the 1950s, staff members at SOAS were provided with a language informant and were expected to take regular periods of study leave in the country in which their language was spoken. From his first informant at SOAS, Asher soon discovered that the modern written Tamil that he was being taught in class was very different from everyday spoken Tamil. This practical encounter with Tamil diglossia was reinforced by his visits to South India. On these visits, because his department taught both language and literature, he divided his time between the study of spoken Tamil and other Dravidian languages and the study of Tamil literature, both classical and modern. The study of Dravidian languages resulted in later years in descriptive grammars of Tamil (Asher, 1992; Asher and Annamalai, 2002) and Malayalam (Asher and Kumari, 1997). The study of Tamil literature led to a collection of Tamil prose made in collaboration with his SOAS informant (Asher and Radhakrishnan, 1971) and a lifetime friendship with two of Kerala's most prominent novelists, Thakazhi Sivasankara Pillai (1912–2000) and Vaikom Muhammed Basheer (1908–1994), whose works he has translated (Basheer, 1980; Pillai, 1993).

In 1965 he left SOAS for a post in John Lyons's newly established Department of General Linguistics in Edinburgh. In due course, in addition to his academic teaching and publishing he became successively Dean of the Faculty of Arts and Vice-Principal of the university. And it was in Edinburgh, in 1988, that his wide range of interests in linguistics, languages, and literature led to an invitation by Alan Steele of Pergamon Press and Angus McIntosh, then Professor of English Language at Edinburgh, to join in discussions that led to his appointment as Editor-in-Chief of ELL1. His vision for ELL1 was

> ... that the Pergamon encyclopædia should seek to display four characteristics: it should be authoritative, international in authorship and content, comprehensive, and up-to-date.... A further characteristic of the work was that it should aim to be informative rather than polemical or sectarian. It should as far as possible provide information on any subject that might seem relevant to a person interested in any aspect of the serious study of human language. It was this that motivated the decision to have as its title *The Encyclopedia of Language and Linguistics* (*ELL*) (Asher, 2002: 38).

See also: Dravidian Languages; Firth and the London School; Firth, John Rupert (1890–1960).

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Asia, Ancient Southwest: Scripts, Earliest

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Alphabetic writing, regardless of the degree to which vowels are represented graphically, is animated by the principle of having one grapheme per sound (an ideal only) and makes use of syllabaries (sign-lists) comprising signs numbering only in the tens instead of the hundreds more typical of logographic, syllabic, and logosyllabic writing systems. The origins of this form of writing date to the very beginning of the second millennium B.C.E. and are evidenced in two main script traditions. The first, and earlier of the two, is drawn in lines (originally pictographic or semipictographic) and is strongly indebted to Egyptian models of writing – indeed, it now appears that Egypt proper is the likeliest place for the invention of this script type. And it is this linear form of alphabetic writing that is eventually borrowed by the Greeks (from the Phoenicians) and transmitted throughout the world. The second script tradition dates from a slightly later period (ca. 14th century B.C.E.) and are currently attested mainly from the ancient north Syrian kingdom of Ugarit and its environs. This form of alphabetic writing employs wedge-shaped cuneiform signs (typically impressed with a stylus on wet clay) inspired by the writing system of the other dominant ancient Near Eastern civilization, Mesopotamia. Unlike the linear tradition, however, alphabetic cuneiform did not survive the great civilization collapse that swept across the Levant at the end of the Late Bronze Age. The early histories of these alphabetic forms of writing are recounted here.

Serabit el-Khadem

The modern study of alphabetic origins dates to 1905 and the discovery of a sanctuary at Serabit el-Khadem and related turquoise mines in a remote part of southern Sinai. The sanctuary dates to the Egyptian Twelfth Dynasty (ca. 1991–1785 B.C.E.) and mining operations were active in the area from that time through the New Kingdom period. In addition to the large number of Egyptian inscriptions, excavations at the sanctuary and the surrounding mines yielded a score or so of very short and poorly preserved inscriptions in what at that time was an unknown script (**Figures 1–2**). The script employs a limited number of signs (between 20 and 30 in all), which are pictographic (or semipictographic) and bear a strong resemblance to corresponding Egyptian forms, both hieroglyphic and hieratic (see esp. Hamilton, 1985), though the language itself is not

Figure 1 Sinai 349.

Figure 2 Sinai 363.

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Asia, Ancient Southwest: Scripts, Earliest

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Alphabetic writing, regardless of the degree to which vowels are represented graphically, is animated by the principle of having one grapheme per sound (an ideal only) and makes use of syllabaries (sign-lists) comprising signs numbering only in the tens instead of the hundreds more typical of logographic, syllabic, and logosyllabic writing systems. The origins of this form of writing date to the very beginning of the second millennium B.C.E. and are evidenced in two main script traditions. The first, and earlier of the two, is drawn in lines (originally pictographic or semipictographic) and is strongly indebted to Egyptian models of writing – indeed, it now appears that Egypt proper is the likeliest place for the invention of this script type. And it is this linear form of alphabetic writing that is eventually borrowed by the Greeks (from the Phoenicians) and transmitted throughout the world. The second script tradition dates from a slightly later period (ca. 14th century B.C.E.) and are currently attested mainly from the ancient north Syrian kingdom of Ugarit and its environs. This form of alphabetic writing employs wedge-shaped cuneiform signs (typically impressed with a stylus on wet clay) inspired by the writing system of the other dominant ancient Near Eastern civilization, Mesopotamia. Unlike the linear tradition, however, alphabetic cuneiform did not survive the great civilization collapse that swept across the Levant at the end of the Late Bronze Age. The early histories of these alphabetic forms of writing are recounted here.

Serabit el-Khadem

The modern study of alphabetic origins dates to 1905 and the discovery of a sanctuary at Serabit el-Khadem and related turquoise mines in a remote part of southern Sinai. The sanctuary dates to the Egyptian Twelfth Dynasty (ca. 1991–1785 B.C.E.) and mining operations were active in the area from that time through the New Kingdom period. In addition to the large number of Egyptian inscriptions, excavations at the sanctuary and the surrounding mines yielded a score or so of very short and poorly preserved inscriptions in what at that time was an unknown script (Figures 1–2). The script employs a limited number of signs (between 20 and 30 in all), which are pictographic (or semipictographic) and bear a strong resemblance to corresponding Egyptian forms, both hieroglyphic and hieratic (see esp. Hamilton, 1985), though the language itself is not

Figure 1 Sinai 349.

Figure 2 Sinai 363.

Figure 3 Sinai 346.

Figure 4 Sphinx and Sinai 345 (facing view).

Egyptian. W. M. F. Petrie, the original excavator, guessed the alphabetic nature of the new script (1906: 130–131), but it was the work of A. H. Gardiner (1916), and, in particular, his successful decipherment of one of the recurring sequences of signs in these texts (house-eye-shepherd's crook-mark [=*b'lt*] 'Baalat' or 'Lady', a Semitic epithet apparently applied to the Egyptian goddess Hathor, see Figure 3) that securely established the thesis. Gardiner's breakthrough was based on his recognition that in addition to the signs' often close graphic similarities to comparable Egyptian shapes, some of them also resembled the form of letters from the later linear Phoenician alphabetic script. From this he deduced their alphabetic quality and hypothesized that the language of the inscriptions was likely West Semitic – presumably the people who left these inscriptions were Asiatics in the employ of the pharaohs (or enslaved by them).

The underlying principle informing this new script is acrophony, a principle by which the picture iconically depicted by a sign represents not the word for the thing portrayed but the initial (consonantal) sound of that word (e.g., the picture of an ox head represents the letter *'aleph*, the initial letter in the Semitic word *'alpu* 'ox'). Scholars had long supposed that the traditional names for individual letters in the various later alphabetic traditions were likely very old. Gardiner's estimation of acrophony as the generative force in the development of the new alphabetic script strongly suggests that this in fact is the case and, what is more, that the letter names themselves furnish important data for reconstructing the original consonantal values of the individual signs.

The long-time consensus of an Eighteenth Dynasty date (ca. 1500 B.C.E.) for the Proto-Sinaitic inscriptions, as these texts have become called, now seems less tenable. With little in the way of positive indication (aside from the inscriptions themselves) for any date in evidence at the site, scholars, especially W. F. Albright (1963), had seized upon the presumed date of the little sphinx bearing an alphabetic inscription (Sinai 345; see Figure 4) attributed to the time of Hajeptsut (see esp. Leibovitch, 1963) as the surest indicator of the age of these texts. However, Egyptologists now agree that the sphinx in question likely comes from the Middle Kingdom period, the same period originally favored by Gardiner for these inscriptions' time of origin. More recent paleographic analyses of the corpus also point to the Middle Kingdom as the likeliest period of origin for these inscriptions (Sass, 1988: 139, 142–144; Hamilton, 2002: 40, forthcoming), as do the recently recovered early alphabetic texts from the Wadi el-Hol.

The Wadi el-Hol Early Alphabetic Texts

The newest additions to the early alphabetic corpus are two short, complete inscriptions from the Wadi el-Hol (Figures 5–6), a site located at the midpoint of the main Theban road into the Western Desert. The rock face of the great wadi cliffs that make up the site is covered with hundreds of Egyptian inscriptions and drawings, the large majority of which come from the Middle Kingdom period. It was in the process of drawing, recording, and photographing these Egyptian inscriptions that J. C. and D. Darnell came across the two early alphabetic texts that they described as being "written in the Proto-Sinaitic script" (Darnell and Darnell, 1997: 46–47). Like much of the Serabit el-Khadem corpus, these two inscriptions have so far defied satisfactory decipherment. Still, their alphabetic character is apparent – they are not decipherable as any form of Egyptian; they employ a radically abbreviated number of graphemes; and most of the individual signs bear very close resemblance to or exhibit clear continuity with the various signs as known from the emergent alphabetic script traditions (e.g., ox head → *'alep*, seated figure → *he*, house → *bêt*). And as with the Serabit el-Khadem inscriptions, the writing is oriented variously (one horizontally, the other vertically) with individual signs facing both left and right.

Though these newly recovered inscriptions require broader scrutiny, their significance for understanding the early history of alphabetic writing can already be estimated. First, it is much more obvious from the Wadi el-Hol inscriptions (given the striking closeness in appearance of many of the letter forms to Egyptian

Figure 5 Wadi el-Hol 1 (horizontal).

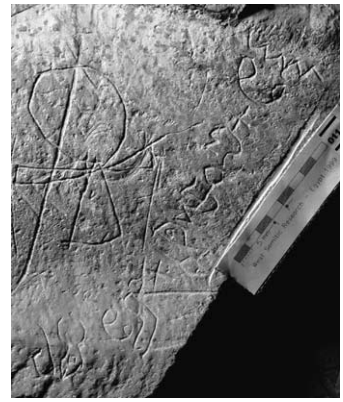

Figure 6 Wadi el-Hol 2 (vertical).

signs) that alphabetic writing is a derived script tradition. That is, the forms of the earliest alphabetic signs were borrowed from a "pre-existent and often developed range of shapes in their Egyptian prototypes" (Hamilton, 2002: 39), prototypes that included both hieroglyphic *and* hieratic forms. Though already apparent from the Serabit el-Khadem corpus (see esp. Hamilton, 1985), the mixed character of Egyptian prototypes used for alphabetic forms is prominent in the two Wadi el-Hol graffiti as well. Second, through paleography and contextual considerations, the Wadi el-Hol texts may be dated far more confidently than those from Serabit el-Khadem, thus providing a more stable anchor from which to assay the chronology of early alphabetic writing. Paleographically, the letter forms derived from hieratic models are all important, since hieratic evinces diachronic variation and thus is tractable chronologically in ways not possible for Egyptian hieroglyphs. In particular, the specific paleographic models used for certain of the hieratically derived signs (e.g., the head, serpent, seated figure signs), the mixed use of both hieratic and hieroglyphic models, and the vertical orientation of otherwise predominantly horizontally oriented signs (especially the two water signs) indicate an emerging paleographic profile for these signs that fits most naturally within a Middle Kingdom milieu. Contextual considerations – the prominent location of the alphabetic inscriptions on superior rock surface and in the midst of hundreds of late Middle Kingdom and Second Intermediate Period Egyptian inscriptions, the so-called Bebi inscription, which places Asiatics at the Wadi el-Hol precisely during the late Middle Kingdom – point more precisely to the later Middle Kingdom (late Twelfth to early Thirteenth Dynasty, ca. 1850–1700 B.C.E.) as the likeliest time of inscription for these texts, and thus a date early in the Egyptian Middle Kingdom (early to mid-Twelfth Dynasty, ca. 1900 B.C.E.) cannot be far off for the beginning of alphabetic writing. Third, the likelihood that alphabetic writing began geographically in Egypt proper is now, with the recovery of alphabetic writing from the heart of the Western Desert, a thesis deserving serious consideration. Lastly, the Wadi el-Hol texts contribute to a clearer understanding of the development of certain individual alphabetic letter forms, add to the list of alphabetic signs with known biforms, and attest several previously unknown signs.

Early Alphabetic Writing from the Levant

Apart from the Serabit el-Khadem texts and the two rock-cut graffiti from the Wadi el-Hol, the remainder of the early alphabetic corpus comes from the southern Levant. This corpus is comparable in size to that of Serabit el-Khadem, numbering between 20 and 30 epigraphs (depending on what is included; see Hamilton, 1985, forthcoming; Puech, 1986; Sass, 1988) and forms a single continuous script tradition with the early alphabetic texts from Egypt and Sinai. These inscriptions, too, are mostly short, fragmentary, and enigmatic. They divide into two unequal groups. The smaller group contains the earliest inscriptions, all dating roughly to the end of the Middle Bronze Age (ca. 1650–1500 B.C.E.), and at minimum would include the Najila sherd, Lachish dagger, and Gezer sherd. Sometimes labeled Proto-Canaanite (Hamilton, 1985: 3), the scripts of these inscriptions, like those of the texts from Serabit el-Khadem and the Wadi el-Hol, remain (more or less) transparently pictographic, even when the letter forms are derived from the more schematized and abbreviated hieratic shapes. In the second, and larger, group, sometimes referred to as Old Canaanite (Hamilton, 1985: 3), various of the letter forms are beginning to lose their

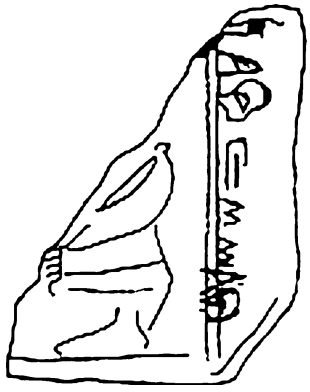

Figure 7 Shechem plaque.

Figure 8 Grossman seal.

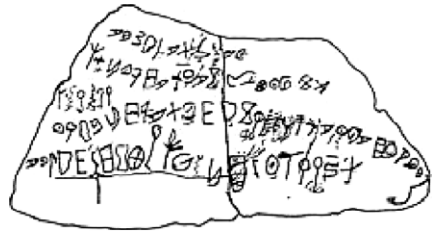

Figure 9 Abecedary from Izbet Sartah.

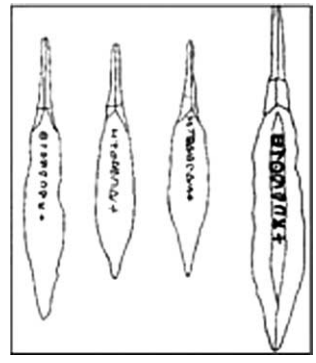

Figure 10 Inscribed bronze arrowheads from the 11th century B.C.E.

recognizably pictographic shape and the script tradition as a whole is becoming more linear. This process is already setting in by around 1400 B.C.E. (e.g., the Shechem plaque and the Grossman seal; see Figures 7 and 8) and is well advanced by the end of the 13th and beginning of the 12th centuries, as evidenced, for example, by the Izbet Sartah ostracon (ca. 1200 B.C.E.; Figure 9), the longest of the early alphabetic inscriptions so far recovered. The 11th century marks the end of the use of pictographic letter forms and the advent of the fully linear alphabetic script tradition. The collection of more than 30 inscribed bronze arrowheads from the period (see Cross, 2003: 200–202 for a convenient tabulation) provides an exquisite witness to this important transitional period. In the earliest of these arrowheads (e.g., El Hadr I–III in Figure 10), some pictographic forms are retained, letter stance is still variable, and vertical writing is permitted. But by the end of the century all has changed. Pictographic forms die out completely, the direction of writing (sinistrograde, from right to left) becomes standardized, and letter stances are fixed. The latest in the sequence, that of Azarbaal son of Adonibaal (no. 7 [Beirut Museum], Milik, 1961), dates into the 10th century, and thus overlaps with the earliest linear Phoenician inscriptions (e.g., Ahiram [KAI 1], ca. 975 B.C.E.). And thus, with the turn of the millennium, a new phase in the history of (linear) alphabetic writing begins.

Alphabetic Cuneiform

One consequence of the delinguistic character of writing, observes M. O'Connor (1983: 441), is that "it is at least as likely for **the notion** of a writing system to be borrowed as for **the system itself** to be taken over." The paradigm example from antiquity is the invention of alphabetic cuneiform in the 14th century (Figure 11). The place of invention cannot be known for certain but there is no reason not to think that it was in the ancient kingdom of Ugarit on the north Syrian coast. Since 1929 some 1500 cuneiform tablets in an alphabetic script have been recovered from excavations at Ras Shamra and its immediate environs. The scribes of Ugarit, well schooled in the syllabic cuneiform writing system of Mesopotamia, borrowed the notion of cuneiform writing and its technique and created a syllabary of 30 signs to write the local Northwest Semitic dialect spoken at Ugarit. The individual signs themselves are composed of simple combinations of long, short, and/or angled wedges but they bear no paleographic resemblance to signs in syllabic cuneiform (see esp. Windfuhr, 1978). Neither are their shapes obviously influenced by the shapes of the early linear alphabetic pictographs (see e.g., Cross, 2003: 318; Millard, 1979: 615), even though Ugaritic alphabetic cuneiform shares a common heritage with the linear

Figure 11 Alphabetic Cuneiform (examples from Kirta).

Standard Ugaritic order: ʾbgḫdhwzḥṭykšlmḏnẓsʿpṣqrṯġtiuś

Standard Phoenician order: ʾbg dhwzḥṭyk lm n sʿpṣqrš t

Figure 12 Order of alphabetic signs.

alphabetic script tradition, as shown most tellingly by the order of the signs in abecedaries, which is the same in both script traditions (see **Figure 12**) and the shared tradition of letter names (Cross and Lambdin, 1960; Cross and Huehnergard, 2003). Indeed, the cuneiform alphabetic tablets from Ugarit are the earliest fully deciphered corpus of alphabetic writing yet discovered.

The script used to write alphabetic cuneiform actually is attested in two varieties. The longer version is the normal one used at Ugarit itself (**Figure 13**). Its 30 signs represent the 27 phonemes of the local Ugaritic dialect plus three supplemental signs (*ʾi*, *ʾu*, *ś̌*). The latter are placed at the end of the sign sequence in the standard abecedaries from Ugarit. The first two of these are *ʾaleph* signs; they join with the initial *ʾaleph* sign (which stands at the head of the abecedary) to represent the syllabic values /ʾa/, /ʾi/, and /ʾu/. The last sign (*ś̌*) is a rarely used biform of *s* that is generally limited to loanwords. Texts using this script are generally written from left to right (as with syllabic cuneiform). A shorter script, presumably corresponding to the 22-letter script better known from linear Phoenician and the first millennium West Semitic scripts, is discernible in a handful of tablets from Ras Shamra and Minet el-Beide (*CTU* 1.77; 4.31, 710; 7.60) (*The cuneiform alphabetic texts from Ugarit, Ras Ibn Hani, and other places*. Edited by M. Dietrich, O. Loretz, and J. Sanmartin, Münster, 1995 (the number identifies the specific text in the collection) and on tablets or inscribed objects found at sites outside of Ugarit, such as Tell Nebi Mend, Kamid el-Loz, Sarepta, Tell Taanak, and Mount Tabor. The direction of writing in texts using this script is generally from right to left, meaning the signs are the mirror image of the

Figure 13 Standard abecedary from Ugarit. *CTU* 5.6.

corresponding signs in the standard script. The two scripts are used contemporaneously and more or less in complimentary distribution. The authenticity of the longer form is not to be doubted, given its overwhelming prominence at Ugarit and the interspersing (instead of appending) of the five 'extra' graphemes in the standard Ugaritic abecedaries – indeed, a longer script of this type is presumed by the graphic (and phonemic) inventory of the extant early linear alphabetic inscriptions from Egypt and the southern Levant as well. Whether the shorter script, then, is derivative of the longer is harder to tell. Ugarit must be presumed to be the center of alphabetic cuneiform learning during the Late Bronze Age, and there the long script clearly prevails.

One of the most recent and surprising discoveries from the ongoing excavations at Ras Shamra-Ugarit is an abecedary (RS 88.2215) preserving the South Semitic order of alphabetic signs (i.e., *h-l-ḥ-m*, cf. Bordreuil and Pardee, 2001). Recent reanalysis of the long-known Beth Shemesh tablet (*CTU* 5.24) reveals that this tablet contains a similarly ordered abecedary (see esp. Loundine, 1987). These abecedaries (perhaps reflecting a language or languages other than Ugaritic) unambiguously show the antiquity of the South Semitic letter order and mean that it is increasingly likely that the Proto-Arabic script tradition branched off from the linear alphabetic script traditions relatively early (cf. Cross, 1954: 22, 1967: 19*). And further, they, along with the alphabetic cuneiform inscriptions originating outside of the environs of Ugarit proper, suggest that knowledge and use of alphabetic cuneiform may have been far more widespread in the Levant than previously thought.

See also: Phoenician; Semitic Languages; Ugaritic.

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Asia, Ancient Southwest: Scripts, Epigraphic West Semitic

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Two primary categories of linear scripts are evidenced for ancient Near Eastern alphabetic texts: lapidary and cursive (cf. Daniels, 1990, on the problems with the term 'alphabet'). The dominant features of a lapidary script are its graphic arrangement, letter clarity, uniformity of letter form and size, and general conservativeness (i.e., retarded development). Lapidary inscriptions are normally found on surfaces that were carefully prepared, and in general they were intended to be permanent. The primary features of a cursive script are the rapidity with which it can be written and its adaptability. For a cursive script, variations in letter form and size are common, stroke curvature tends to be more prominent, letter spacing is more compact, semiligatures are more common, and development occurs more rapidly. Writing instruments and media are of fundamental importance in this regard but not always determinative (because cursive scripts can be employed on stone). For the scripts that constitute the focus of this article, both lapidary and cursive traditions are attested. Drawings of various inscriptions, on various media (metal, pottery, and stone), with various writing instruments (chisel, incising tool, and brush and ink) are included so as to demonstrate some of the diversity of the epigraphic material in West Semitic scripts. Finally, it should be noted that paleography is the field that focuses on precise analysis of a script series, and stringent paleographic methods produce the most convincing

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assessments of the diachronic development and synchronic variation of a script series (Cross, 1982; Rollston, 2003).

The Phoenician Script

Alphabetic Semitic inscriptions are attested throughout much of the 2nd millennium (Albright, 1966; Sass, 1988). Many of these inscriptions are pictographic, but several thousand alphabetic cuneiform tablets have been discovered as well (Segert, 1984). Alphabetic cuneiform was ephemeral, but the pictographic alphabetic script ('early alphabetic,' following McCarter) continued to develop throughout the 2nd millennium B.C.E., becoming more linear with the passage of time (Cross, 1967). During the terminal horizons of the 2nd millennium, several developments are of fundamental importance: (1) The letters have become quite linear; (2) the stance has stabilized; (3) the direction of writing is consistently sinistrograde (rather than the sinistrograde, dextrograde, and boustrophedon of earlier periods); and (4) the alphabet consists of 22 letters, reflecting a number of 'consonant mergers' (rather than preserving the larger stock of Semitic consonants attested for the pictographic and cuneiform scripts). These features are present during the mid-11th century; this script is referred to as Phoenician.

Phoenician inscriptions have been discovered at numerous sites. The bronze spatula inscription (late 11th century or very early 10th century B.C.E.) was a 'prestige item' (in the shape of an arrowhead) from Byblos ('Gebal') (Figure 1). Six lines of Phoenician text (often considered enigmatic) are etched into the metal. There are numerous archaic features of this inscription's script, including the general 'vertical' stance of *mem*, the 'truncated' vertical shaft of *samek*, and the high junctions of the internal strokes of *šin*. The inscription chiseled into the stone sarcophagus of the Byblian king named Ahiram continues to be one of the most important for analyses of the early Phoenician script. This inscription derives from the same basic period as that of the bronze spatula but is substantially longer, with more consonants of the alphabet represented. The successive royal inscriptions of Yehimilk, Abiba'al, Eliba'al, and Shipitbaal also come from Byblos and provide data for a reliable script typology of the 10th-century Phoenician script (McCarter, 1975).

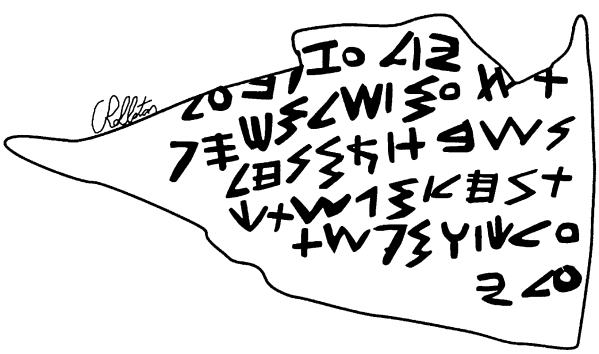

Figure 1 Bronze spatula (Phoenician).

The Phoenician script soon became an international script. For this reason, Kilamu (king of Sam'al in northern Syria) commissioned the production of a monumental inscription (9th century) in Phoenician (language and script), even though Phoenician was not the dominant local language. Moreover, the Anatolian (Neo-Hittite) regent Azitawadda also commissioned a Phoenician inscription (8th century) to parallel his (native) Hittite Hieroglyphic rendition. This inscription (from the site of Karatepe) is the longest of the Phoenician inscriptions. Significantly, early cursive Phoenician inscriptions are also attested, such as the (8th century) Kition bowl (Cyprus) and the ivory plaque from Sarepta (Lebanon), demonstrating that the Phoenician script possessed both cursive and lapidary traditions, both in the colonies and in the homeland.

During the succeeding centuries, the Phoenician script continued to be used quite widely. For example, the sarcophagus of the Sidonian king Eshmunazor II and the Byblian Stele of Yehawmilk (both 5th century) were inscribed with long Phoenician inscriptions, in a script that reflects substantial development from the early Phoenician scripts. Late Phoenician inscriptions (from the 3rd and 2nd centuries B.C.E.) have been found at various sites (Peckham, 1968). Moreover, Punic inscriptions are attested from various sites, such as Carthage and Hadrumetum, for a period of several centuries as well. A distinguishing feature of Punic inscriptions is the highly cursive nature of the script (neo-Punic is the term reserved for Punic inscriptions produced after the fall of Carthage to the Romans).

The Berber script (also called Numidian, Libyan, or Libyco–Berber) is often believed to have derived from Punic (or perhaps some South Arabian script). This script series consists of 22 letters. Most of the extant inscriptions are brief, nonmonumental texts. Many of the most informative Berber inscriptions come from Numidia, including some invaluable Berber–Punic bilinguals (2nd century B.C.E.). Furthermore, there are also some Berber–Latin bilinguals (ca. 2nd and 3rd century C.E.) (Chaker, 1984; Friedrich, 1957).

The Iberian script is most problematic. There are some bilinguals (Greek–Iberian and Latin–Iberian)

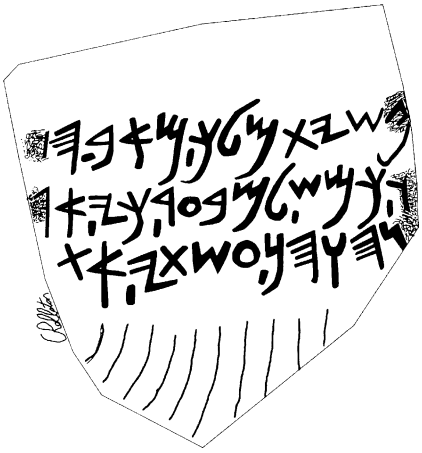

Figure 2 Stone El-Kerak inscription (Moabite).

with proper nouns; hence, the values of the letters are known. Moreover, two major divisions of the script are recognized: Northeast Iberian (written from left to right) and South Iberian (right to left). Nevertheless, a major problem is the origin of this 'script mélange.' Some have argued that the script is based on a Semitic script, some have argued that it is based on a Greek script, and some have suggested some sort of combination of these two positions (Anderson, 1988).

The Hebrew Script

The Phoenician script was the *Mutterschrift* (i.e., the foundational script from which another script developed) of the Old Hebrew script (a term used to refer to the Hebrew script of the Iron Age), as well as of Early Moabite (e.g., the Mesha inscription and the el-Kerak inscription) (Figure 2). Old Hebrew inscriptions, with a script that reflects distinct morphological features (i.e., from Phoenician) are attested for the late 9th and early 8th centuries. For example, excavations at Arad, Kuntillet Ajrud, Samaria, and Beth Shean have yielded early Old Hebrew inscriptions of the (late) 9th and early 8th centuries in numbers that are sufficient for detailed and reliable paleographic analyses of the early Old Hebrew script (Figure 3).

Among the features that distinguish the Old Hebrew script of this period from the Phoenician *Mutterschrift* of the same period are (1) a distinct curvature of the terminal component of the downstrokes of several Old Hebrew letters (e.g., *kap*, *mem*, *nun*, and *pe*), (2) *bet* consistently has a top-right (i.e., /) orientation, and (3) *taw* is consistently written with two strokes forming an x rather than something often approximating a + (Naveh, 1987; Rollston, 2005a). Significantly, Old Hebrew

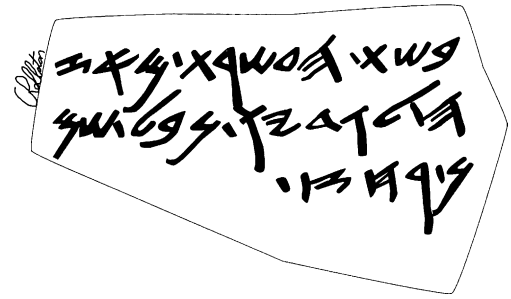

Figure 3 Samaria ostracon 17 (Hebrew).

inscriptions from the late 8th, 7th, and early 6th centuries (from sites such as Gibeon, Mesad Hashavyahu, Horvat Uza, Lachish, and Arad) reflect continuing development of the script (that can be described in an empirical fashion; Rollston, 2003, 2005b). Note that the Arad ostracon drawn in Figure 4 derives from stratum VI–VII of the Tel and dates to the late 7th or early 6th century, and so reflects later developments within the Old Hebrew script of late Iron II (compare, for example, *he*, *yod*, *mem*, and *nun* of this Arad ostracon and the 8th-century Samaria ostracon).

It should also be affirmed that the Old Hebrew script, regardless of its internal diachronic developments, continues to retain various features that distinguish it from the Phoenician and Aramaic scripts of contemporary periods (Naveh, 1987; Rollston, 2005a). Finally, it should be noted that although the Aramaic script supplanted the Old Hebrew script, a form of the Old Hebrew script (often called 'Palaeo-Hebrew' script) persisted (e.g., Qumran and some Hebrew coinage) during the late Second Temple period (McLean, 1982; Tov, 2004). Nevertheless, the majority of the Dead Sea Scrolls (a major repository of texts of the late Second Temple period) are written in the 'Jewish script,' a script derived especially from Aramaic (Cross, 1961).

The Aramaic Script

The Arameans continued to use the 'prestige' Phoenician script for several centuries (cf. the Hadad inscription, the Panamu inscription, Bar Rakib, and Zakir of Hamat – all of the 9th century) (Figure 5). However, Aramaic inscriptions from the mid–8th century demonstrate that the (cursive) Aramaic script has separated from the prestige Phoenician script, reflecting developments that are not paralleled in the Phoenician *Mutterschrift*. Significantly, it is readily apparent that the Aramaic script rapidly became an international script (largely displacing Phoenician). Some of the most important evidence for the Aramaic

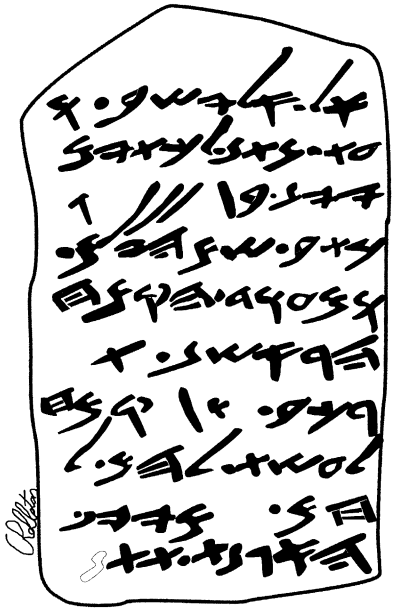

Figure 4 Arad ostracon 1 (Hebrew).

Figure 5 Deir ʻAlla inscribed stone (Early Aramaic).

cursive script series are the Hamat bricks, the Lion-Weights from Nineveh, and the Nimrud ostracon (all dating to the 8th century). The Sefire inscriptions (mid-8th century) are superb exemplars of a standard lapidary text (a treaty carved in stone) and exhibit the more conservative morphology of a lapidary script. The Assur clay tablets and the (lengthy, but elegant) Assur ostracon epitomize the developments of the 7th-century cursive. For the 6th century, the Saqqarah papyrus and the Hermopolis papyri reflect the standard Aramaic cursive script. Of course, the Aramaic from Elephantine provides substantial data for the script of the 5th century (Naveh, 1970; Porten and Yardeni, 1986–1999). Among the most prominent distinguishing features of the Aramaic script during these centuries (beginning in the late 8th century) are the following: (1) open-headed *bet*, *dalet*, and *reš*; (2) an open *ʻayin*; and (3) single barred *ḥet*.

Note that the Ammonite script became an independent national script for a time (separating from Aramaic), but this development was an ephemeral feature (Hackett, 1980; Rollston, 2005a). Aramaic and Ammonite inscriptions are attested at certain (Jordanian) sites, including Hisban and Deir Alla (Aufrecht, 1989).

It is also important to mention that the Aramaic script (and language) became quite prominent in Palestine during the Second Temple period (ca. 538 B.C.E.–70 C.E.). The term 'Jewish script' is used to describe the script that derived from the Aramaic script and became quite dominant during the Second Temple period, including for the writing of the majority of the Dead Sea Scrolls (Cross, 1961) and a number of inscribed ossuaries (Rahmani, 1994).

Concluding Notes on Phonology and Orthography

It should be stated that the *Mutterschrift* (i.e., Phoenician) was not entirely capable of reflecting some of the basic consonantal phonemes in Old Hebrew and Aramaic (i.e., consonants in Old Hebrew and Aramaic did not all merge at the same time and in the same manner as was the case in Phoenician). For example, the voiced interdental fricative /ð/continued to be preserved as a separate phoneme in Aramaic, but there was no Phoenician letter for it; hence, *zayin* was used at times for this phoneme, as was also *dalet*. Moreover, Old Hebrew preserved the voiceless lateral fricative /ś/, but there was no Phoenician letter for it; hence, the grapheme *šin* did 'double-duty' and was used for this phoneme as well (Garr, 1985). Scripts are, after all, frail conventions for symbolizing language and the act of borrowing a script necessitates the acceptance of various accommodations.

Finally, it should be noted that the early alphabetic scripts were employed to represent consonants, not vowels (hence, reconstructing the actual vocalization of Northwest Semitic is quite theoretical). The Phoenician script continued to be used to represent only consonants until very late times. The Aramaic script, however, reflects a major innovation: The consonant letters began to be used (ca. the 10th century) also to represent final (long) vowel sounds. For example, *yod* was used to represent final /ī/, *waw* was used to represent final ū, and *he* was used for the remaining final vowels. Soon this system was employed to represent medial (long) vowels in Aramaic as well. Hebrew began (ca. 9th century) to employ a similar system for the representation of (long) vowels, a system probably dependent on the

Table 1 Correspondences of West Semitic consonants

PS[a]	*Phoenician*	*Hebrew*	*Aramaic*
1. ʾ	ʾ	ʾ	ʾ
2. b	b	b	b
3. g	g	g	g
4. d	d	d	d
5. h	h	h	h
6. w	w (y)	w (y)	w (y)
7. ð	z	z	z/d
8. z	z	z	z
9. ḥ	ḥ	ḥ	ḥ
10. ḫ	ḥ	ḥ	ḥ
11. ṭ	ṭ	ṭ	ṭ
12. y	y	y	y
13. k	k	k	k
14. l	l	l	l
15. m	m	m	m
16. n	n	n	n
17. s	s	s	s
18. ʿ	ʿ	ʿ	ʿ
19. ġ	ʿ	ʿ	ʿ
20. p	p	p	p
21. ṣ	ṣ	ṣ	ṣ
22. ẓ	ṣ	ṣ	ṣ/ṭ
23. ḍ	ṣ	ṣ	q/ʿ
24. q	q	q	q
25. r	r	r	r
26. ś	š	ś	š
27. š	š	š	š
28. θ	š	š	t
29. t	t	t	t

[a]Proto-Semitic.

system first used for Aramaic (Cross and Freedman, 1952) (Table 1).

See also: Aramaic and Syriac.; Hebrew, Israeli; Phoenician; Semitic Languages

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Asia, Ancient Southwest: Scripts, Middle Aramaic

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As early as the 8th century B.C.E., Assyrian palace reliefs depict scribes tallying war spoils in pairs. One scribe typically incises a tablet with cuneiform to reflect the tally in Akkadian while a second scribe records the same data in Aramaic with a pen and scroll. Aramaic had begun its rise to *lingua franca* status in the Near East. When the Assyrian empire dismantled the Levant's numerous Aramaean kingdoms and forcibly deported their citizens (9th to 8th centuries B.C.E.), it assured that Aramaic would become an international language on the ground as well as in prestige circles. The subsequent Neo-Babylonian (6th century B.C.E.), Achaemenid (6th to 4th centuries B.C.E.), and Parthian (3rd century B.C.E. to 3rd century C.E.) empires continued to employ the Aramaic script and (to varying degrees) language for administrative purposes (Naveh, 1970a). It was partly through these institutional frameworks that Aramaic was disseminated abroad and adapted to represent peripheral and still remoter languages.

Palaeographers traditionally divide the Middle Aramaic scripts (200 B.C.E. to 200 C.E.) into western and eastern branches. The western branch includes the scripts of Palestinian Aramaic and Nabataean. The Palmyrene and Hatran scripts represent the eastern branch of Middle Aramaic with Syriac, Elymaic, Mandaic, and (in a broader sense) Iranian Pahlavi the notable scripts of the Late Aramaic period (**Figure 1**, cols. 21–32).

Western Middle Aramaic Scripts

It is necessary to discuss the Persian cultivation of the Aramaic writing system in order to appreciate the means by which the scripts later diversified during the Middle Aramaic period. Official or Imperial Aramaic designates the historical dialect of the language that broadly characterizes documents from the Achaemenid period. The main corpora include about one hundred papyri from Egypt and numerous incised endorsements on cuneiform tablets written in Akkadian or Elamite from Mesopotamia, although a number of monolingual Aramaic tablets have also surfaced. Thus, for substantive linguistic purposes, we mainly look to the Egyptian papyri, the geographic restriction of which raises caveats about the representative character of their dialect(s) (Byrne, 2005). Most Aramaists consider the Official Aramaic of the papyri to represent an eastern dialect of the language. For palaeographic purposes, there are enough similarities of form and ductus between these papyri and the incised tablets from Mesopotamia to warrant the tentative designation of an institutional script. This implies a chancery education for scribes working in Achaemenid administrative circles. Cross (1974) has argued that this chancery hand, best represented by the formal script of the Arsames correspondence (government communiqués on leather scrolls), served as progenitor of what he termed the 'bookhands' of the Qumran documents from the Dead Sea caves. The discovery of the Samaria papyri has provided evidence that seems to validate this view (Gropp *et al.*, 2001; Byrne, 2005). These papyri represent a trove of 4th-century B.C.E. legal documents belonging to Samaritan elites presumably killed during Alexander's invasion of the Levant. They provide a good palaeographic link between the Egyptian chancery script and the formal hands of the Qumran script. This chain of development speaks to the enormous palaeographic influence of the administrative script, although we know little about the circumstances of the chancery education or opportunities for its emulation. The 5th-century papyri from Egypt include documents written by Jewish scribes from the military colony of Elephantine in a less formal cursive script (Naveh, 1970a), but one imagines that such scribes routinely witnessed correspondence in the formal hand of Persian administrators.

With a few exceptions, documents from Qumran written in Aramaic exhibit a script undifferentiated from most written in Hebrew, and so fall within the category of the so-called Jewish square script. The square script formed the basis for the later Rabbinic (Hebrew and Aramaic), Medieval (Hebrew and

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Aramaic), and modern Israeli Hebrew scripts, but it does not in fact derive from Hebrew characters of the Iron Age (Cross, 1961). Perhaps as early as the late Persian period (though some argue Hellenistic), Jewish scribes appropriated the Aramaic script to write Hebrew, and the subsequent development of that adoption defined the familiar square script of Roman-period ossuary inscriptions (Rahmani, 1994), Talmudic and Medieval Jewish literature, Yiddish and the modern font text employed to represent Israeli Hebrew. There was a revival of the Iron Age Hebrew script in the Maccabaean period (2nd century B.C.E.) and in some Qumran texts, but this choice may have been more ideological than functional (and restricted in any case without any successive palaeographic developments). Scholarly literature inconsistently uses the term 'Paleo-Hebrew' to refer both to this archaizing revival and to the referent archaic Iron Age script. This ambiguity needlessly confuses palaeographic discussions, and perhaps the term should be abandoned. Given its prominence in extant Rabbinic manuscripts of the Gaonic and later periods (Goldberg, 1987), the Jewish square script must also have served Amoraic scribes and the late Tannaitic compilers of the Mishnah and Tosefta, whether those texts were composed in Aramaic or Hebrew.

By the 3rd century B.C.E., the earliest Nabataean inscription shows Aramaic beginning to supplant the Thamudic script among Arab scribes living in and around the southern Transjordanian rift valley. The Nabataean kingdom centered at Petra cultivated this script for official purposes, although the spoken language remained Arabic. Short votive, burial, legal, and numismatic inscriptions meet innumerable graffiti to constitute a Nabataean corpus exhibiting gradual development of formal and free cursive styles (Naveh, 1987). Trajan's annexation of Arabia Felix into the Roman empire in 106 C.E. probably diluted much of the institutional imprimatur the script enjoyed, but Nabataean shortly proceeded to evolve ligatures typical of durable cursives (and more formal incised examples continue as well). Over the next couple of centuries, one observes the gradual infiltration of Arabic terms into the texts alongside the Aramaic. Extant Nabataean specimens do not appear later than the 4th century C.E., but the palaeographic affinities with 6th-century pre-Islamic Arabic affirm that the Nabataean cursive was the parent of the Classical Arabic script (Gruendler, 1993). This cursive parentage accounts both for the ligatured nature of Arabic and for the introduction of diacritics for facilitated reading (Naveh, 1987). Despite the arguments of some scholars (e.g., Klugkist, 1986) that Nabataean may underlie the origins of the later Mandaic script (which pervades the incantation bowls from Mesopotamia) and so have witnessed a migration of intellectual property, Naveh (1970b) argues convincingly that the casual resemblance of the few similar graphs is attributable to discretely intuitive ductus rather than ancestry. One properly credits the eastern branch of Middle Aramaic for primeval Mandaic.

Eastern Middle Aramaic Scripts

Arabs living in the Roman city of Palmyra adopted the Aramaic writing system initially to bureaucratize the ballooning commercial activity of caravans visiting this central Syrian oasis (see bibliography in Hillers and Cussini, 1996). The Arabic language was virtually never represented by the script, however, which faithfully records an Aramaic dialect in all epigraphic genres. The vast majority of the surviving inscriptions are votive or epitaphs, rather than contractual, which is attributable to the perishable nature of media (papyri or leather) employed for commercial purposes. The result is a preponderance of incised stone epitaphs, occasionally accompanying glorious artistic scenes or busts, that predictably privilege a lapidary form of the script over the less represented cursive. The cursive occasionally creeps into the funereal epigraphs, but cursive is generally rare even when far-flung examples from Rome and Dura Europos are considered. Some epigraphers have not genuinely appreciated the import of these different scribal styles. Klugkist (1983) has misunderstood the relationship between media and ductus, for example, and eschewed the palaeographic value of the lapidary specimens. Lapidary scripts tend toward the conservative developmentally, but accompanying dates on several Palmyrene inscriptions have confirmed the reliability of the script's contribution to typological knowledge and chronology. The palaeographic correspondences between Palmyrene and the Syriac script of the Late Aramaic period suggest the existence of an ancestor script in common, rather than a linear, filial relationship between the two writing systems. Naveh (1975, 1987) has posited a Seleucid incarnation of this Aramaic script for the 3rd century B.C.E., and some epigraphs from the 2nd century B.C.E. indeed seem to support the reconstructed existence of such an administrative script for the Hellenistic state.

The Mesopotamian oasis of Hatra has produced a wealth of Aramaic inscriptions dating from the Seleucid period to the 3rd century C.E. (Degen, 1978; Aggoula, 1991). The Hatran script represents a local customized form of Aramaic writing unrelated to the Palmyrene/Syriac subset of the eastern branch of Middle Aramaic (Naveh, 1972). Many of these

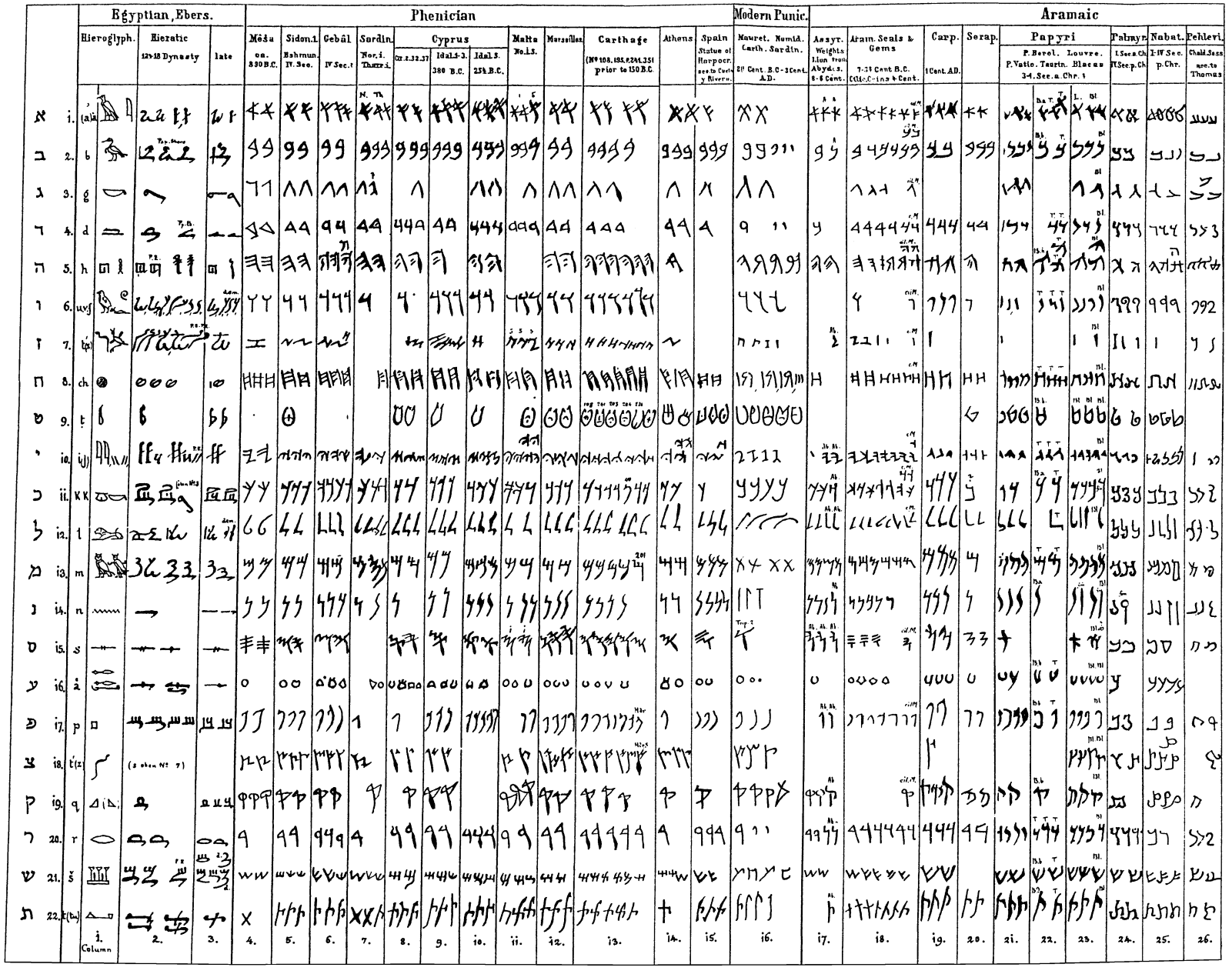
Egyptian, Ebers.
Hieroglyph.
Hieratic
12th-18 Dynasty
late
Phenician
Mêsa
on. 850 B.C.
Sidon. I.
Eshmun. IV. Sec.
Gebâl
IV Sec.
Sardin.
Nor. i. Thurr. i.
Cyprus
Cr. i. 32, 37
Idal. 1-3.
380 B.C.
Idal. 5.
254 B.C.
Malta
No. 1, 5.
Marseilles.
Carthage
(Nº 108, 182, 244, 351 prior to 150 B.C.
Athens
Spain
Statue of Harpocr. see to Cuvier y Rivera.
Modern Punic.
Mauret. Numid. Carth. Sardin.
2d Cent. B.C.-3 Cent. A.D.
Aramaic
Assyr. Weights Lion from Abydos. 8-6 Cent.
Aram. Seals & Gems
7-3d Cent B.C.
Carp.
1 Cent. AD.
Serap.
Papyri
P. Berol. P. Vatic. Tautin.
Louvre. Blacas
3-4. Sec. a. Chr. 1
Palmyr.
I. Sec. a. Ch. II Sec. p. Ch.
Nabat.
I-IV Sec. p. Chr.
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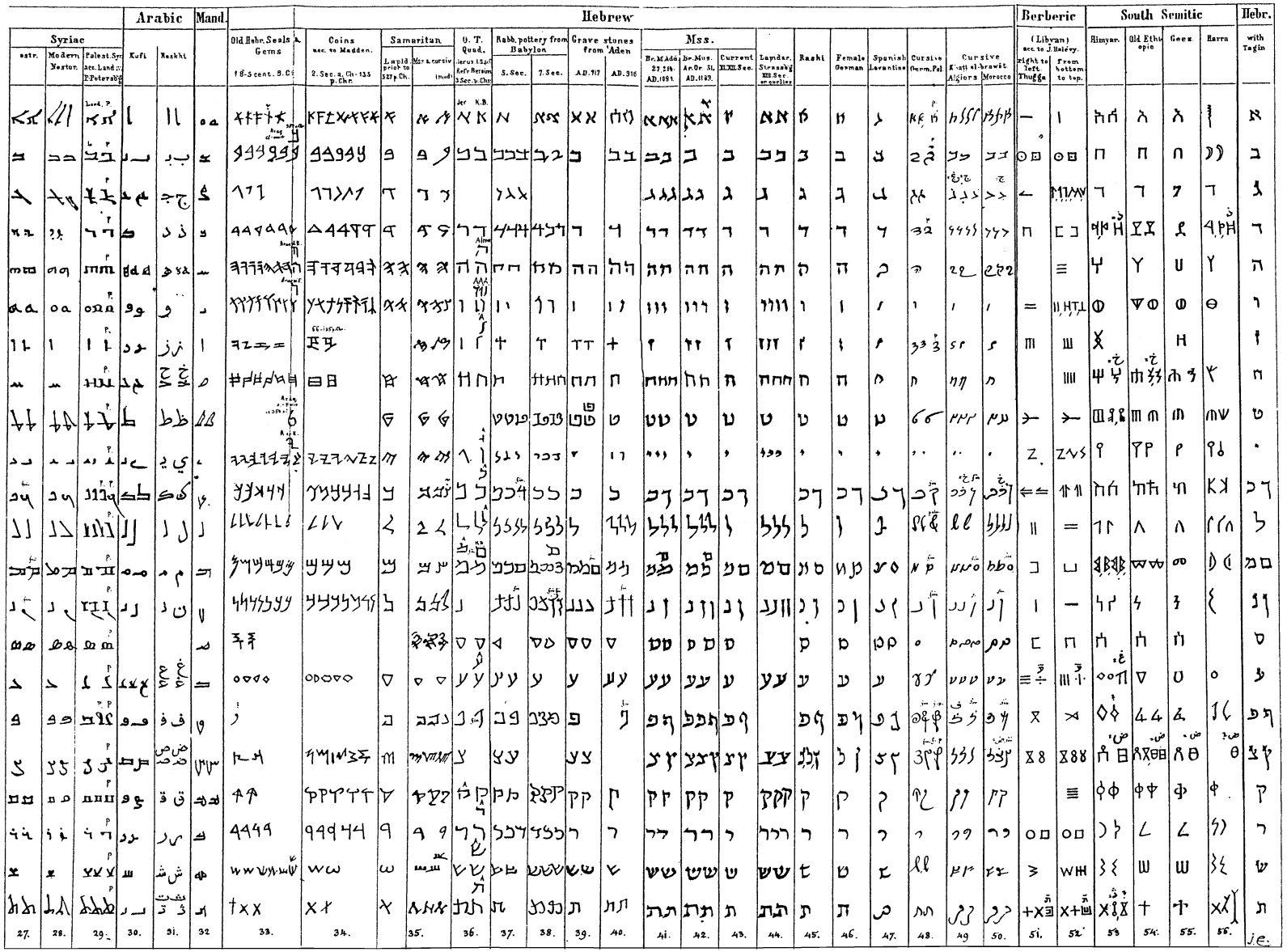

Figure 1 A chart of the West Semitic scripts drawn by Julius Euting in 1877 (most recently reprinted in *Israel Oriental Studies 20* [2002]: 112–115; reproduced courtesy of the publisher, James E. Eisenbraun).

epigraphs are dated internally, which affords a more precise palaeographic treatment of the script's history. The script was extremely conservative developmentally with negligible alterations during the 140-year period of the internal dates (Naveh, 1987). Armenian and Georgian appropriations of the script introduced respective modifications, but the Hatran scribes themselves championed a consistency of reproduction that speaks to a tightly controlled curriculum.

Aramaic and the Indian Scripts

Brāhmī and Kharoṣṭhī are the earliest scripts of the Indian subcontinent to appear following the demise of the Indus Valley script. They record Prakrit or Middle Indo-Aryan languages. Scholars have long recognized the indebtedness of these scripts to the West Semitic writing system (Salomon, 1998), although some Indologists (Dani, 1986) have stressed Indian innovation in the form of modifications to represent syllabic vocalization. The recovery of six Aśokan inscriptions in Aramaic confirms the long-held suspicion that Aramaic was the parent script of Brāhmī, while the new Gandhara epigraphs speak strongly for a palaeographic relationship between Aramaic and Kharoṣṭhī (Salomon, 1999). We have no extant specimens of these scripts earlier than the 3rd century B.C.E., but the palaeographic points of contact with Aramaic argue for a considerably earlier date for the adoption of Brāhmī (McCarter, 1992) and Kharoṣṭhī under Achaemenid chancery auspices. The recent discovery of an 8th-century B.C.E. Aramaic royal inscription from Bukān (Lemaire, 1998), well beyond the borders of the Assyrian empire, may provide a precedent for such scribal transmission to parts far afield.

See also: Aramaic and Syriac; South and Southeast Asia: Scripts.

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Asia, Ancient Southwest: Scripts, Modern Semitic

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By 1100 B.C.E. the seafaring Semitic-speaking Canaanites of the eastern Mediterranean had a writing system consisting of 22 letters representing consonants. The Greeks came into contact with this people between the 11th and 8th centuries B.C.E. and named them 'Phoenicians' for the purple dye for which they were famous. Neighboring Semitic-speaking peoples, the Hebrews, Moabites, and Arameans, also used this consonantal alphabet for their closely related languages. The Phoenicians seem most directly responsible for transmitting the consonantal writing system to the Greeks, and from them the Etruscans and Romans would adapt it a few centuries later. In the Middle Ages, the Europeans would make variations on the Latin version, and the Slavs would fashion a version of the Greek alphabet. Written Moabite had a fairly short literary life in the first half of the first millennium B.C.E., and in the second half of that millennium, the Hebrews adopted the Imperial Aramaic style of writing these letters. In the first centuries C.E. the Arabic-speaking Nabateans also adopted a version of the Aramaic script, and the modern cursive Arabic script would arise with the rise of Islam in the second half of the first millennium C.E.

This Semitic system represented consonant segments only and not vowels. Peter Daniels has termed such a selectively segmental writing system an 'abjad,' based on the first four letters ⟨', b, j, d⟩ of the Arabic name for this system (in Arabic the sound /g/ shifted to /dʒ/.). Hebrew and Aramaic also used this writing system, but even though they had slightly larger consonant inventories than Phoenician, they created no new letters to meet the need. In succeeding centuries, ironically, consonant mergers in these languages would make a more adequate grapheme–phoneme fit. That ancient abjad has four modem descendants in the Middle East used for writing four Semitic literary languages: Hebrew, Arabic, and two varieties of Aramaic called Syriac and Mandaic (Figure 1 of **Asia, Ancient Southwest: Scripts, Middle Aramaic** cols. 27, 28, 31, 32, 57). (Later adaptations of these scripts for non-Semitic languages – the Hebrew abjad for Yiddish, Ladino, and Judeo-Arabic, among others; the Arabic abjad for Pashto, Urdu, Ottoman Turkish, Kurdish, and Uyghur – became increasingly alphabetic, that is, they revalued some consonant letters to represent vowel segments more consistently on an equal plane with consonants. The details lie outside the scope of the present article.)

Text proceeded then, as now, from right to left across the writing surface. (Compare modern Amharic in Ethiopia, descended in the Christian era from the Old South Arabian cousin to the Phoenician abjad, which has reversed direction to left-to-right.) The original letters had one form for all positions in a word. The modern descendants (except Mandaic) have developed allographs for word-final position irrespective of the type of word or its position in the sentence. The current 'square' shapes of Hebrew developed as varieties of Aramaic toward the end of the first millennium B.C.E. Along with this, four Hebrew letters, ⟨k, n, p, ṣ⟩, kept their downward stroke word-finally but bent it leftward when followed by another letter in the same word, that is, word-initially and word-medially. Thus the forms now designated 'final' forms are actually the original forms, and the nonfinal came later. The originally jagged line of ⟨m⟩ closed into a square word-finally and a more rounded figure with an open lower left corner nonfinally. As Arabic developed several hundred years later, its cursive style came to finish all but four of its letter shapes – ⟨', w, d, r⟩ (and the last two add a dot for ⟨ð, z⟩ respectively) – with a flourish or tail. Syriac, also written in a cursive style, has somewhat fewer distinct final forms. (Compare the later Greek-Roman-Cyrillic family of alphabets with complete parallel letter sets called upper and lower case. Upper case is usually reserved for sentence-initial position for all words and word-initial position for certain kinds of words and lower case for the rest of the word and the rest of the words in the sentence.)

These superficial changes in the letter shapes of each of the four systems have not altered their basic principles of operation: one symbol still represents one speech sound, specifically consonant phonemes. The dual function of the letters for glide consonants will be discussed below.

Consonant Inventories

The stock of 22 letters for the consonant phonemes of Hebrew and Aramaic remained stable till the end of the first millennium B.C.E. The six nonpharyngealized stops of these languages, /p, t, k, b, d, g/, had phonetically postvocalic fricative alternates, and the script did not represent them. (The chronology of the rise of that stop/fricative alternation is still controversial and arose in Hebrew and Aramaic at different times.) Arabic script, developing in the middle of the first

millennium C.E., increased the letter inventory to 28 by adding one, two, or three dots to existing consonant letters. Some of these dots also served to distinguish several letter shapes that had become too similar. The movement toward vowel dots in these scripts during the second half of the first millennium C.E., to be discussed below, also included for Hebrew and Aramaic/Syriac the practice of distinguishing the stop/fricative alternates by a dot: Hebrew opposed a dot in the letter for the stop to the letter without a dot for the fricative, while Syriac placed a dot above and below respectively.

In Hebrew the increasing phonemicization of these stops and fricatives has still not led to the creation of new letters. Modern Hebrew /f/, for example, is both an automatic variant of /p/ and also a phoneme in foreign borrowings. Although this does not change the letter, it certainly changes the distribution and the modern speaker's ability to read unfamiliar text. Formerly an older borrowing such as *pilosofiya* 'philosophy' had word-initial /p/ and postvocalic /f/, but in many modern people's speech it has been in a sense reborrowed as *filosofiya* with initial /f/. Hebrew spelling cannot show this without these additional dots, with which it in any case dispenses in normal modern writing.

Modern Hebrew and Syriac, similarly, have both experienced phonological reduction through consonant mergers – for example, loss of pharyngealized dentals in Hebrew (older pharyngealized /ṭ/ merging with plain /t/) or loss of pharyngeals in both languages – but retain all the historical letters, creating a largely historical, morphological spelling. The only new graphic element in modern Hebrew is the diacritic apostrophe for new palatal phoneme in foreign borrowings. Two existing dentals ⟨ṣ, z⟩ and the velar ⟨g⟩ add this mark to converge on the palate as /tʃ, ʒ, dʒ/, respectively.

The original ABGDH order of the letters as preserved in some Hebrew acrostic texts (e.g., Psalm 119) came to serve the dual purpose of numerical representation, possibly one of the factors that helped maintain the order. Arabic with its new dotted consonant letters reorganized the alphabet by letter shape. This results in an initial sequence glottal stop, b-t-θ, j-ḥ-x, d-ð, r-z, s-ʃ, ṣ-ḍ, ṭ-ẓ, '-ġ, f-q, k, l, m, n, h, w, y. Nonetheless, modern Arabic can still resort to the old 'Semitic' order for numbering and outlining.

Vowel Representation with Existing Resources

Toward the end of the second and beginning of the first millennium B.C.E., each letter represented a single consonant segment. Aramaic, early in the first millennium B.C.E., however, extended the letters for the glide consonants ⟨y, w, h, '⟩ to represent long vowels as well, a technique termed *matres lectionis* 'mothers of reading' or 'reading aids.' The palatal glide letter ⟨y⟩ represented the front vowels /iː/ and /eː/; the labial glide letter ⟨w⟩ covered the back vowels /uː/ and /oː/. Both ⟨h⟩ and ⟨'⟩ signaled the nonhigh vowels /aː/ and /eː/ but only word-finally. Hebrew eventually followed in this practice as well and continues till today. Short vowels found no representation in this early period. Interestingly, Phoenician itself did not participate in this development and remained solely consonantal for the duration of its existence (its later colonial development, called Punic, did begin to represent vowels toward the end of its existence). It is still a matter of discussion whether the Semites innovated this extension independently or were influenced by the Greeks, who, in borrowing the Phoenician abjad, revalued the glide letters as the familiar vowel letters A-E-I-O-Y/U on an equal graphic plane with the consonants. (Since the Greeks did this consistently for all vowel segments, their system is regarded as the first 'true alphabet' in the sense of representing all segments by equal characters.)

Over a millennium later the Arabic script emerging in the age of Islam retraced these same steps for its three-vowel system: ⟨y⟩ for /iː/, ⟨w⟩ for /uː/, and, in a new development, ⟨'⟩ for /aː/ anywhere in the word. The only short vowel represented is /a/, by ⟨h⟩ but only word-finally and specifically the feminine singular noun ending, e.g., *madiːna* 'city' written ⟨mdynh⟩; *kataba* 'he wrote' written ⟨ktb⟩; *rusuːl* 'messenger' written ⟨rswl⟩; *kitaːb* 'book' appears as ⟨kt'b⟩. Under some circumstances, especially in morphological alternation with the diphthong /ai/, ⟨y⟩ serves for final /aː/ as in *bana* 'he built,' written ⟨bny⟩, compared with the *banaytu* 'I built,' written ⟨bnyt⟩. Post-Biblical Hebrew and Aramaic incorporated *matres lectiones* as a matter of course but did not insert them into the existing Biblical text.

Innovations in Vowel Representation

Preserving the correct pronunciation of sacred texts in these languages became a major occupation during the second half of the first millennium C.E., and each society introduced systems of adlinear dots and dashes superimposed over the canonical consonantal text as consistent and nearly unambiguous representations of vowel segments, a technique called 'vocalization' or 'pointing.' Texts in these languages, then, are designated un/vocalized or un/pointed, that is, with or without maximal vowel representation beyond the *matres lectionis*. The Syriac grammarians

pioneered this technique. Several generations of Hebrew scholar-copyists with schools in Tiberias and Babylon were known as the Massoretes ('preservers and transmitters', from Hebrew *masora* 'tradition'), and their texts preserve the Massoretic text of the Hebrew Bible. Three quite different vocalization systems – Palestinian, Babylonian, Tiberian – were in use, but Tiberian emerged as the one standard system. Arabic tradition also had ways of verifying and preserving the revealed text of the Qur'an. Vowels are thus represented by signs of a qualitatively different nature from consonant signs (and *matres lectionis*). The 'letters' provided a consonantal skeleton and the superimposed dots represented the vowel segments.

Hebrew and Syriac devised dots for all their vowel qualities and quantities and, unusually, recognized both phonemes and allophones, particularly for the mid vowels. The *matres lectionis* represented long vowels, but the Syriac and Hebrew systems amplified their representation to include nonfinal /aː, eː/ and for the first time included all the short vowels as well. The Hebrew [h] glide represented a vowel only word-finally and specifically the nonhigh vowels /a, e/ as well as a very few instances of /o/. The other crucial feature of this 'vocalized abjad' is that the dots are optional. Modern Hebrew, for example, uses them only in Bible texts, dictionaries, poetry, children's books, and some textbooks, and indeed they represent a much richer vowel system than that of modern Israeli Hebrew.

Eastern and Western Syriac vocalized on similar principles, recognizing long and short vowels somewhat differently, but the visual difference was quite apparent. Eastern Syriac used dots like Hebrew, but Western Syriac, being closer to the Greek sphere of influence, actually used small Greek vowel letters above its consonant letters.

Mandaic has moved farthest away from the 'abjad' principle. It spells virtually all its vowels with *matres lectionis*, retracing the steps of the Greeks in creating a 'true alphabet' with equal symbols for consonants and vowels. One can observe the same kind of development in the Arabic script adaptations for, e.g., Kurdish and Uyghur.

See also: Arabic; Aramaic and Syriac; Hebrew, Israeli.

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Asia, Ancient Southwest: Scripts, South Semitic

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Earliest Evidence

Among the late second millennium tablets excavated at Ras Shamra, the ancient site of Ugarit, a dozen or so, referred to as abecedaries, simply contain the thirty-odd letters of the Ugaritic cuneiform alphabet in a certain order. Almost all of these are in an order beginning 'ʔ b g (ḫ) d . . .' homologous to the 'ʔ b g d . . .' order familiar from the Hebrew alphabet, and distantly reflected in the 'a b c d . . . '/'α β γ δ . . .' of the Roman/Greek alphabets. One of these texts, however, excavated in 1988, which is duplicated by a tablet found far to the south, at Beth Shemesh in contemporary Palestine, shows an order beginning 'h l ḥ m . . .' (Bordreuil and Pardee, 1995). This is exactly the beginning of the traditional order of characters in Ethiopic script (see the traditional order in **Figure 4**), and in both the Ancient South Arabian and Ancient North Arabian scripts, as known from both native abecedaries and other evidence (see Ryckmans, 1985; Irvine and Beeston, 1988; cf. Macdonald, 2004a, 494). **Figure 1** shows the intuitively clear formal relationship of the Ancient Arabian scripts and Ethiopic to each other. Although the three 'alphabetic' orders show some important differences in the further ordering of some of the subsequent signs (see

pioneered this technique. Several generations of Hebrew scholar-copyists with schools in Tiberias and Babylon were known as the Massoretes ('preservers and transmitters', from Hebrew *masora* 'tradition'), and their texts preserve the Massoretic text of the Hebrew Bible. Three quite different vocalization systems – Palestinian, Babylonian, Tiberian – were in use, but Tiberian emerged as the one standard system. Arabic tradition also had ways of verifying and preserving the revealed text of the Qur'an. Vowels are thus represented by signs of a qualitatively different nature from consonant signs (and *matres lectionis*). The 'letters' provided a consonantal skeleton and the superimposed dots represented the vowel segments.

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Earliest Evidence

Among the late second millennium tablets excavated at Ras Shamra, the ancient site of Ugarit, a dozen or so, referred to as abecedaries, simply contain the thirty-odd letters of the Ugaritic cuneiform alphabet in a certain order. Almost all of these are in an order beginning 'ʔ b g (ḫ) d . . .' homologous to the 'ʔ b g d . . .' order familiar from the Hebrew alphabet, and distantly reflected in the 'a b c d . . . '/'α β γ δ . . .' of the Roman/Greek alphabets. One of these texts, however, excavated in 1988, which is duplicated by a tablet found far to the south, at Beth Shemesh in contemporary Palestine, shows an order beginning 'h l ḥ m . . .' (Bordreuil and Pardee, 1995). This is exactly the beginning of the traditional order of characters in Ethiopic script (see the traditional order in Figure 4), and in both the Ancient South Arabian and Ancient North Arabian scripts, as known from both native abecedaries and other evidence (see Ryckmans, 1985; Irvine and Beeston, 1988; cf. Macdonald, 2004a, 494). Figure 1 shows the intuitively clear formal relationship of the Ancient Arabian scripts and Ethiopic to each other. Although the three 'alphabetic' orders show some important differences in the further ordering of some of the subsequent signs (see

Value †	Ugaritic	South Arabian	(cf. Ethiopic)
h	𐎍	𐩨	ሀ
l	𐎛	𐩡	ለ
ḥ	𐎗	𐩩	ሐ
m	𐎘	𐩣	መ
q	𐎚	𐩪	ቀ
w	𐎝	𐩥	ወ
s^2 (θ)	𐎜	𐩬	ሠ
r	𐎞	𐩧	ረ
b	𐎟	𐩠	በ
t	𐎠	𐩫	ተ
s^1 (š)	𐎡	𐩮	ሰ
k	𐎢	𐩲	ከ
n	𐎣	𐩯	ነ
ḫ	𐎤	𐩱	ኀ
ṣ	𐎥	𐩰	ጸ
s^3 (s)	𐎦	𐩭	
f (p)	𐎧	𐩤	ፈ
ʾ	𐎨	𐩵	አ
ʿ	𐎩	𐩺	ዐ
ḏ (ẓ)	𐎪	𐩸	ፀ
g	𐎫	𐩴	ገ
d	𐎬	𐩷	ደ
γ	𐎭	𐩶	
ṯ	𐎮	𐩻	ጠ
z	𐎯	𐩹	ዘ
δ	𐎰	𐩼	
y	𐎱	𐩾	የ
θ		𐩽	
ẓ		𐩿	

† (Ugaritic value)

Figure 1 South Semitic script order (Daniels, 1997, 34, Table 2.5).

discussion in Daniels, 1997), the existence of these 'South Semitic'-type abecedaries at that period in Ugaritic, together with the clear formal relationship of at least some of the South Semitic characters to their North Semitic counterparts (compare Figures 1 and 3), show that the South Semitic writing tradition is not only quite ancient, but also shared, at least at one point in time, a cultural context with the North Semitic tradition.

Epigraphic South Arabian

The earliest contextualizable attestations of the South Semitic script are in monumental inscriptions which begin to appear in the 8th century B.C.E. in a series of city-states – Maʿin, Saba ('Sheba'), Qataban, Hadramawt – along wadis draining the Yemeni and eastern Omani highlands into the southwestern and southern edge of the great Arabian desert, the Empty

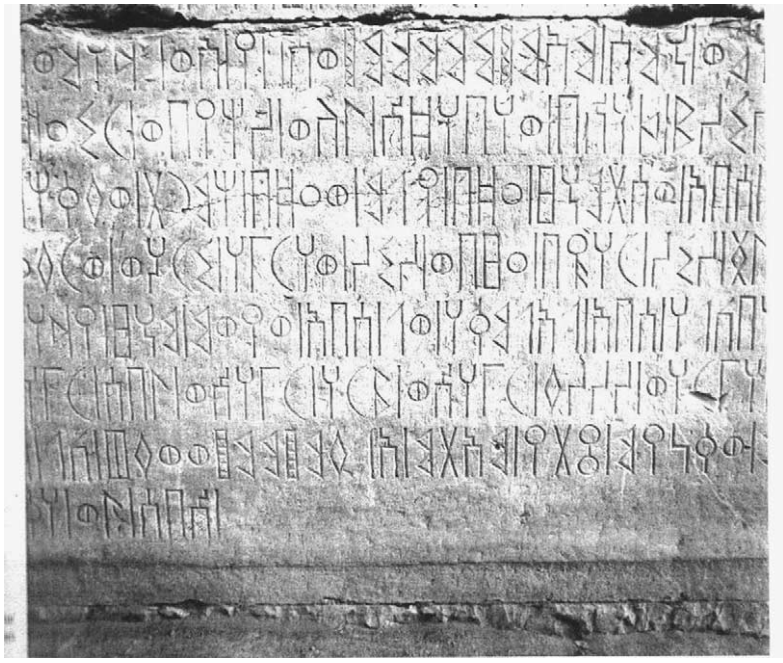

Figure 2 Example of ''classic'' South Arabian inscription (Nebes N & Stein P [2004]. 'Ancient South Arabian.' In Woodard R (ed.) *The Cambridge encyclopedia of the world's ancient languages.* [Cambridge. Cambridge University Press], 457, Figure 15.1).

Quarter. Stemming from a long second millennium tradition of urbanization and agriculture on the terraced and irrigated highlands, these desert-edge polities derived much of their influence and prosperity from being well situated to control the various stages of the incense route between the indigenous regions for frankincense and myrrh to their point of transshipment up the Hijaz to the Mediterranean world.

The earliest Ancient South Arabian texts are already cleanly incised on prepared stone surfaces with uniform geometric characters, whose consistent transformations can be tracked across generations of scribal ductus (Figure 2). Words are neatly separated by a vertical line serving as word-divider, but there is no other consistent punctuation. Compared with some North Semitic writing systems, only a restricted use is made of consonants such as *w, y, ʔ, h* to indicate vowel quality or length. The writing of many of the earliest Sabaic texts, from the 8th to the 4th centuries B.C.E., is *boustrophedon*, that is, starting out on the top line in one direction, the next line will be written in the other direction, and so on (as the ox plowing a field turns up one row and down the next). Although it is used in shorter texts, the formative context of this writing style may have been very long inscriptions running the length of a building, where the reader would not be obliged to go all the way back to the other end of the structure to continue to follow the text. After the 4th century, however, Epigraphic South Arabian is written consistently from left to right (again, as opposed to North Semitic systems). According to the dating system that eventually evolved, the last of the South Arabian monumental texts comes from the mid 6th century (554–559) C.E.

It has always been supposed that once a writing system was developed for the various South Arabian dialects it would have been used for utilitarian administrative and economic purposes. Indeed, many Ancient Near Eastern parallels suggest that it would have been put to use for utilitarian purposes first, and only then adapted for monumental, religious, and cultural ends. However, apart from ubiquitous graffiti, which attracted little interest next to the many thousands of beautifully written monumental texts, almost nothing was known about eventual practical applications of Ancient South Arabian writing until it was realized in the 1970s that markings on thin wood sticks or strips – often the central spine of palm fronds – actually represented a cursive form of Ancient South Arabian. Since then several thousand of these have been identified, most apparently dating from the 2nd and 3rd centuries C.E. Written in a highly transformed, cursive writing system and dealing with an entirely different range of subject matter – inventories, loans, letters, etc. – their interpretation has been slow and difficult. But the several dozen that have been published have already thrown new light on the language – for example, in giving abundant attestations of second person forms, hitherto virtually absent from the highly stereotyped

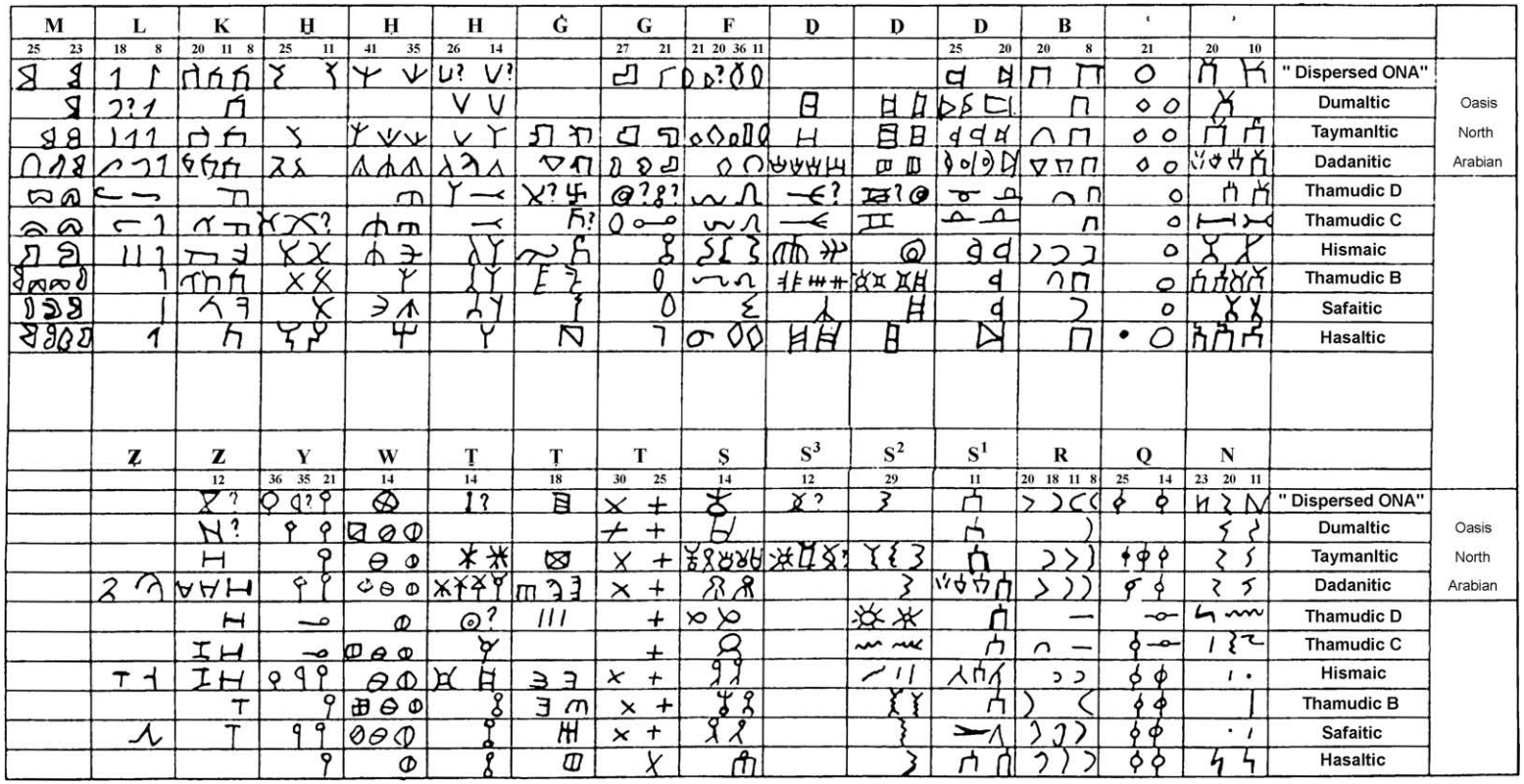

f0015 **Figure 3** North Arabian scripts (Macdonald, 2004a, 496, Figure 16.3).

formulae of the monumental texts, which refer to participants in recorded activities exclusively in the third person.

Early Epigraphic North Arabian

Ancient North Arabian is a group of interrelated dialects attested in well over 40 000 inscriptions, for the most part graffiti, from settled ('oasis') and nomadic populations in central and north Arabia, southern Syria, and eastern and southern Jordan, between the 8th century B.C.E. and the 4th century C.E. Ancient North Arabian dialects are themselves closely related to, but distinct from, Arabic 'proper' – Classical, Qur'anic, and Modern – and Arabic and Ancient North Arabian both belong to a branch of Semitic distinct from that of Ancient South Arabian (on the complex classification questions involved here see Macdonald, 2004a).

However distinct linguistically Ancient Northern and Southern Arabian may have been, they are clearly both using the same South Semitic writing systems (compare **Figures 1 and 3**). It is not certain to what extent the system used by the various Ancient North Arabian dialects was simply borrowed as such from their Ancient South Arabian contacts in the incense trade (as they shuttled the precious merchandise between Yemen and the Mediterranean world), and to what extent it may represent an independent continuation of a South Semitic writing tradition in the northern part of its range. Some features of writing style are distinctly nonsouthern, for example, a predominantly right-to-left direction of writing in the great oases, while many of the nomadic graffiti are written in any direction, according to the whims of the writer and/or the disposition of the ad hoc writing surface. On the other hand, certain oasis monumental inscriptions are boustrophedon, and use word-dividers. An absence of the use of consonants as auxiliary vowel indicators is common to both Southern writing traditions.

Ethiopic

The genetic relationship between Ancient South Arabian and Ethiopic Semitic language groups (and Modern South Arabian, which in any case has no writing tradition) is at least as complicated as that between Ancient South Arabian and Ancient North Arabian. However, in this case, the writing system as well is clearly South Semitic (see **Figure 1**). Moreover, here it seems fairly certain that it was Ancient South Arabians who were the bearers into Ethiopia of this writing system. It is clear that Ancient South Arabian trader-colonists had established by the 5th century B.C.E. urban centers on the Ethiopian highland with typical South Arabian religious and cultural institutions, including religious buildings with typical Ancient South Arabian monumental inscriptions.

The cultural relationship and balance of power between Ethiopia and South Arabia shifted back and forth in the centuries succeeding first colonization, and by the 1st century C.E. Aksum, a powerful city-state on the Ethiopian highland not far from an earlier Ancient South Arabian settlement, exercised tight control over commercial traffic in the southern part of the Red Sea. Monumental inscriptions appear written in Ge'ez, the Ethiopic Semitic language of Aksum, with distinctly Ethiopian character shapes. The earliest inscriptions are in a nonvocalized script, completely isomorphic to the script of Ancient South Arabian – in fact a few inscriptions, mistakenly called bilingual (or trilingual if they also involved a parallel version translated into Greek), have the same Ge'ez text written in Ethiopic and in South Arabian characters. At one point, toward the middle of the 4th century C.E., a king named Ezana, whose earlier inscriptions had been polytheistic (involving in part deities from the South Arabian pantheon) and unvocalized, begins to write inscriptions that invoke a monotheistic god *ʔəgziʔabḥer* 'Lord of the Earth' (who is or becomes identified with the Christian god; a similar process took place over a longer period of time in Southern Arabia).

At this point a capital development takes place in the writing system, the creation of a vocalization system, and in a way that is completely at variance with the evolution of vowel notation systems in other Semitic alphabets. Instead of indicating vowels by line or point diacritics, as in Hebrew or Arabic, or by above-line or under-line vowel symbols, as in Syriac, a vowel following the consonant is indicated by modifying, more or less consistently across the system, the basic shape of the consonant symbol itself. Each of the twenty-five consonant symbols is provided with six variants, making a total of seven shapes for the consonant followed by one of the seven vowels of Ge'ez: *ä u i a e ə o* (in the traditional syllabary order). The base shape was reinterpreted as C + ä, and the others were assigned in the traditional order, giving *Cä Cu Ci Ca Ce Cə Co*. The four labiovelars q^w $ḫ^w$ k^w g^w represent a special case, since (1) they could not be followed by a rounded vowel *u o* and (2) they apparently had no base shape in the unvocalized alphabet. For these phonemes a graphic representation was created by making five additional variants on the base *q ḫ k g* shape. Altogether this modification process yielded out of the twenty-five character alphabet a 257×7 (= 175 member) main syllabary grid, plus a 47×5 (= 20 member) secondary

	Classical Ethiopic							*Additional letters for Amharic*									
	ä	u	i	a	e	ɔ	o	ʷa		ä	u	i	a	e	ɔ	o	ʷa
h	ሀ	ሁ	ሂ	ሃ	ሄ	ህ	ሆ										
l	ለ	ሉ	ሊ	ላ	ሌ	ል	ሎ	ሏ									
ḥ	ሐ	ሑ	ሒ	ሓ	ሔ	ሕ	ሖ										
m	መ	ሙ	ሚ	ማ	ሜ	ም	ሞ	ሟ									
š	ሠ	ሡ	ሢ	ሣ	ሤ	ሥ	ሦ										
r	ረ	ሩ	ሪ	ራ	ሬ	ር	ሮ	ሯ									ሧ riyä
s	ሰ	ሱ	ሲ	ሳ	ሴ	ስ	ሶ	ሷ	š	ሸ	ሹ	ሺ	ሻ	ሼ	ሽ	ሾ	
q	ቀ	ቁ	ቂ	ቃ	ቄ	ቅ	ቆ										
qʷ	ቈ		ቊ	ቋ	ቌ	ቍ											
b	በ	ቡ	ቢ	ባ	ቤ	ብ	ቦ	ቧ									
t	ተ	ቱ	ቲ	ታ	ቴ	ት	ቶ	ቷ	č	ቸ	ቹ	ቺ	ቻ	ቼ	ች	ቾ	ቿ
ḫ	ኀ	ኁ	ኂ	ኃ	ኄ	ኅ	ኆ										
ḫʷ	ኈ		ኊ	ኋ	ኌ	ኍ											
n	ነ	ኑ	ኒ	ና	ኔ	ን	ኖ	ኗ	ñ	ኘ	ኙ	ኚ	ኛ	ኜ	ኝ	ኞ	ኟ
ʾ	አ	ኡ	ኢ	ኣ	ኤ	እ	ኦ										ኧ ä
k	ከ	ኩ	ኪ	ካ	ኬ	ክ	ኮ		ḫ	ኸ	ኹ	ኺ	ኻ	ኼ	ኽ	ኾ	ዃ
kʷ	ኰ		ኲ	ኳ	ኴ	ኵ											
w	ወ	ዉ	ዊ	ዋ	ዌ	ው	ዎ										
ʿ	ዐ	ዑ	ዒ	ዓ	ዔ	ዕ	ዖ										
z	ዘ	ዙ	ዚ	ዛ	ዜ	ዝ	ዞ	ዟ	ž	ዠ	ዡ	ዢ	ዣ	ዤ	ዥ	ዦ	ዧ
y	የ	ዩ	ዪ	ያ	ዬ	ይ	ዮ										
d	ደ	ዱ	ዲ	ዳ	ዴ	ድ	ዶ	ዷ	ǰ	ጀ	ጁ	ጂ	ጃ	ጄ	ጅ	ጆ	ጇ
g	ገ	ጉ	ጊ	ጋ	ጌ	ግ	ጎ										
gʷ	ጐ		ጒ	ጓ	ጔ	ጕ											
ṭ	ጠ	ጡ	ጢ	ጣ	ጤ	ጥ	ጦ	ጧ	č	ጨ	ጩ	ጪ	ጫ	ጬ	ጭ	ጮ	ጯ
ṗ	ጰ	ጱ	ጲ	ጳ	ጴ	ጵ	ጶ										
ṣ	ጸ	ጹ	ጺ	ጻ	ጼ	ጽ	ጾ	ጿ									
ḍ	ፀ	ፁ	ፂ	ፃ	ፄ	ፅ	ፆ										
f	ፈ	ፉ	ፊ	ፋ	ፌ	ፍ	ፎ	ፏ									
p	ፐ	ፑ	ፒ	ፓ	ፔ	ፕ	ፖ										

Figure 4 Ethiopic syllabary (Daniels, 1997, 39, Table 2.10).

sub-syllabary; a j̄ was added as well (Figure 4). In addition the writing system had, continuing a South Arabian tradition, a word-divider, which became two vertically aligned dots in the Ethiopic system.

It is sometimes suggested that the rise of the vowel system was caused by the necessity of a fully vocalized writing system for the translation of the Bible that followed on the conversion of Ethiopia to Christianity. It should be pointed out, however, that if the vocalized monotheistic monumental texts are indeed correctly dated to the 4th century, these texts antedate by at least two centuries the arrival of the refugee Syrian monophysite monks who are credited in the Ethiopian tradition with translating the Bible into Ge'ez. In any case the monumental tradition weakened considerably after Ezana, and a long Dark Age ensued, corresponding roughly to the Islamic conquest. This was a period, lasting up until the 11th century, of nearly absolute isolation of Ethiopia from the Mediterranean, and during this time virtually no manuscripts are known. When the manuscript tradition resumes, we see again that the vocalized writing

system known from the 4th century is the sole norm for writing Ge'ez. It is a writing tradition that continues uninterrupted into the present, the sole surviving representative of the South Semitic writing tradition.

Although Ge'ez is still used up to the present time as a written ecclesiastical language, from the 17th century on, and increasingly since the end of the 19th century, modern Ethiopic Semitic languages, and especially Amharic and Tigrinya (Tigrigna), the most important Ethiopic Semitic national languages of Ethiopia and Eritrea, respectively, have become standardized written languages and the principal normal vehicles of administration, mass media, and education. The traditional syllabary is viable for both of these languages because both maintain the 7-vowel system of Ge'ez. Whereas some distinctions present in Ge'ez were lost in the consonantal systems (and indeed had begun to be lost in late inscriptional Ge'ez), the written consonant inventory of Ge'ez is maintained intact, with characters representing merged phonemes, such as s and š functioning as allographs. In fact, in Amharic and Tigrinya (as well as most other modern Ethiopic Semitic languages) a new phoneme š emerged, as did a whole series of new palatal consonants. For these, new graphemes were systematically created where possible by placing a 'hat' on top of the corresponding nonpalatalized consonant. (Similar means were used to create a 'v' out of a spirant 'b,' and an 'x' out of a spirant 'k,' where required.)

Thanks to a minimal adaptation, the continued survival of the South Semitic writing system seems assured in the case of Amharic and Tigrinya, and perhaps for a few other Ethiopic Semitic languages whose use is being encouraged in local administration and education. However, many of the new written languages of Ethiopia, in particular the widely spoken Cushitic language, Oromo, having successfully resisted earlier political and cultural pressures to use the traditional syllabary, are resolutely proceeding with Latin-character-based writing systems.

See also: Amharic; Ethiopia: Language Situation; Ethiopian Semitic Languages; Ge'ez; Tigrinya.

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Asia, Inner: Scripts

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Introduction

A number of disparate writing systems were devised between the 6th and 17th centuries for several non-Chinese languages in states founded on or near traditionally Chinese territory: the Khitan, Jurchen, and Tangut scripts, inspired by Chinese script; Turkic runiform, Old Uighur, Mongolian, and Manchu scripts, descended from Soghdian scripts; and the 'Phags-pa script, adapted from Tibetan script (*see* **Tibet: Scripts**). Earlier Inner Asian scripts are mentioned in Chinese sources, especially that of the Toba (Tabghach) Wei state of northern China (386–534), but they seem to have left no remains. While many of these scripts have been superseded or have died out, the Mongolian and Manchu scripts survive to this day. The term 'Inner Asia' is here to be taken in a loose cultural sense to refer to steppe-based nomadic societies in the Chinese cultural sphere and Buddhist or animist in religion, in the steppe regions east of Islamic Central Asia. The languages of Islamic Central Asia are predominantly Turkic and Indo-Iranian (Yakut is the only significant non-Islamic Turkic language) and as part of the Islamic world have been heavily influenced by Persian and Arabic and have been written in Arabic script since Islamization. Inner Asian languages, on the other hand, are Mongolic, Tungusic, and Sino-Tibetan, and the development of their scripts was shaped by Chinese ideals of statecraft and by religion (chiefly Buddhism).

The writing systems predating the Mongol empire – Khitan, Jurchen, Tangut, Turkic, and Uighur – were created at the behest of non-Chinese rulers of states containing substantial sedentary populations, primarily Chinese, who continued to be governed in their native languages by traditional sedentary administrations. (Mote, 1999: 39). These states were rivals of several Chinese dynasties that demanded from them the traditional signs of submission (e.g., the use of the current dynastic calendar and reign-year titles); promulgating a non-Chinese writing system for the elite language signified the rulers' legitimacy and equality in Chinese terms. Similarly, the patronage of Buddhism, which the Chinese elite viewed as a foreign doctrine despite its popularity among the Chinese people, secured non-Chinese rulers the support of a universalist religion with a highly educated clergy claiming great magical power. (Mote, 1999: 43–44, 398–399).

However, it was only when the ruling peoples became sedentary that much imaginative literature came to be written – aside from translations of the Buddhist scriptures – among the Uighurs after the 9th century, and probably among the Tanguts. Thus, the great part of what survives in the other pre-Mongol scripts consists of inscriptions and translations of Chinese and Uighur Buddhist texts. The situation in the early Mongol empire was somewhat different, for the Mongol emperors saw themselves as ruling by sheer right of conquest and seem to have adopted writing purely for pragmatic reasons. After the end of Mongol rule in China (1368), however, Mongol rulers increasingly patronized Buddhism, which ensured the survival of Mongolian script after the 'Buddhist Renaissance' of the 16th century spread *Ge-lug-pa* ('Order of Virtue', known colloquially as 'Yellow Hats') Tibetan Buddhism to the Inner Asian steppes. Despite the prestige of Tibetan, Mongolian Buddhist terminology to this day remains a mixture of native terminology and Sanskrit, Tocharian, Soghdian, Uighur, Chinese, and even Greek loanwords. Mongolian also served as the language of diplomacy north of the Great Wall from the 15th century on; because of its religious and political significance, the script was adopted and reformed by the Manchu rulers as part of their effort to portray themselves as the legitimate successors of the Mongolian Great Khans and Ming emperors and as patrons of Tibetan Buddhism (Mote, 1999: 786–787).

Sinitic Inner Asian Scripts

Khitan and Jurchen (Chinggeltei, 2002)

The Khitans, a nomadic people of Manchuria who appear to have spoken an early Mongolic language, were unified in 907 and expanded to rule the Inner Asian steppes and North China south to the Yellow River by the 950s (Mote, 1999: 56–69). Their state, the Liao, fell to their former subjects the Jurchens between 1113 and 1125, though a member of the Khitan imperial family escaped to found a state in Central Asia, Kara Khitai ('Black/Great Khitans') or Western Liao, that lasted from 1131 to 1211 (205–206). The Jin (Chinese for 'gold') state of the Jurchens, a sedentary people of northeastern Manchuria who spoke an early form of Manchu, ruled North China until their destruction by the Mongols between 1213 and 1234. Abaoji, the Liao founder, ordered the creation of a Khitan script in 920, the Khitan large script; this was succeeded in 925 by the Khitan small script. Following the example of the Khitans, the Jin founder Aguda ordered the creation of the Jurchen large script

in 1120, supplemented by the Jurchen small script in 1138. Surviving Khitan texts are sparse and almost exclusively consist of memorial inscriptions from the Liao state (very few documents in Khitan script survive from the Western Liao); the Jurchens banned the diplomatic and administrative use of Khitan script in 1191 and archival materials from before this date appear not to have survived (219). While relatively few Jurchen texts have survived, their language is much better known than Khitan because Chinese dictionaries of Jurchen and other languages for use by translators and interpreters have survived (the Ming *Hua-Yi yiyu,* surviving in several manuscripts; the vocabularies from the Bureau of Translators list Jurchen characters, while those from the Bureau of Interpreters list only Jurchen pronunciations in Chinese transcription). Although Jurchen script was little used after the end of the Jin dynasty, texts survive from as late as c. 1550; its use was finally banned in 1658 by the Qing dynasty (Kane, 1989: 10).

Khitan and Jurchen texts were collected and studied by Chinese, Japanese, Korean, and Soviet scholars in the first half of the 20th century (particularly Luo Fucheng, Wang Qingju, and Li Dingkui), who made some progress in the decipherment of Khitan script by comparing identical elements of Khitan inscriptions and their Chinese paraphrases, such as names, official titles, and dates; this allowed the identification of some Khitan numerals, animal names, and other words. Real progress in deciphering Khitan script started in 1975 with the foundation of the Khitan Script Research Group of the PRC (principally Chinggeltei, Liu Fengzhu, Chen Naixiong, Yu Baolin, and Xing Fuli). By systematic comparison of the phonetic representation of Chinese names and titles in Khitan texts and from there working out the readings of native words, the readings have been determined for about 208 of 378 known small-script characters and the meanings of over 300 large-script characters (Chinggeltei, 2002: 100–113). Jurchen script was first studied in the West by Wilhelm Grube (1896), with scholarly interest picking up a half-century later. Significant work on Jurchen has been done by Chinggeltei and his colleagues, Jin Qicong, and Daoerji and Hexige (Dorji and Kheshig), with important reconstructions of Jurchen by Kiyose Gisaburo (1977) and Daniel Kane (1989), the latter concerned with spoken Jurchen. The discovery in 1979 of a manuscript dating from shortly after the creation of the script (the *Nüzhen zishu*) has allowed the development of the script to be traced (Kane, 1989: 8).

Khitan and Jurchen scripts look much alike and operate along the same principles. The large scripts were entirely logographic, while the small scripts included phonetic characters. The script was oriented like Chinese; in Khitan, small-script phonetic characters within a word are arranged horizontally in pairs, with the pairs arranged vertically to make triangular or oblong units of as many as seven characters, while Jurchen small-script characters are written sequentially. As Jurchen script developed, it became increasingly phonetic (roughly syllabic); multisyllabic roots written earlier with one logographic character came to be written with all but the first syllable written phonetically, rather like the modern Japanese system of *kanji* and *hiragana*, except that the script makes no rigid distinction between logographic and phonetic characters (Kane, 1989: 28–30). It is unclear whether Khitan script showed a similar development (**Figure 1**).

Tangut (Kychanov, 1995)

The Tanguts, who spoke a Tibeto-Burman language, founded the Xixia (Western Xia) state in modern-day Gansu between 983 and 1038; a Chinese-based script was promulgated in 1037 (Mote, 1999: 180–181). The Tangut rulers heavily patronized Buddhism as a protector of the state and commissioned complete Tangut translations of the Buddhist scriptures (the Tripitaka). In 1210 the Xixia surrendered to Chinggis Khan but refused to fulfill the resulting tributary duties, for which they were destroyed in 1227; the Mongols flattened and burned the Xixia capital Xingqing and killed most of the captives (254–257). This marked the end of most Tangut writing, though its use survived into the 16th century.

Many texts survived in Buddhist temples, including a number of Chinese-Tangut and monolingual Tangut dictionaries and translations of Chinese Buddhist texts and the Chinese classics, first discovered in 1908 by an expedition to Inner Mongolia under Pëtr Kozlov. (The Chinese scholar Zhang Zhu had identified specimens of the by then long-lost Tangut script in 1804, Mote, 1999: 180.) The sources (detailed in van Driem, 1991: 520–523) contain Chinese and Tangut indications of the readings of many Tangut characters (monolingual dictionaries indicate readings with the *fanqie* method), Tangut transliterations of Chinese and Sanskrit words, and Tibetan annotations in a few texts, which have permitted a number of (somewhat inconsistent) partial phonological reconstructions, of which the most important are those of Nishida Tatsuo (1966), Mikhail Sofronov (1968), and Li Fanwen (1986). Nikolai Nevsky carried out important early work on deciphering Tangut before his arrest and execution during the Great Purge of 1937. Tangut morphology and syntax are well understood, particularly through the work of Evgenii Kychanov and Ksenia Keping.

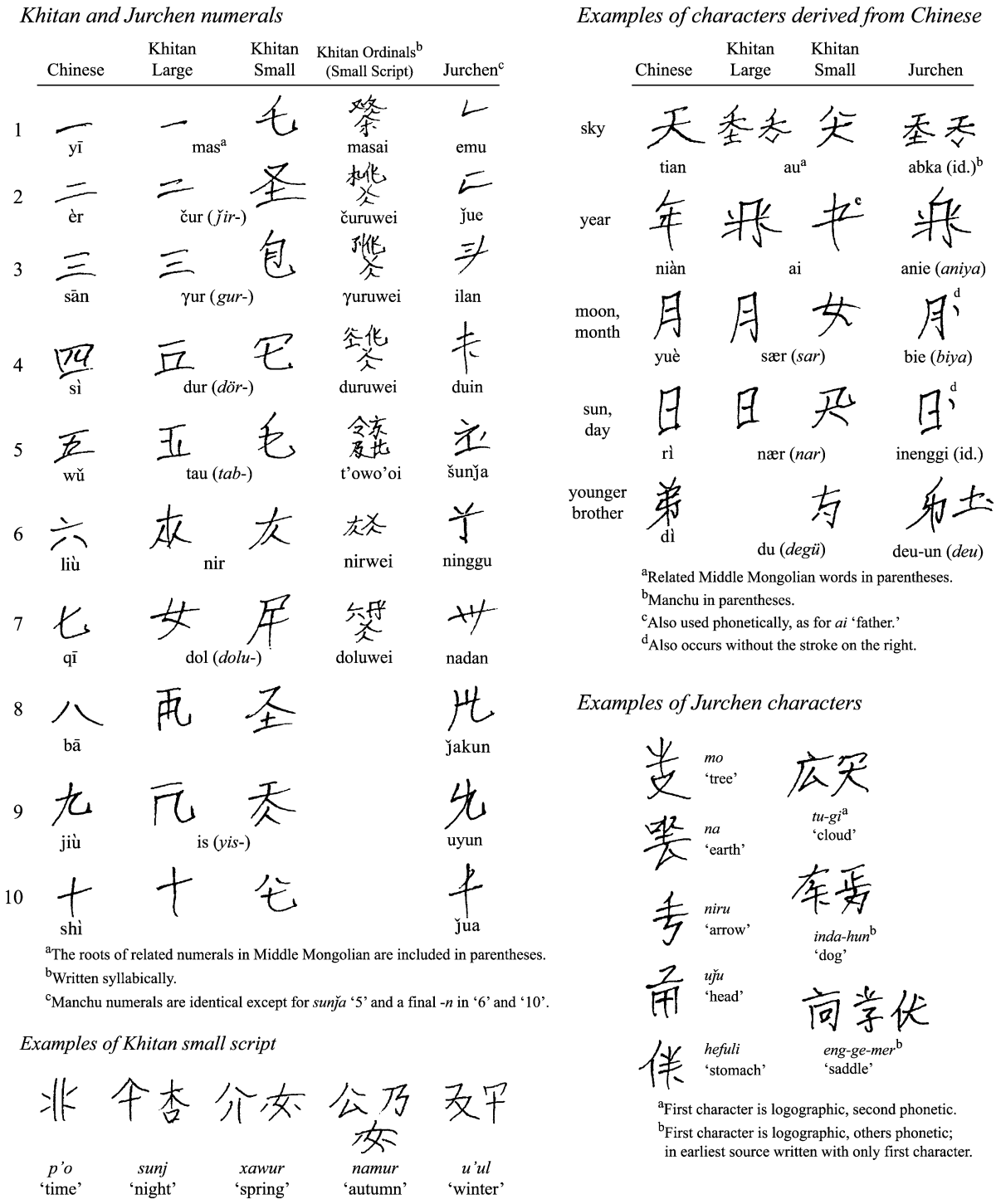

Figure 1 Examples of Khitan and Jurchen scripts (Chinggeltei 107; Kane 21-9).

Tangut script consists of about 6600 square logographic characters written top to bottom and right to left. Because the language was rich in homophones, the principles of Chinese script were easily adapted to it, with characters formed by compounding radicals (determinatives) with simpler characters in several of the ways Chinese characters are formed; however, most of the basic characters do not appear to have a

Figure 2 Tangut script (Keping 90, 330–45).

Chinese source, and, in general, Tangut characters are markedly more complex than Chinese characters (Kychanov, 1995: 228–230) (Figures 2 and 3).

Soghdian Inner Asian Scripts

History and Decipherment

Turkic runiform script (often called 'Turkic runes') and Turkic written in cursive Soghdian script originated during the two Turk empires. The First Turk Empire, founded in 552 by the tribal leader Tumen, was divided into eastern and western halves having distinct economic bases until it fell apart with Chinese connivance in the 580s. While the eastern wing was held together by booty and tribute from China, the western wing relied on tolls from trade along the Silk Road and tribute from the city-states of Central Asia; because of its sedentary character the western half was the source of Turkic scripts. The Second Turk Empire, founded in 683, collapsed in 734 and its remnants were destroyed by the Uighurs in 745.

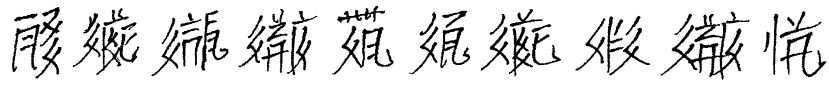

khion[1] ta[1] šie[1] nɪ[2] šiə[1] ndźi̯wə ta[1] ku[1] nɪ[2] la[1]
strong TOP reach come first weak TOP arrive come after

'The strong ones will reach it first, and the weak ones will arrive later.'
From the Tangut translation of Sūnzǐ *Bīngfǎ* (*The Art of War*):

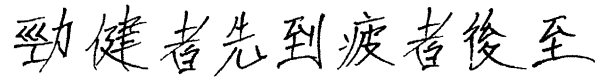

jìng jiān zhě xiān dào pí zhě hòu zhì
strong healthy NOM first reach weak NOM after arrive
(Keping 274-5)

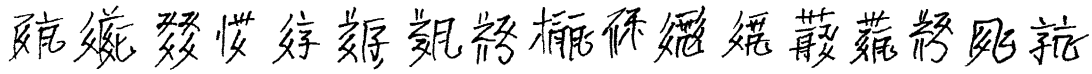

thɪ[2] ta[1] kɪ[1] ndie[2] xion[2] čhio[1] ndźêi vie[1] ni[2] ʔɪn[1] ŋi[2] mbɪn[2] tha[2] sa[1] vie[1] na[2] si[2]
this TOP definitely Fen Chan ERGATIVE you ABSOL wife PRF kill do -2s thus

'That means that Fen Chan was the one who killed your wife.'
From the Tangut translation of the *Lèilín* (*Forest of Categories*)

Figure 3 Samples of Tangut script. (Keping 263; van Driem 529).

Like their predecessors, the Uighurs ruled the steppes through a combination of tribute and booty extracted from the Tang dynasty and international trade until their empire was destroyed in 840 by a revolt of the Kirghiz. Many Uighurs moved south to Central Asia, where in c. 866 they founded a state based on the cities along the Silk Road (Christian, 1998: 252–271). Soghdian merchants, who spoke an Iranian language, dominated trade under all three empires and frequently served as local administrators; from them, dialects of Old Turkic came to be written in a number of related Syriac and Soghdian scripts deriving ultimately from Aramaic, the written language of Achaemenid Persia (253, 257). Runiform script were based on a noncursive script, while Old Uighur was the longest-lived of a family of closely related Turkic scripts based on Soghdian cursive scripts, each generally restricted to a particular religious tradition (particularly Buddhism, Manichaeism, and Nestorian Christianity; see discussion in von Gabain, 1950 [1941]: 15–41). Formerly it was believed that cursive script developed centuries after the creation of runiform script; however, the discovery in the late 1960s of a cursive-script Turkic inscription in Mongolia dated c. 568 showed that the scripts coexisted, with runiform script generally filling a secular role.

Mongolian script was taken over almost unchanged from Old Uighur script, probably as early as 1204 (Christian, 1998: 398–399; Mote, 1999: 424). The Uighurs became the first sedentary people to submit to Chinggis Khan in 1209, and by loyally fulfilling their tribute obligations they soon came to constitute the core of the Mongol administration in conquered sedentary states; they wrote Middle Mongolia with Old Uighur conventions. A number of scripts for Mongolian were devised under Tibetan influence in the 16th century (the 'horizontal square script' and the *svayambhu* or *soyombo* script) but found mostly ceremonial uses. A variant called 'clear script' (Mong. *toda üsüg*, Oirat *todorxoi üzüq*) was devised in 1648 by the lama Zaya Pandita Ogtorguin Dalai to eliminate the ambiguities of Mongolian script and found official use in Dzungaria, the state founded by the Oirats (the westernmost branch of Mongols); it was used by the Kalmyks (western Oirats) until the 1920s and remains in use in parts of Chinese Turkestan (Kara, 1996: 548–550). Apart from these and 'Phags-pa script, Mongolian script continued to be used by most groups of Mongols until the tripartite division of ethnic Mongolia in the 20th century: Buriat, the group of Mongolian dialects spoken on Russian territory, was cyrillized in 1939; Outer Mongolia (predominantly Khalkha) broke away from China in 1911 and abandoned Mongolian script under Soviet pressure in the early 1940s, although the republic has introduced and repeatedly

postponed plans to make Mongolian script official since 1990; to this day, Mongolian script serves as a pan-dialectal writing system in Inner Mongolia. (There were also unsuccessful latinizations of Buriat and Khalkha in the 1930s.)

The Manchus conquered the eastern or Khalkha Mongols in 1636 and North China eight years later, founding the Qing dynasty of China. The founder of the Manchu state, Nurhaci, had established a Manchu script in 1599 closely based on Mongolian. Remaining ambiguities were removed in 1632 by introducing certain diacritical marks ('script with circles and dots,' or *tongki fuka sindaha hergen*); this script is often considered the most esthetically pleasing of the Inner Asian Soghdian scripts. Manchu served as the language of high Manchu officials of the Qing dynasty until its fall in 1911, though most Manchus were native speakers of Chinese at least a century and a half before. Manchu script was also used to write the Manchurian languages Daur (Mongolic) and Evenki (Tungusic). Slightly modified Manchu script is currently used to write the Sibo (Chin. *Xibe*) dialect of Manchu, spoken in Xinjiang by descendants of Manchu border garrison tribes.

Western scholars knew of runiform inscriptions of southern Siberia (the 'Yenisei inscriptions,' written in Old Kirghiz) by the 1730s with the publication of Philipp Johann von Strahlenberg's account of his travels (1738); however, they were not systematically collected until two Russian expeditions of 1887 and 1888 led by Wilhelm Radloff (1892), shortly followed by Nikolai Yadrintsev's discovery of the first 'Orkhon inscriptions' in the Orkhon Valley of Mongolia in 1889. Each of the first two Orkhon inscriptions, the Köl Tegin (732) and Bilgä Kagan (735) inscriptions, covers three faces of a monolith, with a parallel Chinese inscription on the western faces. The fact that the language of the inscriptions was identified greatly eased their decipherment, which was announced by Vilhelm Thomsen in 1893 and published in 1896, with refinements during the next 50 years. Besides three other major and several minor Orkhon inscriptions from the second Türk empire and the Yenisei inscriptions, there are three inscriptions in Mongolia from the Uighur empire and several manuscripts in runiform script from Turkestan (particularly the *Ïrq Bitig*, or *Book of Divinations*). There are numerous inscriptions in a runiform script from Khazaria (630–965), an offshoot of the second Turk empire based north of the Caucasus, that are unrelated and remain largely undeciphered. Western knowledge of Mongolian and of classical script started in earnest with the research of Peter Simon Pallas (1769–1774), Józef Szczepan Kowalewski (1844–1849), and Aleksei Bobrovnikov (1849).

Principles of the Scripts

The Soghdian scripts used to write varieties of Old Turkic had three vowel signs and a surplus of consonant signs. Because Old Turkic had eight phonemic vowels, unmodified Soghdian script could not indicate vowel harmony unambiguously. The dearth of vowel signs was made good by indicating the vowel harmony of a word by the choice of consonant signs. Ideally, all consonants would have had separate signs for front-vowel and back-vowel words, but in practice many consonant signs were neutral.

Turkic Runiform Script (von Gabain, 1950 (1941); Tekin, 1968; Kara, 1996)

Monumental runiform script typically runs right to left, with rows read from bottom to top; the orientation is more varied in other sources. Two vertical dots are used to separate words. The runiform script used in the Orkhon inscriptions contains 40 signs; some supplemental and variant forms occur in other texts. Four signs indicate vowels without a following consonant, and another 27 can indicate either a consonant or a sequence *aC/äC/eC*, 20 of which indicate vowel harmony. Of the remainder, three indicate consonant clusters with preceding *a/ä*, two a velar consonant preceded or followed by a rounded vowel, and four miscellaneous sequences.

Texts vary in the extent to which vowels inside a word are written, with manuscripts approaching alphabetic writing and inscriptions more underspecified. When marked, vowel length is indicated by an extra vowel sign; for example, the negative existential verb *yōq* 'there is not' is written y^1-*u*-*oq*, where the long vowel is confirmed by, for example, the diphthong in Yakut *suoχ* 'id.' (Tekin, 1968: 52). In the Orkhon inscriptions, the treatment of vowels depends on their position in the word, with vowels in first syllables marked much more often than in later syllables (Figures 4 and 5).

First syllable: In vowel-initial words, short *a/ä/e* are not marked, being inherent in the following consonant sign, while their long counterparts are frequently written. Other initial vowels are always written. Non-initial *a/ä/e* are usually not marked, long or short; *i/ï* are frequently though not systematically marked; rounded vowels are almost always marked. (The mid-rounded vowels *o/ö* only occurred in the first syllable in this stage of Turkic.)

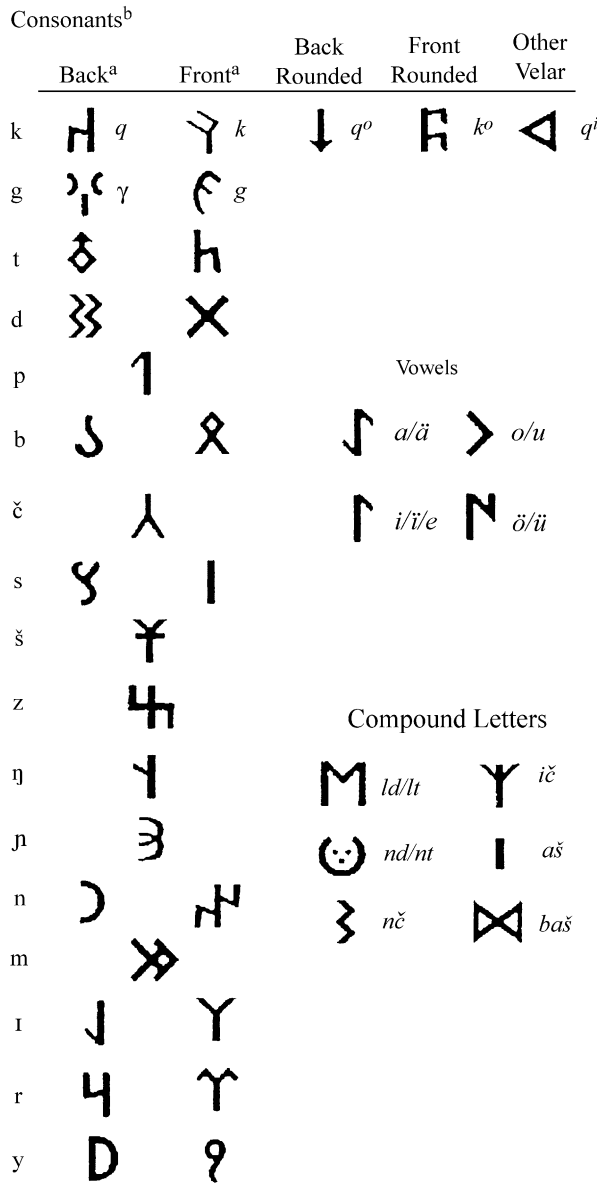

[a]Transcribed C^1 for back vowel words, C^2 for front vowel words, except for velars.

[b]Neutral consonant signs indicate *aC/äC/C*, back or front signs *aC/C* and *äC/C*, resp.; special velar signs can have a rounded vowel either preceding or following the consonant.

Figure 4 Runiform script. (Radloff 2; von Gabain 12; Tekin 23–4.)

Later syllables: Most medial short vowels are not regularly marked, except for *u/ü* following a syllable with an unrounded vowel. Long medial vowels tend to be marked, *i/ï* usually and the others sporadically. Word-final vowels are always marked. (Tekin, 1968: 30–38)

Cursive Soghdian-Based Scripts

Cursive-script Turkic was originally written from right to left, with rows running top to bottom, but under Chinese influence was rotated 90 degrees to run top to bottom and left to right, which is the orientation of Mongolian and Manchu scripts. As the name implies, words were written as sequences of distinctive signs strung along a vertical spine and were separated by uniform spaces, with major syntactic units separated by a variety of groups of dots (one or two dots separating clauses, for example, and often four dots in a diamond separating paragraph-level units). In cursive scripts vowels were always written (Figures 6 and 7).

There are three orthographic principles common to the three cursive scripts. First, the scripts distinguish initial, medial, and final forms of letters; a limited set of separate forms could occur word-finally to break up certain ambiguous sequences of signs. Positional variants serve to mark morpheme or word boundaries: all verbal suffixes are written joined to the stem, but noun roots frequently end in final forms, separated by a space from suffixes beginning with initial or medial forms; this juncture is transcribed with a hyphen. Pronominal forms, which unlike nouns have extensive allomorphy, are regularly written as a unit, as are words in other classes; in particular, inflected noun forms with special adverbial meanings are usually written as a unit (e.g., Manchu *dade* 'in the beginning', a specialized sense of the dative/locative of *da* 'root').

Second, as in runiform script, cursive scripts indicate vowel harmony by the choice of certain consonant signs; vowel signs are underspecified. Old Uighur (with nine vowels) and Mongolian (with seven) used the three Soghdian vowel signs as follows. *Aleph* and *yodh* were used to write the vowels *a/ä* and *i/ï/e* in Old Uighur, respectively, and *a/e* and *i* in Mongolian. In first syllables *waw* indicated *o* or *u*, the ligature *waw* + *yodh* either *ö* or *ü*, while in later syllables *waw* was used for all four rounded vowels. (*o* and *ö* occurred only in initial syllables in Middle Mongolian and only rarely in noninitial syllables in Old Uighur.) All word-initial vowels except *e* were preceded by an *aleph* written with a special sweep, called *titem* (from Greek *diadem* 'crown'). For the most part, vowel harmony was indicated by the signs used for velar consonants, with Aramaic velar and uvular signs being used in front- and back-vowel words, respectively. Apart from the word-initial distinction between *a* and *ä/e*, there were no other indications of vowel harmony in Old Uighur or Mongolian; in Manchu, signs for dental stops also indicated vowel harmony. Most long vowels could be indicated in Old Uighur script by duplicating *yodh* or *waw*, though frequently this was not done;

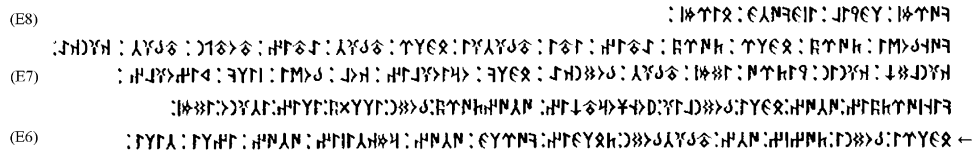

bglri	bodni	**tözsz**	**öčn**	tbγč	bodn	**tblgin**	**körlg**	**öčön**
bäg-lär-i	bodun-ï	tüzsiz	üčün,	tabγač	bodun	täblig-in	kürlüg	üčün,
lord-PL-3	people-3	discordant	because	China	people	deceitful.GEN	tricky	because

rmkčisin	**öčön**	**inli**	**čili**	**kiŋsörtkin**	**öčön**	**bgli**	bodnliγ
armaγči-sin	üčün,	ini-li	äči-li	kiŋsür-tük-in	üčün,	bäg-li	bodun-lï-γ
tricky.GEN	because,	(brothers)		cleave.PP.GEN	because	(lord and people).ACC	

yoŋšortqin	**üčün**	**törk**	bodn	**illdk**	**ilin**	ičγno	idms
yoŋšur-tuq-in	üčün,	türük	bodun	illä-dük	il-i-n	ïčγïn-u	ïd-mïs,
slander.PP.GEN	because	Türk	people	found.PP	nation.3.ACC	lose.CV	send.PAST

qγnldq	qγnin	**yitrö**	idms	tbγč	bodnqa	**bglk**	orioγlin
qaγan-la-duq	qaγan-ï-n	yitür-ü	ïd-mïs,	tabγač	bodun-qa	bäg-lik	uri-oγl-ï-n
khan.VB.PP	khan-3.ACC	lose.CV	send.PAST	China	people.DAT	lord.ADJ	son.3.ACC

qol	bo<u>l</u>di	**silk**	qizoγln	**köŋbo<u>l</u>di**	**törk**	**bglr**	**törk**
qul	bol-dï,	esi-lik	qïz-oγl-ï-n	küŋ bol-dï,	türük	bäg-lär	türük
slave	become-PAST	lady.ADJ	daughter.3.ACC	concubine become.PAST	Türk	lord.PL	Türk

atin	**iti**	tbγčγi	**bglr**	atin	totpn	tbγč	qγnqa
at-ï-n	i(t)-ti.	tabγač-γï	bäg-lär	at-ï-n	tutu-pan	tabγač	qaγan-qa
name.3.ACC	lose.PAST	China-LOC	lord-PL	name-3-ACC	keep.PCV	China	khan-DAT

körms	**lgyil**	**isgköčg**	**birms**
kör-mis,	älig yïl	is-ig küč-ig	bir-mis
see.PAST	50 year	work.ACC strength.ACC	give.PAST

'Because the lords and the people were discordant, because the Chinese were deceitful and crafty, because younger and older brothers created rifts, and because the lords and the people slandered each other, the Türks lost the nation they had founded, they lost the emperors they had set up. For the Chinese people their noble sons became slaves, their highborn daughters became concubines; the Türk lords lost their Türk names. The lords in Chinese lands kept their names and submitted to the Chinese emperor, and for fifty years gave them labor and strength.'

Figure 5 Sample of Turkic Runiform script. Lines 6–8 of the east side of the Köl Tegin inscription, describing the fall of the first Türk empire as seen by the rulers of the second. Front-vowel signs indicated with bold type. (Radloff 7; Tekin 233; von Gabain 250.)

this practice was not carried over into Mongolian (except in transcriptions of Sanskrit), which, unlike the modern dialects, seems not to have had distinctive vowel length, and was reintroduced only for *waw* in Manchu script to distinguish certain homophones.

Finally, all three languages were written as having CV(C) syllable structure, which rendered the 'tooth letters' *aleph*, *nun*, and *gimel/heth* ambiguous. The latter two were given distinct syllable-initial and syllable-final forms by the addition of diacritical marks. The only syllables in Old Turkic and Middle Mongolian that did not fit this rule were those containing diphthongs of the form $V+y$, which were written as two syllables, *ayi*, etc., except word-finally (and in Mong. *naiman* 'eight') as *-ai*. However, Manchu also allowed the onsets *y* and *w* and the offglide *w*; the onsets were written as sequences *ow* and *iy*, and the offglide *w* as *o*: *niyowanggiyan*

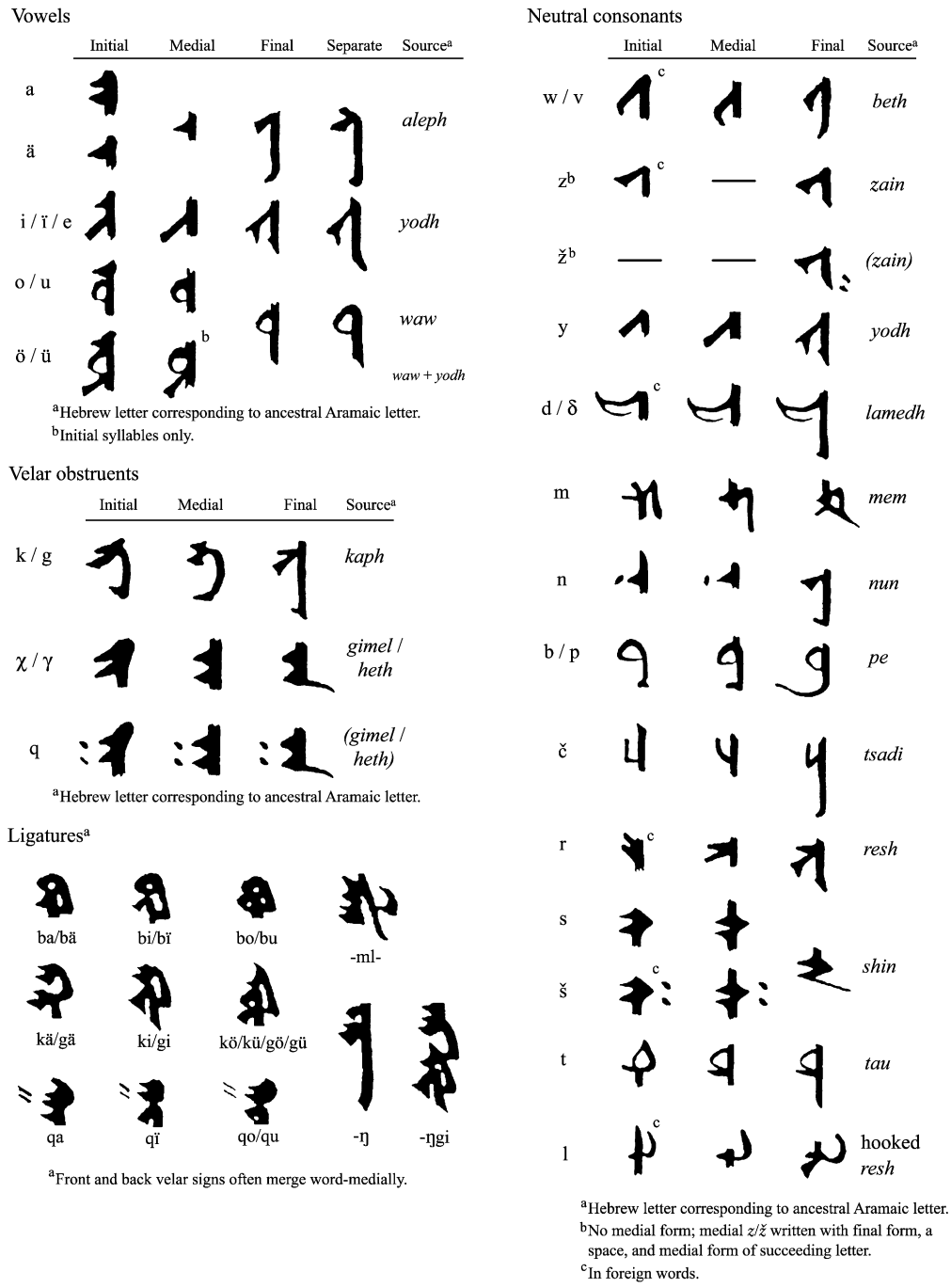

Figure 6 Old Uighur script. (von Gabain 17–25; Kara 540.)

[ɲ^{w}aŋg^{y}an] 'green', *deo* 'younger brother', and note doublets like *goimbi/gûwaimbi* 'to hit the target'.

Ambiguities of Mongolian Script

Besides Old Uighur ambiguities in writing rounded vowels, several differences in the phonologies of the two languages led to ambiguities in Mongolian script. First, the only consonants that could occur word-initially in Old Uighur were *b, t, k, č, s, y,* and (rarely) *m* and *n* (von Gabain, 1950 [1941]: 52); thus, Mongolian script did not distinguish the voicing of word-initial stops. Second, Old Uighur script did not distinguish between *k* and *g* in front-vowel words

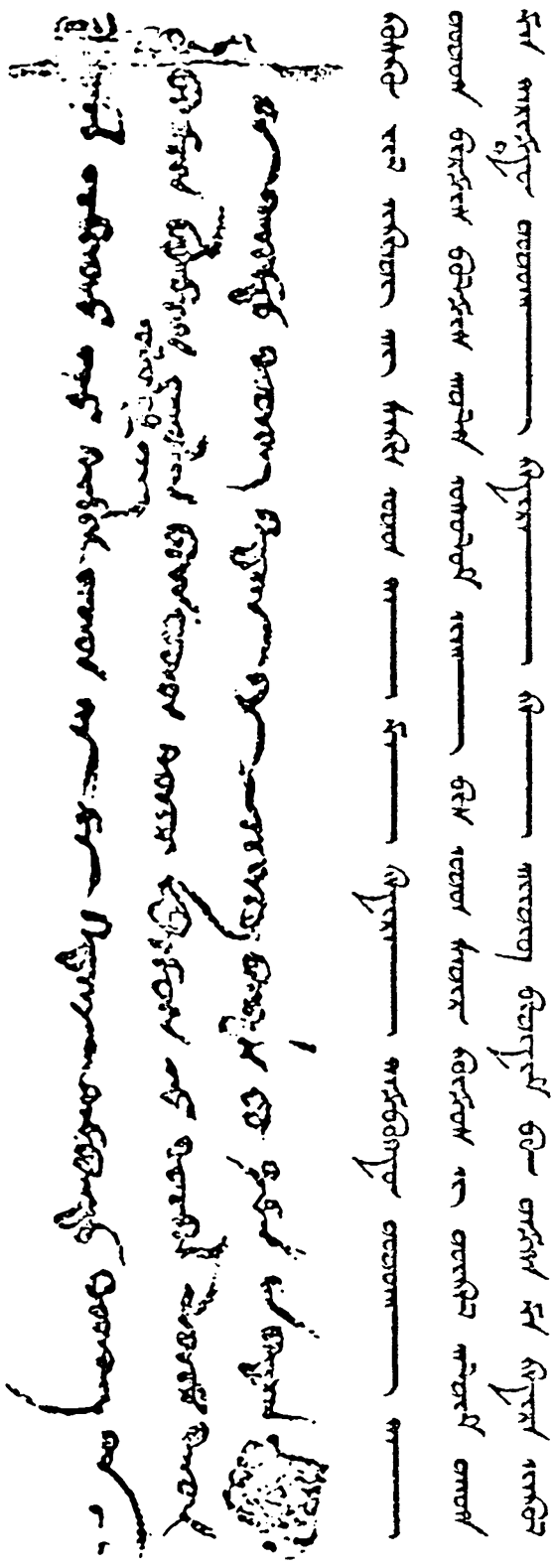

Figure 7 Sample of Old Uighur script.

[küskü]	yïl	iki-nti	ay	sekiz	
mouse	year	2-ORD	moon	8	
otuz[1]	-γa	män	kädirä	qambuqtu	
30	.DAT	1s	Kädirä	Kambuktu	
tutung	-γa /	[tutuq]	bir-mis	bulmïš	
Tutung	.DAT	duty	give-PAST	Bulmïsh	
atl[ï]γ	oγul-um	-nïng	biš	otuz	satïr
named	son.1s	.GEN	5	30	*stater*
kümüs	-ig	tökil	al-tï-m	tanuq /	
silver	.ACC	full	get.PAST.1s	testimony	
[män]	qarïmtu	tutung	kädirä	-gä	
1s	Karïmtu	Tutung	Kädirä	.DAT	
ayt-ïp	biti-di-m	bu	tamγa	m[ä]n	
say.PCV[2]	write.PAST.1s	this	stamp	1s	
kädirä	-ning-ol[3]				
Kädirä	.GEN.3s				

'On the 28th of the second month of the mouse year, I, Kädirä, received in full 25 *staters* of silver for my son Bulmïsh serving Kambuktu Tutung. *Witness:* I, Karïmtu Tutung, spoke and wrote [this] for Kädirä. This stamp is mine, Kädirä's.' (Radloff (1928) 86-8, lines 10-12.)

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[1] In Old Turkic, numbers in the decades take the form *unit* + *succeeding decade*.

[2] Past converb: Action precedes that of the following verb.

[3] In Old Turkic, the 3s pronoun *ol* 'he, she, it; that' also served as a copula.

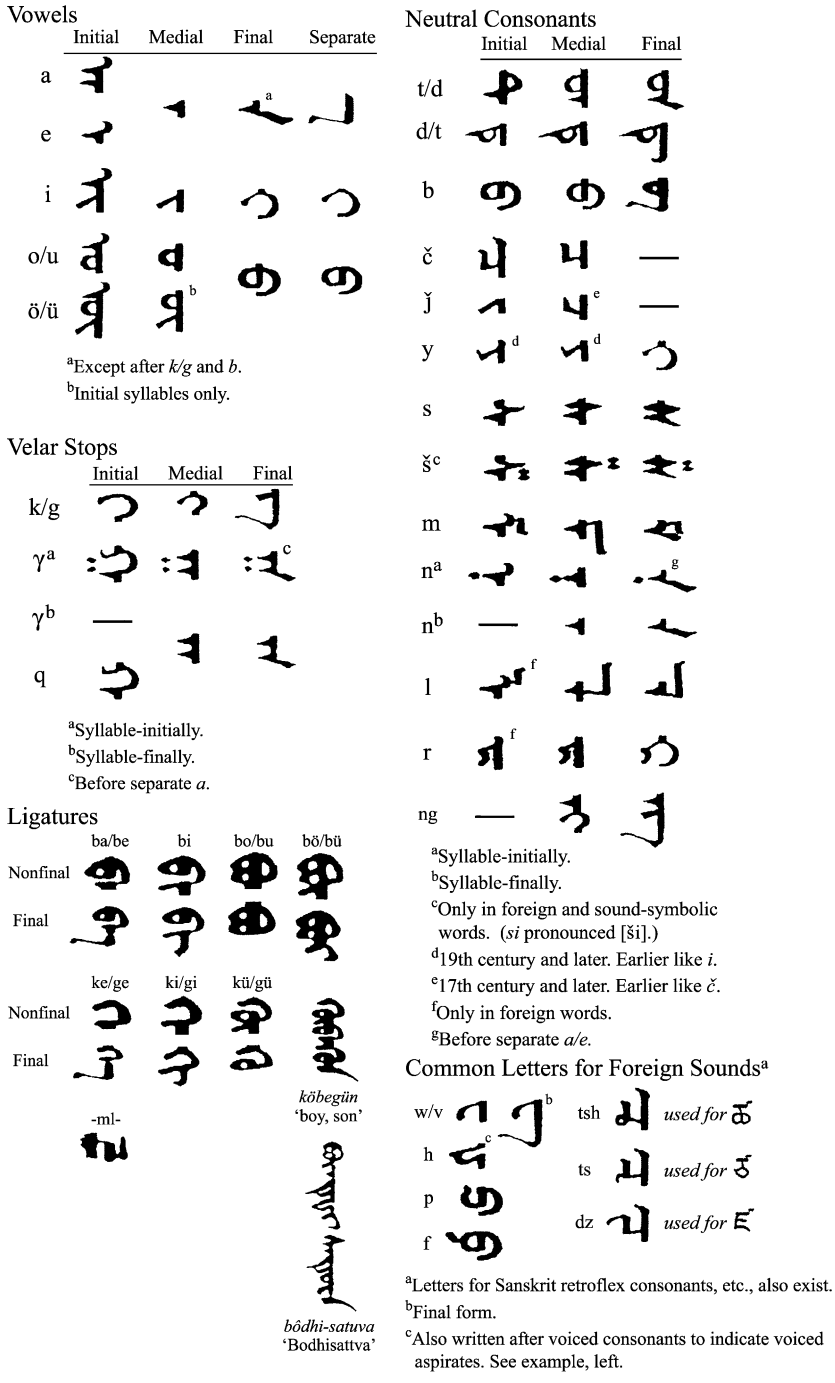

Figure 8 Mongolian script (Kara 545–8).

and, as time passed, lost a strict graphical distinction between medial *d* and *t*; thus the voicing of most stops is ambiguous in Mongolian script. (This ambiguity was somewhat reduced because Middle Mongolian did not have *p* or syllable-final voiceless obstruents.) Third, because Old Uighur did not have *j*, it was written with the sign for *y* word-initially and (after the 17th century) with an alternate form of *č* medially; a distinct form for initial *y* was borrowed from Manchu script in the 19th century. Finally, Middle Mongolian possessed word-initial *h* (lost fairly early) that was not written. A number of devices served to reduce some of the resulting ambiguity: for example, some important homophones were disambiguated by

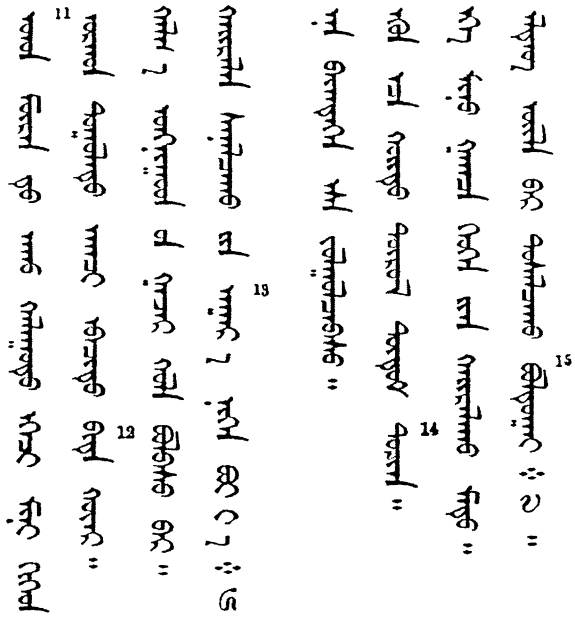

onon	mören	-dü	a-qu	qalaγutu	egeči	-mini	kiged :	orqon	tuγula-du	
Onon	river	.DAT	be.FP	warm	sister	.1s	and	Orkhon	Tula.DAT	
a-gči	ebečitü /	bide	qoyar :	qalq-a	onγnigud	-un	γajar	qola	bol-basu	
be.AGENT	sick	1p.in	two	Khalkha	Ongnigud	.GEN	land	far	become.COND	
ber :	qayirala-n	sana-lča-qu	-yin /	aγar-a	nigen	bui	j-e ::	ene	beyendegen	ese
TOP	love.SCV	think.RECIP.FP	.GEN	air	one	exist	PROB	this	lifetime	NEG
jolγo-lča-basu :	egün	-eče	qoyitu	töröl	tütüm /	-dür-yen :	eke	inu	γaγča	
meet.RECIP.COND	this	.ABL	future	birth	more	.DAT.SPM	mother	3s	solitary	
keüken	-iyen	qayirala-qu	metü :	eldeb	üile	-ber	tus[al]alča-qu /	bol-tuγai ::		
child	.SPM	love.FP	like	various	way	.INSTR	help.RECIP.FP	become.VOL		

FP: Infinitive/future participle; SPM: Subject-possessive marker; SCV: Subordinative converb

'[You,] my dear aunt, living on the Onon River, and / [I], the sick one, who lives on the Orkhon and Tula—we two, / although the lands of the Khalkha and the Ongnuut are far apart, / are one in the sphere of mutual love and longing. // If we do not meet again in this life, / then in all our future lives, / as a mother loves her only child, / let us help each other in every way (by all means).'

Figure 9 Sample of Mongolian script. The 6th and the 7th quatrains of a poem of Prince Tsoght of the Khalkha (1621) addressed to his paternal aunt. The language of the poem shows a number of modern features, such as *o* and *ö* in non-initial syllables. The text is reproduced from Vladimirtsov with slight changes to better resemble the original. The numbers in the text refer to the lines of the inscription; each quatrain is numbered in Tibeto-Mongolian numerals, left out in this transcription. (Vladimirtsov 1253–1280.)

ad hoc spellings, such as *yesün* in place of *yisün* 'nine' to prevent confusion with *jisün* 'complexion', and *waw* was written double following a velar stop to indicate the value *g*, with *k* indicated by a single *waw* (Sanzheyev, 1988 [1964]: 34–35). On the whole, however, Mongolian tolerated extensive ambiguity (Figures 8 and 9).

Manchu Script Reforms

After the reform of 1632, Manchu script had two additional diacritics and three additional consonant signs (for *p*, *f*, and initial *y*), which eliminated all ambiguities. This was possible because Manchu had only five vowels and much-reduced vowel

[a]Takes dot if necessary to prevent ambiguity. e.g., *aǰi* 'firstborn' vs. *enǰi* 'vegetarian' (adj.)'
[b]Except following labial and front-velar signs.
[c]Rare except in foreign words.
[d]Also has separate form for genitive marker *-i*.

[a]Only the voiceless stops occur in this position.
[b]Also followed by *i*. (Convention for Mandarin.)

[a]Indicates *f* before *i*, *o*, and *u*, *w* before *a* and *e*.
[b]Indicates *f* before *a* and *e*.
[c]Only in foreign words.
[d]Dot omitted in syllable-final position.
[e]Takes dot in certain Chinese words.

Ligatures with *p* are formed like those with *b*. Diacritics for *g* or h are written to the right of the curve of the *k*.

Figure 10 Manchu script (Kara 550–4).

The Manchu system is similar to *pinyin* but is based on an older form of Mandarin. Tone is not marked. Initial consonants are generally written with the corresponding Manchu signs (voiceless for aspirated, voiced for unaspirated), with additional signs for back velars, certain affricates, and *r*. Back velars are written with a modified form of the front-velar sign, with voicing and frication shown by the circle and dot; *k* and *g* are usually written with this sign, but *h* is quite often written with the usual back-velar sign. (*Pinyin* is indicated by italics, Manchu spellings by boldface.)

c (**ts**) *k* (**k'**) *zu* (**dzu**)
z (**dz**) *r* (**ž**)

Between an initial consonant and the vowel Mandarin allows the three glides written *u, i*, and *ü/u*. The first two are written **-iy-** and **-uw-/-ûw-**; the last will be discussed presently. Vowel-coda combinations are written as in *pinyin* (for example, *eng* as **eng**), with these exceptions: *ou, ao, ong,* and *(u)o* are written **eo**, **ao/oo**, **ung/ûng**, and **o**, respectively.

meng (**meng**) *long* (**lung**) *lian* (**liyan**) *hua* (**hûwa**)

Unlike *pinyin*, Manchu uses the same symbol for palatal and retroflex affricates, with a following **i** to indicate the former. Thus, *chan* is written **čan**, while *qian* is **čiyan** or **kiyan**. On the other hand, the retroflex fricative *sh* is written **š**, with the palatal fricative *x* written **si** or **hi**. Syllables of the form *jiong* and *jiu* are usually written **jiong** and **jio**, but **-iyung** and **-iyu** also occur.

xiao (**hiyoo**) *Jiangxi* (**giyangsi**)

There are special conventions for writing the final retroflex glides in *zhi, ri*, etc.

ci (**tsï**) *zi* (**dzi**) *si* (**sï**) *ri* (**ži**)

chi (**či**) *zhi* (**jï**) *shi* (**ši**)

The consonants *q, j, x, l*, and *n* can be followed by the glide *ü* (written *yu* initially) and the vowel *ü*. The most common ways of writing these syllables are as for *j-*.

ju **jioi** *juan* **jiowan** *jue* **jiyo** *jun* **jiyûn** *nü* (**nioi**)

The most common variants are **yuwan** and **yuwei** for *yuan* and *yue*, and **ji(y)owei** and **jiyuwei** for *jue*; *xun* and *yun* often have **u** for **û**. (*q, j,* and *x* are also often written **k**, **g**, and **h**.) Finally, note the following spellings.

fen	**fen/fun**	*you*	**io**
feng	**feng/fung**	*wo*	**o**
fu	**fu/feo**	*wu*	**u**
lun	**luwen**	*er/-r*	**el/-l**

Figure 11 Manchu transcription of Mandarin.

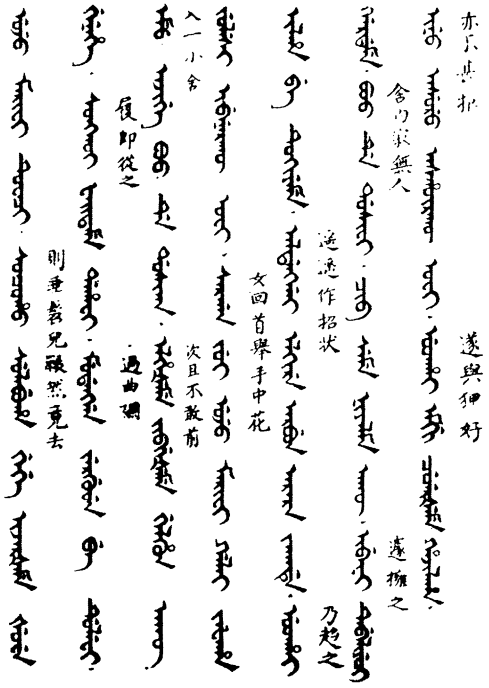

Transcription: uju mari-fi tuwa-či • sončoho sula-bu-ha gege ijarša-me šuwe / gene-he •
Gloss: head turn.PCV look.COND hair fall.CAUS.PRF maiden smile-ICV direct go.PRF

songkoi fayita-me daha-fi • mudangga jerguwen-be dule-fi • / emu ajige boo-de dosi-ka •
accordingly cut.short.ICV follow.PCV curved railing.ACC pass.PCV one small house.DAT enter.PRF

elheše-me jibgeše-me gelhûn-akû / julesi ibene-rakû o-fi • sargan jui uju mari-fi gala-i
hesitate.ICV tarry.ICV fear.PRIV forward advance.NEG.PAST[1] female son[2] head turn.PCV hand.INSTR

jafa-ha / ilha-be tukiye-me • aldanggai elki-re arbun ara-ra jakade uthai / garda-me
hold.PRF flower.ACC offer.ICV from.afar summon.IMPF situation make.IMPF because then rush.ICV

boo-de dosi-fi • čib seme niyalma-akû • ibeni tebeliye-či / inu asuru ashû-rakû o-fi • uthai
house.DAT enter.PCV quietly[3] person.PRIV advancing embrace.COND also very resist.NEG.PAST then

emgi čečerše-me hajila-ha •
together quiver.ICV become.dear.PRF

ICV: Imperfective converb; PCV: Perfective converb; PRIV: Privative

---

[1] *gelhûn-akû* followed by a negative verb is an idiom for "not to dare to *verb*."
[2] Literal term for "daughter," also used to mean "young woman."
[3] *čib* is sound-symbolic for great quiet; *se-me* is the imperfective converb of *sembi* "to say." Phonesthetic adverbial constructions in *seme* are very common in Manchu.

'When he turned his head to look the maiden in falling braids walked past smiling happily. He followed her immediately. Passing a curved railing she went into a small house. Embarrassed, he hesitated and did not dare advance. The young woman turned her head and offered him the flower she held in her hand. Because she had made a sign beckoning him from afar, he rushed into the house. It was quiet and no one else was around, and when he advanced and embraced her she offered no resistance at all. Then, trembling together, they fell in love.'

Figure 12 Sample of Manchu script. From a mid-Qing woodblock print of the Manchu translation of "Painted Wall," from Pu Songling's *Liaozhai Zhiyi* (*Strange tales from a make-do-studio*). (Pu 59–60.)

harmony (*e* alternated with *a* and *o*; *i* and *u* were neutral, as were many suffixes with *e*). The two diacritical marks were a small circle and a small dot added just to the right of the consonant sign or the following vowel sign. The first was affixed to velar stop signs to indicate *h* (/x/). The second served to indicate two distinct features depending on the place of articulation of the consonant. For velar and dental stops, the dot indicated voicing, with distinct forms of the consonant signs to indicate vowel harmony. For other consonant signs (and for word-initial *u*), the dot indicated the higher vowel of the pairs *a/e* and *o/u*. While dental signs followed by *u* did not indicate the vowel harmony of a word, velar signs did; to prevent the ambiguity that would have resulted between *go* and *ku*, the ligature *waw* + *yodh* (transcribed *û*) indicated *u* following velars in back-vowel words. This ligature was used sporadically in other environments, apparently in many cases to distinguish (near) homophones: *tumbi* 'to hunt' vs. *tûmbi* 'to hit, beat, pound', *munggan* 'tumulus; mausoleum' vs. *mûnggu* 'bird's nest'; a few words show both forms: *šungge* ~ *šûngge* 'learned; fine-grained'. Manchu also developed a system for transcribing Mandarin (**Figures 10–12**).

See also: Asia, Ancient Southwest: Scripts, Earliest; Asia, Ancient Southwest: Scripts, Epigraphic West Semitic; Asia, Ancient Southwest: Scripts, Middle Aramaic; Asia, Ancient Southwest: Scripts, Modern Semitic; Asia, Ancient Southwest: Scripts, South Semitic; China: Scripts, Non-Chinese; China: Writing System; Iran: Scripts, Old Persian, Aramaic, Avestan; Mongolic Languages; Sino-Tibetan Languages; Sogdian; Tibet: Scripts; Tungusic Languages.

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Aspect and Aktionsart

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Phases and Boundaries

The notions of 'aspect' (also called 'viewpoint' or 'perspective') and 'aktionsart' (also called 'lexical aspect,' 'aspectual class,' 'aspectual character,' 'actionality,' 'situation type' as well as a few other terms) are concerned with the temporal semantics of an utterance in terms of the time intervals (also termed 'phases') conceptualized in the construal of the situation expressed by that utterance. The fundamental criterion is the inclusion or noninclusion of starting points and/or end-points ('boundaries') in the conceptualization of the situation. In a sequence of utterances such as the following, a number of different types of situation boundaries are involved: *Yesterday we went to the beach. We knew the weather was fine. My son built a sand castle, then we swam for half an hour, and then we went home*.

The predicate of the first clause, *went to the beach*, may be said to be associated with at least three different types of boundedness on three different levels of representation. First, it is bounded by virtue of it being one link in a chain of narrated events which happen in a temporal sequence, each event bounding the preceding and the following one (*x* and then *y* and then *z*). This type of bounding will not concern us at the moment. Second, on the abstract lexical-semantic level, the event {go to the beach} has a built-in goal, the location *beach*, which terminates the event when reached. This is a different type of boundedness, embedded in the semantics of the expression (constructional semantics plus the lexical semantics of the constituent parts of the construction). Third, the simple past *went* (as opposed to the progressive *were going*) suggests that the goal is actually reached. This provides us with the third level of bounding, the actual temporal marking at the utterance level, which spells out the intrinsic bounding, already prepared, as it were, by the presence of the directional locative phrase.

In the mainstream of both classical and modern aspectology, the third type of bounding, the act of completing the event, indicated by means of the simple past, would be regarded as a matter of aspect, while the second type of boundedness, the intrinsic one, would be regarded as a matter of aktionsart. As our little example shows, the act of realizing inherent boundedness at the utterance level is performed in English by the aspectual values of the tense morphemes, which act as aspect operators ('aspect grams'). Had we said *we were going to the beach*, this would imply that the end-point was not yet reached: we were still on our way, that is, in the preliminary phase (henceforth pre-phase) of going to the beach. Thus, one may say that the abstract phrase *go + definite directional* is semantically designated for an end-point, but is (at the abstract lexical-semantic level) underspecified for the actual realization of this end-point. There are two formally distinct 'tenses' in English that regulate the choice between the pre-phase interpretation and the interpretation of the end-point being actually reached: the simple past and the progressive. In traditional terms the simple past would be considered as an instance of the perfective aspect (boundary indicating), and the progressive as an instance of the imperfective aspect (non-boundary indicating). The aktionsart under discussion here is called telic (Greek 'having an inherent goal/end-point'). Telic events fall into several subtypes depending on how much pre-phase they admit; the type we are concerned with here and which allows for a fairly separate activity phase is called accomplishments, in contrast to achievements, such as *reach* or *die*, which allow for very little if any pre-phase (on aktionsart terminology see below).

Aktionsart is traditionally defined as a lexically inherent semantic property of the simple verb, characterizing the phasal time structure of the event it denotes, i.e., the various intervals of its development (beginning, end, repetition, etc.). As we see here, this traditional view is misleading. Aktionsart is actually a property of the verb plus its argument frame. Thus, several distinct frames may lead to the same aktionsart interpretation, and quantificational or determinational features of arguments in the same frame may lead to different aktionsart interpretations, both independent of the verb's 'basic' aktionsart. While in the example discussed above the built-in end-point of the telic accomplishment predicate is a directional, in the third clause of our little story it is an object (*a sand castle*) that is created by the activity expressed by the verb; once the object is ready, the situation has reached its natural goal. The implications of the simple past and the progressive are the same as in the first example: *he built a sand castle* suggests that the sand castle is finished, while *he was building a sand castle* suggests that he was in the pre-phase of building it. The end-point may also be completely inherent in a simple verb, as in *turn*: if we say *he was turning* he hasn't completed the turn, but if we say *he turned*, the turn is done. As for quantificational features that may come into play, {build a sand castle} is a telic event, while {build

sand castles} is not: the bare plural does not suggest a limited number of sand castles that would naturally terminate the event when ready.

In our little story, we have a simple predicate of this kind: *swim* in the third sentence. This verb is atelic: it does not have a built-in end-point. Boundedness here comes about through the durative time adverbial *for half an hour*, which sets a time frame with a clear end-point. However, this end-point is different from that established by the spatial goal or the completed entity in the first two clauses. This finds its linguistic correlate in the fact that one cannot say *we were swimming for half an hour* implying that we were in a pre-phase of completing the 30 minutes. This state of affairs is characteristic of a class of verbal expressions whose aktionsart value is called activities. These are characterized by the fact that they do not have natural end-points but, rather, arbitrary time limits. One cannot swim for eternity: at one time, one starts doing it, and after a while, one stops. Here, the contrast between simple past and progressive has quite different implications. The simple past *we swam* indicates that the entire act, including its beginning, its active phase, and its end, happened at a certain time in the past. The progressive *we were swimming* indicates that only the active (ongoing) phase is described, while the arbitrary beginning and end-point are out of focus; they are not implied by the grammatical form.

Let us finally look at the verb *know* in the second sentence. It is clear without further consideration that the situation expressed in this sentence is not bounded by the surrounding events. We probably already knew that the weather was fine before we started to go, and nothing is implied about when we learned of it; likewise, nothing is implied about whether or when we will stop knowing it. In fact, no boundaries are conceptualized here at all. This is characteristic of the aktionsart called states. The same form (simple past) is used here as with the complete, boundary-including phase of activities, but in a different reading: since no boundaries are implied, it pertains to the persistent state of knowing in the past. The progressive is not compatible with this aktionsart.

In summary, each aktionsart has its characteristic pattern involving two types of information concerning the aspect operators (aspect grams): co-occurrence restrictions between aktionsart and aspect operators, and the semantic effects induced by a certain aktionsart for the aspect operators. Aspect systems in the languages of the world are typically characterized by this kind of interaction between the two dimensions of aktionsart and grammatical aspect, which is manifested in the interplay of different temporal bounding or unbounding characteristics: those inherent in the aktionsart, which are part of its semantics, and those provided by grammatical aspectual devices such as the progressive/simple past distinction in English. The details of this interplay are a matter of the individual language's lexicogrammar, whose organization in terms of verbal semantics and inventory of grammatical devices sets the stage for the actual phenomenon of interlocking between these two dimensions.

Aspect Theories and Their Historical Development

An excellent introduction to the early history of aspectology is found in Pollak (1988). The grammatical description of the Slavic verb system served both as an instigator and as a pacemaker for later developments of the theory. The first descriptions of aspectual oppositions in Slavic languages go back to the early 17th century. The Prague scholar Benedikt von Nudožer was the first to describe grammatical aspect as a complementary system of two perspectives or viewpoints, which later came to be called perfective and imperfective (these are loan translations of Russian *sovershennyi vid* 'completed viewpoint' and *nesovershennyi vid* 'uncompleted viewpoint' respectively). The Russian term *vid* 'viewpoint', which provided the basis for the loan translation 'aspect,' was first used by N. I. Greč in his Russian grammar of 1827. These early works shaped the concept of a system of 'aspects' or 'aktionsarten' (the terms being used synonymously by that time) of roughly the following form: the speaker has a choice between two options: he may present a situation as an undivided whole, including both its initial and final boundaries (perfective); or he may present a situation from an internal perspective, ignoring the boundaries of a situation (imperfective). This concept was then applied by Indo-Europeanists to morphological oppositions in other languages where a similar semantic distinction was found, such as Greek aorist versus imperfect, Latin perfect versus imperfect, French *passé simple* versus *imparfait*, English simple past versus progressive past, etc.

The first attempt to differentiate between grammatical aspect and the lexically inherent time-constitutional characteristics of verbs was Agrell (1908), which exploited, for that purpose, the presence of the competing synonymous terms 'aspect' and 'aktionsart' by distinguishing them in much the same manner as we do today. His main point was that grammatical aspect cuts across aktionsarten, e.g., the imperfective aspect is compatible with the nondurative aktionsart (durative versus nondurative was the terminological predecessor of what was later called atelic versus telic), thus showing that one needs two

dimensions to deal with the whole range of phenomena. Even though this convinced many scholars in the first half of the 20th century of the necessity to differentiate between grammatical aspect and lexical aktionsarten, the aktionsart theory enjoyed limited success, perhaps due to the fact that aktionsarten continued to be defined as formal, i.e., derivational categories. The classic Slavist aktionsart terminology as we still find it today in handbooks of Russian and other Slavic languages (e.g., ingressive [beginning of action], egressive [end of action], delimitative [a certain temporal extension], iterative [repetition or habituality], semelfactive [single instance]) is all associated with certain derivational devices, mostly verb prefixes, occasionally also suffixes. The situation was further complicated by the oddities of the Slavic system with its enormous overlap in the formal devices used to mark grammatical aspect and aktionsarten. Attempts at a proper systematization of phasal time constitution and its interrelation with grammatical aspect operators (grams) was thus hampered by the presence of two independent approaches: a logical/philosophical one where aktionsarten were taken to be abstract schemata characterizing all predicate expressions, and a morphologically oriented one that defined aktionsarten in terms of derivational morphology, ignoring the question of how the simplex, nonderived items would fit into an overall schema of time constitution. (For a brief characterization of the situation in the early 1980s see Krifka, 1989: 102–106.) Under these circumstances, research on aktionsarten would possibly have come to a dead end, were it not for the fact that Zeno Vendler's famous 'time schemata' of 1957 (better known in the version of 1967 and extremely influential since then) brought a breath of fresh air into attempts at coming to grips with aktionsart semantics. Not originally intending to provide a classification of lexical verbs (this was often misunderstood because of his use of the term 'verb'), Vendler divides the universe of 'verbs' into four 'time schemata': activity terms, accomplishment terms, achievement terms, and state terms. The first two make up a class of processes, consisting of successive phases and allowing the use of the progressive in English. Activities and accomplishments are distinguished by the fact that activity terms are atelic ('do not have a set terminal point'), while accomplishment terms are telic and share this feature with achievements. Chief criterion for telicity is the compatibility with durative time adverbials (*for an hour*) and frame adverbials (*in an hour*); activities are compatible with the former, but not with the latter, while the reverse is true for accomplishments. Vendler's standard examples show that he does not classify lexical verbs in the sense of the classic aktionsart approach but uses actual verb phrases:

Activities:	run, push a cart
Accomplishments:	run a mile, draw a circle, grow up
Achievements:	win a race, reach the summit
States:	love somebody, have something

The time schema approach had a great impact on research into aspect and time constitution in formal grammar and early computational linguistics, mainly because of its refinement by David Dowty (Dowty, 1979). The post-Vendlerian approach splits aspectologists into two groups, which I have termed 'unidimensionalists' and 'multidimensionalists' (Sasse, 2002). The unidimensional approach proceeds from the assumption that aspect and aktionsart are essentially the same phenomenon (predominantly called 'aspect' in these approaches). What traditional aspectology would have analyzed as the interaction between the two is usually treated as 'recategorization' in an unidimensional approach, e.g., the progressive aspect in English used with a telic verb as in *he's dying* could be looked upon as an achievement recategorized as an activity. This approach is inadequate as it does not allow a proper treatment of the subtle semantic nuances that arise from the interaction between lexical aktionsart characteristics of verbs and verb phrases on the one hand and the semantics of aspectual markers in languages with richer grammatical aspect systems on the other. Moreover, the affinities between perfectivity and telicity on the one hand, and imperfectivity and nontelicity on the other, leave one type of interaction unaccounted for, namely activities, which are typically characterized by their compatibility with both perfectivity and imperfectivity. Nevertheless, important work in particular on the compositionality of the aspectual interpretation of sentences (i.e., the influence of quantificational and determinational characteristics of noun phrases involved – cf. the examples in the previous section) has been done by unidimensionalists. A different approach to these issues on the basis of a multidimensional understanding of aspect and aktionsart was taken by Krifka (1989).

In multidimensional approaches, two levels are assumed: one of lexical aktionsart, and one of grammatical aspect, the latter interacting with the former. How this might work was informally demonstrated in the previous section. There are several variants of this approach. A 'selection theory' would assume every aktionsart to have a characteristic interaction pattern for the aspect categories, resulting in 'interaction senses'; both the perfective and the imperfective aspect would have a number of specific

'readings,' depending on the interaction with the aktionsart they combine with. A 'cumulative theory' would assume total independence, resulting in the cumulation of aktionsarten and aspect semantics. It seems that the unidimensional approach is gradually losing ground. Modern aspectology is characterized by numerous different multidimensional approaches, where aktionsart systems of various sizes are proposed, all elaborating on the Vendler categories, as we did in the previous section (cf. Breu, 1994; Bertinetto, 1997; Smith, 1997). An excellent table comparing some of these systems is found in Tatevosov (2002: 320–321); see also Sasse (2002).

See also: Agrell, Sigurd (1881–1937); Perfectives, Imperfectives, and Progressives; Perfects, Resultatives, and Experientials; Temporal Logic; Tense and Time: Philosophical Aspects; Tense; Tense, Mood, Aspect: Overview; Verbs.

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Assertion

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Plato in such works as *Cratylus* takes a sentence to be a series of names. This view is untenable because it is not the case that in uttering a series of names one thereby says something either true or false. "Ephesus, 483, Neptune" says nothing either true or false. By contrast, an indicative sentence, such as "Ephesus was a large city," is true, and it seems to include elements other than names. Aristotle seems to be making just this point when in *De Interpretatione* he remarks

> Falsity and truth have to do with combination and separation. Thus, names and verbs by themselves—for instance "man" or "white" when nothing further is added—are like the thoughts that are without combination and separation. So far they are neither true nor false (1963: 16^a9)

Aristotle, however, does not distinguish in his use of "statement" among (1) the sentence used to express a proposition, (2) the proposition thereby expressed, or (3) the use of that proposition in the performance of a speech act, such as an assertion. These are three distinct phenomena, but it took over two millennia before the point was formulated clearly by the philosopher-logician Gottlob Frege.

According to Frege, a proposition (such as the proposition that global warming is accelerating) is an abstract object, the existence of which does not depend upon any mind grasping it or any sentence expressing it (1984). By contrast, a sentence expresses a proposition if it is indicative and meaningful. Unlike propositions, sentences exist only as part of a conventional linguistic system and so in a clear sense depend upon human activities. Nevertheless, one can utter a sentence expressing a proposition without making an assertion. One might utter such a sentence in the course of testing a microphone, or in rehearsing one's lines for a play, or for that matter in

'readings,' depending on the interaction with the aktionsart they combine with. A 'cumulative theory' would assume total independence, resulting in the cumulation of aktionsarten and aspect semantics. It seems that the unidimensional approach is gradually losing ground. Modern aspectology is characterized by numerous different multidimensional approaches, where aktionsart systems of various sizes are proposed, all elaborating on the Vendler categories, as we did in the previous section (cf. Breu, 1994; Bertinetto, 1997; Smith, 1997). An excellent table comparing some of these systems is found in Tatevosov (2002: 320–321); see also Sasse (2002).

See also: Agrell, Sigurd (1881–1937); Perfectives, Imperfectives, and Progressives; Perfects, Resultatives, and Experientials; Temporal Logic; Tense and Time: Philosophical Aspects; Tense; Tense, Mood, Aspect: Overview; Verbs.

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Assertion

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Plato in such works as *Cratylus* takes a sentence to be a series of names. This view is untenable because it is not the case that in uttering a series of names one thereby says something either true or false. "Ephesus, 483, Neptune" says nothing either true or false. By contrast, an indicative sentence, such as "Ephesus was a large city," is true, and it seems to include elements other than names. Aristotle seems to be making just this point when in *De Interpretatione* he remarks

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Aristotle, however, does not distinguish in his use of "statement" among (1) the sentence used to express a proposition, (2) the proposition thereby expressed, or (3) the use of that proposition in the performance of a speech act, such as an assertion. These are three distinct phenomena, but it took over two millennia before the point was formulated clearly by the philosopher-logician Gottlob Frege.

According to Frege, a proposition (such as the proposition that global warming is accelerating) is an abstract object, the existence of which does not depend upon any mind grasping it or any sentence expressing it (1984). By contrast, a sentence expresses a proposition if it is indicative and meaningful. Unlike propositions, sentences exist only as part of a conventional linguistic system and so in a clear sense depend upon human activities. Nevertheless, one can utter a sentence expressing a proposition without making an assertion. One might utter such a sentence in the course of testing a microphone, or in rehearsing one's lines for a play, or for that matter in

investigating a proposition to see what its consequences are without endorsing it. For instance, one might put forth the proposition that global warming will cause the melting of Greenland's glaciers to see what would follow (the submersion of Florida, etc.) without claiming that global warming will in fact go so far as to melt Greenland's glaciers.

There are three distinct items then: an indicative sentence, a proposition expressed by that sentence, and the use of that sentence and proposition expressed to make an assertion. 'Statement,' 'claim,' 'judgment,' and even 'proposition' are often used interchangeably among these three notions, and in the history of philosophy no small amount of mischief has resulted from such ambiguous usage. (For a trenchant discussion of such ambiguity, see Geach, 1972; on the distinction between illocutionary force and semantic content, see Green, 2000.)

Isolating assertions from propositions and indicative sentences is only the beginning of wisdom about the former. An assertion is a speech act. Just as one can make a promise by saying, "I promise to do so and so," so too one can assert P with such words as "I hereby assert that P." (Austin, 1962 placed assertion on his list of 'expositives'; Vanderveken, 1990 locates assertion on his list of 'assertives.') Further, just as a promise can only be made if certain conditions have been met (you cannot promise to do what is obviously outside your control), so too an assertion can only be made under certain conditions. For instance, it is doubtful that you can assert what is obvious to both you and your audience to be false. An attempt to do so will most likely be taken facetiously. Further, Strawson (1950) held that a sentence can make presuppositions that if not met prevent that sentence from being usable for assertions. If Iceland has no monarchy, then according to Strawson my utterance of, "The present queen of Iceland is beautiful," will fail to make an assertion in spite of the fact that I have in good faith uttered a meaningful indicative sentence.

To assert a proposition is at the very least to put it forth as true. Searle (1969) tried to capture this dimension by construing an assertion of proposition P as an "undertaking to the effect that P." That may be a necessary, but is not a sufficient condition: My betting a large sum on P's coming out true is an undertaking to the effect that P is true, but it is no assertion thereof. (For instance, if I bet on P without believing P true, I am not a liar; if I assert P under those conditions, I am.) Searle, however, elsewhere wrote that an assertion has word-to-world direction of fit. According to this conception, inherent in the practice of asserting is the norm that the speaker's words are supposed to track how things are. This feature distinguishes assertion from, say, commands, the aim of which is not to track the world but rather to get the world (in particular, one or more of its inhabitants) to conform to what the command enjoins. Commands are thus commonly said to have world-to-word direction of fit.

This notion of word-to-world direction of fit may be elaborated further by the way in which one sticks one's neck out by making an assertion. One who asserts a proposition P is right or wrong on the issue of P, depending upon whether P is true: one is right on that issue if P is indeed the case and wrong if it is not. In thus exposing oneself to liability to error on the issue of P, one is doing more than if one had just uttered a sentence expressing P.

However, liability to error on the issue of a particular proposition still does not distinguish assertion from other speech acts involving propositions. One who guesses that P is also right or wrong on the issue of P, depending on whether P is the case. How may we distinguish assertion from other proposition-involving speech acts? Williamson (1996) contended that one who asserts P is thereby open to the challenge, "How do you know?" This much may not be said of other proposition-involving speech acts. For instance, it would be inappropriate to respond to one who conjectures, guesses, or supposes for the sake of argument that a black hole inhabits the center of the Milky Way, with the question, "How do you know?" Unlike these other speech acts, an assertion purports to convey knowledge.

One who makes an assertion incurs a risk through the aforementioned liability to error and, if Williamson is correct, is exposed to a conversational challenge. What if such a challenge is made? According to the view of Brandom (1983, 1994), in that case its issuer is obliged to respond with reasons that would justify the contested claim. Those reasons might invoke items of experience or the authority of others. The issuer of the assertion might even show that the speaker raising the challenge is committed to that proposition by her own convictions. If, however, the assertor is unable to convince the interlocutor of the assertion, others will become unable to defer to his or her authority if their own assertion of that same proposition is challenged.

In light of incurring a risk of error and exposing oneself to a conversational challenge, it might seem that asserting is more trouble than it is worth. Yet, asserting is the bread and butter of conversational life, so it presumably has redeeming points. First, one whose assertions turn out to be reliably correct, or at least widely accepted, garners credibility. That in turn is a source of social authority: We look to

reliable assertors to get things right. Second, it might be held that knowledge has intrinsic worth. Although making an assertion that is borne out is not a sufficient condition for knowledge (you might have gotten lucky or not have believed what you claimed), it is often associated with it. For this reason, getting things right by means of a correct assertion might be thought to be its own reward.

Third, an assertion that is not challenged, or is challenged but the assertor responds with an adequate defense of the claim, may be entered into conversational common ground. A conversation begins with a (possibly empty) set of propositions that interlocutors hold in common while being mutually aware that they hold this information in common. Among fans at a baseball game this common ground might include propositions about current weather conditions, the teams' score, and perhaps a few items in the current national news. Much more will typically be common ground among members of a tightly knit family, less among people waiting at a major bus terminal (Clark, 1996).

Let Σ_i be a commitment store for interlocutor i, containing all those propositions to which interlocutor i is committed. Where 1, . . ., n are interlocutors, we may define $\Sigma_{1\cap,\ldots,\cap n}$ as $\Sigma_1\cap,\ldots,\cap\Sigma_n$. Even if $P \in \Sigma_{i\cap j}$, it does not follow that P is in the common ground of i and j, for neither may have any commitments with regard to the other's commitment to P. Rather, where $s_1, \ldots, s_n$ are a group of interlocutors,

P is common ground among $s_1, \ldots, s_n$ (written $P \in \Sigma_{1\ldots n}$) iff
(a) for all $s_i \in \{s_1, \ldots, s_n\}$, $P \in \Sigma_i$, and for all $s_i \in \{s_1, \ldots, s_n\}$, $(a) \in \Sigma_i$.

$\Sigma_{1\ldots n}$ will in general be a proper subset of $\Sigma_{1\cap,\ldots,\cap n}$. When $s_1, \ldots, s_n$ are engaged in a conversation and s_i asserts that P, then so long as no other member of $s_1, \ldots, s_n$ demurs, $P \in \Sigma_{1\ldots n}$. This may bring about progress on a question at issue (Where is the bus station?; or Why is the child ill?) or may aid in the elaboration of a plan (of getting to the bus station or curing the child), and it enables speakers at a later time to presuppose P in their speech acts. For instance, once it is common ground that the child's illness is viral, we may presuppose this fact, as shown by the acceptability of a remark such as, "Since antibiotics will be useless on her, we need to ease her discomfort some other way." The use of the phrase, "Since antibiotics will be useless on her," would be inappropriate if it were not already common ground that the child's illness is viral and that antibiotics do not treat viral infections (see Green, 2000 for a fuller discussion).

In addition to enhancing inquiry and planning and to laying the foundation for later presuppositions, an assertion may generate other pragmatic effects. For instance, one who asserts P may also suggest, insinuate, or implicate a distinct proposition through the meaning of what one says: If one asserts that Mary was poor but honest, the use of "but" suggests that there is some tension between poverty and honesty. According to Grice's theory of implicature (1989), in that case one does not, however, assert that there is such a tension. Rather, what one asserts is true only in case Mary is poor and Mary is honest. Again, if someone asserts that Mary lost a contact lens, he or she will normally be taken to suggest that Mary lost one of her own contact lenses, rather than someone else's contact lens. This implicature, due not to the conventional meaning of any particular locution but rather to norms governing conversational practice, is also no part of what he or she asserts. When a speaker asserts P, he or she often means (specifically, speaker means) a good deal more without thereby asserting those other contents.

Assertions are not just beholden to the norm of accuracy about the world; they are also held to the norm of sincerity. One who asserts what one does not believe is a liar. By contrast, it is no lie conversationally to implicate what one does not believe. If in response to your question, "Where is Mary?" I reply that she is somewhere in Spain, I may implicate that I am in no position to be more specific. If in fact I do know that she is in Pamplona, I have been evasive, misleading, and perhaps even mendacious but no liar (Adler, 1997). Similarly an assertion of P, while representing oneself as believing that P, is not also an assertion that one believes that P. Were that so, one would literally contradict oneself in saying, "P but I don't believe that P." As G. E. Moore (1993) observed, however, although this utterance does seem absurd in some way, it is not a self-contradiction. What it says could well be true. Although an assertion of P is not an assertion that one believes that P, that assertion does express, manifest, or display one's belief that P. Current research is actively engaged with the relation between assertion and the states of mind that it manifests (Williams, 1996; Davis, 2003; Green and Williams, 2006).

See also: Lying, Honesty, and Promising; Mood, Clause Types, and Illocutionary Force; Normativity; Pragmatic Determinants of What Is Said; Propositions; Truth: Primary Bearers.

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Assessment of First Language Proficiency

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One of the earliest instances of high stakes first language (L1) assessment is reported in the biblical book of Judges, chapter 12. A civil war of sorts is being waged between two contingents of Israelites, the Gileadites and the Ephraimites. The Gileadites prevail, and seek to decimate the retreating troops who, not many years earlier, had been their compatriots. But how to discriminate foe from friend, since the Ephraimites are not marked by any obvious physical distinction? Indeed, both camps are comprised of speakers of the same language. Thus it is easy, when accosted, for members of the vanquished forces to simply deny their out-group membership. As it happens, however, a language proficiency criterion is advanced to discriminate losers from winners.

> And it was so, that when an Ephraimite who had escaped said, "Let me go over" that the men of Gilead said to him, "Are you an Ephraimite?" If he said, "No", they then said to him, "Say the word Shibboleth". If he said "Sibboleth", for he could not frame to pronounce it right, they took him and slew him at the passages of Jordan.

The Bible records that 42 000 individuals receive failing grades on that particular L1 proficiency exam.

Sociopolitical Issues in First Language Proficiency Testing

Language lies at the heart of national identity. It is key to attributing in-group status to individuals who share mutual values and loyalties (McGroarty, 2002). Standard varieties of languages evolve as ways of marking those to whom prestigious status will be accorded. To the degree that L1 proficiency is equated with facility at producing those standard varieties – as opposed to those who 'could not frame to pronounce it right' – L1 tests demand attention to far more considerations than mere psychometric adequacy. Rather, L1 testing is fraught with sociopolitical considerations (Ruth, 2003) about who is to be included among the anointed of a society, and who may be left to fear for their lives on the banks of the Jordan.

It might mistakenly appear tautological to remark that L1 testing is intended for native speakers. But as the prevalence and ambiguities of multilingualism become ever more evident, the very construct of 'native speaker' is called into question (A. Davies, 2001).

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It might mistakenly appear tautological to remark that L1 testing is intended for native speakers. But as the prevalence and ambiguities of multilingualism become ever more evident, the very construct of 'native speaker' is called into question (A. Davies, 2001).

A sampling of national census questions over several years and countries reveals that the 'mother tongue' of which one is a native speaker might be officially defined variously as 'the language spoken by the individual from the cradle,' 'parent tongue,' 'thinking language,' 'language of their homes,' 'language of everyday use,' and so on (Pattanayak, 1998: 125). One may thus qualify as a native speaker of more than one language, achieve native proficiency in several languages, fail to achieve native-like proficiency in the language that is chronologically one's first while attaining native speaker status in a L2 or L3, or possess one native language for some communicative purposes and another native language for others. Perhaps the only indisputable fact about native language status is that everyone is a native speaker of at least some language some of the time (Muysken, 1998).

The inherent complexity of native speaker status is highly problematic for the L1 testing enterprise. First, it complicates the issue of exactly who should be eligible for L1 testing, and who will test instead as a speaker of an additional language. Recent studies show that third generation immigrants to the United States are overwhelmingly English dominant (Alba, 2004), yet many such students with Latino surnames are surprised to find themselves tested as English language learners and 'placed' into bilingual programs, often for years (Ravitch and Vitteriti, 1997; see also Nero, 1999 for the case of native speakers of Caribbean English assigned to ESL classes). Second, the lack of an unambiguous definition of L1 speaker status calls into question exactly what language variety test makers should adopt as criterial to language proficiency. Thus, for example, a governmental agency in Jamaica, West Indies, that requires prospective employees to demonstrate 'good English' might impose a standard that favors speakers of British English over those who speak the dominant native Jamaican acrolect (Irvine, 2004). Third, test makers cannot ignore the ethical consequences of measurement tools that inevitably perpetuate elitist class distinctions when proficiency is equated to approximation to a prestige language variety (Shohamy, 2001).

One strategy for overcoming these sociopolitical conundrums is to simply abolish artificial boundaries that distinguish tests of L1 proficiency from tests for speakers of additional languages. Proposals for simply arraying all speakers – native speakers along with speakers of additional languages – along a single continuum of assessment have some cogency, but do not really avoid the inevitable sociopolitical stratification between more native-like and less native-like that would nonetheless result (A. Davies, 2001).

Functional and Processural Criteria for Assessing L1 Speaking, Listening, Writing, and Reading

Another way to mitigate adverse sociopolitical effects of L1 testing is to adopt proficiency criteria focusing more on communicative, expressive, or information seeking *functions* of language (Programme for International Student Assessment, 2003; National Communication Association, 1998), or on literacy and oracy ***processes*** (Simons, 1971) rather than on degree of language accuracy as adjudicated by some standard or prestige variety. Emphasizing communicative and processural assessment criteria is consistent with views of language proficiency as **performed communicative competence**, rather than as decontextualized mastery of discrete formal features of language (e.g., National Council of Teachers of English and International Reading Association, 1994).

It is easiest to envision functional rather than formal criteria for L1 proficiency within the domains of speaking and listening. Thus, for example, students might engage in referential communication accuracy activities, in which quality points are assigned for the number of target pictures or items successfully encoded or decoded (Patterson, 1981), or raters might evaluate student presentations using rubrics that point to key rhetorical traits of specific oral genres, such as 'show and tell' (Michaels, 1986). Notwithstanding the relative ease of generating principled criteria for evaluating speaking and listening, oral language remains the least likely aspect of L1 to be the object of systematic evaluation. Several factors contribute to its neglect, including the costliness of real-time evaluation of speech performance, the difficulty in achieving inter-rater reliability, and the attitude that since oral L1 develops naturally, it need not receive much investment in the school curriculum (Pinnell and Jaggar, 2003; Rubin and Schramm, 1997). Often programs that are advertised as assessing oral language, especially among young children, are merely prereading inventories employing such criteria as memory of text and story sequencing (e.g., D. Davies, 2001). (Reviews of methods for assessing L1 oral can be found in Morreale and Backlund, 1996; Bostrom, 1997; Rubin and Schramm, 1997.)

With respect to L1 writing proficiency, the most widely known communicatively oriented mode of evaluation is primary trait rating (Lloyd-Jones, 1977), originally developed for use by the U.S. National Assessment of Educational Progress (NAEP; Persky *et al.*, 2002). Beyond its first decade, NAEP diluted the intended rhetorical specificity of

primary trait scales (Freedman, 1991), but the spirit of primary trait scoring – that is, to identify a small number of primary rhetorical demands of a particular writing prompt and to construct a scoring rubric that carefully delineates levels of fulfilling those demands – persists in many writing assessment scoring rubrics. (For a review of assessment procedures and types of scales, see Wolcott and Legg, 2001. For a review of mainly psychometric issues pertaining to L1 writing assessment – including the feasibility of computer scoring of writing samples – see Breland *et al.*, 1999.)

The problem with applying a primary trait scale to any writing sample – indeed, the problem with basing any high stakes decision on only a one-shot sample of language assessment performance – is that a single sample of written language collected under controlled testing circumstances and constrained by unnatural time limits cannot represent the full panoply of writing skills any literate individual possesses. Even the syntactic complexity exhibited in an individual's writing is hardly a stable stylistic trait. Rather, syntactic complexity in writing manifests low test-retest reliability (Fitzgerald and Shanahan, 2000). To enable assessment of a broad and representative sample of writing, a number of educators have advocated assembling and rating entire portfolios of writing (Freedman, 1991; Yancey, 1992). In a typical portfolio assessment, students themselves select work they wish to showcase from among several months of schoolwork. They might include multiple draft compositions and brief explanations about their evolution. Some of the work collected in the portfolio might have benefited from teacher input. Other work might very well have been the product of collaborative authorship. Often students write cover letters telling evaluators what they value in their portfolios. While the washback effect of this assessment technique to teaching language arts might be salubrious indeed, the utility of these kinds of unstandardized writing portfolios for discerning with any precision levels of competence in written language appears limited (Despain and Hilgers, 1992).

For the same reason that single-point tests of writing performance are seen as limited, some educators have likewise advocated use of portfolios for more broad-based assessments of reading (Tierney *et al.*, 1998). Indeed, earlier focus on comprehension as the main criterion for reading ability has made way for more holistic measures, including measures of metacognition and strategy, as well as reading attitudes and quality of literary experience (Farr and Beck, 2003). The measures developed by the 43-nation Programme for International Student Assessment (PISA; 2003) comprise a prime example of such a broad approach to L1 reading. PISA tasks for assessing the reading proficiency of 15-year-olds in school presume decoding and comprehension. Instead of evaluating these, they test abilities to (1) retrieve information, (2) interpret texts, and (3) reflect and evaluate. Thus, a high-difficulty item that tests information retrieval might ask test takers to use information in a footnote to locate information in a diagram. A mid-level interpretation item requires test takers to explain a character's motivation in light of sequenced events presented in a long narrative. A low-level reflection and evaluation item asks readers to justify a personal point of view based on evidence in a long narrative. Like many contemporary reading examinations (see, for example, Hill, 2004), the PISA items include both multiple choice and supplied-response formats. (For an overview of L1 reading assessment practices, see McKenna & Stahl, 2003.)

Beyond the Four Modalities of Language

The PISA test is noteworthy also because it includes among its reading passages, texts consisting not only of connected prose, but also of a variety of graphs, charts, and visual organizers. The PISA test blurs boundaries between traditional notions of reading and visual literacy. Indeed, an age of post-typographic 'new literacies' and hybrid modes of communication mediated by digital technologies demands an expanded notion of what it means to be proficient in one's L1 (Kinzer and Leander, 2003). As just one example, a December 2004 release of the U.S. government's *9/11 Commission Report* has been published by AV books on an MP3 CD. It contains video, audio, and searchable text. One may listen/view/read it on a number of electronic devices ranging from personal computers to Apple iPods. As writers learn to compose vertically as well as horizontally in hypertext, the illusion of linearity in text processing is forever put to rest (Bolter, 1998). As users select links to follow, or pass their pointing devices over one hot link or another, the distinction between reader and author passes into anachronism. As a new generation of students sits at their school desks surreptitiously 'chatting' via cell phone text messaging with students across the aisle – augmented by synchronous nonverbal gestures – speaking and writing merge into an as yet unnamed telegraphic yet expressive language modality. Despite the rapid diffusion of new literacies, at least among industrialized nations, methods for proficiency assessment in this domain have yet to be invented (Kinzer and Leander, 2003).

Integrated, Standard-Based Performance Assessment of L1 Proficiency

The hybrid quality of new literacies is an especially dramatic reminder that users rarely deploy just one language modality – listening, speaking, writing, reading – at a time, except perhaps in the artificial contexts of testing. Progressive L1 curricula move toward unifying language modalities in authentic inquiry-based learning (Peters and Wixson, 2003). At the same time, the movement for authentic assessment enjoins testers to assess student skills in meaningful contexts that permit a variety of performance modalities, rather than employing decontextualized test prompts that reveal only students' abilities to produce reductionistic responses on demand (Wiggins, 1989). Carefully articulated performance standards – including fully annotated exemplars of work products and behaviors at each level of quality – are necessary to implement meaningful, systematic assessment in the context of integrated language arts and authentic testing (Claggett, 1999).

L1 testers might look to the New Standards performance assessment project as a paradigm of just such an enterprise (Pearson *et al.*, 1998; Rubin and Hampton, 1998). Additional New Standards materials provide annotated work-products and even videotapes of oral language performances to be used for benchmarking rater judgments (e.g., New Standards, 1998, 2002). Publicly available benchmarked performance standards also render proficiency criteria transparent for test takers and for the teachers who prepare them. Moreover, New Standards performance objectives are integrated both within the language arts and across other learning domains. Integration within the language arts is represented, for example, by a task that asks a secondary school student to write a critique of a functional document, such as an assembly manual, for its use of graphics and layout conventions. Integration between language arts and other subjects is represented, for example, by a task that asks postsecondary students to give an oral presentation interpreting a series of line graphs that show interdependencies in shifting bird populations.

Implementation and Washback of L1 Proficiency Testing

It has become commonplace to remark that the validity and consequences of any testing process may vary depending on the users (students, teachers, education agencies, policy makers) and the uses (formative learner evaluation, individual classification, certification, selection decisions, program evaluation) of the resulting data. The landscape of L1 testing is littered with instances of psychometrically viable and even conceptually well-intended language proficiency assessments that ultimately limited or undermined the quality of instruction learners received (e.g., Hill, 2004; Ruth, 2003). When an assessment process, to the contrary, enhances instruction by reinforcing the teaching of proper proficiency criteria, it is said to have positive washback or consequential validity. It seems apparent that L1 assessments such as NAEP that emphasize writing performance and rhetorical criteria for proficiency have exerted positive washback on the teaching of writing (Moss, 1994). It is likewise anticipated that integrated L1 performance standard based assessment procedures such as New Standards may bring about substantial reform in L1 instruction (Pearson *et al.*, 1998).

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Assessment of Second Language Proficiency

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Introduction

Language testing in the past decade has seen the rethinking of fundamental positions and attitudes. There have been important developments in the area of validity theory (how we understand the process by which tests yield meaningful information about test takers) as well as changes in our understanding of the socially constructed character of language test performance, new thinking about research methods (quantitative and qualitative) in language testing validation research, and an increasing realization of the political character of tests, including their role within social and educational policy. This article briefly discusses these developments and their implications for language testing research and practice in the context of current developments in validity theory.

Developments in Validity Theory

Language testing researchers (Bachman, 1990, 2005; Chapelle, 1998; Chapelle *et al.*, 2004; McNamara, 2000), drawing on work in educational measurement by (in particular) Messick, Mislevy, and Kane (e.g., Messick, 1989; Mislevy *et al.*, 2002, 2003; Kane, 1992, 2001), understand scores on language tests not simply as reports of performance in the test situation but as having meaning only as the basis for inferences beyond that situation. The real target of the assessment, the candidate's performance under nontest conditions, cannot be observed directly but is inferred from observations of test performance. Language tests resemble those experimental procedures in science that use hypotheses and reasoning from observable data to draw inferences about things that cannot be observed directly.

Given this, central to assessment is the chain of reasoning from the observations to the claims we wish to make about students. Mislevy *et al.* (2003) call this the 'assessment argument' (Figure 1); Kane uses the term 'validity argument' (Kane, 1992, 2001). Such an argument is needed to establish the relevance of assessment data to test score inferences – that is, the value of the test data as evidence. Articulation of the assessment argument is a requirement of any assessment system.

According to Mislevy *et al.* (2003),

> An assessment is a machine for reasoning about what students know, can do, or have accomplished, based on a handful of things they say, do, or make in particular settings. (p. 4)

The key element in this procedure is 'reasoning' – both about how adequately the target knowledge, skills, and performance abilities (the test domain or test criterion) are understood or represented theoretically in the test construct and about the relationship of the assessment procedures to the construct. (Obviously, the term 'machine' is used metaphorically, meaning a 'systematic procedure' or 'mechanism.')

Furthermore, the goal of assessment is to establish a basis for assertions about what students 'know, can do, or have accomplished.' Mislevy *et al.* (2003) refer to these assertions as 'claims.' This term is important because assessments often appear to yield definitive, authoritative, factual statements about test-takers; instead, we should recognize the assertions of tests as claims based on evidence and necessarily open to dispute.

Finally, the evidence for these claims, their basis in observations, is usually, for reasons of time and resource constraints, rather scant – 'a handful' of performances collected in the time available for an

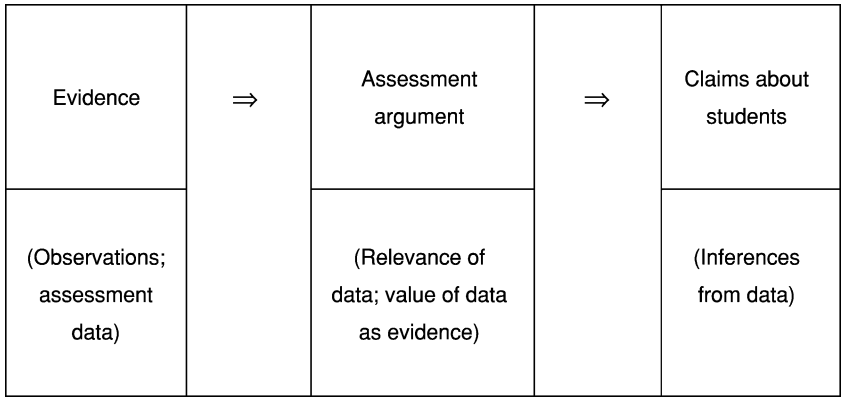

Figure 1 The assessment argument.

assessment, often no more than 1 or 2 hours. These will include essays, diagrams, marks on answer sheets, oral presentations, utterances in a conversation, and so on. They are thus vulnerable because the evidence is necessarily incomplete.

Evidence-Centered Design

Assessment, then, is an act of interpretation; it yields only claims, never certainty. Any assessment system will need to embrace this fact and explicitly justify how the evidence provided by systematic observation of learner behavior forms an adequate basis for claims about the language capacities and language development of learners. Mislevy and colleagues (Mislevy *et al.*, 2002, 2003) recommend a principled procedure for relating the evidence available in test performance to the inferences we wish to make about the individual who has provided that evidence. This approach to building an assessment argument is known as Evidence-Centered design. The procedure involves a number of stages (Figure 2).

I focus only on the first two stages of this complex approach: domain analysis and domain modeling. The other stages will be discussed more briefly. An example will then be given of how this approach was used to inform a recent school-based language assessment development project.

Domain analysis is a preliminary research stage prior to the actual development of the test. It involves drawing on multiple sources of information to derive a definition of the test domain – what knowledge,

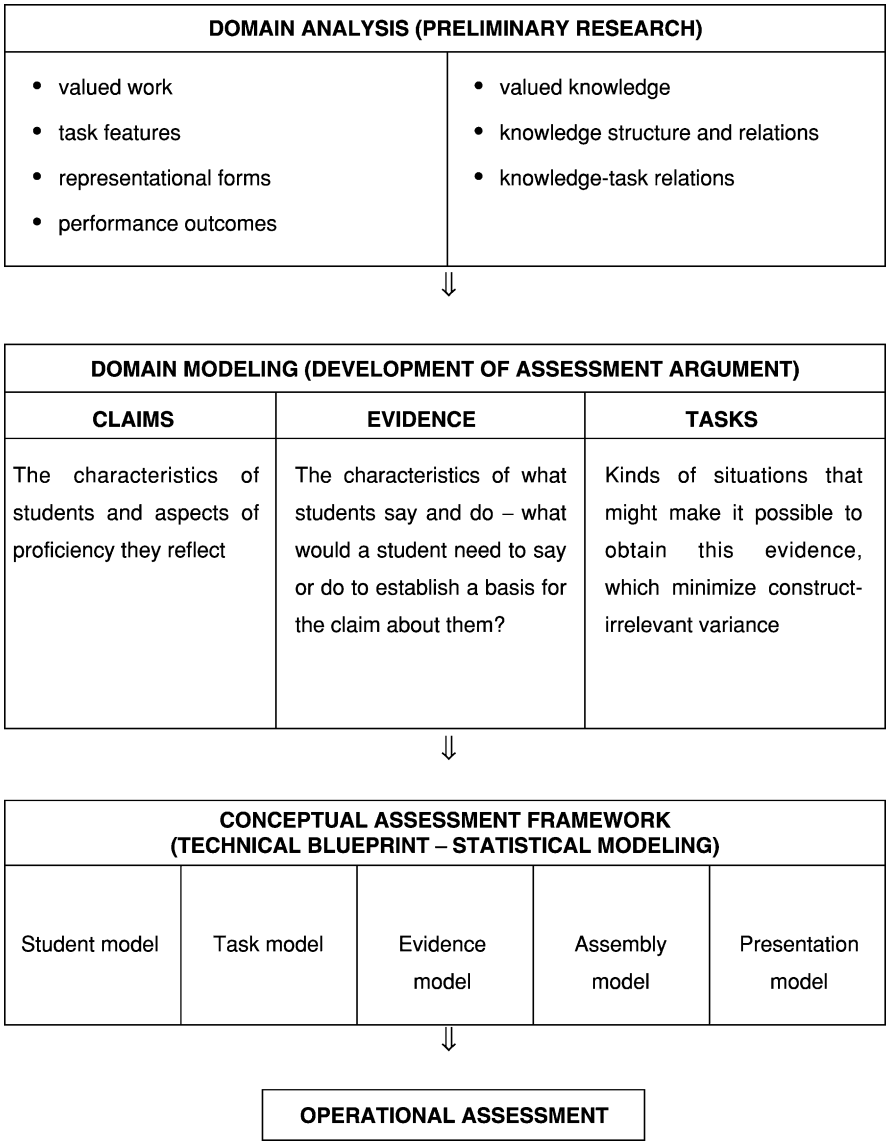

Figure 2 Evidence-centered design. Adapted from Mislevy *et al.* (2003, p. 6).

what performance tasks define it? For example, Tests of English for Academic Purposes, such as the International English Language Testing System (IELTS) or the new internet-based Test of English as a Foreign Language (TOEFL – iBT), are based in part on research identifying the communicative tasks facing international students studying in English-medium universities. In school settings, where assessment is related to the curriculum, the curriculum constitutes one such domain definition – a clear advantage of curriculum-related assessment because domain definition is already done.

The second and most important of the stages of Evidence-Centered design, domain modeling, has three substages: claims, evidence, and tasks. Together, the modeling of claims and evidence constitute the test construct.

In the first substage, the claims we wish to be able to make about students are formulated. These claims may lie along a continuum of specificity, from the general ('has advanced proficiency for his/her age/grade level') to the more specific ('a student can read to integrate information and arguments across multiple sources by generating an organizing frame that is not contained in any of those sources'). The choice of granularity of claims bears on the functions that the claims serve: certification for admission to work or study, the enhancement of curriculum-related learning, and so on. Frequently, a set of claims is presented as an ordered series, thus forming an assessment framework or statement of standards, the most important way in which assessment of language development is currently constructed. Examples include the standards that currently dominate thinking in U.S. school education, the Common European Framework of Reference for languages, and the descriptive bands of achievement in English for Academic Purposes that form the basis for reporting performance on tests such as IELTS.

The second substage of domain modeling is to consider the evidence – the things that we would like to observe a student doing – that will form the basis for claims. Engagement in what kinds of tasks would provide evidence to determine claims about the abilities of the person so engaged? Here, the results of the domain analysis will obviously be relevant. Also, what standard of performance is required? It is important to realize at this stage that the tasks here are not the tasks that appear in the test but, rather, the kinds of things we would like to be able to observe or capture in some way in the test; exactly how is the subject of the following substage. This second substage also involves articulating the aspects of the student's performance that we consider important: in other words, we need to determine the criteria by which it will be assessed. This is especially important for performance assessments, in which the student produces a whole spoken or written text, which is then judged subjectively against certain criteria. Ironically, or perversely, the test construct of an assessment scheme is often most clearly present, albeit implicitly, in the assessment criteria, yet centrality of criteria is neglected in many accounts of assessment theory.

The third and final substage involves determining how evidence will be collected – in other words, what tasks we will require students to engage in to enable us to observe them profitably. This raises the issue of the context and conditions of performance, which if not attended to properly can jeopardize the validity of the claims because of the introduction of construct irrelevant factors.

In the following stage of Evidence-Centered design, Mislevy *et al.* discuss the psychometric or measurement input into the process of test development. The discussion here is highly technical, and space precludes us from considering it further. In general, the hypothesized relationships of the domain modeling stage are now modeled statistically. This means that empirical evidence in the form of data from student test responses can be analyzed statistically to confirm the domain modeling. The data must also be analyzed to satisfy basic psychometric requirements of reliability (consistency of measurement), in both discrete-item and judge-mediated tests. Addressing these and other evidence-related issues involves increasingly sophisticated statistical methods; a helpful review of these developments is available in Bachman (2000). They include generalizability theory, item response modeling including Rasch modeling, and structural equation modeling. In addition, qualitative research methods (Lumley and Brown, 2005) are an increasing feature of language test validation, and include, in particular, the use of introspective methods in research on listening (including multimedia listening and viewing), the rating of writing, and many other topics. A survey of discourse-based studies of oral language assessment (McNamara *et al.*, 2002) identified a number of topics dealt with in such research and indicated the extensive range of qualitative research techniques used. In addition, significant studies of the validity of oral language tests have used a combination of quantitative and qualitative methods. For example, O'Loughlin (2001) combines Rasch analysis, lexical density counts of candidate discourse, and case studies of individual candidates to establish his claim about the lack of comparability of two supposedly equivalent instruments, direct and semidirect measure of oral proficiency. Iwashita *et al.* (2001) use a combination of Rasch analysis and

careful study of candidate discourse to reach important conclusions about the applicability of Skehan's model of task performance conditions to the definition of dimensions of task difficulty in a speaking test. Brown (2003) combines conversation analysis and Rasch analysis of scores to illuminate the character of interlocutor behavior in speaking tests and its impact on scores.

Emerging from these design processes is what we might call a technical blueprint for the assessment, including both for the design and administration of tasks and for collecting empirical data that can be used to check aspects of the validity of the modeling and other features of the assessment. (Confusingly, Mislevy calls the technical implementation blueprint a 'conceptual assessment framework,' but this term seems more suited to the earlier phase of domain modeling.) The final stage, then, is an actual operational assessment, which will include quality assurance mechanisms based on data from the assessment.

Developing a Language Assessment System: An Example

This section provides an illustration of how Mislevy's framework of claims, evidence, and tasks provides a useful context for the development of assessment systems in schools. A brief outline is given of how the framework was used in a project on the measurement of outcomes in the learning of Asian languages in Australian schools (Hill *et al*., 2004).

Given its geographical location, Australian government policy in recent years has promoted the study of Asian languages in Australian schools, to the point where Japanese and Indonesian for a number of years have rivaled traditional European languages such as French and German as the most popular languages learned in school; the demand for Chinese is increasing rapidly. In some areas of the country, the study of these languages is commenced at primary school level (covering the first 7 years of education, from kindergarten to year 6). As part of the evaluation of its policy promoting the study of Asian languages in schools, the Australian government wanted to establish whether the considerable expenditure in support of the policy had yielded measurable achievements in terms of learner proficiency. A complicating factor is that educational provision is the responsibility not of the federal government but of the eight states and territories of Australia, each of which has three distinct educational systems (government, Catholic, and independent non-Catholic). There was a need for coordination between these many different educational systems to agree on a single national set of measures to evaluate the outcomes of student learning. The project therefore aimed to develop nationally agreed key performance measures (KPMs) for two Asian languages, Indonesian and Japanese, at two transition points – the end of primary schooling (years 6/7) and the end of compulsory foreign language learning (year 10).

Given the diversity of provision (three different education systems in each of eight states and territories), each with its own curriculum and assessment frameworks, it was decided to use Mislevy's framework to organize the discussion of existing commonalities and possibilities for agreement across systems (Table 1).

Through an intensive series of consultations and workshops, administrators and teachers were engaged in discussions of how to formulate the claims, the kinds of evidence that would support these claims, and the way that evidence would be captured in task design. The KPMs represent the agreed claims that would be the target of assessment. The project went beyond claims, however, to evidence and broad task design, and in the discussions of these latter, opportunities for this evaluation project to serve the needs of teachers and learners were built in. It was agreed that there would be a mix of external standardized test measures for the skills of listening, reading, and writing, but that these would be supplemented by further writing and speaking tasks that would be more locally relevant and delivered by teachers but assessed externally using an agreed common set of scoring criteria. In addition, student training in self-assessment would be a feature of any data gathering because aggregated self-assessments have been shown

Table 1 Key performance measures for Asian languages project

Claims (+ reporting)	*Evidence*	*Tasks (design for data gathering)*	*Data collection*
What claims do we want to make about learners?	What evidence will we seek to support these claims?	How will we go about gathering this evidence?	*Writing, trialing, and administering assessment tasks*
In what terms will these claims be made?			
How will these be reported?			
[Scales]	[Student performances; task design]		

to be sufficiently reliable to constitute further evidence of system-level (not individual-level) achievement. In this way, in addition to this assessment serving external management purposes, it had the potential to be of lasting benefit to teachers and learners. It was found that those participating in the project related easily to this broad framework, and the project was completed successfully. The project did not require the development, trialing, and administration of actual tests (Table 1), but the blueprint for their development now exists.

I have discussed one approach to the development of an assessment argument, that of Mislevy, because it has not been widely discussed in the language testing literature despite the fact that it is playing an increasingly important role in the development of language assessments, such as TOEFL – iBT. An alternative and somewhat better known approach is that of Kane (Kane, 1992, 2001), who similarly proposes a number of logical steps in the development of any assessment scheme in order to tie test performance to valid inference about test-takers beyond the testing situation. He terms this process the development of an 'assessment argument.' Distinctively, he proposes that we consciously envisage threats to the validity of test score inferences and empirically investigate those as part of the test validation process. Kane's thinking is increasingly important in language testing: Useful introductions to it can be found in Chapelle *et al*. (2004) and Bachman (2005).

Messick on Test Validation: The Social Dimension

The work on validation by Mislevy, Kane, and others is heavily influenced by the thinking of Messick, who defines validity (Messick, 1989) as

> the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores or other modes of assessment. (p. 13)

Messick's thinking contains within it a concern for the social and political function of language tests that is addressed far less explicitly in the work of Mislevy and Kane – not at all, in the case of Mislevy, and imperfectly in the case of Kane. Bachman (2005) attempts to develop Kane's work in this regard by using Kane's approach to the development of a validity argument to consider the social consequences of test use, but the discussion only partly deals with the kinds of issues that have been raised to date in the discussion of the social and political functions of language tests.

Messick distinguishes a number of facets within his unified theory of validity (Table 2). The first cell in the matrix refers to 'empirical evidence and theoretical rationales' for the inferences we make in assessments. Mislevy and Kane can be read as elaborating and systematizing this requirement. The second cell on the top line stresses the need for test constructs to be relevant and useful in the context in which they are used: Not any test can be used for any purpose, no matter how sound the test may be. There is a tendency for people to believe (mistakenly) in the 'one best test' or to think that 'one test fits all.' For example, in the case of the assessment of the language and literacy development of children, 'off-the-shelf' tests may not be appropriate to the educational context, particularly if their relationship to the curriculum is unclear. The convenience of using such commercially available tests does not in itself form an adequate justification for their use. If a test developed in one context (e.g., IELTS, targeted at adult students intending to study at university or in training courses) is to be used in another (e.g., to assess the English language skills of non-native-speaking 15-year-olds in the transition from middle school in the home country to high school in an English-speaking country), then a new validation effort is required to support test score inference in the new context.

In the two lower cells in Table 2, Messick stresses, in a way that the work of Mislevy and Kane does not, the social and political values embodied in assessment constructs and the consequences of assessment practice.

The bottom left cell of Messick's matrix suggests that all test constructs, and hence all interpretations of test scores, involve questions of value. This means that educational assessment can never be 'objective' or 'scientific,' despite the fact that its daunting psychometric trappings and appeal to scientific rigor, and the authority that tests seem to possess, suggest otherwise. Messick sees all test constructs and practices

Table 2 Facets of validity

	Test interpretation	*Test use*
Evidential basis	Construct validity	Construct validity + relevance/utility
Consequential basis	Value implications	Social consequences

(From Messick (1989, p. 20).

as located in the arena of contestable values. This requires test developers to reveal and to defend the value implications of their test constructs. For example, in the case of literacy assessment, conflicting definitions of literacy involve differences in values, epistemologies, and ideologies, even where these are relatively 'naturalized,' as arguably in the case of the cognitive–psychological models of literacy that have been criticized by those taking a more social view. The adoption of a particular definition of literacy as the basis for a test will need to be defended in terms of the values and ideologies it implies. Recent work has drawn attention to the potential of poststructuralist thought in understanding how apparently neutral language proficiency constructs are inevitably socially constructed and thus embody values and ideologies (McNamara, 2001). It is worth noting that the deconstruction of such test constructs applies no less to constructs in other fields of applied linguistics, notably second language acquisition.

Similarly, traditional cognitively based constructs of individual proficiency that do not adequately theorize the contribution of interlocutors to the performance of individuals on speaking tasks may be questioned. This is obviously an issue in school-based assessments of young children, in which guidance from the teacher is fundamental in eliciting performance from the child, but it relates to a larger theoretical issue. During the past decade, there has been a growing critique of individualistic models of proficiency. A strong influence has been work on discourse analysis that stresses the coconstruction of performance (Jacoby and Ochs, 1995):

> One of the important implications for taking the position that everything is coconstructed through interaction is that it follows that there is a distributed responsibility among interlocutors for the creation of sequential coherence, identities, meaning, and events. This means that language, discourse, and their effects cannot be considered deterministically preordained . . . by assumed constructs of individual competence. (p. 177)

Research exploring the implications of this position for language testing has been most advanced in the area of oral language proficiency testing in face-to-face contexts, such as in the oral proficiency interview (Brown, 2003). This research demonstrates that the performance of the interlocutor is implicated in the performance of the candidate; this poses difficult questions for assessment schemes that are framed in terms of reports on individual competence.

Returning to Messick, in the final cell of the matrix (Table 2), he raises the issue of the impact of tests, particularly the wanted and unwanted consequences of test score interpretations (cell 4). The educational measurement field has responded strongly to the idea that exploration of the consequences of the use of language test scores be seen as part of test score validation. Although many theorists support this view (Kane, 2001), pointing out that validation of the use of test scores has been a central theme of the discussion of validity theory for more than 40 years, others (Popham, 1997) wish to restrict validation research to investigation of the accuracy of test score interpretation. In fact, Popham agrees that the consequences of test use are a subject requiring investigation, and he actively contributes to public discussions on what he views as the damaging consequences of school and college testing in the United States; he simply does not want to call it 'validation' research.

Within language testing, a concern to understand test consequences is increasingly evident. The educational impact of assessment schemes is the subject matter of studies of 'washback' (Cheng *et al.*, 2004). Of particular interest is the way in which teachers work with curriculum and assessment standards frameworks (Rea-Dickins, 2004).

A particularly difficult aspect of the impact of assessment schemes on educational outcomes has been a growing realization that many language test constructs are explicitly political in character and hence, when their influence is seen as negative, not amenable to influences that are not themselves political (Brindley, 2001). The most compelling examples include the way in which the Common European Framework of Reference for Languages (Council of Europe, 2001), a scheme that has been used to rationalize assessments across languages within Europe for the purposes of administrative and educational reform, has been widely criticized, among other things, for its view of language (Fulcher, 2004); however, critics face the realization that the mechanisms for modifying the constructs, or indeed of challenging the scheme in its entirety, are exclusively political. The political imposition of language testing constructs means that language test validation research will have an impact only to the extent that it is itself politicized; academic researchers have usually had limited success in such roles. A further example is the implementation of the No Child Left Behind Act of 2001 in the United States, which requires all states to introduce literacy assessments (among others) for grades 3–8. The impact of this policy on assessment, the way assessments are driving the curriculum, is being felt throughout school systems in the United States, but concern to resist the negative impacts of the assessments faces the hurdle of the political nature of the mandate requiring that such assessments be carried out, and carried out in particular ways.

Outside the educational sphere, the political character of language assessments is nowhere clearer than in the increasing use of language tests for control of refugee flows. The widespread use of language tests in processes to support the claims of asylum seekers to be from areas in which they have a justified fear of persecution is resulting in practices that have drawn increasing criticism regarding the validity of the sociolinguistic and sociophonetic constructs that underlie them and of the processes through which they are being implemented (Eades *et al*., 2003). Again, vigorous criticism from academic researchers has fallen on deaf ears politically. An attempt has been made to draw up guidelines for responsible professional practice in the conduct of such assessments, and they are being used in cases before the courts to evaluate the adequacy of assessments submitted as evidence.

These explicitly political considerations can also be understood in terms of test consequences. In the previous example of the asylum seekers, even if the procedure currently used was carried out on the basis of more adequate and defensible sociolinguistic constructs, and conducted more professionally, the entire procedure necessarily has serious consequences for those concerned and raises complex issues of the ethics of engagement in such work. The ethical responsibilities of language testers as an aspect of their professionalism is a major topic of debate within the field (Davies, 1997; Kunnan, 2000).

A more radical response to the issue of the consequences of test use involves direct political critique of the institutional character of assessment. Most significant is the work of Elana Shohamy (2001), who introduced the term 'critical language testing' to describe a research orientation committed to exposing undemocratic practices in assessment. This important work is still in its early stages. An example of the potential for critical archival research on language tests is the account in Spolsky (1995) of the political and institutional forces surrounding the initial development and struggle for control of TOEFL. Much more work is needed, for example, on critical responses to the use of language tests for immigration and citizenship within the context of inflamed intergroup relations in Europe and elsewhere. If language testers are to make an appropriate professional contribution to these debates, their training must prepare them not only to engage productively with the technicist orientation to validity of thinkers such as Mislevy and Kane but also to provide them with the conceptual skills necessary to make sense of the social and political context of their work so that they may act responsibly within it.

See also: Applied Forensic Linguistics; Applied Linguistics in Australasia and the Pacific; Assessment of First Language Proficiency; Critical Applied Linguistics; Immigrant Language Education; Language of Tertiary Education; Languages for Specific Purposes; Second and Foreign Language Learning and Teaching; Second Language Listening; Second Language Reading; Second Language Speaking.

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Assimilation

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Definition

Assimilation is a phonological process in which two sounds that are different become more alike. (The opposite of assimilation is *dissimilation*, in which sounds that are alike become different.) Assimilation may be either *local*, in which the two sounds must be immediately adjacent, or *long distance*, where one sound affects another even though other segments intervene. Local assimilation is the most common type of phonological process, and it can occur along just about any phonetic dimension, including place, voicing, nasality, continuancy, rounding, and palatalization. Assimilations may be *partial* or *total*. In partial assimilation, one segment comes to match another in one or more, but not all, phonological features. In total assimilation, two segments become identical. Both partial and total assimilation can be illustrated with the English negative prefix in-. The basic form of the prefix is [in-], as in 'inaccurate' and 'insecure.' In 'impossible,' the [n] undergoes partial assimilation, changing to match the place of articulation of the following stop, but maintaining its underlying nasality. In 'illiterate,' the assimilation is total, with the [n] becoming identical to the adjacent [1].

Assimilations may also be distinguished by the direction in which the change occurs. In a sequence AB, if A changes to become more like B, as in [np] becomes [mp], the assimilation is termed 'regressive' (as though B were reaching back to change A) or 'anticipatory' (A anticipates a feature of B). If B changes to become more like A, the assimilation is termed 'progressive' (A reaches forward to affect B) or 'perseverative' (some feature of A perseveres into B). An example of progressive assimilation is found in the English past tense and plural suffixes, which are basically voiced (as in 'rowed' [ro-**d**] and 'toes' [to-**z**]), but become voiceless when preceded by a voiceless segment (as in 'cats' [kæ**t-s**] and 'talked' [ta**k-t**]).

Assimilation is sensitive to syllabic position and to prominence. For example, segments in the syllable coda assimilate to segments in the onset far more often than reverse (Itô, 1988; Beckman, 1998). Position in the word also plays a role: medial vowels assimilate to initial vowels, and affixes assimilate to roots. Steriade (2001) defines prominence in terms of perceptual salience, arguing that segments assimilate

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in contexts where contrastive features can not be clearly heard: postvocalic consonants generally assimilate to prevocalic consonants, because release into a vowel provides the most salient cues to the phonological features of a consonant.

Examples

Local Assimilation, Partial

One of the most common assimilations crosslinguistically is nasal consonants assimilating in place of articulation to a following stop. Examples include English 'inaccurate' vs. 'impossible' and 'compact' vs. 'contact' vs. 'co[ŋ]gress.' In Twi, the negative prefix is also a nasal: [me-m-pɛ] 'I do not like,' [me-n-tɔ] 'I do not buy,' [me-ɳ-ɳa] 'I do not receive,' [me-ŋ-ka] 'I do not say.' For Catalan (Catalan-Valencian-Balear), Kiparsky (1985) reported nasal assimilation to seven different places of articulation:

(1)	so[n] amics	they are friends
	so[m] pocs	they are few
	so[ɱ] felicos	they are happy
	so[n̪] [d̪]os	they are two
	so[ɳ] rics	they are rich
	so[ɲ] [y]iures	they are free
	so[ŋ] grans	they are big

The feature [nasal] itself may assimilate (Cohn, 1990; Piggott, 1992; Walker, 1998). Vowels often become nasal adjacent to a nasal consonant. In French, [bon] 'good' becomes [bõ]. In Sundanese (Sunda), [**ŋa**tur] 'arrange' is pronounced [**ŋã**tur] (Robins, 1957). Assimilation of nasality from consonant to consonant is found in Twi, when a root-initial voiced stop follows the negative prefix: [me-**g**u/] 'I pour,' [me-**ŋ-ŋ**u] 'I do not pour.'

Another common assimilation is voicing assimilation. Clusters of obstruents often assimilate in voicing, usually regressively. In Russian, for example, a string of obstruents always agrees in voicing with the final obstruent in the sequence: [o**d vz**bútʃki] 'from a scolding,' [o**t fsp**léska] 'from a splash' (Jakobson, 1978). Generally, sonorants do not participate in voicing assimilation (note that the [l] in [fspléska] neither becomes voiceless nor causes the preceding consonants to become voiced), though there are cases of sonorant–obstruent voicing assimilations. Postnasal voicing is attested in a number of languages, for example Kikuyu (Gikuyu) [**t**ɛm-a] 'cut-IMP,' [**n-d**ɛm-ɛɛtɛ] '1SG-cut-IMPERF' (Clements, 1985; see also Hayes, 1999 and Pater, 1999 for further examples and discussion). Voicing assimilation from consonant to vowel is found in Japanese, where high vowels become voiceless if surrounded by voiceless consonants: [ko**k̟u̥s**ai] 'international,' [**ki̥t**ai] 'expectation' (Tsuchida, 1996).

In Ancient Greek, obstruent clusters assimilated in both voicing and aspiration (Smyth, 1920): [gra**p**^{h}-o] 'I write,' but [gɛgra**p-t**ai] 'has been written' and [gra**b-d**en] 'writing/scraping'; [tri**b**-o] 'I rub,' but [tetri**p-t**ai] 'has been rubbed' and [etri**p**^{h}-**t**^{h}e:n] 'it was rubbed.'

Vowels and consonants sometimes influence one another. In many languages, coronal consonants become alveopalatals before high front vowels or glides, assimilating the higher tongue position. English has alternations such as grade/gradual ([d]/[dʒ]), habit/habitual ([t]/[tʃ]), press/pressure ([s]/[ʃ]). A vowel may also impose palatalization as a secondary articulation on a consonant, adding an additional high front tongue position without changing the consonant's primary place: Russian [ʒe**n**-a] 'wife,' [ʒe**n**^{j}-**i**-t^j] 'marry.'

The change of a stop to a fricative between vowels, as in Spanish [**b**ola] 'ball,' [l**a β**ola] 'the ball,' is sometimes considered assimilation of the feature [+continuant]. Assimilation of [-continuant] may be seen in postnasal hardening: Kikuyu [**β**ur-a] 'lop off-IMP,' [**m-b**ur-eete] '1SG-lop off-IMPERF' (Clements, 1985).

Local Assimilation, Complete

Several African languages have rules of complete vowel assimilation at word boundaries (Welmers, 1973). In Yoruba, for example, [ow**o**] 'money' plus [**e**po] 'oil' becomes [ow**ee**po] 'oil money.' In Igbo, [nwok**e**] 'man' plus [**a**] 'DET' becomes [nwok**aa**] 'that man.'

Total assimilation of consonants is found in English [in-] assimilation to [l] and [r] (mentioned above) as in 'illegal' and 'irreconcilable.' Another example of complete assimilation involving [l] is found in Arabic: the [l] of the definite prefix [ʔal] assimilates completely to a following coronal consonant: [ʔal-kitaab] 'the book' but [ʔaʃ-ʃams] 'the sun,' [ʔad-daar] 'the house,' [ʔan-nahr] 'the river' (Kenstowicz, 1994).

Long-Distance Assimilation

Long-distance assimilation is known as *harmony*. Vowel harmony is a type of assimilation in which all vowels in a certain domain (usually the word) must agree in one or more features. Vowel harmony has been extensively discussed in the phonological literature, and harmony systems involving backness, rounding, vowel height, and advanced vs. retracted tongue root have been described: see van der Hulst and van de Weijer (1995) for an overview. In

Hungarian, for example, suffix vowels assimilate in backness to the root vowel: [ha:z-nak] 'to the house,' [va:ros-nak] 'to the city,' [vi:z-nek] 'to the water,' [yr-nek] 'to the gap' (Ringen, 1988; see also Vago, 1976, Goldsmith, 1985). In Turkish, high vowels agree with a preceding vowel in both backness and rounding, while nonhigh vowels agree in backness. Some oft-cited examples from Turkish (Clements and Sezer, 1982) include:

(2) genitive sg.	genitive pl.	
ip-in	ip-ler-in	'rope'
kɨz-ɨn	kɨz-lar-ɨn	'girl'
jyz-yn	jyz-ler-in	'face'
pul-un	pul-lar-ɨn	'stamp'

In many West African languages, all vowels in a word must agree in the feature [advanced (or retracted) tongue root] (Welmers, 1973; Archangeli and Pulleyblank, 1989, Zsiga, 1997). In Igbo, [ɔ-sɪ-ala] 's/he has told' contains only vowels from the retracted set, [o-si-ele] 's/he has cooked' has vowels only from the advanced set.

Several Austronesian languages exhibit long-distance nasal harmony. Nasal assimilation in Sundanese (Robins, 1957; Cohn, 1990) may extend over a sequence of vowels and glides: [ɲãĩãn] 'wet.' Rose and Walker (2004) discuss nasal harmony from consonant to consonant in Kikongo (Kango): [m-bud-**idi**] 'I hit,' [tu-ku**n-ini**] 'we planted.'

Consonant harmony such as that seen in Kikongo is less common than vowel harmony. Attested cases involve long-distance assimilation of nasality, laryngeal features, and subsidiary place features such as [retroflex] or [anterior] (Hansson, 2001; Rose and Walker, 2004). One well-known example is anterior assimilation in Chumash (Poser, 1982): all coronal fricatives and affricates in a word must agree with the rightmost fricative or affricate in the value of [+/-anterior]: [k-sunon-us] 'I obey him,' [k-ʃunon-ʃ] 'I am obedient.'

Finally, tone may assimilate from vowel to vowel, or syllable to syllable. In Shona, for example, a string of suffixes following a low toned root will be low toned ([èrèŋg] 'read,' [kú-èrèŋg-ès-èr-à] 'to make read to') and a string of suffixes following a high-toned root will be high toned ([téŋg] 'buy,' [kú-téŋg-és-ér-á] 'to sell to') (Myers, 1990; Kenstowicz, 1994). The long-distance behavior of tone was instrumental in the development of the theory of 'autosegmental' 'phonology' (Goldsmith, 1976, discussed below).

Some Assimilations That Do Not Occur

The feature [+/-consonantal] does not assimilate. Vowels adjacent to consonants do not become consonants, and vice versa (though a possible counterexample is proposed by Kaisse, 1992). Nor does the feature [sonorant] assimilate, except as a byproduct of nasal assimilation or complete assimilation. The sequence [dr], for example, does not become [lr]. Stress does not assimilate. An unstressed syllable adjacent to a stressed syllable does not become stressed – rather the opposite: two adjacent stressed syllables or two adjacent unstressed syllables are avoided.

Assimilation and Phonological Theory

If linguistic theory is concerned with the question of 'What is a possible human language?' then phonological theory must be concerned with the question of 'What is a possible process of assimilation?' The best theory would be powerful enough to encode all actually occurring assimilatory patterns, but constrained enough to rule out impossible patterns.

Feature-Changing Rules

In the formal theory of Chomsky and Halle (1968), processes of assimilation were expressed as feature changing rules of the form A → B/ C__D ('A' changes to 'B' in the context of CAD). The crucial concept of feature 'matching' in assimilation was expressed via 'alpha notation.' Greek letters stand for variables over '+' and '−,' and every instance of the variable in a rule must be filled in with the same value. Thus

(3) [-sonorant] → [αvoice]/ ____ [-sonorant, αvoice]

would be read 'an obstruent agrees in voicing with a following obstruent.'

The Catalan nasal assimilation rule in (1) above would be:

(4) [+nasal] →	[α coronal]/	____	[α coronal]
	[β anterior]		[β anterior]
	[γ labial]		[γ labial]
	[δ back]		[δ back]
	[ε high]		[ε high]
	[ϕ distributed]		[ϕ distributed]

Feature-changing rules, however, are both too powerful, and not powerful enough (Bach, 1968; Anderson, 1985). They are too powerful in that nothing rules out impossible rules like that in (5):

(5) [-sonorant] → [αvoice] / ____ [-sonorant, αback]

In this rule, a consonant's voicing value must match its feature for back, yet this impossible rule is identical in formal complexity to the common rule of obstruent voicing assimilation. Feature-changing rules are not powerful enough, however, in that the

common and straightforward process of nasal place assimilation is represented via a complicated formula.

Feature-Spreading Rules

In the theory of 'autosegmental phonology,' assimilation is formalized as 'feature spreading.' A feature is linked to a segment via an association line, and features may spread (assimilate) via the addition of further associations. Obstruent voicing assimilation would be formalized as in (6).

(6)

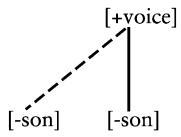

The voicing feature begins as a property of the second consonant in the cluster (indicated by the solid line), but comes to be shared between the two (indicated by the addition of the dotted line). Thus assimilation is given a privileged status as an elementary operation, while more complicated feature switches have a correspondingly more complicated representation. Long-distance assimilation is easily handled as spreading over longer domains. The features [sonorant] and [consonantal] form the 'core' of the segment, the 'root node,' and do not themselves spread.

Different hierarchical groupings of autosegmental features ('feature geometries') have been proposed to account for the fact that certain groups of features (such as the place features in Catalan or the laryngeal features in Greek) assimilate together (Clements, 1985). If all of the place features are grouped under a single node, then place assimilation can be formalized as the addition of a single association line, the formal simplicity mirroring the rule's ubiquity.

(7)

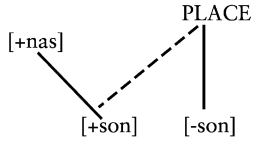

Consensus has not been reached, however, on a universal geometry that can capture all the relevant groupings needed. Harmony systems such as Turkish, where [back] and [round] (but not other vowel features) spread together, have proven problematic. Another challenge is accounting for the fact that consonants are sometimes transparent to vowel assimilations (as in vowel harmony), and sometimes participate in vowel assimilations (as in palatalization). McCarthy (1988), gave an overview of one widely accepted geometry. Hume (1992) and Clements (1993) suggested a different set of class nodes, and Padgett (1995) provided an alternative, nonrepresentational account of feature classes in assimilation.

Constraints

In a nonderivational constraint-based theory such as 'optimality theory' (Prince and Smolensky, 2004), there is no reference to rules or processes of assimilation. Rather, 'markedness constraints,' which define preferred and dispreferred linguistic structures, are argued to prefer sequences where features agree, or where features spread over a certain domain. Such constraints may be grounded in either ease of articulation (e.g., switching voicing in the middle of an obstruent cluster is hard) or ease of perception (e.g., cues to place of articulation in preconsonantal nasals are hard to hear.) Specific assimilations are seen in languages that give specific markedness constraints high priority, and are not seen in languages that give higher priority to maintaining underlying specifications. Kaun (1995), Beckman (1998), and Bakovic (2000) provide constraint-based accounts of vowel harmony. Lombardi (1999) discusses voicing assimilation, and Padgett (1995) provides an account of nasal place assimilation. McCarthy (2004) provides a critical review of ALIGN and SPREAD constraints, and proposes an alternative analysis.

Assimilation vs. Co-articulation

Phonological assimilation can be distinguished from phonetic 'co-articulation.' Daniel Jones, in his 'Outline of English phonetics' (1940), distinguished 'assimilation,' which he defined as a change in phonemic status, and 'similitude,' in which two sounds become more alike but do not change their phonemic identity. In the foregoing discussion, it has been assumed that phonological assimilation results in a change in a segment's phonological features (from [+voice] to [-voice], for example), and thus the segment's phonological category. In co-articulation, there is no change in phonological category, but only in phonetic realization. Two articulatory gestures overlap in time, and thus may exert a physical influence on one another. For example, the [k] in 'key' is pronounced further forward than the [k] in 'coo,' because the former is overlapped in time (coarticulated) with a front vowel and the latter is coarticulated with a back vowel. In English, vowels are nasalized before a nasal consonant, because the velum begins to open before closure for the consonant is achieved (Cohn, 1990). Phonological assimilation is complete and categorical; phonetic coarticulation may be gradient and variable (Keating, 1990).

It may sometimes be difficult, however, to empirically distinguish the two. Browman and Goldstein (1990, 1992), in the theory of 'articulatory phonology,' showed that overlap and blending of articulatory gestures can result in apparently complete assimilation without any change of phonological features. They argue that in phrases like 'hundre[b] pounds' and 'i[m] pairs' the word-final coronal is still articulatorily present, as shown by phonetic imaging techniques. Assimilation is perceived because a coronal and a labial pronounced at the same time sound like an assimilated labial. Assimilation of alveolar [n] to dental [θ], as in the pronunciation of 'ten things' in English, or in the Catalan case discussed above, can also be accounted for in terms of articulatory overlap, as two different overlapping gestures blend to an intermediate place of articulation.

Articulatory phonology argues that all assimilations can be accounted for in terms of gestural overlap. Studies such as Cohn (1990) and Zsiga (1995, 1997), however, showed that categorical and gradient processes of assimilation must be distinguished. Cohn (1990) described both gradient and categorical processes of nasal assimilation. Zsiga (1995) showed that the categorical assimilation of [s] to [ʃ] in 'pressure' is qualitatively and quantitatively different from the partial and gradient change in the phrase 'press your point.' Zsiga (1997) examined Igbo [ATR] vowel harmony and vowel assimilation, showing that harmony is categorical and featural, while assimilation (except in some very common phrases like [nwoka-a] from [nwoke-a]) is gradient and the result of gestural overlap. It is argued that phonological features may be mapped into articulatory gestures, but that the phonological and phonetic modules should remain separate.

Is All Assimilation Local Assimilation?

Articulatory phonology has been extended to account for vowel harmony and other long-distance assimilations. Gafos (1999) proposed that harmonizing features should be understood as a single underlying gesture that persists throughout a word. Consonants do not break up sequences of harmonizing vowels, for example, but are overlaid on contiguous vowel gestures. From this point of view, all assimilation is local assimilation. 'Transparent' segments (vowels and consonants that intervene in a harmony domain but that apparently do not share the harmonizing feature) are obviously a problem for this approach. NíChiosáin and Padgett (2001) and Rose and Walker (2004) suggested various means by which such apparent 'action-at-a-distance' can be reanalyzed, and all assimilation be constrained to be strictly local.

Conclusion

Assimilation is the most common of all phonological processes, and thus has played an important role in phonological theory. Phonological theories have sought to capture what sorts of assimilation can and cannot occur, what groups of features assimilate together, and why certain segments participate in assimilations while others do not. Current work on assimilation is teasing apart the contributions of articulatory coarticulation and phonological feature switch, and continues to examine the proper formalization of local and long-distance assimilations.

See also: Dissimilation; Harmony; Hungarian: Phonology; Phonology: Optimality Theory.

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Association for Computational Linguistics

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The ACL was founded in 1962 as the Association for Machine Translation and Computational Linguistics, with Victor H. Yngve as its first president. However, the words *machine translation* were deleted from the name a few years later because of the cloud that hung over that enterprise at the time (*see* **Machine Translation: History**). Much of the growth of the association in subsequent years was attributed to the work of Donald E. Walker, who was president in 1968 and secretary-treasurer (in effect, administrator) from 1976 until his death in 1993.

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See also: Computational Linguistics: History; Human Language Technology; Machine Translation: History; Natural Language Processing: Overview; Symbolic Computational Linguistics: Overview.

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Associationism and Connectionism

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Associationism maintains that all knowledge is represented in terms of associations between ideas, that complex ideas are built up from combinations of more primitive ideas, which, in accordance with empiricist philosophy, are ultimately derived from the senses. Connectionism is a more powerful associationist theory than its predecessors (Shanks, 1995) that seeks to model cognitive processes in a way that broadly reflects the computational style of the brain. The brain carries out millions of computations simultaneously in densely interconnected networks of

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neurons. Information is represented as distributed patterns of activity, and learning is achieved by modifying the strength of connections between neurons. Connectionist or 'parallel distributed processing' models attempt to capture these general properties in highly artificial neural networks. These are self-organizing systems that discover for themselves the representations required to perform a specific task stipulated by the researcher. Their main interest lies in the fact that they display emergent rule-like behavior. The question is whether their learning trajectory, ultimate performance, and breakdown after damage mimic that of humans. Connectionist research provides an empirical means of evaluating whether associationist learning principles are sufficient to explain specific aspects of human behavior.

The simplest kind of connectionist network consists of a single layer of neuronlike units, in which each unit represents a predefined feature that can be activated by external input. Each unit is connected to every other unit by a connection whose strength, or 'weight,' determines the amount of 'activation' that passes along it. During training, when two units are simultaneously active, the strength of the connection between them is increased. Through this associationist learning principle, the network absorbs the correlational structure of the input and comes to represent concepts as distributed patterns of activity over its processing units. It has been demonstrated that representations of multiple individual instances of experience can be encoded in a single network and retrieved from partial cues by a process of pattern completion, while less specific cues prompt the retrieval of a prototype (McClelland and Rumelhart, 1985). Concepts can be thought of as 'attractor basins' in a multidimensional space of possible network states, an idea that has proved useful in explaining semantic errors in dyslexia (Hinton and Shallice, 1991) and in modeling semantic priming (Masson, 1995).

More complex networks are required when the problem involves mapping between different kinds of representation, for example, converting from orthography to phonology in single-word reading. Separate layers of units encode input and output representations, and typically, there is an intermediate layer of 'hidden' units whose function is to represent the input in a form that can be mapped onto the output (it is these hidden units that increase the computational power of connectionist networks compared to earlier associationist theories). During training, for each input pattern, the degree of error on the output is used to modify connection weights within the network so as to reduce the error in future. Using this 'back-propagation' learning algorithm, the network's behavior is gradually shaped until, ideally, it produces the correct output for the entire set of training examples. Of course, connectionist models would not be very interesting if all they did was store the input–output mappings they were trained on. What is critical is whether, after training, they exhibit humanlike performance. Models of word reading have been particularly successful in this respect. They produce humanlike responses to nonwords, showing generalization to items that they were not trained on, and they mimic subtle aspects of reading known words, such as the combined effects of regularity and frequency (Plaut *et al.*, 1996; Seidenberg and McClelland, 1989). This suggests that they extract knowledge of underlying regularities, rather than merely storing the specific items received during training. It is also claimed that, when damaged (e.g., by removing some of the connections), they show similar patterns of behavior to brain-damaged patients, and that different dyslexic syndromes can be simulated by damaging the network in different regions (Plaut *et al.*, 1996).

Another area of intensive connectionist research has been in relation to the English past tense. In this case, phonological representations of word stems are mapped onto phonological representations of past tense forms. It has been claimed that these networks mimic the human developmental profiles for regular and irregular forms, and for subgroups of irregulars (Plunkett and Marchman, 1993; Rumelhart and McClelland, 1986). They are also able to produce humanlike past tenses for nonce forms (MacWhinney and Leinbach, 1991), despite containing no discernible rule-like representations. By damaging a network in different regions, it is possible to simulate the kinds of dissociations between regular and irregular morphology found in brain-damaged patients (Joanisse and Seidenberg, 1999), paralleling the effects obtained in word reading.

Language processing also has an obvious sequential component. To deal with this, 'simple recurrent networks' are taught to predict each successive item in a sequence, using a record of the hidden unit activations to previous events. Not only do such networks learn to reproduce sequences, but they also extract the transition probabilities between items across the entire training set. There are simple recurrent network models of single word production that make humanlike speech errors (Dell *et al.*, 1993), and models of speech recognition that use phoneme transition probabilities to help locate word boundaries in continuous speech (Christiansen *et al.*, 1998; Elman, 1990). Models of syntactic processing use transition probabilities between words to form internal representations that reflect word classes (Elman, 1990). Such networks can also make structure-dependent

predictions over long distances and show sensitivity to embedding and recursion, suggesting that they could form the basis of a connectionist approach to syntactic processing (Elman, 1993).

Connectionism challenges a number of assumptions of traditional, 'classical' approaches to studying language and the mind. The classical approach sees rule knowledge as being represented in symbolic form, while exceptions to rules are stored in memory (Pinker, 1994; Ullman, 2001). Connectionist models produce rule-like behavior, yet they contain no symbolic representations. Rule-like behavior emerges as a consequence of the way in which individual instances of experience are stored in a single memory system. The connectionist challenge has provoked sustained debate (beginning with Fodor and Pylyshyn, 1988), focusing recently on the necessity for symbolic, or algebraic, rules (cf. Marcus *et al.*, 1999; Seidenberg and Elman, 1999) and the separation between rule knowledge and item memory, particularly in relation to the English past tense (Pinker and Ullman, 2002 and commentary). The reason for this heated debate is that connectionism challenges the classical assumptions about modularity, domain specificity, and innateness (as expressed in Pinker, 1994). The same neural architectures and learning algorithms are applied to linguistic and nonlinguistic domains alike, and no information is encoded in connectionist networks that is not ultimately derived from the input. Issues such as the poverty of the stimulus, universals, critical periods, and robustness have to be approached from novel perspectives (Elman *et al.*, 1996).

Connectionism has inspired new ways of thinking about language processing and learning. It emphasizes the statistical properties of the input and how complex behaviors are the outcome of multiple, competing constraints. This has motivated empirical work looking at human abilities to learn by tracking statistics (Saffran, 2001) and has provided the theoretical foundation for interactionist and 'constraint satisfaction' approaches to sentence processing and learning (MacDonald *et al.*, 1994; MacWhinney, 1987). Whether or nor connectionism in its purest form will be able to explain all aspects of language processing and learning is an empirical question. But connectionism has stimulated debate and focused empirical research on fundamental issues in the language sciences.

For a general introduction to connectionism, including reprints of seminal articles, see Ellis and Humphreys (1999). For reviews of language-related work, see the special issue of *Cognitive Science* (1999, *23(4)*) and Plaut (2003).

See also: Abstraction; Associationism and Connectionism; Computational Approaches to Language Acquisition; Developmental Dyslexia and Dysgraphia; Disorders of Morphology; Dual-Mechanism Morphology; Fodor, Jerry (b. 1935); Interactionism; Language Development: Morphology; Modularity; Modularity of Mind and Language; Morphology and Language Processing; Morphology in Parallel Distributed Processing; Prototype Semantics; Reading Processes in Adults; Sentence Processing; Speech Recognition: Psychology Approaches; Spoken Language Production: Psycholinguistic Approach.

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Audio-visual Speech Processing

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The mouth, lips, tongue, teeth, and jaw systematically shape the pattern of sound that a talker produces. That is, the production of speech sounds has visible consequences. What bearing does this have on our understanding of speech and language mechanisms, and what are people doing when they read speech from facial actions?

Most of us, much of the time, do not need to see the talker to understand what has been said. For this reason, as much as any other, the acoustic properties of speech have constituted the major focus of research in speech science. Interest in audiovisual speech is rekindled from time to time by several factors: One is the need to communicate in noisy environments. Engineers try to find ways of increasing message redundancy by providing both visible and audible speech information. It has been estimated that seeing the talker offers a gain equivalent to around a 15 dB increase in signal-to-noise ratio for users of English. A second reason for interest in audiovisual speech is the rapid development of computer models of human action: Rewards are high for developing naturalistic, computer-generated visible speech, driven by a real actor's voice or from text (*see* http://mambo.ucsc.edu; Stork and Henneke, 1996; Massaro, 1998; Massaro *et al.*, in press). From the speech-perception point of view, non-acoustic aspects of the speech signal need to be considered in order to develop adequate models of natural speech comprehension. The variability in the signal that arrives at the listener's ears is a problem for a purely acoustic perceptual system. Does adding the talker's face and body improve the reliability of such analysis, and if so, how? In another realm, that of hearing loss and hearing remediation, and especially cochlear implant development, seeing the speaker's speech is a critical determinant of the ease and utility of hearing-aid use (see Bergeson and Pisoni, 2004, for review of this field).

A key finding, which reinvigorated the study of audiovisual speech processing, was that of McGurk and MacDonald (1976), who demonstrated that a heard syllable, presented in a quiet setting, could be influenced by a face that appeared to be saying something else. They showed that seeing 'ga' while hearing 'ba' led to the impression that 'da' had been spoken. This effect was not a unique demonstration of the influence of vision on audition, but it was the first time that the phenomenal report of a heard speech sound was categorically different depending on whether the eyes of the perceiver were opened or closed. The effect is powerful, robust, and relatively automatic. It can be demonstrated in children. The underlying mechanism is not difficult to unpick in general terms: 'ba,' 'ga,' and 'da' are acoustically similar, differing in terms of spectral features that are easily lost in noise. By contrast, the visible distinction between 'ba' (lips closed for the initial consonantal plosive) and 'ga/da' (mouth open) is reliable and

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Audio-visual Speech Processing

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observed easily. As long as phonetic features can be derived from more than one modality and are integrated prior to perceptual report, then 'da' is likely to be the best fit to a seen 'ga' coincident with a heard 'ba.'

This demonstration locates one source of audiovisual integration at the segmental (phonemic) level, but prephonemic aspects of speech are sensitive to vision. Four- to five-month-old infants, who have not yet tuned in to the phonetic contrasts of the spoken language that surrounds them, are susceptible to McGurk effects, responding to a speech event as if it were novel when its novelty resides in the audiovisual, but not the auditory percept (see Burnham, 1998). In adults, visual aspects of the talker's speech affect where the perceiver sets phonetic boundaries. Using tokens spliced from videoimages of talkers under different speaking conditions, Green and colleagues showed that seen speech rate and seen place of articulation affect boundaries for perceiving voicing (/p/ vs. /b/), a phonetic feature with the acoustic correlate of voice-onset time. Nor is voicing the only phonetic feature to be affected by vision. The perceived boundary between heard /l/ and /r/ is sensitive to a preceding bilabial ('iri' vs. 'ili' and 'ibri' vs. 'ibli'). That is, the perceptual system adjusts for perceived anticipatory coarticulation. Green and Norrix showed that the shift occurs when /b/ is simply seen in the token, as well as when it is heard (Green, 1998). These demonstrations are unlikely to be unique. They suggest that the phonetic processor is promiscuous with respect to the source of speech information.

Given these fine-grained effects of vision on audition, we should not be too surprised that susceptibility to McGurk effects can be sensitive to the language of the speaker and perceiver, for the phonetic characterizations of languages differ, even when some of the phoneme categories appear superficially to be similar. Sekiyama and colleagues report reduced susceptibility to McGurk effects in Japanese and in Chinese perceivers and also that the effect varies with the appearance of the talker – talkers who appear to be Japanese generate different effects than those who appear to be American (Burnham and Sekiyama, in press). Much detailed work remains to be done on cross-linguistic perception of audiovisual speech. For the moment, studies suggest that skilled language users bring to speech comprehension analysis of both visual and acoustic properties of speech that they know and that these infiltrate processing at the most fine-grained, phonetic level. A similar point can be made with respect to dialectal and idiolectal speech processing. These forms of processing are almost entirely unexplored in relation to sensitivity to audiovisual illusions, but a start has been made. Walker *et al.* (1995) reported that McGurk effects were more likely to occur with unfamiliar than with familiar face-voice combinations. This finding suggests that the highly idiosyncratic specific actions associated with a known individual saying 'da' are well represented in memory and are therefore not so likely to be confused with (seen) 'ga' or (heard) 'ba' uttered by that individual (see also Lander and Bruce, in press).

Perhaps surprisingly, given the fine temporal resolution (tens of milliseconds) required to distinguish many consonantal sounds by ear, classical McGurk effects are not very sensitive to synchronization (McGrath and Summerfield, 1985; Munhall *et al.*, 1996). Visuo-auditory lead times of up to a half-second do not noticeably impair audiovisual integration in running speech (Campbell and Dodd, 1980). Shorter 'windows of synchronization' are required for other bimodal events, such as glass breaking or hands clapping, and such environmental sounds tend not to show asymmetries in favor of vision leading audition. The reasons for these differences are still obscure, but are likely to relate to the visual correlates of anticipatory coarticulation. The disposition of the facial muscles can be set for optimal production of a word, phrase, or even sentence well in advance of the precise movements of the (less visible) speech articulators: For example, in producing the sentences (each with a focus on the last word) 'my mother bought me a tutu' and 'my mother bought me a wee-gee,' the distinction between them can be seen in the extent and shape of mouth opening early in the production of the sentence, and sometimes even at the utterance of the first syllable. The audiovisual speech processor is sensitive to such long-distance visual cues in the speechstream, but is sufficiently flexible to manage well-synchronized fine-grained temporal distinctions as well.

What mechanisms account for McGurk effects? Bernstein *et al.* (2004) offered a recent, authoritative review (see also Schwartz *et al.*, 1998). The main issues are sketched out here. One influential approach (Massaro, 1987; 1998), saw audiovisual speech as a special case of a general integration metric within perception. It supposed that, within each modality, specific perceptual features (in this case phonetic) are identified; these features are then aligned for integration, and a bestfit to a pattern prototype (in this case, a consonantal phoneme) is achieved using Bayesian procedures – a fuzzy logical model of perception (FLMP). This late integration and identification model has powerful generalizability, but hardly characterizes the extent to which audiovisual speech may be special. It also has difficulties in explaining

prephonemic integration, including evidence from prelinguistic infants and audiovisual influences in phonetic categorization mentioned above. In contrast, a late integration model honors one important finding: Auditory adaptation effects, whereby repeated presentations of a spoken syllable shift the perceived phonetic boundary of an aftercoming, ambiguous syllable, are not susceptible to audiovisual (illusory) pressures. That is, there is a level of acoustic speech function that may be inaccessible to visual influence (Roberts and Summerfield, 1981; Saldaña and Rosenblum, 1995).

Other approaches to integration have been more naturalistic. Thus, Rosenblum (Rosenblum and Saldaña, 1998; Rosenblum, 2005) offered an ecological perspective that focused on the attributes of the speech signal – whether heard or seen – that have commonalities of structure. This approach forced a very different view of the speech signal than that which emphasized the complementarity of vision and audition. The latter approach was epitomized at the beginning of this article in the context of phonological identification and can be taken to be a general principle of speech in many different languages: One reason that audiovisual speech is useful is because vision can deliver contrasts that are relatively poorly discriminated by ear. Figure 1 illustrates this point.

However, the complementary process approach begs the important question – exactly how does integration across the modalities occur (the binding problem)? Theoretical approaches that stress commonality of structure across vision and audition offer a feasible (albeit partial) solution to the problem of integration. If the developing child picks up on regularities in the perceived environment – for example, regular changes in amplitude of a noise-emitting object as it approaches and recedes from the perceiver – an amodal processor should be sensitive to (say) time-varying changes in acoustic spectral characteristics and retinal size, each with similar dynamic characteristics and each locked to a common timeline. The relevant information for natural perception should be sought in the stimulus characteristics. Such direct perception notions have a history dating back to J. J. Gibson (1966) in visual perception, whereas in speech perception, they are epitomized by motor theories (Liberman and Mattingly, 1985; Fowler, 2004). The consequences for audiovisual speech were elaborated in a pioneering discussion by Summerfield (1987). This analysis suggested that 'the object of perception' in speech is not a specific acoustic signature, but rather the speech gesture itself, characterized by its motoric, acoustic, visible, and somaesthetic correlates. Speech gestures are intrinsically and essentially dynamic, for speech is produced in real time and is characterized by temporally structured distinctions as it is perceived. However, such characteristics can be picked up by sensors in any of the different modalities. Indeed, it is the exploration of the temporal (time-varying) attributes of seen speech that has

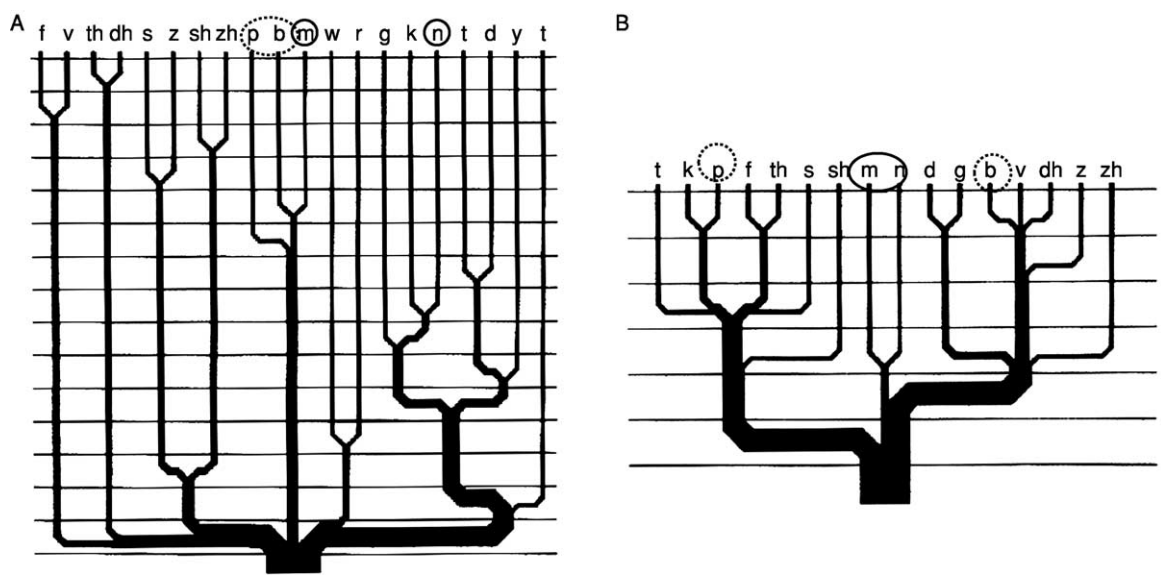

Figure 1 Confusions made among (A) visually perceived and (B) auditorily perceived consonants in CV syllables of vowel sound 'ah.' Easily confused consonants cluster at the top ends of the branches; least confusable consonants are at the roots. (A) summarizes the results of a cluster analysis of the visual confusions made by trained hearing-impaired adult observers. The pattern is roughly the reverse of that in (B), which is derived from auditory confusions made in different levels of auditory noise (more noise, lower horizontal lines). For example, 'm' and 'n' are not confusable visually, but are confusable auditorily (within the solid markers), whereas 'p' and 'b' are confusable visually, but distinguishable auditorily (within the dotted markers). Adapted from Summerfield (1987).

produced some of the most impressive recent experimental data. Rosenblum and colleagues have shown that McGurk effects can be induced when the perceiver sees speech illuminated solely by point-light movements on the facial surface – that is, when no detail of the visual form of the disposition of the articulators at a particular point in time is available (*see* http://www.faculty.ucr.edu for demonstrations). Munhall, Vatikiotis-Bateson, and colleagues (see Munhall and Vatikiotis-Bateson, 1998; Munhall *et al.*, in press) encompassed insights from motor-theoretical approaches into a different program. They attempted a detailed, engineered, description of natural speech in terms of its motor, acoustic, and visible properties, along with the requisite computational algorithms for producing and perceiving it. This work has underlined the importance of visible speech kinematics beyond the phoneme or syllable. For example, one recent study showed that seeing the head movements of the talker improved intelligibility of auditory speech-in-noise in passages of connected speech. In particular, larger head movements correlated with both voice frequency (F0) and acoustic amplitude (Munhall *et al.*, 2003). **Figure 2** shows how this correlation can be demonstrated. Aspects of the acoustic spectrum and temporally aligned head movements as measured by optical tracking devices mounted on the head and face show clear correspondences.

The finding (Kamachi *et al.*, 2003; Lachs and Pisoni, 2004) that different (unknown) individuals can be identified cross-modally from their vocal patterns at better than chance levels suggests a similar 'correspondence-seeking' process at work, but here it works in the service of identification of the talker, rather than the content or intent of their speech. These studies have shown that identifying a particular talker (audio-only) after watching a number of people talk (vision only) is possible, even when the talkers are similar in age, gender, and other obvious characteristics that might affect perceived voice quality. The reverse is also possible. Identifying a particular talker (vision only) after hearing how he or she speaks can be performed at above chance levels. Control experiments suggested that the characteristic speech patterns of the talker are the basis for this ability, although the detailed cues required to make this identification are still unknown. In Kamachi's study, for instance, neither still photographs of a talker nor reversed-animation images of the talker were matchable to the heard voices. To drive the point home, Lachs and Pisoni (2004) found that point-light versions of the talker's face, with no further image detail

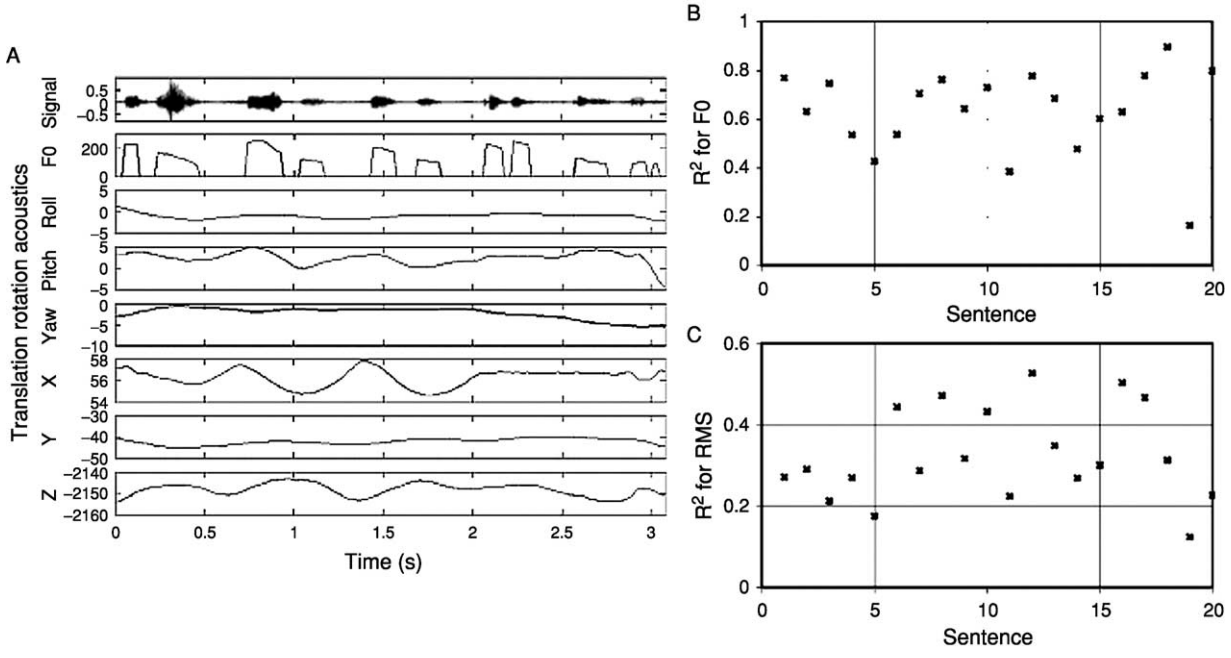

Figure 2 Example of acoustic and head-movement patterns for a single sentence (A) and results of the multiple regression analyses (B, C). In (A), the acoustic waveform, fundamental frequency of the voice (F0), and six degrees of freedom of head motion (three positional coordinates: x, y, z; three angular coordinates: roll, pitch, yaw) are plotted as a function of time. (B) shows the R^2 values for the multiple regression analysis of F0. The correlations are consistently high, with on average more than 63% of the variance in the talker's voice pitch being accounted for by the six components of head motion. (C) shows R^2 values as predicted by the six degrees of freedom of head motion, plotted for the 20 sentences used as stimuli. Although the correlations are smaller than for F0 (mean $R^2 = 0.324$), they are still strong for most sentences. From Munhall K G *et al.* (2003), **Figure 2**, with permission of Blackwell (publishers), and the author.

(no shape of the mouth or size of the teeth), could support such identity matching.

Brain Bases for Audiovisual Speech Processing

Although the brain bases for language have been well researched for 150 years (*see*), studies of the cortical bases for McGurk effects were initiated by Sams in 1991 (Sams and Levänen, 1996) and are ongoing using ERP and MEG techniques (for example, Colin *et al*., 2002; Raij and Jousmäki, 2004). These studies suggested that the visual component of an audiovisual percept can affect left temporal regions that are specifically active when listening to speech, within 180–220 msec of stimulus onset. This relatively early waveform can be distinguished from a later modulation of the auditory waveform that can occur for less 'natural' cross-modal pairings, such as a letter and its spoken name (see Raij and Jousmäki, 2004, for review). MEG and such similar procedures as ERP have fine temporal resolution, but for spatial resolution, PET and fMRI are preferred options. Using fMRI, Calvert *et al*. (1997) showed that several sites within the superior temporal lobe were preferentially activated by audiovisual speech. These sites included the auditory cortex, including some lateral parts of the primary auditory cortex on the edge of Heschl's gyrus, and the secondary auditory cortex in the surrounding superior temporal plane and extending into the superior temporal gyrus on the lateral surface of the temporal lobe. Within visual regions, extensive activation was observed in inferior occipito-temporal sites (Brodmann areas 37/39), regions characterized as responsive to visual movement.

Neuropsychological case studies confirm the importance of visual movement analysis to audiovisual speech perception (Campbell *et al*., 1997; Munhall *et al*., 2002). A region that appears to be especially implicated in audiovisual speech is the posterior part of the superior temporal sulcus (STS), on the inferior surface of the superior temporal gyrus. This region has been proposed as an essential binding site for auditory input (via the secondary auditory cortex) and visual input (via secondary visual regions), because it is in this region that activation for bimodal processing is nonlinear and usually super-additive, with respect to each of the unimodal processing patterns (Bernstein *et al*., 2004; Calvert and Lewis, 2004; Campbell *et al*., in press). The temporal course of audiovisual speech interaction, measured using MEG, also supports this proposal (Möttönen *et al*., 2004).

Does activation within the STS thus reflect binding of the complementary features of audition and vision (see Figure 1), or is the STS essentially a detector of commonalities of seen and heard speech, especially in terms of its temporal signature? A suggestion that brain sites can be distinguished that support these different functions is emerging. Callan *et al*. (2004) used spatial wavelet-filtering techniques to degrade visual information in audiovisual processing. Low-filtered information retained movement information, but lost much of the fine (visual) spectral information required to identify the place of articulation. In contrast to a low-filtered condition, high-filtered and unfiltered audiovisual clips activated the (left) middle temporal gyrus (MTG, BA 21), as well as the superior temporal gyrus. One inference is that the MTG is especially implicated in the processing of the visually perceived place of articulation.

Brain imaging studies also seem to support the notion that gestural aspects of speech are integrated into its perception. The production of speech is generally associated with activation in left frontal regions, with the left inferior frontal regions as a critical focus (Broca's area = Brodmann areas 45/47). Not only is Broca's area regularly activated by audiovisual speech perception (Callan *et al*., 2003; Campbell *et al*., in press) but transcranial magnetic stimulation on the skull above motor regions of the brain (left frontal regions) also causes electromyographic activity of the lips and tongue to be blocked when watching audiovisual speech (Watkins *et al*., 2003). The location of the sites currently known to be involved in audiovisual speech perception is shown in Figure 3.

Audiovisual Speech: Detection and Attention

The focus on McGurk effects detracts from some other interesting aspects of audiovisual speech. Grant and Seitz (2000) asked whether seeing the speaker helps in detecting as well as identifying speech in noise. The detection of speech-in-noise is an acute practical problem for a range of communication systems. Using spoken sentences presented sparsely, in large amounts of white noise, they found a mean audiovisual-to-auditory advantage to sentence detection of between 1.0–2.2 db, depending on the sentences seen. This advantage was specific to audiovisually concordant sentences: There was no advantage in detecting sentences when the face and voice did not match. However, Schwartz *et al*. (2004) showed that the effect of vision on auditory speech detection in high levels of noise is not specific to the detailed facial movement information in the face. A facial animation display of an ambiguous syllable was sufficient to cue syllable-specific auditory signal

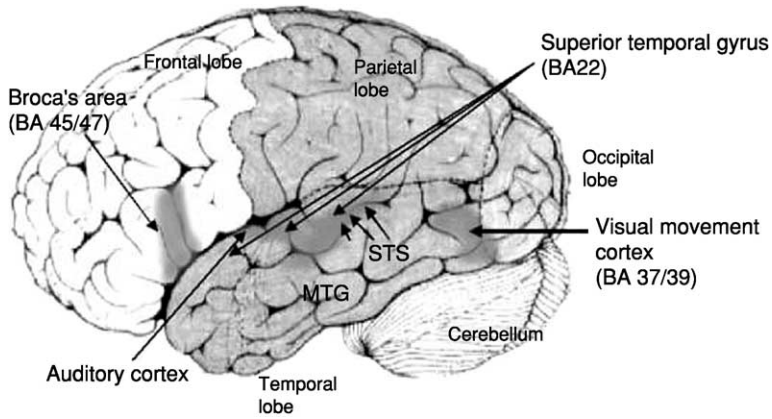

Figure 3 The left surface of the brain, lateral view. Regions shown in dark gray have been implicated in visual (speechreading) and audiovisual speech perception. STS = superior temporal sulcus, MTG = middle temporal gyrus.

processing. This general 'alerting' aspect of visual speech brings to mind the ventriloquism illusion (Radeau and Bertelson, 1978), whereby a heard sound is perceived to originate from a seen source that may be distant from it. A more complex version of this effect was demonstrated by Driver (1996) who showed, using spatially and temporally overlapping voices with seen-to-be-speaking faces at different locations, that preattentive cross-modal matching occurs. Under these circumstances, the perceiver can shadow one of the overlapping voices better when the two speech events appear to originate from spatially separated speaking faces, with each one being congruent with one of the auditory speech tracks.

However, visual enhancement of the detection of speech-in-noise is not just a function of speech-universal, general-purpose alerting mechanisms based on general familiarity with the visual correlates of speech. Kim and Davis (2003) found language-specific enhancement in a sentence-in-noise detection task when they contrasted Korean and English participants in their own and the other language. This enhancement occurred only for sentences that showed low correlations between acoustic temporal envelope spectral characteristics and visual articulation movement. For sentences where the correlation was high, other-language users were worse at detecting sentences in audiovisual than auditory conditions. One suspects that detection-in-noise involves the activation of relatively high-level, language-specific processes, even in the absence of full identification of the material, but the reasons for this paradoxical effect remain to be clarified.

Conclusion

Several issues have been highlighted in this short and selective review: To what extent does audiovisual speech depend on mechanisms that reflect correspondence between input systems, or on those mechanisms that reflect complementary between them? To what extent do top-down and bottom-up mechanisms, and the processing of visual movement, affect the variety of audiovisual phenomena touched on in this article? It has not been possible to do more than give the flavor of a burgeoning area of research, one that is developing from a growing and well-defined community of cross-disciplinary researchers. Its growth in recent years may be technology led – Digital processing has made possible explorations that were hardly dreamt of even 10 years ago – but it has a scientific core. Respecting the signal and sensory properties of speech in the auditory and the visual domains means that theories of how speech is acquired and used will be placed appropriately in their biological and computational context – one in which the perception of speech may be acoustically dominant but not all-powerful and one that needs to encompass vision, action, and bodily sensation.

See also: Phonetics, Acoustic; Phonetics, Articulatory; Cross-Linguistic Comparative Approaches to Language Acquisition; Evoked Potentials; fMRI Studies of Language; Idiolect; Language Acquisition Research Methods; Magnetoencephalography; Speech Recognition, Audio-Visual.

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Augmentative and Alternative Communication

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What is Augmentative and Alternative Communication (AAC)?

Augmentative and alternative communication (AAC) refers to methods of communication that can supplement speech and writing when these are impaired. When a disability makes it impossible to use speech as the primary means of communication, other techniques must be employed. The central importance of communication for human beings has meant that a wide variety of imaginative augmentative and alternative approaches has been developed. Often some ability is still present to communicate naturally, and this is usually employed as much as possible. Users of special communication methods will often continue to make use of vocalization, facial expression, and gesture, to the degree they are possible, along with their alternative methods of communication. Unimpaired communication is, of course, inherently multimodal, with the speech content being modified by prosody and delivered in parallel with facial expression, gesture, posture, and a range of other nonverbal communication methods. Both unaided speakers and augmented speakers will use multiple communication modes simultaneously, but the augmented speaker must use a variety of special techniques to compensate for their physical impairment. The ultimate goal of AAC is to help users accomplish the full range of human interactions, which involves information transfer and the expression of needs, but more importantly also includes performing social routines and maintaining social bonds.

There are times when everyone may make use of alternative methods of communication. For the unaided speaker, this is typically when the environment makes the usual forms of communication difficult. We may use gesture and iconic hand signals to communicate at a distance across a noisy room; or, at a lecture we may give an exaggerated facial expression to silently signal an opinion to a friend sitting next to us. Special techniques developed by people with disabilities can be seen as ways to help a disabled person deal with the ordinary environment; interestingly, the same or similar approaches are often used by the ordinary person who is temporarily disabled by the environment in which they find themselves.

Who Uses AAC?

The inability to communicate without some sort of assistance can have a number of congenital or acquired causes. The most common congenital causes

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Who Uses AAC?

The inability to communicate without some sort of assistance can have a number of congenital or acquired causes. The most common congenital causes

are cerebral palsy (usually produced by brain damage at birth), developmental delays, specific language disorders, and autism. The most common acquired conditions among people who use AAC are amyotrophic lateral sclerosis (ALS – also called motor neurone disease in the U.K. and Lou Gehrig's disease in the United States), multiple sclerosis, head or spinal cord injury, and stroke. Estimates of the prevalence of the need for AAC vary, but a figure of about 0.1% of the population is frequently cited. Of course, manual signing systems have been developed for deaf people, and these constitute a rich and efficient language system. People with learning difficulties may use simple manual signing systems as well as graphic symbols to assist in communication. The AAC systems described here are primarily used by people whose difficulty consists of impairment in the physical systems that produce vocal communication.

Types of AAC

AAC constitutes a spectrum of methods used to communicate, from techniques which require no equipment at all to methods using cards, boards, and books, to systems making use of advanced technology. A typical AAC user will employ a number of techniques in parallel and will vary the technique used depending on the situation and with whom they are communicating. Roughly speaking, the use of specialist materials and techniques is more and more appropriate as the user communicates with people they do not know well. One approach may be used at home, a second when with friends, and a third with strangers.

Despite a lack of intelligible speech, vocalization can still be useful for many nonspeaking people. If a vocal sound of any sort can be produced, it can be useful to signal assent, disagreement, or understanding, or to convey an emotional reaction. Most communicators with AAC like to make use of as much voice as they can in their communication. Pointing can also be used, for instance, to make a referent clear. For people who are unable to move, except for their eyes, the eyes may be used to indicate rough direction. Facial expression and gesture can be employed to the degree that the person is able to control their movements. One problem that a person with lack of muscle control can have is that the facial expression may not accurately reflect their communicative intention, and can be misinterpreted by people not familiar with them. With family and close friends, however, this mode of expression is still usable to some extent. Signing systems may be of limited use to some nonspeaking people who also have a physical disability. Having said that, many people have developed a set of personal gestures that they can use with those who are familiar with them. Also, as has been noted, for people who have communication difficulties but retain good muscle control, such as some people with learning difficulties or developmental delays, sign language can be a useful precursor and then a support for verbal communication, or it may be a good permanent augmentative strategy.

A number of methods have been developed to help nonspeaking people communicate using graphic symbols and text. For people who have a learning disability along with their speech difficulty, actual objects can be used to assist in communication. The user can point to boards or cards with graphic symbols, letters, or text in order to convey their message. Where the user is unable to point, eyegaze direction is sometimes used with a large board. Another technique is for a helper to go through the options on the board, with the nonspeaking person indicating their choice by whatever method they can manage. With some progressive conditions, a controlled eyeblinking ability is retained even when all other voluntary muscle functions are not operating. This capacity can be used as part of the signaling system for a helper.

Communication boards or booklets can display pictures, graphic symbols, letters, words, or phrases. Pictures are the most particular in their reference, graphic symbols are more general than pictures, and text provides the most flexibility in expression. The expressive power of the method must be weighed against the linguistic abilities of the user. One relevant consideration is that a high percentage of those born without the ability to speak struggle to achieve literacy, which is independent of their intellectual ability. Thus even those with an adult level capacity of expression and understanding may require a graphic symbol system for communication, rather than one requiring spelling and grammatical abilities. A number of graphic symbol systems are currently in use, of varying degrees of abstractness. A system called Blissymbolics is a graphic symbol language with its own syntax. This was originally developed as a suggested method for cross-language communication. The structure of the symbols is modeled on Chinese characters, with a central meaning component that can be concatenated with other subcomponents to modify the meaning. Blissymbols provide a richer form of communication than systems consisting of single, unmodifiable graphic symbols, but they require that the communication partner also be familiar with them. Adding ordinary text labels to Blissymbols, and other graphic symbols sets, makes them more universally useful.

Using graphic symbol systems, and indeed any AAC method which provides a partial version of a

full grammatical utterance, puts more of the responsibility for successful communication onto the communication partner, compared to conversations between unaided speakers. The development of electronic and computer-based communication systems has the potential to redress this imbalance somewhat. However, what has emerged is that the issue is a complex one. Communication between people is in fact a system involving all participants simultaneously, and not just a case of active speaker and passive listener swapping roles. The usual conversational rule is that participants expect to bear an equal responsibility for the success of the communicative encounter. From the point of view of a conversation partner who has natural speech, interacting with a person using AAC often requires extra effort from them to interpret abbreviated utterances. Often the communicative process that emerges from an encounter between someone using AAC and a naturally speaking partner is one that encourages passivity on the part of the person using AAC. Improved technologies offer them ways to take more control of an interaction, but they do require the user's attention to be diverted from the conversation partner and focused on the technology that is helping to construct the utterance. This disruption of the intimacy of an encounter is often felt to be so unhelpful as to make the increased communicative independence not worth the effort. Research continues on ways to make the technology less obtrusive in an interaction, but this issue remains as an important one on the field and illustrates the blend of technology and social aspects that characterize improvements in AAC.

Speech Synthesis

The development of good quality synthetic speech would seem to offer nonspeaking people the possibility of having or regaining a voice. However most nonspeaking people have physical impairments that, as well as denying them naturally produced speech, also impede their rapid use of any controlling mechanisms for synthetic speech. The rate of speech output would need to be extremely high to keep up with normal conversational rates, which range from 120 to 200 words per minute. Nonetheless, the availability of intelligible and acceptably human-sounding synthetic speech has made a great difference to nonspeaking people.

Natural speech can be recorded and stored in a computer system. A wide number of portable devices are available which can store common words and phrases for outputting when needed. Synthetically created speech offers greater flexibility; new words and phrases can be produced at will. To accomplish this, the system must perform a conversion of text into synthetic speech.

Two approaches to creating synthetic speech are by using rules, and by the use of statistical methods with a corpus. A rule-based system employs rules and heuristics derived from theoretical and empirical work in phonetics. Rule-based speech synthesis has achieved good intelligibility and a reasonable level of naturalness. However, in common with rule-based approaches in artificial intelligence, such systems are heavily reliant on complex sets of rules and parameters, which tend to be particular to the individual system, and are not easily shared across systems. The corpus-based approach involves sets of coded speech data which are used as the basis for a statistical approach to building a model. The corpus-based approach is currently seen as the most promising for future development.

The quality of speech synthesis is usually judged in terms of intelligibility and naturalness. Intelligibility can be measured, but naturalness is a more subjective quality. Most agree that it would include prosodic features that convey expressive features along with the information content. With a natural speaker, there will be an emotional overlay to the words spoken, individual speaking style, and features that relate to the nature of the communicative event. Work continues on increasing the perceived naturalness of synthetic speech. It may be that taking a selective, more 'impressionistic' approach to the problem offers a better solution than attempting to exhaustively mimic all the details of natural speech.

Electronic Assistance

The development of speech synthesis and of smaller, more powerful electronic devices has made possible the presentation of communication boards in electronic form, with speech output. A number of specialized input methods have also been developed, so that users can direct the communication system by activating it with a finger, thumb, hand, fist, head, foot, eyeblink, and in fact any part of the body with which the user retains good control. For people who have good muscle control, the direct selection of language units is possible. Where muscle control is more limited, a scanning technique is used, with candidate choices presented and the user indicating their selection with a single switch activation. In order to make the scanning process more efficient, ways have been sought to devise scanning methods that minimize the time taken to make a selection. Row/column scanning involves working with a grid display, selecting from a row and then a column, thus homing in on the wanted item. Scanning layouts are

usually organized with most frequently needed items at the start of the scan. A binary selection technique can be employed, which involves the user selecting which half of a set of displayed items contains the one they want. A sequence of such binary selections homes in quickly on a desired item, even in a large set. For people with a visual impairment, auditory scanning can be employed, with the candidate selections voiced by synthetic speech.

Computer-Based Assistance

Computer-based AAC systems are now widely used. These include dedicated systems, where the hardware and software are part of the one package, and software-only systems that can be run on any personal computer. In both cases, hosting an AAC system on a computer allows for a number of assistive methods for the user to be provided.

The control display can be a dynamic one. An interesting issue about dynamic displays is that there is a trade-off between speed of access and familiarity. For instance, it is possible to rearrange the items on a grid of selections based on the choice made thus far. Users often report that they would prefer to leave the choices in a set position, which they become familiar with, rather than have to hunt for them in a new configuration, even if it is a smaller one. This issue highlights one of the difficulties faced by people using AAC. Natural speakers, talking at 120–200 words per minute, do not need to be consciously aware of the details of how they are selecting and arranging their vocabulary. Indeed, this would not be possible, given the speed of the output. The person using AAC, however, because of physical difficulties causing a reduced speed of communication, is by the nature of the process consciously aware of the details of the communication construction. Because of this, AAC might be characterized as more like a written than a spoken communication mode.

The way that language material is laid out on a dynamic display can vary, and with most systems the user can choose the layout that best suits them. The material is often presented in way that reflects both the semantics and the pragmatics of communication. A semantic approach might involve a taxonomic classification of items, organized in a tree structure. Pragmatics-based schemes include organizing material for quick output of social greetings, feedback remarks, and farewells, and putting together 'pages' of material suitable for particular tasks or situations. Frequency of use can be tracked, and this information can be used to place material higher in a hierarchy of possible choices (though attention must be paid to the speed–familiarity trade-off referred to earlier).

For users who are able to construct text, a number of predictive word-completion systems have been developed and are in common use. These tend to make use of frequency-tagged dictionaries in order to offer the user a short menu of predictions as to the word being created. Some systems also include a 'recency' factor that has the effect of upgrading the rating of uncommon words that the user employs, at least for that session. This can have the effect of capturing context words for that particular conversation. Thus if a relatively infrequent word, such as *elephant* is used, it will come up high on the prediction list the next time an *e* is typed in to begin a word. Attempts have also been made to include syntactic information to improve word completion. These have offered only a slight improvement in performance, but some users have reported valuing the way that such a system will not present them with clearly inappropriate words. One consideration with word completion systems is that the user must pay attention to the prediction menu, as well as continuing to type in their text. This means that such systems tend to be used only by people whose typing is so slow that the cognitive overload problem is not an important consideration. Another method of accelerating input is to predict word pairs, based on tracking the user's previous utterances. Here the payoff for glancing at the prediction list could be considerable if the second word is a long one.

Coding systems have been devised to allow users easier access to common phrases and words. One technique is to take the first letter of each word in a phrase to make a short sequence of characters that can retrieve the whole phrase. A very successful input acceleration technique has been developed that enables users to retrieve words by using a sequence of multimeaning icons. The first icon in the sequence sets the context for the next ones. For this to be effective, users must memorize the icon sequences for a large dictionary of words, but having done so, they can regain to a degree the sense of communication flow without the deliberation that natural speakers experience.

As has been said, a typical person using AAC will employ multiple modes of communication in parallel. It may be that people unfamiliar with them will only be able to understand speech output from a computer-based AAC system, but the more familiar conversation partners will be able to interpret a range of communicative acts.

Research into Improving AAC

While many users of AAC have put a great deal of effort into mastering what are at best cumbersome

ways to enable them to interact through language, the slow communication rate of even the most advanced AAC systems used by the most skilled operators reduces the ability to interact fully. It is a common experience for AAC users that their slow response time means the conversation has moved on to a new topic before they can make their contribution. Also, when they have a speaking turn, the conversation must step down to a much slower pace, which makes many unfamiliar participants uncomfortable. In order to keep up as far as possible with the rapid speed of interaction going on around them, many AAC users must often confine themselves to single word utterances.

Research continues on finding ways around this problem. There is a debate underlying this about the importance of communication rate as opposed to communication effectiveness. Arguing from a systems point of view, many say that the communication of an individual using AAC cannot be measured in isolation: the communicative approach of the other participants plays a part. This is undoubtedly true, and a trained or familiar partner can greatly increase the communicative effectiveness of the person using AAC by helpful techniques and attitudes. However, what is unavoidable is that when it comes to very low communication rates, quantity must affect quality in most situations that they will encounter.

In an attempt to help users who have physical limitations that restrict their movement so that using a normal keyboard is not possible, large-format touchpad keyboards are available. Work has also been done on having reduced-key keyboards with multiple letters assigned to each key. Software has been designed that disambiguates the text that is being typed in, by making use of transition probabilities for the possible sequences that the keys could produce. The probabilities are derived from text corpuses. It has been established that this can be effective, even starting with a relatively small corpus and an adaptive capability. One example of a reduced-key keyboard is of course a telephone keypad, and when texting on a mobile phone, users can make use of disambiguation software provided by a number of manufacturers. This is a recent but not by any means the only example of work originally done for people with disabilities having a general application. As has been noted, the reason this works is that all of us may at different times have a temporary disability, in this case, having to cope with a smaller than normal keyboard because of space restrictions on the mobile phone and the size of our fingers.

Another form of reduced input that has been explored is allowing the user to enter a few letters, and from this predicting the correct word, then allowing them to enter a few words, and from this predicting the correct sentence. The technique involves a semantic analysis of the input and the generation of syntactically correct output using a functional unification model. This is a computationally expensive approach, but may point out a useful direction for future systems.

The reason that people using AAC produce utterances at such a slow rate is that they must put them together letter by letter, or word by word, unlike natural speakers who can take advantage of the rapid, largely unconscious control of the speech organs. The subjective experience of a natural speaker is that of thoughts and intentions materializing into speech almost magically, so that they are sometimes surprised by what they say themselves. In an attempt to mimic this practically effortless move from thought to utterance, some systems have been developed for whole-utterance communication, which consist of a large amount of prestored conversational material and a method for predicting when particular items will be needed.

This approach involves applying knowledge from the pragmatics of communication, and in particular, findings from discourse and conversation analysis, to highlight areas of communication which might be amenable to this sort of prepackaging. Work has been done on stereotypical aspects of communication, such as openings, closings, and feedback remarks. Systems have been developed for transactional communication based on scripts and frames. Coping with specific situations such as shopping and talking on the telephone can be catered for more easily than for just chatting. However, more free-flowing, casual conversation has been modeled in prototype systems by means of intersecting perspectives of time and aspect, and by using fuzzy information retrieval.

The increasing power and decreasing size of computers with multimedia capability has offered new possibilities for people using AAC. It may be that having to communicate by computer could offer advantages that natural speakers do not enjoy, in the form of being able to show graphics, photos, and film, and employ sound effects and music as part of an interaction. This possibility remains a research speculation at the moment. One factor that will militate against this is the usual wish to reduce the prominence of the technology between the person using AAC and their conversation partners, in order to maximize the interpersonal impact of the interaction. As with all the technical approaches to AAC, their introduction will only work when they add real value to the communicative interaction and do not require too much of the users' time and attention to be diverted from maintaining rapport with the other

participants and enjoying a meaningful interaction. Smaller and smaller devices offer the possibility of the kind of unobtrusive help that is wanted by nonspeaking people, but there is a significant design challenge in creating an interface on such a small display that is both efficient and effective.

The AAC field is an unusual one, in that it is not just clinicians or researchers who are creating improvements and increasing our knowledge. People using AAC, their families, and manufacturers of AAC systems all provide input to the process of improvement and widening understanding of the field. This is reflected in the membership of the international organization that promotes AAC. The International Society for Augmentative and Alternative Communication (ISAAC) has members from the whole spectrum of involvement in AAC, and its international conferences draw participation from all these groups.

See also: Adaptability in Human-Computer Interaction; Communicative Competence; Conversation Analysis; Dialogue and Interaction; Disorders of Fluency and Voice; Gesture and Communication; Nonverbal Communication; Speech Processes in Dysarthria; Speech Synthesis.

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Augustine, Saint: Theory of the Sign

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The Augustine treated in this article was born in 354 A.D. and died in 430 A.D. No man or woman has left a larger mark on intellectual culture, both that of his own Latin times and after. His seminal contribution to the theory of the sign is a good example of why. "Symbols grow," Peirce noted; and Augustine in the matter of signs symbolizes nothing less than what we might properly call the original florescence of semiotic consciousness.

Before the work of Augustine, signs were conceived of as a particular class of natural events, to wit (Aristotle, *Prior Analytics* II: Chap. 27, 70a8), "anything such that when it is another thing is, or when it has come into being the other has come into being before or after, is a sign of the other's being or having come into being. In the intellectual culture of ancient Greece, medicine had come into being on the basis of this notion of sign as σημείον. And in general, 'signs,' σημεία, were the basis on which human beings depended for understanding the world of nature, sickness, and health, events providing the basis for inferences about what is, has been, or will be.

Of course, to understand nature, to predict a storm or diagnose an illness, words will be necessary among humans. But they were seen as quite external to **what it was** that was being predicted or diagnosed, far removed from it, and belonging to another realm entirely. The realm of φυσις, or nature, was one thing, quite another was νομοσ, the realm of human creations and language, σύμβολα and ονοματα. Human language in particular, for us today a realm of signs *par excellence*, no one in the ancient world conceived in terms of 'signs.' At most, for particular rhetorical and logical contexts in which inferences concerning σημεία were at stake, the idea of words as signs would come up indirectly. No one denied that words were signs. But neither did anyone carry on any reflection about language in general in terms of signs.

participants and enjoying a meaningful interaction. Smaller and smaller devices offer the possibility of the kind of unobtrusive help that is wanted by nonspeaking people, but there is a significant design challenge in creating an interface on such a small display that is both efficient and effective.

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Augustine, Saint: Theory of the Sign

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The Augustine treated in this article was born in 354 A.D. and died in 430 A.D. No man or woman has left a larger mark on intellectual culture, both that of his own Latin times and after. His seminal contribution to the theory of the sign is a good example of why. "Symbols grow," Peirce noted; and Augustine in the matter of signs symbolizes nothing less than what we might properly call the original florescence of semiotic consciousness.

Before the work of Augustine, signs were conceived of as a particular class of natural events, to wit (Aristotle, *Prior Analytics* II: Chap. 27, 70a8), "anything such that when it is another thing is, or when it has come into being the other has come into being before or after, is a sign of the other's being or having come into being. In the intellectual culture of ancient Greece, medicine had come into being on the basis of this notion of sign as σημείον. And in general, 'signs,' σημεία, were the basis on which human beings depended for understanding the world of nature, sickness, and health, events providing the basis for inferences about what is, has been, or will be.

Of course, to understand nature, to predict a storm or diagnose an illness, words will be necessary among humans. But they were seen as quite external to **what it was** that was being predicted or diagnosed, far removed from it, and belonging to another realm entirely. The realm of φυσις, or nature, was one thing, quite another was νομοσ, the realm of human creations and language, σύμβολα and ονοματα. Human language in particular, for us today a realm of signs *par excellence*, no one in the ancient world conceived in terms of 'signs.' At most, for particular rhetorical and logical contexts in which inferences concerning σημεία were at stake, the idea of words as signs would come up indirectly. No one denied that words were signs. But neither did anyone carry on any reflection about language in general in terms of signs.

Signs were not 'generals.' They were a particular class of natural phenomena, those phenomena that allow something else to be inferred.

That is the situation that the work of Augustine changed, in particular with his little work titled *De Doctrina Christiana*, begun in 396 A.D. and completed as far as Book III, Para. 35, in 397; then fully finished through Book IV in 427 A.D. (the entire work consists of a Prologue of nine paragraphs, Book I with 44 paragraphs, Book II 63 paragraphs, Book III 56 paragraphs, Book IV 64 paragraphs, covering 167 pages in the critical Martin edition). The heart of his revolution occupies very little space: Book II, Para. 1–5; in particular: Para. 1, lines 5–7; Para. 2, lines 1–3, and Para. 3, lines 1–3. Let us take the texts in turn.

First comes his proposal of sign as a general notion: "Signum est enim res praeter speciem, quam ingerit sensibus, aliud aliquid ex se faciens in cogitationem venire." (For a sign is a thing which, besides the impression it makes on the senses, makes something other than itself come into the awareness.) With this definition, in a stroke, Augustine proposes the sign as superior to the division of being into natural and cultural: any material structure, whether from nature or art, which, on being perceived, conveys thought to something besides itself functions as a sign. There is an earlier work of disputed authenticity but probably of Augustine, written *ca.* 387 A.D. under the title *De Dialectica*, which defines sign in almost the same terms: "anything which shows itself first to the sense and then indicates something beyond itself to the mind." We will discuss shortly the weakness his successors were to divine in Augustine's general formula for sign, but first we need to grasp what was revolutionary about it.

Then comes his proposed division of this general notion: "Signorum igitur alia sunt naturalia, alia data." (Of signs therefore some are natural, others are deliberate), continuing: (The natural signs are those which, independently of any will or desire of signifying beyond themselves, yet make something other than themselves be known," and here we clearly recognize the σημεία of Aristotle and Hippocrates. The explication of the next division is what begins a whole new era of philosophical reflection – the Latin Age as an indigenous development of philosophy in contrast to the Greco-Roman heritage of antiquity.

'Signa data' is usually rendered into English as 'conventional signs.' However, this rendering does not convey the whole idea. Conventional signs are 'man-made,' to be sure, and this is an essential part of Augustine's meaning here, but not the whole essence. 'Signa' that are 'data,' he tells us, are "those signs which living things **of whatever kind** give to one another in order to manifest, **insofar as they are able**, a movement of their soul or sensed or understood things of whatever sort." So 'signa data' are signs deliberately made for the very purpose of communicating. Among these signs, as far as human beings are concerned, the predominant ones are words, the very words of language never before thematically considered under the rubric of sign. To these, Augustine now gives the focus of his intention, both because human beings principally communicate among themselves through words and because through words God has manifested his will for humanity in the books of Scripture.

But rather than follow Augustine down the particular path that he has introduced the general notion of sign in order to locate, let us instead pause at the outset to scan the vista itself that he has opened. Conventional signs are indeed *signa data* as Augustine has defined the expression, but how far they are from occupying the whole of the prospective range of the *signa data*! Augustine proposes a tripartite rationale according to which *signa data* might be emitted: a disturbance of the soul, something sensed, something understood. Keep in mind that the notion of 'anima' or soul in Augustine's time meant not only the human mind (the 'intellectual soul'), but also the life-principle of plants (the soul simply, or vegetative soul), and the principle of animal life as cognitive (the 'sensitive soul'). *Signa data*, then, would include all those actions of signs that are labeled today as 'phytosemiotic,' such as the immune reactions developed by trees a mile or more distant from a tree that suffers an infection ('motus animi sui') or the deceptive forms plants assume to attract particular insects. *Signa data* would also include those actions of signs that are labeled today 'zoösemiotic,' the realm of animal communication with no involvement of words. And only finally would *signa data* involve those actions of signs that are linguistic and species-specifically human, written and spoken language, which we now know presuppose and in various measures depend upon phytosemiotic and zoösemiotic sign activity (Deely, 1980).

The inclusion of natural signs as a coordinate species with the *signa data* under the genus *signum* precludes in principle the later misunderstandings of certain thinkers who, realizing that Augustine was the first to bring language thematically under the rubric of sign, tried to argue that Augustine also opened the path to the late modern semiological conception of sign as *paradigmatically* linguistic, such as was envisioned by Ferdinand de Saussure (1916) and by the intellectual movement of the 20th century known as semiology that developed on the basis of Saussure's proposal. For the natural signs have

nothing to do with human conventions. If, for centuries, from Aristotle to Galileo and after, the philosophers and the Churchmen misread the movements of the heavens to see in them certain indications that the sun revolved around the earth, this misreading did not determine the nature of the case. Through all the misreadings, the independence of the natural movements involved constantly provided the possibility – eventually seized upon, as the web of human experience grew large enough to manifest within itself the truth of those natural connections – of discovering that, all previous opinions to the contrary notwithstanding (including certain literal readings of Sacred Scripture), the earth that revolves relative to the sun and not vice-versa. The Augustinian 'natural signs,' thus, leave wide open the whole question of an action of signs prior to and independent of life in nature at large, or physiosemiotics, as Nöth's symposium (2001) expressly considered.

To appreciate better the vista Augustine has opened, and its independence of his apologetic intentions throughout the work, let us go back to the beginning of his *De Doctrina Christiana*, Book I, Para. 2, lines 1–2, where again he introduces a formula that will prove to reach far beyond his own intentions and understanding of the matter. "Omnis doctrina vel rerum est vel signorum, sed res per signa discuntur." (All doctrine concerns either things or signs, but things are learned through signs.)

Augustine's general theory of signs, as Darrell Jackson well noted (1972: 92), "was proposed for a definite use – namely, Christian apologetics – and not for its own sake." Augustine had made it clear in his earliest lengthy discussion of signs (389 A.D., *De Magistro*) that, in the end, signs counted for nothing apart from the interior illumination of the soul by God in the person of Christ. That this remarkable view was meant in all its force is clear from several facts. When, in 426/427 A.D., Augustine comes to reconsider his *De Magistro* (in *Retractatio* 1.12), he reaffirms its culminating teaching about Christ without even mentioning the discussion of signs that had otherwise provided the bulk of that treatise. But much earlier, in his *De Genesi adversus Manicheos* (388/389 A.D.: Sect. 2.4.5–2.5.6), he had postulated that the dependence of human communication upon signs was (in Cameron's summary, 1999: 794b), "the result of the epistemological chaos" wrought by original sin! In the *De Doctrina Christiana* itself, he lays the diversity of human languages to this same source.

Small wonder, then, that Augustine never undertook a full *ex professo* treatment of sign beyond the context of those works between 387 and 396 A.D.: *De Dialectica*, *De Genesi contra Manicheos*, *De Magistro*, *De Doctrina Christiana*.

Two weaknesses marred the proposal for a general theory as Augustine left it. The first was his failure to revisit and revise his definition of sign as requiring that it be a sense-perceptible material structure. The second was kin to this one, namely, his failure to integrate his doctrine of the interior word or concept (the *verbum quod intus lucet*) with his doctrine of the exterior or spoken word (the *verbum quod foris sonat*).

This was the "constantly alive, burning and inevitable problem" (Beuchot, 1986: 26) that Augustine bequeathed to his Latin posterity, a problem that it would take all the succeeding centuries of the Latin Age finally to resolve in the *Treatise on signs* of John Poinsot (1632). Space does not allow us to trace the lines of this solution here (but see Deely, 2001: Chaps. 6–10). Suffice to say that even Augustine's late treatment of the *verbum mentis* or 'interior word' in his *De Trinitate* (422/426) does not draw upon the perspective of sign. His radically nonsemiotic treatment of the interior word in its connection with 'exterior words' leaves his account of signs as linguistic "as running parallel to the stream of experience and alongside it, so to speak, rather than within it" (Markus, 1972: 72). Oddly, Augustine has conceived of the ultimate root of communication, the interior word, as independent of all external influence, including signs.

Yet, once psychological states along with outward signs have been brought into the perspective of the doctrine of signs, and the notion of 'doctrine' itself has been understood in its appropriate philosophical sense (Deely, 1986) respecting semiotics, it proves true that all objects depend upon the action of signs, and things are discovered within the world of objects also through the action of signs. Augustine's formula that "All doctrine concerns either things or signs, but things are learned through signs," turns out to be an anticipation of Peirce's postmodern formula that "the universe is perfused with signs, if it does not consist exclusively of them."

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Austerlitz, Robert Paul (1923–1994)

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Robert Austerlitz was of the persuasion that the understanding of Language derives from the study of languages – the more distant from the observer's own, the better. Though his oeuvre overall defies labels, his devotion to Ural-Altaic, Paleosiberian, and a host of other little-studied languages formed its core. This core generated, like sparks, brilliant studies in the most diverse areas of the language sciences, including phonetics, morphology, metrics, internal reconstruction, and typology. The following draws most heavily on Abondolo, 2004, among the other sources cited.

Born in Bucharest to an Austrian father and an American mother of Bohemian ancestry, Austerlitz grew up speaking German (German, Standard), Hungarian, and Romanian. In 1938, Austerlitz came to New York where he attended Stuyvesant Public High School. Thereafter, he matriculated at New York University, but his studies were interrupted by World War II, during which he served in the U.S. Army. He resumed his undergraduate studies after the war and earned his bachelor of arts degree at the New School for Social Research in 1950. During the same year, he also earned his master of arts in linguistics from Columbia University, having written a thesis on Hungarian phonemics. Austerlitz's teachers at Columbia included André Martinet, with whom he studied Indo-European, and János Lotz, who deepened Austerlitz's interest in and exposure to Uralic languages, Hungarian philology, and metrics. His interest in Gilyak (also called Nivkh) dates to the fall of 1949, when he heard Roman Jakobson speak on 'The

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structure of Gilyak and Marr-ism' at the International Congress of Americanists at the American Museum of Natural History in New York City (Austerlitz, 1977: 16).

During the summer of 1951, Austerlitz studied Korean at the University of California at Berkeley. From the fall of 1951 through the spring of 1953, he was abroad to study Uralic (at the University of Helsinki) and Paleosiberian. The second year of these studies was supported by a Ford Foundation Fellowship. Also in 1953, he married Sylvi Nevenlinna. They subsequently had two children (Nevenlinna died in 1981). In the fall of 1953, still under this fellowship, he went to Tokyo to study Tungusic. The following spring, he undertook two months of fieldwork with a Nivkh informant (and a shaman) albeit not in her original home.

Austerlitz returned to Columbia in the fall of 1954 and completed his Ph.D. in 1955 with a dissertation on the metrical structure of Ob-Ugric folk poetry (published as Austerlitz, 1958). He began teaching in the Department of Linguistics at Columbia in 1958. In 1965, he became a full professor and from 1965 to 1968 served as department chair. He became a professor emeritus in 1993. By this point, Columbia had closed its Department of Linguistics.

The research interests Austerlitz discovered early on continued to engage him throughout his scholarly career, i.e., to the end of his life. These include: Nivkh and Ainu, and more generally Paleosiberian; Ural-Altaic languages; phonetics, phonology, morphology, historical linguistics and internal reconstruction and metrics, verbal art, and folk poetry.

Austerlitz published widely and frequently on a myriad of subjects related to his research interests (see Abondolo, 2004: 147–152 for a bibliography). He also served as an editor of *Word* from 1960 to 1965 and of publications of general linguistic interest, notably *Readings in linguistics II* (Hamp *et al.*, 1966) and *The scope of American linguistics* (Austerlitz, 1975). Over the course of his career, he was a visiting professor at many universities in the United States and abroad. Countries and institutions, no less than his colleagues, frequently recognized his distinguished scholarship and leadership with prestigious honors and appointments. In 1969, the president of Finland designated Austerlitz 'Knight First Class, Order of the Lion of Finland.' He was awarded honorary doctorates by the University of Umea in 1986 and by the University of Helsinki in 1994. In 1987 at Columbia, he delivered the University Lecture, choosing phonetics as his subject. From 1972 to 1973 he was a Senior Fellow at the National Endowment for the Humanities. He served as president of the American Oriental Society from 1981 to 1982 and as president of the Linguistic Society of America in 1990. This list is merely representative.

Austerlitz tended toward skepticism about any theory purporting to offer totalizing explanations. He preferred to anchor his thinking about linguistic phenomena in considerations of the social circumstances of individuals in a community, not because this was a better theory, but because his interest was in the realities of languages, including their social and cultural environments. This inclination seems naturally suited to, say, the study of bilingualism (Austerlitz, 1976), but it also governed his critique of long-range comparison (Austerlitz, 1991). Here he proposed that phenomena such as bilingualism may provide more natural explanations for the appearance of 'reflexes' of a lexical item across language families than does the reconstruction of 'genetic' links between the families themselves.

An article on the teaching of phonetics (Austerlitz, 1986) gave a hint of what Austerlitz's classroom was like. We see here his skepticism toward codified systems of phonetic symbols (or other terms) beyond their usefulness for the task at hand ("Insist that all symbols used in phonetics are mere ad hoc tokens and have no more than momentary validity, based on a temporary contract between the writer and the reader" (p. 1); cf. Branner, 1995), his (serious) spirit of play ("Encourage the use of self-made transcription systems . . . e.g., a flower for a voiced velar fricative" (Austerlitz, 1986: 1)), and the care with which he thought through the most effective order in which to introduce students to topics, concepts, and data. His discussion of vocalic coarticulation encapsulated several prominent features of his teaching style. "Likes," he wrote, "will exclude likes, i.e., velarized velars are less likely to occur than velarized dentals. This is a kind of incest prohibition (or: no ketchup on chicken cacciatore)" (p. 4). Here we see his knack for pithy formulation ("Likes will exclude likes"), suggestive, *echt*-structuralist analogy ("a kind of incest prohibition"), and jocular, self-reflective fillip ("no ketchup on chicken cacciatore"). The last-quoted remark may be more than a throwaway. Austerlitz was attuned to the 'grammar' of culture in all its domains, including the culinary; this is therefore arguably an instance of his penchant for serious play.

Play proved to be a subject to which Austerlitz gave some consideration toward the end of his life. His characterization of play in 'Myth, play, humor' (1988) reads as if it were his own *ars poetica*. Austerlitz defined play as experimentation with myth (i.e., accepted or sanctified norms). "Play is," he wrote, "myth-without-obligation" (p. 37). And so, in effect, was much of his own thinking (writing, teaching) about language – therein lay its power. As his succinct

essay demonstrated, far from shrinking from concepts and models, Austerlitz formulated them with virtuosity and even delight; but such things, in his eyes, were means to an end (e.g., illumination of the recesses of language), not creations worthy of canonization. Austerlitz approached his objects of study in an exploratory spirit.

Austerlitz died of cancer in September 1994. He is survived by his daughter Monica and son Paul.

See also: Aalto, Pentti (1917–1998); Endangered Languages; Jakobson, Roman (1896–1982); Martinet, André (1908–1999).

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Austin was born on March 26, 1911 in Lancaster. After studying philosophy in Shrewsbury and Oxford, he became fellow of All Soul's College (1933) and later professor in Magdalen College at Oxford University, where he remained until his premature death on February 8, 1960. Although he was 'White's Professor of Moral Philosophy,' Austin is especially known for his contribution to linguistic philosophy and for his very personal use of ordinary language philosophy, which he applied to fundamental issues such as meaning, free will, knowledge, truth, and other minds.

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essay demonstrated, far from shrinking from concepts and models, Austerlitz formulated them with virtuosity and even delight; but such things, in his eyes, were means to an end (e.g., illumination of the recesses of language), not creations worthy of canonization. Austerlitz approached his objects of study in an exploratory spirit.

Austerlitz died of cancer in September 1994. He is survived by his daughter Monica and son Paul.

See also: Aalto, Pentti (1917–1998); Endangered Languages; Jakobson, Roman (1896–1982); Martinet, André (1908–1999).

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Austin did not organize these ideas into a systematic theory, nor did he live long enough to answer the objections soon made to the published version of his lectures, which shows the evolution in his approach of 'words and deeds' and ends with a number of open questions. Thus it was all the more important that Searle turned Austin's gradually revised approach into a comprehensive speech act theory.

See also: Analytic Philosophy; Pragmatics: Overview; Speech Acts.

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Australia: Language Situation

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Introduction

The languages spoken in Australia can be classified into the following:

- indigenous languages spoken by Aboriginal and Torres Strait Islander people;
- pidgins and creoles arising from language contact, primarily spoken by Aboriginal and Torres Strait Islander people and the descendants on Pacific Islander groups;
- community languages, including Australian Sign Language (Auslan) and the languages spoken by immigrant community groups and their descendants;
- Aboriginal English, primarily spoken by Aboriginal and Torres Strait Islander people;
- Australian English, the official language of the country and spoken by a first language by 90% of the population, with regional and social variation.

Aboriginal and Torres Strait Islander Languages

When Australia was colonized by Europeans in the late 18th century, it was home to approximately 250 indigenous Aboriginal and Torres Strait Islander languages (Dixon, 1980; Walsh, 1997; Angelo *et al*., 1994; Austin, 1996), many of which are now either extinct, moribund, or endangered. Today, only 12 indigenous languages continue to be learned by children (McConvell and Thieberger, 2004), meaning that 95% of Australia's indigenous heritage has disappeared or is highly threatened. Recently there have been moves toward revitalization of Aboriginal languages (see below).

The languages spoken in the Torres Strait Islands fall into two groups: Meryam Mer, spoken in the eastern islands, is related to Papuan languages to the north, and Kala Lagaw Ya, spoken in the western islands, is related to languages of the Australian mainland. For Tasmania, the existing sources are poor and

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it is difficult to say much definitively about the traditional indigenous language situation (Crowley and Dixon, 1981); however, much work has been done on reconstructing old sources (Crowley, 1993) and the Tasmanian Aboriginal Centre is promoting the revived language.

There has been growing awareness of Aboriginal and Torres Strait Islander languages among the general Australian population, and Aboriginal language courses are now taught in secondary schools in Victoria, South Australia (Nathan, 1996), and soon to be introduced in New South Wales. Bilingual education is also available in the Northern Territory, Queensland, and Western Australia, although programs are often threatened with funding cuts and lack of staff. Over the past 20 years, a number of Aboriginal-run Language Centres have been established throughout the country to collect language and culture information, prepare practical materials such as dictionaries and text collections, and to support local education and cultural revival initiatives. These grassroots organizations have been successful in mobilizing scarce resources in support of the languages. National bodies such as the Federation of Aboriginal and Torres Strait Islander Languages (FATSIL) have been set up, and Aboriginal languages have an increasing presence on the internet (see David Nathan's Aboriginal Languages Virtual Library website for sources). The Central Australian Aboriginal Media Association is also involved in broadcasting and recording and distribution of Aboriginal music. Since the 1980s, Aboriginal rock music bands, some of whom, such as Yothu Yindi, sing in indigenous languages, have become popular across Australia and internationally.

Although threatened by dominant Australian English, there are signs of indigenous language and cultural revival in South Australia (Amery, 2001) and elsewhere. In 2003, the New South Wales government committed significant funds to supporting indigenous languages in that state and introducing them into the school system in the Languages Other than English (LOTE) program.

Language Relationships

The indigenous languages spoken across the southern two-thirds of the Australian continent plus eastern Arnhemland belong to a single language family called Pama-Nyungan, originally proposed by Kenneth Hale and Geoffrey O'Grady in the 1960s. Much descriptive and comparative work, especially in the last 10 years, has provided support for this family group (see Bowern and Koch, 2003 for the most recent sources, especially the extensive cognate materials given by Alpher in that volume). In the 'Top End' (the Kimberley, Daly River, and western Arnhemland), there is much more linguistic diversity, with some 20 language families having been identified (although recent research has increasingly argued that higher level groupings may also exist; see Evans, 2003). Whether all the languages are ultimately related as a single genetic family remains to be determined.

Linguistic Characteristics

Traditionally, Aboriginal groups were multilingual, as a result of exogamous marriage patterns, and individuals spoke several languages, while claiming primary allegiance to the tongue of their descent group. Languages also showed sociolinguistic variation: geographically different dialects, and special speech styles reflecting kinship and ritual relationships (see Walsh and Yallop, 1993).

Phonologically, languages generally lack fricatives and affricates, and there are contrastive stops at up to five points of articulation, with a nasal for each stop position, one or more laterals, a flap, a semiretroflex continuant, and two glides (*see* **Gamilaraaya** and **Jiwarli** for further details). Stops and nasals contrast laminal and apical manners of articulation. There is usually no voicing contrast for stops (i.e., no contrast between *p* and *b*, for example). Most languages have just three vowels: high front *i*, high back *u*, and low *a*, with a phonemic length contrast found in about half the languages (Dixon, 1980). Some Cape York Peninsula languages have undergone historical sound changes introducing fricatives, prenasalized stops and additional vowel contrasts; Arandic languages of Central Australia are argued to have only two vowels and a contrast between rounded and unrounded consonants (see Breen in Simpson *et al.*, 2001).

The general phonotactic structure of word roots is CV(C)CV(C). Every word must begin with a single consonant and end in a vowel, or a restricted number of consonants. Some languages only allow vowel-final words (*see* **Jiwarli**). Word initially, in general only nonapical stops and nasals, and the two glides are found. Word medially, there are limited consonant clusters, primarily homorganic nasal plus stop, and apical nasal or lateral plus peripheral stop (*p* and *k*). Vowel clusters are not found, though Vowel–Glide–Vowel sequences are possible. Word stress is generally not phonemic and predictable from the phonological shape of words (*see* **Gamilaraaya** for examples).

Languages of the Pama-Nyungan (PN) group are entirely suffixing in their morphology;

non-Pama-Nyungan (non-PN) languages may show both suffixes and prefixes, and tend to be head-marking rather than dependent-marking. There are two major word classes: nominals and verbs, with nominals in PN languages typically showing rich systems of case-marking (in non-PN case-marking is often absent) and verbs marking tense/aspect/mood and dependent clause categories. Nominals can be subdivided into substantives (that cover both noun and adjective concepts in a language like English), pronouns, and demonstratives. Minor word classes include adverbs, particles, and interjections.

Nominals in PN languages typically inflect for case, with the syntactic functions of intransitive subject (S), transitive subject (A), and transitive object (P) showing a split-ergative pattern of syncretism in the case forms determined by animacy:

- for pronouns S and A fall together as a single (unmarked) form with P different (making nominative–accusative case marking);
- for other nominals, S and P fall together as a single (unmarked) form with A different, making ergative–absolutive case marking.

In some languages, some nominal categories (e.g., animate nouns) show a three-way contrast distinguishing S-A-P. In non-PN languages, there are typically systems of verb affixation encoding agreement with verb arguments; this agreement may also reflect gender categories of the nominals.

The following cases are also typically found in PN languages:

- dative, marking alienable possession and direction toward a place;
- locative, coding location in a place;
- ablative, coding direction from a place, and cause.

Australian languages typically have complex systems of nominal word-building morphology that involves suffixation between the root and case inflection. Categories encoded in word-building morphology include number, having, and lacking. Some non-PN languages encode gender on nouns via affixation.

Pronouns generally distinguish three persons and singular, dual, and plural number; in the first person nonsingular, there is an inclusive–exclusive contrast in about half the languages. Some languages also show bound pronouns, often these are reduced forms of the free pronouns and in PN languages are suffixed to particular elements of the clause (Dixon, 1980).

Verbs morphologically distinguish between main verb and dependent verb inflections. Main verbs encode tense and mood categories, while dependent verbs occur in hypotactically linked clauses and mark relative tense (and is some central Australian languages also switch-reference; see below). There are typically a number of verb conjugations that are morphologically determined but may show some correlations with transitivity (Dixon, 1980). Verbs show productive word-building morphology, including affixes that indicate aspectual categories or change in transitivity (detransitivizing and transitivizing processes). Generally passive forms are not found, though some eastern Australian languages have antipassive derivations. Non-PN languages show agreement via affixation on the verb. The minor categories of adverb, particle, and interjection show no morphological variation. All languages also have affixes that attach to words of any category, typically encoding discourse status, evidentiality, and other pragmatically based meanings.

A common pattern in many Australian languages (*see* **Jiwarli**) is for word order to be relatively free and hence to find all possible orders of Subject, Object, and Verb, as well as separation of nouns and adjectives referring to a single entity (with case agreement indicating common reference). Similarly, possessors (in dative case) may precede or follow the alienable possessed noun. Free omission of nominals whose reference is clear from the context is also common. Australian languages have become famous for their 'nonconfigurational syntax.'

Interclausal syntax shows a degree of variation; some languages (*see* **Gamilaraaya**) place little restriction on linking of clauses, while others such as Dyirbal have 'ergative syntax' where the linked clauses must share coreferential absolutive (S or P) nominals. Many central Australian languages have switch-reference where cross-clausal identity or nonidentity of subjects (S or A) is encoded on the dependent verb. Non-PN languages tend to make use of parataxis in clause linkage.

Particles in Australian languages tend to have scope over the whole clause and encode such semantic concepts as polarity (affirmation versus negation) and mood (possibility, negative imperative, etc.).

Pidgins and Creoles

Australia has a number of English-based pidgins and creoles as a result of language contact between the indigenous languages and the English of the colonizers, beginning in the late 18th century. A range of geographically diverse forms have been and are found, including Sydney-pidgin (extinct since the 19th century; Troy, 1990), Kriol of the 'Top End,' Cape York Creole (Crowley and Rigsby, 1979), and Broken or Blaikman Tok of the Torres Strait islands (see Schnukal in Angelo *et al.*, 1994). Kriol is now the

native language of some 30 000 speakers in northern Australia.

The various creoles show clear influence from Australian indigenous languages both lexically and structurally (e.g., distinguishing singular, dual, and plural pronouns, and inclusive–exclusive reference in the nonsingular). They also share many characteristics with Pacific pidgins and creoles such as Tok Pisin and Bislama.

The descendants of Pacific islanders removed to Australia in the 19th century to work on sugar plantations in Queensland spoke Pacific pidgins and creoles – these are now being replaced by Aboriginal English.

Community Languages

As a result of on-going immigration of non-English speakers into Australia, some 200 languages have been added to the linguistic ecology of the country (see Clyne, 1991; Clyne and Kipp, 1997). The distribution of these 'community languages' varies regionally, especially between the major urban centers, e.g., Melbourne adolescents show dominance of Italian and Greek (reflecting immigration after the Second World War), while Sydney shows dominance of Arabic and Chinese languages (reflecting more recent immigration from the middle East and Southeast Asia). All community languages are undergoing shift to English (Clyne and Kipp, 1997), though to varying degrees in different communities (e.g., more highly among Dutch than Poles or Maltese and Turks). Community languages are widely taught in schools (as LOTE), and bilingual education (including immersion programs) is available in some languages. Local governments in Australia, particularly in the urban centers, pay attention to community languages and provide services and information in a range of languages. There is a system of registration for interpreters and translators, and strong infrastructure of telephone and court interpreting services for non-English speakers.

An important community language is Australian Sign Language (Auslan), which is widely used in the deaf community, and differs in significant ways from American Sign Language (ASL) and British Sign Language (BSL). After being ignored for a long time, research and publications on Auslan have appeared over the past 15 years (see Johnston, 1989, for example) and an active program of documenting Auslan is underway. Because of early diagnosis of deafness and the widespread use of cochlear implants in deaf children, the number of native Auslan signers has shown a dramatic decline in recent years; the language is currently endangered.

Aboriginal English

Aboriginal English is a particular form of Australian English primarily spoken by Aboriginal and Torres Strait Islander people. It is spoken as a first or second language and is a continuum that ranges from varieties that resemble pidgin or creole English to those more like nonstandard Australian English (Eagleson, 1983; Eades, 1991; Kaldor and Malcolm, 1991). Aboriginal English in rural settings shows substrate influence in articulation (having apico-domal (retroflex articulations) and replacement of fricatives with stops, for example), lack of copula, lack of number marking and *bin* as a past tense marker. In urban settings, Aboriginal English shows many features found in nonstandard varieties across the world, such as multiple negation, and nonstandard verb agreement; however, there are lexical and pragmatic features (Eades, 1991) that are distinctive. Even in regions such as Sydney and Melbourne where the indigenous languages ceased to be spoken in the 19th century, Aboriginal English contains lexical items derived from the indigenous languages such as *koorie* 'Aboriginal person' and *goom* 'alcohol.'

Australian English

A distinctive Australian variety of English (AustEng) is spoken by 90% of the 20million inhabitants of the continent, with regional and social variation. AustEng has its origins in the English dialects brought by mainly English and Irish settlers in the 18th and 19th centuries, to which have been added the speech of immigrants from all over the world. Long regarded as a substandard form of speech and lacking prestige (Turner, 1994), AustEng has become accepted over the past 20 years and has been codified in dictionaries (including the Macquarie Dictionary in various versions dating from 1981, also now with a strong web presence, and the Australian National Dictionary), is used in English language teaching in Australia, and has been popularized in textbooks (e.g., Burridge and Mulder, 1998). It is now the prestige variety of English-language broadcasting. Like most other varieties of English, AustEng is currently being subjected to influence from American English, especially in the lexicon, but also in pronunciation (Burridge and Mulder, 1998).

Australian English shows a large number of loan words from indigenous languages (the Australian National Dictionary records over 400), especially for the distinctive flora and fauna of the country, and for place names, e.g., *kangaroo*, *billabong*, *waratah*, and *galah*, or *Woomooloo* and *Mordialloc* (see Dixon *et al.*, 1990 for other examples). Other sources

Table 1 Australian English vowels

Broad	*General*	*Cultivated*	*Key word*	*RP*
	ɪ		*kit*	ɪ
	e		*dress*	e
	æ		*trap*	æ
	ɐ		*lot*	ɐ
	ʌ		*strut*	ʌ
	ʊ		*foot*	ʊ
	aː		*bath*	aː
	ɒ		*cloth*	ɒ
	ɜː		*nurse*	ɜː
əːɪ	+ i	ɪi	*fleece*	iː
ʌːɪ _ aːɪ	ʌɪ	ɛɪ	*face*	eɪ
	aː		*palm*	aː
	ɔː		*thought*	ɔː
ʌːʊ-aːʉ	ʌʉ	öʊ	*goat*	əʊ
əːʉ	ʊʉ	ʊu	*goose*	uː
ɒːɪ	ɒɪ	aɪ	*price*	aɪ
	ɔɪ		*choice*	ɔɪ
ɛːo	æo	aʊ	*mouth*	aʊ
	ɪə - ɪːə - i ː		*near*	ɪə
	eə		*square*	ɛə
	aː		*start*	ɒː
	ɔː		*north*	ɔː
	ɔː		*force*	ɔː
	ʊə - ɔː - ʊːə - ʊː		*cure*	ʊə

of distinctive lexical materials include English dialects, convict slang, and rhyming slang, e.g., *Joe Blake* for *snake*, as well as locally developed terms, e.g., *outback*.

AustEng shows a degree of regional variation, particularly in vocabulary and pronunciation. Lexical variation has been well researched and increasingly documented in the dictionaries, while variation in pronunciation has been less studied. Among features that show geographical differences are [æ] vs. [a] in *graph* or *dance*, postvocalic vocalization of *l* (in words like *eagle*), lowering of low front [ɛ] (in words like *Mel*, *helicopter*) and bisyllabification of past participles (so that *grown* sounds like *grow-en*).

Social variation in Australian English has been well studied since Mitchell and Delbridge (1965) established the categories of Broad, General, and Cultivated Australian. The differences are particularly clear phonetically in vowel nuclei, especially the diphthongs of *face*, *price*, *goat*, and *mouth* (see Harrington *et al.*, 1997). Table 1 below (from Melchers and Shaw, 2003: 105, based on Wells, 1982) shows the variants of Australian English vowels in comparison to Received Pronunciation.

Melchers and Shaw (2003: 104) list the following as especially salient features of AustEng:

- front [aː] in *palm*, and *start* (shared with New Zealand English)
- wide diphthongs in *fleece*, *face*, *price*, *goose*, *goat*, and *mouth*;
- close front vowels, in *dress*;
- extremely productive use of two noun suffixes *-ie* and *-o*,
- use of *she* as a generic pronoun, e.g., *she'll be right* 'it's fine';
- highly characteristic vocabulary, some drawn from indigenous languages, some from British dialect slang, and other elements locally developed.

Note also that AustEng differs from RP in having schwa in unstressed syllables, intervocalic voicing and flapping of *t*, and shares with it lack of postvocalic *r* found in American and Canadian English. A distinctive high rising terminal intonation contour, noticed by Mitchell and Delbridge (1965) and investigated in depth for Sydney speech by Horvath (1985), is characteristic of female, teenage, and lower working class speech.

Morphologically, AustEng is characterized by a high degree of clipping, e.g., *uni* for *university*, *Oz* for *Australia*, which may or may not be combined with highly productive suffixation of *-ie* or *-o*, as in *Salvos* for *Salvation Army*, *maggie* for 'magpie,' *sunnies* for *sun glasses* and *lippie* for *lipstick*.

See also: Gamilaraaya; Jiwarli.

Language Maps (Appendix 1): Maps 146, 147.

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Australian Languages

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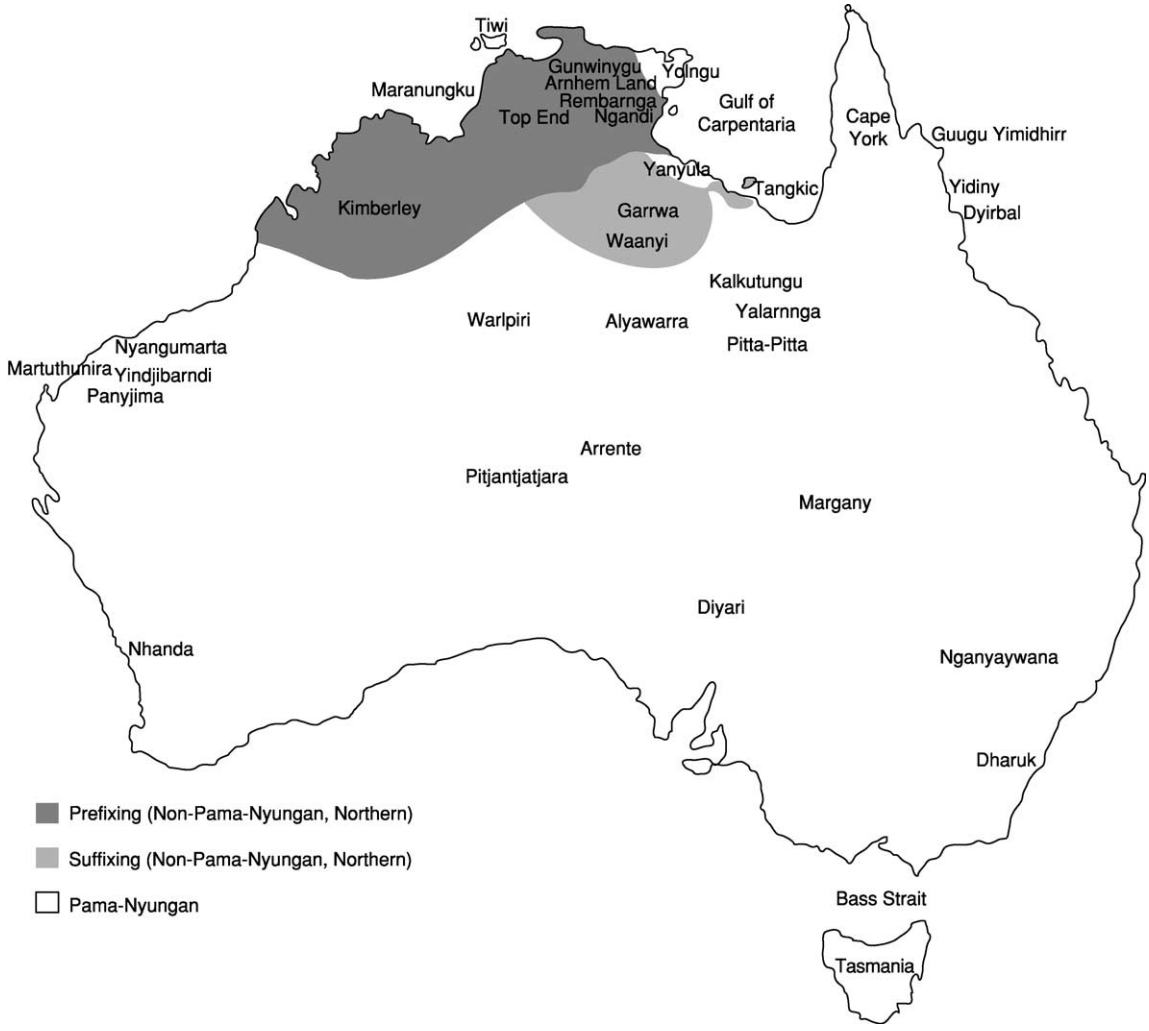

Figure 1 Pama-Nyungan and northern Australian languages.

the north of the continent (see Figure 1). In the suffixing group, all affixes are suffixes, while in the prefixing group there are some prefixes, mainly pronominal forms for subject and object (Capell, 1956: 31–60). The suffixing languages are predominantly agglutinative, but in the prefixing languages there is more fusion, mainly in the pronominal and other prefixes to the verb.

The languages of the mainland are generally thought to be related, since certain roots are widespread. These include lexical roots, such *na* 'to see,' *mil* 'eye,' and *yan* 'to go,' and grammatical roots, such as *nga-* 'first person,' *nu* 'he,' and *ku* 'dative case marker'. In 1966 O'Grady, Wurm, and Hale produced a classification that recognized 29 'families' (O'Grady *et al.*, 1966a; O'Grady *et al.*, 1966b), but more recent work by various scholars has demonstrated that the figure could be reduced to as few as a dozen or so. The basis of the classification was lexicostatistical, and 'family' in this context meant a group of languages that could be linked on the basis of any member's sharing 15 percent or more of basic vocabulary with any other member.

A notable feature of the O'Grady *et al.* (1996a,b) classification is that one family, the Pama-Nyungan family, covers most of the mainland except for the Kimberleys and the Top End. It coincides roughly with the suffixing languages, taking in the Yolngu languages of northeast Arnhem Land, which represent an enclave of suffixing among the prefixing languages. The name Pama-Nyungan is derived from *pama* 'man' in the northeast of the continent and *nyunga* 'man' in the southwest.

Blake showed that between Pama-Nyungan and the other (Northern) languages, there are some consistent differences in the forms of some pronouns. For instance, while most Pama-Nyungan languages have a first person dual pronoun *ngali*, this is absent from the Northern languages, and while most Pama-Nyungan languages reflect a second singular **ngin*, a

majority of Northern languages reflect *$ngin^y$ with a palatal nasal as the third segment. A number of Pama-Nyungan languages have a third person pronoun root *nhu-*, whereas the Northern languages have *nu-*(Blake, 1988: 13). Blake's classification involved some reclassification, taking the Tangkic languages of the Gulf of Carpentaria to be Northern, and Yanyuwa to be Pama-Nyungan. Garrwa (Garawa) and Waanyi (Wan[j]i) are two languages with some Northern and some Pama-Nyungan pronouns.

Evans demonstrated that there is a regular correspondence between Pama-Nyungan and the Northern languages, reflecting a phonological change in Pama-Nyungan in which initial apicals (*t*, *n*, *l*) merged with laminals (dental or palatal), the *nhu-/nu-* correspondence in the third person singular pronoun being part of the evidence for this change (Evans, 1988: 98–100).

While Blake and Evans provided evidence for a revised Pama-Nyungan that went beyond the lexicostatistical, in his recent book of Australian languages, Dixon argued strongly against the existence of Pama-Nyungan. He argued that the pronouns that characterize so-called Pama-Nyungan such as *ngali* 'we two' have diffused. He showed that the original lexicostatistical classification was flawed and that the shift in initial apicals to laminal did not coincide exactly with Pama-Nyungan. He also pointed out that no fauna or flora terms had been reconstructed that could be attributed to Proto-Pama-Nyungan (Dixon, 2002). Nevertheless, Australianists have so far not been convinced by Dixon's arguments (see, for instance, the papers in Bowern and Koch, 2004).

As noted in this article, the languages of the mainland look as if they are related, though Dixon was pessimistic about the prospects of demonstrating this by the comparative method. There are several factors militating against reconstructing anything like Proto-Australian: the enormous time depth, demonstrable diffusion, and paucity of data, particularly for the southeast, which was taken over by Europeans early and was heavily settled.

It has not been possible to relate the languages of Tasmania to those of the mainland. Tasmania was cut off from the mainland about 14 000 years ago, when the earth warmed as it slowly emerged from the last Ice Age and the sea level rose, resulting in an unnavigable strait (Bass Strait) between Tasmania and the mainland. Given a time depth of 14 000 years for the period of separation, it is likely that any evidence of a genetic connection would have been obliterated.

It has likewise not been possible to establish a genetic connection between any Australian language, whether from the mainland or Tasmania, and any language from elsewhere.

Phonology

In Europe the phonologies of English, French, German, Italian, and Polish are quite different, but the mainland languages of Australia tend to be similar in their inventory of phonemes and in their phonotactics (word shapes). All Australian languages have stop sounds, but there is typically only one set, represented either by *p*, *t*, *k*, etc., or by *b*, *d*, *g*, etc. Normally five or six stops are found: labial (*p*), apico-alveolar (*t*), apico-postalveolar or retroflex (represented here by *rt*), dorso-velar (*k*), and one or two laminal stops. Where there is one laminal stop, the pronunciation may range from dental to palatal, and by convention this stop is represented as palatal (*tj*). Where the dental and palatal stops are phonemically distinct, the dental is usually represented as *th*. Corresponding to each stop is a nasal. There is always one lateral (*l*), but there may also be dental (*lh*), palatal (*ly*), or retroflex (*rl*) laterals. Commonly there are two rhotics: a glide often described as retroflex and a flap, or trill. These are represented here by *r* and *rr,* respectively. All Australian languages have a labio-velar glide (*w*) and a palatal glide (*y*). Figure 2 displays the consonants commonly found in Australian languages.

The majority of Australian languages have only three vowels (*i*, *a*, and *u*), though often there are long and short versions, which gives effectively six vowels. Some languages have *e* or *o* or both.

Words in Australian languages usually have more than one syllable, and more often than not they end in a vowel.

Although Australian languages right across the continent tend to have quite similar phonological systems, a few languages in a number of quite separate areas have undergone a series of phonological changes involving the loss of initial consonants or even whole syllables. In a number of Pama-Nyungan languages, there is a word *kumpu* for 'urine.' In Nhanda (western Australia), the initial consonant has been lost to yield *umpu*; in some languages of Cape York, the first syllable has been lost to give *mpu*; and in the Arandic languages of central Australia, the form *mpwa* occurs, the *k* having been lost and the *u* being reflected as labialization of the *mp* cluster. The effect of these changes has been to make some languages look quite atypical, and at one stage certain languages, such as Nganyaywana, were thought to be unrelated to other mainland languages, because cognate forms could not be readily recognized.

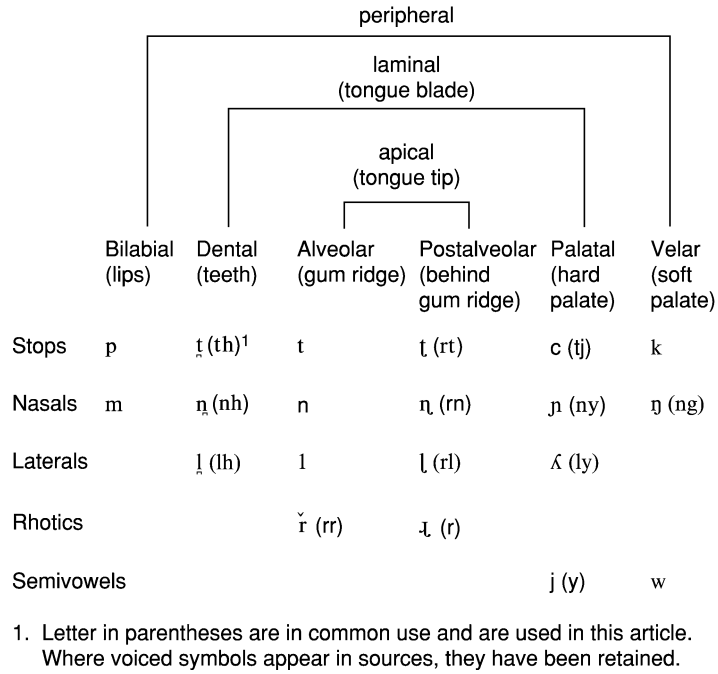

Figure 2 Consonants.

Morphology and Syntax

Inflection apart, words may be simple, compound, or reduplicated. In Pitta Pitta, for instance, *ngampa-manha* (stomach-bad) is 'sad,' and reduplicated forms of *ngapu* 'water,' *mayi* 'dirt,' and *maka* 'fire' yield *ngapu-ngapu* 'wet,' *mayi-mayi* 'dirty' and *maka-maka* 'hot.' The most common means of deriving new words is via suffixes. An almost ubiquitous feature of Australian languages is the presence of a suffix for 'having' and a suffix for 'lacking,' though the actual forms employed vary a good deal from language to language (see [1] and [3] for examples). In Pitta Pitta, for instance, we find forms like *kanga-maru* (alcohol-having) 'intoxicated' and *nhupu-yaku* (spouse-lacking) 'unmarried.' Most languages have suffixes to mark the derivation of nouns from verbs and vice versa. In Diyari *wirlpa-nganka* 'to make a hole' is formed from the noun *wirlpa* 'hole,' and from this stem can be derived the noun *wirlpa-mganka-ni* 'opener.' Most languages have a suffix to mark the derivation of intransitive verbs from nouns, often with an inchoative sense. In Dieri we find formations such as *kilpa-rri* 'become cool' and *yapa-rri* 'become afraid.' Causatives of intransitive verbs are also common as in Diyari *pali-ma* 'to extinguish a fire,' from *pali* 'to die.' The majority of Australian languages express reflexive and reciprocal notions by using a derived intransitive verb. In Diyari we find *muduwa* 'to scratch' (transitive) and *muduwa-thadi* 'to scratch oneself.' Note the *d* in these words. Diyari has a voicing contrast in apical stops.

In the Pama-Nyungan languages, all derivational and inflectional affixes are suffixes. Nouns are marked for case, and verbs are marked for categories such as aspect, tense, and mood. In some languages, case concord extends from the head noun to its dependents; in others, it occurs only on the final word in the noun phrase.

With only a handful of exceptions, nouns in Pama-Nyungan languages take ergative case marking when functioning as the agent of a transitive verb (A) and zero case marking when functioning as the sole argument of an intransitive predicate (S) and a direct object (O). The following examples are from Margany, a language of southwestern Queensland.

(1) Nguda barndin-bayi.
dog dirt-having
'The dog is dirty.'

(2) Nguda-nggu yurdi gamba-nhi.
*dog-*ERG *meat bury-*PRES
'The dog is burying the meat.'

On the other hand, in most Pama-Nyungan languages pronouns serving as S or A are treated alike (normally the bare stem is used, at least with nonsingular pronouns), while a pronoun in O function takes accusative case marking. This, too, can be illustrated from Margany.

(3) Ngali bulu-idba.
*we.two food-*LACKING
'We have no food.'

Table 1 Margany case marking

English	stone	we two
nominative	*barri*	*ngali*
ergative	*barringgu*	*ngali*
accusative	*barri*	*ngalinganha*
genitive	*barrigu*	*ngalingu*
dative	*barrigu*	*ngalingun.gu*
allative	*barridhadi*	*ngalingundhadi*
locative	*barringga*	*ngalingunda*
ablative	*barrimundu*	*ngalingunmundu*
instrumental	*barringgu*	*ngalingundu*

(4) Gara ngali nhaa-nhi ina-nha.
not *we.two* *see*-PRES *you*-ACC
'We can't see you.'

Typically there is a dative case, an allative ('to'), a locative ('at'), an ablative ('from'), frequently a genitive, and sometimes a causal or aversive that can cover cause, as in 'I'm sick from (eating) bad meat,' or what is to be avoided, as in 'Keep away from the fire.' The paradigms of Margany case forms displayed in Table 1 are typical with respect to both forms and categories. However, there is one idiosyncratic difference. The ergative case marker covers not only instrumental function, as it does in the majority of Pama-Nyungan languages, but also the causal or aversive sense alluded to in this article. In this function it can occur with pronouns and contrasts with the unmarked form used for the agent of a transitive verb.

A feature of case marking in Australian languages is the prevalence of double case marking. This is found, for instance, where a genitive-marked dependent of a noun displays case concord with its head, as in Margany.

(5) Ngaya waban-gu ngali-ngu-ngga bama-ngga.
I *go*-PURP *we*-GEN-LOC *bro*-LOC
'I'm going with our brother.'

In about two-thirds of Australian languages, there are bound pronominal representations, either clitic pronouns or inflection, for subject (S and A) and object (O), and in a few languages there are forms for other complements or adjuncts, such as recipients or beneficiaries. In the suffixing languages, these pronominal elements are suffixed to the verb or to the first constituent in the clause.

Examples (6), (7), and (8), from Pitjantjatjara, illustrate the contrast between *-rna* the S/A(subject) form and *-rni* the O form. In this language, the bound pronouns are enclitic to the first constituent in the clause.

(6) Munu-rna purta kapi-ku kutju a-nkuku?
and-I.SUBJ QUERY *water*-DAT *alone* *go*-FU
'And should I go for water alone?'

(7) Purnu-rna mantji-nu.
wood-I.SUBJ *get*-PT
'I got the wood.'

Example (8) illustrates the double object construction, with a verb for 'give' in which the noun serving as patient object is unmarked, while the recipient is represented by both an accusative marked pronoun and a bound object pronoun that is enclitic to the first constituent. There is no overt form for third person subject.

(8) Minyma-ngku-rni mayi ngayu-nya u-ngu.
woman-ERG-*1*SG.O *bread* *1*SG-ACC *give*-PT
'The woman gave me bread.'

In some languages, there is a detransitivized construction in which the agent of a two-place verb is encoded as S and the patient is expressed in the dative or some other oblique case. The following pair of sentences from Pitta Pitta (Queensland) illustrate the normal transitive construction and the derived intransitive construction, which, following Silverstein (1976), is generally known as the antipassive (AP). Pitta Pitta and some other related languages of western Queensland are unusual in that they have both ergative and accusative marking on all nouns and pronouns.

(9) Pithi-ka nga-thu ina.
hit-PT *I*-ERG *you*.ACC
'I hit you.'

(10) Pithi-li-ya ngantja in-ku.
hit-AP-PRES *I* *you*-DAT
'I feel like hitting you.'

The antipassive has a different semantic function in different languages, but it always signals some kind of reduced semantic transitivity. In Pitta Pitta, it signals desiderative aspect.

Pitta Pitta uses a construction similar to the antipassive in the future tense. The verb is unmarked, there being neither the derivational antipassive nor the past or present inflection, and the subject (S or A) bears a special future subject inflection.

(11) Pithi nganyu in-ku.
hit.FU *I*.FU.SUBJ *you*-DAT
'I'll hit you.'

Pama-Nyungan languages are generally referred to as 'ergative'; this term indicates that they exhibit ergative case marking on the agent of a transitive verb. While most of these languages are like Margany, in that the ergative marking is found only on nouns and is complemented by accusative marking on pronouns, a handful of Pama-Nyungan languages – including Warlpiri, Kalkutungu (Kalkutung), and Yalarnnga – have ergative marking on both nouns and pronouns in A function, but no accusative marking

on any free nominals. About two-thirds or more of Australian languages have bound pronominal representation for core functions, and these bound pronouns, with only a very few partial exceptions, operate on the basis of a subject (S and A) form and an object form (O).

Dixon (1972) argued that in Dyirbal, syntactic rules are sensitive to the grouping S + O, as opposed to A. This phenomenon has come to be referred to as ergative syntax, as opposed to accusative syntax; the latter term refers to a system of syntactic rules based on the notion of S + A (i.e., subject), as in English and numerous other languages. Ergative syntax is also found in some of Dyirbal's neighbors, including Yidiny, and in two adjacent languages of western Queensland, Kalkutungu (Kalkutung) and Yalarnnga. It manifests itself in a number of rules. For instance, there is a requirement that in relative clauses, the relativized function, which is covert, can be only S or O. To relativize an agent, the relative clause must be detransitivized via the antipassive, which thereby converts a potential A into S. In purpose clauses (also used for indirect commands), antipassive is used to signal that A is coreferent with S or O. The examples in (12) and (13) are from Yalarnnga. In the nature of things, coreference between S and A is common (as in [12]) and between P and A (as in [13]). In both these patterns of coreference, the antipassive is used.

(12) Ngani-mi ngiya manhi-wu miya-li-ntjata.
go-FU *I* *food*-DAT *get*-AP-PURP
'I'll go and get food.'

(13) Tjuwa tjala ngathu ngapa-mu,
boy *this* *I*.ERG *tell*-PT
watjani-wu pinpa-li-ntjata.
wood-DAT *gather*-AP-PURP
'I told this boy to gather firewood.'

The example in (14) provides a nice contrast. Here there is coreference between S in the second clause and P in the third, and there is no antipassive.

(14) Ngathu tjala ngapa-mu ngani-ntjata
I.ERG *this* *tell*-PT *go*-PURP
marnu-yantja-mpa karri-ntjata.
mother-HIS-ALL *wash*-PURP
'I told him to go to his mother and get washed.'

In (15) there is coreference between A and A, and no antipassive.

(15) Ngathu miya-ntjata yimarta
I.ERG *get*-PURP *fish*
yunkunhi-nti-yarta yita-wampa.
return-CAUS-PURP *this*-ALL
'I am going to get some fish and bring it back here.'

It appears, however, that ergative syntax is not common in Australia, despite the widespread use of ergative case marking. In a number of languages with ergative case, there are syntactic rules based on the familiar grammatical relation of subject (S + A). Many such rules have to do with showing maintenance of reference or switch reference. In Pitjantjatjara, for instance, the conjunction *munu* is used to link clauses with the same subject (SS), while *ka* is used to link clauses where there is a change of subject (DS). The point is that the rules operate on the basis of S and A, not S and O, as in languages like Dyirbal.

(16) Tjitji panya ngarrikati-ngu munu
child *that* *lie*-PT *and*.SS
ngarri-ngi kunkunpa ka kurta
lie-PT-IMPF *sleep* *and*.DS *old.bro*
panya paka-rnu.
that *get.up*-PT
'The child lay down and was lying asleep and the older brother got up.'

In a small group of Pama-Nyungan languages in western Australia, there is no ergative marking at all. The subject (S + A) appears in the nominative case, and the object (O) in the accusative/dative case. This group includes Ngarluma, Panyjima (Panytyima), and Yindjibarndi. It has been argued that these accusative languages derive from ergative languages via the generalizing of detransitivized constructions of the type illustrated in (10) and (11).

The non-Pama-Nyungan or Northern languages span the Northern part of the continent from western Australia to the Gulf of Carpentaria. With a few exceptions, mostly at the eastern end of their range, the Northern languages have bound pronominal elements for subject and object prefixed to the verb. In some languages, these pronominal elements are separable, but more often than not, they fuse to one another and to other formatives in the verb. There is no accusative case marking on nouns or free pronouns, though there is ergative marking in some languages.

Among the prefixing languages, but also in the northwestern suffixing languages, it is common to find that only certain verbs can bear inflection. These verbs can appear on their own, as in (17), or they can act as auxiliaries in concert with an uninflected lexical verb, as in (18). These examples are from Maranungku (Maranunggu).

(17) Tawun kangani yi.
town NONFU.*I.go* PT
'I went to town.'

(18) Tirr wuttar wat kangani yi.
edge sea walk NONFU.*I.go* PT
'I walked to the beach.'

Systems of noun classes are common among the Northern languages, though a rarity in the Pama-Nyungan family. A majority of the Northern languages of the Kimberleys and the Top End have from two to eight noun classes, with each class marked by a prefix. The classification typically includes a masculine class, a feminine class, and a class for vegetable food. It is thought that these class markers are derived generic nouns. It is not uncommon in Australian languages to use a generic noun accompanied by a specific noun. See, for instance, (26). The vegetable class marker is *m-*, *ma-* or *mi-*, and *mayi* is a widespread word for 'vegetable food,' so it is thought likely that the former derives from the latter. These class markers may appear not only on nouns representing direct dependents of the verb but also on associated demonstratives and appositional nouns. They may also appear on the verb, where they serve as crossreferencing pronominal forms. In the following example from Ngandi, *ni* (masculine) and *gu* (marking one of the inanimate classes) appear prefixed to the subject and object nouns respectively, and they are also prefixed to the verb.

(19) Ni-gu-may ni-yul-thu gu-dyundu.
NI-GU-*got* NI-*man*-ERG GU-*stone*
'The man got the stone.'

The noun phrases in (19) can be omitted. *Ni-gu-may* can stand as a sentence on its own, meaning 'He got it' or, more precisely, 'A member of the *ni* class got a member of the *gu* class'.

A feature of the prefixed bound pronoun systems is the prevalence of hierarchical principles of ordering or marking. In Gunwinygu (Gunwinggu) (Northern Territory), first and second person forms always precede third, irrespective of which is subject.

(20) Nga-n-di bun.
1SG-OBJ-3PL *hit*
'They hit me.'

(21) Nga-be-n bun.
1SG-3PL-OBJ *hit*
'I hit them.'

The form *n-* glossed as object is common among the prefixing languages. In some languages this behaves like an inverse marker, in that it is used only when a person lower on the hierarchy acts on a higher person. This is the situation in Rembarnga (Rembarunga), where the hierarchy is 1 > 2 > 3PL > 3SG. Note that it does not appear in (22), where first acts on third, but it does appear in (23), where third plural acts on first.

(22) Pa-nga-na.
3PL-1SG-*saw*
'I saw them.'

(23) Nga-n-pa-na.
1SG-O-3PL-*saw*
'They saw me.'

A number of Northern languages incorporate nominals into the verb. The incorporated forms are often different from the corresponding words used outside the verb, and the range of concepts that can be incorporated is usually relatively small. The following example is from Tiwi, in which the incorporated form *wuliyondyi* refers to the direct object represented by *ti*.

(24) Pi-ti-wuliyondji-rrurlimpirr-ani.
3PL-3SG.FEM-*dead.wallaby-carry.on.shoulders-*
PT.HABIT
'They would carry the wallaby on their shoulders.'

Incorporated forms tend to correspond to the object of the verb, but they can correspond to other complements or adjuncts or to the subject of an intransitive verb.

Example (24) is fairly typical of Tiwi and of a number of other Northern languages that can be described as polysynthetic incorporating languages. Tiwi is obviously of quite a different type from Margany, which has no bound pronouns, or even Pitjantjatjara, which does. Tiwi has no case marking at all, and relations of complements and adjuncts to the verb are signaled via three series of bound pronouns representing subject, direct object, and indirect object, plus a few local prepositions. Not only are relations within the clause marked on the verb, but the possessive relation is signaled within phrases by cross-referencing the possessor on the possessed (head) noun. 'Purrukuparli's son' is expressed as *Purrukuparli ngarra-mirani*, literally 'Purrukuparli, his son.'

Most Australian languages appear to have very free word order. Not only can the predicate, its complements, and its adjuncts appear in any order, but even the sets of words that translate a noun phrase of English may be separated. A common pattern is for a more general term, such as a pronoun or a generic noun, to be placed first, with the modifier late, often at the end. The example in (25) is from Nyangumarda (Nyangumarta).

(25) Nyungu ngawu tjininganinyi
this mad make.1PL.O
walypila-mila-lu kari-lu.
white.man-GEN-ERG beer-ERG
'This is making us silly, the white man's beer.'

The strategy employed in (25) is common in Australian languages. Another variation on this tendency is to use a generic noun early in the sentence and then a specific noun later, as in (26), from Yidiny.

(26) Ngayu minya bugang ganguul.
I animal eat wallaby
'I'm eating wallaby.'

The fact is that most Australian languages have pragmatic principles rather than grammatical rules for word order. One such principle that is widespread is to put the focus (the emphasized phrase) first. There is probably no Australian language with word order as rigid as in English, but some languages have very strongly preferred orders. Some languages in the interior of the continent, including Pitjantjatjara, have fairly regular subject-object-verb order, and a few, such as Garrwa (Garawa), are predicate-initial.

Semantics

The Australian Aborigines were hunter-gatherers, and naturally the vocabularies of Australian languages are rich in terms for fauna and flora as well as in terms for hunting and catching animals. There is regularly a distinction, for instance, between hitting or killing with a missile and hitting or killing with the hand or a handheld implement. There are words for decoy devices for attracting birds, words for a noose on a stick to catch a bird, words for different kinds of spears and boomerangs, and so on. Some semantic distinctions that are quite different from any made in European languages intrude into the grammar. In some Northern languages, there are forms for 'you and I' that pattern as singulars, i.e., the speaker and addressee are treated as a unit. This becomes obvious when we examine the distribution of dual and plural marking. In Table 2 the prefixed pronominal forms in Gunwinygu (Gunwinggu) are presented. The form *ngarr-* for 'thou and I' does not take dual marking but contrasts with a dual-marked form *ka-ne*, meaning 'speaker and two addressees,' and a plural-marked form *ka-rri*, meaning 'speaker and three or more addressees.'

Table 2 Gunwinygu (Gunwinggu) pronominal prefixes

Number	*Singular*	*Dual*	*Plural*
1	*nga-*	*ngane-*	*ngarri-*
12	*ngarr-*	*kane-*	*karri-*
2	*yi-*	*ngune-*	*ngurri-*
3	Ø	*bene-*	*birri-*

In some languages there are different nonsingular pronouns for the kinship relations between the people referred to. In Alyawarra (Alyawarr), for instance, *mpula* means 'you two' but is used only for two people who belong to the same section. Among the Alyawarra everyone belongs to a patrimoiety, and within each patrimoiety there are two sections of alternating generations. There is a separate pronoun, *mpulaka*, for two people who are members of the same patrimoiety but not the same section (e.g., father and child), and a third form, *mpulantha*, for two people belonging to different patrimoieties (e.g., mother and child). This system of distinctions applies to all dual and plural pronouns.

Avoidance and Secret Vocabularies

In Aboriginal society it is common to have a special vocabulary that is to be used in the presence of certain kin. Normally a man is required to avoid dealings with his mother-in-law, for instance, and the prohibition covers real, prospective, and classificatory mothers-in-law. In some areas a man is required to use the special vocabulary in the presence of a mother-in-law, and such special vocabularies have come to be called 'mother-in-law languages,' though they are not separate languages, nor are they always reserved for speech in the presence of a mother-in-law.

Secret languages have also been reported from a number of areas. Like forms of avoidance language, these are special vocabularies usually taught as part of male initiation.

All these special vocabularies are of great linguistic interest. They typically consist of only a few hundred words, and often one finds a generic term in the reduced vocabulary that is lacking in the everyday language. In the avoidance language of the Dyirbal (Queensland), for instance, there is a single word, *dyidyan*, for any lizard, skink, or goanna, and a single word, *dyiburray*, for any possum, squirrel, or glider. However, in the everyday language, there are words only for particular species (Dixon, 1980: 61).

Sign Language

Over much of central and northern Australia, sign language is used as an alternative to speech. Signs are made with the hands and correspond to words in the spoken language and to particles and suffixes that have local meanings, such as 'to' or 'here.' Sign language is traditionally used in a variety of contexts,

including rituals, during periods of mourning when speech is proscribed, in conversing over long distances, or in hunting, where silence is important.

The Future of Australian Languages

Only a score or so of Australia's native languages are being passed on to the next generation. Over the past three decades, there have been bilingual programs aimed at helping Aboriginal languages survive, and there is at least one instance of a language's being revived, namely Dyaabugay in Queensland. There are also attempts at reclamation of languages no longer spoken, but the materials available for many languages, particularly in the southeast of the continent, are inadequate, and the best that future generations can hope for is to learn about their languages rather than acquire their languages. Some languages that are still spoken are undergoing drastic changes. Modern Tiwi, for instance, is much more analytic than traditional Tiwi, which is polysynthetic. For many Aborigines in the north of the continent, a creole is the first language – Torres Strait Broken (Torres Strait Creole), for example, spoken on Cape York, or Kriol in the Kimberleys and the Northern Territory. These creoles have a lexicon largely from English, with an admixture of vernacular vocabulary. They have some claims to being Aboriginal languages, not only on the grounds that they serve to mark Aboriginal identity but also in that they embody traditional semantic concepts that are calques from the vernaculars.

For most Australians, Aboriginal languages are a closed book, though there is a testimony to their existence in a few hundred words borrowed from Aboriginal languages – including *kangaroo* (Guugu-Yimidhirr, Guguyimidjir), *boomerang* (Dharuk), and *dingo* (Dharuk) – and thousands of place names, including Geelong (*tjilang* 'tongue'), Warrnambool (*warnam-bul* 'having fire'), and Wagga-Wagga (*waga-waga* 'crows').

See also: Australian Lexicography; Case Grammar; Ergativity; Head/Dependent Marking; Sign Language: Interpreting; Transitivity: Stylistic Approaches.

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Australian Lexicography

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English-speaking people began to colonize Australia in 1788 and soon dominated the entire territory. Separate British colonies joined to form a federation, the Commonwealth of Australia, in 1901. A distinctive variety of English had probably emerged by the 1830s in Sydney, the oldest city, but the local accent and colloquial vocabulary were long regarded as substandard.

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including rituals, during periods of mourning when speech is proscribed, in conversing over long distances, or in hunting, where silence is important.

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See also: Australian Lexicography; Case Grammar; Ergativity; Head/Dependent Marking; Sign Language: Interpreting; Transitivity: Stylistic Approaches.

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Edward Ellis Morris (1843–1902, a professor at the University of Melbourne) should probably be considered Australia's first lexicographer. His *Dictionary of Austral English*, published by Macmillan,

London, in 1898 (republished by Sydney University Press in 1972), was an informative record of Australian and New Zealand usage, well supported by citations. Most of Ellis's entries were names of flora and fauna, but other vocabulary was not neglected. Local uses of words such as *currency* and *station* were included.

A later and rather different work is Sidney J. Baker's *The Australian Language* (Angus & Robertson, Sydney, 1945; later editions published by Currawong, Sydney, 1966 and 1978). The book was not strictly a dictionary but a lively account of various areas of vocabulary, in which Baker tended to emphasize colloquialisms and Australianness.

A more measured and more conventionally lexicographical treatment of colloquial Australian English is G. A. Wilkes's *A dictionary of Australian colloquialisms*, first published by Sydney University Press in 1978, but reprinted several times. It was most recently published by Oxford University Press in 1996. Various other Australian dictionaries of slang, some well researched, some less so, are on the market.

The first Australian dictionary offering a general coverage of Australian English – that is, including words shared with other parts of the English-speaking word as well as Australianisms – was Oxford University Press's *Australian pocket Oxford dictionary*, edited by Grahame Johnston and published in 1976.

In the 1970s, major lexicographical work began under the leadership of Arthur Delbridge, Professor of English (later of Linguistics) at Macquarie University in Sydney. *The Macquarie Dictionary* appeared in 1981, edited by Delbridge and J. R. L. Bernard, D. Blair, and W. S. Ramson, and published by Macquarie Library. It broke new ground in **not** labeling Australianisms; Australian usage and Australian pronunciations were considered to be the norm. Revised editions (with Delbridge, Bernard, and Blair joined by other editors) appeared in 1990 and 1997. The two-volume Federation Edition, published in 2001, has about 120,000 primary headwords, including encyclopedic entries. Some (by no means all) definitions are accompanied by citations.

In 1988, Oxford University Press published a historical dictionary, *The Australian national dictionary: a dictionary of Australianisms on historical principles*. Edited by W. S. Ramson, it listed only Australianisms (about 6000 headwords) but with plenty of citations in the Oxford manner (about 60 000 in all).

Oxford continues to publish Australian dictionaries with general coverage, under the editorship of Bruce Moore: the *Australian pocket*, for example, reached its fifth edition in 2002. Both Oxford and Macquarie publish a range of related volumes, such as concise and compact dictionaries, and thesauri. HarperCollins also has a range of Australian dictionaries, its largest being *Collins Australian Dictionary* (fourth edition, 2003). Collins, Macquarie, and Oxford dominate the dictionary shelves of most bookshops in Australia.

There are two dictionary research centers at Australian universities: the Australian National Dictionary Research Centre, jointly funded by Oxford University Press and the Australian National University, Canberra; and the DRC (Dictionary Research Centre) at Macquarie University in Sydney. AUSTRALEX, the Australasian Association for Lexicography, was founded in 1990.

See also: Lexicography: Overview.

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Austria: Language Situation

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Austrian German

Up to 1918, Vienna was the capital of the Austro-Hungarian Empire and had never been politically united with Germany. The accepted norm was *Schönbrunner Deutsch* (*Schönbrunn* being the court and residence of the Emperors). This variety differs from present-day German Standard German (henceforth GSG) by including several features from the eastern Austrian dialects, for example:

Hat sie gelacht? 'Did she laugh?'
GSG: [hat zi gəlaxt]
Schönbrunner Deutsch: [hɔts glɔxt]

Here we see the typical features of elision of unstressed vowels (schwa in the past participle prefix *ge-* and of /i/ in the pronouns *sie, Sie*), and the rounding of /a/ to [ɔ] (which affects most, but not all lexical /a/s). In addition, Schönbrunner Deutsch typically had /ərl/ as its diminutive suffix and often [a] for umlauted [ɛ], for example:

Glas 'glass (as a material)' vs. *Gläschen/Glaserl* 'glass (for drinking)'
GSG: [glas] – [glɛ:sçən]
Schönbrunner Deutsch: [glas] – [gla:zərl]

An additional, often-cited characteristic of Schönbrunner Deutsch is that everything is pronounced slightly nasalized.

The dialects of Austria fall into two major groups, the Allemanic dialects in the eastern third of the country (in the Province of Vorarlberg) and the Southern Bavarian dialects in the rest of the country. The Allemanic dialects are akin to the dialects of Switzerland and southeastern Germany (Swabia), and the Southern Bavarian dialects to those of southwestern Germany (Bavaria).

Minority Languages in Austria

The minority languages in Austria are Croatian, Slovene, Hungarian, Czech, Slovak, and Gypsy (Roma and Sinti). The official national minorities of Austria are the Burgenland Croats, Slovenes, Hungarians, Czechs, Slovaks, and Roma. Each of these ethnically or politically-historically defined groups corresponds to a single language spoken by its members. Yiddish was formerly spoken in the Jewish community, especially in Vienna, and disappeared when emigration and Nazi genocide forcefully removed its speakers between *c.* 1930 and 1945.

All of the present-day minority languages of Austria are spoken by more people outside Austria than inside the country.

Croatian (*Burgenlandkroatisch*) is mainly spoken in parts of the southeastern province of Burgenland. The number of Croatian speakers according to official censuses has fallen from 43 633 in 1910 to 17 730 in 2001. In view of the unfriendly official policy toward minorities in the past, it is safe to assume that the actual numbers are considerably higher.

Slovene is spoken in the southern provinces of Carinthia (*Kärnten*) and Styria (*Steiermark*) by 50 000 speakers (estimated; census figure 20 000).

Hungarian is also spoken in parts of southeastern Burgenland, but also in Vienna and Graz, by an estimated 25 000 people.

Czech was formerly the language of household personnel, craftsmen, shopkeepers, and publicans in Vienna at the time of the Austro-Hungarian Empire. They were brought in because they were considered to have greater skills than the local workers, especially in the gastronomic area. After 1918, Czech speakers gradually either returned to Czechoslovakia or assimilated into the German-speaking community and gave up their original language. Although still officially a minority, there are now probably far fewer speakers of Czech in Austria than of Serbo-Croatian and Turkish. One legacy of this minority is the high proportion of Czech surnames among German-speaking Austrians in and around Vienna. Today this minority has up to 20 000 speakers (estimated; census figure 8000).

Slovak has long been spoken by a very small minority (estimated at 5000; census figure 1600) in Vienna and to its northeast, up to the Slovakian border.

Gypsy (Roma and Sinti) is an awkward term in German, which perhaps reflects the problematic relationship between Gypsy and German speakers. The German term corresponding to Gypsy is *Zigeuner* (for a male person) or *Zigeunerisch* (for the language); but this is considered derogatory because of a folk etymology that derives this word from *ziehende Gauner* 'wandering crooks.' So the names of two groups of Gypsies, i.e., Roma and Sinti, are used instead. They are found in Burgenland, in and around Vienna, and also in other towns throughout Austria.

An Austrian Minority in Italy

Historically, the area known as the Tyrol (*Tirol*) comprised North, East, and South Tyrol. When the Austro-Hungarian empire was dissolved after the First World War, South Tyrol became a part of Italy.

The majority of people in this area still speak their own dialect of German.

See also: Czech; Japanese; Romani; Slovak; Slovene; Yiddish.

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Austric Hypothesis

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Austric is the name given by the German missionary priest Wilhelm Schmidt (1906: 81–82) to the hypothesis that the Austronesian and Austro-Asiatic language families (also first named by Schmidt) are genetically related. Other versions of the hypothesis either include or exclude the Tai-Kadai language family of Southeast Asia, and/or the Hmong-Mien language family. The term 'Macro-Austric' is sometimes applied to a phylum which includes the Hmong-Mien language family.

The possible relationship of an Austro-Asiatic language, Nicobarese, with languages in what was then known as Malayo-Polynesian was first proposed in the latter part of the 19th century, but it was Schmidt who made the first systematic comparison of the two families, citing a considerable number of lexical comparisons, and claiming "complete agreement in phonology, morphology and various features of the syntax." Most of the lexical similarities cited by Schmidt have since been rejected by linguists (Diffloth, 1994) as not being adequately supported by regular sound correspondences. Nevertheless, the search for possible lexical cognates between the two language families continues. The most ambitious work in recent times has been that of Hayes (1999, and earlier works). However a careful review (Reid, 2004) of Hayes's proposed basic vocabulary comparisons revealed that only a very small percentage are probable cognates supported by the usual requirements of regular sound correspondences and semantic similarity.

As for their phonology, morphology, and syntax, it is clear from the extensive descriptive materials that have been published since Schmidt's time that there is certainly not the "complete agreement" that Schmidt claimed for them. However, there are a number of puzzling similarities which call for explanation, especially when Nicobarese is considered. The aspect of Nicobarese that first stimulated Schmidt and others to note its similarities to Austronesian was not only that the language was typologically similar to languages such as Malay (with which they usually compared it) in having prefixes, infixes, and suffixes attached to verbs, but that the form and function of these affixes in many respects appeared to be similar to those in many Austronesian languages. Some of these features were first discussed by Schmidt (1916), and were expanded on in Reid (1994, 1999). Much of the following discussion is based on these two papers.

Typologically, Nicobarese is unlike other Austro-Asiatic languages in being a verb-initial language. In many respects it appears to be an Austronesian language with Austro-Asiatic lexicon. It has been generally characterized as SVO (Schmidt, 1906); however, text materials show numerous examples of VOS word order, found for example in Tagalog, Malagasy, and other Austronesian languages. Noun phrase structure in Nicobarese is also strikingly similar to that found in many Austronesian languages, with noun-attribute word order, and attributes such as relative clauses linked to their head nouns with a form *na*, which commonly occurs in Austronesian languages with identical function. The same form also links adverbial attributes to their head verbs, just as in Austronesian. Noun phrases are introduced by one of a set of distinct case-marking forms, some of which have identical shape and function

The majority of people in this area still speak their own dialect of German.

See also: Czech; Japanese; Romani; Slovak; Slovene; Yiddish.

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Austric is the name given by the German missionary priest Wilhelm Schmidt (1906: 81–82) to the hypothesis that the Austronesian and Austro-Asiatic language families (also first named by Schmidt) are genetically related. Other versions of the hypothesis either include or exclude the Tai-Kadai language family of Southeast Asia, and/or the Hmong-Mien language family. The term 'Macro-Austric' is sometimes applied to a phylum which includes the Hmong-Mien language family.

The possible relationship of an Austro-Asiatic language, Nicobarese, with languages in what was then known as Malayo-Polynesian was first proposed in the latter part of the 19th century, but it was Schmidt who made the first systematic comparison of the two families, citing a considerable number of lexical comparisons, and claiming "complete agreement in phonology, morphology and various features of the syntax." Most of the lexical similarities cited by Schmidt have since been rejected by linguists (Diffloth, 1994) as not being adequately supported by regular sound correspondences. Nevertheless, the search for possible lexical cognates between the two language families continues. The most ambitious work in recent times has been that of Hayes (1999, and earlier works). However a careful review (Reid, 2004) of Hayes's proposed basic vocabulary comparisons revealed that only a very small percentage are probable cognates supported by the usual requirements of regular sound correspondences and semantic similarity.

As for their phonology, morphology, and syntax, it is clear from the extensive descriptive materials that have been published since Schmidt's time that there is certainly not the "complete agreement" that Schmidt claimed for them. However, there are a number of puzzling similarities which call for explanation, especially when Nicobarese is considered. The aspect of Nicobarese that first stimulated Schmidt and others to note its similarities to Austronesian was not only that the language was typologically similar to languages such as Malay (with which they usually compared it) in having prefixes, infixes, and suffixes attached to verbs, but that the form and function of these affixes in many respects appeared to be similar to those in many Austronesian languages. Some of these features were first discussed by Schmidt (1916), and were expanded on in Reid (1994, 1999). Much of the following discussion is based on these two papers.

Typologically, Nicobarese is unlike other Austro-Asiatic languages in being a verb-initial language. In many respects it appears to be an Austronesian language with Austro-Asiatic lexicon. It has been generally characterized as SVO (Schmidt, 1906); however, text materials show numerous examples of VOS word order, found for example in Tagalog, Malagasy, and other Austronesian languages. Noun phrase structure in Nicobarese is also strikingly similar to that found in many Austronesian languages, with noun-attribute word order, and attributes such as relative clauses linked to their head nouns with a form *na*, which commonly occurs in Austronesian languages with identical function. The same form also links adverbial attributes to their head verbs, just as in Austronesian. Noun phrases are introduced by one of a set of distinct case-marking forms, some of which have identical shape and function

with those found in Austronesian languages. In morphology, there are a number of affixes, such as the causative prefix *ha-* (from earlier **pa-*), the agentive affixes *<um>* and *ma-* / *<am>*, the nominalizing infixes *<an>* and *<in>*, and the objective suffix *-a*, which are taken to be cognate with Austronesian affixes with the same or similar shape, and similar if not identical functions.

The main alternative explanation that has been proposed by those who reject a genetic relationship to account for these facts is borrowing. The claim has been made that the morphosyntactic features found in Nicobarese that appear to be Austronesian are probably remnants of a language spoken by early Austronesian sailors who may have made frequent landfall in the Nicobars, perhaps in some cases staying, intermarrying, and influencing the local language. But there remain several strong barriers to acceptance of this position. One is that several of the proposed comparisons between Nicobarese languages and Austronesian are not limited to Nicobarese, but are found across wide areas of the Austro-Asiatic family. In some cases (especially *<um>* and *<in>*), comparisons are clearest between Nicobarese and Austronesian, because other eastern Austro-Asiatic languages have either lost the form (in the case of verbal suffixes) or modified them due to the strong areal influence of Chinese. Another argument against the borrowing scenario is that some of the forms that are apparently of Austronesian origin predate Proto-Malayic and had changed by the time Austronesian sailors could have reached the Nicobars. A third argument against the borrowing hypothesis that has been proposed is that it is highly unlikely that a language could borrow so much morphology without also borrowing any of the lexical forms which carried it.

The only other possible explanation, according to Reid (1994), is a genetic one. The claim is that Nicobarese is a very conservative Austro-Asiatic language, a classic example of a 'relic' language because of its geographic isolation, lying far off the coast of mainland Southeast Asia, uninfluenced by the leveling influences of Chinese and subsequently Thai that have produced the set of areal features commonly found in Mon-Khmer and other Austro-Asiatic languages. Nicobarese therefore is considered to reflect much of what must be reconstructed for the morphology and syntax of Proto-Austro-Asiatic and ultimately Proto-Austric.

Despite the lack of verifiable lexical comparisons and sustainable sound correspondence sets, some linguists still believe the Austric hypothesis has merit, considering the fairly substantial body of morphosyntactic evidence outlined above. Blust (1996) even proposes a homeland for Proto-Austric, in the general area of the watersheds of the Salween, Mekong and Yangtze rivers in the upper Burma-Yunnan border area. He claims that pre-Austronesians separated from this homeland around 7000 B.C., gradually moving down the Yangtze River valley till they reached the coast, and eventually sailed south and across the Taiwan Strait to Formosa. These proposals, however, have not been widely accepted.

The most recent challenge to the Austric hypothesis has come from Sagart (2004), who proposes an alternative genetic relationship for Austronesian. He claims that Austronesian is most closely related to Sino-Tibetan, and that at least some of the morphological features that appear to support the Austric hypothesis were present also in the parent of Sino-Tibetan-Austronesian, and therefore possibly give evidence of a relationship with Austro-Asiatic at a much greater time depth.

See also: Austroasiatic Languages; Austronesian Languages: Overview; Mon-Khmer Languages; Morphology: Overview; Sino-Tibetan Languages.

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Austro-Tai Hypotheses

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Austro-Tai is the name given to the hypothesis that the Austronesian language family and the Tai-Kadai language family are genetically related. Austronesian languages are primarily spoken in Taiwan, island Southeast Asia and the Pacific, while Tai-Kadai languages are spoken in mainland Southeast Asia, specifically South China, Vietnam, Laos, Thailand, Burma, and Assam (India). Siamese, or Thai, the national language of Thailand, is the best-known Tai-Kadai language and the largest in terms of numbers of native speakers. Lexical similarities between Thai and the Austronesian languages have long been recognized (Schlegel, 1901). However, the hypothesis that the language family to which Thai belongs is genetically related to Austronesian was first proposed by Benedict (1942). Benedict proposed that the genetic relationship between the two language families was a sister relationship, implying that the Tai-Kadai languages are the descendant languages of a parent language – Proto-Austro-Tai – from which pre-Austronesian peoples split in a move to Taiwan, where Proto-Austronesian developed.

Although his later work (Benedict, 1975) was well received by archaeologists and prehistorians, it was generally less well received by linguists, who were skeptical of the extensive array of Proto-Austro-Tai reconstructions that he proposed and his unorthodox methodology for reconstructing them. A number of critical reviews of his work appeared (esp. Gedney, 1976), casting doubt on the nature of the relationship, and pointing to a number of unrecognized loans from Chinese. But the presence in the Tai-Kadai family of a considerable number of forms from the area of basic vocabulary that are very similar in sound and meaning to corresponding Austronesian forms removes the possibility of coincidence as a possible explanation for the similarities. Whether the similarities reflect a genetic relationship or are the result of contact was examined by Thurgood (1994). He concluded that the sound correspondences and tonal developments within the Tai-Kadai languages of forms with comparable Austronesian reconstructions are irregular and thus cannot be evidence of a genetic relationship, but rather of an early contact relationship.

A recent reexamination (Ostapirat, 2000) of the whole question of the internal relationships within the Tai-Kadai family of languages (renamed by Ostapirat as Kra-Dai) has opened up once again the nature of the relationship that exists between this family and Austronesian. In an insightful paper, Ostapirat (2005) presented a list of some 50 pan-Kra-Dai basic vocabulary items, at least half of which can be related by regular sound correspondences to equivalent forms in Proto-Austronesian. The English glosses of Kra-Dai forms that appear to be related to Austronesian include the following: *bear* (n.), *bird*, *black*, *child*, *eat*, *excrement*, *eye*, *far*, *fire*, *grandmother*, *grease*, *hand*, *head*, *I*, *leaf*, *leg*, *live*, *louse (head)*, *moon*, *nose*, *raw*, *sesame*, *shoulder*, *this*, *tooth*, *water*, and *you*.

From this evidence, Ostapirat concluded, "It does not seem likely that the very high number of roots between Kra-Dai and Austronesian that emerge from the core list could be accidental or simply result from borrowings." In commenting on Thurgood's claims that there are no regular sound correspondences between the Kra-Dai and Austronesian families, Ostapirat explained that they are the result of Thurgood's being unaware of crucial data from little-known languages, and of the inadequacy of some of his Proto-Kra-Dai reconstructions. Despite the apparent strength of the evidence he cited, Ostapirat nevertheless considered the evidence to be debatable as proof of a genetic relationship between the families.

An alternate hypothesis regarding the external relationships of the Kra-Dai family is that the languages are genetically related not to Austronesian, but to the Sino-Tibetan family. Ostapirat rejected this hypothesis, noting that etyma that appear to be related to Chinese are rarely found in all branches of the family and almost none belong to the core vocabulary of the language.

The most recent view of the external relationships of the Kra-Dai family is that proposed by Sagart (2005). Building on the comparisons established by Ostapirat, Sagart presented data from a recently described language of the Kra group, Buyang (BYU) (Li, 1999), which apparently, alone, among the Kra-Dai family, retains a number of disyllabic forms which correspond to Proto-Austronesian or Proto-Malayo-Polynesian (PMP) reconstructions, such as BYU ma^{0} $tɛ^{54}$ 'die' (PMP *matay); BYU ma^{0} ta^{54} 'eye' (PMP *mata); BYU qa^{0} $ðu^{11}$ 'head' (PMP *quluh); BYU ma^{0} $ðu^{312}$ 'eight' (PMP *walu), etc.

Data such as these establish beyond any doubt that a genetic relationship exists between the two families. The nature of the relationship, however, is still being discussed. Sagart rejected the possibility that Proto-Kra-Dai and Proto-Austronesian are sister languages, thereby rejecting the Austro-Tai hypothesis in its original formulation. He claimed instead that the Kra-Dai languages are a subgroup of Austronesian, being descendants of the language spoken by a group of Austronesian-speaking people who returned to the mainland from the east coast of Taiwan, long after the first Austronesian settlement there, but probably before the movement south to the Philippines some 4000 years ago of the ancestors of the Extra-Formosan, or Malayo-Polynesian, languages.

Ostapirat stated that if Kra-Dai were a subgroup within Austronesian, as Sagart believes, it would seem likely that they must have belonged to one of the primary branches, in that Proto-Kra-Dai retains a distinction between the reflexes of Proto-Austronesian *C and *t, and *N and *n, pairs of sounds which fell together and are therefore not distinguished in Proto-Extra-Formosan. Moreover Proto-Kra-Dai retains a sibilant reflex of Proto-Austronesian *S, which developed as *h in Proto-Extra-Formosan. In addition, he noted that although there are no Extra-Formosan languages which have reflexes of Proto-Austronesian *Cumay 'bear (n.),' the form is reflected in Kra-Dai languages.

Sagart's position, on the other hand, is that the ancestors of the Kra-Dai languages must have returned to the mainland about the time that the ancestors of the Extra-Formosan languages moved south, in that they apparently reflect certain forms, such as *-mu 'you (sg.),' *lima 'five,' *manuk 'chicken,' etc., that Sagart believes are reconstructible only to the parent of the Extra-Formosan languages, but not to Proto-Austronesian.

If the speakers of the parent of Proto-Tai-Kadai did in fact return to the mainland from Taiwan as proposed by Sagart, he suggests that they probably settled in coastal areas in Guangdong or Guangxi, and their language was eventually relexified by a language from some probably extinct phylum, but one ultimately related to Austroasiatic, retaining only the most basic elements of its Austronesian lexicon.

See also: Austronesian Languages: Overview; Tai Languages.

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Austroasiatic Languages

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The Austroasiatic languages are spoken in small, often remote and inaccessible, hilly or mountainous regions throughout Southeast Asia, as far west as central India and as far east as Vietnam. There are over 150 languages belonging to the numerous Austroasiatic subgroups, enumerated below.

The primary split in the family is between the Munda languages in central and eastern India and the rest of the family. While lexically it is clear that Munda belongs to Austroasiatic, structurally the highly synthetic Munda languages are radically different from their predominantly isolating sister languages to the east. There are two major Munda subgroups, North Munda and South Munda (*see* **Munda Languages**).

Nahali (Nihali), an enigmatic group who speak a language that may or may not belong to Austroasiatic, are now mostly living as subjects to the North Munda Korku in the Indian states of Madhya Pradesh and Maharashtra. Some consider Nahali to have a special relation to Munda, others consider it to be a separate but related group of Austroasiatic, a third faction consider Nahali to be an isolated group in South Asia, like Burushaski (*see* **Burushaski**), while a fourth group of researchers reject Nahali as an independent language, rather considering it to be some kind of thieves' argot or secret language. Exact numbers of speakers are hard to gauge but may be around 5000.

There are at least three other major subgroups of Austroasiatic, the internal relations of which are still a subject of dispute. One such group is Nicobarese, which consists of a small number of languages spoken in the various Nicobar Islands, which lie off the southeastern coast of India, to which they belong administratively. Among this group of languages, Car Nicobarese, Nancowry Nicobarese or Central Nicobarese have received the most amount of linguistic investigation. One language, Shompeng (Shom Peng), appears be highly divergent within the group, but the materials on this language remain scanty. Other Nicobarese languages include Southern Nicobarese, Chaura (Chowra), and Teressa. Published sources include Radakrishnan's (1981) study of Nancowry morphology, among others. The total number of speakers of all Nicobarese languages is likely less than 25 000.

The next major subgroup of Austroasiatic is the Aslian group, which is spoken primarily in Malaysia (where the speakers are known as Orang Asli) but also in adjacent areas of Thailand. Ethnoracially, the Orang Asli of Malaysia fall into three subgroups: the Semang/Negrito, the Sakai/Senoi, and the Jakun/Aboriginal Malay (Parkin, 1991: 41). The first option in each case was traditional but has now become stigmatized, and the latter variant is now preferred. (Note that curiously the Semang/Negrito speakers prefer Sakai, although this is considered offensive to those whom it originally designated; cf. Parkin, 1991: 42.) Only two Jakun/Aboriginal Malay groups speak Aslian languages, Semelai and Temoq. Importantly, the linguistic subgroups of Aslian do not correspond neatly (although partially) to this ethnoracial categorization. In particular, there appears to be a primary split between a southern group (Semelaic (Semelai)) a northern, and a central subgroup (Jahaic (Jehai) and Senoic, respectively). Jah Hut may constitute an isolate branch within Aslian, although others consider it a divergent member of the Senoic subgroup. The exact relation between these subgroups remains to be worked out explicitly. Jahaic includes Negrito groups as well as racially Senoic Chewong. Jahaic languages are mainly spoken by very small groups of a few hundred speakers at most. None could be described as well known, but the subgroup includes such languages as Kintaq (Kintaq Bong), Minriq, Mintil, Jehai (Jahai), Batek, Tonga/Mos, which is mainly spoken in Thailand, Kensiu, and probably the Lowland Semang of Sumatra, with nearly 10 000 speakers. Senoic languages consist of several subgroups. The most important of these are the Lanoh, the poorly known Sabüm, the Temiar, and especially the Semai, who are the largest Aslian-speaking group with possibly as many as 20 000 speakers. Temiar, with perhaps 10 000 speakers, has been an important loan source for Jahaic languages, and is one of the best-studied members of this group (Carey, 1961; Benjamin, 1976). The Semelaic (South Aslian) branch consists of a small number of languages, each of which has probably fewer than 2000 speakers. In addition to Semelai and Temoq, the languages include Semaq Beri and Maq Betiseq (Besisi), also known as Mah Meri. Semelai has recently become the best studied of all Aslian languages with the publication of a large grammar by Nicole Kruspe (2004).

The fourth and final major subgroup within Austroasiatic is the far-flung Mon-Khmer group. This has a number of different subgroups, the internal relations of which remain to be adequately worked out. Major languages in this subgroup include Khmer (Cambodian, Khmeric), Mon (Monic), Vietnamese

(Viet-Muong), Khasi (Khasic), Bahnar (Bahnaric) [BDQ], Kuy (Katuic), Palaung (Palaung-Wa), including Pale, Rumai, and Shwe, and so forth (*see* **Mon-Khmer Languages**).

Generally speaking, the westernmost languages of the family exhibit the greatest degree of morphological development. Munda languages are inflectional and agglutinating, with a diverse and highly developed system of tense/aspect marking, subject and object agreement, noun incorporation, and so on. An extreme example of this comes from Kharia, where the following word has no fewer than 8 morphemes:

(1) *Kharia*
ḍoḍ-kay-ṭu-ḍom-bhaʔ-goḍ-na-m
carry-BEN-TLOC-PASS-quickly-COMPLT-FUT-2
'get yourself there for me quickly'
(Malhotra, 1982)

Tense/aspect morphology is not common among non-Munda Austroasiatic languages but may be found in Lyngngam of the Khasic branch of Mon-Khmer (*see* **Khasi**) and in certain Bahnaric and Katuic languages. In addition to Munda, certain Aslian languages show subject agreement in the verb, but otherwise this feature is not a common one in Austroasiatic.

South Munda and Nicobarese, and to a lesser extent the Aslian language Temiar, reflect evidence of noun incorporation, and this may therefore have been a feature of earlier stages of the Austroasiatic language family.

(2) Temiar
pasal-naq ki-chiibjuq
reason-that 1PL-walk < *'go.foot'
'so we had to go on foot'
(Carey, 1961: 46)

It seems certain that Proto-Austroasiatic was richer morphologically than the majority of Mon-Khmer languages, particularly in terms of derivation, but not as developed as the Munda languages. Among the more noteworthy features of Austroasiatic is the unusually frequent use of infixation processes. A small number of derivational elements appear to be cognate across the members of the family, for example, a causative verb formant and a nominalizing element. The former appears either as a prefix or an infix, depending on the stem shape. Both elements are found in such branches as Munda, here exemplified by Juang Nicobarese, and the Mon-Khmer subgroups Monic and Khmuʔic (Khmuic), while other branches preserve only the prefix allomorph.

(3) Juang
a'b-soŋ
CAUS-buy
'sell'
(Pinnow, 1960a)
< *kɔsɔr*

Juang
kɔ-'b-sɔr
dry..-CAUS-..dry
'dry sthg'

(4) Nancowry
ha-kah-naŋ
CAUS-know-ear
'make understand'
(Radakrishnan, 1981: 87)

Nancowry
p-um-lóʔ
lose-CAUS-lose
'make lose'
(Radakrishnan, 1981: 54)
< *plóʔ*

Another infixation process found across the langauges of the Austroasiatic stock is the nominalizing infix -n-. This is found in such forms as Khasi *shnong* 'village' < *shong* 'live,' Mlabri *chnrɛɛt* 'comb' < *chrɛɛt* 'to comb,' or Mundari *dunub* 'meeting' < *dub* 'sit.'

It has been put forth that Austroasiatic may be a part of a larger genetic unit. Various proposals include relations with Austronesian, Tai-Kadai, Hmong-Mien (Miao-Yao), and even Sino-Tibetan, variously labeled 'Austric,' Austro-Tai, and so on. None of these proposals are widely accepted by specialists, and these hypotheses should therefore be treated with caution. Among modern specialists in Austroasiatic languages, Gerard Diffloth deserves special mention.

See also: Austronesian Languages: Overview; Burushaski; India: Language Situation; Khasi; Khmer; Mon; Mon-Khmer Languages; Munda Languages; Santali; Sino-Tibetan Languages; Vietnam: Language Situation.

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Austronesian Languages: Overview

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The Language Family and Its Speakers

Austronesian is possibly the largest language family in the world. Its 1200 or so languages (Grimes *et al.*, 1994: 122) amount to about a fifth of the world's total number. While the Niger-Congo family is sometimes said to be larger than Austronesian by a couple of hundred languages, it is by no means a well-established grouping, and some have suggested that it is merely a typological rather than a genetic grouping. The lower-level Benue-Congo grouping (*see* **Benue-Congo Languages**) is much better established, but it has about 200 fewer languages than the Austronesian family. Austronesian is way ahead of the next grouping, the Trans New Guinea languages, which has fewer than 600 members. However, Austronesian again constitutes a much more clearly recognizable family than the Trans New Guinea grouping.

Austronesian languages represent the fourth-largest grouping of languages in the world in terms of the number of speakers. According to some, they are beaten again by Niger-Congo languages, relegating them to fifth position, though the relatively poorly supported claims about the genetic unity of these languages means that the fourth position for Austronesian should perhaps be maintained. The total number of speakers of Austronesian languages is about 300 million, which represents about 5% of the world's population. The Austronesian family includes the world's 13th-largest individual language (Javanese) in terms of the number of native speakers. Malay/Indonesian (*see* **Malayo-Polynesian Languages**) and Tagalog (spoken in the Philippines) (*see* **Tagalog**) come in at 9th and 18th respectively in terms of the total number of first- and second-language speakers (Crystal, 1987: 287). No putative

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Austronesian Languages: Overview

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The Language Family and Its Speakers

Austronesian is possibly the largest language family in the world. Its 1200 or so languages (Grimes *et al.*, 1994: 122) amount to about a fifth of the world's total number. While the Niger-Congo family is sometimes said to be larger than Austronesian by a couple of hundred languages, it is by no means a well-established grouping, and some have suggested that it is merely a typological rather than a genetic grouping. The lower-level Benue-Congo grouping (*see* **Benue-Congo Languages**) is much better established, but it has about 200 fewer languages than the Austronesian family. Austronesian is way ahead of the next grouping, the Trans New Guinea languages, which has fewer than 600 members. However, Austronesian again constitutes a much more clearly recognizable family than the Trans New Guinea grouping.

Austronesian languages represent the fourth-largest grouping of languages in the world in terms of the number of speakers. According to some, they are beaten again by Niger-Congo languages, relegating them to fifth position, though the relatively poorly supported claims about the genetic unity of these languages means that the fourth position for Austronesian should perhaps be maintained. The total number of speakers of Austronesian languages is about 300 million, which represents about 5% of the world's population. The Austronesian family includes the world's 13th-largest individual language (Javanese) in terms of the number of native speakers. Malay/Indonesian (*see* **Malayo-Polynesian Languages**) and Tagalog (spoken in the Philippines) (*see* **Tagalog**) come in at 9th and 18th respectively in terms of the total number of first- and second-language speakers (Crystal, 1987: 287). No putative

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Niger-Congo language appears in the top 20 for either list.

If we exclude the spread of Indo-European languages to the New World in association with colonialism, Austronesian languages also have by far the largest geographical spread of any language family in the world. Their territory extends from the islands of Taiwan and Hawai'i in the north, Easter Island (or Rapanui) in the east, New Zealand in the south, and Madagascar in the west. However, the territory within these bounds is not occupied exclusively by speakers of Austronesian languages, as Australia (*see* **Australian Languages**) and Tasmania, parts of the New Guinea area, and parts of mainland Southeast Asia include a variety of different non-Austronesian languages.

The Austronesian family is noteworthy not just for its largest languages, as it includes a huge number of very small languages as well. The Republic of Vanuatu (*see* **Vanuatu: Language Situation**) – located in the southwest Pacific – has a population of only about 200 000, but its people speak at least 80 separate Austronesian languages (Lynch and Crowley, 2001), giving each language an average population of about 2500 speakers and making Vanuatu possibly the world's most diverse nation in terms of the number of languages per capita.

While Austronesian languages constitute a well-defined linguistic grouping, their speakers are very diverse in terms of physical appearance. People of a variety of Asian types speak Austronesian languages in what is now Indonesia (*see* article **Indonesia: Language Situation**), Malaysia, Singapore, Brunei, the Philippines (*see* Philippines: Language Situation [01736]) and the interior of Taiwan. In the far west in Madagascar, speakers of the Austronesian language Malagasy clearly exhibit African genes. In the Pacific, the Melanesian speakers of Austronesian languages from the island of Timor, the Indonesian province of West Papua, Papua New Guinea (*see* article **Papua New Guinea: Language Situation**), Solomon Islands (*see* article **Solomon Islands: Language Situation**), Vanuatu, New Caledonia, and Fiji differ in appearance from their Asian neighbors to their west, from their Polynesian neighbors to their east, and from their Micronesian neighbors to their north.

In fact, the boundaries between physical types are far from rigid, and there is often a gradual transition from one type to another, as genes have been mixing for centuries. In any case, linguistic boundaries and the boundaries of physical types often fail to coincide. We see this most dramatically in the New Guinea area, where physically similar Melanesian peoples may speak Austronesian languages or any of a number of completely unrelated non-Austronesian languages, including languages belonging to the Trans New Guinea grouping referred to earlier in this article. Sometimes, people in neighboring villages may speak totally unrelated languages. In fact, in the agglomerated village of Hanuabada, in Papua New Guinea, speakers of Austronesian Motu and non-Austronesian Koita (Koitabu) live side by side in the same community.

The Austronesian-speaking area exhibits cultural diversity that is even more dramatic than the diversity of physical types. As an illustration, we could point to the Hindu culture of Bali, in Indonesia; the traditional animist belief systems of Austronesian speakers in Melanesia (which continue to be practiced in some areas); the traditional polytheistic practices of the Polynesians, the Muslims of most of Indonesia, Malaysia, and southern Philippines; and the centuries-old Christian traditions of the central and northern Philippines. In some parts of the Austronesian-speaking world, traditional culture areas may be only slightly larger than the areas occupied by some of the very small individual languages. For instance, on the island of Malakula, in Vanuatu, significant differences in social organization and material culture can be found over quite short distances, with distinct culture areas including only two or three quite small language groups.

Of course, there has been a great deal of relatively recent technological and cultural change throughout the Austronesian-speaking world, with the advent of European colonialism and the modern technological revolution. The changes have perhaps been most dramatic (and most recent) in Melanesia, where in some cases fully traditional practices held sway until the first half of the 20th century. Although there are unlikely to be any more dramatic discoveries of 'lost tribes' who know nothing of the outside world, there are certainly still places where contact has until now been fairly minimal. While Christianity has now been adopted with fervor in most of Melanesia, Micronesia, and Polynesia, this change has often taken place in a way that has allowed for the retention of various aspects of the traditional belief system along with (or as part of) local Christianity.

Internal Genetic Relationships and Reconstruction

Based on the analogy of the naming of the Indo-European family after the geographical extremities – Indian and European languages – the Austronesian languages were originally referred to as Malayo-Polynesian, after Malay (and its relatives) in the west and the Polynesian languages in the east. However, it was subsequently realized not only that the

indigenous Formosan languages of Taiwan belonged in this family but also that these represented several distinct high-level subgroups. The term *Malayo-Polynesian* was then reassigned to cover all of the non-Formosan languages within the enlarged family. This was, henceforth, referred to as Austronesian, based on the elements *Austro-* 'southern' and *-nesia* 'island.' The latter element is, of course, also found in the names for the geographical areas of Polynesia (= many islands, because of the large number of islands involved), Melanesia (= black islands, because they are occupied by dark-skinned peoples), and Micronesia (= small islands, because these are mostly narrow, low-lying atolls).

While the Austronesian languages exhibit a considerable amount of structural diversity, the existence of the language family as a whole is completely uncontroversial, in contrast to that of some other language groupings – including the so-called Niger-Congo languages – where debates rage between 'lumpers' (who seek to link together as many languages on the basis of what sometimes look to others more like typological similarity) and 'splitters' (who are sometimes overcautious in requiring anything but absolutely infallible proof of genetic relationship).

In fact, the idea that Austronesian languages are related is often obvious even to a casual observer, in contrast, again, to many other language groupings where even an experienced linguist might find it difficult to see convincing evidence of a relationship. For example, the root for 'eye' is *mata* in exactly this shape in languages as far apart as Yami (in Taiwan), Tagalog (in the Philippines), Malay/Indonesian, Manggarai (in eastern Indonesia), Manam (in Papua New Guinea), Roviana (in Solomon Islands), Raga (in Vanuatu), and Tongan, Tahitian, and Rapa Nui (on Easter Island). Such lexical similarities are reasonably common in those parts of the vocabulary which we would expect to be most resistant to borrowing – hence strong indicators of genetic relationship – and borrowing is most unlikely, in any case, as an explanation for these similarities, given the huge distances involved.

So readily apparent is the relationship between many of these languages that a connection of sorts between the Polynesian languages and Malay was suggested by Hadrian Reland as early as 1708, when very little indeed was known about most of these languages. Lorenzo Hervas y Panduro in 1784–1787 described a more detailed set of linguistic relationships among Austronesian languages in which the language of Madagascar and a larger number of Indonesian languages were also included (Lynch *et al.*, 2002: 1).

The little-known islands of Melanesia were usually excluded from these original generalizations, perhaps partly because of a mistaken assumption that the physically distinct Melanesian peoples should also be linguistically very distinct. However, it turned out from work in the late 19th century by H. C. von der Gabelentz and R. H. Codrington (Lynch *et al.*, 2002: 2), based largely on information supplied by Christian missionaries in the field, that a substantial number of these languages *do* belong in this family as well. While many of the languages of the New Guinea area are clearly *not* Austronesian, some of the Austronesian languages of Melanesia were originally thought to be non-Austronesian only because extensive phonological changes had obscured the shapes of many widely distributed Austronesian roots, or because extensive lexical innovation had led to the replacement of some of the more widespread Austronesian cognates by which relationship could be most easily recognized. By the end of the 19th century, however, it was realized that a substantial number of indisputably Austronesian languages were in fact spoken in many of the coastal parts of the New Guinea area, as well as in Solomon Islands, Vanuatu, and New Caledonia.

This burgeoning language family was soon to become the most serious early testing ground for the comparative method of phonological and lexical reconstruction that was developed initially on the basis of Indo-European – and, less widely known, Finno-Ugric – languages in the second half of the 19th century. Although Edward Sapir's reconstruction of Uto-Aztecan in 1913–1915 represented a stunning early application of the comparative method to unwritten languages, Otto Dempwolff's (1934, 1937, and 1938) comparative study of the vastly larger Austronesian family represented a much more challenging test of the method.

Of course, a large number of new Austronesian data have become available since Dempwolff's time, and there has also been significant fine-tuning of the comparative method itself. Many of his comparisons were enriched in the work of Isidore Dyen (1951, 1953a, 1953b, 1965) and others from the 1950s, and many new reconstructions have also been proposed. Robert Blust (1970, 1980) has progressively added to the reconstructed lexicon since the early 1970s, bringing the total number of lexical reconstructions now to many thousands of entries. A substantial amount of morphosyntactic reconstruction since the late 1970s can also be ascribed to the level of Proto-Austronesian as a result of work by Stanley Starosta (1985), Lawrence Reid (1978), and others.

Comparative reconstruction has not proceeded solely at the level of Proto-Austronesian, as there has been major effort devoted to lower levels of reconstruction as well. Perhaps the most significant intermediate reconstruction involves the ongoing work since the 1990s of Malcolm Ross *et al*. (1998, 2003) in the reconstruction of Proto-Oceanic, the ancestor of the 500 or so members of the Oceanic subgroup. However, many others have also contributed in this area, beginning with the work of George Grace (1969) and Wilhelm Milke (1968) in the 1960s. Below the level of Proto-Oceanic, there is a tradition of reconstruction of Proto-Polynesian, for which serious comparative work based on a wide selection of languages dates from David Walsh and Bruce Biggs (1966).

With such a huge language family, internal subgrouping could be expected to be a somewhat contentious issue. However, there is now broad agreement on many issues of subgrouping within Austronesian. Work on subgrouping methodology by Malcolm Ross since the 1980s has added new considerations to the subgrouping of Austronesian languages, with his distinction between separation-induced 'subgroups' on the one hand and 'linkages' that have arisen as a result of gradual diversification of dialects that remained in geographical contiguity (Ross, 1988). This distinction allows us to take into account the fact that some lower-level groupings of languages, rather than uniquely sharing a set of defining innovations, may actually overlap with neighboring groupings in that they may appear to share innovations from more than one subgroup.

While new data and fresh approaches to subgrouping methodology may bring about further revisions in the future, the generally accepted current view is that the area of greatest subgrouping diversity is on the island of Taiwan (Lynch *et al*., 2002: 4). Recent research indicates that there may be as many as nine first-order subgroups there (Blust, 1999), with the remaining first-order subgrouping consisting of the Malayo-Polynesian languages, which is made up of the huge number of remaining Austronesian languages.

The western part of the Malayo-Polynesian subgroup appears to consist of a large number of smaller subgroups. This region includes all of the languages of the Philippines, as well as Malaysia and the islands of Indonesia from Sulawesi and Sumbawa westward, and also the Malagasy language of Madagascar. It is in this area that all of the very large Austronesian languages belong, including Tagalog (*see* article **Tagalog**), Sebuano, Ilokano (Ilocano), Hiligaynon, and Bikol (Bicolano) in the Philippines, and Malay/Indonesian, Javanese (*see* article **Javanese**), Sundanese (Sunda), Madura, Minangkabau, Bugis, Balinese (Bali), and Acehnese (Aceh) in Indonesia.

All of the languages to the east of the Western Malayo-Polynesian languages probably belong in a single very large Central and Eastern Malayo-Polynesian subgrouping that consists overwhelmingly of much smaller languages. This subgroup is thought to involve a binary split between a geographically restricted Central Malayo-Polynesian grouping involving the languages of Sumba, Flores, Timor, Buru, Seram, and adjacent smaller islands, and a much larger Eastern Malayo-Polynesian grouping consisting of all the rest. However, the internal subgrouping of both Central and Eastern Malayo-Polynesian and Central Malayo-Polynesian remains poorly understood. Eastern Malayo-Polynesian in turn enters into a binary split between the Southwest Halmahera–West New Guinea languages on the one hand and the very large Oceanic subgroup on the other.

The Oceanic subgroup occupies a special place within Austronesian linguistics. Although this is by no means one of the highest-level subgroups in the family, it is nevertheless a huge grouping, comprising nearly half of all of the Austronesian languages and amounting to nearly 10% of all of the languages of the world. With a total Oceanic-speaking population of about 2 million, the average-sized Oceanic language can claim only about 4000 speakers. Excluding some of the largest Oceanic languages from this total, such as Fijian (*see* article **Fijian**), with nearly 500 000 speakers, the average size for an Oceanic language drops to closer to 3000 speakers. Most of these languages are poorly documented in comparison to languages further west, and many are almost completely undocumented.

Oceanic subgrouping diversity is greatest in the west, with possibly four of the five primary subgroups located in this area: the Admiralties languages; the Western Oceanic languages of the north coast of the Indonesian province of Papua (formerly known as West Papua) and the coast of New Guinea, New Britain, New Ireland, Bougainville, and western Solomon Islands; the St Matthias subgroup; and the Yapese language as a single-language subgroup (Lynch *et al*., 2002: 92–120).

A putative Central and Eastern Oceanic subgroup covers Polynesia and Fiji and all remaining areas of Micronesia and Melanesia, including New Caledonia, Vanuatu, and part of Solomon Islands. Within this very large grouping, there is a five-way split between the Micronesian languages, the languages of southeastern Solomon Islands, the languages of Utupua and Vanikoro in Solomon Islands, the languages of

Vanuatu and New Caledonia, and finally the Central Pacific languages, consisting of Fijian, Rotuman, and the Polynesian languages.

Further conclusions have been presented about subgrouping at even lower levels, with a detailed subgrouping diagram available for the Polynesian languages. Given the size of the Oceanic family within Austronesian, the final family tree diagram is obviously going to be extremely complex. All subgrouping hypotheses will have to be kept 'open' pending further linguistic documentation in poorly known areas. One point that will be obvious, however, is that the geographically expansive and relatively well-described Polynesian languages, which have for more than 200 years figured so prominently in European fantasies about the Pacific, represent just a very small grouping of just over two dozen languages at the very lowest level of Austronesian subgrouping.

Linguistic Features

The huge size of the Austronesian family makes any kind of summary statements about 'typical' features well-nigh impossible. At the same time, the approximately 5000-year time depth for Austronesian languages is relatively shallow compared with language groupings such as Australian languages and Trans New Guinea languages, and the Austronesian family is structurally rather less diverse than such groupings as a result.

Since there are major structural differences between some of the Formosan and Western Malayo-Polynesian languages on the one hand and the Oceanic languages on the other, it is perhaps best to offer several sets of generalizations about widespread linguistic features in Austronesian languages. Even so, it must be recognized that within any such structural groupings, there are many languages that exhibit rather different sorts of patterns, so the patterns that are presented here are those which, in addition to having substantial geographical distribution, also appear to reflect some antiquity in a reconstructive sense.

In terms of phonology, it is particularly difficult to generalize about Austronesian languages. One thing that it is possible to say is that tonal contrasts are almost completely absent, in contrast to the phonological systems of many neighboring Asian languages. Tone is furthermore not reconstructible at all in Proto-Austronesian. While there has long been general agreement on the reconstructed four-vowel system /i u ə a/, there has until recently been much less agreement firstly on the number of consonantal contrasts, and secondly on the precise phonetic value of a number of reconstructed protoconsonants.

Complex sets of consonantal correspondences led scholars in the past to posit consonant inventories varying between two and three dozen segments in total. Arguments were presented, for example, that correspondences pointed to a maximal set of reconstructions involving /d ḍ D D_1 D_2 D_3 d_1 d_2 d_3/, where the symbols represented a mix of phonetic and purely formulaic information (Ross, 1994: 54). These issues of phonetic uncertainty and the proliferation of protoconsonants have now been largely laid to rest (Blust, 1999), though Wolff (2003) remains a dissenting voice. Because the few Formosan languages represent a number of primary subgroups of Austronesian, the relatively recent study of these languages has provided evidence for substantial modifications in both the inventory and the phonetic value of Dempwolff's original phonological reconstructions.

There has been a considerable amount of phonemic merger, split, and shift in many subgroups and in many individual Austronesian languages. There has also been phonological erosion of particular phonotactic positions, particularly involving word-final consonants in Oceanic languages. Original nasal-stop clusters have also been reanalyzed in Oceanic languages as prenasalized stop phonemes, resulting in substantial phonotactic simplification. Some individual languages have undergone other more dramatic phonological changes, including also the reanalysis of other material as part of the root, so reconstructible **mata* 'eye' appears regularly as /nəmrə/ in the Lenakel language of Vanuatu.

In terms of basic clause structure, the languages of the geographical extremities of the Austronesian-speaking areas are typologically very different. The languages of Taiwan and the Philippines exhibit what are often called 'focus' systems, which appear to directly reflect a reconstructible pattern at the Proto-Austonesian level (Ross, 1994: 64–66). In this system, verbs carry inflectional marking – expressed variously as prefixes, suffixes, or infixes or as a combination of more than one of these affixed elements – for so-called Actor Focus (AF), Undergoer Focus (UF), Locative Focus (LF), and Instrumental Focus (IF). The noun phrase that is signaled as being in focus typically appears clause-finally, is definite, and performs a range of possible semantic roles according to the nature of the focus marking on the verb. This is a completely un-English construction for which it is difficult to provide close translations, but examples (1), (2), (3), and (4) from Tagalog illustrate this pattern, based on the verb roots *bili* 'buy,' *tamVn* 'plant,' and *putol* 'cut':

(1) *B-um-ili* *ng* *kotse* *ang* *lalake.*
AF:buy PATIENT car TOPIC man
'The man bought a car.'

(2) *B-in-ili* *ng* *lalake* *ang* *kotse.*
UF:buy AGENT man TOPIC car
'The car was bought by the man.'

(3) *T-in-amn-an* *ng* *lalake* *ng*
LF:plant AGENT man PATIENT
damo *ang* *lupa.*
grass TOPIC ground
'The ground was planted the grass in by the man'–i.e., 'The man planted the grass in the ground.'

(4) *I-p-in-utol* *ng* *lalake* *ng*
IF:cut AGENT man PATIENT
isda *ang* *kutsilyo.*
fish TOPIC knife
'The knife was cut the fish with by the man' – i.e., 'The man cut the fish with the knife.'

Oceanic languages, by way of contrast, evolved a system of formal marking for transitivity on verbs that expresses a range of different semantic roles associated with the verbal object. This marking involves verbal suffixes that express a distinction between unsuffixed transitive verbs with undergoer objects and those that carry a transitive suffix with typically oblique objects. These transitive suffixes are often described as expressing close and distant transitive respectively and are associated with different sorts of semantic roles. Thus, in Fijian the intransitive verb *qasi* 'crawl' corresponds to the close transitive form *qasi-va* 'crawl to (location)' and the distant transitive form *qasi-vaka* 'crawl with (something held).'

Oceanic languages have evolved a wide range of other innovative features from the reconstructible Proto-Austronesian pattern. At the Proto-Oceanic stage, a formal distinction had developed between inalienable and alienable possession, with the former being expressed by means of pronominal suffixes attached directly to a noun and the latter expressed by means of an adposed possessive constituent to which pronominal suffixes were attached (Lynch *et al.*, 2002: 40–41). This distinction is still widely reflected in Oceanic languages in examples such as (5) and (6), from the Naman (Nama) language of Vanuatu:

(5) *khavo-g*
brother-1SG
'my brother'

(6) *neim* *khëso-g*
house POSS-1SG
'my house'

Naman has in fact simplified the reconstructible system for the expression of alienable possession, in that there is now only a single set of adposed possessive constituents. At the Proto-Oceanic stage, there are likely to have been separate possessive forms depending on whether the possessed item was for eating, for drinking, or for any miscellaneous purpose (Lynch *et al.*, 2002: 42). This three-way distinction is still maintained in many Oceanic languages, such as examples (7), (8), and (9), from Fijian:

(7) *na* *me-mu* *wai*
ART DRINK-2SG water
'your water'

(8) *na* *ke-mu* *dalo*
ART ED-2SG taro
'your taro'

(9) *na* *no-mu* *vale*
ART POSS-2SG house
'your house'

In some Oceanic languages, however, a number of additional categories of alienable expression occur. In the Raga language of Vanuatu, for example, in addition to forms expressing edible, drinkable, and miscellaneous possession, there are the possessive constituents *bila-* 'garden plots, crops, domestic animals, personal adornments' and *wa-* 'sugarcane,' and some languages have developed even more categories of alienable possession.

The Polynesian languages have taken the expression of possession in yet another direction. A possessor is preceded by a possessive marker containing either the vowel *a* or *o*. Thus, in Samoan, we find examples such as those in (10) and (11) (Lynch *et al.*, 2002: 43):

(10) *lo-'u* *tama*
POSS-1SG son
'my son'

(11) *la-'u* *naifi*
POSS-1SG knife
'my knife'

Inalienably possessed items generally express possession by means of the *o* forms, while *a* forms tend to correspond to categories of alienable possession in other Oceanic languages. However, there is substantially more arbitrariness and metaphor involved in the interpretation of the alienable-inalienable distinction in these languages. For instance, the possession of canoes in Samoan is considered as being more 'personal' than the possession of a knife, so 'my canoe' is expressed as *lo-'u paopao*.

Historical Interpretation

By combining subgrouping information, the content of the reconstructible lexicon of Proto-Austronesian

(as well as the lexicons of various lower-level subgroups, most significantly Proto-Oceanic), and information provided by the archaeological record, it is possible to come up with a fairly sophisticated picture of Austronesian history dating back at least 5000 years (Bellwood *et al.*, 1995). The story of human settlement of the Pacific Islands has tended to attract the interest of enthusiastic amateurs and religious groups who have been prepared to argue particular points of view in a way that has sometimes attracted a certain amount of broader public acceptance, even though the scientific evidence often points in radically different directions.

Given that the area of greatest subgrouping diversity within a language family is most likely to represent the original homeland, we could argue on these grounds alone that the Austronesian homeland is likely to have been either on Taiwan or on the adjacent mainland of southern China and that there has been a general west-to-east movement, with Polynesia being the last area to be settled. Given that the Polynesian languages represent a linguistically very homogeneous and geographically expansive subgroup, this, on linguistic grounds, would be the least likely source for Austronesian languages. However, that has not prevented people inspired by the *Kon Tiki* expedition from arguing instead for a general east-to-west population movement, beginning in South America.

The view of some religious groups that Polynesian people are descendants of one of the Lost Tribes of Israel is also impossible to reconcile with the fact that there is no linguistic evidence in support of this contention, while there is a huge amount of incontrovertible evidence in support of linguistic relationships between Polynesian languages and those of the rest of the Austronesian-speaking world. And of course, there is a mass of archaeological evidence pointing to the origin of Polynesian peoples from previously settled areas of the Austronesian-speaking world, and none in support of an origin elsewhere (Howe, 2003).

The first major population movement away from the Austronesian homeland was that which took speakers of Proto-Malayo-Polynesian out of the Taiwan area into the Philippines, presumably via an entry point in the north. A series of population movements and associated linguistic splits would have seen this original group spread to the rest of that archipelago and ultimately to all of what is now Indonesia. As part of this series of population movements, the island of Madagascar was settled by a group of people who originated from Kalimantan.

Ultimately, speakers of a language immediately ancestral to Proto-Oceanic moved out of the area of Halmahera and the Indonesian province of Papua into the Oceanic homeland of New Britain and New Ireland approximately 3500 years ago. Melanesia was at the time occupied by speakers of non-Austronesian languages. As early descendants of Proto-Oceanic speakers began to spread, their progress was limited on the mainland of New Guinea to coastal areas, while the hinterland and the distant interior continued to be occupied by speakers of non-Austronesian languages.

However, there was obviously substantial linguistic contact between these two major linguistic groups, as the reconstructible *VO* word order often shifted to *OV* order in this area under the apparent influence of non-Austronesian patterns. A small number of languages – most famously Magori and Maisin of Papua New Guinea – underwent such thoroughgoing influence from non-Austronesian languages that for many years there was dispute as to whether they should be classified as Austronesian or not.

Population movements – and associated linguistic diversification – continued with the eastward drift of Oceanic-speaking groups. Up to this stage, most of the population movements involved relatively short ocean voyages to islands that were clearly visible from neighboring populated islands. However, about 3000 years ago there was a period of sudden geographical expansion out of western Melanesia involving a series of major ocean voyages into what must initially have been unknown and unpopulated territory. These voyages led to settlement as far afield as Tonga and Samoa.

It was in Tonga and Samoa that Proto-Polynesian diverged from its ancestor. From there, an even more dramatic series of oceangoing voyages led to the discovery and settlement of nearly every island group in the Pacific between the time of the birth of Christ and A.D. 1000. It should be kept in mind that this was all happening at a time when Britons were still lumbering across narrow rivers in coracles. It was Polynesian sailors who were the world's first major navigators, rather than the likes of Vasco da Gama, Christopher Columbus, and Captain Cook, whose voyages followed well over 1000 years later.

Possible External Genetic Relationships

The Austronesian languages constitute a very well defined language family in that there are few languages whose status as being Austronesian is in dispute. The status of some languages has been the subject of debate given the possibility of influence from so-called Papuan or non-Austronesian languages in the New Guinea area, and different scholars in the past were uncertain as to whether Maisin and Magori should be treated as non-Austronesian

Figure 1 The Austronesian family and major Austronesian language groups (drawn by Malcolm Ross).

languages or as Oceanic languages (Lynch *et al.*, 2002: 16). While both clearly show evidence of substantial borrowing from non-Austronesian languages, it is now accepted that they can be treated as genuinely Austronesian languages. There are also a handful of languages spoken in the extreme east of Solomon Islands about which there has been some debate in the past; this issue has not yet been definitively resolved.

Most suggestions of relationships between Austronesian languages and other language groupings call for greater willingness to come to conclusions on the basis of relatively little evidence. Some scholars have claimed that there is a relationship between Austronesian languages and Japanese, others between Austronesian and the Tai-Kadai languages of southern China, others between Austronesian and Sinitic languages, and others between Austronesian and Austro-Asiatic languages, such as Nicobarese (Ross, 1994: 95–99). The few similarities between Japanese and Austronesian seem likely, at best, to involve a few very early Austronesian loans into Japanese. The other links may point to a series of relationships within a single very large grouping, though few would regard such a hypothesis as demonstrable.

Just as interesting, of course, is the question of a possible relationship between Austronesian languages and language groupings for which no suggestions of wider relationships have ever been offered. Most significant among these are the Australian languages, which represent a completely separate language family in their own right, and the various 'Papuan' languages of the New Guinea area. So convincing is the lack of relationship between the latter and Austronesian languages that these 'Papuan' languages are often collectively referred to in regional studies simply as non-Austronesian languages.

See also: Australian Languages; Austro-Tai Hypotheses; Benue-Congo Languages; Fijian; Indonesia: Language Situation; Javanese; Malayo-Polynesian Languages; Papua New Guinea: Language Situation; Solomon Islands: Language Situation; Tagalog; Tagalog; Vanuatu: Language Situation.

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Austro-Tai Hypotheses

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Austro-Tai is the name given to the hypothesis that the Austronesian language family and the Tai-Kadai language family are genetically related. Austronesian languages are primarily spoken in Taiwan, island Southeast Asia and the Pacific, while Tai-Kadai languages are spoken in mainland Southeast Asia, specifically South China, Vietnam, Laos, Thailand, Burma, and Assam (India). Siamese, or Thai, the national language of Thailand, is the best-known Tai-Kadai language and the largest in terms of numbers of native speakers. Lexical similarities between Thai and the Austronesian languages have long been recognized (Schlegel, 1901). However, the hypothesis that the language family to which Thai belongs is genetically related to Austronesian was first proposed by Benedict (1942). Benedict proposed that the genetic relationship between the two language families was a sister relationship, implying that the Tai-Kadai languages are the descendant languages of a parent language – Proto-Austro-Tai – from which pre-Austronesian peoples split in a move to Taiwan, where Proto-Austronesian developed.

Although his later work (Benedict, 1975) was well received by archaeologists and prehistorians, it was generally less well received by linguists, who were skeptical of the extensive array of Proto-Austro-Tai reconstructions that he proposed and his unorthodox methodology for reconstructing them. A number of critical reviews of his work appeared (esp. Gedney, 1976), casting doubt on the nature of the relationship, and pointing to a number of unrecognized loans from Chinese. But the presence in the Tai-Kadai family of a considerable number of forms from the area of basic vocabulary that are very similar in sound and meaning to corresponding Austronesian forms removes the possibility of coincidence as a possible explanation for the similarities. Whether the similarities reflect a genetic relationship or are the result of contact was examined by Thurgood (1994). He concluded that the sound correspondences and tonal developments within the Tai-Kadai languages of forms with comparable Austronesian reconstructions are irregular and thus cannot be evidence of a genetic relationship, but rather of an early contact relationship.

A recent reexamination (Ostapirat, 2000) of the whole question of the internal relationships within the Tai-Kadai family of languages (renamed by Ostapirat as Kra-Dai) has opened up once again the nature of the relationship that exists between this family and Austronesian. In an insightful paper, Ostapirat (2005) presented a list of some 50 pan-Kra-Dai basic vocabulary items, at least half of which can be related by regular sound correspondences to equivalent forms in Proto-Austronesian. The English glosses of Kra-Dai forms that appear to be related to Austronesian include the following: *bear* (n.), *bird*, *black*, *child*, *eat*, *excrement*, *eye*, *far*, *fire*, *grandmother*, *grease*, *hand*, *head*, *I*, *leaf*, *leg*, *live*, *louse (head)*, *moon*, *nose*, *raw*, *sesame*, *shoulder*, *this*, *tooth*, *water*, and *you*.

From this evidence, Ostapirat concluded, "It does not seem likely that the very high number of roots between Kra-Dai and Austronesian that emerge from the core list could be accidental or simply result from borrowings." In commenting on Thurgood's claims that there are no regular sound correspondences between the Kra-Dai and Austronesian families, Ostapirat explained that they are the result of Thurgood's being unaware of crucial data from little-known languages, and of the inadequacy of some of his Proto-Kra-Dai reconstructions. Despite the apparent strength of the evidence he cited, Ostapirat nevertheless considered the evidence to be debatable as proof of a genetic relationship between the families.

Authorship Attribution: Statistical and Computational Methods

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Introduction

Traditional authorship attribution studies attempt to identify the author of an anonymous text by external methods (e.g., a publisher's payment records, ads in contemporary newspapers) or a subset of available internal methods (e.g., an author mentioning other books that he or she has written, an author mentioning a spouse, or even a practitioner invoking impressionistic stylistic evidence). If a rigorous traditional study of an anonymous work is inconclusive, it should be determined whether a valid nontraditional study could be employed. Nontraditional authorship attribution studies (a.k.a., 'stylometry' or 'stylometrics') use the computer, statistics, and stylistics to arrive at a statement of probability that a suspected author wrote the anonymous work. The nontraditional approach is based on the hypothesis that every writer has a unique and verifiable style. It is important to realize that every nontraditional authorship study is different and demands a unique experimental setup.

Background

When – a Short History

Much of the following brief history is based on the Delcourt (1994) article and other items in the bibliography – specific references can be had there. The quantitative description of texts goes at least as far back as about 300 B.C. Saunaka, a Sanskrit grammarian, counted the number of syllables, words, and stanzas in the *Rig-Veda*. This was done to aid in the accurate preservation of the text. In about 180 B.C., Aristarchus of Samothrace listed 'seldom used expressions' and 'once used expressions' in the *Iliad, Odyssey,* and other Greek works. Aaron Ben-Asher, in about 950 A.D., counted the number of letters, words, verses, and other, even more arcane style markers in the Hebrew Bible.

Many similar studies were done down through the ages. Then, in 1851, Augustus de Morgan stated that word length might prove to be a unique marker of an author's style. This is generally accepted as the beginning of nontraditional authorship attribution studies. T. C. Mendenhall, in 1887, using word-length distributions, conducted the first nontraditional experiment to determine whether it was Bacon or Shakespeare who wrote some disputed plays. There was then a modest spate of activity. Lucius Sherman (1888) worked on sentence length and punctuation as authorship discriminators. Also in 1888, William B. Smith (writing under the name of Conrad Mascol) worked on various style markers in attribution studies. G. W. Gerwig (1894) worked on sentence-length markers in authorship studies. Wincenty Lutoslawski (1897) wrote about a "science of style" that would not only help with chronology problems, but also with "questions of authenticity." Robert E. Moritz (1903) worked on various style markers in attribution studies. In Britain and Germany, classicists also began the quantitative analysis of texts in the 19th century.

The early 20th century saw Andrej A. Markov (1913) studying grapheme sequences, and Godfrey H. Thomson and J. Ridley Thompson (1915) analyzing vocabulary. In 1932, George K. Zipf published the first of his important works. But it was not until the late 1940s that the first large burst of activity started and continued to the 1970s. To name a few of these practitioners, there was George Yule, Gustav Herdan, and C. B. Williams in the United Kingdom; Pierre Guiraud in France; Louis T. Milic, Frederick Mosteller, and David L. Wallace in the United States; Wilhelm Fucks in Germany; Alvar Ellegård in Sweden; and Herman Somers in Belgium. Then in the 1970s, with the increased availability of computers, the number of studies took a quantum leap. Some of these studies appear in the bibliography – but keep in mind that over 1000 other publications do not.

What and Why

Nontraditional authorship studies are interdisciplinary both in their own domain (the computer, statistics, and stylistics) and in 'subject' matter (the data). The subject matter is drawn from many disciplines and can be divided into two groups: group one, where the results are important but not really critical – e.g., literature (in the broadest sense), political science, and history; and group two, where the results are not only important but potentially critical – e.g., religion, the law (both law enforcement and the courts), and the intelligence community.

The reason for doing an authorship attribution study and the ramifications of the subsequent answer are quite different for the two groups. The usual reason for doing an attribution study on group one is to determine an author's canon, so that studies of the author's ideas, stylistic traits, literary techniques, and 'place' in the discipline can be carried out. Each definitive attribution study allows scholars to be more precise and give valid, more meaningful insights

into the history of ideas. Group two, on the other hand, presents more serious implications. What ramifications are presented to Christians in general if the Pauline Epistles were not all written by St Paul? What ramifications are presented to the Church of Jesus Christ of Latter-day Saints if Joseph Smith is shown to be the author of the Book of Mormon? Attribution in the court room can be a matter of a guilty or not-guilty verdict, prison or freedom, even life or death. The FBI uses nontraditional authorship techniques to aid in their investigations – e.g., the writings in the Unabomber case and the note in the Jon Benet Ramsey case. The Rand Corporation is using these techniques to aid the intelligence community in their work on counterterrorism.

Who

Nontraditional attribution studies demand much of the practitioners. Ideally, they must be scholars in the field of the anonymous text – not just in the language, genre, and historical period, but also in the techniques of the editors and publishers. And they must be able to carry out a valid traditional attribution study. They must be competent bibliographers, more than competent statisticians, and competent computer users with a knowledge of programming. They must be 'scientists,' versed in the scientific method, able to construct and implement a valid experimental design.

In reality, very few practitioners meet these criteria. Published practitioners range from undergraduates to scholars of religion, history, literature, philosophy, economics, linguistics, mathematics, statistics, and computer science, and even to physicists, biologists, librarians, and businessmen.

Many studies are done in collaboration. Yet, even in collaboration, not only should all of the areas of expertise be covered, but also every member of the collaboration should have a good enough working knowledge of every other area, so that meaningful checks and balances can be employed. Enough time and resources must be made available to do a valid study. Shortcuts demanded by unrealistic time constraints and money constraints have relegated many published studies to the all-too-large stack of 'highly questionable' works. Too many reviewers are ineffectual gatekeepers, foisting invalid nontraditional studies on an unsuspecting audience and casting doubt on the nontraditional enterprise as a whole.

Where

It is vitally important that attribution researchers be aware of the studies that have gone before. Too many studies cover the same ground, make the same mistakes, and render themselves meaningless because they are unaware of the problems that have been solved and the pitfalls to be avoided. Doing the required bibliographic search is a daunting task, more so than in any other discipline. There are hundreds of different journals in a multitude of disciplines that have published articles on nontraditional authorship attribution. In addition, there are even more journals in more disciplines that have published pertinent peripheral articles on style, stylistics, rhetoric, linguistics, statistics, computational methods, and bibliographic studies – and this is not an exhaustive list. And, although this entry is emphasizing works that were published in English, the practitioner must be aware of and knowledgeable about the wealth of excellent studies written in French, German, Italian, Russian, Japanese, and many other languages.

Dissertations (doctoral, masters, and even undergraduate) offer a rich source of background material and innovative techniques. It is not enough to research only the books about nontraditional studies, but the practitioner should become aware of the dozens of imbedded chapters and sections in books whose titles give no indication of any nontraditional attribution content. And, as in most disciplines, conference papers give the most up-to-date information and allow for valuable give and take.

Methodology

Since there are separate articles in this encyclopedia for corpus linguistics and forensic linguistics (*see* **Corpus Linguistics**; **Applied Forensic Linguistics**) this article concentrates on literary attribution that compares an unknown writing to a suspect author and to all of the other valid potential authors. The use of corpus linguistics in authorship attribution usually compares the unknown writing with a suspect author by using the linguistic norms of a given population. Forensic linguistics usually does likewise, looking especially for linguistic anomalies that are then shown to differ from not only linguistic norms but from the usage by the other suspects in the case. However, any practitioner working in any of these areas must be aware of the methodology used by the others – there is substantial and valuable overlap.

The computer has become so ubiquitous that its use in all of the stages of nontraditional attribution, from bibliographic research and editing, formatting, and analysis of the study texts to formatting and publishing of the final report, is a 'given' and not reported on here. Be forewarned, however, that the technological advances associated with the computer are so rapid and far reaching that the practitioner must continually upgrade his or her skills.

Before any nontraditional attribution study is undertaken, an exhaustive traditional study must be

done. The nontraditional methodology is only a tool for the traditional scholar – and surely not the most important one.

There are four basic categories of nontraditional authorship attribution studies:

1. An anonymous text with no idea of who the author is;
2. An anonymous text with two, three, or some other small number of suspected authors;
3. An anonymous text that is the result of a collaboration;
4. An anonymous text with one suspected author.

In addition to this fractionating, there are almost as many methodological variations as there are studies.

Not all four types of study are treated here. The following is a simplified outline of an ideal experimental design for a category-four study that embraces many techniques. It gives a general idea of what should take place in nontraditional attribution studies. There is much more involved in a valid attribution study. Not all of these steps are necessary for every study – remember, every attribution study is different. Because the field is so complicated, the following concentrates on literary prose. More specifically, an actual authorship problem: Did Daniel Defoe write the anonymous 1705 political tract, *A letter from Scotland to a friend in London* (*Letter*)?

Get the Texts

All necessary texts must be identified and obtained. As a rule, the printed edition closest to the final holograph is to be used; every subsequent edition has the potential to compound the systematic error by allowing editorial and typographical interpolations and errors. The following two are the most important of several criteria to be used in selecting the texts:

1. All of the texts must be the same genre as the anonymous text. In our example, all of the texts must be political tracts. It has been shown empirically that an author uses a different style for different genres. Studies can be done, for example, to see if an author's style in political tracts is statistically the same in closely allied genres, such as religious or historical tracts. This has the potential to increase the size of the data, thereby improving the statistical probabilities.
2. All of the texts must have been originally published in the same constricted time frame, e.g., plus or minus five years. It has been shown empirically that an author's style changes over time. A few of the other criteria are length, gender, and same 'native' language – in our example British English.

These selected texts are divided into three categories:

1. The anonymous text – the *Letter*;
2. The suspected author's texts – every political tract written by Defoe between 1700 and 1710. A random sample of these texts are taken from this sample and used as a control;
3. The control texts – (a) a subset of the suspected author's texts, i.e., the random sample just mentioned above, and (b) a significant random sample of all of the other potential authors of political tracts published between 1700 and 1710.

The ideal would be to include every text that passes the criteria. It is a daunting task for even an expert in 18th century bibliography to identify, locate, and obtain these texts. However, every text that is excluded, for any reason, increases the systematic error of the study.

Each text is then prepared for analysis by unediting, deediting, and editing, e.g., deleting editorial intervention, fixing obvious typesetting errors, deleting quotes, deleting foreign languages, disambiguating (e.g., homonyms), 'marking-up' the text (i.e., tagging the text using a system such as that of the Text Encoding Initiative), and in certain circumstances, lemmatization (see Rudman, 2005). This is an especially vexing problem working with Defoe and 18th century literature – self-quoting, 'imitation,' and plagiarism were the rule rather than the exception. This is a tedious and time-consuming task; well over a million words must be looked at with critical, scholarly care. All texts not already in a machine-readable form are then scanned into the computer by an optical character reader, obtained from the Web, or typed into the computer. Scanning the texts for our example is impractical. The latest 'error rate' obtained in scanning pre ~1750 texts is over 65%. Obtaining texts via the Internet causes other problems, e.g., bad editions and incomplete texts.

Style and Stylistics

Style and stylistics are separate entries in this encyclopedia and it is necessary that the reader of this article be familiar with their content (*see* **Style; Stylistics**). A complete and accurate knowledge of style and stylistics is such a vital part of nontraditional attribution studies that it is with some trepidation that I do no more than point to these entries. As a general rule, practitioners of nontraditional authorship attribution use this operational definition of style: the combination of selected quantifiable stylemarkers. There are

two basic types of these stylemarkers: (1) those that are taken from the author's own words, e.g., word-length distributions, type/token ratios, and percentages of various function words; and (2) stylemarkers that are not the author's own words, e.g., quotations, foreign phrases. Since the use of type-two stylemarkers entails a different kind of study, only type-one markers are referenced in this entry.

Another hypothesis of nontraditional attribution studies is that authors have a conscious control over some stylemarkers while other markers are used unconsciously. Most practitioners feel that the unconscious stylemarkers (e.g., word-length correlation) give more reliable results.

There are hundreds of thousands of quantifiable type-one stylemarkers that have been identified. They can be divided into four main categories: (1) metaword – paragraph (e.g., length, first word of, number of sentences per), sentence (e.g., length, word order, types), phrases, clauses; (2) word – type/token ratios, length distribution, length correlation, once-used words, cooccurrences, function words, parts of speech (e.g., distribution, ratio); (3) subword – *n*-grams, syllables, prefixes, suffixes, phonemes, morphemes, letters; and (4) other – punctuation, imagery, rhetorical devices (e.g., zeugma, chiasmus).

In order to show that a suspected author wrote the anonymous text, it must be shown that the chosen stylemarkers are used in a consistent way by the suspected author, and not used in the same way by the 'other suspected authors' of the control group. Then it also must be shown that the anonymous work uses the same stylemarkers consistent with the suspect author. The determination of which stylemarkers to use is complex; in general, the more markers that pass the selection criteria and are used, the 'better' (higher probability) the answer. Putting this into the context of our example of the *Letter*, we now want to identify those stylemarkers that Defoe uses consistently in his selected writings (minus the randomly selected subset that is to be used as a control).

Sampling

Sampling is used in two different ways in nontraditional attribution studies. One has to do with the intratext block size to be used in determining the variation of a stylemarker within a text. This block size is determined by the stylemarker that is being used, which statistical test is being used, and the length of the text. Given today's technology, the entire prepared text should be used. No block of text should be excluded, even by random sampling. The second way that sampling comes into play is in the selection of the subset of the suspected author's texts and in the selection of 'all other possible authors' control texts. Sampling is not desirable in selecting these texts but is, at times, necessary. It is very rare, if ever, that all of the suspected author's texts (in the same genre and constricted time frame) cannot be used. And, although a random sample of 'all other authors' texts may be necessary, the ideal study would include every text (same genre and constrained time frame) by every author – the closer the sample comes to 100 percent of these authors, the 'better' the results.

Statistics

Much of the following is based on the Holmes (1985) article and other items in the bibliography. The statistics employed in nontraditional studies run the gamut from simple word counts and percentages, through chi-square tests to multivariate analysis and the use of 'learning' programs. These include, for example, neural networks (that recognize the underlying organization of data – a connectionist approach), genetic algorithms (that 'learn' by generating a large number of syntactically valid but semantically meaningless rules), and support-vector machines (that use an optimally defined surface that is typically nonlinear in the input space, linear in a higher-dimensional space, and used for classification, regression and data fitting, and supervised and unsupervised learning). Every practitioner who is not a statistician must possess a level of statistical sophistication that would enable him to at least carry on an intelligent two-way conversation with a statistician. Although the value of the study does not go up with the sophistication of the statistics, very simple statistics usually produce simplistic answers. It is incumbent upon the statistician to understand, employ, and communicate the assumptions behind each statistical test to be used. A statistical technique that requires random input data cannot use stylemarkers that were not produced randomly. A test that requires multiple stylemarkers to be independent cannot produce valid results if the stylemarkers are not independent.

It is usually easier for a practitioner who is a statistician to achieve an adequate level of expertise in stylistics and bibliographical studies than for an expert in literature, history, or religion to achieve a comparable level in statistics. The Mosteller and Wallace (1964) nontraditional authorship study of the *Federalist* papers (arguably the best nontraditional study to date) tried various classical methodologies but made a case for the Bayesian approach. This technique had the added advantage of being able to use the 'best guesses' of traditional authorship practitioners as to who is the author of an anonymous text as the prior-odds input. Their statistically sophisticated study was

the most praised and most cited nontraditional study. However, no practitioner has duplicated his or her methodology on a different authorship problem. This article cannot begin to explicate the mathematical complexity of the statistics that can be used in nontraditional authorship studies. There were many books and articles like Brainerd's (1974) that attempted to do this.

The following is a simplified list of some of the techniques that have been employed in the field: (1) chi-square test, (2) frequency distributions (e.g., percentages, occurrences per block), (3) ratios (e.g., type/token), (4) Simpson's index (*D*), (5) Yule's Characteristic (*K*), (6) Waring-Herdan law, (7) Dolphin-Muller law, (8) Zipf's law, (9) Ule's relative vocabulary overlap, (10) Morton's Qsum, (11) Burrows's Delta, (12) *z*-test, (13) *t*-test (for independent samples), (14) *t* test (for correlated samples), (15) *f*-test (e.g., analysis of variance [anova]), (16) Markov chains, (17) phi coefficient, (18) Spearman rank correlation coefficient, (19) Kendall rank correlation, (20) Pearson product moment correlation, (21) entropy, (22) Mann-Whitney *U* test, (23) Wilcoxon test, (24) factor analysis, (25) discriminant analysis, and (26) cluster analysis. Many variations of these tests also have been employed.

Very few of these techniques have escaped criticism from other statisticians. There are no universally accepted statistical methodologies in nontraditional authorship attribution. The use of multivariate methodologies seems to show a consensus of acceptability and preferability by present day practitioners.

The use of 'packaged' statistical programs poses dangers to the unsuspecting nonstatisticians. It is not always clear exactly what algorithms are used in the 'black box' or what assumptions are made about the data. When all of the statistical manipulation is finished, a complete and completely understandable presentation of the results should be made. A picture (or graph) is worth much more than 1000 tables of numbers. A statement of probabilities has to be accompanied by a meaning of the statistical probabilities.

Returning to the *Letter* example with all of this in mind, the practitioner now wants to identify those stylemarkers that Defoe uses consistently in his primary sample of selected writings. This is done by testing the thousands of potential stylemarkers on the primary Defoe data. Say, for illustrative purposes, that Defoe uses 500 stylemarkers in a consistent way throughout his selected writings, e.g., every 1000 word block shows, within acceptable statistical error, the same word-length distribution, the same type/token ratio, the same various function-word distributions. These 500 markers are then tested against the 'all other potential authors' control sample. This is done to weed out those markers that are zeitgeist-driven or genre-driven. Again, for illustrative purposes, say that 200 of these 500 stylemarkers are genre- or zeitgeist-driven, i.e., the control group uses these 200 markers in the same way (statistically) that Defoe does. These 200 markers are discarded from further study.

This is not to say that any of the remaining 300 stylemarkers are not used by any of the control group authors in the same way as Defoe, but that none of the other authors use all of these markers the same way (statistically) as Defoe – an important distinction. The amount of this overlap correlates with the probability of the answer. The next step is to test the remaining 300 stylemarkers against the *Letter*. Does the author of the *Letter* show the same statistical stylemarker usage as Defoe? But before going to an 'answer,' the Defoe subgroup control that was randomly selected before analysis began is tested to ensure that there was no 'cherry picking' of stylemarkers (even unconsciously) by the practitioner. If the subsample control exhibits the same statistical results as the main Defoe sample with all 500 stylemarkers, the marker selection is validated. Now, only the final probability (with experimental and systematic error rates) remains to be calculated.

Keep in mind that this example of the *Letter* is the most difficult type of authorship problem. If there are only a few possible candidates for authorship, as in the *Federalist* dispute, the 'other potential author' control group becomes more manageable and allows for a 'more reliable' answer but to a different and far easier problem: which of the limited number of potential authors is the most likely to have written the text.

Conclusion

Nontraditional practitioners (and many others) look upon their work as 'science,' with the concomitant commitment to produce and follow a complete and valid experimental design. However, there are many skeptics who look at the field as pseudoscience or simply 'aspiration' to become a science. The skepticism (not entirely unjustified) is the result of many factors, besides the ones mentioned earlier: (1) a lack of consensus on methodologies, techniques, and results; (2) many (if not most) practitioners allow their work to be governed by expediency – it is easier to take shortcuts than do a 'complete' experiment; (3) a lack of expertise in all of the allied fields; and (4) a lack of understanding of what is required and what has been done in the field. In addition to these there are the well-publicized 'mistakes' (e.g., the debunking

of Morton's Qsum methodology by England's Channel 4 program 'Street-legal,' and the much ballyhooed Foster attribution of the *Funerall elegye* to Shakespeare, with the subsequent proof that he was in error – an error that Foster admitted in a retraction.

If the experimental design has any flaws, the entire study is put in doubt. This is truly a case where the chain is only as strong as its weakest link. Yet even these flawed outcomes must be studied by practitioners. And, if a practitioner publishes a flawed study, it does not mean that all of his or her studies are flawed; *Erratum in unum* does not mean *erratum in omnes*. There are two important principles that the practitioner must follow: (1) completeness – every detail must be published or made available; and (2) reproducibility – any other competent practitioner must be able to reproduce the results.

Nontraditional attribution studies do not give a 'yes' or 'no' answer. Answers are expressed in statistical probabilities. This is not to denigrate the value of these answers; the probabilities can approach certainty the same way that DNA analysis does. The answer can be presented to the 'jury' as being beyond a reasonable doubt.

The future full acceptance of nontraditional authorship studies as a legitimate discipline does not lie with more-sophisticated statistical techniques; the successful implementation of a neural net or support vector machine cannot make up for faulty control selection or faulty primary text preparation. Its future lies with a rigorous adherence to valid experimental designs.

Because of length restrictions, this article cannot do the subject justice. I have tried to give the curious reader and the serious researcher a good idea of what nontraditional authorship attribution is all about and how a fledgling practitioner might get started.

See also: Applied Forensic Linguistics; Computers in the Linguistic Humanities: Overview; Corpus Linguistics; Genre and Genre Analysis; Literature: Empirical Studies; Style; Stylistics: Corpus Approaches; Stylistics.

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[Note: There are well over 100 different journals that publish articles pertaining to nontraditional authorship attribution. The following two journals are worth noting for the quantity and quality of these articles: *Literary and Linguistic Computing* and *Computers and the Humanities*. The following 30 entries were selected from a bibliography of well over 1000 items. They were selected for their representativeness, importance, and/or historical value to the field. This bibliography does not contain the seminal and other important works in style and stylistics by such giants as Yule, Milic, and Burrows or in other component fields such as forensic linguistics by practitioners like McMenamin and Chaski.

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Autism and Asperger Syndrome: A Spectrum of Disability

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Autism spectrum disorder (ASD) is a severe developmental disorder, first labeled and described by Kanner in 1943. The onset of ASD occurs before age 3 and persists throughout life. A male predisposition exists with a ratio of approximately 3 to 1. The prevalence of this disorder is approximately 1 of every 1000 births. According to the *Diagnostic and statistical manual*, 4th edition (DSM-IV; American Psychological Association), and the *International classification of diseases*, 10th edition (ICD-10; World Health Organization), this disorder is part of the Pervasive Developmental Disorders category and is characterized by three main disabilities: (1) failure to develop normal social interactions and relationships, (2) language delay and communication disability, and (3) restricted, repetitive, and stereotyped behaviors. Mental retardation is frequently associated with autism. Approximately 75% of individuals with autism have severe mental retardation (also known as low-functioning autism; LFA), and the rest have mild retardation or average intelligence (also called high-functioning autism; HFA). Approximately 10% of individuals with ASD may have very low levels of intellectual abilities, but show excellent rote memory and possess isolated savant skills, such as calendar calculations, exceptional musical or drawing abilities (Volkmar and Pauls, 2003).

Individual differences in ASD are also observed in language development. Some children with autism never develop speech, whereas others become verbally fluent but still have problems with comprehension and language use. As the manifestation of autism varies in degree of severity and from one individual to another, it is generally assumed that there is a spectrum of autistic disabilities ranging from LFA to HFA and Asperger's syndrome (AS). The distinction between LFA and HFA consists mainly of the fluency and flexibility of expressive language skills (Lord and Paul, 1997). LFA individuals may be mute or may acquire only minimum speech characterized by echolalia (the immediate repetition of what is said by another person) without any apparent communication purpose. HFA individuals develop speech, but tend to show idiosyncratic use of words and phrases and have difficulty participating in conversation (Bushwick, 2001). Asperger's syndrome constitutes a milder variant of the autism spectrum and, like the autistic disorder, is characterized by social disability and restricted stereotyped behaviors. However, AS individuals do not show mental retardation and language acquisition delay as in autism (Volkmar and Klin, 2000). Consequently, AS is often not diagnosed until late childhood or even adulthood. The prevalence of AS is higher than that of autism and is estimated at 3 of 1000 births. Although the cause of ASD is unknown, there is strong evidence for a genetic contribution to the development of the disorder. The concordance rate for monozygotic twins is very high (i.e., over 90%; Volkmar and Pauls, 2003).

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Neuroanatomic and neuroimaging investigations have revealed functional and structural brain abnormalities in individuals with ASD, such as hyperserotonemia, reduced volume of cerebellar vermis, and abnormalities in cell structure in the hippocampus and amygdala (Beauman and Kemper, 2003). High rates of seizures have also been observed in individuals with ASD. The similarity of autistic impairments with frontal lobe and right hemisphere lesions (Martin and McDonald, 2003) and Landau–Kleffner syndrome (*see* **Landau-Klefner Syndrome**) (Levisohn, 2004) has been highlighted.

Abnormal auditory cortical processing of complex sounds in children with autism has also been revealed in a positron–emission tomography activation study and confirmed previous results obtained in adults. This irregular processing seen in both adults and children with autism could be involved in inadequate behavioral responses to sounds and in language impairments characteristic of autism (Boddaert *et al.*, 2004). In addition, a language-association cortex asymmetry was revealed in autism and specific language impairment (SLI), suggesting a phenotypic link between autism with language impairment and SLI. Language-impaired boys with both autism and SLI had reversal of asymmetry on frontal language-related cortex, whereas linguistically unimpaired ASD boys had asymmetry similar to that found in the control group. It would appear that this asymmetry reversal is more a reflection of language impairment than specifically linked to autism diagnosis (De Fosse *et al.*, 2004).

Language in ASD and Asperger's Syndrome

As most autistic children are usually diagnosed around 3 or 4 years of age, few investigations have been conducted with younger children. However, retrospective analyses of home videotapes of 1 year old children later diagnosed with ASD and parental reports of their child's language have provided useful information about the preverbal phase of the autistic disorder. Lord *et al.* (2004) reported that parents often observe word loss in the second year of life in children with autism. In addition, 1 year old autistic children are less responsive to their names or attend less to people than do typically developing children. The autistic child's failure to orient preferentially to speech, share attention, and use eye gaze to disambiguate an adult's intention may be the earliest signs of the disorder and constitute particularly strong handicaps for the acquisition of language (Dawson *et al.*, 2004; Rollins and Snow, 1998).

Language impairment is an important part of the diagnostic in autistic spectrum disorders. As already mentioned, many children with autism may never learn to speak or show any attempt to communicate through compensating gestures or body expressions. Those children who acquire speech, approximately 50% of autistic individuals (Minshew *et al.*, 1992), show striking peculiarities such as unusual intonation, severe difficulties in social use of language (pragmatics), echolalia, neologisms, and pronominal reversal (e.g., using 'you' instead of 'I').

Comprehension of language is often more delayed than expression in individuals with autism. As reported by Bartak *et al.* (1977), children with autism show more severe deficits in speech comprehension when compared to other mentally retarded children, matched for nonverbal cognitive level, as well as to normally developing children (Tager-Flusberg, 1981). More recently, a study of 134 children with autism, without severe mental retardation, showed that word comprehension and sentence comprehension were more delayed than word production, in contrast with the performance of the normative sample as measured by the MacArthur Communicative Development Inventory (Charman *et al.*, 2003).

The phonological processing of 80 probands with ASD and 59 healthy controls was thoroughly assessed by Bishop *et al.* (2004). In that study, the parents of the participants completed a battery of tests including verbal and performance IQ, nonword repetition, nonsense passage reading, and a questionnaire about history of language and literacy problems. Interestingly, verbal IQ was the only measure to show any familiality within the index group. It appears that phonological processing impairments are not part of the ASD phenotype.

Pragmatic Language

Most individuals with a diagnosis of HFA and AS eventually develop good verbal skills (although delayed in HFA), with the ability to engage in relatively fluent and articulate speech, but still show marked deficits in pragmatic language abilities (i.e., the appropriate use of language in social context; Happé, 1993; Martin and McDonald, 2003). The language of individuals with AS is often described as pedantic, tangential, and overtalkative. These individuals also tend to have an overliteral understanding of what is said. In addition, individuals with AS have difficulty with the pragmatic interpretation of nonliteral utterances, such as metaphors, irony, and narrative humor (Happé, 1993; Martin and McDonald, 2003).

The ability to repair communicative breakdown is an important pragmatic skill. A number of studies have consistently shown that individuals with ASD generally recognize communicative breakdown and adequately respond to requests for clarifications (RQCL) with a variety of repair strategies. However, Volden (2004) has shown that children with ASD were more likely than language age-matched peers to respond to an RQCL with an inappropriate response.

Prosody

Segmental or articulatory aspects of speech have been reported to be generally appropriate for the developmental levels of people with HFA or AS (Bishop, 2003; Tager-Flusberg, 1981). However, abnormal suprasegmental aspects of speech, or prosody, constitute another characteristic frequently observed in autism (McCaleb and Prizant, 1985; McCann and Peppé, 2003; Rutherford *et al.*, 2002; Tager-Flusberg, 1981). Therefore, abnormal tone, pitch, and modulation of speech are common. Specifically, studies on the use of contrastive stress (a component of prosody used to highlight an important word in an utterance, as the focus of attention) showed that individuals with autism tend to use stress in an atypical way (McCaleb and Prizant, 1985). Children with autism misassigned stress twice as often as typically developing children. However, as contrastive stress is dependent on the pragmatic intention of the speaker, a deficit in that aspect of prosody may be in fact a pragmatic deficit. In addition, Rutherford *et al.* (2002) investigated the affective aspects of prosody. They asked participants to listen to 40 stimuli and then decide which of two adjectives best described the affective content of the stimuli. Their results suggest an impairment in the comprehension of prosodic affect in individuals with HFA and AS.

Verbal Semantic Processing

According to Charman *et al.* (2003), children with autism have a broadly similar pattern of acquisition of different word categories and types than typically developing children. Lopez and Leekam (2003) reported no difficulty in a word-priming task as HFA and typically developing children showed similar facilitation effects. They all identified words related to a prime faster than words preceded by a neutral prime.

The fact remains that specific difficulties in semantic aspects of language have been reported in individuals with autism. The observed impairments refer to the understanding of particular types of words (i.e., terms with social or emotional content). As measured by the British Picture Vocabulary Scale, individuals with autism showed specific difficulties in understanding emotion-related terms, but not with emotion-unrelated ones (Hobson and Lee, 1989). Other studies have reported a specific impairment with terms having deictic function (terms that change their meaning according to the context in which they are used, e.g., 'you,' 'now,' 'there,' 'this'; Charman *et al.*, 2003). Individuals with HFA also showed impairment in processing lexical ambiguous sentences (Jolliffe and Baron-Cohen, 1999) and interpretation of homographs (Happé, 1997); both tests involve the ability to adequately interpret the context in order to understand the meaning of the sentences.

Syntactic Aspect of Language

Syntactic development has not been well studied in autism. There is considerable individual variation in grammatical skill among children with autism. Many children never acquire productive syntax, but others show relatively high achievement (Rollins and Snow, 1998). Generally, in fluent HFA, sentences are grammatically intact. Dawson *et al.* (2004) and Rollins and Snow (1998) have shown that the establishment and manipulation of joint attention (the ability to coordinate attention between another person and an object or event of interest) may be a pragmatic skill prerequisite to the development of productive syntax. Their observations showed a strong association between pragmatic and morphosyntactic skills with autistic children who rarely established a joint focus of attention (Rollins and Snow, 1998).

Theoretical Understanding of Autism

Three hypotheses have been suggested to explain the cognitive and social features of autism. The first and most prominent position on the causation of social impairment in autistic disorder is the theory of mind hypothesis (ToM; i.e., a deficit in mental inference ability). This model suggests that an inability to attribute mental states to others (i.e., intentions, desires, feelings, and beliefs) leads to difficulties in effective communication and therefore in social interactions (Volkmar and Pauls, 2003). The ToM hypothesis has been widely studied using the standard False Belief Task (Martin and McDonald, 2003). Children with autism characteristically fail this test (Happé, 1993). In addition, Happé (1993) observed a strong association between ToM deficits and pragmatic comprehension in autism. The level of ToM complexity

(first- or second-order intentions) is related to the ability to understand similes (a literal level of comprehension), metaphors (first-order intention), or irony (second-order intention). However, Ozonoff *et al.* (1991) found that adolescents diagnosed with AS do not fail ToM tasks as children with autism do, suggesting that they possess an understanding of mental states. However, AS children still have major difficulties with social interactions. Despite strong evidence of an association between ToM deficits and communication difficulties in autism, this model is somewhat limited in the explanation of their impaired social interactions.

A second hypothesis, the weak central coherence hypothesis (WCC), was proposed by Frith (1989) to explain the tendencies of people with autism to pay preferential attention to parts rather than global coherent patterns of information. This hypothesis takes into account their pragmatic deficit – an impairment in the ability to use language appropriately in context – and also their superior capacities of recalling and processing information. Because this theory suggests that autistic individuals pay preferential attention to segments rather than whole features of objects, it can explain the superior performance of autistic individuals over normal healthy controls, as on the Block Design subtest of the Wechsler Adult Intelligence Scale (WAIS), for example. However, some authors have found that global processing was intact in individuals with autism (e.g., Ropar and Mitchell, 2001). Thus, the WCC remains a controversial hypothesis.

The impaired executive functions hypothesis in autism is a third explanatory perspective of a primarily social impairment. Executive functions underlie planning, social judgment, insight, inhibition, flexibility, and working memory mediated by the frontal lobes. Consequently, the obsessive desire for sameness, restricted interests, and stereotyped and rigid behaviors that characterize individuals with autism have been associated with a deficit in executive function skills, which may explain their poor social skills. In order to assess executive dysfunction in autism, Ozonoff and McEvoy (1994) used the Wisconsin Card Sorting Test (WCST) and the Tower of Hanoi Test. In contrast to typically developing controls, children with autism showed a poor performance on both of these executive function tests. Nevertheless, executive function deficits are not specific to autism and a more recent study showed that there exists an association between performance on the WCST and social impairment in autism, but no relationship with communication impairment (Liss *et al.*, 2001).

Treatment and Prognosis

Autism spectrum disorder is a lifelong disability. Although the symptoms may improve with age, most individuals with ASD or AS still show impairments in social and occupational functioning later in life. Onset of speech before the age of 5 (Venter *et al.*, 1992) and joint attention abilities (Dawson *et al.*, 2004) have been associated with a good prognosis. To date, there is no recognized medical treatment for the core deficits in autism. However, developmental, behavioral, and educational therapeutic programs have met with some success in helping reduce behavior problems and in fostering communication. Positive effects with significant improvement in language and social behavior have been reported with individual and intensive interventions dispensed early in childhood (Howling, 2003). However, clinical intervention should also focus on utterances that disrupt the conversational flow and that generate severe social penalties for the speaker with ASD (e.g., Volden, 2004).

See also: Landau-Klefner Syndrome; Williams Syndrome.

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Autolexical Syntax

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Though the name implies a syntactic theory, Autolexical Syntax (ALS) is actually a view of the relationship among the various components of a grammar only one of which is syntax. The name is justified, however, because in more mainstream grammatical theories much of what is included in syntax is seen in ALS as the province of other components, particularly morphology and semantics. In ALS distinct grammatical levels are described by autonomous grammars, called modules, each of which generates a set of well-formed representations at a single level.

The foundational article (Sadock, 1985) considered mainly the syntactic and morphological levels, applying the idea of autonomous syntactic and morphological representations to the analysis of two phenomena, cliticization and incorporation. Both were taken to be cases of significant, but allowable, structural discrepancy among independent representations provided by the syntactic and morphological modules. English auxiliary clitics, for example, were analyzed as syntactically identical to their free-verb counterparts, but, at the same time, as suffixes in the parallel morphology. The noun incorporating suffixes of West Greenlandic Inuit, or Kalaallisut (Inuktitut, Greenlandic), were taken to be transitive verbs in the syntax and, at the same time, verb-forming suffixes in the morphology. The position of both clitics and incorporating affixes thus presented mismatches in two autonomous modules, as illustrated in Figures 1 and 2, which are typical of work in the framework. Such diagrams present the structure of expressions in the form of two (or more) simultaneous trees, each one corresponding to an analysis in a single module.

(1) Jones or Smith's leaving.

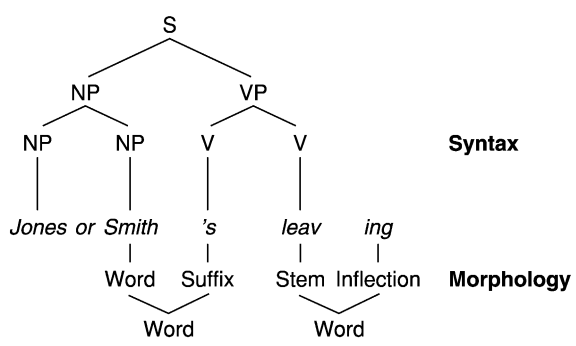

Figure 1 English Auxiliary Clitic.

(2) Hansi qernertu-mik qimme-qar-poq
Hans black-INSTR/SG dog-have-INDIC/3SG
'Hans has a black dog.'

One requirement for full grammaticality in this model is that an expression must be properly analyzable in each of the modules. In addition, ALS contains an interface component that ensures that various features of the autonomous representations correspond to some degree. Part of the interface includes the lexicon, since all of the representations of an expression must be compatible with the same set of lexical items. (Compare the idea of a numeration in the Minimalist Program.) In order to limit both the degree and kind of mismatches that the system allows, two quite specific interface constraints were suggested in Sadock (1985). Parts of morphological words are ordinarily not represented in the syntax at all, but if they are, the following interface principles were assumed: (1) The Cliticization Principle, which requires that a host word and a morphological clitic be linearly adjacent in syntax, and (2) The Incorporation Principle, which demands that a host stem and an affix or stem with which it combines morphologically be the head of a syntactic phrase and the head of its complement. (Compare head movement in the government and binding framework.) The interface was also charged with the task of adjudicating conflicts between modules. For example, one component may require the order B-A, and another the order A-B. A hierarchy of strength of components was proposed as the major feature of the system of conflict resolution: morphology outranks syntax and syntax outranks semantics. In cases of conflict the higher-ranked module wins out.

Subsequent research turned up a number of phenomena that did not fit the stringent requirements of

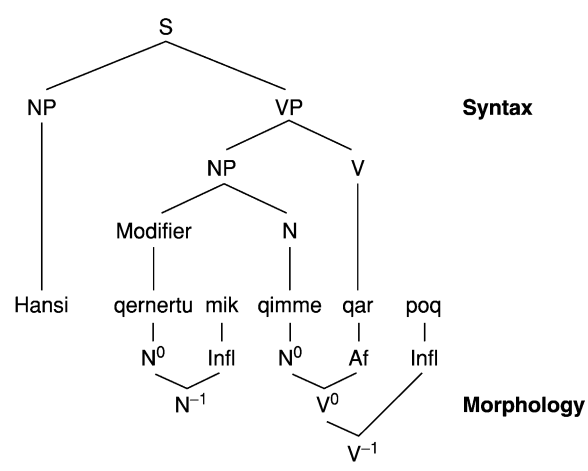

Figure 2 West Greenlandic (Inuktitut) Incorporation.

the Cliticization and Incorporation Principles. Hans Smessaert (1996), for example, described the system of West Flemish (Westrlaams) pronominal clitics, which attach to complementizers or to finite verbs, even if the position of the free correspondent of the clitic is quite some distance away, and even if there is an intervening head such as a preposition, as in the following example where the element *-der-* is a clitic in the morphology and the syntactic object of the stranded preposition *mee,* which is two words away from where it would be found as an independent NP:

(3) k-èn-der-ik ol mee èklapt
1sNOM-have- already with talked
PREP.OBJ-1sNOM
'*I have already talked to him/her.*'

Based on such examples, the interface constraints were generalized (and weakened). In their place, Sadock (1991) suggested a Weak and Strong L(inearity) C(onstraint) demanding two different degrees of correspondence in linear order between independent representations, and a Weak and Strong C(onstructional) I(ntegrity) C(onstraint), enforcing two different degrees of match in terms of the hierarchical position of elements found in both the syntax and morphology. The Strong LC is similar to the older Cliticization Constraint and the Strong CIC does much the same job as does the Incorporation Constraint, while the weak versions allow for a lesser degree of correspondence.

Further examples required even further generalization (and weakening) of the interface. In Sadock and Schiller (1993) all constraints on the interface were reduced to a single principle, the Generalized Interface Principle, which requires all structural features of two independent representations of an expression, including linear order, hierarchical position, and also category, to match as closely as the content of the levels and the demands of lexical items allow. While attractive in its generality, this principle does not actually place any absolute limits on discrepancies between modular representations. It does, however, make mismatches costly in terms of the lexical and/or grammatical specifications that would be required to override the default tendency toward full intermodular matching.

Subsequent work made it clear that other levels of organization beyond the classical trio of syntax, semantics, and morphology needed to be recognized. Woodbury (1996) and Chelliah (1996) drew an important distinction between morphology proper and morphophonology; Faarlund (1996) suggested an independent module representing expressions in terms of predicates and thematic roles.

During the 1990s the emphasis of work in ALS shifted from morphology-syntax discrepancies to syntax-semantics discrepancies, covering such topics as control phenomena, complementation, lexical categories, and compounding. More complex analyses that take account of the interaction of three or more components at the same time have also appeared. A number of languages have been addressed from an ALS perspective, including English, French, Japanese, Hungarian, Norwegian, Circassian (Adyghe), Bangla (Bengali), Welsh, Crow, and Hebrew.

Research in the late 1990s and early 2000s has emphasized individual constraints in addition to, or perhaps instead of, the systems of rules that constitute the modules. This work recognizes a number of distinct forces that compete for expression in surface form and therefore resembles Optimality Theory, although in the ALS framework the constraints are weighted rather than ranked and can exhibit additive effects. Intermediate degrees of grammaticality are recognized as cases in which conflicts among forces are unavoidable. The more serious the conflicting demands of the constraints are, the less acceptable the form is predicted to be.

Jackendoff (1997, 2002) has put forward a similar model which shares with the present model the idea of independent modules whose outputs are connected by an interface system, although the details of the various modules themselves differ somewhat from the ordinary practice of those working in ALS. His semantics, for example, are more similar to what is found in Faarlund (1996) than to the predicate-calculus semantics of most other works in ALS.

See also: Clitics; Incorporation; West Greenlandic.

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Autonomy

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The concept of autonomy is a recurrent topic in linguistics and has been hotly debated, especially with the advent of transformational generative grammar. At least three independent systems have been claimed to be autonomous: syntax, knowledge of language, and grammar. Together, they form the Autonomy Hypothesis, which, following Croft (1995) and Newmeyer (1998), can be formulated as follows:

1. Syntax is self-contained; it has its own primitives and makes no reference to semantic or discourse-related external elements.
2. Knowledge of language or competence is independent of language use or performance.
3. Grammar is a self-contained system that makes no reference to system-external factors.

The innateness hypothesis often associated with generative grammar is independent of the autonomy hypothesis and its three subcomponents. For example, the idea that grammar or language constitutes an autonomous entity (i.e., a module; subhypothesis 3 above) can be adopted within a nativist (Chomsky, 1972, 1975, 1986; Fodor, 1983), constructivist (Karmiloff-Smith, 1992), or behavioral/associationist conception of the mind. Development can thus be seen as involving a gradual process of modularization, through learning in the traditional sense, without necessarily postulating innate structure.

In addition, one can adopt subhypothesis 3 or subhypothesis 1 without necessarily subscribing to the proposal in subhypothesis 2. A case in point is Fodor's (1983) view of language as an input system, which challenges Chomsky's conception of language as both an input and an output system, with the latter clearly distinguishing knowledge of language from its implementation in language processing (see Newmeyer 1998: 25 for discussion).

Concentrating on the autonomy of syntax, Chomsky's point is that a sentence can be ungrammatical yet have meaning: although sentence (1a) is ill-formed in English, the sentence can easily be understood as signifying the same as its grammatical counterpart (1b).

(1a) *John his books sold.
(1b) John sold his books.

Second, a sentence can be grammatical but make very little sense. As a way of illustration, consider Chomsky's (in)famous example in (2):

(2) Colorless green ideas sleep furiously.

This sentence is certainly grammatical. Compare (2) with (3), which contains the same string of words, but in a different order. Native speakers of English converge in rejecting (3) as ungrammatical, whereas they see that in (2) no rule of grammar has been violated (the adjectives appear before the noun, the subject is placed before the verb, etc.).

(3) *Furiously sleep ideas green colorless.

These simple examples are often taken to show that there should be two linguistic levels of representation, one syntactic and the other semantic. The implication that this view has for the pairing between structure and meaning is that there is no one-to-one correspondence between syntax and semantics. Syntax has its own set of principles that are independent from semantics. A case in point is the behavior of weak islands. In the generative literature, the split construction in (4a) is taken to be perfectly interpretable with the reading in (4b) (Rizzi, 1990). Yet the sentence is ill-formed because it violated a syntactic principle, that of locality. The negative element 'pas' (not) is of the same type as 'combien' (how many) and is thus closer to its target (i.e., the left-most position in the sentence) than the interrogative operator.

(4a) Combien as-tu lu de livres?
how-many have-you read of books
'How many books have you read?'
(4b) Which is the number x, x a book, such that you have read x.

Most (if not all) functionalists reject the contention that there is no one-to-one mapping between form and interpretation, preferring a one-to-one mapping,

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and accusing formalists in passing of having a syntax bias. However, it must be noted that the term 'formalist,' although often used by functionalists (sometimes with derogatory force) to describe generativists, is odd in this context. This is because one can be a formalist without subscribing to the two-level hypothesis. Montague's grammar (Montague, 1974), for instance, and the semantic tradition that stems from it, is purely formal, and its practitioners are typical formalists, yet for most such semanticists, there is a direct mapping between syntax and semantics. See Sadock (2003) for ample discussion.

Nevertheless, it must be added that, as perspicaciously mentioned by Newmeyer (1998), the term 'formalist' is ambiguous – it can refer either to 'form' as in syntax (as opposed to meaning) or 'form' as in 'formal*ized*' or 'formaliz*able*.' Quoting Newmeyer (1998: 8): "While functionalists have not produced formalized theories, many agree that in principle there is nothing about their orientation that should prevent them (someday) from doing so" (Li, 1976; Croft, 1995; Bybee, 1998). It is fair to say, however, that many functionalists themselves use the term 'formalist' negatively in both senses of the word.

Although the position of functionalists on form is often greatly exaggerated, the idea that Chomskyan linguistics pays no attention to function is also a caricature. In recent years, Chomsky (1995, 2000, 2001) has put forward the hypothesis that movement phenomena are driven by syntax external factors (including discourse notions among others). However, syntax being a perfect system (in the sense that it is designed to counter external pressures) has at its disposal features that are responsible for displacement. These features are formal features: they must be checked and erased as the derivation proceeds. They are, in other words, the formal encapsulation of function. The autonomy of syntax is therefore as relevant a topic for mainstream generative linguistics as it was 40 years ago.

In recent years, the autonomy of syntax has nonetheless appeared to be under threat within some generative circles. This is perhaps most obvious in the work of Fox (1995, 2000) and Reinhart (1995), in which Quantifier Raising (QR) may only apply to derive a L(ogical) F(orm) with interpretation α if α cannot be derived without that application of QR. In other words, QR applies only if it changes the *in situ* scope relations, allowing a kind of leakage of the semantics into the syntax.

One way to solve the leakage problem (assuming it is a problem) is to postulate a feature as part of the Numeration. This is exactly what Chomsky (1995) does when he suggests that QR involves the raising of a quantificational feature to some functional head (T or v) that is a potential host. The idea is that the host has an optional affix feature allowing it to host. This proposal is in accordance with the basic minimalist requirement that the operation Move is motivated by feature checking. In this view, optionals are built into the lexicon, and there is no sense that the semantics are looking down at the syntax. The operation QR is dependent on the insertion of a feature, and this is a lexical decision before, or at least while, the derivation proceeds.

Less discussed, at least in explicit terms, is the threat to the autonomy of syntax from the so-called cartography approach (at least in its strong form). Following the work of Rizzi (1997) and many others, researchers have argued in recent years that CP (Complementizer Phrase), and perhaps DP (Determiner Phrase), should be split into several distinct positions. This is an empirical domain of research, and it has achieved great results, showing for instance that focus and topic positions should be syntactic positions in their own rights. However some take the view that *a priori*, each semantic or pragmatic function should have a syntactic position. For example, Benincá and Poletto (2004: 1) say that: "One assumption that seems natural to us, and possibly valid even beyond the immediate scope of this article, is that there is a one-to-one relation between position and function." In the same vein, they declare (2004: 1): "There is no limit, in our view, as to how many these projections will ultimately be, provided that there is syntactic and semantic justification for them."

Although it is from a different angle, this line of research resembles that of Diesing (1992), who argues that there is a strict mapping between syntactic position and interpretation (in her view, a presuppositional NP (Noun Phrase) must appear in high IP (Inflectional Phrase)-external position, whereas a nonpresuppositional NP must appear in a low IP-internal position (see also de Hoop [1992], whose view on the syntax-semantics mapping is less strict, but who nevertheless associates presuppositional NPs with high NP positions). Although cases in which there is a one-to-one relation between position and function abound, there are also many cases in which this is not the case, and in which mismatches occur (see Francis and Michaelis [2003] for examples and discussion). To conclude, this means that position and function are not necessarily in a one-to-one correspondence and that the autonomy of syntax thesis is, therefore, still well-supported.

See also: Associationism and Connectionism; Associationism and Connectionism; Constructivism; Constructivism; E-Language versus I-Language; Functionalist Theories of

Language; Generative Grammar; Language of Thought; Modularity of Mind and Language; Modularity; Scope and Binding: Semantic Aspects.

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Autosegmental Phonology

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Introduction

The central tenet of autosegmental phonology is that sounds, or, with a technical term, segments (or phonemes) can be split up into smaller units, which can be independently manipulated by phonological operations such as deletion or spreading. A segment is the abstract (or mental) representation of a sound that is postulated in phonology. Speakers of a language are able to split up the continuous speech stream into such smaller units: for instance, although no single sound [t] is ever exactly the same phonetically, hearers are almost always able to recognize and map these different perceptual constructs onto a single segment, notated /t/. This is graphically depicted in (1):

(1)

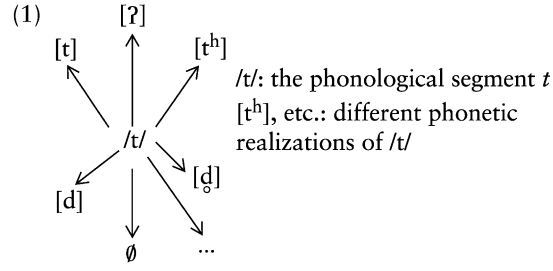

Phonologists analyze the different shapes a phonological segment can take in different phonetic circumstances (e.g., before a vowel, after a nasal, when unstressed, in rapid speech, when whispered, etc.), and propose rules to describe the distribution of

Language; Generative Grammar; Language of Thought; Modularity of Mind and Language; Modularity; Scope and Binding: Semantic Aspects.

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Introduction

The central tenet of autosegmental phonology is that sounds, or, with a technical term, segments (or phonemes) can be split up into smaller units, which can be independently manipulated by phonological operations such as deletion or spreading. A segment is the abstract (or mental) representation of a sound that is postulated in phonology. Speakers of a language are able to split up the continuous speech stream into such smaller units: for instance, although no single sound [t] is ever exactly the same phonetically, hearers are almost always able to recognize and map these different perceptual constructs onto a single segment, notated /t/. This is graphically depicted in (1):

(1)

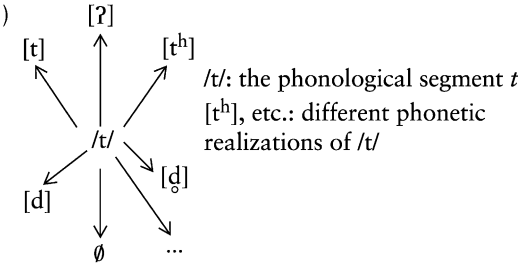

Phonologists analyze the different shapes a phonological segment can take in different phonetic circumstances (e.g., before a vowel, after a nasal, when unstressed, in rapid speech, when whispered, etc.), and propose rules to describe the distribution of

different shapes a segment can take, taking into account, for instance, phonetic environment (e.g., word- or syllable-initial consonants are typically realized differently from syllable-final ones; vowels that are stressed differ from vowels that do not have stress). Similar relations between phonological segments and phonetic realizations may also be investigated from a historical point of view: the relations in (1) might also be conceived of as particular instances of historical changes. To the extent that such rules and changes are uniform across languages, they represent important insights into the way in which languages of the world work and how they change. Many rules of realizations are recurrent across languages, but there are also language-particular oddities, which deserve special attention and may as a result become the topic of debate. Research of this type has resulted in the insight that segments often change in small ways, adapting to part of the phonetic environment in which they come to appear, e.g., as a result of morphological concatenation. For instance, a stop that appears before or after a nasal may take over the voicing property of the nasal without becoming a full nasal itself (cf. also below). In a sense, the object of autosegmental phonology is to find out what properties (e.g., voicing, nasality, place of articulation, etc.) can be passed on from one segment to another and what circumstances favor or disfavor sharing such properties (e.g., referring to adjacency of segments as a condition for such processes). In what follows, these aspects will be explored in more detail.

Segments into Features

In this section we will investigate the evidence for the view that phonological segments such as /t/ or /ɛ/ can be decomposed. Questions that arise as a matter of course in such an investigation are: what are the smaller units that make up such a segment? and what kinds of manipulations are possible on these units? A widely accepted answer to the first question is that the smaller units are distinctive features, such as [±voice], [±round], etc. The most comprehensive theory of *distinctive features* is probably that offered by Noam Chomsky and Morris Halle in *The sound pattern of English* (*SPE*; Chomsky and Halle, 1968). In their proposal, which was enormously influential, segments are construed as bundles of distinctive features, such as exemplified for /i/ in (2) (see, for instance, Chomsky and Halle, 1968: 176–177 for a chart of all phonological segments of English analyzed in terms of distinctive features):

(2) /i/

$$\begin{bmatrix} +\text{high} \\ -\text{low} \\ -\text{back} \\ -\text{round} \\ -\text{cons} \\ -\text{nasal} \\ +\text{cont} \\ +\text{tense} \\ \ldots \end{bmatrix}$$

However, the precise characterization of the set of distinctive features is a matter of considerable controversy. In the theory of *SPE*, and lots of work associated with the theory of *generative phonology*, all features can have two values: they are either 'plus' (e.g., [+nasal]) or 'minus' (e.g., [−cont]), and there is no particular structure to the feature set, as (2) clearly shows; all features are formally unrelated to each other, although traditionally (and also in *SPE*) groups of features such as manner features, place of articulation features, and major class features are distinguished.

In the time after 1968, it became apparent that although for some features two values are appropriate, there are also properties of phonological segments that are better expressed by single-valued features, such as a segment that may be a coronal one or not, or whether it is nasal. Indeed, some frameworks have tried to eliminate all binary features in favor of single-valued ones (e.g., dependency phonology, see). We will sidestep this issue here, and instead explore the consequences of the hypothesis that segments can be split up into smaller parts.

Autosegmental Phonology

The first property of phonological segments that was analyzed as a smaller unit that could be manipulated independently was in fact a suprasegmental property, *viz. tone*. John Goldsmith suggested the term 'autosegmental phonology' in his 1976 MIT dissertation that bears the same name, and which dealt with *tonal* phenomena in a number of Bantu languages, and also with a number of other topics that he related to this, such as stress in English and vowel harmony in other languages. In work partly building on earlier results of Bill Leben (Leben, 1973), Goldsmith had the insight that the tones in these languages displayed independent behavior *vis-à-vis* the vowels they normally appeared on. Sometimes a vowel was deleted but the tone that originally appeared on that vowel was saved, and appeared on another vowel in the same

word; sometimes tones disappeared leaving their vowels intact. Finally, it appeared that in such languages strings of tones had independent meaning, i.e., played a role in the grammar without necessarily being associated with particular vowels.

Consider the case of Lomongo (Mongo-Nkundu; a Niger-Congo language spoken in the Democratic Republic of Congo), for instance, in which a rule of intervocalic b-deletion as well as a rule of vowel elision conspire to delete the final vowel of the first part and the initial consonant of the second one in constructions such as the following (after Goldsmith, 1976 [1979]: 33), following Lovins, 1971a, 1971b, glosses checked with the aid of Hulstaert, 1957):

(3)	bàlónó	bǎkáé	→	bàlónǎkáé	'his book'
	book	his			
	bánà	bǎmǒ	→	bánǎmǒ	'other children'
	children	other			
	bǫ̀mǫ̀	bòtámbá	→	bǫ̀mǫ̀támbá	'another tree'
	other	tree			
	bǎtswá là	èmí	→	bǎtswêmí	'you who lead me away'
	go with	me			

In the first of the forms in (3) the final *o* vowel, which has a High tone, is deleted from the first word. The High tone, however, survives this operation and ends up on the first vowel of the second word, the *a* vowel, which already had a Low-High contour tone, and which, as a result, ends up having a High-Low-High contour. In the second form, the final *a* vowel has a Low tone. After deletion of this vowel, no effect is seen on the first vowel of the second part, since the first vowel of this part of the construction has a Low-High contour. Apparently, the Low-Low-High tone structure is automatically converted into, or interpreted as a Low-High contour. This type of automatic operation, in which two identical tones are simplified into a single one, also received a great deal of attention in Goldsmith's work and that of others (e.g., Leben, 1973), and became known as the Obligatory Contour Principle (see also McCarthy, 1986). In the final two forms in (3), the tone preservation (or tone stability) effects are again obvious: in the last form, the three tones (High-Low-Low) on the final vowel of *bǎtswá* and on *là* together make up a High-Low contour on the output form. Thus, in all these forms, the tones are independent of the vowels they occur on: crucially, when a vowel is deleted, this does not necessarily mean that *all* its properties are deleted: in this case, its tonal features remain behind and end up on a different vowel. Goldsmith proposed to formalize this independence by placing different properties of the segment on different autosegmental levels, which are linked by association lines (see e.g., Goldsmith, 1976 [1979]: 19, 23).

We will not go into notational issues, but operations such as tone spreading, as in (3) above, are formalized as follows:

(4)

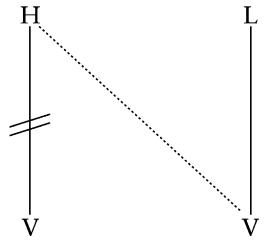

In this situation, the High tone from the first vowel is delinked, indicated by the broken association line. Rather than being deleted, it re-associates with the vowel on the right, leading to a High-Low tone contour on the second vowel.

At this point, it should be mentioned that the idea of separate levels for separate phonological properties was not new. In his description of the Chinese monosyllable, J. R. Firth (1937) added as a component of phonological description "phonetic properties that must be considered as properties of entire syllables rather than of designated positions within them" (Langendoen, 1968: 50). Obviously, tone was considered to be such a feature, but 'yotization' (i.e., palatalization) and 'labiovelarization' could be considered in the same way (Firth and Rogers, 1937: 91). Another proposal that had similarities with Goldsmith's proposal was made by Zellig Harris and Bernard Bloch (e.g., Harris, 1944; Bloch, 1948), which identifies 'long components', which are phonetic properties that may extend over a number of segments, such as voicelessness or continuancy. See Goldsmith (1976 [1979]: 5ff) for discussion.

Already in Goldsmith's dissertation, the idea of autonomous features was applied to phenomena other than tone. Goldsmith (1976 [1979]: 150 ff) discusses vowel harmony, which refers to the phenomenon that vowels in a certain domain (usually the phonological word) must agree for a specific feature, i.e., all bear the same value for roundness, height, backness, or a combination of features. Vowel harmony occurs in many African languages, but also in others, such as Turkish and Finnish. To describe *vowel harmony*, the idea that distinctive features are not necessarily part of individual segments is also extremely useful: rather in such languages, distinctive features such as [+round] or [−back] are properties of **larger** domains than individual segments, such as the word, and are therefore allowed to link (formally in the same way as

the tone in [4] links to the vowel) to all available positions in the word. This is exemplified for front/back harmony in (5):

(5)

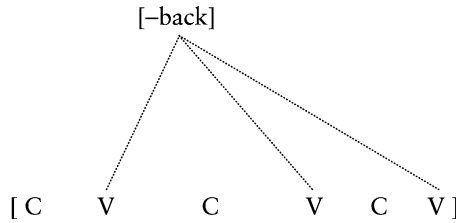

Cases of harmony therefore provided evidence for which features could display autosegmental behavior, and the extent to which different types of vowel harmony are found (cf. van der Hulst and van de Weijer, 1995 for an overview of issues involved); these provide evidence for the existence and autosegmental activity of different distinctive features. Harmony-like behavior has also been reported for some consonantal properties, such as anteriority (e.g., Shaw, 1991), while particular laryngeal properties, such as voicing, aspiration, and glottalization, also display cross-consonantal harmony-like effects (for instance, these properties may be tolerated if and only if they appear on all consonants in a word; see, e.g., Kehrein, 2002: Chap. 3).

Feature Grouping

The discussion in the previous section has shown that there are a number of features that can display independent, autosegmental behavior. One aspect of feature theory, already hinted at above, has not thus far been captured by autosegmental theory, namely that different features may delink or assimilate **together**, i.e., not alone but together with features of the same kind. A straightforward example of this involves Place assimilation. Many languages have a rule in which a coronal nasal assimilates in place of articulation to a following stop: this may happen in the morphology or in phrasal phonology, as the examples in (6) show:

(6a) *in+possible* → *i*[m]*possible*
in+consistent → *i*[ŋ]*consistent*
in+tolerable → *i*[n]*tolerable*

(6b) *i*[m] *Boston*
i[ŋ] *Goa*
i[n] *Toledo*

Obviously what is involved in these cases is autosegmental spreading of *all and only* Place features from the stop to the nasal (cf. [4] above for the similarity in formalism):

(7)

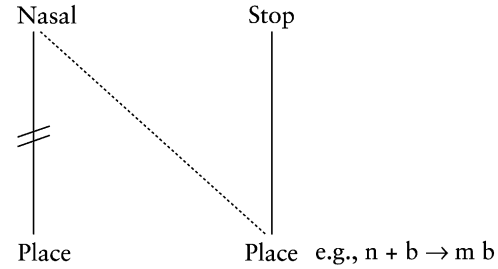

Obviously, we wish to maintain that the **same** rule takes place for all possible processes of Place assimilation in a particular language, i.e., we want to read the label 'Place' in representations such as (7) to stand for any place feature, whether this refers to labial, coronal, dorsal place, or in fact to any other place of articulation. One influential way in which this insight has been captured is by assuming that individual Place features are attached to a higher, organizing Place **node**, just like there is a higher node, usually referred to as the **root**, which dominates **all** features, so that manipulations of entire segments, such as deletion or insertion, can also be described in the autosegmental format that we have used so far.

Another situation in which an organizing node is useful is when all features of the same type are disallowed in particular positions. Consider the case of languages like Thai, for instance, which have a contrast between aspirated, voiced, and voiceless stops in the initial position of the word, but disallow any contrasts at the end of the syllable. For such languages, it may be assumed that any Laryngeal feature (whether this refers to voicing, aspiration or – for other languages – glottalization) is disallowed in syllable-final position. Here are some standard examples from Thai, in which initial voiced, voiceless, and aspirated stops contrast (from Kenstowicz, 1994: 38):

(8) dam 'black'
tam 'to pound'
t^ham 'to do'

In final position in Thai, only a plain voiceless stop [t] is permitted. To describe this in a uniform manner, the autosegmental formalism may incorporate a Laryngeal node, which is then delinked, or disallowed, in syllable-final position:

(9a) Delinking of a final Laryngeal node

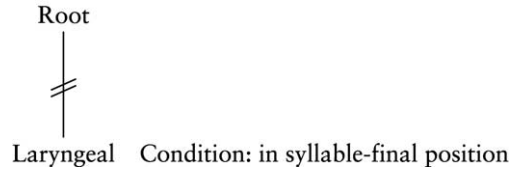

(9b) Constraint against a final Laryngeal node

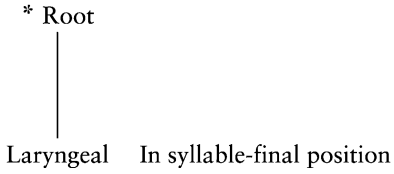

The constraint in (9b) says that representations with a final Laryngeal node are ill-formed (cf. Lombardi, 1995, 1999 for the implications of this line of inquiry).

The idea of autosegmental features that are organized with intermediate nodes, such as Place and Laryngeal, leads to a tree-like model of the segment. For the past 20 years, there has been a great deal of discussion about the exact species of the tree, centering around such questions as which features exactly are needed, which organizing nodes are needed, and the way in which the highest node (the root) links to higher-level prosodic structure. Probably the most widely cited and influential proposal was that made by Elisabeth Sagey in her 1986 MIT dissertation (Sagey, 1986; see also Clements, 1985). However, the debate as to whether there is one geometry for all languages continues to the present day, although in recent years this debate has been overshadowed somewhat by controversies regarding the content and nature of phonological manipulations: are these rule-like, autosegmental operations (as in [9a] above), or is the relation between underlying representation and output form best captured by way of a hierarchy of mutually ordered constraints (such as [9b] above), as proposed in recent work within the *optimality theory* framework (Prince and Smolensky, 1993, and much later work)? For many cases, the distinction may not matter, in the sense that autosegmental representations may play similar roles in either rules or constraints (as [9] shows), although the specific role of relations between features, both within the segment and across segments, remains a topic of active inquiry.

See also: Assimilation; Distinctive Features; Phonetics: Overview; Phonology: Overview; Pragmatics: Optimality Theory; Tone: Phonology.

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Avestan

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Avestan is the language of the most ancient collection of texts sacred to the Zoroastrian religion. It represents the Old Iranian stage of the Iranian language family, and provides, along with Old Persian, the earliest evidence for the Iranian branch of the Indo-Iranian and Indo-European language families. The language is known only via a defective medieval manuscript tradition, which was preserved in Iran and also in India, to which adherents of the Zoroastrian faith, the Parsis, emigrated according to tradition in 10th-century A.D. Hence its study presents a range of philological, textual, and interpretative problems.

Two forms of the language are documented: Old Avestan (OAv.; sometimes called Gathic Avestan) and Younger Avestan (YAv.). Opinion is at present divided as to whether they represent earlier and later forms of precisely the same language, or whether dialect differences are also involved. A difficulty is that OAv. is known only from a very small number of texts: the Gāthās, seventeen complex poems in five different meters attributed to the prophet Zarathuštra himself, which still present many problems of interpretation; two short sacred prayers; and a traditional liturgy in seven sections, the Yasna Haptaŋhāiti. The most extensive surviving Avestan texts, that is, the other parts of the 72-chapter Yasna, the lengthy Yašts, which honor divinities such as Mithra and Anāhitā, and the Vīdēvdāt, 'the Law which rejects False Gods' are composed in YAv. A few short sections of the Yasna are in YAv. with an artificial veneer of OAv. phonological features (pseudo-OAv.). Faulty grammar in parts of the Avesta may suggest that composition continued at a stage when Avestan was no longer a living language, but the text may also have deteriorated during transmission.

Absolute dates for Avestan are entirely lacking. The date of the prophet Zarathuštra is still debated, but many scholars agree that the Gāthās must be roughly contemporary with the RigVeda in India (i.e., toward the end of the second millennium B.C.), as OAv. morphology and syntax are on a par with those of the earliest Vedic language. YAv. shows many simplifications, particularly in its verb system, and innovations, and the text collection as a whole must span several centuries.

Avestan diverges from Old Persian in some important sound changes (IE **ḱ, ǵ, ǵh* > Av. *s, z, z*, but > OP *θ, d* [δ], *d* [δ]; IE **ḱu̯, ǵu̯* > Av. *sp, zb*, but OP *s, z*), but in these respects it agrees with the majority of Iranian languages. It is often described as East Iranian because geographical names found in the YAv. texts refer to the region of present day Afghanistan and East Iran and none refer to West Iran. However, Avestan does not share in the most characteristic features known from Middle Iranian languages of the extreme East, such as Khotanese. Rather it shows several phonological developments (if these do indeed belong to the original Avestan language) that are unparalleled elsewhere in Iranian (**-aha-* > *-aŋha-*, **-ft-* > *-pt-*, **-rt-* > *-š̰-* when the syllable was accented, etc.). No Iranian language known from later times can be identified as a direct descendant of Avestan.

The Avestan texts were composed orally, and they were recited and transmitted orally by the Zoroastrian priesthood in different regions of Iran, but it is hard, if not impossible, to assign specific features of Avestan to influence from specific local languages. The written recension was only made during the Sasanian period (224–651 A.D.), when Zoroastrianism flourished as the state religion. An elaborate alphabet of 53 signs, including 16 for vowels, was invented on the basis of the cursive Zoroastrian Pahlavi script and the Christian Psalter script (both derived from Aramaic) in order to record as precisely as possible the traditional pronunciation of Avestan, which had ceased to be a living language several centuries earlier. Avestan orthography is not based on phonemic principles, but it conveys a wealth of information about allophonic variation. Consequently, Avestan words often look very different from their exact counterparts in Vedic, even though the languages are closely related; contrast YAv. *hāuuōiia-*: Vedic *savya-* 'left' or OAv. *məŋghī*: Vedic *maṁsi* 'I thought.' Moreover, morphological regularities within the Avestan language itself are often obscured (e.g., *barahi, baraiti, bareṇti* represent 2 sg., 3sg., 3pl. present active based on the inherited thematic stem *bara-* 'bear,' cf. Skt. *bharasi, bharati, bharanti*).

The Avestan manuscripts, of which the earliest dates from 13th-century A.D., reflect a written tradition that barely survived the centuries following the Islamic conquest. At one stage only a single manuscript existed for each part of the extant Avesta, and approximately three-quarters of the Avesta as described in the Sasanian Zoroastrian books has been lost. Recent scholarship has made progress in reconstructing the spellings of the 'Sasanian Archetype' text, but it is still often difficult to determine which features belong to the original Avestan language and which arose in the course of either oral or

written transmission. According to some scholars, the phonology of OAv. was close to that of Proto-Iranian, and Gathic meter may provide evidence for archaic features such as the vocalization of semivowels according to Sievers' Law, and a hiatus between vowels caused by the recent loss of laryngeals.

The inflectional morphology of both OAv. and YAv. is extremely rich. For nouns, adjectives and pronouns, the full set of eight IE case inflections and three numbers remain alive, with a huge range of nominal stem types, and some ancient irregular paradigms, such as YAv. *paṇtå̊* (nom.), *paϑō* (gen.) 'path'; OAv. *huuarə* (nom.), *xᵛəṇg* (gen.) 'sun'; OAv. *aogō* (nom.), *aojaŋhā* (instr.) 'strength.' The OAv. enclitic acc. pl. personal pronouns *nå̊* 'us,' *vå̊* 'you' (cf. Latin *nōs, vōs*) are an archaism not found elsewhere in Indo-Iranian. At the same time, there are innovations, such as the OAv. (and YAv.) nom. pl. masc. ending *–ā* in thematic stems (more frequent than inherited *-å̊*, *-å̊ŋhō*), and the creation in YAv. of a distinct ablative singular inflectional ending for all nominal classes.

In the OAv. verb system all the IE tense-aspect stems (present, aorist, perfect) are fully employed. YAv. has a much simplified system where present and preterite are based on a single stem (the inherited present) and distinguished by different inflectional endings. The inherited augment *a-* rarely appears, and its function in Av. is problematic. Although thematic presents are productive, the rarer types of athematic present are well represented, notably acrostatic root presents (OAv. *stāumī* 'I praise,' *aogədā* 'he said,' YAv. *å̊ŋhāire* 'they sit'). Modal forms (subjunctives, optatives, and imperatives) are frequent at all stages.

The Avestan lexicon is remarkably free of loanwords from non-Iranian languages, and it preserves some IE lexemes that were lost in Indo-Aryan, e.g., *varəz-* 'to work,' *vad-* 'to lead.' Contrasting vocabulary items for good (ahuric) versus evil (daevic) beings reflect Zoroastrian dualism but their linguistic origins are complex (e.g., *staman-/ zafar-* 'mouth,' *dōiϑra-/ aši-* 'eye,' *aog-/ dauu-* 'to speak,' *tak-/ zbar-* 'to run,' *nmāna-/ gərəδa-* 'house,' *ϑβərəs-/ karət-* 'to fashion').

See also: Indo–European Languages; Indo–Iranian; Iranian Languages; Sanskrit.

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Aymara

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The name 'Aymara' is used for one of the most important native languages of South America. It is spoken by approximately 2 000 000 people in three countries: Bolivia (mainly in the department (administrative division) of La Paz, but also in parts of Cochabamba, Oruro, and Potosí), Chile (in the highlands of Tarapacá), and Peru (in the departments of Moquegua, Puno, and Tacna). Aymara is closely related to the Jaqaru language – spoken by less than a 1000 people, mainly in the village of Tupe in the province of Yauyos (department of Lima) in central Peru – as well as to Cauqui, spoken by a few individuals in the nearby village of Cachuy. Together, the languages Aymara, Jaqaru, and Cauqui form a family that has variously been called 'Jaqi' (Hardman, 1978), 'Aru' (Torero, 1972), 'Aimara' (Cerrón-Palomino, 2000), and 'Aymaran,' which is the name used in this article.

The Aymaran language family has no proved external relatives. There are close and detailed similarities in the phonological, structural, and lexical domains with the neighboring Quechua language group; the two groups also share more than 20% of their lexicon. This situation suggests a protracted period of interaction between the underlying protolanguages of both Aymaran and Quechua. The interaction may have continued on a local basis during the further

written transmission. According to some scholars, the phonology of OAv. was close to that of Proto-Iranian, and Gathic meter may provide evidence for archaic features such as the vocalization of semivowels according to Sievers' Law, and a hiatus between vowels caused by the recent loss of laryngeals.

The inflectional morphology of both OAv. and YAv. is extremely rich. For nouns, adjectives and pronouns, the full set of eight IE case inflections and three numbers remain alive, with a huge range of nominal stem types, and some ancient irregular paradigms, such as YAv. *paṇtå̊* (nom.), *paϑō* (gen.) 'path'; OAv. *huuarə* (nom.), *xᵛəṇg* (gen.) 'sun'; OAv. *aogō* (nom.), *aojaŋhā* (instr.) 'strength.' The OAv. enclitic acc. pl. personal pronouns *nå̊* 'us,' *vå̊* 'you' (cf. Latin *nōs, vōs*) are an archaism not found elsewhere in Indo-Iranian. At the same time, there are innovations, such as the OAv. (and YAv.) nom. pl. masc. ending *–ā* in thematic stems (more frequent than inherited *-å̊*, *-å̊ŋhō*), and the creation in YAv. of a distinct ablative singular inflectional ending for all nominal classes.

In the OAv. verb system all the IE tense-aspect stems (present, aorist, perfect) are fully employed. YAv. has a much simplified system where present and preterite are based on a single stem (the inherited present) and distinguished by different inflectional endings. The inherited augment *a-* rarely appears, and its function in Av. is problematic. Although thematic presents are productive, the rarer types of athematic present are well represented, notably acrostatic root presents (OAv. *stāumī* 'I praise,' *aogədā* 'he said,' YAv. *å̊ŋhāire* 'they sit'). Modal forms (subjunctives, optatives, and imperatives) are frequent at all stages.

The Avestan lexicon is remarkably free of loanwords from non-Iranian languages, and it preserves some IE lexemes that were lost in Indo-Aryan, e.g., *varəz-* 'to work,' *vad-* 'to lead.' Contrasting vocabulary items for good (ahuric) versus evil (daevic) beings reflect Zoroastrian dualism but their linguistic origins are complex (e.g., *staman-/ zafar-* 'mouth,' *dōiϑra-/ aši-* 'eye,' *aog-/ dauu-* 'to speak,' *tak-/ zbar-* 'to run,' *nmāna-/ gərəδa-* 'house,' *ϑβərəs-/ karət-* 'to fashion').

See also: Indo–European Languages; Indo–Iranian; Iranian Languages; Sanskrit.

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Aymara

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The Aymaran language family has no proved external relatives. There are close and detailed similarities in the phonological, structural, and lexical domains with the neighboring Quechua language group; the two groups also share more than 20% of their lexicon. This situation suggests a protracted period of interaction between the underlying protolanguages of both Aymaran and Quechua. The interaction may have continued on a local basis during the further

development and expansion of both language groups. The close similarities between the two language groups have often been interpreted as a proof of common origin (the so-called Quechumaran hypothesis). Nevertheless, most similarities are attributable to linguistic convergence, making it difficult to distinguish between borrowed and inherited material (*see* **Andean Languages; Quechua**).

Before 1600, Aymara and related dialects were widely spoken in southern Peru and in the eastern and southern Bolivian highlands, where Quechua is now the dominant language. The historical influence of Aymara through borrowing can be appreciated from the spread of Aymara numerals into the southern cone of South America (Mapuche) and into the Amazonian basin (Tacanan languages). The name 'Aymara' is probably derived from a province or ethnic group located in the present-day Peruvian department of Apurimac (now Quechua speaking). The study of the Aymara language received an important stimulus in the 17th century when the Jesuit order established a mission in Juli, on the southwestern shore of Lake Titicaca. The first grammar and dictionary of Aymara were written in 1603 and 1612, respectively, by a Jesuit, Ludovico Bertonio.

The Aymara vowel system consists of three vowels (*a*, *i*, *u*), of which the high vowels are lowered to (*e*, *o*) next to a uvular consonant. There is a distinction of vowel length that is mainly used in morphology, but also in a few lexical roots. Stops and affricates are normally voiceless; they can be plain, glottalized, or aspirated. There is a contrast between velar and uvular consonants. Dialects in the border area of Bolivia, Chile, and Peru have a distinctive velar nasal consonant. Stress is predictable and is located on the penultimate syllable or mora. All roots are vowel final. However, the final vowel of a nominal expression is regularly deleted before pause. Although the structure of Aymara roots and suffixes is basically simple, surface forms can be complex due to the fact that many suffixes trigger the suppression of a preceding vowel. This suppression must be treated as a formal property of the suffix in question, because there are no synchronically valid phonological rules to account for it. In some cases, root-interior vowels are also suppressed under similar circumstances. These different types of vowel suppression produce elaborate consonant clusters, as illustrated in *han unxtkiri* 'without moving,' 'immobile,' which can be analyzed as follows (vowels between parentheses are suppressed; PROG, progressive; AGT, agent; NOM, nominalizer):

(1) han(i) un(u)q(i)-t(a)-k(a)-iri
not rock-upward/begin-PROG-AGT.NOM

The combination *unxta-* (< unuqi-ta-) is fixed and is interpreted as 'to move slightly.'

Aymara has an agglutinating structure mainly based on suffixation; there are no prefixes at all. The morphology is complex, but regular. Words containing as many as nine consecutive suffixes are no exception (the fixed combination *aru-si-* means 'to speak'; INCL, inclusive; REFL, reflexive; PL, plural; COMPL, completive; BEN, benefactive):

(2) hiwas-kam(a) aru-s(i)-kipa-si-p-xa-ña-naka-taki-sa
we(INCL)-case:among speak-REFL-turn-REFL-PL-COMPL-NOM-PL-case:BEN-too
'so that we are able to communicate among ourselves'

Verb-final order is obligatory in dependent clauses and is the preferred order in full sentences. In noun phrases, all modifiers precede their heads. Nouns can be marked for case, number (plural), and person of possessor. The overall structure of the language is nominative–accusative. Case is expressed by suffixes, but the accusative is marked by eliminating a stem-final vowel. There is a four-term pronominal system consisting of speaker (*naya* 'I'), addressee (*huma* 'you'), third person (*hupa* 'he/she'), and an inclusive plural that comprises both speaker and addressee (*hiwasa*). This system is also reflected in nominal possession and in verbal inflection.

Verbs in Aymara exhibit a rich derivational morphology, including causative, reflexive–reciprocal, spatial direction, number of subject, aspect, speaker orientation ('hither'), and several other options. Tense, mood, and personal reference, both of the subject and of a human (in)direct object, are combined in complex portmanteau endings, which are a hurdle for the nonnative learner. In these endings (nine for each tense or mood paradigm), a third-person object is not explicitly indicated. Characteristic for the Aymara verb is the existence of evidential distinctions (inference, conjecture, nonpersonal witness, etc.), for which the Aymara society is highly sensitive.

Verbalizations – copula 'to be,' locative verb 'to be at' – are indicated morphologically, the former by vowel lengthening (1POSS, first-person possessor; VERBAL, verbalizer; 2SUB, second-person subject; ASSERT, assertive):

(3) hič^{h}a-x(a) wawa-ha-:-x(a)-ta-wa.
now-topic child–1POSS-VERBAL :be-COMPL – 2SUB-ASSERT
'Now you are already my child.'

Nominalization plays an important central role in Aymara morphosyntax. Different types of dependent

clauses are obtained by combining nominalized verbs with specific case markers. Nominalization is also used to form relative clauses. In contrast to Quechua, person of object cannot be indicated morphologically in nominalized verbs. (Note: Examples (1)–(3) are from Albó and Layme (1992)).

See also: Andean Languages; Bolivia: Language Situation; Chile: Language Situation; Peru: Language Situation; Quechua.

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Azerbaijan: Language Situation

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A former republic of the Soviet Union, the Republic of Azerbaijan became independent in 1991. The main language of Azerbaijan is Azerbaijani (North Azerbaijani). Article 21 of the Republic's constitution notes that "the Azerbaijan language shall be the state language of Azerbaijan." Among the languages of the republic's residents, three language groups are currently represented: Turkic speakers (around 89%), Russian speakers (3%), and Armenian speakers (2%, most of whom are resident in the Nagorno-Karabakh district). The remaining six percent of the population are native speakers of Georgian, Lezgin (Lezgi), Talysh, Avar, Tatar, Tat, Tsakhur, or Kurdish (Kurmanji). Public affairs and higher education require linguistic minorities to use Azerbaijani.

Native speakers of Azerbaijani reside, in addition to the Republic of Azerbaijan (where North Azerbaijani is spoken), in Iran (South Azerbaijani), Dagestan, Georgia, Turkey, Syria, and Iraq. North Azerbaijani is marked by Russian loanwords, and South Azerbaijani is distinguished by Persian loanwords.

Ninety eight percent of those who speak Azerbaijani consider it their first language. Periodicals have been printed in it since the mid-19th century. Azerbaijani was written in the Arabic script until 1924, when the Latin alphabet was introduced. In 1939, the Cyrillic alphabet – used to write Russian – replaced it. Literacy among North Azerbaijani speakers neared 100% by 1970. During 1991, the Republic of Azerbaijan's legislature approved a third reform, to use the 'new Roman' alphabet. At the end of the Soviet era, the Republic of Azerbaijan published 151 newspapers, of which 131 were in the official language.

One of the southern branch of the Altaic family of languages, Azerbaijani is not an Indo-European language. With the Anatolian Turkish spoken in Turkey, Turkmen spoken in Turkmenistan, and dialects of Crimean Tatar, Azerbaijani forms the Oghuz or southwestern Turkic family of languages. Like other Turkic languages, those who speak Azerbaijani add suffixes to fixed noun stems to indicate gender and number. Verbs agree with their subjects in case and number and have voice, tense, mood, and nonfinite forms.

Marked by archaic characteristics that are absent in modern Turkish, Azerbaijani is closer to the Ottoman Empire's official language. Like Ottoman Turkish, it also bears the influence of Arabic in its vocabulary and grammar. Azerbaijani has nine vowels and 23 consonants. As with other Turkic languages, it requires vowel harmony: vowels of suffixes must harmonize with the vowels of noun and verb stems.

In Azerbaijan, the Institute of Linguistics (named after the poet Naizami) sponsors research. The institute, which supports the study of written and spoken Azerbaijani, as well as poetics and folkloric studies, has been affiliated with the Azerbaijani National

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Academy of Sciences, founded in 1945. The institute does not sponsor research in minority languages, poetics, or folklore.

Azerbaijani speakers in Iran are more numerous than those in Azerbaijan (13 to 30 million in northern Iran, 6 million in the Republic of Azerbaijan). In Iran, Azerbaijani speakers reside in the Caspian Sea provinces; those of Tabriz and its surrounding areas speak a dialect distinct from that of a second, Southern dialect group. Outside of the Republic, these speakers have no official status, so secondary and higher education in Azerbaijani are not available to them.

Azerbaijani is taught as a foreign language throughout the world. For example, in the United States, where, for purposes of university administration, Azerbaijani is considered a less commonly taught language, it is taught at the University of California at Los Angeles, Indiana University, New York State University at Geneseo, Cameron University, and at the Foreign Service Institute.

See also: Azerbaijanian; Iran: Language Situation; Turkic Languages.

Language Maps (Appendix 1): Map 77.

Relevant Websites

www.science.az – Azerbaijan National Academy of Science.
http://www.azstat.org/indexen.php – Statistical Yearbook of Azerbaijan.

Azerbaijanian

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Location and Speakers

Azerbaijanian (Azerbaijani, Azeri) (*Azərbaycan dili, Azərbaycanca*) belongs, like Turkish, to the western group of the southwestern, or Oghuz, branch of the Turkic language family. It is spoken in northern and southern Azerbaijan (i.e., in the Republic of Azerbaijan), particularly in the province of Azerbaijan, and in Iran. Azerbaijanian is the official language of the Republic of Azerbaijan (*Azərbaycan Respublikası*), which constitutes the easternmost part of Transcaucasia. The Republic is situated between Iran and Russia, with a small European portion north of the Caucasus range. It includes the exclave of the Nakhchivan Autonomous Republic and the separatist Nagorno–Karabakh region. It borders on the Russian Federation in the north, Georgia in the northwest, Armenia in the west, Iran in the south, and the Caspian Sea in the east. Azerbaijanians make up about 90% of the Republic's total population of about 7.8 million. Other ethnic groups include Dagestanis, Russians, and Armenians (mainly in Nagorno-Karabakh). Over 80% of the citizens speak Azerbaijanian as their first language. The number of speakers in the Republic amounts to about 7 million. The standard language is based on the dialect of the capital Baku (*Bakı*). The number of speakers in southern Azerbaijan, which is located in northwestern Iran and borders on Turkey in the west, is estimated to be over 13 million. Similar varieties are spoken in eastern Anatolia, northern Iraq, Georgia, and Armenia. The total number of speakers may amount to 20 million.

The current status of the language in the Republic is very solid. More than half of Azerbaijani speakers are monolingual. The social situation of the varieties of Azerbaijani spoken in Iran is quite different. There the languages have not been promoted; on the contrary, their use has been discouraged and public use of Azerbaijani was banned for several decades. The situation is now improving.

Origin and History

The language goes back to the Oghuz Turkic varieties of the Seljuks, who immigrated to the area in the 10th and 11th centuries. These people originally belonged to the Oghuz confederation of tribes, whose Inner Asian steppe empire collapsed in 744. Due to political and religious differences, Azerbaijanian Turks for centuries lived in relative separation from the Turks of Turkey. Azerbaijan's history shows substantial cultural influence from Iran. In 1828, Azerbaijan was divided into a northern and a southern part under Russian and Persian rule, respectively. Northern Azerbaijan was part of the former Soviet Union for 70 years. It regained independence in 1991.

Related Languages and Language Contacts

The language is related to Turkish, Gagauz, South Oghuz, Khorasan Turkic, and Turkmen. It has a

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Related Languages and Language Contacts

The language is related to Turkish, Gagauz, South Oghuz, Khorasan Turkic, and Turkmen. It has a

strong Iranian substrate and has for many centuries been in close direct contact with Persian. Turkish had a considerable influence on the northern Azerbaijanian standard language as established before the Soviet era. During the past century, Russian has influenced the standard language, whereas the contacts with Turkish have been very limited. There is nevertheless a high degree of interintelligibility with Anatolian Turkish.

An Azerbaijanian koiné functioned for centuries as a lingua franca, serving trade and intergroup communication all over Persia, in the Caucasus region and in southeastern Dagestan. Its transregional validity continued at least until the 18th century. Later on, it lost its importance in favor of Persian in the south, whereas Russian was dominant in the north. In the period of Russian domination of economy and politics, Russian had a strong position; 38% of the Azerbaijanians of the Republic still speak Russian fluently.

The Written Language

The early history of Azerbaijanian as a literary language is closely linked to that of Anatolian Turkish. Signs of its detachment are found in sources written at the end of the 14th century. Azerbaijanian has a long and rich literary tradition. The language was written in Arabic script up to the 20th century. In 1923, a Latin-based script, *yaŋalif* 'the new alphabet,' was introduced in Soviet Azerbaijan. It was a model for the Roman alphabet that was introduced in Turkey in 1928. This alphabet was replaced by a Cyrillic script in 1939–1940. In 1991, after the disintegration of the Soviet Union, the Republic of Azerbaijan adopted a new modified Roman-based alphabet incorporating a few special letters. The transition to this script has been gradual. The Republic still applies a dual script system, with the Roman- and Cyrillic-based letters appearing side by side. In southern Azerbaijan, where the written use of the language is highly restricted, the Arabic script is still used.

Distinctive Features

The language exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following discussions, only a few distinctive features will be dealt with – in particular, some ways in which Azerbaijanian is different from Turkish. In the notation of suffixes, capital letters indicate phonetic variation, e.g., A = a/e, I = ï/i. Segments in parentheses occur after vowel-final or consonant-final stems. Hyphens are used here to indicate morpheme boundaries.

Phonology

Unlike Turkish, Azerbaijanian has a mid vowel phoneme *e* and a higher phoneme *ė* (e.g., *ėl* 'people, country' vs. *el* 'hand' and *ėn* 'width' vs. *en* 'most'). In words of Arabic–Persian origin, non-high-position vowels are more fronted than they are in Turkish (e.g., *teref* 'side' vs. Turkish *taraf*). Common Turkic initial *y-* is often lost before high vowels (*üz* 'face' (Turkish *yüz*) and *ulduz* 'star' (Turkish *yıldız*)). Initial *ï-* is replaced by *i-* (*il* 'year' (Turkish *yıl*)). Vowels are often rounded in the neighborhood of *v* (*ov* 'hunt' (Turkish *av*)).

The spoken language is relatively conservative with respect to sound harmony. It still displays invariable suffixes – i.e., suffixes not subject to sound harmony (*gel-dox* [come-PAST-1.PL], *gel-dïx* [come-PAST-1.PL] 'we came' and *išle-max* [work-INF] 'to work'); cf. Turkish *gel-dik* [come-PAST-1.PL] and *işlemek* [work-INF] (with front–back and rounded–unrounded harmony). In the standard language, the vowel harmony is normalized on the standard Turkish model, e.g., *it-ler-imiz-den* [dog-PL-POSS.1. PL-ABL] (front vowels) 'from our dogs' vs. *at-lar-ïmïz-dan* [horse-PL-POSS.1.PL-ABL] (back vowels) 'from our horses.' A few suffixes are invariable. As in Turkish, rounded vs. unrounded harmony does not affect low suffix vowels.

Common Turkic initial *q-* is, as in Turkmen, represented by the back-voiced stop *ġ-*, e.g., *ġara* 'black' (Turkish *kara*). Common Turkic final back *-q* is represented by *-ġ* in polysyllabic words and in certain monosyllabic words (after originally long vowels), e.g., *ayaġ* 'foot' (Turkish *ayak*), *aġ* 'white' (Turkish *ak*). It is fricativized to *-x* in other cases (*yox* 'nonexistent' (Turkish *yok*)). Stem-internal *q* is also fricativized (*yaxïn* 'near' (Turkish *yakin*)). The voicing of Common Turkic *k-* generally follows the same pattern as in Turkish (*gör-* 'to see' < *kör-*). There are, however, some differences, as for *kėč-* 'to pass' vs. Turkish *geç-*. The distribution of the initial dentals *t-* and *d-* is generally the same as in Turkish (*diš* 'tooth' < *ti:š*). Exceptions include *tik-* 'to sew' (Turkish *dik-*) and *daš* 'stone' (Turkish *taş*). The distribution of the initial labials *p-* and *b-* mostly follows the Turkish pattern. Exceptions include *barmaġ* 'finger' (Turkish *parmak*) and *poz-* 'to destroy' (Turkish *boz-*). As in most Turkic languages, the initial nasal *m-* occurs instead of *b-* as a result of assimilation to a following nasal (*min* 'thousand' (Turkish *bin*)). Glottal *h* and uvular *x*, which have merged into *h* in Turkish, are

distinct phonemes (e.g., *heyat* 'life' (Turkish *hayat*) and *xeber* 'information' (Turkish *haber*)). A word-medial glottal stop occurring in loans of Arabic origin may be pronounced or realized as vowel length, as in *te'sir* or *te:sir* 'influence.' Unvoiced obstruents may be strongly aspirated, as in $t^h op^h$ 'gun, cannon.' The stops *k* and *g* are strongly palatalized in many dialects. Consonant metathesis is a rather common phenomenon (*ireli* 'front' (Turkish *ileri*) and *körpü* 'bridge' (Turkish *köprü*)).

Grammar

The dative forms of the pronouns *men* 'I' and *sen* 'you' are *mene* [I-DAT] and *sene* [you-DAT] (Turkish *bana*, *sana*). The marker *-(y)Ar*, corresponding to Turkish *-(V)r*, forms a general, less focused present tense with habitual, intentional, prospective, and similar meanings (e.g., *bil-er* [know-AOR] 'knows, will know' (Turkish *bil-ir* [know-AOR]) and *gel-er* [come-AOR] 'comes, will come' (Turkish *gel-ir* [come-AOR])). The present-tense marker *-(y)Ir* corresponds to Turkish *-Iyor* and Turkmen *-yA:r*, as in *yaz-ïr* [write-PRES] 'writes, is writing' (Turkish *yaz-iyor* [write-PRES]) and *iste-yir* [want-PRES] 'wants' (Turkish *istiyor* [want-PRES]). Unlike in Turkish, low vowels have thus been generalized in *-(y)Ar*, whereas high vowels have been generalized in *-(y)Ir*. The first-person copula suffixes of the pronominal type are *-(y)Am* (e.g., *gör-ür-em* [see-PRES-1.SG] 'I see,' *al-ïr-am* [take-PRES-1.SG] 'I take,' *gör-ür-ük* [see-PRES-1.PL] 'we see,' and *al-ïr-ïğ* [take-PRES-1.PL] 'we take' vs. Turkish *gör-üyor-um* [see-PRES-1.SG], *al-iyor-um* [take-PRES-1.SG], *gör-üyor-uz* [see-PRES-1.PL], and *al-iyor-uz* [take-PRES-1.PL]). The second-person singular copula suffix is *-sAn*, as in *gözel-sen* [beautiful–2.SG] 'you are beautiful' (Turkish *güzel-sin* [beautiful–2.SG]). The perfect paradigm contains first-person forms with *-mIš*, whereas *-(y)Ib* is used in the second and third persons (e.g., *gel-miš-em* [come-PERF-1.SG] 'I have come,' *gel-ib-sen* [come-PERF-2.SG] 'you have come,' and *gel-ib-*[*dir*] [come-PERF-(3.SG)] 'has come'). The perfect markers are not used as the corresponding Turkish *-mIş* markers, which have indirective meaning. Thus, forms such as *ġoy-muš -am* [put-PERF-1.SG] 'I have put' and *al-miš-am* [take-PERF-1.SG] 'I have taken' are translated into Turkish by *koy-d-um* [put-PAST-1.SG] and *al-d-im* [take-PAST-1.SG] rather than by *koy-muş -um* [put-EV-1.SG] and *al-miş -im* [take-EV-1.SG]. The Persian influence on the dialects varies considerably. Some varieties use the comparative suffix *-ter* and the superlative suffix *-teri:n*, both copied from Persian.

Though the syntax is rather similar to that of most other Turkic languages, the Persian impact has been considerable, especially in the southern varieties. Many conjunctions and other functional words are copied from Persian and Arabic (via Persian), e.g., *ki,* which precedes complement and relative clauses.

Lexicon

Due to the different political and cultural developments for the past 600 years, the Azerbaijanian vocabulary differs from the modern Turkish vocabulary in many respects. There are certain differences in the genuinely Turkic lexicon (*tap-* 'to find' vs. Turkish *bul-*, *öz* 'self' vs. *kendi*, *isti* 'warm' vs. *sıcak*, *düš* 'to go down, to land' vs. *in-*, *sümük* 'bone' vs. *kemik*). Turkish *düş-* means 'to fall'; *sümük* means 'mucus.' The vocabulary has preserved numerous elements of Persian and Arabic–Persian origin that have been abandoned in Turkish as a result of the puristic language reforms, including *lüγet* 'dictionary' (Turkish *sözlük*), *müellim* 'teacher' (*öğretmen*), and *pul* 'money' (*para*).

Since the 19th century, Russian loanwords, particularly technical terms, have entered the northern Azerbaijanian varieties (*zavod* 'factory' (Turkish *fabrika*), *fevral* 'February' (Turkish *şubat*), *stul* 'chair' (Turkish *sandalye*), and *galstuk* 'necktie' (Turkish *kravat*)). The southern varieties exhibit many loans from Persian (e.g., *miz* 'table' and *ruzname* 'newspaper' (the northern varieties have *stol* and *gezet*).

Dialects

The spoken language includes several dialects. They are mostly divided into three groups: northern dialects spoken in the Republic of Azerbaijan, southern dialects in northwestern Iran, and East Anatolian dialects. Though these dialects differ a great deal from each other, they are mostly mutually intelligible. Among the northern dialects, there is a western subgroup in the central part of the Republic (including Genje, Shusha, Kazak, Karabagh, and Ayrum). Dialects of an eastern subgroup are spoken on the shore of the Caspian Sea, in Derbent, Kuba, Shemakha/Shamakhi, Baku, Sal'jany, Mughan, and Lenkoran, for example. The standard language is based on the urban dialect of the capital Baku. Dialects spoken in the northern parts of the Republic include Zakataly, Nukha, and Kutkashen. Dialects spoken in the southern parts of the republic include those of Nakhchevan and Ordubad.

The dialects of Iran include those of Tebriz, Urmia, Qūščī, Xoy, Marāγa, Marand, 'Oryān Tepe, Torkmānčay, Ardabīl, Sarāb, Meyāna, and the exclave Galūgāh. The dialect of the Karapapakh 'Black Caps' was spoken between the upper Kura

and Arpachay Rivers, on the boundary between Armenia and Georgia, and in Persian Azerbaijan near Lake Urmiya. Some dialects are spoken in Khorasan, including Loṭfābād and Daragaz.

See also: Altaic Languages; Azerbaijan: Language Situation; Iran: Language Situation; Turkic Languages; Turkish; Turkmen.

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Relevant Website

http://www.turkiclanguages.com – Website with many Turkish language resources.

B

Babylonian Grammatical Texts

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Background: Writing, Lists, and Lexicography

What is, and undoubtedly will remain, the oldest attested tradition of grammatical analysis comes to us from cuneiform texts on clay tablets drawn up in the scribal schools of southern Mesopotamia. The tradition begins in the Old Babylonian Period (first half of 2nd millennium B.C.E.) with a corpus collectively known as the Old Babylonian Grammatical Texts (OBGT), assembled and published by scholars at the Oriental Institute of the University of Chicago in 1956, in the context of a series, Materials for the Sumerian Dictionary (MSL), whose 17-plus volumes make available the entire corpus of Sumerian school texts. The tradition continues, with important transformations and developments, through the Middle Babylonian Grammatical Texts (MBGT) and Neo-Babylonian Grammatical Texts (NBGT), down to the final stages of the use of cuneiform in the Seleucid period. Eighteen OBGT and nine NBGT texts are published in MSL 4, with a substantial critical-interpretative introduction by Thorkild Jacobsen; three MBGT texts are available in MSL Supplementary Series 1.

The grammatical tradition is, from the beginning, bilingual, consisting of long and often intricately structured parallel lists of words, phrases, and morphemes in Sumerian and Akkadian – invariably Sumerian in the left-hand column and Akkadian in the right. The obvious originating factor behind this genre of texts was the need on the part of Akkadian-speaking scribes to acquire the reading and writing knowledge of Sumerian, essential for advancement in the cultural and economic spheres (in the earlier stages), as well as the cultural and religious spheres (at all stages). But in this genre, as in the lexical, initial practical preoccupations often were overtaken by a drive to systematicity, symmetry, and formal completeness, which led to the creation of artificial forms, not attested in texts, to fill in gaps and unoccupied slots in the paradigms.

It is impossible to document exactly when grammar joined the curriculum of Mesopotamian schools, but the textual record shows that already at the earliest stages of writing at the end of the 4th millennium B.C.E., a certain portion of the cuneiform corpus is devoted to the sign lists and school exercises necessary for the transmission of knowledge about the writing system itself. At first these lists were monolingual Sumerian and, already at the beginning, developed quickly from simple lists of signs to topically arranged exhaustive enumerations of designations for flora, fauna, and artifacts. At the same time, an increasingly complex economy stimulated the development of elaborate, multicolumn hierarchical document formats with totals, subtables, subtotals, and summaries, to record increasingly complex transactions and inventories. In the meantime, very early in the development of the cuneiform writing system and perhaps nearly at its origins, the population of southern Mesopotamia was increasingly shifting toward Akkadian as its first language – including, as is shown by their proper names, the population of scribes and scribal students. This led, on the one hand, to an adaptation of the cuneiform writing system for Akkadian in the course of the 3rd millennium B.C.E. and, by the end of the millennium, to the addition of Akkadian columns to the monolingual school texts. The earliest of these simply provided Akkadian translations for the topically arranged inventories of words/things – the series called, from its *incipit*, Har-ra (= MSL 5–11). However this expansion allowed new genres of lexical texts to appear: lists in which the first column gives, in a reduced syllabary, a representation of the pronunciation value of the sign in the second column (to which still another column with a sign name might be added), with or without a final column with an Akkadian translation (MSL 2–3, 14); lists with synonyms or near synonyms in the two languages, thus nuancing the massive topical lists in the direction of a kind of thesaurus (see MSL 17); lists giving Sumerian equivalents, always in

the left-most column, of Akkadian words that share the same lexical root, thus in effect an Akkadian-Sumerian dictionary organized by roots (MSL 16); and lists giving supposedly useful phrases in the two languages for drawing up legal documents (MSL 1) or administrating agricultural or other economic units.

From Word Lists to Paradigms

It is only a short step from inventories of legal boilerplate to phrase lists illustrating the morphological and syntactic patterns of the language as such, thus the series from an OBGT in Table 1. Note here that the homophonous first- and second-person forms in Sumerian are differentiated in Akkadian and that Akkadian, which has a gender distinction in the second- and third-person pronouns, just uses the masculine form to translate the genderless corresponding forms in Sumerian.

It is an even closer step to abstract from such rudimentary phrases actual paradigms of the relevant parts of speech, as in OBGT I in Table 2. (Additional lines, not rendered here, give Sumerian variant orthographies and/or word forms corresponding to the simple Akkadian pronouns.) The other entries in this part of the text shows the plural forms of the pronouns in the two languages, first in the simple nominative form, then in combination with various enclitics, prepositions/postpositions, and finally verbal contexts. Note the familiar order of persons (1, 2, 3) consistently observed in all parts of this paradigm, as opposed to the variant orders we will see later in the verbal paradigms.

Table 1 OBGT phrase lists

OBGT line number	*Sumerian*	*Akkadian*
1.	dubsar-me-en scribe-COP-1.SING 'I am a scribe'	ṭupšarum anāku scribe PRO.1.SING 'I am a scribe'
2.	dubsar-me-en scribe-COP-2.SING 'you are a scribe'	ṭupšarum atta scribe PRO.2.MASC.SING 'you are a scribe'
3.	lú-e dubsar-a man-PROX scribe- COP.3.SING 'he (near) is a scribe'	annûm ṭupšarum this.3.MASC.SING scribe 'this one is a scribe'
4.	lú-ri dubsar-a man-far scribe- COP.3.SING 'he (far) is a scribe'	ullum ṭupšarum that.3.MASC.SING scribe 'that one is a scribe'

It is in the verb paradigms that the true complexity of the grammatical texts can be seen, particularly in five longer texts, each of which is devoted to the paradigm of a single important verb: OBGT VI *ŋar* = *šakānum* 'set'; OBGT VII *du*/*ŋen* = *alākum* 'go'; OBGT VIII *kas*$_4$ + *dug*$_4$ = *lasāmum* 'run'; OBGT IX *sá* + *dug*$_4$ = *kašādum* 'reach'; and OBGT X *gub* = *uzzuzum* 'stand.' Note that, in addition to dealing with more or less homologous inflectional categories of modality and subject and object PNG (person-number-gender), these paradigms also tackle Sumerian verbal categories that are entirely foreign to Akkadian, or at least to its inherited Semitic morphological grid: an aspectual distinction between durative and punctual, which is pivotal for Sumerian verb morphology and which in the verb 'go' is suppletive both for a singular and plural subject (*du* 'go.DURATIVE.SING' vs. *sub* 'go.DURATIVE.PL' vs. *ŋen* 'go.PUNCTUAL. SING' vs. *su* 'go.PUNCTUAL.PL'); a category of compound verb involving an incorporated nominal constituent in the 'reach' and 'run' paradigms; an m-series category of 'orientation to speaker/speech-situation', for which Akkadian seems to have developed a special first-person dative suffix (termed ventive); and, paired with the last category in this text, Sumerian forms prefixed with an opposing b-series, for which the Akkadian column consistently uses verbal forms in a passive-reflexive-derived stem with infix *–t-*.

The structure of the long (324 lines, of which 307 are preserved) 'go' paradigm is particularly complex and instructive. Lines 1–95 give, for a singular subject, first the modal forms (lines 1–30, with order of persons: 2 = imperative, 1 = cohortative, 3 = optative) and then the nonmodal forms (with order of persons: 3, 1, 2), durative (lines 31–67) and punctual (lines 68–95). Within each of these three major sections, verb forms are given (in terms of the Akkadian translation) in the ventive and nonventive, with and without *-t-* infix, and with and without singular object suffixes. Lines 96–190 then repeat this structure for a plural subject. Lines 191–246 repeat the whole structure of 1–190 with object pronouns of

Table 2 Pronoun paradigm

OBGT I line number	*Sumerian*	*Akkadian*
373–5	menden PRO.1.PL 'we'	nīnu PRO.1.PL 'we'
376–8	menzen PRO.2.PL 'you'	attunu PRO.2.MASC.PL 'you'
379–84	enene PRO.3.PL 'they'	šunu PRO.3.MASC.PL 'they (MASC)'

the first- and second-person plural (separable in Akkadian and given with a number of subtle morpho-semantic distinctions); lines 247–324 go over the same structure with object pronouns of the third-person plural. The excerpt in Table 3 gives, for the most basic forms, an idea of what is involved in this text.

The Last Stage: Morpheme Lists and Technical Terms

By the period of the NBGT, a number of which come from the famous library of Ashurbanipal in Nineveh, living contact with Sumerian was a millennium or more in the past. A few of the grammatical texts from this period repeat some of the full pronominal and verbal forms of the earlier texts but only in apparently scattered excerpts. For the most part, the NBGT consist of long lists of single signs and sign sequences, most of which represent classes of verb prefixes (occasionally suffixes) and prefix sequences, taken from the complex prefix chains that characterize Sumerian verb morphology. Note that because the cuneiform writing system is limited to the representation of syllables, prefixes consisting of a single consonant could not be directly represented. However, occasional sequences such as NBGT I lines 47–50, in which the Sumerian column has successively *un*, *an*, *in*, and *en* and only the first line is glossed in the Akkadian as 'I, full, prefix, infix,' may be an attempt to convey the notion of a prefix/infix *–n-* preceded by any vowel.

As in the passage just noted, the occasional glosses in the Akkadian columns are for the most part pronominal, but, much more interesting, they are frequently accompanied by technical grammatical terms describing the function and form assigned to the Sumerian affixes. The structure and rationale of these texts is far from clear, and the meaning of many of the terms is uncertain or unknown, but they clearly represent the end stage of a long tradition of analysis and teaching of Sumerian and must be counted among the earliest attempts to elaborate a technical linguistic terminology. A list and analysis of a number of these is given by Civil (1994): 'superior' (= prefix), 'middle' (= infix), 'inferior' (= suffix), 'of one' (= singular), 'of many' (= plural), 'quick' (= punctual), 'fat, slow' (= durative), 'empty' (= vocalic affix), 'full' (= vowel + consonant affix), 'complete' (= perfect?), 'leading' (= movement toward speaker?), 'which makes turn around' (= pronominal affix?), 'additional' (= ?), and 'late' (= ?).

Table 3 Paradigm for 'go'

OBGT line number	*Sumerian*	*Akkadian*
19.	ŋen-a	alik
	go.PUNCTUAL-IMP	go.IMP
	'go!'	'go!'
20.	ga- ŋen	lullik
	COHORTATIVE-go.PUNCTUAL	go.JUSSIVE.1.SING
	'may I go'	'may I go'
21.	ḫé- ŋen	lillik
	OPTATIVE-go.PUNCTUAL	go.JUSSIVE.3.MASC.SING
	'may he go'	'may he go'
⋮		
31.	al-du	illak
	stative-go.durative	go.pres.3.MASC.SING
	'he is going'	'he goes'
32.	al-du-(e)n	allak
	STATIVE-go.DURATIVE-1.SING	go.PRES.1.SING
	'I am going'	'I go'
33.	al-du-(e)n	tallak
	STATIVE-go.DURATIVE-2.SING	go.PRES.2.MASC.SING
	'you are going'	'you go'
68.	i-n- ŋen	illik
	neut-goal-go.punctual	go.pret.3.MASC.SING
	'he went'	'he went'
69.	i-n- ŋen-en	allik
	NEUT-GOAL-go.PUNCTUAL-1.SING	go.PRET.1.SING
	'I went'	'I went'
70.	i-n-ŋen-en	tallik
	NEUT-GOAL-go.PUNCTUAL-2.SING	go.PRET.2.MASC.SING
	'you went'	'you went'

Conclusion

Although we possess only the bare bones of the Mesopotamian grammatical tradition, a fossil remnant, as it were, of a living tradition of linguistic analysis, what we have is sufficient to show how, faced with a situation of rich language diversity and complex linguistic interaction, scholars responded by elaborating subtle and even elegant structures whose interpretation can fascinate their successors thousands of years later.

See also: Akkadian; Mesopotamian Cuneiform Script; Sumerian.

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Back-Formation

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Normally word formation involves the addition of elements to an existing base. This may take a variety of forms. A common method is the attachment of inflectional or derivational affixes, shown in **Table 1**.

Another common technique is compounding. Existing bases, which may be fully fledged words, may be combined to create a new word. This is illustrated in **Table 2**.

Occasionally, words are formed by *back-formation*. When this happens, a new word is created by removing a real affix or a chunk of the word that is re-analyzed as an affix (Adams, 1973, 2001; Huddleston, 1984; Quirk *et al*., 1985; Huddleston and Pullum, 2002). Consider the examples in **Table 3**.

The words in **Table 3** were created by analogy to the words like *writer*, *governor*. The ending – pronounced ə (or ɚ in rhotic dialects) and spelled *-er, -or, -ar* – is interpreted as the agentive suffix meaning "someone who does x," which derives nouns from the corresponding verbs. Since the words in the left-hand column are nouns, it was wrongly presumed that there must be an unsuffixed verb base from which they must have been derived, and speakers proceeded to recover it.

The story of the word *beg* is instructive. According to Adams (1973), the verb *beg* was formed by analogy to *sing* (verb) and *singer* (noun), *write* (verb) and *writer* (noun). Speakers misinterpreted the *-ar* as an agentive suffix, although the apparent *-ar* suffix is unrelated to the agentive morpheme. The *Oxford English dictionary* (*OED*) shows *beggar* to be descended from medieval Latin *beghardus;* Old French *bégard*. This was a lay brotherhood that arose in the Low Countries in the 13th century, many of whose members were simply idle, vagrant mendicants.

Back-formation tends to be sporadic and unsystematic. It is not possible to predict when and where it will happen. However, some morphological contexts seem more favorable to it than others. For instance, nouns ending in *-ion* are quite susceptible to having *-ion* removed to yield a verb; see **Table 4**.

By contrast, certain other suffixes – such as *-ity*, as in *electricity* and *divinity* – do not lend themselves so readily to back-formation (cf.**ident* and **tenac* from *identity* and *tenacity)*.

Acceptability of Back-Formations

Many new back-formations are not well received and occasionally attract a considerable amount of negative comment. The morphological misanalysis that motivates them is viewed by some as a sure sign of a poor command of the language. That is true of the back-formation *cohabitate*, from *cohabitation*, which is used instead of the established word *cohabit*, or *orientate*, from *orientation*, which some use instead of the more established word *orient*.

At least in part, the problem here seems to be that the new *cohabitate* and *orientate* look odd, but in time everyone might get used to them. However, this

Table 1

Inflection	*Derivation*	
talks	governor	misgovern
talked	government	ex-governor
talking	governable	ungovernable

Table 2

Noun	+ *Noun*	*Compound Noun*
desk	top	desktop
rail	way	railway
fire	fighter	firefighter

Civil M (1975). 'Lexicography.' In Lieberman S (ed.) *Assyriological studies 20: Sumerological studies in honor of Thorkild Jacobsen*. Chicago: University of Chicago Press. 123–157.
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Normally word formation involves the addition of elements to an existing base. This may take a variety of forms. A common method is the attachment of inflectional or derivational affixes, shown in Table 1.

Another common technique is compounding. Existing bases, which may be fully fledged words, may be combined to create a new word. This is illustrated in Table 2.

Occasionally, words are formed by *back-formation*. When this happens, a new word is created by removing a real affix or a chunk of the word that is re-analyzed as an affix (Adams, 1973, 2001; Huddleston, 1984; Quirk *et al*., 1985; Huddleston and Pullum, 2002). Consider the examples in Table 3.

The words in Table 3 were created by analogy to the words like *writer*, *governor*. The ending – pronounced ə (or ɚ in rhotic dialects) and spelled *-er, -or, -ar* – is interpreted as the agentive suffix meaning "someone who does x," which derives nouns from the corresponding verbs. Since the words in the left-hand column are nouns, it was wrongly presumed that there must be an unsuffixed verb base from which they must have been derived, and speakers proceeded to recover it.

The story of the word *beg* is instructive. According to Adams (1973), the verb *beg* was formed by analogy to *sing* (verb) and *singer* (noun), *write* (verb) and *writer* (noun). Speakers misinterpreted the *-ar* as an agentive suffix, although the apparent *-ar* suffix is unrelated to the agentive morpheme. The *Oxford English dictionary* (*OED*) shows *beggar* to be descended from medieval Latin *beghardus;* Old French *bégard*. This was a lay brotherhood that arose in the Low Countries in the 13th century, many of whose members were simply idle, vagrant mendicants.

Back-formation tends to be sporadic and unsystematic. It is not possible to predict when and where it will happen. However, some morphological contexts seem more favorable to it than others. For instance, nouns ending in *-ion* are quite susceptible to having *-ion* removed to yield a verb; see Table 4.

By contrast, certain other suffixes – such as *-ity*, as in *electricity* and *divinity* – do not lend themselves so readily to back-formation (cf.**ident* and **tenac* from *identity* and *tenacity)*.

Acceptability of Back-Formations

Many new back-formations are not well received and occasionally attract a considerable amount of negative comment. The morphological misanalysis that motivates them is viewed by some as a sure sign of a poor command of the language. That is true of the back-formation *cohabitate*, from *cohabitation*, which is used instead of the established word *cohabit*, or *orientate*, from *orientation*, which some use instead of the more established word *orient*.

At least in part, the problem here seems to be that the new *cohabitate* and *orientate* look odd, but in time everyone might get used to them. However, this

Table 1

Inflection	*Derivation*	
talks	governor	misgovern
talked	government	ex-governor
talking	governable	ungovernable

Table 2

Noun	+ *Noun*	*Compound Noun*
desk	top	desktop
rail	way	railway
fire	fighter	firefighter

is not certain. Some back-formations of long standing, like *aggress* and *intuit* (dating from 1575 and 1776 respectively, according to the *OED*), have not yet gained common currency. Many others have won acceptance. *Resurrect* and *separate* do not seem to us in any way odd and attract no comment. Resistance to back-formations seems strongest in cases where the new word competes with a synonymous established word that shares the same root, as in the cases of *cohabitate* and *orientate*.

Note, however, that some back-formations are not warmly embraced even when they are established. The reluctance to embrace them manifests itself in the somewhat restricted range of verbal inflections that they are allowed to take (cf. Quirk *et al*., 1985; Huddleston and Pullum, 2002). For instance, many who will accept the back-formation *self-destruct* from *self-destruction* do not tolerate the word if it is given the *-ed* inflection (**he self-destructed*). Likewise, while *sightsee*, *housekeep*, and *daydream* are acceptable, none of the sentences here, with the back-formation of these in the past tense, would be judged well formed:

a. **Jane sightsaw.*
b. **We housekept.*
c. **I daydreamed all afternoon.*

Table 3

Original word	*New word*
editor	edit
inspector	inspect
sculptor	sculpt
juggler	juggle
swindler	swindle
peddler	peddle
burglar	burgle
beggar	beg
scavenger	scavenge
swashbuckler	swashbuckle (> swashbuckling)

Table 4

intuit	intuition
resurrect	resurrection
donate	donation
orientate	orientation
emote	emotion
televise	television
separate	separation
administrate	administration
liaise	liaison
agress	aggression

Many back-formations live at the margins of grammar, where experimentation may result in jocular effects. When *gruntled* is formed from *disgruntled*, and *couth* from *uncouth*, the effect is normally intended to be humorous. Where the speaker or writer has no humorous intent, others may still ridicule their use of an odd-sounding back-formation. That is what happened when an officer of the law used the back-formation *allegate*, which is derived from *allegation*, instead of the established word *allege*:

> . . . an officer of a Florida court stated that a plaintiff had 'allegated' something. He then referred to the plaintiff as 'the allegator,' summoning up the vision, in a state in which alligators are common, of a reptile-plaintiff (Block, 2004).

Back-Formations from Compounds

Back-formations are a highly productive method of creating denominal verb compounds. The back-formations created in this fashion fall into three broad categories (Marchand, 1969; Adams, 1973, 2001; Huddleston, 1984; Quirk *et al*., 1985; Huddleston and Pullum, 2002). In one type, the source compound ends in *-er* or *-ing* and the semantic role of the first noun is like that of a patient argument of the verb in a normal sentence; see Table 5.

Thus, a *stage manager* is a person who *manages a stage*, a *word processor* is a device that is used to *process words*, and so on. The back-formation removes the ending from the entire noun compound to yield the compound verb, but the argument structure remains unchanged.

In the second type, which is exemplified in Table 6, the syntactic construction that is the source of the compound verb is verb + PP – e.g., *spring-cleaning* is derived from *cleaning during spring*, *daydreaming* is from *dreaming during the day*, and so on.

Table 5

bookkeeper	book-keep
headhunter	headhunt
gate-crasher	gate-crash
air conditioner	air-condition
bargain hunt	bargain hunt
babysitter	babysit
housekeeper	housekeep
stage manager	stage-manage
firefighter	firefight
word processor	word process
typewrite	typewrite
lipreading	lip-read
house hunting	house hunt

Table 6

spring-cleaning	spring-clean
daydreaming	daydream
sleepwalking	sleepwalk
chain-smoking	chain-smoke

Table 7 Hypocoristics

Japanese	Akira	Aki-tyan
(Mester, 1990)	Midori	Mii-tyan

Removal of the ending, again, does not affect the semantic relation between the first and second parts.

The third type changes a compound whose second constituent is a participial adjective into a verbal compound whose first constituent is some sort of adjunct. Examples of this include the verb *spoon-feed* from *spoon-fed* (Marchand, 1969) and the verbs *handpick* and *fast-freeze* from *handpicked* and *fast-frozen*.

Hypocorism

This type of back-formation is not motivated by analogy. It involves the truncation of a longer word without the excuse of there being an affix that is removed. Numerous languages have hypocoristic forms of nouns. They are especially prevalent in the familiar versions of personal names. Typically, hypocoristics are minimal words that have two syllables or two moras. In French, for example, *Isabelle* is reduced to *Iza*, *Zabel*, or *Zabe*.

Japanese also has hypocoristic versions of personal names. As seen in Table 7, they too have a bimoraic base, to which is added the familiar ending *-tyan*. Examples of hypocorism in English are given in Table 8.

In English such truncation is also common and it is accompanied by the attachment of a *-y* or *-ie* suffix.

This process is also applicable to common nouns and is especially popular in Australian English; see Table 9.

The last example in Table 9 shows that the truncated word is not always a term of endearment.

Table 8

Jennifer	Jenny
Amanda	Mandy
Anthony	Tony
Margaret	Maggie
Elizabeth	Betty, Bessie, etc.

Table 9

barbecue	barbie
breakfast	brekky
Australian	Aussie
postman	postie
mosquito	mozzie

Back-Formation in Inflection

So far, we have only dealt with back-formation in derivational morphology. In rare cases, back-formation is also attested in inflectional morphology. For instance, a few English nouns ending in *-s* that were originally singular in number were incorrectly analyzed as plural and a singular form lacking the -s was created by back-formation.

Two famous examples are *cherry* and *pea*. The *OED* shows that *cherry* is a back-formation from Old Northern French *cherise*, which was mistaken for a plural. Similarly, *pea* is a back-formation from the word originally spelled *pease* or *peas*, which was the word for the round seed of the plant whose botanical name is *Pisum sativum*, which was a non-countable mass noun. The *-s* was taken off to create the basic singular form, *pea*.

Though not insignificant, back-formation is not a major technique for forming words in English. It is far less important than conversion, whereby a word is derived without an overt change in form (e.g., *jump* [verb] > *jump* [noun]); affixation, whereby a word is formed by adding a prefix or suffix (e.g., *dance* [verb] > *dancer* [noun]); or compounding (e.g., *hot* [adjective] + *spot* [noun] > *hot spot* [noun]). A statistical analysis of the *OED* shows that between 1880 and 1882, only 2.6% of new words were shortenings; 18.5% were compounds; prefixation accounted for 12.4%, and suffixation was responsible for a staggering 47.4% (Bauer, 1994).

See also: Affixation; Compound; Conversion; Inflection and Derivation; Productivity.

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Francis Bacon was a foremost thinker in philosophy and scientific methodology at the twilight of Renaissance and the new rationalist order. His ambition was to reform the advancement in scientific knowledge starting with a criticism of scholasticism and Aristotelianism. His reform also had a social character and included the reclassification of sciences. Bacon's thoughts on language, a portion of his theories, are relevant to language sciences and history of ideas in linguistics.

In *Advancement of learning, arts intellectual* (1605), Bacon outlines the role of language in the preservation and transmission of human knowledge and discusses the relation between language and thought, language and linguistic and non-linguistic communication, oral/written language including writing systems, arbitrariness and the 'science of grammar.' Whereas a 'philosophical' grammar studies 'the power and nature of words as they are the footsteps and prints of reason,' the analogy between words and reason, reality, a 'popular' or 'literary' grammar encourages 'speedy and perfect' learning of languages, for 'the intercourse of speech and understanding of authors.' On the basis of the analogy between words and reason in the philosophical grammar, Bacon construes the conceptual framework for the investigation of languages as the sources of knowledge about peoples' customs and beliefs, manifested in 19th and 20th century theories of language and culture. The *Advancement of learning* also introduces Bacon's thoughts on ciphers and hidden languages 'the art of ciphering and deciphering.' He argues for a hierarchical system of 'real characters' to express basic 'things and notions.'

In *Novum Organum* (1620), he postulated a replacement for deductive reasoning by his new inductive or scientific reasoning. Significant conceptual changes in scientific thinking and an intellectual revolution ensued. His intellectual legacy exerted broad influence during his lifetime and subsequently gained much more prestige. Language underpinned the search for a new method to gain knowledge of nature. Bacon elaborates on the pervading theme of the deceptiveness of language, the most common reference in any work on Bacon, in the memorable discussion of the four 'idols of the mind' and particularly 'idols of the market-place.' Jointly, they ushered a series of works on artificial languages in the 17th century. Since then, a tradition of postulating philosophical theories on the deceptive character of language has been established among the analytical philosophers in Great Britain. Equally important is the critique of logic and rhetoric. Bacon viewed logic as the rules of thinking. Only recently linguists have begun to turn their attention to Rhetoric to study communication, pragmatics and semantics.

Although Bacon was aware that a theory of signs was important; it was to remain a *desideratum*. The 18th and 19th century investigation and comparison of the world languages was arguably based on his scientific principles. Francis Bacon's own use of language has been itself a pertinent research object.

See also: Language of Thought.

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Little is known about the life of the 13th-century English friar Roger Bacon. He was probably born in Somerset. He studied and subsequently lectured at both Oxford and Paris, and entered the Franciscan order in his thirties or forties. We do know that Bacon wrote voluminously on many topics – mathematics, philosophy, optics, geography, alchemy, astronomy, and languages – and that he had a fiercely independent and critical temperament (Little, 1972). He championed an experimental approach to knowledge of the world, in opposition to the metaphysical orientation of medieval scholasticism. In the field of language, Bacon was unusual in his day in arguing for the importance of study of Greek, Hebrew, and Arabic, and in his interest in cross-linguistic comparison and dialectal variation.

Bacon achieved notoriety in his lifetime for his unconventional intellectual interests and his attacks on other scholars. But his own scholarship sometimes lacks objectivity and depth. Easton (1952: 33) wrote: "Bacon can give a masterpiece of brilliant exposition of a difficult theory, then follow it elsewhere with absurd and puerile non-sequiturs; he can produce a violent polemic and then ruin it with a piece of contradictory evidence which he does not see will vitiate the whole."

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works, his *Greek grammar* (eds. Nolan and Hirsch, 1902: 27), in which he asserted that "the substance of grammar is one and the same in all languages, despite variation in its accidents." Thomas (2002) analyzes more than 50 citations of this passage. Many follow Chomsky's (1966: 105) use of it to depict medieval speculative grammar, which he connects to 'Cartesian linguistics' and hence to generative grammar. Hovdhaugen (1990), however, distinguishes Bacon's approach from the speculative grammarians' assumptions about the unity of language, thought, and reality. Bourgain (1986) and Rosier (1984) add other evidence that Bacon's reputation as a precursor of modern Universal Grammar is unwarranted. Notwithstanding the famous 'one and the same' passage, Bacon's real contribution to linguistics lies in his promotion of foreign language study.

See also: Grammar, Early Medieval.

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Bactrian was the local Iranian language of the Greco-Bactrian (or Kushana) kingdom in northern Afghanistan, founded by soldiers of Alexander the Great. The language is known from coins, a few stone and wall inscriptions (private and royal, the earliest from the 2nd century), and a small number of manuscript fragments from Turfan, as well as a large number of economic and legal documents, mainly on parchment, from northwestern Afghanistan dated between 342 and 781 A.D. It shares features with both Parthian, its western neighbor, and Chorasmian and Sogdian, its northern neighbors.

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works, his *Greek grammar* (eds. Nolan and Hirsch, 1902: 27), in which he asserted that "the substance of grammar is one and the same in all languages, despite variation in its accidents." Thomas (2002) analyzes more than 50 citations of this passage. Many follow Chomsky's (1966: 105) use of it to depict medieval speculative grammar, which he connects to 'Cartesian linguistics' and hence to generative grammar. Hovdhaugen (1990), however, distinguishes Bacon's approach from the speculative grammarians' assumptions about the unity of language, thought, and reality. Bourgain (1986) and Rosier (1984) add other evidence that Bacon's reputation as a precursor of modern Universal Grammar is unwarranted. Notwithstanding the famous 'one and the same' passage, Bacon's real contribution to linguistics lies in his promotion of foreign language study.

See also: Grammar, Early Medieval.

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Bactrian

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A definite animate direct object is indicated by the preposition *abo* 'to.'

The verbal system is of the common Iranian type. There are three stems: present, past, and perfect (perfect participle = past stem + suffix *-igo*, FEM *-iso*; e.g., PRES *nabis-* 'write,' PAST *nabixt-*, PERF MASC *nabixt-igo*). Special features include modal forms formed from the indicative plus the original modal third singular ending.

optative: *ma froxoaš-ond-ēio* [fraxwaš-und-ēy]
lest leave-INDIC.3RD.PL-OPT.3RD.SING
'lest they abandon'

subjunctive: *boo-ado* [buw-ād]
become-SUBJ.3RD.SING
'(that) he shall become'

and

boo-ind-ado [buw-ind-ād]
become-INDIC.3RD.PL-SUBJ.3RD.SING
'(that) they shall become'

The perfect is formed with the old participle in **-aka-*

ot-ēia . . . pidgirbo fromado kirdi eim-oano bag-ano ki-di m-aska nibixt-ig-endi
and-he.OBL image ordered.PAST do.INF these-PL.OBL god-PL.OBL REL-PART the.OBL-above written-PERF.PART-COP.PRES.3RD.PL
'and he ordered images to be made of these gods which are written above'.

In the ergative construction, the relatively widespread phenomenon of letting verbs such as 'give' agree with the indirect object is found in Bactrian as well.

od-omo ladd-ēi iōgo zino
and-I.OBL give.PAST-be.2ND.SING one woman
'and I have given you a (certain) woman'

A feature unusual in Iranian is the preposed negation in past tenses.

ko-ado-mēno n-isto paralado
that-PARTICLE-we.OBL not-is.3RD.SING sold.PAST
'that we have not sold'

A typically Bactrian construction is that of the subjunctive or optative with the particle *-an* used to express future eventuality.

(1) *asid-ano oalo šatar-ano* [*šatar* < *šado* + *-tar*] *kald-ano abo to xoēo xoado lrogo oēn-ano*
but-PART there happy.COMP-COP.SUBJ.1ST.SING when-PART DO you lord self healthy see.PRES-SUBJ.1ST.SING
'but I shall be happier there when I see you myself healthy'

(2) *ot-ēio pido asagg-e iθo oilirdo at-ano abo ma lizo faro karano abo ma gao-ēio*
and.PART-he.OBL on stone-PL thus arrange.PAST so that-PART in DEF citadel for people water NEG lack-OPT.3RD.SING
'and on (it) he placed stones so that in this citadel water might not be lacking for the people'

The particle *-do* is commonly attached to initial conjunctions, as in *kal-do* 'when,' *aki-do* 'who,' and *asi-do* 'which'; the common form *oto* 'and' is from *odo* 'and' + *-do*.

See also: Afghanistan: Language Situation; Iranian Languages.

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El-Said Muhamed Badawi was born on July 5, 1929 in a small village in Sharqiyyah, Egypt. He is best known for two major works in the field of Arabic linguistics; his book entitled *On levels of contemporary Arabic in Egypt*, and his *Dictionary of Egyptian Arabic* (1986). In the former, he introduced a case of multidiglossia, as opposed to the earlier bilateral divisions introduced by Ferguson.

As the eldest of four children in the family, he was sent to study Arabic and Qur'anic studies at the Azhar-affiliated religious Institute of Al-Zaqaziq. After he graduated, he moved to Cairo where he studied at Dar Al-Ulum and got his B.A. degree with honors in Arabic language and literature, and Islamic studies in 1954. He then worked in the Cairo English School for four years as a teacher of Arabic and religion. It was there where he met a young Irish lady, Mary, and shortly after that they got married. He went to England to study for his M.A. in general linguistics on his own expense. He lived in England for 10 years, where he received both his M.A. and his Ph.D. from the University of London. He was granted a full scholarship to do his Ph.D. on phonetics and to carry out the field research for his thesis on the intonation of Riyadhi Arabic as spoken in Saudi Arabia.

Badawi was on loan from his home institution, once to the University of Umdurman in Sudan between 1966 and 1969, and the second time in Cairo at the American University in Cairo (AUC) in 1970. He finally resigned from Dar Al-Ulum and was granted tenure at AUC. Since that time, Badawi has continued to work at AUC in different capacities as a professor of Arabic and linguistics, and as a senior administrator. Since 1989, he has been working as the director of the Arabic Language Institute (ALI) and co-director of the Center for Arabic Study Abroad (CASA).

Since he set foot at AUC, Badawi has always tried to develop the Arabic language component at both the undergraduate and graduate levels. During his tenure, ALI has become an independent department where nonnative students have been studying Arabic at different levels of proficiency. He was the first to think of launching an M.A. program to qualify teachers of Arabic as a foreign language. The program started to offer academic degrees in 1978 under his directorship and has graduated about 90 students since then. He has also been working on promoting a B.A. degree in Arabic for nonnative speakers for the past six years. Badawi continues to teach graduate courses in Arabic Syntax, Phonetics of Arabic, Sociolinguistics, and Arabic Dialectology. His major research interest has been in dialects. Some of his publications received international recognition, such as *A comparative study of Egyptian Arabic* (1978), *Al-Kitab Al-Asasi* (1983), *Dictionary of Arab names* (1990), and *Modern written Arabic, a comprehensive grammar* (2004). He published many articles in local and international journals dealing with teaching Arabic as a foreign language and Arabic linguistics. Over the last four years, Badawi has been working with a group of linguists on compiling an Arabic–English dictionary of Qur'anic usage. The project is financed by the SOAS at the University of London.

See also: Arabic; Arabic Linguistic Tradition.

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Bahá'í Faith

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The Bahá'í Faith is the religion of the followers of Bahá'u'lláh (1817–1892), which signifies in Arabic 'The Glory of God.' The faith first appeared in Persia (modern-day Iran) in a Shiite milieu, whence it may be considered to have sprung from an Islamic background in the same way as did Christianity from Judaism. Bahá'u'lláh, who was otherwise known as Mírzá Ḥusayn 'Alí, was of noble ancestry, and a lineal descendant of both Abraham and Zoroaster. The Bahá'í Faith sprang more immediately from what Bahá'ís regard as a precursor revelation, the Bábí Faith. The prophet-founder of the Bábí Faith, Siyyid 'Alí-Muḥammad (1819–1850), was also a Persian, and, as his designation of *Siyyid* indicated, a descendant of the Prophet Muḥammad. He assumed the title of The Báb, signifying in Arabic 'The Gate.' The Báb taught that the purpose of his mission was to herald a revelation far greater than his own, a prophecy which Bahá'u'lláh fulfilled when in 1863 he declared his mission in Baghdad, the occasion of the greatest of Bahá'í Festivals. Bahá'u'lláh appointed as successor his eldest son, 'Abdu'l-Bahá (1844–1921), who, with the Báb and Bahá'u'lláh, is the third of the three central figures of the Bahá'í Faith.

Bahá'ís believe that their religion is unique in the vastness and the authenticity of its scriptures, which, revealed in both Arabic and Persian and now rendered into most languages, comprise a substantial number of individual works only some of which, such as Bahá'u'lláh's *The hidden words*, *The book of certitude*, and the *Kitáb-i-Aqdas* (The most holy book), bear specific titles.

The fundamental teaching of the Bahá'í Faith is unity, whether of God, humanity, or religion. Bahá'u'lláh, who reaffirmed the oneness of God, taught further that all the great religions had proceeded from a single divine origin; all were fundamentally in agreement, and all had progressively expounded a single universal faith, albeit prescribing different social teachings to suit the needs of different ages. "The earth," he announced, "is but one country and mankind its citizens," while the destiny of all peoples was to live together in harmony within a single, equitable global polity. The supreme remedy for the ills afflicting the world was for humanity to unite in "one universal Cause, one common Faith," whose establishment should signal the fulfillment of the millennial expectations cherished by all religions, leading to the unfolding of universal peace based on justice, a civilization of unparalleled splendor, and the inauguration of a Golden Age in humanity's development on earth. It was this supernal vision that he, as the promised one of all ages, had been commissioned to realize.

By the terms of Bahá'u'lláh's Covenant, authority in the community passed to his eldest son 'Abdu'l-Bahá, thence to his great-grandson Shoghi Effendi, and is now vested in the Universal House of Justice, an elected council presiding over a hierarchy of similar bodies at national and local levels. These constitute the Bahá'í Administrative Order, the pattern of Bahá'u'lláh's new world order, and its ultimate safeguard against schism.

The Bahá'í World Centre in the northern reaches of the Holy Land has been the spiritual and administrative center of the Bahá'í Faith since Bahá'u'lláh was exiled there, in 1868, by the Ottoman government in collusion with the Persian government and the Persian and Turkish Muslim religious hierarchies. The burial places of the Báb on Mount Carmel in Haifa and of Bahá'u'lláh in Bahjí near Acre are the two holiest places on earth for Bahá'ís.

See also: Arabic; Islam and Arabic; Persian, Modern.

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Bahamas: Language Situation

Editorial Team

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The official language of the Commonwealth of the Bahamas is English, with 296 000 speakers, existing in a Creole continuum with Bahamas Creole English. Bahamas creole English is reported to be very close to Sea Islands Creole English and Afro-Seminole Creole of the United States.

That the English of the Bahamas is reported to be more reminiscent of American varieties than of the Caribbean Englishes has historical reasons. From 1670 to 1720, the Bahamas and Carolina were a single colony. After the American Revolution, many American loyalists and their slaves emigrated to the Bahamas. Because the Bahamas were unsuited to the cultivation of sugar cane, the population remained mixed for much longer (*see* **Antigua and Barbuda: Language Situation** and **Barbados: Language Situation**). Some loyalists attempted cotton production on some of the southern islands. When the cotton failed, many were financially ruined and abandoned their plantations, leaving their slaves in virtual freedom. Thus, many of the southern islands apparently had almost exclusively African populations, in contrast to the situation in the north, where the population was more mixed. This relative isolation meant that their speech retained many Creole features that were losing ground in the north.

Significant minority languages are Haitian Creole French, spoken among Haitian immigrants, and English. There is a deaf population of 16 481 and two deaf institutions. There is a dictionary of Bahamas Creole English. Literacy is 95%.

A language now extinct in the Bahamas is Taino, an Arawakan language. Its original speakers were enslaved by the Spanish, who sent them to the then Spanish colony Santo Domingo on Hispaniola (which later became the Dominican Republic) where the community died. The remaining speakers of Taino now mainly live in the United States, Puerto Rico, and Cuba. Existing speakers in these countries estimate their language to be approximately 55% Taino and 45% Spanish.

See also: Gullah; Pidgins and Creoles: Overview.

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The official language of Bahrain, an island state in the Persian Gulf, is Arabic. As in other Arab countries, the language situation in Bahrain is characterized by diglossia: Modern Standard Arabic (Arabic, Standard) is used in writing and for formal situations, and colloquial Gulf and Baharna Arabic are used in everyday speech. Of the 677 000-strong population of Bahrain, about a third (235 000) are nonnationals, and there are comparatively large communities of speakers of other varieties of Arabic, as well as of Persian (Farsi) and Urdu. The use of English is widespread in all domains of public life, reflecting the strong historical ties between Bahrain and Great Britain. The role of English has become even more important over the past two decades with the diversification of Bahrain's economy, which, after decreasing oil production, has been developing international banking and tourism sectors.

The public education system was established in 1919, and adult literacy in 2002 was 88.5%. Literacy of people from 15 to 24 years of age was even higher, 98.6%.

Bahrain's media publish in Arabic, but there are English language daily newspapers as well as an English channel on the local radio station run by the Bahrain Radio and Television Corporation.

See also: Arabic.

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See also: Arabic.

Bakhtin, Mikhail Mikhailovich (1895–1975)

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Mikhail Milosevic Bakhtin was born in Orel, Russia, south of Moscow, on November 16, 1895. Coming of age in turbulent times, he attended Saint Petersburg University between 1916 and 1918, dividing his time between classics, literature, and philosophy, while maintaining a keen interest in language outside the classroom. During the 1920s Bakhtin came into contact with Voloshinov and Medvedev, two fellow intellectuals who shared his broad interests in language, politics, dialogue, and literature. Later known as the Bakhtin Circle, these young writers met regularly to discuss the philosophy of language until 1929, when Bakhtin was arrested, detained, and later exiled to Kustanai in 1930. After working as a bookkeeper on a collective farm, Bakhtin traveled to Saransk in 1936 to accept a position at the Mordovia Pedagogical Institute, where he taught Russian and world literature until his retirement in 1961. In 1940, Bakhtin submitted his dissertation, *Rabelais and the history of realism,* to the Institute of World Literature in Moscow, for which he was awarded the lesser degree of Candidate of Philological Sciences in 1952, rather than the doctorate. Although Bakhtin was a humble scholar who received little public recognition during his lifetime, his ideas have had an enormous, global impact on the philosophy and sociology of language. Bakhtin died in Moscow, Russia, on March 7, 1975.

Bakhtin is best known for his work on dialogue, a concept he continued to develop over the course of his career. For Bakhtin, dialogue was the central reality of language, a position partly inspired by the Greek philosopher Socrates, who stressed the emergent nature of truth in dialogic exchanges between opposing parties. In Bakhtin's estimation, the most productive exchanges occur between parties that enter into a discussion with contrasting points of view, allowing for change and diversity in society. Bakhtin hinted at this position in his first major publication, *Problems in Dostoevsky's poetics* (1929), in which he praised Dostoevsky for writing 'polyphonic' novels that represent the many competing voices found in every society. Because these voices resonate with larger systems of thought, such political orientations or even scientific worldviews, Bakhtin maintained that ideology, or perspective, is pervasive in everyday language use.

The political implications of dialogue are greatly expanded in Bakhtin's later writings. In *The dialogic imagination* (1981), he identified two major trends on the ideological plane. One tendency is toward homogeneity, where 'centripetal' forces seek to centralize the perspectives, discourses, or linguistic varieties found in society, reducing diversity and the possibility of change. Taken to an extreme, this monologic tendency leads to the death of dialogue, a fearful possibility that Bakhtin personally experienced under Stalin's regime. Fortunately, other 'centrifugal' forces are at work, destabilizing meaning by promoting diversity within society, whether as competing discourses or contrasting linguistic varieties. Here Bakhtin offered one of his most important concepts, that of 'heteroglossia,' where these competing centripetal and centrifugal forces enter into ongoing conflict, potentially sustaining internal diversity within a speech community, as separate but intermingling genres, registers, sociolects, discourses, and ideologies. In *Rabelais and his world* (1965), Bakhtin offered the telling image of the medieval carnival, where unofficial discourses and genres flourished, subversively contesting the centripetal forces of official hegemony.

See also: Voloshinov, V. N. (ca. 1884/5–1936).

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Balbín, Bohuslav (1621–1688)

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Bohuslav Balbín was the seventh child born into a gentry family. After the death of his father, the family became impoverished, and young Bohuslav joined SJ at the age of 15. He studied at Jesuit colleges in Bohemia and Silesia, and in 1649 he was ordained as a priest. In the period of a vigorous recatholicization of the heretical Czech lands after the Thirty Years' War, he worked as a missionary and later as a teacher at Jesuit schools. His teaching career ended quickly and under unclear circumstances – Balbín was banned from any contacts with students, and in 1661 he became an SJ historian of the Czech province. His teaching resulted in texbooks of rhetoric (*Quesia oratoria, Brevis tractatio de amplificatione oratoria*) and a general overview of humanities (*Versimilia humaniorum disciplinarum* (1969) – lessons in Latin grammar, style, letter writing, rhetoric, and poetry).

It was his historical research and collection of sources that brought Balbín, a devoted and faithful Catholic, to his patriotism, originating in admiration of the Czech Kingdom history and of the original Czech culture. As a baroque scholar, he paid close attention to the history of locations significant to the Catholic church (especially places and legends connected with the cult of the Virgin Mary). Nevertheless, his *Epitome rerum Bohemicarum* ('A summary of Czech history') could be published only after fulfilling the censorship requirements of the SJ, since it mentioned events and historical personalities unacceptable to the Catholic church.

All Balbín's works were written in Latin. In the 17th and 18th centuries, the status and functional range of the Czech language steadily declined. After the loss of autonomy, when Vienna became the capital, administrative activities were conducted in German (German, Standard), while the major language of religion, education, and culture was Latin. Czech became a vernacular spoken among peasants, used purposefully only in sermons and other religious texts addressed to plain people. Balbín's main work, *Miscellanea historica regni Bohemiae* ('Miscellanea of the history of Czech kingdom') was outlined in 30 volumes, intending to cover not only the history but also the geography and nature of Czech lands. During Balbín's life, only 10 volumes were published. They are still considered a valuable source of historical material.

In the 18th century, the patriotic enthusiasm of Balbín's work appeared to correspond with basic ideas of a newly emerging Enlightenment – efforts to explore history and culture without prejudices. At the same time, all of Balbín's posthumously published treatises were a breeding ground for an early romantic concept of a nation as a community of people, sharing not only a territory and political establishment (a state), but primarily conceiving 'a nation' as shared history, culture, and language. In 1776, Balbin's overview of Czech literature and scholarly writing, *Bohemia docta*, was published, which was important for the early period of the Czech National Revival (a movement aiming for the rebirth of Czech culture and especially language, and later trying to emancipate the Czechs politically).

Even more important was the appearance of Balbín's *Dissertatio apologetica pro lingua slavonica, praecipue Bohemica* ('A defense of Slavonic language, particularly Czech'), finished probably in 1672 and originally not intended for the public. 'A defense of a language' is a historically specific genre merging belles lettres and journalism, with the author's intention to ardently persuade a reader that the language in question (here, Czech), however currently neglected, imperfect, or even condemned, is noble and beautiful. It has to be honored because of its glorious past (wise, noble, and powerful men used to speak, pray, and write in Czech) and it deserves to be supported and

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cultivated in order to regain its glory. A language is the essence of a national entity, which means that to preserve a language means to preserve (or re-create) a nation at the same time. (It is worth mentioning that in 1775, half of the edition of *Dissertatio* (abbrev.) was confiscated; only in 1869 could the book be published in full.) Later, Balbín's defense became a model of numerous enthusiastic papers with a similar bias. The very phenomenon of defending a language as a main representative of a 'nation' shows a striking feature of Czech culture analyzed and described by Czech semioticist V. Macura: the whole Czech culture at the end of the 18th and in the first three decades of the 19th century was language-based and language-centered, existing primarily through the language; as a matter of fact, it is a metalanguage phenomenon. Czech language functioned as a value by itself, and it was one of the most frequent topics of literary texts. Partially, this was Balbín's legacy.

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Balinese

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Balinese (Bali) is an Austronesian language spoken by some 3 million people, mainly in the islands of Bali and Nusa Penida, Indonesia, but also in western Lombok and in transmigration sites in Lampung (Sumatra) and central Sulawesi. There is a general consensus that Balinese is a member of the Bali-Sasak-Sumbawa subgroup (Esser, 1938; Dyen, 1965; Mbete, 1990), but it is also seen as a member of a wider subgroup that includes Javanese (Blust, 1985).

History and Sociolinguistics

Balinese has had a literacy tradition for over a millennium. The earliest known Old Balinese (OB) texts are inscriptions on copper plaques dated to 882 C.E., concerning royal decrees (Goris, 1954). OB is characterized by the influence of Old Javanese (Kawi) and Sanskrit, which suggests the existence of cultural and language contact between Javanese and Balinese prior to the 9th century. Javanese influence on Balinese intensified in the 14th–15th century, when Bali was controlled by the Javanese Majapahit Kingdom. Old Javanese elements and Sanskrit borrowings began to spread from highly formal – i.e., royal and religious – usage to everyday speech. These helped form the diglossic speech-level system of Modern Balinese, which is absent in OB (see Clynes, 1989, 1995). The speech-level system is invoked by differences in status between speech participants. As shown in **Table 1**, the English 'I' corresponds to several Balinese first person pronouns, each with a different specification of the speakers' and/or addressees' social status, originally based on the traditional caste stratification (Arka, 1998); e.g., *icang* is used when both the speaker and the addressee are low-caste persons. While all of them are still in use now, *tiang* is widely used for polite first person irrespective of the caste of the addressee.

There are quite a large number of words like those in **Table 1** in other categories, such as nouns, verbs,

Table 1

Pronominal forms	*Relevant social information of the participants*	
	Speaker	*Addressee*
nira	god	-
gelah	royal	
titiang	-	highest caste
tiang	-	medium caste
icang	low caste	low caste
kai	-	nonhuman

cultivated in order to regain its glory. A language is the essence of a national entity, which means that to preserve a language means to preserve (or re-create) a nation at the same time. (It is worth mentioning that in 1775, half of the edition of *Dissertatio* (abbrev.) was confiscated; only in 1869 could the book be published in full.) Later, Balbín's defense became a model of numerous enthusiastic papers with a similar bias. The very phenomenon of defending a language as a main representative of a 'nation' shows a striking feature of Czech culture analyzed and described by Czech semioticist V. Macura: the whole Czech culture at the end of the 18th and in the first three decades of the 19th century was language-based and language-centered, existing primarily through the language; as a matter of fact, it is a metalanguage phenomenon. Czech language functioned as a value by itself, and it was one of the most frequent topics of literary texts. Partially, this was Balbín's legacy.

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adjectives, prepositions and adverbs. They must be individually learned, because the related words are expressed by suppletive forms. The richness of the speech-level system is significant for Balinese verbal arts and linguistic politeness. However, the speech-level system is absent in the Bali Aga or Mountain Balinese (MB) dialect, suggesting that MB is a conservative dialect. Further evidence for this comes from the fact that MB (e.g., in the dialect of Sembiran) retains the Austronesian pronominal *aku* and *engko* and their corresponding bound forms *-ku* and *-mu*. These forms have disappeared in modern Lowland Balinese (LB). LB consists of several dialects showing phonological and lexical variations (Bawa, 1983), with Buleleng and Klungkung varieties being considered representative of standard modern Balinese.

Orthography and Phonology

The traditional Balinese script developed from the Old Javanese script, which itself originated from southern India. It is a syllabic system: a character represents a default CV (Consonant Vowel) syllable with V being phonetically [a] as in Table 2. Any specific opposition is indicated by a diacritical character on top of, below, before, and/or after it, as shown in Table 3. The line, as in the Roman script, runs from left to right.

While modern orthography in Roman script is also now commonly used, especially in paper writing, the traditional script is the only script used in *lontar* (palm leaf) writing. *Lontar* writing and the tradition of *lontar* chanting, called *ma(be)basan*, are still practiced nowadays, primarily for religious purposes. Indonesian, not Balinese, is used as a medium of instruction in schools in Bali. However, Balinese, with its traditional script in paper writing and reading, is taught in primary and secondary schools.

Table 2

ᬲ	(h)a	ᬢ	ta	ᬩ	ba
ᬦ	na	ᬲ	sa	ᬂ	nga
ᬚ	ca	ᬯ	wa	ᬧ	pa
ᬭ	ra	ᬮ	la	ᬜ	ja
ᬓ	ka	ᬫ	ma	ᬬ	ya
ᬤ	da	ᬗ	ga	ᬞ	nya

Table 3

ᬦᬾ	[na]	ᬦᬶ	[ni]	ᬦᬸ	[nu]	ᬦᬾᬭ	[ne]
ᬦᬾᬲ	[nə]	ᬦᬾᬭᬵ	[no]	ᬦᬾᬭ	[nar]	ᬦᬾᬭᬸ	[nur]

Modern Balinese has six vowels, as shown in Table 4. Conventionally, the orthography *e* represents mid front [e] and the central [ə], e.g., *penek* [pənek] 'climb'. Word-final grapheme *a* is pronounced [ə], e.g., *bapa* [bapə] 'father', but as [a] elsewhere, e.g., *bapanne* [bapanne] 'his father'. VV sequences are not diphthongs but are treated as two syllables (Clynes, 1995), possibly with an intervocalic glide in certain dialects, e.g., *liu* [liu]~[liju] 'a lot'.

Eighteen Balinese consonants are shown in Table 5. Word-final /k/ may be also alternatively realized by a glottal [ʔ] in certain dialects, but a glottal stop is not phonemic in Balinese.

Balinese allows a maximally $C_1C_2VC_3$ syllable structure, where only V is obligatory and C2 is restricted to a liquid/glide, e.g., *alih* (V.CVC) 'search', *kranjang* (CCVC.CVC) 'basket', and *meme* 'mother' (CV.CV). Stress is on the final syllable of a root, and a bound morpheme does not generally attract stress, particularly in the Badung dialect, e.g., *jemak* [dʒə.mak] 'take', *jemaka* [dʒə.mak.ə] 'be taken', and *jemakang* [dʒə.mak.əŋ] 'be taken for' (stressed syllables are underlined).

Morphosyntax

Balinese is an agglutinating language with relatively rich verbal and nominal morphology. A typical verbal expression involves a root and a voice morphology, which can be: (i) the homorganic nasal prefix N, indicating an 'active' or 'agentive' voice, (ii) a zero prefix, indicating undergoer or objective voice, (iii) the middle (intransitive) voice prefix *ma-*, which expresses a wide range of meanings, e.g., reciprocal (*madiman* 'kiss each other'), reflexive (*mapayas* 'dress oneself'), agentive (*magae* 'work'), patientive (*makeplug* 'explode'), and stative-passive (*maadep* 'be sold'). A verb may also have a causative or applicative affix. The applicative suffix *-in* is typically associated with a locative or source role, whereas the applicative *-ang* is generally associated with a theme, goal/benefactive, or instrumental role; hence the contrast of *jemak* 'take' → *jemak-in* Y 'take something from Y' vs. *jemak-ang* Y 'take something for Y'. The causative *-in* or *-ang* commonly appears with intransitive bases, but certain transitive verbs may have it, e.g., *diman* 'kiss' → *diman-ang*

Table 4

	Front	*Central*	*Back*
High	i		u
Mid	e	ə	o
Low		a	

Table 5

		Labial	*Alveolar*	*Palatal*	*Velar*	*Glottal*
Stop	V-less	p	t		k	
	V-ed	b	d		g	
Aff.	V-less			tʃ		
	V-ed			dʒ		
Nasal		m	n	ɲ	ŋ	
Fricative			s			h
Trill			r			
Lateral			l			
Glides		w		j		

'make X kiss Y'. When *-in* and *-ang* appear with the same intransitive base, the derived verb generally contrasts in meaning, e.g., *tegak* 'sit' → *tegak-in* 'sit on something' (applicative *-in*) vs. *tegak-ang* 'make somebody sit' (causative *-ang*), *paek* 'near' → *paek-in* 'move close(r) to something' (applicative *-in*) vs. *paek-ang* 'make something close(r) to something' (causative *-ang*).

Word order is typically S(ubject)–V–O(bject), with S possibly coming after VO. In a double-object construction, the order of the two objects is fixed: S–VO_{Goal}–O_{Theme}.

Balinese appears to have symmetrical objects (Arka, 1998, 2003): either O_{Goal} or O_{Theme} could generally alternate to become S in a nonagentive voice construction, given the right context and intonation contour.

Balinese grammar has been well researched, mainly in the form of Ph.D. dissertations. Hunter (1988) and Beratha (1992) were historical-descriptive in perspective; Artawa (1994) was typological, highlighting the ergativity in Balinese syntax; and Clynes (1995) was also descriptive, focusing on Balinese phonology and morphosyntax (based on the dialect of Singaraja). Pastika (1999) was functional, focusing on the voice selection in Balinese narrative discourse. Arka (1998, 2003) was typological and theoretical, focusing on topics such as phrase structures, argument structures, and (reflexive) binding from a Lexical Functional Grammar (LFG) perspective. Wechsler and Arka (1998) and Wechsler (1999) were theoretical, from a Head-driven Phrase Structure Grammar (HPSG) perspective. Previous work on Balinese, not in the form of dissertations, also consisted essentially of descriptive sketches of grammar, e.g., Kersten (1970), Barber (1977), and Oka Granoka *et al.* (1985).

Dictionaries include Balinese-Indonesian (Warna *et al.*, 1993; Kersten, 1984; Ananda Kusuma, 1986), Indonesian-Balinese (Bahasa, 1975; Ananda Kusuma, 1986; Sutjaja, 2004), Balinese-English (Shadeg, 1977; Barber, 1979; Sutjaja, 2000), English-Balinese (Sutjaja, 2000), Kawi-Balinese-Dutch (Van Der Tuuk, 1897), and monolingual Balinese (Simpen, 1985; Sutjaja, 2003).

See also: Javanese; Malayo-Polynesian Languages.

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Balkans as a Linguistic Area

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Definitions

Sprachbund

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Balkan

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The Balkan Languages

For linguistics, the Balkan sprachbund has traditionally consisted of Albanian, Greek, Balkan Romance (BR), and Balkan Slavic (BS). Albanian is divided into two dialects, Gheg north of the river Shkumbi and Tosk south of it. The modern standard is based on northern Tosk. Mainland Greek is also divided between northern and southern dialects at the Gulf of Corinth and the northern frontier of Attica, the southern dialects of the Peloponnese being the basis of the standard vernacular Dhimotiki. During the 19th century, Modern Greek was still called *Romaic*, i.e., 'Roman', a reference to Byzantium as the second

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Balkans as a Linguistic Area

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Rome. BR consists of Romanian, Aromanian, Megleno-Romanian (MR), and Istro-Romanian. Dalmatian, a remnant of West Balkan Romance, whose last speaker died in 1898, is rather poorly attested and generally does not figure in Balkan linguistic accounts. Istro-Romanian is, like Arbëresh (the Albanian of Italy) and Asia Minor Greek (until the exchange of populations between Greece and Turkey in 1923), outside the Balkan geolinguistic area (see 'Balkan Languages vs. Languages of the Balkans'). The Romanian standard is based on the Wallachian dialects of the south, as is the standard of the Republic of Moldova, which at various times has called its official language Moldovan or Romanian. (At present [31 October 2004] the official name is Moldovan.) Aromanian, spoken in Albania, Greece, the Republic of Macedonia, and southwestern Bulgaria (with a large diaspora in Romania, especially Dobrogea) is divided into north/west dialects of Albania and western Macedonia and south/east dialects of Greece and eastern Macedonia. A standard based primarily on the eastern dialect is in use in the Republic of Macedonia. MR survives in seven villages near Gevgelija in the southeast of the Republic of Macedonia and across the border in Greece. During the 19th century, BR was often called Wallachian. The term 'Vlah' can be used as a convenient cover term for BR south of the Danube (Aromanian plus Megleno-Romanian). BS consists of Bulgarian, Macedonian, and the southeast Serbian (Torlak) dialects. Bosnian/Croatian/Serbian (BCS) together with Slovene, form the West South Slavic group, and Macedonian and Bulgarian comprise East South Slavic. The Bulgarian standard is based on its eastern dialects, the Macedonian standard on its west-central dialects. The northern and western boundaries of Torlak as a Balkan dialect are variously defined using phonological or morphological criteria. The narrowest definition is morphological, e.g., the isogloss for the presence of the postposed definite article; the broadest definition is phonological, e.g., the absence of distinctive vocalic length and tone. During the 19th century, BS was often called 'Bulgarian,' and Bulgarian and Serbian linguists and armies fought over where to draw a line between Bulgarian and Serbian. Unable to adjust to modern times, many Bulgarian linguists still cling to the 19th-century practice.

Romani Despite having been summarily dismissed by traditional Balkan linguists, Romani in the Balkans displays many of the same contact-induced structural phenomena and is increasingly present in Balkanological works. Two of the four main dialectal groups of Romani are spoken in the Balkans: Balkan and Vlax (not to be confused with Vlah). The Vlax dialects of Romani take their name from the fact that they took shape in Romania, but they are now dispersed all over Europe and beyond. In the Republic of Macedonia, a Romani standard is emerging on the basis of the Arli dialect of the Balkan group. Unless otherwise specified, references to Romani refer to those dialects spoken in the Balkans.

Turkish Balkan Turkish is divided into two major dialect groups: West Rumelian Turkish (WRT) and East Rumelian. The boundary between the two corresponds roughly to the east-west line of Bulgarian dialects. The Christian Gagauz of Bulgarian and Romanian Dobrudja and Gagauz Yeri in Moldova and adjacent parts of Ukraine speak a language in the Oghuz group – to which Turkish also belongs – which was recognized as official in the USSR in 1957. Although most Balkan linguistic studies treat Turkish as an adstratum, contributing lexicon and phraseology but very little else (aside from evidentiality, see 'Evidential' below), WRT and Gagauz also participate to a certain extent in the Balkan sprachbund. Most of Gagauz, however, ended up in the former Russian Empire, due to migration and border changes. As a result, most of Gagauz is now more influenced by Russian, while the dialectal Gagauz remaining in the Balkans is in need of description.

Jewish Languages Judezmo, the language of the Jews expelled from Spain in 1492, became the majority language among Balkan Jews, overwhelming Judeo-Greek (Yavanic, Yevanic), which survived in the Romaniote liturgy and some enclaves in Epirus. (A written version of Judezmo based on literal translation from Hebrew is known among scholars as Ladino.) Although most speakers of both Judezmo and Judeo-Greek were murdered in the Holocaust, these languages survive as endangered languages and also participated in Balkan linguistic processes.

Balkan Languages vs. Languages of the Balkans There are many other languages spoken in the Balkans in enclaves with varying social relations, e.g., Armenian, Circassian (until 1999), German, Hungarian, Ruthenian, Tatar, Ukrainian, Yiddish, etc. Aside from the dialects spoken in Romania, most of these are outside the geolinguistic Balkans, which for our purposes has a northwest boundary defined by contiguous Albanian dialects that join the major Torlak isoglosses continuing to the Danube. (Such a definition includes the southernmost Slavic dialects of Montenegro as well as the Slavic dialects of northern Kosovo, neither of which fall in the Torlak group. In terms of the Balkan sprachbund, these dialects do show some important transitional features, which will be

noted.) For the most part, the enclave languages were late arrivals or outside the area of intensive diffusion/convergence and did not participate in the type of complex Balkan multilingualism that characterizes the sprachbund as a whole. We can thus distinguish Balkan languages, i.e., those in the sprachbund, from languages of the Balkans, i.e., languages spoken in the Balkan peninsula.

History of Balkan Linguistics

1770–1861

The earliest collections of Balkan linguistic material were intended to eliminate Balkan linguistic diversity. The 1770 Greek-Aromanian-Albanian vocabulary of T. Kavaliotis and the 1793 or 1794(?) Greek-Aromanian-Macedonian-Albanian lexicon of Daniil of Moschopolis (Albanian Voskopoja) were explicitly aimed at the Hellenization of the speakers of other Balkan languages. The first was republished in 1774 by J. Thunmann, who was the first to suggest that Albanians and Romanians were descended from Illyrians, Dacians, and Thracians, thus laying the groundwork for the substratum theory of Balkan linguistics. The second was republished in 1814 by M. Leake, who suggested that similarities among Albanian, BR, and Greek were due to BS influence. His one concrete example was the postposed definite article. It was this same phenomenon that most impressed J. Kopitar, whose 1829 characterization of BR, BS, and Albanian as *drey lexikalisch verschiedenen, aber grammatisch identischen Sprachen* 'three lexically distinct but grammatically identical languages' – which he attributed to the influence of a Thraco-Illyrian substratum – is taken as the earliest formulation characterizing the Balkan sprachbund. Kopitar also noted the replacement of infinitival with subjunctive constructions and the formation of the future using 'want' as shared with Greek and Serbian as well.

A. Schleicher is sometimes cited as the first to formulate the Balkan sprachbund in 1850, when he writes of Albanian, BR, and BS saying *eine Gruppe aneinandergränzender Sprachen zusammengefunden hat, die bei stammhafter Verschiedenheit nur darin übereinstimmen, dass sie die verdorbensten ihrer Familie sind* ('a group of propinquitous languages has coalesced that, being of different lines of descent, agree only in the fact that they are the most corrupt in their families'). However, since he gives no indication of the causes of this 'corruption', his formulation differs from Kopitar's mainly in its ideology of language change as degeneration.

The next real advance in the development of Balkan linguistics was F. Miklosich's 1861 article on Slavic elements in Romanian, which added genitive-dative merger (see 'Genitive-Dative Merger'), object pronoun doubling (see 'Resumptive Clitic Pronouns [Reduplication, Replication]'), and the formation of teens (see 'Numeral Formation: The Teens'). Miklosich accorded more attention to Greek and was also the first to adduce a number of phonological changes, including the development of stressed schwa (see 'Vowel Reduction and Raising') and the raising of unstressed /a/ and /o/ to schwa and /u/, respectively (see 'Stressed Schwa').

1861 Onward

The next six decades were characterized by the gathering of materials relating to specific Balkan languages or specific aspects of individual or pairs of Balkan languages. The 1920s saw the basic syntheses and theoretical formulations that continue to inform the field. Trubetzkoy's contribution has already been described. In 1925, A. Seliščev attempted a balanced account of Turkish, Slavic, Latin, Greek, and substratum languages as the sources of various Balkanisms, i.e., the similarities among the Balkan languages that can be attributed, at least in part, to shared, contact-induced change. Sandfeld (1930) tried to attribute almost all the commonalities of the Balkan sprachbund to the influence and prestige of Byzantine Greek. Other scholars have laid particular emphasis on Balkan Latin as the primary causal factor, while our knowledge of the pre-Latin non-Hellenic languages of the Balkans remains too meager for almost any serious speculations beyond the lexicon.

While the 1920s saw the establishment of Balkan linguistics as a subdiscipline within linguistics, the period from 1930 to 1960 was characterized by slow growth and was also the period when the insights gained in Europe finally came to the attention of North American linguists. From the 1960s onward, there has been a constant increase in the production of studies pertaining to the Balkan languages and Balkan linguistics. At the same time, studies of such contact-induced phenomena as creolization, code switching, and language shift have led to the identification of contact linguistics as an overarching field of study. More recently, in the past decade or so, a renewed interest in linguistic typology has brought forward questions of the extent to which the Balkan sprachbund is or is not part of a larger European linguistic area, defined more by typological profile without necessarily identifying specific paths of diffusion or convergence. We will return to the question of Eurology vs. Balkanology in 'Causation'.

Balkanisms

This section surveys some of the principal Balkanisms (see '1770–1861') as identified during the course of the past two centuries. Although system, not mere inventory, must be the basis of detailed study, and a given surface phenomenon may function differently in different systems, it is nonetheless convenient to use lists as a kind of shorthand for the systemic relations that can yield the most insights. We do not want to fetishize the labels for these systemic manifestations, assigning numeric values to them and tallying up the number of points a language 'scores'. Rather these labels stand for complex interrelations that include differences as well as similarities that must be elucidated in their larger contexts (cf. Friedman in Reiter, 1983).

Phonology

In contradistinction to linguistic areas such as the Caucasus, the Northwest Coast, and South Asia, where phonological features such as glottalization and retroflexion are among the most salient commonalities, there are no truly pan-Balkan phonological features. Rather, there are articulatory tendencies of greater or lesser extent.

Vowel Reduction and Raising The reduction of unstressed vowels to schwa or nonsyllabic elements (and thence sometimes to zero) as well as the raising of unstressed mid-vowels (/e/ and /o/) to high vowels (/i/ and /u/, respectively) can be treated as Balkan, albeit not pan-Balkan. Both Albanian and BR show a tendency to reduce unstressed vowels as early as the Latin period, e.g., Lat. *imperātor* > Albanian *mbret* and Romanian *împărat* 'king'. While shared phonological tendencies in Albanian and BR, like shared vocabulary of pre-Latin origin, are attributed by some scholars to substrate influence, the evidence of vowel reduction in Western Romance leads other scholars to suggest that this is a typological rather than an areal feature. Nonetheless, the raising and/or elimination of unstressed vowels is characteristic of southeastern Macedonian, eastern Bulgarian, northern Greek, BR, and Gheg, although the details differ among these languages.

Stressed Schwa All the Balkan languages and their dialects possess the classic European five vowel system /a, e, i, o, u/, at least under stress. A phenomenon common in the Balkans is the existence of a stressed schwa, but its status as a contact-induced phenomenon is not pan-Balkan. Greek lacks stressed schwa altogether. In Macedonian, almost all the dialects outside the west-central area have stressed schwa, but of different origins in different areas, and some western peripheral dialects also lack stressed schwa. Most of Bulgarian has stressed schwa, but not the Teteven-Erkech and central Rhodopian dialects. In Albanian, stressed schwa develops from nasal *â* only in Tosk, but it is incorrect to characterize all of Gheg as lacking stressed schwa, since it also occurs in central Gheg as a result of later processes. Romani has schwa when in contact with languages that have it. WRT has a tendency to lower and front the high back unrounded vowel to schwa.

Other Vowels Most Balkan languages lack front rounded vowels, but most of Albanian has /ü/, or, in West Central Gheg, /ö/. Southern Montenegrin dialects in contact with Albanian also have /ü/, but East Central Gheg, which is mostly in Macedonia, unrounds /ü/ to /i/, as does southernmost Tosk (Lab, Çam, Arvanitika), in contact with Aromanian and Greek (which also merged /ü/ with /i/, a change that had not yet been completed in the 10th century). Similarly, WRT tends to eliminate /ö/ by merging it with /o/ or /ü/ (more rarely /e/), and /ü/ (like /u/ and /ɯ/) becomes /i/ word finally. Other vocalic phenomena that have been suggested are relatively localized.

Consonants The alternation of clear /l/ before front vowels and velar /ł/ elsewhere is characteristic of BS (including Torlak but not the rest of BCS), Northern Greek, Balkan Romani, and Vlah, but not Albanian, where the two sounds are in phonemic contrast, nor Daco-Romanian and Southern Greek, where only clear /l/ occurs. Aromanian has Greek and Albanian interdental and Greek voiced velar and palatal fricatives in loanwords from Albanian and Greek, but these tend to be replaced by corresponding stops and the palatal glide by speakers who do not know Greek or Albanian, particularly the younger generation in Macedonia.

Aside from Greek, most Balkan languages have an opposition between strident palatal affricates, on the one hand, and mellow palatals, dorso-palatals, or palatalized velars, on the other. The opposition is neutralized in Albanian, BS, and WRT dialects in Kosovo, parts of Western Macedonia, and along the Serbo-Bulgarian border. Northern Greek has palatals lacking in the south.

In western Macedonia, the velar fricative is generally lost or replaced in Albanian, Macedonian, and WRT, a phenomenon that extends into parts of Kosovo, as well as adjacent Serbia, much of Montenegro, and Bosnia-Herzegovina, where the preservation of BCS /x/ is characteristic of Muslim and some Catholic dialects now Bosnian and Croatian, respectively.

In the northern Gheg of Malësia e Madhe, final devoicing is a phenomenon shared with adjacent Montenegrin dialects. It is worth noting that final devoicing is atypical for most of the rest of BCS and Gheg, and it appears rather to be a Macedonian feature extending into this region. Such influence also seems to be the case in the transitional Gheg and northern Tosk dialects. Some of the Romani dialects in this region also have final devoicing, and in the WRT of these regions final devoicing, which is usually limited to stops in Turkish, extends to fricatives. Five of the seven MR villages also have final devoicing.

Prosody Although prosodic distinctions of length, and in some cases pitch, were present in the attested ancestors of the Balkan languages, the modern Balkan languages are generally characterized by the absence of length and tone and the presence of a stress accent that usually does not move further back in the word than the antepenultimate syllable. If stress does move further back, there is usually a secondary stress on one of the last three syllables. However, Northern Gheg and Southern Tosk preserve Common Albanian length, and Southeastern Macedonian has new long vowels as the result of loss of intervocalic consonants and elision. Similar new long vowels occur in Gora, a string of Slavic-speaking Muslim villages along the western and northern slopes of Mounts Korab and Šar in northeastern Albania and the southwestern corner of Kosovo. The most significant isoglosses (fixed antepenultimate stress, postposed article, etc.) link Goran with the northwest Macedonian dialects rather than with the Serbian of Prizren.

Morphosyntax

Grammaticalized Definiteness In BS, BR, and Albanian, native demonstrative pronouns have been encliticized or suffixed to nominals (normally the first in the noun phrase) and become definite articles. The article follows a plural marker, if any, and in BS the clitic-like nature of the article is seen in that it does not trigger certain morphophonemic alternations, e.g., Macedonian *starec* 'old man', *starci* 'old men' but *starecot* 'the old man' and not **starcot*. Hamp (1982) adduces evidence suggesting that the autochthonous language that became Latinized into Romanian and with which the ancestor of Albanian was in contact might already have had a postposed definite article by the time of contact with Latin. Common Slavic already had a postposed relative pronoun **jĭ* affixed to adjectivals to denote definiteness, as this phenomenon is attested in Old Church Slavonic (OCS; 9th–11th centuries), and the morphology (but not the grammatical meaning) survives in Slavic outside the geopolitical Balkans. Remnants of this older definite/indefinite opposition survive in West South Slavic adjectives, and traces of the morphology occur in BS, e.g., Macedonian *star* 'old INDEF. MASC', *stariot* 'old DEF.MASC', where the /i/ indicates that the newer definite article has been suffixed to a definite adjectival form. Scandinavian and dialectal North Russian also have postposed definite articles of pronominal origin, and Czech, which has been in close contact with German, has uses of its deictics that are basically articular. These typological parallels and historical antecedents, however, do not change the fact that the BS postposed definite article developed during the period of its contact with BR and Albanian.

Greek and Romani have preposed definite articles, both based on native material. In the case of Greek, the pronoun that became an article was still mostly demonstrative and was facultative except with proper names in Homeric, but it was obligatory in Attic. Romani articles look like borrowings from Greek, e.g., MASC NOM SG *o* FEM NOM SG *i*, but the oblique forms /le/ and /la/ in Vlax dialects demonstrate that the Romani articles are derived from native demonstratives, reflecting the regular change of $*t > l$, which occurred prior to contact with Greek. It was contact with Greek, however, that triggered the transformation of native material into definite articles, and Romani usage patterns very much like Greek. Romani dialects outside the Balkans in contact with languages lacking definite articles tend to lose them.

The use of an atonic form of the numeral 'one' as an indefinite article is characteristic of the Balkan languages and, even though such developments are common in many languages, is arguably a Balkanism. 'One' was not used in this function in OCS, Ancient Greek, or Latin, but it was so used in Orkhon Turkic (8th century C.E.). To this we can add the fact that such usage does not occur in East Slavic. Usage in Turkish, Albanian, and BR is at a similar level of frequency to that of English, although details in individual grammars will cause some lack of isomorphism. Usage in BS and in Greek is approximately half that of the other Balkan languages, while usage in Romani in the Balkans patterns with BS and Greek, and Romani elsewhere patterns like its contact languages. An indication that this is an areal phenomenon despite the occurrence of such usages in Western Europe and elsewhere is the fact that, as one moves north and east through West South Slavic territory, the usage becomes increasingly restricted.

Finally, we can mention here the phenomenon of double determination, i.e., the presence of a definite article on a noun modified by a demonstrative pronoun. Such usage occurs in Greek, BR, BS, Albanian,

and Romani, although the rules and relative frequency and acceptability of the construction vary. In Greek it is obligatory, e.g., *autós o ánthrōpos* or *o ánthrōpos autós* but not **autós ánthrōpos* 'this person'. In Romanian, the article is not used if the deictic is preposed, but is used if it is postposed (and the deictic takes the so-called deictic particle *-a*): *omul acesta* but *acest om* 'this person', cf. Aromanian *aistã carte*, *cartea aistã* 'this book'. Megleno-Romanian has frequent double determination *tsista lup-u* 'this wolf-DEF', but indefinite nouns also occur *tsista drāc* 'this devil-INDEF'. In Albanian, the deictic is preposed to either the indefinite or definite: *ai njeri*, *ai njeriu* 'this person'. In BS, double determination occurs but is considered dialectal, Macedonian *ovoj čovekov* (vs. *ovoj čovek*) 'this person', or Torlak *taja starata* 'that old [lady]'. Romani permits but does not require the use of a definite article with a demonstrative, in which case the article must precede the substantive but the demonstrative can precede or follow: *kova manuš*, *kova o manuš*, *o manuš kova* 'this person'. Double determination or the order noun-determiner is pragmatically more thematic in the discourse.

Resumptive Clitic Pronouns (Reduplication, Replication) Balkan languages are characterized by the use of clitic or weak resumptive object pronouns that agree in gender, number, and case with the nonclitic/strong pronoun or substantive they refer to. This phenomenon is called (object/pronoun) reduplication/doubling in Balkan linguistics and is connected to expressions of definiteness, referentiality, and animacy: the first candidates for reduplication are personal pronouns (inherently definite and, in the first two persons, usually human), then indirect objects (usually human, often topicalized), then definite direct objects, and finally specific or topicalized direct objects.

From a morphosyntactic point of view, there are four types of reduplication: pronominal object doubling, substantival object replication, pronominal possessive doubling, and substantival possessive replication. All four phenomena can be illustrated in the following Macedonian sentence:

Tatko mi	moj	i	majka
father me.DAT	*my.M*	*and*	*mother*
mu	na car-ot	im	rekoa
him.DAT	*to king-the*	*them.DAT*	*said.3PL.AOR*
nim	da	mu	gi
them.DAT	*SP*	*him.DAT*	*them.ACC*
dadat	knigi-te	na	dete-to
give.3PL.PRES	*books-the*	*to*	*child-the*

'My father and the king's mother told them to give the books to the child.'

The first three of these expressions are facultative and could be replaced by *tatko mi*, *majkata na carot* (*majka* is definite), and *im*, respectively. The reduplication serves to emphasize or focus the referent of the reduplicated pronoun. The last set of reduplications, *mu . . . na deteto* and *gi . . . knigite*, are obligatory in standard Macedonian and, for the most part, in the western dialects on which it is based. The norm requires reduplication for definite direct objects and all indirect objects. In practice, however, even the most normative grammar shows that specificity or topicalization rather than definiteness is the trigger (Koneski, 1967: 232):

kako	vistinski	ja	doživuvame	edna	situacija
how	*truly*	*it.ACC*	*experience. 1PL.PRES*	*one*	*situation*

'how we actually experience a [given] situation'

Pronominal object doubling occurs in all of BS (and southern Montenegro), BR, Albanian, Greek, and Romani. It is conditioned by discourse factors such as emphasis or focus and can be compared to the use of subject pronouns. Just as the fact that the subject is marked on the verb makes the subject pronoun redundant unless there is a need for emphasis or specification, so, too, the clitic pronominal object, which is the required form if the object is a pronoun, makes the full form redundant except under similar discourse-bound circumstances. The absence of such doubling from the rest of BCS is a diagnostic separating Balkan from non-Balkan Slavic.

The clitic replication of oblique nominals shows how grammatical change can enter a language via discourse phenomena and at the same time supports Topolińska's observation that analytic markers of referentiality are characteristic of convergent development. Object reduplication is another scalar Balkanism. It is rare in Torlak and used only for emphasis and thus separates East from West South Slavic. Similar conditions hold for Romani except in possessive constructions. Object reduplication is more pragmatically conditioned and less grammaticalized in Bulgarian, Romanian, and Greek, where the phenomenon signals topicalization, focus, or emphasis, and is restricted by factors such as animacy (or humanness) and degree of referentiality (definiteness, specificity, determinacy, etc.). In Albanian, Vlah, and West Macedonian, reduplication has become grammaticalized. It is most frequent in Macedonian, where, unlike in the other Balkan languages, it can even occur (facultatively) with indefinite indeterminate pronouns such as *nikoj* 'nobody'.

While it lacks a definite article, Turkish does have a special accusative marker used for definite or specified direct objects. The following proverb illustrates

how the Turkish definite accusative is rendered by Balkan object reduplication. Note that Greek and Bulgarian have reduplication with an indefinite object, indicating its specificity:

Turkish:	Yavaş	başı	kılıç	kes-mez (Turkish)		
	gentle	*head-DEF.ACC*	*sword*	*cuts-not*		
Bulgarian:	Pokorena	glava	sabja	ne	ja	seče
	bent	*head*	*sword*	*not*	*it.ACC*	*cuts*
Greek:	Kefáli	proskynēméno	spathì	dhèn		
	head	*bent*	*sword*	*not*		
	tò	kóvei				
	it.ACC	*cuts*				
Romanian:	Cap-ul	plecat	nu	l	taie	sabia
	head-DEF	*bent*	*not*	*it.ACC*	*cuts*	*sword.DEF*
Albanian:	Kokën	e	falur	yatagan-i		
	head	*PART.F.DEF.ACC*	*bent*	*sword-DEF*		
	nuk	e	pret			
	not	*it.ACC*	*cuts*			

'A/The sword does not cut off a/the bent head'
(= Keep your head down.)

Possessive doubling is a more restricted phenomenon. The use of dative clitics to indicate possession in Macedonian is limited to kinship terms, Aromanian has special possessive clitics that can only be used with kinship terms, and Albanian also has special possessive constructions for kinship terms. In Bulgarian, possession is usually signaled by a dative clitic following the definite form of the noun, and possessive adjectives, which are the norm in Macedonian, are more emphatic in Bulgarian. In Greek, clitic dative pronouns after the definite form of the noun is the normal manner of indicating possession, and emphasis is rendered by adding the appropriate form of the adjective *dikós* '[one's] own' immediately before the pronoun. However, pronominal doubling is also used colloquially for emphasis:

to	vivlio	mou	mena
the	*book*	*me.GEN*	*me.GEN*

'**my** book'

Romanian also has such clitic doubling colloquially:

propria-mi	mea	semnătura
own.FEM-me.DAT	*my*	*signature.DEF*

'my very own signature'

Substantival possessive replication occurs in all the Balkan languages, but the details differ from language to language. The Turkish construction of genitive possessed plus pronominal suffix on the possessor is the normal pattern:

kral-ın	anne-si
king-GEN	*mother-his*

'the king's mother = the mother of the king'

Genitive-Dative Merger Albanian, BS, BR, and Greek have no formal (i.e., surface) distinction between the shape of the genitive and the shape of the dative, the dative having replaced the genitive except in Greek, where the genitive replaced the dative. The same forms thus do double duty for marking possession and indirect objects. Romani and WRT maintain the genitive/dative distinction, and the situation is more complicated in Albanian and MR. Albanian has merged genitive and dative but has a distinct ablative. The dative is used as the object of a verb, the genitive is preceded by a particle of concord, and the ablative is the object of certain prepositions or in apposition to another substantive. In the indefinite plural, however, Albanian has a special ablative form in *-sh*. Pronominal declension also has a distinct ablative form used with certain prepositions, NOM *nga unë/djali* 'from me/the boy', ACC *për mua/djalin* 'for me/the boy', DAT *më tha mua/i tha djalit* 'he told me/the boy (with initial clitic reduplication)', ABL *prej meje/djalit* 'from me/the boy'. MR preserved a remnant of the genitive-dative distinction, albeit only in the speech of the oldest generation: *cari* 'who' *pe cari* 'whom.ACC', *la cari* 'to whom.DAT' but *al cruj* 'of whom, whose'. Elsewhere, the dative and accusative are distinct, and the genitive is identical to the dative.

Analytic Case Relations All the Balkan languages have simplified their inherited patterns of inflection. Eastern Macedonian and colloquial Bulgarian have gone the farthest, completely eliminating all traces of case morphology other than accusative personal pronouns and accusative vs. dative clitics. The marking of nonclitic dative objects is by means of the preposition *na* and the accusative pronoun. All other case relations are likewise indicated syntactically throughout BS, usually by a preposition but sometimes just by apposition. Western Macedonian preserves a distinctive set of dative synthetic pronouns, and, in the dialects that serve as the basis for the standard, a few remnants of animate singular masculine accusatives. As one moves further to the periphery of BS in the southwest and north, the complexity of case marking increases to include feminine accusatives, masculine datives, feminine datives, and eventually, in Gora and Torlakia, oblique plurals. In the Torlak dialects and the Macedonian dialects around Korça in Albania, case marking also occurs in the definite article. The other Balkan languages all retain at least three distinct cases (nominative, accusative, and genitive-dative).

Balkan Romani and WRT both preserve their full inflectional systems, but with tendencies toward simplification that show an intersection between the areal and typological. From a typological point of view, it is the peripheral cases that are expected to be lost first, and this is precisely what happens. Thus, WRT exhibits dative-locative confusion:

gittı-k	Selanik-te
went-1PL.AOR	*Salonica-LOC*

'We went to Salonica'

There is also a tendency to eliminate case marking in locational postpositions:

ürti	üsti [vs üstü-n-de]	kedi-ler
blanket top	*top-its-LOC*	*cat-PL*

'on top of his blanket [there were] cats'

Romani dialects in contact with BS tend to replace the locative with the dative and the dative, locative, and ablative with prepositional constructions derived from case affixes, themselves of postpositional origin:

jekh-e	aindž-a-te	vs.	jekh-e	aindž-a-ke	>	k-i jekh aindž	
one-OBL	*field-OBL-LOC*		*one-OBL*	*field-OBL-DAT*		*to-FEM one field*	
'in a field',			'to a field'			'in/to a field'	

aindž-a-tar	=	tar-i aindž
field-OBL-ABL		*from-FEM field*

'from a field'.

Outside the pronouns, a distinct Romani accusative is limited to animate (or in some dialects referential) nouns, while in Turkish accusative marking is limited to definite or specific direct objects (see 'Resumptive Clitic Pronouns' [Reduplication, Replication]).

The vocative survives in all the Indo-European Balkan languages, and some argue that this preservation is a shared archaism, reinforced by contact, which is consistent with the direct encounters that lead to contact phenomena. It runs counter to the tendency toward analytism, however.

Analytic Gradation of Adjectives Although the comparative is analytic in all the Balkan languages, remnants of synthetic comparatives survive at the peripheries, i.e., Greek has a number of inflected comparative forms, and northern Torlak preserves a very limited set. In the rest of BS, analytic comparatives with *po* are realized with almost complete consistency. Southern Montenegrin dialects also have analytic adjectival gradation using the same markers. BR, Albanian, and most Balkan dialects of Romani have complete consistency in the analytic marking of the comparative, the markers being *mai* (<*magis*) in Romanian and Megleno-Romanian, *cama* (*quam* + *magis*) in Aromanian, *më* in Albanian, and borrowed in Romani (generally the marker of the main contact language, but Slavic *po* and Turkish *da[h]a* are both more widespread). Remnants of a synthetic comparative in *-eder* also survive in some Romani dialects, but generally those spoken outside the Balkans. Given that Romani entered the Balkans some time between the 10th and 13th centuries, and given that during this same period Slavic preserved its inflectional system of adjectival gradation, it would appear that BS and Romani were undergoing this shift at about the same time, and those dialects that left the Balkans did so before its completion.

In general, the standard of comparison is an ablative marker, which is synthetic in Turkish and most of Romani but prepositional (lexical 'from') in BS, BR, Greek, some Romani, and Albanian, particularly Tosk. Albanian can also use relative *se* and BR can have relative *ca*. Clausal comparisons (e.g., 'to eat is better than to sleep') in Albanian, BR, and BS involve quantifiers, *se [sa]* 'that [how much]', *de.cît* 'from. how much', *ot.kolko[to]* 'from.how much [that]', respectively. Greek has *pará* 'contrary to, despite'.

There is a bifurcation in the superlative between Turkish and BS, on the one hand, and Greek and Albanian on the other, with BR and Romani occupying a middle ground. In Turkish and BS, the relative superlative is purely analytic and uses native markers: Turkish *en*, BS *naj*. In Greek and Albanian, the relative superlative is expressed by the definite of the comparative. (Greek also has a synthetic absolute comparative in a few adjectives.) Romanian and most of MR pattern like Albanian, whereas Aromanian and the MR of Tsãrnareka have borrowed Slavic *naj*.

The expression of analytic adjectival gradation in Turkish is attested in the oldest monuments (8th century). The Greek dialects of Epirus, Thrace, Asia Minor, and of the Sarakatsan (transhumant Hellenophone shepherds) use the comparative marker *[a]kóm[a]* 'yet, still', calquing exactly Turkish *daha* (Table 1).

In Moldavian Gagauz, *sam* (<Russian *samyj*) is in competition with *en* as the superlative marker for the younger generation of speakers.

Numeral Formation: The Teens The formation of teens by means of a construction meaning 'numeral on ten' is pan-Slavic but absent from Baltic, occurs in BR but not the rest of Romance, and is also Albanian. Although assumed to be a calque from BS into BR and Albanian, Hamp (1992) has pointed out that the words for 'twenty' in BS and BR and 'thirty' in Albanian show the numeral 'ten' is masculine in Slavic but feminine in Albanian and BR. Based on the isomorphism in gender for BR and Albanian and a combination of old shared sound changes and ancient

Table 1 Balkan adjectival gradation

Turkish	daha	büyük	ablative	en büyük
Romani (Arli)	po/da[h]a	baro	ablative	en/naj baro
Bulgarian	po-	goljam	ot	naj-goljam
Macedonian	po	golem	od	najgolem
Aromanian	kama	mari	di	nai mari
MR (Tsărnareka)	mai	mari	di	naimar[l]i
				most big
MR	mai	mari	di	tsăl mai mar[l]i
Romanian	mai	mare	de[cît]	cel mai mare
Albanian (Tosk)	më	i madh	nga	më i madhi
Greek	pio	megálos	apó	o pio megálos
	more	big	from	the more big
	'bigger than'			'biggest'

Table 2 Balkan teens and tens[a–f]

OCS	edinŭ	na	desęte
Romanian	un	spre	zeci
Aromanian	ună	spră	[dzătse]
MR	un	spră	ts
Albanian (Tosk)	një	mbë	dhjetë
	one	*on*	*ten*
Greek	enteka (en[a] deka)		
	one ten		
Romani	deš u jekh		
	ten and one		
Turkish	on bir		
	ten one		
	'eleven'		

[a]Slavic gender in numerals: dva (MASC) dve (FEM) 'two'.
[b]Romanian gender in numerals: doi (MASC) două (FEM) 'two'.
[c]Albanian gender in numerals: tre (MASC) tri (FEM) 'three' (dy [MASC], dȳ [FEM] 'two').
[d]OCS 10 = MASC dŭva desęte 'twenty'.
[e]Romanian 10 = FEM două zeci 'twenty' (zece 'ten' < Lat. decem).
[f]Albanian 10 = FEM tri dhjetë 'thirty'.

borrowed lexicon among the three, Hamp suggests that this innovation occurred at a time when the Indo-European dialects that became Slavic, Albanian, and the language that Latinized into Romanian were part of a Northwest European sprachbund prior to their respective migrations to the Balkans (Table 2).

Analytic Subjunctive The analytic subjunctive formed by means of a subordinating particle (SP), usually of pronominal origin, plus a finite verb agreeing with its subject (omitted if the same as in the main clause, specified if different) replaces older nonfinite complements (infinitives) in all Balkan languages to varying degrees. Gheg has a new infinitive employing the preposition *me* 'with' and a short participle in contexts where Tosk uses the analytic subjunctive, but Gheg also has uses of the analytic subjunctive, and Tosk has some nonfinite participial constructions where other Balkan languages have the analytic subjunctive. Romanian and MR still have remnants of the Latin infinitive that can be used in some traditional infinitival functions. The BR infinitive is strongest in Maramureş, the northernmost Romanian region and the one in most contact with infinitive-using languages (Ukrainian, Hungarian, formerly Yiddish). BR in general also preserves Latin infinitives in *-re* as verbal nouns. Greek has a morphological remnant of the infinitive, but its only living function is to represent the main verb in perfects and pluperfects. Bulgarian has a very marginal remnant of the Slavic infinitive limited to subordination to a tiny number of verbs. The infinitive has disappeared completely from Torlak except in some folk songs. Macedonian and Romani have eliminated all traces of earlier infinitives. Thus the replacement of infinitives with subjunctives is not uniform but scalar. At one end is Gheg, followed closely by Romanian, then Tosk, Bulgarian, Greek, and Vlah, with Torlak, Romani, and Macedonian at the other end.

New infinitival constructions have arisen in Romani outside of the Balkans in contact with infinitive-using languages. In Macedonian, some uses of the verbal noun can replace SP-clauses and thus function as a kind of new infinitive, although these constructions, which are highly colloquial, are merely alternatives. The option of using an SP-clause rather than an infinitive is available to all of BCS, but there is a tendency for such usage to become more frequent as one moves from northwest to southeast in the direction of Torlak. Since 1991, Croatian language planners have identified SP-clauses with Serbian and infinitives with Croatian, as a result of which Croatian speakers are now discouraged from using SP-clauses. In Serbian and Bosnian, however, the two constructions continue to coexist amicably (Table 3).

In WRT, optatives have expanded at the expense of infinitives owing to the influence of the other

Table 3 Balkan SP clauses

Romani	mangav	te	hramonav
Albanian (Tosk)	dua	të	shkruaj
Albanian (Gheg)	[due	me	shkrue]
Greek	thélō	na	gráfō
Bulgarian	iskam	da	piša
Macedonian	sakam	da	pišuvam
Torlak	oču	da	pišem
Romanian	vreau	să	scriu
Vlah	voi	s(i)	scriu
gloss	*I.want*	*SP*	*I.write*
WRT	isterim		yazayım
gloss	*I.want*		*I.write.OPT*
	'I want to write'		

Table 4 Balkan futures

Romani	ka		dža[s]
Albanian (Tosk)	do	[të]	shkojmë
Greek	tha		páme
Bulgarian	šte		trŭgnem
Macedonian	ḱe		odime
Torlak	če		odime
Romanian (Colloquial, South)	o	să	mergem
Aromanian	va	s-	neadzim
MR		si, să	neadzim
[MR-Tsãrnareka	ãs		neadzim]
English	*we will go*		

Balkan languages. The usage in Table 3 was a possibility in older Turkish, but, in a classic case of convergence via feature selection, the WRT optative now occurs where Turkish would normally have a nonfinite construction:

ben seni ist-er-im şimdi bir
I you.ACC want-PRES-1SG now one
müneccim ol-a-sın
astrologer be-OPT-2SG
Now I want you to be an astrologer

Similarly, Balkan Judezmo, which preserves the Spanish infinitive, nonetheless has some uses of its subjunctive, e.g., in questions, that calque Balkan SP-clauses and do not occur in Modern Spanish or North African Judezmo:

kwando ke te vengamoz a tom-ar? (Balkan Judezmo)
when that you.ACC we.come to take-INF
Póte na 'rthoúme na se pároume? (Greek)
when SP we.come SP you.ACC we.take
Koga da ti dojdeme da te zemame? (Macedonian)
when SP you.DAT we.come SP you.ACC we.take
Cuándo quieres que vengamos a recog-er-te? (Modern Spanish)
when you.want that we.come to take-INF-you
'When do you want us to come to get you?'

All Balkan languages use the independent analytic subjunctive to express wish, desire, or a milder form of imperative. Albanian also has a synthetic optative used mostly in formulae.

Futures in 'Will' and 'Have' When Slavic entered the Balkans (6th–7th centuries C.E.), there was competition between the auxiliaries 'have' and 'want (will)' + infinitive to mark futurity in Latin and Greek, with Latin favoring 'have' and Greek favoring 'want'. OCS used the perfective of 'be' in addition to 'want', 'have' and various forms of 'begin' + infinitive. The 'will' + infinitive construction survives (with modified or new infinitives) in Romanian, northwestern Gheg (near and in Montenegro), in Bulgarian dialects (with postposed auxiliary), and MR (for speculations and threats). This form also survives in all the non-Balkan Štokavian dialects of BCS and connects them with East South Slavic. In fact, much of Štokavian ended up in its current location as a result of northward migrations during the 15th–18th centuries. The rest of Slavic developed the perfective of 'be' as a future marker. The next stage was 'will' + SP + conjugated present tense verb (Greek 14th century, Slavic 15th century). This stage also survives in BCS, including Torlak. The third stage, which overlaps the second, is the transformation of 'will' into an invariant particle + SP + conjugated main verb. This type of construction is still the main one in Tosk and parts of Gheg, especially in the northwest and southeast peripheries; it is characteristic of southern Romanian and survives in Torlak and in certain modal uses in East South Slavic, but not in Greek. The fourth stage is the elimination of the SP so that the future is marked by an invariant particle plus a conjugated verb. In addition to being the standard future in Balkan and southern Vlax Romani, Greek, and BS, it is common in colloquial Tosk. In MR, the future marker merged with SP, producing a new particle, *ãs*, in Tsãrnareka, but eliminating a distinct future marker in the other villages. Romani outside the Balkans has other means of forming or expressing the future, and it appears that the Romani development in the Balkans occurred in concert with the other Balkan languages (cf. 'Analytic Gradation of Adjectives') (Table 4).

Conjugated 'have' + infinitive, attested for early stages of all the traditional Balkan languages, remains the predominant future in most of Gheg. Conjugated have + SP + present is still used in Romanian, and invariant 'have' (which can also be an existential in all the Balkan languages with lexical 'have', cf. French *il y a*) is used in Arbëresh and occurs with modal

Table 5 Negated futures

Macedonian	nema		da	odime
Bulgarian	njama		da	hodime
Aromanian	noare		s'	neadzim
	not.has		SP	we.go
Romani	na-e	amen	te	dža[s]
	not-is	*we.ACC*	*SP*	*go.IPL.PRES*
WRT	yok-tur			gid-elim
	not-is			*go-OPT.1PL*
English	*we won't go*			

functions in BS. In East South Slavic, the ordinary negated future uses this negative existential + SP + present, and this type is calqued into Aromanian, Romani, and WRT. Since Turkish and most of Romani lack lexical verbs meaning 'have', their calques use their negated existentials, which also code possession (Table 5).

Future in Past as Conditional The combination of a future marker with a past tense marker to form a conditional, especially irrealis, is a classic Balkanism, although its realization differs among the various Balkan languages. (The construction itself can have a variety of related meanings, e.g., 'X almost happened/was about to happen', iterative-habitual, anterior future, and languages and dialects can be differentiated on the basis of which of these meanings are encoded.) Greek, Macedonian, and Romani all use the invariant future marker plus the imperfect. Tosk and Aromanian are almost the same, but they still have the SP, at least optionally. MR has an invariant 'will' marker (*vrẹa*) + SP + present or perfect (see 'Perfect in "Have"'). In Bulgarian, Torlak, and other dialectal BCS, however, it is 'will' that conjugates in the imperfect+SP+present, and Gheg has the conjugated imperfect auxiliary 'have' + infinitive. The Balkan construction extends into BCS as far as southern Croatia and southwestern Serbia, and the southern Montenegrin dialects have the widest range of uses for the construction, thereby being most Balkan. In Turkish, the future participle plus a past auxiliary *[i]di* or [*i*]*miş* has the same nuances of irrealis conditional (Table 6).

In Greek, Albanian, and Vlah, conditional constructions normally have a form of the 'will' morpheme. In BS, the Balkan conditional is in competition with the inherited conditional using the old optative of 'be' (invariant *bi* in Macedonian, conjugating in Bulgarian and Torlak) + old resultative participle. Romani dialects in contact with Slavic also use invariant *bi* + present as a conditional. In Romanian, a special conjugation of 'have' + infinitive serves as a conditional-optative.

Table 6 The Balkan conditionals

Romani	ka		keravas*
Greek	thá		égrafa
Macedonian	ḱe		napravev^{u}
Aromanian	va	[s]	făceam^{u}
Albanian (Tosk)	do	të	bëja
	FU	*SP*	*do.IM.ISG*
MR	vrẹa	si	am fat(ã)
	want.PRES.3SG	SU	do.PERF.1SG
Bulgarian	štjah	da	napravja
	šćaše/šćeše	da	napravim/ radim
	want.3SG.IM	*SU*	*do.PRES.1SG*
Albanian (Gheg)	[kishna	me	bâ]
	I.have	*with*	*do.PART*
Romanian	aș	fi	făcut
	COND	*be.INF*	*do.PAST.PART*
Turkish	yap	acak	tı m
	ROOT	*FU*	*PAST 1SG*
'I would have done'			

*Arli has a new imperfect formed by the long present + imperfect of '3SG/PLbe', e.g. *kerava sine*.

Perfect in 'Have' The use of 'have' as an auxiliary with a nonfinite main verb to form an analytic perfect is attested for Greek and Latin at the end of the ancient period and is characteristic of Albanian, BR, and Greek, while such constructions (and lexical 'have') are absent from WRT and most of Romani. In BS 'have' + past passive participle (or its descendant) forms resultative constructions ranging from a fully grammaticalized perfect (with an invariant neuter verbal adjective) that has completely replaced the inherited perfect ('be' + old resultative particle in *-l*) in extreme southwestern Macedonian and spreading north to Mt. Šar and east to the Vardar and beyond, to resultative syntagms with 'have' + past passive participles agreeing with their direct objects and limited to transitive verbs with human subjects in most of Bulgaria.

Given the geography and history of the 'have' perfect in BS, it is clearly a calque on one of the non-Slavic contact languages. Although Greek and Albanian have been proposed as the possible models, Gołąb's arguments in favor of Aromanian are the most convincing. In Aromanian, the feminine participle is selected as the invariant, since in BR (as in Albanian) the feminine gender is unmarked (neuter is obsolete). The Macedonian invariant neuter verbal adjective therefore corresponds exactly to the Aromanian in terms of unmarked gender. In Greek, the main verb is a remnant of the infinitive and in Albanian the participle does not mark singular gender. Thus the BR construction most closely resembles the Macedonian. An additional argument in favor of BR as the model is evidence of Macedonian and Vlah mutual calquing in other resultative constructions.

Table 7 Aromanian (Fărshălots, Bela di Suprã and Albanian indicatives (3sg 'work')

	Nonadmirative		*Admirative*	
Present	lukrã	punon	lukracka	punuaka
Perfect	ari lukratã	ka punuar	avuska luktratã	paska punuar
Pluperfect	ave lukratã	kish punuar	–	paskësh punuar
2nd Pluperfect	avu lukratã	pat punuar	–	–
Double perfect	ari avut lukratã	ka pasë punuar	ari avuska lukratã	paska pasë punuar
Double plup.	ave avut lukratã	kish pasë punuar	ave avuska lukratã	paskësh pasë punuar
2nd Dbl. plup.	avu avut lukratã	pat pasë punuar	–	–

Table 8 The Novo Selo probabilitive 'see'

Present	1	gla*dàčă m	gla*dàčă mo
	2	gla*dàčăš	gla*dàčă tă
	3	gla*dàčă	gla*dàčă ju
Future		că gla*dàčă m, etc.	
Past		budàčă m ∼ bičă m glă dàl, etc.	

Evidential In a Balkan context, evidentiality (inferential, distance, mode of indirect narration, indirective, status, French *médiatif*) is a grammatical category encoding the speaker's evaluation of the narrated event, often, but not always, predicated upon the nature of the available evidence. Evidentials can be of two types: confirmative (vouched for, 'witnessed') and nonconfirmative (not vouched for, 'reported', 'inferential'). The nonconfirmative can be felicitous (neutral report or inference) or infelicitous, in which latter case the nonconfirmative expresses either acceptance of a previously unexpected state of affairs (i.e., surprise, admirativity *sensu stricto*) or rejection of a previous statement (i.e., sarcasm, dubitativity). The opposition confirmative/nonconfirmative was already encoded in the Turkic simple past in *-di* (confirmative) and the perfect participle in *-miş* (nonconfirmative) at the time of the earliest monuments. In East South Slavic, the old synthetic pasts are markedly confirmative (this same meaning is also sometimes identified in Torlak). By contrast, the old perfect using the resultative participle in *-l* has become an unmarked past, with a chief contextual variant meaning of nonconfirmative. In Albanian, the inverted perfect (participle + 'have') has fused into a marked nonconfirmative present paradigm called admirative, which can then function as an auxiliary to form analytic past tenses. The Frasheriote Aromanian dialect of Bela di Suprã has reinterpreted the 3SG.PRES Albanian admirative marker as an admirative suffix, which it adds to a masculine plural imperfect participial base to form a new admirative (Table 7).

Megleno-Romanian uses an inverted perfect + auxiliary construction in a similar function. The Romanian presumptive mood formed with a future, subjunctive, or conditional marker + invariant *fi* 'be' + gerund (or past participle) is a similar marked nonconfirmative, as is the probabilitive mood (based on a BCS-type inverted future) of Novo Selo Bulgarian, a dialect spoken across the Danube from Romania and a few kilometers east of Serbia (Table 8).

The Judezmo of Istanbul uses the pluperfect as a calque on the Turkish past in *-miş*:

Kuando esta-v-an en l' Amérika, les
when be-IM-3PL in the America them.DAT
av-iy-a entra-do ladrón
have-IM-3SG enter-PAST.PART thief
'When they were in America [i.e., absent], a thief broke into (Turkish *girmiş*) their house.'

Other Many other features too numerous to discuss here are cited as Balkanisms, e.g., the conflation of adverbs of location and motion ('where'/'whither'), purposives in 'for' + SP + verb and other prepositional parallelisms, a distinction between realis and irrealis complementizers, and absolute relativizers and interrogatives as complementizers, this last being a feature that has spread to WRT:

čovek-ot što go vid-ov (Macedonian)
person-the what him.ACC see-1SG.AOR
adam ne cür-d-üm (WRT)
man what saw-PAST-I
gör-düğ-üm adam (Standard Turkish)
see-PART-my man
'the man that I saw'

Word Order

Clitic Ordering Greek, Albanian, and BR all permit absolute initial pronominal clitics when the first stressed element is a finite verb, but in BS only Macedonian (especially the western dialects) permits this. Bulgarian keeps pronominal clitics bound to the verb

but either requires the verb or some other element in initial position. BCS, including most of Torlak, still follows Wackernagel's law and has clitics in second position.

Az	često	mu	go	davam.	(Bulgarian)
I	*often.*	*him.DAT*	*it.ACC*	*give.1SG.PRES*	
Ja	mu	ga	često	dajem.	(Serbian)
I	*him.DAT*	*it.ACC*	*often*	*give.1SG.PRES.*	

'I often give it to him'

Davam	mu	go	(Bulgarian)
give.1SG.PRES	*him.DAT*	*it.ACC*	
Mu	go	davam	(Macedonian)
him.DAT	*it.ACC*	*give.1SG.PRES*	

'I give it to him'

Romani pronominal clitics follow the verb. WRT is basically suffixal, like the rest of Turkish, and clitics always follow the stressed element, but elements that can be fused or separated are more likely to be separated and less likely to show vowel harmony in WRT.

Constituent Order Balkan languages are characterized by relatively free constituent order with certain patterns being favored for various types of syntactic and narrative strategies (emphasis, topicalization, focus, contrastive thematization, etc.). The unmarked word order tendency is SVO in all the Indo-European Balkan languages. Unlike most of Turkish, where the tendency is verb-final, WRT and Gagauz show SVO tendencies. Similarly, BR, BS, Albanian, and Greek all have the basic order head-genitive, while Turkish and Romani are genitive-head. Romani dialects in the Balkans and WRT, however, also have head-genitive constructions:

m-e	phral-es-k(er)e	kher-es-k(or)o	vudar	(Romani)
my-OBL	*brother-OBL-GEN*	*house-OBL-GEN*	*door*	

'the door of my brother's house'

o	vudar	e	kher-es-ko
the.MASC.NOM	*door*	*the.OBL*	*house–OBL-GEN*

m-e	phral-es-kere	(Romani)
my-OBL	*brother-OBL-GEN*	
Baba-si	Ali-nin	(WRT)
father-his	*A.-GEN*	
Tatkto	mu	na	Ali	(Macedonian)
father	*him.DAT*	*to*	*Ali*	
Baba-i	i	Ali-ut	(Albanian)
father-DEF	*PC.MASC.NOM.SG*	*A.-Def.GEN*	

Ali-nin	babası	(Standard Turkish)
Ali-GEN	*father-his*	

'Ali's father'

Adjectives generally follow their heads in Albanian and BR, but precede in BS, Greek, WRT, and Romani. In all of these languages, the opposite order is possible in various discourse functions. Albanian enclaves in the eastern Balkans also have preposed adjective as the standard order.

Lexicon, Semantics, and Derivational Morphology

The etymological commonalities of the Balkan lexicon received considerable attention during the formative years of Balkan linguistics, whereas more recently the focus has been on shared grammatical features. Miklosich's 1861 survey of Balkan grammatical commonalities occupied only 4% of what was basically a study of the Slavic lexical influence on Romanian. Sandfeld (1930) devotes 40% of his book to the lexicon, whereas Asenova (2002) allots 10% of her text to such issues. Although the lexicon is the most salient surface manifestation of linguistic influence, words can travel between languages without the aid of communal multilingualism, whereas the diffusion or convergence of grammatical structures is a more complex process that requires at least a core community of bi- or multilingual speakers. In terms of the definition of a sprachbund, it is the shared grammatical features rather than shared vocabulary that is the key determiner, although shared vocabulary is usually part of the picture.

There are common loanwords from each of the component language families in the Balkan languages. Words shared by Albanian and Romanian of pre-Latin (substrate) origin are often connected with domestic items or husbandry, e.g., Albanian *shtrungë*, BR *strungă*, BS (Macedonian and west Bulgarian) *strunga*, Greek (Epirus and Sarakatsan) *stroúgka* 'dairy'. Greek, Slavic, and Romance (especially Balkan Latin and Venetian Italian) were all languages of power in the Balkans at various times during the Middle Ages and contributed a variety of lexemes and even derivational affixes to the common Balkan lexicon, e.g., the Latin agentive suffix *-arius*, the Slavic feminine suffix *-ica* , and the Greek aorist marker *-s-* (used in deriving verbs). As the language of administration, the market place, and urban life in general, Turkish dominated the Balkan peninsula for more than half a millennium. By the 19th century, the shared Turkish lexicon in the Balkan languages was of considerable size. The rise of Balkan standard languages, however, entailed the stylistic lowering and marginalization of many Turkish loanwords, and as many of these items were of Arabo-Persian origin, they were discouraged by Turkish purists as well. The Turkish agentive *-ci*, attributive *-li*, qualitative or concrete *-lik* (with adjustments for vowel harmony, voicing assimilation, and adaptation) continue to be productive as derivational affixes, e.g., Macedonian *pubertetlija* 'adolescent (ironic)' Albanian *partiakçi* 'party hack', Judezmo *hanukalik* 'Chanukah present', etc.

The Balkan languages also share numerous idioms, collocations, and calqued expressions; e.g., the use of 'eat' to mean 'undergo something unpleasant' as in 'eat wood' = 'take a beating' or 'it doesn't cut his mind' = 'he doesn't understand'. There are a variety of shared discourse particles and conjunctions (e.g., Turkish *am[m]a* 'but', Greek *bre* 'hey, vocative particle') that also form part of the common Balkan lexicon.

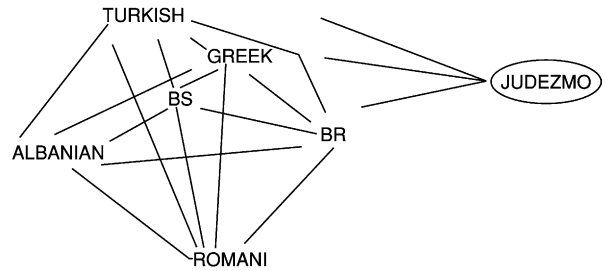

Figure 1 Schematic linguistic social/political hierarchy (Ottoman Period).

Sociolinguistics

Factors such as power, prestige and religion have influenced directions and degrees of Balkan contact phenomena. Throughout the Ottoman period, Turkish had high prestige as the language of the state and the town, Greek had prestige among Christians as the language of the (Orthodox) church with its own literary tradition (and history of power, i.e., Byzantium) and was also a language of commerce. BS had less prestige in the southern Balkans, but its history of medieval literacy and political competition with Byzantium gave it some limited prestige. Although BR was descended from Latin, another language of empire and conquest, the local varieties that developed after the Slavic invasions did not have that level of prestige and, like Albanian, were associated mainly with rural contexts. In Wallachia and Moldavia, Church Slavonic was the liturgical language for centuries, and Romanian was written in Cyrillic until the mid-19th century. Aromanian speakers in southern Balkan towns used Greek outside the home. Romani was at the bottom of the social hierarchy, but Judezmo was outside it. This is reflected in 19th-century Macedonian folklore collections, where characters in ethnic jokes, including Roms (Gypsies), speak in their own languages, except Jews, who speak Turkish, not Judezmo. For both Romani and Judezmo, multilingualism was unidirectional, i.e., Roms and Jews learned other languages but heard their languages spoken by others rarely, if ever. At the opposite end of the prestige scale, speakers of Greek and Turkish were less likely to learn less prestigious languages but were more likely to hear their languages spoken by others. Those languages in the middle of the hierarchy (BS, BR, and Albanian) had the highest degree of multidirectional multilingualism and show a higher degree of congruence.

Marriages could be freely contracted across linguistic lines but not religious ones, so that multilingual households were a commonplace. Although speakers of BS, BR, and Greek were mostly Christian and speakers of Albanian were usually Muslim, each of these religions also had significant communities speaking the other languages. Except for Gagauz, speakers of Turkish were Muslim, but there was still plenty of linguistic contact via religious conversion. Jews and Roms, however, were endogamous along a combination of linguistic and other social lines. This boundary maintenance is reflected linguistically in Romani, where there is a clear opposition between the relatively open systems of adjectival comparison and modality on the one hand to the conservative nominal, pronominal, and tense-aspect systems on the other.

Figure 1 illustrates the relative prestige of the various languages during the Ottoman period. Height symbolizes prestige, while incline indicates relative (never absolute) directionality. The directionality is reversed in the case of slang and secret languages, where it is the covert prestige of languages further down on the social scale that is reflected in patterns of lexical borrowing. In the case of Judezmo, knowledge of Turkish was most widespread, while knowledge of other Balkan languages would depend on the particular (urban) environment.

Causation

For most of the history of Balkan linguistics, causation has been sought in the influence of (interference from) one of the languages, e.g., Greek, Latin, or a pre-Latin non-Hellenic substratum (e.g., Illyrian, Thracian, and/or Dacian – all so poorly attested that we do not have so much as a single sentence in any of them). More recently, however, an ecological model of feature selection argues that those grammatical developments more suitable for effective communication that might be already present in the language, i.e., more adaptive, are more likely to be selected for further development and spread (cf. 'Resumptive Clitic Pronouns [Reduplication, Replication]'). In such a model, languages can utilize native resources that are reinforced by their occurrence, or potential for occurrence, in the contact languages. Mechanisms such as fusion, metatypy, and code copying are all potentially relevant. At the same time, sociolinguistic factors such as those adduced in 'Sociolinguistics' can

influence directions of change. The diffusion of borrowings and the development of convergences are thus compatible parts of a larger picture of a sprachbund in which languages come to be similar without becoming identical. It is worth emphasizing here the insight of Joseph (2001), namely that the move from lexical via phraseological to syntactic borrowings that characterizes the contact-induced changes of a sprachbund such as the Balkans are quintessentially surface phenomena.

Although some scholars have argued against the idea of a Balkan sprachbund since the 1930s, the argument that the Balkans are basically just part of a larger European linguistic zone coincides roughly with the recent rise in interest in contact linguistics and typology. In the case of the Balkans, however, while it is clear that Kopitar's formulation is an exaggeration, it is equally clear that Trubetzkoy's original insight captures facts about language relationships. Of particular significance is the manner in which patterns map such that the languages that surround the Balkan sprachbund do not share the most salient features. The fact that English and Western Romance have gone even further than most of the Balkan languages in some changes does not contradict the hypothesis that the Balkan sprachbund is precisely that, i.e., a product of the process of language contact. If some of those contact-induced changes are the result of shared feature selections, having parallels elsewhere, that may contribute to identifying likely directions of language change, but it does not vitiate the sprachbund as a historical and sociolinguistic phenomenon.

In a sense, a sprachbund is more like a dialect chain than a linguistic family: as features spread over areas, they may do so with differential impact. Thus, while it is possible to define a sprachbund in terms of languages displaying a coalescence of a number of such features, it is not necessarily the case of an 'all and only' phenomenon. Moreover, the transition from pragmatic to syntactic (grammaticalized) to morphological sometimes maps onto the territory of the sprachbund itself, moving from periphery to core. Like dialects, there can be a transitional effect, and a given language, e.g., BCS, can participate in the changes to a greater or a lesser extent. For both the dialect and the sprachbund, politics can have a crucial effect in setting boundaries that favor internal consistency and external differentiation. Just as the very concept of language vis-à-vis dialect (e.g., to which language a given dialect 'belongs' or which isoglosses will be chosen as defining one dialect in opposition to another) can be a complex of intersecting factors, so too can the definition of sprachbund.

See also: Africa as a Linguistic Area; Albanian; Albania: Language Situation; Areal Linguistics; Articles, Definite and Indefinite; Bilingualism; Bosnia and Herzegovina: Language Situation; Bulgaria: Language Situation; Bulgarian; Case; Clitics; Contact-Induced Convergence: Typology and Areality; Ethiopia as a Linguistic Area; Europe as a Linguistic Area; Evidentiality in Grammar; Greece: Language Situation; Greek, Ancient; Greek, Modern; Language Change and Language Contact; Language Politics; Latin; Macedonia: Language Situation; Macedonian; Metatypy; Mood and Modality in Grammar; Nationalism and Linguistics; Old Church Slavonic; Romani; Romanian; Romania: Language Situation; Sanskrit; Serbian–Croatian–Bosnian Linguistic Complex; South Asia as a Linguistic Area; Southeast Asia as a Linguistic Area; Turkey: Language Situation; Turkish.

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Balochi

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There are, by one count, six principal dialects of Balochi, characterized by differences in grammar and lexicon. The western dialect of Raxšānī is the largest, the principal subdialect being Sarhaddī,

Balochi belongs with the North(west) Iranian languages, differently from Persian, which is a Southwest Iranian language; compare, for instance, Balochi *asin* 'iron,' *ǰan-* [dʒan-] 'strike,' *zird* 'heart,' versus Persian *āhan*, *zan-*, *dil*. It is a phonetically conservative language, having preserved much of the Old Iranian consonant system intact, notably intervocalic stops and affricates, for instance, Bal. *pād* 'foot,' *āp* 'water,' *roč* [rōtʃ] 'day' (Pers. *pā*, *āb*, *rūz*). Among innovations are the development of initial *w-* to *g(w)* (OIran. *wāta-* 'wind,' Bal. *gwāt*, Pers. *bād*), *xw-* to *w-* (OIran. *xwara-* 'eat,' Bal. *war-*, Pers. *x*^{v}*or-*), and the change of fricatives into stops (Bal. *nākun* 'nail,' Pers. *nāxon*; Bal. *gipta* 'seized,' Pers. *gereft*).

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There is a four-case system, distinguishing nominative, genitive, and an oblique case. The suffix *-rā* (*-ā* with personal pronouns) can be added to the oblique to express direct and indirect objects.

Notable features of the verb system include the formation of continuous tenses by means of a present participle in *-ag* (*raw-ag-ā int* 'go-ing-in he-is' = 'he is going'), a construction perhaps influenced by the neighboring Indic languages and replacing the older formation with prefix *a-* (*a-rot* 'he goes, is going'). In the conservative dialects, the past tenses use the ergative construction in pure passive form (*man gūnī zurt-ant o šut-un* 'I.OBL sack.PL take.PAST-3RD.PL and go.PAST-1ST SING' = 'I took the sacks and went'), while in the western dialects, the active construction of Persian prevails (*man gūnī-ān zurt-un o šut-un* 'I.DIR/OBL sack.PL.DO take.PAST-1ST.SING and go.PAST-1ST.SING' = 'I sacks took-I and went-I').

Balochi lexicon contains a large number of loanwords, mainly Arabo–Persian and Indo–Aryan from a western Sindhi dialect, as well as a small number of words from Brahui, a Dravidian language, which contains a large number of Balochi words.

See also: Afghanistan: Language Situation; Iran: Language Situation; Iranian Languages; Pakistan: Language Situation.

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Balto-Slavic Languages

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The term Balto-Slavic encompasses the languages of the closely related Baltic and Slavic branches of the Indo-European language family. The Slavic languages, traditionally divided into East, West, and South Slavic, are well-represented over much of Central and Eastern Europe and Siberia. Of the once more numerous and widespread Baltic languages, only two have survived to the present, Latvian and Lithuanian, which together form East Baltic. West Baltic is represented by Old Prussian, which died out in the early 18th century; it is known from word lists, place names, and catechism translations.

The nature of the relationship between the Baltic and Slavic languages has long been a source of debate. In the traditional *Stammbaum* approach, reflected in K. Brugmann's landmark *Grundriß der vergleichenden Grammatik der indogermanischen Sprachen,* Baltic and Slavic are presented as equivalent branches of a Balto-Slavic protolanguage, which derives in turn from Proto-Indo-European.

The assumption of a post-Indo-European period of Balto-Slavic linguistic unity is based on a number of striking and seemingly exclusive correspondences between the Baltic and Slavic languages. In phonology, the most cogent argument for a Balto-Slavic protolanguage is found in the highly complex prosodic structures of both language families, which typically agree in details of stress placement (including reflexes of Hirt's law), syllable tone (including reflexes of Winter's law), and accentual paradigm. Among other phonological agreements, syllabic resonants develop into both *-iR-* and (exceptionally) *-uR-,* with a similar distribution in both language groups. Morphological correspondences include an *-ā* formant marking the preterite/aorist stem, often accompanied by the reduced grade of the root: Lith. *pĩrko* (pres. *peřka*) 'buy.PRET' : OCS *žьda* (pres. *židetь)* 'wait, expect.AOR'; and a present passive participle in *-m-* (for East Baltic and Slavic): Lith. *nešamas,* Latv. *nesams* : OCS *nesomъ* 'being carried'. There are a number of exclusive correspondences in word formation, among them deverbal nouns in-*imo-:* Lith. *piešìmas* 'drawing' : Slavic **pisьmo* 'writing'; agent nouns in *-ā-i̯o-:* Lith. *artójus*, OPr. *artoys :* OCS *ratajь* 'plowman'; agent nouns in *-ik-o*: Lith. *siuvìkas*, OPr. *schuwikis* 'shoemaker' : ORus. *šьvьcь* 'tailor; shoemaker'; denominal adjectives in *-in-:* Lith. *krùvinas* : OSC *krъvьnъ* 'bloody', and diminutives in *-uk-o-*: Latv. *dę̄luks*, OCS *synъkъ* 'sonny'. Finally, there are

There is a four-case system, distinguishing nominative, genitive, and an oblique case. The suffix *-rā* (*-ā* with personal pronouns) can be added to the oblique to express direct and indirect objects.

Notable features of the verb system include the formation of continuous tenses by means of a present participle in *-ag* (*raw-ag-ā int* 'go-ing-in he-is' = 'he is going'), a construction perhaps influenced by the neighboring Indic languages and replacing the older formation with prefix *a-* (*a-rot* 'he goes, is going'). In the conservative dialects, the past tenses use the ergative construction in pure passive form (*man gūnī zurt-ant o šut-un* 'I.OBL sack.PL take.PAST-3RD.PL and go.PAST-1ST SING' = 'I took the sacks and went'), while in the western dialects, the active construction of Persian prevails (*man gūnī-ān zurt-un o šut-un* 'I.DIR/OBL sack.PL.DO take.PAST-1ST.SING and go.PAST-1ST.SING' = 'I sacks took-I and went-I').

Balochi lexicon contains a large number of loanwords, mainly Arabo–Persian and Indo–Aryan from a western Sindhi dialect, as well as a small number of words from Brahui, a Dravidian language, which contains a large number of Balochi words.

See also: Afghanistan: Language Situation; Iran: Language Situation; Iranian Languages; Pakistan: Language Situation.

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Balto-Slavic Languages

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many apparently exclusive lexical items, among them Lith. *rankà* : OCS *rǫka* 'hand'; Lith. *rãgas* : OCS *rogъ* 'horn'; Lith. *líepa* : OCS *lipa* 'linden'.

The assumption of a Balto-Slavic proto-language was first challenged by A. Meillet (1908), who argued that the various agreements between the two language families are only apparent, a result of inherited archaisms and parallel developments in each of the branches. A refinement of this model was advanced by J. Endzelin (1911), who accounted for shared features by positing a period of prolonged language contact between neighboring Baltic and Slavic communities, leading to a degree of linguistic convergence.

More recent studies have stressed the non-equivalence of the notions of Baltic and Slavic. C. Stang (1966: 10 ff.), developing one of Endzelin's ideas, pointed out that while Common Slavic presents a relatively uniform system, Baltic is divided by a number of significant isoglosses. Certain of the innovations represented by these isoglosses connect East Baltic with Slavic as opposed to Old Prussian (for example, the Indo-European **-s(i̯)o* genitive singular of *o*-stem nouns, apparently preserved in Old Prussian, has been replaced in East Baltic and in Slavic by a form that appears outside of Balto-Slavic in ablative function: Lith. *rãgo*, Latv. *raga* = OCS *roga*, 'horn.-GEN SG'); while other isoglosses link Old Prussian with Slavic (for example, the possessive pronouns OPr. *mais, twais, swais* = OCS *mojь, tvojь, svojь* 'my, your, one's own' are refashionings of the IE root represented in Lith. *(manas), tavas, savas* and Latvian *(mans), tavs, savs*).

V. V. Ivanov and V. N. Toporov (1961), in reviewing the methodological preconditions for discussing the Balto-Slavic relationship, have argued that a relatively homogeneous proto-Slavic can be derived from a considerably more archaic and heterogeneous proto-Baltic linguistic model, in effect redefining the notion of Balto-Slavic by treating Slavic as a local development within a Baltic dialectal continuum.

Progress in further defining the relationship between Baltic and Slavic is hampered by a lack of linguistic data from the former Baltic populations assimilated by the East Slavs in the upper Dniepr river basin (the Dniepr Balts), and in present-day Baltic territories by neighboring Latvians and Lithuanians (the Couronians, Selians, Zemgalians, and Jatvingians). The written documents of extinct Old Prussian are scant and rather unreliable, while the earliest monuments of Latvian and Lithuanian date only from the 16th century, when these languages already had a modern appearance. Nevertheless, dialectal data (including toponymic) still being drawn from various Baltic and Slavic languages, together with a more profound study of Baltic and Slavic borrowings in neighboring languages, may help provide new perspectives on the question of Balto-Slavic.

See also: Brugmann, Karl (1849–1919); Bulgarian; Czech; Latvian; Lithuanian; Macedonian; Meillit, Antoine (Paul Jules) (1866–1936); Old Church Slavonic; Polish; Russian; Slavic Languages; Slovene; Sorbian; Stang, Christian S. (b. 1900); Toporov, Vladimir Nikolaevich (b. 1928).

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Born Ayorinde Bamgbose on January 27, 1932, in Nigeria, Ayo Bamgbose is one of the most renowned African linguists. He attended St. Andrew's College, Oyo, Nigeria (1948 to 1951). With his teaching diploma, Bamgbose taught for six years in primary and secondary schools as well as teacher training college. In 1957, he enrolled at the University of Ibadan, Nigeria, and obtained a Bachelor of Arts degree in English with honors in 1960. Afterward, he proceeded to the University of Edinburgh, UK, for

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his graduate work. He received a diploma in General Linguistics in 1961 and was awarded a doctorate in Linguistics in 1963 for his pioneering study of Yoruba grammar. His dissertation, 'A study of structures and classes in the grammar of modern Yoruba,' was the first ever written on Yoruba grammar. Upon his return to Nigeria in 1963, Bamgbose joined the department of Linguistics and Nigerian Languages as a lecturer and became a senior lecturer in 1966. He was appointed Professor of Linguistics and Nigerian Languages in 1968.

Professor Ayo Bamgbose has committed most of his teaching and research efforts on the study of Linguistics and Nigerian languages. He has worked extensively on Yoruba language with limited work on other Nigerian languages such as Mbe, Hausa, and Igbo. He is an internationally acclaimed scholar and teacher. He has served as a visiting professor at the University of Illinois, Urbana-Champaign (1978; 1993–1995), Hamburg University, Germany (1979–1980) and a visiting fellow at Clare Hall, Cambridge University, UK (1987–1988). More recently, Professor Bamgbose served as a visiting professor again at Urbana-Champaign from 1993 till 1995. From 1997 to 1999, he was a visiting professor at the University of Leipzig, Germany. He has also served as guest lecturer at several universities in Africa, Europe, and America. He became a professor emeritus for linguistics and African languages at the University of Ibadan, Nigeria, in 1994.

At the University of Ibadan, Professor Bamgbose has supervised numerous theses and dissertations by students who have gone on to become outstanding scholars and professors in linguistics and the study of African languages. He has also served administratively as, among others, Chair of the department of Linguistics and African languages, Dean of the Faculty of Arts, and Chair of the University Senate committees on Publications and the General Studies Program. He has served as an external examiner to many West African universities (Lagos, Ife, Ilorin, Legon, Sierra Leone, Yaounde, and Zimbabwe). Professor Bamgbose has also variously served outside the ivory tower. From 1966 to 1969, he was a member of the Western Nigeria Ministry of Education Committee on Yoruba orthography. He was a member and later Chairman of the National Language Centre Working Committee from 1968 to 1979. He served as the consultant linguist on the Center's projects. In 1991, he became the chairman of the working committee for the National Institute for Nigerian Languages.

Internationally, he is an ex-president of the West African Linguistic Society and the Yoruba Studies Association. He is a foundation member of the Linguistic Association of Nigeria. He served as a consultant to the Ford Foundation on language related projects from 1966 to 1973. Since 1971, he has served as language expert at several UNESCO conferences and at international conferences organized by organizations such as the British Council, the Ghana English Studies Association, and the World Congress of African Linguistics. He was one of the four directors of the Languages in Contact and Conflicts in Africa (LiCCA) project and is a current executive committee member of the Permanent International Committee of Linguistics (CIPL).

His research interests and publications are in five specific areas: Language and Linguistics, Language and Education, Curriculum Development, Adult Literacy, and Literature and Culture. His work in the area of language and linguistics has ranged from descriptive studies of Nigerian languages to applied linguistic research involving orthographies and language policy and planning as well as aspects of developing and teaching English as a second language in Nigeria. In the area of language and education, Professor Bamgbose has focused on the use of African languages as media of instruction and as subject matter in the curriculum. He has examined, among other things, problems of assessment of different practices, the problem of media transition, and the effective strategies for ensuring viable results in mother tongue education. His work in the third area of curriculum development has been geared to developing language materials for teaching diverse topics. Specifically in this area, he has worked to develop technical terminology in some Nigerian languages for the teaching of mathematics and the basic sciences at the elementary level. Even at the higher level, this same vision has aided Professor Bamgbose's collaborative work with other Yoruba scholars that produced the Yoruba Metalanguage with terminologies for teaching language, literature, and methodology in Yoruba.

In his fourth area of research interest, adult literacy, Professor Bamgbose has worked to design viable language materials using a flexible approach that allows the use of several local languages in adult literacy. Literature and culture is his fifth area of research interest and here, he studies aspects of Yoruba oral and written literature in the total context of Yoruba culture. His work has included the analysis of Yoruba proverbs and folktales as well as the comprehensive analysis of the novels of D. O. Fagunwa, one of the pioneer Yoruba writers. In the context of globalization along with the impact of foreign cultures and technology, Professor Bamgbose has worked on how the media are coping with the expression of foreign concepts in local Nigerian languages such as Yoruba. This newfound interest

brought about an interest in the study of language treatment and the teaching of Yoruba and other Nigerian languages as second languages.

See also: Applied Linguistics in Africa; Educational Linguistics; English in the present day (c. 1900–present); Language Acquisition Research Methods; Literature and the Language of Literature; Media and Language: Overview; Society and Language: Overview; Variation and Language: Overview.

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Bangla *See:* Bengali.

Bangladesh: Language Situation

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Bangladesh is divided into six divisions, with 64 districts and 68 000 villages. After partition, on independence from Britain in 1947, Pakistan made Urdu the state language for both West Pakistan and East Pakistan (now Bangladesh), with the aim of unifying the country. This, in effect, instigated the Bangla Language Movement, which was a major factor in the Civil War in 1970 and led to the creation of Bangladesh as an independent country in 1971. Bengali (*see* **Bengali**) was declared to be the national language. It is the mother tongue of 90% of the people of Bangladesh and has a variety of dialects.

In 1995, it was officially announced that Bengali should be used for all official purposes. English is used, however, for international communication in business, aid, politics, and higher education, not only with Western countries but also within South Asia. School education is conducted in Bengali and Bengali is predominant in mass media. The main dialects of Bangladesh can be divided into four groups, East Bengali (subdialects Hajong, Sylheti, transitional, and Noakhali and Chittagong), Barendri (northern dialects), Kamrupi (Rajbansi-Bahe), and tribal languages. The 30 tribal languages are spoken by approximately 300 000 people.

East Bengali Dialects

The eastern, east central, southeastern, and southwestern subdialects of East Bengali have important phonological and morphological features. Variations of East Bengali are spoken in Greater Dhaka, Mymensingh, Barisal, and eastern parts of Faridpur.

Phonological Features

Nasals are absent, but a 'half-nasal' construction (vowel-nasal-consonant) is found with or without omission of the consonant following the nasal (e.g., *cand*, *can* 'moon'). Palatals are replaced by dento-palatal affricates such as /ts/ and /dz/ (and they sometimes merge with /s/ and /z/); examples are *tsan* 'moon' and *asil* 'was' (for Standard Colloquial Bengali) and *can* and *chilo*, respectively. Voiceless (aspirated) forms are frequently lost intervocally (e.g., *kaha* for *kaka* 'uncle' and *tohɔn* for *tokhɔn* 'then'). Sibilants turn to *h*, as in *bɔho* for *bɔso* 'sit' and *hala* for *sala* 'wife's brother.' Epenthesis is realized

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in *rait* for *rati* or *ratri* 'night' and *buira* for *buro* 'old' in West Bengal, and is also realized with a short glide (from Rajshahi down to Satkhira, Sundarban) in the south (*baykko* for *bakko* 'sentence'). Some of these features are also common in other dialects throughout Bangladesh.

Morphological Features

Plural affixes are found as (*e*)*ra*, *-ain* (as in *beyTTain* 'women'), *-fait* (*beDi-fait* 'women'), and *gun, guli, gulin*, *gulain*; genitive plural forms are *go* and *-rar* (e.g., *amrar*, *amago* 'ours' and *ta-rar* 'theirs'). Case endings are *-e*/*æ* (NOM-SING); *-re*, *-rare*, *-ræ* (ACC-DAT); *-t* (LOC); and *-r*, (*r*)*ar*, (*e*)*rar, -gɔr* (GEN). There are three categories of tense markers. No *nu* past or present (perfect) forms are found, as in West Bengal, to form *korinu korechinu* 'I did,' but *l*-past is common. A preceding participle is used, as in *-khaiya gese* 'has eaten and gone,' or a verb form is used, followed by a participle, as in *-gæse giya* 'go, having gone.' The *b*-future takes the usual markers, but also shows *-m*/*um*/*mu* forms for first person only (e.g., *zam*, *zam-u*, 'I shall go' and *khe-l-um* 'I shall play'). It also has a form like *b* + *m*, as in *zai-b-am* and *khæl-bam*, and *-tam,* as in *zai-tam* 'I would go' (also 'to go'). Nonfinite forms are *kha-* + *ito* = *khaito* 'to eat,' *za* 'go' + *ito* = *zaito* 'to go,' and *kha* 'eat' + *iya* = *khaya* 'having taken food'; likewise, *zaiya* 'having gone' and *ne-* + *ite* > *nito* 'take'; *nito boilla* (double verb); alternatively, *loito*, *loiya* 'having taken.' Emphatic particles are added to verbs: *zaikoilam, gumai koilam*, or *zai-ga-oi*.

East Bengali Subdialects

Hajong Hajong is a mixed dialect with some original Tibeto-Burman forms. Variations are found in nominal forms. In conjugation, verbs take no number-person markers. Both dental and retroflex plosives are maintained. Some other groups at the foot of the Garo hills and in Sylhet border areas also use this speech form.

Easternmost East Bengali Subdialect (Sylheti) Phonological features are *o* > *u* as in *tumar* 'your' and *g'ura* for *ghora* 'horse'; *j* > *z*; in participles, *y* is not pronounced, as in *kori* for *koriya* 'having done'; locative case ends in *ɔ* (*g'ɔr-ɔ* 'in a house'); *p* > *pf* (not *f*); *-k* > *x*; *c*, *ch* > *s*; *h* > *O*; *n* is sometimes realized as retroflex *N*; aspiration is weakened; *kh* is similar to Arabic *kh*.

Morphological features are as follows: (1) case endings with object case *-re*; genitive *-ɔr*, locative *-tɔ* and *-o*; and ablative tone; (2) plural markers are *-ra*, *rar*, *rae*, and *-ain* (e.g., *ghɔr-ain* 'houses'); (3) verb forms have future tense *-bay*; verbal forms *dækh* 'to see' + *lay*, *-ɔin*, *bɔ* ('sit') + *ukka*; (4) pronominals are *tui* 'you' (inferior), *tain* 'he' (honorific), and *hæ* 'he' (ordinary); (5) southern verb forms are *hairam* 'I am eating' and *kha-r-in* 'he is eating'; and (6) northern verb forms are *khayar*, *khayt-ray*, *khay-ray*; and (inferior honorific) *khaita-soin*.

Southwestern Bengali Subdialects (Transitional) Southwestern dialects of Bangladesh along the West Bengal border in the southeast are also called 'transitional dialects.' These include the dialects of Kustia, Jhinaidaha, Jessore, Khulna, Satkhira, and also some areas of Western Faridpur. The vowel *o* is pronounced higher (*bun* for *bon* 'sister'). Infinitives take *i* for *e* (as in *nati* for *naite* 'to bathe') and shorten the verb. Kustia dialects resemble the Rarhi variety as found in Nadia and other places across the Indian border. Vowel harmony, retention of *s*, and *h* initially retained (but lost otherwise) are typical features.

Southeastern Bengali Subdialects (Noakhali and Chittagong) Southeastern Bengali dialects have distinct phonological features. An *R* is found in Noakhali (except in Feni) when preceded by a nasal vowel, as in *bã Ri* (also *ba-i* (dropping *-R-* intervocally and replacing the nasal vowel); *r* is found elsewhere, except in Kamrupi forms, in which it is omitted initially (*ram* > *am*). Development of spirants is used in place of *p*, *ph*, and *k* (in Sylhet and Chittagong, *x*, *f*; also a voiced counterpart of *x* in Chittagong, such as *gorir* 'I do' (< *kori-*), *xazi* (*kazi*), *xafɔr* (*kapor*)). Aspirated plosives turn to h and are also prone to elision (e.g., Standard Colloquial Bengali *ekhane* but Dhaka *ænɔ*). Nasalization is often found in the vicinity of a nasal sound or when the nasal is dropped (e.g., *ãi* for *ami* 'I', *ãr* for *amar* '*my,*' and *tɔ̃* for *tomar* 'your'). In Noakhali, nasalization is common in the vicinity of flapped *-r-* and voiced retroflex *d*, as in *OãDa* 'goat,' *gã Ri* 'coach', and *bã Ri* 'home'; spontaneous nasalization occurs, as in *hãsa* for *saccha* in Urdu-Hindi or *sotto* in West Bengali 'true'; forms such as *aponar* 'your' are realized as *amnEr*; thus, *agun* > *au:n* > *ɔ:n* 'fire.'

Morphological features of southeastern Bengali dialects are also distinct. The common pronominal questions are *kiya* for *ki* 'what,' *kiyare* 'for what,' and *-di* (Standard Colloquial Bengali *diye* 'by'). Noakhali *konDai* 'to where' and *thɔn* 'from' equals *kɔ̃De* and *tun* in Chittagong, respectively. Plural markers are *ɔ̃:l* and *ɔkkɔl*. Case endings differ only in the ending vowel, where *-e* is *æ* and *-er* is *-ɔr* (e.g., *ba-æ* for *bape* (NOM 'father' and *vaɔr* or *baθɔr* GEN 'of father'). Other features are similar to those of East Bengali dialects.

Barendri Northern Dialects

Dialects in the northern central part of Bangladesh also comprise the West Bengal variety, called Upper Rarhi and Barendri. Chapai Nowabgonj, Rajshahi, and the neighboring districts are the focal areas. These dialects have a number of peculiarities in common.

Phonological Features

Nasalization is retained (*e* > *æ*; *ɔ*, *O* > *u*); both *s* and *S* are used; *s* is prominent where Maldaha-Gouriya influence is conspicuous; *r* drops initially (*ruTi* > *uTi* 'bread') and an expansionic *r* is also found (e.g., *i:d* 'Muslim festival' > *ri:d*; *ɔsontos* > *rɔsɔntos* 'discontentment'). An *h* is retained and is sometimes inserted before checked syllables, but aspiration in voiceless stops is lost intervocally (e.g., *gamca* for g*amocha* 'towel') and finally (e.g., *sat* for *sathe* 'with' and *piT* for *piTh* 'back').

Morphological Features

Tense is realized as *kor-nu* 'I have done,' *kor-cu-nu* 'I was doing,' and *kor-mu* 'I shall do.' Future tense is realized as *-be* > *-pe* (*thak-pe* 'will remain') (*i*) *l*-past + first person *–am*, etc., or only *-il*. Case markers are *-k*, *-re*, *-rɔk* (ACC DET), *-thini* (ABL), and *-t* (LOC) as in *pachot* 'in the back.' Pronouns are *hami* 'I', *ui* 'he,' and *ɔra* 'they.' Plurals are formed with *-rɔk*, *-re*, and *-gulain* (as in *tumare jinis* 'your (PL) things' and *turek* 'by you' (PL)). According to S. S. Bose, the difference between Barendri and East Bengali dialects is almost nil in many aspects.

Kamrupi (Rajbansi-Bahe)

Additional northern dialects are the Kamrupi varieties in the Dinajpur, Rangpur, and Patgram-Kurigram-Nageswari regions. The Rajbansi variety is also found in the Darjeeling and Nepal regions, and there are claims that it is a separate speech form, like Assamese. Although it is influenced by Bangla grammar and vocabulary, it shows indications of Tibeto-Burman substrata. There are a number of Kamrupi peculiarities.

Phonological Features

In Kamrupi, *a* > *æ* (*potimæ* for *protima* 'god image') and *o* > *a*, *u* (*kon* > *kun* 'which,' *tomar* > *tumar* 'yours,' and *osukh* > *ɔsukh* 'disease'). Palato-affricates are realized as alveolo-palatals; *S* is retained, although *s* also occurs in some of the subvarieties. Initial aspiration in stop sounds is retained, epenthesis is mixed, and there is bimorism (*m*an*S*i for *manus* 'man' and *ɔgna* for *ɔgrɔhayɔn*, which is the word for a Bengali month.

Morphological Features

Past tense is realized as *-nu* (first person), *-li* (second person), and *-ilɔ* (third person); the future form (first person) is *-mu* (also *-im*). Pronominals are *m*∼*o*, *mui*, *ham*(*i*) 'I,' *amak* (oblique), and *hamra* (plural). Case endings are formed with *-t* (locative) and *-r*, *-k* (genitive). Plural markers are *-ra*, *-gula*, *gulak*, *gila*, and *-ghɔr*. Negative particles are used before verbs, as in *na jaõ* 'do not go.' Verbs take auxiliary particles as compounds (e.g., *ag khoa* for Standard Colloquial Bengali *rag kɔra*, *mɔnet khoa* for Standard Colloquial Bengali *mone laga*, and *hɔtaS khoa* for *hataṣ hɔwa*).

Tribal Languages

Bangladesh is a small country but has a large number of ethnic people. There are 35 or more ethnic groups that concentrate mostly in the Chittagong Hill Tracts, in the southeast, and a few others in the northern part of the country. The important groups in the Chittagong Hill Tracts include the Chakma, Marma, Murang, Mro, Khyang, Panko, Tripura, Urang, and Bawm. In the north (Rajshahi Division), there are the Rajbansi, Buna, Coach, Garo, Mhato, Munda, Saotal, and Uria groups. In Mymensingh and Northern Sylhet, there are the Hajong, Khasia, and Manipuri.

There are many bilinguals in the Chittagong Hill Tract area who use a variety of Burmese. The intertribal language is a local variety of the Chittagonian patois. In north and in Upper Sylhet, varieties of speech such as Garo mixed, Sylheti mixed, or a broken Bengali are found in an interlanguage situation. The Chakmas, Manipuries, and some other groups use a script of their own in addition to the Bengali script. The ethnic groups are keen to maintain their own languages, cultures, and religions.

See also: Bengali; Language and Dialect: Linguistic Varieties; Pakistan: Language Situation.

Language Maps (Appendix 1): Maps 79, 80.

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Bantu Languages

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Introduction

Bantu is the largest of the dozen or so language families that make up the Niger-Congo phylum, which, with nearly 1500 languages, is the largest phylum in the world. Some 750 million people live in Africa, some 400 million speak a Niger-Congo language, and some 250 million – a third of all Africans – speak a Bantu language. Bantu-speaking communities live south of a line from western Cameroon across the Central African Republic, the Democratic Republic of Congo (DRC; once known as Zaire), Uganda, and northern Kenya to southern Somalia. Most languages spoken from that line to the southern tip of South Africa are Bantu. Within that area, they coexist with some non-Bantu languages: a few Khoisan, mostly in the southwest, a few Cushitic, in the northeast, and a string of Nilo-Saharan and Adamawa-Ubangian languages along and within the northern border. In all, 27 African countries – roughly a half – are partly or entirely Bantu speaking.

Certain generalities are true of Bantu-speaking communities. One is that, just as most African countries are multilingual, many individuals are bi- or multilingual. In former times, many who came in contact with neighboring communities, mainly males such as traders or soldiers, spoke two or more languages. Though this is still true, it is increasingly true that many young people are born into one language community, are formally educated in a second language, and may acquire a third language later. Men tend to speak more languages than do women, and living in cities encourages multilingualism more so than does life in rural areas (Wolff, 2000).

Another truism is that many languages are poorly described. Three broad language categories can be distinguished. At the lower end are many dozens of languages for which no data are available. In the middle, the largest set, are many languages for which some data are publicly available, ranging from just a word list to a partial description. Finally, for about 10% of the languages, a reasonably comprehensive grammar exists, as books, doctoral theses, or long articles. In some areas – for example, South and East Africa – the languages are fairly well described, whereas in others (Angola, Cameroon, the DRC, and Zambia) they are less well covered.

A third point concerns the poor health of some of these communities. Dividing the Bantu population of 250 million by the number of languages, 500, gives an average of half a million speakers per community, but that ignores the fact that many smaller communities, especially rural, are in much worse shape than the figures indicate. The best demographic collection available (Gordon, 2004) gives figures for most communities, but gives no breakdown according to age. In many small communities, the fluent speakers are aging, with few or no younger speakers, so these communities of speakers will silently fade away in this century. As the small communities get smaller, the large get larger. At the same time, new urban and regional forms of languages are thriving (*see* Sommer, 1992; Bernsten, 1998; Wolff, 2000).

Finally, across the area, it has proved difficult to distinguish language from dialect. The difference is one of degree of similarity, and the question concerns where to cut a cline of similarity. Thus readers should treat with skepticism the figure of 500 Bantu languages. Estimates have varied between 300 and 600. If lack of reasonable mutual intelligibility with other varieties is a major defining feature of a language, then the figure is nearer 250 than 500.

Classifications

The second half of the 20th century saw dozens of referential and genealogical classifications. The most widely used referential system is that of Guthrie (1948, 1971), who divided the (Narrow) Bantu languages into 15 zones (designated A, B, C, D, E, F, G,

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H, K, L, M, N, P, R, S), and each zone in turn into groups (designated A11, A12, A13,..., etc.), for a total of 85 groups. Thus Nen is A44, Lingala is C36(d), Ha is D66, varieties of Swahili are G41, -42, or -43, and Zulu is S42. Guthrie's zones and groups are based partly on shared features he regarded as important, and partly on geographical contiguity. The most recent version of Guthrie (2003) is Maho. Guthrie's taxonomy did not reflect history, except indirectly.

In contrast, genealogical classifications aim to reflect the evolutionary history and, to a lesser extent, the contact history of the Bantu languages. Nearly all genealogical classifications assume that the current languages derive from Proto-Bantu and nearly all are based on the use of vocabulary in some form: lexicostatistics (counting percentages of shared vocabulary), glottochronology (assigning dates to percentages of shared vocabulary), shared lexical innovations, or juxtaposing results from lexical investigations with those from other disciplines, such as culture or archaeology (DNA comparison on a wide scale is so far lacking). The only study that examined the whole Bantu area and drew on hundreds of languages was the lexicostatistical work of Bastin *et al.* (1999); others used a smaller sample (Ehret, 1998, 1999; Nurse, 1999; Nurse and Philippson, 2003; see also Nurse, 1994–1995). Most of these classifications have in common that (1) they have some trouble defining an exact line between Narrow Bantu and closely related Bantoid languages in Cameroon, (2) they see a small set of languages (zones A, B, C, and bits of D and H, spoken in the northwest and north, in Cameroon, Gabon, Congo, and the northern fringe of the DRC, often called the Forest languages) as different from the rest, and (3) they divide the rest, the majority, into a smaller western (Angola, Namibia, parts of the DRC, Zambia, and Botswana) and a larger eastern set (all of eastern and most of southern Africa). Using nonlexical criteria, Nurse and Philippson (2003) differed somewhat in their view of classification (and history). While acknowledging the northwestern/northern grouping and the western group, they also saw a distinct northeastern group (Uganda, Kenya, and Uganda), but otherwise viewed the remaining languages as a group defined negatively by not sharing the innovations of the west, northwest, north, and northeast.

History

The entire Bantu area historically was covered in work by Vansina (1995), and Vansina (1990) and Ehret (1998) dealt in detail with the northwest/north and east/south/southwest, respectively. An older, slightly outdated, view of the development of Bantu history is found in the work of Oliver (1966) and Phillipson (1977).

Though Ehret and Vansina disagreed on many details, the general outline is clear. Within Niger-Congo, Bantu is part of a grouping currently called Benue-Congo. The ancestors of the Benue-Congo, farmers, lived between what is now the Ivory Coast and western Cameroon, starting some seven millennia ago. By 3000 B.C., the ancestors of the Bantu had emerged and had already divided into what were later to become western and eastern Bantu. During the next millennium, they all moved slowly south and east across Cameroon, carrying the West African planting tradition with them. By 1000 B.C., they had moved much further into the rainforest and had reached various points on or near the Congo (Zaire) River in today's DRC, so that there was a wide range of Bantu communities in the forest (Vansina, 1990: 51–54). There is a popular myth that the huge equatorial rainforest is uninhabitable and uncrossable. In fact, today it has some 12 million inhabitants, spread across 450 ethnic groups (Vansina, 1990: 3), and the early Bantu crossed it easily, following the major rivers (the Congo (Zaire), Kasai, Sankuru, Lualaba, Lomami, and Sangha). By 1000 B.C., the ancestors of today's eastern Bantu were already at the eastern end of the forest, at the western edge of the Great Lakes region, to the east and south of the forest. This is necessarily a shortened and simplified version of events: in particular, it ignores the northwestern and northern Bantu communities, speaking the so-called Forest languages, whose history is somewhat separate and not further followed here.

Ehret saw the ancestors of today's eastern Bantu communities as having divided into two groups, an incipient northern and an incipient southern group, by 3000 years ago, both located in the area west of the West Rift valley in East Africa. The former group likely was to the west and south of Lake Victoria, the latter being west of Lake Tanganyika. The northern group had reached Lake Victoria by the middle of the first millennium B.C. During this period and later, these ancestors came across communities speaking Nilo-Saharan, Cushitic, and Khoisan languages, encounters that contributed to a diversified agriculture and boosted pastoralism. Iron working also had appeared in the region by this time, but its origins are disputed. During the next 500 years, some communities spread around Lake Victoria; some spread across Kenya and northern Tanzania to the coast by the early centuries A.D. and, by a couple of centuries later, others spread south and southeast across Tanzania close to northern Mozambique.

Meanwhile, the southern offshoot of eastern Bantu had left the southern fringes of the rainforest and approached northeast Zambia by the second half of the last millennium B.C. They spread thence into much of Zambia, Malawi, Zimbabwe, southern Mozambique, and eastern South Africa, early Shona societies being established south of the Limpopo River by the third century A.D. These early groups ran across long-established Khoisan peoples in most of the region. Later movements, even into the second millennium A.D., resulted in the current configuration of Bantu communities in South Africa. Western Bantu likewise splintered. Sections moved east and northeast along the upper Congo River and its tributaries, and then southeast, so that nearly all of the rainforest was occupied by western Bantu populations by 1 A.D. Once the ancestors of a southern arm had crossed the lower Congo River and moved out of the rainforest into the adjacent savanna, during the latter half of the last millennium B.C., one section continued south across the Benguela Highlands in Angola and finally into northern Namibia, and another turned east and southeast and moved as far as western Zambia, along the Upper Zambezi River. Most western Bantu populations were in or near their current locations by the late centuries B.C. or the early centuries A.D.

With a few notable exceptions, most major movements of early Bantu-speaking peoples, east and west, were complete by the early centuries A.D., and the ancestors of most current Bantu populations had occupied central, eastern, and southern Africa by that time. Thereafter, some minor movements and local dispersals followed, with much contact, interaction, mixing, and assimilation.

Typology

This section sketches some characteristic features of Bantu phonology, morphology, and syntax, mainly those that occur widely but including a few less widespread, but intrinsically interesting. Exceptions to these generalities occur mainly in northwestern and northern languages.

Phonology

Nearly all Bantu languages have five or seven contrastive vowels, the few exceptions being mainly in Cameroon, Congo, and DRC, with languages with nine or more vowels. Five- and nine-vowel systems derive from earlier seven-vowel systems, the number usually assigned to Proto-Bantu. Despite the apparent similarity of the systems, phonetic realization varies considerably, especially in languages with seven vowels. The full range of vowels is seen in most stem positions, whereas a reduced set occurs in other contexts, such as prefixes and extensions (the derivational suffixes following the stem). Vowel height harmony is widespread, whereby the historical degree-two vowels (the second highest vowels in the seven-vowel system) harmonize and lower to /e/ and /o/ after /e/ and /o/ in the root (and in some languages after /a/) (see Schadeberg, 1994/1995; Hyman, 1999, 2003; Kisseberth and Odden, 2003; Maddieson, 2003).

Proto-Bantu had a few pairs of words differentiated only by vowel length. Some languages have kept these, some have neutralized the length distinction, some have reintroduced it, and others have increased its function, often via loanwords. Phonetic vowel length is typically induced by vowel fusion, following prenasalized consonants, or gliding and 'compensatory lengthening' of the remaining vowel (in sequences of two vowels, /i, e/ and /u, o/ in the first position typically become the glides /y/ and /w/, respectively, before nonidentical vowels).

Most Bantuists credit Proto-Bantu with the following consonant system:

p	t	c	k
b	d	j	g
m	n	ɲ	

Here there is a voiced:voiceless contrast in plosives and a full set of nasals at nearly all the same points of articulation as the plosives. Most contemporary languages have these features, although the voiced plosives have often become continuants. Not shown here, there were also two sets of prenasalized consonants (mb, nd. . .: mp, nt. . .). Most languages still have the voiced set, but the voiceless set has been less stable over time, apparently because of the disparity in voicing between nasal and obstruent.

Some languages still have a simple consonant system that, although altered from the one shown here, derives from it fairly directly. Others have a much-expanded system, partly due to common phonetic processes such as palatalization, gliding, and voicing, but often resulting from a widespread process known as Bantu Spirantization. In this, the two high vowels in the original seven-vowel system affected the preceding plosives, typically producing affricates or fricatives: labial /pf, bv, f, v/ from /p, b/, labials from the nonlabial consonants before the high back vowel, and alveolar or palatal /ts, dz, s, z, etc./ from the nonlabial consonants before the front vowel. Typically, the two high vowels then merged with the degree-two vowels. The result was a smaller five-vowel inventory but a larger consonant inventory with voiced and voiceless plosives and fricatives.

Other consonant processes, geographically more limited, are defined by Dahl's Law and Meinhof's Law. Dahl's Law voices a voiceless stop if the obstruent in the next syllable is also voiceless (so Kikuyu *gek*i from English 'cake'), which has interesting effects in long strings. Possibly linked to this is a more local phenomenon, Katupha's Law, which disallows aspirated consonants in adjacent syllables, deaspirating the first. Meinhof's Law affects sequences of noun, consonant, vowel, noun (consonant), or NCVN(C), deleting the first C, so *ŋgombe* 'cow' would become *ŋombe*. A local variant, the Kwanyama Law, produces the opposite result, *ŋgobe*. Syllables in Bantu are almost universally open, that is, CV or CVV. In restricted contexts, such as prefixes, other shapes (V, N, NCV) occur. A few languages, mostly in the northwest, may have closed syllables (CVC), due to loss of final vowels (but their tones are mostly kept).

Some 95% of Bantu languages are tonal and have a basic contrast between high (H) and low (L), or H and toneless. Contour tones (falling, rising) are usually restricted to bimoraic syllables. Downstepping of each successive H is common. Nouns and verbs show significant differences in the distribution of tone. Nominal prefixes are typically toneless and a number of stem patterns are possible, varying from language to language. Tones in verbs are more complicated than they are in nouns. Verb stems in many languages show a lexical contract between H and toneless, and affixes may also have their own tone, so that in some languages the tone of the verb is more or less the sum of individual tones, modified by certain general processes. In other languages, verb stems have no lexical tone, tone being assigned by general principles, often particular to certain tenses. Even languages with lexical stem tone often have grammatical tone, whereby an H may be assigned to a specific stem mora in certain tenses.

In many Bantu languages, the relationship between an underlying and a surface H is not direct, being modified by widespread principles and processes that favor or disfavor certain configurations. One such is tone spreading (tone of one syllable spreads to the next syllable(s), so being realized on two or more syllables), or tone shift (tone of one syllable is realized only on the next), typically from left to right. Another is avoiding situations whereby phonological structures – typically the intonational phrase or the word – end on an H. A third is the disfavoring of successive (nonsurface) H's, the obligatory contour principle (OCP). Working against the OCP is the plateau principle, whereby a toneless stretch between two H's is avoided. Finally, tones mark certain grammatical functions. Besides being associated with certain tenses or groups of tenses, as already noted, tone often serves, for example, to distinguish statement from question, positive from negative, main from subordinate clause (the latter often including relative clauses), and the third person (H) from the second person singular subject prefix, which are otherwise segmentally identical.

Morphology

Bantu languages have the following word classes: noun, verb, pronoun, adjective (a small class; only a dozen or so are reconstructable for Proto-Bantu), numeral, demonstrative (often a three-way contrast), a small set of quantifiers and interrogatives, preposition (often a compound), and ideophone. One conjunction (*na*) is widespread (see Katamba, 2003; Nurse, 2003; Schadeberg, 2003).

Nouns consist of a stem and a prefix (L). Most prefixes have a CV-shape, stems are of the shapes -CV, -CVCV, -CVCVCV, etc., whereby the last vowel might be part of the stem or it might be a derivational suffix, so in Ha the final vowel of [umwáana] is part of the stem, whereas in *umuhanuuz-i* 'advisor,' *umukén-e* 'pauper,' and *igisus-o* 'example,' the final vowels are derivational suffixes (from *-hanuur-* 'tell', *-ken-* 'miss,' and *-sus-* 'resemble,' respectively). Nouns in many but not all languages have an augment (also called preprefix, initial vowel), consisting of a vowel that reflects the vowel of the prefix. It has various pragmatic and syntactic functions.

All nouns are assigned to a class. Classes have four characteristics: (1) each class has a nominal prefix, (2) there is extensive concord between the noun and the constituents of the noun phrase and the subject and object prefixes in the verb, (3) there are typical singular–plural class pairings, often called genders, and (4) and there is some semantic content to each class and gender. Concord, incidentally, is not always automatic – animacy, for example, can sometimes override automatic class agreement. Typical languages have between 15 and 21 classes and at least six genders, leaving some single classes with no plural pairing. The classes (Cl.) have been given conventional numbers (Cl. 1, 2, 3, 4, etc.) and some genders are widespread (e.g., 1/2, 3/4, 5/6, 7/8, 9/10, 11/10, 12/13, 14/6). Classes 15, 16, and 17 are locative classes and typically have a single member, or even no regular members, their prefixes being added to other nouns. Gender 12/13 (and sometimes 7/8) is a diminutive gender, gender 5/6 (and sometimes 20/21) is an augmentative. Gender 9/10 in many languages appears to act as a dumping ground for nouns that do not fit elsewhere. Nouns may be shifted from one (primary) class to another (derived), typically the classes just

mentioned, in which case the prefix and semantic features of the new class will be added to or replace those of the primary class. Thus there are the Ha words *u-mw-áana* 'child' (Cl. 1), *a-ka-ána* 'small child' (13), *u-tw-ána* 'small children' (13), *i-zí-iko* 'fireplace' (5), and *ku-zí-iko* 'to/on the fire' (16 + 5); also, in Haya (E22), there is *o-mu-ntu* 'person' (1), but *o-lu-ntu* 'tall, slim but slightly ridiculous person' (11). A few northwestern and northern languages have greatly reduced the number of noun classes to a handful, or even to none.

For many decades, it was maintained that with the exception of the derived genders and of gender 1/2 (humans), it was not possible to state the semantic content of most classes and genders, other than by listing typical and obvious groupings, and there were many anomalies. These groupings and anomalies occur across Bantu. Thus gender 3/4 typically contains plants, bushes, trees, and some natural phenomena, but it also widely contains 'year' and 'end,' and, in Swahili, 'mosque'! Contemporary attempts have been made to look at semantic content differently. Rather than trying to reduce content to one or a very few clearly statable characteristics, the new, cognitively inspired approach tries to find coherence in the notion of semantic networks, thus plants > objects made from plants > powerful things (e.g., medicine), or plants/trees > long, extended shape > time trajectory (e.g., 'year, journey'). This still leaves unexplained exceptions, but may lead to even better results when applied to more languages.

It is interesting to note in closing that the final semantic contrasts remaining in languages that have reduced their noun classes almost to zero are those of languages recognized as pidgins. Thus the Cameroonian language Kako (Katanga, 2003: 108), certain D30 languages in the northeastern DRC, and Pidgin Swahili, as spoken in Nairobi, have in common that they have only two or three classes left, retaining only the distinction animate/inanimate or human/nonhuman.

Bantu languages are verby, that is, the verb is not only the organizational center of the sentence but encodes more information than any other word class, information that in, for example, English requires several words. The verb structure is agglutinating and may include up to 20 morphemes in some languages (Nurse and Philippson, 2003c: 9). These two structures cover the main possibilities for the one-word verb:

NEG_1 - prefix - formative - object - root - extension - final vowel - postfinal
prefix - NEG_2 - formative - object - root - extension - final vowel - postfinal

The only two obligatory constituents are root and final vowel, which cooccur in the imperative. Several morphemes may cooccur at prefix, formative, object, extension, and postfinal, typically in a canonical order. The structures differ only in the position of the NEG. Over the past two decades, phonologists have interpreted these linear structures as a hierarchy. Root and extension form the derivational stem: extensions are tonally neutral, have a canonical VC shape, and have a reduced five-vowel system; the derivational stem is the domain of vowel harmony with the root. Derivational stem and final vowel form the inflectional stem, the domain of reduplication, vowel coalescence, and limited consonant harmony with the final root consonant. Derivational stem and object form the macrostem, the domain of certain tonal phenomena. Finally, the macrostem combines with all preceding material to form the verbal word. This synchronic division of the verb into macrostem and prefixes corresponds well with likely historical development – other Niger-Congo languages have the macrostem, to which Bantu prefixes were added later.

Always or nearly always encoded in the inflected verb are subject, tense, aspect, mood, valency, and negation. Subject concord is usually obligatory and encoded at the prefix in both of the preceding structures, whether the subject noun is present or not. Tense is most often encoded at formative, less often at the final vowel or before the prefix. Bantu languages typically have multiple past and future reference: 83% of a database of 100 languages geographically representative of all 500 had between two and five discrete past tenses (40% had two, 32% had three), and 87% had one to three futures (46% had just one, 25% had two). Aspect seems to have been originally marked at the final vowel, but today also appears at formative: perfective, imperfective, progressive, habitual, anterior (also called 'perfect'), and persistive are the commonest aspects. Mood is most often subjunctive, marked by a suffixal [e] at the final vowel. Valency changes are marked at extension and include causative, applicative (encompassing various functions), impositive, neuter/decausative, positional, reciprocal/plurational, repetitive, extensive, tentive, reversive, and passive. Negation appears variously; 51% of the database languages have two negatives, one associated with subordinate clauses, relative clauses, subjunctives, and imperatives, the other with main clauses. The former is typically but not always marked at NEG_2, the latter at NEG_1; 28% of the database languages have a single negative, either at NEG_1 or NEG_2 or pre- or postverbally, and 15% of the languages have more

than two negatives. Tense, aspect, mood (TAM) distinctions in negative verbs may differ from those in positives.

Less often, rarely, or not encoded in the verb are relative markers, focus, pronominal objects, and other categories. Relatives are most often marked before or at prefix in the second structure, and often the main marking is tonal. Focus can highlight several categories (e.g., the lexical verb itself, what follows the verb, or the aspect) and is usually indicated as a second or third morpheme in the formative slot, or verb initially. Pronominal object marking is also variable: some languages allow no object markers in the verb, some allow one, some allow two, and in a few languages four and even five have been recorded, especially in association with an applicativized verb.

A second or third morpheme in the formative slot marks consecutive, itive, or ventive in some languages. Many languages allow compound verbs, whereby the first verb is a tense-marked auxiliary, most often 'be,' and the second, lexical verb carries aspect. Many TAM markers are visibly grammaticalized, reduced forms of auxiliaries.

Syntax

Bantu languages belong to Heine's (1976) Type A, having subject (S) (Aux)-verb (V)-object (O)-X, whereby there may be two objects (double object marking, rather than direct and indirect), and X represents adverbials (the Cameroonian language, Nen, with subject-object-verb (SOV), is the only known exception): prepositions: and noun phrase constituents, including relative clauses and the genitive construction, follow the head noun. The following Ha examples illustrate these and other features mentioned earlier:

inkokó ziníni zóóse záanje
'all my big chickens' (lit. chickens big all my)

izo inkokó ziníni zibíri
'those two big chickens'

igúnira dzuuzúye imbutó
'bag which.is.full.of seeds'

ubwáato bwa-dáatá
'canoe of-father'

ba-ø-teera ibiharagi
'they-sow beans' (postverbal focus)

ba-ø-ra-téera
'they sow' (verbal focus)

wari wágiiye heéhe
'where had you gone?' (lit. you.were you.went where)

keéra ha-rabáaye
'once there-was' (Class 16)

yasutse-mwó amáazi
'she.poured-in water' (Class 16)

urondera-kó (Class 17)
'. . .where you sought' (lit. you sought-where)

yamúhaaye umukáaté umwáana kumwóonga
'she.gave bread to.child at.river'

The first four examples illustrate the order of constituents of the noun phrase. Harjula (2004: 131), from whom these examples come, stated that some of the constituents may change their order "without a change in the meaning" (in other languages, a change of place implies a change in emphasis) and that demonstratives precede the noun (in other languages, they may precede or follow). The fifth and sixth examples show one kind of focus contrast and one way of doing it: the form showing the close relationship between verb and postverbal constituent, also called the conjunctive, has a zero marker (ϕ) between subject marker and verb, whereas the form with focus on the verb, the disjunct, has a morpheme *ra* and retains the H of the stem. The seventh example shows a typical compound verb ('be' followed by main verb) and a wh-question: the wh-word typically retains the position of the element replaced, at least for nonsubjects. Yes/no questions are indicated either by a question marker at the beginning or end of the sentence, or by use of tone. Examples 8–10 show locatives in subject, object, and relative function, respectively, spatial relations being typically coded on the verb. The last example shows the ditransitive verb 'give' with two objects and an adverbial. Of this, Harjula said: "When there are two object prefixes the more indirect (i.e., the patient) is closer to the stem." This runs counter to Bearth's (2003: 127) claim that "the widespread tendency in Bantu languages is to assign the positions next to the verb on account of a hierarchy of parameters defined, in terms of (i) animacy of the referent (human > animate > inanimate), (ii) semantic role relationship (beneficiary > goal > patient > locative), (iii) participant category (first- > second > third person), and (iv) number (plural > singular)". This is true of noun phrases following the verb, and their mirror image, object prefixes preceding it. Finally, although the canonical word order is SVO, considerable word-order variation is possible for pragmatic purposes. The position to the right of the verb, in particular, acts as a focus position.

See also: Africa as a Linguistic Area; Fanagolo; Inflection and Derivation; Kinyarwanda; Proto-Bantu; Shona;

Southern Bantu Languages; Swahili; Template Morphology; Xhosa; Zulu.

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Barbados: Language Situation

Editorial Team

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The official language of Barbados is English, with 268 000 speakers in total. The second language of Barbados is Bajan, also known as Barbadian Creole English, with 259 000 speakers existing in a continuum with 13 000 standard English speakers. The English of Barbados is considerably less creolized than other Englishes in the region and it is reported that even the basilect is closer to standard English than those of Jamaica or Guyana. This has led to some claiming that Bajan may not be a creole. Be that as it may, the decreolization of Bajan has been enhanced by early repressive laws (especially The Sunday and Marriage Act of 1826), the relatively small size of the island and its rather flat topography; linguistic communities could not remain isolated from the standardizing forces for long. Now, it is reported to be increasingly influenced by American English and exists in a Creole continuum with other Englishes spoken in the region. In Barbados, the habitual use of Bajan is perceived as indicative of low social and educational status. Literacy is 97.4%, defined as people of 15 or over who have attended school.

The dominant role of English in Barbados is rooted in the fact that Barbados was never colonized by the

Spanish and was uninhabited when claimed by the British in 1624. The first colonists, growing tobacco, were mainly slaves as well as British farm owners and administrators. During the English Civil War, prisoners of war, Irish rebels, and petty criminals were deported there, ensuring that Barbados English corresponded to the English of the British poor. When production switched to the more labor- and capital-intensive production of sugar in the 1640s, African slaves were brought to the island, further adding to linguistic complexity.

Barbados also played an important role in the spread of English. The effect of the expansion of the sugar plantations was to force smallholders off the land and to disperse to other islands. Emigration from Barbados played an important role in the development of English creoles in, among others, Trinidad and Tobago and Panama. This was enhanced by the fact that Barbados was an important staging post in the Caribbean slave trade. After emancipation in the 19th century Barbados developed a surplus of laborers, who traveled as indentured laborers throughout the Caribbean, taking their English with them.

See also: Guyana: Language Situation; Jamaica: Language Situation; Pidgins and Creoles: Overview.

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Bar-Hillel, Yehoshua (1915–1975)

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Yehoshua Bar-Hillel (see **Figure 1**) was a mathematician, logician, and philosopher of science. He is very famous for his contributions to pioneering fields ranging from syntax (categorial grammar) and theory of information to evaluation of early machine translation and information retrieval. He republished his main papers in two collections, *Information and language* in 1964, containing his works on machine translation, syntax, information retrieval, and information theory, and *Aspects of language* in 1970, dedicated to Rudolf Carnap and containing his works on philosophy of language (indexicality, context-dependence, and pragmatic implication). In addition, he edited several colloquium proceedings on logic, pragmatics, set theory, and philosophy of sciences, which he organized in Jerusalem from 1965 until 1971.

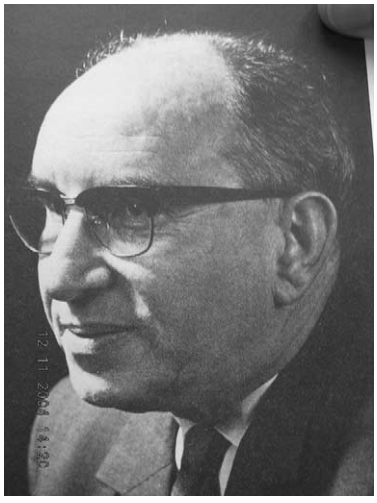

Figure 1 Yehoshua Bar-Hillel.

Yehoshua Bar-Hillel was born in 1915 in Vienna and went to Palestine in 1933. He carried out his studies at the Hebrew University of Jerusalem with an interruption of one year (1934) to join a kibbutz. He took his M.A. in philosophy and mathematics in 1938. Influenced by the reading of Carnap's *Logische Syntax der Sprache*, he began a Ph.D. while teaching mathematics in high schools. From 1942 to 1945 he fought in the Jewish Brigade Group of the British Army and had just enough time to submit his Ph.D. in 1947, on a theory of syntactic categories under the supervision of S. H. Bergmann (Bar-Hillel, 1950), before the beginning of the Israeli war of independence, in which he fought and lost one eye. In 1949 he began an academic career at the Hebrew University of Jerusalem as Research Fellow before going to the United States, where he spent four years. In 1950 he

obtained a fellowship from the Hebrew University at the philosophy department of the University of Chicago, where he met Rudolf Carnap. In 1951 he was appointed to the MIT Research Laboratory for Electronics as a research scholar for the study of the application of computers to linguistic work, most notably machine translation (MT). He had been dubbed the first academic to work full-time in the field of MT. When he returned to Israel in 1953, he was appointed Senior Lecturer in Philosophy (1953–1958), then Associate Professor of Philosophy (l958–196l), and finally Professor of Logic and Philosophy of Science (196l–1975). He died prematurely, before his 60th birthday, after a long illness.

Bar-Hillel contributed substantially to MT by his critical approach and his pioneering proposals on the automatization of syntactic analysis through categorial grammar. Acquainted with international auxiliary languages, he was interested by the possible effect of MT on international communication, especially among scientists. He organized the first conference on MT in 1952 and dedicated many papers to it in the 1950s and 1960s. In 1958 he obtained a research contract through the National Science Foundation to study linguistic data processing, including a critical investigation on the state of machine translation. He published the results in a critical report that described the inadequacy of the theoretical basis of MT (Bar-Hillel, 1960). He especially argued against the feasibility of full automatic high quality translation (coining himself the acronym FAHQT) and advocated post-editing and machine-aided translation. His main argument is well-known: he demonstrated the need for extralinguistic knowledge, inferences, and coreferences (indexical expressions) in order to translate ambiguous words like 'pen' in a sentence like "the box was in the pen" (Léon, 2004). This crucial issue for automatic understanding was addressed by artificial intelligence only several years later. His critical report instigated the creation of the ALPAC committee in 1964, the report of which (known also as the Pierce report), published in 1966, led to the suppression of funds for MT research, hence the disparition of MT centers and researchers all the world over.

Through the prism of MT criticism, Bar-Hillel tackled several issues in the area of philosophy of language, such as indexicality (1954a) and idioms (1955). He was also concerned with set theory and semantic information. Thus, inspired by Shannon's mathematical theory of communication, he tried, in collaboration with Carnap, to define how to measure the meaning of information (Carnap and Bar-Hillel, 1952).

Bar-Hillel's main contribution to MT was his idea of operational syntax, unprecedented among MT researchers, in order to mechanize syntactic analysis. He gave the outline of a quasi-arithmetical description of syntactic structure, a categorial grammar, combining Ajdukiewicz's logics and Harris's method in order to test the syntactic connexity of strings. Sharing Carnap's and Tarski's views, Bar-Hillel advocated a logicist conception of syntax. This was precisely the conception that was criticized by Chomsky and gave rise to the well-known controversy between the two scientists – who were also very good friends – about the role of logic and formal semantics in linguistics in the journal *Language* (Bar-Hillel, 1954b; Chomsky, 1955). Later, Bar-Hillel adopted some of Chomsky's views. While in a first version of his operational syntax (1953) he stood by Harris's immediate constituency, he later rallied to Chomsky's transformational grammar to account for discontinuities and complex sentences (Bar-Hillel, 1960: Appendix II). In the following years, he investigated the complexity of categorial grammar with his associates, Chaim Gaifman, Asa Kasher, and Shamir Eliyahu, of the Applied Logic Branch of the Hebrew University (Bar-Hillel *et al.*, 1967). They opened up a new field that later gained more and more importance in formal and computational linguistics (see, for example, Oehrle *et al.*, 1988).

See also: Ajdukiewicz, Kazimierz (1890–1963); Carnap, Rudolf (1891–1970); Categorial Grammars: Deductive Approaches; Chart Parsing and Well-Formed Substring Tables; Chomsky, Noam (b. 1928); Harris, Zellig S. (1909–1992); Idioms; Information Theory; Logic and Language: Philosophical Aspects; Machine Translation: History; Philosophy of Linguistics; Tarski, Alfred (1902–1983).

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Barthelémy, Jean-Jacques (1716–1795)

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A prominent French explorer of Classical and Oriental antiquities, the abbé Jean-Jacques Barthélemy was born in Cassis in southern France and educated in Marseilles by Jesuits and Lazarists, acquiring a good knowledge of Classical and Oriental languages, including Hebrew, Syriac Aramaic, and Arabic.

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The Revolution caused dramatic upheavals in Barthélemy's life. He lost his positions, and his material condition was reduced to a minimum. In 1790 he was arrested. But his fame was so great that after 16 hours of confinement' he was released and allowed to resume his scholarly work. However, his health was deteriorating and at the age of 79 he passed away – a true classicist! – with a volume of Horace in his hands.

See also: Afroasiatic Languages; Ancient Egyptian and Coptic; Decipherment; Phoenician; Semitic Languages.

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Southern Bantu Languages; Swahili; Template Morphology; Xhosa; Zulu.

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Barbados: Language Situation

Editorial Team

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The official language of Barbados is English, with 268 000 speakers in total. The second language of Barbados is Bajan, also known as Barbadian Creole English, with 259 000 speakers existing in a continuum with 13 000 standard English speakers. The English of Barbados is considerably less creolized than other Englishes in the region and it is reported that even the basilect is closer to standard English than those of Jamaica or Guyana. This has led to some claiming that Bajan may not be a creole. Be that as it may, the decreolization of Bajan has been enhanced by early repressive laws (especially The Sunday and Marriage Act of 1826), the relatively small size of the island and its rather flat topography; linguistic communities could not remain isolated from the standardizing forces for long. Now, it is reported to be increasingly influenced by American English and exists in a Creole continuum with other Englishes spoken in the region. In Barbados, the habitual use of Bajan is perceived as indicative of low social and educational status. Literacy is 97.4%, defined as people of 15 or over who have attended school.

The dominant role of English in Barbados is rooted in the fact that Barbados was never colonized by the

Spanish and was uninhabited when claimed by the British in 1624. The first colonists, growing tobacco, were mainly slaves as well as British farm owners and administrators. During the English Civil War, prisoners of war, Irish rebels, and petty criminals were deported there, ensuring that Barbados English corresponded to the English of the British poor. When production switched to the more labor- and capital-intensive production of sugar in the 1640s, African slaves were brought to the island, further adding to linguistic complexity.

Barbados also played an important role in the spread of English. The effect of the expansion of the sugar plantations was to force smallholders off the land and to disperse to other islands. Emigration from Barbados played an important role in the development of English creoles in, among others, Trinidad and Tobago and Panama. This was enhanced by the fact that Barbados was an important staging post in the Caribbean slave trade. After emancipation in the 19th century Barbados developed a surplus of laborers, who traveled as indentured laborers throughout the Caribbean, taking their English with them.

See also: Guyana: Language Situation; Jamaica: Language Situation; Pidgins and Creoles: Overview.

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Yehoshua Bar-Hillel (see **Figure 1**) was a mathematician, logician, and philosopher of science. He is very famous for his contributions to pioneering fields ranging from syntax (categorial grammar) and theory of information to evaluation of early machine translation and information retrieval. He republished his main papers in two collections, *Information and language* in 1964, containing his works on machine translation, syntax, information retrieval, and information theory, and *Aspects of language* in 1970, dedicated to Rudolf Carnap and containing his works on philosophy of language (indexicality, context-dependence, and pragmatic implication). In addition, he edited several colloquium proceedings on logic, pragmatics, set theory, and philosophy of sciences, which he organized in Jerusalem from 1965 until 1971.

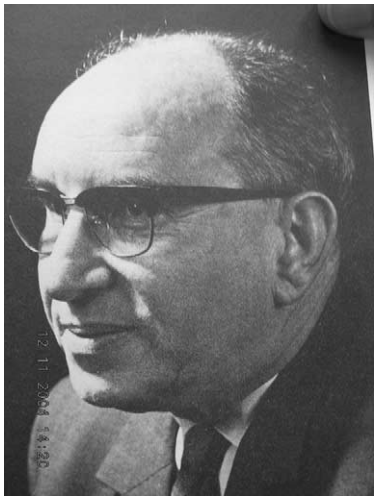

Figure 1 Yehoshua Bar-Hillel.

Yehoshua Bar-Hillel was born in 1915 in Vienna and went to Palestine in 1933. He carried out his studies at the Hebrew University of Jerusalem with an interruption of one year (1934) to join a kibbutz. He took his M.A. in philosophy and mathematics in 1938. Influenced by the reading of Carnap's *Logische Syntax der Sprache*, he began a Ph.D. while teaching mathematics in high schools. From 1942 to 1945 he fought in the Jewish Brigade Group of the British Army and had just enough time to submit his Ph.D. in 1947, on a theory of syntactic categories under the supervision of S. H. Bergmann (Bar-Hillel, 1950), before the beginning of the Israeli war of independence, in which he fought and lost one eye. In 1949 he began an academic career at the Hebrew University of Jerusalem as Research Fellow before going to the United States, where he spent four years. In 1950 he

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Barthes, Roland (1915–1980)

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Roland Barthes, a French critic and theorist of literature and culture, was very much associated with the Parisian intellectual ferment and contention of the 1960s and beyond (especially at the École pratique des Hautes Études, and in his final years as the chair of literary semiology at the Collège de France). Barthes came to international prominence for his structuralist-informed but primarily semiological analyses of myths and cultural practices (see his *Mythologies*: Barthes, 1957).

For stylistics and linguistic criticism, Barthes is chiefly influential in three texts: his early essay on the structural analysis of narrative, in which his ideas of functions, indices, and catalyzers were introduced; *Mythologies*, his collection of essays which innovatively applied structuralist-anthropological methods to an interrogation of the overlooked systematicities of popular culture and mass media (from wrestling to restaurant menus to the Eiffel Tower); and his 1970 study *S/Z*, on the systematic reversals and deceptions in a Balzac story, in which a procedure of detailed commentary on blocks of the story's text (lexias) in terms of five shaping semiotic codes (the hermeneutic, proairetic, semic, cultural, and symbolic) was elaborated in a virtuoso analysis. By analyzing phase-by-phase Balzac's short story 'Sarrasine,' he dealt with the experience of reading, the relations of the reader as subject to the movement of language in texts. According to Barthes, classic criticism has never paid proper attention to the reader, even though the reader is the space where all a text's aspects meet, and a text's unity lies not in its origin but in its destination: "The birth of the reader must be at the cost of the death of the Author."

His cultural criticism combined subtle philosophical critique with personal, and even confessional, individuality of response (and in some respects created and prepared audiences for the different bodies of work of Derrida and Lacan). He recast characters and readers as shimmering confluences of traces, signs, and absences, rather than abbreviated notations of fixed and stable free-standing individuals (the latter view became for him part of an insupportable rationalist, liberal, and bourgeois reading of culture). He sought to elaborate a logic of writing and reading which was based on pleasure (*jouissance*), a concept whose erotic aspects he did not hesitate to acknowledge and explore. Indeed, in his final years Barthes came to assert that the 'system' of a language – by contrast with the anti- or suprasocial pleasures of literature, music, and photography – is repressive, constraining, even a kind of violence, which we must resist. In such ways, Barthes contributed to the poststructuralist and deconstructionist turn. *Camera Lucida,* the last book Barthes published, was in part a grieving over his recently deceased mother; but it also introduced a final pair of antithetical concepts: the *studium*, or scientific-analytic approach, and the *punctum* (of a poem, photograph, etc.): that point or small detail that catches the eye or snags in memory, something poignant or unexpected but somehow prepared for. In all his work – like Beckett – he championed the heterodox and the avant-garde, committed to maintaining a critical discourse that would not be assimilated or appropriated into the dominant culture, the discourse of power and the powerful.

See also: Lacan, Jacques (1901–1981).

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Barthes, Roland: Theory of the Sign

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The sign theory of Roland Barthes (1915–1980) is distributed across a large number of works in literary theory and communications, from his early analysis of '*ecriture blanche*' in the work of Albert Camus, to the pinnacle of his poststructuralist achievements in books such as *S/Z* (1970), *Le plaisir du texte* (1973), and *La chambre claire* (1980). Barthes' sign theory is explicit in theoretical essays from the 1960s such as his analysis of an advertisement – and, by association, much advertising imagery – in 'The rhetoric of the image' (1977a) and implicit in essays such as 'The death of the author' (1977b) that function more like manifestoes than sign analyses. However, it is probably his small 1964 book, *Elements of semiology* (English trans., 1967a), that contains Barthes' most focused comments on sign theory.

While Barthes continued to write about literary criticism, early work such as *Le degré zero de lécriture* (1953) was also carried out alongside such explicitly analytic disquisitions as the essay on signs, 'Myth today,' in *Mythologies* (1957; English trans., 1973). This acted as the conclusion of a series of brief articles written for French magazines in the period 1954 to 1956 that Barthes had drawn together for publication. Each dealing with a 'mythology' – wrestling, the haircuts of the Roman characters in Mankiewicz's film of *Julius Caesar*, the face of Garbo, *steack frites*, striptease, the New Citroën, and the brain of Einstein – the essays were evidence for Barthes that "myth is a language" (1973: 11). More importantly, though, Barthes claims to have actually initiated semiology in this work (1973: 9), instituting the general science of signs that Saussure had first called for (in print) 41 years before.

As a type of speech (as Barthes insisted it was) the myth that creates mythologies produces two levels of signification. The first level of this system Barthes calls the 'language-object': "it is the language which myth gets hold of in order to build its own system" (1973: 115). This level is the domain of the signifier (sound pattern) and signified (mental concept) that Saussure envisaged as being connected in the brain to produce a (linguistic) sign. For Barthes, this level is where straightforward indicating takes place: denotation. The second level, on the other hand, is 'metalanguage': a language that speaks about the first level. The level of metalanguage is constituted by connotation and Barthes suggests that it is 'cynical' because it relies on the level of denotation to naturalize any ideological proposition that it embodies.

In terms of the analysis of the sign, *Mythologies* is a crucial forerunner to the systematic disquisition in *Elements of semiology* seven years later. The visual nature of many of the mythologies in the former book are taken for granted as Barthes applies what was originally a linguistic conception of the sign (Saussure's). In the period leading up to *Elements of semiology*, Barthes also continued to work on sartorial signification of vestments. *Système de la mode* (1967b) is concerned with the nature of the sign of women's vestments as illustrated in fashion magazines. Barthes had been working on the analyses presented in this book during the period 1957–1963, and his ruminations carry over into *Elements of semiology*. These examples are clear evidence that, from a very early stage, Barthes was interested in putting forth a general notion of the sign that, for all its reliance on a thoroughly linguistic basis, he saw as perfectly adequate for understanding verbal and nonverbal semiotic systems alike.

In *Elements of semiology*, Barthes wants to go well beyond the concept of 'sign' that is evident in the teaching of some linguists. In general, he seeks to explicate an understanding of language not as a collection of discrete signs but as an organizing principle of discursive fields. Such discursive fields would not be constituted by verbal signs (and their connections) alone. They would instead take the lead of language as a system of organization. Indeed, he suggests somewhat giddily that "linguistics is not a part of the general science of signs, even a privileged part, it is semiology which is a part of linguistics: to be precise, it is that part covering the *great signifying unities* of discourse" (1967a: 11). Despite Barthes' impetus to embrace the semiotics of verbal and nonverbal systems, then, his sign theory is nevertheless geared to a notion of language as the touchstone of organization.

For Barthes, it is the repetition of signs in successive discourses that entails that each sign becomes an element of the language (*la langue* – "language without speech") (1967a: 14–15). However, according to Saussure, *langue* is a heuristic means for thinking about the language system; language without speech would actually be impossible. Barthes therefore draws attention to the fashion system, where signs work in a somewhat different way. For Barthes, the garment cannot be an instance of speech; it is instead always "a systematized set of signs and rules: it is a language in a pure state" (1967a: 26). This is because "fashion clothes (as written about) are the language at

the level of vestimentary communication and speech at the level of verbal communication" (1967a: 26). The feature of the sign that seems to be most crucial for Barthes and that encourages him to make the counterpoint to Saussure is the idea of the sign as part of an 'ideological' organizing principle. Whereas individual or collective uses of speech (or individual or collective usages of food, the analogous example he uses) (1967a: 28) might become part of language (or alimentary language) as a result of repetition or 'evolution,' what makes up the constituents of 'language' in the case of fashion is the highly directed work of a 'deciding group.'

If it was not clear from the analysis of 'myth' offered by Barthes in *Mythologies*, then *Elements of semiology* makes it apparent that central to his theory of the sign is the way that it can be not simply an ideological 'vehicle' but, in fact, ideological through and through. This is apparent in his comments on the nature of the *signifiant* and the *signifie* (usually translated into English, potentially confusingly, as 'signifier' and 'signified'). Nevertheless, Barthes' formulations in this area are the subject of some questions regarding their consistency and their Saussurean credentials. One reason for this is suggested by Roy Harris – that Barthes came to Saussure relatively late and that his understanding of the Saussurean sign was already refracted through the lens of his reading of Lévi-Strauss, Lacan, Jakobson, Martinet, Benveniste, and especially Hjelmslev (2003: 136). Certainly, the latter is influential in Barthes' theory of the sign, beyond even the conceptions of denotation and connotation. Barthes, for example, introduces accurate definitions of the *signifiant* and *signifie*, but he immediately reframes their operation in terms of 'form,' 'substance,' 'plane of expression,' and 'plane of content' (cf. Hjelmslev, 1970).

Barthes is initially very clear about the *signifiant* and *signifie*: they are an acoustic image and a mental concept, respectively. He underlines the latter, in fact, by writing "the signified [*signifie*] is not a thing but a mental representation of the thing" (1967a: 42). However, Harris points out that while Barthes' formulations about the internal relations in the sign are unexceptional, his definition of what the sign (*signe*) is, concentrating on the relation between *signifiant* and *signifie*, misses its mark. For Harris, Barthes:

> fails to see that for Saussure the *signe* is indeed not only a linguistic unit but *the* linguistic unit, and not a mere 'rapport' between its constituent parts. *A fortiori*, the fundamental Saussurean tenet that in *la langue* semiological relations take priority over – and determine – units sinks without trace in Barthes' exposition … Barthes had not only missed the most original theoretical feature of Saussure's account of linguistic structure, but reinstated precisely the concept that Saussure was at pains to reject, i.e. the sign as a mere correlation between antecedently given items (formal and semantic) (2003: 141).

Yet Barthes' placing of the sign before the semiological relations of *la langue* has a further twist that has been undoubtedly influential and has served to distort the picture for those who take the account in *Elements of semiology* to be the definitive exposition of Saussure. In drawing attention to the "nature of the signifier [*signifiant*]", Barthes writes that:

> it is purely a *relatum*, whose definition cannot be separated from that of the signified [*signifie*]. The only difference is that the signifier is a mediator: some matter is necessary to it. But on the one hand it is not sufficient to it, and on the other, in semiology, the signifier can, too, be relayed by a certain matter: that of the word. This materiality of the signifier makes it once more necessary to distinguish clearly *matter* from *substance*: a substance can be immaterial (in the case of the substance of the content); therefore, all one can say is that the substance of the signifier is always material (sounds, objects, images) (1967a: 47).

It is fairly clear why Barthes makes this un-Saussurean assertion about the *signifiant*, and indeed, he is not shy about it:

> In semiology, where we shall have to deal with mixed systems in which different kinds of matter are involved (sound and image, object and writing, etc.), it may be appropriate to collect together all the signs, *inasmuch as they are borne by one and the same matter*, under the concept of the *typical sign*: the verbal sign, the graphic sign, the iconic sign, the gestural sign are all typical signs (1967a: 47).

For Barthes, the business of establishing a semiology in which verbal and nonverbal signs can be considered equally leads him to override the fundamental principle of Saussure in which the relations within the linguistic sign are purely mental. This is probably the most characteristic feature of Barthes' theory of the sign, although unfortunately, the fact that *Elements of semiology* has often been treated as a faithful explication of Saussure rather than as a manifesto has prompted the erroneous belief that Saussure's *signifiant* is the same as Barthes' (see, for example, Bignell, 1997; Cobley, 1996).

Another feature of Barthes' revision of Saussure concerns the vaunted 'arbitrariness' of relations in the sign, and here Barthes takes his cue from Benveniste and then Martinet. With respect to the word *ox*, Barthes suggests, after Benveniste, that the relation of *signifiant* and *signifie* "is by no means arbitrary (for no French person is free to modify it), indeed, it is, on the contrary, necessary" (1967a: 50). Ultimately,

however, Barthes suggests that the relation is one that is determined by different degrees of 'motivation.' An unmotivated system, he argues, is one where signs are not founded by convention but by unilateral decision; so for him, signs in *la langue* are not unmotivated, but signs in the world of *fashion* (where there is an elite organizing body) are. Signs are motivated, on the other hand, when the relation between *signifiant* and *signifie* is analogical (1967a: 51). This is, once more, evidence of Barthes' attempt to smooth the transition from Saussure's linguistic sign to a general semiology containing, for example, pictorial signs whose *signifiant/signifie* relation is, frequently and unavoidably, one of motivation.

It is evidently important for Barthes that there is an analytic unity in his theory of both verbal and nonverbal signs, chiefly because the ravages of ideology, when exposed, would be less convincing if they were distributed unevenly across different kinds of signifying systems. Indeed, Barthes' justly famous essays on photography are important in this respect because they indicate that the denotative sign enacts a motivated relationship often as if it were in the service of 'validating' the injustice of the connotative sign, establishing its literalness and helping to 'ground' ideology. In identifying and analyzing Barthes' theory of the sign as distinct from Saussure's, then, it is crucial to recognize these imperatives.

See also: Barthes, Roland (1915–1980); Benveniste, Emile (1902–1976); Greimas, Algirdas J.: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Jakobson, Roman (1896–1982); Jakobson, Roman: Theory of the Sign; Saussurean Tradition in 20th-Century Linguistics; Structuralism.

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Bartoli, Matteo Giulio (1873–1946)

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Mattio Giulio Bartoli, one of the founders of the so-called 'Neolinguistic school,' was born September 22, 1873 in Albona d' Istria (now Labin in Croatia), then a small Italian-speaking town in the Istrian province of the Austro-Hungarian empire. Having grown up in the diaspora, he became a fervent Italian nationalist, using linguistic and ethnological arguments to defend the 'Italian character' of his native Istria.

Bartoli studied classical and romance philology in Vienna, Strasbourg, and Paris. Among his masters were the heads of two linguistic schools in conflict, two outstanding scholars, Wilhelm Meyer-Lübke (*see* **Meyer-Lübke, Wilhelm (1861–1936)**) the doyen of the second generation of the Neogrammarians, and Jules Gilliéron (*see* **Gilliéron, Jules (1854–1926)**), one of the founders of linguistic geography.

In 1907, Bartoli became professor of Classical and Romance Philology at the University of Turin; for a time he also taught general linguistics and German language and literature. One of his best students was Antonio Gramsci, the founder of the Italian Communist Party. Starting in the early 1920s, Bartoli dedicated a good deal of his time to the Italian linguistic atlas (*Atlante Linguistico Italiano*), which was continued by G. Vidossi, B. Terracini, and C. Grassi (vol. 4 published in 1997) after Bartoli's death in 1946. From 1926 onward, Bartoli also directed the romance philology section of the *Archivio glottolegico italiano,* one of the most prestigious philological

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With regard to methodology in the field of comparative historical linguistics, Bartoli was responsible for the important insight that the features shared by two or more languages or dialects have to be interpreted in different ways, since they may be due either to common preservations or to common innovations. Only the latter can be regarded as testimony to a common historical development of the respective dialects.

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Bartoli died in Turin on January 20, 1946.

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Bashkir

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Location and Speakers

Bashkir (*bašqort tĕlĕ, bašqořtsa*) belongs to the northern group of the northwestern, or Kipchak, branch of Turkic. Its main area of distribution is the basin of the Belaya River and the southwestern slopes of the Ural Mountains. The Republic of Bashkortostan, or Bashkiria (*Bašqortostan Respublikahï*), which belongs to the Russian Federation and whose capital is Ufa (*Öfö*), borders on Tatarstan, the Udmurt Republic, and the Orenburg, Perm, Sverdlovsk, and Chelyabinsk regions. Of the more than 4 million inhabitants of the Republic, Bashkirs make up only 22%. Other groups include Russians, Tatars, Chuvash, Udmurts, Mari, and Ukrainians. Bashkir-speaking groups are also found south of Kuybyshev and east of Ural, in the regions Orenburg, Chelyabinsk, Samara, Kurgan, and Sverdlovsk. The total number of speakers of Bashkir is about 1.4 million.

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Origin and History

The Bashkirs previously lived farther to the east, in West Siberia, first as subjects of the Volga Bulgar state and, after 1236, under Mongol rule. They reached their present-day territory under the Golden Horde. With the disintegration of the Golden Horde, the Bashkir territory was divided between the three khanates of Kazan, Noghay, and West Siberia. Bashkirs and Tatars came under Russian rule at the end of the 18th century. In 1919, a Bashkir Autonomous Soviet Socialist Republic was established. In 1992, Bashkortostan became an autonomous republic within the Russian Federation.

Related Languages and Language Contacts

Bashkir is closely related to Tatar and constitutes a connecting link to Kazakh. The different origins of its speakers are reflected in heterogeneous linguistic features. Since Bashkir and Tatar varieties have been in close contact for many centuries, the boundaries between them are not always clear.

The Written Language

The Bashkirs used a local variety of Chagatay as their written language until the beginning of the 20th century, when they adopted written Tatar. A Bashkir standard language, mainly based on the eastern (Kuvakan) dialect, was established in the Soviet era. The Arabic script was replaced in 1929 and 1930 by a Roman-based script. The Cyrillic-based script system that was introduced in 1939 and 1940 differs considerably from the script of the Tatar system.

Distinctive Features

Bashkir exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology and a head-final constituent order (subject-object-verb). In the following discussions, some of the distinctive features of Bashkir will be dealt with, with focus in particular on certain comparisons with Tatar.

Phonology

The Bashkir vowel system is very similar to that of the Tatar system. It comprises fully articulated and reduced vowels and exhibits the same systematic vowel shifts. Thus, low vowels of the first syllable have been raised: *e* > *i* (*hin* 'you' (<*sen*)), *o* > *u* (*yul* 'way' (<*yol*)), *ö* > *ü* (*hüδ* 'word' (<*söz*)). High vowels have been centralized and reduced: *i* > *ĕ* (*tĕδ* 'knee' (<*tiz*), *u* > *ŏ* (*moron* 'nose' (<*burun*)), *ü* > *ŏ* (*kŏn* 'day' (<*kün*)).

In its consonant system, Bashkir differs from Tatar and approaches Kazakh. Thus, *č* has developed to *s* (*kis* 'evening' (Tatar *kič*), *sĕs* 'hair' (Tatar *čĕč*)). Word- and suffix-initial *s* has developed to *h* (*harï* 'yellow' (Tatar *sarï*), *bul-ha* 'if it is' (Tatar *bul-sa*)). In other cases, *s* has developed to θ (*ki* θ 'to cut' (Tatar *kis*)). The corresponding voiced sibilant *z* has developed into *δ* (*δur* 'big, great' (Tatar *zur*), *hüδ* 'word' (Tatar *süz*)). Interdental sibilants are also typical of Turkmen. Bashkir exhibits word-initial *y-* in cases in which Tatar has *ǰ* (*yĭlĭ* 'warm' (Tatar *(ǰĭlĭ*)). This phenomenon also affects old loanwords, e.g., *yen* 'soul' (< Persian (*ǰa:n*, cf. Tatar *ǰan*). In its vowel harmony system, Bashkir is similar to Turkmen, Kirghiz, and some other languages in that low suffix vowels are rounded after a rounded vowel in the preceding syllable, e.g., *bŏlŏt* 'cloud' (Tatar *bŏlĭt*), *ŏsŏn* 'for' (Tatar *ŏčĕn*).

The rules for consonant assimilations are much more complicated than they are in Tatar. Suffix-initial consonants may have up to four variants (plural *qala-lar* [city-PL] 'cities,' *at-tar* [horse-PL] 'horses,' *kül-der* [lake-PL] 'lakes,' and *taw-δar* [mountain-PL] 'mountains,' or ablative *qala-nan* [city-ABL] 'from the city,' *taw-δan* [mountain-ABL] 'from the mountain,' *at-tan* [horse-ABL] 'from the horse,' and *yalan-dan* [steppe-ABL] 'from the steppe'). The third-person personal pronouns are singular *ul* 'he, she, it' and plural *ular* 'they' (Tatar *ul*, *alar*). The oblique stem of *ul* is *un-* (Tatar *an-*). The demonstrative pronouns include *bĭl*, *bĭnaw* 'this,' *ošo* 'this here,' and *šul*, *ul*, *anaw*, *tĕgĕ* 'that.'

Dialects

Bashkir has a few main dialects and numerous subdialects. The eastern or mountain (Kuvakan) dialect comprises the subdialects Ay, Argayash, Salyut, Miyas, and Kizil. The southern (Yurmat) group comprises Ik-Sakmar and the central dialect group comprises Kara-Idil and Dim. There are important differences between the eastern and southern dialects. The steppe, or southwestern, dialects have been strongly influenced by Tatar.

See also: Turkic Languages.

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Relevant Website

http://www.turkiclanguages.com – Website with many Turkish language resources.

Basque

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Basque (Euskara) is the only remaining vestige of the linguistic situation in western and central Europe before the Indo-European expansion. Although many attempts have been made to relate Basque to other languages of the world, none of them is generally considered to have been successful. Genetic links with the Finno-Ugric family, the languages of the Caucasus, or any other living language for which some scholars have sought a genetic relationship with Basque would be so remote that no solid proof is likely to emerge.

As for the extinct language of the ancient Iberians, once spoken along the Mediterranean coast of Spain and known to us from a relatively large number of inscriptions, the fact that Basque has been of little help in deciphering these inscriptions forces us to discard the hypothesis that the two languages are closely related (although they do share a number of phonological and morphological features, attributable to areal phenomena). Basque is thus a language isolate.

Throughout its known history, Basque has been spoken in an area of variable extent on both sides of the western Pyrenees and along the coast of the Bay of Biscay. The present-day Basque-speaking area (*Euskal Herria*) corresponds to parts of three different administrative units, two in Spain and one in France. There are currently approximately 700 000 speakers of Basque, almost all fully bilingual in either Spanish or French. The largest number of speakers is found in the Autonomous Community of the Basque Country (ACBC), which comprises the provinces of Bizkaia, Gipuzkoa, and Araba (in Basque)/Alava (in Spanish). Here Basque is co-official with Spanish and has an important presence in the educational system. In this region, the number of Basque speakers is growing in areas where the language is natively spoken by part of the population as well as in other areas, such as the city of Bilbao and most of Araba/Alava, where the Basque language had been lost centuries ago. Basque also enjoys some official recognition in Navarra (in Basque, Nafarroa), which is a separate autonomous community within the administrative structure of Spain. Although the greatest part of Navarra was Basque-speaking just a few centuries ago, the language suffered a strong geographical recession in the 19th and 20th centuries, and nowadays it is spoken natively only in the northwestern area of this region. The French Basque country comprises approximately the western half of the Départment des Pyrenées Atlantiques. In most of the Basque-speaking area of France, the transmission of the language has seriously declined in the last few decades. Only a small percentage of children are currently learning Basque in this area.

From toponyms and other sources, we know that historically the Basque language was spoken over a larger area. The word *Basque* derives from Vascones, a nation that in Roman times occupied most of Navarra and northern Aragon. Across the Pyrenees, there is abundant epigraphic evidence showing that Basque or a very similar language was also spoken in the territory of the Aquitani. The Aquitanian inscriptions on tombstones, in Latin, provide only evidence for proper names, but they contain such clear elements as ANDERE (cf., Basque *andere* 'woman') and CISSON (cf., Basque *gizon* 'man') as proper names for individuals of the respective sex. For the late Middle Ages, we have documentary evidence that Basque was spoken both in northern Aragon and in areas of La Rioja and northern Castile, to the west

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Relevant Website

http://www.turkiclanguages.com – Website with many Turkish language resources.

Basque

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Basque (Euskara) is the only remaining vestige of the linguistic situation in western and central Europe before the Indo-European expansion. Although many attempts have been made to relate Basque to other languages of the world, none of them is generally considered to have been successful. Genetic links with the Finno-Ugric family, the languages of the Caucasus, or any other living language for which some scholars have sought a genetic relationship with Basque would be so remote that no solid proof is likely to emerge.

As for the extinct language of the ancient Iberians, once spoken along the Mediterranean coast of Spain and known to us from a relatively large number of inscriptions, the fact that Basque has been of little help in deciphering these inscriptions forces us to discard the hypothesis that the two languages are closely related (although they do share a number of phonological and morphological features, attributable to areal phenomena). Basque is thus a language isolate.

Throughout its known history, Basque has been spoken in an area of variable extent on both sides of the western Pyrenees and along the coast of the Bay of Biscay. The present-day Basque-speaking area (*Euskal Herria*) corresponds to parts of three different administrative units, two in Spain and one in France. There are currently approximately 700 000 speakers of Basque, almost all fully bilingual in either Spanish or French. The largest number of speakers is found in the Autonomous Community of the Basque Country (ACBC), which comprises the provinces of Bizkaia, Gipuzkoa, and Araba (in Basque)/Alava (in Spanish). Here Basque is co-official with Spanish and has an important presence in the educational system. In this region, the number of Basque speakers is growing in areas where the language is natively spoken by part of the population as well as in other areas, such as the city of Bilbao and most of Araba/Alava, where the Basque language had been lost centuries ago. Basque also enjoys some official recognition in Navarra (in Basque, Nafarroa), which is a separate autonomous community within the administrative structure of Spain. Although the greatest part of Navarra was Basque-speaking just a few centuries ago, the language suffered a strong geographical recession in the 19th and 20th centuries, and nowadays it is spoken natively only in the northwestern area of this region. The French Basque country comprises approximately the western half of the Départment des Pyrenées Atlantiques. In most of the Basque-speaking area of France, the transmission of the language has seriously declined in the last few decades. Only a small percentage of children are currently learning Basque in this area.

From toponyms and other sources, we know that historically the Basque language was spoken over a larger area. The word *Basque* derives from Vascones, a nation that in Roman times occupied most of Navarra and northern Aragon. Across the Pyrenees, there is abundant epigraphic evidence showing that Basque or a very similar language was also spoken in the territory of the Aquitani. The Aquitanian inscriptions on tombstones, in Latin, provide only evidence for proper names, but they contain such clear elements as ANDERE (cf., Basque *andere* 'woman') and CISSON (cf., Basque *gizon* 'man') as proper names for individuals of the respective sex. For the late Middle Ages, we have documentary evidence that Basque was spoken both in northern Aragon and in areas of La Rioja and northern Castile, to the west

and south of the present-day Basque country. It is, however, likely that the historical presence of the Basque language in these latter areas, and perhaps even in part of the territory of the ACBC, is due to territorial expansion during the early Middle Ages.

One reason for the hypothesis that Basque may have occupied a compact area at some point after the fall of the Roman Empire is that dialectal diversity within Basque is relatively small and clearly not ancient. Many obvious innovations are shared by all dialects. In some aspects, such as the accentual system and the morphology of finite verb forms, variation is, nevertheless, considerable (even if it is due to relatively recent diversification) and in fact virtually every valley or town has a recognizable local variety. *Euskara batua* (unified Basque), the standard promoted by the Basque Academy, which is based on the literary tradition of central areas both to the north and the south of the Pyrenees, has been enormously successful in its social implantation through its use in the educational system and in the media.

Most Basque dialects have five vowel phonemes /i e a o u/. Zuberoan (Souletin) and a few other varieties spoken in France have a sixth oral vowel /y/ as well as contrastively nasalized vowels. A common consonantal inventory, such as is found in Gipuzkoan, is the following (the most common orthographic representation follows in parentheses when it is different from the phonetic symbol): /p t c (*tt*) k b d ɟ (*dd*) g t̪s̪ (*tz*) t̪s̪ (*ts*) tʃ (*tx*) s̪ (*z*) s̪ (*s*) ʃ (*x*) x (*j*) m n ɲ (*ñ*) l ʎ (*ll*) ɾ (*r*) r (*rr*)/. The most unusual aspect of this inventory is presented by the contrast between the two fricatives, lamino-alveolar *z* /s̪/ (*izan* 'be') and apico-alveolar *s* /s̪/ (*esan* 'say'), and the two corresponding affricated segments (*atzo* 'yesterday,' *atso* 'old woman'). All Bizkaian and some Gipuzkoan varieties have lost this contrast. The phoneme /x/ is found only in the speech of speakers from Spain. Besides being found in borrowings from Spanish, in central areas (Gipuzkoa and some neighboring regions) it also appears in native words as a result of an evolution /j > ʒ > ʃ > x/ (like in Castilian Spanish). Other dialects have stopped at various stages along this evolutionary path. The result is that orthographic *j* in native words such as *jan* 'eat' is subject to much variation in its pronunciation. Whereas the official standard pronunciation is /jan/, the Gipuzkoan form /xan/ is also in widespread usage in standard Basque, and locally forms like /ʒan/ and /ʃan/ are also used. Conversely, a phoneme /h/ (orthographic *h*: *hemen* 'here,' *aho* 'mouth') is used only in parts of the French Basque country. That is, for most speakers orthographic *h* is silent. The (pre)palatal consonants have a special status. One way to form diminutive/affective forms is by palatalization, for example, *tanta* 'drop,' *ttantta* /canca/ 'small drop,' *zezen* 'bull,' *xexen* /ʃeʃen/ 'little bull.' A pitch-accent system strikingly similar to that of Tokyo Japanese, with a lexical contrast between accented and unaccented words, is found in the northern Bizkaian area. The most common accentual system (in Gizpuzkoan and neighboring areas), however, has regular stress on the second syllable.

Marking of grammatical functions works on a strictly ergative basis, with one case (absolutive, morphologically unmarked) assigned to objects and intransitive subjects and another (ergative, *-k*) assigned to transitive subjects: *lagunak liburua dakar* 'the friend is bringing the book,' *laguna dator* 'the friend is coming.' Nevertheless, a class of syntactically intransitive verbs takes ergative subjects (and transitive auxiliaries and agreement) in a somewhat unpredictable manner: *lagunak dantzatu du* 'the friend has danced.' Finite verb forms are marked for agreement with up to three arguments (subject, object, and indirect object): *dakarzkiguzu* 'you (*-zu*) are bringing them (*-z-*) to us (*-gu*)' (*-kar-* is the verb root 'bring'; *-ki-* is a dative pre-prefix). In addition, in the familiar treatment, an addressee who is not an argument of the verb is also obligatorily encoded in the morphology of verbs in main clauses. Thus, for instance, plain/formal *dakit* 'I know it' is replaced, in the familiar treatment, by *zekiat* 'I know it (male addressee)' or *zekinat* 'I know it (female addressee).'

Although both SOV and SVO orders are common in texts, verb-final structures are more basic: *gizona da* 'it is the man.' Focalized elements and question words are normally immediately preverbal. Main verbs precede auxiliaries (*etorri da* '(she/he) has come'), except in negative clauses (*ez da etorri* '(she/he) has not come').

Articles and demonstratives are phrase-final: *laguna* 'the friend,' *lagun bat* 'a/one friend,' *lagun hori* 'that friend,' *lagun gazte hori* 'that young friend.' Although, as shown in the last example, adjectives follow nouns, genitives and relative clauses precede the head noun, as in most other SOV languages (*lagunaren liburua* 'the friend's book,' *etorri den laguna* 'the friend who has come'). Noun phrases are inflected for number and case by suffixes attached to the last word in the phrase: *lagunari* 'to the friend,' *lagun onari* 'to the good friend,' *etorri den lagun gaztearentzat* 'for the young friend who has come.'

See also: Ergativity; France: Language Situation; Spain: Language Situation; Standardization; Unaccusativity; Word Order and Linearization.

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One of the most respected of Ainu scholars, John Batchelor is widely credited with popularizing the study of Ainu language and culture in the West. Born in Uckfield, Sussex, on March 20, 1854, Batchelor became a gardener at the Uckfield Parish Church at the age of 12. At the age of 19, inspired by a sermon, he decided to become a missionary and asked to be considered for the mission in Hong Kong. Successful, he arrived in Hong Kong in 1875, but soon began suffering from respiratory ailments as well as malaria. In 1877, on the advice of his doctor, he moved to Hokkaido in northern Japan where the cooler climate would provide relief.

In Hokkaido, Batchelor encountered the indigenous Ainu people and, moved by their plight, asked permission to mission to them. He would spend the next 60 years living among the Ainu, learning the language and compiling records of their traditional culture and folklore. Along with translations of the New Testament and collections of folktales, Batchelor published his *Ainu–English–Japanese dictionary* in 1889 (4th edn. in 1938) – considered his most important work. These works, written in Roman characters, made Ainu studies accessible to scholars not versed in Japanese and are still regarded as important reference works today.

Despite this fact, Batchelor's work has drawn heavy criticism, particularly from Japanese scholars such as Mashiho Chiri. Although Batchelor's Ainu language skills were recognized by the Ainu themselves, his training as a missionary rather than as a linguist meant that his transcriptions of the language as well as the grammar accompanying his dictionary left something to be desired. Among the principle criticisms were that his transcription system was

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amateurish and that he forced the Ainu language into the grammatical categories of Latin.

Batchelor also weighed in on the question of the origins of the Ainu and their language, which he considered to be an Indo-European tongue, completely distinct from Japanese. According to Batchelor, there are significant correlations in key vocabulary items between Ainu and Indo-European languages, as well as grammatical characteristics in Ainu normally associated with these languages. While Batchelor did provide a list of words he believed supported his hypothesis, he never truly explained what evidence he found in the grammar.

Batchelor was also recognized for his advocacy of Ainu causes, and while he held attitudes that would be considered patronizing today, he was obviously concerned with anti-Ainu racism among the Japanese and its social consequences. In 1909, Batchelor was awarded the Fourth Order of the Sacred Treasure (zuihosho) by the Japanese emperor for his work, both social and scholarly, among the Ainu, and he would receive the Third Order in 1933. He also attracted the attention and patronage of many prominent Japanese, including Marquis Yoshichika Tokugawa and Prince Takamatsu, the emperor's brother, who funded some of Batchelor's work in 1932.

In 1940, with anti-Western feeling mounting, Batchelor decided to return to Britain, where he died four years later in 1944. Today, the Ainu Museum of Hokkaido University is dedicated to the life and work of John Batchelor.

See also: Ainu; Chiri, Mashiho (1909-61); Japanese; Kindaichi, Kyosuke (1882–1971); Naert, Pierre (1916–1971).

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Gregory Bateson made important contributions to several disciplines, particularly anthropology, psychiatry, and ethology. Although Bateson was not a linguist, his studies of communication, learning, play, and fantasy have been a major influence on sociolinguists, anthropological linguists, and other students of discourse, conversational interaction, and pragmatics. Salient among the concepts developed in his work are the frame, logical types, metacommunication, and the double bind.

Bateson was born on May 9, 1904 in Cambridge, England. He was the youngest of his parents' three children, all sons. His father, William Bateson, was a founder of the modern science of genetics. Bateson attended St John's College, Cambridge, where he earned his bachelor's degree in natural sciences (1925) and his master's in anthropology (1930), having completed fieldwork in New Britain and New Guinea.

In 1932, Bateson and the American anthropologist Margaret Mead met in New Guinea. They were married in 1936 and had one child, Mary Catherine Bateson, a well-regarded scholar in her own right, but they divorced in 1950. Bateson married Lois Cammack in 1961 and they had three children.

Bateson's first major publication was *Naven* (1936), an ethnography based on his work among the Iatmul. His subsequent field work with Mead in Bali yielded *Balinese character* (1942). During World War II, Bateson served in Asia in the Office of Strategic Services.

In the early 1940s, Bateson became involved with Norbert Wiener, Warren McCulloch, Claude Shannon, John von Neumann, and other engineers and mathematicians, who began meeting periodically to elaborate a theory of communication and control in animals and machines dubbed 'cybernetics' by Wiener. Late in life, Bateson would characterize his "membership in those conferences [as] one of the great events of my life" (Lipset, 1982: 180). This developing theory led Bateson to recast his thinking about social organization, and seems to have inspired those of his ideas that have most intrigued linguists.

Most of Bateson's employment was in hospitals and labs for the study of animal behavior. In 1948, he assumed a two-year appointment at University of

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Most of Bateson's employment was in hospitals and labs for the study of animal behavior. In 1948, he assumed a two-year appointment at University of

California Medical School, where he became involved with Juergen Ruesch, M.D. in the study of communication in the context of psychotherapy. They co-authored *Communication: the social matrix of psychiatry* (1951).

In subsequent work in the 1950s on schizophrenia, Bateson, in conjunction with Jackson, Haley, Weakland, and Fry, focused on interaction and the utterances that form part of the interaction. This research group developed the theory of the 'double bind,' a type of communication in which, characteristically, a parent verbally enjoins a child to do one thing, with the request embedded in a nonverbalized metacommunication saying that if the child obeys the verbal command, he or she will be punished. The group hypothesized that this is the matrix from which schizophrenics are born, although they did not discount the biochemical dimension of the illness. Further, the cryptic qualities of schizophrenic discourse, which distort or omit signals about relationships, reflect the schizophrenic's efforts to cope with the double bind. In these studies and elsewhere, Bateson sought to show that pathology of communication derives from confusion or paradoxes of logical typing, in which, e.g., a signifier may be confused with its signified. Such confusion, however, is also the germ of verbal creativity. Much of the suggestiveness of Bateson's thinking lies in the affinities he finds between pathological communication and verbal creativity.

See also: Goffman, Erving (1922–1982); Peirce, Charles Sanders (1839–1914); Tannen, Deborah (b. 1945).

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Bats: Communication by Ultrasound

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Biology and Systematics of Bats

Bats are the only mammals capable of active flight. Classically, zoologists subdivide bats (mammalian order Chiroptera) into microbats (Microchiroptera, 930 species) and megabats (Megachiroptera, 186 species; Simmons, in press). Work by molecular phylogeneticists suggests that most species of the (classically microbat) superfamily Rhinolophoidea are more closely related to the megabats than to microbats (Teeling *et al*., 2002). Both Rhinolophoidea and the remaining microbats are capable of sophisticated echolocation using tonal, larynx-produced sounds (see Echolocation and Why Ultrasound?, below), whereas megabats are not. The new phylogenetic tree therefore implies an evolutionary scenario where either laryngeal echolocation evolved twice independently or the megabat ancestor was capable of laryngeal echolocation and lost this capability in the course of further evolution.

Megabats occur in the Old World tropics and feed on fruit, leaves, pollen, and nectar. They play an important role in the ecology of tropical forests as seed dispersers and pollinators. Sensitive, large eyes and a keen sense of smell guide them on their nocturnal foraging trips. Most megabats roost in trees where there is light for visual orientation and do not use acoustic signals for echolocation. But as most species live in groups and are highly social, acoustic signals play an important role in communication (Fenton, 1985; Van Parijs and Corkeron, 2002). A simple echolocation system evolved in the cave-dwelling megabat genus *Rousettus*. Here, echolocation signals are short, broadband, and rather stereotyped tongue click signals. Echolocation in *Rousettus* therefore is very likely to have evolved independently of microchiropteran echolocation, which is based on laryngeal vocalizations produced by vibrations of the vocal cords.

Microbats live on all five continents and occupy a wealth of ecological niches. Some are fast fliers that hunt insects in the open skies; others are maneuverable, hovering species that pollinate flowers or eat fruit in Neotropical rainforests. Though most species

California Medical School, where he became involved with Juergen Ruesch, M.D. in the study of communication in the context of psychotherapy. They co-authored *Communication: the social matrix of psychiatry* (1951).

In subsequent work in the 1950s on schizophrenia, Bateson, in conjunction with Jackson, Haley, Weakland, and Fry, focused on interaction and the utterances that form part of the interaction. This research group developed the theory of the 'double bind,' a type of communication in which, characteristically, a parent verbally enjoins a child to do one thing, with the request embedded in a nonverbalized metacommunication saying that if the child obeys the verbal command, he or she will be punished. The group hypothesized that this is the matrix from which schizophrenics are born, although they did not discount the biochemical dimension of the illness. Further, the cryptic qualities of schizophrenic discourse, which distort or omit signals about relationships, reflect the schizophrenic's efforts to cope with the double bind. In these studies and elsewhere, Bateson sought to show that pathology of communication derives from confusion or paradoxes of logical typing, in which, e.g., a signifier may be confused with its signified. Such confusion, however, is also the germ of verbal creativity. Much of the suggestiveness of Bateson's thinking lies in the affinities he finds between pathological communication and verbal creativity.

See also: Goffman, Erving (1922–1982); Peirce, Charles Sanders (1839–1914); Tannen, Deborah (b. 1945).

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Bats: Communication by Ultrasound

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Biology and Systematics of Bats

Bats are the only mammals capable of active flight. Classically, zoologists subdivide bats (mammalian order Chiroptera) into microbats (Microchiroptera, 930 species) and megabats (Megachiroptera, 186 species; Simmons, in press). Work by molecular phylogeneticists suggests that most species of the (classically microbat) superfamily Rhinolophoidea are more closely related to the megabats than to microbats (Teeling *et al*., 2002). Both Rhinolophoidea and the remaining microbats are capable of sophisticated echolocation using tonal, larynx-produced sounds (see Echolocation and Why Ultrasound?, below), whereas megabats are not. The new phylogenetic tree therefore implies an evolutionary scenario where either laryngeal echolocation evolved twice independently or the megabat ancestor was capable of laryngeal echolocation and lost this capability in the course of further evolution.

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are insectivorous, others are carnivorous, preying on small mammals, birds, reptiles, amphibians, or fish. Three species of vampire bats eat blood from birds or mammals. The different ecologies of the bat species are reflected in their social systems, in their needs for social communication (Bradbury, 1977), and in the structure of their echolocation calls (Fenton, 1990; Schnitzler *et al.*, 2003).

Echolocation and Why Ultrasound?

Echolocation obviously depends on sound, but not necessarily on ultrasonic sound. The key function of echolocation calls is to generate echoes that permit a bat to negotiate its three-dimensional environment and, for aerial-hawking bats, to detect, evaluate, and track flying insect prey (Schnitzler *et al.*, 2003). Echolocation is sometimes referred to as 'autocommunication' (Bradbury and Vehrencamp, 1998). Echolocation signals of microbats are tonal signals; i.e., they are produced by the larynx (source: phonation) and filtered by the vocal tract (filter: articulation) just like mammalian vocal signals in general. Some species emit their signals through open mouths, others through the nostrils. Echolocation signals can consist of different elements: some that are pure in tone (constant frequency) and others that are frequency modulated (Figure 1). They often have more or less prominent harmonics (overtones). Echolocation signals surely evolved from communication signals and this origin can also be seen in their ontogeny. Young bats steadily increase the frequency and shorten the duration of a certain call type and thereby transform it into the nearly adult echolocation signal that they are able to produce when they become volant at approximately 4 to 8 weeks of age (Brown and Grinnell, 1980).

Laryngeal production of echolocation calls enables bats to produce a continuum of call types that constitute the species-specific signal repertoire. Calls can be varied from short (<1 ms) to long (>10 ms; in some horseshoe bats, genus *Rhinolophus*, up to 300 ms) and repetition rate varies from <5/s to 200/s during prey capture (Figures 1 and 2). The frequencies contained in the call and the call bandwidth can be changed, but the frequency range and often the frequency with most energy are species specific (e.g., Siemers *et al.*, 2001; Siemers and Schnitzler, 2004). These can range from approximately 10 kHz to over 200 kHz, although most species broadcast in the frequency band from 20 to 80 kHz. Humans cannot hear above 20 kHz and therefore we call sounds above 20 kHz 'ultrasonic.' It is important to note that humans and some other large mammals are specialized low-frequency hearers (human hearing range: 16 Hz to 20 kHz), whereas most small mammals have high hearing sensitivity up to at least 40 or 60 kHz. Accordingly, several groups of small mammals, e.g., rodents, shrews, primates, and bats, use communication signals that include ultrasonic elements. That is the first part of the explanation why bats use mostly ultrasound for echolocation: it is perfectly normal sound to them. Additionally, several arthropods that bats feed on and owls cannot hear ultrasound and therefore ultrasound echolocation has the evolutionary advantage of not warning off prey or attracting avian predators. A main reason for ultrasonic echolocation is that sound wavelength is inversely proportional to frequency: the separability of two objects by echolocation (resolution) and the detectability of

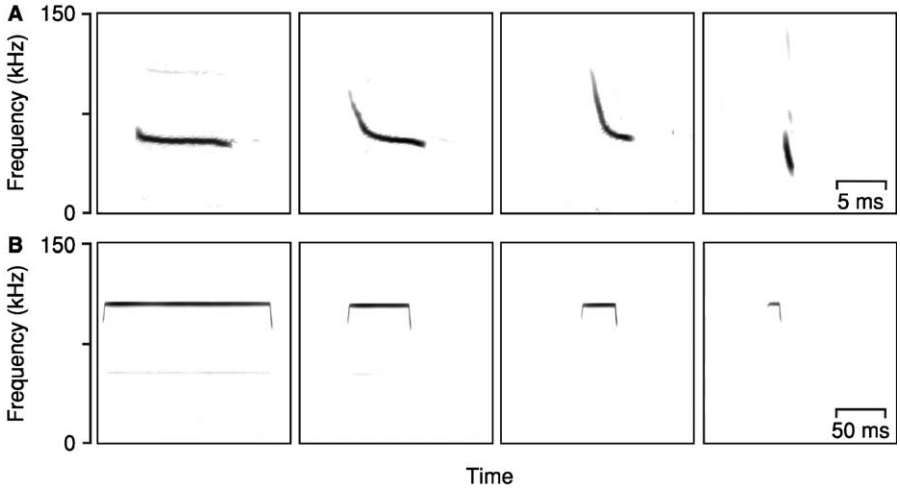

Figure 1 Individual bats are able to adapt the signal structure to the echolocation task they are currently facing. Spectrograms of four calls exemplify the range of the signal repertoires for (A) the Neotropical black myotis (*Myotis nigricans*) and (B) the Mediterranean horseshoe bat (*Rhinolophus euryale*).

small objects increase with decreasing wavelength (but it is important to note that bats can easily detect objects, e.g., thin wires, much smaller than their call wavelength). High frequencies therefore increase the detail in a bat's echo image, but they come at the price of higher absorption loss (atmospheric attenuation). Aerial-hawking bats emit very intense echolocation calls (source levels often >120 dB SPL; Holderied and von Helversen, 2003), but bats usually react to insect targets only when they are as close as 1 to 5 m. Echoes of extended background structures such as the ground or a cliff with very good reflection properties might be perceivable from a maximum of 90 m (Holderied and von Helversen, 2003), but compared to (human) vision, echolocation is clearly not a far-range orientation system. Bats are not blind and complement echolocation by vision in certain situations (Eklöf, 2003).

The Communicative Function of Echolocation Calls

Echolocation involves information leakage because the signals (and perhaps some echoes) are available to any animal that can hear them; i.e., echolocation inevitably has a communicative function. Bats eavesdrop on other bats (Barclay, 1982; Fenton, 2003) and often can determine from the echolocation calls alone whether the other bat is a conspecific or not, with obvious implications for agonistic or mutualistic interactions. A few bat species have been found to show sexual dimorphism or age differences (mainly first-year bats versus older bats) in echolocation signals (e.g., Neuweiler *et al.*, 1987; Russo *et al.*, 2001); i.e., they communicate information about their sex or age group as a byproduct of echolocation (Kazial and Masters, 2004).

Given the long life span (records from the wild >20 years) and the high sociality of bats, we can expect reciprocal interactions and cooperation (e.g., Kerth and Reckardt, 2003), which will depend on individual recognition between colony members. Some data show individual-specific signatures in echolocation calls (Obrist, 1995; Burnett *et al.*, 2001; Fenton, 2003; Fenton *et al.*, 2004), but it is not yet clear whether the bats can make use of them and whether the variability is large enough to reliably code the many individuals of large colonies. We have little evidence for a clear correlation between call parameters and size or body condition within sexes. The data available to date do not suggest that echolocation calls would generally be reliable, quality-related (i.e., honest) signals for the assessment of potential mates or competitors.

Individual bats adapt their signal structure to the echolocation task they are currently facing (Fenton, 1990; Schnitzler *et al.*, 2003). A bat searching for insects high up in the open sky broadcasts long signals with all energy concentrated in a narrow frequency band (i.e., low call bandwidth) to increase detection probability. After detecting prey, it gradually switches to shorter, more broadband signals (Figure 2). Their echoes deliver short, precise time markers to the bat's hearing system and thereby increase localization and ranging accuracy, needed to intercept the insect in three-dimensional space. Prior to capture, the bat

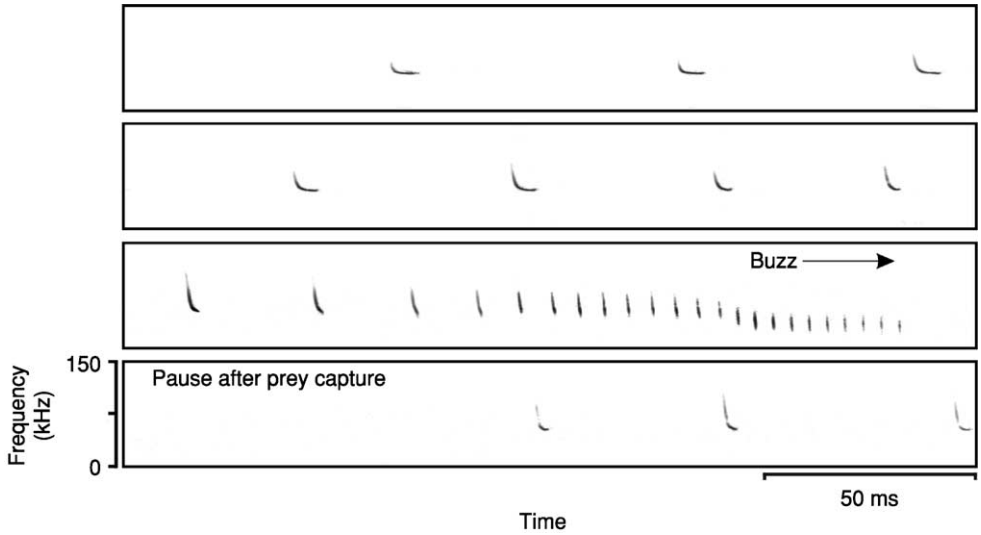

Figure 2 Spectrogram representation of echolocation sequence of a Schreiber's bat (*Miniopterus schreibersii*) broadcast during prey capture. The long, narrowband search calls gradually change into shorter, more broadband approach calls after prey detection. Prior to capture, the bat produces the 'buzz' with the highest signal repetition rates and lowest terminal frequencies. After a pause, it resumes echolocation.

increases repetition rate to track evasive maneuvers of the prey and many species emit a so-called 'buzz': a terminal group with a signal repetition rate of up to 200 Hz. When the same bat forages along a hedgerow or flies within a forest, it is permanently faced with localization tasks to avoid collision and therefore uses short, broadband calls (Siemers *et al.*, 2001). Signal structure thus is varied greatly in response to the current task and individual- or sex-specific call signatures must be very robust not to be masked by the task-specific variability. However, the task specificity of echolocation calls indicates that bats automatically communicate information about their current behavior to homo- or heterospecific eavesdroppers (Barclay, 1982; Fenton, 2003). A high rate of approach sequences and buzzes will signal intense prey capture behavior; i.e., high prey density, to competing or potentially cooperating individuals. There is even evidence that the pause and the calls after the buzz disclose whether the attack was successful (Britton and Jones, 1999; Surlykke *et al.*, 2003).

Social Calls in Bats

Bats use a variety of vocal signals for purely communicative purposes (Figure 3). The acoustic structure of social calls is not constrained by the need to deliver useful echoes for orientation. As a consequence, social calls are often longer and lower in frequency than echolocation signals and therefore can be heard over greater distances. Social calls of many bat species extend into the human hearing range but usually include ultrasonic components. As for echolocation calls, higher frequency decreases the range of effectiveness (because of stronger attenuation of high-frequency sound), but simultaneously decreases the likelihood of divulging the caller's presence to a predator. Most types of social calls are tonal frequency-modulated or constant-frequency signals, often containing strong harmonics; noise bursts sometimes occur, mostly in antagonistic interactions (e.g., Kanwal *et al.*, 1994; Pfalzer and Kusch, 2003). The structure of social calls is by far more complex than that of echolocation calls, including sinusoidal frequency modulation and signals that are composed of several different syllables or elements (Figure 3). This complexity offers the possibility of encoding individual- or situation-specific information in details of time and frequency parameters. We have a fair overview of the acoustic structure of bat social calls, but only relatively few studies addressed the communicative function of these calls in detail. For a rather limited number of bat species, vocal communication has been investigated in the context of mother–infant interaction, mating, agonistic encounters, group recognition, and distress. Each is dealt with briefly in the following paragraph.

Some bats recognize individuals or group members by their social calls. This is especially impressive in the

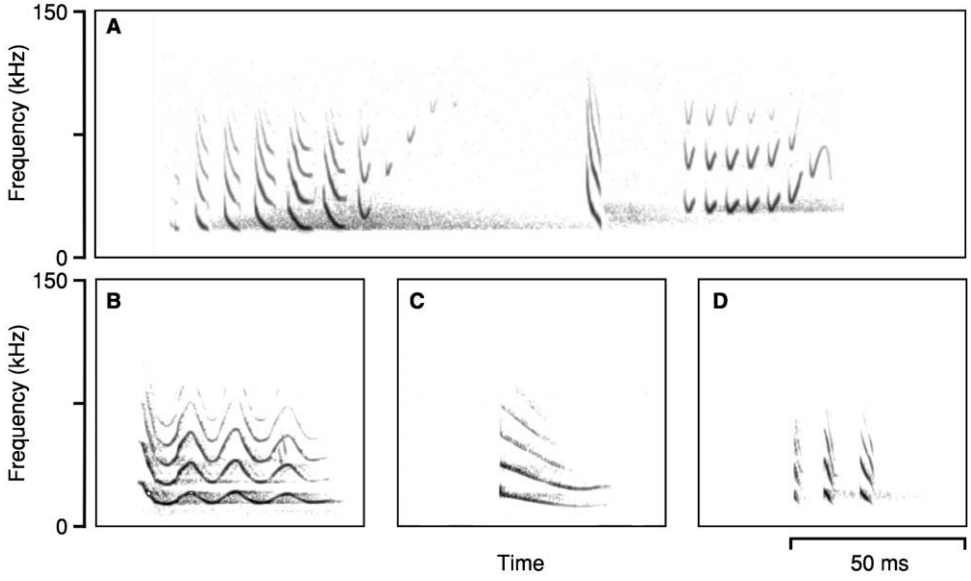

Figure 3 Examples of bat social calls in spectrogram representation: (A) Social calls used by a Nathusius' pipistrelle (*Pipistrellus nathusii*) for courtship and presumably also for defense of transient small hunting territories. Recording by A. M. Boonman, Tübingen University. (B) Sinusoidal directive call of a female lesser spear-nosed bat (*Phyllostomus discolor*) used in mother–infant communication. Recording by K.-H. Esser, Institute of Zoology, School of Veterinary Medicine, Hannover. (C) Isolation calls of a young parti-colored bat (*Vespertilo murinus*). Recording by I. Kaipf, Tübingen University. (D) Distress calls by a handheld parti-colored bat (*V. murinus*). Recording by A. Schaub, Tübingen University.

case of mother–infant recognition, where mothers find their calling pups among thousands of other infants (although spatial memory and olfactory cues also play a role). The young are attracted to the 'directive calls' of the mothers (Figure 3B) but they cannot always recognize their mother (Balcombe and McCracken, 1992). Mothers discriminate the pups by their 'isolation calls' (Figure 3C; Balcombe, 1990). Isolation calls can have heritable signatures (Scherrer and Wilkinson, 1993) and/or be matched to the mother's individual call structure through vocal learning (Esser and Schmidt, 1989). In the mating season (in autumn in temperate regions), male bats use courtship or advertisement calls (Fenton, 1985; Pfalzer and Kusch, 2003). Some species call from mating roosts in trees or caves, whereas others attract females with song flights (Figure 3A). Foraging bats of some species, e.g., pipistrelle bats, utter short sequences of social calls from time to time, especially when chasing off conspecifics. Interestingly, in pipistrelles they are similar to advertisement calls in acoustic structure. Sound analysis and playback experiments showed that these calls are species specific and that the bats respond differently to homo- or heterospecific calls (Barlow and Jones, 1997a; 1997b). They presumably serve to mark transient and very small hunting territories. In contrast, the Neotropical greater spear-nosed bat (*Phyllostomus hastatus*) forms stable groups of unrelated females that benefit from group foraging. They use group-distinctive social calls that are acquired by vocal learning to coordinate their joint trips and to discriminate group mates from strangers (Boughman, 1998; Boughman and Wilkinson, 1998; Wilkinson and Boughman, 1998). Distress calls (Figure 3D) attract bats from their own and from other species, possibly to irritate and deter a potential predator that is threatening the calling bat (Russ *et al*., 2004).

Whereas many types of social calls are complex enough to code individual-specific information, it is not yet clear whether some calls are honest signals in that they would contain quality-related information about the potential mate or competitor. Furthermore, there is very limited information about the function of the non-mother–infant social calls that can readily be recorded at bat colonies. It is technically difficult to identify the signal sender and the receivers plus their behavioral responses in bat roosts with dozens to thousands of densely packed individuals, but this surely represents a major challenge for future bat sociobiology research. Owing to methodological advances in sound recording, marking, and recognition of individuals, paternity assignment, and field observation techniques, the study of bat vocal communication will surely make significant progress in the years to come and answer many of the fascinating questions that are as yet still open.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Development of Communication in Animals; Individual Recognition in Animal Species; Production of Vocalizations in Mammals.

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Baudouin de Courtenay, Jan Ignacy Niecisław (1845–1929)

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Baudouin de Courtenay is best known for his view of language sounds as structural entities rather than as mere physical phenomena, a view which anticipated the modern linguistic concern with linguistic structure.

He was born on March 13, 1845 in Radzymin near Warsaw. His family was of French extraction with a long line of aristocratic ancestors including Baldwin de Courtenay, Count of Flanders, who was Lord of Constantinople in the fourteenth century. Baudouin's great-great-grandfather migrated to Poland and the French branch of the family died out

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Baudouin de Courtenay, Jan Ignacy Niecisław (1845–1929)

K J Woolacott

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Baudouin de Courtenay is best known for his view of language sounds as structural entities rather than as mere physical phenomena, a view which anticipated the modern linguistic concern with linguistic structure.

He was born on March 13, 1845 in Radzymin near Warsaw. His family was of French extraction with a long line of aristocratic ancestors including Baldwin de Courtenay, Count of Flanders, who was Lord of Constantinople in the fourteenth century. Baudouin's great-great-grandfather migrated to Poland and the French branch of the family died out

at the beginning of the 18th century leaving only the Polish side.

Baudouin studied Slavic linguistics at the University of Warsaw, taking a great interest in the psychological interpretation of language facts, a trend growing in Western European linguistics at that time. After obtaining his master's degree in 1866 he went to Prague. Jena, and Berlin, where he studied Sanskrit. Afterward he studied in St Petersburg and in Leipzig, receiving a master's degree in historical linguistics. In 1872, Baudouin went to Italy to study the Slavic dialects of Rezija for which he was awarded a doctorate in comparative grammar by the University of St Petersburg. From 1875–83, he was at Kazan for eight years, where he worked closely with Kruszewski (*see* **Kruszewski, Mikolaj Habdank (1851–1887)**) before becoming professor of Comparative Slavonic at Dorpat (Tartu). In 1893, he became professor of Slavic Linguistics at Krakow and in 1900 moved back to St Petersburg, where he was imprisoned in 1913 for writings against the state. Released at the beginning of World War I, he returned to Poland after the war, to the newly reestablished University of Warsaw, where he died on November 3, 1929.

Although Baudouin specialized in comparative linguistics, he also addressed general problems, including questions of language mixture, children's speech, and the effect of linguistic structure on world outlook. However, Baudouin's principal contribution to modern linguistics was the elaboration of a theory of phonology and morphophonemics which served as a departure point for all further research in these two areas.

Baudouin considered linguistics to be a science which deals with nature and man at the same time. For Baudouin, there were two sciences: a natural science, phonetics (or 'anthropophonics,' to use his term), and a humanistic science, psychophonetics. The two sciences overlap in their scope, but the second studies only that which exists in the form of articulatory–auditory representations. Baudouin considered terms like 'sound' and 'resonance' to belong to natural science and devised new terms to represent linguistic thought based on individual and individual–collective mental processes. He introduced the term 'phoneme' as the psychological equivalent of 'sound,' and 'kineme' and 'acousmeme' for the psychological elements of articulation and audition respectively.

Most of Baudouin's writings are in Polish or Russian (some are in German), and this kept many Western linguists largely ignorant of his contribution to the field for quite some time. Translations of his work are available, however, the main one being Stankiewicz's *Anthology*, which also gives further details of Baudouin's life and career.

See also: Kruszewski, Mikolaj Habdank (1851–1887).

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Bayle, Pierre (1647–1706)

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Pierre Bayle was born in 1647 in Carla, comté de Foix. He died in 1706 in Rotterdam. Son of a pastor, Bayle was first educated by the Protestants in Puylaurens, then by the Jesuits in Toulouse. He converted to Catholicism for two years in 1668, but his return to Protestantism forced him into voluntary exile for four years in Geneva. There he studied theology and discovered the Cartesian doctrine. He came back to France in 1674 and was appointed teacher of philosophy at the *Académie réformée* of Sedan. When the Académie was shut down in 1681, Bayle left France to teach philosophy and history in Rotterdam until 1693.

His famous *Dictionnaire historique et critique* (1697) was originally conceived as a critical response to Louis Moréri's *Grand dictionnaire historique* (1674), but it goes well beyond this goal. The four volumes (almost 4000 pages) of detailed and intricate bio-bibliographical articles, critical commentaries,

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Although no direct contribution to linguistics can be found in Bayle's *Dictionary*, his controversial method was an influential model for Diderot's *Encyclopedia*. In addition, this work constitutes one of the earliest histories of Occidental philosophy and served for a long time as a medium for reading the philosophical doctrines of the Antiquity and Renaissance eras.

See also: Dictionaries; Encyclopédie.

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Beattie, James (1735–1803)

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James Beattie was born in 1735 in Laurencekirk, a village on the east coast of Scotland between Dundee and Aberdeen. From 1749 to 1753 he studied at Marischal College in Aberdeen, where he was appointed Professor of Moral Philosophy and Logic in 1760, having spent the intervening years as a schoolteacher and poet. He published his first poems in 1756, and through the 1760s continued to write both poetry and philosophy. He achieved fame almost simultaneously in both areas, when his *Essay on the nature of immutability of truth, in opposition to sophistry and scepticism* appeared to widespread acclaim in 1770, followed in 1771 by the first canto of his most popular poetical work, *The minstrel; or, the progress of genius*, which marked him as a key early figure in British Romanticism. The *Essay on truth* was aimed particularly at Hume, and it is believed that Beattie was encouraged to compose and publish it by Reid, whose own complex relationship with Hume made it difficult for either to attack the other directly.

It has been suggested that Reid may also have prompted Beattie to write his 'Dissertation on the theory of language,' which appeared as part of Beattie's *Dissertations moral and critical* in 1783, then was published separately in 1788. Part I, 'Of the origin and general nature of speech,' is distinguished by an especially close attention to phonetic detail, including both articulation and differences of accent. Regarding the origin of language, it takes a resolutely creationist stance, declaring as absurd the 'Epicurean' doctrine according to which human beings could have created and learned language: "If, then, there ever was a time, when all mankind were, as the Epicureans supposed, *mutum et turpe pecus*, a dumb and brutal race of animals, all mankind must, in the ordinary course of things, have continued dumb to this day. – For, first, to such animals speech could not be necessary; as they are supposed to have existed for ages without it: and it is not to be imagined, that dumb and beastly savages would ever think of contriving unnecessary arts, whereof they had no

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The discovery of these points that all languages have in common is the subject of Part II, 'Of universal grammar,' in which Beattie proceeds systematically through nouns (including pronouns), attributives (adjectives, participles, verbs and their tenses and moods, adverbs), interjections, connectives (prepositions and conjunctions), and articles. His presentation is heavily dependent on Harris's *Hermes; or, a philosophical inquiry concerning language and universal grammar* (1751), though Beattie's work came at a point 30 years later when Scottish linguistic thought had come to deny that detailed inquiry into universal grammar gave real insight into the structure of the mind. As an attempt to resurrect such inquiry, Beattie's project was a failure, but it did have a certain originality in its particular way of joining a conservative approach to language origins with a retrograde approach to linguistic-*cum*-cognitive analysis. Though not highly influential, it is of interest for its place in the development of the linguistic concerns of the Scottish Enlightenment and for the information it contains about contemporary pronunciations of English.

Beattie's life was one of great hardship. An impoverished childhood left him frail throughout a life in which his marriage broke down, the two children he adored died early deaths, and at the end he was left paralyzed by a series of strokes. Yet he inspired great admiration and affection in those who knew him – "We all love Beattie," as Dr. Johnson told Boswell – and his *Essay on truth* and *The minstrel* remained hugely popular for decades after his death in 1803.

See also: Evolutionary Theories of Language: Previous Theories; Harris, James (1709–1780); Origin and Evolution of Language; Origin of Language Debate.

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Beauzée, Nicolas (1717–1789)

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Nicolas Beauzée was born in Verdun on May 9, 1717, and died in Paris on January 23, 1789. After the death of César Chesneau Du Marsais in 1756, he collaborated with editors of the French Encyclopedia, contributing articles mostly on grammar and language. In addition, he published an essay on religious matters, dedicated to moral education. His most important work outside the encyclopedia is a general grammar published in 1767 (Beauzée, 1974). Following the traditional explanation of the Bible, Beauzée argued for language as a divine gift. His interest in language resulted from his knowledge of ancient and modern languages. Beauzée was a teacher at the Royal Military School, and he signed his articles with the letters E.R.M. (École Royale Militaire). Beginning with the article *Formation*, this abbreviation appears in 135 entries of the encyclopedia. The majority of these articles must have been written by Beauzée, his collaboration with his colleague Douchet having been rather unsuccessful.

One of the merits of Beauzée as a theoretician of language is the improvement of metalinguistic terminology. His attitude toward orthography is contradictory. Writing his general grammar in 1767, he

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attacked severely what he called *néographisme*. But three years later, he used a new system of orthography in his translation of Sallust.

For the publication of the general grammar, Beauzée was awarded a gold medal by Maria Theresia of Austria and appointed to the chair of grammar at the Royal Military School. Five years later, he became a member of the French Academy where he succeeded C. P. Duclos (1704–1772). Frederick II invited him to his court, but he refused to visit Berlin.

Beauzée professed a strictly rationalist grammar that was influenced by Port-Royal, but which followed its own principles. He defined general grammar as a science and opposed it to the grammars of particular languages, which he called art. The rules of scientific grammar should be universal and not depend on arbitrary properties of languages. The relation of language and thought is explained in a dualist way: Thought is independent of language, and language is an instrument of analysis, while simultaneously being a reflection of thought. In the area of differential semantics, he continued the analysis carried out by Gabriel Girard. As a phonetician, Beauzée thought that the role of the vocal cords was to vary the pitch of the voice.

In his most important articles on linguistic matters, Beauzée elaborated these principles, depending largely on Locke, Leibniz, and the Logic of Port Royal (1662), but he enlarged their epistemological basis by providing a mathematical explanation to identity. The identity of a noun and an adjective is explained by the adjunction of semantic features. On the other hand, determination is explained by the mathematical relation of intersection. Beauzée reduced all grammatical relations to either identity (concordance of adjective and noun, of subject and verb) or determination (prepositional groups, case, government of verbs). He made progress in explaining empirical phenomena through his participation in the Panckoucke edition of the *Encyclopédie Méthodique*, reworking his articles and adding new elements.

See also: Evolution of Semantics; Leibniz, Gottfried Wilhelm (1646–1716); Locke, John (1632–1704); Origin and Evolution of Language; Port-Royal Tradition of Grammar; Thought and Language: Philosophical Aspects.

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Karl Ferdinand Becker, German physician and grammarian, born in Lieser on the Mosel River, died in Offenbach. After finishing studies of medicine in 1801, Becker mainly devoted himself to the medical profession in various places. In 1815 he settled in Offenbach as a general practitioner. From 1820 Becker also gave English-speaking children lessons in German. Dissatisfaction with grammars of the Adelung tradition inspired Becker to his linguistic work. He was a member of the *Frankfurtischer Gelehrtenverein*, where he came to know and corresponded with leading German scholars and grammarians such as Jakob Grimm, Wilhelm von Humboldt and J. C. A. Heyse.

Most important are the publications in which Becker develops and applies his syntactic theory, especially *Organism der Sprache* (1827, 1841), *Deutsche Grammatik* (1829), and *Schulgrammatik*

attacked severely what he called *néographisme*. But three years later, he used a new system of orthography in his translation of Sallust.

For the publication of the general grammar, Beauzée was awarded a gold medal by Maria Theresia of Austria and appointed to the chair of grammar at the Royal Military School. Five years later, he became a member of the French Academy where he succeeded C. P. Duclos (1704–1772). Frederick II invited him to his court, but he refused to visit Berlin.

Beauzée professed a strictly rationalist grammar that was influenced by Port-Royal, but which followed its own principles. He defined general grammar as a science and opposed it to the grammars of particular languages, which he called art. The rules of scientific grammar should be universal and not depend on arbitrary properties of languages. The relation of language and thought is explained in a dualist way: Thought is independent of language, and language is an instrument of analysis, while simultaneously being a reflection of thought. In the area of differential semantics, he continued the analysis carried out by Gabriel Girard. As a phonetician, Beauzée thought that the role of the vocal cords was to vary the pitch of the voice.

In his most important articles on linguistic matters, Beauzée elaborated these principles, depending largely on Locke, Leibniz, and the Logic of Port Royal (1662), but he enlarged their epistemological basis by providing a mathematical explanation to identity. The identity of a noun and an adjective is explained by the adjunction of semantic features. On the other hand, determination is explained by the mathematical relation of intersection. Beauzée reduced all grammatical relations to either identity (concordance of adjective and noun, of subject and verb) or determination (prepositional groups, case, government of verbs). He made progress in explaining empirical phenomena through his participation in the Panckoucke edition of the *Encyclopédie Méthodique*, reworking his articles and adding new elements.

See also: Evolution of Semantics; Leibniz, Gottfried Wilhelm (1646–1716); Locke, John (1632–1704); Origin and Evolution of Language; Port-Royal Tradition of Grammar; Thought and Language: Philosophical Aspects.

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Becker, Karl Ferdinand (1775–1849)

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Karl Ferdinand Becker, German physician and grammarian, born in Lieser on the Mosel River, died in Offenbach. After finishing studies of medicine in 1801, Becker mainly devoted himself to the medical profession in various places. In 1815 he settled in Offenbach as a general practitioner. From 1820 Becker also gave English-speaking children lessons in German. Dissatisfaction with grammars of the Adelung tradition inspired Becker to his linguistic work. He was a member of the *Frankfurtischer Gelehrtenverein*, where he came to know and corresponded with leading German scholars and grammarians such as Jakob Grimm, Wilhelm von Humboldt and J. C. A. Heyse.

Most important are the publications in which Becker develops and applies his syntactic theory, especially *Organism der Sprache* (1827, 1841), *Deutsche Grammatik* (1829), and *Schulgrammatik*

der deutschen Sprache (1831). Becker's *Organism* belongs to the category of rationalist (philosophical or universal) grammar, especially as developed in France from the 17th century and in Germany from the end of the 18th century. Its aim was to deduce categories common to all languages from human thinking, which were supposed to be equivalent to the logical categories of Aristotle. However, unlike his predecessors, Becker does not slavishly try to derive the grammatical word classes from logical judgment, e.g., *The tree* (subject > noun) *is* (copula > the verb *be*) *green / a plant / the tree grows* (predicate > adjective, noun, verb), but rather builds his grammatical system on frequent clause patterns of natural language. He distinguishes between three different kinds of syntactic relations (*Satzverhältnisse*): the 'subjective', e.g., *The bird sings / is singing*; the 'objective', e.g., *The bird sings / is singing a song / beautifully*; and the 'attributive' relation, e.g., *the singing / blue bird*. Becker also distinguishes between **grammatical form** (word classes and flectional forms) and **grammatical meaning** (syntactic function) and describes **syntactic synonymy** (the fact that different word classes can have the same function in a clause) and **syntactic homonymy** (the fact that one and the same word can have different functions as a subject, object, etc.). Thus Becker draws a clear dividing line between word classes and clause elements, or, in modern terms, between category and function.

These distinctions are fundamental for the understanding of syntactic structure and must be regarded as an achievement of the 19th century, certainly not equal to those of comparative linguistics, but basically still valid today. The philosophical part of Becker's work, in which the notions 'organism' and 'logic' played a key role, was much admired by his contemporaries but was also the target of severe criticism, partly justified but also exaggerated and partly due to misunderstanding. One example is Heymann Steinthal's book *Grammatik, Logik und Psychologie* (1855), which brought Becker's name into disrepute and oblivion in the academic world. His syntactic system, but not his philosophy, lived on in a simplified form in elementary and higher schools. Even his academic opponents used it, perhaps unaware of its origin. In the 20th century it was still being questioned (e.g., by Hans Glinz), particularly as to its didactic application.

See also: Adelung, Johann Christoph (1732–1806); Grimm, Jacob Ludwig Carl (1785–1863); Heyse, Johann Christoph August (1764–1829); Humboldt, Wilhelm von (1767–1835); Steinthal, Heymann (1823–1899); Tesniere, Lucien Valerius (1893–1954).

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Bee Dance

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Honeybees, living together in colonies of tens of thousands of individuals, have evolved behavioral and physiological mechanisms that allow them to maintain the colony. Compared to most other insects, two aspects are especially important: to find their way between locations of relevance (orientation between the nest site and food sites) and to recruit nest mates (communication) to support in tasks in which many helpers are needed.

The so-called dance 'language' includes both aspects. The observed phenomenon is that after one bee has by chance discovered a food site or a new nesting site, a number of bees, up to half of the colony in the case of swarming, arrive at the site. It is obvious that something must have happened between the bees inside the nest that 'know' the location of interest and those that are recruited to that site. All steps in this communication contribute to a most complex behavior, the mechanisms of which are still not fully understood.

After a successful forager returns from a food or nest site, it performs a conspicuous movement termed the 'waggle dance.' In ~1945, the Austrian zoologist Karl von Frisch discovered a correlation between certain aspects of the waggle dance and the geographical situation linked to this form of signaling. This correlation was a topic of intense debate among scientists asking the question "is this an abstract language, in the sense that bees watching a dance can read this correlation precisely and use it, or not?" The picture that we have today is a mixture of both: the dance language communication is a highly complex system of signals between the bees and cues from the surroundings, and the waggle dance is the initial and most conspicuous step in that system.

The Problem

Honeybees can fly distances up to 10 km away from the hive to which they must return. Scout bees search during such flights for flowers, water, and resin from plants or for new nesting sites. Recruitment to flowers and water speeds up the exploitation by the colony; new nesting sites must be found quickly after a swarm leaves the old home. It is much more important for a swarm to find new shelter quickly than for additional bees to collect nectar from a certain spot. Thus, it may be speculated that a high selection pressure on quick and successful home finding led to the 'invention' of the dance communication, which, after it evolved, was then also used on a small scale as a preadaptation in food recruitment.

The different types of goals have different physical properties. The task is more difficult in recruitment to a new nesting site: It is a spot in the landscape that is not sending any cues into the surrounding area, enormous numbers of bees must be recruited to it, and mistakes can be fatal for the swarming colony. The task is easier in food site recruitment: Flowers do send visual (color) and olfactory (scent) signals, there are typically many flowers distributed over a certain area, only a small number of bees are recruited, and mistakes are not fatal (it has been shown that a colony will still collect enough food even after the dance language is disturbed artificially).

Recruitment of Swarms to a New Nesting Site

Swarming bees form dense clusters of thousands of bees hanging outside on a tree. From there, scout bees screen the landscape for suitable homes. Having discovered such sites, they return to the swarm and perform, on a vertical support formed by the bodies of the other bees, the so-called waggle dance (Figure 1).

The movement pattern is stereotypic and is composed of different segments: a waggle phase in which the bee waggles its body from side to side with a repetition rate of approximately 15 waggles per second. Return runs, during which the bee walks in a loop back to where it started the first waggle phase,

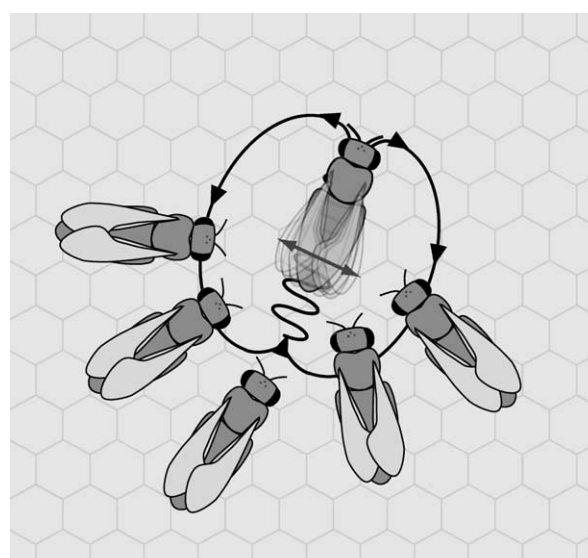

Figure 1 A successful forager returning from a food source performs a conspicuous movement pattern, the so-called waggle dance, in the darkness of the hive.

occur after termination of the waggle phase. Subsequently, the movement pattern is repeated with the next return run directed to the other side. A complete sequence is repeated many times. Figure 2 displays the correlations to the geographical situation, as discovered by von Frisch.

The time span of the waggle phase correlates positively with the distance between the nesting site and the swarm location (Figure 3); the direction of the waggle phase in relation to the direction of gravity gives the angle in the geographical triangle comprising the swarm location, the sun, and the new nesting site. In a fascinating process of consensus formation, initially many different sites are announced, but finally only dances for the best site continue.

The problem now emerges: How do 20 000 bees obtain the information about the location of the new nest site when only a few bees danced on the surface of the swarm cluster? The few bees that dance interrupt their dancing now and then, visit the new site, and mark its vicinity and entrance with scent. In successive visits to the new site, more and more bees arrive there, fly around the site, and possibly scent mark it. Scouts then return to the swarm and dance. After some time, a communication process in which rising body temperature and vibration signals play a role stimulates the swarm to become airborne. What then helps the swarm to move in the correct direction are the conspicuous flight patterns of the bees that 'know' where to go, seemingly again the nest site scouts: One can watch bees flying fast and straight among the swarm bees, directing their route in the correct direction. Near the nesting site, a group of bees (again former dancers) perform slow and looping flights and scent the air around the site and the nest entrance with pheromones. Altogether we have here a complex communication process with signals in each step of the recruitment until the new nest site is occupied.

Recruitment to Food Sources

The waggle dances that we see in food source recruitment are identical to those in nest site recruitment but, in contrast to swarming, they happen in large numbers each summer day and thus can be studied easily.

Each recruitment process can be divided into five steps, which can be analyzed separately.

1. The sender must collect information it wants to pass on.
2. The sender and receiver must establish contact (direct or via media).
3. The sender must send information.
4. The receiver must receive information.
5. The receiver must use all or part of the information.

For the dance communication, these five steps are detailed as follows:

Information Collection by the Sender

The condensed information encoded in the waggle dance figure about the route to the goal is the vector that gives the direction and distance from the starting point to the goal. Before sending these details, the dancer must collect this information. The source for both sets of information is the visual sense of the bees. The direction is experienced by seeing the sun as the reference or, if the sun is hidden behind clouds, the polarization pattern in the sky. The distance is estimated by the so-called optic flow, i.e., the pictures shifting across the eyes of the bees during flight movement. This can be demonstrated by forcing

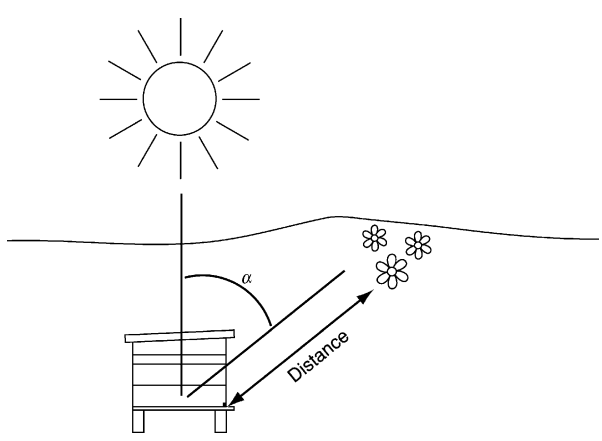

Figure 2 The dance figure contains information, maximally compressed, about the direction and distance to the food source.

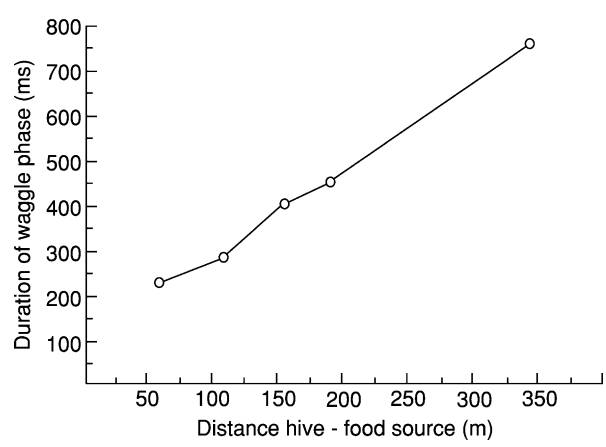

Figure 3 The distance from the hive to the goal is encoded in the duration of the 'waggle phase.'

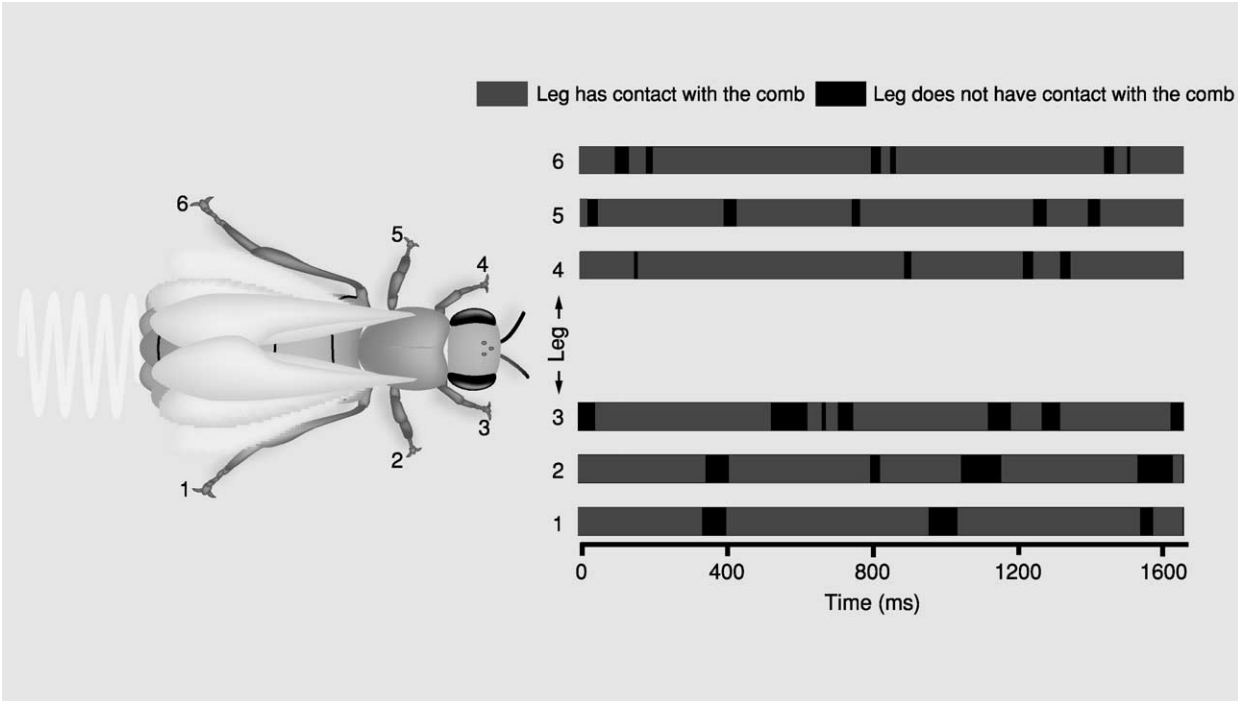

Figure 4 The central part of a waggle dance is the 'waggle phase.' It used to be called the 'waggle run' but we now know that 'waggle stand' is more appropriate as the bee clings with its feet to the rims of the cells to attain mechanical stability.

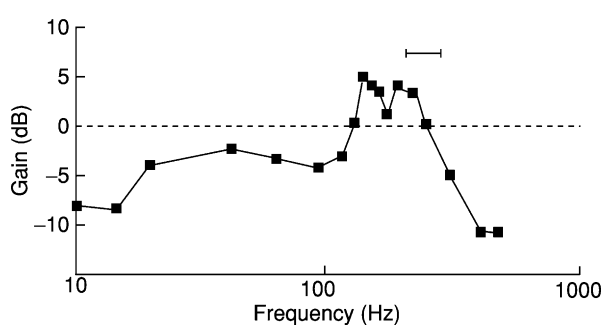

Figure 5 The mechanical properties of the comb are tuned to the frequencies produced by the dancing bee (at approximately 270 Hz). It amplifies the mechanical signals that are produced by waggle dancers and makes them conspicuous over the background noise of the colony.

bees to fly on their route to the food through narrow tunnels and thus close to visual patterns that then generate pictures moving at a rapid rate across the eyes. Such bees indicate in their waggle phase the subjective impression of a flight more than 30 times as long as the flight that they actually completed.

Sender and Receiver Establishing Contact

The dance language for food sources is performed in the darkness of the hive and is of interest to only a comparably small number of bees. Therefore, it makes a great deal of sense that there is a limited area of approximately 10 × 10 cm on the vertical surface of a comb, the 'dance floor,' on which the dancers and those motivated to meet dancers get together. The dance floor can be artificially relocated in the hive and the dance-communicating bees find it quickly to perform their communication, which indicates that it is recognized by scent.

How is a dancer detected in the darkness? Dancers emit a suite of signals and cues linked to the dance performance. These include mechanical, chemical, and thermal events. A dancing bee has a high body temperature, it smells like the food source it comes from, and it produces mechanical signals, each of which can be used to locate a dancer. The mechanical signals are the waggle movement itself and a burst of muscle contractions by the flight muscles located in the wing- and leg-carrying body segment, the thorax. During the dance, the wings are only loosely coupled to the flight muscles so that only small wing vibrations happen, which produce a faint wind detectable by bees standing nearby. The muscle oscillations are additionally transmitted as vibrations into the comb. To efficiently transmit this signal into the substratum, during the waggle-phase the dancing bee clings to the comb with its feet for as long as possible (see Figure 4).

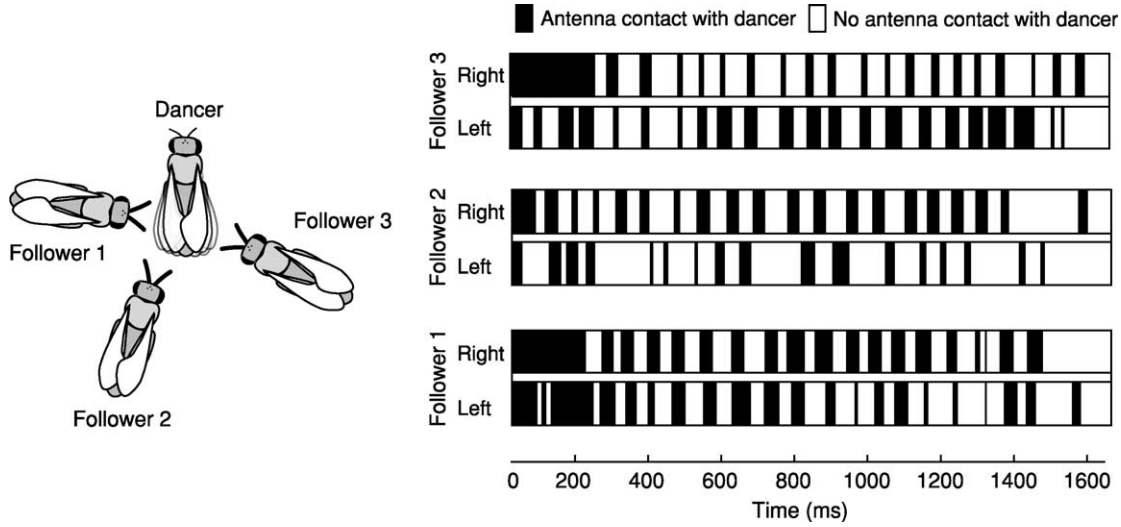

Figure 6 The dance follower bees receive from the bee dancer temporal contact patterns to both antennae from which the direction of the waggle phase can be read in the darkness of the hive.

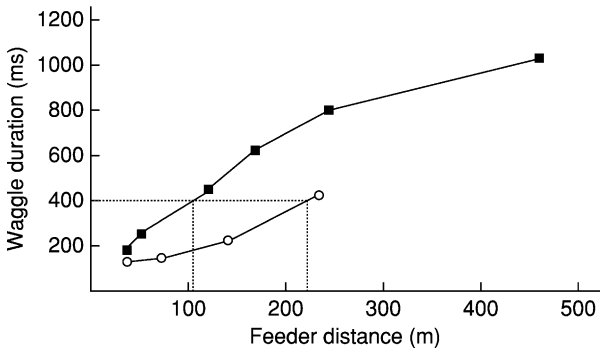

Figure 7 The information on flight distance, encoded in the waggle phase of the dance, is not absolute but depends on the landscape. A waggle duration of 400 ms can for one flight route mean 110 m and for another flight route mean 230 m.

The vibrations introduced into the comb travel as displacements in the form of a shifting of the net made from the upper rims of the cells of the comb.

It is remarkable that the mechanical properties of the comb are well adapted to the properties of the signals. The 'telephone net' of the bees, built by the bees themselves, best transmits frequencies at approximately 270 cycles/s, which is the frequency contained in the oscillation pulses produced by the dancer (see Figure 5).

Sending and Receiving the Signals

Once the dance followers have located and approached a dancer and in that way made contact, the dance followers move around with the dancer in a ballet-like manner. Each step of the dance follower is as stereotyped, but less conspicuous, as the movements by the dancer. During this ballet performance, the sender and receiver keep intense body contact. In particular, the antennae of the dance followers are touched in a certain temporal pattern by the wagging body of the dancer (Figure 6). It is during this contact that the information is transmitted and the antennae play an essential role. However, there is still a large gap in our knowledge about the details of this process.

Using the Information

Correlations do not prove causal relationships. Therefore, it was debated intensely whether and how much of the information that a human observer can read from a waggle dance is actually used by the follower bees. The arguments ranged from "it is an abstract language" to "they use nothing but are stimulated by the dance to simply search for the source of the scent that a dancer bee carries."

It turned out that the truth is a combination of both assertions. The dance transmits information and aids in the field are given to pinpoint the goals. If forager bees are forced to fly through narrow tunnels that produce a high rate of optic flow, one can create 'lying' bees. These bees dance for a different location than that which they actually found, by performing a waggle phase for more than 30 times as long a distance as they had really flown. Observing the recruits, it becomes clear that they do not fly to the forager's real site, but they can be caught in an area around the spot indicated by the dance. Thus, the dances recruit followers in roughly the correct area.

Because the distance communicated depends on the optic flow that a landscape offers to the bees, it is clear that bees do not communicate distance as an absolute quantity (Figure 7). However, as long as

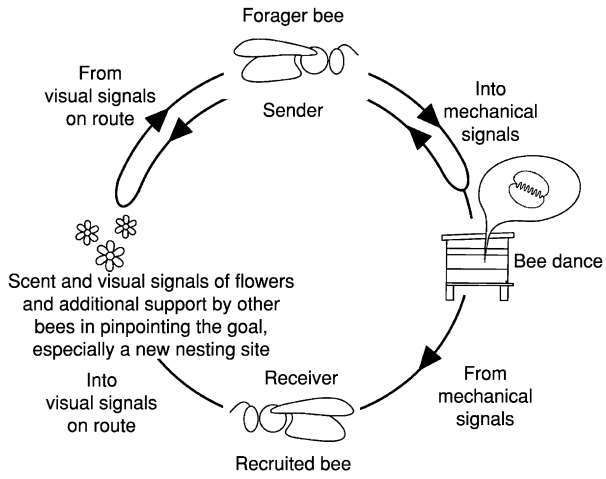

Figure 8 The 'dance language' is a highly complex phenomenon in which multiple translations of information within one bee and between sender and receiver bees take place. The dance language is one form of information transfer embedded in a continuous flow of information between the members of a honeybee colony.

follower bees fly out in the same direction as the dancer, the 'mistakes' that both bees make are the same and cancel each other out.

However, nonmanipulated dancers also send recruits not to a spot, but into a larger area. This area has an almost constant size independent of the distance from the hive. The reason for this is that the directions of consecutive waggle phases are not perfectly identical but show a certain degree of deviation. This deviation is smaller the further away the food source is. This leads to a scatter of the follower bees across a certain range and it makes more sense than having all bees that followed a dance go to one flower.

The identification of flowers in the area that bees have been sent to is thus easy to accomplish when recruited bees follow the scent of flowers. When bees are offered unscented food, events identical to the swarming recruitment result: Experienced bees synchronize their flight so they arrive in groups at the feeder, and once there they fly around in slow looping movements and release scent from a special gland to mark the area. Inexperienced bees then land together with experienced bees at the food source.

Thus, it becomes clear that bees keep contacts and exchange signals not only during the waggle dance. The waggle dance is one component, and the most conspicuous component, in a highly complex communication process in honeybees (see Figure 8).

See also: Animal Communication: Deception and Honest Signaling; Animal Communication Networks; Animal Communication: Overview; Development of Communication in Animals; Insect Communication; Traditions in Animals.

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Behaviorism: Varieties

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The term 'behaviorism' refers to a family of doctrines that emphasize the importance of behavior over mind, or cognitive processing, in psychology, notably as its proper subject matter or its ultimate evidential basis.

Psychological Behaviorism

Early in the 20th century, James Watson wove together three 19th-century ideas – Darwin's evolutionary theory emphasizing the physical as well as psychological continuity between animals and humans, Wundt's experimental method in psychology, and James's functionalist psychology – into both a method and theoretical overview for animal and human psychology. In 1913, he published what came to be known as

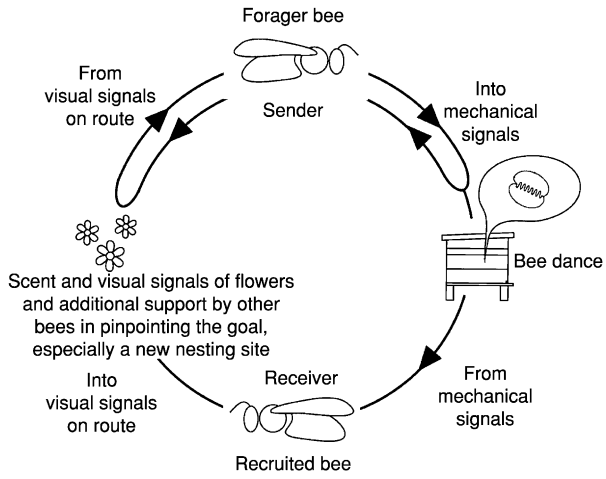

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The term 'behaviorism' refers to a family of doctrines that emphasize the importance of behavior over mind, or cognitive processing, in psychology, notably as its proper subject matter or its ultimate evidential basis.

Psychological Behaviorism

Early in the 20th century, James Watson wove together three 19th-century ideas – Darwin's evolutionary theory emphasizing the physical as well as psychological continuity between animals and humans, Wundt's experimental method in psychology, and James's functionalist psychology – into both a method and theoretical overview for animal and human psychology. In 1913, he published what came to be known as

the behaviorist manifesto, '*Psychology as the behaviorist views it*,' which contained a number of distinct but related doctrines, three of which are of particular interest for the student of language: (1) the rejection of introspection as an experimental method, (2) the shunning of internal events, and (3) the emphasis on learning.

Rejection of Introspection as an Experimental Method

In the late 19th century, Wundt convinced psychologists that scientific work in their discipline must be experimental and quantitative, but like all 19th-century psychologists, he continued to work on psychology's traditional object – consciousness – and to access it by the traditional route of introspection. Stirred by a growing methodological distrust in the value of introspective evidence, and emboldened by various successes in animal psychology in which introspective data were not available, Watson, trained as an animal experimenter, argued that consciousness and introspection were not a proper basis upon which to establish an experimental scientific psychology. According to Watson, experimentation in psychology begins and ends with observable behavior, a methodological prescription that is sometimes called 'methodological behaviorism.' To this day, virtually all working psychologists, even those who see themselves as strong opponents of behaviorism, adhere to Watson's methodological prescription. For this reason, it is better to reserve the term behaviorism for the other behavioristic doctrines present in Watson's manifesto.

Shunning of Internal Events

If all internal events are characterized by the fact that they are conscious and accessible only through introspection, then Watson's rejection of conscious experience as the object of psychology amounts to a rejection of all internal events from the scope of psychology. Indeed, we find in Watson's writing a move from his initial 1913 doubts about the epistemic value of internal events (*qua* conscious events) to the full-fledged elimination of everything internal found in his 1924 monograph *Behaviorism*. However, the elimination of everything internal, a position we could call eliminative methodological behaviorism, which is one of the two main tenets most strongly identified with behaviorism today, is only one way to meet Watson's methodological prescription. The other is to view internal events as theoretical constructs, the value of which flows from behavioral observations. According to this position, internal events can be posited as theoretical construct provided they are 'operationally defined' into behaviors. Few psychologists, even among those we would undeniably classify as behaviorists today, followed Watson's shunning of internal events. Edward Tolman and Clark Hull, for instance, were much more ready to posit internal events (drives, internal maps, etc.) as intervening variables mediating the relation between stimuli and responses. Even Skinner found a heuristic place for internal events in his Experimental Analysis of Behavior (EAB), but reduced their epistemic value within psychology.

We can call this position, held by most behaviorists, 'operationalist methodological behaviorism.' In their day-to-day practice, most psychologists today are operationalist methodological behaviorists. To see what distinguishes those operationalist methodological behaviorists we call behaviorists from those called, say, cognitive psychologists, one has to look at the third element found in Watson's behaviorist manifesto, the emphasis on learning.

Emphasis on Learning

Whereas the first two doctrines found in Watson's manifesto are methodological, the third is theoretical. The main construct on which Watson established his psychology is the reflex; indeed, he opened his 1924 monograph with an analysis of the yawning reflex. However, Watson recognized that basic reflexes, which are fixed and innate stimulus-response (S-R) dispositions, have insufficient explanatory power to account for the behavior of many animals, and certainly those that interested Watson: birds and mammals, including humans.

To achieve the necessary explanatory power, Watson turned to the work of Russian physiologist Ivan Pavlov (1927), who had recently won the Nobel Prize in medicine for his work on a type of learning called classical conditioning. Pavlov showed that, when the temporal contingencies are right, stimuli that are neutral to the organism can be paired with innate (or unconditioned) S-R dispositions so as to acquire the ability to trigger the reflexes' response. Once the new association is established, there is a new, conditioned S-R disposition in the organism's behavioral repertoire. Since so many of human behavioral dispositions are not innate, Watson hoped that classical conditioning would offer a means to account for what is typically human in human psychology. Note that Watson's emphasis on a learning mechanism does not make him an empiricist: indeed, for his own brand of behaviorism to get off the ground, he needs to posit a large number of innate unconditioned reflexes. With the development of the concept of operant conditioning, and to the extent he

relegated classical conditioning to a secondary role, Skinner was actually much more of an empiricist than Watson ever could be.

Skinner developed both a school of psychological research – the Experimental Analysis of Behavior – and a philosophy to underwrite it, called radical behaviorism (Skinner, 1938, 1974). According to EAB, every behavior can be broken down into three parts: the discriminative stimulus (the type of situation the organism is in), the operant response (a response that can be modified as a function of its consequence), and another stimulus: the reinforcer or punisher – an event that increases (reinforcement) or decreases (punishment) the probability that the organism will produce the operant response in the presence of the discriminative stimulus. Operant conditioning, a general learning mechanism, is said to have occurred when a stimulus has increased or decreased the probability that an organism will produce a given operant response when the discriminative stimulus is present.

Unlike Watson's elimination of inner mental states, Skinner's EAB did not shy away from them, but viewed them as operant responses, which could be reinforced or punished by stimuli. Contrary to psychological tradition, however, inner mental states were not seen as causes of behavior, but rather as behaviors (operant responses) in their own right, to be controlled by external stimuli like any other operant response. And unlike classical conditioning – the learning mechanism favored by Watson – operant conditioning is a *creative process*, much the same way natural selection is, allowing for the selection of new responses. Armed with operant conditioning and classical conditioning to a lesser extent, Skinner believed he could account for any human behavior.

In his discourse on method, Descartes famously set a limit on mechanistic explanation in psychology. No mere mechanism could, he believed, account for the productivity and pragmatic appropriateness of language and reasoning. In his 1957 work, *Verbal Behavior*, Skinner sought to show that, by applying the concepts and methods of EAB, one could mechanistically account for both the productivity and pragmatic appropriateness of language. His account of pragmatic appropriateness took sentences as wholes and showed how the environment, especially the verbal community, provides reinforcers and punishers to shape verbal responses. His account of productivity focused on words and attempted to show how sentences are structured by reinforcers and punishers provided by the child's verbal community.

In a famous review of Skinner's book, Chomsky (1959) attacked Skinner's behaviorist account of language. Chomsky set up a two-horn dilemma on which Skinner could only impale himself. Either Skinner uses EAB's theoretical terms in a strict and controlled way – that is, as he defined them operationally – or he interprets them in a loose and metaphorical way. If he interprets its terms in a loose and metaphorical way, then his analysis of language amounts to nothing but a disguised form of mentalism. On the other hand, if Skinner interprets EAB's theoretical terms as he defined them operationally, then, according to Chomsky, Skinner's behaviorism could not account for language.

Operant conditioning shapes verbal behavior by differentially reinforcing and punishing verbal output. One can easily see how this process could account for the pragmatic appropriateness of verbal responses in anyone who can produce them. (Chomsky did not emphasize this aspect of verbal behavior, perhaps because he himself did not have an account of pragmatic appropriateness.) However, according to Chomsky's famous "poverty of stimulus argument," operant conditioning cannot account for the acquisition of the capacity to produce grammatical verbal responses. The linguistic environment (the stimulus) is said to provide children with insufficient evidence – to be precise, evidence that was too *unsystematic* and too weak – to acquire the grammar of the language spoken around them: unsystematic because it contains no negative evidence (evidence that identifies ungrammatical verbal output as ungrammatical) and *weak* because positive evidence (evidence that identifies grammatical verbal output as grammatical) is of low quality. Moreover, because children hear only a small finite subset of all the grammatical sentences of their language, they cannot take the absence of a grammatical form as evidence of ungrammaticality. Yet, despite the poor nature of the stimulus they get from their verbal environment, children normally acquire their native language quite rapidly.

Over the years, every element of this argument has been argued extensively. Skinner himself never bothered to reply to Chomsky since it was obvious to him that Chomsky had not read his book. As noted, *Verbal Behavior* did in many ways offer an account of language's pragmatic appropriateness (one of Descartes' challenges to a mechanistic explanation of the mind), something that formal grammars cannot. However, Chomsky was right in claiming that Skinner's book offered no clue to the productivity of language (Descartes' other challenge), whereas his own did. One could say in retrospect that the score between Skinner and Chomsky is one-all. Nevertheless, by the 1960s, the tide had turned against

behaviorism, and the time was ripe for cognitive science. Chomsky's attack on Skinner's *Verbal Behavior* was seen as one of the definitive moments in the birth of cognitive science.

Philosophical Behaviorism

Philosophical behaviorism is a semantic theory about the meaning of mental statements; that is, statements used to attribute mental states to oneself or another. Although philosophical behaviorism generally is often identified with the particular brand developed by neopositivists, it is important to note that it has three main strands. They are, chronologically, the reductionist philosophical behaviorism of the Vienna Circle and two related but distinct responses to it: the nonreductionist philosophical behaviorism of ordinary language philosophers and the eliminativist philosophical behaviorism of Quine. All of these positions are behaviorist in that they posit a special relation between behavior or behavioral statements and the meaning of mental statements. What distinguishes the three is the type of relation they posit.

Reductive Philosophical Behaviorism

Developed by members of the Vienna Circle as part of their unity-of-science program, reductionist philosophical behaviorism (also called logical or analytical behaviorism) posits that there can be semantic identity between mental statements and (a finite subset of) behavioral statements. Two specific neopositivist theses are at the heart of this approach: (1) positivism – the rejection, as meaningless, of metaphysics and pseudosciences from the unified system of the human knowledge (science) and (2) atomistic verificationism, the view that theoretical statements, taken individually, draw their meaning from their relation of semantic identity to special foundational statements, called 'physical control formulas,' the truth of which, individually, is taken to be directly verifiable by observation. Note that, although atomistic verificationists (and many contemporary commentators) use terms like 'synonymy' to characterize the type of semantic relation posited and 'translation' to characterize the operation carried on to establish the semantic relation, neither terms should be confused with its homonym in ordinary language. Rather, the relation of semantic identity posited by atomistic verificationists is akin to the relations of definition in mathematics or of compilation in computer science (both are relations between elements in formal languages).

Anyone who holds these two views, and believes in the value of psychology as a science will strive to show that psychological statements, as theoretical statements, are semantically identical to physical control formulas: physiological and behavioral statements. Hence, Hempel claimed that 'Paul has a toothache' was semantically identical to 'Paul weeps and makes gestures of such and such kinds'; "At the question 'What is the matter?' Paul utters the words 'I have a toothache'"; and so on (Hempel, 1949: 17).

Just as cognitive science was in part developed as a reaction to the limits of psychological behaviorism, in particular Skinner's EAB, much of the original philosophical background underlying cognitive science was developed through a thorough reflection on the limits of philosophical behaviorism. Indeed, three broad philosophical views on the mind emerged from a reflection on the limits of reductionist philosophical behaviorism: nonreductionist philosophical behaviorism, eliminativist behaviorism, and functionalism. This article addresses the first two (*see* **Functionalist Theories of Language** for the third).

Nonreductive Philosophical Behaviorism

Whereas neopositivists aimed to show that mentalist psychology could be a part of the unified system of science, ordinary language philosophers wanted to understand the day-to-day use of language, including mentalistic language (language that contains mental statements and thus can be used to make mental attributions). First, ordinary language philosophers observed that mental attributions are, first and foremost, a mundane practice and that mentalist language may be ill suited to a scientific endeavor such as psychology. Simply assuming that mental statements were well suited for scientific work because of their value in ordinary human practices was deemed to be a category mistake (Ryle, 1949), or as Wittgenstein put it, to misconstrue the logical grammar of language (Wittgenstein, 1953).

The main error thus made was to assume that mental statements ascribe 'states,' presumably mental ones, but the criticism extended to other types of states (neurological, functional) of individuals. Instead, mental statements attribute complex behavioral dispositions or behavioral patterns to individuals. Such patterns are taken to be so complex that mental statements cannot in practice be reduced to them. Thus, according to nonreductive philosophical behaviorists, when we attribute a mental state to someone, we are not ascribing a given internal state to that person, but are using shorthand to describe what the person might do in various circumstances.

Ordinary language philosophers based their opposition to the brand of philosophical behaviorism developed by neopositivists on two related problems

they saw with reductionist philosophical behaviorism. The first was that reductionist philosophical behaviorists conflated two distinct notions under the heading 'behavior': sometimes, the term referred to movements (of the body), and sometimes it referred to actions (of the person who has that body). Although movement statements can be properly viewed as physical control formulas, action statements cannot. The reason why action statements cannot be viewed as physical control formulas pointed to the second problem that philosophical behaviorists saw with reductionist philosophical behaviorism: the intentional circle (Geach, 1957). The intentional circle refers to the fact that a given mental statement is semantically identical to a given action statement (or set thereof) only on the condition that the person the mental state is attributed to also holds other mental states, and that, to attribute those, one would use mental statements themselves semantically identical to actions only on the condition that the person holds other mental states; and so on, indefinitely. Psychological theoretical statements are thus shown to be irreducible to physical control formulas. The intentional circle argument is a particular instance of a more general argument that applies to any attempt to use semantic identity to justify the reduction of theoretical statements individually to physical control formulas. Let us turn to that more general argument.

Eliminative Philosophical Behaviorism

Atomistic verificationism is at the heart of the neopositivist conception of science, including its reductive philosophical behaviorism. The intentional circle argument brings into question the idea that psychological theoretical statements can be translated solely into physical control formulas – that is, without referring back to other psychological theoretical statements. It is as if all statements, theoretical and observational, are a connection in a kind of network. Drawing on Pierre Duhem's confirmation holism, Quine broadened the scope of the intentional circle argument to cover all of the sciences: confirmational circularity between theoretical and observational statements becomes the norm rather than psychology's exception. Holding on to verificationism, which ties meaning to observational confirmation, Quine rejected atomistic verificationism in favor of holistic verificationism. Behaviorism in psychology thus stops being a peculiarity in the sciences, owing to the quirky nature of its theoretical statements, but equal in that regard to theories in other sciences.

Having thus broadened the ordinary language philosopher's argument against reductive philosophical behaviorism, Quine could have opted for their nonreductive behaviorism. However, he supplied his argument against reductive behaviorism with an argument against all intensional language in science; that is, all language in which extensional inference principles, such as existential generalization and the intersubstitutability of identicals, fail. Nevertheless, Quine's position was quite similar to that of the nonreductive behaviorists. They both rejected reductive behaviorism and mentalist scientific psychology: Quine, because of his rejection of intensional language generally, and ordinary language philosophers because they viewed with suspicion any extension of ordinary linguistic practices to science.

The Return of Psychological Behaviorism?

Most accounts of psychological behaviorism end with Chomsky's successful attack on Skinnerian behaviorism, and most accounts of philosophical behaviorism end with Quine's broad attack on neopositivist reductive physicalism, forgetting that he replaced reductive behaviorism with a more radical eliminative behaviorism. However, since most linguists and psychologists did not follow in Quine's eliminative footsteps, opting instead for the then-growing paradigm of cognitive science, which promised a science of intentionality, a modern student of psychology and linguistics may thus be led to believe that behaviorism is long dead and buried.

However, various elements of behaviorist thinking are making a comeback. Eric Kandel won the Nobel Prize in Medicine in 2000 for his discovery of the molecular basis of three related forms of learning: sensitization, habituation, and classical conditioning (see Kandel *et al.*, 2000). In addition, many neural modelers are now replacing back-propagation in their connectionist models of cognitive capacities with reinforcement learning algorithms, inspired by Skinnerian learning mechanisms. Those algorithms have certain computational advantages over back-propagation that make them more suitable for learning in complex systems, and they are thought to be much more biologically plausible than back-propagation. Moreover, the physiological mechanisms of reinforcement learning are currently being worked out and are thought to involve dopamine and dopaminergic systems as reward systems. Finally, a new trend in robotics, suggestively called Behavior-Based Robotics, shuns central representations and computational systems in favor of simple behaviors strategically connected in a subsumption architecture (Brooks, 1999).

The two questions to ask, a half-century after the initial rejection of behaviorism by cognitive science, is not whether behaviorism is false (it is) but (1) to what extent does our intelligence rely on reflex-like input-output or a modular mechanism, and (2) to what extent is our cognitive life shaped by the type of learning mechanisms studied by behaviorists?

See also: Functionalist Theories of Language.

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Belarus: Language Situation

U Schasny, Minski rayon, Belarus

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Belarusian, as the language has been termed in English since the creation of an independent state of Belarus with the collapse of the USSR in 1991, is also variously known as Byelorussian or White Russian (or Belarusan, per Ethnologue), and along with Russian and Ukrainian is a member of the eastern branch of the Slavonic language family. It is written in the Cyrillic script and is one of the two official languages of the republic of Belarus, along with Russian.

The exact number of speakers of Belarusian is difficult to quantify because of hazy and subjective definitions of what constitutes Belarusian as distinct from dialects of Russian. Census figures in contemporary Belarus are somewhat misleading, as although 85.5% of the population of the republic listed Belarusian as their first language in the 1979 census (and Ethnologue, in its 2000 edition, provided a 1993 figure of 98%, or 7 905 000), what is defined as 'Belarusian' may be more like Russian than the acknowledged literary standard of Belarusian. Consistently weak institutional support for the literary language in Belarus has served to confuse the situation.

Nevertheless, Belarusian as a distinct language from its neighbors has a long, if somewhat checkered, history. The area in which the Slavonic dialects that fused into the Belarusian language sprang up was defined by the Pripyat', Dvina, and Dnepr rivers,

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and the tribes that inhabited this area were known to medieval chronicle writers as the Krivichi, Radimichi, and Dregovichi. The borders of the modern Belarusian state roughly correspond to this linguistic area, with some overlap of the language westward into Latvia and Lithuania.

Linguistic and archaeological evidence suggests, in fact, that the Slavic-speaking tribes conquered and absorbed Baltic-speaking populations within this area and spread westward, and in fact by the 11th century the important trading city of Polotsk (Polatsk) was the dominant political and economic force along the Dvina and Daugava rivers as far as the Baltic sea. The Russian city of Smolensk is also thought to have been founded by the Krivichi tribe. For a time in the 15th century a language that was recognizably proto-Belarusian was in use as the official administrative language of the Grand Duchy of Lithuania, which stretched as far as the Black Sea.

Legal codes of the Duchy, and the partial Bible translations by Francis Skaryna in the 16th century, constitute the first evidence of a Belarusian literary language. But the flowering was not to last, as its use was suppressed with the advent of the Polish-Lithuanian Commonwealth starting in 1569 – Polish was used exclusively on its territory for administration from 1696 on.

It was the disbanding of this commonwealth at the end of the 18th century that gave rise to a second flowering of Belarusian literature, and under Polish influence, the Latin script was in use for the ensuing century, even into the 20th century, though not uniformly, and use of the traditional Cyrillic script continued throughout, until being made the official orthography early in the Soviet period in the 1920s.

Features of the Language

Belarusian is written in a version of Cyrillic that is almost identical to Russian, with the addition of the dotted vowel İ. Characteristic of Belarusian are the affricates *ts* and *dz* in some positions where Russian has *t* and *d*. Syllable-final *w* is found, corresponding to Polish *ł*. Representation of unstressed vowels as spoken (particularly the *o/a* distinction) is more faithful in Belarusian spelling. As in Russian, words have movable stress. The grammar and syntax of Belarusian are not markedly different from that of Russian.

Codification and Status

A grammar of Belarusian did not appear until 1918, with that of Branislaw Tarashkevich. The norms set out in that volume, which was a conscious attempt to synthesize the literary language from a variety of dialects, helped to codify the official language of the Belarusian SSR. The Cyrillic script in its native form was set by decree in 1933, but also at this time, under Stalinism, the grammatical and spelling norms were aligned closer to Russian. The Stalin era inaugurated a demotion in the status of Belarusian that to this day has never truly been reversed. Schools and the press almost exclusively used Russian, and still do, with literary Belarusian marginalized as an 'academic' language. To some extent the written language has been kept alive by an active diaspora living in the West, while the spoken language of the home was, by implication, reduced to the status of a 'Russian dialect.'

Nationalist activity within the country in the dying days of the USSR, however, saw the achievement of a higher status for the language, culminating in a Language Law of 1990 that gave the language sole official status in the country. Under the present neo-Soviet administration of Belarus, the legislative achievements of the nationalists have been largely undone, especially as the result of a referendum in 1995, by which Russian was given equal official status. For the foreseeable future, then, the majority language will officially be a pariah in its own country.

See also: Belorussian; Russian; Ukraine: Language Situation.

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Belgium: Language Situation

M A French

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Belgium (population in 1991: 9 970 000) recognizes three languages as official: Dutch, French, and German. Taking these language names to refer not only to the standard varieties but also to the vernacular forms spoken on Belgian soil, it can be stated that slightly less than three-fifths of the indigenous population have Dutch as their mother tongue, slightly more than two-fifths have French, while German is the mother tongue of less than 1%. Language-related disputes concerning the status of Dutch and French have long been prominent in Belgian public life and, especially since the 1950s, have occasioned a number of constitutional changes. Most political parties and many other organizations come in pairs, one for French speakers and the other for Dutch speakers.

Four linguistic regions are officially recognized: Flanders, with Dutch as the official language (a single variety of Dutch serves as the standard language in both the Netherlands and the north of Belgium); Wallonia, with French as the official language; the Brussels region (in French, *Bruxelles-Capitale*), which is officially bilingual; and a region with German as its official language, forming a narrow (broken) strip along the border with Germany in the province of Liège. In addition to the four regions, three Cultural Communities (corresponding to the official Dutch, French, and German-speaking sectors of the population) are recognized in the Constitution; each has a council with various 'cultural' responsibilities (e.g., broadcasting, promotion of tourism).

The official linguistic boundary (legally recognized in 1962) between the largely Dutch-speaking north (i.e., Flanders) and the overwhelmingly French-speaking south (i.e., Wallonia), after delimiting a small 'French' area around Comines, runs roughly due east from just north of Mouscron (about 15 km to the northeast of Lille) to the southern boundary of the 'panhandle' part of the Netherlands (near Maastricht). Four of Belgium's nine provinces lie to the south of the line and four to the north. The centrally located province of Brabant, however, is exceptional in two respects: the linguistic boundary splits it into a northern and southern part and the officially Dutch-speaking northern part 'surrounds' the Brussels region. Although Brussels is officially bilingual, over three-quarters of its inhabitants now have French as their main or sole language.

The local forms of French in Wallonia can be grouped into three main dialects, of which only one, albeit the largest, is termed 'Walloon' (French: *wallon*); the others are Picard and Lorrain. The local forms of Dutch spoken in Flanders (often called 'Flemish'; Dutch: *Vlaams*) also can be grouped into three main dialects. These are (from west to east) West Flemish, Brabantic (including East Flemish), and Limburgish. Use of non-standard local forms of French and Dutch, especially of the latter, is widespread. The vernacular forms of Flemish differ considerably from Standard Dutch.

The part of Belgium in which German is the official language comprises two areas in the extreme east of Liège province; the principal town of the northern area is Eupen and that of the southern is Saint Vith/Sankt Vith. German also has some official status in areas immediately to the west (for example, in and around Malmédy). The vernacular forms of German that are spoken in the region belong to the Middle Franconian dialect group.

In the Arlon area (southeast corner of the province of Luxembourg) there are between 20 000 and 40 000 speakers of a different variety of German, called '*Lëtzebuergesch*' (part of the Moselle Franconian subdivision of the Middle Franconian dialect group). In contrast to the neighboring Grand Duchy of Luxembourg (where a form of it enjoys the status of national language), Lëtzebuergesch is not official in Belgium.

Among the considerable immigrant population (amounting to about a tenth of the total), French is the most commonly acquired Belgian language. People of Italian origin form the largest non-native ethnic group; there are also, in the 1990s, many immigrants from Southern Europe and neighboring areas (e.g., Morocco, Turkey, Spain, and Greece).

Both French and Dutch are extensively used in publishing and broadcasting. In the German-speaking region of Liège province there are radio stations broadcasting in that language as well as a German-language daily newspaper. In education, pupils in Flanders learn through the medium of Dutch but

are taught French as a subject; in Wallonia, where French is the medium, Dutch is now taught as a subject.

See also: Dutch; French; German.

Language Maps (Appendix 1): Map 135.

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Belize: Language Situation

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Belize's small territory – barely 13 000 square kilometers of the Yucatan Peninsula – harbors a rich diversity of cultures and languages because of its pivotal geographical position at the juncture of Central America and the West Indies. Belize was the British colony of British Honduras from 1862 until 1981, and it is the Central American country with the highest percentage of English speakers (28%) for a population of 240 204 (Population Census 2000). In addition to English, four other languages are spoken in this multiethnic, multilingual society (Maya, Spanish, Garifuna, and German). However, the label 'English' is a misnomer, because English varieties spoken in Belize range over the broad spectrum that is characteristic of creole situations. The primary lingua franca is the basilect, Belizean Creole (BC), and associated mesolectal and acrolectal varieties (*see* **Variation in Pidgins and Creoles**).

BC developed as a contact language in the context of varied Amerindian, Indo-European, and African influences that turned Belize into a microcosm of colonial history. The great Mayan civilization had all but disappeared when the Spaniards visited the Bay of Honduras in the 16th century to extract precious woods from the densely forested interior. Pirates and buccaneers of various origins freely roamed the Caribbean reefs and coast (Belize may derive its name from Wallis or Wallace, a Scottish buccaneer). But there was no permanent settlement until the late 17th century, when the English transported African slaves from their colony of Jamaica to Belize to work in logging (mostly mahogany) camps. There is no detailed account of the origins of Afro-Belizeans, but various sources and records indicate that slaves were brought from several West Indian islands, as well as directly from Africa (the Bight of Benin, Congo and Angola). Later, 2000 English settlers, their African slaves and Miskito allies moved to British Honduras as they had to be evacuated from the Mosquito Shore (now in Nicaragua) in 1787, after the British Settlement was ceded to Spain (Grant, 1976; Bolland, 1988; Escure, 1997).

The original Mayas still live on the fringes of Guatemala and Mexico, and different dialects are spoken by Kekchis in the south, Mopaneros in the west, and Yucatecos in the north. The population was further diversified by the immigration of members of the Garifuna group (Afro-Arawak/Carib) who, after deportation from St. Vincent to Honduras in 1797 and subsequent vicissitudes, moved to Belize in the 19th and 20th centuries (Taylor, 1977; Escure, 2004a). East Indians were also brought as indentured servants after emancipation. The largest ethnic

Table 1 Ethnic groups in Belize in 2000: total population = 240 204

Ethnic group	*Language*	*Population (%)*
Mestizo	Spanish	112 935 (47.0)
Creole	Belizean Creole	67 480 (28.1)
Maya	Maya	24 400 (10.2)
Garifuna	(Garifuna)[a] BC	15 685 (6.5)
Mennonite	German	8125 (3.4)
East Indian	Belizean Creole	8020 (3.3)
Other (Chinese, Lebanese Whites/British, US)	Cantonese, Arabic	3559 (1.5)

[a]Garifuna is now endangered as its speakers adopt BC as L1 (Escure, 2004a).

are taught French as a subject; in Wallonia, where French is the medium, Dutch is now taught as a subject.

See also: Dutch; French; German.

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[a]Garifuna is now endangered as its speakers adopt BC as L1 (Escure, 2004a).

Table 2 Ethnic groups in the six districts of Belize

Districts	*Creole*	*Garifuna*	*Mestizo*	*Maya*	*Other*
Corozal	7.6%	1.3%	74.1%	5.0%	12.0%
Orange Walk	7.4	1.2	71.7	9.1	10.6
Belize	67.9	5.3	18.7	1.2	6.9
Cayo	23.0	1.7	58.0	8.7	8.6
Stann Creek	25.1	36.2	23.7	8.0	7.0
Toledo	5.7	10.0	11.9	62.8	9.6

migration was that of Mestizos (Spanish/Indian refugees of the Indian Caste War in Mexico), who settled in Belize after 1848. Refugees from El Salvador, Guatemala and Honduras have recently increased the Belizean population by at least 15% since the 1991 census (Escure, 1997, 2004b). Finally, Mennonite farmers contribute a variety of German, although, like other groups, they use BC in daily communication. Although Afro-Belizean speakers of BC constituted the majority ethnic group prior to 1990, the demographic distribution has changed due to the surge in Spanish speakers (Table 1).

Table 2 shows the distribution of ethnic groups and languages in the six Belizean districts. The Creole population resides primarily in the Belize District that includes the main town (Belize-City), but also in the districts of Cayo (including Belmopan, the administrative capital), and of Toledo. The Mestizo population is highest in the Corozal, Orange Walk, and Cayo districts, and spreading to other areas.

Although BC and Spanish are the two dominant languages, bilingualism is not widespread. Many Creoles speak only BC, and many Mestizos only Spanish. By contrast, Garifuna is receding, as its younger speakers favor BC. Mayan varieties appear to survive in rural areas. Aspects of BC are documented in Escure (1997, 2004b), and LePage and Tabouret-Keller (1985). Garifuna is a particularly interesting mixed language that comprises Arawak, Carib, French, English, and Spanish components.

As is the case everywhere in Central America, a large segment of the Belizean population has emigrated abroad, mostly to the United States (Greene, 1999). This is reflected in the fact that 65% of the Belizean population is under the age of 24.

See also: Multilingualism: Pragmatic Aspects; Pidgins and Creoles: Overview; Variation in Pidgins and Creoles.

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Bell, Alexander Graham (1847–1922)

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Alexander Graham Bell achieved international prominence on two counts: the first successfully patented invention of the telephone and a methodology for teaching speech to the deaf based on his father's system of 'Visible Speech.'

Bell was born in Edinburgh, Scotland on March 3, 1847, one of the sons of Alexander Melville Bell. He studied briefly at the Universities of Edinburgh and London, without taking a degree. Like his father, he practiced, for a brief period, as an elocutionist and speech therapist in London. In 1863, he and his father were given a demonstration by Sir Charles Wheatstone of Wolfgang von Kempelen's (*see* **Kempelen, Wolfgang von (1734–1804)**) 'speaking machine'; Graham Bell later constructed his own version. His attention then turned to the question of resonances of vowel sounds, a subject that was later to appear in printed form (1879). Contact with A. J. Ellis (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**) introduced him to the work of Hermann von Helmholtz, whose synthesis of vowel sounds by means of electromagnetically driven tuning forks had some bearing on the development of Bell's ideas about telegraphy and telephony.

His emigration to the United States in 1870 led to contacts in Boston with important U.S. scientists and technicians, and he began work on a harmonic multiple telegraph. In the course of this, during 1875–1876, he gradually came to see the possibility of transmitting sound electrically by means of a diaphragm that induced electrical vibrations in a neighboring magnetic coil, and thus the telephone was born. His initial device transmitted speech with relatively poor quality; Thomas Edison's design, in 1878, of a carbon transmitter produced considerable improvements. The commercial exploitation of the telephone secured for Bell considerable personal wealth, a good portion of which he distributed to educational institutions.

His wife, Mabel Hubbard, had been totally deaf since the age of five. Bell was to teach her to speak again, using the principles of articulatory phonetics in Alexander Melville Bell's book *Visible speech*. The success achieved by this method for numerous deaf children and adults led to the founding of various schools for the deaf in North America and Europe, where the Visible Speech method was employed fairly successfully.

Bell's scientific interests extended to genetics (of deaf persons), aviation, and hydrofoils. He was President of the National Geographic Society, and received, in the United States, Scotland, and Germany, various academic and civil awards.

Bell used his considerable intellectual, administrative, and personal qualities in the service of the deaf. Almost all of his publications focus on one or more aspects of how the deaf can be helped, linguistically and educationally, to a better style of life. His *Mechanism of speech* (1906 and later editions) is the text of lectures he gave on phonetics and the audio–lingual education of the deaf, to which he added his paper from 1879 on vowel theories. He died at his home, Beinn Breagh in Nova Scotia, Canada on August 2, 1922.

See also: Ellis, Alexander John (né Sharpe) (1814–1890); Experimental and Instrumental Phonetics: History; Kempelen, Wolfgang von (1734–1804); Phonetics: Overview.

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Bell, Alexander Melville (1819–1905)

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Various members of the same Bell family in the 19th century were associated with the study of 'vocal physiology.' Bell's father, Alexander, practiced in Edinburgh and London as an elocutionist and speech therapist; his brother David Charles did the same in Dublin; one of his sons, Alexander Graham (*see* **Bell, Alexander Graham (1847–1922)**) achieved equal, if not greater, prominence in this field, especially with the deaf, in the United States.

Melville Bell was born in Edinburgh on March 1, 1819 and worked in that city from 1843 to 1865, thereafter in London (1865–1870). Deaths and illness in the family prompted the decision to give up the important position he had achieved as an applied phonetician and to move to Ontario, Canada, where he was able to continue and develop his work (1870–1881). Between 1881 and 1905, he lived and worked in Washington, DC, near his son Alexander Graham Bell. He died there on August 7, 1905.

'Vocal physiology' encompassed descriptive articulatory phonetics, elocution (particularly public speaking), speech therapy, and the audiolingual education of the deaf and hard-of-hearing. Bell's central publication in this area was *Visible speech: The science of universal alphabetics* (1867), the result of nearly 20 years of preparatory work. It expounds a general phonetic theory covering phonation, articulation, and voice qualities, with examples drawn from several languages and dialects of English. An iconic notation, logically constructed, is capable of reflecting many nuances of conversation (including nonspeech sounds). Bell envisaged several practical applications of Visible Speech, including the study of dialects, foreign languages, speech therapy, and the treatment of the deaf and dumb. He further proposed that with embossed versions of each symbol, a blind person could be taught to read. A numerically coded version of each symbol was suggested so that speech might easily be telegraphed and, when received, decoded (i.e., pronounced) by a trained user of the system.

Bell published extensively on the principles of Visible Speech, with numerous illustrative textbooks (e.g., 1892). His *World-English* (1888), however, is a reformed spelling system for English, based mainly on roman, not iconic, letters.

Bell's achievement was to draw on the insights of earlier phoneticians and elocutionists (from the 17th and 18th centuries) as well as of his contemporaries in order to formulate the first thorough statement of general phonetic principles. In addition, he demonstrated the many areas in which a practical knowledge of phonetics could be used successfully.

See also: Bell, Alexander Graham (1847–1922); Experimental and Instrumental Phonetics: History; Phonetic Transcription: History; Phonetics: Overview.

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Bella Wola *See:* Salishan Languages.

Bello, Andrés (1781–1865)

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Andrés Bello was born in Caracas, on November 29, 1781, and died in Santiago de Chile on October 15, 1865. His parents were Bartolomé Bello and Ana Antonia López. He was a Venezuelan poet, educator, and scholar. His poetry is known for its classical style, celebrating the natural beauty and country life of South America. Bello's life was led in three settings: (1) in Caracas (1781–1810) at the end of the 18th and the beginning of the 19th century, one of the most scholarly and culturally developed cities of South America, (2) in London (1810–1829), which was emerging as the capital of a new global empire, and (3) in Chile (1829–1865), where Bello realized most of his fruitful plans.

Bello was educated at the University of Venezuela, where he studied arts, law, and medicine. He began his professional life as a private tutor and wrote prose and poetry. His interest in linguistic problems dates from these early years. Back then he wrote, for example, a first version of his *Análisis Ideológico de los Tiempos de la Conjugación Castellana*, published later in 1841. In 1810 he went, with Simon Bolívar, to London, England, where he served as a secretary to the legations of Colombia and Chile and wrote his famous two-part epic poem, *Silvas Americanas* (American Woods, 1826–1827). After the declaration of independence of Venezuela, Bello continued working for the new government, but following the reconquest by the Spaniards he remained in London without a representational mission, homeland and work. He earned his living by giving French and Spanish lessons and teaching the sons of William Richard Hamilton. He married in England, and after the death of his first wife he took in matrimony Elizabeth Antonia Dunn who accompanied him to Chile and had 13 children with him.

In 1829 Bello returned to South America to accept a post in the Chilean government (Senator, 1837–1855), and in 1843 he became the first rector of the University of Chile. He became a secretary of the Ministerio de Negocios Extranjeros (Foreign Trade Ministry) and an editor of the national newspaper *El Araucano*. Bello was one of the most active collaborators in the reform of the legal system in Chile. He drafted the *Código civil para la república de Chile* (1842), which was passed in 1855. Bello was elected to the Real Academia Española.

Of Bello's many works, the most important are *Principios de derecho internacional* (Principles of international jurisprudence, 1832), a standard textbook on international law, and *Gramática de la lengua castellana para uso de hispano-americanos* (Grammar of the Castilian language for use by Latin Americans, 1847). *Gramática de la lengua castellana para uso de hispano-americanos* was the first scientific study of Spanish; with this work, Bello was the first to propose a single linguistic standard for all of Latin America.

Bello contributed to almost every field of linguistics: the syntax of contemporary Spanish, verb morphology, the history of the Spanish language, metrics, prosody, phonetics, and orthography. In the latter, he favored the successive adaptation of orthography to pronunciation. His contribution to verb morphology consists in an analysis of tenses that uses a new terminology, not depending on the tradition of Latin grammar.

During his sojourn in Europe Bello became acquainted with several contemporary linguistic theories and integrated them into his doctrine. He adopted the analytical method from the French Idéologues and used the ideas of English empiricism. He was very familiar with the tradition of Spanish grammar and incorporated it into his theoretical system in accordance with the present usage of language.

Adhering to a previously defined theoretical model, Bello's *Gramática* displays an internal coherence and includes one of the most detailed descriptions of refined standard Spanish. He denied the suitability of Latin grammatical categories for the description of Spanish and proposed a system of verbal categories exclusively defined by their syntactic functions. The impact of his work led to many condensed versions and adaptations. Bello's theory was largely disseminated in the Hispanic world, and his ideas appeared in almost every Spanish grammar after 1847.

The conservation of the Spanish language as 'a wonderful means of communication' among the peoples of America was one of Bello's most important preoccupations. He was afraid of a recurrence of the confusion of languages that had taken place in Europe in the Middle Ages. His grammar also served the purpose of normalization and prescription of linguistic norms.

See also: 18th Century Linguistic Thought; Morphology and Language Processing; Standardization; Tense; Traditional Grammar.

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Belorussian

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Belorussian (*belaruskaja mova*; Belarusian, Belarusan), which together with Ukrainian and Russian forms the East Slavic branch of the Slavic languages, is the native language of some 8 million speakers in the Republic of Belarus. The standard language is based on the central dialect of the Minsk region. In an earlier form known as Old Belorussian, West Russian, or among contemporaries simply as *rus'skij*, Belorussian served from the 15th through the late 17th centuries (when it finally yielded to Polish) as the chancery language of the multiethnic Grand Duchy of Lithuania (which in 1569 became part of the Polish Commonwealth). Thereafter, with political bans on publication in the language, Belorussian went into a period of decline. It was not until the first decades of the 20th century that Belorussian experienced a revival, with roots not in the distant literary traditions of the Grand Duchy, but in the vernacular of the countryside. The first legal Belorussian periodical, *Naša Niva* '*Our Cornfield*' (1906–1915), attracted contributions from leading intellectuals of the day and did much to promote structural and orthographic uniformity in the language. The first attempt at a normative grammar of the language was Branislaŭ Taraškevič's *Belaruskaja hramatyka dlja škol* '*Belorussian grammar for schools*' (1918). The consolidation of grammatical norms continued well into the 20th century.

Belorussian, which is written in the Cyrillic alphabet, shares a number of phonological features with both Russian and Ukrainian. As in standard Russian, unstressed *o* is pronounced *a* (*ákanne)*, and (as in certain Russian dialects) unstressed *e* becomes *'a* (*jákanne*). Unlike Russian, these features are reflected in the orthography (in the case of *jákanne*, only in pretonic position), which is set up on the phonemic, rather than morphophonemic, principle: *nažý* 'knives' (sg. *nož*) and *zjamljá* 'world' (pl. *zémli*). Most consonants occur in phonemically opposed palatalized–nonpalatalized pairs. East Slavic t^j and d^j have assibilated to $t\underset{\smile}{s}^j$ and $d\underset{\smile}{z}^j$: *dzéci* [ˈd$\underset{\smile}{z}$^{j}et$\underset{\smile}{s}$^{j}i] 'children' (Rus. *déti* [ˈd^{j}et^{j}i]); palatalized r^j has been lost: *rad* 'row' (Rus. *rjad*). As in Ukrainian, the palatal affricates *č* and *šč* are pronounced hard, East Slavic *g* is a fricative [ɣ], and *v* becomes [w] (in transcription from Cyrillic, *ŭ*) in closed syllables: *halóŭka* 'head, dim.' (*halavá* 'head').

Morphological characteristics of the noun include the loss of a distinct neuter plural: *aknó* 'window' (pl. *vókny*; Rus. *oknó*, *ókna*); the alternation of stem-final velars and dental affricates in certain case forms: nom. sg. *ruká* 'hand' (dat. sg. *rucé*); and a tendency toward the spread of the first declension genitive plural marker *-oŭ* (unstressed *-aŭ*) to other declensions: *zímaŭ* (Rus. *zim*) 'of winters'.

The verb has two regular conjugation patterns, illustrated in the present tense by *nésci* 'to carry' (I) and *rabíc'* 'to do, make' (II): 1SG *njasú*, *rabljú*; 2SG *njaséš*, *róbiš*; 3SG *njasé*, *róbic'*; 1PL *nesëm*, *róbim*; 2PL *nesjacé*, *róbice*; 3PL *njasúc'*, *róbjac'*. Like Ukrainian, but unlike Russian, the third-person ending (lacking in the singular of pattern I) is palatalized. As in Ukrainian, there is a change of the masculine past tense marker *l* to *w*: *znaŭ* masc.'knew' (fem. *znála*).

To a greater extent than in Ukrainian, the lexicon reflects the historical influence of Polish, chiefly from the period of the Polish-Lithuanian Commonwealth. Since the late 18th century unification with Russia, the influence of Russian has prevailed.

See also: Balto-Slavic Languages; Belarus: Language Situation; Polish; Russian; Slavic Languages; Ukrainian.

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Belorussian

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Belorussian (*belaruskaja mova*; Belarusian, Belarusan), which together with Ukrainian and Russian forms the East Slavic branch of the Slavic languages, is the native language of some 8 million speakers in the Republic of Belarus. The standard language is based on the central dialect of the Minsk region. In an earlier form known as Old Belorussian, West Russian, or among contemporaries simply as *rus'skij*, Belorussian served from the 15th through the late 17th centuries (when it finally yielded to Polish) as the chancery language of the multiethnic Grand Duchy of Lithuania (which in 1569 became part of the Polish Commonwealth). Thereafter, with political bans on publication in the language, Belorussian went into a period of decline. It was not until the first decades of the 20th century that Belorussian experienced a revival, with roots not in the distant literary traditions of the Grand Duchy, but in the vernacular of the countryside. The first legal Belorussian periodical, *Naša Niva* '*Our Cornfield*' (1906–1915), attracted contributions from leading intellectuals of the day and did much to promote structural and orthographic uniformity in the language. The first attempt at a normative grammar of the language was Branislaŭ Taraškevič's *Belaruskaja hramatyka dlja škol* '*Belorussian grammar for schools*' (1918). The consolidation of grammatical norms continued well into the 20th century.

Belorussian, which is written in the Cyrillic alphabet, shares a number of phonological features with both Russian and Ukrainian. As in standard Russian, unstressed *o* is pronounced *a* (*ákanne)*, and (as in certain Russian dialects) unstressed *e* becomes *'a* (*jákanne*). Unlike Russian, these features are reflected in the orthography (in the case of *jákanne*, only in pretonic position), which is set up on the phonemic, rather than morphophonemic, principle: *nažý* 'knives' (sg. *nož*) and *zjamljá* 'world' (pl. *zémli*). Most consonants occur in phonemically opposed palatalized–nonpalatalized pairs. East Slavic t^j and d^j have assibilated to $t\underset{\smile}{s}^j$ and $d\underset{\smile}{z}^j$: *dzéci* [ˈd$\underset{\smile}{z}$^{j}et$\underset{\smile}{s}$^{j}i] 'children' (Rus. *déti* [ˈd^{j}et^{j}i]); palatalized r^j has been lost: *rad* 'row' (Rus. *rjad*). As in Ukrainian, the palatal affricates *č* and *šč* are pronounced hard, East Slavic *g* is a fricative [ɣ], and *v* becomes [w] (in transcription from Cyrillic, *ŭ*) in closed syllables: *halóŭka* 'head, dim.' (*halavá* 'head').

Morphological characteristics of the noun include the loss of a distinct neuter plural: *aknó* 'window' (pl. *vókny*; Rus. *oknó*, *ókna*); the alternation of stem-final velars and dental affricates in certain case forms: nom. sg. *ruká* 'hand' (dat. sg. *rucé*); and a tendency toward the spread of the first declension genitive plural marker *-oŭ* (unstressed *-aŭ*) to other declensions: *zímaŭ* (Rus. *zim*) 'of winters'.

The verb has two regular conjugation patterns, illustrated in the present tense by *nésci* 'to carry' (I) and *rabíc'* 'to do, make' (II): 1SG *njasú*, *rabljú*; 2SG *njaséš*, *róbiš*; 3SG *njasé*, *róbic'*; 1PL *nesëm*, *róbim*; 2PL *nesjacé*, *róbice*; 3PL *njasúc'*, *róbjac'*. Like Ukrainian, but unlike Russian, the third-person ending (lacking in the singular of pattern I) is palatalized. As in Ukrainian, there is a change of the masculine past tense marker *l* to *w*: *znaŭ* masc.'knew' (fem. *znála*).

To a greater extent than in Ukrainian, the lexicon reflects the historical influence of Polish, chiefly from the period of the Polish-Lithuanian Commonwealth. Since the late 18th century unification with Russia, the influence of Russian has prevailed.

See also: Balto-Slavic Languages; Belarus: Language Situation; Polish; Russian; Slavic Languages; Ukrainian.

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Ben Yehuda, Eliezer (1858–1922)*

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Popularly known as 'the father of Hebrew speech' or 'the reviver of the Hebrew language' Ben Yehuda coined hundreds of new words in Hebrew, most of which are accepted and used today in speaking and in writing. He composed a monumental 16-volume Hebrew dictionary *Thesaurus Totius Hebraitatis* and an additional introductory volume *Prolegomena*.

He came to Ottoman Palestine from Russia with the first wave of modern Jewish pioneers beginning a new period in Jewish history, that of Zionism, having changed his foreign family name of Perlman to the Hebrew name Ben Yehuda. Immediately upon docking in Jaffa, and after kissing the soil of the Holy Land, both Ben Yehuda and his wife swore that from then on they would speak only Hebrew between themselves. From Jaffa they went directly by horse-drawn wagon to Jerusalem.

Ben Yehuda lived in Jerusalem for some 40 years, fulfilling the decision he had publicly proclaimed:

> To revive Hebrew speech, to return to the language of our forefathers, the language we did not use in speech while in exile, to revive it in our mouths and to speak it . . . Just as the Jews cannot truly be a nation unless they return to the land of their forefathers, they cannot truly be a nation unless they return to the *language* of their forefathers and use it, not only in writing on holy or intellectual matters but also, and especially, in speaking, young and old . . . on all matters of living . . . like all the nations, each nation in its national tongue.

Thus were fused together the movement to revive Hebrew-speaking and the nascent Zionist national movement.

Hebrew began to return to life in speech among the small Jewish community in the country composed of the old Jewish settlements (the *Yishuv*) plus the Diaspora Jews who came from exile, speaking Yiddish, Ladino, Arabic, Russian, German, etc. Together with a small band of lovers of Hebrew and scholars of the language, teachers, and writers, Ben Yehuda encouraged the spread of Hebrew speaking, helped in setting up Hebrew schools and kindergartens, searched Hebrew sources (e.g., the Bible, Talmudic literature, later literature, the Prayer Book) for words for daily needs, and created new words. Ben Yehuda also helped found The Hebrew Language Council in 1889, and served as its first president until his death in 1922. The Council also functioned in the British Mandate period 1918–1948, and with the establishment of the State of Israel became the Academy of the Hebrew Language in 1953.

Ben Yehuda created approximately 225 Hebrew words for his *Thesaurus*. He noted them with the sign ∽. About 70 percent of them were absorbed and accepted into the language, and they are still used in the 1990s in speaking and in writing. The words filled a need in the reviving language. They were not words on 'weighty, high, or abstract matters,' as Ben Yehuda notes, 'but for matters most ordinary, for use in everyday life.' These words spread also to the books and periodicals published in Hebrew, in Israel and abroad, in the 1880s and 1890s and the early decades of the 20th century.

Some examples of Ben Yehuda's neologisms are

1. Nouns: *maxlava* (dairy), *zehut* (identity), *mapuxit* (harmonica), *maxlec* (corkscrew), *vaada* (committee), *xavita* (omelette), *aviron* (airplane), *mitriya* (umbrella), *ofna* (fashion), *yozma* (initiative).
2. Adjectives: *kiconi* (extreme), *akiv* (consistent).
3. Participial forms: *moomad* (candidate).
4. Verbs (cited in 3rd MASC sg pt form): *ixel* (wish for), *higer* (immigrate, emigrate – from Arabic), *hitgander* (dress up, show off), *zimzem* (hum).

*translated from the Hebrew by J Fellman.

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Ben Yehuda conceived the idea of a dictionary while still a medical student in Paris, some two years before coming to Palestine. The aim of the dictionary, according to him, was to help realize the idea of the revival of Hebrew in speech. The task of composing it he took upon himself, even though he was not prepared scientifically for it, and could not appreciate the magnitude and scope and the difficulties involved in a work which would preoccupy him until the very last day of his life. The printing would only be completed 37 years after his death, when the Hebrew whose revival he had pioneered was already a robust, thriving language both in speech and in the media, and was in literary and journalistic use. When he realized that the dictionary would take a very long time he published a small Hebrew–Yiddish–Russian dictionary (Warsaw, 1901), with the collaboration of Joshua Steinberg. Later, in 1912, he published a slightly fuller and more complete version.

Preoccupation with the dictionary made Ben Yehuda ultimately a widely read and deeply learned linguist. He learned Aramaic dialects and Arabic, especially the Judeo–Arabic form written in Hebrew letters and used in the works of the medieval Jewish scholars.

The 16 volumes of the *Thesaurus Totius Hebraitatis*, plus the *Prolegomena* were published over a 50-year period (1909–1959), and contain some 8300 pages. The first five volumes were published during Ben Yehuda's lifetime. Volumes 6 and 7 were ready for printing, and were edited by W. F. Albright, Y. N. Epstein, M. Y. Margalit, and assistants. Volumes 8 and 9 were completed by M. Z. Segal, aided by Y. Knaani. The remaining volumes (10–16) and the *Prolegomena* were edited by N. H. Tur-Sinai, with the assistance of M. Medan, D. Yarden, and (for volumes 14–16) D. Peles, Y. Mansour, and Y. Ben David.

See also: Hebrew, Israeli; Hebrew Lexicography.

Benfey, Theodor (1809–1881)

R Schmitt, Laboe, Germany

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Theodor Benfey, the famous Göttingen Indologist and comparatist, was born in Nörten (near Göttingen) on January 28, 1809. After philological studies, he obtained his doctorate in 1828 and became a lecturer (Privatdozent) in the following year at Göttingen University. In 1834 he took up lecturing and finally was appointed extraordinary professor there in 1848 and full professor of Sanskrit and comparative philology in 1864, at a time when he had already become member of several academies of sciences. He was not only a successful university teacher but also a quite fertile scholar in the fields of Indology and Indo-European studies. He died on June 26, 1881, in Göttingen.

Turning from classical studies to comparative grammar, he introduced himself with the *Griechisches Wurzellexikon* (two volumes, 1839 and 1842), one of the first and fundamental treatises on etymology in a scientific sense. As an autodidact, he learned Sanskrit and the Vedic language. In 1840 he summarized the knowledge thus far of the entire field of Old Indian culture in a massive encyclopedic article. In 1848 he translated the hymns of the *Sāmaveda* (1848) and published them in a book, a masterpiece (and by Benfey's own estimation his most inventive book) for a number of reasons, not least because of the glossary he had added, the first ever of a Vedic text. Then he devoted himself to the Sanskrit language itself. He wrote, in succession to Pāṇini, a comprehensive manual of Sanskrit grammar, *Handbuch der Sanskritsprache* (two volumes, 1852 and 1854), that contained both a complete grammar and an anthology with glossary. Later, he compiled *A Sanskrit-English dictionary* (1866).

In many studies, both short and long, he dealt with a variety of Indo-European linguistic problems, among them the origin of the optative mood or the vocative case, and the several endings of nominal or verbal forms. Of special importance is his series of articles about Vedic grammatical problems; Benfey had intended this as preliminary work for a Vedic grammar, but he unfortunately was not able to finish it. The most important of those studies have been republished in various volumes: *Vedica und Verwandtes* (1877), *Vedica und Linguistica* (1880), and *Kleinere Schriften*, edited by A. Bezzenberger (two volumes, 1890 and 1892).

Before he concentrated resolutely on Indo-Aryan and Indo-European topics, he had done other work (e.g., on the Old Persian inscriptions) and even tried to prove a relationship between Egyptian and the Semitic languages, in *Über das Verhältnis der*

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Far beyond linguistics proper, Benfey has become known as the founder of comparative studies of fairy tales, fables, and legends. In his introduction to *Pañcatantra* (1859), a translation of the Indian collection of fables, he produced proof that most Near Eastern and Occidental fairy tales are of Indian origin; he also expounded the route by which these tales had spread all over the Old World, through translation from one language into the other.

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Bengali

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Bengali is the official language of Bangladesh and of the state of West Bengal in India. There is some controversy about the correct name of the language. The term 'Bangla' is increasingly in use, particularly among Indian linguists, for whom the term 'Bengali' may be associated with British India. It is likely that in the not-too-distant future 'Bangla' will replace 'Bengali.' With a total number of about 260 million speakers, Bengali is the world's fifth largest language.

Bengali, together with Assamese and Oriya, belongs to the eastern branch of Indo–Aryan languages. A high percentage of vocabulary is derived from Sanskrit, with lesser influences from Persian, Arabic, and English. Bengali has a very large vocabulary but the language situation is diglossic. The vocabulary used in spoken language is distinct from the highly Sanskritized words used in some literature and formal contexts. Many words have both a Sanskritic and a colloquial version, e.g., হস্ত, /hɔsto/, হাত /hat/ 'hand,' চন্দ্র /cɔndro/, চাঁদ /cãd/ 'moon,' দন্ত /dɔnto/, and দাঁত /dãt/ 'tooth.' The early 20th-century rivalry between the *sadhu bhasha* (literary language) and *calit bhasha* (colloquial language) is now a thing of the past. Standard Colloquial Bengali, based on the language spoken in Kolkata, is the accepted norm. Some Bengali dialects retain the *sadhu* extended verb forms, e.g., আমি যাইতেছি /ami yaitechi/) rather than the contracted calit form (আমি যাচ্ছি /ami yacchi/ for 'I am going.'

Dialects vary in phonological and grammatical deviation. Sylheti, the dialect spoken by most Bangladeshis living in the United Kingdom, has a high percentage of Persian words and is considered by some to be a separate language.

Orthography and Phonology

Bengali is written in a variant of the Devanagari script, which is related to but distinct from the script used for Sanskrit and Hindi. Writing is from left to right and is syllabic. There are 12 vowels or diphthongs, two semivowels, and almost 40 consonants. Bengali has a great number of conjunct letters that combine, in one symbol, two or more consonants or consonant–vowel clusters. Vowel signs are attached to consonants except at the beginning of words and syllables, where the full vowel is written.

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Bengali is the official language of Bangladesh and of the state of West Bengal in India. There is some controversy about the correct name of the language. The term 'Bangla' is increasingly in use, particularly among Indian linguists, for whom the term 'Bengali' may be associated with British India. It is likely that in the not-too-distant future 'Bangla' will replace 'Bengali.' With a total number of about 260 million speakers, Bengali is the world's fifth largest language.

Bengali, together with Assamese and Oriya, belongs to the eastern branch of Indo–Aryan languages. A high percentage of vocabulary is derived from Sanskrit, with lesser influences from Persian, Arabic, and English. Bengali has a very large vocabulary but the language situation is diglossic. The vocabulary used in spoken language is distinct from the highly Sanskritized words used in some literature and formal contexts. Many words have both a Sanskritic and a colloquial version, e.g., হস্ত, /hɔsto/, হাত /hat/ 'hand,' চন্দ্র /cɔndro/, চাঁদ /cãd/ 'moon,' দন্ত /dɔnto/, and দাঁত /dãt/ 'tooth.' The early 20th-century rivalry between the *sadhu bhasha* (literary language) and *calit bhasha* (colloquial language) is now a thing of the past. Standard Colloquial Bengali, based on the language spoken in Kolkata, is the accepted norm. Some Bengali dialects retain the *sadhu* extended verb forms, e.g., আমি যাইতেছি /ami yaitechi/) rather than the contracted calit form (আমি যাচ্ছি /ami yacchi/ for 'I am going.'

Dialects vary in phonological and grammatical deviation. Sylheti, the dialect spoken by most Bangladeshis living in the United Kingdom, has a high percentage of Persian words and is considered by some to be a separate language.

Orthography and Phonology

Bengali is written in a variant of the Devanagari script, which is related to but distinct from the script used for Sanskrit and Hindi. Writing is from left to right and is syllabic. There are 12 vowels or diphthongs, two semivowels, and almost 40 consonants. Bengali has a great number of conjunct letters that combine, in one symbol, two or more consonants or consonant–vowel clusters. Vowel signs are attached to consonants except at the beginning of words and syllables, where the full vowel is written.

An inherent vowel (pronounced /ɔ/ or /o/) is often pronounced when no other vowel is given.

Bengali, like other South Asian languages, distinguishes between aspirated/unaspirated and dental/palatal sounds. Nasalization occurs in individual words and is phonemic (কাদা /kada/ 'mud,' কাঁদা /kāda/ 'weep,' বাধা /badha/ 'obstruction,' বাঁধা /bādha/ 'bind') and in the distinction between ordinary and honorific personal pronouns, as in ওর /or/ 'his/her' (familiar) and ওঁর /õr/ 'his/her' (honorific). Bengali spelling retains some Sanskrit features, but its pronunciation has evolved and changed. The word for 'soul,' though it is spelled আত্মা /atma/, is pronounced /atta/. The Sanskrit word for heaven 'swarga' becomes স্বর্গ, pronounced /sɔrgo/. The distinction between long and short u and i, which is present in the script, is no longer felt in pronunciation. Long /o/ can be represented by the vowel sign or by the inherent vowel. There are three symbols for the sound /ng/: ং, ঙ, and the conjunct ঙ্গ. Their uses are to some extent interchangeable, but ং is never followed by a vowel, thus we have বাংলা /bangla/ (the name for the language), but বাঙালি /bangali/ (the adjective and name for the people). There are three sibilants in Bengali স /s/, শ /ʃ/, and ষ /ṣ/. Their pronunciation is /sh/, except in some conjuncts, in which it changes to /s/, e.g., বিশ্রাম /biʃram/ 'rest,' স্থান /sthan/ 'place,' and নাস্তা /nasta/ 'breakfast.'

Morphology and Syntax

Basic word order is subject–object–verb, but sentence parts can move freely to express emphasis. Bengali has a complex relative–correlative system – i.e., subordinating conjunctions such as যখন /yokhon/ 'when' and যদি /yodi/ 'if' almost invariably have a correlative conjunction in the main clause. Subordinate clauses generally precede main clauses.

Nouns have no grammatical gender. There are four cases, nominative, genitive, object, and locative. The **nominative** is unmarked. Number and definiteness is marked by determiners that are suffixed to nouns, but their use is partly defined by the context. Plural markers for animate and inanimate nouns are distinct from one another. All case endings are added after these suffixes, e.g., মেয়ে /meye/ 'girl,' মেয়েটি /meye-ṭi/ 'the girl,' and মেয়েটিকে /meye-ṭi-ke/ 'to the girl.'

In the **genitive** nouns, add র /r/ or এর /er/: বাবা /baba/ 'father,' বাবার /baba-r/ 'father's,' উকিল /ukil/ 'lawyer,' and উকিলের /ukil-er/ 'the lawyer's.' The genitive has a wide variety of uses, including possession (রিমার ভাই /rima-r bhai/ 'Rima's brother'), attribute (প্রেমের গল্প /præm-er gɔlpo/ 'love story'), function (বসার ঘর /bɔsa-r ghɔr/ 'sitting room'), measurement (দুই ঘণ্টার ছবি /dui ghɔnṭa-r chobi/ 'a film lasting two hours'), and cause or origin (সমস্যার সমাধান /sɔmossha-r sɔmadhan/ 'solution to the problem'). The genitive usually functions as the logical subject in impersonal structures.

The **object case** is marked by কে /ke/: from (বাবা /baba/ 'father' বাবা-কে /baba-ke/ 'to father'). The case ending is used to mark direct or indirect objects. The case marking is usually omitted for inanimate nouns, but can be added for emphasis or to avoid ambiguity.

The **locative** ending is এ /e/ after consonants: সহর /sɔhor/ 'town' সহরে /sɔhor-e/ 'in the town'; য় /y/ after আ /a/ (ঢাকা /ḍhaka/ ঢাকায় /ḍhaka-y/ 'in ḍhaka,' and তে /te/ after all other vowels: বালু /balu/ বালুতে /balu-te/ 'in the sand.' The locative is used to indicate place: বাড়িতে /baṛi-te/ 'at home,' direction: ঘরে /ghɔr-e/ 'into the house,' time: দশটায় /dɔʃṭa-y/ 'at ten o'clock,' cause: তার বলায় /tar bɔla-y/ 'because of what he said,' instrument: হাতুড়িতে /hatuṛi-te/ 'with a hammer,' or origin: চেষ্টায় /ceṣṭa-y/ 'from/through trying.' The locative is rarely used with animate nouns.

Bengali has personal, demonstrative, relative, interrogative, and indefinite **pronouns**. Personal pronouns distinguish three grades of familiarity in the second person and two grades of respect in the third person. They distinguish singular and plural, but not gender. There is a three-way deictic distinction (*here, there*, and *removed from context*) that applies to third-person pronouns, attributive adjectives, demonstratives, and place adverbials, for instance, এ মেয়ে /e meye/ 'this girl,' ও মেয়ে /o meye/ 'that girl (over there),' সে মেয়ে /se meye/ 'that girl, (removed from context),' এখানে /ekhane/ 'here,' ওখানে /okhane/ 'there,' and সেখানে /sekhane/ 'in that place.'

Adjectives precede nouns and are indeclineable. For comparisons, auxiliary words are used:

(1) আমার ভাই আমার চেয়ে লম্বা।
/amar bhai amar ceye lɔmba/
my brother my than long
'My brother is taller than me.'

(2) এই গাছ সবচেয়ে সুন্দর।
/ei gach sɔbceye sundor/
this tree all than beautiful
'This is the most beautiful tree.'

Postpositions are, with a few exceptions, noun forms: about my parents: *on the subject of my parents*; or verbal participles: with the hammer: *having taken the hammer.*

Verb conjugation is very regular. Verb endings are the same for singular and plural. Some active verbs can be extended to form causative verbs, e.g., জানা /jana/ 'know' becomes জানানো /janano/ 'inform'; দেখা /dækha/ 'see' becomes দেখানো /dækhano/ 'show'). There are, morphologically, eight tenses. Present and past tense have simple and progressive aspect. Perfect tenses (present and past) can express

not only perfective aspect but are also used to refer to past events or actions directly. The past habitual is used for remote past events and for subjunctive uses. The future tense forms the after-state of all other tenses. Tense use is much freer than in English – in fact, narrative texts gain color and liveliness through frequent tense changes.

Every verb has four **nonfinite verb forms**: infinitive, verbal noun, conditional, and perfective participle. Conditional and perfective participles, in particular, offer in very concise forms a great range of meanings. The conditional participle is formed by adding লে /le/ to the stem of the verb: থাকলে /thakle/ from থাক- /thak-/ 'stay.' It can be used temporally as well as conditionally and its temporal structure is determined by the main clause, thus a phrase such as সে থাকলে /se thakle/ has a range of meaning, from 'when he is here' to 'if he were alive.' The perfective participle, formed by adding এ /e/ to the verb stem, describes in its basic use a preceding action (e.g., খবরটা শুনে সে বাইরে গেল। /khɔborṭa ʃune se baire gælo/ 'having heard the news he went out'), but it can also take on causal meaning, can describe simultaneous actions, or can be used to change an adjective into an adverb (e.g., ভাল /bhalo/ 'good' becomes ভাল করে /bhalo kore/ 'well'). It is not unusual to have a number of perfective participles in one sentence to describe consecutive events. Perfective participles are also used in the formation of compound verbs, in which two verbs combine to take on a new meaning. The second verb can lose its original meaning entirely and instead add an aspectual feature to the perfective participle, as in খাওয়া /khaoy̆a/ *eat*, খেয়ে ফেলা /khey̆e phæla/ (lit: having eaten, throw = 'eat up') and আসা /asa/ 'come,' এসে পড়া /ese pɔṛa/ (lit: having come, fall = 'arrive'). To some extent, nonfinite verb forms take over the role of subordinate clauses.

Impersonal structures are very common, as, for instance, in expressing possession, possibility, obligation, and physical sensations, feelings, and experiences (examples (3)–(6), respectively):

(3) আমার গাড়ি আছে।
/amar gaṛi ache/
my car be.3.PERS PRES
'I have a car.'

(4) এখানে যাওয়া যায়।
/ekhane yaoy̆a yay/
there go.VN go.3.PERS PRES
'It is possible to go there.'

(5) তাকে যেতে হবে।
/take yete hɔbe/
him.ACC go.INF be.3.PERS FUT
'He will have to go.'

(6) আমার ভয় লাগে।
/amar bhɔy̆ lage/
my fear attach.3.PERS PRES
'I am afraid.'

The logical subject is usually in the genitive.

Passives are formed with verbal nouns and the verb হওয়া /hɔoya/ 'be, become'; for example, সে আমাকে টাকা দিয়েছে। /se amake ṭaka diy̆eche/ 'he has given me money' becomes as shown in example (7):

(7) আমাকে টাকা দেওয়া হয়েছে।
/amake ṭaka deoy̆a hoy̆eche/
me. ACC money give.VN be.3.PERS PRF
'The money has been given to me.'

Intransitive verbs can also be used in passive structures; for example, আমি যাবো। /ami yabo/ 'I will go' becomes as shown in example (8):

(8) আমার যাওয়া হবে।
/amar yay̆oa hɔbe/
my go.VN be.3.PERS FUT
'My going will be.'

Special Features

If languages can be said to have particular characteristics, then Bengali has a sense of play in its phonetic structure. We find it in numerous onomatopoeia, such as চকচক /cɔkcɔk/ 'glittering,' টিপটিপ /ṭipṭip/ 'dripping' (water), ঘোঁত ঘোঁত /ghõtghõt/ 'grunting,' খিলখিল /khilkhil/ 'giggling,' and ধু-ধু /dhu-dhu/ (expressing 'desolation'), but also in sequences of similar or identical syllables to express mutual or extended actions, as in হাসাহাসি /hasahasi/ 'laughing,' মারামারি /maramari/ 'fighting,' ঠেলাঠেলি /ṭhælaṭheli/ 'jostling,' বকাবকি /bɔkaboki/ 'bickering,' লেখালেখি /lækhalekhi/ 'correspondence,' and কান্নাকাটি /kannakaṭi/ 'continuous weeping.' Reduplication of adjectives and adverbs has an intensifying effect, as in বড় বড় /bɔṛo bɔṛo/ 'big big'-'very big,' দূরে দূরে /dure dure/ 'far far' = 'a long way away,' and সকাল সকাল /sɔkal sɔkal/ 'morning morning'-'very early.' Many of these combinations have an element of improvisation and greatly add to the charm of the language.

See also: Arabic Linguistic Tradition; Bangladesh: Language Situation; Hindi; Indo–Aryan Languages; Persian, Modern; Persian, Old; Sanskrit; South Asia as a Linguistic Area.

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Benin: Language Situation

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Benin, a former French colony, became independent in 1962 and was known as Dahomey until 1975, when this name changed. Some have described this country as a fist emerging from the West African coast or a bottle that is planted there upside down. This small country of about 11 570 sq km is sandwiched between Togo to the west, Nigeria to the east and northeast, Burkina Faso to the northwest, and Niger to the north. The population is estimated at about 6.7 million people, with the majority living in the south.

As is often the case in West Africa, the population in Benin has emerged from successive migrations of numerous ethnic groups that settled there at various points of the history. The major ethnic groups include the Yoruba (Nago) and the Fon in the south and the Dendi, the Bariba, the Fulbe, and the Somba in the North.

This mosaic of ethnic groups reflects the number of languages (or dialects) spoken in Benin. The 1990 *Atlas sociolinguistique du Bénin* includes 57 languages and/or dialects that fall into the following different language families:

- Niger-Congo: Kwa, e.g., Yoruba, Fon (Fon-Gbe), Chokosi (Anufo), Basa; Gur, e.g., Ditammari, Baatonu (Bariba), Waama; Senegambian, e.g., Fulfulde, Fulbe-Borgu; and Mande, e.g., Boko
- Nilo-Saharan: Songhai, e.g., Dendi, Zarma
- Afro-Asiatic: Chadic, e.g., Hausa.

In such a multilingual situation, it is common practice in Africa to select the language of the former colonial state – in Benin, French – as the official language to be used in formal contexts (e.g., education, government), while other languages are restricted to informal contexts and certain mass media communications (e.g., vaccination campaigns). The need for such a dual system is stated in the 1990 constitution, which declared that each community has the right to its own language(s) and should be guaranteed the right to develop its own culture. Similarly, the constitution states that the government must promote native languages for intercommunity communication. In this regard, a law was passed in 1997 that opened up broadcasting space to private companies. This triggered the development of local and rural broadcasting corporations that use primarily native languages. This development significantly promoted the use of native languages in both informal and certain formal contexts. For instance, it is now common practice for politicians to address their audience in native languages, or to use slogans written in native languages. This revival of native languages, combined with literacy programs for adults that have been developed since the 1960s, has helped bridge the gap between French and the native languages.

The promotion of native languages, however, should not mask the serious drawbacks of the language policy in Benin. For instance, the exclusive use of French as language of instruction at all levels, that is, from kindergarten to University, severely undermines children's development at school and undercuts sustainable socioeconomic development. Such unbalanced language policy was and remains the challenge for Benin governments.

See also: Afroasiatic Languages; Language Policy in Multilingual Educational Contexts; Multilingualism: Pragmatic Aspects; Niger-Congo Languages; Nilo-Saharan Languages.

Language Maps (Appendix 1): Map 1.

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See also: Afroasiatic Languages; Language Policy in Multilingual Educational Contexts; Multilingualism: Pragmatic Aspects; Niger-Congo Languages; Nilo-Saharan Languages.

Language Maps (Appendix 1): Map 1.

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Benue–Congo Languages

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The Benue–Congo languages form a very large group in Africa and include the well-known Bantu languages. The term 'Benue–Congo' was introduced by Greenberg (1963) to refer to one of the six branches of his Niger–Congo family. Previously, the Bantu languages had been treated as a separate family and the similarity of the other Benue–Congo languages to Bantu had been recognized by referring to them as 'Semi–Bantu' (Johnston, 1919–1922) or 'Bantoid' (e.g., Guthrie, 1948), equivalent to the 'Benue–Cross' of Westermann (1927). Greenberg's innovation was to remove the separate status of Bantu, add it to Westermann's Benue–Cross as a subgroup, and rename the group, using the term 'Congo' to indicate its extension into the Bantu area.

Greenberg's View of Benue–Congo

Greenberg contrasted Benue–Congo with the other five branches of Niger–Congo, though he noted it was particularly close to Kwa. Internally, he subdivided it into Plateau, consisting of seven numbered subgroups; Jukunoid; Cross River, consisting of three numbered subgroups; and Bantoid, containing seven languages or groups, the last of which is Bantu. The term 'Old Benue–Congo' refers to this scenario.

Views of Benue–Congo in the Late Twentieth Century

Bennett and Sterk (1977) noted that lexicostatistics led to some major changes in Greenberg's scenario. In particular, they split Kwa in half and combined the Eastern half with Benue–Congo. The approximate consensus is presented in Bendor-Samuel (1989); Benue–Congo, including the former Eastern Kwa, is now one of the branches of Volta–Congo, which is in its turn a branch of Atlantic–Congo, within Niger–Congo. The term 'New Benue–Congo' refers to this scenario.

Subgrouping of (New) Benue–Congo

Because of the reclassification in the late 1980s and the very large number of languages involved, the subgrouping of New Benue–Congo is in a fluid state. On the basis of lexical innovations, Blench (1989) has suggested a major division between Western Benue–Congo, corresponding to the former Eastern Kwa, and Eastern Benue–Congo, corresponding to Old Benue–Congo. The recognized subgroups are now listed. (Nigerian orthographic conventions used in language names are as follows: ọ [ɔ], ẹ [ɛ], ị [ɪ], ạ [ə], ṣ [ʃ].)

Western Benue–Congo (formerly Eastern Kwa):

(a) Ọkọ (Ogori): a small, little-studied language.
(b) Ukaan–Akpes: two clusters of tiny, barely studied dialects.
(c) Defoid: two clusters of tiny Akokoid (Amgbe) dialects, plus the Yoruboid group, comprising Yoruba, Iṣẹkiri, and Igala.
(d) Edoid: a large number of languages, including Ẹdo (Bini), and Urhobo.

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The Benue–Congo languages form a very large group in Africa and include the well-known Bantu languages. The term 'Benue–Congo' was introduced by Greenberg (1963) to refer to one of the six branches of his Niger–Congo family. Previously, the Bantu languages had been treated as a separate family and the similarity of the other Benue–Congo languages to Bantu had been recognized by referring to them as 'Semi–Bantu' (Johnston, 1919–1922) or 'Bantoid' (e.g., Guthrie, 1948), equivalent to the 'Benue–Cross' of Westermann (1927). Greenberg's innovation was to remove the separate status of Bantu, add it to Westermann's Benue–Cross as a subgroup, and rename the group, using the term 'Congo' to indicate its extension into the Bantu area.

Greenberg's View of Benue–Congo

Greenberg contrasted Benue–Congo with the other five branches of Niger–Congo, though he noted it was particularly close to Kwa. Internally, he subdivided it into Plateau, consisting of seven numbered subgroups; Jukunoid; Cross River, consisting of three numbered subgroups; and Bantoid, containing seven languages or groups, the last of which is Bantu. The term 'Old Benue–Congo' refers to this scenario.

Views of Benue–Congo in the Late Twentieth Century

Bennett and Sterk (1977) noted that lexicostatistics led to some major changes in Greenberg's scenario. In particular, they split Kwa in half and combined the Eastern half with Benue–Congo. The approximate consensus is presented in Bendor-Samuel (1989); Benue–Congo, including the former Eastern Kwa, is now one of the branches of Volta–Congo, which is in its turn a branch of Atlantic–Congo, within Niger–Congo. The term 'New Benue–Congo' refers to this scenario.

Subgrouping of (New) Benue–Congo

Because of the reclassification in the late 1980s and the very large number of languages involved, the subgrouping of New Benue–Congo is in a fluid state. On the basis of lexical innovations, Blench (1989) has suggested a major division between Western Benue–Congo, corresponding to the former Eastern Kwa, and Eastern Benue–Congo, corresponding to Old Benue–Congo. The recognized subgroups are now listed. (Nigerian orthographic conventions used in language names are as follows: ọ [ɔ], ẹ [ɛ], ị [ɪ], ạ [ə], ṣ [ʃ].)

Western Benue–Congo (formerly Eastern Kwa):

(a) Ọkọ (Ogori): a small, little-studied language.
(b) Ukaan–Akpes: two clusters of tiny, barely studied dialects.
(c) Defoid: two clusters of tiny Akokoid (Amgbe) dialects, plus the Yoruboid group, comprising Yoruba, Iṣẹkiri, and Igala.
(d) Edoid: a large number of languages, including Ẹdo (Bini), and Urhobo.

(e) Nupoid (Niger–Kaduna): some seventeen languages including Ebira (Igbirra), Gade, Gbagyi and Gbari (jointly called Gwari), Kakanda, and Nupe.
(f) Idomoid: some nine languages, including Idoma.
(g) Igboid: comprises Ẹkpẹyẹ and a large language cluster centered around Igbo.

Eastern Benue–Congo (Old Benue–Congo):

(h) Kainji: corresponds to Greenberg's Plateau 1; subdivided into Western Kainji, including the Kambari and Bassa groups and the Lela (Dakarkari) language, and Eastern Kainji, including the Northern Jos group of small languages.
(i) Platoid: corresponds to Greenberg's Plateau 2–7 plus Jukunoid; subdivided into Plateau, with five geographical subgroups including many languages, such as Eggon, Che (Rukuba), Berom, Jju (Kaje), and Tyap (Katab); and Benue, containing Tarok and related languages in one group and Jukunoid, including Jukun, in another.
(j) Cross River: subdivided into Bendi, corresponding to Greenberg's Cross River 1 and including Bekwarra and Bokyi; and Delta–Cross, corresponding to Greenberg's Cross River 2 and 3 combined, comprising four subgroups: Upper Cross, including Mbembe and Lokạạ, Lower Cross, including Anaang, Efik, Ibibio, and Obolo; Ogoni (Kegboid), including Kana, Gokana, and Eleme; and Central Delta, including Abuan and Ọgbịa.
(k) Bantoid: subdivided into Northern Bantoid, comprising Mambila with related languages and Samba Daka with related languages; and Southern Bantoid, comprising the Bantu languages, taken in the broad sense, as used by Greenberg, with the addition of Tiv and languages related to it.

Geographical Location

The Benue–Congo language groups are chiefly found in Nigeria, with Yoruboid, Jukunoid, Cross River, and Northern Bantoid extending slightly into neighboring countries and Bantu having expanded dramatically into Central, East, and Southern Africa.

Typological Characteristics of the Group

Benue–Congo languages have Subject–Verb–Object or occasionally Subject–Modal–Verb–Object word order; adverbials are normally sentence-final. A wide variety of serial verb and consecutive verb constructions are found.

The most typical morphological feature is the existence of noun class systems, usually marked by paired singular/plural prefixes or, for mass nouns, by a single prefix. Words that qualify the noun show concording prefixes, and the verb also shows concord with the noun class of its subject. Some languages have developed noun class suffixes in addition to or instead of prefixes. Bantu languages are the most conservative in showing very full noun class systems, but there are few Benue–Congo languages that do not display at least remnants of a former noun class system.

Verbs often take suffixes, 'verbal extensions' or 'extensional suffixes,' which add such meanings as causative, reciprocal, or separative to the meaning of the root.

Most Benue–Congo language groups show typical phonological features of Niger–Congo, such as vowel harmony, labial-velar stops, and tone. The typical root structure is CVCV (where C = Consonant, V = Vowel) in the more conservative languages; others have reduced their roots to CVC or CV. Complex nasal phenomena involving both vowels and consonants are widespread.

See also: Niger-Congo Languages.

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Benveniste, Émile (1902–1976)

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Benveniste, a French linguist known for his work on enunciation, was one of Antoine Meillet's principle disciples and succeeded him at the *Collège de France*. His work is composed of two centers of interest: the analyses of languages and general linguistics. His historical analyses are fundamentally dedicated to the Indo-European (and to the Indo-European languages). The synchronic analyses are generally on the French language (Kristeva *et al*., 1975).

His reflection on general linguistics, though it was not his most frequent occupation, has left important contributions to linguistics, as well as to the constitution of a general semiology. Following this path, he arrived at a distinction expressly made only in 1966 (Benveniste, 1967, 1969a), through which it is possible to comprehend his own theoretical and analytical route. He distinguished two modes of significance in the language: semiotics (that characterizes the sign as an element of the system) and semantics (mode of significance engendered by the enunciation).

Language and Enunciation

An important trait of his work is in the manner in which he considered that the language (the semiotics) contains the marks of the enunciation (of the semantics). He was primarily concerned with the description of the language, of the semiotics, but as a structure that has the marks of the enunciative process that it allows (Arrivé and Normand, 1997).

Regarding the semiotic mode, he carried out studies that had wide repercussions throughout the entire second half of the 20th century. For example, we have the study of personal pronouns, the verbal persons, and the French verbal system. These studies always have the characteristic of describing the forms of the language as marked by their role when enunciated. Through this process, he arrived at a characterization of the personal pronouns and verbal persons that redoes the tripartite division of grammatical persons. For Benveniste, two persons exist (I–you) and enter into a correlation with the nonperson (he).

Regarding the articulation between the semiotic and semantic modes, he left the distinction between the two planes of enunciation that became a classic and is widely utilized. It deals with the distinction between discourse and history. To better understand this distinction (semantic), it is necessary to note that it is done on the basis of description of the language (semiotics). In the study of the French verbs, referred to above, Benveniste (1959) distinguished two paradigms – one that is organized around the *perfect* and another around the *aorist*.

The first includes the present, but the second does not. For Benveniste, the discourse is the enunciation plane marked by the presence of the speaker in what is said, dealing with the functioning of the *perfect* system, while the history is the enunciation plane that does not mark the speaker in what is said; what begins to function is the aorist system.

Still dealing with the relationship of the two modes of significance, he was concerned with important aspects, such as the question of enunciative functioning and the constitution of subjectivity, which appeared, for example, in 'De la subjectivité dans le langage' (1958a) and 'L'appareil formel de l'énonciation' (1970).

In the first of these studies, he developed one of his most decisive theoretical theses. Language is not an instrument of communication; it is constitutive of the subjectivity that is, in truth, intersubjective. There is no I (the subject) without you. And the comprehension of the thesis gains in specificity if we consider another of his better-known texts: 'La nature des pronoms' (1956).

In this work, he considered that the pronominal system is also divided by two different correlations: on the one hand, the personal correlation that separates the person from the nonperson and, within the personal correlation, the subjectivity correlation that separates the first person, the I, from the second person, the you. The 'he' is the mark of the nonperson. If we go back to the French verbal system, we will see that the personal correlation projects itself over the enunciation modes correlated to the discourse, while the nonperson belongs to the historical plane.

In the 'L'appareil formel de l'énonciation' (1970), we will find a search for the characterization of the enunciation's functioning. In this text, Benveniste presented a definition of enunciation, of the semantic level functioning that he already practiced: "the enunciation is putting the language to use by an individual act of utilization" (Benveniste, 1970). In this way, the passage of the language (semiotic) to the enunciation (semantic) is done by the speaker who is, for the entire group of language descriptions that Benveniste offered, the parameter that gives meaning to the enunciations at the enunciative instance. The distinction between the semiotic and the semantic

was fundamental for Benveniste to bring the reflection on the specificity of verbal language in relation to the other semiological systems into the domains of semiological studies. He affirmed that only language combines the two modes of significance (semiotic and semantic), and this is what makes language capable of speaking not only of things and of other semiological systems but of speaking of itself, which means that language is capable of speaking of language, characterizing itself by this metalinguistic capability.

Another important aspect of this distinction is that it permitted Benveniste (1969a) to formulate a relation among the various semiological systems, differing from other more common systems that deal with this relation as something on the order of inclusion or belongingness. For Benveniste, the various semiological systems interpret one another. In other words, their relationships are relationships of signification. And, as mentioned above, the language does not include and is not included by other semiological systems. The difference is in its metalinguistic capability, actioning both the semiotic and the semantic systems.

In the domain of general linguistics, aside from the formulations that sought to characterize the enunciation, in his 'Níveis de análise lingüística' ('Levels of linguistic analysis') (1962), he established the distinction between form and meaning in a very specific manner. He affirmed that, taking any linguistic element, its form is obtained if one observes into what other elements it can be divided, and its meaning is obtained if one observes into which superior level element it is integrated. In this manner, he showed, at the same time, the connection between form and meaning and defined the meaning as belonging to the plane of the relationships in the language.

Another important discussion in which he became involved was the question of sign arbitrariness. In 'Nature du signe linguistique' (1939), he agreed with Saussure on the fundamental character of the value as a constituent of the linguistic sign, but disagreed on the arbitrary character of the significant/signified relationship. For Benveniste, what is arbitrary is the relationship between the sign and the thing. The relationship between significant and signified is necessary. To stay within the Saussuarean system, that is, in the consideration that nothing external to the language is of regard, he brought into play this other characterization of the fundamental relationship of the sign. It is interesting that Saussure disregarded the reference, but Benveniste would later include it (1967, for example) and considered it as belonging to the plane of enunciation (of semantics, in his words).

The Historical Studies

A first and decisive aspect in this regard is that he treated Indo-European as a language just as any other and tried to reconstruct it based on a systematic conception of the language and not as something on the plane of the successivity of the forms (Benveniste, 1935, 1948). This work unfolded in the consideration of the history and culture. Considering that the systems of representation and the social structures are organized like linguistic structures, Beneveniste, through the analysis of the Indo-European languages, dedicated himself to the reconstruction of the culture and history that are signified within them. And, in this work, his position affirming that the categories of thought do not preexist languages gained form and force. These determine those. He also showed this aspect in a specific manner in a text on the categories in Aristotle (Benveniste, 1958b).

These aspects assumed a very particular configuration as he elaborated the linguistic character of signification in an extraordinarily rich form. To illustrate, we quote him: "By comparison and through a diachronic analysis, it is a question of making a signification appear where, in the beginning, we had only a designation. The temporal dimension, therefore, becomes an explicative dimension" (1969b: 12). To him, the temporal dimension is explicative of how something becomes a sign, when a signification, that is not a relation of designation, of reference, then emerges.

Regarding this work, we can recall the comments made by Barthes (1984) when *Problemas de lingüística geral 2* (Problems of general linguistics 2) was published: "This pure linguist, whose objects of study apparently belong to the general linguistic apparatus, transcends, never ceases in reality, to take language in what could be called its concomitances: the work, the history, the culture, the institutions, in short, everything that constitutes the reality of man. The *Vocabulary of the Indo-European Institutions*, the studies of agent names, of the preverbs prae- or vor-, are texts that denature the linguistic discipline, that realize this subversive movement by which the disciplinary compartmentalization crumbles and a new, nameless science appears." (p. 6, l. 3ff.)

Through the systematization, the relationships, Benveniste illuminated the signification of the languages that he studied. He showed that treating signification as a merely situational thing is very little. It is true that he was involved in a search for origins, but what remains is not this. Fundamentally, it is the richness of the question of linguistic signification as something that cannot be reduced to desires or intentions, nor to relationships with objects. What

he called signification is of interest. In other words, in languages, what is interesting are the language relationships. And, in face of this fact, the semiotic order gains in its capacity to describe and explain human phenomena.

Another important question in Benveniste is that his semantic reconstruction procedure included, and regarded as decisive, the consideration of the uses of linguistic forms, "of the contexts in which the form is susceptible to appear. One does not have the right to presume it, positively or negatively, in name of verisimilitude" (1966: 290). Therefore, his reconstruction method necessarily considered what he called the semantic mode of significance. It is by the observation of this mode that the linguist decides on how to organize the semiotic mode.

Another indispensable aspect that should be registered is the important presence of Benveniste's thought in linguistic production from the second half of the 20th century on. To mention just a few, we can recall how Antoine Culioli, Oswald Ducrot, and many others, who today dedicate themselves to semantics based on enunciation studies have Benveniste as a base reference. This reference is not restricted to French linguistics. It extends to all of Europe, including Russia, and America in general. On the other hand, his diachronic work also has interesting repercussions in the work of many that came after him, such as Starobinski.

See also: Barthes, Roland (1915–1980); Culioli, Antoine (b. 1924); Ducrot, Oswald (b. 1930); Meillit, Antoine (Paul Jules) (1866–1936); Saussure, Ferdinand (-Mongin) de (1857–1913).

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Berber

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Introduction

The Berber language is one of the branches of the large Hamito-Semitic (Afroasiatic) linguistic family, which also includes Semitic, Cushitic, ancient Egyptian, and Chadic. With all that this notion implies, Berber can be considered as the 'aboriginal' language of North Africa because currently there is no positive trace of an exterior origin or of the presence of a pre- or non-Berber substratum in this region. As far back as one can go (first Egyptian accounts: cf. Bates, 1914/1970), the Berber language was already installed in its present territory. Particularly, the toponymy has not allowed us to identify, up till now, any kind of pre-

he called signification is of interest. In other words, in languages, what is interesting are the language relationships. And, in face of this fact, the semiotic order gains in its capacity to describe and explain human phenomena.

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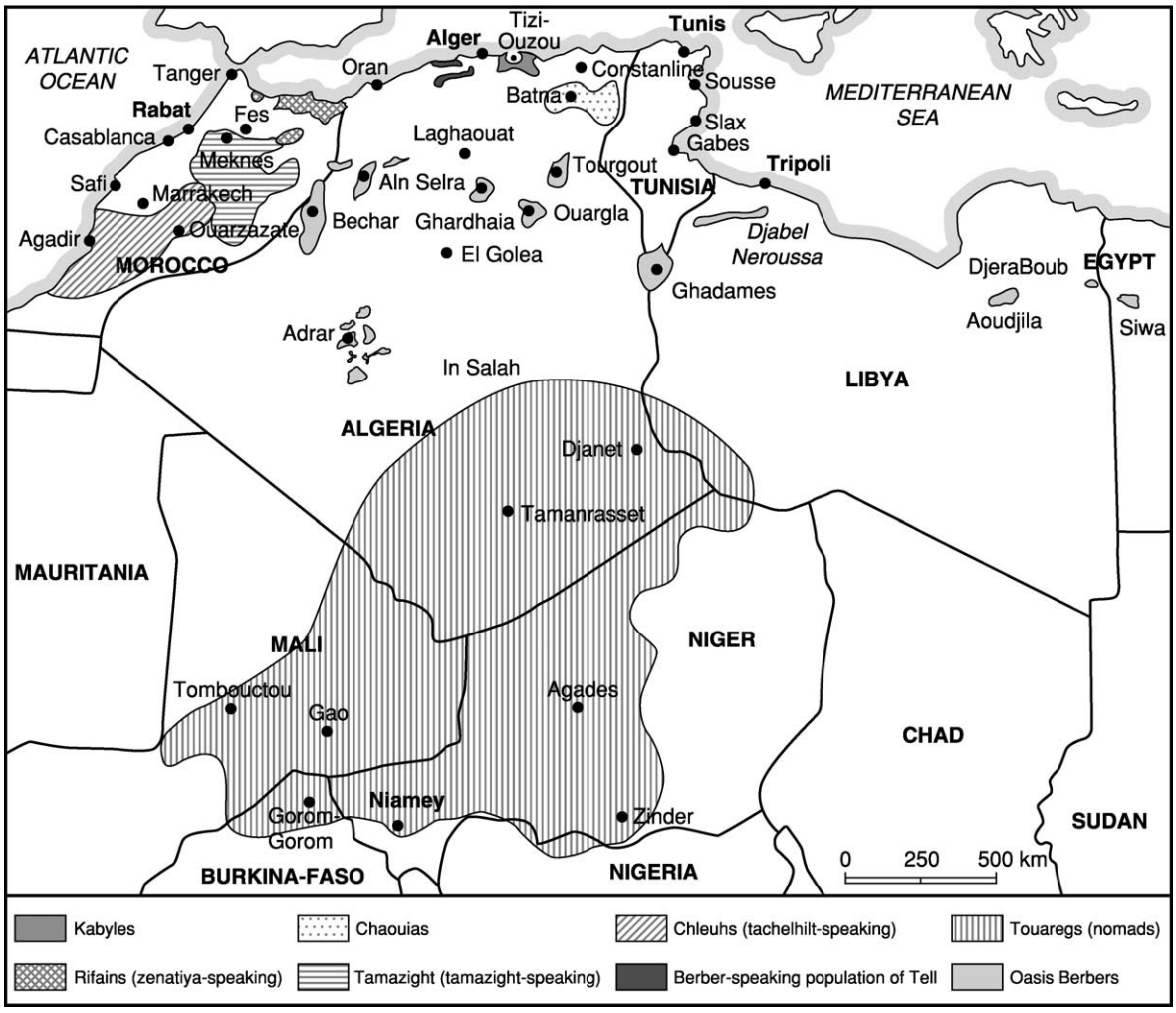

Figure 1 Map of the Berber-speaking region in North Africa.

Berber linguistic sediment. Despite numerous theories suggested by linguists since the 19th century in favor of an external origin of the language (Middle East or East Africa), neither prehistoric archaeology nor physical anthropology could show the movement of a population coming from elsewhere; it has even been solidly established that man has been present in North Africa, in a continuous manner, for at least a million years (cf. Camps, 1974, 1980).

Tamazight (the Berber word for language) covers a vast geographical area: all of North Africa, the Sahara, and a part of the West African Sahel. But the countries principally concerned are, by order of demographical importance: Morocco (35–40% of the total population), Algeria (25% of the population), Niger, and Mali (Tuaregs) (Figure 1).

The Berber-Speaking Regions

In Morocco, spoken Berber is spread into three large dialectical areas that cover the totality of the mountainous regions: in the north is the Rif (Tarifit); in the center, the Mid-Atlas and a part of the High-Atlas (Tamazight [Tamazight, Central Atlas]); and in the south/southwest (High-Atlas, Anti-Atlas and Under), the Chleuh domain (Tachelhit/Tašelḥit/Chilha).

In Algeria, the principal Berber-speaking region is Kabylia. In a relatively limited but densely populated surface area, Kabylia (Kabyle; Taqbaylit dialect) alone has two-thirds of Algeria's Berber speakers. The other significant Berber-speaking groups are: the Chaouias (Chaouia; Tachawit) of the Aures region, having in all likelihood a million people, and the people of the Mzab (in Ghardaia and other Ibadhite cities), having a population of between 150 000 and 200 000. There are in fact other Berber-speaking groups in Algeria, but these are modest linguistic islands of only several thousands to tens of thousands of speakers.

The third large group of Berber speakers is the Tuaregs (Tamashaq [Tamasheq], Tamajaq [Tamajaq,

Tawallammat], Tamahaq [Tamahaq, Tahaggart]), straddling several countries across the Sahara-Sahel zone, principally in Niger (±500 000 people) and in Mali (450 000). The other countries: Algeria (Ahaggar, Ajjer dialects), Libya (Ajjer dialect) Burkina-Faso, and even Nigeria, have more limited Tuareg populations. The total Tuareg population is well over 1 million individuals.

The other Berber speaking regions are isolated, often threatened areas, spread out across the south of Mauritania (Zenaga), in Tunisia (in Djerba, in part, and in several villages in the south-central part of the country), in Libya (where Berber-speaking groups are clearly larger and more resistant), and in Egypt (the Siwa Oasis).

But these are only the traditional locations: from the beginning of the 20th century and especially since decolonization, worker emigration and the massive rural exodus that took place throughout the Maghrib have been the basis for the formation of Berber-speaking communities in all the major cities: Algiers and Casablanca are the most outstanding examples. And Paris is one of the three principal Berber-speaking cities of the world, perhaps even the largest!

Table 1 Adjectival scheme

Adjective	*Verb*	*Root*	*Adj. Scheme*	*Adjective*
'white'	*i-mlul*	*mll*		*aməllal*
	sub.3MSg-be.white	*ccc*	*acc:ac*	

Table 2 Nominal scheme

Noun	*Verb*	*Root*	*Nom. Scheme*	*Adjective*
'robber'	*y-uk^{w}ər*	*kr*	(agent noun)	*amak^{w}ar*
	sub.3MSg-be.white	*cc*	*am-vcc*	

Table 3 Aspectual inflections (Taqbaylit)

Verb	*Root*	*Aorist*	*Perfective*	*Negative Perfective*	*Imperfective*
'go'	*dd*	*ddu*	*dda*	*ddi*	*təddu*

Linguistic Features

Phonetics and Phonology

The phonological consonantic system of Berber (Basset, 1952/1969; Prasse, 1972–1974) relies on an opposition between tensed and nontensed consonants. Variation is induced by: phonemes borrowed from Arabic (Arabic, Standard) (pharyngeals, some emphatics), a tendency towards spirantization in Northern dialects, and palatalization and labio-velarization.

The vocalic system of Berber is ternary: /a/ vs. /i/ vs. /u/. The schwa [ə] is considered by most researchers as a neutral vowel without phonological status. Intermediary phonemes (/e/, /o/, /ä/) that exist in some dialects (Tuareg, Libya, Tunisia) are recent innovations (Prasse, 1984–1986), stemming from the probable phonologization of former contextually conditioned variants. The same is also probably true of vocalic duration, which has distinctive status in those dialects (for instance, to mark the intensive perfective in Tuareg). It probably originates in an expressive lengthening, or in a quantitative reinterpretation of accentual phenomena.

Morphology

Berber stems are composed of a consonantal root and an inflectional scheme, which is specific to the considered part of speech. There are, for instance, adjectival schemes, verbal (aspectual) schemes, and nominal schemes (Table 1, Table 2).

The verb 'go/go with', is composed of a root (*dd*) and an obligatory aspectual inflection (Table 3).

The morphology of Berber is heavily derivational. For instance, there is a class of labile (ambitransitive) verbs, which varies in size depending on the dialects, and which can be semantically transitivized thanks to a causative-transitive prefix (*s-*). The 'passive' is rare and marked through a *ttw-* prefix, reciprocals and middles are marked thanks to a nasal prefix (*my-*). Those prefixes have variants within each dialect (Table 4).

Case in Berber is limited to an opposition between what is traditionally called 'état libre' and 'état

Table 4 Verbal derivation

Stem	*Prefix*	*Verb*	*Grammar*	*Gloss*
kkəs	+ *s-*	*su-kkəs*	CAUS-take.off.PERFECTIVE	'made X take off'
'take off'	+ *ttw-*	*ttwa-kkəs*	PASS-take.off.PERFECTIVE	'got taken off'
	+ *my-*	*my-kkəs*	RECIP-take.off.PERFECTIVE	'took off from each other'

d'annexion.' The former is unmarked, and the latter marked. 'État libre' is the form taken by nominals in citation form, topic position, direct object, possessee. 'État d'annexion' is the form taken by postverbal subjects, nominals following prepositions and numerals, possessors (Table 5).

This distinction is no longer alive in all dialects. Dialects that have lost the opposition are: Nefoussa, Ghadames, Sokna, Siwa (Siwi) in Egypt and Zenaga of Mauritania.

There are two genders, masculine (unmarked), and feminine (marked). Gender is arbitrary. Feminine gender can function as a diminutive or partitive, or denote an item as opposed to a collection (Table 6).

Number distinctions are between singular and plural. Plural inflections are varied, either formed by affixation, or apophony; some plurals are irregular (Table 7).

There are no articles in Berber. Definiteness is contextually inferrable, word order playing a role in the matter. Anaphoric and deictic particles appear where necessary to disambiguate.

All verbs are completed with a personal or participial affix. Therefore, the minimal utterance is composed of a root, always inflected for aspect, and its obligatory personal affix (and accusative and dative clitics where applicable):

Table 5 Case

	État libre (EL)	*État d'annexion (EA)*
clause	*tafunast* tə-čča cow.EL SUB.3FSG-eat.PERFECTIVE (As for) the cow (she) ate/has eaten.	tə-čča *təfunast* SUB.3FSG-eat.PERFECTIVE cow.EA The cow ate/has eaten.
phrase	*axxam* umə̄ksa house.EL shepherd.EA The shepherd's house	axxam *umə̄ksa* house.EL shepherd.EA The shepherd's house

Table 6 Gender

Noun Form	*Masculine*	*Feminine*
diminutive/partitive	*axxam* 'house'	*taxxamt* 'small house/room'
collective vs. item/	*azə̄mmur* 'olives'	*tazə̄mmurt* 'olive tree'

Table 7 Number

Number	*'house'*	*'braid'*	*'heart'*	*'town'*
singular	*axxam*	*asaru*	*ul*	*tamdint*
plural	*ixxamən*	*isura*	*ulawən*	*timdinin*

(1) yə-čča (Taqbaylit)
SUB.3MSG-*eat*.PERFECTIVE
he ate/has eaten

(2) yə-fka yas
SUB.3MPL-*give*.PERFECTIVE DAT.3SG
t idd
ACC.3MSG *proximal.particle*
He gave it to her/him

Constituent Order

Such minimal utterances are very frequent in authentic speech. However, longer utterances, containing noun phrases, also appear. The maximal configuration is examplified below, and illustrates the VSO type:

(3) yə-fka umγar idrimən
SUB.3MSG-*give*.PERFECTIVE *old.man*.EA *money*.EL
i umddak^{w}əl-is
to comrade.EA-POSS.3MSG
the old man gave (some) money to his companion

Only a few quantitative studies on word order have been conducted. Among them, Mettouchi (to appear a) showed that in Taqbaylit, word order was in fact pragmatically motivated. This motivation is also probably true of other dialects. The following table (where V actually stands for a minimal utterance (root+personal affix)) shows the various configurations encountered in authentic speech (Table 8).

This table shows that, whereas the characterization of Berber (here Taqbaylit) as a VO language seems to hold, the status and position of the 'subject' is somewhat more problematic: almost one-fourth of the utterances can appear without one. This special behavior of the subject in Berber has long been recognized in Berber studies. Thus, traditionally, it is the personal affix that is considered as the real subject (and not as an agreement marker), whereas the preverbal coreferential nominal is called 'indicateur de thème' and the postverbal coreferential nominal 'complément explicatif' (Galand, 1964/2002). The positions of nominal constituents are determined to a large extent by pragmatic and semantic factors. Taqbaylit can therefore be considered as a nonconfigurational language, and more precisely, as a pro-

Table 8 Constituent order found in a conversational excerpt (143 third-person verbal predications)

VS	*SV*	*V*	*OV*	*VO*
60 42% (incl. VSO 3%)	25 17.5% (incl. SVO 2%)	35 24.5%	1 0.5%	22 15.5%
85 59.5%			58 40.5%	

nominal argument language. Quantitative studies must be conducted on other dialects to see whether this characterization is valid for Berber as a whole.

Berber is head marking at the level of the clause, but dependent marking at the level of the phrase. At the level of the phrase, Berber is also more rigid, and has the following properties among Greenberg's universals: it has prepositions, the possessor follows the possessee, the modifier (as well as relative clauses) follows the head noun and affixes are mostly prefixes.

Relative clauses (Galand, 1988) are distinguished according to the status of the antecedent: if it is coreferential to the subject of the relative clause, a participle is used. This form is composed of a root inflected for aspect, and an invariant circumfix (in Taqbaylit), or a limited set of affixes (in Tuareg) (Table 9).

In some syntactic contexts (relative clauses, interrogation, negation, TAM preverbs), clitics change position and attach themselves to the new head of the sentence (negative marker, interrogative pronouns or relativizer, preverb). This phenomenon of cliticclimbing is examplified below:

(4) ad as t idd
irrealis DAT.*3SG* ACC.*3MSG* *proximal.particle*
yə-fk
SUB.*3MSG-give*.PERFECTIVE
He will give it to her/him

Table 9 Participial circumfixes

Aïr Tuareg	*Singular*	*Plural*	*Taqbaylit*	*Singular*	*Plural*
masc.	*y——n*		masc.		
		———		*y————— -n*	
		nin			
fem.	*t———-t*		fem.		

Table 10 Quality verbs

Person	*Singular*	*Plural*
1	*məqq^{w}r-γ*	
2	*məqq^{w}r-ḍ*	*məqq^{w}r-it*
3 M	*məqq^{w}r*	
3 F	*məqq^{w}r-t*	

Predicate Nominals and Related Constructions

Verbs very often are the center of predication, but predicates can also be nonverbal. Nouns, adjectives, and free pronouns can function as predicates.

Attribution is marked, either, as in Tuareg, through a simple juxtaposition of nouns

(5) Mûsa amγar n Ahaggar
Mûsa *chief*.EL *of* *Ahaggar*
Mûsa is the chief of Ahaggar

or, as in most Northern Berber dialects, thanks to a special invariant copula (particle):

(6) d amur-iw
predicative.particle *share*.EL-*my*
It's my share

Focus constructions are mostly based on attributive clauses (Taqbaylit):

(7) d amur-iw i
predicative.particle *share*.EL-*my* *relator*
dd y-uk^{w}ər
prox.particle SUB.*3MSG-steal*.PERFECTIVE
It's my share that he stole

But focus-fronting (traditionally called 'anticipation renforcée') is also encountered (Tuareg):

(8) tagəlla a tə-kša
bread DEMONSTRATIVE SUB.*3FSG-eat*.PERFECTIVE
təmγart
old-woman.EA
It's bread that the old woman has eaten

Attributive predication can also be expressed thanks to a special category of verbs, quality verbs, which are only alive in some dialects, among them Taqbaylit. This category represents approximately 60 verbs, mostly referring to size and color, but also to other, more unexpected, semantic domains (Chaker, 1983: 117–118). It is characterized morphologically by a special suffixal conjugation in the perfective, in the 3rd person and the plural. Here is the paradigm of affixes for the verb *məqq^{w}r* 'be big' (Table 10).

'Existence' is marked thanks to the verb *ili* 'be,' 'exist,' in the perfective (Taqbaylit).

(9) lla-n waman

Table 11 Basic aspectual opposition

Aorist	*Perfective*	*Imperfective*
y-ak^{w}ər	*y-ukər*	*yə-ttak^{w}ər*
SUB.3MSG-steal.aorist	SUB.3MSG-steal.perfective	SUB.3MSG-steal.imperfective
neutral/indefinite	punctual/definite/completed	durative/iterative/habitual/progressive

Table 12 Aïr Tuareg aspectual bases

Roots	*Aorist*	*Perfective*	*Perfect*	*Neg. Perfective*	*Imperfective*	*Neg. Imperfective*
rtk, 'fall'	*-rtək-*	*-rtak-*	*-rtaak-*	*-rtek-*	*-raattək-*	*-rəttək-*
g, 'do'	*-g(u)-*	*-ge/a/ə-*	*-gee/aa-*	*-ge/a/ə-*	*-taagg(u)-*	*-təgg(u)-*

Table 13 Negation and aspectual asymmetry in Taqbaylit[a]

Positive	*Negative*
aorist	*a wər* + aorist (optative)
(optative, imperative)	<1%
1%	
ad + aorist	*ur* + imperfective
30%	37%
la/*ad*/*Ø* + imperfective	
16%	
perfective	*ur* + negative perfective
53%	63%
100% of positive utterances	100% of negative utterances

[a]Frequency counts are based on a conversational corpus.

exist.PERFECTIVE-SUB.3MPL *waters*.EA
There is water

Location can be predicated thanks to the association of an interrogative pronoun and an accusative clitic (Taqbaylit):

(10) anda t umur-iw?
where ACC.3MSG *share*.EA-*my?*
where is my share?

Possession is mostly predicated through the association of a preposition and a special personal affix (Taqbaylit):

(11) γur-s sin yəzgarən
with-him *two* *oxen*.EA
He has two oxen

Aspect

Berber dialects are basically aspectual, with evolutions towards tensedness in some of them (Tachelhit, cf. Leguil, 1992). A. Basset (1929, 1952/1969) was the first to reconstruct the basic ternary system of Berber, which opposes three forms: aorist ('aoriste simple'), perfective ('accompli,' 'prétérit'), and imperfective ('inaccompli,' 'aoriste intensif') (Table 11).

All dialects have a special negative form (negative perfective, called 'accompli négatif' or 'prétérit négatif') that is used instead of the perfective after the negative marker. Some dialects also have secondary, more recent, forms: negative imperfective ('inaccompli négatif'), and resultative perfective ('accompli résultatif'). Here is for instance the full system of Tuareg (Table 12).

In all dialects, those forms are preverbed by TAM markers, giving rise to various configurations. Taking into account the preverbs is absolutely necessary to describe properly the oppositions at stake in Berber (Chaker, 1997). Among those preverbs, the most frequent cross-dialectally are *ad* (irrealis), *rad* (future), and *la* (progressive). They stem from ancient deictic or locative markers, and from auxiliaries.

Moreover, verbal negation (*ur*) acts on those oppositions, giving rise to asymmetries (Mettouchi, to appear b). Here are, for instance, the actual oppositions encountered in Taqbaylit (Table 13).

Further Resources

A systematic, regular bibliographic orientation can be found in the *Annuaire de l'Afrique du Nord* (Paris, CNRS) since 1965 (volume IV), edited by Lionel Galand, then Salem Chaker and Claude Brenier-Estrine. There is also a recent, very complete bibliographic recapitulation in *Langues et littératures berbères des origines à nos jours*. Bibliographie internationale (Paris, Ibis Press, 1997), and a bibliographic database developed by Salem Chaker, that can be queried online on the Internet site of the Berber Research Center.

See also: Afroasiatic Languages; Algeria: Language Situation; Libya: Language Situation; Morocco: Language Situation.

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Relevant Website

http://194.167.236.5/pub/enseignements/langues/afrique/berbere – Berber Research Center.

Bergin, Osborn Joseph (1873–1950)

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Osborn Bergin was born in Cork in 1873 of a humble Protestant family. While a student of classics at Queen's College Cork he became interested in the Irish language and went to the Béarra peninsula to learn it. In those years he was deeply attached to the Gaelic League in Cork, which was in constant strife with the League's authorities in Dublin. Having taught in secondary schools in Cork he was appointed lecturer in Irish at Queen's College in 1897. By this time he was acquiring a reputation for accurate scholarship in Irish. He began to publish Irish texts, *Caoineadh Airt Uí Laoghaire* (1896), *Laoi Chnuic an Áir* (1897), and *Éachtra Lomnachtáin an tSléibhe Riffe* (with Eoin Mac Néill, 1901) – all Modern Irish texts. He attended the School of Irish Learning, founded by Kuno Meyer in 1903, and acquired a knowledge of Old Irish. From then on he devoted his attention equally to the modern and the old language. The school awarded him a scholarship, funded by Alice Stopford Green, to study for two years in Germany. There he attended the lectures of Heinrich Zimmer in Berlin and of Rudolf Thurneysen in Freiburg, two of the greatest Celtic scholars of the time. He took his doctorate under Thurneysen in 1906 with a dissertation entitled *Contributions to the history of palatalisation in Old Irish* (*Ériu* III, 1907, 50–91). He succeeded John Strachan as Professor at the School of Irish Learning in 1908 and in 1909

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Osborn Bergin was born in Cork in 1873 of a humble Protestant family. While a student of classics at Queen's College Cork he became interested in the Irish language and went to the Béarra peninsula to learn it. In those years he was deeply attached to the Gaelic League in Cork, which was in constant strife with the League's authorities in Dublin. Having taught in secondary schools in Cork he was appointed lecturer in Irish at Queen's College in 1897. By this time he was acquiring a reputation for accurate scholarship in Irish. He began to publish Irish texts, *Caoineadh Airt Uí Laoghaire* (1896), *Laoi Chnuic an Áir* (1897), and *Éachtra Lomnachtáin an tSléibhe Riffe* (with Eoin Mac Néill, 1901) – all Modern Irish texts. He attended the School of Irish Learning, founded by Kuno Meyer in 1903, and acquired a knowledge of Old Irish. From then on he devoted his attention equally to the modern and the old language. The school awarded him a scholarship, funded by Alice Stopford Green, to study for two years in Germany. There he attended the lectures of Heinrich Zimmer in Berlin and of Rudolf Thurneysen in Freiburg, two of the greatest Celtic scholars of the time. He took his doctorate under Thurneysen in 1906 with a dissertation entitled *Contributions to the history of palatalisation in Old Irish* (*Ériu* III, 1907, 50–91). He succeeded John Strachan as Professor at the School of Irish Learning in 1908 and in 1909

was appointed Professor of Old and Middle Irish at the newly founded University College, Dublin. He continued in that post until 1940 when he resigned to become Senior Professor in the School of Celtic Studies at the Dublin Institute for Advanced Studies, then in the course of being established. He died in 1950.

His publications include *Irish Grammatical Tracts* (1915–1928), an edition of the grammatical treatises compiled by the bardic poets in the Middle Ages, a selection of bardic verse published over the years in *Studies* and other periodicals and collected by David Greene and Fergus Kelly in *Irish bardic poetry* (1970). With R. I. Best he produced a diplomatic edition of the 11th-century manuscript *Lebor na hUidre* (1929), the earliest Irish manuscript containing narrative material. With D. A. Binchy he edited *Tochmarc Étaíne,* the triple tale of the goddess Étaín (1938). His greatest work was the edition, again with Binchy, of the translation of Thurneysen's *Handbuch des Alt-Irischen* (1909) as *A Grammar of Old Irish* and his *Old Irish Reader* (1946–1949). He edited *Ériu,* originally the journal of the School of Irish Learning, and was for many years General Editor of the *Dictionary of the Irish Language based mainly on Old and Middle Irish materials* (1913–1976). His reputation as an accurate scholar persists to the present day, particularly in the area of bardic poetry, but he is also said to have preferred reading detective novels to academic work.

See also: Strachan, John (1862–1907); Thurneysen, Rudolf (1857–1940).

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Knut Bergsland was born in Kristiania (Oslo), Norway. He studied classical philology in Oslo and Paris. In Paris, his studies also included Hittite, Akkadian, and Old Armenian. In 1938 his fiancé got a job in Tromsø in the north of Norway close to a Sámi-speaking area. When visiting her, he used the time when she was working to establish contact with the local Sámi communities to learn their language. Bergsland finished his M.A. studies in 1940 with Latin as the main subject, and during the war he continued to study the little-known South Sámi language spoken in the mountain areas of Middle Norway. This work resulted in a collection of South Sámi texts and a grammar published in 1946, which also was his Ph.D. dissertation. This was the first grammar of a Sámi language written by a linguist with a thorough training in general linguistics, and it was one of the first grammars written within the framework of Hjelmslev's glossematic theory. Unfortunately, the book was written in Norwegian and did not have the impact it could have had on the development of linguistic theory.

In 1947 Bergsland became Professor of Finno-Ugric Linguistics at the University of Oslo, a position he held until 1981. As a professor he devoted most of his research to the documentation and description of the Sámi (Saami, North and Saami, South) languages of Norway with a special focus on the South Sámi language, on which his publications included a very readable grammar, text collections and a dictionary. Bergsland was also a major supporter of the South Sámis' fight to survive linguistically and culturally.

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Learning, and was for many years General Editor of the *Dictionary of the Irish Language based mainly on Old and Middle Irish materials* (1913–1976). His reputation as an accurate scholar persists to the present day, particularly in the area of bardic poetry, but he is also said to have preferred reading detective novels to academic work.

See also: Strachan, John (1862–1907); Thurneysen, Rudolf (1857–1940).

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Bermuda: Language Situation

Editorial Team

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Bermuda is a group of islands in the Atlantic Ocean and a nominal British territory with self-government, which was guaranteed in 1968. It comprises Ireland Island (north and south), Boaz Island, Somerset, Main, St. David's, and St. George's. It was discovered by the Spanish in the 16th century, but it was uninhabited until 1609 when the first British colonizers appeared, at first by accident (when the flagship *Sea Venture* was caught in a tempest with 150 officials) and later deliberately. In 1684 Bermuda became a British crown colony.

The islands (first called Somers Islands) had no permanent population for a long time. Later they were populated by long-term colonizers and slaves. Two-thirds of the current population (64 935 according to a July 2004 estimate) are of African origin, descended from slaves brought in large numbers by colonizers starting in 1616. Some slaves were brought in by British settlers, not directly from Africa but via the Caribbean regions. Some Native Americans were also transported to Bermuda in the 17th and 18th centuries as slaves or prisoners of war. Slavery was formally abolished in Bermuda in 1834.

After the African population, the second-largest (33%) ethnic group of Bermudians are Caucasians, who came as colonists and stayed for a while. Many are of European extraction, descending from British colonists who emigrated here, or were imported as slaves for a period and later earned their freedom. Yet another sizeable group is made up by the one-time Portuguese agricultural laborers brought from the Madeira Islands and from the Azores. More recent arrivals have come, in order of numbers, from Canada, the United Kingdom, and the United States.

The official language of the island is English. Other major languages spoken are Bermudan English (a local English dialect) and Portuguese.

Bertoni, Giulio (1878–1942)

J Albrecht, University of Heidelberg, Heidelberg, Germany

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Giulio Bertoni was first and foremost a traditional philologist; linguistics in the strictest sense of the term plays only a secondary role in his extremely rich scientific oeuvre (nearly 1400 titles; see Monteverdi, 1952). He was born in Modena on August 26, 1878; all his life he remained attached to his native town, which plays an important part in his historical and philological publications. He attended the University of Turin from 1897 to 1903 and, after having gained his doctorate, he went to Florence, Paris, and Berlin to gather academic experience. During these years he came into contact with a number of the leading scholars of his time, e.g., Pio Rajna, Paul Meyer, Jules Gilliéron (*see* **Gilliéron, Jules (1854–1926)**), Antoine Thomas, Alfred Jeanroy, and Adolf Tobler. In 1905 he was appointed to the chair of Romance philology at the University of Fribourg (Switzerland), which he held until 1921. In this period he founded the *Archivum Romanicum* (1917), which quickly gained a leading position among the philological reviews and was published from 1943 onward as *Cultura Neolatina*. In 1921 he returned to the University of Turin, where he held the chair of Romance philology for seven years. The collaboration with his colleague Matteo Bartoli (*see* **Bartoli, Matteo Giulio (1873–1946)**) resulted in an introduction to 'neolinguistics,' to which Bertoni contributed the theoretical and Bartoli the practical part (Bartoli and Bertoni, 1928). In these years he was exposed to the influence of Benedetto Croce (*see* **Croce, Benedetto (1866–1952)**) and of Giovanni Gentile, the intellectual leader of the Fascist Party, which was to be decisive for his philosophical convictions.

Bertoni finished his career most honorably. From 1928 until his death in Rome on May 28, 1942, he occupied the chair of Romance philology at the University of Rome; he became a member of the editorial staff of the *Enciclopedia Italiana* and was elected member of the Italian Academy *(accademico d'Italia)* in 1932. The efforts of his last years were directed toward the compilation of a great Italian dictionary that never got beyond the letter C.

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Beschi, Constanzo Guiseppe (1680–1747)

J-L Chevillard, CNRS–University of Paris 7, Paris, France

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The importance of Constanzo Guiseppe Beschi for Tamil studies cannot be overestimated. Born in Italy, he joined the Jesuits in 1698 and was sent to India which he reached in 1711 and where he spent 36 years (see Besse, 1918; Meenakshisundaram, 1974). He is referred to in Tamil as Vīramāmuṉivar. Although he was not the first European to produce a grammatical description of Tamil, having been preceded by Henrique Henriques (also spelled as Anriquez) who had composed a Tamil grammar in Portuguese around the middle of the 16th century (see Vermeer, 1982), Beschi's grammar of *Koṭuntamiḻ*, composed in 1728 in Latin, rapidly became the standard description of common Tamil for foreign missionaries, and although he himself was a Jesuit, it was printed by the Protestants as early as 1738. It was also to be translated into English and become a reference grammar in the 19th century. Having understood that he could only have a limited impact on the literary elite if he restricted himself to ordinary Tamil, Beschi embarked on a study of Literary Tamil and composed three grammars: two in Latin and one in Tamil, the *Toṉṉūl Viḷakkam,* on the model of traditional Tamil grammars. He composed an epic poem *Tēmpāvaṇi* (in honor of St Joseph) and made a Latin translation of the first two books of the famous classic called *Kuṟaḷ*. His name is also associated with a writing reform, which made it possible to distinguish *e* from *ē* on

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See also: Tamil; Tamil Linguistic Tradition.

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Bhandarkar, Ramakrishna Gopal, Sir (1837–1925)

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One of the greatest Indologists, Sir Ramakrishna Gopal Bhandarkar was born on July 6, 1837, in Malvan, Maharashtra. After his schooling in Rajapur and Ratnagiri, he entered the Elphinstone Institute of Bombay; there he was deeply influenced by Sidney Owen, who instilled in young Bhandarkar a yearning for truth and academic excellence, and E. I. Howard, who spurred his interest in Sanskrit and Indology. Bhandarkar obtained his M.A. in 1863, with Sanskrit as his second language. After serving briefly as the headmaster of Ratnagiri English School, his alma mater, he moved to Elphinstone College, Bombay, in 1867 to teach Sanskrit. He became Assistant Professor of Sanskrit in 1872 and Professor in 1881. He retired from government service in 1893. He was a member of the University of Bombay Syndicate (1873–82) and later the university's vice-chancellor (1893–95). He also served in the Legislative Council (1903–5). He died on August 24, 1925.

Academically outstanding since childhood, Bhandarkar was a prolific author of books and articles in areas related to Sanskrit, philology, history, inscriptions, religions, philosophy, education, and social reform. Among his language-related works are *The first book of Sanskrit* (1864) and *The second book of Sanskrit* (1868), which have helped generations of natives and foreigners to learn the Vedic language. His critical edition of Bhavabhuti's *Malati-Madhava with the commentary of Jagaddhara* (1876) is based on nine manuscripts of the play that he had collected. His monumental *Reports on the search for Sanskrit manuscripts*, published during the period 1882–1891 on assignment from the Bombay government, are treasure troves of literary, philosophical, and religious resources, revealing hitherto unknown manuscripts and helping scholars to date historical works.

Bhandarkar was the first to hold the position of the Wilson Philological Lecturer at the University of Bombay. In 1877, he delivered seven in-depth lectures on Sanskrit, Pali, and related languages and dialects. He dealt with the phases Sanskrit went through, the development of Pali and Prakrits, the linguistic systems of later Indo-Aryan languages like Marathi and Hindi, and their genealogical relationships. These lectures "laid the foundations of linguistic studies of Indo-Aryan family of languages" (Ghatage quote from Dandekar, 1976: 143). He addressed the

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Bhandarkar, Ramakrishna Gopal, Sir (1837–1925)

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One of the greatest Indologists, Sir Ramakrishna Gopal Bhandarkar was born on July 6, 1837, in Malvan, Maharashtra. After his schooling in Rajapur and Ratnagiri, he entered the Elphinstone Institute of Bombay; there he was deeply influenced by Sidney Owen, who instilled in young Bhandarkar a yearning for truth and academic excellence, and E. I. Howard, who spurred his interest in Sanskrit and Indology. Bhandarkar obtained his M.A. in 1863, with Sanskrit as his second language. After serving briefly as the headmaster of Ratnagiri English School, his alma mater, he moved to Elphinstone College, Bombay, in 1867 to teach Sanskrit. He became Assistant Professor of Sanskrit in 1872 and Professor in 1881. He retired from government service in 1893. He was a member of the University of Bombay Syndicate (1873–82) and later the university's vice-chancellor (1893–95). He also served in the Legislative Council (1903–5). He died on August 24, 1925.

Academically outstanding since childhood, Bhandarkar was a prolific author of books and articles in areas related to Sanskrit, philology, history, inscriptions, religions, philosophy, education, and social reform. Among his language-related works are *The first book of Sanskrit* (1864) and *The second book of Sanskrit* (1868), which have helped generations of natives and foreigners to learn the Vedic language. His critical edition of Bhavabhuti's *Malati-Madhava with the commentary of Jagaddhara* (1876) is based on nine manuscripts of the play that he had collected. His monumental *Reports on the search for Sanskrit manuscripts,* published during the period 1882–1891 on assignment from the Bombay government, are treasure troves of literary, philosophical, and religious resources, revealing hitherto unknown manuscripts and helping scholars to date historical works.

Bhandarkar was the first to hold the position of the Wilson Philological Lecturer at the University of Bombay. In 1877, he delivered seven in-depth lectures on Sanskrit, Pali, and related languages and dialects. He dealt with the phases Sanskrit went through, the development of Pali and Prakrits, the linguistic systems of later Indo-Aryan languages like Marathi and Hindi, and their genealogical relationships. These lectures "laid the foundations of linguistic studies of Indo-Aryan family of languages" (Ghatage quote from Dandekar, 1976: 143). He addressed the

Congress of Orientalists in Vienna in 1886, showing the participants rare manuscripts and reciting a Sanskrit poem he had composed for the occasion.

Most notable among his numerous other works are *Early history of the Deccan*, a groundbreaking and critical study of the Deccan, and *A peep into the early history of India*, a short but carefully reconstructed history with evidence from archaeological finds, coins, and inscriptions. *Vaishnavism, Saivism and minor religious systems* (1913) is one of his best and most widely read books. It traces the origin and development of different branches of Hinduism (500 B.C.–1700 A.D.) and Jainism.

Bhandarkar was a member of Asiatic and Oriental societies in the U.K., Italy, United States, France, Germany, and Russia. He was in touch with eminent Orientalists of his day, such as Max Muller and Rhys Davids. In recognition of his exceptional scholarship, he received doctorates from the universities of Göttingen (1885), Bombay (1904), and Calcutta (1908) and was knighted in 1911. On his 80th birthday, a commemorative volume of essays authored by his admirers and students was presented to him, and the Bhandarkar Oriental Research Institute was formally inaugurated by the governor of Bombay, with generous funding from the Tatas, to promote a spirit of enquiry into the literary, social, and political history of India.

See also: Müller, Friedrich Max (1823–1900).

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Bhartṛhari

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The Buddhist pilgrim I-ching, who traveled to India in A.D. 671–695, tells us that a Buddhist poet and grammarian, Bhartṛhari, died in India in about 651. I-ching cites a verse in which Bhartṛhari reproaches himself for his inability to decide between the monastic life and the world (Keith, 1948: 176).

Bhartṛhari became well known for his verses compiled in the *Śatakas* (Hundreds), which consist of *Nīti–Śatakam*, which is about political wisdom, *Śri-Ngāra–Śatakam*, which contains reflections on erotic passion, and *Vairāgya–Śatakam*, which contains poems on renunciation.

Bhartṛhari is also the author of the great grammatical treatise *Vākya-Padīya* (Relating to Sentences and Words). In its first chapter, the *Brahma* or *āgama-Kāṇḍa* (Brahma or The Origin Section), he discusses the philosophical aspects of speech. The second chapter, the *Vākya-Kāṇḍa* (Sentence Section), is about nature of sentences and meaning, and the third chapter, *Pada-* or *Prakīrṇa-Kāṇḍa* (Word or Miscellaneous Section), is divided into 14 subchapters and is about the grammatical aspects of linguistic forms.

Bhartṛhari is also believed to have written the *Bhaṭṭi-Kāvya* (Bhaṭṭi Epic), a work that, in verse form, illustrates the rules of Sanskrit grammar, which, the poet says, are a lamp to those whose eye is grammar; but without the grammar, are like a mirror in the hands of the blind (Chaitanya, 1962: 270). The word *bhaṭṭi* is a later (Prakrit) form of *bhartṛ*, which led tradition to identify Bhartṛhari with the poet Bhaṭṭi of the same century. But a comparison of their verses suggests that there is nothing but the name to support this suggestion (Keith, 1948: 116).

As an illustration of his poetry, consider the following (*Vairāgya–Śatakam* 112):

> kṣaṇam bālo bhūtvā kṣaṇam api yuvā kāmarasikaḥ
> kṣaṇam vittair hīnaḥ kṣaṇam api ca sampūrṇavibhavaḥ
> jarājīrṇair aṅgair naṭa iva valīmaṇḍitatanur
> naraḥ sāṁsārānte viśati yamadhānīyavanikām.
> "For a moment a youngster, for a moment an amorous youth, for a moment bereft of riches, for a moment at the height of opulence; at life's end, with limbs worn out by old age and a wrinkle-adorned face, man, like an actor, retires behind the curtain of death."

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As an illustration of his thoughts on grammar, consider his discussion on the nature of action verbs in the *Vākya-Padīya*. In Sanskrit, action verbs such as *pacati* 'he cooks' are given all together in the form of a process consisting of successive parts: a beginning, a middle, and an end; in constrast, *pāka* 'cooking' is given as a whole without any process in which the parts are separately organized but apprehended as being simultaneous with the whole (Joshi and Roodbergen, 1981: 90). Commenting on this, Bhartṛhari says (*Vākya-Padīya* 3.8.4, 3.8.1, 3.8.42):

> guṇabhūtair avayavaiḥ samūhaḥ kramajanmanām,
> buddhyā prakalpitābhedaḥ kriyeti vyapadiśyate.

"A whole (formed) of (parts) originating in a sequence, mentally conceived as no different from its parts which are subordinate (to it), is called *kriyā* 'action.'"

> yāvat siddham asiddham vā sādhyatvenābhidhīyate,
> āśritakramarūpvāt tat kriyeti pratīyate.

"As long as (something), whether completed (in the past) or not (yet) completed (in the present or future) is mentioned as a *sādhya* 'sequential process', it is understood to be a *kriyā* 'action' in as much a it takes the form of a sequence (of parts)."

> siddhasyārthasy pākādeḥ kathāṁ sādhanayogitā,
> sādhyatve vā tiṇantena kṛtāṁ bhedo na kaś ca na.

"How can a meaning like *pāka* 'cooking,' etc. which is *siddha* (apprehended as being simultaneous with the whole) be connected with *sādhana* 'operators'? Or, if it were (supposed to consist) of *sādhya* 'sequential process,' then there would be no difference (in the meaning conveyed) between *kṛt* (derivatives) and finite verbs."

A second example of Bhartṛhari's thoughts on grammar is his reflection on language and speech. In *Vākya-Padīya*, he discusses the relationship between the perceived utterances of a language and the language itself under the theory of *sphoṭa* 'bursting.' This theory had been discussed by Patañjali (2nd century B.C.) in his *Mahābhāṣya* (The Great Commentary), where he says, "dvau śabdātmanau nityaḥ kāryaśca" [the word (has a) dual representation, (one) as a permanent entity, (the other as an) affect] (Agnihotri, 1963: 43). The theory essentially says that there are two aspects in a linguistic element: the actual event of sound realization, or *dhvani*, and the represented entity, *sphoṭa*, which is actualized by *dhvani*. This naturally leads to the existence of (1) sentence *sphoṭa*, a single meaningful symbol realized by a succession of articulated sounds or *dhvani*; (2) word *sphoṭa*, actualized by a succession of sounds or *dhvani;* and (3) sound or *varṇa sphoṭa*, a permanent unit of distinctive sound capable of semantic differentiation, actualized by its phonetic manifestation or *dhvani*.

In all this, Bhartṛhari considers the sentence to be the primary linguistic unit and regards it as a single undivided element conveying its meaning in a flash, just as a picture is first perceived as a unit despite its components of colored shapes (*Vākya-Padīya* 1.89, 1.90). He, therefore, considers the sentence *sphoṭa* to be the real *sphoṭa* and the word *sphoṭa* and the sound or *varṇa sphoṭa* to be merely the means for its realization.

Bhartṛhari also wrote a commentary on Patañjali's *Mahābhāṣya*, which has been lost. However, its influence survives in the great work of Kaiyaṭa (12th century A.D.), who informs us in the introduction of his *Mahābhāṣya-Pradīpa* (That Which Enlightens the *Mahābhāṣya*) that in commenting on Patañjali he has followed Hari, that is, Bhartṛhari (Belvalkar, 1976: 35).

It can be said that Bhartṛhari was the last independent thinker in the field of grammar, joining the ranks of Pāṇini, Kātyāyana, and Patañjali, and that his *Vākya-Padīya* was the last original contribution to the field, bringing the development of the discipline of Sanskrit grammar to a conclusion.

See also: Katyayana (3rd Century B.C.); Panini; Patanjali (2nd Century B.C.).

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Bhutan: Language Situation

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Bhutan is a Buddhist kingdom located in the Himalaya east of Nepal. It is bordered by the Tibetan Autonomous Region of China on the north and northwest and by India on the south and east. Its population is about 750 000.

Much of Bhutan's culture is shared with Tibet, although with local particularities. The indigenous name of the country, Druk yul (*'brug yul* 'dragon country' in Written Tibetan (WT)), refers to the established religion, the Drukpa Kagyupa sect of Tibetan Buddhism. The national language, Dzongkha, is linguistically a dialect of Tibetan, that is, essentially a modern descendant of Classical Tibetan, which to Bhutanese is Choeke (see below) or 'Classical Dzongkha'. What is often called Drukpa culture traditionally prevails in all but the southern border region of the country, which has been populated beginning in the late 19th century by mainly Hindu settlers of Nepalese origin, officially styled *Lhotshampa* ('southern border people').

More than 20 languages are spoken in Bhutan, all belonging to the Tibeto-Burman family except for Nepali, which is Indo-Aryan. The secular education system, after briefly adopting Hindi, has used English as the medium of instruction since 1964, with Dzongkha taught for one hour daily. The teaching of Nepali in schools in the south of the country was discontinued in 1989. The Bhutanese Broadcasting Service broadcasts radio programs in Dzongkha (about 40%), English, Sharchopkha, and Nepali. The national weekly newspaper, *Kuensel*, appears in English (about 12 000 copies), Dzongkha (3000), and Nepali (300). In the national assembly, debates are conducted in Dzongkha, with translation available into Nepali.

Names

Ethnic names in Bhutan are often derived from place names, with the suffix *-pa*. This suffix and the feminine *-ma* are characteristically reduced to *p* and *m* in Dzongkha and added to the previous syllable, displacing the original final. Language names are compounded with words for language: Dzongkha *ke* (WT *skad*), Bumthang *kha*, Sharchop *lo*.

The terms *Bhotia* and *Monpa* often found in the literature are too imprecise to identify any particular group. Bhotia, from WT *bod* 'Tibet', is a general Indo-Aryan term for Tibetans or for Himalayan peoples taken for Tibetans. Monpa (*Menba* in

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Chinese transcription) is a Tibetan term for non-Tibetans on the southern periphery of Tibet; in Bhutan it is used to refer to several different groups and is found in a traditional Tibetan name for Bhutan itself, *lho-mon* 'southern Mon (country)' (or perhaps 'southerner [i.e., southern Tibetan] and Mon [country]'). Another term used to identify several groups is WT *'brog-pa* (Dzongkha *bjop*), which properly identifies the pastoralist lifestyle and not a particular group or language variety.

Languages

Parts of this section are based on a survey of Bhutanese languages by van Driem (1998).

Dzongkha, the National Language

The national language, Dzongkha, Lho-ke (WT *lho-skad* 'southern language') in older literature, is a standardized version of the language of the Ngalop, the dominant ethnic group in western Bhutan. Traditionally it is the language of the court and of the administrative/monastic fortresses, or *dzongs* (whence its name). In other parts of the country, it was traditionally limited to members of local elites and to those who had contact with the dzongs or with large monasteries, but it is gradually becoming more widely known through schools, videos, cinema, and popular songs.

Written Dzongkha and *Choeke* Classical Tibetan (WT), whose primary importance as a liturgical language is reflected in its Bhutanese name Choeke (WT *chos-skad* 'religion-language'), traditionally served as the written counterpart of spoken Dzongkha. Its reading pronunciation is based on that of modern Central Tibetan, and many of these pronunciations have found their way into spoken Dzongkha, particularly in cultural vocabulary. In secular use, it remains the language of the Bhutanese legal code and of some official documents.

The creation of Modern Written Dzongkha, based on the spoken language, to replace Choeke in secular use was announced in 1961 as part of Bhutan's first five-year plan. An orthography was devised, and a grammar presenting the new standard was published in Choeke in 1972. The Dzongkha edition of *Kuensel* adopted the new standard in 1978. The development of Dzongkha has been promoted by the Dzongkha Division (and its successors) in the Education Ministry since 1971. This division produces textbooks, dictionaries (monolingual, 1993; Dzongkha-English, 2002), and computer software and encourages the use of Dzongkha in official documents. It also conducts some research on other Bhutanese languages.

The written Dzongkha standard takes into account spoken Dzongkha grammar, syllabification, and certain other features, but it also conserves many elements of Choeke spelling that are not pronounced. Like Choeke, it is written in Tibetan script, either in the capital-letter style (WT *dbu-can*) or in the indigenous Bhutanese semi-cursive Joyig (WT *mgyogs-yig*).

Other Tibetan Dialects

Official Dzongkha is based on the dialect of the capital, Thimphu, and Punakha; other, quite distinct Dzongkha dialects, from west to east, are those of Ha, Paro, and east of Thimphu, Wangdue Phodrang. A closely related language, called Chocha-ngacakha (also Tsamangkha or Kurmepkha 'lower Kuri valley language') is spoken in an enclave in the east between the Lhuntse and Monggar districts. Dzongkha belongs to the Southern Tibetan dialect group, which also includes Denjongke ('rice-district language') in Sikkim and Tromowa (Groma) in the Chumbi Valley of Tibet, west of Bhutan. Dzongkha and modern Central Tibetan are not intercomprehensible.

No precise information is available on the dialects of Tibetan spoken by pastoralist nomads (WT *'brog-pa*, Dzongkha *bjop*) in northern Bhutan in Lingshi, Laya, and Lunana, or on Brokkat ('pastoralist-language'), spoken by settled ex-nomads at Dur in Bumthang; Lakha ('mountain language'), spoken by Bjop in Wangdi-Phodrang; or Brokpa (Brokskat), spoken in Mera and Sakteng in the east.

Bumthangkha

The language of Bumthang district in Central Bhutan, east of the Pele-la, is mutually intelligible with the languages of Kheng to the south and of Kurtoe ('upper Kuri valley') to the northeast. Chalikha, spoken north of Monggar in eastern Bhutan, Henkha (also Nyenkha or Mangdekha), spoken near Tongsa, to the west of Bumthang, and Dzalakha (or Khomakha), spoken in northeastern Bhutan, probably all belong to the same linguistic group.

Tshangla or Sharchopkha

Tshangla (the indigenous term) or Sharchopkha ('easterner language'), spoken in the densely populated southeastern quarter of Bhutan, serves as a lingua franca in eastern Bhutan. The same language is spoken just across the border in the Indian State of Arunachal Pradesh, where it is known as Central Monpa (Tshangla), and in Tibet by a longstanding Bhutanese émigré community in the Pemakoe (WT

padma-bkod) region some 400 km northeast of Bhutan. The language of the latter group has been described in Chinese under the names Cangluo Menba (Tshangla) and Motuo Menba (Tshangla).

Dakpa

Near the eastern border, the Dakpa speak a non-Tibetan language which in Arunachal Pradesh is known as Northern Monpa and in the Tibetan region of Tshona as Cuona Menba. This language appears to be close to Bumthangkha. The name (Written Dzongkha *dwags-pa*) does not imply any relation to the Tibetan region of Dwags-po.

Minor Groups

Three groups speaking distinct Tibeto-Burman languages are identified by van Driem as aboriginal remnants: Lhop, or Doya, in an enclave in south-western Bhutan; Gongduk, near Monggar (eastern Bhutan); and Ole (also often called Monpa, and now called 'Black Mountain' by van Driem), in a few villages south of Tongsa (central Bhutan).

Nepali

Bhutanese of Nepali origin speak an eastern variety of standard Nepali similar to that of the Darjeeling district in India. Basic knowledge of this language is widespread in Bhutan. Immigration of Nepali speakers has been halted in recent years, and residents declared to be illegal were expelled in the early 1990s.

See also: Nepali; Tibetan.

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Old Testament

A striking feature of the Old Testament is its tremendous diversity, as might be expected from writings compiled over a period of several hundred years.

There is a diversity of genre: legend (Genesis 1–9), narrative (1 and 2 Samuel, 1 and 2 Kings), genealogy (1 Chronicles 1–9), prophetic verse (much of Isaiah), liturgical verse (Psalms), law and regulations (Exodus 20–40, Leviticus, Deuteronomy), maxims (Proverbs), love poetry (Song of Solomon), and apocalyptic (Daniel 7–12). Of course, there are passages that belong in more than one of these genres.

There is also some diversity of content. Earlier emphasis on the laws and rituals of the tabernacle (and later the Temple) is to some extent apparently contradicted by the teaching of the immediately preexilic prophets: in Exodus 30, Aaron and his successors are commanded by God to burn incense on the altar every morning and every evening, whereas Isaiah 1 has God saying, "Your incense is detestable to me." Postexilic prophets return to the emphasis on ritual: In Malachi 1:11, God again commands the burning of incense, but in a more universal framework: "In every place incense will be brought to my name, because my name will be great among

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the nations." Such differences often reflect differing contexts, especially differing situations facing the people of Israel, and differing attitudes among them.

Languages

In contrast, the choice of language shows little diversity: Almost the whole of the Old Testament is in Hebrew. Up to about the 6th century B.C., Hebrew was the mother tongue of the whole Israelite community. From the time of the two exiles (723 B.C. and 597 B.C.), the community became much more scattered: the 'diaspora' (= dispersion) extended as far east as Iran and into Egypt, Asia Minor, Greece, and Italy in the west. Many communities of the diaspora adopted other languages as their mother tongue, especially Aramaic and Greek.

Aramaic was closely related to Hebrew. Jacob's father-in-law Laban had spoken an early form of it (Genesis 31.47). By the 8th century B.C., it had become the language of diplomacy in the Middle East, and from the late 6th century, Aramaic became the mother tongue of many Jews living in Palestine (*see* **Aramaic and Syriac**). However, as stated above, the overwhelming majority of the Old Testament is in Hebrew. Just a few passages are written in Aramaic: much of Ezra chapters 4–7, much of Daniel chapters 2–7, and Jeremiah 10.11.

Aramaic-speaking Jews needed help to understand the Hebrew scriptures, and this was provided by means of the Targums (Aramaic for 'translations' or 'interpretations'). These tended to go beyond being strict translations and to contain much interpretative material to facilitate understanding.

Although Greek and Hebrew took their alphabets from a common source (Phoenician), the two languages are not at all closely related. The many Jews of the diaspora who took on Greek as their mother tongue, thus very much needed a Greek translation of the Hebrew scriptures. Such a translation was in fact made in Egypt in the 3rd century B.C. Legend has it that the king of Egypt commissioned 72 elders of the Jewish community to carry out this work and that they completed it in 72 days. The translation was for that reason called the Septuagint (Greek for 'seventy'; for more on the Septuagint, *see* **Bible Translations: Ancient Versions**). This version was of extreme importance in early Christianity (see below).

Canon

Judaism recognises three subdivisions within the Old Testament: (1) the Torah (the first five books of the Old Testament), (2) the Prophets (Joshua, Judges, 1and 2 Samuel, 1 and 2 Kings, Isaiah, Jeremiah, Ezekiel, the 12 Minor Prophets), and (3) the Writings (all the remaining books, including the Psalms).

The Canon of the Old Testament (i.e., the list of literary works agreed as authoritative by the Jewish leaders) was finally established some time during the 1st or 2nd century A.D. At the time of Jesus (i.e., 50 to 100 years before the fixing of the Canon), there was universal agreement on the authority of the Torah; most Jews (the notable exception being the Sadducees) accepted the Prophets; but there was less agreement about the Writings (though everyone accepted the Psalms).

Many manuscripts of the Greek Septuagint contain several books not found in the Hebrew original: These books are referred to as 'Apocrypha' (Greek 'things hidden away' – though most of the books have never been in any sense secret). Although some Jewish authorities had been ready to accept them among the Writings, the books of the Apocrypha were excluded from the fixed Canon.

However, because the early Christian church treated the Septuagint as the authoritative form of the Old Testament, the books of the Apocrypha have been treated by Catholic and Orthodox churches as having equal authority with the books recognized by the Jews. Protestants, on the other hand, have followed the Jewish Canon and assigned them secondary status.

Relationship between the Old Testament and the New Testament

The question might well be asked: Why do the Christian scriptures incorporate the Jewish scriptures?

First, it is clear from the gospels that the Jewish scriptures held great authority for Jesus; his first disciples followed him in this. In fact, at the very beginning of the Christian era, when Christians spoke of 'the scriptures' they meant *just* the Jewish scriptures.

A second reason for the place of the Jewish scriptures in Christianity is the perceived importance of the many events in the life and work of Jesus that were held to be fulfilments of Old Testament prophecies (*see* **Prophecy**).

New Testament

The New Testament exhibits considerably less diversity of genre than in the Old Testament (the time scale is much shorter: about 50 years separate the earliest documents from the latest). The genres include narrative (a good deal of the Gospels and Acts), teaching (Matthew 5–7, the whole of Paul), apocalyptic (Revelation), and genealogy (in two passages only: Matthew 1 and Luke 3).

The whole New Testament is written in Koine Greek, a kind of lingua franca of the Eastern Mediterranean area at the time. The frequent quotations from the Old Testament are taken from the Septuagint, which at quite a number of points reads differently from the currently accepted Hebrew text.

There is some diversity of style within the language: Some books are written in a Greek akin to Classical (Attic) Greek (e.g., the Epistle to the Hebrews), but others are in a style rather more influenced by Semitic languages (Hebrew or Aramaic). Most of the epistles were written down by amanuenses from the dictation of the composer, which too would account for some stylistic differences.

The gospels, although written almost entirely in Greek, very occasionally quote Jesus's words in Aramaic, notably his words on the cross *Eloi, Eloi, lama sabachthani* ('My God, my God, why have you forsaken me?' Mark 15.34). This clearly indicates that Jesus spoke Aramaic as his mother tongue. Other examples (e.g., Mark 5.41: *talitha cum* 'Little girl, get up') would suggest that Jesus taught and ministered in Aramaic. Some place names (e.g., Mark 14.72: *Golgotha*) also appear in Aramaic. In 1 Corinthians 16.22, writing mainly to non-Jewish Christians, Paul uses the Aramaic expression: *maran atha* 'Come, Lord'; this suggests that, at this stage in the growth of the early church, such Aramaic tags were in general use.

Religious technical terms in Hebrew appear in the text occasionally; for example, Mark 7.11: *corban* 'votive offering to God.'

The New Testament exhibits some diversity of content: Paul and Jesus speak and teach very differently from one another. This can be partly accounted for in terms of the very different contexts in which they worked: Jesus living almost entirely among Jews in Palestine and closely supervising a single group of disciples within the limits of Palestine, Paul traveling around Asia Minor and Greece setting up churches among Gentiles. Paul v. James (substantive differences of emphasis). Matthew, Mark, and Luke's gospels have much in common with each other, but are quite different in emphasis from John's gospel. The epistle of James (2.14–26) seems to attack Paul on the place of faith in salvation; even if James is in fact attacking a commonly found misinterpretation of Paul rather than Paul's actual teaching, there are indications that James and Paul differed quite fundamentally on a number of issues.

Specifically, Christian scriptures appeared only when the first generation of Christian leaders (men who had known Jesus personally, including members of the group of 12 apostles) began to die (about 60 A.D.). A reliable record of what Jesus had said and done was seen to be essential for the church, and a number of writers set out to produce such accounts. About this time, material already produced by recognized Christian leaders (e.g., the epistles of Paul and others) also began to be gathered together. Paul's earliest epistles date from about 50 A.D.

The New Testament Canon

The Canon of the New Testament was established some time during the 2nd or 3rd centuries A.D. Early in the 2nd century, general agreement had been reached among the different churches that what we have as the four Gospels and Acts were the most powerful and authoritative accounts of the beginning of Christianity.

It was perhaps the heretic Marcion who was the chief catalyst in the process of establishing the Canon. About the middle of the 2nd century, he challenged the growing acceptance of certain writings. To begin with, he rejected the whole of the Old Testament, claiming that the God of Jesus was a God of love, a totally different being from the God of the Old Testament. He also claimed that, of the Christian apostles, only Paul had realized the great gulf between Law and Gospel. From the body of New Testament writings that were becoming influential in the church, Marcion therefore accepted only 10 epistles of Paul and a modified version of Luke's gospel.

The church now saw the need for finally defining which writings were authoritative. The principal criterion used seems to have been a clear connection with the first apostles; a good deal of weight was also given to how strong a particular book's influence had been on congregations. There was substantial agreement among the churches and their leaders that the four Gospels, Acts, and the epistles of Paul had equal authority with the Old Testament; however, for a period there was doubt about the authenticity of certain books, such as Hebrews, 2 Peter, 2 and 3 John, Jude, and Revelation. Certain other works, such as the Epistle of Barnabas and the 'Shepherd' of Hermas, were admitted by a few churches, but eventually were excluded from the generally agreed Canon.

Inclusion within the Canon was taken to imply that a work was inspired by God (2 Timothy 3.16: Greek *theopneustos* 'God-breathed'; *see* **Inspiration and Revelation**).

See also: Aramaic and Syriac; Bible, English; Bible Translation into Lesser-Known Languages; Bible Translations: Ancient Versions; Concordances; Greek, Ancient; Hebrew, Biblical and Medieval; Hebrew Linguistic Tradition; Inspiration and Revelation; Judaism; Prophecy.

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Bible Translation into Lesser-Known Languages

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Introduction

The translation of the Bible began around 200 B.C. with the version known as the Septuagint. Jerome completed the Latin Vulgate translation in A.D. 405, and it became the authoritative translation for Roman Catholicism for more than 1000 years. The Scriptures were first translated into Chinese in the 7th century, into Arabic in the 8th and 9th centuries, and into Persian in the 14th century. Most translation work occurred in Europe, ranging from translations into Georgian and Armenian in the 5th century to translations into Dutch in the 12th century and Spanish in the 13th century. In the 14th century, a team led by John Wycliffe produced the first English translation. Momentum continued building throughout Europe, led by such notable figures of church history as Martin Luther, whose German translation was completed in 1534.

Translations into Lesser-Known Languages: Missionary Movements

After the European impetus began, Bible translation spread along with the missionary movement, fueled by the invention of the printing press in the mid-15th century. The Gospel of Matthew was published in Malay in 1609, and John Elliot completed a translation of the entire Bible in 1663 for the native peoples, who spoke the Massachusetts language. Others picked up the task, including William Carey, who helped translate the Bible into 20 languages of India. The British and Foreign Bible Society was formed in 1804 to facilitate the growing number of missionary translation efforts. By the end of the 19th century, translations were available in 621 languages.

Although translations into major languages cover much of the world's population, questions remain on how to provide access to the Scriptures for members of the lesser-spoken languages. William Cameron Townsend met this challenge in the early part of the 20th century. While working as a Spanish Bible salesman in Guatemala, he was confronted by a Cakchiquel-speaking man who asked, "If this God of yours you are talking about is so wonderful, why doesn't He speak my language?" Townsend determined that the speakers of this language should also have the Scriptures, and despite numerous challenges, he finished a New Testament translation in Cakchiquel in 1928.

Townsend shared his vision for translation of the Scriptures into the languages of the central Americas, and he soon mobilized scores of men and women to take up the task, forming an organization known as the Summer Institute of Linguistics (now known officially as "SIL"). A young scholar named Kenneth Pike began work among the Mixtec of Mexico in 1935 and eventually became one of the leading linguistic authorities in the world. Eugene Nida began with SIL before joining the American Bible Society in 1943; he became the world's leading translation theorist.

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Table 1 Current status of Bible translation projects

Total number of languages	*Adequate Bible*	*Adequate NT*	*At least one book published*	*Projects currently in progress*	*Projected remaining translation needs*
6912	414	1068	873	1678	2644

biblical languages of Greek and Hebrew, translation into the lesser-known languages of the world has been increasing dramatically through the work of personnel in organizations such as Wycliffe Bible Translators, SIL, and member organizations of the United Bible Societies (UBS).

Overview at the Beginning of the 21st Century

At the beginning of the 21st century, the following figures reflect the current status of Bible translation efforts into the world's languages. According to the Ethnologue (15th edition), which is a comprehensive listing of the languages of the world, including data on many particulars for each language, such as language family classification, number of speakers, geographical location, and need for Bible translation, there are 6912 languages in the world. The United Bible Societies reported in 2003 that some or all of the Bible has been translated into 2355 languages. Of these languages, 414 have an adequate Bible, 1068 an adequate New Testament, and 873 have at least one book of the Bible (Table 1).

In addition, the total number of languages in which Bible translation is in progress worldwide is 1678, of which 1410 are deemed to be in languages lacking an adequate translation. The number of languages in which no translation project has begun is 2644, which covers an estimated population of 147 million.

Comments on Areas of Greatest Concentration

Approximately 60% of the world's remaining need for translation into lesser-known languages is found in three major geographical areas: Papua New Guinea and the Indonesia archipelago, East Asia, and central Africa plus Nigeria. Papua New Guinea holds the distinction of being the country with the largest number of identified languages (812), perhaps as many as 400 of which are still in need of translation work.

SIL, whose members are currently working in 1376 languages, adopted at the turn of the century a bold thrust known as Vision 2025. Simply stated, Vision 2025 focuses on seeing a Bible translation program at least started by the year 2025 in every language of the world that needs one. To accomplish this will require a radical quickening of the pace for entering programs, ramping up the number of new starts to approximately two every week. The enormity of Vision 2025 becomes clearer when contrasting the figure for new starts with the previous high point of new translation program beginnings, which took place in the year 1992. New starts were reported worldwide that year in 25 language programs, or an average of almost one every 2 weeks. Since adopting Vision 2025, SIL International reported that from 1999 to 2004, 356 new Bible translation programs began. This was the highest number during any 4-year period in history, averaging one new start every 5 days.

Basic Challenges of Bible Translation and Communication

The communication of meaning from one language to another is complicated by many factors. In discussing issues of translation into lesser-known languages, many obvious hurdles immediately come to mind. For example, how does one communicate the effect of the Apostle Paul experiencing shipwreck, when the audience receiving the translation in Saharan Africa has never seen nor experienced life near a sea? This dilemma is quite common. However, other factors also complicate the process, including sociolinguistics, lexical challenges, grammatical intricacies, and presentation of background information.

Sociolinguistics

Sociolinguistic matters often surface quickly in the implementation of a Bible translation program. For example, decisions must be made regarding various important biblical terms. The difficulty revolves not just around making the appropriate decisions between two or more terms and any semantic overlap involved but also in agreement and buy-in among the Christian community (if indeed there is such a community among the receptors of the translators). Difficulty arising from sociolinguistic decisions can be seen in recent translation efforts in a major translation project in Asia, where two different words for God have

been used in parallel translation efforts. Different translation teams argue for their chosen term on the basis of its historical significance as opposed to current usage, underlying assumptions regarding its non-Christian usage, and cultural ramifications.

In the Sa'a language of Solomon Islands, two different dialects are represented, and each dialect is populated primarily by one denomination. Each denomination has used different terms for 'cross,' which is obviously an important term in the New Testament. Choices for which term to use are sociolinguistically oriented, as one term might alienate one denomination and prejudice them from using the translation. If so, another translation might be needed that is denominationally accepted. Translation committee members and decision makers need to be confident that a compromise solution will be acceptable to a majority of speakers. This type of issue must be resolved for the translation to be successful.

Lexical Challenges

Basic challenges of finding the right word to include in the receptor language translation often revolve around unknown terms, such as boats used by the Apostle Paul, camels referred to in Genesis, olive trees populating the hill near Jerusalem, and sheep that are used by Jesus in a teaching situation. Houses are obviously known throughout the world, but the flat-roof houses of biblical times must be represented in the translation so that language community members can understand Jesus' prohibition against going down from the roof to take anything out of the house during times of trouble (Matthew 24:17). Without adequate background and understanding, readers will be confused, because in many cultures, people go on to the roof of their houses only to repair them, not to carry out daily activities in a usable living space.

References used for the spirit world require particular care and investigation. In using a word to communicate the meaning of 'angels,' for example, questions to be considered include: Is there a concept of angels at all? Are angelic appearances and visitations common, or something merely known through Scripture? Is the term that translates 'angels' one that is in common use? Is the chosen word a transliteration of a major language word, or specific to the receptor language? Similarly, how are the concepts of 'demons' expressed? The translator must determine whether the suggested term is used to express 'spirits of people who have died,' and whether or not associated connotations of the term include a reference to evil activity. If not, that connection will have to be expressed explicitly.

Titles of Christ have generated controversy recently in several places in the Middle East, as translators have grappled with a suitable rendering of 'Son of God.' At issue have been the implications of the use of the term; namely, that a literal rendering of 'son of' implies that sex was involved in the generation/birth of Jesus. As such, many translators feel that the phrase should be avoided and a meaningful representation used instead that expresses the relationship, purpose, and function associated with the term. Others have argued that the form used by the biblical authors was divinely inspired and thus should be used without apology. Compromises and alternative solutions are not easily found, as the chosen term is regarded as crucial to faithful and accurate translation.

Theological concepts including 'grace,' 'forgiveness,' and 'repentance' require special care. The translator must determine the range of meaning used in the New Testament and decide which choice would be appropriate in the passage being translated. This is done with an awareness that often the meaning represented in these terms varies in the Scripture, depending on context, genre, author, and purpose.

Theology is a powerful force in translation. Receptor language deviations from established lexical expectations can lead to fairly harsh responses. For example, in a major translation project in South Asia, copies of a new common-language translation were burned in 1980 and 1981. Foreign Christians in that country who were knowledgeable about *Today's English version* felt that the local translation had 'fallen into a similar pit' as the *Today's English version* by removing overt references to the blood of Christ, choosing instead to render those passages by meaningfully expressing the purpose of his death. Thus, the local translation was accused of reducing the effect of the passages that teach the atonement of Christ. Although the translators felt that they were helping the readership with their approach, this was theologically unacceptable to several people of influence, and thus the books were permanently removed from any prospect of circulation.

An inventory of color words is often in short supply in a language. This poses a particular difficulty in Bible translations in such passages that, for example, delineate the colors of thread used in the making of the Tabernacle, or the colors of the stones in Revelation. The same can be said for numbers. Some languages of Papua New Guinea, such as Kewa, have an elaborate numbering system, using different points of the arm and face as numerical reference points, with some 47 body parts enumerated. However, another language in the same country has only three vernacular number designations: 'one,' 'two,' and 'everything

else.' Solutions to this translation problem often include borrowings from a national or regional language, which in the case of Papua New Guinean languages might include some form of Tok Pisin.

Delineations of birth order among siblings can also present interesting challenges. In many languages, for example, there is no one word for 'brother.' The concept of 'brother' cannot be expressed apart from a designation of older or younger brother. Similarly, in regard to kinship terms, one linguist in Ecuador reported recently his consternation at trying to represent the term for cousin. He reported that there were 16 different words for cousin, but none of those were generic enough to match the concept expressed in Paul's letter to Colossae, "Mark, the cousin of Barnabas" (Colossians 4:10).

Likewise, concepts of time, such as the expression of 'month' or 'year,' are sometimes not easily expressed in languages with a single term, but are tied to natural phenomena such as the ripening cycle of a particular fruit or nut tree. Likewise, unfamiliar quantity measures, such as the Hebrew 'bekah,' are first calculated in terms of a local language substitute and then perhaps rendered in the translation with a national language word related to kilogram.

Careful consideration is also given to taboo words, or words that are prohibited from being read publicly. Even though translators are able to employ readily appropriate expression of certain concepts, such as circumcision or a description of the woman "with an issue of blood" (Leviticus 12:7, Luke 8:43), more than one local language Bible translation committee has determined that the reading of these terms in public could be considered scandalous. The resulting reaction could cover a scale from failure to utter this term during a public reading to the nonuse of the translated Scriptures by a language community. In certain extreme cases, action might even be taken against the translators, and the published books might be removed from circulation. In more than one place, this removal has been through public burning.

Grammar

It is safe to say that thousands of pages of comments could easily be written about grammatical issues and their effect on Bible translation. The following examples are merely representative. Untrained, beginning translators often reproduce the form of the source text in terms of sentence length, word order, and position of vocatives in sentences. Only when these translators develop in their skill and experience do they begin to make natural adjustments for the receptor language. A simple example from Ephesians 1:3–10 highlights possible adjustments needed to sentence length. The Greek New Testament renders these verses as only two sentences. However, many lesser-known languages need to express this information in several sentences, as is done in English in the New Living Translation, which uses nine sentences to render these verses. This translation approach is an attempt to distribute the information load in a meaningful fashion without being tied closely to forms of the original.

In terms of word order, Hebrew is generally recognized as a VSO language; that is, one in which the verb is often in first position in the sentence, with the subject and object following. New Testament Greek, however, is generally recognized as an SVO (subject, verb, object) language. Word order differences are caused by many factors. Among these are prominence, statement type, and participant reference. The translator must discover first the intent of any word order variations and how the corresponding function is expressed in the receptor language. One will note that even though Hebrew and Greek have different word order types, the translator must determine how to render effectively word order signals into the receptor language.

The representation of direct speech varies by language. Linguists working in Munduruku of Brazil reported that there were no natural language examples of indirect speech. Thus, the New International Version text of Genesis 29:12, "He had told Rachel that he was a relative of her father and a son of Rebekah," would have to be rendered with a form of direct speech: "He had told Rachel, 'I am a relative of your father and a son of Rebekah.'" These adjustments can be quite cumbersome for translators.

Rhetorical questions, which are extremely common in the New Testament and particularly in Paul's Corinthian letters, are not easily handled in many languages. The reason for this is that New Testament Greek employs rhetorical questions for several different functions and purposes. The receptor language, however, may only use one of those functions, such as scolding. Therefore, for the translator to mirror the form of the Greek with a question will lead to inaccurately communicated meaning. Instead, a declarative statement will have to be used to deliver the true meaning.

Recent controversies in the United States and Britain regarding inclusive-language translations in English are for the most part nonissues in hundreds of the world's languages. The reason for this is that the pronoun systems of many languages do not reflect the narrow inventory of pronouns used in English. For example, Cheke Holo of Solomon Islands employs six different first-person plural pronouns. Three of those used for the term 'we' include the person being addressed in conversation, and three of

them exclude those addressed. This reflects the common designation in Austronesian languages of inclusive and exclusive pronouns. The other distinctions in this set include two, three, or more than three persons being referred to by the pronoun. Cheke Holo also uses eight different pronouns for third-person plural 'they.' The designations include whether or not men or women are speaking or being spoken to, and how many within the set of plural are being referred to (namely, two, three, or more than three).

Grammatical obstacles range far above lexical and sentence-level considerations to the discourse level, as Robert Longacre has described in his many publications, including his definitive work, *The grammar of discourse*, and in the application of his theory to biblical texts in *Joseph*. The translator must know how subjects once identified in a discourse are to be identified in subsequent occurrences in the story. This means that once Peter is identified by name in Acts 2, will the local language allow him to be repeated by that designation in natural storytelling, or will a pronoun set obligatorily be used? If a pronoun is used, is there any limit as to how many times it can be used in a discourse? The successful translator grapples repeatedly with this type of question.

The same can be said for verb tenses. In some languages the time of action is marked at the beginning of a discourse and then not repeated, though some languages might need the tense marker to be repeated throughout the passage. The repetition of the marker might signal different reasons and responses for the reader. Obviously, this is discovered through extensive language investigation, and the representation of these features in a natural way is often regarded as a key step toward a truly communicative translation.

Background Information

One of the biggest challenges for translators of the Scriptures into lesser-known languages is how to deal with the background information needed to ensure successful communication of the scriptural message. Linguists working among the Dumagat of the Philippines reported that the receptor audience could not easily assimilate the intended meaning of the translated text because they were not familiar with the cultural information of biblical times (even balking at such basic concepts as shepherd), which distracted them from grasping the intended message of scriptural passage. For the Mamainde of Brazil, SIL linguists commented on a similar situation. The local speakers could easily get distracted in reading or hearing the passage about the burial of Jesus because they would wonder why a person would be buried in a cave, and why a stone would be rolled in front of it. Presentation of those facts could cause the hearers to miss the implications of Jesus' death. So, the translator wrestled with how to present this information, commenting that an adaptation would better suit the language community than a product strictly called a translation. Thus came about the development and implementation of bridging strategies, in which vernacular teaching materials and a system for presenting background information are a necessary part in the planning of a language program.

For example, SIL linguists working among the Adioukrou of Côte d'Ivoire reported that readers were missing key, intended information in stories related to the unseen world. Through controlled experiments, the Adioukrou were able to connect with the reality of the biblical world by the use of common receptor language terms. Among devices that helped supply necessary background information for accessing contextual meaning for certain narratives, they found that footnotes were quite effective.

The Future of Bible Translation

Shifts in Theory

Wilt (2003) and Gutt (2000) describe shifts taking place in translation studies, as the effects of advances in related disciplines are measured. Gutt particularly concentrates on strides made in communication studies, and his findings have great implications for the translation practices for lesser-known languages. He has shown extensively how the effect of the study of inferential communication and cognitive effects will cause translators to consider ways of adjusting the hearer's understanding. In previous practice, these kinds of gaps were often automatically bridged by placing background information explicitly into the translated text, but these kinds of adjustments are not always the most useful or faithful to the canon, and so other strategies are considered. Among these strategies are the implementation of extensive and intentional helps, including detailed marginal notes and study aids. Explication within the text is still used, but within tighter and more justifiable theoretical boundaries.

Shifts in Classification

In discussing types of translation into lesser-known languages, reference is often made to the classic scale proposed by Beekman and Callow, which classified translations ranging from highly literal to unduly free. Nida first used the term "dynamic equivalence" to describe meaningful translation, signifying that the translation was to evoke the same response in the

receptor language group that it did among the original hearers. Later, he employed "functional equivalence" to indicate that the meaning of the original communication was clearly expressed, as opposed to "formal equivalence," which was an attempt to represent the forms of the biblical source text in the receptor language.

However, recent presentations by translation consultants in SIL indicate that one might profitably consider a scale of adaptation based on receptor audience need for contextual background. That is, translations or adaptations are classified according to the degree of adaptation, thus providing the translator the necessary latitude to blend into the text the background information needed by the contemporary audience. The inclusion of such information would be considered to be outside some boundaries of acceptable translation, as the biblical authors did not need to make such information explicit for the original audience. But, by thinking in terms of degrees of adaptation which legitimize different translation product approaches for different types of audiences, various context-building and bridging strategies can be usefully implemented in ways that were not previously allowed because of adherence to the Beekman-Callow scale of translation types.

If a language group requires significant amounts of information for context building, it is better to label such efforts as products derived from Scripture rather than stretching the term "translation" to try to include them, as the resulting product should not be confused with Scripture. This is advantageous because a translation team can benefit from the freedom to present the translated message in various stages of release. That is, rather than being tied in the initial release to a publication that necessarily reflects a canonical translation, or one that is recognizable in form and accuracy to an accepted source, the translation team can choose an adaptation within various degrees, all the while building biblical literacy for a receptor language group. This approach prepares the language group for a further translation effort – one that indeed can be classified as translation, and one that is recognizable as canonical, acceptable, and authoritative.

Delivery of Scripture

Storying Approaches for Oral Cultures Chronological Bible Storying, particularly as developed by the International Mission Board of the Southern Baptist Church, is increasingly employed in efforts to reach oral cultures. Claiming that 1.5 billion people will never learn to read and write, and that two-thirds of the world's population are functionally illiterate, the International Mission Board is endeavoring to implement a full array of translated stories into various cultures. Standard story sets and a common base text are chosen. These can then be translated and shared with a language group in an effort to build among them a biblical worldview by introducing basic facts, terminology, and the overall picture of redemptive history, though not calling this a Bible translation. Instead, this is a tool for building biblical literacy and bridging cultural gaps. The board is partnering with three other major mission agencies in the Epic Partnership, which is an attempt to share the Gospel message more effectively by laying the groundwork of easily understood stories translated into lesser-known languages.

Audio Many of the world's nonliterate population will never learn to read, because of factors ranging from lack of educational opportunities to lack of reading materials in the language. In light of this, strategies must be in place to assist nonreaders. Hosanna/Faith Comes By Hearing Ministries is one organization, for example, that works successfully in cooperation with those who translate, print, and distribute Scripture to reach an oral audience.

Video In addition to audio presentations on cassette and compact disk, video has been a powerful force among language communities, most notably through the Jesus Film movement of Campus Crusade for Christ. The film has been completed in 877 languages.

Internet The International Forum of Bible Agencies has developed a website for retrieving and viewing published scriptures in the world's languages. This site is intended to be a central and widely known repository that agencies can use to share their Scripture publication resources with a world readership.

Computer Enhancements

The personal computer has enabled a veritable revolution in the Bible translation world. Drafts of translated Scripture are easily entered, stored, and revised throughout the translation process. Though technological advances are still limited in many places, the number of translation teams that rely on handwritten and typewritten texts, and that depend on others to record their work, is rapidly decreasing.

Beyond simple word processing, personnel in SIL and United Bible Societies have collaborated on several breakthrough software programs that enhance translators' abilities to adequately translate Scripture. Translator's Workplace is an extensive library of ref-

erence materials specifically geared toward Bible translators, although because of copyright restrictions, it is only available to qualified individuals working in Bible translation. Whereas there are numerous commercial software programs available that provide multiple versions of Scripture and an extensive list of reference works, Translator's Workplace focuses on providing aids that are translator specific, such as the journals *Notes on Translation* and *The Bible Translator*, the *Translator's handbooks* of United Bible Societies, and major language translations such as Hausa, Tok Pisin, or Norwegian, which are useful as base texts for some translators but that are not readily found in most commercial programs.

The Biblical Analysis Research Tool is part of the Translator's Workplace suite of programs, although a commercial version is available to the public. The Biblical Analysis Research Tool enables the translator to analyze the biblical text in ways that heretofore have been impossible. These include adjustment of the layout of the biblical text on the screen to reflect discourse groupings or experimentation, links to lexical and grammatical helps, and user-defined tags that can be stored and accessed to reflect the analysis of data. The Biblical Analysis Research Tool features an interlinear gloss of the Old Testament done by SIL scholars and is based on syntactic and semantic considerations.

Paratext, which has primarily been developed by United Bible Societies, is a computer program designed for inputting Scripture translation on-screen, viewed parallel to a major language or biblical text version and limited reference tools. Recent enhancements to Paratext make it the premier software for translators to use in preparing their translations for typesetting and publication.

For many years, computer scientists with an eye toward Bible translation have wondered how the power of the computer can be leveraged to assist with transferring meaning from one language to another with greater ease than is traditionally seen (beginning from the usual starting point of initial exegesis followed by a first draft done by hand). Two software programs have been important in this realm of experimentation and implementation. One is the Computer Assisted Related Language Adaptation program, pioneered among closely related Quechua dialects of Peru. The computer processes a thorough morphological and syntactical analysis, and the rules arising from the analysis are applied from the source language to the related language output. Another program that enables computer transfer of biblical texts is Adapt It, recently developed by SIL linguist Bruce Waters in Papua New Guinea. It differs from Computer Assisted Related Language Adaptation in that it does not require the heavy investment of time and expertise in language analysis to be effective. Though much more than a lexical substitution program, this is a key feature of the program and one which reduces the time needed for translation from one related language to another.

Although these computer tools provide for a useful first draft, the users are cautioned that in no way is the initial output a publication-worthy draft. The use of either of these programs brings up new issues for translators and consultants, including considerations surrounding the related language base text used for the initial transfer. The reliability of that text must be determined. Also, the translators must consider the kind of checking that must be done on the outputted text, being aware of the large amount of necessary work remaining after first-draft generation by computer. These concerns must be considered carefully before work can proceed.

Partnership

One of the most encouraging movements in Bible translation in the 21st century is the emergence of the International Forum of Bible Agencies. It is estimated that 95% of the world's Bible translation projects are conducted under the auspices of at least one of these member organizations. At present, the Forum is an association of 25 major nonprofit organizations that cooperate in translation efforts to avoid unnecessary duplication of effort. The work of Bible translation and distribution has been enhanced by the spirit of mutual concern and cooperation, evidenced by the implementation of joint agreements regarding basic principles and procedures for translation and qualifications for translation consultants. Regional and national forums are forming and gaining momentum, and this kind of coordinated partnership pro-

mises to be a significant development in the future of Bible translation.

See also: Computers in Field Linguistics; Context, Communicative; Ethnologue; Grammar; Lexicon: Structure; Nida, Eugene Albert (b. 1914); Pike, Kenneth Lee (1912–2000); Social Aspects of Pragmatics; Translation: History; Translational Equivalence.

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Bible Translations: Ancient Versions

T Edwards, Oxford, UK

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The Septuagint (LXX)

The LXX is the Greek translation of the Hebrew Bible that originated among the Greek-speaking Jews of Alexandria. The legends surrounding the initial translation of the Pentateuch on the island of Pharos by seventy (-two) Jewish elders from Jerusalem in the 3rd century B.C. have spawned its name, despite only relating to the translation of the first five books (*Letter of Aristeas* 310–311; Philo *Life of Moses* 2: 25–42).

Various theories concerning its inception have been promulgated, yet no consensus has been reached. Many have seen the legends found in the *Letter of Aristeas* as containing elements of truth and have thus posited royal initiative (King Ptolemy II, 285–246 B.C.) behind its inception, while others have seen the liturgical needs of the Greek-speaking Jews of Alexandria as the reason, this latter theory being based on the premise that the Jewish populace could no longer understand the Hebrew Bible that was read each week in the Synagogue. More recently it has been suggested that the LXX arose amongst bilingual Jews who understood both Greek and Ancient Hebrew, and thus there was an educational focus behind its inception. In other words, the Greek translation of the Pentateuch was intended as an interpretive aid designed to bring the readers to the Hebrew text rather than the Hebrew text to the readers. The Greek text, therefore, was originally dependent upon the Hebrew and subservient to it. It is this latter option that perhaps best explains the origins of the LXX, yet such a relationship to the Hebrew does not best describe the development of the LXX in the subsequent centuries. Over time, the ability to understand Hebrew among the Greek-speaking Jews clearly waned, and therefore the LXX gradually became independent of the Hebrew original. Such a development initiated debate as to its relative merits and authority, with its detractors claiming that the original meaning of the Hebrew is lost in translation (prologue to *Ben Sirah*), whereas its supporters argue for the divine inspiration of the translation that is to all intents and purposes exactly like the original (*Letter of Aristeas* 310–311; Philo *Life of Moses* 2: 37–38). This debate was initially an intra-Jewish affair, but with the adoption of the LXX by the Gentile church, the early church fathers enthusiastically embraced the latter view of the divine inspiration of the LXX. Such a situation, alongside a desire to bring the Greek text closer in line with the Hebrew, led to various revisions of the Greek text by Jewish scholars.

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The Three: Aquila, Theodotion, and Symmachus

The Greek translations of Aquila, Theodotion (both second century A.D.), and Symmachus (late 2nd/early 3rd century A.D.) are preserved, in part, in Origen's Hexapla. All three are clearly Jewish translations that display numerous links with rabbinic interpretations of scripture, with Aquila being quoted on numerous occasions in both Talmuds. Both rabbinic and patristic sources state that Aquila was a proselyte, although attempts to link him with the targumist Onkelos are not sound. Theodotion has been described as a Diaspora Jew, whereas Symmachus should be located in Caesarea of Palestine.

As hinted at in the preceding section, it appears that there are two probable reasons behind their inception: the adoption of the LXX by the Christian church and/or the desire to correct the LXX by bringing it closer in line with the Hebrew. This latter reason is particularly relevant for Aquila and Theodotion, who are very literal in their renderings of the Hebrew. Aquila took the literal approach to the extreme, possibly influenced by the teaching of R. Akiva on the divine significance of every letter of the scriptures, and even translated the Hebrew particle that denotes the accusative. Symmachus, however, avoided literalism and produced a much freer translation in good biblical Greek.

The Targumim

There are a variety of Jewish Aramaic translations of the component parts of the Hebrew bible (Pentateuch, Prophets, and Writings), all with differing styles. Targum Onkelos to the Pentateuch and Targum Jonathan to the Prophets, however, were the only two authorized Targumim within rabbinic Judaism, both of which originated in Palestine and were later adopted and revised in Babylonia (probably no later than the 3rd century A.D.). Both Onkelos and Jonathan are literal renditions of the Hebrew, yet both display influence from contemporary rabbinic thought. There are two other complete Targumim to the Pentateuch, Neofiti and Pseudo-Jonathan, both of which are Palestinian in origin and very expansive in style. Neofiti dates from the 2nd century A.D., but contains traditions of interpretations that are older, whereas Pseudo-Jonathan is written in a different style of Aramaic, probably dating from the ninth century A.D. There are also Targumim to all the books of the Writings except Ezra, Nehemiah, and Daniel. These Targumim vary in style and date, although the majority are late (7th century A.D. onward) and expansive in style. It should be noted that with all the Targumim dating is difficult, as they are all contain traditions that are quite often older than the Targum itself, and contain little internal evidence that permits an exact date of composition. Alongside all these there are collections of fragments of Targumim that emphasize the multiplicity of this genre of translation.

Debate continues however as to the original reason for translating the Bible into Aramaic. By far the majority opinion has been that the Jewish population in Palestine had forgotten Hebrew and thus needed an oral Aramaic translation for use in the synagogue alongside the public reading of the Hebrew Bible. Numerous rabbinic references surrounding the correct way to read the scriptures and then translate into Aramaic appears to support such a conclusion (e.g., Mishnah *Megillah* 4: 4). However, a greater understanding of the multilingual environment of Jewish Palestine has prompted a reassessment in some circles to question this as the initial reason for their inception, and an educational function, somewhat similar to the LXX, is being posited. The Targumim are seen as an element in the rabbinic curriculum (*Sifre Devarim* 161), linking the Written Torah (scriptures) to the Oral Torah (rabbinic literature/tradition), and are never spoken of independently of the Hebrew. In other words, they were designed to be read alongside the Hebrew and not to replace it. Such a conclusion is supported by the numerous manuscripts that preserve the Targumim alongside the Hebrew and not independently of it, as well as the fact that there are Targumim for parts of the Hebrew bible that had no liturgical function whatsoever (e.g., Job). Such a conclusion does not deny their liturgical function, but only questions that function as the reason for their inception.

The Peshitta

The Syriac version of the Hebrew bible is called the Peshitta ('simple version'), and is a collective work completed by the early 3rd century A.D., most probably in the region of Edessa. Its collective nature is clear from the comparison of different books that betray diversity in style. Such diversity, however, is best explained as originating among colleagues in a single school rather than from different communities with different agendas. The main question concerning the origin of the Peshitta is whether it is Jewish or Christian in origin. Numerous passages suggest a relationship to the New Testament and appear to preserve Christological interpretations, and some passages appear to be influenced by the LXX. Such findings have caused some to posit a Christian origin for the translation. On the other hand, there are

numerous passages that betray influence from Jewish exegesis of scripture, and there are a number of parallels with rabbinic sources. These facts, combined with the fact that the Hebrew text was clearly the basis for the translation, suggest a possible Jewish context for its origin. The debate remains open at present, although serious consideration must be given to the Jewish origin of at least the Pentateuch, if not for the whole book.

A brief mention should also be made of the Syro-Hexapla, which is a 7th-century translation, by Paul the bishop of Tella, of Origen's revision of the LXX text, but also taking the translations of Aquila, Theodotion and Symmachus into account.

The Vulgate

In the late 4th/early 5th century, in Bethlehem, Jerome undertook his new Latin translation, not from the LXX as with his previous translations of biblical books, but from Hebrew, described by Jerome as the *Hebraica Veritas*, the true Hebrew text. Jerome's was the first Christian translation of the Hebrew, and although of great importance was not initially accepted as authoritative, but simply added to the multiplicity of Latin translations current at that time, a multiplicity that Jerome was fighting. Surviving fragments as well as quotations from church fathers provide evidence for this multiplicity of Latin texts, although it is hard to tell if they all stem from an original or are independent of one another. They are grouped today under the rubric *Vetus Latina*.

The Vulgate, as we know it today, is essentially the stabilization of two traditions: Jerome's *Hebraica Veritas* and the Old Latin versions of the LXX, with the *Hebraica Veritas* taking precedence where the two are in conflict, and thus the original aim of Jerome of providing an authoritative Latin version was eventually realized.

Within Jerome's work there is clear evidence of the influence exerted by his Jewish teachers as well the probable influence of classical sources with which he was so familiar.

Ethiopic

The Ethiopic bible is a Christian translation of the Greek New Testament and the Hebrew Old Testament, with the gospels being translated by the early 5th century A.D., closely followed by the Psalms, Job, and Isaiah, with the whole project being completed by the 7th century. The commonly held view that the translation was completed by Syrian missionaries using the Peshitta text as their source text needs revising, as it is clear that the Hebrew was the source, with the Syriac exerting some influence.

See also: Approaches to Translation, Linguistic; Aramaic and Syriac; Bible; Bilingualism; Ethiopian Semitic Languages; Hebrew, Biblical and Medieval; Hebrew Linguistic Tradition; Inspiration and Revelation; Latin; Religion and Literacy; Sacred Texts: Hermeneutics.

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Bible, English

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Historical Context

The history of translating the Bible into English has as its wider communications context the world of western Christendom, dominated for about 1000 years by the Latin language and the text of Jerome's *Vulgata*. This 4th century C.E. translation quickly displaced earlier Old Latin versions and by the Carolingian era became the western Church's official text of the Bible. It was within the context of the lengthy Latin dominance in the British Isles that the initial efforts to 'English' the Bible began to emerge. These impulses were generally related to reforming movements in the Church, with their particular urgency that scripture in the vernacular would more readily communicate its meaning to the ordinary person than it could in Latin. Opponents of vernacular translation saw it as a threat to accuracy and doctrinal stability. But the precedent encouraging the reformers was that translations had been done already in ancient times for Jews and Christians who could not use the Bible's original languages. So, it would be by translation that English speakers would best be able to hear and read the Bible with understanding, and without need of interpretive 'gatekeepers.'

The Medieval Bible

This was the goal of the influential early translators, John Wyclif (ca. 1328–1384) and William Tyndale (ca. 1492–1536), and also of the translators of the Authorized Version (AV). But already in Anglo-Saxon times there had been 'Englishings' of parts of the Bible, based on the Latin Vulgate. Numerous translations of the Psalms appeared, such as those associated with Aldhelm (d. 709) and Alfred the Great (849–899). The *Lindisfarne Gospels* (ca. 700) feature the Latin text with an interlinear translation glossed in a literal Northumbrian English by Aldred (ca. 950). The *West Saxon Gospels* (ca. 1070) present a complete English text of the Gospels.

It was Wyclif and his Lollard confreres who prepared the first complete English Bible in the latter half of the 14th century, but they had to work from the Vulgate since they did not know Hebrew and Greek. The Wyclif Bible is extant in two main editions, one so literal in approach that it omitted phrases like 'to be' since Latin does not require them. The other edition is considered a later smoothing revision. The preface to the Wyclif Bible contains a sophisticated review of the kinds of problems translators must resolve when working from Latin, with its different verb system. Oddly, this translation had a somewhat antiquated style at its appearance, since Wyclif employed early Middle English at the very time late Middle English was blooming. Although suppressed by Church authorities, some of its phrasings made their mark on the common stock of English biblical language, e.g., "halewid be thi name" (Luke 11.2), and "I shal not dreden euelis, for thou art with me" (Ps. 23.4). Although many copies of this (pre-Gutenberg) Bible were burned, the survival of about 170 copies suggests that a considerable number had been made and that Wyclif's influence was substantial.

The Tudor Bible

By the time of Tyndale, only 150 years later, a virtual sea change had occurred. The Renaissance had spurred intense learning in the biblical languages and textual scholarship, and the technology of printing had been established. Unlike Wyclif, whose English was replete with Latinisms due to his dependence on the Latin text, Tyndale was advantaged by knowing both Greek and Hebrew. His work is thus the first English example of a primary translation, done directly from the Bible's original languages, and not a secondary one, a translation of a translation. His scholarship, and his brilliance with English phrasing, made Tyndale the most influential antecedent of the later AV. Tyndale's aim, as Wyclif's, was to make the Bible accessible to ordinary people. Thus he aimed for an English that was so direct and simple that it could be recited by a plowboy working in the field. Tyndale is widely acclaimed as the inventor of modern English prose, his skillful phrasings turning a somewhat unwieldy language into one of felicity and grace.

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Tyndale's work in the Old Testament is particularly striking and has given many familiar forms and phrases to English prose that are the direct result of Hebrew style and structures. Examples include the parasyntactic style that links clauses by the simple conjunction 'and' (mirroring the Hebrew use of *waw*), the typical Hebrew construct formula 'x of x' ('holy of holies') for genitival and adjectival phrases, and, like the Hebrew language, a simple lexical stock. Tyndale's critics accused him of being overly influenced by Luther and the reformers, and claimed to have found several thousand translation errors. This perception of errors was due largely to the fact that Tyndale worked from the Greek, not Latin. In addition, he chose to render *ecclesia* ('church') as 'congregation,' *agape* ('charity') as 'love,' and *presbyter* ('priest') as 'elder' or 'senior,' to the consternation of traditionalists such as Thomas More. Estimates have been made that at least a third of the AV's wording comes directly from Tyndale, and the rest shows his influence in style, syntax, and word choices. He consistently avoided opaque Latinisms, as is exemplified in his choice of 'our daily bread' for the obscure Greek term *epiousion* in the Lord's Prayer (Matt. 6.11). In contrast, the later Reims-Douai translation merely transliterates the Vulgate text as 'our supersubstantial bread.' Here, no later translation has improved on Tyndale.

When the AV work was begun in 1604, there were as many as 10 earlier English Bibles extant. Several of these were significant. The Bible of Miles Coverdale (1535) appeared only 10 years after Tyndale's New Testament (1525) and five after his Pentateuch. Coverdale was also a major contributor to the Great Bible (1539). The Geneva Bible (1560) was translated by scholars in exile from the persecutions of Mary Tudor (1553–1558) who were sympathetic with the emerging Puritan movement. The Bishops' Bible (1568) was prepared in the first decade of Elizabeth I, to supply a church-approved alternative to the tendentious Geneva Bible with its anti-Catholic polemical notes. The Reims-Douai Bible (1609) was translated by Catholic exiles; it was a literal rendering of the Vulgate, yielding many Latinisms.

The Authorized Version

In the 1st year of his reign, James I (1603–1625) took action on the issue of how to arrive at an English Bible that would be a standard translation preferred by both Church authorities and the people. He appointed a committee of 54 learned divines, and called the Hampton Court Conference (1604), there giving the AV committee its mandate. They were to draw on the best features of all the recent English Bibles, consult the best Hebrew and Greek texts available, use the Bishops' Bible as a baseline text, and produce a translation that would stand above all others and thereby unite English speakers around a common Bible text.

This was less than a century after Tyndale, but by now the largely Cambridge and Oxford scholars assigned to the AV translation committee were very competent in the biblical languages and in biblical scholarship. They were exemplary scholars and their translation theoretics are brilliantly set forth in their preface to the AV, 'The Translators to the Reader.' Nevertheless, they were severely limited in regard to both the number and weightiness of the manuscript copies they then had to work from. For the New Testament, they had access only to late manuscript copies from the 13th to the 16th centuries. The oldest and most weighty of the NT majuscule manuscripts from the 4th and 5th centuries (Codices Vaticanus, Sinaiticus, and Alexandrinus, all late 19th century discoveries), along with even older papyri recently discovered, have subsequently revolutionized the study of the NT text. Revelation 1.5 illustrates this well: the Greek text used for the AV had *lousanti* 'washed,' but the ancient witnesses have *lusanti* 'freed.' The later manuscripts repeat a homophonic copyist's error, so modern translations follow the weightier texts, translating: "freed us from our sins by his blood" (NRSV) not "washed us from our sins in his own blood" (AV).

Because they used the Bishops' Bible as the base, the AV had an archaizing character from the outset. The works of the great poets and writers of the Elizabethan age were already having an impact on English, and the language was swiftly evolving. For example, in the last quarter of the 16th century, use of the possessive 'its' had become common, but 'its' is not in the AV. Curiously, the AV continued to use more awkward circumlocutions such as "toward the forepart of it, over against the other coupling thereof" (Exod. 39.20). The translators also created particular phrasings to translate grammatical distinctives in the biblical languages. The Hebrew infinitive absolute, for example, when coupled with the finite verb, adds intensity. They often covered this with 'surely,' but also resorted to Hebraic style, as in Gen. 22.17, "in blessing I will bless thee." Overall, their skilled use of vocabulary and syntax, their poetic sensitivity and cadenced prose, created what may well be the most influential literary text in English.

Bible Translation: Changing Theory and Practice

Until the mid-20th century, most Bible translation was done according to a methodology called literal or word for word substitution (more recently called formal equivalence or concordance). The AV is the best English exemplar of this approach, as it seeks largely to represent the style and structure of the original language texts as directly as possible in the receptor language. Advocates of this model claim that word for word equivalence yields precision and accuracy. Yet, more often than not, this model yields a translation in an unnatural (e.g., Hebraicized) English, which can actually obscure meaning for the reader/hearer.

Until recently, it was widely thought that all a Bible translator needed was knowledge of the Biblical languages. Through the efforts of linguist-translators such as Eugene A. Nida in the mid-20th century, practitioners in the field of Bible translation gradually became aware that more was needed. Nida stressed that it is as important for clear communication (if not more important) that Bible translators also understand such things as the dynamics of socio-semiotics, and the discourse structure and language patterns inherent to the receptor languages themselves. As the insights of linguistics and audience-oriented translation theoretics were brought to bear on Bible translation, one of the urgent questions was that of accuracy in relation to the sacred text. Jerome, already in the 4th century, was aware of this tension: "From my youth up I have always aimed at rendering sense not words ... A literal translation from one language to another obscures the sense" (Epistle 57.6). Luther also recognized this: "Whoever would speak German should not use Hebrew style ... Once he has the German words that serve the purpose, let him .. express the meaning freely in the best German he knows" (*Weimar Ausgabe, Tischreden* 2.648–649). The reality is that almost all Bible translation now being done operates on the same spectrum between the poles of literal and free and incorporates both. The guiding maxim of the NRSV Bible (1989) was "as literal as possible, as free as necessary" (*see* **Translational Equivalence**).

Modern English Translations of the Bible

The history of the English Bible from the early 1600s to the mid-20th century has largely been that of the AV, with numerous updates of its orthography and wordings over the centuries, seeking to assure continuing meaning for readers increasingly distant from the archaisms of Elizabethan English. The period from 1611 to 1881, despite the AV's dominance, saw the preparation of about 70 English translations. By the late 1800s a major revision of the AV was needed to bring it up to date with the startling new manuscript discoveries and new learnings. The result was the English Revised Version (RV, 1885) in Great Britain and the American Revised Version (ASV, 1901) in the United States. These were very concordant revisions, prized in some churches for their literalness, but for readability and natural English style they represent a step backward. Some scholars have said that Tyndale's phrasings in many cases have a more modern ring. The 20th century, especially its latter half, witnessed a proliferation of new Bible translations in English. And in the 1980s and 1990s most major English translations were revised substantively to bring their English better into line with the shifts in common usage then occurring in the language for handling gender inclusiveness. Curiously, the AV translators had already addressed this issue, in microcosm, when they chose consistently to translate Hebrew *bene Yisra'el* 'sons of Israel' as 'children of Israel,' since Hebrew used it inclusively for 'the people.'

Among the most significant of the modern English Bibles are the following. The Revised Standard Version (1946–1952, further revised in 1989 as the New Revised Standard Version) may be the most influential English version of the 20th century. The Jerusalem Bible (1966, revised 1985), first translated into French in 1961, was brought into English by a team of Catholic scholars, largely British, aiming at the natural English style of educated speakers of British English. The New English Bible (1970, revised 1989) was translated by a British interconfessional team. The translational approach is functional equivalence at a high literary level. The churches were generally critical of this Bible, finding the language too different from the familiar AV. TANAKH (1985) is a high-level, nonconcordant English version of the Hebrew Bible, translated in the United States under the aegis of the Jewish Publication Society.

See also: Bible Translation into Lesser-Known Languages; Bible Translations: Ancient Versions; Bible, English; Translational Equivalence.

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Bickerton, Derek (b. 1926)

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Derek Bickerton was born in Cheshire, England. His initial training was in English literature, and he got his B.A. in 1949 and M.A. in 1967 in this field from the University of Cambridge. Before starting his career as a linguist in the 1970s, he wrote fiction, including poetry, short stories, play scripts, and novels, while living in Madrid, the Mediterranean islands of Ibiza and Mallorca, and Barbados. He first developed his interest in linguistics in Barbados. Bickerton initially supported himself by teaching English as a second language, but in 1964 he was employed as a lecturer in modern English at the University College of Cape Coast in Ghana. In 1967, he was appointed as a senior lecturer in the English language and linguistics at the University of Guyana. In Guyana, his major research interest in Creole languages sprouted from an exposure to the local Creole language (Guyanese Creole [Guyanese Creole English]). The result of the research he conducted on Guyanese Creole was published as *Dynamics of a creole system* (1975), shortly after he moved to the University of Hawaii. He has accepted many visiting positions at various institutions such as the University of Michigan, State University of New York at Stony Brook, Universidade de Campinas (Brasil), Unversidade Católica in São Paulo, Universidate Federale (Rio de Janeiro), University of Texas at Austin, Universiteit van Amsterdam, and Université de Province.

In Hawaii, Bickerton started to study Hawaiian Creole (Hawaiian Creole English) and found many features shared with other creole languages including Guyanese Creole. The research in Hawaii eventually developed into his best-known theory, 'Language Bioprogramming Hypothesis,' according to which language emerges through an evolutionary neurobiological process, forming an integral part of the human brain. The claim is about the nature of universal grammar (UG), but differs from Chomsky's in that Bickerton sees that genetically inherited bioprogramming, which is responsible for language acquisition, unfolds gradually, while Chomsky insists on instantaneous acquisition of language. Creolization is regarded as the outcome of the learning of a pidgin language by children. Notably, pidgin languages differ diversely, but creole languages do not. Furthermore, grammatical features shared by creole languages are often not found in pidgin languages, although the latter precede the former. Since creolization, but not pidginization, involves the acquisition of language, which is prone to bioprograming, the recurrence of certain features is expected in creole languages, but not in pidgin languages.

Bickerton's idea has attracted the attention of a large audience through the most widely cited and reviewed creole work, *Roots of language* (1981), in which the evolution of creole languages from pidgin languages was delineated within the framework of the Language Bioprogramming Hypothesis. *Language and species* (1990), the book following *Roots of language*, focused more on the explanation of a more general evolutionary biological process leading to the emergence of human language, which radically differs from animal communication systems.

See also: Chomsky, Noam (b. 1928).

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Bikol

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Bikol refers to a group of three related Austronesian languages spoken in the Bikol Region of the southern Luzon peninsula of the Philippines, one of the central Philippines' most dialectally diverse areas. As a branch of the Central Philippine subgroup, Bikol is coordinate with the Tagalog and Bisayan branches. The Bikol branch contains 2 of the 12 major Philippine languages (i.e., those having more than 1 million speakers), with Northern Bikol (Central Bicolano) (including the standard Bikol of the cities of Naga and Legaspi) having 2.5 million speakers, and Southern Bikol (Bicolano, Albay), with about 1 million speakers. A third language, Northern Catanduanes Bikol (Bicolano, Northern Catanduanes), has a population of approximately 100 000. Most speakers of a Bikol language simply refer to their language as 'Bikol' without any further distinction of the specific language or dialect they speak. Furthermore, the name Bikol is also used by native speakers to refer to two dialects in central and southern Sorsogon province, even though these dialects are generally classified as Central Bisayan dialects with heavy lexical borrowing from Bikol.

All of the Bikol languages are spoken natively solely within the Bikol Region, a political unit that includes the six provinces of Camarines Norte, Camarines Sur, Albay, Sorsogon, Catanduanes, and Masbate. The Northern Bikol language consists mainly of dialects spoken in and around the major centers of Naga, Legaspi, Daet, and Virac, along with the entire northern coast of the Bikol peninsula from Vinzons in Camarines Norte to Prieto Diaz in Sorsogon, as well as in the town of San Pascual in Masbate Province, and Magallanes in central Sorsogon. The Southern Bikol language consists of the Rinconada and Buhi-non dialects of southeastern Camarines Sur, the Miraya dialects in southwestern Albay and Donsol town in northwestern Sorsogon province, and the dialect of Libon, Albay. The Northern Catanduanes language is spoken in the northern half of the island of Catanduanes.

The standard dialect of the Bikol Region is the dialect of the cities of Naga and Legaspi, referred to as 'Bikol Naga' in the towns closer to Naga and as 'Bikol Legaspi' in the towns closer to Legaspi. The origin of this dialect's status can be traced to the end of the 16th century when Naga (formerly Nueva Caceres) was one of only three officially designated *ciudades* and the seat of one of only three bishops outside of Manila. (Doeppers, 1972) This dialect is still used by the church throughout the Bikol Region to the exclusion of all other varieties of Bikol. With the exception of Bikol Naga, most of the speech varieties of the Bikol Region are underdocumented. The only works that have been published on other dialects are a short description (Yamada, 1972) and textbook (Portugal, 2000) for Buhi-non, and a phrasebook (Lobel and Bucad, 2001b) for Rinconada.

The Bikol language (Naga dialect) was first documented by Marcos de Lisboa (d. 1622), whose *Vocabulario de la lengua Bicol* was published posthumously in 1754 and republished in 1865. Lisboa's work was preceded in print by Andres de San Agustin's (d. 1649) *Arte de la lengua Bicol*, first published in 1647, and republished in 1739, 1795, and 1879. Together, these two works represent the basis of nearly everything written about the Bikol language prior to the 20th century.

The major modern works on Bikol include a textbook (Mintz, 1971a), a grammar description (Mintz, 1971b, 1973), a dictionary (Mintz and del Rosario Britanico, 1985), and two descriptions of dialectology (McFarland, 1974 and Lobel and Tria, 2000). With the exception of the dialectology studies, all of these works concentrate exclusively on the standard Bikol of Naga or Legaspi.

During the first part of the 20th century, the Bikol Region was home to a relatively bustling literary scene, but today there are only scattered efforts at reviving a written tradition, and very little can be found in print in the Bikol language other than the Bible and other religion-related materials. In the past decade, there have been efforts to introduce Bikol language subjects in the schools, and several universities have offered electives in Bikol Language and Literature in recent years. In general, the local variety of Bikol is still the language of most daily transactions, with Tagalog and English being confined to educational institutions, most forms of media, and higher-level business and government transactions.

Bikol has the basic Central Philippine-type phonology with 16 consonants / p b m w t d n s l r y k g ng ʔ h /, three vowels / a i u /, contrastive stress, and contrastive length. Some dialects of Southern Bikol have preserved a fourth vowel as a reflex of PAn *e, usually realized as a high, central tense vowel /ɨ/ but also realized as /o/ in Libon. Two dialects have an extra consonant phoneme: Southern Catanduanes, which has an interdental lateral, and Buhi-non, which has

a voiced velar fricative. The Bikol orthography is largely phonemic except that it does not represent stress, length, or the glottal stop.

Bikol is agglutinative, with a complex system of verbal morphology expressing a wide variety of semantic and syntactic contrasts. Although sometimes analyzed as ergative, these languages are probably of a separate type called Symmetrical Voice Languages in which multiple voice distinctions exist, yet none can be considered more basic than the other (Himmelmann, to appear). Like most other Philippine languages, there are four main verbal voices or 'focuses' (Actor, Object, Location, and Beneficiary) and three case distinctions (Nominative, Genitive, and Oblique) marked on Noun Phrases, name phrases, and pronouns by an introductory morpheme. Nouns, adjectives, and verbs distinguish between singular, plural, and in some cases, dual, and verbs may also be marked for reciprocal action. A number of other meanings can be marked by verbal affixes, including accidental, abilitative, distributive, repetitive, causative, social, diminutive, and infrequentive. Tense-aspect-mood distinctions include infinitive, past/perfective, present/progressive, future, imperative, negative, and negative imperative. Both reduplication and repetition are productive mechanisms that can denote diminutive, repetitive, and intensive meanings, among others. Refer to the following tables for more information about: pronouns, case markers, demonstratives, and focus-mood-aspect morphology.

The Bikol languages have much the same grammatical structure as Tagalog, except for (a) a preference for inflecting verbs for plural actors (with the infix *-Vr-*), (b) the existence of distinct imperative forms, (c) the indication of repetitive action by a verbal affix (*-para-*), and (d) a more elaborate system of case markers that distinguish between referential and nonreferential, and in some dialects, past vs. nonpast.

A noteworthy feature of the Bikol languages is the presence of a speech register reserved for use in anger (Mintz, 1991, Lobel to appear). The lexicon of this angry register is usually either loosely derived or totally unrelated to their normal, nonangry equivalents. As such, an utterance by an angry speaker may hardly resemble an utterance with the same meaning spoken by a nonangry speaker.

See also: Austronesian Languages: Overview; Malayo-Polynesian Languages; North Philippine Languages; Philippines: Language Situation; South Philippine Languages.

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Bilingual Education

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Introduction

The term bilingual education has multiple meanings, with varying positive and negative associations, and a varied history. Take three cases. First, bilingual education is loosely used to refer to schools attended by bilingual children (e.g., Latinos and Latvians in U.S. schools, Greek and Gujarati children in U.K. schools). However, bilingualism is not fostered in such schools. Rather, the aim is to shift the child rapidly from the home, minority language to the dominant, majority language. Second, the term refers to children who are allowed to use their home language in the classroom for only a short period (e.g., one or two years) until they switch to the majority language (called transitional bilingual education). Third, bilingual education appears a more appropriate label for schools in which students learn through two languages in the classroom. For example, there are dual language schools in the United States that teach students through Spanish for one day and the next day through English. In Europe, there are elite bilingual programs (e.g., Luxembourg, Switzerland) in which children both learn, and learn through two or more prestigious languages (e.g., German, French, English).

Types of Bilingual Education

Given that bilingual education has multiple meanings, some clarity is possible by defining different types of bilingual education. Although Baker (2001) and Garcia (1997), respectively, define 10 and 14 different types of bilingual education, a threefold categorization is helpful.

1. 'Null' forms of bilingual education bring together bilingual children but with the aim of monolingualism in the majority language. Submersion education is the term used in academic writing for such education, but not by school systems that tend to use the term mainstreaming. Submersion education implies that the child (on immediate entry to school) only experiences the majority language. The child is thrown into a language at the deep end and are expected to sink or swim in the majority language from the first day.
2. 'Weak' forms of bilingual education allow children to use their home language for a temporary period until they can switch totally to the majority language (Carrasquillo and Rodriguez, 2002). Weak forms of bilingual education include structured immersion, withdrawal classes, various forms of sheltered English, transitional bilingual education, and mainstreaming with foreign language teaching. Second language and foreign language teaching in schools occasionally produces competent bilinguals. Generally, such teaching does not result in age-appropriate proficiency in the second or foreign language, nor reaches a level of language that enables learning of curriculum content to occur via that language. Sometimes, a subset of language abilities is developed for instrumental or practical reasons (e.g., travel, trade, cultural awareness).
3. 'Strong' forms of bilingual education aim for each child, irrespective of ability, to achieve

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3. 'Strong' forms of bilingual education aim for each child, irrespective of ability, to achieve

bilingualism, biliteracy, and cultural pluralism. Such outcomes are gained mainly through students learning content (e.g., mathematics, social studies) through both languages. Strong forms of bilingual education include U.S. dual language schools, Heritage Language programs, Canadian Immersion, and the European Schools movement. Three of these strong forms of bilingual education will be discussed here, so as to define education that has bilingualism as an educational outcome rather than bilingual children as an input.

Immersion Bilingual Education

Immersion education typically has students from majority language backgrounds (e.g., English homes in Canada; Swedish homes in Finland) and teaches them through another majority or a minority language (e.g., French in Canada). However, there are many variations: first, the age at which a child commences the experience. This may be at the kindergarten or infant stage (early immersion), at 9 to 10 years old (delayed or middle immersion), or at secondary level (late or late-start immersion). Second, the amount of time spent in immersion. Total immersion usually commences with 100% immersion in the second language, reducing after 2 or 3 years to 80% per week for the next 3 or 4 years, finishing junior schooling with approximately 50% immersion in the second language per week. Partial immersion provides close to 50% immersion in the second language throughout infant and junior schooling.

Children in early immersion are usually allowed to use their home language for a year or more for classroom communication. There is no compulsion to speak the second (school) language in the playground or when eating lunch. The child's home language is valued and not disparaged. Such children also start immersion education with relatively homogeneous language skills. This not only simplifies the teacher's task, it also means that students' self-esteem and classroom motivation are not threatened because of some students being linguistically more advanced.

Heritage Language Bilingual Education

Heritage language bilingual education occurs when language minority children use their native, ethnic, home, or heritage language in the school as a medium of instruction and the goal is competence in two languages. Examples include education through, or more often partly through, the medium of Navajo or Spanish in the United States (Francis and Reyhner, 2002), or Basque in Spain (Gardner, 2000), or aboriginal languages in Australia (Caldwell and Berthold, 1995). In China, since 1979 minority language education has been provided for over 20 minority groups, partly as a way of improving ethnic minority relationships with central government (Blachford, 1997). In the Canadian provinces of Manitoba, British Columbia, Saskatchewan, and Alberta, there are heritage language bilingual education programs. The heritage language is the medium of instruction for about 50% of the day (e.g., Ukrainian, Italian, German, Hebrew, Yiddish, Mandarin Chinese, Arabic, and Polish). Heritage language programs in the United States (see Krashen *et al.*, 1998) and elsewhere vary in structure and content and overlap with the 90:10 model of dual language education (see later). Some of the likely features are described here.

Most of the children come from language minority homes but may be joined by a small number of majority language children whose parents desire bilingualism in their children. Such parents will often have the choice of sending their children to mainstream schools or to heritage language programs. In most cases, the majority language will also be used in the curriculum, ranging from second language lessons to a varying proportion (e.g., 10% to 50%) of the curriculum being taught in the majority language. There is a tendency to teach mathematical, technological, and scientific studies through the majority language, and to use the majority language progressively more across the grades.

Where a minority language is used for a majority of classroom time (e.g., 80% to almost 100%), the justification is that children easily transfer ideas, concepts, skills and knowledge into the majority language. Having taught a child multiplication in Mohawkian, this mathematical concept does not have to be retaught in English. The **justification** given for such programs is also that a minority language is easily lost, a majority language is easily gained. Children tend to be surrounded by the majority language, especially in the teenage years. Thus, bilingualism is achieved by an initial concentration on the minority language at school.

Dual Language Bilingual Education

U.S. dual language (or two-way) bilingual education typically occurs when there is an approximate balance in numbers between language minority and language majority students in the same classroom. Whereas a 50:50 **language balance** often was advised, the majority language can become dominant (e.g., because of its higher prestige value), putting the aim of bilingualism and biliteracy at risk.

Both languages are used for instruction and learning, revealing that the aim is to produce students

who are bilingual, biliterate, and bicultural or multicultural (Lindholm-Leary, 2001). Dual language schools use a non-English language for at least 50% of curriculum time for up to six grades. In each period of instruction, only one language is used, such that students learn a new language mostly via content. Genesee and Gándara (1999) suggest that such schools enhance intergroup communication and cultural awareness. They produce children who, in terms of intergroup relations, are likely to be more tolerant and sensitive. "Contact between members of different groups leads to increased liking and respect for members of the outgroup, including presumably reductions in stereotyping, prejudice, and discrimination" (Genesee and Gándara, 1999: 667).

Some teachers use both languages on different occasions with their students; others just use one language and may be paired and work together closely as a team. The school ethos also will be bilingual by classroom and corridor displays, curriculum resources, announcements, and extracurricular activity using both languages if possible.

A central idea in dual language bilingual schools is language separation and language boundaries. Language boundaries are established in terms of time, curriculum content and teaching. One frequent preference is for each language to be used on alternate days. Alternately, different lessons may use different languages with a regular change over to ensure both languages are used in all curricula areas. The division of time may be in half days, whole days, or alternate weeks. The essential element is the distribution of time to achieve bilingual and biliterate students. Often, a 50:50 balance in use of languages is attempted in early grades, although in some schools, the minority language is given more time (60% to 90% of the available time). In the later years of schooling, there is sometimes a preference for more emphasis on the majority language.

Bilingual Education and Politics

There is no deep understanding of bilingual education except through understanding the politics behind such education. There are varying philosophical and political origins to bilingual education that underpin different models of bilingual education. For example, bilingual education is best understood by reference to national variations (Cummins and Corson, 1998). The contrasting politics of Canada's two language solitudes and South Africa's management of social integration when retaining multilingualism, the ardor of language activists in the Basque Country and the more gentle revolution in Wales, the suppression of Breton in France, and the historical repression of Native American Indian languages in the United States illustrate that the history and politics of a nation shapes its approach to languages and bilingual education.

The contemporary politics of bilingual education relates to the education of immigrants (e.g., in the United States, the United Kingdom), the preservation of nationalism (e.g., the fate of Breton in France), the devolution of power to regions (e.g., Wales, Catalonia), language revitalization (e.g., Native American Indians, the Maori in New Zealand), internationalism (e.g., the European Schools Movement, bilingual education in Japan), and the emancipatory education of deaf people (e.g., through bilingual education in a sign language and a majority language – see Baker and Jones, 1998). The varying politics of immigrant assimilation and political integration, economic protectionism and global trade, institutionalized racism and equality of opportunity, and recent debates about peace and terrorism can make bilingual education as much about politics as about education. Bilingual education also has become associated with political debates about dominance and control by elites, questions about social order, and the perceived potential subversiveness of language minorities (Garcia, 2002; Tollefson, 2002).

In Macedonia (Tankersley, 2001), China (Zhou, 2001), the United States (Wiese and Garcia, 2001), and the South Pacific (Lotherington, 1998), bilingual education also can be positively located within attempts to effect social, cultural, economic, or political change, particularly in strengthening the weak, empowering the powerless, and invigorating those most susceptible. This is illustrated by Tankersley (2001). Contextualized within the recent ethnic conflict in the Balkans, she examines a Macedonian/Albanian dual language program. The program demonstrated success in aiding community rebuilding after the war and the growth of cross-ethnic friendships. The research shows the potential for bilingual education program to develop students' respect for different languages and cultures, and help to resolve ethnic conflict. However, because the Macedonian language was connected with greater power and prestige, obtaining an equal balance of languages in the classroom was complex.

The importance of a historical perspective on bilingual education as politics is provided by Wiese and Garcia (2001) through an analysis of the U.S. Bilingual Education Act from 1968 to the present. The changing U.S. ideologies in minority language civil liberties, equality of educational opportunity, assimilation, and multiculturalism become translated into legislation and tested in litigation. Most recently, the No Child Left Behind Act of 2001 placed an

emphasis on accountability and testing. Whereas Title V authorizes programs for Native Indian, Native Hawaiian and Alaskan Native Education, Title III requires testing in English for most language minority students. All states are required to monitor the progress of some 3.68 million U.S. language minority students in meeting their English proficiency and academic objectives. The paradox is that the No Child Left Behind Act of 2001 followed the September 11 terrorist attacks. In the aftermath of the attacks, politicians, the press, and the public lamented the lack of language and cultural skills in U.S. intelligence and defense. It also seems possible that peace and harmony between religions and regions would be aided by producing bilinguals who appreciate the diversity that is possibly intrinsic in bilingualism and biculturalism.

Research and analysis of Proposition 227 in California has led to it being one of the most profiled examples of power and politics governing bilingual education (Stritikus, 2001; Crawford, 2004). In effect, Proposition 227 aimed at outlawing bilingual education in California. Proposition 227 was passed in a public ballot by a margin of 61% to 39%. Analysis of the voting and subsequent surveys found that Latinos were clearly against the proposition but, nevertheless, bilingual education became virtually illegal.

The importance of bilingual education for minority language literacy development and biliteracy has become a major recent theme (e.g., Martin-Jones and Jones, 2000; Hornberger, 2003). Using contexts of classroom, home, and community, such literacy research tends to be less concerned with teaching and learning methodology and more focused on, for example, the relationship between asymmetrical power relations and literacy practices that reproduce social inequalities and competing discourses about what counts as literacy. Current biliteracy research suggests that language policies and practices in education are struggles over power and authority, equity and marginalization, legitimacy and social order, symbolic domination and identities, social categorization, and social hierarchicization. Any consideration about who should speak what language, how, when, and where is essentially about what counts as legitimate language and who has dominance and control. Hence, those in power who legitimate the current social order regulate access to linguistic norms and linguistic resources to preserve their power and position.

However cogent and coherent are the philosophical and pedagogic and foundations for bilingualism, biliteracy, and biculturalism, however strong are the educational arguments for bilingual education, and however strong are the arguments for the preservation of vanishing languages in the world, it is the politics of power, status, assimilation, and social order that can refute bilingual education so swiftly. However, bilingual education is typically a necessary, and sometimes an essential condition for the preservation of language species in the world. Where there is a shortfall in minority language reproduction in the family, then language production at school is essential in education to retain or increase the number and density of minority language speakers. From preschool bilingual education to adult language learning (e.g., in Ulpanim), bilingual education has a possible contemporary function not only to educate but also for minority language transmission.

Language Revitalization through Bilingual Education

Bilingual education is sometimes a component of national or regional language planning that varyingly attempts to assimilate indigenous and immigrant minorities, or integrate newcomers or minority groups (e.g., U.S., U.K.). On other occasions, bilingual education is a major plank in language revitalization and language reversal (e.g., among Native American Indians, the Sámi in Scandinavia, and the Maori in New Zealand).

The growing interest in endangered and dying languages has recently provided a further raison d'être to bilingual education. The predicted demise of many or most of the world's languages has created a momentum for language planning (Littlebear, 1999; Nettle and Romaine, 2000; Skutnabb-Kangas, 2000; Spolsky, 2004). For a minority language to survive, it has to produce new speakers, mostly via family language transmission and the education system (including adult language learning). Language planners tend to believe that bilingual education is an important means of language maintenance, language revitalization and reversing language shift, for example, among Native American Indians (Bia and McCarty, 2002; Francis and Reyhner, 2002; House, 2002), Ecuadorians (King, 2001), and the Basques (Gardner, 2000). Language acquisition planning via bilingual education becomes essential for language revival but insufficient by itself.

Nevertheless, bilingual education cannot gain its rational solely from language restoration or maintenance. It requires research to demonstrate underlying educational advantages (e.g., raising student achievement, increasing employment opportunities). There is sometimes over-optimism among language planners about what can be expected from and delivered by bilingual education in revitalizing a language.

Although bilingual education has an important role in language reproduction, and without bilingual education a minority language may not be able to survive except through intense religious usage, bilingual education cannot deliver language maintenance by itself.

The Advantages of 'Strong' Forms of Bilingual Education

Support for bilingual education tends to circle around eight interacting advantages of bilingual education that are claimed for students. There also are societal benefits that already have been alluded to in the above discussion of politics and bilingual education and will be briefly mentioned later. This section concentrates on the individual advantages.

First, bilingual education typically enables both languages to reach higher levels of competency. This potentially enables children to engage in wider communication across generations, regions, and cultural groups (Cummins, 2000). Second, bilingual education ideally develops a broader enculturation, a more sensitive view of different creeds and cultures. Bilingual education will usually deepen an engagement with the cultures associated with the languages, fostering a sympathetic understanding of differences, and, at its best, avoids the tight compartmentalization of racism and stereotyping. Third, strong forms of bilingual education frequently leads to biliteracy (see Hornberger, 2003). Accessing literacy practices in two or more languages adds more functions to a language (e.g., using in employment), widening the choice of literature for enjoyment, giving more opportunities for understanding different perspectives and viewpoints, and leading to a deeper understanding of history and heritage, of traditions and territory (Tse, 2001).

Fourth, research on dual language schools, Canadian immersion education, and heritage language education suggest that curriculum achievement is increased through content learning occurring via dual language curriculum strategies (Cummins, 2000; Tse, 2001). This is returned to later in this article. Fifth, plentiful research suggests that children with two well-developed languages share cognitive benefits (Bialystok, 2001). Such thinking advantages include being more creative because of their dual language systems (Baker, 2001), being more sensitive in communication as they may be interpersonally aware, for example, when needing to codeswitch, and tend to be more introspective of their languages (metalinguistic advantages – see Bialystok, 2001). Sixth, children's self-esteem may be raised in bilingual education for minority language students (Cummins, 2000). The opposite is when a child's home language is replaced by the majority language. Then, the child itself, the parents and relatives, and not least the child's community may appear as inadequate and disparaged by the school system. When the home language is used in school, then children may feel themselves, their home, family, and community to be accepted, thus maintaining or raising their self-esteem.

Seventh, bilingual education may aid the establishment of a more secure identity at a local, regional, and national level. Sharing Welsh, Maori, or Native American Indian identity may be enhanced by the heritage language and culture being celebrated and honored in the classroom. Developing a Korean-American, Bengali-British, or Greek-Australian identity can be much aided by strong forms of bilingual education, and challenged or even negated by weak forms. Eighth, in some regions (e.g., Catalonia, Scandinavia) there are economic advantages for having experienced bilingual (or trilingual) education. Being bilingual can be important to secure employment in many public services and particularly when there is a customer interface requiring switching effortlessly between two or more languages. To secure a job as a teacher, to work in the mass media, to work in local government and increasingly in the civil service in countries such as Canada, Wales, and the Basque Country, bilingualism has become important. Thus, bilingual education is increasingly seen as delivering relatively more marketable employees than monolingual education (Dutcher, 1995; Tse, 2001).

To this list may be added the potential societal, ethnic group, or community benefits of bilingual education (May, 2001; Peyton *et al.*, 2001; Stroud, 2001; Tse, 2001) such as continuity of heritage, cultural vitality, empowered and informed citizenship, raising school and state achievement standards, social and economic inclusion, social relationships and networking, ethnic group self-determination, and distinctiveness. This is well illustrated by Feuerverger (2001) in an ethnography of a village (Neve Shalom/Wahat Al-Salam) in Israel, where Jews and Palestinians attempt to live together harmoniously and cooperatively, maintaining respect for the culture, identity, and languages of each group. This is partly attempted by two schools, an elementary school and the 'School for Peace,' which create bilingual Hebrew-Arabic bilinguals.

The Effectiveness of Bilingual Education

Research support for bilingual education is relatively robust (Baker, 2001) although there has been

much political challenge to this in the United States (Crawford, 2004). Perhaps the strongest research support for bilingual education derives from evaluations of immersion education, particularly from Canada since the 1960s (Johnstone, 2002). There is plentiful research from the United States since the 1960s (see Baker, 2001, for a review).

Evaluations of the effectiveness of dual language schools indicate relative success. One of the most wide-ranging evaluations of dual language schools is by Lindholm-Leary (2001). She analyzed teacher attributes, teacher talk, parental involvement and satisfaction, as well as student outcomes (using 4854 students) in different program types. These programs included Transitional Bilingual Education, English-Only, the 90:10 Dual Language Model, and the 50:50 Dual Language Model. The measured outcomes included Spanish and English language proficiency, academic achievement and attitudes of the students. Socioeconomic background and other student characteristics were taken into account in reporting results. Among a wealth of findings, Lindholm-Leary (2001) found that

- students who had 10% or 20% of their instruction in English scored as well on English proficiency as those in English-only programs and as well as those in 50:50 dual language (DL) programs;
- Spanish proficiency was higher in 90:10 than 50:50 (DL) programs. Students tended to develop higher levels of bilingual proficiency in the 90:10 than the 50:50 DL program;
- for Spanish-speaking students, no difference in English language proficiency was found between the 90:10 and 50:50 DL programs. However, DL students outperformed transitional bilingual education (TBE) students in English by the Grade 6;
- students in both the 90:10 and 50:50 DL programs were performing about 10 points higher in reading achievement than the Californian state average for English-speaking students educated in English-only programs;
- higher levels of bilingual proficiency were associated with higher levels of reading achievement;
- on Mathematics tests, DL students performed on average 10 points higher on Californian norms for English-speaking students educated only in English. There was a lack of difference in the scores of 90:10 and 50:50 DL students;
- DL students tended to reveal very positive attitudes toward their DL programs, teachers, classroom environment and the learning process.

Thomas and Collier's (2002) Final Report on their 1985 to 2001 database of 210,054 minority language students' academic achievement in eight different models of education indicates that: schooling in the home language has a much greater effect on achievement than socioeconomic status; late immigrants whose early education was in their home language outperformed early immigrants schooled in English only; enrichment (heritage language) 90:10 programs and dual language programs (50:50) were the most academically successful for English L2 students and had the lowest dropout rates; the strongest predictor of L2 student achievement is the amount of formal L1 schooling with the more L1 schooling, the higher the L2 achievement; the highest quality ESL content programs reduce about half of the total achievement gap between those in enrichment or dual language programs and those without any bilingual support.

However, the reasons why research finds bilingual education linked with higher achievement are neither simple nor straightforward (August and Hakuta, 1997). There is likely to be a complex equation between such academic success and factors such as the support of the home (e.g., in encouraging literacy development), the devotion and dedication of teachers in school, children feeling their minority language is accepted and their self-esteem thus supported, and the positive relationship between bilingual education and cognitive development. Laosa (2000) reveals that school characteristics such as the quality and ratio of teachers per student, the teacher's credentials, and fragmentation of instruction are potentially influential in student achievement. That is, particular models of bilingual education interact with a host of student, teacher, curriculum, and environmental variables in complex ways to influence student outcomes. It cannot be assumed that bilingual education, *per se*, results in higher attainment across the curriculum. There are many interacting variables that will underlie such success with no simple recipes for guaranteed success.

The English Language and Bilingual Education

The paradox of English in bilingual education is illustrated by the research of Valdés (2001). English language learning policies enacted in schools can deny access to the language and knowledge that would empower U.S. immigrant children. Valdés (2001) shows that, separately and cumulatively, there are complex interacting classroom factors that frequently work against a student's second language development, achievement, employment, citizen rights and opportunities, and self-esteem. Such factors include a lack of regular, purposeful, and developing interactions with native speakers, impoverished second lan-

guage interactions with teachers on a staff-student ratio of over 1:30, passive learning and 'tight discipline' strategies, mixed language competence classes working to a low common denominator, subject matter kept simplistic as the second language is insufficiently developed, and teachers' concerns with 'flawed language' forms rather than communication: "Placing blame is not simple. Structures of dominance in society interact with educational structures and educational ideologies as well as with teachers' expectations and with students' perspectives about options and opportunities" (Valdés, 2001: 4).

The 'English language dominance' dangers for bilingual education also are found in access to Information Communications Technology (ICT) for language minority students. ICT is often dominated by the English language. This relates to current debates about the place of the English language in bilingual education in the context of the internationalization of English and its growing worldwide prominence as a second language rather than a mother tongue (Graddol and Meinhof, 1999). In contrast, there are potential opportunities to support the future of minority languages in education through ICT such as e-books, machine translation, voice recognition, WebTV, international e-mailing, and text messaging (Skourtou, 2002).

The Limitations of Bilingual Education

Although bilingual education has an increasing number of international supporters, it is not without some political critics, especially in the United States – see Cummins (2000) for a review. This has been considered earlier. There also are limitations to the pedagogical view of bilingual education. Bilingual education is no absolute guarantee of effective schooling. It is ingenuous to imagine that employing two or more languages in the school curriculum automatically leads to a raising of achievement, more effective schooling, or a more child-centered education. In reality, the languages of the school are but part of an extensive matrix of variables that interact in complex ways to make schooling more or less effective. Among bilingual schools in every country, there is often a mixture of the outstanding and the ordinary, those in an upward spiral of enhancing their quality, and those that depend on past glories rather than current successes. The school effectiveness research movement has located many of the important factors that make such schools more or less effective (August and Hakuta, 1997). Bilingual education is only one ingredient among many.

Another limitation of the pedagogical perspective on bilingual education is the nature and use of language learned at school. Canadian research suggests that the language register of formal (e.g., immersion) education does not necessarily prepare children for language use outside the school (Cummins, 2000). The language of the curriculum is increasingly complex and specialized. The vernacular of the peer group and the lingo of the street is different. Canadian children from English-speaking homes who have been to immersion schools and learnt through the medium of French and English sometimes report difficulty in communicating appropriately with French speakers in local communities. Local French speakers can find such students' French too formal, awkward, or even inappropriate.

A further concern about bilingual education is that language learning may stop at the school gates. The minority language may be effectively transmitted and competently learned in the classroom. Once outside the school gates, children may switch into the majority language for reasons of status, acceptance by peers, and inclusiveness in peer relations (that is, the majority language is often the 'common denominator' language). Thus, the danger of bilingual education in a minority language is that the language becomes a language of school but not of play; a language of the content delivery of the curriculum but not of peer culture. Extending a minority language learnt at school to use in the community over the teenage and adulthood years is something that is difficult to engineer, difficult to plan, but nevertheless vital if that language is to live outside the school gates.

See also: Language Policy in Multilingual Educational Contexts; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language.

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Bilingual Language Development: Early Years

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Scope

The present article summarizes scientific insights about the acquisition of two languages by children under the age of 6 who have been regularly addressed in these languages from birth. This restriction in terms of the age of first regular exposure allows for a comparison with children raised monolingually from birth, so that it becomes possible to outline major differences and similarities between the processes of early monolingual and bilingual development. This in turn should allow us to address the question whether the number of languages learned has any strong effects on basic processes of early language learning that have hitherto been posited for child language acquisition in general.

This article will not discuss the acquisition of the same two specific languages by one child or group of children. Instead, it tries to draw together findings from different pairs of languages-in-acquisition that appear to hold for all or most of the different pairs investigated. The focus is on language development in normally hearing children growing up in nurturing and stimulating environments who have no obvious physical, psychological, or neurological problems.

Variation in the Input as Key Factor in the Study of Bilingual Children

Children who are addressed in two languages from birth undergo a process of what has been called Bilingual First Language Acquisition (BFLA, cf. Meisel, 1989, De Houwer, 1990). These children have two first languages: A and Alpha. On the one hand, their experience with languages A and Alpha resembles that of monolingual children in that they have never known a time that A or Alpha were not present in their environment. On the other hand, their language experience differs substantially from that of monolingual children, because children raised bilingually have never been in a purely monolingual situation for any length of time. Rather, they are used to hearing a much wider range of variation in the speech addressed to them than any child raised monolingually.

In studies of monolingual children, the aspect of variation in the input has on the whole received fairly little attention. Where it has, the focus has mainly been on frequency differences in the use of similar structures and forms by different people (see Hart and Risley, 1995), and not on, for instance, regional dialect differences between a child's two parents. Typically, it is implicitly assumed that the language heard by a young child in a monolingual setting is fairly uniform, and the possibility of sociolinguistic variation is mostly not addressed. Even though the people addressing an infant may speak differently (mother on the one hand, four-year-old sibling on the other, for instance), such differences are either not taken into account, or, at best, are seen as stylistic variations of one and the same linguistic system. The question is not asked whether the child initially knows that these are stylistic variations of what can be seen as basically the same system, rather than two quite different ways of speaking that form distinct although on some points comparable systems. Instead, in spite of models of piecemeal learning (cf. for instance Fletcher, 1985) or instance-based learning (e.g., Durieux and Gillis, 2001), it is more generally assumed that children raised in a monolingual setting are on their way toward learning one single, closed, rule-based system (however complex). Any forms the child produces that appear not to fit this target system are seen as temporary deviations from that one system. Even in generative approaches, it is assumed that from early on the child 'knows' he or she is dealing with just one language, and everything the child does linguistically is interpreted as a function of this one linguistic system. The boundaries of the system itself are not under scrutiny, but are taken for granted and not usually the subject of discussion. And, indeed, if there is one aspect of early child language that is striking when one compares different languages-in-acquisition in monolingual settings, it is the fact that even young children's speech is

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highly language-specific in terms of the early production of phonological and morphosyntactic elements (compare, for instance, the acquisition of Inuktitut, Turkish, and Dutch; see Allen, 1997, Aksu-Koç, 1988, and De Houwer and Gillis, 1998, respectively).

One could extend the same logic to all children, regardless of the extent of variation they encounter in the input. It is theoretically possible that all children start out with the assumption that everything they hear must be fit into one linguistic system. Children growing up bilingually would in this view be expected to first produce speech that combines elements from both languages, perhaps steered by cognitive operating principles as originally proposed by Slobin (1973). At the level of words, they might generally combine phonemes from both languages in one word. At the level of early sentences, attempts to weld the large range of perceived variation into one system would result in utterances that seemingly quite arbitrarily mix morphemes and words from both languages together in one utterance. Although this view, expressed most strongly and influentially by Volterra and Taeschner (1978), has held quite a long reign, the empirical evidence to date shows that this is not how young bilingual children generally speak. Rather, from the outset of even somewhat intelligible speech, children raised with two languages from birth mostly produce utterances that can be related to just one of either of their input languages (see, e.g., Quay, 1995, Lanza, 1997, Johnson and Lancaster, 1998, Sinka and Schelleter, 1998).

If children everywhere were indeed to start out with a learning assumption that they are dealing with one single linguistic system, the early language-specific utterances in each of two languages by children raised bilingually cannot be explained. The very existence of these early language-specific utterances in two languages in fact goes against the notion that a single system assumption drives language acquisition. From early on, bilingual children are able to determine that the huge range of variation in speech sounds that they are exposed to can be categorized according to two main categories, two main ways of speaking. To learn to understand these two ways of speaking and to learn to speak these two languages, children must know the boundaries between them. This raises the question of how children learn where one language stops and another one starts. In studying bilingual development, then, the issue of boundaries between languages is a crucial one.

Bilingual Input

For there to be a chance for children to learn to distinguish both languages from each other, there must in fact be two separate languages in the input. That may sound obvious, but is not quite: input might be characterized as 'bilingual' if it routinely contains elements that can be described as historically related to two distinct languages. This kind of input occurs, for instance, when young children grow up in bilingual communities where in the personal domain code-switching is the norm (see, e.g., Romaine, 1995: 120 ff.), and virtually every utterance heard by the child contains elements that linguists would describe as belonging to two languages. In this kind of setting, there is no clear differentiation between two ways of linguistic communication that children need to learn to understand and later produce. Children who only hear such code-switched or mixed utterances are not exposed to two separate languages. Thus, they are not actually growing up bilingual.

For input to be considered bilingual, it must include a sizable proportion of unilingual utterances in language A and of unilingual utterances in language Alpha. In addition, there may be mixed utterances, too, i.e., utterances with elements from both language A and Alpha. It is not possible to specify more detailed norms concerning, for instance, the maximum proportion of mixed utterances allowed. First, any cutoff points here would have to be arbitrary. In addition, the proportion of mixed utterances may change quite drastically over the child's life. After all, bilingual settings are usually dynamic and changing, with one of the languages present more strongly than the other in time period 1, and the other way round in time period 2, for instance. All this will depend on the people interacting with the language-learning child and their movements.

There are various ways in which each language can be offered to a young child growing up hearing two languages from birth. Typically, however, the two languages will be used by members of the child's family. If this is not the case, we would usually be dealing with the acquisition of a second language some time after the child has been in a monolingual situation. Three main input types exist in cases of BFLA: (1) every person in the child's environment mainly speaks one language to the child, but combined, these people address the child in two languages ('one person, one language'); (2) every person in the child's environment speaks two languages to the child, and (3) a combination of types (1) and (2). Reports from the literature, informal observation, and unpublished analyses of survey data based on language use in 2250 bilingual families (De Houwer, 2003) suggest that case (3) is the most common. Typically, a child growing up with two languages from birth will hear some people speak just one language, and will hear others speak two languages.

Regardless of which input type a child finds herself in, a typical characteristic of bilingual input is that it is not evenly distributed over the two languages. At any given time, one language will generally be more strongly present than the other one. The balance may change with time, so that a language that is more strongly present in the input in the first year of life is less strongly present later on, for instance. The relative strength of one language compared to the other depends on the number of people speaking it, the variety of different contexts in which it is spoken, and the frequency with which it is spoken. Even if there is only one person in the child's environment who speaks language A, this language may be far more strongly present than language Alpha (spoken by everyone else) if that person spends a great deal of time with the child and speaks a lot to the child.

The fact though that in many cases the 'carrier' of one of the child's languages may be limited to just one person does mean that a bilingual input setting can be quite fragile: if that one person disappears for some reason, the child's language environment changes quite dramatically from bilingual to monolingual.

The question is of course whether all these different input constellations have an effect on the learning of the two languages by the child. There has unfortunately been no systematic study of this. Most in-depth studies of early bilingual development have focused on children growing up mainly in a 'one person, one language' setting (but see Deuchar and Quay, 2000 for a study of a child in input type (3)). In addition, most of the detailed studies available have taken children who actually speak two languages, and who have on the whole heard them in roughly equal proportions. There are a few studies that have looked at children raised in situations where one language was clearly much less strongly present than the other (e.g., Schlyter, 1993), but the data are too scarce to draw any conclusions in terms of the relationship between input type and acquisitional paths.

One feature does appear to be quite robust, though. This is the fact that temporarily dramatically increased input in one of their languages once children have started to talk, combined with the communicative need to use that language, leads to highly increased and more proficient use of that language in a matter of days or weeks. This phenomenon was already noted by Werner Leopold, who has carried out the most detailed study of a bilingual child's development (Leopold, 1970 c. 1939–1949).

Bilingual Children's Language Development

It is trite to state that children all over the world will learn to speak the language they are exposed to. One might thus expect that children exposed to two languages will learn to speak the two languages they are exposed to. It turns out, however, that this is not the case. Quite a lot of children growing up with two languages from birth speak only one language (unpublished data from a survey of approximately 2250 bilingual families carried out by the author suggest that about 1 in 5 children growing up bilingually fail to speak one of the languages they heard from birth; for information on the survey, see De Houwer, 2003). While children growing up bilingually may not learn to actually speak two languages, they apparently do learn to understand two languages: There are no reports of children growing up with two languages who only learn to comprehend one language. This sharp difference between production and comprehension abilities confirms the strong disassociation that has been found between early production and comprehension in some monolingual children (see, e.g., Bates, Dale, and Thal, 1995).

Only a small portion of the possible pairs of languages-in-acquisition has been studied. Published reports are available on approximately 14 different combinations (De Houwer, 2005). Given the estimated 6000 languages in the world, this is of course an extremely small subset of all the possible combinations. Yet, in spite of the highly limited data set, there is a perhaps surprising 'unity in diversity', i.e., similar general results are found.

When bilingual children do speak two languages, they do this in a way that strongly resembles how monolingual children speak each of these languages. In each of their languages separately, then, bilingual children under age 6 sound mainly like monolingual children. In each of their languages, they make similar errors, substitutions, deletions, and they produce a similarly limited repertoire in comparison with adult language use.

The 'milestones' of bilingual development and their timing are the same as those for monolingual children. Bilingual children's comprehension precedes their production, babbling is typical toward the end of the first year, then comes a period in which single-word utterances are produced, to be followed by a short or drawn-out period of two-word utterances. Then come multiword utterances, soon to be followed by multiclausal ones. There is no evidence that the fact that children growing up with two languages have to process more variation in the input has an effect on the rate of acquisition: on

the whole, bilingual and monolingual children reach the milestones of development within similar age ranges.

Whenever more detailed aspects of language use have been compared between monolingual and bilingual children, no qualitative differences have been found. In the area of phonology, bilingual children start out using substitution, deletion, and suppletion patterns that have been found for monolingual children, too. Semantic processes found for monolingual children such as underextension and overextension also appear in young bilingual children. Just as is the case for monolingual children, bilingual children's lexicons grow steadily as they get older, and they do so in two languages. In morphosyntax, children make similar errors and produce similar types of utterances at about the same age for one particular language regardless of whether they are monolingual or bilingual (see, e.g., Almgren and Barreña, 2000, De Houwer, 1990, and Meisel, 1985; for a more detailed comparison of monolingual and bilingual acquisition, see De Houwer, 2002).

Bilingual children differ from monolingual children, however, in that they produce mixed utterances in addition to unilingual utterances in each of their two languages. This occurs from the beginning of speech production onward. Usually, the mixed utterances that young bilingual children produce could have been produced by bilingual adults, too, and often concern the insertion of a noun from language A in an utterance that is otherwise entirely in language Alpha. Occasionally, this inserted noun (or other word class, as the case may be) may be affixed to a bound morpheme from the other language, as is possible in adult bilingual speech, too. However, the range of structurally possible mixed utterances produced by bilingual children is quite limited compared to the range in adult bilingual speech. The structure of young bilingual children's mixed utterances tends to reflect the overall structure of their unilingual utterances produced at about the same age.

A crucial feature of bilingual speakers, including children, is that for every utterance they produce they must make a choice: either the utterance will be unilingual in language A, unilingual in language Alpha, or mixed, combining elements from languages A and Alpha. The actual choice made will depend on what is socially appropriate. Young bilingual children know from early on (soon after they have started to produce intelligible speech, in the second year of life) which selection to make, depending on the sociolinguistic norms they have been socialized into. children as young as 1 year and 3 months and growing up in a 'one person, one language' situation have been reported to use language A exclusively with monolingual speakers of language A, and language Alpha with monolingual speakers of language Alpha (Sinka and Schelleter, 1998). Such high sensitivity to the language choice of their addressees, and the ability to accommodate to this language choice, show a level of sociolinguistic and pragmatic sophistication that is usually not seen in monolingual children until at least a year later. The use of mixed utterances can also be explained in terms of this sensitivity: children will use more mixed utterances, and will continue to use them, the more acceptable they are to the people in their environment. It is through language socialization practices in the family that bilingual children learn which kind of utterances they can and should use on what occasion. Another specifically bilingual feature of young bilingual children's speech is that they easily switch between unilingual utterances in language A, unilingual utterances in language Alpha, and mixed utterances. In this, they resemble bilingual adults.

Young bilingual children who have been regularly addressed in two languages from birth do not necessarily speak their two languages equally well. The literature on bilingual acquisition gives a somewhat different impression, in that most of the children studied developed their two languages at roughly the same pace, but it is well known (and also evidenced in some published reports) that a child may be much more proficient in language Alpha than in language A. This occurs especially when children are just entering the multiword stage in one of their languages. These differences in proficiency levels do not have the perhaps expected effect that the more developed language influences the less developed one. Rather, a bilingual child's two languages form two separate, closed sets as far as morphosyntax is concerned. So far, all studies of bilingual children's morphosyntactic development have provided evidence for the Separate Development Hypothesis (SDH), which states that children regularly exposed to two separate languages from birth develop two distinct morphosyntactic systems, in that "the morphosyntactic development of the one language does not have any fundamental effect on the morphosyntactic development of the other" (De Houwer, 1990: 66). From the moment that bilingual children start to give evidence of morphosyntactic elements in their lexically unilingual utterances (word order and/or bound morphology), they are guided by the structural features of just one of their input languages at a time. In effect, as far as just the combination of their unilingual utterances in language Alpha and language A is concerned, young bilingual children could be likened to two monolingual children in one. This of course is

only part of the picture, and does not take into account their use of mixed utterances, their ability to smoothly switch from one language to another, and their ability to comprehend and speak two languages.

How Do Bilingual Children Learn to Speak Two Separate Languages?

In monolingual acquisition, there is still no widely accepted explanation of how children are able to learn to speak in the early stages. This is the same for bilingual acquisition, where similar problems need to be solved, but where an additional question is how it is possible that bilingual children actually learn so early what elements in their input belong where. Clearly, bilingual children do not combine elements from both their languages at random. When they combine lexical items from one language in the same utterance, they also exhibit order patterns and/or morphological features that are not unexpected for that same language, and that are commonly used by monolingual children exposed to only that language. How do bilingual children know what belongs where?

We are far from having an answer to that question. We can assume on the basis of studies of monolingual children that on the whole, comprehension paves the way for production in bilingual children. Early perceptual studies of bilingual infants have shown that at the age of 4 months, babies can already distinguish between the rhythmic properties of their two languages (Bosch and Sebastiàn-Gallès, 2001). Is it such global differences that guide children toward representations of two different systems? Or are children more locally attuned to the way their interacting partners speak? In any case, only close attention to their input and the patterned variations in it make it possible for young bilingual children to be able to reflect that input so closely at the earliest stages of morphosyntactic production.

More detailed studies of the input in bilingual settings are needed to address these issues. Also there is a great need for more studies of the earliest stages of bilingual development. Conference papers show that such work on early stages is on the research agenda. Until a large body of published reports is available, however, any hypotheses regarding the bilingual child's 'entry' into the two ways of speaking he or she is hearing can only be speculative.

What Can Bilingual Children's Development Teach Us about the Language Development Process in General?

Given that so many of the world's children grow up with more than one language, and that early bilingualism may be even more 'normal' than monolingualism, studies of child language development should pay more attention to bilingual populations. A better understanding of bilingual development in all its different manifestations is of fundamental theoretical interest. It is also necessary to develop prevention and remediation programs to help children who may experience problems with learning language. Understanding bilingual development may in addition shed light on aspects of the language development process in general that remain hidden in studies of monolingual children.

Studies of bilingual development have mostly been limited to middle class children growing up in the Western world, and to a dozen or so language combinations. It is premature, then, to regard the findings discussed as final. Yet, the findings available serve as a starting point to see what we can learn about the language development process by including findings for bilingual children.

Findings based on the study of bilingual children confirm or strengthen many basic issues in the study of child language development, and highlight some aspects of language development that perhaps have not received the attention they deserve – primarily because in monolingual acquisition they are not all that salient.

The fact that many children raised bilingually in fact do not produce two languages, but just one, quite clearly shows that children themselves are in charge in the acquisition process. Children raised bilingually who themselves speak only one language generally do fine communicatively, and have either accustomed their environment to 'bilingual' conversations, where the (at least passively bilingual) adult speaks language Alpha and the child answers in language A, or they are growing up in environments where from the beginning of the child's language production the adults did not care in what language the child spoke, because they understood both languages. These cases of passive bilingual children, who understand two languages but speak only one, offer strong support for the Intentionality Model for language acquisition that places the essential agency of the child at the center of the developmental process (Bloom and Tinker, 2002).

Whether children are hearing one or two languages from birth does not seem to play a significant role in

the overall progression of language skills. Regardless of which language is being acquired and regardless of the number of languages involved, there is a stable progression from linguistic silence to telegraphic speech to larger units to stories, with production often lagging far behind comprehension. The overall language learning process for languages heard since birth, then, is robust.

This general picture is language-specific. Children do not learn to speak 'language in general', but a specific language. This is the same for monolingual and bilingual children, at least for those bilingual children who actually speak more than one language.

Early bilingual development with its demonstration of early language-specific learning is only possible because children pay close attention to the input from early on. Although in monolingual acquisition there have of course been studies of input and its effect on learning, the findings for bilingual development suggest that the specific, local features of the input need to be given more attention in explanations of the language learning process. On the other hand, however, it is possible that bilingual children are more 'keyed in' to the input because they hear so much more variation in it. Close comparisons between monolingual and bilingual children are needed to investigate this possibility, but in any case, more investigations of the precise role that the input plays, also in monolingual acquisition, is a recommendation that follows from the findings on bilingual development.

Changes in the input can have a strong effect on bilingual children's language use: on the basis of a changed input condition, bilingual children can go from hardly speaking a language to speaking it fluently in a matter of days or weeks. Given this extremely strong effect in bilingual settings, changed input conditions have not received as much investigative attention in monolingual acquisition studies as they deserve. If children can change so fast in response to changed input conditions, as evidenced in studies of bilingual children, then perhaps in a monolingual situation sudden increased or more varied input can help to account for more subtle changes in a child's language use, such as an increase in long utterances, for instance.

Studies of bilingual children invariably highlight the fact that sociolinguistic context is a main determinant of language use. A particular sociolinguistic context can determine whether a child will speak a particular language or not. Given that in bilingual settings the effect of a particular sociolinguistic context can be so large, it may have more influence in a monolingual setting than is usually acknowledged. Particularly in the setting up of experiments, the sociolinguistic context should be carefully constructed, and it should not be overlooked as a potential explanatory factor for perhaps unexpected results. In more naturalistic settings, sociolinguistic context may also explain variations in language use in monolingual children.

On the whole, the study of bilingual children inevitably draws attention to individual variation as a correlate of variation in the input. In my view, the field of child language research in general would benefit from a generally closer attention to variations in the input even in monolingual settings. It may hold the key for explanations of language behaviors that otherwise remain elusive.

See also: Bilingualism; Code Switching and Mixing; Early Socialization and Language; Language Maintenance and Shift; Multilingualism: Pragmatic Aspects; Native Speaker; Socialization; Speech Community; Variation in Child Language; Variation in First Language Acquisition.

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Bilingual Lexicography

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Introduction

A bilingual dictionary is a dictionary that presents the lexicon and phraseology of one language (called the **source language**) and translates these components into a second language (the **target language**). This element of translation is essential. By way of contrast, a dictionary that uses a foreign language to describe the features (e.g., etymology) of another language is not a bilingual dictionary because it does not directly help the user to translate.

There are many different sorts of bilingual dictionaries. Arrangement is either alphabetical or thematic. In the case of languages such as Chinese that have an ideographic rather than alphabetical writing system,

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There are many different sorts of bilingual dictionaries. Arrangement is either alphabetical or thematic. In the case of languages such as Chinese that have an ideographic rather than alphabetical writing system, the arrangement is in brush-stroke order (*see* **Chinese Lexicography**). The most common type, **general bilingual dictionaries**, are aimed at a broad user group that ranges from language students to translators, business people, travelers, and others. Since a bilingual dictionary is above all a practical tool, it almost invariably consists of a single volume and is often (but not always) divided into two parts – the source language of the first part becomes the target language of the second part, and vice versa. Bilingual dictionaries vary greatly in size and content. The smallest pocket bilingual dictionaries give little more than undifferentiated one-word equivalents or short lists of possible one-word translations; the largest give a great deal of information for both source and target languages about phraseology and the contextual appropriateness of possible translations. For a large number of language-specific and general articles on the subject of bilingual dictionaries, see Hausmann *et al.* (989–1991). Also, to complement the present article's survey of bilingual dictionaries' general aspects, see articles in this encyclopedia for detailed comments on lexicography in particular languages.

With bilingual dictionaries now having been developed in electronic format, the distinctions between alphabetical and thematic arrangements are not so relevant: full-search text and thematic searches are now possible at the click of a mouse.

A Brief History of Bilingual Lexicography

The history of bilingual dictionaries is intimately linked to the history of translation and to the creation of vocabulary lists that give equivalents in a different language. Berkov (1973) even regards bilingual lexicography as integral to the theory of translation. The history of translation, in turn, is intimately interwoven with the spread of trade and religion.

There is some debate among historians of lexicography as to what came first, monolingual or bilingual dictionaries. In ancient Mesopotamia, bilingual dictionaries (or their ancestors, i.e., lists of words with foreign-language equivalents) came after the first monolingual protodictionaries (i.e., monolingual word lists with added information). The most ancient traces of anything resembling a bilingual dictionary are found in fragments of Sumerian–Eblaitic tablets dating back to the 24th century B.C., discovered in Ebla in 1975. Words from the two source languages were mixed together in a single column. Presumably, it was assumed that users would need no assistance in distinguishing between Sumerian and Eblaitic.

Other bilingual, and sometimes trilingual and even quadrilingual, lists with combinations such as Sumerian/Akkadian, Sumerian/Ugaritic, etc., were found by archaeologists in Mesopotamia. Of great importance is the medium on which the lexicographic data are stored. For example, no bilingual Egyptian/Aramaic word lists have been found to date, perhaps because they were written on a more perishable medium than clay tablets, e.g., papyrus, not because no word lists were created. The earliest dictionary-like document found in ancient Egypt was a Greek > Coptic glossary dating back to the second half of the 3rd century A.D. Also found were Latin > Coptic glossaries and Coptic > Arabic glossaries.

Ancient Greek lexicography – entirely monolingual – started in the 5th century B.C. with glossaries explaining already rare or obsolete archaic words in Homer. The Greeks evinced very little interest in the language and culture of other peoples. In fact, the impetus to the influence of Greek culture on Roman civilization came from the Roman conquest of Greece (143 B.C.) Learning the Greek language and reading the classics in Greek became a central part of every civilized Roman's education and, naturally, dictionaries played their part. Thus, the western tradition of bilingual dictionaries can be traced to the desire of the Romans to read Greek. Classical Greek–Latin and Latin-Greek dictionaries were plentiful, though unfortunately all are lost except for a few fragments, surviving mostly in Egyptian papyruses (Kramer, 2001) (*see* **Greek Lexicography, Classical; Latin Lexicography**).

In China, monolingual lexicography – in the form of inventories of Chinese characters dating from the

Han dynasty (206 B.C.–A.D. 220) – also came first, preceding bilingual lexicography by nearly two millennia. The earliest bilingual dictionary with Chinese as a source language is Robert Morrison's Chinese–English dictionary of 1815 (*see* **Chinese Lexicography**). In recent decades, the growth in international trade with China plus the presence of many Chinese-speaking communities outside China have led to unparalleled growth in bilingual dictionaries in which Chinese is both a source and a target language. Since the 1980s, bilingual lexicography in China has been booming, largely as a result of the 'open-door policy,' that has led to the rapid growth both of literacy and the number of foreign language learners.

In Japan, the rise of lexicography was closely associated with the importation of Buddhism from China via Korea in the 7th century A.D. (*see* **Japanese Lexicography**) Buddhist monks learned to use Chinese monolingual dictionaries for religious purposes. Chinese characters were adapted to represent the Japanese language, which at that time had no indigenous writing system. In the 10th and 11th centuries a number of Chinese–Japanese character dictionaries were compiled, some of them very large indeed (30 volumes). The earliest bilingual dictionaries offering translations of Japanese into a Western language (Portuguese) were compiled by Jesuit missionaries at the end of the 16th century. During the Edo Period (1600–1868), Japan was closed to the outside world, with one exception: trade with the Netherlands was permitted. As a result, in 1796 Inamura Sanpaku compiled a Dutch–Japanese dictionary on the basis of Halma's 1708 Dutch–French dictionary. In the 20th century, bilingual lexicography began to flourish in Japan, with the production of many Japanese–English dictionaries. Other languages were not neglected. Currently, one of the most imaginative projects is the Saipam Japanese–Thai dictionary project, an online cooperative effort of Thai professionals working in Japan, to which the dictionary users themselves are invited to contribute.

In the Arab world, too, bilingual dictionaries did not appear until long after monolingual dictionaries. They were compiled mostly by nonnative speakers of Arabic from societies that were in contact with Arabic speakers, for example, speakers of Persian requiring access to Arabic as the language of the Koran (*see* **Arabic Lexicography**).

As for Hebrew, the situation was different. The first dictionary of Hebrew, by Saadia Gaon (Babylonia, 902), was written with Arabic as the target language, so it can be considered as a bilingual dictionary. The first monolingual Hebrew dictionary is that of Menahem ben-Sarouq (Spain, mid-10th century) (*see* **Hebrew Lexicography**).

During the Middle Ages, bilingual dictionaries developed in western Europe in connection with Latin, the language of the Christian Church. The Roman Catholic scriptures were in Latin, and clerics would **gloss** Latin words, adding vernacular translations between the lines, and later grouping these translations in **glossaries**, which can be considered as the ancestors of European bilingual dictionaries. The *Abrogans*, the first alphabetical Latin–German dictionary (so named after its first entry), was commissioned by Bishop Arbeo around 765–770 (*see* **German Lexicography**). It was used as a basis for subsequent spinoffs, in which German, the target language, was replaced by translations in other languages.

Until the invention of the printing press in 1436 by Johannes Gutenberg, books, including dictionaries, were either manuscripts or were printed from hand-carved wood blocks. These objects were rare and costly. With the invention of printing, books suddenly became more accessible to a much larger audience, and this had a profound effect on the spread of knowledge and culture during the Renaissance. Without the printing press, dictionaries could not have been widely available; without dictionaries, the effortless spread of Renaissance culture and scholarship across linguistic boundaries would have been greatly inhibited.

Bilingual dictionaries in Renaissance Europe were based mainly on Latin, at a time when Latin was the common language of all learned people, whatever their native tongue. Inevitably, therefore, Latin was both the source and target language of many dictionaries. A major milestone was Robert Estienne's *Dictionnaire Françoislatin* of 1534 (*see* **Stephanus, Robertus (ca. 1503–1559)**), in which French words are described in French and a Latin translation is given. New types of dictionaries free of Latin also appeared at that time. The first non-Latin-based bilingual dictionary in Europe was probably Adam von Rottweil's Italian > German thematic dictionary *Introito e porta*, dating from 1477, followed closely by a French–English vocabulary printed by Caxton in 1480.

In the 17th century in Europe, the main core of bilingual dictionaries contained French or English, but new combinations also appeared, for example, those including Dutch or Spanish.

The age of Enlightenment that followed was also the age of encyclopedias (*see* **Encyclopédie**), ambitious projects with the stated aim of collecting the entire sum of existing knowledge. One aspect of this quest had a considerable influence on bilingual

lexicography, namely the ambition to collect and classify the entire vocabulary of all the languages spoken in the world. This ambition is still unfulfilled – as the postings on the *lexicographylist* website show very clearly. This discussion group contains frequent references to examples of a race against time to record the vocabulary of endangered languages before it is too late. This record is generally done in the form of a bilingual dictionary, with detailed information about the vocabulary and syntagmatics of the source language, with English (or occasionally Spanish, Brazilian Portuguese, or Russian) as the target language. Bilingual lexicographers working with rare and endangered languages often find themselves devoting a great deal of attention to establishing written norms for a language that has no written tradition. The motivation is very often the facilitation of missionary work (usually Christian). In other cases, the aim is more practical, namely to create access for speakers of a rare language to English or to some other international language of trade and technology.

In 19th-century Europe, the production of bilingual dictionaries increased greatly with all sorts of combinations, including dictionaries of newly discovered 'dead' languages, e.g., several Sanskrit–English dictionaries [in particular those of Wilson (1819) and Monier-Williams (1872)] and other combinations such as the *Hebräisch-chaldäisches Wörterbuch* of Wilhelm Genesius (1810). As did colonial expansion and evangelization, political events created conditions that required new publications. The latest in Europe was the creation of the European Union, which now includes 25 countries and 21 languages. In principle, all the documents and transactions of any of these countries must be translated into the languages of all the others.

The Techniques of Modern Bilingual Lexicography

The Three Steps to Making a Dictionary

Recent advances in technology have had a profound influence on not only monolingual lexicography but also bilingual lexicography. The use of electronic corpora (*see* **Corpus Lexicography**) has affected, in particular, both the analysis of the source language and the choice of translation equivalents. Bilingual dictionaries are normally synchronic dictionaries, representations of a language in its present state rather than its historical record. In order to make access to the information easier, meanings are generally ordered by frequency, starting with the most frequent sense in current use.

According to Atkins (1990), the production of a bilingual dictionary can be divided into three main stages:

1. **Analysis of the source language**: This stage is performed by lexicographers who analyze their native language and produce a detailed, structured account of each lexical item (word, phrase, or morpheme). This account of the source language is called the **framework.** It is more than a monolingual dictionary: it is designed to help in the subsequent stages of work, notably translation. It must be reasonably succinct, but nevertheless contain enough information to ensure that translators will have the right connotational contexts, without which their work could be inaccurate or misleading. The framework must also contain many examples of phraseology typical of the way the word is normally used, as well as any other information that will facilitate the next stage, called the **transfer.**
2. **Transfer**: This stage is the translation stage: the meanings of words and their contexts are translated into the target-language system. At a glance, it looks simple, particularly because the lexical units or phraseological items tend to be short. In fact, however, it is an extremely complex task, not least because different translation equivalents of a given word need to be chosen in different contexts, and in some cases there is no direct translation equivalent, so a circumlocution must be found. Only the best of translators (working in their native languages) satisfactorily produce results comprehensive enough to cover the needs of the wide variety of dictionary users. Part of the difficulty lies in achieving the right level of generalization: ideally, the translations should accurately reflect the source-language item, making it safely usable in many contexts. The final product of this stage is the **translated framework.** This framework is an extremely rich bilingual resource, but much too rich for a dictionary. For one thing, much of the information is specific only to certain contexts, so it needs careful trimming and generalizing. Consequently, only 30–40% of the material in the translated framework actually appears in the published version – the 'synthesized' version – of the *Oxford-Hachette French Dictionary on CD-ROM*, 3rd edn. (edited by Marie-Hélène Corréard and Valerie Grundy, 1994).
3. **Synthesis**: During synthesis, the translated framework is cut to size and reorganized into manageable, readable dictionary entries. Editors work in pairs: an editor whose mother tongue is the source language works with a target-language speaker. Editors use all sorts of conventional

resources (other dictionaries, encyclopedias, reference books, and glossaries) and, in some cases, draw upon the skills and knowledge of specialist consultants in technical areas such as the terminology of medicine, law, business, or science. Of course, they also have access to corpus data.

Using Corpus Data in Bilingual Lexicography

Since about 1990, lexicographers have been able to use evidence from electronic corpora (collections of millions, indeed hundreds of millions, of words in the texts available in machine-readable form). Some have pointed out that the World Wide Web itself can be regarded and (up to a point) processed as a vast electronic corpus (Grefenstette, 2002; Kilgariff and Grefenstette, 2003). The effects have been dramatic. Using a simple concordancing program, lexicographers can inspect 'at the press of a button' all the occurrences in a corpus of a particular word or phrase, together with the contexts in which it occurs. At last, lexicographers have easy access to enough evidence about words, thus allowing them to describe the normal meaning and use of words with reasonable confidence and without relying on introspection. This makes the job both easier and more rigorous.

Bilingual lexicographers can approach corpora in two different ways: either as parallel corpora or comparable corpora. Each approach has its advantages and disadvantages. Parallel corpora consist of original texts alongside target-language translations, aligned as far as possible sentence by sentence. These allow instant access to translations and instant comparisons to the original texts. However, a translation is inevitably a text written under the influence of another language, and a translated text is only as good as its translator. The danger of interference from the idiom and syntax of the source language is ever present. Comparable corpora, on the other hand, are collections of texts with similar contents in both languages; though related more loosely, these texts were produced for their own sakes, i.e., independently, not in relation to a source text in a foreign language. However, comparable corpora also require extra work of lexicographers; without a ready-to-use solution, they must search around similar themes in their hunt for translation equivalents.

Corpus data can be used at all stages of bilingual lexicography. It is particularly useful for finding complementation patterns and typical collocations and for ordering meanings during the analysis of the source language. As for transfer, a source-language corpus can be used to find a variety of occurrences against which the translator can test potential translations in order to decide which is the most appropriate, because concordances and statistical tools show very clearly the differences between frequent and rare expressions, and between conventional and rare-but-possible phraseology. A source-language corpus also allows the translator to check connotations. If a comparable corpus is available, the translator can also check possible translations in the target-language corpus (which is composed of texts produced in the target language) and look at the best possible fit between the source-language lexical item and equivalents in the target language.

During synthesis, the final editing stage, corpora help lexicographers to select and keep what is most useful, both in source and target languages. As a result, users will be more likely to find a correct and useful translation, rather than one with fewer relevant possibilities that are based in lexicographical introspection.

Working with Frameworks

Theoretically, frameworks created by source-language lexicographers are independent of a target language. In real life a framework is often created for a given bilingual pair and the word list is devised accordingly. Once a framework is ready for translation, it can be reused with a different target language. Obviously, it will need to be translated again, and also edited (trimmed) again, because the fit of one language with another differs. An English framework used for an English > French dictionary can be used for an English > Polish dictionary, for instance, but some editing will be needed to ensure that the translations are useful in the new configuration and that enough translations are supplied.

Structure of a Bilingual Entry

The structure of a bilingual entry ranges from very simple (e.g., a monosemous regular word in the source language is translated by a monosemous word in the target language, with no irregularities) to very complex. In the pages explaining the structure of entries, taken from the second edition of the electronic version of the *Oxford-Hachette French Dictionary* on CD-ROM, 3rd edn. (published in 2003 by Oxford University Press), the various elements of a bilingual entry are shown.

The first element is the headword. This has to be a recognizable form of the lemma that users will search for (the **citation form**). Conventions regarding citation forms vary from language to language. For

instance, for most European languages verb headwords are given in the infinitive, but in Hungarian they are stored under their 'simplest form,' i.e., the 3rd person singular of the present indicative, while in Greek the citation form for a verb is the 1st person singular of the present indicative.

Other facts about the headword are also recorded, aimed especially at nonspeakers of the language. A headword may have a register that is not neutral: i.e., it may be informal, very informal or vulgar, or it may be particularly formal. In the *Oxford-Hachette French Dictionary* (OHD) register is shown by a symbol denoting nonstandard language or by an abbreviation, for example *fml,* denoting formal language. Other dictionaries use other devices to give information about register. Guidance is also given on pronunciation. In OHD, the standard pronunciation of a word is transcribed in the International Phonetic Alphabet (IPA), using a broad transcription. There are many variant pronunciations of words within languages, of course, and the lexicographers have to decide how many of these should be represented. For example, should a dictionary reflect only standard British English pronunciations (so-called Received Pronunciation – RP) or should it also give U.S. variants, and if so, how many? The decision to include pronunciation variations depends on the scope and aims of a dictionary. Many bilingual dictionaries nowadays record both British and American pronunciations, but it is not normal for, say, Canadian French pronunciations to be recorded alongside metropolitan European French. Such decisions are made on the basis of an estimation of user needs.

Information is also given about inflected forms of a lemma, either explicitly within the entry or in the form of a reference to a table of verb inflections in an appendix to the main dictionary.

Dictionary entries are split into grammatical and semantic subdivisions (or categories). The main subdivisions separate one part of speech from another, if these are homographs. Within each part-of-speech bloc, different subdivisions record the different translations that are relevant in different contexts. These divisions are signposted systematically to help navigation through entries. In many dictionaries each subdivision is marked with a letter or number, which stands out on the page. Grammatical information such as part of speech is usually indicated, although some dictionaries mention it only when it is relevant for navigation or comprehension. There is also usually a direct translation of the headword in each category. There may be grammatical information about the translation such as gender or the fact that a word deviates from the norm by being invariable. There may also be register information about the translation.

If there is more than one translation equivalent and if the two translations are freely interchangeable, then they are given without discriminators. However, if they are not interchangeable, which is normally the case, then markers are added to help users select the most appropriate translation. Various kinds of discriminators are used: for example, a close synonym of the headword in the relevant context, or a pointer to some aspect of the difference, sufficient to help users in their selection of a translation. A typical collocate may also be used as a discriminator; in a verb entry, for example a typical direct object may be given (e.g., 'firing a gun' vs. 'firing a person'), while in an adjective entry, it may be the head noun that the adjective typically modifies (e.g., 'fair hair' vs. 'a fair person'). Discriminators are also used to differentiate semantic categories within an entry.

Another sort of indicator is a label showing the domain to which a particular sense of a word belongs, for example *Computer Science* or *Medicine*.

Special phraseological elements such as idioms or phrasal verbs in English are sometimes grouped together as subentries, usually at the end of an article. For nonspeakers of a language, it is important to show how the phraseology works, for example, where the direct object of a phrasal verb in English should be placed – before or after the particle.

Bilingual dictionaries are also careful to label register, in particular warning that a given item is pejorative, offensive, or taboo.

Main Issues of Bilingual Lexicography

The problems in bilingual lexicography mostly arise because any two languages are differently structured systems, which coincide only occasionally. Moreover, the structure of a dictionary encourages the belief that there are one-to-one equivalences between words in languages, which is not true in many cases. Editors of bilingual dictionaries attempt to get around this problem by translating many phrases that typically use these words. Here a tension arises between the need for economy and regularity of organization in a dictionary and the need to give as much information as possible to help users produce idiomatic translations. Bilingual lexicographers are more reliant than many would care to admit on the ability of users to perceive analogies between the examples of typical phraseology offered by the dictionary and the particular context the user is trying to generate or interpret.

Directionality

The problems just mentioned are compounded because bilingual dictionaries are aimed at a heterogeneous target audience. For example, typical users of a French–English dictionary include native speakers of French trying to understand English texts, native speakers of French trying to communicate in English, native speakers of English trying to understand French, and native speakers of English trying to communicate in French. The needs of these groups are very different.

This brings us to another dimension of bilingual dictionaries, namely their directionality. A bilingual dictionary caters to source- and target-language speakers whose needs are not identical and neither are their activities in looking up a word's translation. Native speakers of the source language are trying to write or speak the target language. They start from something they know and want to encode it into a foreign language; so, they want detailed information about the correct use of words in the target language and some help with the choice of translations. Native speakers of the target language who are trying to understand the source language, i.e., to decode it, will be satisfied with translation equivalents that explain the meaning of a word or phrase; they will be able to use the translations, build on them, and paraphrase them freely. They do not need phraseological information to help them write idiomatically. Despite this, usually for commercial reasons, large bilingual dictionaries are bidirectional, i.e., designed to serve both source and target native speakers with their conflicting interests. Bilingual lexicographers have the impossible task of finding the right balance between giving too little information and giving too much. For this reason, some dictionary publishers now publish works catering to more narrowly specified user groups, e.g., native speakers of Dutch who are writing in English.

Typically, a large general bilingual dictionary has two sections in one volume, the source language of the first section being the target language of the second section. The presence of two sections does not make a dictionary bidirectional. It is the information given in each section that will show whether the dictionary was designed principally for speakers of either the source or target language or for speakers of both languages.

When a dictionary is designed to be bidirectional, the metalanguage chosen must best serve the needs of different users. To take a very simple example (from the *Oxford-Hachette French dictionary*), the word *abstrus* in French is formal in register. French speakers know this intuitively – they don't need to be told – so the label *fml* is aimed at the English-speaking user. However, the English translation, *abstruse,* is no less formal, but now the register information must be stated in French, for French users (*sout.,* for 'soutenu'). The resultant entry is as follows:

abstrus, abstruse /apstry/, /yz/ **adj** fml abstruse *sout.*

This entry assures the user that the target-language translation is the best possible semantic equivalent and that the register is right. This basic structure can become quite complex when, for example, the target language does not have an equivalent in the same register as the source language.

Issues Concerning the Source Language

General information about inflections is usually given in appendices. In a bilingual dictionary, individual words often need extra information, for example, the conjugation pattern number for French verbs or the stress pattern for nouns and verbs in Russian. For practical reasons, this translation information typically appears in the 'wrong' section of the dictionary, i.e., under the source language, whereas most users would ideally prefer to see it given as part of the target language. Although this arrangement saves space and streamlines the entry (because the information is given only once), it means that the user, having found a particular translation in the target language, must then go to the other half of the dictionary to find out about gender, declension, pronunciation, etc.

Some of these issues – regarding the inclusion of headwords and information about headwords – are very similar to those of monolingual dictionaries. But even the issue of the headword list is more complex in bilingual lexicography. It is connected, in a very practical fashion, with how the dictionary is intended to be used. What sort of tool will it be? A decoding (passive) tool, an encoding (active) tool, or both, with speakers of both languages dipping into it? Inclusion decisions have to be made about such matters as proper nouns (names), morphological variations, specialized vocabulary, archaic words, dialect variations.

To convey the conventions of a language to non-speakers, many bilingual dictionaries contain not only general vocabulary words, but also proper names. For example, *William the Conqueror* is *Guillaume le Conquérant* in French; the German town of *Aachen,* known as *Aachen* in English, is *Aix-la-Chapelle* in French; the Russian composer known as

Shostakovich in English is written *Chostakovitch* in French.

Other inclusion questions are strictly about the source language, still seen through the eyes of a nonspeaker. How should multiword expressions be dealt with? Should they be treated as separate entries, or nested under one of the elements and, if so, which? How should regular morphological derivation be represented? In Slavic languages diminutives are morphologically regular and are common in spoken language. Should diminutives be included even if their translations are identical to those of the standard word from which they are derived? Should archaic or rare words be included in the headword list? Should dialect variations? Where should phrases and idioms be entered? Should they be entered in a canonical form, or in the form of an example of actual usage? Should there be crossreferences to the actual location of a phrase from its components? It is impossible to predict where nonspeakers of a language will search for a phrase, and there is always the problem that they may not recognize a phrase as a lexicalized item at all. Even with the technological support and unrestricted space that an electronic dictionary can provide, these are issues that need to be addressed in a principled way. Often, there is no one right answer. Different dictionary editors make different decisions, depending on how they see their users' needs.

Issues Concerning the Translation Process

Along with coverage and presentation of information, it is the quality of the translations that determines the value of a bilingual dictionary. Depending on the activity of the user (encoding or decoding), the translations must be easily usable and preferably innocuous, that is to say, supplied with sufficient information/signposting to ensure that a nonspeaker of a language will be able to make correct translation choices.

Just as the analysis of the source language is performed at word level, a dictionary translation is expected to reflect the normal behavior of words. Unlike the translator, the bilingual lexicographer must work with very little context given and must select a large array of potential real contexts. The strategies used for the translation of continuous text (or speech) are not applicable for dictionaries. It is impossible to work at sentence level, let alone paragraph. Selecting the right translation in a context is a complex task. In a dictionary it is even more complex, because of the element of generalization. The foreign-language equivalent must be valid in as many contexts as possible, and the lexicographer cannot possibly predict all the contexts in which any given word will be used.

Several situations are possible, as summed up by Bo Svensén (1993).

The first case is when the source word is monosemous and has a monosemous equivalent in the target language, e.g., *squirrel* = *écureuil*. However, even in this simple case, some information is necessarily omitted. A person living in France, for instance, will have a mental representation of a red squirrel, whereas someone living in the U.K. or the U.S.A. will most likely visualize a grey squirrel. This does not matter as long as the same word applies in both cases.

The second case is when the source word is polysemous and has a polysemous equivalent with the same structure of meaning in the target language, e.g., *column* = *colonne*.

The third case is when the source word is polysemous and each meaning has a different translation equivalent. It is then necessary to signpost the translations for source-language speakers who need to select the appropriate one for their context, as shown in a simple entry from the *Oxford-Hachette French Dictionary* below:

blaireau, pl **blaireaux** /blɛʀo/ **nm**
1 (animal) badger;
2 (pour rasage) shaving brush;
3 (pinceau) badger-hair brush.

Things get more complicated when the relationship between the words in a source language and the translation equivalents in the target language are not in a one-to-one relationship – e.g., the French word *gâteau* corresponds to *cake, gateau,* or *biscuit* in English – or where the concept of the source language does not exist in the target language, e.g., the terms *Miranda warning* and *Miranda rights* in American English, which do not have an equivalent in French and other languages.

Other situations can arise: a word in the source language may need several translation equivalents because the target language does not have a term at an equivalent level of generalization; it requires more specific categorization. For example, the English phrasal verb *go away* cannot be translated into Russian with a single one-for-one equivalent. The appropriate Russian translation differs from case to case, because a verb denoting a specific manner of motion must be selected: on foot, on horseback, by transport, by plane, by swimming, or whatever.

Technical terms are also a source of difficulty, particularly in areas where cultures/systems are very different, e.g., law terms, even simple ones, like French *avocat,* which (according to context) may

be equivalent to English *lawyer*, *barrister*, *solicitor*, or *attorney*, or indeed to some other term. Often a specialist will be needed to help find correct solutions and to include a paraphrase in the target language. LSP (language for special purposes) dictionaries, devoted to a particular doman, will usually be better than general purpose dictionaries in such instances.

When selecting a translation, lexicographical translators have to consider how usable it will be to a nonspeaker of the language. A translation may be perfect, but only within a restricted context, while another one may be more general. In such a case, the dictionary translator/lexicographer will tend to select the more general one. Ideally, both will be given, signposted to help the user select the right one for the right context. However, space constraints do not always allow for the inclusion of multiple translations, and even if those do, there is always the danger of overloading the user with too much information and making the dictionary too cumbersome to be used effectively. For these reasons, it is often necessary to keep only one translation, the most 'all-purpose' one, which is why translations in dictionaries often seem very bland. What might be seen as a fault in a translated text is a virtue in a dictionary!

Issues Concerning the Third Phase: Synthesis

The final stage of work on a dictionary is dictated by the projected size and editorial policy of the work. What should be kept and in what form? Selecting what will remain in each dictionary article and how to organize it are activities geared towards making the user's task easier. For some language pairs it is easy to group senses together because both languages function in a similar way; for other language pairs, however, senses must be split to a finer grain, because the target language has a different sense structure. What should be kept and in what form also depends on the directionality of the dictionary. Lexicographers try to use the available space to cram in as much information as possible, insofar as this is compatible with usability.

Other Issues of Bilingual Lexicography

Typography Design and typography are extremely important for dictionaries and even more so for bilingual dictionaries because the risk of confusion between the source language and the target language is high, particularly when the two languages have similarities. Bilingual dictionaries also contain a great deal of metalanguage that must be clearly distinguished from the text so that inexperienced users do not confuse metalanguage and translation. In the case of bidirectional dictionaries, the design must also take into account the conventions of both cultures the dictionary is designed for. Sometimes a compromise between conflicting traditions must be found. The objective of good dictionary design is always to enhance accessibility and readability.

In paper dictionaries, improvements in typography in recent years have improved the clarity of the text in many ways. As for electronic dictionaries (handheld, online, and CD-ROMs), much is still to be done. The technology of electronic presentation is primitive compared with that of the printed dictionary page. Handheld dictionaries have a minuscule screen, usually no color, and very few fonts. Larger electronic dictionaries are still very much influenced by paper products (in particular, paper products with a much simpler structure than dictionaries), so they do not make full use of the computer screen's potential. Either the dictionary information is grossly oversimplified – for example with few or no discriminators – or the entries are too large to fit on a screen, so that users may get lost within entries or forget to look at many more senses not immediately visible, i.e., 'down the page.' These problems will no doubt eventually be solved by computer typographical designers. They will find ways of making the information more accessible, for example by using hypertext menus to show the size and shape of an article.

Symmetry in Bilingual Dictionaries: Nonreversibility The issue of symmetry and reversibility has been explored. Every publisher's dream of producing a cheap bilingual dictionary by reversing language A > language B is in fact unworkable, except for very simple technical glossaries in restricted domains. Why? Because a bilingual dictionary is the description of a source language (language A) using only some of the resources of the target language (language B). A compilation of those resources used for the target language does not itself constitute a framework for language B as a source language. There is no reason to believe that all the expressions of language B that need translation will be present in the terms used to translate language A. Another temptation is to use two dictionaries with the same source language A > B and A > C to create a B > C or C > B dictionaries. Again, this tends to result in an inadequate (and distorted) word list.

The Limitations of Bilingual Lexicography The limitations of bilingual dictionaries are quickly reached for such items as jokes, puns, and palindromes. Translators working within the context of a novel or a

story will work hard to find solutions, but a general bilingual dictionary cannot begin to deal with these things. Another area where bilingual dictionaries cannot provide all the help that is necessary or desirable for translators or foreign readers lies in cultural differences and connotations. A translation may be completely correct at the word level, but the background will remain unexplained. Worse still, there will be no usable equivalent terms, because of cultural differences. In order to compensate for these gaps, some bilingual dictionary publishers now add little cultural notes to supply extra-linguistic information. This stilll leaves translators to their own devices to find a suitable solution.

Bilingual Dictionaries Today and Tomorrow

The world of dictionaries is evolving at great speed with free online dictionaries, scientific project dictionaries, and all sorts of other independent enterprises, as well as commercial projects. Commercial dictionaries are classified either by the media in which they are presented (paper, CD-ROM, online, or handheld devices) or, more traditionally, according to their size or their macrostructure (or arrangement of headwords). They can also be distinguished by the way information is presented: alphabetically or thematically. The main subdivisions of alphabetical dictionaries are: general dictionaries, specialized (or LSP) dictionaries, and learners' dictionaries. The name 'general dictionaries' is self-explanatory; these dictionaries vary in size, according to the audience they are aimed at: travelers, businesspeople, translators, etc. Specialized or LSP dictionaries are aimed at users who are working within a subject field and only need access to a restricted, yet relevant, set of words or terms. These are sometimes called technical dictionaries (*see* **Terminology and Terminological Databases**). Learners' dictionaries are the subject of a separate article (*see* **Learners' Dictionaries**). A fourth kind of alphabetical dictionary – halfway between a monolingual and a bilingual dictionary – is called semi-bilingual by its publishers or bilingualized by the academic world. It combines the definitions of a monolingual learners' dictionary, adapted to the learner's level of competence, with the sort of headword translation equivalents supplied in a bilingual dictionary, thus helping the user understand the definition. However, it is not a translation dictionary in the traditional sense of the term. The translation complements the information about the source language; it is not usually given as a piece of directly usable information.

In the European tradition, thematic bilingual dictionaries are uncommon; they are usually designed for learners and are useful for learning words about a subject. Two types are worth mentioning. The first one is the series called Word Routes, published by Cambridge University Press, and several language pairs such as English–French, English–Greek, English–Italian, etc., are available. All the explanations are supplied in the language of the foreign (non-English) speaker. The foreign language to English section is very restricted; it is an index at the end of the book that references those pages where the word is used as a translation of an English headword.

The second category of thematic bilingual dictionaries is pictorial or visual. In these dictionaries, illustrations replacing headwords are grouped by theme and numbered. Numbers give access to words in two languages on the same page as the picture. At the end of the book, an index in each language crossreferences the page and item number of the pictures, the translation of each word, and the subject's vocabulary. Oxford University Press has published the original *Duden pictorial dictionary* in a variety of languages including the *Oxford Arabic-Duden pictorial English dictionary with Arabic index*, the *Oxford-Duden Thai and English dictionary*, and two other pictorial dictionaries – the English and Chinese and the Portuguese and English.

Currently available bilingual electronic dictionaries, whether on CD-ROM or handheld, tend to be based on the electronic files of an existing paper dictionary, usually alphabetical, with a few added functionalities for searches. These functionalities may include subject-based searches, making the dictionaries more versatile and giving them a thematic flavor.

Handheld dictionaries, which usually have a small screen showing only a few lines of text, are difficult to use for more complex entries. Electronic dictionaries on CD-ROM have a few more functionalities (notably full-text search and hypertext navigation), but at this time few, if any, have been designed only in electronic format. It is impossible to name all the projects currently being developed: commercial ones for obvious reasons of confidentiality, others simply because of their numbers. Searches on the Web give many site addresses of projects, some bilingual, some multilingual, which involve contributors all over the world. Their reliability varies and so does their user-friendliness. New projects are being devised such as a Dutch > English dictionary "conceived as an electronic device that will contain one central database including all relevant information for receptive and

productive use of the L2" (Bogaards and Hannay, 2004).

Finally, another direction of bilingual lexicography should be mentioned, namely dictionary projects for endangered languages, in particular the work and electronic tools of organizations such as SIL (the Summer Institute of Linguistics), "a faith-based organization that studies, documents, and assists in developing the world's lesser-known languages," and SULTRY (Sydney University Language Technology Research Laboratory), which focuses on Australian Aboriginal languages.

So long as dictionaries are published as books, their evolutionary scope is very limited. As dictionaries, particularly bilingual ones, move into the electronic era, however, their shape and contents will evolve until they are so different from those today that they may no longer even be called dictionaries. They will be called translation aids, translation tools, lexical databases ... and many other things, some difficult to imagine today as we stand on the threshold of these developments.

See also: Chinese Lexicography; Corpus Lexicography; Encyclopédie; German Lexicography; Greek Lexicography, Classical; Latin Lexicography; Learners' Dictionaries; Stephanus, Robertus (ca. 1503–1559); Terminology and Terminological Databases.

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Bilingualism

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What Is Bilingualism?

Bilingualism is a product of extensive language contact (i.e., contacts between people who speak different languages). There are many reasons for speakers of different languages to get into contact with one another. Some do so out of their own choosing, whereas others are forced by circumstances. Among the frequently cited factors that contribute to language contact are education, modern technology, economy, religion and culture, political or military acts, and natural disasters. One does not have to move to a different place to be in contact with people speaking a different language. There are plenty of opportunities for language contact in the same country, the same community, the same neighborhood, or even the same family.

However, although language contact is a necessary condition for bilingualism at the societal level, it does not automatically lead to bilingualism at the individual level. For example, Belgium, Canada, Finland, India, Luxembourg, Paraguay, and Singapore, to name but a few countries, are bi- or multilingual, but the degree or extent of bilingualism among the residents of these countries varies significantly. There are large numbers of bilingual or multilingual individuals in Luxembourg, Paraguay, and Singapore, but considerably fewer in the other officially bi- or multilingual countries. Mackey (1962) claims that there are actually fewer bilingual people in bilingual countries than there are in the so-called 'unilingual' ones, because the main concerns of bi- or multilingual states are often the maintenance and use of two or more languages in the same nation, rather than the promotion of bilingualism among their citizens. It is therefore important to distinguish bilingualism as a social or societal phenomenon from bilingualism as an individual phenomenon.

Who Is Bilingual?

People who are brought up in a society in which monolingualism and uniculturalism are promoted as the normal way of life often think that bilingualism is only for a few, 'special' people. In fact, one in three of the world's population routinely uses two or more languages for work, family life, and leisure. There are even more people who make irregular use of languages other than their native one; for example, many people have learned foreign languages at school and only occasionally use them for specific purposes. If we count these people as bilinguals, then monolingual speakers would be a tiny minority in the world today.

Yet the question of who is and who is not a bilingual is more difficult to answer than it first appears. Baker and Prys Jones (1998: 2) suggest that in defining a bilingual person, we may wish to consider the following questions:

- Should bilingualism be measured by how fluent people are in two languages?
- Should bilinguals be only those people who have equal competence in both languages?
- Is language proficiency the only criterion for assessing bilingualism, or should the use of two languages also be considered?
- Most people would define a bilingual as a person who can speak two languages. What about a person who can understand a second language perfectly but cannot speak it? What about a person who can speak a language but is not literate in it? What about an individual who cannot speak or understand speech in a second language but can read and write it? Should these categories of people be considered bilingual?
- Should self-perception and self-categorization be considered in defining who is bilingual?
- Are there different degrees of bilingualism that can vary over time and with circumstances? For instance, a person may learn a minority language as a child at home and then later acquire another, majority language in the community or at school. Over time, the second language may become the stronger or dominant language. If that person moves away from the neighborhood or area in which the minority language is spoken or loses contact with those who speak it, he or she may lose fluency in the minority language. Should bilingualism therefore be a relative term?

The word 'bilingual' primarily describes someone with the possession of two languages. It can, however, also be taken to include the many people in the world who have varying degrees of proficiency in and interchangeably use three, four or even more languages. In many countries of Africa and Asia, several languages coexist and large sections of the population speak three or more languages. Individual multilingualism in these countries is a fact of life. Many people speak one or more local or ethnic languages, as well as another indigenous language which has become the medium of communication between different ethnic

groups or speech communities. Such individuals may also speak a foreign language – such as English, French or Spanish – which has been introduced into the community during the process of colonization. This latter language is often the language of education, bureaucracy and privilege.

Multilingualism can also be the possession of individuals who do not live within a multilingual country or speech community. Families can be trilingual when the husband and wife each speak a different language as well as the common language of the place of residence. People with sufficient social and educational advantages can learn a second, third, or fourth language at school or university; at work; or in their leisure time. In many continental European countries, children learn two languages at school – such as English, German, or French – as well as being fluent in their home language – such as Danish, Dutch, or Luxembourgish.

It is important to recognize that a multilingual speaker uses different languages for different purposes and does not typically possess the same level or type of proficiency in each language. In Morocco, for instance, a native speaker of Berber may also be fluent in colloquial Moroccan Arabic but not literate in either of these languages. This Berber speaker will be educated in Modern Standard Arabic and use that language for writing and formal purposes. Classical Arabic is the language of the mosque, used for prayers and reading the Qur'an. Many Moroccans also have some knowledge of French, the former colonial language.

Theoretical Issues in Bilingualism Research

Chomsky (1986) defined three basic questions for modern linguistics:

i. What constitutes knowledge of language?
ii. How is knowledge of language acquired?
iii. How is knowledge of language put to use?

For bilingualism research, these questions can be rephrased to take in knowledge of more than one language (see also Cook, 1993):

i. What is the nature of language, or grammar, in the bilingual person's mind, and how do two systems of language knowledge coexist and interact?
ii. How is more than one grammatical system acquired, either simultaneously or sequentially? In what aspects does bilingual language acquisition differ from unilingual language acquisition?
iii. How is the knowledge of two or more languages used by the same speaker in bilingual speech production?

Taking the acquisition question first, earlier observers of bilingual children concentrated on documenting the stages of their language development. Volterra and Taeschner (1978), for example, proposed a three-stage model of early bilingual development. According to this model, the child initially possesses one lexical system composed of lexical items from both languages. In stage two, the child distinguishes two separate lexical codes but has one syntactic system at his or her disposal. Only when stage three is reached do the two linguistic codes become entirely separate. Volterra and Taeschner's model gave rise to what is now known as the 'unitary language system hypothesis.' In its strongest version, the hypothesis supposes that the bilingual child has one single language system that they use for processing both of their languages in the repertoire.

In the 1980s, the unitary language system hypothesis came under intense scrutiny; for instance, by Meisel (1989) and Genesee (1989). They argue that there is no conclusive evidence to support the existence of an initial undifferentiated language system, and they also point out certain methodological inconsistencies in the three-stage model. The phenomenon of language mixing, for instance, can be interpreted as a sign of two developing systems existing side by side, rather than as evidence of one fused system. Meisel's and Genesee's studies led to an alternative hypothesis, known as the 'separate development hypothesis' or 'independent development hypothesis.' More recently, researchers have investigated the possibility that different aspects of language (e.g., phonology, vocabulary, syntax, pragmatics) of the bilingual child's language systems may develop at different rates (e.g., Li and Zhu, 2001). Care needs to be taken in interpreting research evidence using children at different developmental stages.

Although the 'one-versus-two-systems' debate (i.e., whether bilingual children have an initially differentiated or undifferentiated linguistic system) continues to attract new empirical studies, a more interesting question has emerged regarding the nature of bilingual development. More specifically, is bilingual acquisition the same as monolingual acquisition? Theoretically, separate development is possible without there being any similarity with monolingual acquisition. Most researchers argue that bilingual children's language development is, by and large, the same as that of monolingual children. In very general terms, both bilingual and monolingual children go through an initial babbling stage, followed by the

one-word stage, the two-word stage, the multiword stage, and the multiclause stage. At the morphosyntactic level, a number of studies have reported similarities rather than differences between bilingual and monolingual acquisition. Garcia (1983), for example, compared the use of English morpheme categories by English monolingual children and bilingual children acquiring English and Spanish simultaneously and found no systematic difference at all. Pfaff and Savas (1988) found that their 4-year-old Turkish/German subject made the same errors in Turkish case marking as reported in the literature on monolingual Turkish children. Muller's (1990) study of two French/German children indicates that their use of subject–verb agreement and finite verb placement in both languages is virtually identical to that of comparable monolingual children. De Houwer (1990) found that her Dutch/English bilingual subject, Kate, used exactly the same word orders in Dutch as monolingual Dutch-speaking children, both in terms of types and in proportional use. Furthermore, De Houwer found in Kate parallels to monolingual children for both Dutch and English in a range of structures, such as nonfinite verb placement, preposed elements in affirmative sentences, clause types, sentence types, conjunctions, and question inversion.

Nevertheless, one needs to be careful in the kinds of conclusions one draws from such evidence. Similarities between bilingual and monolingual acquisition do not mean that the two languages a bilingual child is acquiring develops in the same way or at the same speed, or that the two languages a bilingual child is acquiring do not influence and interact with each other. Paradis and Genesee (1996), for example, found that although the 2–3-year-old French–English bilingual children they studied displayed patterns that characterize the performance of monolingual children acquiring these languages separately, and they acquired these patterns within the same age range as monolingual children, they used finite verb forms earlier in French than in English; used subject pronouns in French exclusively with finite verbs, but subject pronouns in English with both finite and nonfinite verbs, in accordance with the status of subject pronouns in French as clitics (or agreement markers) but full NPs in English; and placed verbal negatives after lexical verbs in French (e.g., 'n'aime pas') but before lexical verbs in English ('do not like'). Further evidence of cross-linguistic influence has been reported by Dopke (1992), for example, in her study of German–English bilingual children in Australia. These children tended to overgeneralize the –VO word order of English to German, which instantiates both VO and OV word orders, depending on the clausal structure of the utterance. Dopke suggests that children learning English and German simultaneously are prone to overgeneralize SVO word order in their German because the VO order is reinforced on the surface of both the German and the English input they hear.

Most of the studies that have examined cross-linguistic influences in bilingual acquisition focus on morphosyntactic features. One area that has hitherto been underexplored is the interface between phonetics and phonology in bilingual acquisition. Although most people seem to believe that the onset of speech by bilingual children is more or less the same as for monolingual children, there are indications that bilingual children seem to develop differently from monolingual children in the following three aspects: the overall rate of occurrence of developmental speech errors, the types of speech errors and the quality of sounds (Zhu and Dodd, 2005). For example, studies on Cantonese/English (Holm and Dodd), Putonghua/Cantonese (So and Leung), Welsh/English (Ball *et al.*), Spanish/English (Yavas and Goldstein), and Punjabi/English (Stow and Pert) (also in Zhu and Dodd, 2006) bilingual children seem to indicate that bilingual children tend to make not only more speech errors but also different types of speech errors compared with monolingual children of the same age. These speech errors would be considered atypical if they had occurred in the speech of monolingual children. Moreover, although bilingual children seem to be able to acquire monolingual-like competence at the phonemic level, there are qualitative differences at the phonetic level in terms of production. For example, using instrumental analysis, Khattab (also in Zhu and Dodd, 2006) finds that although Arabic–English bilingual children have similar patterns of production and use of VOT, /l/, and /r/ in some respects to those of monolinguals from each language, they also show differences that are intricately related to age, input, and language context. These studies and others are reported in Zhu and Dodd (2005).

There is one area in which bilingual children clearly differ from monolingual children; namely, code-mixing. Studies show that bilingual children mix elements from both languages in the same utterance as soon as they can produce two-word utterances. Researchers generally agree that bilingual children's mixing is highly structured and grammatically constrained, although there is no consensus on the nature of the specific constraints that organize their mixing. Vihman (1985), who studied her own son Raivo, who acquired English and Estonian simultaneously, argued, for example, that the language mixing by bilingual children is qualitatively different from that of more mature bilinguals. She invoked as evidence for this claim the fact that young bilingual children

indicate a propensity to mix function words over contentives (e.g., nouns, verbs, adjectives) – a type of mixing that is rare in older bilingual mixing. However, Lanza's (1997) study, although finding similar patterns in the mixing produced by her two Norwegian–English bilingual subjects, argued that children's mixing is qualitatively the same as that of adults; their relatively greater degree of mixing of function words is evidence of what Lanza called 'dominance' of one language over another rather than of a substantial difference from bilingual adults' mixing. Both Vihman and Lanza, as well as other studies of children's mixing, show that bilingual children mix their languages in accordance with constraints that operate on adult mixing. The operation of constraints based on surface features of grammar, such as word order, is evident from the two-word/two-morpheme stage onward, and the operation of constraints based on abstract notions of grammatical knowledge is most evident in bilingual children once they demonstrate such knowledge overtly (e.g., verb tense and agreement markings), usually around two years and 6 months of age and older. As Genesee (2002) points out, these findings indicate that in addition to the linguistic competence needed to formulate correct monolingual strings, bilingual children have the added capacity to coordinate their two languages in accordance with the grammatical constraints of both languages during mixing. Although these studies provide further evidence for the separate development, or two-systems, argument, they also indicate that there are both quantitative and qualitative differences between bilingual acquisition and monolingual acquisition.

Another area of interest in acquisitional studies of bilingual children is the role of input and social context in the rate and order of language acquisition. Earlier assumptions were that the bilingual child would have half, or less, of the normal input in each of their two languages, compared with the monolingual child. More careful examinations of bilingual children show considerable variations in the quantity and quality of input, interactional styles of the parents, and environmental policies and attitudes toward bilingualism. On the basis of Harding and Riley's work (1986), Romaine (1995) distinguished six types of early-childhood bilingualism according to the native language of the parents, the language of the community at large, and the parents' strategy in speaking to the child.

Type 1: One person, one language.

- Parents: The parents have different native languages, with each having some degree of competence in the other's language.
- Community: The language of one of the parents is the dominant language of the community.
- Strategy: The parents each speak their own language to the child from birth.

Type 2: Nondominant Home Language/One Language, One Environment

- Parents: The parents have different native languages.
- Community: The language of one of the parents is the dominant language of the community.
- Strategy: Both parents speak the nondominant language to the child, who is fully exposed to the dominant language only when outside the home, and in particular in nursery school.

Type 3: Nondominant Home Language without Community Support

- Parents: The parents share the same native languages.
- Community: The dominant language is not that of the parents.
- Strategy: The parents speak their own language to the child.

Type 4: Double Nondominant Home Language without Community Support

- Parents: The parents have different native languages.
- Community: The dominant language is different from either of the parents.
- Strategy: The parents each speak their own language to the child from birth.

Type 5: Nonnative Parents

- Parents: The parents share the same native language.
- Community: The dominant language is the same as that of the parents.
- Strategy: One of the parents always addresses the child in a language that is not his or her native language.

Type 6: Mixed Languages

- Parents: The parents are bilingual.
- Community: Sectors of community may also be bilingual.
- Strategy: Parents code-switch and mix languages.

The three headings Romaine used to classify the six types of childhood bilingualism – the languages of the parents, the sociolinguistic situation of the community, and the discourse strategies of the parents and other immediate carers – are critical factors not only in the process of bilingual acquisition but also in

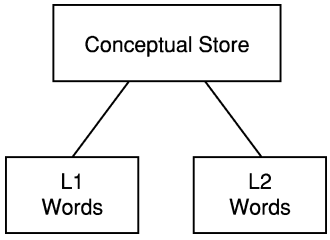

Figure 1 Lexical association model.

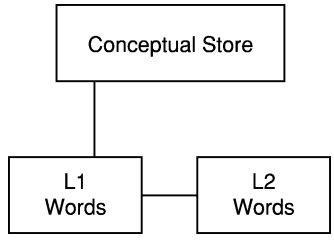

Figure 2 Dual-store model.

the final product of that process (i.e., the type of bilingual speaker it produces). Arguably, the six types of bilingual children would grow up as different types of bilinguals with different mental representations of the languages and different patterns of language behavior.

Research on the cognitive organization and representation of bilingual knowledge is inspired and influenced by the work of Weinreich. Focussing on the relationship between the linguistic sign (or signifier) and the semantic content (signified), Weinreich (1953) distinguished three types of bilinguals. In type A, the individual combines a signifier from each language with a separate unit of the signified. Weinreich called them 'coordinative' (later often called 'coordinate') bilinguals. In type B, the individual identifies two signifiers but regards them as a single compound, or composite, unit of signified; hence 'compound' bilinguals. Type C refers to people who learn a new language with the help of a previously acquired one. They are called 'subordinative' (or 'subordinate') bilinguals. Weinreich's examples were from English and Russian:

```
(A) 'book'    'kniga'
      |          |
    /buk/     /kn'iga/

(B)   'book' = 'kn'iga'

        /\
     /buk/   /kn'iga/

(C) 'book'
      |
    /buk/
      |
    /kn'iga/
```

Weinreich's distinctions are often misinterpreted in the literature as referring to differences in the degree of proficiency in the languages, but in fact the relationship between language proficiency and cognitive organization of the bilingual individual, as conceptualized in Weinreich's model, is far from clear. Some 'subordinate' bilinguals demonstrate a very high level of proficiency in processing both languages, as evidenced in grammaticality and fluency of speech, and some 'coordinative' bilinguals show difficulties in processing two languages simultaneously (i.e., in code-switching or in 'foreign' word identification tasks). It must also be stressed that Weinreich's distinctions among bilingual individuals are distributed along a continuum from a subordinate or compound end to a coordinate end and can at the same time be more subordinate or compound for certain concepts and more coordinate for others, depending on, among other things, the age and context of acquisition.

Weinreich's work influenced much of the psycholinguistic modelling of the bilingual lexicon. Potter *et al.* (1984) presented a reformulation of the manner in which bilingual lexical knowledge could be represented in the mind in terms of two competing models: the Concept Mediation Model and the Word Association model. In the Concept Mediation Model, words of both L1 and L2 are linked to amodal conceptual representations. In the Lexical Association Model, in contrast, words in a second language are understood through L1 lexical representations. As can be seen in Figure 1, the models are structurally equivalent to Weinreich's distinction between coordinative and subordinative bilingualism. At the same time, several researchers (e.g., Kolers and Gonzalez [1980] and Hummel [1986]) presented evidence for the so-called dual-store model, as represented in Figure 2. This latter model has also generated considerable research on the existence of the putative 'bilingual language switch' postulated to account for the bilingual's ability to switch between languages on the basis of environmental demands (e.g., MacNamara, 1967; MacNamara and Kushnir, 1971).

Subsequent studies found conflicting evidence in favor of different models. Some of the conflicting evidence could be explained by the fact that different types of bilingual speakers were used in the experiments in terms of proficiency level, age, and context of acquisition. It is possible that lexical mediation is associated with low levels of proficiency, and concept mediation with higher levels, especially for those who have become bilingual in later childhood or adulthood. Some researchers called for a developmental dimension in the modelling of bilingual knowledge.

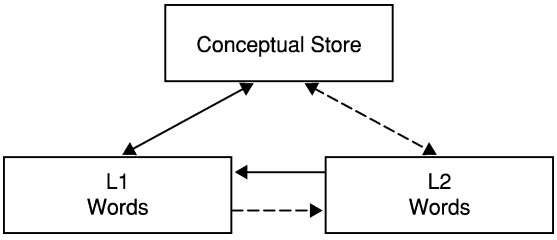

Figure 3 Revised hierarchical model.

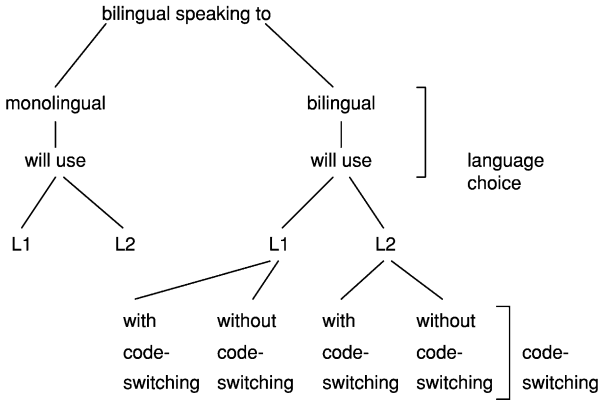

Figure 4 Adapted from Grosjean, 1982: 129.

Kroll and Stewart (1994), for example, proposed the Revised Hierarchical Model, which represents concept mediation and word association not as different models but as alternative routes within the same model (see Figure 3).

An important distinctive feature of being bilingual is being able to make appropriate language choices. Bilingual speakers choose to use their different languages depending on a variety of factors, including the type of person addressed (e.g., members of the family, schoolmates, colleagues, superiors, friends, shopkeepers, officials, transport personnel, neighbors), the subject matter of the conversation (e.g., family concerns, schoolwork, politics, entertainment), location or social setting (e.g., at home, in the street, in church, in the office, having lunch, attending a lecture, negotiating business deals), and relationship with the addressee (e.g., kin, neighbors, colleagues, superior/inferior, strangers). However, even more complex are the many cases in which a bilingual talks to another bilingual with the same linguistic background and changes from one language to another in the course of conversation. This is what is known as code-switching. Figure 4 illustrates a decision-making process of the bilingual speaker in language choice and code-switching.

There is a widespread impression that bilingual speakers code-switch because they cannot express themselves adequately in one language. This may be true to some extent when a bilingual is momentarily lost for words in one of his or her languages. However, code-switching is an extremely common practice among bilinguals and takes many forms. A long narrative may be divided into different parts expressed in different languages, sentences may begin in one language and finish in another, and words and phrases from different languages may succeed each other. Linguists have devoted much attention to the study of code-switching. It has been demonstrated that code-switching involves skilled manipulation of overlapping sections of two or more grammars and that there is virtually no instance of ungrammatical combination of two languages in code-switching, regardless of the bilingual ability of the speaker. Some suggest that code-switching is itself a discrete mode of speaking, emanating from a single code-switching grammar.

One important aspect of the code-switching grammar is that the two languages involved do not play the same role in sentence making. Typically, one language sets the grammatical framework, with the other providing certain items to fit into the framework. Code-switching therefore is not a simple combination of two sets of grammatical rules but grammatical integration of one language in another. Bilingual speakers of different proficiency levels in their two languages or speaking two typologically different languages can engage in code-switching and, indeed, vary it according to their needs. The possible existence of a code-switching grammar calls into question the traditional view of the bilingual as two monolinguals in one person (for further discussions, see Grosjean, 1985). One consequence of the 'two-in-one' perspective is that bilingual speakers are often compared to monolinguals in terms of their language proficiency.

For example, some researchers have suggested that bilingual children have smaller vocabularies and less-developed grammars than their monolingual peers, while their ability to exploit the similarities and differences in two sets of grammatical rules to accomplish rule-governed code-switching was not considered relevant. In some experimental psycholinguistic studies, tests are given without taking into account that bilingual speakers may have learned their two languages under different conditions for different purposes and that they only use them in different situations with different people. It is important to emphasize that bilingual speakers have a unique linguistic and psychological profile; their two languages are constantly in different states of activation, and they are able to call on their linguistic knowledge and resources according to the context and adapt their behavior to the task at hand.

Bilingualism as a Sociopolitical Issue

Language choice is not a purely linguistic issue. In many countries of the world, much of the social identification of individuals, as well as of groups, is accomplished through language choice. By choosing one or another of the two or more languages in one's linguistic repertoire, a speaker reveals and defines his or her social relationships with other people. At a societal level, whole groups of people, and in fact, entire nations, can be identified by the language or languages they use. Language, together with culture, religion, and history, is a major component of national identity.

Multilingual countries are often thought to have certain problems that monolingual states do not. On the practical level, difficulties in communication within a country can act as an impediment to commerce and industry. More seriously, however, multilingualism is a problem for government. The process of governing requires communication both within the governing institutions and between the government and the people. This means that a language, or languages, must be selected as the language for use in governing. However, the selection of the 'official language' is not always easy, as it is not simply a pragmatic issue. For example, on pragmatic grounds, the best immediate choice for the language of government in a newly independent colony might be the old colonial language, as the colonial governing institutions and records are already in place in that language, and those nationals with the most government experience already know it. The old colonial language will not, however, be a good choice on nationalist grounds. For a people that has just acquired its own geographical territory, the language of the state that had denied it territorial control would not be a desirable candidate for a national symbol. Ireland has adopted a strategy in which both the national language, Irish, and the language of the deposed power, English, are declared as official; the colonial language is used for immediate, practical purposes, and the national language is promoted and developed. However, in many other multilingual countries that do not have a colonial past, such as China, deciding which language should be selected as the national language can sometimes lead to internal, ethnic conflicts.

Similarly, selecting a language for education in a multilingual country is often problematic. In some respects, the best strategy for language in education is to use the various ethnic languages. After all, these are the languages the children already speak, and school instruction can begin immediately without waiting until the children learn the official language. Some would argue, however, that this strategy could be damaging for nation-building efforts and disadvantage children by limiting their access to the wider world. It should be pointed out that there is no scientific evidence to show that multilingual countries are particularly disadvantaged, in socioeconomic terms, compared to monolingual ones. In fact, all the research that was carried out in the 1960s and 1970s on the relationship between the linguistic diversity and economic well-being of a nation came to the conclusion that a country can have any degree of language uniformity or fragmentation and still be underdeveloped, and a country whose entire population speaks the same language can be anywhere from very rich to very poor. It might be true, however, that linguistic uniformity and economic development reinforce each other; in other words, economic well-being promotes the reduction of linguistic diversity. It would be lopsided logic, though, to view multilingualism as the cause of the socioeconomic problems of a nation.

Multilingualism is an important resource at both the societal and personal levels. For a linguistically diverse country to maintain ethnic group languages alongside the national or official languages can prove an effective way to motivate individuals while unifying the nation. In addition, a multiethnic society is arguably a richer, more exciting, and more stimulating place to live in than a community with only one dominant ethnic group. For the multilingual speaker, the availability of various languages in the community repertoire serves as a useful interactional resource. Typically, multilingual societies tend to assign different roles to different languages; one language may be used in informal contexts with family and friends, while another for the more formal situations of work, education, and government. Imagine two friends who are both bilingual in the same 'home' and 'official' languages. Suppose that one of them also works for the local government and that her friend has some official business with her. Suppose further that the government employee has two pieces of advice to give to her friend: one based on her official status as a government representative, and one based on their mutual friendship. If the official advice is given in the 'government' language and the friendly advice in the 'home' language, there is little chance that there would be any misunderstanding about which advice was which. The friend would not take the advice given in the 'home' language as official.

There is a frequent debate in countries in which various languages coexist concerning which languages are a resource. The favored languages tend to be those that are both international and particularly valuable in international trade. A lower place is

given in the status ranking to minority languages, which are small, regional, and of less perceived value in the international marketplace. For example, French has traditionally been the number one modern language in the British school curriculum, followed by German and Spanish, and then a choice between Italian, Modern Greek, and Portuguese. One may notice that all of these are European languages. Despite large numbers of mother-tongue Bengali, Cantonese, Gujarati, Hakka, Hindi, Punjabi, Turkish, and Urdu speakers in England, these languages occupy a very low position in the school curriculum. In the British National Curriculum, the languages Arabic, Bengali, Chinese (Cantonese or Mandarin), Gujarati, Modern Hebrew, Hindi, Japanese, Punjabi, Russian, Turkish, and Urdu are initially only allowed in secondary schools (for 11–18 year olds) if a major European language such as French is taught first (Milroy and Milroy, 1985).

Clearly, multilingualism as a national and personal resource requires careful planning, as would any other kind of resource. However, language planning has something that other kinds of economic planning do not usually have: language as its own unique cultural symbolic value. As has been discussed earlier, language is a major component of the identity of a nation and an individual. Often, strong emotions are evoked when talking about a certain language. Language planning is not simply a matter of standardizing or modernizing a corpus of linguistic materials, nor is it a reassignment of functions and status. It is also about power and influence. The dominance of some languages and the dominated status of other languages are partly understandable if we examine who holds positions of power and influence, who belong to elite groups that are in control of decision-making, and who are in subordinate groups, on whom decisions are implemented. It is more often than not the case that a given arrangement of languages benefits only those who have influence and privileges.

For the multilingual speaker, language choice is not only an effective means of communication but also an act of identity (Le Page and Tabouret-Keller, 1985). Every time we say something in one language when we might just as easily have said it in another, we are reconnecting with people, situations, and power configurations from our history of past interactions and imprinting on that history our attitudes toward the people and languages concerned. Through language choice, we maintain and change ethnic group boundaries and personal relationships and construct and define 'self' and 'other' within a broader political economy and historical context.

Changes in Attitudes Toward Bilingualism

From the early nineteenth century to about the 1960s, there was a widespread belief that bilingualism has a detrimental effect on a human beings' intellectual and spiritual growth. Stories of children who persisted in speaking two languages in school having had their mouths washed with soap and water or being beaten with a cane were not uncommon. The following is a quote from a professor at Cambridge University that illustrates the dominant belief of the time, even among academics and intellectuals:

> If it were possible for a child to live in two languages at once equally well, so much the worse. His intellectual and spiritual growth would not thereby be doubled, but halved. Unity of mind and character would have great difficulty in asserting itself in such circumstances. (Laurie, 1890: 15)

Professor Laurie's view represented a commonly held belief throughout the twentieth century that bilingualism disadvantages rather than advantages one's intellectual development. Early research on bilingualism and cognition tended to confirm this negative viewpoint, finding that monolinguals were superior to bilinguals on intelligence tests. One of the most widely cited studies was done by Saer (1923) who studied 1400 Welsh–English bilingual children between the ages of 7 and 14 years in five rural and two urban areas of Wales. A 10-point difference in IQ was found between the bilinguals and the monolingual English speakers from rural backgrounds. From this, Saer concluded that bilinguals were mentally confused and at a disadvantage in intelligence compared with monolinguals. It was further suggested, with a follow-up study of university students, that "the difference in mental ability as revealed by intelligence tests is of a permanent nature since it persists in students throughout their university career" (Saer, 1923: 53).

Controversies regarding the early versions of IQ tests and the definition and measurement of intelligence aside, there were a number of problems with Saer's study and its conclusions. First, it appeared to be only in the rural areas that the correlation between bilingualism and lower IQ held. In urban areas, monolinguals and bilinguals were virtually the same; in fact, the average IQ for urban Welsh–English bilingual children in Saer's study was 100, whereas for monolingual, English-speaking children it was 99. The urban bilingual children had more contact with English both before beginning school and outside school hours than did the rural bilinguals. Thus, the depressed scores of the rural population were probably more a reflection of lack of opportunity

and contexts to use English and were not necessarily indicative of any sociopsychological problems.

More important, however, is the issue of statistical inference in this and other studies of a similar type. Correlations do not allow us to infer cause-and-effect relationships, particularly when other variables – such as rural versus urban differences – may be mediating factors. Another major factor is the language in which such tests were administered, particularly tests of verbal intelligence. Many such studies measured bilinguals only in the second or nondominant language.

At around the same time that Saer conducted studies on bilinguals' intelligence, some well-known linguists expressed their doubts about bilingual speakers' linguistic competence. The following is Bloomfield's characterization of a Menomini Indian man in the United States, whom he believed to have 'deficient' knowledge of Menomini and English:

> White Thunder, a man around 40, speaks less English than Menomini, and that is a strong indictment, for his Menomini is atrocious. His vocabulary is small, his inflections are often barbarous, he constructs sentences of a few threadbare models. He may be said to speak no language tolerably. (Bloomfield, 1927: 395)

This is one of the early statements of a view that became fashionable in educational circles; namely, that it was possible for bilinguals not to acquire full competence in any of the languages they spoke. Such an individual was said to be 'semilingual.' These people were believed to have linguistic deficits in six areas of language (see Hansegard, 1975; Skutnabb-Kangas, 1981):

1. Size of vocabulary
2. Correctness of language
3. Unconscious processing of language
4. Language creation
5. Mastery of the functions of language
6. Meanings and imagery.

It is significant that the term 'semilingualism' emerged in connection with the study of language skills of people belonging to ethnic minority groups. Research that provided evidence in support of the notion of 'semilingualism' was conducted in Scandinavia and North America and was concerned with accounting for the educational outcomes of submersion programs in which minority children were taught through the medium of the majority language. However, these studies, similar to the ones conducted by Saer, had serious methodological flaws, and the conclusions reached by the researchers were misguided.

First, the educational tests used to measure language proficiencies and to differentiate between people were insensitive to the qualitative aspects of languages and to the great range of language competences. Language may be specific to a context; a person may be competent in some contexts but not in others. Second, bilingual children are still in the process of developing their languages. It is unfair to compare them to some idealized adults. Their language skills change over time. Third, the comparison with monolinguals is also unfair. It is important to distinguish whether bilinguals are 'naturally' qualitatively and quantitatively different from monolinguals in their use of the two languages (i.e., as a function of being bilingual). Fourth, if languages are relatively underdeveloped, the origins may not be in bilingualism per se but in the economic, political, and social conditions that evoke underdevelopment.

The disparaging and belittling overtone of the term 'semilingualism' itself invokes expectations of underachievement in the bilingual speaker. Thus, rather than highlighting the apparent 'deficits' of bilingual speakers, the more positive approach is to emphasize that when suitable conditions are provided, languages are easily capable of development beyond the 'semi' state.

One of the specific issues Bloomfield raised in his comments on the language behavior of members of the Menomini Indians in North America was the frequent mixing of their own language and English. It has been described as 'verbal salad,' not particularly appealing but nevertheless harmless, or 'garbage' that is definitively worthless and vulgar. Unfortunately, although switching and mixing of languages occurs in practically all bilingual communities and all bilingual speakers' speech, it is stigmatized as an illegitimate mode of communication, even sometimes by the bilingual speakers themselves. Haugen (1977: 97), for example, reports that a visitor from Norway made the following comment on the speech of the Norwegians in the United States: "Strictly speaking, it is no language whatever, but a gruesome mixture of Norwegian and English, and often one does not know whether to take it humorously or seriously." Gumperz (1982: 62–63) reports that some bilingual speakers who mixed languages regularly still believe such behavior was "bad manners" or a sign of "lack of education or improper control of language." One of the Punjabi–English bilinguals Romaine interviewed said: "I'm guilty as well in the sense that we speak English more and more and then what happens is that when you speak your own language you get two or three English words in each sentence . . . but I think that's 'wrong'" (Romaine, 1995: 294).

Attitudes do not, of course, remain constant over time. At a personal level, changes in attitudes may occur when there is some personal reward involved. Speakers of minority languages will be more motivated to maintain and use their languages if they prove to be useful in increasing their employability or social mobility. In some cases, certain jobs are reserved for bilingual speakers only. At the societal level, attitudes toward bilingualism change when the political ideology changes. In California and elsewhere in the southwestern United States, for instance, *pocho* and *calo* used to serve as pejorative terms for the Spanish of local Chicanos. With a rise in ethnic consciousness, however, these speech styles have become symbolic of Chicano ethnicity and are now increasingly used in contemporary Chicano literature. Since the 1960s, there has been a political movement, particularly in the United States, advocating language rights. In the United States, questions about language rights are widely discussed not only in college classrooms and language communities but also in government and federal legislatures.

Language rights have a history of being tested in U.S. courtrooms. From the early 1920s to the present, there has been a continuous debate in U.S. courts of law regarding the legal status of language minority rights. To gain short-term protection and a medium-term guarantee for minority languages, legal challenges have become an important part of the language rights movement. The legal battles concerned not just minority language vs. majority language contests, but also children vs. schools, parents vs. school boards, state vs. the federal authorities, and so on. Whereas minority language activists among the Basques in Spain and the Welsh in Britain have been taken to court by the central government for their actions, U.S. minority language activists have taken the central and regional government to court.

The language rights movement has received some support from organizations such as the United Nations, Unesco, the Council of Europe, and the European Union. Each of these four organizations has declared that minority language groups have the right to maintain their languages. In the European Union, a directive (77/486/E EC) stated that member states should promote the teaching of the mother tongue and the culture of the country of origin in the education of migrant workers' children. The kind of rights, apart from language rights, that minority groups may claim include protection, membership of their ethnic group and separate existence, nondiscrimination and equal treatment, education and information in their ethnic language, freedom to worship, freedom of belief freedom of movement, employment, peaceful assembly and association, political representation and involvement, and administrative autonomy.

However, real changes in attitudes toward bilingualism will not happen until people recognize or, better still, experience the advantages of being bilingual. Current research indicates that there are at least eight overlapping and interacting benefits for a bilingual person, encompassing communicative, cognitive and cultural advantages (adapted from Baker and Prys Jones, 1998: 6–8):

Communicative advantages

Relationships with parents: Where parents have differing first languages, the advantage of children becoming bilingual is that they will be able to communicate in each parent's preferred language. This may enable a subtler, finer texture of relationship with the parent. Alternatively they will be able to communicate with parents in one language and with their friends and within the community in a different language.

Extended family relationships: Being a bilingual allows someone to bridge the generations. When grandparents, uncles, aunts and other relatives in another region speak a language that is different from the local language, the monolingual may be unable to communicate with them. The bilingual has the chance to bridge that generation gap, build closer relationships with relatives extended family.

Community relationships: A bilingual has the chance to communicate with a wider variety of people than a monolingual. Bilingual children will be able to communicate in the wider community and with school and neighbourhood friends in different languages when necessary.

Transnational communication: One barrier between nations and ethnic groups tends to be language. Language is sometimes a barrier to communication and to creating friendly relationships of mutual respect. Bilinguals in the home, in the community and in society have the potential for lowering such barriers. Bilinguals can act as bridges within the nuclear and extended family, within the community and across societies.

Language sensitivity: Being able to move between two languages may lead to more sensitivity in Communication. Because bilinguals are constantly monitoring which language to use in different situations, they may be more attuned to the communicative needs of those with whom they talk. Research suggests that bilinguals may be more empathic towards listeners' needs in communication. When meeting those who do not speak their language particularly well, bilinguals may be more patient listeners than monolinguals.

Cultural advantages

Another advantage of being a bilingual is having two or more worlds of experience. Bilingualism provides the opportunity to experience two or more cultures. The monolingual may experience a variety of cultures; for example, from different neighbours and communities

that use the same language but have different ways of life. The monolingual can also travel to neighbouring countries and experience other cultures as a passive onlooker. However, to penetrate different cultures requires the language of that culture. To participate and become involved in the core of a culture requires a knowledge of the language of that culture.

There are also potential economic advantages to being bilingual. A person with two languages may have a wider portfolio of jobs available. As economic trade barriers fall, as international relationships become closer, as unions and partnerships across nations become more widespread, all increasing number of jobs are likely to require a person to be bilingual or multilingual. jobs in multinational companies, jobs selling and exporting, and employment prospects generated by translational contact make the future of employment more versatile for bilinguals than monolinguals.

Cognitive advantages

More recent research has shown that bilinguals may have some advantages in thinking, ranging from creative thinking to faster, progress in early cognitive development and greater sensitivity in communication. For example, bilinguals may have two or more words for cacti object and idea; sometimes corresponding words in different languages have different connotations. Bilinguals are able to extend the range of meanings, associations and images, and to think more flexibly and creatively. Therefore, a bilingual has the possibility of more awareness of language and more fluency, flexibility and elaboration in thinking than a monolingual.

It would be misleading to suggest that there is no disadvantage to bilingualism. Some problems, both social and individual, may be falsely attributed to bilingualism. For instance, when bilingual children exhibit language or personality problems, bilingualism is sometimes blamed. Problems of social unrest may unfairly be attributed to the presence of two or more languages in a community. However, the real possible disadvantages of bilingualism tend to be temporary. For example, bilingual families may be spending significantly more of their time and making much greater efforts to maintain two languages and bring up children bilingually. Some bilingual children may find it difficult to cope with the school curriculum in either language for a short period of time. However, the individual, cognitive, cultural, intellectual, and economic advantages bilingualism brings to a person make all the effort worthwhile.

A more complex problem associated with bilingualism is the question of identity of a bilingual. If a child has both a French and an English parent and speaks each language fluently, is he or she French, English, or Anglo-French? If a child speaks English and a minority language such as Welsh, is he or she Welsh, English, British, European, or what? It has to be said that for many bilingual people, identity is not a problem. Although speaking two languages, they are resolutely identified with one ethnic or cultural group. For example, many bilinguals in Wales see themselves as Welsh first, and possibly British next, but not English. Others, however, find identity a real, problematic issue. Some immigrants, for instance, desperately want to lose the identity of their native country and become assimilated and identified with the new home country, while some others want to develop a new identity and feel more comfortable with being culturally hyphenated, such as Chinese-American, Italian-Australian, Swedish-Finn, or Anglo-French. Yet identity crises and conflicts are never static. Identities change and evolve over time, with varying experiences, interactions, and collaborations within and outside a language group.

Bilingualism is not a static and unitary phenomenon; it is shaped in different ways, and it changes depending on a variety of historical, cultural, political, economic, environmental, linguistic, psychological, and other factors. Our understanding of bilingual speakers' knowledge and skills will grow as research methodology is defined and refined and our attitudes toward bilingualism change to the positive.

See also: Bilingual Education; Bilingual Language Development: Early Years; Bilingualism and Second Language Learning; Interlanguage; Lingua Francas as Second Languages; Society and Language: Overview.

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Bilingualism and Aphasia

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Bilingual individuals, sometimes referred to as multilinguals or polyglots, are broadly defined as individuals who know (and use) two or more languages. These individuals possibly acquire (or are still acquiring) the two or more languages at different times in their lives and use these languages at different levels of proficiency. Although the term 'perfect bilingual' has been used to refer to individuals who are equally proficient in the languages they know, often proficiency and use depend on the social/functional situations (e.g., work vs. family settings). Thus, it has been argued that bilinguals are not truly 'two monolinguals in one person' but are holistic, unique, and specific speaker–hearers (Grosjean, 1989). In the case of aphasia (language deficits as a result of brain damage), the various languages can be affected and recovered differently. Consequently, assessing and rehabilitating bilingual aphasics warrant considerations that are different from (or additional to) those associated with monolingual aphasics.

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Bilingual individuals, sometimes referred to as multilinguals or polyglots, are broadly defined as individuals who know (and use) two or more languages. These individuals possibly acquire (or are still acquiring) the two or more languages at different times in their lives and use these languages at different levels of proficiency. Although the term 'perfect bilingual' has been used to refer to individuals who are equally proficient in the languages they know, often proficiency and use depend on the social/functional situations (e.g., work vs. family settings). Thus, it has been argued that bilinguals are not truly 'two monolinguals in one person' but are holistic, unique, and specific speaker–hearers (Grosjean, 1989). In the case of aphasia (language deficits as a result of brain damage), the various languages can be affected and recovered differently. Consequently, assessing and rehabilitating bilingual aphasics warrant considerations that are different from (or additional to) those associated with monolingual aphasics.

Bilingualism and the Brain

In order to better understand how neurological injuries may affect the linguistic abilities of individuals who speak more than one language, it is important to consider how multiple languages may be organized in the brain. Traditionally, the debate has been centered on 'language laterality' or 'hemispheric specialization'; that is, whether one side of the brain (the left side) is mostly responsible for both languages, whether the right hemisphere contributes in the case of bilinguals more so than in monolinguals, and whether one hemisphere contributes mostly to only one language (Paradis, 1990). Although the issue of laterality has some bearing on predicting the presence or absence of aphasia as a result of brain injury, it only considers the brain in very gross neuroanatomic terms (i.e., left and right hemispheres). Recently, the precise neuroanatomic circuits within and across cerebral hemispheres have been considered, as have other structures in the nervous system, along with factors such as language use, age of acquisition, proficiency, and level and medium of exposure, which potentially have more extensive clinical implications. Recent neuroimaging studies, although involving only isolated linguistic tasks, suggest that attained proficiency and the age of language acquisition may be determining factors in whether the two languages are subserved by the same neural circuits. Wong *et al.* (2005) found that even though both native Mandarin-speaking and English-speaking adults (who do not speak Mandarin) were able to discriminate Mandarin lexical tone patterns, a feature of the Mandarin language, the two groups used regions near the inferior frontal gyrus but in opposite hemispheres when doing so, presumably due to their corresponding attained proficiency or lack thereof in Mandarin.

Kim *et al.* (1997) found that early but not late bilinguals showed spatially overlapping brain activations in the left inferior frontal gyrus associated with sentence generation in first (L1) and second (L2) languages. Late bilinguals also showed activation in the left inferior frontal gyrus, but the centers of activation were further apart relative to the early bilinguals. However, since early bilinguals tend to have a higher level of proficiency in both languages, other studies have suggested that attained proficiency might be the most important factor in determining whether or not the two languages are subserved by the same neural circuit (Perani *et al.*, 1998; for a review, see Abutalebi *et al.*, 2001). Converging evidence on brain and bilingualism is being built and shows great promise for the effective assessment and rehabilitation of bilingual aphasics, especially when combined with existing knowledge in the neurobiology of monolingual aphasia. For example, studies suggest that perilesional areas may be recruited in aphasia recovery (Warburton *et al.*, 1999). If, as Kim *et al.* (1997) suggested, L1 and L2 in late bilinguals (who likely speak L2 with relatively low proficiency) are in the same gross neuroanatomic region but nonoverlapping, then one language may be associated with the perilesional areas, areas that surround the injured area, in certain instances of brain injury (i.e., one language might be more preserved). Consequently, relying on these perilesional areas (and the less disrupted language) in rehabilitation of these individuals might be more productive than rehabilitation of their early bilingual or even monolingual counterparts whose injury might have caused disruption of all language(s) they speak. It is important to note that although some ideas have been proposed (Green and Price, 2001), little evidence exists to support one rehabilitation strategy over another in bilingual aphasia.

Types of Bilingual Aphasias and Patterns of Recovery

Different types of bilingual aphasia, as well as different patterns of recovery, have been reported, involving not only speaking and understanding speech but also reading and writing (Streifler and Hofman, 1976). In addition to cases in which the two or more languages are equally impaired, it has been reported that some individuals showed selective aphasia in which signs of aphasia were evident in one language but not the other (Paradis & Goldblum, 1989). Differential aphasia has also been reported where different types of aphasia were shown in different languages (Albert and Obler, 1978; Silverberg and Gordon, 1979) – for example, conduction aphasia in one language and global aphasia in another. In addition, some individuals showed involuntary blending of grammatical elements (e.g., syntactic and morphologic units) of two languages (Glonig & Glonig, 1965; Perecman, 1984) – for example, combining syllables of two languages, thus creating a new word (Paradis, 1998). This is different from 'code switching,' which involves the alternative use of two or more languages in the same conversation (Milroy and Myusken, 1995). Code switching can function to convey emotional content, to emphasize or clarify the references being made, and to quote (De Fina, 1989), and it is considered to be an important aspect of normal bilingual discourse in many communities (Heller, 1995). Patterns of code switching were also found to be different between bilingual aphasics and normal individuals (De Santi *et al.*, 1995; Muñoz *et al.*, 1999).

It has been suggested that the degree and type of linguistic impairments in bilingual aphasics may be specific to the structures of the language. For example, it has been found that although Mandarin–Cantonese bilinguals showed impairment in the production of lexical tones (pitch patterns used to contrast word meaning), a greater degree of deficit was found in Cantonese production, possibly because Cantonese contains six tonal contrasts, whereas Mandarin contains only four (Lim and Douglas, 2000). In Friulian–Italian bilingual aphasics, the most frequently made errors in Friulian but not Italian involved the omission of the second obligatory pronoun, which is a typical feature of Friulian but not Italian (Fabbro and Frau, 2001). In other words, a type of linguistic impairment may not be apparent in one language because it does not occur as often (or at all) in that language. This also reinforces the idea of assessing multiple languages in bilingual aphasic individuals because impairments in one language do not necessarily predict the same impairments in the other.

With regard to patterns of recovery, as well as improvements in both languages in terms of comparable rate and extent (parallel recovery), individuals show the following kinds of recovery: selective recovery, when only one language improves; successive recovery, when one language improves before the other language; or differential recovery, when one language improves more so than the other. Most interestingly, some individuals show antagonistic recovery, namely improvement in one language but deterioration in another (Paradis and Goldblum, 1989). Some even demonstrate alternating antagonism, in which the improvement–deterioration pattern of the two languages alternates (Paradis *et al.*, 1982). It has also been reported that some individuals showed paradoxical recovery, namely when the patient recovered a 'dead' language – that is, a language the individual once had some knowledge of but had never used it premorbidly for ordinary communicative purposes. For example, Grasset (1884) reported a case of a monolingual French-speaking Catholic woman who started to speak single Latin words and prayers (the language of the church) a few days following a left-hemisphere stroke but was unable to speak French. It is worth noting that it is not known what single factor influences the pattern of recovery (Paradis, 1998). For example, it is not always the case that the language spoken most proficiently premorbidly will be the language affected the most or the least by brain injury or the language that will be recovered first.

Bilingual Aphasia Assessment

When evaluating a bilingual aphasic individual, various important issues warrant special considerations. First, a 'direct translation' is not the same as cross-language equivalency. Different languages have different (nonoverlapping) grammatical structures and vocabulary that can potentially influence how thoughts are expressed; consequently, certain linguistic impairments may or may not manifest themselves depending on the language, as suggested previously in the Mandarin–Cantonese and Friulian–Italian bilingual cases. Furthermore, languages are used in different social and cultural contexts, resulting in context-dependent interpretations even for the same utterance. Second, because bilingual aphasics use the two or more languages in different social settings, and because the two or more languages can be affected and recovered differently, all languages the individuals speak premorbidly need to be assessed in order to gain a more complete picture of the aphasia. Third, in addition to any formal measures, a thorough case history detailing use and proficiency of each language needs to be taken because it can potentially affect the rehabilitation process.

Different formal/standardized test batteries are available for assessing aphasics who speak different languages. These include tests that are originally constructed in English but then translated into other languages with considerations of the appropriate linguistic and cultural contexts and/or normative data for the specific groups. For example, there is a Cantonese version of the Western Aphasia Battery (Yiu, 1992), a Spanish version of the Boston Naming Test (Taussig *et al.*, 1992), and a Japanese version of the Communication Abilities in Daily Living (Sasanuma, 1991). In addition, there are also tests designed for assessing bilingual individuals, including the Bilingual Aphasia Test developed by Paradis and colleagues for more than 65 languages and 170 specific language-pair combinations [e.g., an Urdu version (Paradis and Janjua, 1987) and a Bulgarian–French version (Paradis and Parcehian, 1991)] and the Multilingual Aphasia Examination in Chinese, French, German, Italian, Portuguese, and Spanish (Rey and Benton, 1991).

Rehabilitation

Traditional approaches employed in aphasia rehabilitation still apply to rehabilitating bilingual aphasic individuals, such as language stimulation approaches that emphasize individual linguistic units

and processes such as grammar and naming, as well as compensatory approaches that target the individual's participation in vocational and social settings despite linguistic impairments. However, additional challenges exist when more than two languages are present. For example, should rehabilitation focus on one or two languages? If one, which one? No one set of widely accepted guidelines exists for selecting one or all languages in aphasia rehabilitation, and evidence and arguments exist for either consideration (Bond, 1984; Chlenov, 1948; Linke, 1979; Wald, 1958). Similarly, it is still unclear whether skills acquired from the rehabilitation of one language can be transferred to another. Evidence suggests that skill transfer across affected languages may be optimal if the languages are closely related (e.g., Spanish and Italian) (Paradis, 1998). As stated previously, different individuals use their multiple languages in different social and vocational settings. In rehabilitation, the affected individual and her or his family should be counseled to consider the preponderating need of one language over another. For example, the social penalty of linguistic impairments in English may be greater for Spanish–English bilinguals whose immediate peers are English-speaking, even though Spanish might be the more proficient language.

Conclusion

Basic knowledge of how multiple languages are represented in the brain and what factors influence representation undoubtedly have bearing on the clinical process. Moreover, careful documentation of linguistic impairment characteristics and the course of recovery in the two languages can also inform us about how the brain is organized. With increasing interaction between individuals from diverse linguistic and cultural backgrounds, due to factors such as immigration, globalization, and state unionization, the number and proportion of individuals who know and use more than one language will most likely increase. The clinical population as well as clinical needs will likewise increase. Thus, a greater basic and clinical understanding of bilingualism and the brain is warranted.

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Bilingualism and Second Language Learning

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Introduction

There is a widespread perception in monolingual societies, particularly in the United States, that bilingualism is a rare and exceptional occurrence in communication. By contrast, from a global perspective, bilingualism is a world-wide phenomenon. In fact, global communication is often carried out through a speaker's second, third, or even fourth language. According to David Crystal (1997) approximately two-thirds of the world's children grow up in a bilingual environment which, in turn, leads to adult bilingualism/multilingualism. However, childhood bilingualism is not the only reason for adult bilingualism. A host of different factors (such as marriage, religion, education, linguistic plurality of a particular region, migration, jobs, government policies, urbanization, etc.) also lead to adult bilingualism. How, then, do humans become bilingual? Is adult second-language learning different from child-language learning? Is bilingual-language acquisition different from monolingual-language acquisition? Is early bilingualism different from late bilingualism? Does second language learning have adverse cognitive effects on children? And how are two (or more) languages represented in the brain? This chapter attempts to answer these and other questions concerning bilingual language learning and use.

Key Concepts

Before discussing language development among bilinguals, it is crucial to give an overview of key fundamental concepts concerning language development in children and adults. Also, it should be mentioned that the term 'second language learning' is used in a wider sense to include the learning of any additional language during a period ranging from childhood to adulthood. An additional language may be a language of the country or spoken outside the country (i.e. foreign language).

Acquisition vs. Learning

A child's process of learning languages is different from an adult's process. A child can learn any language relatively effortlessly, while the same task becomes rather challenging for adults. For this reason, some second language researchers (Krashen,

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Acquisition vs. Learning

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1985) distinguish between two types of mechanisms in language development: a subconscious process resulting in tacit knowledge of the language (i.e., 'language acquisition'), and a more conscious process (i.e., 'language learning'). While children go through the former process, adults undergo the latter in their quest to become bilingual.

The Critical Period Hypothesis and Its Biological Basis

In addition to degree of effort, it has been frequently observed that even very proficient bilinguals fall short of being perfect bilinguals. In spite of the complete mastery of syntax, their speech is marked by traces of the first language accent. Similarly, it is also shown that in spite of considerable effort and motivation, the ultimate attainment of some grammatical structures by adults is seldom achieved. To explain these and other differences in language acquisition and recovery from aphasia Lenneberg (1967) proposed the "critical period hypothesis," which is sensitive to age. This hypothesis claims that there is a period in the maturation of human organism, lasting from two years to puberty, in which nearly effortless and complete language acquisition is possible. Afterwards, this hypothesis notes, language learning requires more effort and motivation, largely because of a loss of brain plasticity resulting in the completion of the lateralization of the language function in the left hemisphere. Recent research claims have additionally shown that there are different critical periods for different grammatical structures of language. Since the accent (phonetics and phonology) of a second language is the most difficult to attain, the critical period for phonetics and phonology (approximately from five to seven years) is earlier than that for morphology and syntax. See Johnson and Newport (1991) and Bhatia and Ritchie (1999) for details.

Access to Universal Grammar (UG)

Children are born to acquire human languages. Regardless of gender, race, ethnicity, or nationality, every normal child is capable at birth of acquiring any human language. In theoretical studies following from the Chomskyan mentalistic framework, this innate ability is termed the access to universal grammar (UG). In this case, a child has full access to universal grammar, whereas an adult has either limited or no access. These and other universal principles of grammatical structures and principles of learning largely lead a child's language development. The role of parental input then becomes to trigger an appropriate value for innately given or set parameters, specific to the language to which the child is exposed. One such parameter, called the 'head parameter,' describes how a child does not have to even learn the specific word order of his/her language, but only has to choose between already specified values – head-initial or head-final – based on the nature of the input language. Children begin to learn to set parametric values even from the one-word stage. A Japanese child learns to choose the head-final system, whereas an English-speaking child chooses the head-initial value. These principles are generally refereed to as a child's language acquisition device (LAD).

Input and Learning Environment: Natural vs. Unnatural Settings

Usually children become bilinguals or multilingual in a natural way. A normal child can become a fluent bilingual by the age of five, for instance, without any formal training. In the process of acquiring a language, the role of input (motherese, etc.) or imitation is important but limited. Children do not learn a language by mindlessly imitating the input provided by mothers or caretakers. That is, while the role of parental input cannot be ruled out, language acquisition studies show that neither motherese nor imitation plays a significant role in a child's language development. Instead, this burden is carried by the child himself/herself. Research on child-language acquisition reveals that the child learns the language by using the 'rule formulation strategy.' For instance, an English-speaking child learns on his/her own that by the addition of the inflection '-ed' to a verbal stem, one generates the corresponding past tense form of the verb. In this process, the child over-generalizes and produces utterances such as 'I go-ed' [go-PAST]. Even after being corrected [i.e. provided negative evidence] by the mother or caretaker that the child meant 'I went' [go.PAST], the child still does not reject the rule s/he has formulated in his or her mind and which s/he still produces in utterances such as 'I went-ed' [go.PAST-PAST]. The role of the adult is thus to prevent the child's grammar from overgeneralization. In other words, the child has an innate capacity to acquire languages in an environment which is termed a 'natural' environment, whereas, by contrast, adults and school-age children learn language in formal settings such as schools and colleges through a formal instructional method.

Defining and Measuring Bilingualism

What is bilingualism and who is bilingual? Defining and measuring bilingualism is a very complex task due to the number and types of input conditions, biological, socio-psychological, and other non-linguistic factors that can lead to a varying degree

of bilingual competencies. In short, there is no widely-accepted definition or measures of bilinguals.

Instead, a rich range of scales, dichotomies, and categories are employed to characterize bilinguals. If a bilingual can understand but cannot speak a second language, such an individual is called a receptive bilingual, whereas a productive bilingual demonstrates a spoken proficiency in two languages. If the second language is acquired in a natural setting before the age of five that individual is termed an early bilingual, in contrast with a late bilingual who learns his second language after the age of five either in home or in schools. Labels such as fluent vs. non-fluent, functional vs. non-functional, balanced vs. unbalanced, primary vs. secondary, and partial vs. complete refer, either to a varying command in different types of language proficiency (e.g., spoken, listening, writing, etc.), or an asymmetrical relationship (dominance) between two languages. A compound vs. coordinate bilingual refers to the way two languages are processed in the brain. The list is by no means exhaustive. Other major distinctions such as simultaneous vs. sequential are discussed in the next section. Similarly, bilingualism can be viewed from individual, societal (attitudes towards bilingualism), and political (i.e., government policies toward bilingualism) perspectives.

In general, a bilingual person demonstrates many complex attributes rarely seen in a monolingual person. For that reason, a bilingual is not equivalent to two monolinguals, but something entirely different. This working definition of bilingualism is offered by Bloomfield (1933), who claimed that a bilingual is one who has a native-like control of two languages, i.e., a balanced bilingual (see Grosjean 1982 or Edwards, 2004 for more details).

Patterns and Mechanisms in Bilinglual Language Development

Providing either a natural environment or inputs in monolingual/dominant language speech communities is not a challenging task. The same is also true for those societies where social and political systems are conducive to bilingualism. For instance, in India, where bilingualism is viewed as natural, approved by society, and further nurtured by government language policies, linguistic groups and communities do not need to take any special measures to assure that their children receive input from two languages. In sharp contrast, in societies where bilingualism is not valued or where the language of a minority is distinct, it becomes imperative for families to plan meaningful strategies to ensure the smooth exposure to the family language. One such strategy that families employ in this second setting, described by Bhatia and Ritchie (1999) as "discourse allocation," restricts the use of one language to one social agent or social setting and the other language to other social situations. The various manifestations of such strategies are the following: (a) one-parent/one-language (e.g., the child's mother speaks one language and, the child's father speaks the other. This strategy was employed by Leopold (1939–1949) in his classic study of bilingual language development of his daughter, Hildegard; (b) one-place/one-language (e.g. speaking one language in the kitchen and the other elsewhere); (c) a language/time approach; and (d) a topic-related approach. Although the discourse allocation approach is better than providing no input and thus raising a monolingual child, it leads to different patterns in bilingual language development than developing bilingualism in a natural setting. For instance, during the early stages of Hildegard's bilingualism, she developed a rule that fathers speak German and mothers speak in English.

Childhood Bilingualism

Other factors such as age and amount of exposure to the two languages also result in differences in the pattern of childhood bilingualism. The distinction between simultaneous and sequential bilinguals in research on bilingual language acquisition is based on age and the degree of exposure to two languages. When the child is exposed to two languages to more or less the same degree from birth onward, the pattern of language development is referred to as simultaneous, whereas sequential bilingualism describes the attainment of one language first and the second language later, preferably before the age of seven. Similarly, the term late bilingual is used for those sequential bilinguals who acquire their second language at a relatively younger age than adults learning a second language. Although there is unanimous agreement among researchers about the validity of the simultaneous and sequential bilinguals, there is no consensus among scholars about the exact line of demarcation between the two. See McLaughlin (1984) and De Houwer (1995) for either theoretical or methodological grounds.

One of the most intriguing aspects of the childhood bilingualism is how children learn to separate the two languages, particularly in a natural setting (i.e., a simultaneous bilingual) in initial stages. After all, when parents provide input, they do not tag or prime their input with a language identification label. Even if parents go to the absurd length of identifying the language of each word or sentence they use, these labels are semantically empty for

children. Furthermore, bilingual parents unwittingly make the task of separating the two languages even harder for children because of their normal tendency to mix two languages. In short, a child is provided with three distinct types of linguistic inputs: two languages, each in an unmixed/pure form, and one with a mixture of two languages. Given this state of affairs, how does the child learn to separate the two languages in question? This task is not challenging for a monolingual child because only one language serves as a source of input. The two hypotheses which attempt to shed light on this question are the unitary system hypothesis and the dual system hypothesis.

According the unitary system hypothesis (Volterra and Taeschner, 1978), the child undergoes three stages before s/he is able to separate two input languages. During the first two stages, the child experiences confusion. During the first stage, s/he is unable to distinguish the two lexicons and grammars of the linguistic systems. At this stage, they have a single lexicon made up of items drawn from the lexicons of both languages. Hence, no translational equivalents or synonyms are found in their vocabulary. Volterra and Taeschner claim that their two bilingual subjects at the ages of 1 year 10 months and 1 year 6 months had a hybrid list of 137 words with no translational equivalents. During the second stage, the child slowly learns to separate the two lexicons, but is still unable to separate the grammatical systems. Cross-linguistic synonyms emerge, but the child applies the same set of syntactic rules to both languages. It is only during the third stage that the child becomes capable of separating the two sets of vocabularies and grammars. Findings of recent research reveal that the unitary system hypothesis cannot sustain the scrutiny of the succeeding research and the evidence motivating the three stages of bilingual language development is full of shortcomings and contradictions both on methodological and empirical grounds.

The dual system hypothesis states that bilingual children, based on their access to Universal Grammar and language specific parameter setting, have the capacity of separating the two grammars and lexical systems right from the beginning. A wide variety of cross-linguistic studies (e.g., different input conditions – one parent/one language and mixed input condition; and different word order types) lends support to this hypothesis. For instance, in a study devoted to the language development of a Hindi-English bilingual child, it is clear that at age 2, the child is capable of developing two distinct lexicons using a syllabification strategy. At the age of 1 year 7 months, two different word orders develop – SVO [subject-verb-object] for English and SOV for Hindi. For a more detailed treatment of the shortcomings of the unitary system hypothesis and the strengths of the dual system hypothesis, see Bhatia and Ritchie 1999: 591–614.

Another fascinating feature of bilingual speech is that, not only are bilinguals capable of keeping the two linguistic systems separate, but they often mix them either within a sentence or inter-sententially. This behavior is often termed 'code-mixing' or 'code-switching' in sociolinguistic literature. Depending upon the theoretical and empirical objectives of their research, some researchers do not distinguish between the two terms and use them interchangeably; for those researchers who distinguish between the two, the code-mixing refers to intra-sentential mixing while the term code-switching refers to the intersentential mixing in bilinguals. Both bilingual children as well as adults show this behavior. What explains this behavior of language mixing? Earlier research attempted to explain it in terms of the language deficiency hypothesis: it was claimed that bilinguals in general and children in particular have language gaps. As claimed by the unitary system hypothesis the lack of synonyms compels them to mix the two lexical systems during stage I. Similarly, stage II yields the mixing of two language systems due to confusion. In other words, the lack of proficiency in either one language (i.e., the absence of balanced bilingualism) or both languages (i.e., semi-bilingualism) leads to mixing.

The language augmentation hypothesis is capable of offering deeper insights into the bilingual mixing behavior. As it has been shown earlier in the discussion of the dual system hypothesis, children do not go through the initial stages of treating the two linguistic systems as if they were one system, but begin to distinguish them immediately. The consideration of optimization leads bilinguals to mix language with an aim to get maximum mileage from the two linguistic systems at their disposal. An analogy drawn from the beverage industry further explains this point. The separation of juices (e.g., apple vs. orange juice) renders two distinct tastes. However, if one mixes the two juices, the result is a new taste, a distinct from the two pure juices. The same is true of bilingual language mixing. Research on the linguistic and sociolinguistic motivations for language mixing both in children and adults shows that such considerations as semantic domains and semantic complexity (an item less complex or salient in one language), stylistic effects, clarification, elaboration, relief strategy (i.e., a linguistic item is temporarily unavailable in one language), interlocutor's identification, discourse strategies of participants/topics, addressee's perceived linguistic capability and speaker's own linguistic

ability, and other complex socio-psychological reasons, such as attitudes, societal values, and personality, prompt bilinguals to mix two languages. The list of motivations is by no means exhaustive (see Bhatia and Ritchie, 1996, for more details).

Adult Bilingualism: Second Language Learning

In contrast to sequential childhood bilingualism, adults who learn a second language after they have learned their mother tongue experience the learning of a second language as a laborious and conscious task. As pointed out earlier, unlike children who are able to universally and uniformly acquire native competency in their mother tongue, adults rarely achieve native-like competency in their second language. Depending on the level of their motivation and hard work, adults can learn a second language with varying degrees of competence. However, there comes a point during the second language learning that even the most talented learner cannot bypass the stage of 'fossilization.' This stage is marked with second language errors which no amount of training can correct. For these reasons, second language (L2) learning is viewed as fundamentally different from first language (L1) acquisition. The hypothesis which aims at accounting for these differences between the child and the adult language is termed the fundamental difference hypothesis.

In spite of the asymmetrical relation between L1 and L2 learning, one should not draw a conclusion that there is nothing in common between the two. What is common between L1 and L2 learners is that both undergo stages of language development. In other words, like L1 learners, in the process of grammar construction, L2 learners undergo stages of development: the intermediate stages of grammar development between the initial stage and the ultimate stage are termed interlanguage grammars. Take the case of the development of negation in English L1 and L2 learners. The grammar of negation in L2 learners of English shows the same stages of development as in L1 English learners – Stage I: the sentence-initial placement of negation; Stage II: preverbal placement of negation with no auxiliary verb; and Stage III: preverbal placement of negation with an appropriate auxiliary verb.

Native Language Influence and Dominance

An important way in which L2 learning is different from L1 learning is the influence of the mother tongue on second-language learning. The mother tongue or L1 plays an important role in the process of L2 acquisition. Research on grammatical errors of L2 shows that L2 learners transfer the grammatical rules – phonetic, phonological, morphological, and syntactic rules – of L1 to their second language. An English-speaking learner of Hindi has difficulties in hearing and producing a four-way contrast between Hindi aspiration and voicing contrast (i.e., unvoiced unaspirates, unvoiced aspirates, voiced unaspirates, and voiced aspirates).

It would be a gross simplification to claim that L2 learners transfer all grammatical features of L1 to L2. Adult learners possess a relatively higher level of logical and cognitive ability than do children; therefore, these qualities color their second language learning. For instance, English-speaking learners of Hindi will not translate <u>there</u> in these sentences:

1. There is a chair in the room
2. The chair is over there

in an identical way (i.e. by choosing the remote locative adverb in both cases). Similarly, it would be an oversimplification to claim that childhood bilingualism is free from the dominance relationship between the two languages. Not only does the mother tongue influence second language acquisition in children, it also affects their school achievement.

Approaches to Second Language Learning

In adult language acquisition research, the term second language is used in a wider sense to include both the acquisition of a second language which may or may not be foreign to a country. However, in the context of language teaching the distinction between the two is made to highlight major differences in the learning aims, teaching methods, and the achievement levels to be attained.

A number of approaches have been developed to facilitate the learning of second/foreign languages. Some of the following are notable:

1. Grammar-translation method: Following the tradition of teaching classical languages such as Greek, Latin, and Sanskrit, this method places emphasis on memorization and rote learning. Learners memorize nominal and verbal paradigms of the second language and translate L1 into L2 or vice versa. Very little emphasis is placed on developing spoken proficiency in the foreign language, while reading and written comprehension receives overwhelming importance. This method is perhaps the oldest method of language teaching which dates back to the 19th century.
2. The direct method: Also known as oral or natural methods, it departs from the grammar-translation method in three important respects: one, memorization receives a back seat in the learning of the second language; two, special emphasis is placed on acquiring spoken and listening competencies;

and three, the introduction of the target language is free from any reference to the native language of learners. Native language is never used as a tool to explain either grammar or other intricacies of the target language usage. This model attempts to simulate the native speaker environment of the target language. However, in actual practice there are severe constraints on replicating the natural setting of the native speaker's learning environment in an actual classroom setting.

3. The audio-lingual method is a byproduct of World War II during which the United States experienced an urgent need to quickly train its troops in foreign languages for overseas military operations. An emphasis is placed on spoken and listening competencies, rather than on written ones.
4. The structural method: In order to speed up the acquisition of foreign languages, insights of structural linguistics were applied to language teaching. This method exposes learners to different structural patterns and transformation drills.

Audio-lingual structural models assume that L2 is acquired through imitation. The discussion in the key concept section shows the limitation of this model. A number of other methods such as the natural approach and 'suggestopedia' have been proposed, but the fact remains that no method has a grip on the complexity involving learning a second language.

Bilingual Education: Additive vs. Subtractive Bilingualism

Teaching children a school language, particularly if the school language is different from the child's home language, is one of the major challenges for bilingual education programs. Bilingual education programs in America aim at minority students learning English. Such programs have attracted a great deal of controversy on the basis of their merit and outcome. While there is rapid growth of bilingual education programs in the United States, the aim of such programs is not always to introduce additive bilingualism which ensures the maintenance of the child mother tongue, while learning the school/dominant language. A large number of bilingual education programs in the United States aim at subtractive bilingualism. In other words, while they offer children a transition to learning the school/majority language, in that process they do not ensure the maintenance of the child's mother tongue.

In contrast, the language policies of bilingual nations such as India, Canada, and Switzerland are very conducive to the promotion of language rights for minority languages. The government of India, for instance, favors the advancement of linguistic diversity and pluralism by the introduction of the Three Language Formula, which calls for trilingualism in education. In addition to learning two national languages, Hindi and English, students are expected to learn a third language beyond their native tongue. For example, in northern India, students are expected to learn one of the four Dravidian languages (Tamil, Telugu, Kannada, and Malayalam) from southern India.

While bi- or multi-lingual education programs like India's do not view bilingualism in general and the maintenance of minority languages in particular as a threat to national integration, this is not the case with bilingual education in the United States. U.S. educational policies are not conducive to linguistic and cultural diversity.

A notable feature of the Canadian bilingual education program is termed the language immersion program. Introduced in the 1960s in Quebec, the program was introduced at the request of the English-speaking minority to provide their children a high level of proficiency in schools in the dominant language of the region, French. Children were immersed in schools in the second language of students (i.e., French) in which children used their mother tongue to communicate with a bilingual teacher who would reply in French. This process leads children from what Cummins (1981) calls basic interpersonal communication skills (BICS) proficiency to cognitive-academic language proficiency (CALP) in the school language. BICS refer to the language proficiency level of students with restricted vocabulary and simpler syntax, whereas CALP requires a type of proficiency suitable for academic pursuits – a developed vocabulary and sufficiently complex syntax suited for abstract and analytical thinking. The success of the Canadian language immersion model continues to generate enthusiasm and controversy in bilingual education in the United States.

Socio-Psychological Factors

Successful language learning not only depends on teaching methods but also on learners' motivation, intelligence, opportunities, and other factors, such as their attitude toward the target language and culture. Keeping in mind the motivation and the learners' attitudes, there are two types of learners: instrumental and integrative learners. Instrumental learners, who learn a language for the purpose of gaining external rewards (monitory gains, good jobs, etc.), however, tend to be less successful learners than integrative learners, who have a positive attitude toward the culture of the target language. Psychological factors such as the affective filter (Krashen, 1985)

either inhibit or promote the learning of a second language: negative influences such as anxiety, lack of self-confidence, and inadequate motivation can create serious obstacles to successful language learning. Due to a lack of self-esteem and a higher level of performance anxiety, minority children tend to raise the affective filter, which results in the reduction of comprehensible input. Consequently, it takes a toll on their progress in language acquisition. Similarly, since adults show more self-consciousness than children, they put themselves in a disadvantageous position in terms of language acquisition.

Effects of Bilingualism

Does bilingualism have an adverse linguistic and cognitive effect, particularly on children? Earlier research in the United States pointed out that exposing children to more than one language during their childhood leads them to semi-bilingualism and confusion. Crowding their brain with two or more languages, this research suggested, not only leads children to linguistic deficiency, both in competence and performance levels (semi-lingualism, stuttering, etc.), but also to a wide variety of cognitive and psychological impairments such as low intelligence, mental retardation, left-handedness, and even schizophrenia.

Research by Peal and Lambert (1962), however, put to rest such a negative view of bilingualism: their findings and the work of succeeding researchers provide ample evidence that these negative conclusions of earlier research were premature, misguided (biased toward immigrant communities), and unnecessarily pessimistic. Solid on methodological grounds, Peal and Lambert's study revealed a positive view of bilingualism, including the conclusion that bilingual children demonstrate more cognitive flexibility than monolinguals. Contrary to previous studies, bilinguals performed better than monolinguals in both verbal and non-verbal measures. The study, which was conducted in Montreal, was revolutionary in its own right, changing the face of research on bilingualism forever (see Hakuta, 1985: Chap. 2 for details). This study has been replicated in a number of countries confirming the positive effects of bilingualism.

Conclusions

A number of diverse and complex conditions and factors lead to life-long bilingualism. These factors – biological, social, psychological, and linguistic – account for a varied pattern amongst bilinguals, witnessed around the world. Thus, a bilingual is neither two monolinguals in the brain, nor are two bilinguals clones of each other. These complexities indicate why no theory of language learning and/or teaching is capable of explaining bilingual verbal behavior and the mechanisms leading to bilingual language development.

See also: Bilingualism; Bilingual Education; Bilingual Language Development: Early Years; Code Switching and Mixing; Foreign Language Teaching Policy; Interlanguage; Second and Foreign Language Learning and Teaching; Second Language Acquisition: Phonology, Morphology, Syntax.

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Binbinka *See:* Wambaya.

Binding Theory

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What Is Binding?

Binding theory concerns syntactic restrictions on nominal reference. It particularly focuses on the possible coreference relationships between a pronoun and its antecedent (the nominal that a nondeictic pronoun depends on for its reference). For instance, in (1a) *himself* must refer to the same individual as *he*. In contrast, in (1b) *her* cannot refer to the same individual as *she*. Instead, the sentence must mean that some person voted for some other person.

(1a) He voted for himself.
(1b) She voted for her.

Pronouns like *himself* or *ourselves*, which must corefer with some other noun phrase in the sentence, are called reflexive pronouns or reflexives. Pronouns like *she*, *her*, and *us* are called nonreflexive pronouns. Two nominal expressions that corefer, or refer to the same individual or individuals, are annotated by identical subscripts; if two nominals do not corefer, they are annotated with different subscripts:

(2a) He$_i$ voted for himself$_i$.
(2b) She$_i$ voted for her$_j$.

In an example like *He$_i$ voted for himself$_i$*, we say that the reflexive pronoun *himself* is bound by *he*, and that *he* is the binder of *himself*.

Reciprocals like *each other* and *one another* must also be bound by a local antecedent and are grouped in binding-theoretic terms with reflexives:

(3a) They$_i$ voted for each other$_i$.
(3b) * I$_i$ voted for each other$_j$.

Reflexives and reciprocals are together called anaphors.

Some major works on binding are Faltz (1977), Wasow (1979), Chomsky (1981, 1986), Reinhart (1983), Dalrymple (1993), Reinhart and Reuland (1993), and Pollard and Sag (1994). Huang (2000) contains a rich cross-linguistic survey of pronominal systems. Büring (2004) provides a recent comprehensive overview of the syntax and semantics of binding and presents a new synthesis.

Binding Conditions

Binding theory is typically stated in terms of conditions that refer to three key aspects: the class of nominal involved, the syntactic region that constitutes the domain of binding, and a structural condition on the syntactic relation between a nominal and its potential binder.

Classes of Nominals

For the purposes of binding theory, nominals are traditionally partitioned into several classes, as shown here:

(4)

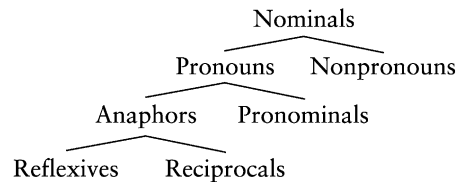

The first major division is between pronouns and nonpronouns. Pronouns are then further subdivided into reflexives and reciprocals, which are collectively referred to as 'anaphors,' and nonreflexive pronouns, often simply called 'pronominals' or 'pronouns' (in opposition to anaphors). We will here refer to nonreflexive pronouns as 'pronominals,' reserving the term 'pronoun' for the class that includes anaphors and other pronouns. This yields three classes for the purposes of binding theory: anaphors, pronominals, and nonpronouns. Each class is governed by its own binding condition.

Binding Domains

Traditional definitions of binding domains distinguish local from nonlocal domains. Consider the following sentence:

(5) Bill$_i$ said that [Gonzo$_j$ voted for himself$_{*i,j}$]

The reflexive *himself* must be bound in its local domain, here the subordinate clause *Gonzo voted for himself*. The only appropriate binder in this domain is *Gonzo*. The reflexive cannot be bound by the higher subject *Bill*, which is outside the reflexive's local domain. This is indicated by placing the marker of ungrammaticality (*) beside the illicit index.

A pronominal in the same position must not be bound in its local domain:

(6) Bill$_i$ said that [Gonzo$_j$ voted for him$_{i,*j}$]

The local domain for the pronominal is also the subordinate clause, and it cannot be bound in this domain. It can, however, be bound by the matrix subject, which lies outside the local domain.

Command

Besides a syntactic domain condition, binding involves the requirement that the binding nominal be in a structurally dominant position. This required relation between a pronoun and its binder is called 'command' and is defined in different ways in different theories. The structural condition on binding means that certain elements cannot be binders, even if they fall within the correct syntactic domain:

(7) Gonzo$_i$'s friend$_j$ voted for himself$_{*i,j}$.

The entire subject *Gonzo's friend* can bind the reflexive, but the possessor *Gonzo* cannot, because the possessor does not command the reflexive.

We have thus far seen that anaphors must be bound within some local domain and that pronominals cannot be bound within some local domain. Nonpronouns cannot be bound in any domain, whether local or nonlocal:

(8a) * He$_i$ voted for Bill$_i$.
(8b) * He$_i$ said that Gonzo voted for Bill$_i$.
(8c) When he$_i$ voted for George, Gonzo$_i$ was drunk.

In (8a) and (8b), the pronoun is in the proper structural relation to command the name. Since this results in the nonpronoun being bound, the sentences are ungrammatical on the indexation indicated. In (8c), by contrast, the pronoun is not in the proper structural relation to command the name, because the pronoun is too deeply embedded. Although the pronoun and the name corefer, as indicated by the coindexation, there is no binding relation, and the sentence is grammatical.

Bringing these ideas together, a typical statement of binding conditions is as follows (based on Chomsky, 1981):

A. An anaphor (reflexive or reciprocal) must be bound in its local domain.
B. A pronominal (nonreflexive pronoun) must not be bound in its local domain.
C. A nonpronoun must not be bound.

Following Chomsky (1981), these binding principles are often referred to as Principle A, the condition on anaphors; Principle B, the condition on pronominals; and Principle C, the condition on nonpronouns. Principles A, B, and C are also called Conditions A, B, and C.

Variation in Structural Relation

All versions of binding theory incorporate some notion of structural domination or superiority as a component of the binding relation. We referred to this relation above as command. One commonly assumed version of command is the tree-configurational relation of c-command (Reinhart, 1983):

(9a) A c-commands B if and only if A does not dominate B and the first branching node dominating A also dominates B.

(9b)

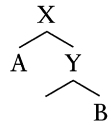

In the tree in (9b), the first branching node dominating A, labeled X, also dominates B, and A does not dominate B. Therefore, A c-commands B. B does not c-command A, because the first branching node dominating B is Y, and Y does not dominate A.

Other tree-based definitions of command have been proposed; in them, command is relativized to nodes other than the first branching node. For example, the similar relation of m-command makes reference to the first maximal projection dominating A. Thus, in diagram (9b), A m-commands B if X is a maximal projection (*see* **X-Bar Theory**). Notice also that if X is a maximal projection and Y is not a maximal projection, then B also m-commands A because the first maximal projection dominating B dominates A and B does not dominate A. Some literature on binding continues to use the term 'c-command' but defines it as m-command.

Other theories define a command relation on linguistic structures other than trees. In lexical functional grammar (LFG), command is defined on f(unctional)-structures, which represent predicates and their adjuncts and subcategorized grammatical functions. The command relation relevant for binding in LFG is called 'f-command' and is defined as follows:

(10a) An f-structure A f-commands an f-structure B if and only if A does not contain B and every f-structure that contains A also contains B.

(10b)

$$X\begin{bmatrix} F_1 & A[\ ] \\ F_2 & Y\begin{bmatrix} F_3 & B[\ ] \end{bmatrix} \end{bmatrix}$$

In the f-structure in (10b), the f-structure labeled A f-commands B: A does not contain B, and the f-structure X that contains A also contains B. B does not f-command A because there is an f-structure Y that contains B but not A. Notice that in (10), A and Y f-command each other, just as in a tree there

is mutual c-command between sisters. Since A can be the subject and Y the object, we need an additional principle to ensure that the subject binds the object but not vice versa. Otherwise a perfectly grammatical sentence like (11) would be a Principle B violation because the object reflexive would bind the subject pronominal.

(11) He$_i$ injured himself$_i$.

Cases of mutual f-command like the above occur not just between subjects and objects but among all coarguments of a given predicate. Such cases are handled by an independently motivated relational hierarchy of grammatical functions based on the notion of obliqueness, in which the subject outranks the object, which in turn outranks the other arguments.

In head-driven phrase structure grammar (HPSG), grammatical functions are encoded on SUBCAT (subcategorization) lists, which are ordered according to the aforementioned obliqueness hierarchy: the subject is the first member of SUBCAT, the object is the second, and so on. Early work in HPSG defined a version of command called o-command on the SUBCAT list, in terms of this obliqueness relation. A simplified definition of o-command follows:

(12a) A o-commands B if and only if A does not contain B and A precedes B on a SUBCAT list, or A o-commands X and X contains B.

(12b)

$$\text{SUBCAT}\left\langle \text{A}, \ldots, \text{X}[\ldots \text{B} \ldots] \right\rangle$$

In the SUBCAT list in (12b), A o-commands B because A o-commands X and X contains B. B does not o-command A, on the other hand, because B does not precede A on a SUBCAT list and B does not o-command anything that contains A. The o-command relation in HPSG and LFG's f-command relation are similar in that they are defined on structures that encode grammatical functions. The two theories are also similar in using the relational hierarchy to define binding constraints.

More recent work in HPSG (Manning and Sag, 1999) defines binding on the ARG-ST (argument structure) list, a basic representation of argument structure, rather than on SUBCAT. The ARG-ST version of HPSG binding replaces o-command with a-command, where a-command can be defined by replacing all mention of o-command in (12) with a-command and all mention of SUBCAT with ARG-ST. To the extent that ARG-ST encodes thematic relations like agent (logical subject) and patient (logical object), the a-command version of HPSG binding is related to proposals that define the structural binding relation on a thematic hierarchy, such as Agent > Goal > Theme (Jackendoff, 1972; Wilkins, 1988).

Variation in Binding Domain

Some theories assume that the local domain for the anaphoric and pronominal binding conditions (Principles A and B) is the same: anaphors are required to be bound in exactly the same domains in which pronouns are required not to be bound. For example, Chomsky (1981) proposed that the local binding domain for both anaphors and pronominals is the governing category, where a governing category for an element is the minimal domain containing a subject and the head that selects the element. This predicts that anaphors and pronominals are in complementary distribution, a prediction that seems to be borne out by examples like the following:

(13a) Gonzo$_i$ saw himself$_i$/*him$_i$.
(13b) Gonzo$_i$ thought that George liked him$_i$/ *himself$_i$.

Huang (1983) subsequently pointed out that the prediction above is incorrect, based on examples like the following:

(14a) They$_i$ saw each other$_i$'s pictures.
(14b) They$_i$ saw their$_i$ pictures.

(15a) They$_i$ saw pictures of each other$_i$/themselves$_i$.
(15b) They$_i$ saw pictures of them$_i$.

In (14) and (15), the anaphors and pronominals occur in identical positions: there is no complementary distribution. Chomsky (1986) addressed this problem by proposing that the local domain for anaphoric and pronominal binding is the smallest domain in which the binding constraint in question could be satisfied. For the anaphoric cases in (14a) and (15a), there is no possibility of satisfying Principle A within the noun phrase that contains the anaphor. Therefore, the anaphor's local domain becomes the domain of the containing NP; since the anaphors in (14a) and (15a) are bound in this slightly larger domain, the sentences are grammatical. In contrast, the local domain for the pronominals in (14b) and (15b) is the smaller domain constituted by just the NP containing the pronominal since Principle B is satisfiable within this domain.

Although the English examples above are amenable to a treatment along these lines, data from other languages indicate that a unified notion of local binding domain for all anaphora is inadequate. Some languages have several anaphors, each with a different local domain. Consider the two Norwegian reflexives *seg* and *seg selv*:

(16a) Jon$_i$ fortalte meg om seg selv$_i$ /*seg$_i$
J. told me about self
'Jon told me about himself.'

(16b) Jon$_i$ hørte oss snakke om seg$_i$ /*seg selv$_i$
J. heard us talk about self
'Jon heard us talk about him.'

Based on data like the above, Manzini and Wexler (1987), Dalrymple (1993), and others argued that binding constraints must be parameterized as lexical properties of particular pronouns. Thus, part of the lexical entry for *seg selv* specifies that it must be bound to an argument of the same syntactic predicate, whereas the lexical entry for *seg* specifies that it must be bound in the minimal finite clause in which it is contained but cannot be bound by a co-argument. Thus, a single language can have various anaphors, each with its own binding domain. Indeed, Norwegian has a third reflexive (*ham selv*) that has yet a different binding domain.

Furthermore, many languages have long-distance reflexives that must be bound within the same sentence but place no further restrictions on their binding domain (Koster and Reuland, 1991; Cole *et al.*, 2001). The possibility for a reflexive to allow long-distance binding has been claimed to correlate with its morphological form (Faltz, 1977; Pica, 1987): morphologically complex reflexives like English *himself* or Norwegian *seg selv* allow only local binding, whereas morphologically simple reflexives like Norwegian *seg* allow long-distance binding.

A puzzle that has gone largely unaddressed in the literature on binding is the local nature of reciprocal binding. Although there are many examples of reflexive pronouns that need not be locally bound, there seem to be no comparable examples of long-distance reciprocals. Treating reflexives and reciprocals as anaphors that must obey the same binding principle does not lead us to expect this difference in behavior.

Defining the Binding Relation

In all of the examples we have examined so far, the relation between the pronoun and its potential antecedent has involved either coreference or noncoreference. In more complicated cases involving plurals, the possibility of partial overlap of reference arises. Lasnik (1981) discussed examples like (17), which he marked as ungrammatical:

(17) * We like me.

In this example, the speaker is included in the referent of the subject, leading to the impossibility of a pronoun referring to the speaker in object position. Lasnik also claimed that in (18), the group of people referred to as *they* cannot include the referent of *him*:

(18) They like him.

Examples such as these have prompted some researchers to revise the treatment of the binding relation by introducing a more complicated indexing system.

Higginbotham (1983) proposed that the symmetrical coindexation mechanism be replaced with an antisymmetrical linking mechanism, represented by an arrow notation:

(19) John said that he thought Mary liked him.

This mechanism is particularly adept at representing split antecedents—cases in which a plural pronoun's antecedent is made up of two syntactically separate nominals:

(20) John told Mary that they should leave.

The referential dependency of the pronoun on the two nominals is represented by linking it to both antecedents simultaneously.

The most extensively explored revision to the standard coindexation mechanism is the proposal to represent the index for plural noun phrases as a set containing an index value for each individual in the set (Lasnik, 1981). In (21), *they* refers to two individuals, *i* and *j*. This index value is used to prevent the object *him* from referring to either individual *i* or individual *j*:

(21) They$_{\{i,j\}}$ like him$_{*\{i\}/*\{j\}/\{k\}}$.

This move necessitates a corresponding adjustment to the binding condition for pronominals, which must now refer to overlap of set-valued indices rather than simply to identity of atomic indices. For example, Principle B would be reformulated to require that the index of a pronominal must not overlap with the index of a commanding nominal in the pronominal's local domain. Overlap is understood in set-theoretic terms: a set index A does not overlap with a set index B if and only if the intersection of A and B is empty. Notice that this treatment of indexation also blocks readings in which there is overlapping reference between plural pronouns:

(22) They$_{\{i,j\}}$ like them$_{*\{i,j\}/*\{i,k\}/*\{j,k\}/\{k,l\}}$.

With the move to set-valued indices and a notion of overlap based on intersection, the binding relation no longer concerns coreference and noncoreference, but rather coreference and disjoint reference. Principle B requires disjoint reference, as discussed above, whereas Principle A still requires coreference, i.e., total overlap/equality of set indices:

(23a) They$_{\{i,j\}}$ like himself$_{*\{i\}/*\{j\}}$.
(23b) They$_{\{i,j\}}$ like themselves$_{\{i,j\}}$.
(23c) They$_{\{i,j\}}$ like themselves$_{*\{i,k\}/*\{i,j,k\}}$.

Example (23a) is ungrammatical because there is no coindexation that can make the set index of the reflexive equal to the set index of the antecedent (*himself* cannot be plural). Example (23b) is, by contrast, grammatical: the set index of the reflexive and its antecedent are equal. Example (23c) illustrates that overlap of reference or intersection is not sufficient for reflexive binding, since the sentence cannot have an interpretation in which a group of people likes another group of people that includes only some of the first group.

A problem for this approach is that there are grammatical examples that appear to be structurally identical to the ungrammatical examples above. Berman and Hestvik (1997) presented the following example, which, while syntactically similar to (18), is acceptable for many speakers:

(24) John and Mary often connive behind their colleagues' backs to advance the position of one or the other. This time they got her a job in the main offce.

Since *they* refers to John and Mary and *her* refers to Mary, the grammatical sequence *they*$_{\{i,j\}}$ *got her*$_{\{j\}}$ *a job* appears to be identical in binding-theoretic terms to the ungrammatical indexing *they*$_{\{i,j\}}$ *like him*$_{\{j\}}$ for (18).

Reinhart and Reuland (1993) and Kiparsky (2002) proposed that the crucial difference between ungrammatical and grammatical instances of overlapping reference lies in whether the predicate taking the pronominal as an argument is interpreted collectively or distributively. If the predicate is a collective predicate, then overlapping reference is possible, but if it is a distributive predicate, then overlapping reference is impossible. This is meant to derive the difference between the grammatical (25a) and the putatively ungrammatical (25b):

(25a) We elected me.
(25b) * We voted for me.

The idea is that *elect* is a collective predicate and the overlapping reference is allowed, but *vote for* involves each individual voting separately and is therefore distributive, rendering the sentence ungrammatical. Similarly, the context of (24) makes it clear that John and Mary together got her a job – the predicate is interpreted collectively. However, many speakers find (25b) just as grammatical as (25a), even though *vote for* is presumably equally distributive for these speakers. In addition, certain grammatical instances of overlapping reference do not obviously involve collective predication or do not involve predicates whose collective reading is logically distinct from their distributive reading (Büring, 2004), and certain ungrammatical instances of overlapping reference similarly do not involve obviously distributive predicates.

Semantic Approaches to Binding Theory

Bach and Partee (1980) provided a semantic alternative to syntactic binding theories, couched in Montague semantics. They argue that functional application in the semantics yields a sufficiently rich structural relation to model binding theory, provided that certain auxiliary assumptions are made. These assumptions can be thought of as analogous to binding constraints. Bach and Partee principally sought to show that a semantic binding theory achieves a coverage equal to syntactic binding theories (of the time), but they noted that one advantage of their semantic binding theory is that it generalizes readily to languages whose syntactic structure is less configurational. These languages nonetheless have rules of semantic composition similar to those of configurational languages, even if notions like subject and object in these languages are not defined configurationally. In this respect, their binding theory is similar to syntactic binding theories that define binding in terms of grammatical functions rather than on structural configurations, which only indirectly model grammatical functions. The HPSG and LFG binding theories discussed in an earlier part of this article are two such theories.

Keenan (1988) also offered a semantic binding theory, but one based on his semantic case theory rather than on Montague semantics. His binding theory deals principally with reflexives and shares with the Bach and Partee theory (1980) the advantage of applying readily to nonconfigurational languages. The basic insight behind Keenan's theory of reflexivization is that a reflexive denotes a function SELF that when applied to a binary relation R returns the set of x such that $\langle x, x\rangle$ is in R. The function SELF thus reduces the arity of the relation that it applies to. This treatment of reflexivization as an arity-reducing function is shared by Bach and Partee (1980).

Reinhart and Reuland (1993) offered a mixed syntactic/semantic approach to binding theory. Their theory centers around the notion of predication, with syntactic predicates distinguished from semantic predicates. A semantic predicate is a predicate and its semantic arguments. A syntactic predicate is a head, all of its selected internal arguments, and, crucially,

an external argument (a subject). Reinhart and Reuland proposed the following two binding conditions:

1. A reflexive-marked syntactic predicate is reflexive.
2. A reflexive semantic predicate is reflexive-marked.

A predicate is reflexive-marked if and only if one of its arguments is a reflexive. A predicate is reflexive if and only if two of its arguments are coindexed.

Given these conditions, a sentence like *Gonzo$_i$ injured himself$_i$* is allowed since *injured* is a reflexive-marked predicate (marked by *himself*), that is reflexive (the arguments of the predicate are coindexed). The sentence **Gonzo$_i$ injured him$_i$* is disallowed because the predicate is reflexive but not reflexive-marked. And the sentence **Gonzo$_i$ said Kate injured himself$_i$* is unacceptable since *injured* is reflexive-marked but not reflexive (*Kate* and *himself* are not coindexed).

Exemption and Logophoricity

Certain formulations of binding theory allow some occurrences of anaphors to be excluded from the purview of binding constraints. For example, HPSG's Principle A states that a locally commanded anaphor must be locally bound (where the command relation is either o-command or a-command, depending on the version of the theory, as discussed above). If an anaphor is not locally commanded, HPSG's Principle A does not apply to it: the anaphor is exempt from binding (Pollard and Sag, 1994). For example, the reflexive in the following sentence is an exempt anaphor:

(26) Gonzo$_i$ downloaded a picture of himself$_i$.

Similarly, in (27) the reflexive is in noncomplementary distribution with a pronoun and is treated as exempt from binding constraints:

(27) Gonzo$_i$ saw a snake near him$_i$/himself$_i$.

The binding theory of Reinhart and Reuland (1993) is similar in treating some anaphors as exempt. Recall that their Principle A requires a reflexive-marked syntactic predicate to be reflexive. Crucially, a syntactic predicate must have a subject. Therefore, although the noun *picture* in (27) is reflexive-marked, it does not count as a syntactic predicate, and Reinhart and Reuland's Principle A does not apply to it. Theories like these, in which some anaphors are exempt from binding constraints, contrast with approaches like that of Chomsky (1986), sketched earlier. In Chomsky's view, reflexives in examples like (27) are not exempt from binding but rather must be bound in a slightly larger syntactic domain. The binding theory of LFG is similar in this regard.

Constraints on the distribution of exempt anaphors are often claimed to be defined in nonsyntactic terms. For example, Pollard and Sag (1994) argued that exempt anaphors are used to refer to an antecedent whose point of view is being reported. In this view, exempt anaphors are subject to discourse and pragmatic constraints, as discussed extensively by Kuno (1987). In cases of noncomplementary distribution, such as (27), Kuno argued that the reflexive indicates that the speaker has taken on the subject's point of view but the pronoun does not. The encoding of point of view in pronominal systems is typically discussed under the rubric of logophoricity.

Theories of exemption differ on the treatment of the specifier or possessor of a noun phrase. Reinhart and Reuland's theory (1993), like Chomsky's (1986), treats specifiers of noun phrases as subjects for purposes of binding theory. This predicts that sentences like (28) are ungrammatical:

(28) * Gonzo$_i$ downloaded her picture of himself$_i$.

Since the specifier *her* is in the right structural position to count as a subject, the reflexive must be bound in the NP, either because it can be bound in this minimal domain (in Chomsky's 1986 account) or because the head noun counts as a syntactic predicate and is reflexive marked (in the Reinhart and Reuland account).

Recent psycholinguistic evidence has been shown to bear on this issue; speakers in fact find sentences like (28) grammatical (Asudeh and Keller, 2001; Runner *et al.*, 2003):

(29) Gonzo$_i$ downloaded her picture of himself$_i$.

Asudeh and Keller (2001) argued that the result exemplified by (29) supports predication-based binding theories that do not treat possessors as subjects, such as certain versions of HPSG and LFG binding theory. They noted that the possessor in the noun phrase is not an argument of the head noun and concluded that if the possessor is not a semantic argument, then it is not a subject in predication-based theories. In an HPSG binding theory, the reflexive in (29) is exempt. In an LFG account, the reflexive is not exempt but must be bound in the minimal domain containing a subject, which corresponds to the matrix clause.

Pragmatic and Blocking Approaches to Binding

In the binding theories reviewed thus far, Principle A and Principle B derive a kind of blocking effect: pronouns are in general barred where reflexives are

required. Pronouns and reflexives are thus predicted to be in mostly complementary distribution, although the complementarity is relaxed in certain situations, using a variety of mechanisms. Kiparsky (2002) noted that this derivative notion of blocking has the conceptual disadvantage of lacking deep motivation: the general complementarity seems merely coincidental. He argued that the grammar should include blocking principles that explicitly compare structures containing pronouns to ones containing reflexives. He gave an overview of the issues involved and offered a hybrid binding theory that includes blocking principles.

Huang (2000) presented an alternative sort of blocking account based on a theory of neo-Gricean pragmatics. Huang's analysis followed in an established tradition of pragmatic approaches to binding, which he reviewed extensively. His account contrasts with that of Kiparsky (2002), in which the blocking constraints rely on notions of featural and morphological economy rather than on pragmatic principles.

Although blocking accounts arguably provide an explanation of pronoun/reflexive complementarity that nonblocking accounts lack, they are by the same token seriously challenged when the complementarity breaks down. Reflexives and pronouns must be shown to give rise to different meanings or pragmatic effects in such environments, with the result that the blocking relation fails to apply since it chooses only between semantically or pragmatically equivalent options (Kiparsky, 2002; Huang, 2000).

Reflexives and Valence Reduction

Reflexive forms do not always fill a syntactic and semantic role of a predicate. In many languages, the same form can play two roles. It can be a reflexive pronoun with an independent syntactic and semantic role in some cases, and it can mark intransitivity or valence reduction, with no associated semantic role, in other cases. For example, the Swedish form *sig* serves as an argument long-distance reflexive in (30a). However, in (30b) it simply marks the verb as intransitive. Examples (30c) and (30d) show that the verb is intransitive, since the verb cannot take a full local reflexive or a free object.

(30a) Johan$_i$ hörde oss prata om sig$_i$.
J. heard us talk about self
'Johan heard us talk about him.'

(30b) Johan skyndade sig.
J. hurried self
'Johan hurried up.'

(30c) * Johan$_i$ skyndade sig själv$_i$.
J. hurried self

(30d) * Johan skyndade Maria.
J. hurried M.

A question raised by this pattern of data is why the long-distance reflexive is used for valence reduction. Reinhart and Reuland (1993) offered an explanation of these facts based on the observation that long-distance reflexives are morphologically simple (Faltz, 1977; Pica, 1987). However, in languages like English, which lack morphologically simple reflexives, full reflexives seem to serve a similar function:

(31a) Gonzo behaved himself.
(31b) * Gonzo behaved David.

A detailed study of reflexivization and its relation to syntactic and semantic valence reduction was presented by Sells *et al.* (1987).

Binding and Movement

Binding theory is invoked in certain treatments of A-movement (movement to an argument position) and A-bar movement (movement to a nonargument position) in transformational grammar. Such treatments assume that the passive example of A-movement in (32a) and the *wh*-question example of A-bar movement in (32b) involve transformations, in which the *t* represents the original position – the trace – of the coindexed element:

(32a) Gonzo$_i$ was accosted t_i.
(32b) Who$_i$ did someone accost t_i?

The fact that binding theory applies to these examples might initially appear puzzling since binding theory is about anaphors, pronominals, and nonpronouns, and traces do not seem to fit into any of these categories. However, Chomsky (1982) gave a featural breakdown of overt noun phrases in terms of the features [± a(naphor)] and [± p(ronominal)] and then applied the classification to covert noun phrases, i.e., empty categories. The passive trace is grouped with anaphors using the feature assignment [+ a, −p]. The trace in *wh*-movement is grouped with nonpronouns using the feature assignment [−a, −p]. This classification enables the statement of locality relations on transformations in terms of binding requirements on traces of moved elements.

The binding-theoretic treatment of empty categories has been considerably revised in more recent transformational work. Hornstein (2001) revived the connection by claiming that anaphors are the result of overt A-movement. In this view, pronominals and reflexives are both claimed to be grammatical formatives introduced during derivations, not by lexical insertion. This treatment of binding has the

advantage for transformational grammar of reducing binding to movement, which is independently motivated in transformational theory. However, it faces a number of challenges. The account does not readily extend to long-distance, intransitivizing, or exempt/logophoric reflexives. In addition, it treats deictic pronouns differently from anaphors and pronominals, as lexical items introduced through lexical insertion. This raises the question of why nondeictic personal pronouns, which are purely grammatical formatives, uniformly have the same morphological realization as deictic personal pronouns.

Despite these challenges, further evidence for binding as movement apparently comes from resumptive pronouns, as in the following Swedish example:

(33) Vilken elev trodde Maria att han fuskade?
which student thought M. that he cheated?
'Which student did Maria think cheated?'

This example seems to indicate that *wh*-movement has left a pronoun in the extraction site. This could be explained by treating resumptive pronouns as overt traces that result from a last-resort attempt to save a derivation. Boeckx (2003) offered an alternative movement-based account in which a resumptive pronoun is the result of spelling out a head whose complement has moved away to become the resumptive's antecedent. However, resumptive pronouns do not obey standard constraints on movement and do not possess other characteristics of *wh*-traces. They therefore do not lend straightforward support to the binding-as-movement view. In a recent overview of resumption, Asudeh (2004) argued that resumptive pronouns are not last-resort grammatical devices, overt traces, or the result of movement but are rather ordinary, lexically inserted pronouns that are bound by the *wh*-phrase and whose distribution is explained on the basis of semantic composition.

Lastly, binding is also relevant to movement as a diagnostic tool for the extraction site for movement. Reconstruction, as in (34a), and connectivity, as in (34b), are two particular phenomena in which binding has been crucial:

(34a) Which picture of himself$_i$ does nobody$_i$ like$_i$?
(34b) What nobody$_i$ was was sure of himself$_i$.

The locality of reflexive binding has been used as evidence that the *wh*-phrase in (34a) must be reconstructed in its base position. Similarly, the free relative's subject in its surface position in (34b) does not command, and therefore cannot bind, the reflexive. In order to bind the reflexive, the free relative's subject must at some nonsurface level be the subject of the second copula. Büring (2004: chapter 12) gave an extensive overview of reconstruction and connectivity, as well as other issues concerning binding and movement.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Anaphora: Philosophical Aspects; Command Relations; Coreference: Identity and Similarity; Deixis and Anaphora: Pragmatic Approaches; Pronouns; Scope and Binding: Semantic Aspects; X-Bar Theory.

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Biosemiotics

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Semiotics develops a general theory of all possible kinds of signs, their modes of signification and information, whole behavior and properties, but is usually restricted to human communication and culture. Biosemiotics (*bios*, life and *semion*, sign) is a growing field that studies the production, action, and interpretation of signs, such as sounds, objects, smells, and movements, as well as signs on molecular scales, in an attempt to integrate the findings of biology and semiotics to form a new view of life and meaning as immanent features of the natural world. Life and semiosis are seen as coexisting. The biology of recognition, memory, categorization, mimicry, learning, and communication are of interest for biosemiotic research, together with the analysis of the application of the tools and notions of semiotics such as interpretation, semiosis, types of sign, and meaning. The biosemiotic doctrine accepts nonconsciously intentional signs in humans, nonintentional signs, also between animals as well as between animals and humans, and signs between organs and cells in the body and between cells in the body or in nature. Thus the biological processes between and within living beings transcend the conceptual foundation of the other natural sciences.

In the tradition of Peirce, who founded semiotics as a logic and scientific study of dynamic sign action in human and nonhuman nature, biosemiotics attempts to use semiotic concepts to answer questions about the biologic and evolutionary emergence of meaning, intentionality, and a psychic world. Peircian biosemiotics builds on Peirce's unique triadic concept of semiosis, where the 'interpretant' is the sign concept in the organism that makes it see/recognize something as an object. This is its interpretation of what the outer sign vehicle stands for in a motivated context by relating to a code that is connected to that specific functionality. For instance, why a small gazelle, and not an elephant, is seen as prey for a cheetah. As Peirce's semiotics is the only one that deals systematically with nonintentional signs of the body and of nature at large, and therefore accepts involuntary body movements (such as instinctive motor patterns in animal courtship) and patterns of and within the body (such as plumage for another bird and smallpox for a physician) as signs, and further patterns and differences in nature (such as the track of a tornado), it has become the main source for semiotic contemplations of the similarities and differences of signs of inorganic nature, signs of the living systems,

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and the cultural and linguistic signs of humans living together in a society.

Semiotics is also defined as the study – or doctrine – of signs and sign systems, where sign systems are most often understood as codes. Examples of biological codes are those for the production of proteins from the information of the genome, for the reception and effects of hormones, and neurotransmitters spring to mind as obvious biological sign systems. Marcello Barbieri (2001) has pointed to the importance of codes in living systems such as the genetic code, signal codes for hormones and between nerve cells, and between nerve cells and muscles, codes for recognition of foreign substances and life form in the immune system, etc. He defines codes as rules of correspondence between two independent worlds such as the Morse code standing for letters in the alphabet. A code gives meaning to differences or information in certain contexts. But information is not a code in itself. He also points to the peculiar fact that the proteins in the living cell are different from proteins created through external spontaneous chemical processes. Living systems are not natural in the same way as physical and chemical systems because the protein molecules they are self-constructed from are manufactured by molecular machines (the ribosomes and connected processes). The ribosomes, that is an organelle in the cell constructed by huge RNA molecules connected with several enzymes, are systems that are capable of assembling molecules by binding their subunits together in the order provided by a template. Cell proteins have the sequences of their amino acids determined by the internal code system in the cell connected to the genes in the nucleus's DNA. The ribosomal system for building proteins uses the base sequence of messenger-RNA, which comes out to the ribosome from inside the nucleus, in itself a template of the gene in the DNA, to determine the amino acid sequence in the proteins. Living systems are thus built out of artificially produced, code-based molecules from the cell's molecular assembler machine. They are autopoietic (self-creating) – as pointed out by Maturana and Varela – as they produce their own elements and internal organization. A living system's structure, organization, and processes are determined by internal codes and they are therefore in a certain way artificial.

Thus a code is a set of process rules or habits (for instance, how the ribosome works) that connects elements in one area (e.g., genes) with another area (e.g., proteins) in a specific meaning context (here the creation, function, and survival of the cell). As the biosemiotician Kalevi Kull (1999) points out, codes are correspondences that cannot be inferred directly from natural laws. To most biosemioticians, it is crucial that the correspondence is not a universal natural law but is motivated from a living signifying system. Thus machines do not make codes themselves. A sequence of differences such as the base pairs in DNA can be information for coding, but is not a code in itself. Biosemiotics argues that codes are triadic sign processes where an interpretant makes the motivated connection between objects and signs (representamens). Living systems function based on self-constructed codes. This differentiates them from physical, chemical, and technological systems (computers do not make their own codes as they function causally after the codes we have made and installed). As Alexis Sharov (1998) notes, a sign is an object that is a part of some self-reproducing system. A sign is always useful for the system and its value can be determined by its contribution to the reproductive value of the entire system. Thus semiosis is a crucial part of those processes that make systems living and lift them out of the physical world's efficient causality through the informational realm of formal causality in chemistry into the final causation in semiotic processes. Thus, biosemiotics works with more types of causation than classical sciences inspired by Peirce's semiotic philosophy.

In Peirce's philosophy, efficient causality works through the transfer of energy and is quantitatively measurable. Formal causality works through pattern fitting, difference, and with signals as information in a dualistic proto-semiotic matter. Final causation is semiotic signification and interpretation. Semiosis, both in the form of signification and communication, is viewed as an important part of what makes living systems transcend pure physical, chemical, and even the informational explanations of how computers function. Molecules are composed of sequences of atoms and make three-dimensional shapes. They interact informationally through formal causality. The biological macromolecules are composed of minor molecules often put in sequences. Cells interpret the molecules as coded signs and interact with them through final causation in semiosis.

Thus far, biosemiotics considers the living cell to be simplest system possessing real semiotic competence. Biosemiotics sees the evolution of life and the evolution of semiotic systems as two aspects of the same process. The scientific approach to the origin and evolution of life has overlooked the inner qualitative aspects of sign action, leading to a reduced picture of causality. The evolution of life is not only based on physical, chemical, and even informational processes, but also on the development of semiotic possibilities, or semiotic freedom as one of the founding biosemioticians, Jesper Hoffmeyer (1996), calls it. It is the evolution of semiotic freedom that creates the

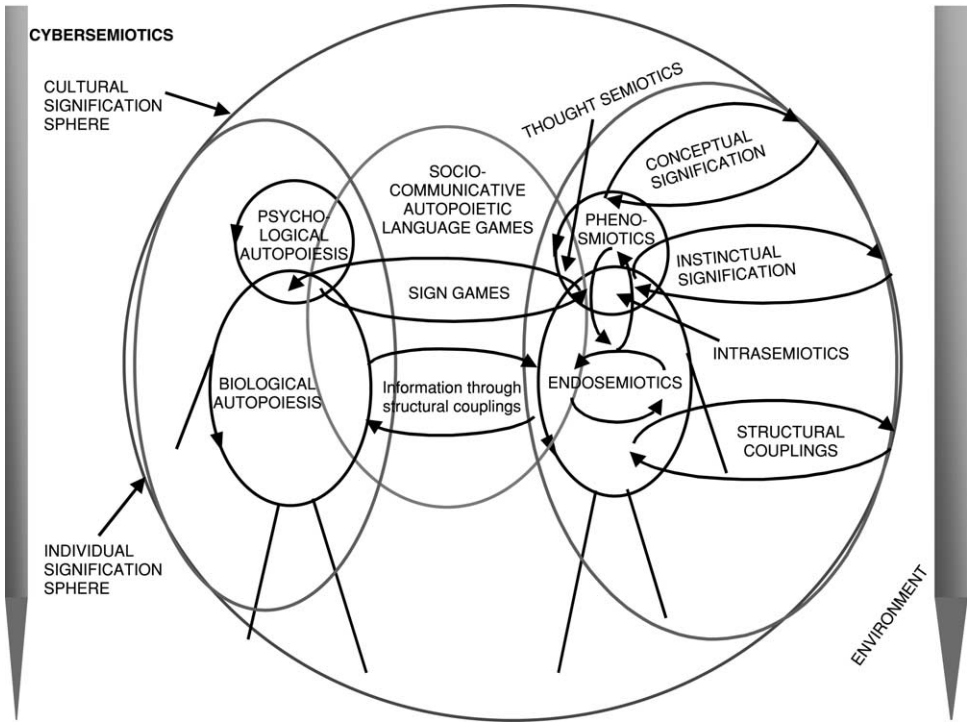

Figure 1 The model classifies types of semiosis and proto-semiotic (informational) processes. On the left side is Luhmann theory of viewing the body, the psyche, and the linguistic system as autopoietic (closed and self-organized). The localization of the processes in this diagram is symbolic and not really related to actual physical locations; for example, the head is also part of biological autopoiesis and the location of endosemiotic processes. To simplify this model, I have placed all the cybernetic-autopoietic concepts on the left and all the biosemiotic ones on the right, although all concepts concern both persons. Each person is placed within a signification sphere (*Umwelt*). When these spheres are combined through sociocommunicative autopoietic language games, a common signification sphere of culture is created. One part of exosemiotic signification is based on the linguistic processes of conceptualization and classifications. Underneath the language games is the biological level of instinctually based sign games, and under that is the informational exchange through structural couplings. Thus, exosemiotics also has a level of biopsychological, or emphatic, signification, as well as a level of structural couplings that the organism, or rather the species, has developed through evolution. Endosemiotics is made up of the processes between cells and organs in the body. Phenosemiotics is prelinguistic sign processes in the mind such as emotions and imaging, where thought semiosis is conceptualized thinking. On the far left side are the signification processes toward the environment that consists of nonintentional potential signs that become the signification sphere when they are interpreted as signs.

zoosemiotic system of sign games, as the bio- and cybersemiotician Søren Brier (1995) calls it. These sign games are the primary system behind the foundation of human language games and the tertiary system of culture such as Thomas Sebeok and Marcel Danesi (2000) have thoroughly shown in their Modeling System Theory.

Multicellular living individual beings are then understood as swarms of communicatively organized semiotic cellular units. The human body is seen as organized in swarms of swarms of biological and as layer upon layer of internal (endo) semiotic processes, as well as external (exo) signification processes building up a signification sphere (*Umwelt*) and finally exo-semiotic social processes between individuals constructing language and first-person experiences (see Figure 1).

Complex self-organized living systems are not only governed by physically efficient causation; they are also governed by formal and final causality. They are governed by formal causality in the sense of the downward causation from a higher level structure (such as a tissue, an organ, or the entire organism) to its individual cells, constraining their action, but also endowing them with functional meanings in relation to the entire metabolism (as systems science has shown). Organisms are governed by final causality in the sense that they tend to take habits and generate future interpretants of the present sign actions, as in learning. In this sense (Brier, 1998), biosemiotics draws upon the insights of fields such as systems theory, theoretical biology, and the physics of complex self-organized systems. As Sharov (1998) points out, biosemiotics can be viewed as a root of biology and semiotics rather than a branch of semiotics (in its conventional limit to human languages). As such, biosemiotics also represents a suggestion for a deeper foundation that can connect biology with the humanities in another way than sociobiology and evolutionary psychology do.

Biological systems are then understood as being held together for communicative reasons and are therefore not natural in physical–chemical understanding. They are communicative structures, as Kull (2001) argues. One could also call them discursive material systems. As we can call humans language-cyborgs because our minds are artificially formed by language, we can call all other living systems sign-cyborgs because they are made of coded molecules and organized communicatively by semiotic processes. But computers only work on and are organized around differences or informational bits. Thus, they are dualistic and therefore proto-semiotic (Nöth, 2002), as genuine semiosis is triadic according to Peirce. The same goes for information in natural systems, for example dissipative structures such as tornadoes.

Biosemiotics offers a rich field of exploration and ongoing research into the life of signs as they are found in the actual world's ecological, mental, and artificial systems (Emmeche, 1998). Examples of relevant topics are sign functions in physical, chemical, biological, and computational systems such as molecular biology, cognitive ethology, cognitive science, robotics, and neurobiology; communication of all living systems including the area of ethology; the semiotics of cellular communication in the body among organs, the immune system, and in the brain such as psychoneuroimmunology, the representational dynamics of disease and possible relevance for medical diagnose and treatment; the study of the semiotics of complex systems, anticipatory systems, artificial life, and real life; the semiotics of collective biological phenomena such as emergent signs in swarm intelligence; the metaphysics of Darwinism: can semiotics provide a foundation for a new evolutionary paradigm through Peirce's idea of Thirdness, and the emergence of interpretants in biotic evolution? Biosemiotics can help develop the theory of biological self and its relation to the emotional and sign-producing systems in animals as well as the linguistic thinking system in humans, the theory of the embodiment of consciousness and language and internal mental causation. Such may be a short and bold formulation of the biosemiotic view combining several researchers' contribution to a view that is as close to consensus as possible for the leading researchers in this still young research program.

Apart from C. S. Peirce, early pioneers of biosemiotics are Jakob von Uexküll (1864–1944), Charles Morris (1901–1979), Heini Hediger (1908–1992), and Giorgio Prodi (1928–1987); the founding fathers are Thomas A. Sebeok (1920–2001) and Thure von Uexküll (1908–2004), and the founders of the second wave are contemporary scholars such as Jesper Hoffmeyer and Claus Emmeche (who formed the biosemiotic group in Copenhagen in the 1980s), Kalevi Kull (the Jakob von Uexküll center), Alexei Sharov, Søren Brier, Marcello Barbieri, Anton Markos, Dario Martinelli (zoosemiotic musicology), and semioticians such as Floyd Merrell, John Deely, Myrdene Anderson, Lucia Santaella, Frederik Stjernfelt, Tommi Vehkavaara, and Winfried Nöth have also contributed as part of their more general work. In the following, we look into the foundations and specific theories. However, it is interesting that F. S. Rothschild (1899–1995), who did not notably influence the development of biosemiotics, was the first to use the term in 1962 in the *Annals of the New York Academy of Sciences* 96: 774–784.

Thomas Sebeok's Development of Zoosemiotics and Biosemiotics

Ever since Umberto Eco formulated the problem of the semiotic threshold, Peircian semiotics has developed further into the realm of biology. The efforts of Thomas Sebeok (1920–2001) have led to the development of a biosemiotics encompassing all living systems, including plants and microorganisms as sign users (Petrilli and Ponzio, 2001). Sebeok's name is associated most of all with the term 'zoosemiotics,' the study of animal sign use (Sebeok, 1972). It was coined in 1963 and it deals with species-specific communication systems and their signifying behaviour. Zoosemiotics is concerned more with the synchronic perspective than the ethology of Lorenz and Tinbergen, which focuses more on the diachronic dimension. Sebeok's research succeeded in broadening the definition of semiotics beyond human language and culture to a biosemiotics encompassing not only human nonverbal communication but also all sign processes between and within animals (Sebeok, 1990). He pointed out that we are living in a world of signs: a 'semiossphere.' Sebeok argued that the biosphere and the semiossphere are linked in a closed cybernetic loop where meaning itself powers creation in self-excited circuits. With Sebeok's enthusiastic support as editor, the two large special volumes of *Semiotica* on biosemiotics (Sebeok *et al.*, 1999), and on Jakob von Uexküll's contribution to the foundation of biosemiotics (Kull, 2001) were edited by first the Copenhagen and next the Tartu school of biosemiotics. Later, through the collaboration of these schools of biosemiotics, a series of annual conferences under the name Gatherings in Biosemiotics has been developed since 2000, now also in collaboration with biosemioticians in Prague. In 2004, through further cooperation with the Italian school

of semantic biology (Barbieri), work on starting a *Journal of Biosemiotics* has begun.

Hoffmeyer and Emmeche's Theory of Code Duality

Later Sebeok decided that that zoosemiotics rests on a more comprehensive science of biosemiotics. This global conception of semiotics, namely biosemiotics, equates life with sign interpretation and communication. It is carried by an inspiration from Jakob von Uexküll's theory that all living beings are the center of a phenomenal *Umwelt* (Sebeok, 1989). This idea was carried on through Thure von Uexküll, with whom Sebeok interacted in creating the foundations for a modern biosemiotics. In the late 1980s, these ideas merged with the ideas of the Danish biochemist Jesper Hoffmeyer's communicative view of life and his and the biophilosopher Claus Emmeche's theory (Emmeche and Hoffmeyer, 1991; Hoffmeyer and Emmeche, 1991) of the foundational code duality of living systems: they see living systems defined by the interactions through evolution between a digital code in the gene or genotype and an analog code in the whole individual or phenotype. The gene is a code for memory and self-representation and the individual living body is a code for action and interaction with the real world and its ecology. Thus life appears also to be an interplay of different types of self- and other-descriptions. The egg and the hen as two interacting aspects of a living system evolving through time and space is another example. Thus signs and not molecules are the basic units of the study of life and the semiotic niche is the species home. Biological evolution is a development toward more semiotic freedom. Hoffmeyer's contribution to biosemiotics is summarized in Emmeche *et al*. (2002).

The Roots from Uexküll and Ethology

Although biosemiotics is already prefigured in Jakob von Uexküll's *Umweltlehre*, although not in semiotic terms, Sebeok fruitfully combined the influences of von Uexküll and Charles S. Peirce, to merge them into an original whole, in an evolutionary perspective, arriving at the thesis that symbiosis and semiosis are one and the same (Sebeok, 1989). Biosemiotics finds its place as a master science, which encompasses the parallel disciplines of ethology and comparative psychology. As Uexkull was one of Konrad Lorenz's most important teachers, the ethology he and Tinbergen developed fitted nicely into biosemiotics as it developed from Sebeok's studies of animal communication and ethology.

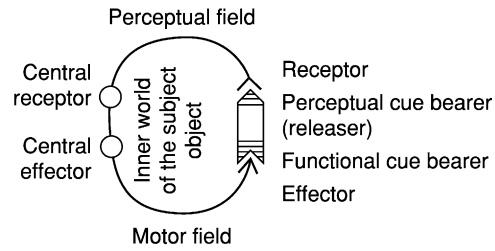

Figure 2 Jakob von Uexküll's functional circle that demonstrates his (phenomenal constructivistic) concept of objects (von Uexküll 1957: 10–11; referred to as 'Figure 3.') In cybernetic recursive e processes between receptors and effectors, the perceptual object is created on the basis of a functional tone.

In J. and T. von Uexküll's writings (J. von Uexküll, 1934; T. von Uexküll *et al*., 1982) on the species-specific and subjective *Umwelt* in animals, one finds the roots of important concepts such as sign stimuli, innate release mechanisms, and 'functional tones' that are later utilized in Lorenz's ethological research program as the concept of motivation. J. von Uexküll's 'tone' concept is the root of Lorenz's specific motivation, but it seems even more closely related to Gibson's affordances, although it is unclear whether Gibson ever read von Uexküll. The functional tones are the number of functions an animal can distinguish in its surroundings, which creates its functional images of 'thing' that thus becomes 'object' in the animals *Umwelt*. Brier (1999) has coined the term 'signification sphere' to give a modern semiotic term to Uexküll's presemiotic concepts. Figure 2 shows the presemiotic Uexküll model of object perception.

As von Uexküll's concept of 'tone' becomes Lorenz's 'motivation,' the 'subjectively defined object' becomes the 'sign stimuli' in ethology, and finally the 'functional relation between receptors and effectors' becomes the 'IRM' (innate response mechanism). However, it is clear that von Uexküll's biophenomenological concepts differ from the biocybernetic and partially mechanistic framework found in the theoretical foundation of Lorenz and Tinbergen's articles from around 1950. First in the new biosemiotics, this conceptual difference can be solved using Peirce's philosophy (Brier, 2001).

Animal Languages or Sign Games?

The empiricist and natural science readings Sebeok offers for communication were new to the semiotics field. References to animal models are made throughout his work in the context of ethology. The approaches of ethology and sociobiology have been controversial and, in their applicability to human culture and society, accused of reductionism. Sebeok shows that some of this controversy may find itself

played out in the new transdisciplinary framework of biosemiotics. In 1992, he and his wife Jean Umiker-Sebeok published 'The semiotic web 1991' as a volume titled *Biosemiotics*. This volume was predicated on a book they edited in 1980, *Speaking of apes*, which presented a detailed critical evaluation of current investigations of the ability of apes to learn language. Sebeok showed in a profound critique of the way the experiments were constructed that it is very doubtful that apes have such capabilities. Thus biosemiotics does not entail that there are no significant differences between human and ape linguistic capabilities. But through biosemiotics, Sebeok and Danesi (2000) argued that a zoosemiotic system exists as the foundation of human language, which has to be called the primary one; thus languages become secondary and culture tertiary, as already mentioned.

Anthroposemiotics as Part of Biosemiotics

But biosemiotics does not only deal with animals in zoosemiotics; it also deals with signs in plants in phytosemiotics, with bacterial communication. According to one standard scheme for the broad classification of organisms, five super kingdoms are now distinguished: bacteria, protists (protozoa-like slime molds and primitive algae, all with a nucleus), plants; animals; and fungi. Thus the major classification categories in biosemiotics are: bacteriosemiotics, protistosemiotics, phytosemiotics (Krampen, 1981), mycosemiotics, and zoosemiotics (Deely, 1990). Within zoosemiotics, anthroposemiotics encompasses the human race. There are two biosemiotic interpretations of anthroposemiotics. One is that it encompasses the traditional area of semiotics of language and culture plus the embodiment of human signification. The other one, that leading biosemioticians share, is that it only deals with the human body and the biological parts of human cognition and communication. Going into the body of multicellular organisms, *endosemiotics* (T. von Uexküll *et al.*, 1993) deals with communication between the cells in the body of all living systems, including human physiology. In the framework of endosemiotics, there is, for instance, a special area of immunosemiotics dealing with the immunological code, immunological memory, and recognition. The way that we now know that the nervous system's, the hormone system's, and the immunological system's communicative codes work on each other is considered to be the basis of the biological self: an endosemiotic self-organized cybernetic system with a homeostasis.

The Peircian Influence

The majority of biosemiotics builds on Peirce's unique triadic concept of semiosis, where the interpretant is the sign concept in the organism's mind, which is the interpretation of what the outer sign vehicle stands for: its object. For instance, that a raised fist's object is a physical threat. Peircean biosemiotics is based on Peirce's theory of mind as a basic part of reality (in Firstness) existing in the material aspect of reality (in secondness) as the inner aspect of matter manifesting itself as awareness and experience in animals and finally as consciousness in humans. Peirce's differentiation between the immediate object of semiosis and the dynamic object – that is all we can get to know about it in time – is a differentiation between the object of the organism and the environment or universe outside it. Biosemiotics begins with the process of knowledge: how signification occurs within living systems, making perception and cognition possible.

Peircian Biosemiotics

Modern Peircian biosemiotics is very different from the symbolic semiotics of human language that cyberneticians distanced themselves from many years ago. The theories of Heinz von Foerster on recursive functions in the nervous system establishing perceptual objects as eigen functions of this recursive cognitive interplay between nervous system and environment has supported Uexküll's older concept of object (Brier, 1996). Humberto Maturana and Francisco Varela's concept and theory of autopoiesis, the cell as a self- and closure-organizing system recursively reproducing the closure and internal organization of living systems, have had a significant influence on the development of the Copenhagen school of biosemiotics (Brier, 1995). The interaction between the autopoiesis, the genome, and semiosis in an animal (here a small fish) as understood through biosemiotics can be modeled as shown in **Figure 3**.

Peircian biosemiotics is distinct from other semiotic paradigms in that it not only deals with intentional signs of communication, but also encompasses non-intentional signs such as symptoms of the body and patterns of an inanimate nature. Peircian semiotics breaks with the traditional dualistic epistemological problem of first-order science by framing its basic concept of cognition, signification, within a triadic semiotic philosophy. Triadic semiotics is integrated into a theory of continuity between mind and matter (Synechism) where the three basic categories (Firstness, Secondness, and Thirdness) are not only inside the perceiver's mind, but also in the nature

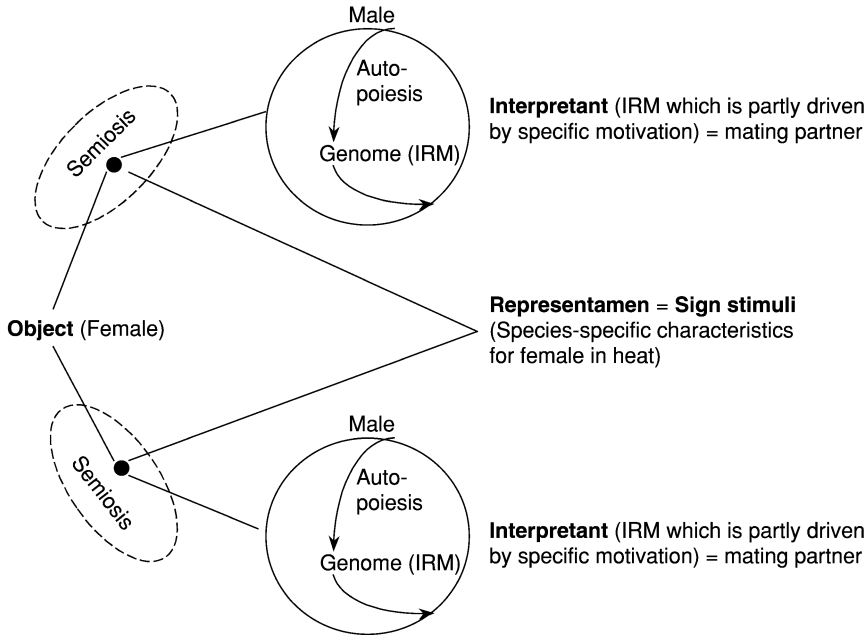

Figure 3 Brier's model showing two autopoietic systems (males) of the same species (gene pool) see the same sign in an object, creating the interpretant of a female of the same species. This occurs through the partially inherited structural coupling that ethology calls the innate response mechanism (IRM), which is tuned to anticipate certain differences as significant for survival and proliferation, i.e., as sign stimuli. The whole model is within one life form (naturalizing Wittgenstein's concept), mating, which again generates the mating sign game or ground (Peirce). I have excluded here, for simplicity, the female's point of view as a species-specific autopoietic system.

perceived. This is connected to the second important ontological belief in Peirce's philosophy, namely Thycism that sees chance and chaos as basic characteristics of Firstness. This is combined with an evolutionary theory of mind (Agapism), where mind has a tendency to form habits in nature. Chaos and chance are seen as a First, which is not to be explained further (for instance, by regularities). It is the basis of habit-forming and evolution. The chaos of Firstness is not seen as the lack of law, as it is in mechanicism and rationalism, but as something full of potential qualities to be manifested individually in Secondness and as general habits and knowledge in dynamic objects and semiosis in Thirdness. This is the deep foundation of Peirce's pragmaticism (Brier, 2003).

Biosemiotics and Information in Computer and Physiosemiotics

The essential question for the current debate about the possibility of a transdisciplinary information/signification science is whether the Percian biosemiotics can comprise uninterpreted natural objects, dissipative structures, and other spontaneous generations of order and patterns in nature as signs. These objects were previously described in physical–chemical terms. Now some adherents of the paninformational paradigm want to explain them in purely informational terms (Brier, 1992). From a Peircian point of view, these phenomena are proto-semiotic, or quasi-semiotic, when compared to the semiosis of living systems, because they are only displays of Secondness in the well-argued view of Winfred Nöth (2002). There is thus competition between the informational and the semiotic approaches in producing that new transdisciplinary framework that can unite the traditional views of nature by the sciences, with the new understandings of computers and cognition and finally the social aspects of language and consciousness in communication.

But some scholars even accept to use the sign concept on processes between nonliving entities in nature and machine: physiosemiotics. John Deely (1990) is one of the more prominent promoters of a Peircean view of semiotics as a transdisciplinary theory encompassing both the human mind and its text production as seen from phenomenology and hermeneutics as well as all of nature and life seen from a biosemiotic as well as a physiosemiotic viewpoint. That is not the discussion of whether any natural thing can become a sign when placed in a meaningful context by a living system, but if the objects and their processes are signs *per se*.

It is interesting to see that semiotics thus has moved from the humanities into biology and from there even into the other natural sciences at the same time as the

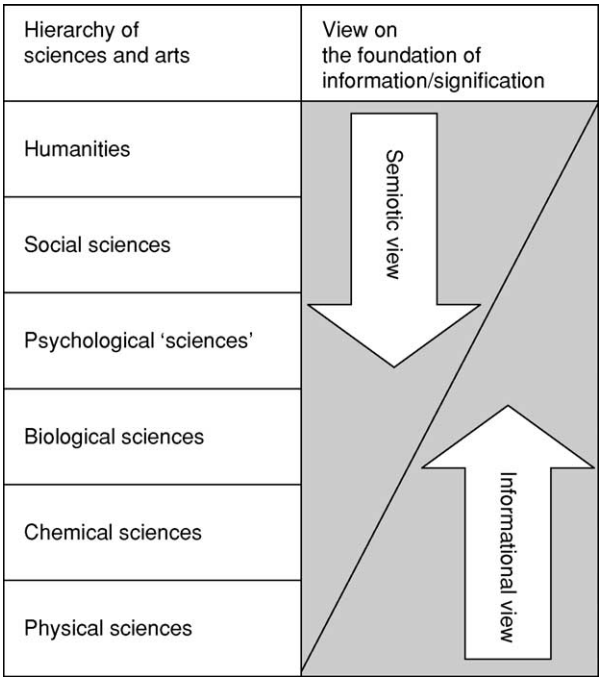

Figure 4 The relevance of the bottom-up informational view and the top-down semiotic view in the area of the foundation of information science. On the left side is a hierarchy of sciences and their objects, from physics to humanities and vice versa. On the right is an illustration of the two most common scientific schemas for understanding and predicting communicative and organizational behavior: (1) the semiotic top-down paradigm of signification, cognition, and communicative and (2) the informational bottom-up functionalistic view of organization, signal transmission, and AI. The width of the two paradigms in correlation with the various subject areas shows an estimate of how the relevance of the paradigm is generally considered, although both claim to encompass the entire spectrum.

formulation of objective informational concepts has been used as the basis of understanding all types of cognitive processes in animals, machines, humans, and organizations in the information processing paradigm. Information science is thus moving from computer science down into nature and up into cognitive systems, human intelligence, consciousness and social systems, and communication in competition with semiotics that is moving in the other direction (see Figure 4).

Information theory is now an important part of the consciousness research program, but there is a great deal of work to do for serious philosophy, considering how many central philosophical topics of mind, language, epistemology, and metaphysics will be affected by the biosemiotic development. Peircian biosemiotics may contribute to a new transdisciplinary framework in understanding knowledge, consciousness, meaning, and communication. But to do this, new elements have to be integrated, making it possible to unite the functionalistic approaches to information and communication coming from cybernetics and computer science with the semantic pragmatic approaches coming from the linguistic point of view and semiotics if we want to bridge this gap in our culture and knowledge. Concepts of closure, self-organization, and differentiation of biological, psychological, and social systems developed in second-order cybernetics and autopoiesis theory need to be integrated into theories of embodiment and Peircian biosemiotics.

Cyber(bio)semiotics

Søren Brier (2003) has developed such a philosophy of information, cognition, and communication science framework that encompasses biosemiotics and information science and well as second-order cybernetics and autopoiesis to this transdisciplinary area, which he calls Cybersemiotics.

Peircean cybersemiotics is based on Peirce's theory of mind as a basic part of reality (in Firstness) existing in the material aspect of reality (in Secondness) as the inner aspect of matter (hylozoism) manifesting itself as awareness and experience in animals and finally as consciousness in humans. Combining this with a general systems theory of emergence, self-organization, and closure/autopoiesis, and a semiotized version of Luhmann's triple autopoietic theory of communication (see Figure 1) combined with pragmatic theories of embodied social meaning, it forms an explicit theory of how the inner world of an organism is constituted and, therefore, how first-person views are possible and are just as real as matter. Such a theory has been missing from the modern discussions of a science of consciousness. Through this foundation for semiosis, a theory of meaning and interpretation including mind – at least as immanent in nature – is possible, and cybernetic views of information as well as autopoietic views on structural couplings can be combined with pragmatic theories of language in the biosemiotic perspective.

The term 'pro- and quasi-semiotic objects' recognizes that systems in nature and culture work with differences, often in the form of coding, instead of through either physical causality or meaningful semiosis. Systems of Secondness have established an information level above the energetic and causal level of nature. This area, delimited from a semiotic point of view, is part of what classical first-order cybernetics considers their subject area: goal-oriented machines and pattern-forming, self-organized processes in nature that are based on information. The terms 'informational,' 'coding,' and 'signal' are used mainly in cybernetic contexts for these systems, before attempts, foreshadowed by Wiener, to create a

paninformational paradigm (Brier, 1992). In Peircean biosemiotic philosophy, these levels can be bound together by Synechism, Tychism, and Agapism, combined with an evolutionary view of the interactions between Firstness, Secondness, and Thirdness. The view of Firstness as a blend of qualities of mind and matter containing qualia and living feeling and a tendency to form habits is crucial for understanding the self-organizing capabilities of nature and how what seems to be dead matter can, through evolutionary self-organization, become autopoietic and alive with cognitive/semiotic and feeling abilities (Brier, 2003).

To summarize, cybersemiotics develops a semiotic and informational theory accepting several levels of existence, such as a physical and a conscious social linguistics, now placed in the broader cybersemiotics framework that combines Peirce's triadic semiotics with systemic and cybernetic views including autopoiesis and second-order cybernetics. When talking about reality, I think we should distinguish between:

1. The first level of quantum vacuum fields entangled causality is not considered physically dead, as is usually the case in physicalistic physics. Cybersemiotics conceives it as a part of Firstness, which also holds qualia and pure feeling. Although physicists may be bothered by this new metaphysical understanding of this level of reality, they cannot claim that there is no room for new interpretations, because physics has a complete understanding of it. On the contrary, this is one of the most mysterious levels of reality we have encountered, and its implications and interaction with the observers' consciousness have been discussed since the 1930s and were central in the disputes between Bohr and Einstein, and now some researchers are attempting to exploit the entanglement to explain the possibility of teleportation.
2. The second level of efficient causation is clearly what Peirce describes as Secondness. This realm is ontologically dominated by physics as classical kinematics and thermodynamics. But for Peirce, it is also the willpower of the mind. It is mainly ruled by efficient causation. Thus Peircean cybersemiotics does not accept a level of pure mechanical physics; nor did Ilya Prigogine.
3. The third level of information is where the formal causation manifests clearly and where the regularities and Thirdness becomes crucial for interactions through stable patterns that are as yet only proto-semiotic. This level is ontologically dominated by the chemical sciences. This difference in ontological character may be one of the keys to understanding the differences between physics and chemistry. It is not only a matter of complexity but also of organization and type of predominant causality, which here is formal causation.
4. On the fourth level, where life has self-organized, the actual semiotic interactions emerge. First internally in multicellular organisms, such as in endosemiotics, and between organisms such as in sign games. This framework – based on biosemiotics – points out that the informational concept may be useful for analyzing life at the chemical level, but it is not sufficient to capture the communicative, dynamic organizational closure of living systems. This is one of the reasons why Maturana and Varela do not want to use the information concept in their explanations of the dynamics of life and concept. But they do not use a semiotic either. Final causation dominates here as in the next level where it emerges as purpose.
5. Finally on the fifth level with syntactic language games, human self-consciousness emerges and with that rationality, logical thinking, and creative inferences (intelligence). Intelligence is closely connected to abduction and conscious finality. Abduction is crucial to signification. It is the ability to see something as a sign for something else. This something else has to be a habit of nature, mind or society. Some kind of regularity or stability in nature that the mind can recognize as somewhat lawful is necessary for it to be a fairly stable eigen value in the mind (an interpretant) and be useful for conscious purposeful action and interaction in communication as well as in ethical social praxis (Phronesis).

See also: Barthes, Roland (1915–1980); Eco, Umberto (b. 1932); Information Theory; Jacobsen, Lis (1882–1961); Luhmann, Niklas (1927–1998); Morris, Charles (1901–1979); Peirce, Charles Sanders (1839–1914); Sebeok, Thomas Albert: Modeling Systems Theory; Semiology versus Semiotics.

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http://triplec.uti.at – Brier's article in *TripleC*.

Birdsong: a Key Model in Animal Communication

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Introduction

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Birdsong: a Key Model in Animal Communication

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Introduction

The melodious beauty and complexity of birdsong have long attracted amateurs, naturalists, and scientists alike. Despite the almost ubiquitous presence of birdsong in both natural and anthropogenous environments, few people are aware that birdsong is one of the most elaborate acoustic communication systems in the animal kingdom. Birdsong shows some basic and almost unique similarities to human speech, an aspect that has attracted considerable interdisciplinary scientific attention from biologists, psychologists, and linguists. As in human speech acquisition, vocal learning by songbirds plays a prominent role in song development (Catchpole and Slater, 1995). There is a sensitive period in which the basic species-specific structure is acquired, in much

the same way that humans have to acquire the phonemes of their language in the first few years of life. The only other well-established examples of animal communication in which learning plays such a central role in signal acquisition are found in parrots, hummingbirds, bats, and marine mammals (Janik and Slater, 1997).

Using birdsong as a model system allows us to study the complexity of animal behavior from both mechanistic and functional perspectives. Because it is the best studied vertebrate communication system on almost all levels of scientific investigation, from molecular biology to evolutionary ecology, birdsong development has become a textbook example for illustrating basic biological processes (Alcock, 2001; Campbell and Reece, 2001; Barnard, 2004). In most songbirds that breed in the temperate zones, only the males sing; their songs function to defend a territory against other males and to attract and stimulate females (Catchpole and Slater, 1995), but there is an enormous variation in song structure and phenomenology, development, and delivery. The taxonomic order of perching birds (passerines) can be subdivided into two distinct groups: the oscines (over 4000 species), which in general learn their song, and the sub-oscines (about 1000 species), for which there is limited evidence that key structural components of the species-typical song are learned (Kroodsma, 2004). Many of the sub-oscines are tropical birds and their song is often much simpler than is the highly complex song common in oscine species. Songbirds in the tropics also differ from those in the temperate zones in how and when they sing: singing tends to occur all year round and often females also sing. Even more strikingly, mated pairs may combine their songs into highly coordinated duets (Hall, 2004). The speed and precision in coordination of timing of duets results in a composite signal that, even for an experienced human listener, sounds like the song of a single individual. This article will mainly focus on song by males in temperate zone passerines, as these are much better studied than tropical birds and are ideal to illustrate general principles of songbird vocal communication.

Birdsong versus Bird Calls

Birdsong is distinguished from the remainder of songbird vocalizations, which are generally referred to as calls. Calls have been defined based on both structural and functional criteria. Calls are given by both sexes, they are simple in structure, and in many cases they are highly context specific, such as begging calls or alarm calls (Marler, 2004). Other than song, which is normally delivered only in the breeding season, calling occurs all year. Calls have long been thought to be affected little, if at all, by vocal learning. However, with more studies addressing call learning, it has emerged that there is much more developmental plasticity than previously thought. Among the various calls given by birds, the alarm calls given in response to predators have received specific attention, because they can vary gradually with the urgency of the threat and even provide functionally referential information (*see* **Alarm Calls**), a trait that has long been viewed to be specific to human language.

Singing Versatility

Birdsong structure and versatility vary enormously, from structurally simple songs with only one repeated element (e.g., grasshopper warblers, *Locustella naevia*) to highly complex songs (e.g., nightingales, *Luscinia megarhynchos*) in which each male sings around 200 different song types, each of which is composed of many different elements (**Figure 1**). For the purpose of comparative studies, it has proved useful to categorize birds into continuous and discontinuous singers (Hartshorne, 1973; Catchpole and Slater, 1995). Continuous singers such as reed warblers (*Acrocephalus scirpaceus*) produce long, almost continuous streams of elements (the basic units of vocal production). The elements in the song repertoire of a continuous singer are usually recombined in various ways, so that each new sequence is slightly different from the previous ones. Most male songbirds, however, are discontinuous singers, i.e., they alternate songs (which are a specific combination of song elements) with silent intervals (**Figure 1**). Among different species of discontinuous singers, there are two discrete singing styles. In some species, males repeat the same song type several times before switching to a song of a different type. This way of singing is most characteristic for species in which males have a small to medium repertoire of different song types (i.e., a repertoire of 2 to 10 acoustically distinct songs/male). There are some exceptions to this rule, though; for example, Carolina wren (*Thryothorus ludovicianus*) males have a repertoire of about 40 distinctly different song types, but deliver their repertoire with eventual variety. Birds following this repetitive mode are generally said to be singing with 'eventual variety.' Examples are song sparrows (*Melospiza melodia*), yellowhammers (*Emberiza citrinella*), chaffinches (*Fringilla coelebs*), and great tits (*Parus major*). In other species, males hardly ever repeat the same song type in immediate succession but instead, after each song, switch to a different song type within their repertoire. This singing style is 'referred to as showing 'immediate variety' and is characteristic of species that have larger song repertoires, such as mockingbirds (*Mimus polyglottus*), European blackbirds (*Turdus merula*), or nightingales.

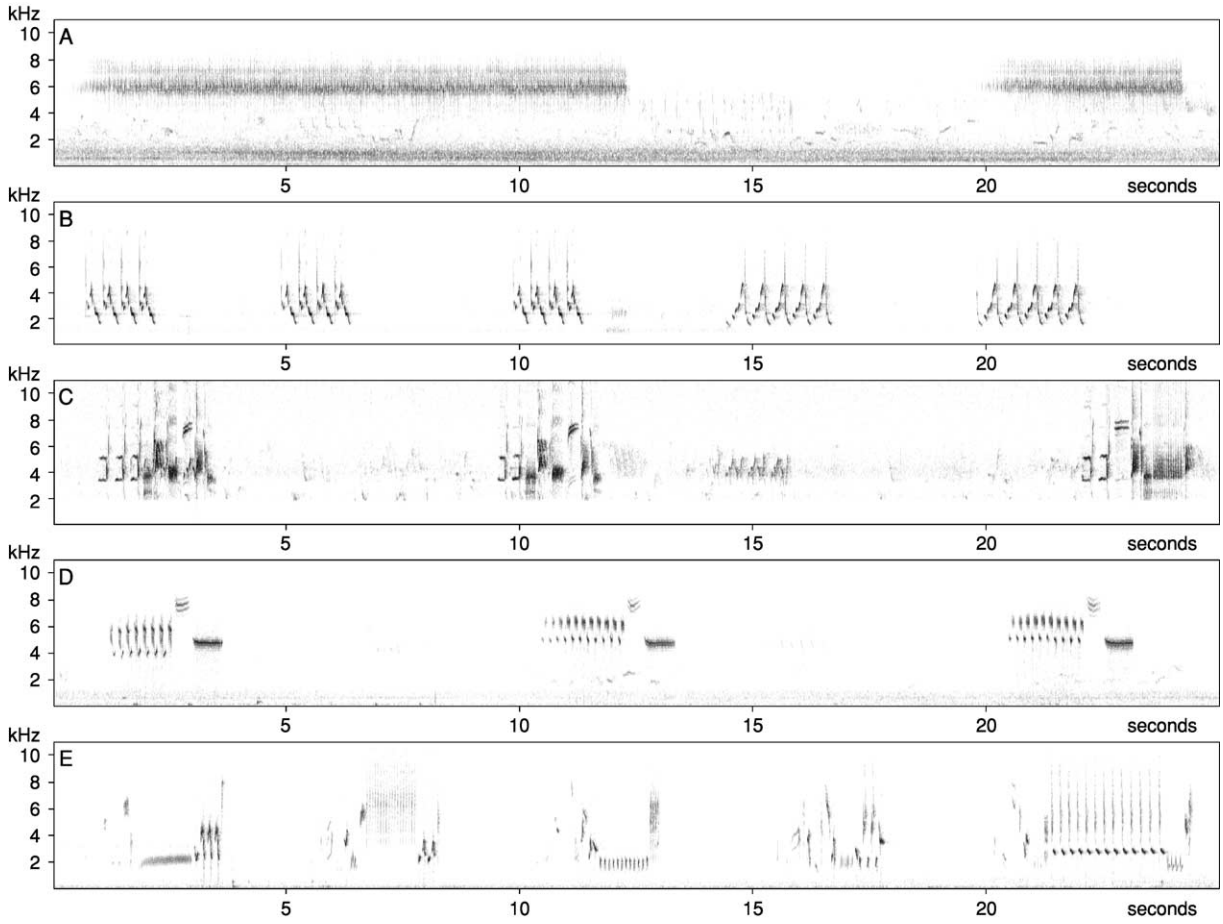

Figure 1 Sound spectrograms of 25-s singing sequences by males of five different species of songbirds. (A) Grasshopper warbler, *Locustella naevia*, (B) Carolina wren, *Thryothorus ludovicianus*, (C) song sparrow, *Melospiza melodia*, (D) yellowhammer, *Emberiza citrinella*, (E) nightingale, *Luscinia megarhynchos*; (B)–(D) show singers with eventual variety and (E) shows a species with immediate variety.

Song Development

Songbirds have an exceptional faculty for vocal learning (Figure 2). Song learning consists of a phase of acquisition (sensory phase: memorization of song patterns) and a phase of production learning, i.e., the sensorimotor learning phase of the complex motor pattern. The timing of these two processes during development varies across species, from tightly overlapping to completely separate in time. The acquisition process is often limited to a sensitive phase during the first year of life (which is the time to maturation in most songbird species), with no additional learning after the first breeding season ('closed-ended learners'; e.g., chaffinches or zebra finches (*Taeniopygia guttata*)). In other species, learning might continue throughout life ('open-ended learners'; e.g., canaries (*Serinus canaria*) or starlings (*Sturnus vulgaris*)). Often this entails repertoire size increasing with age.

Song acquisition learning seems to take place during a sensitive phase without apparent external reinforcement ('channeled' or 'pre-programmed' learning). Unlearned biases (varying in their specificity across species) guide what types of vocalizations are preferentially learned. Generally, the first auditory memories are laid down during the first weeks of life, often around the time when the young birds fledge from the nest, and the sensory learning phase precedes the motor learning phase. In seasonal species, this might not occur until months after the offspring heard adult birds sing. Early singing consists of quiet, amorphous warbling (subsong) that proceeds to more structured and phonologically varied song (plastic song). Whereas these first two phases may take several weeks, the last transition, to the fully crystallized song, often occurs rather rapidly, within a few days. After that, phonology, phonological syntax, and timing fully are those of adult song (Figures 3 and 4). The onset of motor practice and song crystallization correlates with changes in steroid hormone levels, which are triggered by photoperiod in temperate zones but exhibit less clear circannual patterns in tropical nonseasonal species. Where song

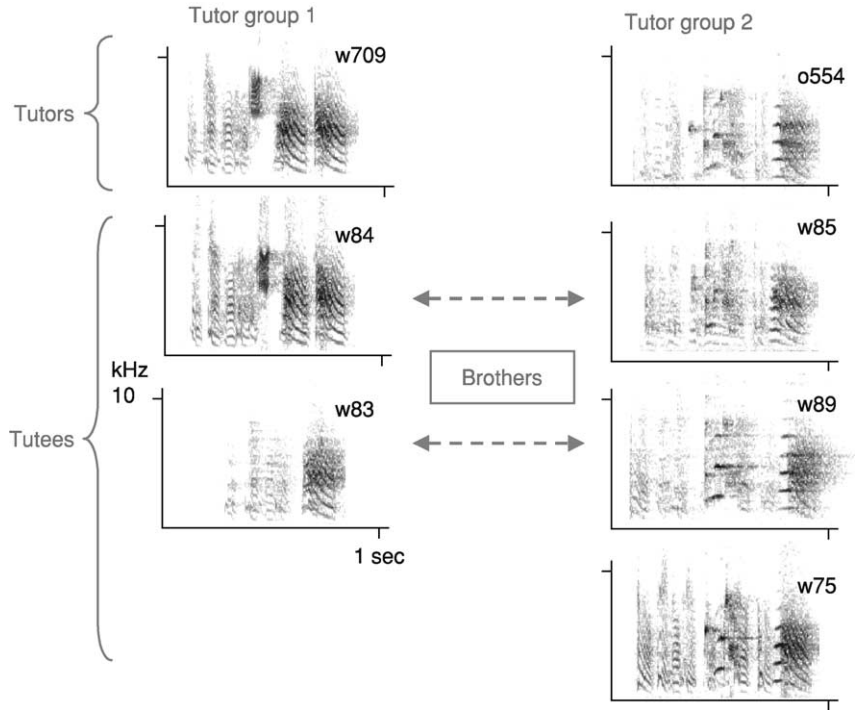

Figure 2 Culturally transmitted song types in the zebra finch (*Taeniopygia guttata*). Columns show spectrograms of tutors' songs in the top row (adult males w709 and o554, respectively) and their respective tutees. Young males were housed with their respective tutors throughout the sensitive phase for song learning (days 35–65 posthatching); as a result, songs of tutees resemble the song of their tutor and each other more than do those of full brothers.

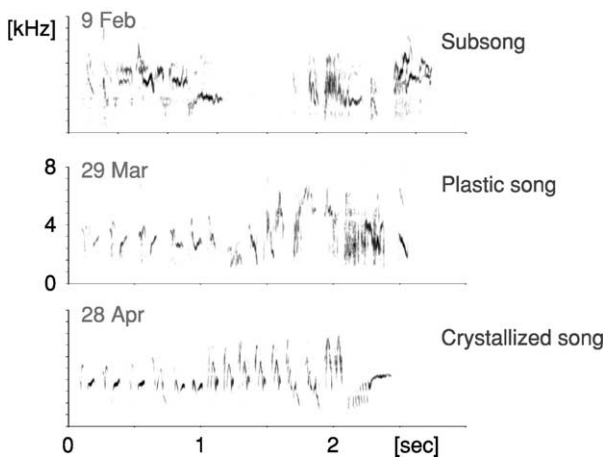

Figure 3 An example of changes in one song motif in the course of ontogeny in a chaffinch, *Fringilla coelebs*. The crystallized song type was also in the final song type repertoire of this individual (illustrated in **Figure 4**, tutee song type 2).

and testosterone titers are seasonal, a brief phase of subsong is observed before the onset of the breeding season even in adult birds.

In the sensorimotor model of song learning, a crude early template sets the sensory predispositions that filter the types of acoustic stimuli that are laid down as specific song memories (the 'template') during the sensory learning phase. The template is adjusted by learning and plays an important role in the development of full song in the subsequent sensorimotor phase. This is in line with observations that song developed by young birds deprived of adult song tutors contains species-specific characteristics (a song-deprived nightingale sounds different from a song-deprived starling) but lacks the fine detail of normal adult song. With the onset of the motor learning phase, auditory feedback is crucial to adjust the song output until it matches the template. Interrupting the auditory feedback by masking it with noise or by blocking the central nervous connections, thus making the bird unable to hear its own song, will result in the development of song that is even more impoverished than the song of isolate-raised birds. The original model of song learning has been updated and altered over the years, but both behavioral and neurobiological findings seem to support the principle underlying ideas of a two-phase process (sensory and sensorimotor learning phases), and this still serves well as an appropriate description of the basic pattern observed in many species.

Consequences of vocal learning are increased interindividual and geographic variation arising from imprecise song copying (see individual w83 in **Figure 2** and differences between tutor's and tutee's songs in **Figure 4**). As in human speech, birds can have local dialects that are discretely different from

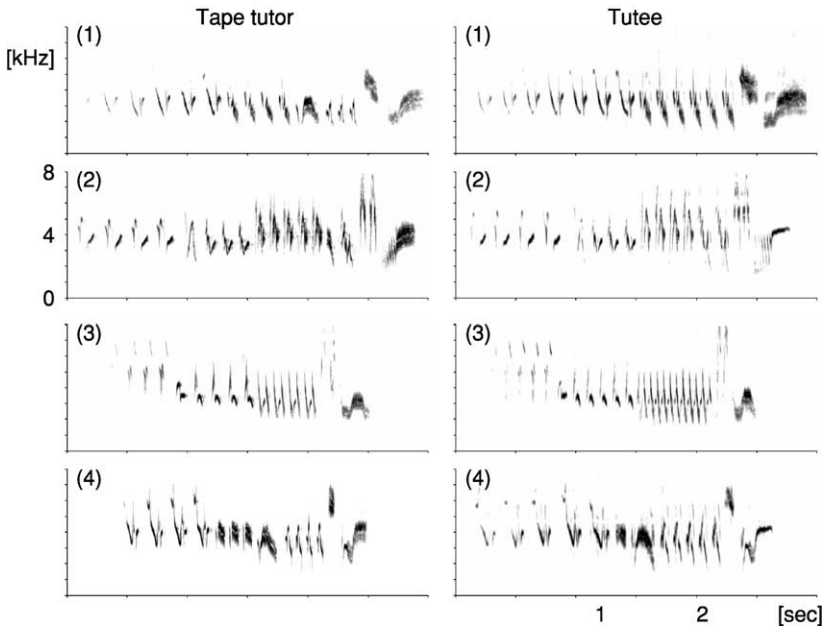

Figure 4 Four song types were played on tape to young fledgling chaffinches (tape tutor). The final repertoire of one of the respective tutees in the subsequent spring is shown (for song development, see **Figure 3**). Redrawn from Riebel K and Slater P J B (1999), *Ibis 141*, 680–683.

other dialects in the same species, with clear-cut dialect boundaries (*see* **Dialects in Birdsongs**). Population changes in time and space have been relatively well studied due to short avian generation times, and cultural changes in song can be easily observed and documented. Songbirds thus provide an important study system for nonhuman gene-culture co-evolution studies and diachronic and geographic change such as dialect formation.

Development of Vocalizations in Non-oscine Birds

In contrast to the extensive vocal learning process in most songbirds, their closest relatives, the sub-oscines, seem to be able to develop species-specific song even when deprived of adult song or auditory feedback, although vocal learning now also has been shown to occur in some sub-oscines. Vocal learning in songbirds seems to have evolved independently several times and has also been reported for at least two other avian orders, parrots (Psittacidae) and hummingbirds (Trochilidae). Vocal learning has been little investigated in other avian taxa and may be even more widespread than reported (Kroodsma, 2004). Developmental changes during maturation also occur in taxa not described as vocal learners. For example, specialized juvenile vocalizations (such as begging calls) may disappear from the vocal repertoire or the characteristics of the vocal tract may change during growth. An analogue to human 'voice breaking' has been described in a number of bird species. Even in bird species in which the sexes do not exhibit substantial morphological differences, adult males and females often show consistent differences in acoustic parameters such as fundamental frequencies and harmonic composition. These differences often seem to come about rather suddenly during sub-adult development and possibly coincide with steroid hormone-induced changes of the vocal tract (Ballintijn and ten Cate, 1997).

Song Production

Birds have a larynx located at the top of their trachea, but vocalize with the aid of a specialized organ, the syrinx, located much lower down where the two bronchi join to form the trachea (*see* **Vocal Production in Birds**). The tonal character of many bird vocalizations and the existence of a unique sound-producing organ have triggered a wealth of hypotheses as to possible fundamental differences in sound production mechanisms between birds and mammals. Recent findings suggest that the basic mechanism is the same: cyclic opening and closing of the gap between the vocal membranes lead to harmonic sound at the source, which undergoes filtering by the vocal tract. However, whereas a larynx consists of only one pair of vocal folds, there are two sets (one in each bronchus) of each of the several pairs of membranes involved in birdsong production (Goller and Larsen, 2002). The two halves of the syrinx are innervated

independently, creating two potential sound sources that can, within certain limits, be operated independently. In most songbirds, one side of the syrinx seems dominant over the other, and this lateral dominance might even differ from syllable to syllable and even within a syllable. As in mammal sound production, including human speech, the settings of the songbird vocal tract act as a vocal filter and movements of the neck, tongue, and beak contribute to changes in resonance properties.

Neurobiological Correlates of Singing and Song Learning

Songbird brains show special adaptations for the production and acquisition of song (Figure 5). A number of interconnected brain nuclei (the 'song system') are absent in non-vocal-learning bird species and are sexually dimorphic in those species in which producing song is a behavioral dimorphism. The brain areas involved are highly specialized and easy to distinguish from surrounding brain tissue using standard tissue staining techniques. Two main pathways are involved in sound production (Figure 5A). The posterior (or motor) pathway descends from cerebral areas to control the syrinx via the hypoglossal nerve (XII); two cerebral regions (HVC and RA; see Figure 5 for abbreviations) show neuronal activation synchronized with singing. The anterior pathway plays an important role in song learning, and lesions in either Area X or MAN in young birds disrupt song acquisition; such lesions do not affect singing in adult birds. The well-delineated sensitive phases of sensory learning in many songbird species allow controlled experimental assessment of the quantity and quality of the sensory input. Avian song learning is thus a prime model to study the neurobiological basis of vocal learning and adult neuronal plasticity (seasonal changes, neurogenesis). Insights from neurophysiology and anatomy and from studies on effects of differential gene expression mediating neuroanatomical and functional change have greatly advanced our understanding of the subtle neuroanatomical changes involved in learning (Jarvis, 2004).

Sex Differences

The avian song system has provided examples of the most extreme sex differences in functional brain anatomy in vertebrates documented so far. The pronounced sex difference related to song systems and the pronounced seasonal changes in neuronal number and volume (up to threefold) and of the song nuclei (Tramontin and Brenowitz, 2000) provide interesting insights into the role of steroid hormones in neuronal

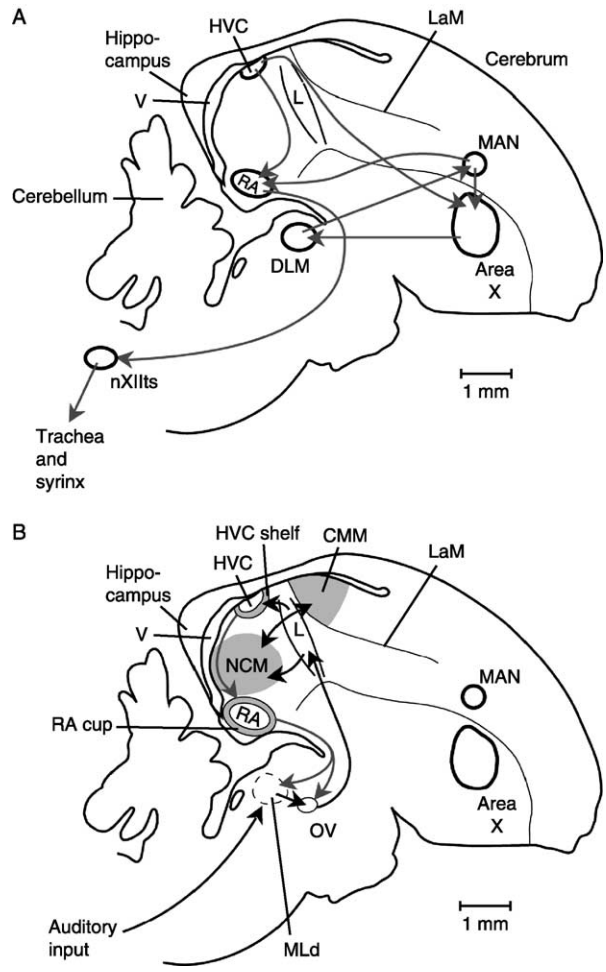

Figure 5 Song system. Schematic drawings of a parasagittal section of the songbird brain. Abbreviations are based on the revised nomenclature of Reiner *et al.* (2004), *Journal of Comparative Neurology 473*, 377–414: CMM, caudal medial mesopallium (former: caudal medial hypertriatum ventrale, CMHV); DLM, medial part of the dorsolateral thalamus; HVC, high vocal center; L, Field L2; LaM, lamina mesopallialis (former: lamina hyperstriatica, LH); MAN, magnocellular nucleus of the anterior nidopallium; MLd, mesencephalic lateral dorsal nucleus (dashed lines indicate the nucleus is located more medially than the illustrated section); NCM, caudal medial nidopallium; nXIIth, nucleus hypoglossalis partis tracheosyringalis; Ov, nucleus ovoidalis; RA, magnocellular nucleus of the arcopallium; V, lateral ventricle. (A) Anterior and posterior pathway. Arrows connect nuclei of the conventional 'song system' that consists of the posterior (motor) pathway and the anterior forebrain pathway. Two main pathways are involved in sound production and learning; the posterior (motor) pathway is activated during singing and descends from the HVC (pallium): HVC → RA → nXIIts → syrinx. The anterior pathway, HVC → Area X → DLM → MAN → RA, is involved in vocal learning. (B) Auditory pathway: input from cochlea via auditory nerve (VIII) and brain stem nuclei (not shown) → MLd (mesencephalon) → OV (in the thalamus) → L (with primary and secondary auditory cells of the pallium) → tertiary auditory areas of the nidopallium (NCM, CMM, HVC shelf, and RA cup). From the HVC shelf there is also a descending pathway via the RA cup to the auditory regions of the midbrain. The gray areas show neuronal activation when the bird is exposed to conspecific song. Figure kindly provided by Terpstra N and Brittijn M (2004), *Journal of Neurosciences 24*, 4971–4977.

development and differentiation. Large differences between closely related species, ranging from species in which females have never been observed to sing to those in which females sing as much as males, provide excellent opportunities for comparative studies in neuroethology (Brenowitz, 1997; MacDougall-Shackleton and Ball, 1999). They also provide a prime model for the study of hormonal and genetic effects in gender differentiation. When song is sexually dimorphic, it is possible to differentiate production and perception learning and to identify specialized adaptations of the brain. In a cross-species comparison across 20 or so species, sex differences in the neuronal song system were found to be correlated with sex differences in song output and repertoire size (MacDougall-Shackleton and Ball, 1999). However, it is unclear whether this is due to sex differences in song output or to vocal learning. Most studies so far have been based on sex differences related to quantity and quality of adult song output and not to song learning (Gahr *et al.*, 1998). Though many species show clear sex differences in song usage, there have been few studies investigating female vocal learning abilities, but this is a rapidly growing field of research (Riebel, 2003). Evidence is quickly accumulating that early learning greatly influences adult female song and its perception. Future studies will thus have to show whether females differ from males in when and what they learn, or only in how much they sing.

Hearing and Perception

The Avian Ear and the Auditory Pathway

For any communication system, the study of physical properties of signals and their production needs to be paralleled by the study of the corresponding receptors. Bird ears are similar to mammal ears in many respects, but differ in a number of key features. The outer ear lacks an external pinna, and its opening in the skull is covered by feathers and there is only a single middle ear bone (the columella). Moreover, the basilar papilla is straight rather than coiled and shows a greater diversity of sensory hair cell types compared to mammal ears (Causey Whittow, 2000). These differences might explain why the range of audible frequencies seems little curtailed despite the remarkably short basilar papilla, which is only about 2–3 mm long (compared to up to 9 mm in owls and 30 mm in humans). Despite these differences, in general, birds' ears work like those of mammals. Sound waves set the membrane separating the inner from the outer ear vibrating. This motion is transmitted via the columella to the fluid of the inner ear. The pressure changes and motions within the fluid excite the hair cells on the sensory epithelium; the hair cells act as transducers, leading to sound-specific patterns of discharge in the auditory nerve (the (nVIIIth)). From nVIIIth, the auditory pathway (Figure 5B) continues, ascending via a number of nuclei in the brain stem, the mesencephalon, and the thalamus (ovoidalis) to primary and secondary auditory cells of the pallium. From there, auditory information is transmitted to tertiary auditory areas of the nidopallium. Thus, in line with songbirds' sensory learning abilities, there is a full ascending sensory pathway to higher forebrain regions.

Hearing Range and Perception

The hearing ranges of birds have been determined using both electrophysiological methods (recording neuronal activities on sound playback) and behavioral methods (training birds to indicate behaviorally whether they can discriminate between two sounds). Bird hearing is remarkably acute both in the low- and high-frequency ranges, despite the short basilar papilla. Audiograms show species-specific peaks and troughs, with specialists such as night-hunting owls showing higher sensitivities. Inspection of avian audibility curves reveals no ultra- or infrasonic hearing (Figure 6). Though birds might hear from roughly 0.5 to 10 kHz, they generally hear best between 1 and 6 kHz, with absolute sensitivity approaching 0–10 dB SPL at the most sensitive frequency, which is usually at around 2–3 kHz (Dooling, 2004). Generally, the sounds that birds produce map

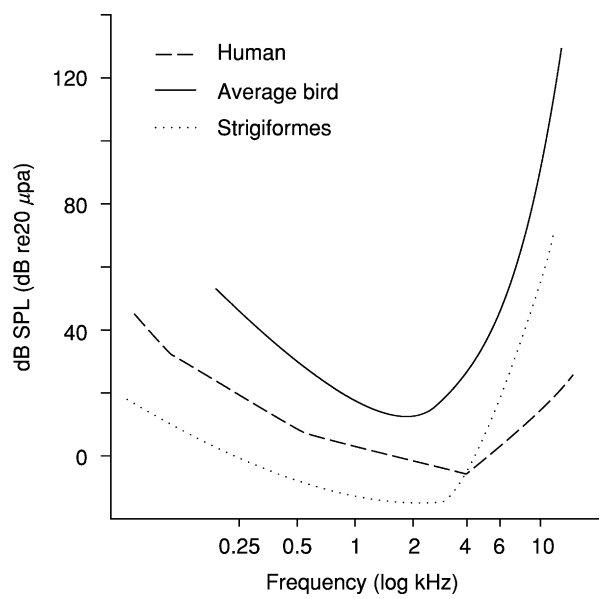

Figure 6 Avian and human audibility curves. Owls (Strigiformes) have a higher sensitivity compared to an average songbird and to humans. Redrawn from Dooling R J *et al.* (2000), in Dooling R J, Fay R R, and Popper A N (eds.) *Comparative hearing: birds and reptiles*, 308–359, New York: Springer Verlag; and Dooling (2004).

well onto the frequency range of their most sensitive hearing.

Despite their small head size, songbirds also show good directional hearing. Instead of integrating the information of directionality using differential arrival times of a sound at both ears, songbirds' ears are connected via the air cavities in the skull bones so that sound is incident on the inner surface of the tympanic membrane at the opposite ear. Two different pressures build up on either side of the membranes; by moving its head until the two pressures are equalized, the bird localizes the sound. The magnitude of spatial masking release is similar to that in humans (10–15 dB, with tone and masking noise 90° apart). Masking effects of noise are frequency specific and strongest when overlapping with the actual signal (Klump, 1996). Compared to humans, birds do less well in detecting changes in intensity, but when discriminating between complex sounds, birds demonstrate fine temporal resolution, exceeding that of humans. However, birds' perception also shows some interesting parallels with human abilities, and there is good experimental evidence for auditory stream analysis (filtering of auditory objects from general background noise) and categorical perception (both for avian and non-avian vocalizations; i.e., birds show categorical perception of human phonemes). Birds also superficially show complex serial pattern recognition (for example, in the discrimination of musical tunes), but use different strategies for categorization than humans. Unlike humans, who focus on differences in relative pitch, in bird species tested so far, absolute pitch and absolute frequency range were more important in classification of complex sounds.

Development of Hearing and Perception The development of hearing and perception has not been widely studied, compared to song production. However, even in species not known as vocal learners, perception is modulated by experiences during development. In ducklings (*Anas platyrhynchos*), preferences for and recognition of the species-specific maternal call are greatly impaired in birds that are deprived of hearing their mother's and their own calls while still in the egg (Gottlieb, 1978). Development and learning are of even greater impact when complex vocalizations, such as the learned songs in songbirds, are concerned. During the sensorimotor learning phase, auditory neurons develop specific responsiveness to elements of, first, the tutor and, later, the bird's own song. Song discrimination abilities are impaired in both males and females if they are deprived of species-specific song during development, suggesting that the fine tuning of song perception also depends on early experiences in non-singing females. Moreover, evidence is accumulating that female preferences for specific variants of conspecific songs are also greatly influenced by social learning processes (Riebel, 2003).

Evolution and Functions of Birdsong

Functions of Birdsong

So far we have dealt with the proximate causation of song: its development, control and perception. But why do birds sing? And what kind of information do they signal and extract from a song that they hear? It is well documented that birdsong is an advertisement signal with a dual function: territory defense and mate attraction. However, the precise functions of song can differ among species. Moreover, within species, the function of song may differ with time of day or season and it may differ depending on how birds sing, i.e., which song patterns they sing and how they use them when interacting with each other. Song encodes information about the singer and such information can be relevant for other males and females. Nevertheless, females and males may attend to different aspects of song so that, even though song may be addressed to both sexes, the specific traits that are used to assess a singer may differ, depending on which sex is listening.

Birdsong as a Long-Range Signal

Unlike human speech, birdsong, in common with other advertisement signals in the animal kingdom, is used as a long-range signal, often over 100 or more meters. During transmission through the environment, acoustic signals inevitably attenuate and degrade (Wiley and Richards, 1982; Slabbekoorn, 2004) (Figure 7). Thus the structure of a song at the position at which a receiver makes a decision differs from its structure at its source. The nature of these environmentally induced changes in a song depends on habitat structure and weather conditions. The differences in the acoustic properties of a given habitat are of evolutionary significance, and certain signal structures will be more effective than others in long-range communication. As a consequence, songbirds in forests sing differently from those that live in open areas, such as woodlands or fields. The reflecting surfaces of the vegetation in forests are the main cause of sound degradation (signal reverberation); in contrast, open habitats cause negligible reverberation. Rapid repetitions of elements with the same frequency structure, i.e., trills, are particularly susceptible to being blurred by reverberation. Indeed, birds in closed habitats have been found to sing trills with slower repetition rates compared to birds in

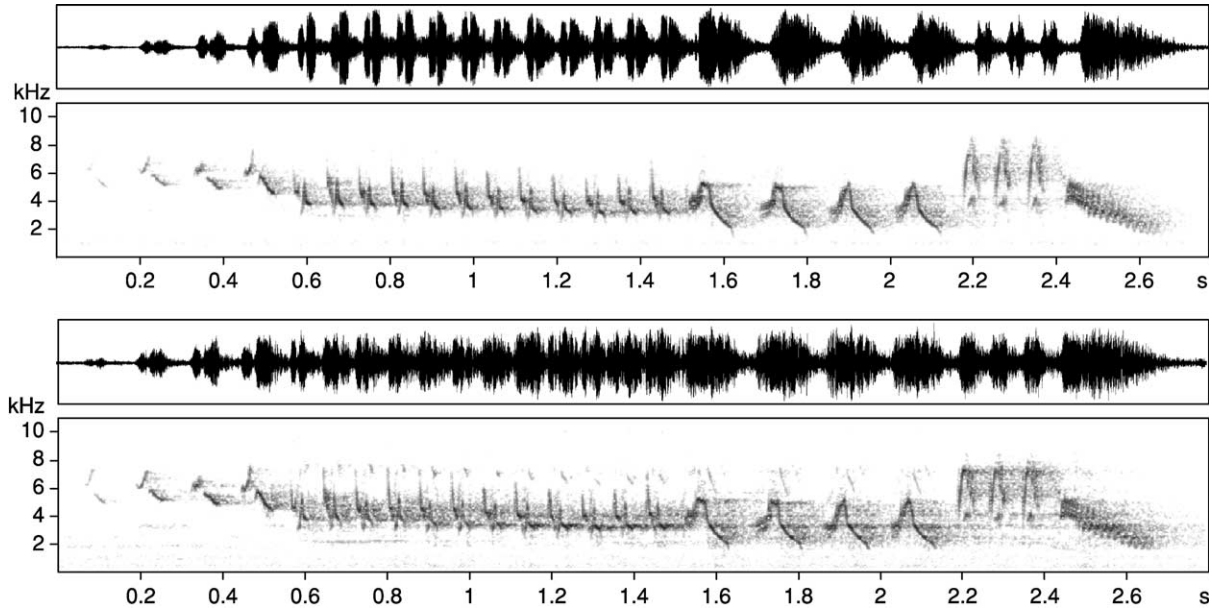

Figure 7 Undegraded and degraded sound spectrograms and oscillograms of a chaffinch song. Upper panel: song as recorded from a singing male within a distance of 10 m is undegraded. Lower panel: song as recorded at a distance of 40 m in a deciduous forest. Here the oscillogram (top) and spectrogram (bottom) show temporal smearing of the sound.

open habitats. Because vegetation also causes additional attenuation of sound, and specifically of the higher frequencies, there should be strong selection to avoid higher frequencies for long-range communication in forests. Empirical findings show that birds in open habitats use, on average, more high frequencies than do birds in closed habitats. However, the environmental effects on song transmission not only mask information coded in the song but also provide additional relevant information. Degradation and attenuation with distance are to some extent predictable, so that birds, like humans, have been shown to use cues from degradation and attenuation as distance cues (Figure 8). This can be crucial for an effective defense of large territories against rival males (Naguib and Wiley, 2001). Because they can assess the distance to a singing rival, males need only invest time and energy in repelling a rival that is nearby and therefore is a likely threat; energy need not be wasted when the rival is far away and beyond the territorial boundary.

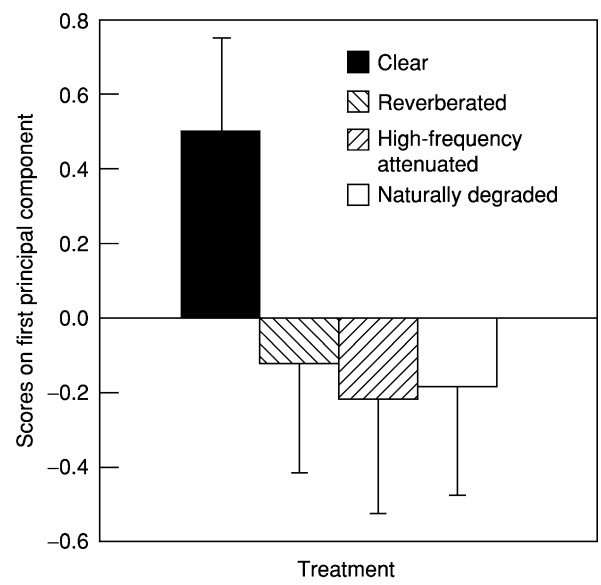

Figure 8 Response scores of Carolina wrens to playback of undegraded (clear) song and song with added distance cues. Scores on the principal component (shown on the *Y* axis) indicate strength of response. Birds, like humans, use reverberation and high-frequency attenuation as separate cues to distance. Reproduced from Naguib M (1995), *Animal Behaviour 50*, 1297–1307.

Territorial Function and Communication among Males

Song in most passerine birds is used as a territorial signal, i.e., to advertise an area that will be defended against rival males. In a classic study on the territorial function of birdsong, Krebs and colleagues (Krebs, 1977) removed male great tits from their territories; installed loudspeakers then played recorded conspecific song or a control sound, or no sound was broadcast (Figure 9). Territories in which no song or the control song (a tune on a tin whistle) was broadcast were occupied by new males earlier than when conspecific songs were broadcast. This and subsequent experiments provided convincing evidence that male song keeps out rival males. Moreover,

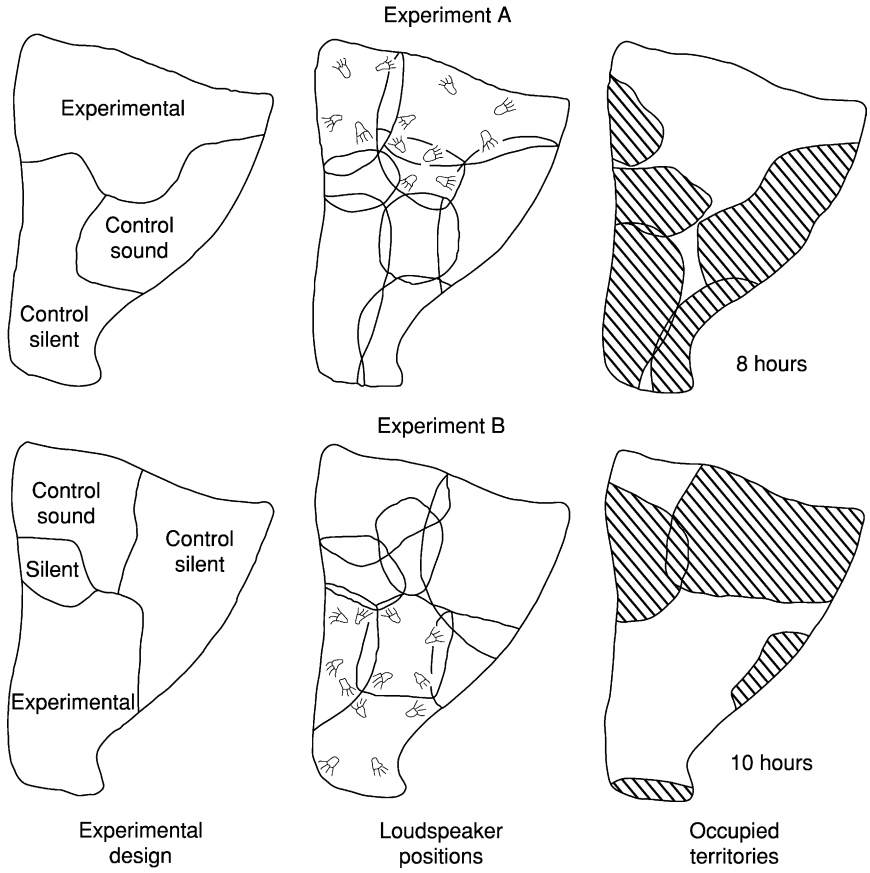

Figure 9 Schematic representation of a classic experiment on the territorial function of song in great tits. Males were removed from their territory and were replaced by loudspeakers either playing great tit songs ('experimental') or playing back a control stimulus, or no stimulus was broadcast. Shaded areas on the right indicate re-occupation of the territory by other males after 8 or 10 hours. Males settle only in those areas ('control silent', 'control sound') in which no great tit songs were broadcast. Redrawn from Krebs J R and Davies N B (1992), *An introduction to behavioural ecology*, Oxford: Blackwell Scientific.

playback experiments in the field and observations of undisturbed singing in different contexts have shown that males obtain important information from a rival's song on which they base their decision on how to respond to that rival. As in all social behavior, individual specific information is of central relevance when repeated encounters occur. Birds can use such information to distinguish between familiar and unfamiliar individuals. Moreover, males discriminate not only between neighbors and strangers, but also become more aggressive when they hear their neighbor's song from the opposite side of their territory (Figure 10). Thus, information on familiarity with song is linked to a location from which it is usually heard. The reduced response to a neighbor's song when received from the 'correct' direction is termed the 'dear enemy effect' (Stoddard, 1996). Neighbors are rivals in competition for space and matings, but, once a relation is established, neighboring males benefit by reduced aggression toward each other. In addition, neighbors also can act as an early warning system when a stranger starts singing somewhere in the territorial neighborhood, an issue that has received specific attention in studies using birdsong as a model in investigating communication networks (Naguib, 2005; Peake, 2005).

During territorial conflicts, males can signal their readiness to escalate a contest by a range of different singing strategies. There is variation within and among species as to which strategy has which signal value (Todt and Naguib, 2000). Males may time their songs during an interaction so that they overlap songs of their opponent. In almost all species studied to date, song overlapping is used and perceived as an agonistic signal. Another way of agonistically addressing a rival is to match his song type, i.e., to reply with the same song pattern the rival has just sung. Song rate and the rate of switching among different song types can likewise signal changing levels of arousal. In barn swallows (*Hirundo rustica*), the structure of the song can be correlated with levels of testosterone (Figure 11), and thus song may be used as a predictor of fighting vigor. The importance of song in territory defense also may vary with time of the season and

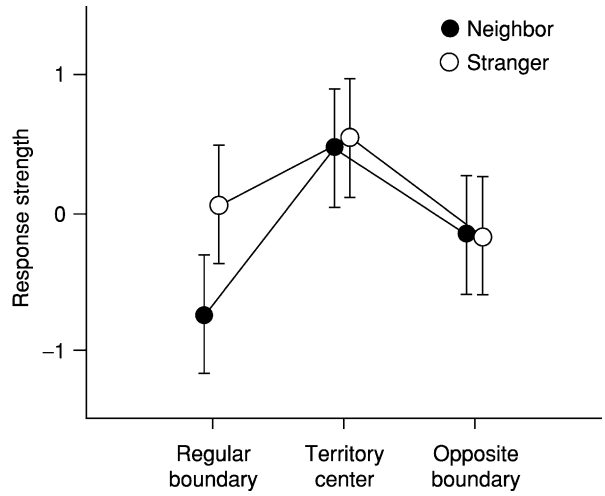

Figure 10 Response strength of male territorial song sparrows to playback, at different locations in their territory, of song of neighbors and strangers. Neighbor/stranger discrimination usually occurs only at the boundary toward the territory of the neighbor whose song is broadcast. At the center of a territory or at the opposite boundary, no discrimination is observed, suggesting that intrusions at these sites are assessed as equally threatening regardless of the identity of the intruder. Redrawn from Stoddard P K *et al.* (1991), *Behavioural Ecology and Sociobiology 29*, 211–215.

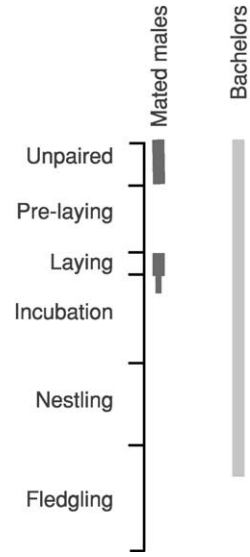

Figure 12 Nocturnal singing activity of male nightingales. Bars indicate the period of the breeding cycle when males sing at night. Males cease nocturnal song after pairing but resume it when their females lay eggs. Males that remain unpaired ('bachelors') continue nocturnal song throughout the entire breeding season (bachelors, $N = 12$; mated males, $N = 18$). Modified from Amrhein *et al.* (2002), *Animal Behaviour 64*, 939–944.

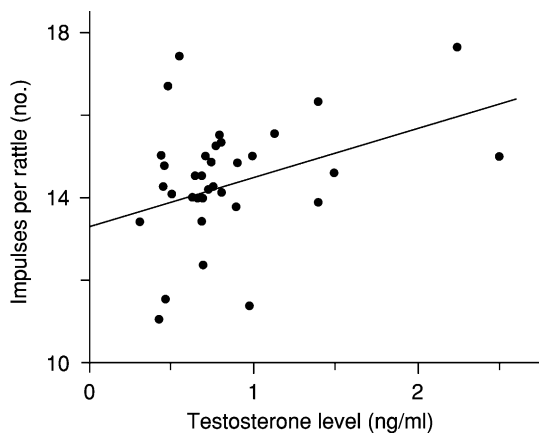

Figure 11 Relation between levels of plasma testosterone and number of impulses per rattle in barn swallow songs. Males with more impulses in the rattles of their song had higher testosterone levels, suggesting that song codes information on the physiological state of the singer. Redrawn from Galeotti P *et al.* (1997), *Animal Behaviour 53*, 687–700.

with time of the day. The dawn chorus, for instance, a marked peak of singing activity early in the morning in many temperate-zone songbirds, has a specific function in territory defense in some species (Staicer *et al.*, 1996).

Function in Mate Attraction

Song provides information on male motivation and quality and there is now good evidence that females use this information for pairing and mating decisions. Females may choose a male partner on the basis of his song and, once paired, still mate additionally with other males with more attractive song, in so-called extra-pair copulations. There are two lines of evidence showing the function of song in female choice. Field studies have shown that song traits are linked to mating success and to paternity, and laboratory studies have shown that females are more responsive to specific song traits. In many bird species, males change their singing behavior after pairing, suggesting that the function of song differs between the period of mate attraction and the period thereafter. Many warblers show a marked decrease in singing activity after pairing, and nocturnally singing birds such as the nightingale cease nocturnal song the day after a female has settled within their territory (Amrhein *et al.*, 2002) (Figure 12).

Sedge warbler (*Acrocephalus schoenobaenus*) males become paired earlier when they have large vocal repertoires (Figure 13), suggesting that repertoire size is a trait used by females in mating decisions. Great reed warbler (*Acrocephalus arundinaceus*) females exhibit more display behavior in response to complex songs than to simple ones (Figure 14) and have been shown to copulate only with those neighboring males that have a song repertoire larger than their social mate has (Figure 15). Dusky warblers (*Phylloscopus fuscatus*) that produce song elements at a higher relative amplitude gain more extra-pair matings than do

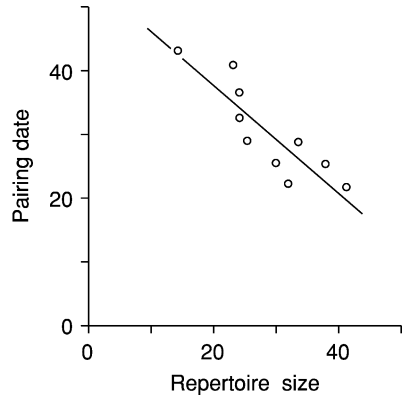

Figure 13 Pairing and song repertoire in sedge warblers. Males with larger song repertoires pair earlier, suggesting that song repertoire is used in female choice. Redrawn from Catchpole C (1980), *Behaviour 74*, 149–166.

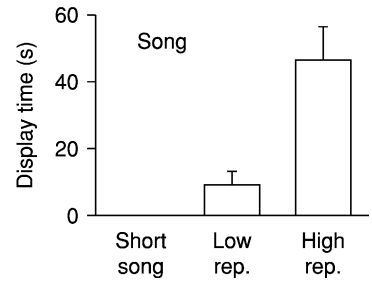

Figure 14 Female copulation solicitation displays in response to playback of songs of different complexity in great reed warblers. Female displays last longer in response to larger song repertoires, suggesting that males with larger song repertoires are more attractive. Redrawn from Catchpole C *et al.* (1986), *Ethology 73*, 69–77.

males that sing their elements 'less well'. Furthermore, studies have shown that males usually increase their song output when their mate disappears or is removed experimentally. In addition, studies under controlled laboratory conditions have shown that females show strong preferences for specific song traits. Females show more copulation solicitation displays (a specific posture females use to elicit copulations) when hearing large song repertoires than when hearing smaller, less complex song repertoires, as in great reed warblers (Figure 14). In canaries, a substructure of the song, a complex syllable category (a trill), has been identified as a 'sexy syllable' to which females pay specific attention. More recent studies have used operant techniques in which females were allowed to peck a key to release playback of songs of different complexity, and with this technique it is possible to test female preference for song in more detail (Riebel, 2003).

Comparison to Human Speech

Both human speech and birdsong consist of finite sets of smaller units (humans: phonemes; birds: elements or syllables) that are arranged by a species-specific combinatorial system into larger units (humans: words and sentences; birds: phrases and songs). Despite the very different functions fulfilled by birdsong (territorial and mate-attracting signal) and human speech (physical carrier of human language), there are many parallels. Both types of communication are acquired by a form of channeled social learning, whereby some sounds are more likely to be copied than others. Learning of speech by humans and song by birds takes place without obvious external reward, occurs at specific phases during development, and relies on auditory feedback and a prolonged phase of motor learning (birds: subsong; humans: babbling). As in the (prelinguistic) acquisition of phonemes in humans, in birds a sensory learning phase precedes the first production attempts. Babbling babies, like young birds, undergo a long phase of motor practice during which initial phonological (over)production moves toward producing phonological units that become more and more similar to the phonologies that are heard. In human speech acquisition, learning to produce the phonetic units precedes the mapping of meaning onto these units. It is thus in the acquisition of auditory memories and in the first (prelinguistic) phase of motor learning that birdsong and speech development can perhaps best be seen as an analogue.

Next to similarities on the behavioral level, highly specialized brain regions control vocal learning, memory, production, and perception, both in human speech and in birdsong. Songbirds' vocal learning ability is mirrored in highly specialized forebrain areas solely dedicated to the acquisition and perception of vocalizations and to the control of the complex motor patterns underlying song. Both song and speech acquisition have sensitive periods during which learning is greatly enhanced and sensory experience leads to learned representations guiding vocal output via complex feedback mechanisms. Increasing experience and sub-adult hormonal changes later slow down or stop further acquisition learning. These similarities of the acquisition of vocal units suggest that similar neural mechanisms might underlie vocal learning in birds and in humans. In line with this, studies on functional morphology of the bird brain now suggest that avian forebrain areas are functionally much more equivalent to mammalian forebrain areas than previously thought. Moreover, central and peripheral control of both song and speech show lateralization, which is a clear indication of evolutionarily highly derived systems. Birdsong phonology is often highly complex and can show

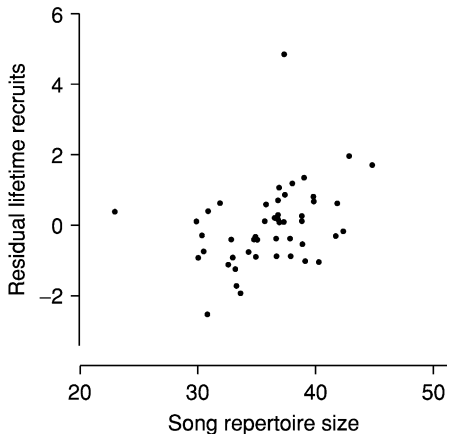

Figure 15 Relation between male song repertoire and survival of their offspring in great reed warblers. Offspring survival (measured as recruits to the next year's breeding population) is positively related to the father's song repertoire size, suggesting that song repertoire is an indicator of male quality. Data from Hasselquist *et al.* (1996), *Nature 381*, 229–232.

more than one hierarchical level (elements show specific associations resulting in phrases and songs; these higher units will also show nonrandom sequential organization). However, in birdsong there is no evidence of the recursiveness (the embedding of units of the same hierarchical category within each other) that is found in human language. Moreover, alternative combinations of units do not normally create different semantic meanings, except in a very limited sense: Different combinations of units may code for general information such as species, age, gender, and motivation. Song is thus best seen as an analogue to human speech (not language) and to nonverbal aspects of acoustic communication. In this respect, it is a valuable model for comparative studies (Doupe and Kuhl, 1999; Hauser *et al.*, 2002) on mechanisms (behavioral, neurobiological, gene regulatory, and hormonal) as well as on the evolution of vocal learning (Fitch, 2000). In addition, how learning processes affect diachronic change and geographical variation of signaling provides interesting opportunities for comparative research into gene-culture co-evolutionary processes (*see* **Dialects in Birdsongs**).

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Communication in Grey Parrots; Communication in Marine Mammals; Development of Communication in Animals; Dialects in Birdsongs; Fish Communication; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Traditions in Animals; Vocal Production in Birds.

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Bislama

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Bislama, an English-lexifier pidgin-creole, is the national language of Vanuatu, a republic in the southwest Pacific within the region of Melanesia. Along with English and French, it is also one of the official languages of the country. As the national language, it is spoken by the majority of the population as either a first or second language. There are as many as 100 distinct languages spoken in Vanuatu (81 actively spoken languages according to Lynch and Crowley, 2001) for a population of only 186 678 (1999 census), and as a result Bislama is vital as a lingua franca between speakers of different language groups. In urban areas and even in some rural areas, it is fast becoming the main language used in daily life. According to the 1999 census, in urban areas, where there is a great deal of intermarriage, Bislama is the main language used at home in 58% of households; in rural areas, this figure is considerably lower, at 13.3%. However, even in the most remote areas of the country only a minority of elderly people are not fluent in Bislama. Currently, English and French are the principal languages of education in Vanuatu and Bislama is generally banned in schools. However, Bislama is used for many other government and community services. For example, the majority of radio broadcasts are in Bislama, although only some of the content of newspapers is published in Bislama. Parliamentary debates are conducted in the language, as are local island court cases.

Bislama is a dialect of Melanesian Pidgin, mutually intelligible with Solomons Pijin (Pijin), spoken in Solomon Islands, and Tok Pisin, spoken in Papua New Guinea. Thus, the language is not just an important lingua franca of Vanuatu, but also a common regional language that allows for communication among most peoples of Melanesia. Only in New Caledonia is Melanesian Pidgin not spoken.

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Bislama, an English-lexifier pidgin-creole, is the national language of Vanuatu, a republic in the southwest Pacific within the region of Melanesia. Along with English and French, it is also one of the official languages of the country. As the national language, it is spoken by the majority of the population as either a first or second language. There are as many as 100 distinct languages spoken in Vanuatu (81 actively spoken languages according to Lynch and Crowley, 2001) for a population of only 186 678 (1999 census), and as a result Bislama is vital as a lingua franca between speakers of different language groups. In urban areas and even in some rural areas, it is fast becoming the main language used in daily life. According to the 1999 census, in urban areas, where there is a great deal of intermarriage, Bislama is the main language used at home in 58% of households; in rural areas, this figure is considerably lower, at 13.3%. However, even in the most remote areas of the country only a minority of elderly people are not fluent in Bislama. Currently, English and French are the principal languages of education in Vanuatu and Bislama is generally banned in schools. However, Bislama is used for many other government and community services. For example, the majority of radio broadcasts are in Bislama, although only some of the content of newspapers is published in Bislama. Parliamentary debates are conducted in the language, as are local island court cases.

Bislama is a dialect of Melanesian Pidgin, mutually intelligible with Solomons Pijin (Pijin), spoken in Solomon Islands, and Tok Pisin, spoken in Papua New Guinea. Thus, the language is not just an important lingua franca of Vanuatu, but also a common regional language that allows for communication among most peoples of Melanesia. Only in New Caledonia is Melanesian Pidgin not spoken.

The formation and development of Bislama, and of Melanesian Pidgin generally, took place within Vanuatu and other regions of Melanesia and also in Australia and other countries of the Pacific. A pidgin first started to emerge in Vanuatu (known as the New Hebrides at the time) in the mid-1800s as a result of the sandalwood and sea slug trade. Further development took place in the second half of the 19th century, with increasing numbers of Ni-Vanuatu being recruited to work on plantations both inside Vanuatu and in other areas of the Pacific, particularly in the sugarcane plantations of Queensland and Fiji (Crowley, 1990a). During the early decades of the 20th century, the language stabilized, such that its structure today is very close to what it was then. The status of and need for Bislama as a lingua franca within the country increased in the period leading up to independence in 1980, to the extent that today it has become the unifying language of the nation.

The majority of the Bislama lexicon, approximately 84–90%, is derived from English, reflecting its history of development alongside English-speaking traders, plantation owners, and colonists. Only approximately 3.75% of the vocabulary originates from the vernacular languages and 6–12% derives from French (Crowley, 2004). Of those words that derive from local languages, the majority describe cultural artifacts and concepts and endemic floral and faunal species that have no common names in English, such as *nasara* 'ceremonial ground,' *navele* '*Barringtonia edulis*,' and *nambilak* 'buff-banded rail.' Note that many of these words start with *na-*, the form of an article or noun marker in many Vanuatu languages.

Although the majority of the lexicon is derived from English, the grammar of Bislama is greatly influenced by the vernacular languages. For example, in the pronominal system there is an inclusive-exclusive distinction in the first person, *yumi* 'we (inclusive)' is distinguished from *mifala* 'we (exclusive).' Dual and trial number is also distinguished from the plural, as *yutufala* 'you (two),' *yutrifala* 'you (three),' and *yufala* 'you (pl.).' Another feature that Bislama inherits from the substratum languages is reduplication. Reduplication is a productive process for both verbs and adjectives, but it is rarer for nouns. In verbs, reduplication can mark an action as being continuous, habitual, reciprocal, or random. It can mark intensity in both verbs and adjectives, and it also marks plurality in adjectives.

Like English and many Vanuatu languages, Bislama is characterized by AVO/SV word order, and this is the only means of recognizing the subject and object of the clause. Peripheral arguments are marked by prepositions. The preposition *long* has a wide general use; it marks the locative, allative, ablative, and dative. It can also mark the object of comparison in a comparative construction, the instrumental, and a number of other less easily defined functions. The preposition *blong* also has a number of functions, marking the possessor in a possessive construction, a part-whole relationship, and a purposive role. Prepositions marking other semantic roles are *wetem* 'with' (instrumental and comitative), *from* 'for, because of' (reason), and *olsem* 'like' (similitive).

As is true of most pidgin languages, there is little marking of tense, aspect, and mood. The preverbal markers *bin* and *bae* mark the past and future tense, respectively. However, it is possible for an unmarked verb, preceded only by its subject, to indicate either past, present, or future tense, depending on the context. A number of auxiliaries also occur, with aspectual or modal functions, such as *stap,* marking a continuous or habitual action; *mas* 'must'; *save* 'be able'; and *wantem* 'want.' Verb serialization is a productive process in Bislama, encoding various meanings and functions such as a cause-effect relationship; a causative; or direction, position, or manner of action.

See also: Central Solomon Languages; Papua New Guinea: Language Situation; Pidgins and Creoles: Overview; Solomon Islands: Language Situation; Tok Pisin; Vanuatu: Language Situation.

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Black Islam

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The involvement of black Americans with Islam reaches back to the earliest days of the African presence in North America. The history of black Islam in the United States includes successive and varied presentations of the religion that document black Americans' struggles to define themselves independently in the context of global Islam. This article is a historical sketch of black Islam that focuses on the following topics: Islam and transatlantic slavery, early 20th-century mainstream communities, early 20th-century racial separatist communities, and mainstream Islam in contemporary black America.

Islam and Transatlantic Slavery

Muslim slaves – involuntary immigrants who had been the urban-ruling elite in West Africa, constituted at least 15% of the slave population in the United States in the 18th and 19th centuries. Their religious and ethnic roots could be traced to ancient black kingdoms in Ghana, Mali, and Songhay. Some of these West African Muslim slaves brought the first mainstream Islamic beliefs and practices to America by keeping Islamic names, writing in Arabic, fasting during the month of Ramadan, praying five times a day, wearing Muslim clothing, and writing and reciting the Qur'an.

The fascinating portrait of a West African Muslim slave in the United States who retained mainstream Islamic practices was that of a Georgia Sea Island slave, Bilali. He was one of at least 20 black Muslims who are reported to have lived and practiced their religion in Sapelo and St. Simon's Islands during the antebellum period. This area provided fertile ground for mainstream Islamic continuities because of its relative isolation from Euro-American influences. Bilali was noted for his religious devotion: for wearing Islamic clothing, for his Muslim name, and for his ability to write and speak Arabic. Islamic traditions in his family were retained for at least three generations.

Fascinating portraits of outstanding African Muslim slaves in the United States, which exist in the historical literature, also include Job Ben Solomon (1700–1773), a Maryland slave of Fuble Muslim origins; Georgetown, Virginia, slave Yarrow Mamout, who was close to 100 years old when his portrait was painted by Charles Wilson Peale; Abd al-Rahman Ibrahima (1762–1825), a Muslim prince in Futa Jallon, who was enslaved in Mississippi; Omar Ibn Said (1770–1864), a Fuble Muslim scholar who was a slave in North Carolina and pretended a conversion to Christianity; and numerous others.

By the eve of the Civil War, the black Islam of the West African Muslim slaves was, for all practical purposes defunct, because these Muslims were not able to develop community institutions to perpetuate their religion. When they died, their presentation of Islam, which was West African, private, with mainstream practices, disappeared. But they were important nonetheless, because they brought black Islam to America.

Early 20th-Century Mainstream Communities

In the late 19th century, the Pan-Africanist ideas of a Presbyterian minister in Liberia, Edward Wilmot Blyden (1832–1912), which critiqued Christianity for its racism and suggested Islam as a viable religious alternative for black Americans, provided the political framework for Islam's appeal to black Americans in the early 20th century. Moreover, the internationalist perspective of Marcus Garvey's Universal Negro Improvement Association and the Great Migration of more than one million black southerners to northern and midwestern cities during the World War I era provided the social and political environment for the rise of black American mainstream communities from the 1920s to the 1940s. The Ahmadiyya Movement in Islam, a heterodox missionary community from India, laid the groundwork for mainstream Islam in black America by providing black Americans with their first Qur'ans, important Islamic literature and education, and linkages to the world of Islam.

Mufti Muhammad Sadiq, the first Ahmadiyya missionary to the United States, established the American headquarters of the community in Chicago in 1920. He recruited many of his earliest black American converts from the ranks of Marcus Garvey's Universal Negro Improvement Association. By the mid-1920s, Sadiq and black American converts, such as Brother Ahmad Din and Sister Noor, had established *The Muslim Sunrise*, the first Islamic newspaper in the United States, and thriving multiracial communities in Detroit, Michigan; Gary, Indiana; and St. Louis, Missouri.

There were several dynamic early 20th-century communities to which black American Sunni Muslims can trace their roots. These communities – the Islamic Mission to America, Jabul Arabiyya, and the First Cleveland Mosque – were influenced by Muslim

immigrants and their own constructed presentations of mainstream Islam in black communities.

Four things influenced the Islamic Mission to America in New York City: the local Muslim immigrant community; Muslim sailors from Yemen, Somalia, and Madagascar; the Ahmadi translation of the Qur'an; and the black American community. Shiek Daoud was born in Morocco and came to the United States from Trinidad. Daoud's wife, 'Mother' Sayeda Kadija, who had Pakistani Muslim and Barbadian roots, became president of the Muslim Ladies Cultural Society. The Islamic Mission to America published its own literature about mainstream Islam. Sheik Daoud believed that black American Muslims should change themselves not only spiritually, but also in "language, dress, and customs" to connect them to Islamic civilization and revivalism in Asia and Africa. Daoud immersed himself in the complex experiences of, and boundaries between, Muslim immigrants and black converts to Islam in New York City and Brooklyn from the 1920s to the 1960s.

Muhammad Ezaldeen, an English teacher and principal, was a Moorish Science Temple member in Newark, New Jersey, in the 1920s. After several years of Arabic and Islamic studies in Egypt, he returned to the United States to promote the Islamic connections between Arab and black American culture in the Adenu Allahe Universal Arabic Association. In 1938, he and his followers established Jabul Arabiyya, a Sunni Muslim community ruled by Islamic law in rural West Valley, New York. Communities of this association were founded in New Jersey (Ezaldeen Village); Jacksonville, Florida; Rochester, New York; Philadelphia, Pennsylvania; and Detroit, Michigan. These communities emphasized the hijra – the movement of early Arabian Muslims from Mecca to Medina in 622 C.E. – as the centerpiece of their spiritual philosophy.

Tensions between black American and immigrant leaders in the Ahmadiyya Movement in Islam resulted in the establishment of the Sunni First Cleveland Mosque by Imam Wali Akram in 1936 and the First Muslim Mosque in Pittsburgh by Nasir Ahmad and Saeed Akmal in the same period. Wali Akram was one of the first black American Muslim converts to sever all ties with the immigrant community in order to establish mainstream Islam in a black American community. The imam and his wife, Kareema, learned Arabic and taught the language and the recitation of the Qur'an to black converts. One of Akram's unique contributions to the black American community was the Muslim Ten Year Plan, which utilized the faith and discipline of Sunni Islam to get black people off welfare and to make black American Muslim communities economically and socially self-sufficient.

In 1943, Wali Akram conducted the first session of the Uniting Islamic Society of America in Philadelphia. This national group was established to unify disparate black American mainstream organizations against the agenda of foreign Muslims. The Uniting Islamic Society of America met several times from 1943 to 1947 to develop a united platform on doctrine, politics, women's issues, leadership, and relations with the immigrant community. Ultimately, this organization failed because of personality conflicts and different visions of the black American mainstream Islamic community.

The grassroots work of these mainstream groups with their emphasis on study of the Arabic language and the Qur'an, the transformation of domestic space and community life, adoption of Islamic dress and customs, and cosmopolitan travels to Egypt, Morocco, Trinidad, India, Barbados, Jamaica, and New York City are key to understanding the Muslim lifestyles of these early Sunni black American converts as expressions of global Islam. These early black American Sunni communities were overshadowed by the successful missionary work of the heterodox Ahmadiyya movement and later by the ascendancy of the Nation of Islam in the 1950s. Mainstream Islam did not become a popular option for black American Muslims until the 1960s.

Early 20th-Century Racial Separatist Communities

Noble Drew Ali (1886–1929) was the founder of the Moorish Science Temple of America in Newark, New Jersey, in 1913. This was the first mass religious community in the history of black American Islam and the black nationalist model for the Nation of Islam. In the late 1920s, the Moorish American community in the United States grew to approximately 30 000 members and was the largest Islamic community in the United States before the ascendancy of the Nation of Islam in the 1950s.

The Moorish Americans, who established branches of their community in several northern cities and made their headquarters in Chicago in the 1920s, claimed to be descendants of Moroccan Muslims and constructed a nationalist identity by changing their names, nationality, religion, diet, and dress. Their esoteric spiritual philosophy was constructed from Islam, Christianity, and black Freemasonry. In 1927, Ali wrote their sacred text, the *Holy Koran of the Moorish Science Temple*, also called the *Circle Seven Koran*, to teach his followers their preslavery religion, nationality, and genealogy. To support his

case for a Moorish American identity, he emphasized two important points: first, black Americans were really 'Asiatics' – the descendants of Jesus, and second, the destiny of western civilization was linked to the rise of the 'Asiatic' nation – Asians, Africans, Native Americans, and black Americans.

In the *Holy Koran of the Moorish Science Temple*, Noble Drew Ali also argued that truth, peace, freedom, justice, and love were the Islamic ideals that his followers should emulate. The Moorish Science Temple survived in factions after Noble Drew Ali's mysterious death in 1929 and received official recognition for its Islamic linkages to Morocco from the Moroccan ambassador to the United States in 1986. Major communities exist today in Baltimore, Pittsburgh, and Los Angeles.

The Nation of Islam began in Detroit, Michigan, in 1930 as the Allah Temple of Islam – a small black nationalist Islamic movement founded by W. D. Fard, an immigrant Muslim missionary, who preached a philosophy of political self-determination and racial separatism to the newly arrived black southerners of the Great Migration. Fard believed that Western civilization would soon end in a race war, and he established an institutional framework – the Fruit of Islam, The Muslim Girls Training Corps, and the University of Islam to separate black Muslims from white Christian America. Although his ethnic and Islamic identity remains undocumented, Fard might have been a Druze, a sectarian branch of the Ismaili Shii Muslims, who have a long documented tradition of human divinity and esoteric interpretations of the Qur'an.

A victim of police brutality, he disappeared mysteriously in 1934, after he assigned leadership of his community to Elijah Muhammad (1897–1975), who led the Nation of Islam from 1934 to 1975 from its Chicago headquarters and was an important figure in the development of black nationalism and Islam among black Americans in the 20th century. The members of the Nation of Islam believed that their descendants were the Asiatics, who were the original Muslims and the first inhabitants of the earth, and they claimed a divine identity for their founder, W. D. Fard, and prophetic status for Elijah Muhammad.

During World War II, the Nation of Islam's membership decreased dramatically as Elijah Muhammad and his son, Herbert, became involved politically with Satokata Takahashi, a Japanese national organizer among black Americans, and they were prisoners in the federal penitentiary in Milan, Michigan, from 1943 to 1946. In the 1950s and 1960s, as black Americans and Africans cracked the political power of white supremacy in the United States and abroad, Elijah Muhammad's institutional quest for economic power made the Nation of Islam into the wealthiest black organization in American history. In this era, the Nation of Islam provided a community model and political inspiration for the black power movement. Malcolm X's phenomenal organizing efforts among young lower-class black men and women in the northern cities created powerful constituencies for the Nation of Islam across the United States, and the *Muhammad Speaks* newspaper, which was edited by a leftward-leaning staff, provided exemplary coverage of international news and anticolonial struggles in Asia and Africa. Malcolm X provided a powerful message of racial separatism, self-discipline, and black community development in the midst of the integrationist strategies and nonviolent demonstrations of the civil rights movement. However, as the political tactics and strategies of the civil rights and the black power movements became more sophisticated Elijah Muhammad's economic agenda for his community resulted in a conservative vision regarding political activism; this was one of the primary factors that led to Malcolm X's departure from the Nation of Islam.

In the wake of President Kennedy's assassination in 1963, a public controversy between Elijah Muhammad and Malcolm X evolved into a permanent separation. Establishing a new spiritual and political identity, Malcolm abandoned the heterodox, racial-separatist philosophy of the Nation of Islam and converted to multiracial Sunni Islam during the last year of his life.

In March, 1964, he founded the Sunni Muslim Mosque, Inc. in Harlem as the base for a spiritual program to eliminate economic and social oppression against black Americans. Then, Malcolm made the hajj, the Islamic pilgrimage to Mecca, Saudi Arabia, in April 1964. There, he changed his name from Malcolm X to El Hajj Malik El-Shabazz, which signified the adoption of a new identity that was linked to mainstream Islam. Malcolm's Sunni Islamic identity became a significant model for many black Americans who have converted to mainstream Islam since the 1960s.

After Mecca, Malcolm traveled extensively through North and West Africa establishing important religious and political linkages with Third World nations. These profound international experiences deepened his Pan-African political perspective. When Malcolm returned to the United States, he founded the Organization of Afro-American Unity in New York City on June 29, 1964, to promote his political perspective, which linked the black American struggle for social justice to global human rights issues in Africa, Asia, Latin America, and the Caribbean.

During the final weeks of Malcolm's life in 1965, he began to talk about the black American freedom struggle as an aspect of "a worldwide revolution" against racism, corporate racism, classism, and sexism. Because of his potential (if he had lived) to unite many black Muslims and black Christians in America and abroad in a global liberation struggle that could have involved the United Nations, there is no question that the American intelligence community had the incentive to be involved in Malcolm X's murder.

Since 1978, Louis Farrakhan has led the revived Nation of Islam and published the *Final Call* newspaper. Farrakhan speaks fluent Arabic and travels frequently to the Middle East and West Africa to promote the issues of black American Muslims. His greatest achievement as leader of the Nation of Islam was the Million Man March in 1995, which brought the healing spirit of Islam to more than one million black men who gathered in Washington, D.C. This was the largest political gathering of black Americans in American history. On Saviours' Day in Chicago in February 2000, Farrakhan announced changes in the Nation of Islam's theology and ritual practices that will bring his community closer to the center of mainstream Islam in North America.

Major factions of the Nation of Islam are led by John Muhammad in Highland Park, Michigan; Silis Muhammad in Atlanta, Georgia; and Emmanuel Muhammad in Baltimore, Maryland. The Five Percenters, also called the Nation of Gods and Earths, are popular among rap musicians and the hip-hop community; they were founded by Clarence 13X in New York City in 1964.

Mainstream Islam in Contemporary Black America

Large numbers of black Americans have turned to mainstream Islamic practices and communities since Malcolm X's conversion to Sunni Islam in 1964. Like Malcolm X, black American Sunni Muslims see themselves as part of the mainstream Muslim community in the world of Islam and study Arabic, fast during the month of Ramadan, pray five times a day, make the hajj to Mecca, practice charity and social justice, and believe in one God and Muhammad as his last prophet. The dramatic growth of mainstream Islam in black America is also related to the arrival of more than three million Muslims in the United States after the American immigration laws were reformed in 1965.

Elijah Muhammad's son, Warith Deen Mohammed, has played an important role within mainstream Islam in the United States. He became the Supreme Minister of the Nation of Islam after his father's death in 1975. During the first years of his leadership, he mandated sweeping changes, which he called the "Second Resurrection" of black Americans, in order to align his community with mainstream Islam. He refuted the Nation of Islam's racial-separatist teachings and praised his father for achieving the "First Resurrection" of black Americans by introducing them to Islam. But now the community's mission was directed not only at black Americans, but also at the entire American environment. The new leader renamed the Nation of Islam the "World Community of Al-Islam in the West" in 1976; the American Muslim Mission in 1980; and the "American Society of Muslims" in the 1990s. Ministers of Islam were renamed 'imams', and temples were renamed 'mosques' and 'masjids'. The community's lucrative financial holdings were liquidated, and mainstream rituals and customs were adopted. Although Warith Deen Mohammed's positive relationships with immigrant Muslims, the world of Islam, and the American government are important developments in the history of mainstream Islam in the United States, his group has diminished in members since the 1980s, and he resigned as the leader of the American Society of Muslims in 2003. In the wake of Mohammed's departure, Mustafa El-Amin, a black American imam in Newark, New Jersey, has attempted to revive this black mainstream Islamic community.

Darul Islam, founded in Brooklyn, New York, in 1962 and having branches in many major American cities, is probably the largest and most influential community of black American Sunni Muslims. Prestige and leadership are based on knowledge of the Qur'an, the hadith, and the Arabic language. Darul Islam is a private decentralized community, which did not allow immigrants in its midst until the mid–1970s. The Hanafi Madh-hab Center, founded by Hammas Abdul Khalis in the 1960s, is a black American Sunni group that made headlines in the 1970s because of its conversion of the basketball star Kareem Abdul Jabbar and the assassination of Khalis's family in their Washington, D.C., headquarters. Siraj Wahhaj leads an important black Sunni community in Bedford Stuyvesant in Brooklyn, New York.

Although black American Muslims populate multiethnic Sunni masjids and organizations across the United States, reportedly there are subtle racial and ethnic tensions between black American and immigrant Muslims. Immigrant Muslims talk about 'a color- and race-blind Islam' and the American dream, whereas black American Muslims continue to place Islam at the forefront of the struggles for social justice, as the United States has entered a new century of frightening racial profiling and violence

in a post–September 11 world. Certainly, black American and immigrant Muslims have a lot to learn from each other and need to present a united front on social justice issues, as mainstream Islam's appeal and ascendancy in the United States in this century may depend on American Muslims' ability to claim a moral and political high ground on social justice and racial issues that have historically divided the American Christian population. In the wake of post–September 11 legislation, such as U.S. Patriot Act that has enabled the detention of Muslim immigrants and Muslim Americans, black American Muslims are probably in the strongest position to refute arguments that claim there is a clash of civilizations between Islam and the West because of the ethnic group's history of contributions to the American experience.

Although there are no conclusive statistics, some observers estimate that there are six to seven million Muslims in the United States and that black American Muslims comprise 42% of the total population. Finally, the future of American Muslim communities in the 21st century may be determined significantly by the conversion experiences and social-political perspectives of young black Americans. According to *A report from the Mosque Study Project 2000*, published by the Council on American–Islamic Relations, black Americans constitute the largest percentile of the yearly converts to mainstream Islam, and many of these converts are young black men and women who reside in urban locations.

See also: Islam in Africa; Islam in East Asia; Islam in Southeast Asia; Islam in the Near East; New Religious Movements; Religion: Overview.

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Blaming and Denying: Pragmatics

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Definition of Terms

Blaming and denying, frequent and constitutive features of conflict talk, are expressed in many different direct or indirect linguistic modes, depending on the specific broad and narrow contexts of the conversations, on the functions of the utterances, and on the formality of the interactions. Moreover, the usages and functions of blaming and denying are dealt with in many disciplines (psychoanalysis, sociopsychology, political sciences, sociology, anthropology, psychiatry, linguistics, argumentation studies, history, and so forth). For example, the specifics of blaming and denying can be related to psychological and psychiatric syndromes, wherein certain patterns are viewed as compulsive and out of control, and to political debates and persuasive discourses, in which blaming and denying, by serving to promote one group and to debase or attack the opposition, are carefully and strategically planned and serve positive self-presentation and negative other-presentation. Thus, the linguistic analysis of those verbal practices that construct a dynamic of 'justification discourses' requires methodologies that are adequate for the specific genre and context (speech act theory, conversation analysis, discourse analysis, text linguistics, argumentation analysis, rhetoric, and so forth) (for overviews of some important features of conflict talk in specific domains from varying perspectives, see Austin, 1956/1957; Gruber, 1996; Kopperschmidt, 2000) (*see also* **Discourse Markers; Psychoanalysis and Language**).

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The Use of Blaming and Denying: Domains and Genres

Blaming and denying occur both in private, intimate conversations and in the domains of politics, the law, and the media. Linguistic manifestations depend on the choice of genre and on the formality/informality of the settings. For example, studies on racist or anti-Semitic discourses show that the more informal the setting (anonymous conversations, conversations with friends, or e-mail postings), the more likely the use of abusive language, derogatory terms, and discriminatory language. If the setting is more formal (for example, a televised debate or political speech), the wording of 'blaming' is mitigated, more indirect, and often introduced by disclaimers (*Some of my best friends are Jewish/Turks, but…*; *I love all people, but…*; and so forth), after which, the 'other' is attacked, often by a projection of guilt or by a turning of the tables (van Dijk, 1993; Wodak, 2004) (*see* **Mitigation**).

Justification discourses have been analyzed in studies dealing with court trials (Scott and Lyman, 1976; Alexy, 1996), relationships between parents and children (Wodak and Schulz, 1986), intimate relationships (Jacobson and Kettelhack, 1995; Dejudicibus and McCabe, 2001), media debates (Lamb and Keon, 1995; Dickerson, 1998), and the speeches, print media, slogans, and debates of election campaigns (Chilton, 2004); they have also been focused on in the police environment and other bureaucratic settings (Ehlich and Rehbein, 1986) and during proceedings in which official bodies have attempted to come to terms with traumatic past events (Ensink and Sauer, 2003; Martin and Wodak, 2003). One of the most significant manifestations of denial is 'Holocaust denial,' in which speakers and writers suggest evidence or arguments for their claim that the Holocaust never happened, being – in their opinion – invented by a (supposedly Jewish) conspiracy (Lipstadt, 1993). There is no doubt that such a denial serves many functions, probably primarily to reject (individual and/or collective) guilt by counterattacking an imaginary opponent.

Justification discourses are not restricted to oral, spontaneous texts; the same types of blaming and denying are also manifest in many written genres, reflecting the intentions and aims of the authors of newspaper articles, letters, party programs, election materials, or legal documents. The visual genres, especially caricature, lend themselves to justification discourses through the presentation of, and debate about, visual evidence (e.g., photos representing war crimes; see later).

The Linguistic/Pragmatic Analysis of Blaming and Denying

Depending on the genre, different linguistic and/or pragmatic approaches are used in analysis. Most obviously, speech act theory allows for the categorization of direct and indirect forms of blaming and denying in conversations or debates (*see* **Speech Acts**). In conversation analytic terms, blaming consists of two parts: on the one hand, a specific action is presented; on the other hand, there is the negative evaluation of this action, often an accusation. Gruber (1996) listed several important forms of these so-called 'adjacency pairs' (*see* **Conversation Analysis**). Accusations can either relate to situational factors or to factors that are outside of the specific setting. Either way, perceived violations of rules and norms may trigger the speech act of blaming. Moreover, accusations can be formulated either directly or indirectly, depending on the knowledge that the participants in the debate or conflict are supposed to possess.

Reacting to aggressive behavior, a defendant can either apologize and try to legitimize her/his actions through accounts, anecdotes, various kinds of evidence, and so forth (Scott and Lyman, 1968/1976), or the accusation can be rejected. Conversation analysts propose that rejection is the preferred mode of reaction (Pomerantz, 1978). Silence can also occur; this is usually interpreted as the accused acknowledging the legitimacy of the accusation. Sometimes, a counteraccusation may follow, or the accusation may be partially or completely denied. These patterns of speech acting can create a conversational dynamic that it is very difficult to overcome.

Argumentation analysis focuses on typical modes of arguments that are used in conflict talk. Certain *topoi* characterize blaming as well as denying; both the *topoi* and the fallacies are difficult to deconstruct, such that a rational debate becomes almost impossible. Many argumentative moves can be made while blaming an opponent, ranging from attacking the opponent personally (*argumentum ad hominem*) or threatening the opponent and his/her freedom of expression (*argumentum ad baculum*), to undermining the credibility of the opponent by showing that he/she does not adhere to the point of view that he/she publicly defends (*tu quoque*, a variant of the *ad hominem* argument) (for typical fallacies in conflict talk, see van Eemeren and Grootendorst, 1992; Reisigl and Wodak, 2001) (*see also* **Argument Structure**).

What holds for argumentation is also true of denials. Denials can occur as disclaimers (*I am not a racist, sexist, etc., but…*) or as direct rejections of

certain accusations; they can be formulated as counterattacks (identification with the aggressor), or as 'straw man' fallacies (when a fictitious standpoint is attributed to the opponent, or the opponent's actual standpoint is being distorted). Some of these fallacies have already been described in classical rhetoric (as in Aristotle's *De sophisticis elenchis*), wherein fallacies are defined as incorrect moves adopted in dispute to refute a thesis (see van Eemeren and Grootendorst, 2004) (*see also* **Rhetoric, Classical**).

Discourse analysis focuses on the strategies employed in blaming and denying. These strategies are realized linguistically in various, predictable ways, depending on the context. Moreover, mitigation and intensification markers are of obvious interest, because they serve to open or close options for debate and argument. Discursive strategies such as scapegoating, blaming the victim, blaming the messenger, victim–perpetrator reversal, the straw man fallacy, turning the tables, and so forth have been studied extensively; they all belong to the category of 'discourses of justification' (Wodak *et al.*, 1990; Van Leeuwen and Wodak, 1999). 'Strategy' is defined as a more or less detailed and directed plan of practices (including discursive practices), adopted to achieve a particular social, political, psychological, or linguistic aim. As far as discursive strategies, i.e., systematic ways of using language, are concerned, they are located at different levels of linguistic organization and complexity. Strategies, realized as macroconversational patterns or moves, are often used to structure public debates, such as on AIDS, poverty, economic problems, the welfare state, racism, xenophobia, and anti-Semitism; as well as on sexism and the representation of rape (Carlson, 1996; Maynard, 1998; Anderson *et al.*, 2001).

An Example: The War-Crimes Debate

Between 1995 and 2004, the Hamburg Institute for Social Research created and presented to the public two itinerant exhibitions, under the common denomination *Crimes of the German Wehrmacht* (see Heer *et al.* (2003); for an extensive analysis of the debates surrounding the exhibitions, as well as an analysis of the historical narratives in Germany and Austria around the discursively constructed images of the German *Wehrmacht*, see also Wodak (2005)). The first exhibition was shown from March, 1995, through the end of 1999, at a total of 33 venues in the Federal Republic of Germany and in Austria. The second exhibition was shown to the public for the first time in Berlin in November, 2001; the new exhibition upheld the main statement of the former exhibition (which had been hotly debated and often criticized, both in the press and in other fora of discussion): viz., that during World War II, the *Wehrmacht* was extensively involved, as an institution, in planning and implementing an unprecedented war of annihilation. However, the second exhibition had shifted to a focus on texts, whereas the first exhibition had presented mainly photographs. The exhibitions demonstrated the at times passive, at times active, role of the *Wehrmacht* in German war crimes. From November, 2001, through March, 2004, this second exhibition was displayed in 11 German cities, as well as in Vienna and in Luxemburg, attracting more than 420 000 visitors (the Hamburg Institute's first exhibition on the same subject had attracted about 800 000 visitors). Both exhibitions triggered a discussion throughout the Federal Republic of Germany and Austria about the crimes committed during the war waged by the National Socialist regime and about how postwar German society dealt with this part of its past. Never before had the West German and Austrian publics discussed their past with such intensity and for such a long period.

In the debates surrounding the two exhibitions (1995 and 2001) on war crimes committed by the German *Wehrmacht* in World War II, typical discursive strategies of blaming and denying become apparent. Interviews with visitors to the exhibition emphasized, on the one hand, the fact of "not having seen, known, or heard anything" about the deportation and extermination of prisoners of war as well of racial and ethnic groups such as Jews, Roma, and other civilians. On the other hand, the blame was projected onto 'a few soldiers,' who were labeled as 'exceptions'; in this way, any explicit involvement of the *Wehrmacht* as an institution was denied (Heer *et al.*, 2003). The same patterns are found in the reports on hearings of the South African Truth and Reconciliation Commission (TRC) and in the debates about the pictures of tortured Iraqi prisoners that first appeared in 2004, during the Iraq war.

Figure 1 summarizes the most important strategies of denial (i.e., discursive reactions to blaming). The main distinction shown in the diagram is between people orienting themselves toward the context, i.e., acknowledging the fact that they are watching an exhibition about the German army's war crimes, and taking a stance toward that fact (the left side of the diagram), and people who do not orient themselves toward the context (the right side of the diagram).

The first three strategies negate the very context, at least at the explicit level:

1. People do not position themselves with respect to their belief in the existence of war crimes. This may be done by (a) refusing to deal with the issue

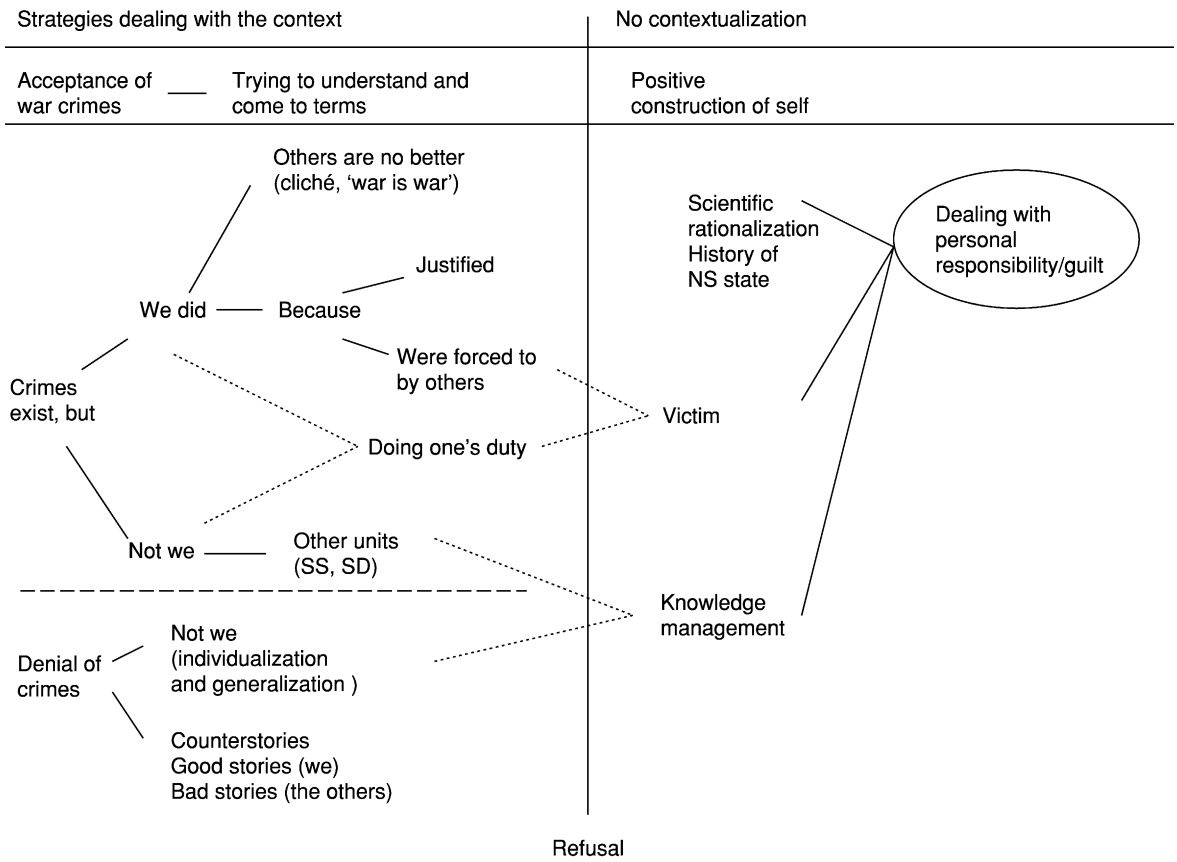

Figure 1 Array of discursive strategies (see Benke and Wodak, 2003: 124). Abbreviations: NS, Nazi state; SS, *Schutzstaffel* (Hitler's 'protection guard' unit; SD, *Sicherheitsdienst* (security police). From Benke G & Wodak R (2003). 'The discursive construction of individual memories: how Austrian ''German Wehrmacht'' soldiers remember WW II.' In Wodak R & Martin J R (eds.) *Re/reading the past*. Amsterdam: Benjamins. 115–138. With kind permission by John Benjamins Publishing Company, Amsterdam/Philadelphia.

at all, (b) claiming ignorance, combined with a refusal to take a stance (people using this strategy claim that they do not/did not know anything about what happened), or (c) claiming victimhood (people adopting this strategy may offer elaborate stories about all sorts of terrible things that happened to them during and after the war; in this way, they are able to avoid having to deal with the issue of war crimes committed by the *Wehrmacht*).

2. People lift the discussion up to a more general level. Using the strategy of scientific rationalization, some people launch into extensive analyses of the Nazi state, aiming to explain how National Socialism came to be successful, why people were in favor of the Nazis, and so on. (This strategy was found among all of the visitors to the exhibitions, both in Germany and in Austria.)
3. People engage in 'positive-self' presentation: the interviewee tells stories that portray him/her as having performed good and praiseworthy deeds. War crimes are acknowledged, yet the actor claims to have had no part in them (or fails to mention any relation to war crimes); the interviewees declare themselves to have acted responsibly, in such a way that they are morally without blame.

The following strategies acknowledge the fact of the exhibition at some level, either by acceptance or refutation:

1. In a strategy of acceptance, some people try to understand what happened.
2. For the most part, however, people try not to deal with the past; instead, they use several strategies to justify, and/or deny, the existence of the war crimes, either by (a) relativizing the facts (people using this strategy will start to enumerate crimes of other nations, or use clichés, such as "every war is horrible") or by (b) adopting two further strategies seeking to provide a (pseudo-) rational causal explanation for the war crimes. The first is characterized by the interviewees' continuing the unmitigated and undisguised use of Nazi ideology and Nazi propaganda of the kind that was promoted during that time to justify the war: "If we hadn't fought them, the Russians would be at

the Atlantic Ocean today." The second of these strategies similarly stems from the Nazi period, but at least it acknowledges, however implicitly, that the war's moral status is questionable: "Others forced us."

3. Another strategy acknowledges that crimes indeed did happen, and that the army should perhaps be held responsible, yet it attributes the responsibility to someone higher up, possibly within the army: "I only did my duty."
4. Yet another strategy is the "Not 'we,' but 'them'" strategy, which attributes the crimes to units of the army other than the one in which the interviewee served. A variant is: "Not 'this,' but 'that'" (e.g., "We didn't bomb Copenhagen, only Rotterdam").
5. Finally, there is a strategy that simply denies the fact that war crimes happened at all. In this strategy, people often turn the focus of their memory on their particular *Wehrmacht* unit, in which horrors of the kind shown in the exhibitions simply were said to be unthinkable.

These discursive strategies are all strategies of responding to an interview situation following the interviewees' presence at an exhibition where thousands of photos of war crimes are shown. Though people employ a number of strategies throughout an interview, their answers can usually be grouped into subsets, each of which serves primarily one of the strategic functions mentioned herein. Some of the strategies are mutually exclusive, i.e., people who completely deny the existence of war crimes would not try to relativize them. This appears to be a logical necessity, but as Billig *et al.* (1988) pointed out, logic or logical consistency is not necessarily prevalent in official texts; neither is it in everyday conversation, and even less so in emotionally charged debates or conflicts.

See also: Argument Structure; Conversation Analysis; Discourse Markers; Mitigation; Psychoanalysis and Language; Rhetoric, Classical; Speech Acts.

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Bleek, Wilhelm Heinrich Immanuel (1827–1875), and Family

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Wilhelm Heinrich Immanuel Bleek was born March 8, 1827, in Berlin, in what was then Prussia; he died in Cape Town, in the Cape Colony in South Africa, on August 17, 1875. He was the son of the famous theologian and specialist in New Testament exegesis Friedrich Bleek, professor of theology at the University of Bonn. His mother was Augusta Charlotte Marianne Henriette, née Sethe, originating from a prominent family of Prussian civil servants. In 1862 in Cape Town, Wilhelm H. I. Bleek married Jemima C. Lloyd, daughter of an archdeacon. They had four children.

Bleek is recognized as the founder of German African Studies. He attended the *Gymnasium* in Bonn and then studied classics and theology at the University of Bonn from 1845 to 1848 and from 1849 to 1851. He chose as his main subject Old Testament studies. Like all researchers in the *Textwissenschaft* of the Old Testament, he compared several Semitic languages to clarify some linguistic points; in this way, he extended his interest to North African (Hamitic) languages. As a consequence, he studied in Berlin in 1848 and 1849 with the famous specialist in Egyptological research, Richard Carl Lepsius. Here Bleek had to transcribe manuscripts of southern African languages, sent mostly by missionaries, into Lepsius's phonetic alphabet. In 1851, Bleek submitted his doctoral thesis at the University of Bonn. From this time on, he propagated the hypothesis that the 'Hottentot' (*Khoekhoe*) language was typologically and genetically linked to the North African (Hamitic) languages: like the Hamitic languages, it was a gender language, differing from the Bantu languages without nominal gender. Later, it was Bleek who created the classificatory term 'Bantu-languages.'

From 1855 on, Bleek worked as an explorer- linguist in southern Africa, though he had to break off his first attempt to explore Africa from the Guinea coast because of fever. In the *salon* of the Prussian ambassador in London, C. C. J. von Bunsen, who was an aristocratic historian, a friend of Bleek's family, a promoter of Sanskrit and Oriental Studies, and a correspondent of Alexander von Humboldt, Bleek got to know Sir George Grey, governor of the Cape province (a British colony at this time) and J. W. Colenso, bishop of Natal. Colenso engaged Bleek formally to accompany him to compile a Zulu grammar, and Bleek arrived in 1855 in Natal. He had great plans for doing extended field work and thus becoming a sort of Livingstone of linguistics, but the only concrete result was a stay at the court of the famous Zulu king Mpanda. All other plans had to be abandoned due to financial and health problems.

The only institutions in the world where scientific research was professionalized and thus constantly remunerated at this time were the Prussian universities; but Bleek was never a member of the staff of a Prussian university. What helped him to survive and to carry on his work, on a more limited scale, was the patronage of Sir George. In 1856, Bleek became the curator and bibliographer of Sir George's enormous collection of documents concerning the languages and the ethnology of southern Africa, and he constantly extended this collection, which was intended to become the most complete collection of material on aboriginal languages from all over the world. So Bleek spent the rest of his life in Cape Town; but here, at least, he had the opportunity in 1858 to meet Livingstone on his way to Mozambique. In 1859, when Sir George was appointed governor of New Zealand, he donated his collection to the South African Public Library at Cape Town, with Bleek as its curator (1862). In 1870, through the influence of Sir George, Bleek's name was placed on Gladstone's *Civil List*, ensuring him a royal pension like other persons such as Charles Darwin or Charles Lyell. Only then, for the first time in his life, did he enjoy financial independence. As a bibliographer, Bleek's main work was *The library of H. E. Sir George Grey, K. C. B.* (1857–1867), but his main scientific

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work was *A comparative grammar of South African languages* (1862–1869).

In his *Comparative grammar,* Bleek wanted not only to prove, by the means of the 'science of language,' the kinship between the Hottentot and the north African languages, but also to make a definitive contribution to a question already posed in Sanskrit and Oriental linguistics: what are the very first, the primitive forms of human language (after the full natural evolution of man and language), and can they be found in the Hottentot and 'Kafir' (*Zulu*) languages. An adherent of evolutionism, he was convinced that in southern Africa the most primitive state of mankind was preserved.

This was the immediate goal of his research, but he also pursued another, more distant goal: to understand the causes of the specific cultural difference between populations adhering to a primitive or natural religion and those adhering to a transcendental religion. For this son of a Protestant theologian, culture, mind, and religion were the same 'thing.' In this he refers to Max Müller, whom he probably met in Bunsen's house in London, but without agreeing with him on every point. Bleek seeks the cause of religious or mental differences in linguistic differences concerning the 'forms' and 'elements' of language, which he compares by analogy to certain nonmathematical and nonlogical sciences: to organic chemistry (phonology as the science of the 'elements' of language) and to comparative anatomy (the 'forms' as the skeleton of language). So in his main work as elsewhere, Bleek works not only as a comparative linguist, but as a linguistic researcher who has his intellectual background in Spinoza's philosophy, as transmitted among certain Lutheran theologians and elsewhere in German intellectual culture.

Bleek's debt to Spinoza's philosophy is manifest mainly in his explicitly speculative work *The origin of language*, submitted in 1853 for the Volney Prize (which he did not win), prefaced for publication in 1867 by himself and by his uncle, Ernst Haeckel, a researcher on human evolution and a Darwinist. This work advanced the thesis that there is no opposition, no essential difference between sciences and humanities, between natural sciences and the sciences of the mind (*Geisteswissenschaften*). Spinoza's philosophy implies epistemological naturalism, a continuity between man and nature. To this naturalistic conception of history were opposed the post-Kantian and Hegelian idealistic German historicism and '*Geisteswissenschaft*.'

Bleek's last great scientific enterprise was his *Bushman dictionary*, begun in about 1870 and completed by his daughter Dorothea Frances Bleek in the 1940s, published in the American Oriental Society series in 1956. His many works on Bushman tales, studied because they give access to the religion, were published in 1911 by his sister-in-law, Lucy C. Lloyd. Here, as in his other works, the languages of the 'negroes' are legitimate subjects of scientific research, not inferior to the classical languages: each 'race' has a place in the history of the evolution of man and is equally interesting. The more primitive 'races' may even be more interesting. The *Bushman dictionary* constitutes an enormous compendium of information about languages that have become in the meantime extinct.

Bleek's main hypothesis concerning the kinship of the Hottentot and the North African languages survived up to the work of the Hamburg Africanist Carl Meinhof; when he tried to prove this kinship definitively by means of comparative philology, Meinhof found that it did not exist. Comparative philology, or the science of language, was and is a modern research science capable of revising its own hypotheses. Bleek's belief in the existence of a causal relation between language and mind in the sense of the structures of religious systems is no longer accepted. Comparative research into civilizations understands the difference between primitive or natural and transcendent religions in a different way.

Dorothea Frances Bleek, born March 26, 1873, in Mowbray, Cape Colony, died June 27, 1948, in Plumstead, South Africa. The youngest daughter of W. H. I. Bleek, she was an eminent researcher in the Hottentot (*Khoekhoe*) and Bushman (*Khoisan*) languages. In 1904, she was a student of African languages in Berlin, Germany; after 1908, she concentrated on research in the Bushman languages and cultures. She was introduced to these studies by her father's sister-in-law, Lucy C. Lloyd. Miss Lloyd continued and edited the work of W. H. I. Bleek, encountering many difficulties, since she was 'only' a woman in Victorian times.

Dorothea F. Bleek continued and edited the work of both W. H. I. Bleek and Lucy C. Lloyd. From 1910 to 1930 she did extensive fieldwork among Bushman populations. The results are documented in a series of publications, the most important of which is the *Bushman dictionary*, begun by her father about 1870, continued by Lucy C. Lloyd, but mainly established by Dorothea F. Bleek and published by the American Oriental Society in 1956. She was also active in other domains, such as Bushman anthropology, for the Africa Museum in Cape Town, and the study of Bushman rock paintings. While Dorothea Bleek's father was the inventor of the term 'Bantu-languages,' the daughter established the distinction of three main regional groups of the Khoisan languages: southern, northern, and central Khoisan, with the Hottentot (Khoekhoe) language being a part of the central Khoisan group. Her father's hypothesis of a typological-genetic link between the Hottentot and the Hamitic languages is no

longer accepted, but the main classificatory result of the daughter's work still holds. From 1923 to 1948, Dorothea Bleek was Honorary Reader in the Bushman Languages at the University of Cape Town. But she refused the title of an Honorary Doctor, regarding herself simply as her father's humble disciple.

See also: Africa as a Linguistic Area; Bantu Languages; Lepsius, Carl Richard (1810–1884); Meinhof, Carl Friedrich Michael (1857–1944); Müller, Friedrich Max (1823–1900); South Africa: Language Situation.

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Blend

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Introduction

The word *Oxbridge* is composed of a string of segments corresponding to segments at the left edge of *Oxford* and the right edge of *Cambridge*. This is a blend, and so are *vodkatini* (*vodka* + *martini*), *jazzercise* (*jazz* + *exercise*), and *maridelic* (*marijuana* + *psychedelic*). Blends (also called portmanteau words) exhibit some sort of structural fusion, in which a single word is formed from two words (and in a handful of cases from three). The byproduct of this fusion is the truncation of segmental material from the inner edges of the two words or only one of them (i.e., the material not underlined in the examples above). Note that blends refer only to cases where the inner edges are truncated. Forms in which the right edges of the two (or more) words are truncated, such as *sitcom* (*situation* + *comedy*), *modem* (*modulator* + *demodulator*), and *fortran* (*formula* + *translation*), are called clipped compounds. Blends in which only the first word undergoes truncation could also be considered a clipped compound (*mocamp* from *motor* + *camp*), especially when each word contributes only one syllable to the surface form, which is a characteristic of clipped compounds.

A blend is one word that delivers the concept of its two base words and its meaning is thus contingent on the semantic relation between the two base words. In *skinoe* (*ski* + *canoe*), the word *canoe* functions as the semantic head, since *skinoe* is a type of *canoe*. In *snazzy*, however, neither *snappy* nor *jazzy* functions as a head and the meaning of the blend is thus a hybrid of the meaning of the two (sometimes near-synonymous) base words.

The most intriguing question with respect to blends is whether their phonological structure, i.e., their size, syllable structure, and segmental makeup, is predictable on the basis of the base words (Bauer, 1983). For example, why do we get *beefalo* from *beef* and *buffalo*, rather than **beelo* or **beebuffalo*? And since the order of the base words affects the phonological shape of the blend, we may also ask why the order is not *buffalo* + *beef*, which would result in **buffabeef* or **bubeef*?

In most cases, two base words provide only one possible blend (there is a handful of cases where both orders are available, e.g., *tigon* (*tiger* + *lion*) versus *liger* (*lion* + *tiger*), *absotively* (*absolutely* + *positively*) versus *posilutely* (*positively* + *absolutely*), and *moorth* (*moon* + *earth*) versus *earthoon* (*earth* + *moon*)). Therefore, we may suspect that the formation of blends is not accidental, but rather governed by some general principles. The principles reflect two competing tendencies: (i) to truncate segments from

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Table 1 Types of semantic relations between the base words

	Base words			*Blend*
(a)	Endocentric relation: one of the words functions as a semantic head (in bold below) and the other as a modifier			
	klan	+	**koran**	kloran 'a bible used by the members of KKK'
	education	+	**entertainment**	edutainment 'educational entertainment'
	key	+	**container**	keytainer 'a container for keys'
(b)	Exocentric relation: both words have the same semantic status, and thus none of them serves as a head			
	alphabetic	+	numeric	alphameric 'consisting of both letters and numbers'
	escalator	+	lift	escalift 'a hybrid device with the advantage of both an escalator and a lift'
	tangerine	+	lemon	tangemon 'a hybrid of tangerine and lemon'

the base in order to allow the blend to have the length a single word, preferably one of the base words, and (ii) to preserve as many segments from the base words as possible and thus maximize the semantic transparency of the blend.

The principles proposed in the following sections take English blends as the empirical basis (the data are drawn mostly from Adams (1973) and Bryant (1974)). However, these principles should be applicable to blends from other languages, though some parameter settings might be required (see Kubazuno (1990) for English and Japanese; Bat-El (1996) for Hebrew; Fradin (2000) for French; and Piñeros (2004) for Spanish).

The Semantic Relation between the Base Words

The meaning of a blend is composed of the meaning of its base words, which exhibit two types of semantic relation, endocentric and exocentric (Table 1) (see Adams (1973) and Algeo (1977) for other types of relation).

In some cases, it is not clear whether the semantic relation is endo- or exocentric. The blend *smog* (*smoke* + *fog*), for example, has two meanings, 'a mixture of fog and smoke' (exocentric) and 'an airborne pollution' (endocentric). The same is true for *brunch* (*breakfast* + *lunch*), which means either 'lunch with some characteristics of breakfast' (endocentric) or 'a mixture of breakfast and lunch' (exocentric).

Table 2 The number of syllables in a blend equals the number of syllables in Its longer base word

Blend	*Base words*
alphameric (4)	alphabetic (4) + numeric (3)
econocrat (4)	economist (4) + bureaucrat (3)
pinkermint (3)	pink (1) + peppermint (3)
plastinaut (3)	plastic (2) + astronaut (3)
portalight (3)	portable (3) + light (1)
smothercate (3)	smother (2) + suffocate (3)
tangemon (3)	tangerine (3) + lemon (2)
Texaco (3)	Texas (2) + (New) Mexico (3)
zebrule (2)	zebra (2) + mule (1)

These two types of relations also appear in compounds (Bauer, 1988; Spencer, 1991), but blends are much more permissive in this respect. Blends allow any possible combination of lexical categories, including some that do not appear in compounds (e.g., verb–verb, as in *baffound*, from *baffle* + *confound*). In addition, blends do not show preference for endo- or exocentric relation, whereas compounds are mostly endocentric. Finally, in endocentric compounds the order of the head and the modifier is fixed and this is also true for most endocentric blends in English (Kubozono, 1990), which are right-headed, like compounds. In Hebrew, however, whose compounds are left-headed, blends can be either right- or left-headed (Bat-El, 1996).

The Size of the Blend

The formation of a blend aims toward two competing goals. On the one hand, it must have the structure of a single word, unlike compounds, in which the two base words are accessible. For this purpose, the blend often adopts the number of syllables in one of its base words, thus truncating some segmental material. On the other hand, a blend must preserve as much of the structure from its base words as possible. To accommodate the first goal and maximize the fulfillment of the second, the number of syllables in a blend is often identical to the number of syllables in the longer base word (number of syllables in parentheses) (see Table 2).

By adopting the number of syllables from the longer rather than the shorter base word, the blend obtains the structure of one word and maximizes its size. Maximization facilitates the semantic recoverability of the base words, since the more segmental material from the base words there is, the easier it is to identify them.

Table 3 Segmental maximization also determines the order of the base words in exocentric blends

A + B – Maximizing order		*B + A – Nonmaximizing order*	
blurt	blow + spurt	*spow	spurt + blow
glaze	glare + gaze	*gare	gaze + glare
smash	smack + mash	*mack	mash + smack
snazzy	snappy + jazzy	*jappy	jazzy + snappy
swacket	sweater + jacket	*jater	jacket + sweater
camcorder	camera + recorder	*recmera	recorder + camera
citrange	citrus + orange	*ortrus	orange + citrus

There are, however, some exceptions, for example, *plumcot* (2) from *plum* (1) + *apricot* (3); *brunch* (1) from *breakfast* (2) + *lunch* (1); *goon* (1) from *gorilla* (3) + *baboon* (2); and *bionic* (3) from *biology* (4) and *electronic* (4). It should be noted that Kubozono (1990) claims that the number of syllables in a blend is identical to the number of syllables in the rightmost word, but some of the exceptions above (*bionic*, *plumcot*, *goon*) do not obey this generalization either.

When the two base words have an identical number of syllables, the number of segments often plays a role. Here again, in order to facilitate recoverability, blends tend to preserve as many base segments as possible, given the restriction on the number of syllables noted above. This tendency affects the order of the base words in exocentric blends, in which the order is not determined by a head–modifier relation. For example, a word with a complex onset will be first and a word with a complex coda second. That is, the order of the base words is determined by the principle requiring the maximization of the number of segments (see Table 3).

In some cases, segmental maximization is blocked by the phonotactics of the language. For example, from *bang + smash* we obtain *bash*, rather than the segmentally richer form **smang* (*smash + bang*), since English does not allow monomorphemic sCVC words where the two Cs are nasal (Davis, 1988). The fact that blends are subject to stem phonotactics supports the claim that blends are monomorphemic despite their polymorphemic base.

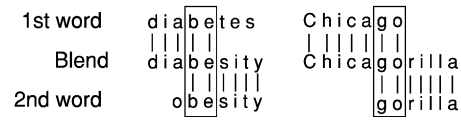

Figure 1 Segmental overlap.

The Switch Point at Segmental Overlap

Contrary to the principle given above, there are blends consisting of more, and sometimes fewer, syllables than the longer base word. In many cases, this is due to the presence of one or more segments (shown in boldface below) shared by the two base words. In such cases, the position of the shared segments determines the 'switch point' of the blend, i.e., where the first base word ends and the second begins (see Table 4).

The selection of the position of the shared segment(s) as the switch point contributes to segmental maximization. The shared segments overlap and thus correspond to segments in both base words, allowing more segments from each word to be preserved in the blend. For example, *diabesity* preserves *diabe* from *diabetes* and ***besity*** from *obesity*. Notice that in *Chicagorilla* all segments of the base words appear in the blend. Of course, the more segments of the base words in the blend there are, the more transparent the base words are (see Figure 1).

Segmental overlap by the shared segments may also determine the order of the base words in exocentric blends (in which the order of the base words is not determined by the head–modifier relation) (see Table 5). There are cases where only one order of the two words allows a segmental overlap of the shared segments.

The requirement to have the switch point at the segmental overlap usually overrides the requirement to maintain the same number of syllables in the blend as in the longer base word (see Table 4). In a few cases, such as *Bisquick* 'quick biscuit.' it also overrides the order imposed by the head–modifier relation (Algeo, 1977). However, there are plenty of blends that meet all the requirements (see Table 6).

Table 4 The switch point at the overlap of the identical segments shared by the base words

Blend	*Base words*	*Expected number of syllables*
Chica**go**rilla (5)	Chica**go** (3) + **go**rilla (3)	*Chicalla (3)
cine**ma**gpie (4)	cine**ma** (3) + **ma**gpie (2)	*cinegpie (3)
croi**ssan**dwich (3)	croi**ssant** (2) + **san**dwich (2)	*croiwich (2)
dia**be**sity (5)	dia**be**tes (4) + o**be**sity (4)	*diasity (4)
esca**li**ft (3)	escalator (4) + **li**ft (1)	*escalalift (4)
lu**mi**st (2)	lu**mi**nous (3) + **mi**st (1)	*lumimist (3)
op**t**ronic (3)	op**t**ic (2) + ele**ct**ronic (4)	*optictronic (4)
transis**t**ena (4)	transis**t**or (3) + an**t**enna (3)	*transisna (3)

Table 5 The switch point at the shared segments determines the order of the base words

A + B – Overlap of shared segment(s)		*B + A – No overlap of shared segment(s)*	
bee**f** + bu**ff**alo	bee**f**alo	buffalo + beef	*bu**ff**abee**f**
cla**m** + to**m**ato	cla**m**ato	tomato + clam	*to**m**acla**m**
windo**w** + **w**all	windo**w**all	wall + window	***w**allindo**w**
po**l**o + **l**acrosse	po**l**ocrosse	lacrosse + polo	***l**acro**l**o
ova**l** + **ll**iptic	ova**ll**iptic	elliptic + oval	***ll**ipta**l**

Table 6 Blends that meet all the requirements

Blend	*Base words*
adv**er**tainment (4)	adv**er**tisement **(4)** + ent**er**tainment **(4)**
dy**n**etic (3)	dy**n**amic **(3)** + mag**n**etic (4)
nar**co**ma (3)	nar**co**tic **(3)** + **co**ma (2)
sh**am**ateur (3)	sh**am**e (1) + **am**ateur **(3)**
sn**ob**lem (2)	sn**ob** (1) + pr**ob**lem **(2)**
veloci**t**one (4)	veloci**t**y **(4)** + **t**one (1)
we**st**ralia (4)	we**st** (1) + Au**st**ralia **(4)**

The Switch Point at Syllable Constituency

When the two base words do not have a shared segment, the syllable structure plays a role in determining the switch point. In monosyllabic blends, derived from two monosyllabic base words, the switch point (marked with •) must be at the onset–nucleus boundary (see Table 7). The question is: which word contributes its nucleus, the first (CV•C) or the second (C•VC)? It appears that there is a preference for the latter option; that is, the first word contributes only its onset and the second contributes its nucleus and coda, i.e., its entire rhyme (Kubozono, 1990).

Since the onset and the nucleus are perceptually more salient than the coda, this division allows the blend to preserve one perceptually salient element from each base word, i.e., the onset from the first word and the nucleus from the second. There are, however, several exceptions, some of which are due to lexical blocking, for example, *slosh* (**slush* – lexical blocking) from *slop + slush; boost (*boist) from boom + hoist; and moorth (*mearth – lexical blocking) from moon + earth*.

In polysyllabic blends, there is a preference for the switch point to be at the syllable boundary in the blend, which allows maximization of the segmental material (see Table 8). That is, *camera + recorder* yields *cam•corder* rather than **cam•order*. However, there is a restriction on the type of coda–onset contact at the switch point. This restriction, known as the Syllable Contact Law (Vennemann, 1988), requires

Table 7 The switch point in monosyllabic blends

Base words	*C•VC* *W1 word onset – W2 nucleus + coda*	*CV•C* *W1 onset + nucleus – W2 word coda*
blank + beep	bleep	*blap
blow + spurt	blurt	*blort
smoke + haze	smaze	*smoze
Swiss + watch	swatch	*switch
bump + conk	bonk	*bunk
spiced + ham	spam	*spim
snazzy + ritzy	snitzy	*snatzy

the coda to be more sonorous than the adjacent onset. When this requirement is not met, or when the distance in sonority between the coda and the onset is insufficient, the switch point is at the onset–nucleus boundary of the second word (as in monosyllabic blends). Thus, *rocket + balloon* does not yield **rock•lloon*, due to the offending *kl* contact and therefore the surface form is *rock•oon*.

Conclusion

The discussion above suggests that the formation of blends is governed by several principles that together determine the order of the base words, the size of the blend, and the switch point.

The order of the base words is determined by the head–modifier relation, requiring the head to follow its modifier (see Table 1a). In the absence of such a relation, i.e., in an exocentric relation, the phonology plays a role. When the two base words have one or more shared segments, the order of the base words is such that these segments overlap (Table 6). In the absence of shared segments, segmental maximization determines the order (Table 3).

The number of syllables in the blend is also determined by the overlap of the shared segments, which demarcate the switch point (Table 4). In the absence of a shared segment, the number of syllables in the blend is identical to that in the longer base word (Table 2). If the two base words have an identical number of syllables, then segmental maximization plays a role (Table 3).

The switch point is determined by the shared segments, which overlap in the blend (Tables 4 and 5). In the absence of a shared segment, the switch point is determined by syllabic constituency. In monosyllabic blends, the switch point is at the onset–nucleus boundary, such that the blend preserves the onset of the first word and the nucleus plus the coda of the second (Table 7). In polysyllabic blends, the switch point is at the syllable boundary, in cases where the

Table 8 The switch point in polysyllabic blends

Base words	*Switch point at syllable boundary*	*Switch point at onset–nucleus boundary*
camera + recorder	cam•corder	*cam•order
color + asbestos	color•bestos	*color•estos
proletariat + cult	prolet•cult	*prolet•ult
smother + suffocate	smother•cate	*smother•ate
sun + reflector	sun•flector	*sun•ector
rudder + elevator	rudder•vator	*radder•ator
brush + terrific	*brush•riffic	brush•erific
cattle + buffalo	*cat•ffalo	catt•alo
earth + moon	*earth•moon	earth•oon
hurricane + balloon	*hurric•lloon	hurric•oon
molecule + organism	*molec•nism	molec•ism
pink + peppermint	*pink•permint	pink•ermint
rocket + balloon	*rock•lloon	rock•oon
slanting + perpendicular	*slant•pendicular	slant•endicular
zebra + mule	*zeb•mule	zebr•ule

coda–onset contact respects the Syllable Contact Law; otherwise, it is at the onset–nucleus boundary (Table 8).

The principles governing the formation of blends are not always obeyed. The few exceptions found reflect a natural state of affairs in derivational morphology, where exceptions are often due to some extragrammatical factors. There is, however, intergrammatical (nonexceptional) violation of principles, in cases of conflict (e.g., switch point at syllable constituency and the Syllable Contact Law (Table 8). In such cases, one principle has a (language-specific) priority over the other, allowing a deterministic selection of the surface form. A model of conflicting principles and violation under conflict is provided by Optimality Theory (Prince and Smolensky, 1993).

See also: Complex Segments; Compound; Head/Dependent Marking; Neoclassical Compounding; Pragmatics: Optimality Theory; Syllable: Phonology.

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Blessings

B G Szuchewycz

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Blessings are utterances associated primarily with the sphere of religious activity, but they also appear with varying frequency in the politeness formulas and parenthetical expressions of everyday conversation. In both contexts, the dominant linguistic feature is the use of formal and/or formulaic language. Blessings, particularly in religious ritual, may also be accompanied by specific nonlinguistic features including gestures (e.g., laying on of hands, the sign of the cross) and the use of special objects (e.g., a crucifix) or substances (e.g., water, oil). Concern with such patterned relationships between linguistic form, on the one hand, and social context and function, on the other, is central to the study of the role of language in social life.

Linguistically, blessings (and their opposite, curses) are marked by the use of a special language, which may be either a highly formal or archaic variety of the dominant language (e.g., Classical Arabic) or a different code entirely (e.g., Latin). In addition to their specific content, linguistic features such as repetition, special form (e.g., parallel couplets), special prosody (e.g., chant), and fixity of pattern distinguish blessings from other types of speech and contribute to their formal and formulaic character.

The concept of blessing in Jewish, Christian, and Muslim thought, as in many other traditions, is concerned with the bestowal of divine favor or benediction through the utterance of prescribed words. As such, blessings represent an example of the belief in the magical power of words, other manifestations of which include the use of spells, incantations, and curses.

As an aspect of religious behavior, blessings are associated with essential components of public and private ritual activity. They are performed by religious specialists in situations of communal worship as, for example, in rituals where a general blessing of those present marks the end of the event. Blessings are also used by nonspecialists to solemnize, sacralize, and/or mark the boundaries of social events. In traditional Judaism, for example, *brokhe* 'blessings' include short formulaic expressions used in a wide variety of situations as well as longer texts associated with domestic ceremonies (e.g., a grace after a meal) and specific occasions or rites (e.g., Passover, weddings, funerals). Common to all is a fixity of form and the strict association of specific texts to specific occasions.

In the Bible, the Hebrew root *brk* 'blessing' is associated with a number of meanings. A blessing may be an expression of praise or adoration of God, a divine bestowal of spiritual, material, or social prosperity, or an act of consecration that renders objects holy. The Greek *eulogia* of the New Testament stresses the spiritual benefits that are obtainable through Christ, the gospels, and the institution of the church (e.g., liturgical blessings). Each instance – praise, benediction, and consecration – represents a social and religious act accomplished through the use of a highly conventionalized form of language.

Blessings often function as 'performatives.' A performative is a speech act that, when uttered, alters some state of affairs in the world. Under the appropriate conditions, if a minister states, 'I pronounce you man and wife,' then a marriage has been socially established. If someone says, 'I promise,' then a promise has been made. Similarly, blessings function as religious performatives, in that the utterance of the requisite expression precipitates a change in spiritual state.

Mastery of the linguistic formulas, however, is not sufficient for the successful realization of blessings (and other performatives). The existence of an extralinguistic institution (e.g., family, descent group, religious institution) with differentiated social roles and statuses for the blessor and blessee(s) is a necessary precondition to an authentic and valid performance of the act. Only certain individuals may pronounce a couple man and wife and create a legally binding marriage. The same is true of blessings.

Catholicism, for example, distinguishes those blessings exchanged between lay persons, the spiritual value of which depends on the personal sanctity of the blessor, from liturgical blessings, which carry the force of the ecclesiastical institution. As the institution itself is hierarchically organized, so too is the right to confer particular blessings. Some may be performed by the pontiff alone, some only by a bishop, others by a parish priest, and yet others by a member of a religious order. Similarly, and in a very different ethnographic context, among the Merina of Madagascar the *tsodrano* is a ritual blessing in which seniors act as intermediaries between ancestors and those being blessed, their juniors. A father bestows fertility and wealth on his son through a ceremonial public blessing that transfers to the son the power of the ancestors in a ritual stressing the continuity and reproduction of the descent group.

Like other performatives, blessings operate properly only within a context of social and cultural norms and institutions, which are necessary for their realization and to legitimate and maintain their force.

Much of human face-to-face interaction is ritualistic in nature, and it has been argued that the use of formalized and prepatterned linguistic and nonlinguistic behavior in everyday life is evidence of a link between interpersonal rituals of politeness, on the one hand, and ritual behavior in the sacred sphere, on the other (Brown and Levinson, 1987). Blessings are an example of a specific linguistic routine common to both.

In nonreligious contexts, blessings are evident in the politeness formulas and parenthetical expressions of everyday conversation: for example, the English 'Bless you!' as a conventional response to a sneeze. Similarly, in greetings, thanks, and leave-takings, blessings are exchanged between interlocutors and, although they may literally express a wish for supernatural benefits, their primary communicative function is as highly conventionalized markers of social and/or interactional status. In both their religious and secular uses, blessings thus function as expressions of solidarity, approval, and good will.

When embedded parenthetically within larger sentences or longer texts, blessings may also function as semantically and interactionally significant units. In oral narratives, the use of a blessing (or curse) serves to communicate directly the emotional state or attitude of the speaker toward the topic, providing a means of internal evaluation and signaling speaker involvement in the text. Yiddish speakers, for example, make extensive use of a large set of fixed expressions, many of which are blessings, for just such a purpose (Matisoff, 1979).

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Bloch, Bernard (1907–1965)

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Bernard Bloch studied English and German (A.B. 1928, M.A. 1929) at the University of Kansas, where his father Albert taught art. Continuing at Northwestern University, he took a course in linguistics with Werner F. Leopold in 1931. That same year, he was chosen as a field worker on the *Linguistic Atlas of New England*, directed by Hans Kurath. In 1933 he followed Kurath and the *Atlas* project to Brown University. Bernard (and his wife Julia) did much exacting editorial work on the *Atlas*. He completed his Ph.D. at Brown in 1935, in English and linguistics, teaching English and modern languages there until moving to Yale's linguistics department in 1943.

His character, his intelligent and disciplined scholarship, and his extraordinary writing and editorial skills soon made Bloch an influential presence within the Linguistic Society of America. In 1940 he became the second editor of its journal, *Language*, and continued as editor until his death. His insistence on clarifying each point in a manuscript made it no idle jest when he later remarked that he had published many papers each year, most of them under famous pseudonyms.

Bloch and Leonard Bloomfield shared intensely demanding applied linguistic work during the war. Although he was Bloomfield's junior colleague at Yale for only a few years, Bloomfield's influence on him was profound (Bloch, 1949). The austere modernist intellectual architecture of their work is very similar (Bloch, 1948); Bloch's writing is much friendlier to readers. His wartime work on Japanese was published as a basic course, and later in a series of descriptive publications capped by the article on phonemics (Bloch, 1950), all meant to illustrate the application of the principles of linguistic description. His 'English verb inflection' (Bloch, 1947) is an exemplar of distributionalist structural morphology, compactly presenting a remarkably complete solution together with its rationale.

Bloch was an extraordinary teacher, delivering beautifully composed informal lectures as lightly as one might carry on a conversation, sustaining an easy exchange of statements, questions, and answers. He would sometimes read a few sentences from some unidentified publication, extracts chosen for their comic value in illustrating various rhetorical or

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See also: Bloomfield, Leonard (1887–1949); Japanese; Kurath, Hans (1891–1992); Phoneme; Structuralism.

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Jules Bloch was born in Paris on May 1, 1880, and attended the Lycée Louis-le-Grand as a scholarship student. He completed his Licence ès Lettres, and subsequently became a graduate student in Sanskrit and ancient literature and culture in the École des Hautes Études at the University of Paris.

In 1905, he undertook his first major academic project toward the end of his graduate training. He and two other researchers were given the task of translating large portions of the monumental three-volume *Kurze vergleichende Grammatik der indogermanischen Sprachen* (1902–1904) by the Indo-European linguists Karl Brugmann and Berthold Delbrück. Bloch then helped edit an abridged version of the translated text, *Abrégé de grammaire comparée des langues indo-européennes* (1905), supervised by Antoine Meillet, a specialist in Indo-European linguistics at the École des Hautes Études.

In 1906, Bloch published his own diploma thesis on Sanskrit, *La phrase nominale en sanscrit,* and went on to pursue the study of Hindi and Tamil. He performed research in the field in India, later moving to Vietnam, where he served on the faculty of the École Française d'Extrême Orient in Hanoi.

In 1914, Bloch completed and submitted his doctoral thesis, *La formation de la langue marathe,* a diachronic study of Marathi; for this he received the Prix Volney, a prestigious linguistic prize awarded annually by the Institut de France since 1822. His research was soon interrupted by infantry service for four years in World War I, during which he rose from sergeant to lieutenant and was awarded the Croix de Guerre for bravery.

Bloch returned to the École des Hautes Études in 1919, and was made Director of Studies there in 1920. He also served as Professor of Sanskrit at the Sorbonne, and in 1937 became a professor at the Collège de France, where he remained until his retirement in 1951. Bloch also served as the secretary of the Société Linguistique in France for close to a quarter of a century (1920–1944), keeping in close touch with other leading linguists in Europe and India throughout his career. He also guided and assisted many Indian students in Paris, and a number of them subsequently distinguished themselves in the field of Indo-European linguistic studies.

Bloch developed proficiency in and did research on a number of languages of India, ancient and modern, including Sanskrit, Pali, Vedic language, Hindi, and Marathi, an Indo-European language spoken by over 65 000 000 people. Bloch also did research on Tamil, a Dravidian language spoken by more than 50 000 000 people in India, Sri Lanka, Malaysia, and elsewhere in Southeast Asia. His *Structure grammaticale des langues dravidiennes* (1946) was one of the first modern linguistic studies of the Dravidian family of languages.

Bloch also began a project to translate the Pali Buddhist Canon, with his inaugural volume of the *Canon bouddhique Pāli* (1949), but this work was unfortunately not continued by others. In the last year of his life, Bloch published one of the first modern scholarly studies of the Romany-speaking people, *Les Tsiganes* (1953). Romany, spoken by an estimated 2 000 000 people, is an Indo-European language with origins in India and grammatical affinities with Sanskrit. Bloch was one of the first Indo-European

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In 1921, he moved to Ohio State University as a full professor. While there, he and the behavioral psychologist Albert Paul Weiss (1879–1931) became friends, and Bloomfield adopted some of the idiom of that approach, though its role in his work has been greatly exaggerated. There Bloomfield also took part, with George Melville Bolling (1871–1963), in founding the Linguistic Society of America in 1925. Esper (1968) was an invaluable eyewitness report on this period in Bloomfield's career. In 1927, Bloomfield returned to the University of Chicago, where he and Edward Sapir (1884–1939) were briefly colleagues. His years at the University of Chicago seem to have been the most pleasant and productive of his working life. In 1940 he went to Yale, as Sterling Professor, the successor of Prokosch and to some degree also of Sapir. Bloomfield led the linguistics program and took an active role in war-related work on practical language-learning materials, writing and editing a number of manuals. A stroke ended his working life in 1946; he died in 1949.

His family life was darkened by tragedies. Bernard Bloch, who knew and admired him, described his personality as "not strongly magnetic" (1949: 91). Anecdotes show his readiness to use highly refined sarcasm in dealing with critics, colleagues, and students alike. For an extended example, see Bloomfield, 1944; in a more typical instance, he claimed that his introductory textbook *Language* (1933) could be understood by any bright high-school student. This remark has often been cited as evidence of Bloomfield's innocence by scholars who have struggled with this formidable book. It is not.

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He supervised only a handful of dissertations, and he sometimes tried to discourage students from specializing in linguistics. It was through his publications,

especially *Language*, that he shaped American descriptive linguistics as a discipline during its structuralist period. Bloomfield began as a Germanist and Indo-Europeanist in the Neogrammarian tradition. These disciplines, and his rigorous cast of mind, provided the foundation for his austere approach to language description. The contrastive comparison of linguistic forms through the construction of textual concordances, the logic of textual variants, and many other analytical techniques and concepts of the classical comparative method, all became basic tools of descriptive and pedagogical applications of linguistics. Bloomfield's *Outline guide for the practical study of foreign languages* (1942) described this toolkit and explained its use. His method was based on the notion of the linguistic sign; it called for comparing linguistic forms that are partly alike and partly different, and then looking for other examples of each part so as to understand how they are alike and how they are different in form and function. In a letter to Truman Michelson written in 1919, Bloomfield, then 32, had already condensed his method of analysis into one sentence: "No preconceptions; find out which sound variations are distinctive (as to meaning) and then analyze morphology and syntax by putting together everything that is alike" (Hockett, 1987: 41). When compiling a descriptive grammar, however, Bloomfield selected among variants in his data to build and then describe a community norm of usage. Such a norm was implicit in his account of usage differences among Menomini speakers (1927); the details of its construction were brilliantly illuminated by Goddard (1987).

See also: Algonquian and Ritwan Languages; Bloch, Bernard (1907–1965); Boas, Franz (1858–1942); Brugmann, Karl (1849–1919); Germanic Languages; Hockett, Charles Francis (1916–2000); Leskien, August (1840–1916); Linguistics as a Science; Sapir, Edward (1884–1939); Structuralism; Tagalog.

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Blumer, Herbert (1900–1987)

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Herbert Blumer is the founding father of the unique social psychological perspective called 'symbolic interactionism.' The foremost student of George Herbert Mead (*see* **Mead, George Herbert (1863–1931)**), he translated Mead's philosophy into a theory of self, society, and interaction that has come to be known as the 'symbolic interactionist perspective' in contemporary U.S. sociology.

Blumer received his bachelor's and master's degrees from the University of Missouri in 1921 and 1922, respectively. He taught there until 1925, when he left to enter the doctoral program of the department of sociology at the University of Chicago, where he received his Ph.D. in 1928. He became an instructor in sociology at Chicago in 1925, was an associate professor from 1931 to 1947, and was a professor from 1947 to 1952. When Mead died in 1931, Blumer took over his social psychology course. From 1930 to 1935, Blumer was secretary–treasurer of the American Sociological Association and was elected president in 1955. In 1954, he was elected president of the Society for the Study of Social Problems. He also served as president of the Pacific Sociological Association and as vice president of the International Sociological Association. From 1941 to 1952, he was editor of the *American Journal of Sociology*. During World War II, he served as liaison officer between the Office of War Information and the Bureau of Economic Warfare and as a public panel chairman of the War Labor Board. He taught at the University of Chicago from 1925 to 1952. In 1952, he went as chair to the Department of Sociology at the University of California at Berkeley, where he remained as a faculty member until his death in 1987.

Blumer was the author of approximately 60 articles, dozens of book reviews (in the *American Journal of Sociology*), two monographs [*The rationale of labor–management relations* (1958), and *The world of youthful drug use* (1967)], at least three review essays, three obituaries (Louis Wirth, Ernest Burgess, and Joseph Lohman), and four books [*Movies and conduct* (1933), *Movies, delinquency, and crime* (with D. M. Hauser, 1933), *Critiques of research in the social sciences, I. An appraisal of Thomas and Znaniecki's The Polish Peasant in Europe and America* (1939), and *Symbolic interactionism* (1969)]. Posthumous publications include a collection of his papers on *Industrialization as an agent of social change: a critical analysis*, as well as *The collected papers of Herbert Blumer: George Herbert Mead and human conduct* and *Selected works of Herbert Blumer: a public philosophy for mass society.*

Blumer is remembered for his athletic prowess, his warmth as a person, his capacity as a sympathetic and understanding listener, and his acute memory and critical mind. He was a powerful and effective teacher of several generations of students who "found themselves and their careers while sitting in his classes" (Shibutani, 1970: viii).

Blumer's impact on U.S. sociology has been substantial. A loyal opponent of functionalism, positivism in sociology, and behavioral and cognitive psychology, he long championed the interpretive, naturalistic approach to human experience, social theory, and social research. Many of the ideas he put forth early in his career have since, as Shibutani noted, become generally accepted. His studies of the movies, fashion, collective behavior, racism and prejudice, the industrialization process, and social problems have become sociological classics and models of research for other scholars. As the chief systematizer of the sociological implications of Mead's thought, his writings on symbolic interaction have served to define this perspective within the international sociological community.

Blumer's sociology involved the following assumptions. Human beings act toward things on the basis of the meanings things have for them. Meanings arise out of, and are modified in, the process of social interaction. Society consists of the joint interactions of individuals. These joint actions describe recurrent patterns of collective activity, complex networks of institutional relations, and historical processes and forces. The proper study of society is at the intergroup, interactional level. Society is a framework for the operation of social, symbolic, economic, political, religious, kinship, and legal interactions. The notion of structure as process is central to Blumer's argument. Social structures are composed of interacting units "caught up in the interplay of opposing processes of persistence and change" (Morrione, 2004: xvi). Social reality is situated in these sites of interaction.

Blumer put in motion a methodological project that assumed an obdurate natural social world that could be studied scientifically – that is, mapped, reproduced, and made sense of through the careful work of the naturalistic researcher who gets close to the phenomenon under investigation. He sought a processual, interpretive social science that would utilize sensitizing concepts grounded in subjective

human experience. The empirical materials of this science would be valid, reliable, and permit the testing of hypotheses and the formulation of theoretical generalizations. Interpretive theory would confront the obdurate features of human group life and be shaped around the previously mentioned kinds of materials.

When the Society for the Study of Symbolic Interaction formed in 1974, Blumer was an immediate supporter. His impact on symbolic interactionism has been permanently recognized by the society with its annual Herbert Blumer Award, which is given to the outstanding graduate student paper best representing the tradition associated with Blumer's scholarship.

See also: Mead, George Herbert (1863–1931).

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Boas, Franz (1858–1942)

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Franz Boas was born in Minden, Germany to a family of merchants. He graduated from the University of Kiel (Ph.D., 1881), specializing in psychophysics and geography. His first field work was conducted in Baffin Land in 1883; apparently this is when the focus of his interests began to shift from geography to anthropology. He came to the United States in 1886, working for a time at assorted jobs, including teaching, and managing anthropology exhibits at the Chicago World's Fair (1892–1895). In these years he also began his long examination of Kwakiutl, Tsimshian, and other Northwest Coast languages and cultures.

In 1899 he secured an appointment at Columbia University, an affiliation he retained for the rest of his life. He was a master of administration and fund raising. From his secure academic position, he soon made Columbia the source from which the professionalization of American anthropology would spread, shifting its focus from museums of artifacts to academic and field research, with linguistics as a core discipline. He strove always to reorient the field away from racism, whether overt or tacit.

As the developer and impresario of modern American anthropology and the mentor of many of its leading figures, he made an immensely significant contribution to American linguistics. Further, as a linguist in his own right, his contribution was highly respectable. Boas was self-taught in linguistics. He was more successful in establishing standards for linguistic field work than in re-inventing historical and comparative linguistics as a tool of culture history. His background in perceptual psychology led him to publish (1889) an insight into naïve impressions of foreign language sounds that is a very early and independent expression of what became the phonemic principle. The magnitude of his overall contribution to the development of field linguistics and the study of Native American languages, even after making allowances for the personal contributions of Edward Sapir, his brilliant student, and Leonard Bloomfield, his friend, is only slightly exaggerated in Bloomfield's memorial statement (1943: 198): "Boas amassed a tremendous body of observation, including much carefully recorded text, and forged, almost single-handed, the tools of phonetic and structural description."

See also: Bloomfield, Leonard (1887–1949); Canada: Language Situation; Cultural Evolution of Language; Linguistic Anthropology; Primitive Languages; Relativism; Sapir,

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Body Language

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Body Language as Human Semiosis

Body language belongs to the sphere of anthroposemiosis, the object of anthroposemiotics (*see* **Anthroposemiotics**). In fact, the term 'language' in today's semiotics is specific to human semiosis (i.e., human sign behavior).

Following Charles Morris's and Thomas Sebeok's terminological specifications, semiotics describes sign behavior with general reference to the organism (i.e., it identifies semiosis and life), and distinguishes between 'signs in human animals' and 'signs in nonhuman animals,' reserving the term language as a special term for the former. In others words, language is specific to man as a semiotic animal – that is, as a living being not only able to use signs (capable of semiosis) but also able to reflect on signs through signs (capable of semiotics). In this acceptation, language is not verbal language alone: Language refers to both verbal and nonverbal human signs. In this view – that is, from a semiotic and not a linguistic perspective (pertaining to linguistics) – language is not reduced to speech but speech is a specification of language. Language is acoustic language as much as the gestural or the tactile, etc., depending on the kind of sign vehicle that intervenes, which is not necessarily limited to the verbal in a strict sense. Following Morris (1946/1971a: 112–114), there are five criteria for the definition of language:

1. Language is composed of a plurality of signs.
2. In a language each sign has a signification common to a number of interpretants: this is linguistic signification, common to members of the interpreter-family, whereas there may, of course, be differences of signification for individual interpreters, but such differences are not then regarded as linguistic.
3. The signs constituting a language must be 'comsigns' – that is, producible by the members of the interpreter-family. Comsigns are either activities of the organisms (e.g., gestures) or the products of such activities (e.g., sounds, traces left on a material medium, or constructed objects).
4. The signs that constitute a language are plurisituational signs – that is, signs with a relative constancy of signification in every situation in which a sign of the sign-family in question appears.
5. The signs in a language must constitute a system of interconnected signs combinable in some ways and not in others in order to form a variety of complex sign-processes.

If language is considered as synonymous with 'communication,' animals no doubt also possess language. If, on the contrary, language is distinguished from communication and determined by the five criteria mentioned previously, then animals certainly do not have language, although they do communicate. Even if some of the conditions that enable us to speak of language would seem to occur in animals, they do not occur together.

On this subject, the following statement by Morris (1946/1971a: 130) seems important:

> But even if these conditions were met [i.e., if all the other requirements were met in nonhuman animal communication], the fifth requirement is a harder hurdle. For though animal signs may be interconnected, and interconnected in such a way that animals may be said to infer, there is no evidence that these signs are combined by animals which produce them according to limitations of combinations necessary for the signs to form a language system. Such considerations strongly favor the hypothesis that language – as here defined – is unique to man.

Edward (1884–1939); Structuralism; United States of America: Language Situation.

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This means that by comparison with animal signs, human language is characterized by the fact that its signs can be combined to form compound signs. It would seem, therefore, that in the last analysis, this 'capacity for combination' is the most distinctive element. This conception is very close to Sebeok's when he states that language (he too distinguishing it from the communicative function) is characterized by 'syntax' – that is, the possibility of using a finite number of signs to produce an infinite number of combinations through recourse to given rules.

Body language includes different sign systems. Common to these sign systems is their foundation in language intended as a specific human modeling device (Sebeok, 1991, 2001b).

All animal species have models to construct their world, and language is the model belonging to human beings. However, the distinctive feature of language with respect to other zoosemiotic systems (although this feature is present in endosemiotic systems, such as the genetic code, the immune code, the metabolic code, and the neural code) is syntax, through which the same construction pieces may be assembled in an infinite number of ways. Consequently, the human primary modeling system can produce an indefinite number of models and worlds.

All species communicate in a world peculiar to that species alone ensuing from the type of modeling characteristic of that species. In the early stages of its development, the hominid was endowed with a modeling device able to produce an infinite number of worlds. This explains the evolution of hominids into *Homo sapiens sapiens*. The reason why it is possible for such animals to produce a limitless number of worlds is that the human modeling device, or language, functions in terms of syntax – that is, in terms of construction, deconstruction, and reconstruction with a finite number of elements that may be composed and recomposed in an infinitely great variety of different forms. We are referring to the human ability to reflect on sign materials, means, and models (i.e., on that which has already been modeled), to the end of using such materials in new modeling processes. This is what is intended by specific human semiosis – that is, 'semiotics.' Body languages are semiotical.

Body Language and the Sign–Body General Connection

The previous discussion demonstrated the connection with body language and human semiosis. However, body language belongs to the general connection between signs and bodies that is found in all the universe of life (i.e., in all planetary semiosis). This implies continuity from nonhuman animal signs to human signs. As Morris (1946/1971b: 13) concludes his discussion of the distinction between nonhuman animal signs and human signs, human language (and the postlanguage symbols it makes possible) goes far beyond the sign-behavior of animals. On this subject, the following observation is similar to Sebeok's conception of human signs:

> But language-behavior is still sign-behavior, and language signs rest upon, and *never completely take the place of* [italics added], the simpler signs which they presuppose. The continuity is as real as the discontinuity, and the similarity of human and animal sign-behavior as genuine as the difference.

All sign processes include the body in some sense because the entire sign process takes place in a biological, social, or technical medium; it must have a channel of access to the object interpreted. Channels and media are different and consequently have different ways to connect sign and body. The source may be (1) an inorganic body, such as a natural inorganic object or manufactured inorganic object, and in this case, the interpreted may be a sign only because it receives an interpretation from the interpreter ('semiosis of information'), or (2) an organic substance or a living being (organism or components) belonging to *H. sapiens* or speechless creatures ('semiosis of symptomatization,' in which the sign is unintentional, and 'semiosis of communication,' in which the sign is intentional). In body signs of symptomatization semiosis (symptoms, clues, and traces) the interpreted sign is already an interpretant response before being interpreted as a sign by an interpretant. However, this response is not oriented to being interpreted as a sign; that is, it does not come to life for the purpose of being interpreted. On the contrary, in semiosis of communication where too the interpreted is already an interpretant response before being interpreted as a sign by the interpretant, this interpretant response is intended to be interpreted as a sign.

When an organism or a machine takes an object as a sign of another object, it must have a 'channel,' a passageway to access it. Possible channels are gases, liquids, and solids with regard to matter; they are chemical and physical with regard to energy. Concerning the latter, channels may be acoustic (air, water, and solids) or optical (reflected daylight or bioluminescence; Sebeok, 1991: 27–28), tactile, chemical, electric, magnetic, or thermal. Semiosis may engage several channels and also a simultaneous use of more than one channel, as is frequently the case in human communication.

'Medium' can be used as a synonym of channel (Sebeok, 1991: 27), but medium is also the world in

which semiosis takes place. It may be a biological, social, or technical medium. In this double sense that connects medium to model and modeling, we may refer to semiosis in the world of technical instruments and social institutions. In any type of semiosis there is a connection between signs and bodies, signata and signantia, media/channels and significata, semiosis and materiality. Materiality of the signans (Petrilli, 1990: 365–401; Rossi-Landi, 1992: 271–299) is not limited to extrasign materiality, physical materiality (the body of the signans and its channel), and instrumental materiality (nonsign bodily residues of nonverbal signs, i.e., their nonsign uses and functions; Rossi-Landi, 1985: 65–82). More than this, materiality of the signans is 'semiosic materiality,' and in the sphere of anthroposemiosis it is also 'semiotic materiality.' Semiotic materiality is historicosocial materiality at more or less high levels of complexity, elaboration, and/or articulation (elaboration materiality). It is ideological materiality, extraintentional materiality (i.e., objectivity independent from consciousness and volition), as well as signifying otherness materiality (i.e., the possibility of engendering other signata than the signatum of any specific interpretive route) (Ponzio, 1990: 15–61, 1994: 42–45). Signs are bodies. However, the physical object may be transformed into a sign while still belonging to the world of physical matter due to 'sign work,' to use Rossi-Landi's terminology. As a sign, the physical body acquires meaning engendered in the relation to something else, it defers to something external to itself, and it reflects and refracts another reality from itself (Voloshinov, 1929/1973: 10):

> Signs also are particular, material things; and ... any item of nature, technology, or consumption can become a sign acquiring in the process a meaning that goes beyond its given particularity. A sign does not simply exist as a part of reality – it reflects and refracts another reality.

The following distinction is proposed: The expression 'semiosic corporeality' is used for bodies that have become signs in a world modeled by living beings where sign processes are languageless, and semiotic corporeality is used where bodies that are signs presuppose a world modeled by language (i.e., a human world).

As Marx (Marx and Engels, 1845/1968: 42), suggested, "From the start the 'spirit' is afflicted with the course of being 'burdened' with matter, which here makes its appearance in the form of agitated layers of air, sounds, in short, of language." Here, language is "agitated layers of air, sounds": This is about its physical materiality. However, language is also human consciousness and the organization of human life: This is about the semiotic materiality of language as human primary modeling. "Language is as old as consciousness, language is practical consciousness that exists also for other men, and for that reason alone it exists for me personally as well" (Marx and Engels, 1845/1968: 42). Language is "the immediate actuality of thought. ... Neither the thought, nor the language exist in an independent realm from life" (Marx and Engels, 1845/1968: 503–504).

As a body, the sign is material in a physical sense; as sign, it is material in a semiosic sense; and as human historicosocial matter, it is material in a semiotic sense. In human worlds modeled by language, a body is a sign because of its historicosocial materiality. It is this kind of materiality that interests us when a body is taken into consideration and studied as a human sign (i.e., in a semiotic framework).

The Body in the Sign

In contemporary general semiotics, of which the most holistic expression is Sebeok's 'global semiotics,' the criterion of life (i.e., of living body) is semiosis. Using the formula employed by Marcel Danesi to sum up Sebeok's conception of the semiosic character of living beings, we may say that the body is in the sign (i.e., life is defined by semiosis). In the human animal, or 'semiotic animal,' this means that semiosis is the bond that links together body, mind, and culture (Danesi, 1998: 16). Studies on the manifestation patterns of semiosis in nature and culture show persuasively that in anthroposemiosis there exists an inextricable nexus among sign, body, and culture.

The type of sign (according to Charles S. Peirce's typology of signs), in which the body lives and organizes its world on the basis of its species-specific modeling device, is first and foremost the 'icon.' In other words, iconicity is a basic signifying strategy in various life-forms. The iconic mode of representation is the relation of the sign with its referent through replication, simulation, imitation, or resemblance. Iconicity is the default form of semiosis, as Sebeok demonstrated by documenting that in vastly different species the manifestation of the capacity to produce signs stands in some direct simulative relation to their referents. In his works, Sebeok showed the variety of manifestations of iconicity in different species. Iconic signs can thus be vocal, visual, olfactory, gustatory, or tactile in their form. It may be that in humans too all signs start out as a simulative relation to their referential domains. Like Peirce, Sebeok viewed iconicity as the primordial representational strategy in the human species. Danesi (1998: 10) considers iconicity as an aspect of utmost relevance in the study of signs.

He emphasizes the important role of iconicity – documented by Sebeok especially in the final three chapters of his 1986 book – in the bond that links semiosis, body, mind, and culture. This inextricable nexus manifests itself in the form of iconical representational behavior. "Iconicity is, in effect, evidence of this nexus" (Danesi, 1998: 37).

Danesi (1998: 18–20) refers to the conception that the iconic mode of representation is the primary means of bodily semiosis as the 'iconicity hypothesis.' Consequently, another principle of global semiotics or semiotics of life is the 'sense-implication hypothesis' (Danesi, 1998: 17), which suggests that semiosis is grounded in the experiential realm of sense. This principle has a philosophical antecedent in John Locke – according to which all ideas came from sensation first and reflection later – but it is connected with modeling theory: what is acquired through the body is modeled differently through the innate modeling system possessed by different species. In fact, a species perceives according to its own particular anatomical structure and to its own particular kind of modeling system. Due to its species-specific modeling system, called language by Sebeok, *Homo*, the semiotic animal, not only is a sophisticated modeler of the world but also has a remarkable ability to re-create his world in an infinite number of forms.

The living body is initially an iconic sign – that is, in a world iconically modeled. This is valid too in the case of the human species on the ontogenetic and phylogenetic levels. Natural learning flow (i.e., the semiosic process in which children acquire knowledge) takes place through the body and human primary modeling system and proceeds from iconicity to the forms of modeling that children learn in the cultural context. To recognize that the body is, lives, in the sign with reference to human ontogenetic development in the body–sign–culture relation implies, as Danesi (1998: 61) states, that the semiosic capacities of the learner and the determination of his or her semiosic stage – rather than the subject matter to be learned – should therefore be the focus of education. The main implication of the formula 'the body in the sign' and modeling theory for education is of a methodological nature. If the teacher is familiar with the forms of the semiosic process in human learning, he or she would be in a better position to help the learner acquire knowledge and skill more effectively and efficiently. In fact, the key to successful learning, states Danesi, lies, arguably, in determining at what point the learning phase is ready to be overtaken by the following – that is, what the Russian psychologist Vygotsky (1934/1962) called the 'proximal zone' of learning. The semiotic approach to education, as the psychologist and semiotician Vygotsky claimed, is indispensable for an appropriate foresight of the 'zones of proximal development' of each particular learner.

The Body in the Languages of Globalization and 'Grotesque Realism'

Here, another argument is added to those proposed by Danesi in order to consider the implications of the formula 'the body in the sign' for education. Included as goals in education are the capacity for criticism, social conscience, and responsible behavior. On this subject, the previously mentioned formula has implications for an adequate consciousness and comprehensive interpretation of communication under present-day semiosis conditions (i.e., in the phase named 'globalization').

In the current age, characterized by the automated industrial revolution, the global market, consumerism, and the pervasiveness of communication through the whole production cycle (communication – production, communicative exchange, and consumption of goods that are messages), 'the body in the sign' highlights that globalization and therefore languages of globalized communication incorporate human life in all its manifestations. 'Life in all its manifestations' refers to life in the form of development (well-being and consumerism) as well as in the form of underdevelopment (poverty and impossibility of survival); in the form of health and of disease; in the form of normality and deviation; in the form integration and emargination; in the form employment and unemployment; in the form functional transfer of the workforce, characteristic of emigration and migration, which expresses the denied request of hospitality; and in the form of exposition to war disseminated at a worldwide level, and planned as infinite. Again, incorporation of the body in the languages of globalized communication is not limited to human life alone. Life over the whole planet is now involved (even compromised and put at risk).

The planetary perspective of global semiotics allows for the necessary distance and indeclinable responsibility (a responsibility without alibis) for an approach to contemporaneousness that does not remain imprisoned within the confines of contemporaneity itself.

The controlled insertion of bodies into languages of the production apparatus of global communication goes hand in hand with the spread of the concept of the individual as a separate and self-sufficient entity. The body is understood and experienced as an isolated biological entity, as belonging to the individual, as an autonomous sphere of private interests. Such an attitude has led to the almost total extinction of cultural practices and worldviews based on

intercorporeality (i.e., reciprocal interdependency), exposition and opening of the living body. Think of the ways the body is perceived in popular culture, discussed by Bakhtin (1965) in the forms of carnival and grotesque realism, where the body and corporeal life generally are conceived neither individualistically nor separately from the rest of terrestrial life and, indeed, from the world.

We refer to verbal and nonverbal languages of the grotesque body that we may find in all cultures on the planet and in the literary carnivalized genres of all national literatures. Grotesque realism presents the body as something that is not defined once and for all, that is not confined to itself, but as flourishing in symbiosis with other bodies, in relations of transformation and renewal that far exceed the limits of individual life.

Globalization, in which communication is exploited for profit, does not weaken the individualistic, private, and static conception of the body, connected with the rise of the bourgeoisie, but, on the contrary reinforces it. Division and separatism among the sciences are functional to the ideological–social necessities of the 'recent new cannon of the individualized body' (Bakhtin, 1965). This in turn is functional to the controlled insertion of bodies into the languages of the reproduction cycle of today's production system. The interdisciplinary focus of global semiotics and attention on the signs of the interconnection between living bodies, human and nonhuman, are the presuppositions of an education that is free from stereotyped, limited, and distorted ideas and practices of communication under present-day conditions. This is another implication of the semiotic global approach for education and another possible meaning of the proposition chosen by Danesi to sum up what Sebeok said: 'The body is in the sign' – that is, semiosis is the bond that links the body, the mind, and culture.

Body Language and Speech in Human Phylogenesis

It appears virtually certain that early hominid forms that evolved to *Homo erectus* had language as an interior modeling device, although not speech. As previously mentioned, a modeling system is a tool with which an organism analyzes its surroundings. Language as a modeling system seems to have always been an exclusive property of the species *Homo*. It is an original *lingua mutola* (a mute, speechless language) described by Giambattista Vico in *La scienza nuova*, and which consists in the inventive, 'poetic' capacity to model different possible worlds at the basis of communication among members of the early hominid species.

According to Sebeok's (2001a: 17–30) reconstruction, hominids to *H. erectus* (included) communicated with each other by nonverbal means, in the manner of all other primates. However, differently from the latter, its body signs were already body languages because they were founded on a specific human primary modeling device. *Homo habilis* ('handy man,' 2.4–2.0 million years ago) and *H. erectus* ('upright man,' more than 1.5 million years ago) with a brain volume of 800–1200 cm^3 and a far more elaborate tool kit (including fire), had language, but not speech, and communicated with mute body languages (i.e., in an articulate and organized world on the basis of syntax inherent to human primary modeling). Speech did not appear until our own immediate archaic *sapiens* ('wise man') ancestors appeared (approximately 300 000 years ago), who, as indicated by evidence from rule-governed behavior, not only had language but also manifested it in the form of speech.

Thus, although language as a specific human primary modeling system emerged on the scene perhaps 2.5 or 3.0 million years ago, verbal language or speech appeared solely in *H. sapiens* as a communication system and developed slowly in *H. sapiens sapiens* also as a cognitive system, namely as a secondary modeling system. However, the human nonverbal system had body languages as communicative devices implicating, similarly to future speech, language not reducible to a communicative device: The specific function of language in the evolution of anthroposemiosis was not to transmit messages and give information but to model species-specific human worlds. Following Sebeok, we may say that language is essentially 'mind work,' whereas speech is 'ear and mouth work.'

The relatively simple, nonverbal models that nonhuman animals live by, that hominids used to communicate, and that normal human infants (*in-fans*) likewise employ are indeed kinds of primary modeling. Consequently, the sign systems of nonhuman animals are merely body sign systems, whereas sign systems of the human animal (semiotic animal) including hominids and today's normal infants are body languages. However, as a type of primary modeling, all these models are more or less pliable representations that must fit 'reality' sufficiently to tend to secure survival in one's Umwelt.

Such 'top-down' modeling (to use a current jargon borrowed from the cognitive sciences) can persist and become very sophisticated indeed in the adult life of exceptionally gifted individuals, as borne out by Einstein's testimonial or by what we know about Mozart's and Picasso's abilities to model intricate auditory or visual compositions in their heads in

anticipation of transcribing this onto paper or canvas. This kind of nonverbal modeling is indeed primary, in both a phylogenetic and an ontogenetic sense. Syntax makes it possible for hominids not only to represent immediate 'reality' (in the sense discussed previously) but also, uniquely among animals, to frame an indefinite number of possible worlds in the sense of Leibniz (Sebeok, 1991: 57–58).

Dialogism of Body Language

In Bakhtin's view, dialogue consists of the fact that one's own word alludes always and in spite of itself, whether it knows it or not, to the word of the other. Dialogue is not an initiative taken by self. As clearly emerges from Bakhtin's analysis of novels by Dostoevsky, the human person does not enter into dialogue with the other out of respect for the other but, rather, in spite of oneself. Both word and self are dialogic in the sense that they are passively involved with the word and self of the other. Internal and external verbal discourse is implied dialogically in otherness, just as the 'grotesque body' (Bakhtin, 1965) is implied in the body of the other. In fact, dialogue and body are closely interconnected. Bakhtin's dialogism cannot be understood separately from his biosemiotic conception of sign. On this basis, he criticized both subjective individualism and objective abstraction. According to Bakhtin, there cannot be dialogism among disembodied minds. Unlike platonic dialogue, and similarly to Dostoevsky, for Bakhtin, dialogue is not only cognitive and functional to abstract truth, but it is also a life need grounded in the inevitable interconnection of the self's body with the body of other.

For Bakhtin, dialogue is the embodied, intercorporeal expression of the involvement of one's body with the body of the other. The concept of the body as an individual, separate, and autonomous body is only an illusion. The image that most adequately expresses the condition of intercorporeity is the grotesque body (Bakhtin, 1965) in popular culture, in vulgar language of the public place, and in the masks of carnival. This is the body in its vital and indissoluble relation to the world and to the body of others.

In 1926, Bakhtin published an article on the biological and philosophical subject titled 'Contemporary vitalism' (signed by the biologist I. I. Kanaev, who subsequently declared that Bakhtin was the author). In his description of the interaction between living body and environment and opposing the dualism of life force and physical–chemical processes, Bakhtin maintained that the organism forms a monistic unit with the surrounding world. In his works of the 1920s, Bakhtin criticized both the vitalists and the reflexologists, as well as both Freudianism and mechanistic materialism (e.g., the mechanistic view of the relation between base and superstructure). In Bakhtin's view, each of these different trends is vitiated by false scientific claims that underestimate the dialogic relation between body and world. Such approaches either dematerialize the living body or physicalize it in terms of mechanistic relations.

Bakhtin formulated the category of 'carnivalesque' in his study on Rabelais, which he extended to culture at a world level insofar as it is human and not just Western culture. The carnivalesque participates in 'great experience,' understood as offering a global view of the complex and intricate life of bodies, signs, and languages. As Bakhtin shows in the 1963 edition of his book on Dostoevsky, dialogue in the polyphonic novel has its roots in the carnivalesque language of the grotesque body. Plurivocality, ductility, and ambiguity of sense in verbal language (the expression of centrifugal forces in linguistic life) are also connected with the grotesque body. This is especially evident in the double character of verbal and gestural 'language of the public place,' of vulgar expression that is simultaneously laudatory and offensive. Most interesting on this subject is Bakhtin's reference (in Voloshinov, 1929/1973) to Dostoevsky's notes on an animated conversation formed of a single vulgar bodily word used with different meanings.

Foremost Expressions of Body Language

On the basis of the discussion of an issue that is essentially methodological and that also concerns body language (which coincides with the human semiosphere; i.e., the special semioses characteristic of the semiotic animal, the sole animal gifted with the primary modeling device called language by Sebeok), we may now consider some exemplars of body language.

As the expression of body language, we have already discussed such human signs as gesture, face expression, vocal songs, and bodily movements used to communicate in phases antecedent to verbal language (i.e., speech) on both the phylogenetic and the ontogenetic level. These are nonverbal signs used by infants and hominids before the advent of *H. sapiens*.

Body language includes signs studied by physiognomics – the discipline that studies the relations between bodily characteristics, especially facial features, and psychic characters of the human individual. In semiotics, an important work on the bond between body and temperament is *The open self* by Charles Morris (1948), who used the typology ('endomorphy,' 'mesomorphy,' and 'ectomorphy') proposed by psychologist William H. Sheldon in

The varieties of human physique and *Varieties of temperament* from a semiotic perspective.

Body language involves modifications of the cultural body, which belong to some complex sign system or merely to the binary presence/absence system, in a wide range of cultural alterations operated on the body from brands, tattoos, the stripping of the flesh, and piercing to maquillage, including the use of belladonna to dilate the pupils. Body language also includes dance, especially ritual dances, in which any small body movement can have a precise meaning.

We have also mentioned cultural modifications in the distinctive pheromonal function of the human chemical signature now studied by semiochemistry (Sebeok, 2001b: 96). On this subject, Sebeok cited both the novel *Das perfume* by Patrick Süskind, based entirely on the indexical facets of human semiochemistry, and a passage from Peirce concerning the study of odors as signs, with special reference to women's favorite perfumes. Human odors are classified by Sebeok as indexical signs, but this body language also has an iconic aspect (i.e., it also signifies on the basis of similarity): In the passage cited by Sebeok, Peirce's comment is the following: "Surely there must be some subtle resemblance between the odor and the impression I get of this or that woman's nature" (Sebeok, 2001b: 313).

Signs of body language are also signs that relate to phrenology, anthropometry, palmistry, and graphology or practices such as handwriting authentication and identification by fingerprinting or by individual unique sequences of DNA molecules. Moreover, body language is studied by the branch of semiotics called proxemics – that is, the semiotics of interpersonal space, originally developed by Edward T. Hall in the context of cultural anthropology.

Finally, body language includes such human sign systems as the 'sign language' of the American Indians (Sebeok, 1979), monastic signs (Sebeok and Umiker-Sebeok, 1987), and the language of deaf-mutes. The latter is further proof of the fact that man as a semiotic animal is not the speaking animal but the animal that is endowed with language, the primary modeling device. It is not true that dogs only lack speech. Dogs and other nonhuman animals lack language. Instead, the deaf-mute only lacks speech, as a pathology. This means that other nonverbal systems, such as the gestural, can be grafted onto the human primary modeling device. Also, due to these sign systems the deaf-mute is able to accomplish the same inventive and creative mental functions as any other human animal.

It must be emphasized that the connection between verbal language and body language largely depends on their common participation in language understood as human primary modeling.

Concerning verbal intonation, and specifically the important phenomenon of language creativity called 'intonational metaphor,' Bakhtin (1926/1983) observed that an intimate kinship binds the intonational metaphor in real-life speech with the 'metaphor of gesticulation.' In fact, the word itself was originally a 'linguistic gesture,' a 'component of a complex body gesture,' understanding gesture broadly to include facial expression, gesticulation of the face. Intonation and gesture belong to body language, and they express a living, dynamic relationship with the outside world and social environment.

By using intonation and gesticulation, stated Bakhtin (1926/1983), an individual takes up an active social position with regard to certain values. Of course, this position is conditioned by social instances. Verbal intonation and gesture participate in the creative modeling of human language. In this sense, they belong to the anthroposemiotic bond relating sign–mind–culture. In this bond also reside the aesthetic–creative forces of body language that create and organize artistic forms.

See also: Anthroposemiotics; Biosemiotics; Gesture: Sociocultural Analysis; Gestures: Pragmatic Aspects; Indexicality: Theory; Kinesics; Performance in Culture; Semiotic Anthropology; Sign Language: Overview; Significs: Theory; Silence: Cultural Aspects; Social Semiotics; Structuralism.

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Boeckh, August (1785–1867)

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August Boeckh (**Figure 1**) was born in Karlsruhe on November 24, 1785, as the son of court secretary and notary Georg Matthäus Boeckh (1735–1790). Following the advice of his mother, he attended the well-known 'Gymnasium illustre' in Karlsruhe, where he received a special education under the supervision of mathematician and physicist Johannes Lorenz Böckmann (1741–1802), graduating as *Candidatus theologicus*. The influence of Schleiermacher and Friedrich August Wolf (1759–1824) led Boeckh to break off his theological studies in 1805 and devote himself to the study of Greek antiquity. Completing his studies in 1806, Boeckh went to Berlin to attend the 'Seminar für gelehrte Schulen,' directed by J. J. Bellermann, then headmaster of the Gymnasium 'Zum Grauen Kloster.' As a member of the seminar, Boeckh taught Latin, French, and history. He soon developed a friendship with Professors Buttmann and Heindorf, with whom he founded the *Berliner Griechische Gesellschaft*, also known as *Graeca*. After finishing his dissertation at Halle University, he moved to Heidelberg. He immediately passed his *Habilitation,* thereby obtaining an *Extraordinariat*, which was raised to an *Ordinariat für Klassische Philologie* in 1809, in the seminar founded by Friedrich Creuzer (1771–1858). Through cordial relations with Clemens Brentano (1778–1842) and Achim von Arnim (1781–1831), Boeckh introduced in detail Schleiermacher's Plato translations in the *Heidelbergische Jahrbücher*. Two years later, W. von Humboldt offered him a professorship in Berlin, where he earned high praise in the organization of teaching and research at the newly founded university. In 1812, the philological seminar, developed

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August Boeckh (Figure 1) was born in Karlsruhe on November 24, 1785, as the son of court secretary and notary Georg Matthäus Boeckh (1735–1790). Following the advice of his mother, he attended the well-known 'Gymnasium illustre' in Karlsruhe, where he received a special education under the supervision of mathematician and physicist Johannes Lorenz Böckmann (1741–1802), graduating as *Candidatus theologicus*. The influence of Schleiermacher and Friedrich August Wolf (1759–1824) led Boeckh to break off his theological studies in 1805 and devote himself to the study of Greek antiquity. Completing his studies in 1806, Boeckh went to Berlin to attend the 'Seminar für gelehrte Schulen,' directed by J. J. Bellermann, then headmaster of the Gymnasium 'Zum Grauen Kloster.' As a member of the seminar, Boeckh taught Latin, French, and history. He soon developed a friendship with Professors Buttmann and Heindorf, with whom he founded the *Berliner Griechische Gesellschaft*, also known as *Graeca*. After finishing his dissertation at Halle University, he moved to Heidelberg. He immediately passed his *Habilitation,* thereby obtaining an *Extraordinariat*, which was raised to an *Ordinariat für Klassische Philologie* in 1809, in the seminar founded by Friedrich Creuzer (1771–1858). Through cordial relations with Clemens Brentano (1778–1842) and Achim von Arnim (1781–1831), Boeckh introduced in detail Schleiermacher's Plato translations in the *Heidelbergische Jahrbücher*. Two years later, W. von Humboldt offered him a professorship in Berlin, where he earned high praise in the organization of teaching and research at the newly founded university. In 1812, the philological seminar, developed

Figure 1 August Boeckh 1857 (Berlin, Stadtmuseum Berlin. Fotografie: Christel Lehmann).

and directed by Boeckh, was raised to university level. Along with Schleiermacher, Savigny, and the anatomist Carl Asmund Rudolphi (1771–1832), Boeckh joined a commission charged with evaluating the university statutes that were introduced at the *Alma mater Berolinensis* in 1817.

A large part of Boeckh's scientific lifework emerged within the context of the Prussian Academy of Sciences, to which he was admitted in 1814. As successor of his friend Schleiermacher, Boeckh was secretary of the humanities section for 27 years (1834–1861). In 1815, he initiated on behalf of the Academy the four-volume *Corpus Inscriptionum Graecum* (CIG), published between 1825 and 1859. The ambitious enterprise of collecting all antique inscriptions led to Boeckh's reputation as the father of epigraphy and initiated the monumental academy projects successfully implemented by his successors Mommsen, Harnack, Wilamowitz, and Diels.

Boeckh was no armchair philologist. Besides lecturing and his academy work, he took on increasingly administrative tasks within the framework of building and extending the university. He was dean for the first time in 1814/1815, and was elected *Rektor* first in 1825. He held this office five times consecutively, last in 1860 at the age of nearly 75, when Berlin University celebrated its 50th birthday.

Boeckh's commitment reached far beyond the university. Not only did he remain interested throughout his life in political issues, he also participated actively on a regular basis. This is illustrated, e.g., by his commitment to the reform of the Prussian teacher education program and becomes even clearer by his dedication to German unification and academic freedom.

Boeckh's high offices at the university and the Academy, combined with his indisputable intellectual authority as a scholar, made him an important contact person for both court and state. He was careful, however, to preserve his independence, merely accepting the title of *Geheimer Regierungsrat*. In 1832, he ostentatiously declined working for the censorship agency, followed by his refusal to become *Kultusminister* in 1848.

Even without a political office, Boeckh exerted considerable influence over the intellectual life of his time, transcending the university and the academy. By accepting the philology chair, Boeckh had become *Professor eloquentiae et poeseos*. This position included not only formulating a foreword for the lecture timetable each semester and composing all Latin university documents, it also involved being the university's main speaker on festive occasions, a task he conscientiously fulfilled until shortly before his death. Boeckh's personal correspondence provides evidence that limitations on freedom of speech made this by no means easy for him. Yet Boeckh, who called himself a 'Protestant' in the actual sense of the word, never deviated from his personal opinion. His numerous speeches, which focused on the concept of academic freedom, profess a liberal point of view and a pugnacious humanism. Academic freedom found in him one of its most eloquent and persistent defenders.

Boeckh was married twice. In 1809 he married Dorothea Wagermann, the daughter of superintendent general Gottfried Wagermann. After her early death, Boeckh married Anna Taube in 1830. On August 3, 1867, August Boeckh died at the age of 82 as a result of lung disease.

Boeckh began with studies on Plato (especially 'Timaios') and the Pythagorean Philolaos, using his thorough mathematical education. Through Greek musical studies he discovered the field of Greek metrics. In Berlin, Boeckh developed a special interest in rhetorical-antiquarian matters, due to B. G. Niebuhr's influence. In 1817, he published *Die Staatshaushaltung der Athener*, the first Attic economic history. In the foreword, he articulates his wish that science should expand from a one-sided linguistic approach to an all-comprehensive exploration of Greek life. Boeckh did theoretically design and practically implement an extensive science of classical antiquity, comprising as equal components of a complex whole all areas of life and all of its cultural expressions. The over-enthusiastic plan of his youth to create a cultural-historical *oeuvre* entitled 'Hellen,' – intended to present an overall picture of Greek life in all of

its political, economic, religious, and intellectual facets – remained beyond his reach, mainly due to the existence of only insufficient preparatory work, or none at all, for too many sections of his envisioned composition. He never discarded his central idea of an interdisciplinary, cultural-study-based approach to classical antiquity. Instead, he advanced to heading the realistic philological school in opposition to the linguistic-text-critical school or so-called 'Wortphilologie,' of Gottfried Hermann (1772–1848). Hermann and his supporters argued that only through language could "everything else that characterizes a people be comprehended and understood." The dispute, begun with a review by Hermann of the first issue of CIG journal, continued for several years. Besides his interdisciplinary emphasis, it is especially Boeckh's insistence on a solid methodological basis for every research that casts him in such a modern light. His famous lecture on *Encyklopädie und Methodologie der Wissenschaften*, given regularly between 1809 and 1865, should be required reading for every philologist even today.

See also: Greek, Ancient; Humboldt, Wilhelm von (1767–1835); Paleography, Greek and Latin; Wolf, Friedrich August (1759–1824).

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Boethius of Dacia (fl. 1275)

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Boethius of Dacia, also known as Boethius the Dane and Boethius of Sweden, was born in the early 13th century. He was associated with the University of Paris as a teacher of philosophy and grammar, and his theory of language and grammar was based in the Averroist tradition of Aristotelian philosophy. Also called a 'radical Aristotelian,' Boethius found many of his philosophical writings condemned in 1270 and again in 1277 by the Bishop of Paris. It is possible that later in life, Boethius joined the Dominican Order and probably served in Dacia, Romania.

As a grammarian, Boethius was part of a group of like-minded thinkers called the 'Modistae.' The Modistae produced written works on the nature of language based on the then-recently rediscovered philosophies of the ancient Greeks, particularly Aristotle. They developed the notion of 'speculative grammar,' or the function of language as a mirror of what is real in the world. Boethius wrote on the nature and origin of grammar, including parts of speech in *Modi Significandi sive Quaestiones Super Priscianum Maiorem* (1980). In this work, he broke with the linguistic philosophy of Priscian by establishing grammar as a science:

> Quia ergo ea, de quibus est grammatica, sunt comprehensibilia ab intellectu et habent causas *per se*, ideo grammatica est scientia. ('Because, therefore, those things with which grammar is concerned are comprehensible by the intellect and have causes *per se*, it follows that grammar is a science.') (Quote and translation from McDermott, 1980.)

Boethius believed that philosophy and grammar were intertwined:

> One ought to be grammarian, in order that he might consider modes of signifying; a philosopher, so as to consider the properties of objects, and a philosopher-grammarian so as to derive the modes of signifying from the properties of objects. (Translation from McDermott, 1980.)

His belief that the human soul was not immortal, that the world was eternal, as well as his association

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with other Averroists such as Siger of Brabant, ultimately resulted in the condemnation of his writings by Etienne Tempier, bishop of Paris, in 1270 and again in 1277. Many of his writings are either lost or remain unedited. His three best-known works are *De summo bono* ('On the supreme good'), *De aeternitate mundi* ('On the eternity of the world'), and *De somniis* ('On dreams'). Although he professed his faith in Christ as a Christian and may have joined the Dominican Order, his philosophical theories kept him at odds with the church for the remainder of his life. The exact date and place of his death are unknown.

See also: Aristotle and Linguistics; Aristotle and the Stoics on Language; Priscianus Caesariensis (d. ca. 530).

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Böhtlingk, Otto Nikolaus (1815–1904)

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Born into a family of a German merchant in St Petersburg, Russia, Otto von Boehtlingk studied Oriental Languages at the university of his native city, but in 1835 he moved to Germany, where he felt that his interest in Sanskrit could be satisfied. After a short time in Berlin, he finished his studies in Bonn as a pupil of August Wilhelm von Schlegel and Chr. Lassen. In Bonn he published his first work, the Sanskrit grammar of Pānini with Indian scholia and his own commentary (Boehtlingk, 1839–1840).

In 1842 Boehtlingk returned to Russia to enter the Imperial Academy of Sciences in St Petersburg as a research fellow (he became a full member of the Academy in 1852). He published a series of articles on Sanskrit grammar, but the announced plan of an integral Sanskrit grammar never came into being. Instead, for a time he interrupted his work on Sanskrit and approached a new, pioneering task; the Academy commissioned him to systematize the Yakut data that had been collected by A. Th. von Middendorff's Siberian expedition. At that time, this unwritten peripheral Turkic language from Eastern Siberia was hardly known. Analyzing the received data and working with an informant he found in St Petersburg, Boehtlingk provided a descriptive work (Boehtlingk, 1851), which is still considered a classic in the field of Altaic studies. Boehtlingk adapted the ideas of early European typological theory (from W. von Humboldt, A. F. Pott, and H. Steinthal) for the practical analysis of an agglutinating language and used the methods of comparative and historical philology to distinguish the inherited Turkic vocabulary of Yakut from Mongolian and other borrowings.

The main work of Boehtlingk was the *Sanskrit dictionary* (Boehtlingk and Roth, 1855–1875), also known as the *St Petersburg dictionary*, which was compiled with assistance of Rudolf von Roth and other sanskritologists. It was the first European Sanskrit dictionary based not on Indian lexicographic works, but on the thorough study of primary texts. It was also a historical dictionary, representing the development of Sanskrit from the Vedic hymns through the late stages of the language. To complete his dictionary, Boehtlingk moved to Germany in 1868, with the permission of Russian authorities, where copious Sanskrit resources were available. He stayed in Germany until the end of his life, first in Jena and later in Leipzig. The so-called 'shorter version' of his Sanskrit dictionary (Boehtlingk, 1879–1889, also prepared with assistance of many sanskritologists) in fact includes an enlarged number of entries versus his earlier work; however, most of the examples were omitted from this version. An offspring of Boehtlingk's lexicographical work was a collection of Indian sayings (Boehtlingk, 1863–1865). During his life Boehtlingk published a number of Indian texts; his second edition of Pānini's grammar (Boehtlingk, 1887) contains not only the text and a German translation, but almost the half of the book consists of indices, word and root lists, grammatical commentaries, and other useful supplements.

See also: Panini; Sanskrit; Schlegel, August Wilhelm von (1767–1845); Turkic Languages; Yakut.

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Bolivia: Language Situation

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Bolivia is home to approximately 40 indigenous languages representing four distinct Amerindian stocks, an impressive degree of linguistic diversity (see **Figure 1**). Two European languages are also spoken: in addition to Spanish, Plautdietsch (Low German) is spoken in eastern Bolivia by Mennonites who emigrated from Canada (possibly via Mexico) to avoid conscription during World War I.

The best represented of the Amerindian stocks, in terms of number of living speakers, is Andean: Aymara and Quechua are spoken natively by millions of Bolivians. These languages are spoken primarily in the mountainous southwestern third of Bolivia. In recent years, the presence of Quechua and Aymara in urban centers further to the east has increased dramatically as speakers have migrated in search of better economic opportunities. A third Andean language, Leco, is nearly extinct, according to data from Bolivia's Rural Indigenous Census of 1994 (the source for all numerical figures in this article). Finally, Callahuaya (Callawalla), which blends Quechua morphosyntax with roots from Puquina, an extinct language of Peru, was a specialized (nonnative) language used by Incan herb doctors, and is still used by a few herb doctors today.

The great majority of Bolivia's languages spring from the Equatorial-Tucanoan and Macro-Panoan stocks (see **Figures 2** and **3**). A final group of three varieties – Besiro, as well as the now extinct Moncoca and Churapa – belong to the Chiquitano family, a linguistic isolate. (*Note:* the Ethnologue classifies Chiquitano as Macro-Ge. This is probably an oversimplification: Díez Astete and Murillo (1998: 75–76) indicated that Chiquitano is an artificial family constituted of more than 40 languages spoken by ethnolinguistic groups who were forcibly relocated in Jesuit missions

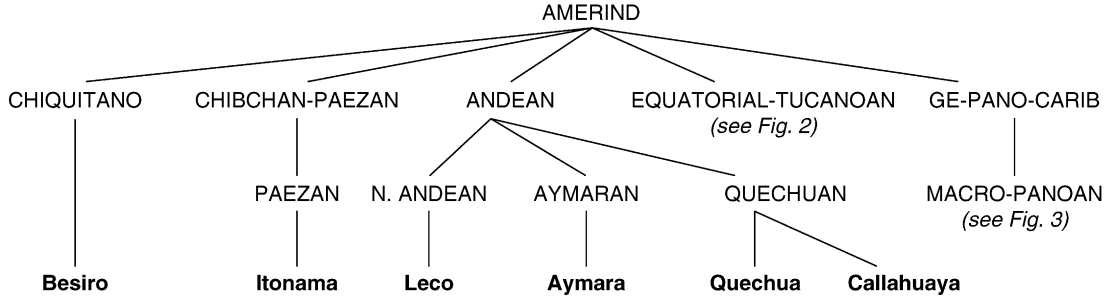

Figure 1 Macro-linguistic affiliation of Bolivian languages (References: Ruhlen, 1991; Ethnologue).

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Bolivia is home to approximately 40 indigenous languages representing four distinct Amerindian stocks, an impressive degree of linguistic diversity (see Figure 1). Two European languages are also spoken: in addition to Spanish, Plautdietsch (Low German) is spoken in eastern Bolivia by Mennonites who emigrated from Canada (possibly via Mexico) to avoid conscription during World War I.

The best represented of the Amerindian stocks, in terms of number of living speakers, is Andean: Aymara and Quechua are spoken natively by millions of Bolivians. These languages are spoken primarily in the mountainous southwestern third of Bolivia. In recent years, the presence of Quechua and Aymara in urban centers further to the east has increased dramatically as speakers have migrated in search of better economic opportunities. A third Andean language, Leco, is nearly extinct, according to data from Bolivia's Rural Indigenous Census of 1994 (the source for all numerical figures in this article). Finally, Callahuaya (Callawalla), which blends Quechua morphosyntax with roots from Puquina, an extinct language of Peru, was a specialized (nonnative) language used by Incan herb doctors, and is still used by a few herb doctors today.

The great majority of Bolivia's languages spring from the Equatorial-Tucanoan and Macro-Panoan stocks (see Figures 2 and 3). A final group of three varieties – Besiro, as well as the now extinct Moncoca and Churapa – belong to the Chiquitano family, a linguistic isolate. (*Note:* the Ethnologue classifies Chiquitano as Macro-Ge. This is probably an oversimplification: Díez Astete and Murillo (1998: 75–76) indicated that Chiquitano is an artificial family constituted of more than 40 languages spoken by ethnolinguistic groups who were forcibly relocated in Jesuit missions

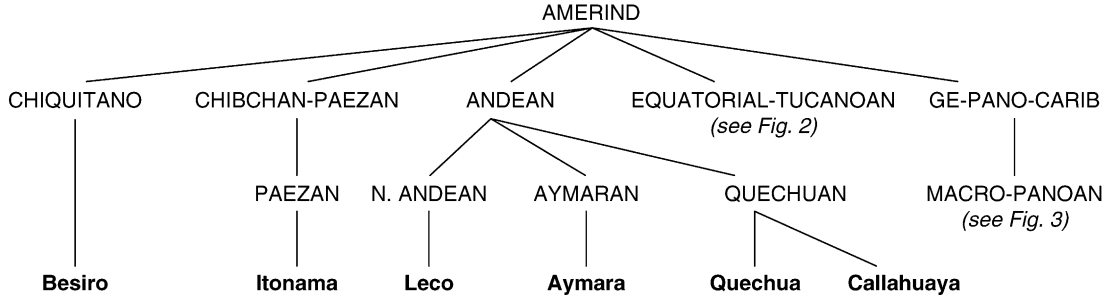

Figure 1 Macro-linguistic affiliation of Bolivian languages (References: Ruhlen, 1991; Ethnologue).

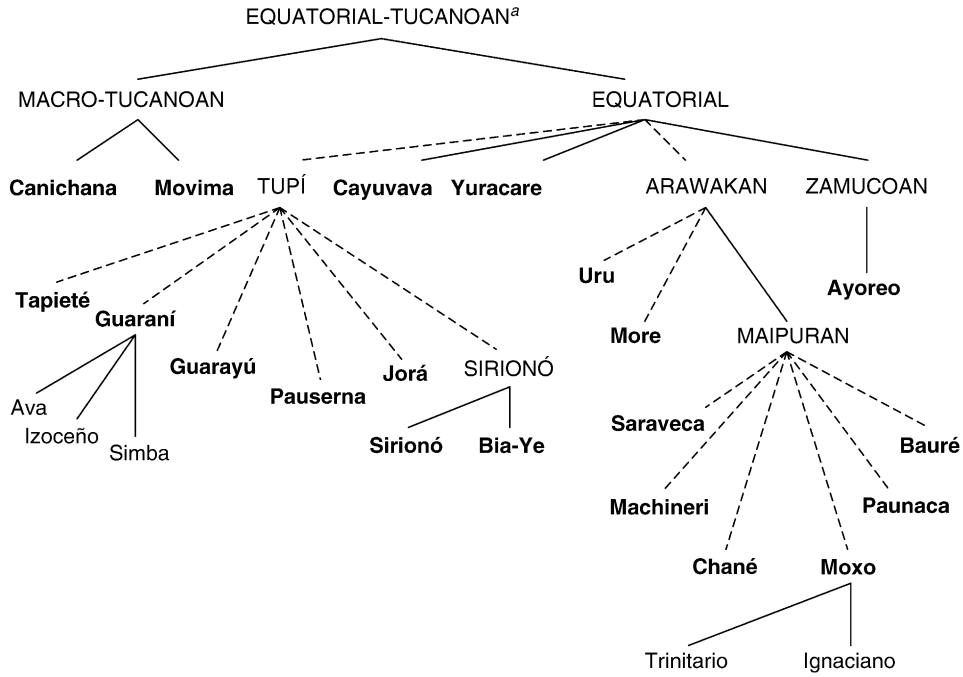

[a] Some nodes in the linguistic trees in Figures 2 and 3 have been suppressed for simplicity. Where relevant, this has been indicated with a dashed line. Nodes representing families appear in small capitals. Language names appear in lower case, emphasized in boldface. Dialects of languages appear in lower case with no emphasis.

Figure 2 Equatorial-Tucanoan languages spoken in Bolivia (More detailed information concerning classification can be found in Ruhlen, 1991; Jensen, 1999; and the Ethnologue).

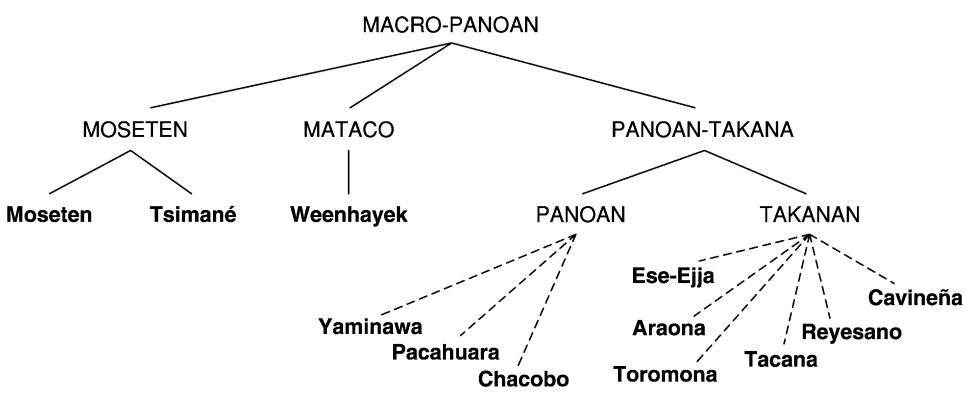

Figure 3 Macro-Panoan Languages Spoken in Bolivia (References: Ruhlen, 1991; Ethnologue).

in the Chiquitos region beginning in 1550. The relationships among these languages is not known. Besiro is thought to have resulted from contact among several languages in this group.)

Bolivia's Equatorial-Tucanoan, Macro-Panoan, and Chiquitano languages, along with Itonama (Paezan), are (or were) spoken in the Tierras Bajas, or Lowlands, in the zones known as Amazonía (in the north), Oriente, and the Chaco (south, adjacent to Paraguay and Argentina). All of the lowland languages are endangered to a greater or lesser extent. Many, including Canichana, Cayubaba, and Reyesano, will become extinct once the few remaining, elderly speakers have passed away. Some lowland languages, for example, Guaraní and the Moxo varieties, are relatively stable. Still other languages, at greater risk of extinction, represent two general situations. Some are robust within their heritage communities, but the futures of the groups themselves are uncertain because their members are too few to guarantee sustainability (for

Table 1 Population and language statistics for the indigenous groups of Bolivia's Lowland Region

Linguistic family	*Heritage language*[a]	*Total population of ethnolinguistic group (all ages)*	*Population aged 6+ yrs*	*% pop. aged 6+ yrs. monolingual in heritage language*	*% pop. aged 6+ yrs. bilingual in heritage lang. & and Spanish*	*% 6–14-year-olds who are bilingual*
Arawak	Baure	631	504	0.4	2.4	0
	Moxo	20 805	15 793	1.8	37.0	22.51
	Machinere	155	105	0.0	0.0	100
Chiquitano	Besiro	47 086	36 255	0.7	32.4	23.22
Tupían	Sirionó	419	311	1.9	92.9	95.8
	Yuqui (Bïä-Yë)	138	109	7.3	91.1	100
	Guarayu	7235	5509	6.6	77.8	81.86
	Guaraní	36 917	28 823	4.9	88.3	89.23
	Tapieté	74	55	2 (abs)[b]	41 (abs)	84.21
Zamucoan	Ayoreo	856	629	9.7	80.9	85.0
Mataco	Chorote (Weenhayek)	2081	1637	7.8	85.2	89.16
Tacanan	Araona	90	71	41 (abs)	23 (abs)	95.0
	Tacana	5058	3863	0.3	36.3	13.58
	Reyesano	4118	3169	0.3	7.3	1.08
	Cavineño	1736	1339	1.2	66.7	58.78
	Ese Ejja	584	444	4.5	79.7	83.45
Panoan	Yaminawa	161	117	0.9	0.0	95.5
	Pacahuara	18	17	0.0	1 (abs)	0
	Chacobo	767	568	17.1	55.6	74.86
Chapacura	More (Itenez)	108	93	1.1	31.2	10.53
Moseten	Chimané	5907	4221	42.4	46.5	86.0
	Moseten	1177	869	2.2	82.6	78.28
Paezan	Itonama	5090	3911	0.2	2.5	0.79
Quechuan	Leco	9	7	0.0	1 (abs)	0
Tucanoan	Movima	6528	4934	0.5	22.6	4.08
	Canichana	583	480	0.0	3.5	0
Equatorial	Cayubaba	794	609	0.5	7.6	0.44
	Yuracare	3333	2457	1.8	76.8	64.0

[a]Churapa, Moncoca, Jorá, Paunaca, Saraveca, Toromona, and Pauserna are not included in Table 1 because no data is available for these languages (which are extinct or nearly extinct). Callahuaya is not included because it is not spoken as a first language.
[b]Figures accompanies by the abbreviation ''abs'' represent absolute numbers, not percentage.
(Source: the Rural Indigenous Census of 1994, reported in Díez Astete & Murillo 1998.)

example, Araona, Ayoreo, and Sirionó). In other cases, the ethnolinguistic group itself faces no risk of imminent collapse but is undergoing a process of language shift in which the heritage language is gradually replaced by a regionally dominant language in all spheres of life. Examples are Guarayu, and especially Besiro, which is being passed on at a rate of only one child learner per eight adult speakers. The displacing language in Bolivia has generally been Spanish, but this has not always been the case: Chané (Arawakan), a language of the Chaco, was displaced by northwardly migrating Guaraní who conquered and enslaved the Chané people before the arrival of the Spaniards in the 16th century (Pifarré, 1989; Díez Astete and Murillo, 1998). Contact between Guaraní and Chané produced the antecedent of what is now Izoceño, one of three main dialects of Bolivian Guaraní (see Figure 2). Detailed demographic information concerning the linguistic status of Bolivia's lowland languages is provided in Table 1.

Language Maps (Appendix 1): Map 50.

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Boole and Algebraic Semantics

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In 1854 George Boole, a largely self-educated British mathematician, published a remarkable book, *The laws of thought*, in which he presented an algebraic formulation of "those operations of the mind by which reasoning is performed" (Bell, 1965: 1). Since then, boolean algebra has become a rich subbranch of mathematics (Koppelberg, 1989), with extensive applications in computer science and, to a lesser extent, linguistics (Keenan and Faltz, 1985). Here we illustrate the core boolean notions currently used in the study of natural language semantics. Most such applications postdate Boole's work by more than a century, though Boole (1952: 59) anticipated some of the linguistic observations, pointing out, for example, that *Animals are either rational or irrational* does not mean the same as *Either animals are rational or animals are irrational*; similarly, *Men are, if wise, then temperate* does not mean *If all men are wise then all men are temperate*. Generative grammarians rediscovered such truths in the latter third of the 20th century.

We begin with the basic notion of a *partially ordered set* (*poset*) and characterize richer structures with linguistic applications as posets satisfying additional conditions (Szabolcsi, 1997; Landman, 1991).

A poset consists of a domain D of objects on which is defined a binary relation R, called a *partial order* relation, which is *reflexive* (for all x in D, xRx), *transitive* (xRy and yRz implies xRz), and *antisymmetric* (xRy and yRx implies $x = y$). For example, the ordinary arithmetical $\leq$ relation is a partial order: $n \leq n$, any natural number n; if $n \leq m$ and $m \leq p$, then $n \leq p$; and if $n \leq m$ and $m \leq n$, then $n = m$. Similarly, the subset relation $\subseteq$ is reflexive: any set A is a subset of itself. And if $A \subseteq B$ and $B \subseteq C$, then $A \subseteq C$, so $\subseteq$ is transitive. And finally, if $A \subseteq B$ and $B \subseteq A$, then $A = B$, that is, A and B are the same set, since they have the same members. So partial order relations are quite familiar from elementary mathematics.

A case of interest to us is the arithmetical $\leq$ restricted to {0, 1}. Here $0 \leq 1$, $0 \leq 0$ and $1 \leq 1$, but 1 is not ≤ 0. Representing the truth value 'False' as 0 and 'True' as 1, we can say that a conditional sentence 'if P then Q' is True if and only if $TV(P) \leq TV(Q)$, where TV(P) is the truth value of P, etc. Thus we think of sentences of the True/False sort as denoting in a set {0, 1} on which is defined a partial order, $\leq$. The denotations of expressions in other categories defined in terms of {0, 1} inherit this order. For example, one-place predicates (P1s), such as *is even* or *lives* in *Brooklyn*, can be presented as properties of the elements of the set E of objects under discussion. Such a property p looks at each entity x in E and says 'True' or 'False' depending on whether x has p or not. So we represent properties p, q as functions from E into {0, 1}, and we define $p \leq q$ if and only if (iff) for all x in E, $p(x) \leq q(x)$, which just means if p is True of x, then so is q. The $\leq$ relation just defined on functions (from E into {0, 1}) is provably a partial order.

Other expressions similarly find their denotations in a set with a natural partial order (often denoted with a symbol like '$\leq$'). A crucial example for linguists concerns the denotations of count NPs (Noun Phrases), such as *some poets, most poets,* etc., as they occur in sentences (Ss) like *Some poets*

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daydream. We interpret this S as True iff there is an entity x that both the 'poet' property p and the 'daydreams' property d map to 1. Similarly, *No poets daydream* is True iff there is no such x. And *Most poets daydream* is True iff the set of x such that $p(x)$ and $d(x) = 1$ outnumbers the set such that $p(x) = 1$ and $d(x) = 0$. That is, the set of poets that daydream is larger than the set that don't. And for F,G possible NP denotations (called *generalized quantifiers*), we define $F \leq G$ iff for all properties p, $F(p) \leq G(p)$. This relation is again a partial order.

As NP denotations map one poset (properties) to another (truth values), it makes sense to ask whether a given function F *preserves* the order (if $p \leq q$, then $F(p) \leq F(q)$), *reverses* it (if $p \leq q$, then $F(q) \leq F(p)$), or does neither. *Some/all/most poets* preserve the order, since, for example, *is laughing loudly* $\leq$ *is laughing* and *Some poet is laughing loudly* $\leq$ *Some poet is laughing*, which just means, recall, that if the first sentence is True, then the second is. In contrast, *no poet* reverses the order, since, in the same conditions, *No poet is laughing* implies *No poet is laughing loudly*. The reader can verify that *fewer than five poets, neither poet, at most six poets*, and *neither John nor Bill* are all order reversing. And here is an unexpected linguistic correlation: reversing order correlates well with those subject NPs that license negative-polarity items, such as *ever*:

(1a) No student here has ever been to Pinsk.
(1b) *Some student here has ever been to Pinsk.

Observe that as a second linguistic application, modifying adjectives combine with property-denoting expressions (nouns) to form property-denoting expressions and can be represented semantically by functions f from properties to properties. For example, *tall* combines with *student* to form *tall student*, and semantically it maps the property of being a student to that of being a tall student. And overwhelmingly when f is an adjective function and p a property, $f(p) \leq p$. All tall students are students, etc.

In fact, the denotation sets for the expressions we have discussed possess a structure much richer than a mere partial order: they are (boolean) lattices. A *lattice* is a poset in which for all elements x, y of the domain, the set {x, y} has a *least upper bound* (lub) noted $(x \vee y)$ and read as 'x join y,' and a *greatest lower bound* (glb), noted $(x \wedge y)$ and read as 'x meet y.' An *upper bound* (ub) for a subset K of a poset is an element z that every element of K is $\leq$ to. An ub z for K is a lub for K iff $z \leq$ every ub for K. Dually a *lower bound* (lb) for K is an element $w \leq$ every element of K; such a w is a glb for K iff every lb for K is $\leq w$. For example, in the truth value lattice {0,1}, lubs are given by the standard truth table for disjunction: $1 \vee 1 = 1$, $1 \vee 0 = 1$, $0 \vee 1 = 1$, and $0 \vee 0 = 0$. That is, a disjunction of two false Ss is False, but True otherwise. Similarly, glbs are given by the truth table for conjunction: a conjunction of Ss is True iff each conjunct is, and False otherwise. So here the denotation of *or* is given by $\vee$, and that for *and* by $\wedge$. And this is quite generally the case. In our lattices of functions, for example, $f \vee g$, the lub of {f, g}, is that function mapping each argument x to $f(x) \vee g(x)$. Similarly, $f \wedge g$ maps each x to $f(x) \wedge g(x)$. So, for example, in the lattice of properties, the glb of {POET, DOCTOR} is that property which an entity x has iff POET $(x) = 1$ and DOCTOR $(x) = 1$, that is, x is both a poet and a doctor. So, in general, we see that the lattice structure provides denotations for the operations of conjunction and a disjunction, regardless of the category of expression we are combining. We might emphasize that the kinds of objects denoted by Ss, P1s, Adjectives, NPs, etc., are quite different, but in each category conjunctions and disjunctions are generally interpreted by glbs and lubs of the conjuncts and disjuncts. So Boole's original intuition that these operations represent properties of mind – how we look at things – rather than properties specific to any one of these categories, is supported.

And we are not done: boolean lattices present an additional operation, *complement*, which provides a denotation for negation. Note that negation does combine with expressions in a variety of categories: with Adjectives in *a bright but not very diligent student*, with P1s in *Most of the students drink but don't smoke*, etc. Formally, a lattice is said to be *bounded* if its domain has a glb (noted 0) and a lub (noted 1). Such a lattice is *complemented* if for every x there is a y such that $x \wedge y = 0$ and $x \vee y = 1$. If for each x there is exactly one such y, it is noted $\neg x$ and called the *complement* of x. In {0, 1}, for example, $\neg 0 = 1$ and $\neg 1 = 0$. In our function lattices, $\neg f$ is that function mapping each x to $\neg(f(x))$. In distributive lattices (ones satisfying $x \wedge (y \vee z) = (x \wedge y) \vee (x \wedge z)$ and $x \vee (y \wedge z) = (x \vee y) \wedge (x \vee z)$), each x has a unique complement. A lattice is called *boolean* if it is a complemented distributive lattice. And, again, a linguistic generalization: the negation of an expression d in general denotes the complement of the denotation of d.

Given uniqueness of complements, $\neg$ is a function from the lattice to itself, one that reverses the order: if $x \leq y$, then $\neg y \leq \neg x$. We expect, correctly then, that negation licenses negative-polarity items in the predicate, and it does: *He hasn't ever been to Pinsk* is natural, **He has ever been to Pinsk* is not. Reversing the order on denotations, then, is what ordinary negation has in common with NPs such as *no poet, neither John nor Bill*, etc., which as we saw earlier also license negative-polarity items.

The boolean lattices we have so far invoked have further common properties. They are, for example, *complete*, meaning that each subset, not just ones of the form {x, y}, has a glb and a lub. They are also atomic (Keenan and Faltz, 1985: 56). In addition, different categories have some distinctive properties – which, with one exception, space limitations prevent us from reviewing (see also Keenan, 1983). The exception is the lattice of count NP denotations, needed for expressions such as *most poets* and *five of John's students*. This lattice has the property of having a set of complete, independent (free) generators, called *individuals* (denotable by definite singular NPs, such as *John, Mary, this poet*). This means that any function from properties to truth values is in fact a boolean function (meet, join, complement) of individuals (Keenan and Faltz, 1985: 92). And this implies that the truth value of an S of the form [[Det N] + P1], for P1 noncollective, is booleanly computable if we know which individuals have the N and the P1 properties. The truth of Ss like *Most of the students laughed, No students laughed*, etc., is determined once that information is given. This semantic reduction to individuals is a major simplification, in that the number of individuals is the number of elements in E, whereas the number of possible NP denotations is that of the power set of the power set of E. So speaking of an E with just four elements, we find there are just four individuals but 65 536 NP denotations.

These freely generated algebras show up in another, unexpected syntactic way. Szabolcsi and Zwarts (1993) observed that negation determines a context that limits the class of questions (relative clauses, etc.) we can grammatically form. Thus, the questions in (2) are natural, but those in (3), in which the predicates are negated, are not:

(2) How tall is John? How much did the car cost?
(3) *How tall isn't John? *How much didn't the car cost?

It is tempting to say simply that we cannot question out of negative contexts, but that is not correct. Both questions in (4) are acceptable:

(4) How many of the books on the list did/didn't you read?

A more accurate statement is that negation blocks questioning from domains that lack individuals (free generators), such as amounts and degrees. So, as with the distribution of negative-polarity items, we find an unexpected grammatical sensitivity to boolean structure.

Much ongoing work in algebraic semantics focuses on NPs (and their predicates) that are not boolean compounds of individuals. The predicates in the Ss in (5) force us to interpret their subjects as *groups*.

(5a) John and Mary respect each other/are a nice couple.
(5b) Russell and Whitehead wrote *Principia mathematica* together.
(5c) The students gathered in the courtyard/surrounded the building.
(5d) Six teaching assistants graded 120 papers between them.

Respecting each other (*being a nice couple*, etc.) holds of a group of individuals if certain conditions among them obtain. But it does not make sense to say **John respects each other* (**He is a nice couple*, etc.), so we must interpret *and* somewhat differently from the glb operator discussed earlier. We note that the other boolean connectives – such as *either* ... *or* ... and *neither* ... *nor* ... – do not admit of a reinterpretation in the way that *and* does (Winter, 2001). **Either John or Mary respect each other* is nonsense: the disjunctive subject still forces a lub interpretation in which *respect each other* would hold of at least one of the disjuncts.

First attempts to provide denotations for the subject NPs in (5) involve enriching the understood domain E of entities with a partial order relation called *part-of*, to capture the sense in which the individual John is part of the denotation of *John and Mary* in (5a) or some individual student is part of the group of students in (5c), etc. The group itself is a new type of object, one that is the lub of its parts. And new types of predicates, such as those in (5), can select these new objects as arguments. Thus, the domain of a model is no longer a mere set E but is a *join semi-lattice*, a set equipped with a *part-of* partial order in which each nonempty subset has a lub (see Link, 1983, 1998; Landman, 1991).

Yet other new types of arguments are *mass* terms (6a) and *event nominals* (6b).

(6a) Water and alcohol don't mix.
(6b) 4000 ships passed through the lock last year. (Krifka, 1991)

Mass term denotations have a natural *part-of* relation: if I pour a cup of coffee from a full pot, the coffee that remains, as well as that in my cup, is part of the original coffee. So mass term denotations are in some way *ontologically uniform*, with the result that definitional properties of a whole also apply to their parts – the coffee I poured and the coffee that remains are both coffee. This contrasts with predicates in (5), where *respect each other*, *gather in the courtyard*, etc., do not make sense even when applied to the proper parts of their arguments. In general, mass

terms are much less well understood than count terms (see Pelletier and Schubert, 1989; Link, 1998).

Last, observe that (6b) is ambiguous. It has a count reading, on which there are 4000 ships each of which passed through the lock (at least once) last year. But it also has an event reading, of interest here, on which it means that there were 4000 events of ships passing through the lock. If, for example, each ship in our fleet of 2000 did so twice, then there were 4000 passings but only 2000 ships that passed.

Now, the event in (6b) has the individual passing events as parts, so such complex events exhibit something of the ontological uniformity of mass terms. But there are limits. The subevents of a single passing (throwing lines to the tugboats, etc.) are not themselves passings. So events present a *part-of* partial order with limited uniformity, and at least some events can be represented as the lubs of their parts. But in distinction to pure mass terms, events are ontologically complex, requiring time and place coordinates, Agent and Patient participants, etc., resulting in a considerable enrichment of our naïve ontology (see Parsons, 1990; Schein, 1993; and Landman, 2000).

See also: Formal Semantics; Monotonicity and Generalized Quantifiers; Negation: Semantic Aspects; Operators in Semantics and Typed Logics; Plurality; Polarity Items; Quantifiers: Semantics.

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Boole, George (1815–1864)

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George Boole, a mathematician who might have been a shoemaker, was born in Lincoln, UK, on November 2, 1815, to a lady's maid and a shoemaker who could have been a mathematician. The younger Boole, who acquired an early love of mathematics from his brilliant father John, studied Latin with a tutor and by his late teens had taught himself Greek, French, and German. Finances did not allow him an elite education, but through local schools, tutoring, and self-study he grew well versed in mathematics, languages, and literature. In 1831 he began teaching school, opening his own boarding school in 1835 while pursuing independent study of applied mathematics. Four years later he published his first professional paper.

Despite his non-standard education, Boole in 1849 received a professorship in mathematics at the new Queen's College, Cork, partly on the strength of testimonials from his hometown. In 1851 he was elected Dean of Science, the position he held until his death. At Cork he published the works for which he is best

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See also: Formal Semantics; Monotonicity and Generalized Quantifiers; Negation: Semantic Aspects; Operators in Semantics and Typed Logics; Plurality; Polarity Items; Quantifiers: Semantics.

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known, including *An investigation into the laws of thought* (1854). The fundamental assumption of this work is that human language and reasoning can be expressed in algebraic terms and that the truth of a proposition can be examined without reference to the meaning of its components. Boolean logic is based on Boolean algebra, which is founded on the notions of sets, variables, and operators. If variables in an equation are replaced by propositions, and if operators are replaced by connectives such as 'and,' 'or,' 'not,' or 'if ... then,' the truth of a proposition may be evaluated in the same way as the truth of an algebraic statement. The results of such an evaluation are binary: a proposition is held to be either true or not true.

Boolean logic emerges in several subdisciplines of linguistics. The notion that the truth of a proposition may be understood without reference to its meaning is crucial to formal semantics, to the 'predicate calculus' of Frege and others, and to Chomsky's attempts to analyze grammar in mathematical terms. The binary nature of Boolean logic is fundamental to neuroscience, artificial intelligence, software design, and most notably to all digital and electronic devices that rely on binary switching circuits.

In addition to his seminal work on logic, Boole published roughly 50 papers on mathematics. He earned the Medal of the Royal Society in 1844 and was named a Fellow of the Society in 1857. In 1855 he married Mary Everest, niece of the famous explorer. He died of pneumonia on December 18, 1864.

See also: Chomsky, Noam (b. 1928); Formal Semantics; Frege, Gottlob (1848–1925).

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Bopp (**Figure 1**) was born on September 14, 1791 in Mainz, and died on October 23, 1867 in Berlin. After one year studying classical as well as modern languages at the newly created University of Aschaffenburg, he went to Paris, inspired by Friedrich Schlegel's (*see* **Schlegel, Friedrich von (1772–1829)**) *Ueber die Sprache und Weisheit der Indier* (1808), with the encouragement of his mentor Karl Joseph Windischmann, and through contacts established with the Orientalist Antoine Léonard de Chézy. There he studied Sanskrit (largely on his own), Arabic, and Persian with Antoine Isaac Silvestre de Sacy (*see* **Silvestre de Sacy, Baron Antoine-Isaac (1758–1838)**). In 1814, he received a grant from the King of Bavaria that allowed him to continue his research. This culminated in the book whose publication date – 1816 – is generally regarded as marking the beginning of comparative Indo–European linguistics. Bopp spent two more years in Paris until a grant from the Munich Academy of Sciences allowed him to move to London to add to his knowledge of Sanskrit through contacts with the most distinguished scholars in the field, Henry Thomas Colebrooke and especially Charles Wilkins, both of whom had published grammars of the language. During his stay in Britain, Bopp produced a revised English version of the linguistic portion of his *Conjugationssystem* (1820) (the remainder was devoted to translations from Sanskrit literature). While in Paris, Bopp had introduced Friedrich Schlegel's elder brother, August Wilhelm (*see* **Schlegel, August Wilhelm von (1767–1845)**) to the study of the classical Indic language and literature; in London, he tutored Wilhelm von Humboldt (*see* **Humboldt, Wilhelm von (1767–1835)**), who at the time was Prussian ambassador. In order to round off his studies to prepare himself for an academic career, Bopp asked the Bavarian Academy for permission to enroll at the University of Göttingen. Instead, the authorities there granted him a doctorate *honoris causa* in recognition for work already done. Soon afterwards, in the summer of 1821, he arrived in Berlin and (through the intervention of Wilhelm von Humboldt and his brother Alexander) was appointed extraordinary professor of Oriental languages and general linguistics. In 1825 he was made a full professor and a member of the Prussian Academy, in whose Proceedings he published a large number of his comparative linguistic works. From 1824 onward he published his own

known, including *An investigation into the laws of thought* (1854). The fundamental assumption of this work is that human language and reasoning can be expressed in algebraic terms and that the truth of a proposition can be examined without reference to the meaning of its components. Boolean logic is based on Boolean algebra, which is founded on the notions of sets, variables, and operators. If variables in an equation are replaced by propositions, and if operators are replaced by connectives such as 'and,' 'or,' 'not,' or 'if ... then,' the truth of a proposition may be evaluated in the same way as the truth of an algebraic statement. The results of such an evaluation are binary: a proposition is held to be either true or not true.

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Figure 1 Franz Bopp.

grammars of Sanskrit, and his comparative grammar of the major Indo-European languages appeared between 1833 and 1852. Although he had a number of distinguished students, including August Friedrich Pott (*see* **Pott, August Friedrich (1802–1887)**), Adalbert Kuhn, William Dwight Whitney (*see* **Whitney, William Dwight (1827–1894)**), and Michel Bréal (*see* **Bréal, Michel Jules Alfred (1832–1915)**), Bopp's enormous impact on Sanskrit studies and on the field of comparative philology was largely produced – apart from his voluminous comparative grammar – by the vast number of his empirical studies of individual branches of the Indo-European language family. However, as Bréal (1991) pointed out, another reason for his success was that he did not slavishly follow the Indic grammatical tradition in his treatment of Sanskrit but introduced his own perspective to the analysis of this language in conjunction with Greek, Latin, Persian, and other Indo-European languages. Thus he developed a method of showing their basic structural identity, which provided the framework for several generations of comparative-historical linguists.

See also: Arabic; Bréal, Michel Jules Alfred (1832–1915); Humboldt, Wilhelm von (1767–1835); Persian, Old; Pott, August Friedrich (1802–1887); Sanskrit; Schlegel, August Wilhelm von (1767–1845); Schlegel, Friedrich von (1772–1829); Silvestre de Sacy, Baron Antoine-Isaac (1758–1838); Whitney, William Dwight (1827–1894).

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Borgstrøm, Carl Hjalmar (1909–1986)

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Borgstrøm was born in Kristiania (Oslo), Norway. When he began his studies of Celtic languages, his teacher, professor Carl Marstrander, encouraged him to choose Scottish Gaelic dialects as his speciality. Borgstrøm's later studies of dialects on the Hebrides (Borgstrøm, 1940, 1941) were pioneer works and laid the foundation of subsequent investigations of Gaelic dialects.

Borgstrøm also studied comparative Indo-European philology and from 1932 to 1935 was Lecturer in Comparative Philology at Trinity College in Dublin. In 1936–1937 he was Visiting Professor of Sanskrit in Ankara. During his stay in Turkey he learned Turkish and consequently offered courses in Turkish at the University of Oslo. During the war Borgstrøm went to Sweden and in 1945 he was a lecturer of linguistics in Lund.

In 1947 he was appointed Professor of Comparative Indo-European Philology at the University of Oslo. However, during his entire career he published only a few articles in this field that were mainly overlooked or negatively received. His main interest (besides Celtic studies) was general linguistics, and he produced some discerning structural studies on Norwegian phonology (e.g., Borgstrøm, 1938).

However, his most important publication was his introductory textbook on general linguistics, first published in 1958. It was a successful symbiosis of American and European structuralism interspersed with Borgstrom's own ideas on language analysis. For almost two decades it was the basic textbook in linguistics in Norway and also to some extent in the other Nordic countries. Borgstrom thus had an important influence on the emergence of structural linguistics in the Nordic countries.

Borgstrøm was a shy and formal person, but as a teacher and supervisor he was unique. He stimulated, encouraged, and supported his students in a challenging way. A whole generation of Norwegian linguists was influenced by his broad theoretical orientation, his penetrating and constructive way of analyzing linguistic data, and his scholarly and human generosity.

See also: Marstrander, Carl J. S. (1883–1965).

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Bosnia and Herzegovina: Language Situation

Editorial Team

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After the break-up of the Republic of Yugoslavia, and the following war in 1992–1995, Bosnia and Herzegovina was administratively divided into two entities: the Federation of Bosnia and Herzegovina and the Republika Srpska. The population of Bosnia and Herzegovina is about 4 007 608 (estimated, July 2004). There are three official languages: Bosnian, spoken by 48% of the population (2000 census), Serbian (37.1%), and Croatian (14.3%). Other languages spoken are German, Italian, Macedo-Romanian, Vlax Romani, Turkish, and Albanian.

The term 'Bosnian' refers to the languages spoken by Bosnian Serbs, Bosnian Croats, and Bosnian Bosniacs (formerly referred to as Bosnian Muslims), although the Croats and the Serbs in Bosnia and Herzegovina call their language Croatian and Serbian, respectively. Bosnian is used to refer to the language of the Bosniac group. All three languages – Bosnian, Serbian, and Croatian – are dialects of the standard version of Central-South Slavic, formerly and still frequently called Serbo-Croatian. Bosnian and Croatian use a Latin alphabet. Serbian uses both Latin and Cyrillic alphabets.

See also: Serbian–Croatian–Bosnian Linguistic Complex.

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Bosnia and Herzegovina: Language Situation

Editorial Team

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After the break-up of the Republic of Yugoslavia, and the following war in 1992–1995, Bosnia and Herzegovina was administratively divided into two entities: the Federation of Bosnia and Herzegovina and the Republika Srpska. The population of Bosnia and Herzegovina is about 4 007 608 (estimated, July 2004). There are three official languages: Bosnian, spoken by 48% of the population (2000 census), Serbian (37.1%), and Croatian (14.3%). Other languages spoken are German, Italian, Macedo-Romanian, Vlax Romani, Turkish, and Albanian.

The term 'Bosnian' refers to the languages spoken by Bosnian Serbs, Bosnian Croats, and Bosnian Bosniacs (formerly referred to as Bosnian Muslims), although the Croats and the Serbs in Bosnia and Herzegovina call their language Croatian and Serbian, respectively. Bosnian is used to refer to the language of the Bosniac group. All three languages – Bosnian, Serbian, and Croatian – are dialects of the standard version of Central-South Slavic, formerly and still frequently called Serbo-Croatian. Bosnian and Croatian use a Latin alphabet. Serbian uses both Latin and Cyrillic alphabets.

See also: Serbian–Croatian–Bosnian Linguistic Complex.

Bosnian *See:* Serbian–Croatian–Bosnian Linguistic Complex.

Botswana: Language Situation

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Botswana is a medium-sized country located in southern Africa. It is completely landlocked, surrounded by South Africa to its south, Zimbabwe to its east, Namibia to its west, and Zambia and Namibia to its north. It is largely composed of the Kalahari Basin of the southern Africa Plateau. Apart from the Limpopo and Chobe rivers, drainage is internal, and largely to the Okavango Swamp in the northwest. The Okavango Delta, which has resulted from this inland drainage, as well as the surrounding area as far east as the Chobe Basin, is a rich habitat of both fauna and flora and has attracted many different communities, who live in the areas as farmers, fishermen, herders, or hunters.

The country has a population of over 1.7 million people (according to the 2001 census report), giving a density of about 3 people per square kilometer. However, the population is concentrated on the eastern and northern fringes of the country where the land is more fertile. On the other hand, the Kalahari desert of the central, west, and southwest area of the country is home to numerous groups of San and Khoe people, commonly known as Khoesan or Bushman, who traditionally live in scattered bands of no more than 30 people each. In fact, the San were the first inhabitants of the area, having lived there for at least 20 000 years as hunters and foragers. The Khoe arrived in the area about 4000 years ago, followed by the Bantu groups more than 2000 years later.

The territory, often attributed to Khoesan in language maps such as Greenberg's (see Greenberg, 1963), is misleadingly extensive, as settled areas are

Figure 1 The distribution of the 28 Botswana languages (after Batibo *et al.*, 2003).

better considered to be Bantu, who constitute more than 96% of the Botswana population. In fact the Khoesan groups, whose population is about 39 000 in Botswana, are fast vanishing due to integration into the more dominant and socioeconomically prestigious Bantu communities.

Linguistic Relationships

The country has 28 languages (see Figure 1), belonging to three main language families: Bantu (a subbranch of Niger–Congo), Khoesan (Khoisan), and Germanic (a subbranch of Indo-European). There are 14 Bantu languages, of which five belong to the Sotho branch of Southern Bantu: Setswana (Tswana), Shekgalagari, Sebirwa, Setswapong (Tswapong), and Silozi (Lozi). Three languages belong to the Sala–Shona branch of Southeastern Bantu: Ikalanga, Zezuru, and Nambya (Najwa). The southern branch of Central Bantu includes Chikuhane (Sesubiya), Shiyeyi (Yeyi) (erroneously classified by Guthrie [1948] in Zone R), Thimbukushu (Mbukushu), and Rugciriku (Rumanyo) [Diriku]. The only language that belongs to Western Bantu is Otjiherero (Herero) (classified by Guthrie in Zone R). Lastly, Sindebele (Ndebele), which is extensively spoken along the eastern borders of the country, belongs to the Nguni group of languages, together with IsiZulu (Zulu) and IsiXhosa (Xhosa) in South Africa.

There are 12 Khoesan languages which belong to three distinct groups: Northern Khoesan, with three languages: Jul'hoan, ǂKx'auǁ'ein, and ǂHua (formerly thought to belong to Southern Khoesan); Central Khoesan, with eight languages: Nama, Naro, |Gwi, ||Gana, Kua (Hietshware), Shua, Tshwa, and Khwedam (the last comprising Bugakhwe, ||Anikhwe, |Anda, and various Kxoe dialects). The last group, known as Southern Khoesan, has only one member in Botswana, !Xóõ. The other members of Southern Khoesan, formerly spoken mainly in what is now South Africa, have largely become extinct.

There are two Germanic languages: Afrikaans, spoken by about 7500 people, mainly Afrikaner settlers in farms and ranches in the Ghanzi and Kgalagadi districts (Grimes, 2000), and English, which is mainly spoken as a second language.

The figures presented in Table 1 are mere estimates, as no census involving language or ethnicity has taken place in Botswana since independence in 1966. It is difficult to come up with accurate figures regarding the speakers of the various languages, as many people tend to equate language with ethnicity or may want to identify themselves with the majority languages.

Setswana is found in three main dialects: the northern dialect, spoken in the northern areas by the Ngwato, Tawana, and part of the Kwena groups; the southern dialect, spoken in southern areas by the Ngwaketse, Rolong, Tlhaping, Tlharo and part of the Kwena groups; and the eastern dialect, spoken in the eastern areas by the Kgatla, Tlokwa and Lete groups. Setswana is the most dominant language both demographically and in terms of status and prestige. It is spoken by 78.6 percent of the population as first language, and is understood and used by over 90 percent of the population. It is the national language and the main lingua franca of the country. The only other widely used language is Ikalanga (Kalanga), which is spoken by over 150 000 people.

Leaving aside the very early literacy traditions of the Coptic, Nubian, Ethiopic, Vai, and Arab-speaking communities, the Setlhaping variety of Setswana in Botswana has the distinction of being the first African language known to develop an orthography and a literature, with the publication by Robert Moffat of the Christian New Testament in 1839.

Table 1 The estimated number of speakers of the Botswana languages

	Language	*Estimated number of speakers*	*Percentage of speakers*
1.	Setswana	1 335 000	78.6%
2.	Ikalanga	150 000	8.83%
3.	Shekgalagari (including Shengologa)	48 000	2.82%
4.	Thimbukushu	30 000	1.76%
5.	Shiyeyi	18 000	1.06%
6.	Nambya (Najwa)	15 000	0.88%
7.	Sebirwa	12 500	0.73%
8.	Zezuru (Shona)	12 000	0.70%
9.	Otjiherero	11 500	0.67%
10.	Naro	10 000	0.59%
11.	Sindebele	9000	0.53%
12.	Afrikaans	7500	0.44%
13.	Chikuhane (Sesubiya)	7000	0.41%
14.	Setswapong	6000	0.35%
15.	Shua	6000	0.035%
16.	!Xóõ	5000	0.29%
17.	Tshwa	5000	0.29%
18.	Khwedam	4500	0.27%
19.	Ju|'hoan	4500	0.27%
20.	Silozi (Serotsi)	3000	0.02%
21.	Sekgoa (English)	3000	0.002%
22.	Kua	2500	0.015%
23.	ǂKx'au||'ein	2500	0.015%
24.	Rugciriku (Rumanyo)	2300	0.14%
25.	||Gana	1300	0.008%
26.	Nama (Khoekhoegowab)	1000	0.006%
27.	|Gwi	1000	0.006%
28.	ǂHua	200	0.001%
	Total	**1 703 300**	**99.53%**

(After Batibo *et al.*, 2003).

Language Policy, Use, and Literacy

English is the official language of Botswana, while Setswana is the national language. Both are used in the administration and mass media. English is used in the formal business of government, while Setswana is generally used in semiofficial interactions, particularly in the oral mode. Setswana is used in lower primary education and English in upper primary and all the subsequent levels of education.

The official literacy rate is estimated at about 60 percent, although independent estimates of literacy in Setswana are lower. The enrollment for secondary level schooling is reported to be 21 percent. On the other hand, over 2000 students per year enroll in the University, giving Botswana the highest rate of university admission, proportionate to its population, in Africa.

Botswana is one of the countries in Africa where the smaller languages have very few speakers. Most of the small Botswana languages, especially those of Khoesan origin, are spoken by fewer than 10 000 people, most of whom are bilingual in the major languages, particularly Setswana. Hence, the process of language shift and death are a great concern to both linguists and the general public.

See also: Bilingualism and Second Language Learning; Indo–European Languages; Khoesaan Languages; Language Maintenance and Shift; Language Policy in Multilingual Educational Contexts; Languages of Wider Communication; Lingua Francas as Second Languages; Minorities and Language; Multiculturalism and Language; Namibia: Language Situation; Proto-Bantu; South Africa: Language Situation; Xhosa; Zambia: Language Situation; Zimbabwe: Language Situation; Zulu.

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Bouvet Island: Language Situation

Editorial Team

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Bouvet Island, so named after the French naval officer who discovered it in 1739, is a volcanic island situated in the southern section of the Atlantic Ocean, southwest of South Africa's Cape of Good Hope. It is the most isolated island on Earth – the nearest land, the Antarctic Continent, is more than 1600 km away. The first territorial claim came from the British in 1825, but in 1928 the claim was waived in favor of the Norwegian Crown. Bouvet Island was declared a natural reserve in 1971 and, since 1977, Norway has run an automated meteorological station on the island. With no native population, the island is considered a territory of Norway and is administered by the Polar Department of the Ministry of Justice and Police in Oslo. The official language is Norwegian and the few researchers who on occasion are present on Bouvet Island are subject to Norwegian law.

Language Policy, Use, and Literacy

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Bovelles, Charles de (1479–1567)

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Born in Saint-Quentin in Picardy (before March 28, 1479; according to some sources in 1475), Charles de Bovelles (Bouvelles/Bouelles; Latinized: Bovillus) studied in Paris (1495–1503) with J. Lefèvre d'Étaples and started writing his first philosophical works there. He then traveled through Switzerland, Germany, the Low Countries, and Spain. He received instruction in astronomy while in Rome in 1507. Upon his return to Picardy in 1508, he devoted himself to his ecclesiastic functions as a canon in Saint-Quentin and a priest in Noyon, combining these with a scholarly career. He died in Ham (Vermandois) on February 24, 1567 (some sources give 1553 or 1556 as date of his death).

His writings (and extensive scholarly correspondence) cover various domains such as theology, metaphysics, arithmetic, and geometry, but they primarily involved biblical studies, theology, ethics, and metaphysics. His philosophical work was inspired by Ramon Llull, Nicolas of Cusa, Marsilio Ficino, Giovanni Pico della Mirandola, and neo-Platonism in general, which was highly popular in 16th century humanist circles. In his classification of the sciences (in his *Metaphysicum introductorium*, 1503–1504), the liberal arts (grammar, dialectic, and rhetoric) are classified on the lower level; Bovelles, however, took a keen interest in language matters. As a typical Renaissance scholar he wrote almost all his works in Latin, except his poetry (published in 1529) and a manual of geometry (1511, the first geometry handbook in French). He also showed interest in popular sayings and proverbs; his collection of Latin sentences was translated into French in 1557 (*Proverbes et dicts sententieux avec l'interpretation d'iceux*).

Bovelles's main linguistic work is his study of dialect differences in northern France (1533), which also includes a valuable etymological dictionary (in which Bovelles also used Late Latin sources), and a less useful onomasticon. Like many humanists, he saw the relationship between Latin and the Romance languages as that between a regularized, fixed language and various vernacular offshoots, the latter characterized by irregularity and incapable of being laid down into rules (he denied the possibility of writing a grammar of French). He explains language evolution as due to astral determinism and human intervention (*arbitrium hominum*). In his analysis of dialect differences he shows himself as a keen observer of lexical and phonetic data; his work constitutes an important source for French diachronic lexicology. In his explanation of the diversification of Latin, Bovelles gave much weight to substratal and superstratal influences.

See also: Renaissance Linguistics: French Tradition.

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Boxhorn, Marcus Zuerius (1602/12–1653)

D Droixhe

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With C. Saumaise's *De hellenistica* (1643) and G. K. Kirchmayer's school in Wittenberg (see Metcalf, 1974), Boxhorn's work represents one of the most accomplished efforts in pre-comparativism, in its search for a European prototype called 'Scythian.'

Born in Bergen op Zoom (Netherlands) in 1602 or 1612, Marcus Boxhorn studied at Leiden, where he became professor of rhetoric and history, until his untimely death in 1653. As a young teacher, he submitted to his famous colleague Claude Saumaise linguistic comparisons, for example, between Greek *hudor* 'sweat', Latin *sudor*, and 'Celtic' *sud*. A strong Flemish tradition pushed him to look for the key of such a 'harmony' in his national language. The latter had been set among the oldest mother-tongues, on the basis of a relation between the Cimmerians of the Black Sea and the Dutch-Cimbrians (see Swiggers, 1984). Correspondences joining Persian and the Germanic languages had also been recently popularized by Justus Lipsius.

Boxhorn undertook a systematic exploration of the analogies that united the European languages, including the Celtic and Slavic ones. He drew profit from the discovery of Anglo-Saxon, but died before Franciscus Junius's edition of the Gospels in Anglo-Saxon and Gothic (1664–1665). His ideas were expounded in a Dutch *Antwoord* of 1647, concerning the sensational discovery of stone images of the goddess Nehalennia, whose name he interpreted as a 'Scythian root.' That 100-page essay was led to demonstrate the common origin of Greek, Latin, and Dutch.

In a rather traditional way he puts forward various lexical analogies, focusing on the 'basic vocabulary' (esp. names for body parts). His rudimentary search for phonetic rules must be compared to the universal equivalences previously established by Cruciger, Besold, Nirmutanus, Hayne, and others. But, contrary to most of these authors, he vigorously broke with the theory of Hebrew mother tongue, according to the secularization propagated in Leiden by Joseph Juste Scaliger (*see* **Scaliger, Joseph Justus (1540–1609)**) or Grotius. So, his *Originum gallicarum liber* (1654) thrashed John Davies (1632) for having linked Welsh with Hebrew. He was also said to have "planted the seed of Celtic philology in the fertile soil of the mind of Leibniz" (*see* **Leibniz, Gottfried Wilhelm (1646–1716)**).

Boxhorn, remarkably, extended the comparison into morphology: declension of Latin *unus* and German *ein*; likeness of the infinitive endings in Greek and Dutch; similitudes with Latin in the formation of present participles, comparatives, or diminutives. "It is obvious that those nations have learned their tongue from one mother, as can be seen from their ordinary manner of varying words and names, in the declensions, the conjugations, etc.; and even in the anomalies."

By laying the stress on his native language, sometimes awkwardly assimilated to 'Scythian' in declamatory statements, he already betrayed his own quest for a real prototype, and his *Originum gallicarum liber* finally fostered the Celtic fever. Despised by Saumaise – who arrived at the same historical conclusions (!) – Boxhorn was considered a monomaniac. One year before he died, he wrote to Huygens that he nevertheless maintained his ideas with 'pride' and 'joy,' being confident that he had "understood something true and important."

See also: Leibniz, Gottfried Wilhelm (1646–1716); Scaliger, Joseph Justus (1540–1609).

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Brahui

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The word 'Brahui' designates both a language and its speakers. Brahui is the conventional spelling for the phonetically more correct Brāhōī/Brāhūī. The language is a member of the Dravidian family; more specifically, it belongs to the North Dravidian subgroup, of which the other two members are Kuṛux and Malto. The Brahuis live mainly in the Baluchistan and Sind provinces of Pakistan, but some are found also in Afghanistan (Šōrāwāk desert) and Iran (Sistan area). It is estimated that there are about 700 000 Brahui tribesmen, of whom only about 300 000 speak the language. Even those who speak Brahui are bilinguals in either Balochi or Siraki. There are two views current among the scholars to explain the location of Brahui, which is far away from the main Dravidian area. Whereas one view maintains that the Brahuis lived where they are now located from the earliest times, the other holds that they migrated to the current locations from that part of the main area that is occupied by the speakers of Kuṛux and Malto.

Phonology

The Brahui phonological system contains eight vowels and 28 consonants (see Tables 1 and 2). Proto-Dravidian short **e* and short **o* have been removed from the Brahui vowel system under the influence of Balochi; **e* developed into *i/a* and **o* developed into *u/a/ō* (the exact conditionings are not known). The *ē* and *ō* have shorter (and somewhat lower) allophones before a consonant cluster.

The voiceless stops *p*, *t*, and *k* may optionally be accompanied by aspiration in all positions (*pōk/phōk/phōkh* 'wasted'); however, aspirated stops in Indo-Aryan loans sometimes lose their aspiration in the south (*dhōbī/dōbī* 'washerman'). The voiceless lateral *L* is the most characteristic sound of Brahui since it does not occur either in Proto-Dravidian (PDr) or in the neighboring languages of Brahui. It comes from two sources, PDr (alveolar) **l* and (retroflex) **ḷ*; both of these also show the reflex *l* in some words, the conditioning being unclear because of the paucity of the data (*pāL* 'milk' < PDr **pāl*, *tēL* 'scorpion' < PDr **tēḷ*). The contrast between *L* and *l* is illustrated in *pāL* 'milk' and *pāl* 'omen.'

One major dialectal division in Brahui involves the voiceless glottal fricative *h*; it appears in all positions in the northern dialects but is replaced in the south by the glottal stop in initial and intervocalic positions, and is lost before a consonant or in final position; the following examples illustrate the variation in the northern and southern dialects, respectively: *hust*, *ʔust* 'heart'; *sahi affaṭ*, *saʔī affaṭ* 'I don't know'; *šahd*, *šad* 'honey'; and *pōh*, *pō* 'intelligence.'

Table 1 Vowels of Brahui

	Front		*Central*		*Back*	
	Short	*Long*	*Short*	*Long*	*Short*	*Long*
High	i	ī			u	ū
Mid		ē				ōō
Low			a	ā		

Syntax

Word Classes

The following word classes may be recognized for Brahui: nouns (including pronouns and numerals), verbs, adjectives, adverbs (including expressives), particles, and interjections. An adjective normally occurs before the noun it qualifies but may be shifted to the postnominal position for the sake of emphasis:

jwān-ō hullī-as
good-INDEF horse-INDEF
'good horse'

hullī-as jwān-ō
horse-INDEF good-INDEF
'good horse'

Nouns and adjectives characteristically distinguish between definite and indefinite forms. The basic forms are definite and the corresponding indefinite ones are derived by adding *-ō* to the adjective base and *-as* to the nominal base, as illustrated in the preceding examples. A definite adjective that is monosyllabic is often strengthened by the addition of *-ā/-angā*:

sun-angā šahr
deserted village
'deserted village'

An indefinite adjective can function also as a noun:

ball-ō
big-INDEF
'big (one)'

An adverb occurs before the verb. Adverbs may be divided into those of (1) time (e.g., *dāsā* 'now,' *darō* 'yesterday', *aynō* 'today', *pagga* 'tomorrow'), (2) place (e.g., *monaṭī* 'forward'), and (3) manner (e.g., *dawn* 'thus'). For particles, the enclitic pronouns

Table 2 Consonants of Brahui[a]

	Labial		*Dental*		*Alveolar*		*Retroflex*		*Palatal*		*Velar*		*Glottal (VL)*
	VL	*VD*	*VL*	*VD*	*VL*	*VD*	*VL*	*VD*	*VL*	*VD*	*VL*	*VD*	
Stop	p	b	t	d			ṭ	ḍ	c	j	k	g	ʔ
Nasal		m				n		ṇ					
Fricative	f										x	G	h
Sibilant					s	z			š	ž			
Lateral					L	l							
Trill						r							
Flap						ṛ							
Semivowel		w								y			

[a]Abbreviations: VD, voiced; VL, voiceless.

are very commonly used in Brahui. Whereas those for the third person are used in dialects throughout the Brahui area, those for the first and the second persons are more common in the Jahlawān dialect. They are suffixed to nouns or verbs. When added to a noun, they carry the sense of a pronoun in the genitive case; when added to a verb, they signal the direct or indirect object. The forms are: 1SG + *ka* 'my', 2SG + *nē* 'your,' 3SG + *ta* 'his/her/its', 3PL + *tā* 'their' (there are no plurals in the first and second persons):

maL-ē + ka
son-ACC/DAT + 1ENCL
'my son (accus.)/to my son'

xalkus + ka.
strike-PAST-2SG + 1ENCL
'You struck me.'

Word Order

The favored word order in Brahui is subject-object-verb:

ī	dā	kārēmē	kar-ōī	uṭ
I	this	work	do-NOM	be.1SG

'I must do this work.'

Sentences Without the Copular Verb

Like most of the other Dravidian languages (especially the southern ones), Brahui contains sentences without the copula in certain contexts:

numā	šahr-aṭī	aṭ	urā/ōʔ
your	village-LOC	how many	house

'How many houses are there in your village?'

Gender and Number

Brahui, like Toda of South Dravidian, has no gender distinction, but number (singular versus plural) is distinguished (see later, Plural Suffixes). The original neuter forms (both singular and plural) of the third person are retained to refer to all categories: *ō*(*d*) 'he/she/it' (cf. Ta(mil). *atu* 'it', Te(legu). *adi* 'she, it') and *ōfk* 'they' (cf. Ta. *av*(*ay*), Te. *avi* 'they (NEUT)').

Agreement

A finite verb shows agreement with the subject pronoun for person and number (see Table 3).

Noun Morphology

A nominal base is followed by the plural suffix when plurality has to be expressed and then by a case suffix; a postposition is normally attached to the genitive form of a noun.

Plural Suffix

The plural suffix is -k (variant -āk) in the nominative but -tē- before a nonnominative case suffix (see Table 4); as in the South Dravidian languages, use of the plural suffix is optional when plurality is understood from the context:

irā	mār/mā-k (<*mār-k)
two	son/son-PL

'two sons'

Case Suffixes and Postpositions

The nominative is unmarked; locative I means 'in' and locative II means 'on, by' (Table 4 shows all of the case forms of *xal* 'stone'). The following example shows postpositions:

ka-nā	nēmaGāī
my	towards

'towards me'

There are also a few prepositions, such as *bē*(*d*) 'without,' of Perso-Arabic origin that have entered Brahui through Balochi.

Pronouns

All of the pronouns are of Dravidian origin; however, Brahui developed postclitic forms of personal

Table 3 Finite tenses of *tix-* 'to put'

Tense	*Singular*	*Plural*
Past		
1.	*tix-ā* + *ṭ* 'I put'	*tix-ā* + *n*
2.	*tix-ā* + *s*	*tix-ā* + *re*
3.	*tix-ā*	*tix-ā* + *r*
Imperfect		
1.	*tix-ā* + *ṭ-a* 'I was putting'	*tix-ā* + *n-a*
2.	*tix-ā* + *s-a*	*tix-ā* + *re*
3.	*tix-āk-a*	*tix-ā* + *r-a*
Pluperfect		
1.	*tix-ā* + *sut* 'I had put'	*tix-ā* + *suṇ*
2.	*tix-ā* + *sus*	*tix-ā* + *sure*
3.	*tix-ā* + *sas*	*tix-ā* + *sur*
Perfect		
1.	*tix-ā-n* + *uṭ* 'I have put'	*tix-ā-n* + *un*
2.	*tix-ā-n* + *us*	*tix-ā-n* + *ure*
3.	*tix-ā-n* + *e*	*tix-ā-n* + *a*
Present indefinite		
1.	*tix-i-v* 'I may put'	*tix-i-n*
2.	*tix-i-s*	*tix-i-re*
3.	*tix-e*	*tix-i-r*
Future		
1.	*tix-o-ṭ* 'I will put'	*tix-o-n*
2.	*tix-o-s*	*tix-o-re*
3.	*tix-o-e*	*tix-o-r*
Nonpast negative		
1.	*tix-pa-r* 'I will not put'	*tix-pa-n*
2.	*tix-p-ēs*	*tix-p-ēre*
3.	*tix-p*	*tix-pa-s*

and demonstrative pronouns under the influence of Balochi (see preceding discussion, Word Classes). The first-person personal pronouns are *ī* 'I' and *nan* 'we'; the second-person personal pronouns are *nī* 'you(singular)' and *num* 'you (plural).' There is only the singular reflexive pronoun, *tēn* 'self'. The interrogative pronouns are *dēr* 'who?' and *ant* 'what?'. The third-person forms show a threefold deictic distinction: proximal *dā*(*d*) '(one) who is here' (plural *dāfk*), medial *ē*(*d*) '(one) who is at some distance' (plural *ēfk*), and distal *ō*(*d*) '(one) who is far off' (plural *ōfk*).

Numerals

Only the cardinal numbers for one, two, and three are of Dravidian origin (the forms without the final *ṭ* of these function as adjectives); all others are borrowed from Balochi. The number '1' is *asi*(*ṭ*), '2' is *ira*(*ṭ*), and '3' is *musi*(*ṭ*).

Verb Morphology

Verb Bases

A verb base in Brahui may be simple or complex. The complex base is formed from the simple one by the addition of the transitive-causative suffix *-if* (conditioned variant: *-f*). This suffix converts an intransitive into a transitive and an underived transitive into the corresponding causative; it is, therefore, possible to use the suffix twice in a sequence, e.g., *bin-* 'to hear,' *bin-if-* 'to cause to hear,' *kaʔ-* 'to die,' *kas-f-* 'to kill,' and *kas-f-if-* 'to cause (someone) to kill.'

Table 4 Case forms of *xal* 'stone'

Case	*Singular*	*Plural*
Nominative	*xal*	*xal-k*
Accusative-dative	*xal-ē*	*xal-tē*
Instrumental	*xal-aṭ*	*xal-t-aṭ*
Comitative	*xal-tō*	*xal-tē-tō*
Ablative	*xal-ān*	*xal-tē-ān*
Genitive	*xal-nā*	*xal-tā*
Locative I	*xal-*(*a*)*tī*	*xal-tē-tī*
Locative II	*xal-ā*(*ī*)	*xal-tē-ā*(*ī*)

Finite Verbs

There are four kinds of past tense (past, imperfect, pluperfect, and perfect), each with different shades of meaning, and all of them are periphrastic constructions involving the 'be' verb. The past stem, which is the basis for all of these, is formed by adding to the base *-b-* (conditioned variants: *-ē-*, *-k-*, *-g-*, *-is-*, *-s-*, *-ss-*). The following formulas give the structures of these tenses:

1. Past: past stem + present of *ann-* 'to be.'
2. Imperfect: past + *a*.
3. Pluperfect: past stem + past of *ann-* 'to be.'
4. Perfect: past stem + (*u*)*n* + present of *ann-* 'to be.'

The present indefinite, the future, and the nonpast negative are morphological constructions with the following structures (these and the previously mentioned tenses are illustrated in Table 3 with the verb base *tix-* 'to put'):

1. Present indefinite: verb base + *i* + personal suffix.
2. Future: verb base + *o* + personal suffix.
3. Nonpast negative: verb base + *pa* + personal suffix.

There are some other syntactic constructions involving *ann-* 'to be' that need not be mentioned here. One noteworthy feature of Brahui is the strategy of suffixing *-a* to form one type of finite verb from another. The imperfect present-future and the negative present-future are thus formed from the past present-indefinite and the nonpast negative, respectively.

The imperative suffixes are 2SG *-ø*, 2PL *-bo* (conditioned variant: *-ibo*):

tix
put-2SG
'Put!'

tix-bo
put-2PL
'Put (plural)!'

The corresponding negative imperative has the negative suffix *-pa-* (conditioned variant: *-fa-*) between the base and the imperative suffix:

tix-pa
put-NEG-2SG
'Don't put (singular)!'

tix-pa-bo̱
put-NEG-2PL
'Don't put (plural)!'

Nonfinite Verbs

The present adverb has the suffix *-isa*:

bis-isa
bake-PRES ADV
'baking'

The present adjective has the suffix *-ok*:

bin-ok
hear-PRES ADJ
'that hear(s)'

The infinitive-cum-action noun is formed by adding *-ing* (conditioned variant: *-ēng*) to the verb base:

bin-ing
hear-INF/VN
'to hear, hearing'

See also: Afghanistan: Language Situation; Dravidian Languages; Iran: Language Situation; Pakistan: Language Situation.

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Braille, Louis (1809–1852)

A Bowers

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Louis Braille's system is used worldwide to enable the blind to read and write by means of raised dots that are impressed from the reverse side of a page and read with the fingertips. The original system has been adapted to facilitate the notation of many other written forms, including non-European languages, shorthand, mathematical and scientific characters, and music.

Louis Braille was born in 1809 at Coupvray (Seine-et-Marne), the son of a saddler. At age 3, playing in his father's workshop, he injured one eye with a sharp instrument; complications resulted that led to total blindness. In time his father attempted to teach him to read the Roman letter shapes from wooden blocks studded with nails, but this could only serve as a beginning. At 10, in 1819, Braille was sent to an institution for blind children, in Paris (the Institution des Jeunes Aveugles), which had been founded five years earlier by Professor Valentin Haüy. Here, the teaching of reading seems to have been only slightly more advanced than that which the boy had

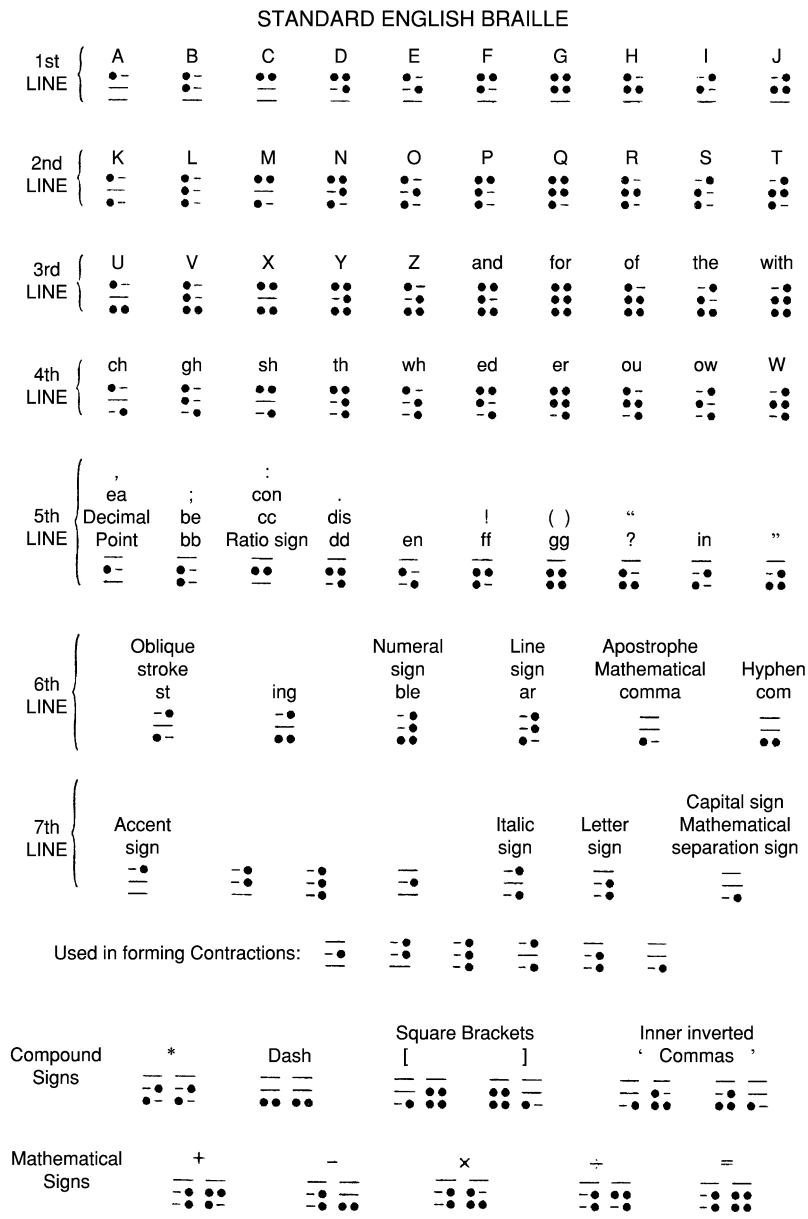

Figure 1 Standard English Braille. (Reproduced by kind permission of the Royal National Institute for the Blind, London, UK.)

experienced at home: again it relied on raised Roman letter shapes, though Professor Haüy is credited with embossing them on paper for his students.

At this time a former military officer, Charles Barbier, had researched a method for night-communication in battle by a code of dots embossed on cardboard, which he maintained would also benefit blind students. In 1824, however, at the age of 15, Braille adapted the existing ideas into a system whereby as many as 63 letters, abbreviations, and numbers could be embossed, requiring only a 6-dot code.

The code for each symbol or word was embossed from the back of the page using an awl and a perforated ruler, and arranged in a 'cell' or domino formation offering six possible dots, with extra guide symbols to multiply their possibilities. The columns were set about 3 mm apart, slightly more widely spaced than in present-day Braille. The inventor published this revolutionary system in 1829, by which time he was a teacher at the Institution. An accomplished musician, he also adapted his system to enable musical notation to be embossed.

Figure 1 is an example of the Standard English Braille dots representing letters and letter groups, together with some of the wide range of contractions, punctuation, and mathematical signs.

The Braille system revolutionized the speed of students' reading, and would have opened the way to large-scale embossed printing of books if the support of the authorities and funding had been available. In fact throughout his life Braille faced stubborn resistance from sighted teachers who insisted that the Roman letter shapes must be used, and several decades passed before his system was adopted widely in Europe. Its simplicity, compactness, and the speed with which it could be used would finally ensure its adoption. Braille died at 43, however, from tuberculosis, before his system was in common use even in his native France.

The only viable alternative that does not use encoded print is Moon Type, which was perfected in 1845 by William Moon, a printer from Brighton, UK. Moon Type uses Roman capital letters, and is valuable for users who have lost their sight late in life.

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Brands and Logos

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Introduction

The technique of promoting products by identifying them with the name of the manufacturer or with some invented name, known as the *brand name*, has become a primary marketing strategy since the turn of the 20th century. It was (and continues to be) based on the premise that the appeal of a product, called the 'brand,' increases if it can be linked to socially significant trends and values that the name evokes subconsciously. Turning a product into a brand thus transforms it into a sign – something that stands for something other than itself – that taps into social meaning systems that govern lifestyle, values, beliefs, and the like. For this reason, the semiotic study of brand creation as a central strategy of consumerist cultures has become widespread. Its origin can be traced to the general study of popular culture as a 'mythological sign system' by Roland Barthes (1915–1980) in 1957. It now constitutes a branch of semiotics, generally called *marketing semiotics* (e.g., Wolfe, 1989; Umiker-Sebeok, 1987; Berger, 2000; Beasley and Danesi, 2002; Danesi, 2002).

Brands and Advertising

The modern history of brands and 'persuasion' advertising overlap considerably (*see* **Marketing and Semiotics: From Transaction to Relation**). It is impossible to advertise 'nameless' products with any degree of persuasion. Brand names imbue products with identities in the same way that names given to human beings give them a distinct identity. It was in the 20th century that advertising evolved into a science of persuasion intended to influence people to perceive objects of consumption as 'necessary' accouterments of life, leading to a widespread, insatiable appetite for new objects of consumption in general 'groupthink.' Roland Barthes (1957) coined the term 'neomania' to characterize this type of groupthink (*see* **Mythologies in Pop Culture**).

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The dawn of advertising as a science of persuasion was signaled by the establishment and rapid growth of 'advertising agencies' at the end of the 19th century. These started composing newspaper ads, posters, and billboards for clients that related the qualities of a product not in themselves, but in relation to specific social and lifestyle trends. By the 1920s, such agencies had become themselves large business enterprises, continuously turning to psychologists to help them develop techniques and methods designed to influence the 'typical consumer' of the product. Business and psychology had clearly joined forces, broadening the attempts of their predecessors to build an unconscious bridge between a product and the consumer by playing on his or her emotional needs, fears, and expectations. With the entrenchment of electronic media (radio and television) in the 1940s and 1950s as mass communication outlets, advertising became itself a mass communication strategy, imprinting in groupthink the perception that objects of consumption were necessarily intertwined with the style and content of everyday life – a perception reinforced today through Internet advertising.

The influence of brand advertising on society is unmistakable. Its language has become the language of virtually everyone – even of those who are critical of it. This is because of its omnipresence in the social landscape. As Twitchell (2000: 1) aptly puts it, "Language about products and services has pretty much replaced language about all other subjects." The objective of brand advertising is, in fact, to get people to assimilate and react to advertising discourse unwittingly and in ways that parallel how individuals and groups have responded in the past to other kinds of 'authoritative' social discourse (such as religious discourse). Advertising language has become one of the most ubiquitous and persuasive forms of social discourse of the modern era. There are now even websites, such as AdCritic.com, that feature ads for their own sake, so that audiences can view them for their rhetorical and aesthetically pleasing qualities alone.

Creating Brand Identity

The main techniques that go into the creation of brand identity are called 'positioning,' 'image-creation,' and 'mythologization.' Positioning is the placing or targeting of a brand for the right market segment. For example, ads for the Mercedes Benz automobile are aimed typically at socially upscale car buyers, whereas ads for Dodge vans are designed to appeal (make sense) to middle-class individuals. The language of the ad, the lifestyle characteristics displayed in it, the overall 'look' of the personages in it, and so on are tailored to reflect class and appurtenant lifestyle distinctions. The register of the language used by the characters in Mercedes Benz ads, for instance, is sociolinguistically higher than that used by characters in Dodge van ads.

Creating an 'image' for a brand inheres in fashioning a recognizable 'personality' for it so that it can be positioned for specific market populations. Personality in this case refers to the traits and qualities that a potential consumer of the brand unconsciously possesses or aspires to have. The image is a sign constructed with an amalgam of signifiers (actual forms) – the brand name, design, logo, price, and overall presentation of the product. This amalgam creates is fashioned to appeal to specific consumer types – hence the term personality (as mentioned). Take alcohol brands as an example. What kinds of people drink beer? And what kinds drink aperitifs? In current American culture, answers to these questions would typically include remarks about the educational level, class, social attitudes, etc., of the consumer. The one who drinks beer is portrayed in ads as a down-to-earth character who simply wants to 'hang out' with friends; the one who drinks an aperitif is portrayed instead as a smooth, sophisticated type. The idea behind creating an image for the brand is, clearly, to speak directly to particular types of individuals, not to everyone, so that these individuals can see their own personalities mirrored in the lifestyle images created by the appurtenant advertising.

Brand identity is often also created by the technique of mythologization. This is the strategy of imbuing a brand with some mythic meaning, such as the quest for eternal beauty, the conquest of death, and so on. This is an especially widespread in the case of cosmetic and beauty products. The eternal beauty myth can be seen in the images that advertisers create for such products. The characters in the relevant ads are, typically, attractive people with a deified, mythic quality about them. They are not unlike the statues of ancient Greek gods like Apollo and Aphrodite. In effect, through positioning, image-creation, and mythologization, the modern advertiser stresses not the brand's qualities as a product or service, but rather the personality image that can be associated with it.

Brand Names

Creating an identity for a product is tantamount to creating a 'signification system' for it – a system of meanings that are relevant to specific kinds of individuals. This is achieved, first and foremost, by giving it a 'brand name.' The product, like a person, can then be easily differentiated from other products.

The legal term for brand name is 'trademark.' It is little wonder that trademarks are so fiercely protected by corporations and manufacturers. So powerful are they as identifiers that some have gained widespread currency, becoming general terms for the product type in common discourse. Examples include 'aspirin,' 'scotch tape,' 'cellophane,' and 'escalator.' Most brand names appear on the product, on its container, and in advertisements for the product. These provide, in effect, an easy way to determine who makes a certain product, helping consumers easily identify what they like about it so that they can purchase it again. A brand represents not only a certain social meaning, but also the manufacturer's reputation and good will.

A so-called 'strong brand' is a product name that has no recognizable meaning, such as Kodak. Strong brands receive broad protection from being used by other companies who might play on the name in order to cause confusion among consumers. 'Weak brands,' on the other hand, are product names created with common words, such as Premier, some of which refer to a characteristic of the product (e.g., Wet 'n Wash). These receive less protection, unless the public identifies them with a certain manufacturer as a result of extensive advertising and long, continuous use.

A brand was, originally, a recognizable mark made on the flesh of animals with a hot iron so as to identify ownership and qualities of the animals. The ancient Egyptians branded livestock as early as 2000 B.C.E. In the late medieval period, tradespeople and guild members posted characteristic visual 'marks' outside their shops for the same basic reasons – to identify the owner and quality of the product or service. Visual signs were used because most people were not literate at the time. Such signs became, a little later, the 'marks of the trade' or 'trademarks.' Shops selling medieval swords and ancient Chinese pottery, for instance, bore visual signs that buyers could identify and use, when put on the products themselves, to ascertain their origin and determine their quality. Among the best-known trademarks surviving from that era are the striped pole of the barbershop and the three-ball sign of the pawnbroker shop.

Names for common products, such as household ones, were first used towards the end of the 19th century. Previously, everyday household products were sold in neighborhood stores from large bulk containers. Around 1880, soap manufacturers started naming their products so that they could be identified and differentiated for their qualities. The first of these were Ivory, Pears', Sapolio, and Colgate. The concept of the brand name thus came into being, spreading rapidly because, as Naomi Klein (2000: 6) aptly observes, the market was starting to be flooded by uniform mass-produced and, thus, indistinguishable products: "Competitive branding became a necessity of the machine age." By the early 1950s, it became obvious that branding was not just a simple strategy for product differentiation but the very semiotic fuel that propelled corporate identity and product recognizability. Even the advent of no-name products, designed to cut down the cost of purchase, have had little counter-effects on the power that branding has had on the consciousness of people. Names such as Nike, Apple, Body Shop, Calvin Klein, Levi's, Coke, Pepsi, among many others, have become 'culture-wide signs' recognized by virtually anyone living in a modern consumerist society. As Klein (2000: 16) goes on to remark, for such brands, the name constitutes "the very fabric of their companies."

To continue to be effective, however, brands must keep in step with the times. In early 2000, some carmakers, for instance, started looking at naming trends that were designed to appeal to a new generation of customers accustomed to an Internet style of communication and representation. Cadillac, for instance, announced a new model with the monogram name CTS in 2001 and STS in 2005. Acura also transformed its line of models with names such as TL, RL, MDX, RSX. Such 'alphabetic names' evoke images of accuracy, technology, and sleekness in an analogy with similar abbreviating tendencies in science at large – e.g., 'laser' for 'l(ight) a(mplification) by s(timulated) e(mission of) r(adiation).' They are also consistent with 'Internet style,' a telegraphic form of language that spawns monogrammatic and alphanumeric signifiers on a daily basis. Hyundai's XG300 model, for instance, sounds perfect for Internet times. On the other side of the naming equation, such abbreviations are hard to remember, especially for older customers who have not yet tapped into Internetese.

As the above examples show, brand names are devised intentionally to create a signification system for products. At a practical informational level, naming a product has, of course, a denotative function; that is, it allows consumers to identify what product they desire to purchase (or not). But at a connotative level, the product's name generates images that go well beyond this simple identifier function (*see* **Denotation versus Connotation**). In the world of fashion, for instance, designer names such as Gucci, Armani, and Calvin Klein evoke connotations of the clothes as *objets d'art* rather than images of mere clothing items, shoes, or jewelry; so too do names such as Ferrari, Lamborghini, and Maserati in the domain of automobiles. The manufacturer's name, in such cases, extends the meaning of the product considerably.

When people buy an Armani or a Gucci product, they feel that they are buying a work of art to be displayed on the body; when they buy Poison, by Christian Dior, they sense instead that they are buying a dangerous, but alluring, love potion; when they buy Moondrops, Natural Wonder, Rainflower, Sunsilk, or Skin Dew cosmetics they feel that they are acquiring some of nature's beauty resources; when they buy Eterna 27, Clinique, Endocil, or Equalia beauty products they sense that they are getting products made with scientific precision; and so on.

Another common brand naming strategy involves iconicity – the strategy of creating names that resemble or assign some sensory property or social meaning to a product (*see* **Iconicity: Theory**). Iconicity is an effective strategy, because it renders the products highly memorable. A name such as Ritz Crackers, for example, assigns sonority to the product that is simulative of sounds that crackers make as they are being eaten. Another example of an iconic brand name is Drakkar Noir, chosen by Guy Laroche for a cologne product. Together with the dark bottle, the name conveys images of 'fear,' the 'forbidden,' and the 'unknown.' Forbidden things take place under the cloak of the night; hence the name *noir* (French for 'black'). The sepulchral name Drakkar Noir is clearly iconic with the bottle's design at a connotative level, reinforcing the idea that something desirous in the 'dark' will happen by splashing on the cologne. The word Drakkar is obviously suggestive of Dracula, the deadly vampire who came out at night to mesmerize his sexual prey with a mere glance.

The name of the Acura automobile, to give another example of the use of iconicity, was likely designed to be imitative of both Italian and Japanese words. Italian feminine nouns end in *-a* and certain Japanese words end in the suffix *-ura* (e.g., *tempura*). The brand name is thus linked iconically to Italian and Japanese words and, by extension, the perceived qualities of the respective cultures at once. Carmakers have used the same strategy of creating car names ending in the vowel *-a* which, given the inbuilt melodious quality of such a word, makes it not only easier to remember but also suggestive of specific qualities. Here are a few examples:

Achieva
Altima
Asuna
Aurora
Corsica
Elantra
Festiva
Integra
Lumina
Maxima
Precidia
Samara
Sentra
Serenia
Sonata

Brand names are clearly powerful signs, because they are suggestive of various qualities or attributes, either explicitly or implicitly. Here are examples of some of the strategies that are used to bring about overt or implicit suggestion.

1. Brand names that are the names of the actual manufacturers imply 'tradition,' 'reliability,' and, in the case of lifestyle products such as clothes, 'artistry,' 'sophistication,' and 'beauty':
   Armani
   Bell
   Benetton
   Calvin Klein
   Folger's
   Gillette
   Gucci
   Kraft
   etc.
2. Brand names referring to real or fictitious people elicit images built culturally into the bearers of the actual name (e.g., Wendy's evokes the image a friendly young girl), or else suggest qualities that the name itself is designed to emphasize (e.g., Mr. Clean):
   Aunt Jemima
   Barbie (the doll)
   Ken (the doll)
   McDonald's
   Mr. Clean
   Wendy's
   etc.
3. Names identifying the geographical location of a product or of a company suggest stability and tradition:
   American Bell
   Southern Bell
   Western Union
   etc.
4. Names designed to refer to some aspect of nature bestow upon the product the meanings that the particular aspect evokes:
   Aqua Velva
   Cascade
   Mountain Dew
   Surf
   Tide
   etc.

5. Names indicating the kinds of things that can be done with the product, such as a vehicle, or the kinds of places that can be visited with it, evoke connotations of lifestyle such as 'country living,' 'back-to-nature living,' 'wild-west lifestyle,' 'city life,' and so on:
   Dodge Durango
   Ford Escape
   Ford Expedition
   Ford Explorer
   Hyundai Santa Fe
   Jeep Grand Cherokee
   Jeep Renegade
   Jeep Wrangler
   Mercury Mountaineer
   etc.
6. Names constructed as hyperboles emphasize product 'superiority' and 'excellence':
   MaxiLight
   SuperFresh
   UltraLite
   etc.
7. Names created as combinations of words describe a product in a 'poetic' way:
   Frogurt (= Frozen + Yogurt)
   Fruitopia (= Fruit + Utopia)
   Yogourt (= Yogurt + Gourmet)
   etc.
8. Names designed to indicate what the product can do set off images of 'user-friendliness':
   Easy On
   Easy Wipe
   Kleenex
   Lestoil
   One Wipe
   Quick Flow
   etc.
9. Brand names designed to indicate what can be accomplished with the product are also suggestive of 'user-friendliness' and 'goal-achievement':
   Air Fresh
   Bug Off
   Close-Up Toothpaste
   No Sweat
   etc.

Even in relaying straightforward information, such as identifying the manufacturer (Bell, Kraft, etc.), indicating the geographical location of the company (Southern Bell, American Bell, etc.), describing what the product can do (Easy On, Quick Flow, etc.), and so on, brand names nevertheless create signification systems. The name Bell, for instance, evokes meanings of 'tradition' and 'reliance' that familiarity with the name kindles. In effect, every brand name entails an unconscious signification system – a set of connotations – of one kind or other. It is this system that is used and reused for various advertising purposes. Indeed, the more connotations a name evokes, the more powerful it is and, as a consequence, the more possibilities it offers to the advertiser for creating truly effective ads and commercials. The higher the 'connotative index' of a signification system, as it has been called (Beasley and Danesi, 2002), the greater its market appeal.

Table 1 Brand names and the signification systems they evoke

Brand names	*Signification systems*
Superpower, Multicorp, Future Now, Quantum Health Resources, PowerAde, etc.	'big picture,' 'forward-looking,' 'strong,' 'powerful,' etc.
People's Choice, Advantage Plus, Light N' Easy, Viewer's Choice, etc.	'free-spirited,' 'advantageous,' egalitarian,' 'common,' 'friendly,' etc.
Biogenical, Technics, Panasonic, Vagisil, Anusol, Proof Positive, Timex, etc.	'scientific,' 'methodical,' 'fool-proof,' 'accurate,' 'reliable,' etc.
Coronation, Morning Glory, Burger King, Monarch's Flour, etc.	'conquering,' 'regal,' 'majesty,' 'nobility,' 'blue-blooded,' etc.
Wash 'N Wear, Drip-Dry, Easy Clean, Okay Plus, etc.	'user-friendly,' 'simple,' 'uncomplicated,' 'basic,' etc.
General Electric, General Mills, General Dynamics, General Foods, etc.	'all-encompassing' 'widespread,' 'popular,' etc.
Cheer, Joy, etc.	'happy,' 'bright,' 'friendly,' 'smiling,' etc.
Pledge, Promise, etc.	'trustworthy,' 'reliant,' 'secure,' etc.

Table 1 shows just a few examples of how signification systems are generated by brand names.

Naming a product makes it possible to refer to it as if it had a distinctive character or quality – 'I don't trust Colgate products; they're useless'; 'I will only buy Quaker Oats; it suits me perfectly'; etc. It is meaningless to say something like 'I don't trust the toothpaste that has blue stripes in it'; or 'I will buy only the cereal that has an oat-like taste to it.' Moreover, a product with a name has the capacity, by its very nature, to tap into the brain's capacity to store meaningful categories in the form of language. A word classifies something, keeps it distinct from other things, and, above all else, allows it to have meaning over and above itself. The name Ivory, for example, evokes an image of something 'ultrawhite,' Royal Baking Powder of something 'regal' and 'splendid,' Bon Ami of 'a good friend,' and so on. Such suggestive images stick in the mind in the same way that the meanings of words do. They become an unconscious part of our semantic memory system.

It is little wonder that the term 'brand' is no longer used today just to refer just to a specific product line, but also to the company that manufactures it, to the image that the company wishes to impart of itself and of its products, and to the 'personality structure' that is perceived in users of the product. Thus, the name Coca-Cola now refers not only to the actual soft drink, but also to the company itself, the social meanings that drinking Coke entails, and so on and so forth. Coca-Cola went on sale as a headache and hangover remedy on May 8, 1886 at Jacob's Pharmacy in Atlanta. It was created by local pharmacist John S. Pemberton from South American cocoa shrub leaves, an extract of African kola nuts, and fruit syrup. It was Pemberton's bookkeeper who named the product 'Coca-Cola' and who suggested writing its name with the familiar flowing script that virtually everyone recognizes. The drink was subsequently promoted with such slogans as "Wonderful nerve and brain tonic and remarkable therapeutic agent" and "Its beneficial effects upon diseases of the vocal chords are wonderful." In 1891, Atlanta pharmacist Asa G. Candler acquired ownership of Coca-Cola, changing its image from a 'tonic' to that of a popular 5¢ soft drink that could be drunk together with family and friends – an image that has persisted to this day and is the basis of Coca-Cola's continued commercial success.

That image was created at first by imprinting the Coca-Cola name on drinking glasses, providing them to diners and other eateries that featured 'pop' and foods meant to be eaten quickly and cheaply. From then, Coca-Cola has coopted socially significant themes, from the brotherly love and peace espoused during the counterculture era of the late 1960s and early 1970s with its "I'd like to teach the world to sing in perfect harmony" campaign, to the "Coke is the real thing" campaign shortly thereafter, to 2000's campaigns showing Coke as the drink of Olympic athletes.

Logos

Logos (an abbreviation of 'logogriphs') are the pictorial counterparts of brand names. They are designed to reinforce the signification system for a product through the visual channel. Consider the apple logo adopted by the Apple Computer Company. As a visual iconic sign suffused with latent religious symbolism, it strongly suggests the story of Adam and Eve in the Western Bible, which revolves around the eating of forbidden fruit (probably the apple) that contained forbidden knowledge. The logo reinforces this symbolic association because it shows an apple that has had a bite taken from it. The creator of the logo, a man named Rob Janoff of Regis McKenna Advertising, has consistently denied any intent to connect the logo to the Genesis story, claiming instead that he put the bite there in order to ensure that the figure not be confused with a tomato. Whatever the truth, the bite in the logo evokes the Genesis story nonetheless.

As another example, consider the Playboy logo of a bunny wearing a bow tie. Its ambiguous design opens up at least two interpretive chains:

1. rabbit = 'female' = 'highly fertile' = 'sexually active' = 'promiscuous' = etc.
2. bow tie = 'elegance' = 'night club scene' = 'finesse' = etc.

The appeal and staying power of this logo is due, arguably, to this inbuilt dual signification system. By not being able to pin down what the actual meaning of the logo is, we start experiencing the sign holistically and, thus, as an artistic text or mysterious pictograph.

Logos have now become part of a culture-wide visual symbolism that interconnects products with daily life. Until the 1970s, logos on clothes, for instance, were concealed discretely inside a collar or on a pocket. Today, they can be seen conspicuously on all kinds of products, indicating that society has become 'logo conscious.' Ralph Lauren's polo horseman, Lacoste's alligator, and Nike's 'swoosh' symbol, to mention but three, are now shown prominently on clothing items, evoking images of heraldry and, thus, nobility. They constitute symbols of 'cool' (Klein, 2000: 69) that legions of people are seemingly eager to put on view in order to convey an aura of high class 'blue-blooded' fashionableness.

To see why logos are so powerful psychologically, consider briefly the Nike symbol, which is found on the shoe brand. As a visual sign suggesting speed, it works on several levels, from the iconic to the mythical. At the iconic level, it implies the activity of running at top speed with the Nike shoe; at the mythic level, it taps into the idea of speed as symbolic of power and conquest (such as in the Olympic races). The combination of these two signifying levels creates a perception of the logo, and thus the product, as having a connection to both reality and narrative history. Nike was the goddess of victory in Greek mythology. An ancient statue of Nike shows a winged female figure alighting on the prow of a ship, presumably to crown the ship's commander. Her garments, wet with spray and blown by her flight, whip about her body.

Given their psychological power, it is little wonder that logos are used as well by noncommercial enterprises and organizations. One of the most widely known ones is the peace sign, often worn on chains and necklaces. Derived from an ancient runic symbol

of despair and grief, it became the logo for philosopher Bertrand Russell's (1872–1970) 'Campaign for Nuclear Disarmament' in the 1950s. The logo's first widespread exposure came when it surfaced in the 1962 sci-fi film *The Day the Earth Caught Fire*, leading to its adoption by the counterculture youth of the era.

In a fundamental sense, a logo is a pictograph – a picture used to express ideas. The inbuilt emotional appeal of pictography is likely the reason why the alphabet character X has become a kind of ersatz logo for everything from movies to sports names: e.g., Nissan's X-Terra model, X-treme sports, the movie action hero 'Triple X,' XXX movies, and so on. The letter X has become a kind of 'macrologo' that is synonymous with youth, danger, and excitement, even though it has been around for centuries as the mathematical variable *par excellence*, as a signature used by those who cannot write, as a blasphemous letter assigned to cartoon bottles of alcohol and boxes of dynamite, and as a symbol marking a secret treasure on a pirate's map. 'X' has always constituted a pictography of various meanings that predate X-treme sports and X-File TV programs.

X is powerful because it conjures up images of things that are just beyond the realm of information, or beyond decency and righteousness. In today's sexually charged culture, 'X' on a product means 'Buy me, I'm X-rated and X-citing.' 'X' is, in a phrase, one of the most provocative symbols of contemporary logo culture, characterizing it in a compact yet accurate way. And the reason is, ultimately, because it reverberates with mythical symbolism that reaches back to the origin of pictography as a craft controlled by those in power. It is a modern-day hieroglyph.

The only way to explain why we extract so much meaning from a simple letter is, in fact, to see it as a product of an unconscious pattern of pictorial symbolism that continues to have emotional hold on the modern mind. Its particular design – a cross symbol that has been rotated 45 degrees – reverberates with contradiction and opposition. No wonder that advertisers, manufacturers, Hollywood moguls, and all the other image-makers of contemporary pop culture have adopted it as a symbol of 'cool.'

Conclusion

As mentioned, brands and logos are now created to name not just products, but entire corporations (IBM, Ford, etc.) and even specific characters that represent, in some way, a corporation. Take, for example, the Disney Corporation cartoon character Mickey Mouse. In 1929, Disney allowed Mickey Mouse to be reproduced on school slates, effectively transforming the character into a logo. A year later Mickey Mouse dolls went into production and throughout the 1930s the Mickey Mouse brand name and image were licensed with huge success. In 1955, *The Mickey Mouse Club* premiered on US network television, further entrenching the brand and image – and by association all Disney products – into the cultural mainstream.

Analogous 'branding events' have repeated themselves throughout modern society. The idea is to get the brand to become intertwined with cultural spectacles (movies, TV programs, etc.) and thus indistinguishable as a sign from other culturally meaningful signs and sign systems. Because of the Disney Corporation, toys, children's TV programming, childhood films, videos, DVDs, theme parks, and the like have become part of the modern perception of childhood as a Fantasyland world. This is why children now experience their childhood through such products.

See also: Barthes, Roland: Theory of the Sign; Denotation versus Connotation; Iconicity: Theory; Marketing and Semiotics: From Transaction to Relation; Media: Semiotics; Mythologies in Pop Culture.

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Braune, Wilhelm (1850–1926)

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Wilhelm Braune belonged to the so-called 'Neogrammarians,' a group of linguists with quite a strong influence on linguistic research in the last third of the 19th century and at the beginning of the 20th century. But whereas other Neogrammarians such as Hermann Paul and Karl Brugmann became rather famous, Wilhelm Braune more or less took on the role of the decent working linguist in the background. The obituaries of his friend Eduard Sievers (1927) and of his successor Friedrich Panzer (1927) give evidence of his calm and peaceable character and of his conscientious working attitude.

As the most famous results of his diligence, Braune's *Gotische* and his *Althochdeutsche Grammatik* should be mentioned. The newest (20th) edition of the *Gotische Grammatik* only recently has been revised by Frank Heidermanns and so today is still of value as a reliable working tool. The *Althochdeutsche Grammatik*, too, has seen many editions, and even the *Althochdeutsche Lesebuch* is still in print.

Furthermore, a great part of Braune's working energy was absorbed by the *Beiträge zur Geschichte der deutschen Sprache und Literatur*, a journal he founded together with Hermann Paul in 1874 and which quickly became one of the central periodicals of the Neogrammarians (the common abbreviation PBB refers to the initials of the co-founders: Paul and Braune's Beiträge). A great deal of Braune's works were published here, among others an important essay on the history of the German language titled *Zur Kenntnis des Fränkischen und zur hochdeutschen Lautverschiebung* (1874) and a voluminous analysis of the *Handschriftenverhältnisse des Nibelungenliedes* (1900). These two titles, as well as the *Beiträge*, are representative of Braune's scientific position: he saw himself not only as a linguist but also as a Germanist, a philologist who is not interested in linguistic questions alone (see also Panzer, 1927: 159). That he was still open to new scientific trends in his later years can be seen in his essay *Althochdeutsch und Angelsächsisch* (1918), in which he took into account geographical and cultural aspects.

Braune's university career was quite unspectacular, fitting for his role as a decent worker. He studied in Leipzig, where he was mostly influenced by his teachers August Leskien, Friedrich Zarncke, and Rudolf Hildebrandt. In Leipzig he also met Hermann Paul, Eduard Sievers, Hermann Osthoff, and Karl Brugmann and hence became part of the new development in linguistics, which quite soon was named Neogrammarian. After his graduation Braune first worked as an assistant at the library at the University of Leipzig, then he gave lectures, and finally he was offered a chair at Gießen in 1880. Mainly due to the influence of Hermann Osthoff, who already taught there, he was offered a chair at the University of Heidelberg in 1888, where he lived until he died in 1926.

See also: Brugmann, Karl (1849–1919); English, Old English; German; Gothic; Leskien, August (1840–1916); Osthoff, Hermann (1847–1909); Paul, Hermann (1846–1921); Sievers, Eduard (1850–1932); Zarncke, Friedrich (1825–1891).

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Brazil: Language Situation

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Background

The indigenous population in what is now Brazil was much higher in the past, with a multiplicity of societies and languages. According to Roosevelt (1994), the oldest pottery in the New World (6000–8000 years) is found in Brazilian Amazonia, on whose flood plains dense populations, divided into chiefdoms, lived at the time of European contact. Other regions of Brazil, such as the central highlands, the semi-arid northeast, and the more temperate southern region, were likewise home to sizeable indigenous populations, most of which were destroyed or absorbed. Over 40% of the modern Brazilian gene pool is of indigenous origin.

European contact began with the arrival of the ships of the Portuguese explorer Pedro Álvares Cabral in 1500. He encountered some Tupinambá on the eastern coast of Brazil. European immigration was relatively slight for the first two centuries. European men frequently took indigenous wives, and a class of mestizos was produced, which was important in the colonizing process, during which large numbers of native people were relocated and obliged to learn the language of the mestizo, Língua Geral, or Nheengatu (Nhengatu), a Tupí-Guaraní language originally spoken on the coast that was modified by substratum effects and borrowings from Portuguese. Several dialects of Nheengatu still persist in Amazonia. With the expulsion of the Jesuits in the mid-18th century, the state assumed control over the communities of resettled native peoples (*reduções*), where the population was already declining from occidental disease.

The regions of Brazil that have been occupied the longest have the fewest indigenous societies and languages, especially eastern Brazil, where few indigenous groups still speak their language. Rodrigues (1993) estimates that 75% of the indigenous languages became extinct. The surviving native groups are mostly in remote areas, especially in Amazonia, where contact with national society has been more recent and less intensive. There are still native groups living out of contact with the outside world. Newly contacted groups still commonly lose two-thirds of their population to Western diseases – an unnecessary loss, since the diseases responsible for this loss of life and language are preventable or treatable. A number of native political organizations exist in Brazil (for example, the Coordenação de Organizações Indígenas da Amazônia Brasileira – COIAB, and the Federação de Organizações Indígenas do Rio Negro – FOIRN) and are active in debating policy and defending the interests of the communities that they represent. Indigenous affairs are under the control of the National Indian Foundation (FUNAI), and all researchers must obtain authorization from that governmental entity to enter indigenous areas, as well as approval from the National Council for Scientific and Technological Development (CNPq).

The Study of Native Brazilian Languages

Some of the earliest descriptive studies of the native languages of the New World were conducted by Jesuits in Brazil, for example, Anchieta (1595). This tradition did not take hold, however. In the 19th century and the first half of the 20th century, a number of nonspecialists, especially members of scientific expeditions, accomplished a certain amount of linguistic description. These include, notably, Karl von den Steinen, General Couto de Magalhães, Theodor Koch-Grünberg, Curt Nimuendaú, Emilie Snethlage, and João Capistrano de Abreu. Modern scientific studies of native Brazilian languages only began in the second half of the 20th century. Mattoso Câmara established the Setor de Lingüística at the Museu Nacional in 1961 and also authored a book about indigenous languages (1965), though he was not a fieldworker. During a number of years, Brazilian research on indigenous languages was mainly done at the Museu Nacional and at the State University of Campinas (UNICAMP). However, in the second half of the 1980s the study of native languages spread to other centers, especially the Federal Universities of Brasília (UnB), Goiás (UFG), Pernambuco (UFPE), and Pará (UFPA), aside from the University of São Paulo (USP) and the Museu Goeldi, which is a federal research institute in Belém.

The anthropologist Darcy Ribeiro established a cooperation agreement between the Summer Institute of Linguistics (SIL) and the Museu Nacional in 1956. This agreement was terminated in 1981, and there are now no formal ties between Brazilian academic centers and missionary organizations. Foreign missionaries have become less influential in the study of indigenous languages as their place is being taken to a certain extent by Brazilian missionaries and increasingly by professional and numerous Brazilian scientific linguists. A number of these latter have studied abroad in recent years, and upon the completion of their studies, they are strengthening the national capacity in scientific linguistics, especially in diachronic linguistics (see, for example, Meira and Franchetto, forthcoming), in recent theory and methodology, and

in overall descriptions of individual languages. The first complete grammar of a native language in decades authored by a Brazilian linguist was the description of Kamayurá by Seki (2000). More such general descriptions have been undertaken by young Brazilian linguists. There is, unfortunately, no national program for identifying and describing endangered languages in Brazil. However, a number of recent modern documentation projects with international funding have improved the level of documentation efforts. These are very popular with native groups. The small number of foreign nonmissionary linguists studying Brazilian indigenous languages has increased considerably in recent years.

Some modern information about Brazilian native languages appeared in a general work on South American languages edited by Klein and Stark (1985). Amazonia became identified as a distinct research area in linguistics with the publication of the *Handbook of Amazonian languages* series, edited by Derbyshire and Pullum (1986–1998) and the compendium edited by Payne (1990). Later useful general works with the same regional focus are those edited by Queixalós and Renault-Lescure (2000) and by Dixon and Aikhenvald (1999). These typically include languages outside of what is, strictly speaking, Amazonia, for example, the languages of the central highlands of Brazil. In recent years, volumes of the *ILLA* series have included many Brazilian languages, for example, the volumes edited by van der Voort and van de Kerke (2000) and by Crevels, van de Kerke, Meira, and van der Voort (2002).

In Portuguese, a general treatment of Brazilian languages is that by Rodrigues (1986). Rodrigues (1993) presents information on the situation of Brazilian native languages, but suffers from confusion between the number of speakers and the population size, which results in underestimating the degree of endangerment. Seki (1999) and Franchetto (2000) describe the study of indigenous languages in Brazil. Wetzels (1995) presents a collection of phonological studies. A recent collection of articles is that by Cabral and Rodrigues (2002). One Brazilian periodical dedicated exclusively to indigenous languages is *Línguas Indígenas Americanas* (*LIAMES*), of UNICAMP. The *Boletim do Museu Paraense Emílio Goeldi* contains linguistics articles in its Anthropology issues. Articles likewise appear in the journals *Revista de Documentação de Estudos em Lingüística Teórica e Aplicada* (*D.E.L.T.A.*) of the Pontífica Universidade Católica de São Paulo, the *Boletim da ABRALIN*, and the *Cadernos de Estudos Lingüísticos* of UNICAMP. Of the many NGOs working with indigenous groups, the largest and most concerned with documentation is the Instituto Sócio Ambiental (ISA), whose website is a valuable source of information and also publications (including maps) that can be purchased via the Internet. There is also a website and a listserv run by the Museu Antropológico, Universidade Federal de Goiás.

The Situation of the Native Brazilian Languages

Of course, Portuguese is the official language of Brazil. Impressionistically, Brazilian Portuguese is about as different from the Portuguese dialects in Portugal as American English is from the English dialects in Great Britain. There are many other languages spoken by immigrant communities in Brazil, especially German, Italian, and Japanese. We will focus attention here on the situation of the native languages. It must be emphasized that the information presented below is approximate, due to the lack of systematic data gathering about the situation of the native languages of Brazil. Even when population size is known, the number of effective speakers and the degree of transmission is often not known with certainty. What are considered to be different languages sometimes turn out to be dialects of the same language, often reflecting ethnic or political divisions. Much of the information is a revised version of information presented in an overview article about endangered languages in lowland South America by Moore (forthcoming), which is based on a number of sources, including Queixalós and Renault-Lescure (2000), Rodrigues (1993), Dixon and Aikhenvald (1999), the map of the Centro de Documentação Indígena (1987), the website of the Instituto Sócio Ambiental, the author's own knowledge of several regions, and personal communications from many linguists actively studying indigenous languages in various geographical areas.

Language names and the genetic classification are adapted from those of the Instituto Sócio Ambiental website, which are a 1997 adaptation of information from Rodrigues (1986). Names used by Ethnologue, if different, appear in parentheses after (note that Ethnologue's family names and categorization sometimes differ from the one used here). Population figures are normally from this same website; numbers from other sources are put in brackets. Speaker estimates are from various sources; when more than one source is used, the second is separated by placing it in brackets. Where no real information is available, the space is left blank. Since many tribal groups span national boundaries, it is important to note that all estimates are specific to Brazil and excluding speakers of those groups living in, say, Colombia or Venezuela. Likewise, the estimate of the amount of study refers to

studies carried out among speakers in Brazil, not in other countries. These estimates are very rough and can change quickly with the publication of new work.

Languages with little or no significant scientific description are rated 0; those with an M.A. thesis or several articles are rated 1, those with a good overall sketch or doctoral thesis on some aspects of the language are rated 2; and those with reasonably complete descriptions are rated 3. In the terminology used here for genetic groupings, 'family' means a group of related but different languages whose genetic relation is reasonably obvious, and 'stock' refers to a group of families whose relation is not so obvious. Because of the small size of the surviving speech communities and the precarious conditions in which they live, all might be considered to be in danger of extinction. However, it is more useful to distinguish those that are in serious, imminent danger of disappearing, either because of a low number of speakers, low transmission, or both factors. Some languages listed may already be extinct, but are listed anyway because a careful search sometimes finds remaining speakers somewhere, and that search may be abandoned if they are not listed. Languages are not considered urgently endangered if there are a reasonable number of speakers of at least one dialect or a reasonable number of speakers in another country. Larger groupings are considered first, following alphabetical order within the grouping.

Hypothetical Linguistic Stock

Macro-Jê Various authors have, on one basis or another, proposed groupings of languages often considered today as Macro-Jê. It is important to confirm or disconfirm each of the proposed genetic affiliations, some of which are not obvious. The Jê family of languages, the largest of the stock, is focused on the savanna regions of Brazil from the southern parts of the states of Pará and Maranhão south to Santa Catarina e Rio Grande do Sul. The other families of this hypothesized stock generally occur outside of Amazonia, mainly in eastern and northeastern Brazil, but with some in central Brazil and farther west. Rikbaktsa has been held to be the exception, apparently living for a long time in an Amazonian environment in northern Mato Grosso. Recent research, however, indicates that the Jabutí languages are probably Macro-Jê, as was speculated by some authors, indicating a wider and older presence in Amazonia as well. Because of their early contact with Europeans, many of the Macro-Jê languages in the east and northeast of Brazil are extinct, with or without some documentation. The last speaker of Umotína died recently (Table 1).

Major Language Families

Arawak The languages of the Arawak family, in its restricted sense, also designated Maipurean, have long been recognized as related, though proposed genetic links to other linguistic groups are more doubtful. The supposed link with the Arawá languages, for example, has no linguistic basis. The work of Noble (1965) influenced archeology, but is dubious in its conclusions. The Arawak languages are amazingly widespread, from the Caribbean to Bolivia. In Brazil, they occur in northern Pará state, on the tributaries of the Rio Negro in the northwest, along the Purus River in the west, on the tributaries of the Juruena River in Mato Grasso, and along the Upper Xingu River. The relatively numerous Terêna live in Mato Grosso do Sul. It is not certain whether or not there are still speakers of Mandawáka (Mandahuaca) in the region of the Upper Rio Negro. The Arawak languages are polysynthetic and often have gender and nominal classification (Table 2).

Carib The Carib family is centered on northern South America. The Carib languages of northern Brazil are rather similar, though Waimiri-Atroari (Atruahí) is more distant. The language called Galibi do Oiapoque is intrusive from French Guiana, where it is called Kali'na (or Carib in Surinam and Guyana). The Carib languages on or near the Upper Xingu are quite different from the northern languages and also do not constitute a single consistent subgroup (Table 3).

Pano The Pano linguistic family is not highly differentiated internally. It occurs in Peru, Bolivia, and Brazil, and is usually considered to be related to the Tacana family of Bolivia. The Brazilian Pano languages occur in the states of Acre and Amazonas, except for the Kaxararí in Randônia, and have received relatively little study. Sources are contradictory as to whether Amawáka is spoken in Brazil (Table 4).

Tucano Of the divisions of the Tucano family, Western, Eastern, and (for some authors) Central, it is mainly the Eastern branch which occurs in Brazil, though Kubewa (Cubeo), of the putative Central branch, also occurs there. Except for Arapaso, each of the Tucano languages of Brazil is also spoken in Colombia, where they have generally received more study. More recent sources doubt that Yuruti (Juriti) is spoken in Brazil. These languages are noted for tone or pitch accent, morpheme-intrinsic nasality, and complex obligatory coding of evidentiality. The languages are spoken in the region of the Vaupés, Tiquié, and Papurí Rivers. The speakers of several of them refer to themselves as Yebá-masã (Yepá-masã).

Table 1 Macro-Jê (Macro-Ge) stock

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Boróro Family						
Boróro (Borôro)			1024		2	
Guató Family						
Guató		5 [40]	372	low	2	urgent
Jê Family						
Akwén	Xakriabá	0?	6000	none		urgent
	Xavánte	most	9602	high?	1	
	Xerénte	all?	1814		1	
Apinayé			1262	high?	2	
Kaingáng	Kaingáng do Paraná		25 000 total Kaingáng		2 total Kaingáng	
	Kaingán Central					
	Kaingáng do Sudoeste					
	Kaingáng do Sudeste					
Kayapó	Gorotire		7096 total Kayapò	high	1 total Kayapó	
	Kararaô					
	Kokraimoro					
	Kubenkrankegn					
	Menkrangnoti					
	Mentuktíre (Txukahamãe)					
	Xikrin					
Panará (Kreen-akore, Krenakarore)		all	202	high	2	
Suyá	Suyá	all	334	high	1–2	
	Tapayúna (Beiço-de-Pau)		58			
Timbíra	Canela Apaniekra		458	high	2	
	Canela Ramkokamekra		1337	high		
	Gavião do Pará (Parkateyé, Gavião, Pará)		338	low	2	
	Gavião do Maranhão (Pukobiyé)		250			
	Krahô		1900	high	1	
	Krikatí (Krinkatí, Krikati-Timbira)		620			
Xokléng (Xokleng)			757	low	1	
Karajá Family						
Karajá	Javaé	most	919	good	2	
	Karajá	1860	2500	high	1	
	Xambioá	10	185	none	0	
Krenák Family						
Krenák (Krenak)		10?	150	low	1	urgent
Maxakalí Family						
Maxakalí		most?	802		1	
Ofayé Family						
Ofayé (Opayé, Ofayé-Xavante)		25	56	low	1	urgent
Rikbaktsá Family						
Rikbaktsá (Erikpaksá, Rikbaktsa)			909	med?	1	
Yathé Family						
Yathê, Fulniô, Carnijó)		most?	2930	med?	1	

Table 2 Arawak (Aruák, Maipure) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Apurinã (Ipurinã)			2779	med	2	
Baníwa do Içana (Kurripako, Kuripako, Curripaco)			3189 [5000]	high	3	
Baré		0?	2790	none	1	
Kampa (Axíninka, Ashéninca)			813		0	
Mandawáka (Mawaca, Mandahuaca)		?	[3?]			urgent
[Mawayána]		<10	<10	none?	0	urgent
Mehináku	close to Waurá	all	199	high	1	
Palikúr			918		1	
Paresí (Aritĩ, Haliti, Pareás)			1293		1	
Píro	Manitenéri (Machinere)		[530]		0	
	Maxinéri (Machinere)		459 [345]		0	
Salumã (Enawenê-Nawê)			320	high	1	
Tariana (Tariano)	Yurupari-Tapúya (Iyemi)	100	1914	very low	3	urgent
Terena (Tereno, Terêna)			15795		1	
Wapixána (Aruma)			6500	variable	1	
Warekéna (Guarequena)			491		2	
Waurá	Close to Mehinaku	all	321	high	1	
Yawalapití		8	208	none	1	urgent

Many of these languages are quite robust, but have received little study in Brazil (Table 5).

Tupí The Tupí family consists of 10 branches, one of which, Tupí-Guaraní, spreads over a vast area, with extensions into Argentina, Paraguay, Bolivia, Peru, and French Guiana. Languages of this branch have been studied for centuries, but with more fascination for the Tupí-Guaraní dialects on the coast studied by the Jesuits, which contributed many loanwords to Portuguese and which achieved an almost classical status in Brazil, where the word 'Tupí' is sometimes used to refer to these dialects. Though Tupí-Guaraní is often thought to be somehow more central in the family, it is actually rather atypical. Awetí is apparently the branch most closely related to Tupí-Guaraní, and these two together with Mawé form a subgroup within the family. The Ramarama and Puruborá branches form a subgroup also; the other relations are not obvious and are still being worked out. Research on the Tupi families in the western state of Rondônia, often considered the original location of the Tupi peoples, is rather recent. A number of languages important for comparative Tupi studies are urgently endangered (Table 6).

Medium-sized Language Families

Arawá The Arawá languages are spoken in a relatively circumscribed region centered on the upper and middle Purus and Juruá rivers. Their maintenance is generally good (Table 7).

Katukina The Katukina family of languages (not to be confused with Katukina do Acre, a Pano language) are spoken by groups on the Javaí, Juruá, and Jutuí rivers in southern Amazonas. Recently, Adelaar (2000) presented evidence that the Peruvian family Harakmbut is genetically related to the Katukina family of languages. Their study is urgent (Table 8).

Makú The Makú languages (not to be confused with the Máku language of Roraima) are spoken by hunter-gatherer groups mainly in the region of the Vaupés, though the Nadëb live lower on the Rio Negro. The Bará (Kakua, Kakwa) language (not to be confused with the Bará (Barasana) language of the Tucano family) is spoken on the border with Colombia, and it is not clear how many live in Brazil (Table 9).

Table 3 Carib (Karib) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Aparaí (Apalaí)		most	415 [150?]	high	2	
Arara do Pará (Ukarãgmã, Arára, Pará)		all?	195	high?	1	
Bakairí		most	950	good	2	
Galibí do Oiapoque (Kali'na, Carib)			28	low?	0	
Hixkaryána		most?	[550]	high	3	
Ingarikó (Kapóng, Akwaio, Patamona)			675	good	1	
Kalapálo (Kuikúro-kalapálo)	Kalapálo, Kuikúru, Matipú, Nahukwá are dialects of one language	most	417	good	1	
Kaxuyána (Warikyána, Kaxuiâna)	Shikuyana is dialect	most	69 [145]	low	1	
Kuikúru (Kuikúro-Kalapálo)		most	450 [500]	good	2	
Makuxí (Macushi)		most	16 500	high?	3	
Matipú (Matipuhy)		few	119	low	0	
Mayongong (Makiritáre, Yekuána, Maquiritari)		most?	426	high?	0	
Nahukwá (Matipuhy)		most	105	good	1	
Taulipáng (Pemóng, Pemon)		most	532	high?	1	
Tiriyó (Tirió, Trio, Trió)		all	735 [900]	high	3	
Ikpeng (Txikão)		all	310	high	2	
Waimirí (Waimirí-Atroarí Atruahí)		all	931	high	2	
Wai-Wai (Waiwai)		all?	2020	high	2	
Wayána (Wayana)		most?	450 [150?]	med?	1	

Table 4 Pano (Panoan) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Amawáka (Amahuaca)			[220]?		0	
Arara (Shawanauá, Sheuanahua)	Arara, Shanenawá, Yaminâwa, Yawanawá are perhaps dialects of one language	9?	200		1	
Katukina do Acre (Katukína Pano; Katukína, Panoan)			318		1	
Kaxararí			269		0	
Kaxinawá (Hãtx Kuin, Cashinahua)			3964	variable	2	
Korúbo (Korubo)			250		0	
Marúbo			1043	high	2?	
Matis (Matís)		all	239	high	2	
Matsés (Mayoruna)			829 [250]	high	2	
Nukini (Nukuini)		any?	458	none?	0	urgent
Poyanáwa		2	403 [180]	none	1	urgent
Shanenawá (Xipináwa)			178 [160]		1	
Yaminâwa (Jaminawa, Yaminahua)			618		0	
Yawanáwa (Yawanowa)			450 [220]	low		

Table 5 Tucano (Tucanoan) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Arapaso			328		0	
Bará (Waimajã)			39		0	
Barasána, (Barasana)			61		0	
Desána (Desano)	close to Siriáno		1531		1	
[Yuruti (Juritî)]	close to Tuyúka		[50?]			
Karapanã (Carapana)			42		0	
Kubewa (Kubeo, Cubeo)			287		0	
Makúna (Yebá-masã, Macuna)			168		0	
Pira-Tapuya (Waíkana, Piratapuyo)	close to Wanano		1004		0	
Siriáno (Siriano)			17 [10]		0	
Tucano (Tukano)			4604		3	
Tuyúka (Tuyuca)			593		0	
Wanano (Guanano)			447		2	

Nambikwara The Nambikwara languages occur in western Mato Grosso and southeastern Rondônia, in a region that includes both tropical forest and savanna, centered on tributaries of the Guaporé and the Juruena rivers (Table 10).

Chapakura (Txapakúra) The extant Chapakura languages are spoken in the state of Rondônia (and in Bolivia). Torá, in the state of Amazonas, is described by recent visitors as already extinct for many years. Recent ethnographers state that Urupá is extinct also. The Moré live in Bolivia, though there may be a few in Brazil (Table 11).

Yanomami The languages of the Yanomami family are spoken in Brazil and in Venezuela, by rather unacculturated groups. In Brazil these languages occur in the northern state of Roraima, near the Venezuelan border (Table 12).

Smaller Language Families

Bora Some speakers of the Miranha dialect of Bora reportedly live along the Solimões River in Brazil.

Guaikurú Kadiwéu, one of the Guaikurú languages (which tend to occur in the Chaco region of Paraguay and Argentina) is spoken in Mato Grosso do Sul in Brazil.

Jabutí The name of this family is a corruption of Djeoromitxi, one of its component languages. The languages are found in southern Rondônia.

Mura The language of the Mura and that of the Pirahã appear to have been quite close; often they are grouped under one name (Múra-Pirahã). There are occasional reports of elderly Mura speakers, though the Mura generally speak Portuguese or a dialect of Nheengatu (Table 13).

Isolated Languages

Seven languages are not known to be genetically affiliated with others. Of these, Aikanã (Tubarão), Kanoê (Kanoé), and Kwazá are in the same region in southern Rondônia. The language of the Iranxe (Irântxe) and Mynky is spoken near the headwaters of the Juruena River, in Mato Grosso. The Trumái are thought to have been relative latecomers to the Upper Xingu regional system. There is said to be only one Máku speaker, in the state of Roraima. The Tikuna (Ticuna) are numerous, living along the Solimões River, extending into Columbia and Peru. It is a sign of progress that, of these isolated languages, Kanoê, Kwazá, Mynky, Trumai, and Tikuna have received intensive modern study in recent years (Table 14).

Creole Languages

There are two groups in the northern state of Amapá, the Galibi-Marworno (Carib) and the Karipuna do Norte (Karipúna Creole French), both of whom lived for some time in French Guiana and speak creoles heavily influenced by the French-based creole of that country (Table 15).

Table 6 Tupí family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Arikém Branch						
Karitiána		all	206	high	2	
Awetí Branch						
Awetí		all	138	high	1	
Juruna Branch						
Juruna (Yuruna, Yudjá, Jurúna)		all	278	high	2	
Xipaia (Shipaya, Kuruáya)		2?	595?	none	2	urgent
Mawé Branch						
Mawé (Sateré-Mawé)		most?	7134	good	2	
Mondê Branch						
Aruá		12?	58	low	0	
Cinta-Larga (Cinta Larga)	Aruá, Cinta Larga, Zoró, and Gavião are dialects of one language	all	1300	high	1	
Gavião (Gavião do Jiparaná)		all	338	high	2	
Salamãy (Mondé)		2 semi	10?	none	0	urgent
Suruí (Paitér)		all	920	high	1	
Zoró		all	414	high	0	
Puruborá Branch						
Puruborá		2 semi	[50?]	none	0	urgent
Mundurukú Branch						
Kuruáya		3?	115	none?	0	urgent
Mundurukú		most	7500	high	3	
Ramarama Branch						
Karo (Arara, Arára)		most	184	good	2	
Tuparí Branch						
Ajuru (Wayoró)		8?	77	low	0	urgent
Makuráp			267	med?	2	
Sakurabiat (Mekém Mekens)		25	66 [70]	low	2	urgent
Tuparí		most?	338	med-low	1	
Akuntsu		7	7	high	0	urgent
Tupí-Guaraní Branch						
Akwáwa	Parakanã	most	800	high?	0	
	Suruí do Tocantins (Suruí do Pará)	most	185	high?	1	
	Asurini do Tocantins (Asuriní)	most	303	high?	2	
Amanayé		any?	192	none?	0	urgent
Anambé		6	132	none?	1	urgent
Apiaká (Apiacá)		0?	192	?	0	urgent
Araweté		most	278	high	0	
Asuriní do Xingu (Asuriní, Xingú)		most	106	high?	1	
Avá-Canoeiro		most?	14		0	urgent
Guajá		all	280	high	1	
Guaraní	Kaiowá (Kaiwá)		34 000 total		2 total	
	Mbyá (Guaraní, Mbyá)					
	Nhandéva (Chiripá)					
Kaapór (Urubu-Kaapór, Urubu-Kaapor)		most	800	high	2	
Kamayurá		most	355	high	3	
Kayabí		most?	1000	high?	1	

Continued

Table 6 Continued

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Kawahíb	Parintintin		156		2 total	
	Diahkói		30			
	Juma (Júma)		7			
	Karipúna		21			
	Tenharin		585	med		
	Uru-Eu-Wau-Wau (Uru-eu-uau-uau)	all	87	high		
Kokáma	Kokáma (Cocama-Cocamilla)	5	622	low?	2	urgent
	Omágua (Kambeba, Omagua)	few?	156 [240]	low?	0	urgent
Língua Geral Amazônica (Nheengatu, Nhengatu)	= coastal Tupi-Guarani altered by contact	>6000?		med	1	
Tapirapé			438		1	
Tenetehára	Guajajara		13100		2	
	Tembé		820	variable	2	
Wayampí (Waiãpi; Oiampi; Wayampi, Amapari)		most?	525	high?	2	
Xetá		3	8			urgent
Zo'é (Puturú, Poturu)		all	152	high	1	

Table 7 Arawá (Anian) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Banawá-Yafí (Banawá)			215	high	1	
Deni (Dení)			738	high	1	
Jarawára (Jaruára)			160	high	3	
Kulína (Culina)			2318	high	1	
Paumarí			870	low	3	
Jamamadí (Yamamadí, Kanamantí)			800	high	1	
Suruahá (Zuruahá)			143	high	1	

Table 8 Katukina (Katukinan) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Kanamarí		most?	1327		1	
Katawixí		10?	250		0	urgent
Katukina do Rio Biá (Pedá Djapá, Katukína)		few?	289		0	urgent
Txunhaã-Djapá (Tsohom-Djapá, Tshom-Djapa)		30?	100		0	urgent

Table 9 Makú (Maku) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Bará (Kakua, Cacua)		[220]	in Brazil	?		
Dâw (Kamã)		83			2	
Húpda (Hupdë)	close to Yuhúp	1800	[1800]	high	2	
Nadëb (Guariba)		400			1	
Yuhúp (Yuhup)		400			1	

Table 10 Nambikwára (Nambiquaran) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Nambikwára do Norte (Mamaindê; Latundê; Nagarotê; Nambiquára, Northern)		323	[346]	med	2	
Nambikwára do Sul (Nambikuára, Southern)		all	[721]	good	2	
Sabanê (Sabanês)		7 active	[30]	none	2	urgent

Table 11 Chapakura (Txapakúra, Chapacura-Wanham) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Kujubim (Kuyubi)	very close to Moré?	2?	27[50]	none	0	urgent
Oro Win		5?	50			urgent
Torá		0?	51 [250]		0	urgent
Urupá		?0	[150] any?		0	urgent
Warí (Pakaanova, Pakaásnovos)			1930	good	3	

Table 12 Yanomami (Yanomam) family

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Ninam (Yanam)		466	11 700	high	2	
Sanumá		462	total	high	2	
Yanomám (Yanomae, Yanomam̃o)		4000		high	2	
Yanomami (Yanomámi)		6000		high	3	

Table 13 Small families

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
[**Bora Family**]						
[Miranha]	dialect of Bora	few?	613		0	
Guaikurú (Guaicuruan) Family						
Kadiwéu		most	1592 [900]	high	2	
Jabutí Family						
Djeoromitxí (Jabutí)		30?	123	low	1	urgent
Arikapú		2	19	none	1	urgent
Mura Family						
Mura (Múra-Pirahã)		any ?	5540	none	0	urgent
Pirahã (Múra-Pirahã)		all	360	high	3	

Table 14 Isolated languages

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Aikaná (Masaká, Kasupá, Tubarão)			264	med?	2	
Iránxe (Irântxe)	Mynky (dialect)		326		2	
Kanoê (Kanoé)		5	95	low	2	urgent
Kwazà (Koaiá)		25	25 [40]	low	3	urgent
Máku		1	[1]	none	1	urgent
Trumái (Trumaí)		51	120	low	2	urgent
Tikúna (Ticuna)			32 613		3	

Table 15 Creole languages

Linguistic unit	*Dialects, groups*	*No. of speakers*	*Population*	*Transmission*	*Studies*	*Endangered*
Galibi Marwono (Carib)			1764 [860]		0	
Karipuna do Norte (Karipúna Creole French)			1708 [672]		1	

See also: Arawak Languages; Benveniste, Emile (1902–1976); Cariban Languages; Endangered Languages; Evolution of Semantics; Guarani; Meaning: Pre-20th Century Theories; Polysemy and Homonymy; Tupian Languages.

Language Maps (Appendix 1): Map 51.

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Bréal, French linguist and one of the founders of semantic linguistics, studied Sanskrit in Berlin with Bopp and Albrecht Weber. He received his Ph.D. in 1863, defending the thesis *Hércules et Cacus. Étude de mithologie comparée* and *Des noms perses dans les ecrivains grecs*. In 1864, he became a professor of compared grammar at the Collège de France.

In 1868, he joined the group that founded the *École des Hautes Études*, where he became director and was, for a time, Ferdinand de Saussure's professor. From 1879 to 1888, he was Inspector General of French Public Instruction. His work was dedicated to three domains: the study of ancient inscriptions and myths, the study of historical and compared linguistics, and reflection on questions related to teaching.

He himself named his work in linguistics *semantics*, having been the first to use this word in a linguistic discipline (Bréal, 1883). In these studies, Bréal included himself in the historical perspective of the 19th century and considered that semantics deals with the change of the signification of words (Delesalle, 1988). He differed from the comparativists of his time (Aarsleff, 1981; Delesalle, 1980), as he considered that language does not reduce to forms and that its study must necessarily include the meaning (Bréal, 1866).

Changes in language are not natural, ruled by inevitable laws, but occur by man's willful action and intelligence. Willful action, which is not conscious, is constituted by the slow and groping agreement of the will of many, a collective will. Intelligence is a faculty of knowledge and has its origin in the functioning of the sign. Language represents an accumulation of intellectual work. Therefore, language is not a natural science; it is historical and cultural (Bréal, 1897).

In this domain, Bréal established a fundamental concept in semantics studies – that of polysemy – and this aspect can be found in the work that synthesizes the principal points of his production (1897). Willful action and intelligence change the signification of a word that, not losing its previous signification, takes on more than one meaning. Polysemy is the result of history and is one of the places that represent the accumulation of the intellectual work of the language.

Another important aspect, also present in the *Éssai de sémantique*, is what he called the subjective element. He who speaks is marked in what he spoke. In languages there are the forms that, when used, mark this presence. Personal pronouns are one of the examples of these forms, which would later be crucial in the work of Émile Benveniste.

See also: Bopp, Franz (1791–1867); Weber, Albrecht Friedrich (1825–1901).

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Though trained as a natural scientist, Jakob Hornemann Bredsdorff is remembered most of all as one of the first scientific runologists and historical linguists. He was born on April 3, 1790, in Vester Skerninge (on the island of Fyn, Denmark) into a line of highly educated Lutheran priests. After thorough preparation at home, Bredsdorff entered Nykøbing Cathedral School in 1807. Here, his language teacher was S. N. J. Bloch, a renowned philologist and pedagogue who also taught Rasmus Rask. In 1809 Bredsdorff enrolled at the University of Copenhagen, where he received a first degree in Divinity in 1814 and a doctoral degree in natural sciences in 1817. Early on in Copenhagen, if not before, Bredsdorff met Rask, with whom he was friends until the latter's death in 1832. He spent most of his career as a reader in geology and botany at the prestigious private school Sorø Academy, where he died on June 16, 1841.

Bredsdorff left a small but remarkable body of linguistic writings. He owes his special place in the history of linguistics most of all to his highly original paper *On the causes of linguistic change* (published in Danish in 1821), which provides a genuine theory of language change, with the speaker as the central locus of change. It differs fundamentally from the ideas of Rask, who treated language history in terms of natural history. Being at least 40 years ahead of its time and published in an examination program of Roskilde Cathedral School, the paper passed unnoticed. It was rediscovered and republished by Vilhelm Thomsen in 1886.

In the long-standing Scandinavian tradition of runology, Bredsdorff gave the first more-or-less correct interpretation of the runic inscription on the famous Golden Horn of Gallehus (1839), which ultimately led to today's standard transliteration by Ludvig Wimmer. He was also the first to realize that the 24-character runic alphabet was older than the more common 16-character alphabet, though he derived both erroneously from Ulfilas Gothic alphabet. His data-oriented analysis of the relationships between the Germanic languages also foreshadowed modern views, arguing that Gothic should be considered a separate branch of Germanic and not the ancestor of High German or all Germanic languages together.

Being well aware of the gap between the rough classification of sounds in orthography and the more sophisticated differentiations in pronunciation, Bredsdorff tried to develop an alphabet to represent pronunciation more accurately, which he applied to both standard and colloquial Danish in 1817.

The sources of Bredsdorff's linguistic insights have not yet been investigated; preliminary information can be found in Andersen (1982).

See also: Gothic; Phonetic Transcription: History; Rask, Rasmus Kristian (1787–1832); Runes; Thomsen, Vilhelm Ludvig Peter (1824–1927).

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Breton

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Breton (*brezoneg, brezhoneg*) belongs to the Brythonic branch of the Celtic languages. It is spoken in Lower Brittany, and its linguistic border is the westernmost limit of the withdrawal of Celtic before Roman expansion.

Breton has long been considered the continuation of Gaulish. Linguistic studies in the 19th century smothered all purported genetic connection between Breton and French and also any close relationship to Gaulish. Some historians argued that Breton had been imported whole by immigrants from Britain into a thoroughly romanized Armorica. Modern Celtic studies confirmed the view that Breton was a late offshoot of British Celtic. We now know that emigration from Britain began before the Saxon invasions,

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so that most scholars acknowledge that Breton is rooted in Armorican Gaulish, absorbing different varieties of British Celtic.

A traditional view of the language purports the existence of a unified old Breton, supposed to have split into four dialects, named after the dioceses as they existed before the 1789 French Revolution: Léonais for the diocese of Léon, Trégorrois for Tréguier, Cornouaillais for Cornouaille, and Vannetais for Vannes. There are, in fact, two major dialect groups: (1) KLT – Cornouaille (Kerne), Léon, Trégor and (2) Vannetais, the western border of which is the river Ellé. Falc'hun (1962, 1981) has reported the existence of an intermediate dialect centered on Carhaix, the meeting point of all the major roads, and constituting a bridge between remote linguistic forms, like the reflexes of the dental spirants from old Celtic **tt* and **d*. Léon *deiz* 'day' and *dervez* 'duration of a day' (Welsh *dydd* and *dyddwaith*) are far removed from vannetais *de* and *deùeh*. The central forms are *de* and *devez*, dropping *z* from **d* as in vannetais, but keeping *z* from **tt* as in Léon. The primitive twofold partition could reflect the difference between Osismii and Venetes Gaulish, the latter keeping closer to Armorican.

An intensity stress generally falls on the penultimate in the northwest, whereas in the Southeast a pitch stress affects the last syllable, not unlike French.

Voiceless consonants and /m/ are fortes, voiced spirants are lenes, and voiced stops and /l/, /n/ and /r/ can be either. Vowels are short before fortes and long before lenes when stressed. One can thus oppose *ar zal* 'the room' (long [a:], weak [l]) and *zall* 'salted' (short [a], strong [l]). There can be up to eight phonemic nasal vowels, which are not borrowings from French, but archaic features, as in *hañv* 'summer'.

Primitive consonants were weakened, especially between vowels. These changes survived the loss of final syllables, turning a simple phonetic mechanism into a grammatical device called 'lenition,' so that the initial consonants of feminine words are lenited after the article – originally ending in a vowel – and also the following adjective: *mamm* 'mother,' *mad* 'good,' *ar vamm vad* 'the good mother.' The geminate voiceless fortes became voiceless spirants, giving rise to the spirant mutation: *penn* 'head,' *he fenn* 'her head.' Another sandhi phenomenon caused the so-called provective mutation: a final *-h* in *hoh* 'your' devoices a following voiced initial consonant, as in *bugel* 'child,' *ho(h) pugel* 'your child.'

Final consonants are devoiced before pausa. *Ma zad* 'my father' keeps a long [a:], but a devoiced *-d* when final, the voice being restored when the utterance is followed by a vowel as in *ma zad eo* '(he) is my father'. All voiceless consonants are voiced before a vowel or *l*, *m*, *n,* and *r*. Native Breton speakers are readily recognizable in French when they pronounce *toud' la z'maine* for *toute la semaine* 'during the whole week.'

English and Breton grammars show striking similarities; for example, both use a compulsory periphrastic progressive in opposition to a simple present: *Ma breur ne gan ket* 'my brother does not sing' vs. *ma breur n'ema ket o kana* 'my brother is not singing.'

The lexis is basically Celtic (*dorn* 'fist, hand', Welsh *dwrn*, Gaelic *dorn*; *den* 'person', Welsh *dyn*, Gaelic *duine*). About 500 common words are Latin borrowings (*taol* <*tabula* 'table,' *spered* < *spiritus* 'mind,' *kistin* < *castanea* 'chestnut'). For centuries, a flow of romance and French words has enriched the language, very much like in English. Some words have been kept in both languages while disappearing from French; for example, *skourje* 'whip' from *escourgée*, *écourgée*, English *scourge*. The most important borrowings are the numerous affixes, taken both from Latin (*-adur* < *-atura* as in *skub-adur* 'sweepings') and French (*lenn-abl* 'read-able').

Polls carried out in 1991 and 1997 show that from 1950 to 1990, the percentage of Breton speakers has decreased from about roughly 70 to 20% of the population. In 2004, it is estimated that about 250 000 persons are able to speak the language, and most of them are over 60 years old. French has become dominant because of the unprecedented social and agricultural revolution occurring in Brittany.

Before 1941, there existed two written forms, called at the time 'breton vannetais' and 'bas-breton,' which had been developed in the two Jesuit colleges of Quimper and Vannes in the 17th century; each form had its own grammars, dictionaries, and literature. In 1941 the *peurunvan* 'totally unified' orthography was established. 'Cat,' *kaz* in KLT and *kah* in vannetais, would be spelled *kazh*. A new spelling called 'orthographe universitaire,' which was closer to the spoken language, was created in 1954. Finally, a third orthography, *etrerannyezhel* 'interdialectal,' was created in the 1970s to take into account all regional differences.

Both the French State and the Breton Regional Assembly have encouraged publishing in the Breton language in the last 30 years, and Breton is partially used on local state-owned (France-Bleu Breiz Izel) and private radio (like *Radio Kerne*) and television stations (France 3).

Degrees in Breton, at all levels, are delivered in Rennes and Brest. Breton language teachers have been recruited since 1982 to teach in the secondary schools. Breton is taught to about 5000 children at the primary level in a few bilingual classes in public and Catholic schools, and the private *Diwan* schools teach mostly through Breton. However, less than

1% of Breton children benefit from this bilingual education.

See also: Celtic; France: Language Situation; Welsh.

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British Indian Ocean Territory: Language Situation

Editorial Team

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The British Indian Ocean Territories comprise an overseas territory of the United Kingdom. It consists of more than 2000 islands in the Indian Ocean to the south of India, midway between Africa and Indonesia. The territory was established in 1965, when it was slightly larger than today; in 1976 a number of islands became part of the newly independent Seychelles. Currently the British Indian Ocean Territories comprise the six main island groups that make up the Chagos Archipelago. The largest of these islands is Diego Garcia, which houses a joint U.K.–U.S. naval support facility. It is the only island that is inhabited, by approximately 1500 (U.K. and U.S.) military personnel and 2000 civilian contractors. During the establishment of the naval base (1967–1973), the local population of Ilois, mainly agricultural workers, were relocated to Mauritius and the Seychelles. There is a legal campaign to gain the right of return, but so far this has been unsuccessful, largely due to the special military status of Diego Garcia. Thus, the official (and only) language of the British Indian Ocean Territories is English.

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See also: Celtic; France: Language Situation; Welsh.

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Brøndal, Rasmus Viggo (1887–1942)

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Viggo Brøndal, born Rasmus Viggo Hansen on October 13, 1887, in Copenhagen, was a Danish linguist and Romance philologist. He changed his name from Hansen to Brøndal in 1912. Brøndal studied with Sandfeld and Nyrop at the University of Copenhagen and graduated as *magister artium* in Romance Philology in 1912. As a postgraduate, Brøndal studied with Bédier and Meillet in Paris for a year. In 1917 he was awarded the degree of Doctor of Philosophy by the University of Copenhagen for a dissertation on loans and substratum influences in Romance and Germanic languages. The book is heavily influenced by the sociological Meillet school and thereby atypical of Brøndal's later work. From 1917 to 1925 he worked as an assistant to the Place-Name Committee, and then returned to Paris for a three-year period where he was a reader of Danish at the Sorbonne. In 1928 he was appointed Professor of Romance Philology at the University of Copenhagen, a position that he held until his death on December 14, 1942.

Viggo Brøndal was among the founding members of the Linguistic Circle of Copenhagen (1931), and, until his premature death, he was a major force in its endeavors to further structural linguistics. In particular, he and Louis Hjelmslev together edited the *Acta Linguistica* (later *Acta Linguistica Hafniensia*) from its start (1937). Brøndal formed strong bonds with other structuralists, such as Roman Jakobson, and he functioned as the secretary general of the 1936 Copenhagen Congress of Linguists, which was presided over by his former teacher, Otto Jespersen.

Brøndal's particular kind of structuralism is of an idealist transcendent type, based on his reception of the Aristotelian categories. From his work on word classes (1928), arguably his best book, until his theory of the prepositions (1940), the vision is refined, but the outlines remain the same: The four generic concepts of *descriptum* (D), *descriptor* (d), *relatum* (R), and *relator* (r) may be combined to form what are seen as the possible linguistic categories in any specific system. Brøndal uses his categories to analyze the relation between morphology and syntax in his 1932 book on the subject and later wrote a number of papers, collected in the posthumously published *Essais de linguistique générale* (1943).

Viggo Brøndal was a fascinating orator, and the debates between him and Hjelmslev were both fierce and singularly gratifying for a whole generation of Danish linguists. Brøndal deeply influenced his immediate pupils, the Nordic philologist Paul Diderichsen, the Romance philologist Knud Togeby, and the literary historian Hans Sørensen, but none of them are seen to adhere to his theory, strictly speaking, in their later works. The theory is justly characterized by Eli Fischer-Jørgensen as a great intellectual achievement in that it seeks to capture everything linguistic with rather few but very abstract concepts and strives to treat all linguistic levels from phonology through word classes (morphology) to syntax and semantics using only these same concepts to arrive finally at a characteristic of a language – and through this – a culture. But unlike Hjelmslev's theory, Brøndal's impressive structure has remained outside the mainstream of linguistics.

See also: Copenhagen School; Scandinavia: History of Linguistics.

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Brockelmann, Carl (1868–1956)

M V McDonald

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The German Orientalist Brockelmann was born in Rostock on September 17, 1868. While still at school, his imagination was fired by the great geographical discoveries then being made, and he showed an early interest in exotic languages. However, on entering Rostock University in 1886 he began with the study of classics as offering more secure career prospects. The award of a scholarship allowed him to move shortly to Breslau (now Wroclaw) where he studied Semitic and Indo–European philology. At this time he also taught himself Turkish, a language which was to remain an abiding interest. In 1888 he went to Strasbourg (then in Germany) in order to study under Nöldeke (*see* **Nöldeke, Theodor**. Here he occupied himself with Sanskrit, Armenian, and Ancient Egyptian. By 1892 he was once again in Breslau where he completed his *Habilitation* (on Ibn al-Jawzi), wrote his *Lexicon Syriacum*, and traveled for the first time to Turkey. While in Constantinople he made the acquaintance of Jahn, to whose chair in Königsberg he was later to succeed. These years in Breslau saw in particular the preparation of his edition of Ibn Qutayba's '*Uyūn al-Akhbār* (Berlin/Strasbourg, 1900–1908) and the first edition of his *Geschichte der Arabischen Litteratur* (Weimar/Berlin, 1898–1902).

In 1903 he was appointed to a chair in Königsberg, where he completed his own best-loved work, the *Grundriss der Vergleichenden Grammatik der Semitischen Sprachen* (Berlin, 1907–1913). In 1910 he accepted a chair in Halle, which became his hometown for the rest of his life. In 1923 he went back to Breslau, from which he finally retired to Halle in 1935. His years of retirement were overshadowed by World War II and its ensuing miseries. His son was taken prisoner at Stalingrad, only returning in the early 1950s, and his wife died in 1945. His savings became worthless, and a period of extreme difficulty was finally alleviated when in 1947 he was made librarian to the *Deutsche Morgenländische Gesellschaft* in Halle. It is said to be due to his efforts that this library was not shipped to the Soviet Union as war reparations. Even during these years, he continued to teach a number of languages, and his scholarly energies remained undimmed. He retired again in 1953 and was still working on his *Hebräische Syntax* at his death (May 6, 1956).

During his lifetime, Brockelmann produced a mass of articles and studies covering an enormous range of Semitic and Turkish studies (see Fück, 1958), centering mainly on grammar, syntax, and lexicography. He is best remembered however, by Arabists at least, for his *Geschichte der arabischen Literatur*, the final version of which appeared in Leiden (1943–1949). This is an invaluable but unwieldy work; to some extent it has been superseded by later works, but it is still indispensable, even though it is occasionally impossible to identify his references. He is one of the select band of Orientalists whose name has become a household work in the field, and a copy of 'Brockelmann' is one of the most-used works in any Arabic library.

See also: Nöldeke, Theodor (1836–1930); Semitic Languages.

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Brosses, Charles de (1709–1777)

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Charles de Brosses was born in Dijon, France, on February 7, 1709, and died in Paris, on May 7, 1777. He was a French magistrate and scholar, who came from a family of judges and studied in his home town. A classmate of Georges Louis Leclerc de Buffon (1707–1788) at Godrans Collège in Dijon, he was appointed judge at the Burgundian Parlement des États (1730), later becoming a *conseiller* (1741) and finally first president (1775). He also followed his inclination towards literature and science, and, during a visit to Italy in 1739–1740, he wrote his letters on Italy which were published posthumously. His friend Buffon solicited him to undertake the composition of his *Histoire des navigations aux terres australes* (1756). This work included many word lists and was translated into English and German. De Brosses was the first to lay down the geographical divisions of Australasia and Polynesia, which were afterwards adopted by succeeding geographers. His works on the history and origins of language earned him a reputation as a theorist in this field. He was elected to the Académie des Inscriptions in 1758.

In 1760 de Brosses published a dissertation, *Du culte des dieux fétiches*, which was afterwards inserted into the *Encyclopédie méthodique*. In this work, secretly smuggled into France after having been rejected by the Académie des Inscriptions, he developed the hypothesis that all divinities had a physical origin and that they were initially material objects adored for their own sake.

In 1765 appeared his work on the origin of language, *Le Traité de la formation méchanique des langues*. De Brosses aimed at giving a naturalistic interpretation to symbolic functioning. Language is for him primarily an organic phenomenon. 'Mechanical' was not a neutral term, but was taken from the works of Jean Baptiste le Rond d'Alembert (1717–1783), who used it to designate a part of applied mathematics which tried to explain movement and its forces. The linguistic use of the term mechanical was not invented by de Brosses, but he took it up from Noël Antoine Pluche (1688–1761), who used it in a work on the acquisition of languages by children (*La Méchanique des langues et l'art de les enseigner*, 1751). De Brosses goes further in his explanation, adopting materialist connotations of the mechanical description of the first languages. Their elements should be natural and necessary and can be found in any language. His aim was to observe the operation of the expressive movement of the body and the iconic links between the first sounds and the objects they represent. Nature is the author of the germination of sound and the first true words. The gradual evolution of languages towards arbitrariness does not eliminate this link. He developed a phonetic theory which allowed him to link words of different languages with their organic root.

Nevertheless, de Brosses's emphasis on etymology and the study of regularities of sound change does not make him a forerunner of historical linguistics. In this respect, the *Traité* was more likely a failure. De Brosses thought that we would be able to compare all languages on the basis of their organic roots and that the forms of unknown languages would fit easily into this scheme. He stressed the word in itself, independent of its relation to specific languages. Together with his thesis of a universal family of languages this emphasis produces an unbridgeable gap which separates his theory from the comparative grammar of the 19th century.

De Brosses was occupied throughout most of his life with a translation of Sallust, attempting to supply the lost chapters of that celebrated historian's work. These literary occupations did not prevent the author from efficiently executing his official duties as first president of the parliament of Burgundy, nor from carrying on a constant and extensive correspondence with the most distinguished literary figures of his time. Presenting himself as a candidate for the Académie Française in 1770, de Brosses was rejected due to the opposition of Voltaire (1694–1778) on personal grounds.

See also: 18th Century Linguistic Thought; Origin of Language Debate.

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Brown, Gillian

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Gillian (Gill) Brown, with a Cambridge M.A., had already taught in Ghana (1962–1964) before becoming an assistant lecturer in Phonetics and Linguistics at Edinburgh University in 1965. After fieldwork in Uganda, Gill published an early paper in generative phonology (Brown, 1970), which became part of her Edinburgh doctoral dissertation on the phonology of Lumasaaba in 1971, and the basis of a scholarly monograph (Brown, 1972). In the 1970s, Gill's work on the practical applications of phonetics and phonology led to her widely acclaimed book on listening to spoken English (Brown, 1977/1990). Later, Gill's intonation project (1975–1979), funded by the first of many research grants, developed innovative methods of eliciting and analyzing spoken data (Brown *et al.*, 1980). Gill then combined linguistics, cognitive psychology, and the study of discourse structure to create a book that helped define the field of discourse analysis for many linguists (Brown and Yule, 1983a). Further research projects resulted in more books, two on the teaching and testing of spoken language (Brown and Yule, 1983b and Brown *et al.*, 1984), one on language understanding (Brown *et al.*, 1994) and another on referential communication (Brown, 1995). In subsequent research, Gill has focused on the ways in which context is created in discourse understanding (Brown, 1998).

While the research projects continued, Gill moved from Edinburgh (1965–1983) to become Professor of Applied Linguistics at the University of Essex (1983–1988), then to serve as the founding Director of the Research Centre for English and Applied Linguistics at Cambridge University (1988–2004), where she created a stimulating intellectual environment for graduate study in many areas at the intersection of linguistics and cognitive psychology. As one of the few women professors in these institutions at the time, Gill was increasingly involved in administration, serving as Dean of Social Sciences at Essex, in committee work, such as the University Grants Committee, and in public service, as a member of the Kingman Inquiry into English language teaching in British schools. In recognition of her outstanding work, Gill received a CBE in 1992.

See also: Assimilation; Cognitive Pragmatics; Cohesion and Coherence: Linguistic Approaches; Communication, Understanding, and Interpretation: Philosophical Aspects; Discourse Processing; Elicitation Techniques for Spoken Discourse; Generative Phonology; Human Reasoning and Language Interpretation; Information Structure in Spoken Discourse; Intonation; Language Education: Grammar; Narrative: Cognitive Approaches; Phonetic Processes in Discourse; Phonetic Transcription: Analysis.; Phonology: Overview; Second Language Listening; Spoken Discourse: Types.

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Brown, Gillian

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Gillian (Gill) Brown, with a Cambridge M.A., had already taught in Ghana (1962–1964) before becoming an assistant lecturer in Phonetics and Linguistics at Edinburgh University in 1965. After fieldwork in Uganda, Gill published an early paper in generative phonology (Brown, 1970), which became part of her Edinburgh doctoral dissertation on the phonology of Lumasaaba in 1971, and the basis of a scholarly monograph (Brown, 1972). In the 1970s, Gill's work on the practical applications of phonetics and phonology led to her widely acclaimed book on listening to spoken English (Brown, 1977/1990). Later, Gill's intonation project (1975–1979), funded by the first of many research grants, developed innovative methods of eliciting and analyzing spoken data (Brown *et al.*, 1980). Gill then combined linguistics, cognitive psychology, and the study of discourse structure to create a book that helped define the field of discourse analysis for many linguists (Brown and Yule, 1983a). Further research projects resulted in more books, two on the teaching and testing of spoken language (Brown and Yule, 1983b and Brown *et al.*, 1984), one on language understanding (Brown *et al.*, 1994) and another on referential communication (Brown, 1995). In subsequent research, Gill has focused on the ways in which context is created in discourse understanding (Brown, 1998).

While the research projects continued, Gill moved from Edinburgh (1965–1983) to become Professor of Applied Linguistics at the University of Essex (1983–1988), then to serve as the founding Director of the Research Centre for English and Applied Linguistics at Cambridge University (1988–2004), where she created a stimulating intellectual environment for graduate study in many areas at the intersection of linguistics and cognitive psychology. As one of the few women professors in these institutions at the time, Gill was increasingly involved in administration, serving as Dean of Social Sciences at Essex, in committee work, such as the University Grants Committee, and in public service, as a member of the Kingman Inquiry into English language teaching in British schools. In recognition of her outstanding work, Gill received a CBE in 1992.

See also: Assimilation; Cognitive Pragmatics; Cohesion and Coherence: Linguistic Approaches; Communication, Understanding, and Interpretation: Philosophical Aspects; Discourse Processing; Elicitation Techniques for Spoken Discourse; Generative Phonology; Human Reasoning and Language Interpretation; Information Structure in Spoken Discourse; Intonation; Language Education: Grammar; Narrative: Cognitive Approaches; Phonetic Processes in Discourse; Phonetic Transcription: Analysis.; Phonology: Overview; Second Language Listening; Spoken Discourse: Types.

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Brown, Roger William (1925–1997)

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Roger Brown was a social psychologist trained at the University of Michigan. During a 40-year-long career teaching at Harvard University and, briefly, MIT, he made at least three substantial contributions to late twentieth-century American linguistics.

First, Brown is probably best known for his 1973 study of the acquisition of English by three preschoolers. Capitalizing on the recent invention of the portable tape recorder, Brown or his graduate students visited the homes of 'Adam,' 'Eve,' and 'Sarah' weekly or every other week to record at least two hours a month of spontaneous speech. Data were collected from Eve for eleven months; from Adam and Sarah, for five years. The recordings were then transcribed and meticulously analyzed. Brown developed the technique of calculating a child's Mean Length of Utterance, measured in morphemes. Using MLU as a basis for calibrating the three children's emerging grammars, he found commonalities in how they expressed semantic relations, and in their gradual building up of grammatical and morphological complexity. Brown's transcripts and tapes were later deposited in the CHILDES online database, where they have had lasting influence on the study of child language acquisition.

Second, Brown was extraordinarily effective as a teacher. He trained a cohort of students who have had distinguished careers in diverse subfields of linguistics and psycholinguistics, including Jean Berko Gleason, Ursula Bellugi, Melissa Bowerman, Courtney Cazden, Kenji Hakuta, Howard Gardner, Michael Maratsos, Steven Pinker, Eleanor Rosch, and Dan Slobin. Kessel's (1988) *festschrift* provides a fuller list of Brown's students and showcases their writings.

A third contribution Brown made is related. Not all of Brown's students inherited his distinctive working style (self-described as "phenomenon-centered," "low-tech, minimally mathematical" with "an almost Talmudic taste for poring over data … involving nothing but the free exercise of the principles of induction" [1989: 49–50]), but it set a particular tone to the emerging discipline of psycholinguistics. Moreover, in person and in his best-selling textbooks (1958, 1965), Brown modeled open-mindedness, intellectual playfulness, and an unfailing sense of wonder that attracted many to the study of language.

Brown's work on Adam, Eve, and Sarah achieved such prominence that it is surprising to learn that he published nothing on child language after the midpoint of his career. However, he left behind diverse work on linguistic relativity, music and language, tip-of-the-tongue phenomena, and the sociolinguistics of politeness. He also left behind a painful memoir (Brown, 1997) that meditates on the afflicted personal life of a man celebrated as much for his geniality as for his professional success.

See also: Language Acquisition Research Methods; Psycholinguistics: Overview.

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Brücke, Ernst (1819–1891)

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Ernst Wilhelm Ritter von Brücke (b. June 6, 1819, d. January 7, 1892), not to be confused with his grandson and biographer, Ernst Theodor Brücke, was a physiologist who taught for 46 years, 41 of them as Professor of Physiology at the University of Vienna (1849–1890). Brücke was classically educated, which gave him a thorough foundation in Greek and Latin and a broad humanistic interest in languages and learning. Then he studied medicine, primarily in Berlin with physiologist Johannes Müller, who encouraged him to apply his physiological expertise to developing a natural system of speech sounds with which all the world's languages could be described (Jankowsky, 1999: 247). It is his groundbreaking works in this field, most especially *Grundzüge der Physiologie und Systematik der Sprachlaute für Linguisten und Taubstummenlehrer* (1856), for which he is remembered in linguistic, and particularly phonetic, history, although he had 140 publications in all.

In his first work on speech physiology, *Untersuchungen über die Lautbildung und das natürliche System der Sprachlaute* (1849), Brücke laid the foundation for *Grundzüge*, painstakingly describing various pronunciations of all the vowels and consonants and arranging them in a system according to genetic criteria, introducing terms such as alveolar and dental still in use today. Apparently, Brücke was unaware of Ellis's *Essentials of phonetics* (1848) as he wrote it (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**), so he essentially developed a natural system of speech sounds with no help from predecessors, except for some observations by Kempelen (*see* **Kempelen, Wolfgang von (1734–1804)**). In the 7 years between *Untersuchungen* and *Grundzüge*, Brücke deepened his observation of languages with help from colleagues in Vienna, including Miklosich (*see* **Miklošič, Franc (1813–1891)**) for Slavic and Anton Hassan for Arabic languages. He also realized a further practical application for his now 'fine-tuned' system: as a tool for teachers of the hearing-impaired (Jankowsky, 1999: 246).

Although Brücke's *Grundzüge* was superseded by Sievers's *Grundzüge der Lautphysiologie* in 1876 (*see* **Sievers, Eduard (1850–1932)**), Brücke's work provided the physiological description linguists had lacked and laid the foundation for this later work. He was extremely influential on Sievers and his generation, and also on Sigmund Freud. Scherer (*see* **Scherer, Wilhelm (1841–1886)**) and Sweet (*see* **Sweet, Henry (1845–1912)**) are among those who used and praised his work.

See also: Ellis, Alexander John (né Sharpe) (1814–1890); Freud, Sigmund (1856–1939); Kempelen, Wolfgang von (1734–1804); Miklošič, Franc (1813–1891); Scherer, Wilhelm (1841–1886); Sievers, Eduard (1850–1932); Sweet, Henry (1845–1912).

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Brugmann, Karl (1849–1919)

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Karl Friedrich Christian Brugmann (see **Figure 1**) was born on March 16, 1849 in Wiesbaden. He graduated from high school in his home town in 1867, studied philology for one year in Jena, then decided to move on to Leipzig, where he selected as his major subject comparative philology, with Georg Curtius (*see* **Curtius, Georg (1820–1885)**) becoming his principal teacher. His doctoral thesis of 1871, entitled *De Graecae linguae productione suppletoria*, was followed in 1877 by his *Habilitationsschrift, Zur Geschichte der Nominalsuffixe -as-, -jas- und -vas-* (published in *Zeitschrift für*

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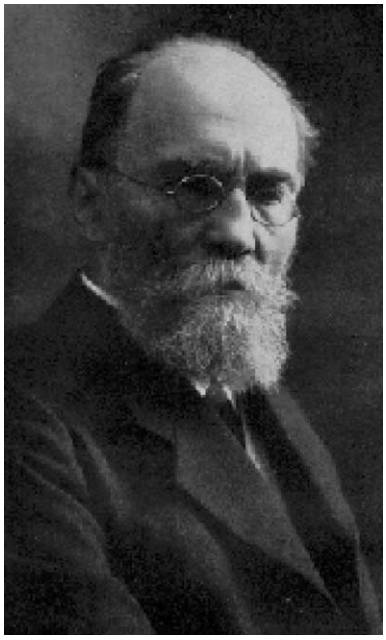

Figure 1 Photograph of Karl Brugmann from *Idg. Jahrbuch* IV (1918). Retrieved from http://titus.uni-frankfurt.de/personal/galeria/brugmann.htm.

vergleichende Sprachforschung 24: 1–99), qualifying him as a university teacher. Before that he had obtained his *Staatsexamen* in 1872 and taught high school, for one year in Wiesbaden, then at the Nicolai-Schule in Leipzig. In 1877 he started his university career, first lecturing on Sanskrit and comparative philology in Leipzig, where he was appointed associate professor (*Extra-Ordinarius*) in 1882. Two years later he went to Freiburg as full professor (*Ordinarius*) and stayed there for three years, only to return to Leipzig for good in 1887 to occupy the newly established chair for Indo-European philology. He died in Leipzig on June 29, 1919.

Brugmann was the most productive of the Neogrammarians and undoubtedly also the one who commanded the greatest influence on language students who streamed to Leipzig from all over the world. Apart from the enormous impact through the substance of his writings, his unparalleled success was to a large extent also due to his unique personal style and courage. As a young man of 27, he broke with his mentor Curtius, who could not approve of Brugmann's impatient zest for exploring even less conventional avenues if he thought that it furthered the advancement of his science. And from then on he embarked on a course of quiet but determined confrontation. This frame of mind was the basis for the second feature that aided his climb to unprecedented prominence. Within a short time after he entered the teaching profession, Brugmann managed to establish himself as an arbiter of what should be acceptable as solid linguistic achievement and what would have to be discarded as insignificant.

When he sat in judgment, his criteria were derived from solid research that he and his Neogrammarian comrades-in-arms kept supplying in abundance. Even before Brugmann had started teaching at the university level, his first two major studies, written in 1876, brought him recognition and fame that continued to grow rapidly with every work he produced. Of the approximately 400 titles in his list of publications, two above all others were instrumental in solidifying his reputation as the unchallenged leader in the field, and even today those works remain achievements that need to be consulted. The first is the *Griechische Grammatik* of 1885, a model treatment of all components of grammar from a comparative point of view; the second, his *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen* (vols. 1, 2, 6). Following Franz Bopp (*see* **Bopp, Franz (1791–1867)**) and August Schleicher (*see* **Schleicher, August (1821–1868)**), he was the third scholar to attempt a comprehensive documentation of what comparative linguistics had accomplished at his particular time. To achieve this monumental task, he had to restrict himself to phonology and morphology of the eight principal Indo-European languages, leaving it to Berthold Delbrück (*see* **Delbrück, Berthold (1842–1922)**) to deal with syntax (vols 3–5).

As was characteristic of all Neogrammarian scholars, Brugmann was truly fascinated by discovering and securing as many relevant linguistic facts as he possibly could. But he, as did most of his Neogrammarian friends, went far beyond the mere amassing of facts in that he successfully attempted to arrive at the formulation of the basic principles that govern those facts and place them within a coherent system.

See also: Bopp, Franz (1791–1867); Curtius, Georg (1820–1885); Delbrück, Berthold (1842–1922); Neogrammarians; Schleicher, August (1821–1868).

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Bruneau, Charles (1883–1969)

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Charles Bruneau graduated from the Sorbonne and then followed Gilliéron's classes on dialectology at Ecole des Hautes Etudes. He received a position at the University of Nancy in 1913 and at the Sorbonne in 1933. In 1934 he succeeded his former professor, Ferdinand Brunot, as chair of History of French Language and remained there until 1954. Born in the French Ardennes, Bruneau focused his thesis on the local dialects in 93 villages of this region (*Etude phonétique des patois d'Ardenne*). In 1912 he was called by Ferdinand Brunot to participate in the 'Archives de la parole,' the first institutional oral survey. This was based on using a Pathé phonograph to collect phonograms. An automobile to transport their 500 kilograms of recording equipment was even made available to them, quite an innovation at that time.

Bruneau first used the method of questionnaires learned from Edmont and Gilliéron for the *Atlas linguistique de la France*, asking for translations of words and sentences into the local dialect. This gave a large amount of speech facts. As he explained in several letters written to Brunot (available at the Archives du département de l'audiovisuel from the Bibliothèque Nationale de Paris) he then changed his method, preferring to analyze his speakers' free speech and accents, instead of comparing the words or phrases he solicitated from them. Brunot and Bruneau finally gathered 166 recordings that they filed following the Viennese 'Phonogrammarchiv,' marking the geographical particularities of the samples, as well as some biographical data describing the speakers, and giving a phonetical transcription of the records.

After he settled in Paris, Bruneau contributed to Ferdinand Brunot's monumental *Histoire de la langue française des origines à nos jours* by writing 'L'Epoque romantique' (covering the period 1815 to 1852) and 'L'Epoque réaliste' (covering the period 1852 to 1886). These two volumes mostly describe the history of literary language through stylistic monographies, different from the rest of Ferdinand Brunot's work. Around 1952 Bruneau, arguing against Spitzer's stylistic criticism, made a distinction between pure (or scientific) stylistics, and stylistics applied to literature (or authors' stylistics), the former being part of language science.

See also: Brunot, Ferdinand (1860–1938); Dialect Atlases; Gilliéron, Jules (1854–1926); Spitzer, Leo (1887–1960).

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Charles Bruneau graduated from the Sorbonne and then followed Gilliéron's classes on dialectology at Ecole des Hautes Etudes. He received a position at the University of Nancy in 1913 and at the Sorbonne in 1933. In 1934 he succeeded his former professor, Ferdinand Brunot, as chair of History of French Language and remained there until 1954. Born in the French Ardennes, Bruneau focused his thesis on the local dialects in 93 villages of this region (*Etude phonétique des patois d'Ardenne*). In 1912 he was called by Ferdinand Brunot to participate in the 'Archives de la parole,' the first institutional oral survey. This was based on using a Pathé phonograph to collect phonograms. An automobile to transport their 500 kilograms of recording equipment was even made available to them, quite an innovation at that time.

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After he settled in Paris, Bruneau contributed to Ferdinand Brunot's monumental *Histoire de la langue française des origines à nos jours* by writing 'L'Epoque romantique' (covering the period 1815 to 1852) and 'L'Epoque réaliste' (covering the period 1852 to 1886). These two volumes mostly describe the history of literary language through stylistic monographies, different from the rest of Ferdinand Brunot's work. Around 1952 Bruneau, arguing against Spitzer's stylistic criticism, made a distinction between pure (or scientific) stylistics, and stylistics applied to literature (or authors' stylistics), the former being part of language science.

See also: Brunot, Ferdinand (1860–1938); Dialect Atlases; Gilliéron, Jules (1854–1926); Spitzer, Leo (1887–1960).

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Brunei Darussalam: Language Situation

C H Gallop

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Brunei Darussalam is an independent sultanate on the northwest coast of Borneo. There are four districts: Brunei Muara (where the capital is situated), Belait, Tutong, and Temburong (an enclave in the adjoining Malaysian state of Sarawak). The population is 75% Malay, with the largest minority group being Chinese (15%).

The official language is Bahasa Melayu (Standard Malay), the variety jointly accepted by Malaysia, Indonesia, and Brunei Darussalam. It is widely used in all areas of public life, including government, the printed media, and broadcasting. English is also understood and spoken in various domains of public and private life.

The education system is bilingual, with academic subjects, including the sciences, taught in English, while culturally based subjects and Islamic religion are in Malay. Malay is now written in romanized form, but learning of the original Jawi script, an adaptation from Arabic, is currently being revived in schools. Three Islamic religious institutions use a combination of Arabic, Malay, and English. The majority of students at the University of Brunei Darussalam (opened in 1985) study in English.

Seven communities are accepted by the 1959 constitution as being indigenous groups of the Malay race. Brunei Malay is the dialect of the numerically and politically dominant people of that name who have traditionally lived on water. Kedayan is the dialect of the land-dwelling farmers. These two variant dialects of the Brunei Muara district are each about 80% cognate with Standard Malay. The other five communities, the Tutong, Belait, Dusun, Bisaya, and Murut, speak the languages of their names. The Bisaya and Murut reside only in Temburong. All five languages are less than 40% cognate with Brunei Malay. Their use is declining in favor of Brunei Malay due to population mobility, intermarriage, and, for Dusun, Bisaya, and Murut, conversion to Islam. Iban, Penan, and Mukah are Sarawak languages spoken only by small groups of settled immigrants. The urban Chinese use mainly the Hokkien, Cantonese, and Hakka dialects.

A national ideology, the Malay Islamic Monarchy concept, is being promoted in education and public life. It characterizes Brunei Darussalam as a monocultural, Malay-speaking, Islamic society, and is contributing to the decline of minority languages.

See also: Malay.

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Bruner, Jerome Seymour (b. 1915)

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Jerome Bruner is a pre-eminent, powerfully influential, and multiply pioneering psychologist whose studies have touched on language in many ways.

Born in New York City of nominally observant Jewish parents, he was blind for the first two years of life. His father, a watchmaker, died when he was 12, after which his family moved about, and he developed his interest in sailing. He attended Duke University (B.A., 1937), and went to Harvard for graduate study in psychology (Ph.D., 1941). He served in the U.S. Army Intelligence Corps in World War II, applying his knowledge of propaganda and public opinion. He then joined the Harvard faculty, doing experimental psychological research on the dependence of perception on motivation (the 'New Look' studies). He carried out an enormously influential series of studies on the acquisition of structured cognitive categories, involving the grouping of instances on the basis of values of defining attributes. He founded and directed the Center for Cognitive Studies in the 1960s, leading the way toward the field's mentally realistic engagement with information processing. He left Harvard for the Watts Professorship of Experimental Psychology, at Wolfson College, Oxford University, in 1972, personally sailing across the Atlantic to assume his new role, and then returning to the United States in 1979. He has subsequently taught at the New School for Social Research (New York City) and the New York University School of Law. His research interests progressed from cognitive to developmental and educational psychology, where his thinking has galvanized our understanding of pedagogical practice, and then on to cultural and narrative psychology, providing specimen studies exemplifying another novel and productive paradigm for human studies.

His abiding interest in language began with his work on wartime propaganda and public opinion, more or less by-passed his perceptual experiments, and continued with his analyses of conceptual categorization. Despite personal contacts with George A. Miller, Noam Chomsky, Roman Jakobson, and Roger Brown, he never became enamored of the structural properties of syntactic or phonological grammars. For instance, it was Brown who added a 65-page appendix to *A study of thinking*, indicating how attributes and categorizations are involved in speech and linguistic meaning.

He became interested in language development, as epitomizing a symbolic, in contrast to iconic or enactive, system of representation and cultural 'amplifier' of reflective, in contrast to sensory or motoric, capacities. From language as an instrument of thought, based on semantic representation, he went on to treat language development in terms of communicative (or pragmatic) function. This perspective allowed him to combine prior American pragmatic and generative influences, with Oxfordian 'ordinary language' work on Austinian illocutionary acts, as well as Tinbergen's ethology – in his delineation of the ontogenesis of speech acts. He went on to the formulation of the Language Acquisition Support System, through which speakers became participants with particular linguistic communities or subcommunities. In this way, he could emphasize not only cultural influences, but also narrative structures and processes. He based his account of stories on Kenneth Burke's pentad (Agents, Actions, Goals, Instruments, Settings – plus Trouble!), as well as other structural accounts and hermeneutic modes of human intentionality. Narratives, thus conceived, have properties that allow construction of personal selves/identities, as well as human institutions (such as schools and legal systems), and provide for the dynamics of individual development/aging and or human history (the passing forward of culture).

His prolific career has provided contributions sufficient to suggest several approaches to the role of language in the human sciences, but reflects a general trend from the application of his original experimental psychology to his more recent anthropological/interpretive stance. He has managed to combine an engagement in current political, educational, and legal issues, as they have become crucial over the decades, with a principled perspective stemming from meaning-based psychological research and theory – which he has helped shape and vitalize. His has not been a 'school of psycholinguistics,' but rather a schooling of psychological engagement in human language.

See also: Brown, Roger William (b. 1925); Chomsky, Noam (b. 1928); Jakobson, Roman (1896–1982); Psycholinguistics: Overview; Tinbergen, Niko (1917–1988).

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Brunot, Ferdinand (1860–1938)

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Alumnus of Ecole Normale Supérieure (1879), Ferdinand Brunot ranked first in the 'Agrégation de grammaire' competition of 1882, got his doctorate in 1891, and a tenured position at the Sorbonne in 1900, in a new chair in 'History of French Language' specifically created for him. At Ecole Normale he was trained by the philologists Gaston Paris and Arsène Darmesteter. Under the influence of Clédat he worked on 'patois' and on spelling. His friends were Baudrillart, Bergson, Jaurès, and the sociologist Durkheim. Brunot became politically engaged and was a convinced 'republican.' He was on the side of Dreyfus, helped found the Human Rights League and later became a mayor of Paris.

He created the monumental *Histoire de la langue française*. He wrote the first 10 parts in 18 volumes, over 10 000 pages: the emphasis is placed on language as a human and social phenomenon, on historical philology, and on both the internal history and the external geography of language, while proposing the first steps of a social lexicology. This work reached 26 volumes, the latest ones, covering the period 1870 to 2000, were published by CNRS. Brunot's other substantial work is *La Pensée et la langue* (1922), a French grammar including oral usages that are based on a classification of ideas more than of signs, forms, and grammatical categories.

This well-recognized philologist, who was a member of the 'Académie des Inscriptions et Belles Lettres' and of the 'Académie Royale de Belgique,' and who also inspired the teaching of stylistics in France, got some fresh reactions from linguists: Bourciez and Meillet criticized the large number of facts and the absence of a system; Meillet and Bally, the process of starting from concepts to get to the language; Bally, the mixing of syntagm and paradigm, and of synchrony and diachrony. As a polemist, Brunot published a critique of the 1932 French Grammar of the Académie Française. As an innovator, he strongly encouraged spelling reform. He also became involved in training teachers of French as a foreign language.

Brunot created the Institut de Phonétique of the University of Paris and the 'Archives de la parole' (1911), in order to record and store samples of 'patois' (from Ardennes, with Bruneau, and from Berry Limousin). He also recorded and stored samples of average Parisians' speech and politicians', poets', and actors' voices (Barrès, Dreyfus, and Apollinaire). This was the beginning of the Département de l'audiovisuel at the Bibliothèque Nationale de France.

See also: Bruneau, Charles (1883–1969); Meillit, Antoine (Paul Jules) (1866–1936).

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Buck, Carl Darling (1866–1955)

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Born in Bucksport, Maine in 1866, Carl Darling Buck was an expert in historical linguistics, especially the history of the Italic branch of Indo–European. Having completed his undergraduate studies at Yale in 1886, he continued his graduate studies there for another 3 years. He then moved to Europe, where he studied classical languages in Athens (1887–1889) and Leipzig (1889–1892). Buck joined the University of Chicago in the year of its founding, 1892, as a professor of Sanskrit and Indo-European comparative philology. He remained at this post until his retirement in 1933, when he became professor emeritus. In his retirement, Buck remained active in his scholarship, working on his reverse dictionary of Greek nouns and adjectives co-authored with Walter Petersen (1945) and his dictionary of synonyms in the Indo–European languages (1949). In 1954, the University of Chicago honored him as one of three surviving individuals who had been at the University since its founding. Buck died the following year.

During his remarkable career, Buck made significant contributions in the areas of the Oscan and Umbrian languages, including a study of these languages' vocalic systems (1892) and verbal forms (1895). Together with William Gardner Hale, he produced a grammar of Latin (1903), and in the next year his grammar of Oscan and Umbrian appeared. Before the end of the first decade of the 20th century, Buck had also produced studies of ancient Greek dialects. However, many students of Indo–European linguistics may know Buck best through his comparative grammar of Greek and Latin (1933) and his dictionary of Indo–European synonyms (1949). These works have endured as classic reference books in historical linguistics.

See also: Greek, Ancient; Indo–European Languages; Proto-Indo–European Syntax.

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Buddhism, Japanese

I Reader

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Buddhism has had major linguistic influences in Japan, ranging from the development of classical Japanese literary forms and new syllabaries to the use of a wide vocabulary that has, in the course of time, become part of standard Japanese usage. It entered Japan along with many other facets of continental Asiatic culture from the 6th century onward. Along with Buddhism, the most significant cultural influence that entered Japan in this period was the Chinese writing system, which the Japanese adopted. It was through the medium of Buddhist texts written in Chinese that the Japanese originally encountered and studied Buddhist thought. This Chinese orientation provided the predominant lens through which the Japanese viewed and learned about Buddhism. Until the 19th century, no systematic attempts were made to study such root languages of Buddhism as Sanskrit or Pali or to study early pre-Chinese Buddhist texts. There was, however, in the work of the 18th century writer Tominaga Nakamoto, a recognition of the conditional nature of language, dependent on the time in which it was used, the form of expression used, and the intent of the user. Tominaga's studies of Buddhist texts and of the varying ways

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that Sanskrit terms had been translated, in different eras and by different authors, into Chinese enabled him to come to an understanding of the relative nature of language and of religious forms and to develop the foundations of a critical scholarship of religion and of Buddhist texts.

The entry of Buddhism into Japan led the Japanese to study Chinese culture in depth and, especially, to embark on an intensive study of the Chinese language and its writing system so as to facilitate study of the new religion. Consequently, the entry of Buddhism was a powerful spur toward the Japanese adoption of the Chinese writing system. It also proved to be a major medium for its gradual transformation into a Japanese system, for in order to make the texts more readily comprehensible they were read in a Japanese syntactical style that applied Japanese pronunciations to the ideograms. Even in the early 1990s, Japanese Buddhist priests intoned, with Japanese pronunciations, texts written in Chinese. Because few understand Buddhist Chinese, this has led to a situation in which most priests and worshippers do not understand the meanings of the texts they recite. Large numbers of contemporary Japanese translations and commentaries on Buddhist texts are, however, available to explain such texts.

Buddhism played a major part in the development and use of the phonetic syllabary *katakana*, which forms an intrinsic part of the written language along with Chinese ideograms. *Katakana* developed as a mnemonic device for providing Japanese readings and pronunciations of Chinese Buddhist texts and was widely used in the temples of Nara, the ancient capital, by the 8th century. Its use was subsequently diversified into the world of literature and eventually into general use. Although the earliest usages and development of the other phonetic syllabary, *hiragana*, occurred outside of Buddhist temples, it is clear that this syllabary was also widely used in the Buddhist world by the 10th century, and this further stimulated the emergence of an authentic written language combining ideograms and phonetic script.

Many Buddhistic words still in use in the late 20th century (e.g., the term *issai shujô*, 'all sentient beings') derive from the earliest wave of assimilation in the 6th century: although changes in the dominant form of Chinese in the 7th century affected the ways that the Japanese pronounced most Chinese ideograms, the Buddhist temples resisted this change and continued for the most part to preserve the earlier forms. For example, the ideogram meaning 'being, existence' is more commonly pronounced *sei*, but in Buddhist contexts generally retains the earlier pronunciation *jô*. To this extent, Buddhist Japanese as used in rituals has a rather archaic feeling compared to standard Japanese. Nonetheless, many standard Buddhist terms based on these earlier forms of pronunciation, for example, *jigoku* ('hell') and *gokuraku* ('heaven'), have become everyday terms still extant in contemporary Japanese and not limited to Buddhistic usage. Because of its close relationship with the Chinese language, which formed the basis of the Japanese writing system and which added immeasurably to the Japanese vocabulary of the time, Buddhism has thus played an instrumental role in the evolution of the Japanese language and in augmenting its scope, both orally and in written forms.

See also: Buddhism, Tibetan; South Asia: Religions.

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Buddhism, Tibetan

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During the 7th century, Tibet was an expanding military power. Its armies conquered large parts of China's Central Asian territories, but as it came into contact with more advanced civilizations, Tibet became increasingly aware of its cultural backwardness. One consequence of this was the decision by King Songtsen Gampo (ca. 618–650) to send his advisor Tönmi Sambhota to India to develop a written script for the Tibetan language. With the help of Indian *pandit*s, he developed a script based on north Indian models that is still used today.

Although Tibetan histories written centuries later by Buddhist clerics present Songtsen Gampo as an emanation of the Buddha Avalokiteśvara whose primary goal in life was to spread Buddhism, there is little evidence that he had any real interest in the religion. Some of his successors, however, became

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devout Buddhists, and they began the process of translating the Indian Buddhist canon into Tibetan. The Tibetan language is part of the Tibeto-Burman language family, and aside from the codifications of Tönmi Sambhota (who adopted case endings and other features of Sanskrit), there is no linguistic similarity between it and Indic languages. As a result, Tibetan translators of Sanskrit texts decided to create a specialized vocabulary, which was codified in standard lexicons, as well as an artificial grammar and sentence structure for their translations that reflected those of Sanskrit Buddhist texts.

Contemporary Tibetan scholars make a distinction between two forms of Tibetan: (1) 'dharma language' (*chos skad*), which is the canonical language devised for scriptural translation, and (2) 'colloquial language' (*phal skad*), which is used for day-to-day conversation among Tibetans. Both share the same grammar and syntax, but differ in their vocabulary. Largely due to the sponsorship of Tibetan governments, a vast corpus of Indic Buddhist texts was translated into Tibetan, and in the 14th century the scholar–monk Pudön (1290–1364) compiled a standard canon, which is still normative today.

The 'first dissemination' (*snga dar*) of Buddhism to Tibet began in the 7th century under the patronage of Tibet's kings, but stalled after the early dynasty fell. In the 11th century, the Indian master Atiśa (982–1054) traveled to Tibet and initiated the 'second dissemination' (*phyi dar*) of Buddhism. His mission was so successful that from this point forward, Buddhism became the dominant religion in the region.

Tibetan Buddhism historically derived from two primary sources: (1) the monastic universities of northern India and (2) tantric lineages based mainly in Bengal and Bihar. One of the most important Tibetan innovations was the system of reincarnating lamas (*sprul sku*), the most important of which is the Dalai Lama lineage. This began in the 16th century, when Sönam Gyatso (1543–1588) was given the title "*Ta le*" ('Ocean') by the Mongol chieftain Altan Khan. The fifth Dalai Lama, Ngawang Losang Gyatso (1617–1682), was made ruler of Tibet in 1642 with the help of Mongol supporters, and his successors remained the temporal and religious leaders of the country until 1950, when troops of the Chinese People's Liberation Army invaded the country. In 1959, the 14th Dalai Lama, Tenzin Gyatso (1935–), fled into exile in India. Since that time, Chinese control over religion has intensified, and currently there is no real religious freedom in Tibet. Buddhism has been revived in exile, however, and study and practice thrive in Tibetan exile communities in South Asia.

See also: Buddhism, Japanese; Sanskrit; South Asia: Religions; Tibetan.

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Bühler, Karl (1879–1963)

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Karl Bühler (see **Figure 1**) was born in Germany (Meckesheim) in 1879 and, after gaining a doctorate in philosophy and medicine, started work as an assistant to Oswald Külpe, a psychologist in Würzburg. Later he worked as a professor of psychology in Dresden and Vienna (1922–1938), before having to emigrate to the United States in 1938, where he lived in Los Angeles from 1945 until his death in 1963.

In linguistics Bühler is most famous for his work on deixis and on language function, but he also published work on developmental psychology, language comprehension, and human cognition as well as on other linguistic phenomena such as phonology, syntax, morphology, and stylistics.

Bühler postulated four axioms for linguistics, which were concerned with (1) the organon model of language, (2) the sign status of language (by virtue of *abstract* features), (3) the field structure of language (Bühler united von Humboldt's dichotomy of *ergon* and *energeia* and de Saussure's distinction between *langue* and *parole* in his *Vierfelderschema* of language as *Sprechhandlung*, *Sprachwerk*, *Sprechakt*, and *Sprachgebilde*), and (4) the fact that language is a system of two 'classes' (*Zweiklassensystem*), namely semantics and syntax. Of these four axioms, it was especially the organon model that was influential.

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Figure 1 Karl Bühler. With permission of the Archiv der Universität Wien.

The Organon Model

In his *Organonmodell* Bühler took up Plato's proposal to explain language by virtue of the metaphor of language as a tool (Greek *órganon*) that serves distinct functions in society. He distinguished between three functions: *Darstellung* ('representation'), *Ausdruck* ('expression'), and *Appell* ('vocative', 'appellative'). In very simple terms, language may be used for the representation of things (*Dinge: Darstellung*), for the expression of the speaker's inner feelings/states (*Sender: Ausdruck*), and for influencing the hearer's behavior (*Empfänger: Appell*). The linguistic sign is hence functionally very complex: it is a ***symbol*** by virtue of its representational function, a ***symptom*** (sign, index) by virtue of its dependence on the sender, and a ***signal*** by virtue of its appeal to the hearer. In a given instance, one of these functions may dominate the others: *Darstellung* dominates in scientific language, *Ausdruck* in poetic language, and *Appell* in military language, but this does not mean that the other functions are not present as well (Bühler speaks of *Dominanzphänomene*). Thus, an expression such as *es regnet* ('it's raining') denotes a meteorological event (*Darstellung*). But by uttering it with different intonations, the speaker can also express his/her feelings (*Ausdruck*) or appeal to someone not to forget to bring an umbrella (*Appell*) (1982: 46). Because of Bühler's occasionally imprecise style of writing, aspects of this model remain much-discussed in European linguistics. For instance, it is not clear to what extent means of *Ausdruck* are employed intentionally or subconsciously and to what extent they are conventionalized. Although some of his examples include conventional and intentional expressions, *Ausdruck* is defined by him as "freie oder gehemmte Entladung von Affekten" (1982: 352), i.e., the free or inhibited discharge of emotions, which seems to more or less *subconsciously* 'mirror' the speaker's mental state or personality traits (Auer, 1999: 33). From a strict viewpoint, this function thus does not concern linguistics (Konstantinidou, 1997: 36; cf. also Péter, 1984: 245; Stankiewicz, 1964: 239f.); however, Bühler's expressive function has also been interpreted as referring to intentional linguistic communication.

The 'Field Theory' of Language

Bühler also developed his own contextual language theory, the *Zweifelderlehre* ('two-field theory'). Signs, he said, are not isolated entities but always occur in context, in a 'field' that can be deictic (*Zeigfeld*) or symbolic (*Symbolfeld*). As such, linguistic signs function as *Feldgeräte*. Representational symbols can be interpreted solely with the help of the *Symbolfeld*, but in order to assign meaning to utterances containing deictic signals (*Zeigwörter*), hearers need the extralinguistic context (the *Zeigfeld*). What is designated by expressions such as *here, there, I, you* changes according to the position of the speaker. Thus, it is the *I*, *now*, and *here* that establishes the deictic center (Bühler calls it the *Ich-jetzt-hier-Origo)*. The matter is more complicated because there are several *modi* of pointing toward the context of utterance: *ad oculos* (reference to components of the current context), *anaphorisch* (reference to textual components), and *am Phantasma* (reference to fictional worlds).

Bühler's contribution to linguistics is enormous: apart from crucially influencing linguistic research (especially the Prague School) before World War II, his work has been of great importance in linguistics since the 'pragmatic turn' in the 1970s, although he failed to gain the deserved attention upon his emigration to the United States. His *Organonmodell* has been immensely significant in that it influenced the establishment of derived functional models from Roman Jakobson to Dell Hymes and M.A.K. Halliday. He is still being reinterpreted and analyzed within modern linguistics (e.g., Kubczak, 1984; Péter, 1984; Auer, 1999). Similarly, his comments on deixis, morphology, and metaphor have provided a stepping stone for modern approaches in these fields. His estate is currently being reorganized by the FDÖP (*Forschungsstelle und Dokumentationszentrum für österreichische Philosophie*).

See also: Functionalist Theories of Language; Halliday, Michael A. K. (b. 1925); Jakobson, Roman (1896–1982); Prague School.

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Bulgaria: Language Situation

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The Bulgarian language is spoken mainly in the central and eastern Balkans. There are also Bulgarian-speaking minorities or language islands in the regions of Banat (Catholic settlers on the territory northwest of the Balkans, cf. Stojkov, 1967), Bessarabia and Tavria (emigrants in Moldova and Ukraine, Stojanova, 1997), Albania (Hristova, 2003), northern Greece (Shklifov and Shklivova, 2003), and Turkey (Bojadzhiev, 1991). If, to this population, which identifies itself as Bulgarian, one adds the speakers of the Macedonian language – the majority of whom also considered themselves Bulgarians until 1944, when the Macedonian language was created (cf. Kočev *et al.*, 1994; Bozhinov and Panayotov, 1978; Angelov, 2000) – the number of Bulgarian speakers may reach 10.5 million.

Bulgarian is also used as a first language for educational purposes by various minorities in Bulgaria: Turks, Roma, Russians, Armenians, and Jews (Angelov and Marshall, 2005), although after signing the European Framework Convention for the Protection of National Minorities in 1999, the Bulgarian Ministry of Education started to include some minority languages in its educational programs. According to the last census (March 2001) Turks are the largest minority in Bulgaria (758 000 or 9.5% of the whole population). They are mainly rural (63%), concentrated in northeast and southeast of the country, speaking Turkish dialects, probably different from Standard Turkish. During the last 15 years, after the democratic changes, Turks have their own media and role in the public administration. Roma (last census records 365 797, but other sources 650 000) are heterogeneous, differing by origin, religion, language, and dialects. Some Roma are Christians, other are Muslims (part of them speakers of Turkish); they live across the country in urban ghettoes or village neighborhoods. They have a huge number of non-government organizations (NGOs), but lack coordination, and do not have their own media, as the Turks do. Russians (30 000), Armenians (14 000), and Jews (3000) are mainly urban populations, each of them with specific cultural traditions and religious institutions.

The sociolinguistic situation in the country presents also some alleged, smaller minority groups and confessional communities. The Pomaks, called also Bulgarian Mohammedans (Muslim Bulgarians) are located in Rhodopi Mountains. They speak archaic Bulgarian dialect, although they started to learn Turkish in the 1990s as a step-mother tongue. Gagaouz (few villages in north-east Bulgaria), counter to the

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Pomaks, are Christians who speak a Turkish dialect. Catholics (found in small towns and villages as Chiprovtsi, Rakovski, and Bardarski Geran) are related with the Bulgarian minority of Banat in Romania.They use specific archaic Bulgarian, which has a written norm, based on Latin alphabet and influenced by Croatian liturgical tradition.

Modern Bulgarian, spoken by 99% of the population of the country, including the bilingual minorities (10–15%), is a South Slavic language which stems from Old Church Slavonic (Old Bulgarian, according to Leskien, 1919; Mladenov, 1929; Vaillant, 1948; Duridanov, 1993). The beginning of the Bulgarian literary tradition was laid by the brothers SS Cyril and Methodius, who are now recognized as the inventors of the Glagolitic, an alphabet that corresponds accurately to the phonetic peculiarities of the Slavic languages. The New Testament was translated into this new literary language as early as the 9th century, along with a number of other liturgical books and mediaeval ecclesiastical writings. The Cyrillic was named after St. Constantine-Cyril the Philosopher, and its invention is ascribed to St. Clement of Ohrid (c. 830–916), the most prominent disciple of the two brothers, who was ordained by Bulgaria's Tsar Simeon (893–927) 'first bishop of the Bulgarian language' in 893. Today the Cyrillic is used in Bulgaria as well as Russia, Ukraine, and Serbia; it was also used until recently in Mongolia and some other ex-Soviet republics.

In the 16th, 17th, and 18th centuries the Bulgarian language changed significantly (Mirchev, 1963), although it preserved its rich vocabulary (Gerov, 1995) and script. Modern Bulgarian has a somewhat different grammar (Weigand, 1907; Beaulieux, 1933; Scatton, 1984; Hauge, 1999; Kotova and Yanakiev, 2001) and an analytic structure. Bulgarian has nine tenses, a developed system of aspect and moods, intensive use of prepositions and impersonal constructions, but no case declension in the noun; the three main cases are preserved in the personal pronouns. Thus the grammatical structure of Bulgarian differs from that of the other Slavic languages (Ivanchev, 1988).

There were probably significant dialectal differences on Bulgarian language territory as early as the Middle Ages, but the varied relief of the Balkans produced a considerable number of dialects within a comparatively small geographical region (Stojkov, 1993). There are two main spoken variants in Bulgarian—Eastern and Western, which can be traced along the northeast axis from the Danube River to the Aegean, i.e., parallel to the Black Sea coast but around 300 to 350 km inland on the central Balkans. Bulgarian dialects are still used in the highland villages of the Rhodopi Mountains and the Central Balkan Range, as well as in the Rila, Pirin, and Strandja mountains. In urban conditions the traditional dialects have evolved into interdialects, influenced by the urban social environment and Standard Bulgarian (Videnov, 1990; Videnov and Angelov, 1999; Dimitrova, 2004).

The modern Bulgarian literary standard was established in the late 19th century (Gyllin, 1991; Hill, 1992; Georgieva *et al.*, 1989) on the basis of the Northeastern Bulgarian dialects, although the capital city, Sofia, lies in the western part of the country. This gap has resulted in some cultural and linguistic disproportions; however, they do not disrupt the continuum in communication. Actually there are no language barriers between the Slavic peoples even on a far larger geographical territory that covers the South and East Slavic languages. Various genres of fiction and poetry have developed in Modern Bulgarian, especially in the 19th and 20th centuries, as well as stylistic registers used in public administration, science, and education. Specific urban slang, professional jargons, and sociolects have also emerged naturally; e.g., 'tarikatski jargon' of Sofia (Armjanov, 1993) is still typical of the young generation, in the same way it was used in some urban folksongs during the 1920s.

See also: Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; Balkans as a Linguistic Area; Bulgarian Lexicography; Bulgarian; Europe as a Linguistic Area; Language and Dialect: Linguistic Varieties; Language Education Policy in Europe; Leskien, August (1840–1916); Lingua Francas as Second Languages; Macedonia: Language Situation; Migration and Language; Minorities and Language; Moldova: Language Situation; Nationalism and Linguistics; Old Church Slavonic; Proto-Indo-European Morphology; Proto-Indo–European Phonology; Proto-Indo–European Syntax; Romania: Language Situation; Slavic Languages; Standard and Dialect Vocabulary; Teaching of Minority Languages; Ukraine: Language Situation.

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take different subject and oblique forms of the article: (*j*)*at* and (*j*)*a*. In spoken Bulgarian (*j*)*at* is typically not used.

Bulgarian has preserved the Indo-European tense-aspect system of imperfect and aorist alongside the newer perfective-imperfective system. Typically, imperfect suffixes are added to imperfective stems and aorist suffixes to perfective stems. Bulgarian does offer examples of perfective stems with imperfect suffixes in subordinate clauses introduced by, e.g., *shtom* 'as soon as' and in main clauses; they express a completed action that is repeated. The following example (1) is from Feuillet (1995: 36).

(1)	Vecher	sedneshe	na	chardaka
	Evening	*sit-down–3SG*	*on*	*verandah-DO*

'In the evening he would sit down on the verandah'

Sedn is perfective and *-eshe* is imperfect.

There are two future constructions, one for assertions and the other for denials. The former structure uses the particle *shte*, derived from the verb *xoshtõ* 'I want/wish.' The meaning 'want' is now expressed by *iskam*, cognate with the Russian *iskat'* 'search for'. Compare (2) and (3).

(2a)	Dimo	shte	dojde	utre
	Dimo	*particle*	*come-PERF-3SG*	*tomorrow*

'Dimo will come tomorrow'

(2b)	azshte	dojda	utre
	I particle	*come-PERF-1SG*	*tomorrow*

'I will come tomorrow'

(3)	az	iskam	da	dojda
	I	*want-IMPERF-1SG*	*conjunction*	*come-PERF-1SG*

'I want to come'

The future-conditional still consists of a verb (originally the imperfect of *xoshtõ*) plus a *da* complement clause: *shtjax da dojda* 'I would come,' *shteshe da dojdesh* 'you would come.'

The negative future construction consists of the invariable *njama*, originally a negative form of *imam* 'have,' plus a *da* clause, as in (4).

(4a)	Donka	njama	da	dojde
	Donka	*not-have-IMPERF-3SG*	*conjunction*	*come-PERF-3SG*

'Donka won't come'

(4b)	az	njama	da	dojda
		not-have-IMPERF-1SG	*conjunction*	*come-PERF-1SG*

'I won't come'

Ne shte occurs, but the *njama* construction is the norm.

Bulgarian has a perfect as well as a perfective: Bulgarian *chetox* 'I read' (last week) versus *chel sŭm* 'I have read.' *Chel* is the perfect participle (originally resultative) and *sŭm* is the copula. Both Bulgarian and Macedonian have developed another perfect, with a passive (resultative) participle and *imam* 'I have': compare ***angazhiral*** *sŭm masa* 'I have booked a table,' where *angazhiral* expresses a property of the speaker, and *imam angazhirana masa* 'I-have booked a-table,' where *angazhirana* expresses a property of table.

Bulgarian has what Bulgarian linguists call a renarrative construction. It is based on the perfect and past perfect. De Bray (1980: 123) talks of the past perfect as used in renarration; Feuillet talks of the use of the perfect and past perfect to signal distance or inference. That is, neither recognizes a separate renarrative tense. Examples are in (5); see Feuillet (1995: 41).

5(a)	Kazal	na	Bozhura,	che
	He-supposedly-said	*to*	*Bozhura*	*that*
	shtjal	da	se	vurne
	he-would	*conjunction*	*self*	*return*

'He is supposed to have told Bozhura that he would return'

5(b)	Kaza	na	Bozhura,	che
	He-said	to	Bozhura	*that*
	shtjal	da	se	vurne
	he-would	*conjunction*	*self*	*return*

'He told Bozhura that he would return'

(3a) demonstrates a Balkan feature, a lack of infinitives. Where Russian, for example, has an infinitive, Bulgarian has a finite clause. Bulgarian has two principal subordinating conjunctions, *da* and *che*. *Da* is used for irrealis clauses; in (4a) the event of Donka coming is not a fact but a possibility. In (6) (from Feuillet, 1995) the event of his looking at the traffic is irrealis; he is not doing it. In (7), in contrast, the event of Donka coming is presented as fact, and the clause is introduced by *che*.

(6)	Toj	varveshe,	bez	da
	He	*was-walking*	*without*	*conjunction*
	obrashta	vnimanie	na	dvizhenie-to
	turns	*attention*	*to*	*traffic-the*

'He was walking without paying attention to the traffic'

(7)	Tja	kaza,	che	Donka	shte	dojde
	'She	said	that	Donka	will	come'

Da was originally a marker of irrealis main clauses, a function which it still has in modern Bulgarian.

Bulgarian has a relativizer *kojto* (masculine), *kojato* (feminine), and *koeto* (neuter), with the plural *koito*. It is used as a free relative: *kojto pie tazi rakija e glupak* 'whoever drinks this rakija is an idiot,' and as a relativizer in relative clauses, as in (8).

(8)	knigata,	kojato	kupix
	book-the	*which*	*I-bought*

'the book which I bought'

The structure preposition plus relativizer is used: *knigata, v kojato chetox tezi dumi* 'the book in which I read these words.' Spoken Bulgarian has a relative clause introduced by the invariable *deto* 'where': *knigata DETO ja kupikh* 'the book that I bought,' *momcheto deto dojde* 'the boy that came.' It also has a relative clause structure with *shto* ('what') and resumptive pronoun: *kniga, shto ja kupikh* 'the-book that it I-bought.'

Despite the lack of case suffixes Bulgarian has flexible word order because of clitic personal pronouns (see Feuillet, 1995: 52–55). The personal pronouns have long and short (clitic) forms: *mene me* (me-accusative), *mene mi* (me-dative), *nego go* (him-accusative), and so on. Consider the question–answer pair in (9).

(9) Chete li ja Dimo novata kniga?
Read Q it Dimo new-the book?
'Did Dimo read the new book?'
Dimo ja chete novata kniga
Dimo it read new-the book
'Dimo read the new book'

(9) is neutral; it asks simply if this event took place, not whether it was Dimo doing it or someone else, or if it was the new book that was read or something else. The order *novata kniga ja chete Dimo* highlights *ja chete Dimo*; the pronoun *ja* signals that *novata kniga* is the direct object of *chete*. The order *novata kniga,* ***Dimo*** *ja chete*, with focal stress on *Dimo*, puts contrastive highlighting on *Dimo*: 'As for the book, it was Dimo who read it and not anyone else.'

See also: Balto-Slavic Languages; Bulgaria: Language Situation; Bulgarian Lexicography; Clitics; Macedonia: Language Situation; Macedonian; Old Church Slavonic; Relative Clauses; Spoken Discourse: Word Order; Tense.

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Bulgarian Lexicography

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Bulgarian lexicography began much later than that of most other European languages. This was largely due to the decline of the early Bulgarian literary culture, after the Turkish destruction of the second Bulgarian empire at the end of the 14th century. The literary culture did not begin to revive until 1762, the beginning of a period known as the Bulgarian Renaissance which lasted until 1878 (the end of the Russian–Turkish war).

Pioneer dictionaries in Bulgarian include a manuscript of a Bulgarian–Greek word index from Bogasko, near Kastoria (16th century); *Chetiriezichen rechnik*, by Daniil of Moschopolis (1802); *Dodatak k Sanktpeterburgskim sravnitel'nim rechnitsima sviiu eziki*, by Vuk Karadzhich (1822); and the manuscripts *Gr"tsko-b"lgarski razgovornik* and *Gr"tsko-b"lgarski rechnik*, by Zakhariĭ Krusha (1828). However, these works had no influence on subsequent Bulgarian lexicographical tradition, which developed as a part of the Bulgarian Renaissance, or on the development of New Bulgarian as a literary language. Works from the Renaissance period can be classified as follows:

1. Purist compilations: these include the word indexes in *Bolgarska gramatika* by Neofit Rilski (1835) and *P"rvichka b"lgarska gramatika* by Ivan Bogorov (1844), and a dictionary entitled *Rechnik na dumi turski i gr"tski v iazika b"lgarskiĭ* (1855) by Mikhail Pavlev and Aleksandur T. Zhivkov.
2. Dictionaries of foreign words that have enriched the Bulgarian vocabulary: these include *Kratkiĭ rechnik za chuzhdestrannite rechi, koito sia nakhozhdat v b"lgarskiĭ iazik* (1863), by Teodor Khrulev, and thesauri as appendixes to various books by Anastas Kipilovski, Petko R. Slaveĭkov, Sava Radulov, and Mikhail Popovich.
3. Bilingual dictionaries: chief among these are *An English and Bulgarian vocabulary in two parts* (1860) by Charles Morse and Konstantin Vasiliev, and *Frensko-b"lgarski rechnik* (1869)

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Bulgarian lexicography began much later than that of most other European languages. This was largely due to the decline of the early Bulgarian literary culture, after the Turkish destruction of the second Bulgarian empire at the end of the 14th century. The literary culture did not begin to revive until 1762, the beginning of a period known as the Bulgarian Renaissance which lasted until 1878 (the end of the Russian–Turkish war).

Pioneer dictionaries in Bulgarian include a manuscript of a Bulgarian–Greek word index from Bogasko, near Kastoria (16th century); *Chetiriezichen rechnik*, by Daniil of Moschopolis (1802); *Dodatak k Sanktpeterburgskim sravnitel'nim rechnitsima sviiu eziki*, by Vuk Karadzhich (1822); and the manuscripts *Gr"tsko-b"lgarski razgovornik* and *Gr"tsko-b"lgarski rechnik*, by Zakhariĭ Krusha (1828). However, these works had no influence on subsequent Bulgarian lexicographical tradition, which developed as a part of the Bulgarian Renaissance, or on the development of New Bulgarian as a literary language. Works from the Renaissance period can be classified as follows:

1. Purist compilations: these include the word indexes in *Bolgarska gramatika* by Neofit Rilski (1835) and *P"rvichka b"lgarska gramatika* by Ivan Bogorov (1844), and a dictionary entitled *Rechnik na dumi turski i gr"tski v iazika b"lgarskiĭ* (1855) by Mikhail Pavlev and Aleksandur T. Zhivkov.
2. Dictionaries of foreign words that have enriched the Bulgarian vocabulary: these include *Kratkiĭ rechnik za chuzhdestrannite rechi, koito sia nakhozhdat v b"lgarskiĭ iazik* (1863), by Teodor Khrulev, and thesauri as appendixes to various books by Anastas Kipilovski, Petko R. Slaveĭkov, Sava Radulov, and Mikhail Popovich.
3. Bilingual dictionaries: chief among these are *An English and Bulgarian vocabulary in two parts* (1860) by Charles Morse and Konstantin Vasiliev, and *Frensko-b"lgarski rechnik* (1869)

Table 1 The main Bulgarian dictionaries from 1945 to the present day

Type of dictionary	*Title*
Dictionary of foreign words	Stefan Ilchev *et al.* (1982): *Rechnik na chuzhdite dumi v b"lgarskiia ezik*
Explanatory monolingual dictionaries; dictionaries of record	Liubomir Andreĭchin *et al.* (1st edition 1955, 4th edition 1994 revised and completed by Dimit''r Popov): *B"lgarski t"lkoven rechnik*
	Stoian Romanski *et al.* (1955–1959): *Rechnik na s"vremenniia b"lgarski knizhoven ezik*
	Kristalina Cholakova *et al.* (1977–, 11 volumes published by 2002, up to *oiam se*): *Rechnik na b"lgarskiia ezik*
Spelling dictionaries and pronouncing dictionaries	Ivan Khadzhov *et al.* (1945): *Pravopisen i pravogovoren nar"chnik*
	Liubomir Andreĭchin *et al.* (1st edition 1945, 10th edition 1984): *Pravopisen rechnik na b"lgarskiia knizhoven ezik*
	Stoian Romanski (1951): *Pravopisen rechnik na b"lgarskiia knizhoven ezik s posochvane izgovora na dumite i poiasnenie na chuzhdite dumi*
	Pet''r Pashov/Khristo P''rvev (1975): *Pravogovoren rechnik na b"lgarskiia ezik*
	Elena Georgieva/Valentin Stankov (1983): *Pravopisen rechnik na s"vremenniia b"lgarski knizhoven ezik*
	Dimit''r Popov *et al.* (1998): *Rechnik za pravogovor, pravopis, punktuatsiia*
	Valentin Stankov *et al.* (2002): *Nov pravopisen rechnik na b"lgarskiia ezik*
Frequency dictionaries	Tsvetanka Nikolova (1987): *Chestoten rechik na b"lgarskata razgovorna rech*
	Elena Todorova (1995): *Chestoten rechik na b"lgarskata publitsistika 1944–1989g.*
Historical dictionaries	Dora Ivanova-Mircheva *et al.* (1999–, 1 volume published by 1999, up to *N*): *Starob"lgarski rechnik*
	Dora Ivanova-Mircheva/Angel Davidov (2001): *Mal"k rechnik na starob"lgarskiia ezik*
	Vladimir Georgiev *et al.* (1971–, 6 volumes published by 2002, up to *slovar*): *B"lgarski etimologichen rechnik*
Dictionaries of personal names and place names	Stefan Ilchev (1969): *Rechnik na lichnite i familnite imena u b"lgarite*
	ĭordan Zaimov (1988): *B"lgarski imennik*
	Nikolaĭ Michev (1989): *Rechnik na selishchata i selishchnite imena v B"lgariia: 1878–1987*
Phraseological dictionaries	Keti Nicheva *et al.* (1974–1975): *Frazeologichen rechnik na b"lgarskiia ezik*
	Keti Nicheva (1993): *Nov frazeologichen rechnik na b"lgarskiia ezik*
Dictionaries of archaisms and neologisms	Stefan Ilchev *et al.* (1974): *Rechnik na redki, ostareli i dialektni dumi v literaturata ni ot XIX i XX vek*
	Diana Blagoeva *et al.* (2001): *Rechnik na novite dumi i znacheniia*
Paradigmatic dictionaries	Liubomir Andreĭchin *et al.* (1975): *Obraten rechnik na s"vremenniia b"lgarski ezik*
	Stefka Vasileva (1988): *Rechnik na paronimite v b"lgarskiia ezik*
	Emiliia Pernishka/Stefka Vasileva (1998): *Rechnik na antonimite v b"lgarskiia ezik*
	Liuben Nanov (1st edition 1950, 2nd revised edition 1968): *B"lgarski sinonimen rechnik*
	Milka Dimitrova/Ana Spasova (1980): *Sinonimen rechnik na s"vremenniia b"lgarski knizhoven ezik*
	Ani Nanova/Liuben Nanov (1987): *B"lgarski sinonimen rechnik*
Dictionary of acronyms	Lidiia Krumova/Mariia Choroleeva (1983): *Rechnik na s"krashcheniiata v b"lgarskiia ezik*
Valency dictionary	Mariia Popova (1987): *Krat"k valenten rechnik na glagolite v b"lgarskiia ezik*
Dictionaries of jargon and slang	Georgi Armianov (1993): *Rechnik na b"lgarskiia zhargon*
	Gancho Ganchev/Albena Georgieva (1994): *Rechnik na obidnite dumi i izrazi v b"lgarskiia ezik*

and *B"lgarsko-frenski rechnik* (1871), both by Ivan Bogorov.

4. Unfinished projects of monolingual explanatory dictionaries: these include *Bulgarski rechnik* (1856) by Naĭden Gerov, with a Russian translation section (only part *A–vleka* was completed); *Slovar na b"lgarskiia ezik, izt"lkuvan na cherkovnoslavianski i gr"tski ezik* (1875) by Neofit Rilski, with a Greek translation section (only letters *A–B* were published); *B"lgarski rechnik. S"birane sichkite nashi dumi, posreshchnati s frenski i ist"lkuvani d"lgo i shiroko b"lgarski* (1881) by Ivan Bogorov, with a French translation section (only the first five letters were completed); *B"lgarski rechnik s t"lkuvanea i primeri* (1871) by Ivan Bogorov (only part *A–vdl"bnat* was published); and a manuscript of a monolingual explanatory dictionary by Petko R. Slaveĭkov (1827–1895), in which only parts of the letters *A*, *B*, *V*, and *G* are preserved.

Two pioneering monolingual dictionaries with Russian translation sections appeared at the end of the 19th century: *Slovar' bolgarskogo iazyka po pamiatnikam' narodnoĭ slovesnosti i proizvedeniiam' noveĭseĭ pechati* (1885–1889) by Aleksand"r Diuvernua, and the five-volume *Rechnik na b"lgarskyĭ ezyk' s' t"lkuvanie rechi-ty na b"lgarsky i na*

russky (1895–1904) by Naĭden Gerov, with a supplementary volume (1908) by Todor Panchev (a facsimile of the six volumes was published in 1978). Both works concentrate on colloquial vocabulary and are important lexicographical records of the formation of New Bulgarian. Based on these two dictionaries is the unfinished *B"lgarski t"lkoven rechnik* (1927–1951) founded by Stoian Argirov, Stefan Mladenov, Aleksand"r Teodorov-Balan, and Ben'o Tsonev; this work was continued by Stefan Mladenov and renamed *B"lgarski t"lkoven rechnik s ogled k"m narodnite govori*. Only letters *A–K* were completed. A number of monolingual dictionaries were published in the early 20th century; these include the first dictionary of synonyms by Mariana Dabeva (1930–1934); *Entsiklopedichen rechnik na chuzhdite dumi* (1939) by Georgi Bakalov, a dictionary of foreign words; and Stefan Mladenov's *Etimologicheski i pravopisen rechnik na b"lgarskiia knizhoven ezik* (1941), the first etymological dictionary and the first codification of Bulgarian orthography. In the second half of the 20th century, Bulgarian lexicography began to expand rapidly and is currently thriving, supported by the Bulgarian Academy of Sciences (BAS) in Sofia and by the universities of Sofia, Veliko Turnovo, Plovdiv, and Shumen. During the past 60 years, a great number of modern dictionaries have appeared, each with a different linguistic approach and editorial aim (see Table 1). The major scholarly record of the Bulgarian language is *Rechnik na b"lgarskiia ezik* by Kristalina Cholakova *et al.* (this work, in progress since 1977, had 11 volumes published by 2002, up to *oiam se*).

Since 1998, the BAS has worked to create an electronic corpus of the Bulgarian language. The corpus is representative of all major registers of the Bulgarian language and is being continually enlarged and updated. It can be expected to have an important effect on the future of Bulgarian lexicography.

In addition to practical dictionary making, numerous theoretical metalexicographical works have been published (the most important of which are included in the following bibliography), in which lexicography is generally viewed as a branch of lexicology. The Department for Bulgarian Lexicology and Lexicography at BAS is an institutional member of European Association of Lexicography (Euralex) and publishes the lexicographic journal *Leksikograficheski pregled*.

See also: Bilingual Lexicography; Bulgarian; Bulgaria: Language Situation; Dictionaries; Lexicography: Overview; Lexicology; Macedonian; Old Church Slavonic; Slavic Languages.

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Relevant Website

http://www.ibl.bas.bg – electronic corpuas of the Bulgarian language.

Bullokar, William (c. 1531–1609)

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William Bullokar was a persistent spelling reformer who provided evidence about the pronunciation of English toward the end of the 16th century. From his books we can glean some information about his life. Born of a Sussex family about 1530, he spent at least one period of military service abroad, namely in Le Havre, which had been occupied by the English in 1562 and 1563. Several years earlier, Bullokar had been a teacher. In 1570 he married the daughter of an alderman of Chichester and, 4 years later, moved to the Chichester parish of St. Andrews, where he died in early 1609. His son John was the author of the 1616 book *An English expositor: teaching the interpretation of the hardest words used in our language* (reprinted in 1971). In 1585 his father had published for John the book *The short sentences of the wyz Cate* in his spelling system.

About 1574, Bullokar started to devise a remedy for the state of English orthography. He did not try to substitute traditional spelling for a phonetic one. Rather, he essentially kept the historical orthography and attempted to indicate the pronunciation by means of diacritical marks above and below the graphemes. However, he did not completely succeed in this and often allowed himself to be influenced by the traditional writing system. He laid down his orthographic system of 37 letters in his *Amendment of orthographie for English speech* of 1580. Bullokar had several of his books printed in his script, namely a collection of fables (*Aesopś fablź*, 1585), as well as his grammatical treatises. His system was, however, too complex to be adopted for English generally. The pronunciation mirrored in his works seems basically to have been that of the London middle class, that is, of Standard English, which lower-class people strove for. On the other hand, Bullokar retained a good many dialectisms and vulgarisms, some of which were imported into the standard language during the 17th century. Bullokar also wrote the first English grammar in English. However, he followed William Lily's *Grammatica Latina* very closely. Still, some of his observations are noteworthy, such as those on phrasal verbs.

See also: English, Early Modern; Spelling Reform.

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Burji *See:* Highland East Cushitic Languages.

Burkina Faso: Language Situation

B Coulibaly

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Burkina Faso is a multilingual and multiethnic country. A distinction must be made between the official language, French, and the national languages. Indeed, the constitution of the Fourth Republic stipulates under Section II, article 35: 'French is the official language. The methods by which the national languages are to be promoted shall be laid down by law.' Among the national languages, there is a distinction between majority languages, which are used as lingua francas, and local, minority languages.

French

French, as stated, is the official language of administration, foreign affairs, the judicial system (Supreme Court and High Court of Justice, etc.), and of formal education (both primary and secondary schools and universities).

French is also the language that allows further access to other foreign languages (mainly English, with German in second place). French is even the means of access to other national languages. It is the 'Strait Gate' through which all desirous of state employment must pass. Thus, French is the language of initial education for most of those who are literate. According to the 1985 census, 73.37% of literate people (i.e., 12.1% of the population) are literate in French.

All this demonstrates just how privileged a position the French language occupies, and it doubtless explains why the national languages are flooded by French expressions. In this respect, no area of lexis is immune. But this influence only concerns lexis: the syntax, phonology, and morphology of the respective languages are not, or hardly, affected. Thus, those who attain mastery of the French language are limited in number. At a rough estimate they make up some 10% of the population. They live mainly in the large towns. The remaining 90% use only the national languages as their means of expression.

The National Languages

The main issues to be considered are the number of national languages, their geographical distribution, the division into language families, and the extent to which people are bi- or multilingual.

How Many National Languages Are There?

Tiedrebeogo and Yago (1983) speak of 60 languages used by a population then estimated at 5 600 000 people. Of these 60 languages, only 36 have been studied linguistically, and 18 are the object of National Subcommissions. The aim of these Subcommissions, under the general direction of the National Commission (set up on January 17, 1969), is to undertake, carry out, and promote the study of the various national languages and to teach adult literacy in them.

The languages concerned are, in alphabetical order: Bisa (Lala: Bisa), Bobo, Bwamu, Cerma, Dagara (Dagara Northern), Fulfulde, Gulmancema (Gourmancéma), Jula, Kar (Karaboro, Eastern), Kasem, Lobiri (Lobi), Lyele (Lyélé), Moore (Mòoré), Nuni, San, Senufo (Sénufo, Senara), Songhai (Songhay), and Tamasheq (Tamasheq, Kidal).

Language Families and Geographical Distribution

The languages found in Burkina Faso mostly belong to three main groups: the Gur languages group or Voltaic group (Moore, Gulmancema, Kasem, Dagara, etc.); the Mande group (Jula, Dafing (also known as Marka), Bobo, San, Bisa) and the West Atlantic group represented by Fulfulde. These three groups correspond to the three language types accepted by Houis as representing the totality of African languages, i.e., the 'economic' type, the type with differentiated morphology, and the intermediate type. The Mande languages are examples of the first type, with their open syllable (CV) structure, productive compound word morphology, lack of nominal classes, etc.; the languages with differentiated morphology are represented by the only West Atlantic language, namely Fulfulde, which has closed syllable structure, nonproductive compound word morphology, extensive nominal classes, etc., and, finally, there are the Gur or Voltaic languages that represent the intermediate type with both open and closed syllable structure, fairly extensive nominal classes, etc. Tiedrebeogo and Yago (1983) list the following as languages used for interethnic communication: Moore, Jula, and Fulfulde. In general terms, Moore is used in the center of the country, Jula in the west, and Fulfulde in the northeast, but each of the three languages extends well beyond these areas and they thus behave, given their general use, as true lingua francas.

Bilingual and Multilingual Areas

According to I. Nacro (*Plurilingualism and education in Africa: a sociolinguistic approach to the situation in Upper Volta, 1984)*, there are four bilingual areas in Burkina Faso:

1. The west is notable for the existence of a whole host of minority languages. Indeed, 71.42% of the national languages are located in this area. This state of affairs has benefited Jula, which is used as a second language by several ethnic groups, such as the Bobo, Bwaba (Bwamu), Senufo, Dagara, Lobiri, Samo, Gouin (Cerma), Turka, Toussian, Siamu (Siamou), etc. Each of these groups automatically uses Jula when unable to communicate with anyone in their native language.
2. The central southern area where Moore is used as a second language by the Bisa.
3. The central northern area where Moore is used as a second language by the Peul.
4. Finally, the north where the Tamasheq and the Bela use Fulfulde as their second language.

The large towns, and especially Ouagadougou and Bobo-Dioulasso, form multilingual areas. Apart from the three languages listed above, French and Bobo (in Bobo-Dioulasso), are spoken there.

For What Purposes Are the Various Languages Used?

Despite the low prestige they enjoy, the national languages are the subject of some attention on the part of the government authorities. Since 1969, a certain number of official measures have been taken and instructions issued in their support. It is worth mentioning the successive setting-up of the DAFS, the ONEPAFS, the INAFA, and the INA; the translation of the national anthem into some 10 languages in 1985; the fact that civil servants are taught to read and write in national languages; the publication of a circular obliging ministers and senior managers to use the national languages for preference when addressing the people at large; the 'Commando' literacy program and the 'Bantaré' program aimed at making 10 000 women literate; and so on.

All these measures will be given concrete expression by the use of the national languages on television and radio, in written materials of all types, in the courts of first instance, and in religious services.

On television The three most widely used languages are employed daily to broadcast news that has already been broadcast in French, to debate certain problems in magazine programs broadcast in the relevant languages, and to give lessons in transcription through courses organized by the officials of the INA.

On radio Some 20 national languages have access to the radio where they are given generous time allocations. They use these to broadcast news and to organize programs containing folktales, proverbs, and riddles, thus encouraging oral literature.

In written and oral literature Oral literature exists in all the languages. It has its own means of preservation and is not dependent on being written down. Written literature is practically nonexistent, however, being limited to a few INA publications, to essays by some authors in the context in the national Grand Prix for Art and Literature (GPNAL), and to religious writings. Nonetheless, it is worth noting the existence of some newspapers that appear at irregular intervals in four of the country's languages, namely Moore, Jula, Fulfulde, and Gulmancema.

In the courts of first instance In these courts, and especially in local arbitration and reconciliation tribunals, all the national languages are used. However, in the large towns, the three majority languages enjoy a privileged position, with the other languages being mainly employed in the villages.

In religious services This area is where the national languages are used the most. The Christians teach their congregations to read and write in these languages. In this context, the SIL (Summer Institute of Linguistics) organizes literacy courses.

Conclusion

In Burkina Faso, several so-called national languages live peacefully side by side with the official language, French. Briefly, the use that the typical citizen of the country makes of languages may be described as follows: the official language is used to communicate with the outside world, while the national languages are devoted to internal purposes.

Language Maps (Appendix 1): Map 2.

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Burma: Language Situation

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First, a note on alternative names. The names of places, ethnolinguistic groups and their languages may in some cases be rendered in English in two ways: one introduced by the Burmese government in 1989 and one in use before then that may still have general currency. Such pairs are separated with an oblique stroke, the older name preceding the newer one, thus: Burma/Myanmar.

Burma, like the entire Southeast Asian region, is an area of extreme linguistic diversity. Most languages indigenous to the territory of the Union of Myanmar (here referred to simply as Burma) belong to the Tibeto-Burman, Tai-Kadai, and Mon-Khmer language families. The task of enumerating the languages spoken in Burma is confounded by three factors that may cause the number of languages to be overestimated or underestimated.

Firstly, there is a general dearth of accurate and up-to-date demographic data describing the population of Burma and the languages they speak. There has never been a formal linguistic survey of the country, and many of the data available are patchy and unreliable, and the speaker numbers presented here include provisional and rough estimates. Secondly, languages and dialects spoken in Burma may be referred to by multiple names, which may be ethnonyms and/or language names, both autonymic and exonymic. Conversely, one name may be used to refer to multiple languages and dialects. Lastly, the perennial problem of how to define distinct languages as opposed to dialects of the same language is frequently encountered in Burma.

The geographical distribution of Burma's languages is obviously a complex affair. In general, the Burmese-speaking Burman/Bamar majority live in the central plains, occupying about half the area of the country, with other languages found in the more mountainous areas nearer the borders in all directions. These areas coincide mostly with the area of the administrative non-Burman States: Arakan/Rakhine, Chin, Kachin, Shan, Karenni/Kayah, Karen/Kayin, and Mon.

The most comprehensive reliable listings of the languages spoken in Burma are Bradley's map of the country in the *Atlas of the world's languages* (Bradley, 1994) and SIL International's *Ethnologue*. The total number of languages spoken in Burma is put at 107 by SIL International. The population of the country has recently been estimated to be approximately 53 million, some 20% more than the figures used by SIL.

In official Burmese government sources, the number of 'national races' in Burma is put at 135. The ethnic groups in this list are often categorized geographically according to the state in which they reside, with no regard for their linguistic relationships. This tally appears to stem from the 1931 British Census of India, and bears little resemblance to the actual ethnolinguistic situation.

Tibeto-Burman Languages

Tibeto-Burman languages are spoken by about four-fifths of the population of Burma.

Burmese is the Tibeto-Burman language with more speakers than all the rest of the Tibeto-Burman languages combined. It is the first language of about two-thirds of the population and is spoken non-natively by several million speakers of other languages. The dialects Arakanese (Arakan/Rakhine State), Tavoyan (Tenasserim/Tanintharyi Division), and Intha (Shan State) may be argued to be separate languages. Other closely related Burmish languages/dialects include Taungyo, Yaw, Hpun, Achang, Lashi, Maru, and Danu.

Languages of the Loloish branch of Tibeto-Burman are spoken in the eastern part of Shan State, including Lisu (roughly 125 000 speakers), Lahu (approximately 125 000 speakers), and Akha (approximately 200 000 speakers).

The western side of Burma is home to the languages in the diverse Kuki-Chin branch of Tibeto-Burman. In northern Arakan/Rakhine State and in Chin State, some two dozen Chin languages are spoken, typically with thousands or tens of thousands of speakers at most: Southern Chin (including Daai, Khumi, Mro, and Asho), Mro, Central Chin (including Haka/Lai and Lushai/Mizo), and Northern Chin (including Tedim, Falam, and Thado).

The languages of northern Burma's Kachin State include languages for which the classification within Tibeto-Burman is disputed or unclear. The half-dozen Nungish languages include Nung and Rawang; the Sal group (comprising Baric and Luish languages and Jinghpaw, or classified alternatively as Jinghpaw-Konyak-Garo) includes languages such as Jinghpaw, Kado, Khienmungan, Chang, and Tase.

About 20 languages of the Karen branch of Tibeto-Burman are found in the areas of eastern Burma bordering Thailand, in Karen/Kayin and Karenni/Kayah States, spoken by 3–4 million people. The larger

languages include Sgaw and Pwo (Pho) (approximately 1.25 million speakers each), Padaung (Kayah) (roughly 300 000 speakers) and Pa'O (approximately 500 000 speakers). Other Karen languages include Yintale, Yinbaw, Paku, Geko, Geba, and Manu.

Mon-Khmer Languages

Mon-Khmer languages account for only about 7% of the population. The major Mon-Khmer language spoken in Burma is Mon, a literary language with a rich history, spoken by some 800 000 in the Mon State in southeastern Burma. Palaungic languages, a part of the Northern branch of Mon-Khmer, are spoken by scattered communities in Shan State and in northern central Burma. The larger of these include Wa, a diverse group of several dozen dialects including Paraok, En, Son, Va, and Vo. Wa and the closely related language Plang are spoken in Shan State by perhaps 600 000–700 000 people. About half that number speak other Palaungic languages: Palaung (Pale, Shwe, and Rumai), Riang, Loi, Samtao, and related dialects.

Tai-Kadai Languages

Burma's Tai-Kadai languages are spoken in the northeastern part of Shan State, with speakers of Shan found also some areas of Kachin State. Tai-Kadai languages account for about one-tenth of the population. The major Tai languages spoken in Shan State are Shan (approximately 6% of the population, over 3 million speakers) and the smaller Tai languages Khamti, Khün, Lü, and Tai Nüa.

Other Languages

As a result of Burma's colonization by the British, some South-Asian Indo-Aryan languages not indigenous to Burma – principally Hindi/Urdu, Bengali, and Panjabi – are spoken, mainly in urban centers. They are the descendants of people brought to Burma as part of the colonial administration established by the British. Chinese is spoken both natively and used as a major lingua franca in areas near the Chinese border, in particular the Kokang area.

In Arakan/Rakhine State, a variety of the Chittagonian dialect of Bengali is spoken by the Muslim Rohingya population, numbering in the hundreds of thousands. The Rohingya's status as Burmese nationals has been problematic; in recent years refugees from Burma have fled to Bangladesh, from where a number have been repatriated to Burma. There are a few thousand speakers of Hmong Njua, a Hmong-Mien language, in the northeast of the country.

Burmese is the official and national language. It is the sole language of all the official business and administration of the military government, including all broadcast media and state education, though there is a state-run University for the Development of National Races, established in 1990, with the aim of training teachers in Kachin, Karenni/Kayah, Sgaw and Po Karen/Kayin, Shan, Mon, Arakanese/Rakhine, and Kachin (possibly meaning Jinghpaw), and Chin (possibly meaning Haka/Lai Chin).

Other languages may be taught as part of political movements associated with a particular ethnic group, for example the Mon-language education system promoted by the New Mon State Party in the 1990s.

The use of English in Burma has been a contentious issue over the last century, when at times Burmese took second place in the education system developed under British Colonial Rule. The status of Burmese was reasserted in the 1930s in connection with nationalist anticolonialist political movements such as the *Dobama a-Si a-Youn*. The status of English was drastically reduced under all-Burmese education policies of the U Ne Win socialist government established in 1962, though the teaching of English has resumed and flourished in the last two decades.

At present, private schools, typically the reserve of relatively wealthy city-dwellers, may provide part of their curriculum in English or in Chinese. Such schools may be a popular choice for parents who want to equip their children for commercial success in the future.

While Burmese remains the language of communication at the national level, a number of languages function as regional lingua francas, such as Arakanese in Arakan/Rakhine State and southern Chin State. Shan, Chinese, and Lahu are all used between speakers of other languages in various parts of Shan State.

It is relatively rare for ethnic Burmans/Bamar to speak languages other than Burmese, but most people whose first language is a language other than Burmese speak Burmese to some degree, and frequently other languages besides. A simple straw poll revealed that a quarter of a group of about 25 speakers of the Mon-Khmer language Wa in Shan State spoke five or more languages in their everyday lives.

Pāli, no longer a living language, remains culturally prominent in Burma as the language of the Buddhist scriptures, which are routinely studied and chanted as part of Buddhist religious practice. Pāli is also an important source of loanwords – typically learned and religious vocabulary – in the written languages with predominantly Buddhist speaker populations, namely Burmese, Mon, and Shan.

Languages spoken in Burma have also borrowed vocabulary from English and from the major languages spoken in the countries neighboring Burma: Chinese, Thai, Bengali, and Hindi.

Of course, many of the languages spoken in areas near Burma's borders with neighboring countries are spoken on both sides of the border by speech communities that may have a common sense of identity despite the political divisions imposed by the border. Examples of such communities are Wa in Burma and China, Karen/Kayin in Burma and Thailand, and Naga in Burma and India.

The general lack of research on Burma's linguistic landscape means that there is an incomplete picture of the extent and scope of language endangerment in Burma. Undoubtedly, certain languages may be losing ground to Burmese or regional languages, or may be losing internal dialectal diversity.

There is a critical need for a systematic language survey of Burma.

See also: Burmese; Endangered Languages; Mon; Multilingualism: Pragmatic Aspects; Wa.

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Burmese

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Introduction

Burmese is the national language of Burma/Myanmar and is the mother tongue of the Burman (Bamar) ethnic majority, who make up approximately two-thirds of Burma's population of slightly over 50 million. The rest of the country's indigenous population is diverse, speaking between 60 and 100 other languages among them, depending on the criteria used to distinguish languages from one another. Most non-Burmans live in the areas near Burma's borders with Thailand, Laos, China, India, and Bangladesh, although many live interspersed with Burmans and speak Burmese and other languages in addition to their native language. Burmese is little spoken outside Burma, but widely dispersed and fragmented communities of Burmese expatriates may be found in Asia and around the world.

Burmese belongs to the Tibeto-Burman language family, which comprises approximately 350 languages spoken across a vast territory stretching from the Himalayas to mainland Southeast Asia. Burmese has by far the largest number of speakers of any of the Tibeto-Burman languages, most of which have only a few thousand speakers and many of which may disappear during the 21st century.

Most of the other languages spoken in Burma also belong to the Tibeto-Burman language family. Some, such as Arakanese (Rakhine), Intha, and Danu, are so similar to Burmese as to be considered by some to be dialects of Burmese rather than separate languages.

History and Script

The Burmese have been in the area of modern Burma/Myanmar from approximately 850 C.E. onward, founding their capital at Pagan (Bagan). Despite extensive contact over the following two centuries with the Pyu, the speakers of a now-dead Tibeto-Burman language that occupied the area, the first inscriptions in Burmese date from the 11th century, with no extant examples of Burmese writing before then. Burmese script is a close cousin of the Mon script, which was adapted from a southern Indian script, a descendant of the Brāhmī script that was the ancestor of many Indic scripts found in South and Southeast Asia. It is thought that the Burmese adapted the script from Mon after Mon scribes were brought to the city of Pagan after the Burmese king Anawratha, in 1057 C.E., defeated the Mon, although this theory has been disputed in recent research.

Aside from the rounding of the originally square characters into the distinctive round-shaped letters of Burmese today, the alphabet has remained largely unchanged to the present day. It is widely believed that the round shapes of Burmese letters evolved because texts were traditionally written on palm leaves, which would split easily if angled shapes were scratched on them. Whether or not this is true, Burmese writing retains its distinctive round shapes, and handwriting with consistent, even circles is praised.

The writing system evolved between the period of the early inscriptions and the 16th century C.E. when it assumed a form similar to its present-day state. The spoken language has changed considerably since that time, with the result that a faithful transliteration of written Burmese (such as the one approved by the American Library Association and the Library of Congress used here) gives little impression of the way letters or words are pronounced in the language today. Sound changes have applied to certain initial consonants. Final consonants have disappeared. A glottal stop is all that remains of final stop consonants, whereas the place contrasts of written final stops are realized as vowel changes in the syllable. Final nasal consonants have been replaced by a parallel series of nasalized vowels. In general, many combinations of symbols are pronounced differently from the sounds represented by the symbols individually.

The phonetic transcription used here is faithful to the principles of the IPA, although several others have been devised. A transliteration and transcription are compared in the following example.

Burmese script	ရုပ်မြင်သံကြား
Transliteration	RUP'MRAṄ'SAṀKRĀ
Transcription	jouʔ.mjìɴ.θàɴ.ʤá
Gloss	picture.see.sound.hear
Translation	'television' (more commonly တီဗီ tì.vì 'T.V.')

Burmese script is basically alphabetic. There are separate symbols to represent consonants (Table 1) and vowels (Table 2), but the symbols are organized in syllabic clusters, which are written from left to right. Within each cluster, however, the symbols do not necessarily appear in left-to-right order. For example, to write the syllable တီ *tì* 'worm,' the vowel ◌ိ *-ì* is placed on top of the consonant တ *t*, but to write တူ *tù* 'nephew,' the ◌ု *ù* must hang below the initial တ *t*. Certain sounds in Burmese, namely affricates, voiceless sonorants, and initial consonant clusters, are written using medial forms of four consonants, shown in Table 3.

Table 1 Consonants of Burmese, transliterated and transcribed

Burmese script					*Tranliteration*					*Transcription*				
က	ခ	ဂ	ဃ	င	K	KH	G	GH	Ṅ	k	k^h	g	g	ŋ
စ	ဆ	ဇ	ဈ	ဉ/ည	C	CH	J	JH	Ñ /ÑÑ	ʨ	$ʨ^h$	ʥ	ʥ	ɲ
ဋ	ဌ	ဍ	ဎ	ဏ	Ṭ	ṬH	Ḍ	ḌH	Ṇ	t	t^h	d	d	n
တ	ထ	ဒ	ဓ	နဉ်	T	TH	D	DH	N	t	t^h	d	d	n
ပ	ဖ	ဗ	ဘ	မ	P	PH	B	BH	M	p	p^h	b	b	m
ယ	ရ	လ	ဝ	သ	Y	R	L	V	S	j	r	l	w	θ
	ဟ	ဠ	အ			H	Ḷ	-			h	l	ʔ	

Table 2 Burmese word-initial and word-internal vowel symbols

Word-initial		*Word-internal*		*Transliteration*	
အ	အာ	◌	◌ာ	A	Ā
အိ	ဣ	◌ိ	◌ီ	I	Ī
အု	ဥ	◌ု	◌ူ	U	Ū
အေ	ဩ	◌ေ	◌ော	E	O

Burmese script has retained the features and symbols needed for writing the South Asian languages for which its parent scripts were originally designed, such as Pāli, the language of the Buddhist scriptures and the source of many loans in Burmese, which can easily be identified because of phonological features such as doubled consonants and retroflex consonants that do not occur in Burmese words. A Pāli phrase and its rendition in Burmese are shown next.

Burmese script	ဗုဒ္ဓံသရဏံဂစ္ဆामိ
Transliteration	BUDDHAṀ SARANAṀ GACCHĀMI
Transcription	bouʔdàɴ θəɹənàɴ gjiʔs^{h}àmḭ
	'I go to the Buddha for refuge'

Phonetics and Phonology

Some of the sounds used in Burmese are considered unusual because they occur relatively rarely in the world's languages. These are the so-called voiceless nasals, which include the sound of air escaping through the nose. The Burmese word for ရင်းနှီးမြှုပ်နှံမှု jíɴ.n̥ì. m̥jouʔ.n̥àɴ.m̥ũ 'investment' contains examples of two such sounds: /m̥/ and /n̥/. The consonants in Burmese are set out in Table 4.

For reasons of historical phonology, vowels in orthographically open syllables (Table 5), which are written with no final consonant letter, can be distinguished from those found in orthographically closed syllables (Table 6) namely those ending in a glottal stop or with a nasal vowel (transcribed here with /ɴ/, which does not represent a final nasal consonant), both of which are written as final consonant letters in the writing system.

Like the majority of the languages spoken in mainland East and Southeast Asia, Burmese is a tone language. The tonal contrasts involve not only the commonly observed differences in pitch and vowel length but also differences in phonation type – whether the voice is breathy or sharp in character. The presence or absence of a glottal stop at the end of the syllable may also considered to be part of the tonal system. Table 7 gives a basic description of the tonal contrasts on a syllable consisting of a bilabial nasal and an open vowel.

Table 3 Medial forms of Burmese consonants

Initial	*Medial*	*Burmese*	*Transcription*	*Pronunciation*	*Gloss*
ယ	ျ	များ	MYĀ"	mjá	'many'
		ကျား	KYĀ"	tɕá	'tiger'
ရ	ြ	မြန်မာ	MRAN'MĀ"	mjàɴmà	'Burma/Myanmar'
		ခြောက်	KHROK'	tɕʰ auʔ	'dry'
ဝ	ွ	လွယ်	LVAY'	lwɛ̀	'easy'
		နွား	NVĀ"	nwá	'cow'
ဟ	ှ	မှာ	MHĀ"	m̥à	'order'
		ရှုံ့	RVHAṀ'	ʃṵɴ	'mud'
Words may be spelled with a maximum of three medial consonants:					
		အမြှာ	AMRVHĀ	ʔəm̥wà	'segment'

Table 4 The consonants of Burmese

	Bilabial	*Dental*	*Alveolar*	*Postalveloar*	*Palatal*	*Velar*	*Glottal*
Stop	p pʰ b		t tʰ d	tɕ tɕʰ dʑ		k kʰ g	ʔ
Nasal	m m̥		n n̥		ɲ ɲ̥	ŋ ŋ̥	
Fricative		θ ð	s sʰ z	ʃ			h
Approximant	w ʍ		(ɹ)		j		
Lateral			l ɬ				

Burmese morphemes in phrases and compounds display varying degrees of phonological juncture, principally voicing assimilation and reduction of the first syllable, as shown in the following examples.

- Voicing assimilation on internal morpheme boundaries in compounds.

ပန်း + ခြံ > ပန်းခြံ	pán + tɕʰàɴ > pándʑàɴ	'flower' + 'enclosure' > 'garden'
စား + ပွဲ > စားပွဲ	sá + pwɛ́ > sábwɛ́	'eat' + 'event' > 'feast'
မြင် + တယ် > မြင်တယ်	mjìɴ + tɛ̀ > mjìɴdɛ̀	'see' + REALIS > 'sees/saw'

- Reduction of first element in compounds.

ခါ + ပိုက် > ခါးပိုက်	kʰá + paiʔ > gəbaiʔ	waist + carry > 'pocket'
စား + ပွဲ > စားပွဲ	sá + pwɛ́ > zəbwɛ́	eat + event > 'table'

Table 5 Vowels of Burmese in orthographically open syllables

Vowel	*Lowe tone*		*High tone*		*Creaky tone*	
/i/	ဣ	ì	ဣ။	í	ဣ	ḭ
/e/	ေ–	è	ေ–။	é	ေ–	ḛ
/ɛ/	–ယ်	ɛ̀	––ိ	ɛ́	––ိ	ɛ̰
/a/	–ာ	á	–ာ။	á	–	a̰
/ɔ/	ေ–ာ်	ɔ̀	ေ–ာ	ɔ́	ေ–ာ့	ɔ̰
/o/	–ို	ò	–ို။	ó	–ို့	o̰
/u/	–ု	ù	–ု။	ú	–ု	ṵ

Morphology

Morphemes in Burmese are predominantly monosyllabic. With the exception of Indo-European loans, typically from Pali or English, compounding is the major source of polymorphemic words. In the television example above, four morphemes (N + V) (N + V) combine to form a noun.

Derivational morphology by prefixation is common, in particular noun-formation from verbs using the prefix အ-ʔə-.

ပြိုင်ဆိုင် > အပြိုင်အဆိုင်	pjàɪnsʰàɪn > ʔəpjàɪn ʔəsʰàɪn	compete > competition
ရောင်း / ဝယ် > အရောင်းအဝယ်	jáʊn / wɛ̀ > ʔəjáʊn ʔəwɛ̀	sell / buy > trade

The verbal complex, typcially occurring at the end of a Burmese sentence, may comprise one or more head verbs in series followed by a string of auxiliary verbs, verbal particles, and markers.

NP	NP	VP
ခေတ်မီဈေးတွေ	ဟိုတယ်တွေ	ဖြစ်ပေါ်လာစေပြန်ပါတယ်။
kʰiʔm̰ì. zé.dwè	hòtɛ̀.dwè	pʰjiʔ.pɔ̀. là. zè.bjàɪn.bà.dɛ̀

Table 6 Vowels of Burmese in orthographically closed syllables: killed tone or nasal vowel

Vowel	*Nasal vowel*						*Killed tone*	
	Low tone		*High tone*		*Creaky tone*			
/i/	–င်	ìɪn	–င်။	ínɪn	–င့်	ḭɪn	–စ်	iʔ
/e/	–ိန်	èɪn	–ိန်။	éɪn	–ိန့်	ḛɪn	–တ်	eiʔ
/ɛ/							–က်	ɛʔ
/ai/	–ိုင်	àɪn	–ိုင်။	áɪn	–ိုင့်	a̰ɪn	–ိုက်	aiʔ
/a/	–ိ	àn	–နှ်။	án	–နှ့်	a̰n	–တ်	aʔ
/au/	ေ–ာင်	àʊn	ေ–ာင်။	áʊn	ေ–ာင့်	a̰ʊn	ေ–ာက်	auʔ
/ou/	–ုန်	òʊn	–ုန်။	óʊn	–ုန့်	o̰ʊn	–ုတ်	ouʔ
/u/	–ုန်	ùn	–ုန်။	ún	–ုန့်	ḭn	–ုတ်	uʔ

Table 7 Burmese tones

Tone name	*IPA*	*Burmese script*	*Description*
Low	[mɑː]	မာ	long, low
High	[mɑ́ː]	မား	long, high; sometimes breathy
Creaky	[mɑ̰]	မ / မာ့	short, high, with creaky phonation
Killed	[mɑ̰ʔ]	မတ်	short, high, with final glottal stop

[a]Syllables with one of these tones may in some contexts become reduced to a short, unstressed schwa which is counted as a fifth tonal category in some analyses.

modern.market.PL hotel.PL become emerge.begin.
CAUS.also.
POLITE.REALIS
'. . . caused modern markets and hotels to begin to appear as well'

Burmese has a system of noun case markers, which in many contexts are not obligatorily present, and postpositions, as illustrated next.

ဦးဘက	မန္တလေးကို	အမေနဲ့	သွားတယ်။
ʔú.ba˺.ga˺	mə́ndəlé.gò	ʔəmè.nɛ̰	θwá.dɛ̀
U Ba.SUBJ	Mandalay.to	mother.with	go.REALIS

Burmese, like other languages of the region, encodes power and solidarity in personal relationships using a rich system of pronouns and forms of address. Pronouns may be true pronouns, such as ငါ ŋà 1SING 'I' and နင် nìN 2SING 'you' (both familiar, not polite), or grammaticalized from other sources, such as ကျွန်တော် tɕɔnɔ̀ 1SING (male, polite; literally 'royal slave'). Other forms of address include titles, personal relationships, and names or a combination of all three, such as ဆရာမဒေါ်ခင်ခင်ချော sʰəjáma˺. dɔ̀.kʰì nkʰìntɕʰɔ́ 'Teacher (FEM) Aunt (= Mrs.) Khin Khin Chaw.'

Literacy and Literary Burmese

The literacy rate in Burma has often been said to be high compared to other countries in the region, but accurate data are extremely difficult to obtain. One recent source suggests that nearly 80% of Burmese people over the age of 15 are literate, but other sources have put the figure much lower.

The Burmese language exists in a colloquial style used in spoken informal contexts and a literary style used in official formal settings. The main difference between the two is that they have separate sets of grammar words and some other vocabulary. A colloquial-style sentence is compared to its literary-style equivalent in the next example.

Spoken	ဦးဘက	မန္တလေးကို	အမေနဲ့	လာတယ်။
	ʔú.ba˺.ga˺	mə́ndəlé.gò	ʔəmè.nɛ̰	là.dɛ̀
Literary	ဦးဘသည်	မန္တလေးသို့	အမေနှင့်	လာ၏။
	ʔú.ba˺.ðì	mə́ndəlé.ðo̰	ʔəmè.n̥ḭN	là.ʔḭ
	U Ba.SUBJ	Mandalay.to	mother.with	come.
				REALIS

'U Ba came to Mandalay with his mother'

Given the large number of speakers of Burmese and the existence of a large diaspora community scattered around the world, Burmese has an inevitable presence on the Web, although at the time of writing standardized encoding has yet to be widely adopted and so text is usually displayed on the Internet as graphics. For ease of use, computer users often render Burmese in romanized form in Internet chat rooms or e-mail.

See also: Burma: Language Situation; Sino-Tibetan Languages; Sino-Tibetan Languages; Sino-Tibetan Languages.

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Burnett, James, Monboddo, Lord (1714–1799)

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James Burnett, born in Monboddo in Scotland on October 14, 1714, was a judge, classics scholar, and a Scottish Enlightenment philosopher. After a classical education, Burnett studied law and eventually became a judge, Lord of Session, taking the title Lord Monboddo, in 1767 and remained in this post until his death on May 26, 1799. An eccentric and controversial figure, Monboddo was not afraid to expound unpopular views, both on the bench and in his scholarship, especially as a member of the Select Society of Edinburgh, a group of prominent citizens that gathered weekly to share ideas that included David Hume and Adam Smith (*see* **Smith, Adam (1723–1790)**) among others. In his two anonymously published six-volume works, *Of the progress and origin of language* (OPL) (1773–1792) and *Antient metaphysics* (AM) (1779–1792), he opposed Locke's popular empiricism, favoring the idealist metaphysics and authority of the ancient Greeks, especially Aristotle.

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See also: Harris, James (1709–1780); Herder, Johann Gottfried (1744–1803); Jones, William, Sir (1746–1794); Locke, John (1632–1704); Origin and Evolution of Language; Smith, Adam (1723–1790).

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Burrow, Thomas (1909–1986)

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Thomas Burrow was born on June 29, 1909 in the Lancashire village of Leck. He studied classics at Cambridge University. He became interested in Sanskrit through a course in comparative philology and received his Ph.D. for his studies on the Kharosthi documents from Chinese Turkestan (now Xinjiang, land of the Uighur people). In 1944 he was appointed to the Boden Chair in Sanskrit at Oxford. He retired in 1976 and died 10 years later.

Burrow's first book on the Kharosthi documents analyzes them as related to a Prakrit of Northwest India, now in the Peshawar region. He provides a grammar of the language and a combined index and vocabulary. Burrow's work in Sanskrit itself is well represented by *The Sanskrit language* (1955, 1966, 1973). Burrow's focus here is the description of Sanskrit in its relation to Indo-European. He masterfully lays out the Indo-European neighbors of the language and their overlapping characteristics, quoting at the beginning the famous words of Sir William Jones in his address to the Royal Asiatic Society of Bengal in 1786: "The Sanscrit language, whatever be its antiquity, is of wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either . . .". Burrow writes of Sanskrit as "a form of language which in most respects is more archaic and less altered from original Indo-European than any other member of the family." He emphasizes that the importance of Sanskrit grammarians is unequalled anywhere in the world, and that Panini's work regulated the language of the classical literature in the language "to the last detail."

In the 1960s, Burrow, with Murray B. Emeneau, made a signal contribution to the study of the other great language family of India, Dravidian. Their *Dravidian etymological dictionary* (DED) first appeared in 1961. It has been called a landmark event in Dravidian linguistics. Data from almost 30 languages are taken into account. The dictionary itself runs to some 500 pages. There are indexes of Dravidian, Indo-Aryan, Munda and other languages, including Hobson-Jobson. There is also an index of English meanings and of flora. The dictionary does not contain proto-Dravidian reconstructions – Burrow and Emeneau decided that the time required was not warranted by the state of Dravidian studies at the time.

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See also: Caldwell, Robert (1814–1891); Emeneau, Murray Barnson (b. 1904); Jones, William, Sir (1746–1794); Panini; Sanskrit.

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Burundi: Language Situation

Editorial Team

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Burundi lies surrounded by the Democratic Republic of the Congo in the east, Rwanda in the north, and Tanzania in the east. In the southwest, Burundi borders Lake Tanganyika. The comparatively small country has about 6.2 million inhabitants divided into three main ethnic groups: Hutus (approx. 85%), Tutsis (approx. 14%), and Twa (1%). The Twa pygmies are an original hunter-gatherer community and are now mainly engaged in hunting, pottery, and ironworking. They are assumed to be the original inhabitants of the area, with Hutus and Tutsis arriving later. The Urundi kingdom became part of German East Africa in 1890, together with the neighboring Rwanda. After World War I both territories were administered by Belgium under a League of Nations mandate. In 1962 Burundi became an independent kingdom, and in 1966, after the overthrow of the monarchy, a republic. Burundi has a long history of suffering from internal unrest and ethnic violence brought about by conflicts between Hutus and Tutsis. Ironically, the country is a counter-example to the claim that monolingualism brings internal stability, as all ethnic groups in Burundi speak one language, Rundi.

Rundi (Kirundi) is a Bantu language closely related to Kinyarwanda, the language of Rwanda, as well as to Ha of Tanzania. All three are largely mutually intelligible, although the varieties are distinct enough to serve for ethnic and national identification. Within Burundi, Hutus, Tutsis, and Twas speak different dialects of Rundi. The last two groups are assumed to be originally speakers of non-Bantu languages, and to have shifted to Rundi. Communities of Rundi speakers, including refugees, are also found in Rwanda, Uganda, and Tanzania. In addition to Rundi, the former colonial language, French, is used in Burundi, especially for formal and official purposes, in education, and for international communication. Both Rundi and French are official languages. The third important language in Burundi is Swahili, which is spoken by the Muslim, Asian, and Congolese communities, as well as a contact language by others, mainly in the capital, Bujumbura, and along Lake Tanganyika.

See also: Rwanda: Language Situation; Tanzania: Language Situation.

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Burushaski

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Burushaski is a language isolate spoken in the Northern Areas, Pakistan, primarily in the Hunza, Nagar, and, Yasin valleys. A small enclave of Burushaski speakers is also found over the border in Kashmir, India. The Hunza and Nagar varieties differ only minorly from each other; both stand at a relative distance from the Yasin variety of Burushaski, sometimes also considered to be a close sister language, Werchikwar.

There are approximately 80 000 speakers of Burushaski, including somewhere in the area of 15 000–20 000 people speaking the Yasin dialect, with an additional 20 000–30 000 speakers of both Hunza Burushaski and Nagar Burushaski. In all communities where Burushaski is spoken, the language remains vital, with many women and children still monolingual speakers.

The first comprehensive study of Burushaski was Lorimer (1935–1938). The most recent is Berger's three-volume grammar, dictionary, and text collection (1998).

Bilingualism among Burushaski speakers is common primarily in the two Dardic Indo–European languages Shina (Nagar Burushaski speakers) and Khowar (the Burusho of Yasin valley). In Hunza, especially in the village of Mominabad, the Indo–Aryan-speaking Dúumaki (Domaaki) live in close contact with Burushaski speakers; nearly all Dúumaki speakers appear to be bilingual in Burushaski. Burushaski itself may have previously been spoken in a wider area than it is currently found: for example, in Dras, in Baltistan, there is a group of people known as the Brokpa or Brusa; also, in Ponjal, there are the so-called Burushken, who are now Shina speaking.

Burushaski has a basic five-vowel system, with two series of contrastive long vowels, alternatively bearing stress or higher pitch on the first or second mora, respectively:

(1)	i	íi	íí			u	úu	uú
	e	ée	eé			o	óo	oó
				a	áa	aá		

There is some dispute among Burushaski specialists as to the exact nature of these long vowels. Varma (1941: 133) described the suprasegmental or intonational contrasts of Burushaski long vowels as representing a rising and falling tone; modern investigators, however, e.g., Tiffou (1993), Berger (1998), and Morin and Tiffou (1989), considered this to be a difference of moraic stress: that is, Burushaski long vowels may receive stress on either the first mora or the second, corresponding to Varma's falling and rising tones, respectively. These phenomena are phonemic in Burushaski. A comprehensive instrumental analysis of Burushaski vocalism remains to be done. A lowered pitch on the first mora is sometimes heard with the former (initial-mora prominent) forms. (Note that expressive diminutives are generally associated with this intonational pattern, e.g., *šon* 'blind' vs. *šóon* 'somewhat blind' or *ṭak* 'attached' vs. *ṭáak* 'somewhat attached.') Yasin exhibits the same intonational phenomena as the standard Hunza and Nagar varieties, although the moraic stress difference seems to be less pronounced, and in some speakers, this contrast has been neutralized.

Examples of phonemic vowel contrasts in Burushaski include *bat* 'flat stone' vs. *baát* 'porridge' (as in *bras-e baát* 'cooked rice,' *aalu-e baát* 'mashed potatoes'); *ḍir* 'boundary, water ditch between fields, small irrigation canal; hostility' vs. *ḍíir* 'overhanging rock'; *ɣun* 'wooden block in door lock, stocks (for prisoner)' vs. *ɣúun* 'quail'; *men* 'who' vs. *meén* 'old, venerable; fallow field'; *gon* 'dawn' vs. *goón* 'like, as.' Note that these length contrasts only appear in stressed syllables in Burushaski.

Three-way contrasts between short, first-mora-prominent, and second-mora-prominent vowels are found in a small number of lexical items in Burushaski. Such triplets include *bo* 'grain, seed, sperm/semen' vs. *bóo et-* 'low, bellow' vs. *boó* (cf. *nupáu* ~ *nupoón* in the converb form) 'sit down, lower self,' *don* 'large herd' vs. *dóon* (~*dóon ke*) 'still, yet, nevertheless' vs. *doón* 'woman's head scarf; open' (Berger, 1998: vol. 3, pp. 121–122). Two-way length contrasts, such as *báak* 'punishment, torture' vs. *baák* 'generosity' are relatively common.

Burushaski has an extensive system of consonants. In fact, there are eight different stop/affricate series attested in the language. This includes labial, dental, alveolar, retroflex, palatal, palatal-retroflex, velar, and uvular. All of these series may be found in voiceless unaspirated, voiceless aspirated, and voiced series (see Table 1).

Table 1 The consonantal inventory of Burushaski

p	t	c	ṭ	č	c̣	k	q	
p^h	t^h	c^h	$ṭ^h$	$č^h$	$c̣^h$	k^h	q^h	
b	d	z	ḍ	ǰ	ǰ̣	g	ɣ	
(f)[a]		s		š	ṣ	(x)[a]		h
m	n					ŋ		
w				y	y̧			
	l	r						

[a][f] and [x] occur only in loan words, or as a variant of the aspirated stops [pʰ] and [qʰ] or [kʰ], respectively.

Table 2 Plural formation in Burushaski

Singular	*Plural*	
hal	*hal-ǰó*	'fox'
ǰiip	*ǰiip-uc*	'jeep'
ɣus	*ɣuš-oŋo*	'earthen clump'
čonč	*čonč-iŋ*	'summit, peak'
-ɣarum	*ɣarum-iŋ* ~ *ɣarim-iŋ*	'part'
gírkis	*girkič-o*	'rat'
ɣurkun	*ɣurkuy-o*	'frog'
ɣurkuc	*ɣurkuč-o*	'frog' (Nagar)
ašaáto	*ašaátu-tiŋ*	'weak(ling)'
ɣat-enč̣	*ɣat-aŋ*	'sword'

While retroflexion is common throughout the languages of south Asia, Burushaski has one of the largest inventories of nonsonorant retroflex sounds among the languages of the region, with no fewer than seven such sounds. In addition, the Hunza and Nagar varieties possess a curious retroflex, a spirantized palatal, symbolized /ɣ̱/, with a range of local or idiolectal realizations. This sound is lacking in the Yasin Burushaski dialect.

Burushaski possesses four noun classes, based on real-world semantic categorization. Thus, male humans belong to class I, female humans to class II, nonhuman animates to class III and inanimates to class IV (2). These classes are formally realized not in the noun themselves but through the selection of case allomorphs and verb agreement morphology.

(2) I: male human — II: female human
hir 'man' — *dasín* 'girl'
III: animate nonhuman — IV: inanimate
haɣúr 'horse' — *ɣaténč̣* 'sword'

Another salient feature of the nominal system of Burushaski is the wide range of plural formations attested in the language. There are literally dozens of plural markers in the language, each often found with only a small number of nouns. Sometimes these are found only with nouns of a particular class but others crosscut this categorization (see Table 2).

Burushaski has a highly developed system of grammatical and instrumental cases as well as an elaborate system of local/directional cases and instrumental/comitative cases (see Table 3). The exact number is difficult to determine as new elements enter this system through the grammaticalization (and phonological fusion) of relational nouns/postpositions. There are at least the following grammatical cases (i.e., ones assigned by structural position or verbal subcategorization): ergative, genitive, dative, ablative. In the latter two instances with class II nouns, the cases are built off the genitive (or oblique) stem.

Numerals agree in class with their nominal complement in class in Burushaski (note class-I and class-III are conflated here; see Table 4). Numbers 20 and above are based on a clear vigesimal system, 30 literally being '20–10' and 40 being (etymologically) '2–20.' etc.

(3) *aalter(an)* 20 — *aalter toorumo* 30
aaltuwalter 40 — *aaltuwalter toorumo* 50
iiski aalter 60 — *iiski aalter toorumo* 70
waalti aalter(an) 80 — *waalti aalter toorumo* 90 — *t^{h}a* 100

The verbal system of Burushaski stands out for its morphological complexity among south Asian languages. There are two basic sets of inflections, depending in part on the stem allomorph. These two broad categories are as follows:

(4)

I	II
past	future
perfect	present
pluperfect	imperfect
aorist (conative)	

The maximal template of the Burushaski simplex verb is given by Tikkanen (1995: 91) as:

(5)

NEG-	D-	PERSON/CLASS/NUMBER-	CAUS-	√-
–4	–3	–2	–1	Ø
	PL.SUBJ-	DUR-	1SG.SUBJ-	
	+1	+2	+3	

PRTCPL/OPT/COND/AUX-	SUBJ.SFX-	Q
+4	+5	+6

Some examples of verbs reflecting this template are given in (6). Note the curious and morphologically triggered (and phonologically unmotivated) devoicing of obstruents following the negative allomorph *a-* (but not *oó-*).

(6)

oó-min-im-i	*oó-man-um-an*
NEG-drink-AP-I	NEG.PL-become-AP-PL
'he didn't drink (it)'	'they didn't become'
(Berger, 1998: 106)	(Berger, 1998: 106)
a-túru-m-i	*duróo-m-i*
NEG-work-AP-I	work-AP-I
'he didn't work'	'he worked'
(Berger, 1998: 105)	(Berger, 1998: 105)
a-mí-kač-ič-a-i	*mi-k^{h}áč-iča-i*
NEG–1PL-enclose-DUR-AUX-I	1PL-enclose-DUR-AUX-I
'he doesn't enclose us'	'he encloses us'
(Berger, 1998: 105)	(Berger, 1998: 105)
a-tu-ququ-m-i	*du-q^{h}óqu-m-i*
NEG-D-be.confused-AP-I	D-be.confused-AP-I
'he was not confused'	'he was confused'
(Berger, 1998: 105)	(Berger, 1998: 105)

In addition to subject and direct/indirect objects, the Burushaski verb may also optionally encode an

Table 3 Case forms in Burushaski

	'man' [I]	*'woman' [II]*	*'horse' [III]*	*'sword' [IV]*
Grammatical cases				
NOM/ABS	*hir*	*gus*	*haɣur*	*ɣatenč*
ERG	*hir-e*	*gus-e*	*haɣur-e*	*ɣatenč-e*
GEN	*hir-e*	*gus-mu*	*haɣur-e*	*ɣatenč-e*
OBLQ.stem	*hir-*	*gusmu-*	*haɣur-*	*ɣatenč-*
DAT	*hir-ar*	*gusmu-r*	*haɣur-ar*	*ɣatenč-ar*
ABL	*hir-cum*	*gusmu-cum*	*haɣur-cum*	*ɣatenč-cum*
Local-Directional Cases				
gus-mu-ṭe				
woman-II.OBLQ-SUPERESS				
'on the woman'				
ǰakun	*un-ale*	*bi-m*		
donkey	you-ADESS	be-III.AP		
'the donkey was near you'				
e-ṣ̌-aṭum				
I-neck-SUPERABL				
'from on his neck'				
Instrumental/Comitative Cases				
uskó	*yáṭ-umuc-aŋe*	*hin*	*jinzaat-an*	
three	head-PL-INSTR.B	one.I	demon-SG.ART	
'a three-headed demon'				
day-o-k	*d-I*			
stone-PL-INSTR	hit			
'pelt with stones'				
-me-ke	*gaṭ*			
tooth-INSTR	bite			
'bite with teeth'				
ǰmé-k	*d-I*			
bow-INSTR	hit			
'shoot with bow'				
ǰamé-k-aṭe	*bišá-*			
bow-INSTR-SUPERESS	throw			
'shoot with bow'				

animate possessor of a logical argument as an argument morphologically in the verb-word (7).

(7a) *k^{h}ak^{h}áay-umuc* *p^{h}aṣ̌ú* *mée-t-aa*
walnut-PL gobble.up 1PL-AUX-2
'you gobbled up our walnuts' (Berger, 1998: 162)

(7b) *hiles-e* *dasin-mo* *mo-miṣ* *moo-skarc-im-i*
boy-ERG girl-GEN II-finger II-cut-AP-I
'the boy cut off the girl's finger' (Willson, 1990: 5)

Another characteristic feature of the Burushaski verbal system is the grammaticalized use of double argument indexing with intransitive verbs. This single vs. double marking appears within two separate functional subsystems. In the first one, presence vs. absence of double marking implies degree of control of the subject over the action: less control is indexed through double marking (8a). In the second such subsystem, class-IV nouns receive single marking while class-III nouns receive double marking with the same predicate (8b).

(8a) *ɣurc-ím-i*
sink-AP-I
'he dove under' (Berger, 1998: 118)
i-ɣúrc-im-i
I-sink-AP-I
'he drowned' (Berger, 1998: 118)

(8b) *ha* *ɣulú-m-i*
house burn-AP-IV
'the house burned' (Berger, 1998: 118)
hun *i-ɣúl-im-i*
wood III-burn-AP-III
'the wood burned' (Berger, 1998: 118)

Syntactically, Burushaski is a fairly rigid SOV language. In narrative texts, head-tail linkage, a common narrative device among south Asian languages, is frequently found (clauses are linked by rote repetition of the finite verb of a preceding sentence in a nonfinite form in an immediately following sentence). Further, some cases appear only on the leftmost of two (conjunctively or disjunctively) conjoined nouns, while others appear on both. There thus appear to be both phrasal and word-level case forms in Burushaski.

Table 4 Numerals

	I/III	*II*	*IV*
1	*hin*	*han*	*hi(k)*
2	*aaltan*	*aala/aalto*	*aalti/aalto*
3	*iisken*	*usko*	*iiski*
4	*waalto*	*waalto*	*waal(ti)*
5	*cundo*	*cundo*	*cindi*
6	*mišindo*	*mišindo*	*mišin(di)*
7	*talo*	*talo*	*tale*
8	*aaltambo*	*aaltambo*	*aaltam(bi)*
9	*hunčo*	*hunčo*	*hunti*
10	*toorumo*	*toorumo*	*toorimi*
11	*turma hin*	*turma han*	*turma hik*

A further curious aspect of Yasin Burushaski is the highly atypical semantic (plural) agreement seen with **dis**junctively conjoined NPs (Anderson and Eggert, 2001). Most of these features can be seen in the following examples.

(9a) *gus* *ya* *hir-e* *dasen* *a-mu-yeec-en*
woman or man-ERG girl NEG-II-see-PL
'the woman or the man didn't see the girl'
(Anderson *et al.*, 1998)

(9b) *hir* *ya* *guse-e* *dasen* *a-mu-yeec-en*
man or woman-ERG girl NEG-II-see-PL
'the man or the woman didn't see the girl'
(Anderson *et al.*, 1998)

Another characteristic feature of Burushaski syntax is the extensive use of case forms to mark a wide range of subordinate clause functions (Anderson, 2002).

(10) *ma* *ma-ír-áṭe* *ǰe* *taŋ*
y'all 2PL-die-SUPERESS *I* sad
a-máy-a-m
1-become.dur-1-AP
'when you all die I will be sad'
(Berger, 1998: 140)

Burushaski includes loans from a range of local languages including Urdu, Khowar, Shina, and even (perhaps indirectly) from Turkic languages as well. In some instances, loan affixes may be found as well, e.g., *ḍaḍaŋ-ci* 'big-drum drummer' (Berger, 1998: 209). More tenuous lexical connections have been proposed with Northeast Caucasian languages and Paleo–Balkanic Indo–European languages (Casule, 1998).

There is a small body of indigenous literature in Burushaski written in a modified Urdu script. In addition, various texts in transcription have appeared, including Skyhawk *et al.* (1996), Skyhawk (2003), etc.

See also: Pakistan: Language Situation.

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C

Çabej, Eqrem (1908–1980)

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Eqrem Çabej was born in Gjirokastra (at that time Turkey) on August 6, 1908, and died on August 13, 1980, in Tirana (Albania). He received his elementary education in the place of his birth and then was sent to Austria to attend a high school at Klagenfurt. Subsequently, he went to Graz and Vienna to study comparative Indo-European linguistics and Albanian philology. In 1933, he defended his doctoral dissertation 'Italoalbanische Studien' before the commission of Paul Kretschmer and Norbert Jokl. After graduating from Vienna University, he worked as a teacher of Albanian in secondary schools and other educational institutions, first in Gjirokastra and then in Shkodër. Spending the interwar period in Italy, which occupied Albania, Çabej studied archival documents from the Albanian past preserved there in libraries. After the end of World War II, when a two-year Pedagogical Institute in Gjirokastra had been created in 1946, he was nominated a 'pedagogue' in linguistics and Albanology. In 1947, he became a member of the Institute of Sciences, and in 1957 he was offered a professorial position at Tirana University. For some years he worked in the Institute of Language and Literature, and when the Academy of Sciences was formed, he was elected a member of its presidium. In 1959, Çabej defended a thesis on 'Some aspects of historical phonetics of Albanian in the light of the language of Gjon Buzuku' [*Disa aspektë të fonetikës historike të shqipes në dritën e gjuhës së Gjon Buzukut*], securing him the degree 'candidate of philological sciences'; and, in the same year, he was given the title 'professor' for his theoretical and practical achievements. He had also prepared a dissertation for a doctor's degree devoted to 'Etymological studies in the domain of Albanian' [*Studime etimologjike në fus hë të shqipes*], but, meanwhile, this degree was abolished. Etymology and history of language were the domains in which he worked until the last days of his life, taking part in all professional sessions of national and international character, in Albania and other research centers of the Balkans and of central Europe, and publishing in journals all over the world.

The scientific activity of E. Çabej embraces two phases. In the first phase, 1929–1945, he was a philologist, folklorist, dialectologist, and ethnographer; in the second, 1945–1980, the focus of his interest shifted to linguistics, etymology and historical phonetics, lexicology, and lexicography. Çabej's first step in describing his own native language in terms of comparative linguistics was a dissertation devoted to Italian and Albanian, a copy of which is available in Vienna University. He paid particular attention to the roots and the place of Albanian in the Balkans. His chrestomathy for high school pupils, 'Elements of linguistics and Albanian literature' [*Elemente të gjuhësisë e të literaturës shqipe*] (1936), comprised in addition to literary texts knowledge related to linguistic classifications and the distribution of Albanian dialects. In it he defended his hypothesis concerning the Illyrian ancestry of his native tongue, exploiting the opinions of philosophers such as G. W. Leibniz, J. E. Thunmann, and J. P. Fallmerayer, and linguists such as G. Meyer and F. X. von Miklosic, as well as P. Kretschmer and N. Jokl. His next monograph, 'On the genesis of Albanian literature' [*Për gjenezën e literaturës shqipe*] (1939), is characterized by its etymological explorations of ethnonyms: *Arbën*, *Arbër*, *Arbëresh*, and the first historical periodization of Albanian literature. Between 1935 and 1942, Çabej published several works from linguistics, folkloristics, and mythology, chiefly in *Revue internationale des études balkaniques*, *Knjige o Balkanu*, and *Leipziger Vierteljahresschrift für Südosteuropa*. In the 1940s, he collaborated with *Hrvatska Enciklopedija* (1941) and later prepared 'The linguistic Atlas of Albanian' (1943). Decisive for Çabej's linguistic reorientation was the study of the 'Missal of Gjon Buzuku' (*Meshari i Gjon Buzukut*) from 1555, preserved in the Vatican Library. The results of his studies of this translation of the Catholic missal and his acquaintance with texts of other Albanian authors led him to write both a series of articles from historical morphology and phonetics published in the *Bulletin*

for Social Sciences at Tirana and a critical edition of the work of Gjon Buzuku (1968) with philological elaboration and explanation throwing light on literary traditions of earlier times. On the basis of constatations included in his earlier works he wrote a treatise 'On some basic problems of the ancient history of Albanian' which had been translated into Italian, French, and English. In some other articles published for international organizations Çabej pointed to the role of Albanian in relation to historically cognate and geographically adjacent languages. The results of his historical studies are reflected in two monographs edited as textbooks for students of Albanian language and literature, 'Introduction to the history of Albanian' and 'Historical phonetics of Albanian' (published in one volume in 1970).

The core of numerous publications of the 1960s and 1970s, however, was Çabej's answers to unresolved questions: whether Albanians are descendants of Illyrians and whether they had always lived in the territories they occupy at present. He provided counterarguments to the claims of G. L. Weigand and other researchers regarding the non-autochthon character of Albanians. Çabej's studies on agricultural terminology beginning in antiquity show the sedentary character of the Albanian tribes.

Opus vitae of Çabej are his 'Etymological studies in the domain of Albanian' (*Studime etimologjike në fushë të shqipes*), discussed and interpreted successively in parts between 1969 and 1979. With his historical experience he has contributed decisively to the codification and standardization of the Albanian language while taking part on editorial boards of practically all dictionaries, both monolingual and multilingual, published in Albania after the War as well as in working groups concerned with orthography, including the Congress of 1972.

See also: Albanian; Leibniz, Gottfried Wilhelm (1646–1716); Miklošič, Franc (1813–1891).

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Cacaopera *See:* Misumalpan.

Caddoan Languages

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Caddoan is a family of North American language consisting of two branches: Caddo, formerly spoken in Texas and Louisiana, and now spoken only in Oklahoma; and North Caddoan, found in the central Plains from Oklahoma to North Dakota. The North Caddoan languages include Arikara, Pawnee, Kitsai, and Wichita. Arikara and Pawnee are linguistically very close, while Kitsai falls between them and Wichita.

Language Structure

The Caddoan languages have extremely small phoneme inventories, but complex morphophonemics. They are morphologically and syntactically prototypical examples of polysynthetic structure. The proposed phoneme inventory for the family is */p, t, k, c (= [ts]), s, w, n, r, y, ʔ, h, i, a, u/ (Chafe, 1979: 218–219). Caddo has a somewhat larger set, which appears to result from relatively recent expansion.

Caddoan verbs consist of 30 or more positional slots into which bound morphemes may be inserted; the verb root occurs near the end. In addition to expected categories like tense, modality, aspect,

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Caddoan verbs consist of 30 or more positional slots into which bound morphemes may be inserted; the verb root occurs near the end. In addition to expected categories like tense, modality, aspect,

pronoun, number, evidential, and verb root, there are slots for certain adverbs, incorporated objects, patient definiteness (in Wichita and possibly others), and derivational stem-forming elements. All the languages have a bipartite verb stem for many verbs; a class of 'preverbs' occurs separated from the root by several slots.

Nouns generally may take only one of two or three suffixes: an 'absolutive' (which occurs only when the noun is used alone), a locative, or, in some of the languages, an instrumental. Noun compounds are frequent and productively formed. All the languages lack adpositions and most adjectives.

Sentential argument structure (subject, object, indirect object, possessor) is marked entirely in the verbal complex; word order in clauses has strictly pragmatic functions. Intransitive verbs fall into two classes depending on whether their subjects are marked by transitive object pronouns or transitive agent pronouns.

History and Scholarship

Europeans first encountered speakers of Caddoan languages during the 16th-century Spanish expeditions from Mexico searching for Quivira (the land supposed to have included El Dorado, a rumored but non-existent city with streets of gold). Maps from those expeditions record a few (now largely uninterpretable) place names, but beyond that most information on the languages has been collected since the 1960s. Kitsai was recorded as spoken by its last monolingual speaker in the early 20th century, but none of the data has been published. The other languages continued to have a few speakers at the beginning of the 21st century, but all will probably be extinct by 2025, despite language preservation and revival efforts.

Large text collections and good grammars are available for two of the languages, Arikara and Pawnee, thanks to the work of Douglas R. Parks. Parks has also coauthored a series of Arikara teaching grammars and a dictionary for elementary school students. Wichita is documented in a grammar, several articles about grammatical phenomena, and a few texts by David S. Rood, as well as audio and video documentation archived at the Max Planck Institute for Psycholinguistics in Nijmegen, the Netherlands. For Caddo, see the texts by Wallace L. Chafe and the detailed description of verb morphology by Lynette Melnar. Allan R. Taylor and W. L. Chafe have published on the history of the Caddoan language family (see Chafe, 1979, for further reading).

See also: Adpositions; Endangered Languages; Polysynthetic Language: Central Siberian Yupik; United States of America: Language Situation.

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Caldwell, Robert (1814–1891)

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Among all the Europeans who have studied the languages of south India, Bishop Caldwell (see Anonymous, *IJDL XVIII–1*, 1989 for his biography) is probably one of the most famous. He was born in Ireland and arrived in India in 1838 as a protestant missionary. In his *Comparative grammar of the Dravidian or south-Indian family of languages*, first published in 1856 in London, he is credited with demonstrating what had been until then hypothesized by earlier writers (*see* **Ellis, Francis Whyte (ca. 1778–1819)**), namely that several languages of south India are related and belong to one and the same family. Caldwell called this family 'Dravidian,' from the Sanskrit *drāviḍa*, which had sometimes been used to refer to the Tamil language and people, and sometimes more vaguely to south Indian peoples (see Krishnamurti, 2003: 1–2). From Caldwell onwards, the word 'Dravidian' has frequently been used mainly in two contexts: (1) comparative Dravidian linguistics, where Caldwell's (1875) lists of "six cultivated dialects" (Tamil, Malayalam, Telugu, Canarese (Kannada), Tulu, and Kudagu) and "six uncultivated dialects" (Tuda (Toda), Kôta (Kota), Goṇḍ, Khond (Kui), Orâon, and Râjmahâl) have now been extended to "23 modern languages plus three ancient ones" (Steever, 1998); and (2) politics, with the success of parties such as the DMK, or *Tirāviṭa Muṉṉēṟṟak Kaḻakam* 'Dravidian Progress Association' (see Ramaswamy, 1997). Some of the most significant continuators of Caldwell's theories in the field of Dravidian linguistics in the 20th century have been Jules Bloch and M. B. Emeneau, the latter one being responsible, along with T. Burrow, for the important *Dravidian etymological dictionary* (1984). Caldwell is also known for his 1881 *A political and general history of the district of Tinnevelly, in the presidency of Madras, from the earliest period to its cession to the English government in* A. D. *1801*. He is one of three Europeans (along with Beschi and Pope) to have his statue near the Marina Beach in Chennai.

See also: Beschi, Constanzo Guiseppe (1680–1747); Bloch, Jules (1880–1953); Burrow, Thomas (1909–1986); Dravidian Languages; Ellis, Francis Whyte (ca. 1778–1819); Emeneau, Murray Barnson (b. 1904).

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Calligraphy, East Asian

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Chinese calligraphy depends on the brush, paper (created in the 2nd century A.D.), and the multiple forms of Chinese characters. Chinese painters and calligraphers use the same instruments and the same material, but most artists would rather be remembered as calligraphers than as painters. In China, calligraphy is art, perhaps the highest form of art possible. Another distinguishing point is the fact that it was practiced amongst equals, it was never simply commissioned. In calligraphy, it is not only the hand that writes, but the whole arm, the whole body and above all, the whole mind.

The earliest known examples of Chinese writing go back to the Shang period (*ca.* 1766–1122 B.C.) to a script called Jiaguwen. The next script, Jinwen zhongdingwen, was used during the Zhou period (late 11th century B.C.) but did not yet exhibit many signs of calligraphic distinction. It was supplanted by the Great Seal script, Dazhuan, which flourished between 1700 and 800 B.C. In the 3rd century B.C., China was finally united under the first Qin Emperor Shi Huang Di (259–210 B.C.), and (we are told) on his instructions a new script, Xiaozhuan, the Small Seal script, was created to meet the growing demand for documents and records. Though it was the basis for later calligraphic developments, it was still only written with the tip of a longhaired brush, mainly on bamboo slips or wood. In addition, Xiaozhuan could not be written with speed, a serious shortcoming for a script specially designed to serve an increasing bureaucracy.

However, Lishu (the 'clerical script'), a simplified version of the Small Seal script, which allowed the brush to move swiftly over paper, was designed. Between 200- and 400 A.D. three more variations of Lishu came into existence: Caoshu (*fl.* 200–400 A.D.), Xingshu (*fl.* from the 3rd century A.D. to the present) and the most important variation Kaishu, the 'proper style of Chinese writing.' Kaishu was used for public documents and private correspondence, and eventually also for block printed books. It also served as an examination subject in the Civil Service examination, which started during the Tang period (618–907 A.D.) and was abolished only in 1905.

Kaishu allowed for a maximum of individuality. Its greatest exponents were the 'the two Wangs' (father and son) who lived in the 4th century A.D. and influenced not only Chinese but also Korean and Japanese calligraphy. Wang Xizhi relaxed the tension in the arrangements of strokes and by doing so furthered the two other styles: Xingshu the 'running script' and Caoshu the 'grass script.'

Chinese script, paper, ink, and the Chinese way of writing were brought to Korea and Japan during the earlier part of the first millennium A.D. But the Korean and the Japanese languages are ill suited for being written in Chinese characters and fairly soon attempts at simplification were made. In 1446, the Korean King Sejong promulgated an alphabetic script called Hangul, which consisted of only 11 basic vowels and 17 consonant signs. Korean could have been written in this script at this time, but the hostility of the Chinese educated elite relegated it mainly to the use of women authors and people of low rank. Overall, Korean calligraphers relied on copying the great Chinese masters. During the Koryo dynasty (918–1892), a square angular form was used; this was eventually followed by the *zhao* style, again copied from the Chinese calligrapher Zhao Mengfu (1254–1322). The most famous calligrapher of the Choson period (1392–1910) was Kim Ch'ong hui (1786–1856), a member of the School of Practical Learning. After World War II, Korean calligraphy lost its importance, but today there is, for the first time, an attempt to use calligraphy based almost exclusively on King Sejong's Korean alphabet.

In Japan, the situation was similar. Between the 8th and the 10th centuries, two syllabaries, *katakana* and *hiragana*, appeared, provoking similar reactions from the Chinese-speaking elite as in Korea. Proper Japanese calligraphy begins in the Nara period (710–794 A.D.) written in *kanji* (Chinese characters) mostly based on Chinese Tang models and the 'two Wangs.' Buddhist sutra literature preferred *kanji* styles such as Kaisho, Gyosho, and Sosho. In the 9th century, during the Heian period (794–1185), Japan had terminated the embassies to China, and Japanese calligraphers began to interpret, not just copy, Chinese models. The Heian period also saw new and more sophisticated trends, such as novels written by women entirely in an elegant *hiragana* style known as *onnade* (women's writing).

The 16th century once more encouraged close contacts with China, and new styles of Ming calligraphy were taken up, but a century later the pendulum swung back to Japanese, largely through the masters of the Kan'ei period (1624–1644). Apart from the *wayo* (Japanese) tradition, there developed another highly original style of calligraphy, which traces its origin back to Chinese Chan Buddhism. In reaches as far back as the 13th century, when the Zen Sect was formed by the monks Eisai (1141–1215) and Dogen (1200–1253). In the newly founded Zen monasteries,

a special type of calligraphy developed, referred to, especially after the 14th century, as Bokuseki (traces of ink). This is a greatly distinct form of calligraphic writing and it eventually became connected with the aesthetics of the tea ceremony.

Today calligraphy is still held in highest esteem in Japan, and the work of good calligraphers sells at adequate (or as we would call it) exuberant prices.

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Calligraphy, Islamic

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Islamic calligraphy begins with the Qur'an and the need for its precise and appropriate transmission. The sacred text had been revealed in Arabic over a period of some 23 years to the Prophet Muhammad, which gave both language and script a new status. At first the various parts were preserved, either through oral traditions or recorded on different materials (wood, paper, parchment, bone, leather, etc.). In 633 A.D., during the battles following Muhammad's death, many of the story tellers (*huffaz*) were killed, and fearing for the safety of the revelation, Abu Bakr (r. 632–634 A.D.), the first Caliph, instructed one of the Prophet's secretaries to compile the full text into one book. The book that appeared in 651 A.D. still forms the authentic version of every Qur'an.

In the 7th century, the Arabs possessed a script of their own, a stiff angular development of Nabataean called Jazm, which was mainly used for commercial purposes. The earliest copies of the Qur'an were written in variations of Jazm named after the towns where they had originated: Ambari (after Anbar), Hiri (after Hirah), Makki (after Mecca), Madani (after Medina), and so on. None of them was well defined and only two achieved a measure of prominence: a round form used in Median called Mudawwar and a more angular form under the name of Mabsut. Finally, after a number of experiments, a style developed named after the city of its origin: Kufah. This was a bold, elongated and straight-lined script, which for the next 300 years became the main script for copying the Qur'an. By the late 10th century, two distinct forms of Kufic emerged: eastern Kufic that developed in Persia and western Kufic, eventually called Maghribi. Maghribi originated around Tunis and became the source of various scripts of North and West Africa, and of Andalusia. After the 13th century, Kufic went out of general use and was from then on mainly used for decorations.

Besides the elongated Kufic, a number of more rounded, cursive scripts had been used for personal use and for administration. Early attempts at improvements had led to the creation of some 20 different styles, many short-lived, all lacking elegance and discipline. In the 10th century, Ibn Muqlah (886–940 A.D.), an accomplished Baghdad calligrapher, set out to redesign them so as to make them suitable for writing the Qur'an. His system of calligraphy rested on mathematical measurements: the rhombic dot, the standard *alif*, and the standard circle. The rhombic dot, formed by pressing the pen diagonally on paper so that the length of the dot's equal sides were the same as the width of the pen; the standard *alif*, a straight vertical line measuring a specific number of dots (mostly between five and seven); and the standard circle, which has a diameter equal to the length of the standard *alif*. Thus the various cursive styles were ultimately dependent on the width of the pen and the number of dots fashioning the standard *alif*.

Ibn Muqlah's reform (known as *al-Katt al Mansub*) was successfully applied to the *sittah*, the six major styles known as Thuluth, Naskhi (the most popular form of writing in the Arab world and, after 1000 A.D., the standard script for copying the Qur'an), Muhaqqaq, Rayhani (another popular Qur'an script), Riqa (favored by the Ottoman calligraphers), and Tawqi. Under Ibn Muqlah's influence, four more styles

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Ibn Muqlah's reform had not been accepted in the Maghrib, the western part of the quickly extending Muslim empire, where copying acknowledged masters preserved the purity of the style. Between 800 and 1200 A.D., the city of Kairouan (now Tunis) was an important religious and cultural center. The Maghribi style introduced a rounding of rectangular curves into semi-circles while the final flourishes of letters are often extended, sometimes touching other letters in the adjoining word. Maghribi became the main script in Northwest Africa and Spain and was responsible for the creation of important substyles such as Qayrawani, Fasi, Andalusi, and Sudani.

After the extension of Islam to Persia, Turkey, and further east to Malaysia (even China), the Arabic script had to be adapted to languages belonging to different linguistic families. This meant some changes in the script but it also opened the possibility for new forms of calligraphy.

In the 16th century, Persian calligraphers developed Ta'liq, an already existing style, which became influential in the eastern part of the Islamic world, gaining special favor in Turkey and India. A later development of the same style, Nasta'liq, was mainly used for secular literature. In the middle of the 17th century, a style called Shikasthe ('broken form') developed in Herat. Characterized by exaggerated density and closely connected ligatures, it became the preferred script for Persian and Urdu correspondence. Persian calligraphers and Persian influence brought Nasta'liq to India and Afghanistan. During the 14th century, a minor Indian style called Bihari arose, which was characterized by the use of colors. Chinese Muslims generally used the style prevalent in Afghanistan but a special script called Sini, sometimes written with a brush, was used for writing on ceramic and china.

Soon after the defeat of the Mamluks in 1517, Turkish dominion extended over most of the Arab world. From then on, Islamic art and calligraphy became increasingly associated with the Ottoman Turks who not only excelled in most calligraphic styles but also created some highly effective scripts of their own. The two most important are Diwani and Jali. The Turks also excelled in the art of mirror writing, where the left side reflects the writing on the right. Another style, Siyaqad, combines complexity of line with elements of cryptography and was used to communicate important political information. An impressive calligraphic device is the Tughra, an ornamental design based on the name and titles of the reigning Sultan that served as a signature legitimizing official degrees.

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Calligraphy, South Asian and Tibetan

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Although the term 'calligraphy' derives from *graphein* (to write) and *kallos* (beautiful), beautiful writing in itself is not calligraphy. Fine writing, even the development of distinct styles, is not necessarily calligraphy. Calligraphy makes a statement about a particular society, a statement about the sum total of its cultural and historical heritage. As such, it results from the interaction between several essential elements: the attitude of society to writing; the importance and function of the text; definite, often mathematically based rules about the correct interaction between lines and space and their relationship to each other; and mastery and understanding of the script, the writing material, and the tools used for writing. Calligraphy is to a large extent an expression of harmony, as perceived by a particular society. Calligraphy also encourages a certain amount of individuality, though within strictly confined

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Calligraphy, South Asian and Tibetan

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circles. Only three civilizations have produced true calligraphy: the Arabs (and those who use the Arab script), the Chinese (and those who use the Chinese script), and Western civilization based on Roman letters, Roman laws, and the Christian Church.

India, and with it the scripts of South and Southeast Asia that developed from Indian prototypes, did not create calligraphy in the strictest sense of the word, mainly for two reasons. First there was the lack of writing materials and writing tools suitable for calligraphy: palm leaves into which the letters had to be incised with a metal stylus (or in the north written with a reed pen), and secondly the attitude to writing. Though writing, as is generally assumed, had been introduced by Semitic traders in the 6th or 7th century B.C., Hinduism, the religion of the area, was decisively hostile to it. The memorizing and the recital of the Vedic hymns was predominately the property of certain Brahmanical subcastes whose status deepened on maintaining this monopoly. Buddhism too, though not overtly hostile to writing, placed the importance of the text above its visual representation. Monks should not take delight in visual beauty. In consequence, the vast majority of South Indian and Sri Lankan palm-leaf manuscripts are at best only adequately, and indeed often indifferently written. Indian manuscripts, and with it Indian scripts, are predominantly meant to provide information.

Only a few surviving manuscripts from India predate the 11th century, and those come mostly from the north or from the Jain area. Though some have beautiful illustrations, the script (whether Siddhamatrika or Kutila) is well done but uninspiring. In Tibet, where writing was introduced together with Buddhism, in the 7th century A.D., writing was taught in the monasteries as part of the curriculum. Only about three styles developed: a book hand (*dbu-can*), a more cursive script for everyday life (*dbu-med*) or for official documents (*bam-yig*), and decorative scripts *(bru-tsha*). None of them displayed any calligraphic traditions.

Fine writing did, however, play a major part in the complex and esoteric world of Hindu Tantras, popular Daoism, and most of all Tantric Buddhism. It was in Tantric Buddhism that beautiful writing, combined with other elements, eventually moved toward calligraphy. The script that underwent this transformation was *siddham*, an Indian syllabic script that goes back to the Indian Gupta period (320–647 A.D.).

According to the legends associated with Tantric Buddhism, the siddham letters 'exploded' out of emptiness and were taught by the Buddha but kept secret until the Indian saint Nagarjuna revealed them to his disciples. From the 7th century onward, siddham letters were mostly used for the representation of 'seed syllables' within mantras (sacred diagrams), each letter personifying a different cosmic force of the Buddha. Awareness of emptiness, so the teaching goes, is transformed into a seed syllable, from the seed develops the Buddha, who may be portrayed by an icon (in this case the seed syllable), and contemplation of the icon unites the devotee with the seed and returns him to emptiness.

Buddhism brought Sanskrit texts, mainly written in siddham script, to China. Unlike India, China had always given much importance to the written word, since the large number of different dialects made oral communication difficult. In keeping with this attitude, Chinese Buddhists paid great attention to the form and the correct construction of siddham characters. Once the pen was replaced by the Chinese brush, siddham became a special branch of Chinese calligraphy connected with sacred writing. From China, Buddhism brought the siddham script to Korea, and in the 9th century two Japanese monks, Kukai (773–835 A.D.) and Saicho (767–822 A.D.), who had both studied in China, introduced it to Japan, where it soon gained considerable popularity within certain circles. Both the Heian (794–1185) and the Kamakura period (1185–1333) produced a number of siddham masters. After a period of decline, siddham calligraphy re-emerged in the 17th century. It is still an important calligraphic tradition and has indeed experienced something of a renaissance. There are today prominent modern siddham masters whose work is much valued, aesthetically as well as financially.

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Calligraphy, Western, Modern

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The 20th century saw a remarkable revival of Western calligraphy. The motivation for it lay partly in a growing unease about some of the more ugly aspects of the Industrial Revolution. Life now seemed increasingly dominated by shoddy, machine-made objects, which no longer had any direct connection with their users. This brought about a nostalgic yearning for the past and with it a growing interest in medieval art and craftsmanship. Such sentiments were intellectually underwritten by the philosophy of John Ruskin (1819–1900), by artistic movements such as the Pre-Raphaelite Brotherhood and to some extent the Gothic Revival. The eventual re-emergence of calligraphy was, however, largely rooted in the stimuli created by the Arts and Crafts Movement of the 1880s and 1890s, the work of William Morris and, most of all, Edward Johnston.

Calligraphy in Britain

Between 1870 and 1876, the poet, writer, and (greatly idealistic) Socialist William Morris (1834–1896), who until then had been much occupied with creating designs for wallpapers, glass, textiles, tapestry, and print, turned his attention to medieval and humanistic-style manuscripts. He experimented with various scripts, studying scribal techniques and using quill and parchment to achieve results. His calligraphy shows good rhythmic quality but lacks an understanding of the shape of letters and their inner relationship. Nevertheless, his manuscripts, and the research and patronage connected with his work, created great interest and opened the way for calligraphic reforms. In 1890, Morris founded the Kelmscott Press and successfully tried his hand at engraving, type designing, and high-quality printing. In the same year, T. J. Cobden-Sanderson's Doves Press was created. Both presses considerably increased the status of the book, eventually commissioning calligraphers to design the type. In due course, Morris became one of the moving spirits behind the Central School of Arts and Crafts, which had originally been founded in 1896 by William Richard Lethaby (1857–1931). There, eventually, Sir Sidney Carlyle Crockerell (1867–1962), one of Morris's secretaries, taught calligraphy and lettering.

It was, however, Edward Johnston (1872–1944) who was most decisively responsible for the renewal of Western calligraphy. Impressed by Morris's ideas, he abandoned his study of medicine and turned his attention to the manuscripts in the British Museum. In the process, Johnson rediscovered the lost technique of writing. He realized that the nature and form of a script were determined by the way the pen was held, that the proportions of a letter stood in direct ratio to the breadth of the pen's edge, which, trimmed chisel-wise, could produce that range of graduation from the thickest strokes to the finest of hairlines that characterized the best medieval works. He also taught himself how to cut and sharpen reeds, bamboo, and quills.

In 1898, Johnston began to teach, first at the Central School of Arts and Crafts and, later, at the Royal College of Art (where Lethaby worked as Professor for Ornament and Design). As a teacher, Johnston had a decisive influence on calligraphy and typography, particularly in England and Germany. His pupils included Eric Gill (who later became a well-known sculptor, engraver, and letterer), Noel Rooke (who engraved illustrations for Johnson's later works), William Graily Hewitt, Percy J. Delf Smith (who became the honorary Secretary of the short-lived Society of Calligraphers), and most of all the highly gifted Anna Simons (who introduced Johnston's method to Germany, Austria, Switzerland, and the Netherlands).

Other art schools followed the example of the Royal College of Art, offering courses in lettering and writing. The first was Birmingham; Leicester College of Art came next, and eventually the subject became part of the curriculum in most arts schools throughout the country. Type design, which had for so long been in the hands of engineers, passed into the hands of artist and calligraphers such as Stanley Morison, Jan van Krimpen, Bruce Rogers, and Victor Hammer. By selecting fine alphabets for font material, they ensured that those alphabets were used for books (printed as well as manuscript) and book covers, and they began to influence the private market. Johnston himself had done some of his best work for church service books, wedding gifts, presentations and the like as a result of commissions from private patrons and public bodies. Calligraphy had always been used for such purposes, but now it received a new impetus and new quality.

In 1906, Johnston published his first book, *Writing & illuminating & lettering*. It consisted of 500 pages, illustrated with his own and Rooke's drawings, and reproductions from historic manuscripts. It was instructive, stimulating, technically helpful, and in due course it became an important handbook for calligraphers, not only in Britain but also in Germany,

the United States, and Australia. Three years later, Johnston's second book, *Manuscript and inscription letters*, appeared, including a number of plates by Eric Gill; it was specially meant for schools and craftsmen. Other writing manuals followed. In 1916, Graily Hewitt's *Handwriting manual* was published. Hewitt had replaced Johnston at the Central School for Arts and Crafts 4 years earlier. He admired the Humanist manuscripts of the 15th century but his great achievement was the recovery of the craft of laying and burnishing gold leaf. Alfred Fairbank, one of his students, turned his interest to italic handwriting. One of his aims was the improvement of everybody's handwriting. In 1932, his *A handwriting manual* came out. It was a forerunner of books on italic script. In 1952, Fairbanks became President of the Society of Scribes and Illuminators (SSI) and encouraged the formation of a Society for Italic Handwriting. Finally, in 1955, J. H. Benson's *The first writing book: Arrighi's 'La Operina'* appeared, going back to the early copybooks of the Italian masters.

In 1915, the London Transport Services commissioned Johnston to design a new alphabet for publicity and signs; the letters can still be seen all over London, especially on the underground. His result was a *sans serif* block letter alphabet based on classical Roman proportion, which, during the coming decades, exerted considerable influence on the choice of letterforms used in advertising. By reaching commerce, calligraphy began to play a role in the everyday life and the everyday business of people. Newspapers, journals, and magazines began to display more lavish and in many cases better-written and better-composed advertisements. It was (and is) indeed in the sphere of advertising that many calligraphers found a new and lucrative outlet.

The Society of Scribes and Illuminators (SSI) was founded in 1921. The idea came originally from Graily Hewitt and Laurence Christie, who had both been students of Johnston and were now teaching at the Central School of Arts and Crafts. The Society held its first exhibition a year later in Brook Street Gallery: it showed 106 works by 31 members of the Society. In the beginning, it was fairly easy to be accepted by the Society as a Fellow but as time passed higher and higher standards were required and the reputation of the Society rose. In 1924, the Society set up small research groups to study particular problems and techniques: writing on skins, quality of pigments, preparation of inks, methods of gilding, and styles of cursive handwriting. The result of this research provided the basis for the compilation of the first *Calligrapher's handbook* compiled during the 1950s. The Society also produced an excellent, worldwide, and still active journal: *The Scribe*. Several members (such as Alfred Fairbank and Joan Kingsford) wrote manuscripts for private clients; some of them can still be seen in national museums and libraries.

Already in 1931, the Society of Scribes and Illuminators had arranged, together with the Victoria and Albert Museum, an exhibition of *Three centuries of illuminated addresses, diplomas and honorary freedom scrolls*. The exhibition included five Freedom Scrolls made for City Livery Companies by Edward Johnston and a good number of presentation addresses executed by Graily Hewitt, Ida Henstock, Laurence Christie, Daisy Alcock, and others. With the increase in calligraphic activities in Great Britain, some exhibitions were (in 1930 and 1938) sent to the United States, the first at the invitation of the American Institute of Graphic Arts. The second exhibition was shown in New York, Boston, Chicago, as well as the Universities of Yale and Pittsburgh. Other exhibitions followed. They gave contemporary calligraphy an opportunity to come to the attention of a wider public. The years following World War II created a need for Rolls of Honor and provided the Society of Scribes and Illuminators with new opportunities.

The manipulation of letterforms has always been at the center of Western calligraphy. The 20th century's revival of the craft was closely connected with a reform of letter carving. In England, this reform, largely promoted by Eric Gill, based itself to a considerable extent on the Roman lettering of Trajan's column. Analyzed in detail, such letters were soon taught in every art school and became models for sign writing, street names, memorials, foundation stones, and so on.

Calligraphy and 20th-Century Art

The new use of letterforms touched other aspects of life as well. Especially on the Continent, graphic artists, painters, and (mostly) politically motivated groups of artists such as the Dadaists, the Constructivists, and the more moderate Bauhaus, began to involve lettering in their publications.

The Dadaists, founded in 1917 in Zurich, were nihilistic groups of artists, who aimed at demolishing current aesthetic standards that they linked with bourgeois values. Seeing letters as the normal expression of a conventional society, they began to turn them into instruments of attack. The chaos of typefaces used for their magazine *Dada* illustrates this point. The Constructivists used the disposition, the size, and the weight of the components of individual letters to create unique abstract patterns, which they saw as representation of the contemporary machine age and the new revolutionary order in Russia, which had replaced the previous decadence. Their

work included posters, advertisements, letters, and newspaper headings; their preferred letterform was the *sans serif,* a functional letterform without historical commitment. Most important, however, was the Bauhaus, which in many ways reacted more positively than the others. It flourished in Germany between 1919 and1933 and its aim was to end the schism between art and technically expert craftsmanship. Though their interest centered around architecture, they soon began to teach typography in order to find new and positive letterforms.

Painters too began to treat letters as an important part of their visual vocabulary. Cubists, Surrealists and the Collagists began to include single letters, or fragments of newspapers, in their paintings. The secret writing pictures of Paul Klee (1879–1940) and Max Ernst (1891–1976) used at first still legible writing that did, however, soon turn toward more abstract brush movements in the hands of Mark Tobey and Hans Hartung (1904–1989). Letters in a painting were used to underline themes, add a message, and they thus became an integral part of the picture itself; or they could simply provide a visual effect by using the idea of layout linked to meaning. A good many artists have used (and are using) lettering in this way. From Pablo Picasso (1881–1973) and Joan Miro (1893–1983) to Franz Kline (1910–1962), who under De Kooning's influence developed his characteristic action painting of slashing black and white calligraphy, and eventually Andy Warhol (1928–1987), Roy Lichtenstein (1923–1997) and the Pop Art Movement as such. Pop Art, which emerged in the 1950s, set out to challenge conventional ideas of good taste and the hermetic inviolability of art itself; the use of letters is often in the form of advertisements and billboards, reminiscent, at times, of the early Construtivists.

The first half of the 20th century saw a good deal of success in revitalizing calligraphy and related crafts. This success depended mainly on three elements:

1. teaching lettering and calligraphy in arts schools, polytechnics, and similar institutions;
2. the growing number of exhibitions, many of them in connection with the United States and the Continent;
3. the foundation of societies and the publications of journals and books, which greatly encouraged the rising of standards.

Since well before World War II, and for quite some times afterward, calligraphy was taught in almost every school. It was one of the subjects included in the National Diploma, which was a B.A. equivalent course. It was also taught at the Royal College of Art, a postgraduate college where the diploma is equal to an M.A. But in 1953, calligraphy was discontinued at the Royal College of Art. In the early 1960s, it received a second blow, the National Diploma was replaced by the Diploma in Art and Design (a B.A.) and calligraphy was no longer included in the new courses, and was almost totally phased out as an examination subject. The only exceptions were the Reigate School of Art where it is still taught. Roehampton Institute of Higher Education started a 1-year Diploma course in calligraphy and bookbinding in 1979, and also an advanced Diploma in Calligraphy. Around 2003, bookbinding was dropped. Reigate and Roehampton are (it seems) now the two main institutions that still teach calligraphy in Great Britain.

Now that calligraphy is no longer taught officially at university level, adult education institutes throughout Great Britain are putting on courses – of often widely varying value. The Society of Scribes and Illuminators also runs a number of workshops and some residential courses, which are advertised in their journal. Still flourishing as well is the Society for Italic Handwriting founded in 1952 under the direction of Alfred Fairbank. The year 1971 saw the establishment of the government-funded Crafts Council, which provided grants.

In 1994, CLAS (Calligraphy and Lettering Arts Society) was founded. CLAS has its own website, and it runs Diploma and Advanced Diploma courses, Certificates, annual festivals, and exhibitions. It has accredited tutors and keeps in contact with American calligraphers. The first major exhibition was held in 2002 and the society is now preparing for its Tenth Anniversary Exhibition. A magazine, *The Edge,* is regularly published and free to all members. CLAS provides a variety of courses and a Certificate of Competence. It operates an annual examination and awards diplomas on three progressive levels. Its main advantage is that it is in principle open to everybody but carefully tutors and examines those who are allowed to teach. There is, in fact, a good deal of enthusiasm for calligraphy at the moment in Britain.

An often voiced complaint is the lack of excellent teachers. This, however, does not mean that there are no longer any impressive calligraphers. We only have to think about Ann Camp, Donald Jackson, Heather Child, Sheila Waters, and Ann Hechle – to name but a few.

Calligraphy in Europe

The 20th century revival in the art of lettering and writing was not restricted to Britain. Parallel (and not unconnected) movements occurred in other parts, most notably in Austria and Germany. The traditional alphabets in Germany and Austria had proceeded

along different lines, keeping the Gothic script until the 1930s.

In Austria, the main exponent was Rudolf von Larisch (1856–1934), who worked in the Imperial Chancellery in Vienna where he had ample opportunity to study historical manuscripts and compare the various hands he found there with the (far less impressive) contemporary standards. His *Zierschriften im Dienst der Kunst* (Decorative lettering and writing in the service of art) was published in 1899. It led, 3 years later, to a teaching appointment at the Vienna School of Art. His publication appeared 7 years before Johnston's work, but soon rivaled its standing in Austria. Unlike Johnston, von Larisch did not believe that calligraphy rested on the study of historic hands but was a natural vehicle for creative self-expression. Though he held different views and encouraged different teaching methods, in 1909, when Larisch and Johnston met in London, they found themselves in mutual sympathy. Larisch's most important work, *Unterricht in Ornamentaler Schrift* (Instruction in decorative writing and lettering), published in 1906, further extended the scope of his studies and had considerable influence in German-speaking countries. Applying calligraphy on glass, metal, textiles, wood, and pottery fascinated him. He believed that calligraphers should express intuitive feelings in their work and that the pattern of letters on the page should be in harmony with the rhythm of writing and the material used.

In Germany, it was Anna Simons (1871–1951), Johnston's favorite pupil, who became instrumental in strengthening the link between German and English calligraphers. From a Prussian legal family, she began to study with Johnston in 1901 and became his best student. After retuning to Germany, she translated Johnston's two books (*Writing & illuminating & lettering* in 1910 and later *Manuscript and inscriptional letters*) and helped with exhibitions.

It was, however, mainly Rudolf Koch (1874–1934) who initiated the movement. He was a skilled calligrapher who had close ties with type and type design. He worked at the Klingspor type foundry and taught lettering at the School of Arts and Crafts in Offenbach. In 1918, under his leadership, a group called the Offenbach Penmen was founded. It later became a workshop community, where people worked on lettering, woodcuts, embroidery, weaving, and books written on Japanese paper. Many of the people there became leading teachers in Germany, Austria, the United States, and England. Whereas Johnston had seen writing as the central discipline of his craft, Koch gave this place to lettering in the broadest sense.

In Europe, the link between art schools, printing houses, and the workshops of craftsmen had always been much closer than in Britain; most early pioneers in calligraphy were also type designers of some note. This dual tradition was kept alive in the work of calligrapher/type designers such as Friedrich Poppl (1893–1982), who said that "calligraphy will always remain the starting point for script design." Poppl was a member of the Arts and Crafts School at Wiesbaden and later professor at the Technical College there. He specialized in designing alphabets for typesetting and photo printing.

Another important German calligrapher was Walter Kaech (d. 1970), who taught lettering for many years. Imre Reiner studied graphic arts in Stuttgart and was well known for his lively calligraphic inventions and type designs. The same can be said of Karl Georg Hoefer and, most prominently, Hermann Zapf (b. 1918). Zapf enjoyed a great reputation as a calligrapher, book designer, and typographer.

In the Netherlands, this claim goes to Jan van Krimpen (1892–1958), in Czechoslovakia to the book artist and calligrapher Oldrich Menhart (1897–1962), in Estonia to Villu Toots (b. 1916), an outstanding teacher and exponent of lettering. There are now in fact several hundred graduates from the lettering school he founded in 1965, including his own grandchildren. The most important penman in Scandinavia is Erik Lindegren, whose survey of *Lettering and printing types* was published in 1975. All of them looked for new ways to link tradition with new means of expressing letterforms.

In the last few decades, the influence of Austria and Germany has been strongly felt in the United States. The effects of exhibitions such as those produced by Zapf and Friedrich Neugebauer during the 1980s, the development of intensive workshops, and the resulting meetings of craftsmen, have enabled gifted teachers to kindle an enduring enthusiasm.

Calligraphy in the United States

American calligraphy (or interest in writing) had, during the 17th and 18th centuries, mostly been concerned with practical considerations, namely how to improve everybody's handwriting. Some English manuals (William Mather's *Young man's companion*, London 1681; and Edward Cocker's *The pen's triumph*, London 1660) were well known; they taught an English version of Italian Humanistic mixed with remnants of older Gothic hands. The first known American printed manual for handwriting appeared in Philadelphia in 1748 under the imprint of Franklin & Hall. It was George Fisher's *The instructor, or American young man's best companion containing instructions in reading, writing and arithmetic and many other*

things beside the art of making several sorts of wines. It gave examples of Round Hand, Flourishing Alphabets, Italian Hand, and Gothic Secretary. Most of these books had been pirated from English models. There were also tentative attempts to involve the teaching of women, as for example John Jenkins's *The art of writing, reduced to a plain and easy system, on a plan entirely new*, Boston, 1791, which taught an orthodox version of the English unlooped Round Hand to the "Gentlemen and Ladies and to the Young Masters and Mistresses throughout the United States."

During the 19th century, such attempts led to various systems (methods of teaching) and colleges where they could be taught. Over the first half of the century, over 100 writing masters were distributing copybooks that in the main taught rapid writing (a Running Round Hand) to men of business in the form of self-instructors. Among the first manuals were Henry Dean's *Analytical guide to the art of penmanship* (Salem, 1894) and Benjamin Howard Rand's *A new and complete system of mercantile penmanship* (Philadelphia, 1814). Well-known and commercially successful was the Spencerian College of Penmanship and Business which dominated the market for some 35 years. Founded by Platt Roger Spencer (1800–1864) in Ohio, it propagated a sloping, semiangular style, which was rapid and legible, while at the same time lending itself easily to embellishment. Spencer had begun teaching handwriting at the age of 15 and he and his five sons ran the college (and eventually a chain of such colleges in some 44 cities) from a log cabin at the family farm, while at the same time traveling around the country to teach at various academies.

As the 19th century progressed, competition mounted between those who emphasized a plain practical business hand and others who delighted in flourishes, which could occasionally lead to such extravagances as quill-written pen pictures of animals and humans; however, as time passed the 'flourishers' grew increasingly more defensive. Another successful writer/entrepreneur was Charles Paxton Zaner, who in 1888 founded the Zanarian College of Penmanship, also in Columbus, Ohio, which eventually produced a 'commercial cursive' or 'business hand' that, like copperplate in the Old Country, soon found favor among those anxious to advance their career prospects.

Modern American handwriting derives largely from the teachings of H. Dean, B. F. Foster, R. P. Spencer, and A. R. Dunton (who was involved in lengthy disputes with Spencer). At the beginning of the 20th century, the Italic style, and the use of the broad-edged pen were greatly advanced by Frances M. Moore, who after having studied in London under G. Hewitt, published her manual in 1926. Since then, it has been mainly the formal and semiformal Italic hand that has made headway in the United States, finding favor not only as a model for everyday handwriting, but also among those actively engaged in the pursuit of calligraphy. In the beginning, it took some effort to convert teachers and pupils to this style; more recently such books as Fred Eager's *Italic way to beautiful writing* (1974) has given further impetus in this direction.

The usefulness of calligraphy in America and Britain is basically based on different considerations. In Britain, emphasis has been placed on formal purpose, such as ceremonial occasions. In consequence, British scribes have shown a more formal approach to layout and letter style, even when designed for commercial use. In America, the predominant use for calligraphy has been in the commercial field. Calligraphers were also designers who produced a constant flow of lively work to serve a wider commercial field.

At the beginning of the 20th century, several attempts were made to reform not only handwriting, but also lettering and type design. Such reforms centered mainly on men like Frederic W. Goudy (1865–1945), Bruce Rogers (1870–1957) and, most of all, William A. Dwiggins (1880–1956). Dwiggins was a well-known type designer whose calligraphy owed little to European influence and showed great gaiety, character, and originality. In 1925, he founded the (wholly imaginary) Society of Calligraphers and issued beautiful certificates of honorary membership to people who worked in publishing and in the graphic arts whom he considered worthy of such distinction.

The contact with Britain did, however, continue. In 1913, Ernst Frederick Detterer (d. 1947) of Chicago came to London to take private lessons from Edward Johnston. After his return to America, he began to establish a calligraphic tradition of formal penmanship, especially in the midwest. In 1931, he became Curator of the John M. Wing Foundation at the Newberry Library in Chicago, where he founded a Calligraphic Study Group, which greatly influenced the development of American calligraphy.

A versatile calligrapher was John Howard Benson (1901–1956) from Rhode Island, who studied in New York at the National Academy of Design at a time when lettering had not yet attained a recognized place in art education. In 1950, he published a manual *(Elements of lettering*) and 5 years later he produced the first English translation of Arrighi's *La Operina*.

Other influential teachers and calligraphers were Arnold Bank (b. 1908), Paul Standard (b. 1896) and Lloyd Reynolds (*Italic calligraphy and handwriting*; 1969). In 1958, Reynolds went a step further and

mounted an exhibition at the Portland (Oregon) Museum of Art entitled *Calligraphy: The Golden Age and its Modern Revival*, the result of many years of historical study, research, and practical work. Another influential exhibition (mostly works of British calligraphers) was organized by P. W. Filby in 1959 at the Peabody Institute Library in Baltimore called *Calligraphy and Illumination*; followed 2 years later by *Calligraphy and Handwriting in America, 1710–1961*. Filby also became involved in an exhibition on *Two Thousand Years of Calligraphy* held in 1965 at the Walters Art Gallery in Baltimore, which produced a detailed and scholarly catalogue.

Today calligraphy-related activities concentrate themselves mainly around well-known teaching centers (New York; Rhode Island; Chicago; Portland; Oregon; Boston; California), a wide use of fine writing in commerce (much more pronounced and more positive than in Europe), and individual circles where calligraphy is practiced and taught both as an art form and a traditional craft. On the whole, calligraphy is increasingly alive, widely practiced, and appreciated; there are now more groups, more conferences, more exhibitions, and more periodicals produced by influential societies, such as *Alphabet* (for the Friends of Calligraphy, San Francisco), *Calligraphy Idea Exchange* (a quarterly magazine) and *Calligraphy Review*. There are also more courses at art schools or run by private individuals and groups (some of them formal and structured, others less so), more national and international conferences, and a good deal more general awareness of calligraphy than in Europe. One of the reasons lies perhaps in the fact that in the United States there is less divide between calligraphers, artists, designers, and amateurs. After the 1950s, which saw a general regrouping of ideas and resources, an additional stimulus was provided by some prominent calligraphers such as Sheila Waters, David Howells, and (most of all) Donald Jackson taking up teaching appointments at American centers, stimulating workshops and the foundation of new societies, which in turn created a further need for tutors. There has also been an increase in media coverage, a large number of books covering special aspects of calligraphy, and periodicals promoting both an interest in the formal historical scripts while at the same time introducing new trends and new practices to the audience.

See also: Asia, Ancient Southwest: Scripts, Earliest; Asia, Ancient Southwest: Scripts, Epigraphic West Semitic; Asia, Ancient Southwest: Scripts, Middle Aramaic; Asia, Ancient Southwest: Scripts, Modern Semitic; Asia, Inner: Scripts; China: Scripts, Non-Chinese; Japan: Writing System; Korean Script: History and Description; Paleography, Greek and Latin; South and Southeast Asia: Scripts; Tibet: Scripts; Typography; Writing Materials.

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Câmara Júnior, Joaquim Mattoso (1904–1970)

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Mattoso Câmara, Brazilian linguist, is responsible for the introduction of linguistic structuralism in Brazil. He was a graduate in Architecture and Law and began his career in linguistics in the 1930s, taking courses given by George Millardet in Rio de Janeiro. Later on, he went to the United States where he studied under Jakobson. He was a professor of linguistics at the Federal District University, in Rio de Janeiro, from 1937 to 1939. In 1950, he became a professor of general linguistics at the University of Brazil's National College of Philosophy, also in Rio de Janeiro. He was a visiting professor in the United States, Portugal, Mexico and Uruguay (Uchôa, 1972).

Câmara Jr. is the author of the first work on general linguistics published in Brazil (*Princípios de Lingüística Geral* [Origins of General Linguistics, 1941]). Its second edition, revised and enlarged, was published in 1954. In it, Mattoso already shows his formation, marked by the structuralism of the School of Prague (fundamentally Jakobson), Saussure and Sapir. His work covers a wide range of preoccupations: stylistics, phonemics, grammar, the study of indigenous Brazilian languages, and the history of language and general linguistics. In the area of general linguistics, his reflections on the relationship of language and culture are very important. Ever since *Princípios de Lingüística Geral*, he has taken a position according to which the relationship between language and culture is such that language in part of the culture, but a part that can be detached.

Therefore, on the one hand, a language is capable of speaking of the culture itself and, on the other, it signifies the culture of which it is part. It was in this way that, due to his functionalist mentalism, he forever marked the position that the study of language is of interest because it is significant. In the area of general linguistics, he also published the *Dicionário de Fatos Gramaticais* (Dictionary of grammatical facts, 1956), renamed *Dicionário de Filologia e Gramática* (Dictionary of philology and grammar, 1963).

The Portuguese Language

His work describing Portuguese was especially dedicated to phonology and morphology. In the phonological area, aside from an important vision of the conjuncture of the Portuguese phonological system, produced on rigorously structural bases, with an eye to rigor of structural description, Câmara formulated a number of hypotheses that caused discussion. One of them is the nonexistence of nasal vowels in Portuguese. In his opinion, there is a nasal archiphoneme closing the syllable, as in *canto /kaNtu/*.

In his morphological studies, also of a structuralist nature, he presents a rigorous comprehension of the structure of names in Portuguese, but his most interesting contribution regards the morphology of verbs. Aside from his description of the verbal system, he left an indispensable analysis of the so-called irregular Portuguese verbs. According to him, there are other verbal paradigms and not exactly irregularities of the regular paradigms (Câmara, 1969, 1970, 1972, 1975).

In the study of the Portuguese phrase, we can call attention to his description of the functioning of the pronoun *ele*, in colloquial Portuguese, as a verbal complement in Brazilian Portuguese instead of the atonic pronoun *lhe* (Câmara, 1957). In European Portuguese, the pronoun *ele*, as well as *eu*, *tu*, *nós*, *vós* and *eles*, function only as the subject.

The Portuguese language (Câmara, 1972) is perhaps his most complete analytic work on the Portuguese language (Naro, 1976). Initially, it gives an extremely acute presentation of the history of Portuguese and its fixation in Brazil. Following this presentation, the descriptions made by the author during the 1950s and 1960s regarding Portuguese phonology and morphology appear. These are followed by a study of the lexicon and also the Portuguese phrase. Part of this work is published in *Estrutura da língua portuguesa* (Structure of the Portuguese language) (Câmara, 1970), surely the first descriptive (rather than normative) grammar produced in Brazil.

Regarding stylistic studies, he published a specific work (Câmara, 1953a) and produced a large number

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of articles in his life, notably on one of the most important authors of literature in the Portuguese language, Machado de Assis. These works were later compiled into a book (Câmara, 1962). These stylistic studies had an important impact on his grammatical description of verbs.

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On the study of indigenous languages in Brazil, he published *Introdução às Línguas Indígenas Brasileiras* (Introduction to the indigenous Brazilian languages, 1965). In this work, in addition to producing a vision of the conjunctional problem of studying indigenous languages in Brazil, he brings up interesting discussions on the question of linguistic borrowing. Also, as a professor of the National Museum's Department of Anthropology, in Rio de Janeiro, he was responsible for the presence of linguistics when the postgraduate course in Anthropology was created. In this program, the question of indigenous languages has always been of great importance.

Aside from these aspects, he also dedicated himself to the study of linguistic history, having published an interesting work in this domain (Câmara, 1975b). He was also dedicated to teaching and produced works for this purpose. He was a rigorous and important translator of Sapir's and Jakobson's texts to Portuguese.

See also: Jakobson, Roman (1896–1982); Sapir, Edward (1884–1939); Saussure, Ferdinand (-Mongin) de (1857–1913).

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Cambodia: Language Situation

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Ninety-five per cent of Cambodia's current population of approximately 12 million speaks Khmer or Cambodian. While the majority of the population is ethnic Khmer, there are substantial numbers of ethnic Vietnamese and Chinese who maintain their respective language and customs in addition to Khmer. There are also various indigenous minorities, such as the Cham (or Khmer-Islam) and Khmer Loeur (Upland Khmer), who speak various dialects of Mon-Khmer languages. Foreign languages such as Sanskrit, Pali, French, Thai, and English have also had a strong influence on Khmer vocabulary and usage.

Literacy

Literacy rates among men and women have varied considerably during the 19th and twentieth centuries. Prior to the establishment of modern public education, reading and writing was primarily taught at temple schools and was generally limited to boys ordained as novice monks. Under the French (1863–1953), the traditional temple-based system was maintained until the early 1900s, when a French-styled system of public education was introduced. By 1925

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there were about 160 primary schools with 10 000 students. However, enrollment remained relatively small until late in the colonial period. Even by 1944, for example, only 500 out of the approximately 80 000 students enrolled in primary schools went on to the secondary level. After the nation gained independence in 1953, Prince Norodom Sihanouk accelerated Cambodia's educational reforms, and by the late 1960s, Cambodia enjoyed one of the highest literacy rates in Southeast Asia. This rapid progress came to an abrupt halt in the 1970s under the genocidal regime of Pol Pot (1975–1979), when many schools were converted into torture centers and approximately 75% of Cambodia's teachers died of starvation, overwork, or execution. After the 1993 UN-sponsored elections and the end of two decades of civil war, Cambodia's literacy rates began to recover. A recent study by the Cambodian Ministry of Education, Youth, and Sports states that approximately 55% of women and 75% of men are functionally literate.

Foreign Influence

Historically, foreign languages and ideas have had a significant influence on Khmer vocabulary and usage. Contact with the literature and social institutions of India, Thailand, and France and the current widespread use of English have expanded the Khmer lexicon with foreign loanwords, especially for vocational purposes. For centuries prior to the Angkor period (9th to 15th centuries), Indian influence had already led to the use of many Sanskrit loanwords. With the establishment of Hinayana Buddhism in the 15th century, Pali loanwords were added. After the fall of the Angkor Empire, Thai influence increased as Cambodian kings and monks went to live and study in Thailand. From the middle of the 19th century, the use of French for official, education, and recreational purposes rivaled the use of Khmer. However, unlike in Vietnam, the French were never successful at romanizing the Khmer script. To the contrary, after gaining independence in 1953, there was a growing impetus to affirm Cambodian national and cultural identity and a concerted effort was made to expunge French loanwords and replace them with Khmer terms. During the Khmer Rouge period (1975–1979), a new vocabulary, including politicized metaphors, appeared that reflected the regime's radical ideology. Finally, over the last ten years, the influence of English as the language of international business and development has had an impact on Khmer similar to the previous use of French.

Phonology and Grammar

Most Khmer words are monosyllabic or disyllabic, while polysyllabic words are generally neologisms or loanwords from Sanskrit and Pali. Another distinctive feature of Khmer and one that distinguishes it from Thai, Lao, and Vietnamese is the fact that it is non-tonal. There are a total of 33 basic consonants in the Khmer alphabet, comprising two distinct series or registers. The register (whether voiced or voiceless) determines the pronunciation of the vowel that follows. In addition, there are 12 independent vowels, 16 vowel symbols, and 31 subscript consonant symbols, which are used in combination with the basic consonant symbols. Khmer also has 10 diacritical marks that modify the sounds of the dependent and independent symbols. Although Khmer nouns and verbs are not inflected, number and verb tense are indicated by syntax and time markers as needed.

See also: French; Pali; Sanskrit; Thailand: Language Situation.

Language Maps (Appendix 1): Map 78.

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Cambodian *See:* Khmer.

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Deborah Cameron is Rupert Murdoch Professor of Language and Communication at the University of Oxford. She has degrees from the University of Newcastle upon Tyne (B.A., 1980) and the University of Oxford (M.Litt., 1985). She is a sociolinguist whose work focuses on language, gender, and sexuality; feminist theory; language ideologies; and media language. She is one of the principal scholars to show the implications of feminist theory for linguistics, as well as to demonstrate the contributions that sociolinguistic research can make to interdisciplinary feminist theory and research. Her works in this area include *Feminism and linguistic theory* (1985), *Women in their speech communities: new perspectives on language and sex* (with Coates, J., 1998), *The feminist critique of language: a reader* (ed., 1990), and 'Gender, language, and discourse' (1998).

She is a key contributor to the emerging and rapidly growing body of scholarship on language, sexuality, and desire (see *Language and Sexuality*, with Kulick, D., 2003; and 'Performing gender identity: young men's talk and the construction of heterosexual masculinity,' 1997). She has argued that many sociolinguistic researchers take a 'merely' ethical approach to their research, and has (with Elizabeth Frazer, Penelope Harvey, Ben Rampton, and Kay Richardson) raised questions about, and tried to develop examples of, what sociolinguistic research that is devoted to advocacy for, or even empowerment of, disenfranchised communities might look like in the collaborative book *Researching language: issues of power and method* (1992). In a similar vein, *Verbal hygiene* (1995) takes up a number of case studies that challenge the truism that linguists should, and do, describe rather than prescribe linguistic practices; it received the 1996 Book Award from the British Association of Applied Linguistics.

She has recently begun writing about the implications of globalization for communication in such works as *Good to talk? talk and working in a communication culture* (2000b), *Globalization and language teaching* (ed., with Block, D., 2002), and 'Styling the worker: gender and the commodification of language in the globalized service economy' (2000c). She has also published six other books, including *The lust to kill: a feminist investigation of sexual murder* (with Frazer, E., 1987), and *Working with spoken discourse* (2001).

Professor Cameron's speaking style is funny without being flip, and blunt without being rude. Her writings, even as they lay out complex theoretical insights, are always lucid, in ways consistent with her arguments that if sociolinguists fail to find ways to educate wider audiences in sophisticated ways about language, others will supply more stereotypical, problematic perspectives (see 'A self off the shelf?: consuming women's empowerment,' 2000a). This, in combination with her knack for identifying cutting-edge research questions, makes her widely sought after as a plenary speaker and as a public commentator on sociolinguistic issues.

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Cameroon: Language Situation

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The Republic of Cameroon has a population of approximately 14.5 million people, speaking almost 300 languages. Like its neighbor Nigeria to the west, it has an extremely complex linguistic setting, with a high ratio of languages relative to overall population, as well as the additional complication of colonial languages and their legacy. In Cameroon this legacy is more complex than elsewhere, as the country has inherited languages from two colonial administrations, British and French, whose policies or attitudes towards indigenous languages were diametrically opposed.

No one indigenous language dominates, as none has a substantially disproportionate number of speakers. Three, however, approach this status: Fula, or Fulfulde, spoken in the northern part of the country, has approximately 668 700 first-language speakers (population figures for individual languages are taken from Grimes, 2000) and functions as a lingua franca in that region, with up to 5 000 000 others using it as a second language, though there is substantial dialect variation. Ewondo has 577 700 speakers and serves as a lingua franca in the central region; its status is bolstered as a result of being the language of the capital, Yaoundé. Duala, despite a relatively low number of first-language speakers (87 700), is a lingua franca in the western region, due largely to its status as the language of Douala, the financial heart of Cameroon.

In addition to these, Cameroon Pidgin English (sometimes referred to as 'Wes Cos') is spoken predominantly as a second language by approximately 2 000 000 people in the South West and North West provinces (*see* **Pidgins and Creoles: Overview**). Its use ranges far beyond these areas, however, and in practice it is the most widely used lingua franca in Cameroon. It should be added that Cameroon Pidgin English is not the only pidgin spoken in country; Ewondo Populaire is a pidginized version of Ewondo spoken around Yaoundé, and the variety of Fulfulde used as a second language is also arguably pidginized. Of all Cameroonian languages, Fulfulde is the largest in terms of first-language speakers and only a few others boast more than 100 000 speakers. The average number of speakers per language is 51 000, and as many as 31 languages are listed (Connell, in press) as having fewer than 1000 speakers.

Cameroon has a complex colonial history, with the French dominating the bulk of the country, but first the Germans and then the British controlling the western region. It was only in 1961 that the former British Cameroon decided by referendum to leave the newly independent Nigeria to join French Cameroon. This mottled history has had a significant impact on the linguistic situation in the country. Following the tradition of the French, little or no importance has been attached by the government to the use of indigenous languages in education, and to date there is no official policy in this respect. Attitudes among the people, however, do seem to vary somewhat between the so-called francophone and anglophone zones. In the former British colony there is greater importance attached to mother tongue education, and although it is still not to be found in state schools, there is a greater tendency for private schools (typically, but not only, mission schools) to offer at least the first years of primary education in the language of the community. An increasing tendency, particularly in the anglophone zone of the southwest, is the use of pidgin in primary education, although this practice is not at present recognized by the government.

Only French and English are acknowledged as official languages, and the use of two colonial languages as official languages has led to intergroup conflict. As has happened elsewhere (Canada, Belgium), a minority language group has perceived itself as being discriminated against, and in Cameroon those who are of the English zone claim difficulty in obtaining civil service employment where, despite the policy of two official languages, the language of the workplace is French.

Despite the lack of official policy or status regarding indigenous languages, a certain degree of attention has been devoted to their documentation and development. The *Atlas Linguistique du Cameroun* was undertaken as part of a larger effort, the *Atlas Linguistique d'Afrique Centrale* (1983), sponsored in part by the French government and in part by Cameroonian government agencies. In addition to this, a standardized orthography has been developed suitable for the writing of all Cameroonian languages.

The great number of languages found in Cameroon, their substantial diversity, the low average number of speakers, and the high number of languages with fewer than 1000 speakers, has important implications for linguistic studies. At a very basic level, most of these languages remain only partially described at best, and considerable work of importance remains to be done to rectify this situation. There is a very real threat that, in the face of globalization and modernization, many of these languages will disappear in the near future before they can be documented. The implications of the linguistic diversity found in

Cameroon, and particularly the Nigeria-Cameroon borderland, are of great interest for historical studies, both of a linguistic and general nature. This region is now generally accepted by historical linguists as being the ultimate homeland of the Bantu languages (*see* **Bantu Languages**), as it is here where the older relatives of Bantu, Bantoid language groups such as Mambiloid, and the apparent isolates Dakoid and Fam are found. The considerable amount of work to be done on these from the historical and ethnological perspective will eventually reveal much about the prehistory of the peoples of West and Central Africa.

See also: Bantu Languages; Niger-Congo Languages; Nigeria: Language Situation; Pidgins and Creoles: Overview.

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Campanella, Thomas (1568–1639)

C Massai

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Campanella was one of the most important philosophers of the Italian Renaissance. Besides theology, poetry, and astrology, his interests also included linguistics. He was the author of a Latin *Grammar*, and several of his works discuss language reforms of both an orthographical and semantic nature.

Campanella was born on September 5, 1568 at Stilo in Calabria. While still very young he entered the Dominican order, but irked by the discipline in 1589 fled the monastery for Naples, Rome, Florence, and Padua, where he studied at the University. In 1599 he returned to Calabria, where he was involved in a plot against the Spanish. The plot was discovered and Campanella passed the next 27 years in prison. A late summons to the French court, due to his fame as an astrologer, brought him the tranquillity he had never known and enabled him to dedicate himself to the revision and publication of works written in prison. He died in Paris on May 21, 1639.

The most important of Campanella's writings to deal with linguistics are his *Poetica* (Italian edition, 1596, Latin, 1612) and the *Grammatica* (1618, but published with *Poetica* in 1638; see Firpo, 1940). The latter is somewhat traditional in outlook, similar to the grammars of the Modistae. Indeed, according to Padley (1976), "Campanella's work forms an important part of . . . Scholastic reaction." However, other features of the *Grammatica* are typical of its day, such as its interest in the creation of a philosophical language. Campanella outlines its theoretical basis in the last pages of the grammar, the *Appendix de philosophicae linguae institutione*. The new language, he states, must be clear and unambiguous, reflecting an absolute correspondence between words and things. Similarly, its orthography should show a marked relation between sounds and letters. In the *Grammatica*, but still more so in the *Poetica*, Campanella suggests that letters should be represented as they are articulated (e.g.,) (representing lip closure for *b*, etc.) (*see* **Phonetic Transcription: History**).

Campanella's theories were to play an important role in 17th-century debates on the subject of artificial language, and considerably influenced the work of J. Wilkins, who in his *Essay* of 1668 cites him among his sources (*see* **Wilkins, John (1614–1672)**).

See also: Phonetic Transcription: History; Wilkins, John (1614–1672).

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Cameroon, and particularly the Nigeria-Cameroon borderland, are of great interest for historical studies, both of a linguistic and general nature. This region is now generally accepted by historical linguists as being the ultimate homeland of the Bantu languages (*see* **Bantu Languages**), as it is here where the older relatives of Bantu, Bantoid language groups such as Mambiloid, and the apparent isolates Dakoid and Fam are found. The considerable amount of work to be done on these from the historical and ethnological perspective will eventually reveal much about the prehistory of the peoples of West and Central Africa.

See also: Bantu Languages; Niger-Congo Languages; Nigeria: Language Situation; Pidgins and Creoles: Overview.

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Campe, Joachim Heinrich (1746–1818)

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Joachim Heinrich Campe, born in 1746 in Deensen near Holzminden, Germany, studied Protestant theology and philosophy at the universities of Helmstedt and Halle. After graduating in 1769, he spent four years as private tutor in the house of Alexander Georg von Humboldt in Berlin, then two years as military chaplain in Potsdam, only to return in 1775 to the Berlin-Tegel castle of the Humboldts, this time as educator of the two sons, Wilhelm (b. 1767) and Alexander (b. 1769). Wilhelm von Humboldt later reminisced on this, for him, unforgettable period of his life: "[Campe] showed even then a most appropriate, natural gift of vividly stimulating a child's intellect" (cf. Hallier, 1862: 17; transl. by K. R. Jankowsky). Rousseau's new theory of education, advanced in his monumental 4-volume *Emile, ou De l'éducation* (published 1762) significantly strengthened Campe's interest in pedagogy. He welcomed his appointment in 1776 by Count Franz von Dessau to the board of directors of the Dessau Philanthropin, a prestigious educational institution, founded in 1772 and directed by Johann Bernhard Basedow (1723–1790). After a few months, he succeeded Basedow as the Philanthropin's director but resigned the following year, due to irreconcilable differences with the institution's founder. From then on he devoted most of his time to writing.

Campe gained widespread recognition among his contemporaries and for a long time thereafter in three major areas:

1. He produced a substantial number of highly influential educational writings, most prominent among them his *Robinson der Jüngere: Zur angenehmen und nützlichen Unterhaltung für Kinder* (Campe, 1779–1780), based on Daniel Defoe's *Robinson Crusoe,* translated in numerous languages, which saw 90 editions within about 100 years. Of comparable importance as an educational tool was his *Kleine Kinderbibliothek* (Campe, 1790a), originally comprising more than 20 volumes and likewise translated in several languages. By 1815, it had gone through 11 editions of varying size.
2. Campe believed in the need for 'purifying' the German (German, Standard) language of non-German ingredients. He tried to achieve this objective by theoretical discussions as well as practical illustrations (cf., e.g., Campe, 1790b, 1794, 1804). Of his approximately 11 000 newly coined German words, about 3000 were there to stay, not necessarily as replacements, but certainly as well-liked variants of their foreign originals. They include 'Hochschule' for 'Universität' (university), 'Einzahl, Mehrzahl' for 'Singular, Plural' (singular, plural), 'Stelldichein' for 'Rendezvous' (rendezvous), 'Feingefühl' for 'Delikatesse' (tact, delecacy). But the majority – like 'Zitterweh' for 'Fieber' (fever), 'Geistesanbau' for 'Kultur' (culture), 'Haarkräusler' for 'Friseur' (hairdresser) – was short-lived, their demise being quickened by ironic, even sarcastic criticism from highly placed sources (cf., e.g., *Xenien* by Goethe and Schiller).
3. Tied to his 'purification campaign' was his effort to present to native speakers the richness of their mother tongue by compiling a comprehensive *Wörterbuch der Deutschen Sprache*. The first fruit of his labors was the 2-volume supplement of 1801 to Adelung's *Wörterbuch der hochdeutschen Mundart* (1774–1786). But his own *Wörterbuch* goes well beyond that of Adelung. He aims at the entire *Deutsche Sprache*, not restictively at the *hochdeutsche Mundart* only. And whereas Adelung lists just ca. 55 000 words, Campe's dictionary comprises almost three times that amount. Even though he counts derivations as separate entries, the advancement is still considerable.

Campe's significance for historical linguistics is still being examined. Publications like Orgeldinger (1999) and the exhibition at the Wolfenbüttel Library as documented in Schmitt (1996) provided just a glimpse of proof that the discussion is far from being over.

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Canada: Language Situation

G J Rowicka, Leiden University, Leiden, The Netherlands

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Canada has a multilingual population of 29.6 million. Since passage of the Official Languages Act in 1969, it has two official languages on the federal level: English and French. However, only 23% of the Canadian population, predominantly inhabitants of Quebec, speak French as their sole or principal language, versus 68% who mainly speak English. English-French bilingualism is not very widespread (17% of the population), but it is increasing. The issue of reconciling Quebec's francophones with the majority anglophone Canadian population seems to have been moved to the back burner since the Quebec government's referendum on independence failed to pass in October 1995.

Canadian English resembles American English in many ways. Like Americans, but unlike speakers of (Southern) British English, Canadians pronounce [r] in *car* and *farm*. Yet Canadian English also has some characteristics of its own in its vocabulary, spelling, pronunciation, and grammar, some of which are seen as 'Britishisms.' Many Canadians still use *serviettes* at the table, rather than *napkins*, as Americans do. They apologize by saying *sorry* [sori], rather than [sari]. Typical is 'Canadian Raising', which makes the vowels [aw] in *house* and [ay] in *knife* (before voiceless consonants) sound quite different – 'higher' – than the vowel in *houses* and *knives* (before voiced consonants). A well-known Canadian trait is *eh*, as in *You like it, eh?*, where Americans would rather use *huh*. There are, however, regional and social differences in these and other features.

Canadian French also differs from European French. It developed out of 17th century French and other languages spoken in France at that time and has preserved some archaic features long since lost in European French. For instance, Quebec French has a distinction between long and short vowels, such as *fête* 'anniversary' [fɛ:t] and *faite* 'done, FEM' [fɛt], while most European French dialects have only short vowels. In several French varieties, word-final consonant clusters can be simplified, for instance, *table* [tab] 'table'. In Quebec French, however, more complex groups are also simplified, as in *astre* [as] 'aster', even in formal contexts. Some words have a different meaning in Quebec and in European French.

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The other main variety of Canadian French is Acadian, which is spoken along the Atlantic coast. Cajun, the French dialect of Louisiana, United States, derives from Acadian.

Canada's linguistic wealth extends far beyond the two largest languages. About 17% of all Canadians speak a language other than English or French as their mother tongue. These are Aboriginal Canadian languages or immigrant languages. According to the 2001 Census, only 21 languages indigenous to Canada are still spoken (although other sources still mention 50). They can be grouped into several language families. Most linguistic diversity is concentrated in the west of the country.

The majority of Aboriginal language families are as distinct from each other as, for instance, Indo-European is from Sino-Tibetan. They exhibit remarkable structural diversity and characteristics unlike those familiar from Indo-European languages. For instance, in Nuxalk (Bella Coola, a Salish language) there are words without a single vowel, e.g., *sk*^{w}*χ' ɬ*$_{p}$ 'seed'. A property of most Aboriginal languages is polysynthesis. Words in polysynthetic languages can contain a large number of meaningful parts (morphemes). For instance, in Mohawk (an Iroquoian language the following is a single word:

s-a-hʉwa-nho-tʉ-kw-ahs-eʔ
again-PAST-she/him-door-close-un-for-PERF
'she opened the door for him again'

Numerous Aboriginal words have been adopted into Canadian English. The country's name, Canada, comes from the Laurentian (extinct Iroquoian language) word for 'settlement'.

In the Northwest Territories, since 1993 several Aboriginal languages have enjoyed an official status equal to that of English and French. Inuktitut (the language of the Inuit) also has official status in Nunavut, a Canadian territory that was part of the Northwest Territories until 1999 and where 80% of the population are Inuit. However, most Aboriginal languages are seriously endangered as a result of, among others, repressive education policies practiced in the past and are only spoken fluently by the oldest generation. Only Cree (80 000 speakers), Ojibwa (45 000 speakers), and Inuktitut (20 000 speakers) are estimated to have good chances of long-term survival. There is a growing involvement of universities in language preservation efforts.

Among the Aboriginal Canadian languages on the verge of extinction is Michif, a unique mixed language of Canada's Métis, most of whom are descendants from Cree or Ojibwa women and French Canadian fur trappers. Michif combines Cree verbs and French nouns. French noun phrases retain lexical gender and adjective agreement, while Cree and Ojibwa verbs retain much of their polysynthetic structure. This makes Michif unlike other contact languages, which usually exhibit simplified grammar.

Among new (immigrant) Canadian languages, Chinese, Italian, and German are each spoken by more than 400 000 people, with Chinese speakers constituting the largest linguistic group in Canada after English and French. Seven other languages (Spanish, Portuguese, Polish, Panjabi, Ukrainian, Arabic, and Tagalog) have between 150 000 and 228 000 speakers each. In some cities there are such large ethnic populations that it is possible to live, work, and shop there without using any of the official languages. In Toronto, 40% of the population speak a mother tongue that is neither English nor French. In Vancouver this figure is 27%, in Winnipeg 21%, and in Montréal 17%.

The strength of nonofficial languages is part of a deliberate policy on the part of the Canadian government.

> It is precisely the rejection of uniformity, the refusal to accept a homogeneous view of themselves and their country, that constitutes the most authentic and widely shared experience of Canadians. The affirmation and preservation of differences, personal, social, local, regional, cultural, linguistic, has consumed the minds and hearts of Canadians all through their history. It is the Canadian response to the question of identity. Our unity – and it is a real and profound unity if we will only bring ourselves to see it—arises from the determination to preserve the identity of each of us. – From *A national understanding* (government report, 1977)

See also: American Lexicography; Isolated Language Varieties; Language Families and Linguistic Diversity; Michif.

Language Maps (Appendix 1): Maps 52–54.

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Canadian Lexicography

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A number of dictionaries of Canadian Aboriginal languages also exist, and more are in preparation. This work was started by missionaries in the 19th century and was taken up more recently by the Canadian Museum of Civilization, which has produced bilingual dictionaries of Western Abenaki, Heiltsuk, Kwakwala (Kwakiutl), Mohawk, and Mi'kmaq (Micmac).

See also: Bilingual Lexicography; Canada: Language Situation; English in the Present Day (since ca. 1900); French.

Relevant Website

http://www.civilization.ca/pub/mpub10e.html

Canary Islands: Language Situation

Editorial Team

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The Canary Islands are a group of seven main islands about 100 km off the African coast opposite Morocco and Western Sahara. They are an autonomous region of Spain.

The islands have been inhabited since at least 200 B.C., and they were mentioned in classical sources. However, there is no further evidence of European knowledge of them until the 13th century, when they were 're-discovered' by a Genovese fleet. At that time, the people living on the islands were speakers of Guanche, most probably a Berber language. However, the only traces of the language are a few place names, as their speakers had been converted to Christianity, and to Castilian Spanish, by the end of the 15th century, when the islands became part of Castile. Spanish is the official language of the

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Canary Islands today. During the 19th and early 20th centuries, a mixed Spanish-English trade variety called Pichingli was used on the islands (Armistead, 1995). In the 20th century, the Canary Islands developed a major tourist industry, and there is now at any one time a substantive contingent of more or less short-term visitors, who are catered to with mainly English and German print media, shop signs, menus, and so forth.

In addition to spoken language, the Canary island of La Gomera is home to the 'whistling language' Silbo Gomero (from Spanish *silbar*, 'whistle'). The language is said to have been used as a means of long-distance communication on the mountainous island since before the arrival of the Spanish, but knowledge of it decreased with the advent of modern communication. Seen as a part of the island's cultural heritage, Silbo Gomero is now taught in schools on the island.

See also: Spanish.

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Cantonese *See:* Chinese.

Cape Verde Islands: Language Situation

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The Republic of Cape Verde consists of 10 islands and five islets off the west coast of Africa, about 600 km west of Senegal. The islands were uninhabited until the 15th century, when they were colonized by the Portuguese, who used them as a supply and trading post for the slave trade. Many speakers of African (mainly West-Atlantic) languages were brought from the then-Portuguese territory of Guinea-Bissau. Cape Verde became independent in 1975.

The official language of Cape Verde is Portuguese. However, the majority of the 415 000 (July 2004 estimate) residents of the islands speak the Portuguese-based Cape Verdean creole Kabuverdianu (Crioulo/Kriolu) as their first language. Kabuverdianu falls into two main dialect groups, Sotavento and Barlavento. The former is spoken on the southern (Sotavento) islands, which include São Tiago, with the capital, Praia, and site of the earliest settlements. Sotavento is spoken by about 65% of Kabuverdianu speakers. The dialect of the northern Barlavento islands, which were settled only in the late 17th and 18th centuries, is spoken by the remaining 35% of speakers.

Since independence, the role and status of Kabuverdianu have increased, and the language is used in domains previously reserved for Portuguese, e.g., formal religious and political discourse. Portuguese is used on television and radio, as well as in education, where it is the primary language of instruction throughout all levels.

Because of harsh economic conditions and high unemployment, many Cape Verdeans have left the islands and work abroad, so the majority of speakers of Kabuverdianu (about 934 000) do not live in Cape Verde. There are large Kabuverdianu communities in Guinea Bissau, Senegal, several western European countries, and the United States.

See also: Pidgins and Creoles: Overview.

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Cape Verdean Creole

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Cape Verdean Creole (henceforth CVC) is spoken in Cape Verde Islands, an archipelago located in the Atlantic Ocean off the northwestern coast of Africa, at approximately 450 kilometers from Senegal. The archipelago is divided into two main clusters: the windward islands (locally known as Barlavento) and the leeward islands (Sotavento). Barlavento includes Boavista, Sal, São Nicolau, Santa Luzia, São Vicente, and Santo Antão. Sotavento consists of Brava, Fogo, Santiago, and Maio.

Given the strategic location of the archipelago at the crossroads of Europe, Africa, and America, the Portuguese settled the islands from 1462 onward, and the islands came to play a critical role in the slave trade from the 15th to the 19th centuries. As a result, many view CVC as the oldest creole alive today. Historical sources (Brásio, 1962) state that the tribes of Mandingues, Balantes, Bijagos, Feloupes, Beafadas, Pepels, Quissis, Brames, Banhuns, Peuls, Jalofos, Bambaras, Bololas, and Manjakus provided most of the human contingent to the slave trade in Cape Verde. The white settlers came from Algarve and Alentejo in Portugal and also included Jews, Spaniards, Italians, and French (Martinus, 1996). Having been settled at different times with different populations, it is not surprising that a number of morphophonological and syntactic features distinguish Barlavento varieties (closer to Portuguese) from their Sotavento counterparts (more Africanized), resulting in a fairly complex sociolinguistic situation.

Although earlier descriptions of the language viewed CVC as a mere dialect of Portuguese, recent studies have shed new light on the hybrid nature of CVC focusing on the African contributions to the formation of the language. Baptista (2003a) studied specifically reduplication, a morphological process found in African languages whereby a reduplicated adjective or adverb expresses emphasis, as in *moku moku* 'very drunk' or *faxi faxi* 'very quickly'. Noun reduplication may yield a distributive interpretation, as in *dia dia* 'every day' or may simply lead to a change in meaning, as in *boka* 'mouth,' *boka boka* signifying 'in secret'. Lexical categories such as adjectives once reduplicated may shift category (i.e., adjective to noun) as in *mansu* 'quiet', *mansu mansu* 'secrecy'. Other scholars such as Rougé (2004) and Quint (2000) have examined the possible African etymology of some of the Cape Verdean linguistic items that have found their way in the grammatical and lexical components of the language. Lang (2004) has investigated how some grammatical morphemes inherited from Portuguese may also take on new functions passed down from substrates like Wolof. In a similar vein of work, Baptista (2003b) has examined how the plural suffix-*s* in Cape Verdean inherited from Portuguese is sensitive to conditions such as the animacy hierarchy and definiteness, two variables playing a role in the African languages having contributed to the genesis of CVC.

Such studies demonstrate the genuine hybrid nature of CVC by examining how various elements from all source languages involved in its genesis interact and at what level. This gives us valuable insights into cognitive processes at play when languages come abruptly into contact.

See also: Cape Verde Islands: Language Situation; Pidgins and Creoles: Overview.

Language Maps (Appendix 1): Maps 47, 48.

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Cariban Languages

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The Cariban family is one of the largest genetic groups in South America, with more than 25 languages (see Figure 1) spoken mostly north of the Amazon, from Colombia to the Guianas and from northern Venezuela to Central Brazil (see Figure 2). Despite the long history of their studies, most Cariban languages are still insufficiently described. The best descriptive works published so far are Hoff (1968, on Karinya) and Derbyshire (1979, 1985, on Hishkaryana). There are good descriptive works on Apalai, Makushi, and Waiwai in Derbyshire and Pullum (1986–1998); Jackson (1972) gives a brief, but detailed, overview of Wayana. Muller (1994) is a very informative Panare dictionary. Meira (2005) and Carlin (2004) are full descriptions of Tiriyo; Meira (2000), mostly a historical study, contains some descriptive work on Tiriyo, Akuriyo, and Karihona. Gildea (1998) and Derbyshire (1999) contain surveys of the family.

Comparative Studies and Classification

First recognized by the Jesuit priest Filippo Salvadore Gilij in the 18th century (Gilij, 1780–1783), the Cariban family was subsequently studied by L. Adam (1893) and C. H. de Goeje (1909, 1946). After some initial tentative proposals within larger South

1. **GUIANAN**		
a.	Karinya (Carib, Galibi, Kali'ña)	10 000
b. *Taranoan*:	Tiriyo (Trio)	2000
	Akuriyo (Akurio, Wama, Oarikule)	3-4
	Karihona (Carijona)	5-10
c.	Wayana (Roucouyenne, Urucuyana)	750
d.	Apalai (?)	450
e.	Palmella (†) (?)	
f. *Parukotoan*:	Waiwai	1000
	Hishkaryana (Hixkaryana)	550
	Kashuyana (Katxuyana, Xikuyana, Kahyana)	90
2. **VENEZUELAN**		
a. *Coastal*:	Chayma (†)	
	Kumanakoto (Cumanagota) (†)	
b.	Tamanaku (†)	
c. *Pemongan* or *Pemong Proper*:	Pemong	5000
	Arekuna, Kamarakoto, Taurepang	
	Kapong	5000
	Akawaio, Patamuna, Ingarikó	
	Makushi (Macuxi, Macushi)	11 400
d.	Panare	1200
e.	De'kwana (Ye'kwana, Maquiritare, Maiongong) (?)	5000
f.	Mapoyo (?)	2
g.	Yawarana (Yabarana) (?)	20
3. **WAIMIRIAN**		
a.	Waimiri-Atroari	1000
	Waimiri, Atroari	
4. **YUKPAN**		
a.	Yukpa (Motilón)	3000
b.	Hapreria (Japreria)	80
5. **PEKODIAN**		
a. *Xinguan*:	Ikpeng	350
	Arara	200
b.	Bakairi	900
	Eastern Bakairi, Western Bakairi	
6. **KUIKUROAN**		
a.	Kuikuro	900
	Kuikuro, Kalapalo, Nahukwa, Matipu	
b.	Pimenteira (?) (†)	

Figure 1 A tentative classification of Cariban languages. (?) = difficult to classify; (†) = extinct (not all listed here). Different names or spellings for the same language are given in parentheses. Dialects are indented under the language name. (Demogropahic data refer to speakers, not ethnic members of the group; sources: Ethnologue and author's own work).

American classifications (the last of which is Loukotka, 1968), the first detailed classification was published by V. Girard (1971), followed by M. Durbin (1977) and T. Kaufman (1994). Durbin's classification – unfortunately used in the Ethnologue (SIL) – is, as Gildea (1998) pointed out, seriously flawed; Girard's classification is limited (14 low-level subgroups); Kafuman's classification is probably the best; it is based not on firsthand sources but on the comparison of other classifications. The proposal in Figure 1 is the preliminary result of ongoing comparative research. There is some good evidence that Cariban and Tupian languages are distantly related (Rodrigues, 1985); other hypotheses (e.g., Ge-Pano-Carib and Macro-Carib, from Greenberg, 1987) remain mostly unsupported and are not accepted by specialists.

Shafer (1963) was the first attempt at reconstructing Proto-Cariban phonology, but its many flaws make Girard (1971) the real first proposal in this area. The most up-to-date study is Meira and Franchetto (2005). Meira (2000) reconstructs the phonology and morphology of the intermediate proto-language of the Taranoan subgroup.

Main Linguistic Features

Phonology

Cariban languages have small segmental inventories: usually only voiceless stops (*p*, *t*, *k*, *ʔ*), one or two fricatives/affricates (*h* or *Φ*, *s* or *ʃ* or *tʃ*), two nasals (*m*, *n*), a vibrant (*ɾ*, often *ɹ* or *ɽ*), glides (*w*, *j*), and six vowels (*a*, *e*, *i*, *o*, *u*, *ɨ*). Some languages have distinctive voiced obstruents (Bakairi, Ikpeng, Karihona), more than one vibrant or lateral (Bakairi, Kuikuro, Ikpeng, Hishkaryana, Waiwai, Kashuyana), or more fricatives or affricates (Bakairi, Waimiri-Atroari, Kashuyana, Waiwai); others have an extra vowel *ə* (Wayana, Tiriyo, Panare, Bakairi, Pemong, Kapong). Vowel length is often distinctive, whereas nasality usually is not, with few exceptions (Apalai, Bakairi, Kuikuro). Many languages have weight-sensitive

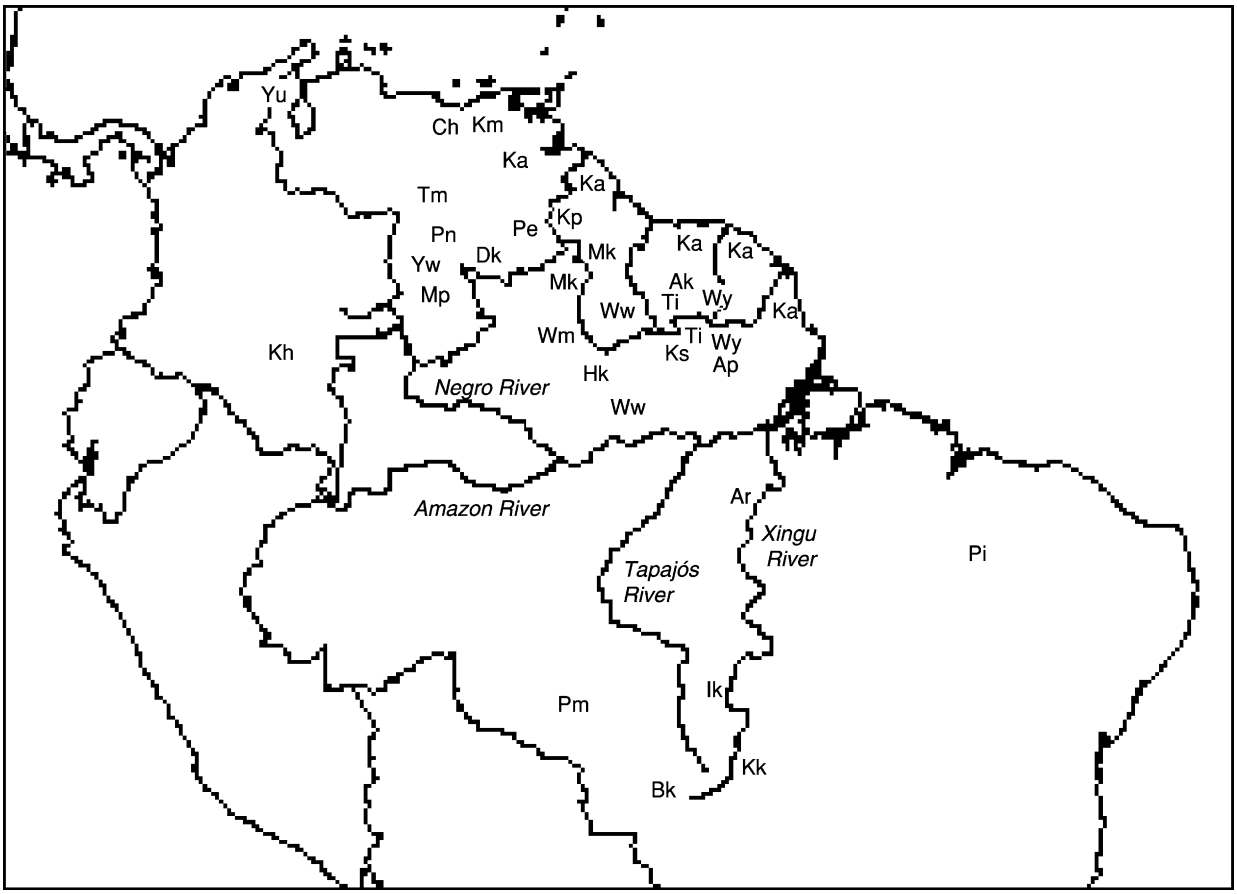

Figure 2 Map of the current distribution of Cariban languages. Living languages in bold, extinct languages in normal type. **AK**, Akuriyo; **Ar**, Arara; **Bk**, Bakairi; Ch, Chayma†; **Dk**, De′kwana; **Hk**, Hishkaryana; **Ik**, Ilkpeng; **Ka**, Karinya; **Kh**, Karihona; **Kk**, Kuikuro; **Km**, Kumanakoto†; **Kp**, Kapong; **Ks**, Kashuyana; **Mk**, Makushi; **Mp**, Mapoyo; **Pe**, Pemong; Pi, Pimenteria†; Pm Palmella†; **Pn**, Panare; **Ti**, Tiriyo; Tm, Tamanaku; **Yu**, Yukpa; **Yw**, Yawarana; **Wm**, Waimiri-Atroari; **Ww**, Waiwai; **Wy**, Wayana.

rhythmic (iambic) stress (Table 1; Meira, 1998); some, however, have simple cumulative, usually penultimate, stress (Panare, Bakairi, Kuikuro, Yukpa). Morphophonological phenomena include stem-initial ablaut in verbs and nouns and the systematic reduction of stem-final syllables within paradigms (Gildea, 1995; Meira, 1999).

Morphology

Cariban languages are mostly suffixal; prefixes exist also, marking person and valency (the latter on verbs). Some languages (Tiriyo, Wayana, Apalai) have reduplication. The complexity of the morphology is comparable to that of Romance languages. There are usually nouns, verbs, postpositions, adverbs (a class that includes most adjectival notions), and particles.

Possessed nouns take possession-marking suffixes that define subclasses (*-ri*, *-ti*, *-ni*, *-Ø*) and person-marking prefixes that indicate the possessor (e.g., Ikpeng *o-megum-rɨ* 'your wrist', *o-muj-n* 'your boat,' *o-egɨ-Ø* 'your pet'). With overt nominal possessors, some languages have a linking morpheme *j-* (e.g., Panare *Toman j-uwəʔ* 'Tom's house, place'). Nouns can also be marked for past ('ex-N,' 'no longer N') with special suffixes (*-tpo*, *-tpɨ*, *-bɨ*, *-tpə*, *-hpə*, *-npə*, etc.; e.g., Bakairi *ũwɨ̃-bɨ-rɨ* 'my late father'). Pronouns distinguish five persons (1, 2, 3, 1 + 2 = dual inclusive = 'you and I,' 1 + 3 = exclusive; the 1 + 3 pronoun functions syntactically as a third-person form) and two numbers (singular, or noncollective, and plural, or collective). The third-person forms also have gender (animate vs. inanimate) and several deictic distinctions (Table 2). To each pronoun usually corresponds a person-marking prefix (except 1 + 3, to which correspond simple third-person markers). In some languages, the 1 + 2 prefixes were lost (Kapong, Pemong, Makushi); in others, the prefixes are replaced by pronouns as overt possessors (Yukpa, Waimiri-Atroari).

In more conservative languages, verbs have a complex inflectional system, with prefixes marking person and suffixes marking various tense-aspect-mood and number distinctions. The person-marking prefixes form what Gildea termed the *Set I* system (Table 3), variously analyzed as split-S or active-stative (e.g., by Gildea) or as cross-referencing both A (Agent) and P (Patient) (Hoff, 1968). In most languages, however, innovative systems have arisen from the reanalysis of older deverbal nominalizations or participials, and are now in competition with the Set I system. Most of the new systems follow ergative patterns, thus creating various cases of ergative splits and even a couple of fully ergative languages (Makushi, Kuikuro, in which the Set I system has been entirely lost). Gildea (1998) provides a detailed account of this diachronic development.

Underived adverbs usually take no morphology other than one nominalizing suffix. There are many postpositions, often formed with smaller locative or directional elements; they can take the same person-marking prefixes as nouns, and (usually) the same nominalizing suffix as adverbs. There are many particles in several syntactic subclasses and with various

Table 1 Rhythmic (iambic) stress: Tiriyo

1. Words with only light (CV) syllables, based on the stem *apoto* 'helper, servant'[a]		
apoto	[(a.po:).to]	'helper'
m-apoto-ma	[(ma.po:).to.ma]	'you helped him'
kɨt-apoto-ma	[(kɨ.ta:).(po.to:).ma]	'the two of us helped him'
m-apoto-ma-ti	[(ma.po:).(to.ma:).ti]	'you all helped him'
kɨt-apoto-ma-ti	[(kɨ.ta:).(po.to:).ma.ti]	'we all helped him'
m-apoto-ma-po-ti	[(ma.po:).(to.ma:).po.ti]	'you all had him helped'
kɨt-apoto-ma-po-ti	[(kɨ.ta:).(po.to:).(ma.po:).ti]	'we all had him helped'
2. Words with at least one heavy (non-CV) syllable.		
kɨn-erahtə-po-ti	[(kɨ.ne:).(rah).(tə.po:).ti]	'he made them all be found'
mi-repentə-tə-ne	[(mi.re:).(pen).(tə.tə:).ne]	'you all paid/ rewarded him'
m-aitə-po-tə-nə	[(mai).(tə.po:).tə.ne]	'you all had it pushed'

[a]Iambic feet are enclosed in parenthesis. Dots = syllable boundaries; hyphens = morpheme boundaries.

Table 2 A typical Cariban pronominal system: Kashuyana

Third person	*Inanimate*		*Animate*		*Other persons*	*Sing.*	*Pl.*
	Sing.	*Pl.*	*Sing.*	*Pl.*			
Anaphoric Demonstrative	*iro*	*iro-tomu*	*noro*	*norojamɨ*	1	*owɨ*	
Proximal	*soro*	*soro-tomu*	*mosoro*	*moʔtʃarɨ*	2	*omoro*	*omjarɨ*
Medial	*moro*	*moro-tomu*	*mokɨ*	*mokjarɨ*	1 + 2	*kumoro*	*kɨmjarɨ*
Distal	*monɨ*	*mon-tomu*	*mokɨro*	*mokjarɨ*	1 + 3	*amna*	

Table 3 Cariban person-marking systems

Conservative (Set I) system: Karinya						*Innovative system: Makushi*			
	IP	*2P*	*1+2P*	*3P*	*(S_A)*		*S*	*P*	*A*
1A		*k-*		*s(i)-*	*∅-*	1	*u-*	*u(j)-*	*-u-ja*
2A	*k-*			*m(i)-*	*m-*	2	*a-*	*a(j)-*	*-∅-ja*
1+2A				*kɨs(i)-*	*kɨt-*	1+2	*i-*	*i(t)-/ ∅-*	*-i-ja*
3A	*∅-/j-*	*a(j)-*	*k-*	*n(i)-*	*n(i)-*	3Refl	*tɨ-*	*t(i)-*	*-tɨ(u)-ja*
(S_P)	*∅-/ j-*	*a(j)-*	*k-*	*n(i)-*					

semantic and pragmatic contents (diminutives, evidentials, modals, etc.; cf. Hoff, 1986, 1990, for the Karinya case).

Class-changing morphology is quite rich. Verbs have many nominalizing affixes ('actual' vs. 'habitual' or 'potential' A, P, S; circumstance; action) and also adverbial-ized forms (participial, temporal, modal, etc.). There also are affixes for intransitivizing, transitivizing and causativizing verb stems (according to their valency). There are several noun verbalizers (inchoative: 'to produce/have N'; privative: 'to de-N X'; dative: 'to provide X with N').

Syntax

Cariban languages are famous as examples of the rare OVS word order (Derbyshire, 1977), with Hishkaryana as the first case study.

(1) *toto* *j-oska-je* *okoje* (Hishkaryana)
man LINKER-bite-PAST snake
'The snake bit the man.'
(Derbyshire, 1979: 87)

Tight syntactic constituents are few: most languages have only OV-phrases (only with third-person A and P), possessive phrases (possessor-possessed), and postpositional phrases. There are no modifier slots: 'modification' is carried out by the apposition of syntactically independent but pragmatically coreferential nominals (e.g., *the woman, that one, the tall one, the one with beads* instead of *that tall woman with beads*). Equative clauses can have a copula, but verbless clauses also occur:

(2) *tuhu* *ʃirə* (Bakairi)
stone this
'This is a stone.'
(author's data)

Negation is based on a special adverbial form of the verb, derived with a negative suffix (usually *-pɨra*, *-pra*, *-hra*, *-ra*, etc.), in a copular clause:

(3) *isapokara* *on-ene-pɨra* *aken* (Apalai)
lizard.sp 3NEG-see-NEG 1:be:PAST
'I did not see a *jacuraru* lizard.'
(Lit. lizard not-seeing-it I-was)
(Koehn and Koehn, 1986: 64)

Subordinate clauses are usually based on deverbal nominals or adverbials. In some languages, there are finite subordinate clauses (Panare, Tamanaku, Yukpa, Tiriyo). The sentences below exemplify relative clauses (in brackets): nominalizations (4) and finite clauses with relativizing particles (5).

(4) *kaikui* *ə-wa:rə,* *[pahko* (Tiriyo)
dog 2-known.to father
i-n-tu:ka-hpə]?
3-PAT.NMLZR-beat-PAST
'Do you know the dog that my father beat?'
(author's data)

(5) a. *tʃonkaiʔpe* *it-etʃeti* *pare* (Tamanaku)
which 3-name priest
[n-epu-i *netʃi]?*
3-come-PAST RELAT
'What is the name of the priest who has (just) come?'
(Gilij, 1782: III, 176)

b. *akeʃ* *peru* *[kat* *amo=n* *woneta]* (Yukpa)
that dog RELAT you=DAT 1.talk
sa=ne *siiw*
thus=3.be white
'The dog that I talked to you about was white.'
(author's data)

With verbs of motion, a special deverbal (supine) form is used to indicate the purpose of the displacement.

(6) *epɨ-he* *wɨ-tə-jai* (Wayana)
bathe-SUPINE 1-go-PRESENT
'I am going (somewhere) to bathe.'
(Jackson, 1972: 60)

Lexicon and Semantics

Cariban languages have few number words, usually not specifically numerical (one = alone, lonely; two = a pair, together; three = a few); higher numbers are expressed with (often not fully conventionalized) expressions based on words for *hand*, *foot*, *person* or *body*, or are borrowings. Spatial postpositions often distinguish: vertical support ('on'), containment ('in'), attachment/adhesion, Ground properties ('in open space,' 'on summit of,' 'in water'), and complex spatial configurations ('astraddle,' 'parallel to,'

'piercing'). Some languages have 'mental state' postpositions (desiderative: *want*; cognoscitive: *know*; protective: *protective toward*; etc.). There are different verbs for eating, depending on what is eaten; to every verb corresponds a noun designating the kind of food in question (e.g., Tiriyo *ənə* 'eat meat,' *otɨ* 'meat food'; *enapɨ* 'eat fruits, vegetables', *nnapɨ* 'fruit, vegetable food'; *əku* 'eat bread', *uru* 'bread food'; *aku* 'eat nuts,' *mme* 'nut food').

See also: Brazil: Language Situation; Colombia: Language Situation; Ergativity; French Guiana: Language Situation; Guyana: Language Situation; Rhythm; Rhythmic Alternations; Suriname: Language Situation; Venezuela: Language Situation; Word Stress.

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Caribbean Lexicography

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Glossaries of 'creolisms' of the Caribbean are found in works ranging from travelogues, novels, and cookbooks to scientific studies, particularly of local flora and fauna. Amateur word lists of varying lengths have also been written for several of the Caribbean territories. These have words and definitions, sometimes with proposed historical derivations, and often include proverbs. The best known are Ottley's series on 'Trinibagianese' (1965–1967), and Mendes's *Cote-ci cote-la*, (1986, 2000) both for Trinidad and Tobago (see also Baptiste, 1993; Haynes, 1987), but these are found for other territories including Jamaica (Maxwell, 1981; Rosen, 1987), Barbados (Collymore, 1955–1970), Belize (McKesey, 1974), Antigua (Christian, 1993), and the Virgin Islands (Seaman, 1967–1976; Valls, 1981). Some word lists focus on contributing languages, for example, Hindi (Mahabir and Mahabir, 1990) and French (Ryan, 1985) or specific domains, for example, dancehall (Francis-Jackson, 1995). These works of 'local slang' are generally intended for a popular, sometimes tourist, audience, often more to amuse than to inform. They are of very limited scope, have no standardized or consistent orthography, and though valuable, are often inaccurate, especially for derivations.

Scholarly lexicography in the English Caribbean began with the landmark *Dictionary of Jamaican English* (Cassidy and Le Page, 1967, 1980). This was the first regional dictionary to be prepared on the historical principles set down by the *Oxford English Dictionary;* it remains a valuable resource and model. Appearing after this are the *Dictionary of Bahamian English* (Holm with Shilling, 1982) and the *Dictionary of Caribbean English Usage* (Allsopp, 1996); the latter is designed to cover the entire English Caribbean beyond Jamaica. Both include illustrative citations and regional designations where known; the latter includes some historical information and guidelines for 'correct' usage. A historical dictionary for Trinidad and Tobago is in preparation (Winer, forthcoming). These dictionaries are all intended to have popular appeal and educational applications, as well as providing information for scholars and readers, especially in linguistics and literature.

Three concerns of current lexicography in the English Caribbean are of particular importance. The first is boundaries of inclusion (Winer, 1993: 48–57), which are often difficult to determine when so many words are shared by a regional English creole and an international standard English. For example, Where words have diverged in meaning, for example, *miserable* E. 'unhappy' vs. CE 'badly behaved,' or are commonly used in the Caribbean but are now archaic in SE, for example, *pappyshow* 'object of ridicule,' it is reasonable to include them. A common problem of amateur works is the inclusion of words as 'local' that are in fact informal or colloquial forms of standard English, for example, *jack up prices, bamboozle*.

The second problem is the lack of an agreed-upon standardized orthography, either within or between countries, with some people favoring a more phonetic approach, and some a more historical one (hampered by frequent uncertainty as to origin) (Winer, 1990). Finally, although all lexicographers may wish for better sources of etymologies, there is a particular lack of appropriate linguistic resources for a number of the major Amerindian and African languages especially relevant to the development of language in the Caribbean.

See also: Barbados: Language Situation; Belize: Language Situation; Jamaica: Language Situation; Trinidad and Tobago: Language Situation.

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Carnap, Rudolf (1891–1970)

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Rudolf Carnap, born on May 18, 1891, in Wuppental (Germany), was a philosopher, logician, and mathematician. From 1910 to 1914 he studied philosophy, mathematics, and physics at the University of Jena and Freiburg, and took part in Frege's courses on the system of logic. Carnap planned to complete his dissertation in physics on thermionic emission, but the advent of World War I interrupted his studies. In 1917 he returned from the war and began to study the theory of relativity in Berlin. The new dissertation he developed dealt with an axiomatic system for the physical theory of time and space (greatly inspired by Kant's *Critique of Pure Reason*). It was issued in 1922 under the title *Der Raum*.

In 1925 Carnap moved to Vienna to accept the post of Assistant Professor at the University of Vienna, and within the next few years he became one of the leaders of the Vienna Circle. In 1931 he moved to Prague to become Professor of Natural Philosophy and four years later emigrated to the United States. He died on September 14, 1970, in Santa Monica, California.

Carnap's works deal mainly with semantics and formal logic, and their application to the methodology of sciences, and also the philosophy of sciences. He researched as well the issue of the basis of mathematics, the theory of probability, logical induction, and the theory of time and space. As his philosophical ideas developed, he underwent a profound change from positivism to neopositivism. In his early works he claimed that philosophical researches should be limited to only the logical analysis of scientific language to which he wanted to apply the traditional philosophy. At the same time, influenced by Wittgenstein, Carnap criticized all kinds of metaphysics, especially realism and idealism, which he called scientific pseudo-problems. Metaphysical statements, he claimed, are neither true nor false, but simply devoid of sense; they are statements only from the grammatical point of view, but logically, they are not statements. Carnap's classification of statements (formulas) in scientific languages may be seen in **Table 1**. The distinction between observational and theoretical formulas, as presented above, led Carnap to distinguish between two scientific laws: empirical and theoretical.

Table 1 Carnap's classification of statements (formulas) in scientific languages

Type of statement	*Observational terms*	*Theoretical terms*
Logical statements	No	No
Purely theoretical statements	No	Yes
Observational sentences	Yes	No
Rules of correspondence	Yes	Yes

Carnap's radical ideas are strongly connected with his view on verification of sentences, and with the need to construct a common language for all empirical sciences. Later, however, the idea of a common language was replaced by a postulate of transformation of (through either reducing or eliminating) the general scientific terms into the language of classical physics. In his last years his views were less categorical. He formulated a kind of basis for the construction of a scientific language, allowing for the use of scientific languages constructed differently. Carnap tried to combine his empiric attitude (connected with the science of natural history) with phenomenalism (a tendency of subjective treatment of experience). Thus, his ideological metamorphosis added also to the decrease of the phenomenological approach.

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Cartography: Semiotics

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Introduction

Maps suggest an intrinsic and largely unconscious link between knowledge and visual representation (pictures, diagrams, etc.), with one implying the other. A map is a type of diagram that allows a user to find places on terra firma through a drawing of those places. **Figure 1**, for example, shows how to go from one location (**A**) to another (**B**). The locations are represented as points and the streets as lines meeting at right angles. Getting to **B** involves traveling west two blocks and north three blocks from location **A**. Compass directions are specified as N = north, S = south, E = east, W = west; and blocks with equally calibrated units on the lines:

With such simple diagrammatic elements (points, lines, etc.), it is actually possible to represent all kinds of actual topographical spaces, in outline form. A map can thus be defined, semiotically, as a diagrammatic text constructed with elemental visual signifiers (*see* **Visual Semiotics**) that are designed to indicate where a topographical object (a place, a river, a mountain, etc.) is located on terra firma, by using signifiers that resemble the features they represent in schematic, or in some cases, actual pictographic form. For example, a small tree might stand for a forest, an orchard, or a state park. But many signifiers have little resemblance to the features they represent, as when a circle stands for a city. The same sign may represent different features on different maps. For example, a triangle might represent a mobile home park on one map and an eagle's nest on another. Such differences make it important to read the map 'legend,' as it is called, to find out what each sign means on a particular map.

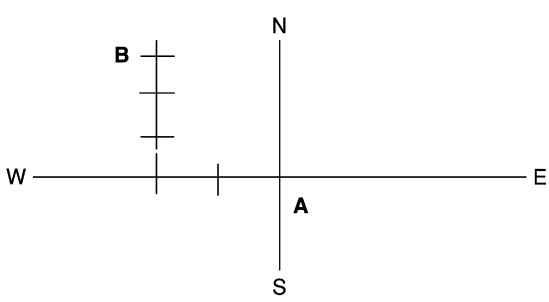

Figure 1 Map of how to get from **A** to **B**.

The relation of the elements to each other involves 'scaling.' A scale shows the mathematical relationship by which distances on a map reduce actual distances on Earth. Many maps illustrate scale by marking off distances on a straight line. Each mark shows how distance on the line corresponds to miles, kilometers, or other units of measurement on Earth. Other maps state the scale in words and figures. Such a scale might appear as *1 inch: 16 miles*. In this relationship, 1 inch (2.5 cm) on the map represents a distance of 16 miles (26 km).

Representative fractions are also used to show scale. These indicate the number of distance units on Earth represented by one unit on the map. In the example above, where the scale is 1 inch: 16 miles, the representative fraction would be 1:1 000 000 or 1/1 000 000, because there are 1 000 000 inches in 16 miles. The relationship remains the same for inches,

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Cartography: Semiotics

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Introduction

Maps suggest an intrinsic and largely unconscious link between knowledge and visual representation (pictures, diagrams, etc.), with one implying the other. A map is a type of diagram that allows a user to find places on terra firma through a drawing of those places. Figure 1, for example, shows how to go from one location (**A**) to another (**B**). The locations are represented as points and the streets as lines meeting at right angles. Getting to **B** involves traveling west two blocks and north three blocks from location **A**. Compass directions are specified as N = north, S = south, E = east, W = west; and blocks with equally calibrated units on the lines:

With such simple diagrammatic elements (points, lines, etc.), it is actually possible to represent all kinds of actual topographical spaces, in outline form. A map can thus be defined, semiotically, as a diagrammatic text constructed with elemental visual signifiers (*see* **Visual Semiotics**) that are designed to indicate where a topographical object (a place, a river, a mountain, etc.) is located on terra firma, by using signifiers that resemble the features they represent in schematic, or in some cases, actual pictographic form. For example, a small tree might stand for a forest, an orchard, or a state park. But many signifiers have little resemblance to the features they represent, as when a circle stands for a city. The same sign may represent different features on different maps. For example, a triangle might represent a mobile home park on one map and an eagle's nest on another. Such differences make it important to read the map 'legend,' as it is called, to find out what each sign means on a particular map.

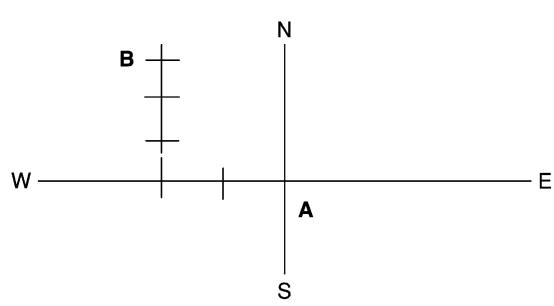

Figure 1 Map of how to get from **A** to **B**.

The relation of the elements to each other involves 'scaling.' A scale shows the mathematical relationship by which distances on a map reduce actual distances on Earth. Many maps illustrate scale by marking off distances on a straight line. Each mark shows how distance on the line corresponds to miles, kilometers, or other units of measurement on Earth. Other maps state the scale in words and figures. Such a scale might appear as *1 inch: 16 miles*. In this relationship, 1 inch (2.5 cm) on the map represents a distance of 16 miles (26 km).

Representative fractions are also used to show scale. These indicate the number of distance units on Earth represented by one unit on the map. In the example above, where the scale is 1 inch: 16 miles, the representative fraction would be 1:1 000 000 or 1/1 000 000, because there are 1 000 000 inches in 16 miles. The relationship remains the same for inches,

centimeters, miles, kilometers, or any other units of measurement.

Given the obvious relevance of maps to semiotics, it is somewhat surprising to find that genuine interest on the part of semioticians in maps goes back only to 1967, with the appearance of Bertin's *Sémiologie graphique* (1967). However, since then, interest has burgeoned, as has interest in the use of semiotic theory among cartographers (e.g., Casti, 2000; Foote, 1985, 1988; Hsu, 1979; Ljungsberg, 2002, 2004; Palek, 1991; Pravda, 1993, 1994; Schlichtmann, 1985, 1999a; Wood and Fels, 1986), leading to the materialization of a branch that is now called 'cartosemiotics' (Wolodtschenko, 1999). A general survey of cartosemiotic literature can be found in Schlichtmann (1999b).

Historical Background

As with any socially functional text, maps tend to condition how groups perceive and interpret territories. To illustrate how a map can do this, consider the technique of cylindrical projection in Western mapmaking. Developed by the Flemish geographer Gerardus Mercator (1512–1594), it consists of wrapping a cylinder around the globe, making it touch the equator, and then projecting (1) the lines of latitude outward from the globe onto the cylinder as lines parallel to the equator, and (2) the lines of longitude outward onto the cylinder as lines parallel to the prime meridian (the line that is designated 0° longitude, passing through the original site of the Royal Greenwich Observatory in England). The resulting two-dimensional map can be made to represent the world's surface as a two-dimensional plane figure such as a rectangle or an ellipse. Figure 2 is an example of the latter.

Because of the curvature of the globe, the latitude lines on the map nearest the poles appear closer together. This distortion makes the sizes of certain landmasses appear smaller than they are. Indeed, the very concept of 'worldview' derives from the fact that the ways in which we come to 'view the world' are, in part, a consequence of how that world is represented for viewing by the maps we make of it.

Although modern technology now makes it easy to construct three-dimensional and, thus, nondistorting maps, traditionally the term 'map' has designated a two-dimensional representation of an area; three-dimensional maps are more accurately known as 'models.' All civilizations have developed mapmaking techniques to meet a host of social needs. In many cultures, these were elaborated and refined in tandem with the rise and growth of the mathematical sciences. Since Mercator invented the cylindrical projection method, most mapmaking techniques have been devised in accordance with the principles of Cartesian coordinate geometry. This consists, essentially, of two perpendicular number lines in a plane. Points of a geometric figure are located in the plane by assigning each point two coordinates (numbers) on the number lines x and y. The x-coordinate, called the line of latitude in cartography, gives the location of the point along the horizontal number line. The y-coordinate, called the line of longitude, locates the point along the vertical number line.

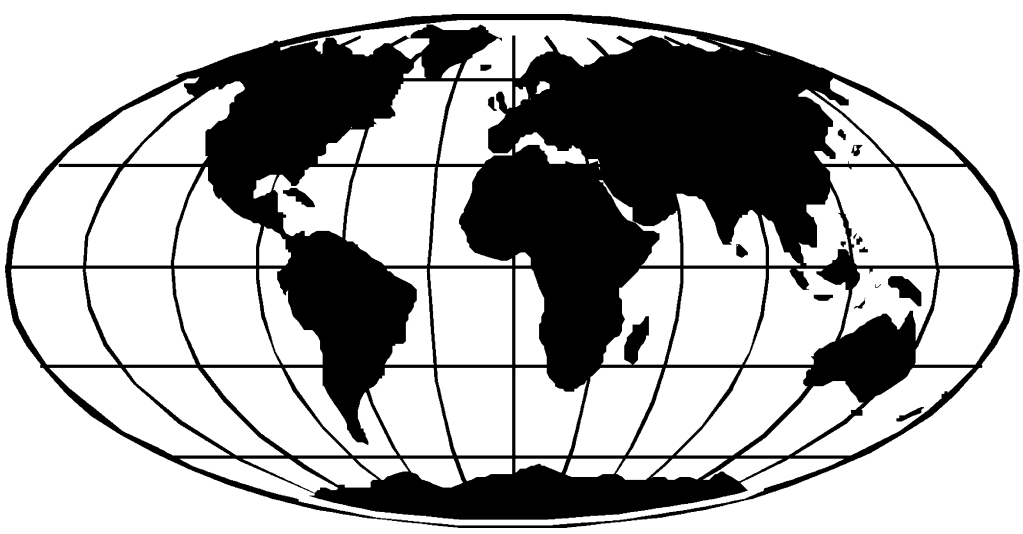

Figure 2 The Mercator projection.

By convention, longitude is marked 180° east and 180° west from 0° at Greenwich, England. Latitude is marked 90° north and 90° south from the 0° parallel of the equator. Points on a map can be accurately defined by giving degrees, minutes, and seconds for both latitude and longitude. As mentioned, distances are represented with the technique of 'scaling,' whereby two points on the earth are converted to two corresponding points on the map by means of a scale: for example, a scale of 1:100 000 means that one unit measured on the map (say 1 cm) represents 100 000 of the same units on the earth's surface. The varying heights of hills and mountains, and the depths of valleys, are portrayed instead with the technique known as 'relief.' In earlier maps, this consisted in making small drawings of mountains and valleys on the maps. But this was extremely imprecise and thus came eventually to be supplanted by the use of 'contour lines.' The shapes of these lines provide accurate representations of the shapes of hills and depressions, and the lines themselves show actual elevations, so that closely spaced contour lines indicate steep slopes. Other methods of indicating elevation include the use of colors, tints, hachures (short parallel lines), and shadings. When colors are used for this purpose, a graded series of tones is selected for coloring areas of similar elevations. Shadings or hachures, neither of which show actual elevations, are more easily interpreted than contour lines and are sometimes used in conjunction with them for achieving greater fidelity in representation.

The first known maps were made by the Babylonians around 2300 B.C. Carved on clay tablets, they consisted largely of land surveys made for the purposes of taxation. More extensive regional maps, drawn on silk and dating from the 2nd century B.C., have been found in China. The precursor of the modern map, however, is believed to have been devised by the Greek philosopher Anaximander (ca. 611–ca. 547 B.C.). It was circular and showed the known lands of the world grouped around the Aegean Sea at the center and surrounded by the ocean. Anaximander's map constituted one of the first attempts to think beyond the immediate territorial boundaries of a particular society – Greece – even though Anaximander located the center of the universe in the Aegean Sea. Then, around 200 B.C., the Greek geometer and geographer Eratosthenes (276?–195? B.C.) introduced the technique of parallel lines to indicate latitude and longitude, although they were not evenly and accurately spaced. Eratosthenes's map represented the known world from present-day England in the northwest to the mouth of the Ganges River in the east and to Libya in the south. About 150 A.D., the Egyptian scholar Ptolemy (ca. 100–ca. 170 A.D.) published the first textbook in cartographic science, entitled *Geographia*. Even though they contained a number of errors, his were among the first maps of the world to be made with mathematical principles. At about the same time in China, mapmakers were also beginning to use mathematically accurate grids for making maps. Figure 3 is Ptolemy's map of the world, which may have been made by Ptolemy himself or by

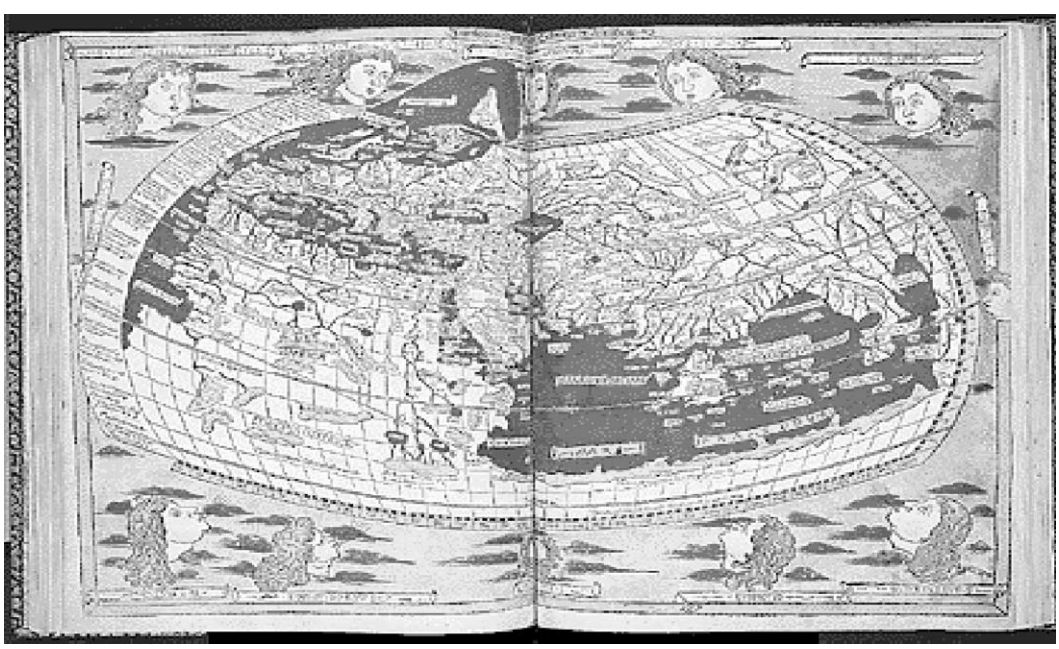

Figure 3 Ptolemy's map of the world.

cartographers who rediscovered his work after it had been lost for many centuries.

The next step forward in cartography came in the medieval era, when Arab seamen made highly accurate navigational charts, with lines indicating the bearings between ports. In the 15th century, influenced by the publication of Ptolemy's maps, European mapmakers laid the foundations for the modern science of cartography. In 1507, for instance, the German cartographer Martin Waldseemüller (ca. 1470–ca. 1522) became the first to apply the name America to the newly identified trans-Atlantic lands, separating America into North and South – a cartographic tradition that continues to this day – and differentiating the Americas from Asia. In 1570, the first modern atlas – a collection of maps of the world – was put together by the Flemish cartographer Abraham Ortelius (1527–1598). The atlas, titled *Orbis Terrarum*, contained 70 maps.

Undoubtedly, the most important development in the 16th century came when Mercator developed the technique of cylindrical projection in 1569, as mentioned above (Crane, 2002). This allowed cartographers to portray compass directions as lines, at the expense, however, of the accurate representation of relative size. By the 18th century, the modern-day scientific principles of mapmaking were well established. With the rise of nationalism in the 19th century, a number of European countries conducted topographic surveys to determine political boundaries. In 1891, the International Geographical Congress proposed the political mapping of the entire world on a scale of 1:1 000 000, a task that occupied cartographers for over a century. Throughout the 20th century, advances in aerial and satellite photography, and in computer modeling of topographic surfaces, have greatly enhanced the versatility, functionality, accuracy, and fidelity of mapmaking.

Today, the so-called Geographic Information System (GIS) consists of computers, computer programs, and extremely large amounts of information, which is stored as computer code and can include measurements or photographs taken from land, sea, or space. Cartographers can use GIS to produce many different maps from the stored data. These are easily stored on computer software or devices, such as CD-ROMs, which enable people to choose exactly the area they want to view, then print a map. There are now also in-vehicle navigation systems that create maps to guide drivers of moving vehicles. These systems constantly track a vehicle's location by using signals from a group of space satellites called the Global Positioning System (GPS). A computer in the vehicle combines the position data with stored street map data and produces maps of the route to a destination. The maps change as the vehicle moves. Some in-vehicle systems show the map on a small screen. Other systems produce spoken directions.

To navigate airplanes, aeronautical charts are used. Depending on their level of certification, pilots use Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) charts. VFR charts show landmarks that pilots can see as they fly, such as roads, bridges, and towns. These also show airports and indicate the heights of mountains and other obstacles. IFR charts are designed for radio navigation. These show the location of transmitters of high-frequency radio signals. Pilots use these signals to determine their position and plot their course. Some airplanes are equipped with computer systems that produce heads-up display maps. These are projected near eye level where the pilot can see them without looking down.

General Semiotic Considerations

How do we interpret a map? To say 'I am here, but I want to get to there' on a map involves two levels of interpretation: (1) that *here* and *there* are indexes (signs indicating location) in map space standing for points in real space, and (2) that the movement from here to there on a map stands for the corresponding movement between two points in real space through scaling.

Modern mapmaking is based, as mentioned, on the principles of Cartesian geometry, which segment the map space into determinable points and calculable scaled distances. The traditional maps of North American aboriginal peoples, on the other hand, are designed to show the interconnectedness among the parts within the map space through a distortion of distance, angulation, and shape, not through segmentation and scaling. Western maps represent the world as an agglomeration of points, lines, and parts, related to each other in terms of the mathematics of the Cartesian plane; aboriginal maps represent it instead as a holistic, unsegmentable entity.

The two types of mapmaking systems thus reveal different worldviews. These have had specific 'consequences,' such as village and city design. Cartesian mapmaking has clearly influenced the design of modern cities. Not only does the layout of the city of New York, for example, mirror a Cartesian map, but the city also names its streets largely in terms of the grid system: for example, 52nd and 4th refers to the intersection point of two perpendicular lines in the city grid. In a fundamental semiotic sense, such cities are the 'iconic byproducts' of the worldview that has been enshrined into groupthink by the widespread use of grid maps since the early 16th century.

As representations of terra firma, maps are also 'intellectual codes' and can thus be used as both navigational and exploratory models of the world. In the same way that the sciences of geometry and trigonometry have allowed human beings to solve engineering problems since ancient times, the science of cartography has allowed explorers to solve navigation and exploration problems with amazing accuracy. Exploration involves determining position and direction. Position is a point on the earth's surface that can be identified in terms of a grid or coordinate system. Direction is the position of one point relative to another within the system. The shortest distance between two points is a straight line, and since any line in the plane is a hypotenuse, then its length can be determined easily by the Pythagorean theorem. In this way, maps have allowed navigators to fix points and determine distances to regions of the plane (i.e., the earth's surface). Explorers setting out on a journey may not know what they will encounter along the way, nor will they know in advance if they will reach a land mass or a body of water. But they can still take that journey with a high degree of assurance that they will be able to predict where they are on terra firma.

Exploration is ancient. According to many archaeologists and historians, it began approximately 3000 years ago in the area of the eastern Mediterranean Sea. Since then nearly every portion of the earth's land surface has been explored and mapped. Space photography and advanced measurement technology, including a laser reflector placed on the moon, have made possible extremely precise measurements of the earth's surfaces. Considerable work is now being carried out to investigate the vast regions that are under the seas.

What is even more remarkable is that cartography has permitted us to describe the positions of heavenly bodies and to calculate their distances from Earth with accuracy. Suffice it to say here that mapping outer space involves the use of techniques that correspond to terrestrial point fixing in terms of latitude and longitude lines. Simply put, the positions of stars relative to one another are regarded as points on a celestial map; the motion of the sun, the moon, and the planets is then indicated as a mean rate of progression across the celestial space. It is truly mind-boggling to think that with the aid of a simple representational device (the map), we have already been able to set foot on the moon and will no doubt be able to visit other places in the skies in the not-too-distant future.

As a final word on the navigational uses of maps, the recent development of computer systems that are used in advanced traffic management to improve traffic control merits some consideration here. Traffic along major highways in some cities is monitored by remote cameras, radar, or sensors in the roadway. A central computer system analyzes the information. If roads are congested, traffic flow can be improved by automatically adjusting traffic-signal timing, controlling traffic flow on freeway ramps, or providing information to drivers by means of electronic signs along the roads. Advanced traveler-information systems are also currently available in some automobiles. These are navigational systems into which drivers enter their destination. An electronic map then displays the best route on a small screen, or a synthesized voice provides directions along the route, including directions on when to turn. These systems use a transponder, or a transmitting and receiving device, in the vehicle and a satellite-based GPS to pinpoint the exact location of the vehicle along its route. When this navigation system is coupled with cellular-radio technology, it can be used to signal a central dispatcher in case of an emergency.

Maps as Texts

Reading maps constitutes a culture-specific form of text-interpretation. A map of New York City would probably not be interpreted as a map by a nomad from the north of Iraq or by an Inuit hunter in Nunavut. A map is identified as such because the visual signifiers that compose it (lines, colors, shapes, and so on) are understood as topographical elements. Like any text (*see* **Texts: Semiotic Theory**) understanding that these elements are part of a whole implies understanding the cartographic code – which in the case of Western maps is Cartesian in nature. Map reading is thus a culture-based text decipherment process, in which the reader constructs the meaning of the map out of the elements that have been assigned specific roles and positions on the text according to the position and relationships between them in the real world. As Wood and Fels (1986) argued, every map is a synthesis of signs and a sign in itself – an artifact of depiction of referents and an instrument of promoting worldview. Like any other kind of text, it is a product of a specific code – a set of conventions that prescribe relations of content and expression in given contexts.

As noted above, some of the elements that constitute a map text include combinations of lines, shapes, and colors to denote road types, green spaces, lakes, and other water bodies, together with miscellaneous types of buildings. The relationships between these elements directly correspond to relationships between the objects and spaces in the real world. A map reflects the real world's structure in the way that the signifiers are combined together – buildings don't

overlap, they are not built in the middle of roads, there is no parkland in the middle of a lake, and so on.

Like any text, moreover, a map is created with an audience in mind, unless it is a personal map. Thus, once the map is finished, the author relinquishes his or her rights to the interpretation of the map, and the text belongs to the audience, which 're-writes it,' 're-fashions' it, or 'adds to' it to suit its specific interpretive needs. If we know the audience for which the map was made, and we compare it to maps made for other audiences, the differences between the two can tell us a lot about the author's intentions, the social situation of the audiences, and the type of power discourse that the map supports or undermines.

A map is supposed to be denotative in that it must resemble the area it represents as closely as possible. Yet, as Derrida (1976) cogently argued in reference to any text, the actual social meanings of maps are constantly 'slipping away' from each other, constantly shifting and changing so that they can never be exactly determined. The slippage in this case is due to the fact that a map is the simplification of a complex topographical object, either drawn on paper or modeled on computer with the aid of photography (which provides perspective).

The modern history of scientific cartography has, in fact, revolved around attempts to solve the slippage problem. To represent the entire surface of the earth without distortion requires a spherical globe. A flat map cannot accurately represent the earth's rounded surface except for very small areas where the curvature is negligible. To accurately display large or medium sized parts of the earth's surface a map must be drawn with distortions of areas, distances, and directions. Various projection techniques are used to prepare flat maps of the earth's surface. These are classified as geometric or analytic depending on the technique used to develop them. Geometric projections are classified based on the type of surface on which the map is assumed to be developed (i.e., cylinders, cones, or planes), while analytical projections are developed by mathematical computation.

Solving the slippage problem has been greatly assisted, needless to say, by technological innovations since World War II. Perhaps most important has been the use of remote-sensing techniques that gather information about an area from far above the ground via aerial and satellite photography. Improvements in satellite technology, computer software, and the use of satellite triangulation have substantially improved the accuracy of remote-sensing techniques and of today's maps.

The foundation of a modern map is a careful survey giving geographical locations and relations of many points in the area being mapped. Nearly all maps developed today make use of both remote-sensing and traditional land-surveying information. Once the information is collected, the map is carefully planned with regard to its final use, so that the information can be rendered clearly and accurately. The collected surveys and remote-sensed data are then used to enter a large number of points on a grid of crossed lines corresponding to the projection chosen for the map. Elevations are determined and contour lines, roads, and rivers are drawn. Final preparation of a map for printing begins by making a series of sheets, one for each color used on the map, that are then scribed onto the surface by a sharp etching tool. Each of these sheets is then used as a negative from which a lithographic plate is made.

But despite all the technological innovations, a map is still a text and, thus, subject to slippage, albeit of a different kind. Reading precisely made maps still requires knowing that the elements on them are signifiers that cohere into an overall representation of space, even if the representation has largely eliminated scale and angle distortions. A device such as a continuous-curve plotter enables a computer to draw accurate maps from the stored data. Computer-generated maps can also be displayed on a video screen, where an operator can easily make alterations in the content. Because such maps, and each incorporated change, can be stored in the computer, they are useful in furnishing an animated picture of a change over a period of time.

Conclusion

The map is an important tool, not only for navigation and exploration purposes, but also for cultural identification purposes. In addition to providing a wealth of factual information, the map permits visual comparison between areas because it may be designed to indicate, by means of symbols, not only the location but also the characteristics of geographic features of an area and, thus, to give it a representation. Like any 'memory code,' such as a history book, this can then be stored for preservation. No wonder, then, that geographers have developed a standard pattern of map symbols for identifying such cultural features as homes, factories, churches, dams, bridges, tunnels, railways, highways, travel routes, mines, farms, and grazing lands.

As map viewers, we think that we have 'topographical reality' laid bare before us. But, as cartosemiotics has shown (and as has been argued in this article), understanding maps involves a process of text decipherment on the part of reader – even if the 'reader' is a computer (which still has to be programmed by a human being). Studying maps from a

semiotic point of view leads to a complex picture of the possibilities and the limitations that the map offers (Foote, 1985, 1988). Technologically made maps belong to a contemporary code of mapmaking that involves the use of informatics. But informatics itself is a code of its own. In effect, the lesson to be learned from studying maps semiotically is that no matter how accurate we try to make our scientific texts, they are inevitably subject to human interpretation in psychological, historical, and cultural terms.

See also: Iconicity; Indexicality: Theory; Sapir, Edward (1884–1939); Texts: Semiotic Theory; Visual Semiotics; Whorf, Benjamin Lee (1897–1941).

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Case

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Case Marking

Case is essentially a system of marking dependent nouns for the type of relationship they bear to their heads. Traditionally, the term refers to inflectional marking, and, typically, case marks the relationship of a noun to a verb at the clause level or of a noun to a preposition, postposition, or another noun at the phrase level. Straightforward examples of case systems can be found in the Dravidian languages. **Table 1** shows the set of case forms for the noun *makan* 'son' in Malayalam.

The nominative is the citation form and is used for the subject of a clause. The accusative is used for the direct object and the dative for the indirect object (the recipient of a verb of giving). The genitive expresses the possessor (*makan̲re peena* 'son's pen') and the sociative (alternatively comitative) expresses the notion of 'being in the company of'. The locative expresses location, and the instrumental expresses the instrument, as in 'cut with a knife' and the agent of the passive. The ablative expresses 'from'. It is built

Table 1 Malayalam case system

Nominative	makan
Accusative	makane
Dative	makan̲nə
Genitive	makan̲re
Sociative	makanooɽə
Locative	makanil
Instrumental	makanaal
Ablative	makanilninnə

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Ablative	makanilninnə

on the locative, and some linguists would take a form like *makanilninnə* to consist of the locative plus the postposition *ninnə*.

Malayalam and the other Dravidian languages provide good examples of case systems since these languages are agglutinative and the case marking (*-e* accusative, *-il* locative, etc.) can easily be isolated. Moreover, the case marking is consistent across singular and plural. Plural is marked as a first-order suffix between the stem and the case marking, as in the following:

(1) Kappal tiramaala-kaɭ-e bheedicu.
ship *wave*-PL-ACC *split*-PT
'The ship broke through the waves.'

In Malayalam, the accusative case is generally used for the direct object only for human nouns, the nominative being used for other nouns. However, where both subject and object are inanimate as in (1), the accusative is used.

Case systems are a feature of conservative Indo-European languages such as Russian and Greek, and much of our framework for describing case comes from the study of the classical languages Ancient Greek, Latin, and Sanskrit. However, there is a complication in these languages in that number marking and case marking are never separate. This means separate paradigms for the two number categories of singular and plural. Moreover, there are different case/number forms for different stem classes. Traditionally five such classes are recognized, and there are also variations within the classes. Three of these classes, or declensions as they are usually referred to, are illustrated in Table 2: the first declension (*ā*-stems), second declension (*o*-stems). and third declension (consonant stems and *i*-stems). The designations *ā*-stems, *o*-stems, and so forth are not synchronically transparent and reflect the product of historical reconstruction.

In Latin, there is also a three-way gender distinction: masculine, feminine, and neuter. With a few exceptions male creatures are masculine and females feminine, but inanimates are scattered over all three genders (though almost all neuter nouns are inanimate). There is a partial association of form and gender in that *ā*-stems are almost all feminine and *o*-stems mostly masculine (except for a subclass of neuters, represented by *bellum* in Table 2). This means that there can be fusion of gender, number, and case. The point is illustrated in Table 2, where we have *domina* 'mistress (of a household)' illustrating feminine *ā*-stems and *dominus* 'master (of a household)', which is based on the same root, representing masculine *o*-stems. As can be seen from Table 2, the word form *domina* simultaneously represents nominative case, feminine gender, and singular number; *dominum* represents accusative case, masculine gender, and singular number; and similarly with other word forms.

In Latin, adjectives decline like nouns, and there is concord between a noun and an attributive or predicative adjective. This concord is sensitive to case and number, and those adjectives that belong to the first and second declension are sensitive to gender. So we find *domina bona* 'good mistress' and *agricola bonus* 'good farmer', where *agricola* is one of the few nouns of masculine gender in the first declension. With adjectives of the first and second declensions, the inflections simultaneously represent case, number, and gender without exception.

Table 2 Latin case paradigms

	1	*2*		*3a*	*3b*
	ā-stems	*o*-stems		cons.stems	*i*-stems
	feminine	masculine	neuter		
	domina	*dominus*	*bellum*	*cōnsul*	*cīvis*
	'mistress'	'master'	'war'	'consul'	'citizen'
Singular					
Nominative	*domina*	*dominus*	*bellum*	*cōnsul*	*cīvis*
Vocative	*domina*	*domine*	*bellum*	*cōnsul*	*cīvis*
Accusative	*dominam*	*dominum*	*bellum*	*cōnsulem*	*cīvem*
Genitive	*dominae*	*dominī*	*bellī*	*cōnsulis*	*cīvis*
Dative	*dominae*	*dominō*	*bellō*	*cōnsul,*	*cīvī*
Ablative	*dominā*	*dominō*	*bellō*	*cōnsule*	*cīvī, cīve*
Plural					
Nominative	*dominae*	*dominī*	*bella*	*cōnsulēs*	*cīvēs*
Vocative	*dominae*	*dominī*	*bella*	*cōnsulēs*	*cīvēs*
Accusative	*dominās*	*dominōs*	*bella*	*cōnsulēs*	*cīvīs, cīvēs*
Genitive	*dominārum*	*dominōrum*	*bellōrum*	*cōnsulum*	*cīvium*
Dative	*dominīs*	*dominīs*	*bellīs*	*cōnsulibus*	*cīvibus*
Ablative	*dominīs*	*dominīs*	*bellīs*	*cōnsulibus*	*cīvibus*

Six cases are recognised: nominative, vocative, accusative, genitive, dative, and ablative; however, no paradigm exhibits six different forms. In the traditional descriptions, a case is established wherever there is a distinction for any single class of nominals, since this facilitates the description of the functions. The vocative, the case used in forms of address, has a distinctive form only in the singular of the second declension. Elsewhere there is a common form for the nominative and vocative; however, distinct nominative and vocative cases are recognized for all paradigms. The utility of this approach can be seen in a phrase such as *O sōl laudande* 'Oh, praiseworthy sun'. Here the adjective has a distinctive vocative form (masculine, singular) but the noun *sōl* does not, but we can still say there is concord.

Types of Case

The term *case* is from Latin *cāsus*, which is in turn a translation of the Greek *ptōsis* 'fall'. The nominative was considered the basic form of nominals, and the other cases 'fell away' from this form and were referred to as the oblique cases. In some languages there is a formal difference between the nominative and the oblique, inasmuch as the oblique cases are built on a common oblique stem. In Malayalam, for instance, some nouns such as *maram* 'tree' have an oblique stem *maratt-* so the accusative is *maratte*, locative *marattil*, and so on (cf. Table 1).

In the description of cases, a distinction is often made between syntactic or grammatical cases and semantic cases. The nominative and accusative are grammatical cases in that they encode the grammatical relations of subject and object respectively, whereas a case such as the locative in Malayalam is semantic in that it expresses a specific semantic role, namely, the notion of position. It can also be said that nominative and accusative function to distinguish arguments of a predicate, whereas a semantic case has content and is a predicate. A further distinction is sometimes made among the semantic cases between local and nonlocal cases. Local cases are those referring to place such as locative ('at'), allative ('to'), and ablative ('from'). However, the distinction between grammatical and semantic case is blurred somewhat by the fact that a primarily grammatical case can have a semantic function and a semantic case can have a grammatical function. In Latin the accusative, a grammatical case, is used to express destination *Vādō Rōmam* 'I go to Rome' and extent or duration, as in *xxv annōs* 'for 25 years', and the ablative, a semantic case, is used for the logical subject in the passive (*occīsus ā cōnsule* 'killed by the consul').

The genitive case is distinct from the others in that it is typically adnominal, marking the dependent of a nominal, whereas the other cases typically mark the dependents of verbs. The genitive has a semantic function, namely that of expressing possession, as in the Latin phrase *cōnsulis equus* 'the consul's horse', but it can have a variety of other functions. In Latin its grammatical character can be seen particularly in a phrase such as *amor patris*. This phrase is ambiguous: it can mean either the love felt by a father or the love directed towards the father. The former is called the subjective genitive since *pater* corresponds to the subject in the verbal expression: *Pater amat* 'Father loves'. The latter is called the objective genitive since *pater* corresponds to the object in *Amat patrem* 'He or she loves father'.

The dative case takes its name from the Latin verb *dāre* 'to give' since it expresses the recipient of verbs of giving. In Latin the dative also expresses the complement of a handful of two-place verbs such as *fidere* 'to trust' and *parēre* 'to obey'. It additionally expresses the experiencer of a few verbs such as *placēre* 'to please': *Dominō non placet bellum* 'War is not pleasing to the master'. A similar range of functions can be found in a number of languages. However, in a few languages, and regularly across the Indian subcontinent, the dative encodes the actor in certain aspects. In Malayalam, for instance, the dative in conjunction with the potential marker *-aam* on the verb signals physical ability or permission.

(2) Avalkku avane itikkaam.
her.DAT *him*.ACC *can/may.hit*
'She can hit him.'

The Latin ablative also illustrates a further complication. Although nominally a semantic case expressing 'from', it represents a syncretism of an ablative, locative, and instrumental, which were distinguished in earlier stages of the language, and therefore it expresses a variety of semantic roles.

A more useful distinction than between syntactic and semantic cases is between core and peripheral cases, where the core refers to subject and object.

Types of Case System

Accusative system

The most common system of core cases is one that opposes nominative for subject and accusative for object. This system is found in various language families, including Indo-European, Uralic, Turkic, Mongolian, Tungusic, and Dravidian (see (1) above), as well as in Korean and Japanese (see (15) below).

Ergative system

A sizable minority of languages have one case for the agent of a transitive verb (A) and another for the subject of an intransitive predicate (S) and direct object (O). The former is called the ergative case, and the latter is called either nominative or absolutive. The latter label is also used for a grammatical relation covering S and O. The absolutive is usually unmarked, as in the following illustration from Yalarnnga (Australian).

(3) Yirri tjala ngani-mi yimarta-ta.
man.ABS *this*.ABS *go*-FU *fish*-PURP
'The man will go for fish.'

(4) Kilawurru tjala yirri-nthu wala-mu payarla-yu.
galah.ABS *this*.ABS *man*-ERG *hit*-PT *boomerang*-ERG
'A man killed the galah with a boomerang.'

Note that in (4) the ergative also encodes the role of instrument. It is very common for ergatives to have non-core functions, another example of grammatical cases having semantic functions.

Ergative systems are often considered rare and remote, but in fact they make up at least 20% of the world's languages. Ergative systems are to be found in Basque, all families of the Caucasian phylum, in the Tibeto-Burman languages, in Austronesian, in most Australian languages, in some languages of the Papuan families, in Eskimo-Aleut, in Tsimshian and Chinook in North America, in the Mayan languages of Central America and several families of South America (Dixon, 1994:5), and in Hurrian and several other languages of the ancient Near East.

Split-intransitive system

Some languages, perhaps no more than a few score, organize their core grammar so that the argument of some one-place predicates is marked like the A of a two-place verb, while the argument of the other one-place predicates is marked like the O of a two-place verb. Such languages have been called split-intransitive languages or split-S languages (Dixon, 1994:70ff). Examples can be found in the Kartvelian (South Caucasian) languages of the Caucasus. The following sentences are from Laz. Note that the suffix *-k*, glossed ergative on the basis of its appearance on A in transitive clauses like (7), also appears on the 'agent' of the intransitive verb in (5). On the other hand, the subject of the intransitive verb in (6) is unmarked like the O of (7).

(5) Bere-k imgars.
child-ERG 3SG.*cry*
'The child cries.'

(6) Bere oxori-s doskidu.
child.ABS *house*-DAT 3SG.*stay*
'The child stayed in the house.'

(7) Baba-k meçcaps skiri-s cxeni.
father-ERG 3SG.*give*.3SG.3SG *child*-DAT *horse*.ABS
'The father gives a horse to his child.'

This pattern also occurs in Georgian, but it applies only to certain classes of verbs in the aorist tense group. In the present tense, all subjects are in the nominative case and the direct objects in the dative.

The active system is also found in the Americas, where it usually shows up in the bound pronouns on the verb. It has been reported from Guaraní (Andean); Lakhota (Lakota) and other Siouan languages; the Pomoan (Pomo) languages; Caddo, Arikara, and other Caddoan languages; and Mohawk, Seneca, and other Iroquoian languages. It also occurs in Acehnese (Austronesian).

Direct-Inverse System

Another system of marking the core relations is the direct-inverse system. In this system, which is characteristic of the Algonquian languages, the marking on the verb indicates whether an activity is direct or inverse. If the action proceeds from first or second person to third it is direct, but if it proceeds from third to first or second it is inverse. In transitive clauses with two third-person participants, the direct and inverse markers distinguish whether a more topical participant (proximate) is A, which gives a direct combination, or a less topical participant (obviative) is A, which gives an inverse combination. A 'more topical participant' will be chosen on the basis of discourse principles and will tend to be the last-mentioned person or the discourse topic. The 'less topical person' is marked by the obviative suffix *-wa*.

(8) a. Nāpēw atim-wa wāpam-ē-w.
man.PROX *dog*-OBV *see*-DIRECT-3SG
'The man saw the dog.'
b. Nāpēw-(w)a atim wāpam-ik.
man-OBV *dog*.PROX *see*-INVERSE.3SG
'The man saw the dog.'

(9) a. Atim nāpēw-(w)a wāpam-ē-w.
dog.PROX *man*-OBV *see*-DIRECT-3SG
'The dog saw the man.'
b. Atim-wa nāpēw wāpam-ik.
dog-OBV *man*.PROX *see*-INVERSE.3SG
'The dog saw the man.'

As can be seen, there are two ways of expressing the same propositional content according to which participant is chosen as topic.

Factors Affecting Marking

It is not common to find languages in which the nominative-accusative or absolutive-ergative distinction holds for all nominals in every context. The 'older' Indo-European languages such as Latin might be thought to provide good examples of a nominative-accusative distinction, but this distinction is neutralized for nouns of the neuter gender. This is illustrated by the word *bellum* 'war' in Table 2. Almost all neuter nouns in Latin are inanimate, though there are numerous inanimates that have masculine or feminine gender. Even in languages like Japanese and Korean, in which the subject and object are marked by postpositions (see (15) below), there is a tendency to drop the postpositions in colloquial speech; the subject marker is more likely to be lost if the subject is pronominal or human, and the object marker is more likely to be lost if the object is inanimate or indefinite. In fact, there is a very strong cross-language tendency for object marking to be confined to objects that are pronominal, human, or definite. In Spanish, for instance, subject and object are distinguished in the clitic pronouns, but with free nominals the preposition *a*, which otherwise means 'to', is used with specific human objects: *Busco un empleado* 'I'm looking for an employee' (anyone will do), *Busco a un empleado* 'I'm looking for an employee' (the one who was here a minute ago).

A large number of languages mix accusative and ergative marking, but the two types of marking tend to complement one another. If we take the hierarchy in Table 3, we can say that where accusative or ergative marking co-occur, accusative marking covers a continuous segment of the hierarchy from the top and ergative from the bottom. In the Pama-Nyungan languages of Australia, for instance, ergative marking is found on all nouns. It may extend to third-person pronouns, and in a few languages it covers all nominals. Accusative marking in these languages is generally found on all pronouns. In some, it extends to cover kin terms and personal names, or all humans as well.

The principle that seems to underlie these restrictions on marking reflects a view that the most natural transitive predication is one with an agent at the top of the hierarchy and a patient at the bottom. Marking tends to be confined to deviations from this ideal, that is, mark pronominal objects with accusative, and nouns, as opposed to pronouns, with ergative.

Table 3 Nominal hierarchy

1st person
2nd person
3rd person
kin terms and personal names
human
animate
inanimate

In some languages there is a split between accusative and ergative on tense or aspect lines. A number of Indo-Aryan languages, including Hindi-Urdu (Literary Hindi), Marathi, and Punjabi (Panjabi), and some Iranian languages, such as Pashto and Kurdish, are described as having an ergative construction only in the perfect. Typical Indo-Aryan languages are described as having a direct/oblique case system where the direct case encodes S, A, and O and the oblique is governed by postpositions. However, if O is animate and specific, it is usually marked by a postposition. There is also subject-verb agreement, as in the following examples from Marathi:

(10) Ti keeḷ khaa-t-e.
she *banana* *eat*-PRES-3SG.F
'She eats a banana.'

(11) Ti Ravi laa chaḷ-ḷ-a.
she *Ravi* ACC *torture*-PRES-3SG.F
'She tortures Ravi.'

In the perfect, however, A is marked by a postposition. The verb agreement is with P unless P is marked by the postposition for specific, animate nouns, with the verb then remaining in its neutral form. In Marathi, the ergative postposition is *ni*.

(12) Ti ni keḷi khaa-ll-it.
she ERG *banana*.PL *eat*-PERF-3PL
'She ate bananas.'

(13) Ti ni Ravi laa chaḷ-ḷ-a.
she ERG *Ravi* ACC *torture*-PERF-NEUT
'She tortured Ravi.'

The postposition *laa*, glossed as ACCusative, marks indirect as well as direct objects.

Size of Case Systems

Some languages have no case system at all, and this is possible since there are alternative mechanisms. For the core relations, one alternative is to use word order. Subject and object are distinguished by the use of the unmarked word order subject-verb-object in a number of languages, including Thai, Cambodian (Central Khmer), and Vietnamese. This is also true of English, but English has vestigial two-way case system marked on most personal pronouns (*I/me*, *she/her*, *he/him*, *we/us*, and *they/them* but no distinction with *you* and *it*).

The other alternative for marking the core relations is to use some form of cross-referencing pronominal representation, usually on the verb or auxiliary

verb. The following example is from the northern Australian language Gunwinygu (Gunwinggu), in which the first person singular is represented as a prefix *nga-* on the verb and the third person plural by *-di-*. The *-n-* indicates that the first person is the object.

(14) Daluk ngaye nga-n-di-ma-ng.
*woman me 1sg-*OBJ*-3*PL*-get-*NONPAST
'The women will get me.'

In this example, the subject and object are represented independently of the verb, but they can be omitted, leaving a sentence meaning, 'They will get me.' The common situation in languages with cross-referencing bound pronouns is for the free pronouns to be used only for emphasis.

Where the function of bound pronominal markers is indicated by a change of form (affix or suppletion) as in Gunwinygu, the system seems to be case-like, and such systems certainly derive from the use of case marking. But there is an important difference. Bound pronominal systems represent grammatical relations, each set being in a one-for-one relationship with a grammatical relation. Cases are not always in a one-for-one correspondence with grammatical relations. If that were the situation, we would deal only in relations and the word forms or markers that express these relations. If, for example, the nominative forms in Latin expressed only subject, the accusative only direct object, the dative only indirect object, then we would talk of subject forms, direct object forms, and indirect object forms. There would be no need for the notion of case, just as there is no need for notional categories between tense markers and tense categories or aspect markers and aspect categories.

For the peripheral functions, the common alternative is the use of adpositions. Case systems, like other systems of grammatical forms, are normally relatively small. They range from two as in the Northwest Caucasian language Kabardian to 15 as in Finnish, but the number of relations a dependent noun can bear to a head will exceed these limits, mainly in the area of relative position ('under', 'over', 'behind', 'between', etc.). As a result, almost all languages use adpositions, whether they have peripheral cases or not. Where adpositions are used in addition to case markers, they form a kind of secondary system. However, in some languages, such as Japanese, postpositions are used to the exclusion of case affixes, even covering core functions. In the following Japanese example, the postposition *ga* marks the subject, *ni* marks the indirect object, and *o* marks the direct object:

(15) Sensei ga Tasaku ni hon o yat-ta.
teacher SUBJ *Tasaku* IO *book* DO *give-*PAST
'The teacher gave Tasaku a book.'

Adpositions can be considered to be analytic case markers as opposed to synthetic case markers. In Latin, which is fairly typical of languages having analytic as well as synthetic case markers, prepositions are like verbs in that they govern cases, and combinations of preposition and case suffix can serve to mark the relations of nouns to the verb. In English, all prepositions govern the accusative (*with me*, *from her*), but in some languages, different prepositions govern different cases. In Latin, some prepositions govern the ablative and others the accusative. The preposition *in* can govern both: in *casā* 'in the cottage', in *casam* 'into the cottage'.

In Malayalam, too, different postpositions govern different cases. *Mutal* 'from' governs the nominative in *mala mutal* 'from the mountain', *poole* 'like' governs the accusative as in *ammaye poole* 'be like mother', and *kuuɽe* 'through' governs the locative in *janalil kuuɽe* 'through the window'. Some postpositions such as *akattə* 'inside' govern the genitive as in *klassinre akattə* 'inside the classroom'. This reflects the noun origin of the postposition, where the genitive originally denoted the dependency of a noun to a noun (cf. English *at the side of the classroom*).

Given the availability of adpositions, it is not surprising that many languages have no peripheral cases. Where a language has the minimal number of cases, namely two, one finds an unmarked nominative and a marked accusative or marked ergative, which have other functions and could appropriately be called oblique. In the Uto-Aztecan language Chemehuevi, the nominative marks subject, and the accusative marks object and possessor. In the Kabardian, the absolutive marks the absolutive relation, and the ergative marks transitive subject and possessor. The absolutive relation embraces what from the standpoint of many other languages is intransitive subject and direct object. If a language has three cases, the third is usually genitive. If it has four, the fourth, whatever it is called, will tend to have a wide range of functions. German is typical in this regard. It has nominative, accusative, genitive, and dative, but dative is in fact a case with a wide range of functions, albeit governed by prepositions.

Where case systems are large, more than six or seven, the expansion is usually among the local cases. Finnish, for instance has 15 cases, including nine local cases. These are formed by markers for location, source, and destination, having partly fused with markers for interior and exterior, as shown in Table 4.

There are claims that the northeast Caucasian languages have case systems of over 40 members, but in these languages the orientation markers (for 'under', 'over', etc.) and the case markers proper are separate systems. The spectacular figures are obtained

Table 4 Finnish local cases

	Location	*Source*	*Destination*
Ø	*-na*	*-tta*	*-ksi*
	essive	partitive	translative
Interior	*-ssa*	*-sta*	*-(h) Vn, -sVVn*
	inessive	elative	illative
	'in'	'from(inside)'	'nto'
Exterior	*-lla*	*-lta*	*-lle*
	adessive	ablative	allative
	'at'	'from(outside)'	'to(wards)'

by counting combinations of orientation markers and case markers as members of one system. This is justified in Finnish where the markers cannot be identified consistently, but not, for the most part, in the Northeast Caucasian languages.

Types of Marking

Case marking is usually via suffixation. The only other mechanism that is at all common is suppletion, as with English pronouns (*I/me*, etc.). Case suffixes follow number marking; when pronominal possessors are marked on the noun, these usually appear before the case marking, as in Turkish, where they appear between the number marking and the case marking: *adam-lar–ım-la* (*man*-PL-1SG.POSS-LOC) 'with my men'; similarly in Hungarian: *hajó-I-m-on* (*ship*-PL-1SG.POSS-LOC) 'on my ships'. In the Balto-Finnic languages, however, the possessor marking usually follows the case marking. In Finnish, for instance, we find: *kirkolla-mme* (church-ADESSIVE-1PL.POSS) 'at our church'. The adessive case expresses the sense of 'near' or 'at'.

In some languages, including Indo-European case languages like Latin and Ancient Greek, case marking (actually case/number marking in these languages, as explained above) appears not only on nouns but also on certain dependents of the noun such as adjectives and determiners. The following example is from Plato. *Bios* is a nominative singular form of a second declension masculine noun, the nominative indicating that *bios* is the subject of the predicate. The definite article and the adjective are in the nominative singular masculine form, their concord in case, number,and gender indicating that they are dependents of *bios*.

(16) Ho anexetastos bios
the.NOM.SG *unexamined*.NOM.SG *life*.NOM.SG
ou biōtos anthrōpō.
not *livable*.NOM.SG *man*.DAT.SG
'The unexamined life is not livable for man.'

This example also illustrates concord between a predicative adjective (*biōtos*) and the subject (*bios*).

Besides concord within the noun phrase and concord exhibited by predicative nominals and adjectives, there is also apparent concord between what looks like separated parts of a noun phrase. In Latin, it is possible to take a word that would appear to modify a noun and express it in a phrase separate from the noun. The following example is from Virgil (*Aeneid* II:3),

(17) Infāndum, rēgīna, iubēs
unspeakable.ACC *queen*.VOC *order*.2SG
renovāre dolōrem.
renew.INF *sorrow*.ACC
'Unspeakable, [O] queen, [is] the sorrow you order [me] to rekindle.'

Here the gerundive adjective *infāndum* is displaced from the word it might be thought to modify, namely, *dolōrem*. In Australian languages, the noncontiguous expression of words that would normally appear within a single noun phrase in most languages is commonplace.

The other common pattern of case marking is for it to be found only on the final word in the noun phrase. We can distinguish two subtypes. In the first, the final word is the head noun in the noun phrase. This type is widespread. It is found, for instance, in Quechua. It is common among the Papuan languages, and there is a concentration of the type in Asia, including the Turkic, Mongolian, and Tungusic (Tungus) families north of the Himalayas, as well as the languages of the subcontinent, whether they be Dravidian, Munda, or Indo-Aryan (though a number of Indo-Aryan languages have vestigial concord). In this area, most languages are consistent modifier-head languages with SOV order at clause level and determiner-noun, adjective-noun order at phrase level. The following example is from the Dravidian language Kannada:

(18) Naanu ellaa maanava janaangavannu
I.NOM *all* *human* *community*.ACC
priitisutteene.
love.1SG
'I love all mankind.'

In the other subtype, the final word in the noun phrase is not always the head. This is the situation in various Australian and Amazonian languages. The phenomenon also occurs in Basque:

(19) etxe zaharr-etan
house *old*-PL.LOC
'in old houses'

In a few languages, a nominal can carry more than one case, each case with different scope, and often with different functions. Most but not all instances involve an inner layer of adnominal case plus an outer layer of concordial adverbal case, as in the following examples from Old Georgian:

(20) sarel-ita man-isa jta
name-INST *father*-GEN INST
'with father's name'

However, some Australian languages evince double adverbal case. In Warlpiri, for instance, a locally marked adjunct may take ergative case marking in a transitive clause. Consider the contrast between the following sentences. In (21a), the noun phrase in the role of destination is marked for allative case, as one would expect. However, if a verb for 'carry' is substituted for a verb meaning 'send', then it is possible to further mark the allative-marked phrase for ergative:

(21a) Ngarrka-ngku ka maliki
man-ERG PRES *dog*.ABS
ngurra-kurra yilya-mi.
camp-ALL *send*-NONPST
'The man is sending the dog to the camp.'

(21b) Ngarrka-ngku ka kuyu ka-nyi
man-ERG PRES *meat*.ABS *carry*-NONPST
ngurra-kurra (-rlu).
camp-ALL(-ERG)
'The man is carrying the meat to the camp.'

An inner local phrase normally has the patient as its scope (and this is normally encoded in the absolutive relation, i.e., as S or O). In Warlpiri, the use of the ergative on the locally marked phrase is to indicate that the agent (A) is also within its scope. With carrying, the agent moves to the same destination as the patient.

Where a clause rather than a noun phrase is a dependent, the same possibilities for the distribution of case marking arise. In most instances the case marker appears only on the head of the clause, namely the verb, as in the following example from Finnish, where the translative case is found on the infinitive. The translative means 'into', mainly metaphorically, as in 'You'll turn into a pumpkin', and purpose as in *mi-ksi* 'what for'. With a nominalised verb, it indicates purpose. The actor of the nominalised verb is expressed by the possessive pronominal suffix.

(22) Osti-n karttakirja-n suunnitella-kse-ni
bought-1SG *atlas*-ACC *plan*-TRANS-1SG.POSS
automatka-n.
car.trip-ACC
'I bought an atlas in order to plan a car journey.'

Another possibility is for the case marking of a dependent verb to spread to its dependents by concord. The following example is from Yukulta (Ganggalida) (Northern Australian). Note that the dative, which is appropriate to the verb *warratj-*, spreads to the allative-marked complement to yield a second layer of case marking.

(23) Taamitya-ngandi tangka
ask-1SG.3SG.FU.AUX *man*.ABS
natha-rul-ngkurlu warratj-urlu.
camp-ALL-DAT *go*-DAT
'I'll ask the man to go to the camp.'

In some languages there are different principles of case marking operating in subordinate clauses, particularly if the verb is non-finite. A well-known example is the use of the accusative for the subject as well as the object in Ancient Greek and Latin 'accusative and infinitive constructions'. The following example is from Latin, where *dominum*, the subject of the verb *vīdisse* is in the accusative as well as the object *cōnsulem*.

(24) Dicunt dominum cōnsulem vīdisse.
say.3PL *master*.ACC *consul*.ACC *see*.PERF.INFIN
'They say the master has seen [lit. 'to have seen'] the consul.'

In Thalantji (Pama-Nyungan), the dative, which is the main adnominal case in this language, is used to mark the complement of transitive verbs in non-finite relative clauses. Contrast the accusative on *kanyara* in the main clause and the dative on *murla* in the subordinate clause in (25):

(25) Ngatha nhaku-nha kanyara-nha
I *see*-PAST *man*-ACC
murla-ku warni-lkitha.
meat-DAT *cut*-REL.DS
'I saw the man (who was) cutting meat.'

The verbal suffix *-lkitha* in this example glossed 'relative, different subject' marks a qualifying clause, the covert subject of which must be interpreted as being distinct from the main clause subject. The marker is a case marker in origin. This is an example of a derived function of case marking.

In Turkish, the genitive is used to mark the subject of a nominalised verb. The object of such a verb if present takes the normal case marking.

(26) Ahmed-i ben-i sev-diğ-in-i
Ahmed-GEN 1SG-ACC *love*-NM-3SG.POSS.ACC
bil-iyor-um.
know-PRES-1SG
'I know that Ahmed loves me.'

The form *-in* is a third singular possessive form in cross-reference with *Ahmed-i*. In Turkish, noun possessors are cross-referenced on possessed nouns: *Biz-im heykel-imiz* (we-GEN statue-1PL.POSS) 'our statue'. The accusative on the nominalised verb marks it as the complement of *biliyorum*, and the accusative on *ben* marks it as the complement of *sevmek* 'to love'.

See also: Ergativity; Head/Dependent Marking; Inflection and Derivation.

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Case Grammar

J M Anderson, Methoni Messinias, Greece

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'Case Grammar' is a label used for various developments in grammatical theory originating in the mid-to-late 1960s that are associated more or less closely with a certain hypothesis concerning the organization of the grammar: the hypothesis concerns the status of semantic functions – or relations or roles – such as Agentive or Locative; functions that label the mode of participation of the denotata of arguments in the situation described by the predication in which they occur. The terms 'various' and 'more or less closely' are used advisedly. Since Case Grammar is a partial hypothesis, it is compatible with a variety of hypotheses concerning other aspects of the grammar, though it will, of course, interact with them. Since, too, the hypothesis can be formulated in more and less strong forms, not all variants of Case Grammar are as distinct in their claims from what is embodied in other frameworks that are not usually termed Case Grammars. The minimum Case Grammar hypothesis is that semantic functions are relevant to the expression of syntactic (as well as semantic) generalizations; in a stronger, more interesting and distinctive form it involves the claim that they are basic to the syntax and that many other aspects of syntactic structure are derivative of them.

The name itself is in part a recognition that what is involved is, again in part, a return to traditional concerns with the semantics and syntax of Case (*see* **Case**), concerns that were neglected by those structuralist (including early transformational) frameworks that abolished the morphology/syntax division and were reticent about semantics. The term 'Case Grammar' specifically devolves from Fillmore's (1965, 1966, 1968a) use of Case Relation, or simply Case, for semantic function, the status of which is fundamental to the Case Grammar hypothesis. In what follows, the first section outlines some of the basic notions central to the main tradition associated with this hypothesis; while the second and third sections give some idea of, respectively, the variety of interpretation to which it has been subjected and the range of attempts to arrive at a definition of Case and Cases.

Some Fundamentals

The use of the term 'Case (Relation)' for semantic function is based on the familiar observation that in a number of languages semantic functions are distinguished by differences in nominal inflexion, as in the Old English sentence of (1):

(1) Him ofhreow þæs mannes
'He/they+dat pitied the+gen man+gen'

(cf. again *see* **Case**), wherein the dative inflexion signals the locus of the emotion denoted by the verb (discussed below as the Experiencer Case Relation) and the genitive inflexion marks the Source of the emotion.

However, it must be acknowledged, as is once more familiar from earlier studies (cf. e.g., Welte, 1987), that in many instances the correlation between case inflexion and semantic function is not simple. Most notoriously, case inflexions can correlate more closely with grammatical functions or relations. Notably, most grammarians would not include Subject among the set of semantic functions. At the very least, it is of a rather different character from Agentive, etc.; hence its differentiation, along with (for many grammarians) Object, etc. as a grammatical relation. The

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inflexions identified by the label nominative in various languages are labeled thus precisely because their occurrence correlates most closely with the nominal identified on other grounds as a Subject.

Further, apart from the fact that case inflexions typically express other categories simultaneously with case (or grammatical) relations, categories such as gender, number, dimensionality, distinctions in Case Relation are frequently expressed otherwise than by nominal inflexion. Typically, as well as or instead of noun inflexions, adpositions, verbal auxiliaries, word order, verb morphology, and combinations of these may be involved, often in combination in the same language.

Consider, for example, the sentences from Eastern Pomo in (2):

(2a)	mí·p̓	békal du·léya
	he	them killed
(2b)	bék^h	mí·pal ša·k̓akiya
	they	him killed
(2c)	mí·p̓	kaluhuya
	he	went-home
(2d)	bék^h	kálp^{h}i·líya
	they	went-home
(2e)	békal	c̓e·xéka
	they	slipped

The shape of the pronoun reflects whether it is Agentive or not: *mí·p̓* and *bék^b* are Agentive, they mark the Source of the Action, both in the transitive examples (2a, b) and the intransitive (2c, d); but *mí·pal* and *békal* signal the entity undergoing the action or process, what I will describe below as an instance of the Neutral Case Relation, both in the transitive examples (2a, b) and in the intransitive (2e). Typically, too, the suppletion illustrated in (2a, b) – the 'kill' verb changes its shape – is in response to the number of the Neutral ('them' vs. 'him'). However, in (2c, d) the (partial) suppletion is triggered by the number of the argument we have already (on the basis of the correlation between semantic function and pronoun morphology) labeled Agentive. This would seem to confirm that the pronouns in (2c) and (2d) are simultaneously Agentive and Neutral, as both are Source of the Action and undergoer of it (and thus moving), whereas that in (2e) is Neutral simply. We return to the association between argument and Case Relation in 'Defining Case Relations.' What is most relevant at this point is illustrating the interaction of different means of expressing Case relations.

There is typically, too, with respect to a specific language, no one-to-one correlation between a particular Case Relation and a particular expression, whether by inflexion, adposition or whatever. Despite occasional claims to the contrary, the English preposition *by*, for instance, is not associated uniquely with Agentives, or *to* with Goals: both can also mark what is often labeled Experiencer (*known by/to*). Nevertheless, given that the expression of distinctions in Case Relation may be regarded as the prototypical function of case inflexions, this 'case' terminology is not unjustified. And its appropriateness is reinforced to the extent that grammatical relations can be regarded as neutralized Case Relations.

Such a notion is crucial to the strong Case Grammar framework developed by Charles Fillmore in the late 1960s. This substituted for the Deep Structure of a grammar of the type envisaged in Chomsky's (1965) basic representations including nodes associated with a set of Case Relations. Both Surface Structures of (3), for example, are derived from the (unordered) Deep (Case) Structure of (4).

(3a)

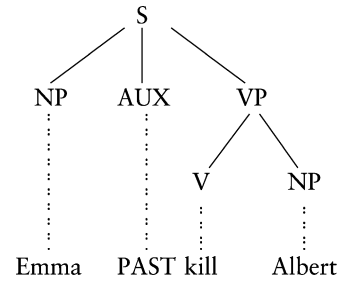

(3b)

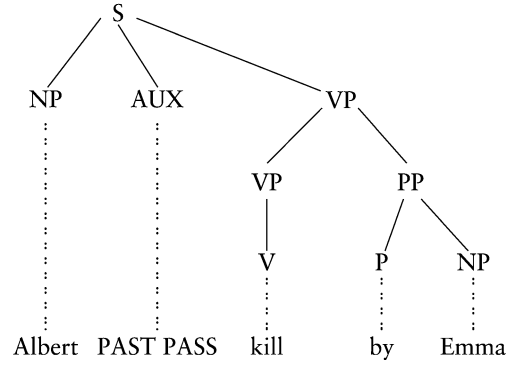

(4)

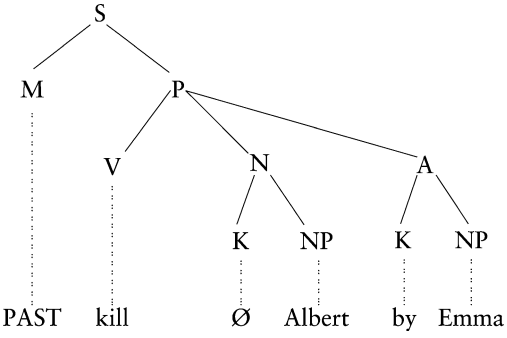

The Proposition consists of a verb and a set of Case Phrases, each of which includes a Case 'flag' (Kasus) and a Noun Phrase. The Agentive is the source of the action; the Neutral is the least specific Case, whose precise relation to the predicate is most obviously dependent on the type of the predicate: it labels the

entity that undergoes processes and movements and actions and has locations and states attributed to it. 'Defining Case Relations' discusses more fully the definition of the Cases; but notice at this point that N(eutral) appears under a number of different labels: Ergative (an acknowledged misnomer), Object(ive), Nominative (again, unfortunate), Absolutive, Patient (usually interpreted more narrowly than Neutral). Modality consists of elements of tense, mood, and aspect, including Modal Cases (such as Manner Phrases), which are interpreted as modalities of the sentence as a whole.

Predicates, such as the verb in (3) and (4), are subcategorized not in terms of their functionally unlabeled complements, but with respect to the set of Case Phrases they require, obligatorily, or optionally, as exemplified in (5a) and (5b), respectively:

(5a) + [_____ N(eutral) A(gentive)]
(5b) + [_____ N (A)]

The verb of (5a) (perhaps *kill*, if we ignore Instrumentals, such as *with a handbag*, for the moment: see again 'Defining Case Relations') is marked as taking a Neutral and an Agentive. That in (5b) takes a N and an optional A, perhaps appropriate for *melt*: see (8) below.

Assignment of the status of Subject is based on the set of Case Phrases present in a sentence, the Case Frame. Each entry in (5) includes a set of Case Frame Features. Unmarked assignment in a particular predication is specifically in accord with a Hierarchy of Case Relations, as exemplified by (6) (Fillmore, 1968a):

(6) Agentive > Instrumental > Objective

In terms of (6), an Agentive, if present, will be Subject; in the absence of an A, then an Instrumental, if present, will be; and so on. With *kill*, the Agentive thus takes priority, as in (3a). The Surface Structure of the passive sentence in (3b) contains signals (the auxiliary construction) that here the Hierarchy has been overridden, a marked selection of Subject has been made, and the 'rejected' subject is distinguished by an appropriate marker (here *by*).

There has been some controversy over the character of the Hierarchy, partly as a result of different views concerning the set of Cases, as discussed in 'Defining Case Relations' below. It may be too that lexical exceptions to the Hierarchy have to be acknowledged. For instance, if *like* and *please* in English are associated with the same set of Case Frame Features, then one of them will apparently have to be marked as exceptional in Subject selection:

(7a) Jemima liked the play
(7b) The play pleased Jemima

whatever the hierarchy, if it is determinate. Anderson (1977: Sect. 2.1.5) and others have denied that this is necessary, in that the two verbs require different sets. Grimshaw (1990) suggests that such pairs as (7) differ 'aspectually.' But even if such exceptions have to be countenanced, the viability of some such hierarchy is the basis for the strong Case Grammar hypothesis, which asserts the basicness of Cases and the dependence thereon of other syntactic phenomena (including Subject selection).

It has also been argued that conventional Deep Structures (as introduced in Chomsky, 1965), as well as being derivable, and indeed dispensable, also form a poor basis from which to project (Deep) grammatical relations, one of their claimed roles: configurational definitions are difficult to maintain across languages; they allow for spurious (or at least never utilized) grammatical relations; and some categories seem themselves to be relational (e.g., Place). Moreover, the role of Deep relations in the grammar (pace Katz, 1972) remains obscure. See here, for example, Anderson, 1977: Sect. 1.2, 1982; Starosta, 1987. And, that argument proceeds, neither Deep Structures nor grammatical relations are relevant to lexical relationships.

Fillmore's work on Case Grammar and beyond has involved a strong interest in lexical semantics (see particularly Fillmore, 1987; also, in the present context, Fillmore, 1968b, 1970, 1971b, 1971c, 1972, 1977a, 1977b). Much effort within Case Grammar has been devoted to showing that subcategorization and lexical relations are sensitive to Case Relations rather than the configurations and grammatical relations that are derivative in CG. So-called ergative verbs (Lyons, 1968) appear to provide a straightforward example with respect to subcategorization. Case Grammarians have argued that the basic distributional potential of verbs such as *melt* in (8) is most transparently described in terms of the Case Features of (9) rather than, say, the conventional frame of (10):

(8a) Burt melted the ice
(8b) The ice melted

(9) N (A)

(10) + [___ ([NP])

Example (10) can be said to obscure what is constant in the two basic occurrences, the Neutral (Objective) argument, with selection of Subject being determined by the Hierarchy. Anderson (1984) attempts to show that a wide range of (lexical) derivational relationships in English make no reference to grammatical relations or the configurations in terms of which they may be defined.

Typical here is *-able* formation, whose central function is to form adjectives of a certain semantic character on the basis of verbs, such that the argument of the adjective corresponds to the Neutral argument of the verb (whatever its grammatical relation); we again have the familiar 'ergative' relation, illustrated in (11) and highlighted therein by the derivational pattern associated with a verb such as *change*:

(11a) The cover is removable (cf. Beppo has removed the cover)
The settings are changeable (cf. Beppo has changed the settings)
(11b) The material is perishable (cf. The material has perished)
The weather is changeable (cf. The weather has changed)

Reference to grammatical relations again obscures the generalization. The import of this is that if the lexicon (via subcategorization and derivational relationships) has access only to basic syntactic structure, then grammatical relations and the division into Subject and Objects do not appear to be basic: this is exactly what is claimed by the Case Grammar hypothesis.

This conclusion can be avoided, with respect to examples such as (8) and (11), at least, if one adopts the Unaccusative hypothesis associated with developments of Relational Grammar and other frameworks. In terms of this hypothesis, the Surface Subjects of (8a) and (11a) are initial Direct Objects; their subjecthood is derivative only. (Other intransitive verbs [typically Agentive] do have initial Subjects; they are Unergative.) The relationships in (8) and (11) can then be described without reference to Case Relations: for example, 'ergative' verbs are transitives with an optionally empty subject; the derivational relationship illustrated by (11) involves uniformly the Direct Object of the base verb. Case Grammarians have argued that such a strategy lacks independent motivation, is unnecessary given the availability of Case Relations, and leads to incorrect predictions (cf. e.g., Anderson, 1980).

Such arguments have also been concerned to show not only that grammatical relations are derivative ('Surface') but also that it is inappropriate to attribute subjecthood at all to certain language types, if a definition of Subject more restrictive than 'obligatory derived relation' is to be maintained. In most languages, Subject is a syntactically motivated grouping (or neutralization) of transitive Agentives and intransitive Neutrals (cf. [8] again). In the ('ergative') Dyirbal language of Australia, such a grouping is at most only marginally relevant from a syntactic point of view. (Direct) Objecthood is also notoriously difficult to identify; and it has been argued that Indirect Object is an incoherent relation, even derivatively (Anderson, 1978, and see more recently S. R. Anderson, 1988).

Throughout the late 1960s and the early 1970s, various different versions of Case Grammar were proposed, to some extent independently (e.g., apart from the work of Fillmore: Anderson, 1968, 1971; Platt, 1971; Cook, 1971, 1972a, 1972b, 1973, 1978; Nilsen, 1972; Longacre, 1976; cf. also Chafe, 1970), and the framework inspired a number of descriptive and applied studies. However, little agreement on the set and nature of the set of Case Relations emerged (see further 'Defining Case Relations' below). It also became clear that Case Grammar was vulnerable to the charge that, apart from the claimed prediction of the distribution of grammatical relations and associated word order properties, little evidence of a syntactic role for Case Relations was adduced. Thus, for example, the Case-based lexicon of Stockwell *et al.* (1973) plays almost no role in the syntactic descriptions that occupy the rest of the volume.

Even more seriously, perhaps, evidence was put forward, on the other hand, for the semantic and syntactic relevance of Deep grammatical relations and for the necessity of positing the kind of relation between active and passive sentences prescribed by the Passive transformation, which was eliminated from the syntax by Fillmore's (1968a) proposals.

Crucial here is the discussion of the role of grammatical relations by S. R. Anderson (1971). Pairs of sentences such as those in (12):

(12a) Ernie loaded the pickup with packs of amaretti
(12b) Ernie loaded packs of amaretti onto the truck

differ in interpretation: the former has been described as 'holistic,' the action exhausts the relevant dimensions of space denoted by the Direct Object; the latter is 'partitive.' If (12a) and (12b) share Case Features (say Agentive, Neutral, Place), then the basis for the difference must be located elsewhere. It is not a property of Surface Structure; the difference remains constant under various transformational movements, as illustrated by (13) and (14):

(13a) The pickup was loaded with packs of amaretti
(13b) Packs of amaretti were loaded onto the truck

(14a) It was packs of amaretti that Ernie loaded the truck with
It was the pickup that Ernie loaded with packs of amaretti
(14b) It was packs of amaretti that Ernie loaded onto the pickup
It was the pickup that Ernie loaded packs of amaretti onto

What the (a) variants share is Deep Structure association of the Place Case Relation with Direct Object function. Their derivations must include a stage at which this association is made, motivating both Passive as a transformation and Deep Object. (This is, of course, not to deny that, given appropriate assumptions, this association could be read off derived structures.) Fillmore (1977a) concedes the force of this argument, and essentially reinstates Deep Structure, thereby effectively abandoning the Case Grammar hypothesis in its strongest form. Others have disagreed.

It is possible, for instance, that Passive may be accommodated constructionally, as bi-clausal (see 'Varieties of Case Grammar' below). But even if that possibility is laid aside, it can be argued that the Case Feature assignments assumed above are inappropriate, that they differ between the (a) and (b) examples. Miller (1985) suggests that the association of nonsubjective arguments to Case Relations is reversed between (a) and (b); J. M. Anderson (1977: Sect. 1.8) accepts that the (a) and (b) examples share the same Case Features and the same associations, but suggests that in addition the Place argument in the (a) examples is simultaneously Neutral: i.e., it bears two Case Relations. (On this see 'Defining Case Relations' below.) Under either proposal, we can associate holisticness, as elsewhere, with the Neutral Case Relation: unless this expectation is canceled in some way, Neutrals are normally understood as participating as a whole in the process being represented. This is true of the Neutrals in (1b) and (12b), for instance.

J. M. Anderson also points out that the generalization based on Deep Object is inadequate. The Subjective Place argument in (15a) but not (15b) is also associated with a holistic interpretation:

(15a) The garden is swarming with bees
(15b) Bees are swarming in the garden

He attributes this to the Place in (15a) being again simultaneously Neutral, which is also associated with its selection as Subject. Once more, (12) and (15) show the 'ergative' (or, more misleadingly, 'unaccusative') pattern that cuts across grammatical relations.

The syntactic role of Case Relations has been variously addressed since the mid-1970s. The force of objections based on the paucity of reference by transformations to Case Relations has been considerably weakened by the apparent demise of individual transformations. For instance, the motivations for a syntactic relationship between pairs such as that in (16), involving a putative Dative Movement, are disputable, where evident:

(16a) Anna taught Helen Greek
(16b) Anna taught Greek to Helen

These pairs can be argued to show a partially shared Case Frame, with the difference in word order being attributable to the differences in Case Relations present (cf. again Anderson, 1978; also Anderson, 1987). The difference in Case Frame is reflected in the contrary acceptabilities of (17a) and (17b):

(17a) *Anna taught an empty room Greek
(17b) Anna taught Greek to an empty room

The *Helen/empty room* argument is involved in the action in a different way in the (a) and (b) examples, suggesting a difference in Case Relation (on the possible character of this difference, once more involving an argument being assigned more that one Case Relation, see again 'Defining Case Relations' below).

More generally, the development of frameworks in which transformations are reduced to a small number, including one, or from which they are eliminated altogether, poses the question of the syntactic relevance of Case Relations in a different way – or rather different possible ways. This is one respect in which different variants of Case Grammar have evolved in response to decisions about other aspects of the grammar than are encompassed by the basic Case Grammar hypothesis.

Varieties of Case Grammar

Fillmorean Case Grammar evolved as an alternative to the kind of transformational grammar expounded in Chomsky (1965), with subject formation instated as one of a number of transformational rules. Anderson (1968, 1971) talks of rules of realization (including 'sequencing'), implying nontransformational mapping of (unordered) Case structures onto surface structures enriched with sequence and configurations; but only a very limited range of constructions is taken into consideration there. And Anderson (1977) envisages complex (transformational) derivational relationships between initial unordered structures and Surface, including prelexical application of syntactic rules (cf. similar developments over the same period within Generative Semantics (*see* **Generative Semantics**).

Partly in reaction to such developments, Starosta (1973, 1978, 1987, 1988) and others have formulated a framework, Lexicase (*see* **Lexicase**), which eschews transformations, and, indeed, syntactic derivations altogether. Syntax is monostratal and Case Relations and Case Forms (including case inflexions) are marked as features on lexical items, the former on nouns, the latter on nouns, verbs, and prepositions. Thus, corresponding to (3) and (4) above we might have (18), with no Deep/Surface distinction (modeled on Starosta, 1987: 65):

(18a)

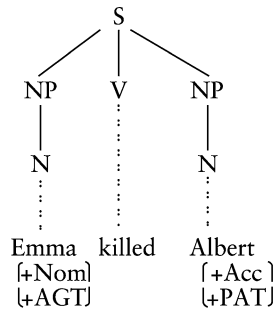

(18b)

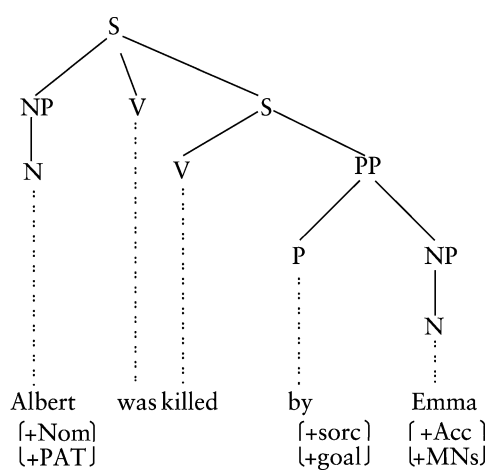

AGT and PAT are Case Relation features, roughly corresponding to A and N; Nom, Acc, Sorc, and Goal are Case Form features. The relationship between the [+AGT] noun in (18a) and the Means ([+MNS]) noun in (18b) is expressed by the rule of lexical derivation that forms the adjectival verb in (18b) from the transitive verb in (18a). Corresponding to the Case Frame Features discussed above, we have Contextual Features such as [+[+AGT]] and [+[+PAT]] associated lexically with predicates. Contextual Features may be either inherent or given by lexical redundancy: e.g., all verbs are redundantly [+[+PAT]] (what Starosta refers to as Patient Centrality: see 'Defining Case Relations' below). The Subject Selection Hierarchy is also expressed by lexical redundancies such as (19) (Starosta, 1987: 67):

$$(19)\quad [+[+AGT]] \quad \rightarrow \quad \begin{bmatrix} +[+PAT] \\ \quad [+Nom] \\ -[-AGT] \\ \quad [+Acc] \\ -[-PAT] \end{bmatrix}$$

Example (19) requires that an item that occurs with a [+AGT] must also occur with a [+PAT] (generalizable as Patient Centrality), and also that the [+AGT] is [+Nom], Subject, and the [+PAT] is [+Acc], Object.

In general, the grammar is reduced to what can be expressed via relationships between individual lexical items, though the status of long-distance dependencies remains uncertain. We should note too that some critics have found it difficult to see how basic word order settings (such as Head-Modifier vs. Modifier-Head) can be regarded as part of the lexicon.

It is still possible within such a restrictive framework to reconstruct the fundamental basis for the Case Grammar hypothesis, the primacy of Case Relations vis-à-vis Case Forms; specifically, in terms of redundancies such as that in (19). But lexical primacy of Case Relations is a property shared by a number of other proposals, such as those made within the tradition of Functional Grammar (*see* **Functional Grammar: Martinet**), as developed by Dik (1978; also 1987) and others. Are these also Case Grammars? Starosta himself describes various Valency Grammars (*see* **Valency Grammar**) as such. This is to some extent a terminological matter. However, the central thrust of work in Case Grammar (what was called above the strong hypothesis) has involved the syntactic primacy of Case Relations and the exclusion of grammatical relations, etc. from the lexicon (cf. 'Some Fundamentals' above). Other developments suggest that this can be maintained within a restrictive theory that nevertheless does not abandon the syntax/lexicon division.

The descriptions proposed by Anderson (1977) involve complex syntactic derivations. But they are conceived of as resulting from the interaction of a small number of universal syntactic rules, and possibly only one involving structure change (Raising), regulated by universal constraints, such as Strict Cyclicity. Roughly, in terms of this last, cyclic structure-changing rules must apply only in derived (nonmonoclausal) environments or in an environment resulting from the application of a cyclic rule. Thus, a derivation whereby the Subject of the finite verb in (20) is Raised out of a subordinate clause, conforms to Strict Cyclicity:

(20) Fran seems to like cheese

whereas monoclausal rules such as Dative and the traditional Passive, whether interpreted as movements or relation changes, are illegitimate. Such a requirement outlaws all the Advancements of Relational Grammar, for instance, if conceived in derivational terms. Raising, indeed, it has been argued (e.g., Anderson, 1982, 1984, 1986), provides a paradigm instance of the syntactic role of Case Relations and of the appropriateness of the strong Case Grammar hypothesis.

In (20), the Raised Subject of the (nonfinite) subordinate clause assumes the Subject function in the main (cyclic) clause. In (21) the Raised Subject becomes the Object of the finite verb:

(21) Nobody expected Fran to like cheese

(Such a formulation clearly rejects attempts to deny such a [derived] status to the *Fran* argument in [21].) The derived relations involved present us with a familiar pattern of distribution, that labeled 'ergative.' The status of Subject in (20) and Object in (21) is exactly what one would expect of a Neutral argument; in (21), it is denied subjecthood by the Experiencer argument of the finite verb. Raising confers the Neutral Case Relation in the cyclic clause on the Subject argument of the subordinate verb.

Formulations of Raising invoking grammatical relations or configurations, once again, obscure this generalization. More interestingly still, this interaction of relations is as predicted by the Case Grammar hypothesis. The identification of grammatical relations is derived, determined by the Hierarchy; thus, the identity of the Subject of the cyclic clause is not available on the cycle of rules applying to that clause (in the absence of an arbitrary ordering of rules); but, if the Subject is identified cyclically, then its identity is available on the next cycle. This is exactly what the formulation of Raising requires: the argument involved is identified as the Subject of the lower clause (now available, on the Raising cycle) and as Neutral (a Case Relation) in the cyclic clause; its grammatical relation in the upper clause is given by the Hierarchy. Indeed, if this argument had to be identified in the formulation of Raising by its grammatical relation in the cyclic clause, such a formulation would stand as a counter-example to the predictions of the Case Grammar hypothesis.

Dative and Passive, also, in so far as they involve manipulation of derived properties within a single clause, also violate the Case Grammar hypothesis, as they do Strict Cyclicity. The two hypotheses converge in excluding them as monoclausal rules. The Dative relationship with examples such as (16) can be allowed for in terms of partially shared Case Features. Such an account is not available, however, for Passive. But as an alternative to the lexical proposal described above, a cue can be taken (as it has been in a number of approaches) from the overtly two-verb structure involved.

Say (Passive) *be* is a Raising verb, and its Subject is Raised out of the subordinate clause associated with the accompanying nonfinite (e.g., Anderson, 1991). It differs from a Raising verb like *seem* only in that the Raised argument is not the Subject of the nonfinite verb; rather, it is the argument next down on the Subject Selection Hierarchy. This stipulation allows for all of (22), with the boundaries of the subordinate clause marked by square brackets):

(22a) Albert was [killed by Emma]
(22b) That was [known by/to everybody]
(22c) The bed was [slept in by a parrot]

In each instance, the Hierarchically highest argument (Agentive, Experiencer, Agentive/Neutral, respectively) is ignored by Raising, and is marked with a preposition characteristic of the Case Relation involved. (On the Agentive/Neutral assigned to (22c) see 'Defining Case Relations' below.)

More recently, it has been claimed (cf. again Anderson, 1991) that Raising (including Passive) is projectively structure-building; more generally, that syntactic structure is built up monotonically on the basis of the valencies (specified crucially in terms of Case Relations) of individual lexical items. Such developments serve to enable us to bring into sharper focus the differences between the lexical Case Grammar advocated by Starosta and the tradition within which Case Relations are seen as syntactically basic.

Crucially involved is the validity of a syntactic/lexical distinction. Advocates of the distinction (e.g., Anderson, 1984) argue, for instance, for a differentiation between syntactic and lexical passives (derived adjectives); it is unclear how, if legitimate, this distinction is to be reconstructed in purely lexical terms. Another central question for the lexical approach (apart from those mentioned above) is: how are the alleged asymmetries between the roles of Case Relations and Case Forms to be accounted for? This involves both the syntactic asymmetry associated with Strict Cyclicity (deployed in the description of Raising given above) and the lexical asymmetry associated with the claimed failure of lexical rules to make reference to Case Forms.

Case Grammar approaches (including perhaps Functional Grammar) are united in highlighting the Contrastive status of Case Relations: they have to be stipulated lexically. Many other aspects of syntactic and lexical structure are redundant, derivative of Case specifications and e.g., parametric settings for basic word order. The Case Relations are also semantically identified, though distributionally distinctive.

Such a view has been influential in the evolution of other, distinctively labeled frameworks, such as Role and Reference Grammar (*see* **Semantics in Role and Reference Grammar**). In the main line of development in transformational grammar (epitomized by Chomsky, 1972, 1981, 1995), the Case Grammar hypothesis was initially rejected, but over time transformational syntax came to embrace Case

Relations (under the unfortunate name of Thematic Relations, or Theta Roles), and eventually to abandon Deep Structure. In these respects, the Minimalist program can be identified as a variant of Case Grammar. On the other hand, Anderson (1989, 1991, 1997) and Böhm (1998), in view of the semanticity of the Case Relations, see Case Grammar as a subpart of Notional Grammar, wherein all the basic elements of the syntax, including word classes, though distributionally motivated, are identified on the basis of semantic properties displayed by their prototypical members.

As 'Varieties of Case Grammar' has in part illustrated, other aspects of Case Grammar have been much more contentious. To some extent, this reflects choice among theoretical alternatives relatively independent of the Case grammar hypothesis. Independence of hypotheses within grammatical systems, however, is only ever relative. Thus, whereas Fillmore (1968a, 1971a) remains rather undecided concerning the appropriate representation of syntactic structures including Cases, others (e.g., Robinson, 1970; Anderson, 1971; Tarvainen, 1987, and cf. Tesnière, 1959) have argued that Case Relations, specifically, are most appropriately expressed by Dependency structures (*see* **Dependency Grammar**). In terms of the framework of Anderson, 1971, for instance, (23) would correspond to (4), with Case nodes dependent on the V(erb) and governing the N(oun); Erg = Ergative (roughly, Agentive; see 'Defining Case Relations') and Nom = Nominative (Neutral):

(23)

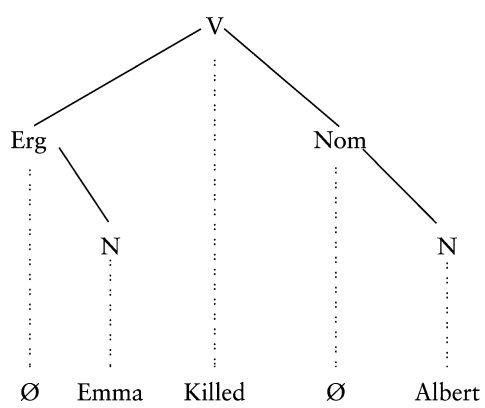

The correlation between the dependency hypothesis, and other aspects of syntax, and the Case Grammar hypothesis itself is controversial. But perhaps the least agreed-on aspect of Case Grammar has been the constitution of the set of Case Relations themselves, an issue that remains unresolved. And the characterization of these in turn has consequences for these other issues concerning the parameters of a Case Grammar.

Defining Case Relations

The arguments of a predicate identify the entities involved in the situation described by the predicate. The nature of the roles played by these entities can be discriminated in more or less detail. In a sense, each predicate prescribes a unique set of roles. But it is possible to generalize over various 'fields' of the vocabulary; and in certain institutionalized situations, in particular, these roles are made lexically explicit in the language. Thus, in the situations described by English verbs such as *sell*, *buy*, *barter*, etc., one role is occupied by a Customer; in those described by *concede*, *justify*, *accuse*, etc., there occurs a Defendant, perhaps (see e.g., Fillmore, 1971c, 1972: Sect. 42, 1977b). More generally still, we can recognize that in many situations it is possible to attribute to a particular entity the role of Source of the Action, the Agentive role.

The Customer in (24a) and the Defendant in (24b) are both Agentive, as Sources of the immediate Action described by the verb:

(24a) Algernon bought a Lada from Bert
(24b) Algernon justified his decision unconvincingly

However, there is no simple mapping between such generalized roles and the more specific institutionalized functions. The Customer in (25), for instance, is not presented as the Source of the immediate Action:

(25) Bert sold a Lada to Algernon

even though the same 'real-world' event may be being referred to by (24a) and (25). This observation undermines such critiques as that offered by Dowty (1989). Dowty's program for eliminating Case Relations from the syntax has been pursued, however, in various ways, as in the tradition exemplified by Hale and Keyser (2002), generally at the cost of acceptance of a very abstract view of syntax and of the syntacticization of lexical structure.

Much of Fillmore's work since the early 1970s has been concerned with the cognitive structures, Frames (*see* **Frame Analysis**), within which detailed role specifications are articulated. However, it is generalized roles such as Agentive that Case Grammarians identify as Case Relations, those semantic functions that are basic to the lexicon and/or syntax. There has been some agreement, and much disagreement, concerning the set of roles that fulfill this function in the grammar. (For a survey of early work see Somers, 1987.)

The set of Case Relations offered in Fillmore (1968a) was tentative and not intended as necessarily exhaustive; he suggests (Fillmore, 1968a: 24–25):

- Agentive (A), the case of the typically animate perceived instigator of the action identified by the verb;
- Instrumental (I), the case of the inanimate force or object causally involved in the action or state identified by the verb;
- Dative (D), the case of the animate being affected by the state or action identified by the verb;
- Factitive (F), the case of the object or being resulting from the action or state identified by the verb, or understood as a part of the meaning of the verb;
- Locative (L), the case that identifies the location or spatial orientation of the state or action identified by the verb;
- Objective (O), the semantically most neutral case, the case of anything representable by a noun whose role in the action or state identified by the verb is identified by the semantic interpretation of the verb itself; conceivably the concept should be limited to things that are affected by the action or state identified by the verb.

Other possibilities are mentioned elsewhere. Fillmore (1971b: Sect. 4) proposes a rather different set as "the case notions that are most relevant to the subclassification of verb types": it includes a Counter-Agent, and splits the Dative into various other Cases, including a new one, the Experiencer (see further below). Fillmore (1971a) contains a slightly different list, in particular lacking Result (regarded there as a Goal) and Counter-Agent and including Location, Time, and Path.

Starosta (1988) suggests a set somewhat reduced compared to his and Fillmore's earlier proposals. Cook (1978: 299), for instance, proposes only Agent, Experiencer, Benefactive, Object, and Locative, while Longacre (1976: 27–34) has Experiencer, Patient, Agent, Range, Measure, Instrument, Locative, Source, Goal, and Path. These sets at least show some overlap; much less of this is evident in, for example, the rather more exotic set proposed by Tarvainen (1987). Such uncertainty over the set of Cases, also well illustrated by the introductory discussion to the sample lexicon of Stockwell *et al.* (1973: Chap. 12, Sect. II.A), has often been cited in criticism of the Case Grammar framework (e.g., Chapin, 1972). It might, indeed, be regarded as a sign of lack of responsibility to describe a particular Case as a 'wastebasket' (Fillmore, 1971a: 42). Unless a theory of Case is properly constrained, new Cases are liable to crawl out of (or be rescued from; Radden, 1978) the 'wastebasket' or from even less desirable spots.

It should, however, be pointed out that the same challenge, or problem, confronts any framework that includes semantic functions or thematic roles (Gruber, 1965; Jackendoff, 1983, and descendants), whose status (as already implied) is now seen by a number of non-Case Grammarians as central to the grammar (cf. e.g., the discussions and references in Wilkins, 1988). Moreover, the determination of the set of syntactic categories as a whole remains contentious. How, for instance, does one group and hierarchize the classes indicated by the labels universal quantifier (e.g., *all*), distributive quantifier (*every*), existential quantifier (e.g., *some*), adjectival quantifier (e.g., *many*), quantificational adjective (e.g., *numerous*, *various*), cardinal numeral, ordinal numeral, superlative adjective, . . . (see e.g., Anderson, 1989)?

On the other hand, this Defendant has to concede that the resolution of the question of the constitution of the set of semantic functions is rather more crucial for a framework in which they play such a fundamental role as is advocated by Case Grammarians. Thus, much effort has been devoted within Case Grammar not merely to the establishing of definitions and semantic/syntactic properties of the individual Cases (cf. e.g., Fillmore's [1972: Sect. 32] discussion of Experiencer and *personally*), but also to the formulation of general principles governing the distribution of Cases and (less commonly) of a general substantive theory of the category of Case.

Some Case Relations seem to be well established: Agentives and Neutrals, for instance, are generally invoked, with agreement over the central instances of such; and their status as Cases is supported by many of the phenomena alluded to in 'Some Fundamentals' and 'Defining Case Relations.' And a Place or Locative Case is generally acknowledged, though its relation to Source and Goal (and Path) is contentious. It is also generally agreed that predicates of experience such as *like* involve a distinct Case, which Fillmore (1968a) dubbed Dative; but the scope of this Case is controversial, with Fillmore (1971a, 1971b), as seen above, for instance, reassigning some former Datives to Goal or Neutral and relabeling the rest Experiencer (Fillmore, 1971a: 42):

> . . . where there is a genuine psychological event or mental state verb, we have the Experiencer; where there is a non-psychological verb which indicates a change of state, such as one of dying or growing, we have the Object; where there is a transfer or movement of something to a person, the receiver as destination is taken as the Goal.

However, as we will see, there are also problems with this revised version.

Many investigators recognize an Instrumental Case Relation, as illustrated by the a hammer argument in (26):

(26a) The vandals dented the BMW with a hammer
(26b) A hammer dented the BMW

And some (cf. e.g., Fillmore, 1971a: Sect. 9) have recognized a Path:

(27) Henry traveled through Celle

Anderson (1971, 1977), however, rejects both of these as Cases, as well as most of the others that have been proposed, in favor of a very restricted set of Case Relations.

Much of this disagreement can be understood in terms of diverse interpretations of the distributional and substantive constraints that Case Relations conform to. The nature of these constraints and the differences in their application can perhaps best be appreciated in terms of an examination of a Case on whose validity most researchers seem to be agreed, the Agentive.

We can provide Agentive with a distinctive semantic definition, perhaps along the lines of one of those given above, and we can associate phrases thus defined with a distinctive distribution, particularly in relation to their role in the Subject Selection Hierarchy. Occurrence of Agentive also correlates with other semanticosyntactic properties: zero-manifestation in imperatives (*Kill Albert!* etc.), adverbial selection:

(28a) Emma killed Albert in cold blood/deliberately
(28b) *Albert died in cold blood/deliberately

where interpretation of (28b) requires some extension of our normal understanding of the meaning and the argument type normally associated with die. Agentives are also, perhaps, "typically animate" (Fillmore, 1968a), even human, as in these examples.

Some phrases that share their basic distribution with Agentives like *Emma* in (28a) are not human, or even animate, however:

(29a) Lightning killed Albert
(29b) Albert was killed by lightning

and they lack many of the associated properties. This can perhaps be allowed for in terms of Fillmore's 'typically animate'; perhaps, to elaborate on this somewhat, lightning in (29) is a nonprototypical Agentive. But what of (30) and the like?

(30a) The poison killed Albert
(30b) Albert was killed by the poison

For Fillmore (1968a), *the poison* is an Instrumental, which in the presence of an Agentive (even if not overt) is necessarily marked by *with*:

(31a) Emma killed Albert with the poison
(31b) Albert was killed with the poison (by Emma)

But the Case of *the poison* in (30a) is in fact indeterminate, given Fillmore's definitions (either A or I), or a nonexistent ambiguity is predicted for its role here.

One solution to this dilemma is to suggest that Instrumentals only ever occur with predicates that also take an Agentive (an instrument presupposes an agent) and to regard *the poison* in (30) as Agentive: it is again a nonprototypical Agentive that we interpret as normally fitting into a frame or scene that includes an (unspecified) ultimate agent. Likewise, there is no distributional reason to recognize a distinct Force Case (Huddleston, 1970) associated with *lightning* in (29): volition and the capacity to wield an instrument are not necessarily to be attributed to nonprototypical Agentives.

The fact that *the poison* in (30) and (31) is now interpreted as bearing two different Cases is analogous to the situation we associated with the Customer role above: an entity bearing the same role, say Instrument, in a 'real-world' situation may be represented linguistically in different ways (cf. [24a] and [25]), in this instance as Agentive or Instrumental. (See Anderson, 1977: Chap. 1; and for a more general description of Instrumentals, Nilsen, 1973.) If the subjects of (29a) and (30a) are not Instrumentals, then prototypical Instrumentals such as those realized in (31) do not participate in Subject and Object Selection; indeed, arguably, they are not an independent component of the subcategorization requirements of any predicate. To put it in its strongest form, it is being claimed that Instrumentals are available with any Agentive predicate. Of course, the class of Instrumental will vary with the class of Agentive predicate: one *travels by car* rather than *with (a) car* (unless one is merely accompanying it). If the availability of Instrumentals can be allowed for by redundancy, i.e., their occurrence need never be stipulated by the Case Features of any predicate, then they can be removed from the set of primary Cases. They are not Participant but Circumstantial (Halliday, 1967/1968; Anderson, 1977, 1986); not Actants (Tesnière, 1959).

The drawing of a distinction between Participant and Circumstantial is the first step in arriving at a delimitation of the set of (Participant) Case Relations. It is only to potential Participants that distributional criteria such as Fillmore's (1971a) principles of 'contrast' and 'complementarity' can be fully applied (see below); circumstantials require a rather different approach.

Circumstantials largely correspond to what many Case Grammarians have dubbed Outer Cases. (It is less clear to what extent Circumstantials as characterized here also correspond in general to Fillmore's Modal Cases.) And perhaps a less controversial

Circumstantial is what Fillmore calls the Outer Locative, as in (32):

(32a) Nigel made lots of money in London
(32b) In London Nigel made lots of money

The Outer Locative (given appropriate choice of lexical items) can appear with any predicate, and, for example, is readily fronted. Contrast the (inner) Locative in (33):

(33a) Nigel kept lots of money in a sock
(33b) ?In a sock Nigel kept lots of money

The (inner) Locative is part of the Case Frame (in its absence the lexical item *keep* has a different sense: 'retain'), and it can be accompanied by an Outer Locative:

(34a) Nigel kept lots of money in a sock in London
(34b) In London Nigel kept lots of money in a sock

Example (34b) lacks the additional interpretation available with (a) with respect to which *in London* modifies *sock*.

Anderson (1977: Chap. 1) argues that a number of proposed (Propositional) Cases are Circumstantial. Thus, Time, for instance, as in (35), is always Circumstantial:

(35) Brenda left on Tuesday

For Anderson, the temporal phrases in (36) and (37) are, respectively, Source and Goal, and Neutral:

(36) The concert lasted from seven to eleven

(37) A long period elapsed

These arguments are associated here with verbs that normally require that their Source-and-Goal or Neutral argument involve temporal reference. And Tuesday in (38) is a nonprototypical Experiencer:

(38) Tuesday saw Brenda's departure

Such a proposal is based on a strategy of eliminating, as distinctions in Case, contrasts that are basically signaled elsewhere. As such, it can be said to represent an implementation of Fillmore's (1971a: 40–41) principle of 'complementarity.'

Fillmore (1971a: Sect. 3) also offers two assumptions that he terms principles of 'contrast.' The second principle, not explicitly formulated as such, is concerned with the establishment of contrasts in Case Relation associated with a single (syntactic) position. Fillmore illustrates this with comparative constructions and with the Subjects of the same predicate in (39):

(39a) I am warm
(39b) This jacket is warm
(39c) Summer is warm
(39d) The room is warm

On one interpretation, *I* in (39a) is an Experiencer (and *warm* a psychological predicate); *this jacket* in (39b) is an Instrument; *summer* in (39c) is a Time; *the room* in (39d) is a Locative/Location. These assignments are supported by the recurrence of such distinctions in Subject position with other predicates (Fillmore discusses *sad*), but it is unclear what the syntactic consequences of some of the posited distinctions might be.

Fillmore's discussion of comparatives (only Noun Phrases of identical Case can be compared) is also inconclusive in this respect, in that it is apparent that many other semantic factors are involved in determining the wellformedness of such constructions. And implementation of 'complementarity' would suggest that (39c) and (39d) (at least) do not involve a distinction in Case (rather, of referential domain). Application of a 'contrast' principle here necessitates that the rest of the environment be kept constant, and so the possibility of 'complementarity' is eliminated.

The other principle of 'contrast' discussed by Fillmore (1971a) is the one-instance-per-clause principle: a single clause will contain at most one (possibly compound) Noun Phrase associated with a particular Case. This has been generally accepted even outside Case Grammar, as in Chomsky's Theta Criterion; and it seems to be well supported. The principal area of dissent concerns Neutral, which Anderson (1971; also 1977: Chap. 1) suggests occurs twice in equatives (*The guy over there is the man she loves*, etc.). He associates this with a further property that has been attributed to Neutral; that it is obligatory with every predicate – what Starosta (1987; also 1978) refers to as Patient Centrality.

This principle of 'contrast' has been frequently coupled with a companion principle requiring that each NP bear at most one Case Relation (Fillmore, 1968a: 24; cf. again the Theta Criterion). However, it has been argued that this is quite generally inappropriate (not just with respect to specific Cases). At issue are, among other things, sentences like those in (40):

(40a) Bert has moved the bookcase
(40b) The bookcase has moved
(40c) Bert has moved

Also see on this and other areas, such as the *see/look* Case Frames, Huddleston, 1970; Anderson, 1968: App., 1971: Chap. 1. In (40a) *Bert* and *the bookcase* are fairly uncontroversially A and N, respectively; and in (40b) *the bookcase* is once more Neutral. But what of *Bert* in (40c)? It is clearly Neutral: the referent of *Bert* undergoes the movement; and its status as

such is required by Patient Centrality. But on one interpretation at least, *Bert* is also the source of the action, Agentive. And there are semantic and syntactic consequences (adverb modification, Unergativity, etc.); some of these are also illustrated by the sentences from Eastern Pomo given in (2) above.

For a contrary view, however, see Starosta, 1987, for instance, where this distinction is not represented. Somers (1987: Chap. 8) surveys some of the arguments involved. Starosta (1988: Sect. 4.3) introduces a third 'case-like' category (besides Case Forms and Case Relations), namely Macroroles (cf. Foley and van Valin, 1984), of which there are two: Actor and Undergoer. The Actor is the Agent of a transitive clause or the Patient of an intransitive one. These are "established to account primarily for morphosyntactic rather than situational generalizations" (Starosta, 1988: 145). But one might have expected them to allow for such phenomena as others have associated with attribution of more than one Case Relation to a single argument, while maintaining the one-instance-per-NP constraint. However, "it appears that Actor, like Patient, is present in every clause" (Starosta, 1988: 146). Thus, both *the bookcase* in (40b) and *Bert* in (40c) would apparently be [+actr, +PAT]. The semantic distinction remains uncaptured. Actor also does not seem to accord well with the syntactic functions Starosta attributes to it. Thus, "the actant which may be omissible in imperatives . . . is the Actor" (Starosta, 1988: 151). But not all intransitive Patients show unmarked imperativization: this is true of (40b) as well as of the Patients associated with verbs such as *stumble*, *blister*, etc. under their normal (nonmetaphorical, non-playacting) interpretation.

Anderson (1977: Chap. 2, in particular) deploys 'complementarity' and nonunary Case assignments for NPs to argue, without recourse to Macroroles, for a very reduced set of (Participant) Cases. For instance, he suggests that Path is a combination of Source and Goal; that Goal is a variant of Locative (with a predicate that also takes a Source, a directional predicate). Experiencers are interpreted as a combination of Locative with a Case Relation which, uncombined with Locative, characterizes Agentives: a Case Relation he calls Ergative. Thus, the Case Relations in (40) are respectively represented as in (41a–c) and those in (7a) and (39a) as, respectively, (41d, 41e):

(41a) Erg Abs
(41b) Abs
(41c) Erg+Abs
(41d) Erg+Loc Abs
(41e) Erg+Loc+Abs

(where Anderson's Abs(olutive) is Neutral, the Nom of J. M. Anderson, 1971). He proposes (Anderson, 1977: 115) a set of four Cases, given in (42), with each Case characterized in terms of combinations of the notional features Place and Source, such that Abs is unmarked and Erg is a non-Place Source, source of the event or situation, physical or mental, potentially in control of it:

(42)

Case relations	Abs	Erg	Loc	Ab1
Case features			Place	Place
		Source		Source

See also, more recently, Ostler, 1980.

These characterizations incorporate a general substantive principle determining the character of Case Relations, to complement the distributional and individual properties mentioned above. They instantiate one articulation of the Localist Hypothesis (cf. Localism), whose earlier history is charted by Hjelmslev (1935/1937), in terms of which the domain of Case is structured by components utilized in our perception of spatial situations: there are no necessarily 'abstract' Case Relations. The hypothesis is one attempt to provide a general definition of Case, avoiding the problems of uncertainty and overlap associated with notional definitions particular to individual Cases.

The importance of a nonparticularist approach to Case is forcibly expressed by Hjelmslev (1935: 4):

> Délimiter exactement une catégorie est impossible sans une idée précise sur les faits de signification. Il ne suffit pas d'avoir des idées sur les significations de chacune des formes entrant dans la catégorie. Il faut pouvoir indiquer la signification de la catégorie prise dans son ensemble.

Apart from within the Localist tradition (including its partial, unwitting adoption by Gruber, 1965 and Jackendoff, 1976, 1983), it is only recently (with developments in Cognitive Grammar (*see* **Cognitive Grammar**) and elsewhere) that such a viewpoint has been to the forefront in the mainstream of the structuralist linguistic tradition in the last few decades.

The postulation of a universal theory of Case is, of course, not to say that the 'same' situation will be expressed in terms of the same Case Frame in different languages, or that what can be an Erg in language X will necessarily correspond to an Erg in language Y (cf. e.g., Dahl, 1987). The English Experiencer (Erg+Loc) in (42) is alien to a large number of languages, for instance. Rather, these Relations form the basis for constructing clause structures in any language, and their applicability is limited primarily,

within the Localist tradition, by the spatial prototypes with which they are associated.

Among the many uncertainties and contentious issues surrounding notions of Case, some of which are surveyed here, perhaps the least explored is the character and status of Circumstantials. Anderson (1986) suggests that, despite their apparent diversity, the set of Circumstantials can be described using the same set of (combinations of) Case Relations as are appropriate to distinguishing Participants, and that the hierarchy of Circumstantials in terms of their closeness of relation to the central proposition is associated with the specificity of the verb class with which they are compatible. Thus, Instrumentals, in so far as they are compatible only with Agentive verbs, are more tightly integrated than Outer Locatives or circumstantial time phrases. But here in particular, much research remains to be done (in any framework). For some discussion, see again, e.g., Somers, 1987: Chap. 1.

See also: Case; Cognitive Grammar; Dependency Grammar; Frame Analysis; Functional Grammar: Martinet; Generative Semantics; Lexicase; Minimalism; Semantics in Role and Reference Grammar; Valency Grammar.

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Castrén, Matthias Alexander (1813–1852)

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Matthias Alexander Castrén (1813–1852) was the founder of scholarly Uralic (Finno-Ugric and Samoyed) studies and an early pioneer of linguistic field work and ethnolinguistics.

Castrén was born in Finland in southern Lapland and went to school in Oulu. He studied classical and Oriental languages at the University of Helsinki and obtained his Cand. Phil. degree in 1836. He was a good friend of the central characters of the national awakening movement in Finland, Johan Ludvig Runeberg, Elias Lönnrot, and Zacharias Topelius, and this affected his course of life. But the person who influenced him the most was A. J. Sjögren (1794–1855), an academician in the Imperial Academy in St. Petersburg. Sjögren had himself made long field trips during most of the 1820s to the western Finno-Ugric populations in Russia, and he inspired Castrén to extend the explorations eastward. Sjögren also was instrumental in arranging funding from the Academy.

Castrén had already done fieldwork in 1838–1839 in Lapland and Karelia, mainly to collect mythology and folklore. In 1841–1844 he conducted his first long field trip, to western and central Russia. Castrén studied Yurak Samoyed (Nenets) in Arkhangel'sk and then continued along the Pechora to the Komis (Zyryans). His grammar of Komi (Komi-Zyrian) (*Elementa grammatices Syrjaenae*) was published in 1844. Castrén crossed the Urals and ended up in Obdorsk, where his health started to falter and he was diagnosed with tuberculosis of the lungs. During this long trip he became convinced that Finnish and Samoyed were related. In 1845 his basic grammar of Mari, Low (Cheremis) appeared.

Castrén's decisive journey lasted from 1845 to 1849 and covered an area extending over Siberia beyond the Yenissei and Ob', from the coastal tundra of the Arctic Sea all the way to the Altay and Sayan mountains, even transgressing the Chinese border. In addition to extensive archeological and ethnographic material, he collected data on all Samoyed languages, including Kamassian (Kamas), of which he found the last 150 speakers east of Krasnoyarsk, Khanty (Ostyak), the isolated and highly complex Ket (Yenissei-Ostyak) language and the related Kott language, two dialects of Turkic, Buryat Mongolian (Buriat, Mongolia), and Evenki (Tungus). All in all, Castrén traveled more than 50 000 km.

Castrén's first comparative study (1839) treated nominal inflection in Finnish, Estonian, and Sámi. He formulated a program for further studies in the field. Castrén rejects the old speculations concerning the biblical origin of Finnish and proceeds to a concrete comparison of morphological categories. He deals with morphophonological alternations like vowel harmony and consonant gradation (*see* **Finnish**) as well as number and case inflection. He was the first to demonstrate that the stop alternations inFinnish, Estonian, and Sámi depend in part upon the structure of the following syllable (open or closed).

Castrén's most important contribution is his comparative grammar of the Samoyed languages. This 600-page posthumous work contains descriptions of all the five Samoyed languages investigated by Castrén, especially their sounds and morphological properties, and provides outlines of the development of the languages and their hypothesized common source. This work constitutes the foundation of comparative Uralic studies.

Castrén's study (1850) of pronominal suffixes in Finno-Ugric, Samoyed, Turkic, Mongolian, and Tungusic languages attempts to show that these languages are related and form the Altaic language family. However, posterity has not accepted this hypothesis.

In 1851, Castrén was appointed the first professor of Finnish at the University of Helsinki, but after only one year in office he died of complications related to his tuberculosis. Even upon his deathbed he struggled with his comparative Samoyed grammar, which (along with many of his other writings) was published posthumously by the academician Anton Schiefner in St. Petersburg (Castrén, 1853–1862).

See also: Anthropological Linguistics: Overview; Finnish; Uralic Languages.

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Catalan

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Geography and Demography

The territories where Catalan is natively spoken cover 68 730 km^2, of which 93% lies within Spain (see Figure 1). They are:

1. The Principality of Andorra
2. In France: North Catalonia – almost all of the département of Pyrénées-Orientales
3. In Spain: Catalonia, except for the Gascon-speaking Vall d'Aran; the eastern fringe of Aragon; most of Valencia (the Comunitat Valenciana), excepting some regions in the west and south that have been Aragonese/Spanish-speaking since at least the 18th century; El Carxe, a small area of the province of Murcia, settled in the 19th century; and the Balearic Islands
4. In Italy: the port of Alghero (Catalan *L'Alguer*) in Sardinia

Table 1 shows the population of these territories (those over 2 years of age in Spain) and the percentages of the inhabitants who can understand, speak, and write Catalan. Information is derived from the 2001 census in Spain together with surveys and other estimates; the latter are the only sources of language data in France and Italy. The total number of speakers of Catalan is a little under 7.5 million. Partly as a result of the incorporation of Catalan locally into the education system, there are within Spain a significant number of second-language speakers who are included in this total. Virtually all speakers of Catalan are bilingual, using also the major language of the state they live in. (Andorrans are bilingual in Spanish or French, or are trilingual.)

Genetic Relationship and Typological Features

Catalan is a member of the Romance family and a fairly prototypical one, as befits its geographically central position in the European Romance area. Some particularly noteworthy characteristics are pointed out here (for more details see Wheeler, 1988). In historical phonology, note the palatalization of initial /l-/ and loss of stem-final /n/ that became word final, for example, LEONEM > *lleó* [ʎə'o] 'lion.' Original intervocalic -C′-, -TJ-, -D- became /w/ in word-final position and were lost elsewhere, for examples, PLACET > *plau* ['plaw] 'please.3.SING,' PLACEMUS > *plaem* [plə'ɛm] 'please. 1.PL.' As the previous examples also illustrate, posttonic nonlow vowels were lost, so that a dominant pattern of phonological words is of consonant-final oxytones. The full range of common Romance verbal inflection is retained, including inflected future (*sentirà* 'hear.3.SING.FUT'), widely used subjunctives, and a contrast between present perfect (*ha sentit* 'has heard') and past perfective (*sentí* 'heard.3.SING. PERF'). In addition to the inherited past perfective form, now largely literary, Catalan developed a periphrastic past perfective using an auxiliary that was originally the present of 'go' (*va sentir* 'AUX. PERF.3.SING hear.INF'). In some varieties of Catalan, this construction has developed a subjunctive (*vagi sentir* 'AUX.PERF.SUBJ.3.SING hear.INF'), introducing, uniquely in Romance, a perfective/imperfective aspect distinction in the subjunctive. Considerable use is made of pronominal and adverbial clitics that attach to verb forms in direct and indirect object functions or partitive or adverbial functions, quite often in clusters of two or three, as in (1).

(1) us n'hi envi-en
2.PL.OBJ PART.LOC *send*-3.PL
"they send some to you (PL) there"

Most of the pronominal/adverbial clitics have several contextually conditioned forms; thus, the partitive clitic shows variants *en* ∼ *n'* ∼ *-ne*. Clitic climbing is commonly found with a pronominal complement of a verb that is itself the complement of a (semantic) modal, as in (2). This example also shows the (optional) gender agreement of a perfect participle with a preceding direct object clitic.

(2) no l'he sab-ud-a agafa-r
not DO.3.SING.F. *know-* *catch*-INF
have.1.SING PART-F
"I haven't been able to catch it (FEM)"

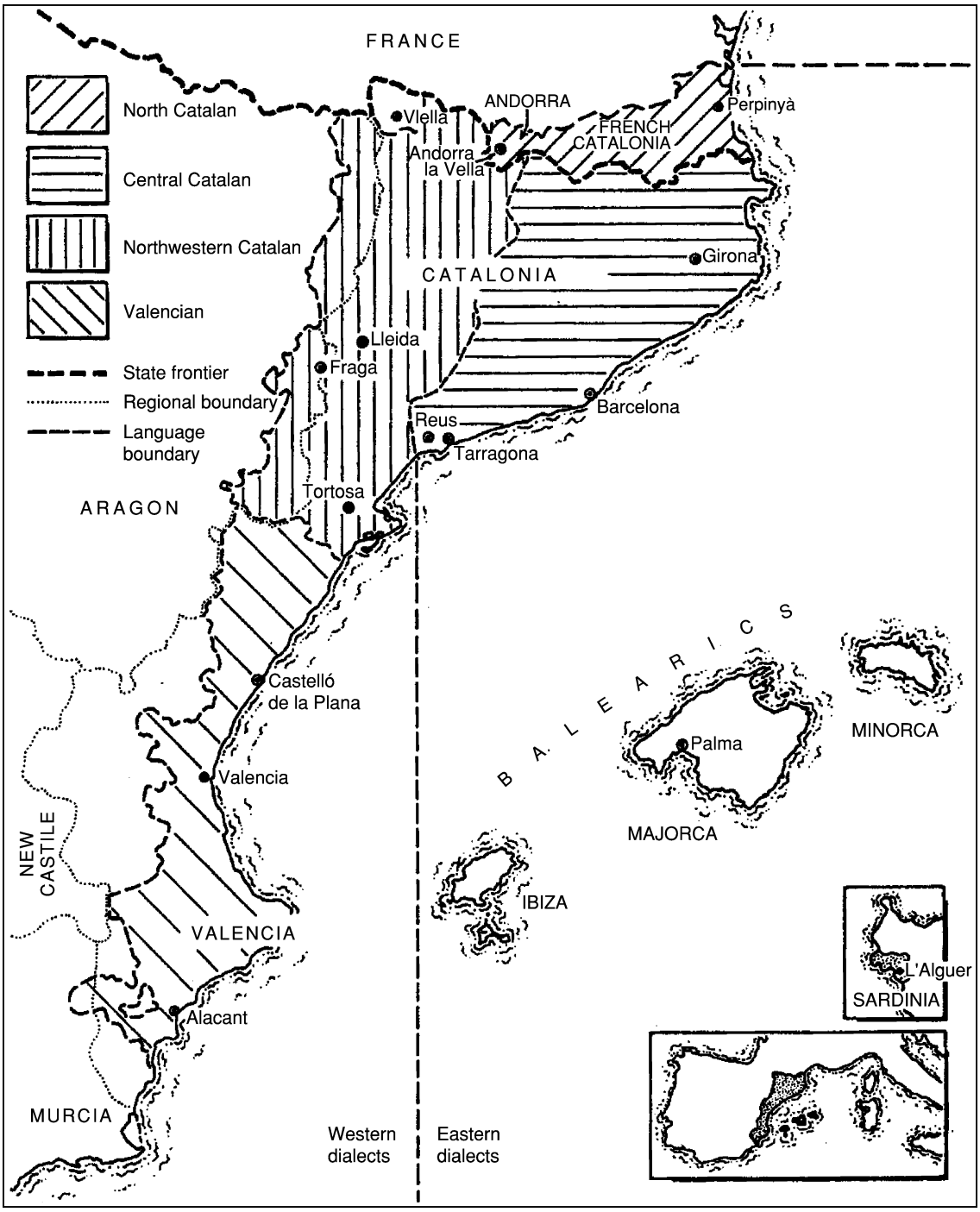

Figure 1 Catalan-speaking areas and dialects.

A fair number of items in the basic vocabulary are etymologically distinct from the corresponding terms in neighboring Romance languages, for example, *estimar* 'to love,' *ganivet* 'knife,' *gens* 'not at all,' *massa* 'too,' *pujar* 'to go up,' *tardor* 'autumn,' and *tou* 'soft.'

Dialects

Although there are significant dialect differences in Catalan, the dialects are to a high degree mutually intelligible. They are conventionally divided into two groups, on the basis of differences in phonology as

Table 1 Catalan language demography and competences

Territory	*Population*	*Understand Catalan (%)*	*Speak Catalan (%)*	*Write Catalan (%)*
Andorra	66 000	97	91	(No data)
North Catalonia	363 000	59	41	10
Catalonia	6 215 000	95	75	50
Aragon fringe	50 000	95	90	(No data)
Valencia	4 145 000	85	48	23
Balearics	822 000	90	68	26
Alghero/*L'Alguer*	38 000	53	46	(No data)
Total	11 699 000	89	64	37

well as some significant features of verb morphology; there are some interesting lexical differences, too. The eastern dialect group (see **Figure 1**) includes North Catalan or *rossellonès* (in France), central Catalan (in the eastern part of Catalonia), Balearic, and *alguerès* (in Alghero/L'Alguer). The western group consists of Northwestern Catalan (western and southern Catalonia and eastern Aragon) and Valencian. The main diagnostic heterogloss distinguishing the two major dialect groups involves vowel reduction in unstressed syllables: In the eastern dialects /a/ is pronounced [ə] in unstressed syllables and, with some exceptions, /e/ and /ɛ/ are also reduced to [ə], whereas /o/ and /ɔ/ are reduced to [u].

History

Catalan is a variety of Latin that developed originally on a small territory on either side of the eastern Pyrenees. Expansion of this territory, the Marca Hispanica of the Carolingian empire, is associated with a process of developing political independence, beginning with the separation (A.D. 988) of the county of Barcelona from the trunk of the Carolingian domain. Eventual fusion with the crown of Aragon (1162) gave new momentum to this projection. In 1151, a treaty between the kings of Aragon and Castile had carved up the future conquest of territories then under Arab control, so that Valencia would fall to the crown of Aragon while lands further west would be attached to Castile. The kingdom of Valencia was captured in the 1230s and was populated by speakers from various parts of Catalonia and Aragon, although a numerous subordinate population of Arabic-speaking *moriscos*, as they were called, remained until their expulsion in 1609. The Balearic Islands were conquered between 1229 and 1287 and were resettled by speakers largely from eastern Catalonia. Sicily was also captured for the house of Barcelona (1282), as was Sardinia (1323–1327); Catalan was widely used as an official language in Sicily until the 15th century and in Sardinia until the 17th century. In Sardinia, only the port of Alghero was subject to Catalan resettlement, and it has remained Catalan-speaking to the present day. The original expansion southward of Catalan following the reconquest extended as far as Murcia and Cartagena, although the kingdom of Murcia became Spanish-speaking during the 15th century.

The chancellery of the kingdom of Aragon was trilingual, using Latin, Catalan, and Aragonese as the occasion required. A substantial body of Catalan literature in various prose and verse genres was produced before decline set in in the 16th century. In 15th-century Valencia the court was already bilingual, and after the merger of the Aragonese and Castilian crowns in 1479 Spanish (Castilian) gradually increased in prestige throughout the Catalan territories, with the urban and literate classes becoming bilingual. From the 16th century, Catalan came increasingly under Spanish influence in vocabulary, syntax, pronunciation, and orthography as a result of the social and cultural prestige of Castile. It was not until the 19th century that a substantial Catalan literary and cultural revival took place, which continues to the present. Standardization of the modern language was achieved in the early 20th century.

Since the Second World War, most of the Catalan-speaking territories have experienced a substantial immigration of non-Catalan speakers. In France, these have been *pieds noirs* resettled from Algeria and retired people from various parts of France. In Catalonia and Valencia, the population almost doubled between 1950 and 1975 as people from less-developed southern Spain sought employment in the manufacturing and service industries. Majorca and Ibiza (Eivissa) have attracted a workforce from many parts of Spain, feeding the tourist industry. Many immigrants have wished to acquire Catalan, or at least have wished their children to do so, as an aid to integration, but until the late 1970s there were few opportunities to realize this. These large Spanish-speaking communities have added to the institutional

and cultural pressures in favor of the use of Spanish in the Catalan territories.

In 1659, Philip IV of Spain ceded the northern part of Catalonia (essentially the modern département of Pyrénées-Orientales) to the French crown. From that point, North Catalonia became subject to the linguistic unification policies of the French state. French became the official language in 1700 and has had a marked influence on the vocabulary of North Catalan and, in recent times, on its phonology as well. Minorca was under British rule during most of the 18th century, and there is a handful of Minorcan Anglicisms in the vocabulary dating from that period. The dialect of Alghero is, not surprisingly, heavily influenced by Sardinian and even more so by Italian in all components of the language.

Present Sociolinguistic Situation

The status, situation, and prospects of the Catalan language are significantly different in each of the territories in which it is spoken, although each of those in Spain shares, in some way, the consequences of Catalan's having been for centuries an oppressed minority language. The cultural decline and loss of prestige affecting Catalan from the 16th century onward has already been mentioned. The defeat of the Catalans in the war of the Spanish Succession (1714) initiated a series of measures, extending throughout the 18th and 19th centuries, that imposed the use of Spanish in public life, for example, in accounts, in preaching, in the theater, in the criminal courts, in education, in legal documents, in the civil registers, and on the telephone. In the 20th century, these measures were mostly repeated and supplemented by the imposition of Spanish in catechism, by the prohibition of the teaching of Catalan, and by sanctions against people refusing to use Spanish. The Second Republic (1931–1939) to a large extent removed these restrictions, but Franco's victory in the Spanish Civil War was followed in 1940 by a total ban on the public use of Catalan. Despite a gradual relaxation allowing some publication of books and magazines, Catalan remained excluded from nearly all public institutions until Spain's adoption of a democratic constitution in 1978.

In the early 1980s, Catalonia, Valencia, and the Balearics obtained their statutes of autonomy, involving co-official status for Spanish and Catalan. All of these statutes promote language normalization, the goal of which is universal bilingualism without diglossia. In Catalonia, the expressed aim of the Generalitat (the autonomous government) goes further than this: It seeks to make the local language the normal medium of public life, with Spanish having a secondary role as an auxiliary language or a home language for its native speakers. In Catalonia, the teaching of Catalan is obligatory in all schools, and primary and secondary education through the medium of Catalan now reaches at least 60% of the population. In Valencia and the Balearics, the de facto policy has been to promote effective knowledge of Catalan through education and to enhance its status while largely preserving a diglossic relationship between Spanish and Catalan. In Valencia, significant political forces reject the name Catalan for the local language and insist on the term Valencian. Although the Balearic Islands Council passed a linguistic normalization law in 1986, progress has been inconsistent, although Catalan is widely available in the education system which includes some Catalan-medium education.

In Andorra, Catalan has always been the sole official language. In 1993, Andorra adopted a new constitution, and the government has been pursuing an active Andorranization policy, involving Catalan-medium education. The status of Catalan in North Catalonia is parallel to that of the other traditional minority languages in France. Language shift was all but universal after the Second World War, so that most native speakers are (as of 2004) over 60 years old. Catalan has at best an occasional, decorative role in public life. In primary schools, some 30% study Catalan (as a foreign language) and, in secondary schools, some 15%.

The current trend is for intergenerational language shift from Catalan in French Catalonia, in Alghero, in southern Valencia around Alicante (Alacant), and possibly in Palma (Majorca). Elsewhere, Catalan is holding its own, with some evidence of intergenerational shift toward Catalan in Catalonia.

See also: Andorra: Language Situation; France: Language Situation; Indo–European Languages; Italy: Language Situation; Romance Languages; Spain: Language Situation; Spanish.

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Categorial Grammars: Deductive Approaches

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Introduction

According to Frege, it is certain possibly complex expressions, and not in general the words, which are the primary bearers of meaning. Thus, while phrase structure grammar classifies words and phrases by atomic categories or types, what Bar-Hillel (1964) dubbed 'categorial grammar' is characterized by the classification of words and phrases into atomic and complex fractional types according to their completeness or incompleteness as expressions (Husserl, 1913; Ajdukiewicz, 1935; Bar-Hillel, 1953). Lambek (1958) gave a calculus in this spirit for which was provided a Gentzen-style sequent system. Deductive approaches to categorial grammar were thus born.

In the next section we present an introduction to categorial grammar. In the section 'Deductive Systems' we review categorical calculus, sequent calculus, natural deduction, and proof nets. The technical appendix provides a contemporary definition of categorial formalism.

Categorial Grammar

In Categorial Grammar (*see also* **Combinatory Categorial Grammar**) the categories or types by which linguistic expressions are classified are defined recursively on the basis of a small set of atomic types by means of two operators, / (over) and \ (under). Atomic types (for example, S for declarative sentence, N for referring nominal and CN for count noun) are types, and if A and B are types, so are the functor types B/A and $A\backslash B$. Expressions of type B/A are those which concatenate with argument As on the right to form Bs and expressions of type $A\backslash B$ are those which concatenate with argument As on the left to form Bs. (Some authors write $B\backslash A$ for $A\backslash B$; we keep to the original notation by which cancellation is under adjacency.) Thus, for example, whereas phrase structure grammar might have a rule N → DefArt CN showing that a definite article combines with a count noun to form a referring nominal, categorial grammar may express the same information by assigning a definite article the functor type N/CN, showing that it combines with a count noun on the right to form a referring nominal.

Let us write α: A to indicate that the expression α is of type A. Then a categorial lexicon might include the following type assignments:

(1) **cat**: CN
Mary: N
likes: (N\S)/N
sleeps: N\S
that: (CN\CN)/(S/N)
the: N/CN

What type assignments follow from what? It is easy to see that the following are valid, where concatenation is indicated by +:

(2)
$$\frac{\beta: B/A \qquad \alpha: A}{\beta+\alpha: B}\,E/ \qquad\qquad \frac{\alpha: A \qquad \beta: A\backslash B}{\alpha+\beta: B}\,E\backslash$$

Furthermore, where a is a variable and coindexed overline indicates the withdrawal of a type assignment statement, the following are valid:

(3)
$$\begin{array}{l} \text{------}i \\ a: A \\ \vdots \\ \beta+a: B \\ \text{------}I/^{i} \\ \beta: B/A \end{array} \qquad\qquad \begin{array}{l} \text{------}i \\ a: A \\ \vdots \\ a+\beta: B \\ \text{------}I\backslash^{i} \\ \beta: A\backslash B \end{array}$$

In the rules E stands for elimination, because the operator is eliminated reading from premises to conclusion, and I stands for introduction, because the operator is introduced reading from premises to conclusion. There are the following derivations of the sentence 'the cat sleeps' and the relative clause 'that Mary likes.'

(4)
$$\frac{\dfrac{\textbf{the}: N/CN \qquad \textbf{cat}: CN}{\textbf{the+cat}: N}\,E/ \qquad \textbf{sleeps}: N\backslash S}{\textbf{the+cat+sleeps}: S}\,E\backslash$$

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(5)

```
                                                  ------i
                                likes: (N\S)/N     a: A
                                ----------------------------E/
                  Mary: N            likes+a: N\S
                  ----------------------------------------E\
                          Mary+likes+a: S
                          ------------------I/i
that: (CN\CN)/(S/N)       Mary+likes: S/N
-------------------------------------------------E/
        that+Mary+likes: CN\CN
```

These will be our running examples in the presentation of deductive systems in the next section.

By way of motivation of categorial grammar, consider right node raising and left node raising coordination:

(6a) John likes and Mary dislikes London.
(6b) John showed Mary Paris and Suzy Berlin.

The conjuncts are nonconstituents on a phrase structure view of grammar; however, in categorial grammar the conjuncts can be analyzed as units so that the node raising can be treated as coordination of like-type constituents:

(7a)

```
                                          ------i
                          likes: (N\S)/N   a: N
                          ------------------------------E/
John: N                       likes+a: N\S
-------------------------------------------------E\
              John+likes+a: S
              ------------------I/i
              John+likes: S/N
```

(7b)

```
------------------i
a: ((N\S)/N)/N          Mary: N
--------------------------------------E/
        a+Mary: (N\S)/N            Paris: N
        ---------------------------------------------E/
                a+Mary+Paris: N\S
        ---------------------------------------------I/i
        Mary+Paris: (((N\S)/N)/N)\(N\S)
```

Deductive Systems

In addition to the *division* operators \ and / there is a *product* operator • such that $A \bullet B$ signifies the concatenation of an A and a B. The interpretation of the categorical operators is summarized:

(8) $[[A \bullet B]] = \{s_1 + s_2 |\ s_1 \in [[A]] \text{ and } s_2 \in [[B]]\}$
$[[A \backslash C]] = \{s |\ \text{for all } s' \in [[A]],\ s' + s \in [[C]]\}$
$[[C/B]] = \{s |\ \text{for all } s' \in [[B]],\ s + s' \in [[C]]\}$

The purpose of deductive systems is to provide sound and complete calculi for this interpretation (Buszkowski, 1986; Pentus, 1994). We consider in turn categorial calculus, sequent calculus, natural deduction, and proof nets.

Categorical Calculus

An arrow $A \rightarrow B$ comprises a source syntactic type A and a target syntactic type B. An arrow is *valid* if and only if in every interpretation, $[[A]]$ is a subset of $[[B]]$. There is the following calculus of valid arrows (Lambek, 1958):

(9)

a. id: $A \rightarrow A$

b. $\dfrac{A \rightarrow B \quad B \rightarrow C}{A \rightarrow C}$ Trans

c. α: $(A \bullet B) \bullet C \rightarrow A \bullet (B \bullet C)$

d. α^{-1}: $A \bullet (B \bullet C) \rightarrow (A \bullet B) \bullet C$

e. $\dfrac{A \bullet B \rightarrow C}{A \rightarrow C/B}\ \beta$

f. $\dfrac{A \bullet B \rightarrow C}{B \rightarrow A \backslash C}\ \gamma$

g. $\dfrac{A \rightarrow C/B}{A \bullet B \rightarrow C}\ \beta^{-1}$

h. $\dfrac{B \rightarrow A \backslash C}{A \bullet B \rightarrow C}\ \gamma^{-1}$

For example, the following shows that the types for 'the cat sleeps' in order yield a sentence:

(10)

```
                                  -------------id
                                  N\S →  N\S
                                  -------------γ⁻¹
----------------------id          N•(N\S) → S
N/CN → N/CN                       ---------------β
----------------------β⁻¹         N → S/(N\S)
(N/CN)•CN → N
-------------------------------------------------------Trans
          (N/CN)•CN → S/(N\S)
          -------------------------------β⁻¹
          ((N/CN)•CN)•(N\S) → S
```

Where R abbreviates CN\CN and TV abbreviates (N\S)/N, the following shows that 'that Mary likes' yields an R:

(11)

```
                                  -------------id
                                  TV → TV
                                  ---------------β⁻¹
                                  TV•N → N\S
-----------------------------α    -------------γ⁻¹          -----------------------------id
(N•TV)•N → N•(TV•N)               N•(TV•N) → S               R/(S/N) → R/(S/N)
-------------------------------------------------------------Trans
                                  (N•TV)•N → S               -----------------------------β⁻¹
                                  --------------------β      R/(S/N))•(S/N) → R
                                  N•TV → S/N                 -----------------------------γ
                                  -------------------------------------------------------Trans
                                          N•TV → (R/(S/N))\R
                                          ---------------------------γ⁻¹
                                          (R/(S/N))•(N•TV) → R
```

The rules of the categorical calculus are elegant but, as we see, the proofs are not very economical. Furthermore, given an arrow to be proved there is no obvious strategy to search for a proof because in the rule Trans of (9b) the type B is an unknown reading from conclusion to premises. This situation is improved in the sequent calculus.

Sequent Calculus

A *sequent* $\Gamma \Rightarrow A$ comprises a nonempty sequence of *antecedent* types Γ and a *succedent* type A. A sequent

$A_0, \ldots, A_n \Rightarrow A$ is *valid* if and only if in every interpretation, if $s_0 \in [[A_0]], \ldots, s_n \in [[A_n]]$ then $s_0 + \ldots + s_n \in [[A]]$. There is the following calculus of valid sequents (Lambek, 1958):

(12) a. $A \Rightarrow A$ b. $\dfrac{\Gamma \Rightarrow A \quad \Delta_1, A, \Delta_2 \Rightarrow C}{\Delta_1, \Gamma, \Delta_2 \Rightarrow C}$ Cut

(13) a. $\dfrac{\Gamma_1 \Rightarrow A \quad \Gamma_2 \Rightarrow B}{\Gamma_1, \Gamma_2 \Rightarrow A \bullet B}$ •R b. $\dfrac{\Delta_1, A, B, \Delta_2 \Rightarrow C}{\Delta_1, A \bullet B, \Delta_2 \Rightarrow C}$ •L

(14) a. $\dfrac{\Gamma, A \Rightarrow C}{\Gamma \Rightarrow C/A}$ /R b. $\dfrac{\Gamma \Rightarrow A \quad \Delta_1, C, \Delta_2 \Rightarrow D}{\Delta_1, C/A, \Gamma, \Delta_2 \Rightarrow D}$ /L

c. $\dfrac{A, \Gamma \Rightarrow C}{\Gamma \Rightarrow A/C}$ \R b. $\dfrac{\Gamma \Rightarrow A \quad \Delta_1, C, \Delta_2 \Rightarrow D}{\Delta_1, \Gamma, A\backslash C, \Delta_2 \Rightarrow D}$ \L

These divide into the identity rules (12) and the logical rules (13) and (14). For each operator there is a left (L) logical rule in which the operator appears in the antecedent of the conclusion and a right (R) logical rule in which the operator appears in the succedent of the conclusion.

With the exception of Cut, which introduces the unknown type A reading from conclusion to premises, every rule contains one less operator in the premises than in the conclusion. Now the calculus enjoys Cut elimination, that is to say that every provable sequent can be proved without the use of Cut (Lambek, 1958). Hence, the calculus provides a decision procedure, backward-chaining from the sequent to be proved in the finite Cut-free search space. For example:

(15)
$$\dfrac{CN \Rightarrow CN \qquad \dfrac{N \Rightarrow N \qquad S \Rightarrow S}{N, N\backslash S \Rightarrow S}\backslash L}{N/CN, CN, N\backslash S \Rightarrow S}\,/L$$

(16)
$$\dfrac{N \Rightarrow N \qquad \dfrac{\dfrac{\dfrac{N \Rightarrow N \qquad S \Rightarrow S}{N, N\backslash S \Rightarrow S}\backslash L}{N, (N\backslash S)/N, N \Rightarrow S}\,/L}{N, (N\backslash S)/N \Rightarrow S/N}\,/R \qquad R \Rightarrow R}{R/(S/N), N, (N\backslash S)/N, N \Rightarrow R}\,/L$$

However, the Cut-free search space still contains proofs which differ in inessential orderings of rules. For example, the following is equivalent to (15):

(17)
$$\dfrac{\dfrac{CN \Rightarrow CN \qquad N \Rightarrow N}{N/CN, CN \Rightarrow N}\,/L \qquad S \Rightarrow S}{N/CN, CN, N\backslash S \Rightarrow S}\,\backslash L$$

Natural Deduction

In natural deduction (Barry *et al.*, 1991), proofs are ordered trees with hypothesis types at leaves and a conclusion type at the root, with coindexation indicating the closing of hypotheses under hypothetical reasoning. Proofs are combined and extended at the roots starting from single types. A proof with left-to-right unclosed leaves $A_0, \ldots, A_n$ asserts that in every interpretation, if $s_0 \in [[A_0]], \ldots, s_n \in [[A_n]]$ then $s_0 + \ldots + s_n$ belongs to the root type.

(18) (a)
$$\dfrac{A \qquad A\backslash C}{C}\,\backslash E$$
(b)
$$\dfrac{C/B \qquad B}{C}\,/E$$
(c)
$$\dfrac{\begin{array}{c} -i \\ A \\ \vdots \\ C \end{array}}{A\backslash C}\,\backslash I^i$$
(d)
$$\dfrac{\begin{array}{c} -i \\ B \\ \vdots \\ C \end{array}}{C/B}\,/I^i$$

(19) (a)
$$\dfrac{A \qquad B}{A \bullet B}\,\bullet I$$
(b)
$$\dfrac{A \bullet B \qquad \begin{array}{c} -i \\ A \\ \vdots \\ -i \\ B \\ \vdots \\ D \end{array}}{D}\,\bullet E^i$$

As with the calculus of the 'Categorial Grammar' section, which is a labeled form of natural deduction, for each operator there is a rule of elimination (E) such that the operator is eliminated reading from premise to conclusion and a rule of introduction (I) such that the operator is introduced reading from premise to conclusion. In \I, A must be the leftmost hitherto unclosed hypothesis and cannot be the last such; in /I, B must be the rightmost hitherto unclosed hypothesis and cannot be the last such. In •E, A and B must be the only unclosed hypotheses in the indicated subderivation.

For example:

(20)
$$\dfrac{\dfrac{N/CN \qquad CN}{N}\,/E \qquad N\backslash S}{S}\,\backslash E$$

(21)
$$\dfrac{R/(S/N) \qquad \dfrac{\dfrac{(N\backslash S)/N \qquad \begin{array}{c} -i \\ N \end{array}}{N}\,/E \qquad N\backslash S}{S}\,\backslash E}{S/N}\,/I^i$$
$$R \quad /E$$

Natural deduction provides quite an economic proof syntax because it does not iterate the contexts of sequent calculus inferences. However, it does not provide an obvious proof search procedure because on the one hand, working from leaves to root, it is not clear which hypotheses to make and later close, and on the other hand, working from root to leaves, /E and \E introduce an unknown. In the next section we present proof nets, which combine the representational and computational advantages of sequent calculus and natural deduction.

Proof Nets

When we inspect the sequent calculus we see that it is predictable which sequent rule will apply to an operator in a proof of a sequent. To the main operator * in an antecedent type will apply the rule *L, to the main operator * in a succedent type will apply the rule *R, and to a subordinate operator * will apply *L or *R according to the propagation of subtypes in the unfolding of a proof. This means we can anticipate the antecedent or succedent position of a type in a proof.

Let there be two *polarities*: input ($^\bullet$) and output ($^\circ$), corresponding respectively to antecedent (L) and succedent (R) position. A *polar type* A^p is a type together with a polarity p. A *polar type tree* is the result of unfolding a polar type up to its atomic leaves according to the following *logical links*:

(22) (a) $A^\circ \quad C^\bullet$ ----------ii, $A\backslash C^\bullet$ (b) $C^\circ \quad A^\bullet$ ----------i, $A\backslash C^\circ$

(c) $C^\bullet \quad B^\circ$ ----------ii, $C/B^\bullet$ (d) $B^\bullet \quad C^\circ$ ----------i, C/B°

(23) (a) $A^\bullet \quad B^\bullet$ ----------i, $A\bullet B^\bullet$ (b) $B^\circ \quad A^\circ$ ----------ii, $A\bullet B^\circ$

In each link, the premises above the line are the immediate subtypes of the conclusion below the line, marked with polarity according to the propagation to antecedent or succedent position. The links (22a–d) and (23a, b) correspond respectively to \L, \R, /L, /R, •L, and •R, showing just the active types without the iterated contexts. They are marked i or ii according as the rule is unary (the premises belong to the same subproof) or binary (the premises belong to different subproofs). Note that in the output unfoldings the left-to-right order of the subtypes is switched. The intuition behind this is that output polarity hides an implicit negation, and in a noncommutative system the negation/reverse of A first and then B second is the negation/reverse of B first and the negation/reverse of A second.

A *proof frame* is a list of polar type trees comprising an output type followed by at least one input type. A proof structure is the result of connecting in a proof frame every leaf with one other with the same atomic type and complementary polarity. These connections are called *axiom links*. A proof structure is a *proof net* if and only if:

(24a) (Acyclicity) Every cycle crosses both edges of some i-link.

(24b) (Planarity) The axiom linking is planar in the ordering of the leaves induced by the list ordering of the frame, i.e., the axiom linking can be drawn in the half-plane without crossing lines.

(24c) (No subtending) No axiom link connects the left and right descendent leaves of an output division node.

(For acyclicity see Danos and Regnier, 1989; for planarity see Roorda, 1991; for no subtending see de Groote and Retoré, 2003.) A proof net over a proof frame A°, $A_0^\bullet$, …, $A_n^\bullet$ asserts that in every interpretation, if $s_0 \in [[A_0]], \ldots, s_n \in [[A_n]]$ then $s_0 + \ldots + s_n \in [[A]]$. For example:

(25)

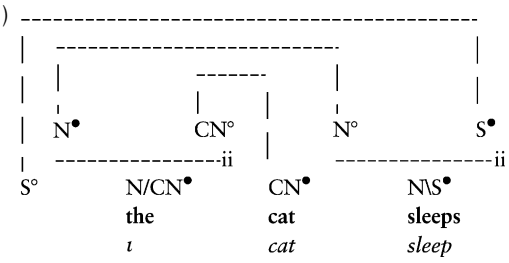

(26)

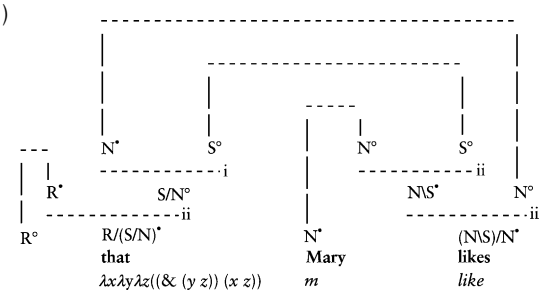

Notice that, the cycle in (26) does indeed cross both edges of a i-link so that it complies with acyclicity.

Introducing now the semantic dimension, a proof net analysis contains implicitly the semantic reading of a proof (de Groote and Retoré, 1996). The semantic form is recovered following a deterministic *semantic trip* through the net. The semantic trip starts upwards at the unique output root and proceeds according to the instructions in (27)–(28), generating the successive characters of the semantic form as indicated. The trip bounces at input roots inserting

the associated lexical semantics. It ends downwards back at the origin having crossed each edge twice, once in each direction.

(27) (a) (b)

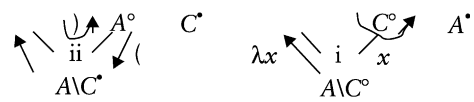

(c) (d)

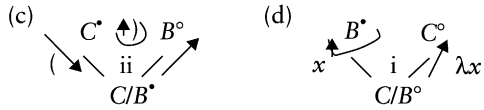

(28) (a) (b)

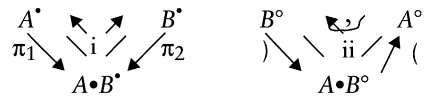

For example, the result of performing the semantic trip on (25) is (29) and the result of performing the semantic trip on (26) is (30a), which is equivalent to (30b).

(29) (*sleep* (ι *cat*))

(30a) ($\lambda x \lambda y \lambda z$((& ($y$ z)) (x z)) λx((*like* x) m))
(30b) $\lambda y \lambda z$((& (y z)) ((*like* z) m))

Conclusion

We have illustrated deductive approaches to the Lambek calculus, the nucleus of categorial grammar. We have seen a variety of calculi leading up to proof nets, which for their parsimony and economy can claim to be **the** syntactic structures of deductive categorial grammar. Recent work has concentrated on generalizations of the basic calculus, extending its linguistic coverage while trying to preserve its attractive logical properties (Morrill, 1994; Carpenter, 1997; Moortgat, 1997). Perhaps the most challenging contemporary aspect is the development of corresponding theories of proof nets (see e.g., Moot and Puite, 2002; Fadda, 2004; Fadda and Morrill, 2005).

Technical Appendix

We are interested in modeling the two dimensions of language: form and meaning. Categorial grammar classifies expressions simultaneously with respect to these two dimensions. We refer to the first as *prosodics*, signifying word order abstracted from mode of articulation, e.g., verbalization or signing, but potentially including intonational contours or their analogue. We refer to the second as *semantics*, signifying logical semantics abstracted from illocution, but potentially including focus or other discourse semantic notions. Syntax is seen as the bridge between these two dimensions.

In the first section we present prosodic representation and interpretation and in the second section semantic representation and interpretation. In the third section we present categorial syntactic types and their bidimensional interpretation.

Prosodics

A *prosodic structure* is a semigroup, i.e., an algebra $(L, +)$ of arity (2) such that $+$ is associative:

(31) $s_1+(s_2+s_3)=(s_1+s_2)+s_3$

Let there be a set **B** of prosodic constants. Then the set **C** of *prosodic forms* is defined by:

(32) $\mathbf{C} ::= \mathbf{B} \mid \mathbf{C}+\mathbf{C}$

That is, the prosodic forms are the terms of a prosodic algebra. A *prosodic interpretation* comprises a prosodic structure $(L, +)$ and a prosodic valuation mapping from **B** into L. The prosodic value $[\alpha]_w \in L$ of a prosodic form α with respect to a prosodic interpretation with *prosodic valuation* w is defined by:

(33) $[\mathbf{a}]_w = w(\mathbf{a})$ for $\mathbf{a} \in \mathbf{B}$
$[\alpha+\beta]_w = [\alpha]_w + [\beta]_w$

Two prosodic forms α and β are *equivalent*, $\alpha \cong \beta$, if and only if $[\alpha]_w = [\beta]_w$ in every prosodic interpretation. Since prosodic structures are associative we have:

(34) $\alpha+(\beta+\gamma) \cong (\alpha+\beta)+\gamma$

Hence, we may omit parentheses in prosodic forms.

Semantics

The functional exponentiation of a set X to a set Y, $X \uparrow Y$ is the set of all functions mapping from Y into X. The cartesian product of a set X with a set Y, $X \times Y$, is the set of all ordered pairs with first element in X and second element in Y. The set **T** of semantic types is defined by:

(35) $\mathbf{T} ::= \mathrm{e} \mid \mathrm{t} \mid \mathbf{T} \rightarrow \mathbf{T} \mid \mathbf{T} \,\&\, \mathbf{T}$

A semantic structure is a **T**-indexed family of sets $\{D_\tau\}_{\tau_e \mathbf{T}}$ such that D_e is a nonempty set of entities, D_t is the set $\{\emptyset, \{\emptyset\}\}$ of truth values, and

(36) $D_{\tau 1 \rightarrow \tau 2} = D_{\tau 2} \uparrow D_{\tau 1}$
$D_{\tau 1 \& \tau 2} = D_{\tau 1} \times D_{\tau 2}$

Let there be a set $\mathbf{V}_\tau$ of semantic variables for each semantic type τ and a set $\mathbf{C}_\tau$ of semantic constants for each semantic type τ, including the logical semantic constants:

(37) $\vee, \&, \rightarrow \in \mathbf{C}_{t\rightarrow(t\rightarrow t)}$
$-\in \mathbf{C}_{t\rightarrow t}$
$\forall, \exists \in \mathbf{C}_{(e\rightarrow t)\rightarrow t}$
$\iota \in \mathbf{C}_{(e\rightarrow t)\rightarrow e}$

The sets Φ_τ of semantic terms for each semantic type τ are defined by:

(38) $\Phi_\tau ::= \mathbf{V}_\tau \mid \mathbf{C}_\tau \mid (\Phi_{\tau'\rightarrow\tau}\Phi_{\tau'}) \mid \pi_1\Phi_{\tau\&\tau'} \mid \pi_2\Phi_{\tau'\&\tau}$
$\Phi_{\tau'\rightarrow\tau} ::= \lambda \mathbf{V}_{\tau'}\Phi_\tau$
$\Phi_{\tau\&\tau'} ::= (\Phi_\tau, \Phi_{\tau'})$

An occurrence of a semantic variable x in a semantic term is *bound* if and only if it falls within a subterm of the form $\lambda x\phi$; otherwise it is *free*. The result $\phi\{\psi/x\}$ of substituting semantic variable x (of semantic type τ) by semantic term ψ (of semantic type τ) in semantic term ϕ is the result of replacing by ψ every free occurrence of x in ϕ; the substitution is free if and only if no semantic variable becomes bound in the process of replacement. *A semantic form* is a semantic term with no free variables.

A *semantic interpretation* comprises a semantic structure $\{D_\tau\}_{\tau\in \mathbf{T}}$, a *semantic assignment* g mapping from each $\mathbf{V}_\tau$ into D_τ, and a *semantic valuation f* mapping from each $\mathbf{C}_\tau$ into D_τ such that:

(39) $f(\vee)(m) = m' \mid \rightarrow m \cup m'$
$f(\&)(m) = m' \mid \rightarrow m \cap m'$
$f(\rightarrow)(m) = m' \mid \rightarrow (\{\emptyset\} \backslash m) \cup m'$
$f(-)(m) = \{\emptyset\} \backslash m$
$f(\forall)(m) =$ Intersection of $m(m')$ for all $m' \in D_e$
$f(\exists)(m) =$ Union of $m(m')$ for all $m' \in D_e$
$f(\iota)(\{m\}) = m$

The *semantic value* $[\phi]_f^g \in D_\tau$ of a semantic term $\phi \in \Phi_\tau$ with respect to a semantic interpretation with semantic assignment g and semantic valuation f is defined by:

(40) $[x]_f{}^g = g(x)$ for $x \in \mathbf{V}_\tau$
$[c]_f{}^g = f(x)$ for $c \in \mathbf{C}^\tau$
$[(\phi\ \psi)]_f{}^g = [\phi]_f{}^g([\psi]_f{}^g)$ functional application
$[\pi_1\phi]_f{}^g = \mathbf{fst}([\phi]_f{}^g)$ first projection
$[\pi_2\phi]_f{}^g = \mathbf{snd}([\phi]_f{}^g)$ second projection
$[\lambda x_\tau\phi]_f{}^g = D_\tau \ni m \mid \rightarrow [\phi]_{f^{(g-\{<x,\ g(x)>\}\cup\{<x,\ m>\}}}$ functional abstraction
$[(\phi, \psi)]_f{}^g = \langle [\phi]_f{}^g, [\psi]_f{}^g \rangle$ pair formation

Note that, the semantic value of a semantic form is invariant with respect to semantic assignment.

Two semantic forms ϕ and ψ are *equivalent*, $\phi \cong \psi$, if and only if $[\phi]_f^g = [\psi]_f^g$ in every semantic interpretation. We have:

(41) $\lambda x\phi \cong \lambda y(\phi\{y/x\})$ α-conversion
provided y is not free in ϕ and $\phi\{y/x\}$ is free
$(\lambda x\phi\ \psi) \cong \phi\{\psi/x\}$ β-conversion
provided $\phi\{\psi/x\}$ is free
$\pi_1(\phi, \psi) \cong \phi$
$\pi_2(\phi, \psi) \cong \psi$
$\lambda x(\phi\ x) \cong \phi$ η-conversion
provided x is not free in ϕ
$(\pi_2\phi, \pi\phi) \cong \phi$

Syntax

The set **F** of syntactic types is defined on the basis of a set **A** of atomic *syntactic types* as follows:

(42) $\mathbf{F} ::= \mathbf{A} \mid \mathbf{F}\bullet\mathbf{F} \mid \mathbf{F}\backslash\mathbf{F} \mid \mathbf{F}/\mathbf{F}$

Let there be a basic type map t mapping from **A** into **T**. This induces the type map T from **F** into **T** such that:

(43) $T(P) = t(P)$ for $P \in \mathbf{A}$
$T(A\bullet B) = T(A)\&T(B)$
$T(A\backslash C) = T(A)\rightarrow T(C)$
$T(C/B) = T(B)\rightarrow T(C)$

A *syntactic interpretation* comprises a prosodic structure $(L, +)$, a semantic structure $\{D_\tau\}_{\tau_e\mathbf{T}}$, and a syntactic valuation F mapping each $P \in \mathbf{A}$ into a subset of $L\times D_{t(P)}$. Then the *syntactic value* $[\,[A]\,]_F$, a subset of $L\times D_{T(A)}$, for each syntactic type A is given by:

(44) $[[P]]_F = F(P)$ for $P \in \mathbf{A}$
$[[A\bullet B]]_F = \{(s_1+s_2, \langle m_1, m_2\rangle) \mid (s_1, m_1)\in[[A]]_F$ and $(s_2, m_2)\in[[B]]_F\}$
$[[A\backslash C]]_F = \{(s, m) \mid$ for all $(s', m')\in[[A]]_F$, $(s'+s, m(m'))\in[[C]]_F\}$
$[[C\backslash B]]_F = \{(s, m) \mid$ for all $(s', m')\in[[B]]_F$, $(s+s', m(m'))\in[[C]]_F\}$

A semiotic interpretation comprises a prosodic interpretation, a semantic interpretation, and a syntactic interpretation, with the same prosodic and semantic structures. A *type assignment statement* $\alpha-\phi$: A comprises a syntactic type A, a semantic form ϕ of type T(A) and a prosodic form α. A *semiotic interpretation satisfies a type assignment statement* $\alpha-\phi$: A if and only if $\langle[\alpha], [\phi]\rangle\in[[A]]$. A semiotic interpretation *satisfies a set Σ of type assignment statements* if and only if it satisfies every type assignment statement $\sigma\in\Sigma$. A set σ of type assignment statements *models* a type assignment statement σ, $\Sigma\mid=\sigma$, if and only if every semiotic interpretation that satisfies Σ satisfies σ. A lexicon comprises a set of type assignment statements. The *language model* $L(\Sigma)$ defined by a *lexicon* Σ is the set of all type assignment statements that Σ models:

(45) $L(\Sigma) = \{\sigma \mid \Sigma\mid=\sigma\}$

This is like the declarative semantics of logic programs wherein the meaning of a program is the set

of all ground atoms which it entails, or a logical theory which is the set of all consequences of an axiomatization.

For example, the language model defined by the lexicon (46) includes the type assignment statements in (47):

(46) **cat**–*cat*: CN
likes–*like*: (N\S)/N
Mary–*m*: N.
sleeps–*sleep*: N\S
that–$\lambda x \lambda y \lambda z((\& \ (y \ z)) \ (x \ z))$: (CN\CN)/(S/N)
that–ι: N/CN

(47a) **the** + **cat** + **sleeps**–(*sleep* (ι *cat*)): S
(47b) **that** + **Mary** + **likes**–$\lambda y \lambda z((\& \ (y \ z))$ $((like \ z) \ m))$: CN\CN

See also: Combinatory Categorial Grammar.

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Categorical Perception in Animals

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The label 'Categorical Perception' (CP) is commonly used to describe the observation that continuous variation in a sensory stimulus is recoded into discrete categories. The classic example is the distinction of voiced and voiceless plosive consonants, such as /da/ and /ta/. These phonemes are mainly but not exclusively distinguished by the time lag between the plosive burst and the onset of voicing, i.e., the so-called 'voice onset time' (VOT). Although VOT may vary continuously between negative values – the voicing begins before the plosive burst – to positive values – the voice sets in after the plosive sound – listeners typically sort these phonemes into one category or another. Such effects have become known as Categorical Perception, although CP may involve not only perceptual categorization, but also categorization of mental representations, and decision-making processes.

Over time, the operational definition of CP has changed from a restrictive view to a more general one, and this has led to some dispute over which findings constitute examples of CP. A conservative definition of CP requires the fulfillment of four criteria: (1) distinct labeling of stimulus categories; (2) failure to discriminate within categories; (3) a

of all ground atoms which it entails, or a logical theory which is the set of all consequences of an axiomatization.

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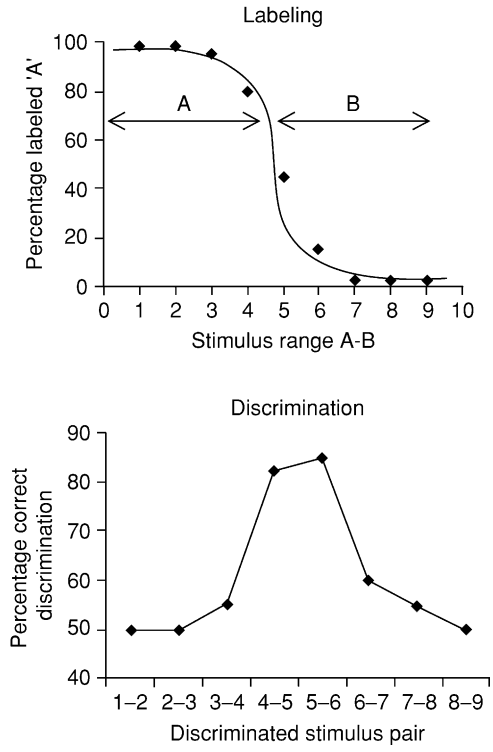

Figure 1 Idealized labeling and discrimination functions. (Top) The graded continuum between the two end-points 0 and 10 is partitioned into two categories, A and B. The labeling function is nonlinear. (Bottom) Discrimination function for discrimination of stimuli that fall within a category (e.g., 2 and 3) and across categories (e.g., 5 and 6). The same physical variation may be difficult to distinguish when it falls within a category and easy to distinguish when it straddles the category boundary.

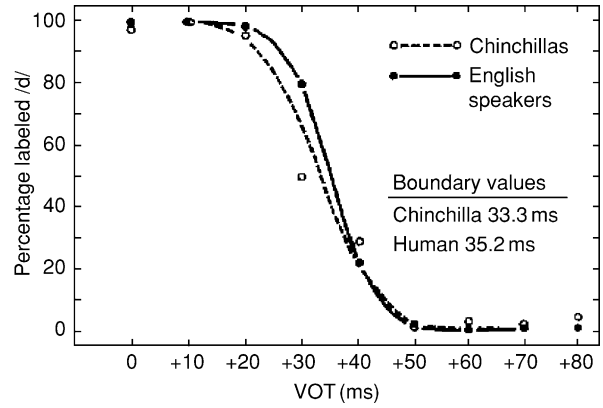

Figure 2 Mean percentage of /d/ responses by chinchilla and human subjects to synthetic speech sounds simulating a continuum ranging from /da/ to /ta/. The animals had been trained on the end-points of the continuum (0 and +80 ms VOT) and then tested with stimuli ranging from +10 to +70 ms. Reprinted with permissions from Kuhl P & Miller J D (1975). *Science 190,* 69–72. © 1975 AAAS. Permission from AAAS is required for all other uses.

discrimination peak at the category boundary; and (4) a close agreement between labeling and discrimination functions (Studdert-Kennedy *et al.*, 1970; see Figure 1). More loosely, CP has been defined as a compression of within-category and/or a separation of between-category differences (Harnad, 1987). Correspondingly, so-called 'perceptual anchors' or 'prototypes' refer to the compressed region within a category, whereas 'boundary effects' occur when a given variation of a stimulus is reported as the 'same' when it lies within a category and is reported as 'different' when it straddles the boundary between two categories (Kuhl, 1991).

In the auditory domain, CP was initially believed to be restricted to the perception of speech sounds and considered to be special to speech (Liberman, 1957). This claim sparked interest in the question of whether animals would exhibit CP of human speech tokens (Kuhl, 1987). In an influential study, Kuhl and Miller (1975) trained chinchillas (*Chinchilla chinchilla*) to discriminate between different human speech tokens. Subjects were trained to distinguish the end-points of the voiced–voiceless continuum between /da/ and /ta/. VOT in these experiments ranged between 0 and 80 ms. In the test trials, animals placed the phonetic boundary at approximately 40 ms (Figure 2) and they also extended their generalization to other consonants differing with regard to VOT (Kuhl and Miller, 1978). Similarly, Morse and Snowdon (1975) demonstrated CP of speech tokens in rhesus monkeys (*Macaca mulatta*). The finding that animals perceived the phonetic boundaries in similar places as English-speaking people initially led to the hypothesis that the observed boundaries may be innate and linked to the mammalian auditory system. However, category boundaries have been shown to be flexible and variable across different languages (Repp and Liberman, 1987). More importantly, a number of animal studies indicated that they may exhibit CP of their own sounds. These findings support the view that categorical boundaries are not innate, but are established through experience.

Several studies employing operant training procedures revealed that nonhuman primates show CP of certain features of their own species' vocalizations (e.g., May *et al.*, 1989). Moreover, a number of studies investigated animals' **natural** responses to graded variations of their own sounds. Female mice reliably responded with retrieval behavior to variations of ultrasonic pup vocalizations that fell within the natural range of the frequency bandwidth, but there was a distinct drop in the propensity to respond to calls whose bandwidth exceeded the category boundary (Ehret and Haack, 1981). Snowdon and Pola (1978) showed that the pygmy marmoset (*Cebuella pygmaea*), a New World monkey, responded in a categorical fashion to the playback of synthetic

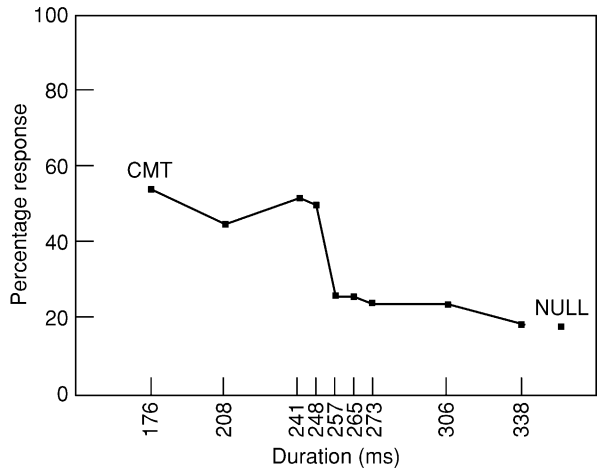

Figure 3 Proportion of stimulus presentations that were followed by a pygmy marmoset emitting a closed mouth trill (CMT) within 5 s of the playback of a closed mouth trill, in relation to trill duration. NULL represents the response when no auditory stimulus was presented. Reprinted from *Animal Behaviour*, *26,* Snowdon C T & Pola Y V, Interspecific and intraspecific responses to synthesized pygmy marmoset vocalizations, 192–206, Copyright (1978), with permission from Elsevier.

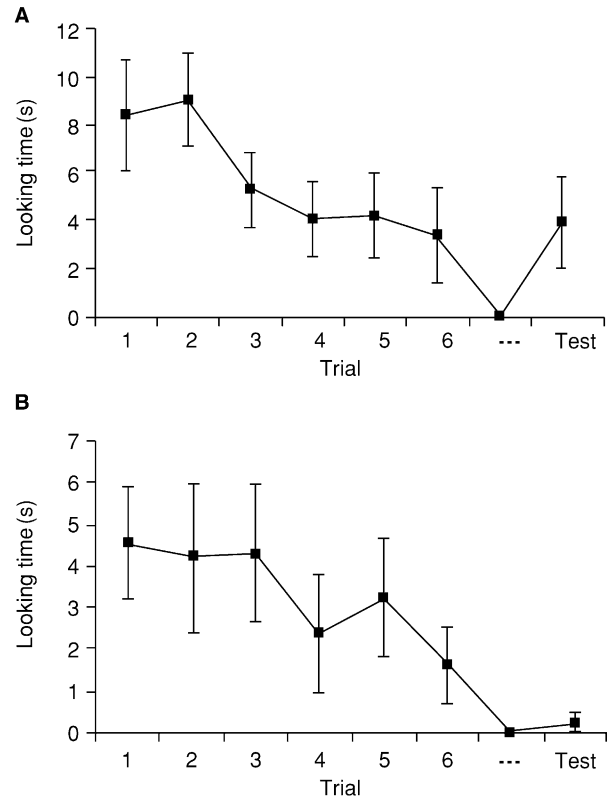

Figure 4 Looking time after playback of a series of Barbary macaque shrill barks given to two different disturbances, human observers and dogs. Graphs depict habituation in response to repeated presentation of calls given in response to observers. In the test, either a call given in response to a dog (A) or a novel call given in response to the observer (B) was played. Test stimuli differed from habituation stimuli by similar acoustic amounts, measured in terms of scores derived from a multivariate acoustic analysis. Unpublished material from Fischer (1996).

modifications of single acoustic parameters in their trills (Figure 3).

A further set of studies adopted a specific playback technique, the 'habituation–dishabituation' paradigm (also 'habituation–recovery'; Fischer *et al.*, 2001) previously used in human infant research (Fantz, 1964; Eimas *et al.*, 1971). With this technique, a series of stimuli is presented until the subject ceases to respond. Subsequently, a putatively distinct stimulus is presented. A recovery in response suggests that this stimulus is placed in a different category than those used for habituation, whereas a failure to respond to this test stimulus suggests that it is placed in the same category as those used for habituation. Using this method, Nelson and Marler (1989) studied swamp sparrow (*Melospiza georgiana*) responses to variation in note duration, a feature characteristic for different populations of this species. In these experiments, animals showed renewed territorial responses only when the note duration was switched to a length of the other category, whereas they failed to do so when the same absolute variation fell within a given category. Crickets (*Teleogryllus oceanicus*) exhibit categorical perception of the frequency of tones, depending on whether they fall in the species-specific range or whether they simulate the presence of bats, one of their main predators (Wyttenbach *et al.*, 1996). Fischer (1998) also adopted the habitation–dishabituation paradigm and demonstrated that Barbary macaques (*Macaca sylvanus*) responded in a categorical fashion to continuous variation between two subtypes of alarm calls (Figure 4). These calls varied with regard to a suite of variables. Experience with the population-typical variants of calls appeared to influence the categorization of sounds, supporting the view that experience with the stimuli can influence the location of category boundaries. Interestingly, baboons showed continuous responses to the graded variation between two subtypes of their loud calls (Fischer *et al.*, 2001).

Both methodological approaches to the study of CP in animals – operant conditioning and observation of natural responses – have been criticized for methodological shortcomings: Studies that employed operant conditioning may have established categories through the training, and therefore the observed categorization may simply be an outcome of generalization of the training stimuli. On the other hand, those studies that relied on natural responses could not demonstrate that subjects were **unable** to distinguish between categories (Snowdon, 1979). Accordingly,

Nelson and Marler (1990) concluded that studies involving operant conditioning were aimed at identifying the 'just noticeable difference' (*jnd*), whereas those relying on the animals' natural responses identified the 'just meaningful difference' (*jmd*), and it has been suggested that the term 'categorical responses' be used for the latter and the term 'categorical perception' be reserved for the former.

Irrespective of the actual label used, however, it seems warranted to conclude that nonlinear responses to continuous variation in sound features are common among species from a variety of taxa, including insects, rodents, birds, and nonhuman primates. This finding supports the view that CP in the broad sense is an expression of categorical effects in the perception and representation of biologically meaningful stimulus variation.

See also: Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Overview; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Development of Communication in Animals; Non-human Primate Communication; Traditions in Animals.

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Categorizing Percepts: Vantage Theory

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Vantage theory (VT) is a theory of cognitive categorization in terms of point of view or 'vantage.' The underlying assumption is that categorization reflects human needs and motives. VT was created by the late Robert E. MacLaury as a way of explaining the meanings and development of color terms across languages when he found prototype theory and fuzzy-set logic inadequate to the task (see MacLaury 1986, 1987, 1991, 1995, 1997, 2002). VT explains

- how people construct categories by analogy to the way they form points of view in space–time;
- how categories are organized;
- how categories divide; and
- the relations between categories.

In VT, cognition consists of selective attention to perception. To form a category, selected perceptions and reciprocal emphases on similarity and difference must be integrated in a principled way. A vantage is a point of view constructed by analogy to physical experience as though it were one or more 'space–motion coordinates' on a spatial terrain. Reminiscent of gestalt theory is MacLaury's claim that a category is the sum of its coordinates, plus their arrangement into one or more vantages by selective emphasis. "The maker of the category, in effect, names the ways he constructs it rather than the set of its components as detached from himself" (1997: 153).

The categorizer's perspectives can be illustrated by an ornithologist 'zooming in' to see a mallard among the ducks on a lake, or alternatively 'zooming out' to see the assembled mallards, widgeon, and pintails as ducks. The mallard is the 'fixed coordinate'; the rest a 'mobile coordinate.' In both views, there is a pair of coordinates that we can loosely differentiate as 'species' and 'genus.'

CONCENTRATION		COORDINATES		BEHAVIOR
Zoom in		Fixed	Mobile	Focus and range
↓	Level 1	Red	S	Red focus, breadth of range
↓			↙	
↓	Level 2	S	Yellow	Warm range
↓			↙	
	Level 3	Yellow	D	Margin of range
Synopsis: Yellow is more similar to red than it is different				

Figure 1 Red focus in the composite 'warm' category; cf. MacLaury (1997: 145).

Imagine mapping warm-category colors (red, yellow) in an array of colored blocks representing the entire color spectrum. If each of the terms 'red' and 'yellow' is mapped differently, there is a single vantage. If there is coextensive mapping (evidence of a composite 'warm' color) with red focus [*see* **Color Terms**], red will dominate at the primary level of concentration, Level 1 in Figure 1, and attention is on 'similarity,' S, as the mobile coordinate. At Level 2 concentration, attention to the mobile coordinate yellow notes its similarity to red (as a warm color). At Level 3, there is attention to D, the 'difference' of fixed coordinate yellow from red. Here, yellow is recessive. Thus does VT model the dominant–recessive pattern of coextensive naming. The dominant vantage includes reinforced attention to similarity; the recessive vantage reinforces attention to difference. Thus, a category is composed of

- selected perceptions;
- reciprocal and mutable emphases on similarity and difference; and
- at least one arrangement of these coordinates into levels of concentration—which is the vantage.

VT has been applied to many cognitive fields: the category of person in 16th century Aztec; literacy choices for Yaquis in Arizona; choice of orthography in Japan; semantic extensions in English, French, Spanish, and Zapotec; lexical choices in French; varieties of Japanese women's speech; terms of address in Japanese; the process of argumentation; and foreign language learning.

See also: Cognitive Linguistics; Cognitive Semantics; Color Terms.

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Relevant Website

http://klio.umcs.lublin.pl/~adglaz/vt.html.

Category-Specific Knowledge

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Principles of Organization

Theories of the organization of conceptual knowledge in the brain can be distinguished according to their underlying principles. One class of theories, based on the neural structure principle, assumes that the organization of conceptual knowledge is governed by representational constraints internal to the brain itself. Two types of neural constraints have been invoked: modality-specificity and domain-specificity. The second class of theories, based on the correlated structure principle, assumes that the organization of conceptual knowledge in the brain is a reflection of the statistical co-occurrence of object properties in the world. Neuropsychological evidence, and more recently findings from functional neuroimaging, have figured centrally in attempts to evaluate extant theories of the organization of conceptual knowledge. Here we outline the main theoretical perspectives as well as the empirical phenomena that have been used to inform these perspectives.

Modality-Specific Hypotheses

The first class of theories based on the neural structure principle assumes that the principal determinant of the organization of conceptual knowledge is the sensory-motor modality (e.g., visual, motor, verbal) through which the information was acquired or is typically processed. For instance, the knowledge that hammers are shaped like a T would be stored in a semantic subsystem dedicated to representing the visual structure of objects, while the information that hammers are used to pound nails would be represented in a semantic subsystem dedicated to functional knowledge of objects. There have been many proposals based on the modality-specific assumption (Beauvois, 1982; Warrington and McCarthy, 1983, 1987; Warrington and Shallice, 1984; Allport, 1985; Martin *et al.*, 2000; Humphreys and Forde, 2001; Barsalou *et al.*, 2003; Cree and McRae, 2003; Crutch and Warrington, 2003; Gallese and Lakoff, in press). One way to distinguish between these proposals concerns whether, and to what extent, conceptual knowledge is assumed to be represented independently of sensory-motor processes. At one extreme are theories that assume conceptual content reduces to (i.e., actually **is**) sensory-motor content (e.g., Allport, 1985; Pulvermuller, 2001; Barsalou *et al.*, 2003; Gallese and Lakoff, in press). Central to such proposals is the notion of simulation, or the automatic reactivation of sensory-motor information in the course of conceptual processing. Toward the other end of the continuum are modality-based hypotheses of the organization of conceptual knowledge that assume that sensory-motor systems may be damaged without compromising the integrity of conceptual knowledge (Martin *et al.*, 2000; Plaut, 2002; Crutch and Warrington, 2003; for discussion, see Mahon and Caramazza, in press).

Domain-Specific Hypotheses

A second class of proposals based on the neural structure principle assumes that the principal determinant of the organization of conceptual knowledge is semantic category (e.g., Gelman, 1990; Carey and Spelke, 1994; Caramazza and Shelton, 1998; Kanwisher, 2000). For instance, in this view, it may be argued that conceptual knowledge of conspecifics and conceptual knowledge of animals are represented and processed by functionally dissociable processes/systems. Crucially, in this view, the first order principle of organization of conceptual processing is semantic category and not the modality through which that information is typically processed. One proposal along these lines, the Domain-Specific Hypothesis (Caramazza and Shelton, 1998), argues that conceptual knowledge is organized by specialized (and functionally dissociable) neural

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circuits innately determined to the conceptual processing of different categories of objects. However, not all Domain-Specific theories assume that the organization of the adult semantic system is driven by innate parameters (e.g., Kanwisher, 2000).

Feature-Based Hypotheses

The class of hypotheses based on the correlated structure principle has focused on articulating the structure of semantic memory at the level of semantic features. There are many and sometimes diverging proposals along these lines; common to all of them is the assumption that the relative susceptibility to impairment (under conditions of neurological damage) of different concepts is a function of statistical properties of the semantic features that comprise those concepts. For instance, on some models, the degree to which features are shared by a number of concepts is contrasted with their relative distinctiveness (Devlin *et al.,* 1998; Garrard *et al.,* 2001; Tyler and Moss, 2001). Another dimension that is introduced by some theorists concerns dynamical properties of damage in the system; for instance, Tyler and Moss assume that features that are more correlated with other features will be more resistant to damage, due to greater reciprocal activation (or support) from those features with which they are correlated (but see Caramazza *et al.,* 1990). Distinctive features, on the other hand, will not receive as much reciprocal support, and will thus be more susceptible to damage. More recently, theorists have expanded on the original proposal of Tyler and colleagues, adding dimensions such as familiarity, typicality, and relevance (e.g., Cree and McRae, 2003; Sartori and Lombardi, 2004). Feature-based models of semantic memory have in general emphasized an empirical, bottom up, approach to modeling the organization of semantic memory, usually drawing on feature generation tasks (e.g., Garrard *et al.,* 2001; Tyler and Moss, 2001; Cree and McRae, 2003; Sartori and Lombardi, 2004). For this reason, feature-based models have been useful in generating hypotheses about the types of parameters that may contribute to the organization of conceptual knowledge.

Clues from Cognitive Neuropsychology

Neuropsychological studies of patients with semantic impairments have figured centrally in developing and evaluating the hypotheses outlined above. Of particular importance has been a clinical profile described as category-specific semantic deficit. Patients with category-specific semantic deficits present with disproportionate or even selective difficulty for conceptual knowledge of stimuli from one semantic category compared to other semantic categories. For instance, the reports of category-specific impairment by Warrington and her collaborators (e.g., Warrington and McCarthy, 1983, 1987; Warrington and Shallice, 1984) documented patients who were impaired for living things compared to nonliving things, or the reverse: greater difficulty with nonliving things than living things. Since those seminal reports, the phenomenon of category-specific semantic deficit has been documented by a number of investigators (for recent reviews of the clinical evidence, see Humphreys and Forde, 2001; Tyler and Moss, 2001; Capitani *et al.,* 2003).

The clinical profile of category-specific semantic deficits is in itself quite remarkable, and can be striking. Consider some aspects of the following case of category-specific semantic deficit for living animate things. Patient EW (Caramazza and Shelton, 1998) was 41% correct (7/16) for naming pictures of animals but was in the normal range for naming pictures of non-animals (e.g., artifacts, fruit/vegetables) when the pictures from the different semantic categories were matched jointly for familiarity and visual complexity. EW was also severely impaired for animals (60%; 36/60 correct) in a task in which the patient was asked to decide, yes or no, whether the depicted stimulus was a real object or not. In contrast, EW performed within the normal range for making the same types of judgments about non-animals. On another task, EW was asked to decide whether a given attribute was true of a given item (e.g., Is it true that eagles lay eggs?). EW was severely impaired for attributes pertaining to animals (65% correct) but within the normal range for non-animals. EW was equivalently impaired for both visual/perceptual and functional/associative knowledge of living things (65% correct for both types of knowledge) but was within the normal range for both types of knowledge for non-animals.

The phenomenon of category-specific semantic deficits frames what has proven to be a rich question: How could the conceptual system be organized such that various conditions of damage can give rise to conceptual impairments that disproportionately affect specific semantic categories? There is emerging consensus that any viable answer to this question must be able to account for the following three facts (for discussion, see Caramazza and Shelton, 1998; Tyler and Moss, 2001; Capitani *et al.,* 2003; Cree and McRae, 2003; Samson and Pillon, 2003).

Fact I: The grain of the phenomenon: Patients can be disproportionately impaired for either living animate things (i.e., animals) compared to living inanimate things (i.e., fruit/vegetables (e.g., Hart and

Gordon, 1992; Caramazza and Shelton, 1998) or living inanimate things compared to living animate things (e.g., Hart *et al.,* 1985; Crutch and Warrington, 2003; Samson and Pillon, 2003). Patients can also be impaired for nonliving things compared to living things (Hillis and Caramazza, 1991).

Fact II: The profile of the phenomenon: Category-specific semantic deficits are not associated with disproportionate impairments for modalities or types of information (e.g., Caramazza and Shelton, 1998; Laiacona and Capitani, 2001; Farah and Rabinowitz, 2003; Samson and Pillon, 2003). Conversely, disproportionate impairments for modalities or types of information are not necessarily associated with category-specific semantic deficits (e.g., Lambon-Ralph *et al.,*1998; Miceli *et al.,* 2001).

Fact III: The severity of overall impairment: The direction of category-specific semantic deficits (i.e., living things worse than nonliving things, or vice versa) is not related to the overall severity of semantic impairment (Garrard *et al.,* 1998; Zannino *et al.,* 2002).

Explaining Category-Specific Semantic Deficits

Most of the empirical and theoretical work in category-specific semantic deficits has been driven by an attempt to evaluate a theoretical proposal first advanced by Warrington, Shallice, and McCarthy (Warrington and McCarthy, 1983, 1987; Warrington and Shallice, 1984): the Sensory/Functional Theory. The Sensory/Functional Theory is an extension of the modality-specific semantic hypothesis (Beauvois, 1982) discussed above. In addition to assuming that the semantic system is functionally organized by modality or type of information, the Sensory/Functional Theory assumes that the recognition/identification of items from different semantic categories (e.g., living things compared to nonliving things) differentially depends on different modality-specific semantic subsystems. In general, Sensory/Functional theories assume that the ability to identify/recognize living things differentially depends on visual/perceptual knowledge, while the ability to identify/recognize nonliving things differentially depends on functional/associative knowledge (for data and/or discussion of the assumption that different types or modalities of information are differentially important for different semantic categories, see Farah and McClelland, 1991; Caramazza and Shelton, 1998; Garrard *et al.,* 2001; Tyler and Moss, 2001; Cree and McRae, 2003). There are several versions of the Sensory/Functional Theory, each of which has emphasized a different correspondence between the type or modality of information and the category of items that differentially depends on that type of information. For instance, it has been proposed that color information is more important for fruit/vegetables than animals (e.g., Humphreys and Forde, 2001; Cree and McRae, 2003; Crutch and Warrington, 2003) while biological motion information is more important for animals than for fruit/vegetables (e.g., Cree and McRae, 2003). Another version of the Sensory/Functional Theory (Humphreys and Forde, 2001) holds that there is greater perceptual crowding (due to greater perceptual overlap) at a modality-specific input level for living things than for nonliving things. Thus, damage to this visual modality-specific input system will disproportionately affect processing of living things compared to nonliving things (see also Tranel *et al.,* 1997; Dixon, 2000; Laws *et al.,* 2002).

Common to theories based on the Sensory/Functional Assumption is that at least some category-specific semantic deficits can be explained by assuming damage to the modality or type of information upon which recognition/identification of items from the impaired category differentially depends (for discussion see Humphreys and Forde, 2001). Other authors have argued that the fact that category-specific semantic deficits are not necessarily associated with deficits to a modality or type of knowledge (see Fact II above) indicates that the phenomenon does not provide support for Sensory/Functional theories (for discussion, see Caramazza and Shelton, 1998; Tyler and Moss, 2001; Capitani *et al.,* 2003; Cree and McRae, 2003; Samson and Pillon, 2003).

Caramazza and Shelton (1998) argued for a Domain-Specific interpretation of category-specific semantic deficits that emphasized the hypothesis that the grain of category-specific semantic deficits will be restricted to a limited set of categories. Specifically, because the Domain-Specific Hypothesis (Caramazza and Shelton, 1998) assumes that the organization of conceptual and perceptual processing is determined by innate constraints, the plausible categories of category-specific semantic impairment are 'animals,' 'fruit/vegetables,' 'conspecifics,' and possibly tools. Recent discussion of this proposal (Caramazza and Mahon, in press; see also Shelton *et al.,* 1998) has capitalized on using the category 'conspecifics' as a test case. Consistent with expectations that follow from the Domain-Specific Hypothesis, patients have been reported who are relatively impaired for knowledge of conspecifics but not for animals or objects (e.g., Kay and Hanley, 1999; Miceli *et al.,* 2000) as well as the reverse: equivalent impairment for animals and objects but spared knowledge of conspecifics (Thompson *et al.,* 2004). Thus, the domain of conspecifics can be spared or impaired independently of both objects and other

living things, and importantly, an impairment for conspecifics is not necessarily associated with a general impairment for living things compared to nonliving things.

Another line of research has sought an account of category-specific semantic deficits in terms of feature-based models of semantic memory organization. For instance, the Organized Unitary Content Hypothesis (OUCH) (Caramazza *et al.,* 1990) makes two principal assumptions. First, conceptual features corresponding to object properties that often co-occur will be stored close together in semantic space; and second, focal brain damage can give rise to category-specific semantic deficits either because the conceptual knowledge corresponding to objects with similar properties is stored in adjacent neural areas, or because damage to a given property will propagate damage to highly correlated properties. While the original OUCH model is not inconsistent with the currently available data from category-specific semantic deficits, it is too unconstrained to provide a principled answer to the question of *why* the various facts are as they are.

Other feature-based models have emphasized the differential susceptibility to impairment of different types of semantic features. These models often assume random (or diffuse) damage to a conceptual system that is not organized by modality or object domain. For instance, in order to account for category-specific semantic deficits, the semantic memory model advanced by Tyler and Moss (2001) makes three assumptions bearing on the relative susceptibility to impairment of different classes of semantic features: (a) Living things have more shared features than nonliving things, or put differently, nonliving things have more distinctive/informative features than living things; (b) For living things, biological function information is highly correlated with shared perceptual properties (e.g., can see/has eyes). For artifacts, function information is highly correlated with distinctive perceptual properties (e.g., used for spearing/has tines). (c) Features that are highly correlated with other features will be more resistant to damage than features that are not highly correlated (see also Devlin *et al.,* 1998; Garrard *et al.,* 2001; Cree and McRae, 2003). This proposal, termed the Conceptual Structure Account, predicts that a disproportionate deficit for living things will be observed when damage is relatively mild, while a disproportionate deficit for nonliving things will only arise when damage is so severe that all that is left in the system are the highly correlated shared perceptual and function features of living things. Recent work investigating the central prediction of the theory through cross sectional analyses of patients at varying stages of Alzheimer's disease has not found support for this prediction (Garrard *et al.,* 1998; Zannino *et al.,* 2002).

Clues from Functional Neuroimaging

Increasingly, the neuropsychological approach is being complemented by functional neuroimaging studies of category-specificity. There is a large body of evidence from functional neuroimaging that demonstrates differentiation by semantic domain within modality-specific systems specialized for processing object form and object-associated motion. Specifically, within the ventral object processing system, areas on the inferior surface of the temporal lobes process object-associated form and texture, while areas on the lateral surfaces of the temporal lobes process object-associated movement (Kourtzi and Kanwisher, 2000; Beauchamp *et al.,* 2002, 2003). Within both form/texture- and motion-specific areas of the ventral object processing system, there is differentiation by semantic category. On the inferior surface of the temporal lobe (e.g., fusiform gyrus), more lateral areas are differentially involved in the processing of living things, while more medial regions are differentially involved in the processing of nonliving things. Furthermore, human face stimuli, in comparison to non-face stimuli (including animals without faces), differentially activate distinct regions of the inferior temporal cortex (Kanwisher *et al.,* 1999). On the lateral surface of the temporal lobes, more superior regions (e.g., superior temporal sulcus) are differentially involved in the processing of motion associated with living things, while more inferior regions (e.g., middle temporal gyrus) are differentially involved in the processing of motion associated with nonliving things (for review, see Kanwisher, 2000; Martin and Chao, 2001; Beauchamp *et al.,* 2002, 2003; Bookheimer, 2002; Caramazza and Mahon, 2003, in press).

All of the theoretical frameworks outlined above have been applied to the data from functional neuroimaging. One widely received view, the Sensory/Motor Theory, developed by Martin, Wiggs, Ungerleider, and Haxby (1996; see also Martin *et al.,* 2000) assumes that conceptual knowledge of different categories of objects is stored close to the modality- specific input/output areas that are active when we learn about and interact with those objects. Other authors have interpreted these patterns of activation within a Domain-Specific Framework (e.g., Kanwisher, 2000; Caramazza and Mahon, 2003, in press), while still others have interpreted these findings within a distributed semantic memory model that emphasizes experience-dependent and/or feature-based properties of concepts (e.g., Tarr and Gauthier, 2000; Levy *et al.,*

2001; Martin and Chao, 2001; Bookheimer, 2002; Devlin *et al.,* 2002). Regardless of what the correct interpretation of these functional neuroimaging data turns out to be, they suggest a theoretical approach in which multiple dimensions of organization can be distinguished. In particular, whether the category-specific foci of activation are interpreted within the Domain-Specific Framework or within a feature-based framework, these data suggest the inference that the organization of conceptual knowledge in the cortex is driven both by the type or modality of the information as well as its content-defined semantic category.

Conclusion

The three proposals that we have reviewed (the Sensory/Functional Theory, the Domain-Specific Hypothesis, and the Conceptual Structure Account) are contrary hypotheses of the causes of category-specific semantic deficits. However, the individual assumptions that comprise each account are not necessarily mutually contrary as proposals about the organization of semantic memory. In this context, it is important to note that each of the hypotheses discussed above makes assumptions at a different level in a hierarchy of questions about the organization of conceptual knowledge. At the broadest level is the question of whether or not conceptual knowledge is organized by Domain-Specific constraints. The second question is whether conceptual knowledge is represented in modality-specific semantic stores specialized for processing/storing a specific type of information, or is represented in an amodal, unitary system. The third level in this hierarchy of questions concerns the organization of conceptual knowledge within any given object domain (and/or modality-specific semantic store): the principles invoked by feature-based models may prove useful for articulating answers to this question (for further discussion of the various levels at which specific hypotheses have been articulated, see Caramazza and Mahon, 2003).

Different hypotheses of the organization of conceptual knowledge are more or less successful at accounting for different types of facts. Thus, it is important to consider the specific assumptions made by each hypothesis in the context of a broad range of empirical phenomena. The combination of neuropsychology and functional neuroimaging is beginning to provide promising grounds for raising theoretically motivated questions concerning the organization of conceptual knowledge in the human brain.

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Catford, John C. (b. 1917)

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Caucasian Languages

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Around 38 languages are deemed to be indigenous to the Caucasus; often difficult demarcation between language and dialect explains the uncertainty. The ancestral homelands are currently divided between:

1. Russia's north Caucasian provinces (Circassian, Abaza, Ingush, Chechen, Avaro-Ando-Tsezic, Lako-Dargic, northern Lezgic);
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indiscriminately applies to any North Caucasian. Circassians are found in Syria, Israel, and Jordan, home also to a significant Chechen population. Speaker numbers range from 500 (Hinukh) to 3–4 million (Georgian). Many of the languages are endangered.

Three families are usually recognized:

A. South Caucasian (Kartvelian)
   Georgian
   Svan
   Mingrelian (Megrelian)
   Laz (Ch'an)

[Scholars in Georgia regard Mingrelian and Laz as codialects of Zan]

B. North West Caucasian
   Abkhaz
   Abaza
   Ubykh (extinct from 1992)
   West Circassian (Adyghe)
   East Circassian (Kabardian)

C. Nakh-Daghestanian
   (*a*) *Nakh (North Central Caucasian)*
      Chechen
      Ingush
      Bats (Ts'ova Tush)
   (*b*) *Daghestanian (North East Caucasian)*

      1. Avaro-Ando-Tsezic(/Didoic):
         Avaric: **Avar**
         Andic: Andi, Botlikh, Godoberi, K'arat'a (Karata), Akhvakh, Bagvalal, T'indi (Tindi), Ch'amalal (Chamalal)
         Tsezic: Tsez (Dido), Khvarshi, Hinukh, Bezht'a (Bezhta) (K'ap'uch'a), Hunzib (these last two are sometimes regarded as codialects)

      2. Lako-Dargic:
         Lakic: **Lak**
         Dargic: **Dargwa** (Dargi(n)) – some treat K'ubachi, Chiragh, and Megeb as full languages

      3. Lezgic:
         Lezgi(an), **Tabasaran** (Tabassaran), Rutul (Mukhad), Ts'akhur (Tsakhur), Aghul, Udi, Archi, Budukh, Khinalugh, Kryts' (Kryts)

Some challenge the Lezgic status of Archi, Khinalugh, Budukh, and Kryts.' Mutual intelligibility basically exists between Laz and Mingrelian, Abkhaz, and Abaza, West and East Circassian. Only Georgian has an ancient tradition of writing, but during the Soviet period the languages in bold all enjoyed literary status. Publishing in Mingrelian, Laz, Ts'akhur, Aghul, Rutul, and Udi was tried in the 1930s but discontinued, though there have been some post-Soviet attempts to publish more widely (including Dido).

Phonetics and Phonology

All Caucasian languages have voiced vs. voiceless aspirate vs. voiceless ejective plosives, affricates, and occasionally fricatives, to which some add a *fortis* series (voiceless unaspirated or geminate). North West Caucasian is characterized by large consonantal inventories coupled with minimal vowel systems, consisting of at least the vertical opposition open /ɑ/ vs. closed /ə/. Ubykh possessed 80 phonemes (83 if the plain velar plosives attested only in loans are admitted), with every point of articulation between lips and larynx utilized and displaying the secondary features of palatalization, labialization, and pharyngalization – Daghestanian pharyngalization is normally assigned to vowels (Table 1).

Some recent analyses of Daghestanian languages have produced inventories rivaling those of the North West Caucasian, though no parallel minimality among the vowels is posited. One analysis of Archi assigns it 70 consonants (Table 2).

Noticeable here, is the presence of 10 laterals, though some specialists recognize no more than three or four.

Table 1 Consonantal phonemes for Ubykh

p	b	p'			m			w
pˤ	bˤ	pˤ'			mˤ			wˤ
			f					
			vˤ					
t	d	t'			n		r	
tʷ	dʷ	tʷ'						
t͡s	d͡z	t͡s'	s	z				
t͡ɕ	d͡ʑ	t͡ɕ'	ɕ	ʑ				
t͡ɕʷ	d͡ʑʷ	t͡ɕʷ'	ɕʷ	ʑʷ				
t͡ʃ	d͡ʒ	t͡ʃ'	ʃ	ʒ				
			ʃʷ	ʒʷ				
t͡ʂ	d͡ʐ	t͡ʂ'	ʂ	ʐ				
			ɬ			ɬ'	l	
								j
(k)	(g)	(k')	x	ɣ				
kʲ	gʲ	kʲ'						
kʷ	gʷ	kʷ'						
q		q'	χ	ʁ				
qˤ		qˤ'	χˤ	ʁˤ				
qʲ		qʲ'	χʲ	ʁʲ				
qʷ		qʷ'	χʷ	ʁʷ				
qˤʷ		qˤʷ'	χˤʷ	ʁˤʷ				
			h					

Table 2 Consonantal system of Archi

p	b	p’	pː					m		w
t	d	t’	tː					n	r	
tʷ	dʷ									
t͡s		t͡s’		tsː’	s	sː	z			
t͡sʷ		t͡sʷ’			sʷ	sːʷ	zʷ			
t͡ʃ		t͡ʃ’		tʃː’	ʃ	ʃː	ʒ			
t͡ʃʷ		t͡ʃʷ’			ʃʷ	ʃːʷ	ʒʷ			
ƛ		ƛ’			ɬ	ɬː	ɮ		l	
ƛʷ		ƛʷ’			ɬʷ	ɬːʷ				
										j
k	g	k’	kː							
kʷ	gʷ	kʷ’	kːʷ							
q		q’		qː’	χ	χː	ʁ			
qʷ		qʷ’			χʷ	χːʷ	ʁʷ			
					ħ		ʕ			
		ʔ			h					

Table 3 Georgian-Avar-Andi vowel system

i			u
	ɛ	ɔ	
		ɑ	

Table 4 Svan’s upper Bal vowel system

i	iː	y	yː			u	uː
				ə	əː		
ɛ	ɛː	œ	œː			ɔ	ɔː
a	aː					ɑ	ɑː

Table 5 Bezht’a basic vowel system

i	y				u
	ɛ	œ		ɔ	
		a	ɑ		

Kartvelian occupies a mid-position with between 28 and 30 consonants (see Georgian). Georgian shares with Avar and Andi the simple five-vowel triangle (Table 3).

Schwa is added to this in the other Kartvelian languages, while the various Svan dialects have length and/or umlaut, Upper Bal having the richest system (Table 4).

Triangular or quadrilateral vowel systems are attested in Nakh-Daghestanian (Table 5).

All but /y, ɛ, œ/ possess long counterparts, and the nasalized vowels: /ĩ, ɛ̃, ɑ̃, ɔ̃, ũ, ũː, ã, ỹː/ have also been recognized. Table 6 shows the Hunzib basic vowels.

All these Hunzib vowels have long counterparts, and fluctuating nasalization on short vowels has been observed.

The simplest (near-)quadrilateral system is attested in Chiragh Dargwa, with four pairs distinguished by length (Table 7). Udi has been analyzed in Table 8, whilst Chechen presents the complicated system (Table 9).

Most, if not all, of these can be nasalized as a result of the weakening of a following /n/.

Stress is sometimes distinctive (Abkhaz-Abaza) but usually not. Tonal distinctions have been proposed for some of the Daghestanian languages (Andi, Akhvakh, Ch’amalal, Khvarshi, Hinukh, Bezht’a, Tabasaran, Ts’akhur, Ingush, and Budukh).

Table 6 Hunzib basic vowel system

i				ɨ	u
	ɛ		ə	ɔ	
		ɑ	ɒ		

Table 7 Chiragh Dargwa vowel system

i(ː)	u(ː)
ɛ(ː)	
	ɑ(ː)

Table 8 Udi vowel system

i iˀ (y)		u uˀ
ɛ ɛˀ (œ)	ə	ɔ ɔˀ
(a)		ɑ ɑˀ

Table 9 Chechen vowel system

i iː y yː	u uː
je ie ɥœ yœ	wo uo
e eː	o oː
a aː	ɑ ɑː

Morphology

North West Caucasian sememes are typically C(C)(V), and minimal case systems combine with highly polysynthetic verbs, which may contain up to four agreement prefixes, locational preverbs, orientational preverbs and/or suffixes, interrogative and conjunctional elements, and markers of tense-modality, (non-)finiteness, causation, potentiality, involuntariness, polarity, reflexivity, and reciprocality (see Abkhaz). Kartvelian balances a moderate total of cases with reasonably complex verbs, which may contain: agreement with two or three (rarely four) arguments via two sets of agreement affixes, directional/perfectivizing preverbs (the large total in Mingrelian-Laz suggests North West Caucasian influence), and markers of tense-aspect-modality, causation, potentiality, version (vocalic prefixes indicating certain relations between arguments), and voice –

Table 10 Avar locative case endings

Series	*Essive*	*Allative*	*Ablative*
1. 'on'	-d(.)ɑ	-d.ɛ	-d(.)ɑ.sːɑ
2. 'near'	-qː	-qː.ɛ	-qː.ɑ
3. 'under'	-k͡ɬːʼ	-k͡ɬːʼ.ɛ	-k͡ɬːʼ.ɑ
4. 'in (mass)'	-k͡ɬː	-k͡ɬː.ɛ	-k͡ɬː.ɑ
5. 'in (space)'	-D (= class-marker)	-D-ɛ	-sːɑ

Kartvelian is the only family to have a full active-passive diathetic opposition. Nakh-Daghestanian has complex nominal systems with both grammatical and sometimes large numbers of locative cases; Lezgi(an), Aghul, and Udi apart, nouns fall into one of between two and (depending on the analysis) five or eight (largely covert) classes. Verbs are correspondingly simple: agreement is totally absent from Lezgi(an) and Aghul; elsewhere, verbs with an agreement slot typically allow only class agreement (Andic), though some languages (Bats, Lak-Dargwa, Tabasaran, Akhvakh, Archi, Hunzib, and Avar dialects) have added perhaps rudimentary person agreement, whilst Udi has person agreement only. Some languages have a small selection of preverbs. Some distinguish perfective from imperfective roots. Some North Caucasian verbs can be construed transitively or intransitively (?passively), depending on the clausal structure. Antipassives are also attested.

Avar illustrates a typical system of locative-cases (Table 10).

Ergativity and some other oblique case function are often merged in a single morph.

Deictic systems range from two-term (Mingrelian, Ubykh, Kryts'), through three-term (Georgian, Abkhaz, Circassian), to five-term in a swathe of Daghestanian, and even six-term (Lezgi(an), Godoberi).

Counting systems are predominantly vigesimal, at least up to '99' (though Bats is vigesimal throughout), but some systems are decimal.

Syntax

Word orders are: Kartvelian and Nakh-Daghestanian AN, GN, N-Postposition, SOV, though Old Georgian was rather NA and NG; North West Caucasian GN, predominantly NA, N-Postposition, SOV. Some degree of ergativity characterizes all the languages, but in Mingrelian, where the system was originally as illustrated for Georgian (*q.v.*), the ergative case marker was extended vertically to replace the original nominative for intransitive (including indirect) verbs in Series II (aorist indicative and subjunctive), where it functions as a Series II nominative allomorph, the original nominative effectively becoming an accusative just for Series II. Laz has extended the case marker horizontally across its three series for all transitive subjects. Active–inactive alignment plays a role in some languages (Bats).

A nominative/absolutive argument is the obligatory minimum in a clause, and where verbs have class agreement, this is the determiner for the class marker (which in some languages also appears on adverbs and as part of a locative case exponent); the determiner for person agreement in languages with class agreement might be this same or a different argument (e.g., the logical subject), depending on a variety of factors.

Verbs such as *want*, *have*, *hear* are construed indirectly with the logical subject in an oblique case, but, if Kartvelian and North West Caucasian employ just the dative/general oblique case for this argument, greater distinctions can apply in Nakh-Daghestanian: Avar employs its dative case with verbs of emotion (*love*), a locative (Series I essive) with verbs of perception (*see*), and the genitive for the possessor in conjunction with the copula.

Only Kartvelian has the category of subordinating conjunctions, naturally associated with full clauses containing indicative or subjunctive finite verbs. Such structures are rare in North Caucasian, where one finds a variety of nonfinite (nominalized) verb forms fulfilling the subordinate role.

Examples:

ilu-di	rik͡ɬːʼi	b-ɛʒ-ɑ	vs.	rik͡ɬːʼi	b-ɛʒ-ɑ
mother-Erg	*meat. Absol$_3$*	*3-fry-Past*			

'Mother fried the meat' vs. 'The meat (was) fried' (Andi)

is-tʼi	sːi	ʁɑrtːɔl-t͡sʰɑ
brother-Erg	*water.Absol*	*boil-Pres*

'Brother is boiling the water' (Bezhtʼa)

vs.

is	sːi-d	ʁɑrtːɔl-dɑː-t͡sʰ
brother.Absol	*water-Instr*	*boil-AntiPass-Pres*

'Brother is regularly engaged in boiling water' (Bezhtʼa)

kʼɔtʃ-k	d͡zʁɑb-i	kɔ-ø-d͡zir-u
man-Nom$_A$	*girl-Acc$_B$*	*Prev-her$_B$-see-he.Aor$_A$*

vs.

d͡zʁɑb-k dɔ-ʁur-u
girl-Nom$_A$ *Prev-die-she.Aor$_A$*
'The man saw the girl' vs. 'The girl died'
(Mingrelian)

k'ɔʃ-s d͡zʁɑb-i ø-ɑ-d͡zir-ɛ
man-Dat$_B$ *girl-Nom$_A$* *he$_B$-Pot-see-her.Pres$_A$*
'The man can see the girl' (Mingrelian)

vs.

k'ɔʃ-s d͡zʁɑb-k k-ø-ɑ-d͡zir-u
man-Dat$_B$ *girl-Nom$_A$* *Prev-he$_B$-Pot-see-her.Aor$_A$*
'The man could see the girl' (Mingrelian)

insː-u-jɛ j.ɑs j-ɔk̚ɬːʼ-u-lɑ
father-Obl-Dat *daughter$_2$.Absol* *2-love-TV-Pres*
'Father loves (his) daughter' (Avar)

insː-u-d.ɑ w.ɑs-ul r-ixː-u-lɑ
father-Obl-LocI *son-Pl.Absol* *Pl-see-TV-Pres*
'Father sees (his) sons' (Avar)

insː-u-l tʃu b-ugɔ
father-Obl-Gen *horse$_3$.Absol* *3-be.Pres*
'Father has a horse' (Avar)

lɑmʃɡɛd-χɛn-iʃ bikw-d sgɑ
shade-from-Gen *wind-Erg$_A$* *Prev*
la-ø-j-k'wiʃ-ø, ɛrɛ
Prev-it$_B$-SV-admit-it.Aor$_A$ *that*

minɛ uʃχwɑr nɛnsgɑ
their *each.other.Dat* *between*
χ.ɔ-l.qmɑʃ-ɑ miʒ
CompPref-strong-CompSuff *sun.Nom$_A$*

lə.m.ar-ø
apparently.be-it$_A$
'The north wind admitted that the sun was apparently the stronger of them'
(Lower Bal Svan)

təʁɑ-ʒə-m təʁɑ-r jɑʒ nɑħ.rəj nɑħ
sun-wind-the. Erg/Obl$_{III}$ *sun-the. Absol$_I$* *self* *much* *more*

ø-zɑ.rə-ɬɑʂə-r ø-qə-g^{w}ə.rə-ø-mə-ʔ^{w}ɑ-mɑ
it$_I$-how-strong-Absol.N/F. Stat.Pres$_I$ *it$_I$-Prev-Prev-it$_{III}$-not-admit. N/F-if$_I$*
ø-mə-χ^{w}ə-n-ɑw ø-χ^{w}ə-ʁɑ
it$_I$-not-happen-Fut-Abs$_I$ *it$_I$-happen-Aor.Fin*
'It became impossible for the north wind not to admit how/that the sun is stronger than it'
(Temirgoi West Circassian)

Kinship

Kartvelian is unrelated to any known language or language family, but the debate continues concerning the relationship between the northern families. Linkage to Hattic is postulated for northwestern Caucasian and to Hurrian for Nakh-Daghestanian. Udi has recently been conclusively demonstrated to descend from Caucasian Albanian.

See also: Abkhaz; Georgian.

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Causatives: Semantics

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Defining Causative Constructions

The causative construction is a linguistic expression that denotes a complex situation consisting of two events: (1) the causing event in which the causer does something, and (2) the caused event in which the causee carries out an action or undergoes a change of condition or state as a result of the causer's action. The following example is such a linguistic expression.

(1) The teacher made Matthew paint the house

In (1), the causer (*the teacher*) did something, and as a result of that action the causee (*Matthew*) in turn carried out the action of painting the house.

The causative construction has two main characteristics. First, the causer noun phrase and the expression of cause must be foregrounded, with the causee noun phrase and the expression of effect backgrounded. The foregrounding of the causer noun phrase and the expression of cause is achieved by putting these two expressions in grammatically more prominent positions in the sentence than the causee noun phrase and the expression of effect. Second, the expression of the causer's action must be without specific meaning; all that is encoded by that expression is the pure notion of cause. For instance, the sentence in (2), although denoting a causative situation similar to (1), is **not** regarded as an example of the causative construction but rather as an example of what may be referred to broadly as the causal construction.

(2) Matthew painted the house because the teacher instructed him to do so

There are two clear differences between (1) and (2). First, in (1) the causer noun phrase, *the teacher*, and the expression of cause, *made*, are the subject and the main predicate of the sentence, respectively (i.e., they are foregrounded). The causee noun phrase and the predicate of effect, on the other hand, appear as a nonsubject noun phrase and a subordinate predicate, respectively (i.e., they are backgrounded). This situation is reversed in (2); the causee noun phrase and the expression of effect appear as the subject and the predicate of the main clause, respectively, with both the causer noun phrase and the expression of cause located in the subordinate clause. Second, in (1) the expression of the causer's action, *made,* lacks specific lexical content. In (2), on the other hand, the expression of the causer's action, *instructed* has specific lexical content.

Types of Causative Constructions

The most widely known classification of causatives is based on the formal fusion between the predicate of cause and that of effect. In this classification, three different types of causative are recognized: (1) lexical, (2) morphological, and (3) syntactic.

The lexical causative type involves suppletion (no formal similarity between the noncausative verb and its causative counterpart). In this type, the formal fusion of the expression of cause and of effect is maximal, with the effect that the causative verb cannot be analyzed into two morphemes. Examples of

Causal Theories of Reference and Meaning

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Reference, Meaning, and Causal Theories

The theory of reference and the theory of meaning are two closely related, fundamental strains within the study of mind and language. The aim of a theory of meaning is to explain what it is that competent speakers of a given language know, or are able to do, in virtue of which they are able to use the language to communicate. The aim of the theory of reference is to explain what it is in virtue of which words refer to what they do, how it is that utterances can hook onto and express information about particular things.

The exact relation between meaning and reference is a controversial matter (in large part because of the wide variety of theoretical approaches to meaning). According to some views, the meaning of an expression is precisely its referent, and so theories of meaning and of reference are just slightly different roads in to what is essentially the same task. Opponents of this notion point to co-referential expressions that differ in meaning (such as 'Portugal' and 'the country immediately west of Spain'), or to meaningful expressions that do not seem to refer to anything ('of', or 'for the sake of'), to show that meaning is distinct from reference. Or again, many theorists hold that proper names refer but cannot really be said to have a meaning, or that complete sentences have a determinate meaning but do not refer to anything.

In any case, the causal theory of reference (i.e., words refer to what they do by virtue of a certain sort of causal relation between word and referent) and the causal theory of meaning (i.e., words mean what they do by virtue of a certain sort of causal relation between word and meaning) are, historically and conceptually, distinct views. To help avoid confusion, I will distinguish the relevant approach to reference by calling it 'the causal-*historical* theory.' ('Historical' is an appropriate distinguishing mark because the history of how a word is transmitted from its original inception to the current speaker ismuch more important on the causal approach to reference, as compared with the causal approach to meaning.)

The Causal-Historical Theory of Reference

The causal-historical theory of reference was developed in the 1960s and 1970s. It is explicitly developed only for proper names (cf. Donnellan, 1970; Kripke, 1972) and natural kind terms (cf. Kripke, 1972; Putnam, 1975). However, Kaplan (1977) raises some related points about indexical expressions, and there have been attempts to fashion a fully general approach to reference along these lines (for discussion, see Stalnaker, 1997; Devitt and Sterenly, 1999). The theory has replaced the descriptivist approach to reference, different versions of which were defended by Frege and Russell, as the orthodox approach to reference. (*see* **Proper Names: Philosophical Aspects** for discussion.)

According to the causal-historical theorists, descriptivists are wrong to demand that, in order to significantly use a term, speakers need to have a uniquely identifying description of its referent. Rather, once a convention is in place, linking a term to its referent, a deferential intention to comply with this practice – i.e., to use 'X' to refer to what others have used 'X' to refer to – is all that is required in order to use the term to refer. The view has it that certain expressions refer to certain things in virtue of a causal-historical relation between word and object, initially fixed during a dubbing or baptism and propagated from there to subsequent speakers, who implicitly defer to that initial dubbing in using the expression to refer.

The notion of a causal-historical chain as that which is criterial in determining reference is developed more or less independently by Donnellan and Kripke. Donnellan (1970: 277) concludes an argument against descriptivism with the claim that "... in some way the referent must be historically, or, we might say, causally connected to the speech act." Donnellan (1974: 17) articulates the point at a bit more length: "Suppose someone says 'Socrates was snub-nosed', and we ask to whom he is referring....[T]his calls for a historical explanation; we search not for an individual who might best fit the speaker's descriptions ... but rather for an individual historically *related* to his use of the name." Kripke (1972: 94–95) uses similar terms to describe his approach: "...It's in virtue of our connection with other speakers in the community, going back to the referent himself, that we refer to a certain man ... In general, our reference depends not just on what we think ourselves, but on other people in the community, the history of how the name reached one, and things like that. It is by following such a history that one gets to the reference." And again Kripke (1972: 106): "... reference actually seems to be determined by the fact that the speaker is a member of a community of speakers who use the name.

The name has been passed to him by tradition from link to link."

The causal-historical theory is an externalist approach to reference, in that reference depends largely on factors external to the speaker's head – factors pertaining to the speaker's linguistic community and to the environment in which the expression in question evolved. (Descriptivists tend to be internalists, insofar as they hold that reference is fully determined by the speaker's beliefs and discriminative abilities.) On the causal-historical view, the criteria for the correct application of a word are not, in general, introspectively accessible to competent speakers; one can competently use 'gold' or 'Aristotle' without knowing anything that would distinguish Aristotle from Plato, or gold from fool's gold. Mistaken or ignorant speakers can still single out specific referents via these complex, communal, causal-historical mechanisms. (*see* **Externalism about Content** for more on this.)

Contra the descriptivists, the causal-historical theorists argue that the meaning of a proper name is not some kind of descriptive sense (*see* **Direct Reference; Proper Names: Philosophical Aspects; Reference: Philosophical Theories** for discussion). From here, the conclusion that the semantic contribution of a name is just its referent looks compelling. This is why the theory has led to a resurgence of interest in the Millian view of proper names (i.e., the meaning of a name it just its referent) and in the Russellian approach to singular propositions (i.e., the proposition expressed by a sentence containing a name – say, 'Kaplan is in California' – is individuated solely in terms of the individual and property that it is about, as opposed to being individuated in terms of more finely-grained concepts or meanings). Many think that the causal-historical chain of transmission story about how a word refers to something in particular nicely complements, and fleshes out, these doctrines of Mill and Russell.

The causal-historical theory does not aim to aim to give a reductive analysis of reference. For example, Kripke (1972: 96) says: "When the name is 'passed from link to link,' the receiver of the name must, I think, intend to use it with the same reference as the man from whom he heard it . . . [T]he preceding account hardly *eliminates* the notion of reference; on the contrary, it takes the notion of intending to use the same reference as a given." (Cf. Kaplan's [1990] discussion of the point that the intention to preserve reference is not itself a causal notion.) Thus, those who seek to naturalize reference, by reducing the relation of reference to something more scientifically respectable, must either significantly alter the causal-historical view, or look elsewhere.

The Causal Theory of Meaning

In contrast, the causal theory of meaning (also called the 'information-theoretic' approach to meaning) is explicitly in the business of explaining semantic phenomena in non-semantic terms. The general aim here is a naturalistic account of the phenomenon of meaning, and the thought is that the notion of causation is the most promising place from which to start. Dretske (1981) is a seminal proponent of this approach, and Fodor (1987, 1990) develops related accounts. Stampe (1977), another influential proponent, gives the following programmatic sketch: "We have causal theories . . . of knowledge and memory, of belief, of evidence, of proper and common names, and of reference. If . . . these phenomena should turn out to have causal analyses, it will be no mere coincidence. Only their having something in common would make it so . . . [The root of this convergence] is that *representation* is essentially a causal phenomenon" (1977: 81).

The general idea behind the causal theory of meaning is that linguistic meaning is a species of causal co-variance. Roughly, the goal is to show that 'means' means (more or less) the same thing in (1) and (2), that both cases are, at root, cases of reliable correlation:

1. Smoke means fire.
2. 'Fire' means fire.

For a word to mean something in particular is for the word to reliably indicate that thing. Alternatively, a word 'W' means M if M tends to cause or bring about tokens of 'W.' (The account is intended to apply not only to tokens of 'W' that are actually uttered, but also, and more fundamentally, to occurrences of the word in thought.)

If a satisfactory account of meaning were forthcoming down this avenue, this would be a monumental leap forward for the human and cognitive sciences. As yet, there is nothing remotely resembling a satisfactory scientific treatment of meaning; given the fundamental and pervasive roles that meaningful thoughts and utterances play in our lives, that is a rather large gap in our scientific understanding of human beings.

(Note that Grice [1957] criticizes a view that he calls 'the causal theory of meaning' – the core of which is the idea that the meaning of an expression 'E' is (roughly) the content of the attitude that is prone to cause a speaker to utter 'E,' and that hearing 'E' is prone to cause in listeners. This view has not played a major role in the philosophy of language; but nonetheless some of Grice's arguments against it are echoed in the criticisms, described in the next section, of the above information-theoretic causal theory.)

Problems and Prospects

There are many problems with the causal-historical theory of reference (which are discussed at more length in **Reference: Philosophical Theories**). Evans (1973) and Searle (1983) develop counterexamples to the theory, cases where it seems to be committed to unwelcome consequences. Furthermore, many of the semantic views with which the theory has been allied (such as those of Mill and Russell mentioned earlier in the second section of this article) are controversial (*see* **Direct Reference; Proper Names: Philosophical Aspects** for discussion). More generally, the causal-historical view is just a sketchy picture – it does not offer anything like specific necessary or sufficient causal-historical conditions for identifying the referent of an utterance or inscription. Any utterance stands in an awful lot of causal relations to an indefinite range of things; to single out precisely which subset of these ubiquitous causal relations are semantically relevant – let alone precisely which of them are relevant to determining the referent of a particular use of a particular expression – is a daunting task that is as yet barely begun.

The situation is worse for the (more reductionist, and so more ambitious) causal theory of meaning. It not only falls prey to the problems that befalls the causal-historical approach to reference but also gives rise to some distinctive problems of its own. Basically, for almost any word-meaning pair 'W'-M, it is not difficult to come up with conditions in which things distinct from M tend to cause 'W's, and conditions in which M does not tend to cause 'W's. For instance, in various sorts of suboptimal conditions, cows might tend to cause tokens of 'horse,' but nonetheless – regardless of how dark it is (or how far away they are, what they are disguised as, etc.) – these cows are distinct from the meaning of 'horse.' In the other direction, if a horse was to 'baa' like a sheep, or was painted with zebra-stripes, or what have you, these misleading factors would affect its tendency to cause 'horse'-tokens, but would not have the slightest effect on the fact that the term 'horse' correctly applies to it. In short, causation is a much more undiscriminating relation than meaning; and this is the source of all manner of problems for the project of using causation to build an account of meaning.

There are many refinements of the basic causal-theoretic view, intended to skirt these elementary problems and their many variants. However, the consensus seems to be that this type of causal theory can only succeed in delivering an account of meaning that accommodates our intuitions about the normativity and determinacy of meaning (i.e., respectively, it is possible to misapply a term, and the terms 'A' and 'B' can differ in meaning even if all As are Bs) if it smuggles in semantic notions, and thus helps itself to meaning, as opposed to offering an account of meaning (for discussion, see Loewer, 1997).

To sum up: the causal theory of reference is the view that a word refers to that to which it stands in the right sort of causal-historical relation. Since the 1970s, it has become the orthodox approach to reference. However, many problems remain to be worked out, for this general picture to yield a satisfactory, comprehensive account of reference. The causal theory of meaning is the view that the meaning of a word is that which reliably causes tokens of the word to be thought or uttered. Many take this to be the most promising avenue for a naturalistic account of meaning. However, there are reasons to think that the approach is too crude to yield an adequate account of linguistic meaning. At best, there are counterexamples that have yet to be satisfactorily addressed.

See also: Direct Reference; Externalism about Content; Proper Names: Philosophical Aspects; Reference: Philosophical Theories; Sense and Reference: Philosophical Aspects.

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Catalan

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Geography and Demography

The territories where Catalan is natively spoken cover 68 730 km^2, of which 93% lies within Spain (see **Figure 1**). They are:

1. The Principality of Andorra
2. In France: North Catalonia – almost all of the département of Pyrénées-Orientales
3. In Spain: Catalonia, except for the Gascon-speaking Vall d'Aran; the eastern fringe of Aragon; most of Valencia (the Comunitat Valenciana), excepting some regions in the west and south that have been Aragonese/Spanish-speaking since at least the 18th century; El Carxe, a small area of the province of Murcia, settled in the 19th century; and the Balearic Islands
4. In Italy: the port of Alghero (Catalan *L'Alguer*) in Sardinia

Table 1 shows the population of these territories (those over 2 years of age in Spain) and the percentages of the inhabitants who can understand, speak, and write Catalan. Information is derived from the 2001 census in Spain together with surveys and other estimates; the latter are the only sources of language data in France and Italy. The total number of speakers of Catalan is a little under 7.5 million. Partly as a result of the incorporation of Catalan locally into the education system, there are within Spain a significant number of second-language speakers who are included in this total. Virtually all speakers of Catalan are bilingual, using also the major language of the state they live in. (Andorrans are bilingual in Spanish or French, or are trilingual.)

Genetic Relationship and Typological Features

Catalan is a member of the Romance family and a fairly prototypical one, as befits its geographically central position in the European Romance area. Some particularly noteworthy characteristics are pointed out here (for more details see Wheeler, 1988). In historical phonology, note the palatalization of initial /l-/ and loss of stem-final /n/ that became word final, for example, LEONEM > *lleó* [ʎə'o] 'lion.' Original intervocalic -C′-, -TJ-, -D- became /w/ in word-final position and were lost elsewhere, for examples, PLACET > *plau* ['plaw] 'please.3.SING,' PLACEMUS > *plaem* [plə'ɛm] 'please. 1.PL.' As the previous examples also illustrate, posttonic nonlow vowels were lost, so that a dominant pattern of phonological words is of consonant-final oxytones. The full range of common Romance verbal inflection is retained, including inflected future (*sentirà* 'hear.3.SING.FUT'), widely used subjunctives, and a contrast between present perfect (*ha sentit* 'has heard') and past perfective (*sentí* 'heard.3.SING. PERF'). In addition to the inherited past perfective form, now largely literary, Catalan developed a periphrastic past perfective using an auxiliary that was originally the present of 'go' (*va sentir* 'AUX. PERF.3.SING hear.INF'). In some varieties of Catalan, this construction has developed a subjunctive (*vagi sentir* 'AUX.PERF.SUBJ.3.SING hear.INF'), introducing, uniquely in Romance, a perfective/imperfective aspect distinction in the subjunctive. Considerable use is made of pronominal and adverbial clitics that attach to verb forms in direct and indirect object functions or partitive or adverbial functions, quite often in clusters of two or three, as in (1).

(1) us n'hi envi-en
2.PL.OBJ PART.LOC *send*-3.PL
"they send some to you (PL) there"

Most of the pronominal/adverbial clitics have several contextually conditioned forms; thus, the partitive clitic shows variants *en* ∼ *n'* ∼ *-ne*. Clitic climbing is commonly found with a pronominal complement of a verb that is itself the complement of a (semantic) modal, as in (2). This example also shows the (optional) gender agreement of a perfect participle with a preceding direct object clitic.

(2) no l'he sab-ud-a agafa-r
not DO.3.SING.F. *know*- *catch*-INF
have.1.SING PART-F
"I haven't been able to catch it (FEM)"

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Causatives: Semantics

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Defining Causative Constructions

The causative construction is a linguistic expression that denotes a complex situation consisting of two events: (1) the causing event in which the causer does something, and (2) the caused event in which the causee carries out an action or undergoes a change of condition or state as a result of the causer's action. The following example is such a linguistic expression.

(1) The teacher made Matthew paint the house

In (1), the causer (*the teacher*) did something, and as a result of that action the causee (*Matthew*) in turn carried out the action of painting the house.

The causative construction has two main characteristics. First, the causer noun phrase and the expression of cause must be foregrounded, with the causee noun phrase and the expression of effect backgrounded. The foregrounding of the causer noun phrase and the expression of cause is achieved by putting these two expressions in grammatically more prominent positions in the sentence than the causee noun phrase and the expression of effect. Second, the expression of the causer's action must be without specific meaning; all that is encoded by that expression is the pure notion of cause. For instance, the sentence in (2), although denoting a causative situation similar to (1), is **not** regarded as an example of the causative construction but rather as an example of what may be referred to broadly as the causal construction.

(2) Matthew painted the house because the teacher instructed him to do so

There are two clear differences between (1) and (2). First, in (1) the causer noun phrase, *the teacher*, and the expression of cause, *made*, are the subject and the main predicate of the sentence, respectively (i.e., they are foregrounded). The causee noun phrase and the predicate of effect, on the other hand, appear as a nonsubject noun phrase and a subordinate predicate, respectively (i.e., they are backgrounded). This situation is reversed in (2); the causee noun phrase and the expression of effect appear as the subject and the predicate of the main clause, respectively, with both the causer noun phrase and the expression of cause located in the subordinate clause. Second, in (1) the expression of the causer's action, *made,* lacks specific lexical content. In (2), on the other hand, the expression of the causer's action, *instructed* has specific lexical content.

Types of Causative Constructions

The most widely known classification of causatives is based on the formal fusion between the predicate of cause and that of effect. In this classification, three different types of causative are recognized: (1) lexical, (2) morphological, and (3) syntactic.

The lexical causative type involves suppletion (no formal similarity between the noncausative verb and its causative counterpart). In this type, the formal fusion of the expression of cause and of effect is maximal, with the effect that the causative verb cannot be analyzed into two morphemes. Examples of

this type include, English *die* vs. *kill* and German *sterben* 'to die' vs. *töten* 'to kill.'

In the morphological type, the expression of cause is in the form of a derivational affix, with the expression of effect realized by a basic verb to which that affix is attached. In Japanese, for example, the suffix *-(s)ase* can apply to basic verbs to derive causative verbs, for example, *ik-* '[X] to go' vs. *ik-ase-* 'to cause [X] to go.' The causative morpheme can be in the form of not only suffixes but also prefixes, infixes, and circumfixes.

In the syntactic type, the expression of cause and of effect are separate verbs, and they occur in different clauses. This type has already been exemplified by (1). Swahili provides another good example (Vitale, 1981: 153).

(3) Ahmed a-li-m-fanya mbwa a-l-e
Ahmed he-PAST-him-make dog he-eat-SUBJ
samaki mkubwa
fish large
'Ahmed made the dog eat a large fish'

The three causative types must be understood to serve only as reference points. There are languages that fall somewhere between any two of the ideal types. For instance, Japanese lexical causative verbs lie between the lexical type and the morphological type because they exhibit degrees of physical resemblance – from almost identical to totally different – to their corresponding noncausative verbs, for example, *tome-* 'to cause [X] to stop' vs. *tomar-* '[X] to stop,' *oros-* 'to bring down' vs. *ori-* 'to come down,' *age-* 'to raise' vs. *agar-* 'to rise,' and *koros-* 'to kill' vs. *sin-* 'to die.'

The Semantics of Causatives: Two Major Types of Causation

As previously described, the causative construction is a linguistic expression that denotes a situation consisting of two events: (1) the causing event in which the causer does something, and (2) the caused event in which the causee carries out an action or undergoes a change of condition or state as a result of the causer's action. There are two mixed but distinct levels of description contained in this definition: the level of events and the level of participants. The first level is where the relationship between the causing event and the caused event is captured. The second level concerns the interaction between the causer and the causee. Most descriptions of the semantics of causatives revolve around these two levels of description.

Two major causation types – the distinction between direct and indirect causation, and the distinction between manipulative and directive causation – are discussed in this article because they are most highly relevant to the three causative types (lexical, morphological, and syntactic) previously described. The first semantic type of causation is based on the level of events; and the second is based on the level of participants.

The distinction between direct and indirect causation hinges on the temporal distance between the causing event and the caused event. If the caused event is temporally adjacent to the causing event, without any other event intervening between them, the overall causative situation may be regarded as direct. For example, if X makes Y fall into the river by pushing Y, the causing event of *X pushing Y* immediately precedes the caused event of *Y's falling into the river.* There is no intervening or intermediary event that plays a role in the realization of the caused event; in direct causation, the caused event is immediately temporally adjacent to the causing event. As a matter of fact, the temporal distance between cause and effect in direct causation may be so close that it sometimes becomes difficult perceptually, if not conceptually, to divide the whole causative situation into the causing event and the caused event (e.g., *the cat jumped as John slammed the door*). Thus, direct causation represents a causative situation in which the causing event and the caused event abut temporally on one another, the former immediately preceding the latter.

Indirect causation, on the other hand, involves a situation in which the caused event may not immediately follow the causing event in temporal terms. There will be at least one event intervening between the causing and caused events. In order for this to be the case, however, the temporal distance between the two events must be great enough for the whole causative situation to be divided clearly into the causing event and the caused event. For example, X fiddles with Y's car, and days later Y is injured in a car accident due to the failure of the car. In this situation, the causing event is *X's fiddling with Y's car* and the caused event is *Y's getting injured in the accident*. But these events are separated temporally from one another by the intermediary event (the failure of the car). The intervening event plays an important role in bringing about the caused event. Note that, although this causative situation is indirect, the caused event is connected temporally with the causing event in an inevitable flow or chain of events: Y's accident caused by the failure of the car and the failure of the car in turn caused by X's fiddling with it (e.g., Croft, 1991). There can potentially be more than one event intervening between the causing event and the caused event in indirect causation.

The other level of description involves the major participants of the causative situation, namely the causer and the causee. Depending on the nature and

extent of the causer's relationship with the causee in the realization of the caused event, the causative situation may be either manipulative or directive. If the causer acts physically on the causee, then the causative situation is regarded as manipulative. The causer manipulates the causee in bringing about the caused event. The situation used previously to exemplify direct causation is also manipulative because the causer physically pushes the causee into the river. In other words, this particular causative situation represents direct and manipulative causation. The causer may rely on an intermediary physical process or means in effecting the caused event. For example, if X causes Y to fall by pushing a shopping trolley straight into Y, the causer effects the caused event through some physical means, as in the case of direct manipulative causation already discussed. But this intermediary physical process also represents an independent event intervening between the causing event and the caused event – in fact, this intermediary event itself constitutes a causative situation consisting of a causing event (X exerting physical force directly on the shopping trolley) and a caused event (the shopping trolley rolling straight into Y). The causative situation in question may thus be regarded as indirect and manipulative causation.

The causer may also draw on a nonphysical (e.g., verbal or social) means in causing the causee to carry out the required action or to undergo the required change of condition or state. For example, if medical doctor X causes patient Y to lie down for a medical examination by giving Y an instruction or direction to do so, the causative situation is directive causation. This particular situation is also direct in that there is no other event intervening between the causing event and the caused event – Y's lying down is immediately temporally adjacent to X's uttering the instruction. Again, directive causation may also be indirect rather than direct. For example, if X causes Y to type a letter by giving Z an instruction to cause Y to do the typing, then we are dealing with indirect directive causation (e.g., *I had the letter typed by Tim by asking Mary to tell him to do so*). The caused event is separated from the causing event by the intervening event of Z asking Y to comply with X's original instruction.

Causative Continuum and Causation Types

There is a strong correlation between the causative and the causation types. The three causative types – lexical, morphological, and syntactic – can be interpreted as forming a continuum of formal fusion or physical propinquity between the expressions of cause and of effect, as schematized in Figure 1.

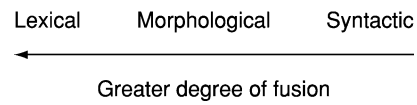

Figure 1 Continuum of formal fusion.

There is a strong tendency for manipulative or direct causation to be mapped onto the causative types on the left of the continuum in preference to those on the right of the continuum. Directive or indirect causation, on the other hand, is far more likely to be expressed by the causative types on the right of the continuum than by those on the left of the continuum. This is often cited in the literature as an excellent example in support of iconic motivations in language. Iconic motivation (or iconicity) is the principle that the structure of language should, as closely as possible, reflect the structure of what is expressed by language (e.g., Haiman, 1985). Recently, the correlation between the causative and causation types has been reinterpreted as that between the degree of difficulty in bringing about the caused event and the degree of transparency in expressing the notion of causation (Shibatani, 2002). For example, directive (as opposed to manipulative) causation involves a nonphysical (verbal or social) means of causing the causee to carry out the required action or to undergo the required change of condition or state. Directive causation entails a higher degree of difficulty in bringing about the caused event than manipulative causation. For one thing, in directive causation the causer relies on the causee's cooperation; the (prospective) causee can refuse to comply with the (prospective) causer's wish or demand. This higher degree of difficulty in bringing about the caused event is then claimed to be reflected by the tendency for directive causation to be expressed by the causative types to the right, rather than the left, on the continuum. The notion of causation is much more transparently encoded in the syntactic causative (i.e., a separate lexical verb of cause) than in the lexical causative, where the notion of causation is not expressed by a separate morpheme, let alone by a separate verb.

Moreover, there is a large amount of cross-linguistic evidence in support of the case marking of the causee being determined by semantic factors relating to the agency, control, affectedness, or even topicality of the main participants of the causative situation (e.g., Cole, 1983). In Bolivian Quechua, for example, the causee noun phrase is marked by the accusative case if the causee is directly under the causer's authority and has no control over his or

her action. If, however, the causee has control over his or her action but complies voluntarily with the causer's wish, the causee noun phrase appears in the instrumental case. Some linguists have made an attempt to reinterpret such variable case marking to reflect the conceptual integration of the causee in the causative event as a whole (Kemmer and Verhagen, 1994). This fits in well with the view that the simple noncausative clause pattern serves as a structural model for morphological causatives (Song, 1996). The causative of intransitive verbs is based on the transitive clause pattern, and the causative of transitive verbs is based on either the ditransitive clause pattern or the transitive clause pattern with an adjunct.

See also: Affixation; Iconicity; Iconicity: Theory; Inflection and Derivation; Morphological Typology.

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Caxton, William (ca. 1415–1491)

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William Caxton (Cauxton, Causton) was born in Tenterden, Kent, some time between 1411 and 1422, and died in Westminster in 1491. After an apprenticeship as a mercer in London, he left for Bruges in 1446, where he went into business on his own. He stayed there for 30 years acting as a governor of the Merchant Adventurers between 1462 and 1465, a post that gave him considerable influence in the supervision of trade between the Low Countries and England. After 1468, he was able to establish close contact with the Duke of Burgundy, who had married Edward IV's sister. But after 1470 he relinquished all his commercial and political offices for good.

Caxton's interests in printing and in translating went hand in hand because, in addition to other titles, he was eager to print his own works. Between 1471 and 1474, he informed himself in Cologne about printing techniques but published his translation of *The recuyell of the histories of Troy*, which he had begun as a preventive against idleness (Dictionary of National Biography), in Bruges in the latter year at a press owned by Colard Mansion. It was the first book printed with movable letters in the English language.

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Between then and his death he produced the incredible output of about 70 books, almost all of them in folio, 21 being his own translations. He edited Chaucer (providing the *editio princeps* of the *Canterbury tales*), Lydgate, Gower, *The chronicle of Brut*, and also pamphlets, *horae*, and speeches. He translated French versions of Latin classical literature and of the philosophers and issued similar translations by others. For experts in printing techniques, his works are recognizable by the founts, which, however, he changed six times, and by such conspicuous signs as the absence of title pages, of ordinary commas and full stops, and of catchwords at the foot of each page. He was the first printer to include woodcuts.

Although he ushered in the new era of printed culture, his influence on the history of English is somewhat indirect. He did not contribute to the standardization of spelling, which was achieved only a century later. His own personal style, as visible in the prologues and epilogues of editions, was quite traditional, with Germanic lexis and syntax, including alliterations. In his translations, however, he conformed with the style of his mostly French authors, which led to a massive acceptance of French words, the abundant use of synonyms, elaborate forms of address, rhetorical figures, etc. Caxton's connection with the court of Burgundy may have been the personal background for this. In doing so and by the sheer mass of books he produced, he supported and reinforced the development of a 'curial' (or 'clergial,' 'aureate') style that was typical of the development of Middle English and brought the language into its own. His edition of a book of French and English conversations, which he probably translated himself, shows a new way of teaching foreign languages in schools, in which the old habit of printing topically ordered vocabulary is embedded in a method of presenting natural dialogues and role play.

See also: Classroom Talk; English, Early Modern; English Spelling: Rationale; Translation: Pragmatics; Western Linguistic Thought Before 1800.

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Cayman Islands: Language Situation

Editorial Team

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The official language of the Cayman Islands is English, with 36 000 speakers. Literacy is 98%. There also exist sizable minority languages of Haitian Creole French, French, and Spanish. Cayman Islands English, although structurally similar to a creole, seems to have borrowed some creole features of Jamaican without having undergone creolization. Unlike many of the other islands in the Caribbean, the Cayman Islands were not directly subject to the pressures exerted by slavery and the plantation system. Instead, early settlers were turtle fishers and wreck salvagers. Population growth forced some emigration to islands off the coast of Central America, the Bay Islands and Corn Island. Strong trading ties also exist with Belize and Jamaica. These population movements and commercial links probably contributed towards language contact and borrowing; however, the lack of a large non-English population seems to have inhibited the development of a true creole.

See also: Haiti: Language Situation.

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Cayman Islands: Language Situation

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The official language of the Cayman Islands is English, with 36 000 speakers. Literacy is 98%. There also exist sizable minority languages of Haitian Creole French, French, and Spanish. Cayman Islands English, although structurally similar to a creole, seems to have borrowed some creole features of Jamaican without having undergone creolization. Unlike many of the other islands in the Caribbean, the Cayman Islands were not directly subject to the pressures exerted by slavery and the plantation system. Instead, early settlers were turtle fishers and wreck salvagers. Population growth forced some emigration to islands off the coast of Central America, the Bay Islands and Corn Island. Strong trading ties also exist with Belize and Jamaica. These population movements and commercial links probably contributed towards language contact and borrowing; however, the lack of a large non-English population seems to have inhibited the development of a true creole.

See also: Haiti: Language Situation.

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Cebuano

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Cebuano is spoken in the central and southern Philippines. It is a member of the Austronesian family of languages, the group of languages spoken throughout most of Indonesia, northward into the Philippines and Taiwan and eastward through much of Papua New Guinea and over the Pacific as far Hawaii and Easter Island. The languages of the Philippines, with the exceptions of the Spanish Creoles, Chabacano and Chavacano, are closely related and typologically similar to one another. In particular, Cebuano is subgrouped with Tagalog and is similar to Tagalog in much the same way as Italian and Spanish are similar to each other (*see* **Tagalog**). Cebuano is called *Sinugbaʔanun* or *Sinibuwanú* natively, and is sometimes referred to as 'Sugbuanon' in the literature about the language. Cebuano is also commonly called 'Visayan' (*Binisayaʔ* natively), after the name of the region of the central Philippines. However, there are in fact more than 30 languages spoken in this area, all of which are referred to as 'Visayan,' such that many publications referring to 'Visayan' have to do with languages other than Cebuano.

Cebuano is spoken by somewhere around a fifth of the population of the Philippines. It is thus second only to Tagalog in number of speakers. Throughout the 20th century Cebuano was widely used as a lingua franca in Mindanao and was almost universally known as a second language by those in Mindanao who were not native speakers of Cebuano. At the present time Tagalog is gaining as the lingua franca at the expense of Cebuano, and in Mindanao, as throughout the Cebuano speech area, native speakers of Cebuano are more and more learning Tagalog as a second language. Cebuano is considered a language of the home and social intercourse, and as such enjoys little prestige and is excluded from settings that are considered official or involve people of high rank. For these settings English is used. Further, the educated classes use English as a code together with Cebuano in social settings. Church services that aim at a lower-class audience are in Cebuano, but those aiming at an upper-class congregation are held in English. Books are in English, and English is the official medium of instruction, although for practical reasons teachers make frequent resort to Cebuano at the primary and even secondary levels (the children do not understand English). As an upshot of the emphasis given to English in the educational system and Cebuano's lack of prestige, the elite know the latter but poorly and speak a kind of basic Cebuano mixed with English, which does not make full use of the rich vocabulary and grammatical apparatus which would allow for eloquence. The best knowledge of Cebuano and most eloquent use is on the part of low-status groups, people with little education and little access to English. Cebuano was widely used in mass media until the middle of the 20th century, but in recent years Tagalog has become more and more widespread. There are still radio programs in Cebuano, and there is one weekly, *Bisaya*, distributed throughout the Cebuano-speaking area, which is aimed at a readership with little education.

Cebuano was first recorded in 1521 in a word list written down by Pigafetta, Magellan's chronicler, when Magellan's expedition made its ill-fated stop in Cebu. Catechisms in Cebuano were composed in the years shortly after the first Spanish colonization in 1564, and the translations made at this time are still in use. The earliest dictionaries and grammatical sketches were composed during the 17th century, although none of these were published until the 18th century. Otherwise no literature antedating the 20th century survives, but the beginning of the 20th century saw a surge of interest in Cebuano and the beginnings of a rich literary production, which gradually diminished from the 1920s and 1930s to the point that now very little is being written. The early dictionaries and catechisms of Cebuano show that the language has changed considerably since the 17th century. Many of the verb forms used in the catechisms and cited in the earliest dictionary are no longer used (although remnants are found in rural dialects) and others are confined to ceremonious or particularly fancy styles, and absent from normal speech. In vocabulary, too, the language has changed considerably. At least one-third of the listings in the major Cebuano dictionary by Fr. Juan Felix de la Encarnación, which dates from the middle of the 17th century, were unknown to more than 100 informants queried during the 1960s and 1970s.

What Cebuano Is Like in Comparison with Tagalog

Cebuano is typologically like the other languages of the Philippines, and most similar to Tagalog (*see* **Tagalog**). The sound systems of the two languages are similar, but have a very different rhythm, for two reasons. First, Tagalog loses the glottal stop in any position except before pause, whereas Cebuano pronounces the glottal stop with a sharp clear break, giving a staccato effect to the language. Second, Tagalog has short and long vowels, with no limit on the number of long vowels within a word or on

the syllable on which length occurs. Cebuano has few long vowels, and only on the final syllable. The Tagalog and Cebuano consonant inventories are exactly the same. The vowels are different, however. Cebuano has only three vowels, /i/, /a/, and /u/. (Some dialects retain a fourth central vowel, schwa, inherited from Proto-Austronesian, but this has merged with /u/ in the Cebuano of Cebu City.) The vowels /a/ and /u/ may occur lengthened in the final syllable. Stress is contrastive and occurs on the final or the penult. There can be no more than one long vowel in a word.

The Cebuano verb system is similar to Tagalog's but not commensurate with it: the Cebuano verb expresses tense (action started or not), and also has special tenseless forms which are used when the verb is preceded by an adverb or phrase which expresses tense. These three verb forms are durative or nondurative, as exemplified below:

(1) Action started, punctual vs. action started, durative:
misulʔub siya ug pula
put-on she OBJ red
'she put something red on'
nagsulʔub siya ug pula
is-wearing she OBJ red
'she is (was) wearing something red'

(2) Action not started, punctual vs. durative:
musulub siya ug pula
put-on she OBJ red
'she will put on something red'
magsulʔub siya ug pula
is-wearing she OBJ red
'she will be wearing something red'

(3) Tenseless verb, durative vs. punctual:
waʔ siya musulʔub ug pula
not she put-on OBJ red
'she didn't put something red on'
waʔ siya magsulʔub ug pula
not she is-wearing OBJ red
'she wasn't wearing red'

A system of affixes which show prepositionlike relationships, analogous to that shown by the Tagalog verb, cuts across this tense–aspect system of Cebuano: the Cebuano verbs contain morphemes which express the relation between the verb and a word it refers to. The verb may refer to the agent (active voice), the patient of the action (direct passive), the thing moved or said (conveyance passive), the instrument of the action, the place of the action, the beneficiary of the action, or (peculiarly for Cebuano) time of the action:

(4) (Active)
Mipalit siya ug ságing
bought he/she OBJ bananas
'he **bought** some bananas [that's what he did]'

(5) (Patient)
Gipalit níya ang ságing
bought-it by-him the bananas
'he **bought** the bananas [that's what happened to the bananas]'

(6) (Place)
bálik ta sa **gipalitan**
let's-go-back we to was-bought-at
nímu ug ságing
by-you OBJ bananas
'let's go back to **the place** you **bought** some bananas'

(7) (Instrument)
Maʔu na y
is-the-one that the-one-that
ipalit nímu ug ságing
will-buy-with-it by-you OBJ bananas
'that is the thing [money] you **will use to buy** bananas **with**'

(8) (Beneficiary)
Putling Maríya **igʔampuʔ** mu kami
Virgin Mary pray-for by-you us
'Virgin Mary **pray for** us'

These verbal inflections are added to roots. In addition, new stems can be formed by adding one or more derivational affixes that have meanings similar to those found in Tagalog (*see* **Tagalog**).

Cebuano has a complex system of deictics and demonstrative pronouns that is a good deal more complex than that of Tagalog. The deictics in Cebuano distinguish tense when initial in the clause: e.g., *dinhi* 'was here', *niʔa* 'is here', *anhi* 'will be here.' They distinguish for four distances, *diʔa* 'is here near me (but not near you)', *niʔa* 'is here (near you and me)', *náʔa* 'is there (near you but not near me)', *túʔa* 'is there (far from both of us)'. When final in the clause the deictics distinguish motion from nonmotion: *didtu* 'there (far away)', *ngadtu* 'going there (far away)'. The interrogatives forms for 'when' and 'where' also distinguish tense.

The changes that Cebuano has undergone since the earliest attestations amount to the loss of distinctions. This can be accounted for partly by the fact that Cebuano has been brought to new areas and spread to populations formerly speaking other languages and also by the fact that there has never been a prescriptive tradition which derogates deviant forms. The four-vowel system, which Cebuano inherited from the protolanguage, has been reduced to

three, except in the case of rural dialects. Further, the category durative vs. punctual, which characterizes the verbal system, has in historical times been lost in the passive verbs except in ceremonial styles. Many of the derivational affixes forming verb stems that were productive in pre-19th-century attestations of the language are now confined to petrified forms. In the past two generations Tagalog has influenced an important component of the verbal system, namely, the loss of the tenseless forms, although in rural speech this part of the system is still intact. Further, the system of deictics has been simplified in speakers influenced by Tagalog: namely, tense has been lost, the four-way distance distinction has been reduced to two – i.e., 'here' vs. 'there,' and the distinction between deictics expressing motion and those which do not has been lost. These changes are most strongly observed in areas which or among groups who have contact with Tagalog speech, and from this population these simplifications spread elsewhere in the Cebuano speech community.

Cebuano morphology differs in type of Tagalog in two ways: first, affixational patterns are regular and predictable in Tagalog but in Cebuano they are not: whereas in Tagalog the paradigms are normally filled out for all roots with a given meaning type, in Cebuano many affixes are capriciously distributed, quite irrespective of the semantic qualities of the root. Second, there are numerous variations in affixation and some of the interrogatives, distributed by areas and individual speakers. Tagalog has much less variation.

See also: Affixation; Austronesian Languages: Overview; Deixis and Anaphora: Pragmatic Approaches; Demonstratives; Philippines: Language Situation; Tagalog.

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Celtic

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The Celts get their name from *Keltoi*, a name of unknown origin applied by the Greeks from around 500 B.C. to a widespread people who lived mainly to the north and west of them. They have long been identified with the archaeological cultures known as Hallstatt and La Tène, named from type-sites in central Europe and dating from the period following 600 B.C., but linking a language to an archaeological culture can be unreliable, and this link and others concerned with the Celts have been queried, notably in James (1999).

The languages understood to belong to these people are of the Indo-European family, the most westerly branch of it, and one important feature thought to mark Celtic out from the rest is the loss (or reduction in some contexts) of the letter *p*. For example, the Indo-European word for a 'father,' which began with *p*- (whence, e.g., Greek and Latin *pater*), gives modern Gaelic (Gaelic, Irish) *athair.* This development predates all the evidence we have for the languages. Another early development was the change in some branches of Celtic, whereby the Indo-European /k^{u}/ (or 'Q') became /p/, whence the well-known division between P-Celtic and Q-Celtic languages. In the later (insular Q-Celtic) languages this *q* has developed to a /k/ sound, written *c*, and so we get oppositions like Gaelic *cenn* and Welsh *pen*, 'head' (from an original stem **qen*-).

The languages may be classified as Continental Celtic and Insular Celtic, the former group dating from the earliest period of Celtic history up till about 500 A.D., by which time all the continental languages had probably disappeared. Three main continental languages are identifiable, Gaulish, Lepontic, and Celtiberian, and we know all three principally from inscriptions (on stones or on coins),

three, except in the case of rural dialects. Further, the category durative vs. punctual, which characterizes the verbal system, has in historical times been lost in the passive verbs except in ceremonial styles. Many of the derivational affixes forming verb stems that were productive in pre-19th-century attestations of the language are now confined to petrified forms. In the past two generations Tagalog has influenced an important component of the verbal system, namely, the loss of the tenseless forms, although in rural speech this part of the system is still intact. Further, the system of deictics has been simplified in speakers influenced by Tagalog: namely, tense has been lost, the four-way distance distinction has been reduced to two – i.e., 'here' vs. 'there,' and the distinction between deictics expressing motion and those which do not has been lost. These changes are most strongly observed in areas which or among groups who have contact with Tagalog speech, and from this population these simplifications spread elsewhere in the Cebuano speech community.

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names (place-names and personal names) and quotations on record in other languages. Verbs, and therefore sentences, are extremely rare, so that our knowledge of all three languages really is minimal. Gaulish and Lepontic are P-Celtic languages, the former belonging to the general area of Gaul (France, but including also parts of Switzerland, Belgium, and Italy) and the latter to parts of the southern Alps. Celtiberian is the name favored, over the alternative Hispano-Celtic, by de Hoz (1988) for the Q-Celtic language, which has, since the mid-20th century, come to be reasonably well attested by inscriptions in north central Spain; a relevant opposition here is between the form used for 'and' (Latin *-que*), appearing as *pe* in Lepontic and as *cue* in Celtiberian.

Archaeology indicates movement of features of the Hallstatt and La Tène cultures from the continent to Britain and Ireland from about 500 B.C., and it is assumed that Celtic languages came with them. Jackson (1953: 4) used the term Gallo-Brittonic to cover both Gaulish and the first P-Celtic languages in Britain. A Q-Celtic language appeared in Ireland, but there is much disagreement as to when, whence, and by what route. There is also much discussion of criteria for assessing relationships between the Celtic languages in this early period, and opinions change frequently (see Evans, 1995); evidence for dating expansion and change in the languages is inevitably scarce.

The Insular Celtic languages are divided into Brythonic and Goidelic groups, the former denoting the descendants of the P-Celtic, which reached Britain from the continent, namely Welsh, Cornish, Breton, Pictish, and Cumbric. Cumbric (or Cumbrian) is used to denote the early language(s) of what are now the northern part of England and the southern part of Scotland, but little is really known about the language(s) apart from what can be gathered from names (see Price 1984: 146–154). The surviving languages in the Brythonic group are Welsh and Breton, Cornish having gone out of general use in the 18th century, though it is still in use among enthusiasts. Sims-Williams (1990: 260; see also Russell, 1995: 132–134) argued that the main linguistic developments from (the theoretical) Brittonic, leading toward the modern insular languages, were in place by 500 A.D., and divergences between Cornish and Breton followed shortly afterward.

Goidelic is the term used by linguists for the Q-Celtic language that appeared in Ireland before the 1st century B.C. and for its descendants. The theory has long been that the original Goidelic language in Ireland spread to western Britain when the power of the Romans waned around 400 A.D., and that Scottish Gaelic (Gaelic, Scots) and Manx eventually developed there. But while the simple theory of a major Irish migration bringing Gaelic to Scotland is widely accepted, even in Scotland, Ewan Campbell has recently shown (Campbell, 2001) that archaeology provides no evidence in support of any such invasion.

The earliest written form of the Gaelic language is that found in Ogam, the alphabet used for inscriptions on stone, dating from about the 4th century till the 7th (McManus, 1991 is a detailed study). Thereafter the language, as attested in the literature, is divided into Old (till 900 A.D.), Middle (900–1200), Early Modern (till *c.* 1650), and Modern periods. The distinctive Scottish and Manx forms only become clearly visible in the Early Modern period. The linguistic theory in Jackson (1951: 78–93) envisaged a historical period, *c.* 1000–1300 A.D., during which Irish (as Western Gaelic) became clearly distinct from Eastern Gaelic (Scottish Gaelic and Manx), but this has come under attack by those (such as Ó Buachalla, 2002) who see the significant historical division within Goidelic as a north/south one, with Scotland, Man, and Ulster in opposition to the rest of Ireland on many points.

On similar grounds, the three Gaelic languages may be seen rather as what Hockett (1958: 323–325) called an L-complex, a single linguistic continuum within which national and even geographical boundaries are ignored by dialectal isoglosses. This suggestion (cf. Ó Buachalla, 1977: 95–96) is supported (a) by the fact that all three 'languages' identify themselves by variants of the same name, *Gaeilge*, *Gàidhlig*, *Gaelck,* and others, whence the English term Gaelic; and (b) by the strong evidence that, while Gaelic survived (until the early 20th century) in the interface area between north-eastern Ireland and the southern Highlands, speakers on both sides of the North Channel were able to converse with little difficulty.

See also: Breton; Cornish; Isle of Man: Language Situation; Scots Gaelic; United Kingdom: Language Situation; Wales: Language Situation; Welsh.

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Celtic Religion

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This is used as a convenient umbrella term to refer to the religious beliefs, myths, rites, and cults of all the Celtic-speaking peoples before the advent of Christianity. The designation *Celtic* may be justified on linguistic, archaeological, and historical grounds, but it should be noted that these criteria do not always converge. Moreover, one might just as well talk of Celtic religions (in the plural), as there are marked regional and chronological differences in a continuum that stretches from Ireland to Asia Minor and from the 5th century B.C. to the 5th century A.D. What we know about Celtic religion is mainly based on archaeological findings, information provided by Greek and Roman authors, and inferences drawn from the medieval vernacular traditions of the Celtic-speaking countries. On this evidence, it is assumed that the Celts worshipped a multitude of gods and goddesses, but the names of these are known only from the Roman imperial period onwards. Classical authors and Latin dedicatory inscriptions from Gaul and Britain usually equate Celtic deities with their Roman counterparts, whereas medieval Irish and Welsh texts tend to treat them on the principle of Euhemerism as mortal beings who were supposed to have lived in a distant past. To judge from the inscriptions, most of the Celtic deities appear to have been of purely local or regional significance. As there are hardly any consecutive Celtic texts from the pagan period, we are ignorant of many basic features of Celtic religion. It is to be stressed, however, that several popular ideas about Celtic religion such as the concept of a 'Celtic calendar' or the belief in a subterranean 'otherworld' are based exclusively on medieval and modern insular sources and should not be projected back on the Continental Celts of classical antiquity. Recent archaeological investigations have provided ample information on pre-Roman cult sites and sacrificial practices, but the well-known Celtic priesthood of the druids continues to be known from literary sources only. Here the most detailed information is provided by the Stoic philosopher Posidonius and by Julius Caesar, but the different pieces of information provided by these two authors are sometimes contradictory and generally cannot be verified by reference to other, independent witnesses. Druids are also mentioned in medieval Irish works of literature set in the pre-Christian period, but the descriptions given of them appear to be modeled on that of Christian priests, so that their source value for the history of Religions appears rather limited.

See also: Early Irish Linguistics; Welsh.

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This is used as a convenient umbrella term to refer to the religious beliefs, myths, rites, and cults of all the Celtic-speaking peoples before the advent of Christianity. The designation *Celtic* may be justified on linguistic, archaeological, and historical grounds, but it should be noted that these criteria do not always converge. Moreover, one might just as well talk of Celtic religions (in the plural), as there are marked regional and chronological differences in a continuum that stretches from Ireland to Asia Minor and from the 5th century B.C. to the 5th century A.D. What we know about Celtic religion is mainly based on archaeological findings, information provided by Greek and Roman authors, and inferences drawn from the medieval vernacular traditions of the Celtic-speaking countries. On this evidence, it is assumed that the Celts worshipped a multitude of gods and goddesses, but the names of these are known only from the Roman imperial period onwards. Classical authors and Latin dedicatory inscriptions from Gaul and Britain usually equate Celtic deities with their Roman counterparts, whereas medieval Irish and Welsh texts tend to treat them on the principle of Euhemerism as mortal beings who were supposed to have lived in a distant past. To judge from the inscriptions, most of the Celtic deities appear to have been of purely local or regional significance. As there are hardly any consecutive Celtic texts from the pagan period, we are ignorant of many basic features of Celtic religion. It is to be stressed, however, that several popular ideas about Celtic religion such as the concept of a 'Celtic calendar' or the belief in a subterranean 'otherworld' are based exclusively on medieval and modern insular sources and should not be projected back on the Continental Celts of classical antiquity. Recent archaeological investigations have provided ample information on pre-Roman cult sites and sacrificial practices, but the well-known Celtic priesthood of the druids continues to be known from literary sources only. Here the most detailed information is provided by the Stoic philosopher Posidonius and by Julius Caesar, but the different pieces of information provided by these two authors are sometimes contradictory and generally cannot be verified by reference to other, independent witnesses. Druids are also mentioned in medieval Irish works of literature set in the pre-Christian period, but the descriptions given of them appear to be modeled on that of Christian priests, so that their source value for the history of Religions appears rather limited.

See also: Early Irish Linguistics; Welsh.

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Central African Republic: Language Situation

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The Central African Republic, with a population of 3.7 million people (annual growth rate = 1.56%), is multilingual, as most of the African countries are (Figure 1). As a rule, urban centers are multilingual, whereas rural areas are more or less monolingual. The language of the dominant ethnic group prevails. For the past decades, contact between urban centers and rural areas has increased, which has resulted in more than one language being used in rural areas. In particular, this is the case in places in which economic activities are going on. In this multilingual setting, French and the Central African language Sango have the status of official languages.

The number of languages spoken in the Central African Republic is not clear. The figures vary between sources. The *Atlas linguistique de L'Afrique centrale: Centrafrique* (ALC), published in 1984, indicates 43 languages, whereas Ethnologue in 2000 mentions 69. One reason for the variance is that different definitions of the term 'language' are used. The individual languages included in these numbers are, in general, associated with ethnic groups and subgroups, which traditionally are found in specific geographical areas. Thus, the languages are not defined according to linguistic criteria. From a linguistic point of view, it would in many cases be more appropriate to speak about dialect clusters instead of languages (Figure 2).

Language Classification

The Central African languages are classified to the Niger-Congo, the Nilo-Saharan, and the Afro-Asiatic phyla (Figure 3). A small number, spoken in the northern and eastern part of the country, is grouped into the Nilo-Saharan phylum (i.e., Runga and Sara, and the Afro-Asiatic languages include Hausa and Arabic. Most national languages are affiliated to the Niger-Congo phylum. More precisely, they belong to the subgroups of the Ubangi and Bantu languages. The Ubangi languages dominate both in terms of number of languages and of speakers. Important clusters include:

1. The Gbaya cluster, including Manza: mainly spoken by the Gbaya people either as a mother tongue or a second language. The Gbaya live in the western part of the country, and the number of Gbaya is estimated at 30% of the total Central African Republic population (1996).
2. The Banda cluster: spoken by people belonging to the Banda groups. These people inhabit the central parts of the country, and they include about 20% of the Central African Republic population.
3. The Ngbandi cluster, with its main dialects Sango Riverain, Yakoma, and Dendi: The dialects are predominantly spoken by the Ngbandi ethnic group, which lives along the Ubangi River. The group represents about 5% of the Central African Republic population. The official language, Sango, is also classified as belonging to the Ngbandi cluster, although the language originates as a pidgin. The language came into being in the nineteenth century as a trade language. Today, it has the character of an extended pidgin/creole language. Its core vocabulary, and parts of its peripheral vocabulary as well, come from the Ngbandi cluster, other Ubangi languages, and Bantu languages. Concepts typical of Western civilization have been encoded in French words, but the grammatical structures developed out the languages of the area. All Central Africans except 11% have at least some proficiency in the language, according to the 1988 census. Approximately 10% of the inhabitants of the Central African Republic speak Sango as their mother tongue.
4. The Zande-Nzakara cluster: spoken by the Zande and Nzakara peoples, who reside along the Mbomou River. Ethnologue also includes the Kpatili variety in the Zande-Nzakara cluster. This variety could also be included in the Ngbandi cluster. The Zande and Nzakara peoples are estimated to make up 3% of the Central African Republic population.

The other subgroup of the Niger-Congo phylum, the Bantu languages, is represented by small languages, such as Mpiemo and Pande, spoken in the southwestern part of the country.

There are also varieties that can be characterized as mixings. For instance, Yangere-Gbaya, spoken south of Bania in the southwest, has emerged out of both

Figure 1 Location of the Central African Republic.

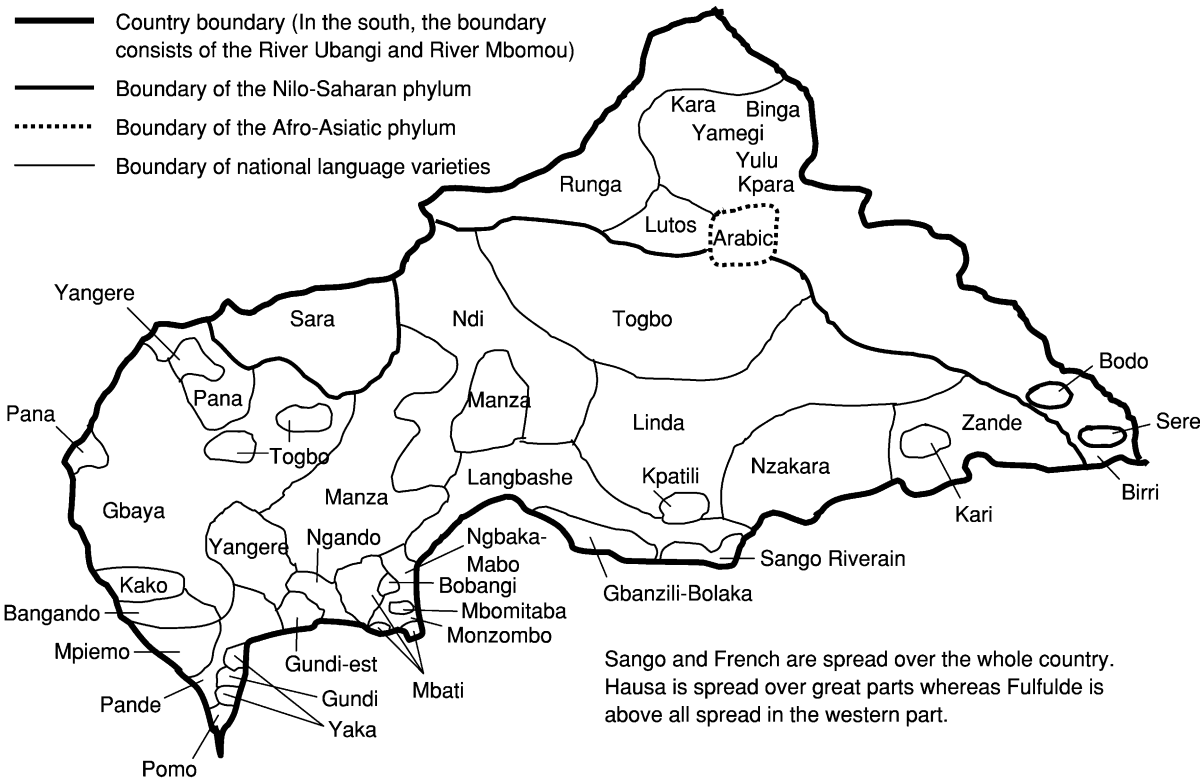

Figure 2 Language map of the Central African Republic, adapted from *Atlas linguistique de L'Afrique centrale: Centrafrique* (1984).

the Gbaya dialect spoken in the area and Yangere, belonging to the Banda cluster.

In addition to Sango, there are lingua francas used at the regional level, such as Gbaya-Biyanda used in the southwestern part of the country and Zande in the eastern part of the country.

Language Policy

The governments in power since the Central African Republic achieved independence in 1960 have kept the former colonial language, French, as official language, but the Sango language has successively been promoted. In 1964, it was declared the only national language, and in 1991 it was declared an official language alongside French. Having the status of a national language, Sango was an important unifying symbol in the building of the independent Central African Republic. Simultaneously with the promotion of Sango as an official language in 1991, the other Central African languages received the status of national languages. This meant that they became recognized by the government which they have not been earlier. They were now allowed to be used in some formal domains, such as at the lower administration levels.

Measures for Sango to function optimally as an official language have been taken. The institution mainly responsible for these matters is the Institut de Linguistique Appliquée in Bangui. An orthography has been elaborated, and a terminology adapted to a modern society has been successively elaborated. In the making of terminology, a purist approach is applied, which implies that the Sango lexical stock and Sango's capacity for word formation are widely used for the creation of new words. French borrowings are avoided, and established French loan words are replaced. A further step in implementing Sango as an official language is the translation into Sango of the constitution, the laws, and government documents, which hitherto have all been in French. In addition, other Central African languages, mainly used in oral communication, are now subject to language-planning activities in terms of elaboration of orthographies, dictionary compilations, and grammar writings based on linguistic research. These languages are focused on by the Association Centrafricaine de Traductions de la Bible et de l'Alphabétisation and SIL International.

Language Use

Despite the language policy determining which language must to be used in formal domains, language use in many situations depends on the speakers' language proficiency. Sango is more and more being

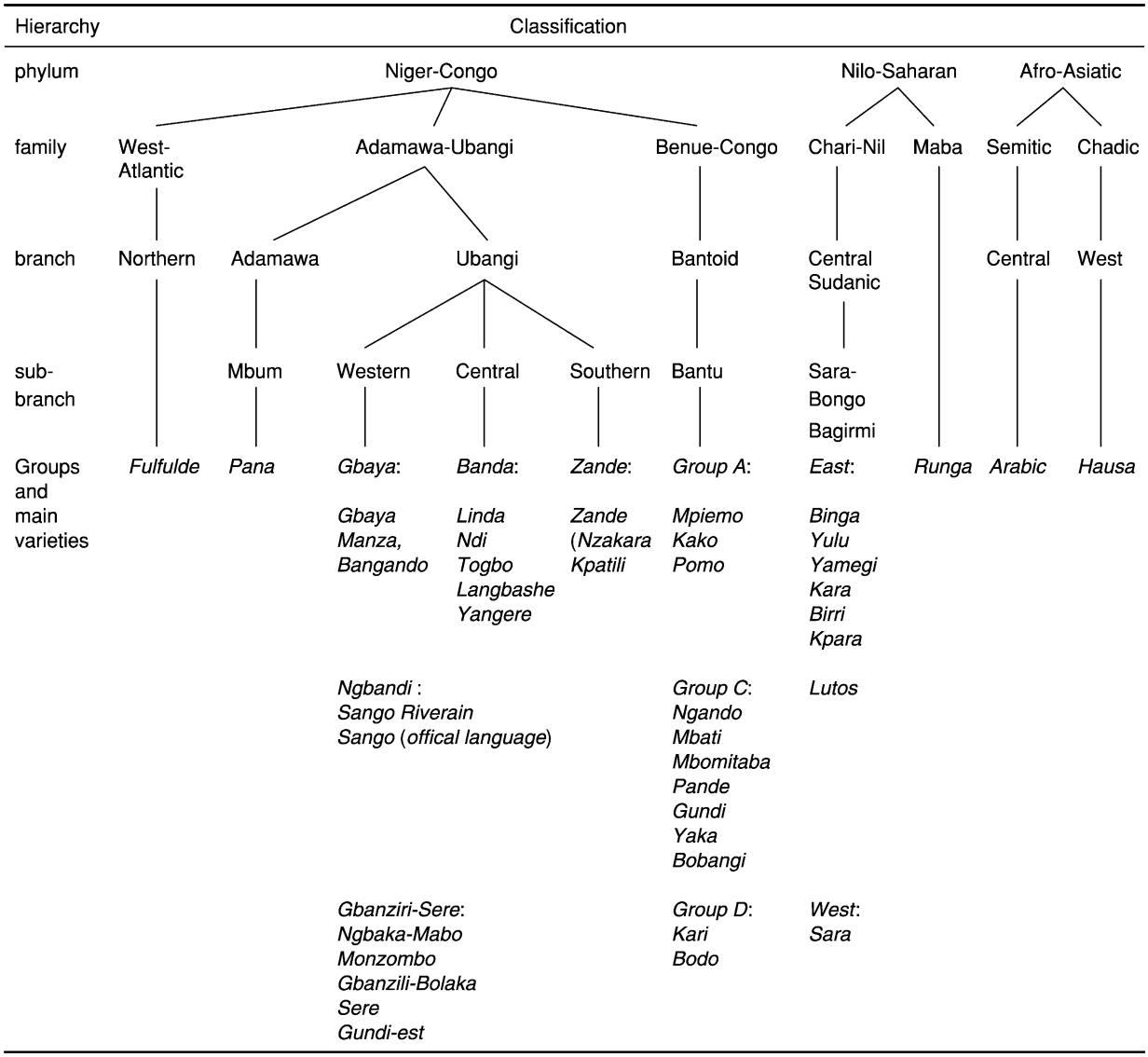

Figure 3 Figure classification of the Central African languages, adapted from ALC (1984).

used at the expense of French. French is mostly used at higher levels of administration, in the media, and at school. Nevertheless, French is still considered to be the more prestigious language. The increasing use of Sango is also occurring at the expense of the other national languages, which in the long run will lead to a country-wide language shift to Sango.

Executive Domain

In the executive domain, the two official languages are used. In the legislative domain, for instance, the National Assembly holds some of its sessions in Sango. In the provinces, Sango is used in situations in which French has traditionally been used, such as in speeches by government officials. In jurisdiction, some laws, such as 98.004 on 27 March 1998 on the electoral code of the country, exist in Sango, and the remainder of the laws are on their way to be translated. In courts, Sango is used when the defendants do not know French, and translation into national languages is given when needed. The traditional leaders, in their role as state representatives, often speak in a national language, or Sango, in their official communications. In international contacts, however, French has been the undisputed language, though today English is a competing alternative.

School

French is the medium of instruction and learning in school at all levels despite the 1984 decree stipulating that instruction should be given in Sango as well. For the time being, explanations in Sango are allowed in

lower grades when needed. Although it is said that other Central African languages are not used for these explanations, they probably are, particularly in rural areas.

Despite primary school being compulsory, less then half the children (males, 47%, and females, 39%) attended primary school, and only 24% of these reached grade 5 according to Central African administration data (UNICEF). The enrolment rate is high in the capital and low in the country's rural areas. Approximately half of the adult population was literate (51%) in 2003 (world Fact-book, 2005).

Proficiency in French and length of school attendance, both in urban and rural areas, are related, because it is in school that students get their greatest exposure to French. This means that more people in urban areas tend to have proficiency in French than in rural areas.

Media and Literature

The state broadcasting company 'Radio Bangui,' which does both radio and TV broadcasts most radio programs in Sango (70%) and the rest in French. French-speaking people frequently listen to international radio channels in French. The television programs shown by Radio Bangui are mainly in French. Programs from abroad are also accessible via satellite dishes, and most of these programs, which are shown to the public by private persons, are in French.

In the capital, people have access to the Internet. There is even a home page in Sango (http://sango.free.fr), of which Marcel Diki-Kidiri at CNRS in Paris is the webmaster. Central African journalists broadcasting in Sango tend to use new terminology, which sometimes makes understanding difficult for common people.

Central African writers write in French and publish in France. An example is Etienne Goyémidé, who published his book *Le silence de la forêt* at the publishing house Hatier, in Paris (1984). Most literature and printed material in the country comprises translations from either English or French and published by religious denominations. The major part of the literature is in Sango, but in recent years printed materials in other Central African languages have been published. Muslims read publications in Arabic, imported from Muslim countries. One reason for the low production of printed materials is that the demand is low – oral communication is much more important.

Religious Activities

Religious activities play an important role in the Central African society because half the population is Christian and 15% are Islamic. In Christian services, Sango is the common language, although a revitalization of national languages is taking place. Moreover, the mixing of languages is not rare in services, nor are translations, such as of the sermon into the dominant national language of the area. In urban areas, services are held in French, and in the capital they are even held in English. The Muslim services are in Arabic, and in some cases explanations are made in Sango or a national language.

Communication in Everyday Life

The language used in the daily life depends on the situation. In a predominantly monolingual geographical area, the national language of the area is, for obvious reasons, used in most domains. Only in communication with visitors who do not know the national language in question is another language, which in many cases today would mean Sango or a regional lingua franca, used.

In a multilingual area, the use of national languages is roughly limited to communication with people belonging to the same speech community. In other situations, Sango, and to a lesser extent the other official language, French, are commonly used. Even within families in which the parents belong to the same ethnic group Sango may be spoken. It is not rare that the parents speak to them in their national language and get the answer in Sango. In these cases, the children understand but do not speak the national language. Between themselves, they always speak Sango.

In everyday conversations, switching between languages is a frequent phenomenon, at the phrase level and beyond. For instance, people speaking Sango and national languages switch very often into French. Furthermore, they frequently use French loan words. This means that people in everyday life speak a Sango variety that differs from the variety modeled by the language-planning institutions, in that this latter variety is free from French expressions.

See also: Arabic; Bantu Languages; French; Hausa; Lingua Francas as Second Languages; Nilo-Saharan Languages; Sango.

Language Maps (Appendix 1): Map 3.

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Central Solomon Languages

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There are four or possibly five Papuan languages in the central Solomon Islands: Bilua, spoken on the island of Vella Lavella; Touo (known more commonly in the literature as Baniata, after one of the villages where it is spoken), spoken on Rendova Island; Lavukaleve, spoken in the Russell Islands; Savosavo, spoken on Savo Island; and possibly Kazukuru, an extinct and barely documented language of New Georgia.

Relationships Among the Languages

By the time of Ray (1926, 1928), there was already an established list of non-Austronesian languages of the Solomon Islands, consisting of Bilua, Baniata (here referred to as Touo), Savo, and Laumbe (now called Lavukaleve). Waterhouse and Ray (1931) later

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discovered Kazukuru, a language of New Georgia, identifying it as unlike both the Melanesian (i.e., Austronesian) and Papuan languages of the Solomon Islands. Much later, Lanyon-Orgill (1953) claimed Kazukuru and two further varieties, Guliguli and Dororo, to be Papuan languages; however, the data are so scant as to make classification uncertain.

Greenberg (1971) was the first to make an explicit claim for the genetic unity of these languages, as part of his Indo-Pacific family. This claim was shortly followed by Wurm's (1972, 1975, 1982) proposal of an East Papuan phylum, linking all the Papuan languages of the islands off the coast of New Guinea into one genetic grouping. Both claims have been firmly rejected by specialists in the region, and recent views have been much more cautious: Ross (2001) suggested, on the basis of similarities in pronouns, that Bilua, Touo (Baniata), Savosavo, and Lavukaleve formed a family, unrelated to other island and mainland Papuan languages. Terrill (2002) found limited evidence of similarities in gender morphology among these languages. In lexical comparisons using an extended Swadesh list of roughly 333 items (with obvious Austronesian loans removed), Bilua, Lavukaleve, Touo, and Savosavo share only 3–5% resemblant forms (i.e., within the realm of chance). In short, at this stage of knowledge, a genetic relationship among any or all of these languages still remains to be proven.

Typological Characteristics

A typological overview of these and other Papuan languages of island Melanesia provided by Dunn *et al.* (2002) showed that, but for a few striking exceptions, the only grammatical features shared by the central Solomon Islands Papuan languages are also held in common with surrounding Oceanic Austronesian languages. These common features include an inclusive/exclusive distinction in pronouns, dual number (actually, there are four number categories in Touo), reduplication for various purposes, nominative/accusative alignment (although Lavukaleve has ergative/absolutive alignment in certain types of subordinate clauses), and serial verb constructions (absent in Bilua).

The two most notable departures from Oceanic grammatical patterns are SOV constituent order in three of the languages (Bilua has SVO with some variation) and the presence of gender; there are three genders in Lavukaleve, four in Touo, and two in Bilua and Savosavo. Gender in Bilua is contextually determined: the masculine–feminine distinction applies only to human nouns, but for inanimate nouns there is a distinction, marked by the same morphology as marks gender in human nouns, between 'singulative' (=masculine) and 'unspecified number' (=feminine) (Obata, 2003). Savosavo has two genders, masculine and feminine, and it is not clear whether they are contextually determined as in Bilua or permanently assigned as in Touo and Lavukaleve (Todd, 1975).

Touo has some very unusual features for the region, including a phonological distinction between breathy/creaky vs. modal vowels, as well as six vowel positions instead of the usual five for the region. Touo sources include Todd (1975), Frahm (1999), and Terrill and Dunn (2003). Lavukaleve too has many unusual features, including focus markers that show agreement in person, gender, and number of the head of the constituent on which they mark focus; and a very complex participant marking system depending on factors to do with predicate type and clause type (Terrill, 2003).

See also: Papuan Languages; Solomon Islands: Language Situation.

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Čeremisina, Maja Ivanovna (b. 1924)

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Maja Ivanovna Čeremisina was born in Kiev (the Ukrainian republic) in 1924. She is a Russian scholar who, after Ubrjatov's death in Novosibirsk, took on the responsibility of continuing research on the syntax of Siberian indigenous peoples' languages. Under her guidance, 33 scholars have investigated the syntactic structures of their mother tongues (Altai, Alutor, Buryat (Buriat), Kazakh, Ket, Khakas, Khanty, Kirghiz, Nganasan, Selkup, Shor, Tuva (Tuvin), and others). Most of them have undertaken 3-year postgraduate courses at the university in Novosibirsk.

Čeremisina received her secondary and higher education in Moscow. Her first years after secondary school were during World War II. On the first day of aerial bombardment in Moscow, her parents' house was completely destroyed, and her mother was killed.

Much later, Čeremisina was educated at the University of Moscow, where she mastered literature and the Russian language and later undertook 3-year postgraduate courses at Moscow University. After graduation, she taught many subjects in Russian philology at university departments in Tomsk, Tula, Beijing (China), and Novosibirsk. Čeremisina obtained her M.A. in 1960 and her Ph.D. In 1974. Her doctoral thesis was entitled 'Complex comparative constructions in the Russian language.' Before Čeremisina's doctoral defense, Ubrjatova asked her to read the manuscript of a book devoted to the analysis of complex sentences in the Yakut language. Čeremisina read the manuscript three times, trying to comprehend Yakut, the frame of mind of its speakers, and their way of expressing themselves, and also trying to penetrate into Ubrjatova's way of thinking, which gradually opened itself up to her. Her main field of endeavor thereafter became Siberian indigenous languages.

In 1975, Čeremisina took charge of a project based on comparative and typological research into the structure of complex sentences in the languages of Siberian indigenous peoples. The starting point of the investigation was one of the postulates propounded by Ubrjatova in her monograph on Yakut syntax – that Turkic languages employ similar language means to establish links between both words and units of higher levels (phrases and sentences). Testing the postulate on other Altaic languages became the goal of Čeremisina and her disciples.

Čeremisina founded a new Department of Languages and Folklore of the Indigenous Siberian Peoples at the university in Novosibirsk.

At present, Čeremisina and her team are working at the typology of a simple sentence in Altaic languages. She has published five monographs, nine textbooks, and 183 papers.

See also: Altaic Languages; Turkic Languages; Yakut.

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18th Century Linguistic Thought

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The 18th century has been characterized as a century of debate on language, leading to the formation of new conceptions in this field. The focus on language has also been supported by the role of public opinion and by profound changes in society. But the most important discussions were about the role of language in thought. In the field of language description, 18th-century authors followed for the most part traditional views and contributed to their further development.

Discussions on Language in the Early 18th Century

The inclusion of language in the philosophical systems of Rene Descartes (1596–1650), Antoine Arnauld (1612–1694), and Baruch de Spinoza (1632–1677) was based on the supposition that there was an analogy between the dualism of language and thought and that of body and mind. The basis of the doctrine, which supposed an incorporeal thinking no longer accessible to humans after original sin, had already been developed by St Augustine (354–430). From a historical perspective, thinking required signs to render collections of simple ideas, as well as memory, possible. Signs gave rise to the manipulation of ideas, and they did not depend on the presence of things or the enumeration of all the simple ideas included in them.

A main tenet of the Augustinian–rationalist doctrine was the merely spiritual nature of all notions and of the relations between them. The denotation of a term was regarded as a mental object that could only have a representational relation to the word and could not depend on linguistic signs and their corporeal nature. The form words obtained in different languages was regarded as arbitrary, whereas the composition of the concept was universal and did not depend on sensations. For the rationalist thinkers, the indispensability of language consisted only in communication between people when the transmission of pure incorporeal notions was impossible. But linguistic signs met the necessities of communication in a very insufficient way because intuitive conceptions overwhelmed the human mind while their linguistic signs distracted from their content and slowed down the process of thinking.

Descartes's vision of the relation between language and thought was a dualistic one, in that he did not attribute to linguistic signs any influence on ideas. He saw a confirmation of this opinion in the fact that animals with highly developed speech organs did not develop human thinking even if they were able to produce some speech sounds. This idea was further developed by Gerauld de Cordemoy (1626–1684), who claimed that the substantial difference between language and thought allowed the development of different languages with arbitrary sound patterns.

The authors of the Port-Royal Grammar (1660) and the Logic (1662) took up the distinction between language-independent thought, communicated thought, and language-dependent thinking, and they subordinated linguistic signs to conceptual notions. Had ideas depended on names, people would not have had the same ideas about even the simplest things

because languages use different names to designate them. Arnauld and Pierre Nicole (1625–1695), the authors of the Logic, criticized Thomas Hobbes's (1588–1679) remark that reasoning consisted of comparing names and uniting them by the copula. For the authors of Port-Royal Grammar, human thinking operated with the designated ideas and not with their names. The arbitrariness of the linguistic sign played an important part in this argumentation. The fact that Arabs and French people could communicate proved that thought was independent of language.

But this language-independent thought had to make use of signs if it was to be communicated. The use of signs that restricted to the communication of ideas could become a habit and finally result in a situation where people could no longer imagine ideas without words. For example, many philosophical treatises aimed at satisfying people with words. These arguments led to a critical discussion of language that played an important part in the 18th-century debate.

The diversity of languages had been regarded just as a proof of the secondary role of linguistic signs, but it could not be denied as a practical and an empirical phenomenon that had to be taken into account by grammarians. The contrast between a general way of thinking and the language-specific way of expression was a widely accepted position in 17th- and early-18th-century grammar. A direct linear word order followed most closely by the French language, for example, was declared to be a universal feature. The Latin deviation from this subject–verb–object order was declared to have had no influence on thought; Romans must have thought like French people before they rearranged their ideas using inversions and ponderous constructions (for the debate on word order, see Ricken, 1978).

The existence of different expressions for the same conceptual structure had already been discussed by the grammarians of Port-Royal, who saw no obstacle to universal ideas in it. The system of language at a given moment was always determined by use, and this meant that people had to rely on the elements of their own language, even if they were less developed or less differentiated than in other languages. For example, all languages had to express relations between nouns and whole syntactic units. In languages with case systems these relations were expressed by morphological elements, whereas in French prepositions and word order served the same purpose.

This kind of explanation appeared often in 18th-century grammars, which associated the special genius of a language (*génie de la langue*) with the function of formal elements of language and not with their relation to thoughts. But the notion of a *génie de la langue* had already become very fashionable at the end of the 17th century in systematizations of Vaugelas's *Remarques sur la langue française* by Louis Du Truc (1668), Jean Menudier (1681), and Jean d'Aisy (1685). A temporary pinnacle in the description of the particular means of a language was attained with Claude Buffier's *Grammaire françoise sur un plan nouveau* (1709). According to Buffier, the reality of language disproved the opinion that a grammatical theory must be prior to all languages. In Buffier's view, it was a crucial error to write a French grammar following the principles of Latin. Regarding the signification of words primarily as a function of individual representation, Buffier warned not to confuse signs with designated notions and denied the exact explicability of significations. Following John Locke (1632–1704) in his nominalist positions, he overcame the rationalist theory of language.

The *Essay concerning human understanding* (1690) by Locke gave a new answer to the question of how thought could be influenced by language. According to Locke, linguistic signs did not represent the objects of knowledge but the ideas that the human subject created. The nominalist explanation of complex ideas led to a denial of the existence of innate ideas and to the supposition of a voluntary imposition of signs onto a collection of simple ideas for which there was no pattern in reality.

Universal language had been a tempting issue for a long time. Even Descartes proposed to base his reflections on this matter on the nature of thought and not on actually existing languages. Taking advantage of such a universal language, peasants would be able to think more conveniently than philosophers using any existing language. It was the same idea that led to the *characteristica universalis* by Gottfried Wilhelm Leibniz (1646–1716). His doctrine of the harmonious structure of the world and its perception made him reject the nominalist supposition that signs denoted arbitrarily a collection of simple ideas. The form of signs was not naturally determined but historically motivated and not the result of an arbitrary imposition. Imperfections that could be explained by the nature of language, the fuzziness of significations, the polysemy of words, and the conscious abuse of language, might lead human thinking through a tortuous path. Although in the customary use of language such insufficiency was unavoidable, the philosophical use of language could elude it by creating its own philosophical sign system.

Contradictory Results of Empirical–Sensationalist Thought

The empirical and sensationalist theory of knowledge developed by Locke had a great influence in many

European countries and was taken up in France by César Chesneau de Du Marsais (1676–1756) and Etienne Bonnot de Condillac (1714–1780), among others, whose thoughts led to different conclusions. Du Marsais, in his "Essay on Tropes" (1730), developed a sensationalist theory of metaphor, apart from tackling grammatical issues in his articles in the French *Encyclopédie*. But, in spite of his views on lexical signification rooted in a sensationalist theory, he held a rationalist opinion on syntax, considering subject–verb–object word order as natural and corresponding to the order of thought. However, he modified this theory, recognizing the communicative and stylistic function of different constructions as a counterpart to the figurative use of words.

Du Marsais is an author who is not easily classified as either a sensationalist or a rationalist. Delesalle and Chevalier (1986: 88) have characterized him as building a system of *empirisme raisonné* in which he finally looked for a new strategy of grammatical operations. He tried to deduce a set of principles that would be transferable to new situations from the use of language. Following this concept of analysis, he did not arrive at new conclusions through the application of theorems but by a kind of arithmetic that consisted of composition and decomposition. What were regarded as reliable in this context were not definitions but only explanations of the appearance of an idea. The fundamental attitude about the acquisition of language that stemmed from his theory was routine. Du Marsais's aim was to find an order, a general principle in the multitude of texts. The following example (Du Marsais, 1729/1797: II, 215) shows how a manual of Latin would look following this approach.

Minóis filiam Ariádnen, cujus ope labyrínthi ambáges explicúerat, secum ábstulit: eam tamen, immemor beneficii, deséruit in insulá Naxo: destitútam Bacchus duxit.

ábstulit	secum	Ariádnen,	filiam
il emmena	*avec lui*	*Ariane*,	*fille*
Minóis;	ab	ope cujus	
de Minos	*par*	*le secours de laquelle*	
explicúerat	ambáges	labyrinthi.	
il avoit démélé	*les détours*	*du labirinthe*.	
Tamen,	immemor...		
Cependant,	*ne se ressouvenant point* ...		

'et enleva Ariane, fille de Minos. Cète princesse avoit donné à Thésée un peloton de fil qui aida ce héros à sortir du labirinte. Cependant, oubliant ....'

The first line is the Latin original in all its complexity and with its inversions. The second line shows the Latin sentence transformed into the natural order, and the third and fourth lines show an interlinear translation into French and a current French translation.

It is easy to suspect that such a procedure would be criticized. Du Marsais introduced routine as a basis for the acquisition of language, but what provided this routine? The bad Latin in the second line of our example was certainly not an appropriate means. One of the protagonists of the critical discussion of Du Marsais's method was the Abbé Noël Antoine Pluche (1688–1761), who picked out as a central theme the function of translation in language teaching. Pluche did not reject the use of interlinear translation for the clarification of the structure of the original text when this structure was maintained on the syntactic level. But, for the initial stage of language learning, he rejected translation made on the basis of rules and vocabularies because it would lead to unusual and awkward expressions that were far from the *génie de la langue latine*.

The development of the issue of a *genie de la langue* by Condillac was different in kind. Condillac formulated a coherent sensationalist theory of cognition by substituting for Locke's dualist explication of sensation and reflection the concept of transformed sensation (*sensation transformée*), which helped to explain even complex thought as made up of simple sensations. The instrument allowing this transformation was language, to which Condillac attributed an important role in human thought. Human language arose from a language of gestures (*langage d'action*), which, gradually and stimulated by the needs of communication, developed into a language of arbitrary (artificial) signs. The signs of human language operated according to the principle of analogy, which corresponded to a motivated relation between signs of analogous content. It was this analogy of signs that made up the genius of a language.

The sensationalist discussion of signs and their influence on thought gave rise to several applied themes of discussion (the abuse of words, grammar teaching, construction of a philosophical language, and synonymy). The sensationalist theory was nevertheless only one solution, and it was not generally accepted by all 18th-century language theorists. Authors such as James Harris (1709–1780) continued to suppose the existence of innate powers that produced mental operations such as thinking and reasoning. Although corporeal entities could always be subdivided, the unities of the mind could not. So it was important to discover the elementary principles of the dispositions of the mind that acted in combination. As an important principle for this analysis, Harris (1786/1993: 307) endorsed the distinction between Matter and Form, which he tried to find in language as well:

"Now if Matter and Form are among these Elements, and deserve perhaps to be esteemed as the principal among them, it may not be foreign to the Design of this Treatise, to seek whether these, or any things analogous to them, may be found in Speech or Language." The genius of a language is given an important role in this context: "[...] many words, possessing their Significations (as it were) under the same Compact, unite in constituting a particular Language" (Harris 1786/1993: 328).

For Harris (1786/1993: 398), human cognition did not derive from sensations but from mental archetypes that anticipated perceptible things. All communication consisted for him in the transmission of ideas and words:

> For what is Conversation between Man and Man? – It is a mutual intercourse of Speaking and Hearing. – To the Speaker, it is to teach; to the Hearer, it is to learn. – To the Speaker, it is to descend from Ideas to Words; to the Hearer, it is to ascend from Words to Ideas. – If the Hearer, in this ascent, can arrive at no Ideas, then he said not to understand; if he ascends to Ideas dissimilar and heterogeneous, and then is he said to misunderstand. – What then is requisite, that he may be said to understand? – That he should ascend to certain Ideas, treasured up within himself, correspondent and similar to those within the Speaker. The same may be said of a Writer and a Reader; as when any one reads to-day or tomorrow, or here or in Italy, what Euclid wrote in Greece two thousand years ago.

Another example of a productive survival of rationalist theory in 18th-century grammar is Nicolas Beauzée (1717–1789), who defined general grammar as a science and opposed it to the grammars of particular languages, which he called art. According to him, the rules of scientific grammar should be universal and not depend on the arbitrary properties of languages. The relation of language and thought was explained in a dualistic way: Thought was independent of language, whereas language was an instrument of analysis and at the same time a reflection of thought

Prize Topics on Language Theory

In the second half of the 18th century, the debate on linguistic subjects was especially intense in the Berlin Academy. Several themes were brought for academic competitions and these can be regarded as a reflection of the general European language debate.

Topic I: Relativity and Subjectivity of Languages as a Means of Cognition and Communication

The president of the Academy, Pierre Louis Moreau de Maupertuis (1698–1759) associated the diversity of languages with different forms of thought (*plans d'idées*): Translation among distant languages was considered virtually impossible, and signs had no strict philosophical validity in regard to reality. Reporting in the *Lettre sur le progrès des sciences* (1752) that travelers to the Pacific Islands had seen savages there, Maupertuis concluded that he would rather have an hour's conversation with them than with the most refined mind of Europe. It was also Maupertuis who introduced the origin of language as the topic of an academic prize contest. The signs by which people designated their first ideas, he argued, have so much influence on all our knowledge that research into the origin of languages and the manner in which they were formed deserved as much attention and could be as useful in the study of philosophy as other methods that build systems on words with meanings that had not been thoroughly examined. We might therefore expect to learn a great deal from the comparison of distant languages because in the construction of languages we could discover the vestiges of the first steps taken by the human mind. The diversity of human languages and universals of thought may be regarded as one of the main themes of the discussion. The search for language origins was an attempt to arrive at basic principles, to examine what was natural as opposed to artificial. The empirical reality of the diversity of languages was a challenge to the universalistic principle.

From this challenge arose the question for 1759, whose prize was awarded to an essay submitted by the distinguished Goettingen professor of Semitic languages, Johann David Michaelis (1717–1791). Michaelis's essay, which was translated into English and Dutch after being published in German and French, has become well known in Europe (cf. Michaelis, 1974). Usually only the successful essay was published at the expense of the Academy and all the others were kept as anonymous manuscripts in the archive, but in this case all the texts were published. It is easy to explain why the Academy decided to do this. The relativistic view suggested by the Academy for 1759 was not really taken up, except by Michaelis's prize essay. Obviously, it did not follow the trend of the contemporary language discussion, which was much more occupied with the general foundations of language.

For Michaelis, languages were the results of the work of whole peoples, and this democratic development led to the conservation of prejudices in words. On the other hand, people could contribute to the improvement of languages by the exclusion of etymologies that might mislead human thinking. The French translation contained some important changes suggested by Johann Bernhard Merian

(1723–1807) and André Pierre Le Guay de Prémontval (1716–1764). Michaelis pointed out that no one particular language had a general advantage over others – richness and poverty had always been relative and depended on the purpose that languages were used for. Changes in the text show that there was an attempt to adapt Michaelis's text to the debate, mainly dominated by French texts and terminology. But the chief supplement dealt with the possibility of framing a successful universal language of learning. He now answered a question that had been considered very important by the Academy since the days of Leibniz. In this context, the antiuniversalistic view of Michaelis appears most clearly: A universal language of science would be exposed to even more arbitrary intervention than a natural language because every scientist or philosopher would be able to determine the significations of the words he used (Michaelis, 1762/1974: 167).

Topic II: The Anthropological Foundations and the Origin of Language

If we look at the context of the discussion, it is not difficult to understand why, as early as 1759, the origin of language, and not the philological or philosophical study of different languages, was the fundamental question. In 1756, Jean-Jacques Rousseau's (1712–1778) *Discours sur l'origine et les fondemens de l'inégalité parmi les hommes* was published in German. In the same year, Johann Peter Süßmilch (1707–1767) read two papers on the divine origin of language. Rousseau presented the dilemma succinctly: If people needed speech in order to learn how to think, they must have been in even greater need of thinking in order to invent the art of speaking.

The Academy was interested in the anthropological foundations of language as well as in an explanation of language variety. The question of the origin of language did not aim at historical and factual explanation of previous phases of language development. It was as hypothetical as the state of nature in political philosophy and, like the latter, its aim was to understand people in the present.

But the authors of the 31 papers submitted to the contest did not always respond exactly to the question emphasized by the Academy text. There was, for instance, a manuscript entitled *Rêveries sur le langage* that reduced the problem to the question of whether language was innate or not. Also, without quoting the great texts on the origin of language, many authors just copied them. So we find Condillac's description of the development of human sound language from a language of gestures; traces of this development were to be found in Hebrew, which by its antiquity could be regarded as a natural language. This was another way to empiricize the search for the foundations of language: One of the classical languages, usually Hebrew, was declared to be so close to the origin that it could be regarded as bearing all necessary traces that languages must have.

The issue of another essay (I-667) was the invention of language by human beings. The invention of language was said to be, first of all, due to necessity and danger. If a couple of human beings were exposed to the danger of being devoured by a hungry wolf, the woman, who represented the weaker but more inventive companion, would imitate the wolf's cry to warn her partner. The author discussed 10 simple steps that led from this origin to the present state of development. It is interesting that for the author of this essay there was no essential difference between the structures of different languages. The languages of Greenland, Japan, the Hottentots, the Oronocs, the Tartars, and the Caribbean were regarded as regular and analogous. They expressed the same anthropological foundations as the European languages, in a very simple way, which could be proved by the forms of their inflexions. According to the author, declension, conjugation, and syntax were common features of all languages. This attitude was typical of the kind of hypothetical empiricism used to study language diversity and its consequences or to explain universals without any regard to real languages. The few examples quoted by any author using this kind of hypothetical empiricism were always very close to the everyday experience of the author. In the case of this essay, the author quoted mainly German examples, to which he added some Polish, French, Greek, and Latin ones.

There was also a second kind of hypothetical empiricism, apart from the one we have just discussed. This is obvious in an essay (I-666) that received the accessit by the Academy, written in Latin by Francesco Soave (1743–1806). For the author of this contribution, evidence about the origin of language was to be obtained by observing children who grew up outside society. He repeated a hypothetical experiment already discussed by Bernard de Mandeville (1670–1733), Condillac, and others. Contemporary authors were aware that ethical concerns would never allow them to carry out this experiment. They referred, however, to cases of real savage children who had been found and whose intellectual and communication habits had been studied.

As we have seen, there was a wide range of thinking about the diversity of human languages and its relation to the mental development of humans. Why, in spite of this, has Johann Gottfried Herder (1744–1803) gone down in the annals of history as a so-called forerunner of linguistic relativism? Herder

offered a solution to the main anthropological problem without leaving aside the empirical reality of languages: Endowed with the capacity for thought characteristic of humans and for the first time freely exercising this capacity, humans invented language. The doctrine of the intimate connection between *Volksgeist* and language has generally been regarded as one of Herder's most important contributions to the thought of that age. Nevertheless, it is easy to find such statements on a reciprocal dependency between the genius of the languages and the characters of the peoples in other texts of the language discussion (cf. Haßler, 1984; Neis, 2003).

Linguistic questions were discussed repeatedly with reference to the great 18th-century texts that were published and distributed. This seems to have contributed to a rather monolithic picture of the ideas brought up by the contests. It is quite natural that Jacob Grimm (1785–1863) should refer respectfully to Herder in his own treatise on the origin of language, even though he noted a lack of depth and erudition in the reflections of this author, who could not compete with the scientific view of language imposed by the development of comparative linguistics in the 19th century. In the 19th century, Herder became one of the intellectual heroes of Romanticism. The references to Herder constitute an impressive corpus, which is sufficient to explain the preferences of modern historiographers. His contribution to the classical heritage seems to be evident. But did it really consist in having found out that languages were different and related to human thought, that every language expressed the soul of the people who used it? This idea was much more explicit in the texts of other contributors of the 1771 question. What really made up the outstanding quality of Herder's essay was the fact that he explained the general foundations of language and, in this way, the origin of language.

The papers submitted for the contest on the origin of language show that the authors did not always answer exactly the question that seemed to be important to the Academy. In contrast to the question of 1759, this time the Academy invited them to examine the foundations of language, but many of the contributors wrote about the presumed history of languages and about their differences and grammatical categories.

Topic III: Comparing and Assessing Languages

It is justified to say that the Academy was always a little late, inviting authors to answer questions that had already been under discussion for several years. But in the case of the relative value of languages with respect to communication and thought, the Academy just changed the focus. After having turned from diversity, which was accentuated in 1759, to the anthropological foundations in 1771, it returned to diversity for another question in the last decade of the century: *Vergleichung der Hauptsprachen Europas, lebender und todter, in Bezug auf Reichthum, Regelmäßigkeit, Kraft, Harmonie und andere Vorzüge; in welchen Beziehungen ist die eine der anderen überlegen, welche kommen der Vollkommenheit menschlicher Sprache am nächsten?* (1792–1794).

But the context of the debate had changed. It was the time of the great language collections, which either had already appeared or were under preparation. Nevertheless, it seems to have been difficult to get contributions. In 1792, when the topic was first brought up, only two essays arrived, one of which was by a Goettingen professor who had worked in accordance with the ideas of Michaelis, comparing mainly classical languages. This author asserted that Greek was the ideal language for scientific communication and that German was a poor language that would never be suited to learned purposes. It is evident that this excluded him from winning the prize, especially at a time when the Academy was looking for a substitute for French, which has been in decline since the death of Frederic the Great. The second manuscript has been lost, but a remark by the secretary of the Academy ascribes it to Johann Christoph Schwab (1743–1821), who had shared with Antoine de Rivarol (1753–1801) the prize on the universality of French.

The Academy had to wait 2 more years to receive a contribution that deserved the prize. It was written by the Berlin preacher Daniel Jenisch (1762–1804) and was published in 1796. Jenisch's book has usually been considered as one of the forerunners of 19th-century historical–comparative linguistics. However, it was written in the context of an empiricism that was merely hypothetical. All his considerations about languages are guided by epistemological observations and second-hand testimonies about language facts. He acknowledged this himself, nevertheless feeling a certain need for another kind of empirical studies.

What Jenisch promised was not a philological comparison of languages – in this respect, the competing Goettingen manuscript was much more consistent – but an assessment of languages on the basis of a constructed ideal. This ideal language consisted of the familiar properties found in the Renaissance discussion of language. Richness, lucidity, insistence, certainty, and euphony were such properties, and they were not to be found to the same degree in all languages. Thus, the advantages or disadvantages of any language depended on the purpose and the field the language would be used for. By asserting that

languages were equal in rank and could not be reduced to a universal grammar, Jenisch envisaged an impartial comparison of languages. But his idea of empiricism was merely hypothetical and based on literature.

So the prize-winning topic on the comparison of languages did not prepare or even open a new epoch of language studies but concluded the discussion on universals and the relativity of languages in the context of the Enlightenment debate. At the end of the 18th century, new kinds of empirical questions were emerging, but many authors still tried to address them through the old epistemological framework.

See also: Academies: Dictionaries and Standards; Adelung, Johann Christoph (1732–1806); Beattie, James (1735–1803); Beauzee, Nicolas (1717–1789); Brosses, Charles de (1709–1777); Burnett, James, Monboddo, Lord (1714–1799); Condillac, Etienne Bonnot de (1714–1780); Diderot, Denis (1713–1784); Early Historical and Comparative Studies; Hamann, Johann Georg (1730–1788); Harris, James (1709–1780); Jones, William, Sir (1746–1794); Language Teaching: History; Lomonosov, Mikhail Vasilyevich (1711–1765); Modern Linguistics: 1800 to the Present Day; Murray, Alexander (1775–1813); Origin of Language Debate; Rhetoric: History; Sign Language: History of Research; Sign Theories; Smith, Adam (1723–1790); Western Linguistic Thought Before 1800.

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El Salvador: Language Situation

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The República de El Salvador is linguistically more Spanish than Spain. Nine tenths of this Spanish-speaking Central American culture is ethnically mestizo (of mixed American and European heritage). Almost none of the resident Amerindians can speak anything but Spanish, which is also the dominant language of most of the European Salvadoreños. Other languages are spoken primarily as foreign languages of cultural and commercial interaction, with the possible exception of some Mayan-speaking immigrants from Guatemala. Spanish usage is so strong that, although knowledge of English is widespread in San Salvador business circles, even foreigners

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Maja Ivanovna Čeremisina was born in Kiev (the Ukrainian republic) in 1924. She is a Russian scholar who, after Ubrjatov's death in Novosibirsk, took on the responsibility of continuing research on the syntax of Siberian indigenous peoples' languages. Under her guidance, 33 scholars have investigated the syntactic structures of their mother tongues (Altai, Alutor, Buryat (Buriat), Kazakh, Ket, Khakas, Khanty, Kirghiz, Nganasan, Selkup, Shor, Tuva (Tuvin), and others). Most of them have undertaken 3-year postgraduate courses at the university in Novosibirsk.

Čeremisina received her secondary and higher education in Moscow. Her first years after secondary school were during World War II. On the first day of aerial bombardment in Moscow, her parents' house was completely destroyed, and her mother was killed.

Much later, Čeremisina was educated at the University of Moscow, where she mastered literature and the Russian language and later undertook 3-year postgraduate courses at Moscow University. After graduation, she taught many subjects in Russian philology at university departments in Tomsk, Tula, Beijing (China), and Novosibirsk. Čeremisina obtained her M.A. in 1960 and her Ph.D. In 1974. Her doctoral thesis was entitled 'Complex comparative constructions in the Russian language.' Before Čeremisina's doctoral defense, Ubrjatova asked her to read the manuscript of a book devoted to the analysis of complex sentences in the Yakut language. Čeremisina read the manuscript three times, trying to comprehend Yakut, the frame of mind of its speakers, and their way of expressing themselves, and also trying to penetrate into Ubrjatova's way of thinking, which gradually opened itself up to her. Her main field of endeavor thereafter became Siberian indigenous languages.

In 1975, Čeremisina took charge of a project based on comparative and typological research into the structure of complex sentences in the languages of Siberian indigenous peoples. The starting point of the investigation was one of the postulates propounded by Ubrjatova in her monograph on Yakut syntax – that Turkic languages employ similar language means to establish links between both words and units of higher levels (phrases and sentences). Testing the postulate on other Altaic languages became the goal of Čeremisina and her disciples.

Čeremisina founded a new Department of Languages and Folklore of the Indigenous Siberian Peoples at the university in Novosibirsk.

At present, Čeremisina and her team are working at the typology of a simple sentence in Altaic languages. She has published five monographs, nine textbooks, and 183 papers.

See also: Altaic Languages; Turkic Languages; Yakut.

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Rodolfo Cerrón-Palomino, an emeritus professor at the Universidad Nacional Mayor de San Marcos, Lima, (1970–1991) and an active professor at the Pontificia Universidad Católica del Perú (1998 to date), is a prominent figure of Andean linguistics.

He received his Bachelor of Arts from the Universidad Nacional Mayor de San Marcos, Lima, and his Masters degree from Cornell University in Lingusitics. Professor Cerrón-Palomino has two Ph.D. degrees in Linguistics, one from Universidad Nacional Mayor de San Marcos, and a second one from the University of Illinois at Urbana Champaign. He was awarded the Gugenheim fellowship, in addition to earning several other honors in Germany, Holland, and the United States.

Cerrón Palomino's linguistic work focuses on the indigenous languages of the Andes: Quechua, Aimara, Chipaya and Mochica. He has researched bilingualism in Peru, the linguistic interference of Spanish into Indian languages, and the influence of Quechua into Spanish. Within the Quechua linguistic family, he has produced historical, sociolinguistic, and descriptive work of several dialects of Central or Junin-Wanka Quechua. He spearheaded the standardization of modern Quechua, which has been implemented in Peruvian rural public schools to provide the students with bilingual education.

Cerrón-Palomino argued against the Quechumara hypothesis championed by Orr and Longacre. He showed that Proto-Quechua and Proto-Aimara are languages that do not share a common origin. His historical work on Quechua continued in his book *Lingüística Quechua* (1987) a broad survey of Quechua geographical distribution, including all the main dialectal variations, origins, development, classification into dialects, phonology, and grammar.

He studied the Aimara linguistic family from Peru, Bolivia, and Chile in his book *Lingüística Aimara* (2000). In his detailed work on Andean languages, he uses colonial sources such as Ludovico Bertonio, Diego Gonçalez Holguin, and Inca Garcilaso de la Vega. In his article *Lenguas de la costa norte peruana* (2004), he sheds light on prehispanic language contact in Peru due to the 'mitmas.' The mitmas were Inca institutions that caused demographic movements of different human linguistic groups along the Inca Empire and that aimed to control newly conquered people. Recently, he has been working with Andean Spanish and Chipaya, the only language alive of the Uru family.

In his book on Andean Spanish, *Castellano andino* (2003), he addresses the variation of rural Spanish due to the interference of Quechua and Aimara bilingualism in Peru. He exposes the prejudice the speakers of Andean Spanish have to face, since their speech, called 'motoso Spanish,' is highly stigmatized. Andean Spanish has a noncanonical word order and different agreement patterns than standard Spanish. In addition, Andean Spanish incorporates Quechua and Aimara loanwords that are not used in standard Peruvian Spanish. Cerrón-Palomino traces the origins of Andean Spanish in colonial texts, such as in Guamam Poma's *El primer nueva coronica y buen gobierno*. He has also analyzed Quechua loanwords into local Peruvian Spanish and loanwords of Spanish into Quechua.

See also: Bilingual Education; Peru: Language Situation; Quechua; Spanish; Standardization.

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Enrico Cerulli, born on February 15, 1898 in Naples, was a diplomat, anthropologist, and linguist who specialized in the languages, history, and cultures of Ethiopia, Somalia, and Eritrea.

After attending the University of Naples and earning a law degree, in 1920 Cerulli began an impressive diplomatic career. He became Secretary and later Director of Political Affairs in Italian Somaliland from 1920 to 1925. A Counselor for the Italian Legation to Ethiopia from 1926 to 1929, Cerulli also participated in an exploratory trip to Western Ethiopia and a scientific expedition to the sources of the Wabē Shabelē River. He was the Italian representative to the Anglo-Italian Boundary Commission for Somaliland (1930–1931). He became the Secretary-General of the Ministry for Italian Africa from 1932 to 1935, then a delegate to the League of Nations (1935–1937). He married Lina Ciotola in 1936 and had two sons with her.

Favored by Mussolini, Cerulli was appointed Deputy Governor-General of Italian East Africa in 1938. Cerulli is widely recognized as a scholar of considerable repute. Yet Bahru (2001: 162) has cited Cerulli as "the perfect example of scholarship being put at the service of colonial administration." Sbacchi (1985) wrote that many Italians in Africa thought that Cerulli was incapable of carrying out responsibilities of high office and that he favored Somalis over other ethnic groups. Yet he was one of only a few officials with extensive colonial experience, and he was highly knowledgeable about the local environment. Because of incompatibility with the Governor-General, the Duke of Aosta, he was transferred to Harar as Governor. Cerulli retired from public service (1940–1944). Later, he was an Italian delegate to the Peace Conference (1944–1947), the Four-Power Conferences in London from 1947 to 1949, and delegate to the United Nations regarding Italian African Territories. From 1950 to 1954 he was ambassador to Iran, and from 1955 to 1968 he was Councilor of State.

Cerulli wrote many grammatical sketches (based on fieldwork) on languages around the Horn of Africa, including Harari (Ethiopian Semitic); Somali, Sidamo, Arbore, Komso, and Daasanach (Cushitic); Janjero (Yemsa), Chara, Basketto, and Koorete (Omotic); and Berta (Nilo-Saharan). Some of these works were the first linguistic documentation of the languages and are generally quite accurate and useful to this day. In addition, Cerulli showed great interest in Somali poetry and songs.

Islam was a driving interest of Cerulli's, from his university studies through his later writings on Islamic connections to medieval Western culture (1949) and Islam in general (1971). Yet Cerulli was also interested in Ethiopian Christianity, its links to Eastern Christianity in Palestine, and its Ge'ez texts on Ethiopian saints.

Cerulli received honorary doctorates from the Universities of Brussels, Rome, and Manchester. He was a member of many academies and societies in Europe, including the Accademia Nazionale dei Lincei (also its Vice-President). He served as President of the Italian Anthropological Institute.

Cerulli was a "man of science and a man of action" (Ricci, 1990) who successfully combined two careers in public service and in scholarship. Cerulli died on September 19, 1988 in Rome.

See also: African Linguistics: History; Cushitic Languages; Eritrea: Language Situation; Ethiopia: Language Situation; Ethiopian Semitic Languages; Nilo-Saharan Languages; Omotic Languages; Somali; Somalia: Language Situation.

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Chad: Language Situation

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Introduction and History

The Republic of Chad is located in the Sahel of north-central Africa, at the meeting place of three of the four major phyla of African languages. As a result, Chad is characterized by great linguistic variety. Today Chad is a checkerboard of numerous language groups, most of them small and each of which is located in a limited geographic area (see **Appendix 1**). The *Ethnologue* (Gordon, 2004) lists a total of 131 living languages in Chad. Only 21 of these languages boast more than 100 000 speakers (see Table 1); nonetheless, these 21 represent about three-fourths of the population of Chad, which current estimates place at about 9 million. More than 50 Chadian languages, on the other hand, have fewer than 10 000 speakers.

The present linguistic situation is the result of movements of peoples, contact between ethnic groups, and the dominance of certain ethnic groups over the centuries. Most of Chad's peoples claim to have come from northeastern Africa or the Middle East, but the details of their origins have been largely lost in the oral history. The Arabs came in several waves, beginning in the 14th century; their language has had a heavy influence on the indigenous languages of Chad because of its continued contact with them over the years. The Kanem-Borno empire, the Bagirmi kingdom, and the Wadai kingdom, which enjoyed ascendancy at different periods from the 9th to the 19th centuries, are in part responsible for the present-day use of Kanembu, Bagirmi, and Maba as vehicular languages. Finally, the French language arrived in Chad at the end of the nineteenth century as the colonizers' language of administration and education.

French, Arabic, and Other Languages of Wider Communication

Since Chad gained its independence in 1960, French has been the official language; Arabic was early proposed as a second official language, but this proposal has been a source of controversy. The Constitution of 1996 declared that French and Arabic are the official languages of Chad. But there has been some ambivalence as to whether the Arabic referred to is Modern Standard Arabic or vernacular Chadian Arabic. If Chad fit the pattern of diglossia common throughout the Arabic-speaking world, Standard Arabic would be deemed the only variety worthy of official status, the local vernacular (Chadian Arabic) being suitable only for oral informal communication. Nonetheless, Chadian Arabic is used in ways that would otherwise be considered inappropriate: it is used in formal settings (speeches, news broadcasts), and various efforts have been made to give it a standardized written form, even using Latin characters. A growing body of literature exists in Chadian Arabic. Further, the association of Arabic with Islam has made the Arabic question a bone of contention in Chad's officially secular society. It is true that Arabic does not enjoy widespread use in public life (e.g., in education, on signs and billboards, in newspapers) as compared with French, which is still seen as the language

Table 1 Chadian languages with more than 100 000 speakers[a]

Language (with classificatory affiliation)	*Number of native speakers (in thousands)*
Chadian Arabic	1100
Nilo-Saharan languages	
(Sara subgroup)	
Ngambay	1200
Gor/Mango	350
Sar	270
Gulay	240
Kaba Na/Kaba Deme/Kuifa	170
Mbay	140
Nilo-Saharan languages	
(Bagirmi subgroup)	
Naba (Bilala, Kuka, Medogo)	340
Nilo-Saharan languages	
(Saharan branch)	
Kanembu	570
Kanuri	130
Dazaga	420
Zaghawa	120
Nilo-Saharan languages	
(Maban branch)	
Maba	470
Chadic languages	
(Chari-Logone group)	
Nancere	110
Lele	100
Gabri	100
Chadic languages	
(Masa branch)	
Musey	260
Marba	180
Masana	160
Niger-Congo languages	
(Adamawa family)	
Mundang	240
Tupuri	130

[a]Estimated numbers of native speakers in 2004, in thousands, based on projections of ethnic group population from the 1993 census (cf. Bureau Central du Recensement, 1994).

of prestige, the principal language of education and administration. The issue of a 'bilingual' Chad, where French and Arabic are used as equals on the national level, has engendered much debate (cf. Coudray, 1998).

In a country with about 130 languages, bilingualism is a necessity for interethnic communication, but the lingua franca used is not limited to the official languages. Some estimates reckon that only 30% of Chadians understand French, and only a very small minority of Chadians master Standard Arabic. On the other hand, those who understand vernacular Chadian Arabic may be as high as 70%. Chadian Arabic is widely used as a second language throughout the north and east of the country, and it is also gaining ground in certain areas of the south; 'Bongor Arabic' is the pejorative term used to describe the pidginized Arabic used in southwest Chad. But other Chadian languages are also used in specific geographic areas for interethnic communication: Fulfulde in the southwest near the Cameroon border; Sar in the far south, and/or a Sara-Ngambay mixture used across the south; Bagirmi along the Chari River; Kanembu in the area around Lake Chad; Dazaga in the north from Lake Chad across to the Sudan border; and Maba throughout much of eastern Chad.

In urban centers, such as the capital N'Djaména, speakers of diverse languages live side by side, and language use is adapted accordingly. It is common to hear frequent code switching between French, Chadian Arabic, and a local language, depending on the constraints of a given communication situation. Another urban phenomenon is 'common Sara,' forged by speakers of a diversity of Sara languages to enable them to communicate freely.

Use of Chadian Languages in Writing and Literacy

Only 33% of Chadians can read or write French or Arabic, according to a Census Bureau survey in 1998. But there are small numbers of literates in national languages, too. The government's Direction de l'Alphabétisation et de Promotion des Langues Nationales (DAPLAN) coordinates efforts in nonformal education, efforts to provide writing systems for Chadian languages, and efforts to develop pedagogical materials so that Chadian languages can be used in literacy programs.

A number of Chadian languages have been reduced to writing for specific practical purposes. Christian missionaries were the first to do so: translations of Bible portions first appeared in the Mbay language in 1932, in Mundang in 1933, and in Ngambay in 1936. This effort grew in subsequent years, so that today about 50 Chadian languages have some published religious materials, whether Bible portions, liturgical materials, or New Testaments and Bibles. In recent years, nonreligious development agencies and nongovernmental organizations have worked to disseminate health and agricultural materials in a variety of Chadian languages.

There are also grassroots efforts to further the use of Chadian languages. Numerous language committees and cultural associations have been formed in recent years with a view to promoting the local languages, developing local literacy programs on the village level, and developing a body of literature in these languages.

Classification and Linguistic Characteristics of Chadian Languages

The three phyla of African languages represented in Chad are Afro-Asiatic (Afrasian), Nilo-Saharan, and Niger-Congo.

Nilo-Saharan Languages

The Nilo-Saharan phylum is represented in Chad by the following branches (cf. Bender, 1996):

1. *Central Sudanic*, and specifically the Sara-Bagirmi group. More than one third of Chad's population speak languages from the Sara subgroup, which constitutes a dialect continuum in a broad band along the southern border with the Central African Republic. The principal Sara languages are Ngambay, Kaba, Gulay, Mbay, Sar, and Kaba Na, as well as a number of other, intermediate varieties, such as Gor, that have been dubbed dialects or languages according to different classifications. The Bagirmi subgroup, located further to the north, includes Bagirmi, Naba, and Kenga.
2. *Maban*, located in the Wadai near the Sudanese border: principal languages are Maba, Masalit, and Runga.
3. *Saharan* (located throughout the northern desert): its languages are Tedaga, Dazaga, Zaghawa (Beria), Kanembu, and Kanuri.
4. *Eastern Sudanic*, represented by the Tama group and Daju, spoken in eastern and central Chad.
5. *For*, represented by the Amdang language in the area of Biltine.

Linguistically, the Nilo-Saharan show the most diversity among Chadian languages. The Sara languages are quite simple morphologically and syntactically, while languages of the Saharan group show great complexity; the other subgroups show intermediate degrees of complexity.

Afro-Asiatic Languages: Chadic Family

More than one-third of Chadian languages belong to the Chadic family, one division of the Afro-Asiatic (or Afrasian) phylum. (Note that the adjective Chadic refers to this particular language family; the term Chadian refers to the country of Chad.) The following branches of the Chadic family are found in Chad (cf. Barreteau and Newman, 1978):

1. *East Chadic*. All the languages of this branch are spoken in Chad; it divides into two subgroups: the Guéra group (Newman's group "B"), located in the Guéra region of central Chad, whose major languages are Dangaléat, Migaama, Bidiyo, Mukulu, and Mubi; and the Chari-Logone group (Newman's group "A"), located between Chad's two major rivers, and whose major languages are Kera, Kwang, Nancere, Lele, Gabri, Somrai, and Tumak.
2. *Masa*. All languages of the Masa branch of Chadic are spoken in Chad, along its border with Cameroon. The main languages are Masana, Marba, Musey, and several varieties of Zime.
3. *Central Chadic (Biu-Mandara)*. Only a few languages of this branch are spoken in Chad, all located along the Cameroon border, notably Kotoko (several varieties), Buduma, Musgu, and Gidar.

These Chadic languages are normally characterized by grammatical gender in their nominal systems; their verbs may be marked for directionality and/or plurality of action. Vowels are often limited in number; some languages have even been analyzed as having only one underlying vowel, **a**. Many Chadic languages exploit labialization (lip-rounding) and palatalization (fronting) to a greater or lesserzz degree. Vowel length and consonant gemination are common phenomena in the languages of the Guéra subgroup.

Niger-Congo Languages: Adamawa Family

The Niger-Congo languages are represented in Chad essentially by the Adamawa family (cf. Boyd, 1989). Apart from a couple of isolate languages within Adamawa (Day, Laal), the languages spoken in Chad fall into two groups:

1. *Mbum group*, along the border with Cameroon; its principal languages are Mundang, Tupuri, and the Eastern Mbum cluster of Nzakambay, Kuo, and Karang. The languages of the Kim cluster, spoken along the Logone River, were originally recognized as a separate group but are now joined to the Mbum group.
2. *Bua group*, a cluster of languages spoken from the Chari River north to the Guéra; it includes Bua, Niellim, Tunia, Bolgo, and Gula varieties.

Adamawa languages are notable within the Niger-Congo phylum for their lack of a functioning noun class system; in general, the morphology and syntax of Adamawa languages are not greatly complex.

Common Features

A number of distinctive features of Chadian languages are worthy of mention because they can be found in languages of all three phyla. In the sound systems, many languages have phonemic implosives ɓ and ɗ (sometimes also ʃ); many have a series of prenasalized plosives (mb, nd, nj, ng); some have the retroflex flap ɽ; and the labial flap v̌ occurs with some regularity, especially in ideophones. A few languages have ATR vowel harmony (in certain Saharan, Maban, and Bua languages).

Most Chadian languages are tonal, although accent also seems to play an important role in some of them. Most languages have three register tones, which are relatively stable (i.e., not subject to spreading or downstep) but which can combine into tonal contours. Tone is exploited to make both lexical and grammatical distinctions.

SVO word order predominates in Chadian languages of all families; the only notable exception is the SOV order found in Saharan and Maban languages. Morphology is also relatively simple in most of the languages of southern Chad, regardless of classificatory affiliation. The Eastern Chadic languages have a somewhat richer morphology, but the greatest degree of morphological complexity is undoubtedly to be found in the verbal systems of the Saharan languages.

Prospects

Chadian languages have not received much attention from linguists. In the 1960s and 1970s, Europeans such as Jean-Pierre Caprile and Herrmann Jungraithmayr did active research (especially in the Sara languages and the Chadic languages, respectively). In recent years, Chadians have done research and description, especially through the National Institute of Human Sciences or the linguistics department of the University of N'Djaména. Other scholars and organizations, such as SIL, continue to engage in on-site linguistic research and description of Chadian languages.

But much remains to be done. The very existence of certain languages, such as Zerenkel or Mabire in the Guéra, has been discovered or confirmed only in

the past few years, because it is still difficult to reach many areas of Chad even today. And since so many of Chad's language groups are small, it is questionable how long the languages can continue. Indeed, several languages are already moribund, with only a handful of older speakers still living (e.g., Berakou, Mabire, Goundo), and a few others are seriously endangered because of language shift. Nonetheless, bilingualism of the mother tongue with another major language (such as Chadian Arabic) is stable among most groups; many remain relatively isolated from the mainstream; and in most groups children still learn the language of their parents. So most Chadian languages should remain to be spoken for at least two or three generations to come.

See also: Bilingualism; Code Switching and Mixing; Endangered Languages; Niger-Congo Languages; Nilo-Saharan Languages.

Language Maps (Appendix 1): Map 4.

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Chadic Languages

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Introduction

The Chadic language family comprises an estimated 140 to 150 languages spoken in areas to the west, south, and east of Lake Chad (west Africa). The best-known and most widespread Chadic language is Hausa, with upwards of 30 million first-language speakers, more than any other language in Africa south of the Sahara. The remaining languages, some of which are rapidly dying out (often due to pressure from Hausa), probably number little more than several million speakers in total, varying in size from fewer than half a million to just a handful of speakers, and new languages continue to be reported. Written descriptions of varying length and quality are available for only about one-third of the total, although for some – e.g., Bidiya (Bidiyo), Guruntum, Kanakuru (Dera), Kera, Kwami, Lamang, Margi (Marghi Central), Miya, and Mupun – good descriptive grammars have been produced, and several dictionaries have appeared, e.g., Dangaléat, Lamé, Ngizim, and Tangale. Hausa has four recent comprehensive reference grammars, in addition to two

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high-quality dictionaries, making it the best-documented language in sub-Saharan Africa.

Chadic is a constituent of the Afroasiatic phylum, which also includes Semitic (e.g., Amharic, Arabic, [Standard] Hebrew), Cushitic (e.g., Oromo, Somali), Omotic (e.g., Dime, Wolaytta), Berber (e.g., Tamahaq and Tamajeq [Tamajeq, Tayart] [spoken by the Tuareg], Tamazight [Central Atlas], and (extinct) Ancient Egyptian/Coptic. The phylogenetic membership of Chadic within Afroasiatic was first proposed almost 150 years ago, but did not receive wide acceptance until Greenberg's (1963) major (re)classification of African languages. The standard internal classification divides Chadic languages into three major branches: West (e.g., Hausa, Bole, Angas, Ron, Bade), Central = Biu-Mandara (e.g., Tera, Mandara, Bachama-Bata [Bacama], Kotoko [Afade]), and East (e.g., Somrai, Kera, Dangaléat), in addition to an isolated Masa cluster (with subbranches and smaller groupings).

Phonology

Laryngealized implosive stops, e.g., /b ɗ/, and ejective stops, e.g., /p' t'/, are widespread throughout Chadic, together with prenasalized obstruents, e.g., /mb nd/. A characteristic pattern, therefore, is for a language to present a four-way phonation contrast, e.g., coronal /t d ɗ nd/ and/or labial /p b ɓ mb/. The voiceless and voiced lateral fricatives /ɬ ɮ/ are also commonplace, in addition to palatal and velar (including labialized velar) consonants.

Vowel systems generally vary from two (monophthongal) vowels, high /ə/ (with various phonetic values) and low /a/, as in Bachama-Bata and Mandara, to seven vowels, e.g., [Dangaléat] /i e ɛ a ɔ o u/, with /i (e) a ə (o) u/ a common inventory, and the diphthongs /ai/ and /au/ are attested. Tangale has a nine-vowel ATR pattern. Contrastive vowel length, especially in medial position, is also widespread throughout the family.

Chadic languages are tonal, and two level (High/Low) tones, e.g., Hausa, or three (High/Mid/Low), e.g., Angas, are typical. Downstep is also common (e.g., Ga'anda, Miya, Tera). Although tone can be lexically contrastive, its primary function is normally grammatical, e.g., in distinguishing tense/aspect/mood categories. [Transcription: aa = long vowel, a = short; à(a) = L(ow) tone, â(a) = F(alling) tone, H(igh) tone is unmarked.]

Morphology and Syntax

Many Chadic languages have masculine/feminine grammatical gender (an inherited Afroasiatic feature), with no distinction in the plural, and typically distinguish gender in second and third person singular pronouns, e.g., [Miya] fiy/macə 'you (MASC/FEM)', tə/njə 'he/she'. Some also preserve the characteristic n/t/n (MASC/FEM/PL) marking pattern in grammatical formatives (and the masculine and plural markers often fall together phonologically), cf., [Masa] vèt-*n*a 'rabbit', vèt-*t*a 'female rabbit', vèdai-*n*a 'rabbits'.

Noun pluralization is complex, and some widespread plural suffixes are reconstructable for Proto-Chadic, e.g., *-Vn, *-aki, *-i, and *-ai. Examples: (-Vn) kùmən/kùmən*ən* 'mouse/mice' [Bade], miyò/mish*an* 'co-wife/co-wives' [Kanakuru], (-aki) goonaa/gòon*àkii* 'farm(s)' [Hausa], (-i) duwimà/dùwìm*i* 'guineafowl(s)' [Gera], (-ai) mùtù/mu*ta*i 'sore(s)' [Dangaléat]. Other plurals entail infixation of internal -a-, e.g., [Ron] sàkur/sakw*âa*r 'leg(s)'. Some languages restrict overt plural marking to a narrow range of nouns (typically humans and animals).

Verbs in many Chadic languages have retained the lexically arbitrary Proto-Chadic distinction between final –a and final –ə verbs (where the final schwa vowel is often pronounced as [i], [ə], or [u]), cf., [Tera] na 'see' and dlə 'get', [Guruntum] daa 'sit' and shi 'eat'. Verbal semantics and valency are modified by the addition of one or more derivational extensions (often fused suffixes). These extensions encode such notions as action in the direction of (centripetal) or away from (centrifugal) a deictic center (often the speaker), or action partially or totally completed, e.g., (totality) sà-nyà 'drink up' < sà 'drink' [Margi]. Some extensions also have a syntactic function, denoting, *inter alia*, transitivization or perfectivity, e.g., (transitivization) yàw-tu 'take down' < yàwwu 'go down' [Bole], kàta-naa 'return' (TRANS) < kàtee 'return' (INTRANS) [Ngizim]. Verb stems can be overtly inflected for tense-aspect-mood by segmental and/or tone changes.

Many languages also have so-called 'pluractional' verbs, which express an action repeated many times or affecting a plurality of subjects (if intransitive) or objects (if transitive), and are formed via prefixal reduplication, ablaut or gemination, e.g., [Guruntum] pàni/*pàp*pàni 'take', [Angas] fwin/fw*a*n 'untie', [Pero] lofò/lo*ff*ò 'beat'. In some languages, pluractional stems occur with plural subjects of intransitive verbs and plural objects of transitive verbs, producing ergative-type agreement. In a number of languages, intransitive verbs are followed by an 'intransitive copy pronoun', which maps the person, number, and gender of the coreferential subject, e.g., [Kanakuru] nà pòrò-*no* 'I went out' (literally I went out-*I*).

Derivational and inflectional reduplication is widespread throughout the family (often signaling semantic intensification), ranging from (a) copying of a single segment, e.g., [Miya] pluractional verb tly*aa*ɗə

'to hoe repeatedly' < tly*ad*ə 'to hoe', [Bidiya] tà*tt*uk 'very large' < tà*t*uk 'large'; (b) reduplication of a syllable, e.g., [Hausa] prefixal reduplication of the initial CVC syllable of a sensory noun to form an intensive sensory adjective, as in *zùz*zurfaa 'very deep' (< *zur*-zurf-aa) < *zur*fii 'depth' (with gemination/assimilation of the coda /r/); (c) full reduplication (exact copy), e.g., [Guruntum] kìnì-kìnì 'just like this' < kìnì 'like this', [Kwami] kayò-kayò 'a gallop' < kayò 'a ride', [Tangale] sàŋ-sàŋ 'very bright' < sàŋ 'bright', [Margi] pərda-pərda 'sinewy piece of meat' < pərda 'sinew'.

Like many African languages, Chadic languages often have a lexically autonomous class of highly expressive, phonosemantic words known as 'ideophones'. Ideophones usually pattern syntactically with adverbials and often have their own distinct phonological and phonotactic properties. They typically reinforce the manner of an action, event, or state, e.g., [Ngizim] ɓərak 'with a popping sound', [Miya] ɓakù-ɓakù 'hopping along', [Kwami] (adjectival) dùkùɗù 'small and broad', [Hausa] kwàngàr̃àm 'with a clang', [Margi] dzùl-dzùl 'jumping high in running (animal)', [Bidiya] ɓorok (Mid tones) 'emphasizes quickness'.

Word order is normally S[ubject] V[erb] O[bject], although VSO order is found in a few Central Chadic/Biu-Mandara languages spoken in the Nigeria–Cameroon border area. Pronominal indirect objects (recipients/goals) are typically realized as verb clitics, whereas nominal indirect objects occur as prepositional phrases to the right of the direct object/theme (Chadic languages are prepositional), cf., [Kanakuru] à jòɓ-*rò* landài 'he washed the robe for her' (literally he washed-*for her* robe), and à jòɓè landài *gən tamno* 'he washed the robe for the woman' (literally he washed robe *for woman*). *Wh*-questions, focus, and relativization usually pattern together in terms of their formal morphosyntactic reflexes, with overt movement, often to left periphery, and special (focus) marking on the infl(ectional) element, e.g., [Hausa] yaaònkà mukà ganii 'it's your boy (that) we saw' (literally boy.your 1pl.FOCUS.PERF see). Some languages allow (or require) in situ *wh*- and (pragmatic) focus constituents, e.g., [Duwai] Saaku bə̀nə *mù*? 'what did Saku cook?' (literally Saku cooked *what*).

Negation in Chadic is typically signaled with a single marker in sentence-final position, e.g., [Guruntum] tâa kyur shau *dà* 'she will not cook the food' (literally she will cook food NEG), [Kera] wə gùsnə̀ hàrga *bà* 'he didn't buy her a goat' (literally he bought her goat NEG), sometimes reinforced by an additional pre-verbal negative marker. Comparatives are normally ditransitive constructions with the lexical verb 'exceed, surpass, be more than', i.e., exceed object X in relation to manner Y.

In noun phrase syntax, the normative order for constituents is head-initial, i.e., head noun followed by definite determiners, possessives, numerals, relative clauses, etc. The linear order in genitive constructions is possessee X (+ 'of' linker) + possessor Y, e.g., [Margi] tagu gə Haman 'Haman's horse' (literally horse of Haman). Many Chadic languages also make an overt distinction between alienable and inalienable possession whereby inalienable possession is expressed by direct juxtaposition (i.e., with no overt linker), cf. (inalienable) mənda Miyim 'Miyim's wife' (literally wife Miyim), and (alienable) gam ma tamnoi 'the woman's ram' (literally ram of woman) [Kanakuru]. Reflexive pronouns and reciprocals (phrasal anaphors) are typically formed with the body-part nouns 'head' and 'body' respectively, e.g., [Kwami] kuu-nì 'himself' (literally head-his), [Miya] tuwatùw-àamà 'each other (we)' (literally body-our).

See also: Africa as a Linguistic Area; African Linguistics: History; Afroasiatic Languages; Hausa; Nigeria: Language Situation; Phonology: Overview; Syntax of Words.

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Basil Hall Chamberlain (1850–1935) was born in Southampton, England, but educated in France and Switzerland. His family wanted him to become a banker in London, but he went to Japan instead, on the grounds that travel would be better for his health. He arrived in Japan in 1873 to begin intensive study of the Japanese language. In 1876, he became a lecturer in English language and literature at Tokyo University. Having independent means, however, he decided to resume his own studies a year later. He resumed teaching English, at the Japanese Naval Academy from 1874 to 1882, since this post paid well and allowed him time for his own language studies as well.

In 1886, he became professor of Japanese and philology at Tokyo Imperial University, specializing in historical linguistics. He was among the first Westerners to do serious advanced research on Japanese academic subjects, and one of his advanced students at Tokyo University, Ueda Kazutoshi (1867–1937), became a pioneer in developing modern Japanese lexicography and the study of linguistics in Japan.

In addition to his work on standard Japanese, Chamberlain studied the Japanese language variants used in the Ryukyu Islands, as well as the Ainu language, then still spoken widely in northern Hokkaido. He began studying Korean in 1881 and subsequently did comparative linguistic studies of Japanese, Ryukyu dialect, Ainu, and Korean, initiating research carried on and developed by Hattori Shirō and other Japanese linguists two generations later.

In 1880, Chamberlain began his research on the *Kojiki,* the oldest Japanese history text written in the Japanese language. In 1883 he published a translation, the *Ko-ji-ki or records of ancient matters* (Chamberlain, 1982), with notes by William George Aston (1841–1911), the Tokyo British embassy secretary. Aston was a Japanese language specialist who published a companion translation of the *Nihon shoki* (1896), the oldest Japanese history text written in classical Chinese. Chamberlain continued his *Kojiki* research after leaving Japan, publishing his final version in 1932. The next full English *Kojiki* translation did not appear until 1969.

Though Chamberlain's professional focus was on classical literature and linguistic analysis, he also wrote a series of popular books introducing Westerners to Japanese language and culture. *A handbook of colloquial Japanese* (1888) designed for use by learners at a basic level, was widely used for more than half a century, until it was superseded by more complete references in English after World War II. Chamberlain's *Things Japanese* (1890), one of the few books available in this area then, was a popular introduction to Japanese social life and customs and is still in print today.

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Basil Hall Chamberlain (1850–1935) was born in Southampton, England, but educated in France and Switzerland. His family wanted him to become a banker in London, but he went to Japan instead, on the grounds that travel would be better for his health. He arrived in Japan in 1873 to begin intensive study of the Japanese language. In 1876, he became a lecturer in English language and literature at Tokyo University. Having independent means, however, he decided to resume his own studies a year later. He resumed teaching English, at the Japanese Naval Academy from 1874 to 1882, since this post paid well and allowed him time for his own language studies as well.

In 1886, he became professor of Japanese and philology at Tokyo Imperial University, specializing in historical linguistics. He was among the first Westerners to do serious advanced research on Japanese academic subjects, and one of his advanced students at Tokyo University, Ueda Kazutoshi (1867–1937), became a pioneer in developing modern Japanese lexicography and the study of linguistics in Japan.

In addition to his work on standard Japanese, Chamberlain studied the Japanese language variants used in the Ryukyu Islands, as well as the Ainu language, then still spoken widely in northern Hokkaido. He began studying Korean in 1881 and subsequently did comparative linguistic studies of Japanese, Ryukyu dialect, Ainu, and Korean, initiating research carried on and developed by Hattori Shirō and other Japanese linguists two generations later.

In 1880, Chamberlain began his research on the *Kojiki,* the oldest Japanese history text written in the Japanese language. In 1883 he published a translation, the *Ko-ji-ki or records of ancient matters* (Chamberlain, 1982), with notes by William George Aston (1841–1911), the Tokyo British embassy secretary. Aston was a Japanese language specialist who published a companion translation of the *Nihon shoki* (1896), the oldest Japanese history text written in classical Chinese. Chamberlain continued his *Kojiki* research after leaving Japan, publishing his final version in 1932. The next full English *Kojiki* translation did not appear until 1969.

Though Chamberlain's professional focus was on classical literature and linguistic analysis, he also wrote a series of popular books introducing Westerners to Japanese language and culture. *A handbook of colloquial Japanese* (1888) designed for use by learners at a basic level, was widely used for more than half a century, until it was superseded by more complete references in English after World War II. Chamberlain's *Things Japanese* (1890), one of the few books available in this area then, was a popular introduction to Japanese social life and customs and is still in print today.

He returned to Europe permanently in 1911, after almost 40 years in Japan, and spent the remaining two dozen years of his life in Switzerland. He continued to research and write about Japan and revise his earlier works for definitive publication. He spent time visiting his younger brother, the controversial author Houston Stewart Chamberlain (1855–1927), a prominent ultranationalist and activist in Germany who later became a German citizen. Unlike Houston, Basil spent his life immersed in studying the culture of another country without losing a scholarly perspective. The fact that Basil's complete works were republished in 2000 (Chamberlain, 2000) testifies to the value of his contributions to the study of Japanese language and culture.

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Champollion, Jean-François (1790–1832)

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Jean-François Champollion, born December 23, 1790, was an Orientalist most remembered for his decipherment of ancient Egyptian hieroglyphics such as those found on the storied Rosetta Stone. Others, including English physicist Thomas Young, had labored for many years to reveal what the hieroglyphics symbolized, but it was Champollion – with knowledge of these foregoing efforts, his expertise in many languages, and his research on the cartouches of the pharaohs – who was the first to successfully unravel the mystery, beginning late in 1821 and into 1822. Champollion's breakthrough furthered Young's own suspicions that some hieroglyphics had phonetic values. His discoveries enabled scholars to accurately translate hieroglyphic texts and were therefore crucial to the current understanding of ancient Egyptian civilization.

The Rosetta Stone, a dark granite stela bearing the same text in three different scripts (Egyptian demotic, Egyptian hieroglyphic, and Greek – the first two representing a single language), was unearthed in 1799 at a construction site near the town of el-Rashid, or Rosetta, in the Nile River delta during Napoleon Bonaparte's ill-fated campaign in Egypt. It fell to the English after the French were defeated in Egypt and has been on exhibit at the British Museum in London almost continuously since 1802.

Born in Figeac, France, during the unrest of the French Revolution, Champollion received virtually no formal schooling at as early age, although he taught himself to read and became well-versed in Greek and Latin. In 1801 he was sent to Grenoble to live with his older brother, Jacques-Joseph Champollion-Figeac, a great source of inspiration for Champollion and a noted archaeologist and paleographer; Champollion became known as *le jeune*.

Champollion's propensity for languages flourished under the influence of his brother and Joseph Fourier, a mathematician, physicist, and prominent member of Napoleon's mission in Egypt who first met Champollion in 1802 while holding office in Grenoble. Champollion eventually studied Arabic, Avestan, Chinese, Coptic, Hebrew, Pahlavi, Persian, Sanskrit, and Syriac, among other languages. In 1807, at the age of 16, he addressed the Société des Sciences et des Arts de Grenoble (later the Académie delphinale) and soon afterwards, became its youngest member. He continued to follow his conviction that the more modern Coptic language would play an important role in the decipherment of the ancient Egyptian inscriptions. In 1809, after studying in Paris for several years under such figures as Silvestre de Sacy, Champollion was appointed to an academic post in history in Grenoble. In the following year he was named docteur ès lettres. He later fell victim to the political hostilities at the onset of the Bourbon Restoration and lost his position at Grenoble in 1816, although was given a chair in history and geography there in 1818.

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In 1822 Champollion stunned the academic world with his celebrated *Lettre à M. Dacier*, in which he announced his success in identifying the values of a number of hieroglyphics from Egyptian texts. His achievements came to the attention of the French kings Louis XVIII and Charles X and Champollion first reaped the rewards of royal favor when he was sent on a tour of Italian museums to study their collections of Egyptian antiquities. He was also honored in 1826 with an appointment as curator of the soon-to-open Egyptian and Oriental collections at the Louvre in Paris. Champollion continually refined his analysis of the hieroglyphic system over the years and by the end of his short life he had concluded that it consisted of three types of elements: those with phonetic values (be they syllabic or purely alphabetic), ideograms (figurative or symbolic in nature), and determinatives (providing information as to semantic sense and pronunciation). Others before him had failed to realize that the system was complex as such. Champollion's work on the hieroglyphic system also clarified the relation between it and two descendent scripts of ancient Egypt, demotic and hieratic.

Champollion mounted a joint expedition to Egypt in 1828 with his Italian colleague Ippolito Rosellini, during which Champollion conducted the first systematic survey of the monuments and hieroglyphic inscriptions found there. Although criticized by some for removing such inscriptions, many of which would later appear in museums abroad, others feel that in doing so, Champollion and others may have saved them from destruction. In 1830 he was elected to the Académie des Inscriptions et Belles-Lettres; the following year the Collège Royal (later Collège de France) in Paris established a chair in archaeology for him. He died after a series of strokes on March 4, 1832 at the age of 41. Many of his manuscripts, including his Egyptian dictionary and grammar, were published posthumously by his brother and others.

Champollion is widely considered the father of the modern discipline of Egyptology. For his sheer brilliance, professional accomplishments, and devotion to all aspects of the field, Champollion was often referred to as *the Egyptian*.

See also: Afroasiatic Languages; Ancient Egyptian and Coptic; Decipherment; Egypt: Scripts, Ancient; Lepsius, Carl Richard (1810–1884); Scripts, Undeciphered; Young, Thomas (1773–1829).

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Channel Islands: Language Situation

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The Channel Islands (see **Figure 1**) constitute a small archipelago off the west coast of the Cotentin peninsula of Normandy. The eight islands, in descending order of size, are Jersey, Guernsey, Alderney, Sark, Herm, Jethou, Lihou, and Brecqhou. The precise date of the Roman occupation of the islands and hence of the introduction of Latin is unknown but it can be assumed that Latin and, later, some form of Romance speech have been spoken there for approximately two millennia. Despite the fact that the archipelago was separated from the Duchy of Normandy in 1204 and has, from that time on, formed part of the British Isles (although the islands are self-governing: Jersey forms its own bailiwick and the other islands form the bailiwick of Guernsey), until relatively recently the majority of the inhabitants spoke Norman French dialects closely related to those of the neighboring mainland.

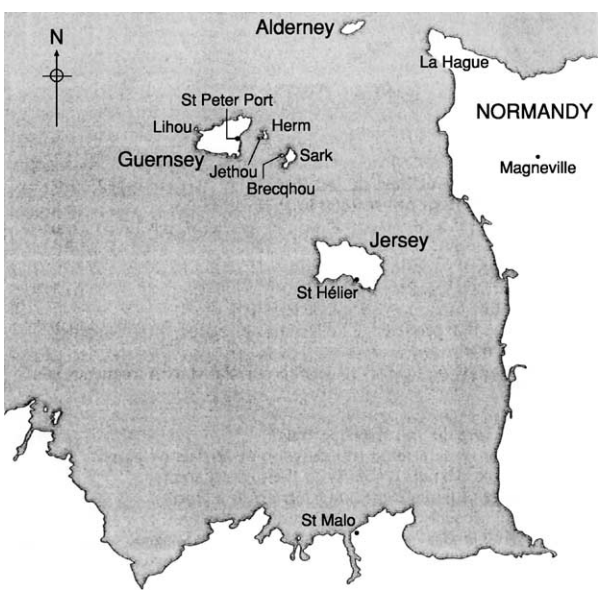

Figure 1 The Channel Islands.

English was introduced to the islands in the Middle Ages, when garrisons were established there, but the local dialects remained as the everyday variety of the majority of the Islanders until well into the nineteenth century, when the growth of trade and tourism led to progressive Anglicization. The evacuation of many of the inhabitants to the British mainland in the days preceding the German occupation of the islands during the Second World War had severe linguistic repercussions. Alderney, where the local dialect (Auregnais) was already moribund, was totally evacuated and the dialect is now extinct. Since the standard language of all the Channel Islands has been French and never the indigenous dialects, their presence in 'official' domains has been virtually nonexistent. Standard French (and now English) has been the language of religion and legislation and English has always been dominant in the education system. Today, Standard French is reserved largely for ceremonial functions.

Official statistics for speakers of the local dialects have been gathered twice for Jersey (in the 1989 and 2001 censuses) and once for Guernsey (in the 2001 census). A comparison of the Jersey results from the two censuses provides us with a clear indication of the decline of the dialect in recent years. In 1989, there were 5720 speakers of Jersey French (Jèrriais), representing 6.9% of the total resident population. By 2001, this had gone down to 2874 speakers, or 3.2% of the total resident population, with some two-thirds of these speakers aged over 60. The 2001 census also recorded that only 113 speakers declared Jèrriais to be their usual everyday language. On Guernsey, the number of people able to speak Guernsey French (Guernesiais) fluently in 2001 was 1327, or 2.2% of the total resident population, with nearly 70% of these speakers aged over 64. No such information has been gathered for Sark, although it is estimated that fewer than 20 out of the 600 permanent inhabitants can speak Sark French (Sercquiais).

Despite their linguistic affinity with mainland Norman, the dialects of the Channel Islands show salient differences from the mainland varieties – and from

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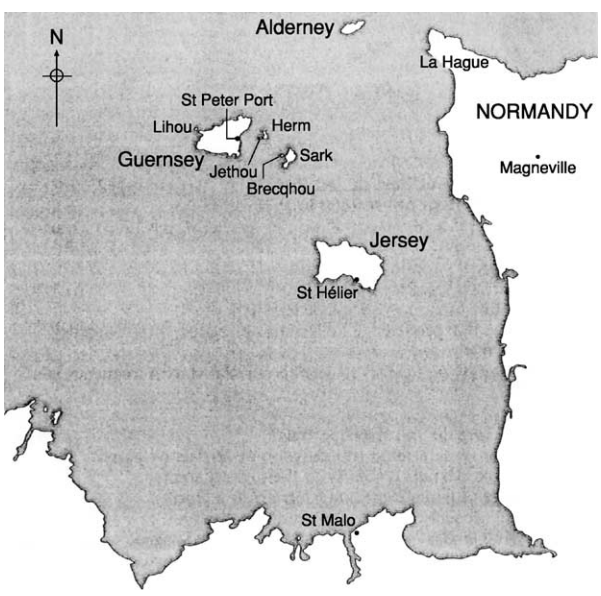

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Despite their linguistic affinity with mainland Norman, the dialects of the Channel Islands show salient differences from the mainland varieties – and from

each other. The dialects spoken in Jersey and Guernsey also display considerable regional variation.

An embryonic language support campaign currently exists on Jersey (where the dialect has recently been standardized), including limited teaching of Jèrriais in school (from September 1999). Since January 2004, Guernesiais has been taught to children of infant school age in three of Guernsey's primary schools. There is nothing comparable in Sark.

The dialects have left a substrate imprint on the distinctive variety of English spoken in the Channel Islands. However, with increasing immigration from the UK, this variety is not as widespread as it once was.

A limited amount of literary output has been produced in the local dialects of Jersey and Guernsey.

See also: Jèrriais.

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Y. R. Chao is easily the most famous linguist to have come out of China. Born before the end of the last dynasty in China, he received a traditional Confucian education, but was also one of the first Chinese people to be sent to the West for training in modern Western science (under the Boxer Indemnity Fund). The remarkable breadth and scope of his studies included physics, mathematics, linguistics, musical and literary composition, and translation, and he was a pioneer in many of these fields. Chao received a B.A. in mathematics from Cornell University in 1914, and a Ph.D. in philosophy from Harvard in 1918, but began his career teaching physics at Cornell and Harvard. He returned to China in 1920 to take a position at Tsing Hua University; there he acted as interpreter for Bertrand Russell, Dora Black, and John Dewey. He was involved in the vernacular literature movement, in 1922 translating *Alice in Wonderland* into vernacular Chinese, and also in the national language and standardization movement. He developed the system of National Romanization that was adopted by the government and was one of the key members of the group that created the national language, with his voice being the one on the recordings of the new national and standard language. In the late 1920s, when the Academia Sinica was founded, he became the head of the linguistics section of the Institute of History and Philology. There he organized teams to go to the field to systematically record the different Chinese dialects, and published his *Studies of the modern Wu dialects,* the earliest descriptive work of its kind in China. It was also in those years that he wrote his famous article 'On the non-uniqueness of phonemic solutions of phonetic systems.' During the war years he was back in the U.S., in Hawaii, then Yale and Harvard. He was recruited to lead the U.S. Army Chinese language program at Harvard, where he wrote his *Cantonese primer* (1947) and *Concise dictionary of spoken Chinese* (1946). These publications also led to his *Mandarin primer* (1961), *Readings in sayable Chinese* (1968), and *Grammar of spoken Chinese* (1968), still the best grammar of Mandarin Chinese available. It is an amazing piece of scholarship not only for its incredible thoroughness, but also because of his insightful inductive analysis, taking Chinese on its own terms (in fine structuralist tradition) rather than trying to force it into any preconceived categories.

In 1947 he was on his way back to China, but stopped off at the University of California at Berkeley, where he was offered a position, in which he remained until he retired in 1960, becoming Agassiz Professor of Oriental Languages and Literatures in 1952. His contributions were also recognized by his election to president of the Linguistic Society of America in 1945 and president of the American Oriental Society in 1960. Among his well-known students are Wang Li (*see* **Wang Li (1900–1986)**), Kun Chang (who replaced Chao at Berkeley upon his retirement), and Jerry Norman.

See also: Chinese; Phoneme; Wang Li (1900–1986).

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Character Sets

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Everything is a number to a computer, and so, in order to represent text, it is necessary to create a numerical representation for it. The most common technique for doing so is to assign numbers to individual characters in a writing system; the term 'character set' is used to refer to such a mapping.

More specifically, everything is a binary number of a fixed size to a computer. A single binary digit is referred to as a bit. Because the binary representation of a number is difficult for humans to use, computer scientists usually use base 8 (octal) or base 16 (hexadecimal) numbers. In octal numerals, only the digits 0 through 7 are required; hexadecimal uses 0 through 9 and A through F as digits. When it is unclear which base is being used, octal numerals are written with a leading 0, and hexadecimal numerals with a leading 0x.

The smallest-size number a computer can readily manipulate is called a byte. Earlier systems used bytes that varied in size from computer to computer; today, an eight-bit byte or octet is standard. Bytes are the basis of data interchange between different computers.

We can therefore say that a character set is a mapping between a set of text elements such as characters to a series of bytes. Conceptually, this process can be broken down into stages (see Figure 1):

1. the abstract character repertoire, which is the collection of characters to be encoded;
2. the coded character set, which maps the elements of an abstract character repertoire to a set of non-negative integers;
3. the character encoding form, which maps the elements of a coded character set to code units of a specific size; and
4. the character encoding scheme, which maps code units from one or more character encoding forms to an actual sequence of bytes.

History

The first efforts to create numerical encodings for text date from the 19th century with the advent of telegraphy. As the technology advanced and developed, so did increasingly sophisticated techniques to coordinate the transmission of textual information via numerical or other codes and the technology used for transmission. This dovetailed with the pioneering work in computers to create the first computer character sets.

The most direct descendant of the telegraphy codes is EBCDIC (Extended Binary Coded Decimal Interchange Code), used in IBM mainframe computers from the early 1960s onwards. Its chief rival was the American Code for Standard Information Interchange (ASCII), developed at about the same time by what is now the American National Standards Institute (ANSI). ASCII has proven far more popular and influential; use of EBCDIC has been restricted largely to IBM mainframes and closely related systems.

ASCII represents characters using units of seven bits, which provides for a set of $2^7 = 128$ characters. The first 32 and last one are used for control codes – numbers that do not represent text but are used to give instructions to the machines displaying or printing it. (Character 0x08, for example, was frequently used to instruct a terminal to ring its bell.) The remaining 95 are the characters for display. In its current form, ASCII includes the upper- and lower-case letters of the Latin alphabet as used for English, the numerals 0 through 9, basic punctuation, and some accents. The accents were used for non-English languages. A French 'é' would be represented by instructing the terminal to type 'e', physically move backwards one place, and then type the accent.

ASCII is sufficient for use with standard modern English as typed on typewriters, but not for anything else. Nor is it actually sufficient even for English typesetting, as it is missing important symbols such as em and en dashes.

On systems based on the eight-bit byte, the use of ASCII seems wasteful, since that eighth bit is unused. Originally it was intended that the extra bit should be used as a parity bit as a redundancy check. By the 1980s, however, eight-bit extensions to ASCII had become common. The first 128 characters, 0x00 through 0x0F, were as in ASCII, and the remaining 128 were used for extensions such as dingbats or additional letters. Most notable of the eight-bit character sets are MacRoman, developed by Apple Computer for use on its Macintosh computers, and the ISO 8859 series of standards developed by the International Organization for Standardization.

Eight-bit character sets are inadequate for languages requiring more than 256 characters. Extensions were developed, therefore, for use in East Asia. The most common are referred to as double-byte character sets. In these character sets, the bytes 0x00 through 0x7F are used as ASCII. Bytes 0x80 through 0xFF are available to signal the start of

Abstract character repertoire:	A, B, C, D,…
Coded character set:	A → 65, B → 66, C → 67, D → 66,…
Character encoding form:	A → 0x0041, B → 0x0042, C → 0x0043, D → 0x0044,…
Character encoding scheme:	ABCD → 00 41 00 42 00 43 00 44, or ABCD → 41 00 42 00 43 00 44 00

Figure 1 Stages in the character-encoding process.

two-byte units. The Latin letter 'A' would therefore be represented by the single byte 0x41, and the Chinese character 井 by the two-byte sequence 0xA4AB. Such techniques provide enough room for the daily needs of modern East Asian languages.

By 1990, there were dozens of character sets in common use, with varying repertoires and architectures. This created problems for software companies, whose products were originally written with ASCII or one of its eight-bit extensions in mind. Getting software to work with multiple character sets was a long and expensive process. This led to the desire for a universal character set, adequate for the representation of all languages.

Two efforts to produce a universal character set converged in the early 1990s. One is known as ISO/IEC 10646, produced by the international standardization community. The other is Unicode, produced by the Unicode Consortium, an industry consortium consisting largely (but not entirely) of companies headquartered in the United States. The convergence of the two character sets means that the terms 'Unicode' and 'ISO/IEC 10646' can be used almost interchangeably in most circumstances. We will generally use the term 'Unicode', as Unicode is formally an implementation of ISO/IEC 10646 with additional specifications.

The existence of a universal character set has proven vital in the rise of the Internet. So long as documents are created and printed on a single computer, it doesn't make much difference which character set is used. When a user in Nome, Alaska is using his Windows system to access a Japanese Web page hosted by a computer in Calcutta running Linux, however, it becomes important to make sure that both systems can handle the same character set. And when that computer in Calcutta is used to host the records of a multinational corporation requiring support for English, French, Chinese, Japanese, Hindi, and Thai, it becomes even more important to avoid the accounting headache of dealing with multiple character sets.

By the turn of the 21st century, Unicode and ISO/IEC 10646 had become the focus of all efforts to extend the computer representation of human languages. They are also increasingly supported by modern operating systems and software.

Characteristics of Unicode

Unicode was originally based on a simple 16-bit architecture: there were $2^{16} = 65\,536$ code points available from 0x0000 through 0xFFFF. The first 128 code points are identical with ASCII; indeed, the first 256 code points are identical with the popular eight-bit standard, ISO 8859-1. The remaining space included characters of well over a dozen other scripts ranging from Greek to Thai. Numerals and punctuation marks were included, together with mathematical symbols and popular dingbats.

It soon became clear that this was insufficient room for the full set of characters people actually wanted to use. Sixteen additional planes each of 65 536 code points each were added and multiple encoding forms created, as described below, to accommodate them.

The number assigned a character is referred to as its Unicode scalar value (USV), and is usually written as 'U+' followed by four or more hexadecimal digits. Each character is also assigned a name. The Latin letter 'A' has U+0041 for its USV and is named LATIN CAPITAL LETTER A. In addition to standalone characters, Unicode includes a number of combining marks. These are included to allow support for on-the-fly generation of new accented forms. This makes it unnecessary to actually catalogue every accented Latin letter, for example, before it can be represent on computers.

Several thousand code points are reserved for private use; that is, the standard does not define what they are to represent but leaves that to private agreements between different users. This allows users to interchange data using unencoded characters or characters inappropriate for encoding, such as corporate logos.

One of the most controversial aspects of Unicode is its inclusion of a unified set of ideographs for all of East Asia: Chinese (both its simplified and traditional forms), Japanese, and Korean. (Unicode and ISO/IEC 10646 use the linguistically incorrect term 'ideograph' for historical reasons. The authors of both standards are aware that other terms better describe the function of these characters in the languages that use them.) The process of producing a single set of characters for East Asian languages is referred to as

Character	Chinese (PRC)	Chinese (Taiwan)	Japanese	Korean
U+4E95	井	井	井	井
U+753B	画	画	画	
U+76F4	直	直	直	直
U+8435	葛	葛	葛	葛

Figure 2 Han unification.

Han unification (see Figure 2). Because individual characters are often written in visually distinct ways in different parts of East Asia, there was some concern that this would force, for example, a Japanese user to see their name written with culturally inappropriate Chinese glyphs; and because the Unicode Consortium itself and the bulk of its officers are American, it was also felt that Americans were being insensitive to the needs of people in East Asia.

Both fears proved to be overstated. In point of fact, most Japanese users use systems with fonts designed specifically for Japanese and only rarely are confronted by Japanese text written using Chinese glyphs. Even where they are, the glyphs they see would generally be perfectly acceptable, or, at most, about as odd-looking as the spelling 'colour' is to an American or 'color' to a Briton. The actual work of Han unification, moreover, has been done by an international group. This group, now called the Ideographic Rapporteur Group or IRG, currently has delegations representing the People's Republic of China (PRC), the Special Administrative Regions of Hong Kong and Macao, Taiwan, North and South Korea, Japan, Vietnam, Singapore, and the United States, with a liaison representing the Unicode Consortium. The current head of the IRG is Dr Lu Qin of Hong Kong Polytechnic University, and its remaining officers are all from the PRC.

The issue of Han unification serves to illustrate a fundamental distinction made by Unicode and ISO/IEC 10646, that between character and glyph. A character is a unit of meaning in a writing system, while a glyph is what one actually sees on the page or on the screen. Thus 'a', 'b', and 'c' are different characters, while 'a' and '*a*' are different glyphs for the same character (see Figure 3).

The distinction is an important one. Characters are the fundamental units where meaning is concerned, and are what are used in processes such as searching, sorting, pattern matching, or text to speech. They are insufficient for more visually oriented processes such as printing or optical character recognition. Scripts such as Arabic, for example, make extensive use of contextual forms, where a letter changes its shape depending on its position in a word. If each of the different forms for each letter were separately encoded, not only would that make text input and

Distinct characters: a ɐ α ᵘ ɴ क

Distinct glyphs: a a a *a* *a* ɑ

Figure 3 Characters and glyphs.

U+10391
UGARITIC LETTER ZU

UTF-8: F0 90 8E 91
UTF-16: D800 DF91
UTF-32: 00010391

A

U+0041
LATIN CAPITAL LETTER A

UTF-8: 41
UTF-16: 0041
UTF-32: 00000041

Figure 4 Unicode encoding forms.

spelling checking more complex, it would also lock the visual representation of Arabic into one calligraphic style. By separating the encoding of the characters from the drawing of the glyphs, it's possible for the same text to have substantially different appearances, depending on additional information such as font and point size.

Unicode is thus aimed at plain text rendering; its goal is minimal legibility – the minimum amount of information needed to guarantee legibility. Pure Unicode should be legible to users regardless of the details of the rendering process.

Unicode defines three character encoding forms, named after the size of the code unit they use: UTF-8, UTF-16, and UTF-32 (see Figure 4). ('UTF' can be taken to stand either for 'universal transformation format' or 'Unicode transformation format.') In UTF-8, each character is represented by one to four bytes. The 128 characters from ASCII are, in fact, represented by the same bytes as they are for ASCII itself. This is an enormous advantage for software originally written for ASCII or other character sets sharing its basic architecture. UTF-16 corresponds to the original definition of Unicode. Characters U + 0000 through U + D7FF and U + E000 through U + FFFF are represented by one 16-bit unit. Characters above U + FFFF are represented by two 16-bit units, using a combination of two units in the ranges 0xD800 through 0xDFFF. (The scalar values U + D800 through U + DFFF are therefore not used for character encoding.) In UTF-32, each character is represented by its Unicode scalar value, padded to 32 bits.

Finally, Unicode defines five character-encoding schemes based on these three encoding forms. These are necessitated because computers vary in how they combine two bytes into one 16-bit unit.

The Future

Unicode and ISO/IEC 10646 can be considered to have rightfully won their title of **the** universal

character set. Although other character sets continue in use, all work on computer representation of text is now done either in Unicode or in a fashion compatible with it. All major operating systems are being written around Unicode, and most software in development supports it.

Major issues still remain. One is the distinction between character and glyph. Although in most cases, the line between the two is clear, in some it is not. Many of the ideographs being considered for encoding by the IRG, for example, are so obscure that even the experts are not sure which ones are distinct characters. In scripts that are yet to be fully deciphered, such as the Indus Valley script, there is the same problem.

Another issue is diachronicity. With a few exceptions, the scripts encoded in Unicode are modern scripts in current use, which means that the repertoires are relatively well defined, as are the ranges of acceptable glyphs for the characters. When an effort is made to represent a script in use over the course of centuries or millennia, things are not always clear cut. Oracle-bone Chinese is not fully understood, for example, and it's unclear how to coordinate it with modern Chinese.

And there is also the issue of scripts that do not follow the linear approach to layout common to all modern writing systems. Unicode has already expressly disavowed any intention of fully encoding music or mathematics because they are so two-dimensional in layout. Egyptian hieroglyphics, however, are a written representation of human language and should be encoded, although the details are far from clear.

But in the meantime, computer technology has advanced considerably in its ability to represent human languages, over the course of just the past decade. Prior to 1990, it would have been unthinkable to exchange data in virtually any human language virtually anywhere in the world. That, however, is now becoming a reality.

See also: Asia, Ancient Southwest: Scripts, Modern Semitic; China: Writing System; Digital Fonts and Typography; Japan: Writing System.

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Character versus Content

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David Kaplan introduced the content/character distinction in his monograph *Demonstratives* (1989a) to distinguish between two aspects of the meaning of (1) indexical and demonstrative pronouns (e.g., 'I', 'here,' 'now,' 'this,' and 'that') and (2) sentences containing them. Roughly, the content of an occurrence of an indexical or demonstrative is the individual to which it refers, and its character is the rule that determines its referent as a function of context. Thus, an indexical has different contents in different contexts, but its character is the same in all contexts. For instance, the character of 'I' is the rule, or function, that maps a context of utterance to the speaker of that context. This function determines that the content of Sally's utterance of 'I' is Sally.

Content/Character Distinction and Semantics

Sentences containing indexicals or demonstratives are context-dependent in two ways. First, contexts help to determine what these sentences say. Second, contexts determine whether what is said is true or false. For instance, suppose Sally says, 'I'm cold now' at time t. The context supplies Sally as the referent for 'I' and time t as the referent for 'now,' so it helps to determine what Sally said. Other facts about the context, specifically whether Sally is cold at time t, determine whether she said something true or false. Different contexts can play these different roles, as they do when we ask whether what Sally said in one context would be true in a slightly different context. A central virtue of Kaplan's semantics is that it distinguishes between these two roles of context. For Kaplan, a *context of use* plays the first role, of

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e	c^1	c^2	c^3
u^1	T	F	T
u^2	F	F	F
u^3	T	T	T

Figure 1 Two-dimensional matrix.

supplying contents for indexical expressions, and a *circumstance of evaluation* plays the second. A context of use is just a context in which an indexical expression may be used, and which supplies a content for the indexical expression. A circumstance of evaluation is an actual or merely possible situation in which the content of an utterance is evaluated for truth or falsehood.

A semantic framework like Kaplan's, which captures the double-dependence of meaning on context, is sometimes called a two-dimensional semantics. In the two-dimensional framework, a meaningful entity such as a linguistic expression or an utterance determines not a single semantic value but a two-dimensional matrix of semantic values. **Figure 1** represents Kaplan's semantics in this way. In **Figure 1**, the vertical axis of the matrix displays contexts of use (u^1-u^3) and the horizontal axis displays circumstances of evaluation (c^1-c^3). Each cell in the matrix gives the extension of the linguistic expression *e* as used in the specified context of use and evaluated in the specified circumstance of evaluation. In this matrix, the cell in row *n* and column *m* gives the semantic value of *e* in the context of use specified at the beginning of row *n* and evaluated in the circumstance of evaluation specified at the top of column *m*. If *e* is a sentence, cells will be filled in with truth values as illustrated.

Kaplan offers a syntax and semantics for a formal language containing indexicals, demonstratives, and a variety of modal operators. In this formal system, a context of use is an ordered n-tuple of contextual features to which indexicals or demonstratives are sensitive, such as the speaker, time, world, and location of the context. A circumstance of evaluation is an ordered n-tuple of a possible world-state or world-history, a time, and perhaps other elements as would be required given the sentential operators in the language. For Kaplan, all contexts of use are *proper,* which means that the speaker of the context must be located at the time, place, and world of the context. Circumstances of evaluation, however, need not be proper.

Contexts of use and circumstances of evaluation play a role in the specification of the character and content of an expression. The character of any linguistic expression *e* is a function from contexts of use to contents appropriate for *e*, i.e., an individual if *e* is a singular term, a proposition if *e* is a sentence, and sets of n-tuples of individuals if *e* is an n-place predicate. Indexical expressions only have contents relative to a context of use. So Kaplan speaks of the content of an occurrence of an expression rather than the content of the expression itself. Contents are evaluated in circumstances of evaluation, and these evaluations yield extensions appropriate to the kind of content under evaluation. So we also can characterize the content of an occurrence of *e* as a function from circumstances of evaluation to extensions of a type appropriate to *e*. For instance, the extensions for sentences are truth values, for indexicals, individuals, and for n-place predicates, n-tuples of individuals. For individuals and n-place predicates, these will be constant functions (i.e. the function delivers the same extension in every circumstance of evaluation). It is often simpler to think of contents as individuals (for singular terms), propositions (for sentences) and sets of n-tuples of individuals (for n-place predicates), and Kaplan typically talks about contents in this way. Both ways of thinking of contents are semantically equivalent.

For Kaplan, indexicals and demonstratives are both directly referential and rigidly designating. They are directly referential because they contribute only their referents to the propositions expressed by sentences containing them. They are rigidly designating because, once they secure a content in a context of use, they retain that content in every circumstance of evaluation. Indexicals and demonstratives contrast with the typical definite description in both respects. Definite descriptions typically contribute a descriptive condition to a proposition rather than an individual, and this descriptive condition is typically satisfied by different individuals in different worlds of evaluation. Although Kaplan's view that demonstratives are directly referential is widely accepted, some recent discussions of complex demonstratives (i.e. expressions of the form 'that F') have defended a quantificational approach, and some considerations in favor of such an approach may apply to the pure demonstratives 'this' and 'that' (King, 2001).

Kaplan's semantics has technical virtues lacking in earlier treatments of natural language indexicality. It shares with other double-indexing accounts (Kamp, 1971) a technical superiority to single-index theories, which evaluate sentences relative to a single index, which is an ordered n-tuple of features of a context, such as a speaker, time, location, and world. Such theories cannot account for the interaction of indexicals and certain sentence operators. To evaluate the sentence (1), for instance, we need to consider the truth value of the constituent sentence,

'the man who is now President of the United States no longer hold[s] that office' in situations occurring *after* the sentence is uttered.

(1) Someday, the man who is now President of the United States will no longer hold that office.

But the indexical 'now' in that constituent sentence must still refer to the time (1) is used, and not the time at which the constituent sentence is evaluated. As Hans Kamp has argued, only a double-indexing theory will correctly predict the truth conditions for (1) (Kamp, 1971).

Content/Character Distinction and Philosophy

The content/character distinction sheds light on some specifically philosophical issues involving context-sensitivity in thought and language. These applications involve philosophically significant assumptions, and are more controversial than the applications to the semantics of indexicals and demonstratives.

First, content and character play two roles that Gottlob Frege initially envisioned for the meaning, or sense, of a sentence, one semantic and the other more broadly psychological (Frege, 1892). Frege thought that the sense of a sentence should both determine its truth condition and provide the cognitive significance of beliefs expressible with that sentence. Although Frege expected that one entity, the sense, could play both roles, indexical and demonstrative belief undermines this expectation, since it appears to require two different entities to play the two roles. Different people who have a belief they could express by saying 'I'm cold' will be in the same psychological/functional state. They will all be shivering and trying to get warmer. But because each person who thinks, 'I'm cold' is a constituent of the content of that thought, all of these thoughts will differ in content. The psychological role of an indexical belief appears to be more closely tied to the character of the sentence the thinker would use to express that belief than to the content of the belief. But the content, rather than the character, is more directly relevant to the truth condition of an occurrence of a sentence containing an indexical.

Second, Kaplan has suggested that the content/character distinction helps to explain the relation between the epistemological notions of logical truth and the *a priori*, on the one hand, and the metaphysical notions of necessity and contingency on the other. Other philosophers have put broadly similar applications of the two-dimensional framework into service to the same end (Stalnaker, 1978, cf. Stalnaker, 2004; Chalmers, 1996; Jackson, 1998). As is evident to anyone who understands sentence (2), it cannot be uttered falsely. Therefore, sentence (2) is in a certain sense a logical or *a priori* truth. Yet it does not express a necessary truth, since occurrences of (3) will typically be false.

(2) I am here now.

(3) Necessarily, I am here now.

Kaplan has suggested that we explain the special status of (2) as follows: metaphysically speaking, (2) is contingently true in virtue of its content. But it has its special epistemic status in virtue of its character: the character of (2) requires that it express a truth in every context of use. Other sentences which may express the same content as a particular occurrence of (2), but a different character, such as (4), do not have the same special epistemic status.

(4) GWB is in Washington, DC on June 16, 2004.

Because (4) and some occurrences of (2) share a content but differ in their epistemic status, it is natural to conclude that contents cannot be the bearers of this special epistemic property. Critics of this account of the *a priori* (Soames, 2005) say that the content/character distinction cannot underwrite the general account of *a priori* knowledge that some of its defenders (Chalmers, 1996; Jackson, 1998) have claimed.

Third, some philosophers have used Kaplan's content/character distinction to distinguish narrow content (i.e. content determined by the internal state of the thinker) from wide content (i.e. content determined by the internal state of the thinker and his or her environment) (Fodor, 1987; see also Chalmers, 1996; Jackson, 1998, for a related application of two-dimensional semantics to these ends). They suggest that narrow content is loosely modeled on Kaplan's characters, and wide content on Kaplan's contents. That characters seem to capture something important about the psychological roles of belief makes them particularly attractive candidates to model the purely internal aspects of thought. Critics of the approach contend that although characters help to characterize internal states of thinkers, they are not themselves determined by such states (Stalnaker, 1989).

See also: Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; Direct Reference; Essential Indexical; Indexicality: Philosophical Aspects; Reference: Philosophical Theories; Rigid Designation; Situation Semantics.

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Chart Parsing and Well-Formed Substring Tables

S G Pulman

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For efficiency, most practical parsing algorithms (*see* **Parsing: Statistical Methods**) are implemented using a 'well-formed substring table' (wfsst) to record parses of complete subconstituents. This means that duplicate paths through the search space defined by the grammar are avoided. Since there may be many such paths, use of such a table can sometimes mean the difference between processing time of seconds, as opposed to minutes or even hours.

Well-Formed Substring Tables

To illustrate the notion of a well-formed substring table, consider the process of parsing a sequence analyzable as:

(1) ...(1) V (2) NP (3) PP (4)

(e.g., '...saw the man in the park'), given rules in the grammar like:

(2) VP → V NP
VP → VP PP
NP → NP PP

In a top-down parsing regime, there will be two points at which the first of these rules will be used to predict an NP beginning at position 2. One should assume that the algorithm first finds the nonrecursive NP from 2 to 3. Now, via the third rule, it will again look for an NP, this time followed by a PP. The naive algorithm might repeat the same sequence of actions it has just performed in recognizing the original NP from 2 to 3.

However, if it is assumed that, whenever a complete constituent is recognized, it is recorded in a table, then the algorithm can be changed to consult this table whenever it is looking for a constituent of a particular type at a given point. In this instance, there is already an NP from 2 to 3; therefore, it is possible to proceed directly to look for a PP beginning at position 3.

Having found this PP, it is possible to assemble two VPs: one from 1 to 3, of the form [VP [V NP]], and one from 1 to 4 of the form [VP [V [NP [NP PP]]]].

Now the situation is reached where the second rule predicts a PP beginning at position 3. The naive algorithm will again go ahead and recompute the sequence of actions leading to the recognition of the PP. However, using the wfsst, the fact is already recorded that there is a PP from 3 to 4, and instead the algorithm can simply use that information to build a VP from 1 to 4 of the form [VP [VP PP]]. Thus, at least two recomputations have been avoided. If this does not sound very impressive, the reader is invited to work through the steps involved in parsing a sequence like:

(3) V NP P NP P NP P NP

(e.g., 'saw the man in the park with a telescope on Friday') given the above rules, along with P → P NP, and to check how many times the same constituents

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(3) V NP P NP P NP P NP

(e.g., 'saw the man in the park with a telescope on Friday') given the above rules, along with P → P NP, and to check how many times the same constituents

are reparsed when a wfsst is not being used. For constructions like this, the numbers can grow very rapidly indeed. Use of a wfsst here is essential if parsing algorithms are to be implemented in a practically usable form.

Another technique is to keep a record of subconstituents that have not been found beginning at a particular point in the input. For example, in the earlier 'saw the man in the park' example, when the VP of the form [VP V [NP [NP PP]]] is found, it will, via the second rule, cause a prediction of a PP beginning at position 4. This prediction fails, because it is at the end of a sentence. When the VP of the form [VP [VP [V NP]] PP] is found, it too will cause the same prediction, via the same rule. Although in this case discovering that there are no more PPs is fairly trivial, this will not always be so, and a lot of recomputation can be saved by also checking that, when looking for a constituent C at position P, one has not already tried and failed to find C at P.

Basic Chart Parsing

A 'chart' is a generalization of a wfsst in which incomplete constituents are also represented. Charts are the basis on which many parsing algorithms are implemented, and they provide a flexible framework within which different types of processing regimes and different types of grammatical formalism can be handled.

A chart consists of a set of 'edges' and 'vertices.' Vertices represent the positions between words in an input sentence, and edges represent partial or complete analyses. An edge, at least when context-free rules or related formalisms are involved, can be thought of as something derived from a rule and having the following structure:

(4) edge(Id, LeftVertex, RightVertex, MotherCat, DaughtersFound, DaughtersSought)

In describing charts it is convenient to use a PROLOG-like notation: Words in lower case are constants, words beginning with upper case are variables, an underscore is a variable whose value is not of interest, and a list of items is enclosed in square brackets, with the convention that an expression like [Head | Tail] represents a list whose first member is 'Head' and whose remaining members (a list) are 'Tail.' An edge has an identifier and connects vertices. DaughtersFound will usually be represented in terms of a list of other edges representing the analysis of those daughters. Daughters Sought is a list of categories. An edge is *complete* if DaughtersSought is empty.

To specify a particular instantiation of a chart framework, it is necessary to state the following:

1. a regime for creating new edges
2. a way of combining two old edges to form a new edge
3. access to an 'agenda' of edges created by (1) or (2) that are waiting for further processing when they are entered into the chart

A Bottom-Up Chart Parser

One particular chart-based algorithm can be specified as follows: It proceeds bottom-up, one word at a time.

(5) New edges:
whenever there is a complete edge put in the chart of the form edge(Id, From, To, Category, -,-) then for each rule in the grammar of the form Lhs → Rhs where Category is the first member of Rhs,
put a new edge on the agenda of the form edge(NewId, From, From, Lhs, [], Rhs)

Not all rules in the grammar meeting this criterion will lead to a complete parse. This step of the procedure can be made sensitive to information precomputed from the grammar so as to select only rules that are, say, compatible with the next word in the input, or alternatively, compatible with the next category sought of at least one incomplete edge ending at the point where the current word starts (see Aho and Ullman, 1977 for various types of relevant grammar relations).

(6) Combine Edges:
Whenever a new edge is put into the chart of the form: edge(Id1, B, C, Cat1, Found1, [])
then for each edge in the chart of the form: edge(Id2, A, B, Cat2, Found2, [Cat1 | OtherDaughtersSought])
create a new edge edge(Id3, A, C, Cat2, [Id1/Found2] Other DaughtersSought)
Whenever a new edge is put into the chart of the form: edge(Id1, A, B, Cat1, Found1, [Cat2 | RestSought])
then for each edge in the chart of the form: edge(Id2, B, C, Cat2, Found2, [])
create a new edge edge(Id3, A, C, Cat1, [Id1/Found1] RestSought)

The first part of 'combine edges' is triggered by the addition of a complete edge to the chart, and produces a new edge for each incomplete edge ending where

the complete edge begins that can combine with it. These incomplete edges are already in the chart. The new edges are put on the agenda.

The second part is triggered by the addition of an incomplete edge to the chart, and produces a new edge for each complete edge beginning where the incomplete edge ends. These new edges are put on the agenda.

Looking at things from the point of view of a complete edge, the first part of 'combine edges' ensures that it is combined with whatever is already in the chart that it can be combined with, whereas the second part ensures that it will be combined with any future incomplete edges entering the chart. Thus, no opportunity for combination will be missed, at whatever stage of parsing it arises.

All that has to be done now to specify a complete chart-parsing procedure is to define access to the agenda: either treat the agenda as a stack (last in, first out) in which case the general search strategy will be depth first, or as a queue (first in, first out) in which case the search order of hypotheses will be breadth first. There could also be more complex heuristics ordering edges on the agenda according to some weighting function: This would mean that the highest scoring hypothesis was explored first, independently of the order in which they were generated.

The procedure must also be embedded in some kind of top-level driver, so as to start off the process and to check for complete analyses when the process is ended. The final program, then, might have the following structure:

```
(7) Until no more words:
      create new edges for next word
      do New Edges for these edges.
        Until agenda is empty:
          pop next edge off agenda and put in chart
          do New Edges
          do Combine Edges
    Check for complete edges of desired category
      spanning start to finish
```

Given the following grammar, the algorithm would proceed as follows on the input sentence 'they can fish' (with the words occupying chart positions 1 to 2, 2 to 3, and 3 to 4, respectively):

S → NP VP
NP → they | fish
VP → Aux VP
VP → Vi
VP → Vt NP
Aux → can
Vi → fish
Vi → can

Operation	*Chart*	*Agenda*
new word edge		e1(1, 2, NP, [they], [])
pop	e1	
new edge		e2(1, 1, S, [], [NP, VP])
pop	+e2	
combined el e2		e3(1, 2, S, [e1], [VP])
pop	+e3	
new word edges		e4(2, 3, Aux, [can], []), e5(2, 3, Vt, [can], [])
pop	+e4	
new edge		e6(2, 2, VP, [], [Aux, VP]), e5
pop	+e6	
combine e4 e6		e7(2, 3, VP, [e4], [VP]), e5
pop	+e7	e5
pop	+e5	
new edge		e8(2, 2, VP, [], [Vt, NP])
pop	+e8	
combine e5 e8		e9(2, 3, VP, [e5], [NP])
pop	+e9	
new word edges		e10(3, 4, Vi, [fish], []) e11(3, 4, NP, [fish], [])
pop	+e10	e11
new edge		e12(3, 3, VP, [], [Vi]), e11
pop	+e12	e11
combine e12 e10		e13(3, 4, VP, [e10], []), e11
pop	+e13	e11
combine e7 e13		e14(2, 4, VP, [e4, e13], []), e11
pop	+e14	e11
combine e3 e14		e15(1, 4, S, [e1, e14], []), e11
pop	+e15	e11
pop	+e11	
new edge		e16(3, 3, S, [], [NP, VP])
combine e9 e11		e17(2, 4, VP, [e5, e11], []) e16
pop	+e17	e16
combine e3 e17		e18(1, 4, S, [e1, e17], []) e16
pop	+e18	e16
pop	+e16	
combine e16 e11		e19(3, 4, S, [e11], [VP])
pop	+e19	

At this point, no more processing can take place. Inspecting the chart, it can be found that these are two complete edges (edges 15 and 18) spanning the input of the desired category, S. By recursively tracing through their contained edges, the syntactic structure of the analyses implicit in the chart can be recovered. It can be noticed that, as well as sharing some complete subconstituents (edge 1), the final analyses were built up using some of the same partial constituents (edge 3).

Other Chart-Based Parsing Algorithms

It is easy to formulate different processing regimes within the chart framework. By redefining the 'new

edges' routine to operate on incomplete edges, one can implement a top-down, 'Earley' style of algorithm (Thompson and Ritchie, 1984). Alternatively, it is possible to define 'new edges' so that any arbitrary constituent, rather than the first, is used to build new edges, and with corresponding changes to 'combine edges,' constituents can be built right to left, as well as left to right (Steel and de Roeck, 1987). This can be useful for practical efficiency when some construction is 'keyed' by an item that is not the leftmost one, (e.g., conjunctions in English or verbal complements in subordinate clauses in languages like German). A left-to-right strategy would have to allow for the possibility of many types of constituents before there was any evidence for them, possibly leading to a lot of wasted computation most of the time. This strategy can also be generalized to 'head-driven' parsing, using information from the head of a phrase to guide the search for its sister constituents to the left or right (Kay, 1990).

For all of these different types of parsing algorithms, appropriate search strategies can be imposed by different methods of manipulating the agenda, as mentioned earlier.

Chart parsing also offers a degree of robustness in the case of a failure to find a complete parse, either because the input is ungrammatical or (what amounts to the same thing from the point of view of the parser) is not within the coverage of the grammar. Even if the overall parse fails, an algorithm like the one above will result in all well-formed subconstituents that are present in the input being found. From these, different types of heuristic strategy can be used to do something useful. Mellish (1989) described one such technique, which attempted to massage an ill-formed input into a well-formed one by inserting or deleting constituents after the ordinary parsing process has failed.

It is also worth pointing out that many of the virtues of charts as a basis for parsing are also desiderata for the reverse process of generation. In generation as well as in parsing, it is important to avoid unnecessary recomputation. Shieber (1988) describe that a chart-based framework that was intended to accommodate a variety of generation and parsing algorithms.

Packing

Although charts, as so far described, offer considerable economy of representation and processing, they still take exponential time and space when there is an exponential number of parse trees to be assigned to a sentence. This can be improved on. Notice that in the example above, two VP constituents were built spanning 2 to 4, and these in turn gave rise to two S constituents, each containing the same NP. This has the advantage that all analyses of the sentence are explicitly represented: There is an S edge for each one. However, it has the disadvantage that the combination is done redundantly on the second and any further occasions. (This is where the exponential behavior arises.) If an NP can combine with one VP from 2 to 4 to form a sentence, then it is obvious that it can also combine with any other VP from 2 to 4. At the point at which this move is made, the fact that the two VPs have a different internal structure is irrelevant.

At a cost of extra work in spelling out explicit parse trees when other processing has been completed, this redundancy can be eliminated. In the chart framework developed here, this is most easily achieved by generalizing the representation of complete edges so that the 'constituents' or 'Daughters Found' field is a disjunction of lists of edge identifiers, rather a single list. Then the algorithm must incorporate the extra step, whenever it is building a complete edge, of checking to see whether there is already in the chart a complete edge of the same category and with the same 'from' and 'to' labels. If there is, it can simply make a disjunction of the constituents field of the edge being built with that of the existing edge and no new edge is needed, or anything else. Any analyses that the existing edge already takes part in will also involve the new edge, and the new edge will be included in any further analyses involving the existing edge. Thus, in the case of the second VP edge, at the point where edge 9 can combine with edge 11 to form edge 17, edge 14 would have extended to look like:

e14(2, 4, VP, [[e4, e13], [e5, e11]], [])

Then the combination of edge 3 with edge 14 to make a sentence would represent both analyses, without needing to repeat the combination explicitly. In this case, only one set of operations is saved, but it is easy to see that in cases like the multiple PP sentence encountered earlier, the savings can be considerable.

This extension is essentially the notion of 'packing,' as described in, for example, Tomita (1987). If explicit parse trees are required, then there is an extra cost in a post-processing phase, for each disjunction will need to be unpacked into a separate analysis. This step may be exponential even where parsing time was polynomial: The complexity is moved, not eliminated. However, the number of constituents created and the number of computational operations performed while actually parsing will usually be far smaller if packing is used than if the simple chart scheme is used. Moreover, in many practical NLP

systems, parse trees do not need to be enumerated explicitly, except perhaps for debugging purposes, as they are merely a preliminary to semantic interpretation. In some of these systems (e.g., that described in Alshawi *et al.*, 1988), many aspects of semantic interpretation can be done on packed structures directly, saving yet more computational work.

See also: Parsing: Statistical Methods.

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Chatino *See:* Zapotecan.

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Suniti Kumar Chatterji was born in Sibpur, Howrah on November 26, 1890, and died in Calcutta on May 29, 1977. He was born in a traditional Sāmaveda Brahman family of Kaśyapa clan originating in Eastern Bengal. He was educated at Motilal Sil's Free School, Scottish Church College (B.A. 1911), and Calcutta University (M.A. 1913 in English, then also Sanskrit studies until 1919). In 1913 he became Professor of English at Vidyasagar College in Calcutta, and in 1914–1919 he taught English as an Assistant Professor at Calcutta University.

Chatterji undertook further studies of Indo-Aryan and Indo-European in London in 1919–1921 (D.Litt. 1921 in Indo-Aryan philology, under L. D. Barnett, F. W. Thomas *et al.*) and in Paris in 1921–1922 (under Bloch, Meillet, Przyluski, Pelliot *et al.*). In 1922 he became Khaira Professor of Indian Linguistics and Phonetics at Calcutta University, and in 1952 he was named Emeritus Professor of comparative philology. As a friend of Tagore, he served many years as a member of the governing body of Visva-Bharati University. In the 1950s and 1960s he was Chairman of the Upper House of the West Bengal Legislature. He attended numerous congresses and traveled widely, e.g., around 1951 acting as visiting lecturer at Pennsylvania University for 6 months. He won many honors, e.g., Dr.h.c. in 1960 from Rome and D.Litt.h.c. in 1965 from Delhi. From 1964 on he was National Research Professor of Humanities.

Chatterji's London dissertation, *Origin and development of Bengali,* published in 1926, made him famous as the foremost linguist of India. He was no theoretician but had a good grasp of historical linguistics and discussed questions of Old and Middle Indo-Aryan, Bengali, and Hindi and contacts of Indo-Aryan with other Indo-European and non-Indo-European languages. He was one of the first phoneticians in India. In addition to linguistic works he edited Bengali and Maithili texts and wrote a number of books and essays on such topics as languages, literature, history, national questions, and travel books in English, Bengali, and Hindi. Among his students were M. M. Ghosh and S. Sen.

See also: Bloch, Bernard (1907–1965); Meillit, Antoine (Paul Jules) (1866–1936); Sen, Sukumar (1900–1992).

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See also: Bloch, Bernard (1907–1965); Meillit, Antoine (Paul Jules) (1866–1936); Sen, Sukumar (1900–1992).

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Chavée, Honoré (1815–1877)

J van Pottelberge, Ghent University, Ghent, Belgium

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Honoré Chavée, a Belgian comparative linguist who specialized in Indo-European and Semitic languages, initiated the school of naturalist linguistics in France and became one of its main representatives. He was born in Namur (Belgium) on June 3, 1815, and trained as a Roman Catholic priest at the Namur Diocesan Seminary (1833–1838). In 1840 he became parish priest of Floriffoux, but soon quit in 1843, moving to Brussels and eventually to Paris, teaching classes at Stanislas College (1846–1848) that formed the basis for his early magnum opus, *Lexiologie indo-européenne* (1849). Soon afterward he abandoned the priesthood and the Christian faith, embraced Auguste Comte's positivism, and became a Freemason. From 1848 on Chavée taught his students at his home; he gave guest lectures in Pisa and Bologna, and taught German at the *École Polytechnique* in Versailles in 1871–1872. He died after a lingering illness on July 16, 1877.

Apart from his studies of Semitic languages at Leuven under Jan Theodoor Beelen (a biblical exegete and orientalist) from 1838 until 1840 and classes with Eugène Burnouf in Paris, Chavée was essentially self-taught, though influenced by the writings of Frédéric Eichhoff, Friedrich Diez, Franz Bopp, and others. Very much like August Schleicher, with whose work he did not however become acquainted until later, Chavée adopted the view that language is a living organism (and that the loss of transparent morphological structure represents 'illness' or decay), and took a historical and glottogonic approach to comparativism. Throughout his work, he reconstructed primitive monosyllabic roots of language, which consisted of only two classes: syllables expressing sensations (verbs) and demonstrative syllables (pronouns). He considered both kind of etymological roots to be spontaneous creations of the brain and, consequently, regarded linguistics as a branch of anthropology and ultimately as a natural science. Given that comparative research demonstrated the distinct origins of Semitic and Indo-European roots, Chavée drew the conclusion from the polygenetism of the languages that the races who speak them also have a polygenetic origin.

Unlike other comparative work of his time, Chavée's research included (lexical) meaning, as he tried to establish primitive semantic kernels and classified all verbal roots into onomasiological 'natural families' after the model of biological taxonomy. Being over-eager to schematize, however, most of his reconstructions are speculative.

Together with Abel Hovelacque, his most famous pupil, Chavée founded the *Revue de Linguistique et de Philologie Comparée* in 1867 (which appeared until 1916), the first French journal devoted to linguistics and the main dissemination channel of the naturalist school. Apart from his comparative work, Chavée wrote on language education; his descriptions of his native Walloon language are still valuable.

See also: Bopp, Franz (1791–1867); Diez, Friedrich (1794–1876); Indo–European Languages; Naturalism; Schleicher, August (1821–1868); Semitic Languages.

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Chibchan

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The Chibchan stock is currently composed of the 16 languages from Central America and northwestern South America listed below with their main current alternate names, approximate number of speakers, and location: Pech (Paya; 900; Olancho Department, eastern Honduras), Rama (20; Rama Cay and other localities south of Río Escondido, southeastern Nicaragua), Maléku Jaíka (Guatuso; 300; Guatuso County, northern plains of Costa Rica), Cabécar (8500; Atlantic watershed and southern Pacific slope of the Talamanca Range, southern Costa Rica), Bribri (6000; southern Atlantic and Pacific slopes of the Talamanca Range), Boruca (Brunka; 2, 20 semi-speakers with a passive domain of the language; Térraba Valley, southwestern Costa Rica), Teribe (a dialect of Naso; 3000; Teribe and Changuinola rivers area, northwestern Panama; Térraba, the Costa Rican dialect, is extinct), Buglere (Bocotá, Guaymí Sabanero; 3700; Bocas del Toro, Veraguas, Chiriquí Provinces, western Panama), Ngäbere (Guaymí; 110 000 in the Bocas del Toro, Chiriquí, and Veraguas provinces, Western Panama, and 2172 in the bordering area of southwestern Costa Rica), Kuna (70 000 in the eastern Atlantic coast and the southeastern Paya and Pucuro localities of Panama, and 800 in Arquía and Caimán Nuevo in the Urabá Gulf, Colombia), Chimila (450; lowlands to the south of Fundación River, Magdalena Department, Colombia), Cogui (Cágaba; 6000; northern, eastern, and western slopes of the Sierra Nevada de Santa Marta, Colombia), Damana (Malayo; 1500; southern and eastern slopes of the Sierra Nevada de Santa Marta), Ica (Bíntucua; 8000; southern slopes of the Sierra Nevada de Santa Marta), Barí (Motilón; 1500 in Colombia, 850 in Venezuela; Serranía de Motilones), and Tunebo (Uwa; 3500, mostly in Colombia, a few in Venezuela; eastern slopes of the Sierra Nevada de Cocuy). Formerly, the stock included at least eight more languages which are listed with their original location, and approximate time of extinction: Huetar (central Costa Rica, 18th century), Chánguena, Dorasque (both in western Panama, Chiriquí Lagoon area, beginning of the 20th century), Antioquian (central and northeastern Department of Antioquia, Colombia, 18th century), Tairona (the coast to the north of the Sierra Nevada de Santa Marta, 18th century or before), Kankuama (eastern slopes of the Sierra Nevada de Santa Marta, first half of the 20th century), Duit (Boyacá Department, Colombia, 18th century), and Muisca (Cundinamarca Department, Colombia, 18th century).

Subgrouping

The following subgrouping is based on both lexicostatistical and comparative evidence (Constenla, 1995: 42):

I. Pech.
II. Core Chibchan:
  IIA. Votic: Rama, Guatuso.
  IIB. Isthmic:
    B1. Viceitic: Cabécar, Bribri.
    B2. Boruca.
    B3. Teribe.
    B4. Guaymiic: Ngäbere, Buglere.
    B5. Doracic: Dorasque, Chánguena.
    B6. Kuna.
  IIC. Magdalenic:
    C1. Core Magdalenic:
      C1.1. Southern Magdalenic:
        C1.1a. Chibcha: Muisca, Duit.
        C1.1b. Tunebo.
      C1.2. Arhuacic:
        C1.2a. Cogui.
        C1.2b. Eastern-southern Arhuacic:
          C1.2b.1. Eastern Arhuacic: Damana, Kankuama.
          C1.2b.2. Ica.
    C2. Chimila.
    C3. Barí.

There are some indications that (a) the Isthmic group could be divided into two branches: Viceitic-Boruca and Teribe-Guaymiic-Doracic-Kuna, (b) the

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There are some indications that (a) the Isthmic group could be divided into two branches: Viceitic-Boruca and Teribe-Guaymiic-Doracic-Kuna, (b) the

Magdalenic group could be also divided into two branches: Southern Magdalenic-Barí and Arhuacic-Chimila, (c) Huetar might belong to Votic, and (d) Tairona to Eastern-southern Arhuacic (Jackson, 1995: 67–68).

The split of Proto-Chibchan into the ancestors of Pech and Core Chibchan occurred, according to glottochronology, around 6550 years BP, at the times of the beginning of the transition from the hunter-gatherer way of life to the agricultural one. The greater diversity between the languages is found to the west and north, in Central America, which suggests that the Chibchan people's homeland must have been there, probably in Costa Rica and Panama, where archeology has found the oldest sites related to them.

External Relationships

There have been proposals of relationships between Chibchan and at least a score of other Amerindian language groups and isolates from Florida in the United States to northern Chile and Argentina (such as Timucua, Tarascan, Cuitlatec, Xincan, Lencan, Misumalpan, Chocoan, Andaquí, Betoy, Warao, Yanomama, Paez, Barbacoan, Mochica, Kunza, Allentiac), which together would constitute a Macro-Chibchan phylum. None of these have been proved, and the quality of the supposed evidence in their favor is extremely poor (Constenla, 1993: 81–95).

Typology

The Chibchan languages belong to the Lower Central American Linguistic Area, characterized by features such as SOV order, postpositions, prepositive genitive, postpositive numerals and adjectives, lack of gender contrasts, and contrasts between voiced and voiceless stops.

The Chibchan languages of southern Costa Rica and western Panama, together with the Chocoan languages, constitute a Central Subarea characterized by the predominance of features such as distinctive vowel nasality, tense/lax vocalic contrasts, ergative or active case systems, and absence of person inflections. Most Chibchan languages in this subarea present numeral classifiers, postpositive demonstratives, and tone contrasts.

Pech, Rama, and Maléku Jaíka are part of a Northern Subarea, and the Magdalenic languages, of an Eastern Subarea. Although each of these subareas possesses its own characteristics, they share the predominance of features, both positive and negative, opposed to those of the Central subarea such as accusative-nominative case systems (Maléku Jaíka and Tunebo are exceptions to this), person inflection for possession in nouns and for agent and patient in verbs, prepositive demonstratives, and lack of numeral classifiers, distinctive vowel nasality, and tense/lax vocalic contrasts.

See also: Choco Languages; Colombia: Language Situation; Costa Rica: Language Situation; Honduras: Language Situation; Misumalpan; Nicaragua: Language Situation; Panama: Language Situation; Venezuela: Language Situation.

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Chickasaw *See:* Mobilian Jargon; Muskogean Languages.

CHILDES Database

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Overview of the System

The Child Language Data Exchange System (CHILDES) has revolutionized the way that research is carried out among the child language research community in the 20 years since its inception. The system was first developed by Brian MacWhinney and Catherine Snow and put in place at Carnegie Mellon University in the United States. MacWhinney has remained the driving force behind the development of the system. The CHILDES system consists of three main tools: a system of transcription for linguistic data (CHAT format), a set of tools for analyzing those data when transcribed according to the principles of the system (the CLAN programs), and a database of linguistic corpora provided by members of the language research community for use by the wider research community. All aspects of the system are available online and can be downloaded from the CHILDES homepage. In addition, the CHILDES system supports online access to membership lists and e-mail distribution lists (info-childes) that have encouraged discussion and debate among eminent researchers and new researchers. From its humble beginnings, the system has grown to include corpora from more than 30 languages, covering first-language acquisition, bilingual acquisition, language disorders, and narrative. The transcripts are generated from case studies and from groups of children, and include both longitudinal and cross-sectional data. Although American English and British English are well represented, other languages such as Sesotho, Estonian, Spanish, and Cantonese are included in the database.

A key benefit of the CHILDES system is in providing researchers with a wealth of data on which to base their analyses of children's early language. Due to time and financial constraints, researchers wishing to use longitudinal data have made recordings (traditionally approximately one hour every week) from small numbers of children or even from case studies. This means that it is sometimes difficult to generalize research findings to other children. Researchers are now able to compare the results from their own data with those from other comparable children from the CHILDES database. Indeed, many researchers use the database as the sole source of data for their analyses. However, to use the CHILDES system properly, it is essential to understand the basics of transcription. In addition, as a courtesy to those who donate data, it is necessary to cite an appropriate reference to recognize the researchers who contributed the data used in an analysis. Researchers should also cite the CHILDES handbook (MacWhinney, 2000a, MacWhinney, 2000b) to acknowledge use of the system and to recognize the work of Brian MacWhinney in developing and maintaining the system.

Transcription and CHAT Format

The first major tool of the CHILDES system is the CHAT format for transcription. This is a set of guidelines for transcription that, if followed correctly, enables all researchers who understand the system to accurately interpret any transcripts contributed to the database and to use the data in their analyses. The system is relatively straightforward but takes a bit of time to master. A handbook written by Brian MacWhinney entitled *The CHILDES Project: tools for analyzing talk, Vol. 1* (2000a) provides details of the various aspects of transcription, but readers are advised to consult the online transcription manual for up-to-date information, as the format for transcription is sometimes modified in line with developments in the overall system.

A simple transcript includes *header* tiers that provide background information, for example the participants, the location or setting, the date, and so on. The header tiers are then followed by the transcript. Each *main* line of the transcript represents a separate utterance and is identified by a speaker ID followed by the utterance. Each main line can then be accompanied by any number of *dependent* tiers that appear directly beneath the utterance and allow more detailed coding, for example speech act coding, glosses of second languages, error coding, and any general comments that assist the researcher. All transcripts must finish with a final 'End' line. Figure 1 shows a sample transcript in the CLAN window. The transcript shows headers, main lines, and a few dependent tiers (for errors –%err, and morphological analysis, %mor), and also includes examples of coding for retracings [/], imitations [+ I], unintelligible speech (xxx, [+ PI]), incomplete utterances +//. [+ IN], and omitted material prefaced with 0.).

When transcribing data, transcripts can be made as simple or as complex as is required by the individual researcher. However, as transcription is a lengthy process (often up to 10 hours per hour of data), forward planning is essential to make the most of the time available. It is possible to save a lot of time if sufficient thought is given in advance to the kinds of

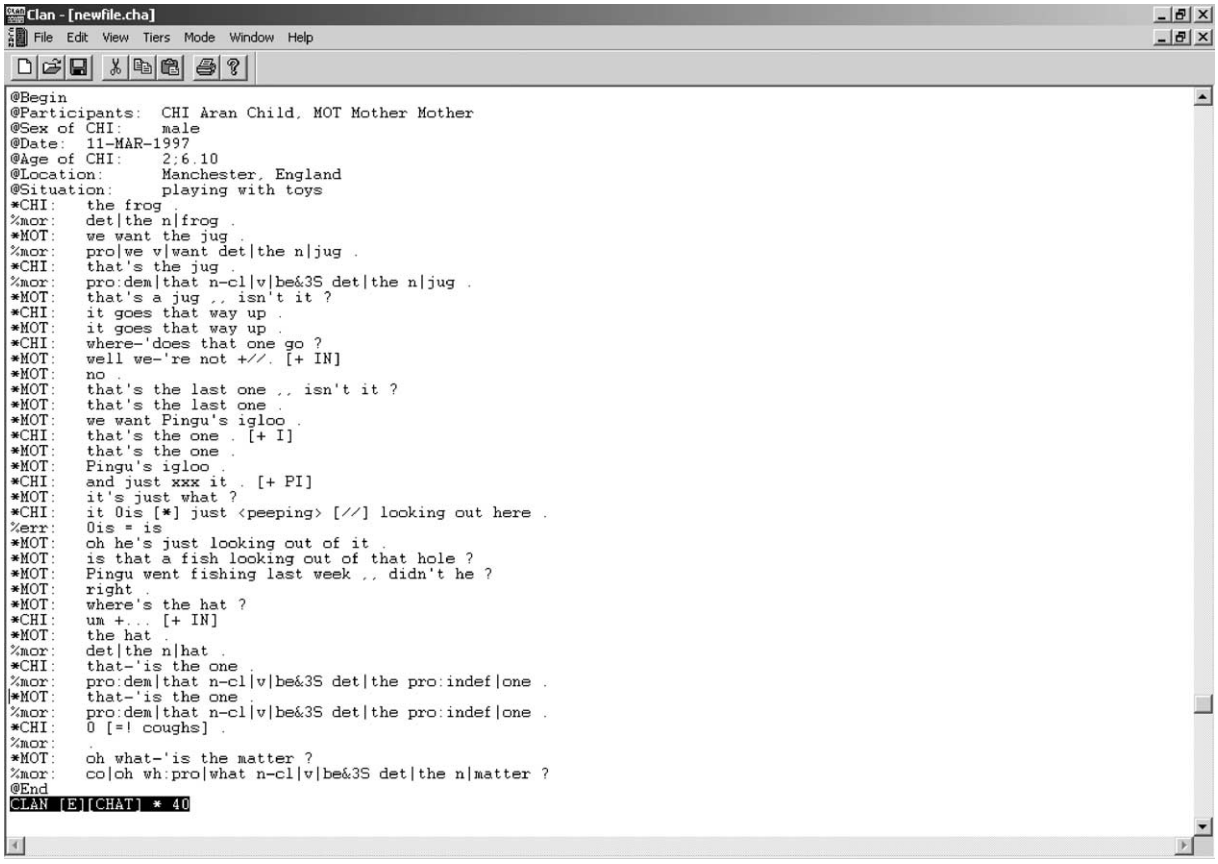

Figure 1 A sample transcript (adapted from the Manchester corpus available on CHILDES, Theakston *et al.*, 2001).

questions the researcher might want to ask of the data and the transcript is coded accordingly. Many aspects of linguistic interactions are easy to code as transcription is taking place, but are somewhat harder to locate at a later stage should it be necessary for a given analysis. For example, argument structure overgeneralizations (e.g., *Don't giggle me*) are difficult to locate unless coded as errors, and the identity of omitted words or morphemes may be evident in the context of the recording when intonation patterns are available, but may be unclear when we are faced with the bare transcript. However, the vast range of coding possibilities available and the necessity of selecting among these to address the needs of the immediate research means that when using data available on CHILDES that has been contributed by other researchers, it is essential to ascertain whether the coding carried out is sufficient to support your own specific analyses.

Analysis and the CLAN Programs

Once the researcher has transcripts available for analysis, either through the transcription of new data, or by accessing data online, the second component of the CHILDES system comes into play. The CLAN programs provide a powerful computerized system of analysis for transcripts in CHAT format. There are about 40 programs, although most researchers will find themselves using just a handful. To run the programs, it is necessary to type fairly basic commands into the command window (see Figure 2), and to ensure that this is done accurately, as programs will either not run or will generate inaccurate results if the command is flawed. The most commonly used programs allow automated calculation of standard measures such as mean length of utterance or turn (MLU, MLT), type token ratios and measures of lexical diversity (VOCD, FREQ), and enable researchers to conduct basic frequency counts on words or phonemes quickly and accurately (FREQ, PHONFREQ). More advanced programs allow researchers to isolate utterances containing specific words, word types, or word combinations either alone or with preceding and following linguistic context (KWAL and COMBO). It is also possible to generate co-occurrence data showing the frequency with which individual combinations of words occur together (COOCCUR).

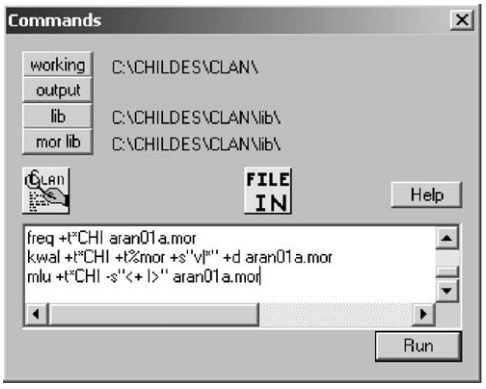

Figure 2 The CLAN commands window.

Those researchers who take the time to fully understand the CLAN programs will be rewarded, as many more complex research questions require the use of a combination of different programs in sequence, using the output of one program as input to another to generate results. Using the CLAN programs can be confusing for the novice, as all programs have a number of switches that allow different output. For example, it is possible to output information with or without line numbers, in alphabetical order, preserving details of file names, or merging all output from several files together. As for transcription, there is a published manual (MacWhinney, 2000a, 2000b) providing guidance on the use of the programs, but readers are advised to consult the online manual, as many programs are regularly updated as the capabilities of the system improve. The manual also provides basic tutorials in the use of the programs.

At the most straightforward level, analyses are carried out on all speakers and on the main line in the transcript. However, it is possible to fine-tune analyses by specifying individual speakers or individual tiers over which to conduct these analyses. Moreover, it is possible to run the programs on single transcript files, or over many files simultaneously, and to generate output file by file, or to merge output together across files and/or speakers. Search commands can be modified to include wildcards to allow more complex analyses. Anyone carrying out analyses using the CLAN programs should check the output against the original files, at least in the first instance, to check that the search is operating in the way expected. Although the programs are powerful and can perform searches quickly and efficiently, the accuracy of the output relies crucially on the accuracy of the transcription, coding, and the search command.

In addition to the analysis programs, the MOR and POST programs allow researchers to add a line of morphological coding to their transcripts. For researchers interested in the development of grammar, these programs provide an extremely valuable tool. Once a transcript has been coded, it is then possible to search for specific word types, for example verbs, pronouns, and for combinations of these items, allowing much more powerful analyses. To date, almost all of the English data in CHILDES has been run through the MOR program by Brian MacWhinney and colleagues, as well as some Spanish, Japanese, and Cantonese corpora. For English, the POST program provides almost fully automated coding (the MOR program alone generates options for grammatical coding, but the choice of the correct coding is largely done by hand). There are currently MOR grammars available for Cantonese, Chinese, Dutch, English, French, German, Italian, Japanese, and Spanish, and grammars are being developed for a number of other languages. Of course, the accuracy of any analysis based on the line of morphological coding depends on the accuracy of the coding itself. Although the grammars are continually being updated, in the past there have been a few problems with the accuracy of the coding, so researchers are advised to check transcripts carefully prior to running any analyses to ensure that the coding is correct.

New Directions

One of the more recent developments of the CHILDES system is the ability to link transcripts to digitized audio and video data. It is necessary to create a digitized sound or video file, but it is then possible to create a direct link between an individual utterance in a transcript and the corresponding section of audio or video recording. This has the potential to revolutionize child language research, as it will allow us to investigate issues that were not considered by the original researchers, by recoding the audio or video data. For example, this may be useful to people interested in phonological development, as few recordings are transcribed phonetically by researchers interested in later language development or the acquisition of grammar. It will also allow researchers to double-check utterances that they are unsure of, for example, children's errors or utterances marked unintelligible by the original transcriber. It is now possible to access linked transcripts for a number of datasets from the CHILDES website and either download these or view them online.

New improvements in technology bring with them potentially difficult issues with respect to participant consent and confidentiality. When parents and children agree to participate in studies of child language acquisition, we have a responsibility to ensure that we obtain consent for all uses of the resulting

data. In the past, parents would not have envisaged transcripts of their interactions with their children appearing on the Internet, available to anyone who cares to look and listen. Traditionally, researchers have dealt with this problem by giving children pseudonyms and removing any potentially identifying information from the transcripts. Of course, this is easy to do with written transcripts, but much more difficult if we intend to make audio and video recordings available online to the wider research community. The availability of audio and video recordings also means a much wider range of questions that may potentially be asked of the data than the original researchers intended, again raising issues of participant consent.

A second ongoing development is the transformation of the CHILDES database into XML format through the Talkbank project. This will eventually allow researchers to access the CHILDES database online and to run analyses directly without having to download the data to their own computers. Of course, many researchers prefer to recode data before analysis, but the facility to run analyses online will doubtless prove useful to many people.

Conclusion

The CHILDES system has led to significant improvements in research in child language acquisition over the last 20 years, and will continue to do so with the new developments taking place. It is a huge benefit to the research community that there are now large amounts of data for English, and increasing amounts of data from a wide range of other languages. However, it is necessary for researchers to exercise caution. First, over-reliance on the CHILDES database can lead to the extensive analysis of data from just a few children, which may bias our findings in various ways. Second, when comparing children using data from CHILDES, it is important to carefully control for the age and linguistic stage of the children concerned, and to ensure that the corpora are comparable in terms of transcription procedures and coding before carrying out any analyses. Third, the increasing trend toward analyses at the lexical level means that although the CHILDES system provides data from many children, relatively few of these children have enough data in a dense enough time period to support such analyses. These issues mean that although the CHILDES database is a valuable resource, it is essential that researchers continue to donate new data to CHILDES to promote rigorous cross-linguistic research into language acquisition.

See also: Corpora of Spoken Discourse; Corpora; Corpus Linguistics; Language Development: Overview; Parsing and Grammar Description, Corpus-Based.

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Relevant Websites

http://childes. psy.cmu.edu – CHILDES.
http://xml.talkbank.org – Talkbank.

Children's Literature: Translation of

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Role and Readership

Translation of children's literature poses particular challenges owing to some special characteristics of children's books and qualities of child readers. The fact that children's literature tends to have a peripheral position in cultures (Shavit, 1986) and suffer from lack of prestige makes it possible to manipulate texts translated for children in various ways to make them accord with the expectations of the receiving culture. Furthermore, children are not expected to tolerate as much strangeness and foreignness as adult readers, and therefore, modification of the content and language of source texts is often considered necessary. Instead of being innovative, translated children's books thus tend to conform to conventional, accepted forms, models, and language. However, children's literature plays an important part as a tool for education, socialization, development of linguistic skills, and spreading world knowledge. Especially in minor language cultures, where translations account for a large proportion of published children's literature, children are likely to come into contact with literature and its educative and entertaining functions mainly through translations. Therefore, translations may have a key role in introducing child readers to characters, events, and language typical of fiction.

The term 'children's literature' usually refers to fiction targeted at readers from preliterate children to young teenagers; nonfiction, such as school textbooks, is excluded. Children's fiction is, in fact, not a uniform genre either; its various subgenres, e.g., fairy tales and fantasy stories, detective novels, realistic stories, differ in terms of purpose and language (see Puurtinen, 2003: 402), which is likely to affect the choice of translation methods. Here, however, children's fiction is treated as one, albeit very heterogeneous, genre.

Although children are the primary readership, children's books actually have an important secondary target group – adult readers, whose preferences and literary tastes must be taken into account by both authors and translators. However, Oittinen (1993, 2000) advocates translating **for children**, rather than translating children's literature, and emphasizes the significance of children's culture and their magical world, as well as society's image of childhood and the translator's own child image (Oittinen, 2000: 41–60).

In addition to the existence of two target groups, children's literature has a number of other special qualities, which have an effect on both the content and language of translations: strong ideological, didactic, ethical, and moral norms, ambivalence, aim at high readability and speakability, and text–picture relationship. (Nikolajeva, 1996, is an extensive discussion of features and forms of children's literature.) Translation problems and their solutions made at the level of language tend to reflect, and result from, these hierarchically higher levels. (For a comprehensive review of studies on the translation of children's literature, see Tabbert, 2002.)

Cultural Norms

Various norms regulating the translation of children's literature can be subsumed under the more extensive concept of culture, or ideology in a neutral sense, referring to taken-for-granted assumptions, beliefs, and values shared by a particular society or culture. In fact, ideology is the overriding constraint, an umbrella concept, dictating what is acceptable children's literature (see Stephens, 1992; Knowles and Malmkjær, 1996). In general, children's books are expected to be in some way beneficial to children and sufficiently easy in terms of plot, characterization, and language to be comprehensible (Shavit, 1981: 172, 1986: 112–128). These two requirements may sometimes be contradictory. For instance, a maximally understandable text may be regarded as too simple to teach anything new and, in that respect, benefit the child reader. Moreover, notions of what is beneficial and comprehensible vary from culture to culture and change with time, which often leads to manipulation of source texts in translation (see Shavit, 1981, for examples of manipulation, and Desmidt, 2003, for didactic norms and readability).

A good example of the effect of strong didactic norms on language is the French translation of *Pippi Longstocking,* the originally Swedish *Pippi Långstrump* by Astrid Lindgren. While the original Pippi shows disrespect towards adults in her anarchic, norm-breaking language use, the French translation has turned her into a more obedient, well-behaved girl by, e.g., toning down impolite expressions (Heldner, 1993). Another example of didacticism is provided by the older German (German, Standard) translations of Tove Jansson's originally Swedish *Moomintroll* books, which have, e.g., omitted references to kissing, poker games, and American dance music, because these were considered unsuitable for German children's literature in the 1950s, at the time

of publishing the translations (Bode, 1996; for censorship in East Germany, see Thomson-Wohlgemuth, 2003).

Ambivalence

The need to appeal to adult readers leads to the creation of ambivalent texts, which can be read and interpreted differently by children and adults (Shavit, 1986: 63–91). Well-known classics, such as Lewis Carroll's *Alice's adventures in wonderland* and Kenneth Grahame's *The wind in the willows,* are examples of ambivalent texts, which children are supposed to read on only one level, as simple fairy tales, whereas adults are expected to be aware of the ironical or satirical levels as well. Intertextuality, such as allusions to other literary texts, films and real-life or fictional characters, is a typical element of ambivalence intended to please the more knowledgeable adult audience. When translated, an ambivalent children's book may be simplified and directed merely to children by omitting all ingredients of ambivalence; sometimes two different translations can be made, one for children and the other, retaining ambivalence, primarily for adults.

Readability and Speakability

All special features and norms typical of children's literature are naturally to some extent manifest in the language used, but the feature which is the most directly related to linguistic details is readability, or comprehensibility. Although readability is also influenced by other factors than purely linguistic ones (e.g., such text-external factors as the reading situation, the reader's subject and world knowledge, interest, and motivation), it is usually defined as a textual quality determined by the level of linguistic difficulty. The main determinants of readability include the length and complexity of sentences and the length and familiarity of words (Puurtinen, 1995: 104–115, 135–164; see also Puurtinen, 1997, for syntactic norms). Readability can be understood to cover speakability, the ease of reading aloud, which is an important quality in children's books read aloud by adults to small children (see Puurtinen, 1995: 164–178; Dollerup, 2003). In addition to lexical and syntactic features relevant to readability, speakability is also affected by, e.g., rhyme, rhythm, and alliteration, which make reading aloud fluent and pleasant.

If readability requirements in the source and target literatures are different, the translator may, e.g., simplify sentence structures, decrease sentence length, or use more familiar, concrete vocabulary. The age of the potential readers is crucial, as the reading skills of different age groups vary extensively. The educative function of children's literature and aim at high readability in translation may sometimes be contradictory: Culture-specific elements, such as references to foreign places and customs, convey information about foreign cultures if retained in translation, but they also reduce readability. If, on the other hand, such elements are replaced with familiar, domestic ones, i.e., if cultural adaptation is carried out, readability is increased, but the opportunity to improve knowledge is simultaneously lost. (For preservation, neutralization, and adaptation of culture-specific elements, see, e.g., Klingberg, 1986; Nord, 1993.) In Israel, the desire to teach children the highly valued literary form of Hebrew through literature resulted in a translation policy which forced translators to turn even colloquial source text dialogues into standard, formal Hebrew (Even-Zohar, 1992). Easily understandable, everyday source text language was thus replaced with the traditional, varied, but less readable Hebrew variant. Since the 1980s, didactic intentions have been giving way to considerations of readability in Hebrew children's literature (Du-Nour, 1995).

In some cases high readability may clash with the aim to create an inspiring, enjoyable translation. The numerous descriptive personal names in the *Harry Potter* books (e.g., Neville Longbottom, Minerva McGonagall, Vindictus Viridian) are complicated enough to have a negative effect on readability, but as they often refer to some special qualities of the characters and require inferences and interpretation from the reader, they are likely to make the reading process more active and enjoyable. Therefore, most translators tend to choose such target language equivalents for the names that also trigger inferences (Davies, 2003; for functions and translation of proper names in children's literature, see Nord, 2003).

Relationship between Text and Illustrations

The relationship between text and illustrations is particularly important in picture books for small children, where pictures are the dominant element. In illustrated books for older children, pictures may also have a central role in supporting the text. There is interaction between words and pictures. Pictures influence the interpretation of the content of the story, and words create a point of view to the pictures (Oittinen, 1993: 113–139, 2000: 100–114, 2001, 2003). Thus, the translator's interpretation of the story is affected by the pictures, and this interpretation is reflected in the formulation of the translation. Although translators try to make the text and

illustrations cohere, discrepancies are sometimes created if, e.g., the translator has to work on the basis of the verbal text only, or if the translator is provided with new pictures different from the original ones. To improve correspondence between text and pictures, the translator may also deviate from the text of the original (Dollerup, 2003: 88). However, the original balance between text and pictures can be disturbed, if the translator adds such information into the target text which in the original is only conveyed by pictures (see Tabbert, 1991; O'Sullivan, 2000: 287–291). Translating illustrated texts requires specialized knowledge of the text–picture relationship, child readers' picture reading abilities, and potential cultural differences in the conventions of illustrated books.

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Chile: Language Situation

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Introduction

Chile is situated in the southwest of South America. After gaining independence from Spain, it became an independent republic in 1810. Its geography is uneven and mountainous with a surface of 756 626 sq km, out of which 379.9 sq km are islands. With 15 116 435 inhabitants (census of 2002), Chile is a country with a stable economy and has become one of the most powerful countries of South America, with great human potential as well as potential natural resources and natural beauties.

The official language is Spanish, but there are also minority languages. Autochthonous languages include Mapudungún, Aymara, Rapanui, and Qawásqar, the language of the last representatives of the ethnic group known as Alacalufe. A number of foreign languages are spoken, resulting from successive migrations during the 19th century that were facilitated by the structure of the territory: 4300 km of coastline and innumerable geographical irregularities that generate relatively isolated spaces. All this has influenced the linguistic evolution of the country and, as a consequence, Chile is today a multilingual and pluricultural country.

The education is in Spanish; however, second languages are taught, notably English, but also German (German, Standard), French, Italian, Hebrew, and Japanese.

Spanish Spoken in Chile

The Spanish spoken in Chile is a dialect of the Spanish language and includes characteristics that are also present in other dialects of Spanish, but it is set apart by the frequency in the use of some forms.

Phonologically, Chilean Spanish is, like other South American dialects of Spanish, characterized by *seseo* (that is, European Spanish /θ/ is pronounced /s/). For example, *zapato*, 'shoe', is pronounced [sapáto], as opposed to European Spanish [θapáto]. *Yeísmo* (/λ/ is pronounced /ĵ/); *caballo*, 'horse,' is pronounced [kaßáĵo]. Other features in the speech found in varieties of Chilean Spanish are the aspiration or elision of /s/ in coda position (e.g., [á^{h}no] for *asno*, 'donkey'), and lenition or elision of intervocalic /d/ (e.g., [aláðo] ~ [alá:o] for *alado*, 'winged').

In morphology and syntax, a distinct feature of Chilean Spanish is the use of definite articles before first names, especially with female names (e.g., *la Maria*). These are used less frequently with male names (e.g., *el Juan*), and not with family names (e.g., #*la González*). In tense-aspect morphology, future tense is often formed with a periphrastic construction with *ir a* ('go to') plus infinitive, e.g., *voy a amar*, 'I will love,' instead of the synthetic *amaré*. Another relevant phenomenon related to the forms of address is the one known as '*voseo*,' a phenomenon that, in Chile, has a verbal character: VERB2*psing* + PRON *tú*. In this way, the canonical forms *"tú cantas, tú quieres, tú ves"* [kántas, kjéres, bes] 'you sing, you like, you see' are pronounced "*tú cantai*, *tú querí(h)*, *tú veí(h)*" [kantái, keríh, βeíh]. The use of the pronoun *vos* is stigmatized. Although the phenomenon of *voseo* does not exist in formal speech, this is quite common in colloquial speech as a sign of 'familiarity' between speaker and hearer. Similarly, *ustedes* replaces *vosotros*, and *os* is not used at all.

On the lexical level, Chilean Spanish includes several loanwords from Amerindian languages, e.g., *guata*, 'belly,' *chuncho*, 'owl,' *laucha,* 'little mouse,' and *pololo*, 'boy friend' from Mapudungún; and *camanchaca*, 'mist,' and *calato*, 'naked,' from Aymara. In addition, there are loanwords from European languages such as *kuchen*, 'cake,' *pizza*, and *sandwich*. There is an increasing influence of English, especially in sport-slang, economy, and business. Specific uses in informal speech include *huevón* [weßón], 'fool,' used as an emphatic term of address, as well as *gallo*, 'cock,' for 'man,' *cabro*, 'goat,' for 'boy,' and *cabra*, 'she-goat,' for 'girl.' This is why it is not strange that, as a humorist once said, "*En Chile los gallos se casan con las cabras*" ('In Chile roosters marry goats').

Autochthonous Languages

Mapudungún is the language of the about 1 000 000-strong Mapuche ethnic group. The smaller groups of Pehuenches and Huilliches also belong to this ethnic group and speak languages similar to Mapudungún. Mapudungún (also called Mapuche or Araucanian) is an SVO language. The Mapuche population is predominantly bilingual Mapudungún-Spanish, but has managed to maintain its linguistic identity, despite the violent process of acculturation and economic control suffered from the 16th century onwards. Mapudungún has been studied since the 17th century. In 1992, Adalberto Salas published *Mapuche or Araucanian: phonology, grammar and analysis of texts*, the most complete and modern work on this language.

Chilean Aymara is spoken by approximately 40 000 people in small villages in valleys of the mountain range and high plateau strip in the northern part of Chile, at altitudes of 3000–3800 m. Little work has been done on Chilean Aymara. It is an agglutinative language with a large amount of affixes. The phonological and lexical variations detected until now indicate that it is a variety of the Bolivian Aymara. The Chilean group has developed a form of Aymara-Spanish bilingualism of its own kind.

Rapanui, or Pascuense, is an Austronesian VSO language spoken by approximately 2400 speakers on Easter Island, an island about 3700 km off the Chilean coast. The important and enigmatic archaeological history of this island is responsible for a great flow of tourism and multinational research, which favors the multilingual activity of the island's inhabitants. Bilingual Spanish-Rapanui education is offered in primary and secondary education. Many students continue their studies in universities in continental Chile. There are a number of studies on Rapanui, and there are descriptions of the current language being developed.

Fuegian Languages

Of all the languages once spoken in the inhospitable Chilean Patagonia, the languages of the Ona (or Selk'nam) became extinct in 1928, and of the Yámana or Yagan, in 2003; only a small community of about 20 Qawásqar or Alacalufes persists. There are linguistic studies that have been developed and others still in development, before the inevitable extinction of these languages.

Conclusion

The Spanish spoken in Chile is a peripheral dialect in relation to the rest of the Spanish-speaking world. It has evolved by preserving archaisms and developing a creativity with its own rules. It is in contact with two vernacular Indoamerican languages and one Austronesian language. With current globalization, it is also experiencing a notable increase of anglicisms.

As for the autochthonous languages, there are initiatives with the Department of Education and university researchers for their study and conservation. It is interesting to note the active participation of the young people of these groups. The promulgation of the Indigenous Law – though a great part of these declarations remain effective only on paper – in some way has given place to the recognition of the autochthonous people. In contact areas, some schools give primary education in minority languages. Alphabets have been created for these languages and several universities are preparing teachers for a bicultural and bilingual education.

See also: Austronesian Languages: Overview; Mapudungan; Spanish.

Language Maps (Appendix 1): Map 49.

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China: Language Situation

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China is known in Chinese as *Zhongguo* 'middle nation,' and indeed the cultural influence of China and the Chinese on all its neighbors has been profound. Chinese has been the dominant language of China for millennia, but many other languages are spoken in China. The languages of China fall into ten main groups:

1. Sino-Tibetan, including Sinitic (Han Chinese, the majority nationality) and Tibeto-Burman (17 nationalities, more than 100 languages) throughout the country;
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3. Mongol in the north central region (5.5 nationalities, including half of the Yugur, seven languages);
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5. Austro-Asiatic or Mon-Khmer in the far southwest (Wa, Bulang, De'ang, and Jing nationalities, plus some small unclassified groups, more than 12 languages);
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The Chinese Language

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Outsider linguists often say that the Han Chinese speak seven distinct, mutually unintelligible languages:

- Beifanghua ('northern speech') (known as Mandarin in English) in the north and west;
- Wu around Shanghai;
- Min in and around Fujian and in Taiwan;
- Yue (known as Cantonese in English, from the name of Guangdong Province) around Hong Kong, Guangzhou city, and most of Guangdong;
- Hakka (also known as Gejia in Mandarin), widely scattered across the southeast; and
- The inland varieties Gan and Xiang.

Some scholars further subdivide Mandarin, and there may be some additional varieties of Chinese, such as Waxianghua in southwestern Hunan. From a Chinese perspective, these varieties are all historically part of the Han Chinese majority group, all share the same *zhongwen* 'middle writing' Chinese character writing system, and all speak some *fangyan* of the Han Chinese *yuyan*. *Fangyan* is usually translated as 'dialect' and *yuyan* as 'language', but their meanings are broader. Among the minority languages, many historically related and structurally similar mutually unintelligible speech varieties are also classified together.

Norman (1988) and Ramsey (1987) provide an excellent introduction to the differences between the various varieties of Han Chinese. These are particularly great in phonology and lexicon, with lesser morphosyntactic differences. Many scholars suggest that the Han Chinese varieties diverged in the 7th century A.D., but some separated considerably earlier.

The non-Mandarin speech varieties of many cities also continue to be written, especially for local opera and folklore; additional local characters are used for words that do not exist in Mandarin. Lexically, every non-Mandarin speech variety is full of borrowings from other varieties, especially from Mandarin, including several strata from Mandarin of different periods.

Sociolinguistics of Chinese

In the long history of China, diglossia developed gradually, with Confucian and other texts from the mid-first millennium B.C. remaining the standard for official literary use up to 1911; this came to be called *wenyan* 'writing sound'. Alongside this, popular spoken-language literature, known as *baihua* 'white speech', came into use over the last millennium. During most dynasties, the spoken language of daily administration has been a Mandarin dialect, and this came to be known as *guanhua* 'official speech'; however, other varieties of Chinese were used locally. During the Republic period (1911–1949), the Mandarin of Beijing was standardized and made the official written language as well, under the name *guoyu* 'nation language'. In the 1950s, Beijing Mandarin was again codified, and in 1958 it was made the national language, under the name *putonghua* 'common speech'. The lexical differences between *guoyu,* which is still the official language in Taiwan, and *putonghua,* which has constitutional status as the national language in the People's Republic of China (PRC), are substantial and growing. The PRC has made major educational achievements in spreading putonghua alongside other spoken varieties of Chinese and minority languages and literacy in Chinese characters. There is also a standard romanization for putonghua called *pinyin* 'phonetic writing', introduced in 1958. Pinyin was originally intended to replace characters, but this plan was soon dropped.

The sociolinguistic situation in Hong Kong is interesting. Cantonese is diglossic, with a literary and formal spoken high version that is quite different from the spoken low version. Since mid-1997 Cantonese, Mandarin, and English have had co-official status. Knowledge and use of Mandarin has spread widely since the late 1980s, but is still far behind most of China; traditional rather than simplified characters and Cantonese continue in general use.

Writing Systems

The Chinese character writing system, with nearly four millennia of history, is a strong unifying characteristic for Han Chinese of all spoken varieties. Because it is logographic, sound change does not require orthographic reform. However, in 1958 a major reform was introduced in China; this simplified more than 36% of the frequently used characters and restricted the use of all but 6196 characters (Bradley, 1991: 310). The traditional full-form characters are still used in Hong Kong and Taiwan and by many overseas Chinese, but simplified characters are now used in Singapore and Malaysia. Conversely, full-form characters have been returning to use in China since the 1990s, especially for contacts with overseas Chinese, study of ancient literature, and greater status and formality.

Some of the other languages of China also have logographic scripts; some are directly derived from traditional Chinese characters, with additions following the same principle of combining a radical (semantic element) plus a phonetic. These include the Zhuang orthography as well as the better-known Japanese *kanji* 'Chinese characters', Vietnamese *chu nôm*, pre-hangul Korean, and so on. Distinct logographic

systems include Naxi and four separate traditions of Yi.

Mongol (Peripheral Mongolian) and Manchu were long written with Sogdian scripts. Tibetan is written with an Indic-derived script; one Mongol emperor tried unsuccessfully to replace Chinese characters with a modified Tibetan script in 1269. Turkic and other language groups in western China switched from Sogdian to Arabic scripts in the 13th century A.D. Some minority languages had scripts (mainly romanizations) devised by Christian missionaries. The missionary Samuel Pollard used roman letters, letters from Pitman shorthand, and invented letters in his script, mainly used for Miao and some Yi languages. In Pollard scripts, consonants are large, vowels are small, and the position to the vowel relative to the consonant indicates the tone: above for high etc.

From the 1950s onwards, new romanizations for many minority languages were produced following the principles of pinyin. Some were created to replace existing orthographies (for Lisu, Lahu, Miao, Wa, and other Christian scripts, along with various Arabic scripts); others were created for then-unwritten languages. When Russian linguists were active in China, some Cyrillic letters were used; but after 1958 most were removed. Since the 1980s, some groups have gone back to their pre-1950 scripts, especially Arabic in Xinjiang and Christian romanizations and others in the southwest (Lisu, Miao, etc.). Conversely, the Yao pinyin-based script of the 1950s became the basis of a unified Yao orthography also used by Yao outside China.

Minority Languages

The classification of non-Han ethnic groups was a gradual process. Four historically important groups – the Mongols, Manchu, Tibetans, and Hui – were recognized during the Republic period (1911–1949); the PRC flag has one large star representing the Han majority and four smaller stars representing these four groups. During the 1950s, a further fifty national minorities were recognized, and in 1978 the Jinuo nationality was added. Like the Han Chinese majority, some of the national minorities are linguistically highly composite; the Yi nationality, for example, includes six language clusters and many more distinct languages. In some cases, the ethnic classification links unrelated or distantly related languages. For example, the Lajia of eastern Guangxi, who speak a Tai-Kadai language (Lakkia), are included in the Yao nationality; the Yao of Hainan are included in the Miao nationality; and the Nu nationality includes speakers of four languages – two of which, Raorou (Zauzou) and Nusu, are Burmese-Yi languages, one of which, Dulong (Drung), is also the language of the Dulong nationality, and the last of which, Anong (Nung), is related to Dulong and to Rawang in Burma (Myanmar). For maps and linguistic classification, see Wurm *et al.* (1987/1991) or Moseley and Asher (1994).

Ramsey (1987) and Bradley (1994, 2001) have discussed language policy for minorities. Briefly, each recognized nationality has the constitutional right (but not the obligation) to maintain and develop its language and culture, and for each nationality one or more 'standard' varieties has been selected and codified. The overall policy is transitional bilingual education in the first few years of primary school. In some minority autonomous areas, local government has decided to maintain their language even up to university level, but this is the exception. With the transition to a market economy, education in and use of minority languages is decreasing.

Table 1 gives census population figures for all recognized groups in China. The large minority population increases between 1982 and 2000 reflect minority re-identification of Sinicized people who do not speak their traditional minority languages. The Unclassified category includes many very small groups who have not been recognized as separate national minorities and has gradually decreased as some such groups have been assigned to existing nationalities. For example, the 40 000 Kucong of south central Yunnan, who speak a language quite closely related to Lahu, were amalgamated into the Lahu nationality in 1987; and the 5000 Laomian in southwestern Yunnan, whose language is only distantly related to Lahu but who live in Lahu areas and are mostly bilingual in Lahu, were amalgamated into the Lahu nationality in 1990.

The Hui nationality is mainly composed of Muslim speakers of local varieties of Chinese and is usually said not to have a language. However, there is one group of Hui in Gansu who speak a distinctive variety of verb-final Chinese, presumably as a result of influence from languages of the area. Another group of Hui in Tongren County, the Qinghai Province, are locally called Kangjia and speak a Mongol language closely related to Bao'an (Bonan). A third group of Hui in southern Hainan speak a Chamic Austronesian language, Tsat.

The Mongol nationality also shows how ethnic identity and language are not necessarily linked. This group includes the Mongols, whose language is similar to the speech of Mongolia and of the Buriats in Russia. It also includes several southwestern groups who claim descent from Mongol armies sent to China during the Yuan (Mongol) Dynasty. The 'Mongols' of southwestern Sichuan are in fact Moso, speakers of a

Table 1 Population of China by ethnic group[a]

	1982	*1990*	*2000*
Han (Chinese)	936 675	1 042 482	1 137 386
Zhuang	13 378	15 490	16 179
Manchu	4299	9821	10 682
Hui	7219	8603	9817
Miao	5031	7398	8940
Uighur	5957	7214	8399
Tujia	2833	5704	8028
Yi	5453	6572	7762
Mongol	3412	4807	5814
Tibetan	3870	4593	5416
Buyi	2120	2545	2971
Dong (Kam)	1425	2514	2960
Yao	1403	2134	2637
Korean	1764	1921	1924
Bai	1131	1594	1858
Hani	1059	1254	1440
Kazakh	908	1112	1250
Li	817	1111	1247
Dai	840	1025	1159
She	369	630	710
Lisu	481	575	635
Gelao	54	438	579
Dongxiang (Santa)	279	374	514
Lahu	304	411	454
Shui	286	346	407
Wa	299	352	397
Naxi	245	278	309
Qiang	103	198	306
Tu (Monguor)	159	192	241
Mulao	90	159	207
Xibo	83	173	189
Kirgiz	114	142	161
Daur	94	121	132
Jingpo	93	119	132
Maonan	38	72	107
Salar	69	88	105
Bulang	58	82	92
Tajik	27	34	41
Achang	20	28	34
Pumi	24	30	34
Ewenk	19	26	31
Nu	23	27	29
Jing (Vietnamese)	12	19	23
Jinuo	12	18	21
De'ang	12	15	18
Bao'an	9	12	17
Russian	3	14	16
Yugur	11	12	14
Uzbek	12	15	12
Menba (Monpa)	6	7	9
Oroqen	4	7	8
Dulong	5	6	7
Tatar	4	5	5
Hezhe (Nanai)	1	4	5
Gaoshan	2	3	4
Luoba	2	2	3
Foreign-born citizens	5	3	1
Unclassified	879	749	734

[a]Numbers shown in thousands; 1982 1990 and 2000 census data shown.

language classified as eastern Naxi, whose speakers are included in the Naxi nationality in adjacent Yunnan. The 'Mongols' of Tonghai County in south central Yunnan speak a Yi language. The Yugur nationality is another composite group; about half speak a Turkic language and half speak a Mongolic language.

Contact Languages

Since the 1950s putonghua has increasingly become the lingua franca throughout China. It is used as a second Mandarin variety by those whose first speech variety is another kind of Mandarin, as a second Chinese variety by 300 million whose first speech variety is a non-Mandarin variety, and by an increasing proportion of minorities. The trend is for the urbanized or educated minority group members not to speak their traditional languages at all.

Several contact languages have developed in China. One such language is spoken in Wutun and two nearby villages in northeastern Qinghai; it is structurally mainly Mongol, with extensive postpositional agglutinative morphology. However, the speakers follow Tibetan Buddhism (as most Mongols did from the Yuan Dynasty onward) and have long been in close contact with Tibetans and Han Chinese; therefore, the speech of Wutun contains a very large proportion of Tibetan and Chinese lexicon and also shows some influence from the syntactic structures of Tibetan and Chinese. Another is the Portuguese creole of Macao, now moribund; it has extensive Cantonese lexicon, in addition to the various strata of lexicon from previous contact in Malacca (now in Malaysia) and India.

Language Endangerment

Several large nationalities are rapidly losing their languages. This includes the very large Manchu nationality, former rulers of the Jin and Qing dynasties, with about 20 very old speakers left in remote areas. In the southeast, the language of the She nationality in Guangdong Province now has fewer than a thousand speakers, or less than 0.1% of this group. The Gelao nationality, mainly in Guizhou, has fewer than 1% speaking any of the various Gelao languages. Similarly, less than 1% of the Tujia nationality in Hunan and nearby speak either of the two traditional Tujia languages (Northern and Southern Tujia). The Xixia language, formerly spoken in what is now Ningxia and Gansu, has been extinct for over 700 years; many other languages have doubtless disappeared, their descendants now speaking Chinese.

Many of the smaller groups included within composite national minorities speak endangered languages. Bradley (forthcoming) lists 90, including 49 Tibeto-Burman, 16 Tai-Kadai, 7 Miao-Yao, 7 Tungusic, 6 Mon-Khmer, two Turkic, two Mongol, and one Indo-European creole. One example is the Sanie just west of Kunming in Yunnan (Bradley, 2005; Bradley and Bradley, 2002; Bradley *et al.*, 1999). In 76 villages there are 17 320 Sanie, classified as Yi nationality; some of the Han Chinese population of Kunming doubtless also have unremembered Sanie ancestry. All 8000 remaining speakers are bilingual in Yunnanese Mandarin, and most of these are adults.

The long-term prognosis for many non-Han languages of China is bleak. This is especially so for those that are spoken only in less remote areas of China, are not designated as the standard language for their nationality, and do not extend into adjacent countries where they also have official status (Mongol, Korean, Russian, Vietnamese, Tajik, Kazakh, Kirghiz, and Northern Uzbek).

See also: Chinese; Language Education Policy in China; Minorities and Language; Sino-Tibetan Languages.

Language Maps (Appendix 1): Map 81–83.

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China: Religions

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Chinese Religion

Scholars have devised several models to describe the Chinese religious situation at various periods of history. One model that well describes the situation since the Song dynasty (960–1279) considers that – with the exception of religions (Islam, Christianity) that arrived in China from the outside and could not become fully integrated because of exclusive claims of truth – all religious practices, beliefs, and organizations in China belong to a single system, best called Chinese religion. This organic, pluralist, and nonhierarchical system integrates traditions of individual salvation (meditation and bodily techniques, morality, and spirit-possession techniques, including spirit writing), communal celebration (cults of local saints and ancestors), and death rituals together with three institutionalized religions, Buddhism, Taoism, and Confucianism. The sectarian tradition that formed around the 15th century has sometimes been described as China's fourth religion; it has distinctive scriptures and a theology of its own, but is actually well integrated socially into the larger religious system.

The basic principles of Chinese religion were already attested in late antiquity (before the advent of the Qin empire in 221 B.C.E.). They include a cosmology describing an organic universe without either notions of separate matter and spirit or an external creative force that evolves continuously according to objective rules explained by symbolical models (*yin* and *yang*, five phases, trigrams...); a sacrificial liturgy for ancestors and local territorial gods as well as dead heroes and related purification rules (*zhaijie*); practice of spirit possession; and exorcisms to cure illnesses and improper possessions. During the Han dynasty (206 B.C.E.–220 C.E.), Confucianism, the heir of the sacrificial religion of the nobility, was constituted as state religion; Taoism was fully formed as a religion with a distinctive theology, liturgy, clergy, and churchlike organization; and Buddhism began to arrive from Central Asia.

During the medieval and Tang periods (3rd to 9th centuries), Taoism, Buddhism, and Confucianism alternated competition and cooperation before the affirmation of their coexistence and equal orthodoxy was firmly established as an imperial doctrine. All three institutionalized religions attempted to take control of numerous local cults and their spirit mediums with limited success. During the Song period, within the context of a strong demographic and economic expansion, local communities constituted around the cults of their saints, as well as corporate lineages devoted to the cult of their ancestors, emerged as the most common and powerful religious institutions and ushered in a tremendous rise of vernacular religious arts (notably opera and other performing arts in the framework of temple festivals) and techniques (spirit writing, which allows an unmediated direct access to deities and saints). Meanwhile, the clerical institutions of the three religions remained extremely prestigious and respected as they provided scriptural (elaborating theological justifications for local cults) and liturgical services to such local, lay religious communities. This pluralist system remained in place until a sudden shift in religious policies during the 20th century, inspired by the introduction of Western notions, restrained the extent of officially tolerated religious activities. The Republican (1912–) and Communist (1949–) regimes distinguished five authorized although controlled religions (Buddhism, Taoism, Islam, Catholicism, and Protestantism) but actively suppressed superstitions, notably local cults (the Nationalist government in Taiwan has strongly liberalized its stance since the 1970s). This suppression, though, has been much less effective than expected, as the strong renewal throughout the Chinese world, notably on the mainland since the 1980s, shows.

The three institutionalized religions are each precisely defined by a distinctive clergy, a canon (scriptures, which define orthodoxy), a liturgy, and training centers (monasteries, academies, where the canon is kept and the clergy is trained and ordained). The institutions defined by these four characteristics can be properly named Buddhism, Taoism, and Confucianism. They do not exist in isolation but serve Chinese religion as a whole. This whole is not syncretism as it is too often described; the three institutionalized religions are expected to coexist but not mingle, and people do not confuse them. It is an organic, pluralistic religious system. Also, it might prove very useful to dispense totally with the much-abused notion of 'popular religion' or 'folk religion' and indeed with the very word *popular*. The many independent communities that form the social structure of Chinese religion choose within the shared repertoire of beliefs and practices and the services offered by the three religions those that give them relevant meaning, and their choices hinge on socioeconomic, ideological, and theological considerations much more complex than an elite/popular dichotomy can suggest.

The role of Confucianism, Buddhism, and Taoism within Chinese religion then is not to exist as exclusive

institutions providing their members a way to salvation, as the 19th-century Western concept of religion would imply, but rather to transmit their tradition of practice and make it available to all, either as individual spiritual techniques or liturgical services to entire communities. In late imperial times and well into the 20th century, only clerics and a small number of retired laymen (*jushi*) would declare themselves Buddhist or Taoist, but very few Chinese indeed would never engage in Buddhist or Taoist practices. The wide acceptance and official status of the doctrine of the three religions' coexistence made them complementary. The services offered by the three religions and their clerics were comparable in many respects, sometimes causing collaboration and/or competition, while each of the three also provided unique services.

The Three Religions' Approach to Languages and Texts

The birth of Chinese writing is closely associated with religious practices, as the earliest available instances of Chinese writing are divination records, the *jiagu wen*. These texts were written on tortoise breastplates and mammal bones that had been heated after a question was asked of ancestors or other gods, and the answer was read in cracks caused by the heating: both question and answer were subsequently noted on the used breastplate or bone and kept in royal archives. Written language served to keep track of divinations, then, but was not instrumental in the divination process itself.

Among the various institutionalized religions that developed in China, whether indigenous (Confucianism, Taoism) or imported (Buddhism) (*see* **Buddhism, Tibetan**), we might oppose those essentially based on oral teaching and liturgy, that is, Confucianism and Buddhism, and Taoism, which is fundamentally predicated on written texts. This might come as a surprise since both Confucianism and Buddhism are well known for their extensive canons, exegetical tradition, and high valuation of reading and study. However, both these religions describe their own history as initially characterized by oral transmission before reaching a stage at which writing texts became necessary, and only then as a way to safeguard the tradition. Confucius himself claimed to have merely written the texts that he, like any gentleman, had learned as a child. These texts, which became the scriptures/classics (*jing*), that is, authoritative standards for orthodoxy within Confucianism, are fundamentally linked to liturgy. They include the Book of Odes (*Shijing*), essentially odes and hymns to be sung during rituals; the Book of Documents (*Shujing*) recording the grand rituals performed by past kings; the *Yijing*, a divination manual; and liturgical manuals.

A broadly similar process, but under very different circumstances in India, occurred in Buddhism, in which the teachings of the Buddha were reportedly transmitted orally and only noted down during a council when various versions began to diverge too widely. It was only much later, within the early so-called Mahayana (great vehicle) networks, that a devotion to texts as objects formed, linked to a divinization of texts themselves identified as Buddhas and also to specific revelation techniques.

On the other hand, Taoism very early developed a specific theology of writing, whereby written characters in their primordial form (of which the commonly used characters were merely imitations) are considered fundamental elements in the structure of the universe, embodying primordial truths, hence the name *zhenwen* (transcendent writs) for scripts used in the construction of Taoist ritual altars. Similarly, talismans (*fu*) are construed the true names of various cosmic forces, and the proper writing of talismans gives the priest command on such forces. Talismans and transcendent writs are not pronounced but only written. Thus, in contrast to Confucian and Buddhist liturgies in which the crucial act is the proper recitation of texts and hymns, Taoist liturgy hinges on written communication with forces of the Dao. The priest, after purification, writes the various memoirs, requests, and other communications according to precise forms, rules, and models (writing mistakes are punished by the gods); burns them (fire is the main channel of communication between this and the other world); and silently in meditation raises to submit the requests himself in audience with Heaven. This liturgy of the sacrifice of scriptures (which within Taoism replaces the sacrifice of meats of common religion, see Schipper, 1974) has been well attested since the 2nd century C.E. and remains central to Taoist liturgy in the 21st century.

Devotional practices linked to written characters found their first known expression in Taoist community rules (the 'Hundred eighty rules of the Supreme lord', probably 2nd or 3rd century C.E.) and much later developed into a practice known as *xizi*, 'Care for written characters', embedded into common religious ethics of the early modern period (16th to 19th centuries). *Xizi* adepts consider throwing away a paper or other material with any written characters on it (not only scriptures, but any text) as a sin; they treat all such material with care, pick up those discarded by others, and regularly burn them in a clean furnace before bringing the ashes to the sea or a river.

Buddhist influence, notably through the Lingbao revelations (early 5th century C.E.), has caused Taoism

to adopt the oral recitation of scriptures (different modes of chanting exist according to the exact nature of the text, see Boltz, 1996) as a part of rituals and to adopt notions (of Indian origin) of sacred and efficacious sounds proper to the Buddhist tradition. The Buddhist tantric tradition of *dharani*, texts whose recitation provoke a spiritual effect, was also adopted in China well beyond Buddhist circles, and *dharani* texts are found engraved on many supports and are recited in case of danger (Strickmann, 1996).

As a consequence of the adoption of Buddhist notions of efficacious sounds, Buddhist and Taoist clerics have to pronounce (in some cases orally, in others silently) incantations/spells, *zhou* (see Sawada, 1984), that ensure purity and avoid demonic contamination in many precise circumstances (eating, urinating, getting to sleep). Moreover, Chinese religious practice, including the sectarian tradition, values mantras, that is, secretly transmitted efficacious words, either in proper Chinese or in (pseudo-)Sanskrit (*see* **Sanskrit**). On the other hand, the Taoist focus on the written word has not diminished because of Buddhist influence, and Chinese Buddhism had even adopted the Taoist practice of written communication with the otherworld. Large Buddhist rituals since at least the Song period have also included sending written petitions to the Buddhas. Writing and speaking are then two distinct, parallel modes of communication with the divine, the former more Taoist oriented and the latter more Buddhist and Confucian oriented, although all traditions and communities use both media. Ordinary devotees address the deities they pray to either orally in the vernacular (no specific language of prayer has developed) or, with the help of a clerical specialist, by writing and burning a formal request (*shu*).

Scriptures and Revelations

The language of the Confucian and Taoist scriptures is not fundamentally different from that of other contemporary texts. Confucian scriptures were used in educating children (who learned them by rote) and formed the curriculum of state and private schools that developed gradually and, notably under the Song, in relation to state civil service examinations. The style of these scriptures was thus widely imitated, and citations are found throughout any oral or written discourse to the present day. Taoist scriptures, many of which were transmitted only to initiates, did not enjoy such a status as models of writing and speech, yet also exerted a deep influence on poetry, notably the Shangqing texts (revealed during the late 4th century B.C.E.), whose rich and often arduous flowery metaphors and mystic vocabulary informed later secular poetry. Aesthetic judgments on poetic and calligraphy style and doctrinal contents are deeply interconnected in the transmission and diffusion of all Chinese religious texts.

The status of Buddhist scriptures is different because these had to be translated from very different languages, most of them Indo-European (*see*). Translation strategies varied, from using the existing Taoist lexicon (which facilitated adoption, but caused confusions), to transliterating original words, to eventually creating, mostly from existing Chinese words, a new Chinese Buddhist vocabulary (Zürcher, 1991). Part of this vocabulary, including a few transliterations from Sanskrit and other Indo-European languages, has found its way into everyday language. The translation of Buddhist texts was a huge enterprise lasting from the 2nd to the 13th centuries, with the imperial state and rich patrons sponsoring whole translating institutes where native speakers of Indian or Central Asian languages and Chinese monks collaborated to produce word-for-word translations and then readable final texts. Major texts were translated several times by different teams, and the best, most readable versions eclipsed others. Incidentally, in the process of making technical Buddhist dictionaries and transliterating names and words, Chinese scholars developed ways to classify syllables according to initials and finals. At the same time as thousands of Buddhist texts were translated, others, the apocrypha, were written in Chinese while pretending to be translations, and a good deal of the scholastic activity of the Buddhist establishment consisted in compiling canons and sorting apocrypha from true scriptures according to philological as well as theological criteria. The history of translation of Islamic and Christian texts into Chinese, at later periods, bears comparison with the great Buddhist translation enterprise, although the more limited impact of these exclusive religions did not allow new words coined by translators to become everyday vocabulary.

While the Buddhist and Confucian canons were basically closed during the Song period, scriptures of Taoism, local cults, and sectarian traditions continued to appear in large numbers. One major feature of Chinese religion is the openness of revelation. Spirit possession is extremely common, and it is widely accepted that although certain forms of possession by certain spirits are dangerous or not desirable, possession is an authentic means of communication with deities and therefore of accessing truth and obtaining grace. Official religion during antiquity institutionalized possession, but this was no longer the case for Confucianism after the Han or for Buddhism. On the other hand, possession continues to this day to be practiced within the confines of local cults,

devotional groups, and sectarian communities; spirit mediums are not organized as a clergy but are trained by Taoists and work for local communities. Temple spirit mediums are usually regarded with disdain and sometimes hostility by clerics, but play a crucial role throughout China in answering personal queries (difficult choices, righting wrongs) and healing illnesses. When possessed, they may write talismans to help, protect, or cure the patient, but also often act as oracles, speaking with the voice of the god to answer the question asked. The spirit mediums working for spirit-writing groups are different, as they are often considered to have a higher status. When possessed, they hold a forked object, usually made of wood, over a tray of sand, ashes, or just a table and write characters that are then interpreted and noted by an assistant. Books revealed by such means are extremely numerous, edited, printed, and freely distributed (as a pious act) by the groups who received them. They include morality books, *shanshu*, where deities lay out the common ethics of Chinese religion and tell tales of retribution for good or evil acts (on the language aspects of *shanshu*, see Bell, 1996); immortality techniques manuals, where immortals guide directly their adepts in their self-cultivation quest; medicinal recipes; and poetry and other narratives. Such books have been produced by the thousands since the Song, with a sharp increase around the 17th century.

Classical and Vernacular Language in Religious Practice

In China, as in many other cultures, the use of texts and language style differentiates the religious practice of various social classes and groups. As a general rule, an explicit contrast opposes the clergies (Buddhist, Taoist, Confucian), that is, specialists sharing a nationwide training and ordination system and practicing a (supposedly unified) liturgy, with the same texts, music, and chanting/reciting techniques throughout the country, to vernacular specialists totally embedded in local village culture and not related to larger clerical institutions. The former speak (during the course of the ritual) national, classical language, whereas the latter only use the vernacular local dialect (*see* **Chinese**). Such an opposition, best known through the Taoist case where specialists are divided into classical-speaking and vernacular-speaking priests (see notably Schipper, 1985), is similarly observed in the Buddhist and Confucian contexts. It should be emphasized that the classical/vernacular dichotomy is both real in the sense that it is an explicit category for both specialists and laypeople (it is crucial in this context that people do not understand what priests say when speaking in classical language) and an ideological construct hiding much more complex realities. First, the classical language used, supposedly unique throughout the Chinese world, actually varies very much from one region to the next and is often a classical/archaic form of the local language, rather than a language understandable in other parts of China.

Second, rituals actually mix classical and vernacular language; Buddhist and Taoist rituals are composed of many different rites, some very solemn with hymns that have not changed for centuries and some in which improvisation is possible, and the style is much closer to spoken language. Clerics also frequently sing ballads or tell devotional stories in the vernacular, fully understood by the audience. Largely, the same rhetorical dialectics and complementarity between the more prestigious classical and the more vulgar vernacular can be observed in the opera. Chinese opera, which formed under the Song (on the basis of more ancient and not well known antecedents), is intimately linked to Chinese religion and local cults, since temple festivals were the major venue for opera shows. Large temple festivals included both clerical (Buddhist, Taoist, Confucian) rituals within the temple and opera shows outside, both being offered to the local gods. Many opera plays have religious themes (although there is no distinction between profane/sacred themes), and some performing arts have a direct ritual efficacy, such as exorcist plays or puppet shows. Opera also mixed songs in classical language with more vernacular dialogues.

Preaching

Even though the classical/vernacular dialectics valorize the former, it would be wrong to think that vernacular language was universally considered a debased medium for communication with deities or transmitting religious truths in Chinese religious circles throughout history. First, the Song period witnessed a rise, which has not abated since, of the genre of recorded conversations, *yulu*, of spiritual masters, Confucian, Buddhist, and Taoist. *Yulu* are supposed to be verbatim records of question-and-answer exchanges between a master and his/her disciples as actually spoken, that is, in the vernacular. Some of them have actually been edited and cannot truly reflect oral usage, yet such texts are among our best witnesses of spoken Chinese language for the early modern period. The valorization of vernacular language in such texts is linked to a spiritual movement to enhance the living master, his/her actions, and everyday words, rather than the scriptures, as the main guide to truth and transcendence: such

ideas were formulated by Quanzhen Taoism, Neo-Confucianism, and Chan Buddhism, the latter having expressed the most radical statements to this effect, with a (rhetorical) rejection of scriptures as useless and a glorification of 'teaching without words' (Gardner, 1991; Berling, 1987). The late Ming (16th and early 17th centuries) move to use vernacular language in literature (notably novels) was also a religious movement with similar motivations, aiming at retrieving the language Confucius spoke.

A second reason why some religious specialists strove to use the vernacular both in print and in speech was the need to preach. Because the three religions do not have exclusive lay organizations and share the status of orthodox teachings, they do not much proselytize. Clerics and activists, however, have been active throughout history in spreading their message in both print and speech. Late imperial Confucian activists wrote manuals aimed at helping those who had, as the law mandated, to recite an imperially written text on morality (the 'Sacred edicts', *shengyu*) to villagers twice a month. As the sacred edicts in terse written classical style were hardly intelligible when recited aloud, these activists wrote texts in various shades of vernacular aimed at explaining them and providing simple examples (Mair, 1985). Buddhist and Taoist preaching (*see* **Preaching**) was usually somewhat different, being less-tersely didactic and relying more on performing arts techniques. Medieval (5th to 10th centuries C.E.) manuscripts found in Dunhuang include such Buddhist preaching texts (*bianwen*) alternating vernacular speech, rhymed songs, and large images to be shown to the audience. Taoists also developed songs (notably *daoqing*, 'Taoist feelings' ballads) to be sung by clerics and/or professional performers during festivals, promising salvation and appealing to conversion. Devotional literature, telling the stories of the saints and the retribution of evil in the prosimetric style alternating prose and rhymed songs and known as *baojuan*, has been extremely widespread since the 16th century. *Baojuan* performers are invited during temple festivals or in the houses of the large families to recite their texts, a meritorious, pious, and at the same time enjoyable performance that can last for nights on end.

See also: Buddhism, Tibetan; Chinese; Preaching; Sanskrit; South Asia: Religions.

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China: Scripts, Non-Chinese

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Soon after 1949, influenced by policies already instituted in the Soviet Union, the new government of the People's Republic of China decided to promote the recognition of ethnic minority peoples on a scale unprecedented in Chinese history. Groups with fully functional, widely used traditional scripts include the Uygur, Kazak, Mongols, Koreans, and Tibetans (Zhou, 2003: 280). The Yi, Naxi, and Dai had writing systems used only by shamans, priests, or monks. In the pre-1949 era, several scripts were created by Western missionaries (such as Samuel Pollard, Alfred Lietard, and Pere Paul Vial) for some divisions of the Miao, Jingpo, Lisu, Hani, Lahu, and Wa (Va) and the Yi subgroup known as Sani. Other scripts used by the Zhuang, Shui, and Dong were based on vernacular usages of Chinese characters and had very limited implementation. Miao epic poems from Guizhou Province mention an ancient, but lost, script. An absolete form of phonetic script different in form from both Chinese and Yi scripts (see below) and consisting of approximately 180 graphs dates to the Qing dynasty (1644–1911). A traditional 'women's script' (*nushu*) of unknown origin (some have suggested a minority link) was in recent use in Jingyong County, Hunan Province, for writing letters and stories in verse.

One goal of the early era of minority recognition was the creation of written scripts for those groups that did not have a tradition of writing. By the early 1950s, Chinese linguists, often working with local representatives, had begun to devise scripts for a number of the groups, especially those living in the border areas of the southwest. Initially, Cyrillic and roman alphabets were utilized in creating new scripts. In some cases, the International Phonetic Alphabet (IPA) was also used, sometimes in combination with the other systems. Ultimately, roman letters (sometimes with IPA symbols) prevailed in the official scripts, which numbered approximately 13. The trend toward roman letters was strongly influenced by the adoption of the Pinyin romanization system, developed between 1956 and 1958, for writing the sounds of Standard Chinese. Over the ensuing years, script creation was affected by policy revisions, national and local budget allocations, the rate of publication and distribution of script materials, and the degree and effectiveness of local implementation and use. In a few cases, the created scripts crossed borders, as in the case of the Jingpho (Jingpo) script used in Yunnan and contiguous ethnic areas in Myanmar.

Among the first languages targeted for the creation of a new script was Northern Zhuang (Zhuang). China's largest ethnic minority group, the Zhuang, number approximately 15 million and live in the Guangxi Zhuang Autonomous Region and surrounding areas in the southwest. A major challenge was finding a system that could represent the sounds of the various Zhuang dialects, some of which are mutually unintelligible. The key question was which dialect would be the basis for the writing system – an issue in the creation of many of the other minority scripts. At the urging of a Russian specialist, the Wuming dialect was chosen as a standard. A romanized script was first proposed in the early 1950s, but again on Soviet advice, a system combining roman letters, Cyrillic letters, and certain IPA symbols was adopted in the mid-1950s. This script was put to limited use until it was displaced by an all-roman system in 1982. As with several other southern minority scripts, consonant letters placed at the end of a morpheme were used to represent the linguistic tones. Examples of the Pinyin-based script are as follows: *vunz* ('person') employing the second tone (55), *menh* ('slow') employing tone six (33), and *laeuj ndok guk* ('tiger bone wine') employing an alternate usage of the third tone (55) and tone seven (35). Dictionaries, school texts, signs on government offices, and folk literature utilizing the script appeared throughout the 1980s, though Chinese continues to be the primary script for most Zhuang speakers.

By the mid-1950s, Russian linguists were also advising Chinese scholars either to adapt Cyrillic systems already developed in the Soviet Union for scripts for small, seminomadic transborder groups such as the Ewenki and Oroqen, or to create new Cyrillic-based scripts for larger or more sedentary groups of Mongolian-related speakers in northern and northeastern China. One case was Daur, spoken by approximately 100 000 people in eastern Inner Mongolia and Heilongjiang Province (with several thousand speakers in Xinjiang, as well). Traditionally, the Daur have no written scripts of their own. A Cyrillic-based script was created. One concern was the representation of vowel chronemes, which was solved by using double roman letters (such as the Russian 'a' for the IPA 'a', represented as 'aa') (Zhou, 2003: 179–180). This script, however, was never widely implemented. By 1980, a new romanized Daur script was in limited use that included experiments with the script in schools, the publishing of a Daur/Chinese dictionary, and the publication of some folk songs

and stories. Some features of the earlier Cyrillic-based script were carried over into the Pinyin-based romanization, including the representation of chronemes, as exemplified by the words *baatur* ('hero'), *maamaa* (child's term for 'horse'), and *taawudaar* ('number five' in a series). Similar conventions are used in some other scripts, including a mixed IPA and Pinyin script later developed for representing Oroqen, as with *axaaj* ('elder brother') and *axaxaan* ('little brother').

The case of the Yi nationality of the Liangshan Yi Autonomous Prefecture, Sichuan, is unique in that a whole new syllabary was created out of traditional logographic and syllabic graphs. Beginning in the 1950s, a romanized script was created to write the sounds of a variety of Sichuan Yi (Northern Yi) (Bradley, 2001: 207). Three of the four tones in Shynra dialect are represented by final consonants; t (55), x (44), p (21). The mid-level tome (33) is unmarked. An example of the script from a textbook (Li and Ma, 1981: 2) is as follows:

Speaker A: **Nop jiet nyi zzyrmuo bat?**
Your home also well (particle)?
Is your homes well also?
Speaker B: **Zzyrmuo ggehni jjoddu ap jjo.**
happy healthy worries not have.
No worries, all happy and healthy

The romanized script, however, failed to gain popularity, in part because of local attachments to the native writing system (once used by approximately 2% of the population, mostly ritual specialists). In the 1970s, efforts were made to develop a syllabary based on traditional graphs. By 1980, a new syllabic script was being taught in many schools throughout the Liangshan Prefecture and neighboring Ninglang Prefecture in Northern Yunnan. The syllabic script was based on 819 traditional graphs and the Shynra dialect pronunciation (as spoken in Xide County). Newspapers, journals, textbooks, poetry collections, folklore, and other writings have been published in the script, though most modern Nuosu authors write and publish in Chinese, the medium of officialdom. Although the script was welcome in Northern Yi-speaking areas, it was inadequate to meet the needs of speakers from other dialect areas where the traditional scripts vary greatly. Thus, attempts have been made in Yunnan and Guizhou to create a 'supra-X' system based on approximately 2000 traditional characters. It has yet to be fully developed and local conventions are in use in several areas. For instance, scholars of the Sani subgroup in Yunnan have published a number of multilinear folk literature texts combining local versions of traditional Yi characters, IPA symbols to represent Yi sounds, and Chinese graphs. Another factor working against script acceptance in some areas of Yunnan and Guizhou is a decline in speakers of local Yi dialects.

Around 1905, Samuel Pollard created a nonroman alphabetic script for a Miao subgroup (Hua Miao) in eastern Yunnan. The script was modified several times in the 1950s, but is still in use in some areas today (Zhou, 2003: 317–323). By the late 1950s, Chinese linguists had devised romanized scripts for several Miao groups in Guizhou and contiguous areas. As with Yi, the varying degree of intelligibility between dialects has made it difficult for researchers to achieve the elusive goal of a universal Miao romanization system. Although written Chinese is the major script in all the Hmong-(Miao-) speaking areas, in some places the romanized Miao scripts have been implemented in limited ways. In the case of the Eastern dialect (which represents a group of three subdialects in the Eastern Guizhou province), dictionaries, grammars, and folk literature texts have appeared in bilingual editions. In a grammar designed to introduce the Eastern romanized script, eight speech tones are represented by consonants attached to each morpheme: b (33), x (55), d (24), l (22), t (44), s (23), k (53), f (21). An example of first tone usage is *dab* ('reply'), with the second tone *dax* ('come'), the third *dad* ('length'), and so forth. The work also included several long folk stories written in the script. The following sample is from *Dail Daib Pik Vongx* (*The dragon maiden*) (Wang, 1985: 224). The text was presented in a multilinear format with word-for-word Chinese (here substituted by English, followed by a translation):

nongd nangx ngax hek jud, nenx ghax dad laib khangb lol ket tob tob:
need eat meat drink wine, need then grab a calabash come shake lightly lightly:
When he needed to drink wine, he just took the calabash and shook it lightly, saying:
"lol ngax khangb! lol ngax dit ob bad daib nangx khangb!
"come meat calabash! come meat for us father–son eat!
Calabash, bring on the meat, bring on the meat for this father and son to eat!
lol jud khangb! lol jud dit ob bad daib hek khangb!"
come wine calabash! come wine for us father–son drink calabash!"
Calabash, bring on the wine! bring on the wine for this father and son to drink!"

Since 1949, revisions have been made to a number of the traditional scripts, and over a dozen official scripts (and numerous unofficial ones) have been created for various ethnic groups in China. However, social and economic pressures will be a determining factor in the continued use of the minority scripts. The needs of information technology offer new

avenues for the development and use of romanized scripts. By the late 1990s, computerized script programs had been developed for all the major traditional written scripts and several of the newer ones. For example, researchers have developed a romanized Uyghur (Uygur) script that is more compatible with on-line usage than the Arabic-based traditional script (Zhou, 2003: 138). Nevertheless, without increased promotion, it is likely that many of the newer scripts will eventually exist primarily as tools for scholars and symbolic markers of ethnicity.

See also: China: Language Situation.

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China: Writing System

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The Chinese characters are a unique form of writing in the modern, integrated world. They have been the primary script across East Asia, and they have proven to be fascinating to the entire world. In China, their two major forms are those of ancient inscriptions:

1. bronze (*jīnwén* 金文)
2. oracle bone or 'OBI' (*jiǎgǔwén* 甲骨文, *qìwén* 契文)
3. seal (*zhuànwén* 篆文, *zhuànshū* 篆書, *xiǎozhuàn* 小篆)

and the newer ink-brush styles:

1. clerical (*lìshū* 隸書)
2. 'running' and 'grass' (*xíngshū* 行書, *cǎoshū* 草書)
3. modern square script (*kǎishū* 楷書)

In Chinese society today there is considerable knowledge about ancient scripts outside of the community of scholars of paleography. All known styles of Chinese script, including those recently rediscovered through archaeological excavation, are the subject of modern calligraphy practice, one of the prime vehicles of self-cultivation in Chinese traditional secular culture.

Ancient Inscribed Styles

Seal

Seal script has been used on signature seals since 'Warring States' times (475–221 B.C.E.), and was the main form used in public inscriptions in the Qín (221–206 B.C.E.) and Hàn (B.C.E. 206–221 C.E.) dynasties. The Qín standardization of the script is thought to have involved seal script, although it is less well known that Qín itself cultivated a highly conservative character structure in an effort to show that it was the worthy successor of the Zhōu. Seal script has long been used on official seals, and so is associated with political legitimacy.

avenues for the development and use of romanized scripts. By the late 1990s, computerized script programs had been developed for all the major traditional written scripts and several of the newer ones. For example, researchers have developed a romanized Uyghur (Uygur) script that is more compatible with on-line usage than the Arabic-based traditional script (Zhou, 2003: 138). Nevertheless, without increased promotion, it is likely that many of the newer scripts will eventually exist primarily as tools for scholars and symbolic markers of ethnicity.

See also: China: Language Situation.

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China: Writing System

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The Chinese characters are a unique form of writing in the modern, integrated world. They have been the primary script across East Asia, and they have proven to be fascinating to the entire world. In China, their two major forms are those of ancient inscriptions:

1. bronze (*jīnwén* 金文)
2. oracle bone or 'OBI' (*jiǎgǔwén* 甲骨文, *qìwén* 契文)
3. seal (*zhuànwén* 篆文, *zhuànshū* 篆書, *xiǎozhuàn* 小篆)

and the newer ink-brush styles:

1. clerical (*lìshū* 隸書)
2. 'running' and 'grass' (*xíngshū* 行書, *cǎoshū* 草書)
3. modern square script (*kǎishū* 楷書)

In Chinese society today there is considerable knowledge about ancient scripts outside of the community of scholars of paleography. All known styles of Chinese script, including those recently rediscovered through archaeological excavation, are the subject of modern calligraphy practice, one of the prime vehicles of self-cultivation in Chinese traditional secular culture.

Ancient Inscribed Styles

Seal

Seal script has been used on signature seals since 'Warring States' times (475–221 B.C.E.), and was the main form used in public inscriptions in the Qín (221–206 B.C.E.) and Hàn (B.C.E. 206–221 C.E.) dynasties. The Qín standardization of the script is thought to have involved seal script, although it is less well known that Qín itself cultivated a highly conservative character structure in an effort to show that it was the worthy successor of the Zhōu. Seal script has long been used on official seals, and so is associated with political legitimacy.

Figure 1 A page from a Sòng dynasty dictionary of seal forms, with text in square script.

Seal script has been the focus of traditional paleography and graphology, because it is documented in a 1st-century dictionary, the *Shuōwén jiězì* 說文解字, the oldest native work of its kind. But seal script represents a highly evolved stage of development and is not ideal for research on the early history of Chinese writing. It is formalistic and most of its graphs are broadly isomorphic with modern square script, even though seal script differs in having lines of even weight, rounded corners, and rounded line-ends (see the example in Figure 1, from a Sòng dynasty (960–1279) compendium). Characters are written so as to conform to an invisible box and look balanced and neat.

Bronze

Some of the most structurally conservative ancient graphs tend to be those cast on early bronze vessels,

Figure 2 A Western Zhōōu bronze inscription.

which abound from the period of the Shāng (1766–1122) and Western Zhōu dynasties (1122–221). Bronze script was a monumental form; the sacrificial vessels on which it appears were often costly and had ritual functions in the ancestral temples of important families. Many short inscriptions (5–20 characters) exist, recording little more than personal names and a few formal phrases associated with the commissioning of the vessel. An example appears in Figure 2, from a Western Zhōu *guǐ* vessel. But some longer texts (as long as several hundred characters) also exist and are a major source for historical and linguistic study of this period. Their formal nature, however, must never be forgotten; this was not a medium or a context that lent itself to casual writing or to the recording of natural speech.

Bronze script graphs tend to have both regular angles and smooth curves, with lines of varying thickness and separated by irregular spaces. Their size and shape may vary considerably within a single inscription, in contrast to more standardized graphs of later periods. Texts are generally written in columns, top to bottom, continuing right to left, and, in the best inscriptions, the columns have a largely linear appearance, with the graphs about equally spaced. But graphs themselves vary a great deal in form; this is true of both the appearance of primary elements and the structure of compound graphs. Ancient bronzes have been known and handled continuously since their own time (there is a tradition in the received literature that possession of certain vessels of state betokens the possession of the throne). The collection and study of their inscriptions continues in a tradition

Figure 3 A fine oracle bone inscription on scapula.

unbroken since the Sòng dynasty, although modern archaeological finds and linguistic method have increased our knowledge incalculably in the past half century. The form shown here is taken from a modern rubbing (*tàpiàn* 拓片).

Bone

The oldest Chinese writing now known and definitively identified as writing is the oracle bone inscriptions (OBI), dating mainly from the time of the last 12 kings of the Shāng dynasty, or the period ca. mid-14th-century to 1122 B.C.E. Tortoise plastrons and carabao scapulas were used in ritual divination by or for the kings (some were also inscribed with related information), and finally they were either stored or discarded. They were first identified around the turn of the 20th century, and so their study is entirely modern. The great majority of authentic Shāng bones come from an area near Ānyáng in China's Hénán Province 河南安陽, the site of the later Shāng capital; there are also smaller finds from other parts of north China, as well as pieces dating from the early Western Zhōu. Inscriptions are generally classified into five very rough stylistic periods.

Bone and scapula are harder materials than the soft clay on which bronze inscriptions were actually prepared, and OBI are rougher in appearance, with simpler structure and lines that are more jagged (see Figure 3 for an unusually legible and large

inscription). Most OBI finds are fragmentary, and even complete texts are usually short and highly compact. For these reasons, the identification of graphs by linguistic context is often much more tentative than with bronze inscriptions.

Ink-Brush Styles

Although there is internal evidence that OBI and bronze graphs must have developed from earlier ink or painted forms, no undisputed specimens have yet been unearthed. From the 4th and 3rd centuries B.C.E., however, there are a number of examples of cursive ink writing on bamboo splints (*zhújiǎn* 竹簡) and silk (*bóshū* 帛書). Important recent finds come from sites at Bāoshān 包山 and Guōdiàn 郭店 in Húběi 湖北 Province. The texts represented in these documents tend to vary a good deal from received versions, and character structure seems to have been highly variable. The *Shuōwén* records a tradition that, in the fragmentation of 'China' prior to the Qín unification, each politically independent region developed its own style of writing. However, the variation is not simply geographical; we sometimes see the same character written quite differently even within the same document. Materials of this type were not well known in traditional times, although there is a Sòng dynasty dictionary, the *Hànjiǎn*, that contains some related forms.

Cursive brush forms tend to look much more abstract than the older bone and bronze forms. Horizontal strokes are often greatly thickened, and vertical strokes tend to trail off unless they turn and continue horizontally. A sample of a recent find at Guōdiàn appears in Figure 4.

In all brush styles, whether cursive or formal, the brush allows control of the amount of ink released, and the thickening or narrowing of lines becomes an essential part of the aesthetics of the script, in a way that was not seen in the older inscriptional styles. However, from the Hàn onward, we see inscriptions using ink-brush styles, because paper (first widely used in the Hàn) could be pasted on stone and the ink characters on it carved there. That provided a way for medieval Chinese governments to promulgate standard texts in standard script: they erected official editions of the classical texts that were a part of their intellectual basis for rule, and visitors could make rubbings and take them home for study and emulation.

Clerical

True, so-called 'clerical' script is the term applied to cursive writing from the Qín and Hàn, but these are clearly a development from Warring States cursive tradition. From the Hàn we have a number of stone steles carved from ink models. The Cáo Quán Stele

Figure 4 A fragment of Warring States brushwork.

曹全碑, dated 185 C.E. and unearthed in the 16th century, is one of the most striking examples of the style; see Figure 5. The characters are square, with many of the basic stroke types formed in a regular and distinctive way. Writers are evidently paying close attention to control of the brush-tip. Structurally, most of the characters are already very close to modern square script, in spite of stylistic differences.

'Running' and 'Grass' Styles

The 'running' (literally, 'walking') and 'grass' styles are both characterized by ellipsis of discrete structural elements and the flowing connection between various remaining lines of the graph. Grass style is the more elliptical of the two and, contrary to popular belief, is the older, dating from the Western Hàn (B.C.E. 206–8 C.E.); it was originally a cursive development of clerical script. It remains a favored style for calligraphy, and the elegance of fine specimens arouses a visceral aesthetic response in some afficionados, although the effect is often lost on viewers who cannot read Chinese, and is even baffling to them. In more extreme examples, even people who appreciate calligraphy cannot always make out every character. The (relatively moderate) work of the 14th-century Kānglǐ Zǐshān 康里子山 is shown in Figure 6. Running style is generally much more legible for the modern reader; its forms bear a much closer relationship to

Figure 5 From a Hàn stele inscription in clerical script.

modern square script, and it developed later, in the 3rd century, probably as a casual style for use in letters. A rubbing of the running script of the 8th century Lǐ Yōng 李邕 is shown in Figure 7. When the running and grass styles are compared with modern square script, the viewer becomes aware that a kind of systematic vocabulary of ellipsis is involved, and that vocabulary has been made the subject of a number of books, including one in English by Fred Fang-yü Wang (1958).

Modern Square Script and the Simplification Movement

Modern square script is the style in common use today. It seems to have developed by the 3rd century, and rapidly became standard for official writing. No later than the end of the 6th century there were dictionaries circulating that exhibited standard square script forms, no doubt for emulation. Square script does not flow; lines are discrete and generally straight. Vertical lines are supposed to go straight up and down, and horizontal lines are supposed to be almost level, or rising very slightly from left to right. Changes of line direction are clearly expressed and the narrowing and flaring of the different parts of each line are exactly prescribed. Figure 8 shows a 6th-century example from the 7th-century tomb inscription of Sū Cí 蘇慈. Even though it is obviously

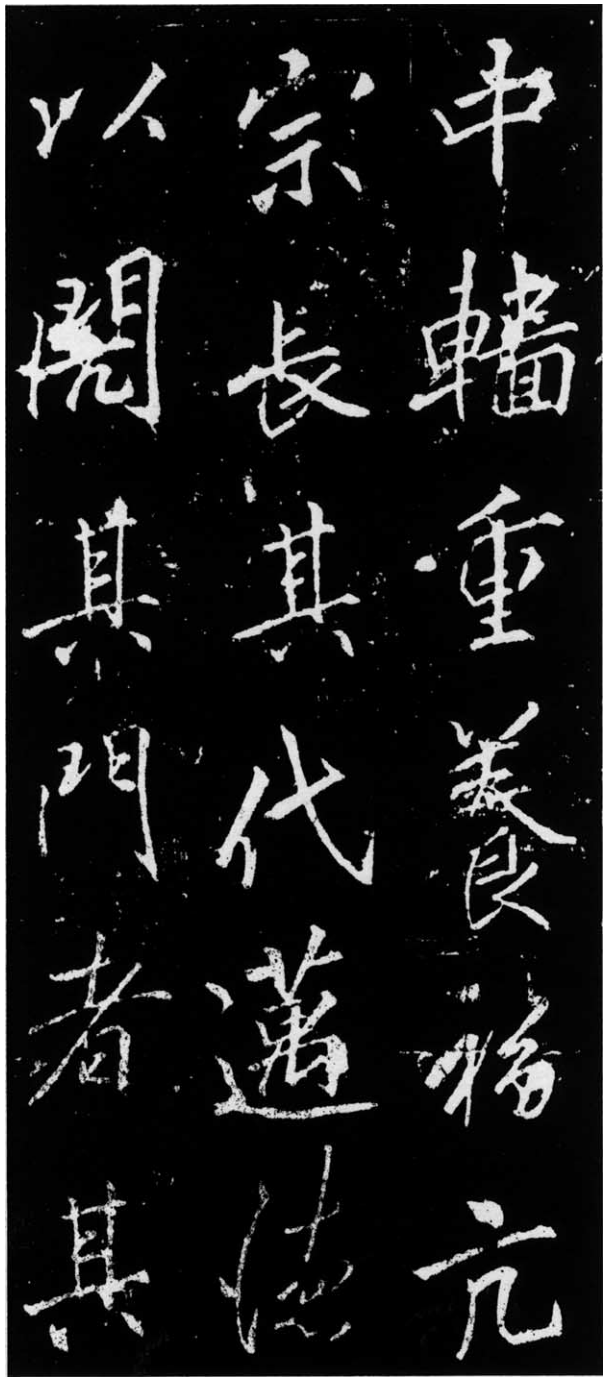

Figure 6 A sample of Mongol-era 'grass' script.

not contemporary, almost all the graphs are instantly readable by any literate person today.

In the 20th century, both the Nationalist (KMT) and Communist governments of China promulgated official lists of 'simplified' characters (*jiǎntǐzì* 簡體字). Many of these graphs are essentially running script forms given a square script cast, and almost all of them have been in popular handwritten use for a very long time, at least regionally and often universally. When the Chinese civil war wound down

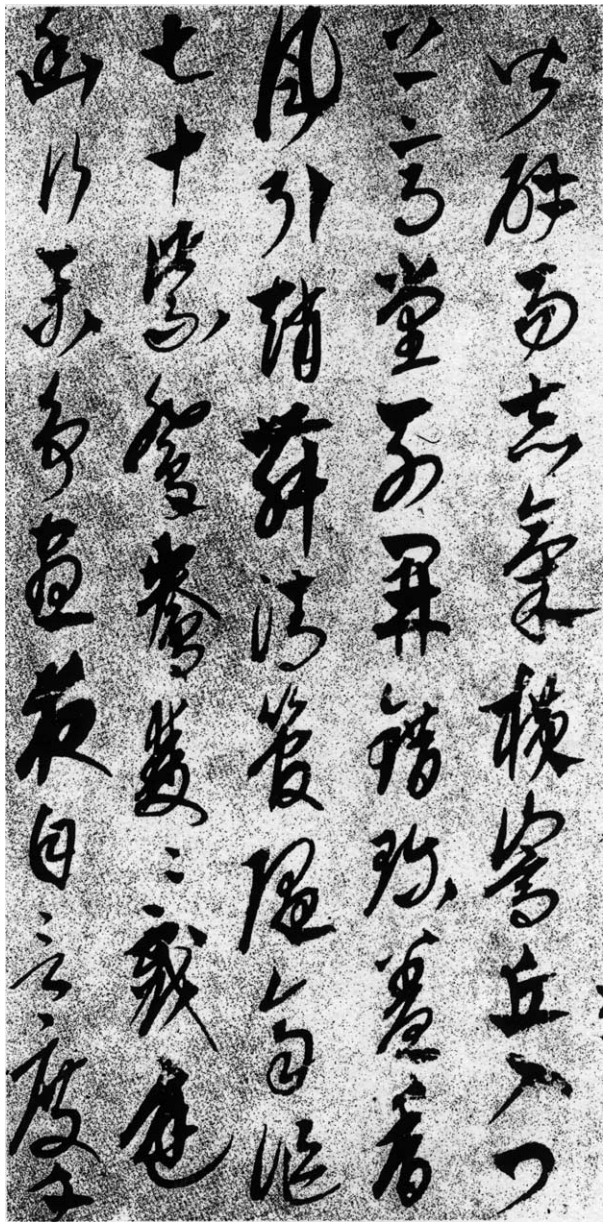

Figure 7 A sample of 8th-century 'running' script.

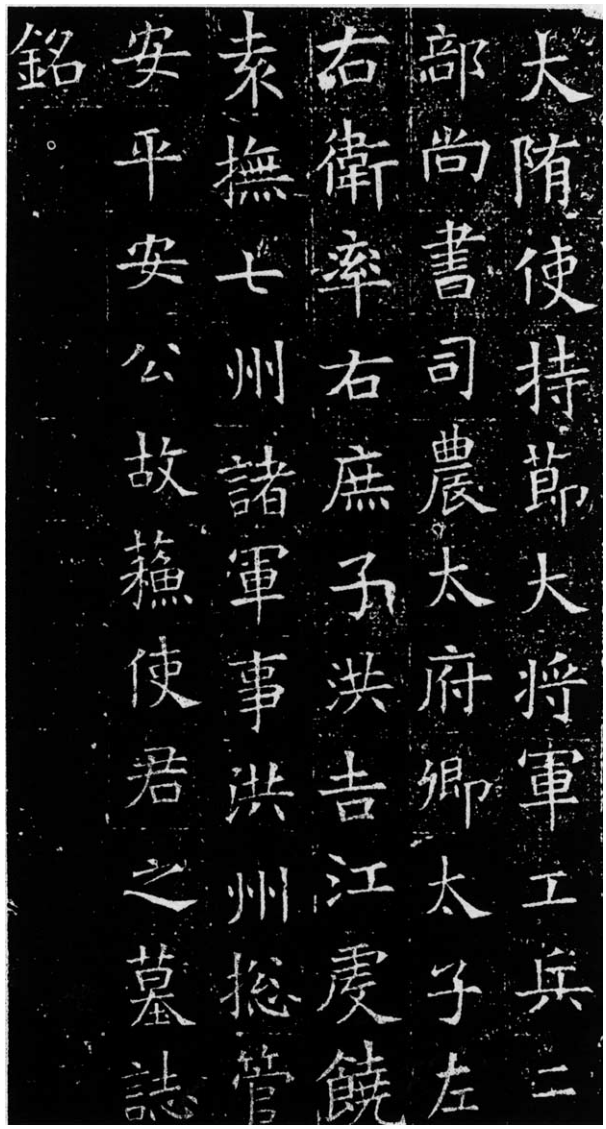

Figure 8 A sample of 7th-century square script.

to a stalemate in the 1950s, the Communist-governed mainland was promoting a simplified script as an aid to proletarian literacy and as a step toward the eventual eradication of the characters, while the KMT-governed island of Taiwan was promoting traditional script, as commonly seen in printed texts from the previous several centuries. In some cases, systematic principles are involved in how characters are simplified, but those principles were never fully implemented. For example, the traditional form 變 is officially simplified to 变, 亂 to 乱, 繭 to 茧, 歡 to 欢, 讓 to 让, and so on. The example of 變 is paralleled by 鸞, 鑾, and 欒 being simplified to 銮, 鸾, and 栾, and the case of 歡 is paralleled by 觀, 權, and 勸 being simplified to 观, 权, and 劝. But there are many other uncompleted sets: 罐, 灌, and 獾 remain unchanged in the official simplified character set, as do 瓤, 壤, and 嚷.

As of the turn of the 21st century, there has not been full popular integration of the simplified and traditional character sets in popular usage, even though the actual differences between the two are relatively superficial. Typically, a week of review is all that is needed for someone literate in one character set to master the other set. But many native speakers of Chinese still claim only to be able to read one or the other set, a declaration that the neutral observer suspects is really about political or regional allegiance rather than any intrinsic incompatibility between the two. Software developers have quietly made it possible for the two sets to be integrated in most computer applications.

As for full alphabetization and the elimination of the characters, as of this writing it remains official Communist policy, but seems to this writer unlikely ever to take place because of the dominating place of the script in Chinese identity. Enthusiasts of alphabetization include a number of prominent Western scholars. DeFrancis (1950) and Serruys (1962) give good resumes of the early history of the simplification and alphabetization movement.

Other Matters of Form and Punctuation

Form of Connected Writing

Until recent decades, Chinese has conventionally been written in straight columns, top to bottom and continuing right to left. (Bronze inscriptions occasionally run in columns from left to right, often in only one of a pair of inscriptions facing each other on the lid and body of a single vessel.) Over the course of the 20th century, it became usual to write in rows from left to right. Taiwan and conservative overseas newspapers made the switch in the late 1990s. In Taiwan and Hong Kong, much literature continues to use the traditional format. In the mainland, only scholarly works of classical literature and philology still frequently follow the traditional format.

Chinese characters in modern print are generally all the same size and occupy an (invisible) square, with the same amount of space between them. Unstressed syllables and the one important Mandarin subsyllabic morpheme (the rhotacizing 'suffix' *-r* 兒 / 儿) always take up the same amount of space as 'full' syllables.

Punctuation

Modern Chinese, since the early 20th century, has been punctuated with a set of symbols derived from Western usage: the period 。 or •, the comma, colon, semicolon, question mark, quotation marks, and exclamation point: : ; ? !. There is also a special 'half-comma' (、) used for separating items in a list (and not rendered orally as a pause, as a comma is in English). The half-comma is derived from the shape of a simple dot as conventionally written with a brush. There are traditional quotation marks 「 and 」 (or ﹁ and ﹂ in columnar format) and brackets 【 and 】 (︻ / ︼), and 〈 and 〉 (︿/﹀). It is usual for all of these punctuation marks to be given the same amount of space as a normal character, although with the advent of computers and wider exposure to other written languages, many typographical practices are in rapid coevolution. There was historically no such thing as italicization, but its availability in word processors has introduced it to the Chinese printed world since the late 1980s.

Traditional printed books usually had no punctuation, although individual readers might 'point' the text by hand, as needed, using a circle or half-comma. However, Warring States bamboo manuscripts often have 'half-comma'-like marks at the ends of what we can identify as phrases and sentences. Traditional teachers would sometimes mark alternate tonal readings of a given character by putting a dot or a small circle in one or another of its corner (so-called *quānpò* 圈破 'circling the "broken" reading'). Ancient bronze inscriptions and bamboo texts made frequent use of a 'doubling mark' (*chóngwén* 重文), which is the numeral 'two' (二) added to the bottom right corner of a character to indicate that the character was to be read twice – sometimes a series of characters could be so marked, meaning that a phrase was to be read twice. Figure 2 contains one such example in the upper left corner.

In later texts, broadly speaking from the Hàn onward, the doubling mark is given its own space as a character, fitting into its own invisible square. By the 6th century we see a more elaborate doubling mark 々 used, which survives in handwriting today.

Ligatures

Ligatures (*héwén* 合文) are very common in ancient texts. We find two common characters pressed into the space of one, often written in such a way as to share strokes, and the doubling mark added at bottom right. There is no firm evidence as to how these were to be read; possibly two morphemes were to be read, or possibly there was some kind of spoken contraction involved.

In Warring States bamboo texts there is a second kind of ligature, where a single compound character has the doubling mark but is meant to be read as two different morphemes. For example, the graph *bìng* 並 'together' with the doubling mark added is understood to be read as *bìnglì* 並立 'standing together'; the graph 並 itself is historically two 立 written side by side, and the use of the doubling mark to indicate 並立 requires that fact to be known to the reader.

The Internal Linguistic Structure of the Chinese Script

The Chinese script is famous for being nonphonetic. Although phonetic principles have plainly determined its development, it remains highly 'defective' in the technical sense: the sounds of speech are represented inconsistently, and are often totally concealed.

Figure 9 Pictographs: 馬, 立, 大 (top) and 口, 目, 月 (bottom).

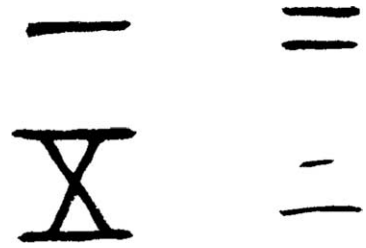

Figure 10 Symbol-graphs: 一, 二 (top) and 五, 上 (bottom).

Primary Elements

Chinese characters are of two basic types: primary elements and compound characters made from two or more primary elements.

A primary element is one we recognize as being indivisible, so that no discrete linguistic meaning attaches to smaller components. Most primary elements are derived from 'pictographs' (*xiàngxíng* 象形 'form-depicting' characters), which stylize some physical object. Examples (from ca. 10th-century B.C.E. bronze inscriptions) are shown in Figure 9: the characters shown represent common Chinese words for 'horse,' 'to stand,' 'large' (in the top row) and 'mouth,' 'eye,' and 'moon, month' (bottom row). In their modern square script forms, the graphs are 馬立, 大 (top) and 口, 目, 月 (bottom).

Another traditional category of primary elements is the *zhǐshì* 指事, graphs that 'indicate a matter.' They are abstract and nondepictive. Figure 10 shows a few examples: 'one' 一, 'two' 二 (top) and 'five' 五, 'on top; to ascend' 上 (bottom). Relatively few primary elements are of this type.

Compounding: Extension of Primary Elements Through Polyvalence

Primary elements often appear as discrete graphs, but frequently we do not see them used in their primary meaning. Rather, the earliest attested usage is often as a loan for a near homophone or synonym standing at some distance from what we believe to be the primary sense. Such 'polyvalent' usage is known in Chinese as *jiǎjiè* 假借 ('loan') usage. Its best known form is semantic polyvalence – 'polysemy,' or the 'rebus' principle, in which one graph represents two words with different meanings but very similar sounds. Polysemy allows us to write words for which no obvious physical symbol can be found, by using any other word that has a sound that is the same or similar. Polysemy is a phonetic principle, and is the most fundamental linguistic principle involved in grasping the structure of Chinese script.

As an example, 立 represents an intransitive verb meaning 'to stand,' but we often see it used in other senses. One such usage is the transitive 'to erect,' although that is not usually considered to be *jiǎjiè* because the meaning 'to erect' is not now associated with a different graph or word. But 立 also stands for the word we now write 位 'place, position.' The ancient spoken word originally written 立 is reconstructed **g-rəp* (Mandarin *lì*), and 位 is reconstructed **rəps* (*wèi*); we believe the two words were alike enough in sound and meaning that the use of one to stand for the other would not have been a big jump for a literate reader. A third word sometimes written with 立 is 蒞 **g-rəps* (*qì*) 'to arrive at one's place.'

The three words standardly written 立, 位, and 蒞 are close enough that we can believe they may have been cognate, and so the use of a single form to stand for all three does not surprise us. But to date we have found no explicit native statement about these relationships, and so are forced to make deductions about the range of loangraph relationships. We also have no explicit word lists – lexicons showing sound, meaning, and a conventional graphic representation – older than about the 6th century C.E., and those from the 6th century are filled with archaisms and late standardizations. Consequently, our ability to reconstruct the early language and identify the words represented by graphs in excavated materials is still very limited.

A second form of polyvalence is 'polyphony' – writing a graph usually associated with one word to represent another word with a totally different sound but similar in meaning. Relatively few examples of this kind have survived the standardizing tendencies of the past 2200 years, but we do see occasional examples such as 屮, associated both with **hngrat* 'sprout' (a word long obsolete) and **'tshuʔ* 艸/草 'plant' in the received literature. In excavated ancient documents, however, there appear to be a great many examples of this kind.

Table 1 Phonetic compounds based on 刀

Graph	*Reconstruction*	*Meaning*	*Structure of graph*
刀	**'taw*	'blade, knife'	pictograph
到	**'taws*	'to arrive'	刀 disambiguated by the addition of semantic determinative 至 **tits* 'to arrive' (the element 刂 is an altered form of 刀)
召	**draws*	'to summon'	刀 disambiguated by the addition of semantic determinative 口 **khoʔ* 'mouth; oral'

Extension of Primary Elements Through Compounding

Primary elements are only a minute proportion of the total number of Chinese graphs. In most cases, a typical Chinese graph is a compound of two or more of them. Compounding is thought to have come about at an early date because of the intrinsic ambiguity of polyvalence. To resolve the ambiguity, 'determinative elements' were added, forming a compound graph. Determinatives may be either phonetic or semantic: they may give the reader a clue to the intended word through either sound or meaning.

The overwhelming majority of compounds involve the addition of a semantic determinative to a primary phonetic element that may once have been used polyphonically. Such 'phonetic compounds' (*xíngshēng* 形聲 'form and sound' graphs) make up the vast proportion of all of the Chinese characters attested from antiquity. Table 1 shows three graphs, two of which are compounds, differentiated semantically from the first, which was a polysemous primary graph.

From 到, another graph 倒 was derived for the word **'tawʔ* 'to fall down (said of a person)'. 倒 is two derivational steps away from 刀: in it, the compound 到 (associated with **'taws* 'to arrive' and **'tawʔ* 'to fall down') has been disambiguated by the addition of semantic determinative 人 **nin* 'person' for the word **'tawʔ* but not for **'taws*.

From 召 have sprung a whole series of secondary compound graphs, shown in Table 2.

And from 昭 another (tertiary) compound 照 has been derived, for **taws* 'to shine on' by the addition of the semantic determinative 灬 (火) **'hməj* 'fire'. None of the elements 至, 口, 人, 日, 手, 水, 言, 走, 音, 糸, 多, or 火 appear to contribute to the overall phonetic value of these graphs; in every case, our ability to read a character stems from the original association of the element 刀 with the sound **'taw*. Many scholars have proposed etymologizing these words so as to link them to the basic meaning of 刀 **'taw*, 'blade or knife': perhaps 'bright' and 'to shine' suggest the sharpness or glint of a blade, or perhaps 'summon' and 'command' suggest compulsion by force of arms. But that is speculation; there is no reason to assume that 刀 was used as anything except a token of sound in these graphs. If 'blade' and 'bright' are related, that is mainly a matter of the etymology of spoken words.

Our ability to describe early graphic evolution in Chinese is greatly complicated by two problems. First, compound graphs are rarely seen in their earliest meanings, and, second, primary graphs are rarely seen in the loan usages that we believe to have been disambiguated later as distinct phonetic compounds. Full documentation may never be possible, because it seems likely that many phonetic compound graphs known in post-Hàn times were perhaps formed directly *as compounds* without having gone through the process of disambiguation of a primary polyphonic pictograph.

A minority of compound graphs were formed by the addition of a phonetic element to an older pictograph. An example is the word *zhù* 'to cast in metal' now written 鑄 **tus* (?). The modern square-script form is a phonetic compound, with 壽 **duʔ* as the phonetic element and 金 'metal' **k(r)əm* as the semantic determinative. Figure 11 shows several ancient forms of 鑄: the three in the top row have in common the primarly elements 皿 'vessel' at the bottom and what appear to be two hands holding some sort of inverted vessel at the top. Between these two parts are variously 火 **'hməj* 'fire', 金 'metal' **k(r)əm*, and the element 㝵, whose reading and meaning are disputed but which appear to be the phonetic element in modern 壽. Of these three graphs, only the one containing 㝵 is recognizable to us as a phonetic compound, in which 㝵 specifies that a word resembling 壽 **duʔ* is intended; the other two must be understood as compounds of some sort. In the bottom row of Figure 11, we see a form containing 火, 金 and 㝵, followed by another form containing only 金 and 㝵 with 口 **'khoʔ* 'mouth' (an element of modern 壽). Both of these must be forebears of modern 鑄. Last is a form containing only 金 and 寸 **stuʔ* (?; likely variant of 手 'hand', phonetic in 守 **stuʔ* 'to protect'); this is also a phonetic compound graph, using a different phonetic element from the received form. In sum, it appears that early ways of writing 'to cast' were not phonetic, but that 㝵 was first added as a phonetic determinative and the complex pictographic elements gradually reduced to 金, which looks like a semantic determinative. But we can see that simple phonetic-plus-semantic structure

Table 2 Phonetic compounds based on 召

Graph	*Reconstruction*	*Meaning*	*Structure of graph*
昭	**taw*	'bright'	召 disambiguated by the addition of semantic determinative 日 **nit* 'sun'
招	**taw*	'to summon with the hand'	召 disambiguated by the addition of semantic determinative 手 **huʔ* 'hand'
沼	**tawʔ*	'pond'	召 disambiguated by the addition of semantic determinative 氵(水) **h(l)uʔ* 'water'
詔	**taws*	'to command'	召 disambiguated by the addition of semantic determinative 言 **ngan* 'to say'
超	**thraw*	'to exceed, surpass'	召 disambiguated by the addition of semantic determinative 走 **ʼtso(k)ʔ* 'to run'
韶	**daw*	'kind of ritual music'	召 disambiguated by the addition of semantic determinative 音 **(r)əm* 'music'
紹	**dawʔ*	'to connect'	召 disambiguated by the addition of semantic determinative 糸 **sə* 'thread'
貂	**tew*	'marten: kind of weasel'	召 disambiguated by the addition of semantic determinative 豸 **lreʔ*(?) 'any legless wild creature' (!)

Figure 11 Six bronze forms of *zhù* 鑄 'to cast in metal'.

is actually late in this graph, and developed following a different path than the 刀 compounds.

Semantic Compounds

Because compound characters are made of two or more primary elements, it is often thought that it is the *meanings* of those elements that combine to indicate the meaning of the whole compound. That is a misconception, one widespread in China as well as abroad. Chinese traditionally call such 'semantic compounds' *huìyì* 會義, graphs with 'meanings conjoined'. There are some graphs that (at present) are almost always explained as semantic compounds; for instance *lín* 林 'forest' is apparently composed of the element *mù* 木 'tree' doubled. But by far the overwhelming majority of compound graphs contain at least one patently phonetic element. Moreover, modern scholars continue to study those compounds that are ambiguous, and, in some cases, they have been plausibly explained as originally phonetic compounds in which the phonetic element has ceased to be recognized. A fine example is 鳴 **mreng* 'to crow,' apparently a compound of the elements 口 **ʼkhoʔ* 'mouth' and 鳥 **ʼtiwʔ* 'bird,' neither of which can be phonetic. However, it has been proposed by modern scholars that 口 is actually a polyphonic element, and that in addition to 'mouth' it also stands for a word meaning 'to call.' In addition to 鳴, common words using 口 phonetically for this sound are 名 **meng* 'name, to name' and 命 ** mrings* 'to command.' Presumably, one of the three words **mreng* 'to crow,' **meng* 'name,' and **mrings* 'to command' is what was originally intended by the use of the primary element 口 in all three graphs. Findings like this are disputed in many circles, however; the *huìyì*-type compound is part of the traditional lore of the Chinese script, whether or not it turns out to have a historical basis.

Character Structure and the Dictionary

Chinese dictionaries have been arranged by sound since at least the 6th century C.E., but how does one find a character if one doesn't know how it is pronounced? To solve this problem, Chinese dictionaries are also arranged by character structure. Usually, the semantic determinative, if there is one, is identified as the classifying element of a graph, and all the characters that have the same semantic determinative are placed together. For example, the characters 馮, 馳, 駁, 駕, 駱, 騎, and 贏 are all placed under 馬 in the dictionary, because 馬 is identified as a recurring determinative element in all of them.

Westerners generally call this element the 'radical' of the character, but the Chinese name (*bùshǒu* 部首) is better translated as 'classifier.' 'Radical' suggests that the determinative element is somehow the etymological 'root' of the graph, when in fact most semantic determinatives are late additions in compound characters; it is the original polysemous phonetic element that really deserves the name 'root.'

See also: Calligraphy, East Asian; Chinese; Printing and Typewriting.

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Chinantec: Phonology

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Chinantecan is a group of about 14 VSO languages within the Otomanguean family, spoken by approximately 90 000 people in northeastern Oaxaca, Mexico, having branched from the Otomanguean tree more than 16 centuries ago. The 14 major languages (where 'language' is defined as a speech community with mutual intelligibility not in excess of 80% with other communities) are Ojitlán, Usila, Tlacoatzintepec, Chiltepec, Sochiapan, Tepetotutla, Tlatepusco, Palantla, Valle Nacional, Ozumacín, Lalana, Lealao, Quiotepec, and Comaltepec. The first seven are northern languages and tend to be more innovative phonologically; the second seven southern languages are more conservative. Syllables are usually CV, with only a few post-vocalic elements, among them a nasal and/or laryngeals. Proto-Chinantec is reconstructed as possessing consonants *p, *t, *k, *k^w, *b, *z, *g, *g^w, *s, *m, *n, *ŋ, *w, *l, *r, and *j. Laryngeals *h and *ʔ could stand alone prevocalically, or could precede any of the voiced consonants. Additional consonant-glide clusters are reconstructed as well. The reconstructed tonal inventory includes *H, *L, *HL, *LH, and *HLH. Vowels included *i, *e, *a, *u, *ɨ, and *ə, as well as several diphthongs. The vowels may be augmented in a bewildering number of ways, however. In modern Comaltepec – the most conservative Chinantecan language – eight vowel qualities (i, e, æ, a, o, ʌ, ɨ, u) may be combined with five tonal qualities (L, M, H, LM, LH), two voice qualities (plain and aspirated), a nasality contrast, as well as a binary length contrast. The cross-classification of these 5 independent systems results in 320 possible nucleus qualities ($8 \times 5 \times 2 \times 2 \times 2$). Thus, a single vowel quality may possess up to 40 contrastive values.

Chinantec roots and words are usually monosyllabic. The rich inflectional system normally involves modification of root vowels, resulting in monosyllabic stems that bear a particularly high informational load. In Comaltepec, for example, a single syllable may contain not only the root but also (in the case of verb complexes) active/stative markers, gender markers (animate/inanimate), transitivity markers (intransitive/transitive/ditransitive), aspect (progressive/intentive/completive), and possibly subject pronoun clitics (two subsyllabic classes). Methods of stem modification involve nasalization, tone, length, phonation augmentation, and sometimes consonant changes. Additionally, certain irregular patterns are marked by ablaut. Due to their inherent inflection,

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Table 1 Partial verb paradigm from comaltepec

hit (transitive/inanimate)	1s	1p	2	3
progressive	bah˩	ba˩	bah˩	bah˩
intentive	bah˥	bah˥	bah˥	bah˩
completive	bah˩	bah˥	bah˩˨	bah˩
hit (transitive/animate)				
progressive	bʌːn̥̍˧	bʌːn̥̍˧	bʌn̥̍˧	bʌːn̥̍˧
intentive	bʌːn̥̍˥	bʌːn̥̍˥	bʌn̥̍˥	bʌːn̥̍˧
completive	bʌːn̥̍˧	bʌːn̥̍˥	bʌːn̥̍˩˨	bʌːn̥̍˧

bare verbal roots do not exist as such in Chinantecan. All Chinantecan languages have a large number of verb classes, along with many lexical exceptions. Classes are differentiated by patterns of identity or nonidentity across aspect/person combinations. For example, in the partial paradigm for the verb 'to hit' shown in Table 1, some complexes are identical to others, while others are different. Verbs in this class will tend to show a similar pattern of identity and nonidentity across cells, while verbs in other classes show a different pattern.

Table 2 provides examples of stem inflection from Quiotepec (Robbins, 1968).

In at least some Chinantecan languages, the verb may be prefixed by a subject agreement marker for intransitive verbs, or by an object agreement marker for transitive verbs. Additional verbal prefixes include a negation marker, and tense and aspect markers (imperfect, past, hodiernal past, perfect, past imperfect, etc.). Unlike verbs, nouns do not typically display internal inflection, instead showing stability across inflectional augmentation. In Tepetotutla, for example, noun roots may concatenate with a quantifier, a gender-inflected numeral, a classifier, etc. In Lealao, constituents of the noun phrase may include a quantifier, the head, a modifier, a possessor, and a deictic marker, in that order, as well as a classifier prefix in some cases.

Stem complexes are obligatorily stressed. Posttonic and pretonic syllables are not stressed. Stressed syllables may possess greater phonological and morphological complexity than do unstressed syllables. In Sochiapan, unstressed syllables differ from stressed ones in displaying a more limited distribution of phonemes. Posttonic syllables in Palantla consist of a small list of words that do not contrast for tonal features. Pretonic syllables, while maintaining tonal contrasts, do not possess postvocalic elements, except in very careful speech. In Comaltepec, posttonic syllables consist of a limited set of clitics, person-of-subject inflectors (in verbs), and possessors (in nouns). Pretonic syllables consist of only several verbal prefixes and a few proclitics, and possess a smaller inventory of tone values. These syllables are not a site for further inflection, and thus do not

Table 2 Examples of stem inflection in Quiotepec (Robbins, 1968)

kʷoː˧	I give (something)
kʷoːˀ˥	I gave (something)
kʷo˧ʔo˥	thou givest (something)
kʷo˧ʔo˥	thou gavest (something)
kʷo˧ʔo˧	I give (something to someone)
kʷo˥ʔo˧	I gave (something to someone)
kʷo˧ʔo˥	thou givest (something to someone)
kʷo˥ʔo˥˨	thou gavest (something to someone)
kʷoːj̩˩ n̥nã˧	I give (something animate)
kʷoj̩˧ n̥nã˧	I gave (something animate)
kʷoːj̩˩ ʔnỹ˧	thou givest (something animate)
kʷoːj̩˧ ʔnỹ˧	thou gavest (something animate)
kʷoːj̩ʔ˩ n̥nã˧	I give (something animate to someone)
kʷoj̩ʔ˧ n̥nã˧	I gave (something animate to someone)
kʷoːj̩ʔ˩ ʔnỹ˧	thou givest, gavest (something animate to someone)

possess morphological complexity. In Quiotepec, too, stress falls on the major lexical classes (verbs, nouns, etc.); most pretonic syllables consist of inflectional material. Pretonic syllables only occur with single tones, never with tonal contours. In at least several Chinantecan languages, the vocalism of posttonic syllables is harmonically determined by the stem vowel. Tone may spread from stem to suffix as well.

Regarding Chinantecan stress, several languages are traditionally characterized as possessing either 'ballistic' stress or 'controlled' stress on stem syllables. In Palantla, Tepetotutla, Sochiapan, and Comaltepec, ballistic syllables have been characterized by an initial surge and rapid decay of intensity, and a loss of voicing of postvocalic elements; controlled syllables exhibit no such initial surge of intensity, displaying a more evenly controlled decrease of intensity, and a lack of postvocalic devoicing. Ballistic syllables tend to be shorter in duration than controlled syllables, and may possess a smaller inventory of tonal patterns. In at least several Chinantecan languages, ballistic syllables cross-classify with almost every other syllable type. Both oral and nasal vowels, both long and short vowels, preaspirated and preglottalized onsets and plain onsets, open and checked syllables, and nasally closed syllables, may all possess ballistic stress. Ballistic stress interacts most significantly with tone, tending to raise high tones and lower low tones. In Lalana, ballistic stress (considered postvocalic h in some analyses) may not occur with glottal checking, and may occur with only H, L, and HL tones, whereas controlled syllables reportedly also possess MH, LH, and HLH, and may be checked. In Lealao, only level tones (L, M, H, VH) may occur with ballistic stress, whereas controlled syllables may also occur with tonal contours (LM, LH). In Comaltepec, ballistic syllables may occur with almost any tonal pattern.

Table 3 Tone sandhi in Comaltepec

Non-sandhi context	*Sandhi context*	*Gloss*
to:˩	kwa˧ to:˥˩	give a banana
ŋɨh˩	kwa˧ ŋɨh˥˩	give a chayote
ku:˧	kwa˧ ku:˥˧	give money
hi˧	mɨ:˧ hi˧˥	I ask for a book
mohʔ˧	mɨ:˧ mohʔ˧˥	I ask for squash

The ballistic stress found in some Chinantec languages corresponds to tonal lowering in Ojitlán and Usila. Quiotepec is variously characterized as possessing ballistic accent or raised tones in these same contexts, often accompanied by postvocalic aspiration. The Chinantecan ballistic syllable corresponds to postvocalic aspiration in related Mixtecan and Otopamean languages, to prevocalic aspiration in related Popolocan languages, and to glottally 'interrupted' (CVʔV) syllables in the Chatino, Zapotec, and Tlapanec languages. Chinantecan ballistic syllables may derive from Proto-Otomanguean *CVh syllables (which may or may not have been phonetically realized as interrupted vowels). Indeed, recent phonetic and phonological investigations have recharacterized the ballistic phenomenon as largely laryngeally-based, involving postvocalic aspiration.

Segmental sandhi is rather limited in Chinantecan, although tone sandhi is widespread, being both phonologically and morphologically conditioned. The best-studied tone sandhi system is that of Comaltepec. Here, LH tones spread their H component on to a following vowel. Furthermore, M tones on unchecked controlled syllables (deriving from Proto-Chinantec H) trigger the presence of an H tone on the following syllable. Examples are shown in Table 3.

See also: Oto-Manguean Languages.

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Chinese

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The State of the Art

If language is ultimately seated in the minds of individual speakers, as some linguists claim, then Chinese can be described as a collection of over 1.3 billion idiolects scattered around the world, in Mainland China, Taiwan, Hong Kong, and Singapore in particular. If on the other hand language is held to be the property of a speech community, as many linguists believe, Chinese is then an assemblage of numerous 'dialects' spreading over different continents and across time zones, some of which are so different that their speakers cannot even communicate with one another. In spite of the vast diversity, and even some mutual oral unintelligibility, all literate speakers can overcome the barrier imposed by the oral unintelligibility via reading (not aloud!) and writing. The writing script partly enables the users to transcend the differences of idiolects and dialects, and bridges the past and the present.

In this article, Chinese will be discussed within its two natural divisions: spoken Chinese and written Chinese. The former includes (1) the classification of dialects and their geographic and demographic

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The State of the Art

If language is ultimately seated in the minds of individual speakers, as some linguists claim, then Chinese can be described as a collection of over 1.3 billion idiolects scattered around the world, in Mainland China, Taiwan, Hong Kong, and Singapore in particular. If on the other hand language is held to be the property of a speech community, as many linguists believe, Chinese is then an assemblage of numerous 'dialects' spreading over different continents and across time zones, some of which are so different that their speakers cannot even communicate with one another. In spite of the vast diversity, and even some mutual oral unintelligibility, all literate speakers can overcome the barrier imposed by the oral unintelligibility via reading (not aloud!) and writing. The writing script partly enables the users to transcend the differences of idiolects and dialects, and bridges the past and the present.

In this article, Chinese will be discussed within its two natural divisions: spoken Chinese and written Chinese. The former includes (1) the classification of dialects and their geographic and demographic

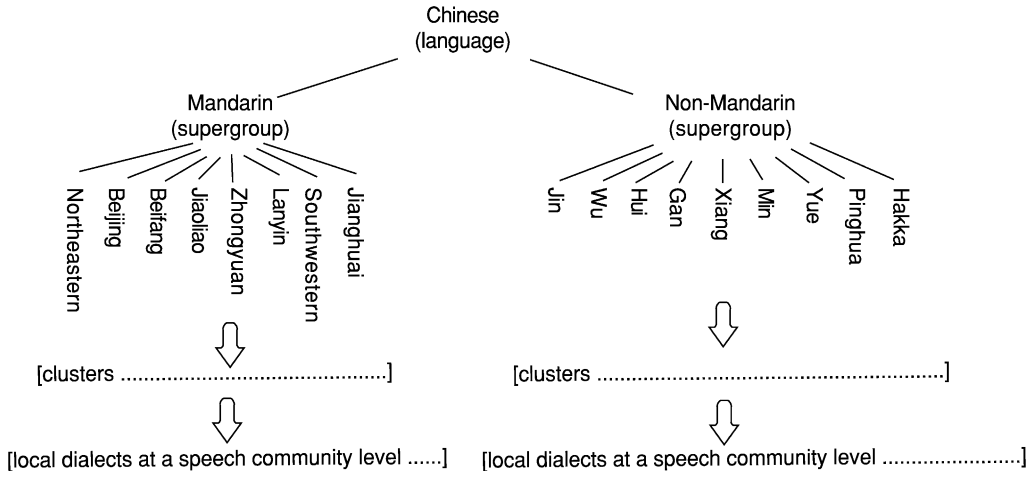

Figure 1 Classification of Chinese dialects.

distributions; (2) Putonghua as a lingua franca; and (3) a brief discussion plus sound illustrations of three major dialects. The latter includes (1) the writing script, and (2) the historical evolution of written Chinese from archaic Chinese to modern Chinese. The article concludes with a summative account of how Chinese, both spoken and written, is electronically processed.

Spoken Chinese

Although Chinese, like any other language in the world, is substantiated in idiolects, i.e., parole in the Saussurean term, they are thrown away after being used as evidence for language system construction i.e., the Chinese language. In other words, talking about Chinese, over 1.3 billion idiolects are generally ignored. What linguists are interested in is the various dialects evolved from them. The number of dialects depends on how fine-grained the researcher's scheme is intended to be. It is hardly a rare case that people in two villages only a dozen of miles apart cannot intelligibly communicate through speech.

Dialect Classification and Distribution

Chinese dialects can be classified by adopting a tree-like structure. The first branching-out from the trunk is the two major supergroups: Mandarin and non-Mandarin. Mandarin includes eight subgroups: Northeastern, Beijing, Beifang, Jiaoliao, Zhongyuan, Lanyin, Southwestern, and Jianghuai. The non-Mandarin group comprises nine subgroups: Jin, Wu, Hui, Gan, Xiang, Min, Yue, Pinghua, and Hakka. Each of the subgroups has its own clusters, each of which in turn encompasses local dialects (see Figure 1).

Geographically speaking, Mandarin is spoken in the following provinces and major cities: Heilongjiang, Jilin, Liaoning, the eastern part of the Inner Mongolia Autonomous Region, Shandong, Beijing, Tianjing, Hebei, Shanxi, Gansu, Qinghai, Ningxia Hui Autonomous Region, Sichuan, Yunnan, Guizhou, Guangxi Zhuang Autonomous Region, western part of Hubei, Chongqing, northern parts of Jiangsu, and Anhui. The total Mandarin-speaking population, based on the 1982 census, was about 662.23 million. Table 1 shows the demographic distributions among the subgroups of Mandarin. The demographic distributions of other non-Mandarin dialects are shown in Table 2.

Mandarin Chinese is often nontechnically regarded as an equivalent to Chinese, which was historically the language of the Han nationality. Thanks to massive immigration and frequent contact, Mandarin Chinese is spoken by non-Han ethnic peoples as well. Some members of the Hui nationality, for instance, who are of Mohammedan origin, adopt Mandarin as their mother tongue. Almost all members of the She and Manchu nationalities speak Mandarin Chinese. Conversely, some people of Han origin in Hainan Province speak the Be language instead of Mandarin.

Putonghua as Lingua Franca

Dialects create diversity and local identity, and at the same time impose constraints on communication and social interaction. A tension always exists between diversification and standardization of the language. Many campaigns have been launched in the long history of China in favor of standardizing both spoken and written Chinese. The policy of *shu tong wen zi* ('writing according to the same script') adopted in the Qin Dynasty (248–207 B.C.) was in fact a systematic reform undertaken by the imperial court to standardize the writing script. In the Sui Dynasty, Lu Fayan's (fl. 600 A.D.) *Qieyun* ('Guide to poetic rhyming') became a standard reference on pronunciation

Table 1 Mandarin-speaking population by 1982

Northeastern	82.00
Beijing	18.02
Beifang	83.63
Jiaoliao	28.83
Zhongyuan	169.41
Lanyin	11.73
Southwestern	200.00
Jianghuai	67.25
*Yet to be grouped	1.36
Total	662.23 (million)

Table 2 Demographic distributions of other non-Mandarin dialects by 1982

Jin	45.70
Wu	69.75
Hui	3.12
Gan	31.27
Xiang	30.85
Min	55.07
Yue	40.21
Pinghua	2.00
Hakka	35.00
*Yet to be grouped	2.06
Total	315.03 (million)

for the generations to come, as well as for the reconstruction of ancient phonological systems. The campaign for the standardization of modern Chinese started as early as the last leg of the Qing Dynasty (1616–1911 A.D.) when the National Language Movement was vigorously launched as a part of the measures to revitalize the shattered country. It was argued that the nation could not be unified without a unified language. Guoyu ('national language') was initially envisaged and artificially constructed on the basis of some major dialects. This proved to be untenable, for it was next to impossible to promote such a language without natural speakers. New Guoyu ('new national language'), with the Beijing dialect as its base, was proposed and eventually adopted. Immediately after the founding of the People's Republic of China in 1949, language reform was put high on the government's agenda. Modern Standard Chinese, officially called Putonghua, was adopted as the national language. It uses the Beijing dialect for its standard pronunciation and northern dialects as its base input. Putonghua is officially stipulated to be the language of instruction at all levels of education, and of mass media.

The term Guoyu is still being used in Taiwan, while in Singapore it is called Huayu (i.e., Chinese). Putonghua, Guoyu, and Huayu are three different terms to refer to more or less the same Modern Standard Chinese.

Modern Standard Spoken Chinese

Phonology The phonological structure of Modern Standard Chinese is conceptualized more in traditional Chinese terms than otherwise. A syllabic structure has three essential components: initials, finals, and tones. The initials and finals are two segments of a syllable, while the tones are supersegmental, i.e., features superimposed on the segments. The initials are the sounds known as consonants in Western literature. The finals, i.e., vowels, have internal structures of their own: the medial and the root of the final, which is further decomposed into two: the main vowel and the syllabic terminal (see Figure 2).

The initial, the medial, and the syllabic terminal are not obligatory to make a Chinese syllable. A simple syllable can consist of a main vowel plus a tone only.

The possible initials, finals, and tones of Modern Standard Chinese are summarized in Tables 3, 4, and 5, respectively.

It is perhaps well-known now to the non-Chinese speaking world that Chinese tones are phonemic, that is, the same phonetic syllable pronounced in different tones will produce different words. The syllable /ma/ is the classic example: ma55 (mother), ma35 (hemp), ma214 (horse), ma51 (scold), and ma0, (a functional particle without a fixed lexical meaning).

While tones are properties of words, there are also intonations of utterances. The relation between the tone and the intonation is often metaphorized as small ripples (cf. word tones) riding on large waves (cf. utterance intonations). The interaction between the tone and the intonation results in an algebraic sum of the two kinds of waves.

Grammar It is generally held that, although Chinese dialects are so diversified that mutual unintelligibility in speech is not uncommon, they are conversely amazingly unified in matters of grammar. There are some minor divergencies found between dialects, for example, with regard to the order of direct and indirect objects, the Wu dialects and Cantonese differing from Mandarin Chinese. Cases like this, however, are extremely limited. It is quite valid to hold that there is one universal Chinese grammar.

At the risk of oversimplification, which is unavoidable in such a short essay as the present one, Chinese grammar, in comparison with English and other European languages, is pragmatically oriented. The subject and predicate in the grammar of Western languages are best viewed as the topic and comment in Chinese. The subject/actor and the predicate/action are treated as a special case of topic and comment.

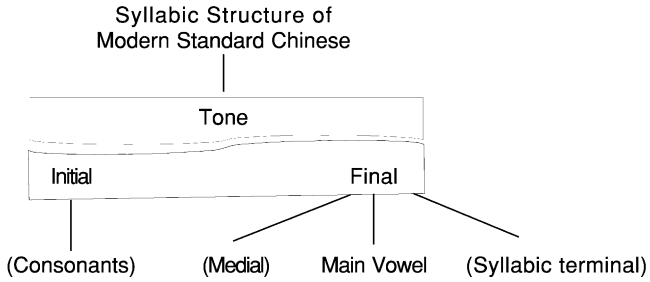

Figure 2 Syllabic structure of Modern Standard Chinese.

Table 3 Initials of modern standard Chinese

Description	*Pinyin*	*IPA*
Bilabials	b	p
	p	pʻ
	m	m
	f	f
Alveolars	d	t
	t	tʻ
	n	n
	l	l
Dental sibilants	z	ts
	c	tsʻ
	s	s
Retroflexes	zh	tʂ
	ch	tʂʻ
	sh	ʂ
	r	ɹ
Palatals	j	tɕ
	q	tɕʻ
	x	ɕ
Velars	g	k
	k	kʻ
	h	x

For instance, *jiu bu he, yan chou* (word-for-word rendering: wine not drink, cigarette smoke) is understood as 'Talking about wine, I don't drink; but as for cigarettes, I do smoke.'

The topic-comment structure has something to do with the complaint often made by Westerners about Chinese saying 'no' but actually meaning 'yes.' Responding to the utterance *zhe shu bu hao* (word-for-word rendering: 'this book not good'), if the speaker also thinks that the book is not good, he will say *shi* ('yes'), meaning that he agrees with what the first speaker said about the book. While the English mind checks the statement against the fact, the Chinese mind expresses agreement or disagreement with the speaker. In other words, the Chinese mind tends to treat the speaker's utterance as setting up a topic, and the responder's job is to comment on the topic. The issue of the truth or falsehood of the statement becomes secondary.

Pragmatics One of the Chinese politeness maxims dictates that the speaker should denigrate him or herself, while elevating the other. This maxim has been codified in a range of lexical items. All the self-related expressions, including those referring to one's family members, relatives, properties, writings, and so on, are marked with denigration, whereas the other-referring expressions, including those referring to the other's family members, relatives, properties, writings, and so on, carry the force of elevation. For instance, a man referring to his own house will politely use *han she* ('cold living place'), but *fushang* ('mansion') to refer to the other's residence.

The self-denigration and other-elevation maxim also operates in compliment-taking. Complaints are made about Chinese failing to take a compliment gracefully. Hearing a compliment like *ni de yifu hen piaoliang* ('your dress is beautiful'), a Chinese lady will vigorously insist that it is very ugly indeed: *bu bu bu, chou shile* ('no no no, deadly ugly').

Written Chinese

In most languages, spoken and written forms are generally regarded as two functional varieties of one and the same language. The relation between spoken and written Chinese, however, cannot be dealt with so readily in the same way. Inscriptions incised on oracle bones, dated 1400–1100 B.C., are the earliest existent written records of Chinese. The inscriptions were not transcripts of the speeches of emperors or tribal kings. They can be regarded, at best, as setting up some of the earliest instances of a particular genre of written Chinese. By the time of the late years of Qing Dynasty (1616–1911) 3000 years or so later, the archaic written Chinese had become so different from the contemporary spoken Chinese that it would take years of dedicated study before one could read and write it. To make things even worse, the archaic written Chinese was prescribed as the medium of education. It was, and still is, no easier for students to learn it than it would be to learn a foreign tongue. Some language reform activists in the 1910s went on record arguing that archaic written Chinese

Table 4 Finals of modern standard Chinese

Pinyin	*IPA*	*Pinyin*	*IPA*	*Pinyin*	*IPA*	*Pinyin*	*IPA*
		i	i	u	u	ü	y
a	a	ia	ia	ua	ua		
o	o				uo		
e	ɣ						
ê	ɛ	ie	iɛ			üe	yɛ
ai	ai			uai	uai		
ei	ei			uei	uei		
ao	au	iao	iau				
ou	ou	iou	iou				
an	an	ian	iɛn	uan	uan	üan	yɛn
en	ən	in	in	uen	un	ün	yn
ang	aŋ	ing	iŋ	ueng	uəŋ		
ong	uŋ	iong	ŋ				
er	ɚ						

Table 5 Tones of modern standard Chinese

Chinese terms in Pinyin	*Description*	*Value in five-point scale*
Yinping (1st tone)	high level	55
Yangping (2nd tone)	rising	35
Shangsheng (3rd tone)	falling-rising	214
Qusheng (4th tone)	falling	51
Qingsheng (neutral tone)		0

was partially to blame for the humiliating decline of the Chinese civilization following the time of the Tang dynasty (618–907).

Attempts to reform written Chinese thus had two aspects: the reform of the writing script and the reform of archaic written Chinese as the medium of education.

Writing Script Reform: Alphabetization Versus Simplification

he nature of the Chinese writing script has been disputed for years, as can be seen in the variety of English terms used to designate the marks on paper known in Chinese as *hanzi* (i.e., Chinese characters): pictographs, pictograms, ideographs, ideograms, phonograms, logographs, ideophonographs, lexigraphs, morphographs, sinographs, and so on. The evidence for the claim that the Chinese writing originated from picture-drawing is substantial. Table 6 shows four instances of pictographs taken from oracle bone inscriptions with their corresponding present-day characters.

It is apparent that the pictographs have evolved, through orthographic reforms, to such an extent that even those characters with highly iconicized origins as shown in the table have lost their picturesqueness. Chinese characters are constructed from five basic strokes (see Table 7) in a square space.

Picture-based character creation is only one of the many ways in which Chinese characters are constructed. Some philologists in the Han dynasty (206 B.C.–220 A.D.), on the basis of the then existent writings, abstracted six principles of character formation. Later studies show that only four of them are genuine: (1) zhi shi, the simple indicative principle; (2) xiang xing, the pictographic principle; (3) hui yi, the compound indicative principle; and (4) xing sheng, the semantic–phonetic principle. The pictographic method of character formation had ceased to be productive by the Han dynasty. The semantic–phonetic character formation has been the most productive of all, and the majority of Chinese characters are thus constructed. It is on this account that the Chinese writing system can be appropriately designated as being morphosyllabic.

A Chinese character can be as simple as one stroke (e.g., 一 'one'), or as complex as dozens of strokes (e.g., 齉 'snuffling'). Given a set of 11 834 characters, the average number of strokes per character is 11.5516, and 63 percent of the set is made of 12-stroke characters. Since it is quite a challenging task to learn to write such characters, there has been no shortage of appeals to reform the writing script. As early as the 1910s, some language reform activists argued for abolishing the characters altogether, to be replaced with a new alphabet script. This proved to be completely infeasible. The PRC government eventually adopted three reform measures: (1) a romanization alphabet known as Pinyin that is used to mark the pronunciations of characters; (2) a simplification scheme according to which 1754 characters would be simplified; and (3) a total of 1055 duplicate characters that were to be abolished.

Table 6 Instances of Chinese pictographs

Pictographs found in oracle bone inscriptions				
Corresponding present-day characters	虎	鹿	馬	象
English translation	tiger	deer	horse	elephant

Table 7 Strokes and character writing

Strokes	*Sample*	*Translation*
一	舞	dance
一		
亠		
丶		
丿		

The Reform of Archaic Written Chinese

Archaic written Chinese models the writings prevalent from the Spring and Autumn (770–476 B.C.) to the Later Han (25–220 A.D.) periods. Partially because the characters were immune to the dynamic changes of actual speech sounds over space and time, archaic written Chinese achieved, as it were, an independent symbolic existence. By the 1900s, it had no natural speakers. It did, however, have several potential rivals under the name *baihua wen,* literally meaning 'unadorned speech writing,' which was far closer to the contemporary vernacular speech. The reform movement basically dethroned archaic written Chinese and replaced it with the baihua wen that had been formerly much despised. The reform proved to be an uphill task, however, as it met with fierce resistance from die-hard adherents.

Three Major Dialects

As graphically shown in Figure 1, the non-Mandarin supergroup falls into nine subgroups of dialects, which of course can be further divided into smaller groups. In this section three dialects, Hong Kong Cantonese, Shanghainese and Fuzhou dialect, representing the Yue group, the Wu group and the Min group respectively, are examined as a window to show what the non-Mandarin dialects look like. They are highlighted here thanks to the demographic size (see Table 2) and relatively prestigious status they enjoy.

The Yue Group: Hong Kong Cantonese

Hong Kong Cantonese is one of the important varieties of the Yue group. It is spoken by 89 percent of Hong Kong's 6.4 million population (by the 1996 census) in family discourse. It is also used in some radio and TV programs, and as an instructional language in schools and university classrooms. English was the main official language in the former British colony, but its use actually was, and still is, quite limited. Since the return of sovereignty to China in 1997, Putonghua has become increasingly popular. Having said this, Hong Kong Cantonese still remains a true vernacular of the local people.

The term 'Cantonese' is derived from Guangzhou, the most influential city in southern China, which is known as Canton in English. Hong Kong and Guangzhou Cantonese are not noticeably different except that the former's lexicon has more English loan words than the latter's. In speech Cantonese and Mandarin or Putonghua are mutually unintelligible. Educated Cantonese speakers, however, use the standard form of written Putonghua. There are some spoken Cantonese words that have no corresponding Putonghua characters. Some Cantonese written words coined by local newspapers and in advertisements in Hong Kong are unintelligible to Putonghua readers.

Backed up by the economic and financial strength and influence of Hong Kong and Guangzhou, Cantonese is enjoying a prestige that is unprecedented for any regional dialect in China, and is the most studied of all the dialects. Grammars, dictionaries, and textbooks have been written to render it more like a language than a regional dialect.

Cantonese has 16 initial consonants. Unlike Mandarin, it has completely nasal syllables with *m* and *ng*

functioning as vowels. For instance, the Cantonese word for the Mandarin word *wu* ('five') is *ng*, which can only be a syllabic nasal terminal of a final in Mandarin. It has eight vowels, and two sets of consonants that can be syllabic terminals: (1) nasals:-m,-n,-ng; (2) unreleased consonants:-p,-t,-k. Its tone system is far more complex than that of Putonghua. The exact number of tones is not without controversy. Some hold that only six tones are clearly distinctive in Hong Kong Cantonese, although there can be up to nine tones in the Yue group.

The Wu Group: Shanghainese

The Wu group is spoken mainly in Shanghai, Southern Jiangsu Province, and a large part of Zhejiang Province. Historically the Suzhou Wu dialect enjoyed more prestige and esteem than the other regional varieties. When Shanghai established itself as an industrial and commercial center in China, it lost its glory and was replaced by Shanghainese, whose speakers seem to be eager to establish their own identity. Shanghainese speakers, who may speak fluent Putonghua, will loose no opportunity to code-switch to Shanghainese if they can be understood by an interlocutor, even at the risk of rudely shutting off any non-Shanghainese speakers from the conversation.

In comparison with Cantonese, Shanghainese is very much under-studied. Existent literature on it mainly consists of academic research papers. Like Cantonese, educated Shanghainese speakers write in written Putonghua, although there exist lexical items that are unique to the dialect.

The term Shanghainese refers to the majority speech of downtown Shanghai. It has 28 initials (i.e., consonants), and 43 finals (i.e., vowels). One of its hallmark features (and also of the Wu group) is a three-way distinction in the initial consonants p, p', and b, which become a two way distinction, p, and p', in Putonghua. Although Wu dialects have seven or eight tones, tones 4, 5, and 6 have been lost as separate categories, which results in five tones in Shanghainese: (1) high level (53), (2) level high (35), (3) low level (13), (4) high + a glottal stop (5), and (5) low + a glottal stop (1).

The Min Group: Fuzhou Dialect

The Min group is mainly spoken in Fujian, Taiwan, Hainan, as well as some areas in Guangdong, Zhejian, Guangxi, and Jiangxi. It is by no means a homogeneous group. On the contrary, even within Fujian Province six subgroups can be identified, one of which is known as the Min eastern subgroup, with the Fuzhou dialect as its prototype. Mutual communicability within this eastern subgroup is quite low.

Table 8 Sample usage in Fujian dialect

Putonghua	*Fujian dialect*	*English translation*
水稻 (shuidao)	粘	rice
书信 (shuxin)	批	letter
冷 (leng)	清	cold
哭 (ku)	啼	cry
逃跑 (taopao)	走	escape
走 (zou)	行	walk

Historically the Fuzhou dialect was understood to cover an area of 11 counties. The present-day use of the term is much restricted to the speech of the locals in downtown Fuzhou. Phonologically it has 15 consonants, 46 vowels including diphthongs, and 7 tones. One of the striking features of the Fuzhou dialect in comparison with Mandarin is that it has preserved a great many archaic words or usages. For instance, the word for 'rice' is 粘 in Fujian dialect, which is totally obsolete in Putonghua. For another instance, the word 批 in Fujian dialect is used to mean a letter, a usage found only in archaic Chinese. Table 8 lists some more instances.

Sound Illustrations

The phonological differences between Putonghua, Hong Kong Cantonese, Shanghainese, and Fujian dialects can be illustrated by the ways four natural objects – the sun, the moon, stars, and thunder – are lexicalized and pronounced (see Table 9).

Chinese Information Processing

At the early stage of computer technology, processing Chinese characters seemed to be such a forbidding task that calls for the romanization of the Chinese writing system were made again, but initial conceptions of the problem proved to be exaggerated. The national standard GB 2312–80, established on the basis of ISO 646 and officially coming into effect in 1981, provides a standard scheme of coding 6763 characters, which are subdivided into two groups according to the frequency of usage: the most frequent set, and the less frequent set. The most frequent set of 3755 characters is assumed to be 99.9% adequate for general usage (based on a statistical study of lexical frequency made in 1974). The GB 2312–80 standard met the demands of hardware and software development and exchange of information for general purposes, but it soon had to be amended as new demands arose. In 1994, a standard coding scheme for two supplementary sets consisting of 7237 and 7039 characters was officially

Table 9 The phonological differences between Putonghua, Hong Kong Cantonese, Shanghainese, and Fujian dialects

Dialects	*The sun*	*The moon*	*Stars*	*Thunder*
Putonghua	太阳 t'ai^{51} • iɑŋ^{1} 老爷儿 lau$^{214\text{-}21}$ iɛr^{35} 日头 ʐʅ^{51} • t'ou^{1}	月亮 yɛ^{51} • liɑŋ^{1}	星星 ɕiŋ^{55} • ɕiŋ^{2}	打雷 ta^{21421} lei^{35}
Hong Kong Cantonese	日头 jɐt^{2}t'ɐu$^{21\text{-}35}$ 太阳 t'ai^{33}jœŋ^{21}	月光 jyt^{2}kwɔŋ^{55} 月亮 jyt^{2}lœŋ^{22}	星 siŋ^{55}	行雷 haŋ^{21}løy^{21}
Shanghainese	太阳 t'a$^{33\text{-}34}$ɦiã$^{13\text{-}44}$ 日头 ȵjɪʔ$^{1\text{-}11}$dɤ$^{13\text{-}44}$	月亮 ɦyɪʔ$^{1\text{-}11}$liã$^{13\text{-}23}$ 月光 ɦyɪʔ$^{1\text{-}11}$kuɑ̃$^{53\text{-}23}$	星 ɕiŋ^{53}	雷响 le$^{13\text{-}22}$ ɕiã$^{34\text{-}44}$ 打雷 tã$^{34\text{-}44}$le^{23}
Fuzhou	日头 niʔ^{544} t'au^{53}	月 ŋuoʔ^{5}	星 siŋ^{44}	拍亮线 p'aʔ$^{23\text{-}21}$liaŋ^{44} s niaŋ^{212}

Note: The characters are transcribed in IPA symbols. The superscripted numbers are tone types with 1–5 values.

announced. As GB 2312–80 was designed to accommodate simplified characters, the new GB 12345–90 was introduced for nonsimplified characters that are maintained in Taiwan and Hong Kong. Nowadays, character recognition for both print fonts and handwriting is commercially available. Text-to-speech synthesis and production in the genre of journalistic texts has achieved a high degree of naturalness. The character script and lexical tones, which were thought to be two major obstacles for Chinese information processing, are no longer condemned, but appreciated as features with a flavor of real Chinese.

See also: China: Language Situation; China: Religions; China: Scripts, Non-Chinese; China: Writing System; Chinese as an Isolating Language; Chinese Lexicography; Chinese Linguistic Tradition; Chinese (Mandarin): Phonology.

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Chinese (Mandarin): Phonology

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Chinese is the first language of over 1 billion speakers. There are several dialect families of Chinese (each in turn consisting of many dialects), which are often mutually unintelligible. However, there are systematic correspondences among the dialects and it is easy for speakers of one dialect to pick up another dialect rather quickly. The largest dialect family is the northern family (also called the Mandarin family), which consists of over 70% of all Chinese speakers. Standard Chinese (also called Mandarin Chinese) is a member of the northern family; it is based on the pronunciation of the Beijing dialect. There are, therefore, two meanings of the term Mandarin Chinese, one referring to the northern dialect family and one referring to the standard dialect. To avoid the ambiguity, I use Standard Chinese (SC) for the latter meaning. SC is spoken by most of those whose first tongue is another dialect. In principle, over 1000 million people speak SC, but in fact less than 1% of them do so without some accent. This is because even Beijing natives do not all speak SC.

SC has five vowels, shown in Table 1 in IPA symbols (Chao, 1968; Cheng, 1973; Duanmu, 2002; Lin, 1989). [y] is a front rounded vowel. When high vowels occur before another vowel, they behave as glides [j, ɥ, w]. [i] and [u] can also follow a nonhigh vowel to form a diphthong. The mid vowel can change frontness and rounding depending on the environment. The low vowel can change frontness but not rounding.

The consonants of SC are listed in Table 2; sounds with limited distribution are in parentheses. For most speakers, [ŋ] cannot occur in syllable-initial position. In syllable-coda position, only [n] and [ŋ] can occur. The palatals do not contrast with [ts, ts^h, s], [ʈʂ, ʈʂ^h, ʂ], or [k, k^h, x]; the palatals only occur with front vowels or front glides, but the other three sets do not. Because some speakers pronounce the palatals as [ts^j, ts^{jh}, s^j], it is possible to analyze a palatal as a combination of a dental and a front vowel. The retroflex liquid (sometimes written as a fricative [ʐ]) is not a trill but an approximant (and has no lip rounding, unlike that in English); because SC does not have a trill, I transcribe it as [r] instead of [ɹ]. The retroflex series [ʈʂ, ʈʂ^h, ʂ, r] is a major characteristic of SC speakers from Beijing. SC speakers from other areas often replace [ʈʂ, ʈʂ^h, ʂ, r] with the dentals [ts, ts^h, s, z]. The unaspirated stops and affricates [p, t, k, ʈʂ, ts] can become voiced [b, d, g, ɖʐ, dz] when they occur in an unstressed syllable.

SC also has two syllabic consonants [z] and [r] (or [ʐ]). They were previously thought to be special vowels, probably because it was believed that every syllable must have a vowel. [z] is used when a syllable starts with [ts], [ts^h], or [s] and when there is no vowel in the rime; it can be seen as the extension of the [s] element into the rime, where it becomes voiced. [t] is used when a syllable starts with [ʈʂ], [ʈʂ^h], [ʂ], or [r] and when there is no vowel in the rime; it can be seen as the extension of the retroflex element into the rime. SC also has a couple of syllabic nasals, which are usually interjections.

The SC syllable can made of up to four sounds – CGVX, where C is a consonant, G is a glide, V is a vowel, X is a nasal or an offglide of a diphthong, and VX is the rime. When both C and G are present, they are realized as one sound C^G, where G is the secondary articulation. Thus, the SC word [s^{w}ei] 'age' is phonetically quite different from the English word [swei] *sway*. SC also has a suffix [r], which changes the rime of the syllable it is attached to from VX to Vr and adds a retroflex quality to the nuclear vowel. In other words, the [r] suffix can lead to loss of contrast in the original coda.

SC has two kinds of syllables, which can be called full (or regular) syllables and weak syllables. Full syllables (mostly monosyllabic content words) have tones and are long. Weak syllables (mostly grammatical words) are short and do not have their own tones. A full syllable can sometimes change to a weak syllable, in which case it loses its underlying tone and

Table 1 Standard chinese vowels

High	i	y	u
Mid	ə		
Low	a		

Table 2 Standard chinese consonants

Labial	*Dental*	*Palatal*	*Retroflex*	*Velar*
p	t			k
p^h	t^h			k^h
	ts	(tɕ)	ʈʂ	
	ts^h	(tɕ^h)	ʈʂ^h	
f	s	(ɕ)	ʂ	x
m	n			(ŋ)
	1		r	

undergoes rime reduction and shortening. In syllable theory, full syllables are heavy and have two moras each, whereas weak syllables are light and have one mora each. In other words, in weak syllables the vowel is short. In full syllables, the vowel is short when the rime is VC or VG and long when the rime is V.

In the electronic dictionary CMUDICT, English has approximately 10 000 monosyllables (excluding homophones). In contrast, SC has a very small syllable inventory, only approximately 400 syllables excluding tones (or approximately 1300 syllables including tones). It is a puzzle why SC uses so few syllables, especially when many times more seem to be available. For example, given about 20 Cs, three Gs, five Vs, and five Xs, there are approximately 2000 possible CGVX combinations (excluding tones), yet just 400 are used. It turns out that two-thirds of the unused forms are ruled out by two requirements. The first is that C and G cannot have the same place of articulation, which follows from the analysis that C^G is a single sound because in a single sound each place feature can be used just once. The second requirement is that V and X cannot have opposite values for [round] or [back].

There are four distinctive tones on full SC syllables. Weak syllables may get tone from certain intonational environments; otherwise, they remain toneless, which is phonetically a low pitch. The four distinctive tones are high, rise, low, and fall. The pitch range of the tones can vary according to stress, whereby a syllable with greater stress has a wider pitch range (Shen, 1985). Using standard tonal features, according to which contour tones are made of two (or more) level tones, the four tones are represented in (1), where the vowel is long because it is in a V rime.

(1)

Tone name	First	Second	Third	Fourth
Tone feature	H	LH	L	HL
Syllable	maa	maa	maa	maa
Gloss	'mother'	'hemp'	'horse'	'scold'

In the alphabet system Pinyin, the words in (1) can be written *ma1*, *ma2*, *ma3*, and *ma4*, where vowel length is not represented and tones are represented by the digits 1–4. The first, second, and fourth tones have normal voice quality, but the third tone has a murmured voice quality. The third tone may also begin with a slight dip in pitch, which does not seem to be phonologically relevant. In final position, the third tone can optionally end with a rise, in which case it is phonetically extra long. Phonologically we may represent it with three moras, exemplified in (2). Such a syllable often has an amplitude break or a glottal stop in the middle, and to some people it sounds like two syllables.

(2) L H
maaa
'horse'

Of the 1300 or so SC syllables (including tones), most are full syllables, in which the four tones are fairly evenly distributed, as shown in Tables 3 and 4. In Table 3, one sees that there are slightly fewer second tones than other tones, but not by a lot. In Table 4, one sees that most syllables have four or three tones each, and only a small number of syllables have two or one tone each.

According to a text corpus of over 45 million Chinese character tokens (Da, 2000), there are over 6000 different Chinese characters, most of which represent monosyllabic words. This means that each SC syllable represents approximately 15 words excluding tones or five words including tones. The homophone load is not distributed evenly, as Figure 1 shows. The top 15 SC syllables are shown in (3), where the number of words a syllable represents (ignoring tones) is shown in parentheses. One might think that the most frequent syllables are the most natural or unmarked, namely, those that children learn first or those that are most common in the world's languages, such as [ba],

Table 3 Frequency of tones

Tone	*First*	*Second*	*Third*	*Fourth*	*All*
Number	337	255	316	347	1255

Table 4 Frequency of tones

Tones per syllable	*4*	*3*	*2*	*1*	*All*
Number of such syllables	178	130	59	35	402

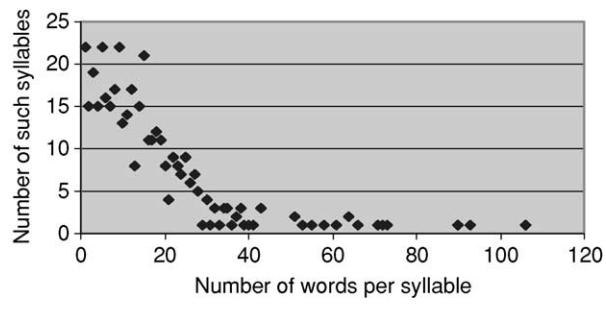

Figure 1 Homophone density in Standard Chinese (ignoring tones), based on the analysis of 6000 characters listed in Da (2000). Most syallables represent fewer than 20 words each, but the syllable [ji] represents over 100 words.

[ma], or [ta]. However, many of the syllables in (3) do not seem to be unmarked syllables.

(3) pi (51), tɕy (51), wei (53), wu (55), ʂɿ (58), tɕan (61), ɕi (64), ɻan (64), tɕʰi (66), li (71), tʂɿ (72), fu (73), ɻy (90), tɕi (93), ji (106)

Most English monosyllables represent just one word each. Because Chinese has so many homophones, a natural question is: How does Chinese avoid ambiguity in speech? The answer seems to be that most ambiguities are clarified by context. For example, although *sun* and *son* are homophones in English, there are few contexts in which they would cause ambiguity.

Despite the large number of homophones, the syllable inventory of Chinese continues to decrease. SC no longer allows [p, t, k] or [m] in syllable-final position, although some other dialects do. Shanghai has lost all diphthongs, and its tonal inventory has reduced to just two. In all likelihood, SC is moving in the direction of further reduction. For example, SC does not make use of such contrasts as [wi] vs. [wei] or [ji] vs. [i], which English does (consider *we* vs. *way* and *yeast* vs. *east*). In addition, about 200 of the 1300 syllables are now rarely used. From a functional point of view, it is a mystery why the high homophone density has not prevented syllable loss in SC or at least slowed it down. A possible answer, paradoxically, is that high homophone density may in fact speed up syllable loss. Studies on frequency effects show that frequent words (Bybee, 2001) are more likely to undergo reduction than infrequent words. Because Chinese has fewer syllables than English, Chinese syllables are used more frequently and so they are more likely to undergo reduction and loss of contrasts.

In disyllabic English words and phrases three kinds of stress differences can be distinguished. In words such as *Peter*, *Anna*, and *panda*, the first is clearly stressed and the other not. In such cases, the stressed syllable is longer, has an unreduced vowel, and has a pitch accent. In contrast, the unstressed syllable is short, has a reduced vowel, and has no pitch accent. In words such as *blackboard* and *pancake*, the stress difference is also clear. Although both syllables are heavy and have an unreduced vowel, one syllable has a pitch accent and the other does not. In expressions such as *Red Cross*, *real deal*, and *red-hot* (adjective), the stress difference is no longer obvious; in each case, both syllables are heavy, have an unreduced vowel, and have a pitch accent. As a result, they are sometimes thought to have equal stress.

When a full SC syllable occurs next to a weak one, their stress difference is like the first English case (*Peter*, *Anna*, and *panda*). When two (or more) full SC syllables occur together, they all have tones and so their stress difference is not obvious; this is similar to the third English case (*Red Cross* and *real deal*). Now, in English the first two cases are quite common, and so stressed syllables often stand out. In Chinese, on the other hand, full syllables often occur together, and so stressed syllables often do not stand out. This may have contributed to a common view that there is no stress in Chinese.

The difference between full and weak syllables in SC can be explained in terms of moraic trochee – a full syllable has two moras, so it forms a foot and has stress. However, Chinese also uses disyllabic feet. For example, the disyllabic foot is used in poetic templates, and it is also a domain for certain kinds of tone sandhi. In addition, a minimal expression should be disyllabic. If a noun is monosyllabic, a semantically redundant syllable is often added. Thus, an SC speaker usually cannot say *Fa* 'France' or *Wang* 'Wang', but must say *Fa Guo* 'France country', *Lao Wang* 'old Wang', or *Xiao Wang* 'little Wang'. In contrast, *Sudan* 'Sudan' and *Yindu* 'India' can be said by themselves (and adding 'country' to them would be odd). The disyllabic requirement has created a large dual vocabulary whereby many words have two forms, a monosyllabic form and a disyllabic form. The disyllabic form is a compound in structure but a single noun in meaning, and it can be called a pseudo-compound. Some examples are shown in Table 5.

It is commonly thought that the creation of disyllabic words is triggered by homophone density. However, the common view cannot explain why monosyllabic names need another syllable, even though there is no ambiguity, such as when you address someone in person. A more likely reason for the creation of pseudo-compounds is to fill a disyllabic foot (Duanmu, 1999b).

A disyllabic noun (or compound) can be heavy-heavy (two full syllables) or heavy-light (a full syllable and a weak syllable), but not light-heavy. This suggests that the disyllabic foot is trochaic. However, when a heavy-heavy noun is spoken in isolation, the second syllable is often longer and appears to have slightly more stress. This has led to the view that Chinese has final stress (Chao, 1968; Hoa, 1983).

Table 5 Pseudo-compounds

Pseudo-compound	*Literal meaning*	*Gloss*
mei-tan	coal-charcoal	'coal'
shi-jian	time-interval	'time'
shang-dian	business-store	'store'
jin-qian	gold-money	'money'
lao-hu	old-tiger	'tiger'

But when a heavy-heavy noun is in nonfinal position, its second syllable no longer has extra duration (Feng, 1985; Wang and Wang, 1993). It seems, therefore, that the extra duration of a final full syllable is due to prepause lengthening and the trochaic analysis fares better overall.

The discussion so far suggests that a disyllabic word contains both moraic trochee and syllabic trochee (Duanmu, 1999a). The structure is shown in (4), which can be called a dual-trochee.

```
(4)                    heavy-light     heavy-heavy
                          x               x
   Syllabic trochee:    (σ   σ)         (σ     σ)
                         /\   |          /\     /\
   Moraic trochee:      (mm) .m         (mm) . (mm)
                          x               x      x
```

The dual-trochee distinguishes three degrees of stress: (1) a heavy syllable that heads a syllabic foot, (2) a heavy syllable that does not head a syllabic foot, and (3) a light syllable. The cases are easy to distinguish in English: (1) an unreduced vowel and a pitch accent (first syllable in *Peter*, *pancake*, or even *city*, if the last word is syllabified as *cit.y*), (2) an unreduced vowel but no pitch accent (second syllable in *pancake*), and (3) a reduced vowel and no pitch accent (second syllable in *Peter* or *Anna*). In Chinese, (1) and (2) are hard to distinguish because they both have tones and unreduced rimes; however, (3) is easy to distinguish from (1) and (2) because it has a reduced rime and no tone.

Because Chinese uses pitch contour (tones) to contrast word meanings, intonation is often expressed not as pitch variation on lexical words themselves, but as boundary tones that are added after lexical tones. Two examples are shown in (5) and (6).

```
(5) Tone          Intonation
    LH        +   L            →   LHL
    nan                            nan
    'difficult'   'affirmation'    'Surely difficult!'

(6) Tone          Intonation
    HL        +   H            →   HLH
    mai                            mai
    'sell'        'question'       'Sell?'
```

The boundary tones can also occur on what might be called intonation syllables. For example, the boundary tone in (5) can occur on [a] or [ou], and that in (6) can occur on [ma].

Many Chinese dialects have tone sandhi, whereby syllable tones change in context. The most well-known tone sandhi in SC is Third Tone Sandhi, by which a third tone changes to a second tone when another third tone follows, or T3 T3 → T2 T3. In an expression made up of many third tones, the resulting change can be quite complicated. To understand the change we must first understand the formation of syllabic feet, which in turn depends on syntax (Shih, 1986; Shen, 1994; Chen, 2000; Duanmu, 2002). Thus, Third Tone Sandhi offers an excellent case for the study of the interaction between phonology and syntax.

In summary, Chinese differs from languages such as English in a number of ways (such as a lack of polysyllabic words, a small inventory of syllables, high homophone density, a dual vocabulary, and the use of distinctive tones). However, the difference is only apparent. Under careful analysis, Chinese also observes linguistic principles similiar to those in other languages (such as foot structure, the behavior of heavy vs. light syllables, and the effect of frequency on syllable reduction).

See also: Chinese; Chinese as an Isolating Language; Chinese Linguistic Tradition; Foot; Phrasal Stress; Word Stress; Tone: Phonology.

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Chinese as an Isolating Language

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If we use the term 'isolating' in what is perhaps its simplest and most often used sense – referring to whether the words of a language are mostly monomorphemic (*see* **Classification of Languages**) – then Chinese can be considered only a moderately isolating language, because Chinese has at least as many multimorphemic as it has monomorphemic words. The term isolating, however, has also been used to refer to whether the morphemes of a language are clearly identifiable, defined by the following properties: (1) whether morpheme boundaries in the language are sharply defined, (2) whether there is only a single distinct morphemic identity represented within a defined morpheme boundary space (i.e., the extent to which there is no overlapping exponence; (*see* **Classification of Languages**), and (3) whether morphemes in the language have a single, invariant phonological form. If we define an isolating language based on an identifiable morphemes criteria, then Chinese scores relatively high on the 'isolating language' scale. It can be profitably studied using both definitions of the term.

Isolating Defined as Having Monomorphemic Words

The definition of isolating language as monomorphemic relies on whether words in a language appear without the obligatory affixation of grammatical morphemic information. This property was intended to contrast with languages such as Russian and Latin in which word roots are generally bound content forms that require affixation of grammatical morphemic information (indicating such properties as case, number, or gender) when they occur in context. For example the Russian root for 'book' (*knig-*) must be augmented with an inflectional ending that reflects case or number (*knig-u* book-ACC.SING; *knig-i* book-NOM.PL), and cannot appear as a bare stem in isolation.

Languages like Chinese whose words occur without such obligatory grammatical marking are considered isolating because the words in such languages may appear in bare form without the necessity of adding morphemic information. The absence of obligatory affixation means that words in such languages will tend to contain fewer morphemes on average, giving rise to the monomorphemic word definition of isolating language.

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As it turns out, many (if not most) Chinese words are in fact dimorphemic, consisting of either (1) two free content morphemes (compound word), (2) one free and one bound content morpheme or two bound content morphemes (bound root word), (3) a free or bound content morpheme plus a word-forming affix (derived word), or (4) a free content morpheme plus an inflectional affix (grammatical word; see Packard, 2000 for further details). However, most dimorphemic Chinese words are either compound words or bound root words, and so the multimorphemic status of Chinese words is generally not due to the presence of affixation. Moreover, when Chinese words do contain affixes, they are never obligatory in the sense that they are required in the default case, as seen in the Russian example above.

Chinese affixes are, nonetheless, sometimes obligatory in an alternative sense: if a property in question is selected to be expressed by the speaker, then the use of the affix concomitant with that property is a required element. Some common examples of this obligatory marking of an optionally selected property in Chinese are the use of classifiers with nouns, the marking of plural numbers on human pronouns, and the use of aspect marking on verbs.

Classifiers are word-forming morphemes that are required when nouns are modified by a number and/or a determiner. For example, the noun *shu* 'book' generally occurs in context in bare form with no grammatical marking whatsoever. But when *shu* is modified by a number such as *san* 'three' or a determiner such as *na* 'that,' the classifier *ben* 'volume' must occur between the modifying element and the noun, yielding *san-ben shu* and *na-ben shu* for 'three books' and 'that book' respectively.

In the case of human pronouns, the personal pronouns *wo* 'I/me,' *ni* 'you,' and *ta* 'he, she' are obligatorily marked with the plural suffix *-men* when the referent is plural in number, to yield *women* 'we, us,' *nimen* 'you (pl),' and *tamen* 'they, them.'

Verbs in Chinese may occur with inflectional suffixes that express various forms of grammatical aspect, that is, that refer to the activity profile of the event represented by the verb. For example, the verbal aspect marker *-le* (note that this is the *-le* that affixes to and has scope over the verb, and not the *le* that occurs in sentence-final position and has scope over the sentence) indicates that the event associated with the verb has been completed, the verbal aspect marker *-guo* indicates that the event associated with the verb has occurred at least once, and the verbal aspect marker *-zhe* indicates that the action represented by the verb is ongoing or continuous.

In Chinese, the obligatory marking of a selected property as seen in classifiers, human plural pronouns, and verbal aspect contrasts with cases in which the marking of a selected property is optional, as with plural marking on regular human nouns. When a human noun is transparently plural in number, the addition of the suffix *–men,* which would explicitly represent a plural number, is optional. For example, in both of the following examples the Chinese noun that translates into English as 'teachers' refers unambiguously to a set that contains multiple members.

(1) laoshi dou you shu
teacher all have book
'the teachers all have books'

(2) laoshimen dou you shu
teacher-PL all have book
'the teachers all have books'

Both examples refer to 'teachers' as a plural concept but only the second overtly marks the plural number with the suffix *-men*. The two examples are identical in meaning, but the second explicitly marks the plural while the first does not.

If Chinese is examined as an isolating language based on its use of monomorphemic words, it is worthwhile to consider in concrete terms where Chinese should be located on the monomorphemic word scale. The contemporary Chinese novel *Shui Ru Da Di* by Wen Fan (2004; Beijing: People's Literature Publishing House) provides a typical sampling. If we examine the first 100 words in the third paragraph on page 16, we find that 51 (51%) of the words are monomorphemic (if by token; 35 words or 47.2% if by type), 45 (45%) of the words are dimorphemic (if by token; 35 words or 47.2% if by type), and 4 words (4% if by token, 5.4% if by type) contain more than two morphemes. If counted by type, 47.3% of the words are monomorphemic, and 52.7% are multimorphemic.

In addition, the average number of morphemes per word token for that hundred-word sample is 1.54. This figure may be compared with the 1.06 morphemes-per-word cited for Vietnamese (perhaps the most purely isolating language using this criterion), 1.68 for modern English, and 3.72 for Eskimo (*see* **Classification of Languages**). In sum, if the concept of monomorphemic words is used as the defining criterion, Chinese must be considered only moderately isolating.

Isolating Defined as Having Clearly Identifiable Morphemes

To determine where Chinese belongs on the isolating language scale using the 'identifiable morpheme' criterion, the first property to consider is sharply

defined morpheme boundaries. In Chinese, morpheme boundaries are nothing if not clearly defined. There is generally no question where one morpheme ends and another one begins in any Chinese utterance. Even in cases of affixation in which the phonological form of the stem is affected, it is quite clear which part of the affixed word belongs to the stem and which part belongs to the affix.

To illustrate, consider the following examples of *-er* (phonetically [ər]) diminution suffixation (data from Cheng, 1973; in IPA, tones not marked). The *-er* suffix often makes only a negligible semantic contribution to the derived word, but it is the affixation operation that has the greatest phonological effect in (Mandarin) Chinese.

The *-er* suffix attaches to words with varying degrees of phonological effect on the stem and on the affix itself. In examples (1)–(3) of Table 1, the *-er* suffix is appended to the stem with the [ə] vowel of the suffix dropped in favor of stem vocalic elements, and with no effect on the phonological form of the stem. In (4), the [ə] vowel of the suffix is dropped and the stem final velar nasal [ŋ] is lost, but its nasality is retained in the form of nasalization on the stem nuclear vowel, that is, [ɑ̃]. In (5), the [ə] vowel of the suffix is dropped and the stem final apical nasal [n] is lost, but its nasality is not retained as in (4). In (6), we see a stronger contribution from the suffix, since it retains its [ə] vowel. In (7), the suffix is appended in unaltered form, and the stem final [n] is displaced. In (8)–(10), the suffix is appended in unaltered form, replacing various parts of the stem final, including its complete replacement in (9) and (10).

The examples in Table 1 demonstrate that even though suffixation of *-er* results in a good deal of phonological variability on both stem and affix, in all cases the resulting derived words contain phonological strings that can be unambiguously attributed to either the stem or the affix, and the phonological identities of the participating morphemes remain clear.

Table 1 Some phonological effects of *-er* suffixation

	Noun	*Noun plus* -er *([ər]) suffix*	*Meaning*
(1)	niou	niour	'ox'
(2)	uɑ	uɑr	'frog'
(3)	kɣ	kɣr	'song'
(4)	gɑŋ	gɑ̃r	'jar'
(5)	p'an	p'ar	'pan'
(6)	i	iər	'clothes'
(7)	in	iər	'seal'
(8)	kuei	kuər	'ghost'
(9)	ci	cər	'word'
(10)	pei	pər	'cup'

Thus, the sharply defined morpheme boundary aspect of the identifiable morpheme criterion for isolating language makes Chinese appear quite isolating indeed.

The second criterion for identifiable morphemes is the existence of overlapping exponence. 'Overlapping exponence' refers to the occurrence of more than one grammatical property within a single affix. For example, in the case of the *-us* ending on the Latin word *lupus* 'wolf', where the *-us* encodes both accusative case and singular number, there is no way to confer an independent phonological identity upon a portion of the *-us* suffix that encodes the accusative and a part that encodes the singular. In Chinese, there are no affixes that do such double duty by systematically encoding more than one grammatical meaning in a single affix. Therefore, Chinese is clearly an isolating language in view of this property.

The third necessary property of identifiable morphemes is invariance of phonological form. Chinese morphemes do commonly change from their citation phonological forms when they appear in context. Such phonological variation, however, is virtually always completely determined by phonological environment. This is in contrast with languages such as Russian and Latin, where allomorphic variation in general is grammatically conditioned, and generally occurs independent of phonological context. In Chinese, the shift from citation form usually involves tone sandhi, a phonologically conditioned change in lexical tone. Two tone sandhi rules from Mandarin, the L tone sandhi rule and the MH tone sandhi rule, provide an illustration (from Chen, 2000: 20, 27).

Mandarin Chinese has four lexical tones: a high (H) tone, a mid-rising (MH) tone, a low (L) tone, and a high-falling (HL) tone. The L tone sandhi rule changes an L into an MH when the L precedes (i.e., occurs to the left of) another L. The MH tone sandhi rule changes a nonfinal MH into an H when it follows (i.e., occurs to the right of) by an H or an MH. In (3), the citation tones for 'to bury a horse' are MH and L, and their surface realizations are the same as their citation forms. In (4), the tone on the word 'buy' in 'to buy a horse' changes from citation L to sandhi MH following the L tone sandhi rule, making utterances (3) and (4) completely homophonous.

(3) mai 'to bury'
MH
mai ma *bury horse* 'to bury a horse'
MH L sandhi tones = citation tones

(4) mai 'to buy'
L
mai ma *buy horse* 'to buy a horse'
L L citation tones
MH L sandhi tones

(5)	fen	shui	ling	*divide water mountain-ridge* 'watershed'
	H	L	L	citation tones
	H	MH	L	sandhi tone forms (intermediate, nonrealized forms)
	H	H	L	sandhi tone forms (final surface forms)

In (5), the citation L tone on *shui* changes to an intermediate, nonrealized sandhi MH tone in accord with L tone sandhi, and that intermediate sandhi MH value for *shui* acts as input into the MH tone sandhi rule, changing the nonrealized sandhi MH tone to a final surface H tone. From these examples it is clear that the phonological shape of Chinese morphemes does undergo considerable variation, but such variation is entirely a function of phonological context.

To conclude, the reputation of Chinese as an isolating language is perhaps not so well-deserved if we rely merely on the monomorphemic word criterion, since the preponderance of Chinese words are multimorphemic. But if our criterion is how easy the morphemes of a language are to identify and individuate, then Chinese scores rather high on the isolating language scale.

See also: Arabic as an Introflecting Language; Chinese; Chinese (Mandarin): Phonology; Chinese Lexicography; Classification of Languages; Finnish as an Agglutinating Language; Italian as a Fusional Language; Morphological Typology.

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Chinese Linguistic Tradition

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In China, linguistic research started very early. Theoretical analysis, lexicography, and dialectology were cultivated by Chinese scholars before the foundation of the Empire (221 B.C.). On the other hand, some fields had to wait until they received a hint from foreign cultures. Phonology was born under the Indian influence in the 3rd century A.D., and grammatical studies began following some Western examples only in the 19th century.

The Beginnings

The idea that language is largely based on an agreement among human beings was established by Xunzi [Xunzi (Hsün-tzu) was one of the most outstanding Confucian philosophers and author of a book of the same name] and Moists [Moism is the doctrine founded by Mozi (Mo-tzu)]. According to the first, 'names are attached to things once for ever, but this link is based on an agreement,' and the latter added, 'names are like painted tigers' (i.e., just a pale image of the real thing).

With the foundation of the Empire, things changed. The major philosopher of the Han dynasty, Dong Zhongshu [Dong Zhongshu (Tung Chung-shu) played a key role in establishing Confucian orthodoxy], adopted the opposite idea of linguistic realism: A natural bond exists between names and things. The Han penchant toward the cosmological theory of the 'five elements' (everything in the world is connected with five principles and modifies following them) prevented them from a nominalistic theory of the language.

It is impossible to underevaluate the imprinting given by the ideographic writing system of Chinese on linguistic studies. The ideograms (it is well-known 'ideogram' is far from ideal when talking about Chinese characters, but more precise terms, such as sinograms or logograms, are not yet widely used), that nearly completely hide the phonological and morphological aspects of the language, and their importance as a tool of the state administration produced a sort of a 'pheticism of the ideograms' in the minds of the cultivated people, who seldom dared to see them closer or to 'open' them to better understand their nature. Therefore, since the very beginning, the pioneering linguistic works in China were not devoted to analyzing speech and its component, the word, but to collecting and comparing ideograms.

First, some dictionaries of difficult words appeared, including the *Ji jiu pian* ('Quick performances') and some others, among which the most important was the *Er Ya* ('Perfection attained'), a list of 2016 words

grammatical system threw a bright light over most of the specific features of Chinese.

Current Situation

Currently, all branches of linguistics are fully developed in China due to the efforts of many scholars at the international level, including Lü Shuxiang, Zhu Dexi, and many others.

The first stage, in the 1950s, was largely dominated by the influence of the Soviet Union.

For example, in a major debate over 'are there or are there not word classes in Chinese?' the core for a long time was actually 'are there or are there not in Chinese the same word classes as in Russian?'

However, it was also open to influences from the West such as structuralism. During the second stage, in the 1960s and 1970s, sociolinguistics (how to simplify the writing system and how to teach the national language) mainly held the ground. The third stage, after the opening to the world and the development of social sciences, succeeded in giving impulse to modern linguistics.

Nevertheless, the tradition still plays a role, and the strong points of Chinese linguistics remain paleography, etymology, dialectology, grammar, and lexicography – much more than general linguistics.

See also: China: Writing System; Chinese; Chinese as an Isolating Language; Chinese Lexicography; Chinese (Mandarin): Phonology.

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Chinese Lexicography

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A Brief Historical Survey

Lexicographical development in China can be divided into three stages. The rudimentary period followed a long and tortuous course from 200 B.C. to the 14th century. The inception of Chinese lexicography was closely related to the study of exegesis, critical interpretation of ancient texts, which inevitably involved the analyses of meaning. It is in this connection that some scholars regard 易经 (*Yi ching; The book of changes*) as the first dictionary in the Chinese language. However, the book hardly has any features typical of a modern dictionary.

It is generally agreed that 尔雅 (*Erya; Near correctness*), which came out in the Han Dynasty (206 B.C.–220 A.D.), consisting of 30 books about the accepted meanings of classic texts, was the earliest quasidictionary in China. The first Chinese dictionary in the modern sense of the word was 说文解字 (*Shuowen jiezi; The origin of Chinese characters*) by Xu Shen in the Eastern Han Dynasty (25–220 A.D.). The book contains some 10 000 Chinese characters with pronunciations and definitions. A few other books having characteristics of a dictionary or an encyclopedia in this stage paved the way for the advancement of Chinese lexicography, including books on Buddhism in the Tang Dynasty (618–907).

The intermediate phase (from 1368 to 1700) was marked by the compilation of the handwritten 永乐大典 (*Yongle dadian; The yongle canon*), a 60-volume encyclopedia compiled in 1408 in the Ming Dynasty (1368–1644). The most important lexicographical publications in this period are encyclopedic in nature, focusing on particular subjects. These include 本草纲目 (*Bencao gangmu; A compendium of herbal medicine*), 1578; 农政全书 (*Nongzheng quanshu; The encyclopedia of agriculture*), a 60-volume work published in 1639; 天工开物 (*Tiangong kaiwu; The exploitation of the works of nature*), a three-volume encyclopedia about agriculture and handicrafts published in 1637. The last of these was later translated into French, Japanese, German, and English.

The modern phase (from 1700 to the present) witnessed the publication in 1716 of a remarkable dictionary, 康熙字典 (*Kangxi zidian; The kangxi lexicon*), with 47 035 Chinese characters. Since then,

thousands of dictionaries have been produced, most of them being published after the 1900s. Some of the notable dictionaries are 四库全书 (*Siku quanshu; The complete library in four divisions*), compiled between 1772 and 1782; 中华大字典 (*Zhonghua da zidian; The great China character dictionary*), with 48 000 characters, compiled in 1915; 辞源 (*Ciyuan*), an encyclopedic dictionary with almost 100 thousand references, published in 1915; 国语正音字典 (*Guoyu zhengyin zidian; A Chinese character dictionary with revised pronunciations*), published in 1926; 新华字典 (*Xinhua zidian; Xinhua dictionary of Chinese characters*), published in 1957; 现代汉语词典 (*Xiandai hanyu cidian*; *A dictionary of modern Chinese*), published in 1978; 汉语大字典 (*Hanyu da zidian; An unabridged dictionary of Chinese characters*), published in 1988–1990; 汉语大词典 (*Hanyu da cidian; An unabridged Chinese dictionary*), compiled 1986–1993; and 中国大百科全书 (*Zhongguo da baike quanshu; The encyclopedia of China*), compiled 1980–1993. Robert Morrison published the first Chinese–English dictionary in 1815. A few other bilingual dictionaries came into being in the first two decades of the 20th century and this category grew in full swing from 1970 to the end of the century.

Recent Developments

Since the 1990s, a number of electronic dictionaries have been produced. Chinese dictionaries in the electronic media are chiefly focused on the 'personal digital assistant' (PDA) and other hand-held devices. There are a few online dictionaries and encyclopedias on CD-ROM, but they generally lack the multimedia functions that are the principal advantage of such dictionaries. For example, *The encyclopedia of China* has a four-CD version that is even larger in scope than Microsoft's *Encarta*. It boasts over 50 000 pictures. The other media formats (sounds, video clips, and animations), however, are yet to be incorporated. Pocket e-dictionaries in China have their own advantages, though. Most of them offer two-way translation and can be updated easily. As for online dictionaries, they invariably present a much more extensive vocabulary than is found in paper dictionaries, and are revised and updated at irregular intervals.

At one time, plagiarism was rampant, but after a celebrated lawsuit in 1993, Chinese copyright laws and intellectual property rights began to be respected. For several years, however, in the wake of this lawsuit, there were heated intellectual discussions in Chinese lexicographical circles about what constitutes a breach of copyright in dictionary-making and how to eliminate the problem.

Another significant development in Chinese lexicography has been a shift from prescriptivism to descriptivism. Take 现代汉语词典 (*A dictionary of modern Chinese*), for example. This dictionary used to be (and in many ways still is) considered as the authority on the Chinese language. It is a prescriptive model of how Chinese should be written. The new edition published in 1996, however, contains a number of colloquialisms and new borrowings from foreign languages.

In recent years, corpus linguistics has been given more attention in China. Quite a few corpora, ranging in size from 1 million to 70 million words, have been established in Guangzhou, Shanghai, Beijing, and Nanjing. For instance, the general-purpose Chinese corpus at Tsinghua University contains some 50 million words and the Chinese Academy of Social Sciences has a corpus with 10 million words. As a result, corpus-based dictionaries have been compiled and are available to the general public.

Retrieval Systems

In Chinese, the character is the basic semantic unit, so that conventionally the distinction can be made between 字典 (*zidian*), a dictionary of Chinese characters, and 词典 (*cidian*), a dictionary of Chinese words comprising one, two, or more characters. The generic term for dictionaries and encyclopedias in Chinese is 辞书 (*cishu*), which also denotes any reference work. Since Chinese is an ideographic writing system in which symbols represent ideas rather than sounds, the macrostructure of a Chinese dictionary is traditionally organized in brush-stroke order instead of the alphabetical order. The retrieval of characters in Chinese dictionaries is achieved by means of radicals. The user checks the radical index for the page number of the character to be consulted. Then, in the microstructure, the user looks for the word or words grouped under that character. The radicals are arranged in ascending order of the number of strokes. The basic rules for brush-stroke order are as follows: (1) horizontal strokes precede vertical strokes; (2) downward–left curved strokes go before downward–right curved strokes; (3) from top to bottom; (4) from left to right; (5) from outside to inside; (6) middle strokes go before strokes on the sides. Due to the complicated nature of Chinese characters, in 1997 the National Working Committee on Chinese Speech and Writing issued a set of guidelines called the Standard Brush-Stroke Order of Modern Chinese Characters.

In modern Chinese dictionaries, however, 拼音 (*pinyin*, a scheme for the Chinese phonetic alphabet in Roman letters), is adopted in addition to the radical index, so that the user can look up characters in the

alphabetical order of *pinyin*. As Chinese is a tonal language, the flat tone is conventionally given first for words having the same pronunciation but different tone, followed by the rising, falling-rising, and falling tones. In the case of homonyms, brush-stroke order applies.

In the 1920s, Wang Yunwu (Y. W. Wong), the editor-in-chief of the Commercial Press Ltd. in Shanghai, invented his 四角号码检字法 (*sijiao haoma jianzi fa*, the four corner system). Each Chinese character is given a four-digit number according to the brush strokes in the system. The user has to identify the elements of the four corners of the character in question by moving clockwise from the upper left-hand corner, then the upper right, next the lower left, and, finally, the lower right-hand corner. When the four digits have been determined, the user checks the four-corner index to find the page number for the character to be consulted. The system is difficult to handle at first, but once the rules are mastered it becomes easy. For various reasons, the four-corner system is out of fashion nowadays, at least in mainland China.

Standardization

The plethora of dialects in China makes it necessary to employ 普通话 (*putonghua*, or Mandarin) as the official language and to standardize the spoken and written forms. A number of academic organizations in China are directly or indirectly involved with language standardization, for example the National Working Committee on Chinese Speech and Writing, the National Committee on the Standardization of Chinese, the National Committee on the Standardization of Scientific and Technical Terminology, the Standardization Administration of China, the China Language Modernization Society, the China Language Society, and the China Lexicographical Society.

Three Chinese publishing houses specialize in dictionaries: Shanghai Lexicographical Publishing House, Hubei Lexicographical Publishing House, and Sichuan Lexicographical Publishing House. There used to be authoritarian control over which Chinese presses could publish reference works, but now such restrictions have been lifted. The Chinese journal 辞书研究 (*Cishu yanjiu, Lexicographical studies*) is devoted to issues related to all reference works.

Dictionary Types

Chinese lexicography in modern days covers every type in the field, ranging from desk dictionaries to pocket versions in size, from paper to electronic editions in media, and from monolingual to bilingual in language. Although written Chinese is homogeneous, the spoken form varies geographically. There are scores of such variations. To cope with this problem, and partly as an effort to preserve the cultural heritage, dictionaries have been compiled for the major regional dialects. It should be noted that 汉语 (*hanyu* Chinese or Mandarin), the official language in China, literally means 'a language spoken by the Han nationality.' There are other languages used by minority ethnic groups in the country, such as Tibetan, Mongolian, and Weiwuer. Bilingual dictionaries in China therefore may be foreign language (FL)-Chinese, Chinese-FL, minority language (ML)-Chinese, or Chinese-ML. In fact, many ML-Chinese and Chinese-ML dictionaries have been published since 1950.

Markets

Given the large population of China (1.29 billion in 2003), the market for dictionaries, both monolingual and bilingual, is vast and continues to expand. Over 400 million copies of 新华字典 (*Xinhua dictionary of Chinese characters*) have been printed between the first edition in 1953 and the 10th edition in 2004. Considering the fact that there are tens of millions of English learners in the country, it is not surprising that most bilingual dictionaries can command a ready sale. 新英汉词典 (*Xin yinghan cidian; A new English–Chinese dictionary*), for example, has sold over 10 million copies since the 1970s. International publishing houses have been trying to enter the market since China joined the World Trade Organization in 2001. It can be reasonably expected that, with the improvement of literacy among the young generation and the expansion of college enrollments, the dictionary market will grow even more extensively.

See also: Bilingual Lexicography; China: Writing System; Chinese; Chinese as an Isolating Language; Chinese Linguistic Tradition; Chinese (Mandarin): Phonology; Corpora; Corpus Linguistics; Corpus Lexicography; Language Education Policy in China; Lexicography: Overview; Lexicology; Plagiarism; Thesauruses; Tone: Phonology.

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Relevant Websites

http://www.omniglot.com – Provides a guide to the Chinese writing system.
http://www.camsociety.org – For discussion of Chinese brush strokes.
http://www.pinyin.info – For information about Chinese phonology.

Chino, Eiichi (1932–2002)

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Eiichi Chino, who taught in the Tokyo University of Foreign Studies (Gaikokugo daigaku) and former president of Wakō University, was known above all as a Japanese Bohemicist, a specialist in Czech philology, who studied and later taught the Czech language, wrote textbooks (co-author of *Chekogo no nyūmon* [Introduction to the Czech language], 1976, Tokyo: Hakusuisha), lectured on Czech language and literature, and published a series of essays on various aspects of Czech cultural and political life (Chino, 1990, 1997). Eiichi Chino translated into Japanese a variety of text genres, ranging from books for children (cf. František Hrubín, *Kuřátko a obilí–Hiyoko to mugibatake* [The little chicken in a field of grain]) to film scripts (the Oscar nominated film *Kolya*), libretti (Leoš Janáček's opera *Osud – Unmei* [Fate]), and a collection of essays by the leading Czech structuralist Jan Mukařovský (co-translator, see Mukařovský, 1982). What brought Chino fame and admiration, however, were above all his translations of canonical Czech literature. He had a lifelong affection for Karel Čapek, whose unique style not only found in Chino a sensitive and creative interpreter (Karel Čapek's play 'R.U.R.' – *Robotto, Kareru Chapekku*. Tokyo: Iwanami Shoten, 1989) but also a keen director, who engaged his Tokyo students of Czech (at Gaikokugu daigaku) in staging the play. Preceding 'R.U.R.' were Chino's own essays on Karel Čapek (Chino, 1975). Chino wrote epilogues to many of his translations familiarizing Japanese readers with the Czech cultural setting. Among other Czech authors translated by Chino were Franz Kafka, Viktor Fischl, Milan Kundera (1992, 1998), and Ota Pavel (2000). In 2000, for rendering outstanding service to Czech culture (see also his articles and essays in *Asahi Shimbun* and a series of university lectures in the 1980s on the Prague Linguistic Circle), Eiichi Chino was awarded the Medal of Merit, First Grade by President Václav Havel. The interest in Czech philology, though deep and emotional, always remained part of Chino's broader interest in Slavic philology (including Old Church Slavonic, Russian, Polish, Slovak, Serbo-Croatian and Bulgarian), and comparative linguistics ("Studies of Non-Indo-European Languages" in Miyaoka, O. (ed.), *Languages of the North Pacific Rim: types and history*. 1992. Tokyo: Sanseidō,). Eiichi Chino was a co-editor of a 6-volume encyclopedia known as The Sanseidō encyclopaedia of linguistics (Chino, 1988–1996) and an author of many enlightening books on linguistics (Chino, 1980a, 1980b, 1994, 1999). These were preceded by studies on the Japanese language (Chino, 1977). Eiichi Chino's multifarious activities reflect the variety of his studies, completed at three universities: the Tokyo University of Foreign Studies (Russian), the University of Tokyo (general linguistics), and Charles University, Prague

(5)	fen	shui	ling	*divide water mountain-ridge* 'watershed'
	H	L	L	citation tones
	H	MH	L	sandhi tone forms (intermediate, nonrealized forms)
	H	H	L	sandhi tone forms (final surface forms)

In (5), the citation L tone on *shui* changes to an intermediate, nonrealized sandhi MH tone in accord with L tone sandhi, and that intermediate sandhi MH value for *shui* acts as input into the MH tone sandhi rule, changing the nonrealized sandhi MH tone to a final surface H tone. From these examples it is clear that the phonological shape of Chinese morphemes does undergo considerable variation, but such variation is entirely a function of phonological context.

To conclude, the reputation of Chinese as an isolating language is perhaps not so well-deserved if we rely merely on the monomorphemic word criterion, since the preponderance of Chinese words are multimorphemic. But if our criterion is how easy the morphemes of a language are to identify and individuate, then Chinese scores rather high on the isolating language scale.

See also: Arabic as an Introflecting Language; Chinese; Chinese (Mandarin): Phonology; Chinese Lexicography; Classification of Languages; Finnish as an Agglutinating Language; Italian as a Fusional Language; Morphological Typology.

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Chinese Linguistic Tradition

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In China, linguistic research started very early. Theoretical analysis, lexicography, and dialectology were cultivated by Chinese scholars before the foundation of the Empire (221 B.C.). On the other hand, some fields had to wait until they received a hint from foreign cultures. Phonology was born under the Indian influence in the 3rd century A.D., and grammatical studies began following some Western examples only in the 19th century.

The Beginnings

The idea that language is largely based on an agreement among human beings was established by Xunzi [Xunzi (Hsün-tzu) was one of the most outstanding Confucian philosophers and author of a book of the same name] and Moists [Moism is the doctrine founded by Mozi (Mo-tzu)]. According to the first, 'names are attached to things once for ever, but this link is based on an agreement,' and the latter added, 'names are like painted tigers' (i.e., just a pale image of the real thing).

With the foundation of the Empire, things changed. The major philosopher of the Han dynasty, Dong Zhongshu [Dong Zhongshu (Tung Chung-shu) played a key role in establishing Confucian orthodoxy], adopted the opposite idea of linguistic realism: A natural bond exists between names and things. The Han penchant toward the cosmological theory of the 'five elements' (everything in the world is connected with five principles and modifies following them) prevented them from a nominalistic theory of the language.

It is impossible to underevaluate the imprinting given by the ideographic writing system of Chinese on linguistic studies. The ideograms (it is well-known 'ideogram' is far from ideal when talking about Chinese characters, but more precise terms, such as sinograms or logograms, are not yet widely used), that nearly completely hide the phonological and morphological aspects of the language, and their importance as a tool of the state administration produced a sort of a 'pheticism of the ideograms' in the minds of the cultivated people, who seldom dared to see them closer or to 'open' them to better understand their nature. Therefore, since the very beginning, the pioneering linguistic works in China were not devoted to analyzing speech and its component, the word, but to collecting and comparing ideograms.

First, some dictionaries of difficult words appeared, including the *Ji jiu pian* ('Quick performances') and some others, among which the most important was the *Er Ya* ('Perfection attained'), a list of 2016 words

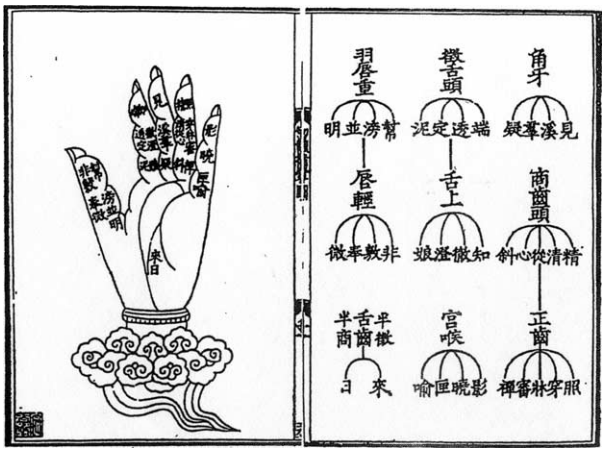

Figure 1 The 36 initial sounds divided into nine categories and printed on a hand as a memory aide. From *Qie yun zhi zhang tu* ('Tables to understand the rhymes') by Sima Guang, 10th century.

classified into 19 sections, without pronunciation, in the following way:

> *xu* (wait)/*si* (wait)/*ti* (stop)/*li* (reach)/*di* (attain)/*zhi* (stop)/*xi* (wait): They mean *dai* (wait).

The logic of the *Er Ya* was to list difficult words together with simpler ones in order to explain the first by the latter and to provide the writer with many synonyms. For this reason, this kind of lexicographical work had great success and approximately 150 similar books were compiled during the Empire, up to the past century.

The first dialectological works were clearly inspired by the *Er Ya*. The *Fang Yan* ('Local speeches') collected dialectal words together with more widespread words to attain the same results as *Er Ya*:

> *dang/xiao/zhe* mean *zhi* (know). In Chu they say *dang* or *xiao*, and between Qi and Song they say *zhe*.

In the book, the key notion of 'common speech' is found for the first time, as a reflection of the unified Empire in the minds of its inhabitants.

However, the main work of Han dynasty linguistics is another dictionary, the *Shuo wen jie zi* ['Explanation of words'; *wen* refers to the simple ideograms (e.g., 'tree') and *zi* to the complex ideograms (e.g., 'forest' – made of two trees to suggest plurality); *shuo* means 'explain' and *jie* 'dissect' or 'analyze'], written by Xu Shen between 100 and 121 A.D. With nearly 10 000 monosyllabic words, it is a huge work, but its importance is in its several lexicographic inventions, so apt to the description of Chinese language, that have lasted up to the present.

First, all of the ideograms are divided into six categories: pictograms, symbols, associated logic elements, associated semio- and phono-elements, and two less important categories. The definition is highly standardized. For instance, the first category is explained as 'x mean y. Pictogram,' the third as 'x mean y. From a, from b,' and the fourth as 'x mean y. from a, sounds as b.'

> *Ming niao sheng ye. Cong niao, cong kou*
> *Ming* (sing of a bird) means voice of a bird. From *niao* 'bird,' from *kou* 'mouth.'

> *Bing ming ye. Cong huo, bing sheng*
> *Bing* (bright) means bright. From *huo* 'fire,' sounds as *bing*.

Furthermore, for the first time the pronunciation of the items is also given by an homophonus ideogram, and the formula *x du ruo y* 'x is read as y.'

Moreover, a list of 540 graphic components was established, also for the first time (e.g., wood, water, word, ship, worm, and roof), in order to classify all the 10 000 graphs of the texts. These graphic components, reduced during the last dynasty to 214 [in *Kangxi zidian*, 'Dictionary of the emperor Kangxi (K'ang-hsi),' by Zhang Yushu, 1716], are still used in the dictionaries of today under the name 'radicals.'

Besides the previously mentioned works, based on solid scientific grounds, the realistic tradition of the Han produced some lexicographical works also worth mentioning. The best among them is the *Shi ming* ('Names explained') by Liu Xi:

> *Jing* ('view') means *jing* ('territory'): what eyes embrace within a certain territory.
> *Jin* ('brocade') means *jin* ('gold'): what is as precious as gold.

The theoretical basis of the work was the so-called *sheng xun* ('phonological exegesis'), according to which any definitions must be based on synonymy and homophony.

The Flourishing Age

The contacts with Sanscrit, due to the introduction of Buddhism in China from the 1st century A.D., finally gave the Chinese the suggestion to split the ideograms into two parts in order to start a phonological analysis of their own language and to establish a better way of writing their readings.

Sun Yan (a scholar, fl. during the Wei dynasty, 220–265) was likely the first in his *Er Ya yin yi* ('Sounds and meanings in *Er Ya*') to adopt a new system called *fanqie* (lit. 'rotate and cut') to analyze phonologically the words in *Er Ya*. The *fanqie* system is one of the most outstanding achievements of the old linguistics. According to it, the reading of an ideogram is given through two other ideograms with no connection in meaning, the first giving the reading

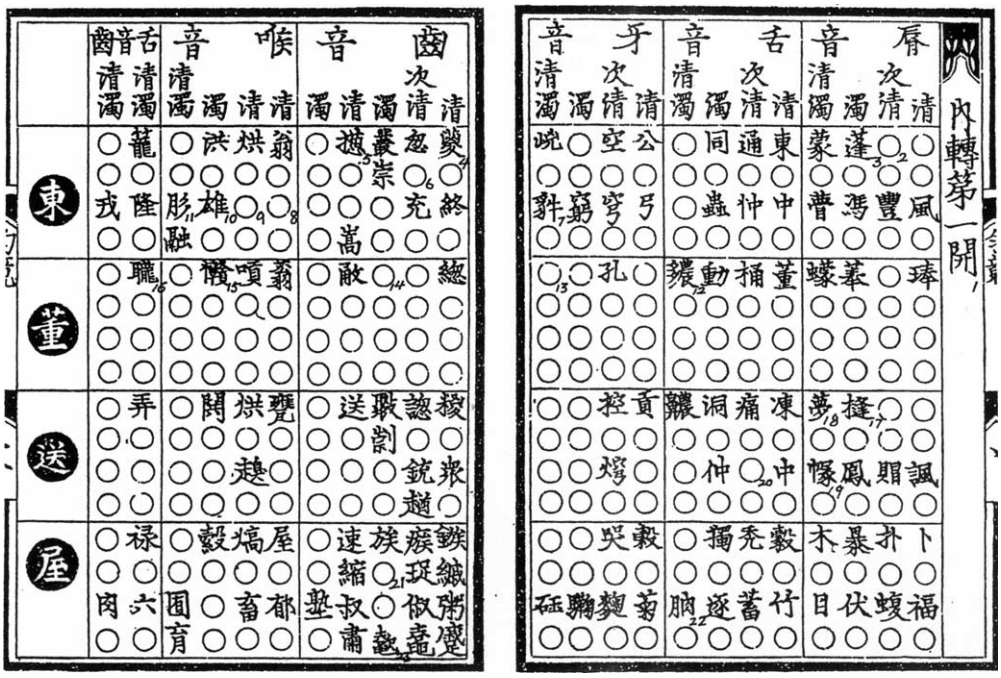

Figure 2 A rhyme book, *Yunjing* ('A mirror of rhymes'), by Zhang Lizhi (1161). The column at the top provides the initial sounds. The four columns below the first provide the final sounds, divided according to the 'tones' (the four black circles) and the 'degrees' (/-a-/, /-u-/, /-i-/, and /-y-/).

of the initial sound (*sheng*), and the second giving the reading of the final sound (*yun*):

dong = *d(u)* + *(h)ong*
dong (east) = *d(u)* (capital) + *(h)ong* (red)

This system was not only a brilliant invention for an ideographic writing system but also very productive and gave birth to a new branch of research, covering the whole length of the Empire and that lasted until the last century.

First, the *yun shu* ('books of rhymes'), a large number of dictionaries arranged phonologically and grouping together those words sharing the same final sound, were written, mainly to help students during the imperial exams (in which one of the most important tests was writing poems) but also to give a new impulse to linguistics. The first book of rhymes was *Qie Yun* ('Rhymes according the *fanqie*') by Lu Fayan, written in 601 A.D.

Second, grouping together the words sharing the same initial sound, Chinese derived 36 words working as the letters of the Latin alphabet: *kiem* (see) for /k-/, *k'i* (creek) for /k'-/, and so on. From a technical standpoint, the time was ripe to adopt a more rational system of writing than the ideographic one. Nevertheless, a reform that could have given an alphabet to Chinese was never undertaken, for the good reason that a highly complicated system was one of the *raisons d'etre* of the powerful officers who ruled the Empire.

Third, not only the initial sounds but also the final sounds were identified and classified with slightly more than 100 ideograms distributed into four 'degrees' according to the openeness of the first syllable: /-a-/ ('open mouth degree') as in *ma* (horse), /-u-/ ('close mouth degree') as in *hu* (lake), /-i-/ ('teeth at the same level degree') as in *di* (earth), and /-y-/ ('round mouth degree') as in *lü* (donkey).

As a dignified conclusion to the classical linguistics period, in 1899 some casual discoveries gave birth to modern paleography. A huge amount of 'dragon bones' (which were at first called *jiaguwen*, 'oracle bones') with inscriptions dating back to 1500 B.C., completely renewed the traditional ideas of paleography and etymology, based for all the extent of the Empire on more recent graphs.

For instance, for centuries the character for *wang* ('king'), was considered 'a trait d'union between heaven, earth and man,' although it is simply the picture of an axe plunged into the ground.

The study of *jiaguwen* is a developing science; to date, not more than approximately 60% of the old inscriptions have been deciphered.

The Reform

The 20th century saw the birth of one more linguistic branch: grammar and syntax. The clashes and contacts with the West persuaded the Chinese that learning Western sciences was fundamental to saving

Figure 3 One page of the *Kang xi zi dien* ('A dictionary of the emperor Kangxi'). Out of the frame are the words in the old writing system called *xiao zhuan* ('small seal'). Within the page, the words are followed by the definitions and the sources quoted (in the circles).

and developing the country, and the idea arose to spare much of the time devoted to traditional learning by heart of the thousands of Chinese characters through Western techniques (i.e., grammar and syntax, mainly English, but also Latin and French) and so to be able to study more natural sciences and engineering.

In 1898, the first grammar of classical Chinese, *Ma shi wen tong* ('A grammar by dr Ma') by Ma Jianzhong was published, followed in 1921 by the first grammar of modern Chinese, *Xinzhu guoyu wenfa* ('A new grammar of national language') by Li Jinxi.

In the past, no systematic description of the language could be found, besides some general ideas such as the distinction between *shizi* ('full') and *xuzi* ('empty words') or some research on particles. Later, many comprehensive grammars were brought to life, which despite their heavy debt to the Western

grammatical system threw a bright light over most of the specific features of Chinese.

Current Situation

Currently, all branches of linguistics are fully developed in China due to the efforts of many scholars at the international level, including Lü Shuxiang, Zhu Dexi, and many others.

The first stage, in the 1950s, was largely dominated by the influence of the Soviet Union.

For example, in a major debate over 'are there or are there not word classes in Chinese?' the core for a long time was actually 'are there or are there not in Chinese the same word classes as in Russian?'

However, it was also open to influences from the West such as structuralism. During the second stage, in the 1960s and 1970s, sociolinguistics (how to simplify the writing system and how to teach the national language) mainly held the ground. The third stage, after the opening to the world and the development of social sciences, succeeded in giving impulse to modern linguistics.

Nevertheless, the tradition still plays a role, and the strong points of Chinese linguistics remain paleography, etymology, dialectology, grammar, and lexicography – much more than general linguistics.

See also: China: Writing System; Chinese; Chinese as an Isolating Language; Chinese Lexicography; Chinese (Mandarin): Phonology.

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Chinese Lexicography

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A Brief Historical Survey

Lexicographical development in China can be divided into three stages. The rudimentary period followed a long and tortuous course from 200 B.C. to the 14th century. The inception of Chinese lexicography was closely related to the study of exegesis, critical interpretation of ancient texts, which inevitably involved the analyses of meaning. It is in this connection that some scholars regard 易经 (*Yi ching; The book of changes*) as the first dictionary in the Chinese language. However, the book hardly has any features typical of a modern dictionary.

It is generally agreed that 尔雅 (*Erya; Near correctness*), which came out in the Han Dynasty (206 B.C.–220 A.D.), consisting of 30 books about the accepted meanings of classic texts, was the earliest quasidictionary in China. The first Chinese dictionary in the modern sense of the word was 说文解字 (*Shuowen jiezi; The origin of Chinese characters*) by Xu Shen in the Eastern Han Dynasty (25–220 A.D.). The book contains some 10 000 Chinese characters with pronunciations and definitions. A few other books having characteristics of a dictionary or an encyclopedia in this stage paved the way for the advancement of Chinese lexicography, including books on Buddhism in the Tang Dynasty (618–907).

The intermediate phase (from 1368 to 1700) was marked by the compilation of the handwritten 永乐大典 (*Yongle dadian; The yongle canon*), a 60-volume encyclopedia compiled in 1408 in the Ming Dynasty (1368–1644). The most important lexicographical publications in this period are encyclopedic in nature, focusing on particular subjects. These include 本草纲目 (*Bencao gangmu; A compendium of herbal medicine*), 1578; 农政全书 (*Nongzheng quanshu; The encyclopedia of agriculture*), a 60-volume work published in 1639; 天工开物 (*Tiangong kaiwu; The exploitation of the works of nature*), a three-volume encyclopedia about agriculture and handicrafts published in 1637. The last of these was later translated into French, Japanese, German, and English.

The modern phase (from 1700 to the present) witnessed the publication in 1716 of a remarkable dictionary, 康熙字典 (*Kangxi zidian; The kangxi lexicon*), with 47 035 Chinese characters. Since then,

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Relevant Websites

http://www.omniglot.com – Provides a guide to the Chinese writing system.
http://www.camsociety.org – For discussion of Chinese brush strokes.
http://www.pinyin.info – For information about Chinese phonology.

Chino, Eiichi (1932–2002)

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Eiichi Chino, who taught in the Tokyo University of Foreign Studies (Gaikokugo daigaku) and former president of Wakō University, was known above all as a Japanese Bohemicist, a specialist in Czech philology, who studied and later taught the Czech language, wrote textbooks (co-author of *Chekogo no nyūmon* [Introduction to the Czech language], 1976, Tokyo: Hakusuisha), lectured on Czech language and literature, and published a series of essays on various aspects of Czech cultural and political life (Chino, 1990, 1997). Eiichi Chino translated into Japanese a variety of text genres, ranging from books for children (cf. František Hrubín, *Kuřátko a obilí–Hiyoko to mugibatake* [The little chicken in a field of grain]) to film scripts (the Oscar nominated film *Kolya*), libretti (Leoš Janáček's opera *Osud – Unmei* [Fate]), and a collection of essays by the leading Czech structuralist Jan Mukařovský (co-translator, see Mukařovský, 1982). What brought Chino fame and admiration, however, were above all his translations of canonical Czech literature. He had a lifelong affection for Karel Čapek, whose unique style not only found in Chino a sensitive and creative interpreter (Karel Čapek's play 'R.U.R.' – *Robotto, Kareru Chapekku.* Tokyo: Iwanami Shoten, 1989) but also a keen director, who engaged his Tokyo students of Czech (at Gaikokugu daigaku) in staging the play. Preceding 'R.U.R.' were Chino's own essays on Karel Čapek (Chino, 1975). Chino wrote epilogues to many of his translations familiarizing Japanese readers with the Czech cultural setting. Among other Czech authors translated by Chino were Franz Kafka, Viktor Fischl, Milan Kundera (1992, 1998), and Ota Pavel (2000). In 2000, for rendering outstanding service to Czech culture (see also his articles and essays in *Asahi Shimbun* and a series of university lectures in the 1980s on the Prague Linguistic Circle), Eiichi Chino was awarded the Medal of Merit, First Grade by President Václav Havel. The interest in Czech philology, though deep and emotional, always remained part of Chino's broader interest in Slavic philology (including Old Church Slavonic, Russian, Polish, Slovak, Serbo-Croatian and Bulgarian), and comparative linguistics ("Studies of Non-Indo-European Languages" in Miyaoka, O. (ed.), *Languages of the North Pacific Rim: types and history.* 1992. Tokyo: Sanseidō,). Eiichi Chino was a co-editor of a 6-volume encyclopedia known as The Sanseidō encyclopaedia of linguistics (Chino, 1988–1996) and an author of many enlightening books on linguistics (Chino, 1980a, 1980b, 1994, 1999). These were preceded by studies on the Japanese language (Chino, 1977). Eiichi Chino's multifarious activities reflect the variety of his studies, completed at three universities: the Tokyo University of Foreign Studies (Russian), the University of Tokyo (general linguistics), and Charles University, Prague

(Slavic philology, Czech and general linguistics). As a professor of Wakō University, Chino wrote an essay entitled 'Japanese – a treasure trove.' (*Nihongo Kyoiku Tsushin, 16*). The title is symbolic: Eiichi Chino's legacy is a treasure trove of many and varied contributions to linguistics, literature, foreign language teaching (Chino, 1986), and translatology – and a challenge for those interested in this charismatic polyglot and his research (cf. the obituary by Vlasta Winkelhöferová (2002) 'Odešel japonský bohemista Eiiči Čino.' *Dokořán 22, Obec Spisovatelů.* [Bulletin of the union of writers.] Prague).

See also: Japanese; Translation and Genre: Literary.

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Chi-Nyanja *See:* Nyanja.

Chiri, Mashiho (1909–1961)

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Mashiho Chiri was the first ethnic Ainu person to attend Tokyo Imperial University and was hailed as the Ainu genius, countering claims of Ainu inferiority to the Japanese. He was born in Hokkaido, Japan, in 1909 to an Ainu family and grew up in the town of Muroran. Despite his Ainu heritage, the stigma associated with the Ainu language and culture at the time being what it was, he did not grow up speaking Ainu, but Japanese instead. He remarked that he would later have to learn Ainu as a foreign language, as he might French or German (German, Standard), and that this pained him greatly.

Chiri's aunt, Matsu Kannari, and his sister, Yukie Chiri, were Ainu speakers and informants of Kyosuke Kindaichi, the famous Ainu scholar. Kindaichi encouraged Mashiho to study and helped him enter a prestigious high school and, later, Tokyo Imperial University. Initially, Chiri entered the English literature department, but later transferred to the department of linguistics where Kindaichi was teaching at the time. Together with Kindaichi, he published his dissertation *Ainu goho gaisetsu,* where he provided a description of Ainu grammar.

Chiri and Kindaichi had different interests with regard to their studies. While Kindaichi was primarily interested in the classical language of the epic yukar, Chiri, although also a scholar of the yukar, chose to focus on the colloquial varieties of the spoken

(Slavic philology, Czech and general linguistics). As a professor of Wakō University, Chino wrote an essay entitled 'Japanese – a treasure trove.' (*Nihongo Kyoiku Tsushin, 16*). The title is symbolic: Eiichi Chino's legacy is a treasure trove of many and varied contributions to linguistics, literature, foreign language teaching (Chino, 1986), and translatology – and a challenge for those interested in this charismatic polyglot and his research (cf. the obituary by Vlasta Winkelhöferová (2002) 'Odešel japonský bohemista Eiiči Čino.' *Dokořán 22, Obec Spisovatelů.* [Bulletin of the union of writers.] Prague).

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Mashiho Chiri was the first ethnic Ainu person to attend Tokyo Imperial University and was hailed as the Ainu genius, countering claims of Ainu inferiority to the Japanese. He was born in Hokkaido, Japan, in 1909 to an Ainu family and grew up in the town of Muroran. Despite his Ainu heritage, the stigma associated with the Ainu language and culture at the time being what it was, he did not grow up speaking Ainu, but Japanese instead. He remarked that he would later have to learn Ainu as a foreign language, as he might French or German (German, Standard), and that this pained him greatly.

Chiri's aunt, Matsu Kannari, and his sister, Yukie Chiri, were Ainu speakers and informants of Kyosuke Kindaichi, the famous Ainu scholar. Kindaichi encouraged Mashiho to study and helped him enter a prestigious high school and, later, Tokyo Imperial University. Initially, Chiri entered the English literature department, but later transferred to the department of linguistics where Kindaichi was teaching at the time. Together with Kindaichi, he published his dissertation *Ainu goho gaisetsu,* where he provided a description of Ainu grammar.

Chiri and Kindaichi had different interests with regard to their studies. While Kindaichi was primarily interested in the classical language of the epic yukar, Chiri, although also a scholar of the yukar, chose to focus on the colloquial varieties of the spoken

language. After graduation, Chiri started teaching in Sakhalin, then a Japanese territory, and began studying the Sakhalin dialect of Ainu. The result was *Ainu goho kenkyu*, a grammar of this dialect. He was convinced of the importance of distinguishing between the different dialects and using them to understand the local culture where each dialect was spoken. He also made significant contributions to the study of geographical names, sometimes in collaboration with Hidezo Yamada, a renowned scholar of Ainu place names. In the course of his studies, Chiri also proposed that Ainu, still believed to be a language isolate, exhibits vowel harmony, a property associated with the Altaic languages.

Chiri resented the subordination of the Ainu in Japan and the discrimination which they endured. He himself was also teased at school, being called 'inu' or dog, a common slur against the Ainu. He was also critical, perhaps excessively so, of what he considered to be 'bad scholarship' on the Ainu people. Although he was raised in a Japanized home, he sometimes claimed that non-Ainu scholars, especially those with whom he disagreed, did not understand the language and culture the way he did. In particular, he attacked John Batchelor and his famous dictionary, referring to it as a collection of errors. Chiri began what would be his own magnum opus, the *Classified Ainu dictionary*, a complete dictionary of the Ainu language accounting for dialectical variations. In June of 1961, at the age of 52, Mashiho Chiri died after having written only three of the planned ten volumes.

See also: Ainu; Batchelor, John (1853–1944); Japan: Language Situation; Japanese; Kindaichi, Kyosuke (1882–1971); Naert, Pierre (1916–1971).

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Choco Languages

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Present Indians of Western Colombia

Colombia, a basically Spanish-speaking nation in the northwestern corner of South America, conserves a considerable number of Indian languages. The speakers of the various languages survived the colonization of the subcontinent, isolating themselves in rather desolate places far from the urban centers, where there were no mestizos and only the black population dared to enter. Of the immense mosaic of aboriginal languages thought to have existed when the Europeans arrived in what is today Colombian territory – for its privileged situation as a crossroads for peoples from north to south and from south to north of the continent – about 90 peoples still survive. They are characterized as different from the majority of the Spanish-speaking population, because they maintain particular sociocultural characteristics, among them a language of their own, as is the case for 65 of these 90 peoples. These languages have been characterized by the most diverse range of linguistic varieties, i.e., isolating, agglutinating, and flexive languages, as correspond to such highly varied regions in which their speakers are found: desert zones, grasslands, jungles, coastal littorals, river littorals, foothills, and mountainous zones of both temperate and cold climates.

Four of these Indian languages still survive in western Colombia, which correspond to four ethnic groups that continue to preserve their own cultural characteristics, such as their language and, therefore, their particular way of thinking, or worldview. The first of these four languages is Tule, of the Chibchan linguistic family, the speakers of which are known as 'Cunas.' They occupy the extreme northwestern part of the country, in the Golfo de Uraba (where there are no more than 1000 individuals) and the majority are found in the neighboring country of Panama, in the San Blas Islands (around 40 000 individuals), where they have immigrated for more than half a century. The second language is Awa or Awa-Cuaiquer,

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classified as an independent language, whose speakers are thought to number about 4000 and are located in the extreme southwestern part of the country (in the department of Nariño) and in smaller numbers in the neighboring country of Ecuador. The third and fourth languages are Waunméu (Woun Meu) and Embera, which belong to the so-called Choco language group, which has only recently been classified as an independent linguistic family.

Waunméu is spoken by the Waunanas, who number around 4000 individuals in Colombia, along the lower San Juan River, in the south of the department of Choco, and no more than 2000 individuals who have immigrated to the Province of Darien, in Panama. Embera is spoken by the Indians who call themselves Emberas but who are known by different names in the literature because they constitute a much larger number of speakers – around 60 000 – divided in various dialects. The Emberas are dispersed throughout the western part of Colombia and even in the frontier zones of Panama and Ecuador, and some of these dialects have grown so far apart that they are now mutually unintelligible.

Of course, this is a timid sample of the much greater number of ethnic groups that inhabited the western part of Colombia when the Europeans arrived, among which we can recall the names of the Idabáez, Ingarás, Birus, Surrucos, Poromeas, and the present-day Kunas, Waunanas, Katíos, or Emberas. Some of the denominations applied to the Indians then generally known as 'Choco' or 'Chocoes' were the Andáguedas, Baudó, Chamís, Dabeibas, Dariens, Katíos, Noanamás, and Saijas. Nowadays it is known that these names are derived from the names of the regions inhabited by these groups, which generally took the name of the main river that crossed through their territory and, in the case of the name 'Katío,' to the fact that the Embera Indians eventually occupied the region of the Katío Indians, a brave warrior tribe that succumbed to the Spanish.

The Embera Indians occupy a much greater territory today than they did at the time of the arrival of the Europeans, but with a very atomized coverage, i.e., only in different and specific points of little extension. Mestizo settlers displaced them to these Indian reservations, called 'Resguardos' or 'Cabildos,' which were very effective in the colonial period in preventing the extinction of these peoples, by impeding their occupation by outsiders but obliging the Emberas to give up the extensive territories in which they had once freely roamed.

In this article we see the different dialects into which the Embera language is presently divided. These dialects are a product of the different regions in which the Embera Indians have settled since the arrival of the Spanish, in different latitudes of the continent but always limited to a fringe that extends from the western littoral: the Pacific coast of Colombia, from north to south, to the Cauca River, which separates the western and central cordilleras stretching from north to south along the country, together with the eastern cordillera, the final branches of which disappear as they enter the Caribbean region of Colombia. Thus, the scenario that the Choco Indians occupy consists of the Pacific coast of Colombia, with its jungle plains; the Province of Darién, in Panama; and the spurs of the western cordillera and its terminal branches to the west of the Cauca River.

Retrospective of Linguistic Studies and Attempts to Classify the Emberas

The inclusion within a single linguistic family of the speech of the different Choco groups (the Waunana language and the different Embera dialects) that survived the Conquest and the colonial period is a recent fact. Their classification within any one of the great variety of American linguistic families is still open to discussion.

In the literature on the country's Indians, there is abundant documentation on population and migrations of the Choco, from chroniclers like Fray Pedro Simón, Bartolomé de Las Casas, Jorge Robledo, Juan de Castellanos, Pedro Cieza de León, to recent researchers like Henry Wassen, Katleen Romoli, Reina Torres de Arauz, Sven Isacsson, Mauricio Pardo, and Patricia Vargas. The last two, who are Colombian authors, have advanced in research about the Emberas, having reviewed all previous studies. In his article 'Bibliografía sobre indígenas Choco' (1981), for example, Pardo did an excellent review of the ethnohistoric literature available to date, and in 'Regionalización de indígenas Choco' (1987), he updated the discussion of the ethnohistoric panorama. Vargas (1986), on the other hand, found that the incursion of the Emberas into the territories of the Katío Indians did not mean the total extinction of the latter, because the two peoples intermingled, which is why the present Emberas of the region present particular characteristics that could be assigned to the Katíos.

The term Choco was already used in the 17th century to designate the Emberas of the upper San Juan and Atrato rivers and the Waunanas of the lower San Juan River. The earliest report known about the Emberas is found in the diary of the missionary Father Joseph Palacios de la Vega, around 1787, in San Cipriano, on the San Jorge River. This linguistic material, consisting of 37 phrases and 107 morphemes, fundamentally corresponds to the speech of the present Emberas of the northeast (Reichel-Dolmatoff, 1955).

A series of vocabularies was later collected by travelers, mostly foreigners, in different Choco Indian localities (Mollien, 1824; Cullen, 1851; Seeman, 1851; Bastian, 1876; Greiffenstein, 1878; Collins, 1879; White, 1884; Peláez, 1885; Etiene, 1887; Simons, 1887; Pinart, 1887; Velásquez, 1916; Robledo, 1922). These materials fundamentally served as the basis for analysis and classification until the middle of the 20th century.

But there have also been comparative studies since the 19th century: Bollaert (1860) proposed affinities between the Choco and Mesoamerican groups; Adam (1888) compared vocabularies obtained by Cullen, Seeman, and Uribe; Brinton (1891) observed the territorial extension of the speech of the Choco; Chamberlain (1907) determined that the geographical limits of the Choco were between 8 and 4 degrees northern latitude, between the Golfo de Urabá and the Golfo de San Miguel, and proposes Choco as an independent linguistic group; Lehmann (1910, 1920) suggested kinship with the Chibcha dialects of the Barbacoas and Talamanca groups; Loukotka (1968 [1942]) reaffirmed the separation of these languages as an independent linguistic family and recognized nine extant languages and five extinct languages; Rivet (1912, 1924, 1943) compared elements of the Choco vocabulary with 56 Caribe dialects, 34 Chibcha dialects, and 29 Arawak dialects and concluded that there was a strong Caribe influence and, to a much lesser degree, Chibcha and Arawak influence; Ortiz (1937, 1940, 1954, 1965), Mason (1950), Meillet and Cohen (1952), and Tovar (1961) followed Loukotka's regionalization and Rivet's affiliation.

The first attempts to classify the native languages of America were made in the second half of the 20th century. At the beginning of the 20th century, 19 independent language families were mentioned for the Pacific coast, including the Choco family (see, for example, the classifications of Alexander Chamberlain [1913] for the linguistic families of South America). Later researchers, such as Paul Rivet (1944), reduced this number and proposed the inclusion of the Choco family within other macrofamilies, like the Chibcha or the Caribe. At present, in light of recent linguistic explorations, the thesis of the independence of this family seems to be the most reliable, vindicating its defenders, among whom, in addition to Chamberlain, we can name Nordenskiold (1928), Loukotka (1968 [1942]), Tovar and Larrucea (1984), and Pardo and Aguirre (1993).

The cultural unity and the common origin of the Choco Indians were the subject of controversy for a long time. Mason's classification (1950) (broadened with that of Greenberg, 1960), for example, divided the Choco languages into Empera, with 3 variants; Catío (Embera-Catío), with 14 variants; and Noanamá (with 1 variant). Loukotka (1968 [1942]) had already spoken of 9 extant and 5 extinct Choco languages, and later Loukotka and Rivet proposed 10 extant variants for the Choco group (which they call the Emperá division) and 2 extinct ones (see Ortiz, 1965: 197–200).

Jacob Loewen (1960) confirmed Erland Nordenskiold's statement, testifying that linguistically only two languages (Waunana and Embera) – mutually unintelligible but nonetheless related – belonged within the Choco family, and proposed, with a phonological criterion, four large dialectal areas, one Waunana and three Embera, with lexical variations within the Embera areas.

Among the main bibliographical compilations on the Choco languages were those of Adam (1888), with 7 references; Lehmann (1920), with 30 references; Reichel-Dolmatoff (1945), with 38 references; Ortiz (1954), with 60 references; Loewen (1963), with 191 references, which were not only linguistic but historical as well; Ortega (1978), with 67 references; and Pardo (1981), with 72 references, and (1986), a survey of everything written on the subject to date, with 135 references, including everything from academic studies to simple lists of words.

There have been grammatical studies of the Embera language since 1881, when José Vicente Uribe published a brief article in which he presented the different types of Embera words in a general way. In 1936, Fray Pablo del Santísimo Sacramento published a grammatical essay on the speech of the Embera-Catíos of the Apostolic Prefecture of Urabá, as well as a classification of Embera, in which he dedicated a small portion to the syntax of the language. In 1918, an anonymous Catío-Spanish catechism appeared for missionaries of Antioquia. There is also an undated Catía grammar by María Betania (quoted in Pinto, 1974), and the Claretian priest Constancio Pinto published a Catío-Español dictionary (1950), as well as another extensive dictionary with grammar (1974).

Scientific studies based on fieldwork began with the research of Jacob Loewen, an American Mennonite missionary who did a study for a master's degree (1954) among the Waunana Indians of the lower San Juan River, and a doctoral thesis (1958) on the speech of the Emberas of the Sambú River, in the province of Darién in Panama. Loewen also wrote numerous articles on Embera phonology and dialectology, on comments on traditional stories, on loans from Spanish, on problems of bilingual literacy programs, and on basic readers in Indian languages.

Jean Caudmont (1955) elaborated notes on phonological and grammatical generalities through the use of field notes of Reichel-Dolmatoff (1945), taken 10 years earlier among the Embera group in Riofrío

in the department of Valle, who had emigrated from the region of the Chamí. The Claretian missionary Constancio Pinto, who lived with the Emberas of the region of the Chamí (headwaters of the San Juan River) for more than 40 years, published a dictionary (1950) of the Embera language, as well as a book with a much more extensive vocabulary and with a section on grammar (1974). Despite their having been based on methodical fieldwork, these studies suffered from the fact that they had been transcribed using Spanish-language phonetics and indistinctly presented, especially in the work of Pinto, words from zones like the Chamí, the Andágueda, the Sinú, and the Atrato, without taking the dialectal variations into account. With more linguistic precision, the Swedish researcher Nils Holmer (1963), in one of the publications of the Gutemburg Ethnographic Museum, occupied himself extensively with phonological and morphological aspects of Waunana.

The Summer Institute of Linguistics (SIL), which arrived in the country in 1962, carried out linguistic studies in distinct zones inhabited by Embera Indians. Francés Gralow (1976) elaborated a phonological description for the Chamí zone. In the 1970s, Eileen Rex and Mareike Schotlenndreyer traveled throughout the municipalities of Dabeiba, Frontino, and Chigorodó, in the department of Antioquia, and the upper Sinú, in the department of Córdoba, and published a phonology (1973) of the speech of the Emberas of the upper Sinú and northwestern Antioquia. Schotlenndreyer developed a literacy primer for the zone of Chigorodó (1973) and a structural analysis of her and Rex's stories (1977). Eileen Rex wrote her master's thesis on the Catía grammar (1975). Phillip Harms developed basic readers on the Embera language and tales and stories in the company of the natives from 1981 to 1985, for the Emberas of the Saija River on the coast of the department of Cauca, to the south of the department of Choco, and carried out a phonological description with Judy Powell (1984) and a grammatical study of the speech of these Emberas (Harms, 1987). Powell also mimeographed some Embera stories and biblical passages. David Stansell, who lived for more than 10 years among the Emberas of the Bojayá River in the department of Choco, wrote about them in *Aspectos de la cultura material de grupos étnicos de Colombia* (1973). Michael and Nellis (1984) produced primers in Chamí for the Emberas of the Valle de Garrapatas in the department of Valle del Cauca.

Gordon Horton worked with the Emberas of the upper Sinú in the 1960s and 1970s, mainly on the morphology of the language, and developed a series of primers and other didactic materials. Miguel Loboguerrero carried out a linguistic study (1976) on the dialect of the Chamí region; his resulting work included a phonological description, a grammatical description, and a corresponding lexicon. Nelly Mercedes Prado did an analysis of the 'Epera' variant ('Embera,' according to the phonology of this dialect) of the Saija River (1982) as her master's thesis, the presentation of which included phonology, morphology, and an appendix titled 'Un estudio inicial,' along with a lexicon of 845 items, each with its respective phonetic transcription. She continued her work with the publication of didactic materials (1985), further explored aspects of the language, such as nasality (1991), and later worked in ethnolinguistic conflicts between blacks and Indians (1992) within the broadest project, known as 'Cada río tiene su decir.'

Many missionaries working in Embera territories have concerned themselves with the language. One primer on the language of the Emberas of the upper San Juan, with an alphabet, was developed by G. Manzini (1973); another primer, on the Katía variety, was designed by Martínez and Guisao (1980). There are a catechism in the Baudó dialect (1981) and a primer by Livia Correa (1982), as well as one, by María L. Picón (1985), on the Itsmina region.

For the Waunanas, in addition to Holmer's studies, there was a phonological and grammatical study done by the Sacred Heart missionaries Sánchez and Castro (1977), with the advice of Reinaldo Binder of the SIL, and a monograph by Luz Lotero (1972).

The Embera Waunana Regional Organization (OREWA) of Choco wrote a manual for indigenous teachers (1987), within the framework of its newly initiated ethnoeducation program.

Mauricio Pardo has done phonological and grammatical descriptions of the Embera language in northwestern Antioquia and the zone of the upper Baudó River in the department of Choco. With his participation in workshops with teachers from Baudó and in 1983 in northeastern Antioquia, an era of studies began that committed both Indians and researchers to a common cause in the application of the results of linguistic studies. In 1986, Pardo proposed, together with the author of this article, a revision of the Choco dialectology established by Loewen, 1963 (see next section of this article), and has done an extensive compilation of the publication of linguistic data on this language up to 1986. This author has also concerned himself with the elaboration of language primers and sociolinguistic aspects of the ethnic group.

Present Regionalization of the Embera Indians

The first Indians denominated 'Chocos' by the Spanish were the Emberas of the upper San Juan River,

who were then known as the Simas or the Tatamás. These Indians today call themselves Chamí. This denomination would later be applied to all indigenous groups of the upper Atrato River, in the department of Choco, then known as 'Citará' or 'Citarambirá,' and to the Indians of the middle and lower San Juan, respectively called 'Poya' and 'Noanama' in the the 17th century. Based on these points, registered in colonial papers, and respecting the linguistic data obtained from present settlements, one can attempt to reconstruct the dispersion of the Chocos (see **Figures 1** and **2**).

Most of the Chamí are located along the upper San Juan River, in the Risaralda municipalities of Mistrató and Pueblorico, on the border with Choco. They have moved northward and southward along the cordillera to places like the upper Andágueda River, in southeastern Choco, to the southwestern part of the department of Antioquia in the municipalities of Jardín, Valparaíso, and Bolívar, and to the northern part of the department of the Valle del Cauca along the Garrapatas and Sanguininí rivers. Small groups are also located in other parts of Antioquia and Valle and have even moved down into the departments of Caquetá and Putumayo.

Those who were called Citarás or Citarambirás during colonial times – then located along the upper Atrato River, on the Capá River, in Lloró, and along the lower Andágueda River – have moved northward along the river to the upper Baudó River, toward the coastal tributaries to the north of Cabo Corrientes and the Panamanian portion of Darién. These river-dwelling Indians are known as 'Cholos' on the Pacific coast of Colombia.

Because these people form a distinct dialectal zone and because they are generally considered a mountain group, researchers believe the Indians who presently occupy territories in northeastern Antioquia – in Dabeiba, Frontino, Ituango, Murrí, among other places, and in the department of Córdoba, in the upper Sinú, San Jorge River, Rioverde, etc. – must descend from Emberas who, after the Conquest, settled along the eastern tributaries of the middle course of the Atrato River, a group different from the Citarás. These Indians are erroneously known as 'Katíos,' but colonial documents imply that the real Katíos succumbed toward the end of the 17th century, after a terrible struggle with the Spanish. Vargas (1990) postulated, based on archival documents, that many Katíos united both in alliance and in war with the Emberas.

The Indians encountered by the Spanish in the middle San Juan River, whom the Spanish called 'Poyá,' are believed to be the ancestors of the present dwellers of middle Baudó River, in the affluents Catrú, Dubasa, and surroundings. The Poyá presented a dialectal

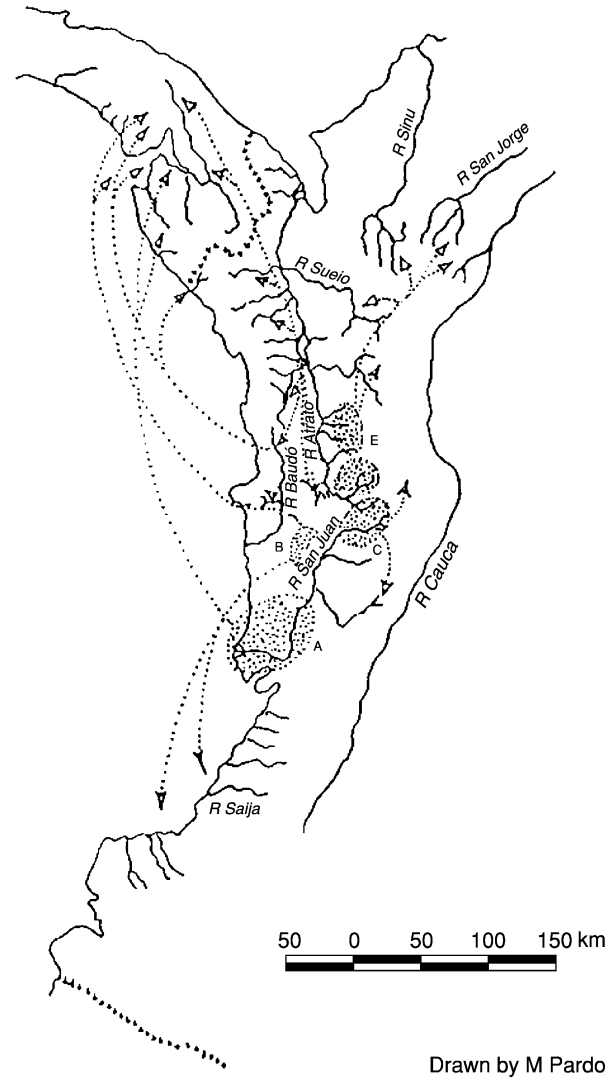

Figure 1 Current Choco Dialectology. Reproduced from Pardo M (1987). 'Regionalización de indígenas choco.' In *Revista del Museo del Oro*, Boletín 18, January–April. Bogota: Musco del Oro. 46–63.

difference with the ones from the upper Baudó River. These people called themselves Emberas to differentiate themselves from the mountain people, who were called Katíos.

The Indians presently located to the south of Buenaventura also descended from the Poyás, whose main settlements are along the Saija River (department of Cauca), and the Satinga and Saquianga rivers

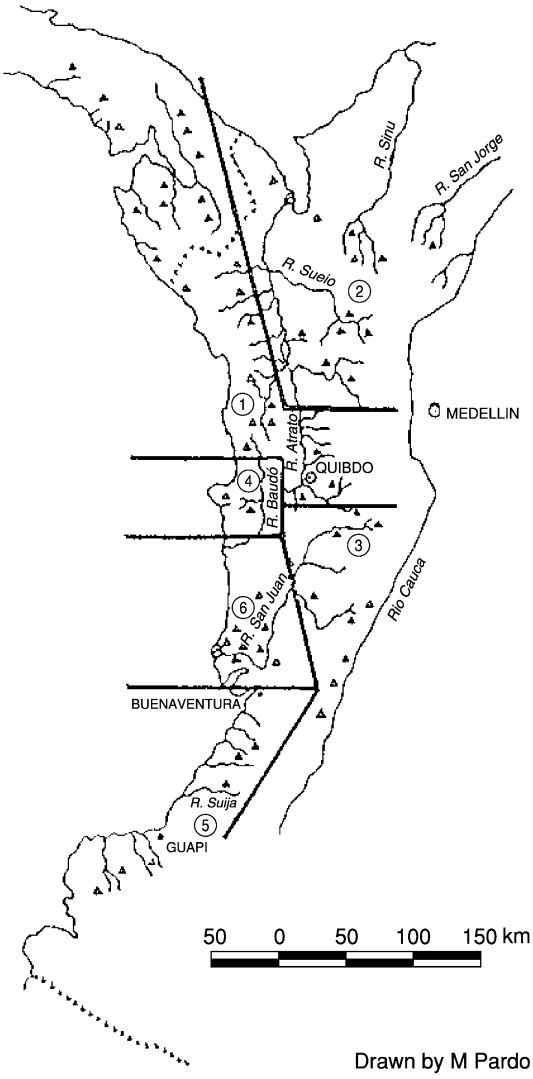

1 Atrato, Upper Baudó, Panamá*
2 Northern Antioquia, Córdoba*
3 Upper San Juan*
4 Mid Baudó*
5 South Coast
6 Waunan Language, Lower San Juan
△ Principle settlements
* Embera dialects
++++ Present national frontiers

Figure 2 Choco Dispersion. Reproduced from Pardo M (1987). 'Regionalización de indígenas choco.' In *Revista del Museo del Oro*, Boletín 18, January–April. Bogota: Musco del Oro. 46–63.

(department of Nariño) (Pardo, 1987). They call themselves 'Eperas,' in accordance with the phonology of their dialect.

In the department of Caldas, there are settlements of Embera Indians, known to the rest of the population as 'Memes.' They live in municipalities such as Belalcázar, Vitervo, and Riosucio, in places like La Betulia, La Tesalia, and the Indian reservations of San Lorenzo and Nuestra Señora de la Montaña. Some are Indian reservations with reserved territory, while others such as Cañamomo and Lomaprieta are in the process of becoming reservations (these are called 'partialities'). In addition to the problem of vindicating their own identity as a separate ethnic group, they have encountered major difficulties for having lost their native tongue, but nonetheless they are at present actively committed to carrying out programs to recover their language with the help of native speakers from other regions.

The Emberas who settled along the lower San Juan River and its tributaries, along the Juradó, Jampavadó, Docampadó, and Siguirisúa in southern Choco, and along the San Juan de Micay River in Cauca were called 'Nonamá' or 'Noanamá' ever since the invasion, but they call themselves 'Waunana' or 'Waunán.' Over the course of a century they have migrated to the province of Darién in Panama, where 2000 now reside, and to the Chintadó River along the lower Atrato, where there are several hundred who migrated some 20 years ago. There are estimated to be about 4000 native speakers of Waunana in Colombia. Like the Emberas, they are known as 'Cholos.' The Waunanas and the Emberas are the only two ethnic groups that can clearly be identified as presently forming part of the Choco family.

In 1988, the author of this article, together with the anthropologist/researcher Mauricio Pardo, presented a proposal for the regional classification of the Choco Indians – a revision of that proposed by J. Loewen – based on the different dialects encountered during fieldwork in the different zones with Choco Indians in Colombia. Some samples to support this proposal are presented below. These are taken from personal fieldwork notes and first appeared in an article entitled 'Dialectología Choco' in the memoirs of the seminar-workshop 'Estado actual de la clasificación de la lenguas indígenas de Colombia,' held in February 1988 at the Instituto Caro y Cuervo in Bogota (Pardo and Aguirre, 1993) (see Figure 3).

To begin, a diagram showing the present linguistic variations and the local denominations is presented (Figure 3). The proposal of Jacob Loewen is then presented (Table 1), followed by the Pardo-Aguirre proposal (Table 2). After that, the zones and specific places identified by Pardo and Aguirre are presented in detail (Table 3), along with a global diagram of said zones (Figure 4). Finally, phonological and grammatical comparisons of the Waunana language and the different dialects proposed for the Embera language (as well as among the latter) are shown (Tables 4–6).

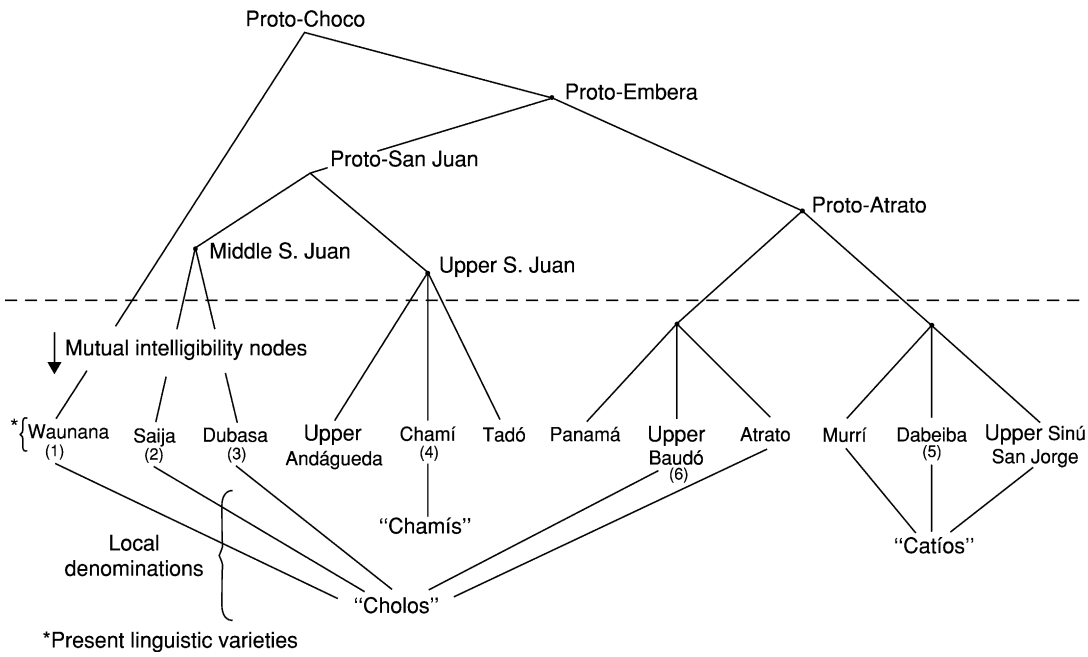

Figure 3 Phylogenetic tree of the Choco linguistic varieties (local denominations).

Table 1 Choco phonological systems (according to Jacob Loewen)

	Waunana	*Saija* *Baudó*	*Riosucio* *Tadó* *Chamí*	*Catío-S. Jorge* *Río Verde* *Sambú*
PLOSIVE				
Voiceless aspirated	p^h t^h k^h	p^h t^h k^h		
Voiceless non-aspirated	p t k ʔ	p t k	p t k	p t k
Voiceless tense			p' t' k'	p' t' k'
Voiced	b d g	b d g	b d g	b d g
FRICATIVE				
Voiceless strong	s š	s č	s č	s č
Voiced mild				z ǰ
LATERAL	l	l	l	l
TRILL	r̃ ṛ	r r̃	r r̃	r r̃
Voiced	r r	r r	r r	r r
NASAL				
Voiced	m n	m n	m n	m n
APPROXIMANT	w y h	w y h	w y h	w y h
VOWELS (for all dialects)				
Oral and nasal		i ï u e o a		

Note: As can be seen, Loewen proposed 4 phonological systems and dialect subdivisions at the lexical level within them. Nonetheless, the recent data show that at least 6 different systems can be identified: 1 for Waunana and 5 for the different Embera dialects.

Present State of Studies on the Embera Language

Colombia, together with the other Latin-American countries, with all the richness that multiculturalism and plurilinguism represent, only in recent times has given attention to its aboriginal languages. There is not still an official position on the defense of these languages and their speakers, who are not extinct, thanks to their proper fight and the support of a sector of the civil population. Just during the last 20 years of the 20th century were the Indian and Afro-Colombian languages, still alive in the national panorama, taken seriously by academia.

In 1984, the Anthropology Department of Andes University instituted a Masters in ethnolinguistics, with the sponsorship of the Centre Nationale de la Recherche Scientifique (CNRS) of France. In the program, researchers are prepared for the study of

Table 2 Choco phonological systems (based on recent data)

	Waunana[a]	*South Coast*[b]	*Lower Baudó*[c]	*Upper San Juan*[d]	*Antioquia Córdoba*[c]	*Upper Baudó Atrato Panama*[c]
PLOSIVE						
Voiceless strongly aspirated	p^h t^h k^h	p^h t^h k^h	p^h t^h k^h			
Voiceless mildly aspirated				p^h t^h k^h	p^h t^h k^h	p^h t^h k^h
Voiceless non-aspirated	p t k ʔ	p t k ʔ	p t k			
Voiced tense				b d	b d g	b d g
Voiced relaxed	b d g	b d g	b d			
IMPLOSIVE			ɓ ɗ	ɓ ɗ	ɓ	ɓ ɗ
AFFRICATE	č	č	č	č	č ǰ	č ǰ
FRICATIVE	s h	s h	v s h	v s h	v s z ð h	v s z h
LATERAL	l	l	l	l	l	l
TRILL	r rr	r rr	r rr	r rr	r rr	r rr
NASAL	m n		m n	m n	m n	m n
APPROXIMANT	w j	w j	w j	w j	w j	w j
VOWELS (for all dialects)						
Oral and nasal	a e i o u ʉ For the South Coast, there is a sixth vowel, which is the ə (oral only)					

[a]Data from Mejía (2000b)
[b]Data from Prado (1991)
[c]Data from Pardo (1985a)
[d]Data from Aguirre (1995a)

Table 3 Details regarding the zones and specific places of the Choco proposed by Pardo and Aguirre

	Waunana	*Lower Baudó*	*Upper San Juan*	*Choco West Atrato. Antioquia East Atrato*
PLOSIVE	p^h t^h k^h	p^h t^h k^h	p^h t^h k^h	p^h t^h k^h
	p t k	p t k	b d	b d g
	b d g	b d		
		ɓ ɗ	ɓ ɗ	ɓ ɗ/ð
AFFRICATE				z ǰ
			v	
FRICATIVE		č s h		
TRILL		r rr		
SOUNDING		l m n		
APPROXIMANT		w j		

Note: According to this scheme, at the strictly phonological level, Saija and Waunana have identical systems, even though they are very different at the lexical level.

the native and Afro-Colombian languages, their eventual goals being publication, conservation, and strengthening of these languages. The program's students and professors constitute the Centro Colombiano de Estudios de Lenguas Aborígenes (CCELA), through which they do the scientific work of the rescue and fortification of these languages. With these linguist students, a new era in the research and promotion of the aboriginal and creole languages of the country has begun, with them covering the entire national territory, doing fieldwork and linguistic data analysis *in situ*. This has yielded an awakening of these communities for the rest of Colombian population and even for themselves.

Several students from the program have done research on the Embera language:

Rito Llerena Villalobos. He was a student from the first promotion, having finished the program in 1987. He is now a professor at Universidad de Antioquia, in the Department of Linguistics. From 1989 to 1992, he worked on compared phonology of the Amerindian languages of Antioquia, including the Tule language (of the Cuna Indians), subject of his degree thesis (1987). This researcher has worked lately on the Embera language, creating didactic materials for the Indian teachers of Alto Andágueda, phonological and morphological research in the Embera Reservation of

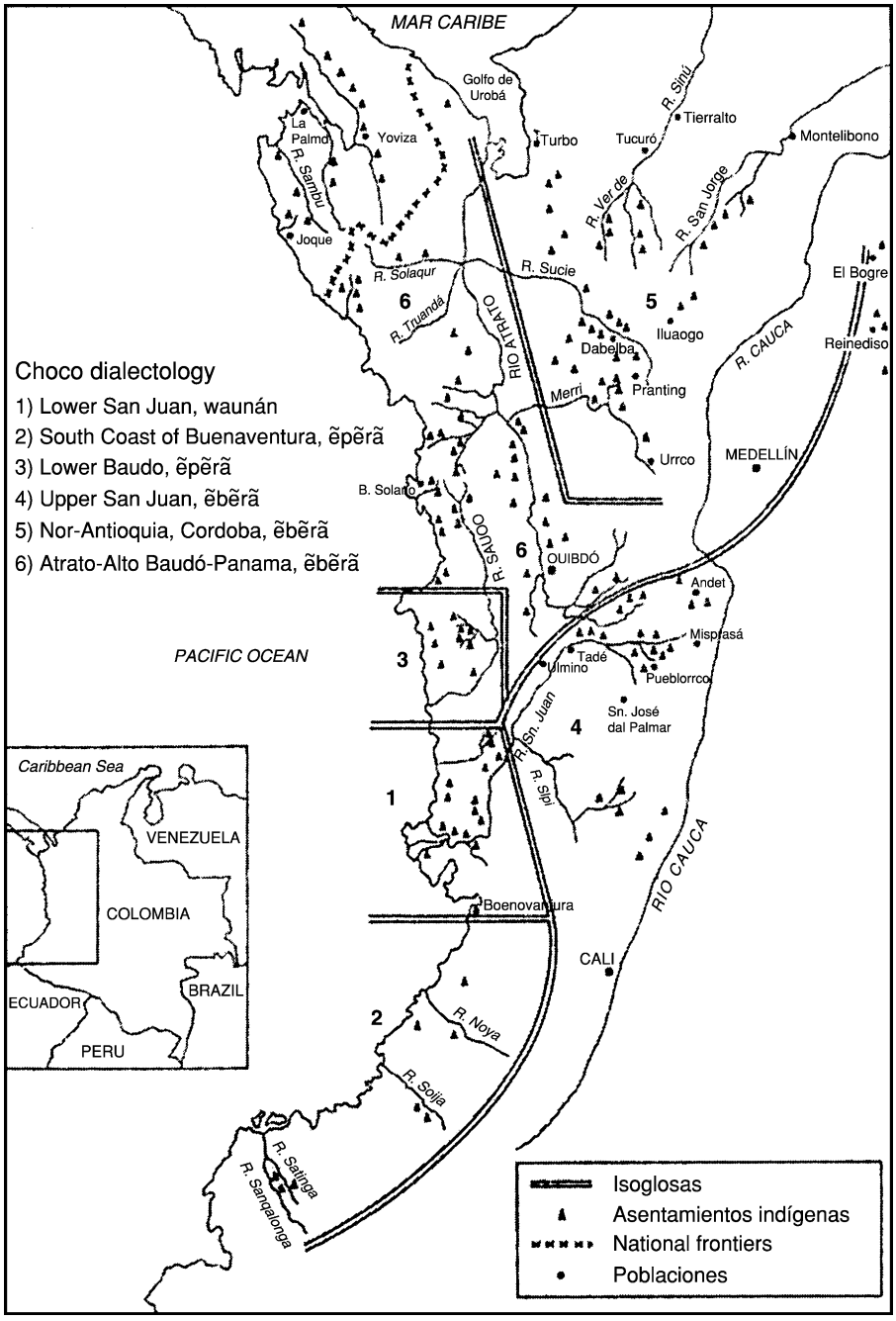

Figure 4 Choco dialectology.

Jaidukamá, department of Antioquia, and collaborating in ethnoeducation among the Emberas of Tierralta, upper Sinú River, in the department of Córdoba, where he is working at present. In the year 2000 he wrote a report on the grammar and phonology of the Tule language for the Instituto Caro y Cuervo.

Mario Hoyos Benites. He, too, was a student from the program's first promotion and finished in 1987. At present he is a professor at the Universidad de la Guajira. He worked in 1984 in the Napipí and middle Atrato rivers and other places in the region. His research has addressed everything from the design of didactic material for Indian teachers around all the country (1991) to interdialectal phonology. He presented a report on the Embera language for the Atlas Etnolingüístico de Colombia of the Instituto Caro y Cuervo in 1997, and wrote a report (2000) on the Embera language of the Napipí River for the institute.

Table 4 Phonological variation according to Lexicon. Representative sample

	Waunana	*South Coast*	*Lower Baudó*	*Upper San Juan*	*Antioquia Córdoba*	*Atrato*
I	mʉ	mʉ̃	mʉ̃	mʉ̃	mʉ̃	mʉ̃
You	pʉ^{h}	pʉ	pʉ	bʉ	bʉ	bʉ
He	ič	ači	ači	ači	iji	iji
We	mač	tai	tači	dači	dai	dai
You	paan	pará	mãrã	mači/mãrã	mãrã	mãrã/pãrã
They	hakʉ́n	ãči	ãči	ãči	ãji	ãji
Who	k^{h}ai	k^{h}ai	k^{h}ai	kai	kai	kai
Person	waunán	ẽpẽrã́	ẽpẽrã́	ẽbẽrã	ẽbẽrã́	ẽbẽrã́
Man	emk^{h}oi	ʉ̃mʉ̃kʉ̃rã	ʉ̃mʉ̃k^{h}ĩrã	mũkĩrã	mãkĩrã	mã́kĩrã
Woman	ʉi	ʔʔawera	ũẽrã/vẽrã	ũẽrã	ũẽrã	ũẽrã́
Father	ai	ãkõrẽ	tata	čača/dadá	zeze	zeze
Mother	at/tata	nãvẽ	nana	dana/nãvẽ	papa	papa
Son	ieuá	oarra	uarra	varr/oarra	vuarra	oarra
Daughter	k^{h}a	k^{h}au	k^{h}au	kau	kau	kau
Spouse	huuǰa	k^{h}ima	k^{h}imá	kima	kima	kima
Head	puru	poro	boro	boro	buru	boró
Eye	dau	tau	tau	dau	dabú	dau
Tooth	k^{h}ier	k^{h}ida	k^{h}iďá	kiďa	kiðá/čiðá	kiďa
Mouth	i/ihure	it^{h}ai	it^{h}ae	i/itae	itae	itae
Stomach	bi	bi	ɓi	ɓi	ɓi	ɓi
Hand	húa	húa	húa	húa	huwá	hʉwá
Foot	bʉi	bʉrʉ/hĩrʉ́	hĩrũ	hʉ̃rʉ̃/hẽrũ	hĩrʉ́	hẽrʉ́
Blood	bak	wáa/iwá	va	oa	va	oá
Meat	nemekmót	čier	čik^{h}o	kiuru	ǰiko	ǰiko
Water	du	panía	panía/paitó	banía	banía	baidó
Ground	hẽp	joró	joró	éoro	egoró	egoró
Stone	mok	mãũ	mõkará	mokara	mõgará	mõgará
River	du	to	to	do	do	do
Mountain	duursi	ʔee	eǰa	ea	katumá	eǰá
Sun	edau	ãkõrẽhĩrù	umãdau	umãda	ĩmãdau	umãdau
Tree	pabʉ́	pak^{h}uru	pakurú	bakuru	bakuru	bakuru
Leaf	k^{h}iri	k^{h}iru	k^{h}itúa	kidúa	kitúa	keduá
Root	pak̂^{h}are	k^{h}arrá	k^{h}arra	karr	karrá	karrá
Dog	saak	usa	usa	usa	usá	usá
Bird	nemčai	ipana	ĩpaná	ibana	ĩbaná	ĩbaná
Fish	ãwárr	cik^{h}o	ɓetá	ɓeda	ɓedá	ɓedá
One	aʔpai	aba	aɓa	aɓa	aɓa	aɓa
Two	daunumí	ome	õmẽ	ome	ume	umé
Three	t^{h}arhũp	õpé	õpea	õbea	ũbea	ubea

Notes: Details regarding the zones and specific places of the Choco proposed by Pardo and Aguirre. **Waunana:** lower San Juan River, Docampadó, coastal rivers, Juradó, Panama, Chintadó. **South Coast:** Saija, Satinga, Saquianga, Naya, Cajambre, south of Buenaventura. **Lower Baudo:** Catrú, Dubasa, coastal rivers, Purricha, Pavaja. **Upper San Juan:** Chamí, Tadó, upper Andágueda River, southwest of Antioquia Department, Garrapatas River (north of Valle Department). **Antioquia/Córdoba:** Dabeiba, Murrí, Riosucio, upper Sinú and San Jorge Rivers. **Atrato:** upper Atrato River, Capá, Bojayá, upper Baudó River, Panamá. Actually, the difference among the diverse phonological inventories is in the plosive systems and the voicing of the sibilant /s/ and the palatal affricate. Hence, the global scheme outlined in **Table 3** can be suggested.

Table 5 Grammatical similarities and differences

	Waunana	*South Coast*	*Upper San Juan*	*Antioquia Córdoba*	*Atrato Panamá*
Ergative/Instrumental/Attributive	a/au/iu	a/pa	a/ba	a/ba ± ra	a/ba
Intransitive/Accusative	ø/ta	ø/ta	ø/ra	ø/ra/a	ø/ra/da
Previous Reference	ø	ø	ra	ra	ra
Dative	ik	ma/ǰa/a	a	a	a
Benefactive	it^{h}ee	it^{h}e	ita	ita	ita
Sociative	dʉi	ome	ome	umé	ume
Situative	e	de	ďe	ðe	ďe
Alative	g	ma	m/ďa	eða	ďa
Ablative	mu	depa	ďeba	ðeba	ďeba

Table 6 Basic sentence order

	S	*O*	*V*
1. Waunana	saak-iu	berúč	k^{h}aahím
	perro- erg	tatabro	mordió
2. South Coast	usa-pa	et^{h}érre	peehí
	perro-erg	gallina	mató
4. Upper San Juan	ũẽrã-ba	mũ-buda	kõsí
	mujer-erg	mi pelo	cortó
5. Antioquia/Córdoba	ũẽrã-ba	ũãũã-ra	ubeasía
	mujer-erg	niño-ac	pegó
6. Atrato/Panamá	hãĩbana-ba	kauzake-da	ʉratʉsía
	chamán-erg	niñita-ac	frotó

Common characteristics: 1. Predominant suffixing. 2. Occasional prefixing: integration in nominals, some verbal aspectualizing. 3. Varients of: number, gender, affection, position, permanence in the auxiliary. 4. Tactical order variation for focalization. 5. Verbalized lexical determination (adjectival verbs). 6. Actancy, opposition: agent, attributive, instrumental versus intransitive subject, accusative. 7. Great variation in prenominal suffixing. 8. Basic S O V order.

Ernesto Llerena García. He completed the program in 2001, with a dissertation titled 'La predicación de la oración simple en la lengua embera del Alto Sinú' (simple sentence predication of the Embera of Atto Sinú). He has been profesor of linguistics at the Antioquia and Córdoba universities, where is working at the moment. With his father, Rito Llerena, and the Emberas of upper Sinú River, he wrote *Diccionario etnolingüístico de la lengua Embera* (2003) for the Normal Superior de Montería (capital of the department of Córdoba).

Daniel Aguirre Licht. A student from the second promotion, he finished up in 1989. In 1985, he began phonological studies of Chamí, southeast of the department of Antioquia. He continued with morphological studies in 1987, and then morphophonological and grammarians in 1998. In 1988, he collaborated with the anthropologist Mauricio Pardo in research on Choco dialectology; included in the resulting article (Pardo and Aguirre, 1993) was an answer to Paul Rivet's hypothesis about the origin Karib of the Choco languages. Aguirre Licht also worked in the department of Risaralda, the location of the Indian reservation Embera-Chamí of Purembará (from *puru* = 'town' and *embera*), a possible place of the dispersion of the different Embera groups at the Spanish arrival, and he has also worked with the Emberas of Garrapatas Valley, in the department of Valle del Cauca.

About the Waunana there are also the works of Gustavo Mejía (1987), another student from the first promotion of the master's in ethnolinguistics of the Universidad de los Andes. He did a grammarian investigation in 1987 as his thesis. He also did, for the Instituto Caro y Cuervo, a phonological and morphosyntactic description of Waunana (2000b) and a presentation of the aboriginal languages of the Pacific coast of Colombia (2000a).

Edel Rasmussen, who worked at the Universidad Nacional de Panamá, studied the Embera language of the Panama area and published research on phonology (1986) and on grammar (1985).

The Technological University of Pereira (UTP), located in the capital of the department of Risaralda, has paid attention the great number of the Embera-Chamí Indians who live in the department, both in studies of their language and in projects on other matters. Fernando Romero L. of the Psycho-Pedagogy Department in the School of Education does research on linguistic and pedagogical problems of the teaching of Spanish as a second language with bilingual Chamí and Nasa (Páez) teachers, as well as on discourse analysis of this variety of the Embera language, including studies in which the author of this article has participated. Linguist Olga L. Bedoya works with him, and as Director of the Ethnoeducation and Community Development Program in the same school she does research on the interference of Spanish in different Embera dialects, problems of orality versus writing, and other aspects of Embera language and culture.

See also: Applied Linguistics in South America; Bilingualism and Second Language Learning; Colombia: Language Situation; Educational Linguistics; History of Linguistics in Central and South America; Identity: Second Language; Language Policy in Multilingual Educational Contexts; Pedagogical Grammars: Second Language; Teaching of Minority Languages.

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Choctaw *See:* Muskogean Languages.

Choctaw Trade Language *See:* Mobilian Jargon.

Chomsky, Noam (b. 1928)

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Noam Avram Chomsky (Figure 1) was born in 1928 in Philadelphia, Pennsylvania, and studied at the University of Pennsylvania. From 1951 to 1955 he was a junior fellow of the Harvard University Society of Fellows, completing his Ph.D. in linguistics in 1955. In that year he took up a post in the Department of Modern Languages and Linguistics at Massachusetts Institute of Technology. From 1958 to 1959 he worked at the Institute for Advanced Study at Princeton. From 1966 to 1975 he held the Ferrari P. Ward Professorship of Modern Languages and Linguistics, and was appointed Institute Professor in 1976.

Chomsky's thinking has had a radical influence on grammar theory and the philosophy of grammar, syntax, morphology, language acquisition, phonology, and the historiography of linguistics. His linguistic work (the other half of his life is devoted to political writing) can be divided into four main phases: an early phase (the 1950s); a classical phase (1960s and 1970s); a transitional phase, in the 1980s; and a new phase in the 1990s, in which the 'minimalist program' was introduced.

The first work of Chomsky's to make a wider impact was *Syntactic structures* (1957), which introduced a new way of looking at grammar and language that opened up exciting avenues of enquiry. In this book Chomsky circumvented the debate as to what constituted a sentence by postulating it as a primitive in his system. According to *Syntactic structures*, a language was "a set ... of sentences, each finite in length and constructed out of a finite set of elements" (Chomsky, 1957: 13), and "the fundamental aim in the linguistic analysis of a language L is to separate the grammatical sequences which are the sentences of L from the ungrammatical sequences which are not sentences of L ... The grammar of L will thus be a device that generates all the grammatical sequences of L and none of the ungrammatical ones." 'Grammatical' did not mean 'meaningful,' as the sentence 'Colorless green ideas sleep furiously' showed, which, while not being uncontroversially meaningful, is syntactically well-formed. In *Syntactic structures* Chomsky also introduced the concept 'generative' to mean not only productive, but also formally explicit. Chomsky argued that neither finite-state nor phrase-structure (PS) grammars were adequate as a means of generating the sentences of a natural language, and introduced a transformational component by means of which further operations could be performed on the output of a PS-component to generate the strings that underlie sentences. Finally, this study emphasized the evaluative function of grammar theory (in selecting the best grammar) as opposed to the discovery procedures favored by the preceding generation.

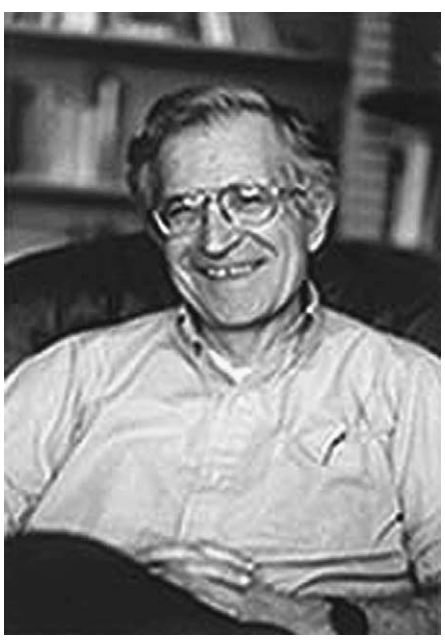

Figure 1 Noam Chomsky.

Aspects of the theory of syntax (Chomsky, 1965) marked an increasing interest in grammar as reflecting the structure of the human mind. This work introduced the notions of *competence* (a speaker's ability to produce and understand correct sentences) and *performance* (the externally verifiable product of such competence), and also deep- and surface-structure. This study is the source of his classic statement, "Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogenous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors ... in applying his knowledge of the language in actual performance" (Chomsky, 1965: 3). This approach to grammar became known as 'standard theory' (ST). Keen to distance himself from his immediate predecessors, Chomsky stressed the affinities between transformational grammar and so-called traditional grammar: "It would not be inaccurate to regard the transformational model as a formalization of features implicit in traditional grammars, and to regard these grammars as inexplicit transformational generative grammars" (Chomsky, 1964: 918).

Standard theory raised questions about the nature of a deep structure that postulated identical representations for synonymous sentences, about the nature of global and cross-derivational constraints, and about how illocutionary force could or should be incorporated into the syntax. Differences on these issues led to a split in the movement, with 'generative semantics' being rejected by Chomsky and some of his associates in favor of an 'interpretive semantics' (Huck and Goldsmith, 1995).

After *Aspects* Chomsky published successive revisions in what came to be known as 'the generative enterprise,' each of which is characterized by a key work. 'Standard theory' was followed by 'extended standard theory' (Chomsky, 1973) and 'revised extended standard theory' (Bach, 1977), which introduced the concept of 'core grammar' and periphery, and devoted much attention to conditions and filters. It then became 'government-(and)-binding theory' (Chomsky, 1980, 1981), which introduced θ-roles ('semantic' or 'thematic relations'), and replaced deep- and surface-structure by 'D-structure' and 'S-structure,' though not with identical meanings.

Up to this point the goal of Chomskyan theory had been the writing of grammars of natural languages. The next – transitional – phase saw a move toward a different goal – exploring the principles of universal grammar. This – Chomsky's 'second conceptual shift' (Chomsky, 1986: 6, 145) – was pursued within the theory of 'principles and parameters.' Competence and performance were replaced by the (partly overlapping) 'I-language' (internalized language as a property of the human mind) and 'E-(externalized)-language' (speech written or oral). Principles and parameters are properties of all human languages (part of innate UG), but the principles are invariable whereas the parameters can have different settings. Thus the 'projection principle' ("lexical structure must be represented categorially at every syntactic level" – Chomsky, 1986: 84) is assumed to apply to all human languages. But the 'head parameter' will specify by its setting for a given language whether the head typically comes first in a construction (followed by its complements, as in *bought the book*) or last (as in Japanese).

Principles and parameters theory was succeeded in the 1990s by the 'minimalist program' (Chomsky, 1995). The change in terminology from 'theory' to 'program' is significant. The question had now become, 'How perfect is human language?' The minimalist program is driven by the view that human language is maximally simple, and by a striving for economy – economy of representation, economy of principles, and economy of derivation.

Although *Syntactic structures* contained little evidence of the degree to which grammar theory and language acquisition theory were to merge, there was evidence as early as the 1950s of the challenge that Chomsky's ideas were to pose in psycholinguistics. In his review of Skinner's *Verbal behavior* (Chomsky, 1959), Chomsky both attacked behaviorist theories of language acquisition and opened up new avenues for research: "The fact that all normal children acquire essentially comparable grammars with remarkable rapidity suggests that human beings are somehow specially designed to do this, with data-handling or 'hypothesis-formulating' ability of unknown character and complexity" (Chomsky, 1959: 57). The question was how, on the basis of the available data, the child manages to construct a grammar of its mother tongue: "A consideration of the character of the grammar that is acquired, the degenerate quality and narrowly limited extent of the available data, the striking uniformity of the resulting grammars, and their independence of intelligence, motivation, and emotional state, over wide ranges of variation, leave little hope that much of the structure of the language can be learned by an organism originally uninformed as to its general character" (Chomsky, 1965: 58).

The information that 'the organism' possessed to deal with this task was characterized as a 'language acquisition device,' a 'black box' that, while one had no direct access to its contents, nevertheless permitted hypotheses to be made about its workings on the basis of its output. A search for universals of language acquisition was thus under way that ultimately turned into the task of describing the properties of I-language.

In the mid-1960s Chomsky concentrated on grammar theory, phonology, and the history of ideas. The position adopted in *The sound pattern of English* (Chomsky and Halle, 1968) illustrates a general move away from structuralist taxonomic description toward the generative paradigm. *The sound pattern of English* made use of a set of primitive terms together with a set of rules for combining them and for linking the morphophonemic, phonological, and phonetic levels by means of transformations. The system was symbol-based and formally defined, with rules of the form $A \rightarrow B/X____Y$ (to be read as: 'interpret – or re-write – A as B when it appears in a context preceded by X and followed by Y'). In the early stages, interest focused on the nature of phonological rules, rule ordering, and the cyclic nature of rules. Though – or perhaps because – *The sound pattern of English* presented a theory that was essentially one-dimensional, not fully fleshed out, and language specific, it too stimulated further research.

In that volume and elsewhere Chomsky preferred to look back to the work of earlier grammarians as opposed to his structuralist predecessors. In 1966 he published *Cartesian linguistics,* in which he argued that his innateness theory was not simply the product of a backlash against behaviorist views, but had a much longer pedigree. This work was sharply reviewed, notably by Salmon, who showed that even in Descartes' time proponents of innateness theories were locked in combat with empirical-sensualist theorists. Despite Chomsky's disclaimers in the book, the consensus view seemed to be that *Cartesian linguistics* was not a model of how to write the history of linguistics. It says something for Chomsky's stature, though, that his excursion into the history of linguistics acted as a powerful stimulus to younger scholars (Walmsley, 2000).

Chomsky's work dominated the second half of 20th-century linguistics like that of no other linguist. The switch from a taxonomic, inductive, descriptive approach to a generative, hypothetico-deductive, 'explanatory' approach left an indelible mark on how we do syntax, morphology, and phonology today. It increased precision by committing itself to symbolic representation and formalization. The increase in precision, though, came at a price: the scope of 'linguistics' narrowed. Since a language was said to be "a set of structural descriptions of sentences, where a full structural description determines (in particular) the sound and meaning of a linguistic expression" (Chomsky, 1977: 81), the focus of attention moved in effect from 'language' to 'grammar.'

Chomsky, of course, was not the only source of linguistic ideas in the 20th century, but it would be difficult to grasp much of modern linguistics without some understanding of his ideas and techniques. His ideas have proved fruitful not only in themselves, but also in the reactions they provoked within morphology, syntax, and elsewhere. Underlying almost all these theories however are frequently untested assumptions about the fundamental categories of language – word classes, attributes, and their values. The energy invested in the Chomskyan paradigm has in part deflected attention from these issues. As Lyons put it: "in *Aspects* . . ., as generally, Chomsky was . . . content to operate, uncritically, with the categories and subcategories of traditional grammar" (Lyons, 1989: 167). These categories have hardly been questioned by the big commercial grammars, either.

Chomsky's influence has left its mark on mathematical linguistics, historical linguistics, theories of language acquisition, anthropology, the study of human cognition, biology, philosophy and the philosophy of science, artificial intelligence, logic, music theory, literary theory, law and theology, among other fields (Otero, 1994).

See also: Constituent Structure; Generative Semantics; Grammar; Language Acquisition Research Methods; Principles and Parameters Framework of Generative Grammar; Phonology: Overview; Syntax of Words; Traditional Grammar; Transformational Grammar: Evolution; X-Bar Theory.

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Chorasmian

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Chorasmian was an Iranian language spoken in medieval Chorasmia, a state on the Oxus/Amu Darja south of the Aral Sea. The name is first mentioned in the Avesta and the Achaemenid inscriptions (*see* **Avestan; Persian, Old**) but the language is known only from much later times. Several words pertaining to the calendar and astronomy were cited by Abu Rayhan Biruni in his *Athar al-baqiya* (comp. 1000). Since then archeological excavations have uncovered inscriptions and documents on parchment and wood from ca. 200–700 A.D.; also, a number of manuscripts of Arabic works containing interlinear glosses in Chorasmian have been found in libraries in Turkey, notably Abu'l-Qasim Zamakhshari's *Muqaddimat al-adab* (ms. from ca. 1200) and several 13th-century Arabic law books. The Chorasmian glosses are written in Arabic script, with several modified letters. Those in the *Muqaddima* are often underpointed or not pointed at all, which makes them hard to interpret.

Some Arabo-Persian letters were modified to express special Chorasmian sounds. Triple superscript dots over *c* = *ts* and *dz*, over *f* = *β*. Triple subscript dots were used under *s* to indicate *s*, not *š*, and single subscript dot under *d* to indicate *d*, not *δ*.

Chorasmian historical phonology is characterized by extensive affrication of dentals, palatalization, and a variety of, often unpredictable, simplifications of consonant groups. For instance, *t* and *d* > *c* [ts] and *j* [dz] before and after *i*, *y*: *pc* < *pati-* (preverb) and **pitā* 'father'; *pzy* 'sinew', cf. Av. *paiδiiā-*. Intevocalic *š* developed variously: *'mh* 'ewe', cf. Av. *maēšī-*; *mwf* 'mouse', cf. Av. *mūš*; *γwx* 'ear', cf. MPers. *gōš*; etc.

The Chorasmian vowel system is characterized by the reappearance (in the script) of final vowels before suffixes, *pc* = *pic*^{a} 'father', but *pc'm* = *picā-m*^{i} 'my father'. Contraction of final vowels with vowels of suffixes is common, e.g., *hāβ*^{i}*r-īn*^{a} 'give.IMPERF-1ST.SING' = 'I gave', but *hāβir-*^{i}*n*^{a}*-h*^{i}*-d*^{i} 'give.IMPERF-1ST.SING-he/she/it.ENCL.OBL-you.ENCL.OBL' = 'I gave her to you' > *hāβir-nā-hī-d*^{i} > *hāβir-n-ī-d*^{i}. Such final vowels are sometimes indicated by the Arabic vowel marks.

Masculine and feminine gender are distinguished in the definite article (*ĭ*, *ya*; *-ĭ*, *-ă* after prepositions) and in declension (nom. sing. masc. no ending, but fem. *-a*). Five cases are distinguished in masculine nouns: nominative-accusative, vocative (*-a*), possessive (*-ān*), dative (*-i*), and ablative-locative (*-a*), but feminine nouns have only two forms: nominative and locative (*-a*) contrasting with the other cases (*-iya*). The plural endings are *-i* or *-ina*, possessive *-in-ān*. A final *-k* becomes *-c* before *-i*. The direct object can be marked by *-δār* attached to the dative (presumably < **rāδ*, cf. Pers. *-rā*). Examples: *ī kām-h*^{i} 'DEF mouth.MASC-he.ENCL.OBL 'his mouth'; *f-ī kāmā-h*^{i} 'in DEF mouth'; *yā camā-h*^{i} 'DEF eye.FEM-he.ENCL.OBL'; *yā cam-yā-h*^{i} *δār* 'DEF eye.FEM-DAT-he.ENCL.OBL' = 'his eye' (DO); *ī βandik* 'the servant', *ī bandic-*^{i} 'the servants', *f-ī bandic-ī-h*^{i} 'with-DEF servant-PL-he.ENCL.OBL' = 'with his servants'; *ī bfin-ēnik ī βūm-in-ān* 'DEF create.AGT DEF earth-PL-POSS' = 'the creator of the earths'.

When several enclitic personal and local pronouns are added to a verb, the order is strict, e.g., *γēr-īdā-hī-nā-bir* 'turn-IMPERF.3RD.SING-he.ENCL.OBL-they.ENCL.OBL-upon' = 'he made them go around him', where *-bir* goes not with the preceding *-nā-*, but with *-hī-*. When personal and local complements follow the verb, they must be anticipated as enclitics, e.g., *m-uxwās-idā-nā-w*^{a} *f-ī razik-*^{a} *ī cūb* 'IMPERF-let-PAST.3RD.SING-they.ENCL.OBL-there in-DEF-vinyeard-LOC DEF-water.PL' = 'he let the water into the vinyeard'; *hīδ-idā-hī-nā-dā-bir ī salām* 'read.IMPERF.3RD.SING-it.ENCL.OBL-they.ENCL.OBL-there-on DEF-greeting.PL' = 'he recited the greetings upon him'.

The verbal system is of the Eastern Middle Iranian type. There are three stems: present, past, and perfect (perfect participle = past stem + suffix *-ik*, FEM *-ic*^{a}). There are numerous modal forms (indicative, imperative, subjunctive, optative, injunctive); an imperfect formed with prefixes (*m-ikk-* 'did') or lengthening of the vowel of the first syllable (*h-ā-βir-* 'gave'), both reflexes of the Old Iranian augment; a form ending in *-ī(n)* added to personal endings, the function of which is not completely clear but which is referred to as 'permansive'; a (present) perfect formed with the perfect participle and the verb *δār-* (transitive verbs) or 'be' (intransitive verbs), e.g., *akt-ik δāriy-ā-yī* 'do.PERF.PART.MASC have.PRES-1ST.SING-PERMANSIVE' = 'I may have done'; *purāc*^{a}*-ihi* [<*purād-c-*]> *purācīhi* 'divorce.PERF.PART.FEM-be.PRES.2ND.SING' = 'you are divorced'.

See also: Iranian Languages.

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Christianity and Language in the Middle Ages

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Christianity was founded by a carpenter's son and spread by fishermen. Since the first Latin versions of the Bible were produced for very humble folk, their language was correspondingly humble; it was also marked by lexical and syntactic Hebraisms and Hellenisms. For educated pagans of late antiquity, the problem with Christianity was not theological, but linguistic: the language of its scriptures was simply considered too crude. While, moreover, the case made by the 'Nijmegen School' for a specifically Christian sociolect would seem to be untenable, the works of Christian writers were sufficiently unclassical to make educated pagans turn up their noses. When the highly educated Cyprian embraced Christianity, a pagan dubbed him instead *Coprian* ('Mr. Shit').

The educational system that produced such people consisted of two parts. Broadly speaking, the role of the 'grammaticus' was to teach correct Latin and to expound the classics. The 'rhetor' then coached the student in the five parts of rhetoric: invention, disposition, style, memory, and delivery. Style (*elocutio*) comprised figures of language (e.g., *adiunctio*, *anaphora*, *anastrophe*, *annominatio*, *asyndeton*) and figures of thought (e.g., *aetiologia*, *allegoria*, *aposiopesis*, *apostrophe*, *aversio*). The problems posed by such an educational system for Christians are conveniently illustrated by the two greatest of the doctors of the Church: Jerome and Augustine. Jerome had been the star student of Donatus, the doyen of grammatici. When as a hermit Jerome preferred the stylistic finesse of Cicero to the rebarbative language of the Old Latin Bible, he had a famous dream, in which he was hauled before God's throne and told: 'You are a Ciceronian, not a Christian'. Augustine had been a professional rhetor himself. When as a bishop he then wrote the *De doctrina christiana*, the only use he could find for the old educational system was as an ancillary to the better understanding of the Bible.

Both Jerome and Augustine lived to see the fall of Rome. The barbarization and ruralization resulting from the influx of hordes of illiterate Germans led ultimately to the collapse of the old educational system. With the end of Roman rule, private and public libraries began to disappear. The books that survived usually found refuge in the monasteries, which had developed in the fifth century, when the appeal of a life of ascetic withdrawal grew. Such monasteries were also in a position to provide education. A similar function could be performed by the schools that came to be attached to cathedrals. Education accordingly became the preserve of the Church: a clerk is now a 'cleric'.

If Christians like Jerome and Augustine had been ambivalent in their attitude toward classical education, 6th-century monks like Benedict and Gregory the Great rejected it decisively. Benedict's Rule makes his monks copy books, but Benedict himself had run away from school and composed his Rule in Vulgar Latin; the books he had in mind were naturally Christian. The prefatory letter to Gregory's *Moralia in Iob* proclaims its author's resolute refusal to trammel the Word of God with the "rules of Donatus." His friend Gregory of Tours wrote a particularly solecistic Latin that showed how far the language had advanced toward Proto-Romance and how close to each other its written and spoken forms had become.

Throughout the Dark Ages the light of learning still shone in Ireland, which had received Christianity in the 5th century. At the same time the Irish also received Latin, which as the language of the Bible, the Liturgy, and the Church Fathers was the indispensable concomitant of the new religion. The Irish also did not share the unease of their continental coreligionists with the pagan classics, since Ireland had never known Roman paganism. In addition, because in Ireland Latin was the preserve of an educated elite, the language was not exposed to the evolutionary tendencies that affected it on the increasingly Romance-speaking continent. Irish monks were therefore able to bring Christianity and a fairly classical form of Latin to their neighbors, the English.

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Accordingly, Alcuin was in turn summoned by Charlemagne from the cathedral school in York to his capital Aachen, where this well-educated Englishman masterminded the Carolingian renaissance.

This renaissance entailed a revival of classical education. As a species of Carolingian 'minister of culture', Alcuin established the trivium of 'grammar', 'rhetoric', and 'dialectic'. He thereby bequeathed to the Middle Ages a tradition of writing correct and cultivated Latin, which were the objectives of grammar and rhetoric, respectively, while dialectic taught correct thinking. Texts of the pagan authors became once again the subject of diligent study instead of being ignored or destroyed; their dissemination was also facilitated by the new Carolingian minuscule (writing style). Donatus was reinstated as the arbiter of acceptable usage. Zealous attention was now paid to his two *Artes*, both of which set out the eight parts of speech. While the longer treatment dealt with the *vitia et virtutes orationis*, the shorter one, with its congenial question-and-answer layout, became the favorite grammar for beginners throughout the rest of the Middle Ages. Henceforth, Latin was treated as a learned language separate from Romance.

However, some qualifications must be noted to this rosy picture of linguistic and literary renaissance. The unclassical features that had marked the style of the Church Fathers persisted; here particular mention may be made of the use of *quod*, *quia,* and *quoniam* rather than the accusative and infinitive, of the use of the infinitive to express purpose, of a tendency to employ prepositions indiscriminately, and of a greater license in the handling of tense and mood. Similar divergencies from the classical language characterized Jerome's massively influential Vulgate version of the Bible, which by the Carolingian period had generally replaced the stylistically hair-raising Old Latin translations that had so repelled him in his youth. The Bible and writings of the Church Fathers alone seemed an appropriate object of study to some religious leaders, who disapproved of the use of pagan texts; Alcuin himself had felt qualms, although Christian allegories were always an option. Even when such reservations were absent, the goal was always a proper understanding of Holy Writ. Charlemagne's own motivation had been largely pragmatic, since he wished to improve the quality of officials for Church and State. Moreover, there is evidence that in the decades following Charlemagne's death, his educational reforms were not being systematically implemented.

Such as it was, this Carolingian renaissance was effected through the schools that were attached either to monasteries (e.g., Fulda, St. Gall, Tours) or to cathedrals (e.g., Metz, Orléans, Reims); such establishments were the forerunners of the great monastic and cathedral schools of the High Middle Ages. Charlemagne's own biographer Einhard was himself an alumnus of Fulda; his masterpiece, the *Vita Caroli*, illustrates the new enthusiasm for the classics by its studious imitation of Suetonius's *Vita Augusti*. If in matters of grammar the Carolingian age preferred to rely on the handily succinct Donatus, he was eclipsed in the 11th century by Priscian's much ampler *Institutiones grammaticae*, which likewise deals with the eight parts of speech. For rhetorical instruction the main textbooks continued to be the pseudo-Ciceronian *Rhetorica ad Herennium* and Cicero's juvenile *De inventione*; the latter had inspired Alcuin's own *De rhetorica et de virtutibus*.

Medieval authors produced numerous commentaries on these four key manuals of grammar and rhetoric as well as textbooks of their own that derive from them; here, passages from Christian works could be used for exemplification in place of pagan ones. Of the rhetorical handbooks, the *Rhetorica ad Herennium* in particular sets out its subject with admirable clarity and comprehensiveness. Its fourth book, which often circulated separately, is devoted to a very full treatment of the 64 figures of language and thought. Lavish use of these figures in Walter of Châtillon's 12th-century *Alexandreis* enabled this epic to outrank even Virgil's supposedly incomparable *Aeneid* in the favor of the schools.

This same 12th century saw a weakening of the Church's role in the teaching of Latin. Here a number of factors were involved. First, the new orders of Cistercians and Carthusians admitted only adults, so they did not maintain schools. Second, this period was marked by the emergence of so-called private schools, some of which developed in the following century into the universities. Last, a large number of 'grammar schools' appeared. While the old monastic schools continued to exist, their importance accordingly declined in the face of this competition from urban centers. The final point to be made in this connection is that the role of these monastic schools in education had for the first time made education available at a higher level to women, who learned Latin as nuns.

If the 12th century had managed to equal the *auctores*, in the 13th the study of them succumbed to dialectic. Rhetoric itself now tended to be reduced to the 'ars dictaminis', which was principally concerned with imparting a good prose style for the composition of letters. Here the Ciceronian arrangement of a speech into 'exordium', 'divisio', 'narratio', 'confirmatio', 'refutatio', and 'peroratio' was condensed to 'salutatio', 'narratio', 'petitio', and 'conclusio'. Careful attention was also given to 'cursus', whereby three

principal types of accentual cadence were employed at the ends of sentences: 'planus' (´- -´-), 'tardus' (´- -´- -´-) and 'velox' (´- - -´-). In connection with such 'artes dictaminis,' reference may also be made to the 'artes poetriae' and to the specifically Christian 'artes praedicandi'. These two kinds of manual-issued precepts for the writing of poetry and sermons, respectively: while the 'ars praedicandi' dealt chiefly with the division and amplification of a theme, the 'ars poetriae' laid particular stress on the figures of language and thought expounded in the fourth book of the *Rhetorica ad Herennium*.

In the sphere of grammar this period saw the rise of the Modistae, whose 'grammatica speculativa' set about applying to Priscian the new methods of scholastic logic; it now went beyond his morphology to embrace syntactic analysis. Grammar accordingly came to be perceived as possessing a universal character that transcended individual languages: the grammatical 'modi significandi' reflected the mind's 'modi intellegendi', which in turn reflected the 'modi essendi' of reality itself. While moreover Priscian's examples had been taken from the *soigné* language of the classics, the scholastically minded Modistae devised their own, which in comparison were often bizarrely utilitarian.

A word should also be said about the effect of scholasticism on the Latin language itself. While Medieval Latin as a whole had always been prone to admit neologisms, this tendency was particularly characteristic of scholastic Latin. Here, particular importance was attached to the use of suffixes (e.g., *certitudinaliter*) and to the substantivization of adjectives (e.g., *haecceitas*), participles (e.g., *ens rationis*) and infinitives (e.g., *pro posse*). The result was a Latin that was precise but unclassically inelegant. Classical elegance returned with the Renaissance humanists, whose obsession with it killed Latin as a general means of communication; even the grammars of Donatus and Priscian were rejected in favor of observing the usage of classical authors themselves. Such aspirations to linguistic classicism could moreover entail an intermittent neo-paganism that tended to disown Christianity itself.

A brief mention must also be made of languages other than Latin. Educated Romans of the classical period had been bilingual, since they were equally proficient in Latin and Greek. By late antiquity, however, knowledge of Greek in the West was on the wane. During the Middle Ages, Greek was largely unknown, even though it was the language of both the New Testament and of Aristotle, who exercised a vast influence on scholasticism. Likewise, Hebrew, the language of the Hebrew Bible, was hardly known. In both cases the Middle Ages relied instead on Latin translations. The vernaculars also were largely unimportant until the late Middle Ages, since they lacked the prestige of Latin, which was felt to be the language of theology, the most important of the sciences.

See also: Latin.

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Christianity in Africa

A Hastings

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The involvement of the Christian churches in issues of language has been central both to the modern linguistic history of sub-Saharan Africa and to the life of the churches themselves. Apart from Swahili in the east and Fulfulde and two or three others in the more Islamized west, none of the languages of sub-Saharan Africa had been given a written form prior to the coming of missionaries.

Early Missionary Translation Work

The earliest extant Bantu text is a lengthy catechism in Portuguese and Kongo produced by the Jesuit Mattheus Cardoso and printed in Lisbon in 1624. This, a subsequent Kongo dictionary by a Capuchin, Georges de Geel, and a grammar produced by another Capuchin, Giacinto Brugiotti da Vetralla in 1659, are immensely valuable for Bantu linguistic history. The last includes the Bantu noun-class and concord system. Unfortunately, the Catholic missionaries of that era produced little work in any other language. It was the 19th-century Protestant missionaries, with their far higher conviction of the necessity of Bible translation, who produced a mass of linguistic work – dictionaries, grammars, and biblical texts for scores of languages in every part of Africa. The pioneering work of Krapf in the east, van der Kemp, Moffat, Appleyard, and Colenso in the south, and Raban, Schön, and Crowther in the west – to name but a few from the early and middle years of the 19th century – stands for a vastly larger undertaking that has as yet received no adequate historical survey. In almost every African language with a written literature, missionaries have been responsible for the basic work and indeed for most subsequent published literature as well, except in a handful of the larger languages. The vast multiplicity of African languages and the policy of most colonial and postcolonial governments to use English, French, or Portuguese for educational purposes mean that (apart from some score of languages, such as Yoruba, Swahili, Shona, and Ganda) there is still little, if anything, of any extent published in most languages except for church purposes.

Missionary Imposition of a Dialect as a Language

Missionaries could not, of course, have done this work without African collaborators who had themselves first learned English. Inevitably the precise language canonized by missionaries, in the first dictionaries and New Testaments, was the dialect used by their assistants. As all languages inevitably varied geographically, so that it is indeed open to argument how far any

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specific language actually existed prior to its precise, missionary-constructed form, the language of missionary literature represents in every case the particular local form in which the missionary's assistants were at home. Once a language was printed, it was, however, essential that it be used across a wider area in which people were much less at home with it. The missionary approach had mistakenly assumed a degree of linguistic uniformity that in fact it had rather to impose. This produced inevitable tensions and at times rebellions. Moreover, other missionaries working in the same general language area but some distance away inevitably absorbed different dialectical forms. Missionaries certainly revised their translations as their language knowledge improved, but Africans had also to some extent to relearn their languages when they studied the Scriptures or other works in mission schools. Moreover, tensions between different forms of a language as fixed by a range of different missionary translations (so that, for instance, Protestant and Catholic Baganda could divide linguistically as well as theologically) continued for decades, at least until the 1930s, or later, when colonial governments insisted on standardized forms for state-assisted schools. Even then, imposed uniformity, such as 'Union Igbo,' was not easily accepted.

The missionary preoccupation with the vernacular written word was quickly taken over by leading African Christians. The Reverend John Raban's initial work on Yoruba was continued by the Yoruba school teacher, and later bishop, Samuel Ajayi Crowther, who made a major linguistic contribution in his recognition of the essential role of tone in Yoruba, Nupe, and other Nigerian languages. In southern Africa, the Presbyterian minister Tiyo Soga, the translator of Bunyan's *Pilgrim's progress* into Xhosa, died in 1871 while at work on the Acts of the Apostles. While some missionaries and African Christians, such as Schön and Crowther, were undoubtedly outstanding precisely as students of language, their primary preoccupation – to translate as quickly as possible as much biblical and Christian literature as they could – often, it must be said, weakened their achievement precisely as linguists.

The Name of God

For missionaries, the great question was a practical and pedagogical one: how far could they find suitable words already in existence for the special things they wished to teach about, how far had they instead to invent words in which to do so? In the latter case, how were they to arrive at the words they needed? It is striking that in the large majority of African languages, missionaries were content to use an existing vernacular name for the all-important name of God. In some places, at least at first, they felt unable to do this and imported foreign names like Dio or Godi. But these were exceptional and mostly short-lived. For the greater part, the missionaries became convinced that Africans had already sufficient belief in a single almighty spirit for it to be possible to adopt an African name for such a spirit to use for the biblical and Christian Yahweh, the Father of Jesus. Thus, in East Africa, Mungu, Mulungu, or Ruhanga; in central Africa Lesa or Nzambi; in southern Africa Molimo all came – among many other names – to be used. In Zimbabwe, there were long hesitations among some over the use of Mwari – in this case because of its localized cult. It is noticeable that in many cases these names had already obtained a considerable degree of intertribal currency, in some cases overshadowing more local names. It seems clear that missionaries preferred words with the wider usage.

Other Key Christian Terms

This seems true for a wide range of religious terms. As missionaries advanced from one people to another, they inevitably carried words, especially key words, across intertribal boundaries. They did this particularly in eastern Africa in the early years with regard to Swahili. While Swahili is basically a Bantu language, it has incorporated a very large number of Arabic words, including especially religious words. Despite their Muslim origin, these seemed, with their theistic character and biblical links, ideal for missionary use. Hence words like *eddini, essala, injili, kanisa* ('religion,' 'prayer,' 'gospel,' 'church') were imported into many other inland Bantu languages from Swahili. They seemed to fill a gap while avoiding the importation of purely European words to which many missionaries were driven in other circumstances, when no suitable vernacular word was discovered for some major Christian concept. However, a later generation of missionaries found this dependence upon Swahili regrettable, perhaps because of its apparent Muslim connotations, and in several languages such words were systematically eliminated if alternatives could be found.

'Gospel' and 'baptize' are typical cases. The root meaning of the one is 'good news,' of the other 'wash' or 'sprinkle,' but each has turned in Christian usage almost into a proper name. Many early missionaries (Catholics especially) were unwilling simply to find a vernacular phrase meaning 'good news' or 'wash' and render the words in this way. Hence, vernacular Christian doctrinal texts could be peppered with strange-sounding terms, transliterations of Greek, Latin, or English. The tendency now is to eliminate these in favor of genuinely local words.

Muzimu and *Nganga*

In other cases, traditional words with a religious connotation were available but were avoided just because it seemed the wrong connotation. Words for 'spirit' are probably the clearest case. Missionaries were most anxious not to let the 'Holy Spirit' become identified with, or understood in terms of, the 'spirits' of traditional religion, especially spirits of the dead, which frequently possessed the living. Hence, nearly everywhere the typical Bantu spirit word *muzimu* was rejected. Again, the almost universally used term throughout Bantu Africa for a priest, diviner, or medium, *nganga*, was regarded as unusable for a Christian minister in the 19th century and since. The *nganga* became, instead, the stereotype of the pagan 'witch doctor' against whose influence Christianity was battling. This is interesting because missionaries in the 16th and 17th centuries willingly described themselves as '*nganga*.' These are two cases in which the linguistic challenge of assimilation still remains to be met.

The Fluidity of Word Meanings

What seems clear is that language usage in nonliterate societies is far more fluid than might be imagined. It is less a matter of finding the right word than of making it right by regular usage. Existing words had the flexibility of all language, and anyway missionaries could not know how reliable were their informants. Words (and not only the name of God) moved easily across language groups in precolonial Africa. Missionary importations and adaptations were nothing new. Once a word was adopted, used in a certain way in scriptures, hymns, and sermons, it easily acquired the meaning now given it, whether it had it before or not. Within a generation or so, non-Christians, too, could be using it the missionary way. Thus, for instance, even where missionaries mistakenly adopted for 'God' a local name that had really belonged to a culture hero of quite limited importance (e.g., the Nyakyusa Kyali), the new missionary content for the word quickly became a normative one, recognized by all but the antiquarian.

The Lasting Language Impact of Missionary Translations

In the scores of African languages that have possessed a Bible, a hymn book, a catechism, for 50 to 100 years, but still very little more in the way of written literature, these books, with their specific vocabulary and the meanings of the words that the content of the Bible and Christian tradition impose upon them, may now be near the heart of living language usage. Rather little in that vocabulary was formally imported, but the conversion of traditional words to new meanings has effectively taken place. Nevertheless, the new meanings have not simply obliterated old meanings. African religion in most places is now an integrated mix of the traditional with the Christian (or the Islamic). That mix is one of concept, of ritual, and also, inevitably, of linguistic meaning. Moreover, the process described in this article has not proceeded everywhere at the same rate or gone so far. In some languages it began considerably later than in others. In many smaller languages, little of scripture has even now been printed. Much has depended, too, on how linguistically skilled early missionaries were. In some places they did indeed master the language, translate intelligibly, preach eloquently, and in a way impose their meanings upon it. In others, missionaries were unable to do this. Their linguistic ability was simply inadequate. They preached through poorly trained interpreters and remained so marginal to the vernacular culture that what translations they produced had little impact upon its world of meaning. The very fact that schooling was in English or French might have actually protected vernacular meanings from the impact of Western Christian verbal imperialism. Nevertheless, in most rural areas where Christian churches have been actively at work and (as in the case of most countries of Africa south of the Equator) now have a majority of the population considering itself Christian, biblical literature and a Christian interpretation of religious words may be almost as central to vernacular culture as was the King James version and its vocabulary specific to the culture of preindustrial Britain.

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Christianity in Central Asia and the Near East

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During the 2nd century A.D., the kingdom of Osrohoene, with its capital city Edessa (Urfa in Turkey), emerged as a major center of Syriac Christianity, which quickly spread throughout the Syrian territories of the east Roman Empire and penetrated Mesopotamia. When the Sassanians conquered the Parthians in 225 A.D., the incoming Zoroastrian king Ardashir found substantial Christian communities in his territories, stretching from the northern regions of Mesopotamia to Mesene (Basra) in southern Iraq. Syriac Christianity also expanded along the coastline of the Arabian Gulf and was transmitted to India, as well as establishing itself in Iran and Central Asia.

The Christian population of the Sassanid Empire were supplemented by deportees from Byzantium following the incursions of Shapur I into Syria in 256 A.D. and 260 A.D. This pattern was repeated throughout the centuries of Sassanid rule. It culminated with the influx of thousands of Monophysite captives following the defeat of Antioch by Chosroes II, whose campaigns ventured deep within the Byzantine empire, taking Jerusalem in 612 A.D. Some of the deportees were settled in Herat in northern Afghanistan, where Syrian Orthodox bishops still resided as late as the 9th century. In Mesopotamia, where the Sassanian royal house and the nobility were Zoroastrian, the burgeoning Christian communities lived alongside Jews, Manichaeans, and Mandaeans.

The Council of Nicaea was convened in 325 A.D. by Emperor Constantine (324–337 A.D.) to discuss the Arian interpretation of the Trinity, resulting in the Niceno-Constantinopolitan Creed of 381 A.D. that was adopted universally by Christian communities in both the Byzantine and Sassanid territories. This unity was shattered at the Council of Ephesus in 431 A.D. when Nestorius, bishop of Constantinople, was excommunicated because of his Diophysite theology. The Church of the East, which followed the teachings of Nestorius, separated from Christianity in the Byzantine territories. In reality, in 424 A.D. the Synod of Dādīšō, held at the religious centre of Hira in southwest Iraq, had declared the Christian communities east of the Euphrates autocephalous of the five pentarchies of Alexandria, Antioch, Constantinople, Jerusalem, and Rome, effectively severing relations with the West.

By the 5th century, the Church of the East had consolidated itself in eastern Iran and Turkestan, although Syrian Orthodox, Armenian, and Byzantine (principally Melkite) missionaries were also active. The *Synodicon Orientale*, a listing of the synods held by the Church of the East between 410 A.D. and 790 A.D., recorded that bishops of Nišapur, Marv, and Herat were represented at the Synod of Dādīšō in 424 A.D. The Syriac *History of Mar Aba* recounts the consecration of a Hephthalite bishop in 549 A.D., when a delegation traveled to Seleucia- Ctesiphon to present their candidate and rendered obeisance both to the Sassanid monarch and the Patriarch. The Hephthalite see may have been the bishopric of Badghis-Qadistan, near Herat. Herat was elevated to a metropolitanate of the Church of the East at the 585 A.D. Synod of Išo'yāb, but, as mentioned, there was also a Syrian Orthodox presence.

Marv, the administrative seat of the Sassanid province of Margiana, was strategically located on the Silk Route to be the starting point for missions in Central Asia among the Turkic nomadic tribes that were progressively moving westward and had infiltrated the regions around the Syr and Amu Darya rivers. Reflecting this role, the Synod of Mar Aba in 544 A.D. ranked Marv as the seventh metropolitanate, after Beth Lapat, Nisibis, Perath dhe Maysan (Basra), Arbel (Erbil), Karkha de Beth Selokh (Kirkuk), and Rew Ardashir, all of which were located in Mesopotamia or the nearby Iranian territories. The missionary activities of the metropolitans of Marv are recorded in several Syriac sources. The anonymous 6th-century *Chronica Minora* narrates that the metropolitan converted a Turkic kinglet by a quasi-shamanic ceremony, making the sign of the cross to still a storm that had been conjured by pagan priests.

Samarkand was also a base for proselytism among both the Sogdian-speaking Iranian communities settled in east Turkestan and the westward-moving nomadic groups whose Turkic languages became the lingua franca. Syriac sources do not comment directly on Samarkand's role in missionary enterprises, but there are three Nestorian crosses and inscriptions engraved on a rock on the main route from Bactria to Lhasa. A single Sogdian word may be interpreted as 'Jesus', while a longer inscription, also written in Sogdian, reads "in the year 210 ... came Nôš-farn from Samarkand as emissary to the Khan of Tibet" (Gillman and Klimkeit, 1999: 108). The metropolitan of Samarkand may have helped consolidate the Church of the East in Tibet where, in the late 8th century, Patriarch Timothy I made reference to the consecration of a metropolitan of the bēt tûptāyê', possibly the Tibetans.

The metropolitanate of Kashgar probably emerged during the dynamic incumbency of Patriarch Timothy I (787/8–823 A.D.). An important trade station, Kashgar was located where the Silk Route to China bifurcated. Its jurisdiction extended over the bishoprics of Yarkand, Urumtsi, and various sites on the rim of the inhospitable Tarim basin, including Khotan. On the northern side, the Turfan oasis was dotted with Christian sites. The most renowned was Buläyiq, where a monastery of the Church of the East and its library of Syriac, Sogdian, and Christian Turkic manuscripts was discovered by the 1905 expedition of Albert von le Coq. Kashgar was still a metropolitanate in the 12th century A.D., while a century later Marco Polo noted that near the city were "some Turks who are Nestorian Christians." The metropolitanate was well located for ministering conversions among the eastern Turco-Mongol Naiman, Merkit, Ongut, and Kerait tribes.

The precise details of the conversions of these tribes are not known, but the influence of Christianity probably was felt during the 9th century when the dioceses of the Church of the East stretched to Chang'an in western China. Gregory Bar Hebræus, writing during the Mongol Il-Khanate, narrated the conversion of the Kerait in 1007 A.D. in his two Syriac historiographies, *Chronicon ecclesiasticum* and *Chronicon Syriacum*, but the term 'Kerait' may have been inserted. Thomas of Marga's *Historia monastica* (Book of the governors), written c. 840 A.D., narrates the preparation undertaken by missionaries, which included instruction in Syriac, the liturgical language of the Church of the East, as well as vernacular languages. Missionaries built churches, baptized, and organized dioceses, selecting the lower ranks of the clergy, priests and deacons, from the indigenous population. Bishops and metropolitans were drawn from Mesopotamian clergy, thus maintaining a direct link with Seleucia-Ctesiphon and later Baghdad.

During the Abbassid period (850–1256 A.D.), Christians assumed a prominent profile as physicians to the caliphs and the transmitters of Greek scientific and medical works. One of the principals of the House of Knowledge, an institution of higher learning in Baghdad founded by Caliph Mamun (d. 833), was the 'Nestorian' Hunain ibn Ishaq (d. 873), who translated over 100 books from Greek into Syriac and Arabic, including Aristotle's *Organum*, *Analyticon,* and *Hermaneutics*. Despite the increasingly Islamic tenor of the law and bureaucracy, financial exactions, and forced conversion of some Christian Arab tribes, Patriarch Timothy I was able to win the respect of Caliph al-Mahdi (775–785 A.D.) by emphasizing the traditional enmity between the Church of the East and the Orthodox church of Byzantium. A staunch defender of the faith, Timothy also debated with the caliph on the respective claims of Christianity and Islam but sought to stress the common monotheism of Muslims and Christians.

The Church of the East reached its zenith during the incumbency of Timothy I. Its dioceses encompassed Arabia, where a bishop was ordained for the communities in Sanaa (Yemen); India, where the church was elevated to a metropolitanate; Tibet; Central Asia; and China. Details are found in Timothy's extant correspondence. Writing to the monks of Mar Maron, he revealed the conversion of "the King of the Turks with all his people." In a letter sent to the Metropolitan of Elam, Timothy announced: "in these days the Spirit anointed a metropolitan for the bēt ṭûrkāyê." This event was also chronicled in Arabic during the 12th century by the Christian historian Mari ibn Suleiman in *Kitab'ul mijdal*: "Henceforth, Timothy led into faith the *Khaqan*, the king of the Turks and other nations." The metropolitanate was probably located near the Syr Darya river in western Turkestan, where the Oghuz settled around 600 A.D. During the incumbency of Timothy I, the T'ang dynasty in China accepted the Church of the East as a 'Persian religion,' together with Manichaeism and Buddhism.

The legacy of the Church of the East's missions in Central Asia came to fruition in 1258 A.D. when Hulagu Khan sacked Baghdad. Several Christian Kerait princesses, including Sorghotani, the mother and wife of Hulugu Khan, were in the royal Mongol household. Gregory Bar Hebræus's *Chronography* notes that in 1279 A.D. the mother of the third Il-Khan, Tegudar Ahmad (1282–1284 A.D.), revived the Christian procession of the Epiphany, which had ceased due to conflicts between the Christians and Muslims. The Il-Khans were disposed to Christianity and considered an alliance with Western Europe against the Muslims, sending the Uighur monk Rabban Sauma to Europe as an ambassador. There he met Philip, king of France, and Edward I of England, as well as Pope Nicholas IV. In 1281 A.D. an Ongut monk, enthroned as Mar Yabhallaha III, became Patriarch of the Church of the East. Ten years later, the Il-Khans embraced Islam and the tide turned against the Christian communities in their domains. The Mongolian script, a derivative of Syriac, is a lasting legacy of the Christian influence.

The Fransciscan friars John de Plan Carpin and William of Rubruck, who visited in the 13th century, provide information about the 'Nestorians' at the Mongol court in Karakorum. These medieval Latin commentaries are the last eyewitness accounts of the Mongol Christians of Central Asia. At Tokmek and Pishpek, in the region of Semireche'e, between

Lake Balkash and Issy-kol (Kirghizia), cemeteries with hundreds of Old Turkic headstones written in the Syriac script indicate the presence of sizeable Christian Turkic communities between the 9th and 14th centuries. Faced with the ravages of Timur Lang, the Christian communities of Central Asia disappeared, and Mesopotamian Christians were forced northward into the Hakkari region of Kurdistan. The Church of the East existed there as an enclave until the end of the Ottoman Empire. The Syrian Orthodox community also survived in pockets around Tekrit in Iraq, in northeast Syria, and in the Tur 'Abdin region of southeast Turkey.

Under Ottoman jurisdiction, the Syriac communities were governed under the 'Millet i-Rum' being granted a degree of semi-independence in return for allegiance to the sultan and payment of taxes. The activities of Roman Catholic missionaries during the 17th and 18th centuries led to the creation of Uniate churches, which seceded from the Church of the East and the Syrian Orthodox. At first the links between the ancient Syriac churches and Rome were tenuous, with many schisms and counterclaims, but the Chaldaeans and the Syrian Catholics were permitted to retain their liturgy and the use of Syriac. An influx of Protestant missionaries arrived in the early 19th century, following the discovery of the ancient Christian communities. The American Presbyterian Mission established its base of Urmia (in Azerbaijan, Iran) in 1830, building schools, hospitals, and welfare centers and establishing the first printing press. The Anglican mission to the Church of the East was led by the Rev. George Percy Badger, who was the representative of the Archbishop of Canterbury. On his two journeys in 1842–1844 and 1850 to the homeland of the Church of the East in Kurdistan, Badger also met Syrian Orthodox communities at Aleppo, Urfa, Diyarbekir, Mardin, and Mosul.

The Uniate churches are now dominant in the Near East, with congregations in Iran, Iraq, Syria, Jordan, and Istanbul. The Chaldaeans are the largest denomination in Iraq, but the ancient churches also survive. Both the Church of the East, otherwise known as Assyrian, and Syrian Orthodox communities are still found in Syria, Iran, and Iraq, with sizeable diaspora communities in Europe, the United States, and Australia.

See also: Arabic; Aramaic and Syriac; Armenian; Greek, Ancient; Islam and Arabic; Mongolic Languages; Syriac; Turkic Languages; Turkish; Uyghur.

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Christianity In Latin America

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With the Spanish conquest and the Portuguese settlement of Brazil, Spanish and Portuguese became the principal languages of those two New World empires: Portuguese in Brazil, and Spanish in the rest of South America, Mexico, and large areas of southwestern United States. But European missionaries who followed the conquest used the Native American languages as their main instrument for evangelization. Thanks largely to their efforts, the myriad Indian languages of Latin America were preserved throughout colonial times, and some of them, such as Quechua, Aymara, and Guaraní, continue to be spoken today by millions of Latin Americans. The religious also transformed the oral traditions of the pre-Columbian peoples into written literature in Spanish and Portuguese, as well as the native languages.

Spain and Portugal established Catholic Christianity as the official religion of all Latin America. Under the concept of royal patronage, a special concession made by different popes, the Spanish and Portuguese monarchs enjoyed the right to establish the church, name bishops, collect tithes, and authorize missionaries to go to the New World. The initial evangelization of Spanish and Portuguese America was carried out by missionaries belonging to religious orders: Franciscans, Dominicans, Augustinians, and later on, the Jesuits. The secular or diocesan clergy followed later in order to serve the pastoral needs of the white settlers, although many of them also did mission work among the Indians and black slaves.

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The first phase of evangelization, which corresponded to the conquest of the Caribbean and the

first years of Spanish rule in Mexico, was somewhat disorganized: The missionaries did not know the native languages and practiced mass baptisms without knowing whether the Indians understood them. At the same time, in reaction to the atrocities committed by the European settlers, many churchmen raised their voice in defense of the Indians. Antonio de Montesinos, a Domincan, denounced his fellow Spaniards in a sermon in Santo Domingo in 1511, and soon afterward Bartolomé de las Casas, who originally had gone to the New World to exploit the Indians, experienced a major conversion, became a Dominican, and emerged as champion of the rights of the Indians. He influenced Emperor Charles V, who was simultaneously King of Spain (1516–1556), to make laws to protect the Indians.

Mexico: The Utopian Phase

This first phase was characterized by utopian and even apocalyptic concepts. Many religious dreamed of forging a church in which they and the Indians would live together in peaceable harmony, free from the contamination of European civilization. Vasco de Quiroga, a lay humanist who was a member of the ruling board of Mexico, founded two colonies for the Indians, both based on Thomas More's *Utopia*. The Franciscan bishop of Mexico City, Juan de Zumárraga, founded several schools for Indians boys and girls, the most famous of which was Santa Cruz of Tlatelolco (1536). In time, the missionaries finally began mastering the native languages, usually by having recourse to newly baptized Indians, especially children, many of whom studied in the mission schools. The Franciscan friar Toribio de Benavente (known by his Nahuatl name of Motolinía) wrote a history of the Indians of New Spain (Mexico), and later another Franciscan, Bernardino de Sahagún, with the aid of his own Indian students at Santa Cruz of Tlatelolco, wrote the multivolume *History of the things of New Spain* (finished around 1580) in Nahuatl and Spanish. These early histories were based upon oral testimony and codices that contained pictures and symbolic expressions of Aztec history and culture. The missionaries also wrote grammars, catechisms, and books of sermons in Nahuatl and other native languages. In 1544 Pedro de Córdoba, a Franciscan, published the first catechism printed in Mexico, 'in the Mexican and Castilian Languages.' Between 1524 and 1572, 109 works were written in native languages in Mexico by missionaries, 80 of which were done by Franciscans.

Peru

These same religious orders set about evangelizing Peru following Pizarro's conquest of the Incas in 1532. They founded Indian parishes and wrote grammars and sermons in Quechua, the language that the Incas had used as the lingua franca throughout their empire. In southern Peru and Bolivia the principal language used was Aymara. Viceroy Francisco Toledo (1569–1581) created a system of *reducciones* (territories reserved only for Indians) in order to protect the Indian population from unbridled exploitation by the Spanish. At the same time, the *reducciones* served to control the Indian population and facilitate the process of evangelization. For each *reducción* a parish, known as a *doctrina*, was established.

Methods of Evangelization

Following the Council of Trent (1545–1563), similar church councils were held in Spanish and Portuguese America with the aim of reorganizing the evangelization process and standardizing methods. The Third Lima Council (1582–1583), presided over by Archbishop Toribio de Mogrovejo, produced a catechism. It was the first book printed in Peru, written in three languages: Spanish, Quechua (or Quichua), and Aymara. This catechism was used in Indian parishes until the 18th century throughout the Andes, in Peru, Bolivia, Chile, and Ecuador. Priests who worked in these parishes were expected to preach in the native languages. If they could not, they had recourse to Indian interpreters and catechists. But evangelization was not limited to catechism classes; Christianity was also communicated through the liturgy and sermons, through Biblical plays, and through art and music. In Bolivia and Peru a school of native artists painted images of the Trinity, Christ, Mary, the angels, and many Biblical themes. Popular religiosity in Latin America, which centered on certain devotions, was in large part a creation of the newly Christianized Indians, mestizos, and blacks.

The Jesuits

Arriving early in Brazil (1549), the Jesuits soon became the dominant missionary order there until the 18th century. They arrived later in Spanish America (Peru in 1568; Mexico in 1572), where the other orders had already carried out the initial evangelization. But the Jesuits came for another purpose: to found schools for the Creoles, the sons of the Spanish born in the New World. They also worked with the Indians, but in a

more specialized way than the first religious. For example, in Peru they were entrusted with running two schools in Lima and in Cuzco for the sons of Indian chiefs. José de Acosta, a Spanish Jesuit, wrote two important works: *De procuranda Indorum salute* ('On bringing about the salvation of the Indians,' 1588), which became a standard manual for missionaries on how to treat the Indians; and *A moral and natural history of the Indies* (1590), a wide-ranging description of the religion and cultural achievements of the Peruvian and Mexican Indians. Other Jesuits became notable linguists, especially Alonso de Barzana and Blas Valera. Blas Valera was a mestizo (born of Spanish and Indian blood) who knew Quechua as a child and later as a Jesuit wrote extensively on Inca history and culture. Though most of his writings were lost, they did reach the hands of Garcilaso de la Vega, the Cuzco-born mestizo who wrote the *Royal commentaries of the Incas,* in which he cites Valera extensively. Garcilaso and Blas Valera may be considered among the creators of a distinct American and Peruvian literature because they represented a non-Spanish mentality that esteemed (and at times romanticized) the positive values of Indian culture and history.

For the Jesuits especially, language was the key to evangelization. Particularly important was their mission in Juli, by Lake Titicaca, where they ran four parishes for Indians. Many Jesuits learned Quechua or Aymara in Juli before going to their permanent assignments in Lima, Bolivia, or Chile. Juli also became a connecting link between Lima and the Jesuit missions in Paraguay. Finally, after Charles V, who allowed Flemish friars to work in the New World, the door to foreign (non-Iberian) missionaries was closed. The Jesuits alone had the privilege of having a percentage of foreign missionaries: Germans, Bohemians, Swiss, Italians, Tyroleans (like Eusebius Kino in Arizona), and Flemish.

The Missions

In colonial Latin America, the 'missions' referred to the nomadic and warlike Indians living near the frontiers of the two empires: the deserts of northern Mexico and the Amazon jungle in South America. These Indians had not been touched by the initial conquest and resisted efforts to subdue them until the 17th, 18th, and even the 19th century. But the missionaries were able to do what the soldiers could not: approach the Indians and persuade them to build mission towns. The soldiers followed later in order to protect the missions from non-Christian Indians and the encroachment of other Europeans. The two principal missionary orders were the Franciscans and the Jesuits. Both established missions in California (the Franciscans in present-day California and the Jesuits in Lower California), northern Mexico, remote regions of the Andes (in Peru and Bolivia), the Amazon jungle (in Peru, Bolivia, Ecuador, Colombia, Venezuela, and Brazil), Paraguay, and the Chaco region of Paraguay and Argentina.

Missionaries of both orders learned the new languages and wrote grammars, dictionaries, and catechisms. Gonzalo de Tapia, an exceptionally gifted Jesuit in northern Mexico, was able to give a sermon in Tarascan 15 days after he began studying the language. In Brazil, José de Anchieta, a Portuguese Jesuit, wrote a grammar in Tupí (1556) that became a standard for other missionaries. In the 17th century, another Jesuit, Antonio de Vieira, founded numerous villages to protect the Indians in the Maranhão region of northern Brazil. Vieira exhorted fellow Jesuits to learn the native tongues of the Indians because the Holy Spirit would speak through those new tongues. In Chile, Luis de Valdivia wrote a grammar for the Mapuche language. This intense linguistic activity made it possible for Lorenzo Hervas, the 18th-century Spanish Jesuit philologist, to include a great number of native American languages in his survey of world languages (1784).

Paraguay

Paraguay is the only truly bilingual country of Latin America. This is due in large measure to the Jesuit missionaries, who separated the Guaraní Indians from the white settlers and gathered them into 30 *reducciones* (mission towns), and for over 150 years (1609–1768) spoke to them in their native Guaraní. Before the Jesuits, two Franciscans had prepared the way: Luis de Bolaños, who mastered Guaraní and wrote the first grammar that later missionaries would use, and Francisco Solano, who worked among the tribes in the Argentinian Chaco. The Jesuits themselves created a unified 'mission Guaraní' that became the lingua franca for all the missions. Although the Indians learned a rudimentary Spanish, Guaraní was the principal language used in the missions, which covered present-day southern Paraguay, Uruguay, and the northern department of Argentina, Misiones. Printing presses in the missions produced grammars, dictionaries, and catechisms. The standard grammar used was *Arte de la lengua guaraní* (*Grammar of the Guaraní language,* 1640) by Antonio Ruiz de Montoya, a Peruvian Jesuit who was superior of the missions. Two Jesuits who worked among the Chaco tribes wrote lengthy descriptions of their customs and beliefs: Martin Dobrizhoffer, a Bohemian, and Florian Paucke, a Swiss.

After the expulsion of the Jesuits in 1768, the missions fell into decline. The mission Indians drifted into neighboring Spanish and Portuguese cities, where many used the crafts they had learned in the missions to obtain work. The music played in the mission towns of Chiquitos in eastern Bolivia lives on today, where Baroque music festivals are held yearly.

Creole Authors

In later colonial times, native-born religious made significant contributions to Latin American literature. In Mexico, Sor Juana Inés de la Cruz became the leading poet of America and the only female literary figure of note. The exiled Jesuits, especially Francisco Clavijero of Mexico and Juan Ignacio Molina of Chile, wrote histories of their respective countries that impressed Europeans with the material and cultural wealth of the Indian civilizations of preconquest America.

Contemporary Christianity

Protestantism appeared in the 19th century but only experienced significant growth in the 20th century, especially in Chile, Brazil, and Guatemala. In 1936, William Cameron Townsend founded the Summer Institute of Linguistics with sections in many Latin American countries. Using the Bible as its principal instrument, the Institute aims to convert the languages of the native peoples of the Amazon and other remote areas into written languages. Affiliated to the Wycliffe Bible Translators, based in the United States, the Institute has translated the Bible into numerous native languages. In general, Protestants of the historical confessions and progressive Catholics have achieved a close ecumenical relationship.

See also: Aymara; Hervás y Panduro, Lorenzo (1735–1809); Mapudungan; Missionary Linguistics; Nahuatl; Portuguese; Quechua; Society and Language: Overview; Spanish.

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Christianity in South Asia

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Christianity in South Asia has developed in the midst of South Asia's rich historical traditions, diversities of cultural expressions, and multitudes of languages – 1650 or more. It also has faced major religious traditions of Hinduism, Buddhism, and Islam as well as other local religious practices. Interaction with churches and missionaries from the West has been a prime factor in shaping Christianity in this region, but the indigenization of Christian faith in local sociocultural forms by South Asian Christians has played an equally important role in this process.

The Historical Formation of Christianity in South Asia

Three different influxes form the background to Christianity in South Asia: St. Thomas Christianity, Roman Catholic, and Protestant Christianity, and they each form distinctive aspects of South Asian Christianity.

Mar Thoma Christianity

The arrival of the Apostle Thomas in the first century is regarded as the beginning of Christianity in South Asia. Thomas is believed to have arrived on the southwest coast of Malabar by sea, or perhaps came over land from the north, and was later martyred on the southeast coast at Mylapore. Though this tradition lacks material support, nevertheless the existence of Christian and Jewish communities in Malabar can be traced back to the second century. The oldest literature describing the work of St. Thomas is the *Acts of Thomas,* which originated in the second century, as is evidenced by the existence of a Syriac version. Other Christian traders and settlers moved into the western coast of India. Later, as a result of persecutions of Christians in the Persian Empire, there were increasing influxes of Christians to India, and eventually the patriarch of Babylon claimed ecclesiastical authority over these Christians. Syriac became the literary and liturgical language for all Thomas Christians and the doctrine was Nestorian, that is, of the belief that there are two separate natures, divine and human, in Christ (contrary to the Creed of Chalcedon). Though their allegiance was to the Syrian patriarch of Babylon, due to Muslim expansion in the 7th century this close relationship became more difficult to maintain.

In spite of enjoying higher status than other local people, Mar Thoma Christians faced a major challenge when the Portuguese authority established the *Padroado* (royal patronage) in Goa in 1533, and during their subsequent missionary work toward the south. The Syrian Church of the East suffered its major schism in the 19th century, when the Mar Thoma Church of Malabar broke away. Furthermore, as a result of the intervention of outside ecclesiastical authorities, missionary work by other groups, and various internal divisions, there are currently at least six different groups in Kerala who claim their origin in the Thomas tradition.

Catholic Christianity

Catholic Christianity was introduced with the arrival of the Portuguese and the ecclesiastical hierarchy was established in Goa. Through the integration of marriage with the local community and the efforts of monastic priests and friars, the Christian population of Goa increased. The encounters between Roman Catholic and Thomas Christians were long and complicated. They began when the fishermen of Cochin asked help from the authorities in Goa in 1502 to protect them from Muslim threats, which resulted in the acceptance of Roman ecclesiastical authority over the Thomas Christians. However, the relationship between Roman Catholics and Thomas Christians was soured by differences over doctrine and ritual issues and over ecclesiastical hegemony in Kerala. When the *Propaganda Fide* encouraged mission to areas beyond Portuguese control, Catholic missionary activity concentrated on new territories, for example St. Francis Xavier on the Parava coast. Jesuits worked in northwestern Sri Lanka, where they formed the Tamil and Singhala-speaking Christian communities, and in other parts of India, including the areas controlled by the Mughal empire; although some were invited to the court of the Grand Mughal, their work was generally limited in the cultural and diplomatic realm. Most Catholics are of the Latin rite but, following Vatican II, there have been various changes, including the indigenization of liturgy in the local language and the employment of Hindu symbols and philosophy.

Protestant Christianity

Protestant missions began their work with the arrival in 1706 of Lutheran missionaries in Tranquebar, which was a Danish trading port. As a result, the Tamil Evangelical Christian community was established. From 1792 onward, William Carey and other missionaries from England arrived in Serampore, from where the various modes of Protestant mission steadily developed. Some of the East India Company's

chaplains, such as Henry Martyn, were also involved in mission work beyond their role of ministering to the British officials and soldiers and, in fact, many of the company's officers were sympathetic toward missionary work among Indians. One of the distinctive aspects of Protestant missions was their emphasis on the translation of the Bible into local languages. The missionaries in both Tranquebar and Serampore concentrated their efforts in Bible translation, and this had a great impact, not only in terms of the church expansion but also in the indigenization of Christianity in India.

During the late 19th and early 20th centuries the conversion of lower and outcastes in various parts of India brought changes in the demography of the Indian religious setting. Mass conversion along the lines of caste group or community was a general pattern in the history of Christianity in India, but this became a very sensitive issue, especially as the British government in India moved in 1932 to provide a separate electorate for the depressed classes, and it thus became a political issue. Toward Independence there were active discussions for unity among the Protestant denominations in South India, and as a result the Church of South India was formed in 1947 as an amalgamation of the South India United Church, Anglican, and Methodist Churches. This was an unprecedented case of the union of Episcopal and non-Episcopal churches, which became a basis of schemes of union in North India, Pakistan, and Sri Lanka. Furthermore, in 1978 a joint council was established by the Church of South India, Church of North India, and the Mar Thoma Church, reflecting a high degree of union: intercommunion, doctrinal unity, episcopal polity, mutual recognition of one another's ministry, and some joint activities.

Various Christian Expressions and the Demography of Christianity

Christianity was introduced to the northeast of India by the Baptists of Serampore during the early part of the 19th century; they were soon followed by American Baptists and Welsh Presbyterian missionaries during the rest of the 19th and early 20th centuries. Baptist missions were particularly successful in terms of numerical growth, resulting in a remarkably high proportion of Christians in these states (up to 90% in places). The churches in northeast India face considerable challenges in terms of sociopolitical and economic tensions with the central government, but continue to maintain Christian activities both within the northeast and beyond. Recently Pentecostal and charismatic movements, which have conservative theology, organized missionary apparatus, and an emphasis on various spiritual gifts mentioned in the Bible, have been strong among the lower and outcastes, and this seems to set to continue. There has also been movement among *dalit* (outcaste) Christian groups for their social uplift in society as well as equality within the Christian churches.

Christianity in India is the second largest religious minority, after Islam. According to the 2001 census there were 24 million Christians, 2.3% of the total population. Looking at the states, the northeast states have a very high proportion of Christians – for example, Nagaland, 90%; Mizoram, 87%; Meghalaya, 70.3%. Goa has 26.7% and Kerala 19.0% whereas in many of the north and central states Christians are less than 1% of the population. The Christian churches have been actively involved in medical, educational, and other social work in India, for example, the work of Mother Teresa.

Christianity in Sri Lanka largely consists of Catholics who are descendants of converts during the Portuguese time, Anglicans, and some others. Most of the 1.7 million Christians (9.3% of the population) live on the west coast and over 70% are Catholics. Pakistan has 3.8 million Christians (2.4% of the population), of which 80% are from the Punjabi-speaking ethnic group as a result of an early–20th-century mass conversion movement. In 1970 the United Church of Pakistan was formed. In recent years Christians have been the subject of intimidation by some militant Muslim groups. As in other South Asian nations, Christians are a minority in Bangladesh and Nepal, and their religious worship and activities are limited by being in a disadvantageous state in their societies.

Issues in Christianity in South Asia

Christianity in South Asia, with the exception of the Mar Thoma tradition, has been introduced in association with foreign imperial authorities, and this historical attachment has always been a problem for the Christians in this region. There are two major areas of concern for Christianity in South Asia: 'inculturation' of Christianity (making Christianity acceptable and relevant to South Asian culture and society) and overcoming the problem of conversion (the relationship between the Christian community and the wider religious community).

'Inculturation' of Christianity

One of the earliest and best known examples of Christian attempts at inculturation was by the Jesuit missionary Roberto de Nobili, who arrived in Madurai in 1605. He mastered Sanskrit in order

to convey the Christian faith by means of Indian philosophy, and also translated catechisms into the Tamil language. He lived like a *sannyasi* (Hindu holy man) and worked among the Brahmin caste. He even suggested to the Catholic authorities that Sanskrit instead of Latin should be taken as the liturgical language for the Indian church. Since then there have been various attempts to bridge the gap between Christian doctrines and Hindu philosophy by actively employing Sanskritic religious concepts into Christian thinking. In late 19th-century Bengal, Brahmabandhab Upadhyay advocated the idea of Indian Christians as 'Hindu-Catholic' in the sense of being Hindus in culture and Christian in faith, and suggested that the Christian doctrine of the Trinity could be related to the definition of Brahman as Being, Consciousness, and Bliss. Also following classical *advaita* philosophy, in 1964 Raymond Panikkar published his book *The Unknown Christ of Hinduism,* in which he argued that Christ is already present in Hinduism as *Ishvara* (the Lord). On the other hand, following the tradition of *bhaki* devotion, in the early 20th century A. J. Appasamy interpreted Jesus Christ as the unique *Avatar* (descent) or incarnation of the deity.

The Problem of Conversion and Communal Relations

The most contentious issue between Christian and Hindu communities has been the problem of conversion. The traditional understanding of conversion as manifested in joining the Christian community leads to serious difficulties in the life of the converts in South Asia, particularly in India, where change of religious community has major implications for relations with the wider Hindu community. Hindu leaders oppose Christian conversion as incompatible with Indian philosophies and social practices, and have countered it by legislation and by the reconversion of Christian converts. In particular in the 1930s, M. K. Gandhi made his strong objection to Christian conversion activities a part of his political agenda in his struggle against the British Raj because he feared mass conversions would increase communal disturbances. During and after Independence, the discussion about conversion was focused on the inclusion of the freedom to 'propagate' as one of the fundamental rights in the Indian Constitution Assembly (1947–1949). Hindu objections to Christian missionary activities led to a public inquiry into missionary activities by the government of Madhya Pradesh in 1954. The resulting Niyogi Report, completed in 1956, was highly critical of converting activities, particularly the conversion of tribals, and of the activities of foreign missionaries. Subsequently, Hindu objections to conversion were made concrete in three main ways: by the introduction of Hindu 'personal laws,' which were disadvantageous for caste Hindus who converted to another religion (1955–1956); by the limitation of social benefits for converts from Scheduled Caste backgrounds (1950s); and by the passing of the Freedom of Religion Acts in various states (1960s and 1970s). The election of 2003 was won by the Congress Party, which promotes a secular approach to religious issues in the central government, and the tensions over the conversion issue seem to have relaxed.

Christianity in South Asia, despite being a minority in numbers, has made major contributions to nation-building, especially in education, medical work, and other social areas. Christian communities in India try to live side by side with their neighbors by fully integrating into the languages and cultures of India, while at the same time affirming their Christian faith and practices, which may be distinctive from others. The future shape of Christianity in South Asia may lie in the balancing of these two aspects of integration and distinctiveness as Christians strive to exhibit their integrity and identity in both public and private life in the diverse yet often rigid cultures and societies of this region.

See also: Aramaic and Syriac; Christianity, Catholic; Christianity, Protestant; Dravidian Languages; Hindi; Islam in Southeast Asia; Sanskrit; South Asia: Religions; Tamil.

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Christianity in Southeast Asia

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The Early Spread of Christianity

The history of Christianity in Southeast Asia can be dated from 1494, when the Treaty of Tordesillas divided the global missionary project between Europe's two great Catholic powers. What is now the Philippines fell in the Spanish sphere, with the Portuguese given responsibility for the Malay-Indonesian archipelago. A Spanish expedition reached the Philippines in 1521, but a full commitment did not come until 1570, when Manila was captured. Over the next century Spanish control and the Christian religion spread over the entire archipelago except for the Muslim south.

From the outset, the Catholic orders were committed to mastering local languages. Using romanized phonetic writing rather than local scripts, they compiled dictionaries, catechisms, confessions, and sermons in the major Filipino languages. Latin or Castilian words were retained for terms such as 'God,' 'heaven,' 'hell,' 'holy spirit,' 'sin,' 'limbo,' etc., so that new concepts would not carry the baggage of animist beliefs. The vocabulary and traditions of Christianity were also adapted by Southeast Asians, with Filipino versions of the sung *Pasyon*, the life of Christ, assuming a central position in religious ritual. Though Church schools were a major vehicle for imparting the new teachings, ethnolinguistic boundaries were reinforced because each order developed expertise in the cultural area to which it was assigned.

The impact of Portugal's Christianizing effort was more limited than that of Spain. The conquest of Melaka on the Malay Peninsula in 1511 was expected to provide a base for missionary work, but Islam was already entrenched in the western archipelago. There was less opposition in the islands east of Java, but despite initial successes the lack of priests made it difficult to prevent apostasy. Numerous Portuguese words were nonetheless adopted into local languages and Portuguese became widely used in diplomacy and trade. The creole known as Kristang is still spoken by the Portuguese-descended community in Melaka.

The Portuguese missionary effort suffered a major blow when the Dutch East India Company (VOC) captured Melaka in 1641. The Dutch harbored an intense dislike of Papism and actively promoted Protestantism, especially in the spice-producing islands of eastern Indonesia where VOC interests were concentrated. VOC ministers used Portuguese or more commonly Malay for Christian instruction, since both were well established as lingua franca. The Bible was printed in both romanized Malay and the Arabic-based Jawi script. Christian teachings were prominent in the schools established in areas under VOC control, with teaching delegated to Christian schoolmasters familiar with Malay in its new romanized form. Although older Catholic communities such as the one in Melaka survived, Portuguese missionary activity was mostly restricted to coastal areas in Flores and eastern Timor. The British settlements of Penang (1786) and Singapore (1819), intended primarily to further trade, had only limited influence in Christian proselytizing.

In mainland Southeast Asia, Catholic missions were more active. A romanized form of Vietnamese known as *quoc ngu* ('national language') was developed to help missionaries prepare sermons and translate texts. In 1662, the Missions Étrangères de Paris (MEP) established a base in Siam, but their 'converts' were generally infants, the dying, or marginalized groups such as the Mon or Lao. The MEP had more success in neighboring Vietnam, especially among women, but suffered periodic persecution, and during the 18th century missionaries were expelled or withdrew.

Christianity, Colonialism and Nationalism

During the 19th century, all Southeast Asia except Thailand came under European control. Colonial administrations typically used a European and a selected local language for administrative purposes, but always showed a preference for employing Christians. Roman Catholicism thus revived in French-controlled Vietnam, and French became the language of the elite. *Quoc ngu* was promoted and eventually displaced Chinese and the Chinese-based Vietnamese script known as *nom*. French-speaking Vietnamese were also employed in Laos and Cambodia. In the Netherlands Indies, Malay was the medium of communication between colonial officials and indigenous administrators, although English was somewhat more common in British Malaya. Because Burma was part of British India, Indians fluent in English were commonly hired for the colonial service, and Burmese never developed into an administrative language.

Colonial administrations were generally wary of encouraging Christian missions in societies already committed to other world religions. However, remote areas were opened up to missionaries, who saw the

compilation of dictionaries and grammars for unwritten and little-known languages as a primary task. New as well, revised translations of the Bible and other Christian books were accorded a high priority. Fonts were developed to print the gospels, Christian tracts, and catechisms in Burmese and Thai characters. In 1813, American Baptist missionaries began working in Burma, concentrating on non-Buddhist societies such as the Chins, Karens, and Kachins. The Netherlands East Indies government looked favorably on the Bible Society and other missionary groups because conversion of animist groups was seen as a way of stemming the Muslim advance. From the mid-19th century, Catholic missions were permitted entry, with German Lutherans prominent among the Toba Batak of Sumatra. In Vietnam the French 'civilizing mission' encouraged Church penetration into the highlands, and in 1917 the first extensive dictionary of a Miao dialect was published.

This linguistic codification had far-reaching effects because the standardized form of favored languages was endorsed by government usage, mission education, school texts, and vernacular newspapers. While this affirmed the position of well-known languages such as Malay, others such as Iban became more widely known as a medium for mission teaching. Tetun Prasa (one of 16 languages in Portuguese Timor) became a lingua franca primarily because it was promoted by the Catholic Church. Often a new sense of identity was forged between previously separate groups, as in the Kachin areas, where Baptist missionaries created a common language, Jinghpaw, for all the Kachin tribes.

For the most part, indigenous Christian communities saw themselves as allies of colonial regimes, and it is not surprising that migrant Asians, especially Chinese, frequently adopted Christianity. In the Philippines, however, the tensions associated with colonialism were fueled because the Catholic Church never welcomed the ordination of indigenous priests. The vocabulary of the *Pasyon*, with its images of heaven, illumination, and saintly leadership, proved highly effective in motivating and inspiring peasant-based anticolonial movements. Resistance also drew on a growing body of nationalist literature written in Spanish by elite Filipinos, the most notable of whom was Dr. Jose Rizal. When a revolution against Spanish rule finally erupted in 1896, he was condemned as a traitor and executed.

With America's acquisition of the Philippines in 1898 after the Spanish-American war, the Catholic Church lost some of its former wealth, but it remained a formidable influence in Philippine society. However, the door was now open to Protestant missionary activity, notably in the highlands and in the Muslim island of Mindanao. English became the accepted medium for Christian preaching and instruction among a new generation of Protestant and Catholic leaders. Tagalog was more common in a Catholic breakaway group, the Iglesia Filipina Independiente, and in the Protestant Iglesia ni Kristo, both of which developed during the early years of the American occupation.

The outbreak of the Second World War and the Japanese invasion of Southeast Asia in 1941 mark the end of a chapter. All Europeans were imprisoned, and although the French gained a short reprieve in Vietnam, the Japanese eventually assumed control here as well. Those who followed Christianity were regarded as supporters of the colonial powers, and European languages were forbidden.

Christianity After Independence

All the colonized countries of Southeast Asia eventually attained their independence after the Second World War, and indigenous control over practice and policy has increased as more local men and women have become ministers, priests, and high-ranking church officials. In 1960, for instance, the first Filipino cardinal was appointed. Although foreign missionaries have continued to work in the region, despite occasional government opposition, there have been pronounced linguistic shifts. In Catholic areas, this was especially evident after Vatican II (1962–1965) sanctioned indigenous languages for celebrating Mass. Within the formal church structure, some developments are uniquely local. In the Philippines, the Pentecostal movement known as El Shaddai has remained within the Catholic Church, but its charismatic leadership, belief in miracles, and use of symbols invoke earlier peasant movements. Because preaching is largely in Tagalog rather than English or the 'Taglish' associated with intellectuals, El Shaddai has a strong working class base and has moved overseas via the Filipino diaspora. At the same time, evangelical churches in the Philippines have also proliferated, drawing many adherents away from mainstream Catholicism.

In Indonesia and Malaysia, most churches still display their origins in European missionizing, but there is considerable room for local transformations because they were initially built on an ethnic base, such as the Gereja Batak Karo Protestan (the Karo Batak Protestant Church) and the Gereja Toraja, both founded in 1941. This allows for local expressions of Christian identity such as the huge monuments that Toba Bataks erect in honor of the dead. After 1965, when communism was made illegal, Church

membership increased everywhere in Indonesia. Because Indonesian rather than a regional language is increasingly common in city churches and among a younger generation of Christians, earlier ethnic explicitness has been muted. An example of a greater inclusiveness comes from Borneo, where the Sidang Injil Borneo (Borneo Gospel Council, established by Westerners in 1928) is now under complete local control. It is very strong among some interior communities such as the Kelabit, but has also established a firm base in urban centers by conducting services in both Malay and Iban. Annual pilgrimages to revered mountain sites, faith healing, and a belief in miracles are all reminiscent of older animist practices. As elsewhere in Southeast Asia, this localization can generate tensions. While there are few difficulties in employing indigenous languages, questions always arise about the adoption of specific cultural practices, especially in regard to marriage and burial.

Throughout contemporary Southeast Asia, connections with overseas Christian organizations remain influential. Because the region is so linguistically diverse, translation of Christian texts is a high priority. In 1971, the Summer Institute of Linguistics was established to translate the Bible into little-known languages. It has been very active in Indonesia, where Catholicism and Protestantism are two of the five officially sanctioned religions and where missionary work is thought to assist development programs. The Indonesian government has permitted numerous Christian missions to teach and proselytize, with most using Indonesian as a medium. In the Philippines, evangelization has also continued in Mindanao, and among interior groups. Apart from Thailand, where the presence of missionaries as teachers and health workers among the hill tribes is again seen as compatible with the government's goal of modernization, Christian proselytization on the mainland has faced more obstacles because there is always the potential that Christian churches will become critics of the government. The authorities have only to look towards East Timor, which was invaded by Indonesia in 1975 and where the Catholic Church emerged as a focus for dissent, particularly after 1981 when Mass was conducted in Tetun Prasa in place of the banned Portuguese. In Burma, ethnic groups associated with Christianity such as the Karens have also been strong opponents of the government. Such examples explain why Christian congregations in Vietnam are subject to closer surveillance, especially in the non-Vietnamese highlands. In the Philippines, the Catholic Church initially supported President Ferdinand Marcos in his declaration of Martial Law in 1972, but Church leadership was critical in the 'people's power' movement that ended the Marcos regime. Much of this opposition was generated by activist priests, nuns, and laity, who argued that liberation theology and an alliance with the Communist Party was the best means for dealing with entrenched poverty. For the most part, this left wing movement has been retained within the Catholic Church.

At the beginning of the 21st century, a disturbing development is the simmering Christian-Muslim hostility in eastern Indonesia and the southern Philippines. Although the issues must be analyzed within a historical context, hostilities have been fueled by global developments. Internet sites have become a battleground as advocates from both sides seek to make their causes more widely known, mostly in English, but also in local languages.

Despite some internal divisions, Christianity maintains an unassailable position in the Philippines (91% of the population) and East Timor (93%), with the majority Roman Catholic. In all the other countries of Southeast Asia, Christians are a minority, ranging from an estimated 10% in Brunei and 8% in Indonesia to 4% in Burma and 0.5% in Thailand. In these places, Christianity is more vulnerable if it is thought to provide an umbrella for opposition to government policies.

See also: Applied Linguistics in Southeast Asia; Bateson, Gregory (1904–1980); Burma: Language Situation; Christianity in South Asia; Indonesia: Language Situation; Islam in Southeast Asia; Language Education Policies in Southeast Asia; Malay; Malaysia: Language Situation; Philippines: Language Situation; Tai Languages; Thailand: Language Situation; Vietnam: Language Situation.

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Christianity in the Far East

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The encounter between Christianity and East Asian languages, cultures, and nations took place mainly in the larger context of the confrontation between Western expansionism and societies meeting with a number of crises. The original conditions of the encounter still partly determine the relationship between Christianity and East Asian languages (the focus of this article being on Chinese, Japanese, and Korean). However, this relationship was shaped not by historical factors only but also by the intrinsic difficulties encountered in translating the Christian worldview as elaborated in Europe throughout centuries with words, concepts, and linguistic structures proper to East Asia. Four successive questions will help us to circumscribe the issues here at stake:

- How were the historical circumstances of the encounter between Christianity and East Asia reflected in religious terminology and linguistic choices made up to the present day?
- How did translations of the Bible in East Asian languages contribute to this religious–linguistic encounter?
- How to translate religious terms and concepts dependent on Greco-Latin vocabulary and philosophy into languages of the Far East, especially when taking into account the fact that these languages rely on the present use or past inheritance of Chinese characters loaded with specific cultural meanings?
- Do lexical, syntactic, and cultural characteristics of East Asian languages provide Christianity with new resources for expressing anew its dogma, worldview, and spiritual experience?

Historical Encounter and Language Issues

Christianity as shaped by European tradition encountered the civilizations of Japan, China, and Korea from 1550 on. Until the beginning of the 19th century, East Asian nations witnessed the arrival of mostly Catholic missionaries, whose lingua franca was Latin, although Portuguese (due to the patronage delegated by the Pope to the King of Portugal) and other European languages were also used as communication and translation tools. Protestant missionaries arrived in the region at the beginning of the 19th century. Their linguistic policies had much to do with efforts developed for translating the Bible into vernacular languages and will therefore be sketched later.

Jesuit missionaries in particular dealt directly with a variety of linguistic problems. Matteo Ricci (in China from 1583 until his death in 1610) took pains to write his apologetic works in elegant literary Chinese. In 1615, the Jesuits received from the Pope permission to use vernacular language in the liturgy and to translate the Bible into classical Chinese. However, the development of the Rites Controversy prevented them from making use of this permission. Attempts made in Japan during the same period were also aborted. More generally, although apologetic and catechetical treaties in East Asian languages were numerous, the authoritative sources of Catholicism were still controlled by the use of Latin until the middle of the 20th century. Making use of Chinese as a language for theological teaching and research is a quite recent enterprise, at least when one speaks about 'professional' theologians contrasted with the lay persons who, from the 17th century on, expressed their understanding of the faith in their own language. For example, the Jesuit faculty of theology in Shanghai, which was first transferred to the Philippines from 1952 to 1967, kept Latin as the only teaching language until 1964, later shifting to English. In the Catholic world, it is only with the foundation of the Fu Jen Faculty of Theology, in Taipei, that teaching and research were conducted in Chinese, starting in 1968. From that time on, the shift has been swift and complete. Similar remarks could be made for Japan and Korea. It is no wonder that the Catholic Japanese novelist Shusaku Endo made one of his characters declare to a Christian having studied abroad, "Your Latin is good. But your faith is rotten."

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Besides the large-scale encounter between European Christianity and East Asia that occurred from 1550 onward, more limited exchanges took place throughout history, which brought into East Asia Christian traditions shaped through other languages and cultures. The most interesting of these attempts is the one that developed after 635 when a few monks from the Chaldean (Nestorian) Church arrived at Xi'an, capital of the Chinese Empire. The Xi'an Stele (erected in 781) remains the most complete testimony of this early presentation of Christianity to China. Based on Syriac documents translated into Chinese, it makes a creative use of Buddhist and Taoist terminology in order to express aspects of the Christian mysteries. Approximately 70 years after the completion of the stele, this Christian community was included within the large-scale persecution that decimated Buddhism in China, and its fragile roots were probably extirpated from the Chinese soil. However, the questions that this first attempt at inculturation raised have remained acute.

With regard to the relationship between the spreading of the faith and sociolinguistics, the cases of Korea and Taiwan deserve special mention. In Korea, Christian use of the Hangul script enabled the spreading of the faith. As early as the end of the 18th century, portions of the Gospels, doctrinal books, and a hymnary appeared in this script. This was a challenge to the perceived cultural superiority of Chinese and a factor in the rise of literacy. In Taiwan, the influence of the Presbyterian Church is strongly linked to its early advocacy of the Taiwanese (Minnan) language and romanization.

Translating the Bible into East Asian Languages

Protestant missionaries in the Far East viewed the encounter between Christianity and Eastern languages mainly through the prism of Bible translation. An exploratory stage took place from 1820 to 1890, a time during which full translations in Japanese and Chinese of both testaments were completed. In approximately 1910–1920, revised, reliable, and well-polished translations of the Bible in Far Eastern languages were published and are still in use today. In 1919, the publication of the Mandarin Union Version, coinciding with the May Fourth Movement, was a lasting cultural and literary event. In Japan, authoritative Catholic and Protestant versions of the New Testament were published in approximately 1910–1917. From the 1920s onward, the translated Bible was not only a religious but also a literary text influencing the intellectual life of China, Korea, and Japan. Biblical narratives and stylistic features entered into Far Eastern languages. After 1960, new publications appeared, based on renewed scholarship. The first complete Chinese Catholic Bible was published in 1967 in Taiwan. In Korea, the Bible was newly translated for common use by both the Catholic and the Protestant churches – the New Testament in 1971 and the Old Testament in 1977. Questions regarding the reliability of these two translations have been raised; a Catholic Bible was completed only in 2002.

East Asian Languages and Christian Dogmas

East Asian Christian theology might have yet to develop a body of assumptions and research that would make it comparable in size and importance to other 'regional' theologies such as found in India, Africa, or Latin America. Furthermore, with regard to the global theological field, Chinese, Korean, and Japanese are still minority, if not marginal, languages.

At the same time, regarding elaborate theological discourse in East Asian languages, the reference to Chinese is somehow analogous to what was the reference to Latin in classical Christianity. Linguistic–cultural concepts embodied in characters such as dao (the Way), li (Reason), and xing (Nature) are the indispensable tools used not only by Chinese but also by Japanese and Korean Christian thinkers. The challenge is that the Chinese intellectual tradition (at the same time a corpus of wisdom, a philosophical worldview, and a religious way of life) does not easily accommodate the conceptual framework through which Christian theology is currently expressed.

Chinese as a linguistic tool deeply differs from languages such as Greek, Latin, or Sanskrit. Its morphology does not distinguish between clear-cut grammatical categories. On the other hand, Chinese characters have a concrete flavor and a suggestiveness of their own and constitute a framework for expressing perception and thought that closely associates form and meaning. Consequently, basic Western concepts such as soul, substance, and modality have often been translated in a rather clumsy way, whereas finding equivalents for some basic Chinese categories is a painstaking endeavor. Furthermore, Chinese terminology is rooted in the canon of classical writings that constituted the basis for the development of Chinese culture and philosophy. This explains the fact that in the entire East Asia, for Christian theology, Confucianism was always perceived as an "embedded cultural–linguistic matrix" (the expression is due to the Protestant Korean theologian Heup Young Kim). With regard to such an inheritance, it is not surprising that theological inculturation has much to do with semantics. In this respect, a few terms deserve special attention.

First, the word 'God' has no immediate equivalent in Chinese language. A choice had to be made between the terms 'Heaven' (*tian*) and 'Lord (or Emperor) from above' (*shangdi*). Forming a pure neologism (as had been the case in Japan), expressions such as 'Supreme Principle' (*taiji*) or 'Spirit' (*shen*) were less plausible alternatives. Later, the Catholics adopted the term *tianzhu* ('Lord of Heaven'), and the ecclesiastical authorities prohibited the use of other names after 1704. Today, most Protestant denominations still prefer the term *shangdi*, which is more common in Chinese.

Another field open for semantic inculturation is that formed by words such as 'virtue' (*daode*), 'law' (*fa*), and 'rites' (*li*). Virtue is traditionally seen as an internal principle that governs one's conduct and deeply influences one's surroundings. In contrast, law is often accused of being an artificial construct that goes against the natural and virtuous flow of life. Some Chinese theologians have contrasted Moses, who gives his people a law, with Confucius, who gives the Chinese cultural world a set of internal principles of conduct.

The previous examples illustrate how terminological problems are intrinsically linked with theological debates that determine the understanding and development of Christianity in East Asian societies and cultures.

East Asian Languages and the Reshaping of the Christian Narrative

During the past 30 years of the 20th century, Korean *minjung* theology has provided East Asia with an example of the importance of language issues in the crafting of a new Christian expression. Although *minjung* roughly means 'people,' the word is usually not translated in order to preserve the specificity of the historical experience it represents. Korean minjung theology pioneered extratextual hermeneutics, insisting on popular rituals and expressions of feeling as a source of inspiration. Of special importance has been the stress put on *kut*, a shaman-like rite that makes the community as a whole gathering, resurrecting and offering sacrifice. Similarly, much writing has been devoted to *han*, the dominant popular feeling arising from "the suppressed, amassed, and condensed experience of oppression" (Suh Nan-dong). Such journey allowed, for instance, the Korean feminist Chung Hyun Kyung to write, "I discovered my bowels are shamanistic bowels, my heart is a Buddhist heart, and my head is a Christian head." (On the blurring of religious identities, *see* **Christianity in Southeast Asia**.) Although not as vibrant as was the case in the 1980s, minjung theology still provides a set of questions for East Asian Christianity as a whole.

The linguistic and cultural rooting of Christianity in the East Asian context is a multivalent endeavor. It means coming to terms with the East Asian worldview embedded into words, concepts, and linguistic structures. It requires to remain open to the plurality of experiences as translated into linguistic forms. The various texts and cultural–linguistic expressions that East Asian Christian thinkers have to deal with are to be taken and analyzed according to their hermeneutical status: A closer look at the ambivalence of Chinese classics enriches biblical exegesis, individual narrations of the spiritual experiences undergone in East Asian contexts challenge Western categories of the spiritual or mystic path, and Buddhist and Taoist scriptures obey hermeneutic models that challenge the usual categorization of theological discourse (a good example is provided by the debate between the Buddhist philosopher Masao Abe and the Catholic theologian David Tracy). Interpreting anew the quest for 'harmony' typical of East Asian culture, recalling stories of hardships, traumas, forgiveness, survival, and hopes, and being attentive to the style of storytelling found in various East Asian cultures, all contribute to the writing of the Christian East Asian narrative. The appropriation of Christianity by East Asian languages is not a mere lexicographic endeavor: words and concepts take blood and flesh within the flow of a story told in many tongues.

See also: Bible; Christianity in Southeast Asia; Sacred Texts: Hermeneutics.

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Christianity, Catholic

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Latin Christianity

Christianity first developed in the West in Greek-speaking Jewish communities, thus the earliest surviving documents are in Greek; from the first half of the 3rd century, however, there are sophisticated Latin texts from Christian communities in Africa and in Rome (although use of Greek as well continued in Rome (see Lafferty, 2003)). The religious idiom of the Latin texts owed much to the Greek Christian authors who had built on the linguistic achievements of Hellenistic Judaism (see Loi, 1992a, 1992b), and owed much as well to the anonymous translations of the scriptures from Greek into Latin (known collectively as the *Vetus Latina*, by way of distinction from translations and revisions made later by the biblical scholar Jerome (d. 420)). The Latin of these translations is quite distinctive due to the large number of lexicographic, syntactic, and stylistic Grecisms and mediated Hebraisms created by the literalism of the translators, and due as well to the many vulgarisms (some coincident with Grecisms and Hebraisms) that the translators admitted to the written register, whether consciously, with a view to accessibility, or unconsciously, because of their limited control of written Latin (see Sheerin, 1996a).

Christian Latin

Christian Latin has been studied extensively (see Sanders and Van Uytfanghe, 1989) and its peculiar features are well known (see Sheerin, 1996a). There are mostly literary remains, but the language of less educated Christians is known from inscriptions and graffiti, from reports by literary figures, and from usage in the many sermons that survive from stenographic records. What has proved controversial is the exact linguistic category into which 'Christian Latin' should be placed.

Christian Latin could be called a sociolect, but not as conventionally understood, for its use was not restricted along class lines. Yet it was at once the creation and the linguistic identifier of a particular group, and might even be called a 'restricted code' (in the sense of sociolinguistic scholar Basil Bernstein), for it would have been confusing and exclusionary to non-Christians. But it was employed only in connection with religion, thus it was, in effect, a *Fachsprache*, a 'language for special purposes,' or technolect. However, Christian Latin was employed by and helped to define an ever-growing and more varied community, a community that went far toward realizing its ambition of universality.

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Phonology and morphology were unaffected save by the many foreign-sounding terms and names

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Christianity, Catholic

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Latin Christianity

Christianity first developed in the West in Greek-speaking Jewish communities, thus the earliest surviving documents are in Greek; from the first half of the 3rd century, however, there are sophisticated Latin texts from Christian communities in Africa and in Rome (although use of Greek as well continued in Rome (see Lafferty, 2003)). The religious idiom of the Latin texts owed much to the Greek Christian authors who had built on the linguistic achievements of Hellenistic Judaism (see Loi, 1992a, 1992b), and owed much as well to the anonymous translations of the scriptures from Greek into Latin (known collectively as the *Vetus Latina*, by way of distinction from translations and revisions made later by the biblical scholar Jerome (d. 420)). The Latin of these translations is quite distinctive due to the large number of lexicographic, syntactic, and stylistic Grecisms and mediated Hebraisms created by the literalism of the translators, and due as well to the many vulgarisms (some coincident with Grecisms and Hebraisms) that the translators admitted to the written register, whether consciously, with a view to accessibility, or unconsciously, because of their limited control of written Latin (see Sheerin, 1996a).

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that came with Christianity and by a toleration of – indeed, a preference for – vulgarisms (see, e.g., Augustine, *De doctrina christiana* IV). Syntax was not greatly affected save that the prestige of the scriptures made written registers of Christian Latin permeable to the Grecisms, mediated Hebraisms, and vulgarisms that characterize the Latin biblical translations. Rusticity became for a time the Christian ideal – often real, sometimes pretended as a humility *topos*.

The Latin Church

Latin became the official language of Western Christianity, so much so that Western Christianity was sometimes called *Latinitas* (see Sheerin, 1987). Latin dominance in Romanized regions is to be expected, but Latin primacy was also resolutely maintained against non-Romance vernacular alternatives. Thus, although Eastern Christianity early produced scripture, liturgy, and literature in Greek, Syriac, Coptic, Ge'ez, Armenian, and Georgian, and later in Church Slavonic and Arabic, Latin remained the unique vehicle for the higher end of ecclesiastical discourse in the West, the official language of the Bible and liturgy (see Sheerin, 1996b), and over the centuries distinctive styles and idioms developed in the schools for philosophy, theology, and canon law (see articles in Mantello and Rigg (1996)). Even when religious texts became available in the vernaculars, a kind of ecclesiastical diglossia continued through the Middle Ages and well beyond (see 'The "Latin Stronghold": the Church,' in Waquet (2001: chap. 2)).

Of course, vernacular vocabulary, syntax, and, to a far greater degree, pronunciation affected ecclesiastical Latin (see Erasmus, *De correcta latini graecique sermonis pronuntiatione*). Not until the early 20th century did anything like a 'standard' pronunciation of ecclesiastical Latin came about, with the general adoption of 'Roman' or 'Italian' pronunciation as a consequence of the revival of Gregorian chant, and even then not without resistance from traditionalists in France (see Brittain, 1955) and, later, from 'nationalists' in Spain. But even in the post-Vatican II era, Latin has remained the official language of the Roman Catholic Church (see the Vatican's official publication, *Acta apostolicae sedis*). How well Latin has served may be seen in the fact that for 1700 years Latin has been the vehicle of administration, regulation, and education of a polyglot religious *imperium* more extensive than any political empire the world has seen.

Clerical education had to begin with training in Latin. Even in late antiquity, clerical ignorance of Latin was a problem; Augustine (*De catechizandis rudibus* 9.13) remarked on the scandal caused by clerics' garbled Latin, and clerical inability to compose *ex tempore* contributed to the abandonment of improvised liturgical prayers for fixed ones. Complaints about clerical ignorance of Latin are found in the literature through the Middle Ages and well beyond (see Waquet, 2001: 60–63). Training in Latin, rudimentary or advanced, was the preserve of males, of clergy alone for centuries, but later young 'gentlemen' as well (see Ong, 1959). Though some women, mostly in religious life, were taught Latin and became proficient scribes and composers of Latin texts (see Churchill *et al.*, 2002), women in religious life, in degree varying with time and place, had to depend on oral instruction in the vernacular or on versions of theological and spiritual texts in the vernacular.

The vernacular languages of the Catholic peoples, however, were the medium for unwritten communication with the vast majority who did not know Latin. In the later Middle Ages, multiple factors evoked an increase in the composition of religious texts in the vernacular languages and *pari passu* an elaboration of vernacular resources for the presentation of religious thought (a view of these resources can be had in a glance at the work of Foster and Carey (2002)). Printing, the Reformation, and the Counter-reformation accelerated the vernacularization of religious language. But the Catholic church barely allowed vernacular translations of the Latin Vulgate Bible and refused translation of the Latin liturgy. Latin remained the medium for theological education and discourse, but vernacular theological language had to be employed in vernacular controversial literature and in vernacular catechisms for the instruction of the laity.

The Roman Catholic Church in the United States

Here focus shifts abruptly from the pre-modern to the modern period, and narrows from the official Latin language to the vernacular of American Catholics. Until at least the early 1960s, the speech of American Catholics was characterized, to a limited degree, by pronunciation and the use of Latin tags (for their residue, see Wills (1972: 16–17) and Bretzke (1998)), but far more by a latinate English terminology, a technolect, largely derived from the *Baltimore catechism*, which had been promulgated by the U.S. Catholic bishops in 1891 (the American equivalent of the Anglo-Irish 'penny catechism,' *A catechism of Christian doctrine*).

Catholic elementary school students were taught about things divine and how to define *perfection*, *unity*, *nature*, and *substance*; they were taught about the church and how to define its attributes of *authority*, *infallibility*, and *indefectibility*, and how to describe the various ranks of the officers of the church, those in *minor orders* and *major orders*, and the prelates who ruled the church, from *monsignor* through the *Pope* (who could teach *ex cathedra*) and his *vicars apostolic* and *cardinals*. They were taught a taxonomy of sins: *original* and *actual*, *mortal* and *venial*, and *capital* and *material*, and about *predominant sin* or *ruling passion*, which might determine for each what constituted a *near occasion of sin*. But *grace* was available – *actual grace* and *sanctifying grace* – which came through the *sacraments* (the *sacraments of the living* and *sacraments of the dead*), with their *outward sign*, *matter*, and *form*, and the requisite *right intention* and *right dispositions*. Students learned that *confession* and *general confession* (not recommended for those with *scruples*), with its *absolution* and *penance*, could *remit the two punishments due to actual sins*, the *eternal punishment*, but only part of the *temporal punishment* in *purgatory*. For help with the latter, one sought a *plenary indulgence* or a *partial indulgence*. Catholics knew the *end of man*, that after death there would be a *particular judgment* that would send him to *hell*, *purgatory*, or *heaven*, but that there was to be a *general resurrection* followed by a *general judgment*, after which the souls of the just would live on in a *glorified body*, with its qualities of *brilliancy*, *agility*, *subtility*, and *impassibility*.

For some practices, Catholics had expressions ranging from the top to the bottom of Catholic idiom (see Wills (1972: 40), on the hypercorrect usage of the Catholic intelligentsia of the 1950s), e.g., from the formal 'receive the Eucharist' or 'receive Holy Communion' to the informal 'go to Communion,' to the antiformal 'hit the rail' (the communion, or altar, rail that separated the sanctuary from the nave of the church). The intelligentsia employed a reserved code of compressed, implicit expressions, such as when they advised one another to 'offer it up' (gladly to offer personal discomfort or frustration in place of the pains of the *church suffering* in *purgatory*) or excused themselves to 'make a visit' (to the Blessed Sacrament *reserved* in church). Even Catholic profanity was distinctive, an apt topic for a study such as that of Beccaria (2001).

Catholic communities were distinguished also by onomastics. Religion restricted the choice of personal names given in the sacraments of baptism and confirmation to 'saints' names' broadly understood, and affected even the toponymy of areas where Catholics lived. Spanish-speaking Catholics had left the mark of their religion on the toponymy of the western states in names that are still intact or that have been abbreviated, e.g., in the United States, Ventura (California), from *San Bonaventura*, and the Animas River (northern Colorado), from *Rio de las Animas Perdidas*. Later waves of Catholic immigrants used parish boundaries to create their own toponymy for the great cities in which they settled. Thus, when asked where they or another lived, they would reply with the name of the parish. This could have ethnic significance, e.g., St. Laurence O'Toole (Irish), St. Liborius (German), or St. John Nepomuk (Czech), or might simply indicate in which Catholic community they lived, with all of the socioeconomic and cultural implications of any other community designation. This toponymy was confusing to non-Catholics or even to Catholics from out of town, and confusion was compounded when the term 'parish' was dropped from the complete or abbreviated parish name, as when one would say that he was from 'Blessed Sacrament' or 'Holy Rosary' or from 'Sorrows' (Our Lady of Sorrows parish) or 'Immaculate' (Immaculate Conception parish).

Roman Catholic culture has undergone fundamental changes since the Second Vatican Council, and the American Catholic idiom described here is now obsolescent. Some of its features endure, but many have been displaced by new formulations, and, in the interests of interfaith relations, gender equity, etc., many peculiar usages have been eliminated altogether. It would be, perhaps, inexact to apply the term 'language death' to this case, but the fact remains that cultural changes are bringing about the extinction of a form of peculiarly Catholic mode of communication.

See also: Bible; Ethnicity; Gender, Grammatical; Languages for Specific Purposes.

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Christianity, Protestant

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Protestantism is one of the three major Christian traditions, alongside Roman Catholicism and Greek and Russian Orthodoxy. Its number of adherents worldwide is calculated to be 342 000 000 Core Protestants, to which should be added another 491 000 000 Wider Protestants, members of so-called independent traditions, which are referred to as Protestant by others. Statistics of adherents of religions are not always fully reliable, however, since they are often based on self-reported figures by the churches themselves. European countries with vestiges of the historical state-church system count baptized members (for example, in both Sweden and Finland approximately 82% of the respective populations), many of whom have no meaningful relationship to Christianity or Protestantism. Nonetheless, Protestants comprise about 44% of the adherents of world Christianity. Much like Roman Catholicism, Protestantism is not confined to Europe and North America but has increasingly been, since the 18th century, a global phenomenon. The importance of Protestantism can be seen in the fact that worldwide the overwhelming number of Christian publications come from Protestant sources and that a Christian 'megacensus,' which measures everything empirically measurable about Christianity, has found that 75% stem from Protestant initiatives.

Unlike Roman Catholic and Orthodox Christianity, however, Protestant Christianity is divided not only geographically and culturally, but also theologically and ecclesiastically. There is no single Protestant Church as such, as there is – despite various diversities – a single Roman Catholic Church. Quite the contrary, there are dozens upon dozens of Protestant Churches. Some of these, such as the Anglican Communion, are worldwide in scope and distribution of membership; others such as the Church of the Prussian Union are confined to a single country or area; still others such as the independent snake-handling congregations of Appalachia in the United States, are solitary congregations. Despite such diversity, which Catholics in the past used to buttress their own truth claims (since truth – as Bishop Bossuet noted in the 17th century – must be one, not many), virtually all of these traditions had their origin in staking out the same absolutist truth claims as have the Roman Catholic and Orthodox churches. Until the modern era, all Protestant churches insisted on their exclusive possession of Christian truth and, each in its own way, echoed the ancient notion, *extra ecclesiam nulla salus* – outside the church there is no salvation – except that Protestants had a way of defining 'church' rather subjectively.

The term 'Protestant' itself comes from the 'protest' which the German territorial rulers, supportive of Luther's movement of reform, lodged at the diet (parliament) at Speyer in 1529 against the decision of the Catholic rulers to carry out the stipulations of the Edict of Worms against Martin Luther. Thus, one may define Protestant as all those individuals and churches that affirm the Bible as the sole norm of truth and, in so doing, protest the authority of the Roman pontiff and the Catholic Church. The term itself is, therefore, a negative one, even though some interpreters of the 1529 action have pointed to the root meaning of the Latin *protestari* as denoting 'to bear witness' as is still found in the word 'protestation,' meaning strong declaration or affirmation. Protestantism may thus be defined with a number of positive assertions, as one also.

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Historically, Protestantism had its beginnings early in the 16th century in the various efforts to engage the Roman Catholic Church in reform of practice and theology. These efforts were spearheaded by Martin Luther, professor at the University of Wittenberg in Central Germany, and his 95 Theses against the practice of indulgences. The prompt verdict of excommunication against Luther and his supporters issued in 1521 meant a parting of the ways and, before long, the establishment of new churches separate from the Roman Church.

It is a truism that, once the break had occurred, subsequent theological reflection convinced the Protestant reformers that their understanding of text and message differed categorically from that of the old church. There surely should be no doubt – the exceptions seem to be systematic theologians who tend to view the past from the perspective of the present – that from a certain time onward in the Reformation controversy, the reformers and their successors would not have returned to the Catholic Church even if they had been welcomed with open arms.

Soon it became obvious, however, that common opposition against the Roman church and its theology did not mean common belief. Dissension arose within the movement of reform, first among those who wished for a more selective church and repudiated the baptism of infants, later called Anabaptists, then among those who held different interpretations of the meaning of the Lord's Supper. Indeed, this particular issue became the cause for a far-reaching split among the ranks of the reformers, with the line drawn most sharply between the Lutheran and the Calvinist traditions, the latter tracing its origin to John Calvin, a Frenchman whose reforming activities centered in Geneva, Switzerland. Calvin understood the bread and wine of the Communion service to signify the spiritual union between the believer and Christ, while Luther held that these elements were his true body and blood.

Calvin's tradition has had a particularly strong importance in the Anglo-Saxon world, while Lutheranism tended to be found in central and northern Europe. In the England of King Henry VIII, religious agitation together with the strong will of the king led to the establishment of a new church that initially focused on the repudiation of papal authority but subsequently, under Edward VI and Elizabeth I, took on a more Protestant ring. Even as on the Continent earlier in the century, there had been those for whom the reforms undertaken did not go far enough, so there were those in England during Elizabeth's reign who called for reform that was more extensive and a purer church. Dubbed Puritans by their opponents, these ardent reformers owed a great debt to Calvin, and became a lasting element in English Protestantism. Mainstream Protestantism in England, soon dubbed Anglican, saw its distinctive feature in the affirmation of a *via media* between Catholicism and Protestantism.

The story of Protestantism in England gained in excitement in the course of the 17th century with the turbulence of the civil war and its mixture of political and religious concerns. This brought the emergence of several dissenting churches that, while small in numbers, have lastingly influenced English Protestantism to this day: Baptists, Quakers, and Congregationalists. Similar discontent with mainstream Protestantism in England in the 18th century led to the emergence of the Wesleyan movement, named after the Oxford don and Church of England clergyman John Wesley. Eventually, this movement separated from the Church of England and subsequently became known as Methodist.

Continental Protestantism was characterized in the 17th century by an emphasis on proper doctrine (thus, the label Orthodoxy), which later gave it the unmerited reputation of having little empathy for the praxis of Christianity. Orthodox theology focused on delineating the distinctive doctrines of the respective traditions, which led, among other affirmations, to the delineation of the notion of the verbal inspiration of the Bible. Late in the century, Philipp Jakob Spener, a German Lutheran clergyman, influenced by such English devotional writers as William Perkins and William Ames, offered a proposal for renewing the church in a book entitled *Pious Desires*. This book triggered the movement of Pietism, which can be seen as a Continental parallel to the Wesleyan movement in England.

Of equal, if not greater, importance for the course of Protestantism were the intellectual changes emanating from the European Enlightenment in the late 17th and 18th centuries. The searching reexamination of long-held scholarly, philosophical, and religious views led to an increasing attack on the conventional understanding of the Bible as well as on traditional theology. A group of English thinkers labeled Christian Deists challenged the time-honored understanding of the Bible as a revealed book, repudiating not only the concept of revelation but miracles and prophecy as well. Protestantism became divided into two camps: those that affirmed traditional Christian doctrines and those who reinterpreted these doctrines.

In the 19th and even the 20th century, the history of Protestantism was less the story of great church leaders or institutions than it was the story of theologians, such as Friedrich Schleiermacher, Albrecht Ritschl, David Friedrich Strauss, or Adolf Harnack. These theologians undertook to reinterpret the

Christian faith in the face of the challenges of modernity. Others, often less in the public eye, affirmed traditional notions. Twentieth century Protestantism was marked by several theological waves. Some, such as Neo-Orthodoxy, were theologically conservative, while others, such as Liberation Theology, tended to be more liberal. The great theme of 20th century Protestantism, however, was its globalization and its eroding numbers and importance in Europe.

Protestantism was successfully transplanted from old to New England in the 17th century. Many immigrants who came to North America were religious dissenters, such as the Mennonites, the Amish, the Independents, or the Baptists, for whom the new continent was the biblical city on a hill, where they could practice their faith unhindered by government, though they often manifested the same kind of intolerance that they themselves had experienced in their European homelands.

Theologically, several affirmations characterize Protestantism, of which the centrality of the Bible as sole authority for life and faith holds the primacy of place and importance. The Latin phrase *sola scriptura* ('Scripture alone') expresses this centrality, which implies the rejection of the church and its traditions as normative authority as is variously the case in Roman Catholicism and Greek and Russian Orthodoxy. Since it is the presupposition of this Protestant premise that the meaning of the Bible is clear and self-evident, Protestantism has no teaching office (*magisterium*) as does the Roman Catholic Church. Thus, the distinctive Protestant hallmark has to do with authority.

A second Protestant assertion relates to the doctrine of justification, which explains how humans are reconciled with God. Catholic teaching has held in varying ways that such justification entails a process of divine and human cooperation, where humans will marshal their moral prowess to which divine grace is added. This Catholic notion of cooperation, often mislabeled as work righteousness by Protestants, was countered in Protestant theology with the insistence that justification is solely attributable to divine grace, which humans appropriate solely by faith. Here, too, Protestant nomenclature invoked the Latin *sola* (alone) to insist that justification is *sola gratia, sola fide*, solely by grace, solely by faith.

Beyond these basic affirmations, Protestantism is marked by theological diversity. Protestant diversity finds its explanation in the absence of a central authoritative entity – either person or structure – in Protestantism that would exercise normative authority (and power). The Protestant recourse to the Bible, or the Word of God as the ultimate authority, produced multiple divergent interpretations, and new theological or biblical interpretations frequently assumed structural concreteness. Yet it seems neither fair nor theologically accurate to contrast the relatively homogeneous Catholic and Orthodox churches with the diversity of Protestant denominations – and to find in this diversity proof positive for the nonviability of Protestant truth claims. The Roman Catholic Church sustains its theological homogeneity through excommunication or the voluntary separation of dissenting members, indicating that it is not itself able to maintain unity of interpretation. The very existence of Orthodox and Protestant traditions suggests that the Roman Catholic Church has not been able to sustain its truth claims universally but has sloughed off dissent within its ranks. In Protestant churches, excommunication and dissent have likewise led to separation, but with a difference: the establishment of new groupings and churches. The phenomenon of new ecclesial structures has been particularly prominent in places where the legal freedom to do so existed. The absence of established churches in North America and the non-European world has allowed dissent from the mainstream to express itself organizationally and sociologically in the form of new churches, each of which claims its own truth.

The diversity of Protestant churches, especially pronounced in the United States, entails two consequences. One is the difficulty of speaking of **the** Protestant understanding of almost any topic, be it worship, doctrine, ethics, etc. Even as regards the traditional hallmark of Protestantism, the priority of grace in salvation, there are diverse Protestant notions as to exactly how divine grace and human effort are to be related. Second, there is also the increasingly popular (at least among scholars) tendency to use the plural and speak of Protestantisms to denote the empirical reality of Protestant diversity. This view, which simultaneously speaks of Catholicisms or Christianities, ignores the fundamental unity in diversity by favoring the latter rather than the former.

The closing decades of the 20th century saw a striking vitality of theologically conservative Protestant churches, especially in places such as Korea, Central America, and Africa. Pentecostal churches have seen dramatic increases in membership. This is in contrast to stable membership numbers and a more liberal theological outlook in the European and North American Protestant churches. The important question, as regards the future of Protestantism, will be if these recent developments must be seen as harbingers of identity and place of Protestantism in the 21st century.

See also: Bible; Christianity, Catholic; Christianity in Africa; Christianity in Latin America; Christianity in the Far East; Luther, Martin (1483–1546); Quakerism; Reformation, Northern European; Religious Language; Sacred Texts: Hermeneutics.

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Christmas Island: Language Situation

Editorial Team

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An Australian Territory since 1958, Christmas Island is a small tropical isle in the eastern sector of the Indian Ocean, 2600 km northwest of Perth, Western Australia. Its closest neighbor is Java, 360 km away. The uninhabited island was discovered and named on Christmas Day of the year 1643 by Captain William Mynors of the East India Ship Company, but it was not until 1888 that Christmas Island was annexed by Britain and settled. The Clunies-Ross brothers from neighboring Cocos-Keeling Islands (some 900 km to the southwest) established a settlement at Flying Fish Cove to collect timber and supplies for the growing industry on Cocos, and when phosphate mining began in the 1890s, Christmas Island became increasingly populated. The earliest settlers spoke English and Cocos Malay, a unique version of Malay that has been isolated from the mainstream language for over 150 years. Early arrivals from China mainly spoke Cantonese. In fact, many early place names on Christmas Island are Cantonese words, such as *Poon Saan*, which means 'halfway up the hill'. Postwar arrivals who came from Penang introduced other Chinese languages including Hakka, Hainese, Hokkien, and Teochew, while those from Singapore introduced Mandarin. Malay is widely spoken by the Malay Community present on the island and, even though English is the official language of Christmas Island, there are many residents who generally communicate in Malay or one of the four Chinese dialects. Because English was not a prerequisite for employment, a sizable proportion of today's community is not fluent in English and many residents still converse in their native tongue. The Australian Bureau of Statistic Census of 2001 recorded a total population of 1508 people on Christmas Island, with an ethnic composition of approximately 60% Chinese, 10–15% European, and 25–30% Malay. The influx of tourists has also had an impact on the island's language. Indonesian is frequently spoken along with many of the Chinese languages. Thai, Japanese, German, and a few other European languages are sometimes also heard.

See also: Cocos (Keeling) Islands: Language Situation; Malay.

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Chrysippos (ca. 282–208 B.C.)

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Born in Soli (Cilicia), Chrysippus went to study in Athens, where he received his philosophical training in the Platonist academy with Arcesilaus and subsequently in the Stoic school led by Cleanthes of Assos. He succeeded his master, Cleanthes, and became the third head of the Stoic school. He died in Athens around 205 B.C.

Chrysippus was an extremely influential thinker and highly prolific writer, but unfortunately very little is left of the approximately 700 titles attributed to him by Diogenes Laertius, whose *Lives of the philosophers* remains our main source of information on Chrysippus and other Stoic philosophers. Chrysippus's main fields of research were dialectics and language study (i.e., philosophy of language and grammar), and he seems to have laid the foundations of Stoic linguistic thought. For Chrysippus, the term *dialektikê* ('dialectics') referred to the study of signs and 'things signified.' From the catalogue of his lost writings it is possible to get an idea of the extent and technicality of his philosophical-linguistic work (more than 100 titles). The areas of dialectics and language study investigated by Chrysippus covered the following topics: (a) judgments and other types of sentences (disjunctive judgments, hypothetical judgments, consequents; questions, queries, answers, orders); (b) predicates and classes (species, genera, contrary terms, and relative terms); (c) words, word classes, and their morphological and syntactic behavior (this domain includes writings on cases, on proper names, on the elements of speech, on the arrangement of expressions); and (d) the origin of words (etymology). The first three kinds of topics fall within Stoic logic and theory of meaning: the composition, the nature, the content, and the function of sentences

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Chukotko-Kamchatkan Languages

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Chukotko-Kamchatkan

Chukotko-Kamchatkan, formerly also known as Luor[a]vetlan, is a small family of languages spoken in extreme northeastern Siberia on the Chukotka Peninsula, opposite Alaska and the large Kamchatka Peninsula in far Eastern Siberia. The family consists of four remaining languages, Alutor, Chukchi, Itelmen, and Koryak. All of the languages in the group, excluding Chukchi, are endangered; Kerek became extinct in the 1990s.

Alutor (*Ethnologue* code ALR), also known as Alyutor or Palana Koryak, is spoken by some 200 people in the villages of Vyvenka and Rekinniki in the Koryak National District, in the northeast Kamchatka Peninsula. Chukchi (*Ethnologue* code CKT) is spoken by some 10 000 people, primarily on the Chukchi Peninsula of northeastern Siberia. In English language literature, especially older works, the language is sometimes spelled Chukchee as well. Several local variants exist, but differences are relatively minor. More celebrated were the once active phonological differences in men's and women's speech, seen in the following word pair: (men) *reqərkən* = (women) *tzeqətzən* 'what is s/he making/doing?' (Kämpfe and Volodin, 1995: 8). Itelmen (*Ethnologue* code ITL) is also known as Kamchadal. Itelmen is currently moribund, with fewer than 100 speakers. Itelmen speakers are found primarily in the Tigil region, in Kovran, and in the Upper Khairiuzovo villages on the Kamchatka Peninsula. There were originally at least three Itelmen languages, two gradually giving way to Russian over the past two centuries, and they are now extinct. Only the Western dialect remains; it is sometimes divided into separate Kovran and Sedanka varieties. Kerek (*Ethnologue* code KRK) became extinct in the late 1990s. It was closely related to Koryak (*Ethnologue* code KPY); Koryak has some 3500 speakers scattered across the Koryak National Okrug, on the northern half of Kamchatka. An alternate name is Nymylan. There are several divergent varieties, some now considered separate languages (Alutor). Dialects include Chavchuven, Apukin, and Kamen.

Itelmen stands in isolation from the northern languages genetically, with the speech representing a southern branch. It is sometimes debated whether Itelmen is related at all to Northern Chukotko-Kamchatan, and it is indeed different in numerous ways, but these are attributable rather to different substrate populations and various locally defined internal developments within Northern and Southern Chukotko-Kamchatkan, and their ultimate genetic unity seems clear. The northern branch in many

(and their constituents, such as subject terms, predicates) were the essential prerequisite for a correct analysis of syllogisms, ambiguities, fallacies, *aporiai,* and other philosophical puzzles. Chrysippus played a major role in showing the importance of linguistic-grammatical study (focusing on the structure of the proposition, on propositional content, and on the meaning of its constituent parts) for logical analysis and for a correct understanding of statements (as referring to states of affairs).

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interpretations has further subgroups of Alutor and Koryak (and Kerek), in opposition to Chukchi.

Along the coasts, Chukchi people live as sea mammal hunters, like the local Yup'ik populations, but they live as reindeer herders in the interior. Approximately three-quarters of the Chukchi live as reindeer herders. Northern Kamchatkan groups mainly practice reindeer-oriented economies and fishing and sea mammal hunting along the coasts. The Itelmen live primarily as subsistence fishers.

Chukotko-Kamchantkan languages in general, but the northern ones in particular, are characterized by a range of features that set them apart from many indigenous Siberian languages, but also reflect a number of areally common features. First, many words in Chukotko-Kamchatkan languages are very long (e.g., Chukchi *ga-npənačg-ərgəna-qora-ma* 'with the old men's reindeers' (Skorik, 1986: 107)), and initial *ŋ-* is common (as is typical of northern and eastern Siberian languages (Anderson, 2003). Clusters of stop + *ŋ* are also found. Example (1) is from Skorik (1986: 79, 85) (cf. Itelmen *ŋosx* 'tail' and *ŋeyŋe* 'mountain' (Volodin, 1976: 31)):

(1)	Chukchi	Koryak	Alutor	Kerek	gloss
	ŋoyŋən	ŋoyŋən	ŋoyŋən	ŋuyŋən	'tail'
	ŋəron-laŋ-o	ŋəyon-laŋ	ŋərun-laŋ	nəyuq-laŋu	'3 together'

Compare Kerek *tŋivek* 'to send' (Skorik, 1986: 89) with Itelmen *pŋilpnəl* 'root' (Skorik, 1986: 78)). Itelmen shows an unusual tolerance to consonant clusters word-initially, as well as ejective consonants that the northern languages do not share. Thus, words such as *klfknan* 'it fell out' and *kstk'ɬknan* 'he jumped' may be found in Itelmen.

Northern Chukotko-Kamchatkan languages stand out for their areally atypical system of vowel harmony. Vowels belong to one of two harmonic classes, strong/dominant and weak/recessive. A strong vowel triggers strong allophones throughout the word, and therefore a vowel in an affix may trigger alternation in stem vowels, as shown in Example (2) for Koryak:

(2)	weyem	'river' >	wayam**əŋ**	'river-DAT'
	mil'ut	'hare' >	mel'ot**aŋ**	'hare-DAT'
	eñpič	'father' >	añpeče-na-**naŋ**	'father-AUGM-DAT'

Note: ***geyqə-miml-e*** 'with water' vs. ***gawən-memlə-ma*** 'with water' (Zhukova, 1972: 111–112; 120).

Among the most characteristic features of Chukotko-Kamchatkan morphology is the frequent use of circumfixes (combined prefix + suffix combinations) to encode a variety of inflectional categories, both nominal and verbal, some of which appear to be very old in the family. In Koryak, this is realized as ***ga-čol'-ma*** 'with salt' (Zhukova, 1972: 120), and in Chukchi it is ***ga-npənačg-ərgəna-qora-ma*** ' with the old men's reindeers' (Skorik, 1986: 107). In Koryak, *y(A)-. . .-ŋ* (Zhukova, 1972: 202):

(3)	**y**-ačačgañ-**ŋ**-ək	**ye**-lqəñ-**ŋ**-ək
	DESID-laugh-DESID-INF	DESID-leave-DESID-INF
	'want to laugh'	'want to leave'

In Chukchi, *re-. . .-ŋ* (Kämpfe and Volodin, 1995: 88):

(4)	vinretə-rkən	>	**re**-vinretə-**ŋə**-rkən
	help-IMPERF. REALIS		DESID-help-DESID-IMPERF.REALIS
	'he helps'		'he wants to help'

Among the wider relationships that have been proposed for Chukotko-Kamchatkan languages, none widely accepted by specialists, are connections with Uralic, Eskimo-Aleut, and 'Eurasian,' among others.

See also: Endangered Languages; Russian Federation: Language Situation.

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Church Slavonic

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Church Slavonic is a generic term for the closely related, highly conservative varieties of Slavic language used for liturgical purposes by the Eastern Orthodox Slavs (Belorussian, Bulgarian, Macedonian, Russian, Serbian, Ukrainian) and the Ukrainian Uniates, and also by the Romanians until the 16th century and, until the introduction of services in the vernacular, the Roman Catholic Croats of the Slavonic rite. In the medieval period, Church Slavonic also had the wider functions of a literary language among most of these peoples.

Church Slavonic originated in the translations of Scripture and liturgy made mainly from Greek by SS Cyril and Methodius and their associates in the late 9th and early 10th centuries (*see* **Old Church Slavonic**). The basic vocabulary, grammatical forms, and pronunciation of these texts predominantly followed the usage of Slavs in the southeast Balkans, while syntax and word-formation were to a large extent modeled on Greek.

Two developments signal the transition, by the end of the 11th century, from Old Church Slavonic to Church Slavonic. One was the emergence of local varieties, such as Croatian, Russian, and Serbian Church Slavonic, which compromised between traditional pronunciation and grammatical forms and the vernacular usage of the area. Initially unsystematic, these modified varieties rapidly stabilized to local norms that in the hands of competent scribes attained a high degree of regularity. The other development consisted in revisions of syntax and vocabulary, which seem to have been motivated partly by the

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desire to eliminate outdated or unfamiliar linguistic material, but also aimed to make texts conform to a received Greek version and to produce more closely literal translations. The earliest systematic revisions are associated with Preslav, the capital of Bulgaria in the 10th century, when a number of early Church Slavonic revisions, new translations, and original compositions came into existence. There also appears to have been a revision of Croatian Church Slavonic texts on the basis of Latin sources in the 12th century.

Revisionist tendencies culminated by the 14th century in comprehensive reform of scriptural and liturgical translations into Bulgarian and Serbian Church Slavonic. This development has been associated with the Bulgarian patriarch Euthymius (elected patriarch in 1375; exiled by the Turks in 1393), though more recent research suggests it began in the early part of the century, perhaps on Mount Athos. The resulting standardized orthography, conservatism in grammatical forms and vocabulary, and highly literalistic translational practice were introduced among the East Slavs from the end of the 14th century, albeit with some adjustments to pre-existing local usage. The late 16th and early 17th centuries saw attempts in the Ukraine at systematic description of this late and composite type of Church Slavonic, on the model of Greek and Latin grammars; the most comprehensive of these, compiled by Meletij Smotryc'kyj in the early 17th century and subsequently modified to conform to Muscovite practice, remained the fullest description of Russian Church Slavonic until the 19th century.

Further revisions of Church Slavonic texts initiated in Muscovy or the Ukraine in the 16th and 17th centuries, though controversial in their time, dealt with minor textual discrepancies or the detail of grammatical and orthographical norms. A final standardization was effected in the publications approved by the Synod of the Russian Orthodox Church in the 18th century. Thanks to the dissemination of these printed books in the Balkans, the Orthodox Bulgarians, Macedonians, and Serbs came to use 'Synodal' Russian Church Slavonic, albeit with their own pronunciations.

Modern Church Slavonic does not stand in a simple genetic relationship to other Slavic languages. Its texts may be understood in different ways and to varying degrees by Slavs of differing linguistic background and, as a result of literalistic translational practices aiming at morpheme for morpheme equivalence, some of them are intelligible only with the help of their Greek originals. It is virtually a closed system, for though new texts can be created if need arises, they are acceptable as Church Slavonic only insofar as they reproduce traditional constructions and phraseology. While its liturgical use still prevails in the Russian Orthodox Church, among the Orthodox South Slavs, Church Slavonic tends increasingly to be supplanted by modern vernacular translations, and survives mainly as a vehicle for the traditional corpus of hymns.

See also: Balto-Slavic Languages; Bulgaria: Language Situation; Bulgarian; Macedonia: Language Situation; Macedonian; Old Church Slavonic.

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Chuvash

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Location and Speakers

Chuvash (*čăvaš čĕlxi, čăvašla*) is the only modern representative of the Oghur (or Bulgar) branch of the Turkic language family. It is spoken in the Volga-Ural region, partly in the Chuvash Republic (*Čăvaš Respubliki*) at the 'Great Bend' of the Volga River. The Chuvash Republic (the capital is Cheboksary, *Šupaškar*) was established in 1990 within the Russian Federation; its forerunner was the Chuvash Autonomous Soviet Socialist Republic, created in 1925. The Chuvash have majority status in the Republic, forming nearly 70% of the population. Over three-fourths of the population regard Chuvash as their native language.

More than half of the speakers of Chuvash live outside the Republic, especially in the south and southwest parts of Tatarstan, in the central and west parts of the Bashkortostan, and in the Kuybyshev, Ulyanovsk, and Samar provinces. Speakers of Chuvash also live in other parts of Russia, in West and East Siberia, in the Far East, and in some Central Asian republics. The total number of Chuvash-speaking people is nearly 2 million. According to a law adopted in 1991, Chuvash and Russian are the official languages of the Republic. Russian is the medium of communication between nationalities and the main language of instruction. However, the efforts to maintain Chuvash are strong, even in the younger generation.

Origin and History

Parts of the old Oghur tribal confederation, originally based in the Baikal Lake region, moved west and arrived, in the mid-5th century, in the European steppe, where they established states on the Kuban, Danube, and Volga rivers. They mostly assimilated linguistically, a well-known example being the Slavicization of Bulgar groups in the Balkans. At the end of the 9th century or earlier, Oghur groups settled in the Volga-Kama region, where they established the Volga Bulgar kingdom, with its center on the middle and lower course of the Volga River. They accepted Islam as early as 922. After the destruction of this state by the Mongols in the 13th century, the Volga Bulgars and other groups of the region became subject to the Golden Horde.

Early Oghur is unknown except for the evidence found in some proper names and old loanwords. Chuvash, which was recorded for the first time in the 18th century in word lists, texts, and one grammar, is considered closely related to Volga Bulgar and other old varieties of the Oghur type. Volga Bulgar is partly known from tombstone inscriptions found on the left bank of the Volga River, dating to the 13th and 14th centuries. Several linguistic features recorded in these epitaphs do not, however, fit very well with the known features of Chuvash. It is thus still not quite clear that Chuvash is a direct descendant of Volga Bulgar. It is also unknown whether the ancestors of the Chuvash took part in the written culture of the Bulgars. There are no Volga Bulgar epitaphs on the territory of the Chuvash Republic. The fact that Chuvash is one of the very few Turkic languages that is not strongly influenced by Islam may indicate that the ancestors of the Chuvash were not affected by the Volga Bulgar Islamic culture.

Related Languages and Language Contacts

Chuvash is the result of the oldest known split within the Turkic family. Its origins reside in the language of Oghur Turkic group. Chuvash has played a key role in comparative Turkic linguistics, especially in discussions about a possible genealogical relationship of Turkic, Mongolic, and Tungusic within an Altaic language family. According to an older view, Chuvash constitutes an independent Altaic language. The hypothesis of an Altaic protolanguage relies on reconstructions on the basis of words shared by Turkic, Mongolic, Tungusic, and sometimes other languages, such as Korean and Japanese. Deviant Chuvash consonant representations have been used to reconstruct a Proto-Altaic phonology.

Chuvash words with *r* and *l* sometimes correspond to Common Turkic words with *z* and *š* (e.g., Chuvash *čul* 'stone' vs. Common Turkic *ta:š*). This is an archaic Oghur feature. Two Samoyed words that can be traced back to **yür* 'hundred' and **kil'* 'winter' have obviously been copied from Oghur words containing the same final consonants. The corresponding Chuvash words are *śĕr* and *xĕl*, whereas other Turkic languages display forms ending in *-z* and *-š*, respectively (e.g., Turkish *yüz*, *kış*). Chuvash words with *r* and *l* sometimes have Mongolic equivalents with *r* and *l* (e.g., *čul* 'stone' vs. *čilaγun*). Cases such as these have been used to reconstruct the special Proto-Altaic elements r^2 and l^2, which are thought to be represented by *r* and *l* in Mongolic and Chuvash, whereas they have developed into *z* and *š* in Common Turkic. Scholars who do not accept the Altaic hypothesis

explain these and other correspondences by contact relationship. In this case, the assumption is that an Oghur language of the Chuvash type, with certain features, was the source of the oldest layer of Turkic loanwords in Mongolic. Tungusic, in turn, is thought to have borrowed words with these features from Mongolic.

Complex processes of linguistic assimilation have taken place in the Volga-Kama region since the 10th century. The Bulgar influence on East Finnic, Slavic, and early Kipchak Turkic was considerable. Ancestors of the Chuvash assimilated speakers of Udmurt (Votyak) and Meadow Mari (Cheremis). The assimilation of local populations led to strong substrate influences, especially from Mari. The term 'Chuvash,' first documented in Russian chronicles of the 16th century, originally referred to groups that also included speakers of Mari. On the other hand, the designation 'Cheremis' was also applied to Chuvash. After the Mongol conquest, from the 14th century on, Kipchak-speaking newcomers played an important role in the area. Speakers of Volga Bulgar were linguistically influenced by them. Parts of them assimilated Volga Bulgars and other Oghur-speaking groups, which led to substratum influence. What is known as Chuvash today remained relatively uninfluenced by the Kipchak wave. In its more recent linguistic history, however, Chuvash has been closely connected with Kipchak Turkic through massive Tatar impact.

The Written Language

Standard Chuvash is written with a Cyrillic-based alphabet that includes a few special letters. It goes back to a script system established by Ivan Jakovlev (1848–1930), which mirrors the pronunciation of the Anatri dialect. The alphabet was reformed in 1938 and has remained unchanged since then. It basically represents phonemes, and few allophones.

Distinctive Features

Chuvash shares basic linguistic features with other Turkic languages, preserving numerous so-called Common Turkic traits. It exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is, for example, an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. On the other hand, it strongly deviates from Common Turkic in some respects, particularly in its phonology. In the following suffix notations, capital letters indicate phonetic variation (e.g., A = ă/ĕ). Hyphens are used to indicate morpheme boundaries.

Phonology

Chuvash phonology displays many irregular and complicated sound changes. This is especially true of the vowels, of which correspondences with Common Turkic vowels are far from unequivocal. For instance, the Common Turkic vowel *a* is represented by *u* in words such as *ut* 'horse' (cf. Tatar *at*), but by *ï* in words such as *pïr-* 'to go' (cf. Tatar *bar-*). Chuvash possesses the reduced vowels *ă* and *ĕ* (e.g., *tăr-* 'to stand', *pĕr* 'one'), which have their counterparts in neighboring languages, including Tatar, without corresponding to them in a systematic way. Originally long vowels are generally not preserved in Chuvash. In some cases, however, they are represented by diphthongs (e.g., *kĕvak* 'blue' < *kö:k*).

Chuvash has a rather reduced consonant inventory in comparison with most other Turkic languages. Under Slavic influence, palatalized and nonpalatalized consonants are distinguished, the palatalized ones occurring before and after front vowels. Chuvash *r* sometimes corresponds to an Old Turkic interdental *δ*, as in *ura* 'foot' vs. *aδaq*. This is not necessarily an archaic feature. In cases such as this, early Bulgar *δ* seems to have changed into *z*, which then developed into *r* in late Bulgar.

Chuvash words are, as a rule, subject to sound harmony. The vowels of a word normally belong either to the front or to the back class. Most suffixes have a back vowel and a front vowel variant. However, some suffixes of standard Chuvash exist only in a front vowel variant: the plural suffix *-sem*, as in *ača-sem* 'children' (of *ača* 'child'), and the third-person possessive suffix, as in *ïvăl-ĕ* 'her/his son' (of *ïvàl* 'son').

Grammar

The morphology exhibits certain deviations from Common Turkic patterns. There are thus exceptions from the agglutinative principles generally valid for Turkic languages (e.g., *tu* 'mountain' vs. *tăv-a* [mountain-DAT] 'to the mountain') (cf. Turkish *dağ* [mountain], *dağ-a* [mountain-DAT]). Eight cases are normally distinguished for the standard language. As a result of phonetic development, the dative and accusative case markers have fused into one marker, *-A*. Besides the suffixless nominative, the dative–accusative, the genitive in *-An*, the locative in *-rA*, and the ablative in *-rAn*, Chuvash grammarians reckon with an instrumental-comitative case in *-pA*[*lA*], a privative (or abessive) case in *-sAr*, and a causal or purposive case in *-šAn*. Some scholars distinguish still more cases, e.g., a directive in *-AllA*. The plural suffix *-sem* is of unknown origin; other Turkic languages use plural suffixes of the type *-lAr*. The plural

marker *-sem* follows possessive suffixes and precedes case markers (e.g., *kil-ĕm-sen-čen* [house-POSS.1.SG-PL-ABL] 'from my houses'). In other Turkic languages, the plural suffix precedes the possessive markers, as in Turkish *ev-ler-im-den* [house-PL-POSS.1.SG-ABL].

The nominative forms of the personal pronouns of the first and second persons contain a proclitic deictic element *e-*, lacking in other Turkic languages: *epĕ* 'I', *esĕ* 'you (singular)', *epir* 'we', *esir* 'you (plural)' (cf. Turkish *ben*, *sen*, *biz*, *siz*). The reflexive pronouns of the type *xa-* plus possessive suffixes (e.g., *xam* 'I myself') are unknown in other Turkic languages. Three degrees of proximity are expressed with the demonstrative pronouns *ku* 'this', *śak*(*ă*) 'this there', and *śav*(*ă*) 'that there'. The numerals 1–10 display, besides their normal forms (*pĕr*(*e*) 'one', *tăxăr* 'nine'), emphatic variants with long consonants for use in isolated syntagmatic positions (*pĕrre* 'one', *tăxxăr* 'nine'). Ordinals are formed with the suffix *-mĕš*, otherwise unknown in Turkic (*ikkĕ-mĕš* [two-ORD] 'second').

The Chuvash verb system does not exhibit such important deviations from the common Turkic system as has been assumed by some researchers. For example, the so-called 'aorist' (e.g., Turkish *gel-ir* [come-AOR.3.SG] 'comes, will come') is not lacking in Chuvash, but has survived as the so-called future, as in *kil-ĕ* [come-FUT.3.SG] 'will come'. The negated imperative is formed with a preposed particle *an* (*an pĭr* [NEG go.IMP] 'do not go'), whereas other Turkic languages use the negation suffix *-mA* with imperatives as well (e.g., Turkish *git-me* [go-NEG.IMP] 'do not go').

It has been suggested that some of these idiosyncratic Chuvash features – the deictic element *e-*, the pronouns *śakă* and *śavă*, the negative particle *an*, and the plural suffix *-sem* – have been copied from Mari or other Volga Finnic languages.

Lexicon

Most basic words in the Chuvash lexicon belong to the common Turkic vocabulary. Many elements have, however, been copied from other languages, mostly from Tatar, neighboring Finnic languages, and Russian. An old layer indicates contacts with Samoyeds in southwestern Siberia. Later loans reflect the contacts with Mari in the Volga region, e.g., *pürt* 'house' < pört. Tatar dialects have exerted strong influence on the lexicon. Words of Arabic and Persian origin have mostly entered Chuvash via Tatar, but certain words were borrowed already in the Volga Bulgar period. Words of Mongolic origin have also mostly been copied from Tatar, such as *tăxta-* 'to wait' < *tuqta-* 'to stop'. There are numerous Russian loans, including xaśat 'newspaper' < *gazeta* and *kĕneke* 'book' < *kniga*. There are also many lexical elements of unknown origin.

Dialects

Modern Chuvash has two main dialects. Viryal, the 'upper' dialect, is spoken in the northern and northwestern parts of the Republic. Anatri, the 'lower' one, is spoken in the south. In the center and northeast, there is found a transitional dialect that is rather close to the lower dialect. The differences between the dialects are small. Standard Chuvash is based on Anatri dialects. Chuvash speakers living outside the Republic also speak Anatri dialects. Vowel harmony is less consistent in Standard Chuvash and Anatri than in Viryal. Tatar loans are more common in Anatri, whereas Mari and Russian loans are more common in Viryal.

See also: Altaic Languages; Russian Federation: Language Situation; Turkic Languages.

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Relevant Website

http://www.turkiclanguages.com – Website with many Turkic language resources.

Circum-Baltic Area

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The Circum-Baltic area comprises primarily Baltic, Germanic, and Slavic languages within Indo-European; Finnic and Saami within Uralic/Finno-Ugrian; as well as the Indo-Aryan language(s) Romani and the Turkic languages Tatar and Karaim. Since time immemorial it has been an arena for intensive linguistic contacts, but it has never been united, either linguistically, politically, economically, or culturally. Following Jakobson, linguists have suggested various partly overlapping Sprachbünde here. However, the notion of Sprachbund is hardly applicable to an area of such historical and linguistic complexity, with many layers of micro- and macrocontacts and mutual influences superimposed on each other over a long period of time.

The Circum-Baltic Area: The Historical, Geographical and Sociocultural Background

The region around the Baltic Sea has been inhabited by man at least since the end of the last glacial era (around 8000 B.C.). In historical times, it has mainly been the home for languages from two linguistic stocks: Indo-European (Baltic, Germanic and Slavic languages) and Uralic/Finno-Ugrian (Finnic and Saami). In addition, three 'exotic' languages have been used in the area for a considerable time: the Indo-Aryan language(s) Romani and the Turkic languages Tatar and Karaim. The exact delineation of the 'Circum-Baltic area' (CB area) and list of the 'Circum-Baltic languages' (CB languages; both terms launched in Dahl and Koptjevskaja-Tamm, 1992 and further developed in Dahl and Koptjevskaja-Tamm, 2001) are open to discussion. At least the following languages can count here (see also Figure 1):

- Indo-European
  - Germanic
    - West: High German, Low German, Eastern Yiddish
    - North: Danish, Swedish, Dalecarlian, Norwegian
  - Baltic: Latvian, Lithuanian
  - Slavic
    - West: Polish, Kashubian
    - East: Belarusan, Russian
  - Indo-Aryan: Romani
- Finno-Ugrian
  - Finnic: Estonian, Finnish, Ingrian, Karelian, Ludian, Olonetsian, Veps

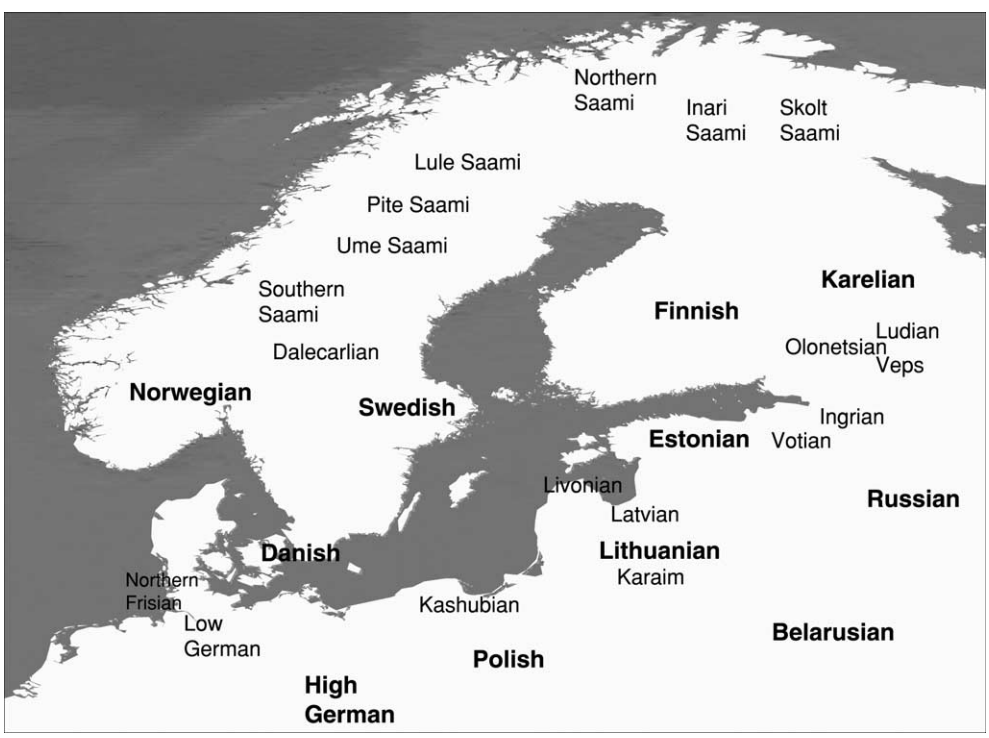

Figure 1 The Circum-Baltic languages. Nonterritorial languages (Romani, Yiddish, Tatar) not shown.

Saami: Southern S., Ume S., Pite S., Lule S., Northern S., Inari S., Skolt S.
Turkic: Karaim, Tatar

The list does not contain extinct languages – e.g., Polabian (Slavic); Old Prussian, Jatvingian, Curonian, and Galindian (Baltic) – and ignores the dialectal variation. Dalecarlian (*egentligt dalmål*), however, is treated here as a separate language, or a chain of languages, as opposed to its traditional inclusion among the Eastern Swedish dialects. 'Dalecarlian' refers to the highly conservative Scandinavian vernaculars that are spoken in the Swedish province of Dalarna (Dalecarlia) and are not comprehensible to speakers of Standard Swedish.

The CB area was settled via numerous migrations; among others, the northward expansion of groups of Indo-Europeans, and much later the Slavic northward expansion to the former Baltic and Finnic-speaking regions. Archaeologists, geneticists, and linguists all claim to trace back the two language stocks in the area at least to the 2nd millennium B.C., even though they disagree on who of the Indo-Europeans or Finno-Ugrians were the first ones where. Finno-Ugrians and Indo-Europeans were engaged in multiple contacts already in prehistoric times, both outside and within the CB area. Some of these contacts must have taken place in extensive bilingual areas; otherwise it is hardly possible to explain the huge number of Baltic and Germanic loanwords in Finnic, including even kinship terms and names for body parts.

Although the CB area has been an arena for intensive contacts since time immemorial, it has never been economically, politically, culturally, or linguistically united. The contacts, both peaceful and military, have been achieved both across the sea and by land. Movements across the sea normally involve fewer people than those on land, either tradesmen, missionaries, warriors, or colonizers, and there is a smaller chance that the newcomers will 'sweep' through the area. Also, coastlines and numerous islands often serve as refuges for the languages pushed from the inland by expanding ones.

The CB area has been constantly divided and redivided among different spheres of influence. Thus, the period of 800–1000 meant expansive activities of the Scandinavian Vikings and the emergence of the Scandinavian, Polish, and Russian states, each with its own sphere of dominance. The period of 1100–1500 witnessed Denmark's expansion, the crusades and the establishment of the Teutonic Order states in Northern Baltikum, the dominance of the Hanseatic league, and the expansion of the Polish and Lithuanian states, later of the Polish-Lithuanian state. In later times, the area went on being repartitioned among powers such as Sweden, the Polish-Lithuanian Commonwealth, Prussia (later Germany), and Russia (later the Soviet Union). Each of the dominant powers brought with it a new prestige language (Danish, Low German, the Eastern Slavic variety used in the Grand Duchy of Lithuania, Polish, Russian, Swedish and German) that expanded over a large area and influenced the local languages. The three main religions in the area – Catholicism, Lutheranism, and Greek Orthodoxy – have also considerably shifted their spheres of dominance over time.

Contact Phenomena within the CB Area

There is an old tradition of studying contacts among the languages around the Baltic Sea which mostly concentrated on loanwords. R. Jakobson (1931/1971) was the first to apply the term 'Sprachbund' to the languages of the CB area. He suggested that several languages spoken around the Baltic Sea together built a 'phonetic' Sprachbund. These included Baltic, two South Finnic languages (Livonian, Estonian), Mainland Scandinavian (except for an area in the west of Norway and for most of the Swedish dialects in Finland and in Estonia), Northern Kashubian, and the Germanic varieties spoken in the Cologne-Trier area (Central Franconian and Limburgian), i.e., outside of the CB area proper. Their common property is lexical, or pitch accent (i.e., tonal oppositions in addition to stress), which in Danish corresponds to the opposition between syllables with and without a glottal closure, *stød*. However, although the CB languages show a very high concentration of lexical accents in Europe, and probably also globally, there is no evidence for any real connections here, primarily, between the Scandinavian languages, on the one hand, and Baltic and South Finnic, on the other hand (Lehiste, 1988; Koptjevskaja-Tamm and Wälchli, 2001).

Later research has suggested several partly overlapping Sprachbünde in the CB area, with two main hotbeds of areal phenomena. The first is the Latvian–Livonian–Estonian zone stretching in different directions over the Baltikum and further – the 'Peipus-Bund' (Décsy, 1973); the 'Baltischer Sprachbund' (Haarmann, 1970; 1976); the 'Convergence zone in the Baltikum' (Stolz, 1991; see also Falkenhahn, 1963); and the second is the Eastern Finnic–Northwestern Russian (–Baltic) core – the 'Eastern Baltic Sprachbund' (Mathiassen, 1985a, 1985b) and the 'Karelian Sprachbund' (Sarhimaa, 1999).

The core in each zone has been a mixed bilingual or multilingual area over long periods of time with complex local contacts leading to assimilation, acculturation, language convergence and/or language shifts. Thus, a strong Finnish substrate is generally

recognized in Latvian, especially in its northeastern dialects, covering the area originally inhabited by Livonians. Livonian itself is at present spoken by a few dozen speakers and is largely influenced by Latvian. Northern Russian has a number of features generally attributed to the Finnic substrate and, primarily, to contacts with the smaller Finnic languages (Ingrian, Karelian, Ludian, Veps, and Votian). The latter languages are now on the verge of extinction or, in the case of Karelian, are mainly used as one part in bilingual mixed codes (Sarhimaa, 1999).

In addition, the CB area partially overlaps with two other suggested convergence zones including, first, Scandinavian–Celtic–Northern Finnic–Saami–the 'Wikinger-Bund' (Haarmann, 1976), and second, Polish–Kashubian–Belarusan–Ukrainian–Lithuanian–the 'Rokytno-Bund' (Haarmann, 1976), or the 'Baltic-Slavic contact area' (Wiemer, 2004; see also Falkenhahn, 1963).

The abundance of different Sprachbünde in the CB area rests partly on a fairly vague understanding of the term. The CB area shows many layers of micro- and macrocontacts and mutual influences superimposed on each other over a long period of time, and the term 'Sprachbund' hardly does justice to an area of such historical and linguistic complexity (Nau, 1996; Koptjevskaja-Tamm and Wälchli, 2001).

The crosslinguistically most striking isoglosses in the CB area are mainly found in its eastern part and include the following (for details, see Koptjevskaja-Tamm and Wälchli, 2001).

1. The alternation between the accusative and the genitive (in Baltic and Slavic) or the partitive (Finnic) case marking differentiates between high transitivity and low transitivity objects, or 'total' vs. 'partial' objects. The details and the relevance of this distinction are subject to a considerable crosslinguistic variation, where Finnic and Standard Russian show the most vs. the least grammaticalized system. The factors underlying this distinction include polarity of the clause (affirmative vs. negative), as in example (1) from Polish, aspect, affectedness of the object, etc. *see* also **Partitives**.

(1) Polish
a. Widzi-my **gwiazd-ę.**
see.PRES-1PL ***star***-ACC
'We see a/the star.'
b. Nie widzi-my **gwiazd-y.**
NEG *see*.PRES-1PL ***star***-GEN
'We do not see a/the star.'

2. Less canonical subjects can sometimes be marked with the genitive (in Baltic and Slavic) or the partitive (Finnic) case. Again, the most grammaticalized system is found in Finnic, where the partitive case consistently marks subjects in existential clauses, as in example (2) from Finnish, and in semantically related clause types. The partitive case is particularly preferred if the clause is negated and the subject refers to a quantitatively nondelimited entity. Roughly the same two conditions govern the choice between the nominative and the genitive case marking on Baltic and Slavic existential subjects, but on a significantly more restricted scale, with the most grammaticalized distinction found in northwestern Russian.

(2) Finnish
a. **Kirj-at** o-vat pöydä-lla.
book-NOM.PL *be*.PRES-3PL *table*-ILLAT
'The books are on the table.'
b. Pöydä-llä o-n **kirj-oja.**
table-ILLAT *be*.PRES-3SG ***book***-PART.PL
'There are (some) books on the table.'

3. In several constructions in Finnic, Baltic and Northern Russian (both Old Northern Russian and modern northwestern dialects), the object appears in the nominative case and not in the accusative. One common context, illustrated in example (3) from northwestern Russian dialects, is provided by an infinitival clause functioning as the subject of a necessitive matrix predicate. The Latvian correspondence to such clauses involves the so-called Debitive Mood, also with the object in the nominative. The set of nominative–object constructions differs greatly across the languages. Thus, while nominative objects in Northern Russian and Lithuanian are normally restricted to clauses with clearly nonfinite predicates (infinitives and converbs), Finnic requires, in addition, nominative objects in imperative clauses and clauses with impersonal passives. It has been suggested that the common denominator of all these contexts is their systematic lack of an overt personal subject (Timberlake, 1974).

(3) Northwestern Russian dialects
a. Topim **pečk-u.**
heat.PRES.1PL ***oven***-ACC
'We are heating the oven.'
b. Nado/ Pora topit' **pečk-a.**
it-is-necessary/ it-is-time heat.INF ***oven***-NOM
'It is necessary/It is time to heat the oven.'

4. Finnic, Baltic, and Slavic display double (or sometimes multiple) options in the case marking of predicate adjectives and nominals. The choice between the nominative and some oblique case, e.g., the instrumental in example (4) from Lithuanian, can roughly be described as correlating with the distinction between time-stable and temporary situations respectively (Stassen, 2001).

(4) Lithuanian
a. Jis yra **mokytoj-as.**
he.NOM *is* ***teacher***-NOM
'He is a teacher.'
b. Jis buvo **mokytoj-u.**
he.NOM *was*.3SG ***teacher***-INSTR
'He was (working as) a teacher.'

5. In Finnic and most Slavic, most cardinal numerals higher than one alternate between case-governing and agreeing with their complements under well-defined syntactic conditions. As example (5) from Russian shows, when the numeral is in one of the direct cases (nominative or accusative), the complement appears in the genitive (or in the partitive in Finnic). Otherwise, both the numeral and the complement are in the same case (here, in the dative). In Baltic, the two properties are primarily associated with different sets of numerals, which is more common both crosslinguistically and within Indo-European.

(5) Russian
a. Ja vižu **pjat'** **stakan-ov.**
I.NOM *see*.PRES.1SG ***five***.NOM/ACC ***glass***-GEN.PL
'I see five glasses.'
b. Ja priš-l-a **s** **pjat'-ju** **stakan-ami.**
I.NOM come-PAST-F.SG ***with*** ***five***-DAT ***glass***-DAT.PL
'I came with five glasses.'

6. Estonian, Livonian, Latvian and Lithuanian use special 'evidential' verb forms for marking that the speaker's factual claims are based on indirect evidence, rather than on direct, or attested evidence (evidential, quotative, relative or oblique mood). These are basically nonfinite verb forms, primarily participles, sometimes 'frozen' in an oblique case: thus, *-vat* in example (6) from Estonian is historically the partitive case form of the present participle.

(6) Estonian
Sina **rääki-vat** saksa keel-t.
you(SG).NOM *speak*-QUOT *German language*-PART
'You are said to speak German; they say you can speak German.'

An isogloss connecting Scandinavian, Baltic, and East Slavic languages is the expression of certain verbal voice functions (reflexive, reciprocal, anticausative, passive) by means of verbal postfixes, i.e., affixes in the last position of a word, following, e.g., tense/aspect and agreement markers. These affixes have all developed due to coalescence between the main verb and permutable reflexive and reciprocal pronouns (*-s/-st* in Scandinavian, *-s* in Baltic, and *-s'/-sja* in East Slavic).

Conclusion

Significantly, there are no isoglosses covering all the CB languages; moreover, the isoglosses pick up different subsets of the languages, in many cases also extending outside of the CB area proper. In the CB area, convergence works primarily on a microlevel and reflects language contacts of groups of people and, maximally, of two or three languages. Convergence comprising more than two or three languages seems always to be the result of the overlapping and superposition of different language contacts. In some respects, the CB region forms a border zone between the Central Eurasian languages in the east and the Standard Average European languages in the west.

See also: Belarus: Language Situation; Case; Contact-Induced Convergence: Typology and Areality; Denmark: Language Situation; Evidentiality in Grammar; Finland: Language Situation; Germany: Language Situation; Jakobson, Roman (1896–1982); Latvia: Language Situation; Lithuania: Language Situation; Norway: Language Situation; Numerals; Partitives; Poland: Language Situation; Sweden: Language Situation; Tone: Phonology.

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Cladistics

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Cladistics is an approach to classification initially introduced for animals and plants. When we consider how close two or more species are to one another, 'close' can mean two different things. In a phenetic classification, what matters is surface similarity: this might mean what animals look like, or how they behave. Phenetic methods seek to measure the distance between species, regardless of cause. Cladistic classifications, however, are based on identifying natural groups, which share characters derived from a common ancestor. Cladistics therefore seeks to recover the shared history of a group of organisms.

Three dangers occur in cladistic classification that are less problematic for phenetics.

- The same character might arise in two or more species by convergent evolution: often, this means the same environmental pressures have led to parallel solutions. Animals with white coats in winter do not necessarily share a single, recent common ancestor; but they probably live in similarly cold conditions for part of the year. Several different mutations may also lead to the same endpoint in different species, especially if systems are intrinsically limited in permitted variability: in DNA, there are only four bases (A, C, G, and T), so that over a long period, multiple mutations at the same site may well result in a C, regardless of starting states and histories. Both forms of convergence are known as homoplasy.
- Contemporary species may also exhibit shared retentions from a distant common ancestor. If several groups have lost a feature, it may be taken as indicating greater closeness than is historically the case between the groups that happen to retain it. For example, egg-laying has been retained in both monotremes (like the duck-billed platypus) and birds; but this tells us nothing about the closeness of the historical relationship between the two groups. Monotremes, historically speaking, are definitely mammals, though other mammals no longer lay eggs.
- The final difficulty does not generally hold at the species level, but at the population level. Within a species, interbreeding between groups and consequent genetic interchange can lead to shared features, though these are a result of recent history, not signals of common ancestry.

Cladistics, because it seeks explicitly to recover the histories of groups, cannot treat all features as equal, since it would then be calculating distance only, and would fall prey to the difficulties outlined above. Instead, it is essential to identify and prioritize shared, derived features, or synapomorphies.

Both cladistic and phenetic methods can be relevant to language. In constructing family trees, we are doing cladistics, since here we attempt to prioritize shared, derived linguistic features. Typological comparison, on the other hand, is essentially phenetic, if the distribution rather than the source of features is the main issue. When conducting cladistic language classifications, it is important to remember the three problems raised above for biological cladistics, since in language too we face homoplasy, or parallel developments; shared retentions in some languages that have been lost in others; and borrowing. It follows that linguistics may also benefit from the investigation and adoption of computational methods

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- The final difficulty does not generally hold at the species level, but at the population level. Within a species, interbreeding between groups and consequent genetic interchange can lead to shared features, though these are a result of recent history, not signals of common ancestry.

Cladistics, because it seeks explicitly to recover the histories of groups, cannot treat all features as equal, since it would then be calculating distance only, and would fall prey to the difficulties outlined above. Instead, it is essential to identify and prioritize shared, derived features, or synapomorphies.

Both cladistic and phenetic methods can be relevant to language. In constructing family trees, we are doing cladistics, since here we attempt to prioritize shared, derived linguistic features. Typological comparison, on the other hand, is essentially phenetic, if the distribution rather than the source of features is the main issue. When conducting cladistic language classifications, it is important to remember the three problems raised above for biological cladistics, since in language too we face homoplasy, or parallel developments; shared retentions in some languages that have been lost in others; and borrowing. It follows that linguistics may also benefit from the investigation and adoption of computational methods

from biology that seek to assist in determining best trees, and in diagnosing features that are inconsistent with such trees (Ringe *et al.*, 2002; McMahon and McMahon, 2003).

See also: Contact-Induced Convergence: Typology and Areality; Historical and Comparative Linguistics in the 19th Century; Language Change and Language Contact.

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Herbert H. Clark has been one of the most important psychologists within the community of linguists, psychologists, and other cognitive scientists interested in language use. His influential research, pursued with a number of colleagues over the years, has focused on the role of shared knowledge in linguistic communication and has been extremely important within his core fields of psychology of language and psycholinguistics. In addition, connections with Stalnaker's notion of Common Ground and analysis of presupposition (Stalnaker, 1974, 1978) helped his work to become influential in semantics and pragmatics (e.g., Heim, 1982); meanwhile, his interest in detailed analyses of interaction brought his work into close contact with discourse analysis.

Clark did his undergraduate work at Stanford and his graduate work at Johns Hopkins, receiving his Ph.D. in 1966. He briefly taught at Carnegie Mellon before returning to Stanford in 1969, where he has been Professor of Psychology since 1969. He has spent time as a visiting scholar at University College, London, and the Max Planck Institute for Psycholinguistics in Nijmegen.

See also: Pragmatics: Overview; Psycholinguistics: Overview.

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Class Language

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The relationship between language and social class is a key theoretical and empirical issue in critical discourse studies, ethnography of communication, and sociolinguistic research. It has been a focal point for postwar and current policy in language planning, and language and literacy education. The central questions of a class analysis of language were stated in Mey's (1985) proposal for Marxian pragmatics: 'Whose language' counts? With what material and social consequences? For which communities and social groups? Central concerns are how language factors into the intergenerational reproduction of social and economic stratification, and how communities, families, schools, the media, and governments contribute to "linguistic inequality" (Hymes, 1996). Yet current research continues to table and debate contending definitions of language and social class as social and economic phenomena.

Marx viewed language as an intrinsic characteristic of human 'species being,' as a form of mental and material labor. The "language of real life," he argued, is "directly interwoven" with "material activity and... mental intercourse" (Marx and Engels, 1845/1970: 118). This "mental production" is "expressed in the language of politics, laws, morality, religion, metaphysics etc. of a people." 'Sense experience,' the work of the eye and ear, was the basis not only of science, but of communal and social life (Marx, 1844/1964: 160–166). At the same time, Marx's (Marx and Engels, 1845/1970: 37) classical definition of ideology as a 'camera obscura' established the centrality of language in the distortion and misrepresentation of social and economic reality in social class interests (*see* **Marxist Theories of Language**).

Marxist theory establishes three critical traditions in the analysis of language and class. These are: (1) the analysis of language as a form of class-based social action and consciousness; (2) the analysis of social class and linguistic variation; and (3) the analysis of language as the medium for power and control, ideology, and truth in specific linguistic and capital markets (*see* **Power and Pragmatics**).

Language as Social Action and Class Consciousness

The prototypical class analysis of language was undertaken by Voloshinov (1973) (*see* **Voloshinov, V. N. (ca. 1884/5–1936)**). Language was conceptualized as a marker of class consciousness and a medium of class struggle. According to models of heteroglossia and 'multivocality,' each utterance and text is a revoicing of previous historical speakers and writers. The ideological content and social functions of each speech act or speech genre bear their own material historical origins. That is, they are produced and reproduced by and through social and economic "conditions of production" (Fairclough, 1992). By this account, face-to-face language exchanges are instances of class conflict and ideological difference, where class-located social actors bring to bear distinctive material interests and discourse positions. The point of such analysis is to extend the notion of the situated speaking and writing subject, to a closer sociological and economic analysis of that positionality. Contemporary work in critical discourse analysis supplements class analysis with attention to the linguistic construction of gender, race, sexual preference, and other forms of social identity ideology, and position (e.g., Lemke, 1995).

If utterances and their use are indexical of ideology and social class consciousness, what might this mean for differing cultural groups, communities, and their historical practices? Following Vygotsky (*see* **Vygotskii, Lev Semenovich (1896–1934)**), Luria (1982) argued that the cognitive uses of the 'tool' of language were mediated by one's social relations, cultural practices, and material conditions. In his studies of the Uzbeks, Luria made the claim that particular forms of cognition and consciousness, what Marx referred to as capacity for the "production of ideas," were linked to cultural practices and material conditions of tool use. The cognitive affordances of language and literacy are mediated by material economic and social conditions, including class location and cultural history.

In contemporary literacy theory, Paulo Freire also argued for the direct links between language and social class consciousness. Freire's (1972) prototypical work was concerned with the effects of literacy education upon the language and consciousness of the indigenous population and peasantry of postwar Brazil. Bringing together Marxist dialectics with liberation theology, he argued that autocratic governments and education systems constituted "cultures of silence" where marginalized populations were educated in ways that misnamed and misrecognized the world. Freire's work views ideologically distorted language as a mode of class-based false consciousness.

For Freire, critique of class consciousness was achieved through an educational process of 'renaming'

the world in ways that demystified power, consciousness, and life, a similar agenda to that of Mey (1985), Chouliaraki and Fairclough (2001) and other contemporary critical linguists. Current agendas for the teaching of 'critical literacy' and critical discourse analysis stand in this Marxist tradition, focusing on the demystification, critique, and reconstruction of ideological language (Luke, 2004).

Linguistic Variation and Social Class

A further concern in the analysis of language and social class is how language variation acts as a marker and instrument of social class, and of racial and other forms of social stratification. A principal concern of sociolinguists in the postwar period has been over the effects of the differential and inequitable spread of economic and social capital on the language minority, postcolonial, and economically marginal communities (Hymes, 1996) (*see* **Minority Languages: Oppression**). The postwar origins of language planning reflect the impact of colonization, decolonization, migration, and geopolitical conflict upon linguistic retention and stability. The flow of global, regional, and national capital visibly impacts upon language loss, use, and retention (Pennycook, 1998). In the postwar period, sociolinguistic and language planning research has engaged with the effects of the unequal spread and distribution of economic capital upon language loss. Yet attempts to theorize and empirically describe the complex reproductive relationships of language and social class have been debated and contested (*see* **Linguistic Decolonization**).

The sociological and sociolinguistic research on U.K. children by Basil Bernstein and colleagues (e.g., Bernstein, 1975) took up this challenge. This work provided an account of the role of language in the institutional production of stratified levels of educational achievement. Bernstein's argument was that working class students spoke a "restricted code," characterized by embedded and literal meanings, limited command of deixis, and thresholds in technical complexity. Middle-class children, he argued, mastered an "elaborated code" which was fitted for educational success and mastery of academic and scientific discourses. These, he argued, were tied to particular forms of early childhood language socialization and family structure (Bourdieu and Passeron, 1992). Bernstein's work was the object of several decades of controversy. Labov's (2001) studies of urban African-American language registers and nonstandard dialects, and Heath's (1983) studies of early class-based language socialization made the case against models of linguistic deficit. Bernstein's model has been defended by systemic functional linguists, who argue that there are indeed elaborated technical registers and contents, specific language domains affiliated with power, some of which particular social classes make explicitly available in early language socialization and educational training (Hasan and Williams, 1996) (*see* **Codes, Elaborated and Restricted (Bernstein)**).

As distinctive sociodemographic speech communities, particular social classes may indeed have different speech patterns, varying in lingua franca, register, dialect, accent, and practices of diglossia (*see* **Multilingualism: Pragmatic Aspects; Register: Overview**). These, further, are affiliated with class-based social ideologies and cultural practices (Fishman, 1991). Ethnographic studies have shown how these variations are made to count in local social networks and institutions (Milroy, 1987). But the social and cultural bases and material consequences of such differences remain localized and contentious. To move past descriptive claims requires a broader sociological theory of social class, of "linguistic markets" (Mey, 1985; Bourdieu, 1992), and of changing media and modes of production and information.

Language as Capital in Linguistic Markets

Classical sociological definitions of social class begin from conceptions of structural economic location and material position. They attempt to define position and power *vis-à-vis* dominant means of production. The tendency of Marxist models is to further affiliate social class with particular 'class consciousness,' of which language, its use and its expression, is a constitutive speech marker. Bourdieu's (1992) sociology began from a view that class position is at least in part structurally determined. But it is also embodied by human subjects in their 'habitus,' the sum total of socially acquired dispositions.

By this account, the bodily performance of linguistic competence is an element of cultural capital. This capital and affiliated forms of embodied taste, style, and ideology, constitute a key marker of one's social class position and mobility. Linguistic capital is deployed in specific social fields, which constitute 'linguistic markets.' Each market, each institutional context, in turn has variable rules and conventions of exchange whereby linguistic competence and literate proficiency in specific languages is valued or not. There, language use – as class marker and tool – has exchange value and power only in relation to other forms of capital, including social capital (e.g., networks, institutional access), economic capital, formal institutional credentials, artifacts, and so forth.

This is a more complex view of the relationship of language and social class. Language matters, as a primary marker of class, gender, culture, training, education, networks, traditions, and ideological consciousness. Yet like post-structuralist theories of discourse, Bourdieu's model viewed language not just as an index or marker of class position, but as reflexively constituting position and identity, power, and categorical social status. In this way, how language marks class, capital, and power is sociologically contingent, rather than determined by the characteristics of linguistic code or class position per se, or the ostensive power of any given utterance, genre, or text (Luke, 1996). This contingency is dependent on the availability of other forms of capital, and the variable, historically shifting norms, rules, and conventions of particular social institutions, fields of knowledge, and linguistic markets (*see* **Discourse, Foucauldian Approach; Poststructuralism and Deconstruction; Structuralism**).

Current Issues

One of the principal critiques of postwar sociolinguistics, ethnography of communication, and functional linguistics was that they lacked a sufficient analysis of power, capital, and conflict. Indeed, sociolinguistic models of 'social context,' 'context of situation,' and 'social network' are often based on structural functionalist models of society and culture. The study of language and social class requires the rigorous analysis of social and economic relations within and between speech communities. Current work on language and social class continues to examine how language represents class consciousness, how it is implicated in ongoing issues of class conflict and cohesion, and how its acquisition and use are central to intergenerational production of social stratification of material and discourse resources.

Language variation, diversity, change, and ideology can be systematically linked to social class. Linguistic performance in text and discourse production does indeed have both symbolic and material exchange value, particularly in service- and information-based economies. But this depends upon the complex local economic and institutional formations of particular speech communities. Bourdieu offered a stronger analytic frame for analyzing how language 'counts' in specific institutional, disciplinary, and knowledge fields, and everyday social contexts. He suggested that issues around 'whose language' counts, which classes have power, require a rigorous socioeconomic analysis. Particularly under conditions of late capitalism and globalization, these sociological and sociolinguistic contexts and conditions are under considerable historical transition and challenge.

As the medium of consciousness and labor, language is entailed in the production of ideology, material goods, and social relations. The move in globalized economies towards information- and discourse-based forms of labor raises a number of key challenges to linguistic and ethnographic studies. First, linguistic, semiotic, and discourse competence will have increased significance in productive labor and consumption, shifting social class relations to means of production. Second, social class location and membership is determined by relations to dominant modes of communication, semiosis, and information (Castells, 2000) as much as it might be defined in classical Marxist terms. Finally, the formation of social class identity, ideology, and speech community have become more complex. They are now strongly influenced by forces of mass culture, media, and globalized information flows.

One of the principal claims of post-structuralist and postmodern theory of the past decade has been a breakdown of essential relationships between discourse and social class as a primary analytic category. It is increasingly difficult to analyze social class formation without due consideration of the complexity of cultural, racial, gender, and religious identity and position. Any analysis of language and social class must engage with this complexity. But indeed, any contemporary analysis of class and intersecting categories must engage with the constitutive place of language, text, and discourse.

See also: Codes, Elaborated and Restricted (Bernstein); Critical Discourse Analysis; Discourse, Foucauldian Approach; Language Planning and Policy: Models; Linguistic Decolonization; Marxist Theories of Language; Minority Languages: Oppression; Multilingualism: Pragmatic Aspects; Poststructuralism and Deconstruction; Power and Pragmatics; Structuralism; Voloshinov, V. N. (ca. 1884/5–1936); Vygotskii, Lev Semenovich (1896–1934).

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Classical Antiquity: Language Study

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As is the case with so many other Western intellectual endeavors, the formal study of language begins in ancient Greece and is transmitted to the modern world by the Romans, but only after the latter have creatively adapted and transformed the linguistic legacy bequeathed to them by their Greek predecessors. The original historical context is the dynamic symbiosis of philosophical speculation and literary experimentation that characterized and helped to define the golden age of classical Greece, but that context changed dramatically over the centuries and ranged from the scholarly ambience of Alexandria to the bilingual reality of Constantinople and from the fledgling philology of early Rome to the monumental tradition of the late Latin *artes grammaticae*. Graeco–Roman language science features numerous noteworthy accomplishments: the obligatory inclusion of vowels in the alphabetic inventory, an achievement of momentous import for the development of literature; the enumeration of four illocutionary forces, what they called sentence-types; the invention of and reliance upon the four *pathē* or transformations (addition, deletion, substitution, permutation) as both heuristic procedures and explanatory devices; the coining of an entire metalanguage (much of which is still in use) to refer to the hundreds of grammatical phenomena they discovered; the canonical definitions of the parts of speech; carefully composed and cogent arguments on the arbitrariness of language and the relationships between *signifiant* and *signifiée*; meticulous and copious descriptions of accidence including, in the case of the Romans, the discovery and identification of the declensions and conjugations that form the keystone of all subsequent Latin grammatical treatises and textbooks; the publication and widespread dissemination of linguistic knowledge throughout both the Greek and Roman worlds via grammatical manuals (*technai*) and tomes (*artes*); and in general the conscious acknowledgment of, and emphasis upon, the central and ubiquitous role of grammar in education and intellectual discourse as well as an unremitting insistence upon scientific rigor in linguistic exegesis. So classical linguistics is much more familiar to modern language scientists than might at first be supposed.

Historiographical Problems

The lamentable loss of so much of ancient grammatical literature has made it difficult to chronicle accurately the course of classical language science: no Stoic linguistic treatise is extant; the dating and authorship of the only surviving Alexandrian grammatical manual have been questioned for centuries; almost all of ancient Rome's early scholarly forays into the study of the Latin language, i.e., Aelius Stilo's

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The lamentable loss of so much of ancient grammatical literature has made it difficult to chronicle accurately the course of classical language science: no Stoic linguistic treatise is extant; the dating and authorship of the only surviving Alexandrian grammatical manual have been questioned for centuries; almost all of ancient Rome's early scholarly forays into the study of the Latin language, i.e., Aelius Stilo's

linguistic analyses of archaic documents, Varro's voluminous corpus, and Palaemon's grammar, are lost; and in extant Roman *artes*, references to otherwise unknown grammars and grammarians are all too frequent. The tendency to ascribe various notions and developments to nonexistent texts and anonymous authors is therefore one of several historiographical problems posed by the vast lacunae in our knowledge. Dichotomies of one sort or another for which there is little evidence abound in the secondary literature – nature and convention, analogy and anomaly, philosophical and technical grammar – and are adduced to provide theoretical links between extant and lost texts in order to chart a cumulative course for the history of grammatical thought in antiquity. More recent research, however, has concentrated exclusively on extant texts and what can be known for sure, has uniformly eschewed weighty and sweeping generalizations, and has concluded that the history of Graeco–Roman linguistics is for the most part a discontinuous one. Episodic such accounts may be, but they are at least faithful to the historical record. Despite the many problems, readable and informative surveys of classical linguistics do exist, e.g., Della Casa (1973), Pinborg (1975), Baratin & Desbordes (1981), Hovdhaugen (1982), Robins (1990), Schmitter (1991), Law (2003).

Such surveys readily reveal that linguistic information can be found almost anywhere, for philosophers, logicians, rhetoricians, historians, philologists, literary critics, even poets, as well as bona fide grammarians, contribute to formulating ancient language science. Moreover, Greeks and Romans neither compartmentalize knowledge nor always broker out grammatical phenomena as we do. They do, however, create a vast array of technical terms, but that terminology is, for much of the time, in the process of evolving and does not become fixed until late in the tradition; consequently many authors employ the language of everyday intellectual discourse, often embellished by notable metaphors, rather than an established metalanguage when articulating their linguistic theories and practices. So both the availability of texts and the contents of those texts pose historiographical problems of some magnitude. What the Greeks and Romans have to say about language and the study of language in those texts is, however, significant and ranks as one of the major intellectual legacies bequeathed to us by classical antiquity. They do, after all, construct the classical foundations of most subsequent language science, and so we can observe firsthand the Western world's earliest attempts to describe scientifically and to study formally what is uniquely human, namely, language. We can also, of course, find striking anticipations of and parallels with later, even modern, linguistics, but we can also encounter equally striking differences in both intellectual attitudes and approaches to the analysis of linguistic phenomena.

From the Origins to Plato and Aristotle

Including vowels in the Semitic alphabet that the Greeks imported and adapted was a stroke of genius and, *inter alia*, allowed the Greeks to commit Homer's orally composed *Iliad* and *Odyssey* to writing. The two processes established the foundation of language science in Greek antiquity, and as a consequence literature enjoys forever a privileged status in the scientific study of language. As literature proliferates, 5th-century Greeks attend consciously to differences in dialect and meter and to errors in morphology (barbarisms) and syntax (solecisms). Protagoras initiates what becomes a hallmark of Greek linguistics, namely, taxonomy: he distinguishes three genders, three numbers, and probably the four *pathē* or transformations; he also identifies four sentence-types (wish or prayer, question, answer, command). Herodotus informs us of an Egyptian experiment to determine the original language, but both monogenetic and polygenetic theories on the origin of language(s) are known. Socrates addresses the existential and equational functions of the copula and the arbitrariness of the sign. The scores of etymologies and the explicit confrontation of conventional and natural explanations for names in the *Cratylus* have attracted far more attention than one would suppose, and the dialogue has its fair share of both critics and admirers. The term *ptōsis* ('inflected form' and later 'case') also appears, but the relationship between its etymological meaning ('a fall or falling') and its grammatical meaning is still puzzling. Plato analyzes and classifies the sounds of Greek reasonably effectively and also establishes once and for all the roles of NP and VP in linguistic thought, though the key passage (*Sophist* 261D–263D) is quite vexing. He begins by referring to *onomata* 'nouns' and *rhēmata* 'verbs' as individual entities but then abruptly treats them in combination as necessary sentential constituents, presumably therefore as 'subjects' and 'predicates'; yet nowhere does he employ *onoma* as 'subject' or *rhēma* as 'predicate.' Nonetheless, he has both defined noun and verb and postulated a fundamental, binary, syntactic structure that necessarily includes the former in one part and the latter in the other. So by the mid-4th century, grammatical knowledge is fairly extensive but also fairly eclectic.

The grammatical sketch in Aristotle's *Poetics* (21) takes us into the realm of more formal linguistic analysis and probably into the schoolroom as well.

Aristotle reprises much of what we already know from Plato but organizes and augments it. He divides letters into vowels, semivowels, and consonants (mutes), and he correctly identifies aspirated stops for the first time. He then defines and describes syllable, conjunction, article, noun, verb, cases (inflected forms of both nouns and verbs), and discourse or speech. These contents clearly manifest an organizational scheme that ultimately becomes traditional in both grammar and education: a hierarchical arrangement of linguistic items (letters, syllables, words, sentences), an embryonic account of selected parts of speech (although, conspicuously, Aristotle does not use and presumably does not know that term), and a rudimentary description of nominal and verbal accidence. Aristotle affirms the conventional view of language, the uniqueness of human language (as opposed to animal sounds), and the priority of speech over writing; formulates more precise definitions by including the feature 'minus tense' in his definition of noun and 'plus tense' in that of the verb; defines metaphor as a semantic *analogia* 'proportion, analogy'; provides a fairly sophisticated and semisyntactic treatment of solecisms; offers better-developed notions of subject and predicate; and formulates a list of ten predicate-types that is as exhaustive as it is ignored by later grammarians. Aristotle's analysis of predicates may not be unrelated to his four parts of speech, for an Aristotelian categorical syllogism essentially requires only nouns, articles, verbs, and conjunctions (his rather open-ended category that includes logical connectors). Aristotle's remarks on innateness strikingly anticipate modern theories that postulate a universal mental language common to all humankind. Greek language science has obviously progressed and expanded its scope of inquiry during the classical period.

Hellenistic Linguistics

The Hellenistic Age (3rd–1st centuries B.C.) features Stoic logic and Alexandrian philology: the former introduces what passes for syntax throughout most of classical antiquity, and the latter establishes literary criticism as the 'noblest part' of grammatical inquiry. Our major sources for Stoic logic, Diogenes Laertius and Sextus Empiricus, are both late (also confused and polemical respectively), and the Alexandrian *Technē* ascribed to Dionysius Thrax may not be completely authentic. It was, however, a remarkably productive period in the history of classical linguistics.

Stoics divide their epistemology into logic (dialectic) and rhetoric and the former into the study of *phōnē* 'sound' and *to sēmainomenon* 'the being signified.' Stoics therefore define language science properly as the relationship between sound and meaning. Under *phōnē* they analyze sounds, letters, parts of speech, grammatical errors (barbarisms and solecisms), poetic diction, verbal ambiguities, euphony, and music; under *to sēmainomenon* they study case, voice, mood, and *lekta* 'sayables.' They increase the number of parts of speech by adding articles and maybe adverbs and by differentiating common and proper nouns, + or – case becomes a defining feature of the major parts of speech, the cases are identified and named, and grammatical terminology proliferates. Arguably the Stoics' most sophisticated linguistic achievement is their analysis of aspect and tense in the Greek verb system, but where and exactly how they do so are still *sub iudice*. Stoic logic privileges *to sēmainomenon*, and the increase in the number of parts of speech is due to the emphasis on logic and *lekta* rather than to any cumulative process or more refined taxonomy.

Lekta, the things signified, are to be distinguished from both the things signifying (sounds) and the things existing (referents); the former are incorporeal, but the latter two are corporeal. Referents aside, logicians often distinguish declarative statements, which can be written or spoken and read or heard and which are therefore corporeal, from propositions, which are what the statements mean or express and which are consequently incorporeal. *Lekta* are either complete or incomplete. Complete *lekta* are yes–no questions, questions requiring a declarative answer, commands, oaths, and, most significantly, propositions (*axiōmata*), i.e., statements that can be affirmed or denied. Stoic logic is therefore propositional logic, and Stoic syntax is the syntax of propositions. Our sources discuss the several types of *axiōmata* and their syntax at length. Incomplete or deficient *lekta* include predicates and, although no text explicitly says so, probably subjects. The Stoic analysis of predicates distinguishes clearly and unambiguously between the incorporeal predicate (*katēgorēma*) and the corporeal verb (*rhēma*) and accordingly treats the former under *to sēmainomenon* and the latter under *phōnē*. Both the structure and the metalanguage of Stoic logicolinguistic thought are remarkably consistent. The complete absence of original Stoic linguistic texts from the historical record is one of the most lamentable losses in intellectual history.

Alexandrian scholars are first and foremost philologists and literary critics: Aristophanes of Byzantium produces epoch-making editions of the *Iliad* and *Odyssey*; Aristarchus invents critical symbols for indicating doubts about the authenticity, repetition, or order of verses, and introduces respect for the authority of manuscript traditions into the history of

scholarship; and Dionysius Thrax becomes famous for his lectures on Nestor's cup (*Iliad* 11.632–37). Numerous commentaries, lexicographical treatises, etc., facilitate and enhance the reading of the now critically edited texts of classical Greece's monumental authors. Though no textbooks are extant, the study of language and literature is obviously at the core of the educational curriculum.

Critical editions and ancillary scholarly texts presuppose a vast reservoir of grammatical knowledge, but whether such knowledge is ever pursued for its own sake is still in dispute. For example, Aristophanes supposedly authors a treatise entitled *Peri Analogias* and adduces five principles, to which Aristarchus adds a sixth, for determining analogy, and so some scholars argue that the Alexandrians actually formulate rules for inflection, declensions, conjugations, paradigms, etc. Yet no extant text contains anything of the sort, and so other scholars argue that the criteria for analogy are much more readily understandable as criteria for emending texts. As Aristotle uses *analogia* as a means of identifying and defining metaphor, so the Alexandrians employ it as a heuristic procedure for correcting poorly transmitted manuscripts. Moreover, no extant Hellenistic text, grammatical or otherwise, testifies to any sort of analogy/anomaly quarrel between Alexandrians and Stoics, as was once supposed. The Alexandrians do, however, dramatically expand the scope of grammatical inquiry in their drive to edit and comprehend literary texts, but unfortunately the one extant grammatical *Technē* that purportedly summarizes their accomplishments in language science raises more questions than it answers.

Both the authorship and the dating of the *Technē Grammatikē* have been questioned for centuries (see Di Benedetto, 1958–59, 1973; and Law and Sluiter, 1995). Moreover, neither the *Technē* nor its author receives contemporary acclaim, and both are more influential later and elsewhere. The text begins as follows (translation from Kemp, 1986):

> Grammar is the practical study of the normal usages of poets and prose writers. Its six divisions comprise: (1) skill in reading (aloud) with due attention to prosodic features; (2) interpretation, taking note of the tropes of literary composition found in the text; (3) the ready explanation of obscure words and historical references; (4) discovery of the origins of words; (5) a detailed account of regular patterns; and (6) a critical assessment of poems; of all that the art includes this is the noblest part.

Dionysius or whoever is clearly thinking of grammar in philological and literary terms. After four brief entries on the first topic, the text switches abruptly to an analysis of letters and syllables, defines word and sentence, then enumerates eight parts of speech, and thereafter devotes itself wholly to defining and exemplifying those parts of speech; none of this (except the four items on reading aloud) follows from any of the six divisions listed in the introductory paragraph. Scholars account for this inconcinnity of contents by assuming that the first five paragraphs are genuine and the remainder spurious. In any case, the contents of the slim volume are hardly exceptional, offering little or nothing beyond the ken of any competent Hellenistic grammarian.

Aristotelian categorical and Stoic propositional syllogisms no longer determine the enumeration of the parts of speech; so Alexandrians are free to focus on the parts of speech (or, more properly, parts of the sentence) in normal literary discourse and therefore arrive at eight such items. The *Technē*'s parts of speech are noun (including both common and proper nouns), verb, participle, article, pronoun, preposition, adverb, conjunction, and this list becomes canonical. The author is addicted to semantic taxonomy – he classifies nouns into 24 subtypes, adverbs into 26, and conjunctions into eight, all on the basis of meaning – but he describes grammatical accidence rather skillfully. The plethora of grammatical terms is impressive: the tiny volume contains about 150 technical terms that will comprise almost the entire Western linguistic vocabulary until well into the 20th century. The definitions of the parts of speech include morphological, semantic, and, at least implicitly, syntactic criteria, but they suffice and so endure for centuries without much elaboration or alteration.

In fine, Alexandrian scholarship privileges textual and literary criticism and the manifold linguistic issues ancillary to such endeavors, and if grammar is not yet autonomous, it is nearly so. Language science now possesses an extensive metalanguage, linguistic levels are clearly demarcated, and the phonological and morphological parameters of linguistic inquiry are well established even if syntax still remains hidden in the dark domains of Stoic logic and/or solecisms (but see Swiggers and Wouters, 2003). The word-class system of grammar instituted by Stoic and Alexandrian language science readily transfers to the Roman world.

Linguistic Theory and Practice in Rome: Varro

Intellectual activity, along with military, political, and economic power, moves westward in the late 1st and 2nd centuries B.C. to Rome. Educated and bilingual Romans are aware of their literary and linguistic

debts to Greece, as early Latin literature abundantly attests. In 168 B.C. or so, Crates of Mallos, a Stoic philosopher, introduces Romans to the formal study of literature and linguistics. (Bits and pieces of his unconventional poetics are beginning to emerge from a papyrus roll discovered in the mid-18th century but only recently edited.) Early Roman language science, however, is decidedly Alexandrian in mode (editions of poetry, commentaries, etymological analyses, interpretations of hymns and legal documents, etc.) but also demonstrably practical and quintessentially Roman in purpose (orthography and spelling reform). Lucius Aelius Stilo (*fl.* 100 B.C.), Rome's first philologist of note, teaches both Cicero and Marcus Terentius Varro (116–27 B.C.), and the latter becomes Rome's most famous scholar.

Varro's intellectual curiosity is all-consuming and his learning vast – he authors at least 74 works – but dearest to his soul is the Latin language. Of the dozen or so major works he authors on language science, however, only six of the original 25 books, i.e., chapters, of his *magnum opus*, the *De lingua Latina*, remain. His eclectic work combines Greek and Latin linguistic thought into a distinctively Roman blend of language science. The books on etymological theory, morphological practice, and syntax are lost, but fragments suggest that Varro's syntax is Stoic, i.e., it deals with propositions. Books 5–6 on etymological practice are an enormous reservoir of cultural artifacts testifying to what Romans think about their own language, and books 8–10 on morphological theory are replete with penetrating observations on the nature of language and linguistic inquiry. Varro's accomplishments in the *De lingua Latina* are numerous: he addresses etymology from a distinctly scientific perspective; distinguishes, for the first time in ancient linguistic thought, between derivational and inflectional morphology; formulates the first embryonic declensions and conjugations in ancient language science; is the first and only grammarian in ancient times to apply abstract models to the articulation and solution of linguistic problems; so creatively adapts the Stoic analysis of the Greek verb to the Latin verb system that he becomes the only Latin grammarian prior to the Renaissance to recognize the future perfect indicative; and even includes syntax in his account of the Latin language. Such achievements arguably establish that Varro is classical antiquity's premier linguistic theoretician.

According to Varro's word-based theory (cf. Taylor, 1974 and 1996), words are of two sorts: those that vary in form, and those that do not. *Declinatio* 'morphological variation' is a linguistic universal and is likewise of two sorts: *declinatio voluntaria* is derivational morphology, and *declinatio naturalis* is inflectional morphology. Varro determines that Latin has four *partes orationis* 'parts of speech': words with case, words with tense, words with both, words with neither. How words vary inflectionally is determined by both their *figura* 'phonological form' and their *materia* 'grammatical substance,' and thus *similitudo* 'linguistic similarity' is a matter of both form and substance (but not meaning). The linguist's task is to identify *similitudo* wherever he can, and *analogia* 'proportion' is his most useful heuristic procedure. Varro utilizes four arithmetical proportions as models of inflection, which allow him to discover both declensions and conjugations. Because he ignores vowel length, his five declensions are not the same as our five, and his conjugations are only three in number; nonetheless he succeeds in identifying, perfectly in theory and almost so in practice, the declensions and conjugations of Latin, and these form the core of Latin grammar forever. Varro's status as a grammarian *par excellence* and the *vir Romanorum eruditissimus* is thus guaranteed, and it is no wonder that he is the most frequently cited source in the Roman grammatical tradition and *ergo* the first authorial figure in the history of Latin linguistics.

Early Roman Imperial Grammar and the Alexandrian Renaissance

During the first two centuries A.D., Rome attracts scholars from all over its far-flung empire who publish extensively on lexicography, orthography, and metrics, but most such texts are lost. The pace of language science accelerates, grammars assume their canonical form, and the now prominent discipline garners attention from emperors and critics alike. Grammarians like Palaemon and Probus are able to specialize on the uninflected parts of speech and the verb respectively and to become sufficiently famous that later works are spuriously attributed to them. Palaemon substitutes the interjection for the article, which Latin lacks, in the Alexandrian list of *partes orationis* and is also credited with authoring the first Roman *ars*. Meanwhile, Greek scholars like Apollonius Dyscolus (cf. Blank, 1981 and Householder, 1981), his son Herodian, and Sextus Empiricus produce influential and innovative works. Apollonian language science dominates Byzantine linguistics, and Priscian's Latin grammar (see below) is heavily dependent upon Apollonius and Herodian. The latter's works have not survived independently but were copiously quoted by later grammarians. Moreover, Apollonius is the first grammarian in ancient times, Greek or Roman, whose book-length works, or at least four of them, have been preserved more or less *in toto* and also the first

formal syntactician in Graeco–Roman linguistics. Sextus, a physician and philosopher, is a skeptical critic not only of grammar, the first of the liberal arts, but of all the arts and sciences.

Quintilian's description (*Institutio oratoria* I, 4–8) of grammatical education in 1st-century A.D. Rome is the most extensive extant Latin linguistic text of the period. Quintilian is not himself a grammarian, but his text is our best source for early imperial grammar. His organizational scheme accords nicely with that of the *ars* in subsequent centuries as well as with what little we know of Palaemon's *ars*, whose pupil he is reputed to have been. Grammarians and their students first study sounds, then word derivation, then the parts of speech, next declension and conjugation, and finally the virtues and vices of speech, particularly barbarisms and solecisms. The tripartite arrangement of the later monumental *artes* – phonology, morphology, *vitia virtutesque orationis* – is therefore present, at least implicitly, in Quintilian's account. The study of phonology is important for reading aloud (the norm in classical antiquity), spelling, and scanning poetry, and the stylistic component presupposes at least some normative grammar. The largest section in Quintilian's educational schema is that on morphology, and it emphasizes the parts of speech, declined and conjugated forms in particular, although Quintilian nowhere classifies nouns and verbs into particular declensions or conjugations and presumably does not know them. Ambiguity interests him, and he adduces (6.1) and discusses at length four criteria for resolving ambiguities and other doubtful grammatical issues: reason (analogy or etymology), antiquity, authority, usage. He criticizes excessive reliance on any one criterion, however, and inveighs mightily against prescriptive analogy and conjectural etymology. Examples are ubiquitous throughout Quintilian's entire account of 1st-century A.D. grammatical education, and they provide fascinating glimpses into the many linguistic questions with which Roman grammarians and their students were grappling at the time. What the Romans do best, however, is to systematize and organize, and as Quintilian's sketch and subsequent *artes* suggest, that is what it appears they do most of all for language study in the early empire.

Apollonius Dyscolus is a rationalist and an analogist: linguistic problems have reasonable solutions, and similar problems have analogous solutions. Language is by nature logical, orderly, and rule governed; any and all deviations from linguistic logic, order, and rule are explicable by reason and analogy; and grammatical analysis is therefore principled behavior designed to discover rules and to explain exceptions. Apollonius assumes an underlying structure for all levels of language. So there is an order to the letters of the alphabet, to the parts of speech, to the cases, and to the sentence. Letters combine into syllables, syllables into words, and words into sentences, but constraints obtain; therefore none of these processes is random. Change (*pathos*) affects each level, however, and Apollonius analyzes change as addition, deletion, substitution, and transposition, i.e., the four transformations or the *quadripartita ratio*. Just as words are subject to *pathos*, i.e., are misspelled, and are corrected by the theory of spelling, so too sentences may consist of improperly combined *noeta* 'meanings' (Apollonius is also a mentalist) and are to be corrected by syntactic theory. He decomposes complex syntactic structures with subordination into synonymous but coordinate simple structures and analyzes elliptical constructions on the basis of complete ones. Apollonius's insistence on an underlying structure to phonology, morphology, syntax, and semantics is remarkably forward-looking and allows him to stress *katallēlotēs* 'grammaticality' and to seek such structures where they are not overtly apparent. Sextus Empiricus could not disagree more. For him, a science of grammar is simply not possible, and he therefore debunks Stoic and Alexandrian grammatical doctrines alike with impartial glee. In so doing, however, Sextus provides precious information, albeit negatively expressed, about both Stoic and Alexandrian linguistic thought. He also proves himself a keen observer of both diachronic change and synchronic variation. He reports quite accurately that *oi*, *ei*, *ou*, and *ai* are no longer diphthongs, that *zeta* is now simply [z], and that the aspirated stops *phi*, *theta*, and *chi* have become continuants. He also stresses the role of style, register, or idiolect and how it varies from speaker to speaker or from speech act to speech act. Of course, Sextus adduces such observations in order to argue, *pace* his predecessors, that neither analogy nor usage, separately or in tandem, can establish correctness in speech. We know little about either Apollonius (e.g., why he was called Dyscolus 'ill tempered') or Sextus (e.g., where he lived), but together they constitute the last chapter in the history of ancient Greek linguistics.

The Roman *Ars Grammatica*

In late antiquity, grammar is the undisputed queen of the sciences: the sheer quantity of grammatical texts dwarfs that of the preceding centuries taken collectively; numerous grammarians are represented in the corpus of extant texts; many others who are otherwise unknown are mentioned in those texts; and grammarians everywhere enjoy a status in society that guarantees them respect and remuneration.

Unfortunately, few texts have been edited properly, and we must therefore depend for the most part upon Keil's eight mammoth but outdated volumes (1857–1880). Worse, prosopography is often chaotic, footnoting either casual or conspicuous by absence, and plagiarism rampant. Extant *artes* range from textbooks to reference grammars, their authors include amateurs as well as professionals, and even a new genre, the grammatical commentary, emerges. Thus, contents vary widely from favorite themes to areas of expertise, methods comprise the purely formal and the heavily semantic (sometimes both in the same text), and elaborate taxonomies abound. Despite such diversity these *artes* nonetheless manifest an apparent uniformity that obfuscates their authors' occasional forays into independent thought. Therefore determining with precision the historical course of progress, dependence, influence, and innovation is virtually impossible, but the wealth of information in these copious *artes* is undeniably vast. Phonology, spelling, orthography, metrics, the *partes orationis* and their accidence, declensions, conjugations, comparison, *vitia virtutesque orationis*, even syntax, and countless other topics all receive their due and more, and grammarians ruthlessly mine both pagan and Christian texts for relevant literary examples.

Sacerdos (3rd century A.D.) authors the first extant *ars*, but it is in the next century that grammar proliferates and rises to prominence. Charisius regularly exercises his own judgment as he reviews and critiques Roman grammatical literature; Diomedes can be unduly influenced by Greek sources one moment but quite independent, even radical, the next; and Donatus, the teacher of St Jerome and the most famous and influential contemporary grammarian, produces two classics, his *Ars major* and *Ars minor*. The latter is a series of questions and answers concentrating exclusively on the parts of speech and testifying to the preeminent place of morphology in Latin grammar, whereas St Augustine reprises much of Stoic linguistics in his *De dialectica*. Contrastive linguistics looms larger as both the Roman empire and grammar become bilingual, a fact much in evidence in the grammatical works of Marius Victorinus, Macrobius, and Dositheus. The 5th century features equally frenetic grammatical activity. Consentius and Phocas limit their *artes* to the noun and verb: both take a deductive approach to Latin grammar, but the former emphasizes definitions and explanations in the manner of schoolbooks while the latter produces a *regula*-type grammar heavy on rules, paradigms, and examples. Servius, Cledonius, and Pompeius inaugurate the new genre of grammatical literature by commenting on the texts of Donatus. Martianus Capella's bizarre fantasy on the marriage of Mercury and Philology ranks the *ars grammatica* as the first of the *artes liberales* just as Varro's *Disciplinae* had done more than a half-millennium previously.

Priscian's *Institutiones grammaticae* (5th–6th century A.D.) constitutes the stunning and surprising culmination to the history of Graeco–Roman language science. Priscian is a data-oriented grammarian who devotes his first 16 books to morphology; examples and literary quotations by the thousands enhance some of the most extensive morphological analyses in the entire history of linguistics. (His abridged treatise on the noun, pronoun, and verb becomes a pedagogical classic.) Semantics reigns supreme in his linguistic theory, however, for Priscian is heavily dependent upon Apollonius Dyscolus, as befits a grammarian writing in Constantinople. Priscian devotes books 17 and 18 to syntax, the first such study in all of Roman language science. He relies on Apollonius for theory, form, content, and methodology, and thus reason, analogy, order, and, obviously, semantics figure prominently everywhere. He cites Apollonius repeatedly and even recasts in Latin Apollonius's famous analogy between spelling and syntax. Like his Greek predecessor, Priscian decomposes complex structures into simpler ones and analyzes ellipses on the basis of complete constructions. Especially noteworthy, are Priscian's analyses of the ablative absolute, gapping, the passive transformation, and impersonal verbs. Priscian's work is so significant that it is transmitted in more than a thousand manuscripts, and his syntax so striking that books 1–16 and books 17–18 are often separately entitled *Priscianus major* and *Priscianus minor*, respectively. Priscian's supreme achievements in morphology and syntax are difficult to assess in detail, for even now we still "have no extensive study of him nor even a satisfactory philological edition of his work" (Hovdhaugen, 1982: 105); nonetheless his *magnum opus* stands as the consummate swan song to ancient language study.

Conclusion

Western intellectual history would not be the same without the contributions of classical antiquity's language scientists, for individually and collectively the grammarians of Greece and Rome lay the foundations and chart the course for the formal study of language in the future. Their claims on originality are considerable; the four transformations, parts of speech, grammatical terms by the score, the word-class system, word-and-paradigm grammar, sign and referent, and dozens of other linguistic matters first articulated in Greece or Rome are still with us

today. Plato and Aristotle begin the lengthy process of identifying the fundamental constituents of language, Stoic logic remains *au courant*, the *Techne*'s taxonomic and terminological influence is indisputable, Varro's revised declensions and conjugations are the permanent heart and soul of Latin grammar the world over, Donatus's *artes* are centerpieces of grammatical literature and educational curricula, and Priscian's syntactic analyses have found their way into modern textbooks. The history of Graeco–Roman language science is not always as well documented as we would like, but what is extant not only testifies to one of the longest-lasting intellectual legacies in the Western world but also continues to inspire and inform its modern practitioners.

See also: Apollonius Dyscolus and Herodian; Architecture of Grammar; Aristotle and Linguistics; Aristotle and the Stoics on Language; Diogenes the Babylonian (ca. 240–152 B.C.); Dionysius Thrax and Hellenistic Language Scholarship; Ellipsis; Europe Alphabets, Ancient Classical; Grammar; Greek, Ancient; Hippocrates: Theory of the Sign; Historiography of Linguistics; Latin; Linguistic Terminology; Logic and Language: Philosophical Aspects; Plato and His Predecessors; Pliny the Elder (23–79 A.D.); Priscianus Caesariensis (d. ca. 530); Quintilian (ca. 30–98 A.D.); Roman *Ars Grammatica*; Sextus Empiricus (fl. 200 A.D.); Varro, Marcus Terentius (116–27 B.C.); Word Classes/Parts of Speech: Overview.

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Classical Tests for Speech and Language Disorders

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Introduction

The evaluation of speech and language is one of the most important tasks of speech-language pathologists and professionals from a variety of disciplines and backgrounds (neuropsychologists, physicians, nurses, etc.). The assessment session is often the first contact with clients and also constitutes the starting point of all clinical interventions. Because of the absence of biological markers or simple assessment methods, the early detection or diagnosis of speech and language problems remains dependent on various indirect assessments (i.e., speech or language functioning must be inferred from the client performance in various tasks devised to explore the different areas of this functioning) performed to identify specific impairments and eliminate other possible causes.

There are various purposes to conduct speech-language assessments. The main goal of screening is to determine whether a client has a problem or not. The output of this type of assessment is a 'pass' or 'fail' result, based on an established criterion that could lead to a more extensive or a follow-up assessment. Diagnosis and differential diagnosis assessments are usually performed to label the communication problem and/or to differentiate it from other disorders in which similar characteristics are usually reported.

Another important purpose to evaluation is to provide clinicians with a detailed description of the client's baseline level of functioning in all areas of communication in order to identify affected and preserved components, to plan for treatment, to establish treatment effectiveness, or to track progress over time through periodic re-evaluations. These types of assessment require the clinician to consider all aspects of communication, including the different areas of speech (e.g., articulation, voice, resonance) and language (e.g., lexical access, comprehension, written spelling), but also important related abilities and components such as pragmatics, cognitive functions (e.g., attention, memory, visual perception), emotions, awareness of deficits, etc. The selection of evaluation tools is also conditioned by the specific objectives of assessments. Screening for a speech or language disorder is usually performed with standardized screening measures whereas standardized norm-referenced tests are used for diagnosis and differential diagnosis assessments as well as for clinical treatment purposes (baseline, effectiveness, progress).

Reference Models for the Assessment of Speech and Language Impairment

The choice of a particular method of assessment, the selection of evaluation tools as well as the interpretation of results, is highly dependent not only on the clinician's own conception of speech and language functioning but also on the reference to a clinicopathological or cognitive model of assessment.

In the clinicopathological model, speech and language problems are considered as essential characteristics of clinical syndromes. These clinical syndromes are organized and classified according to neurological-neuropathological characteristics (e.g., deterioration of cortical tissue in a specific brain area) and according to semiology (e.g., sensitive and motor deficits, visuospatial deficits, language deficits, etc.). For the purpose of assessment, the emphasis is put on the precise identification of the diagnostic label that best corresponds to the observed deficits as well as to the identification of the possible etiology. For example, within this model, the general assessment process of an aphasic person essentially consists of (1) gathering case history data (e.g., cerebrovascular accident in the left frontal area), (2) administrating a specific test battery (e.g., the Boston Diagnostic Aphasia Examination [BDAE]; Goodglass *et al.*, 2000), (3) confronting the results and description of behavior (e.g., impaired fluency, impaired articulatory agility, relatively good auditory comprehension, agrammatism) with the classification of neurogenic acquired deficits of language, and (4) specifying the precise aphasic label (Broca's aphasia) that best fits these characteristics. If screening or labeling is the main goal of the assessment, the clinicopathological model is probably the best option. It is, however, certainly not so if the purpose of the evaluation is to localize the functional origin of deficits or to guide clinical practice. Knowing that a person presents with a Broca's aphasia may not be much help in identifying the specific components of language that are totally or partially affected or preserved. It also does not tell the clinician what intervention goals are appropriate, what treatment approaches will succeed best.

Instead of resorting to a medical assessment model, clinicians may use cognitive neuropsychological models, directly derived from information-processing theories, to evaluate language. In these models, cognitive functions, including language, are sustained by specialized interconnected processing components,

represented in functional architecture models. For example, as shown on Figure 1, the ability to orally produce a word in picture naming is conceived as a staged process in which the activation flow is initiated in a conceptual-semantic component and ends with the execution of articulation mechanisms.

An assessment process based on cognitive neuropsychological models consists in the localization of the impaired and preserved processing components for each language modality. This localization is performed through the administration of specific tasks or test batteries (e.g., Psycholinguistic Assessments of Language Processing in Aphasia [PALPA]; Kay *et al.*, 1992) aiming at the evaluation of each component and route of the model. For example, the evaluation of naming abilities in an aphasic person could be performed by the administration of tasks exploring the conceptual-semantic (e.g., semantic questionnaire), phonological output lexicon (e.g., picture-naming task controlled for frequency, familiarity, etc), and phonological output buffer (e.g., repetition of words and nonwords controlled for length) components. Important information regarding the level of impairments also arises from error analysis. With the same example, an anomic behavior could arise from distinct underlying deficits (e.g., in the activation of conceptual-semantic representations or in retrieving phonological forms of words in the output lexicon), leading to distinct types of errors (e.g., semantic substitutions, phonemic errors). The complete cognitive assessment process should allow the clinician to understand the client's deficits (i.e., surface manifestations, underlying origins, affected components) as well as to identify the strengths and weaknesses in his communication abilities. When recommended, the treatment may focus on the impaired levels of processing (i.e., function restoration) or on alternative processing routes (i.e., function reorganization) that will allow the client to communicate successfully.

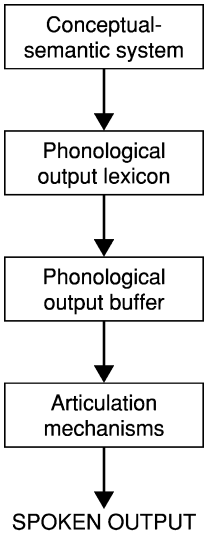

Figure 1 Schematic depiction of the cognitive neuropsychological model of spoken picture naming.

Classical Tests for the Assessment of Aphasia

Aphasia is the most common disorder of communication resulting from brain damage (i.e., stroke, brain tumor, head trauma, infections). This affection mainly involves language problems of production and comprehension as well as disturbances in reading and spelling.

Bedside and Screening Tests

The patient's symptoms change rapidly during the first days and weeks following the brain damage. Moreover, patients are often too ill to complete an exhaustive aphasia examination and bedside or screening instruments may be useful to advise relatives and health care professionals about the global communication profile and the best means to communicate in functional situations. These instruments are also useful to help clinicians to determine the necessity of performing a more thorough and extensive assessment of language or to establish the priority of patients on a waiting list. In addition to actual screening tests (e.g., Aphasia Screening Test; Reitan, 1991; for an extensive list see Murray and Chapey, 2001 and Spreen and Risser, 2003), clinicians also may administer shortened versions of comprehensive tests of aphasia (e.g., short form of the Token Test; Spellacy and Spreen, 1969; for an extensive list see Murray and Chapey, 2001). As pointed out by Spreen and Risser (2003), although bedside and screening tests may be used to identify language impairments in moderate and severe aphasics (language is obviously affected, even in simple and natural communication situations), they are inappropriate or of little use to distinguish the responses of individuals with mild deficits from those with normal language skills.

Comprehensive Examinations and Aphasia Batteries

As compared to bedside and screening tests, the main purpose of comprehensive examinations of aphasia is to provide an extensive description of language skills through the administration of tests designed to explore the different areas of language (i.e., spontaneous speech, naming, oral expression, auditory and written comprehension, repetition, reading, and writing). According to the reference model of assessment, the

output of a comprehensive examination may consist in the identification of a particular diagnostic of aphasia with the description of severity of deficits in each language area (clinicopathological approach), or in the localization of specific impairments affecting functional processing components of language skills (cognitive neuropsychological approach).

There are several classical comprehensive examinations and aphasia batteries. The most widely used in clinical and research settings in English are BDAE (Goodglass *et al.*, 2000), the Western Aphasia Battery (Kertesz, 1982), and the Aphasia Diagnostic Profiles (Helm-Estabrooks, 1992). All these standardized test batteries comprise different subtests (e.g., BDAE has 27 subtests) that assess all the dimensions of language in order to diagnose and classify aphasic syndromes according to clinical localization-based classifications (i.e., Broca's, Wernicke's aphasia, etc.). For a complete description and a critical review of these instruments, and others not reported here, see Spreen and Strauss (1998), Murray and Chapey (2001), and Spreen and Risser (2003). PALPA (Kay *et al.*, 1992) is a comprehensive test battery directly derived from the cognitive neuropsychology approach of assessment. This aphasia battery, commonly used in the United Kingdom, consists in a set of resource materials comprising 60 rigorously controlled tests that enable the user to select tasks "that can be tailored to the investigation of an individual patient's impaired and intact abilities." The scoring and analysis of errors give the clinician a detailed profile of language abilities, including reading and written spelling, which can be interpreted within current cognitive models of language. As compared to classical batteries of aphasia, the versatile and flexible nature of PALPA is, however, lessened by the lack of standardization and validity/reliability measures.

Tests for the Assessment of Specific Aspects of Language

Specific aspects of language behavior can also be assessed through the administration of several tests. These are often used to complete aphasia batteries but some of them also are used as screening tests. Clinicians may select these tests according to the different aspects of language they want to explore in depth, but also according to the underlying theoretical model of assessment. For example, comprehension may be tested through the administration of specific tests aiming at the discrimination of phonemic sounds (Phoneme Discrimination Test; Benton *et al.*, 1994), semantics (Pyramids and Palm Trees Test; Howard and Patterson, 1992), sentence length and syntactic complexity (Auditory Comprehension Test for Sentences; Shewan, 1979), commands (Token Test; De Renzi and Vignolo, 1962), or narrative discourse (Discourse Comprehension Test; Brookshire and Nichols, 1993). Other tests are available for measuring verbal expression, spoken and written naming, verbal fluency, reading, writing, gestural abilities, etc. An extensive list of specific language function tests can be found in Spreen and Strauss (1998), Murray and Chapey (2001), and Spreen and Risser (2003).

The Assessment of Functional Communication

Traditional tests provide useful information on linguistic abilities and language impairments in aphasia. However, performance on these tests does not necessarily predict how a person will communicate in more naturalistic settings and everyday life. Instead of focusing on the importance and the nature of deficits, the functional communication approach of assessment aims at the impact of these deficits on the person's activities and participation in society. Functional communication skills may be assessed with specific structured tests or by rating scales and inventories of communication profiles. Structured tests such as Communication Activities of Daily Living 2 (Holland *et al.*, 1999) and the Amsterdam–Nijmegen Everyday Language Test (Blomert *et al.*, 1994) have been devised to explore functional communication skills using role-play in daily life activities (shopping, dealing with a receptionist, etc.) and have shown themselves to be useful to track progress over time. However, while they are certainly more ecological than comprehensive examinations and tests for specific aspects of language, structured tests of functional communication do not necessarily give reliable views of the communication skills of a person in real-life situations. In this respect, rating scales and inventories of communication profiles are closer to functional situations. For example, the Functional Assessment of Communication Skills for Adults (Frattali *et al.*, 1995) is a rating protocol of 43 items, on a seven-point scale, based on the observations made by the speech-language pathologist or other significant person in the following four domains: social communication (e.g., 'refers to familiar people by name'); communication of basic needs (e.g., 'makes needs to eat'; reading, writing, and number concepts (e.g., 'writes messages'); and daily planning (e.g., 'tells time'). For a more extensive description of these functional communication tools, and others not described here, see Murray and Chapey (2001) and Spreen and Risser (2003).

Classical Tests for the Assessment of Speech and Language Impairment in Children

The assessment of language and communication in children can take place from infancy through

adolescence, when cognitive abilities are developing. Therefore, the language assessment process must not only inform on current specific abilities, but has also to capture changes over time in the level, sequence, and rate of acquisition. The interrelationship between language and other cognitive and social skills is also of primary importance. As a part of a larger process, usually performed by different professionals, the evaluation of language in children should be completed by an assessment of nonverbal communication, play and social skills, perception, attention and memory, behavior, etc. Moreover, because of the major influence it has on child development, the evaluation also has to consider the familial and social environment, especially with respect to adult–child interaction. The different components (e.g., sensitivity, promptness) as well as the context (e.g., physical settings, types of play, activities) in which this interaction takes place should be analyzed through specific assessment tools or through direct observation.

The assessment of preschool children (children aged 2 to 5 years) and school-age children (5 to 10 or 12 years) is usually based upon a combination of parent interviews, standardized tests, criterion-referenced instruments, developmental scales, and observations. All these tools and methods aim to explore both receptive and expressive language abilities in semantics, morphology, syntax, phonology, and pragmatics. Collecting a communication sample is also a frequently used method to analyze communication in terms of sentence length, intelligibility of speech, vocabulary, and conversational strengths and weaknesses. Similarly to tests for aphasia, preschool and school-age tests can be divided into two major categories: screening and diagnostic tests. The purpose of screening tests is to determine if the child's communication should be explored more extensively for the presence of a possible impairment. On the other hand, the main purposes of diagnostic tests is to establish the presence or absence of a deficit in one or more areas of language, to identify a possible difference in language development, to determine the child's eligibility for clinical services, and to identify the targets for intervention. These instruments are devised to assess language development by reference to the parameters of the normal range.

Screening Tests

Screening tests are usually inexpensive and require minimal time for administration and interpretation of results. Many norm-referenced standardized instruments may be used to establish the child's general level of expressive and receptive language functioning as well as other areas of functioning. For example, the Denver Developmental Screening Test II (Frankenburg *et al.*, 1990), a standardized screening battery for children from birth to age 6, is designed to test the child's abilities in the following four sectors: personal-social, fine motor, gross motor, and language (including expressive-receptive vocabulary). Screening tests may also consist in large batteries exploring language and cognitive functions through tasks of general verbal and nonverbal intellectual abilities. For example, the Wechsler Intelligence Scale for Children IV (Wechsler, 2004) is the most widely used measure of verbal and nonverbal intelligence in individuals from age 6 years 0 months to 16 years 11 months. As a screening tool, this battery consists in 16 subtests of verbal comprehension, perceptual reasoning, working memory, and processing speed skills.

For school-age children, some large screening batteries specifically concern academic achievement. That is, for example, the case with the Peabody Individual Achievement Test – Revised (PIAT-R; Markwardt, 1998), which provides a screening measure of achievement in the areas of mathematics, reading recognition and comprehension, spelling, and general information. However, most of the tasks of these large screening batteries are multifactorial and are therefore not appropriate to assess specific language or cognitive processes. For this purpose, clinicians may select among various specific screening tests for preschool and school-age children that focus only on language. Most of these instruments are designed to explore the different language components. That is the case, for example, with the Fluharty Preschool Speech and Language Screening Test II (Fluharty, 2001), which explores articulation, expressive and receptive vocabulary, and composite language in children from 2 to 6 years old. An exhaustive list of norm-referenced standardized screening tests of language can be found in Paul (2001).

Comprehensive Examinations and Batteries

As for screening, some diagnostic tools are designed to explore language skills as well as other aspects of development. That is the case, for example, with the Communication and Symbolic Behavior Scales Developmental Profile (Wetherby and Prizant, 1998), which includes tasks exploring expressive and receptive language, symbolic play, and nonverbal communication in children from 6 to 24 months old. Another example is the Rossetti Infant-Toddler Language Scale (Rossetti, 1990), which is used to assess attachment, play, gestures, and pragmatics, as well as language comprehension and expression in children from birth to 3 years old. There are also several

standardized comprehensive batteries of language processing that comprise tests exploring exclusively some or all of the language areas. That is the case, for example, with the Preschool Language Scale 4 (Zimmerman *et al.*, 2002), which is used to identify specific strengths and weaknesses in receptive and expressive language skills in children from birth to 6 years 11 months. The Clinical Evaluation of Language Fundamentals 4 (Semel *et al.*, 2003) is a multidimensional battery that can be used in individuals between the ages of 5 and 21 years to explore semantics, expressive and receptive language, and syntax, as well as working memory. The Comprehensive Assessment of Spoken Language (Carrow-Woolfolk, 1999), designed for children from age 3 to 21, is another comprehensive battery of language skills, comprising 15 tests that provide an assessment of expressive and receptive skills in four language categories: lexical/semantic, syntactic, supralinguistic, and pragmatics. An extensive list of available comprehensive examinations and batteries of language for children can be found in McCauley (2001), Paul (2001), Mattis and Luck (2002), and Haynes and Pindzola (2003).

Tests for Specific Aspects of Language

Different components of language can be affected with more or less intensity in children according to the origin of developmental disorders. Therefore, the in-depth assessment of language and communication disorders in children is a critical component in the clinical process. Core tests can be used to evaluate each of the language areas in order to identify specific impairments, establish baselines, and identify precise therapeutic and intervention goals. For example, there are several core tests and instruments for the evaluation of word retrieval (e.g., naming and verbal fluency tests), phonology (e.g., word and nonword repetition tests), receptive and expressive vocabulary (e.g., word definition tests), receptive and expressive syntax and morphology (e.g., sentence-to-picture matching tests), and pragmatic skills (e.g., narrative production, story comprehension tests).

A combination of different tests, each focusing on specific language components, may also be used to establish such a language and communication profile. For example, to assess vocabulary, clinicians may select the following standardized norm-referenced specific tests: the Expressive One-Word Picture Vocabulary Test Revised (Gardner, 2000), to exclusively explore expressive vocabulary in individuals ages 2 years 0 months through 18 years 11 months; or the Peabody Picture Vocabulary Test (Dunn and Dunn, 1997), to exclusively explore receptive vocabulary in individuals from age 2 years 6 months to adult. A more complete description of available diagnostic tests adapted to preschool and school-age children can be found in McCauley (2001), Paul (2001), Mattis and Luck (2002), and Haynes and Pindzola (2003).

The Assessment of Reading and Writing

The relationship between language acquisition and academic achievement is well established. Developmental disorders of language in preschool children are frequently associated with later difficulties in learning to read and write. The most common referral for a speech-language pathology assessment concerns school-age children who encounter problems in progressing beyond the developing language phase and present with difficulties in learning and acquiring communicative and academic skills. As for other populations, but especially at this stage of development, a significant difficulty in assessing school-age children arises because of important comorbidity between language and learning disorders and other cognitive and clinical pathological profiles, such as attention deficit/hyperactivity or executive function disorders. Therefore, the assessment process should include specific tests of language and communication but also instruments designed for exploring other cognitive functions, such as attention, working memory, and executive functions. In addition to formal tests, another important source of information also comes from structured interviews of the child himself, his parents and his teacher. With respect to language, phonological processing deficits are considered as an underlying cause of dyslexia and also play a role in developmental disorders of spelling. For example, dyslexic children often show problems with word and nonword repetition tasks, phonological awareness tasks (e.g., word and nonword segmentation tasks, phoneme manipulation, etc.), and working memory tasks for verbal material (i.e., word or digit span tasks). The semantic processing is another cognitive area highly related to reading and writing. School-age children usually learn new words through reading and writing. Those who encounter problems in reading and writing often present with poor vocabulary as well as with difficulty in word association and comprehension. Therefore, the assessment procedure for written language problems should be part of a more exhaustive evaluation of language and cognition. It should also include a close control of psycholinguistic parameters (e.g., orthographic regularity, lexical frequency) that are known to play an important role in written and spoken word recognition, reading comprehension, phoneme–grapheme

conversion, decoding, etc. However, very few standardized assessment tools fulfill these conditions. As an exception, French-speaking clinicians may use the Batterie d'Évaluation du Langage Écrit et de Ses Troubles (Mousty *et al.*, 1994), a written-language-testing battery based on current models of reading and writing, to assess children between the ages of 7 and 12 years. In addition to experimental tasks, one can resort to standardized achievement or specific tests of reading and writing skills. Among the most used of achievement tests are PIAT-R (Markwardt, 1998), which comprises subtests of reading comprehension, reading recognition, and spelling, and the Wide Range Achievement Test (Wilkinson, 1993), a brief test measuring reading recognition, spelling, and arithmetic computation. For a description of specific clinical tests of reading and writing, see Spreen and Strauss (1998) and Bailet (2001).

Classical Tests for the Assessment of Speech and Language Impairment in Special Populations

Referral for speech-language assessment not only concerns aphasia and developmental deficits of language but also involves individuals of different age groups presenting with various language and communication problems. In children and adolescents, these references include language deficits in pervasive developmental disorders (e.g., autism, Asperger's disorder), mental retardation, attention deficit/hyperactivity disorder, specific language impairment, sensory deficits (hearing loss, blindness), acquired disorders (e.g., traumatic brain injury), stuttering, etc. In adults, referral for a speech-language evaluation may be required for language and communication deficits following right hemisphere damage, traumatic brain injury, Alzheimer's disease and other forms of dementia (e.g., primary progressive aphasia, semantic dementia), stuttering and other fluency problems, etc.

In children, adolescents, and adults, clinical assessments may also concern such speech problems as dysarthria, following a stroke and neurodegenerative illnesses or accompanying cerebral palsy, acquired or developmental apraxia of speech, etc. In addition to the conventional evaluation of basic language (or speech) skills, the assessment procedure in all these special populations involves specific aspects and particularities of speech and language. For example, because of the absence of biological markers or simple diagnosis methods, the early detection of dementia often depends on various assessment tools, including language and cognitive tests performed to exclude other possible disease processes or identify specific forms of a given disease. In that particular domain, the assessment of speech and language usually includes tests allowing for differential diagnosis. For example, tests that specifically tap either semantic processing or written spelling can contribute to differentiating common disease processes in the elderly population. Semantic deficits are prominent characteristics of individuals diagnosed with Alzheimer's disease and these individuals usually differ from patients diagnosed with vascular dementia or frontotemporal dementia because of the presence of surface dysgraphia, a specific spelling disorder.

It is obviously not possible to exhaustively describe here the various tests adapted to special populations. The reader will find a more complete description of such tests in McCauley (2001), Paul (2001), Haynes and Pindzola (2003), and Spreen and Risser (2003).

Conclusion

Language production and comprehension are complex cognitive skills that should not be considered in isolation in assessment procedures. The interrelation between language and other cognitive functions has to be captured, particularly with respect to the possible influence of attention, working memory, and executive functions on linguistic abilities. If possible, clinicians should always select valid and reliable norm-referenced tests to assess language and communication. Resorting to theoretical models of language functioning also appears of primary importance and may sometimes condition the utilization of experimental, well-controlled, assessment tasks. A comprehensive assessment of language and communication is more than just an evaluation of specific skills in terms of preservation or impairment of processing components and surface structures. The scope of assessment should be widened in order to provide information about physical, social, and emotional contexts of communication, cultural differences, and economic factors. The combination of these data, obtained through assessment tools and direct observations, should then allow the clinician to establish a complete portrait of functional communication abilities.

See also: Dementia and Language; Impairments of Proper and Common Names; Phonological Impairments, Sublexical; Phonological, Lexical, Syntactic, and Semantic Disorders in Children; Primary Progressive Aphasia in Nondementing Adults; Speech Impairments in Neurodegenerative Diseases/Psychiatric Illnesses.

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Classification of Languages

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Classification of Languages

This article describes the principles underlying the classification of languages in this encyclopedia. Classification may be based on genetics, diffusion, lexicostatistics, or other relationships. A map (Figure 1) showing locations of major language groupings worldwide is provided.

Genetic Classification

Both professional linguists and general readers find a genetic classification the most satisfying way to group languages. This approach is one in which languages are classified into families on the basis of descent from a common ancestor. A good example is the Indo-European family of languages, which includes most of the languages of Europe, Iran, Afghanistan, and the northern part of South Asia. These languages can be shown to descend from a common ancestor, a common protolanguage. There are no records of the ancestral language, but it can be reconstructed from records of daughter languages such as Sanskrit, Ancient Greek, and Latin by using what is known as the 'comparative method'. Consider the following words for 'father': Sanskrit *pitár*, Greek *paté:r*, and Latin *pater*. It is possible to align the initial *p*s, the medial *t*s, and the final *r*s and reconstruct a root with the consonants *p-t-r* (the vowels require a little further examination). English is also a related language, so the word *father* should show the same consonants, but in fact the expected *p* shows as an *f* and the *t* shows up as a *th* (representing a voiced dental fricative). However, a consideration of further words shows that the *f/p* correspondence also appears in many other words, such as English *foot* against Sanskrit *pád-*, Greek *pod-*, and Latin *ped-*, and the *th/t* correspondence also shows up in other words, such as English *mother* against Sanskrit *ma:tá:r*, Greek *má:te:r*, and Latin *ma:ter*. We still reconstruct *p-t-k* and conclude that English has systematically changed the original stop consonants into fricatives. In fact, all the Germanic languages have done so.

Inflections as well as roots can be reconstructed. A common genitive ending in *-s* can be seen in Greek *pod-ós*, Latin *ped-is*, and English *foot's*. Proceeding in this way, we can reconstruct a good deal of the protolanguage and we can demonstrate that these languages and a score or so others are related as members of one family, which we call Indo-European.

A language family can be represented by a tree diagram, with the branches representing subgroups. Subgroups are characterized by shared innovations, which sets them apart from other languages in the family. The Germanic branch of Indo-European (English, German, Dutch, etc.) is characterized by various consonant shifts such as $p \rightarrow f$ and $t \rightarrow th$, as just mentioned, and by a past tense marked by a dental (or alveolar) stop, as in English *answered* or German *antwortete*. Other branches of Indo-European that can be reconstructed include Armenian, Anatolian, Celtic, Tocharian, and Italic. The Italic branch contained languages located in Italy, such as Oscan, Umbrian, and Latin. Latin was spread by conquest from Rome to a large area around the Mediterranean. It is no longer a spoken language, but it survives through its daughters, namely, French, Portuguese, Spanish, Italian, and Romanian, to mention only national languages. These languages, collectively called the Romance languages, form a sub-branch of the Italic branch of the Indo-European family. In this instance, we have records of Latin, which serves as a check on what we might reconstruct as proto-Romance. All of the Indo-European languages treated in this encyclopedia are included in the alphabetic list of families and other large groupings in the last section of this article ('Status of the Groupings Used in the Classification').

It is common in studying languages to find among them resemblances that are insufficient for the reconstruction of a protolanguage. This can be because there are insufficient data or because the languages have diverged so far that only a little evidence remains of their genetic affiliation. Where there is insufficient evidence for establishing a family or grouping families into a wider family, so that they become branches of the larger family, we can describe the languages in question as belonging to a particular stock. There can be degrees of resemblance among languages. If languages are grouped into stocks on the basis of sharing 10–20% of vocabulary, and some stocks are found to share between 5 and 10%, then these stocks can be said to belong to the one phylum.

Diffusion

In the ideal case, a number of innovations will coincide, as with the Germanic innovations mentioned previously, and a branch can be added to a tree diagram. However, all innovations, whether they

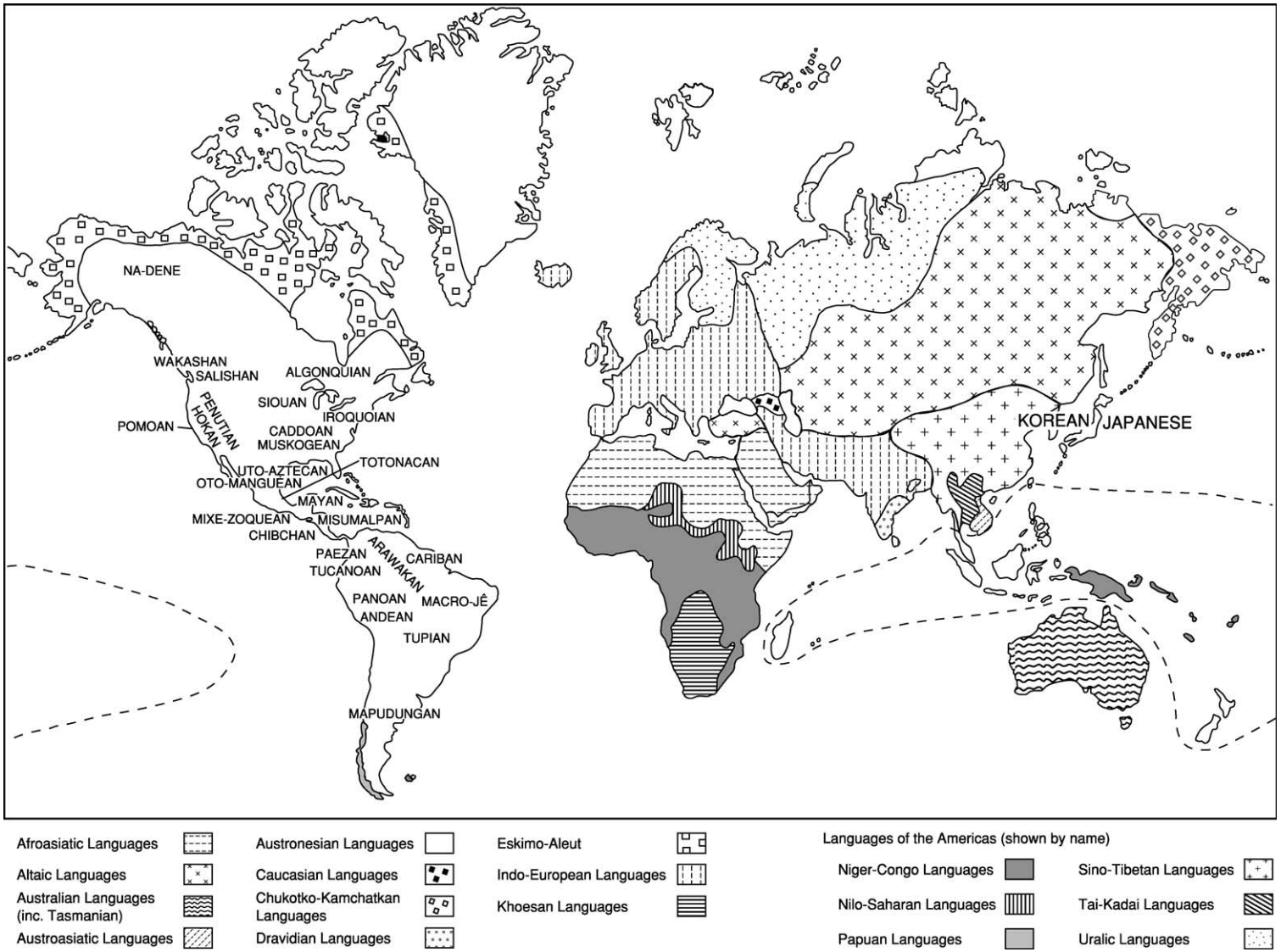

Figure 1 Locations of the major language groupings of the world, excluding the large-scale expansion of European languages such as English and Spanish over the past 500 years. The approximate locations of major concentrations are shown. In the Americas, there are many families, often with discontinuous and interlocking distributions, so the labels, indicated by name, are very approximately located.

are new pronunciations, new affixes, new words, or new constructions, must start at a particular location and then spread, and different innovations can have different starting points, and the spreads can overlap. This can happen within a particular language or between languages in contact, with the result that linguists cannot always present a neat, noncontroversial tree diagram.

The diffusion of language features can be massive and widespread. Vocabulary can be borrowed from one language to another. 'Borrow' is the conventional term for the adoption of language features from another language, but no paying back is implied. Words to do with culture are most easily borrowed. English, for instance, has borrowed almost the entire learned stratum of its lexicon from French, Latin, and Greek. Similarly, Thai, Lao, and Khmer (Cambodian) have borrowed their learned stratum from Pali, a language of the Indo-Aryan branch of Indo-European. Pali is the language of Buddhism. In areas where Islam is found, languages exhibit various degrees of borrowing from Arabic. Common vocabulary is not immune from borrowing. English, for example, has borrowed *very* from French, and it has borrowed some hundreds of fairly basic words from Old Norse, including the pronominal forms *they*, *their*, and *them*. The standard tree diagram shows English as part of the West Germanic sub-branch of Germanic and Old Norse (ancestral to the modern Scandinavian languages), as representing North Germanic, but it is more realistic to think of English as a mixture, predominantly West Germanic, but with an admixture of North Germanic. And there is also the learned stratum of vocabulary already mentioned.

Though grammatical forms, particularly bound forms such as plural markers or past tense markers, are not normally borrowed, grammatical structure or patterns are relatively diffusible. It is interesting to note that most of the languages of South Asia have subject-object-verb (SOV) word order even though they belong to different language families: the Indo-Aryan branch of Indo-European, Dravidian, and the Munda branch of Austro-Asiatic. Burushaski, a language isolate spoken in northern Pakistan, is also SOV. In China, and in Laos, Thailand, and Vietnam to the south, a number of genetically diverse languages have assimilated to Chinese in having monosyllabic roots and tones. When languages converge in this way, we have a *Sprachbund* (German for 'language union'), or linguistic area. If languages were classified typologically, then various languages of different genetic provenience would be classified together because of diffusion. Vietnamese is a good example. Historically, it belongs to the Mon-Khmer branch of Austro-Asiatic, but it has been so influenced by Chinese that not only has it adopted numerous Chinese words, but it has also reduced its own roots to conform to Chinese patterns and it has developed tones as in Chinese. Word order is subject-verb-object, as in Chinese.

Lexicostatistics

Linguists are not always in a position to reconstruct the relationship between languages as has been done in the case of Indo-European. Where linguists have been confronted with a number of languages that have not been studied in detail, a common situation outside Europe over the past century, they have resorted to lexicostatistics. The method is very simple. The percentages of common roots are counted using a list of 'basic' words. The theory is that basic vocabulary is resistant to borrowing, so that the percentage will give a guide to how closely languages are related. Although it is true that everyday words are less easily borrowed compared to words to do with culture (in the broadest sense), the difference is one of degree. One of the 200-word lists of basic vocabulary that has been used contains the numerals 'one', 'two', 'three', 'four', and 'five', but these can be borrowed, as in the case of the Tai languages, which have borrowed them from Chinese. The same list also contains 'animal', 'lake', and 'mountain', all of which are borrowings in English, ultimately from Latin. The problem of distinguishing roots that have been borrowed as opposed to those that have been inherited from a protolanguage is even greater when dealing with languages for which no detailed descriptions are available. Nevertheless, lexicostatistics has been widely used in the classification of the languages of various areas, including Africa, the Americas, Australia, and New Guinea. Lexicostatistics does give a good guide to the degree of similarity between languages, and on the basis of the percentages obtained it is possible to draw a hierarchical tree diagram and classify languages in terms of phylum, stock, family, branch, sub-branch, language, and dialect. However, there is no guarantee that such a tree diagram reflects the successive breaking up of protolanguages, and the terms *family*, *branch*, and *sub-branch* do not have the same meaning as these terms do when based on the comparative method.

Greenberg classified the languages of Africa and the Americas using a form of lexicostatistics. Although his classification of African languages is widely accepted and in general use, his classification of the languages of the Americas is rejected by most scholars. In this classification, all of the languages of the Americas are united in one vast Amerind family, except for Na Dene (mainly in northwestern part of

North America) and Eskimo-Aleut in the Arctic (Greenberg, 1987).

Beyond the Language Family

As mentioned previously, there can be various degrees of resemblance between language families and the levels of relationship can be quantified lexicostatistically and described in terms of stock and phylum. But besides hypotheses of wider relationships based purely on lexicostatistics, there are hypotheses about possible relationships between families using standard techniques of reconstruction or mixtures of standard methodology and lexicostatistics. The Nostratic hypothesis is one of the boldest and most controversial approaches; largely the work of Aharon Dolgopolsky and Vladimir Illich-Svitych, the hypothesis claims that there is a macrofamily consisting of Indo-European, Semitic, Berber, Kartvelian, Uralic, Altaic, Korean, Japanese, and Dravidian (Dolgopolsky, 1998). Other work includes that of Paul Benedict, who proposed an Austro-Tai family combining Hmong-Mien (Miao-Yao), the Tai-Kadai (or Daic) family, and Austronesian. Joseph Greenberg considered that these three recognized families plus Austroasiatic form an Austric family (Ruhlen, 1991: 152–156).

Isolates

A number of languages appear to belong to no family, though in many cases they are presumably remnants of families. The following languages are examples:

- Ainu (spoken in Japan)
- Burushaski (spoken in northern Pakistan)
- Basque (spoken in the Pyrenees)
- Elamite (an extinct language of southwestern Iran; it has been claimed to be related to the Dravidian languages of southern India)
- Japanese and the Ryukyuan dialects (the latter spoken in the Ryukyu Islands of Japan)
- Ket (spoken in the Yenisei Basin, Siberia)
- Korean
- Nivkh (spoken in eastern Siberia, including Sakhalin Island)
- Sumerian (extinct language of Mesopotamia with records from the 3rd millennium B.C.)
- Yukaghir (spoken in eastern Siberia).

For most of these languages, hypotheses are put forward from time to time linking them with other languages. A number of scholars include Japanese or Korean, or both, in the Altaic family, and some would include Yukaghir in the Uralic family.

Pidgins and Creoles

Where people find themselves in contact but without a common language, a 'pidgin' develops, which is a simplified form of language. The pidgin usually combines elements from more than one language, but in most cases the bulk of the lexicon comes from one particular language. A number of pidgins developed in the context of European colonial expansion from the 15th to the 19th centuries in places where workers, often slaves, from different language backgrounds were faced with an unfamiliar European language and in many cases unfamiliar languages of fellow workers. Where later generations learned these pidgins as their native language, the pidgins expanded to be full languages. Such languages are known as 'creoles'. In terms of classification, pidgins and creoles do not lend themselves to the hierarchical taxonomy wherein each language has a single ancestor. However, they tend to be identified in terms of which language supplies most of the vocabulary. The list of the pidgins and creoles included in this work, given in Table 1, shows the main source of the lexicon and where the pidgin or creole is, or was, spoken.

Table 1 Pidgins and creoles

Language	*Main source of the lexicon*	*Location*
Bislama	English	Vanuatu
Cape Verdean creole	Portuguese	Cape Verde
Fanagolo	Bantu languages (e.g., Xhosa, Zulu)	Southern Africa
Gullah	English	Sea Islands of South Carolina
Hawaiian creole	English	Hawaii, United States
Krio	English	Sierra Leone
Louisiana creole	French	Lousiana, United States
Mobilian jargon	Choctaw, Chickasaw	Southeastern United States (extinct)
Palenquero	Spanish	Colombia
Papamiento	Portuguese, Spanish	Aruba, Bonaire, Curaçao
Russenorsk	Russian, Norwegian	Arctic (extinct)
Sango	Ngbandi, French	Central African Republic
Sranan	English	Surinam
Tok Pisin	English	New Guinea
Yanito	English, Spanish	Gibraltar

Status of the Groupings Used in the Classification

This section contains a list of language families and other groupings in alphabetic order with an indication of the status of the groupings, i.e. whether the labels represent generally accepted families, controversial families or larger entities. It should be noted that while the list covers most of the language families of the world, it is not a complete catalogue of the world's languages, which total somewhere near 5000.

Afroasiatic Languages

There are various classifications of Afroasiatic languages. The one used here recognizes six families: Ancient Egyptian and its successor, Coptic; Berber (northwest corner of Africa); Chadic (Niger and Chad); Cushitic (Somalia and eastern Sudan); Omotic (southern Ethiopia); and Semitic. Semitic has three branches. The eastern branch is represented by Akkadian, which was spoken in Mesopotamia from the 3rd to the 1st millennium B.C. The southern branch is represented by the Ethiopian languages (Amharic, Tigrinya, and the extinct Ge'ez). The central branch, which is centered around the eastern end of the Mediterranean, includes the dead languages Phoenician, Syriac, and Ugaritic, plus Aramaic, a language in which parts of the Bible are written and which is still spoken; Hebrew, which has been brought back to life as the language of Israel; and Arabic, which, as the language of Islam, has spread over northern Africa and the Middle East.

Altaic Languages

Altaic is a widely, though not universally, accepted language family covering three branches: Turkic, Mongolic, and Tungusic, represented in this work by Evenki. The Turkic languages, which include Turkish, extend across from the Balkans through Turkey across central Asia to Siberia. The Mongolic languages are centered on Mongolia and the Tungusic languages in Siberia and northern China. If Altaic is rejected as a family, then we have three separate families rather than three branches of a family. These languages are typologically similar in that they are agglutinative, and they represent the classic SOV word-order type with SOV word order, postpositions, and preposed genitives. Some linguists would include Japanese and/or Korean in the Altaic family.

Australian Languages

The languages of the Australian mainland look as if they are related, but no detailed reconstruction of a protolanguage has been undertaken and it is unlikely that such a reconstruction will be possible. These languages have been classified lexicostatistically, i.e., by counting percentages of common vocabulary. This classification currently recognizes about a score of lexicostatistical families, with one of them, Pama-Nyungan, covering most of the mainland. Some genetic groupings are recognizable within Pama-Nyungan, and some of the other lexicostatistical families can be shown to be true families, such as the Tangkic family, which includes Kayardild, and West Barkly, which includes Wambaya. Tiwi is the sole member of the Tiwian family. Dixon (2002: 674) suggests that the similar-looking Daly group of languages (represented in this work by Ngan'gityemerri) is an areal group rather than a genetic one. Records of the extinct Tasmanian languages consist almost entirely of amateur word lists. These show very few resemblances to the languages of the mainland. Joseph Greenberg classified the Tasmanian languages, the Papuan languages, and the languages of the Andaman Islands in an Indo-Pacific phylum (Ruhlen, 1991). This grouping has been disregarded by almost all other linguists.

Austroasiatic Languages

The Austroasiatic classification comprises two branches: the Munda languages of northeast India, which includes Santali, and the more scattered Mon-Khmer branch, which includes Mon (southeastern Myanmar (Burma)), Khmer (or Cambodian, the official language of Cambodia), Khasi (northeast India), Wa (southwest Yunnan, China), and Vietnamese. Vietnamese is interesting from the point of view of classification. It has been so influenced by Chinese that as well as borrowing large numbers of Chinese words, it has reduced the form of roots and developed tones so that the language looks like a Chinese language.

Austronesian Languages

The Austronesian language family contains over 1000 languages. In the most widely used classification, there are four branches, Paiwanic, Tsouic, Ayatalic, and Malayo-Polynesian. The first three are the indigenous languages of Taiwan and are collectively known as the Formosan languages. The extra-Formosan languages, which are assumed to have emanated from Taiwan, make up the Malayo-Polynesian branch, which is spread from Madagascar in the western Indian Ocean, where Malagasy is spoken, to Easter Island in the eastern Pacific. Oversimplifying somewhat, we can consider there are three subbranches: western, which takes in the languages of the Philippines, Indonesia, and Malaysia as well as

Malagasy and Hawaiian; central, represented in this work by the Flores languages and Malukan languages; and Oceanic, which covers languages such as Fijian, Maori, Samoan, Tahitian, and Tongan.

Caucasian Languages

The languages of the Caucasus comprise a South Caucasian or Kartvelian family, represented here by Georgian, and the North Caucasian languages, with a northwestern sub-branch, represented here by Abkhaz, and a northeastern sub-branch, represented by Lak. It is not quite certain that the northwestern branch and northeastern Branch are branches of a single family, and it is even more uncertain that South Caucasian and North Caucasian families form a genetic group, but the label 'Caucasian languages' is useful since the two groups share some features and are all quite distinct from surrounding languages.

Chukotko-Kamchatkan Languages

This is a small family of languages spoken on the Chukotka and Kamchatka peninsulas of Siberia.

Dravidian Languages

This language family is concentrated in southern India. Some branches are recognizable. Dravidian proper includes Gondi, Kurukh, and Telegu; the southern branch includes Kannada, Malayalam, Tamil, and Toda, and the northwestern branch includes Brahui.

Eskimo-Aleut

The Eskimo-Aleut language family has two primary branches. The Aleut branch is spoken in the Aleutian Islands and the Eskimo languages are found in Siberia, Alaska, Canada, and Greenland. The latter branch is represented here by Inupiaq and West Greenlandic.

Indo-European

Indo-European is the most widely studied of all language families and has a well-articulated sub-grouping based on the comparative method, though details of the classification are subject to dispute from time to time. This family of languages contains a number of branches containing a single language (or group of dialects), namely, Albanian, Armenian, Hellenic (Greek), and two dead languages, records of which came to light only in the 20th century. One dead language is Hittite, which was spoken in Anatolia (modern Turkey). There are records of Hittite from the latter part of the second millennium B.C. The other dead language, Tocharian, the easternmost Indo-European language, was spoken in what is now the Xinjiang province of western China. There are records of Tocharian from the period 500–700 A.D.

Among other branches are the following Indo-European languages:

- Baltic contains Lithuanian and Latvian, and Slavic, the earliest records of which are in Old Church Slavonic and date from the 11th and 12th centuries. Modern Slavic languages include Polish, Sorbian, Czech, and Slovak (western sub-branch); Bulgarian, Macedonian, Slovene, and the 'Serbian-Croatian-Bosnian complex' (southern sub-branch); and Russian, Belorussian, and Ukrainian (eastern sub-branch). Some linguists would classify Baltic and Slavic as sub-branches of a Balto-Slavic branch.
- Celtic is usually divided into two sub-branches: the Brythonic branch, which contains Breton, Cornish, Welsh, and possibly Pictish, about which little is known, and the Goidelic branch, which contains Scots Gaelic.
- Germanic contains three sub-branches. The eastern sub-branch is represented by the extinct Gothic; the northern sub-branch, by the Scandinavian languages (Danish, Icelandic, Norwegian, Swedish); and the western sub-branch, by German (including High German, Yiddish, and Low German), Frisian, Dutch, and its South African derivative, Afrikaans, and various forms of English, including Scots.
- Indo-Iranian is a large branch containing two large sub-branches, Indo-Aryan (or Indic) and Iranian. Indo-Aryan covers Sanskrit, the language of the Hindu sacred texts; Pali, the language of the Hinayana Buddhist canon; plus Bengalic, the Dardic languages, Dhivehi, Domari, Gujerati, Hindi, Hindustani, Kashmiri, Lahnda, Marathi, Nepali, Punjabi, Sindhi, Sinhala, and Urdu, all of which are spoken in India, Pakistan, and Bangladesh, plus Romani, the language of scattered Gypsy communities. Iranian covers Avestan, the language of the Zoroastrian scriptures, plus Bactrian, Baluchi, Chorasmian, Khotanese, Kurdish, Ossetic, Pahlavi (Middle Persian), Pashto, Persian, Sogdian, and Tajik.
- Italic contains a number of extinct languages of Italy, one of which, Latin, was spread via the political dominance of Rome. The descendants of Latin, known collectively as the Romance Languages, include several national languages (French, Italian, Portuguese, Romanian, and Spanish) as well as Catalan (northeastern Spain), Galician (northwestern Spain), Jerriais (Jersey), Occitan (southern France), Rhaeto-Romance (eastern Switzerland and northeastern Italy), and Sardinian.

Khoesan Languages

The Khoesan group of languages is spoken by the Khoekhoe and San peoples of southern Africa. The group is often described as having three branches, but the branches are probably separate families. Two languages of northern Tanzania, Hadza and Sandawe, are also included in the group in most reference works, but it is not clear that they are genetically related to any of the southern families.

Languages of the Americas

As mentioned in the preceding section on lexicostatistics, Joseph Greenberg classified all of the languages of the Americas in one vast Amerind family, except for Na-Dene (mainly in northwestern part of North America) and Eskimo-Aleut in the Arctic. This classification is generally rejected and most scholars would recognize some scores of separate families in Greenberg's Amerind, though allowing that some of these can be grouped into stocks. We have followed a widespread convention of breaking up the languages of the Americas into three geographical regions: North America, Central America, and South America. This is largely to reduce a very large area to manageable chunks. We have considered Eskimo-Aleut separately from the languages of the Americas since it is not confined to North America.

Languages of North America

- The Algonquian languages are found in the eastern part of North America and westward into Alberta and Montana, and the Ritwan languages (Wiyot and Yurok) are found in northern California. Mithun (1999: 327) recognizes Eastern Algonquian, Central and Plains Algonquian, and Ritwan as branches of an Algic family. Algonquian is represented in this work by Cree and Mitchif. Mitchif is a creole, but, unlike most creoles, it did not arise from a pidgin. It retains the complex verbal morphology of Cree, and noun phrases show distinctions of number, gender, and definiteness, as in French.
- The Caddoan language family belongs to the Great Plains of the midwestern United States.
- The Hokan group of languages is centered in California. It is not established that these languages form a family. Among the Hokan languages is the Pomoan family of northern California.
- The Iroquoian language family of southeastern Canada and the eastern United States is represented in this work by Oneida (Northern Iroquoian) and Cherokee (Southern Iroquoian).
- The Keres language consists of a number of dialects spoken in New Mexico.
- The Muskogean language family of the southeastern United States includes Choctaw (Mississippi) and Creek (Alabama and Georgia).
- The Na-Dene language family includes Tlingit, Eyak, and the large Athapaskan branch. Most of these languages belong to Alaska and western Canada, but there is an enclave of Athapascan in the southwest of the United States. Navajo (Navaho) is spoken in Arizona, New Mexico, and Utah.
- The Penutian group of languages or stock belongs to the west of North America, from British Columbia to California.
- Languages of the Salishan family are spoken in British Columbia and the northwest of the United States.
- The Siouan family of languages covered a vast area of the Great Plains and included Crow, Lakota, and Omaha-Ponca.
- The Wakashan language family is mainly from Vancouver Island, British Columbia, and is represented by Nuuchahnulth (Nootka).

Languages of Central America

- Languages of the Chibchan family are spoken in Nicaragua, Costa Rica, Panama, western Colombia, and Ecuador, and the Paezan languages are spoken in Colombia.
- The Mayan family of languages is spoken in southeastern Mexico and Guatemala.
- The Misumalpan language family is found in western Honduras and western Nicaragua.
- The Mixe-Zoquean language family is found in southern Mexico.
- The Oto-Manguean language, represented here by Zapotecan, is found in Southern Mexico.
- The Uto-Aztecan language family is found mainly in the southwest of the United States and Mexico, but extends as far north as Idaho. This family includes Cupeño, Hopi, Tohono O'odham, and Nahuatl, the language of the Aztec civilization.

Languages of South America

- The most widely spoken native language of South America is Quechua. It is spoken in Peru, Ecuador, and Bolivia, extending north into Colombia and extending south into northern Chile and northwestern Argentina. It shares similarities with Aymará and the two are sometimes grouped in an Andean family, but this is not generally accepted, since it is not agreed whether the resemblances are genetic or arise from contact.

- The large Arawak language family is widespread, ranging from Honduras in Central America to Brazil in South America, and formerly to Paraguay and Argentina. The Arawak language in this work is Tariana, of Brazil.
- The large Carib language family is found in Brazil and the countries of South America north of Brazil.
- The Choco language family is found in Brazil.
- The languages of the Panoan family are found in Peru and neighboring parts of Bolivia and Brazil.
- Macro-Jê is a grouping of languages that have been considered to be related to the Jê family. These languages are located in Brazil.
- The Mapudungan language is spoken in Chile and Argentina. It has no clear genetic affiliation.
- The Tucanoan language family is found in western Brazil and neighboring parts of Colombia, Ecuador, and Brazil.
- The Tupian language family is located in Brazil. The Tupí-Guaraní sub-group is also found in Brazil, but various members of the sub-group are found in Bolivia, Paraguay, and Argentina. Guaraní is an official language of Paraguay, along with Spanish.

Niger-Congo Languages

This is a very large language family, with about 1000 members. It is spread over southern Africa. There are various classifications, including some that are hierarchical with several levels. We have adopted a flat classification with eight branches:

- The Kordofanian group of languages is spoken in Sudan. In some classifications, a Niger-Kordofanian family is recognized, with Kordofanian and Niger-Congo as the primary branches.
- The Atlantic Congo language sub-group is located in the far west of Africa from Liberia to Senegal. It includes Fula and Wolof.
- Languages of the Kru sub-group are spoken in Ivory Coast and Liberia.
- The Mande language sub-group is found from Senegal to Burkina Faso (Upper Volta) and Ivory Coast.
- The Gur (Voltaic) language sub-group is spoken in Mali, Burkina Faso, and Ghana, and extends east into Nigeria. In some classifications, Dogon is not assigned to any branch; in others, it is assigned to the Gur sub-branch.
- The Kwa sub-group of languages extends from Liberia to Nigeria.
- The Benue-Congo language sub-group covers a very large part of southern Africa. This branch includes Efik, Yukuben, and Mambila. The very large Bantu language group, which includes Kikuyu, Kinyarwanda, Nyanja, Shona, Swahili, Xhosa, and Zulu, is a sub-group of Benue-Congo and hence a sub-sub-group of Niger-Congo.
- The Adama-Ubangi language sub-group is spoken in a band running across Africa from Nigeria to Sudan.

Nilo-Saharan

The languages of the Nilo-Saharan family are found mainly in northeastern and north-central Africa. They include Dinka, Kanuri, Luo, and the Songhay languages.

Papuan Languages

The label 'Papuan' has no genetic significance. It is defined negatively as the non-Austronesian languages of New Guinea and surrounding islands. It covers about 750 languages in New Guinea and another 50 or so on neighboring islands from Timor to the Solomons. These languages can be classified into 23 families and 10 isolates. One very large family, the Trans-New Guinea family, covers most of New Guinea and is also found on some of the neighboring islands. It contains a number of branches, including the Madang languages. Other families include Sepik, represented in this work by Manambu of the Ndu subgroup, Skou, Torricelli, and West Papuan. Also included in this work is an article on several of the Papuan languages of the central Solomons.

Sino-Tibetan

The Sino-Tibetan languages include the Sinitic family and Tibeto-Burman. Sinitic can be equated with Chinese, but Chinese is popularly understood to be a single language, whereas in fact it is more like a family of languages, one of which, Mandarin Chinese, is the standard, based largely on the Beijing dialect. Tibeto-Burman takes in a number of genetically related languages, including Tibetan and Burmese, but there is no consensus about the details of the classification. Whether Tibeto-Burman and Sinitic are genetically related is not agreed, but there are some apparent cognates.

Tai Languages

The Tai, or Daic, language family is centered in Laos and Thailand and includes the national languages of these two countries, Lao (or Laotian) and Thai. The family is also represented in Burma, southern China, northern Vietnam, and on Hainan Island in the Gulf of Tonkin. Lao and Thai are mutually comprehensible. A purely linguistic classification would recognize a chain of Tai dialects across the two countries that included the national languages.

Uralic Languages

The Uralic languages are a family of languages spoken in northeastern Europe, extending across northern Russia into northwestern Siberia. There are two major branches, the Samoyed branch, represented in this work by Nenets, spoken in northern Russia, and Finno-Ugric, which includes Estonian, Finnish, and Saami (spoken in northern Norway, Sweden, and Finland), as well as Hungarian, the national language of Hungary, which is separated from the rest of the family. Some would include Yuhaghir in the Uralic family, others would combine Uralic and Altaic into a larger family.

See also: There are separate articles on each of the languages and language families shown in the classification appended to this article. There is also an alphabetical list of all the language articles in the classified index.

Language Classification

Afroasiatic Languages
- Ancient Egyptian and Coptic
- Berber Languages
- Chadic Languages
  - Hausa
- Cushitic Languages
  - Highland East Cushitic Languages
  - Oromo
  - Somali
- Omotic Languages
  - Wolaitta
- Semitic Languages
  - Eblaite
  - Eastern
    - Akkadian
  - Central
    - Arabic
    - Aramaic
    - Hebrew, Biblical and Jewish
    - Hebrew, Israeli
    - Jewish languages
    - Maltese
    - Phoenician and Punic
    - Syriac
    - Ugaritic
  - Southern
    - Ethiopian Semitic Languages
    - Amharic
    - Ge'ez
    - Tigrinya

Altaic Languages
- Mongolic Languages
- Tungusic Languages
  - Evenki
- Turkic Languages
  - Azerbaijanian
  - Bashkir
  - Chuvash
  - Kazakh
  - Kirghiz

Language Classification (cont.)

  - Tatar
  - Turkish
  - Turkmen
  - Uygur
  - Uzbek
  - Yakut

Australian Languages
- Pama-Nyungan
  - Arrernte
  - Gamilaraay
  - Guugu Yimidhirr
  - Jiwarli
  - Kalkutungu
  - Kaytetj
  - Morrobalama
  - Pitjantjatjara
  - Warlpiri
- Daly
  - Ngan'gityemerri
- Tangkic
  - Kayardild
- Tiwian
  - Tiwi
- West Barkly
  - Wambaya

Austroasiatic Languages
- Mon-Khmer Languages
  - Northern
    - Khasi
    - Vietnamese
    - Wa
  - Eastern
    - Khmer
  - Southern
    - Mon
- Munda Languages
  - Santali

Austronesian Languages
- Formosan Languages
- Malayo-Polynesian Languages
  - Western
    - Balinese
    - Bikol
    - Cebuano
    - Hawaiian
    - Hiligaynon
    - Ilocano
    - Javanese
    - Kapampangan
    - Madurese
    - Malagasy
    - Malay (Malaysian and Indonesian)
    - Niuean
    - North Philippine Languages
    - Riau Indonesian
    - Samar-Leyte
    - South-Philippine Languages
  - Central
    - Flores Languages
    - Malukan Languages

Language Classification (cont.)

- Oceanic
  - Fijian
  - Maori
  - Tahitian
  - Tamambo
  - Tongan
  - Vures

Caucasian Languages
- Abkhaz
- Georgian
- Lak

Chukotko-Kamchatkan Languages

Dravidian Languages
- Brahui
- Kannada
- Kurukh
- Malayalam
- Tamil
- Telugu
- Toda

Eskimo-Aleut
- Inupiaq
- West Greenlandic

Indo-European Languages
- Albanian
- Anatolian Languages
  - Hittite
- Armenian
- Balto-Slavic Languages
- Baltic Languages
  - Latvian
  - Lithuanian
- Slavic Languages
  - Belorussian
  - Bulgarian
  - Church Slavonic
  - Czech
  - Macedonian
  - Old Church Slavonic
  - Polish
  - Russian
  - 'Serbian-Croatian-Bosnian Linguistic Complex'
  - Slovak
  - Slovene
  - Sorbian
  - Ukrainian
- Celtic Languages
  - Breton
  - Cornish
  - Pictish
  - Scots Gaelic
  - Welsh
- Germanic Languages
  - Afrikaans
  - Danish
  - Dutch
  - English, Early Modern
  - English: African American Vernacular
  - English: Middle English
  - English, Later Modern

Language Classification (cont.)

  - English: in the present day
  - English: Old English
  - English, World
  - German
  - Germanic Languages
  - Gothic
  - Luxembourgish
  - Norwegian
  - Old Icelandic
  - Scots
  - Swedish
  - Yiddish
- Hellenic
  - Greek, Ancient
  - Greek, Modern
- Indo-Iranian Languages
  - Indo Aryan Languages
    - Bengali
    - Dardic
      - Kashmiri
    - Dhivehi
    - Domari
    - Gujarati
    - Hindi
    - Hindustani
    - Lahnda
    - Marathi
    - Nepali
    - Pali
    - Punjabi
    - Romani
    - Sanskrit
    - Sindhi
    - Sinhala
    - Urdu
  - Iranian Languages
    - Avestan
    - Bactrian
    - Baluchi
    - Chorasmian
    - Khotanese
    - Kurdish
    - Ossetic
    - Pahlavi
    - Pashto
    - Persian, Modern
    - Persian, Old
    - Sogdian
    - Tajik
- Italic Languages
  - Latin
  - Romance Languages
    - Catalan
    - Franglais
    - French
    - Galician
    - Italian
    - Jerriais
    - Occitan
    - Portuguese
    - Rhaeto-Romance
    - Romanian
    - Spanish
  - Tocharian

Language Classification (cont.)

Khoesan Languages
- Khoesan Languages

Languages of the Americas

Languages of North America
- Algonquian and Ritwan Languages
  - Cree
  - Mitchif
- Caddoan Languages
- Hokan Languages
  - Pomoan Languages
- Iroquoian Languages
  - Oneida
  - Cherokee
- Keres
- Muskogean Languages
  - Choctaw
  - Creek
- Na-Dene Languages
  - Navaho
- Penutian Languages
- Salishan Languages
- Siouan Languages
  - Crow
  - Lakota
  - Omaha-Ponca
- Wakashan Languages
  - Nuuchahnulth

Languages of Central America
- Chibchan and Paezan Languages
- Mayan Languages
- Misumalpan
- Mize-Zoquean Languages
- Oto-Manguean Languages
  - Zapotecan
- Totonacan Languages
- Uto-Aztecan Languages
  - Cupeño
  - Hopi
  - Nahuatl
  - Tohono O'odham

Languages of South America
- Andean Languages
  - Aymará
  - Quechua
- Arawak Languages
  - Tariana
- Cariban Languages
- Choco Languages
- Chibchan (see Central America)
- Macro-Jê Languages
- Mapudungan
- Panoan
- Piraha
- Tucanoan Languages
- Tupian Languages
  - Guarani

Niger-Congo Languages
- Kordofanian Languages
- Mande Languages

Language Classification (cont.)

- Atlantic Congo Languages
  - Fula
  - Wolof
- Dogon
- Gur Languages
- Kru Languages
- Adamawa-Ubangi
- Kwa Languages
  - Akan
  - Ewe
  - Yoruba
- Benue-Congo Languages
  - Efik
  - Mambila
  - Bantu Languages
    - Gikuyu
    - Kinyarwanda
    - Luganda
    - Nyanja
    - Shona
    - Swahili
    - Xhosa
    - Zulu
    - Southern Bantu Languages

Nilo-Saharan Languages
- Dinka
- Kanuri
- Luo

Papuan Languages
- Central Solomon Languages
- Sepik Languages
  - Manumbu
- Skou Languages
- Torricelli Languages
- Trans New Guinea Languages
  - Madang Languages
- West Papuan Languages

Pidgins and Creoles
- Bislama
- Cape Verdean Creole
- Fanagolo
- Gullah
- Hawaiian Creole
- Krio
- Louisiana Creole
- Mobilian Jargon
- Palenquero
- Papamiento
- Russenorsk
- Sango
- Tok Pisin
- Tsotsi Taal
- Yanito

Sino-Tibetan Languages
- Sinitic Languages
  - Chinese
- Tibeto-Burman Languages
  - Burmese
  - Tibetan

Language Classification (cont.)

Tai Languages
- Lao
- Thai

Uralic Languages
- Estonian
- Finnish
- Hungarian
- Nenets
- Saami

Language isolates and Languages of disputed affiliation
- Ainu
- Basque
- Burushaski
- Elamite
- Japanese
- Ryukyuan
- Ket
- Korean
- Nivkh
- Sumerian
- Yukaghir

Artifical Languages
Esperanto

Language Classification
- The Languages of the World
- Austric hypothesis
- Austro-Tai hypothesis
- Ethnologue
- SIL

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Classification of Text, Automatic

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Introduction

In the last two decades, the production of textual documents in digital form has increased exponentially, due to the increased availability of inexpensive hardware and software for generating digital text (e.g., personal computers, word processors) and for digitizing textual data not in digital form (e.g., scanners, optical character recognition software). As a consequence, there is an ever-increasing need for mechanized solutions for organizing the vast quantity of digital texts that are being produced, with an eye toward their future use. The design of such solutions has traditionally been the object of study of information retrieval (IR), the discipline that, broadly speaking, is concerned with the computer-mediated access to data with poorly specified semantics.

There are two main directions for providing convenient access to a large, unstructured repository of text:

- Providing powerful tools for searching relevant documents within this repository. This is the aim of text search (*see* **Document Retrieval, Automatic**), a subdiscipline of IR concerned with building systems that take as input a natural language query and return, as a result, a list of documents ranked according to their estimated degree of relevance to the user's information need. Nowadays the tip of the iceberg of text search is represented by Web search engines (*see* **Web Searching**), but commercial solutions for the text search problem were being delivered decades before the very birth of the Web.
- Providing powerful tools for turning this unstructured repository into a structured one, thereby easing storage, search, and browsing. This is the aim of text classification (TC), a discipline at the crossroads of IR, machine learning (ML), and (statistical)

Language Classification (cont.)

Tai Languages
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- Basque
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- Elamite
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Artifical Languages
Esperanto

Language Classification
- The Languages of the World
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natural language processing, concerned with building systems that partition an unstructured collection of documents into meaningful groups (Sebastiani, 2002).

Text Clustering and Text Categorization

There are two main variants of TC. The first is **text clustering**, which is characterized by the fact that only the desired number of groups (or clusters) is known in advance: no indication as to the semantics of these groups is instead given as input. The second variant is **text categorization**, whereby the input to the system consists not only of the number of categories (or classes), but also of some specification of their semantics. In the most frequent case, this specification consists in a set of labels, one for each category and usually consisting of a noun or other short natural language expression, and in a set of example labeled texts, i.e., texts whose membership or nonmembership in each of the categories is known. Clustering may thus be seen as the task of finding a latent but as yet undetected group structure in the repository, while categorization can be seen as the task of structuring the repository according to a group structure known in advance. In logical-philosophical terms, we can see clustering as the task of determining both the extensional and intensional level (*see* **Extensionality and Intensionality**) of a previously unknown group structure, and categorization as determining the extensional level only of a group structure whose intensional level is known.

It is the latter task that will be the focus of this article (text clustering is covered elsewhere in this volume – *see* **Text Mining**). From now on we will thus use the expressions 'text classification' and 'text categorization' interchangeably (abbreviated as TC), and the expression '(text) classifier' to denote a system capable of performing automatic TC.

Note that the central notion of TC, that of membership of a document d_j in a class c_i based on the semantics of d_j and c_i, is an inherently subjective notion, since the semantics of d_j and c_i cannot be formally specified. Different classifiers (be they humans or machines) might thus disagree on whether d_j belongs to c_i. This means that membership cannot be determined with certainty, which in turn means that any classifier (be it human or machine) will be prone to misclassification errors. As a consequence, it is customary to evaluate automatic text classifiers by applying them to a set of labeled (i.e., preclassified) documents (a set that here plays the role of a gold standard), so that the accuracy (or effectiveness) of the classifier can be measured by the degree of coincidence between its classification decisions and the labels originally attached to the preclassified documents.

Single-Label and Multi-Label Text Categorization

TC itself admits of two important variants: single-label TC and multi-label TC. Given as input the set of categorories $C = \{c_1, \ldots, c_m\}$, single-label TC is the task of attributing, to each document d_j in the repository, **the** category to which it belongs. Multi-label TC, instead, deals with the case in which each document d_j may in principle belong to zero, one, or more than one category; it thus comes down to deciding, for each category c_i in C, whether a given document d_j belongs or does not belong to c_i.

The technologies for coping with either single-label or multi-label TCs are slightly different (the former problem often being somehow more challenging), especially concerning the phases of feature selection, classifier learning, and classifier evaluation (see below). In a real application, it is thus of fundamental importance to identify whether the application requires single-label or multi-label TC from the beginning.

Hard or Soft Text Categorization

Taking a binary decision, yes or no, as to whether a document d_j belongs to a category c_i, is sometimes referred to as a 'hard' categorization decision. This is the kind of decisions that are taken by autonomous text classifiers, i.e., software systems that need to decide and act accordingly without human supervision. A different type of decision, sometimes referred to as a 'soft' categorization decision, is one which consists of attributing a numeric score (e.g., between 0 and 1) to the pair (d_j, c_i), reflecting the degree of confidence of the classifier in the fact that d_j belongs to c_i. This allows, for instance, ranking a set of documents in terms of their estimated appropriateness for category c_i, or ranking a set of categories in terms of their estimated appropriateness for d_j. Such rankings are often useful for nonautonomous, interactive classifiers, i.e., systems whose goal is to recommend a categorization decision to a human expert, who is responsible for making the final decision. For instance, in a single-label TC task a human expert in charge of the final classification decision may take advantage of a system that preranks the categories in terms of their estimated appropriateness to a given document d_j.

Again, the technologies for coping with either soft or hard categorization decisions are slightly different, especially concerning the phases of classifier learning and classifier evaluation (see below). In any real-world application, it is thus important to establish whether the task is one requiring soft or hard decisions from the beginning.

Applications

Maron's seminal paper (Maron, 1961) is usually taken to mark the official birth date of TC, which at the time was called automatic indexing; this name reflected that the main (or only) application that was then envisaged for TC was automatically indexing (i.e., generating internal representations for) scientific articles for Boolean IR systems (*see* **Indexing, Automatic**). In fact, since index terms for these representations were drawn from a fixed, predefined set of such terms, we can regard this type of indexing as an instance of TC (where index terms play the role of categories). The importance of TC increased in the late 1980s and early 1990s with the need to organize the increasingly larger quantities of digital text being handled in organizations at all levels. Since then, frequently pursued applications of TC technology have been newswire filtering, i.e., the grouping, according to thematic classes of interest, of news stories produced by news agencies, thus allowing personalized delivery of information to customers according to their profiles of interest (Hayes and Weinstein, 1990); patent classification, i.e., the organization of patents and patent applications into specialized taxonomies, so as to ease the detection of existing patents related to a new patent application (Fall *et al.*, 2003); and Web page classification, i.e., the grouping of Web pages (or sites) according to the taxonomic classification schemes typical of Web portals (Dumais and Chen, 2000).

The applications above all have a certain thematic flavor, in the sense that categories tend to coincide with topics, or themes. However, TC technology has been applied to real-world problems that are not thematic in nature, among which spam filtering, i.e., the grouping of personal e-mail messages into the two classes LEGITIMATE and SPAM, so as to provide effective user shields against unsolicited bulk mailings (Drucker *et al.*, 1999); authorship attribution, i.e., the automatic identification of the author of a text among a predefined set of candidates (Diederich *et al.*, 2003) (*see* **Authorship Attribution: Statistical and Computational Methods**); author gender detection, i.e., a special case of the previous task in which the issue is deciding whether the author of the text is a MALE or a FEMALE (Koppel *et al.*, 2002); genre classification, i.e., the identification of the nontopical communicative goal of the text (such as determining if a product description is a PRODUCTREVIEW or an ADVERTISEMENT) (Stamatatos *et al.*, 2000); survey coding, i.e., the classification of respondents to a survey based on the textual answers they have returned to an open-ended question (Giorgetti and Sebastiani, 2003); or even sentiment classification, as in deciding if a product review is a THUMBSUP or a THUMBSDOWN (Turney and Littman, 2003).

Techniques

Approaches

In the 1980s, the most popular approach to TC was one based on knowledge engineering, whereby a knowledge engineer and a domain expert working together would build an expert system capable of automatically classifying text. Typically, such an expert system would consist of a set of 'if ... then ...' rules, to the effect that a document was assigned to the class specified in the 'then' clause only if the linguistic expressions (typically: words) specified in the 'if' part occurred in the document. The drawback of this approach was the high cost in terms of human-power required for (i) defining the rule set, and (ii) for maintaining it, i.e., for updating the rule set as a result of possible subsequent additions or deletions of classes or as a result of shifts in the meaning of the existing classes.

In the 1990s, this approach was superseded by the machine-learning approach, whereby a general inductive process (the learner) is fed with a set of example (training) documents preclassified according to the categories of interest. By observing the characteristics of the training documents, the learner may generate a model (the classifier) of the conditions that are satisfied by the documents belonging to the categories considered. This model can subsequently be applied to new, unlabeled documents for classifying them according to these categories.

This approach has several advantages over the knowledge engineering approach. First of all, a higher degree of automation is introduced: the engineer needs to build not a text classifier, but an automatic builder of text classifiers (the learner). Once built, the learner can then be applied to generating many different classifiers, for many different domains and applications: one only needs to feed it with the appropriate sets of training documents. By the same token, the above-mentioned problem of maintaining a classifier is solved by feeding new training documents appropriate for the revised set of classes. Many inductive learners are available off the shelf; if one of these is used, the only human power needed in setting up a TC system is that for manually classifying the documents to be used for training. For performing this latter task, less skilled human power than for building an expert system is needed, which is also advantageous. It should also be noted that if an organization has previously relied on manual work for classifying documents, then many preclassified documents are already available to be used as training documents when the organization decides to automate the process.

Most importantly, one of the advantages of the ML approach is that the accuracy of classifiers built by these techniques now often rivals that of human

professionals, and usually exceeds that of classifiers built by knowledge engineering methods. This has brought about a wider and wider acceptance of learning methods even outside academia. While for certain applications such as spam filtering a combination of ML and knowledge engineering still lies at the basis of several commercial systems, it is fair to say that in most other TC applications (especially of the thematic type), the adoption of ML technology has been widespread.

Note that the ML approach is especially suited to the case in which no additional knowledge (of a procedural or declarative nature) of the meaning of the categories is available, since in this case the classification rules can be determined only on the basis of knowledge extracted from the training documents. This case is the most frequent one, and is thus the usual focus of TC research. Solutions devised for the case in which no additional knowledge is available are extremely general, since they do not presuppose the existence of e.g., additional lexicosemantic resources that, in real-life situations, might be either unavailable or expensive to create (*see* **Computational Lexicons and Dictionaries**). A further reason why TC research rarely tackles the case of additionally available external knowledge is that these sources of knowledge may vary widely in type and format, thereby making each instance of their application to TC a case in its own, from which any lesson learned can hardly be exported to different application contexts. When in a given application external knowledge of some kind is available, heuristic techniques of any nature may be adopted in order to leverage on these data, either in combination or in isolation from the IR and ML techniques we will discuss here. However, it should be noted that past research has not been able to show any substantial benefit from the use of external resources (such as lexicons, thesauri, or ontologies) in TC.

As previously noted, the meaning of categories is subjective. The ML techniques used for TC, rather than trying to learn a supposedly perfect classifier (a gold standard of dubious existence), strive to reproduce the subjective judgment of the expert who has labeled the training documents, and do this by examining the manifestations of this judgment, i.e., the documents that the expert has manually classified. The kind of learning that these ML techniques engage in is usually called supervised learning, since it is supervised, or facilitated, by the knowledge of the preclassified data.

Learning Text Classifiers

Many different types of supervised learners have been used in TC (Sebastiani, 2002), including probabilistic 'naive Bayesian' methods, Bayesian networks, regression methods, decision trees, Boolean decision rules, neural networks, incremental or batch methods for learning linear classifiers, example-based methods, classifier ensembles (including boosting methods), and support vector machines. While all of these techniques still retain their popularity, it is fair to say that in recent years support vector machines (Joachims, 1998) and boosting (Schapire and Singer, 2000) have been the two dominant learning methods in TC. This seems attributable to a combination of two factors: (i) these two methods have strong justifications in terms of computational learning theory, and (ii) in comparative experiments on widely accepted benchmarks, they have outperformed all other competing approaches. An additional factor that has determined their success is the free availability, at least for research purposes, of well-known software packages based on these methods, such as SVMlight and BoosTexter.

Building Internal Representations for Documents

The learners discussed above cannot operate on the documents as they are, but require the documents to be given internal representations that the learners can make sense of. The same is true of the classifiers, once they have been built by learners. It is thus customary to transform all the documents (i.e., those that are used in the training phase, the testing phase, or the operational phase of the classifier) into internal representations by means of methods used in text search, where the same need is also present (*see* **Indexing, Automatic**). Accordingly, a document is usually represented by a vector lying in a vector space whose dimensions correspond to the terms that occur in the training set, and the value of each individual entry corresponds to the weight that the term in question has for the document.

In TC applications of the thematic kind, the set of terms is usually made to coincide with the set of content-bearing words (which means all words but topic-neutral ones such as articles, prepositions, etc.), possibly reduced to their morphological roots (stems – *see* **Stemming**) so as to avoid excessive stochastic dependence among different dimensions of the vector. Weights for these words are meant to reflect the importance that the word has in determining the semantics of the document it occurs in, and are automatically computed by weighting functions. These functions usually rely on intuitions of a statistical kind, such as (i) the more often a term occurs in a document, the more important it is for that document; and (ii) the more documents a term appears in, the less important it is in characterizing the semantics of a document it occurs in.

In TC applications of a nonthematic nature, the opposite is often true. For instance, it is the frequency

of use of articles, prepositions, and punctuation (together with many other stylistic features) that may be a helpful clue in authorship attribution, while it is more unlikely that the frequencies of use of content-bearing words can be of help (*see* **Computational Stylistics**). This shows that choosing the right dimensions of the vector space for the right classification task requires a deep understanding, on the part of the engineer, of the nature of the task.

It is fairly evident from the above discussion that internal representations used in TC applications are, from the standpoint of linguistic analysis, extremely primitive: with the possible exception of applications in sentiment classification (Turney and Littman, 2003), hardly any sophisticated linguistic analysis is usually attempted in order to provide a more faithful rendition of the semantics of the text. This is because previous attempts at applying state-of-the-art natural language processing techniques (including techniques for parsing text robustly (Moschitti and Basili, 2004), extracting collocations (Koster and Seutter, 2003), performing word sense disambiguation (Kehagias *et al.*, 2003), etc.) have not shown any substantial benefit with respect to the basic representations outlined above.

Reducing the Dimensionality of the Vectors

The techniques described in the previous section tend to generate very large vectors, with sizes in the tens of thousands. This situation is problematic in TC, since the efficiency of many learning devices (e.g., neural networks) tends to degrade rapidly with the size of the vectors. In TC applications, it is thus customary to run a dimensionality reduction pass before starting to build the internal representations of the documents. Basically, this means identifying a new vector space in which to represent the documents, with a much smaller number of dimensions than the original one. Several techniques for dimensionality reduction have been devised within TC (or, more often, borrowed from the fields of ML and pattern recognition).

An important class of such techniques is that of feature extraction methods (examples of which are term clustering methods and latent semantic indexing – *see* **Latent Semantic Analysis**). Feature extraction methods define a new vector space in which each dimension is a combination of some (or all) of the original dimensions; their effect is usually a reduction of both the dimensionality of the vectors and the overall stochastic dependence among dimensions.

An even more important class of dimensionality reduction techniques is that of feature selection methods, which do not attempt to generate new terms, but try to select the best ones from the original set. The measure of quality for a term is its expected impact on the accuracy of the resulting classifier. To measure this, feature selection functions are employed for scoring each term according to this expected impact, so that the highest scoring ones can be retained for the new vector space. These functions mostly come from statistics (e.g., Chi-square) or information theory (e.g., mutual information, also known as information gain), and tend to encode (each one in their own way) the intuition that the best terms for classification purposes are the ones that are distributed most differently across the different categories.

Challenges

TC, especially in its ML incarnation, is today a fairly mature technology that has delivered working solutions in a number of applicative contexts. Interest in TC has grown exponentially in the last 10 years, from researchers and developers alike.

For IR researchers, this interest is one particular aspect of a general movement toward leveraging user data for taming the inherent subjectivity of the IR task, i.e., taming the fact that it is the user, and only the user, who can say whether a given item of information is relevant to a query she has issued to a Web search engine, or relevant to a private folder of hers in which documents should be filed according to content. Wherever there are predefined classes, documents previously (and manually) classified by the user are often available; as a consequence, these latter data can be exploited for automatically learning the (extensional) meaning that the user attributes to the categories, thereby reaching accuracy levels that would be unthinkable if these data were unavailable.

For ML researchers, this interest is because TC applications prove a challenging benchmark for their newly developed techniques, since these applications usually feature extremely high-dimensional vector spaces and provide large quantities of test data. In the last 5 years, this has resulted in more and more ML researchers adopting TC as one of their benchmark applications of choice, which means that cutting-edge ML techniques are being applied to TC with minimal delay since their original invention.

For application developers, this interest is mainly due to the enormously increased need to handle larger and larger quantities of documents, a need emphasized by increased connectivity and availability of document bases of all types at all levels in the information chain. But this interest also results from TC techniques having reached accuracy levels that often rival the performance of trained professionals, levels that can be achieved with high efficiency on standard hardware and software resources. This means that more and more organizations are automating all their activities that can be cast as TC tasks. Still, a number of challenges remain for TC research.

The first and foremost challenge is to deliver high accuracy in **all** applicative contexts. While highly effective classifiers have been produced for applicative domains such as the thematic classification of professionally authored text (such as newswire stories), in other domains reported accuracies are far from satisfying. Such applicative contexts include the classification of Web pages (where the use of text is more varied and obeys rules different from the ones of linear verbal communication), spam filtering (a task which has an adversarial nature, in that spammers adapt their spamming strategies so as to circumvent the latest spam filtering technologies), authorship attribution (where current technology is not yet able to tackle the inherent stylistic variability among texts written by the same author), and sentiment classification (which requires much more sophisticated linguistic analysis than classification by topic).

A second important challenge is to bypass the document labeling bottleneck, i.e., tackling the facts that labeled documents for use in the training phase are not always available, and that labeling (i.e., manually classifying) documents is costly. To this end, semisupervised methods have been proposed that allow building classifiers from a small sample of labeled documents and a (usually larger) sample of unlabeled documents (Nigam and Ghani, 2000; Nigam *et al.*, 2000). However, the problem of learning text classifiers mainly from unlabeled data unfortunately is still open.

See also: Authorship Attribution: Statistical and Computational Methods; Computational Lexicons and Dictionaries; Computational Stylistics; Document Retrieval, Automatic; Extensionality and Intensionality; Indexing, Automatic; Latent Semantic Analysis; Stemming; Text Mining; Web Searching.

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Classifiers and Noun Classes: Semantics

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Almost all languages have some grammatical means for the linguistic categorization of nouns and nominals. The continuum of noun categorization devices covers a range of devices, from the lexical numeral classifiers of Southeast Asia to the highly grammaticalized gender agreement classes of Indo-European languages. They have a similar semantic basis, and one can develop from the other. They provide a unique insight into how people categorize the world through their language in terms of universal semantic parameters involving humanness, animacy, sex, shape, form, consistency, and functional properties.

Noun categorization devices are morphemes that occur in surface structures under specifiable conditions, and denote some salient perceived or imputed characteristics of the entity to which an associated noun refers (Allan, 1977: 285). They are restricted to classifier constructions, morphosyntactic units (e.g., noun phrases of different kinds, verb phrases, or clauses) that require the presence of a particular kind of morpheme, the choice of which is dictated by the semantic characteristics of the referent of the nominal head of a noun phrase.

Noun categorization devices come in various guises. We distinguish noun classes, noun classifiers, numeral classifiers, classifiers in possessive constructions, and verbal classifiers. Two relatively rare types are locative and deictic classifiers. They share a common semantic core and differ in the morphosyntactic contexts of their use and in their preferred semantic features.

Noun Classes

Some languages have grammatical agreement classes based on such core semantic properties as animacy, sex, and humanness, and sometimes also shape. The number of noun classes (also known as genders, or gender classes) varies – from two, as in Portuguese or French, to 10 or so, as in Bantu, or even to several dozen, as in some languages of South America. Noun classes can to a greater or lesser extent be semantically transparent, and their assignment can be based on semantic, morphological, and/or phonological criteria. They are realized through agreement with a modifier or the predicate outside the noun itself. Examples (1) and (2), from Portuguese, illustrate masculine and feminine genders, which are marked on the noun itself and on the accompanying article and adjective.

(1) o menin-o bonit-o
ARTICLE: MASC.SG child- MASC.SG beautiful- MASC.SG
'the beautiful boy'

(2) a menin-a bonit-a
ARTICLE: FEM.SG child-FEM.SG beautiful-FEM.SG
'the beautiful girl'

The cross-linguistic properties of noun classes are the following:

1. There is a limited, countable number of classes.
2. Each noun in the language belongs to one (or sometimes more than one) class.
3. There is always some semantic basis to the grouping of nouns into gender classes, but languages vary in how much semantic basis there is. This usually includes animacy, humanness and sex, and sometimes also shape and size.
4. Some constituent outside the noun itself must agree in gender with a noun. Agreement can be with other words in the noun phrase (adjectives, numbers, demonstratives, articles, etc.) and/or with the predicate of the clause, or an adverb.

In some languages there is a marker of noun class on every noun; in some languages nouns bear no marker. Noun class systems are typically found in languages with a fusional or agglutinating (not an isolating) profile. Languages often have portmanteau morphemes combining information about noun class with number, person, case, etc.

The semantics of noun classes in the languages of the world involves the following parameters:

- Sex: feminine vs. masculine, as in many Afroasiatic languages, in East-Nilotic, and in Central Khoisan
- Human vs. nonhuman, as in some Dravidian languages of India
- Rational (humans, gods, demons) vs. nonrational, as in Tamil and other Dravidian languages
- Animate vs. inanimate, as in Siouan, from North America

The term neuter is often used to refer to irrational, inanimate gender or to a residue gender with no clear semantic basis.

Languages can combine these parameters. Zande and Ma (Ubangi, Niger-Congo) distinguish masculine, feminine, nonhuman animate, and inanimate. Godoberi (Ghodoberi) (Northeast-Caucasian) has feminine, masculine, and nonrational genders.

Primarily sex-based genders can have additional shape- and size-related meanings. In languages of the Sepik region of New Guinea, feminine is associated with short, wide, and round, and masculine with long, tall, and narrow objects (e.g., Ndu family; Alamblak). Feminine is associated with small size and diminutives in Afroasiatic and East-Nilotic languages; masculine includes long, thick, solid objects. Hollow, round, deep, flat, and thin objects are feminine in Kordofanian and Central Khoisan languages (Heine, 1982: 190–191). Unusually large objects are feminine in Dumo, a Sko language from New Guinea (see the summary in Aikhenvald, 2000: 277).

In some languages, most nouns are assigned to just one noun class; in other languages, different noun classes can be chosen to highlight a particular property of a referent. Manambu, a Ndu language from the Sepik area, has two genders. The masculine gender includes male referents, and feminine gender includes females. But the gender choice depends on other factors and can vary: if the referent is exceptionally long, or large, it is assigned masculine gender; if it is small and round, it is feminine.

Rules for the semantic assignment of noun classes can be more complex. The Australian language Dyirbal (Dixon, 1972: 308–312) has four noun classes. Three are associated with one or more basic concepts: Class I – male humans, nonhuman animates; Class II – female humans, water, fire, fighting; Class III – nonflesh food. Class IV is a residue class covering everything else. There are also two rules for transferring gender membership. By the first, an object can be assigned to a gender by its mythological association rather than by its actual semantics. Birds are classed as feminine by mythological association, since women's souls are believed to enter birds after death. The second transfer rule is that if a subset of a certain group of objects has a particular important property, e.g., being dangerous, it can be assigned to a different class from the other nouns in that group. Most trees without edible parts belong to Class IV, but stinging trees are placed in Class II.

A typical gender system in Australian languages contains four terms that can be broadly labeled as masculine, feminine, vegetable, and residual (Dixon, 2002: 449–514). Andian (Northeast Caucasian) languages have a special noun class for insects, and Bantu languages for places (also see Corbett, 1991).

The degree of semantic motivation for noun classes varies from language to language. Noun classes in Bantu languages constitute an example of a semantically opaque system. Table 1 summarizes a basic semantic grid common to Bantu noun class systems (Spitulnik, 1989: 207) based on the interaction of shape, size, and humanness. However, these parameters provide only a partial semantic motivation for the noun classes in individual Bantu languages. (In the Bantuist tradition, every countable noun is assigned to two classes: one singular and one plural.)

Table 1 Noun classes in Bantu

Class	*Semantics*
1/2	Humans, a few other animates
3/4	Plants, plant parts, foods, nonpaired body parts, miscellaneous
5/6	Fruits, paired body parts, miscellaneous inanimates
7/8	Miscellaneous inanimates
9/10	Animals, miscellaneous inanimates, a few humans
11/10	Long objects, abstract entities, miscellaneous inanimates
12/13	Small objects, birds
6	Masses
14	Abstract qualities, states, masses, collectives
15	Infinitives

In modern Bantu languages, however, noun class assignment is often much less semantically motivated, though the semantic nucleus is still discernible. Thus, in Babungo, Class 1/2 is basically human; however, it is a much bigger class than it was in Proto-Bantu, and also contains many animals, some birds and insects, body parts, plants, and household and other objects, e.g., necklace, pot, book, rainbow (Schaub, 1985: 175). Shape and size also appear as semantic parameters: in ChiBemba, class 7/8 is associated with large size and carries pejorative overtones, while class 12/13 includes small objects and has overtones of endearment (also see Denny, 1976; Aikhenvald, 2000: 281–283).

In a seminal study, Zubin and Köpcke (1986) provided a semantic rationale for the gender assignment of nouns of different semantic groups in German. Masculine and feminine genders mark the terms for male and female adults of each species of domestic and game animals (following the natural sex principle), and neuter is assigned to non-sex-specific generic and juvenile terms. Masculine gender is used for types of cloth, for precipitation and wind, and for minerals. Disciplines and types of knowledge have feminine gender, and games and types of metal – with the exception of alloys – have neuter gender. This is contrary to a common assumption that there is no real semantic basis for gender assignment in the well-known Indo-European languages.

Noun class assignment is typically more opaque for inanimates and for nonhuman animates than for humans and high animates. In the Australian language Bininj Gun-Wok (Evans, 2003: 185–199) masculine class includes male humans, the names of certain malevolent beings mostly associated with

the sky, items associated with painting (a male activity), and also some mammals, some snakes, and some birds and fish. Feminine class includes female humans, and also some reptiles, fish, and birds. Vegetable class includes all terms for nonflesh foods, but also a few bird names. Finally, the neuter, or residue, class is the most semantically heterogenous – it includes items that do not fit into other classes, e.g., most body parts, generic terms for plants, and terms for various inanimate objects.

In Jingulu (Pensalfini, 2003: 159–168) nouns divide into four classes, only some of which are more or less semantically transparent. The vegetable class mostly includes objects that are long, thin, or pointed. This class happens to include most vegetables, as well as body parts such as the colon, penis, and neck; instruments such as spears, fire drills, and barbed wire; natural phenomena such as lightning and rainbows; and roads and trenches. The feminine class includes female humans and higher animates, and also words for axes, the sun, and most smaller songbirds. The semantic content of the remaining two classes, masculine and neuter, is much harder to define: masculine is mostly used for the rest of animates and neuter for the rest of inanimates, except that flat and/or rounded inanimates – such as most trees and eggs, and body parts such as the liver and the brow – are masculine.

Noun Classifiers

Noun classifiers categorize the noun with which they co-occur and are independent of any other element in a noun phrase or in a clause. They are often independent words with generic semantics. Thus, in Yidiny, an Australian language, one would not generally say: 'the girl dug up the yam'; it is more felicitous to include generics and say 'the person girl dug up the vegetable yam' (Dixon, 1982: 185), as in (3). Classifier constructions are in square brackets.

(3) [mayi jimirr] [bama-al
vegetable+ABS yam+ABS CL:PERSON-ERG
yaburu-ŋgu] julaal
girl-ERG dig-PAST
'The person girl dug up the vegetable yam'

Every noun in a language does not necessarily take a noun classifier. And a noun may occur with more than one classifier. In Minangkabau, a Western Austronesian language from Sumatra, different noun classifiers may be used with the same noun to express different meanings, e.g., *batang limau* (CL:TREE lemon) 'lemon-tree', *buah limau* (CL:FRUIT lemon) 'lemon-fruit.' They are similar to derivational-like devices. The choice of a noun classifier is predominantly semantic, based on social status, function, and nature, and also on physical properties, e.g., shape. But in some cases the semantic link between a noun classifier and a noun is not obvious. In most languages of the Daly area in Australia, honey takes the noun classifier for flesh food. The choice of noun classifier in Jacaltec, a Mayan language from Guatemala, is often obscured by extension through perceptual analogy; for instance, ice is assigned to the rock class (see Craig, 1986: 275–276).

Noun classifiers are found in numerous Australian languages, in Western Austronesian languages, in Tai languages, and in Mayan languages (Aikhenvald, 2000). In Yidiny (Australian) (Dixon, 1977: 480 ff.; 1982: 192 ff.), a language with 20 noun classifiers, these are of two kinds:

- *Inherent nature* classifiers divide into humans (*waguja* 'man,' *bunya* 'woman,' and a superordinate *bama* 'person,' as in [3]); fauna (*jarruy* 'bird,' *maŋ gum* 'frog,' *munyimunyi* 'ant'); flora (*jugi* 'tree,' *narra* 'vine'); natural objects (*buri* 'fire,' *walba* 'stone,' *jabu* 'earth'); and artefacts (*gala* 'spear,' *bundu* 'bag,' *baji* 'canoe').
- *Function* classifiers are *minya* 'edible flesh food,' *mayi* 'edible nonflesh food,' *bulmba* 'habitable,' *bana* 'drinkable,' *wirra* 'movable,' *gugu* 'purposeful noise.'

A distinction between flesh and nonflesh food is typical for Australian languages with noun classifiers (Dixon, 2002: 454–459).

Noun classfiers for humans often involve social functions. In Mayan languages of the Kanjobalan branch, as in Jacaltec, humans are classified according to their social status, kinship relation, or age. Mam has classifiers for men and women; for young and old men and women; for old men and women to whom respect is due; and for someone of the same status as the speaker. There is also a classifier for babies, and just one nonhuman classifier. In Australian languages, noun classifiers that refer to social status include such distinctions as initiated man. Murinhpatha (Australian) (Walsh, 1997: 256) has a classifier for Aboriginal people (which also covers human spirits) and another for non-Aboriginal people, which includes all other animates.

Nouns with nonhuman, or inanimate, referents are classified in terms of inherent nature-based properties from the natural domains of human interaction: animals, birds, fish, plants, water, fire, minerals, and artefacts. Individual systems may vary. There is often a general term for birds and fish, as in Minangkabau (Western Austronesian); while Ngan'-gityemerri (Australian) and Akatek (Mayan) have a generic noun classifier for animals. Classifiers in

Murrinh-Patha, from Australia, cover fresh water and associated concepts, flowers and fruits of plants, spears, offensive weapons, fire and things associated with fire, time and space, and speech and language, and there is a residue classifier.

There is usually a noun classifier for culturally important concepts. Mayan languages have a noun classifier for corn, a traditionally important crop, and for domesticated dogs, while Daly languages, in northern Australia, have classifiers for spears, diggings sticks, and spear throwers.

Noun classifiers often have to be distinguished from generic nouns. In Yidiny, a test for what can be used as a classifier is provided by the way interrogative-indefinite pronouns are used: there is one that means 'what generic?' and another meaning 'generic being known, what specific?' Another decisive criterion is how obligatory the classifiers are, and whether it is possible to formulate explicit rules for their omission. Incipient structures superficially similar to noun classifiers can be found in Indo-European languages. In English it is possible to use a proper name together with a descriptive noun phrase, such as *that evil man Adolf Hitler*, but this type of apposition is rather marked and used to achieve rhetorical effect. Lexicosyntactic mechanisms of this kind may well be a historical source of noun categorization devices. Noun classifiers should be distinguished from derivational components in class nouns, such as *berry* in English *strawberry*, *blackberry*, etc., with their limited productivity, high degree of lexicalization, and the fact that they are restricted to a closed subclass of noun roots.

Numeral Classifiers

Numeral classifiers are morphemes that only appear next to a numeral, or a quantifier; they may categorize the referent of a noun in terms of its animacy, shape, and other inherent properties. Uzbek, a Turkic language, has 14 numeral classifiers. A classifier for humans is shown in (4). Inanimate objects are classified by their form, as shown in (5) (Beckwith, 1998).

(4) bir nafar âdam
one CL:HUMAN person
'one person'

(5) bir bâs karâm
one CL:HEAD.SHAPED cabbage
'one (head of) cabbage'

Numeral classifiers are relatively frequent in isolating languages of Southeast Asia; in the agglutinating North Amazonian languages of South America; in Japanese, Korean, and Turkic; and in the fusional Dravidian and Indic languages.

In a language with a large set of numeral classifiers, the way they are used often varies from speaker to speaker, depending on the speaker's social status and competence (Adams, 1989). In this (and in the ways they are acquired by children), they are much more similar to the use of lexical items than to a limited set of noun classes. Each noun in the language does not have to be associated with a numeral classifier. Some nouns take no classifier at all; and some nouns take more than one classifier, depending on which property of the noun's referent is in focus.

Numeral classifiers are always determined by the semantics of the noun referent. Typical semantic parameters are animacy, physical properties (such as dimensionality, shape, consistency, nature), functional properties (e.g., object with a handle), and arrangement (e.g., bunch). There can also be specific classifiers for culturally important items, e.g., canoe, house. A few languages (e.g., Kana, a Cross-River language from Nigeria, and a number of New Guinea languages) (Aikhenvald, 2000: 287–288) have no classifier for animates or humans: when counted, these are classified by shape or by function. For instance, a human is assigned to a class of vertically positioned or elongated objects.

A typical problem with numeral classifiers concerns differentiating between sortal classifiers, which just characterize a referent, and mensural classifiers, which contain information about how the referent is measured. As Ahrens (1994: 204) put it, classifiers can classify only a limited and specific group of nouns, while measure words can be used as a measure for a wide variety of nouns. Almost every language, whether it has numeral classifiers or not, has quantifiers, the choice of which may depend on the semantics of the noun. This often depends on whether the noun referent is countable or not. For instance, in English *much* is used with noncountable nouns, and *many* with countable nouns; other languages have just one word covering 'much' and 'many.' The choice of quantifying expressions may also depend on the properties of the referent noun; for instance, in English we include *head* in *five head of cattle*, *stack* in *three stacks of books*, *flock* in *two flocks of birds*, and so on. These quantifying expressions are not numeral classifiers, because they do not fill an obligatory slot in the numeral-noun construction, but are instead used in a type of construction that is also employed for other purposes. For instance, quantifier constructions in English *three head of cattle* are in fact a subtype of genitive constructions. This is the main reason that English is not a numeral classifier language. The quantifiers also have a lexical meaning of their own.

Classifiers in Possessive Constructions

Classifiers in possessive constructions are of three kinds. *Relational classifiers* categorize the ways in which noun referents relate to, or can be manipulated by, the possessor – whether they are to be eaten, drunk, worn, etc. They tend to occur in languages that distinguish alienable and inalienable possession. In Fijian (Lichtenberk, 1983: 157–158), different classifiers are used to categorize kava as something one is going to drink, as in (6), or as something one has grown or is going to sell, as in (7).

(6) na me-qu yaqona
ARTICLE CL:DRINKABLE-my kava
'my kava (which I intend to drink)'

(7) na no-qu yaqona
ARTICLE CL:GENERAL-my kava
'my kava (that I grew, or that I will sell)'

Oceanic languages typically have from two to five relational classifiers, while Kipeá-Karirí, an extinct Macro-Jê language from Brazil, had 12. Categorization of the possessive relationship via a relational classifier is based on functional interaction between possessor and possessed. The primary semantic division of referents is into consumable and nonconsumable, as in Fijian, or general and alimentary, as in Manam (Lichtenberk, 1983; Dixon, 1988: 136). Consumable objects can be further classified according to the way in which they are consumed (eaten, drunk, chewed), or prepared (e.g., cooked or roasted). Nonconsumable objects are classified according to how they have been acquired (e.g., found, or received as a gift, as in Kipeá-Karirí). Value is a semantic parameter used in relational classifiers in Oceanic languages. Humans can be classified by their social function, that is, social status or kinship relationship, as in Ponapean, a Micronesian language.

Possessed classifiers characterize a possessed noun itself, based on the physical properties (shape, form, consistency, function) or animacy of its referent, as in Panare (a South American language from the Carib family) (Aikhenvald, 2000: 128), shown in (8).

(8) y-uku-n wanë
1sg-CL:LIQUID-GENITIVE honey
'my honey (mixed with water for drinking)'

Possessed classifiers can also be in a generic-specific relationship with the noun they categorize (this is similar to noun classifiers mentioned in this article). In some Carib languages, 'my papaya' can only be phrased as 'my fruit papaya,' as in (9), from Macushí:

(9) u-yekkari ma'pîya
1sg-CL:FRUIT.FOOD papaya
'my papaya'

Table 2 Examples of the use of 'give' in Mescalero Apache

1. *Nát'uhí* **shán'aa** 'Give me (a plug of) tobacco'
2. *Nát'uhí* **shánkaa** 'Give me (a can, box, pack) of tobacco'
3. *Nát'uhí* **shánłtı̨į** 'Give me (a bag) of tobacco'
4. *Nát'uhí* **shántı̨į** 'Give me (a stick) of tobacco'
5. *Nát'uhí* **shánjaash** 'Give me (loose, plural) tobacco'

Generic possessed classifiers are often function-based. Uto-Aztecan languages have possessed classifiers for pets and domesticated plants.

Only one language, Dâw (from the Makú family in South America), has *possessor* classifiers characterizing the possessor in possessive constructions in terms of animacy.

Verbal Classifiers

Also called *verb-incorporated classifiers*, they appear on the verb, categorizing a noun, which is typically in S (intransitive subject) or O (direct object) function, in terms of its animacy, shape, size, structure, and position. Example (10), from Waris, a Papuan language of the Border family (Brown, 1981: 96), shows how the classifier-*put*-'round object' is used with the verb 'get' to characterize its O argument, coconut, as a round object.

(10) sa ka-m put-ra-ho-o
coconut 1sg-to VERBAL.CL:ROUND-get-BENEFACTIVE-IMPERATIVE
'Give me a coconut (literally coconut to-me round.one-give)'

Suppletive (or partly analyzable) classificatory verbs are a subtype of verbal classifiers. Classificatory verbs can categorize the S/O argument in terms of its inherent properties (e.g., animacy, shape, form, and consistency), as in Athapascan languages of North America, such as Mescalero Apache, shown in Table 2. Different arrangements of tobacco are reflected in the form of a classificatory verb whose basic meaning is 'give' (in bold) (Rushforth, 1991):

Alternatively, classificatory existential verbs can categorize the S/O argument in terms of its orientation or stance in space, and also to its inherent properties, as in Dakota and Nevome, from North America, and in Papuan languages of the Engan family in the Highlands of New Guinea. In Enga, a verb meaning 'stand' is used with referents judged to be tall, large, strong, powerful, standing, or supporting, e.g., men, houses, trees; and 'sit' is used with referents judged to be small, squat, horizontal, or weak, e.g., women, possums, ponds.

Cross-linguistically, classificatory verbs tend to belong to the semantic groups of handling, motion, and existence/location. That classificatory verbs should combine reference to inherent properties of referents, and to their orientation, is not surprising. Shape, form, and other inherent properties of objects correlate with their stance in space. Certain positions and states are only applicable for objects of particular kinds; for instance, a tree usually stands, and only liquids can flow. However, classificatory verbs differ from the lexical selection of a verb in terms of physical properties or the position of an object. Most languages have lexical items similar to English *drink* (which implies a liquid O), or *chew* (which implies an O of chewable consistency). Unlike these verbs, classificatory verbs make consistent paradigmatic distinctions in the choice of semantic features for their S/O argument throughout the verbal lexicon. In other words, while English distinguishes liquid and nonliquid objects only for verbs of drinking, classificatory verbs provide a set of paradigmatic oppositions for the choice of verb sets depending on the physical properties of all kinds of S/O. Similarly, posture verbs in many languages tend to occur with objects of a certain shape. For instance, in Russian, long, vertical objects usually stand, and long, horizontal ones lie. However, the correlations between the choice of the verb and the physical properties of the object are not paradigmatic; these verbs cannot be considered classificatory.

Locative Classifiers

Locative classifiers occur with locative prepositions and postpositions, and categorize the head noun in terms of its animacy or physical properties, including form and shape. These are found in South American Indian languages of the Carib family, and in Palikur, an Arawak language from Brazil: e.g., *pi-wan min* (2sg-arm LOC.CL + VERTICAL) 'on your (vertical) arm'; *ah peu* (tree LOC.CL + BRANCH LIKE) 'on (branchlike) tree'.

Deictic Classifiers

Deictic classifiers occur on deictics within a noun phrase and categorize the noun referent in terms of its inherent properties and position in space, such as horizontal or vertical. They are found in Siouan languages from North America, e.g., Mandan *dɛ-mãk* 'this one (lying)'; *dɛ-nak* 'this one (sitting).' Nouns are typically classified by their canonical position, which correlates with their shape and extendedness; for instance, in Pilagá (a Guaicuruan language, from Argentina), fire and stones are classified as horizontal, and buildings and animals as sitting.

All noun categorization devices use the same set of core parameters, which include:

- animacy;
- physical properties covering shape and dimensionality (one-, two-, or three-dimensional objects, including long, flat, and round referents) and direction; size; consistency (flexible, hard or rigid, liquid); material (what the object is made of, e.g., clothlike);
- functional properties (to do with specific uses of objects or kinds of action typically performed on them), including social status, which can be considered a subtype of functional categorization;
- arrangement (that is, configuration of objects, e.g., a coil of rope or a bunch).

Various kinds of noun categorization devices opt for different preferred semantic parameters: animacy and humanness are predominant in noun classes, while noun classifiers often categorize referents in terms of their function and social status. Numeral classifiers typically categorize referents by shape (e.g., round or vertical), while verbal classifiers may also involve orientation (vertical or horizontal). Semantic parameters employed in noun categorization systems follow some tendencies. If a language has classifiers for three-dimensional objects, it is likely to also have classifiers for two-dimensional ones. A summary of preferred semantic parameters depending on a type of noun categorization device is in Table 3 (for their cognitive correlates, see also Bisang, 2002). These preferences represent only tendencies.

Generic-specific relations are characteristic of noun classifiers, verbal classifiers, and sometimes possessed classifiers, but not of other types (they are rare in numeral classifiers).

The semantic complexity of an individual noun class or classifier varies. Some are semantically simple, e.g., the classifier 'person' in Malay and Minangkabau used with all humans. Others undergo semantic extensions, and their choice is less straightforward. Consider the semantic structure of the classifier *-hon* in Japanese (Matsumoto, 1993: 676–681). In its most common use, it covers saliently one-dimensional objects, e.g., long, thin, rigid objects such as sticks, canes, pencils, candles, trees, dead snakes, and dried fish. It also covers martial arts contests with swords (which are long and rigid), hits in baseball, shots in basketball, Judo matches, rolls of tape, telephone calls, radio and TV programs, letters, movies, medical injections, bananas, carrots, pants, guitars, and teeth. This heterogeneity results from various processes of semantic extension and metonymy. Extensions can be based on certain rules for transferring class

Table 3 Preferred semantic parameters in classifiers

Classifier	*Typical semantics*	*Generic-specific relation*
Noun classes	Animacy, humanness, physical properties, rarely nature or function	No
Numeral classifiers	Animacy, humanness, physical properties, nature, rarely functional properties	Rare
Noun classifiers	Social status, functional properties, nature	Yes
Verbal classifiers	Physical properties, rarely animacy, nature	Yes
Relational classifiers	Functional properties	No
Possessed	Physical properties, nature, animacy	Yes
Classifiers	Functional properties	
Locative classifiers	Physical properties, rarely animacy	No
Deictic classifiers	Directionality, physical properties	No

membership, as in Dyirbal (see the section "Noun Classes").

According to these principles, idealized models of the world – for instance, myths and beliefs – can account for other chaining links within the structure of a class. In Dyirbal, birds belong to feminine Class II, because they are believed to be the spirits of dead human females.

A further type of extension is the Domain of Experience Principle, which links members thought to be associated with the same experience domain. Thus, fish in Dyirbal belong to Class 1, since they are animate, and so do fishing implements, because they are associated with the same activity. These domains are often culture-specific, and subject to change with sociocultural changes. The numeral classifier *tay* in Korean was originally used with reference to traditional vehicles, and then was extended to introduced European artifacts with wheels. It was further extended to any electric machinery, and to other kinds of machines or instruments, including even the piano. In Austroasiatic languages, shape parameters in inanimate categorization account for typical semantic extensions of terms for plants and their component parts when employed as classifiers, such as small and roundish (from the word for 'seed'), round (from 'fruit'), bulky (from 'tuber'), flat and sheetlike (from 'flower,' 'leaf,' 'fiber'), and long (from 'stalk,' 'stick,' 'sprout') (Conklin, 1981: 341).

An instructive example of prototype-and-extenson in a multiple classifier system comes from classifier *tua* in Thai (used with numerals, demonstratives, and adjectives). The structure of the category is shown in Figure 1. Arrows indicate extensions from a prototypical member to a less prototypical one (Carpenter, 1987: 45–46).

The prototypical referent classified with *tua* is a four-legged animal, such as a dog or a water buffalo. The classifier extends to include trousers and shirts, due to their shape: trousers are leglike, and shirts have armlike sleeves. Because of shared function, and the bodylike shape, this classifier also applies to jackets

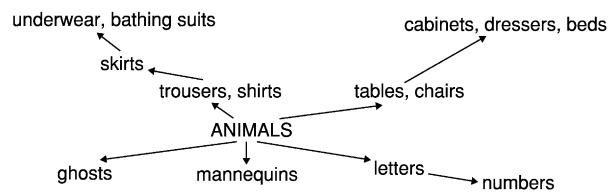

Figure 1 Structure of the *tua* category in Thai.

and skirts and even to dresses, underwear, and bathing suits. The general four-legged shape of items of furniture, such as tables and chairs, accounts for their inclusion in the category covered by the classifier *tua*. Other kinds of furniture were then added because of their shared function with tables and chairs. 'Letter (of the alphabet)' in Thai is a compound *tua nangseu* 'body book', so a combination of shape and repetition of the generic compound head caused letters to be classified with *tua*. Numbers were included either on the basis of shape or by their shared function with letters. Ghosts were included because of their similarity with the two-limbed shape of a human body. Semantic extensions of classifiers can be manipulated by language planners. Following an order of King Mongkut issued in 1854, 'noble' animals, such as elephants and horses, should be counted without any classifier; the classifier *tua* could be used only for animals of a 'lower' status. In Setswana, a Bantu language with a large set of noun classes, it is now considered politically incorrect to refer to ethnic minorities, such as the Chinese or the Bushmen, using noun class 5/6 (which includes substances, such as dirt or clay, and abstract nouns); all humans have to be referred to with the 'human' class 1/2 (see Table 1).

Noun categorization devices are hardly ever semantically redundant. They are often used to distinguish what can be encoded with different lexemes in some languages. For instance, in Burmese a river can be viewed as a place, as a line (on a map), as a section, as a sacred object, or as a connection. These meanings are distinguished through the use of different

Table 4 Categorization of an inanimate noun in Burmese with a classifier

Noun	*Numeral*	*Classifier*	*Translation*
miyiʔ	tə	yaʔ	river one place (e.g., destination for a picnic)
miyiʔ	tə	tan	river one line (e.g., on a map)
miyiʔ	tə	hmwa	river one section (e.g., a fishing area)
miyiʔ	tə	sin	river one distant arc (e.g., a path to the sea)
miyiʔ	tə	θwɛ	river one connection (e.g., connecting two villages)
miyiʔ	tə	pa	river one sacred object (e.g., in mythology)
miyiʔ	tə	khu	river one conceptual unit (e.g., in a discussion of rivers in general)
miyiʔ	tə	miyiʔ	river one river (the unmarked case)

numeral classifiers – this is shown in Table 4 (Becker, 1975: 113).

In Apache, a plug, a box, a stick, and a bag of tobacco are distinguished through the use of different classificatory verbs. In languages with overt noun class marking, variability in marking noun class on the same root is a way of creating new words. In Bantu languages, such as Swahili, most stems usually occur with a prefix of one class. Prefixes can be substituted to mark a characteristic of an object. *M-zee* means 'old person' and has the human class prefix *m-*. It can be replaced by *ki-*(inanimate class) to yield *ki-zee* 'scruffy old person'. In Dyirbal, the word 'man' can be used with the feminine class marker, instead of masculine, to point out the female characteristics of a hermaphrodite. In Manambu, 'head' is usually feminine because of its round shape, but it is treated as masculine when a person has a headache, since then the head feels heavy and unusually big.

We have seen that semantically noun categorization devices are heterogenous, nonhierarchically organized systems that employ both universal and culture-specific parameters. The ways these parameters work are conditioned and restricted by cognitive mechanisms and the sociocultural environment. Among universal parameters are animacy, humanness, and physical properties, e.g., shape, dimensionality, consistency. Culture-specific parameters can cover certain functional properties and social organization.

Classificatory parameters associated with function rather than physical properties are more sensitive to cultural and other nonlinguistic factors. Human categorization, as a sort of 'social' function, depends entirely on social structure. Functional categorization of inanimate and nonhuman objects is directly related to cultural notions. Animacy and sex, when extended metaphorically, are influenced by social stereotypes and beliefs.

Correlations between the choice of physical properties encoded in classifiers and nonlinguistic parameters are much less obvious. They may relate to the cultural salience of certain shapes or forms, and they may ultimately be based on typical metaphorical extensions.

See also: Cognitive Semantics; Gender, Grammatical; Metaphor and Conceptual Blending; Metaphor: Psychological Aspects; Possession, Adnominal.

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Classroom Talk

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Much classroom activity takes the form of talk. In recent decades, studies of teacher and student spoken language in the classroom have been undertaken from a variety of perspectives in applied linguistics, education, ethnography, and ethnomethodology. In particular, the analyses of talk between the teacher and the students, as well as among students, seek to understand how the spoken language and the discourse of the classroom affect learning (including language learning) and the development of sociocultural affiliation and identity (e.g., Watson-Gegeo, 1997).

To a great extent, spoken language and face-to-face interaction constitute the foundational aspects of both teaching and learning at school. Although specialists in education and teaching first became interested in the impact of classroom discourse and interaction on students' learning and the development of cognitive skills in the 1930s and 1940s, since that time, research on classroom talk has moved forward in a number of directions. In the study of language and applied linguistics, classroom talk has been the subject of considerable exploration in discourse, conversation, and text analyses, as well as sociolinguistic and sociocultural features of interaction.

The linguistic features of classroom talk were studied intensively in the 1970s and 1980s, when the uses of language and forms of interaction at school became an important venue in discourse, pragmatic, and literacy studies. Many of the early discourse analyses focused on the linguistic features of talk, narrative structure, common speech acts, their sequences, and the contexts in which they occurred, as well as the flow of classroom speech (e.g., Sinclair and Coulthard, 1975; Stubbs, 1983). As a matter of course, these studies approached classroom talk as occurrences of conversational discourse, without attempting to discern the effect of the language spoken in the classroom on student learning and the educational processes. The analyses of the discourse flow and the language of interaction revealed that classroom talk is highly structured and routinized.

Building on the discourse-analytic foundation, the influential work of such sociolinguists and cognitive linguists as Cazden (2001), Gumperz (1982, 1986), Edwards and Mercer (1987), and Edwards and Westgate (1994) employed a combination of methodological perspectives in their explorations of the spoken discourse, language, and the structure of interaction in schooling. In general terms, sociolinguistics takes into account the social contexts and the structure of interaction to determine how they shape the spoken language. Sociolinguistic research methods in the classroom are usually complemented by ethnographic and pragmatic perspectives. Taken together, the findings of these studies have brought to the foreground issues of power, socioeconomic class, culture, and the social construction of experience in

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the classroom. Many, if not most, of these investigations point to the common and frequent mismatches between the normative properties of the school language and the language used in students' families.

A number of important and congruent findings have emerged from the study of classroom discourse and spoken language. One prominent thread in research is that a large majority of classroom interactions occur between the teacher and the students, individually or in groups, although some student–student interactions also take place during group or collaborative activities. Investigations carried out in different locations and countries around the world have shown that in classroom interactions, teachers talk approximately 75% of the time, with the remainder divided among the students. This pattern of talk seems to be comparatively consistent and, on the whole, resistant to change, despite the calls for its modification or attempted educational reforms (e.g., van Lier, 1988, 1996; Dysthe, 1996; Nystrand, 1997).

Another strand that runs through practically all studies is that classroom talk includes a number of predictable and observable sequences. Much of the classroom spoken language centers around knowledge and information elicitation turns between the teacher and the students, cohesive topical stretches of talk, or exchanges motivated by instructional activity in the classroom. In general terms, teacher–student exchanges reflect the unequal and hierarchical relationship of their participants in teacher-fronted classrooms (Edwards and Westgate, 1994).

The typical conversational patterns in such dyadic exchanges proceed along the lines of what has become known as Initiation-Response-Feedback (IRF) (also called Initiation-Response-Evaluation or Question-Answer-Comment), e.g.:

Teacher: So, why did Peter run to the village?
Student: For a joke.
Teacher: Right!

In such routine classroom sequences, the teacher initiates the interaction or asks a question, the student responds or answers the question, and the teacher takes the concluding turn that provides a commentary (e.g., *So, Peter was bored*) or an evaluation (e.g., *Good/Great answer*).

Spoken language in the classroom is fundamentally different from many other types of talk, such as conversations among peers, coworkers, or family members. Some researchers, such as, for example, Mehan (1979) and van Lier (1996), have pointed out that IRF interactions are, by their nature, artificial and constrained and, for this reason, they cannot be analyzed as ordinary conversational discourse that follows ordinary interactional conventions. In their view, the institutionalized structure of classroom talk is crucially distinct when the teacher nominates topics and speakers, and controls turn-taking and the amount of participant talk.

The decades of investigating talk in the classroom have also identified the social, cultural, and behavioral practices that predominate in classroom discourse. Numerous studies carried out in such locations as the United States, the United Kingdom, and Scandinavia have demonstrated that complex systems of sociocultural prescriptions and expectations that exist in the wider society are strongly reflected in the norms of speaking and behaving in the classroom. Influential works by, for example, Heath (1983) and Gee (1990), highlight the pervasive discontinuities between the middle-class linguistic and interactional practices widely adopted in schooling and those in children's homes. The disparities between the rigidly prescribed and traditional rules of the classroom talk extend to the learning, socialization, and literacy development of the children in racially and linguistically diverse schools. Examples of language and interaction mismatches abound (e.g., Scollon and Scollon, 1981; Brock *et al.*, 1998):

- Spanish-speaking students in the United States are not always familiar with the predominant norms of classroom behavior when students are expected to be quiet while the teacher or another student is speaking.
- Native American students often participate in class conversations collectively, but not individually, as is usually expected in U.S. and Canadian schools.
- Ethnic Chinese students in U.K. and Australian schools rarely speak during requisite classroom activities and strongly prefer to work alone instead of working in groups, where much conversation is required.

In all, a large number of sociolinguistic and ethnographic studies have shown conclusively that the practice of classroom talk and the rigid norms of interaction in schooling represent culturally bound contexts for learning. As an outcome, the learning and literacy development of racial and linguistic minority students can be constrained in the classrooms where the structure of talk and discourse follows sociocultural prescriptions different from those in the students' communities outside the school.

From a different vantage point, research in discourse and conversation analysis, as well as language acquisition, has also shown that classroom talk has numerous important learning, cognitive, and social functions. The most common of these include exposure to language and linguistic input in the form

of, for example, direct instruction, questions and answers, orientations to topics, information elicitations, explanations, hypothesis-making, and using evidence. In the following example of a story-circle discussion, the teacher attempts to elicit more elaborate explanations and evidential support for the students' in effect accurate appraisal of the story events:

Teacher: Ok, so Laura got a pretty new dress ... . A very nice dress. She must have liked it. So, did she like it?
Several students together: Noooooooo.
Teacher: She didn't? Well, no, she didn't ... . Eh, ok, ... so how do we know that she didn't?
Sam: She said ... I ... I don't need it ... it ... the new one. So, she didn't.
Teacher: Good job, Sam, good thinking ... . Laura **really** didn't need this dress? Ok, or maybe, she didn't like it? Can we tell? How can we tell?

In addition to guiding the students to support their conclusion by means of the information in the story, the teacher also uses relatively advanced syntactic constructions, such as *must have liked it* and a number of complex sentences with noun clauses and negation.

More recently, with the increased understanding of learners' cognitive and linguistic development, investigations of classroom talk have continued to gain importance in language teaching and education of second language and minority students. In many cases, discourse and conversation analyses of classroom talk have also shown that language uses and interactions in educational contexts play an important role in learner language and cognitive development (see, e.g., Edwards and Westgate, 1994; Dysthe, 1996; Seedhouse, 2004). For instance, the uses of lexical and grammatical features in classroom talk have allowed researchers to assess the value of classroom language exposure and input in language learning and the growth of first and second language literacy skills.

Among other venues, for example, the uses of display and referential questions in classroom talk have been extensively researched. The purpose of display questions is to elicit information already known to the interaction participant, who asks the question to lead to the display of knowledge or familiarity with information, e.g., "What do we call this thing?" On the other hand, referential questions elicit information that is not known to the speaker, e.g., "Why did you and Mary put this picture before that one?" Studies of referential questions have shown that their educational uses lead to different classroom exchanges that result in significantly longer speech events, higher rates of lexically and syntactically complex responses, and greater opportunities for learner language use (e.g., Edwards and Mercer, 1987; van Lier, 1996).

In-depth investigations of classroom talk have undertaken to gain insight into a large number of sociocultural and linguistic properties of interaction, such as equal and unequal power relationships, some aspects of turn-taking, talk management, and the timing and length of speech events (e.g., Markee, 2000). From the perspective of conversation analysis, classroom interactions have provided a fertile ground for examinations of repair, correction, self-correction, discourse, and face-saving markers in equal and unequal power educational contexts.

At present, sociologists, educators, and linguists almost universally recognize that social and cultural institutions of schooling are inseparable from how language and discourse are employed to transmit knowledge and socialize learners (e.g., Watson-Gegeo, 1997; Cazden, 2001).

See also: Conversation Analysis; Identity and Language; Institutional Talk; Language Education: Teacher Preparation; Socialization.

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Clause Relations

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The concept of the 'clause relation' grew up in a number of places at the same time at the end of the 1960s and at the beginning of the 1970s. Given that there was limited contact between the linguists responsible for the notion, it is unsurprising that each linguist or group of linguists labeled and defined it slightly differently, but a basic shared element in the definitions was that a clause relation was a regularly recurring semantic relationship holding between parts of a text, minimally clauses, that helped account for the organization of the text.

One of the places where the concept of the clause relation was developed was at Hatfield Polytechnic, Hatfield, England, where Eugene Winter headed a small group of researchers interested in the ways in which written text may be organized. Winter had worked with M. A. K. Halliday, Richard Hudson, Rodney Huddleston, and Alec Henrici on a corpus-based study of scientific writing, funded by the Office of Scientific and Technical Information and completed in 1968, and it had become apparent to him that some aspects of the ways clauses and sentences interconnected in scientific text could not be explained in terms of the scale-and-category model (an early version of systemic grammar) which they were using. He therefore posited that clauses were systematically related to each other (Huddleston *et al.*, 1968; Winter, 1971) in ways that could be described independently of the grammar (though he was always insistent on the close relationship between grammar and clause relations, and felt that grammars needed to be adapted to take account of this relationship). He defined clause relations as follows:

> A clause relation is the cognitive process whereby we interpret the meaning of a sentence or group of sentences in the light of its adjoining sentence or group of sentences. (Winter, 1971 and elsewhere)

It will be noted that, despite its label, a clause relation may hold between sentences and groups of clauses as well as, of course, between clauses. It will also be noted that the definition treats the clause relation as a property of the reader's processing of the text rather than a property of the text itself, an important difference from the position adopted by others working with the notion. These points will be returned to later.

Winter quickly moved to the position that there are two basic kinds of clause relation (Winter, 1971 *et seq.*): matching relations and logical sequence relations (relabeled sequence relations in Hoey, 1983, in order to accommodate spatial and temporal sequence relationships). Matching relations are characterized by two clauses or groups of clauses being matched for points of similarity and difference in the content. Such relations include compatibility (e.g., *I like Mozart and so does my wife*), contrast (e.g., *I like Mozart but my wife does not*), generalization – exemplification (e.g., *My wife doesn't like classical music. For example, she hates Mozart*), and preview–detail (e.g., *There are three composers I especially like. I really enjoy Mozart, I love Bach and I adore Sibelius*) The simplest kind of matching relation is topic maintenance (e.g., *Mozart is one of my favorite composers. He was born in Salzburg*).

Authentic examples of matching relations can be found in the following passage from a 1907 biology primer (*A primer of biology and nature study* by Randal Mundy):

> 2.1 **A Simple Classification of Plants.** – Plants may be divided into two great groups:

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> 2.1 **A Simple Classification of Plants.** – Plants may be divided into two great groups:

BRYOPHYTES	or moss-like plants	consist of	a stem and leaves	(but) have no true roots or fibro-vascular bundles
PTERIDOPHYTES	or fern-like plants	possess	stem, leaves	roots and fibro-vascular bundles
replacement (of name)	replacement (of point of comparison)	repetition (by rough paraphrase in this context)	repetition (by use of same words)	replacement (of negative by positive)

Figure 1 A simple analysis of the repetition/replacement pattern in a contrast relation between two pieces of text.

I. *Flowerless Plants* (Cryptogams).
II. *Flowering Plants* (Phanerogams).
I. **Flowerless Plants** comprise the Thallophytes, Bryophytes and Pteridophytes.
  1. THALLOPHYTES have a body commonly in the form of a flattened shoot, termed a thallus. They have no true roots and are reproduced by **spores**. They are thus sub-divided:-
    (a) *Algae*, *e.g.*, sea-weeds and many fresh water plants, such as Chara.
    (b) *Funghi*, *e.g.*, moulds and mushrooms. No chlorophyll is present.
    (c) *Lichens*, peculiar plants each consisting of an alga and a fungus, living together for their mutual advantage.
  2. BRYOPHYTES or moss-like plants consist of a stem and leaves, but have no true roots or fibro-vascular bundles. They are reproduced by **spores**. Bryophytes are sub-divided into:-
    (a) *Hepatics* or *Liverworts*, *e.g.*, Marchantia and Jungermannia.
    (b) *Mosses*. *(See Chapter XXII)*
  3. PTERIDOPHYTES or fern-like plants possess stem, leaves, roots and fibro-vascular bundles, and are reproduced by **spores**. They comprise :-
    (a) *Ferns*.
    (b) *Equisetums* (Horsetails).
    (c) *Lycopodiums* (Club mosses).
II. **Flowering Plants** have root, stem, leaves, flowers and fibro-vascular bundles, and are reproduced by **seed**. They are sub-divided into:-
  (a) GYMNOSPERMS, with seeds naked, *i.e.*, not enclosed in a cavity (ovary); *e.g.*, Cycads, and Conifers such as the pine, fir and yew.
  (b) ANGIOSPERMS, with seeds enclosed in an ovary. They comprise:-
    i. *Monocotyledons* (one seed-leaf or lobe), *e.g.*, grasses, rushes, palms and lilies.
    ii. *Dicotyledons* (two seed-lobes), *e.g.*, most trees, shrubs and herbs.

This passage is more or less entirely made up of different kinds of Matching relations. At the uppermost level, the whole passage is organized by a preview-detail relation, with

> 2.1 A Simple Classification of Plants. – Plants may be divided into two great groups:- I Flowerless Plants (Cryptogams). II Flowering Plants (Phanerogams)

functioning as the preview and the remainder of the passage serving as the detail. Within the paragraphs there are also instances of generalization–example, such as:

> Algae, e.g., sea-weeds and many fresh water plants, such as Chara.

In this case neither the generalization nor the examples are expressed as full clauses. The contrast relation can be illustrated in the following two pieces of text:

> BRYOPHYTES or moss-like plants consist of a stem and leaves, but have no true roots or fibro-vascular bundles.

> PTERIDOPHYTES or fern-like plants possess stem, leaves, roots and fibro-vascular bundles . . .

Winter (1979) noted that pieces of text such as these can be analyzed in terms of what is repeated and what is replaced (see Figure 1). The focus here is on what is replaced rather than on what is repeated, because it is the differences that provide the basis for the classification. In the two pieces of text in Figure 2, however, the focus is on the sameness; this, then, is an instance of a compatibility relation, and it will be seen that the only replacement here is of the topic.

Clause relations may function between large chunks of text (the preview–detail relation) or between bits of clauses (the generalization–example relation) or between one or more clauses (the contrast and compatibility relations). In this respect, the name is misleading, implying as it does that the relationships are only or primarily between clauses. Relations may be inferred by the reader or can be signaled by

They [ref. THALLOPHYTES]	have no true roots and	are reproduced by **spores.**
[ellipsis of BRYOPHYTES]	have no true roots ...	They are reproduced by **spores.**
replacement of name	repetition	repetition

Figure 2 A simple analysis of the repetition/replacement pattern in a compatibility relation between two pieces of text.

the writer, either by parallel structures and repetition as in the compatibility example or by a special vocabulary of signals (signals in the passage include *subdivided*, *e.g.*, *thus*, *but*, *comprise*, *consist of*, *i.e.*, *such as*), which serve to label both prospectively and retrospectively the relations the writer sees between the chunks of text, as well as by typographical features such as listing and capitalization.

As noted above, the other great class of clause relations, according to Winter, is that of the sequence relations. Sequence relations include time sequence (e.g., *she washed her face and then put her coat on*), cause–effect (e.g., *it was cold, so she put her coat on*), instrument–purpose (e.g., *she put her coat on to protect herself from the cold*), instrument–achievement (e.g., *she put her coat on and protected herself against the cold*), and spatial sequence (e.g., *Her coat hung on a clothes-stand in the hall. An old umbrella lay on a table next to it*). It will be noticed from the fabricated examples that, as with the matching relations, the relationship may be between clauses that are syntactically integrated, between clauses that are loosely coordinated or between self-standing sentences. Some of the sequence relations are illustrated in the following extract from a biography of Shakespeare published in 1908 (*A life of William Shakespeare* by Sidney Lee).

> At the beginning of 1616 Shakespeare's health was failing. He directed Francis Collins, a solicitor of Warwick, to draft his will, but, though it was prepared for signature on January 25, it was for the time laid aside. On February 10, 1616, Shakespeare's younger daughter, Judith, married, at Stratford parish church, Thomas Quiney, four years her junior, a son of an old friend of the poet. The ceremony took place apparently without public asking of the banns and before a license was procured. The irregularity led to the summons of the bride and bridegroom to the ecclesiastical court at Worcester and the imposition of a fine.

This passage contains a number of sequence relations. First, we can identify a cause–effect (or cause–consequence) relation between the first sentence and the first clause of the second. Likewise we can see a time sequence relation between the second and third sentence, and another between the third sentence, summarized in the first clause of the fourth (*the ceremony took place*), and the final clause of the fourth (*a license was procured*). The fourth sentence, summarized as the noun phrase *the irregularity*, is the cause and *the summons . . . to the ecclesiastical court* and *the imposition of a fine* are its effects (or consequences), themselves in a time sequence relation. As before, relations may be inferred by the reader or can be signaled by the writer; the special vocabulary of signals used in this passage comprises *before* and *led to*, as well as the use of dates in the second and third sentences.

Winter's work was picked up and developed by a number of linguists, including Winifred Crombie (see below), Michael Hoey, and Michael Jordan (1983, 1985, 1988, 1990, 1992); Jordan's work seeks to integrate clause relational theory with cohesive analysis in interesting ways. Although Winter himself never attempted to itemize or classify clause relations (indeed, in his later work such as Winter, 1982, 1986, 1992, and 1994 he retreated from classificatory systems), they quickly turned into a classificatory system, and here the second place where the idea turned up was influential. Working in conjunction with the Summer Institute of Linguistics, John Beekman and John and Katherine Callow were involved in efforts to translate the Bible into languages in which it had hitherto been unknown. They found that translations that only concerned themselves with the transference of sentence meanings from one language to the other resulted often in stilted and even unintelligible translations. Only if a textual dimension was built in was there a chance of a translation being accepted in the community for which it was intended. More specifically, they argued in a series of articles (Beekman, 1970a, etc.) and a book (Beekman and Callow, 1974) that texts are organized in terms of regular semantic relations the world over and that the first step in undertaking any translation is to analyze the source text into its component relations; the translation may need to configure these relations differently in accordance with the expectations of the target language community but the relations themselves would not be altered. A similar position was argued by Robert Longacre and his colleagues in a range of papers and books (Ballard *et al.*, 1971; Longacre, 1972, 1976 [substantially revised as Longacre, 1983], 1979, *et seq.*), though the

attention in the earlier of these works was on the relationship of clauses only.

The Callows (Callow and Callow, 1992: 6) emphasized the perspective of the writer or speaker rather than that of the reader or listener (in contrast to Winter, see above): "The speaker is central." My own adaptation of Winter's definition (Hoey, 1983) also foregrounded the writer/speaker, though not at the expense of the reader/listener.

Despite the sender/receiver focus of both these perspectives, the practice of clause relation analysts in both the United States and the United Kingdom was message centered. Beekman and the Callows argued that messages are structured. For them, the largest unit of communication is the message, roughly equivalent to the text, and the smallest unit is the proposition, roughly equivalent to the content of a clause. A message consists of 'units-in-relation' and their term for the relation holding between units is 'coherence relation':

> Related propositions constitute a configuration. The clauses *Mary blushed* and *Simon laughed* do not, as they stand, realize a configuration, because their relationship is not clear. But *Mary blushed because Simon laughed* does realize a configuration. *When Mary blushed Simon laughed* realizes a different configuration: the units are the same but the coherence relation is different. (Callow and Callow, 1992: 9)

This analysis is, it will be noted, text centered. The writer is only here in the connectives that make the configuration interpretable. The reader is nowhere. Despite the fact that Beekman and the Callows appear to be talking about the same things as Winter, their starting point was at the other end of the interaction, which is unsurprising, given that their background was in translation. The terms and concepts, though, are very similar. They did not divide relations into matching and sequence relations, but they did have relations such as purpose, reason, result, and identification and they showed how such relations can account for the organization of one of the shorter Epistles, that of Jude (Beekman, 1970b).

Like Beekman and the Callows, Winifred Crombie (1985a, 1985b) had a practical goal – the improvement of ELT materials. Drawing on Winter's work, with a knowledge also of the work of Beekman and his colleagues, she provided one of the fullest classifications of clause relations, which she termed 'semantic relations.' She grouped these relations in a more complex way than Winter or Hoey, her broad categories being temporal, matching, cause–effect, truth and validity, alternation, bonding, paraphrase, amplification, and setting/conduct. It would go beyond the scope of an article such as this to give details of all of these, but bonding, for example, subdivides into:

1. Coupling (two or more juxtaposed members, without comparison or sequence being in focus, e.g., *Achilles wore a robe and carried a shield*)
2. Contrast
3. Statement–exemplification
4. Statement–exception.

Crombie's categories are perceptive and thorough and as a starting point for analysis they comprise the best classification within the British tradition (and arguably elsewhere as well). They are, however, even more text centered than those of Beekman and the Callows, and Crombie sought to represent them formally in quasi-logical and partly abstract fashion. Winter's focus on the reader is not lost, though – she introduced the notion of semantic relations in terms of the questions that might be asked by a reader to elicit particular relations – and she also picked up from Winter an attention to the way relations are signaled, a facet of clause relation analysis that will be returned to later in the article.

Crombie is not the only linguist to have attempted to classify clause relations, though she is probably the only one to have linked such a classification to the ways in which writers may signal to the reader the semantic relations they intend between pieces of text. One pair of linguists who went further down the classificatory road and at the same time further from the interactive starting point is William Mann and Sandra Thompson (1986, 1987; Mann *et al.*, 1992), whose rhetorical structure theory (RST) grew explicitly out of the work of Winter, Jordan (1984), Hoey, and Beekman and the Callows. Like Crombie, Mann and Thompson took great care to formalize and categorize relations and in common with all the linguists so far mentioned, they were driven by a practical goal, in this case the automatic generation of text as well as the automatic processing of text within a systemic-functional tradition.

One of the major features of Mann and Thompson's adaptation of clause relations is that relations are typically asymmetric, with one member being central (the nucleus) and the other being more marginal (the satellite). The relation operates between spans of text and within spans of text. White's (1998) account of the orbital structure of newspaper texts would at first sight be supportive of their position, in that he argued that news stories are organized in terms of a series of satellites all relating back to an initial sentence or sentences that report the core news. White's analysis was not, however, apparently compatible with RST in another respect, as will be explained below.

Mann and Thompson, with Matthiessen, argued for a hierarchical analysis of texts:

> Texts are organized such that elementary parts are composed into larger parts, which in turn are composed into yet larger parts up to the scale of the whole text. (Mann *et al.*, 1992)

This assumption, which they noted is not the only possible assumption one might make, is helpful because it reminds us that chunks of text may relate to other chunks. It also forces a fuller and more systematic examination of the relations in a text. A hierarchical view of clause relations is present also in the work of Gottfried Graustein and Wolfgang Thiele (1981, 1987, etc.), East German linguists who independently developed the notion of configurations of clause relations but were apparently unknown in the American tradition, though in contact from the late 1970s with Winter and his colleagues. Like Mann and Thompson, Graustein and Thiele saw text as hierarchically organized, but they made greater, and more clearly separate, use than Mann and Thompson of culturally popular patterns such as the problem–solution pattern (*see* **Problem-Solution Patterns**).

To show the way a hierarchical analysis can work (though without representing it in accordance with the terms and diagrammatic style of either Mann and Thompson or Graustein and Thiele), it is worth considering again the biology extract we analyzed earlier, which, though it has an apparently straightforward hierarchical organization, permits demonstration of the problems that a strict hierarchical view of the organization of text brings.

The first division into flowerless and flowering plants seems to license a first analysis into two blocks, the first block corresponding to the account of the flowerless plants, i.e., the thallophytes, bryophytes, and pteridophytes, and the second of course the account of the flowering plants (see Figure 3).

What Figure 3 claims is that the passage is divisible into two uneven chunks, the first comprising a general overview of the topic (the preview), the second the particulars of the topic (the details); Winter would have labeled this relation the general–particular relation. The details in turn are divisible into two (again uneven) chunks in a matching contrast relation between the three chunks of text concerned with the description of thallophytes, bryophytes, and pteridophytes and the block of text concerned with the description of flowering plants. As already intimated, the first chunk is further divisible into three subsections relating to three types of flowerless plants, in which the focus is equally on what they share (their compatibility) and where they differ (contrast). Each of these subsections is analyzable on similar lines until all the clauses are accounted for.

All these relations are justifiable in terms of the signals that the writer has incorporated into his text. The initial division into preview and details is established by the repetition of the headings with their Roman numerals and typographical distinctiveness. The contrast is explicitly signaled in advance by the word *divided* and the phrase *two great groups*, and also in the chunks themselves by two parallel questions being answered: what subclasses of flowerless/flowering plants are there, and how do they reproduce? The compatibility relations amongst the three sections on the flowerless plants are signaled by the kinds of repetition patterning that were being illustrated earlier. In short, such an analysis works and indicates both the way a text may be hierarchically organized and the way in which relations may occur between blocks of language.

The problem that the strictly hierarchical position has is that Figure 3 does not reflect all the relations in the text. While the flowering plants section undoubtedly stands in a contrast relation with the preceding three flowerless plants sections, it is also stands in a separate relation of compatibility with the last of the three flowerless plants sections, the pteridophytes. This can be shown in a similar fashion as previously in Figure 4.

The relations of compatibility and contrast in Figure 4 are no different from those we find between the sections devoted to the thallophytes and bryophytes, and indeed it would be possible to argue on linguistic evidence for a hierarchical analysis that represented the second stage as in Figure 5.

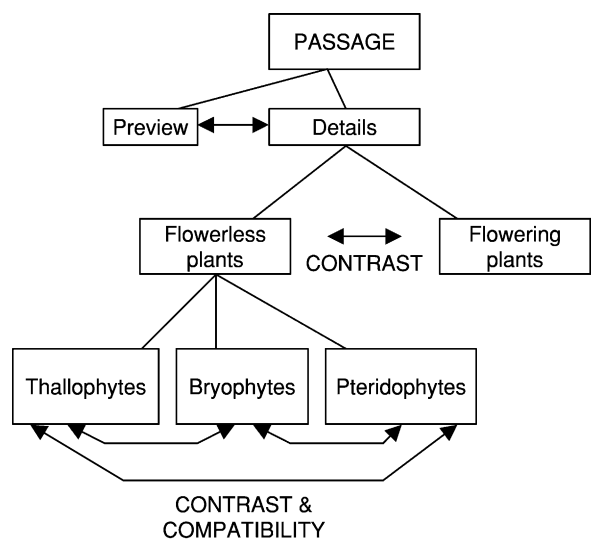

Figure 3 A partial hierarchical analysis of a passage of text.

PTERIDOPHYTES or fern-like plants	possess	stem, leaves, roots	—	and fibro-vascular bundles	and are reproduced by **spores.**
Flowering plants	have	root, stem, leaves	flowers	and fibro-vascular bundles	and are reproduced by **seed.**
replacement of topic	repetition by paraphrase	repetition by same lexical items	replacement by addition	repetition by same lexical items(s)	replacement of means of reproduction

Figure 4 Patterns of repetition and replacement in two sentences from the botany passage.

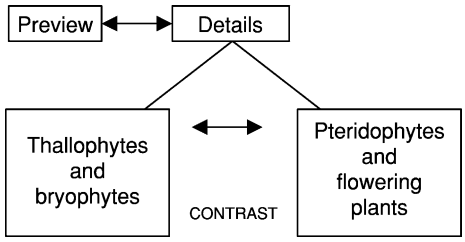

Figure 5 An alternative (partial) hierarchical analysis of the botany passage.

The hierarchical model of clause relations also assumes that all texts conform to a particular monologue model. White's work on news stories, referred to above, would seem fundamentally incompatible with the hierarchical assumption of RST; my account of colony texts such as dictionaries and encyclopedias (Hoey, 1986, 2001) also challenged the assumption, though it is possible to represent such texts as a shallow hierarchy.

All of this work has been influential and RST in particular still has many adherents, but the study of clause relations, and their use in analysis (as opposed to the use of culturally popular patterns, which are related to clause relations in a variety of ways [*see* **Problem-Solution Patterns**]), is perhaps no longer central to text linguistics. Except in a crude and limited fashion, they are not part of the armory of tools used in systemic-functional linguistics despite RST's close relationship to that model, which has after all a textual dimension. Nor are they used in critical discourse analysis, perhaps the most productive branch of written discourse analysis at the present time; Fairclough (1989) provided a helpful list of analytical tools that might be brought to bear upon a text, and clause relational analysis is not among them. Clause relations are not much used in contemporary stylistics, although Winter, Hoey (e.g., Hoey and Winter, 1982), Coulthard (1990), and other linguists have made effective use of the concept in the past. It is not that the concept has been rejected but that it has slipped out of use.

The reasons for this relative current neglect are probably fourfold. In the first place, clause relational analysis is time consuming. Secondly, it is often hard to allocate a particular pair of clauses (or groups of clauses) to a particular category of relationship with confidence. Thirdly, it is often sufficient to know that an analysis can be done without needing to do it; a detailed analysis of a text may be true but unrevealing. Finally, and most importantly, clause relational analysis is, as currently normally conceived, text centered rather than writer/reader centered. As we have seen, Winter's original definition placed clause relations in the interpretation of text by a reader, not in the text itself, though a later definition by Hoey and Winter (1986: 188) tried, perhaps unsuccessfully (and certainly clumsily), to define clause relations both in terms of the reader and in terms of the textual product:

> A clause relation is the cognitive process, and the products of that process, whereby the reader interprets the meaning of a clause, sentence, or group of sentences in the context of one or more preceding clauses, sentences, or groups of sentences in the same discourse. It is also the cognitive process, and the product of that process, whereby the choices the writer makes from grammar, lexis, and intonation in the creation of a clause, sentence or group of sentences are made in the context of the other clauses, sentences, or groups of sentences in the discourse.

Widdowson (2004) emphasized that text does not have meaning on its own but that readers find meaning in texts on the basis of context and what they bring to the text. In such terms, any attempt to find **the** semantic structure of a text is inherently misguided. This is not to say that a text never contains clause relations independently of the reader's interpretation – the writer may have chosen to signal explicitly the relation that he or she perceived between two pieces of text – but it is to say that there is no single analysis possible of any text unless, improbably, every possible semantic relation has been explicitly signaled within it. Readers may differ both in the relations they find in a text and in the inventory of relations they have available to them for processing the text. Consider

again the first two sentences of the passage about Shakespeare's final year: "At the beginning of 1616 Shakespeare's health was failing. He directed Francis Collins, a solicitor of Warwick, to draft his will, but, though it was prepared for signature on January 25, it was for the time laid aside." They were represented as standing in a cause–consequence relation. But that is one reader's interpretation and is not explicitly signaled in the text. It would be open to another reader to read these as in the relation of simultaneity (a special sequence relation in which time sequence is denied), in which Shakespeare's decision to draft a will may have been unconnected with his failing health. I prefer my reading but the other reading has to be accounted for. The future of clause relational analysis must therefore lie in a closer integration with reading theory. Attempts to determine a single semantic structure may be misguided but attempts to find **possible** semantic structures are not. It would be unfortunate if the insights clause relational analysis offers were lost for lack of any attempt to bring it up to date.

See also: Causatives: Semantics; Coherence: Psycholinguistic Approach; Cohesion and Coherence: Linguistic Approaches; Connectives in Text; Discourse Markers; Discourse Processing; Discourse Semantics; Functional Discourse Grammar; Macrostructure; Popularizations; Problem-Solution Patterns; Reading Processes in Adults; Rhetorical Structure Theory; Systemic Theory; Tagmemics; Text and Text Analysis; Text World Theory.

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Clause Structure in Spoken Discourse

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Clauses in unplanned speech are simpler than clauses in planned writing, which can be edited. The differences lie in the simplicity of noun phrases (NPs) and in where less-than-simple NPs are positioned in clauses; in the lack of *to*-clauses, *ing*-clauses, and complement clauses in subject position and their abundance at the end of clauses; in the absence of sentences; and in constructions that are typical of unplanned speech or planned writing (although a good number of constructions are typical of both). The constructions typical of unplanned speech are regarded as reflecting its general characteristics, especially the lack of editing time, the limitations of short-term memory, and the fact that information is signaled not just by the verbal component of language but also by nonverbal components such as gesture, pitch and amplitude, and voice quality.

Not all analysts agree that unplanned speech has simpler clause structure (e.g., Halliday, 1989), but the disagreements can be explained in terms of formality (setting, topic, and participants). Greater formality generally leads to more complex language. Speakers also differ from one another. Speakers with long exposure to written texts produce complex language in unplanned speech. And the more experience speakers have of unplanned speaking in formal situations, the more likely they are to produce complex language.

NPs as a Measure of Complexity

Complexity is measured by two properties: the number of words in a phrase and of phrases in a clause, and the depth of embedding. NPs provide a good illustration. Miller and Weinert (1998: 146) found that in a sample of monologue, 50% of the NPs consisted of a pronoun and another 7% consisted of a single nonpronominal word. When NPs consisting only of a numeral (*give me two please*) or a quantifier (*I'd like more*) were counted, the percentage of one-word NPs rose to 64. Few NPs contained other constituents: 5.6% of the NPs contained an adjective, 6% contained a prepositional phrase (*the car outside the house*), and 3.2% contained a relative clause. There were no complex NPs, that is, NPs containing a combination of these constituents, as in *a new proposal from the agency, which is likely to be rejected*. In contrast, an analysis of the NPs in the letters to a newspaper (see Miller and Weinert 1998: 154) showed that 19.7% contained adjectives and 18.8% contained prepositional phrases (*every telephone exchange in the country*). Only 3% contained relative clauses, but 3% were complex, as in *a rigorous and valid examination on applied economics that consists of three papers*.

Counting alone is not sufficient; **where** types of NPs occur in clauses is also important. The main tendency is clear: in subject position speakers use simple NPs. In Thompson's data (1988), the subject NPs of transitive clauses did not have adjectives, although some subject NPs of intransitive clauses did. (Transitive clauses have object NPs and are more complex; intransitive clauses do not have object NPs.) In Miller and Weinert's spoken data (1998), no adjectives occurred in subject NPs; Crystal (1979: 164) found that in the conversations in the London-Lund Corpus, 77% of the clauses had as subject a pronoun or an 'empty' word such as *it* or *there*. The pattern is confirmed in Biber *et al.* (1999: 235–237).

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In unplanned speech subject NPs do not normally contain infinitives (e.g., *to see Naples and die would be idiotic*) or gerunds, whether simple gerunds such as *seeing Vesuvius erupting was the highlight of the trip* or complex gerunds such as *their missing the eruption of Vesuvius was unfortunate*. Biber *et al*. (1999: 754) found that *to*-clauses and *ing*-clauses (infinitives and gerunds) are relatively rare in conversation.

Complement clauses occur in unplanned speech, but not in subject NPs; examples such as *that she was leaving the company came as a surprise to everyone* are rare. Instead, in spoken English we find the construction called extraposition, which allows speakers to place infinitives, gerunds, and complement clauses at the end of clauses. It is called extraposition, the name reflecting the idea that the infinitives, gerunds, and complement clauses are really the subject but are out of position, as in *it would be idiotic to see Naples and die*, *the highlight of the trip was seeing Vesuvius erupt*, *it came as a surprise to everyone that she was leaving the company.* The construction allows speakers to produce the main predication, as in *it would be idiotic* and *it came as a surprise*, and to add the phrase specifying what *it* refers to. *It* is often analyzed as a dummy or empty subject pronoun; for unplanned speech it is tempting to analyze *it* as having a referent, one which has to be specified by the infinitive, and so on.

In many languages speakers avoid complex subject NPs by means of a construction consisting of an NP followed by a clause, as in *the guy that tried to lift it he nearly dropped it on his foot*. The speaker produces a complex NP which is not part of a clause – *the guy that tried to lift it* – and then produces the clause conveying information about the referent of the NP – *he nearly dropped it*. The initial NP need not be very complex; compare *the driver you get a laugh with him*, from the Edinburgh Corpus of Spoken Scottish English.

A very common construction in unplanned speech is *it's unfair what they're doing to the union* and *it is unreasonable what she suggests*. This construction allows the speaker to produce a clause containing the information that something is unfair or unreasonable and then to produce an NP specifying the something. As in the examples above, the complex NP is not integrated into a clause.

Number of Modifiers in Clauses

In unplanned speech there are severe limitations on the number of phrases modifying a verb in a single clause. Highly literate speakers can produce clauses such as *the duckling was killed by the farmer for his wife at dawn near the duck pond with a .357 Magnum*. In fact, clauses in unplanned spoken English typically contain just one or two NPs, subject and direct object, with at most three NPs: *he killed the duckling* and *he killed the duckling with his .357 Magnum*. An account of the event in unplanned spoken English will be along the lines of *the farmer went to the duck pond at dawn; he took his .357 Magnum and shot a duckling for his wife*.

The number of modifiers in clauses is affected by the distinction between given and new information. The constituents conveying given information (that is, information handled as being available to the listener) are regularly ellipted. Consider the following sequence from the Edinburgh Corpus of Spoken Scottish English. One participant asks *what's he going to do anyway that boy?* The reply is *play golf*; both *he* and '*s going to* have been ellipted.

What is merely typical in unplanned spoken English is obligatory in some languages that are spoken only. Munro and Gordon (1982: 111) suggested that in the Native American language Chickasaw, clauses can have only two modifiers per verb, and Lichtenberk made a similar comment with respect to the Austronesian language Toqabaqita (To'abaita) (Solomon Islands).

The number of modifiers is relevant to constructions expressing different perspectives on transitivity. Most clauses in unplanned speech and in formal writing are active, although the proportion of passive clauses increases in dense informative texts such as academic monographs and textbooks. Such texts do contain long passives such as *this scientist was criticized by theologians*; unplanned speech contains very few long passives but does offer short passives, such as *this scientist was criticized*.

Clause Structures (Un)Typical of Unplanned Speech

Certain clause constructions are quite untypical of spontaneous speech. These include gapping (*Jim washed and Margaret dried the dishes*), accusative and infinitive (*we consider her to be the best candidate*), possessive gerunds (*his having resigned before he even took up the post astonished everyone*), free participles (*browsing in the bookshop, I came across a book on Peter the Great)*, and participial phrases/reduced relative clauses (*the book rejected by the publisher*, *the plane sitting on the runway at Heathrow*).

In general there are fewer finite subordinate clauses in unplanned speech than in planned writing. Miller and Weinert (1998: 90–93) found that 25% of all the finite clauses in their conversational data were subordinate. Almost the same percentage occurred in fiction (26%), but a broadsheet newspaper had 41%, and a semiacademic journal 45%.

Finite adverbial clauses present a complex pattern. Thompson (1988) found the highest proportion of finite adverbial clauses in informal speech but looked only at monologues. Greenbaum and Nelson (1995: 186) found a low percentage of finite adverbial clauses in spoken English, a higher percentage in informal written texts, and the highest in formal written texts, but analyzed monologues, broadcast discussions, and conversation.

Adverbial clauses of condition, reason, and time are most frequent in speech, but what appear to be clauses of condition and reason are regularly used as main clauses. Commands are issued via 'conditional' clauses: *if you just put the parcel on the table*. Reason clauses behave like main clauses, even allowing tag questions, which are excluded from subordinate clauses: *cos it's too dear, isn't it*. In Miller and Weinert's data, concessions are expressed by means of main clauses ending in *though*: *you won't find many dogs here though*. Another construction currently in regular use in unplanned speech looks like an adverbial clause of concession, e.g., *although you won't find many dogs here*. Such clauses may be separated from surrounding clauses by a very long pause and do not combine with a main clause to form a 'sentence' or clause combination. The essential property of the construction is that *although* is uttered with a separate intonation and separated by a long pause from the main part of the clause. These occurrences of *although* look more like discourse particles than subordinating conjunctions.

See also: Coordination; Influence of Literacy on Language Development; Relative Clauses; Sentence Fragmentation: Stylistic Aspects; Subordination.

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Clefting in Spoken Discourse

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Syntactic Structure of Cleft Constructions

Among sentences that overtly exhibit the informational functions of their constituents, cleft constructions are special in that they achieve this effect by means of syntactic devices: the copula and a subordinator. As the informational functions of a constituent are concerned with its contribution to the insertion of the sentence in a given discourse, the information supplied by the context may be considered from two different angles: ground/focus and presupposition/assertion. The information that the speaker regards as active in the mental world of the listener is distinguished from the one introduced as new, on the one hand, and what is presented as granted or assumed from what is presented as prominent, on the other. In cleft constructions, the copula *be* and the subordinator are employed to focus a constituent, while placing the others in the background. Although the focused constituent is syntactically highlighted, it does not always provide new information.

'Cleft' is a polysemous word: as a cover term it will be used to refer to all constructions that involve clefting; they will be called 'cleft constructions.' It is also used to refer to a specific type of construction, 'it-cleft sentence.' The following are samples of cleft constructions:

(1a) It was the paper that Jeremy left on the desk yesterday.
(1b) What Jeremy left on the desk yesterday was the paper.
(1c) The paper was what Jeremy left on the desk yesterday.

Finite adverbial clauses present a complex pattern. Thompson (1988) found the highest proportion of finite adverbial clauses in informal speech but looked only at monologues. Greenbaum and Nelson (1995: 186) found a low percentage of finite adverbial clauses in spoken English, a higher percentage in informal written texts, and the highest in formal written texts, but analyzed monologues, broadcast discussions, and conversation.

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(1a) It was the paper that Jeremy left on the desk yesterday.
(1b) What Jeremy left on the desk yesterday was the paper.
(1c) The paper was what Jeremy left on the desk yesterday.

The sentences in (1) exemplify the two main types of cleft constructions: (1a) is a cleft sentence (also named 'it-cleft' or 'true cleft'), and (1b) and (1c) are pseudocleft sentences (also called 'wh-cleft'), in their basic and reversed version, respectively. Cleft and pseudocleft sentences may be connected to a simpler, undivided sentence (2):

(2) Jeremy left the paper on the desk yesterday.

Syntactically, cleft constructions are biclausal copulative sentences. Both clauses are linked by a shared constituent, tacit in the subordinate clause, as direct object of *left*, but explicit as complement of the copula in the matrix clause: the noun phrase (NP) *the paper.*

(3) It was **the paper** that Jeremy left__on the desk yesterday.

From a semantic perspective, cleft constructions are specificational copulative sentences. A description that predicates on a certain kind of object – *Jeremy left* ***something*** *on the desk* – is specified by the focused constituent, whose referent appears as the only object that renders it true, namely *the paper.*

From a pragmatic point of view, cleft constructions are emphatic copulative constructions, for they contain a focused constituent that corrects a piece of information of the precedent discourse (an actual sentence or presupposed information). Such focus attains contrastive meaning because it rejects all other alternatives of the same category. The structure of the subordinate clause reproduces that of the original sentence:

(4a) Jeremy left the book on the desk yesterday.
(4b) No, it was **the paper** that Jeremy left on the desk yesterday.

The complexity of these constructions is evident in each of the levels, as well as in the intricate relationships holding between them. As a consequence, they have received continued attention from grammarians, who are interested in accounting for their syntactic anomalies, and from pragmaticians, who focus more on their informative functions. On the other hand, clefts are sensitive to differences in registers: in colloquial English, for example, a pleonastic construction, such as *What Jeremy left on the desk is Jeremy left a paper*, is common at all sociolects; in spoken Spanish, the most frequent cleft is *(Lo que pasa) es que* ... ('What happens is that ... 'or 'it is that'), an explicative resource for the preceding sentence.

The general syntactic characteristics of cleft constructions will be analyzed in the next section, starting from their components: the copula, the subordinate clause, and the focused constituent. Then the types of cleft constructions, namely cleft sentences, pseudocleft sentences, and some other minor types, will be differentiated in English and Spanish. Finally, the discursive value of cleft constructions in spoken discourse will be examined.

Cleft Constituents: Configurational Definition and Process Definition

Cleft constructions can be described in two alternative ways. In configurational terms, each class denotes a sentence type consisting of a certain sequence of constituents in a particular order, which takes the following form in English:

(a) It-cleft: It + copula + focused constituent + 'relative' clause.
(b) Basic pseudocleft: Free relative clause + copula + focused constituent.
(c) Inverted pseudocleft: Focused constituent + copula + free relative clause.

The it-cleft sentence is characterized by its first segment: a dummy subject, *it*, followed by the copula, and a noncanonical relative. In pseudocleft sentences the copula occupies an intermediate position between a free relative clause and the focused constituent.

However, 'cleft' is associated with 'clefting,' a process term. In this sense, it may involve the operation of splitting an undivided simpler sentence into two clauses. The three cleft constructions in (1) are different expansions of the basic sentence (2). In effect, sentence (2) describes the same state of things as the three sentences in (1), expressed via an identical argument structure, with the same illocutionary force and truth value. This equivalence holds, regardless of any commitment to an actual psychological operation or to a derivational analysis of these constructions. In fact, the process may be understood as an expository device to depict a relationship holding between sentences.

Each of the complements or adjuncts of the undivided sentence (2) can be cleft. The focused phrase may be an NP (direct object, or DO, in (1), the subject in (5a); a prepositional phrase, PP, or an adverbial phrase, AdvP (5b); or a nontensed (5c) or tensed clause (5d):

(5a) It was *Jeremy* who left the paper on the desk yesterday.
(5b) It was *on the desk/yesterday* that Jeremy left the paper.
(5c) What Jeremy did was *to leave the paper on the desk yesterday.*
(5d) What happened was that Jeremy left the paper on the desk yesterday.

In contrast, neither atonic elements (determiners, clitic pronouns, auxiliaries) nor peripheral constituents

(supplement modifiers, disjuncts, vocatives) are cleft. When the focused constituent is an NP, as in (1), all three types of cleft constructions are possible. Clauses, in contrast, are nearly exclusively foregrounded by means of basic pseudocleft sentences. In these, free relatives may introduce lexical units that are not present in the simpler sentence: the verb *do* in (5c) signals that the focused nonfinite clause is headed by an action verb; the verb *happen* in (5d) does not distinguish between types of predicates.

Contrary to the case of pseudocleft sentences, it-clefts always have undivided correlates. It is possible to cleave only one constituent (6a), usually lighter in 'it-clefts' or 'reversed-pseudoclefts'; heavier in 'basic pseudoclefts,' with the exception of the combination of a temporal and a locative expression, which functions as a single constituent, indicating a spatiotemporal setting:

(6a) *It was **the regional paper on the desk** that Jeremy left.
(6b) It was **in Malta in 1945** that the treaty was signed.

Value of the Copula: Specificational Copular Sentences

The copula *be* is a relational word that conjoins the subject and a predicative expression. It provides inflectional information, both manifesting subject/predicate agreement features and indicating the temporal setting of the state or relationship. Three types of copular sentences are usually identified, as follows.

First, in predicational copular sentences, the predicative complement assigns a property to the referent of the subject or ascribes it to a class: *the grammar professor is funny/vegetarian/my mother's neighbor.* Secondly, identificational copulative sentences establish an identity between two potential referring expressions. Thus, in *the grammar professor is Julia's husband/Ignacio/that one*, the referent of the subject is identified as the same person as the referent of the copular complement. Although the resulting sentence is also grammatical when the order is reversed – *Julia's husband/Ignacio/that one is the grammar professor* – the change in order entails different interpretations, which are pragmatically justified. If the listener is able to match both referring expressions, the complement of the copula becomes referential.

In the third type, specificational sentences, the identification proceeds in the opposite direction (7a). It is the one to which cleft constructions belong. The variable contained in an open proposition is specified by the referential expression in focus position (7b). As a consequence of this relation variable/value, the specification provides two pieces of information that the noncopular sentence (2) lacks: the referent of the focused phrase (thing, person, property, proposition), whose existence is presupposed, is the only one that satisfies the description (exhaustivity, [7c]), thus rejecting all other possible referents (contrastiveness, [7d]):

(7a) Jeremy left something on the desk: the paper.
(7b) The x such that Jeremy left x on the desk = the paper.
(7c) The paper is the **only** thing that Jeremy left on the desk.
(7d) The only thing that Jeremy left on the desk is the paper, **not the book.**

Although all cleft constructions are specificational, pseudoclefts form part of a broader paradigm. The initial description may be a (semi)free relative clause or else a definite NP, a general noun perhaps modified by a superlative expression. The demarcation line between free relative clauses (or even semifree relatives with demonstrative pronouns) and NPs with a restrictive modifier is not always neatly drawn cross-linguistically. In pseudoclefts the relative pronoun provides only grammatical information on the missing phrase, but the nominal elements in (8b) add lexical information: the copular complement may be an instantiation or hyponym of the subject head:

(8a) The one who left the paper on the desk was Jeremy.
(8b) The person who left the paper on the desk was Jeremy.
(8c) The person who read the most papers is Jeremy.

On the contrary, as the three types of copulative sentences can have free relative clauses as subjects, ambiguity may arise as regards their predicative or specificational character, as seen in (9):

(9a) What he told you is fiction.
(9b) What John is is necessary.

The complement of the copula in (9a) may be interpreted as evaluative ('an invention') or else as a work of literature; only in the latter case is the sentence specificational. Sentence (9b) is ambiguous as well: in its specificational reading, *necessary* picks up the defining feature of *John*, and not that of his profession, as in the predicational interpretation. This type of ambiguity, frequent in pseudoclefts, is rare in cleft sentences.

In predicational and identificational copular sentences, the copula has independent temporal information: tense situates the predicate in a point in time. In cleft constructions, copular tense is not an informative grammatical unit but rather a dependent category: it may be a default tense, the present, or a tense copied from the inflection of the subordinate clause.

The directionality of this influence also shows that the copula is not the main verb of the sentence but a defective verb, almost an auxiliary. However, modality marks as auxiliaries, tenses, or adverbs can modify the copula independently of the principal verb: *it will/would be the paper that Jeremy left on the desk*.

In the syntactic structure of pseudocleft sentences, the copulative verb is placed in the habitual position between the subject and its complement. The position of the copula is less canonical in it-clefts. In fact, the copular segment – *it is* – appears to be a focalizing device rather than the matrix clause. The initial copula does not permit changes in order. This rigidity is accounted for in terms of the restrictions on copula position: because it must be adjacent to the focused constituent, it cannot be final; the 'relative clause' can appear only in final position.

Subordinate Clauses: Relative Pronouns or Conjunctions

The free relative clauses in pseudoclefts are semantically versatile constructions, able to represent the different denotations listed in (10):

(10a) NP non personal: What I need is money.
(10b) PP place: Where he found it was on the desk.
(10c) AdvP time: When I met you was spring.
(10d) AdvP manner: How he fought was courageously.
(10e) NP or AdjP quality: What he is is a bastard/is important.
(10f) Verb phrase (VP) action: What he is doing is hitting the door.
(10g) Clause: What he said is that he is tired of the noise.

Relative pronouns anticipate the semantic type of the focused constituent. But in it-clefts, the complementizer *that* lacks semantic information; in fact, it may even be empty: *it was this paper Jeremy read yesterday*; when the relativized unit is a human noun, the relative pronouns *who, whose*, or *whom* carry grammatical information about the case.

It-clefts are not susceptible to a wholly satisfactory binary analysis: neither *It is the paper/that Jeremy left on the table* nor *It is/the paper that Jeremy left on the table* is an adequate analysis. In the first segmentation, it is not clear what function the subordinate clause performs. The problem with the second one is that the focused constituent and the 'relative' clause do not form a constituent, as the contrasts in (11) show:

(11a) It was the paper that Jeremy left on the desk.
(11b) I didn't find the paper that Jeremy left on the desk.

(12a) It was Jeremy who left he paper on the desk.
(12b) Jeremy, who left the paper on the desk, has been looking for it.

Unlike (11b), the 'relative clause' in (11a) does not restrict the antecedent *paper*, but rather it is an open clause to be specified. In (12b), the relative clause is not restrictive, as the comma indicates, while in (12a) the relative clause after *Jeremy* is not marked by means of a separate tonal group as in the non-restrictive relative clause in (12b) is. Nor is the subordinate clause a complement clause: there is no selector word, and it is not a complete sentence for it contains a missing phrase specified by the focused constituent, as the contrast with an extraposed omplement clause portrays (13a and 13b):

(13a) It is unlikely that my son will return this week.
(13b) That my son will return this week is unlikely.
(13c) It is the paper that John left__on the desk yesterday.
(13d) *That John left on the desk yesterday is the paper.

The subordinate clause in it-clefts is not canonically relative, nor is it a complement clause, but rather a focusing modifier, and so a special 'relative clause' (thus the use of quotation marks).

The Focused Constituent

It-/wh-clefts present differences regarding the categorial options of the focused constituent. As it-cleft only permits referential phrases, NPs or PPs, it rejects negative or universally or existentially quantified phrases, as well as phrases preceded by a focalizer such as *even* or *also*:

(14a) *It was nobody/somebody/everybody that came.
(14b) *It is even/also money I need.

The rejected phrases contradict the semantic conditions of cleft constructions: existence, exhaustivity, and contrastivity. Yet, adverbs like *precisely, exactly,* and *justly*, are perfectly compatible with such contents.

Wh-clefts are less restrictive: the focused constituent may be not only a referential expression but also a predicative one: an AdjP or usually a clause. It must be semantically congruent with the relative pronoun. On the other hand, the focused constituent of reversed pseudoclefts differs as much in categorial restrictions as in their 'weight': the cleft constituent, topicalized as subject, is generally an NP, specifically a pronoun:

(15a) That is what I said.
(15b) Here is where I live.

The category and weight of the focalized constituent, then, in clefts and reversed pseudoclefts, are similar: a light phrase as an NP, generally pronominal (*that*), or else a deictic or anaphoric adverb (*there, then, so*). Basic pseudoclefts usually focalize heavy constituents, usually clauses. A paradigm such as (1) is possible, then, only with nominal constituents.

In conclusion, the paradigm in (1) can lead to the misguided idea of a perfect symmetry among the three members. Nevertheless, the differences regarding the focused constituent displayed by the two versions of pseudoclefts are not dependent only on word order. The most outstanding distinctions are to be found between it-clefts and the rest of cleft constructions: the nonreversible order of their constituents and their peculiar 'relative clause.' These sentences prove unsuitable for dichotomous categories as regards constituency, syntactic functions, nature of the subordinate clause, and value of the copula. Most of these anomalies arise from their high degree of grammaticalization.

Types of Cleft Sentences

The structural realization of informative functions reflects crosslinguistic diversity. These differences are connected to the structural features of languages. In languages with strict word order, intonation is exploited for informational purposes: in Germanic languages, in general, nuclear stress falls on the focalized constituent, regardless of the position it occupies. Cleft constructions are more sophisticated alternative strategies, for they trigger syntactic mechanisms. Strict word orders render them useful compensatory devices. In languages with more flexible word order, the movement of the focused constituent to initial position – obligatory in Hungarian, optional in others, such as Spanish, Italian, or Portuguese – does not need clefting; yet, cleft constructions reinforce the focal status of the displaced constituent. Some nonconfigurational languages – e.g., polysynthetic languages such as Quichua, Toba, and Mapuche (Mapudungan) – lack clefts.

In Spanish or Portuguese, word order on its own does not make it possible to differentiate clefts from pseudoclefts, since the latter present three possible orderings. In Italian it-clefts, the 'relative clause' (16a) alternates with the infinitive verb preceded by the preposition *a* (16b) when the focused constituent is an agentive subject; in Portuguese and American Spanish, only the first option is available. Both Italian and Portuguese admit focused NPs in it-clefts, while in American Spanish only PP or adverbials are possible:

(16a) è (stato) Gianni che lo ha detto
is (been) Gianni that has said it

(16b) è stato Gianni a dirlo
is been Gianni a to say it

(16c) foi o bolo che comeu Joao
was a cake that ate Joao

(16d) *Fue la torta que comió Juan
**Was the cake that ate Juan*

Genetically and typologically related languages deploy, then, different strategies (Smits, 1989). Furthermore, cleft constructions are not only interlinguistically but also interdialectically divergent, as is the case in Spanish.

Additionally, there are marginal varieties of canonical clefts and pseudoclefts, particularly in spoken discourse: reduced clefts, conditional clefts, and inferential or eventive clefts, which will be presented below. Other possibilities are also available, such as this-cleft, all-cleft, and there-cleft. In spoken French, *avoir*-cleft, or presentational cleft (Lambrecht, 1988), makes use of segmentation in order to introduce a new referent in a given discourse or as event-reporting statements:

(17a) j'ai ma voiture qui est en panne
I have my car that is breakdown
'my car broke down'

(17b) y'a le téléphone qui sonne
there-has the telephone that rings
'the phone's ringing'

All these varieties are specificational but, as some of the typical constituents are missing, they imply a broader definition of cleft constructions, which not all linguists are open to accepting.

Spanish Clefts and Pseudoclefts

Spanish pseudocleft sentences admit three possible orders; grammars call them 'relative periphrasis':

(18a)	fue	eso	lo que	dijo	Juan
	was	*that*	*what*	*say*-PAST 3PERS	*John*
	'that was what John said'				
(18b)	lo que	dijo	Juan	fue	eso
	what	*say*-PAST 3PERS	*John*	*was*	*that*
	'that was what John said'				
(18c)	eso	fue	lo que	dijo	Juan
	that	*was*	*what*	*say*-PAST 3PERS	*John*
	'that was what John said'				

When the focused constituent is a personal pronoun, it determines the inflectional features of the copula but not those of the verb in the relative clause. In any of the orders, the relative pronoun imposes third person agreement:

(19a)	soy	yo	la	que	ha	sido	acusada
	be.PRE 1SING	*I*	*the*-FEM	*that*	*has*	*been*	*accuse*-PAST FEM
	'I'm the one who's been accused'						

(19b) la que te miras en el espejo
the-FEM that look yourself at mirror
eres tú
are you
'the one who is looking at herself in the mirror is you'

If the focused constituent is a PP, the relative pronoun reproduces the preposition in all three orders:

(20a) de la que (quien) todos hablan es de la mujer del presidente
about the one who everybody talks is about the president's wife
'the one everybody talks about is the president's wife'

(20b) de la mujer del presidente es de la que (quien) todos hablan
about the president's wife is about the one who everybody talks
'the president's wife is the one everybody talks about'

(20c) es de la mujer del presidente de la que (quien) todos hablan
is about the president's wife about the one who everybody talks
'it is about the president's wife that everybody talks'

Both European Spanish and American Spanish possess pseudoclefts, yet only American Spanish has real clefts, which are unacceptable for normative grammars. These (it)clefts, characteristic of spoken discourse, are nonreversible constructions in which the relative clause is introduced by the complementizer *que* alone. In these sentences the focused constituent, a PP or AdvP, can be pre- or post-copular:

(21a) es de la mujer del presidente que todos hablan
is about the president's wife that everybody talks
'it is about the president's wife that everybody talks'

(21b) de la mujer del presidente es que todos hablan
about the president's wife is that everybody talks
'it is about the president's wife that everybody talks'

A third variety, limited both dialectically and sociolinguistically, is found in nonstandard registers of Caribbean Spanish, as well as in Portuguese, especially Brazilian: in it, the copula becomes a focalizing device, practically frozen in tense and agreement:

(22a) todos hablan **es** de la mujer del presidente
*everybody talks **is** about the president's wife*
'it is the president's wife everybody talks about'

(22b) Juan come es papa/papas
John eats is potato/potatoes
'what John eats is potato(es)'

Truncated Clefts

In spoken discourse, truncated cleft constructions, as (23), lack subordinate clauses, although the omitted clause is still recoverable from the context. The missing information is a cohesive resource and functions as a means of segmenting the flow of information in shorter units:

(23a) A. Who left the paper on the desk? B. It was Jeremy.

(23b) Yesterday two cars crashed head-on. It was on the bridge.

Spanish and other null subject languages have not only cleft but also pseudocleft reduced variants. In (24a) and (24b), the omitted part is the focused constituent, but as it is a pronominal, *this* or *that*, or an adverbial unit, *here or there*, it is inferable from the context or situation. In (24c) the omitted clause is recoverable from the situational context. The speaker wants to identify himself as the person who is speaking, on the telephone, for example. Although the verb is in the first person, the insertion of the personal pronoun in preverbal position would be inappropriate in such a context:

(24a) es lo que yo digo
is that I say
'that is what I say'

(24b) es donde nos encontramos siempre
is where we meet always
'that is where we always meet'

(24c) soy Juan
am Juan
'I am Juan'

Some constructions that have been analyzed as a peculiar type of cleft are those that are reduced to the two characteristic syntactic devices of clefts, *es que (it is that)* in strict adjacency in (25) and interrupted by the anticipated subject in (26). As reduced versions of basic pseudoclefts, the focused constituent is the entire clause; the lack of a variable guiding the interpretation is compensated for by a specific relationship with the context: as an explanation, in terms of causes, reasons, results, or conclusions (Delahunty, 2001; Declerck, 1992a), and as the identification of a perception. It is precisely by virtue of this relation that they are termed 'inferential' (25) and 'eventive' (26), respectively.

(25a) ¿por qué no te quedas a comer? – Es que estoy apurada
'why don't you stay for lunch? – it's because I'm in a hurry'

(25b) no es que me disguste, sino que no tengo hambre
'it is not that I don't like it, rather I'm not hungry'

(26a) ¿qué pasa? – Es Juan que acaba de llegar
'what's happening? – it's Juan who's just arrived'

(26b) ¿Qué ruido es ese? – Es el teléfono que está sonando
'what's that noise? – it's the phone ringing'

The sequence *es que*, which corresponds to *é che, c'est que, it is that,* has been analyzed in Spanish as a conversational marker resulting from a reanalysis produced by grammaticalization. In fact, a subject may be added, as *eso* 'that,' *la verdad* 'the truth,' *lo que pasa* 'what happens': these expressions indicate the pertinence of the explanation to a previous sentence. However, the cleft status of these sentences is proved by possible inflectional features of the copula, modification by means of modal auxiliaries, and the presence of negation, inducing subjunctive.

Conditional Clefts

The structure of conditionals also provides a segmented syntactic scheme: the copula in the if-clause foregrounds a particular constituent (27) or else the whole sentence (28), placed in the main clause:

(27a) si quiere a alguien, es a su hijo
if loves anybody, is to his/her son
'if there is anyone he/she loves, that is his/her son'

(27b) si se entusiasma con algo, es con la computadora
if is enthusiastic with anything, is with the computer
'if he/she gets enthusiastic about anything, it is the computer'

(28a) si dijo eso, es (por)que está resentida
if said that, is because is resented (FEM)
'if she said that, it is because she feels resentful'

(28b) si lo acepta, es para que la vuelvan a invitar
if accepts it, is for to be invited again
'if he/she accepts, it is because he/she wants to be invited again'

These are also specificational sentences, in which the focused constituent specifies the value of a variable, the indefinite pronoun situated in the if-clause, but they differ from clefts in that they are interpreted as high degree quantified expressions. On the other hand, when the variable that is specified is an adjunct, it does not have to be explicit, as can be seen in (28), where the clause is understood as an explanation, causal in (28a) and final in (28b).

In conclusion, the differences between cleft constructions in Spanish and English stem from idiosyncratic characteristics of these languages. In European Spanish, cleft strategies have shown a high degree of redundancy in pseudoclefts, contrasting with the economic device in Caribbean Spanish. The copula is grammaticalized in American Spanish clefts, merely reinforcing the displacement of focus.

The analysis of the three groups of cleft constructions has allowed us to see that the syntactic device copula-subordinator foregrounds two types of constituents: phrasal referential expressions on the one hand and clausal units on the other. It-clefts and reversed pseudoclefts foreground referential constituents. Both types constitute a natural class, as evidenced by the lightness of the constituents and the inverted variable-value order. Basic pseudoclefts are specialized in focusing clauses, heavy constituents that occupy the final position according to a fixed order: first variable, then value.

Reduced versions of each type follow this pattern. Conditional structure presents both kinds as well. Yet *es que* is specialized in focalizing clauses: the relationship with the context (linguistic or nonlinguistic) is necessary to infer the missing link so as to build up the explanation. The specification of the value of an entire clause is, then, performed directly when the variable is supplied in the free relative clause, or indirectly when it is necessary to infer it from context. The vagueness and indeterminacy of texts render this specification not always an easy task (Sornicola, 1989).

On the other hand, it-cleft sentences are more frequent in written discourse, not only in English but also in Spanish (Sedano, 1990). The more canonical character of pseudoclefts explains the wider paradigm, which includes colloquial constructions such as *What he looked up was he looked up a linguistic term,* semifree relatives (8a), and hyperonyms nouns modified by relatives (8b).

Cleft Constructions in Spoken Discourse

The focused constituent has been considered so far as a syntactic constituent of cleft constructions. In this section, in contrast, it will be analyzed from the perspective of the informational functions it performs. The focus of cleft sentences, intonationally and syntactically marked, is involved in two information partitions: focus/ground and assertion/presupposition. The first partition is realized through word order, from what is anchored in the preceding discourse or in the situational context to the new information. The second partition is expressed in clefts by

means of the biclausal structure. The subordinate clause contains the information regarded as presupposed, while in the matrix clause, which conveys the assertion, the focus is the lexical element.

These two information partitions may well coincide or intertwine. In the first case, the subordinate clause indicates old-discourse information, GROUND, while the focused constituent is in charge of the new-discourse information, FOCUS. That is what generally occurs in pseudoclefts, as (29) shows:

(29) "¿Me desvío otra vez? No creo, no soy yo el que se desvía, **la que se desvía es la historia**. . . . **Lo que me lleva también a desviarme es la intensidad, la tragicidad de los hechos que narro, desbocados todos excesivos.**"

'Am I diverting again? I don't think so, it's not me who diverts, it is history that diverts. . . . what leads me to divert is the intensity, the tragic nature of the events I narrate, bolted, all excessive' (Feinman, 2003: 163).

In the succession of cleft constructions that answers the initial question, the speaker picks up already uttered words, correcting some – a nominal as well as a verbal one – and reproducing the rest. The question subject is first negated and then taken up in a semifree relative clause: *la que se desvía*, whose variable is specified with the referent of the focused constituent as the value that exhaustively and exclusively satisfies it. In the next sentence, *Lo que me lleva también a desviarme*, it is the verb, modified by a modal, that is reintroduced with contrastive meaning.

In it-clefts, on the contrary, the focus may also introduce new information (30a) or, in most cases, establish a relationship with the context, as information already introduced in the listener's 'mental world' but syntactically highlighted (30b); in reversed pseudoclefts (30c), the focus is topicalized as well as the subject; thus it is nearly always thematic:

(30a) A. Tiene el doctorado hecho en Estados Unidos. B. ¿Pero es en Lingüística que era el doctorado? (Barrenechea, 1971: 2, 13)
A. He/she has finished the Ph.D. in the United States. B. But, is in linguistics that the Ph.D. was?

(30b) Buenos Aires era la ciudad centralizadora. Es esa la imagen que yo tenía de Buenos Aires hasta hace poco
'Buenos Aires was the centralizing city. It was the image that I had of Buenos Aires . . .' (Barrenechea, 1971: 1. III, 59)

(30c) eso fue lo que dijo
'that was what he said'

In fact, presupposition does not necessarily mean old discursive information; it can be either old or new information depending on the order of the constituents and on the type of cleft construction. The clause usually contains the new information both in clefts and in reversed pseudoclefts, their foci generally transmitting already known or inferable information, as frequently shown by their pronominal realization. The free relative clause in basic pseudoclefts, in contrast, tends to be the cohesive portion.

Thus, focus may be either strongly cohesive or strongly novel. When it is cohesive, as in clefts and reversed pseudoclefts, it may lose its contrastive value, becoming a mere emphatic resource: in fact, (31a) does not necessarily indicate that the event took place in that particular year, but rather it is normally interpreted without a contrastive sense. When the focalized constituent has discourse-old information, the relative clause may contain the contrastive value, shown in paralelism in (31b):

(31a) It was in 1932 when my family immigrated to Argentina

(31b) It was then when you gave me **the paper**, not **the keys**

Then, the focused constituent is available not only as a contrastive resource but also as a cohesive or an emphasizing device. The importance of two information partitions comes from the way in which cleft constructions establish their particular relationship with the context: when the speaker specifies the value of a variable, he/she foregrounds a piece of information, contrasting with another explicit or inferred textual piece or acting as if the contrast did exist actually. Indeed, the metalinguistic nature of cleft constructions can be explained through this conversational dynamic, which accounts for most of the syntactic and semantic anomalies detected.

See also: Focus; Foregrounding; Functional Categories; Information Structure in Spoken Discourse; Relative Clauses; Syntactic Variation; Thematic Structure.

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Clitics

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Term and Definitions

The term clitic is used in traditional grammar for a word or particle that cannot bear accent or stress and leans on an adjacent accented word (from Greek *kli:no* 'lean'). It includes both enclitic and proclitic elements. An enclitic morph joins to the end of an adjacent word, such as the reduced form of the English auxiliary verb *have* in (1), which is cliticized to the subject pronoun. It cannot appear in the question in (2) because it lacks a host to its left. A proclitic element attaches to the beginning of a word, such as the reduced form of the English auxiliary verb *do* in (3):

(1) they'**ve** decided against it.
(2) * '**ve** they decided against it?
(3) **d**'you need to decide today?

Some clitics may be proclitic in one context and enclitic in another, such as in Macedonian, where pronominal clitics are proclitic on the finite verb (4a) and enclitic on the gerund (4b) (see Franks and King, 2000).

(4a) **mi** **ja** dadoa smetka-ta
me.DAT it.ACC gave.3.PL bill-DEF
'They gave me the bill'

(4b) davajki **mi** **ja** smetka-ta, . . .
give.GER me.DAT it.ACC bill-DEF
'Giving me the bill, . . .'

Items that are clitic vary across languages but are always grammatical (or functional) words and thus members of closed classes in that they cannot be coined (Emonds, 1985: Chap. 4); they may include auxiliary verbs, pronouns (as in many Indo-European languages), question particles (Slavic *-li* in (9) or Finnish *-ko* in Nevis, 1988: 9), negative particles (Slavic verbal negation *ne* -in (9)), and conjunctions

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Clitics

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Term and Definitions

The term clitic is used in traditional grammar for a word or particle that cannot bear accent or stress and leans on an adjacent accented word (from Greek *kli:no* 'lean'). It includes both enclitic and proclitic elements. An enclitic morph joins to the end of an adjacent word, such as the reduced form of the English auxiliary verb *have* in (1), which is cliticized to the subject pronoun. It cannot appear in the question in (2) because it lacks a host to its left. A proclitic element attaches to the beginning of a word, such as the reduced form of the English auxiliary verb *do* in (3):

(1) they'**ve** decided against it.
(2) * '**ve** they decided against it?
(3) **d**'you need to decide today?

Some clitics may be proclitic in one context and enclitic in another, such as in Macedonian, where pronominal clitics are proclitic on the finite verb (4a) and enclitic on the gerund (4b) (see Franks and King, 2000).

(4a) **mi** **ja** dadoa smetka-ta
me.DAT it.ACC gave.3.PL bill-DEF
'They gave me the bill'

(4b) davajki **mi** **ja** smetka-ta, . . .
give.GER me.DAT it.ACC bill-DEF
'Giving me the bill, . . .'

Items that are clitic vary across languages but are always grammatical (or functional) words and thus members of closed classes in that they cannot be coined (Emonds, 1985: Chap. 4); they may include auxiliary verbs, pronouns (as in many Indo-European languages), question particles (Slavic *-li* in (9) or Finnish *-ko* in Nevis, 1988: 9), negative particles (Slavic verbal negation *ne* -in (9)), and conjunctions

(Latin *-que* 'and'). There are no clitic forms for open-class items such as the lexical noun *wood*, despite the homophony with the modal auxiliary *would* (cf. *I'd really like that*).

In formal research, the term clitic is often used to refer only to pronominal clitics as in (4) that have proved to be of particular interest in terms of phonology, morphology, and syntax and the interfaces between these components of the grammar. A clitic cluster is formed when clitic elements in a language appear adjacent to one another, usually in a strict order and often in a fixed position in the clause, even in apparently free–word order languages. In some formal approaches, the clitic cluster may be a primitive of the system with its own rules of clitic order (e.g., Perlmutter, 1971). For many (particularly syntactic) approaches to clitic placement, clitic cluster is a descriptive term, an epiphenomenon of the prosodic properties of clitics and their placement.

In some languages, the position of the clitic cluster is restricted to the second position in the sentence, termed the Wackernagel position after the German 19th-century philologist (Wackernagel, 1892). The second position varies across languages between 'following the first phonological word' (e.g., Ancient Greek; Kaisse, 1985: 80) and 'following the first constituent' (e.g., Finnish; see Nevis, 1988: 19). Other languages allow for both second positions (e.g., Luiseño (Uto-Aztecan); see Kaisse, 1985: 85). To some extent, this is true of Serbo-Croatian, a language whose second position has attracted much debate in recent years (Bošković, 2001: 12):

(5a) taj čovek **je** volio Milenu.
that man aux.3.SG loved Milena
'that man loved Milena'

(5b) taj **je** čovek volio Milenu.
that aux.3.SG man loved Milena
'that man loved Milena'

The clitic auxiliary *je* follows the first constituent in (5a) and the first phonological word in (5b). Recent research on Serbo-Croatian demonstrates that the clitic cluster is restricted from intervening within some initial constituents, that there is substantial native speaker variation, and that the size of the clitic cluster is a factor (see Bošković, 2001: Chap. 2). For cross-linguistic debate on second-position phenomena see articles in Halpern and Zwicky (1996) and for Slavic generally see Franks and King (2000).

A distinction is made between syntactic cliticization and prosodic cliticization. Hence, in the sequence A – *b* – C where *b* is a clitic, it may be the case that *b* is syntactically proclitic on C, but prosodically enclitic on A, for example, the Australian language Nganhcara (Klavans, 1985: 104–105) and Bulgarian (see (9)) (Franks and King, 2000: 63).

Affixes, Words, and Clitics

The fundamental characteristic of clitics is that in some ways they behave like affixes (e.g., the past tense affix *–d* on the verb in (1)) and in some ways they behave like independent words (Sapir, 1930: 70–71), with much cross-linguistic variation. For example, affixes are highly restricted as to their host, whereas words tend to subcategorize for phrases, if at all. Pronominal clitics in many Indo-European languages are similarly restricted to appearing on a verb (as in Bulgarian (9) and French (10)), but this contrasts with Serbo-Croatian pronominal clitics, which do not distinguish between the category of host (see (5) and (7)). Similarly, the English possessive *'s* is dependent on whatever the last word of the preceding noun phrase happens to be (*the man I saw's hat; that man I gave a dollar to's hat*). As a result, it can be termed a phrasal affix.

Also, affixes are subject to word-internal phonological processes to which adjacent words are not subject. In Macedonian, the antepenultimate stress rule exemplified in *žénata* 'the wife' is followed even when the possessive clitic *ti* 'your' is added to form *ženáta-ti* 'your wife'; the clitic appears to be part of the phonological word in the same way as a suffix, and the stress shifts accordingly (see Spencer, 1991: 360). Yet, in Latin, the enclitic *-que* 'and' is not subject to the rule that assigns main stress in a word. This rule does not ordinarily assign primary stress to the penultimate syllable if it is strong, but primary stress still appears on the strong penultimate syllable in the word + clitic *rosáque* 'and the rose (NOM)' (Nespor and Vogel, 1986: 115–116; for other word-internal rules in relation to clitics, see Kayne, 1975: 85, and Nespor and Vogel, 1986: Chap. 5).

Affixes generally appear in a strict order, and, if this order varies at all, then there is a concomitant change in meaning. Most languages with a clitic cluster have an equally rigid ordering. However, Catalan allows freedom in the ordering of some pronominal clitics (Bonet, 1991: 67):

(6) **te** **'m** van recomanar
you.DAT/ACC me.ACC/DAT PAST recommend
per a aquesta feina
for to job
'they recommended me to you for this job' or
'they recommended you to me for this job'

Syntactic rules of ellipsis never apply to affixes. For example, in *Amali played baseball and Yasmin soccer*, the missing verb is understood through identity with the first verb, but the affix *–d* cannot similarly be recovered: **Amali danced the tango and Yasmin play soccer*. This holds true of most clitics, but recent evidence suggests that for some speakers at least, pronominal clitics in Serbo-Croatian may undergo ellipsis:

(7) ona **mu** ga je dala
she him.DAT it.ACC aux.3SG gave

a i ja **sam** **mu** ga dala
and also I AUX. 1.SG him. DAT it.ACC gave
'she gave it to him, and I did too'

Here both the pronominal clitic *mu* 'him' and the lexical verb *dala* 'gave' may undergo ellipsis (Franks and King, 2000: 336).

It is generally accepted that, if a morpheme comes between a stem and an affix, it must be itself an affix (Zwicky, 1977), yet Portuguese pronominal clitics appear between the verb stem and the tense-affix morpheme (Spencer, 1991: 366):

(8) levá **-lo** -ei
raise -it.ACC -aux.fut
'I will raise it'

In Portuguese, the lexical phonological rules treat the future ending like an inflectional affix, and it only appears on the verb. This may be related to the fact that historically the future ending was a clitic auxiliary that has become an affix (cf. French *j'aimerai* 'I will love'; see Spencer, 1991: Chap. 9).

The inability to bear accent or stress, a common feature of affixes, is not always a feature of clitics. In Bulgarian, the pronominal clitic *mu* 'him' bears stress (Hauge, 1976: 30):

(9) **ne** **mú** **li** **go** kaza?
not him.DAT Q it.ACC said.3.SG
'didn't he tell him it?'

The proclitic *ne* 'not' forms a prosodic word with the enclitic *mu* 'him' that bears stress. This word then serves as a host for both the question particle *li* and *go* 'it' (see Klavans, 1982, for further examples of accented clitics). Indeed, it has been suggested that some clitics do not require a host at all, for example, the Dutch prepositional *er* 'there' (Riemsdijk, 1978, 1999). For diagnostics for distinguishing clitics from affixes, see Zwicky and Pullum (1983); for the clitic versus word distinction, see Zwicky (1985).

For phonology and morphology, a principal interest is therefore in the definition of a word and the status of clitics. Some argue that there is a distinct category of clitic group within the prosodic hierarchy between the phonological word and the phonological phrase (Nespor and Vogel, 1986). Much recent prosodic literature rejects the need for a special category, some arguing that a given language may have more than one representation of its clitics and distinct treatments for proclitics and enclitics (see references in Gerlach and Grijzenhout, 2000: 2–8).

Typology of Clitics

The clitics in (1)–(3) appear in a subset of the set of positions in which their corresponding full forms appear (see Kaisse, 1985: 43 for a further discussion of English auxiliaries). In other words, they exhibit no distinct syntactic behavior; their position may be derived from the syntax. These are termed simple clitics in Zwicky (1977). In contrast, the pronominal clitics in examples (4)–(10) appear in a different syntactic position than their full-form equivalents. That is, whereas the clitic *l'* 'him' in the French example (10a) precedes the verb, the full form *lui* 'him' appears in the subcategorized argument position following the verb (10b). Clitics with such idiosyncratic syntax and phonological forms distinct from their full-form alternants are termed special clitics in Zwicky (1977). (A third distinction in Zwicky, 1977, that has not been widely adopted is the bound word, a clitic without any apparent full-form alternant, such as Latin *-que* 'and').

Special Clitics

The principal interest in special clitics and particularly pronominal clitics has been to account for their syntactic position and relation to the full-form positions. Kayne (1975) first argued that the relation was one of movement in French:

(10a) Jean **l'** aime *e*
John him.ACC loves
'John loves him'

(10b) Jean n' aime que lui
Jean NEG loves only him.ACC
'it's only him that Jean loves'

In (10a), the clitic is base-generated in argument position *e* and moved to its surface position. (10b) has the full-form alternant *lui* 'him' in the post-verbal argument position. Issues addressed within the movement approach include the questions of why the movement is generally clause-bound and why, in some Romance and Balkan languages, clitics associated with the argument structure of a subordinate

predicate may appear in the main clause (clitic climbing). Consider the Italian sentence:

(11) Piero **ti** verrà a parlare
Piero you.DAT come.FUT to speak.INF
di parapsicologia
of parapsychology
'Piero will come to speak to you about parapsychology'

Approaches have tended either to focus on the typology of movements (head vs. phrasal movement; A vs. A′ movement) or to argue that the structure in (11) is formally monoclausal in some way (see Rizzi, 1982, and articles in Riemsdijk, 1999). In Bare Phrase Structure (Chomsky, 1995), when a phrase dominates only a pronominal clitic, the clitic is formally both a maximal and minimal projection and thus able to move as either.

Clitic movement differs from more traditional examples of movement because the form of the moved element differs from that of the unmoved element. Also, in some South American Spanish dialects (Borer, 1984: 16), the clitic duplicates a phrase in argument position (called clitic doubling in Jaeggli, 1982):

(12) lo vimos a Juan.
him.ACC see.PRET.1.PL to Juan
'we saw Juan'

The clitic has been seen as absorbing the case and theta-assigning properties of the verb, forcing the need for a preposition (the Kayne-Jaeggli generalization; see Jaeggli, 1982; Borer 1984, 1986). However, there is no preposition in other cases of clitic doubling such as Macedonian example (4) (clitic doubling is common in the Balkan languages, Romanian, Greek, and Albanian, and in South Slavic; see articles in Riemsdijk, 1999; Beukema and Dikken, 2000). One recent reformulation suggests that the clitic is generated as part of the functional structure of the subcategorized phrase (e.g., as D) and moves independently of the overt phrase (e.g., Torrego, 1998).

Alternatively, pronominal clitics are argued to be base-generated in the surface position with an appropriate mechanism relating the clitic to the empty category in argument position (e.g., Borer, 1984; articles in Riemsdijk, 1999). With the rise of a more articulated functional hierarchy, a popular account has been to see clitics as agreement morphemes heading functional projections with arguments raising to check features (e.g., Sportiche, 1995).

Attempts to account for second-position clitics are many and varied, from the purely phonological treatment through to the purely syntactic. Increasingly, accounts involve a combination of components, such as modification of the syntactic output at the phonological or morphological form (either through movement or the selective spell-out of movement copies; see articles in Halpern and Zwicky, 1996; for variable spell-out in, mainly, Slavic, see Bošković, 2001).

Morphologists and Optimality theoretic approaches have often pursued clitics as phrasal affixes, usually with a wider cross-linguistic coverage. Klavans (1982, 1985) and Anderson (1992) position clitics via three parameters: (1) the choice of host as an initial or final element in a phrase (2) preceding or following the host, and (3) whether the item is proclitic or enclitic. Optimality theoretic approaches have proven particularly effective in capturing the various competing constraints with respect to clitic placement cross-linguistically (see Anderson, 1996; Franks and King, 2000; articles in Gerlach and Grizenhout, 2000).

For an introduction focusing on morphology, see Spencer (1991: Chap. 9); for significant reviews of the field and key approaches, see Borer (1986), Riemsdijk (1999), and Gerlach and Grizenhout (2000).

See also: Affixation; A-Morphous Morphology; Ellipsis; Functional Categories; Lexical Functional Grammar; Minimalism; Morpheme; Morphology: Optimality Theory; Noun Phrases; Phonology: Optimality Theory; Rule Ordering and Derivation in Phonology; Transformational Grammar: Evolution; Uto-Aztecan Languages; Wackernagel, Wilhelm (1806–1869); Word; Word Classes/Parts of Speech: Overview; Word Formation; Word Stress.

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Clothing: Semiotics

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Introduction

Like any other object or artifact, we interpret 'clothes' as signs that stand for such things as the personality, the social status, and overall character of the wearer. This is why semioticians talk of 'dress codes' as particular types of social codes – systems of signs that cohere to provide information about how to dress for an occasion. Clothing is more than just bodily covering for protection. It is a sign system that is interconnected with the other sign systems of a society through which such emotions, states, and variables as attitudes, gender, age, social status, political beliefs, etc. can be encoded. This is why uniforms are required by special groups such as sports teams, military organizations, religious institutions, and the like. These encode specific kinds of meanings.

Since Roland Barthes' (1915–1980) study of fashion as a sign system in *Système de la mode* (1967), 'clothing semiotics,' as it is sometimes called, has become a popular area of inquiry both within semiotics (e.g., Rubinstein, 1995; Danesi, 2004) and in cognate disciplines such as anthropology and psychology (e.g., Davis, 1992; Enninger, 1993; Craik, 1993; Hollander, 1988, 1994; McRobbie, 1988; Steele, 1995; Luciano, 2000).

Bodies, Clothes, and Dress

People do not perceive bodies merely as biological substances; they are perceived also as signs of Selfhood (Goffman, 1959). For this reason, the human body has been subject to varying interpretations across history and across cultures. In ancient Greece, for example, the body was glorified as a source of pleasure; in ancient Rome, on the other hand, it was viewed as a source of moral corruption. The Christian church has always played on the duality of the body as a temple and as an enemy of the spirit.

Because clothes are worn on bodies, they are perceived as extensions of bodily meanings and are thus tied to varying cultural interpretation. This does not imply that clothes have basic social functions across societies. As the anthropologist Helen Fisher (1992: 253–254) observes, even in the jungle of Amazonia, Yanomamo men and women wear clothes for sexual

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People do not perceive bodies merely as biological substances; they are perceived also as signs of Selfhood (Goffman, 1959). For this reason, the human body has been subject to varying interpretations across history and across cultures. In ancient Greece, for example, the body was glorified as a source of pleasure; in ancient Rome, on the other hand, it was viewed as a source of moral corruption. The Christian church has always played on the duality of the body as a temple and as an enemy of the spirit.

Because clothes are worn on bodies, they are perceived as extensions of bodily meanings and are thus tied to varying cultural interpretation. This does not imply that clothes have basic social functions across societies. As the anthropologist Helen Fisher (1992: 253–254) observes, even in the jungle of Amazonia, Yanomamo men and women wear clothes for sexual

modesty. A Yanomamo woman would feel as much discomfort and agony at removing her vaginal string belt as would a North American woman if one were to ask her to remove her underwear. Similarly, a Yanomamo man would feel just as much embarrassment at his penis accidentally falling out of its encasement, as would a North American male caught literally 'with his pants down.' As these cross-cultural comparisons bring out, clothing the body for social presentation is fundamentally a reflex of basic human functions. It is, in fact, intrinsically intertwined with sexual, romantic, and courtship functions throughout the world. When a young Zulu woman falls in love, she is expected to make a beaded necklace resembling a close-fitting collar with a flat panel attached, which she then gives to her boyfriend. Depending on the combination of colors and bead pattern, the necklace will convey a specific type of romantic message: e.g., a combination of pink and white beads in a certain pattern would convey the message *You are poor, but I love you just the same* (Dubin, 1987: 134).

At a biological level, clothes have a very important function indeed – they enhance survivability considerably. This is the level of denotation in semiotic theory – the level at which a referent is tied to its biological function. Clothes are, denotatively, human-made extensions of the body's protective resources, perceived as additions to our protective bodily hair and skin thickness. As Werner Enninger (1992: 215) aptly points out, this is why clothing styles vary according to geography: "The distribution of types of clothing in relation to different climatic zones and the variation in clothes worn with changes in weather conditions show their practical, protective function." But, it is also a fact that clothes take on a whole range of connotations in specific social settings that have little to do with survival. Connotations are meanings that accrue in cultural context over time, leading to the formation of 'dress codes' (from Old French *dresser* 'to arrange, set up') that inform people about how to clothe themselves in social situations. To someone who knows nothing about Amish culture, the blue or charcoal *Mutze* of the Amish male is just a jacket. But to the Amish the blue *Mutze* signals that the wearer is between 16 and 35 years of age, and the charcoal one signals that he is over 35. Similarly, to an outsider the Russian *kalbak* appears to be a brimless red hat. To a rural Russian, however, it means that the wearer is a medical doctor.

It is interesting to note, too, that dress codes, like other types of codes, can be used to lie about oneself. Con artists and criminals can dress in three-piece suits to look trustworthy, a crook can dress like a police officer to gain a victim's confidence, and so on. To discourage people from deceiving others through clothing, some societies have even enacted laws that prohibit misleading dressing, defining strictly who can dress in certain ways. In ancient Rome, for instance, only aristocrats were allowed to wear purple-colored clothes, and in many religiously oriented cultures, differentiated dress codes for males and females are regularly enforced.

Dress Codes

The broad range of connotations associated with dress codes is inextricably interconnected with social trends and political movements. Until the early 1950s, females in Western culture rarely wore pants. The one who 'wore the pants' in a family meant, denotatively and connotatively, that the wearer was a male. With the change in social role structures during the 1950s and 1960s, women began to wear pants regularly, sending out the new social messages that this entailed. The reverse situation has never transpired. Except in special ritualistic circumstances – such as the wearing of a Scottish kilt – men have never adopted wearing women's skirts in modern-day Western society. If they ever do, it would probably be labeled an act of 'transvestitism.'

Dressing for social reasons is a universal feature of human cultures. Even in cold climates, some people seem more interested in decorating their bodies than in protecting them. In the 1830s, British biologist Charles R. Darwin (1809–1882) traveled to the islands of Tierra del Fuego, off the southern tip of South America. There he saw people who wore only a little paint and a small cloak made of animal skin, in spite of the cold rain and the sleet. Darwin gave the people scarlet cloth, which they took and wrapped around their necks, rather than wear it around the lower body for warmth. Even in the cold weather, the people wore clothing more for decoration than for protection.

No one knows exactly why or when people first wore clothes. Estimates trace the origin of clothing to 100 000 years ago. Archeological research suggests that prehistoric hunters may have worn the skin of a bear or a reindeer in order to keep warm or as a sign of personal skill, bravery, and strength. By the end of the Old Stone Age – about 25 000 years ago – people had invented the needle, which enabled them to sew skins together. They had also learned to make yarn from the threadlike parts of some plants or from the fur or hair of some animals. In addition, they had learned to weave yarn into cloth. At the same time, people had begun to raise plants that gave them a steady supply of materials for making yarn. They had also started to herd sheep and other animals that gave them wool.

From the outset, it appears that clothes were worn not only for protection, but also for various social reasons. Shamans, for example, have always worn special clothing to indicate who they are. This continues to be the case for all kinds of clerics today. Dress also conveys people's beliefs, feelings, and general approach to life. Confident people often show more independence in choosing their style of dress than do those who are shy or unsure of themselves. The confident individual is likely to try new clothing styles. A shy person may seek security by following current styles. Others may be unconcerned about their dress and care little whether they dress in what others consider attractive clothing. Some people wear plain clothes because of strong beliefs about personal behavior. Such people believe it is wrong to care about wearing clothes as decoration. They believe that, instead, people should be concerned with other matters. Members of the Amish religious group have this kind of belief system. Amish men wear plain, dark clothes, and Amish women wear long, plain dresses. The hippies, on the other hand, dressed to emphasize 'love' and 'freedom' in the 1960s. Motorcycle gang members wear leather jackets, boots, and various items such as brass knuckles to convey toughness. Like language, a dress code can be endearing, offensive, controversial, delightful, disgusting, foolish, or charming.

In all societies, certain items of dress have special meanings. For example, the meanings of headgear vary widely, depending not only on climate, but also on customs. For instance, a Russian farmer wears a fur hat to protect himself from the cold. A South American cowboy wears a felt gaucho hat as part of his traditional costume. The American cowboy wears a wide-brimmed hat for protection from the sun. The members of a nation's armed services wear a hat as part of their uniform. The hats of coal miners, fire fighters, and matadors indicate the wearer's occupation. Clowns wear colorful, ridiculous hats to express fun and happiness. To the Amish, the width of the hat brim and the height of the crown can communicate whether the wearer is married or not.

It is interesting to note that throughout the centuries, the desire of people to be fashionable has resulted in many kinds of unusual hats. During the 1400s, many European women wore a tall, cone-shaped hat called a *hennin*. This hat measured from 3 to 4 feet (0.9 to 1.2 meters) high and had a long, floating veil. The Gainsborough hat became popular with both men and women in the late 1700s. It had a wide brim and was decorated with feathers and ribbons. Hats are, and have always been, props in dress codes, communicating various things about the people who wear them. Most people wear a hat that they believe makes them look attractive. This is why much protective headgear today, such as fur hoods and rain hats, is both attractive and stylish. Even the caps of police officers and military personnel are designed to improve the wearer's appearance.

No one knows when people first wore hats. People in various cold climates may have worn fur hoods as far back as 100 000 years ago. Through the centuries, people have worn headgear to indicate their social status. In ancient Egypt, the nobility wore crowns as early as 3100 B.C. They have also worn them to be fashionable. Some ancient Greeks wore hats known as *pelos* for fashion. These were usually made from wool fibers. Pelos can still be found in parts of southern Siberia today. They are similar to the brimless, tasseled hat known as a *fez*. By the 14th century, people wore hats increasingly for fashion, resulting in the development of a large variety of hats and frequent changes in hat styles. People in one area often adopted the hat styles worn in another. During that century, for example, women in western Europe wore a type of hat that resembled a turban. They adopted this style from the headgear worn by people who lived in the Middle East and the Orient. During the 20th century, hat styles varied more widely than ever before. In the 1920s, women wore a drooping, bell-shaped hat called the *cloche*. In the 1930s, they wore the harlequin hat, which had a wide, upturned brim. A variety of hats were worn in the 1940s and 1950s. The cap became a central accouterment of male teen style, during the heyday of the rap movement in the mid to late 1990s, when it symbolized clique solidarity.

Nudity

The human being is the only animal that does not 'go nude,' so to speak, without social repercussions (unless, of course, the social ambiance is that of a nudist camp). Nudity is the counterpart of clothing, and thus can only be interpreted culturally. What is considered 'exposable' of the body will vary significantly from culture to culture, even though the covering of genitalia seems, for the most part, to cross cultural boundaries.

Semiotically, nudity assumes significance because it is in binary opposition with clothing – i.e., it forms a counterpart to it, with one entailing the other. Acts of 'clothing-removal,' such as strip-tease performances, have appeal because of this unconscious semiotic dualism. In an audience setting, these have, first and foremost, something of a pagan ritualistic quality to them, based on mimetic portrayals of sexual activities and sexual emotions. As the psychoanalyst Sigmund Freud (1856–1939) suggested in many of his writings,

clothing the body has, paradoxically, stimulated curiosity and desire for the nude body. In a word, what makes nudity appealing in such situations is clothing. This is why certain types of clothing items, such as shoes, are perceived to have sexual significance. They allude to bodily parts that have become desirable, engaging viewers in a communal ritual similar to the many carnivals put on throughout the world.

The nude body is, thus, a sign. This is why visual artists have always had a fascination with the nude figure. The ancient Greek and Roman nude statues of male warriors, Michelangelo's (1475–1564) powerful *David* sculpture, Rodin's (1840–1917) nude sculpture *The Thinker* are all suggestive of the potency of the male body. It is this 'iconography' of nudity that enhances the attractiveness of the male in our society. A male with a 'weakling' body is hardly ever perceived as sexually attractive. On the other side of this semiotic paradigm, paintings and sculptures of female nude figures have tended to portray the female body ambiguously as either (1) soft and submissive, as can be seen in the famous ancient Greek statue known as the Venus de Milo, which represents Aphrodite, the Greek goddess of love and beauty (Venus in Roman mythology), or (2) feral and powerful (as can be seen in the sculptures of Diana of Greek mythology). It is (2) that came to the forefront again in the 1990s. Known as the 'girl power' movement, representations of women in pop culture now emphasize the second type of the two iconographic traditions.

The interplay between clothing and nudity as sign systems is part of a culture's historical iconography. This is largely unconscious, conditioning representations of bodies in virtually all areas of human social life, from advertising and erotica to religious dress.

Fashion

Until the Renaissance, following trends in dress, known as 'fashion,' was the privilege of the rich in most parts of the world. Since the early decades of the 20th century, however, it has become an intrinsic component of the lifestyle of common people in many parts of the world. 'Fashion statement' has become personal statement.

Fashion can be defined as the prevailing style or custom of dress. Although fashion usually refers to dress, it does not mean the same thing as clothing. People have always worn clothes that reflected the long-standing customs of their communities, and clothing styles changed extremely slowly in the past. Fashion, however, causes styles to change rapidly for a variety of historical, psychological, and sociological reasons. A clothing style may be introduced as a fashion, but the style becomes a custom if it is handed down from generation to generation. A fashion that quickly comes and goes is called a fad. As Barthes (1967) argued, it constitutes a kind of 'macro' dress code that sets standards according to age, gender, class, etc. To understand how fashion codes emerge, it is instructive to consider the male business suit. The connotative message underlying the apparel text is, of course, 'dress for success.' How did this subtext crystallize in our culture? A look at the history of the business suit provides an interesting answer to this question.

In 17th-century England, there existed a bitter conflict in social ideology between two forces – the Royalist 'Cavaliers,' who were faithful to King Charles I, and the Puritans, who were followers of Oliver Cromwell (1599–1658), the military, political, and religious figure who led the Parliamentarian victory in the English Civil War (1642–1649). This conflict was a battle of lifestyles, as the two warring camps sought to gain political, religious, and cultural control of English society. The Cavaliers were aristocrats who only superficially followed the teachings of the Anglican Church. Their main penchant was for a life of indulgence (at least as the Puritans perceived it). They wore colorful clothes, flamboyant feathered hats, beards, and long flowing hair. This image of the Cavalier as a 'swashbuckler' has been immortalized by literary works such as *The Three Musketeers* (Alexandre Dumas, 1844) and *Cyrano de Bergerac* (Edmond Rostand, 1897). The Puritans, on the other hand, frowned precisely upon this type of fashion, because of the 'degenerate lifestyle' that they perceived it to represent. Known as the 'Roundheads,' Cromwell's followers cropped their hair very short, forbade all carnal pleasures, and prohibited the wearing of frivolous clothing. They wore dark suits and dresses with white shirts and collars. Their clothes conveyed sobriety, plainness, and rigid moralism.

The Cavaliers were in power throughout the 1620s and the 1630s. During this period the Puritans escaped from England and emigrated to America, bringing with them their lifestyle, rigid codes of conduct, and clothing styles. In 1645 the Puritans, led by Cromwell, defeated the Royalist forces and executed the king. Subsequently, many Cavaliers also emigrated to America. Since the Puritans had set up colonies in the northeast, the Cavaliers decided to set up colonies in the south. The king's son, Charles II, escaped to France to set up a court in exile. For a decade, England was ruled by the Puritans. Frowning upon all sorts of pleasure-seeking recreations, they closed down theaters, censored books, enforced Sunday laws, and forbade the wearing of flashy clothing.

With Cromwell's death in 1658, the Puritans were eventually thrown out of power and England

welcomed the exiled king, Charles II, back in 1660. Known as the Restoration, the subsequent 25-year period saw a return to the lifestyle and fashions of the Cavaliers. For two centuries the Puritans had to bide their time. They were excluded from holding political office, from attending a university, from engaging in any socially vital enterprise. Nevertheless, throughout the years they maintained their severe lifestyle and dress codes.

By the time of the Industrial Revolution, the Puritans had their final and lasting revenge. Their lifestyle – based on thrift, diligence, temperance, and industriousness, which some have called the 'Protestant work ethic' – allowed them to take advantage of the economic conditions in the new industrialized world. In America and in England, Cromwell's descendants became rich and eventually took over the reigns of economic power. Ever since, Puritan ethics and fashion in the work force have influenced British and North American business culture, not to mention social mores and values at large. The origins of modern corporate capitalism are to be found in those values. The belief that hard work and 'clean living' are necessarily interrelated, and that this combination leads to wealth and prosperity, had become a widespread one by the turn of the present century. To this day, there is a deeply felt conviction in capitalist culture that hard work and strict living codes will lead to success in both this life and the afterlife.

The business suit is a contemporary version of Puritan dress. The toned down colors (blues, browns, grays) that the business world demands are the contemporary reflexes of the Puritan's fear and dislike of color and ornament. During the 'hippie' 1960s and early 1970s, the office scene came briefly under the influence of a new form of Cavalierism, with the wearing of colorful suits, turtle neck sweaters rather than white shirts, longer hair, sideburns, Nehru jackets, medallions, and beards. This new 'fashion dare' made a serious pitch to take over the world of corporate capitalism. But it was bound to fail, as the hippie movement of the 1960s was defeated and subsequently overtaken by conservative neo-puritanical forces in the late 1970s and 1980s. The 'business suit' model became once again the dress code for all of corporate North America, with only minor variations in detail.

The business suit somehow endures – perhaps because it is intrinsically intertwined with the history of capitalism. But, nowadays, even this fashion code has become rather eclectic, not to say fragmented. Take, for example, the length of the skirt in the female business suit code. The mini, maxi, and normal length skirts are alternatively in and out of fashion. Evidently, a detail such as length of skirt is, in itself, meaningless. What appears to count is what it implies as a signifier about the ever-fluctuating perceptions of women in the workplace and in society at large. When the mini is 'in,' it might imply an increased emphasis on sexual freedom in the culture. When it is 'out,' then it might imply the opposite – a decreased emphasis on sexuality. Whatever the case may be, the point to be made here is that the specific elements and features of a fashion code will invariably have connotative value that is a derivative of larger social codes within the culture.

True fashions began to appear in northern Europe and Italy when a system of social classes developed in the late Middle Ages with the rise of the bourgeois class. At this time, the people of Europe began to classify one another into groups based on such factors as wealth, ancestry, and occupation. The clothes people wore helped identify them as members of a particular social class. Before the late Middle Ages, only wealthy and powerful individuals concerned themselves with the style of their clothes. But when the class system developed, the general population began to compete for positions within society. Fashion was one means by which people did this. One of the first true fashions appeared among young bourgeois Italian men during the Renaissance. While their elders dressed in long traditional robes, the young males wore tights and short, close-fitting jackets called doublets. The was one of the first examples of youth-based clothing that intentionally set itself apart from the adult dress code. German soldiers set another early fashion when they slashed their luxurious silk clothes with knives to reveal another colorful garment underneath. Theirs too was a youth-based fashion trend, probably intended to influence their appeal to the opposite sex.

Before the 1800s, many countries controlled fashion with regulations called sumptuary laws. These limited the amount of money people could spend on private luxuries, being obviously designed to preserve divisions among the classes. They thus regulated fashion according to a person's rank in society. In some countries, only the ruling class could legally wear silk, fur, and the colors red and purple. In Paris in the 1300s, middle-class women were forbidden by law to wear high headdresses, wide sleeves, and fur trimmings. Other sumptuary laws forced people to buy products manufactured in their own country to help the country's economy. For example, an English law in the 1700s prohibited people of all classes from wearing cotton cloth produced outside of England. But the lure of fashion caused many people to break this law. The cloth was so popular that people risked arrest to wear it.

Ordinary people have always hoped to raise their social position by following the fashions of privileged

people. Fashions have also emerged to accompany differing perceptions of gender. Until the late 1700s, upper-class European men dressed as elaborately as women did. It was acceptable for men to wear bright-colored or pastel suits trimmed with gold and lace, hats decorated with feathers, high-heeled shoes, and fancy jewelry. But by the mid-1800s, men had abandoned such flamboyance in favor of plain, dark-colored wool suits. Society came to view this new fashion style as democratic, businesslike, and masculine. Until the early 1900s, European and American women rarely wore trousers, and their skirts almost always covered their ankles. By the 1920s, however, standards of feminine modesty had changed to the point that women began to wear both trousers and shorter skirts.

Contrary to popular belief, political events seldom cause fashions to change. However, political events do sometimes speed up changes that have already begun, as we saw in the case of the business suit. For example, during the French Revolution (1789–1799), simple clothing replaced the extravagant costumes made fashionable by French aristocrats. But simple styles had become popular years earlier when men in England started wearing practical, dark suits instead of elegant, colorful clothes. English people identified these plain suits with political and personal liberty. Because many French people admired English liberty, this style was already becoming fashionable in France before the revolution.

In the 19th century, the invention of mechanical looms, chemical dyes, artificial fabrics, and methods of mass production made fashions affordable to many more people. In addition, new means of mass communication spread European and American fashions throughout the rest of the world. The Industrial Revolution created a 'fashion global village.' Since then, fashion shows and fashion magazines have proliferated. And, as Barthes (1967) pointed out, they change constantly because rapid turnover guarantees economic success. It is the only constant in contemporary fashion trends.

Conclusion

Like all social codes, clothing is interconnected with the other codes of a culture. For instance, it is intertwined with religious ceremonies and rituals – the clothing worn at a religious service, during certain religious feasts and festivals, for example, is designed to send out specific kinds of religious messages. It is also intertwined with daily life routines, whereby dress codes guide or are sensitive to lifestyle and social options. The semiotic study of clothing thus shows that clothing is a sign system. This is why, arguably, people are so interested in fashion trends (Steele, 1995).

Today, attractive-looking celebrities, rather than aristocrats, set trends. People tend to follow fashion primarily to make themselves similarly attractive. When the standard of beauty changes, fashion changes with it. For example, when physical fitness became a popular standard of good looks in the 1980s, people began to wear exercise and athletic clothing more often. A clothing style may become fashionable over time with many different groups. For example, people began wearing blue jeans during the mid-1800s as ordinary work clothes. For decades, they were worn chiefly by outdoor laborers, such as farmers and cowboys. In the 1940s and 1950s, American teenagers adopted blue jeans as a comfortable, casual youth fashion. Young people during the 1960s wore blue jeans as a symbol of rebellious political and social beliefs. By the 1970s, people no longer considered jeans rebellious, and expensive designer jeans had become fashionable.

In a fundamental sense, culture can be characterized as a huge system of connotative meanings that cohere into a 'macro-code' that allows members of the culture to interact purposefully and to represent and think about the world in specific ways. This is why some semioticians prefer to call it the 'semiosphere,' a term coined by the great Estonian semiotician Juri Lotman (1922–1993). In biology, a region that sustains life is called the 'biosphere.' By analogy, the semiosphere is the region of social life that sustains knowledge-making and representational activities (Lotman, 1991). Clothing is one of those sign systems that provides a direct route to the study of the semiosphere.

See also: Body Language; Denotation versus Connotation; Nonverbal Communication.

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Coarticulation

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A stretch of speech is often represented in terms of discrete elements (phonemes, segments, letters, etc.) arranged in a linear sequence on the page. However, when the movements of speech organs that produce this stretch of speech, such as the tongue, lips, and soft palate, are tracked instrumentally, it can be seen that these organs are continuously moving and that movements associated with different segments overlap in time. A consequence of this dynamic overlapping is that there is virtually no one-to-one correspondence between aspects of the speech signal and the discrete units of representation. The attempt to reconcile abstract elements in the phonological representation, which are discrete and timeless, with the time-varying physiological realizations as articulatory movements (and their acoustic consequences) has remained one of the central issues in modern experimental phonetics and has led to the development of many different theories and models.

The ubiquitous overlapping of articulatory movements associated with separate sound segments is referred to as coarticulation. The term appears to have originated in the 1930s with Menzerath and de Lacerda (1933), building on the work of early experimental phoneticians such as Scripture, Rousselot, and Laclotte. In demonstrating that speech organs are continuously moving and overlapping in time, these early investigators argued against a prevailing view of their time that speech consisted of a series of relatively steady-state postures of the speech organs, linked by rapid transitional glides. Scripture, for example, concluded that "the tongue is never still and never occupies exactly the same position for any period of time" (Scripture, 1902: 325). In addition, he established that the character of any articulatory speech movement depends on other movements occurring at the same time: thus there are no static characteristic postures. (For discussions of the early history of coarticulation, see Hardcastle, 1981 and Kühnert and Nolan, 1999.)

One of the consequences of coarticulation is that speech sounds vary (both physiologically and acoustically) according to the nature of neighboring sounds, and 'coarticulation' is often used these days in its broader sense to refer to this variation. Since the 1960s, coarticulation has developed into a major area of phonetic research, and many theories have been devised to account for coarticulatory effects. The volume edited by Hardcastle and Hewlett (1999) offers a comprehensive overview of theories, data, and experimental techniques pertaining to coarticulation. Other critical reviews of models and theories of coarticulation can be found in Farnetani (1990; 1997), Kent and Minifie (1977), Sharf and Ohde (1981), Kent (1983), and Fowler (1985).

The phenomenon of coarticulation can be illustrated by a graphical representation of movements of the speech organs (and different parts of the same organ) (see **Figure 1**). **Figure 1** shows an instrumental record of movements of the jaw, lips, and tongue (tip and dorsum) during production of the sentence "say schooner again" by a Scottish English speaker. This speaker rounds the vowel [u] in the word 'schooner,' and the rounding is indicated in the instrumental record by horizontal protrusion of the lower lip. The lower lip is seen to be protruding (marked as a downward direction of the lip trace) well before the [u] vowel is articulated, in fact as early as the beginning of the [s] (indicated by the fricative noise on the speech waveform and the increase in anterior contact on the EPG trace).

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One of the consequences of coarticulation is that speech sounds vary (both physiologically and acoustically) according to the nature of neighboring sounds, and 'coarticulation' is often used these days in its broader sense to refer to this variation. Since the 1960s, coarticulation has developed into a major area of phonetic research, and many theories have been devised to account for coarticulatory effects. The volume edited by Hardcastle and Hewlett (1999) offers a comprehensive overview of theories, data, and experimental techniques pertaining to coarticulation. Other critical reviews of models and theories of coarticulation can be found in Farnetani (1990; 1997), Kent and Minifie (1977), Sharf and Ohde (1981), Kent (1983), and Fowler (1985).

The phenomenon of coarticulation can be illustrated by a graphical representation of movements of the speech organs (and different parts of the same organ) (see **Figure 1**). **Figure 1** shows an instrumental record of movements of the jaw, lips, and tongue (tip and dorsum) during production of the sentence "say schooner again" by a Scottish English speaker. This speaker rounds the vowel [u] in the word 'schooner,' and the rounding is indicated in the instrumental record by horizontal protrusion of the lower lip. The lower lip is seen to be protruding (marked as a downward direction of the lip trace) well before the [u] vowel is articulated, in fact as early as the beginning of the [s] (indicated by the fricative noise on the speech waveform and the increase in anterior contact on the EPG trace).

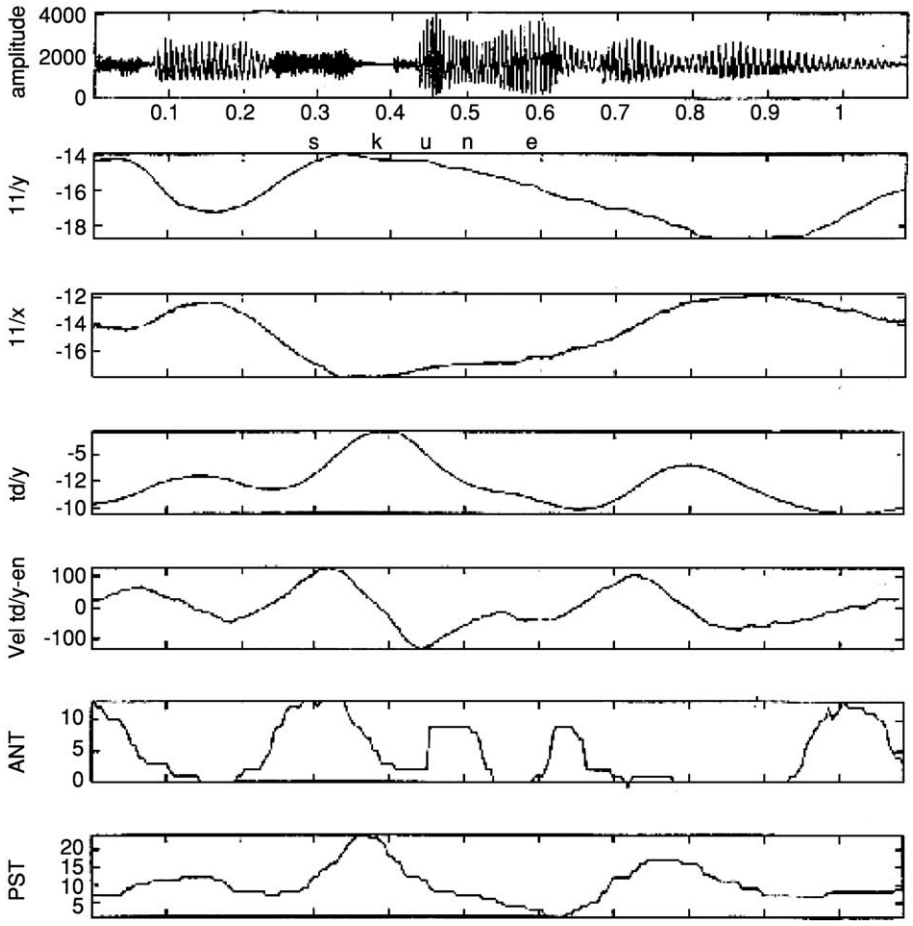

Figure 1 Computer printout of instrumental records of the sentence ''say schooner again'' spoken by a speaker of Scottish English. The top trace shows the speech waveform and time scale in tenths of seconds. The next four traces show kinematic data from a Carsten's electromagnetic articulograph (EMA), which plots movement in the x-y plane of miniature coils attached to the midline of articulatory structures. The EMA traces are, from the top: vertical up-down movement of the jaw; horizontal front-back movement of the lower lip (negative = forward); vertical up-down movement of the tongue dorsum; and velocity of tongue dorsum movement. The lower traces show information from electropalatography synchronized with EMA: total tongue–palate contacts activated in the anterior region of the palate (ANT trace) and total number activated in the posterior region of the palate (PST trace). Reprinted from Durward B, Baer G & Rowe P (eds.) (1999). *Functional Human Movement: Measurement and Analysis*. Oxford, UK: Butterworth Heinemann.

It reaches its maximum forward movement during the articulatory closure for the [k] (indicated by maximum raising of the tongue dorsum trace). The illustration in Figure 1 shows an example of labial coarticulation with the lips moving forward in anticipation of the rounded vowel at the same time as the tongue articulation for the [s]. The [s] in this environment would therefore be different from the [s] in a word such as 'skill,' in which no such lip rounding would be involved. Similar contextual effects involving other articulations can be seen in the [k] in 'key,' which is produced farther forward in the oral cavity than the [k] in 'car' because the body of the tongue is anticipating the more fronted position required for the [i] vowel. Another example is the difference between the vowel sounds in 'mad' versus 'bad.' The vowel in 'mad' will usually be more nasalized than that in 'bad' because the soft palate lowering for the [m] in 'mad' coarticulates or overlaps with the tongue movement for the vowel, unlike in 'bad.'

The term 'coarticulation' in its broadest sense is often used interchangeably with 'assimilation,' which also refers to the influence of context on speech sounds. Thus, we find *place* assimilation in words like 'meat pie,' in which the alveolar stop [t] 'assimilates' into the place of articulation of the following bilabial [p], or *voice* assimilation in a phrase such as 'I have to,' in which the voicing of the [v] assimilates into the following voiceless stop [t] and becomes the perceived voiceless [f]. Some investigators (including the originator of the term, P. Menzerath) restrict 'coarticulation' to the physiological mechanisms underlying speech production and reserve 'assimilation' for audible change to specific sounds in context, often resulting in perception of a different phoneme.

Coarticulatory effects such as those above can be described in terms of their type and extent. Type may refer to the speech organs predominantly involved, e.g., labial coarticulation (or more specifically, lingual/labial), nasal coarticulation, etc. Type may also refer to the direction of coarticulatory influence, whether anticipatory (sometimes called 'right-to-left') or perseverative (carryover, or 'left-to-right'). Designation of coarticulatory influences as anticipatory or carryover depends on the theoretical premise that there is an underlying linear abstract segmental representation at some level in the speech production process. Thus, anticipatory coarticulation occurs if a sound segment is influenced by (or even becomes more like) a following sound (such as in the 'schooner' example in Figure 1). If a sound shows influence of a preceding sound, this is an example of carryover or perseverative coarticulation.

Some theories claim that carryover coarticulation occurs because of inherent physiological characteristics of the speech articulators. For example, in the word 'mad,' coarticulated nasality is said to occur on the vowel because the soft palate is relatively slow moving and takes time to rise from its maximally lowered position for [m]. Anticipatory coarticulation is rather more difficult to explain. At one level it can be seen as a production strategy to enable articulatory movements to occur at the rate necessary to deliver up to five syllables per second, as in normal spontaneous speech. It is also probably the most economical strategy to employ, particularly in the face of increasing demands that occur in fast colloquial speech, and the concept of 'economy of effort' has frequently been linked to coarticulation. (For further discussion of competing demands on the articulators during a communication situation, see Lindblom, 1990). For rapid productions, some degree of parallel processing is inevitable and is seen also in the skeletal motor system (such as in sign language interpreters engaged in rapid finger spelling). At the cognitive level, anticipatory coarticulation can be seen as a further example of the universal tendency for the brain to 'scan ahead of time' (cf. early work on the serial ordering of behavior by Lashley, 1951). There may also be some perceptual motivation for anticipatory coarticulation. For example, as a result of anticipatory coarticulation, acoustic information on an upcoming segment is available to the listeners before that segment is articulated, and this prior knowledge may facilitate more accurate perception than would be the case if all acoustic cues were confined within the temporal boundaries of that segment (Kühnert and Nolan, 1999).

Coarticulation can also be described with reference to the temporal domain of its influence. This can be expressed in terms of time or as numbers of segments. In the example in Figure 1, the labial coarticulatory influence extended two segments in advance of the vowel. Some early theories of anticipatory coarticulation claimed that articulations began as early as possible (e.g., a study by Benguerel and Cowan, 1974, showed lip rounding influence extending up to six segments in advance). Other models using the notion of distinctive features involved a 'feature-spreading' approach following Henke's work (1966) on computer modeling. For example, the feature [+ rounding] spreads across all [-rounded] segments in a string. An earlier influential theory (Kozhevnikov and Chistovich, 1965) proposed a higher-level structure, the articulatory syllable, defined with reference to the temporal domain of coarticulatory spread. Based on measurements of lip protrusion for the vowel [u], the model stated that this protrusion begins at the same time as the first consonant in any string of consonants preceding the vowel, providing these consonants did not involve 'contradictory' articulatory gestures. Later work was to show, however, that coarticulatory influences could in fact extend across articulatory syllable boundaries so that in a vowel-consonant-vowel sequence, for example, the two vowels influence each other across a consonant boundary, a result not predicted by Kozhevnikov and Chistovich's model (see, for example, Öhman, 1966, and for the many studies since, see the review in Farnetani and Recasens, 1999).

These early theories proposed that coarticulation begins as early as possible. An alternative view is that coarticulatory influences are time locked and that the component gestures of a segment begin at a fixed interval before the phonetic target is achieved (see, e.g., Bell-Berti and Harris, 1982). Closely related to the idea of time locking is a radical approach to the phenomenon of coarticulation based on action theory using the concept of coordinative structures (see e.g., Kelso *et al.*, 1986). In this approach the underlying units of speech production are not segment-like units such as is assumed in most of the above accounts but 'gestures,' which are speech-relevant goals containing spatial-temporal information about speech articulations. An example of an articulatory gesture in this framework would be a bilabial closure, which involves a specific and unique combination of coordinated upper lip, lower lip, and jaw movements regardless of the context. Contextual effects are said to arise as a result of temporal overlapping ('coproduction') with other gestures. In this coordinative structure framework, coarticulation is viewed as an automatic consequence of the inherent kinematic properties of the production mechanism. (For discussions of the gestural approach and its formulation in the articulatory phonology framework,

see Browman and Goldstein, 1992, Fowler and Saltzman, 1993, and Nolan, 1982.)

Much research has been devoted to identifying the types of constraints that affect coarticulatory processes. The notion of 'coarticulatory resistance' (Bladon and Al-Bamerni, 1976; Recasens, 1985) attempts to identify some of the articulatory characteristics that may affect the spread of coarticulatory influences. There is evidence that coarticulation is gradual and varies between different segments. Recasens (1991, 2002) has developed an articulatory constraint model that relates coarticulatory resistance to the degree of tongue dorsum raising required for the consonant. Other constraints on coarticulatory processes pertain to prosodic and related aspects of the language, such as stress patterns, suprasegmental boundaries, syntactic structures, rate of articulation, clarity, and speech style (see, e.g., Engstrand, 1988; Lindblom, 1963; Hardcastle, 1985; and Matthies *et al.*, 2001), and all these factors have been found to influence coarticulation both temporally and spatially. The phonological structure of a particular language may also constrain coarticulatory patterns. For example, there is some evidence that the extent of coarticulatory nasalization of vowels preceding a nasal consonant will tend to be more restricted in those languages that have a nasal/oral phonological contrast in vowels (e.g., French) compared with those that do not (e.g., English; see, e.g., Clumeck, 1976). Various models have attempted to account for these language-specific influences (see, for example, the 'window model of coarticulation' of Keating, 1990, and for a comprehensive account of crosslanguage studies of coarticulation, see Manuel, 1999).

Coarticulation remains a productive area of phonetic research, and we can expect to see more-refined models being developed as instrumental techniques for investigating the kinematics of speech production improve.

See also: Distinctive Features; Experimental and Instrumental Phonetics: History; Assimilation; Phonetic Processes in Discourse; Phonetics, Articulatory; Speech; Speech Production.

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Cobbett, William (1763–1835)

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William Cobbett, essayist, politician, agriculturist, and grammarian, was born in Farnham, Surrey, England, on March 9, 1763. Cobbett grew up as a farm boy with virtually no formal education. In 1784, at the age of 21, he joined the army, where he managed to find time to teach himself the rules of grammar by reading and copying Robert Lowth's *A short introduction to English grammar* (1762). One day he received an eloquent but ungrammatical letter from a Nottingham stocking weaver, which impelled him

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to write an English grammar. His *Grammar of the English language*, set out in the form of letters to his son James, first appeared in New York in 1818. It was an immediate success. The second and third editions were published in London in 1819, and the fourth edition followed in 1820. A revised edition, to which were added "Six lessons, intended to prevent statesmen from using false grammar, and from writing in an awkward manner," appeared in 1823. In 1832 Cobbett was elected an M.P. representing Oldham, Lancashire, in which seat he remained until his death on June 18, 1835.

Although the overall framework of Cobbett's grammar is traditional, being based on the nine parts of speech and their categories, the readership he has in mind is unique. As the subtitle indicates, his grammar is "intended for the Use of Schools and of Young Persons in general; but, more especially for the Use of Soldiers, Sailors, Apprentices, and Ploughboys." Thus Cobbett's aim was to make young people of the working class competent speakers and writers of English so that they would be able to "assert with effect [their] rights and liberties" (edn. by Nickerson and Osborne, 1983: 32). Accordingly, his statements are prescriptive rather than descriptive, with reason as the criterion of correctness: "It is *reason* [that] is to be your sole guide" (93). Cobbett warned against the use of *me* in "It was *me,*" which should be "It was *I*" (93). Similarly, he criticized the double negative in "Do *not* give him *none* of your money," which should be "Do *not* give him *any* of your money" (141). Cobbett also advised on matters of style, emphasizing the clearness and strength of meaning. He warned that "one of the greatest of all faults in writing and in speaking is [...] the using of many words to *say little*" (150). Thus his grammar can be seen as a forerunner of such manuals of usage and style as H. W. Fowler's *Modern English usage* (1926).

See also: Fowler, Henry Watson (1858–1933); Lowth, Robert (1710–1787).

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Cocos (Keeling) Islands: Language Situation

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The Cocos (Keeling) Islands are a coral atoll of 27 islands that constitute the westernmost outpost of Australia, positioned in the middle of the Indian Ocean 1000 km southwest of Java. First settled by agents of the East India Company, in 1829 the original population consisted of a total of 98 people, most of whom were of Indonesian/Malay origin, with a few British sailors as well as, possibly, a few individuals of Papuan, Indian, and even Asian provenance. They were portrayed as speaking a form of Trade Malay or a Malay-based *lingua franca*.

As of 2001, the population of the Cocos-Keeling consists of 618 individuals who reside on the two inhabited islands of the atoll. West Island is the base for roughly 100 Australians, mostly administrators and schoolteachers on 2- to 3-year postings. They speak Australian English and, with few exceptions, have no knowledge of Malay. Home Island, the original settlement of the first settlers, still houses 80% of the population, predominantly of Indonesian provenance. These are the Cocos Malays, descendants of laborers brought to the islands during the 150-year period in which the islands were an estate of the Clunies-Ross clan, which lasted until the Australian government took over in 1978. The community is Muslim.

Cocos Malay is the dominant language on Home Island; it can be described as a contact variety of colloquial Malay with strong Javanese influences. It was the dominant language until Australian takeover and is still very alive today. Knowledge of English is restricted in most individuals of advanced age; it is functional in most individuals of middle age, and the younger generations have near-to-native fluency. The school operates a bilingual program in which English is the language of immersion and Cocos Malay is also used to aid in instruction, particularly at primary

to write an English grammar. His *Grammar of the English language*, set out in the form of letters to his son James, first appeared in New York in 1818. It was an immediate success. The second and third editions were published in London in 1819, and the fourth edition followed in 1820. A revised edition, to which were added "Six lessons, intended to prevent statesmen from using false grammar, and from writing in an awkward manner," appeared in 1823. In 1832 Cobbett was elected an M.P. representing Oldham, Lancashire, in which seat he remained until his death on June 18, 1835.

Although the overall framework of Cobbett's grammar is traditional, being based on the nine parts of speech and their categories, the readership he has in mind is unique. As the subtitle indicates, his grammar is "intended for the Use of Schools and of Young Persons in general; but, more especially for the Use of Soldiers, Sailors, Apprentices, and Ploughboys." Thus Cobbett's aim was to make young people of the working class competent speakers and writers of English so that they would be able to "assert with effect [their] rights and liberties" (edn. by Nickerson and Osborne, 1983: 32). Accordingly, his statements are prescriptive rather than descriptive, with reason as the criterion of correctness: "It is *reason* [that] is to be your sole guide" (93). Cobbett warned against the use of *me* in "It was *me,*" which should be "It was *I*" (93). Similarly, he criticized the double negative in "Do *not* give him *none* of your money," which should be "Do *not* give him *any* of your money" (141). Cobbett also advised on matters of style, emphasizing the clearness and strength of meaning. He warned that "one of the greatest of all faults in writing and in speaking is [...] the using of many words to *say little*" (150). Thus his grammar can be seen as a forerunner of such manuals of usage and style as H. W. Fowler's *Modern English usage* (1926).

See also: Fowler, Henry Watson (1858–1933); Lowth, Robert (1710–1787).

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Cocos (Keeling) Islands: Language Situation

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The Cocos (Keeling) Islands are a coral atoll of 27 islands that constitute the westernmost outpost of Australia, positioned in the middle of the Indian Ocean 1000 km southwest of Java. First settled by agents of the East India Company, in 1829 the original population consisted of a total of 98 people, most of whom were of Indonesian/Malay origin, with a few British sailors as well as, possibly, a few individuals of Papuan, Indian, and even Asian provenance. They were portrayed as speaking a form of Trade Malay or a Malay-based *lingua franca*.

As of 2001, the population of the Cocos-Keeling consists of 618 individuals who reside on the two inhabited islands of the atoll. West Island is the base for roughly 100 Australians, mostly administrators and schoolteachers on 2- to 3-year postings. They speak Australian English and, with few exceptions, have no knowledge of Malay. Home Island, the original settlement of the first settlers, still houses 80% of the population, predominantly of Indonesian provenance. These are the Cocos Malays, descendants of laborers brought to the islands during the 150-year period in which the islands were an estate of the Clunies-Ross clan, which lasted until the Australian government took over in 1978. The community is Muslim.

Cocos Malay is the dominant language on Home Island; it can be described as a contact variety of colloquial Malay with strong Javanese influences. It was the dominant language until Australian takeover and is still very alive today. Knowledge of English is restricted in most individuals of advanced age; it is functional in most individuals of middle age, and the younger generations have near-to-native fluency. The school operates a bilingual program in which English is the language of immersion and Cocos Malay is also used to aid in instruction, particularly at primary

level. Code-switching is common in the young generation. This generation is also particularly exposed to standard Indonesian and standard Malay. The exposure to Indonesian comes from the media (Indonesian TV) as well as from Bahasa Indonesia, which is offered in school as a second language choice. The influence of Malay comes less directly, from the status that the language enjoys for literary and religious reasons: in 2001 there were clearly normative voices to be heard advocating a more standard form of Malay to be spoken on the island. All these facts considered, it is quite likely that Cocos Malay may lose many of its particular traits in the near future.

Cocos Malay communities can also be found in Western Australia (children have to move there to complete their education after grade 10) as well as in Sabah, Malaysia. Relocated from the original settlements in different waves as the islands can only sustain a limited population, these communities are described as having lower proficiency in Cocos Malay than that on Home Island. In particular, in Sabah it is reported that convergence towards standard Malay has taken place.

See also: Australia: Language Situation; Bilingualism; Code Switching and Mixing; Language Change and Language Contact; Malaysia: Language Situation.

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Codes, Elaborated and Restricted (Bernstein)

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Bernstein was among the first scholars to focus on the correlation between the scholastic success (or failure) of a learner and the social class he or she belonged to. A student living in a well-off family, having many cultural stimuli (books, newspapers, periodicals, films, etc.) is bound to develop a rich and fully articulated language (a so-called 'elaborate code'), whereas a student who belongs to a working-class family and is exposed to poor linguistic and cultural stimuli, develops a fragmented, poor, syntactically deficient language (called a 'restricted code' by Bernstein) (see Bernstein, 1971–1975).

Contrary to the Chomskyan theory that language naturally develops in the brain, due to the interaction of biologically innate structures and the environment to which the child is exposed, may be that the data to which the child is exposed are so poor and confused that it is easy to demonstrate that the innate learning program prevails over the environmental stimuli, Bernstein emphasizes the predominant role played by the environment in shaping the learning process. Of course, the correlation between social class is not, strictly speaking, without exceptions, because much of the learning process depends on the lifestyle of the family under consideration. There are exceptional working-class families where parents, contrary to all expectations, have good knowledge of the language and place great importance on culture, but the norm is that, within working-class families, cultural stimuli are less predominant than in more well-off families.

The problem, for sociologists, is how to offset the disadvantages of the pupils belonging to working-class families and how pedagogues (and teachers) can have an antideterministic effect on such children.

A possible solution to the problem is to ensure that the school (or the class) becomes another miniature family and that the negative effects of the families are compensated for by the pedagogical action of the school. The school should, therefore, be a positive environment in which pupils are exposed to positive cultural and affective stimuli that help their personalities grow and come to maturity. In such a model of the school, teachers lose their primary function of being transmitters of notions (knowledge, in general) and are required to take the roles of educators or pedagogues who act as models and provisionally replace (at least within the boundaries of the school) the family by setting good examples for the students, and, in particular, exposing them to the positive aspects of culture, intended as knowledge that interacts with the

individual to make him or her grow up intellectually and emotionally. To compensate for the negative effects of families, within which dialogue and conversation have died, or are confined to adjacency pairs consisting of questions/answers or orders/replies, teachers have to play the role of communicators and have to stimulate communication. It is, in my view, impossible for a student to make progress in his or her language (to develop a more articulated written or oral mode of expression) unless he or she understands the function of communication, which is that of transmitting knowledge, but also of enhancing the expressive as well as the interpersonal function. To communicate is not only to express propositions (concerning others), but also to express propositions concerning what we really are and feel, and, by so doing, to interact with others, creating an intersubjective dimension in which social life is possible (see Capone, 2003).

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Code Switching

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In many bi- and multilingual communities around the world, speakers need to choose, often at an unconscious level, which language to use in their interactions with other members of the community. One of the choices that bilingual speakers often make is to code-switch: that is, speakers switch back and forth between languages (or varieties of the same language), sometimes within the same utterance (*see* **Bilingualism; Code Switching and Mixing**).

The motivations for code switching have often been treated simply as lists of possible functions for code switching. For example, Appel and Muysken (1987) cite five such functions. First, code switching may serve a referential function by compensating for the speaker's lack of knowledge in one language, perhaps on a certain subject. Second, it may serve a directive function by including or excluding the listener. Third, code switching may have an expressive function by identifying the speaker as someone having a mixed cultural identity. Fourth, it may have a phatic function indicating a change in tone in the conversation. And fifth, it may serve a metalinguistic function when code switching is used to comment on the languages involved.

While such lists are useful places to start, and no one would deny that code switching can certainly serve these functions, these types of lists fail to answer the question of what motivates speakers to make the choices they do at a particular point in a conversation. This article reviews the major proposals that have been advanced regarding the following question: why do speakers choose to engage in code switching in the first place?

Code Switching as a Research Topic

The current interest in code switching can be dated to a 1972 study of language use in Hemnesberget, a small village in northern Norway, conducted by Jan Blom and John Gumperz and described in a volume on sociolinguistics edited by Gumperz and Hymes (1972). In Hemnesberget, two varieties of Norwegian are used: Ranamål, a local dialect, and Bokmål, the standard variety (*see* **Language and Dialect: Linguistic Varieties**). However, speakers' decisions regarding which variety to use are by no means arbitrary or haphazard. In general, Ranamål, the local variety, is used in local activities and relationships, reflecting shared identities with the local culture. In contrast, Bokmål is used in official settings such as school, church, and the media, communicating an individual's dissociation from the local group, i.e., not stressing his or her local ties.

Blom and Gumperz distinguish between two main functions of code switching: situational and metaphorical. In situational code switching, which seems to be similar to the notion of diglossia, the speaker's choice of language is constrained by factors external to her/his own motivations, for example, the status of the interlocutor, the setting of the conversation, or the topic of conversation. So, in Hemnesberget, Blom and Gumperz observed that when an outsider joins a group of locals engaged in a conversation, the locals will often switch from the local variety, Ranamål, to the standard variety, Bokmål. In a later work, Gumperz (1982) introduces the distinction between 'we' and 'they' codes, which further

amplifies the kind of linguistic alternation that occurs in situational code switching. 'We' codes are associated with home and family, while 'they' codes are associated with public discourse. In contrast to situational code switching, speakers may engage in a more complex type of code switching to create a 'metaphoric' effect. In his 1982 book, Gumperz explains that this metaphoric effect is a way for speakers to communicate "information about how they intend their words to be understood" (1982: 61). The classic example of metaphorical code switching from the Blom and Gumperz 1972 article is from a conversation at the local community administration office, where two villagers switch from the standard variety of Norwegian, in which they had been discussing official business, to the local variety to discuss family and other private affairs.

The Blom and Gumperz study is important because it illustrates that code switching is a complex, skilled linguistic strategy used by bilinguals to convey important social meanings above and beyond the referential content of an utterance. However, this is not to say that the Blom and Gumperz article has not generated some criticism over the years. In addition to some overlap and lack of clarity in the definitions of situational versus metaphorical switching, this model of code switching implies a sharp boundary between the two types of switching. In fact, Myers-Scotton (1993: 55) argues that the metaphorical meaning of a switched utterance is derived from its situationally based meaning. In any case, it is fair to say that this Blom and Gumperz study sparked an interest in studying code switching data in terms of a dynamic, interactional model that focuses on individual choices rather than static factors related to an individual's social status (*see* **Social Class and Status**).

The Audience-Centered Approach to Code Switching

Using a social psychological theory of language use, Howard Giles and his associates have developed a model of interpersonal communication that considers how speakers change the way they speak according to their audience. Giles refers to this type of strategy as accommodation (*see* **Speech Accommodation Theory and Audience Design**). Within Giles's speech accommodation theory, speakers are motivated by their desire for approval *vis-à-vis* their desire to dissociate themselves from the hearer. These concerns are cognitively salient and are realized by speech convergence (similar styles of speaking) or divergence (different styles of speaking). In fact, Giles predicted from these assumptions that the greater the effort in converging, the more favorably the individual will be evaluated by the listener. Thus, convergence and divergence are linguistic strategies to either decrease or increase social distance between participants in a conversation.

Although the premises behind speech accommodation theory have not been rigorously tested using code switching data in any comprehensive way, it is not difficult to see how the model could be used to explain speakers' motivations for code switching. For example, to test the prediction regarding how listeners will evaluate a speaker based on the speaker's perceived effort at converging, Giles *et al.* (1973) conducted an experiment involving bilingual English Canadian students who were asked to rate their reactions to a set of taped descriptions of a simple harbor scene given by bilingual French Canadian students. Different versions of this description – reflecting different levels of linguistic convergence to monolingual English – were presented to the English Canadian raters. The results of this experiment supported the prediction that the greater the effort in converging, the more favorably the speaker would be perceived. More specifically, the most convergent bilingual French Canadian student was viewed as the most considerate and the most concerned about bridging the cultural gap between French and English Canadians.

Speech accommodation theory has been successfully applied mainly in the contexts of dialect or style switching (*see* **Style and Style Shifting**). However, the theory and its predictions still await further testing on code switching in bilingual settings.

The Conversation Analytic Approach to Code Switching

Both the Gumperz and the Giles models of code switching attend to extralinguistic factors such as topic, setting, and participants as influencing speakers' linguistic choices in conversations. Peter Auer (1984) questioned these assumptions and specifically questioned the way 'situation' was defined. For Auer, situation was a not a static set of contextual features that constrain linguistic choices. Rather, situation was seen as a dynamic phenomenon, emerging from the sequential nature of a conversational interaction. Using the terminology and the techniques of ethnomethodology and conversation analysis, Auer argued that the meaning behind code switching must be interpreted on the basis of the linguistic choices made by the participants themselves in the preceding and following turns in a conversation. In other words, for Auer, social meaning is constituted locally rather than at a societal level (*see* **Conversation Analysis; Ethnomethodology**).

Studies that use the technique of conversation analysis typically assign no independent semantic value to either of the languages involved. Instead, the conversational meaning of code switching results from the mere juxtaposition of the two languages, which generates contextualization cues whereby participants signal various contextual presuppositions. Thus, this language switching has a value of its own, independent of the direction of code alternation.

Some have argued that an approach that focuses on the negotiation of meaning as locally constructed cannot generalize across interactions in order to build explanatory theories. However, Auer (1995) has identified several basic code switching patterns that correspond to identifiable meanings, such as participant-related alternations, which reflect language competence or preference on the part of the speaker, and discourse-related alternations, which signal, for example, topic change (among other functions). Nevertheless, most researchers still recognize that in multilingual communities, each language available in the community indexes specific social and interactional meanings, and listeners tend to attribute consistent interpretations to the particular language choices that speakers make (*see* **Pragmatic Indexing**).

The Marked Model: A Speaker-Centered Approach to Code Switching

One of the more richly developed models designed to explain the sociopragmatic motivations for code switching is Carol Myers-Scotton's markedness model, which developed out of her field research in East Africa. The central premise of the markedness model is that speakers are rational actors who make code selections in such a way as to minimize costs and maximize rewards; that is, speakers are concerned with optimizing the outcomes of an interaction in their own favor (*see* **Markedness**).

This notion of the speaker as a rational actor making certain decisions about code choice, albeit at a largely unconscious level, is also evident in speech accommodation theory as well as in Gumperz's approach to code switching. However, unlike these other models, which consign the primary motivation for code switching to the addressee or to some other factor external to the speaker (e.g., topic or social setting), the markedness model is primarily a speaker-centered approach to communication.

Markedness and Communicative Competence

Within the marked model, all code choices fall along a continuum, as more or less marked or unmarked. With respect to bilingual speech, the unmarked choice simply refers to the linguistic variety that is expected, given the societal norms for that interaction. In contrast, marked choices fall at the other end of this continuum; that is, they are in some sense unusual or unexpected for the particular social interaction.

Furthermore, all speakers possess what Myers-Scotton calls a markedness evaluator, or the capacity to evaluate linguistic choices in terms of markedness, as part of their innate communicative competence (*see* **Communicative Competence**). While the capacity to assign markedness readings to linguistic choices is innate, the markedness continuum is established through exposure to the range of linguistic options used in the community.

Explaining Speakers' Choices

All code choices can ultimately be explained in terms of speakers' motivations to optimize the outcomes of the interaction. Most choices that speakers make affirm the norms that are in place for the particular exchange. These are unmarked choices, and they are usually the safest choices to make. The particular code used by the speaker is important only insofar as the participants view its status as marked or unmarked for that type of interaction. Thus, in a multilingual setting such as Nairobi, Kenya, the unmarked choice for most business transactions between strangers is Swahili. However, if the participants discover during the course of their conversation that they are members of the Luyia ethnic group, they will often switch into Luyia to continue the conversation. Luyia, then, becomes the unmarked choice, given the ethnic identity of the participants. However, code switching between Swahili and English within the same turn, within the same sentence, and even within words is typically the unmarked choice for informal social gatherings between educated, middle-class peers in Nairobi. Hence, the markedness of linguistic choices must be evaluated in terms of the norms for a particular exchange; the unmarked setting may even change within a conversation.

In contrast to the relative safety of unmarked choices, marked choices carry with them some element of risk for someone who wishes to defy the norms. Importantly, the interpretation that a marked choice receives derives from its contrast with the unmarked choice for that exchange. That is, the unexpectedness, the 'otherness' of a marked choice carries significant social meaning. Marked choices are typically used to redefine the relationship between the speaker and the addressee, often as an expression of the speaker's authority or power, to indicate anger, or to assert one's ethnic identity (*see* **Identity and Language; Power and Pragmatics**). All these

strategies can be subsumed under a single general principle: speakers make marked choices to negotiate a change in the expected social distance between the participants, either increasing or decreasing it.

The Significance of the Markedness Model

Since its formulation, the markedness model has been successfully used to explain code switching between languages, between dialects and registers, and even between stylistic choices in literary contexts. The strength of the markedness model is its ability to explain not only unmarked choices, which other models do as well, but also its ability to explain marked choices. Furthermore, the markedness model addresses the universal aspects of communicative competence in terms of the cognitive abilities that use readings of markedness to assess speakers' intentions. For these reasons, the markedness model is a powerful tool not only for code switching research, but also for any examination of the ways in which speakers use language to achieve interactional goals.

See also: Bilingualism; Code Switching and Mixing; Communicative Competence; Conversation Analysis; Ethnomethodology; Identity and Language; Language and Dialect: Linguistic Varieties; Markedness; Power and Pragmatics; Social Class and Status; Speech Accommodation Theory and Audience Design; Style and Style Shifting.

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Code Switching and Mixing

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Code switching is a linguistic phenomenon commonly occurring in bi- and multilingual speech communities. The term, which also appears as 'codeswitching' and 'code-switching' in the literature, broadly refers to the systematic use of two or more languages or varieties of the same language during oral or written discourse. One of the earliest definitions of code switching was provided by Weinreich's (1953) description of bilingualism as "the practice of alternately using two languages." Gumperz (1982: 59) highlights the structural aspects of code switching that have dominated the last three decades of research in this area, by defining code switching "as the juxtaposition within the same speech exchange of passages of speech belonging to two different grammatical systems or subsystems."

Although the conversation patterns observed between bilinguals of the same language backgrounds indicate a predominantly unconscious switching back

strategies can be subsumed under a single general principle: speakers make marked choices to negotiate a change in the expected social distance between the participants, either increasing or decreasing it.

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See also: Bilingualism; Code Switching and Mixing; Communicative Competence; Conversation Analysis; Ethnomethodology; Identity and Language; Language and Dialect: Linguistic Varieties; Markedness; Power and Pragmatics; Social Class and Status; Speech Accommodation Theory and Audience Design; Style and Style Shifting.

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Although the conversation patterns observed between bilinguals of the same language backgrounds indicate a predominantly unconscious switching back

and forth between the two languages, this is not to say that switching occurs randomly. In fact, over the last three decades, researchers in the area of language contact have come to a consensus that code switching is a systematic rule-governed linguistic behavior.

Switching may be conscious and intentional. Intentional switching may be used to indicate shifts in topic, change in interlocutor, and change in interpersonal or social relationships. Much of the time, however, switching between languages is unintentional. It is the result of psycho- and sociolinguistic variables that the speaker is not consciously aware of, involving processing issues and the tendency of speakers to adapt their speech style to the interlocutor's style and/or community norms and expectations.

Although switching has at times been associated with language attrition, indicative of weakness in one of the bilingual's languages, many researchers believe that code switching is in fact a natural consequence of competence in more than one language and that it should not be mistaken for a language deficit.

The following are some examples of code switching between (1) Farsi-English, (2) Irish-English, (3) Japanese-English, and (4) Arabic-French.

(1) gofte bud ke she wanted to get revenge.
said was that _____
'She had said that she wanted to get revenge.' (Mahootian, 1993)

(2) Ta carr light green aige
be car _____ at him
'He has a light green car.' (Stenson, 1990)

(3) one algebra question o mark shite
_____*ACC.* ____ *do*
'you mark one algebra question' (Nishimura, 1991)

(4) un professeur ʔaDim
a professor excellent
'an excellent professor' (Bentahila and Davies, 1983)

Types of Code Switching

Two main types of code switching can be identified. Switching between languages at sentence or clause boundaries is called intersentential. Switches within a clause involving a phrase, a single word or across morpheme boundaries are intrasentential switches. Some researchers identify tag switching as a third type of switching, separate from intersentential switching. Tag switches involve the insertion of tag forms such as *I mean, you know, isn't it?*, etc., from one language into an utterance of another language. Example (5) shows an instance of intersentential switching between Puerto Rican Spanish and English; (6) and (7) are examples of intrasentential switching, and (8) is an example of a tag switch between Farsi and English.

(5) Sometimes I'll start a sentence in English
y termino en español
_____ *and finish it in Spanish*
'Sometimes I'll start a sentence in English and finish it in Spanish.' (Poplack, 1980)

(6) I'm shuxi-ing with you.
___ joke-_____
'I'm joking with you.' (Mahootian, 1993)

(7) Your bag is zir-e miz
_____ under of table
'Your bag is under the table.'

(8) It was a good performance, nae?
_____, no?
'It was a good performance, wasn't it?'

Code Mixing

Some researchers have used the term 'code mixing' (also 'codemixing' and 'code-mixing') to refer specifically to intrasentential switching, and code switching to refer to intersentential switching. In most current literature, however, the term 'code mixing' is used interchangeably with 'code switching,' with both terms referring to both types of language mixing. Recently, a few researchers have made finer distinctions between the two terms, using 'code mixing' and 'mixed code' to distinguish the use of two or more languages at the discourse level from switches within clauses/words.

In studies of child bilingualism, however, 'code mixing' carries additional implications. Depending on the researcher's view *vis-à-vis* children's ability to keep their two languages separate, code mixing can be seen as either a sign of the child's display of two differentiated code systems or an underlying unified system. Mixing in the former case refers to the same phenomenon found in adult mixed speech. In the latter, mixing refers to the use of the 'wrong' language in a monolingual context. More on this topic can be found in 'Bilingual Language Acquisition and Code Switching.'

Borrowings, Nonce Borrowings, and Loanwords

Adequately defining bilingualism and distinguishing between two of its related features, code switching and borrowing, has been an ongoing challenge for researchers. Borrowing is not a new phenomenon and can be seen as part of the development and lexical expansion of all languages. The most significant reason that languages borrow from one another is also the most obvious. Borrowing is motivated primarily

by cultural contact, whether through trade or war. Along with new ways, styles, foods, religions, forms of government, etc., new words for these items are introduced into the community. For example, looking at the history of the development of the English language we see the influence of Latin and French in everyday words such as *plant, pear, organ, bishop, heretic, pot, cook,* from Latin, and *cardinal*, *duke*, *court*, *abbey, beef, mutton, joy, poor, fruit,* from French.

Traditionally, the term 'borrowing' has been used to refer to any word or phrase taken from one language and used by the **monolingual** speakers of another language. Usually, borrowings fill lexical gaps arising from imported concepts, such as *telephone, television, fax, pizza*, etc. Before a word or phrase becomes a fully legitimate borrowing and becomes fully integrated into the host language, it goes through a few stages. Usually the target word is introduced into a language through bilinguals. At this stage, the word is not phonologically or morphologically integrated into the host language and its usage is more or less limited to bilinguals. Once a foreign word becomes part of the monolingual speech of a host language, most researchers agree that it has become part of the host language and hence a language borrowing. At this stage, the borrowed word will also show signs of adaptation to the morphology and phonology of the host language.

However, since borrowing is typically a gradual process, there are a number of factors that have been identified as relevant to distinguishing code switches from borrowings. First among these is the length of a borrowed utterance and the degree of morphological and phonological integration of the utterance into the host language. Opinions on the degree of integration range from fully integrated single words that have been completely adapted to the host language phonology and morphology systems, such as the Japanese word *takshi* [takʷši] borrowed from the English *taxi* [tæksi], to phrases of any length showing partial integration (Reyes, 1974; Pfaff, 1979; Haugen, 1956; Hasselmo, 1970; Grosjean, 1982; Mahootian, 1993). Frequency of occurrence in the host language has also been identified as a factor, with the idea that borrowings occur more frequently than code switches (Poplack *et al.*, 1988; Myers-Scotton, 1993).

Loanwords

Based on degree of integration, borrowings are further classified as either loanwords or nonce borrowings. Words fully integrated and used by monolinguals, usually without any knowledge of the words' origins, are loanwords. Loanwords can be further categorized as necessary loans and unnecessary loans. Necessary loans fill lexical gaps or accompany specific items brought into the host culture. Some examples of necessary loanwords in English are *pajamas*, *whiskey*, *chili*, *croissant*, *robot*, *orange*, and a host of other words that most monolingual English speakers probably do not recognize as borrowings. Food, fashion, technology, etc. are typical candidates for necessary loans. Unnecessary loans, as their label implies, do not fill in gaps. In fact, they coexist with the native analog but usually in a semantically altered fashion. For example, the French word *veal*, meaning 'yearling' or 'calf', did not simply replace the English word 'calf,' which also referred to the young animal and, therefore, blocked the French word from applying to that meaning. *Veal* could, however, be used for some other related meaning and was used to refer to the meat from the animal rather than the animal itself.

One of the reasons often cited for the unnecessary loans is that the guest language is associated with prestige by speakers of the host language, but there are many cases where prestige cannot account for such borrowings. A case in point is English borrowings in Japanese. For example, the word *maketo* (<market) connotes a modern image of an indoor market. Its Japanese equivalent, *ichi*, on the other hand, refers to an outdoor market, located under a tent. Clearly, *maketo* is borrowed into Japanese not for prestige but rather to make a useful distinction. Another example is the word *senta* (<center, as in an institution). The Japanese morpheme *-sho*, meaning 'center' conveys a less equipped place. The borrowed word *senta*, on the other hand, conveys a well-equipped, better-made, larger space, with modern furniture. The suffix *-sho* is also used for places that do not cater to fun/positive activities, such as *keimusho* 'jail.' Other such borrowings are used euphemistically. For example, the words *babysitter, nationalism*, and *bargain* are used in Japanese when a speaker wants to elevate or downplay the negative connotations of the Japanese equivalents. Romaine (1995) makes similar observation about English borrowings in Punjabi.

Distinguishing Borrowings from Code Switches

As mentioned earlier, one of the major problems confronting researchers in the area of language contact is how to distinguish between code switching and borrowing. These two have generally been considered different phenomena that produce mixed sentences. Most researchers agree that switching can be of any length. It can occur at the word, phrase, or sentence

level as long as it is a complete shift into the other language, as in example (9) below:

(9) Ça m'étonnerait qu'on ait code-switched autant que ça.
'I can't believe that we code-switched as often as that.' (Grosjean, 1982).

In this example the word 'code-switched' has been code switched, because the speaker has used an English term with an English pronunciation and past participle form in an otherwise French sentence.

In contrast, borrowings tend to be short and phonologically and morphologically adapted to the host language. For example, the word 'code-switché' in sentence (10) is an instance of borrowing (Grosjean, 1982). The English term 'code switch' is pronounced and inflected in French.

(10) Ça m'étonnerait qu'on ait CODE-SWITCHÉ autant que ça.
'I can't believe that we code-switched as often as that.'

The distinction between code switching and borrowing is important in sociolinguistics, where the decision to code switch or not is an integral part of the dynamics of a community (see 'Functions of Code Switching'). Until the early 1990s, linguists interested in the structure of code switching had also honored the distinction between switching and borrowing, with the implication that borrowings behave differently syntactically. However, for the distinction to be useful, it would have to rest on three interrelated assumptions:

1. borrowing and code switching are two conceptually distinct linguistic phenomena,
2. we can systematically and consistently separate the two phenomena, and
3. the distinction will hold across languages in a way that allows us to make generalizations about each phenomenon.

The criteria set thus far for distinguishing the two are not infallible. Since code switching can occur on a single-word level as well in longer utterances, length of utterance does not offer a clear-cut distinction. Phonological adaptation also fails to be foolproof. For example, if a bilingual speaker has transferred the phonological system of L1 to L2 while acquiring L2 (in other words the speaker has an accent), it will be difficult to evaluate whether word X from L2 has been borrowed into an L1 sentence or if the speaker has code switched into L2. Most researchers acknowledge the shortcoming of using morphological adaptation as a guideline in cases where the switch may be only one word such as an adverb or an uninflected free morpheme. Some researchers claim to have developed operational criteria for distinguishing borrowings from code switches. Their operational criteria rest on establishing a parallel between nonce borrowings and established loanwords. They assert that nonce borrowings, like established loans, are morphologically and syntactically integrated into the host language but code switches are not.

Nonce Borrowings

Despite some evidence that nonces are loanwords, there is more evidence that they are not. First, nonce borrowings, like code switches, are only used by bilinguals, not monolinguals.

Second, loanwords are established, recognized by the community as part of the native lexicon, and used as frequently and naturally as other native lexical items. Nonce borrowings are spontaneous usages, not established, with no guarantee of recurrence – just as code switches are spontaneous, not established, with no guarantee of recurrence.

Third, loanwords are phonologically adapted to the host language but nonce borrowings are not. Here too, nonce borrowings behave like code switches.

Fourth, morphological adaptation, as mentioned earlier, is not a foolproof criterion. It may be true that all words morphologically adapted into the host language are borrowings. However, what about words that have no overt morphology? Are they automatically code switches by default?

Fifth, syntactic adaptation also has its limits. For example in the case of two languages with the same word order, such as Spanish and English, would the word *slowly* in sentence (11) be considered a code switch or a borrowing? In cases such as (11), syntactic adaptation fails to be a clear criterion.

(11) Lo hizo slowly.
'He did it slowly.' (Woolford, 1983)

According to proponents of the nonce borrowing hypothesis, *slowly* could be either a nonce borrowing or a code switch.

Matrix and Embedded Languages

The distinction between matrix or host language and embedded or guest language is a crucial part of a number of code switching accounts. However, no feasible criteria have been established that systematically distinguish the matrix language from the embedded language in all instances of code switching. Some have proposed the base language should be whichever language the syntax of the utterance belongs to or whichever language provides the inflectional and

derivational morphemes. Myers-Scotton distinguishes between system morphemes, or grammatical morphemes, and content morphemes, the morphemes that assign thematic roles. System morphemes come from the matrix language. Joshi uses speaker intuition as the basis for distinguishing matrix from embedded language. He claims that in mixed discourse, speaker and hearer 'usually agree' on which language is the matrix language. However, as the following example indicates, not all bilingual speakers seem to be conscious of their switches, let alone which language frame they are using.

(12) I mean I'm guilty in that sense ke ziada wsi English i bolde fer ode nal eda . . . wsi mix kerde rene ã. I mean, unconsciously, subconsciously, keri jane e . . .
'I mean I'm guilty in that sense that we speak English more and more . . . we keep mixing. I mean unconsciously, subconsciously, we keep doing it. . .' (Romaine, 1995)

Not all researchers agree with these criteria. For example, Romaine (1995) notes that the syntax and morphology criteria would not work for Punjabi-English. Nor, as she and others have pointed out, would they yield unequivocal results in all instances. The mixed utterances in (13)–(15) underscore the problematic nature of the criteria proposed for the matrix/embedded distinction. In (13), for example, Japanese structure overlaps with English structure; therefore, it will not be possible to assign matrix language based on syntax. In cases such as (14) and (15), where a single system morpheme is in one language and the remaining utterance is in the other language, it seems counterintuitive, or at least problematic, to designate the language of the grammatical morpheme as the matrix.

(13) Dakedo I don't like New York
but _____
'But I don't like New York.' (Jap-Eng; Nishimura, 1985)

(14) E baguette, s'il vous plaît . . .
a baguette please
'A baguette please . . .' (Alsatian-Fr; Gardner-Chloros, 1991)

(15) Lawyer-et will tell you what to do.
_____-2P-POSS _____
'Your lawyer will tell you what to do.' (Farsi-Eng; Mahootian, 1993)

In addition to the unreliability of the proposed criteria for distinguishing matrix language from embedded, some researchers have pointed out that syntactic analyses of code switching, by virtue of their claim to be based on principles of universal grammar, should not need to resort to such a distinction.

Social and Pragmatic Functions of Code Switching

Early studies of code switching were embedded in studies of language contact and bilingualism. The most significant of these studies were carried out by Weinreich (1953), Haugen (1953), Hasselmo (1961), and Clyne (1972). By the early 1970s, code choice and code mixing were taking more of the spotlight as researchers became interested in the conversational functions and the social motivations of the byproducts of bilingualism. A number of functions were identified and associated with code switching, with most, if not all, directly or indirectly related to a complex of interconnected social and contextual variables or domains such as situation, interlocutor, and topic of discourse. Bilinguals' code switching was likened to monolinguals' style shifting. It was argued that having more than one language gave bilingual speakers a choice of an additional discourse mode. Giles *et al.* (1977) proposed that in addition to these domains, code switching and language choice are also influenced by sociopsychological forces. This approach, known as accommodation theory, would, for example, predict that speakers' needs or desires to associate with or disassociate from a group will direct their language choice.

Referential and Expressive Switching

The two functions most discussed in the literature until the early 1980s were the referential and the expressive functions of code switching. The referential function of code switching refers to the types of code switches that are primarily motivated by lexical gaps, or lack of fluency about a topic in one language, or simple failure of lexical retrieval. This function of code switching highlights the fact that the notion of balanced bilingualism is more an issue of theoretical competence rather than a reality. It is often the case that a bilingual can discuss some subjects more easily in one language than the other. For example, individuals whose home language (L1) differs from the language in which they have been educated (L2) are more at ease discussing academic concepts in the L2 and will therefore switch to the L2 to do so. This is true with regard to technical or culture-specific concepts as well. Tuning in to non-English radio stations in the United States reveals an interesting pattern of code switching. The native-language broadcasts are peppered with English terms for traffic flow, weather conditions, and local events.

The expressive function of code switching is associated with a meta-level act of communication where the form itself, meaning mixed speech discourse, is a comment about the speaker rather than the speech.

The relationship between language and identity has long been established and documented. Language is both co-constructor and a reflection of social identity. This relationship becomes more complex in bilingual communities where the languages and cultural/ethnic values and identities bear unequal social prestige. Studies of Spanish-English code switching among Puerto Ricans in New York and of code switching in the media conclude that speakers choose mixed code as a way to emphasize their bilingual/bicultural identity.

Metaphorical and Transactional Switching

The concepts of metaphorical or nonsituational and transactional or situational code switchings were introduced to capture two functions of code switching (Blom and Gumperz, 1972). Transactional switching is motivated by variables such as topic and interlocutors. Metaphorical switching, on the other hand, accounts for the extralinguistic message the speaker wishes to express, the effect the speaker wants to have on the hearer. Metaphorical code switching is viewed as an indication of the speaker's momentary attitudes and emotions with social variables (class, situation, speakers, topic, etc.) and ideological variables (identity, group affiliation, etc.) as important contributors to the form of the message (Gumperz, 1982). In his seminal work on discourse strategies, Gumperz characterizes bilingual speakers and bilingual speech communities as "marked both by diversity of norms and attitudes and by diversity of communicative conventions" (Gumperz, 1982: 71). In an attempt to capture uniformity across different bilingual language exchanges, he posits five conversational functions of code switching: (Gumperz, 1982: 77ff):

1. Quotation: to distinguish between direct speech and quotations or reported speech: When quoting or reporting someone else's discourse, speakers will often switch into that person's language, as in the following Farsi-English example:

   unvaeqt jan be maen mige, "I don't think I can make it."
   then John to me says _____
   'Then John says to me, "I don't think I can make it."'

2. Addressee specification: speakers may code switch in order to "direct a message to one of several addressees" (Gumperz, 1982: 77):

   'Well I don't know how to describe it but it just doesn't feel like home to me (directed to Hearers 1 and 2; H1 is monolingual, H2 bilingual), to miduni maenzuraem chie, doroste? (you know what I mean, right?' directed to H2). (Farsi-Eng)

3. Interjections: speakers may code switch as a way to mark an interjection as in the phrase 'you know' in the Panjabi-English sentence below:

   I wish, <u>you know</u> ke m3 pure Panjabi bol s3ka
   'I wish, you know, that I could speak pure Panjabi' (Romaine, 1995: 122)

4. Reiteration: speakers may switch languages to emphasize or clarify a message:

   Ven acá, ven acá, <u>come here, you</u>.
   Come here, _____. (Sp-Eng;
   come here, Gumperz, 1982: 78)

5. Message qualification: speakers may switch to add more information in order to qualify the main message.
6. Personalization versus objectification: in this category, switching marks a number of related functions that reflect the degree of speaker involvement or distancing *vis-à-vis* the message, the interlocutors, etc.

Related to the sixth category, Grosjean (1982: 152) identifies a number of additional discourse functions such as marking group identity, emphasizing solidarity, excluding others from a conversation, raising the status of the speaker, and adding authority or expertise to a message.

Though not comprehensive and by his own admission limited, Gumperz's view of the sociopragmatic functions of code switching captured the dynamic nature of language choice and was an important first step to a fresh look at an old phenomenon. Many of the same ideas and observations concerning the discourse functions of code switching were recast by Auer (1984) in a conversational analysis framework and by Appel and Muysken (1987) in the functional framework of Jakobson (1960) and Halliday *et al.* (1964). Based on her work in Africa, Myers-Scotton also suggested that code switching "serves the same general socio-psychological functions everywhere" (Myers-Scotton, 1988: 3) and proposed the markedness model of code switching to "explain the socio-psychological motivations behind CS [code switching]" (Myers-Scotton, 1988: 3).

Attitudes Toward Code Switching

Despite the pragmatic functions that code switching/language mixing serves and clear evidence that code mixed utterances are structurally rule-governed and systematic, in most communities, code switching usually has a stigmatized status. This is not to say that all bilinguals or all bilingual communities consider code switching to be negative. In fact, in all bilingual

communities one finds that attitudes toward mixed language range from positive to negative, depending on class, age, education, profession, and other social factors. For example, older generations of speakers in a bilingual community typically have a negative response to code switching and assert that it shows a loss of pride in the home culture and disrespect to the community elders, not to mention ignorance and laziness. They avoid code switching and usually expect the languages to be kept separate and hence 'pure.' Younger generations are expected to do the same, at least in the presence of their elders. This ideal of language purity is a strong social constraint on language mixing and can be found across many bilingual communities.

Who holds what attitude is not necessarily predictable, however, and can vary from community to community and from language pair to language pair. In part, attitude is tied to a group's position on bilingualism, to the social status of each language, as well as to the status of the immigrant group in the host country. For example, Puerto Ricans in New York have a positive attitude toward bilingualism and code switching. For them, code switching is frequent and occurs in both directions, i.e., from Spanish into English and from English into Spanish. Mixing two languages is an important way to show the speakers' affiliation and connection to both their cultures. In the same vein, in some social contexts, using mixed language discourse is considered the unmarked or expected form, and not mixing is considered marked or unexpected.

Conversely, until recently, among Mexican-Americans, code switching was highly stigmatized and referred to pejoratively. It has been noted that when political ideology changes and a group becomes more conscious of their ethnicity, attitudes toward code mixing change. For example, Romaine (1995) points to the reversal of the previously pejorative use of *pocho* and *caló* used in California and the southwestern United States to refer to the variety of Spanish-English spoken by Chicanos. She ties this shift to a heightened ethnic awareness among Chicanos.

Structural Accounts of Code Switching

Studies of the structure of code switching fall into four categories: descriptive accounts (Timm, 1975; Pfaff, 1979); accounts involving surface constraints and a third grammar for code switching (Poplack, 1980; Sankoff and Poplack, 1981); principle-based accounts involving special mechanisms (Belazi *et al.*, 1994; Bentahila and Davies, 1983; Di Sciullo *et al.*, 1986; Joshi, 1985; Woolford, 1983); and principle-based accounts without code switching-specific mechanisms or constraints (Mahootian, 1993, 1996a, 1996b; Myers-Scotton, 1993).

Overall, these approaches show the progression of code switching accounts moving from a view of code switching as only a dynamic social phenomenon to code switching as a language phenomenon that can inform linguistic theory at other levels such as syntax, morphology, and language acquisition.

Descriptive Accounts of Code Switching

Until the early 1970s, linguists generally considered the grammatical implications in one of two ways. On the one hand, grammatical implications were ignored because it was assumed that the internal structures of sentences have no bearing on the motivations for switching. On the other hand, some researchers concluded that the failure to find rules or constraints indicated that codes witching was syntactically unrestricted and irregular.

However, in the course of the 1970s, some linguists suggested that code switching does not occur syntactically randomly. A number of descriptive accounts, mostly about Spanish and English, observed that switching between languages seemed to follow certain patterns. For example, based on their data of Spanish-English code switches, Timm (1975) and Gumperz (1976) noted that switching did not occur between the subject pronoun and the finite verb. They proposed that switching was in fact prohibited between those elements, shown in examples (16) and (17) from Timm (1975: 477).

(16)	Pron	Subj	Verb		
	Sp	Eng	*Yo went;	*El wants;	*Ellos gave.
	Eng	Sp	*I fui;	*He quiere;	*They daban

(17)	Verb	Pro	Obj	
	Sp	Eng	*Mira him;	*Him mira
	Eng	Sp	*She sees lo	*Lo she sees

Pfaff (1979) described further constraints on Spanish-English code switching. She noted in the case of switches between adjective and noun that the resulting mix must not violate the surface word order of either language. Hence switches between English nouns and postnominal Spanish adjectives are prohibited, as shown in example (18). However, switching between determiners and their NPs, shown in example (19), is allowed.

(18) *<u>I went to the house</u> chiquita
<u>_____</u> small
'I went to the small house.' (Pfaff, 1979)

(19) el <u>same day</u>
the <u>_____</u>
'the same day' (Pfaff, 1979)

A Three-Grammar Approach

Results such as those obtained by Timm and Pfaff led researchers to look for ways to formulate the apparent constraints on code switching. The first effort at formalizing constraints was made by Sankoff and Poplack (1981). They suggested that bilinguals have a code switching grammar separate from the grammar of their two languages. That is, they claim bilinguals have a third, code switching grammar along with their two monolingual grammars. Their code switching grammar comprises the lexicon of the two languages plus the grammatical categories of the two languages.

Poplack (1980) and Sankoff and Poplack (1981) also proposed two universal constraints on code switching. The Free Morpheme Constraint prohibits a switch between a stem and an affix unless the affix has been phonologically integrated into the language of the stem. Accordingly, mixed utterances such as in example (20) are disallowed.

(20) *eat-iendo
'eating' (Poplack, 1980)

Their second principle, the Equivalence Constraint, operates on surface structures. Its simplest form states that the word order before and after a switch must be possible in both languages. In the example below, (21c) is the speaker's utterance, (21a) and (21b) are the corresponding English and Spanish forms, and therefore the switch in (21c) is possible (Poplack, 1980: 586):

(21a) Eng: I told him that so that he would bring it fast
(21b) Sp: (Yo) lo dije eso pa' que (el) la trajero ligero
I him told that so that he it bring fast
(21c) CS: I told him that PA' QUE LA TRAJERO LIGERO

However, the switch between the noun and adjective in example (22) is ruled out since the noun-adjective order is exclusive to Spanish:

(22) *the casa big
___ house ___
'the big house' (Woolford, 1983)

Despite their seminal work showing that code switching is syntactically systematic and rule-governed, Sankoff and Poplack's model has been criticized for falling short on two levels. On the conceptual level, since every language requires a third code mixed grammar, a trilingual speaker would be carrying around seven grammars. This number jumps to 15 for the quadrilingual. Such an increase in the number of grammars seems unlikely.

Second, both of their proposed constraints have been shown to be too strong. The equivalence constraint that operates on linear order disregards the hierarchical relationship among categories and constituents. Consequently, although the constraint adequately predicts switches between Spanish and English, it fails to predict possible switches in the case of typologically dissimilar languages, such as English (SVO) and Japanese (SOV). In example (23), an English adverb is used in Hindi word order and precedes the verb. Example (24) shows a Farsi object DP (determiner phrase) following the verb. In example (25), an English adjective follows an Irish noun and in example (26) a Japanese postposition follows an English DP.

(23) pušpa bahut quickly bat karh hai
Pushpa very _____ word do-PROG
'Pushpa talks very quickly.' (Hindi-Eng; Di Sciullo *et al.*, 1986)

(24) I love xormalu
_____ persimmon.
'I love persimmon.' (Farsi-Eng; Mahootian, 1996a)

(25) Ta carr light green aige
be car _____ at him
'He has a light green car.' (Ir-Eng; Stenson, 1990)

(26) I slept with her basement de.
_____ in
'I slept with her in the basement.' (Jap-Eng; Nishimura, 1985)

Second, the Free Morpheme Constraint proposed as a general constraint on code switching predicts no switching between a bound morpheme of one language and a phonologically unassimilated lexical item of another language. This prediction is not borne out, as seen in the following examples from Arabic-English (Prince and Pintzuk, 1984: 2), Irish-English (Stenson, 1990: 180), and Japanese-English (Nishimura, 1991: 31).

(27) inta hang-ha up
you ____ -it ____
'you hang it up'

(28) job-anna
____-PL
'jobs'

(29) one algebra question-o mark-shite
_____ACC _____-do
'(you) mark one algebra question, and . . .'

The Sankoff and Poplack model accounts for examples such as (23)–(28) by designating the switches as borrowings.

Principle-Based Approaches with Special Mechanisms

The limitations of Sankoff and Poplack's surface level constraints led other researchers to look for more principle-based constraints to account for code switching. Code switching was seen as an additional process that needed to be accounted for by special rules/constraints outside the bilingual speaker's two monolingual grammars but motivated by universal principles of grammar. Toward this end, a number of code switching models were proposed: Woolford's phrase structure congruence model (1983), Bentahila and Davies' subcategorization restrictions model (1983). Joshi's closed-class item constraint (1985), Di Sciullo *et al.*'s government constraint (1986), and Belazi *et al.*'s Functional Head Constraint (1994).

Phrase Structure Congruence Model Woolford (1983) argues for an account of code switching that follows from "the manner which monolingual grammars cooperate to produce hybrid sentences" (Woolford, 1983: 519). Woolford argues against an autonomous code switching grammar, citing as evidence the fact that we do not find utterances such as (30b) where English lexical items in a Spanish structure produce an unacceptable utterance (Woolford, 1983: 521):

(30a) No estoy terca. (Spanish)
not am stubborn
'I'm not stubborn.'

(30b) *Not am stubborn.

In this model, the lexicon and word formation rules of the two languages are assumed to be separate and cannot interact. Instead she proposes that the monolingual grammars interact at D-structure at the level of phrase structure rules, where "the two grammars operate during code-switching just as they do during monolingual speech" (Woolford, 1983: 522). Therefore, while dropping the subject pronoun is acceptable in Spanish (30a), pro-drop is not permitted in English (30b). Woolford's model, like her predecessors', also prohibits morphologically mixed French-English lexical items such as **savoir-ing*.

Terminal nodes of phrase structures can only be filled from the lexicon of the grammar that generated them. Code switches result when a phrase structure is identical in both languages and "both lexicons have equal access to terminal nodes created by common rules" (Woolford, 1983: 524). For example, in both Spanish and English the determiner precedes the noun. Therefore, we should expect to get the four following combinations the phrase 'the old man'.

(31) the old man

(32) el hombre viejo
the man old
'the old man'

(33) the hombre viejo

(34) el old man

On the other hand, the rule that adjectives follow nouns is unique to Spanish. Woolford's model predicts we will get the utterance in (35) but not the ones in (36)–(39):

(35) el hombre viejo
'the old man'

(36) *el man viejo
'the old man'

(37) *el hombre old

(38) *the old hombre

(39) *the man old

Although accepted and incorporated into others' models of code switching, the noun-adjective prediction was shown to be wrong by Mahootian and Santorini (1994) and Santorini and Mahootian (1995). Their account of switching between nouns and adjectives uses the distinction between complements and adjuncts on the one hand and attributive and predicative adjectives on the other, to account for and predict noun-adjective switches between languages with dissimilar NP structures such as Spanish and English, Italian and English, and Irish and English:

(40) I want a motorcycle verde
_____ green
'I want a green motorcycle.' (Sp-Eng; McClure, 1981: 87)

(41) Ma ci stanno dei smart italiani.
'But there are smart Italians.' (It-Eng, Di Sciullo *et al.*, 1986: 15)

(42) do gheansai deas pink
your sweater nice ____
'your nice pink sweater' (Ir-Eng; Stenson, 1990: 171)

The main criticism brought against Woolford's model is its inability to account for switches involving structurally dissimilar languages. With the exception of noun-adjective switches, Woolford's approach successfully accounts for Spanish-English, but like Sankoff and Poplack's equivalence constraint, its reliance on the order of constituents in a phrase renders it too strong when dealing with languages whose word orders differ such as Hindi-English, Farsi-English, Arabic-French, Irish-English, etc.

Although Woolford's model does not account for the full range of code-switching data, it captures

two significant generalizations about the process of code switching. First, code switching is an ordinary language-use phenomenon that is part of our grammar system and does not require a third grammar, and second, switches involve cross-linguistically corresponding categories. These two insights figure prominently in models that followed a decade later.

Subcategorization Restrictions Intrasentential code switches between Moroccan Arabic and French led Bentahila and Davies (1983) to conclude that there are no surface constraints on switching and that, for at least Arabic-French, switching is constrained **only** by language-specific subcategorization restrictions. Accordingly, they were able to account for switches within VP even where the structure of the two languages are dissimilar, as is the case of Moroccan Arabic (VSO) and French (SVO). Although they do not explicitly define it as such, in application their notion of subcategorization restrictions is equal to sisterhood. Accordingly, they allow for the switch in (43), where an Arabic adjective (which subcategorizes as postnominal) follows a French noun (Bentahila and Davies, 1983: 321):

(43) un professeur ʔaDim
a professor excellent
'an excellent professor'

However, they wrongly block switches like the one in example (44), where an Arabic adjective precedes a French noun, thus violating the subcategorization rule for Arabic adjectives. As mentioned earlier, these types of switches were later addressed and accounted for by Mahootian and Santorini.

(44) un ʔaDim professeur
a excellent professor
'an excellent professor'

The subcategorization model also prohibits switching at word-internal morpheme boundaries for which they postulate a constraint similar to Sankoff and Poplack's Free Morpheme Constraint.

Bentahila and Davies' model of switching has an advantage over other models. Although they cannot account for word-internal switches or the range of possible noun-adjective switches, their model accounts for a wide range of intrasentential switches by simply invoking the universal principle of subcategorization restrictions.

The Closed-Class Item Constraint Joshi (1985) also proposed a system for code switching where the grammars of the two languages are kept separate. There is no merging of the phrase structure rules or lexicon of the two languages. Rather the proposed switching constraints are grounded in basic principles of language and grammar.

The system he presents involves a matrix language L_m with a corresponding grammar G_m and an embedded language L_e with grammar G_e. He assumes a correspondence between grammatical categories across the two grammars so that the structure of a DP in one corresponds to the structure of DP in the other.

Joshi places three constraints on switching. The first is asymmetry, which specifies that switching can only occur in one direction: from matrix language to embedded language. The second constraint prohibits switches from occurring at the root node of the matrix language (S_m). The third constraint, the Closed-Class Item Constraint, prohibits switching of closed-class items including determiners, quantifiers, prepositions, possessive, Aux, Tense, etc., meaning that all closed-class items must be in the matrix language.

Two related problems have been noted with this model. In the first place, the viability of the asymmetry constraint is questioned. Asymmetry depends on the distinction between matrix language and embedded language. Joshi claims "speakers and hearers usually agree on which language the mixed sentence is 'coming from'" (Joshi, 1985: 193). However, as noted earlier, this criterion, along with others proposed to distinguish matrix language from embedded language, is unreliable. Consequently, since matrix and embedded languages are not systematically discernible from each other, the closed-class item constraint loses its viability. The following are some examples of switches that violate the predictions of the Closed-Class Item Constraint.

(45) Anyway, I figured ke if I worked hard enough,
_____ that_____
I would be finished by summer.
'I figured that if I worked hard enough I would be finished by summer.' (Farsi-Eng; Mahootian, 1993)

(46) elle te pique min fuq le drap
it bites you through the sheet
'it bites through the sheet' (Mor. Ar-Fr; Bentahila and Davies, 1983)

(47) Where are they, los language things?
_____, the _____
'Where are they, the language things?' (Sp-Eng; Poplack, 1980)

In sentence (45), a Farsi complementizer appears between an English main clause and an English embedded clause. In (46), a lone Arabic preposition appears in the midst of a French sentence. In (47), a Spanish determiner occurs in an all-English sentence.

In each case, the model would designate the language of the closed class item, i.e., the complementizer/preposition/determiner, as the matrix language, regardless of the fact that the rest of the sentence is syntactically and lexically in another language. Despite these problems, the main insights motivating this model remain valuable: that a third grammar for switching is unnecessary; and that switching results from the interaction between two grammatical systems with comparable categories.

The Government Constraint Di Sciullo *et al.*'s Government Constraint Model (1986) was an attempt to account for switches found between languages with dissimilar phrase structure rules, such as Hindi, Farsi, Japanese (SOV), and English (SVO). In this model, switching is prohibited where there is a government relation at S-structure between two elements. They propose that elements in a government relation must be in the same language, designated by the language index *q* such that: if X governs Y, $\ldots X_q \ldots Y_q$ (5). Y is a maximal projection, not a terminal node. The language index is assigned to the highest lexical element in a maximal projection. Government is defined through immediate c-command. For example, in the prepositional phrase *to school*, the preposition and its complement would both bear the index *q*, and would have to be in the same language:

(48)
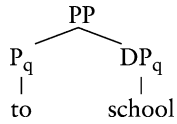

In the phrase *to the school*, however, the determiner *the* is the highest lexical element in the governed DP *the school*, and will therefore be the language index carrier: *to* and *the* must be drawn from the lexicon of the same language, *school* may or may not be in another language. Example (49) illustrates:

(49)
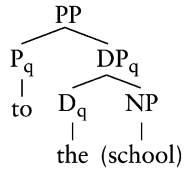

This model successfully eliminates word order equivalence as a criterion for switching and allows for code switching between languages with dissimilar word orders. However, a number of conceptual and empirical problems have been noted. First, the notion of language index that the model rests on is, from a processing point of view, redundant and pointless for the monolingual speaker who may never be exposed to another language. More importantly, the Government Constraint proves to be too strong. The model predicts that switches between a verb (V) and COMP are prohibited, as shown in the Hindi/English examples (50) and (51) from Di Sciullo *et al.* (1986: 17):

(50) I told him that ram bahut bimar hai.
_____ Ram very sick AUX
'I told him that Ram was very sick.'

(51) *I told him ki ram bahut bimar hai.
_____ that Ram very sick AUX
'I told him that Ram was very sick.'

However, as the Farsi-English examples in (52) and (53) illustrate, switches do occur between V and COMP. Farsi, like Hindi, is an SOV language.

(52) I was implying ke in kar dorost nist.
_____ that this act correct isn't
'I was implying that this isn't right.'
(Mahootian, 1993: 104)

(53) They don't know ke noh noh-ta haeštad-o yek-e.
_____ that nine nine-CLASS eighty-and one-is
'They don't know that nine times nine is eighty-one.'

They also predict that conjunctions such as *and* or *but* will be in the same language as the clause being joined, so we should get CPq CONJp CPp, but we would not get *CPq CONJq CPp. However, this prediction does not hold true. Examples (54) and (55) show switching between a Farsi conjunction and the following English CP conjunct, and an English conjunction followed by a Farsi CP, respectively.

(54) fekr kaerd-aem daest-aem
thought did-1st hand-1stPOS
daerd begire vaeli it was fine.
pain get-3rd but _____
'I thought my hand would hurt but it was fine.'

(55) They are boys and morteza xeyli adaem-e- smart-i-ye.
____ morteza very person-EZ____ IND-is
'They are boys and Morteza is a very smart person.'

Halmari (1997) modifies and expands the Di Sciullo *et al.* model to accommodate Finnish-English code switches. In doing so, she strengthens the model and makes the apt observation that the Government model is likely one of a number of models that can account for **some** of the structural outputs of code switching.

The Functional Head Constraint Belazi *et al.* (1994) propose a model that restricts switching between a functional head and its complement: a functional head f-selects its complement with regards to

language as a feature, thereby ensuring a match between the language of the functional head and its complement. Accordingly, switching is disallowed between C and IP, I and VP, Neg and VP, D and NP, and Q and NP. Additionally, to account for noun/adjective switches, they posit the Word-Grammar Integrity Corollary, according to which words from a given language must obey the grammar rules of that language and no other. So, for example, postnominal modifiers cannot occur pronominally in a mixed utterance. The Functional Head Constraint model is similar to the Government Constraint model. Both rest upon and exploit a special relationship between certain elements (government/f-selection) and stipulate a language-sensitive component (language index/language feature) as part of the relationship. From this point, the two analyses turn in opposite directions from each other, resulting in a striking (near-) complementary distribution between Di Sciullo *et al.* and Belazi *et al.*'s analyses. What the government constraint rejects as switch points becomes fertile switching grounds for the functional head constraint.

Examples (56)–(59) show reported switches that violate the Functional Head Constraint.

C and IP
(56) il croyait bi?ana je faisais ça exprès.
he thought that I was doing that on purpose
'He thought that I was doing that on purpose.'
(Mor. Ar.-Fr; Bentahila and Davies, 1983)

I and VP
(57) Ní dispute-alfaidh mé leat.
neg ____-FUT I with-you
'I won't dispute with you.' (Ir-Eng; Stenson, 1990: 180)

Neg and VP
(58) Pára que no talfenéen a la mištará.
so that NEG. phone they would to the police
'So that they wouldn't phone the police.'
(Hebr-Sp; Berk-Seligson, 1986)

D and NP
(59) Ha portato un cadeau.
(he) brought a present
'He brought a present.' (It-Fr; Di Sciullo *et al.*, 1986)

Q and NP
(60) Daban unos steaks tan sabrosos.
(they) served some ____ so tasty
'They served some steaks so tasty.' (Sp-Eng; Pfaff, 1979)

Code-Switching Models Based on Universal Principles with No Special Mechanisms

In the early 1990s two new models emerged. One makes use of a fundamental principle of grammar, the Head-Complement Principle, to account for intrasentential switches as well as word-internal switches. (Mahootian, 1993, 1996a,b; Mahootian and Santorini, 1996). The other, the Matrix Language Frame model, relies on a matrix/embedded relationship between the speaker's two languages and on the distinction between system and content morphemes. (Myers-Scotton, 1993, 2002).

The MLF Model The Matrix Language Frame (MLF) model for code switching (Myers-Scotton, 1993, 2002) explains code switching in terms of two types of asymmetry: (a) the Matrix Language (ML) vs. the Embedded Language (EL) and (b) content vs. system morphemes. System morphemes overlap with the members of the category traditionally referred to as closed-class items. They carry the feature [+Quantification]. System morphemes can be specifiers, quantifiers, possessive adjectives, and inflectional morphemes. Content morphemes have the feature [−quantification] and are the morphemes that assign or receive thematic roles. They may be either in the ML or the EL. Content morphemes can be verbs, nouns, descriptive adjectives, or prepositions.

The MLF model rests on four hypotheses (Meyers-Scotton, 1993): the Matrix Language Hypothesis, the Blocking Hypothesis, the Embedded Language Island Trigger Hypothesis, and the Embedded Language Implicational Hierarchy Hypothesis.

1. The Matrix Language Hypothesis: the grammatical frame in intrasentential code switching is set by the matrix language. This hypothesis is guided by two principles. The Morpheme Order Principle states that, in a mixed constituent, morpheme order cannot violate the order of morphemes in the ML. The System Morpheme Principle states that the ML supplies the system morphemes in mixed constituents.
2. The Blocking Hypothesis: switching is blocked when content morphemes from the embedded language do not meet ML congruency requirements.
3. The Embedded Language Island Trigger Hypothesis: switching into a nonpermissible EL morpheme forces an obligatory EL island, i.e., the constituent must be completed in the EL.
4. The EL Implicational Hierarchy Hypothesis: idiomatic, formulaic, or peripheral EL constituents may occur and will not be barred by hypotheses 1, 2, or 3.

In the mixed constituents in examples (61)–(62), Irish and Finnish are considered the matrix languages.

(61) Ni *disput*alfaidh me leat
neg dispute-FUT I with-you

'I won't dispute with you' (Ir-Eng; Stenson, 1990)

(62) Se oli semmosesta *land*istä.
it was such +ELAT ___ +ELA
'It was about a land.' (Finn-Eng; Halmari, 1997

In her revised MLF model, the 4-M model, Myers-Scotton (2002) makes finer distinctions between system and content morphemes. The 4-M model defines subtypes of system morphemes, arguing that while this basic dichotomy holds, the subtypes of morphemes have both explanatory and predictive power.

The general objection brought against the MLF model has to do with its reliance on the matrix-embedded distinction. As discussed earlier, this distinction is not clearly defined. Although the MLF's first hypothesis is intended to systematize this distinction, it has been noted that the description contains a certain amount of circularity: on the one hand, the ML is recognized by the fact that system morphemes are in the ML. On the other hand, the System Morpheme Principle specifies that system morphemes are supplied by the ML. Thus, examples such as (63)–(65) would either have to be noted as counter-evidence to the model or one must in each instance assign ML status to the entire utterance based on a single morpheme.

(63) Anyway I figured *ke* if I worked hard enough . . .
_____ that _____
'Anyway I figured that if I worked hard enough . . .' (Farsi-English; Mahootian, 1993)

(64) there wasn't an item *vos* we didn't have
_____ that _____
'there wasn't an item that we didn't have' (Eng-Yidd; Prince and Pintzuk, 1984)

(65) Lawyer-*et* will tell you what to do.
_____ 2P-POSS _____
'Your lawyer will tell you what to do.' (Farsi-Eng; Mahootian, 1993)

The Head-Complement Principle Model The Head-Complement Principle model followed in the footsteps of earlier researchers such as Bentahila and Davies and Woolford in looking for a principle-based approach. The model sets out to account for the multitude of switches recorded between typologically dissimilar languages and for switches found between bound and free morphemes. The model builds on three basic assumptions:

1. The same principles and derivational constraints that produce monolingual utterances produce mixed utterances, whether the switch involves a bound morpheme, a single word, or an entire phrase. General principles of phrase structure, rather than constraints specific to code switching, produce code switched utterances.
2. No special third grammar is needed to account for code switched utterances. A bilingual's two grammars are sufficient to generate code switching. The two grammars remain distinct, both sociolinguistically and syntactically. Their interaction is accounted for by (1).
3. From a syntactic perspective, there is no formal distinction between 'code switching' and 'borrowing': both can be accounted for in the same way by the same principles of grammar.

The principle itself is summed up below (Mahootian, 1994, 1996a,b):

> The Head-Complement Principle (HCP): heads determine the syntactic properties of their complements in code switching and monolingual contexts alike: heads determine the phrase structure position, syntactic category, and feature content of their arguments.

The HCP applies to both lexical and functional heads. Consequently, switches are permissible between determiner (including Quantifiers) and NP, Comp and IP, Infl and VP, V and PP, P and DP, and other heads and their complements. Furthermore, single-word switches and within-word switches, often treated as borrowings and therefore left outside of syntactic analysis, are accounted for in the HCP model.

In the HCP model, maximal projection nodes are the points at which switching occurs: switching may occur where there is phrase structure **label** congruence between languages. This is different from previous approaches that rely on word-order congruence between the switching languages.

In line with numerous theories of grammar where the lexicon plays a central role, this model adopts a view of grammar where the lexicon projects phrase structures. Lexical items of a language are represented as trees reflecting their language-particular syntactic requirements in accordance with X-bar theory. This view of language as a combination of structures rather than strings allows for switches between languages with dissimilar word order that other approaches have not been able to address. The HCP model predicts:

- switches at all maximal projections (possible but not obligatory),
- L1 word order with mixed L1/L2 words,
- L2 word order with mixed L1/L2 words,
- L1 word order with all L1 words,
- L2 word order with all L2 words.

Application of the model is illustrated with the Farsi-English object-verb switch in (66). Farsi is an SOV language.

(66) ten dollars dad
_____ gave
'she gave ten dollars'

Based on the assumptions of the model, the utterance in (66) is derived from the Farsi structures shown in (67) and the English structures shown in (68).

(67)
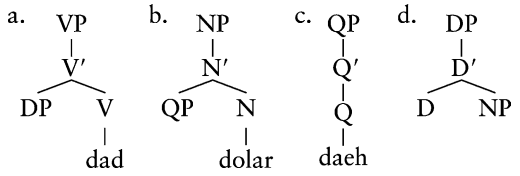

(68)
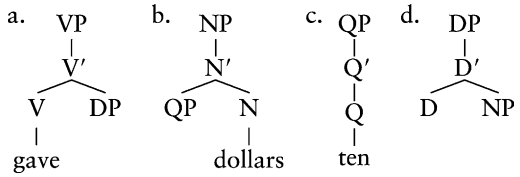

Lexical items project the structures in (67a)–(67d) and (68a)–(68d). The combination of the tree in (68b) + (68c) + (68d) yields the DP structure in (69). This DP combines with the lexical structure for *dad-e* 'gave', to yield a Farsi left-branching VP, *ten dollars dad*, shown in (70).

(69)
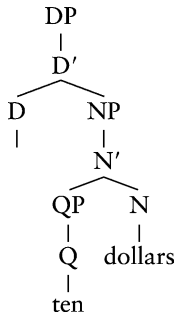

(70)
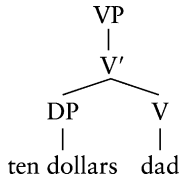

Given the assumptions of this model, the same lexical structures generate comparable monolingual utterances in Farsi and English. By combining phrase structures (67a)–(67d), we get the Farsi utterance in (71).

(71) daeh dolar dad
ten dollar gave
'gave ten dollars'

A combination of (68a)–(68d) yields the English phrase in (72):

(72) gave ten dollars

A number of other attested types of mixed utterances can also result from the phrase structures in (67) and (68), for example, gave daeh dolar, gave daeh dollars, ten dolar dad. Switches across morpheme boundaries are accounted for in the same manner.

The HCP model has some clear advantages over models that require mechanisms and rules specific to code switching. By applying principles of universal grammar, the model accurately predicts switch points at clause, phrase, and within word levels. No additional mechanisms or assumptions are required.

MacSwan (1999), inspired by the simplicity and broad scope of application inherent in the HCP approach, recast the same insights and principles into a minimalist framework.

Bilingual Language Acquisition and Code Switching

'Bilingual language acquisition' refers to the simultaneous acquisition of more than one language during the developmental stages of language acquisition. One of the first documented studies of this process was conducted by Ronjat (1913), who examined his son's simultaneous acquisition of German and French. This was followed by a number of other longitudinal studies. Of particular significance is Leopold's seminal four-volume detailed diary of his daughter's acquisition of German and English (Leopold, 1939–1949). Leopold's study marked the beginning of focused interest in child bilingualism. Since then, numerous other studies have been conducted in this area.

One of the issues arising from research into child bilingualism is the status of code switching. The main theoretical question for researchers in this area is whether children start out with a unitary language system that gradually splits into two separate systems or whether they start out with two separate systems. Proponents of the unitary system contend that the words of both languages form a single lexicon for the child and that mixed utterances at the two- and three-word stage support a nondifferentiated system. Researchers supporting the separate system, also called the Independent Language Hypothesis, maintain that children start out with two separate systems and keep them differentiated. They show that children typically keep their languages separated when they are in monolingual contexts by using the appropriate language for the context. To show an undifferentiated system, they assert, a child would need to use the two languages randomly in either context.

Another question regarding language mixing in early acquisition stages concerns the similarity between the types of switches found in children's utterances and those found in adult switches. Structurally, the question is whether children mix their two languages in the same way adults do. The answer to this question has theoretical implications on a number of fronts. One much debated issue in first language acquisition is whether adult grammars are a continuation of children's grammars or if the two are separate systems. The similarity between adults' and children's code switches may bear on this question in particular, and on the notion of language universals in general.

A further insight gained from child code-switching data concerns existing models of code switching. How well do these models hold up when they set out to account for children's code switches? Of the existing models, only a few, Mahootian's HCP model and Myers-Scotten's MLF model, have been successfully applied to children's code-switching data.

Examples (73)–(77) show mixed utterances produced by children. Children's ages are noted in parentheses in years followed by months. Languages are abbreviated as follows: Fr = French, Germ = German, Russ = Russian, Norw = Norwegian.

(73) ça ça sonne (1;11, Fr-Germ; Köppe and Meisel, 1995)
this this sun

(74) das dort ne? (2;0, Germ-Fr; Köppe and Meisel, 1995)
this sleeps, right?

(75) mer cookie (2;2, Norw-Eng; Lanza, 1997)
more ____
'more cookie'

The following is a comparison between adult mixed utterances and children's mixed utterances showing switches occurring at the same grammatical junctures (Mahootian, 1999).

- Switches between Determiner and NP

(76) el same night
the _____
'the same night' (adult: Sp-Eng; Pfaff, 1979)

(77) That's my kino.
_____cinema (movie)
'That's my movie.' (child: 3; 4, Russ-Eng; O'Neill, 1998)

- Switches between Verb and DP

(78) il ne faut pas changer ttwSe:*l*
_____ the receipt
'You must not change the receipt.' (adult: Arab.-Fr; Bentahila and Davies, 1983)

(79) klappe hand
clap _____
'clap hand' (child: 2; 2, Swed.-Eng; Lanza, 1997)

- Switches between Subject DP and I′

(80) No you govorish, chto eto vozmozhno.
But _____ say that that possible
'But you say that it's possible.' (adult: Russ-Eng; O'Neill, 1998)

(81) Jeg give it to Daddy
I _____
'I give it to daddy' (child: 2; 7, Norw-Eng; Lanza, 1997)

- Switches between V and PP

(82) Nu vidish, Steven King zhil in a trailer.
well you see _____ lived _____
So you see, Steven King lived in a trailer.' (Adult: Russ-Eng; O'Neill, 1998)

(83) on va maintenant zum krankenwagen
we go now to the ambulance
'We now go to the ambulance.' (child: 3; 7,2, Germ.-Fr; Meisel, 1994)

- Switches between Roots and Affixes

(84) Eto na dresser-e.
That on _____-LOC-Sg
'It's on the dresser.' (adult: Russ-Eng; O'Neill, 1998)

(85) It's lop -en.
__ break-____
'It's broken.' (child: 3; 10, Russ-Eng; O'Neill, 1998)

See also: Bilingual Education; Bilingual Language Development: Early Years; Bilingualism and Aphasia; Bilingualism and Second Language Learning; Bilingualism; Code Switching; Codes, Elaborated and Restricted (Bernstein); Identity and Language; Identity: Second Language; Language Attitudes; Language Change and Language Contact; Language Maintenance and Shift; Multiculturalism and Language; Relevance Theory; Rule Borrowing.

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Coelho, Francisco Adolpho (1847–1919)

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Francisco Adolpho Coelho is the most important 19th-century name in the field of Portuguese linguistic studies. He was born in Coimbra on January 15, 1847, and died in Carcavelos on February 9, 1919. Coelho distinguished himself as an extraordinary, self-taught person during his basic education, although it is known that he had attended classes at the University of Coimbra between 1862 and 1864. In Lisbon, Coelho entered the university as a student of the Superior Course of Letters, in which he studied at least from 1865 till 1866. In 1878, he began his career as an assistant professor in this same course, teaching general Indo–European linguistics. Due to Coelho's comparative research on Romance languages, the thesis presented to the academic word by Friedrich Diez in his *Grammatik der romanischen Sprachen* has been applied in modern Portuguese linguistic studies, and that is the reason why philology began to be studied by more qualified people in Portugal from that time on. His first published work, entitled *A língua portuguesa: fonologia, etimologia, morfologia e sintaxe* (1868), is thus considered the initial step of the historical–comparative school in Portugal.

Some years later, Coelho managed to publish two other important works about descriptive grammar based on the comparative method: *Theoria da conjugação em latim e portuguez. Estudo de gramática comparativa* (1870) and *Questões da língua portuguesa* (the first part in 1874 and the second in 1889). His bibliography, nevertheless, is not absolutely restricted to the field of linguistics, since he had written

level. Code-switching is common in the young generation. This generation is also particularly exposed to standard Indonesian and standard Malay. The exposure to Indonesian comes from the media (Indonesian TV) as well as from Bahasa Indonesia, which is offered in school as a second language choice. The influence of Malay comes less directly, from the status that the language enjoys for literary and religious reasons: in 2001 there were clearly normative voices to be heard advocating a more standard form of Malay to be spoken on the island. All these facts considered, it is quite likely that Cocos Malay may lose many of its particular traits in the near future.

Cocos Malay communities can also be found in Western Australia (children have to move there to complete their education after grade 10) as well as in Sabah, Malaysia. Relocated from the original settlements in different waves as the islands can only sustain a limited population, these communities are described as having lower proficiency in Cocos Malay than that on Home Island. In particular, in Sabah it is reported that convergence towards standard Malay has taken place.

See also: Australia: Language Situation; Bilingualism; Code Switching and Mixing; Language Change and Language Contact; Malaysia: Language Situation.

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Codes, Elaborated and Restricted (Bernstein)

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Bernstein was among the first scholars to focus on the correlation between the scholastic success (or failure) of a learner and the social class he or she belonged to. A student living in a well-off family, having many cultural stimuli (books, newspapers, periodicals, films, etc.) is bound to develop a rich and fully articulated language (a so-called 'elaborate code'), whereas a student who belongs to a working-class family and is exposed to poor linguistic and cultural stimuli, develops a fragmented, poor, syntactically deficient language (called a 'restricted code' by Bernstein) (see Bernstein, 1971–1975).

Contrary to the Chomskyan theory that language naturally develops in the brain, due to the interaction of biologically innate structures and the environment to which the child is exposed, may be that the data to which the child is exposed are so poor and confused that it is easy to demonstrate that the innate learning program prevails over the environmental stimuli, Bernstein emphasizes the predominant role played by the environment in shaping the learning process. Of course, the correlation between social class is not, strictly speaking, without exceptions, because much of the learning process depends on the lifestyle of the family under consideration. There are exceptional working-class families where parents, contrary to all expectations, have good knowledge of the language and place great importance on culture, but the norm is that, within working-class families, cultural stimuli are less predominant than in more well-off families.

The problem, for sociologists, is how to offset the disadvantages of the pupils belonging to working-class families and how pedagogues (and teachers) can have an antideterministic effect on such children.

A possible solution to the problem is to ensure that the school (or the class) becomes another miniature family and that the negative effects of the families are compensated for by the pedagogical action of the school. The school should, therefore, be a positive environment in which pupils are exposed to positive cultural and affective stimuli that help their personalities grow and come to maturity. In such a model of the school, teachers lose their primary function of being transmitters of notions (knowledge, in general) and are required to take the roles of educators or pedagogues who act as models and provisionally replace (at least within the boundaries of the school) the family by setting good examples for the students, and, in particular, exposing them to the positive aspects of culture, intended as knowledge that interacts with the

individual to make him or her grow up intellectually and emotionally. To compensate for the negative effects of families, within which dialogue and conversation have died, or are confined to adjacency pairs consisting of questions/answers or orders/replies, teachers have to play the role of communicators and have to stimulate communication. It is, in my view, impossible for a student to make progress in his or her language (to develop a more articulated written or oral mode of expression) unless he or she understands the function of communication, which is that of transmitting knowledge, but also of enhancing the expressive as well as the interpersonal function. To communicate is not only to express propositions (concerning others), but also to express propositions concerning what we really are and feel, and, by so doing, to interact with others, creating an intersubjective dimension in which social life is possible (see Capone, 2003).

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Code Switching

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In many bi- and multilingual communities around the world, speakers need to choose, often at an unconscious level, which language to use in their interactions with other members of the community. One of the choices that bilingual speakers often make is to code-switch: that is, speakers switch back and forth between languages (or varieties of the same language), sometimes within the same utterance (*see* **Bilingualism; Code Switching and Mixing**).

The motivations for code switching have often been treated simply as lists of possible functions for code switching. For example, Appel and Muysken (1987) cite five such functions. First, code switching may serve a referential function by compensating for the speaker's lack of knowledge in one language, perhaps on a certain subject. Second, it may serve a directive function by including or excluding the listener. Third, code switching may have an expressive function by identifying the speaker as someone having a mixed cultural identity. Fourth, it may have a phatic function indicating a change in tone in the conversation. And fifth, it may serve a metalinguistic function when code switching is used to comment on the languages involved.

While such lists are useful places to start, and no one would deny that code switching can certainly serve these functions, these types of lists fail to answer the question of what motivates speakers to make the choices they do at a particular point in a conversation. This article reviews the major proposals that have been advanced regarding the following question: why do speakers choose to engage in code switching in the first place?

Code Switching as a Research Topic

The current interest in code switching can be dated to a 1972 study of language use in Hemnesberget, a small village in northern Norway, conducted by Jan Blom and John Gumperz and described in a volume on sociolinguistics edited by Gumperz and Hymes (1972). In Hemnesberget, two varieties of Norwegian are used: Ranamål, a local dialect, and Bokmål, the standard variety (*see* **Language and Dialect: Linguistic Varieties**). However, speakers' decisions regarding which variety to use are by no means arbitrary or haphazard. In general, Ranamål, the local variety, is used in local activities and relationships, reflecting shared identities with the local culture. In contrast, Bokmål is used in official settings such as school, church, and the media, communicating an individual's dissociation from the local group, i.e., not stressing his or her local ties.

Blom and Gumperz distinguish between two main functions of code switching: situational and metaphorical. In situational code switching, which seems to be similar to the notion of diglossia, the speaker's choice of language is constrained by factors external to her/his own motivations, for example, the status of the interlocutor, the setting of the conversation, or the topic of conversation. So, in Hemnesberget, Blom and Gumperz observed that when an outsider joins a group of locals engaged in a conversation, the locals will often switch from the local variety, Ranamål, to the standard variety, Bokmål. In a later work, Gumperz (1982) introduces the distinction between 'we' and 'they' codes, which further

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many well-recommended texts about literature and popular traditions. In this area, Coelho organized several editions of popular Portuguese short stories and texts for youths. His name is linked as well to ethnographic and anthropological research, with texts written under the brilliant knowledge of the 19th-century ethnolinguists, such as *Exposição Etnográfica Portuguesa* (1896) and *Os Ciganos de Portugal;com um estudo sobre o calão* (1892). Inspired by Hugo Schuchardt's ideas about dialects and creole languages, Coelho proceeded with an exhausting investigation about Portuguese-based African and Asiatic creoles, in addition to having published some studies on Brazilian Portuguese (that, in his conception, should be called Brazilian dialect). This segment of his bibliography has been severely censured by some philologists of his time, such as José Leite de Vasconcelos, who reproached these papers for being the product of desk work only due to the fact that Coelho didn't endeavor to develop field research methods. It is imperative to attribute to Coelho the virtue of renovating the linguistic thought in his country, whose bases still were, by the middle of the 19th century, immersed in the rational ideas of philosophical grammar. This revolutionary trend contributed decisively to a new order in the teaching of vernacular language in elementary and middle levels. According to the Brazilian linguist Serafim da Silva Neto, Coelho "has been a philosopher-philologist, with the faithful purpose of ascending to general ideas." Undoubtedly, his activity in the 19th century linguistic scene opened the doors of Glottology and Ethnolinguistics to those who dedicated themselves to the study of the Portuguese language, and even to the study of the Romance languages in general, creating a great legion of disciples not only in Portugal but also in Brazil.

See also: Diez, Friedrich (1794–1876); Indo–European Languages; Portuguese; Romance Languages; Schuchardt, Hugo (1842–1927).

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Cœurdoux, Gaston-Laurent (1691–1779)

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The French missionary and pioneer of Indology Gaston-Laurent Cœurdoux was born in Bourges, France, in 1691 and died in Pondicherry in the colony of French India in 1779. He joined the Jesuit order in 1715, departed for South India in 1732, and served as a member of Madurai Mission until his death. In 1744 he was named superior of the mission, a role he filled until 1751. Beside his missionary work, he showed keen interest both in science and in language studies. In addition to local Dravidian languages (Tamil and Telugu), he learned Sanskrit and was one of the first to note its resemblance with classical Greek and Latin (and German). In a well-known memoir, he demonstrated the relationship between Sanskrit and European languages well before Sir William Jones; he sent the text to Anquetil-Duperron to Paris for publication, but it remained in manuscript form and was printed only at the beginning of the 19th century (in *Histoire et Mémoires de l'Académie des Inscriptions et Belles-Lettres 49*, 1808: 647–667). Another work by Father Cœurdoux, a detailed account of South Indian customs, remained unpublished and was to a large extent copied by Abbé Dubois in the book he then published under his own name (published in French in 1825, in English translation 1817, rev. ed. *Hindu manners, customs and ceremonies* 1897). The original version is preserved in an abridged version that was published in 1987 by Sylvia Murr, who also showed Dubois's complete dependence on it. There are further some letters by Cœurdoux published in *Lettres édifiantes et curieuses,* a manuscript dictionary 'télougou–français–samskroutam [i.e. Sanskrit],' and some further manuscript works.

See also: Missionary Linguistics.

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Cognitive Anthropology

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Cognitive anthropology is the study of cultural knowledge and processes of cognition in a sociocultural context. While most cultural anthropologists study cultural knowledge, cognitive anthropologists do so distinctively by asking how specific people in a society think. Cognitive anthropology dates from the late 1950s, although there were many earlier precursors (e.g., the work of Evans-Pritchard).

In cognitive anthropology today, major schools can be distinguished by their answers to two questions. First, does the cultural part of cognition (D'Andrade, 1981) consist of mental representations or situated practices? Second, how significant are panhuman cognitive universals?

Cultural Cognition as Culturally Variable Mental Representations

An early, influential statement of this approach, cultural cognition as cross-culturally variable mental

representations, is Goodenough's definition of a society's culture as "whatever it is one has to know or believe in order to operate in a manner acceptable to its members" (Goodenough, 1957: 167). From Goodenough on, language has been central to work in this approach, as both evidence for and the content of cultural knowledge, and linguistics has been an ongoing source of theoretical inspiration.

From the 1950s through the 1970s, a major focus of research was lexical semantics ('ethnosemantics'). Typically, all of the terms in a domain (e.g., kin terms, kinds of talk) are elicited, then an underlying mental structure of defining or salient features is inferred from contrasting patterns of use or judgments of similarity. Influenced by phonologists' decomposition of sounds into distinctive features, componential analysts similarly analyzed word meanings as sets of semantic features (e.g., BACHELOR = +MALE, −MARRIED). Systematic methods were developed for eliciting terms and their relations (e.g., frame and slot elicitation: What words can fill the blank in a sentence like, "____is a kind of sport," or pile sorts and triads tests, analyzed with multidimensional scaling, Weller and Romney, 1988). Work in this tradition sometimes focused on biological classifications and was called 'ethnoscience'; however, that term covers later folk science studies using other methods as well.

One current development of such work is the study of cultural knowledge as consensus in responses to standardized questions (Romney and Moore, 1998; Romney *et al.*, 1986). Cultural consensus analysis can be used to determine patterns of disagreement as well as consensus, which can highlight the social distribution of knowledge (see, e.g., Boster's 1985 study of the effect of kinship and residence on Aguaruna women's knowledge of manioc varieties).

While these methods have been extremely productive, a number of concerns arose about the older, lexically focused methods (these objections do not all apply to cultural consensus modeling). It was not always clear that the analyst's structures corresponded to the mental representations of members of the society in question; in some domains, a study of key terms reveals only problematic cases, not the taken-for-granted normal scenario (Holland and Skinner, 1987); in many cases, lexical semantics omits crucial elements of cultural knowledge (e.g., eliciting meanings of disease terms in English will not reveal a germ theory of disease, D'Andrade, 1995); and distinctive features are not random assortments of attributes, but co-occur in patterned wholes, as discussed by Rosch and others (see summary in D'Andrade, 1995). Schema theory was adopted from the work of linguists such as Fillmore and Langacker and psychologists (e.g., Schank and Abelson) to address these issues. Schemas ('frames') are mental representations of an underlying, typical pattern of features or connected set of ideas understood holistically. For example, my MINIVAN schema includes not only the features that distinguish it from other vehicles, but also a mental image and ideas about what sort of person is likely to drive one. Shared schemas are cultural models (Holland and Quinn, 1987). A speaker's reference to one part of a cultural model will activate the whole schema, as well as related schemas, in a listener's mind; hence, much can be left unsaid when culture is assumed to be shared. Cultural model researchers typically conduct in-depth, semistructured interviews, inferring the implicit understandings that are assumed in what is said (Holland and Quinn, 1987; Quinn, in press).

While the focus of work in this approach has been on contents of cultural knowledge, some researchers have addressed cognitive processes and the way knowledge is used: e.g, in memory and personal narratives (e.g., Garro, 2000; see also memory research in studies of linguistic relativity), metaphor choice (Quinn, 1991), the pragmatics of opinion expression (Strauss, 2004), reasoning (Hutchins, 1980; Quinn, 1996), and motivation (D'Andrade and Strauss, 1992). Connectionist models have been proposed to address how cultural knowledge, including nonpropositional knowledge, is learned, changes, and is sensitive to the context of its use (Strauss and Quinn, 1997).

Cultural Cognition as Situated, Distributed Practices

Cognitive processes, rather than cultural knowledge, dominate the work of cognitive anthropologists who study distributed cognition or 'cognition in practice.' They argue that studies in the first school neglect emergent cognitive effects as people interact with each other and the objects and structures in their environment. Thus, the primary method employed here is observation of ongoing activities (arithmetic while shopping, Lave, 1988 or navigation on board a ship, Hutchins, 1995), perhaps asking the person being observed to think out loud while they are in the midst of their activity. Drawing on Marxian psychology (e.g., Vygotsky, and Leontiev's Activity Theory), some argue that a key way cognition is 'cultural' is that it depends on tools or 'mediating devices': concrete objects, symbols, and activities that are socially produced, and which evoke and

direct thought (Holland and Valsiner, 1988). One example is Goody's argument that the invention of writing, especially lists and tables, created the possibility for new structures of thought (but see Scribner and Cole, 1981 on the cognitive effects of the Vai script in Liberia). The means and social relations of communication are also relevant 'structuring resources' (Lave, 1988). Hutchins (1995), for example, considered how the bandwidth of communications media, the social ranking of who talks to whom, and the timing of their talk affect the propagation of cognitive representations among the members of a navigation team on a large ship (see Nardi, 1996 for a useful comparison of different cognition-in-practice approaches).

Universals in Human Cognition

Other cognitive anthropologists agree with the first school in its focus on mental representations but disagree with its emphasis on cross-cultural variability. Thus, for example, Berlin and Kay (1969; Kay *et al.*, 1997) analyzed basic color terms (ones that are monolexemic like 'red,' not subtypes of another color, etc.) first in 20, then in 110 languages. They found a restricted set of basic color terms with cross-culturally stable focal referents, and comparable composite color categories across all languages. In addition, there is a fairly predictable relation between the number of basic color terms in a language and which colors are named. Atran (1990) and Berlin (1992) observed cross-cultural and historical similarities in classification of plants and animals. Lately, empirical studies have been joined by theories prioritizing cognitive universals. These draw on Chomsky and Fodor's claims that human brains process much information with specialized modules, and those of evolutionary psychologists that human brains are the result of evolutionary adaptation during the Pleistocene, thus include innate knowledge and processing rules that are useful for social cooperation and categorization, mate selection, foraging, and predator avoidance (Cosmides, 1989; Hirschfeld and Gelman, 1994, but see criticisms by Donald, Karmiloff-Smith and others). The research on cross-cultural cognitive universals challenges extreme claims of linguistic relativity.

Directions for the Future

Theoretical bridges have been proposed between cultural models and practice theory; thus, Holland and Valsiner (1988) argued that learned schemas determine the purposes to which mediating devices are put, Keller and Keller (1993) studied feedback between external events and internal representations over the course of an extended activity, and Quinn (1996) argued that cultural models are internal mediating devices. Similarly, cognitive anthropologists in the first and last schools would agree that there are both universals and variation in cultural knowledge (see, e.g., D'Andrade, 1995; Romney and Moore, 1998; Sperber, 1985; Strauss and Quinn, 1997); the only question is of what sorts. An underexplored issue is differences in ways of knowing (Sperber, 1985; Strauss and Quinn, 1997: Chap. 8). Finally, an interest that cuts across all three approaches is what Sperber (1996) called the "epidemiology of representations": how ideas spread among people in groups, how they are transformed, and how they are used as they move between internal and external forms (Hutchins, 1995; Keller and Keller, 1993; Strauss and Quinn, 1997).

See also: Activity Theory; Ethnoscience; Fillmore, Charles J. (b. 1929); Frame Semantics; Human Language Processing: Connectionist Models; Langacker, Ronald (b. 1942); Leont'iev, Aleksei Alekseevich (1936–2004); Modularity of Mind and Language; Sapir, Edward (1884–1939); Schank, Roger C. (b. 1946); Semantic Primitives; Vygotskii, Lev Semenovich (1896–1934); Whorf, Benjamin Lee (1897–1941); Wierzbicka, Anna (b. 1938).

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Cognitive Basis for Language Evolution in Nonhuman Primates

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A defining feature of the human language faculty is its limitless capacity for expressing ideas. We can produce an infinite number of new sentences, and we can compose sentences of infinite length. This ability reveals a powerful computational mechanism, a form of recursion often termed **discrete infinity**. This recursive mechanism entails a procedure or rule that calls itself, specifically, combining the discrete store of words or sentence constituents (e.g., Noun, Verb) into hierarchical phrase structures that can be further embedded within other hierarchically arranged phrase structures. Computational mechanisms are also involved in generating phonological and semantic representations, as well as in the interfaces among syntax, phonology, and semantics. Here we focus on the language faculty and its evolution in terms of these internal computational mechanisms instantiated in the mind/brain of each language user. This focus is conceptually separate from concerns about the actual production and social use of language and leads to a particular set of questions about language evolution.

The significance of recursion for generating linguistic representations and mapping between interfaces leads to the proposal that such a device must be universal to all human languages and innately endowed in human infants (Lenneberg, 1967; Chomsky, 1988). These features, **universal** and **innate**, raise an important question: how did our language faculty evolve? Specifically, do phylogenetic analyses reveal precursors to the language faculty in other animals? This specific question is distinct from, but complementary to, other approaches to studying language evolution that consider historical or cultural factors or employ mathematical models of potential evolutionary scenarios (for a variety of approaches see chapters in Christiansen and Kirby, 2003). In addition, this question reflects a starting assumption that, in the absence of hearing deficits, spoken language is the default output form of the language faculty. Comparative studies complement this starting assumption as our knowledge of other species' communication systems is largely based on ones using the vocal-auditory channel (Hauser and Konishi, 1999). Additional methods will be necessary to explore the language faculty as expressed by signed languages, and to explore questions about why human language has flexibility in its expressive form, an additional defining feature that is lacking in nonhuman communication systems.

Below, we describe why data from nonhuman animals, particularly nonhuman primates (hereafter 'primates'), are critical for explaining the patterns and processes of language evolution. The general conclusion we draw is that once the language faculty is separated into its component systems, a wealth of opportunities for comparative analysis opens up and yields interesting insights into the origins of human language (Hauser *et al.*, 2002).

Applying the Comparative Method of Evolutionary Biology to Language Evolution

Evolutionary biology provides a method for determining the phylogenetic origins of traits and their functions (for a detailed survey see Ridley, 2004). This method selects species that share a trait and then examines their evolutionary relationship. **Homologies** are traits with similar structure or function that have descended from a common ancestor; for example mammary glands used for lactation are shared by humans and rats, and by our common mammalian ancestor. Homologous traits are therefore derived from a common ancestor, tending to arise most frequently among closely related species. **Homoplasies** are traits shared by a pair of species, but not present in their common ancestor; classic examples include the eye, which has evolved independently in many different lineages, and the wing, which has evolved independently in birds and mammals. Homoplasies provide the signature of convergent evolution, and reveal the powerful role of selection in creating adaptive solutions to common social and ecological problems. Further comparisons of species will also reveal **phylogenetically novel** traits that appear in one species, or a cluster of species within a genus, and exhibit a particular structure or function. The comparative method allows researchers to lay out the terrain of shared and unique traits among selected species and then draw inferences about how those traits evolved (for applications to cognition and language see Gallistel, 1990; Shettleworth, 1998; Hauser, 2000; Hauser, 2003; Fitch, in press).

The evolution of language presents a particular set of problems to the comparative approach. First, there are no other living human species and thus we cannot follow the usual form of the comparative method, comparing living, closely related species sharing similar behaviors. Second, the record of early hominids is limited to fossil bits of vocal tract that provide few

insights into the computational machinery underlying what our hominid ancestors produced, while ancient written records essentially represent language in its modern form. Finally, no single nonhuman species is equipped with a sufficiently inclusive set of abilities to constitute a precursor to our full-blown language faculty, and some traits appear to be absent altogether (Hockett, 1960; Hauser, 1996; Hauser, 2000). How do we study language evolution when the human species is a poor model for the comparative method and other species do not offer an equivalent repertoire?

Distinguishing the Shared and Unique Components of the Language Faculty

In exploring language evolution from a comparative perspective, there are three possible outcomes for any given trait:

1. Trait X is not uniquely human, is a homology evolved for an earlier function, directly inherited, and therefore did not evolve for language;
2. Trait X is not uniquely human, but is a homoplasy that evolved completely unrelated to language or evolved for other purposes and was redesigned for language;
3. Trait X is uniquely human, is a phylogenetically novel trait that evolved only in hominid species, possibly for language or possibly for another cognitive capacity.

Hauser *et al*. (2002) lay out a comparative research program for explaining the evolution of the language faculty, separating it into a broad and a narrow sense. The faculty of language in the broad sense (FLB) encompasses the sensory-motor (SM) system responsible for perceiving and producing the sound patterns of spoken language, the conceptual-intentional (CI) system involving conceptual representations and the capacity to refer, and the faculty of language in the narrow sense (FLN). FLN is the recursive system responsible for the computations involved in narrow syntax that generate internal representations and it maps them into the systems of phonology (SM) and semantics (CI); importantly, then, FLN entails recursion and its interfaces with phonology and semantics. The strict definition of FLN and its separation from FLB, along with the available comparative evidence, motivated the proposal that "most if not all of FLB is based on mechanisms shared with nonhuman animals . . . [but] . . . FLN – the computational mechanism of recursion – is recently evolved and unique to our species" (Hauser *et al*., 2002: 1573). This proposal represents "a tentative, testable hypothesis in need of further empirical investigation" (Hauser *et al*., 2002: 1578).

This empirical program targets comparative studies aimed at distinguishing homologies, homoplasies, and phylogenetically novel mechanisms among the components of the language faculty. The data sets include nonhuman animals' natural communication, their noncommunicative problem-solving abilities, and their perceptual sensitivities to speech stimuli and the computational abilities that underlie language organization. The methodologies include field studies of natural behavior, laboratory studies building on those field studies, and, in the case of speech stimuli, combining the two such that researchers employ spontaneous behavioral measures borrowed from the field with carefully controlled laboratory methods. The goal of using speech stimuli, by definition artificial for primate subjects, is to assess whether they have the perceptual and computational abilities to extract the relevant dimensions such as phonetic categories, prosodic rhythms, word-like units, and grammatical structures. By employing the comparative approach, researchers can triangulate on the critical traits that contribute to the uniquely human form of language.

Evidence of Homologous Mechanisms

The sensory-motor system includes abilities used in vocal production, imitation, and auditory perception. Here we highlight studies of auditory perception as they provide strong evidence for homologous mechanisms shared by humans and primates (Trout, 2001; Hauser *et al*., 2002). Vocal production and imitation reveal a more complicated pattern of similarities and differences across species (Rizzolatti and Arbib, 1998; Fitch, 2000).

A classic set of findings reveals that categorical perception, required for detecting the articulatory-acoustic cues to phonetic boundaries, is shared between humans and primates, along with other mammalian and nonmammalian species such as chinchilla and quail (for reviews see Harnad, 1987; Hauser, 1996). These experiments entail carefully controlled laboratory methods with trained responses (e.g., shock avoidance, button pressing) and natural or synthetic speech stimuli to test the animals' discrimination of cues signaling the boundaries between phonetic categories. The general conclusion is that the animals' discrimination and labeling functions follow those detailed in studies of human adults and infants. For example, rhesus monkeys tested on a voice onset time contrast showed, similarly to humans, that they were most sensitive to differences close to the human phonetic boundaries and less sensitive to differences within a phonetic category. Laboratory and field studies of categorical perception using species-specific vocalizations, as opposed to speech, confirm

the general nature of this perceptual ability. These findings lead to the conclusion that categorical perception is shared among a broad range of species and represents a general as opposed to a speech-specific perceptual capacity. Comparative analysis thus reveals that categorical perception is not unique to humans, nor did it evolve for language.

More recent research has extended comparative study of the language faculty in two significant directions: the implementation of nontraining methods and the presentation of speech stimuli other than phonetic categories. In a series of studies comparing human neonates and adult cotton-top tamarins, results suggest that these species share a perceptual mechanism for discriminating the rhythmic classes of spoken languages (for recent results and detailed references see Tincoff *et al.*, 2005). Early descriptions of language rhythms separated them into three major classes reflecting linguistic metrical timing units: stress patterns, syllable length, and a subsyllabic unit length termed the mora. More recently, a quantitative analysis has been conducted of the acoustic characteristics of consonant and vowel units in several spoken languages. This analysis largely confirmed the early descriptive categories and revealed rhythmic clusters such as English and Dutch (stress timed), Spanish and Italian (syllable timed), and Japanese (mora timed). Perceptual experiments with human adults and newborns further confirmed this rhythmic organization. Most recently, human newborns and cotton-top tamarin species were tested in a habituation–discrimination paradigm using the same set of human speech utterances drawn from languages with different rhythmic structures (e.g., stress-timed Dutch vs. mora-timed Japanese). The discrimination response of human newborns was assessed with a high-amplitude sucking measure that capitalized on newborns' natural sucking reflex. The discrimination response of adult tamarin monkeys was assessed by a head orientation measure that capitalized on tamarins' spontaneous tendency to orient to a sound source. Results from both species showed that following habituation to one language (e.g., Dutch), individuals responded more to new sentences from a different rhythmic-class language (e.g., Japanese) than they did to new sentences from the habituation language. Both subject groups, however, failed to discriminate within a rhythmic class (e.g., Dutch vs. English or Spanish vs. Italian) and when the utterances were played backwards, a manipulation that arguably disrupts the rhythmic cues. Figure 1 presents the results of the tamarin subjects across these test conditions. The use of these natural spontaneous responses, compared to arbitrary trained responses, lends stronger support to the conclusion that the shared discrimination ability is based on a homologous perceptual mechanism.

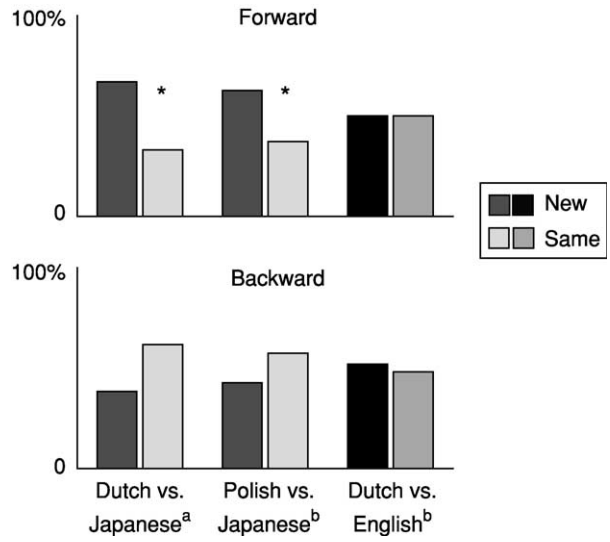

Figure 1 Response to test utterances from New language compared to test utterances from Same, habituated language. Stippled bars indicate responses to different rhythmic class comparisons, Dutch vs. Japanese and Polish vs. Japanese. Solid bars indicate responses to same rhythmic class comparison, Dutch vs. American English. The top panel presents responses to utterances played forward; the bottom panel presents responses to utterances played backwards. Adult tamarins responded significantly more to New language utterances than to Same language utterances when the utterances were played forward and were from different rhythmic classes (*$p < 0.05$). Tamarins failed to discriminate New language utterances when they were played backwards, and when played forward, but were from the same rhythmic class. ([a]percentage of subjects responding, [b]mean percentage of responses across subjects).

Another perceptual domain that extends our knowledge of the sensory-motor system is cross-modal integration. Natural spoken language in face-to-face interactions is both an auditory and a visual/articulatory signal. Much research has documented that humans integrate the acoustic and articulatory sources of spoken syllables into a single percept. Research testing human infants' perception of multimodal stimuli such as sound–object matches, face–voice matches, and auditory-visual vowels shows that cross-modal integration is present from a young age (for reviews see chapters in Lewkowicz and Lickliter, 1994). Experiments with nonhuman subjects, especially primates, are critical for explaining the origins of this fundamental perceptual mechanism and identifying possible homologues or precursors. Recently, a laboratory experiment revealed that rhesus monkeys can spontaneously match the auditory signal of two of their natural vocalizations with the video of the appropriate articulatory gesture: coos, produced by a rhesus monkey caller with a small mouth opening and protruding

lips, and aggressive threats, produced with a larger mouth opening and no lip protrusion (Ghazanfar and Logothetis, 2003). This finding provides the first evidence that the perceptual mechanism for cross-modal matching of acoustic-articulatory cues may be homologous between humans and primates and inherited from a common primate ancestor. It remains an open question whether this mechanism can be used by animals to detect cross-modal matches and mismatches with speech and human faces, and similarly, whether humans could detect correspondences between rhesus faces and voices.

The above findings provide support for the conclusion that at least three perceptual mechanisms utilized by the sensory-motor system of the language faculty evolved before humans, and are homologous with mechanisms present in nonhuman primates and, in the case of categorical perception, other vertebrates. Importantly, these mechanisms evolved to solve more general perceptual problems rather than those that humans specifically encounter in processing speech. These findings are consistent with the first part of the language evolution hypothesis in Hauser *et al.* (2002), emphasizing commonalities within FLB.

Evidence of Phylogenetically Unique Mechanisms

The conceptual-intentional system includes conceptual representations (e.g., number, animacy, color, spatial referents), the capacity to attribute mental states (e.g., beliefs, desires, intentions), and the ability to form and extend a lexicon of words or word-like signals. A long history of comparative research has led to the general conclusion that nonhuman animals, and perhaps especially chimpanzees, have a rich conceptual system, including elements of a theory of mind (see chapters in Heyes and Huber, 2000; Bekoff *et al.*, 2002; Tomasello *et al.*, 2003). These animals lack, however, the full-blown systems observed in humans, and certainly lack the capacity to express in sounds or gestures what they are thinking about (Hauser *et al.*, 2002). Here we focus further on the lexical aspects of the conceptual-intentional system, as they reveal striking differences.

The classic studies of vervet monkeys show that they produce acoustically distinct behavioral and vocal responses to different predator classes (leopards, eagles, and snakes) (reviewed in Hauser, 1996; Cheney and Seyfarth, in press). In particular, field playback experiments demonstrated that vervets could infer the context from the call alone. These findings motivated the conclusion that animals might produce signals that function like symbols, labeling particular external referents or designating instructions for action. A strong claim building on this conclusion proposes that signals such as vervet alarm calls are evidence of precursors to human words. A more cautious claim allows that these signals carry significant information that can be decoded by the listener in order to mediate adaptive responses in the context of food, predation, and social relationships, but that information is not intentionally encoded by the sender to accommodate the listener's beliefs or desires (Cheney and Seyfarth, in press). We, along with most in the field, consider this latter interpretation to be correct. Additionally, nonhuman vocalizations differ from human words in at least three important ways: meaning, as reflected by acoustically distinct calls produced in particular situations, is tied to a narrow range of topics, survival and mating; the calls are never produced in the absence of the referent; and the lexicon is small and finite with no apparent capacity to generate novel sounds with new meaning (Hauser *et al.*, 2002). The implication for the evolution of the language faculty is that our lexical capacity likely stands as a phylogenetically novel trait; if correct, then models and simulations of language evolution that begin with the capacity for reference have skipped over a fundamental evolutionary change. We therefore need a better understanding of when and how our species alone acquired the remarkable capacity to learn words as young children, to generate new words on the fly, and to use our words to refer to absent, or even nonexistent and imagined, entities or events.

FLN – and especially the mechanism of recursion – was defined by Hauser *et al.* (2002)as a computational process that is responsible for the generative and hierarchical properties of narrow syntax. In discussing this system, they leave open the possibility that although the recursive machinery is essential to language, it is also deployed, at least in some form, in other domains. On this view, therefore, a much broader array of investigations is likely to be useful to our understanding of language evolution. For example, comparative studies have explored the generative or hierarchical mechanisms for number and serial-order learning (Biro and Matsuzawa, 2001; Terrace *et al.*, 2003), tool use (Matsuzawa, 2001), foraging and navigation (Shettleworth, 1998), and human grammar (Fitch and Hauser, 2004; Newport *et al.*, 2004). We focus here on studies testing primates' processing of grammar as they provide the most direct test of the FLN system used for narrow syntax. These laboratory studies build on the perceptual studies reviewed above using a familiarization–discrimination test paradigm with natural or synthesized speech stimuli and the same spontaneous orienting measure. The findings show that cotton-toptamarin monkeys share with humans the basic

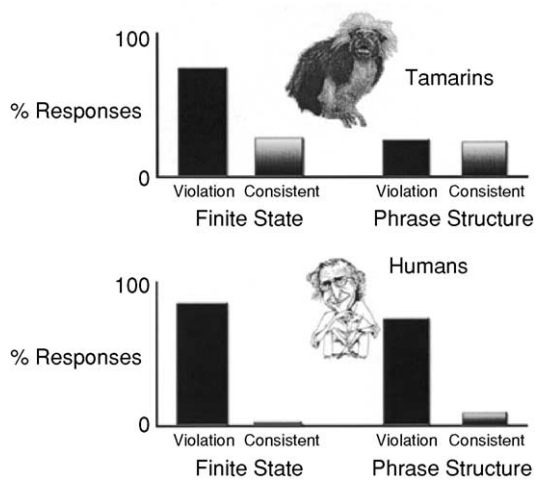

Figure 2 Mean response across subjects to test patterns that violated familiarized grammar compared to test patterns consistent with grammar. The top panel shows that tamarins familiarized to the finite state grammar (FSG) responded significantly more to violations than to grammar consistent patterns, but tamarins familiarized to the phrase structure grammar (PSG) did not discriminate violations from consistent patterns.

computational mechanisms for calculating transitional probabilities (a cue to word boundaries) and extracting algebraic rules (AAB vs. ABB), as well as other finite-state grammars (AB^n patterns). Unlike humans, however, tamarins fail to extract phrase structure grammars (A^nB^n patterns) (Fitch and Hauser, 2004). In this experiment, tamarins were first familiarized to sets of syllables following an A^nB^n grammar. They were then tested with novel items, half violating the grammar, half consistent with it. Tamarins responded equally to the test items, failing to discriminate violations from grammar-consistent items (see Figure 2). This failure cannot be explained by task demands (identical to those used in the finite-state grammar experiment), working memory, capacity to extract the relevant units for the computation (i.e., the syllables were previously used in experiments testing finite-state grammar and algebraic rules), or number. These results suggest that the mechanism for generating hierarchically embedded structures is a phylogenetically novel trait unique to humans.

Conclusions and Open Questions

Although comparative studies related to the language faculty have a long history, most of the core issues associated with understanding the evolution of the language faculty have only recently been approached. One useful approach may be the theoretical framework articulated by Hauser *et al.* (2002) in which the language faculty is carved at several relevant joints, including at the simplest level, the broad and narrow sense with the associated component systems and its interfaces. Comparative studies with nonhuman primates and other animals offer initial support that the sensory-motor component of FLB is homologous. In contrast, the available data suggest that the conceptual-intentional system of FLB is characterized by a pattern of homologous, homoplasic, and phylogenetically unique traits. Finally, no strong evidence has been gathered to argue for a nonhuman homologue or homoplasy for FLN; FLN, as defined for narrow syntax, is a strong candidate for a phylogenetically unique human trait within the language faculty.

Despite these positive developments, the conclusions presently rest on a sparse foundation due to the paucity of species tested and the range of unrelated methods implemented. Furthermore, important caveats must be raised for the identified behavioral homologies. We know relatively little about the neurophysiological substrates for any of the behavioral phenomena described, or the genetic mechanisms that form these processes. Further probing could reveal that the similar behavioral responses are generated by phylogenetically different underlying systems that yield convergent behavior. Alternatively, further probing could reveal homologies throughout the relevant neural, hormonal, or genetic mechanisms. An additional question is whether the target mechanisms serve an adaptive function related to language or if they are byproducts of other adaptations that were co-opted by the language faculty. Studies using neurophysiological preparations with natural vocalizations and human speech, together with studies involving molecular techniques, provide important avenues for the future (for a perspective on the recent mapping of the FOXP2 complex see Marcus and Fischer, 2003). The study of language evolution is an exciting and growing area of linguistics and language behavior. Data from nonhuman animals will play a pivotal role in constraining theories and designing experiments.

See also: Alarm Calls; Animal Communication: Overview; Animal Communication: Vocal Learning; Apes: Gesture Communication; Categorical Perception in Animals; Communication in Grey Parrots; Communication in Marine Mammals; Development of Communication in Animals; Evolution of Phonetics and Phonology; Evolution of Pragmatics; Evolution of Semantics; Evolution of Syntax; Individual Recognition in Animal Species; Non-human Primate Communication; Production of Vocalizations in Mammals; Traditions in Animals.

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Cognitive Grammar

R W Langacker

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'Cognitive grammar' (originally called 'space grammar') is a highly innovative theory of linguistic structure that has been developed and progressively articulated since 1976. In stark contrast to modular approaches, it regards language as an integral facet of cognition, and grammar as being inherently meaningful. It presupposes a 'conceptualist' account of linguistic semantics that properly recognizes our capacity for construing the same conceived situation in alternate ways. With an appropriate view of meaning, all grammatical elements are reasonably attributed some kind of conceptual import. Grammar is thus considered 'symbolic' in nature: it reduces to the structuring and symbolization of conceptual content.

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Linguistic Organization

The ultimate goal of linguistic research is to characterize language as a cognitive entity. As envisaged in cognitive grammar, linguistic structure ultimately

reduces to recurrent patterns of neurological activity, and owing to its multifaceted complexity, a language is more aptly likened metaphorically to a biological organism than to a computer program or a logical deductive system. Thus it is not presumed that any single formalism can capture all aspects of a given phenomenon, or that any particular notation translates directly into specific psychological claims. The various notations and descriptive formats devised in cognitive grammar are meant to be precise within the limits of our understanding and revelatory for particular descriptive and analytical purposes. They do not however constitute a strict or uniquely privileged formalization, nor is the expectation of such a formalism considered appropriate.

To the extent that a pattern of neurological activity is 'entrenched' and readily elicited as a pre-established whole, it is referred to as a 'unit.' Linguistic knowledge or ability (i.e., a speaker's grasp of linguistic convention) comprises a vast array of such units, which is structured in the sense that units participate in excitatory and inhibitory relationships, and that some units include others as components. This knowledge – the 'internal grammar' – is not conceived as a generative or constructive device. The function of linguistic units is rather to serve as templates for the 'categorization' of expressions. An expression is simultaneously categorized by a multitude of units, each of which corresponds to a particular aspect of its structure and represents a constraint on its possible well-formedness (conventionality). Units compete for activation and the privilege of categorization on the basis of entrenchment and their degree of overlap with the target expression.

Cognitive grammar imposes severe limitations on the kinds of units ascribable to a linguistic system. On the one hand, it posits only (a) semantic units, (b) phonological units, and (c) symbolic units (in which semantic and phonological units are linked by symbolic relationships). This is the bare minimum needed to accommodate the basic semiological function of language, namely the symbolization of conceptualizations by means of phonological sequences. Symbolic units are held sufficient for the description of lexicon, morphology, and syntax, which form a continuum (rather than discrete components). On the other hand, cognitive grammar observes the 'content requirement,' which restricts linguistic units to (a) semantic, phonological, and symbolic structures that occur overtly as (parts of) expressions, (b) 'schematizations' of permitted structures, and (c) 'categorizing relationships' between permitted structures (including 'instantiation' of a schema and 'extension' from a prototype). By virtue of these restrictions, the theory achieves naturalness, conceptual unification, and theoretical austerity.

Semantic Structure

Cognitive grammar maintains that grammatical structure is 'symbolic' in nature, being fully describable in terms of symbolic links between semantic and phonological structures. The viability of this conception of grammar depends on a particular view of linguistic semantics.

Basic Tenets

Cognitive semantics rests on several fundamental notions. First, meaning is not identified with truth conditions, but with 'mental experience' or 'conceptualization' in the broadest sense of that term. Included are novel conceptions (as well as established concepts), all facets of sensorimotor experience, and cognizance of the social, linguistic, and cultural context. Second, a linguistic category is typically 'complex': its adequate description requires not just a single structure, but a set of structures linked by relationships of instantiation and extension to form a network. As a special case of this phenomenon, lexical items are typically 'polysemous.' A lexeme's meaning comprises a network of related senses, some being schematic relative to others, and some constituting extensions vis-à-vis more prototypical values. Third, linguistic semantics is 'encyclopedic' in scope. The meaning of a lexical item (even a single sense) cannot in general be captured by a limited, dictionary-type definition. Everything we know about an entity can in principle be regarded as contributing to the meaning of an expression that designates it, even though certain specifications are far more central and linguistically important than others. One cannot motivate any sharp distinction (only one of degree) between semantics and pragmatics, or between 'linguistic' and 'extralinguistic' knowledge. Finally, an expression's meaning does not consist solely in the conceptual content it evokes (let alone in truth conditions or the objective situation it describes) – equally significant is how that content is 'construed.' Two expressions may invoke the same conceptual content yet differ semantically by virtue of the construals they impose.

Construal

Numerous aspects of construal have been identified. They are conveniently grouped under several broad rubrics: specificity, scope, background, perspective, and prominence.

We have the capacity to conceive an entity or situation at varying levels of specificity and detail, as witnessed by such hierarchies as *thing* > *creature* > *insect* > *fly* > *fruit fly*. Each term in the hierarchy is 'schematic' for (and 'elaborated' by) the one that

follows, which characterizes the designated entity with greater precision (finer resolution).

An expression's 'scope' comprises the full array of conceptual content that it specifically evokes and relies upon for its characterization. The term 'lid,' for instance, evokes the schematic conception of a container, as well as the notion of one entity covering another. A conception of any type or any degree of complexity is capable of being invoked as part of an expression's meaning. Numerous conceptions – called 'cognitive domains' – typically figure in the meaning of a given expression, which may evoke them in a flexible and open-ended manner (as determined by context). Hence the starting point for semantic description is not a set of semantic features or conceptual primitives, but rather an appropriate array of integrated conceptions, among them higher-order structures representing any level of conceptual organization. At the lowest level, presumably, are cognitively irreducible 'basic domains' such as space, time, and the domains associated with the various senses (e.g., color space).

Another aspect of construal is our ability to conceive of one structure against the 'background' provided by another. Categorization is perhaps the most fundamental and pervasive manifestation of this ability. Another is the relationship between the source and target domains of a metaphor. Words like *even, only, many, few, more*, and *less* compare an actual value to some norm or expectation, and the contrast between the truth-functionally equivalent *half-empty* and *half-full* is well known. More generally, such phenomena as presupposition, anaphora, and the given/-new distinction all involve construal against a certain kind of background.

Perspective subsumes such factors as *vantage point, orientation*, and the *subjectivity* or *objectivity* with which an entity is construed. Vantage point and orientation both figure in the two interpretations of *Jack is to the left of Jill*, where Jack's position may be reckoned from either the speaker's perspective or from Jill's. By subjectivity or objectivity is meant the degree to which an entity functions asymmetrically as the 'subject' or the 'object of conception.' The conceptualizers (i.e., the speaker and addressee) are construed subjectively in *There's a mailbox across the street*, where they remain implicit as 'offstage' reference points. They construe themselves more objectively in *There's a mailbox across the street from us*.

The final aspect of construal is the relative 'prominence' accorded to the different substructures of a conception. Various kinds of prominence need to be distinguished. One is the salience that comes with objective construal and explicit mention, as in the previous example. A second type of prominence is called 'profiling': within the conception it evokes, every expression singles out some substructure as a kind of focus of attention; this substructure – the 'profile' – is the one that the expression 'designates.' For example, *hypotenuse* evokes the conception of a rightangled triangle (its scope) and profiles (designates) the side lying opposite the right angle. *Above* profiles the spatial 'relationship' between two entities. A third type of prominence pertains to the participants in a profiled relationship. One participant, termed the 'trajector,' is analyzed as the 'figure' within the profiled relationship; an additional salient entity is referred to as a 'landmark.' For instance, because *above* and *below* evoke the same conceptual content and profile the same relationship, their semantic contrast can only reside in figure/ground alignment. *X is above Y* is concerned with locating *X*, which is thus the trajector (relational figure), whereas *Y is below X* uses *X* as a landmark to specify the location of *Y*.

Grammatical Structure

Grammar is claimed to be 'symbolic' in nature. Only symbolic units (form-meaning pairings) are held necessary for the description of grammatical structure. Thus all valid grammatical constructs are attributed some kind of conceptual import. Rather than being autonomous in regard to semantics, grammar reduces to the structuring and symbolization of conceptual content.

Grammatical Classes

An expression's grammatical class is determined by the nature of its profile. The most fundamental distinction is between a 'nominal' and a 'relational' expression, which respectively profile a 'thing' and a 'relationship.' Both terms are defined abstractly. A thing is characterized schematically as a 'region in some domain,' where a 'region' can be established from any set of entities (e.g., the stars in a *constellation*) just by conceiving of them in relation to one another. While physical objects occupy bounded regions in space and are prototypical instances of the thing category, the schematic characterization also accommodates such entities as as unbounded substances (e.g., *water*), geographical areas (*Wisconsin*), regions in abstract domains (*stanza*), collections of entities (*alphabet*), points on a scale (*F-sharp; 30°C*), conceptual reifications (*termination*), and even the absence of some entity (*intermission*). The term 'relationship' is also broadly interpreted. It applies to any assessment of entities in relation to one another, regardless of their nature and status; in particular, they need not be distinct, salient, or individually recognized. Expressions classified as relational are

therefore not limited to those (like *above*) traditionally considered two-place predicates. For instance, the adjective *blue* profiles the relationship between an object and a certain region in color space. When used as a noun, *square* profiles the region comprising a set of line segments arranged in a particular fashion (or else the area they enclose). When used as an adjective, however, it profiles the complex relationship among subparts of this geometrical figure (involving perpendicularity, equal length of sides, and so on).

Expressions that profile things include such traditional classes as noun, pronoun, and noun phrase (for which the term 'nominal' is adopted in cognitive grammar). Relational expressions subsume those traditionally recognized as adjectives, prepositions, adverbs, infinitives, participles, verbs, clauses, and full sentences. On the basis of the intrinsic complexity of their profiles, relational expressions can be divided into those which designate 'simple atemporal relations,' 'complex atemporal relations,' and 'processes.' A simple atemporal relation is one that comprises a single consistent configuration (or 'state' – hence it is also called a 'stative relation'). For example, adjectives and many prepositions have this character. A complex atemporal relation cannot be reduced to a single configuration but can only be represented as an ordered series of states. In *She walked across the field*, for instance, the preposition *across* designates a series of locative configurations defining the trajector's path with reference to the landmark. A process is a complex 'temporal' relation, i.e., one whose component states are saliently conceived as being distributed through a continuous span of time, and whose temporal evolution is viewed sequentially (rather than holistically). Verbs and finite clauses designate processes, whereas participles and infinitives impose a holistic view on the process specified by a verb stem and are thus atemporal.

Rules and Constructions

Grammar consists of patterns for combining simpler symbolic structures into symbolic structures of progressively greater complexity. A symbolically complex expression, e.g., *cracked*, represents a 'grammatical construction' wherein two 'component structures' (*crack* and *-ed*) are 'integrated' to form a 'composite structure.' Such integration, both phonological and semantic, is effected by 'correspondences' established between subparts of the component expressions, and by the superimposition of corresponding entities. Typically, one component structure corresponds to, and serves to 'elaborate,' a schematic substructure within the other. Thus *-ed*, being a suffix, makes schematic phonological reference to a stem, which *crack* elaborates to yield *cracked*. Semantically, the adjectival sense of the past participial morpheme profiles the final, resultant state of a schematically characterized process, which corresponds to the specific process profiled by *crack*. By superimposing the corresponding processes, and adopting the profiling of the participial morpheme, one obtains the composite semantic structure of *cracked*, which profiles a stative relation identified as the final state of *crack*.

It is usual for the composite structure to inherit its profiling from one of the component structures, which thereby constitutes the construction's 'head.' The suffix *-ed* is thus the head within the participial construction *cracked*. A component that elaborates the head is a 'complement,' hence complement of *-ed* by virtue of elaborating the schematic process it invokes. Conversely, a component that the head elaborates is a 'modifier.' In *blue square*, for instance, *blue* modifies *square* because the latter – the head – elaborates *blue*'s schematic trajector (the entity located in the blue region of color space).

Grammatical rules take the form of schematized constructions. A 'constructional schema' is a symbolically complex structure whose internal organization is exactly analogous to that of a set of constructions (complex expressions), but which abstracts away from their points of divergence to reveal their schematic commonality. For instance, the rule for adjective + noun combinations in English is a symbolic structure parallel to *blue square, cracked sidewalk, playful kitten*, etc., except that the adjective and noun are schematic rather than specific: semantically, the constructional schema specifies that the trajector of the adjective corresponds to the profile of the noun, which lends its profile to the composite structure; phonologically, it specifies that the adjective directly precedes the noun as a separate word. A constructional schema may be characterized at any appropriate level of abstraction, and represents the conventionality of a particular pattern of integration. It is available for the categorization of novel complex expressions and can also be thought of as a template used in their assembly.

Other Grammatical Elements

The foregoing remarks indicate that grammatical classes, rules, and such notions as head, complement, and modifier can all be characterized in terms of configurations of symbolic structures. The same is true of other grammatical elements. For instance, a 'nominal' (noun phrase) profiles a thing and further incorporates a specification of its relationship to the 'ground' (i.e., the speech event and its participants) with respect to fundamental, 'epistemic' cognitive domains; demonstratives, articles, and certain quantifiers serve this function in English. Similarly, a

'finite clause' profiles a process grounded (in the case of English) by tense and the modals. A 'subject' can then be characterized as a nominal which elaborates the trajector of a process profiled at the clausal level of organization, and a 'direct object' as a nominal that elaborates its primary landmark.

Grammatical markers are all attributed semantic values, often quite schematic. For example, the derivational morpheme *-er* (as in *complainer*) profiles a thing characterized only as the trajector of a schematic process; like most derivational morphemes, it is semantically schematic for the class it derives, its primary semantic value residing in the profile it imposes on the specific conceptual content provided by the stem it combines with. Besides schematicity, factors considered compatible with a grammatical marker's meaningfulness include semantic overlap with other elements (e.g., redundant marking, as in agreement), the lack of any option (as in government), and failure to exhibit a single sense in all its uses (polysemy being characteristic of both lexical and grammatical elements – e.g., *-ed* has distinct but related meanings in its adjectival, perfect, and passive uses).

Assessment and Outlook

Cognitive grammar has been revealingly applied to a steadily widening array of phenomena in a diverse set of languages. It is rapidly being established as a viable model of language structure, and in view of the restrictiveness and conceptual unification it achieves, it merits serious attention from linguistic theorists. It is fully compatible with 'functional' approaches to linguistic structure, which help explain why certain of the structures it permits have the status of prototypes, or represent language universals or universal tendencies. It also has a natural affinity to 'connectionist' (or 'parallel distributed processing') models of cognition, both because the distinction between rules and data is only one of degree, and also because grammatical structure reduces to form–meaning pairings. The possibility of achieving this reduction has extensive implications for language acquisition, models of language processing, and our conception of the human mind.

See also: Cognitive Linguistics; Cognitive Pragmatics; Cognitive Semantics; Construction Grammar; Grammaticalization.

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Cognitive Linguistics

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Developing over the past two to three decades, cognitive linguistics has as its central concern the representation of conceptual structure in language. This relatively new field can initially be characterized through a contrast of its conceptual approach with two other familiar approaches, the formal and the psychological. The formal approach focuses on the overt structural patterns exhibited by linguistic forms, largely abstracted away from any associated meaning. The tradition of generative grammar has been centered here, but has had limited involvement with the other two approaches. Its formal semantics has largely included only enough about meaning to correlate with its formal categories and operations. And its reach to psychology has largely considered only the kinds of cognitive structure and processing needed to account for its formal categories and operations. The psychological approach regards language from the perspective of general cognitive systems such

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Developing over the past two to three decades, cognitive linguistics has as its central concern the representation of conceptual structure in language. This relatively new field can initially be characterized through a contrast of its conceptual approach with two other familiar approaches, the formal and the psychological. The formal approach focuses on the overt structural patterns exhibited by linguistic forms, largely abstracted away from any associated meaning. The tradition of generative grammar has been centered here, but has had limited involvement with the other two approaches. Its formal semantics has largely included only enough about meaning to correlate with its formal categories and operations. And its reach to psychology has largely considered only the kinds of cognitive structure and processing needed to account for its formal categories and operations. The psychological approach regards language from the perspective of general cognitive systems such

as perception, memory, attention, and reasoning. Centered here, the field of psychology has also addressed the other two approaches. Its conceptual concerns have included semantic memory, the associativity of concepts, the structure of categories, inference generation, and contextual knowledge. But it has insufficiently considered systematic conceptual structuring.

By contrast, the conceptual approach of cognitive linguistics is concerned with the patterns in which and processes by which conceptual content is organized in language. It has thus addressed the linguistic structuring of such basic conceptual categories as space and time, scenes and events, entities and processes, motion and location, and force and causation. To these it adds the basic ideational and affective categories attributed to cognitive agents, such as attention and perspective, volition and intention, and expectation and affect. It addresses the semantic structure of morphological and lexical forms, as well as of syntactic patterns. And it addresses the interrelationships of conceptual structures, such as those in metaphoric mapping (*see* **Metaphor: Psychological Aspects**), those within a semantic frame, those between text and context, and those in the grouping of conceptual categories into large structuring systems. Overall, the aim of cognitive linguistics is to ascertain the global integrated system of conceptual structuring in language. Further, cognitive linguistics addresses the formal properties of language, accounting for grammatical structure in terms of its representation of conceptual structure. And, distinguishing it from earlier semantics, cognitive linguistics relates its findings to the cognitive structures of the psychological approach (*see* **Psycholinguistics: Overview**). Its long-range trajectory is to integrate the linguistic and the psychological perspectives on cognitive organization in a unified understanding of human conceptual structure.

Many of the major themes of cognitive linguistics can be related in a way that shows the overall structure of the field. A beginning observation is that language consists of two subsystems – the open-class or lexical, and the closed-class or grammatical – that have different semantic and functional properties. Closed-class, but not open-class forms, exhibit great semantic constraint, and do so at two levels. First, their referents can belong to certain semantic categories, such as number, gender, and tense, but not to others such as color or material. For example, inflections on a noun indicate its number in many languages, but never its color. Second, they can refer only to certain concepts even within an acceptable category like number – e.g., 'singular,' 'dual,' 'plural,' and 'paucal,' but never 'even,' 'odd,' or 'dozen.' Certain principles govern this semantic constraint, e.g., the exclusion of reference to Euclidean properties such as specificity of magnitude or shape. What largely remain are topological properties such as the magnitude-neutral distance represented by the deictics (*see* **Deixis and Anaphora: Pragmatic Approaches**) in *This speck/planet is smaller than that speck/planet*, or the shape-neutral path represented by the preposition in *I circled/zigzagged through the forest*. The two subsystems differ also in their basic functions, with conceptual content represented by open-class forms and conceptual structure by closed-class forms. For example, in the overall conception evoked by the sentence *A rustler lassoed the steers*, the three semantically rich open-class forms – *rustle, lasso, steer* – contribute most of the content, while most of the structure is determined by the remaining closed-class forms. Shifts in all the closed-class forms – as in *Will the lassoers rustle a steer?* – restructure the conception but leave the cowboy-landscape content largely intact, whereas a shift in the open-class forms – as in *A machine stamped the envelopes* – changes content while leaving the structure intact. The basic finding in this "semantics of grammar" portion of cognitive linguistics is that the closed-class subsystem is the fundamental conceptual structuring system of language (Talmy, 2000).

Such conceptual structure is understood in cognitive linguistics as 'schematic', with particular 'schemas' or 'image-schemas' represented in individual linguistic forms – whether alone in closed-class forms or with additional material in open-class forms. The idea is that the structural specifications of linguistic forms are regularly conceptualized in terms of abstracted, idealized, and sometimes virtually geometric delineations. Such schemas fall into conceptual categories that join in extensive 'schematic systems.' Many of the substantive findings about conceptual organization made by cognitive linguists can be placed within these schematic systems. One schematic system is 'configurational structure,' covering the structure of objects in space and events in time – often with parallels between the two. For example, inits category of 'plexity' – a term covering both number and aspect – the object referent of *bird* and the event referent of *(to) sigh* are intrinsically 'uniplex', but the addition of the extra forms in *birds* and *keep sighing* triggers a cognitive operation of 'multiplexing' that yields multiplex referents. And in the category 'state of boundedness,' the intrinsically unbounded object and event referents of *water* and *(to) sleep* can undergo 'bounding' through the additional form in *some water* and *(to) sleep some* to yield bounded referents.

The second schematic system of 'perspective' covers the location or path of the point at which one

places one's 'mental eyes' to regard a represented scene. For example, in *There are some houses in the valley*, the closed-class forms together represent a distal stationary perspective point with global scope of attention. But the substituted forms in *There is a house every now and then through the valley* represent a proximal moving perspective point with local scope of attention.

The third schematic system of 'attention' covers the patterns in which different aspects of a linguistic reference are foregrounded or backgrounded. For example, the word *hypotenuse* 'profiles' – foregrounds in attention – its direct reference to a line segment against an attentionally backgrounded 'base' of the conception of a right triangle (Langacker, 1987). The verb *bite* in *The dog bit the cat* foregrounds the 'active zone' of the dog's teeth. And over an expression of a certain kind, the 'Figure' or 'trajector' is the most salient constituent whose path or site is characterized in terms of a secondarily salient constituent, the 'Ground' or 'landmark.' These functional assignments accord with convention in *The bike is near the house*, but their reversal yields the odd *?The house is near the bike*.

A fourth schematic system of 'force dynamics' covers such relations between entities as opposition, resistance, overcoming, and blockage, and places causation alongside permitting and preventing, helping and hindering. To illustrate, the sentence *The ball rolled along the green* is force dynamically neutral, but in *The ball kept rolling along the green*, either the ball's tendency toward rest is overcome by something like the wind, or its tendency toward motion overcomes something such as stiff grass (Talmy, 2000).

Schemas from all the schematic systems, and the cognitive operations they trigger can be nested to form intricate structural patterns. To illustrate with events in time, the uniplex event in *The beacon flashed* can be multiplexed as in *The beacon kept flashing*; this can be bounded as in *The beacon flashed 5 times in a row*; this can be treated as a new uniplexity and remultiplexed as in *The beacon kept flashing 5 times at a stretch*; and this can in turn be rebounded, as in *The beacon flashed 5 times at a stretch for 3 hours*.

Further conceptual structuring is seen within the meanings of morphemes. A morpheme's meaning is generally a prototype category whose members differ in privilege, whose properties can vary in number and strength, and whose boundary can vary in scope (Lakoff, 1987). For example, the meaning of *breakfast* prototypically refers to eating certain foods in the morning, but can extend to other foods at that time or the same foods at other times (Fillmore, 1982). For a polysemous morpheme, one sense can function as the prototype to which the other senses are progressively linked by conceptual increments within a 'radial category.' Thus, for the preposition *over*, the prototype sense may be 'horizontal motion above an object' as in *The bird flew over the hill*, but linked to this by 'endpoint focus' is the sense in *Sam lives over the hill* (Brugmann, 1981).

These findings have led cognitive linguists to certain stances on the properties of conceptualization. The conceptual structuring found in language is largely held to be a product of human cognition and imposed on external phenomena (where it pertains to them), rather than arising from putative structure intrinsic to such external phenomena and veridically taken up by language. For example, in one type of 'fictive motion,' motion can be imputed to a shadow – cross linguistically always from an object to its silhouette – as in *The pole threw its shadow on the wall*, even though a distinct evaluative part of our cognition may judge the situation to lack physical motion. An important consequence is that alternatives of conceptualization or 'construal' can be applied to the same phenomena. Thus, a person standing 5 feet from and pointing to a bicycle can use either deictic in *Take away that/this bicycle*, in effect imputing the presence of a spatial boundary either between herself and the bicycle or on the far side of the bicycle.

The notion of 'embodiment' extends the idea of conceptual imposition and bases the imposed concepts largely on experiences humans have of their bodies interacting with environments or on psychological or neural structure (Lakoff and Johnson, 1999). As one tenet of this view, the 'objectivist' notion of the autonomous existence of logic and reason is replaced by experiential or cognitive structure. For example, our sense of the meaning of the word *angle* is not derived from some independent ideal mathematical realm, but is rather built up from our experience, e.g., from perceptions of a static forking branch, from moving two sticks until their ends touch, or from rotating one stick while its end touches that of another.

The cognitive process of conceptual imposition – more general than going from mental to external phenomena or from experiential to ideal realms – also covers directed mappings from any one conceptual domain to another. An extensive form of such imputation is metaphor, mainly studied in cognitive linguistics not for its familiar salient form in literature but, under the term 'conceptual metaphor,' for its largely unconscious pervasive structuring of everyday expression. In it, certain structural elements of a conceptual 'source domain' are mapped onto the content of a conceptual 'target domain.' The embodiment-based directionality of the imputational

mapping is from a more concrete domain, one grounded in bodily experience, to a more abstract domain – much as in the Piagetian theory of cognitive development. Thus, the more palpable domain of physical motion through space can be mapped onto the more abstract domain of progression through time – in fact, in two different ways – as in *We're approaching Christmas* and *Christmas is approaching* – whereas mappings in the reverse direction are minimal (Lakoff, 1992).

Generally, mappings between domains are implicit in metaphor, but are explicitly established by linguistic forms in the area of 'mental spaces.' The mapping here is again directional, going from a 'base' space – a conceptual domain generally factual for the speaker – to a subordinate space that can be counterfactual, representational, at a different time, etc. Elements in the former space connect to corresponding elements in the latter. Thus, in *Max thinks Harry's name is Joe*, the speaker's base space includes 'Max' and 'Harry' as elements; the word *thinks* sets up a subordinate space for a portion of Max's belief system; and this contains an element 'Joe' that corresponds to 'Harry' (Fauconnier, 1985). Further, two separate mental spaces can map elements of their content and structure into a third mental space that constitutes a 'blend' or 'conceptual integration' of the two inputs, with potentially novel structure. Thus, in referring to a modern catamaran reenacting a century-old voyage by an early clipper, a speaker can say *At this point, the catamaran is barely maintaining a 4 day lead over the clipper*, thereby conceptually superimposing the two treks and generating the apparency of a race (Fauconnier and Turner, 2002).

In terms of the sociology of the field, there is considerable consensus across cognitive linguists on the assumptions of the field and on the body of work basic to it. No competing schools of thought have arisen, and cognitive linguists engage in relatively little critiquing of each other's work, which mainly differs only in the phenomena focused on.

See also: Cognitive Semantics; Componential Analysis; Deixis and Anaphora: Pragmatic Approaches; Metaphor: Psychological Aspects; Orality; Prototype Semantics; Psycholinguistics: Overview; Spatiality and Language.

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Cognitive Pragmatics

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Introduction

Cognitive pragmatics is concerned with the mental processes involved in intentional communication. Typically, studies within this area focus on cognitive processes underlying the comprehension of a linguistic speech act and overlook linguistic production or extralinguistic communication.

As far as cognitive processes are concerned authors in this field are interested in both the inferential chains necessary to understand a communicator's intention starting from the utterance he proffered and the different mental representations underlying the comprehension of various communicative phenomena as cognitive processes. Thus, a theory in cognitive pragmatics aims to explain what mental processes a person actually engages in during a communicative interaction (*see* **Shared Knowledge**).

Relevance theory (Sperber and Wilson, 1986/1995) is usually identified as the principal theoretical framework in the area of cognitive pragmatics (*see* **Relevance Theory**). Nonetheless, in the last decade, other theories have been developed. These include a far-reaching theory of the cognitive processes underlying human communication, known as the Cognitive Pragmatics theory (Airenti *et al.*, 1993a, 1993b; Bara, 2005), and the Graded Salience Hypothesis (Giora, 2003), a theory which focuses on mental inferences underlying the comprehension of literal vs. figurative language (*see* **Cognitive Linguistics**; **Metaphor: Psychological Aspects**).

Describing the cognitive processes involved in communicative interaction is interesting not only for the study of such processes as fixed states – an approach that takes into consideration exclusively the final stage in healthy adult subjects – but also for the consideration of how a given function develops from infancy, through childhood, and to adulthood, and how it eventually decays in subjects with brain injuries (Bara, 1995). Such an approach makes it possible to better comprehend, from a cognitive perspective, how pragmatic competence develops and what neurocognitive structures might cause deficits in people's performance if damaged.

A closely related topic is the identification of the cognitive components that contribute to the realization of a complete pragmatic competence. From this perspective, it is important to consider the role played by a person's Theory of Mind and by the Executive Function (see below) during a communicative interaction.

Cognitive Pragmatics Theory

Airenti *et al.* (1993a, 1993b) presented a theory of the cognitive processes underlying human communication aiming to provide a unified theoretical framework for the explanation of different communicative phenomena (Bara, 2005). The authors proposed that their theoretical analysis holds for both linguistic and extralinguistic communication, and thus introduced, with reference to the interlocutors, the terms 'actor' and 'partner' instead of the classical 'speaker' and 'hearer.' The theory assumes that the literal meaning of an utterance is necessary but not sufficient to the partner in order for him or her to reconstruct the meaning conveyed by the actor, and that in order to understand the actor's communicative intention, the partner has to recognize a 'behavior game' the actor is proposing for him (the partner) to play. The behavior game is a social structure mutually shared by the participants of the communicative interaction.

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Suppose, for example, that while you are working in your office, a colleague walks in and says: [1] *It's snowing outside*. Although the literal meaning of the utterance is completely clear, you probably are utterly bewildered about how to respond. Only if [1] is understood as an invitation not to go outside, a request to close the window, a proposal to go skiing next week-end (that is, only if, in some way, the reason or reasons for uttering the expression were evident), will you be able to make the necessary inferences and answer appropriately. The utterance, pure and simple, without a game to refer to, has in itself no communicative significance whatsoever. Thus, an utterance extrapolated from its context of reference has no communicative meaning and cannot have any communicative effect on the partner.

Starting from the assumption that the communicative meaning of an utterance is intrinsically linked to the context within which it is proffered, Bosco *et al.* (2004a) defined a taxonomy of six categories of context: Access, Space, Time, Discourse, Behavioral Move, and Status. Using contextual information, the partner can identify the behavior game bid by the speaker, which allows him to fully comprehend the actor communicative intention.

Following the tenets of the Cognitive Pragmatics theory, Bucciarelli *et al.* (2003) proposed that two cognitive factors affect comprehension of various kind of pragmatic phenomena: the 'inferential load' and the 'complexity of mental representations' underlying the comprehension of a communicative act.

Inferential Load: Simple and Complex Speech Acts

Searle (1975) claimed that in speech act comprehension, the literal interpretation of an utterance always has priority with respect to any other interpretations derived from it. According to Searle, understanding an indirect speech act, e.g., [2] *Would you mind passing me the salt?*, is harder than understanding a direct speech act, e.g., [3] *Please pass me the salt*, because it requires a longer inferential process.

Bara and Bucciarelli (1998) provided empirical evidence that, beginning at two-and-a-half years of age, children find direct speech acts such as [4] *Please sit down*, and conventional indirects such as [5] *Would you mind closing the door?* equally easy to comprehend. In a further study, Bucciarelli *et al.* (2003) found that starting at age two-and-a-half years, children find both direct and conventional indirect speech acts easier to understand than nonconventional indirect speech acts, such as the utterance [6] *Excuse me, I'm studying* when it is a request to a partner who is hammering in a nail to stop making noise.

Using the tenets of Cognitive Pragmatics theory, it is possible to abandon the distinction between direct and indirect speech acts and adopt a new one based on the difference between inferential processes involved in comprehending simple as against complex communicative acts (Bara and Bucciarelli, 1998). According to the theory, the partner's understanding of any kind of speech act depends on the comprehension of the behavioral game bid by the actor; an agent will interpret an interlocutor's utterance based on the grounds that are assumed to be shared. In this perspective, the partner's difficulty in understanding a communicative act depends on the inferential chain necessary to refer the utterance to the game intended by the actor. Direct and conventional indirect speech acts make immediate reference to the game, and thus are defined as 'simple speech acts.' On the other hand, nonconventional indirect speech acts can be referred to as 'complex speech acts,' because they require a chain of inferential steps due to the fact that the specific behavior game of which they are a move is not immediately identifiable. For example, to understand [4] and [5], it is sufficient for the partner to refer to the 'Ask for Something' game. In order to understand [6], a more complex inferential process is necessary: the partner needs to share with the actor the belief that when a person is studying, he needs silence and that since hammering [6] is a request to stop is noisy. Only then, the partner can attribute to the utterance the value of a move in the 'Ask for Something' game. Thus, if the problem is how to access the game, the distinction between direct and indirect speech acts is not relevant. It is the complexity of the inferential steps necessary to refer the utterance to the game bid by the actor that accounts for the difficulties in speech act comprehension.

This distinction applies not only to standard communicative acts such as direct, conventional indirect, and nonconventional indirect speech acts, but also to nonstandard ones such as ironic and deceitful (Bara *et al.*, 1999a). The same distinction between simple and complex standard, ironic, and deceitful communicative acts holds for extralinguistic communication acts as well (*see* **Irony**). That is, the distinction holds also when the actor communicates with the partner only through gestures (Bosco *et al.*, 2004b) (*see* **Gestures: Pragmatic Aspects**).

The inferential load underlying a communicative act may explain the difference in difficulty that exists in the comprehension of different communicative acts pertaining to the same pragmatic category, such as between simple and complex standard communicative acts. To explain the difference in difficulty that might occur among communicative acts pertaining to a different pragmatic category, such as between a

direct communicative act and a deceitful communicative act, is necessary to consider the complexity of the mental representations involved in their comprehension.

Complexity of Mental Representations

Still within the framework of Cognitive Pragmatics theory and along with the same complexity of the inferential load involved, Bucciarelli *et al.* (2003) described an increasing difficulty in comprehending simple communicative acts of different sorts: simple standard, simple deceitful, and simple ironic communicative acts.

According to the theory, in standard communication, default rules of inference are used to understand another person's mental states; default rules are always valid unless their consequences are explicitly denied. Indeed, in standard communication, what the actor says is in line with his private beliefs. Direct, conventional indirect, and nonconventional indirect speech acts are all examples of standard communication. In terms of mental representations, to comprehend a standard communicative act, the partner has to simply refer the utterance proffered by the actor to the behavior game he bids.

On the other hand, nonstandard communication such as irony and deceit involves the comprehension of communicative acts *via* the block of default rules and the occurrence of more complex inferential processes that involve conflicts between the beliefs the actor has shared with the partner and the latter's private beliefs. In the comprehension of irony and deceit, the mental representations involved produce a difference between what the actor communicates and what he privately entertains. It follows that, along with the same complexity of the inferential load involved, standard communicative acts are easier to deal with than nonstandard pragmatic phenomena.

According to Bucciarelli *et al.* (2003), in the case of the comprehension of deceit, the partner has to recognize the difference between the mental states that are expressed and those the actor privately entertains. Consider for instance the following example: Mark and Ann share that the lecture they just attended was incredibly boring. Later Ann meets John and tells him that Mark and she attended a tedious lecture. In the afternoon also Mark meets John, who asks him about the lecture. Actually, Mark is annoyed with John because John did not go to the lecture and he does not want John to know that he feels he wasted the whole morning. Mark does not know that John has already met Ann, thus he answers: [7] *It was really interesting!* John can understand that Mark is trying to deceive him because he recognizes the difference between the mental state that Mark is expressing and the one that he truly and privately entertains.

A statement, instead, becomes ironic when, in addition to the awareness of this difference, the partner also recognizes that the mental states expressed contrast with the scenario that he shares with the actor. For example, some months later, during a chat with Mark, Ann asks: *Do you remember the lecture that we attended some months ago?* Mark answers: [8] *It was really interesting!* What makes this utterance ironic is the fact that both interlocutors share that the lecture had actually been boring. Thus, the difference between irony and deceit lies not in the partner's awareness of the difference between the mental states that the actor expressed and those that he actually entertains, but in his awareness that he does or does not share this difference with the actor.

In the case of irony, the partner has to represent not only the discrepancy between the mental states that the actor expressed and those that he privately entertains, but also that such awareness is shared with the actor. This makes an ironic communicative act more difficult to comprehend than a deceitful one.

Bucciarelli *et al.* (2003) showed the existence of an increase in difficulty in the comprehension of simple standard communicative acts, simple deceits, and simple ironies with an experiment carried out on children from two-and-a-half to seven years of age. The authors also pointed out that the same children show a similar predicted gradation of difficulty in understanding the same pragmatic phenomena, both when these are expressed by linguistic speech acts and when these are expressed by communicative gestures. Regardless of the communicative channel used by the actor, linguistic or extralinguistic, children find simple standard speech acts easier to comprehend than simple deceits, which are, in turn, easier to comprehend than simple ironic communicative acts.

Finally, an overall consideration of the mentioned results makes it possible to conclude that all of the theoretical predictions (both derived from the Cognitive Pragmatics theory and grounded on a person's cognitive processes underlying the communicative comprehension) hold true for the same pragmatic phenomena whether expressed by linguistic speech acts or by gestures. These results seem to indicate that linguistic and extralinguistic communicative acts share the most relevant mental processes in each of the specific pragmatic phenomena investigated and suggest that pragmatic competence shares the same cognitive faculty – regardless of the input processed – be it linguistic or extralinguistic. It is possible to interpret such empirical evidence as being in favor of a unified theoretical framework of

human communication in which linguistic and extralinguistic communication develop in parallel being different aspects of a unique communicative competence (see Bara and Tirassa, 1999; Bara, 2005) (*see* **Communicative Principle and Communication**).

Cognitive Pragmatics and Development

In this section, we shall examine the empirical evidence in favor of the existence of cognitive processes of increasing complexity that underlie different pragmatic phenomena. The developmental domain is particularly interesting for this aim because it makes it possible to observe errors in the comprehension of different kinds of pragmatics tasks that allow us to falsify our hypotheses regarding the complexity of the mental processes involved in specific phenomena. However, adult subjects possess a fully developed cognitive system and communicative competence, and thus they do not show any interesting errors in comprehending or producing different kinds of communicative acts; it is only possible to analyze their time of reaction in solving such tasks.

On the other hand, if inferential processes and mental representations of increasing complexity underlie the comprehension of various kind of pragmatic phenomena, then it is possible to explain why, during the development of children's communicative competence, some communicative acts are understood and produced before others are. For example, children initially only understand sincere communicative acts and only later on in their development do they start comprehending, for example, deceit and irony. Children's ability to deal with mental representations and inferential chains of increasing complexity develops with age, and this fact helps explain the development of their pragmatic competence.

From this perspective, the increasing capacity to construct and manipulate complex mental representations is involved in the emergence of preschoolers' and kindergarten student's capacity to deceive. A deceptive task could be made easier to comprehend by reducing the number of characters, episodes, and scenes involved in the task, and by including a deceptive context (Sullivan *et al.*, 1994).

Likewise the ability to comprehend and produce different forms of ironies involves an increasing and sophisticated inferential ability. Lucariello and Mindolovich (1995) carried out a study on the ability of 6- and 8-year-old children to provide ironic endings to unfinished stories. The authors claimed that the recognition and the construction of (situational) ironic events involve the ability to manipulate the representations of events. These representations have to be critically viewed, and disassembled in order to create new, different, and ironic event structures. Also, different forms of irony behave in different ways, as the authors' experiments show. Their results show that older children construct more complex ironic derivations from the representational base than younger children do.

Just as it is possible to better understand the development of pragmatic competence by considering the cognitive processes involved in a specific communicative act, it also is possible to explain deficits in performance in cases of brain damage. The ability of children with closed head injury to solve pragmatic tasks is closely dependent (for a review, see Bara *et al.*, 1999b). These subjects performed worse than did their normal peers in specific pragmatic tasks such as bridging the inferential gap between events in stereotypical social situations and tasks such as comprehending utterances that require inferential processes because of their use of idiomatic and figurative language (Dennis and Barnes, 1990).

Cognitive Pragmatics and Brain Damage

Neuropsychological diseases affect communicative performance in various ways, depending on which relevant cognitive subsystem is damaged. The information obtained by studying these abnormal processes provides us with an opportunity to better understand the architecture of the brain/mind and its relationship to pragmatic competence (Tirassa, 1999; Bara and Tirassa, 2000). Acquired brain damage impairs certain cognitive processes while leaving others unaffected. For example, it is well-documented in the literature that aphasic patients with left-brain damage have residual pragmatic competence despite their language impairment (*see* **Language in the Nondominant Hemisphere**).

On the other hand, what different cerebral injuries have in common is a damaged capacity to deal with phenomena that require complex mental processes in order to be understood. In particular, if the tasks require more complex inferences, then this capacity seems to be more damaged than in other cases, as we will show later in this section. Results like these seem to confirm the assumption that different pragmatic phenomena require the activation of increasingly complex cognitive processes.

McDonald and Pearce (1996) found that traumatic brain injured patients (TBI) do not have difficulty in the comprehension of written sincere exchanges such as [9] Mark: *What a great football game!;* Wayne: *So you are glad I asked you?*, but they have several problems, compared to the normal control subjects, in comprehending ironic exchanges such as [10] Mark: *What a great football game!*; Wayne: *Sorry*

I made you come. The authors gave the subjects the same experimental material in auditory form and found that the patients' performance did not improve. The authors concluded that TBI patients have difficulty in comprehending irony and that, even if the tone of voice usually facilitates the comprehension of ironic remarks, it is not sufficient on its own.

Furthermore, McDonald (1999) found that, surprisingly, TBI patients have no problem understanding written ironic utterances such as [11] Tom: *That's a big dog*; Monica: *Yes, it's a miniature poodle*. The author suggested that [11] might require a shorter inferential chain compared to [10] in order to be understood. Indeed, in comprehending [11], it is sufficient to understand what Monica answers as meaning that Tom's statement meant the opposite of what it said. In [10], however, Wayne's response is not only a rejection of the original comment, but an allusion to Mark's actual reaction to the game. Thus, there were at least two necessary inferential steps in the comprehension process. Such findings are in line with the proposal that different kinds of irony may vary in their difficulty of being understood, according to the complexity of the required inferential load (Bara *et al.*, 1999a).

Particularly interesting from our perspective are studies that showed that the decay of pragmatic competence in closed head injured subjects (CHI) reflects the same type of development that is observed in normal children, i.e., the capacities acquired later in the development of the pragmatic ability are the most damaged. Using a linguistic experimental protocol, Bara *et al.* (1997) tested a group of CHI subjects and found that specific pragmatic tasks such as the comprehension of nonstandard communication, e.g., deceit and irony, are more difficult than tasks requiring only simple mental representations, such as the comprehension of standard communication involving only direct, conventional, and nonconventional indirect speech acts. In addition, the authors found no differences in patients' comprehension of direct and conventional indirect speech acts. The same results were observed in the performance of children aged 2 to 6 years old who were tested by the same experimental protocol (Bara and Bucciarelli, 1998). It should also be noted that Bara *et al.* (1997) presented two classical tests on false belief to CHI patients in order to measure their theory of mind, but did not find any significant difference with the control group of children who were not brain damaged. Thus, the patients' poor performance on pragmatic tasks cannot be ascribed to a deficit of the Theory of Mind; that is, their poor performance cannot be ascribed to an inability to understand another person's mental states.

Moreover, Bara *et al.* (2000) used a similar extralinguistic version of the same pragmatic experimental protocol and evaluated the comprehension of standard communication, i.e., simple and complex communicative acts, and nonstandard communication, i.e., deceit and irony. Such a protocol contains videotaped scenes wherein the pragmatic phenomena are presented using extralinguistic means, such as pointing or clapping. The subjects were firstly a group of children 2–6 years of age and secondly a group of Alzheimer's disease patients, and found that children show the same tendency in the development of extralinguistc competence that was observed by Bara and Bucciarelli (1998) in the linguistic domain. In addition, the authors observed a similar tendency toward decay in the Alzheimer's patients' extralinguistic competence: the nonstandard extralinguistic tasks are understood less well than are the standard communicative tasks. Finally, the trend of decaying pragmatic competence in the Alzheimer patient group matched the results obtained by CHI patients, when tested according to the same extralinguistic protocol (Bara *et al.*, 2001). The CHI subjects were also given several neuropsychological tests, but no statistical correlation between the subjects' performance on the pragmatic protocol and their performance on these collateral neuropsychological tests was found. Thus, the patient's poor performance cannot be ascribed to a deficit in their executive functioning.

As already observed for the development of pragmatic linguistic and extralinguistic competence, the empirical data concerning brain damaged subjects seem to be in favor of the existence of a unified pragmatic competence which is independent of the input – whether it is linguistic or extralinguistic. That is, the comprehension of speech acts and extralinguistic communicative acts shares the most relevant mental processes when tested on different pragmatic phenomena, and the pragmatic competence seems to be independent of the expressive means used to realize it.

Cognitive Pragmatics and the Executive Function

While the literature provides empirical evidence that mental processes involved in various pragmatic tasks can be ordered according to increasing difficulty, as we have seen above, in order fully comprehend pragmatic competence from a cognitive perspective, we need to consider also a further factor affecting the human ability to communicate: the executive functions.

The Executive Function is a cognitive construct used to describe the goal-directed behaviors that are mediated by the frontal lobes. The Executive

Function guides a person's actions and enables him to behave adaptively and flexibly; it includes cognitive capacities such as planning, inhibition of dominant responses, flexibility, and working memory.

Barnes and Dennis (2001) have shown that, in addition to a deficient inferential ability, also a reduction of working memory and metacognitive skills may be invoked to explain closed-head injured children's problems in comprehending stories. Working memory provides the necessary resources for computing inference in ongoing text comprehension; metacognitive skills are used when checking if, and when, an inference needs to be made. The authors tested children with severe to mild head injury on their ability to comprehend brief written stories, and found inferencing deficits in children with severe (but not with mild) head injury; these children had problems linking their general knowledge to the particular wording of the text. In general, when the metacognitive demands and the pressure on working memory were reduced, children with severe head injuries did not show any deficiencies in inferencing compared to the development in normal children or their mildly head-injured peers. Working memory also plays a role in explaining the poor ability to comprehend written stories that is observed in children with hydrocephalus, a neuro-developmental disorder accompanied by increased pressure of the cerebrospinal fluid on the brain tissue. Children with hydrocephalus, when compared to the control group, show increasing difficulty drawing on information from an earlier read sentence when trying to understand a new sentence, the greater the distance between the two texts. Thus, while these children do not seem to have a fundamental problem in making inferences, their poor performance is mainly due to a deficit in their working memory (Barnes *et al.*, 2004).

As to the role of other executive functions, Channon and Watts (2003) examined the ability of CHI patients to comprehend brief vignettes involving pragmatic judgement and the relationship between this activity and some executive functions: working memory, inhibition, and the ability to organize and plan appropriate responses in a certain context. The authors found that only the ability to solve the inhibition task, which required the subjects to inhibit dominant words and generate words that completed sentences with nonsensical endings, correlates with the pragmatic comprehension task. No association was found with the other executive skills.

From a neuropsychological perspective, intact frontal lobes are critical to executive functioning, and because traumatic brain injury often results in damage to these areas, pragmatic deficits shown by these patients can be explained by a principal Executive Function impairment. From this perspective, the deficits in planning and monitoring of behavior that are usually observed in such patients seem to explain the difficulty these subjects have in adhering to the structure of conventional discourse (McDonald and Pearce, 1998).

To conclude, theoretical and empirical studies in the literature seem to suggest that in order to explain people's pragmatic competence, it is necessary to take into account the role played by at least three elements: mental processes, namely, the inferential load and the complexity of the mental representations; the Theory of Mind; and the Executive Function whereas the empirical studies mainly focus on the linguistic competence that is needed to realize various pragmatic tasks, the perspective should be widened to include a methodical comparison with extralinguistic competence. In order to establish whether, or not, the cognitive components that make these two different means of communication are the same in both cases. Finally, a complete theory in the cognitive pragmatic domain should be able to explain not only adult normal subjects' ability to communicate, but also the development and the decay of this capacity in brain-damaged patients.

See also: Cognitive Grammar; Cognitive Linguistics; Cognitive Semantics; Communicative Principle and Communication; Gestures: Pragmatic Aspects; Irony; Language in the Nondominant Hemisphere; Meaning: Overview of Philosophical Theories; Metaphor: Psychological Aspects; Pragmatics: Overview; Relevance Theory; Shared Knowledge; Speech Acts; Speech Acts, Literal and Nonliteral.

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Cognitive Science and Philosophy of Language

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Much contemporary philosophy of language can be viewed as a synthesis of three major traditions: ideal language philosophy, ordinary language philosophy, and cognitivism. In the first three-quarters of the 20th century, philosophers in both the ordinary and ideal language traditions sought to solve or dissolve traditional philosophical problems through careful exegesis of the meanings of words and sentences. For ideal language philosophers, the project was to formally describe how words and sentences ought to be interpreted in scientific and philosophical discourse. For ordinary language philosophers, the project was to characterize the conventions underlying the actual use of words and sentences in ordinary speech. Philosophers in both traditions made a number of lasting contributions to the philosophical and scientific study of language, but they were not just studying language for its own sake. Many philosophers in this period considered the philosophy of language to be first philosophy, the foundation on which other philosophical inquiries are built, and they had other philosophical issues in mind when developing their accounts of language (*see* **Epistemology and Language; Metaphysics, Substitution *Salva Veritate* and the Slingshot Argument**).

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As the limitations of the ordinary and ideal language traditions became apparent and their influence began to decline, the cognitivist tradition in the scientific study of language was growing. Cognitivists view the mind as a computational and representational system and bring a wide variety of empirical evidence to bear on their investigations into the structure and processing of linguistic knowledge in the mind. The synthesis of cognitive science and philosophy of language, or as I shall call it, the new philosophy of language, integrates the formalisms of the ideal language tradition with the careful attention to the nuances of use that characterized the ordinary language tradition. But as cognitivists, many contemporary philosophers of language also take results from linguistics into account and share with other cognitive scientists a commitment to producing theories that are consistent with available psychological and neuroscientific evidence. What follows is a very brief account of the three traditions and their synthesis into the new philosophy of language, ending with a review of some recent work on proper names that exemplifies this new synthesis.

The Ideal Language Tradition

Ordinary speech is a rich source of vagueness, ambiguity, puzzles, and paradoxes, most of which go unnoticed by most speakers. This may not matter all that much for the purposes of ordinary conversation, but in scientific and philosophical discourse the imprecision of ordinary language is not to be tolerated. So said Bertrand Russell, Gottlob Frege, W. V. O. Quine, and the philosophers of the ideal language tradition (*see* **Frege, Gottlob (1848–1925)**; **Quine, Willard van Orman (1908–2000)**; **Russell, Bertrand (1872–1970)**). According to them, ordinary language contains certain deficiencies and the philosopher's job is to provide remedies (Russell, 1919: 172, describes one such "deficiency" as a "disgrace to the human race"). The goal of these philosophers was to standardize and regiment language, explain away puzzles and paradoxes, and formally characterize ambiguities. Their aim was to transform ordinary language into something closer to an ideal language – one that scientists and philosophers could use to express their hypotheses about the world. The strengths and weaknesses of their approach can be illustrated using Russell's theory of proper names.

Example: Proper Names

The idea that scientific hypotheses are about the world was key for the ideal language philosophers. Sentences in science and philosophy, not to mention ordinary conversation, often attribute properties to objects in the real world (*see* **Objects, Properties, and Functions**). Accordingly, a defining feature of ideal language philosophy was the idea that the relationship of reference is a basic unit of meaning (*see* **Reference: Philosophical Theories**), and the starting point was the analysis of simple property attribution sentences such as:

(1a) Venus is round.
(1b) Venus is a star.

Here are some basic intuitions: Sentence (1a) is true because the planet Venus has the property of being round, and sentence (1b) is false because the planet Venus does not have the property of being a star.

Here is a simple analysis that respects those intuitions: In both sentences, the proper name *Venus* refers to an object (*see* **Proper Names: Philosophical Aspects**; **Proper Names: Semantic Aspects**), the remaining words *is round* and *is a star* attribute properties to that object, and the sentences refer to the propositions that Venus is round and that Venus is a star, respectively (*see* **Propositions**). This analysis is shown more formally in (2), where VENUS denotes the actual object Venus, not a word or an idea.

Simple Analysis of (1)

(2a) *round*(VENUS)
(2b) *star*(VENUS)

This analysis of simple sentences can be developed into a powerful system for characterizing the semantics of much more complex and interesting sentences. But, unfortunately, it also runs into fatal problems with certain sentences that seem just as simple as those in (1). For instance, it is not easy to see how to extend the analysis to cover:

(3) Vulcan is round.

This sentence was once thought to be true by astronomers who postulated the existence of a planet, tentatively named *Vulcan*, to explain the observed perturbations in Mercury's orbit. It is now known that there is no such planet or, to put it another way, that *Vulcan* is an empty name (*see* **Empty Names**). So, although (3) is clearly meaningful and has a grammatical form that parallels the sentences in (1), the simple analysis will not work in this case. Recall that (1a) is true because the object referred to by the name *Venus* has the property of roundness. But in (3), there is no object named *Vulcan* and therefore nothing to which any such property can be applied.

Here we have the makings of a puzzle – if reference is as basic to meaning as it appears to be, then how is it possible to say meaningful things using words that have no referents? One option is to allow that

nonexistent things such as Vulcan, Santa Claus, unicorns, and so on really do have some kind of objecthood. But most philosophers would reject this option because, as Russell (1919: 169) put it, "logic ... must no more admit a unicorn than zoology can; for logic is concerned with the real world just as truly as zoology." Another option is to just bite the bullet and accept that (3) does not express a proposition and is therefore meaningless. Although some contemporary philosophers of language have taken this route (e.g., Adams and Stecker, 1994), the ideal language philosophers did not want to take that way out either because to do so would be to render many important scientific and philosophical hypotheses meaningless.

Russell's Theory of Descriptions

Russell found a solution to the problem of empty names (and other philosophical puzzles) in his theory of descriptions (*see* **Descriptions, Definite and Indefinite: Philosophical Aspects**). Briefly, Russell held that names such as *Vulcan* and *Venus* do not directly refer but instead are shorthand for definite descriptions such as *the planet causing perturbations in Mercury's orbit* and *the second planet from the sun*, respectively. That is, names are disguised definite descriptions. So, when scientists utter sentences such as those in (1) and (3), what they assert is something more like:

Step One of Russell's Analysis of (1) and (3)

(4a) The second planet from the sun is round.
(4b) The second planet from the sun is a star.
(4c) The planet causing perturbations in Mercury's orbit is round.

On the face of it, it looks like (4c) has the same problem as (3) – descriptions such as *The planet causing perturbations in Mercury's orbit* seem like they should be interpreted as namelike referring expressions. But Russell did not think so. He thought that descriptions such as these should be analyzed as general, quantificational statements about what exists in the world. In the case of (4c), the correct interpretation, according to Russell, is that there is exactly one planet causing perturbations in Mercury's orbit and all such planets are round. This analysis is expressed in quantificational notation in (5), where *pm*() stands for the property of being a planet that causes perturbations in Mercury's orbit. (Some of the inessential details have been simplified in a way that Russell might have objected to, but that does not matter for current purposes.)

Step Two of Russell's Analysis of (3)

(5a) There exists exactly one planet x that is the cause of the perturbations in Mercury's orbit, and it is round.
(5b) $\exists x\ ((\ \forall y\ (\ pm(y) \leftrightarrow y = x\ ))\ \&\ round(x))$

In this final analysis, there is no longer any element in the proposition corresponding to the name *Vulcan* and no role available for any referent, and thus the puzzle of empty names disappears. To recap: Names are shorthand for disguised definite descriptions, and sentences that contain definite descriptions express general propositions about the world and the things in it rather than singular propositions about particular entities.

Limitations of the Ideal Language Approach

Russell's analysis of proper names, as clever and influential as it is, runs afoul of ordinary intuitions. Sentence (3) seems to have a very simple subject-predicate form, but the proposition in (5) that provides the meaning for (3) bears no resemblance to that form. Furthermore, (5) is false because it asserts the existence of something that does not exist (i.e., it asserts the existence of a planet that causes perturbations in Mercury's orbit, but there is no such planet). But it is not clear to everybody that (3) really is false (see Strawson, 1950; and the reply by Russell, 1957). To many people, questions such as *Is Vulcan round?* have the same kind of problem as questions such as *Have you stopped cheating on exams yet?* – to answer either "yes" or "no" would be to accept a problematic premise.

Russell was not driven to this analysis of simple sentences as an attempt to characterize how ordinary speech works but as an attempt to dissolve an apparent logico-scientific puzzle that arises when we take the referential commitments of ordinary speech seriously. But the analysis ends up providing no account of the fact that people seem quite capable of making what appear to be true claims about nonexistent things.

(6a) Santa Claus usually wears a red suit.
(6b) Pegasus looks a lot like a horse.

Russell's theory of disguised definite descriptions makes the sentences in (6) come out false, contrary to most people's intuitions. His theory preserves the apparent meaningfulness of these sentences, and does so without maintaining any problematic commitments to entities such as Pegasus and Santa Claus, but at the price of a theory that may not have much to say about their ordinary use.

The Ordinary Language Tradition

As vague, ambiguous, and rife with semantic puzzles as ordinary language is, it also contains a wealth of information that philosophers cannot afford to ignore. In order to discover anything meaningful about important philosophical topics such as Truth, Knowledge, and Justice, philosophers need to know what *truth, knowledge, justice*, and other related words actually mean in ordinary language. This was the perspective of Gilbert Ryle, H. P. Grice, J. L. Austin, P. F. Strawson, Ludwig Wittgenstein (in his later works), and the philosophers of the ordinary language tradition (*see* **Austin, John Langshaw (1911–1960); Grice, Herbert Paul (1913–1988); Strawson, Peter Frederick (b. 1919)**). According to them, philosophers must pay careful attention to the nuances of ordinary language use and must be particularly wary of misusing ordinary language expressions in their philosophical theories. In many ways, this tradition was radically opposed to the ideal language tradition: whereas the ideal language project was a prescriptive project, concerned with legislating how language ought to be understood, the ordinary language approach was purely descriptive, concerned with the investigation of how language is actually used; whereas ideal language philosophers sought to construct a theory of meaning based on reference to things in the world, ordinary language philosophers sought to construct a theory of meaning based on conventions of ordinary use (*see* **Use Theories of Meaning**). But despite these differences, both traditions shared a common motivation, namely, the analysis of language in order to help solve or dissolve philosophical problems. It is just that in pursuing this common aim, ideal language philosophers were busy constructing a new language while ordinary language philosophers were busy pointing out how philosophers tended to misuse the old one.

Example: Ryle on Free Will

Ordinary language philosophers thought that the meaning of an expression is the conventions governing its use. Thus, to get at the meaning of an expression, we have to examine how it is ordinarily used. The standard technique is to assemble a list of sentences containing a given expression and then try to find conditions under which it would be inappropriate or nonsensical to use those sentences. Whatever those conditions turn out to be, their negation must be part of the meaning of the word in question. (Notice that this makes short work of the puzzle of empty names. Because the meaning of a word is the conventions governing its use, names can have meaning whether they have a referent or not.)

As an example of ordinary language analysis in action, consider Ryle's (1949) investigation of the word *voluntary*. Ryle noted that philosophers often characterize free will (another important philosophical topic) based on the distinction between voluntary and involuntary actions – free will is said to be involved in an action when it is performed voluntarily and not when it is performed involuntarily. So *voluntary* (along with grammatical variants such as *voluntarily*) is an important word in philosophy, but what does it actually mean in ordinary language? Consider the following sentences:

(7a) Benazir went to school voluntarily.
(7b) Hussein ate the sandwich voluntarily.
(7c) Ahmad watched *Seinfeld* voluntarily.

As Ryle observed, such uses of *voluntary* and its grammatical variants seem odd or wrong in any situation in which there is no reason to believe that the person in question ought not to have performed the action. So if Benazir has been banned from campus or hates school or is supposed to be doing something else, then (7a) might make sense. But if there is no reason to suppose anything like that, then the word *voluntarily* should be left out. Ditto for (7b) and (7c). From these sorts of considerations, Ryle concluded, part of the meaning of the word *voluntary* must include the condition that it can only be used in the description of an action that for some reason ought not to have been performed.

To bring this back to the philosophical problem of free will, Ryle noted that philosophers who worry about what it could mean to eat a sandwich or watch *Seinfeld* voluntarily, absent any kind of context, are systematically misusing ordinary English. As he put it, they engage in an "unwitting extension of the ordinary sense of 'voluntary' and 'involuntary' " (Ryle, 1949: 69). The conclusion that Ryle drew from these and other considerations was that there is no problem of free will. The appearance of the problem arises only when philosophers misuse ordinary language words such as *voluntary*. The whole problem just dissolves under ordinary language analysis.

Limitations of the Ordinary Language Approach

The ordinary language philosophers tended to be less likely to make use of formalisms for characterizing the meanings of words or sentences. The nature of ordinary language analysis was such that it produced accounts of word or sentence meaning that tended to be less rigorous than those produced by philosophers working in the ideal language tradition. Furthermore, the use theories of meaning pursued by ordinary language philosophers had little to say about the relationship between language and reality,

and were thereby limited in their ability to account for reference and truth conditions, whether in scientific, philosophical, or ordinary discourse. The ordinary language philosophers demonstrated many of the important and subtle ways in which philosophically interesting words are employed in ordinary language, but they did so at the price of having neither a systematic, precise account of meaning nor a theory of the relationship between language and the world.

The ordinary language tradition ultimately met its demise at the hands of its own adherents. In his 1967 lectures on 'Logic and Conversation,' Grice (1989) gave a strong voice to many philosophers' growing misgivings about the project. He argued for a sharp distinction between what is said by a speaker on a particular occasion and what the speaker might have meant by what was said. For Grice, what is said is the literal, truth-evaluable, relatively invariant portion of meaning. To use one of his examples, suppose Alyssa happens upon Cliff, who has run out of gas on the highway, and utters:

(8) There's a gas station around the corner.

What Alyssa has said, in Grice's sense (literally expressed, truth-conditional meaning) is the proposition that around the indicated corner is a gas station. Alyssa said nothing further about whether the gas station is open, has gas to sell, and so on. But assuming she is sincerely trying to help Cliff out, it will be inappropriate for her to use that sentence unless she believes that the gas station is open and has gas to sell. Based on this latter observation, an ordinary language philosopher might be tempted to conclude that these further conditions are part of the meaning of (8). But that, Grice argues, is a mistake.

Grice's alternative is that the further propositional content about the gas station being open and having gas to sell is not part of the literal meaning of (8), but is what he called a conversational implicature (*see* **Implicature**). This conversational implicature is part of what Alyssa means to communicate with (8), but she expects Cliff to be able to pick up on it without requiring her to state it explicitly. The details of how Cliff might do that is beyond the scope of the current discussion (see Grice, 1989; Sperber and Wilson, 1995), but to get a sense of the reasonableness of the distinction between what is said and what is conversationally implicated, consider how Alyssa could have tacked an extra clause onto (8) to take back both what she implicated and what she said.

Clauses That Cancel Implicatures

(9a) There's a gas station around the corner, but it's not open.
(9b) There's a gas station around the corner, but it's out of gas.

The sentences in (9) both have (8) embedded in them, and the fact that they do not seem contradictory indicates that the material in the final clause must not be opposed to any part of the meaning of (8). Now suppose Alyssa had instead uttered one of the sentences in (10).

Clauses That Contradict What Is Said

(10a) There's a gas station around the corner, but it's not a gas station.
(10b) There's a gas station around the corner, but it's not around the corner.

The fact that these sentences are clearly contradictory indicates that the added clauses must be opposed to some part of the literal meaning of (8). So there is strong intuitive support for the distinction between what Alyssa has said, as shown by the contradictory clauses in (10), and what she conversationally has implicated, as shown by the noncontradictory clauses in (9).

On the basis of this distinction, Grice argued for caution when moving from facts about how words are used to facts about the meanings of those words. It would have been inappropriate for Alyssa to utter (8) if she thought the gas station was closed, but that does not tell us anything about what (8) means. Evidence about use can, in principle, indicate something about the literal meaning of words and sentences, but not always in such a simple way. Ryle, in particular, was probably wrong to jump from facts about the use of the word *voluntary* to facts about its meaning (and then to the denial of the problem of free will). Grice thought that ordinary language analysis could still be useful but that philosophers needed to pay more attention to separating what an expression can be used to communicate from what that expression actually means in the language – a project that turns out to be exceedingly difficult (*see* **Semantics–Pragmatics Boundary**).

The Cognitivist Tradition

Language is a fascinating topic of study in its own right, regardless of its role in helping philosophers do their work. It is now clear that the production of even very simple speech behaviors is far more complex than was once thought and working out how linguistic knowledge is structured and processed in the human mind should be a central goal in the scientific study of language. That is what linguists working in the cognitivist tradition tend to think. According to them, the goal of linguistic inquiry is not primarily to account for reference and truth or to characterize conventions of use but rather to find out what it is

about the human mind that makes language what it is. Cognitivism is actually a cross-disciplinary tradition concerned with the study of the human mind in general, not just language. Leading figures in the birth and early development of the cognitivist tradition included computer scientists (e.g., Marvin Minsky; psychologists (e.g., George Miller), linguists (e.g., Noam Chomsky; *see* **Chomsky, Noam (b. 1928)**), and philosophers (e.g., Hilary Putnam, Jerry Fodor, Daniel Dennett; *see* **Fodor, Jerry (b. 1935)**).

There are four features that, taken together, loosely define the cognitivist approach to the study of mind and language: (1) an adherence to computational and representational theories of mind, (2) a rejection of most forms of behaviorism, (3) an openness to empirical evidence from a wide variety of sources, and (4) a tendency toward identifying linguistic meanings with mental states rather than with things in the world or patterns of ordinary use. Each of these aspects is discussed next.

Computational and Representational Theories of Mind

Cognitivists model the mind/brain as an information processing system that performs computations on structured representations of the world. In other words, the mind/brain is a kind of computer, analogous in many ways to a digital computer. Many people find this claim jarring at first, but actually it is quite natural to suppose that, at least in some circumstances, people use computers to do their thinking for them. Whenever an accountant uses a spreadsheet to prepare tax forms, a pilot flies using an automatic guidance system, or a librarian searches an electronic catalog, computers are being used to perform tasks that would require mental effort if performed by human beings. When people use a computer to perform a task, they avoid some of the thinking that would have been required if they had performed the task unaided.

Digital computers accomplish their apparently mental feats by executing algorithms that manipulate data structures. An algorithm is a set of fully explicit, step-by-step instructions for accomplishing a given task, and a data structure is a package of information about some aspect of the world. For example, a data structure might contain information about a social hierarchy, the layout of a city, or the structure of a sentence. Algorithms contain instructions for how to use those data structures to decide, for example, who to approach for a loan, how to get from downtown to the suburbs, or what a speaker might mean by uttering a particular sentence. Cognitivists claim that human thought consists of computational processes (analogous to algorithms) that operate on mental representations of the external world (analogous to data structures), although there remains much debate over the nature of those processes and representations.

Like a digital computer, the mind/brain can be analyzed at a number of different levels (Dawson, 1998; Marr, 1982). At the physical level, digital computers are instantiated in electronic circuitry and minds are instantiated in brains. By investigating the brain, we can figure out what kinds of mental representations and computational processes it supports and what parts of it may or may not be involved in language. At the algorithmic level, digital computers run programs that specify the details of their behavior. The bold conjecture of cognitive science is that minds are the programs that run on the physical circuitry of the brain. By performing psychological experiments, we can shed light on how linguistic knowledge is represented in the mind and what computational processes are involved in using that knowledge (*see* **Psycholinguistics: Overview**). Finally, there is the task level. The programs that digital computers run can only be made sense of in light of knowledge about their connections to the world and the tasks they were designed to solve. Similarly, in order to understand how the mind uses language, it is necessary to have a theory of what language is and what knowledge is involved in language use.

These three levels of analysis thus define a multidisciplinary program of research into the nature of human language, with different research questions posed at each level (see Table 1). Cognitivist linguists focus most of their attention on the algorithmic and task levels, concentrating on the difficult problems of identifying the knowledge required to produce well-formed grammatical utterances, determining how that knowledge must be represented in the minds of the speakers, and identifying which elements of that knowledge are learned and which are innate (*see*

Table 1 Three-level research program

Level	*Questions*
Task	How are natural languages structured? What must people know and what must they know how to do in order to produce and understand human speech?
Algorithmic	How is knowledge of language represented in the mind? What computational processes are involved in producing and understanding speech?
Physical	How are these representations and computational processes implemented in the hardware of the brain?

Innate Knowledge). But as cognitivists, they remain open to, and sometimes make use of, evidence from the physical level as well.

The Rejection of Linguistic Behaviorism

Prior to the establishment of the cognitivist tradition in the 1960s and 1970s, the dominant approach to the study of the mind and language was behaviorism. Many philosophers at the time endorsed or were influenced this approach, including prominent representatives of both the ideal language and ordinary language traditions. Behaviorism comes in a number of varieties (*see* **Behaviorism: Varieties**), but what all behaviorists agree on is a rejection of internal mental states as something that can be scientifically studied or appealed to in explanations of language and behavior. For psychologists such as B. F. Skinner, this meant that linguistic behavior was to be explained as a complex pattern of responses to environmental stimuli. Verbal responses were thought of as being under the control of certain stimuli in the environment (Skinner, 1957).

Skinner's view of language was subjected to ruthless criticism from Chomsky, who pointed out the complexity of linguistic behavior and the wide variety of possible responses to a given stimulus:

> A typical example of stimulus control for Skinner would be the response to … a painting with [the utterance] *Dutch*… Suppose instead of saying *Dutch* we had said, *Clashes with the wallpaper*, *I thought you liked abstract work*, *Never saw it before*, *Tilted*, *Hanging too low*, *Beautiful*, *Hideous*, *Remember our camping trip last summer?* (Chomsky, 1959, p. 31)

Once the nonstimulus-bound nature of linguistic behavior is fully appreciated, said Chomsky, the prospect of arriving at an account of linguistic behavior without involving an appeal to mental states is completely hopeless. Cognitivism pointed the way out of behaviorism by providing a method of formally characterizing those mental states.

The Open Evidence Base

The cognitivist tradition is an empirical tradition. The sources of evidence available to the linguist include the judgments of native speakers, the process of first-language acquisition, the controlled psychological study of speech production and comprehension, the study of acquired and genetic language deficits, and the study of the neurological features of language use in healthy adults, to name but a few. These sources of evidence can be used to investigate language at the task, algorithmic, and physical levels (see Table 2). This is not to say that it is the current practice of linguists to make use of all of these sources of evidence. Indeed much work in theoretical linguistics proceeds using only the grammaticality judgments of the linguists themselves. But there is a general commitment both to the idea that a complete theory of language has to be consistent with all these sources of evidence and to the idea that the evidence base for linguistics is open – that is, there are no principled limits on the kinds of evidence that might bear on the structure of linguistic knowledge.

Table 2 Sources of evidence for the three levels

Level	*Example sources of evidence*
Task	Judgments of native speakers
	Which strings of words are grammatical and which are not?
	What meanings can a sentence have and not have?
Algorithmic	Developmental psychology
	How do children acquire language?
	What are the common patterns of language development?
	Cognitive psychology
	How do adults react to linguistic stimuli under controlled conditions?
Physical	Clinical studies
	What kinds of brain injuries and diseases cause language deficits?
	What specific language deficits are caused by specific brain injuries and diseases?
	Anatomical and functional studies
	What parts of the brain are involved in language use?
	How are these parts interconnected?

The commitment to an open evidence base has important consequences. For behaviorists, the study of language had to be grounded in observable behavior only. As Quine (1960) pointed out, it turns out that this leads to the conclusion that linguistic knowledge and meaning cannot be unambiguously determined. From this, he drew the conclusion that there is simply no fact of the matter about how to specify the mapping from words and sentences to their meanings (*see* **Indeterminacy, Semantic**). A famous response to Quine, again from Chomsky (1969), is based on the notion of the open evidence base. According to Chomsky, Quine reached his radical conclusions about semantic indeterminacy by accepting in advance the behaviorist notion that only observable behavior and responses to environmental stimuli may be used as the data for theories of linguistic meaning. But, as Chomsky points out, no other science places such *a priori* limits on the kinds of evidence that can be used to decide between competing theories. As long as the evidence base in linguistics remains open, the possibility of discovering further evidence that will help determine linguistic meaning is open as well.

Meanings as Mental States

The establishment of a viable theory about mental states and mental processing opened the door to a new class of theories of linguistic meaning based on the pairing of words in the public language with mental states of speakers. The general idea of a mental state theory of meaning is at least as old as Aristotle (*see* **Aristotle and Linguistics**), but the computational and representational theory of mind gave it new life by providing a story about what mental states might be like and how they might be processed in the mind. In addition to endorsing a mental state account of meaning, some cognitivists also harbor a deep mistrust of the reference-based theories pursued in the ideal language tradition. The semanticist Ray Jackendoff (2002) argues that the only kind of reference a cognitivist theory of language can countenance is reference to other mental states (*see* **Jackendoff, Ray S. (b. 1945)**), whereas Chomsky (2000) suggests that reference, as originally construed by ideal language philosophers, is not a suitable topic for scientific inquiry at all.

Jerry Fodor (1975) has proposed that words and sentences come by their meaning through being paired with internally represented formulae in what he calls the Language of Thought (*see* **Language of Thought**), or Mentalese (*see* **Mentalese**). Mentalese is not a public language such as English. It is more like a computer language – a formal system with a combinatorial syntax and an expressive power that equals or surpasses that of a public language. Fodor proposes that words and sentences express mental states, but, unlike Chomsky and Jackendoff, he takes the further step of attempting to scientifically characterize the meanings of expressions in Mentalese as relationships to objects and properties in the external world (*see* **Representation in Language and Mind; Causal Theories of Reference and Meaning**). Fodor's theory of meaning thus has two parts: (1) words inherit their meanings from the mental states they express, and (2) most of those mental states get their meanings through reference to the external world. An important alternative cognitivist account of meaning as mental states is offered by connectionism, although a full discussion of that approach is beyond the scope of this article (*see* **Human Language Processing: Connectionist Models**).

The Limitations of Cognitive Science

It is not yet clear how far cognitive science can go, and there are philosophers who dispute the claim that studying the structure and processing of linguistic knowledge in the human mind can tell us much about the nature of language itself (see Barber, 2003). But the computational and representational theory of mind, as a working hypothesis, has given rise to a productive research program producing theories of mind and language rich and predictive enough that, at the very least, they should not be ignored. The cognitivist approach to the study of mind and language is widely regarded by philosophers as the only approach currently worth taking seriously.

The New Philosophy of Language

The new philosophy of language emerged in the 1970s as a synthesis of the ideal language, ordinary language, and cognitivist traditions. From the ideal language tradition comes the use of rigorous formalisms and a concern for the connection between language and reality. From the ordinary language tradition comes the descriptive nature of the project and careful attention to the nuances of ordinary use, as well as Grice's distinction between what is said and what is implicated by an utterance. And from the cognitivist tradition comes an adherence to computational and representational theories of the mind, a rejection of linguistic behaviorism, an attention to the mental states of the language user, and a concern with making semantic and pragmatic theories consistent with the relevant empirical results concerning language and the mind.

The boundaries between linguistics and the philosophy of language have become blurred in this new synthesis. Whereas phonology (the sounds of language), morphology (the structure of words), and syntax (the structure of sentences) remain a concern mostly of linguists, semantics (the meaning of language) and pragmatics (the communicative use of language) are studied by both linguists and philosophers. There has also been considerable cross-fertilization between linguistics and philosophy. Linguists have adopted the formalisms of the ideal language tradition and the Gricean view of the relation between semantics and pragmatics that arose out of the ordinary language tradition. Philosophers, on the other hand, have adopted the linguistic account of syntax and feel an obligation to relate the semantic interpretation of a sentence to its syntactic form. In addition, the cognitivist approach to linguistics also throws up a host of difficult conceptual issues that demand a rigorous philosophical treatment (*see* **Philosophy of Linguistics**), for example, the place of reference in semantic theory (*see* **Externalism about Content**), the nature of linguistic knowledge (*see* **Innate Knowledge; Tacit Knowledge**), and the connection between language and thought (*see* **Thought and Language: Philosophical Aspects**).

Two More Theories of Proper Names

How might a practitioner of the new philosophy of language tackle a traditional semantic problem such as the content of proper names? Two theories of proper names are presented by Tyler Burge (1973) and Larson and Segal (1995). These two theories agree with one another in many important respects – so much so that we might be tempted to suppose that they are merely variants of one another. But, as Gabriel Segal (2001) points out, there are a number of pieces of relevant evidence from the task, algorithmic, and physical levels of cognitive analysis that may be used to adjudicate between the theories. (A caution: The semantic issue is actually more technical than the following discussion suggests, concerning points of difference between semanticists working in the formal framework of truth-theoretic semantics. Because there is no room to introduce the details of that framework here, the accounts of the rival theories are somewhat sketchy, although, I hope, detailed enough to make it clear how empirical evidence can be used to decide between them.)

Burge's approach to proper names is a variation on Russell's disguised definite descriptions. Burge proposes that proper names are actually a kind of common noun, that is, words such as *table* and *cat* that encode properties that apply to large numbers of objects. In Burge's account, if we have a cat named *Sylvester*, then that object has both the property of being a cat (a property it shares with other cats) and the property of being a Sylvester (a property it shares with other Sylvesters). In defense of this idea, Burge points out that, like common nouns, names can be pluralized and paired with determiners such as *the* and *a*:

(11a) There are very few Sylvesters in the world.
(11b) There were three Madelines at the party.
(11c) There's a Bartholomew Kropotnik here to see you.
(11d) The Jessica I met today was a real jerk.

This idea encounters an immediate difficulty. Burge says that names are common nouns, even when they occur unmodified and on their own:

(12) Fido wants to chase Sylvester.

But other common nouns cannot be used that way in English:

(13) *Dog wants to chase cat.

Sentence (13) only works if we interpret *dog* and *cat* as unusual names rather than as common nouns. So proper names seem to be unlike common nouns in at least this respect. Burge resolves the discrepancy by suggesting that bare, unmodified names actually have hidden determiners attached. A name such as *Fido*, when used on its own is, unbeknown to the speaker, actually the phrase *That Fido* or *The Fido* in disguise.

The rival view is Segal's contention that proper names are not common nouns but instead are a special kind of word, paired in each speaker's mind with a special kind of mental representation – an individual concept. These individual concepts are mental representations that encode information about the individuals named. So the name *David Bowie* is paired with an individual concept of David Bowie, perhaps containing the information that he sings, plays the saxophone, is married to a runway model, has probably had plastic surgery, and so on. Names, in Segal's account, are not at all like common nouns, encoding predicates that can apply to more than one person. Rather, they are labels that attach to conceptual information about particular individuals. There are not many David Bowies sharing one name. Rather, there are potentially many names *David Bowie*, each linked to a different individual concept.

Empirical Evidence

It might seem that in the end, the differences between the two theories do not amount to much. Burge says that the name *Fido* can be applied to anything that is a Fido, whereas Segal says that it only applies to one individual and that the reason why there seem to be so many Fidos is that there are many names for distinct individuals that happen to sound the same (call these names $Fido_1$, $Fido_2$, etc.). Is there any real difference between these two theories? A behaviorist such as Quine might be inclined to think that, as long as each can be integrated into a larger theory of equal power in predicting linguistic behavior, then there is no fact of the matter about which is correct. But a cognitivist would rather suppose that there is a way to tell how the language system works, reflected in the biology and psychology of language, and that at most only one of the two suggestions can be correct. And it seems, at least at first glance, that the evidence from the task, algorithmic, and physical levels supports Segal's theory over Burge's.

At the task level, cognitivists consult the intuitions of native speakers to determine the characteristics of the language that they speak. In the case of proper names, the two theories under consideration make different predictions about the syntax of English. Burge's theory predicts that bare names actually have a hidden determiner word attached to them. But this view has some trouble accounting for common intuitions about how names and common nouns

can be used. For example, why is it that determiners can go unpronounced when attached to names, but not when attached to common nouns, as shown by (13)? And why is it that sometimes special contexts are required to insert the determiner in front of a name? For example, to the question "Where do you live?" the response in (14a) seems natural whereas (14b) sounds awful. If *Saint Louis* is really short for a phrase such as *that Saint Louis*, then why can we not say (14b)?

(14a) I live in Saint Louis.
(14b) *I live in that Saint Louis.

At the algorithmic level, cognitivists look at psychological evidence regarding how linguistic knowledge is represented and processed. Again, the two theories make different predictions about the psychology of names. Burge predicts that names that sound the same are the same name, whereas Segal predicts that each individual's name is distinct. If Segal is right, there should be evidence that people tend to expect identical-sounding names to apply only to a single individual. Again, there is some evidence that supports Segal's prediction. It seems that children learning English as a first language expect there to be a class of nouns that refer to only one thing and make use of syntactic clues such as the presence or absence of determiners to decide whether to apply new words to other objects or not. For example, when told that a novel object is *wuzzle* (with no determiner), children are reluctant to apply the new word to other novel objects, even when they are highly similar to the original. But when told that the novel object is *a wuzzle*, they will happily generalize the term to other objects that seem to share some salient properties with the original – just like ordinary common nouns.

Burge's theory also predicts that names are **not** a special kind of noun, whereas Segal predicts that they are. If Segal is right, we should expect to find psychological differences between names and common nouns. We might also expect some physical-level differences. (Recall that at the physical level, cognitivists look to neurological evidence for or against the kinds of representation and processing they propose in their algorithmic-level theories.) Again, the evidence seems to support Segal's view over Burge's. As previously noted, children seem to be prewired to look for names as well as common nouns. In addition, psychological studies on adults reveal that proper names are much harder to recall than common nouns, suggesting distinct storage and/or processing. And at the physical level, certain kinds of brain damage can cause people to lose their ability to use proper names while leaving their ability to use common nouns intact, and vice versa (*see* **Aphasia Syndromes**). This strongly suggests that names are a special kind of word stored in a separate area of the brain.

In fact, things are not as bad as all that for Burge's theory. Segal (2001), in his much more complete and sober account, correctly points out that the psychological and neurological evidence is still quite sketchy and open to interpretation. It is quite possible that a committed Burgian could find a way to keep the common noun theory of names alive. The main point of this example has been to show how, in principle, multidisciplinary evidence from all three levels of cognitive analysis can bear on an issue in semantics. Whereas a behaviorist might be content with two theories that are equally good at describing some aspect of linguistic behavior, the new philosopher of language looks deeper to try and find out which theory does a better job of accounting for the cognitive aspects of language.

Final Words

The work on proper names reviewed here nicely illustrates the main features of the new philosophy of language. Burge and Segal's truth-theoretic approach to semantics is as rigorously formal as any theory in the ideal language tradition; the attention to ordinary speaker intuitions in mediating between semantic theories echoes the approach of the ordinary language philosophers; the mentalistic nature of the theory, the formal, computational nature of truth theories, and the openness to evidence from all levels of cognitive analysis clearly places the work in the cognitivist tradition.

But is this new hybrid approach really philosophy of language, or is it just a branch of linguistics or psychology? There are still those who hold out the hope that analysis of language will eventually help with the resolution of issues in other branches of philosophy, even if only in providing a starting point, and most contemporary philosophers of language remain sensitive the philosophical puzzles and paradoxes that drove the ideal and ordinary language philosophers. Indeed, one of the selling points of both Burge's and Segal's theories of proper names is that they can account for the meanings of empty names. But heeding Grice's lesson about the difficulties of determining what is said and heeding the lessons from contemporary linguistics about the complexities of ordinary language, few still believe any philosophical problem will be solved or dissolved with just a little bit of armchair reflection on conventions of use. The new philosophy of language promises progress on some of the difficult traditional problems in philosophy of language (and perhaps on more general philosophical problems) by combining careful

conceptual analysis with detailed attention to empirical results from the scientific study of language, the mind, and the brain.

See also: Aphasia Syndromes; Aristotle and Linguistics; Austin, John Langshaw (1911–1960); Behaviorism: Varieties; Causal Theories of Reference and Meaning; Chomsky, Noam (b. 1928); Cognitive Science: Overview; Congo, Republic of: Language Situation; Descriptions, Definite and Indefinite: Philosophical Aspects; Empty Names; Epistemology and Language; Externalism about Content; Fodor, Jerry (b. 1935); Frege, Gottlob (1848–1925); Grice, Herbert Paul (1913–1988); Human Language Processing: Symbolic Models; Implicature; Indeterminacy, Semantic; Innate Knowledge; Jackendoff, Ray S. (b. 1945); Language of Thought; Mentalese; Metaphysics, Substitution ***Salva Veritate*** and the Slingshot Argument; Objects, Properties, and Functions; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects; Propositions; Psycholinguistics: Overview; Quine, Willard van Orman (1908–2000); Reference: Philosophical Theories; Representation in Language and Mind; Russell, Bertrand (1872–1970); Semantics–Pragmatics Boundary; Strawson, Peter Frederick (b. 1919); Tacit Knowledge; Thought and Language: Philosophical Aspects; Use Theories of Meaning.

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Cognitive Science: Overview

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Introduction

Cognitive science is the interdisciplinary scientific study of the mind. Many questions therefore fall within its scope. For instance, how do people perceive the world through their senses? How do they manage to act in a timely fashion in a changing world? How do they solve novel problems? How do they manage to learn new skills? And how do they understand one another? In addressing these questions, most researchers assume that the human mind is some kind of computational device, containing representations. Modeling human language capacities has been a central goal within cognitive science; relevant research draws on a wide range of empirical and

conceptual analysis with detailed attention to empirical results from the scientific study of language, the mind, and the brain.

See also: Aphasia Syndromes; Aristotle and Linguistics; Austin, John Langshaw (1911–1960); Behaviorism: Varieties; Causal Theories of Reference and Meaning; Chomsky, Noam (b. 1928); Cognitive Science: Overview; Congo, Republic of: Language Situation; Descriptions, Definite and Indefinite: Philosophical Aspects; Empty Names; Epistemology and Language; Externalism about Content; Fodor, Jerry (b. 1935); Frege, Gottlob (1848–1925); Grice, Herbert Paul (1913–1988); Human Language Processing: Symbolic Models; Implicature; Indeterminacy, Semantic; Innate Knowledge; Jackendoff, Ray S. (b. 1945); Language of Thought; Mentalese; Metaphysics, Substitution ***Salva Veritate*** and the Slingshot Argument; Objects, Properties, and Functions; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects; Propositions; Psycholinguistics: Overview; Quine, Willard van Orman (1908–2000); Reference: Philosophical Theories; Representation in Language and Mind; Russell, Bertrand (1872–1970); Semantics–Pragmatics Boundary; Strawson, Peter Frederick (b. 1919); Tacit Knowledge; Thought and Language: Philosophical Aspects; Use Theories of Meaning.

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computational methods. This brief overview first characterizes the subject and then sketches a brief history of it. In indicating the current state of play, key issues in mental representation, modularity, and computational architecture are noted, and some current directions in cognitive research are indicated.

Characterizing the Discipline

Christopher Longuet-Higgins is credited with inventing the term 'cognitive science' in 1973 (Darwin, 2004). The term was apparently used in 1975 during a meeting in Abbaye de Royaumont, which hosted a celebrated debate between Noam Chomsky and Jean Piaget. The term covered a then-emerging research field that drew together researchers from diverse backgrounds, including artificial intelligence and computer science, linguistics, psychology, philosophy, the neurosciences, and anthropology. One thing that united these researchers was an interest in the underpinnings of intelligent human behavior and a recognition that researchers in different disciplines, such as linguistics and psychology, were already studying common phenomena, albeit from distinct perspectives. The idea was that, by pooling expertise, deeper understanding could be achieved.

The core objects of cognitive science study are the normal cognitive capacities of a typical adult (Von Eckardt, 1993), so it is most common to experiment on, and model, such individuals. In practice, the majority of experimental participants are probably undergraduate students in the United States, although cognitive science has also benefited greatly from comparative techniques. For instance, comparisons can be made regarding linguistic competence in adults and children (Tomasello, 2000), ability to attribute mental states to others in normal and autistic children (Baron-Cohen *et al.*, 2000), conscious awareness of visual objects in normal adults and in blindsight persons with specific brain lesions (Weiskrantz *et al.*, 1974), problem solving in adults with varying working-memory capacities (Carpenter *et al.*, 1990), generalization abilities in humans and cotton-top tamarins (Hauser *et al.*, 2002), and reading processes in Hebrew and English (Pollatsek *et al.*, 1981).

Whether working with adult normal typical subjects or carrying out one or other type of comparative study, the vast majority of cognitive scientists can be seen to share two substantive assumptions (Von Eckardt, 1993): (1) the human cognitive mind or brain is a computational device (computer) and (2) it is a representational device. Exactly what kind of computer it is remains more open to dispute, as we shall see. However, most would agree with Von Eckardt that a computer is a device "capable of automatically inputting, storing, manipulating, and outputting information in virtue of inputting, storing, manipulating and outputting representations of that information" (Von Eckardt, 1993: 50). A device is taken to be representational if it has states or entities inside it that function as representations; however, there is rather less agreement in the field about what constitutes a representation.

Given that computation and representation are basic to cognitive science, there is clearly a special link between the analytic goals of cognitive science and the synthetic goals of artificial intelligence (AI). Most researchers in AI aim to develop computer programs that help a machine exhibit behavior that, if it were the behavior of a human, would be called intelligent. For instance, some researchers experiment with systems that can participate in natural language dialogues to help users buy products, such as airline tickets. By contrast, most researchers in cognitive science are not in the business of building smarter software (or hardware) agents; rather, they want to know more about human cognitive capacities. However, an important tool in this effort is the use of computational modeling.

If we have a theory of how someone achieves certain performance (such as understanding written words, or solving a novel problem), then a computer-based model can be built to test the theory. If the theory is expressed in terms of algorithms and data structures, a computer model can be given data as input, and both its output behavior and its internal processes can be compared with human behavior and information about the internals underlying that behavior. A computational model has virtues, both theoretical and practical: it requires a theory to be made explicit enough to implement, and it renders that theory testable. Indeed, with explicit theories of sufficient complexity or power, it may well be that a computational simulation is the only way to determine in a timely fashion what the predictions are in some given scenario.

It can therefore be seen that there is two-way traffic between artificial intelligence and cognitive science. AI supplies both terminology and tools, such as algorithms, programs, and simulation environments. Cognitive scientists can use these in their modeling. In the other direction, cognitive scientists develop models of human cognitive capacities that demonstrate that certain computational tasks can be solved under particular conditions, and how these tasks are solved. Such demonstrations can help AI researchers build better systems. It is worth noting, incidentally, that cognitive models of human performance can help builders of computer systems in ways other than by inspiring the design of AI systems. For instance,

by taking human memory limitations into account, specialists in human–computer interaction can build more usable computer interfaces, and they can also use empirical methods borrowed from cognitive science to help evaluate the usability of their systems.

There is one final point to make about the goals of cognitive science. Most cognitive scientists (whatever their disciplinary background) are interested in *how* people carry out particular cognitive tasks. That is, they want to find out what representations and processes underlie the acquisition and execution of the relevant skilled behavior. Some are also interested in *where* the representations and processes are located. On the one hand, this includes neuroscientists, who consider individual behavior and seek to locate the relevant brain areas, neural circuits, and chemical pathways. On the other hand, researchers who study distributed cognition are interested in group behavior, and they seek to locate external representations (such as documents) and processes (e.g., manipulating objects) occurring in the physical environments in which people work and play (Hutchins, 1995). There are connections between this approach and that which focuses on embodied cognition, whereby the (possibly changing) physical properties of an agent strongly influence the development of its cognitive capacities (Clark, 1997).

Yet there is also a recent move toward studying *why* people have specific representations and processes. This is the province of evolutionary psychology (Barkow *et al.*, 1992), which casts the interdisciplinary net even wider than before, and draws on anthropology, archaeology, and paleontology to try to explain why modern humans have, for instance, acquired the kinds of reasoning biases that seem to make them depart from the canons of probability theory. Given the incompleteness of our knowledge of even recent human history, evolutionary approaches remain necessarily speculative. However, advances in genetics and bioinformatics may broaden the interdisciplinary range still further. But before considering current directions in cognitive science, it is worth sketching some history.

The Rise of Cognitivism

In the 19th century, researchers such as Hermann von Helmholtz and Hermann Ebbinghaus studied human thought and developed systematic methods for measuring relevant processes, such as the conduction of nerve signals, or the rate of forgetting. Others, such as Wilhelm Wundt, maintained that controlled introspection could also deliver useful insights into the workings of people's minds. However, in the late 19th and early 20th centuries, introspection fell into disrepute. It took with it most theories involving 'unobservable' mental entities, whether they had been objectively observed or not. It is true that the cognitive tradition did continue, thanks to Russian researchers such as Alexander Luria and Lev Vygotskii. But in North America and most of Europe, the behaviorist school, led by researchers such as John Watson, Edward Thorndike, and B. F. Skinner, argued that the only proper objects of psychological study were the externally observable stimuli and responses of humans and other animals.

In the mid- to late 20th century, behaviorism fell from favor. One reason was the perception that – although it had developed some sophisticated experimental methods, such as various forms of conditioning for studying learning – it was not actually delivering useful psychological generalizations. Another reason was that it came under heavy attack: Noam Chomsky (1959), for example, argued that skilled behavior – linguistic behavior in particular – required mediating mental entities to explain it. Behaviorism might still have survived, but by then there was a respectable alternative.

The alternative arose from the invention, during World War II, of computers. Alan Turing's prewar mathematical and metamathematical work had laid the theoretical foundations for modern computing. According to (one formulation of) the thesis of the American mathematician Alonzo Church, all computable functions are Turing computable; what are now known as 'Turing machines' are theoretical devices for effectively computing mathematical functions. During the war, actual computing machines were built for code-breaking purposes and for other numerically intensive calculations; Turing was instrumental in this effort in the United Kingdom, along with John von Neumann in the United States. After the war, Turing (1950) laid out a vision of machine (or artificial) intelligence. It maintained that what mattered for attributing intelligence to an unknown agent was (as before) its observable behavior; it would be considered intelligent if it passed what subsequently became known as the 'Turing test.' But now, this behavior could be generated by a machine that transformed input data into output data by following an internally stored algorithm.

These ideas gave birth to the fields of computer science and artificial intelligence, the latter of which was nurtured by, among others, John McCarthy and Marvin Minsky, who proposed an artificial intelligence summer project for 1956 at Dartmouth College, New Hampshire. Turing's ideas also had a huge impact in the philosophy of mind, a growing influence in psychology, and soon led to significant interactions between linguistics and computer science (Chomsky,

1957). Turing machines had a relatively simple architecture, but alternative ways of designing computers were soon being developed. von Neumann's architecture was slightly more complex: a single central processor consulted a special part of the computer's memory to find which program instruction to carry out next; on the basis of the instruction, it manipulated other parts of its memory, which were dedicated to storing data. At about the same time, McCulloch and Pitts (1943) developed a very different computer architecture, inspired by the relations between neurons in brains: rather than a single (powerful) processor, with access to large amounts of program and data memory, they perceived that a useful computer can be composed of a large number of rather simple processors with small amounts of memory, so long as the processing nodes are properly interconnected; simple rules could be followed for updating the nodal states, on the basis of the neighboring states.

The von Neumann machine architecture dominated both computer science and cognitive science for decades. As a result, researchers focused on the types of representations that were naturally manipulated within this kind of architecture. Whereas, at low levels, computers might store information in binary digital form, they could be programmed to interpret and generate sequences of symbols. The logical roots of computing reach back at least to Gottlob Frege (1848–1945), and the language and logic of first-order predicate calculus came to function as a symbolic lingua franca for many researchers, providing models for both language and reason.

The idea that computers could run programs that led to intelligent behavior was a special gift to philosophers, such as Hilary Putnam. Computers appear to furnish solutions to a number of crucial problems, including the mind–body problem and the homunculus problem. The mind–body problem concerns the relation between mental states and events and bodily states and events. For instance, are all mental events really just physical events, differently described? Is there a special kind of mental substance? If so, how does it interact with physical substances? The homunculus problem concerns the relation between mental representations and the minds that contain them. If my representation of a pig is a mental image of a pig, who looks at the mental image? Traditionally, it was suggested that the mind would have to contain a viewer who inspected the image; the 'homunculus,' or 'little man,' was needed to fulfill this role. But since the homunculus also had to contain a mental image, he also contained another homunculus. With an infinite regress threatening, the homunculus looks like a nonexplanation.

Computers appear to help solve the mind–body problem because they provide a beautiful analogy: the brain is to the mind as the computer is to the program. A program has a purely physical instantiation, because it is stored in the computer's memory. But when the program runs, interesting – sometimes even intelligent – behavior can occur. Taken further, perhaps the human brain (or the whole body containing the brain) really is just a computer, and the mind is therefore the product of programs running on the computing machine. Computers appear to solve the homunculus problem because they contain internal representations that do not need a smart little man to read them. A very complex program can be decomposed into a finite set of simple instructions. Each of those instructions can be carried out by a very simple processor of limited powers. There is no little man in the machine.

Central Issues in Cognitive Science

With the computational metaphor to empower it, the study of human psychology was liberated from the constraints of behaviorism. From the 1950s to the 1970s, information-processing models were developed to cover a range of human cognitive capacities, such as memory, attention, reasoning, and problem solving (Miller, 1956; Broadbent, 1958; Johnson-Laird and Wason, 1970; Newell and Simon, 1972).

Marr's (1982) work on vision encapsulated the strength of cognitive science, framing three key levels of explanation: the computational, algorithmic, and implementational. The first of these involves the behavior of a human agent given a specific task, the second involves the cognitive or affective systems underlying a given computational task (it is at this level that mental processes and representations are traditionally located), and the third involves the basic biological systems underlying the algorithmic level (such as the brain). Sometimes computational behavior can be explained directly in terms of implementational things and events (explanations involving localized brain damage sometimes take this form), but more frequently, the algorithmic level is required to identify common causes of computational-level behavior.

Modeling human language processing was a central goal for cognitive scientists, and in this context, a number of larger issues emerged. Jerry Fodor played an important role in bringing at least three key issues into focus. One issue concerns the nature of internal mental representations. Fodor (1975) argued that to explain human conceptual learning, we had to posit the existence of 'mentalese,' a language of thought having properties that reflected those of natural

languages. Others, such as Pylyshyn (1973), revived an old debate about the nature of mental imagery, to argue that evidence in favor of image-like mental representations could be explained purely in terms of language-like mental representation. Most recently, however, the pendulum has swung in the opposite direction, and many researchers are now pursuing the idea that language processing draws on mental representations that have imagistic (perceptually oriented) components and motoric (action-oriented) components (Pulvermüller, 1999).

A second issue concerns the relationships between our various mental capacities. Fodor (1983) revisited the notion of faculty psychology, arguing that the human mind is modular in nature, with relatively limited communication between specialized modules. Language processing, in particular, was taken to involve modules that operated automatically, very different in kind from the operation of central (conscious) reasoning. Ideas about the extent and origin of modularity of mind have been very influential and are related to the nativist/empiricist debate (Pinker, 1994; Elman *et al.*, 1996). Modularity has been adopted by evolutionary psychologists such as Leda Cosmides. The massive modularity hypothesis suggests that the mind is highly modularized and that the domain-specific modules correspond to evolutionary adaptations, acquired by our ancestors in solving persistent problems in the relatively recent past. Although these modules may be adaptations, they may not remain adaptive, and this constitutes part of the explanation as to why humans do not always reason in accordance with the canons of probability theory. Evolutionary psychology has its problems, however, not the least of which is the paucity of data concerning the environment of evolutionary adaptation. In the face of this, alternative explanations for apparent anomalies in human reasoning are still being developed, some of which draw explicitly on the idea that reasoning and language interpretation are intimately intertwined (Stenning and van Lambalgen, 2004).

A third and final issue concerns the computational architecture underlying the human mind. Although the von Neumann architecture has prevailed in computer science and cognitive science, the neural architecture proposed by McCulloch and Pitts ran a more checkered career. The neural architecture lends itself very naturally to learning how to compute functions that transform stimuli into responses. Turing had emphasized that for practical purposes, an intelligent machine would have to be a learning machine. But results from Marvin Minsky and Seymour Papert in the 1960s suggested that there were fundamental limits to what neutrally inspired perceptrons could learn to compute. It was not until the early 1980s that work by David Rumelhart and James McClelland and collaborators revived the approach, under the banner of 'parallel distributed processing,' or more generally, 'neo-connectionism.' The development of effective learning algorithms allowed connectionist machines to alter the strengths of connections between nodes, either with or without supervision from outside, and to accomplish a much broader range of computational tasks. The distinction between traditional and neural architectures is sometimes drawn in terms of the representations used by the machines. As already noted, traditional architectures usually store (at least some) information about the world in sentence-like symbolic structures, composed of symbols representing real-world entities and the relations between them. By contrast, connectionist architectures are sometimes considered nonsymbolic or subsymbolic: in some systems, processing nodes may correspond directly to specific real-world entities; but in distributed representation systems in particular, a given node may participate in representing many different real-world objects or relations, and representing a given object may require the activation of many processing nodes.

There has been a vast amount of subsequent work on connectionist modeling of human cognitive tasks. The models have two special virtues: unlike symbolic approaches, learning is built in. This is good, because learning is core to many cognitive abilities. And unlike symbolic approaches, damaging a network leaves residual function. This means that is possible to simulate the effects of lesions in the brain. Many successful models do just this, such as the models of dyslexia by Plaut and Shallice (1994). On the other hand, there are some things that symbolic systems do better than neural systems. For instance, certain properties of language, such as constituency and recursion, are taken to be dealt with quite naturally by symbolic systems, but to pose problems for connectionist systems (Fodor and Pylyshyn, 1988). Considerable effort has consequently been devoted to showing that connectionist systems can indeed process languages with such properties. It has also been argued that connectionist systems are better models of humans because neural networks are more similar to brains than von Neumann architectures are. Against this, neural networks abstract away from many (in fact, nearly all) features of real brain circuitry, and many of the learning algorithms used are biologically implausible. On the other hand, some algorithms are indeed deliberately modeled on processes in neural circuits, such as Hebbian reinforcement (Hebb, 1949).

Current Directions

The past decade has seen an explosion in the number of studies that use at least one brain imaging technique. These include positron emission tomography, functional magnetic resonance imaging, and transcranial magnetic stimulation. The last of these goes beyond straightforward (but computationally intensive) imaging and actively alters brain states in experimental participants (for an introduction to work relevant to language, see, for instance, Poeppel and Hickok (2004)). Cognitive neuroscience started from an interest in pathologies, such as blindsight, but imaging technologies have progressed to the point where many studies are carried out on normal individuals executing simple cognitive tasks. As a result, there is a popular conception that cognitive science is brain science. But, given Marr's three levels of explanation, implementation in brains is only part of the overall picture, and, equally, it is perfectly possible to study the brain without being interested in cognitive processes. What cognitive studies bring to brain science is the ability to demarcate a coherent set of cognitive capacities, and it is these that can (sometimes) be localized within particular brain areas.

Imaging is also, at least in part, responsible for the rehabilitation in recent years of the study of consciousness and emotion. New measurement technologies allow even those researchers who are suspicious of subjective or introspective reports to begin to investigate empirically brain states and events associated with consciousness. The study of emotion and other affective states has also progressed considerably, allowing interactions between affective and cognitive processes to be traced with increasing precision (Davidson and Irwin, 1999). The rapprochement between affect and cognition is particularly notable; for instance, new work on personality and individual differences takes account of imaging results in explicitly advocating cognitive models of personality traits such as anxiety (Matthews *et al.*, 2000).

Another line of development generalizes from one aspect of connectionism: learning from data. The increasing availability of online corpora (of images, speech, and text) has encouraged researchers to explore how far statistical learning techniques can model cognitive performance in real-world domains. From an engineering point of view, substantial successes have been achieved. For instance, both speech processing and, more recently, text processing have been revolutionized by the recruitment of statistical techniques. These successes are mirrored by developments in cognitive science, in language processing, and beyond. On the language side, approaches such as latent semantic analysis have been developed to form the basis of psychological theories of textual meaning (Landauer and Dumais, 1997). More generally, the rational analysis of cognition proposes that a cognitive system operates as a probabilistic engine, to optimize the adaptation of the organism's behavior to its environment (Anderson, 1990; Chater and Oaksford, 1999).

A final area of burgeoning interest arises from progress in genetic research enabled by developments in bioinformatics. Most researchers do not expect to find a one-to-one mapping from genes to specific cognitive capacities or dispositions. Thus, the idea that there might be a single 'language gene' is increasingly considered unsophisticated. However, as genealogy, molecular biology, behavioral genetics, and language research are brought together, significant results are already beginning to emerge. In 2001, *FOXP2* was isolated as a gene in which a point mutation correlates with language (and other) disorders in affected members of the intensively studied three-generation KE family (Lai *et al.*, 2001). The gene codes for a transcription factor, and changes in its structure may therefore have a broad effect on the expression of genes during cognitive development. As might be expected, imaging techniques have also been brought to bear on the KE family (Liégeois *et al.*, 2003), but for current purposes, this recent progress on *FOXP2* is merely the harbinger of changes to come.

Cognitive science has always had the computational metaphor at its core. But with increasingly sophisticated hardware, ever larger online corpora, and more powerful software for processing that data, it seems that computational power is more important than ever for future progress in the interdisciplinary scientific study of the mind.

See also: Cognitive Linguistics; Cognitive Pragmatics; Cognitive Science and Philosophy of Language; Cognitive Technology; Computer-Mediated Communication: Cognitive Science Approach; Consciousness, Thought and Language; Distributed Cognition and Communication; Helmholtz, Hermann Ludwig Ferdinand von (1821–1894); Human Language Processing: Connectionist Models; Human Language Processing: Symbolic Models; Human Reasoning and Language Interpretation; Language Development: Overview; Language, Visual Cognition and Motor Action; Latent Semantic Analysis; Modularity of Mind and Language; Natural Language Processing: Overview; Piaget, Jean (1896–1980); Psycholinguistics: Overview; Rational Analysis and Language Processing; Stroop Effect in Language; Turing, Alan Mathison (1912–1954); Vygotskii, Lev Semenovich (1896–1934); Writing and Cognition; Wundt, Wilhelm (1832–1920).

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Cognitive Semantics

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Cognitive Linguistics and Cognitive Semantics

Cognitive semantics is part of a wider movement known as 'cognitive linguistics.' Prior to surveying the main characteristics of cognitive semantics, it will be advisable to clarify what is meant by cognitive linguistics. As a matter of fact, the term is open to different interpretations. On a broad understanding, any approach that views language as residing in the minds of its speakers and a linguistic description as a hypothesis about a speaker's mental state would merit the designation 'cognitive.' Chomsky's career has been devoted to pursuing cognitive linguistics on this broad understanding. On the narrower, and more specialized interpretation intended here, cognitive linguistics refers to a movement that emerged in the late 1970s and early 1980s, mainly as a reaction to certain tendencies of Chomskyan, and, more generally, formalist linguistics. Linguists who were prominently associated with the emergence of cognitive linguistics, in this narrow sense, were George Lakoff, Ronald Langacker, and Leonard Talmy.

Rather than a specific theory, cognitive linguistics can best be described as an approach, or cluster of approaches to language study, whose practitioners nevertheless share a basic outlook on the nature of language. Several common aspects can be identified:

- Cognitive linguists are skeptical of the idea, promoted within Chomskyan linguistics, that human language might be associated with a language-specific module of the mind. Their starting point, rather, is that language is embedded in more general cognitive abilities and processes. According to the editorial statement of the monograph series *Cognitive linguistics research* (published by Mouton de Gruyter, Berlin), the guiding assumption is that 'language is an integral facet of cognition which reflects the interaction of social, cultural, psychological, communicative and functional considerations, and which can only be understood in the context of a realistic view of acquisition, cognitive development and mental processing.' Special attention, therefore, has been directed towards studying language, its structure, acquisition, and use, from the perspective of such topics as perception, categorization, concept formation, spatial cognition, and imagery. Although these capacities might well be subject to highly specialized elaboration in human language, they are not *per se* linguistic capacities.
- Cognitive linguistics signaled a return to the basic Saussurean insight that language is a symbolic system, which relates signifiers (that is, language in its perceptible form, whether as sound, marks on paper, or gesture) and signifieds (that is, meanings). Indeed, Langacker (1987: 11) characterized a language as 'an open-ended set of linguistic signs [. . .], each of which associates a semantic representation of some kind with a phonological representation.' Importantly, semantic representations, i.e., 'meanings,' are taken to be mental entities, or, perhaps more appropriately, mental processes. Thus, Langacker prefers to refer not to 'concepts' (a term that suggests that meanings are static, clearly individuated entities) but to 'conceptualizations,' where the deverbal nominal emphasizes the dynamic, processual character of the phenomenon.
- A third feature of cognitive linguistics follows from the view of language as a symbolic system, namely that syntax and morphology – patterns for the combination of words and morphemes into larger configurations – are themselves symbolic, and hence inherently meaningful. The same goes for the elements over which syntax and morphology operate – lexical and phrasal categories, for example – as well as the kinds of relations that can hold between these elements, i.e., relations such as subject (of a clause), modification, complementation, apposition, subordination. The view, current in many linguistic theories, that syntax and morphology constitute autonomous levels of linguistic organization is therefore rejected. Indeed, a major thrust of cognitive linguistic research over the past couple of decades has been, precisely, the attempt to offer a conceptual characterization of formal aspects of language organization.

It will be apparent that the orientation of cognitive linguistics, as characterized above, was bound to have considerable influence on the ways in which meanings (whether of words, sentences, syntactic patterns, etc.) have been studied. One aspect has already been mentioned, namely, that meanings are taken to be mental entities. In this, cognitive linguistics contrasts strikingly with other approaches, such as logical approaches, which have focused on logical aspects of sentences and the propositions they express; with truth-conditional approaches, which focus on the relation between propositions and states of affairs in the world; with structuralist approaches, which view meaning in terms of semantic relations within the

language; with behaviorist approaches, which view meaning in terms of stimulus-response associations; and, more generally, with theories of meaning as use. What these alternative approaches to meaning have in common is their avoidance of mentalism, i.e., the characterization of meanings as 'things in the head.'

The remainder of this article surveys some important themes and research topics in cognitive semantics. It should be mentioned that the survey is by no means comprehensive; for broader coverage, the reader is referred to the introductions to cognitive linguistics listed at the end of this article. Some topics, such as metaphor and metonymy, are dealt with elsewhere in this encyclopedia and for this reason are discussed only briefly. It should also be borne in mind that cognitive semantics, like cognitive linguistics itself, does not constitute a unified theory, but is better regarded as a cluster of approaches and research themes that nevertheless share a common outlook and set of assumptions.

Meaning Is Encyclopedic in Scope

Many semanticists, especially those who see the language faculty as an encapsulated module of the mind, insist on the need to make a distinction between the dictionary and the encyclopedia, that is, between what one knows in virtue of one's knowledge of a language and what one knows in virtue of one's knowledge of the world. Cognitive semantics denies the validity of such a distinction. On the contrary, meaning is taken to be essentially encyclopedic in scope. A person's linguistic knowledge would therefore, in principle, be coextensive with the person's total world knowledge. An individual word, to be sure, provides access to only a small segment of encyclopedic knowledge. No clear bounds, however, can be set on how far the relevant knowledge network extends.

The encyclopedic nature of linguistic semantics is captured in the notions of profile, base, domain, and Idealized Cognitive Model (or ICM).

The terms 'profile' and 'base' are due to Langacker (1987). A linguistic expression intrinsically evokes a knowledge structure, some facet of which is profiled. Take the word *hypotenuse*. The word designates a straight line. Whatever we predicate of *hypotenuse* is predicated of a hypotenuse *qua* straight line, as when we assert *The hypotenuse is 3 cm. long*. Obviously, the notion of a straight line does not exhaust the meaning of the word. The straight line in question is part of a larger structure, namely, a right-angled triangle. Although *hypotenuse* does not designate the triangle, the notion of a triangle is essential for the understanding of the word (Figure 1). Notice that

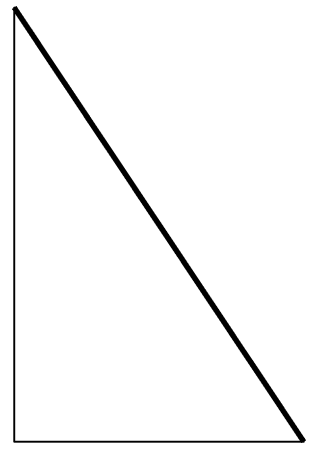

Figure 1 Notion of hypotenuse.

the concept designated by the word cannot be identified with the profile – as mentioned, the profile is simply a straight line. The concept resides in the profiling of a facet of the base.

For other examples that illustrate the profile-base relation, consider words such as *thumb* (profiled against the conception of a human hand), *top* (profiled against a schematic notion of a three-dimensional entity), *island* (a mass of land profiled against the surrounding water). In fact, it is axiomatic, in cognitive semantics, that all expressions achieve their meaning through profiling against the relevant background knowledge.

Returning to the hypotenuse example, it will be apparent that the base – the notion of a triangle – itself presupposes broader knowledge configurations, namely, those pertaining to planar geometry, which themselves are based in notions of space and shape. These broader knowledge configurations are referred to as 'domains.' Some domains may be basic, in the sense that they are not reducible to other domains. Examples include time, space, color, temperature, weight, etc. Otherwise, a knowledge structure of any degree of complexity can function as a domain, for example, the rules of a game, a scientific theory, kinship networks, gender stereotypes, educational, political, and legal systems. Domains may also be constituted by deeply held beliefs about life, nature, causation, the supernatural, and so on.

Most concepts are characterized against a 'matrix' of more than one domain. *Uncle*, for example, profiles a male human being against the base of a (portion of a) kinship network, specifically, that part of the network that relates the uncle to his nephews/nieces. The notion of kinship itself rests on notions of gender, procreation, marriage, inheritance, etc. At the same time, *uncle* profiles a human being, which is understood against multiple domains pertaining to

life forms, to three-dimensional bodies and their various parts, with their features of weight, extension, shape, and so on. If we add to this the fact that, in many societies, uncles may have special rights and obligations *vis-à-vis* their nephews/nieces, we may appreciate that even a single word, if its meaning is fully explored, can take us into the farthest reaches of our knowledge and cultural beliefs.

It will be apparent that the distinction between base and domain is not a clear-cut one. The base may be defined as a knowledge structure that is inherently involved in profiling, whereas domains constitute background, more generalized knowledge. Terminology in this area is also confusing because different authors have favored a range of terms for domain-based knowledge. Some scholars have used the not always clearly distinguishable terms 'scene,' 'scenario,' 'script,' and 'frame' to refer in particular to knowledge about expected sequences of events. Thus, *anger* refers not just to an emotional state, but is understood against an expected scenario that includes such stages as provocation, response, attempts at control, likely outcomes, and so on. Likewise, paying the restaurant bill evokes the 'restaurant script' – knowledge of the kinds of things one does, and the things that happen, when one visits culturally instituted establishments known as 'restaurants.' The notion of paying also invokes the frame of a commercial transaction, with its various participants, conventions, and activities. Mention might also be made of Searle's (1992) notions of 'the Network' and 'the Background,' whereby a particular belief takes its place within a network of other beliefs, and against the background of capacities, abilities, and general know-how.

Of special importance is Lakoff's (1987) notion of 'Idealized Cognitive Model,' or ICM – a notion that bears some affinity with the concept of 'folk theory' (again, different scholars prefer different terms). ICMs capture the fact that knowledge about a particular domain may be to some extent idealized and may not fit the actual states of affairs that we encounter on specific occasions. Consider the words *bachelor* and *spinster*. We might define these as 'adult unmarried male' and 'adult unmarried female,' respectively. The concepts, thus defined, presuppose an ICM of marriage practices in our society. According to the ICM, a person reaches a more-or-less clearly definable marriageable age. People who pass the marriageable age without marrying are referred to as bachelors and spinsters, as the case may be. The ICM attributes different motives to men and women who do not marry. Men do so out of choice, women out of necessity. As will be appreciated, the ICM is idealized, in that it presupposes that all citizens are heterosexual and that all are equally available for marriage. It thus ignores the existence of celibate priests and of couples who live together without marrying. The discrepancy between model and reality can give rise to prototype effects. The fact that the Pope is not a representative example of the bachelor category derives from the fact that Catholic clergy are not covered by the ICM. Appeal to the ICM can also explain the different connotations of *bachelor* and *spinster*. Although one might not want to subscribe to the sexist framing of the ICM, it does offer an explanation for why *eligible bachelor* is an accepted collocation, whereas *eligible spinster* is not.

As mentioned, the meaning of a word may need to be characterized against a matrix of several domains. However, not all uses of a word need invoke each of the domains in equal measure. Certain uses may activate only some domains whereas others are backgrounded or eclipsed. The notion of a kinship network is likely to be prominent in most uses of *uncle*, yet when parents use the word to introduce one of their adult male friends to their child, the kinship domain is eclipsed. For another example of selective domain activation, consider the concept of a book. When you *drop a book*, the status of the book as a (heavy) material object is activated, when you *read a book*, the status of a book as a printed text is activated, when you *translate a book*, the status of the book as a text in a given language is foregrounded. Note that *begin a book* can be interpreted in various ways, according to which of the domains is activated. The activity that one begins with respect to the book could be reading, writing, editing, translating, or even (if you are bookworm, literally!), eating.

The above examples not only illustrate the importance of domains and related notions in the study of word meanings, they also show why it has been deemed necessary to favor an encyclopedic approach to semantics. The reason is, namely, that we need to appeal to domain-based knowledge in order to account for how words are used and for the ways in which complex expressions are judged. Often, the very possibility of interpreting an expression, and of accepting it as semantically well-formed, can only be explained by reference to appropriate background knowledge.

A common objection to an encyclopedic semantics is that one cannot reasonably claim that everything a person knows about the concept designated by a word is relevant to the use of the word. It is certainly true that some facets of background knowledge may be central, and more intrinsic to a concept, others might be more peripheral or even idiosyncratic to an individual speaker. Nevertheless, even extrinsic knowledge might become relevant to a word's use,

for example, in discourse between intimates or family members. Moreover, the study of semantic change teaches us that even highly peripheral and circumstantial knowledge pertaining to a concept can sometimes leave its mark on the semantic development of a word. Langacker (1987: 160) has remarked that Jimmy Carter's presidency had a notable, if transient, effect on the semantics of *peanut*. Equally, Margaret Thatcher's premiership probably influenced the semantic development of *handbag*, at least for British speakers.

The notion of domain is relevant to two important themes in cognitive semantic research, namely metaphor and metonymy. 'Metaphor' has been analyzed in terms of the structuring of one domain of experience (usually, a more abstract, intangible domain) in terms of a more concrete, and more directly experienced domain. For example, time is commonly conceptualized in terms of space and motion, as when we speak of *a long time*, or say that Christmas *is approaching*, or even that it *is just around the corner*. More recently, metaphor has been studied under the more general rubric of 'conceptual blending,' whereby components of two or more input domains are incorporated into a new conceptualization, the blend. Whereas metaphor involves elements from more than one domain, 'metonymy,' in contrast, concerns elements within a single domain. Thus, we can use the name of an author to refer to books written by the author, as when we enquire whether someone *has read any Dickens*. The transfer of reference from person to product is possible because both are linked within domain-based knowledge pertaining to books and their authorship.

Categorization

Every situation and every entity that we encounter is uniquely different from every other. In order to be able to function in our physical and social worlds, we need to reduce this information overload. We do this by regarding some situations and some entities as being essentially 'the same.' Having categorized an entity in a certain way, we know how we should behave towards it and what properties it is likely to have. It is significant that whenever we encounter something whose categorization is unclear we typically feel uneasy. 'What is it?', we want to know.

Categorization is not a peculiarly human ability. Any creature, if it is to survive, needs at the very least to categorize its environment in terms of edible or inedible, harmful or benign. Humans have developed phenomenal categorization abilities. We operate with literally thousands, if not hundreds of thousands of categories. Moreover, our categories are flexible enough to accommodate new experiences, and we are able to create new categories as the need arises.

To know a word is to know, among other things, the range of entities and situations to which the word can be appropriately applied. To this extent, the study of word meanings is the study of the categories that these words denote. And it is not only words that can be said to designate categories. It can be argued that syntactic configurations, for example, those associated with intransitive, transitive, and ditransitive constructions, designate distinct categorizations of events and their participants.

What is the basis for categorization? Intuitively, we might want to say that things get placed in the same category because of their similarity. Similarity, however, is a slippery notion. One approach would be to define similarity in terms of the sharing of some common feature(s) or attribute(s). Similarity, then, would reduce to a matter of partial identity. Feature-based theories of categorization often require that all members of a category share all the relevant features. A corollary of this approach is that categories are well-defined, that is, it is a clear-cut matter whether a given entity does, or does not, belong in the category. It also follows that all members have equal status within the category.

There are a number of problems associated with this approach. One is that the categories designated by linguistic expressions may exhibit a prototype structure. Some members of the category might be more representative than others, while the boundary of the category may not be clearly defined. In a well-known passage, though without introducing the prototype concept, Wittgenstein (1953: §66) drew attention to categorization by family resemblance. Imagine a family photograph. Some members of the family might have the family nose, others might have the family chin, others might have the family buck teeth. No member of the family need exhibit all the family traits, yet each exhibits at least one; moreover, some members might exhibit different traits from others. Wittgenstein illustrated the notion on the example of the kinds of things we call 'games,' or *Spiele* (Wittgenstein was writing in German). Some (but not all) games are 'amusing,' some require skill, some involve luck, some involve competition and have winners and losers. The family resemblance notion has been usefully applied to the study of word meaning. Thus, some uses of *climb* (as in *The plane climbed to 30 000 feet*) exhibit the feature 'ascend,' some (such as *The mountaineers climbed along the cliff*) exhibit the feature 'move laboriously using one's limbs.' Considered by themselves, these two uses have very little in common. We see the relation, however, when we

consider some further uses of *climb* (as in *The boy climbed the tree*), which exhibit both of the features.

A fundamental problem with feature-based theories of categorization concerns the nature of the features themselves. As Wittgenstein pointed out, skill in chess is not the same as skill in tennis. The concept of skill therefore raises the very same issues of how categories are to be defined as were raised by the notion of game, which the notion of skill is supposed to explicate. Understanding similarity in terms of partial identity is problematic for another reason. Practically any two objects can be regarded as similar in some respect (for example, both may weigh less than 100 kg., or both may cost between $5 and $5000), but this similarity does not mean that they constitute a viable or useful category. An alternative approach would be that categorization is driven by the role of the entities within broader knowledge configurations, that is, by domain-based knowledge and ICMs. Sometimes, apparently similar activities might be categorized differently, as when making marks on paper might be called, in some cases, 'writing', in other cases, 'drawing.' The distinction is based on knowledge pertaining to the nature and purpose of 'writing' and 'drawing.' On the other hand, seemingly very different activities might be brought under the same category. In terms of the actions performed, making marks with a pen on a piece of paper has little in common with depressing small, square-shaped pads on a keyboard. But given the appropriate domain-based knowledge, both can be regarded as instances of 'writing.' Categories, as Murphy and Medin (1985) have aptly remarked, are ultimately based in 'theories' (that is, in ICMs).

The matter may be illustrated by the distinction (admittedly, not always a clear-cut one) between 'natural kinds' and 'nominal kinds.' Natural kinds are believed to be given by nature and are presumed to have a defining 'essence'; moreover, we are inclined to defer to the scientists for an elucidation of their defining essence. Nominal kinds, in contrast, are often defined *vis-à-vis* human concerns, and their perceptual properties and/or their function is often paramount in their categorization. Remarkably, even very young children are sensitive to the difference (Keil, 1989). Suppose a zebra had its stripes painted out; would it thereby become a horse? Or suppose a giraffe had its neck surgically shortened; would it cease to be a giraffe? Even very young children respond: 'No.' Changes to the appearance of the entities would not alter their defining essence. But suppose you saw off the back of a chair. Does the chair become a stool? Arguably, it does. In this case, a 'superficial' aspect is crucial to categorization.

The dynamics of categorization may be illustrated by considering the relationship between a linguistic expression (e.g., the word *fruit*) and its possible referents (e.g., an apple). We can address the relation from two perspectives. We can ask, for this word, what are the things in the world to which the word can be applied? Alternatively, we can ask, for this thing, what are the linguistic expressions that can refer to it? The first perspective (the 'referential' perspective: 'To what does this word apply?') operationalizes the notion of prototype. *Fruit* designates, primarily, such things as apples, pears, and bananas – these are the fruit prototypes. Less commonly, the word might be used to refer to olives and tomatoes. The second perspective (the 'onomasiological,' or naming perspective: 'What is this thing to be called?') operationalizes the notion of basic level. It is evident that one and the same thing can be named by terms that differ in their specificity vs. generality. For example, the thing you are now sitting on might be called a *chair*, an *office chair*, a *piece of furniture*, an *artifact*, or even a *thing*. All of these designations could be equally 'correct.' Yet, in the absence of special reasons to the contrary, you would probably call the thing a *chair*. (This, for example, is probably the answer you would give if a foreign learner wanted to know what the thing is called in English.) *Chair* is a basic level term, the basic level being the level in a taxonomy at which things are normally named. The basic level has this special status because categorization at this level provides maximum information about an entity. Thus, at the basic level, chairs contrast with tables, beds, and cupboards – very different kinds of things, in terms of their appearance, use, and function. Terms at a lower level in a taxonomy, e.g., *kitchen chair* vs. *office chair*, do not exhibit such a sharp contrast while terms at a higher level are too general to give much information at all about an entity. Not surprisingly, basic level terms turn out to be of frequent use, they are generally quite short and morphologically simple, and they are learned early in language acquisition.

The Usage-Basis of Cognitive Semantics

Langacker has described cognitive linguistics as a 'usage-based' approach. The claim can be understood in two ways. On the one hand, it could be a statement about the methodology of cognitive linguistic research. Usage-based research would be research based on authentic data, as documented in a corpus, recorded in the field, or elicited in controlled situations, rather than on invented, constructed data. Although different researchers might prefer different

methodologies, a glance at practically any publication by leading figures in the field, such as Lakoff, Langacker, and Talmy, will show that cognitive linguistics, as a movement, cannot reasonably be said to be 'usage-based' in this sense.

On a second interpretation, usage-based refers to the presumed nature of linguistic knowledge and the manner in which it is acquired, mentally represented, and accessed. The claim, namely, is that a language is learned 'bottom-up' through exposure to usage events. A usage event presents the language user/learner with an actual vocalization in association with a fine-grained, context-dependent conceptualization. Acquisition proceeds through generalization over usage events. Necessarily, many of the context-dependent particularities of the usage events will be filtered out, leaving only a schematic representation of both the phonology and the semantics. In this respect, cognitive linguistics contrasts strikingly with 'top-down' theories of acquisition, whereby the basic 'architecture' of a language is presumed to be genetically given, exposure to usage data being needed merely to trigger the appropriate settings of innately given parameters.

The usage-based approach raises two questions, which have loomed large in cognitive semantics research. These concern (a) the units over which schematization occurs, and (b) the extent of schematization. Let us first consider the second of these issues.

One of the most vibrant areas of cognitive semantic research has been the study of lexical polysemy. It is a common observation that words exhibit a range of different meanings according to the contexts in which they are used. Indeed, the extent of polysemy appears to be roughly proportional to the frequency with which a word is used. Not surprisingly, among the most highly polysemous words in English are the prepositions.

Consider the preposition *on*. Given such uses as *the book on the table* and *the cat on the mat*, it is easy to see how a schematic, de-contextualized image of the *on*-relation could emerge. It involves locating one object with respect to another in terms of such aspects as contact, verticality, and support. But the preposition has many other uses, as exemplified by *the fly on the ceiling*, *the picture on the wall*, *the leaves on the tree*, *the writing on the blackboard*, *the washing on the clothes-line*, *the shoes on my feet*, *the ring on my finger*. Do we proceed with further abstraction and schematization, coming up with a characterization of the *on*-relation that is compatible with all of these uses? Or do we identify a set of discrete meanings, which we may then attempt to relate in a prototype or a family resemblance category? If we adopt this latter approach, another question arises, namely, just how many distinct meanings are to be postulated. Three? Ten? Several dozen? Do we want to say that *the water on the floor* and *the cat on the mat* exemplify different senses of *on*, on the grounds that the relation between *cat* and *mat* is not quite the same as that between *the water* and *the floor*? Needless to say, the issue becomes even more critical when we take into consideration the vast range of nonspatial uses of the preposition: *on television*, *be on a diet*, *be on drugs*, *on Monday*, and countless more.

In general, as is consistent with a usage-based orientation, cognitive semanticists have tended to focus on the particularities of low-level generalizations, an approach that has frequently been censured for the 'polysemy explosion' that it engenders. Nevertheless, the role of more schematic representations is not denied. Langacker, in this connection, draws attention to the 'rule-list fallacy.' The fallacy resides in the notion that rules (high-level generalizations), once acquired, necessarily expunge knowledge of the lower-level generalizations on whose basis the rules have been abstracted. It is entirely plausible that high- and low-level generalizations might co-exist in the mental grammar.

Indeed, knowledge of low-level generalizations – not too far removed, in terms of their schematicity, from actually encountered usage-events – may be needed in order to account for speakers' fluency in their language. The topic interacts with a more general issue, namely, the relative roles of 'computation' vs. 'storage' in language knowledge and language use. Humans are not generally very good at computation, but we are quite adept at storing and retrieving specific information. Consider arithmetical operations. We can, to be sure, compute the product of 12 by 12 by applying general rules, but the process is slow and laborious and subject to error, and some people may need the help of pencil and paper. It is far easier, quicker, and more reliable to access the ready-made solution, if we have learned it, namely, that $12 \times 12 = 144$. The point of the analogy is that in order for speech production and understanding to proceed smoothly and rapidly, it may well be the case that we access ready-made patterns and preformed chunks, which have been learned in their specific detail, even though these larger units could be assembled in accordance with general principles. The role of formulaic language in fluency and idiomaticity has been investigated especially by linguists engaged in corpus-based lexicography and second language acquisition research. Their findings lend support to the view that linguistic knowledge may indeed be represented at a relatively low level. We might suppose, therefore, that *the ring on my finger* is judged to be

acceptable, not because some highly schematic, underspecified sense of *on* has been contextually elaborated, nor because some rather specific sense of *on* has been selected, but simply because speakers have encountered, and learned, such an expression.

These considerations lead into the second aspect of a usage-based model: what are the units over which schematization takes place? The study of lexical semantics has typically been based on the assumption that schematization takes place over word-sized units. Indeed, the above discussion was framed in terms of how many meanings the preposition *on* might have. The study of idioms and related phenomena, such as collocations, constructions, and formulaic expressions, casts doubt on the validity of this assumption. Corpus-based studies, in particular, have drawn attention to the fact that words may need to be characterized in terms of the constructions in which they occur, conversely, that constructions need to be characterized in terms of the words that are eligible to occur in them. It might be inappropriate, therefore, to speak of the 'mental lexicon,' understood as a list of words with their phonological and semantic properties. A more appropriate concept might be the 'mental phrasicon,' or the 'mental contructicon.' It would certainly be consistent with a usage-based model to assume that language is represented as schematizations over the units in terms of which language is encountered – not individual words as such, but phrases, constructions, and even utterance-length units.

Construal

Linguistic meaning has often been approached in terms of the correspondence between an expression and the situation that it designates. Given the expression *The cat is on the mat*, and a situation in which there is a mat with a cat on it, we might be inclined to say that the linguistic expression fully and accurately describes the observed situation. The matter, however, is not so straightforward. For any conceived situation, certain facets will have been ignored for the purpose of its linguistic expression. Where was the mat? How big was it? What color was it? Was it laid out flat or was it rolled up? Was the cat in the center of the mat? Was the cat sitting or lying? And so on. Secondly, the speaker is able to categorize the situation at different levels of schematicity. Instead of saying that *the cat is on the mat*, the speaker could have stated that *the animal is sprawled out on my new purchase*. The speaker's decision to include or exclude certain facets of the scene, and to categorize the scene and its participants in a certain way, are symptomatic of the broader phenomenon of 'construal,' namely, the way in which a conceived situation is mentally structured for the purpose of its linguistic expression.

There is a sense in which the whole cognitive semantics enterprise is concerned with how speakers construe a conceived situation and how this construal receives linguistic expression, as a function of the conventional resources of a particular language. Some important facets are construal are discussed below.

Figure-Ground Organization

A feature of our perceptual mechanism is that a perceived scene is structured in terms of 'figure' and 'ground.' Certain aspects of a scene are likely to be especially prominent and specifically attended to, whereas others are relegated to the background context. Given the situation of the cat and the mat, we are likely to say that the cat is on the mat, rather than that the mat is under the cat. Both wordings might be equally true in terms their correspondence with the situation. Yet one would normally be preferred over the other. This preference is because we would most likely select the cat as the figure, whose location is described with respect to the mat, rather than the other way round.

Figure-ground organization is ubiquitous in perception, most obviously in visual perception, but also in other modalities. When we listen to a lecture, the speaker's voice is (hopefully) the auditory figure, which stands out against the sound of the air conditioning and of people coughing and shuffling. A number of aspects influence the figure-ground alignment. The figure, as the primary object of attention, is likely to be moveable and variable, it can act, or be acted on, independently of the ground, and it is likely to be more information-rich (for the perceiver) than the ground. Moreover, animate entities – especially if human – are likely to attract our attention as figure *vis-à-vis* inanimate entities. The ground, in contrast, is likely to be static relative to the figure, it is presupposed, and provides the context for the characterization of the figure. It must be emphasized, however, that while certain inherent features of a scene may strongly suggest a certain figure-ground alignment, we can often choose to reverse the relation. While at a lecture, we could consciously direct our attention to a background noise, relegating the speaker's voice to the ground.

Figure-ground organization is built into language at many levels. The contrast between an active clause and its passive counterpart can be understood in such terms. *The farmer shot the rabbit* presents the farmer as the figure – we are interested in what the farmer did. *The rabbit was shot (by the farmer)*

presents the rabbit as figure – we are interested in what happened to the rabbit. Note that what is at issue in these examples is not so much how the scene as such might be visually perceived, but how it is mentally organized by the speaker for its linguistic encoding. Figure-ground asymmetry is also relevant to the encoding of reciprocal relations. If A resembles B, then B obviously resembles A. Yet we would be far more likely to observe that a boy resembles his grandfather than to say that an old man resembles his grandson. We take the old man as the ground, against which the growing boy is assessed, rather than vice versa.

Force Dynamics

Another aspect of construal is illustrated by the contrast between *The ball rolled along the floor* and *The ball kept rolling along the floor.* There would be no way to differentiate these sentences in terms of objective features of the situations that they designate. Whenever the one sentence can truthfully be applied to a situation, so can the other. Yet the two sentences construe the situation differently. The difference was investigated by Talmy in terms of his notion of 'force dynamics.' We view entities as having an inherent tendency either for motion (or change) or for rest (or inaction). When entities interact, their inherent force dynamic tendencies also interact. The force of one entity may overcome, or fail to overcome the force of another, or the two forces may be in equilibrium. Typically, in a force-dynamic interaction, our attention goes on a figure entity (the agonist), whose behavior is tracked relative to an antagonist.

The ball rolled along the floor presents the motion of the ball as resulting from its inherent tendency towards motion. But if we say that *the ball* ***kept*** *rolling along the floor*, we assume a force opposing the ball's activity, which, however, was not strong enough to overcome the ball's tendency towards motion. It is the verb *keep* that introduces a force-dynamic interaction into the situation, as we construe it. It conveys that the tendency towards motion of the agonist (i.e., the ball) was able to overcome an (unnamed) opposing force. The opposing force may, of course, be explicitly stated: *The ball kept rolling, despite our attempt to halt it*. Force-dynamic interaction holds even with respect to a 'static' situation. *I kept silent* designates the continuation of a static situation. The stasis, however, results from the fact that an (unnamed) antagonist was not powerful enough to cause the situation to change.

Quite a few lexical items have an implicit force-dynamic content, such as *keep*, *prevent*, *despite*, and even *finally* and *(to) manage*. Thus, *I finally managed to start my car* not only conveys that I did start my car, but also that I had to overcome an opposing force. Force dynamics offers an interesting perspective on causation. Prototypically, causation (as expressed by verbs such as *cause* or *make*) involves the agonist (the causer) exerting force that overcomes the inactivity of antagonist. Variants of this scenario including letting and preventing. *Let* conveys that the agonist fails to engage with the antagonist, while *prevent* conveys that the agonist overcomes the disposition towards action of the antagonist. Another fruitful field of application has been in the study of modality (Sweetser, 1990). Thus, *I couldn't leave* conveys that an unnamed antagonist (whether this be another person, a law or proscription, an ethical consideration, a broken leg, or even the fact of a locked door) overcame my disposition to leave. Similarly, *I had to leave* presents my leaving as resulting from a force that overcame my disposition to remain where I was.

Objective vs. Subjective Construal

Any conceptualization involves a relation between the subject of conceptualization (the person entertaining the conceptualization) and the object of conceptualization (the situation that is conceptualized). In *The cat is on the mat*, the object of conceptualization is, obviously, the location of the cat *vis-à-vis* the mat. Although not explicitly mentioned in the sentence, the subject of conceptualization is relevant to the conceptualization in a number of ways. Firstly, the use of the definite noun phrases *the cat* and *the mat* conveys that the referents of these expressions are uniquely identifiable to the speaker, also, that the speaker expects the hearer to be able to uniquely identify the referents. (It's not just ***a*** *cat*, but ***the*** *cat*.) Also, the use of the tensed verb *is* conveys that the situation is claimed to hold at the time the speaker utters the expression. Since the speaker's role is not itself the object of conceptualization, we may say that the speaker is being construed subjectively.

Langacker has illustrated the notion of objective vs. subjective construal by means of an analogy. For persons who need to wear them, their spectacles are not usually the object of their visual experience. Spectacles function simply as an aid to the seeing process but are not themselves seen. Their role is therefore a subjective one. A person can, to be sure, take off their spectacles and visually examine them, in which case, the spectacles are viewed objectively. 'Objectification,' then, is the process whereby some facet of the subject of conceptualization becomes the object of conceptualization. 'Don't talk to your mother like that,' a woman says to her child. Here, the speaker makes herself the object of conceptualization by referring to herself in the third person. 'Subjectification,'

in contrast, is the process whereby some facet of the object of conceptualization gets to be located in the subject of conceptualization. Take, as an example, the contrast between *Jim walked over the hill* and *Jim lives over the hill*. The first sentence profiles the motion of the figure entity *vis-à-vis* the ground. The second merely designates the location of the figure. The location, however, is presented as one that lies at the end of a path that goes *over the hill*. Importantly, the path is not traced by the object of conceptualization, that is, by Jim. Rather, it is the subject of conceptualization who mentally traces the path.

Subjectification has been identified as an important component of grammaticalization. Consider the use of *(be) going to* as a marker of the future. *Ellen is going to the store* can be construed objectively – Ellen is currently engaged in the process of moving towards the store. If we continue to observe Ellen's motion, we will probably find that she ends up at the store. We can easily see how *(be) going to* is likely to take on connotations of prediction. Indeed, *Ellen is going to the store* might be interpreted in just such a way, not as a statement about Ellen's current activity, but as a prediction about the future. Similarly, *It's going to rain* and *You're going to fall* have the force of a prediction, extrapolated from the observation of current circumstances. Notice, in these examples, that in spite of the use of the verb *go*, there is no objective movement, whether literal or metaphorical, towards the future situation. Rather, it is the conceptualizer who mentally traces the future evolution of the present situation. The idea of motion, contained in the verb *go*, has been subjectified, that is, it has been located in the subject of conceptualization.

A special manifestation of subjectification is the phenomenon of 'fictive motion.' This typically involves the use of a basically dynamic expression to designate an objectively static situation. *Go*, we might say, is basically a motion verb, or, more generally, a change of state verb (*I went to the airport, The milk went sour, The lights went red*). But consider a statement that *the road goes through the mountains*. No motion is involved here – the road is merely configured in a certain way, it does not (objectively) go anywhere. The idea of motion implied by *go* can, however, be attributed to the subject of conceptualization. One mentally traces the path followed by the road through the mountains. Mental motion on the part of the conceptualizer is also invoked in reference to *the road from London to Oxford*, which, of course, could be the very same entity, objectively speaking, as *the road from Oxford to London*. Similarly, one and the same entity could be referred to, either as *the gate into the garden* or *the gate out of the garden*.

Linguistic Conventions

Although speakers may construe a situation in many alternate ways, their options are to some extent constrained by the linguistic resources available to them. The matter can be illustrated with respect to language-specific lexicalization patterns. Talmy has drawn attention to alternative ways in which a motion event can be linguistically encoded. Consider the English expression *I flew across the Atlantic*. In English (and in other Germanic languages), we prefer to encode the manner of motion by means of the verb (*fly*), the path of the motion being expressed in a prepositional phrase (*across the Atlantic*). In Romance languages, an alternative construal is preferred. Path is encoded by the verb, manner by means of an adverbial phrase: *J'ai traversé l'Atlantique en avion* 'I crossed the Atlantic by plane.' Notice that, in the French sentence, the statement of the manner of motion is optional; the French speaker does not **have** to state how the Atlantic was crossed, merely that it **was** crossed. Comparison of the ways in which speakers of different languages give linguistic expression to visually presented situations, and of the ways in which texts in one language are translated into another, supports the notion that situations tend to be construed in a manner that is compatible with the construals made available by the conventional resources of different languages (Slobin, 1996). For example, speakers of English (and Germanic languages) will tend to specify the manner of motion in much finer detail than speakers of Romance languages.

Embodiment

An important theme in cognitive semantic research has been the insight that the relation between words and the world is mediated by the language user him/herself. The language user is a physical being, with its various parts, existing in time and space, who is subject to a gravitational field, and who engages in bodily interaction with entities in the environment. Quite a number of our concepts are directly related to aspects of our bodily experience. To put the matter somewhat fancifully: if we humans were creatures with a different mode of existence, if, for example, we were gelatinous, air-born creatures, floating around in the stratosphere, it is doubtful whether we could ever have access to many of the concepts that are lexicalized in presently existing human languages. Thus, to understand the concept of what it means for an object to be heavy, we have to have experienced the sensation of holding, lifting, or trying to move, a heavy object. The notion of heavy cannot be fully explicated

in purely propositional terms, nor in terms of verbal paraphrase. A characteristic of basic level terms, in particular, is that, very often, they are understood in terms of how we would typically interact with the entities in question. Consider the concept of chair. We understand the concept, not simply in terms of what chairs look like, nor even in terms of their various parts and how they are interrelated, but in terms of what we do with our bodies with respect to them, namely, we sit on them, and they support our body weight. We have no such 'embodied' conceptualization of more schematic concepts such as 'thing' or 'artifact.' We do not understand these categories in terms of how we characteristically interact with them.

The role of bodily experiences has been elaborated in the theory of image schemas (Johnson, 1987; Lakoff, 1987). 'Image schemas' are common recurring patterns of bodily experience. Examples include notions of containment, support, balance, orientation (up/down), whole/part, motion along a path from a source to a goal, and many more. (Force dynamic interactions, discussed above, may also be understood in image schematic terms.) Take the notion of balance. We experience balance when trying to stand on one leg, when learning to ride a bicycle, or when trying to remain upright in a strong wind. The notion involves the distribution of weights around a central axis. (Balance, therefore, is understood in force-dynamic terms.) The notion can be applied to many domains of experience. We can speak of *a balanced diet*, *a balanced argument*, *a political balance of power*, and of *the balance of a picture or photograph*. One could, no doubt, analyze these expressions as examples of metaphor. This approach, however, might be to miss the embodied, nonpropositional nature of the concept. Our experience of balancing provides a primitive, experiential schema that can be instantiated in many different domains.

Compositionality

A particularly contentious issue in semantics concerns the question of compositionality. According to the compositionality principle, the properties (here: the semantic properties) of the whole can be computed from the properties of the parts and the manner of their combination. From one point of view, compositionality is a self-evident fact about human language. *The cat is on the mat* means what it does in virtue of the meanings of the component words, and the fact that the words stand in certain syntactic configurations. Speakers of English can work out what the sentence means, they do not have to have specifically learned this sentence. Unless compositionality were a feature of language, speakers would not be able to construct, and to understand, novel sentences. The very fact of linguistic creativity suggests that compositionality has got to be the case.

Not surprisingly, therefore, in many linguistic theories, the compositionality of natural languages is axiomatic, and the study of semantics is to a large extent the study of the processes of semantic composition. Cognitive linguists, however, have drawn attention to some serious problems with the notion. It is, of course, generally accepted that idioms are problematic for the compositionality principle. Indeed, idioms are commonly defined as expressions that are not compositional. The expression *spill the beans* 'inadvertently reveal confidential information' is idiomatic precisely because the expression is **not** compositional, that is, its meaning cannot be worked out on the basis of the meanings that *spill* and *beans* have elsewhere in the language.

Leaving aside obviously idiomatic expressions – which, by definition, are noncompositional in their semantics – it is remarkable that the interpretation of an expression typically goes beyond, and may even be at variance with, the information that is linguistically encoded. Langacker (1987: 279–282) discussed the example *the football under the table*. The expression is clearly not idiomatic, neither would it seem to be problematic for the compositionality principle. Take a moment, however, to visualize the described configuration. Probably, you will imagine a table standing in its canonical position, with its legs on the floor, and the football resting on the floor, approximately in the center of the polygon defined by the bottom of the table's legs. Note, however, that these specific details of the visualization were not encoded in the expression – they have been supplied on the basis of encyclopedic knowledge about tables. The purely compositional meaning of the expression has been enriched by encyclopedic knowledge. There is more to this example, however. If you think about it carefully, you will see that the enriched interpretation is in an important sense at variance with the compositional meaning. If by 'X is under Y,' we mean that X is at a place lower than the place of Y, the football, strictly speaking, is not actually **under** the table at all. The football, namely, is not at a place that is lower than the lowest part of the table. In interpreting even this seemingly unproblematic expression, we have had to go beyond, and to distort, its strictly compositional meaning.

This state of affairs is not unexpected on a usage-based model. The resources of a language – lexical, syntactic, phraseological – are abstractions over encountered uses. The meanings abstracted from previous usage events are necessarily schematic, and may not fit precisely the requirements of the situation at

hand. In giving linguistic expression to a conceptualization, we search for the linguistic resources that most closely match our intentions, accepting that some discrepancies and imprecisions are likely to occur. We trust to the inferencing powers of our interlocutors to achieve the fit between the expression and the intended conceptualization.

The Conceptual Basis of Syntactic Categories

In many linguistic theories, syntax constitutes an autonomous level of organization, which mediates between phonology and semantics. As pointed out, cognitive linguistics rejects this approach. Rather, syntactic organization is itself taken to be inherently meaningful.

Several things flow from this conception of syntactic organization.

First, the notion of 'meaningless' morphemes gains little support. It is sometimes said, for example, that the preposition *of* is a dummy element in expressions such as *the destruction of the city*, inserted by the syntax in order to satisfy the constraint that a noun cannot take a noun phrase as its complement. The cognitive semantic view of the matter would be that *of* does indeed have a meaning, albeit a fairly abstract one; specifically, *of* profiles an intrinsic relation between entities. Just as talk of a *student* entails some subject matter that is studied, and talk of a *photograph* entails some thing that was photographed, so talk of *destruction* entails some entity that was destroyed. These inherent relations between entities are profiled by the same preposition: *destruction* ***of*** *the city, a student* ***of*** *physics, a photograph* ***of*** *me*.

More far-reaching, perhaps, are the implications of the cognitive linguistic approach for the study of word classes. It is almost a truism, in modern linguistics, that word classes – noun, verb, adjective, etc. – must be defined, not in semantic terms, but in terms of their distribution. The word *explosion* is a noun, not because of what it means, but because it distributes like a noun – it can take a determiner, it pluralizes, and so on. Such an approach is tantamount to claiming that syntax constitutes an autonomous level of linguistic organization, independent of semantics. Many cognitive linguists, committed to the symbolic view of language, have been skeptical of this approach and have reexamined the traditional view that word classes are indeed semantically based. There are a number of ways in which the conceptual approach can be implemented.

One is a prototype approach. Prototypically, nouns designate concrete, enduring, individuated objects, while verbs designate rapid changes of state (Givón, 1984). A problem with this approach is that *explosion*, while semantically not at all a prototypical noun, is nevertheless a noun, whose distributional properties are fully comparable with those of supposedly prototypical nouns, such as *table* and *chair*.

A second approach is functional (Croft, 1991). Nominals designate what is being talked about; adjectivals specify nominals in greater detail; verbal predications make assertions about nominals; while adverbials specify verbal predications more precisely. Each of these functionally defined categories has prototypical instances. Less prototypical instances often bear distinctive morphological markings. Thus, *explosion* betrays its nonprototypical status as an entity to be talked about by its derivational morphology.

Langacker's aim has been more ambitious. It is to offer unified conceptual definitions of the major lexical and syntactic categories. Essentially, the claim is that the syntactic category of a word is determined by the nature of its profile. Conversely, the status of a word as noun, verb, adjective, etc., imposes a certain kind of profile on the associated semantic representation.

A first distinction is between nominal vs. relational profiles. A good way to understand the distinction is by reference to autonomous vs. dependent conceptualizations. A concept is 'autonomous' if it can be entertained without necessary reference to other entities. Of course, there can be no such thing as a fully autonomous concept, given the ubiquity of domain-based knowledge and of the profile-base relation in the understanding of concepts. Nevertheless, relatively autonomous concepts can be proposed, for example, the concept of hypotenuse. As stated earlier, the word *hypotenuse* profiles a straight line. Although the concept is understood against the base of a right-angled triangle, the word does not profile the triangle, nor the relation of the hypotenuse to the triangle. It is in this sense that nominal profiles are autonomous. Compare, now, the preposition *on*. The word profiles a kind of (prototypically: spatial) relation between two entities, often referred to as the 'trajector' and the 'landmark' of the relation. The trajector can be thought of as the figure, i.e., the more prominent element in the relation, the landmark as the ground, i.e., the less prominent participant. Without some schematic notion of the trajector and landmark, the notion of 'on' lacks coherence. It is in this sense that the conceptualization associated with *on* is 'dependent' – it inherently requires reference to other entities.

Relational profiles are subject to further distinctions. *On* designates an atemporal relation – the time at which the relation holds, or over which it holds, is not profiled. Verbs, on the other hand,

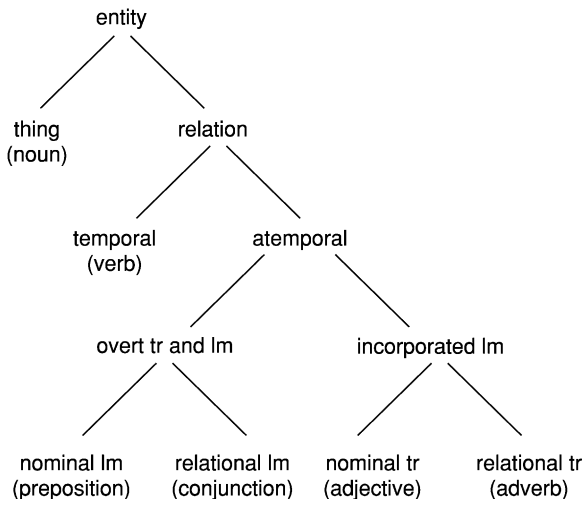

Figure 2 Taxonomy of main lexical categories. Reproduced from Taylor J R (2002) *Cognitive grammar.* Oxford: Oxford University Press, with permission from Oxford University Press.

inherently designate temporal relations. *Like*, as a verb, designates a relation between a trajector (the verb's subject) and a landmark (its direct object). The temporality of the relation is a facet of the profile. Another distinction concerns the nature of the trajector and landmark. These may themselves be either nominal or relational, and, if relational, temporal or atemporal. Prepositions (*before lunch*) take a nominal landmark, subordinating conjunctions (*before we had lunch*) take as their landmark a temporal relation (i.e., a clause). Figure 2 depicts a taxonomy of the major lexical categories based on the nature of their profiles.

The combination of smaller units into larger configurations can now be understood in terms of the way in which the profiles of the smaller units can be combined. Figure 3 illustrates the assembly of *the book on the table*. (The role of the determiners is ignored so as not to unduly complicate the discussion.) In accordance with conventions established by Langacker, nominal profiles are represented by circles, relations by lines between circles, while profiled entities (whether nominal or relational) are depicted in bold. *The table*, having a nominal profile, is able to function as the landmark of *on*. The resulting expression, *on the table*, inherits the relational profile of *on*. *The book* is able to function as the trajector of this expression, whereby the resulting expression, *the book on the table*, inherits the nominal profile of *book*. The composite expression thus designates a book, the book, however, is one which is taken to be *on the table*. The pattern illustrated in Figure 3 is valid, not only for the assembly of the specific expression in question, but also, *mutatis mutandis*, for the assembly of any nominal modified by an prepositional

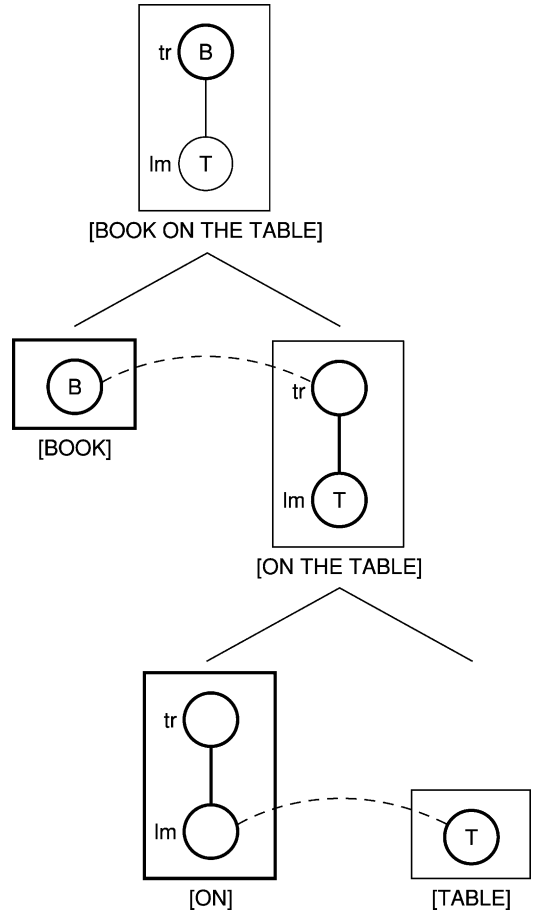

Figure 3 Combination of smaller units into larger configurations. Reproduced from Taylor J R (2002) *Cognitive grammar.* Oxford: Oxford University Press, with permission from Oxford University Press.

phrase. The pattern, therefore, is able to function as a schema that sanctions expressions of a similar internal structure.

Relativism vs. Nativism

The cognitive semantics program highlights the tension between relativism and nativism. The relativist position is that a language brings with it certain categorizations and conceptualizations of the world. The language that one speaks therefore imposes certain construals of the world. It will be evident that a number of themes in cognitive semantics are liable to emphasize the language-specific, and indeed the culture-specific character of semantic structures. For example, emphasis on the symbolic nature of language, in particular the proposal to ground syntactic categories and syntactic relations in conceptual terms, would lead one to suppose that different syntactic structures, as manifested in different languages, would be based in different conceptualizations of the

world. Equally, a focus on the role of domain-based knowledge in the characterization of meaning is likely to accentuate the culture-specific nature of linguistic semantics. On the other hand, several themes in cognitive linguistics are likely to be compatible with the nativist position, according to which the commonalities of human languages reflect a common, universal cognitive endowment. For example, the claim that language is embedded in general cognitive processes and abilities – if combined with the not unreasonable assumption that all humans share roughly the same cognitive capacities – would tend to highlight what is common to the conceptualizations symbolized in different languages. All languages, it may be presumed, manifest embodiment, image schematic and force dynamic construals, Figure-Ground asymmetries, and nominal vs. relational profiling.

Aware of the tension between relativism and nativism, Langacker has scrupulously distinguished between 'conceptual structure' and 'semantic structure.' Conceptual structure – how people perceive and cognize their world (including the inner world of the imagination) – is taken to be universal and based in shared capacities. Semantic structure, on the other hand, pertains to the way in which conceptual structure is formatted in order that it is consistent with the conventionalized resources of a given language. Compare the ways in which English and French speakers refer to bodily sensations of cold. English requires an attributive adjectival construction (*I am cold*), French require a possessive construction (*J'ai froid* 'I have cold'). Although the experience is construed differently in the two languages, one cannot on this basis alone draw the inference that English and French speakers differ in their phenomenological experience of 'being cold.'

In order to substantiate the claim that the different semantic, syntactic, and lexical resources of different languages do influence conceptualizations of the world, it would be necessary to go beyond the purely linguistic evidence and document correlations between linguistic organization and nonlinguistic cognition. Currently, the matter is hotly debated. Evidence is, however, emerging that the different construals conventionalized in different languages may sometimes have repercussions in nonlinguistic domains, giving some support to the relativist position. For example, in English (as in many other languages), we may state the location of an object by saying that it is *in front of us*, *to our left*, or *behind* another object or person. In some languages, for example, in Guugu Yimithirr (Guguyimidjir; spoken in Northern Queensland, Australia) and Tzeltal (spoken in Mexico), these resources are not available. Rather, an object's location has to be stated with respect to the cardinal points (*to the north*, etc.) or to some fixed geophysical landmark (*upstream*, *mountain-wards*). Such differences in the linguistic construal of spatial relations have been shown to correlate with nonlinguistic spatial cognition, for example, speakers' proficiency in dead-reckoning, that is, their ability to track their current location in terms of distance and direction from their home base (Levinson, 2003).

Conclusion

Meaning is central to linguistic enquiry. Meaning, after all, is what language is all about. Yet meaning is a notoriously difficult topic to analyze. What **is** meaning, and how are we to study it?

Some semanticists have studied meaning in terms of relations between language and situations in the world. Others have focused on relations within a language, explicating meanings in terms of paradigmatic relations of contrast, synonymy, hyponymy, entailment, and so on, and syntagmatic relations of collocation and co-occurrence. Yet others have tried to reduce meaning to matters of observable linguistic behavior. Cognitive semanticists have grasped the nettle and taken seriously the notion that meanings are 'in the head,' and are to be equated with the conceptualizations entertained by language users. Cognitive semantics offers the researcher a theoretical framework and a set of analytical tools for exploring this difficult issue.

See also: Cognitive Grammar; Cognitive Linguistics; Concepts; Construction Grammar; Corpus Lexicography; Frame Semantics; Grammaticalization; Idioms; Langacker, Ronald (b. 1942); Metaphor: Psychological Aspects; Metonymy; Modularity of Mind and Language; Onomasiology and Lexical Variation; Polysemy and Homonymy; Prototype Semantics; Relativism; Saussure: Theory of the Sign; Semantics of Spatial Expressions; Spatiality and Language.

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Cognitive Technology

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Scholarly Discipline

The primary area of inquiry is Technological Cognition (TC), which examines what happens to humans when they augment themselves with technologies, either physically or cognitively, to amplify their natural capabilities. The aim of CT/TC is to formulate and to test theories of human cognitive processes that interact with technological artifacts and are partially formed by those interactions. As a fluid, symbiotic hybrid of the embodied mind and its tools, such a technologized cognition has epistemic effects: It affords an understanding and control of the external world that otherwise would not have been possible. As rational agents, humans develop and use tools to empower themselves in the *real* world which exists independently of them. This places CT/TC firmly in the realist tradition, in direct contrast with the assumptions of postmodernism (*see* **Postmodernism**): if the external world were merely a social construct, where reality is reduced to, and interpreted as, *text*, tool augmentation other than that related to natural language (e.g., metaphor) would be superfluous and CT/TC would lose its *raison d'être*. The belief that the human mind *is* molded by tools and open to scientific scrutiny also dissociates CT/TC from any theoretical framework that is essentially behaviorist in nature (*see* **Behaviorism: Varieties**).

Methodology for Tool Design

Dialectic adaptation of the mind to the operations of its tools – a process that is often tool-coerced – leads to technological change. Increased technological sophistication forces us to make ethical choices. Of interest here is a search for design methods and practice capable of eliminating, before they even arise, any undesirable effects of tool use on users. The main question is "Which design methods and practice will result in tool-mind-world hybrids that optimally benefit humankind?" CT, understood as a methodology for design, is thus a process: an approach to design, not a product of such a design. We can design

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Cognitive Technology

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Scholarly Discipline

The primary area of inquiry is Technological Cognition (TC), which examines what happens to humans when they augment themselves with technologies, either physically or cognitively, to amplify their natural capabilities. The aim of CT/TC is to formulate and to test theories of human cognitive processes that interact with technological artifacts and are partially formed by those interactions. As a fluid, symbiotic hybrid of the embodied mind and its tools, such a technologized cognition has epistemic effects: It affords an understanding and control of the external world that otherwise would not have been possible. As rational agents, humans develop and use tools to empower themselves in the *real* world which exists independently of them. This places CT/TC firmly in the realist tradition, in direct contrast with the assumptions of postmodernism (*see* **Postmodernism**): if the external world were merely a social construct, where reality is reduced to, and interpreted as, *text*, tool augmentation other than that related to natural language (e.g., metaphor) would be superfluous and CT/TC would lose its *raison d'être*. The belief that the human mind *is* molded by tools and open to scientific scrutiny also dissociates CT/TC from any theoretical framework that is essentially behaviorist in nature (*see* **Behaviorism: Varieties**).

Methodology for Tool Design

Dialectic adaptation of the mind to the operations of its tools – a process that is often tool-coerced – leads to technological change. Increased technological sophistication forces us to make ethical choices. Of interest here is a search for design methods and practice capable of eliminating, before they even arise, any undesirable effects of tool use on users. The main question is "Which design methods and practice will result in tool-mind-world hybrids that optimally benefit humankind?" CT, understood as a methodology for design, is thus a process: an approach to design, not a product of such a design. We can design

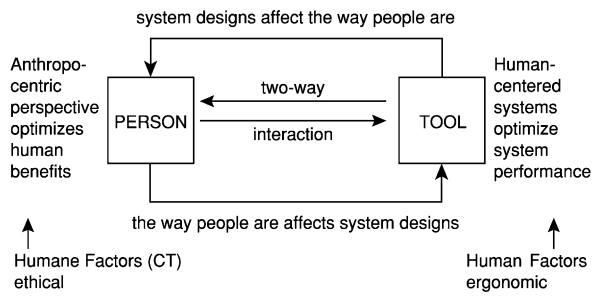

Figure 1 Anthropocentric CT design versus traditional human-centered design.

tools in accordance with CT principles, informed by the theoretical developments of TC, but those tools are not in themselves instances of CT.

The search for ethical factors in tool design means that studies undertaken within CT are primarily about people and not about the technologies that augment them. This distinguishes CT from investigations of the so-called human factors in designing human-centered systems that promote 'naturalness' in human-tool exchanges and aim at designing ergonomic, user-friendly tools, in order to fully accommodate the limits of human performance and fully exploit the advantages of the user (as it is practiced in areas such as Cognitive Ergonomics, Cognitive Engineering, and Engineering Psychology). What such practices do not overtly address is the question of who really stands to benefit. Nor do they explicitly consider that every tool is a prosthetic device (some mental functions become redundant), that the user/tool relation is of one-to-many (with the dangers of stress overload), that sophisticated tools can obscure dignity at work, that they separate people from their natural habitat or change their perception of their own competence. By contrast, CT aims to bring humane factors to bear on design. The tool-mind-world hybrids designed according to the principles of CT are intended to be essentially anthropocentric, i.e., they maximize human (user) benefits (see Figure 1).

Mind-Amplifying Tool

CT takes a broad view of technology. All artifacts are in some measure cognitive tools. We need to understand them in terms of their goals and computational constraints as well as in terms of the external physical and social environments that shape and afford cognition. Any technology that serves that purpose by providing a tool has implications for CT/TC.

Cognitive tools can be situated on a continuum of purposeful use between the extremes of raw material and the brain. They can be more or less externalized or detached from the brain or the body (cf. bionic prostheses incorporating direct brain implants with word processors vs. spades). The greater the detachment, the lower the brain-tool connectivity and alignment. The lower the connectivity, the lower the ability to attend to the feedback the brain receives at the interface; consequently, the less the need for people to adapt to the tool. Within this continuum, we can distinguish between natural technologies and fabricated technologies.

Natural Technologies

Natural technologies are instances of mental *techné*, i.e., learned skills and mental competencies. Examples proposed within CT include a body image generator responsible for perceiving one's own body size, the cognitive processes within the prefrontal cortex responsible for our social competence, or the cognitive processes evolved in autism. Here also belong learned aspects of natural language (*see* **Whorf, Benjamin Lee (1897–1941)**), narratives, mnemonic systems for improving memory, task-dedicated cognitive processes in logic and arithmetic, or metaphors in cultural heritage. The mind itself can be viewed as a complex, goal-driven toolkit of natural cognitive artifacts that bootstrap on what is hard-wired, in order to make available a much bigger set of such artifacts. The mind thus facilitates interactions with the environment through the organization and integration of perceptual data, memory, and goal-management.

Fabricated Technologies

While some fabricated technologies are tangible (pens, paper, computers, mechanical gadgets, telecommunication devices, medical equipment, or flight simulators are obvious examples), others are not, but nonetheless they affect our mental capabilities and competences: e.g., writing systems, narratives, artificial languages, and so on.

Cybernetic systems such as robots can become a scientist's cognitive tools if they are built to further scientific progress. They have been applied to understand how categorical perception works, how intelligence of natural systems is embodied, and to the question of whether there is a fundamental distinction between humans and machines. In artificial intelligence, computation has been employed to formulate and to test theories of intelligence or the nature of consciousness. In computational linguistics (*see* **Computational Linguistics: History**), automated grammars have aided linguists in their efforts to understand the workings of natural language.

Any systematized environment that constrains cognition results in cognitive change. Perhaps the best example is a prison system where people become habituated to its inherent operations; many are unable to function effectively upon release. Or, take an organizational merger: Its most challenging aspect is consolidating the diversity of employees' mental cultures.

Perspectives on Mind Change

The simplest form of cognitive change is learning, and many technologies are purposefully developed to this end. While people will adapt to any technology, the extent of their adaptation depends on the extent of the cognitive fit between the human mind and the augmenting technology. When some mental processes are taken over by technology, the relevant natural technologies augment, too. A subsequent absence of the tool may then render the acquired *techné* ineffective. (As an example, consider the impact of word processors on generating texts.) Such a technological augmentation is not permanent and can be unlearned.

Technological augmentation can also have lasting effects. Longitudinal studies in archaeology reveal that cognitive fluidity can be directly linked to tool use. Studies in primatology and developmental psychology show that language constructs, in particular storytelling, played a crucial role in handling the complexity of the social dynamics responsible for the evolution of the primate brain. Social and narrative intelligence requires a larger neocortex, hence a bigger brain size.

Can we predict *a priori* the long-term effects of a given technology on the human user? The difficulty of this question has been recognized with respect to language. The meaning of a linguistic symbol depends on how, and in which context, it is used (*see* **Context, Communicative; Wittgenstein, Ludwig Josef Johann (1889–1951)**). Language becomes alive and unfolds its history via its interaction with people. Meanings transform across different epochs and different cultures as a result of interpreting and reinterpreting language. The context of its use, and the medium through which it is used, have a bearing on language itself. Consider the impact of the Internet and mobile phones (texting) on the art of conversation or the spelling of words. The same is true of any artifact. Internal structure of design and a form perceived at the interface are insufficient to derive the social and personal significance or the subsequent development of a piece of technology. The latter can only happen in the context in which it is used. In the absence of such context, there is no unique answer to the question "What is this artifact for?" Its affordances for action (the toolness of a tool) only become manifest when the mind comes in contact with it in some context.

To predict the consequences of tool use, it is necessary (though not sufficient) to understand the social, psychological, and cognitive mechanisms that create the need for technological augmentation. A theoretical framework with a potential for such investigations must necessarily deal with motives and benefits, in other words, with *relevance*. Within CT, the Theory of Relevance, originally developed with respect to language use (*see* **Relevance Theory**), has been broadened to encompass all cognitive processes (symbolic and connectionist) involved in action planning and goal management. This extended framework can be invoked to explain the modularity of mind and remove a variety of difficulties experienced in the symbol-driven acquisition of natural technologies or the design of fabricated ones. It provides grounds for classifying a dedicated inferential comprehension module as an instance of natural CT. By recognizing a multitude of cognitive interfaces (e.g., between perception, consciousness, knowledge, motivation, emotion, action, natural/fabricated technologies, external situations), the extended framework can assist the exploration of (1) the extent to which the constraints on our mental life are biologically or technologically determined, and (2) how language *techné* interacts with other aspects of cognition, facilitating, ultimately, the choice between various proposals for developing a humanized linguistic technology. Even so, the big question, whether, and to what extent, technology can be humanized, remains an open question (*see* **Adaptability in Human-Computer Interaction**).

See also: Adaptability in Human-Computer Interaction; Behaviorism: Varieties; Computational Linguistics: History; Postmodernism; Relevance Theory; Whorf, Benjamin Lee (1897–1941); Wittgenstein, Ludwig Josef Johann (1889–1951).

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Coherence: Psycholinguistic Approach

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Coherence in Text and in the Mind

A text is coherent to the extent that it is intelligible, that there are no aspects of the text that do not relate to the message, and that there is no sense that things are missing from the text. We may judge a text as incoherent if these conditions are not met. There are two important sources of information that contribute to coherence: text cues and psychological constraints. Text cues are simply those cues that are in the text itself, while psychological constraints refers to processes of thought or inference that add to what is given by the text. Of course, if as a result of the way it is written we have to make too many poorly-guided inferences to understand a message, then we may say that the text itself appears incoherent. From a psychological perspective, a coherent text may be thought of as one that brings to mind just the right things to facilitate easy understanding, while an incoherent text is one that fails to do that, leaving the reader or listener with no sense of understanding the message. Texts that present the reader or listener with a difficult task may be judged more or less coherent.

This raises an interesting question: how to define a text as distinct from a random concatenation of sentences. There has been a tradition in text linguistics that claims that coherence is an intrinsic defining property of a text. Pieces of writing that do not conform to the principles underlying coherence are taken either to be defective (suboptimal) or not texts at all. For instance, a text that is coherent must have clauses that are clearly connected to one another. Second, the clauses must logically relate to one another, and third, each sentence must somehow be relevant to the overall topic of the discourse. Some of these requirements can be met from what is actually written in the text itself. For instance, texts can contain explicit cohesion markers that provide links between the clauses of a text. But the other requirements, such as clauses logically relating to one another, and the clauses being relevant to the overall topic of the discourse are plainly psychological; they require the reader/listener to perceive relevance. We shall amply illustrate this point in this article.

The psychological view is that coherence is something that depends on the mental activity of the reader or listener, on their capacity to understand the message that the producer of the text is trying to convey. The text can be thought of as providing clues as to what the message is, but the reader has to use these cues. So, from a psychological perspective, we may ask what mental processes lead to the development of a coherent mental representation of the text (knowledge of the message), and what clues in texts help to guide these processes appropriately (see Gernsbacher and Givon, 1995, for a broad perspective).

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Cohesion Markers

One thing that can be seen in texts is a so-called cohesion marker (see Halliday and Hasan, 1976). This marker may be a connective, like *and*, *but, when, while, because, so, therefore, hence*, and so on. Another form of connection is anaphora – using a term that relates a concept back to one that was previously introduced, as in (1):

(1) John came home **because he** was missing his mother.

Here, *because* is a connective that links the two clauses, and *he* is an anaphoric pronoun that refers back to John. Both of these devices provide some glue to connect the two clauses, and help bind them into a coherent whole. The devices are visible in the text itself. There are many other cues that signal relationships between the parts of text, expressions like *first* (which cues that there will be a successor), *next, later, finally*, *after that* (signaling temporal progressions), *similarly,* and *in the same way* (signaling various ways in which clauses or phrases may be related to one another). Such cues are only cues, of course, and they are neither sufficient nor necessary for a text to appear coherent. So, a text with ample coherence markers may be quite incoherent:

(2) John ate a banana. The banana that was on the plate was brown, and brown is a good color for hair. The hair of the dog is a drink to counteract a hangover.

Such texts are not truly coherent, in the sense that they do not produce an obvious message. So the presence of cohesion markers is not enough to guarantee coherence. The clauses in a text need to be sensibly related and to form a sensible whole. Of course, what is sensible depends upon comparing what is being said in the text with what the reader knows about the world. It is clearly a matter of psychology, not just of what is in the text.

Cohesion markers are not necessary for finding a text to be coherent, either. For instance, consider the following:

(3) Mr. Smith was killed the other night. The steering on the car was faulty.

Although there is no stated connection between the two sentences, readers infer that the second sentence provides the reason for the state of affairs depicted in the first sentence, and that makes the text coherent. There is no cue to this in the text itself. In (4) there is such a cue:

(4) Mr. Smith was killed the other night, **because** the steering on the car was faulty.

So, although explicit connectives may indicate the relationship between different clauses and propositions, a text may be quite coherent even in the absence of such markers, as shown in (3).

What psychological studies have shown is that for some connectives, their presence does indeed aid comprehensibility. For instance, if people read short stories where the last sentence either did or did not begin with a connective (for instance, *However, the pilot made a safe landing*), they spend less time reading the final sentence when an explicit connective is used than when it is not. The mental representation of sentences that have clauses linked by causal connectives seem to be more stable as well, since they are better remembered than those that are not directly linked. So although it may be possible to infer the link between two clauses, an explicit cue does help, and of course, may sometimes be necessary.

The Psychological Concept of a Connected, Coherent, Discourse Representation

An almost universal view, within psychology, of how text is processed is that the text expresses ideas that become connected to form a coherent whole. A parallel idea in text linguistics is that each part of a text is linked to at least one other part by some sort of relation (called rhetorical predicates, *see* **Rhetorical Structure Theory**). The idea is similar: that coherence results from being able to appropriately relate each bit of the discourse to some other, so that a connected whole results; however, the psychological approach is concerned with studying how the connections are established, and what are the mental entities that come to be related to each other. The end point is the mental representation of the discourse and is part of memory. Because memory is fallible, the final representation will be incomplete too.

As discussed above, connectives (explicit or inferred) are partly responsible for the local coherence of pieces of text (adjacent pairs of sentences, say). But a text will give rise to a coherent mental representation at several levels. It is possible to illustrate some aspects of connectivity with the following example:

(5) (a) Harry was trying to clean up the house. (b) He asked Mary to put the book in the box on the table. (c) She said she was too busy to do that. (d) She had to write out a check for her friend Jill because she had no money left. (e) Harry nearly exploded. (f) He thought that they spent too much money on charities as it was. (g) Mary suddenly burst into tears.

Connecting Individuals: Anaphoric Reference

The same individuals appear over and again in this simple story. *Harry* in (a) is *He* in (b), *Harry* in (e), and *He* in (f). Identifying Harry in this way is important, since that way we can connect the actions and reactions of that individual. Sometimes *Harry* is used in preference to *He*, as in (e). Using a name like this occurs especially when the individual concerned has not been at the center of the unfolding text (in focus) for a while; psycholinguistic work has shown that the use of a name is especially useful when a character is being 'reintroduced,' as Harry is in (e). Use of *He* would still be intelligible, but slower processing of the sentence would result, showing a difficulty with using a pronoun.

Processing difficulties are minimized with the character Harry because there is only one male character in the story. But the situation with Mary is different because there are two female characters, with Jill introduced in (d). In fact, in sentence (d), the reader has to work out who *she* is from general knowledge, not from the text. In this case, because it would be a person with money who could give money to someone without money, the second *she* is treated as coreferential with Jill, not Mary. Psychological work has shown that such inferential processes, although they seem automatic, are time-consuming.

A further anaphoric connector in the passage is worthy of note. First, in (c), there is *that*. Here the expression refers to the event *Mary puts the book in the box on the table*. Terms like *this* and *that* can refer to huge conglomerations of events, as in a very complex story leading to the statement *This was too much for Harry*. So, to summarize, anaphoric devices are vital to producing a coherent mental representation of who did what. A major review of psychological work on anaphora was Garnham (2000).

Causal Connectivity

With narrative texts especially, the reader has to establish causal links between the various parts of the text, and the whole structure gives rise to global coherence. So, in (a), Harry is given a goal. In (b), a further action is introduced. How is this interpreted? Most people interpret the action as being part of realizing this goal. However, there is nothing in the text to indicate this. In our example, there is hardly anything to tell the reader what the causal structure is. In the passage below, we have included some connectives that fill out the causal structure:

(6) Harry was trying to clear up the house. **TO HELP WITH HIS GOAL** He asked Mary to put the book in the box on the bookshelf. **HOWEVER** (BLOCKING HIS GOAL) She said that she was too busy to do that. **THE REASON WAS** She had to write out a check for her friend Jill because she had no money left. **AS A RESULT OF THIS REASON** Harry nearly exploded. **THE REASON WAS** He thought they spent too much on charities as it was. **AS A RESULT** Mary suddenly burst into tears.

In order to achieve a very minimal understanding of this text, the information provided in bold, or something like it, must be inferred by the reader and incorporated into their mental representation of the discourse. A number of studies have shown that judgments of how clearly the clauses of texts are causally related predicts a number of performance measures during reading, including the time taken to read sentences, judgments of how well sentences fit into texts, the judged coherence of texts as a whole, and the ease of recalling texts (see Langston and Trabasso, 1999). When people understand texts, they appear to do so by forming mental representations consisting of causal chains, and the robustness of the causal chains reflects coherence.

Studies of Inferential Activity

Necessity and Elaboration

Everywhere in discourse, readers are called upon to make inferences; without them, there would be no coherence. A key distinction is made between inferences that are necessary for coherence and inferences that are not necessary, but rather just fill out the picture being portrayed by the writer. Inferring causal relations, and anaphoric relations, are generally considered to be necessary inferences. In general, when a necessary inference is made, it can be shown to take time. One classic case (Haviland and Clark, 1974) is:

(7) Harry took the picnic things from the trunk.
(8) The beer was warm.

On reading (8), to understand how *The beer* fits into things, the reader must infer that beer was part of the picnic supplies. Sentence (8) took longer to read after (7) than it did after (9):

(9) Harry took the beer from the trunk.

Thus measurable time is needed to make the necessary bridging inference. Bridging inferences are assumed to be made only when necessary, when a gap in the connectivity of clauses is detected. There is no inference that beer might be part of the picnic things when just sentence (7) is read; rather, the inference is triggered when (8) is encountered. So such inferences are also called **backwards** inferences.

Necessary backwards-bridging inferences are contrasted with forward elaborative inferences. For instance, given (10), what might one infer?

(10) Unable to control his rage, the angry husband threw the valuable antique vase at the wall.

There are many possibilities, but a highly plausible one is that the vase broke. If on reading (10) this inference were made, then it would be an elaboration over what was said, and as it is not made because it is needed, it is called a forward inference. If this were followed by (11), the forward inference would facilitate comprehension:

(11) It cost well over $100 to replace.

But such an inference would not help us understand (12):

(12) He had been keeping his emotions bottled for weeks.

There has been much debate over whether such elaborative inferences are typical, and if and when they are made. Clearly there are many such inferences that might be made. For instance, given (11), one might infer that the wife of the angry husband might be in some danger, that the husband might become more violent, that he felt ashamed afterwards, etc. Do we make all, or any, of such plausible inferences?

Because such inferences are indeed so plausible, it might be supposed that they are routinely made. In order to test whether an inference has been made, a variety of priming tasks have been used. With these, a test word is presented after a short passage. For instance, after (10), the test word BROKE might be presented. This word would also be presented after a sentence in which information pertinent to breaking is absent. Subjects are asked to read out loud the test word when it appears. The critical question is whether the word is read more rapidly after a priming sentence (11), when compared with a nonpriming sentence. If the word is read more rapidly, then it has been primed, and this suggests that the inference that the vase had broken had been made. Several different tests have been devised based on this idea. Under some circumstances, there has been weak evidence for such forward inferences happening immediately, though the general view is that they are made only under very constrained conditions and are not typical. The paucity of evidence for elaborative inferences was summed up in McKoon and Ratcliff (1992), who put forward the idea that during reading, immediate forwards elaborative inferences are typically minimal, and inferences are largely restricted to the necessary, backward, variety. However, in the long term, elaborative inferences have to be made, since comprehension is only possible when a mental model of what the text is about is constructed. We shall go on to look at some aspects of such a model.

Situation-Specific Information: Scenario-Theory

For a discourse to be understood, it has to be situated with respect to background knowledge. For instance:

(13) John drove to London yesterday.
(14) The car broke down halfway.

Superficially, this is similar to examples (7) and (8), in that a backwards-bridging inference could be made to link *The car* in (14) to *drove* in (13). Such a backwards-inference would be time-consuming for reading (14). However, several studies have shown that the time to read (14) is no greater to read after (13) than it is after (15), where the car is mentioned explicitly:

(15) John took his car to London yesterday.

The key difference between *The car* in (15) and *The beer* in (8) is that *car* is typically definitional of driving, whereas *beer* is just a plausible option for picnic things. So, for entities that are part of the meaning of actions, those entities appear to be included in the representation of the sentence depicting the action. The concept <car> is part of the representation of the action *drove to a place*. Sanford and Garrod (1981, 1998) put forward the idea that when we read a text, we identify as quickly as possible the background situation in which the propositions in the text are grounded; they further assumed that much of what we know is represented in a situation-specific way, in structures that they termed scenarios. Driving is one example, where the concept <car>, and expected actions, are represented. Another well-known illustration is of having a meal in restaurant, where the events, the order of events (find table, get waiter, order meal, eat courses in expected order, get bill, pay, leave, etc.), and the principle actors (customer, waiter, wine-waiter) are represented. In general, if a new entity is introduced into a text, either it will already be part of the prior representation (scenario), or a backwards inference will have to made.

Using situation-based knowledge is essential for developing a coherent representation, and a simple example is:

(16) Fred put the wallpaper on the table. Then he rested his mug of coffee on the paper.

This pair of sentences is immediately coherent; nothing seems out of place. However, (17) depicts an unrealistic state of affairs, and this is immediately recognized:

(17) Fred put the wallpaper on the wall. Then he rested his mug of coffee on the paper.

Sentences (16) and (17) depict different situations: putting wallpaper on a table leaves the paper as a horizontal surface, while putting it on the wall leaves it in a vertical plane, so that the cup would just fall down. The implication is that people try to build a representation of what is being depicted with the each pair of sentences, and in order to do that, they have to use situation-specific knowledge.

Keeping Track of Things: Situation Models The kind of situation-specific knowledge discussed above is stereotyped, and connecting language input to representations of specific situations is essential for adequate understanding, and hence coherence. But this is plainly not enough, in that texts do not simply refer to static situations; rather, as they unfold they depict a dynamic passage of events. Even the simple example (6) serves to illustrate that, which is why the development of a causal chain is so important for a coherent representation.

A bold attempt to grasp the nettle of this more dynamic aspect of comprehension is found in the concept of the situation model (see Zwaan and Radvansky, 1998 for a detailed overview). They propose that as texts unfold, readers may keep track of a number of things. Consider first space. In some stories, people move around in space, and there is evidence that readers keep track of these movements. So, it turns out that readers have faster access to mental representations of rooms where protagonists are, or toward which protagonists are heading, than to representations of other rooms. This suggests two things: readers take the perspective of protagonists (see Duchan *et al.*, 1995, for an introduction to this issue), and they update the focus of interest to where the protagonist is, or is said to be heading. Of course, not all stories are about events in space, but when they are, readers generally update where the protagonist is in their mental representation of the text.

Several researchers have suggested that there are at least five dimensions to situations that could be encoded by the reader: space (as above), time, causation (briefly discussed above), intentionality, and protagonist. It has been plausibly argued that the comprehension of narratives revolves around keeping track of the goals and plans of protagonists (intentionality). It has been shown by probing readers that they appear to make inferences based on what motivates the actions of protagonists, even when this information is not directly available. The protagonist category refers to the people and things in the mental representation. They are the entities that are being updated with respect to place, time, and intentionality. This category leads to a further aspect that has to be understood about characters if coherence is to be achieved: the emotions of the protagonists. Experimental evidence suggests that the emotional states of protagonists might be inferred as forward inferences (see the classic work of Gernsbacher *et al.*, 1992).

Multiple Viewpoints A further aspect of coherence is that with many texts, alternative versions of reality may have to be entertained if the text is to be understood. Consider (18):

(18) John put his wallet on the dresser. Unbeknownst to John, Mary later moved it to his bedside table. When he came in from gardening, John went to get his wallet. First he tried his bedside table.

John's action doesn't make sense in our situation model, because we represent what John believes is the location of his wallet, and we also represent where the wallet actually is. The capacity to capture the beliefs of others and how these beliefs relate to what we know to be reality is called having a 'Theory of Mind.' Without the capacity to make these representations, texts like (18) could not be understood as anomalous, and would display apparent coherence that was unwarranted. Dealing with multiple viewpoints like this has received some attention, and given its prevalence in narratives and real-life situations, deserves more. However, one major discovery is that some people do not have the capacity to handle these multiple perspectives (it is particularly a feature of autism; see Baron-Cohen, 1995; for a very detailed analysis of multiple viewpoints and coherence, see Fauconnier, 1994).

Coherence and Selective Processing

We have portrayed coherence as the establishment of connections between things mentioned in a text, actions mentioned in a text, and world knowledge supporting interpretation. There is an extra ingredient that has to be included, and that is selectivity in processing. Not all parts of texts are equally important, and a key aspect of coherence is being able to sort out what is important from what is mere detail (or even irrelevant). Coherence derives from not merely being able to join up what is in a text and relate it to knowledge, but to be able to selectively attend to what is salient – the gist of a message.

Selective Processing

Ideas as to what constitutes the gist of a text have been around since the seminal work of Walter Kintsch and his colleagues (see Kintsch, 1977, for a sample of this important work). Essentially, the idea was that what was in texts could be expressed as propositions (or idea units). Furthermore, some propositions were dependents of others, and that the less dependent a proposition, the closer it corresponded to gist. Consider the following:

(19) Harry was tired. He planned to go on package holiday to Greece.

In the second sentence, we learn that Harry planned to go on holiday (the key proposition), that the type of holiday was a package holiday (a dependent proposition: there can be no package holiday without there being a holiday), and that the holiday was in Greece (another dependent proposition). Many experiments on summarizing texts, and on remembering texts, showed that summaries and memories tended to lose dependent propositions. Thus a 'gist' representation of (19) might include *Harry planned a holiday*, but might exclude the package-deal component, or the fact that he planned to take it in Greece (unless these details become more salient later).

There are cues in the structure of texts themselves as to what might be the most important information. For instance, discourse focus is a device for indicating where salient information lies. In (20), the salient information is *with the hat*, because that specifies which man was arrested. In (21), however, *with the hat* is merely an incidental attribute of the man.

(20) Q: Which man was it who was in trouble?
A: The man with the hat was arrested.
(21) Q: What was it that happened last night?
A: The man with the hat was arrested.

Recent experiments have shown that if subjects read a text similar to (20) once, and then immediately afterwards read the same thing again, but with hat changed to cap, they tend to notice the change. But if they read (21), they tend not to notice the change. Focus influences what is important, and how deeply the text is processed, showing how it controls patterns of understanding (see Sanford and Sturt, 2002, for a review of shallow processing).

Other aspects of text structure influence what is taken into account in producing a coherent representation. Emphasis may be put on quite different aspects of a state of affairs by simple devices in language, such as negation and quantification. For instance, here are two ways of depicting the fat content of a product:

(22) This product is 90% fat free.
(23) This product contains 10% fat.

Experiments have shown that people judge products to be less greasy and more healthy if the second of these descriptions is used (even if they taste a product). This is because the first description focuses on the amount of nonfat, whereas the second focuses on the amount of fat. Such focusing can happen implicitly, if terms are negative. Experimental work has shown that both of these statements are coherent, but in the fat-free case, people do not interpret the amount of fat-freeness against how much fat would be good or bad in a product. The fat-free formulation inhibits the use of world-knowledge, while the %-fat formulation does not inhibit it. Thus 75% fat free and 95% fat free are both considered to be more or less equally a good thing, while 25% fat is considered to be much less healthy than 5% fat (see Sanford and Moxey, 2003, for a review of these arguments for a variety of situations).

Linking together different elements in a text and linking text to knowledge are important for a coherent interpretation of a text to be made; so too is being selective by choosing perspectives to build coherent structures around, and being selective to avoid over-elaborating inferences that are not relevant. To achieve these goals, the writer or speaker has to choose the right linguistic devices and forms of words to guide the reader/listener into making the right inferences, using the sort of knowledge the producer intended. The capacity of a producer to do this effectively is what makes the discourse they are producing appear coherent.

See also: Cohesion and Coherence: Linguistic Approaches; Discourse Processing; Rhetorical Structure Theory.

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Cohesion and Coherence: Linguistic Approaches

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Discourse is more than a random set of utterances: it shows connectedness. A central objective of linguists working on the discourse level is to characterize this connectedness. Linguists have traditionally approached this problem by looking at overt linguistic elements and structures. In their famous *Cohesion in English*, Halliday and Hasan (1976) describe text connectedness in terms of reference, substitution, ellipsis, conjunction, and lexical cohesion. According to Halliday and Hasan (1976: 13), these explicit clues make a text a text. Cohesion occurs "when the interpretation of some element in the discourse is dependent on that of another" (Halliday and Hasan, 1976: 4). The following types of cohesion are distinguished.

- *Reference*: two linguistic elements are related in what they refer to.

  Jan lives near *the park*. *He* often goes *there*.

- *Substitution*: a linguistic element is not repeated but is replaced by a substitution item.

  Daan loves strawberry *ice-creams*. He has *one* every day.

- *Ellipsis*: one of the identical linguistic elements is omitted.

  All the children had an *ice-cream* today. Eva chose strawberry. Arthur had orange and Willem too.

- *Conjunction:* a semantic relation is explicitly marked.

  Eva walked into town, *because* she wanted an ice-cream.

- *Lexical cohesion:* two elements share a lexical field (*collocation*).

  Why does this little *boy wriggle* all the time? *Girls* don't *wriggle* (Halliday and Hasan, 1976: 285).

  It was *hot*. Daan was lining up for an *ice-cream*.

While lexical cohesion is obviously achieved by the selection of vocabulary, the other types of cohesion are considered as grammatical cohesion. The notion of lexical cohesion might need some further explanation. Collocation is the most problematic part of lexical cohesion (Halliday and Hasan, 1976: 284). The analysis of the first example of lexical cohesion above would be that *girls* and *boys* have a relationship of complementarity and are therefore related by lexical cohesion. The basis of lexical cohesion is in fact extended to any pair of lexical items that stand next to each other in some recognizable lexicosemantic relation. Let us now consider the second example of lexical cohesion mentioned above. Do *hot weather* and *ice-cream* belong to the same lexical field? Do they share a lexicosemantic relationship? If we want to account for the connectedness in this example, we would have to assume that such a shared lexicosemantic relationship holds, since the other forms of cohesion do not hold. The clearest cases of lexical cohesion are those in which a lexical item is replaced by another item that is systematically related to the first one. The class of general noun, for instance, is a small set of nouns having generalized reference within the major noun classes, such as 'human noun':

Halliday M A K & Hasan R (1976). *Cohesion in English*. London: Longman.
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people, *person*, *man*, *woman*, *child*, *boy*, *girl*. Cohesion achieved by anaphoric reference items like *the man* or *the girl* is very similar to cohesion achieved by reference with pronouns like *he* or *she*, although Halliday and Hasan (1976: 276) state explicitly what the difference is: "the form with general noun, *the man*, opens up another possibility, that of introducing an interpersonal element into the meaning, which is absent in the case of the personal pronoun." This interesting observation points forward to similar observations formulated in theories developed much later, as in *Accessibility Theory* (Ariel, 1990) and *Mental Space Theory* (Fauconnier, 1994; Fauconnier and Sweetser, 1996; Sanders and Redeker, 1996). This is only one example in which *Cohesion in English* shows itself to be a seminal work, in some respects ahead of its time.

After the publication of *cohesion in English*, the notion of cohesion was widely accepted as a tool for the analysis of text beyond the sentence level. It was used to characterize text structure, but also to study language development and written composition (Lintermann-Rygh, 1985). Martin's *English text* (1992) is a more recent elaboration of the cohesion work. It also starts from a systemic functional approach to language and claims to provide a comprehensive set of discourse analyses for any English text.

Useful and seminal as the cohesion approach may be, there seem to be some principled problems with it. For instance, the notion of lexical cohesion is hard to define. The intuition that 'hot weather' and 'ice-cream' belong to the same lexical field may be shared by many people in modern Western culture, but now consider example (1).

(1) The winter of 1963 was very cold. Many barn owls died.

Here it is much harder to imagine that 'cold winters' and 'barn owls,' or even 'dying barn owls,' should be related by a lexical field. Still, relating these items is necessary to account for the connectedness in (1). This problem is hardly solved by Halliday and Hasan's (1976: 290) advice "to use common sense, combined with the knowledge that we have, as speakers of a language, of the nature and structure of its vocabulary." Examples like (1) constitute a major problem for a cohesion approach: this short text presents no interpretation difficulties whatsoever, but there is no overt linguistic signal either. This suggests that cohesion is not a necessary condition for connectedness. Such a conclusion is corroborated by cases like (2), from a Dutch electronic newspaper (Sanders and Spooren, in press), to which we added the segment-indices (a) and (b).

(2a) Greenpeace heeft in het Zuid-Duitse Beieren een nucleair transport verstoord.
(2b) Demonstranten ketenden zich vast aan de rails. (*Telegraaf-i*, April 10, 2001)

(2a) 'Greenpeace has impeded a nuclear transportation in the Southern German state Bayern.'
(2b) 'Demonstrators chained themselves to the rails.'

This short electronic news item does not create any interpretative difficulties. However, in order to understand the fragment correctly, a massive amount of inferencing has to take place. For instance, we need to infer that the nuclear transportation was not disturbed by the *organization* Greenpeace, but by members of that organization; that the protesters are members of the organization; that the nuclear transportation took place by train, etc. Some of these inferences are based on world knowledge, for instance that organizations consist of people and that people, but not organizations, can carry out actions like the one described here. Others are based on discourse structural characteristics. One example is the phrase *the rails*. This definite noun phrase suggests that its referent is given in some way. But because there is no explicit candidate antecedent, the reader is invited to link it up with *transportation*, the most plausible interpretation being that the transportation takes place by a vehicle on rails, i.e., a train.

It is clear by now that the cohesion approach to connectedness is inadequate. Instead, the dominant view has come to be that the connectedness of discourse is a characteristic of the mental representation of the text rather than of the text itself. The connectedness thus conceived is often called *coherence* (*see* **Coherence: Psycholinguistic Approach**). Language users establish coherence by actively relating the different information units in the text.

Generally speaking, there are two respects in which texts can cohere:

1. *Referential coherence*: smaller linguistic units (often nominal groups) may relate to the same mental referent (*see* **Discourse Anaphora**);
2. *Relational coherence*: text segments (most often conceived of as clauses) are connected by coherence relations like Cause–Consequence between them (*see* **Clause Relations**).

Although there is a principled difference between the cohesion and the coherence approaches to discourse, the two are more related than one might think. We need to realize that coherence phenomena may be of a cognitive nature, but that their reconstruction is often based on linguistic signals in the text itself. Both coherence phenomena under consideration – referential

and relational coherence – have clear linguistic indicators that can be taken as processing instructions. For referential coherence these are devices such as pronouns and demonstratives, and for relational coherence these are connectives and (other) lexical markers of relations, such as cue phrases and signaling phrases. A major research issue is the relation between the linguistic surface code (what Givón, 1995, calls 'grammar as a processing instructor') and aspects of the discourse representation.

In the domain of referential coherence, this relation can be illustrated by the finding that different referential devices correspond to different degrees of activation for the referent in question. For instance, a discourse topic may be referred to quite elaborately in the first sentence but once the referent has been identified, pronominal forms suffice. This is not a coincidence. Many linguists have noted this regularity (e.g., Ariel, 1990; Givón, 1992; Chafe, 1994). Ariel (1990, 2001), for instance, has argued that this type of pattern in grammatical coding should be understood to guide processing. In her *accessibility theory*, 'high accessibility markers' use little linguistic material and signal the default choice of continued activation. By contrast, 'low accessibility markers' contain more linguistic material and signal the introduction of a new referent (*see* **Accessibility Theory**).

We now turn to (signals of) *relational coherence*. *Coherence relations* taken into account for the connectedness in readers' cognitive text representation (cf. Hobbs, 1979; Sanders *et al.*, 1992). They arealso termed *rhetorical relations* (Mann and Thompson, 1986, 1988, 1992) or *clause relations,* which constitute *discourse pattern*s at a higher text level (Hoey, 1983; *see* **Problem-Solution Patterns**). Coherence relations are meaning relations connecting two text segments. A defining characteristic for these relations is that the interpretation of the related segments needs to provide more information than is provided by the sum of the segments taken in isolation. Examples are relations like Cause-Consequence, List, and Problem-Solution. These relations are conceptual and they can, but need not, be made explicit by linguistic markers, so-called connectives (*because*, *so*, *however*, *although*) and lexical cue phrases (*for that reason*, *as a result*, *on the other hand*) (*see* **Connectives in Text**). In the last decade, a significant part of research on coherence relations has focused on the question of how the many different sets of relations should be organized (Hovy, 1990; Knott and Dale, 1994). Sanders *et al.* (1992) have started to define the 'relations among the relations,' relying on the intuition that some coherence relations are more alike than others. For instance, the relations in (3), (4), and (5) all express (a certain type of) causality; they express relations of Cause–Consequence/Volitional result (3), Argument–Claim/Conclusion (4) and Speech Act Causality (5): 'This is boring watching this stupid bird all the time. I propose we go home now!' The relations expressed in (6) and (7), however, do not express causal, but rather additive relations. Furthermore, a negative relation is expressed in (6). All other examples express positive relations, and (7) expresses an enumeration relation.

(3) The buzzard was looking for prey. The bird was soaring in the air for hours.

(4) The bird has been soaring in the air for hours now. It must be a buzzard.

(5) The buzzard has been soaring in the air for hours now. Let's finally go home!

(6) The buzzard was soaring in the air for hours. Yesterday we did not see it all day.

(7) The buzzard was soaring in the air for hours. There was a peregrine falcon in the area, too.

Sweetser (1990) introduced a distinction dominant in many existing classification proposals, namely that between content relations (also sometimes called ideational, external, or semantic relations), epistemic relations, and speech act relations. In the first type of relation, segments are related because of their propositional content, i.e., the locutionary meaning of the segments. They describe events that cohere in the world. If this distinction is applied to the set of examples above, the causal relation (3) is a content relation, whereas (4) is an epistemic relation, and (5) a speech act relation. This systematic difference between types of relation has been noted by many students of discourse coherence (*see* **Connectives in Text**). Still, there is a lively debate about whether this distinction should be conceived of in terms of domains, or rather in terms of subjectivity; often, semantic differences between connectives are used as linguistic evidence for proposals [see contributions to special issues and edited volumes like Spooren and Risselada (1997); Risselada and Spooren (1998); Sanders, Schilperoord and Spooren (2001); and Knott, Sanders and Oberlander (2001); further see Pander Maat (1999)]. Others have argued that coherence is a multilevel phenomenon, so that two segments may be simultaneously related on different levels (Moore and Pollack, 1992; Bateman and Rondhuis, 1997); see Sanders and Spooren (1999) for discussion.

So far, we have discussed connectedness as it occurs in both spoken/dialogical discourse and written/monological text. However, the connectedness of spoken discourse is established by many other means than the ones discussed so far. Aspects of discourse

structure that are specific to spoken language include the occurrence of *adjacency pairs*, i.e., minimal pairs like *Question-Answer* and *Summons-Response* (Sacks, Schegloff and Jefferson, 1974), and prosody. These topics are subject to ongoing investigations (see especially Ford, Fox and Thompson, 2001) that we consider important because they relate linguistic subdisciplines like grammar and the study of conversation.

In addition, it is clear that linguistic signals of coherence, such as connectives, have additional functions in conversations. For instance, connectives function to express *coherence relations* between segments, like *but* in example (8), which expresses a contrastive relation.

(8) The buzzard was soaring in the air for hours. But yesterday we did not see it all day.

In conversations, this use of connectives is also found, but at the same time, connectives frequently function as *sequential markers*: for instance, they signal the move from a digression back to the main line of the conversation or even signal turn-taking. In this type of use, connectives are often referred to as *discourse markers* (Schiffrin, 2001) (*see* **Particles in Spoken Discourse**).

In sum, we have discussed the principled difference between two answers to the question 'how to account for connectedness of text and discourse?' We have seen that, while cohesion seeks the answer in overt textual signals, a coherence approach considers connectedness to be of a cognitive nature. A coherence approach opens the way to a fruitful interaction between text linguistics, discourse psychology, and cognitive science, but at the same does not neglect the attention for linguistic detail characterizing the cohesion approach. The coherence paradigm is dominant in most recent work on the structure and the processing of discourse (see, among many others, Hobbs, 1990; Garnham and Oakhill, 1992; Sanders, Spooren and Noordman, 1992 ; Gernsbacher and Givón, 1995; Noordman and Vonk, 1997; Kintsch, 1998; Kehler, 2002). In our view it is this type of paradigm, located at the intersection of linguistics and discourse-processing research, that will lead to significant progress in the field of discourse studies.

See also: Accessibility Theory; Clause Relations; Coherence: Psycholinguistic Approach; Connectives in Text; Discourse Anaphora; Discourse Processing; Particles in Spoken Discourse; Problem-Solution Patterns.

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Collitz, Hermann (1855–1935)

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Hermann Collitz, one of the most influential comparative Indo-European linguists from Germany, spent much of his career in the United States. He was among the first linguistic scientists to move to the United States with the specific intention of working at American universities. Hermann Collitz was born on February 4, 1855 in Bleckede, Germany. He completed his linguistic studies at Halle, Berlin, and Göttingen, where he obtained a doctor's degree for his work on "the emergence of the Indo-Iranic row of palatals" (1879). His postdoctoral thesis ('habilitation') on nominal inflection in Old Indian and Greek was published in 1885 at the University of Halle, where he taught Sanskrit and comparative linguistics.

As a professor of German philology – and later as a professor of comparative philology – Collitz went abroad to teach at Bryn Mawr College in Philadelphia, Pennsylvania, in 1886. From 1907 to 1927, he was a professor at Johns Hopkins University, Baltimore, Maryland. In addition, Collitz stayed active in Germany and was among the editors of several books on Indo-European linguistics and dialectology. He worked on a dictionary of his own Low German dialect from Waldeck and concentrated on the dialectal history of Greek in several projects. In general philology, Collitz took part in the collection and editing of Greek dialectal inscriptions and did research on Indo-European mythology.

With his diachronic studies, Collitz was one of the pioneers in comparative linguistics. He specialized in the phonology and morphology of the Indo-European languages. Although he was supposed to be part of the group of Neogrammarians at Leipzig, which included Sievers, Paul, and Braune, these linguists could not persuade Collitz to take part in their activities. In contradiction to their radical theoretical approaches, Collitz stuck to the importance of sound changes in

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Hermann Collitz was honored in a *festschrift* (*Studies in honor of Hermann Collitz*, 1930) and – after his death – in several obituaries that cited his long list of works on Indo-European linguistics and especially the history of German, English, the other Germanic languages, and also Greek and Latin (cf. Sehrt, 1936). A list of four major monographs is supplemented by editorial work for several outstanding American journals such as *Modern Language Notes* and the *Journal of English and Germanic Philology*. Collitz founded the book series *Hesperia* with American work on Germanic philology and he published more than 70 articles and more than 30 book reviews. He received the honorary degree of L.H.D. from the University of Chicago in 1916. In 1925, he was the president of the Linguistic Society of America and the MLA. After retiring in 1927, Collitz remained an active philologist until his death on May 13, 1935.

See also: Germanic Languages; Historical and Comparative Linguistics in the 19th Century; Neogrammarians.

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Collocations

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Historical Use of the Term Collocation

The fact that certain words co-occurred frequently was noticed in Biblical concordances (e.g., Cruden listed the occurrences of *dry* with *ground* in 1769). Style and usage guides in the 19th and 20th centuries (e.g., Fowler's *The King's English*) addressed only the overuse of collocations, labeling them clichés and criticizing their use, especially by journalists (e.g., Myles na Gopaleen (see O'Nolan, 1977: 225–6), in a more humorous vein: 'When and again have I asked you not to do that? Time ... What is our civilization much? Vaunted. What is the public? Gullible. What interests? Vested.').

Collocation in Modern Linguistics

In modern linguistics, collocation refers to the fact that certain lexical items tend to co-occur more frequently in natural language use than syntax and semantics alone would dictate. Collocation was first given theoretical prominence by J. R. Firth, who separated it from cognitive and semantic ideas of word meaning, calling it an "abstraction at the syntagmatic level" (Firth 1957a: 196), and accorded it a distinct status in his account of the linguistic levels at which meaning can arise. Firth implicitly indicated that collocation required a quantitative basis, giving actual numbers of co-occurrences in some texts.

Halliday (1976) saw collocation as a cohesive device and identified the need for a measure of significant proximity between collocating items and said that collocation could only be discussed in terms of probability, thus validating the need for quantitative analyses and the use of statistics. Sinclair (Sinclair *et al.*, 1970) performed the first computational investigation of collocation, comparing written and spoken corpora, identifying ± five words as the span of significant proximity and experimenting with statistical measures and lemmatization.

Halliday (1966) and Sinclair (1966) thought that collocation could enable a lexical analysis of language independent of grammar. Sinclair (1991) suggested that lexical items could be defined by their collocational environments, saw collocation as part of the idiom principle (lexically determined choices), as opposed to the open choice principle (grammatically determined choices). Leech (1974: 20) included 'collocative' in his categories of meaning, but marginalized it as an idiosyncratic property of individual words, incapable of contributing to generalizations. Sinclair (1987c) and Stubbs (1996) suggested that all lexical items have collocations; and Hoey (2004) accommodated collocation within a model of 'lexical priming,' suggesting that most sentences are made

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up of interlocking collocations, and can therefore be seen as reproductions of earlier sentences.

Collocation and Lexicography

The pedagogical value of collocation was recognized by English teachers in the 1930s. English collocations were described in detail by Harold Palmer in a report on phraseology research with A. S. Hornby, using the term fairly loosely to cover longer phrases, proverbs, and so on, as well as individual word combinations. Palmer and Hornby showed a major interest in the classification of collocations in grammatical and semantic terms but also used collocations to indicate the relevant senses of words in word lists (**draw** 1. e.g., *a* ***picture*** 2. e.g., *a* ***line***), and in their dictionary examples (a practice continued in Hornby's (1948) and subsequent editions of the *Oxford advanced learner's dictionary*).

Early EFL dictionaries avoided using the term collocation, e.g., Hornby (1974) referred to "special uses of an adjective with a preposition" (**liable***: ~for, be ~ to sth*), and a "special grammatical way in which the headword is used" (**meantime***: in the ~*). Proctor (1978), in the *Longman dictionary of contemporary English*, referred to "ways in which English words are used together, whether loosely bound or occurring in fixed phrases" and "special phrases in which a word is usually (or always) found"; however, the dictionary also had a section headed 'Collocations,' defined as "a group of words which are often used together to form a natural-sounding combination," and stated that they are shown in three ways: in example sentences, in explanations in Usage Notes, or in heavy black type inside round brackets if they are very frequent or almost a fixed phrase ("but not an idiom"). These are signaled by 'in the phr.' or similar rubrics, and Procter (1978) gave the example *a mountain fastness*.

Later EFL dictionaries (*Cobuild*, *Cambridge*, *Macmillan*, etc.) continued to incorporate collocations in their dictionaries, including them in definitions and examples and typographically highlighting them in phrases. Sinclair's Introduction to the *Cobuild dictionary* (1987b), in the section on 'Word and Environment,' speaks of "the way in which the patterns of words with each other are related to the meanings and uses of the words" and says that "the sense of a word is bound up with a particular usage ... a close association of words or a grouping of words into a set phrase" and "(a word) only has a particular meaning when it is in a particular environment." Examples such as *hard luck, hard facts, hard evidence, strong evidence, tough luck,* and *sad facts* are discussed.

In Sinclair (1987b), collocates are defined as "words which co-occur significantly with headwords," and regular or significant collocation as "lexical items occurring within five words ... of the headword" with a greater frequency than expected, which "was established only on the basis of corpus evidence." For the first time in lexicography, a statistical notion of collocation had been introduced.

Collocation is used to distinguish senses: "Different sets of collocates found with these different senses pinpoint the fact that they *are* different senses"; "Collocation ... frequently reinforces meaning distinctions"; and lexical sets used in disambiguation are "signalled by coincidence of collocation" (Sinclair, 1987a). Collocation can also be a marker of metaphoricity: the presence of modifiers and qualifiers indicates metaphorical uses of *treadmill* and *blanket*, e.g., ... *the* ***corporate*** *treadmill; ... the treadmill* ***of office life***; *a* ***security*** *blanket* ***for new democracies***; *a blanket* ***of snow*** (ibid). Collocation is the "lexical realisation of the situational context" (ibid.). In the central patterns of English, "meaning was only created by choosing two or more words simultaneously" (ibid.). However, the flexibility of collocation (sometimes crossing sentence boundaries) can cause problems in the wording of definitions: often, "no particular group of collocates occurs in a structured relationship with the word" and therefore "there is no suitable pattern ready for use as a vehicle of explanation" (ibid.). The difficulty of eliciting collocates by intuition is discussed; we tend to think of semantic sets: *feet* suggests "*legs, toes, head* or *shoe, sandals, sock*, or *walk, run*," whereas significant corpus collocates of *feet* are "*tall, high, long*, and numbers" (ibid.). Prompted by *hint,* we produce "*subtle, small, clue*"; the corpus indicates "*give, take, no*." The difference between left-hand and right-hand collocates is exemplified by *open*: the most frequent words before *open* are "*the, to, an, is, an, wide, was, door, more, eyes*" and after *open* are "*to, and, the, for, up, space, a, it, in, door*" (ibid.).

Lexicographers can also use collocations to distinguish between near-synonyms, e.g., the difference between *electric* (collocates: specific devices such as *guitar*, *chair*, *light*, *car*, *motor*, *windows*, *oven*, all 'powered by electricity'), and *electrical* (collocates: more generic terms such as *engineering, equipment, goods, appliances, power, activity, signals, systems*, etc., 'concerning or involving electricity').

Finding Collocations in a Corpus

Initially, collocates for dictionary headwords were identified manually by lexicographers wading through pages of printouts of concordance lines. This was

clearly unsatisfactory, and only impressionistic views were feasible. Right-sorted concordances obscured left-context collocates and vice versa. The fixed-length context of printouts prevented the observation of collocates beyond a few words.

Subsequent software developments have enabled the automatic measurement of statistically significant co-occurrences. These are within a specifiable and adjustable span or window of context, using different measures of statistical significance, principally mutual information (or MI-score) and t-score. MI-score privileges lower-frequency, high-attraction collocates (e.g., *dentist* with *hygienist*, *optician*, and *molar*) while t-score favors higher-frequency collocates (e.g., *dentist* with *chair*), including significant grammatical words (e.g., *dentist* with *a,* and *your*). The software can also display the collocate's positional distribution if required, and recursive options are available to investigate the detailed phraseology of collocating items.

Software has also become more publicly available, from *MicroConcord* to *Wordsmith Tools* and *Collocate*. Kilgarriff and Tugwell's *WordSketch* (Kilgarriff *et al.,* 2004) was used in creating the *Macmillan English dictionary* (Rundell, 2002) and offers clause-functional information about collocations, e.g., ***wear*** + objects: *suit, dress, hat*, etc. + prepositional phrases (after *of*: *armor, clothing, jeans*, etc.; after *with*: *pride, sleeve, collar,* etc.; after *on*: *sleeve, wrist, finger*, etc.; after *over*: *shirt, head, dress*, etc.); similarly, ***fish*** is the subject of the verbs *swim, catch, fry*, etc.; the object of the verbs *catch, eat, feed*, etc. and modified by the adjectives *tropical, bony, oily*, and so on.

Lexicographers are in general less concerned about the detailed classification of collocations, although their judgments affect the both the placement and specific treatment of the combinations. Hornby's attempts (e.g., Hornby, 1948, 1974) at classification (focusing on verbs) later used transformations and meaning distinctions as well as surface patterns, and Hunston and Francis (2000) listed the linguistic and lexicological terminology that has developed subsequently for collocational units: lexical phrases, composites, gambits, routine formulae, phrasemes, etc., and referred to the work of Moon (e.g. 1998) and Mel'čuk (e.g. 1998) in discussing degrees of fixity and variation, which does impact on lexicography.

However, one of Firth's (1957b) original terms, 'colligation,' used to describe the habitual co-occurrence of grammatical elements, has not achieved the same widespread usage as 'collocation.' One manifestation of colligation, phrasal verbs, the combination of verb and particle (adverb or preposition) to form semantic units, has been highlighted in EFL dictionaries. Several EFL publishers have produced separate dictionaries of phrasal verbs.

There have been some dictionaries of collocations, but so far each has had its own limitations: not wholly corpus-based (e.g., Benson *et al.*, 1986; Hill and Lewis, 1997), based on a small corpus (e.g., Kjellmer, 1994), or limited coverage (the recent *Oxford collocations dictionary for students of English* (Lea, 2002)).

Collocation in Computational Linguistics, Pedagogy, and Translation

Interest in collocation has increased substantially in the past decade, as evidenced by workshops at lexicographical, linguistic, pedagogical, and translation conferences. For computational purposes, the relevant features of collocation are that they are "arbitrary, domain independent, recurrent, and cohesive lexical clusters" (Smadja, 1993), and "of limited semantic compositionality" (Manning and Schütze, 1999).

But the greatest interest has been generated in the language-teaching profession, with numerous conference and journal papers. Lewis (2000) encapsulates the main concerns: students do not recognize collocations in their input, and hence fail to produce them; collocation represents fluency (which precedes accuracy, represented by grammar); transparent versus 'arbitrary' (or idiomatic) combinations, with familiar words in rarer combinations (a *heavy smoker* is not a fat person); transformation can be misleading (*extremely disappointed* but rarely *extreme disappointment*); students may generalize more easily from corpus concordance examples than from canonical versions in dictionaries (exploring versus explaining); collocation as a bridge between the artificial separation of lexis and grammar; collocation extends knowledge of familiar words (easier than acquiring new words in isolation); and longer chunks are more useful and easier to store than isolated words.

Conclusions and the Future

For many fields, it seems that collocation has a great future. The applications of collocation in language teaching have been one of the notable recent successes. Its more detailed exploration in large language corpora requires a significant advance in software. The exact parameters are not fully established, and the statistical measures can be improved. Research to identify word-senses by the clustering of collocates was initiated in the 1960s (Sinclair *et al.*, 1970), but has still not become sufficiently robust for automatic processing. The identification of lexical sets by collocation, signaled in Sinclair (1966; Sinclair *et al.*,

1970) and Halliday (1966), is yet to be achieved, as is a corpus-generated thesaurus. The theoretical impetus of collocation has yet to reach the level of a language-pervasive system, although Hoey's notion of Lexical Priming heads in that direction.

See also: Computational Lexicons and Dictionaries; Computational Stylistics; Computers in Lexicography; Concordances; Corpus Approaches to Idiom; Corpus Linguistics; Corpus Lexicography; Data and Evidence; Disambiguation, Lexical; Firth, John Rupert (1890–1960); Halliday, Michael A. K. (b. 1925); Idiom Dictionaries; Idioms; Lexicon Grammars; Palmer, Harold Edward (1877–1949); Phraseology; Polysemy and Homonymy; Selectional Restrictions; Statistics.

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Colombia: Language Situation

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Colombia's geography has greatly influenced its present-day linguistic situation. Its position at the end of the isthmus of Panama forced the pre-Columbian peoples migrating southward from North America to pass through it. The extreme diversity of its ecological niches, which include coastal areas along the Pacific and Atlantic Oceans, three Andean mountain ranges with climates varying according to altitude, savannas of the Orinoco Plain, Amazonian forests, torrid deserts, and cold plateaus, allowed many of these populations to settle there. As a result, Colombia has an exceptionally large variety of the South American continent's indigenous language families.

On the other hand, in the 16th century, the islands of the Caribbean Sea and the Atlantic coast of what is today Colombia saw the earliest Spanish settlements and the first shipments of black slaves, historical factors that would greatly influence the sociolinguistic configuration of the country. The languages spoken in Colombia today include 69 Amerindian languages; two creole languages spoken by black populations of African descent in the Caribbean; and the Indo-European language Spanish, represented by a great number of regional variants. This linguistic reality is demographically highly unequal. Of the total Colombian population of over 40 million, there are fewer than 700 000 indigenous language speakers, and the speakers of creole languages number fewer than 35 000. Spanish is therefore the dominant language, and, except in some isolated indigenous zones, most Colombians speak it. In spite of this scarcity of linguistic minorities, there fortunately exists today a greater awareness and acceptance of linguistic diversity.

In 1991, Colombia adopted a new constitution, Article 10 of which says: "Castilian [Spanish] is the official language of Colombia. The languages and dialects of the ethnic groups are also official in their territories. The education that is imparted in communities with their own linguistic traditions will be bilingual." This text has allowed the acknowledgment and fostering of many initiatives, especially in scholastic circles, to use and revitalize the vernacular languages, which have developed over the last 30 years and whose fortune it would be yet premature to predict. In any event, the future of these languages remains worrisome since, of the 71 vernacular languages, 30 have fewer than a thousand speakers.

Afro-American Languages

There are two creole languages, spoken in the Caribbean areas by populations of black African origin: the creole of San Basilio de Palenque, near Cartagena de Indias, spoken by 3000 people; and the creole of the islands of San Andrés and Providencia (Old Providence) off the coast of Nicaragua, spoken by 30 000 people. These two languages are new. They were created by slaves of diverse African ethnolinguistic origin (more clearly Bantu in the case of the creole of Palenque) in the period of the slave trade. The creole of San Basilio, known as Palenquero, was born in a Hispanic context, and a majority of its lexical roots come from Spanish, thus making it the only creole of Hispanic base in the Americas. The creole of San Andrés and Providencia was born in an English context (migrations from Jamaica) and its lexical base is mainly English.

Indigenous Languages

Studies of the indigenous languages of Colombia have developed substantially in recent decades (for a bibliography and a characterization of these advances, see Landaburu, 2003). Relying on these works, it is now possible to group the 69 Amerindian languages present in Colombia into 13 different language families, to which may be added 8 isolated languages whose affiliation with others is as yet undemonstrated, giving us 21 different genetic groups. Greenberg's proposed classification about languages of the Americas

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(1987) is insufficiently documented and argued; a more solid classification is made by investigators in direct contact with these families (see Rodriguez de Montes, 1993; González de Perez, 2000). For demographic data on the indigenous populations, Arango (1999) is a reliable, albeit not yet definitive, authority. However, as very few serious sociolinguistic surveys have been done up to now, the present data refer more to ethnic populations than properly to speakers of languages.

Classification of Languages

The linguistic families of Colombia can be classified according to their geographic scope. Three groupings can be observed:

1. Five genetic groups present throughout the continent:
   a. The Chibcha family (seven languages). This linguistic family, probably of Central American origin, is also present in Panama, Costa Rica, and Nicaragua. 'Chibcha' was the name of the people found by Spaniards in the region of Bogota. In Colombia today, there are Chibchan languages in Darién (Cuna [Kuna], with 1000 speakers in Colombia and more than 30 000 in Panama), in the Sierra Nevada of Santa Marta (Kogui [Cogui], with 10 000 speakers; Arhuaco or Ika [Ica], with 14 000 speakers; Damana, spoken by 1800 Wiwa or Arsario people; and Chimila, 900 people but very few speakers), in Catatumbo (Barí [Motilón], 3500 speakers), and in western Arauca (Uwa or Tunebo, 7000 speakers). A Chibchan affiliation of languages in the south of Colombia (e.g., Páez, Guambiano, Awa or Kwaiker [Cuaiquer]) has been proposed, but there is not sufficient evidence to maintain this assertion.
   b. The Arawak family (nine languages). This is the most geographically extensive family in South America. Probably of central- Amazonian origin, it spread along the tributaries of the Amazon and Orinoco and along the coast of the Caribbean over the past two millennia. In Colombia, Arawak languages are found in three areas: the Guajira (Wayuu or Guajiro, with 144 000 people in Colombia and more than 180 000 in Venezuela), the eastern plains of the Orinoco and the area of the Negro River (Achagua, 280 people; Piapoco, 4500; Curripaco and Baniva of the Isana, 7000; Baniva of the Guainía, Tariano, 330); the area of the Caquetá River (Yucuna, 500 people; Cabiyarí, 280).
   c. The Carib family (two languages). This genetic group also spread before the arrival of the Spaniards, from the Guyanas throughout the north of South America and south of the Amazon. In Colombia, it was represented in the Atlantic areas, the Magdalena River drainage, the Amazon, and probably in other regions as well. Today a group in the mountain range of Perijá subsists partly in Colombia and partly in Venezuela (the department of Zulia). They speak a Carib language called Yuko or Yukpa, with about 3530 people in Colombia and an equal number in Venezuela. Colombia's other extant Carib language is Carijona, found in the Middle Caqueta Region. Its population, greatly decreased during the first decades of the 20th century, has faded away. Today, fewer than 30 people speak Carijona.
   d. The Quechua family (three languages). The presence of languages of the Quechua family in Colombia seems to be modern. Today, Inga or Ingano is spoken in the department of Nariño (Aponte), in the valley of Sibundoy (Putumayo), and in the department of Caquetá (along the upper Caquetá River, the Fragua River, the Yuruyacu River, and the Orteguaza River) by 18 000 people. Another variety of Quechua is spoken near Puerto Asis and along the San Miguel River. Both varieties are comparable with the dialects of Ecuadoran Quichua, especially with the Ecuadoran forest dialects. It is very possible that its presence in Colombia and its expansion is due to its diffusion as a 'lengua general' by the Catholic missionaries of the 17th century. There are also speakers of Peruvian varieties of Amazonian Quechua on the lower Putumayo River.
   e. The Tupí family (two languages). This great language family is found mainly in Brazil, Bolivia, Paraguay, and Argentina, but Tupi languages have a few speakers in the tiny community of Cocama, on the border between Colombia, Brazil, and Peru. Hundreds of speakers of 'Lengua Geral' (Nheengatú) [Nhengatu] have been reported on the Guaviare River.
2. Eight genetic groups with a regional projection present in several areas in the northwest:
   a. The Barbacoa family (two languages). This group is found in the Andean southwest, with possible prolongations in the Ecuadoran west (Chachi [Cayapa], Tsachila [Colorado, Tsafiki]). It includes Guambiano in Cauca (21 000 people), and Awa or Kwaiker [Cuaiquer] in the Pacific piedmont of Nariño (130 000 people).

b. The Chocó family (two languages). It is found on the Pacific coast, from Panama to Ecuador, with incursions in both countries. Its languages are Embera, with much dialectal variation (Embera-Catío, Embera-Chamí, Tadó, Epena, with more than 70 000 people), and the well-differentiated Waunana [Woun Meu] (8000 people) along the San Juán River.

c. The Guahibo family (three languages). This family is found in the eastern plains of the Orinoco in Colombia and also in Venezuela, spoken by formerly nomadic populations who are today mostly settled. In Colombia, two very distinct languages are found at the extreme ends of the area: Hitnu or Macaguane [Macaguán] in the north (500 people), and Guayabero in the south (1200 people). Between these, a more homogenous space is occupied by Guahibo proper or Sikuani (25 000 people in Colombia), with dialectal differences that are not very marked (e.g., Cuiba, Hamorúa).

d. The Sáliba-Piaroa family (two languages). Peoples in the plains of Orinoco were catechized early by the Jesuits in the 17th century. Sáliba is spoken in the west (1300 people); Piaroa is spoken in the east and also in Venezuela, close to the Orinoco River (800 people in Colombia, 5000 in Venezuela).

e. The Macú-Puinave family (five languages). Small groupings of nomadic forest communities along the Inírida River and in the forests of Guaviare and Vaupés speak the languages Yuhup, Hupda [Hupdë], Nukak [Nukak Makú], and Kakua. A more sedentary group along the Inirida river speaks Puinave (5400 people).

f. The Tucano family (eighteen languages). These languages are distributed in two areas: the upper Caquetá and the upper Putumayo in the west, and the upper Negro River and Vaupés in the east. Languages of this family are also spoken in Brazil, Ecuador, and Peru. In Colombia, the languages of the western area (Coreguaje [Koreguaje], Siona; 3000 people) are threatened by recent colonization; the eastern area is characterized by systematic practices of multilingualism. This latter area has 16 languages spoken by its fewer than 30 000 people: Cubeo, Tanimuca [Tanimuca-Retuarã], Tucano, Desano, Macuna, Tatuyo, Barasana, Carapana, Tuyuca, Yurutí, Siriano, Piratapuyo, Bará [Waimaha], Taiwano, Wanano [Guanano], and Pisamira.

g. The Huitoto family (three languages). The Uitoto language with its three dialects is spoken along the rivers Caquetá and Putumayo (6200 people), as is the Ocaina language, spoken by fewer than 100 people (though it is also spoken in Peru), and the Nonuya language, which is now moribund with only three living speakers.

h. The Bora family (three languages). Located in the Caquetá–Putumayo area, its languages are Muinane (550 people), Bora (650 people), and Miraña (660 people); the latter two are very similar.

3. Eight genetically unaffiliated languages:
   a. Andoque (500 people), spoken in Araracuara (Amazonas).
   b. Cofán (1460 people), spoken along the upper Putumayo and in a few communities across the border in Ecuador.
   c. Kamsá (3500 people), spoken in the valley of Sibundoy (Andean–Amazonian piedmont).
   d. Páez (100 000 people), spoken in the Andean southeast (eastern Cauca).
   e. Tinigua (moribund, with two speakers), found in the Sierra de la Macarena.
   f. Yaruro (3000 people total), found on the border with Venezuela (Arauca River); its speakers are occasionally present in Colombia.
   g. Ticuna (6580 people in Colombia; more than 30 000 total), spoken at the edge of the Amazon River and extending beyond the border with Brazil and Peru.
   h. Yagua (300 people in Colombia; 3000 in Peru), found on the border with Peru and along the rivers Putumayo and Amazon.

Some Structural Features of the Indigenous Languages

We here outline only some simple characteristics of the indigenous languages. The more important typological differences are probably those found between the lowland languages (in Amazonas and Orinoquía, and on the Pacific and Atlantic coasts) and the highland or Andean languages (associating with these latter the languages of the Chibcha family that are sometimes found in the lowlands).

At the phonetic–phonological level, we find complex consonantal systems with simple vocalic systems in the Andes; whereas, in the lowlands, the tendency is an opposite one of complex vocalic systems with simpler consonantal systems. Remarkable consonantal characteristics include the retroflex of the Guambiano and the Kamsá; the six consonant series of the Páez,

where the simple oclusives can receive either a feature of palatalization and/or aspiration or a feature of palatalization and/or prenasalization; the use in many languages of the opposition tense/lax, rather than the opposition voiceless/voiced; the existence of implosives in the Embera of the Pacific, in the Arawakan languages of the plains (Achagua, Piapoco, Curripaco), and in the Witoto family (Nonuya, Uitoto-Nepode); the importance of consonantal prenasalization; the postnasals of the Yuhup (Makú); the affricative laterals of the Kogui; the existence of aspirated flaps (Barí, Cabiyarí) or nasalized labiovelars (Kogui).

The most common vocalic system is one of six vowels: the five cardinal vowels plus a vowel which can be mid-central in the Andes, or frequently is closed unrounded and back in the Amazon (note also the rounded front vowel of the Embera-Chamíes). In the Andes or the Chibchan languages, the system can be reduced to four vowels (Páez , Awa-Kwaiker) or to five (Guambiano, Cuna, Chimila). In the Amazon region, there are greater complexities not only in the number of vocalic qualities (nine qualities in Andoque and Yuhup; eight qualities in Cuiba) but also in coarticulations. It is common to have, along with the simple system, a system of nasal vowels and/or a system of glottalized or of aspirated vowels. The handling of vocalic nasality among the eastern Tucano languages of Vaupés is remarkable (morphemic nasality, word harmony). In the same area of Vaupés, and also along the lower Caquetá-Putumayo and the Amazon River, there are tonal languages of two or three registers (the Tucano family, the Bora family, the Makú-Puinave family, Andoque, Ticuna). At the border of this area are pitch-accent languages that keep the oppositions of register, but only on the accented unit (syllable or mora): Piapoco, Yucuna, Barasana, Nonuya, etc.

The most attested type of word morphology is agglutinating, although there are tendencies toward flexion in the classic sense among the languages of the Sierra Nevada of Santa Marta, and isolating tendencies occur in Embera, Cuna, Uwa, and others. The agglutination can go to the point of polysynthesis or holophrasis (Páez , Kamsá), with nominal incorporation, yielding utterances composed solely of a predicate word. The verb is commonly synthetic, but there are also analytical constructions with aspectual, negative, modal, deictic auxiliaries. At the syntactic level, the regressive order (determiner–determined) is dominant, with a strong tendency to locate the verb at the end of the sentence, preceded by its complements. Many languages can choose between different predicate structures to direct the attention to an event or to some entity of the event (Sáliba, Piapoco, Achagua, Cofán, Muinane, Puinave, etc.). The nominal or adjectival predication is frequently expressed as a verbal predicate (the noun or the adjective is 'conjugated' in Cofán, Páez , Piapoco, etc.) since the verb–noun opposition is frequently questionable at a syntactic higher level.

Regarding hierarchial structuring and the classification of participants, there are languages clearly ergative (Embera, Uwa), partially ergative (Kogui, Wiwa [Malayo] or Damana), and accusative (Ika, Andoque, Eastern Tucanoan, etc.). The active–stative type is very common in the lowlands (Arawak). Among the Chibchan languages and in the highlands, morphologic topicalization is common (Awa or Kwaiker, Guambiano, Páez, Uwa or Tunebo, Arhuaco, Cuna, etc.). The nominal function is frequently marked by declension suffixes. The representation of the main participants in an event is commonly made by means of integrated personal or generic markers on the verb. Nevertheless, there are also languages without personal flexion in the verb (e.g., Embera, Uwa-tunebo, Yuhup).

At the syntactic–semantic level, and for the representation of entities, it is common in the lowlands to find classifiers of shape and/or gender markers with functions of syntactic agreement (Sáliba, Tucano family, Bora family, Andoque, etc.), whereas the absence of class and gender markers is dominant in the highlands (Guambiano, Páez , Sierra Nevada, Cuna, Uwa, etc.). There are also numeral classifiers (Cuna). The categorization of person typically opposes 1st and 2nd to the 3rd, although there is also the opposition of 1st versus 2nd and 3rd (in the Andean south, Guambiano, Awa-Kwaiker, Cofán). The Páez language also distinguishes feminine 1st person from masculine 1st person and feminine 2nd person from masculine 2nd person. The Andoque language distinguishes an impregnable (i.e., a potentially pregnant woman) 2nd person (pluralized) from an unimpregnable (i.e., a young girl or old woman) 2nd person. The opposition between inalienable and alienable nouns is generalized; the inalienable ones (body parts, spatial relations, kinship, etc.) appear with obligatory possessive prefixes. The categorization of space is often complex and the systems of deixis or the systems of orientation of event are highly elaborated (Sierra Nevada of Santa Marta, Kamsá, Páez, Sikuani or Guahibo, Andoque, etc.), and it combines criteria of proximity with criteria of movement, nominal class, and the directionality of the sun, the rivers, and so on. Grammaticalization of temporary location also occurs, although it is generally marked by a combination of aspectual and deictic markers. The systems of epistemic modality are also noteworthy, and they highlight a sensitivity to the source of information

(Tucano family, Páez, Guambiano, Uwa, Andoque, Kamsá, languages of the Sierra Nevada, etc.).

The Spanish Spoken in Colombia

We have deliberately focused on the Amerindian linguistic diversity of Colombia because it is more qualitatively profuse and less well-known. Nevertheless, we must remember that Colombia is not today a country with majority or near majority Indian areas like Peru, Bolivia, Ecuador, and Guatemala. Nor was it affected by the demographically significant immigration of Europeans after the 18th century, as is the case in Argentina, Uruguay, and Chile. The three basic population components – Indians, blacks, and whites – were gradually mixed from the 16th century on in diverse proportions in different regions, producing a locally differentiated but globally continuous Spanish speech. This continuum represents nearly the totality of the population of 40 million inhabitants. More than anywhere, it can be found in the three Andean mountain ranges, their inter-Andean valleys, and on the Atlantic coast. In these regions are the great cities in which most of today's Colombians are concentrated, including Bogota, Medellín, Cali, Barranquilla, Cartagena, and Bucaramanga.

The linguistic variation of this Spanish-speaking population is remarkable, but it does not impede communication. The lowest fluency of interactive understanding is found between the speakers of the coastal varieties (found along the Atlantic and 'interland' of the Caribbean) and the others. Among the many different features which distinguish the 'Costeños' from the 'Andeans,' we can note, at the phonetic level, the aspiration or loss of syllable final /s/, the loss of final /r/, and the velar pronunciation of final /n/. These same phonetic features are found and were present in Andalusian Spanish, the variety of Spanish that indeed began the American conquest on the islands and the Caribbean coast. In the use of 2nd person markers, the Costeños of the Caribbean prefer the 'tuteo' (i.e., the use of 'tu'), whereas the Costeños of the Pacific prefer the 'voseo' (i.e., the use of 'vos'), which is generalized in the southeast of Colombia. The Atlantic coastal varieties can be subdivided into Cartagenero, Samario (of Santa Marta), and Guajiro. The more eastern speech of the plains of Orinoco are of a costeño type, possibly from the influence of Venezuelan speech, a coastal variety.

Andean Spanish may be divided into western (Nariño, Cauca, Caldas, and Antioquia) and eastern (Cundinamarca and Boyacá, Santander, Tolima and Huila) varieties. Among the western dialects, we can distinguish Antioqueña or 'Paisa,' Valluna of the area of Cali, 'Pastusa' of the southwest border with Ecuador. The Paisa variety is noticeable to other Colombians for its apico–palatal pronunciation of /s/ (similar to Castillian) and the 'yeismo' (ll>y) that it shares with the people of Valle del Cauca. In Valle del Cauca, the voseo is generalized and the labialization of final /n/ is also noteworthy. In Nariño, as also in Valle del Cauca, the 'quechuismos' (i.e., elements of Quechua) are frequent. The pronunciation resembles that of Andean Ecuador, with tense consonants and a short syllabic rate. On the eastern side of the Andes, the distinctions appear mainly in the lexicon (isoglosses). Of note in Boyacá, though less in Cundinamarca, is the form of 'Su Merced' for polite 2nd person. There is also an assibilation of /r/ in these varieties ('rolo' or traditional speech of Bogota, 'opita' of the department of Huila), a feature probably originating in the indigenous substrate (also present in Nariño).

We cannot here discuss the many differences of lexical usage. For particular studies, see the monumental *Atlas lingüístico-etnográfico de Colombia*, 1981–1983, compiled at the Instituto Caro y Cuervo under the direction of Luis Flórez. It is also important to mention that with the intensification of telecommunications and considerable internal migration over the past 40 years, some of the specificities are disappearing, and many others, mainly lexical, are appearing in areas different from their origin.

See also: Minorities and Language; Spanish; Venezuela: Language Situation.

Language Maps (Appendix 1): Maps 56, 57.

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Color Terms

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Color Perception

Color is a shorthand way of referring to the psychological interpretation of retinal and neuronal perception of reflected visible light (Lenneberg and Roberts, 1956; Hardin, 1988). Colors are commonly thought of as being composed of three properties: 1) hue (perception of wavelength interactions), 2) brightness or luminesence on a dark-light scale (based on reflectivity of a surface), and 3) saturation (perception of purity of one dominant wavelength). The highest degree of luminiscence is 'white' or 'bright,' while the lowest degree (no reflectivity) is 'black' or 'dark' (Figure 1). If there is very low or no saturation, the color is interpreted as 'gray' (Figure 2).

Color Vocabulary

Color terms are not the same thing as the psychophysical perception of wavelength and reflectivity, but are Sausseurian '*signs*' which name color concepts. Individuals from two distinct language-culture groups may perceive given light-wave experiences similarly but use very distinct patterns of color terms to talk about their experiences. For example, it is unlikely that a native English speaker would use a single color term to name the entire range of colors that are named by the term *ŋirô*, or a single term for the range named by *pôs* in Maa, the language of the Maasai, in Kenya and Tanzania (Figure 3). Conversely, many English speakers might use the single word *brown* for the hues that Maa speakers divide into *ŋirô*, *múgíé*, *moríjoi*, and several other categories.

Essentially, all languages have two or more lexical items that name color concepts as their basic sense (but see Levinson, 2002). The Dani (Irian Jaya) word *mola* names a color concept roughly corresponding to a combination of 'red + white + yellow.' The Yagua (Peru) *rúunąy* names 'red.' Some color terms may derive from the names of objects, such as English *olive*, which names a tree and its fruit; only by metonymic extension does it name the grayish-green color corresponding to the prototypical fruit of the olive tree. Some color terms are contextually restricted. Thus, English *blond* primarily applies to human hair colors, and cannot be used for the same hue range in paint found, for example, on cars or walls. The Maa *ómò* is restricted to the color of certain light-brown sheep. Even for terms that are not contextually restricted, their reference on particular occasions of use is likely to be severely affected by context. The meaning of *black* in *black sky* versus in *black crow* is not likely to be same 'black.' *Red* is unlikely to designate the same hue-saturation-brighness values in *red lipstick* and in *red hair* (under natural circumstances). Color terms often have emotional or social connotations, such as the widely-attested association of 'red' with anger. Color terms are common in idioms for human beings.

Sometimes languages include in their 'color' category words that cannot be defined only by hue, saturation, and brightness parameters. The Maa *emúá* 'color' category contains both hue-saturation-brightness terms and color-plus-design terms such as *arôs* 'spotted black and white,' *keshúroi* 'red and white/brown and white' with 'white' on or near the face, *sámpù* 'thinly striped, typically with tan and white' (Figure 4), etc. *Pukótì* 'blend of black and white, so well blended that from a distance the whole may appear blue' is a hyponym (subcase) of

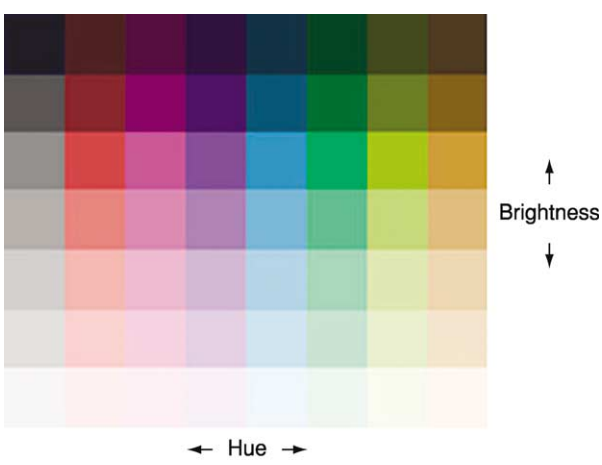

Figure 1 Luminescence.

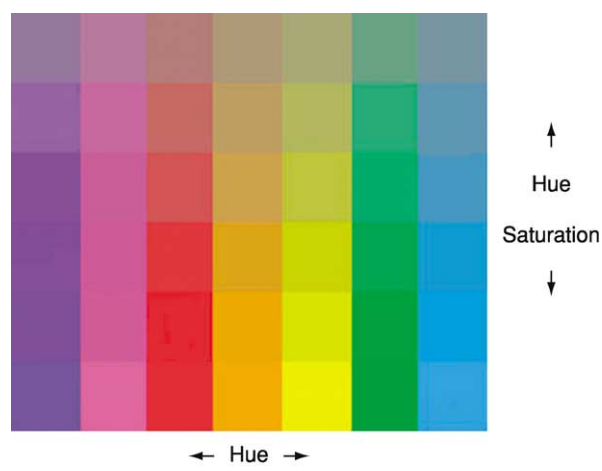

Figure 2 Saturation.

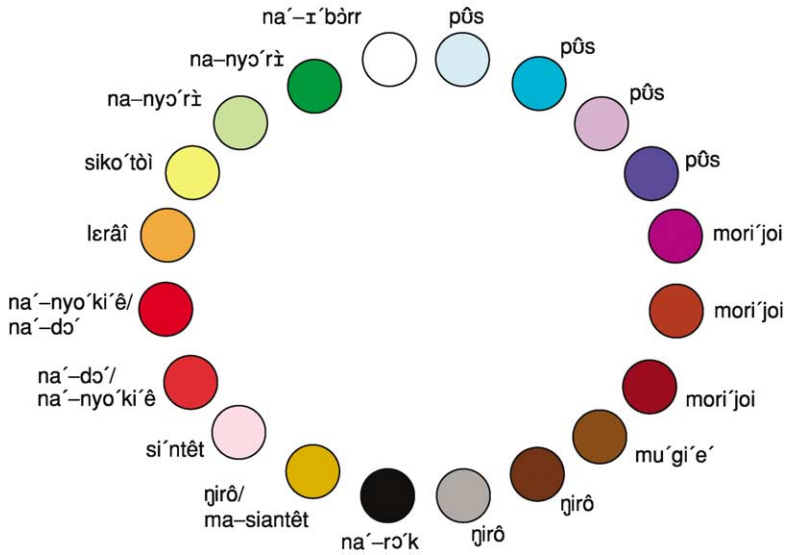

Figure 3 Maa color naming. See *http://darkwing.uoregon.edu/~dlpayne/maasai/MaaColorNaming-.htm*. This figure reflects a color-naming task done by Vincent Konene Ole-Konchellah, a Maa (Maasai) speaker of Kenya, il-Wuasinkishu section. When the task was done, the color circles were randomized within a field. They are re-arranged here according to the names applied to the colors. In other Maa-speaking areas some terms, e.g., siʹntêt and pûs, may designate different colors. Maa has many additional color terms which Ole-Konchellah just did not employ in this task.

pûs 'blue', parallel to *sagárarámì* 'light blue/purple' (from the name of a seed pod), and *kií* 'blue' (from 'whetting stone') (Payne *et al.*, 2003).

On different occasions, the same speaker may name a given hue-saturation-brightness value with different terms. In part, this led MacLaury (1996; 2002) to argue that speakers may switch perspectives in observing a phenomenon; they may look at two items from the vantage point of either how similar, or how different, they are. Perspective-switching allows for flexible cognitive categorizations, hence alternative namings, and eventually may lead to different lexicalizations across speech communities.

Color Term Universals

An enduring question concerns whether universal constraints underlie inventories of color terms. If so, do explanations lie in physiology or the nature of cognition? Bloomfield (1933: 140) advanced the relativist idea that languages can 'mark off' different portions of the wavelength continuum quite arbitrarily. For him, color naming should be entirely culture-specific. A related question concerns to what extent color vocabulary may affect individuals' cognitive perceptions of color (cf. Whorf, 1956; Kay and Kempton, 1984).

Scientific cross-cultural studies of color terms began with the optician Magnus (1880), who drew evolutionary conclusions about vocabulary development. The anthropologist Rivers (1901) drew evolutionary conclusions about social and mental development. Employing Lenneberg and Roberts's (1956) procedures for researching Zuni (New Mexico) color terms, Berlin and Kay (1969) (henceforth BK) addressed the universals question. They distinguished between basic color terms (BCTs) versus color terms generally, and argued against an extreme relativist position, instead positing universal constraints on the evolution of basic terms.

BK defined a BCT as a word that refers to color first and foremost; is not a composite of other color terms; is not a sub-case hyponym of a more general term; is not contextually restricted; and is salient, as judged by being readily used and widely known throughout a language community. By these criteria, we identify Yagua as having four basic color roots (though of differing parts of speech): *pupá*-'white,' *dakuuy* 'be dark, black,' *rúunąy* 'red colored,' *súnụ*-'green-blue.' A concept partially corresponding to 'yellow' can be expressed, but this involves modifying *súnụ*-'green-blue' with a suffix that probably derives from-*diiy* 'near' (*súnụdiipó* 'pale, yellowish,' *súnụdíway* 'be yellowish, pale, anemic'; Powlison, 1995). Secondary criteria, appealed to in problematic cases, include whether the term (a) has the same grammatical properties as other BCTs; (b) is not derived from the name of an object; and (c) is not recently borrowed. Secondary criteria can be synchronically irrelevant for determining basic status, even if historically true.

Figure 4 Animal hide displaying the Maa (Maasai) color term sámpù 'thinly striped, typically with tan and white.

English *orange* was borrowed from French and still is the name of a fruit tree, but *orange* is considered a BCT in modern English because it meets the primary criteria.

BK tested the hypothesis that there are constraints on development of BCTs using an array of about 330 Munsell color chips and 20 languages, relying on bilingual speakers living in California. The BCTs of each language were identified and elicited from the speakers. They were then asked to use the color chips to identify the best example (*focal hue*) of each term identified as a BCT in their respective languages. In a separate step speakers plotted the range of each BCT on an array of the color chips. The 20-language sample was supplemented by data on 78 more languages extracted from dictionaries and field-workers' notes.

BK concluded that though BCTs could show marked differences in range, there was a high degree of stability for focal hues across languages: only about 30 of the chips were nominated as focal hues. These concentrated around the focal hues of English *black, white, red, green, yellow, blue, gray, brown, orange, purple, pink*. Some languages had a term that covered blue + green (cf. Yagua *súnụ-*), but BK's results showed that the focal hue of this term tended to be either 'blue' or 'green,' but not half-way in between. They concluded that languages could be placed along a continuum of seven stages of BCT development, and that an implicational hierarchy governed the order in which new BCTs could be added, ending with a maximum of 11 BCTs (Figure 5). These claims opposed the view that languages could vary without limit.

Further empirical evidence argued that, for people with normal trichromatic vision, certain focal centers are psychologically salient even when a person's language has no BCT corresponding to those focal colors (Heider, 1972; Rosch, 1975). Rosch showed that in Dani, with just two BCTs, speakers were better able to hold certain colors in memory than others, even when the memorable colors did not correspond to a focal center of one of the two Dani color terms. Importantly, the memorable colors corresponded quite closely to the BK 'best examples' from other languages. This result argues that the focal colors BK identified are psychologically salient, with the implication that at least the centers of color term categories were not dependent on culture or language. Again this concept countered a strong form of the Whorfian hypothesis.

Subsequent scholars have challenged the BK study on several grounds, including Western cultural bias, non-random sampling procedures, bilingual interference, transcription and data errors, and inadequate experimental methodologies (Hickerson, 1971; Saunders and van Brakel, 1997). Dedrick (1998) provides an even-handed review of the research from a philosophy of science perspective.

The BK study was nevertheless hugely influential in initiating an enduring research tradition, spurring investigation of hundreds of additional languages (Borg, 1999). Major cross-language studies include MacLaury (1996) and the *World Color Survey* (Kay *et al.*, forthcoming). Together these motivated revisions to the universalist claims (cf. Kay *et al.*, 1997), including the following.

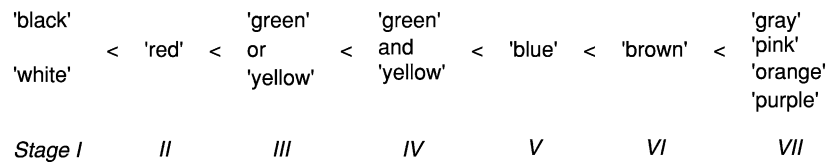

Figure 5 Berlin and Kay's (1969) hypothesized stages in development of BCTs. If a language has any BCT to the right on the hierarchy, it was predicted to have all BCTs to the left. (A Stage VII language need have only some of 'gray, pink, orange, purple.')

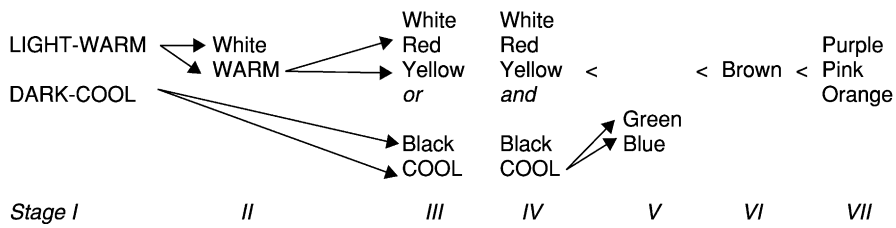

Figure 6 Kay and McDaniel's (1978) revised BCT color sequence. Arrows represent splitting of composite categories. Gray is 'wild,' able to appear anywhere, but later is more likely.

- In addition to 'blue + green,' the developmental sequence was revised to include more composites (Kay and McDaniel, 1978) (Figure 6). This was partially based on the discovery that 'white' was not a focal hue in all two-color BCT systems. For example, though the range of the Dani *mola* includes 'white + red + yellow,' it had a focal hue within the 'red' range. A more insightful characterization is that *mola* is a WARM color term, and neither a 'white' nor a 'red' term. The complementary term is *mili*, which is a 'black + green + blue,' or DARK-COOL composite. 'Yellow + green,' 'white + yellow,' and 'black + blue' composites have also been documented. In some languages a 'green + blue' composite may persist even after 'brown,' 'purple,' or both have achieved BCT status. Acknowledging composites accounted for how speakers can use BCTs to name any hue-saturation-brightness value, whereas BK would have predicted that some phenomenological color values would go unnamed.
- Composite color categories may have their foci in one salient hue or another, or may have multiple foci. This difference may vary by speaker.
- In the revised developmental sequence, the colors of Stages VI and VII were viewed as derived. The developmental sequence thus contained category types: composite, unique hue, and achromatic ('red, yellow, green, blue, white, black'), binary hue ('orange' as a combination of 'yellow' and 'red,' 'purple' as a combination of 'red' and 'blue'), and derived ('brown,' 'pink').
- Developmentally, 'brown, purple, pink, orange' and especially 'gray' may appear earlier than predicted by BK (Greenfield, 1986). Indeed, the supposition that BCTs always come about by splitting hue-based categories into smaller hue-based categories is wrong, as brightness and saturation parameters can play a role. For example, a desaturated 'gray' might surface early in the sequence, and subsequently be reinterpreted as 'blue' (independently of any 'green + blue' composite) (MacLaury, 1999).
- Languages may lexicalize BCTs along a brightness parameter. The Bellonese (Solomon Islands) system has three 'mothers' or 'big names' of colors: *susungu* for bright, light colors (other than light greens and green-yellows), '*ungi* for dark colors (except pitch-black), and *unga* for the rest of the spectrum (plus other non-BCTs) (Kuschel and Monberg, 1974; cf. MacLaury, 1996).
- Though color categories cannot be defined by their boundaries, there are still restrictions on boundaries. Suppose one color category has its focus in 'red' and another has its focus in 'yellow.' If a speaker of such a language moves gradually from the red focus to the yellow one, there will be some point after which the speaker simply can no longer affirm that the hue could be considered 'red': a hue boundary has been passed (Dedrick, 1998).
- Some languages have more than 11 BCTs. Russian has 12, including *goluboj* 'light, pale blue' and *sinij* 'dark, bright blue.' Hungarian has both *piros* 'light red' and *vörös* 'dark red' BCTs (MacLaury *et al.*, 1997).

Explaining Basic Color Terms

The claim that universals partially govern development of BCTs appears to receive strong statistical support (Kay *et al.*, 1997; and the forthcoming *World Color Survey*). Even so, what can ultimately explain the constrained developmental patterns

remains unresolved. Kay and McDaniel (1978) argued that unique hue terms like *white, black, red, green, yellow*, and *blue* could be explained by an opponency theory, derived from the nature of the human eye and basic neural responses (which concerns whether a given retinal cell is maximally excited or inhibited by a given wavelength; Hering, 1920/1964; Hardin, 1988). Appeal was then made to fuzzy set theory (Zadeh, 1965) to account for binary and derived color terms like *brown, orange, purple, pink* and *gray*.

But this set of explanations cannot account well for composite color terms that combine fundamental perceptual categories such as 'yellow + red,' 'green + blue,' and 'white + yellow.' 'Yellow + green + blue' composites are particularly troubling, since certain retinal cells appear to be maximally excited by focal blue hues but maximally inhibited by focal yellow. Disconcertingly, the proposal did not explain how categories change over time – one of the principal claims of the BK research paradigm was precisely that systems do change.

Rosch's findings led to explanations for color categorization in terms of central prototypes grounded in perception. Such an explanation works well for perceptually salient focal colors, but does not account for BCTs like *purple*, which tend not to have a salient focus; nor does it account for category boundary phenomena in color naming tasks.

Arguments have been advanced that composite color terms for LIGHT-WARM and DARK-COOL may be linked to colors typically associated with day and night (Goddard, 1998); and other color terms may develop based on the color of culturally important objects (Saunders and van Brakel, 1997) (the position of cultural relativists). But troubling data for a culturally-grounded explanation of DARK-COOL and LIGHT-WARM terms is that BCTs for these notions do not often correspond to lexical terms for 'night,' and 'day' or 'sun,' respectively. Most troubling, these accounts have no way of accounting for the strong statistical patterns seen in large data sets such as the *World Color Survey* or MacLaury's Mesoamerican study. Almost certainly any reductionist one-factor explanation will ultimately fail in explaining all of the patterns of BCT development in the world's languages.

See also: Categorizing Percepts: Vantage Theory; Cognitive Semantics; Lexicalization; Prototype Semantics.

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Relevant Website

http://www.icsi.berkeley.edu – World Color Survey Site.

Combinatory Categorial Grammar

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Introduction

Combinatory Categorial Grammar (CCG), like other varieties of Categorial Grammar (CG) discussed by Wood (1993), is a radically lexicalized grammar in which all language-specific grammatical information is specified in the lexicon and the application of syntactic rules is entirely conditioned on the syntactic type, or category, of their inputs. No rule is structure-dependent. In this respect CCG is to be contrasted with Transformational Grammar and its descendents. It is further distinguished from them and most other theories of natural grammar by its radically free conception of derivational constituency, uniting intonation structure and surface structure, and its distinctive account of the long-range dependencies involved in relative clauses and coordination. The latter account avoids the use of syntactic variables and eschews movement and deletion as syntactic operations. CCG is also distinguished by its use of a fixed inventory of type-driven rules from nonfinitely axiomatizable categorial logics such as the Lambek calculus and Type-Logical Grammar.

Categories identify the syntactic type of a constituent as either a primitive category or a function category. Primitive categories, such as N, NP, PP, and S, may be regarded as further distinguished by features such as number, case, and inflection (including features of some version of the $\overline{X}$ theory), where appropriate. Functions (such as verbs) bear categories identifying the type of their result (such as S) and that of their argument(s)/complements(s), both of which may themselves be either function categories or primitive categories. For example, the English transitive verb *married* bears the following category:

(1) married := $(S\backslash NP)/NP$

This syntactic category identifies the transitive verb as a function and specifies the type and directionality of its arguments and the type of its result. We here use the 'result leftmost' notation, in which a rightward-combining functor over a domain β into a range α is written α/β; the corresponding leftward-combining functor is written $\alpha\backslash\beta$, where α and β may themselves be function categories. (There is an alternative 'result on top' notation due to Lambek, according to which the latter category is written $\beta\backslash\alpha$. The use of slashes in both notations should be distinguished from the quite different use of slash notation in Generalized Phrase Structure Grammar.)

The transitive verb category in (1) also reflects its semantic type, which we write (following the article Semantics in Categorial Grammar) as $((t \leftarrow e) \leftarrow e)$, where e is the type of an entity and t is the type of a proposition. We can make this semantics explicit by pairing the category with a term of the lambda calculus, via a colon operator:

(2) married := $(S\backslash NP)/NP : \lambda x \lambda y.marry'xy$

(Primes mark constants; nonprimes are variables. The notation uses concatenation to mean function application under a left-associative convention, so that the expression $marry'xy$ is equivalent to $(marry'x)y$.)

Pure CG limits syntactic combination to rules of functional application of functions to arguments to the right or left, which in the present notation can be written as:

(3a) $X/Y{:}f \quad Y{:}a \quad \Rightarrow X{:}fa \quad (>)$
(3b) $Y{:}a \quad X\backslash Y{:}f \Rightarrow X{:}fa \quad (<)$

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Introduction

Combinatory Categorial Grammar (CCG), like other varieties of Categorial Grammar (CG) discussed by Wood (1993), is a radically lexicalized grammar in which all language-specific grammatical information is specified in the lexicon and the application of syntactic rules is entirely conditioned on the syntactic type, or category, of their inputs. No rule is structure-dependent. In this respect CCG is to be contrasted with Transformational Grammar and its descendents. It is further distinguished from them and most other theories of natural grammar by its radically free conception of derivational constituency, uniting intonation structure and surface structure, and its distinctive account of the long-range dependencies involved in relative clauses and coordination. The latter account avoids the use of syntactic variables and eschews movement and deletion as syntactic operations. CCG is also distinguished by its use of a fixed inventory of type-driven rules from nonfinitely axiomatizable categorial logics such as the Lambek calculus and Type-Logical Grammar.

Categories identify the syntactic type of a constituent as either a primitive category or a function category. Primitive categories, such as N, NP, PP, and S, may be regarded as further distinguished by features such as number, case, and inflection (including features of some version of the $\overline{X}$ theory), where appropriate. Functions (such as verbs) bear categories identifying the type of their result (such as S) and that of their argument(s)/complements(s), both of which may themselves be either function categories or primitive categories. For example, the English transitive verb *married* bears the following category:

(1) married := $(S\backslash NP)/NP$

This syntactic category identifies the transitive verb as a function and specifies the type and directionality of its arguments and the type of its result. We here use the 'result leftmost' notation, in which a rightward-combining functor over a domain β into a range α is written α/β; the corresponding leftward-combining functor is written $\alpha\backslash\beta$, where α and β may themselves be function categories. (There is an alternative 'result on top' notation due to Lambek, according to which the latter category is written $\beta\backslash\alpha$. The use of slashes in both notations should be distinguished from the quite different use of slash notation in Generalized Phrase Structure Grammar.)

The transitive verb category in (1) also reflects its semantic type, which we write (following the article Semantics in Categorial Grammar) as $((t \leftarrow e) \leftarrow e)$, where e is the type of an entity and t is the type of a proposition. We can make this semantics explicit by pairing the category with a term of the lambda calculus, via a colon operator:

(2) married := $(S\backslash NP)/NP : \lambda x \lambda y.marry'xy$

(Primes mark constants; nonprimes are variables. The notation uses concatenation to mean function application under a left-associative convention, so that the expression $marry'xy$ is equivalent to $(marry'x)y$.)

Pure CG limits syntactic combination to rules of functional application of functions to arguments to the right or left, which in the present notation can be written as:

(3a) $X/Y{:}f \quad Y{:}a \quad \Rightarrow X{:}fa \quad (>)$
(3b) $Y{:}a \quad X\backslash Y{:}f \Rightarrow X{:}fa \quad (<)$

The application rules in (3) allow derivations equivalent to those in traditional Context-Free Phrase Structure Grammar (CFPSG), such as the following:

$$
(4)\quad \dfrac{\dfrac{\text{Anna}}{NP : anna'} \quad \dfrac{\dfrac{\text{married}}{(S\backslash NP)/NP : \lambda x\lambda y.marry'xy} \quad \dfrac{\text{Manny}}{NP : manny'}}{S\backslash NP : \lambda y.marry'manny'y}\,>}{S : marry'manny'anna'}\,<
$$

The restriction to rules of functional application alone limits pure CG to the level of context-free grammar. CCG generalizes the context-free core by introducing further rules for combining categories. Because of their strictly type-driven character and their semantic correspondence to the simplest of the combinators identified by Curry and Feys (1958) these rules are called combinatory rules – the distinctive ingredient of CCG that gives it its name. They are strictly limited to certain directionally specialized instantiations of a very few basic operations, of which the most important for the present purposes are Type-Raising and functional Composition. A third class of combinatory rules related to Substitution, Curry and Feys's S combinator, is also crucially involved. Some variants of CCG discussed in this article use further combinatory operations. Examples include 'wrapping' or commutative combinatory rules related to Curry and Feys's C (Bach, Dowty, and Jacobson) and the product combinator of Lambek (Pickering and Barry, and Dowty), sometimes eschewing composition and/or type-raising entirely.

All of these combinatory versions of categorial grammar are strictly distinct from Type-Logical Grammar (TLG) and related generalizations of CGs related to the Lambek calculus and/or Martin-Löf Type-Theory. Type-logical grammars equate function categories with implicative formulæ in a substructural logic. Accordingly, TLG treats grammatical derivation as proof rather than as reduction in an applicative system. Logics and applicative systems stand in a very close relation under the 'Curry-Howard isomorphism,' and some of the combinatory rules of CCG are in fact theorems of the (pure, associative) Lambek calculus. However, others are not. Because not even the pure associative Lambek calculus is finitely axiomatizable and it has been shown by Pentus to be not only weakly context-free but to also have an NP-hard decision problem, these are really radically different kinds of systems. In practice, the emphasis of the two approaches has been rather different. Work in TLG has attended more to mathematical foundations, whereas work in CCG has concentrated on linguistic explanation and computational applications. The relation of TLG to both CCG and theories such as TG that make use of syntactic variables is discussed by Dowty (1993).

Much work in CCG has centered on the problem of capturing unbounded dependencies – that is, on constructions such as relative clauses and reduced conjunctions, in which elements that are syntactically and semantically dependent may be separated by arbitrary amounts of intervening linguistic material. Such dependent elements are indicated by subscripts in the following examples:

(5a) a man that$_i$ Anna said Manny thinks I like$_i$
(5b) I wrote to$_i$, and you heard from$_i$, Manny$_i$

Such dependencies are to be contrasted with bounded dependencies, which hold between function and argument categories such as verbs and the noun phrases in their immediate domain, as in the case of binding and control.

The Categorial Lexicon

In order to capture languages with freer word order, such as Turkish and Tagalog, the notation introduced in (1) and (2) must be understood as a special case of a more general notation allowing categories to be schematized over a number of orders of combination and directionalities. Baldridge, following Hoffman, proposed a Multi-Modal Set-CCG notation, according to which the single arguments of a rigid directional category such as (1) are replaced by one or more multisets of one or more argument types, each bearing its own directionality slash, and allowed to combine in any order.

For example, the transitive verb category of a completely free-word-order accusative language with nominal case (such as Latin) is written $S\{|NP_{nom}, |NP_{acc}\}$, where | indicates that either leftward or rightward combination is allowed. The set brackets indicate that the subject and object can combine in either order. For a language such as Tagalog, which is verb-initial but otherwise freely ordered and cased, the corresponding accusative–transitive active voice category is written $S\{/NP_{nom}, /NP_{acc}\}$. Verb-final Japanese accusative transitives are written $S\{\backslash NP_{nom}, \backslash NP_{acc}\}$.

In this extended notation, the English transitive verb can be written in full as $(S\{\backslash NP_{nom}\})\ \{/NP_{acc}\}$. However, we adopt a convention that suppresses set brackets when argument sets are singletons, so that we continue to write this category as $(S\backslash NP)/NP$, as in (1).

We can generalize the semantic notation introduced in (2) using a parallel argument set notation for lambda terms and a convention that pairs the unordered syntactic arguments with the unordered semantic

Table 1 Notation for transitive verb categories

Language	*Notation*
English	$(S\backslash NP)/NP : \lambda x \lambda y.\mathrm{pred}xy$
Latin	$S\{\vert NP_{nom}, \vert NP_{acc}\} : \lambda\{y,x\}.\mathrm{pred}xy$
Tagalog	$S\{/NP_{nom}, /NP_{acc}\} : \lambda\{y,x\}.\mathrm{pred}xy$
Japanese	$S\{\backslash NP_{nom}, \backslash NP_{acc}\} : \lambda\{y,x\}.\mathrm{pred}xy$

arguments in the left-to-right order in which they appear on the page. The transitive verb categories then appear as shown in Table 1.

All such schemata cover only a finite number of deterministic categories like (1) and can only generate the language that will be generated by compiling the schema into explicit multiple deterministic lexical categories. (Baldridge showed that schematization of this kind does not increase the expressive power of the theory.)

The lexicon of a given language is a finite set of categories subject to quite narrow restrictions that ultimately stem from limitations on the variety of semantic types with which the syntactic categories are paired in the lexicon. In particular, we can assume that lexical function categories are limited to finite – in fact, very small – numbers of arguments. (For English at least, the maximum appears to be four, required for a small number of verbs such as *bet* as in *I bet you 5 dollars I can spit further than you*.)

The present paper further follows Jacobson, Hepple, and Baldridge and Kruijff in assuming that rules and function categories are 'modalized,' as indicated by a subscript on slashes. Baldridge further assumed that slash modalities are features in a type hierarchy, drawn from some finite set $\mathcal{M}$ (the modalities used here are $\mathcal{M} = \{\bigstar, \diamond, \times, \cdot\}$). The effect of each of these modalities is described here as the related combinator rules are introduced. The basic intuition is as follows.

- The $\bigstar$ modality is the most restricted and allows only the most basic applicative rules.
- The $\diamond$ permits order-preserving associativity in derivations.
- The $\times$ allows limited permutation.
- The $\cdot$ is the most permissive, allowing all rules to apply.

The relation of these modalities to one another can be compactly represented via the hierarchy given in Figure 1.

By convention, we write the maximally permissive slashes /. and \. as plain slashes / and \. This allows us to continue writing the categories that bear this modality, such as the transitive verbs in (Table 1), as before.

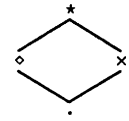

Figure 1 CCG type hierarchy for slash modalities (from Baldridge and Kruijff, 2003).

Combinatory Rules

The function application rules can now be written as follows:

(6a) $X/_{\bigstar}Y{:}f \quad Y{:}a \quad \Rightarrow \quad X{:}fa \quad (>)$
(6b) $Y{:}a \quad X\backslash_{\bigstar}Y{:}f \quad \Rightarrow \quad X{:}fa \quad (<)$

Because $\bigstar$ is the supertype of all other modalities, the $/_{\bigstar}$ and $\backslash_{\bigstar}$ slashes in the rules are interpretated as '$\preceq\bigstar$'—that is, **all** functional categories can combine by these most basic rules, allowing the derivation (4) as before.

For example, Japanese transitive verbs such as *tazuneta* 'visited' have the following category, in which the λ notation is generalized as in (Table 1) and the modalities are $\cdot$ (suppressed by convention):

(7) tazuneta $:= S\{\backslash NP_{nom}, \backslash NP_{acc}\} : \lambda\{y, x\}.visit'xy$

This category is clause-final, and supports multiple derivations, which are guaranteed to yield identical semantic representations:

$$
(8)\quad \dfrac{\dfrac{\begin{array}{c}\text{Anna}-\text{ga}\\ \text{Anna}-\text{NOM}\end{array}}{NP_{nom} : anna'} \quad \dfrac{\dfrac{\begin{array}{c}\text{Manny}-\text{o}\\ \text{Manny}-\text{ACC}\end{array}}{NP_{acc} : manny'} \quad \dfrac{\begin{array}{c}\text{tazuneta}\\ \text{visited}\end{array}}{S\{\backslash NP_{nom}, \backslash NP_{acc}\} : \lambda\{y,x\}.visit'xy}}{S\{\backslash NP_{nom}\} : \lambda y.visit'manny'y)}\,<}{S : visit'manny'anna'}\,<
$$

$$
(9)\quad \dfrac{\dfrac{\begin{array}{c}\text{Manny}-\text{o}\\ \text{Manny}-\text{ACC}\end{array}}{NP_{acc} : manny'} \quad \dfrac{\dfrac{\begin{array}{c}\text{Anna}-\text{ga}\\ \text{Anna}-\text{NOM}\end{array}}{NP_{nom} : anna'} \quad \dfrac{\begin{array}{c}\text{tazuneta}\\ \text{visited}\end{array}}{S\{\backslash NP_{nom}, \backslash NP_{acc}\} : \lambda\{y,x\}.visit'xy}}{S\{\backslash NP_{acc}\} : \lambda x.visit'xanna')}\,<}{S : visit'manny'anna'}\,<
$$

CCG includes a number of further more restricted operations for combining (in the terms of the Minimalist Program (MP), 'Merging') categories. These operations correspond semantically to combinators – that is, type-driven operators over functions of the kind developed by Curry and Feys. For present purposes, they can be regarded as limited to operations of type-raising (corresponding semantically to the combinator T), composition (corresponding to the combinator B), and substitution (corresponding to the combinator S).

Type-raising turns argument categories such as *NP* into functions over the functions that take them as arguments, such as the verbs discussed previously, into the results of such functions. Thus, NPs such as *Anna* can take on such categories as:

(10a) Anna := $S/(S\backslash NP) : \lambda p{\cdot}p\ anna'$
(10b) Anna := $S\backslash(S/NP) : \lambda\ p{\cdot}p\ anna'$
(10c) Anna := $(S\backslash NP)\backslash((S\backslash NP)/NP)$: $\lambda p{\cdot}p\ anna'$

and so on. This operation must be limited to ensure decidability and, in practice, can be strictly limited to argument categories *NP, AP, PP, VP* and *S*. One way to do this is to specify it in the morpho-lexicon in the categories for proper names, determiners, and the like, in which case their original ground types such as *NP* and *NP/N* can be eliminated.

Type-raising therefore resembles the traditional operation of case; NPs and other arguments are specified as to the case slot that they may fill in the verb. In English, case is specified directionally rather than morphologically, but in Japanese the relation of type-raising and case is completely transparent:

(11a) Anna-ga := $S/(S\{\backslash NP_{nom}\}) : \lambda p{\cdot}p\ anna'$
(11b) Anna-o := $S/(S\{\backslash NP_{acc}\}) : \lambda p{\cdot}p\ anna'$
(11c) Anna-o := $(S\{\backslash NP_{nom}\})/\ (S\{\backslash NP_{nom}, \backslash NP_{acc}\}) :$
$\lambda p{\cdot}p\ anna'$

and so on.

CCG also includes rules of functional composition rules such as the following forward composition (>**B**) rule.

(12) $X/_{\diamond}Y : f\ \ Y/_{\diamond}Z : g \quad \Rightarrow_{\mathbf{B}} \quad X/_{\diamond}Z : \lambda x.f(gx)$

(The modalities on $X/_{\diamond}Y$ and $Y/_{\diamond}Z$ in the rule are interpreted as '$\preceq\diamond$'—that is ·, or ◇. The two modalities on these inputs need not be the same, but the modality on $X/_{\diamond}Z$ in the output has to be the same as that on $Y/_{\diamond}Z$, in accordance with the Principle of Inheritance, to be defined later.

In interaction with simple functional application and lexicalized type-raising, composition engenders a potentially very freely reordering and rebracketing calculus and generalizes the notion of surface or derivational constituency.

For example, the simple transitive sentence of English has two equally valid surface constituent derivations, each yielding the same logical form:

(13)
$$\dfrac{\dfrac{\dfrac{\text{Anna}}{S/(S\backslash NP) : \lambda f.f\ anna'}\,{>}\mathbf{T} \quad \dfrac{\text{married}}{(S\backslash NP)/NP : \lambda x\lambda y.marry'xy} \quad \dfrac{\text{Manny}}{S\backslash(S/NP) : \lambda p.p\ manny'}\,{<}\mathbf{T}}{S/NP : \lambda x.marry'x\ anna'}\,{>}\mathbf{B}}{S : marry'manny'anna'}\,{<}$$

(14)
$$\dfrac{\dfrac{\dfrac{\text{Anna}}{S/(S\backslash NP) : \lambda f.f\ anna'}\,{>}\mathbf{T} \quad \dfrac{\dfrac{\text{married}}{(S\backslash NP)/NP : \lambda x\lambda y.marry'xy} \quad \dfrac{\text{Manny}}{(S\backslash NP)\backslash((S\backslash NP)/NP) : \lambda p.p\ manny'}\,{<}\mathbf{T}}{S\backslash NP : \lambda y.marry'manny'y}\,{<}}{S : marry'manny'anna'}\,{>}$$

In (13), *Anna* and *married* compose, as indicated by the annotation >**B**, to form a nonstandard constituent of type *S/NP*, which the object NP commands. In (14), there is a more traditional derivation involving a verb phrase of type *S\NP* commanded by the subject. More complex sentences may have many semantically equivalent derivations. However, all yield identical logical forms, and all are legal surface derivational constituent structures. As we see directly, the point of allowing nonstandard constituents such as *Anna married*$_{S/NP}$ is that they occur as the residue of relativization and coordination, as in *the man that Anna married* and *Frankie divorced, and Anna married, Manny.*

It immediately follows that properties dependent on traditional command relations, notably including binding asymmetries such as the following, cannot be defined over surface CCG derivtions and must be defined over logical forms:

(15a) Manny likes himself
(15b) *himself likes Manny

In fact, surface derivations do not constitute a representational level at all in CCG. They are merely an uninterpreted record of different ways in which the same typed logical form can be put together. In CCG, unlike certain other generalizations of CG, logical form is the sole grammatical representational level.

Substitution, a further species of combinator related to Curry and Feys's **S**, was proposed by Szabolosi under the name 'connection' for the analysis of 'parasitic gaps.' It completes the set of core combinator species used in all forms of CCG. Its role is somewhat specialized, and we defer further discussion until derivation (19), *the book that Anna burned without reading*. The (16) backward crossed substitution (<**S**$_{\times}$) rule is:

(16) $Y/_{\times}Z : g \quad (X\backslash_{\times}Y)/_{\times}Z : f \quad \rightarrow \quad X/_{\times}Z : \lambda z.fz(gz)$

Before moving to a more formal definition of the space of possible CCG grammars, including the principle that again requires that the modalities on $Y/_{\times}Z$ and $X/_{\times}Z$ must be the same, we briefly review the kind of linguistic analyses that CCG allows.

Illustrative Analyses: Unbounded Constructions

This theory has been applied to the linguistic analysis of coordination, relativization, and intonational structure in English and many other languages by Szabolcsi, Dowty, Hepple, Jacobson, Baldridge, Bozsahin, Hoffman, Kang, Komagata, Oehrle, Prevost, Steedman, Trechsel, and others. It has been successfully applied

to the wide-coverage parsing of English newspaper text using a grammar automatically extracted from the Penn Wall Street Journal Treebank by Hockenmaier and by Clark and Curran, with state-of-the-art accuracy in dependency recovery, including such unbounded dependencies.

Relativization

Because substrings such as *Anna married* are now fully interpreted derivational constituents, complete with compositional semantic interpretations, they can be used to define relativization without movement or empty categories, as in (18) and (19), via the following category for the relative pronoun.

(17) that $:= (N\backslash N)/(S/NP) : \lambda p \lambda n \lambda x.(nx) \wedge (px)$

(18) (The man)

$$\dfrac{\dfrac{\text{that}}{\begin{array}{c}(N\backslash N)/(S/NP):\\ \lambda p\lambda n\lambda x.(nx)\wedge(px)\end{array}} \quad \dfrac{\dfrac{\text{Anna}}{\begin{array}{c}S/(S\backslash NP):\\ \lambda f.f\ anna'\end{array}}\,{>}\mathbf{T} \quad \dfrac{\text{married}}{\begin{array}{c}(S\backslash NP)/NP:\\ \lambda x\lambda y.marry'xy\end{array}}}{S/NP : \lambda x.marry'x\ anna'}\,{>}\mathbf{B}}{N\backslash N : \lambda n\lambda x.(nx)\wedge(marry'x\ anna')}\,{>}$$

(19) (The book)

$$\dfrac{\dfrac{\text{that}}{(N\backslash N)/(S/NP)} \quad \dfrac{\dfrac{\dfrac{\text{Anna}}{S/(S\backslash NP)}\,{>}\mathbf{T} \quad \dfrac{\dfrac{\text{burned}}{(S\backslash NP)/NP} \quad \dfrac{\dfrac{\text{without}}{((S\backslash NP)\backslash(S\backslash NP))/VP_{ing}} \quad \dfrac{\text{reading}}{VP_{ing}/NP}}{((S\backslash NP)\backslash(S\backslash NP))/NP}\,{>}\mathbf{B}}{(S\backslash NP)/NP}\,{<}\mathbf{S}_{\times}}{S/NP}\,{>}\mathbf{B}}{N\backslash N}\,{>}$$

(20) (The man)

$$\dfrac{\dfrac{\text{that}}{\begin{array}{c}(N\backslash N)/(S/NP):\\ \lambda p\lambda n\lambda x.(nx)\wedge(px)\end{array}} \quad \dfrac{\dfrac{\dfrac{\text{Mannv}}{\begin{array}{c}S/(S\backslash NP):\\ \lambda f.f\ manny'\end{array}}\,{>}\mathbf{T} \quad \dfrac{\text{says}}{\begin{array}{c}(S\backslash NP)/S:\\ \lambda x\lambda y.say'xy\end{array}}}{S/S : \lambda x.say'x\ manny'}\,{>}\mathbf{B} \quad \dfrac{\dfrac{\text{Anna}}{\begin{array}{c}S/(S\backslash NP):\\ \lambda f.f\ anna'\end{array}}\,{>}\mathbf{T} \quad \dfrac{\text{married}}{\begin{array}{c}(S\backslash NP)/NP:\\ \lambda x\lambda y.marry'xy\end{array}}}{S/NP : \lambda x.marry'x\ anna'}\,{>}\mathbf{B}}{S/NP : \lambda x.say'(marry'x\ anna')manny'}\,{>}\mathbf{B}}{N\backslash N : \lambda n\lambda x.(nx)\wedge(say'(marry'x\ anna')manny')}\,{>}$$

Such extractions are correctly predicted to be unbounded because composition can operate across clause boundaries.

It is the lexical category (17) of the relative pronoun that establishes the long-range dependency between the noun and verb (via the nonessential use of the (nonessential) variable x in the present notation). This relation too is established in the lexicon: syntactic derivation merely projects it onto the logical form. In the terms of the Minimalist Program (MP) of Chomsky, in which such relationships are established by the operation 'Move,' it should be clear that CCG reduces this operation to the other major MP operation Merge because composition and type-raising, as well as application, correspond to the latter, more basic operation.

Crossing Dependencies

The forward composition rule (12) is restricted by the $\diamond$ modality, which means that it cannot apply to categories bearing the $\times$ or $\bigstar$ modalities of Figure 1. Crucially, crossing composition rules, in which the directionality of the composed functions differ, are also allowed in CCG under the Principles of Consistency and Inheritance (discussed later), unlike the pure associative Lambek calculus. An example is the following forward crossed composition ($>\mathbf{B}_{\times}$) rule.

(21) $X/_{\times}Y : f \quad Y\backslash_{\times}Z : g \quad \Rightarrow_{\mathbf{B}} \quad X\backslash_{\times}Z : \lambda x.f(gx)$

There is a natural generalization of all the composition rules to composition into functions with n arguments for some small fixed n, including the following forward crossed composition ($>\mathbf{B}^2_{\times}$) rule.

(22) $X/_{\times}Y : f \quad (Y\backslash_{\times}Z)/W : g \quad \Rightarrow_{\mathbf{B}} \quad (X\backslash_{\times}Z)/W : \lambda y\lambda x.f(gyx)$

These rules are restricted by the $\times$ modality because they have a reordering effect. Most nominal functor categories such as determiners $NP/_{\diamond}N$ bear the $\diamond$ modality of harmonic composition, preventing these rules from applying to allow examples such as the following.

(23)

$$\dfrac{\dfrac{*\text{A}}{NP/_{\diamond}N} \quad \dfrac{\dfrac{\text{tall}}{N/_{\diamond}N} \quad \dfrac{\text{in a raincoat}}{N\backslash_{\diamond}N}}{*N/N}\,{*<}\mathbf{B}_{\times} \quad \dfrac{\text{man}}{N}}{}$$

It is the inclusion of such rules that increases the expressive power of the formalism beyond context-free languages. (Vijay-Shanker and Weir showed that CCG is weakly equivalent to TAG and Linear Indexed Grammar (LIG). This equivalence gives rise to a polynominal time worst-case parsing complexity result and, more important, means that standard parsing algorithms can apply.)

For example, the availability of these rules allows crossing dependencies in Dutch and certain Swiss dialects of German, which cannot be captured by CFG and have given rise to proposals for verb-raising transformational operations, as in the following example (from Shieber):

(24) das mer em Hans es huus hälfed aastriiche
that we–NOM Hans–DAT the house–ACC helped paint

$$\begin{array}{lllll}
NP^{\uparrow}_{nom} & NP^{\uparrow}_{dat} & NP^{\uparrow}_{acc} & ((S_{+SUB}\backslash NP_{nom})\backslash NP_{dat})/VP & VP\backslash NP_{acc} \\
 & & & \multicolumn{2}{c}{\overrightarrow{}_{\mathbf{B}_\times}} \\
 & & & \multicolumn{2}{c}{((S_{+SUB}\backslash NP_{nom})\backslash NP_{dat})\backslash NP_{acc}} \\
 & & \multicolumn{3}{c}{\overrightarrow{}_{>}} \\
 & & \multicolumn{3}{c}{(S_{+SUB}\backslash NP_{nom})\backslash NP_{dat}} \\
 & \multicolumn{4}{c}{\overrightarrow{}_{>}} \\
 & \multicolumn{4}{c}{S_{+SUB}\backslash NP_{nom}} \\
\multicolumn{5}{c}{\overrightarrow{}_{>}} \\
\multicolumn{5}{c}{S_{+SUB}}
\end{array}$$

'that we helped Hans paint the house'

The · modality on the verbs *hälfed* and *aastriichte* permits the forward crossed composition rule (21) to apply. The tensed verb is distinguished as the head of a subordinate clause via the feature SUB. The type-raised NP categories are abbreviated as $NP^{\uparrow}_{case}$ because the fact that they are raised is not essential to understanding the point about crossing dependencies. It is correctly predicted that the following word orders are also allowed in at least some dialects (Shieber, 1985: 338–339):

(25a) das mer em Hans hälfed es huus aastriiche
(25b) das em Hans mer es huus hälfed aastriiche

The construction is completely productive, so the dependencies are not only intersective but unbounded. For example, we have the following (also from Shieber):

(26) das mer d'chind em Hans es huus lönd hälfe aastriiche
that we–NOM the children–ACC Hans–DAT the house–ACC let help paint

$$\begin{array}{lllllll}
NP^{\uparrow}_{nom} & NP^{\uparrow}_{acc} & NP^{\uparrow}_{dat} & NP^{\uparrow}_{acc} & ((S_{+SUB}\backslash NP_{nom})\backslash NP_{acc})/VP & (VP\backslash NP_{dat})/VP & VP\backslash NP_{acc} \\
 & & & & \multicolumn{2}{c}{\overrightarrow{}_{\mathbf{B}^2_\times}} & \\
 & & & & \multicolumn{2}{c}{(((S_{+SUB}\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat})/VP} & \\
 & & & & \multicolumn{3}{c}{\overrightarrow{}_{\mathbf{B}_\times}} \\
 & & & & \multicolumn{3}{c}{(((S_{+SUB}\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat})\backslash NP_{acc}} \\
 & & & \multicolumn{4}{c}{\overrightarrow{}_{>}} \\
 & & & \multicolumn{4}{c}{((S_{+SUB}\backslash NP_{nom})\backslash NP_{acc})\backslash NP_{dat}} \\
 & & \multicolumn{5}{c}{\overrightarrow{}_{>}} \\
 & & \multicolumn{5}{c}{(S_{+SUB}\backslash NP_{nom})\backslash NP_{acc}} \\
 & \multicolumn{6}{c}{\overrightarrow{}_{>}} \\
 & \multicolumn{6}{c}{S_{+SUB}\backslash NP_{nom}} \\
\multicolumn{7}{c}{\overrightarrow{}_{>}} \\
\multicolumn{7}{c}{S_{+SUB}}
\end{array}$$

'that we let the children help Hans paint the house'

Again the unbounded dependencies are projected from the lexical frame of the verb, without syntactic movement.

Coordination

The nonstandard constituents that CCG engenders, such as *Anna married* and *Anna says he married*, can also undergo coordination. We can assume that English conjunctions such as *and* bear the following category, in which Σ is S or any function category into S and, in the latter case, $\wedge$ schematizes over the usual pointwise recursion over logical conjunction (Partee and Rooth):

(27) and $:= (\Sigma\backslash_\star\Sigma)/_\star\Sigma : \lambda p \lambda q.p \wedge q$

This category allows a movement- and deletion-free account of right node raising, as in (28):

(28)
$$\begin{array}{lllll}
\text{[Manny dated]} & \text{and} & \text{[Anna says he married]} & \text{a saxophonist} \\
\overrightarrow{}_{\mathbf{B}} & & \overrightarrow{}_{\mathbf{B}} & \overleftarrow{}_{\mathbf{T}} \\
S/NP & (\Sigma\backslash_\star\Sigma)/_\star\Sigma & S/NP & S\backslash(S/NP) \\
 & \multicolumn{2}{c}{\overrightarrow{}_{>}} & \\
\multicolumn{2}{c}{(S/NP)\backslash_\star(S/NP)} & & \\
\multicolumn{3}{c}{\overleftarrow{}_{<}} & \\
\multicolumn{3}{c}{(S/NP)} & \\
\multicolumn{4}{c}{\overleftarrow{}_{<}} \\
\multicolumn{4}{c}{S}
\end{array}$$

The ★ modality on the conjunction category (27) means that it can **only** combine like types by the application rules (3). Hence, as in GPSG (Gazdar), this type-dependent account of extraction and coordination, as opposed to theories such as TG, LFG, and HPSG that use structure-dependent rules, makes the across-the-board condition (ATB) on extractions from coordinate structures (including the 'same case' condition) a prediction or theorem rather than a stipulation. A consideration of the types involved in the following examples reveals how.

(29a) A saxophonist [that$_{(N\backslash N)\backslash(S/NP)}$ [[Anna married]$_{S/NP}$ and [Manny detests]$_{S/NP}$]$_{S/NP}$]$_{N\backslash N}$
(29b) A saxophonist [that$_{(N\backslash N)/(S/NP)}$ *[[Anna married]$_{S/NP}$ and [detests Manny]$_{S\backslash NP}$]]
(29c) A saxophonist that$_{(N\backslash N)/(S/NP)}$ *[[Anna married]$_{S/NP}$ and [Manny detests him]$_{S}$]]

(29d) A saxophonist that$_{(N\backslash N)/(S/NP)}$ *[[Anna married him]$_S$ and [Manny detests]$_{S/NP}$]

In Japanese, the interaction of type-raising (which is specified by morphological case) and composition similarly allows multiple derivations. In particular, we have:

(30)

Anna-ga	Manny-o	tazuneta
Anna-NOM	Manny-ACC	visited
$S/(S\backslash NP_{nom})$: $\lambda p.p\ anna'$	$(S\backslash NP_{nom})/(S\{\backslash NP_{nom}, \backslash NP_{acc}\})$: $\lambda p.\lambda y.p\ manny'y$	$S\{\backslash NP_{nom}, \backslash NP_{acc}\})$: $\lambda\{y,x\}.visit'xy$

$$\dfrac{\dfrac{S/(S\backslash NP_{nom}) : \lambda p.p\ anna' \quad (S\backslash NP_{nom})/(S\{\backslash NP_{nom}, \backslash NP_{acc}\}) : \lambda p.\lambda y.p\ manny'y}{S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\}) : \lambda p.p\ manny'anna'}{>\mathbf{B}} \quad S\{\backslash NP_{nom}, \backslash NP_{acc}\}) : \lambda\{y,x\}.visit'xy}{S : visit'manny'anna'}{>}$$

'Anna visited Manny'

(31)

[Anna – ga Manny – o]	,	[Erika – ga Sara – o]	tazuneta.
Anna–NOM *Manny*–ACC	and	Erika–NOM *Sara*–ACC	visit–PAST.CONCL
$S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\})$	$(\Sigma/_*\Sigma)\backslash_*\Sigma$	$S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\})$	$S\{\backslash NP_{nom}, \backslash NP_{acc}\}$

$$\dfrac{\dfrac{\dfrac{(S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\}))/(S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\}))}{S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\})}{>} \quad S/(S\{\backslash NP_{nom}, \backslash NP_{acc}\})}{S}{>}$$

'Anna visited Manny and Erika Sara '

(The conjunction category in Japanese is enclitic, unlike English proclitic (27).)

The prediction of nonstandard argument cluster constituents such as *Anna-ga Manny-o* in derivation (30) correctly predicts that such clusters can coordinate.

The possibility of similar argument cluster coordinations in the Dutch and Swiss German verb-raising construction (26) and in English in examples such as (33) is similarly immediate, as Steedman and Dowty pointed out, if we assume the following category for ditransitive *give*, in which the ◇ modality prevents overgenerations such as *I will give a bone a very heavy dog* from arising via the backward crossed composition rule:

(32) give := $(VP/NP)/_\diamond NP$: $\lambda x\lambda y.give'yx$

(33)

Give	the piano – player	a drink	and	the singer	a cigar
$(VP/NP)/_\diamond NP$	$(VP/NP)\backslash_\diamond((VP/NP)/_\diamond NP)$	$VP\backslash(VP/NP)$	$(\Sigma\backslash_*\Sigma)/_*\Sigma$	$(VP/NP)\backslash_\diamond((VP/NP)/_\diamond NP)$	$VP\backslash(VP/NP)$
		$<\mathbf{T}$		$<\mathbf{T}$	$<\mathbf{T}$

$$\dfrac{\dfrac{\dfrac{\dfrac{(VP/NP)\backslash_\diamond((VP/NP)/_\diamond NP) \quad VP\backslash(VP/NP)}{VP\backslash_\diamond((VP/NP)/_\diamond NP)}{<\mathbf{B}} \quad \dfrac{(VP/NP)\backslash_\diamond((VP/NP)/_\diamond NP) \quad VP\backslash(VP/NP)}{VP\backslash_\diamond((VP/NP)/_\diamond NP)}{<\mathbf{B}}}{(VP\backslash_\diamond((VP/NP)/_\diamond NP))\backslash(VP\backslash_\diamond((VP/NP)/_\diamond NP))}{>}}{VP\backslash_\diamond((VP/NP)/_\diamond NP)}{<}}{VP}{<}$$

However, the category (32) makes the order of arguments for the syntactic category of ditransitives the reverse of that of the predicate in the corresponding logical form. The reason for doing this is to allow a standard account of binding asymmetries like the following by embodying traditional notions of command at the level of logical form:

(34a) I shall introduce the participants to each other
(34b) *I shall introduce each other to the participants

We have already seen that the nonstandard derivations of CCG force us to distinguish logical form from derivation. However, this is a departure from some other categorial accounts, which we turn to next.

English Intonation and Information Structure

The fact that substrings such as *Anna married* and *Manny says that Anna married* are accorded the full status of derivational constituents in CCG means that intonation structure and surface structure can be reunited in a single level of derivational structure rather than being consigned to different tiers.

Consider the following minimal pair of dialogs, in which intonational tunes are indicated both informally, via parentheses and small capitals, and in the standard notation of Pierrehumbert, in which prosodic phrases are specified solely in terms of two kinds of elements, the pitch accent(s) and the boundary:

(35) Q: I know who married DANNY. But who married MANNY?
A: (ANNA) (married MANNY).
H*L L+H* LH%

(36) Q: I know which man Anna DATED. But which one did she MARRY?
A: (Anna MARRIED) (MANNY).
L+H*LH% H* LL%

The intuition that these tunes strongly convey systematic distinctions in discourse meaning is inescapable. For example, exchanging the answer tunes between the two contexts in (35) and (36) yields complete incoherence. Prevost and Steedman claimed that the tunes L+H* LH% and H*L (or H* LL%) are, respectively, associated with the topic (or theme) and comment (or rheme) of the sentence, where the theme can be thought of as linking the utterance to the preceding context and the rheme can be thought of as the part of the utterance that moves the discourse forward to a new information state.

The fact that CCG allows alternative derivations such as (13) and (14) offers an obvious way to bring intonation structure and its interpretation – information structure – into the same syntactic system as everything else. Crucially, these alternative derivations are guaranteed to yield the same predicate argument relations, as exemplified by the logical form that results from the two derivations. However, the derivations build this logical form via different routes that construct lambda terms corresponding semantically to the theme and rheme. In particular the derivation (14) corresponds to the information structure associated with the intonation contour in (35), whereas derivation (13) corresponds to that in (36).

Bounded Constructions

A number of accounts stemming from work by Bach, Dowty, and Shaumyan proposed combinatory accounts of bounded constructions such as passive, dative alternation, anaphor binding, raising, and control. Although these have often been presented as syntactic accounts, with combinatory rules applying during syntactic derivation and typically under the control of slash-typing, as in the previous account of unbounded constructions, the very fact that these phenomena are clause-bounded means that they can equally well be regarded as applying presyntactically – that is, as lexical rules or parameters – as was originally proposed by Shaumyan and Dowty.

Binding

The syntactic category that we would first be tempted to assign to *introduce* is $(VP/PP)/NP$, reflecting the linear order of the verb and its complements. However, if we make the standard assumption that anaphors, like reciprocals, have to fall in the scope of their binder, the syntactic derivation implicit in the category makes the PP command the NP, apparently making the wrong prediction concerning (34).

Rather than rectifying the command relations in a logical form, Dowty proposed to instead assign the category $(VP/NP)/PP$ to *introduce* and to allow phrasal verbs such as *introduce to each other* to combine with the second argument *the participants* via the right-wrap combinatory rule proposed by Bach in order to handle a number of bounded constructions, notably including Control. Crucially, if we are to avoid erroneous predictions of preposition-stranding extractions such as **a man that I gave to _ a book*, right-wrapping phrasal verbs such as *introduce to each other* must be specified as *only* combining via right-wrap, a result that we can accomplish by the use of a further slash type, of the kind Jacobson proposed, writing the category for *introduce* as follows:

(37) introduce := $(VP/_{w}NP)/PP : introduce'$

The rule as proposed by these authors was expressed in various notations separating immediate dominance (ID) and linear precedence (LP) relations, as is made explicit in the version proposed by Zwicky and Dowty. In the present notation it can be expressed as the (weakly context-free) Bach/Dowty/Jacobson right-wrap rule.

(38) $(X/_{w}Y) / Z{:}f \quad Y : y \quad Z : z \;\Rightarrow\; X/Z : fz\,Y : y$ (>**WRAP**)

The point of this rule is that it affords a derivation structure in which *the participants* commands its anaphor *each other*, as in derivation (39), in which the interpretation indicated for the reciprocal is merely a placeholder for the semantics (*see* **Semantics in Categorial Grammar**). We are therefore in a position to define binding conditions over derivation structures, say as in Chierchia (1998).

(39)
$$\dfrac{\dfrac{\overset{\text{introduce}}{(VP/_{w}NP)/PP_{to} : introduce'} \quad \overset{\text{the participants}}{NP : participants'} \quad \overset{\text{to each other}}{PP_{to} : eachother'}}{VP/_{w}NP : introduce'eachother'}\;{>}\mathbf{WRAP}}{VP : introduce'eachother'participants'}\;{>}$$

Such rules express a very significant crosslinguistic generalization – for example, as Dowty pointed out, simple transitive verbs in VSO languages such as Irish (Irish Gaelic) must obligatorily wrap the subject and object arguments under these assumptions.

Raising

Jacobson proposed to account for raising verbs such as *seem* in terms of function composition, using a composition rule and a further slash modality, here written $_{\circ}$, distinct from those involved in the earlier account of extraction in that the modality limited categories to only combining via that rule, as in:

(40) $X/_{\circ}Y{:}\,f \quad Y\backslash Z : g \;\Rightarrow\; X\backslash Z : \lambda x.f(gx)$ (>**RAISE**)

Note that, this is a form of crossing composition. This allows derivations such as the following:

(41)
$$\dfrac{\dfrac{\text{John}}{NP : john'} \quad \dfrac{\dfrac{\text{seems}}{S/_{\circ}S_{to-inf} : seemingly'} \quad \dfrac{\text{to drink}}{S_{to-inf}\backslash NP : drink'}}{S\backslash NP : \lambda x.seemingly'(drink'x)}\,{>}\textbf{RAISE}}{S : seemingly'(drink'john')}\,{<}$$

Again it is crucial that this category combine only via rule (40).

Control

Bach proposed an account of Control in terms of rule (38), which in present terms made object control verbs such as *persuade* wrapping verbs with category $(VP/_{w}NP)\ /VP_{to-inf}$, giving rise to derivations such as (42), in which the responsibility for establishing the control relation itself is devolved to semantics (*see* **Semantics in Categorial Grammar**).

(42)
$$\dfrac{\dfrac{\text{persuade}}{(VP/NP)/_{w}VP_{to-inf} : persuade'} \quad \dfrac{\text{Anna}}{NP : anna'} \quad \dfrac{\text{to meet Manny}}{VP_{to-inf} : meet'}}{VP/NP : persuade'(meet'manny')}\,{>}\textbf{WRAP}}{VP : persuade'(meet'manny')anna'}\,{>}$$

He further assumed that subject control verbs such as *promise* were not wrapping verbs but had the category $(VP/VP_{to-\ inf})/NP$.

An Argument for Lexicalizing the Bounded Constructions

Despite the elegance of this account, the costs that follow from including the Bach/Dowty/Jacobson wrapping categories in the CCG lexicon and introducing the corresponding wrapping and raising combinators at the same level as the other CCG combinatory rules are quite high. In particular, WRAP alone does not explain why derivations parallel to (33) exist not only for *promise* but also for the wrapping verbs *persuade*, *introduce*, and *give* itself.

(43a) promise Anna to come and Manny to go
(43b) persuade Anna to come and Manny to go
(43c) introduce the participants to each other and Anna to Manny
(43d) give the piano player a drink and the singer a cigar

There appears to be no easy way to allow cluster coordination analogous to (33) within WRAP-CCG without adding otherwise unmotivated slash types, lifted types, and/or combinatory rules. This is perhaps why Dowty in later work abandoned the combinatory approach entirely in favor of a very expressive form of Type–Logical Grammar, in which the responsibility for supporting word order for nonserial dependencies in Dutch and English is transferred to structural rules.

The alternative is to reinterpret the raising and wrapping combinators (as did Shaumyan and many other lexicalized grammars, such as HPSG) as lexical relations between syntactic types and the related logical forms, as in the earlier analysis of *give* (32) and following categories, in which the wrap relations proposed by Bach *et al.* are already represented at the level of logical form and which, as (33) shows, require no additional raising or wrapping combinatory rules:

(44a) seem := VP/VP: $\lambda p\lambda y.seemingly'\ (py)$
(44b) promise := $(VP/VP_{to-inf})/NP$: $\lambda x\lambda p\lambda y.promise'xpy$
(44c) persuade := $(VP/VP_{to-inf})/NP$: $\lambda x\lambda p\lambda y.persuade'pxy$
(44d) introduce := $(VP/PP_{to})/NP$: $\lambda x\lambda y\lambda z.introduce'yxz$

Opinions currently differ among combinatory categorial grammarians as to whether it is better to extend the syntactic component with extra combinatory rule types to save syntactic raising and/or wrap, or to compile raising and wrap into the lexicon.

Anaphora

A number of theories of pronominal anaphora have been proposed in CCG, notably by Szabolcsi and Jacobson. These theories depart in a number of respects from the forms of combinatory grammar that have been motivated by the syntactic constructions discussed here (they are discussed at length, together with the syntax and semantics of quantifiers, elsewhere; *see* **Semantics in Categorial Grammar**).

Principles and Relations to Other Theories of Grammar

Lexicon

The most basic assumptions concerning the transparency of syntactic types to semantics in all versions of CCG are the following:

- *The Principle of Combinatory Type-Transparency.* All syntactic combinatory rules are type-transparent versions of one of a small number of simple semantic operations over functions.
- *The Principle of Combinatory Type-Transparency.* All syntactic categories are type-transparent to semantic interpretation.

A further principle adhered to by all the theories discussed here (although it is breached by Jacobson's account of anaphora) is that the responsibility for specifying all dependencies, whether unbounded or

bounded, resides in the lexical specifications of syntactic categories for the heads of those dependencies – that is, the words corresponding to predicate-argument structural functors, such as verbs. This principle, which is related to the Projection Principle of GB, can be more formally stated as follows:

- *The Principle of Lexical Head Government*. Both bounded and unbounded syntactic dependencies are entirely determined by the lexical syntactic type of their head.

This is simply to say that the present theory of grammar is 'radically lexicalized,' a property that makes it akin to lexicalized Tree-Adjoining Grammar (TAG). This is a stronger sense of lexicalization than is embodied in Lexical-Functional Grammar (LFG), Head-Driven Phrase Structure Grammar (HPSG), and certain recent minimalist versions of TG.

Radically lexicalized grammars make the lexical entries for words do all of the language-specific grammatical work of mapping the strings of the language to their interpretations. The size of the lexicon involved is therefore an important measure of a grammar's complexity. Other things being equal, one lexicalized grammar is simpler than another if it captures the same pairing of strings and interpretations using a smaller lexicon.

A more restrictive principle of CCG, which it shares with LFG and GB and which sets it apart from TAG, GPSG, and HPSG (which in other respects are more closely related), is that it attempts to minimize the size of the lexicon by adhering as closely as possible to the following stronger principle:

- *The Principle of Head Categorial Uniqueness*. A single nondisjunctive lexical category for the head of a given construction entirely determines both bounded and unbounded dependencies upon that head.

This is not to say that a given word may not be the head of more than one construction and hence be associated with more than one category. Nor (as we have seen in the cases of Tagalog and Japanese) does it exclude the possibility that a given word-sense pair may permit more than one canonical order and, hence, have more than one category per sense, possibly schematized using the set CCG notation in Table 1. The claim is simply that each of these categories specifies both canonical order and all varieties of extraction for the clause type in question. For example, a single lexical syntactic category (2) for the word *married*, which does not distinguish between 'antecedent,' 'θ,' or any other variety of government, is involved in all of the dependencies illustrated in (4), (18), (20), and (28). By contrast, in both TAG and GPSG these dependencies are mediated by different initial trees or categories, and in HPSG they are mediated by a disjunctive category.

Unlike the Principle of Lexical Head Government, exceptions to the Principle of Head Categorial Uniqueness are sometimes forced. An example of such a necessary exception is the treatment of subject extraction in English by Steedman. It is a prediction of CCG (rather than a stipulation via a Fixed Subject constraint or Empty Category Principle) that a fixed SVO word order language such as English cannot permit complement subjects to extract under the Head Categorial Uniqueness Principle, as illustrated by the anomaly of (45a). The exceptional possibility of extracting subjects from English bare complements, as in (45b), therefore have been argued to require an extra antecedent-governed category for bare-complement-taking verbs such as *think*, in violation of that principle.

(45a) *who do you think that married Manny?
(45b) who do you think married Manny?

However, each such exception complicates the grammar by expanding the lexicon and makes it compare less favorably with an otherwise equivalently valued grammar that requires no such exceptions, if one could be found. Baldridge offered a grammar with a single category for such verbs.

The Combinatory Projection Principle

Even quite small sets of functional combinators, including the set {BTS} implicit in CCG, can yield calculi of the full expressive power of Turing machines and the simply typed lambda calculus. However, CCG syntax is subject to a number of principles that limit its expressive power to weak equivalence to TAG and Linear Indexed Grammar (LIG), the least more powerful natural class of languages known (Vijay-Shanker and Weir, 1994).

These principles can be summed up as a 'projection principle' that says that syntax must project (and may not override) directional information specified in the lexicon and, conversely, that the lexicon should not do syntax's job of unbounded projection. This principle is expressed as a number of subsidiary principles

We have given examples of several rules that encode the syntactic reflex of a few basic semantic functions (combinators). However, a larger set of possible rules could be derived from the combinators. CCG restricts the set to only those that obey the following principles:

- *The Principle of Adjacency*. Combinatory rules may only apply to finitely many phonologically realized and string-adjacent entities.

- *The Principle of Consistency.* All syntactic combinatory rules must be consistent with the directionality of the principal function.
- *The Principle of Inheritance*. If the category that results from the application of a combinatory rule is a function category, then the slash type of a given argument in that category will be the same as the one(s) of the corresponding argument(s) in the input function(s).

The first of these principles is merely the definition of a combinator, to which all the rules discussed here (including WRAP) conform. The other principles say that combinatory rules may not override, but must rather 'project,' the directionality specified in the lexicon. More concretely, the Principle of Consistency excludes the following kind of rule:

(46) $X\backslash_{\bigstar} Y \quad Y \quad \Rightarrow \quad X$ (disallowed)

The Principle of Inheritance excludes rules such as the following hypothetical instances of composition:

(47a) $X/_{\diamond}Y \quad Y/Z \quad \Rightarrow \quad X\backslash Z$ (disallowed)
(47b) $X/_{\diamond}Y \quad Y/_{\diamond}Z \quad \Rightarrow \quad X/_{x}Z$ (disallowed)

It is also the Principle of Inheritance that requires that any modality on the slash that unifies with the $/Z$ slash in the input to the combinatory rules previously instanced has to be the same modality on the output $/Z$.

These principles do allow rules such as the following *crossing functional composition rules*, as instances of rules of a kind already seen in their general form in (21):

(48a) $X/_{x}Y \quad Y\backslash.Z \quad \Rightarrow \quad X\backslash.Z \quad (>\mathbf{B}_{X})$
(48b) $Y/.Z \quad X\backslash_{x}Y \quad \Rightarrow \quad X/.Z \quad (<\mathbf{B}_{X})$

Such crossing rules are not theorems of type calculi such as that of Lambek and its descendant Type–Logical Grammar and, in fact, cause the collapse of such calculi into permutation completeness if added as axioms (Moortgat), a fact that has motivated the development of multimodal varieties of categorial grammar within the type–logical tradition by Hepple and others. Although such rules do not cause the same collapse in CCG even without the modalities, the present use of modalities to provide finer control over the rules is directly inspired by multimodal categorial grammar.

Conclusion

CCG abandons traditional notions of surface constituency in favor of flexible surface structure, in which most contiguous substrings of a grammatical sentence are potential constituents, complete with a compositional semantic interpretation, for the purposes of the application of grammatical rules. The benefits of this move are the following.

1. Word order, relativization, coordination, and intonation structure can all be handled via a single mechanism, using strictly type-driven syntactic combinatory rules with low expressive power.
2. These combinatory rules are universal and invariant. All language-specific information is specified in the lexicon.
3. The traditional modules of surface structure, S-structure, and intonation structure are unified into a single surface derivational module. Derivation is not a representational level; the only representational levels are phonetic and logical form.

It follows that everything that depends on relations of c-command (e.g., binding and control, and quantifier domains) must be expressed at the level of logical form, with a consequent transfer of responsibility for the grammar of bounded constructions and the phenomena that have led to proposals for covert movement or quantifier-raising at that level, to the lexicon. The ways in which these matters also can be handled in CCG without syntactic movement is discussed elsewhere (*see* **Semantics in Categorial Grammar**).

See also: Categorial Grammars: Deductive Approaches; Coordination; Long-Distance Dependencies; Semantics in Categorial Grammar; Syntactic Variables and Variable-free Syntax.

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Comenius, Johann(es) Amos (Jan Amos Komenský) (1562–1670)

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Johannes Amos Comenius (Jan Amos Komenský) called himself a theologian. Later centuries saw the pedagogue in him. The linguistic education of young people was his main concern, thus his relevant works, in particular his textbooks, are of a linguistic nature. With the growing interest in his last (unfinished) work, *De rerum humanarum emendatione consultatio catholica*, which was rediscovered only in 1923, he is now considered as a philosopher with a strong inclination to language.

Orphaned when only 11 years old, Jan Komenský spent his childhood and youth in Moravia, educated by a relative and a guardian in the spirit of the Unity of the Bohemian Brethren (*Unitas Fratrum*), a Hussite denomination in which Comenius was to become priest, senior, and last bishop in 1616, 1632, and 1648, respectively. From 1611 to 1614 he studied at the Universities of Herborn and Heidelberg, meeting there, among others, the encyclopedist Johann Heinrich Alsted (1588–1638) and the irenicist David Pareus (1548–1622), who both had a lifelong influence on Comenius's thinking. Between 1614 and 1628 he taught at Unitarian schools in his home country. After that, the turmoil of the Thirty Years' War and the persecution of the Protestants in the course of the so-called Counter-Reformation devastated him and exiled him for good. From 1628 to 1641 he lived in Lezno, Poland. Following an invitation by the Puritan reformer and pedagogue Samuel Hartlib (d. 1670), he visited England, where he contacted the founding members of the Royal Society. After only one year, he left the country because of the civil war. After traveling in the Low Countries and in Sweden, he spent the years 1642–1648 in Elbing, then Swedish territory, and 1648–1650 in Lezno. Accepting an invitation by the Hungarian nobleman Rákóczi, he traveled to Sárospatak, staying there until 1654. He spent the two succeeding years in Lezno again, where in 1656 a fire destroyed almost all his papers, among them the manuscript of a Czech alphabetical dictionary on which he had worked since his time in Heidelberg. Because of the Swedish–Polish war, he emigrated to his last abode, Amsterdam. During all these years he spent as a European refugee for religious reasons, he constantly published books, wrote innumerable letters to the great thinkers and statesmen, met influential people, and supervised schools.

Of a theological character were Comenius's lifelong intentions to restitute the world as willed by God in the unity of the creation, not least through knowledge and education (*pansophia*). Of a philosophical character was his encyclopedia in which he integrated all human knowledge, including the findings of the (then) new sciences. Of a didactic character were his books on teaching, mainly the *Didactica magna* (1657), and his textbooks for learning languages, mainly *Janua linguarum reserata* (1631) and *Orbis sensualium pictus* (1658).

For Comenius, language was the most important means of education, besides belief and piety. Repeatedly, e.g., in *Novissima linguarum methodus* (1648), he developed the triadic arrangement of *ratio-oratio-operatio,* marking the stages of education, and the more elaborated chain *res-mens-lingua-manus-res,* marking the process of general reform that eventually leads to pansophy. In both cases, language, and with it linguistic education, was the central link.

The two works that propagated Comenius's ideas with much more success than his other ones and that are linguistic in the narrow sense are *Janua linguarum reserata* and *Orbis sensualium pictus*; they are both special types of what would today be called onomasiological dictionaries. The former is a collection of exactly 1000 Latin sentences, broken down into exactly 100 sections. Each section provides the complex definition of a term, mostly nouns or adjectives. The latter is a collection on a much smaller scale of 150 sections consisting of defining sentences in Latin and German and of concomitant pictures that semanticize various lexemes incorporated into those sentences. In both books, the arrangement of sentences follows the encyclopedic order as had been popular since the 12th century, not least in the works of Comenius's teacher Alsted. Both books, whose success led to literally hundreds of editions in almost all the European languages, were didactic because they were schoolbooks geared to the capacity of learning children. They were philosophical because they presented all the extant knowledge of the world, and they were theological because they paved the way to pansophy.

For Comenius, the tongue adequate to the envisaged perfect state of mankind was a universal language as a perfect means of cognition and communication for all. He described it in *Via lucis* (1641) and in *Panglottia* (the linguistic part of the *Consultatio*) in the way that was commonly accepted in the British universal language movement.

See also: Applied Linguistics: Overview and History; Lexicography: Overview; Religious Language.

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Comics: Pragmatics

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A comic (plural: comics), also known as (a) comic strip(s), is a narrative form that combines written text (*see* **Text and Text Analysis**) and pictorial elements. A comic consists of a series of interrelated picture/text combinations. Each single picture stands in direct relation to the preceding units; this sequential order constitutes a chain of reference. Comparable to other serial productions of mass media such as soap operas or book and film series, comics have a continuous cast of main characters. The fact that the reader is familiar with the protagonists' background serves as another important point of reference.

Comics either appear as regular strips in printed media (comic strips), in comic magazines with contributions by various authors, or as comic books featuring a main character and his or her story or episodes.

Origins of the Comic

Although the historic roots of comics can be traced back to the 18th and 19th centuries, to political cartoons and illustrated narratives such as *Max und Moritz* (1865) by Wilhelm Busch, comics in their modern form are a relatively recent phenomenon. At the end of the 19th century, American newspapers included comic strips in their Sunday supplement to attract more readers. These humorous picture-stories, also known as 'the funnies' or comic strips, gave their name to a new genre (*see* **Genre and Genre Analysis**), the comics, which is not restricted to funny stories only.

Narrative Means: How Comics Tell a Story

Is there a language specific to comics? At first sight, expressions like 'zooom,' 'grrowr!' and 'splash!' are likely to be identified as typical expressions of comic-language. While such expressions are certainly characteristic of the medium, they do not touch its essence. Among the great variety of narrative means of the comic, the most important feature is the interdependence of the illustrations and written text. Both elements are bearers of meaning, but it is their **combination** that makes up the narrative.

While the narrative may have any imaginable content – there are adventure stories, political satire, family series, the classical Greek mythologies and the Bible retold, comics for children, so-called adult comics with erotic or pornographic components, etc. – what all comics have in common is the use of this specific means of telling a story.

A comic consists of minimally two picture–text units, called panels. Panels are usually square boxes containing an image and sometimes text, bounded by a thin frame line. These panels are to be read in sequential order, comparable to a normal text, and this sequential relation distinguishes a comic from a mere accumulation of pictures. This sequence distinguishes a comic from a cartoon, which consists of a single picture-frame only.

If a comic is to be read like a text, the author has to create coherence within the story. He achieves this by forming a 'chain of reference.' This chain of reference will enable the reader to recognize the different panels as narrative elements of the same story, comparable to the process of reading a text – the reader knows that the preceding words of a sentence are connected to the following words and will create a coherent narrative (*see* **Pragmatics of Reading**).

To illustrate this, let's imagine an episode with the world's most famous duck, Walt Disney's Donald Duck. A first panel might show Donald Duck sitting on a bench; the second one, Donald walking through a park; the last one, Donald in front of a house.

Theoretically, the reader could interpret this pictures as three separate pictures: 'Donald sits on a bench' / 'Donald takes a stroll in the park' / 'Donald stands in front of his/a house.'

But the reader knows, by means of identical reference, that every Donald appearing in the panels following the first panel is the same protagonist in the same story. That way, the reader can fill in the

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But the reader knows, by means of identical reference, that every Donald appearing in the panels following the first panel is the same protagonist in the same story. That way, the reader can fill in the

narrative gaps and verbalize this sequence of panels as 'Donald sat on a bench and walked home through a park.' As most readers will be familiar with the small suburban house that Donald lives in, the author can draw on this familiarity with Donald's surroundings as a further point of reference.

This system of reference is based on two *narrative strings*. One string refers to the space or environment where the action occurs, the other refers to the action itself.

In this way, once introduced, the environment 'park' remains valid until a new environment appears. The depiction of the park can be reduced to a single tree, a meadow, a flower – it may even disappear entirely, with no harm done to text comprehensibility, as the reader will still know the setting to be a park.

The other string deals with the *action*. Here, too, an element, mostly a living being such as Donald Duck in the example above, refers to its first introduction and can be reduced in various ways, e.g., to a silhouette, a hand, a hat floating on the water (as will happen to such an unlucky person as Donald). The separation between these two narrative strings, environment and action, is not absolute, though; an element of the environment can become bearer of an action, for instance, when a rock gives up its function as environment and falls down to block the road instead. Conversely, Donald's car can change function: when he parks it in front of his house and walks away, the car becomes part of the environment and is no longer an element of the action string.

In comics, a story can do without a description of the environment, but not without action. However, even though the description of action thus has priority over that of the environment, the latter has another, equally important function: it determines the rhythm of the narrative. An environment drawn in every detail will slow down the narrative rhythm, since the reader is likely to spend more time contemplating the picture and to study all the details shown, whereas a picture stripped of all environmental details will speed up the pace of the narration (see below, Narrative Rhythm).

Playful Conventions: How to Read the Narrative Codes

Most readers of comics have been familiar with the genre since childhood, hence know to decipher the conventions of the codes specific to comics. There is no prescriptive list of given codes, comparable to punctuation in a written text, such as periods or commas. While certain conventions have been established, each author still has the freedom to disregard them, to play with them, and to invent new means of structuring a story – the only constraint being that the reader still must be able to grasp the meaning.

Common Narrative Codes in Comics

Arrangement of Panels Panels are usually arranged in sequential order, to be read from left to right and top to bottom, according to the usual direction of reading of the Latin alphabet. Deviations are marked by numbers or by arrows indicating the new direction. Deviations of the ordinary sequential pattern are often used to express the rupture of the normal (i.e., linear) flow of narrated time and space, for example, to illustrate simultaneous action or a particular protagonist's train of thought, as in daydreaming. Panels may have subpanels. A large panel may take up an entire page in a comic book, or be divided into subpanels forming a whole; so-called split-panels are arranged to show the details of an action happening, comparable to slow motion in a film.

Panel Frame The panel frame usually consists of a straight line forming a square frame. It indicates the boundaries of the image-text component. The form of the frame is included in the playful way that comics handle narrative conventions. The frame will become more than a mere designating line and start being a bearer of meaning, for instance, when a story within a story is being told. A flashback is marked by wavy or punctuated frame lines, zigzagging lines will express strong emotions or pain. Irrespective of its shape, the frame's function becomes clear within the entire context. Some authors will occasionally omit the frame altogether. By doing so, they strip the topic of its environmental context. Thus, they create a moment of concentration, the effect resembling a close-up in film. Because almost anything goes in this genre (as long as the readers can construct meaning from the context), there are even authors that do without frames altogether.

Balloons Balloons are another vital constitutive element of the comic's narrative codes. They contain words or thoughts attributed to figures in the panel, and indicate who is speaking or thinking. The basic form of the balloon is a round or square frame containing the text; it usually hovers above the speaker's head like a small cloud, a small tail pointing to the speaker's head.

Balloons containing speech are conventionally drawn with a continuous line; balloons containing thoughts replace the balloon-tail by a line of bubbles. Thought-balloons are mostly used for characters that cannot speak in real life, such as animals, e.g., Jim Davis' 'Garfield,' the cat. There are, of course, infinite

Figure 1 In Walt Kelly's 'Pogo,' the lettering is masterfully used to carry meaning. (Kelly, 1972: 120). Copyright 2000 OGPI.

variations on this theme: whispering is illustrated by an interrupted line; a zigzagging balloon-tail indicates a voice as heard over a telephone; a balloon in zigzag-shape shows the speaker to be very angry; little icicles hanging on the balloon's lower frame lines indicate words spoken in an very frosty mood; a balloon wreathed in flowers shows the character's effort to sweet-talk someone.

Colored comics will add color to their balloons and thus enhance the emotional impact of the text spoken or thought. A green balloon will signify envy, a red one anger or pain. A black balloon may even be drawn to resemble a somber storm cloud looming above the character's head, showing his or her dark mood.

Several balloons in a panel, as in a dialog, are to be read according to the direction of reading. Balloons can also contain symbols such as a light bulb (inspiration), a heart (love), or a saw (emulating the sound of snoring).

Written Text

There are three main groups of written text in comics:

a. text within a balloon
b. text within the panel
c. text at the edge of, or between panels, so-called caption texts.

Text Within a Balloon Written texts in comics not only transmit their message by the words themselves, but also through the typographical appearance of the lettering. The latter is especially the case for the first two kinds of text mentioned, (a) and (b).

One important feature of the balloon text is its size. Small letters in a relatively oversized balloon indicate a low voice or a whisper; big letters, almost bursting out of their balloon, indicate a loud voice or scream. The size of the lettering thus compensates for the absence of sound in the comic medium.

Various kinds of typography can be used to characterize the speaker. Comic author Walt Kelly, for instance, does this with great artistic subtlety in his story 'Pogo' (cf. Figure 1). This example shows three types of balloons as well as three types of lettering. The tortoise shown in the first panel is communicating in thought-balloons, according to the convention that animals do not speak. The letters are written in the widely used conventional capitals.

The second panel contains the balloon with the monologue of the deacon, a stiff-upper-lip persona forced to do kitchen-chores ("me, an administrative

advisor, put to work peeling knockwursts and other vegetables"). His speech is contained by an ornamental balloon-frame, resembling ancient parchments. The letters are written in an accordingly old-fashioned way, made to resemble Gothic type, using capital and small letters.

Note, in the third panel, how small the letters ' – sigh – ' appear in the balloon. The last panel introduces an even different type of balloon; it is drawn to resemble a small cloud emerging from the bag containing the sausages and it contains the word 'chomp!' (an expression that combines the verb and the sound – see the next section).

So, just like the form of the panel or the balloon, the form of the letters, too, can bear meaning. Words cried in anguish will appear shaky or fragmented; old-fashioned typography and ornamental lettering is used to evoke an atmosphere of once-upon-a-time.

Text Outside Balloons Since comics cannot represent sound, they make it visible. This is achieved with the aid of sound-imitating or -describing words, also called onomatopoeia – the 'zooom,' 'grrowr!' and 'splash!' mentioned above. Whenever the text is not confined to the balloon, there are even fewer limits on the imagination of the author as to their typography. As in the balloon texts, big-sized lettering indicates loudness.

The source of the sound can be inferred from its position in the panel. 'Plitch,' a sound describing a dripping faucet, will appear near the surface that the water drop falls on. Some authors draw onomatopoeia with such expressiveness that these become pictures in themselves, e.g., a 'bouumm!' with exploding letters.

These expressions are often based on the imitation of sound, such as the just mentioned 'bouumm!' that evokes the sound of an explosion. Often, a verb is shortened into a descriptive form that describes the action, as in 'drip,' 'sob,' 'cracklerattlebash!' Not to forget the innumerable possibilities of combinations of both sound, verb, and description, as the above mentioned 'chomp!' or the sound of a starting racing car: 'vroummmroarr!'

Note that a loud cry can take on the quality of a sound word, drawn without a balloon ('yikes!!').

Caption Texts Caption texts are explanatory texts located at the edge of the panel (or between panels), often in a small, square frame of their own. They comment on the progress of the story in the panel and give information that has not been conveyed by the panels. The function of the caption text is to link the panels, sum up or comment on the action, or provide any information the author wants to communicate to the reader. They frequently deal with time factors, e.g. they could read 'later,' 'meanwhile,' or 'ten years ago.'

Pictorial Signs

Apart from the narrative means of structuring a story listed above, comics dispose of a large variety of pictorial signs. These signs appear as illustrations of the action taking place in the panel; often they are used to show a protagonist's emotional state or his or her general condition. Such illustrations are often graphical translations of a figure of speech, such as 'having a broken heart' or 'if looks could kill' – the lovelorn protagonist will have a splintered heart hovering above his or her head in the first case, whereas small daggers will be drawn on their way from the protagonist's eyes towards his or her adversary in the latter.

Great effort, embarrassment, and alarm are universally shown by little drops of perspiration flying from the protagonist's head (as in sweating, due to physical exertion, or breaking out in cold sweat). Pain is depicted by stars appearing above the hurting part of his or her body; feeling dizzy, being drunk or knocked-out, by spirals around the head (cf. above about 'balloons': hearts, light bulbs, etc., within the balloon).

Apart from these mostly figurative illustrations, comics have developed a specific graphic feature to show movement. They are called 'speed lines' and refer to the slurring of vision to the eye when an object or person moves in fast motion. Speed lines will trail along a speeding object, telling the onlooker 'it was here just a second ago, but it moved over there within the blink of an eye.' Speed lines will show the course of the moving object; often, they are accompanied by small dust clouds to enhance the effect.

Doing without Sound and Motion: Narrative Rhythm

Every narrative is told in segments. An author will select which segments of a progression he or she will show or tell and leave gaps in between for the reader to fill in and make up a continuous narrative flow (see Narrative Means: How Comics Tell a Story, above). The pace of a narration is directly related to the number of panels; an event illustrated by many panels will naturally slow down the narrative rhythm, whereas inserting a caption reading 'two weeks later' above a panel speeds it up. The narrative rhythm is not related to the time narrated (*see* **Narrativity and Voice**).

Apart from the numbers of panels, the narrative rhythm can also be varied by other means: by drawing a detailed environment (usually in a panel that is comparatively larger than the others), or by zooming out into a wide angle, as is often used in films to mark a moment of introduction or contemplation at the beginning or ending of a film. These wide angle shots are, for instance, used as recurring features in Goscinny & Uderzo's 'Asterix the Gaul.' The story usually starts with a large introductory panel, a wide angle shot of the 'small village in Gaul,' depicting a pastoral idyll, and it ends invariably with a panoramic view of the villagers enjoying themselves at a big banquet under the starry sky (with the unmusical bard being tied to a tree in the foreground, in most of the cases).

Equally, comics will make use of the other possibilities of film language, as it is expressed in the way a camera shot is taken. One of the factors involved is distance. A panel can show a small human silhouette in the distance, in the vast landscape of a desert plain. Or it can show only a detail of that person's face e.g., a pair of frightened eyes, seen from very short distance. The close-up shot will let the reader be part of the protagonist's emotional state of mind, whereas the first example keeps the reader more at a distance.

Apart from distance, the virtual camera can choose a particular angle to convey the narrative's message. A character shown from below will appear as someone superior and in control, someone looked down upon will appear as just that. Clever authors even make use of the subjective camera, known from experimental films. Thus, in 'Asterix and the Normans' a teenage boy from the capital Lutetia is sent to a remote small village 'to become a man.' He gets caught by the fear-inspiring Normans, knocked over the head and falls unconscious. The Normans splash water on him and in the following panel we see what the frightened boy sees: A close-up of a row of awe-inspiring beards as seen from lying on the ground, all nasty smiles and helmets, looking very grim indeed.

See also: Genre and Genre Analysis; Language: Semiotics; Media and Language: Overview; Narrativity and Voice; Pragmatics of Reading; Text and Text Analysis.

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Comics: Semiotic Approaches

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The goal of this article is to present the ways comics have been and are studied by semiotics. In particular, the meaning of a semiotic approach will be dealt with, along with an overview of its history; then a preliminary approach to comics considered as a literary genre is depicted, and a wider approach, which considers comics as a language with its own semiotic code(s), is proposed. Various research perspectives on comics are then presented, addressing their narrative form; their mixed language, always in between pure images and pure texts; and their sequential form. Finally, further and future research directions are discussed.

What Does 'Semiotic Approach' Mean?

Forty years ago a young Italian academic intervened in an intellectual philosophic congress on myth with his collection of Superman comic books under his arm. With great cultural boldness, the academic maintained that this superhero was a renovation of myth in the context of the mass society. At the conclusion of his speech, he awaited the reaction of the other academics with some trepidation, given the novelty of his proposal. What followed was a lively discussion, and the audience was enthusiastic, so much so that, at the end of the meeting, the young academic realized that at least half of his precious comic books had disappeared!

The name of that young academic was Umberto Eco (the anecdote is in Eco, 1964a: XI), and his essay 'The myth of Superman,' first published in 1964 (Eco 1964b), was to shortly become a classic in studies on

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Forty years ago a young Italian academic intervened in an intellectual philosophic congress on myth with his collection of Superman comic books under his arm. With great cultural boldness, the academic maintained that this superhero was a renovation of myth in the context of the mass society. At the conclusion of his speech, he awaited the reaction of the other academics with some trepidation, given the novelty of his proposal. What followed was a lively discussion, and the audience was enthusiastic, so much so that, at the end of the meeting, the young academic realized that at least half of his precious comic books had disappeared!

The name of that young academic was Umberto Eco (the anecdote is in Eco, 1964a: XI), and his essay 'The myth of Superman,' first published in 1964 (Eco 1964b), was to shortly become a classic in studies on

mass media. Paradoxically, the fame of 'The myth of Superman' overshadowed the most innovative essay on comics, published in that same year: 'A reading of Steve Canyon' (Eco, 1964c). This reading of a Sunday comic strip marks a theoretical watershed in the approach to this medium and can be considered the forefather of the 'semiotic approach to comics,' the subject of this article. The dates must be considered conventional, in the same way we maintain that America was discovered in 1492.

As far as we know, 'A reading of Steve Canyon' is the first example of the semiotic analysis of comics. In fact, while the discussion on Superman was a sociological one, albeit not completely consolidated, yet already present in the academic literature of those years, 'A reading of Steve Canyon' concentrated – as has never been done before – on language.

Eco asked himself neither "what role do comics have in society?" nor "what effects do they have on young minds?" He analyzed the graphic art of panels and balloons, the decoupage inside the page, the narrative mechanisms. Eco wanted to understand which characteristics of expression allow comics to involve the reader, tell a story, make sense. In short, Eco was doing semiotics.

Easy to say today! In fact, in 1964 semiology (both in Europe and America) had not yet stabilized in precise research paradigms, nor had it been institutionalized as an academic study (for an excursus, see Bailey and Matejka, 1980). But this is of relative importance. When we speak of 'doing semiotics,' before even considering a defined discipline, we are referring to a cultural approach through which to investigate the possibility of meanings of languages. In this light, 'A reading of Steve Canyon' is, without any doubt, a semiotic analysis. It is so in the pioneering fashion of all the essays of the period dedicated to the exploration of semiosis in the different forms of language: literature (Tzvetan Todorov), cinema (Christian Metz), photography (Roland Barthes), and so on.

These pioneers of the sign, as they were inventing new ways of seeing things, had to invent a new (meta)language to explain them and a new method to investigate them.

The Pioneers of the Sign

This can be seen, aside from Eco's work, in that of two other forerunners in the field, Roman Gubern and Pierre Fresnault-Deruelle. Both, at the start of the 1970s, wrote essays programmatically dedicated to the investigation of the language of comics (Gubern, 1972; Fresnault-Deruelle, 1972). While Eco used an interpretative key to locate the instructions to the reading of a comics text, Gubern analyzed, in a cognitive perspective, the mechanisms of expression of the medium. Even more different is the approach of Fresnault-Deruelle, indebted to Saussurian linguistics and with the intent of delineating the structural implant of the language.

The variety of approaches has made the field of study rich in classifications, research methods, and definitions right from the start. With the passage of years, instead of diminishing, the phenomenon has amplified in proportion to the number of essays and articles. Even today, paradoxically, it is impossible to think of a 'semiotics of comics' in the sense of a coherent theoretical picture, as can be done for the cinema or for painting. Therefore the expression 'semiotic approach to comics' remains the most fitting to describe the variety of orientations and instruments adopted.

Misunderstanding 'Comics': Comics as a Genre

As we have said, what is common to the works of Eco, Gubern, and Fresnault-Deruelle, despite their different orientations, is the idea that comics are language. Today this affirmation seems obvious, but in those days it was revolutionary. Proof of this is the 'shyness' in the terms used by the academics.

Eco did not use the term 'language.' Rather, he defined comics as a "particular literary genre" (Eco, 1964c: 151). Fresnault-Deruelle spoke of "paraliterature," explaining that he intended that the term convey no negative connotations (Fresnault-Deruelle, 1972: 29).

All this caution should be understood within the context of the culture of that age. The reason is suggested by the anglophone term 'comics,' which has always been the most popular to define the medium. It recalls the narrative genre that triumphed, initially, on the first American Sunday pages (Couch, 2000). The gags of terrible young brats, clumsy gentlemen, and talking animals were amusing. They were funny: com(ed)ic situations repeated week after week. So the term quickly came to designate the entire editorial universe of comics. Even with the appearance of adventure stories, the name continued to be used, both in the Sunday pages and in the new types of publications (strips and books). *Dick Tracy*, *Flash Gordon*, and *Batman* were not funny, but they were termed 'serious comics.'

They were laying the foundations for the misunderstanding that would persecute the medium for a long time. In fact, the continuous use of this same term for different types of stories resulted in the idea that 'comics' had no dignity of language but were a 'macrogenre.' In the words of Louis T. Hjemslev, it was impossible to think of 'the form' of expression

without certain narrative 'contents' and certain readers, generally children.

Are Comics 'Innocent'? From Genre to Language

This misunderstanding was echoed even in the pages of certain academics, in particular the affirmations of Arthur Asa Berger in his famous essay 'Comic stripped America' (Berger, 1974). The sociologist found a connection between the forms of comics and the American imagination. For example, the simple graphics and the loud spoken gags of the first Sunday pages were an extension of the ingenuity and innocence of the readers of the day – a tempting thesis, but it continued the error that comics are a unique genre of storytelling (see Frezza, 1978). Berger named only one exception to this theory: *Little Nemo in Slumberland*, by Windsor McCay, the most refined and complex comic of the age, in both the narrative and the graphical senses. In reality, the so-called exceptions (aside from *Little Nemo*, we could cite, from those same years, *Krazy Kat*, by Herriman, and *Kin-der-Kids,* by Feininger) prove that comics, from the beginning, demonstrated specific expressive capacities.

In the succeeding decades, 'exceptional' comics have proliferated, putting an end to any misunderstanding. Works like *La Ballata del Mare Salato* [Ballad of the salt sea], by Hugo Pratt, *Contract with God*, by Will Eisner, *Maus*, by Art Spiegelman, *Le garage hermétique* [The airtight garage], by Moebius, *The dark knight returns*, by Frank Miller, *Fuochi*, [Fires], by Lorenzo Mattotti, and many others remind us that comics are not a unique genre but a language with its own semiotic code (Barbieri, 1991).

However, as far as we are concerned, the language/genre misunderstanding is above all proof of the difficulty of defining, in any exhaustive way, the semiotic specifics of the medium. In other words, all of us, looking at comics, realize that they are something different from a movie or a novel, but this difference is not easy to describe; it is entangled with many similarities to other languages. The most obvious similarities are those with literature, on the one hand, and with cinema on the other. Eco and Fresnault-Deruelle addressed the similarities of comics and literature.

Graphic Literature: Comics as a Narrative Form

No doubt comics are related to literature. First of all, like books, they are printed on paper and therefore need the same type of willing reader, with the intention of activating their meaning by reading. Secondly, comics can include a series of verbal elements in their story content (balloons, sound effects, captions), and so they give a literary rhythm to the succession of panels.

The idea of making literature, with the added value of images, has appealed to many cartoonists. Hugo Pratt, for instance, liked to define his works as "Letteratura Disegnata" [graphic literature]. In effect, in richness of narrative, the vicissitudes of his *Corto Maltese* can compete with the works of great adventure novelists (Melville, Conrad, London, etc.). But it is a resemblance induced by a precise type of story. When the Italian author spoke of graphic literature, he renewed the misunderstanding mentioned earlier. This time it is the literary language that is mistaken for a genre: romantic literature.

This, as we have seen, happens with all the narrative languages, in which many things can be told in many ways. This is one way in which literature, comics, and cinema resemble each other! We could compare them to different automobile models. Each has its own bodywork, its own motor, its optionals. But in the end they run on the same fuel: the story.

The Analysis of the Narrative Form in Comics

The first to confront the analysis of the narrative dimension of comics is Fresnault-Deruelle, in the essay he published in 1972. The study was born in the francophone academic context, in that age very sensitive to the subject of the narrative. Back in 1928, after years of oblivion, *Morfologiya Skazki* [*Morphology of the folktale*], an original work by Vladimir J. Propp, was circulated in Europe. It was a proposal for a comparative analysis of the story by locating a reduced number of recurring structural narrative elements, called 'functions.' In the wake of Propp, semiology set forth on several lines of research, manifested by the various European pioneers (Roland Barthes, Claude Bremond, Umberto Eco, Algirdas J. Greimas, and Tzvetan Todorov) in issue number 8 of the magazine *Communications* (1966).

Fresnault-Deruelle took his approach from this analytic heritage. He focused his analysis on the *bande dessinee*, comics in the French language published in albums (for a classification, see Couch, 2000), and in particular on the vast production in series of three celebrated cartoonists: Hergé (George Rémi), J. Martin, and Ed P. Jacobs (authors, respectively, of *Tintin*, *Alix*, and *Blake and Mortimer*). Fresnault-Deruelle found a tight net of plot-points in their comics, and he classified them in terms of recurrence. He even managed to find in all the stories a common structural scheme: (1) threat, (2) unrolling of the plot, and (3) result.

Today the analytic characteristic of Fresnault-Deruelle shows several limitations. Nevertheless, he blazed a trail; only the method was yet to be refined.

In this aspect a decisive role was played by the renowned Paris School of Semiotics (for an overview see Collins and Perron, 1989). The definition is associated with a group of semiologists of the Ecole de Paris, reunited around the figure and teachings of Algirdas J. Greimas. To summarize the Greimasian theory, the story represents the fundamental structure of any process of meaning and, consequently, of any text.

Une lecture de Tintin au Tibet, by Jean-Marie Floch (1997), is an exemplary application of the Greimasian method to comics. The monographic reading of a famous Hergé album becomes an occasion, for the French semiologist, to dig among the panels and balloons in an attempt to bring deep values and meanings to light. The most significant pages of the essay are dedicated to the comparison of all the adventures of Tintin. Floch draws an interesting connection between serial comics and ancient myth: "These had for material an unlimited stock of figures, scenes and motives .... The adventures of Tintin are cut out, responding and inverted in the manner of myths .... The analysis of the Adventures of Tintin in Tibet implicates the analysis of another adventure that, in turn, implicates another" (Floch, 1999: 185–189).

The recent works of Alvise Mattozzi follow this same Greimasian pattern, but they develop the discussion in a social semiotic perspective. Starting from superhero comic books (Mattozzi, 2000) and underground comics, the Italian semiologist analyzed the evolution of the 'superficial' modalities (narratives and graphics) of comics in relation to the 'profound' changes in the sociocultural context. This is a new aspect of research, and of particular interest.

Generally, all the essays on comics that are done in the Greimas style have their merits and limits. The deeper you dig, the more you 'discriminate,' and the greater the probability of finding some principles of identity. But, at the same time, the deeper you dig, the more you 'simplify,' and the greater the probability of losing sight of the specifics of the texts. So the method is effective if the objective is to study the 'genetic' values of the story, independently of the fact that they appear in *Tintin,* in *David Copperfield*, or in *Red Hood*. On the contrary, it is minimally productive if the aim is to explain why, for instance, Melville's *Moby Dick* (literature) and Dino Battaglia's *Moby Dick* (comics) are two very different texts despite the fact that they are based on an identical narrative plot.

In other words, if the Greimasian approach helps us define what comics have in common with literature (and with narrative forms in general), one needs to look at other semiotic methods to understand their differences.

The Strange Case of Dr Image and Mrs Word: Comics as Mixed Language

We have already hinted at the possibilities of language, presented in comics through visual components (balloons, sound effects, captions). Above all, balloons, containers of the thoughts and words of the characters, are the naturalized element of language of comics (or at least it is traditionally perceived to be so). The Italians have even elevated them to the name of the medium: *fumetti* [little smoke clouds]. This way of labeling probably convinced even the American historian Robert C. Harvey: "In speech balloons, we have something that is unique to the medium .... In all other graphic representations – in all other pictorial narratives – characters are doomed to wordless posturing and pantomime. In comics, they speak" (quoted in Groensteen, 2000: 1).

Even other American historians (Bill Blackbeard, Les Daniels, and Maurice Horn) recognized the value of verbal components, so much so that they inserted verbal components into the definition of the medium. According to this approach, the uniqueness of comics lies exactly in the possibility of articulating words and images together in panels. Art Spiegelman has even proposed to change the term 'comics' into 'commix': a commixing of words and images.

Silent Comics: Verbal and Visual Forms in Comics

The Belgian-French Thierry Groensteen (2000) commented, a little maliciously, on the insistence of American theorists on the mixing of words and images; according to him, this is mainly a way of endorsing the fact that the medium was 'Made in the U.S.A.' In fact, the official date of birth of comics is made to coincide with the publication, in 1886, of the American Sunday page *Yellow Kid*. The adventures of the hairless boy are distinguished exactly because they were the first comic with a verbal component integrated into the graphic composition.

Of course, Groensteen was not interested in the controversy that surrounds the argument. Rather, what was of interest to him were the linguistics. Although a student of Fresnault-Deruelle, Groensteen kept his distance from traditional semiology, convinced that, as far as comics are concerned, a specific theory was needed. As he explained in his essay 'Système de la bande dessinée' (Groensteen, 1999), comics (strips, pages, and books) are a mainly visual narrative space. While you can imagine comics without words, you cannot imagine comics without images.

Groensteen cited, as an example, *Arzach*, by Moebius (Jean Giraud). With the abolition of

balloons, captions, sound effects, and even kinetic signs, the silent stories of this surreal character live in the essentiality of juxtaposed panels. Something similar, with grotesque connotations, was done by the Argentineans Carlos Trillo and Domingo Mandrafina with their cycle of mute 'short novels.' But stories without dialogues and captions can be found, occasionally, in more popular serial comics (from *Batman* to *Ken Parker*). With these cases at hand, one could agree with Groensteen and Scott McCloud, who excluded from his famous definition of the medium any reference to the verbal component. In the opinion of McCloud, comics are "Juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer" (McCloud, 1993: 9).

McCloud's definition is especially interesting. His essays represented an original methodological frontier for studies on this subject. *Understanding comics* (McCloud, 1993) and *Reinventing comics* are theoretical works on the language of comics, by a cartoonist, using the language of comics.

The verbal component has a fundamental role: the protagonist (a caricature of McCloud) constantly uses balloons to explain the theoretical steps. In effect, rather than completely denying the importance of words, the author reminds us of how difficult it is to measure their exact expressive importance. To illustrate this, McCloud used a graphic picture/word scale (McCloud, 1993, Chap. 6). In comics differing in format, genre, and nationality, the scale can tip from one side to the other without altering the expressive quality of the story. McCloud, therefore, relinquished any theoretical certainty and rather put his trust in experience: the word/image relationship of comics is more an alchemy than a science.

This solution reminds us of certain cooking recipes that say "add salt as necessary," leaving the cooks to their own devices. Perhaps 'words as necessary' could satisfy able comic gourmets such as Scott McCloud or Will Eisner, but it does not satisfy in the semiotic sense.

If, as Groensteen says, the specificity of the medium resides in the visual juxtaposition of images, may we continue to consider graphic texts such as *Prince Valiant*, *Peanuts*, Superhero Comic Books, and others in which words have a preponderant role, as comics? Would it not be more appropriate to define them as illustrated stories?

Blind Comics: The Analysis of Verbal Form in Comics

Examples of verbose comics are not lacking, but a typical example, mentioned in every essay, is *Prince Valiant*. In the Sunday page of this chivalric hero, created by Harold Foster in 1934, the captions beneath the illustrations are the essence of the story (see the examples of Peeters, 1998). Paradoxically, the events that are narrated would be understandable even without the images. As opposed to the silent comics, so praised by Groensteen, Valiant could be termed a 'blind' comic, in which the word completely dominates over the visual aspect. For this reason, some academics (e.g., Will Eisner, Robert C. Harvey, and Scott McCloud) go so far as to exclude *Valiant* from the comics club and consider it an illustrated story. But this reclassification is not totally convincing.

Even if we were to remove these precious captions from *Prince Valiant*, it would still remain a story told by images, although not very fluid or effective, but nonetheless a visual story. In effect, as Benoit Peeters pointed out (Peeters, 1998: 97–98), in Foster's work the word is not a substitute for images; they are used alongside each other as a stylistic effect. Barthes' 'Rhétorique de l'image' of 1964 had already codified redundancy as one of the possible verbal/iconic combinations. According to Barthes, the image is polysemic, a fluctuating chain of meanings with which words can have various types of relationships.

In *Prince Valiant*, the captions reinstate the epical-chivalric tone of the world that is being represented in a modern chanson de geste. In other comics, the same dynamics are used for different stylistic effects. *Alack Sinner* (by Carlos Sampayo and José Munoz) constantly sets out in its panels the 'voice-over' of the protagonist to reinforce the Chandlerian tone of the detective story. In the comics by Frank Miller, David McKean, and Bill Sienkewicz, the thought-captions of the characters, a sort of 'stream of consciousness,' triumph.

And so we can identify the fundamental semiotic difference between the use of words in comics and in literature. In literary works, and verbal stories in general, words need somebody to utter them, and that somebody, by consequence, is present in the text as a personal or impersonal narrator. On the contrary, in comics (and even in cinema and paintings) the image tells itself, and no subtitles are needed. Words, if present, are intended as components of a vast system of expressions. Another consequence is the so-called metaphonological language (Cigada, 1989): if in a book the mood of the characters and its influences on their utterances are to be described through other words ("said the man in a sad voice," "the girl cried," "proclaimed aloud," etc.), in comics mood and quality of voice are expressed by means other than words (by the images themselves and by other iconic tools).

From this point of view, 'blind' and 'silent' comics are not incompatible categories but rather the

extreme ends of a graduated continuum on which every text is situated according to the particular combination of its components. It is therefore not very advisable to determine the 'purity' of a particular comics only by means of the juxtaposition of words and images. As Daniele Barbieri wrote, "Even if we were dealing with a 'simple' juxtaposition, the global effect would result neither from the words themselves alone nor from the images themselves alone, but from their relationship" (Barbieri, 1991: 203).

The study of the way this relationship functions is the primary objective of the modern semiotic approach to comics. This was determined also in the volume *The language of comics: word and image*, edited by Christina Gibbons and Robin Varnum (2002). For instance, Frank L. Cioffi proposed a study on the "disturbing dissonances" triggered in the reader by the image/word relationship of underground commix. Robert C. Harvey stressed, instead, how the close complementarities of verbal and graphic components can become the distinctive trait of a particular genre of comics, the so-called one-panel cartoons. Even more original was the contribution offered by Gene Kannenberg, Jr., through his analysis of the experimental comics of Chris Ware. Kannenberg stressed the innovative composition of the pages of this cartoonist, which couple graphic and verbal elements in an insoluble 'visual totality.' The works cited above give proof of the variety of points of view and of the research being done on what continues to be one of the main topics in the semiotic debate on comics.

From Panel to Panel: Comics as a Sequential Language

The discussion on the words/images relationship has brought to light the differences between literature and comics, but it has also highlighted comics' resemblances to cinema, a medium born around the same period and which has in common with comics the juxtaposition of images in sequence. This resemblance in expressions has often promoted an intertwining of semiological analyses.

Even the historic dating coincides. The year 1964, the conventional date of birth of semiotic research on comics, is also the year of publication of essays that have become classics on cinema research, such as 'Le Cinéma: langue ou langage?' by Metz and 'Rhétorique de l'image' by Barthes.

As a matter of fact, those suggestive studies originated a heterogeneous line of research (some of it sensible, some rather dubious), with the intention of giving iconic texts universal morphologies and syntheses, in some cases adopted by verbal language, in other cases created from scratch.

For example, right from the start, the frame shots of movies and the panels of comics were equated to the linguistic notion of syntagmas. In the same way that syntagmas are the basic units of verbal discussions, so are frames and panels to visual stories. These are the foundations of the particular dynamics of the shots.

In fact, unlike paintings or photographs, the shots of comics and of the cinema are never closed or ends in themselves. Each image is a partial step in the story, constantly 'in search of' a mate in order to complete its sense. The elements present in each single shot (situations, characters, backdrops) are always organized in respect to what is outside the particular shot and perhaps present in the one that follows. Roman Gubern (1972) was the first to stress how the cognitive discrepancy generated by a shot with respect to its preceding one becomes the principal center of interest to the spectator/reader. The most effective definition of these dynamics is that of Eisner's 'sequential art' (Eisner, 1985).

The Analysis of Sequential Dimension in Comics

Sequentiality bases its process of signifying on what Roman Jakobson defined as the two polar axes of language: contiguity and similarity, or in rhetorical terms, metonymy and metaphor. In fact, on the one hand, the sequential story works by metonymic combination, on the basis of a principle of contiguity, through the juxtaposition of images along temporal paths (actual in cinema, suggested in comics). On the other hand, a metaphoric selection intervenes: every single shot 'replaces' the preceding one, and the perception of the narrative continuum (logical or chronological) lies in the principle of similarity, in seeing the same forms that vary from one frame to the next. Contiguity and similarity cooperate in suggesting connections between the images to the spectator/reader.

The repertoire of these connections, which constitute the grammar of sequential footage (alternated, parallel, etc.), has been the object of several classifications in comics, among which the most famous is still that of McCloud (1993). His catalogue is based on the psychological concept of closure: a completion operated by inference by the reader on the basis of experience. The different types of connections inferred by the reader correspond to the different types of closures.

Although McCloud did not make an explicit distinction between the footage of cinema and that of comics, we must stress that the greatest differences between the two languages lie at the level of closures.

The sequentiality of the frames, unlike in cinema, is not the product of the mechanical running of photograms but an instruction of the text to the reader in order for him to read the static images in a series. We could say that the story is completely in the eye of the reader. As far as visual suggestion may be effective, there remains the physical limit, made by the white lines that outline the frames. Groensteen stressed the importance of the "interconic white" as the site of an ulterior articulation of the language of comics (Groensteen, 1999). The white hiatus creates a discontinuity, a jump, great or small as it may be in terms of time and space, between one shot and the next.

There is another substantial difference between the sequentiality of the two languages. The concept is 'iconic solidarity,' coined by Groensteen to stress that the panels are to be interpreted, simultaneously, both as isolated units and as parts of a whole, determined by the form of the comics (strips, pages, books). As Jakobson put it, the axis of similarity prevails in cinematographic sequences: one shot frame 'chases away' the preceding one. In comics, on the contrary, the axis of contiguity is dominant: the constant reiteration of panels. Iconic solidarity is manifested by the planar (a succession of panels along the same strip) and vertical (a succession of strips in the same page) directions together in the same space.

Comics as Polyphonic Language

This is a very particular prerogative because it allows comics, more than any other language, to have meaning both with the narrative process (intradiegetic), given the succession of events in the story, and the paranarrative process, given the succession of graphic forms on the page. Usually the latter is at the service of the former: a panel of greater size indicates a narrative event of special importance. But there is no universal law on the subject. For example, in superhero comic books, splash panels (giant frames) are used even for the less important parts of the story not to mention all those stylistic variables that cannot be included in the intentions of the single cartoonist, but that instead derive from general cultural codes. In fact, the meaning of comics is activated, aside from the story line, by the perceptive architectures that catch the eye of the reader.

From this reflection, the semiologist Daniele Barbieri developed an analysis paradigm that considered the 'rhythmic' architecture of comics. A student of Eco, Barbieri borrowed his interpretative approach and extended the notion of rhythm, traditionally tied to a musical context, to any text (verbal, graphic, audiovisual) that develops in a sequence (Barbieri, 2004). In a semiotic sense, rhythm is the recurrence inside a (textual) structure of homologous elements that are perceptible sequentially. In the case of comics, the layout, the dialogues, the graphics, the story, etc., are rhythmical forms. On each of these rhythms, any element in contrast to the order set previously is perceived as unexpected, as a novelty. Narrative and paranarrative forms work to build an architecture of tension made of climaxes and downfalls, accelerations and slowing downs, so as to feed the interest of the reader.

This rhythmical paradigm gives rise to a modern semiotic conception of comics. This medium is made rich by the exchanges with other forms of expression, but it is also an autonomous language, able to arrange meaning in polyphonic ways, articulating various levels of expression, all of them tightly interwoven.

The Semiotic Approach to Comics, Today and Tomorrow

Almost 40 years after 'A reading of Steve Canyon,' Eco wondered at the appropriateness of scientific studies (especially semiotic ones) of comics. In his article 'Quattro modi di parlare di fumetti' [*Four ways of speaking about comics*], he distinguished, with subtle irony, four analytical tendencies. A couple of them are more concerned with the critique of the sector rather than with the research, while the remaining two are relevant here.

In the first ('Saggi sui Comics come medium' [essays about comics as medium]), he included himself and the other pioneers of this field, along with the young students (whom he criticizes), among those who still today in their dissertations passionately "rewrite, for the umpteenth time, that there is a syntax of shots, a semantics of balloons, a textual theory on footage, or that the first comics was the mosaic of San Clemente . . . . However it is clear that this phase is over, and at most can now generate useful archive research, perhaps a critical edition of Yellow Kid" (Eco, 1999: 1).

In the second ('Dimenticare il medium' [forgetting the medium]), Eco praised all those who dedicate themselves to the study of the texts and ignore the analysis of expressive forms in general ("as they are no longer in question"), to concentrate on the evolution of "genres, themes, techniques and topics in the universe of the comic-medium" (Eco, 1999: 1).

Eco's words demonstrate the evolution of the semiotics of the past, from the 'abstract' discussions on signs and codes, into the concrete analysis of the text (built with signs and codes). The change to the textual approach has permitted, especially in the cases of languages with aesthetic goals (literature, cinema,

comics), the maturing of more precise theoretical schemes. Therefore, he is right in maintaining that it makes no sense to study comics in the same manner as was done in the past.

Nevertheless, the general theory on comics does not seem to have reached its 'Nirvana.' In fact, this article has highlighted that, despite the indubitable progress made, uncertainties and errors remain. Paradoxically, however, this circumstance must not be seen as a limit of research but rather a stimulus for the future. After all, are there any languages for which we can say with absolute certainty that we know all the grammar and possible meanings? Languages live in their usages and in the creativity of daily use. This is the case with comics: many love them still, read them still, create them still. Styles are evolving, genres are becoming more mature, and reading practices are becoming more refined. In the face of such a dynamic scenario, various research perspectives are opening up.

Of course, as Eco suggests, it is important to focus the analysis of the text on specific themes and techniques, 'forgetting' the medium; but it is also important to remember it from time to time and reevaluate the theoretical perspectives.

See also: Barthes, Roland: Theory of the Sign; Eco, Umberto: Theory of the Sign; Iconicity; Russian Formalism; Visual Semiotics.

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Command Relations

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Since the earliest stages of transformational grammar, it has been observed that linguistic rules are sensitive to the structural relations between nodes in the syntactic tree. Historically, this was noted first for interpretative rules, such as those governing anaphora and quantifier scope. The syntactic relations discussed in the 1960s include 'command,' 'clause-mate,' and the linear relation 'precede.' The relation found most useful at this stage was the composed relation 'precede and command' that was introduced in Langacker (1966) to capture the relations between pronouns and their antecedents (which he viewed as governed by a transformation of pronominalization). The relation was later applied to the analysis of the scope of negation in Ross (1967) and of quantifier scope in Jackendoff (1972). We illustrate the development of the view of command relations with the problem of coreference (between pronouns and antecedents) since this was the problem around which most of the discussion centered historically.

The relation command is defined, following Langacker (1966), as follows:

(1) A node α commands a node β iff neither α nor β dominates the other and the S node most immediately dominating α also dominates β.

(2a) *[$_S$ **She** denied that **Lucie** stole the diamond].

(2b) The man who [$_S$ t traveled with **her**] denied that **Lucie** stole the diamond.

(2c) [$_{NP}$ ***Her*** husband] denied that **Lucie** stole the diamond.

Combined with the relation of 'precedence,' Langacker's generalization on coreference (stated in current terminology) was that a pronoun cannot both precede and command its antecedent. Thus, in (2a) the pronoun both precedes and commands *Lucie*; hence; coreference (marked with bold type) is impossible. In (2b), however, the preceding pronoun does not command *Lucie* (the first sentence (S) node dominating it does not dominate *Lucie*); hence, coreference is not excluded. By this definition of command, (2c) should be blocked as well, because the first S node dominating *her* also dominates *Lucie*. Hence, the pronoun both precedes and commands its antecedent. However, Jackendoff (1972: 140) and Lasnik (1976) suggested a modification of the definition (1) that makes use of the notion 'cyclic node' rather than just S. At the time, the cyclic nodes were believed to be both S and noun phrase (NP). (Lasnik proposed the term 'kommand' for the modified relation.) Their view on the restriction on anaphora remained the same: A pronoun cannot corefer with a full NP that it both precedes and commands. In (2c), the first cyclic node that dominates the pronoun is the NP, which does not dominate *Lucie*. Hence, the pronoun precedes, but does not command, the antecedent, and coreference is permitted.

Reinhart (1976, 1981) argued that structural relations like command can be best understood as defining the syntactic domain of a given node – roughly,

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the portion of the tree consisting of those nodes that a given node bears the structural relation to. The structural conditions on linguistic rules, which are based on these relations, restrict these rules to operate on two nodes just in case one of them is in the domain of the other. In the case of semantic interpretation rules of the type mentioned previously, the domain of a given node corresponds to the portion of the syntactic tree in which that node can effect the interpretation of other nodes. For example, in the case of quantifiers' scope, the syntactic domain of a given quantified NP determines its potential scope over other NPs. Characterized in terms of syntactic domains, the relation 'precede and command' defines the domain in (3). The coreference restriction assumed previously can now be stated as in (4):

(3) The domain of a node α consists of α together with all and only the nodes that α precedes and commands.

(4) A pronoun cannot corefer with (non-pronoun) NPs in its domain.

From this perspective, Reinhart argued that if linguistic rules operate indeed within the domains defined by (3), it would be rather mysterious why this is so since these domains are arbitrary units – chunks of the tree that do not necessarily correspond to independently established syntactic units. The source of the problem is the incorporation of the relation precede in the definition of domains. By this definition, any sequence that follows a given node within the same S (or cyclic node) forms a domain. For instance, given a sentence such as *Ben introduced Max to Rosa in September*, the domains defined are, first, the domain of the subject (the whole sentence) and, next, the domain of the verb (the verb phrase (VP)). These domains correspond to syntactic constituents, but the next domains would be [Max to Rosa in September], [to Rosa in September], and [Rosa in September]. If such arbitrary chunks of the tree constitute syntactic domains, it is difficult to see what content the notion could have.

Next, linear order varies across languages. If (3) is the definition of the domains linguistic rules operate on, different languages may have dramatically different domains. Reinhart (1976: 41, ex. 31) illustrated this with the following example from Malagasy, a VOS language:

(5a) namono **azy** ny anadahin-d **Rakoto**
hit/killed ***him*** *the sister-of* ***Rakoto***
'**Rakoto's** sister killed **him**'

(5b) *namono ny anadahin-d **Rakoto** **izy**
hit/killed the sister-of ***Rakoto*** ***he***
'*__He__ killed **Rakoto's** sister'

The domain of the subject pronoun in the English translation of (5b) is the whole sentence. However, in the subject-final Malagasy, the domain of the pronoun includes only the pronoun since nothing follows it. In (5a), it is the other way around: Whereas in English the object pronoun has nothing in its domain, in Malagasy its domain is the arbitrary chunk [*him the sister of Rakoto*]. As shown in (5), the coreference options are precisely the same in Malagasy and English. However, if the coreference rule operates on domains based on linear order, it should incorrectly allow coreference in (5b) and rule it out in (5a).

Along with the principled questions, Reinhart argued that there are many empirical problems with rules based on the relation precede and command, even for right branching languages such as English. In the area of coreference, for instance, coreference is permitted in (6) (from Reinhart, 1976), although the pronoun precedes and commands its antecedent:

(6a) The chairman hit **him** on the head before **the lecturer** had a chance to say anything.

(6b) Rosa won't like **him** anymore, with **Ben's** mother hanging around all the time.

Reinhart concluded that linear order is universally irrelevant for the definition of syntactic domains, and hence for linguistic rules of the type under consideration. On the other hand, the domains for the relevant linguistic rules must be narrower than those defined by the relation command, and they consist of constituents rather than S or cyclic nodes. The initial definition of Reinhart (1976: 32, (36)) for the relation c-command (constituent command) is given in (7):

(7) A node α c-commands a node β iff neither α nor β dominates the other and the first branching node dominating α also dominates β.

(8) The domain of a node α consists of α together with all and only the nodes that α c-commands.

As observed in Reinhart (1976), this relation is similar to (the converse of) the relation 'in construction with,' which was suggested by Klima (1964) for the analysis of the scope of negation. It also bears resemblance to 'superiority' suggested by Chomsky (1973), the difference being that superiority is asymmetric. Thus, sister nodes cannot be superior to each other, whereas (7) allows them to c-command each other. The formal properties of c-command were further investigated in Reinhart (1981), where she argued that the requirement that neither α nor β dominate the other is empirically superfluous and leads to formal complications. If it is dropped from the definition, then c-command is a reflexive relation (namely, nodes c-command themselves), which has formal advantages. This line was

further pursued in Baker and Pullum (1990). However, the definition that is most widely assumed remains the one in (7). Given this definition, syntactic domains must be defined as in (8). (For a simpler definition, see Reinhart, 1981.)

Given the c-command domains in (7), the coreference restriction (4) captures all cases of coreference discussed here. In the Malagasy (5a), just as in its English translation, the first branching node dominating the subject pronoun is S (inflection phrase (IP)); hence, its domain is the whole S, regardless of whether the other nodes in S precede or follow it. Thus, (4) equally rules out its coreference with *Rakoto* in both English and Malagasy. In (5b) the pronoun does not c-command the antecedent. The domain of the object pronoun for both English and Malagasy is only the VP, which does not dominate the subject. Hence, (4) does not rule out coreference.

In the sentences of (6), the pronoun is an object, and the NP with which it corefers is in a clausal prepositional phrase (PP) attached higher than the VP. The syntactic tree of (6a) is given in (9):

(9) Diagram 1

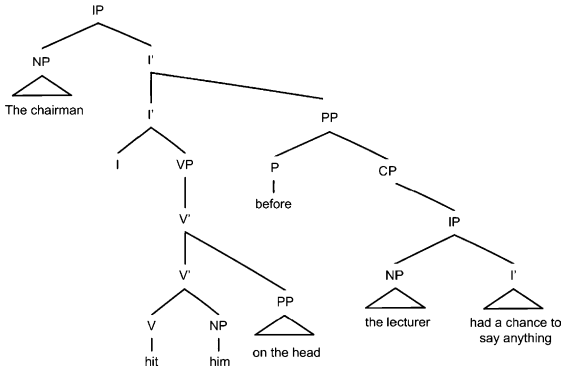

The first branching node dominating the pronoun is V', which does not dominate the PP containing *the lecturer*. Hence, the pronoun does not c-command the potential antecedent, which means that the latter is not in the syntactic domain of the pronoun, so the coreference restriction (4) does not rule out coreference here. Given the command relation, by contrast, the relevant node for defining the domain of the pronoun is not the VP but, rather, the first IP (S) that dominates it. That IP also dominates the potential antecedent; hence, (4) would rule out coreference if it applies in the command domain. For the sentences of (2), the c-command and the precede and command domains give the same results for English. In (2a) the pronoun both c-commands and commands its antecedent (since the first branching node is S). In (2b) and (2c) the pronoun neither commands nor c-commands its antecedent. The coreference restriction (4), applying at c-command domains, was later reformulated as condition C in the binding theory of Chomsky (1981).

As mentioned previously, command relations were first introduced for rules governing semantic dependencies. However, Reinhart (1976) argued that semantic dependencies are just a specific instance of a broader generalization, which she labeled the 'C-command domain condition': All sentence-level linguistics rules and operations are restricted to apply only within the c-command domain. Within this domain, the dependent node must be c-commanded by the node it depends on. Syntactic movement can be viewed as an instance of this dependency – the trace left by the moved element fully depends for its interpretation upon the moved element. Correspondingly, syntactic movement is allowed only into a c-commanding position, namely the target position of the moved element must c-command its source position. Among the illustrations of this principle that Reinhart provides is (10) (couched here in current syntactic terms):

(10a) Felix did not realize he is a failure until whose remarks (underlying)

(10b) Diagram 2

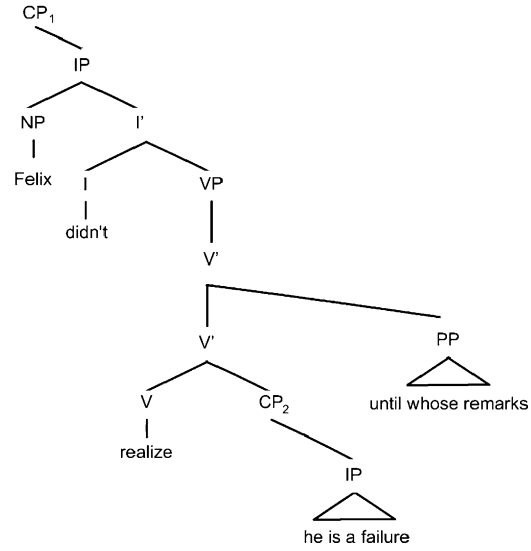

(10c) (Remind me) [$_{CP1}$ until whose remarks$_i$ [$_{IP}$ Felix did not realize [$_{CP2}$ [$_{IP}$ he is a failure]] t_i]]

(10d) *[$_{CP1}$ [$_{IP}$ Felix did not realize [$_{CP2}$ until whose remarks$_i$ [$_{IP}$ he is a failure]] t_i]]

In the underlying (10b), the wh-phrase has to move to a Spec of CP (COMP). If we look at the sequence linearly, the first available Spec is that of the embedded CP_2. However, this Spec does not c-command it, and indeed, it cannot move there, as witnessed in (10d). The only permitted option is movement to

the top Spec of CP_1, which c-commands the wh-phrase, as in (10c). No independent principle, known at the time, could explain why (10c) should be blocked. The subjacency condition on movement, introduced in Chomsky (1973), disallows movement that crosses more than one cyclic node (IP or NP), but the movement in (10c) does not cross any such node.

For examples such as (10), the same results would be obtained if the domains were to be defined in terms of command, rather than c-command, because the lower Spec also does not command the wh-phrase. However, Reinhart (1976, 1983) cited extraposition from NP subjects and result clause extraposition as an example in which the command condition is not sufficient and concluded that the relevant domain for movement is the c-command domain.

The domain condition also provided an explanation for why there can be no syntactic 'lowering' movement, a hypothesis advocated by Chomsky (1977) at the time. Such movement violates the principle that the target must c-command the source position. This condition is still broadly assumed in syntax theory, at least for overt syntactic movement, and it is believed to hold universally.

Let us now pay closer attention to the definition of c-command. The definition in (7) counts any branching node as relevant for c-command. However, it was noted already in Reinhart (1976) that this definition is too restrictive for interpretative rules (e.g., the anaphora rules). In current terms, the reason is that it disregards the special status of adjuncts. This can be illustrated with the VP adjuncts in (11):

(11a) *We met **him** in **Ben's** office.
(11b) We met **every researcher** in **his** office.

(12) Diagram 3

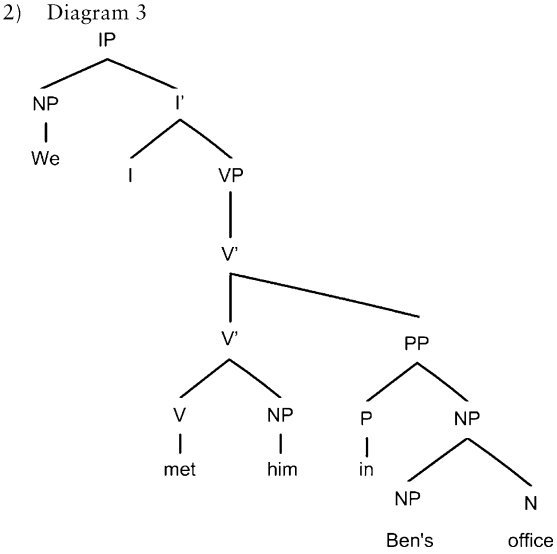

For the anaphora rules, the objects in (11) should c-command the PP: The coreference restriction disallows the pronoun to corefer with an NP in that PP, as in (11a). The bound anaphora restriction (which we did not discuss here) allows quantified antecedent to bind a pronoun only in their c-command domain. As seen in (11b), the quantified object can, indeed, bind the pronoun in the PP. However, the actual representation of, for example, (11a) is (12), where the PP is an adjunct rather than a complement (sister) of the verb. If what determines c-command is the first branching node, the object pronoun does not c-command *Ben* in (12), and coreference would be incorrectly permitted.

It was later found that the branching node definition of c-command is too restrictive also in certain instances of syntactic movement, which also involves adjunction. Head movement (e.g., the movement of V (Chomsky, 1986)) adjoins a given head to another head, as illustrated in the French (13a) and (13b):

(13a) Jean souvent voit Marie (underlying)
Jean often sees Marie
(13b) Jean **voit** souvent **t** Marie

(13c) Diagram 4

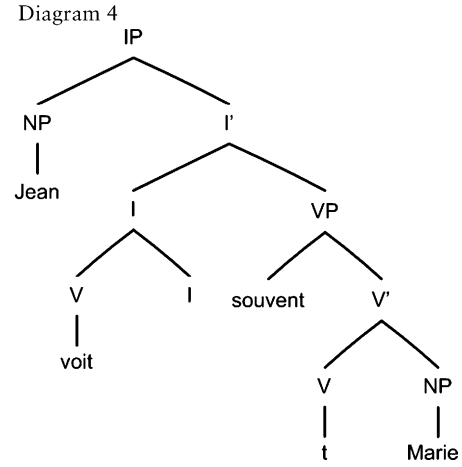

The domain condition allows only movement to a c-commanding position, but the first branching node dominating the verb in its new position in (13c) is the higher I, which does not dominate the trace. Hence, by the branching definition, the moved verb does not c-command its original position.

Reinhart (1976) argued that in view of facts like (11), intermediate categories of the same type should be ignored in the full definition of c-command. At the time, X-bar theory was not available (and the PP of (12) was analyzed as adjoined to VP), so capturing this extension of c-command required the rather complex definition in (14) (Reinhart, 1976: 148, (4)):

(14) A node α c-commands a node β iff (neither α nor β dominates the other and) the first branching node γ_1 dominating α either dominates β or is immediately dominated by a node γ_2 which dominates β, and γ_2 is of the same category type as γ_1.

In (12), the first V' dominating the object pronoun is immediately dominated by another V', which dominates the PP. Since the two instances of V' are of the same category type, the first V' does not count, so given (14), the pronoun c-commands the PP.

With the development of X-bar theory, in Jackendoff (1977) and Chomsky (1981), it became possible to simplify the definition in (14). Aoun and Sportiche (1983) argued that the intuition behind this definition is that the nodes relevant for c-command are not arbitrary branching nodes but, rather, maximal projections (the maximal categorical expansion of a head, e.g., NP, VP, and IP). More broadly, linguistic rules are restricted to operate within constituents that are full projections of a given head. Aoun and Sportiche (1983) coined the term 'm-command' (maximal-command) for the relation under consideration, defined in (15):

(15) A node α m-commands a node β iff (neither α nor β dominates the other and) the first maximal projection dominating α also dominates β.

In (12), the first maximal projection dominating the pronoun is the VP; hence, it m-commands the PP. In (13c), the first maximal projection dominating the moved V is IP; hence, V m-commands its trace. As Aoun and Sportiche pointed out, there is further motivation to replace the definition of c-command with (15). In the case of an intransitive verb, the first branching node that dominates the verb turns out to be the clause node (IP or I') because the VP in that case is not branching. This may be irrelevant for anaphora but would cause problems in other areas, such as government and Case.

Other extensions of the m-command domain have been proposed throughout the years: May (1985) proposed an extension of the domain of adjuncts, which was needed for quantifier raising (QR) and quantifier scope. This rests on the definition (16) for the relation 'dominate':

(16) α dominates β iff every segment of α dominates β.

In the case of adjunction, which creates identical nodes, each occurrence of these nodes is viewed as a segment. In the structure in (17b), QR has applied to adjoin *everyone* to IP. IP does not dominate the NP *everyone* because there is a segment of IP that does not dominate it.

(17a) Who does everyone like t?

(17b) Diagram 5

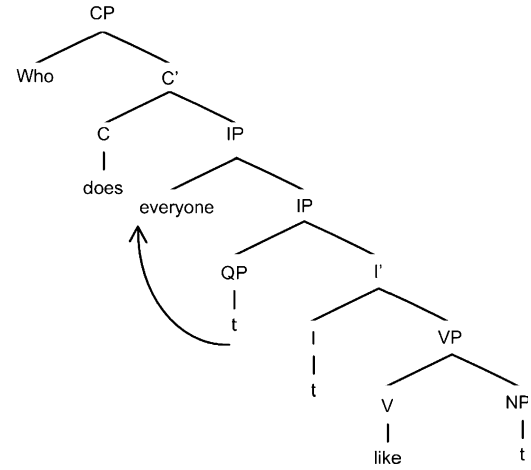

Hence, the first maximal projection that dominates this NP is only the CP, which means that *everyone* m-commands *who*, which is why it can take wide scope over *who*. Chomsky (1986) applied the segment definition of *dominate* to other areas of syntax. Under Kayne's (1994) approach to phrase structure, specifiers are an instance of adjunction. Combined with the definition of dominate in (16), this means that specifiers have the same c-command domain as their maximal projection. This has broad implications in Kayne's system; regarding the problems discussed here, Kayne's definition derives the fact that quantifier binding is possible in examples such as *Every girl's father thinks she's a genius*, discussed by Reinhart (1983: 177).

Reinhart assumed that there is only one relation relevant to linguistic rules, namely the extended c-command in (14), which is better captured in (15). (She viewed (7) as a simplified definition of c-command needed only for expository reasons.) In that view, branching node c-command is just a subcase, or a specific instance, of m-command. However, in subsequent research since Chomsky (1981), two distinct relations have been assumed – the basic branching node c-command defined in (7), repeated here, and m-command, as previously defined:

(7) A node α c-commands a node β iff (neither α nor β dominates the other and) the first branching node dominating α also dominates β.

This left open the question of whether different rules may be sensitive to different command relations – a question we return to later.

In the Principles and Parameters framework ('Government and Binding,' (Chomsky, 1981)), the relation

m-command played a central role. It was used to define the relation of 'government,' which was believed at the time to determine the domain of many local linguistic processes. A version of the definition of government, adapted from Chomsky (1986), is given in (18):

(18) α governs β iff α m-commands β and there is no maximal projection which dominates β and not α.

The m-command domain of a given node α, along the lines examined previously, is α together with all the nodes it m-commands. Assuming that m-command is the relevant command relation of natural language, this means that no linguistic rule can operate on any two nodes if one of them is not in the m-command domain of the other. However, the domains defined by m-command (just as those defined by c-command) may still be quite large, extending down the tree from the m-commanding node. Many linguistic processes, known as 'local,' are restricted to apply in a smaller subdomain of the m-command domain. At this stage of linguistic theory, government was believed to be the relation defining these local domains. The government domain of α consists only of the nodes it m-commands within the same maximal projection, with a few local extensions built into the theory. (Most notably, the verb can govern the subject of its clausal complement.)

To understand why it seemed necessary to take m-command, rather than the branching c-command, as the relation defining government, let us examine case assignment.

(19a) Der Student hat den Mann gesehen. (German)
the student.NOM has the man.ACC seen
'The student saw the man'

(19b) Diagram 6

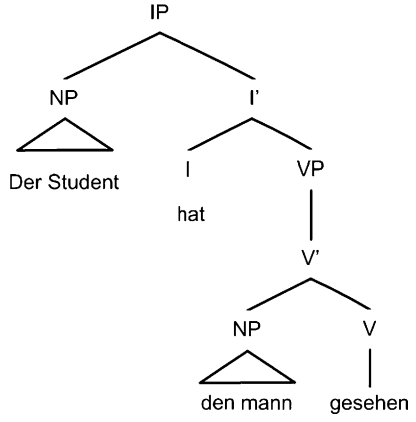

The basic assumption in this framework is that in (19), the object gets its accusative case from V, and the subject gets its nominative case from the functional head I. More broadly, heads of the relevant type (V, N, P, A, and tensed I) are case-assigners. The question was what is the structural relation that must hold between the head and an NP to enable case assignment. In terms of c-command, V and I do not bear the same relation to the NP to which they assign case. In (19), V c-commands the object, but I does not c-command the subject. However, V and I equally m-command the relevant NP. Hence, it was concluded that m-command is the relevant relation for case assignment. The domain for case assignment is further restricted by the government requirement. For example, if we added a PP to (19), such as *mit einem Feldstecher* ('with binoculars'), the NP in that PP cannot be assigned accusative case because it is not in the government domain of the verb (the PP being an intervening maximal projection). Its governor is only the P, which assigns it dative.

However, at the stage of the minimalist program (MP), the relation government was found to be a superfluous relation (Chomsky, 1995). Chomsky (2005) argued that core syntactic processes are sensitive only to c-command, so from this perspective m-command is superfluous as well. Syntactic movement of XPs is permitted only to a c-commanding position. This is the case with wh-movement and NP-movement, which were traditionally labeled 'substitution,' but also XP movement by adjunction (topicalization and extraposition at the overt structure (SS)) and QR at the covert structure (LF) are possible only into a c-commanding position. Regarding the problem of nominative case assignment exemplified in (19), Chomsky (2001) handled it without resort to m-command. Under the VP-internal subject hypothesis (Sportiche (1988), among others), the original position of the subject in (19) is VP internal, as in (20):

(20) Diagram 7

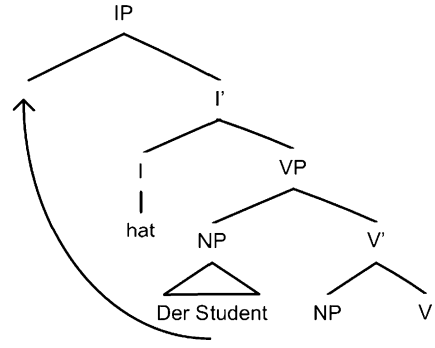

At this position, I c-commands the subject and can therefore check its nominative case (the mechanism is called 'agree'). Subsequently, the subject moves to the Spec IP position (to satisfy the extended projection principle, which requires that Spec IP be filled). Within

the MP, syntactic structure is built gradually, and case checking applies immediately upon the introduction of the relevant case checking head. It follows that an NP can have its case checked only by the closest c-commanding case checker. Thus, the ban against intervention added by the government requirement turned out to be superfluous since it is derived independently.

Head movement, illustrated in (13), is the only instance of a syntactic process that still seems to be restricted by m-command rather than c-command. Pointing out that head movement differs from the core rules of syntax in important respects (not only does head movement violate c-command but also it does not conform to the extension principle, discussed later), Chomsky (2001) suggested that it is a phonological process resulting from the affixal character of the inflectional heads.

This leaves us with the question of semantic interpretation rules. These must still operate in m-command domains. This was illustrated here only with the anaphora problems in (11), but Reinhart (1983) argued that precisely the same holds for relative quantifier scope and other interpretative procedures. The upshot so far seems to be that two distinct syntactic domains must be assumed – the c-command domain for core syntactic processes and the m-command domain for interpretative processes.

An alternative perspective on the c-command domain is offered in Epstein (1999) and Epstein *et al.* (1998). They argued that what appears to be the c-command restriction on syntactic movement is in fact an entailment of an independent linguistic factor. In current MP views, there is one primitive syntactic operation, 'merge,' which constructs a new object from two objects. There are two types of merge: 'external merge,' which puts together two distinct categories, and 'internal merge,' which attaches to a category a phrase that is part of that category (hence, the label 'internal'). Internal merge is movement. There is a general principle governing merge, the extension principle, which determines that a node can be merged only to the root (the topmost node available). Since movement is a subtype of merge, its landing site, the position it merges into, must always c-command its original position. This is so because the moved element must be merged to the root, which obviously dominates the original position. Under the assumption that case checking is done upon merge – namely, case is checked as soon as the head with the case feature is merged – case checking is also possible only when the head c-commands the argument it assigns case to.

In this view, then, only one command relation must be assumed – m-command, which governs mainly interpretative rules. Syntactic processes are executed derivationally and are governed by merge. Interpretative rules must take into consideration the full derivation tree, including adjoined constituents. In the MP, adjunction ('pair-merge' in MP terms) (as in the case of the PP in (11)) is a different process than argument merge ('set-merge'). It applies freely and is not restricted by the extension principle. Hence, a constituent that does not belong to the c-command domain of a given node, because it was inserted by adjunction, may still belong to its interpretative domain if it is inserted in the same maximal projection.

See also: Configurationality; Island Constraints; Principles and Parameters Framework of Generative Grammar; Subjects and the Extended Projection Principle; Transformational Grammar: Evolution; X-Bar Theory.

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Communication in Grey Parrots

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For over 25 years, I have taught Grey parrots the meaningful use of English speech. Using English speech, the oldest, Alex, matches certain cognitive capacities of apes, marine mammals, and sometimes 4- to 6-year-old children (Pepperberg, 1999). His abilities are inferred not from operant tasks common in animal research, but from *vocal* responses to *vocal* questions; that is, he also demonstrates intriguing communicative parallels with young humans, despite his phylogenetic distance. I doubt I taught Alex and other parrots these abilities *de novo*; their achievements likely derive from existent cognitive and neural architectures. My data thus suggest an avian role in the evolution of intelligence and communication.

Animals and Human Language

Historically, animal–human communication studies have focused on cetaceans and apes. 'Talking' birds were rarely included (except by a very small number of researchers, e.g., Mowrer, 1954), birds being viewed as unintelligent mimics. Operant experiments with pigeons had demonstrated capacities inferior to those of mammals and those results were extrapolated to all birds, despite separate intriguing evidence for parrots' cognitive and possibly communicative feats (Pepperberg, 1999). Correlates of intelligence – relatively large brain to body weight ratios, highly social natures, and long lives during which they must continuously be able to both remember and update information about their physical and social environments – do exist in parrots, and proper training induces language-like abilities matching those of other species.

What Greys Can Learn

Alex's accomplishments are impressive (Pepperberg, 1999). He vocally labels more than 50 objects, seven colors, five shapes, quantities to 6, and three categories (color, shape, material), and appropriately uses "no," "come here," "wanna go X," and "want Y" (X and Y are, respectively, locations or items). He answers queries concerning relative size, categories, quantity, presence or absence of attribute similarity/difference, and label comprehension. He combines labels to identify, request, comment upon, or refuse more than 100 items and to alter his environment. He can state color, shape, material, *and* object name of an exemplar. Given two items, he answers the questions "What toy?", "How many?", "What's same/different?", "What color bigger/smaller?", and "What matter bigger/smaller?" Shown collections of mixed numbers of, for example, red and blue balls and blocks, he answers the question "How many blue block?", thus comprehending recursive, conjunctive queries. He uses very limited forms of segmentation – sentence frames and consistent adjective + noun constructions. He semantically separates labeling from requesting. He requests absent objects and refuses substitutes, demonstrating that his labels are representational; that is, he recognizes dissonance between the concept encoded in the request and proffered items. He exhibits solitary practice, apparently building new labels from sounds already in his repertoire; for children, Bruner (1977) referred to this behavior as 'scaffolding.' Thus, after learning "grey" he spontaneously produced "grape," "grate," "grain," "cane," and "chain," subsequently mapping these labels referentially onto relevant objects. Ongoing studies with younger parrots show that he is not exceptional.

Alex's behavior is not simple object-label association. He is equally accurate on items related, but not identical, to training objects, and he transfers

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Alex's behavior is not simple object-label association. He is equally accurate on items related, but not identical, to training objects, and he transfers

utterances to novel contexts: After learning to answer "none" to the question "What's different?" with respect to two identical items, he spontaneously responded "none" when asked "What color bigger?" regarding two equally sized, differently colored blocks (Pepperberg and Brezinsky, 1991). Alex lacks all but a very few verbs, but nevertheless exhibits certain communicative capacities that were once presumed limited to primates.

How Greys Learn: Parallels with Humans

My Greys' learning sometimes parallels human processes, providing insights into how acquisition of complex communication may have evolved. Referential, contextually applicable (functional), and socially rich input allows parrots, like young children – as shown by researchers such as Hollich *et al.* (2000) – to acquire communication skills effectively (Pepperberg, 1999). Reference, the object-word connection, is exemplified by rewarding birds with objects they label. Context/function involves the situation in which an utterance is used and effects of its use; initially using labels as requests motivates birds to learn human speech. Social interaction engages subjects directly, accents environmental components (e.g., contextual explanations for actions and their consequences), emphasizes common attributes – and possible underlying rules – of diverse actions, and allows continuous adjustment of input to learners' levels. I next describe the training technique of our laboratory, then experiments to determine the necessary and sufficient input for engendering learning.

Model/Rival (M/R) Training

My *model/rival* (M/R) system (background in Pepperberg, 1999) uses three-way *social* interactions among two humans and a parrot to demonstrate targeted vocal behavior. The parrot watches the trainer display, and query the second human about, one or more item(s) (e.g., "What's here?", "How many?") and reward correct answers referentially with praise and the object(s). Incorrect responses (like the bird may make) are punished by scolding and temporarily removing item(s) from sight. The second human is a model for the parrot's responses and its rival for the trainer's attention, and illustrates error consequences by trying again or talking more clearly if the responses were first (deliberately) incorrect or garbled. Because the bird is also queried and rewarded for successive approximations to correct responses, training is adjusted to its level.

Unlike the modeling procedures of other researchers (i.e., those reviewed in Pepperberg and Sherman, 2000), ours (a) *interchanges* the roles of the trainer and the model to emphasize that one is not always the questioner and the other the respondent and that the procedure can effect environmental change, and (b) exclusively uses *intrinsic rewards*. Todt (1975), for example, showed that birds whose trainers never reverse roles responded only to the questioner; our birds, however, interact with and learn from all humans. Intrinsic rewards – uttering "X" gets X – ensure the closest possible correlations of labels or concepts to be learned with their appropriate referents.

M/R training demonstrated which input elements enabled referential acquisition, not what was necessary *and* sufficient. What if elements were lacking? Answering that question required additional parrots: Alex might cease learning because training had changed, not because of how it changed. With three naive Greys – Kyaaro, Alo, and Griffin – my laboratory tested the importance of reference, context/function, and social interaction in training.

Eliminating Aspects of Input

We performed eight experiments (Pepperberg, 1999; Pepperberg *et al.*, 2000). First, we concurrently presented Alo and Kyaaro with (a) audiotapes of Alex's sessions, which were nonreferential, not contextually applicable, and noninteractive; (b) videotapes of Alex's sessions, which were referential, minimally contextually applicable, and noninteractive; and (c) standard M/R training. In (a) and (b), birds were socially isolated. Condition (a) paralleled early allospecific song acquisition studies such as those of Marler (1970); (b) involved issues about avian vision and video: Ikebuchi and Okanoya (1999) demonstrated that birds might not see standard video output as do humans. Second, because Rice and her colleagues (Rice *et al.*, 1990) found that interactive coviewers could increase young children's learning from video, a coviewer now provided social approbation for viewing and pointed to the screen with comments like "Look what Alex has!" Birds' labeling attempts would garner only vocal praise. Social interaction was limited; referentiality and functionality matched earlier video sessions. Third, because the extent of coviewer interaction might be relevant, he or she now uttered targeted labels and asked questions. Fourth, so that lack of reward would not deter learning, socially isolated parrots watched videos while a student in another room monitored utterances and could deliver rewards remotely. Fifth, because birds might habituate to the single videotape used per label (although each tape depicted numerous Alex–trainer interactions), we used live video from Alex's sessions. Sixth, because Baldwin (1995) had

demonstrated that labels were not acquired if adult–child duos failed to focus jointly on objects being labeled, a single trainer faced away from the bird (who could reach, e.g., a key) and chatted about the item ("Look, a blue *key*!", "You want *key*?", etc.; sentence frames, Pepperberg, 1999) but had no visual or physical contact with either the parrot or the object; a bird's labeling attempt would receive only vocal praise, thereby eliminating some functionality and considerable social interaction. Parrots failed at referential targeted label acquisition in any non-M/R condition, but succeeded in concurrent M/R sessions (Pepperberg, 1999). Seventh, we eliminated some aspects of modeling: *one* trainer jointly focused with the bird on objects, using labels and making queries. Griffin did not utter labels during 50 such sessions, but clearly produced labels after two or three subsequent M/R sessions. (NB: Birds that were switched to M/R training after 50 video sessions needed ~20 sessions before producing labels.) We suspected latent learning: Griffin apparently stored but could not use labels without observing their use modeled. Finally, we used a liquid crystal monitor to see if cathode ray tube flicker-fusion hindered video learning (Ikebuchi and Okanoya, 1999); parrots still failed at video learning (Pepperberg and Wilkes, 2004). The results emphasized that training must include reference, social interaction, and functionality/contextual use if parrots are to communicate with humans rather than mimic speech.

Mutual Exclusivity: Studying Subtle Changes in Input

Parrots' learning processes may also parallel young children's mutual exclusivity (ME) (Pepperberg and Wilcox, 2000). This term, used by researchers such as Liittschwager and Markman (1994), refers to many children's early belief that each object has one, and only one, label. Along with the 'whole object assumption' (that a label identifies the entire object, not some feature), ME supposedly guides initial word acquisition. Liittschwager and Markman (1994), for example, suggested that ME eventually helps children interpret novel words as feature labels (overcome the whole object assumption), but very young children may initially reject second labels as unacceptable alternatives. Input, however, affects ME: Gottfried and Tonks (1996) showed that children, and I showed that parrots like Alex, who receive inclusivity data (*X* is a kind of *Y*; e.g., colors taught as additional, not alternative, labels: "Here's a key; it's a green key"), accept multiple labels for items and easily form hierarchical relations. Given an object, Alex answers the questions "What color?", "What shape?", "What matter?", *and* "What toy?" (Pepperberg, 1999). But parrots taught colors or shapes as alternative labels (e.g., "Here's key", later, "It's green") have difficulty using these modifiers for previously labeled items. Griffin, thusly trained, initially answered the question "What color?" with object labels. Similarly, he had difficulty learning an object label – *cup* – and answered the question "What toy?" with colors (Pepperberg and Wilcox, 2000). Even small input differences affect acquisition as much for parrots as they do for young children.

Combinatory Learning

Researchers (e.g., Johnson-Pynn *et al.*, 1999) have argued, pointing primarily to behavioral data, that a common neural substrate initially underlies young children's parallel development of communicative and object (manual) combinations and that a homologous substrate in apes allows similar, limited, parallel development, thus suggesting a shared evolutionary history for linguistic and physical behavior. But Heather Shive and I (Pepperberg and Shive, 2001) demonstrated that Griffin showed comparable limited, parallel combinatorial development of three-item and three-label combinations. The percentages of physical and vocal combinations were roughly equal; vocal three-label combinations emerged only when Griffin initiated three-object combinations; only one of 14 vocal combination types that Griffin produced had been trained; and physical combinations were performed with his beak, not with his feet. Moreover, unlike Johnson-Pynn *et al.*'s *Cebus* (1999), Griffin's physical tasks were untrained.

Although Griffin's – or even Alex's (Pepperberg, 1999) – behavior matches neither human language nor combinatory behavior in complexity, our data show that parallel combinatory development is not limited to primates and that mammalian brains are not a prerequisite for such behavior. According to some researchers, responsible substrates are likely analogous, arising independently under similar evolutionary pressures; other researchers believe that the structures may indeed be homologous (see discussion in Medina and Reiner, 2000).

Parallel Evolution of Avian and Mammalian Abilities?

Although human and animal behavior are not isomorphic, many species provide information on evolutionary pressures that helped shape existent systems (Pepperberg, 1999). Such pressures were not exclusive to primates; hence we see analogous complex avian communication systems and likely analogous neural architectures. Moreover, complex

communication apparently requires or coevolves with complex cognition: Although communication is functionally social, its complexity is based on the complexity of information communicated, processed, and received, thus contingencies that shape cognition (social, ecological, etc.) likely shape communication. If, as researchers such as Rozin (1976) and Humphrey (1976) have claimed, intelligence indeed correlates with primates' complicated social systems and long lives – the outcome of selection processes favoring animals that flexibly transfer skills across domains and that remember/act upon knowledge of detailed group social relations – these patterns might drive parrot cognition and communication: long-lived birds with complex primate-like social systems might use abilities honed for social gains to direct information processing and vocal learning. When you add the need for categorical classes (e.g., to distinguish neutral stimuli from predators), the ability to recognize/remember environmental regularities yet adapt to unpredictable changes over extensive lifetimes, and a primarily vocal communication system, then parrots' capacities are not surprising. Whether similar adaptive responses evolved independently for birds and humans under comparable environmental pressures is unclear, but a common core of skills likely underlies complex cognitive and communicative behavior across species, even if specific skills manifest differently. By looking for species commonalities, we can develop theories about behavioral elements essential to, and evolutionary pressures that shape, complex capacities (Pepperberg, 1999).

See also: Animal Communication: Dialogues; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Vocal Learning; Apes: Gesture Communication; Birdsong; Categorical Perception in Animals; Cognitive Basis for Language Evolution in Nonhuman Primates; Development of Communication in Animals; Individual Recognition in Animal Species; Nonhuman Primate Communication; Traditions in Animals; Vocal Production in Birds.

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Communication in Marine Mammals

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Marine mammals are not a monophyletic group but include species as phylogenetically different as whales, manatees, seals, and polar bears. Traditionally marine mammals have been treated as one group because of their adaptations to the marine environment. These adaptations can make distantly related marine species appear physically more similar than closely related terrestrial species. Behaviorally, marine mammals can differ tremendously. This allows for interesting comparisons of evolutionary pathways in animals that live in the same environment. This section concentrates on cetaceans (whales, dolphins, and porpoises, comprising 85 species), pinnipeds (seals and sea lions, comprising 35 species) and sirenians (sea cows, comprising 4 species). While polar bears, otters, and other mammals feeding on marine species have sometimes been considered to be marine mammals, they are not covered in this section. I will also focus on acoustic communication. While marine mammals use visual signals at close range, most species are rather limited in their physical expressiveness, due to the evolution of streamlined bodies suitable for swimming. Furthermore, most marine habitats have very limited underwater visibility, which favors the evolution of acoustic communication since it is not affected by visibility.

Types of Sounds

Cetacean sounds are often split into three categories: tonal calls, clicks, and burst-pulsed sounds. Additionally, cetaceans use a variety of other mammalian-type sounds that are described as barks, grunts, squeals, or similar onomatopoetic descriptors. Little is known about the production mechanisms of these sounds. Tonal calls include many elements of baleen whale songs and whistles of dolphins (reviewed in Tyack and Clark, 2000). The most famous case of a marine mammal acoustic display is probably the song of the humpback whale (*Megaptera novaeangliae*), which typically consists of five to nine different themes (Payne and Payne, 1985) (**Figure 1**). Each theme consists of a repeated phrase. A phrase consists of a stereotypical sequence of elements. Each phrase lasts for around 15 seconds, but it can be repeated multiple times before the animal switches to the next theme. A whole song usually lasts between 8 and 16 minutes. The sequence of themes in a song is fairly stable, but around 10% of theme transitions in songs skip themes in the sequence. Humpback whales repeat their song many times in singing bouts that can last for several hours. It appears that only males produce song, primarily during the breeding season. All individuals in one population share the same song. However, the song sung by all males is different at the start and the end of the breeding season. In the following breeding season they start out with the last song they sang in the previous year. Thus, song changes over the years in synchrony among all males in a population. The only explanation for this change is that males use vocal learning to alter their own song in relation to what other whales produce. A similar pattern seems to exist in bowhead whales (*Balaena mysticetus*) with a somewhat simpler song organization and less change in the song. Blue (*Balaenoptera musculus*) and fin whales (*Balaenoptera physalus*) produce even simpler sequences, consisting of a repeated, single element. In fin whales it appears that only males sing while this is not known for blue whales. Once baleen whales come together in social groups, they produce a variety of burst-pulsed sounds often called grunts or snorts. Some species like the northern (*Eubalaena glacialis*) and southern right whales (*Eubalaena australis*) and the gray whale (*Eschrichtius robustus*) do not appear to sing at all but only engage in sound production during such social encounters.

Dolphins and other toothed whales also do not produce song. Their signals are either used in social interactions akin to the way primates use their signals or for echolocation. Echolocation is a specific adaptation to explore the environment, as is found in bats. An animal produces a click sound and listens to echoes from sound-reflecting objects extracting object feature information from the acoustic parameters

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Communication in Marine Mammals

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Marine mammals are not a monophyletic group but include species as phylogenetically different as whales, manatees, seals, and polar bears. Traditionally marine mammals have been treated as one group because of their adaptations to the marine environment. These adaptations can make distantly related marine species appear physically more similar than closely related terrestrial species. Behaviorally, marine mammals can differ tremendously. This allows for interesting comparisons of evolutionary pathways in animals that live in the same environment. This section concentrates on cetaceans (whales, dolphins, and porpoises, comprising 85 species), pinnipeds (seals and sea lions, comprising 35 species) and sirenians (sea cows, comprising 4 species). While polar bears, otters, and other mammals feeding on marine species have sometimes been considered to be marine mammals, they are not covered in this section. I will also focus on acoustic communication. While marine mammals use visual signals at close range, most species are rather limited in their physical expressiveness, due to the evolution of streamlined bodies suitable for swimming. Furthermore, most marine habitats have very limited underwater visibility, which favors the evolution of acoustic communication since it is not affected by visibility.

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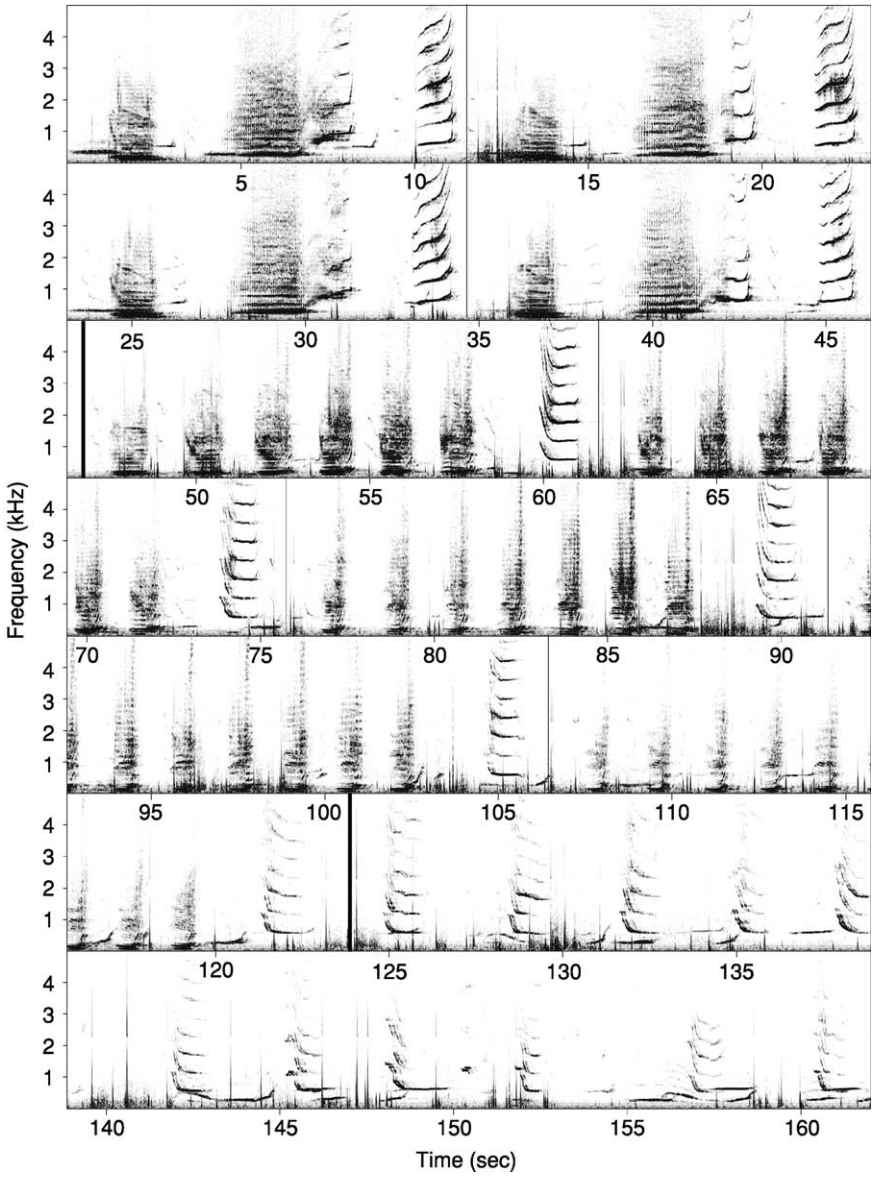

Figure 1 Spectrogram of a section of a humpback whale song. Themes are separated by thick vertical lines. Phrases within themes are separated by thin vertical lines. Recording kindly provided by P. Miller. (FFT size 1024, Flat top window, DF: 44 Hz, DT: 23 ms.)

of the echo. Most cetacean echolocation signals consist of high-frequency clicks that can extend up to above 200 kHz. It has also been argued that the repetitive sequences of fin and blue whale calls could be used for long-range echolocation (Tyack and Clark, 2000). Similarly, sperm whales (*Physeter macrocephalus*) produce click trains of signals that have a bandwidth of 0.1–30 kHz with temporal patterning similar to echolocation click trains used by dolphins. However, this does not mean that every click is an echolocation signal. Sperm whales, porpoises, and some dolphin species almost only have click signals in their repertoires. They are used in social contexts as well and the distinction between echolocation and social signal can be difficult in these species.

Most dolphins use tonal whistles extensively as social signals (Tyack, 1999). Many of these have harmonics extending to more than 100 kHz, but the fundamental frequency is mostly between 2 and 30 kHz. Burst-pulsed sounds are signals that consist of very fast click trains that result in a tonal quality to the human ear. Killer whales (*Orcinus orca*) use these signals as their main social signal and bottlenose dolphins (*Tursiops truncatus*) have a wide variety of burst-pulsed sounds at their disposal. However, many signals produced by cetaceans do not fall into any of

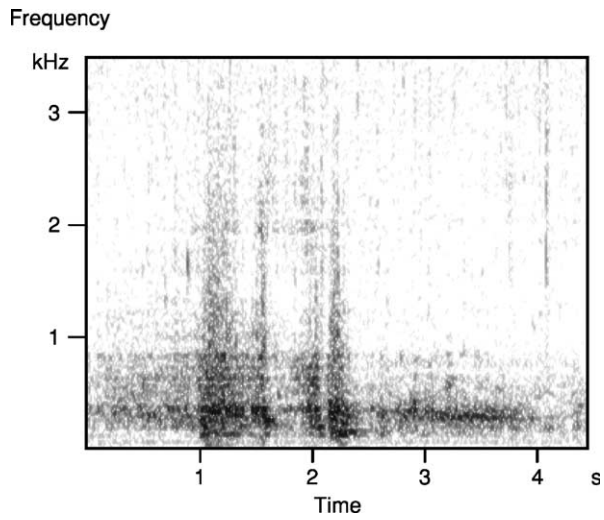

Figure 2 Spectrogram of a harbor seal song. It consists of only one element, which is repeated many times. (FFT size 1024, Flat top window, DF: 37 Hz, DT: 27 ms.)

the three traditional categories of clicks, burst-pulsed sounds and tonal sounds (Janik, 1999). Bottlenose dolphins, for example, produce gunshot-like sounds, pops, squeals, and other sounds that reflect their versatility in sound production. Little is known about these signals because they are common in close social encounters when it is difficult to observe the exact call context.

Pinnipeds produce sounds underwater and in air. Most of their sounds lie in a frequency band between 0.1 and 10 kHz (review in Richardson *et al.*, 1995). Like baleen whales, the walrus (*Odobenus rosmarus*) and several of the so-called true seals (Phocids) produce underwater song. Examples are the Weddell seal (*Leptonychotes weddellii*), the bearded seal (*Erignathus barbatus*), the harp seal (*Pagophilus groenlandicus*), and the harbor seal (*Phoca vitulina*). In all of these species, calling activity peaks in the mating season. The simplest song comes from the harbor seal. Males produce a low-frequency growl sound that is repeated many times (Figure 2). The call itself lasts between 5 and 15 seconds. A similar pattern can be found for the walrus, where males produce repetitive sequences of a sound reminiscent of a church bell. Bearded seal songs consist of very tonal trill sounds that are around 14–30 seconds long. There are six basic trill types, which most often occur alone but can be produced in longer sequences. Only males are believed to produce these calls. In harp and Weddell seals, both sexes have been confirmed to produce underwater calls. However, the general behavior during the breeding season suggests that male calls play a role in mate attraction and territorial defense, the main two song functions in other species. Males also appear to have more call types in their repertoire than females. Repertoire sizes are difficult to determine, since little is known about how animals classify signals they perceive. Thus, researchers can look at spectrograms and sort calls into types, but it is unclear to what extent this reflects classification by a marine mammal. Not surprisingly though, learning seems to lead to larger and more complex repertoires.

Sea lions and fur seals do not appear to produce song. Their sound repertoires consist of bark and moan sounds as well as noisy growls, very similar to those produced by dogs. Most of these are produced in air at haul-out sites. To date there is no evidence for vocal learning in these groups. Hybrids of Antarctic (*Arctocephalus gazella*) and Subantarctic fur seals (*Arctocephalus tropicalis*) display a hybrid repertoire of calls suggesting a strong genetic influence on call development (Page *et al.*, 2000). Northern elephant seals (*Mirounga angustirostris*) have been thought to have different dialects between colonies but these differences could be traced back to a founder effect when small groups of animals repopulated colony sites after heavy depletion (Janik and Slater, 1997). Once the number of animals increased, vocal differences disappeared. Sirenians are relatively quiet animals. Manatees produce very tonal whistle sounds, while dugongs appear to have a larger repertoire of sounds used in social interactions.

Sound Transmission and Active Space

Sound propagation in the sea is much better than in air. In addition to normal spreading loss, an underwater sound of 1 kHz loses around 0.04 dB/km through absorption while the same sound in air loses 4 dB/km. The result is that marine mammal calls have a much larger active space than those of most terrestrial animals. The active space is defined as the area over which a receiver can detect the call of a conspecific. Most marine mammals can produce underwater sounds that have an active space of more than 10 km (reviewed in Janik, 2005). Calls of baleen whales can even be detected over several 100 km. The most detailed information is available for bottlenose dolphins and killer whales. Both species appear to have a maximum active space of around 25 km. However, high frequency components are attenuated more rapidly and are often more directional than low frequency ones. Thus, while it is likely that animals can detect each other over these distances, recognition of a particular call or individual may only be possible at closer range. Data on the active space of pinniped or sirenian calls are not available, but most of the seals that produce underwater song, like bearded seals, Weddell seals, and harp seals can be heard over more than 20 km.

While active spaces of low-frequency signals underwater tend to be large, there are many marine mammal underwater signals that are much quieter and do not travel nearly as far (reviewed in Janik, 2005). Most marine mammals produce sounds at different source levels, many of which are only audible to conspecifics within 100 m or less. Furthermore, several species, such as porpoises and dolphins belonging to the genus *Cephalorhynchus,* hardly use low-frequency sounds (i.e., <20 kHz), but instead use click sounds to communicate. Thus, their signals are subject to much larger transmission loss. Communicative clicks are very similar to echolocation clicks and travel only a few hundred meters, making the active space of these signals relatively small. Communication networks in these species are therefore much smaller and more comparable to those found in some terrestrial species.

The difference between sound transmission in air and in water is demonstrated best by comparing large underwater active spaces with those of in-air calls of elephant seals (Southall *et al.*, 2003). The in-air female attraction call of a pup only reaches animals within 5 to 70 m, depending on ambient noise conditions. The largest active space was found for the male clap threat call, which can travel up to 507 m in quiet conditions. In air, seal colonies often cause an impressive amount of noise. Such colonies can be detected over a few kilometers, but the recognition of single individuals is largely masked by the noise caused by other members of the colony. Thus, recognition of call types or individuals is likely to be compromised by biological background noise.

Social Contexts

Marine mammal sounds can also be split by function into echolocation signals and social signals, including calls and song. Echolocation has been demonstrated in several toothed whale species and larger whales may be able to extract information about objects or whole shore lines using low frequency sounds. Bottlenose dolphins can also extract information from echolocation signals of conspecifics (Xitco and Roitblat, 1996). Several authors have speculated how dolphins swimming side-by-side perceive echoes from signals sent out by the animal next to them. This may lead to a wider field of coverage letting individuals share the same perceptional experience. However, clicks are also used in communication and different types of clicks have been identified that are used in different social contexts. Bottlenose dolphins can be trained to modify click as well as whistle parameters, giving them the potential to produce a vast number of different signals (review in Janik and Slater, 1997).

As in terrestrial mammals, many marine mammals have been shown to use calls if a mother and a calf become separated. Examples are manatees, harbor seals, southern right whales, California sea lions, and bottlenose dolphins, but it is likely to be much more widespread. Bottlenose dolphins are particularly interesting in this context, since they do not simply produce a shared isolation call, but develop individually distinctive signature whistles (review in Janik, 1999) that are used if closely bonded animals are separated from each other (Janik and Slater, 1998) (**Figure 3**). Each individual develops its own signature whistle in the first few months of life and uses it into adulthood to indicate identity and position. Signature whistle development is strongly influenced by learning. It appears that individuals use other animals' whistles as models and develop their own whistle by modifying an existing model. Signature whistles are more plastic in males than in females. Initially, the signature whistle of many males is similar to that of the mother but it may change later in life when a male enters into an alliance with other males. Males in an alliance tend to have similar whistles, too, suggesting a change by at least some of the animals (Watwood *et al.,* 2004). The signature whistle of a female, on the other hand, is very dissimilar to that of her mother from the start and it is remarkably stable even over decades (Sayigh *et al.,* 1990). Fifty-two percent of all whistles used by wild, unrestrained bottlenose dolphins are signature whistles (Cook *et al.,* 2004). Janik and Slater (1998) showed that dolphins tend to produce signature whistles when isolated from their group, demonstrating the importance of signature whistles in group cohesion. Bottlenose dolphins have also been found to imitate each other's signature whistles, most likely in an attempt to address a specific individual (Janik, 2000). Given that this is a learned signal, signature whistles could be considered names of animals. However, we do not know to what extent a receiving dolphin has a mental representation of an individual if it hears that individual's signature whistle.

Several marine mammal calls have group-specific features that allow a researcher to identify which group it came from. Killer whales, for example, use group-specific repertoires of burst-pulsed sounds (review in Janik and Slater, 2003). These calls appear to be acquired through vocal learning and show only subtle changes over long periods of time. Killer whale groups off British Columbia that specialize in preying on fish socialize frequently and share many of their calls. Others in the same geographic area specialize in preying on smaller marine mammals and do not socialize or share calls with the fish eaters. Different killer whale call repertoires are often referred to as

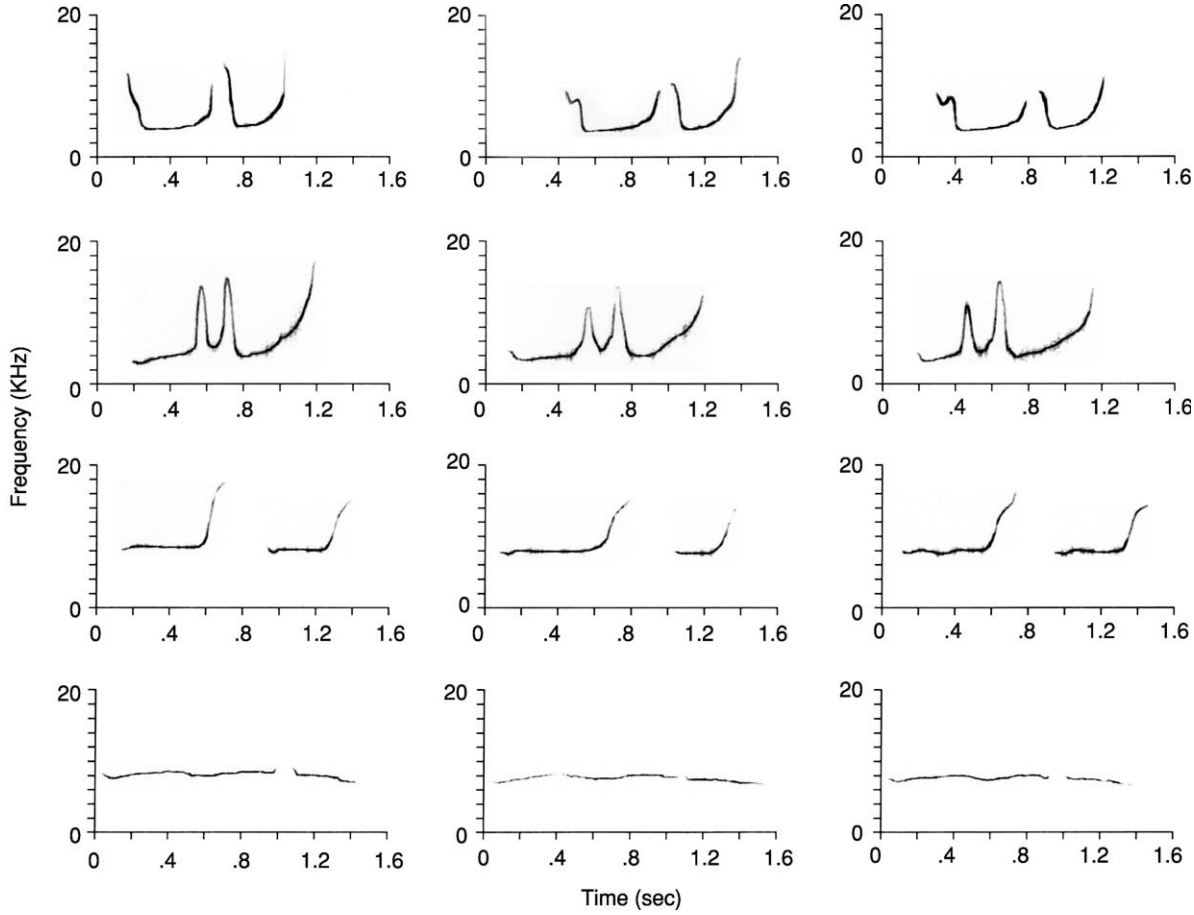

Figure 3 Spectrograms of signature whistles of four bottlenose dolphins. Each line shows three examples of the signature whistle of one individual. Signature whistles are very different among the four individuals but highly stereotypical within individuals. (FFT size 1024, Hamming window, DF: 56 Hz, DT: 18 ms.)

dialects. Sperm whales and blue whales display a similar pattern, but here animals belong to much larger groups that, unlike killer whales, do not appear to be purely matrilineal (review in Janik, 2005). These groups are characterized by shared vocal features and are called vocal clans. Different clans are sympatric but rarely socialize with each other. It appears likely that closed groups like those of killer whales use the degree of sharing to recognize their own and other known groups. It is less clear whether acoustic differences are functional in clans. Clan variation could be used for recognition or be a byproduct of genetically or culturally inheriting calls from relatives that show a particular association or mating pattern. In pinnipeds, group specific calls have not been described, largely because they have not been shown to form the same individualized social groups that can be found in cetaceans. Several pinniped species show geographic variation in their call repertoires (review in Janik and Slater, 1997), but this is most likely caused by genetic drift and environmental differences. In some species geographic variation has been described for haul-out sites that were only a few tens of kilometers apart. However, most of these did not stand up to closer scrutiny of longer-term data.

Other calls that are common in animals are alarm and food calls. There are no specific alarm calls in marine mammals. In fact, most of them become remarkably quiet once they detect a predator. This can be explained by the behavior of the most common predator, the killer whale, which seems to use passive listening to detect prey. Food-related calls have been described for bottlenose dolphins. Many observations exist from other dolphin species rushing toward a feeding site from several kilometers away, suggesting a similar cue. Such calls can be beneficial to the sender for different reasons. They may indicate a food source to relatives. If attracted animals are not related to the caller, they may aid in prey capture by involuntarily chasing fish toward the caller. Finally, such calls may be directed at prey, perhaps modifying prey behavior in a predictable way to facilitate capture. Other dolphins may use these calls as a cue to a food source, but the signal did not evolve to attract them. Alarm and

food calls in marine mammals are reviewed in Janik (2005).

Finally, territory defense and mate attraction are very prominent contexts in marine mammal sound production. As in birds, it is difficult to distinguish between these two functions. Many male marine mammals produce elaborate song displays during the breeding season (see above). Playback studies have been conducted with humpback whales and Weddell seals. In both species, males react to the playback of song while females appear less interested. However, while males may want to repel an intruder immediately, females may need much longer listening periods before they decide on a mate. Thus, their reactions would be less apparent in a playback study where stimuli are only played for a few minutes. Territorial defense is also an obvious calling context at pinniped haul-out sites.

Traditions in Marine Mammal Calls

In animal communication research, the term 'tradition' refers to vocal displays that are learned socially and remain in a population for a set amount of time. This time window has been defined differently by different authors, so that most studies concentrate on whether a display was acquired through social learning or not and how many individuals share it at any one time. Recently, some authors have used the term 'culture' instead of tradition. However, the definition used for 'culture' was the same as the one given for 'tradition' here.

Vocal traditions have been described in a variety of animal species. They occur by definition in all vocal learners, like birds and marine mammals. Examples are the group-specific call repertoires of killer whales or sperm whale clans, the geographic variation of whistle parameters found in bottlenose dolphins, and seemingly the small-scale geographic variation in calls of some phocid seals (review in Janik and Slater, 2003). Even the changing songs of humpback whales can be considered to be traditions, albeit short-lived ones. While usually 63% of all themes in a humpback whale song are shared between all individuals in subsequent years, this rate is not stable. An observed immigration of a few individuals from the west to the east coast of Australia led to a complete adaptation of the west coast song by east coast animals in only one year. While the description of such patterns is a useful first step, the question remains whether such differences have a function. In killer whales, the stability of differences between call repertoires of sympatric groups suggests that variation helps in group recognition. Larger scale variation, however, may just be a byproduct of copying errors when social learning occurs. This can lead to a drift in the trait that could explain the geographic variation found in calls of seals and bottlenose dolphins.

Cognitive Abilities Affecting Communication

Marine mammals have been shown to pay careful attention to their acoustic environment and they have remarkable sound production and perception abilities (review in Janik, 2005). Harbor seals in the wild, for example, learn to recognize calls of mammal-eating killer whales but ignore those of fish-eating killer whales. Harbor seals are also capable of vocal learning (Ralls *et al.*, 1985), the ability to modify signals in form as a result of experience with those of other individuals (Janik and Slater, 1997). Several captive individuals have been found to copy human speech sounds, probably one of the most convincing demonstrations of vocal learning since it requires copying sounds from another species. However, evidence for vocal learning in other pinnipeds is sparse. Cetaceans also show impressive vocal learning skills (review in Janik and Slater, 1997). A careful investigation of the ability to copy computer-generated tonal signals has been conducted with bottlenose dolphins (Richards *et al.*, 1984). Once the animal had learned the paradigm it was able to produce close imitations of novel sounds in the first trial they were used. The patterns of change in humpback whale song also indicate that learning plays a major role in their maintenance. Gray seals can learn to produce existing signals of their repertoire in novel contexts (Shapiro *et al.,* 2004), and bottlenose dolphins can be taught to use learned signals to label objects in their tank. Once some objects have been removed dolphins can report presence or absence of an object by pressing one of two paddles if artificial labels are used to request this information (Herman and Forestell, 1985). Bottlenose dolphins also seem to be capable of responding correctly to referential pointing gestures performed by humans (Herman *et al.*, 1999), even if an object is placed in a novel location. In pointing studies on other species the experimental setup was usually more restricted so that an apparently correct response to pointing could often be explained by a simple conditioning effect causing the animal to move to the left or the right. This summary demonstrates that marine mammals have advanced cognitive abilities that can facilitate complex communication.

Animal Language Studies

Before the discovery that each individual dolphin has its own signature whistle type, dolphin whistle

repertoires were thought to be boundless, since every investigation of a new individual added novel whistle types. This led to fairly naïve attempts to apply linguistic methods to the study of dolphin communication. For example, several researchers applied Zipf's analysis to dolphin whistles and found that the resulting slope is comparable to that found in humans (e.g., Dreher, 1961). This was taken as evidence for dolphin communication to be as complex as human language. However, it is widely accepted now that Zipf's law can apply to a large variety of processes and does not necessarily imply transmission of complex information (Suzuki *et al.,* 2005). John Lilly tried to establish interspecies communication between humans and dolphins by constructing a living environment that allowed a volunteer to live with a dolphin over prolonged periods of time. He hoped that this situation would lead to the development of complex communication between the two. The study failed. It also lacked scientific rigor since the volunteer was also the observer for the study (review in Tyack, 1999).

Early experiments on information transmission in dolphins were conducted by Bastian (1967). He placed two individuals in the same pool with a visual barrier in between them. Each animal had a set of two paddles in its enclosure. Bastian then trained them in a task where only one individual could see a light that indicated which paddle to press. However, only if both animals pressed the correct paddle did they receive a reward. The animals performed successfully in this task. Bastian argued that this demonstrated referential communication about which paddle to press between the two individuals. However, it does not imply that the first dolphin invented a signal for left and right. It is more likely that the second individual received acoustic cues from the position of the first one. Dolphins usually echolocate as they approach a target. When the first animal approached the two different paddles in different locations in the pool, the resulting echoes from pool walls audible to the second animal could have been distinctive enough to serve as conditioning stimuli for that second animal in the paddle pressing task. This means that the result achieved by Bastian can be explained without any intentional communication taking place. The first animal was trained by the experimenter to press one of two paddles, and the second one could have learned to use acoustic cues to achieve the same result. Unfortunately, the necessary tests to identify the cue used by the second animal have not been conducted. Bastian did notice a large amount of clicks sounds during the performance of the task. Nevertheless, the explanation given here could still be too simple. As we have seen earlier, Richards *et al.* (1984) demonstrated that dolphins can learn to use novel sounds as labels for objects. Thus, a more complicated explanation that involves referential communication with novel signals is theoretically still possible.

Animal language studies have been conducted on two marine mammal species, the bottlenose dolphin (Herman *et al.,* 1984; Herman *et al.,* 1993) and the California sea lion (Schusterman and Krieger, 1986; Gisiner and Schusterman, 1992). In 1984 Herman and his colleagues published their results on the comprehension of sentences by bottlenose dolphins. This long-term study used artificial communication systems to instruct two female dolphins what tasks to perform. In the first instance it consisted of signals for objects and actions that could be combined in different ways. One individual was exposed to a purely acoustic system, while the other one received hand-signals. Each dolphin was taught a different syntax. While the first one consisted of sentences structured as OBJECT-ACTION-OBJECT, the second one would receive the same message as OBJECT-OBJECT-ACTION. An example in which the dolphin was supposed to bring a surfboard to a hoop, two of many items in the pool, would read SURFBOARD-FETCH-HOOP in the first system and SURFBOARD-HOOP-FETCH in the second. Once these systems were established, Herman and his colleagues added additional signals called modifiers that indicated object location or direction. The vocabulary in each of these systems consisted of 35 to 40 signals. Novel sequences of these signals were used to test the dolphins' ability to process syntax. Herman and colleagues found that the animals reacted correctly to almost all novel sequences. Another test involved presenting incomplete or incorrect sequences. These tests seemed to demonstrate that the dolphins had a concept of the artificial language system and its rules. Kako (1999) compared the syntactical abilities of three language-trained species, the gray parrot, the bonobo, and the bottlenose dolphin, concentrating on discrete combinatorics, category-based rules, argument structure, and closed-class items. Discrete combinatorics refers to the situation when word meanings do not blend into each other when they are combined, but stay discrete. Category-based rules are rules that determine where a word of a particular category can occur in a sequence. To understand argument structure an animal needs to know how many arguments each verb can have, where these arguments are positioned in a sequence and what relationship they have to the verb in these positions. Finally, closed-class items are items that provide structure in a syntax system rather than referring to actions or objects. Examples are prepositions, quantifiers and determinators like A or THE. Kako found evidence for correct processing of the first three aspects in bonobos, parrots, and dolphins.

Closed-class items were only investigated in dolphins, where it has been shown that they can process such items like the demonstrative pronoun THAT and the conjunction AND. It is important, though, to keep in mind that using syntactical category names is problematic in the interpretation of the performances of language-trained animals. Animals may use their learning skills to perform successfully in such tasks without necessarily using anything like human syntax.

Schusterman and colleagues tried to replicate the dolphin results with a female California sea lion using the OBJECT-FETCH-OBJECT structure (review in Schusterman and Gisiner, 1997). They found that the sea lion was capable of comparable processing as that demonstrated in Herman's study (but not testing closed-class items). However, while Herman argued that dolphins have linguistic capacities, Schusterman and colleagues used a more cautious approach. They suggested that the performances by dolphins and sea lions can be explained by the formation of functional equivalence classes between signals and objects and conditional discrimination learning abilities, and that the development of linguistic concepts was unnecessary to produce the required action sequences. There were several differences in the studies on dolphins and sea lions. The dolphins were taught contrasting terms in relational sentences, for example different signals for taking one object to another or placing one object inside another one. The sea lion, on the other hand, was taught a different set of modifiers that included object features such as size and color. One major difference between the dolphins' and the sea lion's performances was in their responses to incomplete or incorrect sequences. While the dolphins often used parts of the sequence to perform a behavior sequence, the sea lion frequently refused to perform at all. However, Gisiner and Schusterman (1992) argue that this can be explained by different training regimes. While the dolphins were rewarded for any performance in a test trial, the sea lion would never be rewarded in test trials. Thus, it paid for the dolphins to produce a behavioral sequence while it did not for the sea lion. If the dolphins or the sea lion did respond, the way they performed in these trials suggested a close attention to the components of the command sequences they received. However, the extensive exposure to similar sequences in their training history makes it difficult to interpret performances. Thus, it is useful to see the results of these experiments as a remarkable demonstration of rule-learning skills that might also be relevant in humans for language comprehension, but not necessarily as evidence for a linguistic capacity as such, since the animals may use these skills in their own communication system in a very different way.

Language studies that required the animals to produce sounds themselves have been sparse, and an attempt to teach a dolphin to use a keyboard for interspecies communication had little success. Thus, it is difficult to compare the production side of the system with results found in other animals like parrots and great apes.

See also: Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Vocal Learning; Development of Communication in Animals; Individual Recognition in Animal Species; Traditions in Animals.

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Communication, Understanding, and Interpretation: Philosophical Aspects

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Philosophers have asked questions about both the nature and the extent of communication. What, for instance, is the difference between expressing a belief and communicating one, and what role does language play in communication? What must one know to interpret another person, and can we ever really understand another person? Philosophers are still at work refining these questions and considering answers. This discussion aims to sketch the direction of this work.

The Nature of Communication

There might seem nothing especially puzzling about the nature of communication. After all, we seem to communicate with each other all the time and succeed, largely without having to reflect on the nature of our success. We tell others what we think or believe, and they in turn tell us what they think or believe. One way to begin to see what philosophers have found puzzling about the nature of communication is to consider whether nonhuman animals – dogs and cats, for instance – ever communicate with each other or with us.

Suppose that Fido knocks his food bowl over whenever he is hungry, and he does it only in the presence of his master, whom he then looks at

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Suppose that Fido knocks his food bowl over whenever he is hungry, and he does it only in the presence of his master, whom he then looks at

intently. Is Fido trying to communicate with his master? To answer this, we need to know more about what it is to try to communicate. One initially helpful distinction is between communicating a belief and merely manifesting or revealing one. Agents manifest or reveal something about their beliefs, desires, and intentions whenever they act, and ordinarily we can explain and predict these actions by reference to what (we think) they believe, want, and intend. This applies as much to dogs and cats as to people. We might, for instance, speculate that Fido is knocking his bowl over in part because he knows it is empty and wants it to be full. We might even, somewhat more ambitiously perhaps, say that Fido knows that if he knocks the bowl around his master will fill it for him. These attitudes are manifested by Fido's actions, in the sense that we can infer from the actions that he has these beliefs and desires. But, of course, it is one thing for an action to reveal what one believes or desires and another to communicate what one believes or desires. After all, sometimes our actions reveal more than we want, as when we let something slip or when someone is spying on us. Genuine communication, it seems, requires **intending** to reveal what one believes; it requires manifesting one's beliefs or desires on purpose. Communication is thus an intentional activity. Did Fido intend to communicate his beliefs and desires when he knocked the bowl over?

Part of the difficulty in answering this stems from an ambiguity in the phrase 'communicate what he believes'. In one sense, for Fido to communicate what he believes is for him to communicate, in this case, that his bowl is empty, that it should be full, and that he is hungry. In this sense, what is communicated are the facts, or at least the facts as Fido takes them to be. But in another sense, for Fido to communicate what he believes is for him to communicate the fact that he has those beliefs and desires. In this sense, what is communicated is the fact that Fido takes or wants the world to be some way. Plausibly, to communicate what one believes or desires in the second sense, one must be aware that one has those beliefs and desires; one might doubt whether dogs and cats are aware of their own beliefs and desires. To doubt this is not to doubt whether dogs and cats have beliefs and desires or whether their actions are caused by their beliefs and desires. One can admit all of this while still doubting whether dogs and cats have the level of self-awareness necessary for intending to reveal that they have certain beliefs and desires. It is an empirical question whether dogs and cats have this level of self-awareness. In any event, the two senses of 'communicate what one believes' differ only over what is communicated and not over what it is to communicate. So even if it is true that Fido is incapable of communicating **that he believes that his bowl of food is empty**, it might still be true that he can communicate **that his bowl of food is empty**.

But before we can decide this, there is still more we need to know about what Fido is trying to do. More specifically, is Fido trying through his action to influence his master's beliefs or actions? Is Fido trying to get his master to believe something, or is he trying to get him to do something? To try to influence a person's beliefs requires, it seems, some awareness that that person has beliefs that can be influenced. I think it is clear that this is something that humans do when they communicate with one another. But if one doubted that dogs and cats are aware of their own beliefs and desires, then one would likely doubt that they are aware that people have beliefs and desires. Still, we sometimes communicate with others with the intention of influencing their actions, as when we give warnings or orders. But perhaps we do this with the primary intention of influencing their beliefs, hoping that this will lead to the desired action. What is clear, in any event, is that we humans often do communicate with the intent of influencing the beliefs and desires of other people, whether or not this intention is required for genuine communication.

It is also clear that, whether it is necessary or not, acting with an intention to influence someone's beliefs is not enough for genuine communication. I might leave the milk carton on the counter, intending that when my wife notices that it is empty she will plan to buy one on her way home. If my plan succeeds, I will have influenced her beliefs. But it seems wrong to say that I would have communicated to her that the milk carton is empty, or that we need more milk, even though I deliberately caused her to believe these things. If, instead, I had made a show of holding the carton upside down in her presence I might well have communicated these things to her. But what is the relevant difference? Part of the difference, in this example anyway, is that in the second case my wife would know that I am trying to influence her beliefs. She would recognize that in making a show of holding the carton upside down I was trying to make her see that the milk is gone (or that I believe that it is gone). Genuine communication, it seems, may require that the audience recognize one's intention to influence his or her beliefs or actions.

This gives rise to a possible asymmetry in the case of dog-human communication. Plausibly, in knocking his food bowl around, Fido is intending to show his master that the bowl is empty, and no doubt his master can recognize this intention. This could be so even if Fido himself is not aware of having this intention or of his master's recognizing it. And of course

the master can act with the intention of influencing Fido's beliefs or actions. But can Fido, or any dog, recognize such an intention in his master? Can Fido figure out that when his master pulls back on the leash he or she is trying to get Fido to heel? Again, if one doubts that dogs and cats are aware of their own beliefs and intentions then one might well doubt whether they are aware of the beliefs and intentions of others. And if they cannot recognize intentions and beliefs in others, and if this recognition is needed for the audience in genuine communication, then dogs and cats cannot be the audience of genuine communication. But so long as trying to communicate does not itself require being aware of intentions, then dogs and cats might be able to communicate, even if they are incapable of being the audience of a communication. This is the potential asymmetry.

One might think – perhaps with some justification – that the question of whether Fido is communicating or not is, at this point in the discussion, more than a little terminological. After all, all sides can agree – supposing certain empirical questions about the self-awareness of dogs and cats to have been settled – about what dogs and cats and humans can and cannot do to try to influence beliefs and actions. Deciding whether to call what nonhuman animals do 'communication' may seem less important than recognizing the differences and similarities between what all sides agree that human and nonhuman animals can do. In any event, progress in understanding animal communication requires further empirical study, not terminological decision.

The discussion until now has left language out of the picture. The examples have all been of nonlinguistic communication. It is undeniable that we do communicate nonlinguistically with others using waves, winks, and kicks under the table (although there are terminological questions about just how to draw the line between linguistic and nonlinguistic communication). When we do so, we hope that our audience will be able to recognize our intention to communicate. There is nothing, I think, essentially new about linguistic communication except that it involves speech acts – acts done with words having a conventional meaning. However, reliance on conventions is not unique to linguistic communication, since nonlinguistic communication using signals and codes may also involve conventions. There is considerable current research about the nature or essence of human language and how it differs from codes or signal systems. Some leading philosophers also question whether human language is in any interesting sense meant for or designed for communication.

Some philosophers have argued, though, that nonlinguistic forms of communication are in a way dependent on linguistic forms. Some, such as René Descartes in the 17th century and Donald Davidson in the 20th century, held that genuine communication is essentially linguistic. With this view, having beliefs and intentions requires having language, and since (as we have seen) communication requires having beliefs and intentions, communication requires having language. Since dogs and cats have no beliefs they are, on this view, incapable of communication. This is, however, a minority opinion.

The rough definition of communication I have sketched applies just as much to linguistic communication as to nonlinguistic communication. To communicate is to perform an action, perhaps a speech act, with the intention of influencing an audience's beliefs or actions and whose success requires that the audience recognize this intention. This is just a rough sketch of a complete picture. Considerable ongoing philosophical research is aimed at filling in the details. In particular, research is focused on the precise nature of the relevant intentions.

Interpretation and Understanding

Communication, whatever it is, succeeds only when the audience correctly understands the communicator, when he or she correctly interprets what the communicator intended him or her to come to believe or do. Philosophers have asked various epistemological questions about the extent to which we can and do understand each other. Some are quite skeptical that communication ever succeeds.

One kind of philosophical question concerns the possibility that some of an agent's thoughts are essentially private, in the sense that only that agent can think them. Such thoughts would be essentially incommunicable, ones an agent could never communicate to anyone else. One purported kind of example includes thoughts about the character of an agent's own conscious experience. If no one else can know what it is like for me to taste chocolate or to see red, perhaps no one else can truly understand what I say when I try to describe these experiences. Perhaps what it is like to be me, from the inside, is something I can never fully communicate with another. A related kind of purportedly private thoughts are so-called first-person thoughts: thoughts an agent has about her own place in the world. Perhaps what I think when I think that I am in Buffalo is not what you (or I) think when you (or I) think that David Hunter is in Buffalo. Perhaps thoughts that locate my own position for me are not thoughts that others can share. If some thoughts are private in this way, then they would mark one principled limit to communication. But what such private thoughts might be

like – and indeed whether they are even possible – are areas of ongoing philosophical research.

A more generalized skepticism about communication derives from the fact that what a person means by his or her words can never neatly be separated from what he or she believes. We use our words to express our beliefs, but what we intend to say depends on what we believe our words can be used to say. So we cannot understand what someone is saying without knowing what they believe, but our best insight into what they believe is through our understanding of what they say. This fact about the interdependence of meaning and belief has led some philosophers to suggest that what a person means depends on their entire cultural milieu. Different cultures, according to this position, have different systems of belief, or different worldviews, and interpreting or understanding an agent from another culture requires sharing or at least knowing that worldview. A related position is that scientists working within different scientific paradigms, such as pre- and post-Einsteinian physics, cannot genuinely understand each other, because the meanings of their shared words derive from different theoretical structures. It is not just that what Newton meant by 'energy' is not what Einstein meant by it. Rather, the claim is, Einstein could not even understand what Newton meant by it, since he did not share Newton's scientific paradigm.

This skepticism conflicts with the apparent ease of cross-cultural communication and ordinary interpretation. Perhaps this skepticism rests on mistaken semantic assumptions. But it may be that the appearance of easy communication stems from the fact that we typically assume that other people generally share our beliefs and meanings. Perhaps this 'principle of charity' in interpretation creates an illusion of successful communication. In any event, the general point that there is some interdependence between what a person means by their words and what they believe can hardly be doubted and is enough to raise some doubt about just how successful ordinary communication really is.

A more severe skeptical worry starts from the fact that any theory is under-determined by evidence. It is a general fact about the nature of theories that very different, even conflicting, accounts of some phenomena will be compatible with all the available evidence. In the case of communication, this means that very different interpretations of someone's speech act will make equally good sense of all available (indeed, of all possible) evidence. Just as a scientific theory can be adjusted in countless ways to accommodate new evidence, so our interpretation of a speech act can be varied in countless ways by varying our interpretation of the agent's beliefs or meanings. By itself, this under-determination suggests that we might never be in a position to know that our interpretations are correct, since no amount of evidence could identify a single best interpretation. Meaning might forever transcend our ability to know. Some doubt whether this brand of skepticism constitutes a special problem for communication, since all of our theories are under-determined by evidence. Perhaps if our epistemic position with respect to meaning is no worse than that with respect to, say, atomic physics, then we can live with this much skepticism about interpretation.

However, the American philosopher W. V. O. Quine argued powerfully that there is a special problem in the case of communication. In early work, he stressed the idea that the under-determination of translation would occur, even if there were no under-determination of physics. Even if we agreed on all the physical facts, we might not, he argued, be able to agree on a unique best interpretation of an agent's speech act, since there would still be room to vary the agent's beliefs and desires. The physical facts, in his view, do not determine the semantic ones. In later work, Quine stressed the idea that in the case of, say, physics, we are prepared to admit that the physical facts might transcend our cognitive capacities. We might, he held, simply lack the intellectual resources needed to discover those facts, since nothing in the facts themselves guarantees that we can know them. As a result, he said, we are prepared to say that even though conflicting physical theories might be equally compatible with all available evidence, at most one of them can be true. This means that we might not be able to tell which theory is true. However, Quine argued, it makes no sense to suppose that what someone means by his or her words or what he or she believes could transcend the evidence we have at our disposal. Facts about meaning and belief are, he held, essentially public and knowable by us. So, he concluded, the special problem for interpretation and understanding is that it makes no sense to say that one interpretation is truer than any other, so long as they each make equally good sense of the evidence. It is not that facts about meaning could go beyond what we can know; it is that there is nothing more to meaning than what we can know. And because what we can know fails to determine a unique translation, this means that translation is indeterminate.

While Quine's writings on this topic have been extremely influential, there is little consensus about just what his arguments are, let alone what the consequences of his view would be. And while he has won few converts, there is no consensus about where his arguments go wrong. Some have responded that

Quine unjustly adopted behaviorist limits on the available evidence or that he overlooked other sources of evidence at our disposal. Still, the thesis of the indeterminacy of translation is one of the most significant contributions to the philosophy of communication of the 20th century.

See also: Behaviorism: Varieties; Causal Theories of Reference and Meaning; Conventions in Language; Empiricism; Epistemology and Language; Indeterminacy, Semantic; Radical Interpretation, Translation and Interpretationalism.

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Communication: Semiotic Approaches

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The Rise of a Controversy

The topic at issue in this article shows several problematic aspects. In communication research, we are presently crossing a phase of intensive innovation, in which the paradigm and the role of the different disciplines are changing remarkably. For a long time, the leading role in this area was played by the *sciences du language*, in particular by semiotics and linguistics. Nowadays, this role is played by a complex epistemological interplay, where other human and social sciences – focusing on the organizational assets of communication context – as well as technological disciplines contribute to the study of real communicative events. Thanks to these contributions, it has become evident that real communicative events are not only influenced, but functionally governed by their actual context (enterprises, institutions, communities, and other social organizations . . .) and by the media, by which they are not only broadcasted, but also structured.

Moreover, even linguistic sciences, which are expected to explain the internal structure of a communicative event, are largely adopting a model of communication whose conceptual frame is no longer essentially semiotic, but rather pragmatic. The prevailing of a pragmatic paradigm seems to have strongly redimensioned the semiotic claim. More specifically, both major trends – Speech acts Theory and Relevance Theory (i.e., the ostensive inferential model of communication) – are proposing a vision of communication that does not focus on semiotic aspects.

While the former of these trends has developed its own model essentially ignoring the semiotic approach (Austin, 1962 and Searle, 1969), the latter has created a proper controversy, initiating a sort of campaign against the semiotic approach and its academic power.

At this point, it is useful to outline the ostensive-inferential model of Relevance theory synthetically, in

Quine unjustly adopted behaviorist limits on the available evidence or that he overlooked other sources of evidence at our disposal. Still, the thesis of the indeterminacy of translation is one of the most significant contributions to the philosophy of communication of the 20th century.

See also: Behaviorism: Varieties; Causal Theories of Reference and Meaning; Conventions in Language; Empiricism; Epistemology and Language; Indeterminacy, Semantic; Radical Interpretation, Translation and Interpretationalism.

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Communication: Semiotic Approaches

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The Rise of a Controversy

The topic at issue in this article shows several problematic aspects. In communication research, we are presently crossing a phase of intensive innovation, in which the paradigm and the role of the different disciplines are changing remarkably. For a long time, the leading role in this area was played by the *sciences du language*, in particular by semiotics and linguistics. Nowadays, this role is played by a complex epistemological interplay, where other human and social sciences – focusing on the organizational assets of communication context – as well as technological disciplines contribute to the study of real communicative events. Thanks to these contributions, it has become evident that real communicative events are not only influenced, but functionally governed by their actual context (enterprises, institutions, communities, and other social organizations . . .) and by the media, by which they are not only broadcasted, but also structured.

Moreover, even linguistic sciences, which are expected to explain the internal structure of a communicative event, are largely adopting a model of communication whose conceptual frame is no longer essentially semiotic, but rather pragmatic. The prevailing of a pragmatic paradigm seems to have strongly redimensioned the semiotic claim. More specifically, both major trends – Speech acts Theory and Relevance Theory (i.e., the ostensive inferential model of communication) – are proposing a vision of communication that does not focus on semiotic aspects.

While the former of these trends has developed its own model essentially ignoring the semiotic approach (Austin, 1962 and Searle, 1969), the latter has created a proper controversy, initiating a sort of campaign against the semiotic approach and its academic power.

At this point, it is useful to outline the ostensive-inferential model of Relevance theory synthetically, in

order to specify its criticism of the semiotic model of communication, and also what it justly presupposes a semiotic model to be. In fact, the ostensive-inferential model, whose roots are Paul Grice's and David Lewis' works (Sperber and Wilson, 1995/1986: 2) is introduced by means of those aspects that oppose it to the semiotic model (Sperber and Wilson, 1986: 6) "The semiotic approach to communication (as Peirce called it and we will call it ourselves), or the semiological approach (as Saussure and his followers called it), is a generalization of the code model of verbal communication to all forms of communication," and is thus to be abandoned, since it does not seem to explain the real functioning of communicative events: "The code model of verbal communication is only a hypothesis, with well-known merits and rather less well-known defects. [. . .] Its main defect, as we will shortly argue, is that it is descriptively inadequate: comprehension involves more than the decoding of a linguistic signal" (Sperber and Wilson, 1995/1986: 6). In other words, the semiotic appoach appears to interpret communication as a process where a speaker constructs a message by coding a certain meaning by means of a linguistic system, and transfers it to a hearer who simply **decodes** it, thus retrieving its original meaning. The roles of the speaker and the hearer in a communicative event are thus reduced to coding and decoding respectively. The scholars of the ostensive-inferential approach to communication, relying on wide and unquestionable evidence, argue that the process of interpreting a message by the hearer is far more complex, and that the semiotic component represents a rather short stretch of the communicative process.

The semiotic component is neither necessary nor sufficient to explain the process of communication.

Firstly, it is not necessary because many messages do not make use of a linguistic system; very often, the communicator addresses the hearer not through words of a certain natural language, or through another semiotic system, but through traces by which the hearer is expected to be guided to infer the communicative intention of the message. Sperber and Wilson (1995/1986: 25) argued in fact that Grice's originality consisted in suggesting that the identification of the communicator's intentions is **sufficient** for the achievement of successful communication, and the mediation of a verbal code is not necessarily needed. The authors give an example (Sperber and Wilson, 1995/1986: 25–26) that shows how communication may succeed even without the help of the coding-decoding process. If Peter asks Mary: 'How are you feeling today?', Mary may answer by pulling a bottle of aspirin out of her bag and showing it to him. Although there is no code or convention that rules the interpretation of her behavior, this action can be taken as strong evidence that she wants to inform Peter that she does not feel well. In this sense, Mary and Peter can be said to have communicated, even if they have not made use of any verbal or nonverbal code.

The semiotic component is not even sufficient, even in the very usual cases where it is present. However, large it may be, interpretation requires that various contextual aspects are involved in order to complete the information carried by the semiotic component: "Verbal communication is a complex form of communication. Linguistic coding and decoding is involved, but the linguistic meaning of an uttered sentence falls short of encoding what the speaker means: it merely helps the audience infer what she means" (Sperber and Wilson, 1995/1986: 27). Within this complex form of communication, the results of the decoding process are considered a piece of evidence from which the hearer, through a noncoded mechanism, can infer the speaker's intentions. In this sense, the semiotic component becomes subservient to the inferential process. Using the terminology of Relevance Theory, an enrichment of the linguistic form of the message is however indispensable to obtain the semantic and pragmatic interpretation of a message. This is crucial to distinguish between 'sentence' and 'utterance of a sentence.' According to these authors, generative grammars fail to consider that a certain sentence may appear in an enormous variety of utterances that, though sharing a 'core of meaning' (Sperber and Wilson, 1995/1986: 9) bound to the linguistic code, each includes a different nonlinguistic, context-bound meaning that can be neither predicted nor 'calculated' through a decoding process. Therefore, an inference process is required in order to grasp a complete representation of the communicator's intentions. To give just an example (adapted from Sperber and Wilson, 1995/1986: 11), a sentence like 'You're leaving' contains different levels of noncoded meaning: (1) an indexical (you) whose interpretation depends on the actual communicative event where the sentence is uttered; and (2) a set of possible interpretations: is the speaker informing the hearer that she is to leave? Is she making a guess? Or is she rather expressing disappointment because he is leaving?

Thus, the process of comprehension, through which the hearer reconstructs the communicator's intentions, is not a decoding process, but rather an inferential process. Whereas the decoding process "starts from a signal and results in the recovery of a message which is associated to the signal by an underlying code" (Sperber and Wilson, 1995/1986: 13), an inferential process starts from a set of premises and

reaches a conclusion warranted by the premises themselves. Among possible interpretations of an utterance, the hearer chooses the most adequate to certain expectations of truthfulness, informativeness, and comprehensibility. The inferential process of comprehension is an essential component of communication, which is nonetheless often integrated by the employment of a code. A common code between the interlocutors turns out to be the most powerful, however not indispensable, tool for communicating.

Sperber and Wilson's critical remarks are generally convincing and acceptable, where they criticize the attempt to explain the interpretative process merely in terms of decoding. Less convincing is the more general criticism of all semiotic models of communication, accusing them of reducing communication to a coding and decoding process.

Saussurean 'Signification' as Keyword and Sign of Contradiction

Our thesis is that Sperber and Wilson's criticism, which is legitimate in relation to certain semiotic models, is unacceptable for others. Furthermore, in our opinion, their reductive vision of the function of the semiotic component within a communicative process is by no means convincing.

For both points, we should briefly reconsider some of the communication models more or less explicitly proposed by semioticians and linguists in the past century. It is almost compulsory to start by referring to Ferdinand de Saussure, with whom the beginning of modern linguistics in its structuralist phase is usually connected. His representation of the communication process seems to constitute a typical coding and decoding model, Figure 1.

Here the speaker, having in mind a particular *signifié*, correlates it to the corresponding 'signifiant' of her linguistic system (*langue*), which is perceived by the hearer who correlates it to the correspondent *signifié* of the same linguistic system. Nonetheless, Saussure's *Cours* has a problematic nature; its real function is to witness a deep and complex meditation rather than systematicly expounding a theory. Thus, beyond the approximate presentation of the discourse circle (*circuit de la parole*), the Saussurean text introduces the fundamental but problematic distinction between *signifié* – defined as a meaning carried by an element of a *langue* (a linguistic system) – and *signification* – a term denoting a notion that remains rather opaque in the Saussurean text. Its interpretation and the evaluation of its role in Saussure's doctrine is nevertheless crucial, and turned out to characterize the two main divergent trends that emerged within post-Saussurean structuralism. It is worth noticing that these two trends have developed considerably different attitudes toward communication in their theoretical elaboration. Relevant representatives of both trends being numerous, only those scholars who cover significant and universally acknowledged cruxes will be mentioned here.

Figure 1 Ferdinand de Saussure's model.

The Functionalist Reading

Let us consider Saussure's text. In a passage in chapter IV of the second part of the *Cours de linguistique générale* (1916/1995: 158–159), Saussure seems to employ the term *signification* as equivalent to *signifié*: *signification* seems to be nothing but the counterpart of the auditive image, "*un des aspects de la valeur linguistique*" or, better, the value of the conceptual component of the linguistic sign. Nonetheless, in the following passages, Saussure opposes *signification* to *signifié* throughout a series of interlinguistic confrontations (*mouton* vs. *sheep* and *mutton*, French plural vs. Sanskrit plural and dual, etc). So, without explicitly saying it, Saussure employs *signification* as opposed to *signifié*; interlinguistic comparisons between different language-bound *signifiés* are possible thanks to a conceptualization of reality that is formed somehow independently of these *signifiés*. This distinction lets us guess the existence of a complex correlation between the two semantic dimensions (reasonably understood as interpretation), which goes from the *signifiés* obtained through the coding to the *significations*, which articulate the *parole* (the speaker's actual message). Without this conceptualization, evoked by the use of the term *signification*, such a comparison between different languages would be simply impossible (on this point, see Rigotti & Rocci, in press). *Signification*, thus, has to be interpreted as an inter- or translinguistic category independent of the linguistic code, however correlated to it. If we integrate this notion into the Saussurean *circuit de la parole*, we obtain a more comprehensive model of communication, where the correlation of *signifiant* and *signifié* is only a stretch of a more complex path, starting with the actual meaning intended by the speaker, and ending with the reconstruction of this meaning tentatively operated by the hearer.

The interpretation of the Saussurean text presupposed by this model is explicitly adopted by N. Troubezkoy in his *Grundzüge der Phonologie* (1939), where the *signifiés* are considered, at the level of *langue*, as abstract rules and conceptual schemes, which need to be related to the actual *significations* emerging from language use (see also Rigotti & Rocci, in press: 5). On this point, M. Bréal (1844–1995: 552b) observes that, where we need to employ a certain word in communication, we 'forget' all possible meanings of that word except the one that corresponds to our thought ("*s'accorde avec notre pensée*"). Although the other meanings are still somehow present to our mind, we choose the one that corresponds to the meaning we want to express – i.e. to the *signification*. Here, the relation between *signifiant* and *signifié* is certainly not a coding-and-decoding one, since it is mediated by the speaker's choice to her communicative intention. The same approach to communication may be found in Karl Bühler's *Organonmodell*, as outlined in his *Sprachtheorie* (1934). Among the numerous pages of Bühler's text, which could be useful to elucidate his position on this issue, one passage seems particularly revealing (1934: 63), where Bühler argues that no code can ensure the correct interpretation of the word 'horse' as it is used in a text, where it can refer to a single entity or to the species of horses in general. The use within a text is not "*morphologisch erkennbar*," i.e., it cannot be decoded by means of morphological aspects of the language, neither in Latin, a language that does not foresee articles, nor in the Indo-Germanic, article-provided languages. What allows us to correctly interpret the use of the word 'horse,' is a 'detective-attitude' towards the context of the communicative event, which aims at evaluating what the speaker has in mind: "Man muss es detektivisch gleichsam dem Kontexte oder den Umständen der Sprechsituation entnehmen, ob der Sprecher das eine oder das andere im Auge hat und *meint*." Moreover, an author to whom Bühler is quite indebted, Philipp Wegener, had also stressed the interpretative aspect of communication 50 years previously. Wegener argues that the hearer has the complex task of understanding the speaker's action; for this purpose, he has to figure out what the 'goal' of the communicative action may be. Comprehension of verbal messages is achieved through 'inferences' (*Schlüsse*), which rely both on the meaning of the verbal signs as well as the experience of reality. So, where experience is lacking, comprehension is impossible (Wegener, 1885–1991: 128). For instance, one could not understand a sentence such as 'a whistle of the train, and my brother was gone,' if one had no experience of a train setting off from a station.

If, speaking of a semiotic approach to communication, we refer to this research tradition in linguistics and semiotics, the criticism put forward by the scholars of Relevance Theory loses its bite: in fact, the process of communication is not referred to as a coding-decoding process within this trend. Rather, one should acknowledge that the process of communicative inference is constantly associated with the concept of interpretation.

Nor would the objection be acceptable that, in these models, inference only plays the subservient role of integrating the semiotic process. Here, it must be noticed that, if inference is acknowledged as a necessary integration of the semiotic component, it follows that the semiotic component itself is not considered sufficient for the accomplishment of the communicative event. Therefore, the inferential component becomes essential for communication. More specifically, in this first tradition, neither the speaker's coding nor the hearer's decoding hold the supremacy in the communicative process; the crucial moment is rather when it becomes clear what the speaker intended to communicate, and the hearer understands it. As Bühler claims, on the backdrop of a Husserlian philosophical vision, language always appeals to the speaker's knowledge of reality; and each time we understand the meaning of a communicative event, we deeply and unavoidably rely on a 'reality-driven selection' (*sachgesteuerte Selektion*, Bühler, 1934: 65), which constitutes the core of communication. Not by chance, a large part of Bühler's research is devoted to the study of the specific semantic mechanism of the 'indexicals' or 'deictics' (*Zeigwörter*). This term refers to linguistic units and structures whose meaning is reconstructed through the identification of an aspect of the communicative situation (Bühler, 1934 see in particular p. 107).

Here, given the importance that Bühler attributes to reality in the process of communication, it becomes clear why he adopts a 'triadic' notion of the sign, which is rather innovative if we compare it to other structuralist models. In his *Organonmodell* (1934: 24), the sign is conceived as an 'instrument' for communicating; and communication is interpreted pragmatically, as an action accomplished by the speaker and the hearer. According to Bühler (1934: 52), communication must be viewed as a human 'action,' vitally bound to other meaningful human behaviors. Communication is related to other actions, and is an action in itself. In particular, Bühler distinguishes between *Sprechhandlung* (1934: 53), which is the human activity of communicating, i.e., the Saussurean *parole*, as opposite to *Sprachgebilde* (the *langue*, 1934: 57); moreover, with the notion of *Sprechakt* (1934: 62), he focuses on a single communicative

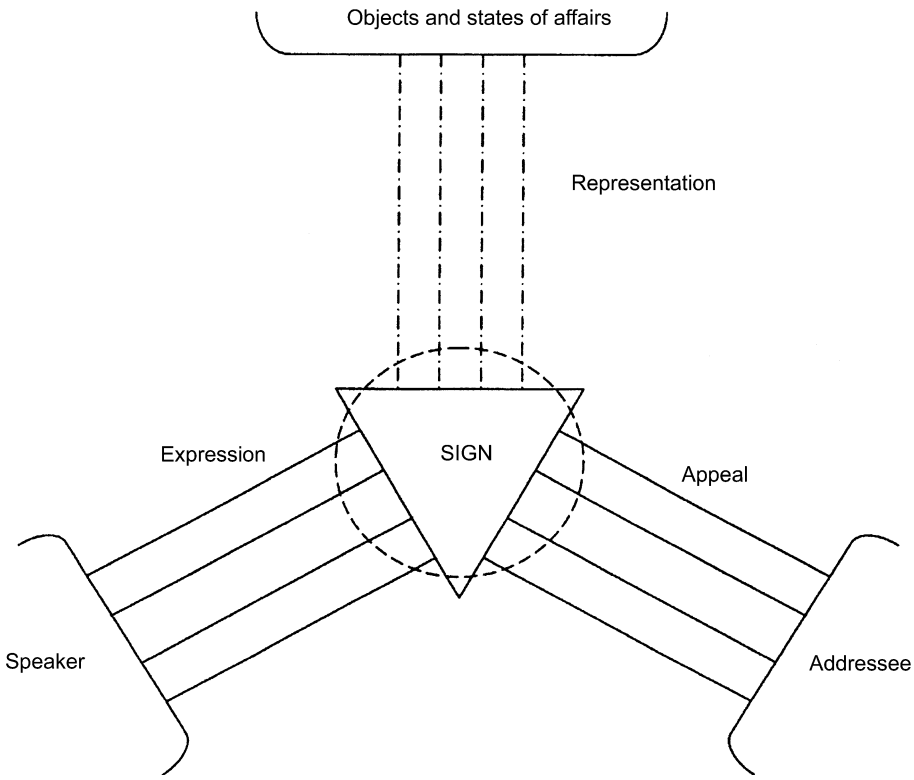

Figure 2 Karl Bühler's *Organonmodell.*

action, and with *Sprachwerk* (1934: 53), he denotes the linguistic products resulting from a single human action of communicating.

Within the model, the sign is related to the speaker (*Sender*), the addressee (*Empfänger*) and the objects and states of affairs in reality (*Gegenstände und Sachverhalte*). The sign is bound to each dimension by a specific relation: with regard to the speaker, the sign is a 'symptom,' bound by a relation of 'expression' (*Ausdruck*); with regard to the addressee, the sign is a 'signal,' and stands in the relation of appeal (*Appel*); and, finally, with regard to the object, the sign is a 'symbol,' and stands in the relation of 'representation.' The following diagram, Figure 2, illustrates Bühler's model (1934: 28):

The distinction between code dimension and discourse dimension of semantics, implied by the Saussurean terms *signifié* and *signification*, is tackled and deepened by another linguist: E. Benveniste, who introduced the terms 'semiotic' and 'semantic' (Benveniste, 1966a). He underlines that the content dimension of code units is a semiotic one; while the content dimension of the same units, insofar as they are used within a discourse, is truly semantic (on this point, see also Rocci, 2003). Moreover, among the indexicals investigated by Bühler, he focuses on personal pronouns, by which the communicative act and its constituents are mirrored in specific linguistic structures (Benveniste, 1966b). The study of personal pronouns on both the diachronic and the synchronic axes brings Benveniste to single out the essential role that is played by subjectivity (*I* and *You*) in communication.

On the basis of the Saussurean notion of 'signification,' conceived as the actual, situation-bound meaning of the sign in the communicative process, and of Bühler's interpretation of the sign as an instrument for communicating, we could modify Saussure's diagram and build a model of communication that is shared in its fundamental aspects by all the authors within the research tradition we have examined so far, Figure 3.

Even in its visual diversity, the well-known model proposed by Roman Jakobson (Jakobson, 1960/1995) is, in many respects, reminiscent of Bühler's sign model. Being evidently influenced by Shannon and Weaver's model, it brings to light the process of transmitting a message, thus offering a rather obvious metaphor of the communicative process, Figure 4.

Jakobson's model has two indubitable merits: firstly, it takes into account, and represents synthetically, a complex set of factors; secondly, it deepens many of the specific functions of the message in relation to each of these factors in the communication process. This Russian linguist treasures his former belonging to the significant experience of Russian formalism, by

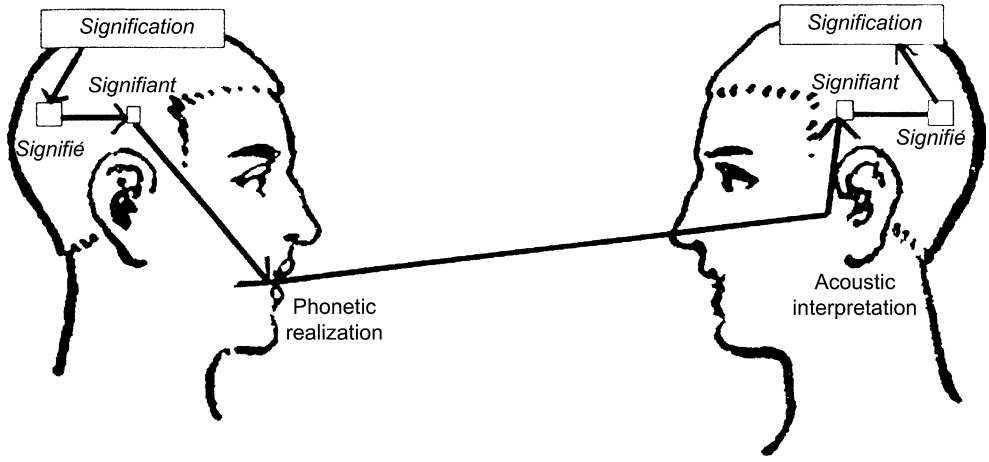

Figure 3 The model of communication within the functionalist reading.

CONTEXT

ADDRESSER MESSAGE ADDRESSEE

CONTACT

CODE

Figure 4 Roman Jakobson's model of the fundamental factors of communication.

REFERENTAL

EMOTIVE POETIC CONATIVE

PHATIC

METALINGUAL

Figure 5 Roman Jakobson's model of the textual functions.

introducing the poetic function into his model, as an autotelic orientation of the message towards itself, Figure 5.

The graphic representation of Jakobson's model appears to be richer than the sign scheme provided by Bühler. However, if we consider the model implicit in the theory of the latter, we have to recognize that Bühler's model is richer in important respects: indeed, in Jakobson's perspective, the pragmatic dimension is weakened; the essential role of inference in interpretation is ignored, as well as the relevance of context for interpretation. Another important aspect concerns the distinction between *signifié* and *signification*, reflecting the more general difference between language (*langue*) and speech (*parole*), which remains outside the graphic model outlined by Jakobson, even though it is adumbrated in some significant research (Jakobson, 1957).

Some Code-model Approaches

The precise definition of the Saussurean model represents a core issue for a large segment of semioticians of the past century. Indeed, besides the tradition we have tackled so far, another tradition of semiotic studies starts from a different interpretation of Saussure's *signification*. The second trend does not concentrate on the notion of *signification*, and therefore it does not focus on the textual and discursive dimension of the *parole*, whereas the point of view of the code (*langue*) is preferred. This position can be found not only in Hjemslev's *Prolegomena to a theory of language* (1961), but also in various scholars belonging to French structuralism – among which R. Barthes plays a paradigmatic role – and in Umberto Eco's first semiotic theory, expounded in his work *Trattato di semiotica generale* (1979).

It is worth noticing that it is quite difficult to infer a model of communication from these positions. Barthes, for instance, stresses the interpretation of language as a system, whereby the individual performing a particular act of *parole* (a discourse) simply selects and actualizes one of the possible states of the system (Barthes, 1964). As the semantic dimension is exhaustively represented by the system of the *signifiés*, the meaning of communicative messages is not built by a speaker for an addressee, but it is rather one possible product the system can generate. The human subject is excluded from the communication process; communication itself, conceived as a communicative interaction between two human beings, i.e., as the junction of the communicative action of the speaker with the interpretative action of the addressee, fails to be considered at all. Umberto Eco (1979: 8) defined communication as "the passage of a signal (*not* necessarily a sign) from a source (through a transmitter, along a channel) to a destination." This definition is meant to include both cases of

machine-to-machine passages of information (see also 1979: 32), and cases where the destination (and not necessarily the source) is a human being. In the latter case, communication involves the process of signification, "provided that the signal is not merely a stimulus but arouses an interpretive response in the addressee" (1979: 32). The process of signification is not conceived as a communicative action; the focus here is on the signification system, "an autonomous semiotic construct that has an abstract mode of existence independent of any possible communicative act it makes possible" (1979: 9). Thus, it is the system that guarantees communication, and the existence of the system does not presuppose the existence of actual communicative events. On the contrary, communication between human beings necessarily presupposes a signification system (thus excluding cases of nonverbal, ostensive communication). It must be observed that Eco explicitly discusses the problem of what the place of the human being, i.e., "the 'acting subject'" (1979: 314) within semiotics should be. He concludes that what is outside the signification system – its "material expressions" (1979: 317) might even be "tremendously important," but it is beyond the subject of semiotics. In fact, as Eco argues, the proper subject of signification is "nothing more than the continuously unaccomplished system of systems of signification that reflects back on itself," whereas individual material subjects only "obey, enrich, change and criticize" the signification system (1979: 315).

As emerges from our survey of some theories within the second trend of Saussurean semiotics, speaking of a proper 'model of communication' in relation to them turns out to be quite difficult. In fact, communication in itself is intrinsically ignored. What they hypothesize are the mysterious workings of an autonomous semiotic program, which would auto-install and run on a mass of undifferentiated terminals, thus defining their individual or network sign production.

Charles Sanders Peirce

The model of communication of the first trend inspired by Saussurean semiotics, which we found in Bühler, and which is confirmed by recent pragmatic models, shows interesting analogies with another tradition, often considered as alternative to the Saussurean one: the semiotic model by Charles Sanders Peirce. As Bühler would do in the 1930s, Peirce had already proposed a triadic notion of sign at the end of the 19th century, Figure 6.

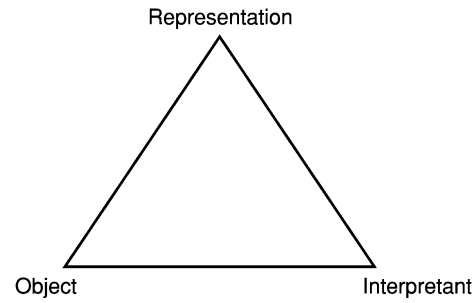

Figure 6 Charles Sanders Peirce's model of sign.

According to what Peirce wrote in 1897 (1897–1935–1958: 2.228), "A sign, or 'representamen' is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign." Although Peirce is often considered one of the founders of semiotics, it must not be forgotten that his contribution is particularly relevant from the logical and philosophical points of view. And his interest for semiotics concerns the cognitive rather than the communicative dimensions. Nonetheless, his contribution is also significant for semiotics and for a theory of communication. Concerning semiotics, we have to underline that Peirce's notion of sign includes 'symbols,' as well as 'indexes' (bound to the object through a real connection), and 'icons,' which remind of objects by reproducing their features. Semiotics turns out to include both verbal and nonverbal dimensions. Nevertheless we should also consider that, within Peirce's enormous scientific production, we find some significant cues for a significantly comprehensive communication model.

Firstly, the correlation of the sign with both subjectivities involved in communication is highlighted by the above-quoted definition, where the subject to whom the sign is addressed is explicitly mentioned and the addresser is presupposed. On this point, M. Hansen (2002) argued that Peirce's approach implies an active involvement of the speaker and the addressee in the process of interpretation. In fact, the 'representamen' does not univocally imply a certain 'interpretant,' but it rather suggests several possible interpretations. Here, the interaction of the speaker and the addressee is necessary to evaluate the interpretation to be chosen: the context of interpretation is actively constructed by the interlocutors, on the basis of the experience of the knowledge community.

Secondly, we find in the Peircean text a truly pragmatic reading of the process of interpretation, as the 'final interpretant' of a sign is the 'habit change,' i.e., "a modification of a person tendencies toward action" (Peirce, 1897–1935–1958: 5.476; on this point, see also Rigotti & Rocci, 2001: 48).

Conclusive Remarks

We might conclude by arguing that the criticism moved against the semiotic tradition by the scholars of Relevance Theory is only valid for those semiotic approaches which can be defined as code-driven, and depend on a reductive interpretation of Saussure. They conceive of the sign as a binary unit, and thus reduce communication to a coding and decoding process. The criticism does not hold for all those, indeed rather numerous, approaches (Peirce and the functionalist interpretation of the Saussurean *Cours*: Troubetzkoy, Bühler, Jakobson, Bally, Sechehaye, Karcevskij ...), where a pragmatic (in the sense of the *Organonmodell* of language) and triadic representation of the sign allows to understand communicative events in an adequately comprehensive perspective.

Our short survey of semiotic approaches to communication in the 20th century shows that not all of them can be considered as code-models, it also puts forward – this concerns in particular some authors like Peirce, Bühler, and Benveniste – the possibility and even the reasonableness of constructing a semiopragmatic model of communication (Searle, 1969; Clark, 1996), concerning both the wording and the interpretation side, this latter being based on semiotic, metaphoric (Lakoff, 1980; Danesi, 2004) and inferential processing (Sperber and Wilson, 1995–1986); comprehending both verbal and nonverbal communication (Rocci, 2003), and including a theory of subjectivity as one of its relevant components (see Rigotti and Cigada, 2004). And the semiotic tradition of the 20th century could be shown to be helpful in this endeavor.

See also: Austin, John Langshaw (1911–1960); Barthes, Roland (1915–1980); Benveniste, Emile (1902–1976); Bühler, Karl (1879–1963); Bickerton, Derek (b. 1926); Grice, Herbert Paul (1913–1988); Hjelmslev, Louis Trolle (1899–1965); Jakobson, Roman (1896–1982); Peirce, Charles Sanders (1839–1914); Saussure, Ferdinand (-Mongin) de (1857–1913); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Wegener, Philipp (1848–1916); Relevance Theory; Structuralism; Speech Acts; Eco, Umberto: Theory of the Sign; Jakobson, Roman: Theory of the Sign; Context, Communicative; Nonverbal Communication; Saussure: Theory of the Sign; Semiosis.

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Communicative Competence

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The phrase 'communicative competence' was introduced by the North American linguist and anthropologist, Dell Hymes, in the late 1960s (Hymes, 1962/1968, 1971). He used it to reflect the following key positions on knowledge and use of language:

- The ability to use a language well involves knowing (either explicitly or implicitly) how to use language appropriately in any given context.
- The ability to speak and understand language is not based solely on grammatical knowledge.
- What counts as appropriate language varies according to context and may involve a range of modes – for example, speaking, writing, singing, whistling, drumming.
- Learning what counts as appropriate language occurs through a process of socialization into particular ways of using language through participation in particular communities.

Hymes's juxtaposition of the word 'communicative' with 'competence' stood in sharp contrast at the time with Noam Chomsky's influential use of the term 'linguistic competence,' which Chomsky used to refer to a native speaker's implicit knowledge of the grammatical rules governing her/his language (Chomsky, 1957, 1965). Such knowledge, Chomsky argued, enables speakers to create new and grammatically correct sentences and accounts for the fact that speakers are able to recognize grammatically incorrect as well as correct sentences such as, in English *She book the read*, or in Spanish *plaza yo a la voy* ('square I am going to'). While accepting the importance of grammatical knowledge, Hymes argued that in order to communicate effectively, speakers had to know not only what was grammatically correct/incorrect, but what was communicatively appropriate in any given context. A speaker therefore must possess more than just grammatical knowledge; for example, a multilingual speaker in a multilingual context knows which language to use in which context and users of a language where there are both formal and informal forms of address know when to use which, such as *vous* (formal) and *tu* (informal) in French. Hymes famously stated that a child who produced language without due regard for the social context would be a monster (1974b: 75).

The emphasis that Hymes placed on appropriateness according to context, in his use of the term competence, challenged Chomsky's view about what exactly counts as knowledge of a language – knowledge of conventions of use in addition to knowledge of grammatical rules. In addition, and more fundamentally, Hymes problematized the dichotomy advanced by Chomsky between 'competence' and 'performance' and the related claim about what the study of linguistics proper should be. Chomsky's interest was in the universal psycholinguistics of language, the human capacity for generating the syntactic rules of language. His interest in knowledge, captured in his use of 'competence,' was therefore at an ideal or abstract level rather than in any actual knowledge that any one speaker or group of speakers might possess. For Chomsky, the focus of linguistics as a discipline should be on understanding and describing the general and abstract principles that make the human capacity for language possible. In contrast, 'performance' or actual utterances – that is, what people actually say and hear with all the errors, false starts, unfinished sentences – could add little to an understanding of the principles underlying language use and was therefore not deemed to be a relevant focus of linguistic study.

Hymes acknowledged the value of the more abstract and idealized approach that Chomsky advocated, not least because such a universalistic approach challenged any theories of language based on genetic differences or notions of racial hierarchy (Hymes, 1971: 4). However, he argued that there

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were other important dimensions to the study of language that should not be so readily excluded from linguistics as a scientific field. Hymes's own interest in language was in large part driven by a concern for language questions arising in real life contexts, such as why children from economically advantaged and disadvantaged social backgrounds differ in the language they use. Chomsky's and Hymes's different aims for developing language theory are nowhere more clearly evident than in Hymes's comment on Chomksy's (1965: 3) now famous statement, on the purpose of linguistic theory: "Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogenous speech-community, who knows its language perfectly.. . ." Hymes (1971: 4) comments: "The theoretical notion of the ideal speaker-listener is unilluminating from the standpoint of the children we seek to understand and to help."

Hymes was highly critical of a theory that explicitly set out to ignore the impact of social context on how language is used and hence the competence/performance dichotomy set up by Chomsky (echoing in some ways the *langue* and *parole* distinction made by Saussure, 1916). At a specific level, his key reasons for challenging such a dichotomy can be summarized as follows (based on Hymes, 1962/1968; 1971; 1974b):

- The dichotomy itself is problematic. It presupposes that knowledge can be understood without reference to use, yet analyzing actual use of language is key to exploring underlying principles for such use. Hymes argued that "performance data" should be considered a legitimate focus for linguistic study both in its own right and as data that reflects knowledge underlying any performance.
- The dichotomy is built on a series of abstractions: ideal speaker-listener, homogenous speech-community, perfect knowledge of language.
- Chomsky's notion of speaker-listener does not acknowledge or account for the differences in reception competence and production competence evident in many contexts, as in children from some social backgrounds understanding formal school language yet not producing it.
- What counts as knowledge of language is reduced to only one aspect of knowledge, namely grammatical knowledge, when there are clearly other aspects to knowledge of language that are important, such as when to use which language, or varieties of languages, and in which contexts.
- Within an approach that focuses on competence as idealized knowledge, it is the abstract system of language that becomes the focus rather than speakers'/groups of speakers' use of language.
- Given the focus on knowledge as a set of abstract rules underlying use, actual use is relegated to only a marginal position in the scientific study of language.

Hymes (1972a: 282) offers communicative competence as a more general and superordinate term to encompass the language capabilities of the individual that include both knowledge and use: "competence is dependent upon both (tacit) knowledge and (ability for) use."

While Hymes argued against the foundational dichotomy between competence and performance proposed by Chomsky, he was not dismissing the value of the distinction entirely. Hymes refers to communicative competence as "abilities in a broad sense" of how to use language, whereas performance is always a specific use of language that reflects some of that competence (2003: 321). Thus any specific performance may partially reflect the nature of the conventions governing an individual or a community's knowledge of language. In setting up a framework for developing an adequate theory of language, Hymes argued that both what is known (competence) and what is actually done (performance) must be taken into account. Such a framework involves exploring and accounting for the following:

1. Whether (and to what degree) something is formally possible
2. Whether (and to what degree) something is feasible
3. Whether (and to what degree) something is appropriate
4. Whether (and to what degree) something is in fact done, actually performed (Hymes 1972a: 284–286).

Questions 3 and 4 are central to the socially oriented approach to the study of language advocated by Hymes. In contrast to Chomsky and his claim to linguistics as a subfield of psychology and philosophy, Hymes seeks to claim a space for the study of language within "a science of social man" (Hymes, 1971: 6).

A Key Concept in an Emerging Sociolinguistic Tradition

Emphasis on the notion of communicative competence formed part of Dell Hymes's call for a new field of study, the ethnography of communication, sometimes called the ethnography of speaking (Hymes, 1962/1968; Gumperz and Hymes, 1972/1986). There are a number of concepts and categories presupposed by the notion of communicative

competence, which continue to be highly influential in sociolinguistics and in many socially oriented approaches to study of language.

Sociocultural Context

Given the importance attached to knowledge of the social conventions governing language use, understanding the context of language use is considered to be central. Exploring such context, that is, the cultural, historical, and social practices associated with the language use of any particular group or community of people, involves detailed descriptions and classification of language use organized around the following key questions. What are the communicative events, and their components, in a community? What are the relationships among them? What capabilities and status do they have, in general and in particular cases? How do they work? (Hymes, 1974b: 25).

Ethnography of Communication

In order to explore how language is used in context, Hymes argued for an ethnographic approach to the study of communication or ways of speaking (Hymes, 1974a). This involves researchers setting out to systematically observe the activities of any given community, through immersing themselves in such activities and collecting a range of data, such as recordings, field notes, and documentation. In this methodology both 'etic' and 'emic' approaches are considered important and complementary; the etic approach refers to observation from the outside as it were, that is, the researcher seeks to observe in detail the communicative activities – or speech events – of participants in a community; the emic involves exploring such events, from the inside, to determine how participants make sense of and understand such events and interactions. Ethnographers emphasize the importance of emic accounts to any theory of language; for example, only an emic perspective would enable a researcher to understand that a clap of thunder may in some cultural contexts be considered to be a communicative act (as in the case of the Ojibwa reported by Hymes, 1974b: 13), or that certain types of communication are permitted to men in some contexts while proscribed in others, such as the disciplining of children (as reported by Philipsen, 1975).

In an attempt to build a descriptive framework of how language is used in different contexts, Hymes, drawing on anthropologists such as Malinowski (1923, 1935), developed a series of categories to map out the relevant contextual aspects to language use, such as speech event and speech community.

Speech Event

This is a category (after Jakobson, 1960) that reflects the idea that all interaction is embedded in sociocultural contexts and is governed by conventions emerging from those contexts. Examples of speech events are interviews, buying and selling goods in a shop, sermons, lectures, and informal conversation. The speech event involves a number of core components identified by Hymes, which are signaled in his mnemonic device SPEAKING. [See Table 1].

Table 1 SPEAKING – acronym invented by Dell Hymes (1972b) to specify relevant features of a speech event

S-settings and scenes	Setting refers to time, place, physical circumstances. Scene refers to the psychological or cultural definitions of the event: for example what 'counts' as a formal event varies from community to community.
P-participants	Who is involved, as either speaker/listener, audience.
E-ends	Ends can be defined in terms of goals and outcomes. Goals refer to what is expected to be achieved in any event: outcomes refers to what is actually achieved. Goals and outcomes exist at both community and individual participant level: for example, the conventional goal of a wedding ceremony may be marriage, however, individuals within that event may have other goals.
A-acts	Speech events involve a number and range of speech acts, particular types of utterances such as requests, commands, and greetings.
K-keys	The tone, manner, and spirit in which acts are done, for example, serious or playful. Specific keys may be signaled through verbal or/and non-verbal means.
I-instrumentalities	The particular language/language varieties used and the mode of communication (spoken, written).
N-norms	Norms of interaction refer to rules of speaking, who can say what, when, and how. Norms of interpretation refer to the conventions surrounding how any speech may be interpreted.
G-genres	Categories or types of language use, such as the sermon, the interview, or the editorial. May be the same as 'speech event' but may be a part of a speech event. For example, the sermon is a genre and may at the same time be a speech event (when performed conventionally in a church); a sermon may be a genre, however, that is invoked in another speech event, for example, at a party for humorous effect.

Speech Community

While the term speech community was not coined by Hymes (the most notable earlier use being that of Bloomfield, 1933), Hymes's elaboration of the term certainly contributed to its prominence in sociolinguistic approaches to the study of language.

The acquisition of communicative competence takes place within speech communities: speech communities are constituted not just by a shared variety or language, but shared sets of norms and conventions about how those varieties can and should be used. Through everyday interaction with others in a speech community, a child learns how to use language appropriately, that is, according to the norms of any given speech community. Some events inevitably involve people from different speech communities, which may create tensions: as in for example school classrooms where participants share a common language but may not be members of the same speech community (Hymes, 1972c).

Diversity

Acknowledgement of diversity and variety between and across language use, in communities and individuals, is a basic position in Hymes's work and is a central tenet in sociolinguistics. Such diversity manifests itself in countless ways: the very existence of language varieties, both as languages and varieties within languages; the range of conventions governing the use of such varieties in different contexts (such differences have been documented in relation, notably, to social class, ethnic group, gender); the different values attached to particular usages (for example, the values attached in different communities to such phenomena as silence, eloquence, and interruptions).

Privileging diversity as a universal of language shifts the emphasis away from any differential status attached to varieties, or the notion that difference signals deficiency in any way. All varieties are seen as equally valid, although some are acknowledged to be more appropriate in particular contexts.

Appropriateness

This is a key presupposition to the notion of communicative competence and is a central notion in sociolinguistics. As discussed, communicative competence presupposes the following; that a language user's knowledge – competence – is more than just grammar-based; that knowledge of language requires knowledge of the appropriate social conventions governing what and how something can be said, to whom and in what contexts. Appropriateness thus involves both linguistic and cultural knowledge (Hymes, 1971: 14).

Within sociolinguistics, a focus on appropriateness of language use is said to indicate a descriptive (how language is used) rather than a prescriptive (how language should be used) approach to language diversity.

Socialization

People learn the rules of use through everyday interaction within speech communities. It is through such interaction that children acquire knowledge about appropriate language use, that is, communicative competence (Hymes, 1971: 10). Hymes indicates that socialization is not constituted by a rigid trajectory and suggests that both "a long and short range view of competency should be adopted" (1972a: 287). From his perspective, the short range view concerns innate capacities as they emerge in the first years of life, and the long range concerns continuing socialization through life. What this short/long range implies is that competence is not static. In some instances, quite drastic changes can be made to an individuals' competence; as when a child whose home language variety is significantly different from the school variety. Of course, as Hymes emphasizes, such extensions or shifts in competence are not necessarily straightforward; there are plenty of opportunities for misunderstanding to occur when receivers/listeners accustomed to the language varieties of one community engage in communication with those from another.

Communicative Competence in Other Domains

The notion of communicative competence has been highly influential in fields beyond linguistics, such as education, sociology, and psychology. In some instances the basic assumptions surrounding the term have been maintained, and in others extended or problematized.

Probably nowhere has the impact of the notion been more powerful than in the teaching of languages, including the teaching of English as a second or foreign language. Whereas the emphasis in language teaching had been on grammatical and syntactic accuracy, following the work of Hymes and others (Gumperz and Hymes, 1972/1986), there was a significant turn towards communicative language teaching: this shift involved the teaching and learning of language considered to be appropriate to specific situations, based on what speakers actually use, rather than what they are presumed to use (Paulston,

1992). Assessment of language learning has been influnced accordingly, with a focus on students' capacity to communicate, rather than the ability to produce grammatically correct sentences (Hall and Eggington, 2000). The extent to which this more situational approach to second and foreign language teaching prevails is a matter of debate, but the impact of communicative competence is widely acknowledged (Firth and Wagner, 1997).

The use of the term has also been extended and modulated in other domains. For example, Culler (1975) developed the influential notion of literary competence to describe readers' knowledge of the conventions required in order to interpret literary texts. Academic communicative competence has been used to refer to knowledge of the conventions governing the use of language in academic communication (Berkenkotter *et al.*, 1991). Both uses refer to knowledge of specific textual features, such as metaphor in the case of literary competence and argument in academic competence, as well as knowledge about what counts as specific text types or genres (academic, literary) in particular cultural contexts.

Other uses of 'communicative competence' have developed, alongside and in contradistinction to the Hymesian term. Habermas (1970) uses the term communicative competence more in line with Chomsky's linguistic competence, to the extent that he is interested in theorizing an ideal speech situation, rather than elaborating a sociolinguistic description of actual situations and utterances. In contrast, Bernstein's interest was in an elaboration of actual use of language, particularly within the context of schooling. However, he offered a critique of the way in which 'competence' models implied an exaggerated capacity of individual rational choice and control over language use, without due attention to "distribution of power and principles of control which selectively specialize modes of acquisition and realizations" (Bernstein, 1996: 56). The need to theorize power in relation to competence and language use is a key strand in other studies re-examining the notion of communicative competence in more recent times.

Re-examining Communicative Competence

The work of Hymes is central in sociolinguistics as a field and continues to reverberate across socially oriented approaches to the study of language in a range of disciplines, including applied linguistics, education, communication studies, and social psychology. In recent times, there have also been significant re-examinations of communicative competence and related notions, as they have come to be used in sociolinguistics, from both critical and post structuralist approaches.

Re-examining Appropriateness

The notion of appropriateness is central to communicative competence and central to the field of sociolinguistics whose empirical goal has been to explore patterns of language use, according to the norms of any given community. However, the use of such a notion has been critiqued by some because it serves to emphasize norms and underplay differences within any given community or communicative context. Fairclough (1995), for example, like Bernstein mentioned above, argues that a model of language based on appropriateness assumes shared views among all users about what counts as appropriate, ignoring struggles and tensions in any given interaction; for example, tensions evident in interactions between institutional representatives and clients, men and women, or speakers from different cultural and linguistic backgrounds. Research in some socially oriented approaches to language, such as feminist linguistics and critical discourse analysis, has made visible the power dynamics in communicative events, within and across communities (Cameron, 1992; Wodak, 1992; Chouliaraki and Fairclough, 1999).

In the same vein, emphasis on a normative notion of communicative competence in second and foreign language teaching has been critiqued by theorists of second language acquisition. Norton (2000) states that although it is important for learners to understand the conventions of the target language, it is also important for them to explore "whose interests these rules serve" (2000: 15). She argues that any definition of communicative competence should include an acknowledgement of the importance of the right to speak (Bourdieu, 1977); such a right to speak, or be heard, is not granted to all speakers in all contexts. Thus for example, immigrants using a foreign language may find that, although familiar with the conventions governing a particular use of that language, they may not be granted the right to speak or be heard in some contexts.

Re-examining Speech Event and Speech Community

While Hymes always indicated that he used the word 'speech' to mean all types of communicative modes/channels, sociolinguistic research has tended to focus on the spoken word. In more recent times, explicit attention has been paid to other modes of communication, thus extending the use of core concepts. For example, those working within literacy

studies have used existing terms to signal a specific focus, such as "writing event" (Basso, 1974), "literacy event" (Heath, 1983; Barton and Hamilton, 1998). Likewise, Swales (1990) has argued that the term discourse community is more useful than speech community, as a term for describing and accounting for practices around written texts. Some theorists have argued that the word 'speech' signals that language is considered more significant than other practices, or that language is somehow divorced from other social purposes and activities, and have argued that the notion of practice, including the notion of "community of practice" is more all encompassing and powerful (Eckert and McConnell-Ginet, 2003; see also discussion about ways in which 'practice' is used in Schultz and Hull, 2002).

A more fundamental challenge to the notion of speech community comes from theorists emphasizing the ways in which recent historical changes, notably globalization, powerfully influence the ways in which people engage in the world and disrupt traditional notions of community and community membership. Through a whole range of technological, social, and economic developments – shaping modes of labor, travel, and communication – individuals' relations to others are more diverse and fluid, less restricted by time and space. The extent to which speech community with any presumed identifiable boundaries continues to be a meaningful category of observation and analysis is debatable within the context of a rapidly changing world (Rampton, 1998; Collins, 2003).

Re-examining the Notion of Speaker

Just as the notion of speech community has been challenged, so too have prominent labels used to categorize individuals in relation to communities – such as social class, ethnicity, linguistic repertoire, and gender. Such terms, because they often denote fixed sets of attributes and capacities, have been recognized as problematic, particularly by post structuralist writers who stress that identity is always in process. Indeed, the relationship between language and identity has established itself as a key area for research. Such work tends to challenge the idea that language use reflects categories of identity (I speak as I do because I am a working class woman) and emphasizes, rather, how individuals actively construct aspects of social and personal identity through their use of language in specific contexts (in speaking as I am, I am constructing and representing myself as a working class woman). While it is recognized that such constructions of identity are not free floating but are regulated by the specific contexts and interactions in which they occur (Cameron, 1997a), the fluidity of identity tends to be emphasized. In these approaches, the term 'performativity' rather than 'performance' is used, in order to signal how identity is enacted or performed through interaction (Cameron, 1997b; Butler, 1990/1999).

Re-examining Context

The work of Hymes placed the importance of context centrally within the concern of linguistics and advocated ethnography as the key organizing methodological tool with which to observe language use. However, there has been considerable debate about what constitutes context and how context should be conceptualized and explored. Two significant and quite distinct approaches to the study of context can be found in conversation analysis and critical discourse analysis: the former orients inwards as it were towards language, the latter orients outwards towards the social world. Conversation analysts argue that speakers construct and represent relevant aspects of context through their actual interaction and that these can be empirically observed (Schegloff, 1997). In contrast, critical discourse analysts (Fairclough, 1995) and feminist linguists (Cameron, 1992) have signaled the limitations to approaches that seek to understand context through empirical observation alone: there have been calls to draw on social, critical, and post structuralist theorists and philosophers such as Foucault, Habermas, Bourdieu, and Bakhtin, in order to explore the ways in which language use is related to ideology and power, and in order to explore how phenomena such as globalization are influencing communicative practices. Some of this work tends to explore language use through the lens of such theory and pays only minimal attention to examining contexts empirically (Chouliaraki and Fairclough, 1999), whereas others drawing on ethnographic traditions such as Hymes's, aim to establish an approach that draws on both empirical observation and specific aspects of social theory (Rampton, 1995; Lee, 1996; Maybin, 1999). Attempts have a been made to integrate levels of analysis at the macro level of society with micro levels of actual utterances; Gee (1996) for example uses the terms big 'D' discourse to refer to the former and little 'd' discourse to refer to the latter; Fairclough (1992) has developed a three-layered framework to explore such relations, which he refers to as a textually oriented discourse analysis (TODA).

See also: Assessment of Second Language Proficiency; Chomsky, Noam (b. 1928); Codes, Elaborated and Restricted (Bernstein); Communicative Language Teaching; Context, Communicative; Discourse, Foucauldian

Approach; Ethnomethodology; Habermas, Jürgen (b. 1929); Identity in Sociocultural Anthropology and Language; Identity: Second Language; Intercultural Pragmatics and Communication; Speech and Language Community.

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Communicative Language Teaching

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Communicative language teaching (CLT) is best understood within the broader historical spectrum of methods or approaches to language teaching. Seen from a 21st-century modernist perspective that views teaching as rather more science than art, the theoretical grounding for the epistemology of practice offered by CLT can be found in (1) the second- or foreign language acquisition research that began to flourish in the 1970s and (2) a long-standing functional view of language and language use as social behavior. The interpretation or implementation of practice in language teaching contexts around the world is, of course, yet another matter. A consideration of these various influences highlights the major issues that confront CLT on the threshold of the 21st century.

Linguistic Theory and Classroom Practice

The essence of CLT is the engagement of learners in communication to allow them to develop their communicative competence. Use of the term 'communicative' in reference to language teaching refers to both the process and goals of learning. A central theoretical concept in CLT is *communicative competence*, a term introduced in the early 1970s into discussions of language (Habermas, 1970; Hymes, 1971) and second-language learning (Jakobovits, 1970; Savignon, 1971). Competence is defined as the expression, interpretation, and negotiation of meaning and looks to second-language acquisition research to account for its development (Savignon, 1972, 1983, 1997). The identification of learner communicative needs provides a basis for curriculum design. Descriptors sometimes used to refer to features of CLT include process-oriented, task-based, and inductive or discovery-oriented

The elaboration of what has come to be known as CLT can be traced to concurrent developments in linguistic theory and language learning curriculum design, both in Europe and in North America. In Europe, the language needs of a rapidly increasing group of immigrants and guest workers, along with a rich British linguistic tradition that included social as well as linguistic context in the description of language behavior, led to the development of a syllabus for learners based on notional-functional concepts of language use. This notional-functional approach to curriculum design derived from neo-Firthian systemic or functional linguistics that views language as meaning potential and maintains the centrality of context of situation in understanding language systems and how they work (Firth, 1937; Halliday, 1978). With sponsorship from the Council of Europe, a Threshold Level of language ability was proposed for each of the languages of Europe in terms of what learners should be able to *do* with the language (van Ek, 1975). Functions were based on the assessment of learner needs and specified the end result or goals of an instructional program. The term 'communicative' was used to describe programs that followed a notional-functional syllabus based on needs assessment, and the language for specific purposes (LSP) movement was launched.

Concurrently, development within Europe focused on the process of classroom language learning. In Germany, against a backdrop of social democratic concerns for individual empowerment articulated in the writings of philosopher Jürgen Habermas (1970), language teaching methodologists took the lead in the development of classroom materials that encouraged learner choice (Candlin, 1978). A collection of exercise types for communicatively oriented English language teaching was used in teacher in-service courses and workshops to guide curriculum change. Exercises

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were designed to exploit the variety of social meanings contained within particular grammatical structures. A system of 'chains' encouraged teachers and learners to define their own learning path through a principled selection of relevant exercises (Piepho, 1974; Piepho and Bredella, 1976). Similar exploratory projects were also initiated by Candlin at his academic home, the University of Lancaster in England, and by Holec (1979) and his colleagues at the University of Nancy in France. Supplementary teacher resource materials promoting classroom CLT became increasingly popular (for example, see Maley and Duff, 1978). There was also a renewed interest in learner vocabulary building. The widespread promotion of audiolingual methodology with a focus on accuracy in terms of so-called native grammatical or syntactic form had resulted in the neglect of learner lexical resources (Coady and Huckin, 1997).

At about the same time, paradigm-challenging research on adult classroom second-language acquisition at the University of Illinois (Savignon, 1971, 1972) used the term 'communicative competence' to characterize the ability of classroom language learners to interact with other speakers and to make meaning, as distinguished from their ability to recite dialogues or to perform on discrete-point tests of grammatical knowledge. At a time when pattern practice and error avoidance were the rule in language teaching, this study of adult classroom acquisition of French looked at the effect of practice in the use of coping strategies as part of an instructional program. By encouraging learners to ask for information, to seek clarification, to use circumlocution and whatever other linguistic and non-linguistic resources they could muster to negotiate meaning, and to stick to the communicative task at hand, teachers were invariably leading learners to take risks, to speak in other than memorized patterns. Consistent with the process of language development that was being documented in first-language and untutored or 'natural' second-language acquisition research, the communicative activities offered learners an opportunity to focus on meaning as opposed to form. Achievement tests administered at the end of the 18-week introductory-level instructional period showed conclusively that learners who had engaged in communication in lieu of repeating laboratory pattern drills performed with no less accuracy on discrete-point tests of grammatical structure. In fact, their communicative competence as measured in terms of fluency, comprehensibility, effort, and amount of communication in unrehearsed communicative tasks significantly surpassed that of learners who had had no such practice. Learner reactions to the test formats lent further support to the view that even beginners respond well to activities that let them focus on meaning as opposed to formal features.

A collection of role plays, games, and other communicative classroom activities was developed subsequently for inclusion in the adaptation of the French CREDIF materials, *Voix et Visages de la France*. The accompanying guide (Savignon, 1974) described the purpose of these activities as involving learners in the experience of communication. Teachers were encouraged to provide learners with the French equivalent of such expressions as 'What's the word for…?,' 'Please repeat,' and 'I don't understand,' expressions that would help them participate in the negotiation of meaning. Not unlike the efforts of Candlin and colleagues working in Europe, the focus was on classroom process and learner autonomy. The use of games, role plays, pair, and other small group activities gained acceptance and was subsequently recommended for inclusion in language teaching programs generally.

The coping strategies identified in the Savignon (1971, 1972) study became the basis for the subsequent identification by Canale and Swain (1980) of strategic competence in their three-component framework for communicative competence, along with grammatical competence and sociolinguistic competence. Grammatical competence represented sentence-level syntax, forms that remain the focus of Chomskyan theoretical linguistic inquiry and were a primary goal of both grammar-translation and audiolingual methodologies. Consistent with a view of language as social behavior, sociolinguistic competence represented a concern for the relevance or appropriateness of those forms in a particular social setting or context. There is now widespread recognition of the importance of these various dimensions of language use and of the need for learners to be involved in the actual experience of communication if they are to develop communicative competence.

Inclusion of sociolinguistic competence in the Canale and Swain framework reflected the challenge within American linguistic theory to the prevailing focus on syntactic features. Dell Hymes (1971) had reacted to Noam Chomsky's (1965) characterization of the linguistic competence of the "ideal native speaker" and had used the term 'communicative competence' to represent the use of language in social context and the observance of sociolinguistic norms of appropriateness. His concern with speech communities and the integration of language, communication, and culture was not unlike that of Firth and Halliday in the British linguistic tradition. Hymes's communicative competence may be seen as the equivalent of Halliday's meaning potential. Social interaction rather than the abstract psycholinguistic

functioning of the human brain would become an identifying feature of CLT. Interpreting the significance of Hymes's perspective for language learners, some U.S. methodologists tended to focus on 'native speaker' cultural norms and the difficulty, if not impossibility, of representing these norms in a classroom of 'non-natives.' In light of this difficulty, the appropriateness of communicative competence as an instructional goal for classroom learners was questioned (Paulston, 1974).

CLT thus can be seen to derive from a multidisciplinary perspective that includes linguistics, anthropology, philosophy, sociology, psychology, and educational research. Its focus has been the elaboration and implementation of programs and methodologies that promote the development of functional language ability through learner participation in communicative events. Central to CLT is the understanding of language learning as both an educational and a political issue. Language teaching is inextricably tied to language policy. Viewed from a multicultural, intranational, and international perspective, diverse sociopolitical contexts mandate not only a diverse set of language learning goals but also a diverse set of teaching strategies. Program design and implementation depend on negotiation among policymakers, linguists, researchers, and teachers. The evaluation of program success requires a similar collaborative effort. The selection of methods and materials appropriate to both the goals and context of teaching begins with an analysis of socially defined language learner needs, as well as the styles of learning that prevail in a given educational setting (Berns, 1990).

Emergence of English as a Global Language

Along with a better understanding of the second-language acquisition process itself, the emergence of English as a global or international language has had a profound influence on language teaching, confronting language teacher education with new challenges worldwide. With specific reference to English, CLT recognizes that the norms followed by those in the 'inner circle' of English language users, to adopt the terminology proposed by Kachru (1992), may not be an appropriate goal for learners (Pennycook, 2001; Savignon 2001, 2002). In a post-colonial, multicultural world where users of English in the outer and expanding circles outnumber those in the inner circle by a ratio of more than two to one, the use of such terms as 'native' or 'native-like' in the evaluation of communicative competence has become increasingly inappropriate.

Learners moreover have been found to differ markedly in their reactions to learning a language for communication. Although some may welcome apprenticeship in a new language, viewing it as an opportunity, others experience feelings of alienation and estrangement. Such phenomena may be individual or general to a community of learners. In Spanish-speaking Puerto Rico, for example, a long-standing general resentment of U.S. domination exerts a powerful negative influence on English language instruction. Not only learners but sometimes teachers also may consciously or subconsciously equate communicative English language learning with disloyalty to the history and culture of the island. Studying the rules of grammar and memorizing vocabulary lists is one thing. Using English for communication in other than stereotypical classroom exercises is quite another. Where they exist, such feelings are a strong deterrent to second- or foreign language use, even after 10 or more years of instruction.

With respect to the documentation of cross-varietal differences of English, research to date has focused most often on sentence-level lexical and syntactic features. Consequently, such attempts as the Educational Testing Service (ETS) Test of English for International Communication (TOEIC) to represent norms for a standard English for international communication reflect a primarily lexical and syntactic emphasis (Lowenberg, 1992). The hegemony of essentially Western conventions at the levels of discourse and genre is represented or challenged less easily. Differences in the way genres are constructed, interpreted, and used of course clearly extend beyond lexical and syntactic variation. Such differences are currently thought of as discursive in nature and are included in discourse competence, a fourth component of communicative competence identified by Canale (1983). Pressures for a 'democratization' of discursive practices have in some settings resulted in genre mixing and the creation of new genres. In professional communities, however, conformity to the practices of an established membership continues to serve an important gate-keeping function. The privilege of exploiting generic conventions becomes available only to those who enjoy a certain stature or visibility (Foucault, 1981; Fairclough, 1992; Bhatia, 1997).

Sociocultural Competence for a Dialogue of Cultures

Consistent with a view of language as social behavior, sociolinguistic competence is as we have seen integral to overall communicative competence. Second- or foreign language culture and its teaching have of course long been a concern of language teachers. Yet, if early research addressed the possibility of including some aspects of culture in a foreign language curriculum (for example, see Lado, 1957), recent

discussion has underscored the strong links between language and culture and their relevance for teaching and curriculum design (Valdes, 1986; Byram, 1989; Damen, 1990; Kramsch, 1993). So mainstream now is the view of culture and language as inseparable that the term "sociocultural" has come to be substituted for the term "sociolinguistic" in representing the components of communicative competence (Byram, 1997; Savignon, 2002; Savignon and Sysoyev, 2002).

Interest in teaching culture along with language has led to the emergence of various integrative approaches. The Russian scholar Victoria Saphonova (1996:62) has introduced a sociocultural approach to teaching modern languages that she has described as "teaching for intercultural L2 communication in a spirit of peace and a dialogue of cultures." Given the dialogic nature of culture (Bakhtin, 1981), we cannot fully understand one culture in the absence of contact with other cultures. Thus, dialogue can be seen to be at the very core of culture, where culture is understood as a dialogical self-consciousness of every civilization.

The emergence of a focus on sociocultural competence can be seen in other European nations as well. The free flow of people and knowledge within the European Union has increased both the need and the opportunity for language learning and intercultural understanding. Brammerts (1996:121) described the creation of the International E-Mail Tandem Network, a project funded by the European Union that brings together universities from more than 10 countries to promote "autonomous, cooperative, and intercultural learning." The project is an extension of the tandem learning initiated in the 1970s in an effort to unite many states in a multicultural, multilingual Europe. Collaboration between entire classrooms of learners is a focus of ongoing research (Savignon and Roithmeier, 2003; Kinginger, 2004).

Interpretations of CLT

Although the term CLT may be recognized worldwide, theoretical understanding and interpretations of it vary widely. Some methodologists have suggested that CLT is an essentially Western concept, inappropriate in other than Western contexts (Richards and Rogers, 2001; Rao, 2002). In addition, there are those who consider discussions of CLT to be passé (Bhatia, 2003; Kumaravadivelu, 2003; Savignon, 2003, 2004). Discouraged by the failure of both grammar-translation and audiolingual methods to prepare learners for the interpretation, expression, and negotiation of meaning and yet encouraged to adopt a variety of commercial materials and strategies increasingly labeled 'communicative,' many teachers and even teacher educators have been left confused or disillusioned. Substantive revision of teaching practice appropriate to a given context is ultimately of course the responsibility of classroom teachers. Yet, they cannot be expected to change their practices without considerable administrative and governmental support along with extensive guided experiential pre-service and in-service professional development.

Given the current widespread uncertainty as to just what are and are not essential features of CLT, a summary description would be incomplete without brief mention of what CLT is *not*.

CLT is not concerned exclusively with face-to-face oral communication; principles of CLT apply equally to literacy. Whether written or oral, activities that involve readers and writers in the interpretation, expression, and negotiation of meaning are in and of themselves communicative. The goals of CLT depend on learner needs in a given context. Although group tasks have been found helpful in many contexts as a way or providing increased opportunity and motivation for communication, classroom group or pair work should not be considered an essential feature of CLT and may well be inappropriate in some settings. Finally, CLT does not exclude metalinguistic awareness or conscious knowledge of rules of syntax, discourse, and social appropriateness. However, knowing a rule is no substitute for using a rule. The creative use of interpretive and expressive skills in both reading and writing requires practice. CLT cannot be found in any one textbook or set of curricular materials inasmuch as strict adherence to a given text is not likely to be true to the process and goals of CLT. In keeping with the notion of context of situation, CLT is properly seen as an approach or theory of intercultural communicative competence to be used in developing materials and methods appropriate to a given context of learning. No less than the means and norms of communication they are designed to reflect, communicative teaching methods will continue to be explored and adapted.

Considerable resources, both human and monetary, are being deployed around the world to respond to the need for language teaching that is appropriate for the communicative needs of learners. In the literature on CLT, teacher education has not received adequate attention. What happens when teachers try to make changes in their teaching in accordance with various types of reform initiatives, whether top-down ministry of education policy directives or teacher-generated responses to social and technological change? Several recent reports of reform efforts in different nations provide a thought-provoking look at language teaching today as the collaborative and context-specific human activity that it is.

Redirection of English language education by Mombusho, the Japan Ministry of Education, includes the introduction of a communicative syllabus, the Japan Exchange and Teaching (JET) Program, and overseas in-service training for teachers. Previous encouragement to make classrooms more 'communicative' through the addition of 'communicative activities' led to the realization by Mombusho that teachers felt constrained by a structural syllabus that continued to control the introduction and sequence of grammatical features. With the introduction of a new national syllabus, structural controls were relaxed, and teachers found more freedom in the introduction of syntactic features. The theoretical rationale underlying the curriculum change in Japan includes both the well-known Canale and Swain (1980) model of communicative competence and the hypothetical classroom model of communicative competence, or the "inverted pyramid," proposed by Savignon (1983: 46).

Minoru Wada, senior advisor to Mombusho, described these efforts as "a landmark in the history of English education in Japan. For the first time it introduced into English education at both secondary school levels the concept of communicative competence. ... The basic goal of the revision was to prepare students to cope with the rapidly occurring changes toward a more global society" (Wada, 1994:1). Following the research model adapted by Kleinsasser (1993) to understand language teachers beliefs and practices, Sato (2002) reported on a year-long study of teachers of English in a private Japanese senior high school. Multiple data sources, including interviews, observations, surveys, and documents, offered insight into how EFL teachers learn to teach in this particular context. Among the major findings was the context-specific nature of teacher beliefs, which placed an emphasis on managing students, often to the exclusion of opportunities for English language learning.

Cheng (2002) has documented the influence of a new, more communicative English language test on the classroom teaching of English in Hong Kong, a region that boasts a strong contingent of applied linguists and language teaching methodologists and has experienced considerable political and social transformation in recent years. In keeping with curricular redesign to reflect a more task-based model of learning, alternative public examinations were developed to measure learners' ability to make use of what they have learned, to solve problems, and to complete tasks. Cheng's ambitious multiyear study found the effect of washback of the new examination on classroom teaching to be limited. There was a change in classroom teaching at the content level, but not at the more important methodological level.

The role of washback in Costa Rica, a small nation with a long democratic tradition of public education, offers a contrast with the Hong Kong study. Quesada-Inces (2001), a teacher educator with many years of experience, reported the findings of a multicase study that explored the relationship between teaching practice and the Bachillerato test of English, a national standardized reading comprehension test administered at the end of secondary school. Although teachers expressed strong interest in developing learner communicative ability in both written and spoken English, a reading comprehension test was seen to dominate classroom emphasis, particularly in the final two years of secondary school. The findings illustrate what Messick (1996) has called "negative washback," produced by construct under-representation and construct irrelevance. The Bachillerato test of English does not reflect the content of the curriculum, assessing skills less relevant than those that go unmeasured. The English testing situation in Costa Rica is not unlike that described by Shohamy (1998) in Israel where two parallel systems exist – one the official national educational policy and syllabus and the other reflected in the national tests of learner achievement.

English language teaching has also been a focus of curricular reform in both Taiwan and South Korea. Adopting a sociocultural perspective on language use and language learning as a prerequisite to pedagogical innovation, Wang (2002) noted the efforts that have been made to meet the demand for competent English language users in Taiwan. They include a change in college entrance examinations, a new curriculum with a goal of communicative competence, and the island-wide implementation of English education in the elementary schools. However, she noted that despite learner preference for a more communication-focused curriculum, grammar teaching continued to prevail and much more needed to be done to ensure quality classroom teaching and learning: "Further improvements can be stratified into three interrelated levels ... teachers, school authorities, and the government. Each is essential to the success of the other efforts" (Wang, 2002: 145).

CLT in the 21st Century

In each of the studies sketched above, the research was both initiated and conducted by local educators in response to local issues. Although each is significant in its own right, together they can only suggest the dynamic and contextualized nature of language teaching in the world today. Nonetheless, the settings that have been documented constitute a valuable resource for understanding the current global status of

CLT. Viewed in kaleidoscopic fashion, they appear as brilliant multilayered bits of glass, tumbling about to form different yet always intriguing configurations. From these data-rich records of language teaching reform on the threshold of the 21st century three major themes emerge, suggestive of the road ahead:

1. The highly contextualized nature of CLT is underscored again and again. It would be inappropriate to speak of CLT as a teaching method in any sense of that term as it was used in the 20th century. Rather, CLT is an approach that understands language to be inseparable from individual identity and social behavior. Not only does language define a community but a community, in turn, also defines the forms and uses of language. The norms and goals appropriate for learners in a given setting, and the means for attaining these goals, are the concern of those directly involved.
2. Related both to the understanding of language as culture in motion and to the multilingual reality in which most of the world population finds itself is the futility of any definition of a 'native speaker,' a term that came to prominence in descriptive structural linguistics and was adopted by teaching methodologists to define an ideal for language learners.
3. Time and again, assessment seems to be the driving force behind curricular innovations. Increasing demands for accountability along with a positivistic stance that one cannot teach that which cannot be described and measured by a common yardstick continue to influence program content and goals. Irrespective of their own needs or interests, learners prepare for the tests they will be required to pass. High-stakes language tests often determine future access to education and opportunity.

See also: Habermas, Jürgen (b. 1929); Halliday, Michael A. K. (b. 1925); Language Teaching Traditions: Second Language; Second and Foreign Language Learning and Teaching; Teacher Preparation: Second Language.

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Communicative Principle and Communication

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Inferential Nature of Communication

The main characteristic of human communicative behavior is that its major part takes place between the explicitly expressed words. Most of the time, there is a significant difference between what we say and what we mean. In spite of this, we usually have no difficulty figuring out what the speaker tries to communicate implicitly. Why is this so? According to Grice, the decisive feature of pragmatic interpretation is its inferential nature (Grice, 1961). He argued that most aspects of utterance interpretation that traditionally are regarded as conventional, or semantic, should be treated as conversational, or pragmatic. This means that the hearer constructs and evaluates a hypothesis about the speaker's meaning. In this process she/he relies on the meaning of utterances, contextual and background assumptions, and general communicative principles that speakers are supposed to observe in normal circumstances. In the center of the Gricean approach are the so-called implicatures which are aspects of the speaker's meaning inferred on the basis of contextual assumptions of communication and principles.

Out of the three main elements of inferential intention-recognition: meaning of utterances, contextual and background assumptions, and principles of communication, the latter has generated most debate. Pragmaticians have been engaged in searching for communicative principles that govern communication. A principle is the formalized expression of the behavior of a system. It is not a statistical generalization but a causal, mechanical explanation, a general law. Models of communication, especially cognitive ones, have made serious efforts to identify the principles that govern different aspects of use and understanding of language.

Cooperative Principle

Grice regarded cooperation as the ruling element of verbal communicative interaction. He argued that utterances automatically create expectations that guide the hearer toward the speaker's meaning. He considered communication to be both rational and cooperative, and claimed that the inferential intention-recognition is governed by a cooperative principle and maxims of quality, quantity, relation, and manner (truthfulness, informativeness, relevance and clarity), which speakers are expected to observe (Grice, 1961, 1989: 368–372). The interpretation that a hearer should choose is the one that best satisfies his/her expectations. Inferential communication can be considered successful when the communicator provides evidence of her/his intention to convey a certain thought, and the audience infers this intention from the evidence provided by the communicator.

Grice's inferential approach to communication has been so fundamental that all subsequent pragmatic theories have been influenced by it. Researchers have accepted and relied on the inferential nature of communication, but some have questioned the cooperative principle and maxims as the governing communicative principle of communication. Several critics of the Gricean view (e.g., Keenan, 1979; Traunmüller, 1991) expressed their skepticism about the universality of maxims, arguing that different cultures have different principles or maxims. According to Gumperz (1978), culturally colored interactional styles create culturally determined expectations and interpretive strategies and can lead to breakdowns in intercultural and interethnic communication. Others, such as Sperber and Wilson (1995), argued that cooperation is not essential to communication and suggested a reduction of Grice's maxims to a single principle of relevance. According to this view, a rational speaker will choose an utterance that will provide the hearer with a maximum number of contextual implications in a minimum processing effort. In recent years, two approaches have emerged as most influential in the debate about the communicative principle: the neo-Gricean view and the theory of relevance.

Neo-Gricean View

Neo-Gricean pragmatists such as Horn (1984) and Levinson (2000) retained the view that cooperation is essential to communication. Whether generalized or particularized, they argue, conversational implicature derives from the shared presumption that speaker and hearer are interacting rationally and cooperatively to reach a common goal. Although they kept the cooperative principle as a decisive factor of communication, they revised the maxims to account for a range of generalized implicatures, which Grice described as carried in all normal contexts and contrasted with more context-dependent particularized implicatures. In his book, Levinson addressed the problem of "generalized conversational implicatures (GCI)" as opposed to "particularized conversational implicatures (PCI)." He claimed that only the former

are truly linguistic in that only they do not rely on "specific contextual assumptions" (Levinson, 2000: 16). He emphasized that "...a theory of GCIs has to be supplemented with a theory of PCIs that will have at least as much, and possibly considerably more, importance to a general theory of communication. It is just to a linguistic theory that GCIs have an unparalleled import" (Levinson, 2000: 22). Levinson listed three principles that guide generalized conversational implicatures:

> Q-Principle:
> Speaker: Choose the maximally informative expression alternative (that still is true).
> Addressee: Assume that speaker has chosen the maximally informative expression alternative (that still is true).
> I-Principle:
> Speaker: Produce only as much linguistic information as necessary to satisfy the communicative purpose.
> Addressee: Enrich the given linguistic information, identify the most specific information relative to the communicative purpose.
> M-Principle (Modality/Manner/Markedness)
> Speaker: Communicate non-normal, non-stereotypical situations by expressions that contrast with those that you would choose for normal, stereotypical situations.
> Addressee: If something is communicated by expressions that contrast with those that would be used for normal, stereotypical meanings, then assume that the speaker wants to communicate a non-normal, non-stereotypical meaning.

Relevance Theory

Supporters of Relevance Theory share Grice's intuition that utterances raise expectations of relevance. However, they question several other aspects of his approach, including the need for a cooperative principle and maxims, the focus on pragmatic processes that contribute to implicatures rather than to explicit, truth-conditional content, the role of deliberate maxim violation in utterance interpretation, and the treatment of figurative utterances as deviations from a maxim or convention of truthfulness (Sperber and Wilson, 1995, 2004). Building on the central insights of Grice's contribution but advancing beyond him in significant ways, Sperber and Wilson (1995) argued that cooperation is not crucial for ostensive communication. However, it is fundamental for all speakers to form their contributions so that the audience will not only attend to them but will be able to infer the intended meaning without unjustifiable processing effort. This approach is grounded in a general view of human cognition according to which human cognitive processes are geared to achieving the greatest possible cognitive effect for the smallest possible processing effort. In order for individuals to achieve this, they must focus their attention on what seems to be the most relevant information available to them. A feature of Sperber and Wilson's theory that is significantly different from Grice's is the idea that the processing of an utterance involves the construction of a context in which the effects of the utterance are evaluated. The context is not given, but is enriched in such a way that the processing of the utterance is facilitated. (*See* **Relevance Theory**).

Sperber and Wilson believe that to communicate verbally is to claim an individual's attention: hence, to communicate is to imply that the information communicated is relevant. This fundamental idea, according to which communicated information comes with a guarantee of relevance, is the communicative principle of relevance. They argued that the principle of relevance is essential to explaining human communication because human cognition tends to be geared to the maximization of relevance (cognitive principle of relevance). According to relevance theory, utterances raise expectations of relevance not because speakers are expected to obey a cooperative principle and maxims or some other specifically communicative convention, but because the search for relevance is a basic feature of human cognition which communicators may utilize (Sperber and Wilson, 2004).

In their book, Sperber and Wilson (1995) demonstrated how these principles are enough on their own to account for the interaction of linguistic meaning and contextual factors in utterance interpretation. Their claim is that the expectations of relevance raised by an utterance are precise enough, and predictable enough, to guide the hearer toward the speaker's meaning. The aim is to explain in cognitively realistic terms what these expectations of relevance amount to and how they might contribute to an empirically plausible account of comprehension.

Criticism of the Principle of Relevance

Levinson (2000) criticized Relevance Theory (RT), while making the case that generalized conversational implicatures comprise a distinct domain within pragmatics. He relies on the Gricean distinction between generalized and particularized conversational implicature and claims that an approach such as RT (Sperber and Wilson, 1995), which does not give any theoretical weight to the distinction and uses the same communicative principle and comprehension procedure in the derivation of all conversational implicatures, cannot really give an adequate account of the nature of these generalized inferences. According to Levinson, RT does not allow for an intermediate level of generalized conversational implicatures in between 'literal meaning' (semantics) and once-off ('nonce') inferences.

Some researchers have described the relevance-theoretic approach to communication as psychological rather than sociological. Mey said that "relevance theory . . . does not include, let alone focus on, the social dimensions of language" (2001: 89). Talbot (1994: 3525–3526) called relevance theory "an asocial model," pointing out that, within the RT framework, there is no way of discussing any divergence of assumptions according to class, gender, or ethnicity. In her response to this criticism, Sperber and Wilson (1997) argued that sociological aspects are not left out of RT because the theory considers human communication inferential, and it presupposes and exploits an awareness of self and others. Inferential communication is fundamentally social, not just because it is a form of interaction but also because it exploits and enlarges the scope of basic forms of social cognition.

Verbal communication usually conveys much more than is linguistically encoded. Pragmatic theories such as RT take an interest mainly in the enrichment of linguistic meaning, derivation of standard implicatures, and principles governing the process of communication. Sociolinguists are more interested in the ostensive or non-ostensive uses of the act of communication itself to convey claims and attitudes about the social relationship between the interlocutors. Sperber and Wilson accepted that RT largely ignored these issues. They emphasized, however, that this did not mean to deny their importance. They merely felt that, at that stage of the theory development, they could best contribute to the study of human communication by taking it at its most elementary level and abstracting away from these more complex aspects.

Another issue is that communication can hardly be restricted to what people intend to communicate. People usually communicate more than they intend and, according to Mey and Talbot, Sperber and Wilson's model rests on the exclusion of precisely this (Mey and Talbot, 1988: 746). In their rebuttal, Sperber and Wilson (1997) pointed out that the issue is not whether non-ostensive forms of information-transmission exist but whether they should be treated as communication. In RT, it is argued that unintentionally transmitted information is subject merely to general cognitive, rather than specifically communicative, constraints. Consequently, it falls under the first, or cognitive principle of relevance rather than the second, or communicative principle.

Communicative Principle

Mey (1993: 2001) introduced an inclusive term 'Communicative Principle' that basically comprises both the Cooperative Principle and the Principle of Relevance. He argued as follows:

> People talk with the intention to communicate something to somebody; this is the foundation of all linguistic behavior. I call this the Communicative Principle; even though this principle is not mentioned in the pragmatics literature (at least not under this name – a variant, the 'Principle of Relevance', will be discussed later in this chapter), it is nevertheless the hidden condition for all human pragmatic activity, and the silently agreed-on premise of our investigation into such activity. (Mey, 2001: 68–69).

According to the Communicative Principle intention, cooperation and relevance are all responsible for communication action in a concrete context.

Conclusion

In recent years pragmatics has been thriving both in the social and inferential paradigms.

However, only an integrated model that unifies the linguistic, cognitive, and social aspects of communication has considerable hope to be able to account for what is universal and what is culture-specific in human verbal interaction.

See also: Context and Common Ground; Context, Communicative; Cooperative Principle; Inference: Abduction, Induction, Deduction; Intercultural Pragmatics and Communication; Nonstandard Language Use; Relevance Theory.

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Communities of Practice

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The notion 'community of practice' was developed by Jean Lave and Etienne Wenger (Lave and Wenger, 1991; Wenger, 2000) as the basis of a social theory of learning. A community of practice is a collection of people who engage on an ongoing basis in some common endeavor: a bowling team, a book club, a friendship group, a crack house, a nuclear family, a church congregation. The construct was brought into sociolinguistics (Eckert and McConnell-Ginet, 1992a, 1992b) as a way of theorizing language and gender – most particularly, of responsibly connecting broad categories to on-the-ground social and linguistic practice.

The value of the notion to sociolinguistics and linguistic anthropology lies in the fact that it identifies a social grouping not in virtue of shared abstract characteristics (e.g., class, gender) or simple copresence (e.g., neighborhood, workplace), but in virtue of shared practice. In the course of regular joint activity, a community of practice develops ways of doing things, views, values, power relations, ways of talking. And the participants engage with these practices in virtue of their place in the community of practice, and of the place of the community of practice in the larger social order. The community of practice is thus a rich locus for the study of situated language use, of language change, and of the very process of conventionalization that underlies both.

Two conditions of a community of practice are crucial in the conventionalization of meaning: shared experience over time and a commitment to shared understanding. A community of practice engages people in mutual sense making – about the enterprise they are engaged in, about their respective forms of participation in the enterprise, about their orientation to other communities of practice and to the world around them more generally. Whether this mutual sense making is consensual or conflictual, it is based in a commitment to mutual engagement, and to mutual understanding of that engagement. Participants in a community of practice collaborate in placing themselves as a group with respect to the world around them. This includes the common interpretation of other communities, and of their own practice with respect to those communities, and ultimately the development of a style – including a linguistic style – that embodies these interpretations. Time, meanwhile, allows for greater consistency in this endeavor – for more occasions for the repetition of circumstances, situations, and events. It provides opportunities for joint sense making, and it deepens participants' shared knowledge and sense of predictability. This not only allows meaning to be exercised, but it provides the conditions for setting down convention (Lewis, 1969).

The community of practice offers a different perspective from the traditional focus on the speech community as an explanatory context for linguistic heterogeneity. The speech community perspective views heterogeneity as based in a geographically defined population, and structured by broad and fundamental social categories, particularly class, gender, age, race, and ethnicity. The early survey studies in this tradition (Labov, 1966; Wolfram, 1969; Trudgill, 1974; Macaulay, 1977) provided the backbone of variation studies, mapping broad distributions across large urban communities. What these studies could not provide is the link between broad, abstract patterns and the meanings that speakers are constructing in the concrete situated speech that underlies them. The search for local explanations of linguistic variability has spurred a range of ethnographic studies over the years (Labov, 1963; Gal, 1979; Eckert, 2000), and in recent decades the ethnographic trend has intensified. A major challenge in such studies is to find local settings in which speakers engage the most intensely in making sense of their place in the wider social world, and in which they articulate their linguistic behavior with this sense.

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The construct 'community of practice' is a way of locating language use ethnographically so as to create an accountable link between local practice and membership in extralocal and broad categories. What makes a community of practice different from just any group of speakers (e.g., a bunch of kids found hanging out on the street, or a group of undergraduates assembled for an experiment) is not the selection of the speakers so much as the nature of the accountability for this selection. While every community of practice offers a window on the world, the value of this approach relies on the analyst's ability to seek out communities of practice that are particularly salient to the sociolinguistic question being addressed. It is this selection that makes the difference between particularism and a close-up study with far-reaching significance.

Explanation for broad patterns is to be found in speakers' experience, understanding, and linguistic development as they engage in life as members of important overarching categories. A white working-class Italian-American woman does not develop her ways of speaking directly from the larger categories 'working class,' 'Italian-American' and 'female,' but from her day-to-day experience as a person who combines those three (and other) memberships. Her experience will be articulated by her participation in activities and communities of practice that are particular to her place in the social order. It is in these communities of practice that she will develop an identity and the linguistic practices to articulate this identity. Thus communities of practice are fundamental loci for the experience of membership in broader social categories – one might say that it is the grounded locus of the *habitus* (Bourdieu, 1977).

Survey studies show us that working-class speakers lead in the adoption of local phonological change. While one can speculate about the motivations for this early adoption on the basis of general knowledge about class, the actual dynamics of social meaning can only be found through direct examination of working-class linguistic practice. Ethnographic work in suburban Detroit high schools (Eckert, 2000) sought to understand the salience of class in adolescents' day-to-day practice. The study uncovered an opposition between two large communities of practice, the jocks and the burnouts, that constitute class cultures in the context of the high school. The working-class culture of the burnouts and the middle-class culture of the jocks are specifically adolescent, and class consciousness and conflict takes the form of a highlighted social opposition in school and the maximization of resources in constructing this opposition. Linguistic variables, a prime resource, correlated significantly with participation in these communities of practice, rather than with parents' social class. The jocks' and burnouts' contrasting orientation to such things as school, the urban area, relationships, and the future provided direct explanations for the burnouts' lead in the adoption of new local changes.

Another important aspect of the communities of practice approach is its focus on the fluidity of social space and the diversity of experience. The speech community perspective's focus on demographic categories implies a center and a periphery (Rampton, 1999). The focus on average behavior for categories suggests a 'typical' speaker, erasing the important activity of speakers at the borders of categories. This also produces a static view of the relation between the linguistic and the social, since change tends to come from the borders (Pratt, 1988). Studies of communities of practice, therefore, can capture the interaction between social and linguistic change. Qing Zhang, for example (Zhang, 2001), has captured the role of stylistic practice among the new Beijing 'yuppies' in the development of new dialect features, and Andrew Wong (Wong, 2005) has traced semantic change in the differential use of the term *tongzhi* 'comrade' between the activist and nonactivist gay communities. Mary Bucholtz's study (Bucholtz, 1996) of a group of girls who were fashioning themselves as geeks – a persona normally reserved for males – provided direct observation of girls pushing the envelope of gender in their daily linguistic practice.

A community of practice that is central to many of its participants' identity construction is an important locus for the setting down of joint history, allowing for the complex construction of linguistic styles. Such history also sets the stage for change. Emma Moore's study of teenage girls in northern England (Moore, 2003) traced the gradual split of a group of somewhat rebellious 'populars' as some of them emerged as the tougher 'townies' in their ninth year. In the process, the vernacular speech patterns of the townies intensified in opposition to those of their more conservative friends.

The enterprise of sociolinguistics (and linguistic anthropology) is to relate ways of speaking to ways of participating in the social world. This is not simply a question of discovering how linguistic form correlates with social structure or activity, but of how social meaning comes to be embedded in language. Meaning is made in the course of local social practice (McConnell-Ginet, 1989) and conventionalized on the basis of shared experience and understanding (Lewis, 1969). The importance of the community of practice lies in the recognition that identity is not fixed, that convention does not pre-exist use, and

that language use is a continual process of learning. The community of practice is a prime locus of this process of identity and linguistic construction.

Communities of practice emerge in response to common interest or position, and play an important role in forming their members' participation in, and orientation to, the world around them. It should be clear that the speech community and the community of practice approaches are both necessary and complementary, and that the value of each depends on having the right abstract categories and finding the communities of practice in which those categories are most salient. In other words, the best analytic process would involve feedback between the two approaches.

See also: Gender; Identity and Language; Interactional Sociolinguistics; Sociolinguistic Crossing.

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Comoros: Language Situation

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that language use is a continual process of learning. The community of practice is a prime locus of this process of identity and linguistic construction.

Communities of practice emerge in response to common interest or position, and play an important role in forming their members' participation in, and orientation to, the world around them. It should be clear that the speech community and the community of practice approaches are both necessary and complementary, and that the value of each depends on having the right abstract categories and finding the communities of practice in which those categories are most salient. In other words, the best analytic process would involve feedback between the two approaches.

See also: Gender; Identity and Language; Interactional Sociolinguistics; Sociolinguistic Crossing.

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Political demand for independence arose later than in most African countries, but in 1975 the three islands of Grande Comore (Ngazija/Shingazija), Anjouan

(Ndzwani/Shindzwani), and Moheli (Mwali) became independent, while the majority on the fourth island, Mayotte (Maore), voted to remain a French overseas territory (*see* **Mayotte: Language Situation**). Despite many declarations by the United Nations and the Organization of African Unity condemning France's behavior as neocolonial, the political division of the archipelago continues today. Since 1975 the political situation of the independent islands was mostly unstable, with many coup d'etats, often assisted by foreign mercenaries. In 1997 Anjouan and Moheli declared their secession from the dominant island of Grande Comore, and only in 2001 under the mediation of the Organization of African Unity did all three islands agree to a new very federal constitution that guaranteed autonomy in many political fields for each island.

On the three islands of the Union of Comoros, the first language of nearly everybody is a form of Comorian, a Bantu language that in the past was often regarded as a mere dialect of Swahili. Today it is generally accepted that Comorian is an independent language, classified within the genetic subgroup of Sabaki languages together with Swahili and four other languages from the East African mainland (Nurse and Hinnebusch, 1993). It is estimated that there are more than 700 000 speakers of Comorian on the Comoro islands (including Mayotte), apart from large groups of Comorian emigrants in neighboring countries and in France.

The language is subdivided into three dialects, following the geographical and political separation within the Union of Comoros: Ngazija/Shingazija (on Grande Comore), Ndzwani/Shindzwani (on Anjouan), and Shimwali (on Moheli). The biggest differences occur between Shingazidja and Shindzwani, while Shimwali stands in the middle of the linguistic continuum.

Although Comorian is the everyday language of the whole population, it was only in the constitution of 2001 that it gained the status of an official language alongside French and Arabic. French can only be attained by formal education, but most Comorians visit school only for few years, which is not enough to acquire a profound knowledge of the language. The main function of French is that of an administrative language. Arabic is only used in religious contexts (more than 95% of the Comorians are Muslims), but real knowledge is restricted to specialists, most of whom have studied abroad.

See also: Bantu Languages; Mayotte: Language Situation; Swahili.

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Comparative Constructions

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Definition of the Domain

In semantic or cognitive terms, comparison can be defined as a mental act by which two objects are assigned a position on a predicative scale. Should this position be the same for both objects, then we have a case of the comparison of equality. If the positions on the scale are different, then we speak of the comparison of inequality. In both cases, however, the notion essentially involves three things: a predicative scale, which, in language, is usually encoded as a gradable predicate, and two objects. Although these objects can, in principle, be complex, the practice of typological linguistic research has been to restrict them to primary objects, which are typically encoded in the form of noun phrases. Thus, a comparative construction typically contains a predicate and two noun phrases, one of which is the object of comparison (the comparee NP), while the other functions as the 'yard stick' of the comparison (the standard NP). In short, prototypical instances of comparative constructions in the languages of the world

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are sentences that are equivalent to the English sentences in (1), in which the noun phrase following the items *as* and *than* is the standard NP:

(1) English (Indo-European, Germanic)
(1a) John is as tall as Lucy
(1b) John is taller than Lucy

The Comparison of Inequality: Parameters

Modern literature on the typology of the comparison of inequality has concentrated largely on the comparison of inequality. Relevant publications include Ultan (1972), Andersen (1983), and Stassen (1984, 1985). The last of these authors presents a typology of comparative constructions that is based on a sample of 110 languages and that boils down to four major types. A basic parameter in this typology is the encoding of the standard NP. First, one can make a distinction between instances of fixed-case comparatives and derived-case comparatives. In the former type, the standard NP is always in the same case, regardless of the case of the comparee NP. In the latter type, the standard NP derives its case assignment from the case of the comparee NP. Classical Latin is an example of a language in which both types were allowed. The sentences in (2) illustrate a construction type in which the standard NP is dependent on the comparee NP for its case marking. In contrast, sentence (3) shows a construction type in which the standard NP is invariably in the ablative case. As a result, sentence (3) is ambiguous between the readings of (2a) and (2b).

(2) Latin (Indo-European, Italic)

(2a) Brutum	ego	non	minus
B.-ACC	1SG.-NOM	not	less
amo	quam	Caesar	
love.1SG.PRES	than	C.-NOM	

'I love Brutus no less than Caesar (loves Brutus)' (Kühner and Stegmann, 1955: 466)

(2b) Brutum	ego	non	minus
B.-ACC	1SG.NOM	not	less
amo	quam	Caesarem	
love.1SG.PRES	than	C.-ACC	

'I love Brutus no less than (I love) Caesar' (Kühner and Stegmann, 1955: 466)

(3) Latin (Indo-European, Italic)

Brutum	ego	non	minus
B.-ACC	1SG.NOM	not	less
amo	Caesare		
love.1SG.PRES	C.-ABL		

(Kühner and Stegmann, 1955: 466)

Both types of comparative constructions can be subcategorized further, on the basis of additional parameters. Within the fixed-case comparatives, a first distinction is that between direct-object comparatives and locational comparatives. Direct-object comparatives (or, as Stassen [1985] calls them, Exceed-Comparatives) have as their characteristic that the standard NP is constructed as the direct object of a transitive verb with the meaning 'to exceed' or 'to surpass.' Thus, the construction typically includes two predicates, one of which is the comparative predicate, and another which is the 'exceed' verb. The comparee NP is the subject of the 'exceed' verb. Concentrations of the Exceed comparative are found in Sub-Saharan Africa, in China and Southeast Asia, and in Eastern Austronesia. Duala, a Bantu language from Cameroon, presents an instance of the Exceed comparative, as does Thai.

(4) Duala (Niger-Kordofanian, Northwest Bantu)

nin	ndabo	e	kolo	buka	nine
this	house	it	big	exceed	that

'This house is bigger than that' (Ittmann, 1939: 187)

(5) Thai (Austro-Asiatic, Kam-Tai)

kǎw	sǔuŋ	kwaà	kon	túk	kon
he	tall	exceed	man	each	man

'He is taller than anyone' (Warotamasikkhadit, 1972: 71)

Locational comparatives, on the other hand, are characterized by the fact that the standard NP is invariably constructed in a case form that has a locational/adverbial function. Depending on the exact nature of this function, adverbial comparatives can be divided into three further subtypes. Separative comparatives mark the standard NP as the source of a movement, with a marker meaning 'from,' or 'out of.' Allative comparatives construct the standard NP as the goal of a movement ('to, toward,' 'over, beyond') or as a benefactive ('for'). Finally, locative comparatives encode the standard NP as a location, in which an object is at rest ('in,' 'on,' 'at,' 'upon'). Concentrations of (the various subtypes of) the Locational Comparative are found in Africa above the Sahara, in Eurasia (including the Middle East and India, but with the exception of the modern languages of Continental Europe), Eskimo, some Western North American languages, Mayan, Quechuan, Carib, Polynesian, and some (but not many) Australian and Papuan languages. Illustrations of the various subtypes of locational comparatives are:

(6) Mundari (Austro-Asiatic, Munda)

sadom-ete	hati	mananga-i
horse-from	elephant	big-3SG.PRES

'The elephant is bigger than the horse' (Hoffmann, 1903: 110)

(7) Estonian (Uralic, Balto-Finnic)
kevad on sügis-est ilusam
spring is fall-from more.beautiful
'The spring is more beautiful than the fall' (Oinas, 1966: 140)

(8) Maasai (Nilo-Saharan, Nilotic)
sapuk olkondi to lkibulekeny
big hartebeest to waterbuck
'The hartebeest is bigger than the waterbuck' (Tucker and Mpaayi, 1955: 93)

(9) Tamachek' (Afro-Asiatic, Berber)
kemmou tehousid foull oult ma m
you pretty.2SG.FEM upon sister of you
'You are prettier than your sister' (Hanoteau, 1896: 52)

(10) Tubu (Nilo-Saharan, Saharan)
sa-umma gere du mado
eye-his blood on red
'His eye is redder than blood' (Lukas, 1953: 45)

Turning now to the derived-case comparatives, in which the case marking of the standard NP is derived from – or 'parasitic on' – the case marking of the comparee NP, we note that, again, two subtypes can be distinguished. First, there is the conjoined comparative. Here, the comparative construction consists of two structurally independent clauses, one of which contains the comparee NP, while the other contains the standard NP. Furthermore, the two clauses show a structural parallelism, in that the grammatical function of the comparee NP in one of the clauses is duplicated by the grammatical function of the standard NP in the other clause. If, for example, the comparee functions as the grammatical subject in its clause, the standard NP will also have subject status in its clause.

Since the construction has two clauses, it follows that the construction will also have two independent predicates. In other words, the comparative predicate is expressed twice. There are two ways in which this double expression may be effectuated. The language may employ antonymous predicates in the two clauses ('good-bad,' 'strong-weak'). Alternatively, the two predicates may show a positive-negative polarity ('good-not good', 'strong-not strong'). An example of the first variant is found in Amele; the second variant has been attested for Menomini. Sentence (13) illustrates one of the comparative constructions in Malay. Here the standard NP and the comparee NP are conjoined as sentence topics, and the following clause predicates the property of the comparee NP only; that is, in this (rather infrequent) variant of the Conjoined Comparative, the comparative predicate is expressed only once. In geographical terms, the conjoined comparative seems to be concentrated in the Southern Pacific, including Australian, Papuan, and Eastern Austronesian languages, but it is also common in large parts of the Americas, and there are also some cases in Eastern Africa.

(11) Amele (Papuan, Madang)
jo i ben , jo eu nag
house this big , house that small
'This house is bigger than that house' (Roberts, 1987: 135)

(12) Menomini (Algonquian)
Tata'hkes-ew , nenah teh kan
strong-3SG , I and not
'He is stronger than me' (Bloomfield, 1962: 506)

(13) Malay (Austronesian, West Indonesian)
kayu, batu, běrat batu
wood, stone, heavy stone
'Stone is heavier than wood' (Lewis, 1968: 157)

A second subtype of derived-case comparison is defined negatively, in that the standard NP has derived case, but the construction does not have the form of a coordination of clauses. Instead, the construction features a specific comparative particle that accompanies the standard NP. With a few, mostly West-Indonesian exceptions, this particle comparative appears to be restricted to Europe. The English *than* comparative is a case in point. Other examples are the comparative construction in French, with its comparative particle *que*, and the comparative construction in Hungarian, which features the particle *mint* 'than, like.'

(14) French (Indo-European, Romance)
tu es plus jolie que ta soeur
you are more pretty than your sister
'You are prettier than your sister' (B. Bichakjian, personal commuication)

(15) Hungarian (Uralic, Ugric)
Istvan magasa-bb mint Peter
I.NOM tall-more than P.NOM
'Istvan is taller than Peter' (E. Moravcsik, personal communication)

In summary, the typology of comparison of inequality developed in Stassen (1984, 1985) can be presented as follows:

(16)

FIXED CASE	direct object	EXCEED
	locational	SEPARATIVE
		ALLATIVE
		LOCATIVE
DERIVED CASE	conjoined	CONJOINED
	nonconjoined	PARTICLE

Predicate Marking in Comparative Constructions

Apart from, or in addition to, case assignment of the standard NP, a further possible parameter in the typology of comparative constructions might be considered to be the presence or absence of comparative marking on the predicate. In the vast majority of languages, such overt marking is absent; predicative adjectives in comparatives retain their unmarked, 'positive' form. Some languages, however, mark a predicative adjective in a comparative construction by means of a special affix, e.g., *-er* in English, German, and Dutch, *-ior* in Latin, *-bb* in Hungarian, *-ago* in Basque) or a special adverb (*more* in English, *plus* in French). Especially in the case of comparative affixes, the etymological origin is largely unknown. As for the areal distribution of this predicate marking in comparatives, it can be observed that it is an almost exclusively European phenomenon, and that it is particularly frequent in languages that have a particle comparative construction. For a tentative explanation of this latter correlation, see Stassen (1985, Chap. 15).

Explanation of the Typology of Comparative Constructions

Stassen (1985) advances the claim that the typology of comparative constructions is derived from (and hence predicted by) the typology of temporal sequencing. That is, the type(s) of comparative construction that a language may employ is argued to be limited by the options that the language has in the encoding of (simultaneous or consecutive) sequences of events. A first indication in favor of this hypothesis is that at least one of the attested comparative types, viz., the conjoined comparative, has the overt form of a temporal sequence (in this case, a simultaneous coordination). Moreover, for most of the other comparative types a correlation with a possible encoding of some temporal sequence can be established as well. Stassen (1985) produces detailed evidence for the correctness of the following set of universals of comparative type choice:

a. If a language has an adverbial comparative, then that language allows deranking (i.e., nonfinite subordination) of one of the clauses in a temporal sequence, even when the two clauses in that sequence have different subjects.
b. If a language has an Exceed-Comparative, then that language allows deranking of one of the clauses in a temporal sequence only if the two clauses have identical subjects.
c. If a language has a conjoined comparative, then that language does not allow deranking of clauses in temporal sequences at all.

The parallelism between these various options in temporal sequence encoding and corresponding comparative types is illustrated by examples from Naga, Dagbane, and Kayapo:

(17) Naga (Sino-Tibetan, Tibeto-Burman)

(17a)

A	de	kepu	ki	themma
I	words	speak	on	man
lu	a	vu-we		
that	me	strike-INDIC		

'As I spoke these words, that man struck me' (Grierson (ed.), 1903: 417)

(17b)

Themma	hau	lu	ki	vi-we
man	this	that	on	good-INDIC

'This man is better than that man' (Grierson (ed.), 1903: 415)

(18) Dagbane (Niger-Kordofanian, Gur)

(18a)

Nana	san-la	o-suli	n-dum	nira
scorpion	take-HAB	his-tail	PREF-sting	people

'The scorpion stings people with its tail' (Fisch, 1912: 32)

(18b)

O-make	dpeoo	n-gare-ma
he-has	strength	PREF-exceed-me

'He is stronger than me' (Fisch, 1912: 20)

(19) Kayapó (Ge)

(19a)

Ga-ja	nium-no
2SG-stand	3SG-lie down

'You are standing, and/ while he is lying down' (Maria, 1914: 238)

(19b)

Gan	ga-prik	ba	i-pri
2SG	2SG-big1SG	1SG	ISG-small

'You are bigger than me' (Maria, 1914: 237)

Given that the universals listed above meet with very few and 'incidental' counterexamples, Stassen (1985) concludes that the typology of comparative constructions is modeled on the typology of temporal sequencing, so that, in effect, comparative constructions appear to be a special case of the encoding of temporal sequences.

A residual problem for this modeling analysis of comparative types is presented by the particle comparatives. Like conjoined comparatives, particle comparatives form a case of derived-case comparison, but unlike conjoined comparatives their surface structure form is not that of a coordination. Nonetheless, there are indications that even particle comparatives are coordinate in origin. In a number of cases, the particle used in particle comparatives has a clear source in a coordinating conjunction or adverb (e.g., *karo* 'than/but' in Javanese, *dan* 'than/then' in Dutch,

baino 'than/but' in Basque, *asa* 'than/then' in Toba Batak, *noria* 'than/after that' in Goajiro, *ngem* 'than/but' in Ilocano, *na* 'than/nor' in Scottish Gaelic, *nor* 'than/nor' in Scottish English, *è* 'than/or' in Classical Greek). Furthermore, particle comparatives in at least some languages share a number of syntactic properties with coordinations. For example, the Dutch comparative allows Gapping, a rule which is commonly thought to be restricted to coordinate structures.

(20) Dutch (Indo-European, Germanic)

(20a)	Ik	verzamel	boeken	en	mijn
	I	collect	books	and	my
	broer	verzamelt	platen		
	brother	collects	records		

'I collect books and my brother collects records' (own data)

(20b) Ik verzamel boeken en mijn broer Ø platen (own data)

(21) Dutch (Indo-European, Germanic)

(21a)	Ik	koop	meer	boeken	dan
	I	buy	more	books	than
	mijn	broer	platen	koopt	
	my	brother	records	buys	

'I buy more books than my brother buys records' (own data)

(21b) Ik koop meer boeken dan mijn broer platen Ø (own data)

One might argue, then, that particle comparatives must be seen as grammaticalizations from an underlying sequential construction. In this way, the particle comparative does not have to present a counterexample to the modeling analysis of comparative constructions, although it certainly forms a recalcitrant case.

See also: Antonymy and Incompatibility; Comparatives: Semantics.

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Comparatives, Semantics

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Introduction

The ability to establish orderings among objects and make comparisons between them according to the amount or degree to which they possess some property is a basic component of human cognition. Natural languages reflect this fact: all languages have syntactic categories that express gradable concepts, and all languages have designated comparative constructions, which are used to express explicit orderings between two objects with respect to the degree or amount to which they possess some property (Sapir, 1944).

In many languages, comparatives are based on specialized morphology and syntax. English exemplifies this type of system. It uses the morphemes *more*/*-er*, *less,* and *as* specifically for the purpose of establishing orderings of superiority, inferiority, and equality, respectively, and the morphemes *than* and *as* to mark the standard against which an object is compared:

baino 'than/but' in Basque, *asa* 'than/then' in Toba Batak, *noria* 'than/after that' in Goajiro, *ngem* 'than/but' in Ilocano, *na* 'than/nor' in Scottish Gaelic, *nor* 'than/nor' in Scottish English, *è* 'than/or' in Classical Greek). Furthermore, particle comparatives in at least some languages share a number of syntactic properties with coordinations. For example, the Dutch comparative allows Gapping, a rule which is commonly thought to be restricted to coordinate structures.

(20) Dutch (Indo-European, Germanic)

(20a) Ik	verzamel	boeken	en	mijn
I	collect	books	and	my
broer	verzamelt	platen		
brother	collects	records		

'I collect books and my brother collects records' (own data)

(20b) Ik verzamel boeken en mijn broer Ø platen (own data)

(21) Dutch (Indo-European, Germanic)

(21a) Ik	koop	meer	boeken	dan
I	buy	more	books	than
mijn	broer	platen	koopt	
my	brother	records	buys	

'I buy more books than my brother buys records' (own data)

(21b) Ik koop meer boeken dan mijn broer platen Ø (own data)

One might argue, then, that particle comparatives must be seen as grammaticalizations from an underlying sequential construction. In this way, the particle comparative does not have to present a counterexample to the modeling analysis of comparative constructions, although it certainly forms a recalcitrant case.

See also: Antonymy and Incompatibility; Comparatives: Semantics.

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(1a) Mercury is closer to the sun than Venus.
(1b) The Mars Pathfinder mission was less expensive than previous missions to Mars.
(1c) Uranus doesn't have as many rings as Saturn.

In the case of properties for which specific measure units are defined, it is also possible to express differences between objects with respect to the degree to which they possess some property, even when the predicate from which the comparative is formed does not permit explicit measurement:

(2a) Mercury is 0.26 AU closer to the sun than Venus.
(2b) ??Mercury is 0.46 AU close to the sun.

Languages such as English also allow for the possibility of expressing more complex comparisons by permitting a range of phrase types after *than* and *as*. For example, (3a) expresses a comparison between the degrees to which the same object possesses different properties, (3b) compares the degrees to which different objects possess different properties, and (3c) relates the actual degree that an object possesses a property to an expected degree.

(3a) More meteorites vaporize in the atmosphere than fall to the ground.
(3b) The crater was deeper than a 50-story building is tall.
(3c) The flight to Jupiter did not take as long as we expected.

Finally, many languages also have related degree constructions that do not directly compare two objects but instead provide information about the degree to which an object possesses a gradable property by relating this degree to a standard based on some other property or relation. The English examples in (4) using the morphemes *too*, *enough* and *so* exemplify this sort of construction.

(4a) The equipment is too old to be of much use to us.
(4b) Current spacecraft are not fast enough to reach the speed of light.
(4c) The black hole at the center of the galaxy is so dense that nothing can escape the pull of its gravity, not even light.

Example (4b), for example, denies that the speed of current spacecraft is as great as the speed required to equal the speed of light.

Gradability

A discussion of the semantics of comparison must begin with the semantics of gradable predicates more generally. Not all properties can be used in comparatives, as shown by the contrast between the examples in (1) and (5).

(5a) ??Giordano Bruno is deader than Galileo.
(5b) ??The new spacecraft is more octagonal than the old one.
(5c) ??Carter is as former a president as Ford.

The crucial difference between predicates such as *expensive* and *close,* on the one hand, and *dead*, *octagonal*, and *former,* on the other, is that the first, but not the second, are gradable – they express properties that support (nontrivial) orderings. Comparatives thus provide a test for determining whether a predicate is inherently gradable or not.

The most common analysis of gradable predicates assigns them a unique semantic type that directly represents their order-inducing feature; they are analyzed as expressions that map their arguments onto abstract representations of measurement, or scales. Scales have three crucial parameters, the values of which must be specified in the lexical entry of particular gradable predicates: a set of degrees, which represent measurement values; a dimension, which indicates the property being measured (cost, temperature, speed, volume, height, etc.); and an ordering relation on the set of degrees, which distinguishes between predicates that describe increasing properties (e.g., tall) and those that describe decreasing properties (e.g., short) (see Sapir, 1944; Bartsch and Vennemann, 1973; Cresswell, 1977; Seuren, 1978; von Stechow, 1984a; Bierwisch, 1989; Klein, 1991; Kennedy, 1999; Schwarzschild and Wilkinson, 2002).

The standard implementation of this general view claims that gradable predicates have (at least) two arguments: an individual and a degree. Gradable predicates further contain as part of their meanings a measure function and a partial ordering relation such that the value of the measure function applied to the individual argument returns a degree on the relevant scale that is at least as great as the value of the degree argument. The adjective *expensive*, for example, expresses a relation between an object x and a degree of cost d such that the cost of x is at least as great as d.

In order to derive a property of individuals, it is necessary to first saturate the degree argument. In the case of the positive (unmarked) form, the value of the degree argument is contextually fixed to an implicit norm or standard of comparison, whose value may vary depending on a number of different contextual factors (such as properties of the subject, the type of predicate, and so forth; *see* **Vagueness**). For example, the truth conditions of a sentence such as (6a) can be represented as in (6b), where *size* is a function from objects to degrees of size and d_s is the contextually determined standard – the cutoff point for what counts as large in the context of utterance.

(6a) Titan is large.
(6b) $size(t) \geq d_s$

In the context here, the various objects in the solar system, the value of d_s is typically such that (6a) is false. If we are talking about Saturn's moons, however, then d_s is such that (6a) is true. This sort of variability is a defining feature of gradable adjectives as members of the larger class of vague predicates.

Comparison

In contrast to the positive form, comparatives (and degree constructions in general) explicitly fix the value of the degree argument of the predicate. There are a number of implementations of this basic idea (see von Stechow, 1984a, for a comprehensive survey), but most share the core assumption that the comparative morphemes fix the value of the degree argument of the comparative-marked predicate by requiring it to stand in a particular relation – $>$ for *more*, $<$ for *less*, and $\geq$ for *as* – to a second degree, the comparative standard, which is provided by the comparative clause (the complement of *than* or *as*).

One common strategy is to assign the comparative morpheme essentially the same semantic type as a quantificational determiner – it denotes a relation between two sets of degrees. One of these sets is derived by abstracting over the degree argument of the comparative predicate; the second is derived by abstracting over the degree argument of a corresponding predicate in the comparative clause. This analysis presupposes that the comparative clause contains such a predicate. In some cases, it is present in the surface form (see (3b)), but typically, in particular whenever it is identical to the comparative predicate, it is eliminated from the surface form by an obligatory deletion operation.

For example, in the analysis developed in Heim (2000), *more (than)* denotes a relation between two sets of degrees such that the maximal element of the first (provided by the main clause) is ordered above the maximal element of the second (provided by the comparative clause). At the relevant level of semantic representation, a sentence such as (7) has the constituency indicated in (8a) (where material elided from the surface form is struck through) and the truth conditions in (8b).

(7) Titan is larger than Hyperion.
(8a) [Titan is *d* large] more than [Hyperion]
(8b) $max\{d \mid large(t) \geq d\} > max\{d' \mid large(\hbar) \geq d'\}$

Note that because the truth conditions of the comparative form do not involve reference to a contextual norm, the comparative does not entail the corresponding positive. Thus (8a), for example, can be true even in a context in which (6a) is false.

Differential comparatives such as (2a) can be accounted for by modifying the basic semantics to include a measure of the difference between the respective (maximal) degrees contributed by the two arguments of the comparative morpheme (von Stechow, 1984a; Schwarzschild and Wilkinson, 2002). Such differences always correspond to closed intervals on a scale and so are measurable even if the degrees introduced by the base-gradable predicate themselves are not (Seuren, 1978; von Stechow, 1984b; Kennedy, 2001).

Because the standard of comparison is derived by abstracting over a degree variable in the comparative clause, this approach allows for the expression of arbitrarily complex comparisons such as those in (3). There are some limits, however. First, the comparative clause is a wh-construction, so the syntactic operation that builds the abstraction structure is constrained by the principles governing long-distance dependencies (see Kennedy, 2002, for an overview). Second, it is also constrained by its semantics; because the comparative clause is the argument of a maximalization operator, it must introduce a set of degrees that has a maximal element. Among other things, this correctly predicts that negation (and other decreasing operators) are excluded from the comparative clause (von Stechow, 1984a; Rullmann, 1995):

(9a) ??Venus is brighter than Mars isn't.
(9b) $max\{d \mid bright(v) \geq d\} > max\{d' \mid \neg bright(m) \geq d'\}$

The set of degrees d' such that Mars is not as bright as d' includes all the degrees of brightness greater than the one that represents Mars's brightness. Because this set has no maximal element, the maximality operator in (9b) fails to return a value.

The hypothesis that the comparative clause is subject to a maximalization operation has an additional logical consequence (von Stechow, 1984a; Klein, 1991; Rullmann, 1995); for any (ordered) set of degrees D and D', if $D \subseteq D'$, then $max(D') \geq max(D)$. The comparative clause is thus a downward-entailing context and so is correctly predicted to license negative-polarity items and conjunctive interpretations of negation (Seuren, 1973; Hoeksema, 1984; but cf. Schwarzschild and Wilkinson, 2002):

(10a) The ozone layer is thinner today than it has ever been before.
(10b) We observed more sunspot activity in the last 10 days than anyone has observed in years.
(11a) Jupiter is larger than Saturn or Uranus.$\Rightarrow$
(11b) Jupiter is larger than Saturn, and Jupiter is larger than Uranus.

Finally, the assumption that the comparative is a type of quantificational expression leads to the

expectation that it should participate in scopal interactions with other logical operators. The ambiguity of (12), which has the (sensible) *de re* interpretation in (13a) and an (unlikely) *de dicto* interpretation in (13b), bears out this prediction.

(12) Kim thinks Earth is larger than it is.

(13a) $max\{d \mid think(large(e) \geq d)\ (k)\} > max\{d' \mid large(e) > d'\}$

(13b) $think(max\{d \mid large(e) \geq \} > max\{d' \mid large(e) > d'\})\ (k)$

The extent to which comparatives interact with other operators and the implications of such interactions for the compositional semantics of comparatives and gradable predicates is a focus of current investigation (see Larson, 1988; Kennedy, 1999; Heim, 2000; Bhatt and Pancheva, 2004).

Comparison Cross-Linguistically

As previously noted, there are in fact several distinct semantic analyses of comparatives that differ in their details but share the core assumption that gradable adjectives map objects to ordered sets of degrees. For example, one alternative analyzes the truth conditions of a sentence such (7) as in (14); roughly, there is a degree *d* such that Titan is at least as large as *d* but Hyperion is not as large as *d* (Seuren, 1973; Klein, 1980; Larson, 1988).

(14) $\exists d[[large(t) \geq d] \wedge \neg[large(h) \geq d]]$

Analysis (14) does not express an explicit ordering between two degrees but instead takes advantage of the implicit ordering on the scale of the predicate to derive truth conditions equivalent to (8b) – given the inherent ordering, (14) holds whenever the maximal degree of Titan's largeness exceeds that of Hyperion (and vice versa).

The fact that the underlying semantics of gradable predicates supports multiple equivalent logical analyses of comparatives appears at first to be a frustrating obstacle to the discovery of the 'right' semantics of the comparative. In fact, however, this may be a positive result when we take into account the extremely varied syntactic modes of expressing comparison in the world's languages (see Stassen, 1985), which include forms that superficially resemble the logical representation in (14), such as the example from Hixkaryána in (15).

(15) Kaw-ohra naha Waraka, kaw naha Kaywerye
tall-NOT he-is Waraka tall he-is Kaywerye
'Kaywerye is taller than Waraka'

Although it may turn out to be difficult to find clear empirical evidence to choose between competing, equivalent logical representations of comparatives within a particular language such English, it may also turn out that a study of the various expressions of comparison in different languages will show that all the possible options provided by the underlying semantics of gradability are in fact attested. Comparatives, therefore, provide a potentially fruitful and important empirical domain for investigating broader typological questions about the mapping between (universal) semantic categories and (language-specific) syntactic ones.

See also: Antonymy and Incompatibility; Comparative Constructions; Monotonicity and Generalized Quantifiers; Negation: Semantic Aspects; Quantifiers: Semantics; Vagueness.

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Complement Clauses

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In approaches to linguistics within, or influenced by, the generative tradition, the term 'complementation' has come to refer to the syntactic situation that arises when a notional sentence or predication is an argument of a predicate. For practical purposes, a predication can be viewed as an argument of a predicate if it functions as the subject or object of that predicate.

(1) **That Zeke eats leeks** is surprising.

(2) Zelda knows **that Zeke eats leeks**.

In (1), the clause *that Zeke eats leeks* functions as a subject and is referred to as a subject complement; in (2), *that Zeke eats leeks* functions as an object and is referred to as an object complement. Complements are subordinate (or co-subordinate) clauses, but not all subordinate clauses are complements: relative clauses, converbals, and clauses of time, manner, purpose, and place are not considered complements because they are not arguments.

Within a given language, various grammatical constructions can serve as complements. Such constructions are referred to as complement types.

(3) a. **That Zeke eats leeks** is surprising.
b. **Zeke's eating leeks** is surprising.
c. **For Zeke to eat leeks** would be surprising.

(4) a. Zelda remembered **that Zeke eats leeks**.
b. Zelda remembered **Zeke's eating leeks**.
c. Zelda remembered **to eat leeks**.

Predicates such as *be surprised, know,* and *remember,* which take complement arguments, are referred to as complement-taking predicates [or ctps].

Every language has a complement type that is identical grammatically to an independent clause; such complements are used to express direct quotes of *say,*

(5) Zelda said "Zeke eats leeks."

and may be found in other contexts as well. Such complements are referred to as a sentencelike complements. The complements illustrated in (1), (2), (3a), and (4a) are also sentencelike. Sentencelike complements exhibit the same possibilities for the expression of tense, aspect, and mood; case marking of subjects and objects; and argument-verb agreement phenomena as independent clauses for any given language.

In addition, languages also have one or more complement types which are reduced or desententialized: such clauses lack some features associated with main clauses. The gerunds [nominalizations] in (3b) and (4b) and the infinitives in (3c) and (4c) lack some features associated with sentence-like complements and main clauses. For example, neither can be inflected for primary tense [past or non-past], though secondary, or relative, tenses [*e.g.,* the perfect] are possible with both.

Complement Types

Complement types are identified by the following criteria:

- Whether they are sentence-like or reduced;
- The part of speech of the predicate [or the grammatical head of the predicate complex], *i.e.,* whether it is a verb, a noun, or an adjective;
- The sorts of grammatical relations the predicate has with its arguments, *e.g.,* whether the agent has a subject relation to the predicate, as in the sentencelike complements above, or whether it has a genitive relation, as in (3b) and (4b);
- The external grammatical relations of the complement construction as a whole, *e.g.,* whether the complement has a subordinate or coordinate relation to the main (or matrix) clause.
- Grammatical constructions that function as complements may have other grammatical functions as well. For example, infinitives may be complements (as in [3c] and [4c]), but they may also be adverbials of purposes (*Zeke came **to eat leeks***), relatives (*The leeks **to eat** are Zeke's*), etc. For a construction to be considered a complement, it must meet the semantic test of functioning as an argument of a predicate.

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Some complement types are regularly accompanied by a complementizer, a word or clitic that marks the construction as subordinate and a complement. The sentencelike complements illustrated above are all accompanied by the complementizer *that;* the infinitives are accompanied by the complementizer *to*. The gerunds ([3b] and [4b]) lack a complementizer: neither the derivational morpheme *-ing* nor the genitive *-'s* are properly complementizers.

The reduction undergone by some complement types may be associated with changes or limitations on the grammatical relations that the complement predicate can have with its logical arguments. This most commonly affects the relation of the predicate to its subject or, in languages lacking subject relations, its agent. For example, with English infinitives the notional subject is either raised (6), equi-deleted (7), or made into an object of an adposition (8):

(6) Zelda wanted **Zeke** to eat leeks.

(7) Zelda wanted **Ø** to eat leeks.

(8) **For Zeke** to eat leeks would amaze Zelda.

Raising refers to a situation whereby an argument of a complement predicate assumes a grammatical relation in the matrix clauses. In (6), *Zeke* is generally analyzed as the direct object of *wanted:* note that if *Zeke* is replaced by a pronoun, it is the objective case *him,* not the subjective case *he,* that is used. In (7), the notional subject of *eat* is *Zelda,* coreferential with the subject of the matrix verb *wanted:* the second mention of *Zelda* is said to be equi-deleted under identity with the matrix subject.

Classification of Complement Types

Some of the more typical features of commonly encountered complement types are described below. These characterizations are ideal types, and it is quite possible to find examples having characteristics that are intermediate between certain of the types listed below. In the discussion below, 'predicate' refers to the head of the verb complex.

- Categories in the verb complex may be reduced. The term 'subjunctive' has traditionally been used for a sentence-like complement type that is specialized for subordinate clauses, though it may have main clause use with hortative or imperative sense.
- Paratactic: The predicate is a verb. The subject is an argument shared by the paratactic complement and the clause which contains the complement-taking predicate. The range of inflectional categories is the same as for independent clauses, though will always be identical to that of the clause containing the complement-taking predicate. Syntactically, the paratactic complement and its accompanying clause are like two coordinate clauses asyndetically juxtaposed, though forming an intonational unit like that of main-subordinate clause pairs. As a result, the paratactic complement is never accompanied by a complementizer.
- Infinitive: The predicate is a verb, but cannot form a constituent with its notional subject, nor can it agree with it if the language permits subject-verb agreement. The range of inflectional categories is reduced.
- Nominalization: The predicate is a noun. Grammatical relations between the predicate and its arguments are expressed in ways characteristic of noun-modifier relations in the language with the predicate as the head (*e.g.,* the notional subject may be expressed as a genitive), but if there is deviation from this pattern, the subject is more likely to retain the noun-modifier mode than is the object. Since it is a noun, the predicate may be marked for nominal categories like case and number. There is often a gradation between nominalizations and infinitives; diachronically, nominalizations often evolve into infinitives.
- Participial: The predicate is an adjective. The notional subject is the head, while the rest of the predication takes the form of a modifier, a participial phrase (or, rarely, a clause identical to ordinary relative clauses) modifying the notional subject NP. Inflectional categories are reduced, and the construction may take adjectival inflections, *e.g.,* concord class morphology, agreeing with the notional subject.
- Languages vary in the number of complement types they employ, the number ranging from two (a reduced vs. a non-reduced complement type) to five or six.

Reduction or Desententialization of Complements

As noted, non-indicative complements are in various ways reduced or desententialized. This is a consequence of two distinct factors. The first is the pragmatic backgrounding of the complement predication: when the information contained within the complement is not the focus of the assertion for the entire sentence, the complement may be reduced.

(9) Dale regretted **that Roy fell off his horse**.

(10) Dale regretted **Roy's falling off his horse**.

(11) Dale regretted **it**.

In (9) the information coded by the object complement is given full expression by an indicative complement. But it is also possible to express the complement as a nominalization as in (10), in which case some information (e.g., tense) is eliminated. In (11), the reduction is such that the direct object is no longer considered a complement.

The second and, for our purposes, more interesting reason for reduction is that the meaning of the complement-taking predicate may limit the semantic possibilities of the complement predication. So, for example, the things we want to occur necessarily occur after our wanting them, so that (12) is possible, but not (13):

(12) I want Zuma to leave **tomorrow**.

(13) I want Zuma to leave **yesterday**.

The greater the degree to which the semantics of the complement is bound to elements of the meaning of the complement-taking predicate, the greater the degree of reduction will be possible.

With the exception of agreement of the notional subject with the predicate, which varies with individual complement types, the retention of inflectional categories associated with predicates in independent clauses can be arranged as follows:

(14)

Full range of tenses	past vs. non-past (morphologically may correspond to the perfect/ non-perfect distinction in the indicative)	aspect	voice, transitivity, causative desiderative, object agreement
1	2	3	4

Generally speaking, the further to the left an item is on this scale, the less likely it is to be coded on a non-indicative complement. The categories in set 4 are almost always coded on infinitive and subjunctive complements if they are coded on indicatives.

Associated with reduction or desententialization is a phenomenon we can refer to as clause merger. Raising and equi-deletion, referred to earlier, are modes of clause-merger: the erasure of the grammatical 'boundaries' between the complement clause and the matrix clause. Degrees of clause merger are arrayed on a continuum ranging from no merger all the way to clause union. Raising is a mode of clause merger, since it removes arguments from the predications with which they are logically associated and assigns them grammatical roles in the matrix clause:

(15) It's tough for Melvin to please **Melba**.

(16) **Melba** is tough for Melvin to please.

Notionally, *Melba* is an argument of *please,* but in (16) *Melba* is expressed as the subject of *be tough*. With clause union, the matrix and complement predictes share the arguments of both matrix and complement predications. We can see an example of this from French:

(17) Roger laissera Marie manger les pommes.
Roger let–3sg-fut Marie eat-inf the apples
'Roger will let Marie eat the apples.'

(18) Roger laissera manger les pommes à Marie.
Roger let–3sg-fut eat-inf the apples to Marie
'Roger will let Marie eat the apples.'

In (17), *laissera* has as its direct object *Marie,* and *manger* has as its direct object *les pommes*. In (18), however, the merged predicate *laissera manger* has a direct object *les pommes* and an indirect object *à Marie:* the clauses have merged and the arguments are shared by the merged predicate.

Choice of Complement Type

Not only the possibility of reduction, but also the choice of a particular complement type is determined by the meaning of the complement-taking predicate. For example, in English, nominalizations [gerunds] are used to express complement predicates taken as facts, whereas infinitives are used to express complement predications treated as potential, projected events. The complement-taking predicate *remember* is compatible with both, since one can remember both a fact and a projected event:

(15) Gus remembered **paying the bill**. [nominalization/gerund]

(16) Gus remembered **to pay the bill**. [infinitive]

Want, however, is compatible only with project events; therefore, *want* is compatible with the infinitive but not with the nominalization:

(17) *Gus wants **paying the bill**. [nominalization/ gerund]

(18) Gus wants **to pay the bill**. [infinitive]

The meanings and uses of a given complement type will vary with each language.

Few grammatical principles, if any, are specific to complementation, and though complementation can be given a workable definition, the definition is semantic, not grammatical. For example, all the grammatical constructions described as complement types have uses outside the realm of complementation proper, so their properties cannot be characterized solely by reference to complementation.

Complementation can be viewed as one mode of clause-combining.

See also: Constituent Structure; X-Bar Theory.

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Complex Predicates

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Complex predicates usually are defined as predicates that are multiheaded; they are composed of more than one grammatical element (either morphemes or words), each of which contributes part of the information ordinarily associated with a head.

In the following discussions, several phenomena that are explained by complex predicate analyses are presented. Several analyses of these phenomena are then suggested in various frameworks.

Phenomena

In dealing with language from a cross-linguistic perspective, it becomes apparent that languages differ in the ways that they express properties such as tense, aspect, and agreement. These differences can be expressed either synthetically or analytically. As an example, consider the French and the German sentences in Examples (1a) and (1b). French expresses the future tense synthetically, whereas German uses a combination of the infinitive of a main verb and an inflected form of the auxiliary *werden*:

(1a) Je le varrai.
I him will.see
'I will see him.'

(1b) weil ich ihn sehen werde
because I him see will
'because I will see him'

Such periphrastic constructions are often analyzed as complex predicates, i.e., it is assumed that the auxiliary forms a complex with the embedded verb that has a status similar to a verb combined with the future morpheme in other languages.

In addition to periphrastic constructions, certain verbal complexes, particle verbs, and combinations of a resultative secondary predicate and a verbal element are treated as complex predicates. The evidence for assuming a closer connection between two heads is discussed in the following subsections. German examples are used for the illustration, but some pointers to literature regarding similar cases in other languages are given.

Topological Properties

German is a subject-object-verb language, and particle verbs, complex-forming verbs, and resultative constructions form a topological unit at the right periphery of the clause. In the descriptive literature, the part in which the respective elements are located is called the 'right sentence bracket' (see Bech (1955) for a brilliant description and analysis of verbal constructions in German) (abbreviations in the following examples: NOM, nominative; ACC, accusative; PART, particle).

(2a) weil jemand ihn
because somebody.NOM him.ACC
anlacht
PART (to).laughs
'because somebody smiles at him'

(2b) weil jemand ihn
because somebody.NOM him.ACC
zu reparieren versucht
to repair tries
'because somebody tries to repair it'

(2c) weil jemand ihn
because somebody.NOM him.ACC
klug findet
smart finds
'because somebody finds him smart'

(2d) weil jemand den Teich
because somebody.NOM the pond.ACC
leer fischt
empty fishes
'because somebody fishes the pond empty'

The accusatives in Examples (2a)–(2d) are dependents of the particle *an* ('toward'), the infinitive *zu reparieren* ('to repair'), and the resultative predicate

Complementation can be viewed as one mode of clause-combining.

See also: Constituent Structure; X-Bar Theory.

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because somebody.NOM him.ACC
zu reparieren versucht
to repair tries
'because somebody tries to repair it'

(2c) weil jemand ihn
because somebody.NOM him.ACC
klug findet
smart finds
'because somebody finds him smart'

(2d) weil jemand den Teich
because somebody.NOM the pond.ACC
leer fischt
empty fishes
'because somebody fishes the pond empty'

The accusatives in Examples (2a)–(2d) are dependents of the particle *an* ('toward'), the infinitive *zu reparieren* ('to repair'), and the resultative predicate

leer ('empty'), respectively; *lachen* ('laugh') is an intransitive verb, as evidenced by Examples (3a) and (3b):

(3a) Er lacht.
he laughs

(3b) *Er lacht sie
he laughs her

The additional argument in Example (2a) is licensed by the particle (Stiebels and Wunderlich, 1994; Stiebels, 1996).

The finite verb + particle/infinitive/resultative predicate forms a topological unit in Examples (2a)–(2d), but this is not necessarily the case, since the finite verb can be serialized in clause-initial position in languages such as German and Dutch. Similarily, it is possible to front the embedded infinitive and the resultive predicate in verb-second (V2) sentences. Particle fronting is possible under certain circumstances (Müller, 2002b), thus the constructions in Examples (2a)–(2d) should be analyzed in syntax.

That predicates form a topological unit in some variant of a clause that could be assumed to be basic is not a necessary condiation for predicate complex formation. Butt (1997) discussed constructions in Urdu that she analyzed as complex predicates and which nevertheless were discontinuous.

Constituent Order

German is a language with relatively free constituent order. Arguments of a single head can be reordered with respect to each other in the so-called *Mittelfeld* (the area between the complementizer and the finite verb in verb-last sentences, but the area between the finite verb and other verbs or verb particles in verb-initial sentences).

The sentences in Examples (4a)–(4d) show that the arguments that are introduced by different heads in Examples (2a)–(2d) may be reordered:

(4a) weil ihn jemand
because him.ACC somebody.NOM
anlacht
PART (to).laughs
'because somebody smiles at him'

(4b) weil ihn jemand
because him.ACC somebody.NOM
zu reparieren versucht
to repair tries
'because somebody tries to repair it'

(4c) weil ihn jemand
because him.ACC somebody.NOM
klug findet
smart finds
'because somebody finds him smart'

(4d) weil den Teich jemand
because the pond.ACC somebody.NOM
leer fischt
empty fishes
'because somebody fishes the pond empty'

The important thing to notice about these examples is that the heads and the accusative elements, which are arguments of the respective heads, appear discontinuously. If it is assumed that *anlacht* ('smiles at'), *zu reparieren versucht* ('tries to repair'), and *leer fischt* ('fishes empty') form a complex head that requires all arguments of the matrix and the embedded element, the data in Examples (4a)–(4d) are explained automatically: since arguments of simplex heads can be reordered in German, it would follow automatically that the nominative and the accusative arguments of the complex heads could be reordered in similar sentences.

Remote Passive

Examples (5a)–(5d) show that the argument of the embedded predicate can be realized as the subject in passive constructions (see Höhle (1978: 175–176) on the remote passive in verbal complexes; corpus examples are provided in Müller (2002a: chap. 3.1.4.1):

(5a) weil er angelacht wurde
because he.NOM PART (to).laughed was
'because he was smiled at'

(5b) weil er zu reparieren versucht wurde
because he.NOM to repair tried was
'because somebody tried to repair it'

(5c) weil er klug gefunden wurde
because he smart found was
'because he was found smart'

(5d) weil der Teich leer gefischt wurde
because the pond.NOM empty fished was
'because the pond was fished empty'

Again, such data can be explained by assuming that the particle verb combination, the combination of infinitive and embedding verb, and the combination of verb and resultative predicate act like a simplex head. The subject of the respective complexes is suppressed and the accusative object is realized as subject. (See also Rizzi (1982) and Monachesi (1998) for long passives in Italian, Manning (1992) for passives of verbal complexes in Romance languages, and Grimshaw and Mester (1985) for passives in Inuit Eskimo.)

Other Phenomena

Due to space limitations, not all phenomena related to complex predicate formation can be discussed

here. Briefly, however, Example (6) shows a verbal complex construction that has two readings:

(6) daß Karl den Roman nicht zu
that Karl.NOM the novel.ACC not to
lieben scheint
love seems
'that Karl does not seem to love the novel'
'that Karl seems not to love the novel'

The negation can scope over the *zu* infinitive or over the matrix verb, although it is placed between parts of what would normally be analyzed as an infinitival verb phrase, i.e., between *den Roman* and *zu lieben*. If *zu lieben* and *scheint* form a complex, *nicht* may attach to it before combination of arguments, and the wide scope reading can be explained. Furthermore, binding-theoretic effects may be observed: reflexives that are arguments of the embedded predicate can be bound by the subject (or by another argument) of the matrix verb.

Apart from the phenomena that were demonstrated using German examples, there is a phenomenon called 'clitic climbing' in Romance languages. Usually a clitic is attached to a verb that it depends on, but with certain auxiliary verbs and causative verbs it is possible that a clitic that corresponds to an embedded verb attaches to the matrix verb. Again, such clitic constructions can be analyzed as involving complex predicate formation. The matrix verb selects both its own arguments and the arguments of the embedded verb. Since the arguments of the embedded verb are treated as arguments of the matrix predicate, it can be explained why they can be realized as a clitic to the matrix predicate (Monachesi, 1998; Abeillé *et al.*, 1997).

Analyses

There have been various analytical approaches to the phenomena of complex predicates. The analyses can be ordered into two groups. One approach assumes that two predicates form a syntactic (or morphologic) constituent and the other approach assumes that two heads project as they would do normally as simplex heads. In the latter approach, the complex predicate effects are explained by restructuring or by movements of heads that result in monoclausal structures. The latter approach is discussed first here.

Verb Phrase Embedding and Small Clauses and Incorporation

One way to analyze the phenomena of complex predicates is to assume that verbal heads uniformly embed maximal projections of a certain type. In the case of complex-forming control verbs and/or raising verbs, it is assumed that the embedded constituent is a complementizer phrase (CP), inflection phrase (IP), or verb phrase (VP) (for particle verbs and for resultative constructions, small clause analyses have been applied; see, for instance, Hoekstra (1988) and den Dikken (1995), and references therein). Structures with monoclausal properties are explained by restructuring, reanalysis, or incorporation. An initial structure that contains the full CP, IP, VP, or small clause is mapped to another structure with different properties, accounting for the fact that a subject of an embedded predicate behaves like an object, or that arguments of embedded heads may scramble with respect to arguments of higher heads (Evers, 1975; Grewendorf, 1994; Grewendorf and Sabel, 1994; Wurmbrand, 2001). For instance, verbal particles are said to incorporate into their matrix verb (see Baker (1988) for a detailed discussion of incorporation). Such accounts are attractive since they can assume that there is just one underlying structure for a certain thematic relation. All other configurations are derived from this configuration by movement. Baker (1988) formulated this as the 'uniformity of theta-assignment hypothesis' (UTAH): "Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure." (See also den Dikken (1995) for other formulations of the UTAH and further discussion.)

Usually, so-called small clauses, i.e., verbless predication structures, are assumed for particle verbs (den Dikken, 1995), for *consider* predication, and for resultative constructions (Hoekstra, 1988). For instance, Example (2c) would be analyzed in the following way:

(7) weil jemand [$_{SC}$ ihn klug]
because somebody.NOM him.ACC smart
findet
finds
'because somebody finds him smart'

The matrix verb *finden* selects a small clause (SC) that contains the adjective *klug* and the subject over which *klug* predicates.

Small clause analyses have been widely criticized (Bresnan, 1982: sect. 9.6; Williams, 1983; Booij, 1990: 56; Hoeksema, 1991; Neeleman and Weermann, 1993; Neeleman, 1995; Pollard and Sag, 1994: chap. 3.2; Stiebels, 1996: chap. 10.2.3; Winkler, 1997: chap. 2.1). One problematic aspect was discussed by Demske-Neumann (1994: 63) (see also Fanselow (1991: 70) for discussion of German, and Hoekstra (1987: 232) for a discussion of Dutch). Noun phrases, adjectives, and prepositional phrases (PPs) can be used predicatively in copula constructions (Examples (8a)–(8c)), but not all of these predicative constructions can

be used in all small clause environments. (Examples (9a)–(9c) and (10a)–(10c)). Therefore, the category of the predicative element has to be available for selection by the governing verb, i.e., *machen* ('to make') or *nennen* ('to call'), respectively.

(8a) Herr K. ist kein Verbrecher.
Mr. K. is not.a criminal.
(8b) Herr K. ist unschuldig.
Mr. K. is innocent.
(8c) Herr K. ist in Berlin.
Mr. K. is in Berlin.

(9a) *Der Richter macht Herrn K. einen Verbrecher.
the judge makes Mr. K. a criminal.
(9b) Das Gericht macht Herrn K. müde.
the court makes Mr. K. tired.

(9c) Der Richter macht Herrn K. zum Verbrecher.
the judge makes Mr. K. to.the criminal.

(10a) Herr K. nennt den Richter einen Idioten.
Mr. K. calls the judge an idiot.
(10b) Herr K. nennt den Richter voreingenommen.
Mr. K. calls the judge biased.
(10c) *Herr K. nennt den Richter alz/zum Idioten.
Mr. K. calls the judge as/to.the idiot.

Demske concluded that the elements that are predicated over have to be treated as specifiers of noun, adjective, and preposition projections in a small clause analysis. However, this is incompatible with $\overline{\text{X}}$-theoretic assumptions. In particular, the relation between *den Richter* and *einen Idioten* is unclear (see Hoekstra (1987: 296–297) on this point). The specifier of *Idioten* is *einen*, so there is no slot for another specifier (see also Pollard and Sag (1994: chap. 3.2) for English examples that are parallel to Examples (9a)–(9c) and (10a)–(10c)). One way out of this is to introduce an additional projection on top of the NP, but then the category features of the predicative phrase inside the small clause have to be made available for selection by heads governing the small clause (den Dikken, 1995: 26).

There have been many proposals for dealing with the mapping from bisentential to monosentential structures. These include Baker's incorporation (1988), which may take place overtly or nonovertly, or the approach by Haegman and Riemsdijk (1986) that assumed simultaneous representations – i.e., not just one underlying structure is mapped to another one, but it is assumed that several analyses together (so-called co-analyses) constitute the analysis of a sentence. Frameworks that use multiple strata to represent grammatical information can account for the monoclausal status on one or several levels. For instance, Butt (1997), who worked in the framework of lexical functional grammar, suggested a complex predicate analysis for Urdu, in which the complex predicate is not formed in the constituent structure but rather in the functional structure. See also Rosen (1997) for a multistratal analysis in the framework of relational grammar.

Complex Predicates

The alternative to an analysis that assumes that maximal projections are embedded and that these structures are reanalyzed, have co-analyses, or similar things, is to assume that the two predicates form a close unit at some level of representation, right from the start. Such analyses have been suggested across frameworks in transformational grammar, government and binding, categorial grammar, lexical-functional grammar, and head-driven phrase structure grammar. The question is how the selectional properties of the heads that take part in complex formation are described. One option is to assume that *fischen* ('to fish') is an intransitive verb in Example (2d) and that the subject of *leer* ('empty') becomes the object of the complete predicate complex *leer fischen*. Such approaches were suggested, for instance, by Chomsky (1985: 100–101), for English particle verbs and *consider* + predicate constructions; by Dowty (1979: chap. 4.7), for English resultatives; and by Neeleman and Weermann (1993) and Neeleman (1995), for English and Dutch resultative constructions. Alternatively, the fact that there will be additional arguments could be encoded in the lexical entry of *fischen*. Such approaches have been suggested for resultative constructions and for all of the other phenomena discussed here. Argument attraction approaches for verbal complexes were suggested by Geach (1970) in the framework of categorical grammar; by Karttunen (1986), for Finnish, in the framework of categorial unification grammar; by Haider (1986) and Bierwisch (1990), for German in the government and binding (GB) framework; and in the framework of head-driven phrase structure grammar (HPSG), by Hinrichs and Nakazawa (1989, 1994), Kiss (1995), Ackerman and Webelhuth (1998), Müller (1999, 2002a), and Meurers (2000) for German, and by van Noord and Bouma (1994, 1997) and Rentier (1994) for Dutch.

Przepiórkowski and Kupść (1997) suggested a complex predicate analysis for Polish, Monachesi (1998) used argument attraction to account for restructuring verbs in Italian, Abeillé *et al.* (1997) dealt with complex predicate formation in French, and Manning *et al.* (1999) suggested a complex predicate analysis of Japanese causatives. Verspoor (1997), Wechsler (1997), Wechsler and Noh (2001), and Müller, (2002a) suggested HPSG analyses for resultative constructions in English, Korean, and German. Winkler (1997: chap. 6.2.2) proposed a corresponding analysis

for resultative constructions in the government and binding (GB) framework.

In what follows, how so-called argument attraction approaches work is demonstrated. The analysis of the phenomena discussed previously will be sketched; in frameworks such as categorial grammar or head-driven phrase structure grammar, functors are specified together with descriptions of the syntactic properties of their dependents. These descriptions are cancelled during syntactic combination. In the case of HPSG, the arguments are specified in a list. (This is a simplification; contemporary approaches assume two lists, one for the subject and one for the remaining arguments. For languages such as German, it is assumed that the subject of finite verbs is treated like the other arguments, because it can be permuted with them.) Identity of elements is indicated by identical numbers in boxes (see Examples (12a)–(12b)).

Hinrichs and Nakazawa (1994) developed an argument attraction approach for auxiliary verbs and modals.

(11) weil er ihn reparieren will
because he him repair want
'because he wants to repair it'

In this analysis, *reparieren* ('to repair') and *will* ('to want') form a close unit that functions as the head of the whole clause. The syntactic information contained in the valence specifications of the respective verbs is given in Example (12):

(12a) reparieren: SUBCAT $\langle$ NP [*str*], NP [*str*] $\rangle$
(12b) will: SUBCAT $\boxed{1} \oplus \langle$ V [SUBCAT $\boxed{1}$] $\rangle$
(12c) reparieren will: SUBCAT $\langle$ NP[*str*], NP[*str*] $\rangle$

NP[*str*] represents a noun phrase with structural case. Case is assigned according to the following principle: The first argument in a SUBCAT list with structural case is realized as nominative unless it is raised to a higher head (Meurers, 1999b). All other NPs with structural case are realized as accusative. The specification for *will* shows how argument attraction works: *will* selects a verb and attracts all elements of the SUBCAT list of the embedded verb. The identity of the attracted elements and the arguments of the embedded verb is indicated by the $\boxed{1}$. Since the arguments of *reparieren will* are not raised by a higher predicate, the first one is assigned nominative case and the second one is assigned accusative case.

This kind of analysis was extended to infinitival constructions involving *zu* infinitives, such as the one in Example (2b), by Kiss (1995). As Kathol (1998) noted, remote passive cases as shown in Example (5b) fall out automatically: If *versuchen* is analyzed as an argument attraction verb, the accusative object of *reparieren* is simultaneously an object of the embedded verb *zu reparieren* and of the complex head *zu reparieren versucht*:

(13a) reparieren: SUBCAT $\langle$ NP[*str*]$_i$, NP[*str*]$_j$ $\rangle$
(13b) versucht: SUBCAT $\langle$ NP[*str*]$_k$ $\rangle \oplus \boxed{1} \oplus$
$\langle$ V[SUBCAT $\langle$ NP[*str*]$_k$ $\rangle \oplus \boxed{1}$] $\rangle$
(13c) zu reparieren versucht (finite):
SUBCAT $\langle$ NP[*str*]$_k$, NP [*str*]$_j$ $\rangle$
(13d) zu reparieren versucht wurde (passive):
SUBCAT $\langle$ NP [*str*]$_j$ $\rangle$

Here *versuchen* is a subject control verb, therefore the referential index of the subject (k) is identified with the referential index of the subject of the embedded predicate in Example (13b). The nonsubject arguments of the embedded verb ($\boxed{1}$) are attracted by the matrix verb. Therefore, the object of the embedded verb is simultaneously the object of the matrix verb. Because both the downstairs object and the upstairs subject are dependents of the same (complex) head, the possibility of reordering is expected, since this phenomenon also occurs with simplex heads in German. If the matrix verb is passivized as in Example (13d), the subject (NP[*str*]$_k$) is suppressed and the second argument becomes the first one in the SUBCAT list. Since it is the first argument in this list, it is realized as nominative, and the remote passive example in Example (5b) is explained. Examples (2c), (4c), and (5c) and similar constructs can be explained similarily: verbs such as *finden* embed an adjective and attract the subject of this adjective.

As Manning (1992) pointed out, the passive examples seem to be problematic for theories that assume that verbal complex formation is a syntactic process, since passive is treated as a lexical process in many frameworks (for instance, lexicalfunctional grammar and HPSG). If argument composition happens at the point where the actual combination takes place, lexical processes cannot access arguments that are selected by other predicates. The argument composition approach that was sketched previously does not have the problems mentioned by Manning. The reason is that the argument composition is done in the lexicon, albeit in an underspecified way. The attracting head does not specify the exact form of the elements that are attracted. If lexical processes are applied to the higher verb, these lexical processes can impose requirements on the raised arguments and make the list $\boxed{1}$ more specific (see, for instance, Müller (2003) for adjectival derivation with *-bar* '-able').

Bobaljik and Wurmbrand (2004) (and Susanne Wurmbrand, in an unpublished manuscript) argued that modification data and fronting data show that a complex predicate analysis for verbal complexes is

not adequate. Wurmbrand discussed the sentence in Example (14):

(14) Sie haben den Fisch eine Woche lang
they have the fish one week long
in zwei Minuten zu fangen versucht.
in two minutes to catch tried
'They tried for a week to catch the fish in two minutes.'

This example shows that both verbs must be available for modification, i.e., a fusion of the two events is not tenable. This sentence is not problematic for complex predicate approaches if it is assumed that adverbials can attach to the verb directly. The adjunct does not change the projection level and therefore *in zwei Minuten zu fangen* has the same status as *zu fangen*. There are also examples in which the adjunct is not adjacent to the verb. To analyze these examples, discontinuous head-adjunct structures could be assumed (Müller, 1999: chap. 17.6), as could an analysis that introduces adjuncts lexically. This was suggested by van Noord and Bouma (1994) for Dutch: a lexical rule introduces an adjunct into the valence list of a head. Argument composition works as previously outlined. If adjuncts are combined with the complex head, they scope over the verb as a dependent of which they were introduced (see also Manning *et al.*, (1999) for an analysis of Japanese causatives that assumes a lexical introduction of adjuncts). The third possibility is to assume that the events variables of the verbs involved in complex formation are available at the predicate complex and that adverbials attach to verbal complexes and pick one of the available event variables, as was suggested by Crysmann (2004).

Wurmbrand also argued against the complex predicate analysis on the basis of fronting as in Examples (15a) and (15b):

(15a) Reparieren wird er den Wagen müssen.
repair will he the car must
(15b) Den Wagen wird er reparieren müssen.
the car will he repair must

Wurmbrand pointed out that *reparieren* and *müssen* are not adjacent and that the verb can be fronted without its object. That the verbs are not adjacent is not a problem if there is some device that mediates between the fronted constituent and the place where argument composition is assumed to take place. In the GB framework, movement is usually assumed for such dislocations; in HPSG, this phenomenon is handled by percolation of feature bundles. Example (15a) has the structure indicated in Example (16):

(16) Reparieren$_i$ wird er den Wagen [$__i$ müssen].

The $__i$ is a trace that corresponds to the fronted *reparieren*, i.e., it has the same syntactic and semantic properties. The argument composition of the arguments of $__i$ and *müssen* works exactly parallel to the composition of arguments of *reparieren* and *müssen* (see also Haider (1990) for a parallel treatment in the GB framework). Wurmbrand argued that Example (15a) is evidence for the XP status of *reparieren*, since *reparieren* is fronted and only maximal projections can be fronted, but this is a theory-internal assumption that is not universally shared. Since $\overline{\text{X}}$ theory does not restrict the set of possible grammars if empty elements are allowed (Koronai and Pullum, 1990), there is no reason to stick to $\overline{\text{X}}$-theoretic assumptions. Analyses of partial verb phrase fronting that allow projections of different projection levels to be fronted were developed by Haider (1990) in the GB framework and by Müller (1999, 2002a) and Meurers (1999a) (see also Bierwisch (1990) for remarks on the necessity to admit phrasal and lexical material in front of the finite verb).

The same argument attraction technique that is used for verbal complexes can be used to account for particle verbs: for the particle *an* ('toward'), the valence list contains one argument with structural case:

(17) an: SUBCAT ⟨ NP[*str*] ⟩

The verb *lachen* has one argument, which also has structural case:

(18) lach-: SUBCAT ⟨ NP [*str*] ⟩

Müller (2002a: 344) suggested a lexical rule licensing an additional lexical item for *lach-* that is subcategorized for a particle in addition to the normal arguments of *lach-*. The result of the rule application is a lexical item with the following subcategorization list:

(19) lach-: ⟨ NP [*str*] ⟩ ⊕ $\boxed{1}$ ⊕ ⟨ PART[SUBCAT $\boxed{1}$] ⟩

When *lacht* and *an* are combined, the resulting complex head selects both the subject of the intransitive base verb *lachen* and the argument of the particle:

(20) anlacht: ⟨ NP[*str*], NP[*str*] ⟩

Since both noun phrases depend on the same head, scrambling of these noun phrases, as in Example (4a), is expected. If *lach*-is passivized, the subject of *lach*-is suppressed and whatever is contributed by the particle ($\boxed{1}$) will occupy the first position in the SUBCAT list. If the passivized form of *lach-* is combined with the particle *an*, the first element of the SUBCAT list of *angelacht* will be the NP[*str*] contributed by *an*. This element is realized as nominative. The sentence in Example (5a) is accounted for.

Verspoor (1997), Wechsler (1997), Wechsler and Noh (2001), and Müller (2002a) suggested a lexical

rule for resultative constructions in English, Korean, and German. The lexical rule licenses additional lexical items that select for a resultative predicate. The subject of the resultative predicate is attracted from the embedded predicate. The matrix verb and the resultative predicate form a complex head, and therefore the subject of the resultative predicate can be permuted with the subject of the matrix verb and the subject of the embedded predicate can be realized as the subject of the matrix predicate if the matrix predicate is passivized.

See also: Argument Structure; Binding Theory; Control and Raising; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Long-Distance Dependencies; Periphrasis; Predication; Principles and Parameters Framework of Generative Grammar; Word Order and Linearization; X-Bar Theory.

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Complex Segments

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A complex segment is a single speech unit with a nonhomogeneous phonetic structure. The term will be used here in a broad sense covering two major subclasses:

A. 'contour segments,' i.e., sounds produced with intrinsic sequential properties, such as affricates [t͡s, t͡ʃ], pre- and postnasalized stops [ⁿd, dⁿ], and short diphthongs [ɛ͡ɪ, u͡o];
B. 'multiply articulated consonants,' i.e., sounds with (more or less) simultaneous articulations at different places, such as 'doubly articulated' labiovelars [k͡p, ŋ͡m] and clicks [⊙, !], and 'secondary-articulated' consonants [pʲ, kʷ, lˠ] (palatalized consonants, labialized consonants, and velarized consonants).

Besides its meaning as a cover term, phonologists also use 'complex segment' to denote either (A) or (B). The former usage is based on Hoard's (1971) original definition; the latter follows Sagey's (1986) terminology.

Complex Segments as Single Speech Units

Many phonologists have observed that affricates, prenasalized stops, doubly articulated consonants, and secondary-articulated consonants behave like single units and unlike clusters for PHONOTACTIC reasons (see Trubetzkoy, 1939, Martinet, 1939 on affricates; Herbert, 1986 for a critical review on prenasalized stops). Dagbani, Boazi, and Chipewyan, for instance, tolerate single consonants and complex segments, though no clusters, in syllable onsets: Dagbani has syllable-initial affricates [t͡ʃ, d͡ʒ] and labiovelars [k͡p, g͡b, ŋ͡m] (Ladefoged, 1964), Boazi has prenasalized stops [ᵐb, ⁿd, ᵑg, ᴺG] (Foley, 1986), and Chipewyan has quite a number of affricates and labialized velars, e.g., [t̪͡θ, t͡s, t͡ʃ, t͡ɬ, kʷ, xʷ] (Maddieson, 1984).

Languages with more complex syllable types show a parallel pattern. Verb stems in Éwé, for instance, allow for initial C+liquid clusters, where C can be a simple consonant, a labiovelar [k͡p, g͡b], an affricate [t͡s, d͡z], or a palatalized nasal [nʲ] (Ladefoged, 1964; see (1d) below). Similarly, word initial C+sonorant clusters in Standard German can start with a single obstruent, e.g., [pl]anke 'plank,' [fl]anke 'flank,' [kʊ]al 'pain,' or an affricate, as in [p͡fl]anze 'plant,' [t͡sʊ]ei 'two.'

The parallel phonotactic behavior of simple and complex segments is supported by a number of further observations. First, complex segments are TAUTOSYLLABIC in intervocalic position, i.e., [a.t͡sa, a.ⁿda, a.k͡pa, a.pʲa] etc., whereas clusters are typically heterosyllabic, [as.ta, ar.ma, at.fa, am.sa]. Verbal nouns in Dera (a.k.a. Kanakuru), for instance, have a high-low tone pattern if their initial syllable is closed, but two high tones if the initial syllable is open, cf. [jáh.ɟɔ̀k] 'sift' and [mó.nɔ́k] 'forget.' A word such as *ɓíndɔ́k* 'squeeze' illustrates that prenasalized stops pattern as onsets, i.e., [ɓíndɔ́k] (Clements, 2000). Similarly, vowel lengthening in open syllables identifies affricates in Faroese as onsets; cf. [eː.ta] 'to eat' and [veː.t͡ʃa] 'wake up,' but [hɛs.tʊr] 'horse' (Lockwood, 1977).

Second, complex segments have PHONETIC DURATIONS comparable to single segments but significantly shorter than clusters. This has been shown for labiovelars in Eggon, Éwé, Idoma, Yoruba, and Igbo, for affricates in English, Polish, and Kabardian, for prenasalized stops in languages such as Ganda and Sinhala, and for palatalized consonants in Russian (see e.g., Sagey, 1986; Ladefoged and Maddieson, 1996).

Third, complex segments differ from clusters by having a FIXED ORDER no matter what their position in the syllable is, e.g., German [p͡faʊ] 'peacock' and [tɔp͡f] 'pot,' but [klaːɐ] 'clear' vs. [kalk] 'lime.' Analyzing complex segments as single speech units explains why they are not affected by the 'sonorancy sequencing generalization,' the principle which determines the order of consonants in syllable onsets and codas.

Fourth, complex segments are INSEPARABLE UNITS with regard to processes such as vowel epenthesis, infixation, or reduplication. In Éwé, for instance, reduplication copies the first consonant and vowel of a stem, as shown in (1a) vs. (1b). Complex segments are copied as units (1c); and clusters of complex segment and liquid are split up after the complex segment, but not after its first component (1d, e) (Sagey, 1986: 86).

(1a)	fo	'to beat'	fo-fo	'beating'	
(1b)	fle	'to buy'	fe-flee	'bought'	
(1c)	t͡si	'to grow'	t͡si-t͡sii	'grown up'	*tít͡sii
(1d)	k͡plo	'to lead'	k͡po-k͡plo	'leading'	*ko k͡plo
(1e)	nʲra	'to rave'	nʲa-nʲrala	'a raver'	*nanʲrala

Finally, complex segments must be distinguished from their corresponding (though phonetically longer) clusters because in some languages at least both are in CONTRAST with each other. Some examples are given in Table 1.

Different Types of Complex Segments

Following the criteria from the previous section, phonologists have identified quite a number of complex segments. Some of them are listed in Table 2 below along with their frequency in Maddieson's (1984) sample of 317 languages. Several conclusions can be drawn from crosslinguistic investigations such as Maddieson's: first and most obviously, some complex segments are widespread among the languages of the world, while others are exceedingly rare. The palato-alveolar affricate [t͡ʃ] is by far the most common, occurring in 141 (7=44.5%) of the languages in the database (80 languages have [d͡ʒ], 43 languages have [t͡ʃʰ], and 35 have [t͡ʃ']).

Second, the frequency of a particular complex segment is not entirely determined by its 'type.' Thus, the affricates [t͡ʃ] and [t͡s] are extremely frequent compared to [t̪͡θ̪], which occurs only in Luo and Chipewyan; [kʷ] is common, but only Nambakaengo (Santa Cruz) has [pʷ]; labiovelars [g͡b] (and [k͡p], in 18 languages) are relatively frequent, but coronovelars, such as the alveolar click [!] in Nama and !Xũ (Kung-Ekoka), or the rather obscure dentopalatal [t̪͡c] of Maung, are not; and while prenasalized stops [ᵐb, ⁿd, ᵑg] occur in 18 languages of the sample, their postnasalized counterparts [bᵐ, dⁿ, gᵑ] are restricted to a single language (Aranda) Western Arrarnta.

Third, complex segments tend to be homogeneous except for a single phonological dimension. This is evident from comparing the frequencies of [t͡ʃ], [ᵐb], [g͡b], or [tʲ] with doubly complex segments such as [t͡sʲ], [ⁿd͡ʒ], and [ŋ͡mg͡b].

Fourth, many potential complex segments do not occur at all in Maddieson's database, nor in any other known language. Restrictions apply to both contour segments and doubly articulated consonants: the former display internal changes in continuancy ([t͡s]), nasality ([ᵐb, bᵐ]), and laterality ([t͡ɬ]), but never in, e.g., voicing (*[t͡d, z͡s]), glottal width (*[m̥͡m̤, l̤͡l̥]), or sonorancy (*[f͡ʋ, ç͡j, ɬ͡l]). The latter are always composed of two, independently movable articulators, i.e., labial and dorsal ([k͡p, g͡b, ŋ͡m, ʘ]), coronal and dorsal ([ǀ, !, ǂ] and possibly [t̪͡c]), or coronal and labial ([t͡p, n͡m]) (in Yeletnye [Yele]; Ladefoged and Maddieson, 1996), but never bilabial and labiodental (*[m͡ɱ]), alveolar and retroflex (*[t͡ʈ]), palatal and velar (*[c͡k]), or velar and uvular (*[k͡q]) (see Halle, 1983).

The same restrictions apply to more heterogeneous types: [t͡sʲ], [ⁿd͡ʒ], and [ŋ͡mg͡b] are possible (and attested) doubly complex segments because their individual components are (cf. [t͡s], [tʲ], [ⁿd], [g͡b]); but *[k͡b], *[tʰ͡z], *[t͡ʈʲ], and *[ᵑ͡gɢ] are impermissible for the general absence of voicing contours (*[t͡d]), glottal width contours (*[m̥͡m̤]), multiple coronals (*[t͡ʈ]), and multiple dorsals (*[k͡q]), respectively.

There is no general agreement on how 'complex' a complex segment can get; but some phonologists have argued that the Chadic language Margi (Marghi Central) carries things to extremes. According to Sagey's (1986) analysis at least, Margi has affricates, prenasalized consonants, labialized consonants, and labiocoronals ([p͡t, b͡d]), as well as many of their combinations, yielding prenasalized, labialized stops ([ᵐbʷ, ᵑgʷ]), 'heterorganic affricates' ([p͡s, p͡ç, p͡ɬ]), stop–affricate combinations [p͡ts, p͡tʃ], and even some 'ternary-complex segments,' such as [ⁿt͡sʷ] and [ᵐb͡dz].

Table 1 Contrasts of complex segments and clusters

Language	*Complex segment*	*Cluster*
Eggon:	k͡pu 'die'	kpu 'kneel'
Russian:	pʲotr 'Peter'	pjot 'drink.3SG.'
Polish:	t͡ʃɨ 'whether'	tʃɨ 'three'
Kabardian:	d͡zaːʃ 'it has been thrown'	dzaːʃ 'we have filtered it'
Sinhala:	laⁿda 'blind'	landa 'thicket'

Source: Sagey (1986).

Phonological Representations for Complex Segments

Complex segments have played quite a role in various developments in theoretical phonology. Doubly articulated consonants have served as major evidence for a fundamental shift from place-of-articulation features to the so-called articulator-based theory (Halle, 1983; Clements and Hume, 1995). In this model, simple and multiply articulated consonants can be represented with different numbers and types of active articulators: simple

Table 2 Frequency of some complex segments

	t͡ʃ	t͡s	kʷ	g͡b	ᵐb	tʲ	t͡ɬ	ⁿd͡ʒ	t͡sʲ	t̪͡θ̪	!	pʷ	t̪͡c	ŋ͡mg͡b	bᵐ
Σ	141	95	38	19	18	12	8	5	3	2	2	1	1	1	1
%	44.5	30.0	12.0	6.0	5.7	3.8	2.5	1.6	0.9	0.6	0.6	0.3	0.3	0.3	0.3

Source: Maddieson (1984).

consonants receive a single consonantal articulator, as shown in (2a); doubly articulated consonants have two consonantal articulators (2b); and secondary-articulated consonants are specified for consonantal and vocalic articulators (2c).

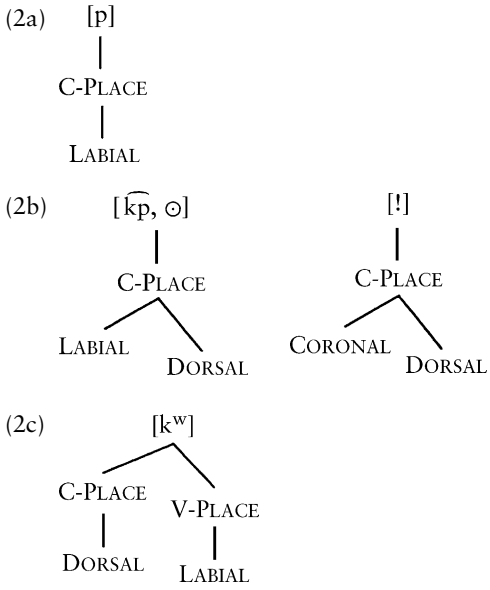

The feature geometrical structures in (2) are interpreted as phonologically unordered. This explains why no language contrasts, e.g., [k͡p] and [p͡k], or [kʷ] and [ʷk]. And it also accounts for the observation that multiply articulated consonants can spread both place specifications to a preceding consonant, as shown below for the labiovelar in Kpelle (Sagey, 1986: 37).

(3)	N-polu	[ḿ.bo.lu]		'my back'
	N-kɔː	[ŋ́.ɡɔː]		'my foot'
	N-k͡piŋ	[ŋ́m.ɡ͡biŋ]	*[ŋ́ɡ͡biŋ], *[ḿ.ɡ͡biŋ]	'myself'

Contour segments, on the other hand, seem to act as one type of sound to their left, but as another type to their right, a phenomenon known as the 'edge effect.' Prenasalized stops, for instance, often nasalize preceding vowels, e.g., /aⁿd/ → [ãⁿd] (in Guaraní, Kaingáng, and other languages), but never following vowels (/ⁿda/ → *[ⁿdã]; Anderson, 1976). Likewise, epenthesis in English plural forms such as *buses* ([-sɪz]), *bushes* ([-ʃɪz]), *Churches* (-[t͡ʃɪz]) and *edges* ([-d͡ʒɪz]) seems to treat affricates as continuant sounds at their right edge (though see 'Affricates as Strident Stops' below).

On the strength of these findings, contour segments are usually represented with phonologically ordered properties: affricates contain a sequence of [−continuant] and [+continuant] specifications (Hoard, 1971; Sagey, 1986), prenasalized stops are [+nasal] then [−nasal] sounds, and postnasalized stops display a change from [−nasal] to [+nasal] (Anderson, 1976). Most phonologists, including Hoard, Anderson, and Sagey, analyze such 'feature contours' as parts of single segments, as shown in (4).

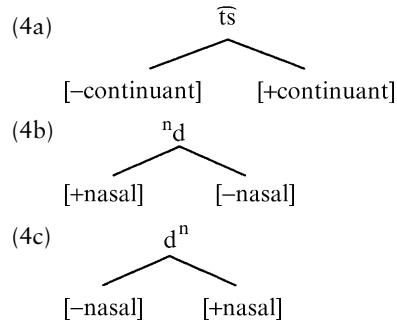

An alternative to segment-internal feature contours is Clements and Keyser's (1983) bisegmental analysis. They treat contour segments as combinations of two (closely related) simple segments sharing a single position in the syllable. This is sketched in (5).

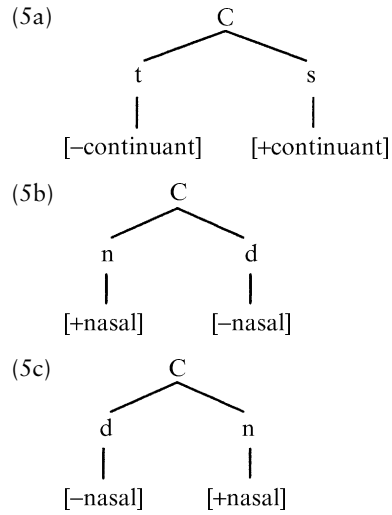

In Clements and Keyser's view, contour segments represent one of the three fundamental ways in which segments can be linked to the syllable template (the so-called skeletal tier): short segments are linked to single skeletal units (6a); long segments are linked to two positions (6b); and contour segments are represented as two segments linked to a single slot on the skeleton (6c).

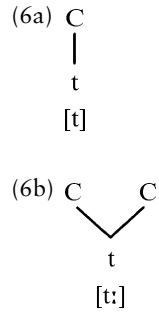

(6c)

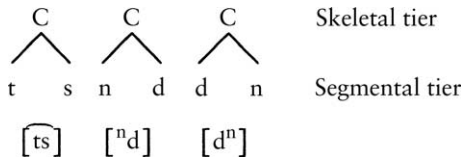

The unitary function of contour segments, in this model, follows from their monopositional status at the skeletal tier. This is shown in (7). (7a) illustrates the parallel phonotactic behavior of simple consonants and affricates in German; (7b) represents an intervocalic prenasalized stop in Dera; and (7c) shows how affricates can be distinguished from clusters in a language such as Polish.

(7a)

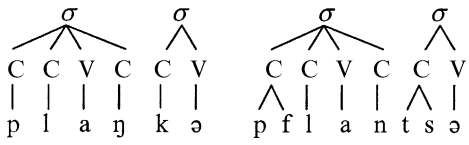

(7b)

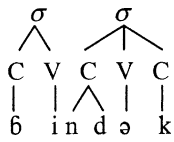

(7c)

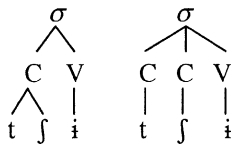

Affricates as Strident Stops

In an early feature analysis, Jakobson, *et al.* (1952) proposed to treat affricates as 'strident stops,' i.e., [+strident, −continuant] sounds. Proponents of the contour analysis of affricates have advanced three major problems with this view: (a) the existence of nonstrident affricates, such as [t̪͡θ̪] in Chipewyan and Luo; (b) the natural class of affricates and fricatives; and (c) the observation of edge effects, suggesting that affricates act as stops only to their left, but as fricatives to their right.

More recent work, however, has raised serious objections to all these points, thereby putting the strident stop approach back on the map. First, contrary to what the internal ordering of features would predict, affricates may well act as [−continuant] sounds to their right (the so-called antiedge effects; see Lombardi, 1990). Second, on closer examination, the alleged natural class of affricates and fricatives as [+continuant] sounds turns out to be a natural class of [+strident] sounds, because it includes stridents, [s, ʃ, ʂ, t͡s, t͡ʃ, t͡ʂ] etc., but excludes nonstrident continuants (see LaCharité, 1993, Kim, 1997, Kehrein, 2002). The English plural, mentioned in the previous section, is a typical example in this regard: only [+strident] explains why epenthesis shows up in *bushes* and *churches* though not in, e.g., *cliffs* ([-fs]) and *moths* ([-θs]) (see also Rubach, 1994, on the active role of stridency in the phonology of Polish).

Finally, Clements (1999) and Kehrein (2002) rejected the idea of nonstrident affricates as independent phonological entities because these sounds never contrast with stops. Rather, they occur either (a) as phonetic variants of simple stops, as in Diyari (Dieri) [t̪] ∼ [t̪͡θ̪], for instance, or (b) as the phonetic realization of a particular laryngeal series of stops, e.g., Tahltan [q, q'] but [qˣʰ], or (c) in cases of minor place distinctions, such as Chipewyan and Luo, which have laminodental [t̪͡θ̪] and apicoalveolar [t], though neither [t̪] nor [t͡θ] (see Clements, 1999; and Kehrein, 2002 for more examples and references).

The findings suggest that affricates are, though phonetically complex, rather simple sounds at the phonological level: strident affricates such as [t͡s, t͡ʃ, t͡ʂ] are specified for [−continuant, +strident], lateral affricates [t͡ɬ, d͡ɮ] are specified for [−continuant, +lateral] (see Kehrein, 2002), and nonstrident affricates ([t̪͡θ̪, k͡x, q͡χ] etc.) are ordinary simple stops phonologically, i.e., [−continuant] sounds. Their affricated phonetic forms, in this view, follow exclusively from requirements of perceptibility. Laterality and stridency are necessarily sequenced with respect to oral closure; and affrication of simple stops might be explained as a strategy to increase the perceptibility of other phonological distinctions, laryngeal series and minor place contrasts in particular.

See also: Autosegmental Phonology; Diphthongs; Distinctive Features; Feature Organization; Phoneme; Phonological Typology.

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Componential Analysis

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Componential Analysis

Componential analysis is an approach that describes word meanings as a combination of elementary meaning components called semantic features or semantic components. The set of basic features is supposed to be finite. These basic features are primitive in the sense that they are the undefined building blocks of lexical-semantic definitions. Hence, the term 'semantic primitives' (or sometimes 'atomic predicates') is used to refer to the basic features.

The advantage of having definitional elements that themselves remain undefined resides in the possibility of avoiding circularity: if the definitional language and the defined language are identical, words are ultimately defined in terms of themselves – in which case the explanatory value of definitions seems to wholly disappear. More particularly, definitional circularity would seem to imply that it is impossible to step outside the realm of language and to explain how language is related to the world.

This motivation for having undefined primitive elements imposes an important restriction on the set of primitive features. In fact, if achieving noncircularity is the point, the set of primitives should be smaller than the set of words to be defined: there is no reductive or explanatory value in a set of undefined defining elements that is as large as the set of concepts to be defined. Furthermore, the idea was put forward that the restricted set of primitive features might be universal, just like in phonology. This universality is not, however, a necessary consequence of the primitive nature of features: the definitional set of features could well be language specific.

The European Tradition of Componential Analysis

Componential analysis was developed in the second half of the 1950s and the beginning of the 1960s by European and American linguists, at least to some extent independently of each other. Although the first step in the direction of componential analysis can be found in the work of Louis Hjelmslev (Hjelmslev, 1953), its full development does not emerge in Europe before the early 1960s, in the work of Bernard Pottier (Pottier, 1964; Pottier, 1965), Eugenio Coseriu (Coseriu, 1964; Coseriu, 1967) and Algirdas Greimas (Greimas, 1966). The fundamental idea behind these studies is that the items in a lexical field are mutually distinguished by functional oppositions. In this sense, componential analysis grew out of a desire to provide a systematic analysis of the semantic relations within a lexical field.

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Methodologically speaking, componential analysis has a double background. First, it links up with the traditional lexicographical practice of defining concepts in an analytical way, by splitting them up into more basic concepts; thus, a definition of *ram* as 'male sheep' uses the differentiating feature 'male' to distinguish the term *ram* from other items in the field of words referring to sheep. In the Aristotelian and Thomistic tradition, this manner of defining is known as a definition *per genus proximum et differentias specificas*, i.e., (roughly) 'by stating the superordinate class to which something belongs, together with the specific characteristics that differentiate it from the other members of the class.' Second, the background of the componential idea can be traced to structural phonology, where the sound inventory of natural languages had been successfully described by means of a restricted number of oppositions.

On the basis of this phonological model, the structuralist semanticians set out to look for functional oppositions within a lexical field, oppositions that are represented, as in phonology, by means of a binary plus/minus notation. Pottier (1964) provides an example in his analysis of a field consisting (among others) of the terms *pouf*, *tabouret*, *chaise*, *fauteuil*, and *canapé*; the term that delimits the field as a superordinate term is *siège*, 'sitting equipment with legs.' These five words can be contrasted mutually by means of distinctive oppositions. Consider the following set:

s_1 'for sitting'
s_2 'with legs'
s_3 'with back'
s_4 'for a single person'
s_5 'with arms'
s_6 'made from hard material.'

We can then define the items in the field:

S_1	*chaise*	$+s_1, +s_2, +s_3, +s_4, -s_5, +s_6$
S_2	*fauteuil*	$+s_1, +s_2, +s_3, +s_4, +s_5, +s_6$
S_3	*tabouret*	$+s_1, +s_2, -s_3, +s_4, -s_5, +s_6$
S_4	*canapé*	$+s_1, +s_2, +s_3, -s_4, +s_5, +s_6$
S_5	*pouf*	$+s_1, +s_2, -s_3, +s_4, -s_5, -s_6$

The work of the structuralist semanticians of the European school tends to be rich in terminological distinctions, and this is also the case in Pottier's work. The values of the oppositional dimensions (s_1, s_2, etc.) are called *sèmes*, and the meaning of a *lexème* (lexical item) is a *sémème* (S_1, S_2, etc). *Siège*, then, is the *archilexème*, and the meaning of this *archilexème* (in this case, features s_1 and s_2) is the *archisémème*. The *archisémème* is present in the *semèmes* of any of the separate *lexèmes* in the field. This is not yet the whole story, since *fonctèmes* (relevant for the description of grammatical meaning aspects, such as word class) and *classèmes* (*sèmes* that recur throughout the entire vocabulary) should also be taken into account.

This terminological abundance has, however, hardly found its way to the customary semantic vocabulary (although the English counterparts of the French terms, such as 'sememe' and 'seme,' may occasionally be met with). This illustrates the fact that, as mentioned before, the European branch of componential analysis has remained more or less isolated. Specifically, it has not played an important role in the developments that grew out of the American branch, such as the incorporation of componential analysis into generative grammar. Beside the ones mentioned above, other names that are of importance within the European tradition are those of Horst Geckeler (Geckeler, 1971), who specifically continues the lines set out by Coseriu, Klaus Heger (Heger, 1964), Kurt Baldinger (Baldinger, 1980), and Leonhard Lipka (Lipka, 2002). Through the work of Greimas, European structuralist semantics has had a considerable impact outside linguistics, especially in literary studies.

The American Tradition of Componential Analysis

In America, the componential method emerged from anthropological linguistic studies. In a rudimentary way, this is the case with Conklin (1955), whereas a thorough empirical, formal, and theoretical elaboration is provided by Goodenough (1956) and especially Lounsbury (1956). The major breakthrough of componential analysis did not, however, occur until the appearance of Jerrold J. Katz and Jerry A. Fodor's seminal article "The structure of a semantic theory" (Katz and Fodor, 1963). It was Katz in particular who extended and defended the theory afterward; see especially Katz (1972).

Rather than analyzing a lexical field, Katz and Fodor gave an example of the way in which the meanings of a single word, when analyzed componentially, can be represented as part of a formalized dictionary. Such a formalized dictionary (to distinguish it from ordinary dictionaries, it is sometimes referred to by the term 'lexicon') would then be part of a formal grammar. What the entry for the English word *bachelor* would look like is demonstrated in Figure 1. Next to word form and word class, two kinds of semantic components can be found in the diagram: markers and distinguishers (indicated with parentheses and square brackets respectively). Markers constitute what is called the systematic part

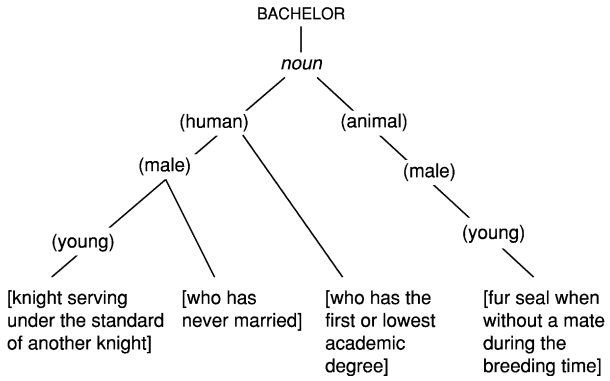

Figure 1 Componential analysis of *bachelor* (after Katz and Fodor, 1963).

of the meaning of an item. Like Pottier's *classèmes*, they recur throughout the lexicon. Specifically, they are supposed to represent those features in terms of which selection restrictions (semantic restrictions on the combinatory possibilities of words) are formulated. Distinguishers represent what is idiosyncratic rather than systematic about the meaning of an item; they only appear on the lowest level of the formalized representation.

The Katzian approach has had to endure heavy attacks (among others from Bolinger, 1965, Weinreich 1966, and Bierwisch 1969), and Katz's views gradually moved to the background of the ongoing discussions. The Katzian distinction between markers and distinguishers, for instance, was generally found not to be well established, and was consequently abandoned. Conversely, various other distinctions between types of features were proposed, two kinds of which may be mentioned separately. To begin with, binary features of the plus/minus type were supplemented with nonbinary features, which represent cases where the distinctive dimension can have more than two values. Leech (1974), for instance, suggested a distinctive dimension 'metal' with multiple values, in order to distinguish between gold, copper, iron, mercury, and so on. Further, a distinction between elementary and complex features was drawn to stress the fact that a concept with distinctive value in one lexical field might itself have to be subjected to further decomposition, until the ultimate level of basic features was reached.

Other developments triggered by the Katzian approach included attempts to combine componential analysis with other forms of semantic analysis, e.g., with lexical field theory (Lehrer, 1974; Lutzeier 1981). One should bear in mind that suggestions such as those enumerated here, although leading away from the original Katzian model, were by and large situated within the very framework that was designed by Katz and Fodor, i.e., that of a formalized componential meaning representation as part of a formal grammar.

The Contemporary Situation

Basically, the contemporary attitude of linguists towards componential analysis takes one of three forms: componential analysis may be used as a descriptive formalism, as an epistemological necessity, or as a heuristic instrument.

To begin with, there are various approaches in formal grammar that use some form of semantic decomposition as a descriptive device: see for instance Dowty (1979) and Pustejovsky (1995), which incorporated ideas from componential analysis in the framework of logical semantics. With the exception of researchers such as Ray Jackendoff (Jackendoff, 2002), who dialogues actively with cognitive psychology, the approaches mentioned here tend to pay minimal attention to the methodological question of how to establish the basic, primitive nature of semantic features. If the original Katzian approach combines the idea of primitiveness with the idea of formalization, most of the approaches in this first contemporary group stress the formalization aspect more than the systematic quest for primitives.

The converse is the case in Anna Wierzbicka's natural semantic metalanguage approach (*see* **Natural Semantic Metalanguage**), which is not much interested in formalization of lexical and grammatical analyses, but which systematically tries to establish the basic set of primitive concepts.

Third, at the other extreme, cognitive semantics and related approaches within contemporary semantics question the componential approach itself: what is the justification for assuming that lexical meanings are to be represented in a fragmented way, as a collection of more basic semantic elements? The antidecompositional reasoning takes many forms (see Fillmore, 1975 for one of the most influential statements), but one of the basic arguments is the following.

The appeal of noncircular definitions seemed to be that they could explain how the gap between linguistic meaning and extralinguistic reality is bridged: if determining whether a concept A applies to thing B entails checking whether the features that make up the definition of A apply to B as an extralinguistic entity, then words are related to the world through the intermediary of primitive features. But obviously, this does not explain how the basic features themselves bridge the gap. More generally, the 'referential connection' problem for words remains unsolved as long as it is not solved for the primitives. And

conversely, if the 'referential connection' problem could be solved for primitive features, the same solution might very well be applicable to words as a whole. So, if noncircularity does not solve the referential problem as such, decomposition is not *a priori* to be preferred over nondecompositional approaches, and psychological evidence for one or the other can be taken into account (see Aitchison, 2003 for an overview of the psychological issues).

However, even within those approaches that do not consider semantic decomposition to be epistemologically indispensable, componential analysis may be used as a heuristic device. For instance, in Geeraerts *et al*. (1994), a work that is firmly situated within the tradition of cognitive semantics, the internal prototypical structure of lexical categories is analyzed on the basis of a componential analysis of the referents of the words in question.

It would seem, in other words, that there is widespread agreement in linguistics about the usefulness of componential analysis as a descriptive and heuristic tool, but the associated epistemological view that there is a primitive set of basic features is generally treated with much more caution.

See also: Cognitive Semantics; Lexical Fields; Natural Semantic Metalanguage; Semantic Primitives.

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Compositionality: Philosophical Aspects

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There are three different but loosely related conceptions that are associated with the term 'compositionality' in the literature of philosophical and linguistic semantics.

One conception, taking its lead from the more literal sense of this technical term, concerns the manner of composition of objects in the world. In this sense, an object or type of object is compositional if it is identical with its parts when they are assembled in some specified way. A slogan for this notion of compositionality is: "An object is the sum of its parts." However, this is a slightly misleading slogan, because

conversely, if the 'referential connection' problem could be solved for primitive features, the same solution might very well be applicable to words as a whole. So, if noncircularity does not solve the referential problem as such, decomposition is not *a priori* to be preferred over nondecompositional approaches, and psychological evidence for one or the other can be taken into account (see Aitchison, 2003 for an overview of the psychological issues).

However, even within those approaches that do not consider semantic decomposition to be epistemologically indispensable, componential analysis may be used as a heuristic device. For instance, in Geeraerts *et al*. (1994), a work that is firmly situated within the tradition of cognitive semantics, the internal prototypical structure of lexical categories is analyzed on the basis of a componential analysis of the referents of the words in question.

It would seem, in other words, that there is widespread agreement in linguistics about the usefulness of componential analysis as a descriptive and heuristic tool, but the associated epistemological view that there is a primitive set of basic features is generally treated with much more caution.

See also: Cognitive Semantics; Lexical Fields; Natural Semantic Metalanguage; Semantic Primitives.

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it does not distinguish between two different types of objects made of the same parts but put together differently. This notion of compositionality is metaphysical in nature: it provides a characterization of the ontology of objects in the world, saying that they can all be described in terms of some basic atomic elements and their combinations. Along with this ontological feature often goes an epistemological feature: that one can know objects in the world by understanding what the atomic items are and the ways they can be assembled. Both the ontological and the epistemological aspects here are further associated with reductionism: the view that objects are "nothing more than" their parts. In this meaning of compositionality, the compositionalists are often called 'atomists,' and anti-compositionalists are called 'holists' or sometimes 'wholists.' These latter theorists deny that all objects can be described and known in terms of their parts and the arrangement of the parts – for instance, they might deny that a corporation, a nation, or a group is "nothing more than" the class of individuals making them up together with their relationships – and hence they are antireductionistic. They might also hold that there are emergent properties and gestalt properties that cannot be described and known in the way required by atomism. A slogan for these theories is: "The whole is more than the sum of its parts."

In the field of semantics, whether semantics of natural language or of mental items, there is a somewhat different conception of compositionality in play. In this realm, it is meaning that is claimed to be compositional; but since meaning is always meaning **of** something, it is this other something that defines the parts and the whole, unlike the case of the first sort of compositionality. The slogan for this second conception of compositionality is: "The meaning of a whole is determined by the meaning of its parts and the way these parts are combined." What we see here is that a **feature** of a whole (its meaning) is claimed to be **determined** by the similar feature in the parts of the whole, plus the mode of combination of these parts – unlike the case of the first type of compositionality, in which it was the whole itself that was alleged to be "nothing more than" its parts. In the second type of compositionality, the notions of 'part' and 'whole', as well as their mode of combination, are presupposed to be already defined in terms of an independent syntax (in the case of language) or an independent mental economy (in the case of concepts). So the realm of syntax or mental economy is presupposed to be compositional in the first sense, and the issue is whether the property of meaning that is associated with the parts and wholes will likewise compose. Since the second conception assumes that the first conception applies to the background syntax, this second conception presupposes basic or primitive meanings for the atomic (syntactic or mental) parts out of which all other (syntactic or mental) items are composed. (Once this second notion of compositionality is acknowledged, where there is a presupposed part-whole structure and it is then asked whether a feature of the whole is somehow determined by the similar features in the parts, one can see questions of compositionality arising in many fields, not just in semantics. For example, one might wonder whether the intrinsic value of an action is determined by the values of the parts of the action and the way the parts are ordered. One might wonder whether the beauty of a whole is determined by the beauty of its parts and the way the parts are combined. One might wonder whether the duties and obligations of a corporation or a society are determined by those of its members and the way these members fit together to form the corporation or society.)

Obviously, whether semantic compositionality is true or false depends upon the presupposed syntax or mental economy, the conception of meaning under consideration, and what is meant by the phrase "is determined by." Indeed, many theorists have thought that this indeterminism inherent in semantic compositionality shows that its truth or falsity is merely "a methodological matter." For a small alteration in the underlying syntax or mental economy might make a given semantics become non-compositional; a slight change in the assumed notion of 'determination' might make it become compositional again; an inclusion or exclusion of some property as "being semantic meaning" (as opposed, say, to "being pragmatics") makes it become non-compositional again; and there might be no reason to make these changes other than to keep or deny compositionality.

The most popular explanation of "is determined by" in the semantic compositionalist's slogan is that it means 'is a (mathematical) function of'; so the slogan becomes: "The meaning of a complex syntactic unit is a (mathematical) function of the meanings of its syntactic parts and the way in which they are syntactically combined." But according to some, this notion allows too much: it is claimed that if no constraints are put upon the function, nearly any meanings of parts and syntactic combination can be compositionally related to the meaning of a whole. Some theorists would want to make the function be natural or systematic (and so on), without saying much about what, exactly and in the abstract, would make a function be natural or systematic. More usual is to be given examples of what sort of mathematical function should be ruled out. Consider the idea that an adjective like *red* means something

different depending on what noun it modifies. For example, according to this view, *red wine* vs. *red rose* vs. *red hair* vs. *red skin* vs. *red grapefruit* all employ a different meaning of *red*. And then compositionality is false, because these phrases are all constructed by the same syntactic rule and yet the meaning of *red* changes as a result of some syntactic item (viz., the noun being modified) that is not a part of the lexical item *red*. But a defender of compositionality could respond that the meaning of *red* is constant throughout, by being disjunctive ("when modifying *wine* it means r_1; when modifying *hair* it means r_2; etc."). This is a perfectly good mathematical function and would obviously yield the right meanings of wholes if there were enough disjuncts. Those who object to the mathematical notion of function in the definition of compositionality might claim here that disjunctive functions are "not natural."

The notion opposed to semantic compositionality is 'semantic holism'. However, this notion means different things to different theorists, and it is not always just taken to mean merely that there is no mathematical function that will generate the required meanings. For example, some people call semantic holism the view that "words have meaning only in the context of a sentence" or that no word or other syntactic unit (including sentences, paragraphs, and discourses) has meaning in itself, but only in the setting of an entire theory or worldview or form of life. Others take semantic holism to be that the meaning of a syntactically defined item is determined not only by the meanings of its syntactic parts and their syntactic combination but also by the nonlinguistic context in which the utterance is made. (For example, it might be thought that the meaning of *There is no money* depends on who is speaking, whether the audience knows which business deal is being discussed, and so forth.) And still other holists, not necessarily wanting to bring these nonlinguistic items into meaning, nonetheless might hold that there are cases where the meaning of a syntactically complex item depends on meanings of linguistic items that are not syntactic parts of the complex. (For example, in *The first man landed on the moon in 1969,* we cannot take the meaning of *the first man* and combine it with *landed on the moon in 1969* to get the right meaning, for there is no sense in which the sentence really is talking about *the first man*. Rather, the relevant meaning of the subject term is that of *the first man who landed on the moon*. But to obtain that meaning, we need to get information from the verb phrase. Hence, to get the meaning of the subject term we need information of items that are not syntactic parts of the subject term.)

A third conception for (semantic) compositionality is less definite than the preceding, and comes through considerations that might be called 'the magic of language'. A set of closely related considerations have been pointed at in various times in the history of philosophy, both Western and Indian:

- We can **understand** an infinite number of novel sentences, so long as they employ words we already understand. We understand sentences and combinations that we have never encountered.
- We can **create** new sentences that we have never heard or used before, and we know that they are appropriate to the situation in which we use them.
- We are finite creatures who are exposed to a finite amount of information concerning our language. Nonetheless, we **learn** a system that is capable of infinite expression.

These considerations all point to the same features: (1) that language is something special (infinite, novel, creative, or whatever) and (2) that people manage to use/learn/understand language despite their finite nature. It is natural to see compositionality as an explanation of this ability – people have a finite stock of atomic items whose meanings are learned primitively, and there is a finite number of rules of combination whose effect on meaning are learned. But given that the rules are recursive in nature, this allows for an infinite number of sentences whose meanings are finitely knowable. (The opening paragraph of Frege [1923] is often taken to be an endorsement of this argument for compositionality, but it is a matter of scholarly dispute as to whether or not Frege actually believed in semantic compositionality. See Pelletier, 2001 and Janssen, 2001 for discussion and further references.)

This third conception of (semantic) compositionality is a 'functional' one and thus less definite than the preceding two. It amounts to saying that compositionality is *whatever* accounts for the magic of language. It might be the second conception of compositionality, with its mathematical functions, that will do the trick, or it might be some other, more exotic type of function. Or it may be some function that operates on items that are not necessarily syntactic subparts of the expression to be evaluated, and somehow thereby brings in information from context (of both linguistic and nonlinguistic varieties).

The magic of language considerations are the only arguments in favor of compositionality that do not seem merely to turn on such methodological considerations as the aesthetics of the syntax-semantics interface. However, it should be noted that they are not conclusive in relation to compositionality-as-mathematical-function. The second notion of compositionality does not guarantee the magic, nor does

non-compositionality in this second notion necessarily deny the magic. For it might be that the meaning of every syntactic whole is a function of the meanings of its parts and its syntactic mode of combination, but if these functions are not computable functions, then the language cannot be learned/used/understood in the way required by the magic. On the other hand, even if there is no function defined solely by the meanings of the parts and their modes of combination that will yield the meanings of the wholes, it could nonetheless be true that these meanings are computable in some other way ... and then the magic would still be there. (An example of this possibility is Pelletier's 1994/2004 'semantic groundedness'.)

Considerations Against Semantic Compositionality

The linguistic semantics literature is rife with demonstrations of how some linguistic phenomenon can or cannot be given a compositional description. It often seems that these works would more accurately be described as demonstrating how a phenomenon can or cannot be given a compositional description **employing some particular syntactic-semantic device or within some specific syntactic-semantic theory.** There are, however, three more general arguments that have been presented against semantic compositionality. The first is an argument from (nonlinguistic) context, of the sort mentioned above, where it is claimed that the meaning of a sentence in a context just cannot be derived from the meanings of the words and their combinations. In evaluating this argument, scholars need to distinguish between (what might be called) 'literal meaning' and 'occasion meaning'. The former is thought of as the meaning-in-language, while the latter is thought of as the meaning-in-a-context. If there is such a distinction, then there will be two principles of semantic compositionality – one for each type of meaning. And it is not so clear that either of them is overturned by considerations of context. The only casualty would be a mixed principle that no one believes, i.e., that the occasion meaning of a complex expression is a mathematical function of the literal meanings of its parts and their manner of combination.

The second general argument against compositionality comes from the existence of synonymy and Mates-like (Mates, 1950) considerations. Given that there is synonymy, so that x1 and x2 mean the same, then there are two sentences, S1 and S2, that differ only in that one contains x1 while the other contains x2. Given compositionality, it follows that S1 and S2 are synonymous too; and by compositionality again, it follows that *Mary believes S1* and *Mary believes S2* are synonymous. But for any such S1 and S2, it can be the case that the former is true, while the latter is false. However, it cannot be the case that, of two synonymous sentences, one is true and the other false. Hence, either there is no synonymy or else compositionality is wrong. And the existence of synonymy is more secure than that of compositionality.

The third general argument comes from the existence of ambiguity. If compositionality implies that the meaning of a whole is a mathematical function of the meanings of its parts (and combination), then there cannot be any ambiguity of the sort where **one and the same item** has two or more meanings, for that would deny that it was a function that computed meaning. As with synonymy, one could of course deny the existence of ambiguity; but most theorists find that this is too lavish a position to take. So it is usually admitted by compositionalists that individual words can be ambiguous; therefore, sentences using these ambiguous words may also be ambiguous (but the ambiguities are always traceable to the ambiguity of the words). Also, it is pointed out that strings of words such as *Visiting professors can be fun* are ambiguous (is it the professors or the activity of visiting the professors that can be fun?), but this ambiguity is traceable to the fact that the words are put together in different ways – that is, there are different structural descriptions that can be associated with this string of words. Hence, this ambiguity is not a challenge to compositionality. However, Pelletier (1994/2004) points to a number of examples that seem neither to have ambiguous words nor to have different structural descriptions but which are nonetheless ambiguous. For example: *When Alice rode a bicycle, she went to school*. This seems to have but one syntactic analysis within any particular theory, but its meaning is ambiguous: *On those occasions where Alice rode a bicycle, she took it to school* vs. *Back in the days when Alice was a bicyclist, she was a student*.

Formal Considerations

There have been a number of works concerned with the question of whether compositionality is a nonempirical issue on the grounds of certain formal features that are required by compositionality. A review article that surveys this work is Westerståhl (1998). More recent work on formal features of compositional semantics is in the important work of Hodges (2001) and material based on this.

History

Although the general principle of compositionality seems to have been around for some time, as

mentioned earlier, it is not clear when the term 'compositionality' came into the linguistic semantics literature (unlike 'holism,' which was introduced by Smuts, 1926). 'Compositionality' is used by Katz (1973) and Thomason (1974).

See also: Context Principle; Holism, Semantic and Epistemic; Human Language Processing: Connectionist Models; Reductionism; Representation in Language and Mind; Systematicity.

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According to the principle of compositionality, the meaning of a complex expression depends only on the meanings of its constituents and on the way these constituents have been put together. The kind of dependence involved here is usually a functional one.

> Principle of Compositionality (PC): The meaning of complex expression is a function of the meanings of its constituents and of the rule by which they were combined.

PC is rather vague unless one specifies the meanings of 'is a function of' and 'meaning(s)', something that is easier said than done. A more rigorous formulation of these notions is possible for formal languages and is due to Richard Montague.

Montague (1974) defined compositionality as the requirement of the existence of a homomorphism between syntax and semantics, both to be understood as 'structures' in the mathematical sense. To keep technicalities down to a minimum, Montague's requirement of a compositional interpretation was that for each syntactic operation 'O' that applies to n expressions $e_1, \ldots, e_n$ in order to form the complex expression '$O(e_1, \ldots, e_n)$', the interpretation of the complex expression '$O_i(e_1, \ldots, e_n)$' is the result of the application of the semantic operation 'C_i', which is the interpretation of 'O_i' to the interpretations $m_1, \ldots, m_n$ of 'e_1', …,'e_n', respectively. In other

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See also: Context Principle; Holism, Semantic and Epistemic; Human Language Processing: Connectionist Models; Reductionism; Representation in Language and Mind; Systematicity.

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Montague (1974) defined compositionality as the requirement of the existence of a homomorphism between syntax and semantics, both to be understood as 'structures' in the mathematical sense. To keep technicalities down to a minimum, Montague's requirement of a compositional interpretation was that for each syntactic operation 'O' that applies to n expressions $e_1, \ldots, e_n$ in order to form the complex expression '$O(e_1, \ldots, e_n)$', the interpretation of the complex expression '$O_i(e_1, \ldots, e_n)$' is the result of the application of the semantic operation 'C_i', which is the interpretation of 'O_i' to the interpretations $m_1, \ldots, m_n$ of 'e_1', …,'e_n', respectively. In other

words, the interpretation of 'O_i (e_1, ..., e_n)' is C_i (m_1, ..., m_n).

An immediate consequence of PC is the 'Substitutivity Condition': Substituting a constituent with its synonym in a given expression does not change the meaning of the resulting expression. Thus, PC is violated if a complex expression has meaning but some of its component expressions do not (the Domain Condition) or if the Substitutivity Condition fails.

As one can see, PC is by itself rather weak, and so it comes as no surprise that in the case of formal languages, one can always devise a trivial compositional interpretation by assigning some arbitrary entities to the primitive expressions of the language and then associating arbitrarily the syntactic operations of the language with corresponding operations on the domain of those entities. This way of implementing the principle can hardly be of any interest, although it has led some philosophers and logicians to claim that PC is methodologically empty.

A slightly more interesting case is the one in which one has an intended semantic interpretation in mind, that is, an interpretation with an intended domain of entities for the primitive expressions of the language to be mapped into, and a class of intended operations to serve as the appropriate interpretations of the syntactic operations of the language. A case in point is Horwich's (1998) interpretation. His formal language was intended to serve as a regimentation for a fragment of English that contains proper names ('John,' 'Peter,' etc.), common nouns ('dogs,' 'cows,' etc.), and verb phrases ('talks,' 'walks,' 'bark,' etc.) as primitive expressions together with grammatical operations on them. For simplicity, let us assume predication is such a grammatical operation marked in this case by an empty space. Thus the syntax contains clauses of the form:

> If '*n*' is a proper name and '*v*' is a verb phrase, then '*n v*' is a complex expression.

The intended semantic interpretation consists of a domain of entities that serve as the intended meanings of the proper names and verbs phrases (whatever they are; they are marked by capitals), together with an operation – say, P – that interprets the grammatical operation of predication (whatever that is). The only thing one needs to worry about in this case is to see to it that the operation of predication is defined for the entities mentioned above. The relevant semantic clauses now have this form:

> The interpretation of '*n v*' is the result of the application of P to the entities assigned to '*n*' and '*v*', respectively.

Thus, the interpretation of the sentence 'John talks' is the result of the application of P to TALKS to JOHN. This interpretation is trivially compositional in that the interpretation of every compound '*n v*' has been defined as the result of the application of the operation assigned to the syntactic operation of concatenation to the interpretations of '*n*' and '*v*', respectively. The more challenging cases for PC are those in which one has an intended interpretation for the complex expressions and would like to find a compositional interpretation that agrees with it. In contrast to the previous case, the meanings of the complex entities are not any longer defined but are given at the outset. We have here a typical combination of PC with the *Context Principle* (CP): An expression has a meaning only in the context in which it occurs. The combination was largely explored in the work of Gottlob Frege and in Donald Davidson's theory of meaning, which assumed the form of a theory of truth. Davidson took whole sentences to be the meaning-carrying units in language, and truth to be a primitive, undefinable semantic property that is best understood. Truth being undefinable, the strategy applied above, which ensured a trivial implementation of PC, is no longer available. Instead, PC acquires the status of a methodological constraint on an empirical theory of truth for the target language: the division of a sentence into parts and their association with appropriate semantic entities in a compositional theory becomes a theoretical business that has no other role except to show how they contribute to the computation of the truth of the sentences of the target language in which they occur.

The literature on formal semantics for natural language has plenty of cases of the application of the Context Principle. We consider just two examples. In *game-theoretical semantics* (GTS), one starts with a standard first-order language and defines truth only for the sentences of that language. The truth of every such sentence (in a prenex normal form) is defined via a second-order sentence, known as its Skolem form. This interpretation is clearly not compositional, since it violates the Domain Condition. One can now ask whether there is a compositional interpretation that agrees with the given game-theoretical interpretation of sentences. It is known that the answer is positive, but only assuming certain nontrivial mathematical principles (the Axiom of Choice).

The second example concerns Dynamic Predicate Logic. The starting point is the same language as in GTS – that is, a standard first-order language – but we now want a compositional interpretation in which, e.g., an existential quantifier occurring in the antecedent of a conditional binds a free variable occurring in the consequence of the conditional and in addition has the force of an universal quantifier.

There is a compositional interpretation that has the required property, that of Dynamic Predicate Logic (Groenendijk and Stokhoff, 1991).

From a technical point of view, the situation described in the two examples may be depicted as an extension problem (Hodges, 1998). One starts with an intended interpretation I, which either (a) fixes only the interpretation of certain complex expressions (e.g., sentences) or (b) puts some relational constraints on the interpretation of complex expressions. One then wants to find a compositional interpretation I' that agrees with the independently understood interpretation I. Hodges's Extension Theorem solves case (a). It shows that any partial interpretation for a grammar can be extended to a total compositional interpretation. This shows that the combination of PC with CP (in its form [a]) is trivially satisfiable. The more interesting cases are those falling under (b). This is the situation that typically arises in the case of empirical linguistics where the intended interpretation is supposed to be motivated by empirical argument.

As an illustration, consider the much-discussed 'pet fish' problem. There is some empirical evidence to the effect that the meanings of concept words are prototypes. A prototype is either a good exemplar of the category or a statistical average of all or some instances of the category (Smith and Medin, 1981). A given instance x is then categorized as X if x resembles the prototype of X more than any other prototype. Given two expressions X (e.g., 'pet') and Y ('fish'), one asks whether there is an interpretation that assigns to the complex concept word XY ('pet fish') a prototype that is the composition of the prototype assigned to X and the prototype assigned to Y. One also wants the meaning function to satisfy certain basic properties that are required for explanatory purposes; e.g., it should be the case that if x is XY, it must also be X and Y. We thus want every x to resemble the prototype of XY no less than it resembles the prototypes of X and Y. It has been argued that there is no such interpretation, that is, there is no operation of composition that yields a prototype as the interpretation of XY with the desired properties when applied to the two prototypes that are the interpretations of X and Y respectively (Fodor, 1998; Osherson and Smith, 1981).

The moral to be drawn from all this should have been somehow anticipated from our discussion of formal languages. When the intended interpretation puts constraints only on the meanings of primitive expressions and on the operations governing them, PC follows rather trivially, provided the semantic entities of complex expressions are not constrained in any way.

When the intended interpretation concerns only the meanings of complex expressions, Hodges's extension theorem shows that a compositional semantics can still be found, at least in some cases, provided that one does not constrain the meanings of the primitive expressions or syntactical operations on them. In natural language, however, the situation is hardly so simple, as one meets constraints at every level. It is no wonder, then, that Fodor and Lepore (2002) argued that most theories of concepts or mental architecture in cognitive science are in contradiction with PC. The case of prototype semantics was only one example, but the same considerations apply to the theory that the meaning of a word is its use or the criteria for its application, etc.

PC is often defended as the best explanation of the empirical phenomenon of systematicity: Any competent speaker of a given language who has in his repertoire the complex expressions P, R, and Q has also in his repertoire the complex expressions in which P, R, and Q are permuted (provided they are grammatical). For instance, anybody who understands the sentence 'Mary loves John' also understands the sentence 'John loves Mary'. Fodor and his collaborators argued extensively that PC is the best explanation of the systematicity of language, but this is an issue that will not be tackled here (cf. Fodor and Pylyshyn, 1988; Fodor, 2001; Fodor and Lepore, 2002; Fodor, 2003; Aizawa, 2002).

PC should not be confused with the principles of productivity or generativity of language, which require that the expressions of a language be generated from a finite set of basic expressions and syntactical rules. Although it presupposes that the language under interpretation has a certain syntactic structure, PC does not take a stand on how that structure should be specified (phrase structure rules, derivational histories, etc.), as long as it is given a compositional interpretation.

See also: Compositionality: Philosophical Aspects; Context Principle; Game-Theoretical Semantics; Montague, Richard (1931–1971); Prototype Semantics; Systematicity.

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Compound

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Definitions

A compound is usually defined (somewhat paradoxically) as a word that is made up of two other words. This basic definition requires a certain amount of modification, some of it for all languages, some of it for specific languages. For example, there may be more than two 'words' involved in the formation of a compound, though there must be at least two. Word is to be understood in this definition as meaning 'lexeme.' The implication of this is that the forms in which the individual subwords appear may be differently defined in different languages: a citation form in one, a stem in another, a specific compounding form in yet a third, a word form in a fourth. Even this leaves room for a certain amount of disagreement about what a compound is in particular languages. Perhaps the rider should be added that the construction created by the two or more lexemes should not be a normal noncompound phrasal structure of the language: *well done* and *in time* are not compounds.

There appear to be two fundamental approaches to the nature of a compound. The first sees a compound as a particular construction type, an entity with a formal definition. The second views a compound as a lexical unit meeting certain criteria. Because the two overlap to a large extent, it may not be clear in which of these two senses the term is being used. For example, under either approach *blackbird*, *windmill*, and *combination lock* would count as compounds of English, as would *sky-blue, onto*, and *freeze-dry*. But the things we find in everyday headlines (such as *PM backs mercy killings bill*, where the relevant unit is *mercy killings bill*) are not included as compounds by those who view compounds as lexical units on the grounds that they arise through the productive use of syntactic rules, but are included as compounds by those who view compounds as a construction type. The argument in favor of the latter view would be that the major distinction between the lexical-item compounds and the headline compounds is frequency of occurrence and that there is no formal distinction to be drawn between the two groups.

Although this leaves us in the unfortunate situation of not necessarily being able to recognize compounds in a given language, there are a number of criteria that are generally accepted as correlating with compound status, at least to a certain degree. These will be considered immediately below.

Orthographic Criteria

Although orthographic criteria cannot be robust, given the number of languages that still are not written or, if written, have had an orthography imposed by nonnative speakers of the language, or, if neither of these, may not indicate word breaks in the orthography at all, nevertheless they are taken as a powerful indicator in those languages for which they are

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relevant. Compounds are assumed to show their status by being written as single words. This type of criterion is employed linguistically especially by corpus linguists, who may have no other way of isolating compounds. For such people, it is a clearly a less than ideal default. Unfortunately, it is taken as a serious definition by some outside corpus linguistics.

There are a number of problems with such a criterion. First, in a language like English, there is so much variation in the writing of two-word lexical items that even standard dictionaries (supposed arbiters of the prescribed norm) are unable to agree. *Rainforest, rain-forest*, and *rain forest* are all easily attestable, for example. It might be argued, however, that such variation merely shows the progress of an item like *rain forest* from syntactic sequence to lexical item. Unfortunately, such drift is not easily correlated with the relative age of dictionaries showing a particular orthography. More serious, though, are items like *a New York–Los Angeles flight*, which, on strict orthographic criteria, give compounds such as *York–Los*. We should also note that orthographic conventions can change, as where recent orthographic changes have made the writing of noun + noun sequences as two words a rather more common event in Danish than it used to be.

Phonological Criteria

There are a number of phonological ways in which status as single words may be indicated. These may be segmental or suprasegmental.

In English, for example, stress is sometimes taken to be criterial, distinguishing most clearly between examples like *blackbird* and *black bird*. Where noun + noun sequences are concerned, stress is less consistent in English, *church-warden*, for example, being reported with various stress patterns. And for examples like *sky-blue*, stress as the sole criterion would suggest that they are compounds when used attributively (*a sky-blue dress*) and not when used predicatively (*her dress was sky-blue*).

In Danish, the *stød* (or glottalization, corresponding to the use of tones in other Scandinavian varieties) is generally lost in the first element of a compound (Basbøll, 1985).

In Japanese, there is a process known as *rendaku*, whereby the initial consonant of the second element of a certain class of compounds becomes voiced, as in the examples in (1).

(1)	iro	'color'	kami	'paper'	→
		irogami	'colored paper'		
	e	'picture'	tako	'kite'	→
		edako	'picture kite'		
	ike	'arrange'	hana	'flower'	→
		ikebana	'flower arranging'		

In Sengseng, geminate consonants are permitted within a word, but are always broken up by an epenthetic vowel if they occur adjacent at word boundaries.

Morphological Criteria

It is sometimes claimed that since compounds are single lexemes, the only inflection allowed in them must be the inflection that allows that single word's functioning in the sentence as a whole to be seen. Accordingly, internal words (words acting as modifiers within the compound) are said to disallow inflections.

There are instances in which this appears to be true. In peninsular Scandinavian, for example, where definiteness is marked by a suffix, no marking for definiteness can occur on the modifying element of a compound.

There are other instances in which this rule appears to hold most of the time, but not all of the time. In English, for example, plural is not usually marked on the modifying elements in compounds so that even a noun like *trousers*, which rarely appears in the singular, has no plural marking in the compound *trouser-press*. However, there is an apparently increasing set of items in which internal plural marking is found: *official secrets act, suggestions box, weapons inspector.* The example of *mercy killings bill* cited earlier is an instance. Although we might want to argue that plural in English is not entirely inflectional, we appear to have sporadic counterexamples here.

Then there are instances in which this rule clearly does not hold. Sometimes these are sporadic, as in Danish *nytår* (new.NEUT·year), where a clearly inflectional neuter agreement occurs contrary to usual practice. In other languages, though, we may find systematic violations of the rule. Consider, for instance, the Finnish examples in (2) (from Sulkala and Karjalainen, 1992) or the Sanskrit examples in (3) (from Whitney, 1889).

(2) auto·n·ikkuna
car·GEN·window
'car window'
maa·lta·pako
country·ABL·flee.NOM
'rural depopulation'

(3) bhayaṁkartṛ
fear.ACC.causer
'causer of fear'

divikṣít
sky.LOC.dwelling
'dwelling in the sky'

Syntactic Criteria

Syntactic criteria are attempts to find ways of indicating that the compound is being treated in the syntax as a single unit and not as a sequence of two distinct units. This usually means that anaphora cannot pick out the modifying element in a compound, but can in a syntactic phrase. Thus, for English, it is noted that we can say *I thought this house had aluminum windows, not wooden ones* (where *ones* refers to windows, not aluminum windows, and thus shows *aluminum windows* to be made up of two elements), and also *The aluminum windows look good but I'm afraid that it may not be strong enough* (where *it*, in referring to the aluminum rather than to the whole compound, again shows that the two words are separate). In parallel instances with lexical compounds such as *combination lock*, the claim would be that *I wanted a combination lock but they only had Yale ones* and *I installed a combination lock and now I can't remember it* (where *it* refers to the combination) are not possible, indicating the unity of the sequence. Because these tests appear to be robust some of the time, they are hard to argue against, but we can make some comments here. First, intuitions are not always as secure as the tests seem to predict; second, speakers do produce the 'impossible' constructions on occasion, as is shown in (4); third, there are constraints on these uses that have not been fully explored; and fourth, because the tests deal with the degree to which the constituent words of a compound can be recognized, they are again tests of lexicalization.

(4) Here he found that the Greatest Story Ever Told had stopped for a tea-break. Dorothy Horncastle was dispensing mugs of the stuff from a large copper urn . . .
(Reginald Hill, *Bones and Silence* (London: Collins, 1990: 275))
I want to give myself a headache by banging it on the floor! (attested)

Semantic Criteria

Semantic criteria sometimes invoked to indicate that something has become a compound are fundamentally indications of lexicalization. A celebrated example concerns the pair *push-chair* and *wheel-chair*. Although it is possible to push a wheel-chair and a push-chair ('baby buggy') has wheels, the two are uniquely identified by their labels that, therefore, imply a lot more than they state. This specialization of meaning is sometimes taken to indicate compound status.

There are two possible counterarguments here. The first is that lexicalization (or idiomatization) is something that affects not only noun + noun sequences such as *wheel-chair*, but also syntactic sequences such as *a red herring* or *how do you do?* If *how do you do?* is still a sentence, so *wheel-chair* should have the same status before and after lexicalization. The second is that meaning specialization is not something that comes only with frequent use (and gradual movement from syntax to the lexicon) but something that comes with first use. Downing (1977) provides us with the celebrated attested example of *apple-juice seat*. In the abstract this could mean a number of things, including the seat in which you have to sit to win some apple juice, the seat on which apple juice has been spilled, the seat on which a can of apple juice has been placed, the seat on which I usually sit when I drink apple juice, and so on. The attested meaning of 'seat with a glass of applejuice placed before it' is already a specialization from the large number of potential meanings that construction could have had. That being the case, we could argue that any relevant sequence that has actually been used has already had a specialized meaning. All that may remain in question is the degree of specialization.

The Universality of Compounds

Because of the two types of definition of compound referred to earlier, it is not clear whether or not all languages have compounds. Claims that they have can be found in the literature; so can claims in grammars of individual languages that compounds are not found in that language. The two need not be incompatible if they depend on different types of definition. It may be, for example, that compounds viewed as a construction type are universal, but compounds viewed as lexical entities are not. Because the problem has not been recognized in the literature, it is impossible to be sure.

There is also the problem that in individual languages, things may be called compounds that would not normally be so termed in other languages. For example, Glinert (1989) describes as compounds of Hebrew, things that sound like blends (q.v.) to the reader more used to languages such as English. Discussions of French sometimes refer to units such as *chemin de fer* ('way of iron' = 'railway') or *pomme de terre* ('apple of earth' = 'potato') as compounds. It is clear that these items are lexical items (listemes in the terminology of Di Sciullo and Williams, 1987). The use of the label compound may thus be intended to indicate the lexicalized nature of such constructions (or at least, of some such constructions) and their near-syntactic productivity rather than be intended to attribute any particular structure to them. The use of the label compound in such

instances certainly adds to the confusion surrounding the whole issue.

Perhaps just as confusing is the way in which noun incorporation is sometimes not included under compounding. Incorporation is an important enough and theoretically interesting enough method of word formation to demand separate discussion, as is done in this encyclopedia (*see* **Incorporation**). But since both compounding and incorporation involve the close binding together of two stems into a new morphosyntactic element, there is also a sense in which the two need to be viewed as related processes. Neoclassical compounds, also dealt with separately here (*see* **Neoclassical Compounding**), have many of the features of compounds, but are compounded according to borrowed patterns rather than native ones.

The Semantics of Compounds

Speakers of European languages, at least, seem to view compounds made up of two nouns as the prototypical type of compound (although there are languages that appear to prefer verb–verb compounds). A noun–noun compound such as *rain–cloud* is an ideal construction for providing a subcategorization. The element *cloud* (the head element; see below) tells us what kind of entity we are dealing with, and the modifying element (here, *rain*) tells us something about the subtype the compound denotes. Similarly, an adjective–noun compound such as *blackbird* provides not so much a description of the bird (female blackbirds are brown) as a label for a subtype of bird. What is perhaps strange in English is that this subcategorizational use of adjectives need not be restricted to compounds: neither a red squirrel nor red wine is prototypically red, yet their labels contrast with *gray squirrel* and *white wine,* respectively, and thus show a subcategorization of precisely the same type that is found in compounds.

Much is made in the literature of the superficial ambiguity of noun–noun compounds. Although a *hayfever pill* may be intended to relieve hayfever, a *sleeping pill* is intended to induce sleep, a *sugar pill* neither relieves nor induces sugar but contains it, and a *morning-after pill* provides a fourth logical link between the elements of the compound. Several approaches to the descriptive problem posed by such apparent ambiguity have been taken in the literature. In no particular order, these include the following:

i. relating the various logical links to the meanings of prepositions available in the language or inflectional cases available in the language (so 'pill against hayfever,' 'pill for sleeping,' and so on) and assuming that the compound arises through the deletion of such marking;
ii. relating the various logical links to the syntactic role the elements might play in sentences glossing the link (where 'the pill relieves hayfever' and 'the pill induces sleeping' would both be of the same subject–predicate type, opposed to 'the pill is taken on the morning after,' which would be a subject–adverbial type);
iii. relating the various logical links to specific predicates that are assumed to be deleted in the course of the syntactic derivation of the compound structure (for example, the actual lexemes RELIEVE and INDUCE might be considered to be present at some underlying level of analysis, but not at the surface);
iv. relating the various logical links to a limited set of semantically basic predicates that are deleted in the process of derivation (this solution is similar to the last, but assumes some set of universal Aristotelian categories rather than language-specific lexemes);
v. some mixture of the above.

Quite apart from the theoretical problems that beset all of these approaches, in the final analysis all of these suggestions fall foul of the fact that there are some compounds that are remarkably resistant to any of these classifications. For example, *spaghetti western* requires some lengthy paraphrase ('western made in a country that can be characterized by the amount of spaghetti that is consumed there'), and yet is not unique: *goulash communism* seems to reflect precisely the same relationship and the relationship underlying *milk tooth* remains obscure.

A preferable solution may be to see the relationship between the elements not as an ambiguity but as a vagueness and to deny that the specific links between the elements of compounds is strictly grammatical at all. Rather, the specificity that speakers read into the meanings of these compounds can be seen as the result of the lexicalization process (q.v.), starting with the context of first use and becoming more specific with further use. Even this solution has problems associated with it, however. Though the ambiguity or vagueness that has been discussed here is found with one type of compound, there are other types that do not show the same variable meaning relationship. Some of these other types will be discussed below.

Compounds and Headedness

In the last section, the point was made that compounds provide a suitable structure for reflecting

subcategorization. Compounds like *rain–cloud* show a modifier–head structure, with the head denoting the superordinate of the thing denoted by the compound, and the modifying element denoting the important feature for subclassification. Compounds of this type denote hyponyms of their head elements.

Whereas the headedness can be defined in semantic terms like this, it is typically the case that headedness can be used to predict rather more about the structure of the compound. First, we can note that compounds of this type all seem to have a binary structure. Even very complex compounds of the headline type can be broken down into a number of binary compounds embedded within each other. At each division we can distinguish a modifier and a head. Second, we note that in languages that have grammatical gender or different inflectional classes, the head of a compound of this type determines the inflectional class for the compound as a whole. Given a German (Standard German) compound like *Zeitgeist* in which the modifying element (*Zeit* 'time') is grammatically feminine and the head element (*Geist* 'spirit') is grammatically masculine, we can tell that the compound will be grammatically masculine and will make its plural in the same way that *Geist* makes its plural. Though there are some apparent counterexamples to this generalization (*highlight* has the past tense form *highlighted* and never **highlit*, despite the inflectional class of *light*), these occur in very special circumstances (here, for example, the verb *highlight* is derived from the noun *highlight*; it is not a compound verb created by the joining of *high* and *light*; compare also *grandstanded*). Also, the head element tends to carry the inflections for the word as a whole, not the modifying element.

There has been some speculation in the literature as to the regularity of the order of modifier and head in compounds of individual languages. There does not appear to be necessary consistency, with languages like Vietnamese and French showing both orders (consider French *homme-grenouille* 'man frog' = 'frogman' as opposed to *chauvesouris* 'bald mouse' = 'bat'). Even English, which is largely right-headed, does not appear to be exclusively so, as is shown by isolated examples such as *whomever* (where the inflections for the word as a whole are carried on the leftmost element) and *Model T* (which denotes a type of model, not a type of T).

This lack of necessary consistency can make it difficult to determine what is treated as the head element in compounds such as *Alsace–Lorraine*, where the meaning is the addition of the two elements rather than a hyponym of one of the elements.

Compounds like *redwood*, which denote not a type of wood but a tree that has red wood, are sometimes said not to have a head. Although it is true that *redwood* is not a hyponym of *wood*, but of an unexpressed element *tree*, it is nonetheless the case that *red* is the modifier of *wood* and that *wood* is the element that carries the inflections for the word as a whole. Thus, *redwood* may be seen as a headed structure, just as much as *rain–cloud*. Similar arguments seem to hold with examples such as *breath-taking, chimney-sweep, trouble-free* where there may be problems in applying the hyponymy criterion in a straightforward way.

Classifying Compounds

Compounds have been classified in a number of ways, none of which appears to be totally satisfactory.

The oldest classification is that provided by the Sanskrit grammarians. This provides four fundamental classes of compound, a classification that continues to be used, in whole or in part, today.

Tatpurusa compounds are the type in which there is a clear modifier–head structure, as discussed above. These are sometimes termed 'determinative' compounds. In *rain-cloud, rain* determines what kind of cloud is denoted. The Sanskrit grammarians give kharmadharaya compounds as a subtype of tatpurusa compounds. In more modern times, the kharmadharaya compounds have been divided into two distinct groups. In the first, we have adjective–noun compounds like *blackbird*. The second type seems very different: it is the compound made up of two elements, each of which refers independently to some facet of the thing denoted by the compound as a whole: *man-servant, secretary-treasurer.* This latter type is sometimes confused with the next category, dvandva compounds. Dvandvas denote an entity that is the sum of the entities in the two elements: *Alsace–Lorraine* is an example of this type; in many other languages we find dvandvas meaning 'parents' made up of the words for mother and father (for example, in Kashmiri, Marathi, and Tamil). The third main Sanskrit type of compound is the bahuvrihi compound. In Sanskrit, these were adjectival in nature, with *bahuvrihi* being an example of the type and meaning 'having much rice'. In more modern descriptions, this label has been appropriated for compounds like *redwood* discussed above, and they are sometimes called possessive compounds or, in German, *Dickkopfkomposita*, again illustrating the type. The final type in the Sanskrit classification is the avyayibhava compound, which is the label given to adjectival compounds used adverbially. The label has tended to be ignored by modern scholars.

Many more modern classifications of compounds are in effect reinterpretations of the Sanskrit labels.

Table 1 Types of compound whose elements can be understood to be coordinated

Examples	*Semantic description*	*Label*
man-servant, writer-director, bitter-sweet	The elements denote different aspects of the same individual	Appositional compounds
Alsace–Lorraine, mother–father (e.g., in Tamil)	The compound denotes a unit made up of the individuals denoted by the elements	Dvandva compounds
Vietnamese *bàn ghê* 'table chair = furniture'	The elements denote different individuals that act as prototypical members of the set denoted by the compound	Usually seen as dvandvas; may be termed co-hyponymic compounds
London–Los Angeles (flight), Greek–English (dictionary)	The elements denote the extremes of some real or metaphorical journey between two points	May be termed translative compounds
American–Australian (talks)	The elements denote the participants; there is no movement between extremes	May be termed participative compounds

For example, dvandvas are sometimes relabeled as copulative compounds, and the *man-servant* type of kharmadharaya is called an appositional compound. This leads to a proliferation of labels without any particular insights. For example, the confusion between appositional and copulative compounds in the literature appears to arise because both can be glossed by inserting the word 'and' between the elements: a man-servant is a man and a servant; Alsace–Lorraine is made up of Alsace and Lorraine. This masks the original insight by focusing on a different superficial similarity, the apparent coordination. But here we can recognize not only the original distinction and instances that may be hard to classify on the borderline, we can recognize further subtypes as well (see Table 1).

Bloomfield (1935) introduces a different fundamental distinction into the classification of compounds. For him, compounds are basically endocentric (they contain their heads) or exocentric (the true head is unexpressed). The tatpurusa compounds are endocentric, as are probably the dvandvas. The bahuvrihi compounds are exocentric. Comment was made above about the headedness of bahuvrihi compounds like *redwood*. But there are many other compounds that have no overt head element. English examples like *pickpocket* or their equivalents in Romance languages (e.g., French *garde-robe* 'keep dress' = 'wardrobe') also lack overt heads. One unfortunate result of this is that these have sometimes been classified as bahuvrihi, which, traditionally, they were not. Rather they are a type not readily encompassed by the Sanskrit terminology. Other exocentric types include *sit-in* (a noun made up of a verb and a preposition), *up-keep* (if this is not to be viewed as a nominalization of a phrasal verb through processes or reordering and stress-change), and compounds like *roll-neck* (*sweater), red-brick* (*university*), *go-go* (*dancer*), and *high-rise* (*block*), which appear to create nonprototypical adjectives although they do not have adjectival heads, and things like *army-fashion*, which are most often used adverbially.

A more recent classification sees all the compounds that have been discussed so far as primary compounds (sometimes misleadingly termed root compounds), in contrast to compounds such as *bus-driver*, which are synthetic compounds (sometimes called verbal compounds or verbal–nexus compounds). Synthetic compounds are built around a verb (in *bus-driver*, the verb is *drive*) with arguments of the verb taking up other structural positions in the verb. So *bus* is the direct object of the verb, and the final *-er* suffix represents the subject or external argument of the verb. There are restrictions on what arguments of the verb can occur in the various positions in a synthetic compound structure. Generally adverbial elements and subject arguments do not occur in the first element of such compounds (**He is a fast-driver of buses*, **Driver-cleaning of buses*), except where the second element is a past participle (*home made, self-driven*). Apparent exceptions to this rule are interesting, in that they may help delimit the notion of synthetic compound. For some authorities, synthetic compounds are found only when very productive affixes are involved (*-er, -ing, -ed*, where English is concerned) so that *speech-synthesizer* is a synthetic compound but *speech-synthesis* is not. For such authorities, a compound such as *insect flight* is not a counterexample to the above generalization, though *consumer spending* is. Some authorities are also unwilling to allow spatial or temporal locative elements as parts of synthetic compounds, but others present wider definitions. An example like *Sunday driver* is this a synthetic compound for some but not for others. Although it is clear that this whole area still needs more work, it is of particular interest since it appears to show the interaction of syntactic and morphological principles in the creation of new lexical items.

The Limits of Compounding

Finally, it must be mentioned that there are some things that look like compounds but are not generally accepted as compounds in the literature.

The most obvious type is the type where the compound is the base of some subsequent process. For example, things that look like compound verbs in English are usually not created by straight compounding but by back-formation (*baby-sit* from *baby-sitter*) or conversion/zero derivation (*to grandstand* from *a grandstand*). There is some equivocation here between the final form and the route by which that final form has been achieved. We have already seen that words like *walk-out* may be viewed as nominalizations of phrasal verbs rather than as compounds.

There are some multilexeme lexical items that appear to derive from the lexicalization of a syntactic structure. English examples include *forget-me-not* and *toad-in-the-hole*. Although these are sometimes called compounds, it seems that their formation is completely distinct from that of the constructions that have been discussed here and that they really belong under a different heading.

The same is true of so-called compounds whose primary motivation appears to be phonetic/phonological: things like *namby-pamby* and *shilly-shally*. Those are dealt with separately in this work, since they are not made up of two lexemes.

See also: Back-Formation; Conversion; Hyponymy and Hyperonymy; Incorporation; Lexicalization; Neoclassical Compounding; Panini; Word.

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Computational Approaches to Language Acquisition

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Why Computational Models?

One of the striking developments in the field of child language acquisition within the past two decades has been the dramatic increase in the use of computational models as a way of understanding the acquisition process. In part, this has been driven by the widespread availability of inexpensive but powerful computers and the development of software that has made modeling more widely accessible. But there is a more interesting and scientifically significant reason for the phenomena. Computational theories of learning themselves have matured significantly since the middle of the 20th century. The renaissance in neural network (or connectionist) approaches, and more recently, the linkages with mathematical approaches such as Bayesian inference, information theory, and statistical learning have provided a much more sophisticated perspective on a number of issues relevant to language acquisition.

These models are necessarily used in conjunction with empirical approaches, but provide an important complement to such approaches. At the very least, computational models can be thought of as enforcing a level of detail and specificity in a theory or account that a verbal description might not possess. Furthermore, even in simple models, there may be interactions among the model's components that are sufficiently complex that only through empirically running a simulation is it possible to know how the model will behave. Computer models also afford the opportunity to explore aspects of a phenomenon that may not be easily tested in the real world (either because the corresponding situation has not yet been studied, or perhaps may be infeasible to test). By systematically exploring the full parameter space of a theory, one can sometimes gain insight into the deeper principles that underlie a behavior. And of course, a model may be amenable to analytic techniques that are not practical with real children. With children we can never do more than make inferences about the internal mechanisms that drive a behavior. Computer models, on the other hand, can in principle be completely understood. Finally, such models can serve as hypothesis generators. They often suggest novel ways of understanding a phenomenon. Of course, the validity of the hypothesis ultimately depends on empirical testing with real children.

In general, there have emerged two complementary approaches to modeling. In the first, the goal is to determine that a problem can be solved without making specific claims that the solution implemented in the computer model is the same as it would be for the child. These approaches tend to be more mathematical in nature. Work involving Bayesian inference, information theory, and statistical learning are of this sort. The second approach attempts to model the acquisition process a bit more directly. Learning plays a central role in these approaches, and the models' behavior at intermediate stages is as much a focus as the ability to ultimately master the task. Connectionist models are examples of this second sort of model.

Because the field of computational approaches to language acquisition has grown so explosively – and cannot be fully covered in the present short review – what follows will be organized around the major issues that have been addressed (leaving aside a large number of interesting but less central phenomena). For excellent discussion of related computational approaches, see Brent (1996), Munakata and McClelland (2003), and MacWhinney (1999).

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Because the field of computational approaches to language acquisition has grown so explosively – and cannot be fully covered in the present short review – what follows will be organized around the major issues that have been addressed (leaving aside a large number of interesting but less central phenomena). For excellent discussion of related computational approaches, see Brent (1996), Munakata and McClelland (2003), and MacWhinney (1999).

Issues and Results

It is useful to focus on the modeling work in terms of three major questions that have been addressed (bearing in mind the caveat above, that just as the field of language acquisition is itself large and diverse, there are many models that fall outside the scope of this taxonomy). These questions have to do with: (1) Oddities in the 'shape of change' (e.g., discontinuities or nonlinearities in acquisition, as in U-shaped curves); (2) What information is available in the input a child receives, and what she can infer from it (e.g., the problem of segmenting words or discovering grammatical categories or syntactic regularities); and (3) How learning can proceed in the face of putatively insufficient information (e.g., 'Baker's paradox' or the so-called 'Poverty of the Stimulus' problem).

We shall consider each of these in detail, considering first what the issues are and then the computational models that have endeavored to understand the phenomena.

Explaining the Shape of Change

The simplest and possibly most natural pattern of development would probably be to assume a linear increase in performance over time. Such a pattern would be consistent with the assumption that the mechanisms that subserve learning remain relatively constant, and thus the increase in what is learned over every time increment should also remain constant. In fact, few developmental patterns illustrate such linear tendencies. Development seems to proceed in fits and spurts, sometimes interrupted by long periods where little appears to change, and sometimes even by phases where performance temporarily deteriorates.

Noteworthy examples of such nonlinearities abound in the realm of language acquisition, and they have played a major role in theories about the mechanisms that make language acquisition possible. The special ability of children to learn languages (the Critical Period) is a notable example of such a nonlinearity. One influential explanation of this effect is that it reflects the existence of a specialized neural mechanism, the Language Acquisition Device, which is operative only during childhood.

Another well-documented set of nonlinearities is exemplified by the rapid increases in word comprehension, production, and knowledge of grammar that occur in young children during their second year of life (as in Figure 1, from Bates and Goodman, 1997). Clearly, something dramatic seems to be happening at the point where, for example, the child manifests a burst in the rate at which she learns new words. Many theorists have interpreted such bursts as evidence that something new has appeared in the child.

A final example has played a particularly important role in the theoretical literature: the apparent U-shaped curve that characterizes children's mastery of the past tense of the English verbal system. At the

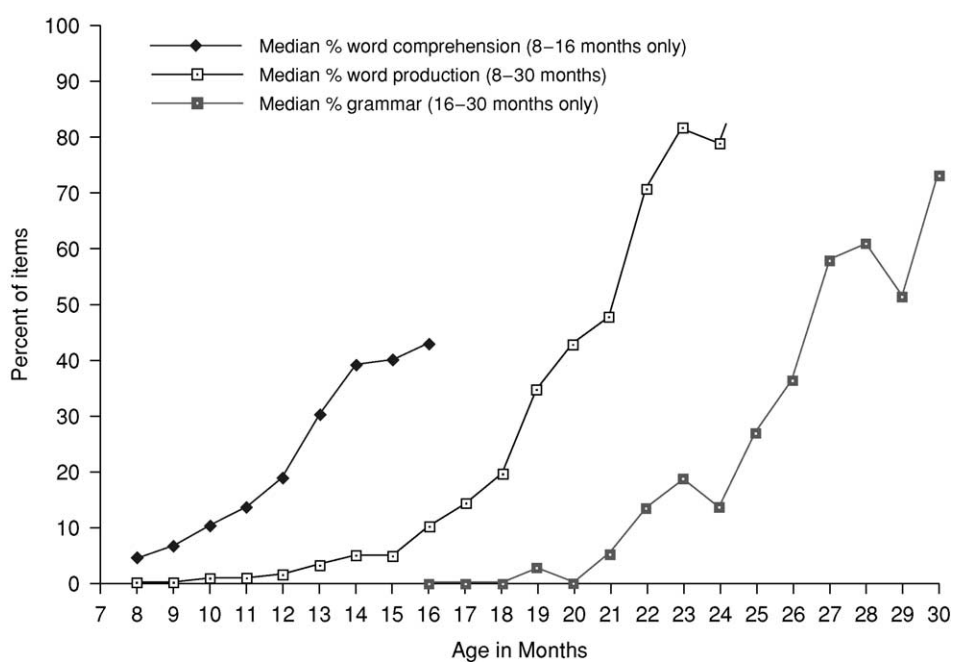

Figure 1 Median growth scores for word comprehension expressed as a percentage of available items. (Reproduced with permission from Bates E & Goodman J (1997). 'On the inseparability of grammar and the lexicon.' *Language and Cognitive Processes 12(5/6)*, 507–584. © Psychology Press Ltd (http://www.psypress.co.uk/journals.asp).)

earliest stage, children know a small number of verbs, mostly of high frequency and tending to be irregular; they typically produce the past tense correctly. At the second stage, the number of verbs in the child's productive vocabulary increases and includes a larger number of regulars, some of which may be lower in frequency. At this stage, both observational evidence (overgeneralization of the '+ed' pattern for regular verbs) and experimental data (ability to generate the regular version of nonce verbs) suggest that the child has learned a rule for forming the past tense. During the second stage, the rule is incompletely learned and misapplied to many (previously correctly produced) irregulars, resulting in a decline in overall performance. Finally, at the third stage, the correct forms for both regulars and irregulars are produced, and the child appears to have learned not only the rule – which applies to regulars – but also the exceptions. These data have provided a powerful argument in favor of the psychological reality of rules.

The Critical Period

A number of computational models have addressed these issues and in many cases provided alternative hypotheses for the phenomena. In attempting to understand how neural networks might deal with complex recursive structure in language, Elman (1993) discovered that the network was able to process complex sentences only when it began either by initially being exposed to simple sentences (a kind of neural network 'motherese'), or if it began the learning process with a restricted working memory (similar to the limited WM found in young children). Elman called this the 'starting small' effect. It is similar in spirit to Newport's "less is more" hypothesis (Newport, 1990). In both accounts, the limitation on processing resources acts like a filter that temporarily hides the more complex aspects of language from the network (or child). Learning the simpler phenomena first creates a foundation of knowledge that makes it possible to subsequently learn more complex regularities. These accounts suggest that rather than being enabled by a special mechanism (the LAD) that is lost in adulthood, the explanation for the Critical Period is that – paradoxically – it is maturational limitations that facilitate the learning of language. However, it is also possible that there are multiple factors that result in Critical Period effects. Using a model based on Hebbian learning (a computational paradigm closely related to the changes in Long Term Potentiation of synaptic junctions that results from synchronous firing of neurons), Munakata and Pfaffly (2004) demonstrated that even though the mechanism for plasticity did not change, what was learned early in a network's life constrained what it could learn later. Marchman (1993) has demonstrated similar effects in networks that learn the past tense; networks that suffer simulated brain damage early in life recover much better compared to networks that are lesioned after much learning has occurred.

The Vocabulary Burst

A number of models have been used to attempt to understand what factors might lead to the rapid acceleration in learning of new words that typically occurs in the middle of the second year of life. Plunkett *et al.* (1992) trained networks to associate linguistic labels with visual images and observed that a burst-like increase in ability to learn labels occurred after early training. They also found that comprehension performance in the networks always exceeded (and preceded) production, that the networks exhibited prototype effects, and that they also show underextension and overextension phenomena found in children. Plunkett *et al.* (1992) attribute these behaviors to the network's need to develop robust conceptual categories. Prior to this time, learning is slow and errorful. Once categories are learned, they facilitate the learning of new words. A similar effect was found in Elman (1998), who also found that there was a direct, causal connection between vocabulary growth and the later emergence of grammar (cf. Bates and Goodman, 1997). The effect arose because essentially grammar was understood as a generalization over the commonalities in syntactic behavior of many words; with a small vocabulary these patterns are not evident, and so vocabulary growth is a necessary prerequisite to discovery of grammatical patterns (cf. Tomasello, 2000 for a similar account in the acquisition literature).

The English Past Tense: Rules or Connections?

The final example of nonlinearities in language acquisition is the U-shaped performance shown in English by many children as they learn the correct past tense forms of verbs. This phenomenon has long been seen as demonstrating the psychological reality of rules, insofar as we appear to be observing the moment in time when the rule for the past tense is being acquired (Pinker, 1991). Rumelhart and McClelland (1986) challenged this assumption by showing that when a neural network was trained, on a verb-by-verb basis, to produce the past tense of English verbs, it not only manifested a similar U-shaped performance curve, but also replicated in detail many of the more specific empirical phenomena found in children. Rumelhart and McClelland suggested that the network account provided an alternative to the traditional interpretation involving rules. Not surprisingly,

this claim provoked a controversy that continues to this day (Prince and Pinker, 1988). The debate has been lively, if at times acrimonious. And although the theoretical interpretation remains controversial, one of the most important outcomes of this debate has been the broadening – in terms of both languages studied and level of detail – of empirical research in English but also in other languages, including German, Hebrew, Icelandic, Italian, Norwegian, Polish, and Spanish. This is an excellent example of how computational models can refine the questions that are addressed and inspire new avenues of empirical investigation. The debate has also led to a more sophisticated understanding of the implications of the competing accounts not only for acquisition but also for other aspects of language processing and historical change.

What Information Is Available to a Child, and What Can Be Learned?

Although obviously a child's experience places a critical role in the learning process, the relationship between what the child hears and what she ultimately knows is in many cases not transparent. Indeed, it has been claimed that in some cases there is no evidence at all for this knowledge (Crain, 1991). The putative insufficiency of the evidence available to a child – the poverty of the stimulus problem – has led to the conclusion that significant amounts of linguistic knowledge must be 'preknown' by a child. This knowledge constitutes a universal grammar that is part of the biological endowment every child uses as she learns the specific features of her own language.

There are three issues that must be considered when evaluating such a hypothesis. The first involves what the actual input is that is available to children. Although that input is in fact massive in terms of word tokens, there is now reason to believe that it reflects a restricted range of the adult language (Cameron-Faulkner *et al.*, 2003). Second, it is also clear that for a long period of time, children are actually much more conservative in their productions and stick closely to what they hear (Cameron-Faulkner *et al.*, 2003; Lieven *et al.,* 2003; Theakston *et al.*, 2003). Nonetheless, it is also obviously true that at some point children venture into uncharted territory, so the problem of what motivates such creative use of language is real. This leads to the third question, which is what theory of learning is assumed. At least some of the Nativist accounts have assumed a weak kind of learning, essentially little more than a mental tabulation of utterances (e.g., Pinker, 1984: 49ff.). Computational models have been most successful in addressing this third question, by exploring the properties of more powerful – but hopefully psychologically plausible – learning mechanisms.

Discovering Where the Words Are: The Segmentation Problem

Unlike written language, in which words are delimited by white space or punctuation characters, spoken language yields few explicit clues as to where the boundaries between words are. For the infant, this poses a serious challenge, complicated by the fact that even the definition of what counts as a word differs dramatically across languages. How does the child thus learn (a) what can serve as a word, and (b) where the words are in continuous speech?

A number of computational approaches have converged in a similar insight, which is that at least to a first approximation, sequences of sounds that are highly associated are good candidates to be words. The manner in which this hypothesis is implemented varies (Brent and Cartwright, 1996; Christiansen *et al.*, 1998; Elman, 1990), but the essential idea is that word boundaries are locations where the conditional probability of the next sound, given what has preceded it, is low. This can be seen in Figure 2, which shows the errors made by a network that has learned to predict the next letter in a sequence of words (white space removed) that make up a child's story (Elman, 1990). Error tends to be greatest at the onsets of words, and decreases as more of a word is heard. Error maxima thus constitute likely word boundaries.

Another issue that concerns word learning is the problem of determining the syntactic and semantic categories of words. Here again, strong claims have been advanced that at least the categories must be innate, as well as innate principles that guide the child in making such determinations. The arguments have included the claim that the kind of distributional information available to a child (e.g., words in the same category tend to have similar distributional properties) will fail given the complexity of real language input. However, a number of computational models have suggested otherwise. Considerably more information of this sort appears to be available to a child than might be imagined (Cartwright and Brent, 1997; Elman, 1995; Mintz, 2002; Redington *et al.*, 1998). Again, these models differ in their details, but share the same insight that a word's privilege of occurrence is a powerful indicator of its category. Importantly, there is an increasingly empirical literature involving learning of artificial languages by infants and young children that is highly consistent with the type of learning embodied in the computational models (see Gomez and Gerken, 2000 and Saffran, 2001 for a discussion of this work).

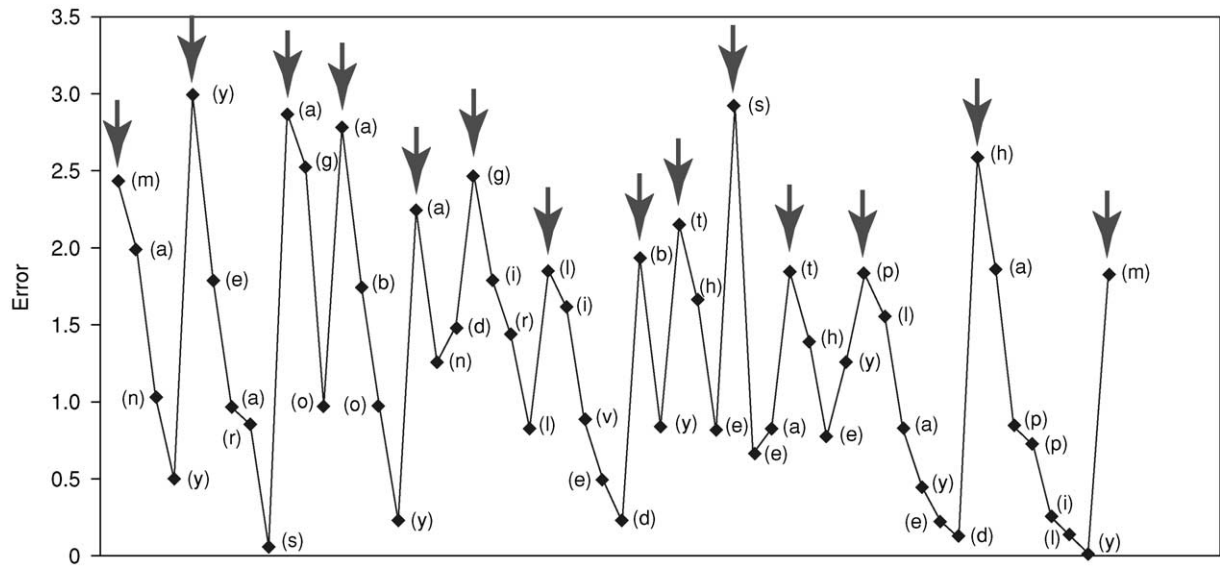

Figure 2 Performance of a simple recurrent network that has learned to predict the next letter in a short story. Error maxima are highly correlated with the onsets of a new word. (Reproduced with permission from Elman J L (1990). 'Finding structure in time.' *Cognitive Science 14(2)*, 179–211. © Taylor & Francis.)

Discovering Grammar? The Poverty of the Stimulus Problem

Perhaps the strongest claims regarding the necessity for children's innate linguistic knowledge arise in the context of grammar. As with the past tense debate, the controversy has been heated. It has also been complex, because it interacts not only with the long-standing nature vs. nurture debate but also with questions regarding the extent to which linguistic knowledge is modular and independent from other cognitive processes (i.e., domain-specific), and whether the uniqueness of language to our species also reflects specialized neural – and presumably also genetic – substrates that are entirely absent in other species. For two different answers to these questions, see Elman *et al.* (1996) and Pinker (1994).

One basic question that arose early in the discussion is whether connectionist models were capable at all of capturing some of the apparently recursive nature of natural language. Even if recursion in human language is only partial, there is good evidence that some kind of abstract internal representations must underlie the surface forms. Symbolic accounts that make use of syntactic trees provide one mechanism that might explain why, for example, the verb *is* in (1) is in the singular, agreeing with *woman,* rather than with any of the other nouns in the sentence.

(1) The woman who Mary and Bob introduced me to last summer while I was visiting them in Paris on my way to Prague is really quite interesting.

Similarly, tree-structured representations provide a formalism that makes possible hypotheses about why (2) is an acceptable sentence, whereas (3) – which is similar in meaning – is ungrammatical. (It should be noted, however, that accounts of such differences are elusive, and there is still not complete agreement within any framework about the explanation for these sorts of differences.)

(2) Who did you believe Annie saw? (Possible answer: I believed Annie saw Elvis.)

(3) *Who did you believe the claim Annie saw? (Possible answer: I believed the claim Annie saw Elvis.)

Claims that neural networks are in principle unable to deal with such linguistic complexities may be premature. Their solution to the problem of recursion differs from classical discrete automata, but recurrent neural networks definitely have sufficient power to deal with complex grammatical constructions (Siegelmann, 1995). More relevant to issues in language acquisition is whether these complex grammatical regularities can actually be learned, given the input to which a child might be exposed.

A number of computational models suggest a positive answer (e.g., Christiansen and Chater, 1999; Elman, 1993). One particularly challenging problem, and the one we will conclude with, was posed by Crain (1991) and concerns what has been called Aux Inversion as a hypothesis to explain how certain kinds of questions are formed.

Crain argued that based on the evidence available to a child, such as question-answer pairs shown in (4) and (5), any account of grammar acquisition that relies solely on learning would be expected to produce the incorrect generalization that, for any declarative, the corresponding interrogative involves inversion of the first verb and first noun, as captured schematically by the rule shown in (6).

(4a) Mary is happy.
(4b) Is Mary happy?

(5a) Timmy can swim awfully fast.
(5b) Can Timmy swim awfully fast?

(6) *Declarative*: **Noun AUX . . .**
Interrogative: **AUX Noun . . .**

But this rule would be wrong, because it predicts incorrectly that the interrogative that corresponds to (7a) would be (7b). In reality, the correct interrogative is (7c) (For convenience, underlining shows the location of the auxiliary prior to inversion.)

(7a) The boy who is smoking is crazy.
(7b) *Is the boy who __ smoking is crazy?
(7c) Is the boy who is smoking __ crazy?

Crain argues that children do not hear the sort of data (e.g., questions of the form in (7c)) until well past the period where they can be shown – by experimentally eliciting them – to correctly produce these forms. He concludes that this is strong evidence for the existence of an innate constraint that requires that abstract constituent structure be the basis for learning grammatical regularities. He calls this the 'parade case' for an innate constraint.

To test this claim, Lewis and Elman (2001) constructed a simulation in which a recurrent neural network was trained on examples of well-formed sentences; the training data were generated to mimic the types and frequencies of sentences found in the Manchester corpora from the CHILDES databank (MacWhinney, 2000; Theakston *et al.*, 2001). Crucially, although there were many sentences of the form shown in (4) and (5), no sentences of the forms shown in (7) were included. The network was then tested on both ungrammatical (7b) and grammatical (7c) inputs. Its clear preference was for the grammatical questions, despite never having seen similar sentences during training.

How did the network learn the true grammatical generalization? It turns out that there are many other sentences present in the input (to children as well as these networks) that provide ample evidence for the fact that noun phrases act as constituents. These include sentences such as those shown in (9a) and (9b).

(9a) The bike with wheels belongs to me.
(*Not:* The bike with wheels *belong to me.)

(9b) The cats my dog chases belong to our neighbor.
(*Not:* The cats my dog chases *belongs to our neighbor.)

The input to the network is thus sufficient to motivate a number of generalizations. These involve learning about different grammatical categories (nouns, verbs, prepositions, complementizers, etc.); selectional restrictions imposed by verbs on their arguments; the form of simple declaratives; the form of simple interrogatives; and the fact that agreement relations (among others) must respect constituenthood. Although these are logically independent generalizations, they have the opportunity to interact. The critical interaction occurs when a complex sentence is also an interrogative. The network has never seen such interactions, but its ability to partial out independent generalizations also makes it possible to combine generalizations as they may interact.

There is an important lesson here, and it is a clear demonstration of the ways in which computational models – particularly those that involve learning – can yield new insights into old problems. To a large degree, the question of what can be learned from the available input hinges crucially on what counts as input. Many of the claims regarding poverty of the stimulus have taken a straightforward and literal view of the input. If the target generalization to be learned involves strings of the form *X*, then the relevant input consists of strings of the form *X*. But this is a limited view of the relationship between our experience and what we make of it. The Lewis and Elman simulation suggests that some of the more complex aspects of language learning may involve a good deal of what is really indirect evidence, and that inductive mechanisms of the sort instantiated in neural networks are capable of combining that evidence in novel ways to yield outcomes that are not transparently related to the input. Whether this is in fact also true of children of course can only be determined through empirical research. The importance of the computational simulations is that they open up a logical possibility that previously had been ruled out.

See also: Associationism and Connectionism; Chart Parsing and Well-Formed Substring Tables; CHILDES Database; Corpora; Developmental Relationship between Language and Cognition; Formal Models and Language Acquisition; Infancy: Sensitivity to Linguistic Form; Information Theory; Language Acquisition Research Methods; Language Development: Morphology; Language Development: Overview; Lexical Acquisition; Syntactic Development.

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Computational Language Systems: Architectures

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Software Architecture

Every building, and every computer program, has an 'architecture': structural and organizational principles that underpin its design and construction. The garden shed once built by one of the authors had an *ad hoc* architecture, extracted (somewhat painfully) from the imagination during a slow and nondeterministic process that, luckily, resulted in a structure that keeps the rain on the outside and the mower on the inside (at least for the time being). As well as being *ad hoc* (i.e., not informed by analysis of similar practice or relevant science or engineering) this architecture is implicit: no explicit design was made, and no records or documentation were kept of the construction process. The pyramid in the courtyard of the Louvre, by contrast, was constructed in a process involving explicit design performed by qualified engineers with a wealth of theoretical and practical knowledge of the properties of materials, the relative merits and strengths of different construction techniques, and the like.

So it is with software: sometimes it is thrown together by enthusiastic amateurs, and sometimes it is architected, built to last, and intended to be 'not something you finish, but something you start' (to paraphrase Brand, 1994).

Several researchers argued in the early and middle 1990s that the field of computational infrastructure or architecture for human language computation merited increased attention. The reasoning was that the increasingly large-scale and technologically significant nature of language processing science was placing increasing burdens of an engineering nature on research and development (R&D) workers seeking robust and practical methods (as was the increasingly collaborative nature of research in this field, which puts a large premium on software integration and interoperation). Since then, several significant systems and practices have been developed in what may be called software architecture for language engineering (SALE).

Language engineering (LE) may be defined as the production of software systems that involve processing human language with quantifiable accuracy and predictable development resources (Cunningham, 1999). LE is related to but distinct from the fields of computational linguistics, natural language processing, and artificial intelligence, with its own priorities and concerns. Chief among these are (1) dealing with large-scale tasks of practical utility, (2) measuring progress quantitatively relative to performance on examples of such tasks, (3) a growing realization of the importance of software engineering in general, and (4) reusability, robustness, efficiency, and productivity, in particular. Software architectures can contribute significantly toward achieving these goals (Maynard *et al.*, 2002; Cunningham and Scott, 2004).

This article gives a critical review of the various approaches that have been taken to the problem of software architecture for language engineering (SALE). The prime criterion for inclusion in this article is that the approaches are *infrastructural* – work that is intended to support language engineering (LE) R&D in some way that extends beyond the boundaries of a single time-limited project.

This article presents categories of work that range over a wide area. To provide an organizing principle for the discussion, we extrapolate a set of architectural issues that represent the union of those addressed by the various researchers cited. This approach has the advantage of making it easier to see how certain problems have been addressed and the disadvantage that multipurpose infrastructures appear in several categories.

The following section discusses infrastructures aimed at algorithmic resources including the issues of component integration and execution. The article then analyzes data resources infrastructure, including the issues of access and the representation of information about text and speech. If concludes with a discussion on future directions for work on SALE.

Software Architectures for Language Engineering

The problem addressed by the systems reviewed here is the construction of software infrastructure for language processing: software that is intended to apply to whole families of problems within this field and to be like a craftsman's toolbox in the service of construction and experimentation. We consider three types of infrastructural systems: frameworks, architectures, and development environments.

A 'framework' typically means an object-oriented class library that has been designed with a certain domain in mind and that can be tailored and extended to solve problems in that domain. A framework may also be known as a platform or a component system.

All software systems have an architecture. Sometimes, the architecture is explicit, perhaps conforming

to certain standards or patterns, and sometimes it is implicit. Where an architecture is explicit and targeted on more than one system, it is known as a 'reference architecture' or a 'domain-specific architecture.' The former is "a software architecture for a family of application systems" (Tracz and Mar, 1995). The term 'domain-specific software architecture (DSSA),' the subject of an eponymous ARPA research program, "applies to architectures designed to address the known architectural abstractions specific to given problem domains" (Clements and Northron, 1996).

An implementation of an architecture that includes some graphical tools for building and testing systems is a 'development environment'. One of the benefits of an explicit and repeatable architecture is that it can give rise to a symbiotic relationship with a dedicated development environment. In this relationship, the development environment can help designers conform to architectural principles and visualize the effect of various design choices and can provide code libraries tailored to the architecture.

The most significant issues addressed by SALE systems include the following.

- enabling a clean separation of low-level tasks, such as data storage, data visualization, location and loading of components, and execution of processes from the data structures and algorithms that actually process human language
- reducing integration overheads by providing standard mechanisms for components to communicate data about language and using open standards, such as Java and XML, as the underlying platform
- providing a baseline set of language processing components that can be extended and/or replaced by users as required
- providing a development environment or at least a set of tools to support users in modifying and implementing language processing components and applications
- automating measurement of performance of language-processing components.

This article focuses on the first two sets of issues, because they are issues that arise in every single NLP system or application and are prime areas where SALE can make a contribution. For a discussion of other requirements, see Cunningham (2000).

Categories of Work on SALE

As with other software, LE programs comprise data and algorithms. The current trend in software development is to model both data and algorithms together, as 'objects.' (Older development methods, such as structured analysis kept them largely separate; Yourdon, 1989.) Systems that adopt the new approach are referred to as 'object-oriented' (OO), and there are good reasons to believe that OO software is easier to build and maintain (see Booch, 1994).

In the domain of human language processing R&D, however, the choice is not quite so clear cut. Language data, in various forms, are of such significance in the field that they are frequently worked on independently of the algorithms that process them. Such data have even come to have their own term: 'language resources' (LRs; LREC-1, 1998), covering many data sources, from lexicons to corpora.

In recognition of this distinction, this article uses the following terminology.

- **Language resource (LR)** refers to data-only resources, such as lexicons, corpora, thesauri, or ontologies. Some LRs come with software (e.g., Wordnet has both a user query interface and C and Prolog APIs), but resources in which software is only a means of accessing the underlying data are still defined as LRs.
- **Processing resource (PR)** refers to resources that are principally programmatic or algorithmic, such as lemmatizers, generators, translators, parsers, or speech recognizers. For example a part-of-speech (POS) tagger is best characterized by reference to the process it performs on text. PRs typically include LRs (e.g., a tagger often has a lexicon).

PRs can be viewed as algorithms that map between different types of LR and that typically use LRs in the mapping process. An MT (Machine Translation) engine, for example, maps a monolingual corpus into a multilingual aligned corpus using lexicons, grammars, and the like.

Adopting the PR/LR distinction is a matter of conforming to established domain practice and terminology. It does not imply that one cannot model the domain (or build software to support it) in an object-oriented manner. This distinction is used to categorize work on SALE. The next section surveys infrastructural work on processing resources, and the following section reviews the much more substantial body of work on language resources.

Processing Resources

Often, a language processing system follows several discrete steps. For example, a translation application must first analyze the source text to arrive at some representation of meaning before it can begin deciding upon target language structures that parallel that meaning. A typical language analysis process

follows such stages as text structure analysis, tokenization, morphological analysis, syntactic parsing, and semantic analysis. The exact breakdown varies widely and is to some extent dependent on method; some statistical work early in the second wave of the application of these types of method completely ignored the conventional language analysis steps in favor of a technique based on a memory of parallel texts (Brown *et al.*, 1990). Later work has tended to accept the advantages of some of these stages, however, though they may be moved into an off-line corpus annotation process, such as the Penn Treebank (Marcus *et al.*, 1993).

Each of these stages is represented by components that perform processes on text and use components containing data about language, such as lexicons and grammars. In other words, the analysis steps are realized as a set of processing resources (PRs). Several architectural questions arise in this context:

1. Is the execution of the PRs best done serially or in parallel?
2. How should PRs be represented such that their discovery on a network and loading into an executive process are transparent to the developer of their linguistic functions?
3. How should distribution across different machines be handled?
4. What information should be stored about components, and how should it be represented?
5. How can commonalities among component sets be exploited?
6. How should the components communicate information between each other? (This question can also be stated as, 'How should information about text and speech be represented?')

This section reviews work that addresses questions 1–5. The issue of representing information about language is addressed in the following section.

Locating and Loading

There are several reasons why PR components should be separate from the controlling application that executes them:

- There will often be a many-to-one relation between applications and PRs. Any application using language analysis technology needs a tokenizer component, for example.
- A PR may have been developed for one computing platform, such as UNIX, but the application wishing to use it may operate on another (e.g., Windows).
- The processing regime of the application may require linear or asynchronous execution; this choice should be isolated from the component structures as far as possible to promote generality and encourage reuse.
- PR developers should not be forced to deal with application-level software engineering issues, such as how to manage installation, distribution over networks, exception handling, and so on.
- Explicit modeling of components allows exploitation of modern component infrastructures, such as Java Beans or Active X.

Accordingly, many papers on infrastructural software for LE separate components from the control executive (e.g., Boitet and Seligman, 1994; Edmondson and Iles, 1994; Koning *et al.*, 1995; Wolinski *et al.*, 1998; Poirier, 1999; Zajac, 1998b; Lavelli *et al.*, 2002; Cunningham *et al.*, 2002a). The term 'executive' is used here in the sense of a software entity that executes, or runs, other entities. The questions then are how do components become known to control processes or applications and how are they loaded and initialized. A related question is what data should be stored with components to facilitate their use by an executive; see the discussion on metadata below. Much work ignores component-related issues the rest of this section covers those SALE systems for which the data are available.

The TIPSTER architecture (Grishman, 1997) recognized the existence of the locating and loading problems, but did not provide a full solution to the problem. The architecture document includes a placeholder for such a solution – in the form of a 'register annotator' Application Programmers' Interface (API) call, which an implementation could use to provide component loading – but the semantics of the call were never specified.

The TalLab architecture "is embedded in the operating system," which allows them to "reuse directly a huge, efficient and reliable amount of code" (Wolinski *et al.*, 1998). The precise practicalities of this choice are unclear, but it seems that components are stored in particular types of directory structure, which are presumably known to the application at startup time.

The Intarc Communication Environment (ICE) is an "environment for the development of distributed AI systems" (Amtrup, 1995) and part of the Verbmobil real-time speech-to-speech translation project (Kay *et al.*, 1994). ICE provides distribution based around Parallel Virtual Machine (PVM) and a communication layer based on channels. ICE is not specific to LE because the communication channels do not use data structures specific to NLP needs and because document handling issues are left to the individual modules. ICE's answer to the locating and

loading problem is the Intarc License Server, which is a kind of naming service or registry that stores addressing information for components. Components must themselves register with the server by making an API call (Ice_Attach). The components must therefore link to the ICE libraries and know the location of the license server as must applications using ICE services.

Following from the ICE work, Herzog *et al.* (2004) presented the latest in three generations of architecture to arise from the Verbmobil and Smartkom projects, in the shape of the Multiplatform system. This architecture supports multiple distributed components from diverse platforms and implementation languages running asynchonously and communicating via a message-passing substrate.

Corelli (Zajac, 1997) and its successor, Calypso, (Zajac, 1998b) are also distributed systems that cater for asynchronous execution. The initial Corelli system implemented much of the CORBA standard (Object Management Group, 1992), and component discovery used a naming and directory service. All communication and distribution were mediated by an object request broker (ORB). Components ran as servers and implemented a small API to allow their use by an executive or application process. In the later Calypso incarnation, CORBA was replaced by simpler mechanisms because efficiency problems (for a usage example, see Amtrup, 1999). In Calypso, components are stored in a centralized repository, which sidesteps the discovery problem. Loading is handled by requiring components to implement a common interface.

Another distributed architecture based on CORBA is SiSSA (Lavelli *et al.*, 2002). The architecture comprises processors (PRs in our terms), servers for their execution, data containers (LRs), and a manager component called SiSSA Manager, which establishes and removes connections between the processors, according to a user-designed data flow. SiSSA uses a processor repository to keep information about processors registered with the architecture.

Carreras and Padró (2002) reported a distributed architecture specifically for language analyzers.

GATE version 1 (Cunningham *et al.*, 1997) was a single-process, serial execution system. Components had to reside in the same file system as the executive; location was performed by searching a path stored in an environment variable. Loading was performed in three ways, depending on the type of component and which of the GATE APIs it used.

GATE version 2 (Cunningham *et al.*, 2002a,b) supports remote components; location is performed by providing one or more component repositories called Collection of REusable Objects for Language Engineering (CREOLE) repositories, which contain XML definitions of each resource and the types of its parameters (e.g., whether it works with documents or corpora). The user can then instantiate a component by selecting it from the list of available components and choosing its load-time parameters. GATE makes a distinction between load-time and run-time parameters; the former are essential for the working of the module (e.g., a grammar) and need to be provided at load time, whereas the latter can change from one execution to the next (e.g., a document to be analyzed). Components can also be re-initialized, which enables users to edit their load-time data (e.g., grammars) within the graphical environment and then reload the component to reflect the changes. GATE also supports editing of remote language resources and execution of remote components using remote method invocation (RMI); that is, it provides facilities for building client-server applications.

Execution

It seems unlikely that people process language by means of a set of linear steps involving morphology, syntax, and so on. More likely, we deploy our cognitive faculties in a parallel fashion; hence, the term 'parallel distributed processing' in neural modeling work (McClelland and Rumelhart, 1986). These kinds of ideas have motivated work on nonlinear component execution in NLP; von Hahn (1994) gave an overview of a number of approaches, and a significant early contribution was the Hearsay speech understanding system (Erman *et al.*, 1980).

Examples of asynchronous infrastructural systems include Kasuga (Boitet and Seligman, 1994), Pantome (Edmondson and Iles, 1994), Talisman (Koning *et al.*, 1995), Verbmobil (Görz *et al.*, 1996), TalLab (Wolinski *et al.*, 1998), Xelda (Poirier, 1999), Corelli (Zajac, 1997), Calypso (Zajac, 1998b), SiSSA (Lavelli *et al.*, 2002), Distributed Inquery (Cahoon and McKinley, 1996), and the Galaxy Communicator Software Infrastructure (GCSI-MITRE, 2002). Motivations include the desire for nonlinear execution and for feedback loops in ambiguity resolution (see Koning *et al.*, 1995).

In the Inquery and Verbmobil systems, an additional motivation is efficiency. ICE, the Verbmobil infrastructure, addressed two problems: distributed processing and incremental interpretation. Distribution is intended to contribute to processing speed in what is a very computer-intensive application area (speech-to-speech translation). Incremental interpretation is designed both for speed and to facilitate feedback of results from downstream modules to upstream ones (e.g., to inform the selection of word interpretations from phone lattices using POS

information). ICE's PVM-based architecture provides for distributed asynchronous execution.

GCSI is an open source architecture for constructing dialogue systems. This infrastructure concentrates on distributed processing, hooking together sets of servers and clients that collaborate to hold dialogues with human interlocutors. Data get passed between these components as attribute/value sets or 'frames,' the structuring and semantics of which must be agreed upon on a case-by-case basis. Communication between modules is achieved using a hub. This architectural style tends to treat components as black boxes that are developed using other tool sets. To solve this problem, other support environments can be used to produce GCSI server components, using GCSI as a communication substrate to integrate with other components.

The model currently adopted in GATE is that each PR may run in its own thread if asynchronous processing is required (by default, PRs will be executed serially in a single thread). The set of LRs being manipulated by a group of multithreaded PRs must be synchronized (i.e., all their methods must have locks associated with whichever thread is calling them at a particular point). Synchronization of LRs is performed in a manner similar to the Java collections framework. This arrangement allows the PRs to share data safely. Responsibility for the semantics of the interleaving of data access (who has to write what in what sequence for the system to succeed) is a matter for the user, however.

Metadata

A distinction may be made between the data that language processing components use (or language resources) and data that are associated with components for descriptive and other reasons. The latter are sometimes referred to as 'metadata' to differentiate them from the former. In a similar fashion web content is largely expressed in HTML; data that *describe* web resources, such as 'this HTML page is a library catalogue,' are also called metadata. Relevant standards in this area include the Resource Description Framework RDF; (Lassila and Swick, 1999; Berners-Lee *et al.*, 1999).

There are several reasons why metadata should be part of a component infrastructure, including the following:

- to facilitate the interfacing and configuration of components
- to encode version, author, and availability data
- to encode purpose data and allow browsing of large component sets.

When components are reused across more than one application or research project, often their input/output (I/O) characteristics have not been designed alongside the other components forming the language-processing capability of the application. For example, one POS tagger may require tokens as input in a one-per-line encoding. Another may require the Standard Generalized Markup Language (SGML) input (Goldfarb, 1990). To reuse the tagger with a tokenizer that produces some different flavor of output, that output must be transformed to suit the tagger's expectations. In cases where there is an isomorphism between the available output and the required input, a straightforward syntactic mapping of representations is possible. In cases where there is a semantic mismatch, additional processing is necessary.

Busemann (1999) addressed component interfacing and described a method for using feature structure matrices to encode structural transformations on component I/O data structures. These transformations essentially reorder the data structures around pre-existing unit boundaries; therefore, the technique assumes isomorphism among the representations concerned. The technique also allows for type checking of the output data during restructuring.

TIPSTER (Grishman, 1997), GATE (Cunningham, 2002), and Calypso (Zajac, 1998b) deal with interfacing in two ways. First, component interfaces share a common data structure (e.g., corpora of annotated documents), thus ensuring that the syntactic properties of the interface are compatible. Component wrappers are used to interface to other representations as necessary; for example, a Brill tagger (Brill, 1992) wrapper writes out token annotations in the required one-per-line format, then reads in the tags, and writes them back to the document as annotations. Second, where there is semantic incompatibility between the output of one component and the input of another, a dedicated transduction component can be written to act as an intermediary between the two.

In Verbmobil a component interface language is used, which constrains the I/O profiles of the various modules (Bos *et al.*, 1998). This language is a Prolog term that encodes logical semantic information in a flat list structure. The principle is similar to that used in TIPSTER-based systems, but the applicability is somewhat restricted by the specific nature of the data structure.

Provision of descriptive metadata has been addressed by the Natural Language Software Registry (NLSR; DFKI, 1999) and by the EUDICO distributed corpora project (Brugman *et al.*, 1998a,b). In each case, web-compatible data (HTML and XML, respectively) are associated with components. The NLSR is

purely a browsable description; the EUDICO work links the metadata with the resources themselves, allowing the launching of appropriate tools to examine them. Note that EUDICO has only dealt with language resource components to date. GATE 2 (Cunningham *et al.*, 2002b) uses XML for describing the metadata associated with processing resources in its CREOLE repositories. This metadata are used for component loading and also for launching the corresponding visualization and editing tools.

In addition to the issue of I/O transformation, in certain cases it may be desirable to be able to identify automatically which components are plug-compatible with which other ones, so as to identify possible execution paths through the component set.

GATE 1 (Cunningham *et al.*, 1997) addresses automatic identification of execution paths by associating a configuration file with each processing component that details the input (preconditions) and output (post-conditions) in terms of TIPSTER annotation and attribute types (see the section on reference attribution). This information is then used to autogenerate an execution graph for the component set.

Commonalities

To conclude this survey of infrastructural work related to processing, this section looks at the exploitation of commonalities between components. For example, both parsers and taggers have the characteristics of language analyzers. One of the key motivating factors for SALE is to break the 'software waste cycle' (Veronis and Ide, 1996) and promote reuse of components. Various researchers have approached this issue by identifying typical component sets for particular tasks (Hobbs, 1993; TIPSTER, 1995; Reiter and Dale, 2000). Work is continuing on providing implementations of common components (Ibrahim and Cummins, 1989; Cheong *et al.*, 1994). The rest of this section describes these approaches.

Reiter and Dale have reviewed and categorized Natural Language Generation (NLG) components and systems in some detail. Reiter (1994) argued that a consensus component breakdown has emerged in NLG (and that there is some psychological plausibility for this architecture); the classification was extended in Reiter and Dale (2000). They also discussed common data structures in NLG (as does the RAGS project; see below) and appropriate methods for the design and development of NLG systems. Reiter (1999) argued that the usefulness of this kind of architectural description is to 'make it easier to describe functionalities and data structures' and thus facilitate research by creating a common vocabulary among researchers. He stated that this is a more limited but more realistic goal than supporting the integration of diverse NLG components in an actual software system. The term he used for this kind of descriptive work is a 'reference architecture,' which is also the subject of the workshop at which the paper was presented (Mellish and Scott, 1999).

The TIPSTER research program developed descriptive or reference architectures for information extraction and for information retrieval. Hobbs (1993) described a typical module set for an IE system. The architecture comprises 10 components, dealing with such tasks as pre-processing, parsing, semantic interpretation, and lexical disambiguation; for a description of the full set, see Gaizauskas and Wilks, 1998). For IR, TIPSTER (1995) describes two functions, search and routing, each with a typical component set (some of which are PRs and some LRs.)

An architecture for spoken dialogue systems, which divides the task into dialogue management, context tracking, and pragmatic adaptation, is presented in LuperFoy *et al.* (1998). This in turn leads to an architecture in which various components (realized as agents) collaborate in the dialogue. Some example components are speech recognition, language interpretation, language generation, and speech synthesis. In addition a dialogue manager component provides high-level control and routing of information among components.

The preceding discussion illustrates that there is considerable overlap among component sets developed for various purposes. A SALE that facilitated multipurpose components would cut down on the waste involved in the continual reimplementation of similar components in different contexts. The component model given in Cunningham (2000) is made available in the GATE framework (Cunningham *et al.*, 2002b). This model is based on inheritance: A parser is a type of language analyzer that is a type of processing resource. Language engineers can choose, therefore, between implementing a more specific interface and adhering to the choices made by the GATE developers for that type, or implementing a more general interface and making their own choices about the specifics of their particular resource.

In several cases, work on identifying component commonalities has led to the development of toolkits that aim to implement common tasks in a reusable manner. For example, TARO (Ibrahim and Cummins, 1989) is an OO syntactic analyzer toolkit based on a specification language. A toolkit for building IE systems and exemplified in the MFE IE system is presented in Cheong *et al.* (1994).

Language Resources

As described above, language resources are data components, such as lexicons, corpora, and language models. They are the raw materials of language engineering. This section covers five issues relating to infrastructure for LRs:

1. computational access (local and nonlocal)
2. managing document formats and document collections (corpora), including multilingual resources
3. representing information about corpora (language data or performance modeling)
4. representing information about language (data about language or competence modeling)
5. indexing and retrieval of language-related information.

Note also that the advantages of a component-based model presented (in relation to PRs) in the section on locating and loading PRs also apply to LRs.

Programmatic Access

LRs are of worth only inasmuch as they contribute to the development and operation of PRs and the language processing research prototypes, experiments, and applications that are built from them. A key issue in the use of LRs for language processing purposes is that of computational access. Suppose that a developer is writing a program to generate descriptions of museum catalogue items this program may have a requirement for synonyms, for example, in order to lessen repetition. Several sources for synonyms are available, such as WordNet (Miller, 1990) or Roget's *Thesaurus*. To reuse these sources, the developer needs to access the data in these LRs from their program.

Although the reuse of LRs has exceeded that of PRs (Cunningham *et al.*, 1994), in general, there are still two barriers to LR access and hence LR reuse: (1) each resource has its own representation syntax and corresponding programmatic access mode (e.g., SQL for Celex, C or Prolog for WordNet); and (2) resources must generally be installed locally to be usable, and how this is done depends on what operating systems are available, what support software is required, and the like, which vary from site to site.

A consequence of the first barrier is that, although resources of the same type usually have some structure in common (for example, at one of the most general levels of description, lexicons are organized around words), this commonality cannot be exploited when it comes to using a new resource. In each case, the user has to adapt to a new data structure; this adaptation is a significant overhead. Work that seeks to investigate or exploit commonalities among resources has first to build a layer of access routines on top of each resource. So, for example, if one wished to do task-based evaluation of lexicons by measuring the relative performance of an IE system with different instantiations of lexical resource, one would typically have to write code to translate several different resources into SQL or some other common format. Similarly, work, such as Jing and McKeown (1998) on merging large-scale lexical resources (including WordNet and Comlex) for NLG, must deal with this problem.

There have been two principal responses to this problem: standardization and abstraction. The standardization solution seeks to impose uniformity by specifying formats and structures for LRs. So, for example, the EAGLES working groups have defined standards for lexicons, corpora, and so on (EAGLES, 1999). More recently, Ide and Romary (2004) reported the creation of a framework for linguistic annotations as part of the work of ISO standardization Technical Committee 37, Sub-Committee 4, whose objective

> is to prepare various standards by specifying principles and methods for creating, coding, processing and managing language resources, such as written corpora, lexical corpora, speech corpora, dictionary compiling and classification schemes. These standards will also cover the information produced by natural language processing components in these various domains.

The work reported here is from Working Group 1 of the committee, which has developed a linguistic annotation framework based on the XML (eXtensible Markup Language), RDF(S) (Resource Discovery Framework (Schema)), and OWL (Ontology Web Language).

Although standardization would undoubtedly solve the representation problem, there remains the question of existing LRs (and of competing standards). Peters *et al.* (1998) and Cunningham *et al.* (1998) described experiments with an abstraction approach based on a common object-oriented model for LRs that encapsulates the union of the linguistic information contained in a range of resources and encompasses as many object hierarchies as there are resources. At the top of the resource hierarchies are very general abstractions; at the leaves are data items specific to individual resources. Programmatic access is available at all levels, allowing the developer to select an appropriate level of commonality for each application. Generalizations are made over different object types in the resources, and the object hierarchies are linked at whatever levels of description are appropriate. No single view of the data is imposed on the user, who may choose to stay with the 'original'

representation of a particular resource or to access a model of the commonalities among several resources, or a combination of both.

A consequence of the requirement for local installation – the second barrier to LR access – is that users may have to adjust their compute environments to suit resources tailored to particular platforms. In addition, there is no way to 'try before you buy,' no way to examine an LR for its suitability for one's needs before licensing it *in toto*. Correspondingly, there is no way for a resource provider to give limited access to their products for advertising purposes or to gain revenue through piecemeal supply of sections of a resource.

This problem of non local access has also attracted two types of responses, which can be broadly categorized as: web browsing and distributed databases.

Several sites now provide querying facilities from HTML pages, including the Linguistic Data Consortium and the British National Corpus server. So, for example, all occurrences of a particular word in a particular corpus may be found via a web browser. This is a convenient way to access LRs for manual investigative purposes, but is not suited to (or intended for) use by programs for their access purposes.

Moving beyond browsing, several papers report work on programmatic access using distributed databases. Fikes and Farquhar (1999) showed how ontologies may be distributed, Brugman *et al.* (1998a,b) described the EUDICO distributed corpus access system, and Peters *et al.* (1998) and Cunningham *et al.* (1998) proposed a system similar to EUDICO, generalized to other types of LR. Some new directions in sharing language resources are discussed in the section on trends.

Other issues in the area of access to LRs include that of efficient indexing and search of corpora (see the section, 'Indexing and Retrieval'), and that of annotation of corpora (see the section on annotation). The issue of how to access SGML documents in an efficient manner is discussed in Olson and Lee (1997), who investigated the use of object-oriented databases for storing and retrieving SGML documents. Their conclusions were essentially negative due to the slowness of the databases used. Hendler and Stoffel (1999) discussed how ontologies may be stored and processed efficiently using relational databases, and here the results were more positive.

Documents, Formats, and Corpora

Documents play a central role in LE. They are the subject of analysis for such technologies as IE, and they are both analyzed and generated in technologies such as MT. In addition, a large amount of work uses annotated documents as training data for machine learning of numerical models. Previous work on LE infrastructure has developed models for documents and corpora, provided abstraction layers for document formats, and investigated efficient storage of documents in particular formats.

Documents may contain text, audio, video or a mixture of these formats; documents with a mixture of formats are referred to as multimedia documents. The underlying data are frequently accompanied by formatting information (delineating titles, paragraphs, areas of bold text, etc.) and, in the LE context, by annotation (storing linguistic data, such as gesture tags, POS tags, or syntax trees). Both formatting and annotation come in a wide variety of formats, including proprietary binary data, such as MS Word's.doc or Excel's .xls; semi-open, semi-readable formats, such as Rich Text Format (Word's exchange format); and nonproprietary standardized formats, such as HTML, XML, or GIF (Graphics Interchange Format).

The Text Encoding Initiative (TEI; (Sperberg-McQueen and Burnard, 1994, 2002), the Corpus Encoding Standard (CES; Ide, 1998), and XCES (Ide *et al.*, 2000) are models of documents and corpora that aim to standardize the representation of structural and linguistic data for textual documents. The general approach is to represent *all* information about document structure, formatting, and linguistic annotation using SGML/XML.

The issue of document formats has been addressed by several TIPSTER-based systems, including GATE and Calypso, and by the HTK speech recognition toolkit (Young *et al.*, 1999). In the HTK toolkit, the approach is to provide API calls that deal with documents in various known formats (e.g. Windows audioformat, MPEG) independent of those formats. For example, a speech recognizer can access the raw audio from these documents without knowing anything about the representation format.

The TIPSTER systems deal with formats by means of input filters that contain knowledge about the format encoding and use that knowledge to unpack format information into annotations. TIPSTER also supplies a model of corpora and data associated with both corpus and documents (Grishman, 1997). Note that the two approaches are not mutually exclusive: Ogden (1999) has defined a mapping between TEI/CES and TIPSTER annotations.

Another important issue that needs to be dealt with in infrastructures supporting LRs in multiple languages is the problem of editing and displaying multilingual information. It is often thought that the

character sets problem has been solved by use of the Unicode standard. This standard is an important advance, but in practice the ability to process text in a large number of the world's languages is still limited by (1) incomplete support for Unicode in operating systems and applications software, (2) languages missing from the standard, and (3) difficulties in converting non-Unicode character encodings to Unicode. To deal with all these issues, including displaying and editing of Unicode documents, GATE provides a Unicode Kit and a specialized editor (Tablan *et al.*, 2002). In addition, all processing resources and visualization components are Unicode-compliant.

Annotation

One of the key issues for much of the work done in this area is how to represent information about text and speech. This kind of information is sometimes called 'language data,' distinguishing it from 'data about language' in the form of lexicons, grammars, etc.

Two broad approaches to annotation have been taken: to use markup (e.g., SGML/XML) or to use annotation data structures with references or pointers to the original (e.g., TIPSTER, ATLAS). Interestingly, the differences between the two kinds of approaches have become less pronounced in recent work. SGML used to involve embedding markup in the text; TIPSTER (and related systems) use a referential scheme where the text remains unchanged and annotation refers to it by character offsets. The embedding approach has several problems, including the difficulty of extending the model to cope with multimedia data (Nelson, 1997, Cunningham *et al.*, 1997; Bird and Liberman, 1999a). Partly in response to these difficulties and as part of the rebirth of SGML as XML (Goldfarb and Prescod, 1998), the 'ML' community has adopted a referential scheme itself, which is now known as 'stand-off markup.' The data models of the various systems are now much closer than they were before XML existed, and the potential for interoperation between referential systems, such as GATE and XML-based architectures, is greater as a result. GATE exploits this potential by providing input from and output to XML in most parts of the data model (Cunningham *et al.*, 2002a,b).

Markup-Based Architectures Language data can be represented by embedding annotation in the document itself, at least in the case of text documents; users of embedding typically transcribe speech documents before markup or use 'stand-off markup.' The principal examples of embedded markup for language data use the Standard Generalized Markup Language (SGML; Goldfarb, 1990). SGML is a 'meta-language,' a language used to create other languages. The syntax of SGML is therefore abstract, with each document filling in this syntax to obtain a concrete syntax and a particular markup language for that document. In practice, certain conventions are so widespread as to be *de facto* characteristics of SGML itself. For example, annotation is generally delimited by <TAG> and </TAG> pairs, often with some attributes associated, such as <TAG ATTRIBUTE = value>. The legitimate tags (or 'elements') and their attributes and values must be defined for each class of document, using a Document-Type Definition (DTD). It does *not* specify what the markup means; the DTD is the grammar that defines how the elements may be legally combined and in what order in a particular class of text; see Goldfarb (1990). A good example of SGML used for corpus annotation is the British National Corpus (BNC; Burnard, 1995).

The HyperText Markup Language (HTML) is an application of SGML and is specified by its own DTD. A difference from ordinary SGML is that the DTD is often cached with software, such as web browsers, rather than being a separate file associated with the documents that instantiate it. In practice, web browsers have been lenient in enforcing conformance to the HTML DTD, which has led to diversity among web pages; this means that HTML DTDs now represent an idealized specification of the language that often differs from its usage in reality.

Partly in response to this problem, the eXtensible Markup Language (XML; Goldfarb and Prescod, 1998) was developed. SGML is a complex language: DTDs are difficult to write, and full SGML is difficult to parse. XML made the DTD optional and disallowed certain features of SGML, such as markup minimization. For example, the American National Corpus (ANC; Macleod *et al.*, 2002) uses XML and XCES (Ide *et al.*, 2000) to encode linguistic annotations.

One of the problems in the SGML/XML world is that of computational access to and manipulation of markup information. Addressing this problem, the Language Technology group at the University of Edinburgh developed an architecture and framework based on SGML called the LT Normalized SGML Library (LT NSL; McKelvie *et al.*, 1998). This in turn led to the development of LT XML (Brew *et al.*, 1999), following the introduction of the XML standard.

Tools in an LT NSL system communicate via interfaces specified as SGML DTDs (essentially tag set descriptions), using character streams on pipes: a pipe-and-filter arrangement modeled after UNIX-style shell programming. To avoid the need to deal with certain difficult types of SGML (e.g., minimized

markup), texts are converted to a normal form before processing. A tool selects what information it requires from an input SGML stream and adds information as new SGML markup. LT XML is an extension of LT NSL to XML; it makes the normalization step unnecessary.

Other similar work in this area includes the XDOC workbench (Rösner and Kunze, 2002), stand-off markup for NLP tools (Artola *et al.*, 2002), and the multilevel annotation of speech (Cassidy and Harrington, 2001).

Reference Annotation I: TIPSTER The ARPA-sponsored TIPSTER program in the United States, which was completed in 1998, produced a data-driven architecture for NLP systems (Grishman, 1997) several sites implemented the architecture, such as GATE version 1 (Cunningham *et al.*, 1999) and ELLOGON (Petasis *et al.*, 2002); the initial prototype was written by Ted Dunning at the Computing Research Lab of New Mexico State University. In contrast to the embedding approach, in TIPSTER, the text remains unchanged while information about it is stored in a separate database. The database refers to the text by means of offsets. The data are stored by reference.

Information is stored in the database in the form of annotations, which associate arbitrary information (attributes) with portions of documents (identified by sets of start/end character offsets or spans). Attributes are often the result of linguistic analysis (e.g., POS tags). In this way, information about texts is kept separate from the texts themselves. In place of an SGML DTD (or XML XSchema), an 'annotation type declaration' defines the information present in annotation sets (though few implementations instantiated this part of the architecture). Figure 1 gives an example of TIPSTER annotation; it "shows a single sentence and the result of three annotation procedures: tokenization with part-of-speech assignment, name recognition, and sentence boundary recognition. Each token has a single attribute, its part of speech (POS); . . .; each name also has a single attribute, indicating the type of name: person, company, etc." (Grishman, 1997).

Text

Kevin admired his bike.

0...|5...|10..|15..|20

Annotations

ID	Type	Span Start	Span End	Attributes
1	token	0	5	pos=NP
2	token	6	13	pos=VBD
3	token	14	17	pos=PP
4	token	18	22	pos=NN
5	token	22	23	
6	name	0	5	name_type=person
7	sentence	0	23	

Figure 1 Example of a TIPSTER annotation.

Documents are grouped into collections (or corpora), each with an associated database storing annotations and such document attributes as identifiers, headlines, etc. The definition of documents and annotations in TIPSTER forms part of an object-oriented model that can deal with inter-as well as intratextual information by means of reference objects that can point at annotations, documents, and collections. The model also describes elements of IE and IR systems relating to their use, providing classes representing queries and information needs.

TIPSTER-style models have several advantages and disadvantages. Texts may appear to be one-dimensional, consisting of a sequence of characters, but this view is incompatible with such structures as tables, which are inherently two-dimensional. Their representation and manipulation are easier in a referential model like TIPSTER than in an embedding one like SGML, in which markup is stored in a one-dimensional text string. In TIPSTER, a column of a table can be represented as a single object with multiple references to parts of the text (an annotation with multiple spans, or a document attribute with multiple references to annotations). Marking columns in SGML requires a tag for each row of the column, and manipulation of the structure as a whole necessitates traversal of all the tags and construction of some other, non-SGML data structure.

Distributed control has a relatively straightforward implementation path in a database-centered system like TIPSTER: the database can act as a blackboard, and implementations can take advantage of well-understood access control technology.

In TIPSTER, in contrast to the hyperlinking used in LT XML, there is no need to break up a document into smaller chunks, as the database management system (DBMS) in the document manager can deal efficiently with large data sets and visualization tools can give intelligible views into this data. To cross-refer between annotations is a matter of citing ID numbers, which are themselves indexes into database records and can be used for efficient data access. It is also possible to have implicit links: Simple API calls find all the token annotations subsumed by a

sentence annotation, for example, via their respective byte ranges without any need for additional cross-referencing information.

Another advantage of embedded markup in TIPSTER is that an SGML structure like <w id = p4.w1> has to be parsed in order to extract the fact that there is a 'w' tag whose 'id' attribute is 'p4.w1'. A TIPSTER annotation is effectively a database record with separate fields for type (e.g., 'w'), ID, and other attributes, all of which may be indexed and none of which ever requires parsing.

There are three principal disadvantages of the TIPSTER approach.

1. Editing of texts requires offset recalculation.
2. TIPSTER specifies no interchange format, and TIPSTER data are weakly typed. There is no effective DTD mechanism, though this may also to an extent be an advantage, as a complex typing scheme can inhibit unskilled users.
3. The reference classes can introduce brittleness in the face of changing data: Unless an application chases all references and updates them as the objects they point to change, the data can become inconsistent. This problem also applies to hyperlinking in embedded markup.

Reference Annotation II: Linguistic Data Consortium The Linguistic Data Consortium (LDC) has proposed the use of Directed Acyclic Graphs (DAGs) or just Annotation Graphs (AGs) as a unified data structure for text and speech annotation (Bird *et al.*, 2000b). Bird and Liberman (1999b) provided an example of using these graphs to mark up discourse-level objects. This section compares the structure of TIPSTER annotations with the graph format.

As discussed above, TIPSTER annotations are associated with documents and have four elements:

1. a type, which is a string
2. an ID, which is a string unique among annotations on the document
3. a set of spans that point into the text of the document
4. a set of attributes.

TIPSTER attributes, which are associated with annotations and with documents and collections of documents, have a name, which is a string, and a value, which may be one of several data types including a string; a reference to an annotation, document, or collection; or a set of strings or references. Some implementors of the architecture, including GATE and Corelli, have relaxed the type requirements on attribute values, allowing any object as a value. This has the advantage of flexibility and the disadvantage that it makes viewing, editing, and storage of annotations more complex.

TIPSTER explicitly models references between annotations with special reference classes. These classes rely on annotations, documents, and collections of documents having unique identifiers.

LDC annotations are arcs in a graph, the nodes of which are time points or, by extension, character offsets in a text. Each annotation has a type and a value, which are both atomic. A document may have several different graphs, and graphs can be associated with more than one document; this is not specified in the model.

There are no explicit references. Rather, references are handled implicitly by equivalence classes: if two annotations share the same type and value, they are considered co-referential. To refer to particular documents or other objects, an application or annotator must choose some convention for representing those references as strings and use those as annotation values. This seems problematic: an annotation of type Co-reference Chain and value Chain23 should be equivalent to another of the same type and value, but this is not true for an annotation of type PartOf-Speech and value Noun. Because LDC annotation values are atomic, any representation of complex data structures must define its own reference structure to point into some other representation system.

TIPSTER has a richer formalism, both because of the complexity of the annotation/attribute part of the model and because documents and collections of documents are an explicit part of the model, as are references among all these objects.

The inherent problems with developing a model of a task to be solved in software in isolation from the development of instances of that software are evident in the work of Cassidy and Bird (2000), who discussed the properties of the LDC AG model when stored and indexed in a relational database. At that point the authors added identifier fields to annotations to allow referencing without the equivalent class notion.

Reference Annotation III: GATE GATE version 2 has a reference annotation model that was designed to combine the advantages of the TIPSTER and LDC models:

- Annotation sets are more explicitly graph-based. This feature allows increased efficiency of traversal and simpler editing because offsets are moved from the annotations into a separate node object. In addition, the offsets can be both character and

time offsets, thus enabling annotation of multimodal data.

- Multiple annotation sets are allowed on documents. Consider the situation when two people are adding annotations to the same document and later wish to compare and merge their results. TIPSTER would handle this by having an 'annotator' attribute on all the annotations. It is much simpler to have disjoint sets.
- Documents and collections are an essential part of the model, and information can be associated with them in similar fashion to that on annotations.
- All annotations have unique identifiers to allow for referencing.
- An annotation only has two nodes which means that the multiple-span annotations of TIPSTER are no longer supported; the workaround is to store noncontiguous data structures as features of the document and point from there to the multiple annotations that make up the structures.
- The annotation values are extensible (i.e., any classes of object can be added to the model and be associated with annotations).

In addition, both LDC and TIPSTER need an annotation meta-language to describe – for purposes of validation or configuration of viewing and editing tools – the structure and permissible value set of annotations. GATE uses the XML schema language supported by W3C as an annotation meta-language (Cunningham *et al.*, 2002b). These annotation schemas define which attributes and optionally which values are permissible for each type of annotation (e.g., POS, named entity). For instance, a chosen tag set can be specified as permissible values for all POS annotations. This meta-information enables the annotation tools to control the correctness of the user input, thus making it easier to enforce annotation standards.

Data about Language

The preceding sections described language data, information related directly to examples of the human performance of language. This section considers work on data about language or the description of human language competence. Much work in this area has concentrated on formalisms for the representation of the data and has advocated declarative, constraint-based representations (using feature-structure matrices manipulated under unification) as an appropriate vehicle with which "many technical problems in language description and computer manipulation of language can be solved" (Shieber, 1992). One example of an infrastructure project based on Attribute-Value Matrices (AVMs) is ALEP, the Advanced Language Engineering Platform. ALEP aims to provide "the NLP research and engineering community in Europe with an open, versatile, and general-purpose development environment" (Simkins, 1992). ALEP, although open in principle, is primarily an advanced system for developing and manipulating feature structure knowledge bases under unification. It also has several parsing algorithms – algorithms for transfer, synthesis, and generation (Schütz, 1994). As such, it is a system for developing particular types of LRs (e.g., grammars, lexicons) and for doing a particular set of tasks in LE in a particular way.

The system, despite claiming to use a theory-neutral formalism (in fact an HPSG (Head-driven Phrase Structure Grammar)-like formalism), is still committed to a particular approach to linguistic analysis and representation. It is clearly of utility to those in the LE community who use that class of theories and to whom those formalisms are relevant, but it excludes or at least does not support actively those who are not, including an increasing number of researchers committed to statistical and corpus-based approaches.

Other systems that use AVMs include a framework for defining NLP systems based on AVMs (Zajac, 1992); the Eurotra architecture, an 'open and modular' architecture for MT promoting resource reuse (Schütz *et al.*, 1991); the DATR morphological lexicon formalism (Evans and Gazdar, 1996); the Shiraz MT Architecture, a chart and unification-based architecture for MT and (Amtrup, 1999), a unified (Finite State Transducer) FST/AVM formalism for morphological lexicons Zajac (1998a); and the RAGS architecture.

A related issue is that of grammar development in an LE context (see Netter and Pianesi, 1997; Estival *et al.*, 1997). Fischer *et al.* (1996) presented an abstract model of thesauri and terminology maintenance in an OO framework. ARIES is a formalism and development tool for Spanish morphological lexicons (Goni *et al.* 1997).

The Reference Architecture for Generation Systems (RAGS) project (Cahill *et al.*, 1999a,b) has concentrated on describing structures that may be shared among NLG component interfaces. This choice is motivated by the fact that the input to a generator is not a document, but a meaning representation. RAGS describes component I/O using a nested feature matrix representation, but does not describe the types of LR that an NLG system may use or the way in which components may be represented, loaded, and so on. More recently, Mellish *et al.* (2004) presented the RAGS conceptual framework and Mellish and

Evans (2004) discussed the implementation of this framework in several experimental systems and how these systems illustrate a wider range of issues for the construction of SALE for generation.

Indexing and Retrieval

Modern corpora, and annotations upon them, frequently run to many millions of tokens. To enable efficient access to this data, the tokens and annotation structures must be indexed. In the case of raw corpora, this problem equates to information retrieval (IR; also known as document detection), a field with a relatively well-understood set of techniques based on treating documents as bags of stemmed words and retrieving based on relative frequency of these terms in documents and corpora (see van Rijsbergen, 1979). Although these processes are well understood and relatively static, IR is an active research field, partly because existing methods are imperfect and partly because that imperfection becomes more and more troubling in the face of the explosion of web content. There have been several attempts to provide SALE systems in this context.

As noted above, the TIPSTER (1995) program developed a reference model of typical IR component sets. More concretely, this program also developed a communication protocol based on Z39.50 for the detection of interactions between the querying application and search engine (Buckley, 1998). The annotation and attribute data structures described earlier were also applied for IR purposes, although the practical applications of the architecture were found in general to be too slow for the large data sets involved.

GATE (Cunningham *et al.*, 2002a,b) uses an extendable, open-source IR engine, Lucene, to index documents and corpora for full-text retrieval. Lucene also allows indexing and retrieval by custom-provided fields like annotations. The model used to wrap Lucene in GATE is designed for extensibility to other IR systems when required.

Whereas the problem of indexing and retrieving documents is well understood, the problem of indexing complex structures in annotations is more of an open question. The Corpus Query System (Christ, 1994, 1995) is the most-cited source in this area, providing indexing and search of corpora and later of WordNet. Similar ideas have been implemented in CUE (Mason, 1998) for indexing and search of annotated corpora and at the W3-Corpora site (University of Essex, 1999) for searchable on-line annotated corpora. Some work on indexing in the LT XML system was reported in McKelvie and Mikheev (1998). Bird *et al.* (2000a) proposed a query language for the LDC annotation graph model, called AGQL. Cassidy (2002) discussed the use of XQuery as an annotation query language and concluded that it is good for dealing with hierarchical data models like XML, but needs extending with better support for sequential data models, such as annotation graphs.

GATE indexes and retrieves annotations by storing them in a relational database, indexed by type, attributes, and their values. In this way, it is possible to retrieve all documents that contain a given attribute and/or value or to retrieve all annotations of a given type in a corpus, without having to traverse each document separately (Bontcheva *et al.*, 2002; Cunningham *et al.*, 2002b). The query language used is SQL.

Recent Trends and Future Directions

As has become evident from the work reviewed here, there are many tools and architectures, and many of these are focused on subareas of NLP (e.g., dialog speech) or specific formalisms (e.g., HPSG). Each of these infrastructures offers specialized solutions, so it is not likely that there will ever be only one universal architecture or infrastructure. Instead, the focus in recent work has been on 'inter-operability', allowing infrastructures to work together, and reusability, enabling users to reuse and adapt tools with a minimum effort. We review some of these new trends here to see how they are likely to influence the next period of research on SALE.

Toward Multipurpose Repositories

To support the reusability of resources, several repositories have been established; some describe NLP tools (e.g., ACL Natural Language Software Registry), and others distribute language resources, such as corpora and lexicons (e.g., ELRA and LDC). To date, these repositories have remained largely independent of each other, with the exception of such repositories as TRACTOR (Martin, 2001), which contain both corpora in a number of languages and specialized tools for corpus analysis.

As argued in Declerck (2001), there is a need to link the two kinds of repositories to allow corpus researchers to find the tools they need to process corpora and vice versa. The idea is to create a multipurpose infrastructure for the storage and access of both language data and the corresponding processing resources. One of the cornerstones of such an infrastructure are metadata, associated with each resource and pointing at other relevant resources (e.g., tools pointing at the language data that they need and

can process). The following section discusses recent research on metadata descriptions for tools and language resources, including handling of multimodal and multilingual data.

Resource Metadata and Annotation Standards

As discussed earlier, there are several reasons why metadata should be part of a component infrastructure (i.e., why it is useful beyond the more narrow scope of providing descriptions of resources in a repository). One dimension that affects the kinds of metadata needed to describe resources is their type: whether they are documents in a corpus, a lexicon, or a tool working on language data. For example, the ISLE Computational Lexicon working group has developed a modular architecture, called MILE, designed to factor out linguistically independent primitive units of lexical information; deal with monolingual, bilingual, and multilingual lexicons; and avoid theoretical bias (Calzolari *et al.*, 2001). Some of these desiderata are relevant also to the problem of resource distribution, as discussed in the section on programmatic access and in Cunningham *et al.* (2000). Multimedia/multimodal language resources (MMLR) pose a different set of problems, and existing standards for tagging textual documents (e.g., XCES; Ide *et al.*, 2000) are not sufficient. Broeder and Wittenburg (2001) provided a metadata vocabulary for MMLR, which encodes information related to the media files (e.g., format and size) and the annotation units used (e.g., POS), as well as the basic information on creator, content, and so on.

Another aspect of improving resource reusability and interoperability is the development of standards for encoding annotation data. Ide and Romary (2002) described a framework for linguistic annotations based on XML and the XML-based RDF and DAML+OIL standards for defining the semantics of the annotations. It provides a link with recent work on formal ontologies and the semantic web and enables the use of the related knowledge management tools to support linguistic annotation. For example, Collier *et al.* (2002) used the popular Protégé ontology editor as a basis for an annotation tool capable of producing RDF(S) annotations of language data in multiple languages.

Open Archives

One of the new research directions is toward 'open archives,' archives aiming to make resources easily discoverable, accessible, and identifiable. This work not only includes language resources, such as corpora and lexicons, but also software tools (i.e., processing resources and development environments). Resource discovery is made possible by metadata associated with each resource and made available in a centralized repository. The recently established Open Language Archives Community (OLAC; Bird and Simons, 2001; Bird *et al.*, 2002) aims to create a worldwide virtual library of language resources through the development of inter-operating repositories and tools for their maintenance and access. OLAC also aims to establish and promote best practices in archiving for language resources. The OLAC infrastructure is based on two initiatives from digital library research: the Open Archieves Initiative and the Dublin Core initiative for resource metadata. Currently, OLAC comprises 12 archives with a cross-archive searching facility.

As argued in Wynne (2002), the current trends toward multilinguality and multimodality suggest that the language resources of the future will span across languages and modalities, will be distributed over many repositories, and will form virtual corpora, supported by a diverse set of linguistic analysis and searching tools. As already discussed, metadata and annotation standards play a very important role here. The other major challenge lies in making existing processing resources accessible over the web and enhancing their reusability and portability.

Component Reusability, Distributed Access, and Execution

To enable virtual corpora and collaborative annotation efforts spanning country boundaries, software infrastructures and tools need to control user access to different documents, types of annotations, and metadata. Ma *et al.* (2002) discussed how this access can be achieved by using a shared relational database as a storage medium, combined with a number of annotation tools based on the annotation graph formalism discussed in the section on the Linguistic Data Consortium. The same approach has been taken in GATE (Cunningham *et al.*, 2002b), in which all LRs and their associated annotations can be stored in Oracle or PostgreSQL. This feature enables users to access remote LRs, index LRs by their annotations, and construct search queries retrieving LRs given annotations or metadata constraints (e.g., find all documents that contain person entities called Bush). User access is controlled at the individual and group level, with read/write access rights specified at LR creation time by their owner (the user who has first stored the LR in the database). Because the storage mechanisms in GATE are separate from the API used for accessing LRs and annotations, the visualization tools and processing resources work on both local

and remote data in the same way. Ma *et al.* (2002) discussed a special version of AGTK TableTrans tool created to work with the database annotations. In addition, GATE's database storage model supports other LRs, such as lexicons and ontologies.

The recent development of web services enables integration of different information repositories and services across the Internet and offers a new way of sharing language resources across the Internet. Dalli (2002) discussed an architecture for web-based inter-operable LRs based on SOAP and web services. Work in progress extends this approach to processing resource execution in the context of on-line adaptive information extraction (see Tablan *et al.*, 2003). Both make extensive use of XML for metadata description. However, the benefits of the relational database storage mechanism can still be maintained by providing a conversion layer, which transforms the stored LRs and annotations into the desired XML format when needed. Similarly, Todirascu *et al.* (2002) described an architecture that uses SOAP to provide distributed processing resources as services on the web, both as a protocol for message passing and a mechanism for executing remote modules from the client. Bontcheva *et al.* (2004) reported recent work in upgrading GATE to meet challenges posed by research in semantic web, large-scale digital libraries, and machine learning for language analysis.

Popov *et al.* (2004) presented an application that combines several SALE systems, including GATE and Sesame, to create a platform for semantic annotation called KIM (Knowledge and Information Management). Their paper covered several issues relating to building scaleable ontology-based information extraction.

Measurement

A persistent theme in SALE work has been measurement, quantitative evaluation, and the relationship between engineering practice and scientific theory. To quote Lord Kelvin in a lecture to the Institution of Civil Engineers, in London in 1883.

> When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of science.

On the other hand, Einstein tells us,

> Not everything that counts can be counted, and not everything that can be counted counts (from a sign hanging in Einstein's office at Princeton University).

Researchers have taken similarly varied approaches to measurement, both of component systems developed using SALE systems and of the success of those systems themselves. The presentation of IBM's TEXTRACT architecture by Neff *et al.* (2004) included an illustration of how the same mechanism can be used for producing both quantitative metrics and for visual feedback to users of the results of automated processing.

Ferrucci and Lally (2004) reported a successor to TEXTRACT called UIMA (Unstructured Information Management Architecture), which is in active development to support the work of several hundred R&D staff working in areas as diverse as question answering and machine translation. The significant commitment of IBM to SALE development indicates the success of the TEXTRACT concept and of architectural support for language processing research.

Prognosis

> The principal defining characteristic of NLE work is its objective: to engineer products that deal with natural language and that satisfy the constraints in which they have to operate. This definition may seem tautologous or a statement of the obvious to an engineer practicing in another, well established area (e.g., mechanical or civil engineering), but is still a useful reminder to practitioners of software engineering, and it becomes near-revolutionary when applied to natural language processing. This is partly because of what, in our opinion, has been the ethos of most Computational Linguistics research. Such research has concentrated on studying natural languages, just as traditional linguistics does, but using computers as a tool to model (and, sometimes, verify or falsify) fragments of linguistic theories deemed of particular interest. This is of course a perfectly respectable and useful scientific endeavor, but does not necessarily (or even often) lead to working systems for the general public (Boguraev *et al.*, 1995).

Working systems for public consumption require qualities of robustness that are unlikely to be achieved at zero cost as part of the normal development of experimental systems in language computation research (Maynard *et al.*, 2002). Investing the time and energy necessary to create robust reusable software is not always the right thing to do, of course; sometimes what is needed is a quick hack to explore some simple idea with as little overhead as possible. To conclude that this is always the case is a rather frequent error, however, and is of particular concern at a time when web-scale challenges to language processing are common.

Also problematic for SALE is the fact that it is not always easy to justify the costs of engineered systems when developers of more informal and short-term solutions have been known to make claims for their power and generality that are, shall we say, somewhat optimistic. The fact that the majority of the language processing field continues to use a SALE system of one type or another indicates that this has been a fruitful pursuit.

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See also: Human Language Technology; Language Processing: Statistical Methods; Natural Language Processing: System Evaluation; Text Retrieval Conference and Message Understanding Conference.

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http://www.info.ox.ac.uk – British National Corpus.
http://www.openarchives.org – Open Archives Initiative.
http://www.dublincore.org – Dublin Core Initiative for Resource Metadata.
http://www.openrdf.org – Knowledge and information management.

Computational Lexicons and Dictionaries

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What Are Computational Lexicons and Dictionaries?

Computational lexicons and dictionaries (henceforth lexicons) include manipulable computerized versions of ordinary dictionaries and thesauruses. Computerized versions designed for simple lookup by an end user are not included, since they cannot be used for computational purposes. Lexicons also include any electronic compilations of words, phrases, and concepts, such as word lists, glossaries, taxonomies, terminology databases (*see* **Terminology and Terminological Databases**), wordnets (*see* **WordNet(s)**), and ontologies. While simple lists may be included, a key component of computational lexicons is that they contain at least some additional information associated with the words, phrases, or concepts. One small list frequently used in the computational community is a list of about 100 most frequent words (such as *a, an, the, of*, and *to*), called a **stoplist**, because some applications ignore these words in processing text.

In general, a lexicon includes a wide array of information associated with entries. An entry in a lexicon is usually the base form of a word, the singular for a noun and the present tense for a verb. Using an ordinary dictionary as a reference point, an entry in a computational lexicon contains all the information found in the dictionary: inflectional and variant forms, pronunciation, parts of speech, definitions, grammatical properties, subject labels, usage examples, and etymology (*see* **Lexicography: Overview**). More specialized lexicons contain additional types of information. A thesaurus or wordnet contains synonyms, antonyms, or words bearing some other relationship to the entry. A bilingual dictionary contains translations for an entry into another language. An ontology (loosely including thesauruses or wordnets) arranges concepts in a hierarchy (e.g., *a horse is an animal*), frequently including other kinds of relationships as well (e.g., *a leg* ***is part of*** *a horse*).

The term 'computational' applies in several senses for computational lexicons. Essentially, the lexicon is in an electronic form. Firstly, the lexicon and its associated information may be studied to discover patterns, usually for enriching entries. Secondly, the lexicon can be used computationally in a wide variety of applications; frequently, a lexicon may be constructed to support a specialized computational linguistic theory or grammar. Thirdly, written or spoken text may be studied to create or enhance entries in the lexicon. Broadly, these activities comprise the field known as **computational lexicology**, the computational study of the form, meaning, and use of words (*see also* **Lexicology**).

History of Computational Lexicology

Computational lexicology as the study of machine-readable dictionaries (MRDs) (Amsler, 1982) emerged in the mid-1960s and received considerable attention until the early 1990s. 'Machine-readable' does not mean that the computer reads the dictionary, but only that it is in electronic form and can be processed and manipulated computationally.

Computational lexicology had gone into decline as researchers concluded that MRDs had been fully exploited and that they could not be usefully exploited for NLP applications (Ide and Veronis, 1993). However, since that time, many dictionary publishers have taken the early research into account to include more information that might be useful. Thus, practitioners of computational lexicology can expect to contribute to the further expansion of lexical information. To provide the basis for this contribution, the results of the early history need to be kept in mind.

MRDs evolved from keyboarding a dictionary onto punchcards, largely through the efforts of Olney (1968), who was instrumental in getting G. & C. Merriam Co. to permit computer tapes to be distributed to the computational linguistics research community. The ground-breaking work of Evens (Evens and Smith, 1978) and Amsler (1980) provided the impetus for a considerable expansion of research on MRDs, particularly using *Webster's seventh new collegiate dictionary* (W7; Gove, 1969). These efforts stimulated the widespread use of the *Longman dictionary of contemporary English* (LDOCE; Proctor, 1978) during the 1980s; this dictionary is still the primary MRD today.

Initially, MRDs were faithful transcriptions of ordinary dictionaries, and researchers were required to spend considerable time interpreting typesetting codes (e.g., to determine how a word's part of speech was identified). With advances in technology, publishers eventually came to separate the printing and the database components of MRDs. Today, the various fields of an entry are specifically identified and labeled, increasingly using eXtensible Markup Language (XML), such as shown in Figure 1. As a result, researchers can expect that MRDs will be in a form that is much easier to understand, access, and manipulate, particularly using XML-related technologies developed in computer science.

```
<entry>
  <headword>double</headword>
  <senses>
    <sense pos = "adj" num = "1" >
      <def>twice as much, in size, strength, number, or amount</def>
      <example>a double dose</example>
    </sense>
    …
    <sense pos = "noun" num = "1">
      <def>something increased twofold</def>
    </sense>
  </senses>
</entry>
```

Figure 1 Sample entry for the word *double* using XML.

The Study of Computational Lexicons

Making Lexicons Tractable

An electronic lexicon provides the resource for examination and use, but requires considerable initial work on the part of the investigator, specifically to make the contents tractable. The investigator needs (1) to understand the form, structure, and content of the lexicon, and (2) to ascertain how the contents will be studied or used.

Understanding involves a theoretical appreciation of the particular type of lexicon. While dictionaries and thesauruses are widely used, their content is the result of considerable lexicographic practice; an awareness of lexicographic methods is extremely valuable in studying or using these resources. Wordnets require an understanding of how words may be related to one another. Ontologies require an understanding of conceptual relations, along with a formalism for capturing properties in slots and their fillers. A full ontology may also involve various principles for 'reasoning' with objects in a knowledge base. Lexicons that are closely tied to linguistic theories and grammars require an understanding of the underlying theory or grammar.

The actual study or use of the lexicons is essentially the development of procedures for manipulating the content, i.e., making the contents tractable. A common objective is to transform or extract some part of the content into a form that will meet the user's needs. This can usually be accomplished by recognizing patterns in the content; a considerable amount of lexical semantics research falls into this category. Another common objective is to map some or all of the content in one format or formalism into another. The general idea of these mappings is to take advantage of content developed under one formalism and to use it in another. The remainder of this section focuses on defining patterns that have been observed in MRDs.

What Can Be Extracted From Machine-Readable Dictionaries?

Lexical Semantics Olney (1968), in his groundbreaking work on MRDs, laid out a series of computational aids for studying affixes, obtaining lists of semantic classifiers and components, identifying semantic primitives, and identifying semantic fields. He also examined defining patterns (including their syntactic and semantic characteristics) to identify productive lexical processes (such as the addition of *-ly* to adjectives to form adverbs). **Defining patterns** are essentially regular expressions that specify string, syntactic, and semantic elements of definitions that occur frequently within definitions. For example, *in (a\|an) [adj] manner*, applied to adverb definitions, can be used to characterize the adverb as **manner**, to establish a *derived-from [adj]* relation, and to characterize a productive lexical process.

The program Olney initiated in studying these patterns is still incomplete. There is no systematic compilation that details the results of the research in this area. Moreover, in working with the dictionary publishers, he was provided with a detailed list of defining instructions used by lexicographers. Defining instructions, usually hundreds of pages, guide the lexicographer in deciding what constitutes an entry, what information the entry should contain, and frequently provides formulaic details on how to define classes of words. Each publisher develops its own idiosyncratic set of guidelines, again underscoring the point that a close working relationship with the publishers can provide a jump-start to the study of patterns.

Amsler (1980) and Litkowski (1978) both studied the taxonomic structure of the nouns and verbs in dictionaries, observing that, for the most part, definitions of these words begin with a superordinate or hypernym (**flax** *is a* **plant**, **hug** *is to* **squeeze**). They both recognized that a dictionary is not fully consistent in laying out a taxonomy, because it contains **defining cycles** (where words may be used to define

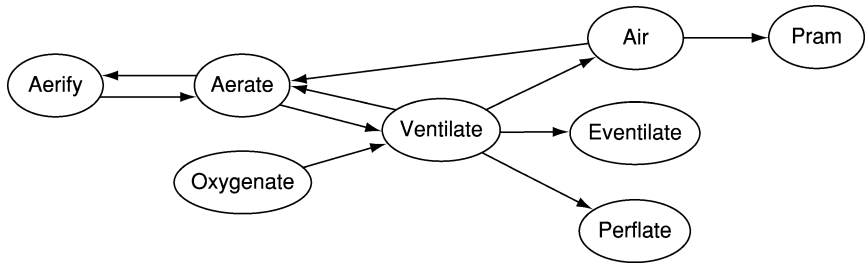

Figure 2 Illustrations of definition cycles for (*aerify, aerate*), (*aerate, ventilate*), and (*air, aerate, ventilate*) in a directed graph anchored by *oxygenate*.

themselves when all links are followed). Litkowski, applying the theory of labeled directed graphs to the dictionary structure, concluded that primitives had to be concept nodes lexicalized by one or more words and verbalized with a gloss (identical to the synonym set encapsulated in the nodes in WordNet). He also hypothesized that primitives essentially characterize a pattern of usage in expressing their concepts. Figure 2 shows an example of a directed graph with three defining cycles; in this example, *oxygenate* is the base word underlying all the others and is only relatively primitive.

Evens and Smith (1978), in considering lexical needs for a question-answering system, presented a description of approximately 45 syntactic and semantic lexical relations. **Lexical semantics** is the study of these relations and is concerned with how meanings of words relate to one another (*see* **Lexical Semantics: Overview**). Evens and Smith grouped the lexical relations into nine categories: taxonomy and synonymy, antonymy, grading, attribute relations, parts and wholes, case relations, collocation relations, paradigmatic relations, and inflectional relations. Each relation was viewed as an entry in the lexicon itself, with predicate properties describing how to use the relations in a first-order predicate calculus.

The study of lexical relations is distinguished from the **componential analysis** of meaning (Nida, 1975), which seeks to analyze meanings into discrete **semantic components** (or **features**). In this form of analysis, semantic features (such as *maleness* or *animacy*) are used to contrast the meanings of words (such as *father* and *mother*). These features proved to be extremely important among field anthropologists in understanding and translating among many languages. These features can be useful in characterizing lexical preferences, e.g., indicating that the subject of a verb should have an *animate* feature. Their importance has faded somewhat, particularly as the meanings of words have been seen to have fuzzy boundaries and to depend very heavily on the contexts in which they appear.

Ahlswede (1985), Chodorow *et al.* (1985), and others engaged in large-scale efforts for automatically extracting lexical semantic relations from MRDs, particularly W7. Evens (1988) provides a valuable summary of these efforts; a special issue of *Computational Linguistics* on the lexicon in 1987 also provides considerable detail on important theoretical and practical perspectives on lexical issues. One focus of this research was on extracting taxonomies, particularly for nouns. In general, noun definitions are extended noun phrases (e.g., including attached prepositional phrases), in which the head noun of the initial noun phrase is the hypernym. Parsing the definition provides the mechanism for reliably identifying the hypernym. However, the various studies showed many cases where the head is effectively empty or signals a different type of lexical relation. Examples of such heads include *a set of*, *any of various*, *a member of*, and *a type of*.

Experience with extracting lexical relations other than taxonomy was similar. Investigators examined defining patterns for regularities in signaling a particular relation (e.g., *a part of* indicating a **part-whole** relation). However, the regularities were generally not completely reliable and further work, sometimes manual, was necessary to separate good results from bad results.

Several observations can be made. First, there is no repository of the results; new researchers must reinvent the processes or engage in considerable effort to bring together the relevant literature. Second, few of these efforts have benefited directly from the defining instructions or guidelines used in creating the definitions. Third, as outcomes emerge that show the benefit of particular types of information, dictionary publishers have slowly incorporated some of this additional information, particularly in electronic versions of the dictionaries.

Research Using *Longman's Dictionary of Contemporary English* Beginning in the early 1980s, the *Longman's dictionary of contemporary English* (LDOCE; Proctor, 1978) became the primary MRD

used in the research community. LDOCE is designed primarily for learners of English as a second language. It uses a controlled vocabulary of about 2000 words in its definitions. LDOCE uses about 110 syntactic categories to characterize entries (e.g., *noun* and *noun/count/followed-by-infinitive-with-TO*). The electronic version includes **box** codes that provide features such as *abstract* and *animate* for entries; it also includes **subject** codes, identifying the subject specialization of entries where appropriate. Wilks *et al.* (1996) provide a thorough overview of research using LDOCE (along with considerable philosophical perspectives on meaning and a detailed history of research using MRDs).

In using LDOCE, many researchers have built upon the research that used W7. In particular, they have reimplemented and refined procedures for identifying the dictionary's taxonomy and for investigating defining patterns that reveal lexical semantic relations. In addition to string pattern matching, researchers began parsing definitions, necessarily taking into account idiosyncratic characteristics of definition text as compared to ordinary text. A significant problem emerged when parsing definitions: the difficulty of disambiguating the words making up the definition. This problem is symptomatic of working with MRDs, namely, that almost any pattern that is investigated will not have complete reliability and will require some amount of manual intervention.

Boguraev and Briscoe (1987) introduced a new task into the analysis of MRDs, using them to derive lexical information for use in NLP applications. In particular, they used the box codes of LDOCE to create "lexical entries containing grammatical information compatible with" parsing using different grammatical theories (*see* **Symbolic Computational Linguistics: Overview**).

The derivational task has been generalized into a considerable number of research efforts to convert, map, and compare lexical entries from one or more sources. Since 1987, these efforts have grown and constitute an active area of research. Conversion efforts generally involve creation of broad-coverage lexicons from lexical resources within particular formalisms. Mapping efforts attempt to exploit and capture particular lexical properties from one lexicon into another. Comparison efforts examine multiple lexicons.

Comparison of lexical entries from multiple sources led to a crisis in the use of MRDs. Ide and Veronis (1993), in surveying the results of research using MRDs, noted that lexical resources frequently were in conflict with one another and could not be used reliably for extracting information. Atkins (1991) described difficulties in comparing entries from several dictionaries because of lexicographic exigencies and editorial decisions (particularly the dictionary size). She noted that lexicographers could variously lump senses together, split them apart, or combine elements of meaning in different ways. These papers, along with others, seemed to slow the research on using MRDs and other lexical resources. They also underscore the major difficulty that there is no comprehensive theory of meaning, i.e., an organization of the semantic content of definitions. This difficulty may be characterized as the problem of paraphrase, or determining the semantic equivalence of expressions (discussed in detail below).

Semantic Networks Quillian (1968) considered the question of "how semantic information is organized within a person's memory." He described semantic memory as a network of nodes interconnected by associative links. In explicating this approach, he visualized a dictionary as a unified whole, where conceptual nodes (representing individual definitions) were connected by paths to other nodes corresponding to the words making up the definitions. This model envisioned that words would be properly disambiguated. Computer limitations at the time precluded anything more than a limited implementation. A later implementation by Ide and Veronis (1990) added the notion that nodes within the semantic network would be reached by **spreading activation**.

WordNet (Fellbaum, 1998) was designed to capture several types of associative links, although the number of such links was limited by practical considerations. WordNet was not designed as a lexical resource, so that its entries do not contain the full range of information that is found in an ordinary dictionary. Notwithstanding these limitations, WordNet has found widespread use as a lexical resource, both in research and in NLP applications. WordNet is a prime example of a lexical resource that is converted and mapped into other lexical databases.

MindNet (Dolan *et al.*, 2000) is a lexical database and a set of methodologies for analyzing linguistic representations of arbitrary text. It combines symbolic approaches to parsing dictionary definitions with statistical techniques for discriminating word senses using similarity measures. MindNet began by parsing definitions and identifying highly reliable semantic relations instantiated in these definitions. The set of 25 semantic relations includes *Hypernym*, *Synonym*, *Goal*, *Logical_subject*, *Logical_object*, and *Part*. A distinguishing characteristic of MindNet is that the inverse of all relations identified by pattern-matching heuristics are propagated throughout the lexical database. As a result, both direct and indirect paths between entries and words contained in their definitions

exist in the database. Given two words (such as *pen* and *pencil*), the database is examined for all paths between them (ignoring any directionality in the paths). The path lengths and weights on different kinds of connections leads to a measure of similarity (or dissimilarity), so that a strong similarity is indicated between *pen* and *pencil* because both of them appear in various definitions as **means** (or **instruments**) linked to *draw*.

Originally, MindNet was constructed from LDOCE; subsequently, *American Heritage* (3rd edn., 1992) was added to the lexical database. Patterns used in recognizing semantic relations from definitions can be used as well in parsing and analyzing any text, including corpora. Recognizing this, the MindNet database was extended by processing the full text of *Microsoft Encarta*. In principle, MindNet can be continually extended by processing any text, essentially refining the weights showing the strength of relationships.

MindNet provides a mechanism for capturing the context within which a word is used and hence is a database that characterizes a word's usage, in line with Firth's (1957) argument that "the meaning of a word could be known by the company it keeps." MindNet is a significant departure from traditional dictionaries, although it essentially encapsulates the process by which a lexicographer constructs definitions. This process involves the collection of many examples of a word's usage, arranging them with concordances, and examining the different contexts to create definitions. The MindNet database could be mined to facilitate the lexicographer's processes. Traditional lexicography is already being extended through automated techniques of corpus analysis very similar in principle to MindNet's techniques.

Using Lexicons

Language Engineering

Research on computational lexicons, even with a resultant propagation of additional information and formalisms throughout the entries, is inherently limited. While a dictionary publisher makes decisions on what to include based on marketing considerations, the design and development of computational lexicons have not been similarly driven. In recent years, the new field of language engineering has emerged to fill this void (*see* **Human Language Technology**). Language engineering is primarily concerned with NLP applications and includes the development of supporting lexical resources. The following sections examine the role of lexicons, particularly WordNet, in word-sense disambiguation, information extraction, question answering, text summarization, and speech recognition and speech synthesis (*see also* **Text Mining**).

Word-Sense Disambiguation Many entries in a dictionary have multiple senses. Word-sense disambiguation (WSD) is the process of automatically deciding which sense is intended in a given context (*see* **Disambiguation, Lexical**). WSD presumes a sense inventory, and as noted earlier, there can be considerable controversy about what constitutes a sense and how senses are distinguished from one another.

Hirst (1987) provides a basic introduction to the issues involved in WSD, framing the problem as taking the output of a parser and interpreting the output into a suitable representation of the text. WSD requires a characterization of the context and mechanisms for associating nearby words, handling syntactic disambiguation cues, and resolving the constraints imposed by ambiguous words, all of which pertain to the content of lexicons. (See also Saint-Dizier and Viegas, [1995] for an updated view of lexical semantics.) To understand the relative significance of lexical information, a community-wide evaluation exercise known as Senseval (word-sense evaluation) was developed to assess WSD systems. Senseval exercises have been conducted in 1998 (Kilgarriff and Palmer, 2000), 2001, and 2004.

WSD systems fall into two categories: **supervised** (where hand-tagged data are used to train systems using various statistical techniques) and **unsupervised** (where systems make use of various lexical resources, particularly MRDs). Supervised systems make use of collocational, syntactic, and semantic features used to characterize training data. The extent of the characterization depends on the ingenuity of the investigators and the amount of lexical information they use. Unsupervised systems require substantial information, not always available, in the lexical resources. In Senseval, supervised systems have consistently outperformed unsupervised systems, indicating that computational lexicons do not yet contain sufficient information to perform reliable WSD.

The use of WordNet in Senseval, both as the sense inventory and as a lexical resource for disambiguation, emphasized the difference between the two types of WSD systems, since it does not approach dictionary-based MRDs in the amount of lexical information it contains. Close examination of the details used by supervised systems, particularly the use of WordNet, can reveal the kind of information that is important and can guide the evolution of information contained in computational lexicons. Dictionary publishers are increasingly drawing on results from Senseval and other exercises to expand the content of electronic versions of their dictionaries.

Information Extraction Information extraction (IE; Grishman, 2002; *see also* **Information Extraction, Automatic** and **Named Entity Extraction**) is "the automatic identification of selected types of entities, relations, or events in free text." IE grew out of the Message Understanding Conferences (*see* **Text Retrieval Conference and Message Understanding Conference**), in which the main task was to extract information from text and put it into slots of predefined templates. Template filling does not require full parsing, but can be accomplished by pattern-matching using finite-state automata (which may be characterized by regular expressions). Template filling fills slots with a series of words, classified, for example, as names of persons, organizations, locations, chemicals, or genes.

Patterns can use computational lexicons; some of these can be quite basic, such as a list of titles and abbreviations that precede a person's name. Frequently, the lists can become quite extensive, as with lists of company names and abbreviations or of gazetteer entries. Names can be identified quite reliably without going beyond simple lists, since they usually appear in noun phrases within a text. Recognizing and characterizing events can also be accomplished by using patterns, but more substantial lexical entries are necessary.

Events typically revolve around verbs and can be expressed in a wide variety of syntactic patterns. Although these patterns can be expressed with some degree of reliability (e.g., *company hired person* or *person was hired by company*) as the basis for string matching, this approach does not achieve a desired level of generality. Characterization of events usually entails a level of partial parsing, in which major sentence elements such as noun, verb, and prepositional phrases are identified. Additional generality can be achieved by extending patterns to require certain semantic classes. For example, in uncertain cases of classifying a noun phrase as a person or thing, the fact that the phrase is the subject of a communication verb (*said* or *stated*) would rule out classification as a thing. WordNet is used extensively in IE, particularly using hypernymic relations as the basis for identifying semantic classes. Continued progress in IE is likely to be accompanied by the use of increasingly elaborate computational lexicons, balancing needs for efficiency and particular tasks.

Question Answering Although much research in question answering has been conducted since the 1960s, this field was much advanced with the introduction of the question-answering track in the Text Retrieval Conferences (*see* **Text Retrieval Conference and Message Understanding Conference**) beginning in 1998 (*see* **Question Answering from Text, Automatic** and Voorhees and Buckland, 2004 and earlier volumes for papers relating to question answering). From the beginning, researchers viewed this NLP task as one that would involve semantic processing and provide a vehicle for deeper study of meaning and its representation. This has not generally proved to be the case, but many nuances have emerged in handling different types of questions.

Use of the WordNet hierarchy as a computational lexicon has proved to be a key component of virtually all question-answering systems. Questions are analyzed to determine what type of answer is required; e.g., "what is the length . . .?" requires an answer with a number and a unit of measurement; candidate answers use WordNet to determine if a measurement term is present. Exploration of ways to use WordNet in question answering has demonstrated the usefulness of hierarchical and other types of relations in computational lexicons. At the same time, however, lexicographical shortcomings in WordNet have emerged, particularly the use of highly technical hypernyms in between common-sense terms in the hierarchy.

Many questions can be answered with string-matching techniques. In the first year, most of the questions were developed directly from texts (a process characterized as back-formation), so that answers were easily obtained by matching the question text. IE techniques proved to be very effective in answering the questions. Some questions can be transformed readily into searches for string patterns, without any use of additional lexical information. More elaborate string-matching patterns have proved to be effective when pattern elements specify semantic classes, e.g., 'accomplishment' verbs in identifying why a person is famous.

Over the 6 years of the question-answering track, the task has been continually refined to present more difficult questions that would require the use of more sophisticated techniques. Many questions have been devised that require at least shallow parsing of texts that contain the answer. Many questions require more abstract reasoning to obtain the answer. One system has made use of logical forms derived from WordNet glosses in an abductive reasoning procedure for determining the answer. Improvements in question answering will continue to be fueled in part by improvements in the content and exploitation of computational lexicons.

Text Summarization The field of automatic summarization of text has also benefited from a series of evaluation exercises, known as the Document Understanding Conferences (see Over, 2004 and references

to earlier research). Again, much research in summarization has been performed (see Mani, 2001 and **Summarization of Text, Automatic** for an overview). Extractive summarization (in which highly salient sentences in a text are used) does not make significant use of computational lexicons. Abstractive summarization seeks a deeper characterization of a text. It begins with a characterization of the rhetorical structure of a text, identifying discourse units (roughly equivalent to clauses), frequently with the use of cue phrases (*see* **Discourse Parsing, Automatic**). Cue phrases include subordinating conjunctions that introduce clauses and sentence modifiers that indicate a rhetorical unit. Generally, this overall structure requires only a small list of words and phrases associated with the type of rhetorical unit.

Attempts to characterize texts in more detail involve a greater use of computational lexicons. First, texts are broken down into discourse entities and events; information extraction techniques described earlier are used, employing word lists and some additional information from computational lexicons. Then, it is necessary to characterize the lexical cohesion of the text, by understanding the equivalence of different entities and events and how they are related to one another.

Many techniques have been developed for characterizing different aspects of a text, but no trends have yet emerged in the use of computational lexicons in summarization. The overall discourse structure is characterized in part by the rhetorical relations, but these do not yet capture the lexical cohesion of a text. The words used in a text give rise to lexical chains based on their semantic relations to one another (i.e., such as the type of relations encoded in WordNet). The lexical chains indicate that a text activates templates (via the words) and that various slots in the templates are filled. For example, if *word1* 'is a part of' *word2*, the template activated by *word2* will have a slot *part* that will be filled by *word1*. When the various templates activated in a text are merged via synonymy relations, they will form a set of concepts. The concepts in a text may also be related to one another, particularly instantiating a concept hierarchy for the text. This concept hierarchy may then be used as the basis for summarizing a text by focusing on the topmost elements of the hierarchy.

Speech Recognition and Speech Synthesis The use of computational lexicons is speech technologies is limited (see Van Eynde and Gibbon [2000] for several papers on lexicon development for speech technologies). MRDs usually contain pronunciations, but this information only provides a starting point for the recognition and synthesis of speech. Speech computational lexicons include the orthographic word form and a reference or canonical pronunciation. A full-form lexicon also contains all inflected forms for an entry; rules may be used to generate a full-form lexicon, but it is generally more accurate to use a full-form lexicon.

The canonical pronunciations are not sufficient for spoken language processing. Lexical needs must reflect pronunciation variants arising from regional differences, language background of nonnative speakers, position of a word in an utterance, emphasis, and function of the utterance. Some of these difficulties may be addressed programmatically, but many can be handled only through a much more extensive set of information. As a result, speech databases provide empirical data on actual pronunciations, containing spoken text and a transcription of the text into written form. These databases contain information about the speakers, type of speech, recording quality, and various data about the annotation process. Most significantly, these databases contain speech signal data recorded in analog or digital form. The databases constitute a reference base for attempting to handle the pronunciation variability that may occur. In view of the massive amounts of data involved in implementing basic recognition and synthesis systems, they have not yet incorporated the full range of semantic and syntactic capabilities for processing the content of the spoken data.

The Semantic Imperative

In considering the NLP applications of word-sense disambiguation, information extraction, question answering, and summarization, there is a clear need for increasing amounts of semantic information. The main problem facing these applications is an inability to identify paraphrases, that is, identifying whether a complex string of words carries more or less the same meaning as another string. Research in the linguistic community continues to refine methods for characterizing, representing, and using semantic information. At the same time, researchers are investigating properties of word use in large corpora (*see* **Corpus Linguistics** and **Lexical Acquisition**).

As yet, the symbolic content of traditional dictionaries has not been merged with the statistical properties of word usage revealed by corpus-based methods. Dictionary publishers are increasingly recognizing the value of electronic versions and are putting more information in these versions than appears in the print versions (*see* **Computers in Lexicography**). McCracken (2003) describes several efforts to enhance a dictionary database as a resource for computational applications. These efforts include much

greater use of corpus evidence in creating definitions and associated information for an entry, particularly variant forms, morphology and inflections, grammatical information, and example sentences (*see* **Corpus Lexicography; Concordances;** and **Idiom Dictionaries**). The efforts also include the development of a semantic taxonomy based on lexicographic principles and statistical measures of definitional similarity. The statistical measures are also used for automatic assignment of domain indicators. Collocates for senses are being developed based on various clues in the definitions (e.g., lexical preferences for the subject and object of verbs, *see* **Collocations**). Corpus-based methods have also been used in the construction of a thesaurus.

A lexicon of a person, language, or branch of knowledge is inherently a very complex entity, involving many interrelationships. Attempting to comprehend a lexicon within a computational framework reveals the complexity. Despite the considerable research using computational lexicons, the computational understanding of meaning still presents formidable challenges.

See also: Collocations; Computers in Lexicography; Concordances; Corpus Lexicography; Dictionaries and Encyclopedias: Relationship; Disambiguation, Lexical; Discourse Parsing, Automatic; Frame Semantics; Human Language Technology; Idiom Dictionaries; Information Extraction, Automatic; Learners' Dictionaries; Lexical Conceptual Structure; Lexical Semantics: Overview; Lexicography: Overview; Lexicology; Lexicon: Structure; Meronymy; Named Entity Extraction; Natural Language Understanding, Automatic; Polysemy and Homonymy; Question Answering from Text, Automatic; Selectional Restrictions; Semantic Primitives; Summarization of Text, Automatic; Symbolic Computational Linguistics: Overview; Synonymy; Terminology and Terminological Databases; Text Mining; Text Retrieval Conference and Message Understanding Conference; Thesauruses; WordNet(s).

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Computational Linguistics: History

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Introduction

A remarkable feature of the 50-year history of natural language processing (NLP) by computer, alias computational linguistics (CL), is how much of what we now take for granted in terms of topics of interest was there at the very beginning; all the pioneers lacked were computers. In the 1950s and 1960s, King was arguing for statistical machine translation, Masterman for the power of a semantic thesaurus, Ceccato for conceptual codings (Ceccato, 1961), and Yngve, still working at the time of writing, had designed COMIT, a special programming language for NLP, and had refined his famous claim about the effect of a limitation on processing resources on permissible syntactic structures in a language (Yngve, 1960). The latter project brought him into direct conflict with Chomsky over the permissible ways of drawing syntactic tree structures, which can now be seen to have constituted a defining moment of schism in the history of NLP in its relationship to mainstream linguistics. It was the foundational schism, not healed until decades later when Gazdar became the first major linguist to embrace a computational strategy explicitly.

Machine Translation (MT) is the subject of a separate article and will be described only indirectly here, but it must always be remembered that it was the original task of NLP and remains a principal one; however, there is now a wide range of other NLP tasks that researchers are investigating and for which companies sell software solutions: question answering, information extraction, document summarization, etc. Thus, NLP does require a task: it is not in itself a program of scientific investigation, which is what CL normally claims to be, and that remains a significant difference between two very close terms.

It is also important to distinguish major tasks, such as those just mentioned, from a wide range of tasks that are defined only in terms of linguistic theories, and whose outcomes can only be judged by experts, as opposed to naïve users of the results of the major tasks above. These non-major tasks include word-sense disambiguation (e.g., Yarowsky, 1995), part-of-speech tagging, syntactic analysis, parallel text alignment, etc. CL is more associated with these tasks than with the very general tasks listed earlier, and they can be taken as ways of testing theories rather than producing useful artifacts.

Linguists are not the only scientists wishing to test theories of language functioning – there are also psychologists and neurophysiologists – and the dominant linguistic paradigm of the last half century, Chomsky's, has never believed that CL was the way to test linguistic theories. This dispute is over what constitutes the data of language study: it very clearly separates NLP and CL on the one hand, from linguistics proper on the other, where data is intimately connected with the intuitions of a speaker rather than with computable processes. Since 1990, emphasis has shifted to the use of corpora, of actual texts, rather than those imagined or written by linguists. Corpora are now normally gleaned from the Web, and have become the canonical data of NLP and CL.

An element in the history of NLP/CL that cannot be overemphasized is the effect of hardware developments that have produced extraordinary increases in

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An element in the history of NLP/CL that cannot be overemphasized is the effect of hardware developments that have produced extraordinary increases in

the storage and processing power available for experiments. This is obvious, and its effect on the field's development can be seen by considering the case of Sparck Jones' thesis (1966/1986), which was almost certainly the first work to apply statistical clustering techniques to semantic issues and the first to make use of a large lexical resource, namely Roget's Thesaurus. Her statistical 'clump' algorithms required the computation of large matrices that simply could not be fully computed with the tiny machines in use in 1964, with the result that this work's significance was not appreciated at the time, and it has been rediscovered, usually without knowledge of the original, at regular intervals ever since.

The first piece of work to capture attention outside mainstream NLP was Winograd's SHRDLU thesis at MIT in 1971 (Winograd, 1971). One reason for the interest it aroused in the wider AI community was its choice of domain: the MIT Blocks World used for robotics and planning research, which consisted of blocks of different shapes that could be stacked, and were either real or simulated (simulated in Winograd's case) as well as a crane and a box for putting blocks in, all on a table top. It was a small world about which it was possible to know every fact. Winograd designed a dialogue program that discussed this world and manipulated it by responding to requests such as "put the red block on the green block into the box."

This system had many sophisticated features, including an implementation of a Halliday grammar in a procedural language, PROGRAMMAR, that prefigured LISP, the language designed specifically for processing strings of symbols, such as sentences. It also had a method of forming up truth conditions in a form in LISP that could then be evaluated against the state of the Blocks World. These conditions expressed the semantic content of an utterance and their value, when run, gave the denotation of the sentence, which might be the name of a block, or false if nothing satisfied them. This was an elegant and procedural implementation of the Fregean distinction of sense and reference. Like most systems of its time, it was not available for general testing and performed on only a handful of sentences.

SHRDLU's virtues and failings can be seen by contrasting it with a contemporary system from Stanford: Colby's PARRY dialogue system (Colby, 1973). This, also programmed in LISP, was made available over the then young Internet and tested by thousands of users, who often refused to believe they had not been typing to a human being. It simulated a paranoid patient in a Veterans' Hospital, and had all the interest and conversational skills that Weizenbaum's more famous but trivial ELIZA lacked. It was very robust, appeared to remember what was said to it, and reacted badly when internal parameters called FEAR and ANGER became high. It did not repeat itself and appeared anxious to contribute to the conversation when subjects about which it was paranoid were touched on: horses, racing, Italians, and the Mafia. It had no grammar, parsing or logic like SHRDLU, but only a very fast table of some six thousand patterns that were matched onto its input.

Contrasts between these two systems show issues that became more important later in NLP: widely available and robust systems versus toy ones; grammar parsing, which was cumbrous and rarely successful, versus surface pattern matching (later to be called information extraction); systems driven by world knowledge versus those which were not, such as PARRY, and which essentially 'knew' nothing, although it would have been a far better choice as a desert island companion than SHRDLU.

We began this historical essay by looking briefly at samples of important and prescient early work, then showing two contrasting, slightly later, approaches to the extraction of content, evaluation, representation, and the role of knowledge. We shall now consider five types of system based on their own theoretical and methodological assumptions, and in this way try to get a picture of the range of influences that have been brought to bear on CL/NLP since the early 1970s.

Systems in Relation to Linguistics

Explicit links between CL/NLP and linguistics proper are neither as numerous nor as productive as one might imagine. We have already referred to the early schism between Yngve and Chomsky over the nature of tree representations and, more importantly, over the role of procedures and processing resources in the computation of syntactic structure. Yngve claimed that such computation had to respect limits on storage capacity for intermediate structures, which he assumed corresponded to innate constraints on human processing of languages, such as George Miller's contemporary claim about the depth of human linguistic processing. Chomsky, on the other hand, assigned all such considerations to mere language performance.

In the 1960s, there were a number of attempts to program Chomsky's transformational grammars to parse sentences: the largest and longest running was at IBM in New York. These were uniformly unsuccessful in that they parsed little or nothing beyond the sentences for which they had been designed, and even then produced a large number of readings between which it was impossible to choose. This last was the fate of virtually all syntactic analyzers until the more

recent statistical developments described below, including the original Harvard analyzer of Kuno and Oettinger (1962), and the parsers based on the more sophisticated linguistic grammars of the 1970s and 1980s.

The last were linguistically motivated but designed explicitly as the basis for parsers, unlike linguistic grammars; the best known was GPSG from Gazdar and colleagues (Gazdar, 1982), which constituted a return to phrase structure, together with procedures for access to deeply nested constituents that owed nothing to transformations. Later came LFG (lexical-functional grammar) from Kaplan and Bresnan (1982) and FUG (functional unification grammar) from Martin Kay (1984) which, like Winograd earlier, was inspired by Halliday's grammars (Halliday, 1976), as well as the unification logic paradigm for grammar processing that came in with the programming language Prolog.

These researchers shared with Chomsky, and linguists in general, the belief that the determination of syntactic structure was not only an end in itself, in that it was a self-sufficient task, but was also necessary for the determination of semantic structure. It was not until much later, and the development of techniques such as information extraction, that this link was questioned with large-scale experimental results. However, it was questioned very early by those in NLP who saw semantic structure as primary and substantially independent of syntactic structure as far as the determination of content was concerned; these researchers, such as Schank and Wilks in the 1960s and 1970s, drew some inspiration and support from the case grammar of Fillmore (1968). He had argued, initially within the Chomskyan paradigm, that the case elements of a verb are crucial to sentence structure (e.g., agents, patients, recipients of actions), an approach which came to emphasize the semantic content of language more than its grammatical structure, since these case elements could appear under many grammatical forms. There have been hundreds of attempts to parse sentences computationally into case structure and Fillmore remains almost certainly the linguist with the most explicit influence on NLP/CL as a whole.

Syntactic and semantic structure can be linked in another way to procedures by considering the traditional issue of the center-embedding of sentences in English. The rule:

$$S \rightarrow aSb,$$

where *ab* is a sentence, is generally considered a rule of English, producing sentences such as *the cat the man bit died*. The problem is that repeated applications of the rule rapidly produce sentences that are well-formed but incomprehensible, such as *the cat the man the dog chased bit died* and so on. Evidence suggests there may be resource limitations on repeated applications of rules, corresponding in some way to syntactic processing limitations in the human, which is no surprise within NLP, but which has no place within linguistics.

However, the situation is more complex: DeRoeck and colleagues (DeRoeck *et al.*, 1982) found the following perfectly comprehensible sentence: *isn't it more likely that example sentences that people that you know produce are more likely to be accepted* which, give or take the *isn't it true that*, has the same depth of syntactic center-embedding as the (incomprehensible) *cat-dog* sentence above. This seems to show that, even given some depth limitation on the comprehension of center-embeddings, there may be another effect at work, namely that the sentence above is understood not by means of syntactic analysis at all but by some other, possibly more superficial, surface semantic coherence, which the *cat-dog* sentence fails to possess. This is precisely the sort of consideration that motivated the semantics-based understanding movement of the 1960s and 1970s.

Representation Issues: Logic, Knowledge, and Semantics

There is an extreme view of NLP, held by AI researchers for whom logic and knowledge representation are still its main technique, that, in Hewitt's words, "language is just a side-effect" (Hewitt, 1971). By that he meant that, since AI could be seen as knowledge-based processing then, if only we had a full computer-based representation of knowledge, that alone would effect the understanding of human language, a matter which then has no intrinsic interest on its own. Unsurprisingly, this view has little support in NLP/CL, but it does capture a core AI view about the universal power of logic-based knowledge representation, a vision of some antiquity, going back at least to Carnap's *Logische Aufbau der Welt*, the logical structure of the world (Carnap, 1928).

The central AI vision (e.g., McCarthy and Hayes, 1969) is that some version of the first-order predicate calculus (FOPC), augmented by whatever mechanisms are necessary, will be found sufficient for this task of representing language and knowledge, a standard view since McCarthy and Hayes (1969). This position, and its parallel movement in linguistic semantics, claim that logic can and should provide the underlying semantics of natural language, and it has had a profound and continuing effect on CL/NLP. In linguistics, the view is usually ascribed first to Lakoff's generative semantics movement, in some

ways a natural extension to transformational grammar, albeit never acknowledged by Chomsky, given the logical origins of that movement in Carnap's rules of transformation as part of what he called logical syntax. Its high point was Montague's model of theoretic semantics (Montague, 1970) for English in the late 1960s, which aimed to formalize language semantics independently of Chomsky's theories.

Although these movements, in AI and linguistics, have many formal achievements in print, they have had little success in producing any general and usable program to translate English to formal logic, nor indeed any demonstration from psychology that such a translation into logic would correspond to the human storage and manipulation of meaning. In more surface-oriented and recent movements such as information extraction, a task driven largely by evaluation competitions run by the US agency DARPA, the translation of English to FOPC structures remains a goal, but no one has yet set realistic standards for its achievement.

Part of the problem that any such translation scheme raises is the following: logical structure is not a mere decoration but something designed to take part in proofs. There will undoubtedly be NLP applications that require logical inferences to be established between sentence representations but, if those are only part of an application (e.g., the consistency of times in an airline reservation system), it is not clear they have anything to do with the underlying meaning structure of natural language, and hence with CL/NLP proper. At this point, there are a number of possible routes to take: one can say (a) that logical inferences are intimately involved in the meaning of sentences, since to know their meanings is to be able to draw inferences, and logic is the best way to do that. A recent survey of such approaches in linguistics is in Pulman (2005). One can also say (b) that there can be meaning representation outside logic, and this can be found in linguistics back to the semantic marker theories of Fodor and Katz (1963), developed within the transformational paradigm, as well quite independently, in NLP as forms of computational semantics. There is also a more extreme position (c) that the predicates of logic, and formal systems generally, such as ontologies, only appear to be different from human language (often accentuated by writing their predicates in capital letters), but this is an illusion, and their terms are in fact the language words they appear to be, as prone to ambiguity and vagueness as other words; both sides of this are argued by Nirenburg and Wilks (2001).

Under (a) in the preceding paragraph, one should note the highly original work of Perrault and colleagues at Toronto in the late 1970s (Perrault *et al.*, 1980) who were the first group to compute over beliefs represented in FOPC so as to assign speech acts to utterances in a dialogue system. Speech acts are a notion drawn from Searle's work in philosophy, which has become the central concept in computational pragmatics, one that might enable a system to distinguish a request for information from an apparent question that is really a command, such as *Can you close the door?* The Toronto system was designed as a railway advisory system for passengers, and made use of limited logical reasoning to establish, for example, that the system knew when a given train arrived, and the passenger knew it did, so the question *Do you know when the next train from Montreal arrives?* would not be, as it might appear, about the system's own knowledge.

Under (b) above, one can indicate the NLP tradition of the 1970s and 1980s of conceptual/semantic codings of meaning (already mentioned in the last section) by means of a language of primitive elements and the drawing of (nonlogical) inferences from structures based on them. The best known of such systems were Schank's conceptual dependency system (1975) and Wilks's (Wilks and Fass, 1992) preference semantics system; both were implemented in interlingual MT systems, and a range of other applications. Schank's system was based on a set of 14 primitive verbs and Wilks's on a set of about 80 primitives of various types. Schank asserted firmly that his primitives were not English words, in spite of similarities of appearance (e.g., with INGEST), whereas Wilks argued there could be many sets of primitives and that they were no more than privileged words, as in dictionary definitions (see 'Corpora, Resources, and Dictionaries' below). Wilks's notion of preference became well known: that verbs and adjectives have preferred agents, objects, etc. and that knowledge of these default preferences is the major method of ambiguity resolution. Such preferences were later computed statistically when NLP became larger scale and more empirical (see 'Statistical and Quntitative Methods in NLP' below). Schank later developed larger-scale structures called scripts that became highly influential as a way of capturing the overall meaning of texts and dialogues.

There are strong analogies between this strand of NLP work and contemporary work in linguistics, particularly with Fillmore and Lakoff, but there was at that time little or no direct contact between researchers in NLP and linguistics proper. That is one of the most striking changes over the last 20 years, and the simplest explanation is distance from Chomsky's distaste for all things computational, and the realization by linguists, at least since the work of Gazdar, that computational methods could be central

for them. In spite of this distance, there were undoubtedly influences across the divide: no one can see the semantic structures of Jackendoff (1983), involving structured sequences of primitives such as:

CAUSE GO LIQUID TO IN MOUTH OF

as representing *drink*, without feeling their similarity to the earlier NLP structures mentioned above.

Corpora, Resources, and Dictionaries

In the 1960s, Masterman (1957) and Sparck Jones (1966/1986) had made use of Roget's Thesaurus, punched onto IBM cards, as a device for word sense disambiguation and semantic primitive derivation, respectively, even though they could not do serious computations on them with the computers then available. Subsequently, large-scale linguistic computation was found only in MT, and in the era of the influence of AI methods in CL/NLP, the vocabularies of working systems were found to average about 35, which gave rise to the term 'toy systems' to refer to most of the systems described above.

But there were movements to bring together substantial corpora of texts for experiments, although these were driven largely from the humanities and in the interests of stylistic studies and statistical measures of word use and distribution. The best-known of these was the Brown-Oslo-Bergen corpus of English (Francis and Kucera, 1964), but the British National Corpus was constructed explicitly with the needs of NLP in mind, and the University of Lancaster team, under Geoffrey Leech, played a key role in its construction. This group had already created the first effective piece of corpus-based statistical NLP, the part-of-speech tagger CLAWS4 (Garside, 1987).

At very much the same time, in the early 1980s, interest arose in the value to NLP, not only of text corpora, but specifically of the texts that are dictionaries, both monolingual and bilingual. Bran Boguraev in Cambridge was one of the first researchers (since very early work on *Webster's Third Dictionary* at Systems Development Corporation in the 1960s; Olney *et al.*, 1968) to seek to make use of a dictionary via its electronic printing tape, in this case of the *Longman Dictionary of Contemporary English*, a dictionary specifically designed for foreign learners of the language. This had definitions with restricted syntax drawn from a vocabulary of only 2000 words.

In the 1980s, there was a great deal of activity devoted to extracting computational meaning on a large scale from such machine-readable dictionaries (see Wilks *et al.*, 1996): it seemed a sensible way to overcome the toy system problem, and after all dictionaries contained meaning, did they not, so why not seek it there? Substantial and useful semantic databases were constructed automatically from LDOCE and a range of other dictionaries, again usually dictionaries for learners of English since they expressed themselves more explicitly than traditional dictionaries for scholars and the broadly educated. Hierarchical ontologies were constructed automatically, and these databases of definitions remain, along with thesauri, a component database for many major systems for resolving word sense ambiguity.

But such dictionaries were not a panacea that cured the problem of meaning, and it became clear that dictionaries themselves require substantial implicit knowledge to be of computational use, knowledge both of the world and of the primitive vocabulary contained in their definitions.

Brief mention should be made here of systematic annotation codings – the automatic attachment of tags representing linguistic information to the words of a text – which began, again, in the humanities with the language SGML for marking up corpora. This type of annotation has now become a huge range of annotations in differing modalities, the best known of which are HTML and XML, the annotations underlying the World Wide Web. A curious effect of all this has been to bring programs, once thought of as quite disjoint from texts, into the space of objects that are themselves annotated texts, which is an unexpected new universality for linguistics, taken broadly.

Another quite independent source of annotated corpus resources were tree banks, of which the Penn Tree Bank (Marcus, 1993) is the best known: a corpus syntactically structured by hand, with the syntactic structure being added to the text as annotations, indicating structure and not merely categories. One effect of the wide use of the Penn Tree Bank for experiments was to enshrine the texts used for it, in particular sections of the *Wall Street Journal*, as ueber-corpora, used so much and so often that some believed their particular features had distorted NLP research.

In the recent past, great energy and discussion has been put into the selecting and balancing corpora – dialogue, novels, and memoranda, etc., – but this activity is becoming irrelevant because of the growing use of very large parts of the World Wide Web itself as a corpus that can be annotated. The so-called Semantic Web project (Berners-Lee *et al.*, 2001) has as one of its aims the annotation of the whole Web-as-a-corpus, so that machines as well as humans can read its content. This is a project that envisages such annotations as reaching further than traditional linguistic annotations, of say syntactic or semantic type, right up to annotating logical structure. This goal brings the project back to the traditional AI one of automatically translating the whole of human

language into logic. The value of this translation, even if possible, has yet to be shown in practice.

Statistical and Quantitative Methods in NLP

This movement is the most difficult to survey briefly, largely because it is currently on-going (see Manning and Schuetze, 1999). In the 1960s, Gilbert King predicted that MT could be done by statistical methods, on the grounds of the well-known 50% redundancy of characters and words in Western languages, though it is not easy to see why the second justified the first. Later, and as we saw earlier, Sparck Jones pioneered what were essentially IR methods to produce semantic classifications, intended ultimately for use in MT.

We noted earlier that the first clear example of modern statistical NLP was the work by Leech and his colleagues on the CLAWS4 part-of-speech tagger in the late 1970s. At the time, few could see the interest of assigning part-of-speech categories to text words. Yet now, only two decades later, almost all text processing work starts with a part-of-speech assignment phase, since this is now believed (even at about 98% accuracy, the usual level achieved) to simplify all subsequent linguistic processes, by filtering out a large range of possibilities that used to overtax syntactic analyzers. The undoubted success of such methods showed that analysis decisions previously believed to require high-level syntactic or semantic information could in fact be taken at a low level by methods such as *n*-gram statistics over sequences of words.

The greatest impetus for statistical NLP, however, came from work on MT, a research program of Jelinek (Brown *et al.*, 1990) and his group at IBM, who were applying methods that had been successful in automatic speech recognition (ASR) to what had been considered a purely symbolic (linguistic or AI) problem. Jelinek began asking what phenomenon should be modeled (answer, translation) and then sought examples of that human skill for the application of machine learning. The most obvious case was parallel corpora: texts expressing the same meaning in more than one language. These were widely available and he took the Canadian *Hansard* texts in English and French.

We can already see some of the major forms machine learning (ML) in NLP can take: in the CLAWS4 work, part-of-speech tagging had been annotated onto text by humans and the ML algorithms were then set to recapitulate those annotations, in the sense of being able to tag new unseen texts at some acceptable level of accuracy.

This is called supervised ML; in Jelinek's work, on the other hand, although the targets to be learned are given, namely the translations in the parallel texts, the training material had not been produced specifically for this task, but consisted of naturally occurring texts, albeit produced by people. Many would call this weakly supervised ML. In the work of Sparck Jones, however, the clusters found were not set up in advance, which is normally called unsupervised ML.

Jelinek's work produced an accuracy level of about 50% of sentences translated correctly, a remarkable fact given that the system had no linguistic knowledge of any kind. When applied to new, unseen texts, it failed to beat the traditional, hand-coded MT system SYSTRAN, which had not been trained for specific kinds of text.

Jelinek's CANDIDE system was a benchmark in that it suggested there were limits to purely ASR-derived statistical methods applied to a linguistic task such as MT, and he himself began a program for the derivation of linguistic structures (lexicons, grammars, etc.) by those same statistical ML methods, in an attempt to raise the level of CANDIDE's success, and in doing so he set in motion a movement throughout NLP to learn traditional NLP/CL structures at every linguistic level by those methods.

There are now far too many such applications to cite here: ML methods have been applied to the alignment of texts, syntactic analysis, semantic tagging, word-sense disambiguation (Yarowsky, 1995), speech act assignment, and even dialogue management. In the case of some of these traditional tasks, the nature of the task has changed with the evaluation and scoring regimes that have come along with the paradigm shift. For example, it was conventional to say, only a few years ago, that syntactic parsers had failed, at least for languages like English, and that there simply was no parser that could be relied on to produce a correct parse for an unseen English sentence, or at least not one that could be reliably picked out, by probabilities or other ordering, from a forest of alternatives. However, now that statistically based parsers learn over tree banks and are scored by the number of brackets they can correctly insert, and the appropriate phrase structure annotations they can assign, the issue is merely quantitative and it is no longer considered essential that a full parse (i.e., to the *S* symbol) is produced. Charniak currently produces the best figures (2001) for doing this.

There is a general perception that statistical, or corpus-driven (also known as empirical), linguistics has resulted in a shift to surface considerations in language: the shallower syntactic structures just mentioned that have allowed syntactic analysis to become more useful in linguistic processing, because they are

more successful and reliable. One could also point to the success of the independent task information extraction (IE; Gaizauskas and Wilks, 1997), which consists, in broad terms, in extracting fact-like structures from texts on a large scale for practical purposes, e.g., all those whom IBM promoted in the 1990s, extracted from public source newspapers. At the 95+% level (this is the norm of acceptability in empirical linguistics), IE has become an established technology, and this has been achieved largely by surface pattern matching, rather than by syntactic analysis and the use of knowledge structures, although the latter have played a role in some successful systems.

However, many of the more recent successes of empirical linguistics, again based on ML over corpora, have been in areas normally considered semantic or less superficial in nature, such as word-sense disambiguation and the annotation of dialogue utterances with their dialogue or speech acts, indicating their function in the overall dialogue.

It may well be that raising the currently low figure for tagging dialogue acts (80%) to an acceptable level does require more complex structures to be modeled, as was shown to be the case in Jelinek's approach to MT, e.g., the modeling of dialogue managers and agent belief systems, but it is proving much harder to model and evaluate these independently than was the case for components of an MT system.

Computational Linguistics as an Independent Paradigm?

In conclusion, let us consider briefly to what extent CL/NLP is an independent paradigm (see Cole *et al.*, 1996), rather than being just a subdivision of linguistics (or even AI). It is certainly the case that a small number of linguists have had a disproportionate and continuing influence on the development of CL/NLP: Halliday's and Fillmore's work continue to appear in computational paradigms, and Halliday's influence on Kay's functional unification grammar is clear. Chomsky, by contrast, has had little influence in CL since the unsuccessful attempts in the 1960s to program transformational grammars.

It is also clear that much of the development described in this article can be traced to the influence on CL/NLP of some combination of the following movements:

1. linguistics itself,
2. logic and knowledge representation in AI,
3. statistical methods: speech research, neural net/connectionists, the evaluation community, and information retrieval,
4. lexicographers and corpus experts.

But there is another strand of influence, one hard to describe, but coming directly from computation itself, namely procedure-based theories: those in which the procedures are essential, and not merely the programming of rules constraining some domain. Some elements of NLP constitute a kind of core NLP, definitive of the subject. In such a list one could include:

- Winograd's procedural expressions of grammar, truth conditions and the movement content of verbs;
- Marcus's syntactic parser (1980), which put a resource bound on searching structures in an attempt to capture the notion of 'garden path sentences';
- Charniak's (1983) attempt to limit searches of semantic nets by means of a finite resource, on the assumption that correct results are defined partly by the resources available;
- Wilks' preference semantics (Wilks and Fass, 1992), an attempt to define the best semantic structure for an utterance as the maximally coherent one in terms of satisfied preferences;
- Woods' display of grammars as a path tracking procedure (ATNs) augmented by recursive push-down stacks and registers (Woods *et al.*, 1974).
- A number of authors, including Gazdar (Evans and Gazdar, 1996) and Pustejovsky (1996), who attempted to define appropriate dictionary entries by some level of maximal compression of information;
- Waltz and Pollack's (1985) connectionist model of word-sense choice in terms of affinity and repulsion;
- Much of the work of Yngve referred to at the beginning of the article, especially the notion of limiting syntactic depth;
- Hirst (1990) and others who have attempted to define semantic structure as one progressively revealed and specified by incoming information;
- Grosz's definition of the accessibility of discourse constituents with a network where partitions are progressively closed off (Grosz and Sidner, 1986).

One could continue with this list, but it might not be especially revealing, and it would certainly not include all or most of NLP/CL. The act of making it does seek, however, to raise the question of whether there is some distinctive core of CL/NLP that captures human language behavior, as well as machine behavior, by some set of procedures based on information compression and the minimization of effort, a component in several theories on that list. All science is information compression, in a wide sense, and it is certainly plausible that the brain, and any other

language machine, will have available distinctive procedures to do this, as opposed to the brute force methods of statistics, which are implausible as models of human language processing. About this last, Chomsky was probably right.

Finally, it is not possible to understand the history of NLP/CL over the last half century without seeing the crucial role of its funders, particularly the U.S. Defense Department, which created MT from nothing in the United States and, through DARPA and ARPA, which have continued to shape the field in the United States, and to some extent worldwide. In recent years, it has been the DARPA evaluation competitions, open to all, that created information extraction and then the entire empirical linguistics movement we are still participating in. Whether all this effort defended anybody or anything is, of course, another question.

See also: Corpora; Fillmore, Charles J. (b. 1929); Fodor, Jerry (b. 1935); Information Extraction, Automatic; Jackendoff, Ray S. (b. 1945); Katz, Jerrold J. (1932–2002); Kay, Martin (b. 1935); Lexicography: Overview; Machine Translation: History; Mark-up Languages: Speech; Meaning, Sense, and Reference; Montague Semantics; Part-of-Speech Tagging; Propositional and Predicate Logic: Linguistic Aspects; Symbolic Computational Linguistics: Overview; Text Retrieval Conference and Message Understanding Conference; Treebanks and Tagsets.

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Computational Stylistics

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Computational stylistics is the study of the features of literary or nonliterary texts using quantitative, particularly algorithmic, means. As such, it is a subfield both of computational linguistics and of stylistics. Although traditionally style has been identified as relating to the form rather than the content of a text, a more helpful definition in this context may be Birch's in *ELL1* "the sum of linguistic features which distinguish one text from another" (ELL1: 4378). In considering these features, computational stylisticians attempt to replace subjective impressions with more nearly objective analyses based on empirical data. Generally, such study has one of two main emphases: (1) determining the special or unique features of the writing of a given author and, thus, differentiating that author from others, and (2) determining differences or distinctions within or among the texts of a single writer.

The first emphasis raises the question of whether one can identify writers on the basis of stylistic habits or traits and, if so, what these distinguishing traits may reveal about the writer. The assumption of many computational stylisticians is that each writer does indeed have unique stylistic tendencies, a kind of stylistic fingerprint that differentiates that writer from all others. This study of unique features is used in two main ways. First, it is used to classify texts and has become central in the field of nontraditional authorship attribution – nontraditional being the term used to differentiate attribution studies utilizing quantitative and statistical procedures from those using more

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The first emphasis raises the question of whether one can identify writers on the basis of stylistic habits or traits and, if so, what these distinguishing traits may reveal about the writer. The assumption of many computational stylisticians is that each writer does indeed have unique stylistic tendencies, a kind of stylistic fingerprint that differentiates that writer from all others. This study of unique features is used in two main ways. First, it is used to classify texts and has become central in the field of nontraditional authorship attribution – nontraditional being the term used to differentiate attribution studies utilizing quantitative and statistical procedures from those using more

traditional historical methods. (*see* **Authorship Attribution: Statistical and Computational Methods**.) If each author's style is unique, it should be possible to attribute a text of unknown authorship to the writer whose style it matches. Second, the study of a writer's individual stylistic features is used descriptively insofar as it may be a means of understanding and commenting on the writer's mind and personality. The author's characteristic stylistic choices can be seen as a reflection of his or her mental or conceptual framework.

The second main emphasis of computational stylistics is the determination of differences or distinctions within or among the texts of a single writer and again may aim toward either classification or description. This kind of study may be used in descriptive literary-critical analyses insofar as it allows the researcher to interpret and comment on meanings within a text. For example, one might attempt to determine whether there are stylistic differences among the dialogues of different characters in a particular play or whether the style changes markedly in certain chapters of a novel. If, for instance, one found that female characters used such words as *perhaps*, *if*, *possibly*, etc., at a significantly higher frequency than male characters, the text might be described as one that viewed women as being less certain than men or as being more affected by the contingencies of the world. Determining differences among the texts of a given writer has also been used for purposes of classification; for instance, techniques developed by Richard Forsyth and others and referred to as stylochronometry are utilized for the dating of texts. The assumption here is that a writer's stylistic habits may gradually change over time.

The purposes indicated above may not appear to differ markedly from the aims of traditional or non-computational stylistics. Traditional stylistics also considers textual features in order to indicate the unique traits of a given writer and to interpret textual meaning. As well, traditional stylistics has been used in order to attribute texts of unknown authorship and to establish the dates of texts. However, many computational stylisticians suggest that human observation alone is incapable of processing the many variations and features that make up a style and that studies based on unaided human observation are particularly susceptible to the bias of the observer.

The Methods of Computational Stylistics

As the above discussion indicates, computational stylistics is primarily concerned with measuring difference. Determining the unique or special traits of a writer is a matter of finding what traits differ from those of other writers. Attributing a work of unknown authorship to a given writer is a matter of measuring the text's relative differences from and similarities to works of possible authors. Commenting on the stylistic traits of characters within a novel depends upon measuring differences in the styles of those characters. The primary questions for computational stylistics then are what differences to measure and how best to measure them.

There seem to be two main approaches to determining which features to measure. The first is simply to begin with features that appear significant. These might be features that traditional stylisticians or literary critics have noted or ones that seem significant from the analyst's own close reading. The other, frequently favored by statisticians and scientists as Horton (*ELL1*) indicates, is to measure "many features (perhaps chosen arbitrarily) in control texts, and [use] statistics to find those features that produce statistically significant differences" (ELL1: 4384).

Computational stylisticians have traditionally recognized these two different approaches. For instance, Milic in one of the early computerized studies, a consideration of Jonathan Swift's prose style, directly confronted the problem of approach, recognizing the need to measure something that is "significant, not something which is merely measurable" (Milic, 1967: 82). His solution for much of his analysis was to use the first approach, which he spoke of as one that "begins with an intuition" but ends with "concrete data" (Milic, 1967: 83). He simply read through Swift's works attempting to observe features present more frequently in Swift's prose than in that of his contemporaries and then counted those features. For instance, he observed that Swift appeared very often to begin sentences with connectives (coordinating conjunctions, subordinating conjunctions, and conjunctive adverbs). He then counted the number of initial connectives in 2000 sentence samples of Swift and three other 18th century writers and found Swift to use initial connectives at a rate more than double that of the next closest writer. The intuitive sense that Swift began sentences in a certain way was confirmed by empirical data.

Although this first approach has the advantage of measuring features that appear significant to unaided human observation and, thus, may be more readily accepted by traditional literary critics, it is particularly susceptible to human bias and may be viewed as circular or tautological, a well-known and devastating charge made by Fish against Milic and computational stylistics in general. The point is that by deciding to measure a feature that already appears 'different,' the researcher has biased the study and found only what was already known. Such an

approach is sometimes said merely to repeat subjective impressions in mathematical language.

The second approach seeks to avoid such bias by using statistical means to determine the significant features to measure. A fuller discussion of some of these statistical procedures is given later in this article, but the assumption is that variables should be 'self-declared.' Milic, in fact, recognized this need and, in one part of his study, turned to the second method. For this analysis, he created a classification system for parts of speech and manually tagged all words in a number of samples of Swift's prose and that of several other 18th-century writers; designating each word as one of the classes, he ran a series of analyses to test whether the distribution of word types would statistically differentiate the texts of one writer from those of another and, thus, make it possible to determine individual stylistic characteristics. The aim was to have the **analysis** rather than the **analyst** determine which word types and distributions were significant. In recent years, this second method has clearly predominated in computational stylistics and most of the more specific procedures and techniques discussed here are examples of that method.

Measuring Difference

Measuring difference raises a number of complicated problems, but several basic statistical procedures described by Hockey, Burrows, and Kenny have often been used by computational stylisticians and can serve as relatively simple examples. The use of normal distribution, standard deviation, and z-scores is one way of measuring comparative data. Normal distribution, the well-known bell-shaped curve, suggests that sets of data are likely to arrange themselves with the majority near the average or mean of all the scores and fewer near either extremity above or below the average. The measurement of distance from the mean is calculated in terms of standard deviation, defined as "the amount by which a set of values differs from the arithmetical mean." This amount can be stated as a so-called z-score; for example, a z-score of .77 would represent .77 of a standard deviation above the mean and a z-score of −.52 would represent .52 of a standard deviation below the mean. Obviously, z-scores allow the analyst to determine the degree to which any result departs from the norm. For instance, in looking at the distribution of the word 'but' among different characters in a given novel, one might find that one character has a z-score of +.63 and another −.78.

The significance of difference is frequently calculated with the chi-square test, a procedure that determines the probability of a given result. If, for example, it is found that one writer uses the word *but* at a rate of 3.7 times per thousand words and another writer uses the word 4.1 times per thousand, it is important to determine whether this variation is meaningful or simply random. The chi-square test, measuring the difference between an expected occurrence and the observed occurrence with the formula $\chi^2 = \Sigma\,[(\text{observed} - \text{expected})^2/\text{expected}]$, produces a result expressed in probability. For instance, a score of .07 indicates a seven percent chance that such a result is likely to occur. Normally, statistical significance is determined by a result of less than .05, that is, a figure indicating a less than a one in twenty probability of the result occurring; highly significant differences are at .01 or less.

A third procedure, one now widely used in the investigation of texts, is multivariate analysis. As the name implies, multivariate techniques allow the analysis of many different variables rather than a single one. For instance, principal component analysis reduces any number of variables to a small number of underlying components or factors, each factor being composed of 'information' from the different variables. The analysis allows one to determine which variables account for the most variation and, because the many variables can frequently be reduced to two significant factors, makes it possible to graph the results and display them in visual form. Although even more sophisticated statistical procedures are currently being utilized in computational stylistics, the purpose is still to measure difference and to determine whether or not the difference is significant.

Computational Studies

Although tests may indicate which differences are statistically significant, obviously it remains the researcher's task to determine what features to measure. Any attempt to list the many features analyzed by computational stylisticians is doomed to be incomplete and rapidly outdated, but Holmes (1985) offers an important treatment of various studies of different 'analytic units' including, among others, studies of word length, syllables, sentence length, distribution of parts of speech, function words, type-token ratio, entropy, and word frequencies. The consideration of several of these procedures may indicate the kind and range of measures being utilized.

Word length and sentence length at first glance seem particularly amenable to statistical analysis, and in fact one of the earliest quantitative studies employed word length. Mendenhall (1887) attempted to solve questions of Shakespearean authorship by measuring word length – i.e., the number of letters per word – in texts of Shakespeare, Bacon, Jonson,

and Marlowe. Although word length continues occasionally to be measured, its appropriateness, at least as a single measure, has been called into question, partly because word length is likely to be a reflection of subject matter and genre rather than a characteristic of a writer's entire style. The measure of sentence length is also problematic, in this case because of its reliance on conventions of punctuation. For example, two texts by the same author could show very different sentence lengths due to punctuation choices made by different editors.

A somewhat more reliable measure is the type-token ratio, sometimes referred to as lexical density. The type-token ratio is simply the ratio of the number of different words in a text to the total number of words. For instance, the preceding sentence contains a total of 22 words but only 14 different words. That is, *the*, *ratio*, *of*, and *number* are all used more than once; each *the*, for instance is seen as a token of the word type *the*. The type-token ratio would be figured by dividing the number of different words by the total number of words and multiplying the answer by 100, in this case, $(14/22) \times 100 = 63.64$. It is usually considered that the more different words that are used and, thus, the higher the type-token ratio, the more difficult or dense the text. However, as Holmes (1985) and others point out, the longer a text, the greater the increase in individual words (tokens) in comparison to the word types. Therefore, any comparison of texts of different lengths must build in a statistical procedure to account for those various lengths. In computational stylistics, the type-token ratio is seldom used by itself but most frequently utilized as one of several measures to characterize or distinguish a text or writer.

Currently, among the more widely used kinds of analysis in computational stylistics is the measure of word frequencies, a measure Burrows (1987) used with great effectiveness in his attempt to determine the idiolects of various characters in Jane Austen's novels. Most often, researchers focus on the most common or frequent words in the literary text, usually personal pronouns, conjunctions, auxiliary forms, prepositions, adverbs, and articles. These grammatical words, which may constitute half of the total words in a given text, are often ignored in favor of lexical words, that is, words viewed as having semantic content. The argument, however, is that the distribution of these grammatical words reveals marked differences in the language and style of texts. Using principal component analysis to measure the distribution of these common words, a procedure frequently referred to as the Burrows technique, has now become standard both in author-attribution and in literary-critical analyses.

The number of words used as variables in this kind of analysis traditionally has ranged from 12 to 50, although Hoover has recently demonstrated that the use of more variables (up to 500 or 600) significantly increases the ability of the method to differentiate among writers. Some researchers include only function words and eliminate nouns and pronouns from their analyses on the grounds that content words tend to reflect subject matter and content rather than style.

Still another measure used either singly or in combination with others is the consideration of collocations, usually defined as the frequent co-occurrence of words or lexical items. Just as writers use words at various rates of frequency, so too they may use sequences of words at greater or lesser frequency. Hoover (2002) refers briefly to scholars who have used word sequences in the study of style and, in the same article, argues that combining word frequency with word-sequence frequency produces more reliable results in author attribution research. In a corpus of 870 000 words (29 novels by 17 writers), he finds the most frequent two-word sequences to be *of the*, *in the*, *to the*, *it was*, *he was*, *and the*, and *on the*. Although these phrases may seem to be meaningless because of their commonality, the fact that different writers use them at significantly different frequencies allows them to be utilized in the study of the unique stylistic features of given writers. Collocations are also used in studies that more directly consider matters of content. For instance, David Miall analyzed Coleridge's notebooks, showing what words (body, heart, love) collocated with words associated with emotion at various times.

Although analyses of word and sentence length, word frequency, collocation, and type-token ratio are among the more frequently used methods in computational stylistics today, the mention of several other methods may indicate some of the range of present-day approaches. Unlike the methods mentioned above, all of which count words in one way or another, some computational approaches focus on grammatical or syntactic sequence. For instance, Jackson (2002) analyzes the pauses in Shakespeare's iambic pentameter lines. Using multivariate analysis to produce correlation coefficients, he demonstrates correlations among the frequencies of pauses in Shakespeare's plays and the dates of those plays. Such results could of course serve as supplementary evidence in the dating of plays, but they also are evidence of Shakespeare's prosodic development.

A different kind of analysis is the identification of themes in various texts. Early in the use of computers for literary study, Fortier and McConnell produced a program to detect the presence of different themes in

texts by locating words associated with those themes and producing frequency and distribution tables for various parts of the text. More recently, Fortier has examined the way in which several themes appear and interact in the works of Celine, Gide, and others.

The Results of Computational Stylistics

The question for computational stylistics ultimately is whether the impressive measurements of many linguistic features and the careful attention to statistical procedures have produced worthwhile results. Has computational stylistics made a difference to textual study in general and added to our understanding of both literary and nonliterary texts? Although computational stylisticians frequently lament their field's lack of impact on mainstream or traditional literary and historical study, there have been a number of promising results, in the areas both of authorship attribution and of literary criticism.

While stylometric attribution has certainly not yet reached the level of scientific proof, it has come to the point where Burrows can claim, "Where only two or three writers are eligible candidates for the authorship of a particular text and where that text is of a sufficient length, we are now well equipped to form strong inferences about their rival claims" (Burrows, 2002: 267). Mosteller's and Wallace's (1964) attribution of several disputed Federalist Papers to Madison is a frequently cited success of computational authorship attribution, but Holmes *et al*. (2001) and a number of other recent studies also demonstrate how traditional and nontraditional approaches can successfully work in tandem on problems of attribution (*see* **Authorship Attribution: Statistical and Computational Methods**).

The results of computational stylistics in the area of literary criticism and interpretation are more ambiguous than those in the field of attribution; certainly, many computational stylisticians believe traditional literary scholars do not take computational study seriously. Even here, though, numerous examples demonstrate what computational stylistics is capable of. Several of these including Milic's (1967) relatively early work have already been mentioned in the discussion of computational studies, but Burrows (1987) is one of the fullest applications of computational methods to traditional literary interpretation.

In his study of the characters in Jane Austen's novels, Burrows' main purpose was to demonstrate "that exact evidence, often couched in the unfamiliar language of statistics, does have a distinct bearing on questions of importance in the territory of literary interpretation and judgment" (Burrows, 1987: 2). Although recognizing the central significance of close and intelligent readings of literary texts, Burrows argued also for the need for the kind of computational evidence "to which the unassisted human mind could never gain consistent, conscious access," noting, for example, the 26 000 uses of *the* in the novels of Jane Austen, a number that defies "the most accurate memory and the finest powers of discrimination" (Burrows, 1987: 2, 3). Burrows is able to demonstrate how apparently inconsequential words help to define characters, noting, for instance, that the imperious Lady Catherine de Bourgh of *Pride and Prejudice* uses the first-person plural pronoun *we* less frequently than any of the 47 other major characters in Austen's novels, a stylistic trait apparently connected to her insolence and exclusivity. As Burrows considers simply this one pronoun, he skillfully moves back and forth from the text, showing how the use of *we* gives insight into various characters.

A particularly interesting and, from a literary critical point of view, significant set of analyses in Burrows uses multivariate analysis of the 12 most common words to chart changes in the idiolects of three characters from *Emma*, Mr. Knightley, Mrs. Elton, and Emma herself. In the discussion, Burrows is able to demonstrate how changes in their idiolects reflect changes in the characters as they move through the novel. Overall, Emma and Mrs. Elton are shown in what Burrows calls a 'parodic' relationship, their idiolects converging at one point and then moving in opposition. Conversely, the idiolects of Emma and Mr. Knightley, though beginning in proximity diverge at various places in the novel only to move toward convergence again near the conclusion, as do the characters themselves. Although Burrows' text is an especially rich, almost classic, example of the merging of computational stylistics and literary criticism, work continues in this area, much of it to be found in the journal *Literary and Linguistic Computing* and, until it recently ceased publication, in *Computers and the Humanities*.

Questions and Controversy

If computational stylistics has shown the ability to comment meaningfully on literary texts, the obvious question is why it appears to have had so little impact on mainstream literary study. Part of the answer may be simply that most literary scholars do not understand statistical procedures and do not trust their use on literary problems. This, however, may not be wholly a matter of ignorance on the part of traditional scholars. Rather, it may be that computational stylisticians have too infrequently shown the relationship of their statistical findings to central critical

issues in a text. Although Burrows and others mentioned above do move back and forth between their statistics and the text, many stylistic studies seem reluctant to do so, staying, as Craig (1999) says, "within the safe confines of the statistical results themselves."

This reluctance probably comes in part from a dilemma implicit in the earlier reference to Fish's criticism of Milic. If the researcher begins an analysis with certain features in mind (e.g., Swift's use of initial connectives or Austen's use of a certain kind of word), the charge of circularity or tautology is likely to be leveled. Even though these features may be very much at issue in critical discussions, the researcher is seen as biasing the analysis. On the other hand, if the researcher selects lower-level items and a statistical procedure designed to determine their significance, it may be extremely difficult to move from, say, the relative frequency of *the* to significant critical commentary. Although some argue that readers are affected by and at least unconsciously are aware of even such apparently low-level differences, the statistics on the surface simply do not appear to have a connection with features that seem meaningful to the reader.

This dilemma may be less troubling in attribution studies where the primary question is the pragmatic one of whether the procedure works: Does the analysis allow us to determine that text A is the product of author B rather than author C? For instance, one could hypothesize the discovery of an algorithm based on the relative distribution of the letters *x*, *z*, and *m* that would unerringly assign authorship in every case. It would be the fingerprint or the DNA of a writer's style and would reflect the unique nature of every writer. Such a procedure would seem to be all that is necessary for authorship attribution, but it would appear to tell the stylistician nothing about the writer's mind or habits and would seem to be of no help to the literary scholar interested in a particular text or writer. Although this hypothetical example may state the dilemma in unrealistically stark terms, the relationship between the method of analysis on the one hand and observable and more apparently interesting and significant textual features on the other remains a problem both real and theoretical.

A second aspect of the problem concerns the issue of whether the kind of objectivity for which computational stylistics is thought to strive is, in fact, possible. This issue was at the heart of Fish's critique of Milic and was again raised in a series of exchanges in scholarly periodicals during the late 1990s. The argument maintains that objectivity is a myth, as is the belief that one can approach textual analysis in a scientific manner. In these arguments, the specter of circularity is nearly always raised with the charge that quantitative analyses yield no more objective proof than do apparently subjective impressions. Computational stylistics simply counts features already labeled prominent.

One answer to these charges, however, was given as early as Burrows, who argued that the so-called circularity or tautology of which the field is sometimes accused "is actually a convergence of two mutually supportive lines of argument, each of which would generally stand in its own right" (Burrows, 1987: 218). That is, it is no more circular to discover quantitative evidence validating a point previously made by scholars using, for instance, the methods of historical criticism than it would be to realize that the assumptions of genre or myth criticism lead to the same understanding. Scholarship frequently uses different approaches to the same question; computational stylistics is one of those approaches. As well, although those involved in authorship attribution studies may need, as Joseph Rudman has pointed out, to make even more rigorous use of scientific methods, certainty, most computational stylisticians do not claim absolute objectivity, recognizing that new evidence in any field is likely to modify what appears to be true at any given time. Rather, they argue that their methods and results are systematic, explicit, and verifiable.

However, even given the cogency of such arguments, there are some signs of movement in new directions in computational stylistics. Ramsay (2003), for instance, suggests that the field has gone wrong with its reliance on "hypothesis testing and empirical validation." He calls instead for a new kind of "algorithmic criticism," a more ludic endeavor in which the powers of the computer are enlisted not simply to validate and test but to bring to the fore patterns, insights, and understandings not otherwise available. Certainly, a number of researchers suggest that computational stylistics should not be simply a more empirical version of traditional literary criticism and particularly that it not be associated primarily with formalist and structuralist literary theory. Instead, computerized textual analysis might lead to a new kind of criticism or at least be used in conjunction with more recent theoretical understandings of literature.

See also: Authorship Attribution: Statistical and Computational Methods; Stylistics; Stylistics: Corpus Approaches.

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Computer-Mediated Communication: Cognitive Science Approach

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Human languages and the conventions for using them evolved with people interacting face-to-face. Likewise, face-to-face interaction is the key setting in which children acquire language. Despite these origins, more and more communication now takes place between people who are not copresent in the same space at the same time, via technologies such as e-mail, instant messaging, cell phones, voice mail, and videoconferencing. How do people adjust when communication is mediated? How is language processing affected? And how is conversation shaped by the medium in which it is conducted?

Consider this example: early one morning, Calion is typing an e-mail message to his wife Aisha, who will soon be in her office in the English Department across

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Human languages and the conventions for using them evolved with people interacting face-to-face. Likewise, face-to-face interaction is the key setting in which children acquire language. Despite these origins, more and more communication now takes place between people who are not copresent in the same space at the same time, via technologies such as e-mail, instant messaging, cell phones, voice mail, and videoconferencing. How do people adjust when communication is mediated? How is language processing affected? And how is conversation shaped by the medium in which it is conducted?

Consider this example: early one morning, Calion is typing an e-mail message to his wife Aisha, who will soon be in her office in the English Department across

campus. If Calion wants Aisha to meet him later for a bite to eat, he cannot simply say, "Meet me for Indian after class." Many things can go wrong. For instance, Calion needs to be confident that Aisha can receive the message (will she remember to plug her laptop into the campus network?), will be attentive enough to notice that a message has arrived (will she be too busy meeting with undergraduates to check e-mail?), will figure out what Calion intends (their common ground will likely enable her to figure out what he intends by "Indian" and "after class"), and is willing and able to commit herself to the action he proposes (or will she have a meeting or other commitment at the time he's proposing?). So after hitting the send key, Calion must await evidence that Aisha has received, understood, and committed to his invitation. For her part, Aisha doesn't simply read Calion's message and resolve to head out to the food court at the appropriate time; she sends an e-mail reply that gives evidence that she has received, understood, and accepted the invitation. Or if she needs to negotiate or clarify the plan, she may switch media and try to instant-message him; this will work only if they can both attend to their screens at the same time. If the expected e-mail response is not forthcoming soon enough, Calion may take the initiative to actively seek out evidence by calling Aisha on her cell phone.

The point is that communication does not succeed automatically, just because two people speak the same language, possess the same cognitive architecture, and know the same things. Regardless of the mode of communication, people jointly construct meanings by engaging in an active process of 'grounding', or seeking and providing evidence that they understand one another (Brennan, 1990, 2004; Clark and Brennan, 1991; Clark and Schaefer, 1989; Clark and Wilkes-Gibbs, 1986; Schober and Clark, 1989). Contributions to conversations are coordinated in two phases: a presentation phase and an acceptance phase (Clark and Schaefer, 1989). As Calion's invitation illustrates, an utterance does not count as an actual contribution to a conversation (nor as part of the interlocutors' common ground) until its acceptance phase is complete. After (or depending on the modality of communication, even *while*) one person presents an utterance, the addressee provides evidence of attention, understanding, and uptake. This evidence may be implicit, in the form of continued eye contact or a relevant next turn (as when an answer follows a question), or explicit, in the form of a rephrasing, a request for clarification, or a modification of what came before (Clark and Schaefer, 1989). Both speaker and addressee take responsibility for seeking and providing evidence; often who takes the initiative at any given moment depends on who can do so more easily (Brennan, 1990). In this way, interlocutors in a collaborative task adjust their individual effort in order to minimize the effort they expend jointly, in order to reach a grounding criterion, or degree of certainty that they understand one another sufficiently well for current purposes (Clark and Wilkes-Gibbs, 1986).

In the rest of this article, we will briefly present some robust findings about mediated communication and discuss them in the context of the grounding framework. The grounding framework conceptualizes mediated communication as a coordinated activity constrained by costs and affordances (Clark and Brennan, 1991). This framework is compatible with both experimental and descriptive findings about communication (whether electronic or face-to-face) and can be used to predict and explain how communication media shape language use.

Basic Findings About Mediated Communication: Speech and Visual Evidence

The richness associated with face-to-face conversation diminishes when communication goes electronic: for instance, prosody is absent when text is the currency of exchange rather than speech; spontaneous facial expressions and gestures are lost when an interlocutor can't be seen; and conversational turns grow longer with voice mail or e-mail messages than with media that support more fine-grained interaction, such as electronic chat or telephone conversations.

Yet perhaps surprisingly, people are able to communicate quite clearly and easily over a wide variety of media, including those with relatively low bandwidth (e.g., text-based media); in fact, cognitive tasks tend to be accomplished just as well over lower-bandwidth media as face-to-face (for a comprehensive review, see Whittaker, 2002). Despite the common expectation that the more similar a medium is to face-to-face communication, the better communication should be, study after study has failed to confirm this 'bandwidth hypothesis' (Brennan, 1990, 1998; Brennan and Lockridge, 2004; Karsenty, 1999; Ohaeri, 1998; Whittaker, 2002). Clearly, more bandwidth is not necessarily better. In fact, mediated communication sometimes offers tangible advantages over face-to-face conversation, especially when it is of value to be able to edit utterances, review them, or save them as a paper trail; when it is useful to broadcast them to many addressees at once; or when interlocutors' schedules prevent them from attending to a message at the same time.

Some studies have documented media-based differences in efficiency among task-oriented conversations

D: ok
now we're gonna go over to
M-Memorial Church?
and park right in
right there
that's *good.*
M: *that's* rude
to park in the church.
D: hheh heh

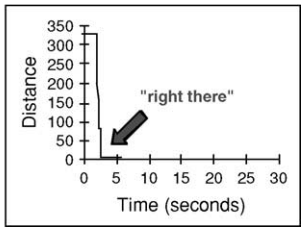

Figure 1 In this example, D can see M's icon, which provides immediate visual evidence about how M understands D's description. The exchange occurs as M moves his icon toward the target location described by D. D takes the initiative to propose that M has the right location using a deictic cue ('right there') after only 6 seconds. The graph shows the convergence of icon to target over time, with the point at which the icon reaches the target marked on the graph by an arrow.

D: you're in the upper
far far upper right-hand corner of
the screen it says Sea Street?
M: *yah*
D: *way* at the top?
M: yeh *[icon in correct location]*
D: you're
you're just a little bit on the road
and the
corner of your car is touching A
of Sea
but you're mostly off the road
the road is to your right
just a- touching *the car*
M: *the road* is to the right of
the car?
D: put the road-put the car right on
the road and you'll overlap me.
M: ok

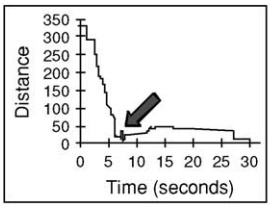

Figure 2 In this example, D cannot see M's icon and so grounding depends on the verbal evidence of understanding sought by D and provided by M. After the icon reaches the correct location there follows a lengthy period of grounding before they reach their grounding criteria and can conclude that they understand one another.

(higher efficiency is when the same task is accomplished just as well in less time or with fewer words). In comparisons of different configurations of speech, handwriting, teletyping, and video, Chapanis and colleagues found early on that remote communication is much less efficient without speech; the only way to substantially improve a medium's efficiency is to add a voice channel (Chapanis *et al.*, 1972; Chapanis *et al.*, 1977; Ochsman and Chapanis, 1974). The ability to coordinate using speech typically makes a task more efficient by a factor of two or more.

Yet adding a video channel to a medium that already includes speech may do nothing to improve either performance or efficiency (Chapanis *et al.*, 1972; Chapanis *et al.*, 1977; Ochsman and Chapanis, 1974; Whittaker, 2002; Williams, 1977). Of course, this depends on what visual information is transmitted: For cognitive or physical tasks where the focus is on the task activity, there are few if any benefits to seeing a partner's face (Fish *et al.*, 1993; Gaver *et al.*, 1993; Whittaker, 1995, 2002), despite repeated attempts by telephone companies and teleconferencing researchers to supply disembodied talking heads along with people's voices. (Seeing the face of a remote interlocutor can, however, have effects upon interpersonal social judgments, affiliation, or adversarial situations involving negotiation; see Whittaker, 2002 for a review). Visual information other than faces, such as views of the objects or task under discussion, can be very useful in task-directed communication (Anderson *et al.*, 2000; Brennan and Lockridge, 2004; Clark and Krych, 2004; Kraut *et al.*, 2002; Whittaker, 1995, 2002). The impact of a particular kind of visual information can be explained by the role it plays in grounding.

Consider the task of giving someone driving directions. This is easiest when both partners can see and point at the same map. In one study of remote communication (Brennan, 1990, 2004), two partners had the same map displayed on their screens and could speak freely to one another. One, the director, knew the target location, and directed the other, a matcher, to move his car icon to the target. Half the time the director could see on her map where the matcher's car was, and half the time she could not (the situation was asymmetrical; the matcher saw his own car icon in both conditions). When directors had visual evidence about matchers' understanding, matchers quite literally came to use icon motion to replace their turns in the conversation. And directors could quickly tell when matchers understood where the target location was, so directors took responsibility for deciding when it was time to move on to the next trial. In trials without such evidence, directors waited for matchers to tell them when they understood well enough to move on. Trials with visual evidence also took less than half as long as those without, because pairs could ground in parallel; that is, while the director presented a description, the partner conducted the acceptance phase simultaneously by silently moving his icon (see Figure 1). Without visual evidence (see Figure 2), he had to give verbal evidence, speaking after the director's description, which made the granularity of interaction much larger.

Grounding in Mediated Communication

In mediated communication, interlocutors typically inhabit different times and/or different places, so some aspects of coordination can be more difficult

Table 1 Affordances of communication media[a]

Affordances of media	*Media*				
	Face-to-face	*Video conference*	*Telephone*	*Instant messaging or chat*	*E-mail*
(1) *Physical co-presence*: Participants share a physical environment, including a view of what each is doing and looking at.	++	??	−−	−−	−−
(2) *Visibility*: One participant sees another, but not necessarily what the other is doing or looking at.	++	+	−−	−−	−−
(3) *Audibility*: One participant can hear another.	++	++	++	−−	−−
(4) *Cotemporality*: Messages are received without delay (close to the time that they are produced and directed at addressees), permitting fine-grained interactivity.	++	??	++	+	−−
(5) *Simultaneity*: Participants can send and receive messages at the same time, allowing communication in parallel.	++	??	++	??	−−
(6) *Sequentiality*: Participants take turns in an orderly fashion in a single conversation at a time; one turn's relevance to another is signaled by adjacency.	++	++	++	−−	−−
(7) *Reviewability*: Messages do not fade over time.	−−	−−	−−	++	++
(8) *Revisability*: Messages can be revised before being sent.	−−	−−	−−	++	++

Adapted from Clark & Brennan, 1991.
[a]Present in a particular medium: ++; present to a limited extent: +; present in some systems: ??; absent: −−. Physical co-presence (1), the hallmark of face-to-face communication, nearly always includes affordances (2) through (5).

than in face-to-face conversation, particularly if people are limited to a medium that does not facilitate grounding or if techniques for grounding within the medium are unknown. Table 1, adapted from Clark and Brennan (1991), compares key affordances of face-to-face conversation with those of four other communication media.

Grounding in communication can be decomposed into various sub-tasks bearing distinct costs (Clark and Brennan, 1991; Brennan, 1998), with the idea that people must adapt techniques for grounding to the affordances and constraints of the current medium in order to meet these costs. Sub-tasks that incur grounding costs include getting a partner's attention in order to initiate communication (startup costs); producing a presentation by speaking or typing or in some other manner (production costs); timing the placement of feedback (asynchrony costs) or of a conversational turn (speaker-change costs); pointing, demonstrating, or gesturing in order to refer or clarify content (display costs); awaiting, reading, or listening to a partner's utterance (reception costs); monitoring the partner's focus of attention and, if the dialog is task-oriented, any relevant activities or tangible products that make up the task (monitoring costs), preventing misunderstandings or repairing errors caused by self or partner (repair costs), and maintaining politeness (face-management costs) [based on Clark and Brennan, 1991 and Brennan and Ohaeri, 1999]. Discussing a few of these costs will help show how grounding shapes behavior.

Startup and monitoring costs are low for people who are physically copresent because they can easily monitor what a partner is doing, assess when the time is right for an interruption, and initiate a conversation by speaking to get the partner's attention (for review of physical proximity effects, see Kraut *et al.*, 2002). Startup is more costly for a video conference, since participants must arrange to be present in appropriately equipped facilities at the same time. Starting up a telephone call is unpredictable on a landline, as people are often away from such telephones; but with proliferating cell phones, calls find addressees regardless of their locations and so startup costs are somewhat lower.

Production costs are typically higher for text than for speech because most people find it harder to type than to speak, so typed utterances tend to be shorter than spoken utterances. In one study, people were more likely to sacrifice politeness when typing than when speaking when it took more words to frame a polite utterance (e.g., inviting a partner's input using hedges), but not when it took the same number of words to be polite (e.g., inviting the partner's input with questions); moreover, individuals with faster typing speeds used more politeness devices per 100 words than those who typed slowly (Brennan and Ohaeri, 1999). This finding demonstrates that people who communicate remotely do not actually become depersonalized or cease to care about politeness (as some social psychological theories have suggested), but that when they must struggle to meet production costs

they do this at the expense of something else, such as face-management. It also illustrates that grounding costs are not independent of one another; often one cost must be traded off against another, and such trade-offs are made differently in different media.

As another example, consider repair costs: When communication is cotemporal, such as with voice, text-based chat, and instant messaging, the grain of interaction is small, and turns tend to be shorter, less formal, and more numerous than in larger-grained text-based media (such as letters or e-mail). So any errors or misunderstandings can be addressed quickly, and repair costs are relatively low (more so for speech than for text, since production costs are higher for text).

In closing, the grounding framework is a useful vantage point from which to view, understand, and predict the effects of new media upon communication. The abundance and portability of new communication programs and devices (PDAs, added cell phone functionality such as digital photography, more extensive wireless networks, unobtrusive methods for eye-tracking, multimedia Internet content, etc.) will continue to make it even easier for mediaphiles to switch mid-conversation from one medium to another, as in our opening example of Calion's e-mail invitation to Aisha. Recently the New York Times chronicled a man and his BlackBerry (a portable wireless device for e-mail and instant messaging): "He once saw a romantic interest walk into a bar and immediately called her on her cell phone. 'I saw her look at the phone and put me right to voice mail,' he said, still indignant. But then he sent her a BlackBerry message, which made her laugh and prompted her to walk over and find him." The ability to spontaneously switch media within the same conversation enables increasingly flexible and innovative techniques for grounding.

See also: Context and Common Ground; Dialogue and Interaction; E-mail, Internet, Chatroom Talk: Pragmatics; Language in Computer-Mediated Communication; Multimodal Interaction with Computers; Pauses and Hesitations: Psycholinguistic Approach; Psycholinguistics: Overview.

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Computers in Field Linguistics

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Computers have been associated with field linguistics from their earliest days, as witness the enthusiasm with which computers were embraced by linguists, from mainframe computers in the 1960s to personal computers in the 1980s. While initially it was common to force our efforts into the framework provided by particular software, we are now more aware of the need to see the data itself as the primary concern of the analyst and not the software that we use to manipulate the data. Inasmuch as it allows us to carry out the main functions desired by a field linguist, software is a tool through which our data passes, the data becoming transformed in some way, but surviving the journey sufficiently to live on, independent of any software, into the future.

In this article, I discuss ways in which computers can assist field linguists whose chief concerns I take to be language documentation, including recording a previously unrecorded or little recorded language in order to write a grammatical description.

Field linguistics has been going through a change in focus over the past few years. There is increasing recognition of the need to record languages with few speakers, and to support such speakers with materials such as text collections, dictionaries, and multimedia (e.g., text, audio, images, and video). Computers are central to this effort, especially as we move to digital recording in which there will be no analog original. Laptop and palm computers are common tools for the first-world linguist, as are solid-state digital recorders and digital video cameras, which produce digital files for access on computers. Processing power of computers keeps increasing as does storage and RAM, which means we are now able to deal with real-time media (audio and video) in ever larger quantities, raising crucial issues for data management.

A typical workflow engaged in by a field linguist is presented below, together with a description of methods for working with small and perhaps endangered languages, and for managing the data so that it can be analyzed. Further analytical tools, like morphological parsers, are considered in the article on Natural Language Processing (NLP) (*see* **Natural Language Processing: Overview**).

An interest in supporting endangered languages, and the efforts of speakers or their descendants to learn about them, encourages us to focus on archival methods and on producing the best quality material for access in the future. Thus, the focus here will be on computer-based tools for analyzing linguistic material in ways that allow it to be safely stored, retrieved, and reused by others, as discussed by Bird and Simons (2003) in a work that is central to the present discussion.

For the linguistic fieldworker, the usual workflow involves recording, transcribing, and interlinearizing a corpus so that there is a base of information for analysis. This analysis is written as a grammar and may be accompanied by a collection of texts and a dictionary of the language. There may also be a set of media files that are linked to by their transcripts, allowing readers to hear audio or see video in the

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Computer-Supported Writing

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Introduction

The concept of computer-supported writing has been evolving and continues to evolve as new computer technologies emerge. As a result, it has at least three current meanings. In some contexts, computer-supported writing refers to various hardware and software tools or aids that often allow writers to be more efficient. For example, this perspective would highlight the claim that writers can revise texts more easily by moving words around in a word processor file than they can by using pen and paper. From a second perspective, computer-supported writing refers to the technologies that allow people at a distance to collaborate on texts. In other words, the concept refers to a particular type of

Computer-Supported Cooperative Work (CSCW) or Computer-Mediated Communication (CMC) in which people use technologies such as electronic mail (e-mail), online archives, and file-sharing programs to compose documents together. Most recently, computer-supported writing encompasses the idea that computer technologies have allowed the creation of new genres (such as personal Web pages), new contexts for writing (such as the worldwide audience available on the Internet), and new expectations about what it means to read and write (such as the ability to compose and interpret texts that may combine words, numbers, sounds, hyperlinks, and visuals). From this perspective, to speak of computer-supported writing is to speak of the development of new literacies or multiliteracies. All of these perspectives continue to influence computer-supported writing in educational settings.

To provide a broad sketch of this concept and its implications, the following discussion is divided into five sections. The first section provides a concise history of computers and writing, briefly highlights the idea of computers as writing aids, and comments on how computers and writing have mutually evolved. The second section focuses on computer-supported writing as a collective activity. In the third section, several new literacies are discussed. The fourth section addresses computer-supported writing in the classroom, and the final section comments on unresolved issues generated by today's writing technologies.

Brief History of Computers and Writing

Computers were not originally conceived of as writing technologies. Rather, before the late 1970s, punchcard-munching, number-crunching mainframes were primarily associated with accounting and with scientific, mathematical, and military calculations. Indeed, according to some, writing was a support for computers. Language capacities began to be programmed to allow humans to document software and to interpret data. By the late 1970s and early 1980s, those language capacities were being developed further by technology manufacturers to reach a growing market of business, government, and academic writers. Since then, computer technologies to support writing have expanded to include not only writing aids, but also electronic networks, and mobile and embedded tools.

Writing Aids

As Hawisher *et al.* (1996) detail, when programmers fully turned to computer-supported writing in the 1970s, the early heyday of Computer-Assisted Instruction (CAI) influenced their assumptions. Computers were not seen primarily as devices for composing texts. Instead, many were programmed as tools to ease the (so-called) drudgery associated with teaching and learning how to write. A computer could drill novice writers on grammar and punctuation through tutorials, exercises, and educational games. A human teacher or editor (presumably) then had more time to address the higher-level skills of argument. Similarly, some computer programs were designed to prompt novice writers through activities associated with the writing process: prewriting, drafting, revising, and editing. The assumptions behind some of these aids have been challenged – that writing can be divided between higher and lower functions to be divvied up between humans and machines. However, products that allow novice writers to practice writing skills remain a strong component of computer-supported writing.

The early 1980s were marked by technologies that initiated a widespread change in writing practices: word processing programs on personal computers. The programs for drilling novice writers morphed into spelling and style-checkers that were incorporated as standard features of word processors. More importantly, word processors allowed writers to replicate, manipulate, and store texts in ways that they had not before. Writers also took advantage of new electronic reference aids such as dictionaries, writing handbooks, and concordance programs that could analyze multiple documents to identify Key Words In Context (KWIC). As software and hardware developed throughout the 1980s and early 1990s, writers began to experiment with new multimedia capacities (see below, Hypertexting and Multimediating). They could more easily combine words with illustrations, background colors, links to other documents and files, and audio and visual clips. As a result, writers and composers could create new kinds of texts and could reinterpret older, print-based genres. From a novelty, computer-supported writing became an expected activity; from a gadget for replicating pen-and-paper writing practices and making them more efficient, the computer became for many writers a necessity associated with its own genres and practices.

Networks

Also by the early 1990s, computer-supported writing commonly included writing across networks (Hawisher *et al.*, 1996). The Local Area Networks (LANs), Wide Area Networks (WANs), and BITNET (Because It's Time Network) of the 1980s were joined and then overshadowed by the Internet. As servers and personal computers worldwide joined the Internet, writers discovered faster and often cheaper

means of communication. Some of these technologies included e-mail, bulletin boards, Internet Relay Chat (IRC), and early chat rooms. Many documents no longer had to be sent through snail mail, or physical postal services, but could be e-mailed or uploaded and downloaded from online locations via various file transfer programs. By the late 1990s, the Internet had become nearly synonymous with the World Wide Web (WWW or Web), as the connective infrastructure provided by the Internet was adapted to new uses, and as standard protocols such as hypertext markup language (html) were developed. The Web brought multimedia writing to the forefront, because it employed graphical, linked Web pages (as opposed to command lines) as the preferred interface among humans and machines. Although early networks had been primarily used in military, government, research, and educational settings, the Web was also embraced by the wider public and commercial interests. Personal Web pages existed side-by-side with more official sites published by institutions and businesses. The new writing profession of 'Web designer' soon took hold. Technologies began to be developed to better enable collaboration on Web sites and across these networks (see below, 'Collective Writing').

Mobile and Embedded Technologies

Although personal computers and the Internet/Web remain the focus of writing theorists in the first decade of 2000, the next wave of computer-supported writing is becoming apparent: mobile and embedded technologies. Some mobile technologies are essentially smaller forms of desktop computer technologies. Yet, because computer components can now be miniaturized, they also can be incorporated into other handheld, mobile devices. Personal Digital Assistants (PDAs), for example, record notes. Cell phones have become multimedia writing devices. In addition to transmitting sound, they can send textual Instant Messages (IM) and digital pictures just as programs on the Internet/Web can. Even more, computer components are being embedded into other appliances to create smart versions, or 'things that think.' For instance, smartboards are whiteboards that can electronically record anything handwritten on them with a special stylus. The future for many nations, scholars speculate, may be cultures in which technologies that enable computer-supported writing become ubiquitous and thus invisible.

Collective Writing

As networks and especially the Internet have grown in popularity, considerable funding, time, and human resources have been devoted to improving the technologies that support writers who collaborate on documents or contribute to collective projects, especially writers who live at a distance from each other. Even so, as of the first decade in 2000, computer-supported collective writing remains a relatively new concept. In fact, programmers commonly complain that many writers tend to be fairly conservative in adopting new collective writing technologies, preferring instead to send documents as e-mail attachments and to converse on the phone. Early adopters of technologies are still experimenting with the new tools and social norms that enable people to compose texts together.

Again, these initial experiments have often attempted to transfer existing writing practices to new media (part of a process that Bolter and Grusin, 1999, have called remediation). As early adopters have grown more familiar with the technologies, they have developed new practices that have in turn required new technologies, in a continuing cycle. The following entries represent only a sampling of the collective writing technologies still under development.

E-zines and Fanfic Sites

E-zines (electronic magazines) and fanfic (fanfiction) sites have evolved from a long tradition. Historically, writers often have shared their work with each other in small groups and have self-published to larger audiences. For example, zines are amateur, often collectively written, home-grown print magazines. They became especially popular with grassroots organizers, reporters, and fiction writers when photocopiers became widely available. E-zines update this common practice, for they are distributed relatively cheaply on the Internet/Web and potentially reach worldwide communities. E-zines are often about serious topics such as political activism or health issues, but they can be integral components of a fanfic Web site as well. Fans of popular culture icons congregate on shared bulletin boards, document centers, and blogs (see following section) to write scripts for new episodes of their favorite television series, create characters for a popular book series or computer game, discuss their favorite bands and lyrics, hold contests for the best adaptation of a published story, and so on.

Webrings, Blogs, Wikis, and MOOs

In addition to e-zines and fanfic sites, many specialized social protocols and software programs have arisen to support collective writing. Among the most popular have been Webrings, blogs, wikis, and MOOs.

A Webring is a collection of Web sites linked to one another, usually with a template that provides 'back' and 'forward' arrows in a footer to lead visitors from one site to the next. The sites may engage in direct dialogue and conversation, as they comment on each other's content, or the links may merely provide easy access to resources on related topics.

The term *blog* began as the shortened name for a Web log, or an annotated record of the Web sites a Web designer had consulted. A blogging program's ability to record and publish chronological entries on the Web, however, soon attracted the attention of diarists, essayists, and journalists. Today, blogs range from online diaries read by groups of friends, to bibliographic entries collected by a team working on a research project, to political or editorial commentary written by news reporters.

Like blogs, wikis combine database and Web-publishing capabilities, although wikis tend to be associated with large-scale, collective writing projects. They have been used, for example, to communally generate dictionaries and other reference materials. When a contributor submits a written entry on a topic, others can comment on and revise the original entry and subsequent comments. Wikis thus may preserve a record of contributors' debates and corrections, offering different viewpoints on the topic. Their approach to written text is modeled on the Open Source movement, in which software programmers collectively work on programs that are shared, commented upon, and continually tweaked.

A MOO (Multi-user domain, Object Oriented) is somewhat like a chat room where multiple guests, owners, and wizards can verbally create virtual identities, describe their environments, sometimes represent these realms or domains through graphics, and create computerized objects that interact with humans. For example, on Connections MOO (1994–2004), the Tuesday Café was a virtual meeting space for writing specialists, and it was complete with tables, benches, and a server (a bot – a computer-generated character) named Rhet who filled drink and food orders. Like Webrings, blogs, and wikis, MOOs have been used for multiple purposes, and they have included both formal and informal writing initiatives.

Collaboratories

Collaboratories (from 'collaborative laboratories') represent a formal attempt to foster collective research and writing. In the mid-1990s, the U.S. National Science Foundation (NSF) sponsored a grant initiative to fund Internet- and Web-based sites to support scientific research. These sites allowed scientists in a specialized area to share access to expensive scientific instruments, bibliographic databases, bulletin boards, and writing resources. The concept of collaboratories soon spread to nonscientific venues, especially education. The Inquiry Page and iLabs, for example, provide educators, students, civic leaders, and researchers with suites of collaborative communication and information technologies to support individuals and groups as they pursue various inquiries.

Interactive Publication Systems

While collaboratories have begun to change research groups, publishers and academics have also started a revolution in publication practices. Newspapers, magazines, academic journals, books, and other print-based publications have been translated to digital media. In some cases, an online publication is simply a digitized (often a pdf file) version of the print format. In other cases, the publication exists only online. In all cases, though, these digitized archives plus increasingly powerful search engines have significantly changed reading practices because they often allow readers to browse and find appropriate materials more easily.

Beyond making the search for materials more efficient, experimental sites and journals have taken further steps to make publications more interactive. Like wikis (see above, Webrings, Blogs, Wikis, and MOOs), they allow readers and writers to engage in dialogues over articles. Similarly, some publication sites, such as the Los Alamos preprint archive, sidestep traditional journal practices by allowing researchers to post the penultimate or conference versions of their articles (preprints) directly to the site for discussion. These open dialogues, some scholars propose, might replace traditional forms of peer review, or the processes by which manuscripts are vetted for publication. The more open digital sites and journals, too, may allow writers to hyperlink their alphanumeric texts to other online, collective resources, such as image databases. As a result, these sites do not simply replicate traditional, paper-based publications, but change how writers and readers connect texts with larger contexts.

New Literacies

To capture this understanding that computer-supported writing is not merely pen-and-paper writing made more efficient, but something different, several recent theorists have proposed that computers require multiliteracies or new literacies. In other words, they propose that today's technologies require different ways of knowing how to compose and interpret texts. In particular, today's texts require knowledge

of new genres and the social contexts in which they are used. Writing theorists have proposed several lists of new literacies. What follows is a selection of recent proposals to extend traditional ideas of what counts as reading and writing.

Hypertexting and Multimediating

Both hypertexts and multimedia texts may break the conventions of traditional print texts, and thus may require different composing and reading practices. For example, a traditional academic article presents an argument in a linear and hierarchical manner, with each main point supported in turn by evidence. A hypertext, however, contains hyperlinks that enable writers and readers to jump from one section of a document to another, or to other documents entirely. A multimedia document contains non-alphanumeric elements such as visuals or audio clips, and, of course, a hypertext may also be multimediated. As a result, arguments presented as hypertexts and/or multimedia may be more associative, nonlinear, and nonhierarchical. Although this last claim is sometimes questioned, most writing theorists believe that the explosion of hypertexts and multimedia on CD-ROMs and the WWW has created new conventions for reading and writing.

Employing Visual Rhetoric

An outgrowth of the interest in multimedia has been a specific interest in visual rhetoric. Although people have communicated through visuals for centuries (art, illustrations, graphs, etc.), today's technologies have made visuals easier and often cheaper to produce, copy, manipulate, and distribute. They are being used extensively in texts that once relied more on words, such as textbooks and advertisements. As a result, visuals are inspiring several theoretical questions about how they communicate: How are people persuaded by visuals? How do people interpret a visual's elements? Must viewers be able to translate a visual into words before it can be said to be offering an argument? Most important, can a more sophisticated language be developed to describe and to teach writers systematically about visuals' effects?

Designing and Manipulating Information Architectures

To sort through electronic resources quickly is a learned skill, and it often depends on knowledge of information architectures. How does a database organize and retrieve its various entries? What constitutes an appropriate interface or Web site design? How do search engines work, what constitutes an appropriate keyword for a search, and how can users best retrieve information from outdated or legacy systems? Questions such as these address how information is categorized. Because categorizing something is a rhetorical choice, and often a politically and socially charged activity (as when people are categorized according to different races and ethnicities), information scientists today see a desperate need for more computer users to become literate in information architectures.

Understanding Netiquette, Viruses, and Urban Legends

To participate on the Internet/Web effectively, many users have had to learn to be cautious. Certain conventions have developed, for example, to maintain relatively polite conversations on electronic lists, chatrooms, and other interactive spaces. These netiquette conventions often directly address the use of text, as when words in all capital letters are declared to be the equivalent of shouting, or when emoticons (such as smiley faces) are used as punctuation marks to indicate irony and tone. Similarly, many users have become more savvy about the rhetorical strategies (such as misleading subject lines) that hackers may employ to cause them to open a virus-laden e-mail message. The same strategies often characterize urban legends, more-or-less plausible but usually false stories, which often spread rapidly through Web sites and forwarded e-mails. All of these topics have become the subject of academic scrutiny, as they represent new social conventions for texts.

Gaming

Although some scholars and pundits may resist the idea that computer gaming constitutes a new literacy, other academics see games as a new genre(s) with specific conventions. Computer games (e.g., *Zork*) began as entirely text-based entities, as graphics and sound were not immediately possible. Gamers learned to accommodate fragmented and often scrolling text. More important, this community learned how to compose and to interpret the standard elements still found in today's multimedia games: familiar plotlines, puzzles, character types, and ways the player can manipulate the virtual environment. Currently, many game manufacturers (most notably, Electronic Arts, the creators of *SimCity*) even invite fans to participate in creating the game's environment by proposing new storylines on online fanfic sites (see above, E-zines and Fanfic Sites). Some scholars have proposed that games represent the next wave of literature, as they are attracting not only substantial profits but also the next generation's creative energy.

Computer-Supported Writing in Educational Settings

Computer-supported writing appears in all three forms (as aids, collective writing sites, and new literacies) in educational settings, often in combination. For instance, teachers might refer students to an online writing handbook as they contribute to a collaborative course blog, and in turn, learn the students' Instant Messaging netiquette. Yet, in addition to deciding which forms of computer-supported writing might be the most appropriate for different instructional goals, educators must consider several other aspects involved with using computer technologies to teach writing. This section highlights the recent questions that have most concerned writing specialists.

Computer Classrooms

Computer classrooms may be physical, virtual, or both. How classrooms are arranged has proven to be a key concern, as different stakeholders attempt to make these expensive investments both cost-effective and educationally sound. Experienced educators know that a classroom's arrangement has varying effects on the student-teacher relationship. For example, many physical classrooms are arranged so that students sit at desktop computers placed in rows. However, this arrangement tends to place the instructor at the front of the room, as a 'sage on the stage.' Many writing specialists instead recommend turning attention onto students and their texts. A computer classroom might be arranged with desktop computers placed around the perimeter to allow individual or small group work, and with a central seminar table to allow the entire class to work face-to-face together. Even more flexible are islands of desktop computer carrels that can be rearranged at will, or wireless laptops that can be used throughout a room. As yet, few conversations about physical classroom arrangements are taking into account students' own handheld devices (PDAs, cell phones, etc.) and how they might be incorporated into writing instruction.

Like physical classrooms, virtual writing environments may take many forms. One influential software package has been the Daedalus Integrated Writing Environment (DIWE). Created first for Local Area Networks (LANs) that connected the computers within a physical classroom, DIWE is now accessible through a Web interface. DIWE provides various features, including writing prompts, screens where writers compose texts, and a chatroom environment that allows an entire class or groups within the class to collaborate. Other virtual writing environments may include specialized areas on wikis, blogs, and MOOs (see above, Webrings, Blogs, Wikis, and MOOs) or collective Web sites that provide both tools for active collaboration and places to self-publish student work.

Course-Management and Commenting Software

In recent years, courseware and commenting programs have become common, especially as schools and campuses have mandated their use. Several commercial products, among them Blackboard and WebCT, allow educators to keep track of writing assignments students have completed, their grades, and notes about the students' progress. Other products, such as Comment, primarily allow peers and teachers to write responses to student work. Still other programs combine both functions. For example, TOPIC (Texas Tech Online-Print Integrated Curriculum), developed at Texas Tech University and now available commercially, can manage the many class sections that constitute an entire writing department. A fully digital environment, it allows students to upload their papers, to comment on peers' work, to access writing advice, and to read and respond to comments from several writing instructors. Educators have responded to these various programs with mixed judgments, both liking the organizational power of computers and expressing concern over the potential for excessive surveillance.

Assessment Software

Also currently earning mixed reactions are tools whose sophisticated algorithms are used to assess student texts. For example, testing services have developed software to rate students' college entrance essays. Although a computer does not read a text's content in the way a human would, it can analyze textual features such as sentence and essay length, punctuation and grammar usage, word choice, and overall organization. As a result, some scholars claim that these products predict scores that compare favorably to the assessment scores that human readers provide. Similarly, other products and online services can assess a student's use of other texts. By comparing strings of words between a student essay and other documents, some services claim that they identify plagiarism. Writing teachers often use online search engines (such as Google) to do the same. Ultimately, the debates over whether or not to use these assessment tools depend on questions that are decided locally, such as whether the writing forms these tools privilege and measure are appropriate for the instructors' educational goals.

Significant Unresolved Issues

In addition to the questions that educators ask when they turn to computer-supported writing, several significant issues remain unresolved. Despite the expectation among authors worldwide that writing will be computer-supported, there remain questions about who really will be able to write and for whom, who owns texts, and how long documents will ultimately survive.

Access to Computers

Scholars have argued that although computer technologies are widespread, a digital divide exists between the haves and have-nots. Where to draw the line to mark the divide remains a source of contention: into which category should someone with institutional (school, church, community service) access to computers, but no home access, be placed? Nonetheless, because government officials and ruling classes tend to have access to these technologies, they incorporate them into their definitions of literacy and of who counts as capable workers and citizens. In particular, access to the Web remains an issue, both for economic and political reasons. Some regions have difficulty maintaining the infrastructures (phone and cable lines, access to satellite communications, and so on) needed to support the Internet. Other regions object to some of the content available online and so take measures to block access. Computer-supported writing is not a universal norm.

Intellectual Property

With new writing media have come reconsiderations of intellectual property conventions. Designed for print media, copyright and patent laws in most nations have not kept pace with social conventions that digital information ought to be copied and shared, or with technological capacities to instantly copy (or pirate) anything posted online. In fact, as lawmakers debate new provisions to extend copyright and patent protections, movements such as the Open Source have developed an alternative set of conventions for how to share text as well as code. Arguments over intellectual property are likely to shape discussions about computer-supported writing for many years to come.

Preservation of Documents

The conversations about preserving computer-supported writing swing between a concern that digitized writing persists without authors realizing it, and a concern that digital media cannot be easily stored in archives. On the one hand, many writers may not realize that materials posted on the Web can be copied by mirror Web sites, readers worldwide, and Internet archives. Removing the material from a personal Web site, for example, does not guarantee that the writing is gone. On the other hand, digital media do not age well. Web sites often contain broken links, and digital files may be corrupted. Moreover, if the software programs that created certain files are not maintained, or if the files are not continually updated, then these documents could become irretrievable. Finally, if the preservation of texts is at issue, so is the purpose of citations. Footnotes, parenthetical notes, and works cited are intended to allow readers to locate the referenced materials. However, if those materials are moved, lost, copied, altered, or corrupted, then the citations become instable as well. These questions, too, are being discussed widely by academics, businesses, and government officials, as new practices are slowly evolving.

Conclusion

Computer-supported writing has grown exponentially in its various forms since its beginning and promises to continue to evolve. Yet technologies in themselves are rarely solutions for problems; rather, they bring both benefits and challenges that writers and readers need to assess carefully. The questions ultimately to ask are what do emergent technologies enable and disallow; and what social, writing, and reading practices must be altered to make them useful?

See also: Language Education, Computer-Assisted; Language in Computer-Mediated Communication; Writers' Aids.

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Bernard Comrie, one of the world's leading figures in the field of language universals and linguistic typology, was born on May 23, 1947, in Sunderland, England. He studied at the University of Cambridge, from which he received a B.A. in modern and medieval languages (1968) and a Ph.D. in linguistics (1972). At Cambridge, he was Junior Research Fellow at King's College (1970–1974) and subsequently became University Lecturer (1974–1978). In 1978 he joined the faculty of the University of Southern California, Los Angeles, first as Associate Professor (1978–1981), then as Full Professor (1981–1998), of linguistics. Comrie is currently Director of the Department of Linguistics of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany (since 1997). He is also Honorary Professor of Linguistics at the University of Leipzig (since 1999), and Distinguished Professor of Linguistics at the University of California, Santa Barbara (since 2002). Honors conferred upon him are Member of the Saxon Academy of Sciences, Leipzig (1999), Corresponding Member of the British Academy (1999), Foreign Member of the Royal Netherlands Academy of Arts and Sciences (2000), and Doctor of Letters Honoris Causa, La Trobe University, Australia (2004).

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Computers in Field Linguistics

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Computers have been associated with field linguistics from their earliest days, as witness the enthusiasm with which computers were embraced by linguists, from mainframe computers in the 1960s to personal computers in the 1980s. While initially it was common to force our efforts into the framework provided by particular software, we are now more aware of the need to see the data itself as the primary concern of the analyst and not the software that we use to manipulate the data. Inasmuch as it allows us to carry out the main functions desired by a field linguist, software is a tool through which our data passes, the data becoming transformed in some way, but surviving the journey sufficiently to live on, independent of any software, into the future.

In this article, I discuss ways in which computers can assist field linguists whose chief concerns I take to be language documentation, including recording a previously unrecorded or little recorded language in order to write a grammatical description.

Field linguistics has been going through a change in focus over the past few years. There is increasing recognition of the need to record languages with few speakers, and to support such speakers with materials such as text collections, dictionaries, and multimedia (e.g., text, audio, images, and video). Computers are central to this effort, especially as we move to digital recording in which there will be no analog original. Laptop and palm computers are common tools for the first-world linguist, as are solid-state digital recorders and digital video cameras, which produce digital files for access on computers. Processing power of computers keeps increasing as does storage and RAM, which means we are now able to deal with real-time media (audio and video) in ever larger quantities, raising crucial issues for data management.

A typical workflow engaged in by a field linguist is presented below, together with a description of methods for working with small and perhaps endangered languages, and for managing the data so that it can be analyzed. Further analytical tools, like morphological parsers, are considered in the article on Natural Language Processing (NLP) (*see* **Natural Language Processing: Overview**).

An interest in supporting endangered languages, and the efforts of speakers or their descendants to learn about them, encourages us to focus on archival methods and on producing the best quality material for access in the future. Thus, the focus here will be on computer-based tools for analyzing linguistic material in ways that allow it to be safely stored, retrieved, and reused by others, as discussed by Bird and Simons (2003) in a work that is central to the present discussion.

For the linguistic fieldworker, the usual workflow involves recording, transcribing, and interlinearizing a corpus so that there is a base of information for analysis. This analysis is written as a grammar and may be accompanied by a collection of texts and a dictionary of the language. There may also be a set of media files that are linked to by their transcripts, allowing readers to hear audio or see video in the

language. In addition, this material is housed in a suitable repository, a digital archive which preserves the data for future use.

The types of tasks that we will need to carry out in the analysis of a previously unrecorded language are outlined below. Assuming that we begin with recordings (digital, or analog converted to digital) that are the primary data, we first need to label them clearly, so that they are identifiable from the moment of recording, and to establish a database of metadata, the who/what/where/when information that is easily forgotten in a short time without good descriptive notes. It is useful at this stage to have considered a naming convention, so that the tapes can be permanently identified in both our own documentation and in any archive in which we lodge the data. (Filenames should persist over time so that any reference to them can be resolved, for example by someone looking through the data in the future. Filenames should not contain unusual characters that various computer systems find difficult to recognize.) Maintaining a good database of the items (tapes, transcripts, texts, images, etc.) and of the relationships between them allows us to keep track of derived forms and the context from which they are derived.

We then need to transcribe the media to produce a textual index in whatever form we require. Transcription can be undertaken with tools that capture time-alignment, so that the resulting file has timecodes associated with chunks of text.

We should be clear from the outset that we are engaging in a data management task, in which complex relationships between types of ethnographic data need to be tracked, both for our own use of them and for assisting in retrieving information in the future. Database structures can assist here, but only if they do not lock up the data in a proprietary format (one that is owned by a company rather than being 'open source' or publicly and freely available). Relational databases allow us to reflect relationships in the data and to avoid duplication by listing, for example, items on a tape linked to the names of speakers and their characteristics (age, sex, etc.), and the derived information (such as texts, media files, and lexicons).

In the late 1980s, Lancashire (1991) listed a number of software tools for various aspects of linguistic analysis, many of them aimed at working with large corpora of metropolitan languages. Not all of these are useful from the point of view of a fieldworker recording a small language (one with relatively few speakers and typically with no written record), as the programs deal with what we can characterize as 'high-end' applications such as NLP or analysis based on very large datasets.

An issue that was dealt with extensively in the late 1980s was representation of orthographic typefaces by fonts, and it may not be too optimistic to say that we are about to overcome these problems by means of the international standard, Unicode, in which most character sets have found a home. While field linguistics is not addressed as a subject heading in Lancashire's compilation, more recent work by Johnston (1995) and Antworth and Valentine (1998) is devoted to just this topic and surveys the relevant software of the time in some detail.

Some of the tools described in these two sources are still used by field linguists, but this is partly because there is no choice. Shoebox is an example of a fine piece of software that is the mainstay of lexicographic and textual analysis and was last updated in 2000, although it has recently been replaced as Toolbox on Windows platforms. A number of tools have not been updated and are now unable to run on recent operating systems.

Bearing in mind that the data is our primary concern and not the software we use to manipulate it, it is nevertheless critical that the software enables us to perform the kinds of tasks we routinely require in order to assist us in our fieldwork. It is the function of a software tool to transform data, or to allow us to interact with the data. We take it as given that the tools discussed here may soon be superseded. The kinds of functions that we need as linguists will continue to be addressed in new ways in the future. As there is no one tool that will do all that we require, we need ways of allowing our data to flow between the tools. This typically involves the use of text manipulation software or regular expression parsers.

Most of the examples of tools listed below can be found on the Internet, and searching for the major headings here will locate any more recent items. There is an enormous possibility for new uses of linguistic data, both in the exploration of its internal links and in the representation of the data itself, to accompany our analyses or to assist in language reintroduction programs. Given that this is the case, it would be foolhardy to suggest that we could provide all the answers in a fixed time or location. Rather, there are major sources of information on these topics, as given in the list of web links below, that should be consulted by anyone wanting to locate current information on these topics. They should also get in touch with the local linguistic archive that will be keeping abreast of the best emerging practices.

Transcribing

Producing a textual index (or transcript) of a media file, with timecodes inserted into the resulting file.

Elan, http://www.mpi.nl/tools/elan.html
Transcriber, http://www.ldc.upenn.edu/mirror/Transcriber/
Clan, http://childes.psy.cmu.edu/clan/
TASX, http://tasxforce.lili.uni-bielefeld.de/

(cf. the Annotations page which has a list of many of these kinds of tools: http://www.ldc.upenn.edu/annotation/)

Interlinearizing Text

Providing an annotation of the transcript, in a morpheme-level correspondence, typically with reference to a controlled vocabulary that will become a lexicon of the language.

Shoebox, http://www.sil.org/computing/shoebox/
Toolbox, http://www.sil.org/computing/toolbox/

Building a Corpus of Media Material

Amassing transcripts linked to media files to allow navigation through the media via the textual index. Instantiating links established with transcription tools.

Audiamus, http://www.linguistics.unimelb.edu.au/thieberger/audiamus.htm

Concordancing the Corpus

Establishing a list of all words in the corpus in their context. Ideally this concordance interacts with the corpus to allow you to move between the concordance and the corpus (McEnery and Wilson 2001: 209ff., give a list of tools for corpus research).

Conc, http://www.sil.org/computing/conc/
Wordsmith, http://www.lexically.net/

Conversion of Linguistic Data

To restructure our data for use in the tools listed here we need conversion methods that can take the data from one format to another. Regular expressions allow the linguist to query the data on structure rather than content. So, for example, the expression '\r.' will find any carriage return and following character, regardless of what it is. Similarly, '\r[0-9]' finds any numeral in that position. Regular expressions assist in structuring textual data to move it between applications. A general search on 'regular expression' will give more information, see for example http://www.regular-expressions.info. Tools that use regular expressions include:

Emacs, http://www.emacs.org
BBEdit, http://www.barebones.com/products/bbedit/index.shtml
Perl, http://www.perl.com
ECONV, (http://www.mpi.nl/tools/econv.htm) does conversions between *Shoebox*, *Transcriber* and *Elan* textual formats without the need to learn regular expressions.

Building a Dictionary Based on the Corpus

Shoebox, http://www.sil.org/computing/shoebox/
Databases programs are, in general, not recommended for building dictionaries as they are too restrictive on the form in which an entry can be represented. A major benefit of Shoebox is that it provides a means for glossing texts linked to a dictionary, a function that is not available with other tools. Dictionary presentation tools are a useful way of getting structured lexical information into a public form, for example:

Kirrkirr, http://www-nlp.stanford.edu/kirrkirr
LexiquePro, http://www.lexiquepro.com

Spectral Analysis

Acoustic analysis of segments of field recordings can be accomplished with these two widely used tools.

Praat, http://www.fon.hum.uva.nl/praat/
Emu, http://emu.sourceforge.net/

Archiving Data

These archives are both repositories for field recordings and derived forms of data and analysis and clearinghouses for relevant information on linguistic methods and tools.

Digital Endangered Languages and Musics Archive Network (DELAMAN), http://delaman.org/
Open Language Archives Community. (OLAC), http://www.language-archives.org/
Aboriginal Studies Electronic Data Archive (ASEDA), http://www.aiatsis.gov.au/rsrch/rsrch_pp/ased_abt.htm
Archive of the Indigenous Languages of Latin America, http://www.ailla.utexas.org
Documentation of Endangered Languages (DOBES), http://www.mpi.nl/DOBES
Endangered Languages Archive (ELAR), http://www.hrelp.org/archive/
Pacific and Regional Archive for Digital Sources in Endangered Cultures (PARADISEC), http://paradisec.org.au

Linguistic Computing Directories

General sources of information on linguistics and computing tools.

http://www.sil.org/linguistics/computing.html
http://www.linguistlist.org/sp/Software.html

See also: Character Sets; Natural Language Processing: Overview; Phonetics: Field Methods; Semantics: Field Work Methods.

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Johnston E C (1995). 'Computer software to assist linguistic field work.' *Cahiers des sciences humaines 31(7)*, 103–129.

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McEnery T & Wilson A (2001). *Corpus linguistics: an introduction*. Edinburgh: Edinburgh University Press.

Computers in Lexicography

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Computers can be used in lexicography to support the analysis of the language and to support the synthesis of the dictionary text. There are, of course, many other interactions between computing and lexicography, including the preparation and presentation of electronic dictionaries, the use of dictionaries in language technology systems (*see* **Computational Lexicons and Dictionaries**), and the automatic acquisition of lexical information (*see* **Controlled Languages; Lexical Acquisition**). They will not be covered here.

In technologically advanced dictionary-making, the lexicographer works with two main systems on their computer: the corpus query system (CQS) for analysis and the dictionary writing system (DWS) for synthesis. Currently, these are always independent, with communication between the two via cut and paste. We describe requirements, and the state of the art, for each.

Dictionary Writing Systems (DWSs)

Anyone producing a dictionary needs to (a) write it, and (b) store it. Each can be done on either paper or computer. 'Dictionary writing system' means the software used where either or both are done on a computer.

Producing a dictionary is a large and complex operation. The DWS can facilitate the operation at many points. Dictionary production usually involves a team whose members include lexicographers, a chief editor, a project manager, and a publisher. The DWS will be a key tool for all of them, each from a different perspective. The lexicographer wants the tool to facilitate writing and editing text. The chief editor wants it to support quality checking and consistency, including ensuring that dictionary policies are observed. The project manager wants it to support progress monitoring, including the process of allocating packages of work to lexicographers, distributing them, and checking that they are returned on time. The publisher wants it to deliver a versatile database that can readily be used for producing various dictionaries (electronic and paper, large and small) and potentially for licensing for a range of other purposes, such as spell-checking or automatic translation.

The Dictionary Grammar

A dictionary is a highly structured document. An entry typically contains a headword, pronunciation and part-of-speech code, optional labels, and information about inflectional class and morphological and spelling variants, then a sequence of senses, each with definition or translation and optional examples. Each of these is a different information field.

There are constraints on which fields are required or allowed where. Fields are often distinguished by font or use of bold or italics. Some fields, like part of speech, may only take one of a small set of values; others play a specific role in sorting or cross-referencing. A lexicographer or user of an electronic

Linguistic Computing Directories

General sources of information on linguistics and computing tools.

http://www.sil.org/linguistics/computing.html
http://www.linguistlist.org/sp/Software.html

See also: Character Sets; Natural Language Processing: Overview; Phonetics: Field Methods; Semantics: Field Work Methods.

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There are constraints on which fields are required or allowed where. Fields are often distinguished by font or use of bold or italics. Some fields, like part of speech, may only take one of a small set of values; others play a specific role in sorting or cross-referencing. A lexicographer or user of an electronic

version of the dictionary data may wish to specify particular fields in a search. For all these reasons, they need to be explicit; all data in the dictionary database must be within a particular field. When lexicographers write or edit an entry, they must not only input the text; they must also specify the field it falls within.

The 'dictionary grammar' is at the center of the project. It names the different fields of information and says how they are to be nested and ordered, and which are obligatory and which are optional.

When a dictionary project is planned, decisions must be made about the different fields and entry structures. These policies, along with many more, go to form the 'style manual,' an extensive document detailing how all the many varieties of lexical fact are to be classified and presented.

The dictionary grammar implements the style manual. It tells the computer what a dictionary entry needs to look like. The computer can then make sure entries have appropriate structures and can guide the lexicographer through the compilation process. There should be a one-to-one mapping between the information fields in the style manual and those in the dictionary grammar (and it is sensible to give them the same names in both). The human-readable rules for entry structures in the style manual and the computer-readable ones in the dictionary grammar should correspond. If policies change, with new information types or entry types added, corresponding changes must be made to the dictionary grammar. The lexicographer will need to become highly expert on dictionary style, and this will mean knowing the dictionary grammar, as well as the style manual, very well.

Database and XML

At the heart of a DWS is a database, which stores the growing dictionary. Standard database functions that a DWS needs are fast access, locking items when a user is working on them, backup, and crossreference checking. (Crossreference checking and sorting are two particular tasks where a dictionary project makes demands that go beyond what many generic systems offer.)

The database view of the dictionary is a 'nuts and bolts' view, critical for the working of the project but not supporting a view of the dictionary as structured text. For this, a language for representing texts is needed (*see* **Mark-up Languages: Text**). XML (eXtensible Markup Language) is designed for this purpose (and is now the language of choice throughout the publishing industry). XML can be used to specify the dictionary grammar. (XML provides two mechanisms for specifying the structure of a document: a document type definition, or XML schema. Both are suitable for specifying the dictionary grammar.) The XML version of the dictionary database will then serve as an 'exchange format' (for delivering the dictionary to printers and other customers) and for guaranteeing its longevity. (Any database systems will in due course be superseded, so it is important for the publisher to have access to a version of the dictionary that does not become unusable if the database system is no longer supported.) XML and associated standards support many of the processes of dictionary production, including style sheets (so the format of paper and electronic products can be efficiently specified, in a process that the lexicographer need not worry about), linking to other resources, and transforming the data (so a range of derived dictionaries and other variants may be produced automatically).

The database view and the XML view are complementary. The database must be one that allows the data structures to be specified by a dictionary grammar and that can both input and output XML.

The Lexicographer's Perspective

Lexicographers will spend most of their working week with the DWS, so it is crucial that it helps them rather than hinders them. It must do jobs for them, not give them extra jobs to do.

It must be robust (so that it does not crash and lose a week's work) and fast (so there is no time wasted waiting for the computer to respond). It should be intuitive; lexicographers will need training in lexicography and linguistics, but should not need to commit much time to learning the software.

It should support working from home (with or without a high-bandwidth Web connection). It should give them read-only access to an up-to-date version of the whole database, so they can see how other entries related to the one they are working on have been handled.

When typing, it will tend to be most intuitive for the lexicographers to 'fill in boxes' for different information fields, but they will also want to be able to check how the overall entry looks as they proceed. So the DWS should support both of these views, and possibly others.

Some fields, like part-of-speech labels, will have a closed set of possible contents. In such cases, the options should be offered in a drop-down list, both so the lexicographer need not remember details of capitalization, punctuation etc., and so that consistency is guaranteed.

Lexicographers often want to restructure long entries, including changing the ordering or nesting of senses and other units. This will be a hard intellectual

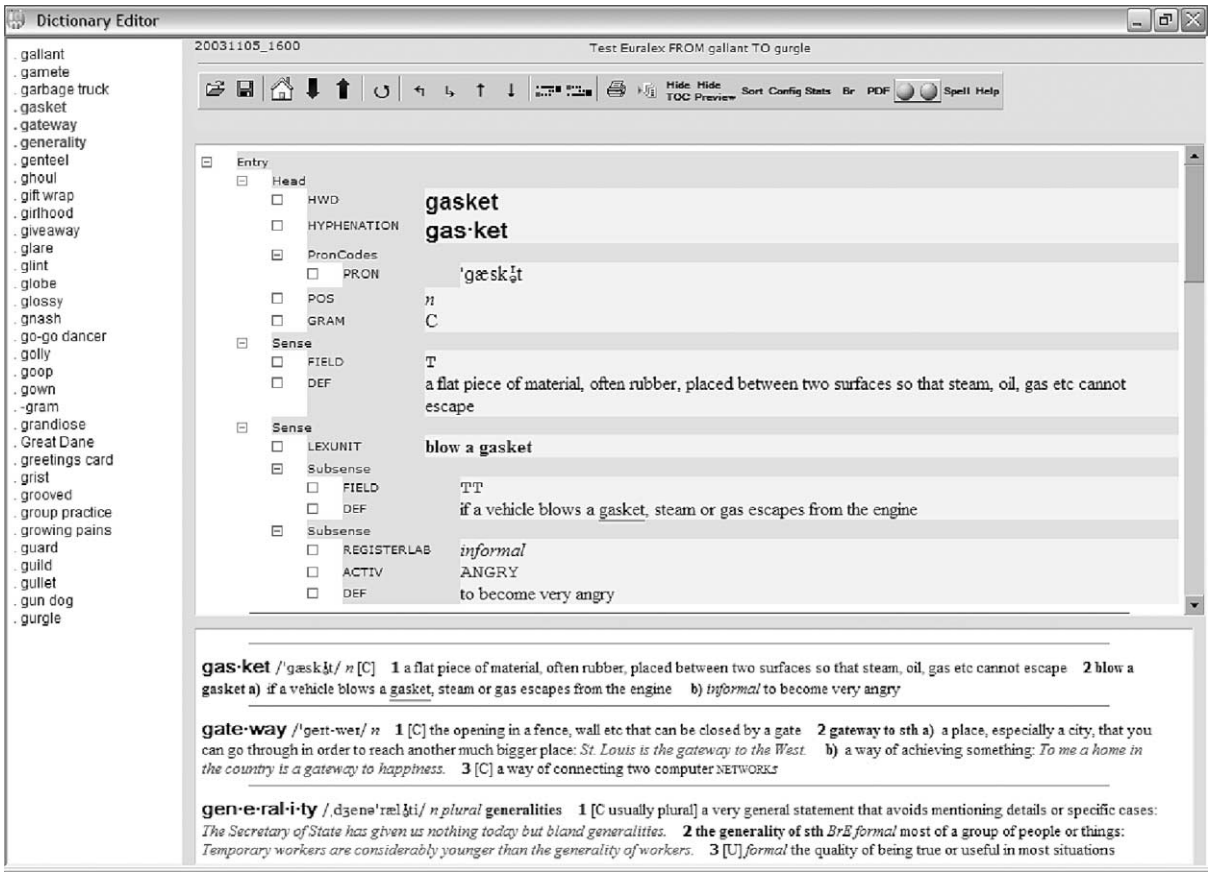

Figure 1 Dictionary Writing System, standard lexicographer's view.

task; the DWS can at least make it a technically easy one.

Figure 1 presents a screenshot of a leading DWS. It shows the 'structure view' (the default for data input) in the top half of the screen with the WYSIWYG view, simulating what the entry will look like on the dictionary page, in the bottom half. (Editing can take place in either window.)

Checks and Searches

The DWS, in its database functionality, needs to support the many checks to be made before a dictionary text is ready to publish.

It must report any failures to comply with the dictionary grammar, or unresolved crossreferences, or spelling errors, or use of words which are not themselves defined (for many, though not all, dictionary types). These checks can be fully automatic. A further range of checks require a combination of specific database searches combined with human judgment: 'find me all the sports-domain words with examples using a country name' (to ensure we do not repeatedly talk about the same country winning or losing) or 'find me all the phrasal-verb entries with a grammar field which specifies a preposition other than *to* or *for*' (to check that they are all consistent with one of the dictionary policies on grammatical description of phrasal verbs).

One important checking role is to assess the quality of revised entries when they are received back from lexicographers, prior to replacing the earlier versions of those entries. For that, a tool which supports quick comparison is needed. Such a tool from one leading DWS is shown in Figure 2.

History

The earliest use of computers to support English dictionary compilation was by Laurence Urdang on the *Random House Dictionary of the English Language* (1966). A computer was used to sort and classify words and senses, so that contributors could work in logical rather than alphabetical order: for example, the medical editor wrote all the entries for words denoting diseases systematically, leaving alphabetical sorting to the computer. At that time computer typesetting was not advanced, and when compilation was complete, the whole text of that dictionary had to be printed onto paper and rekeyed by the printer.

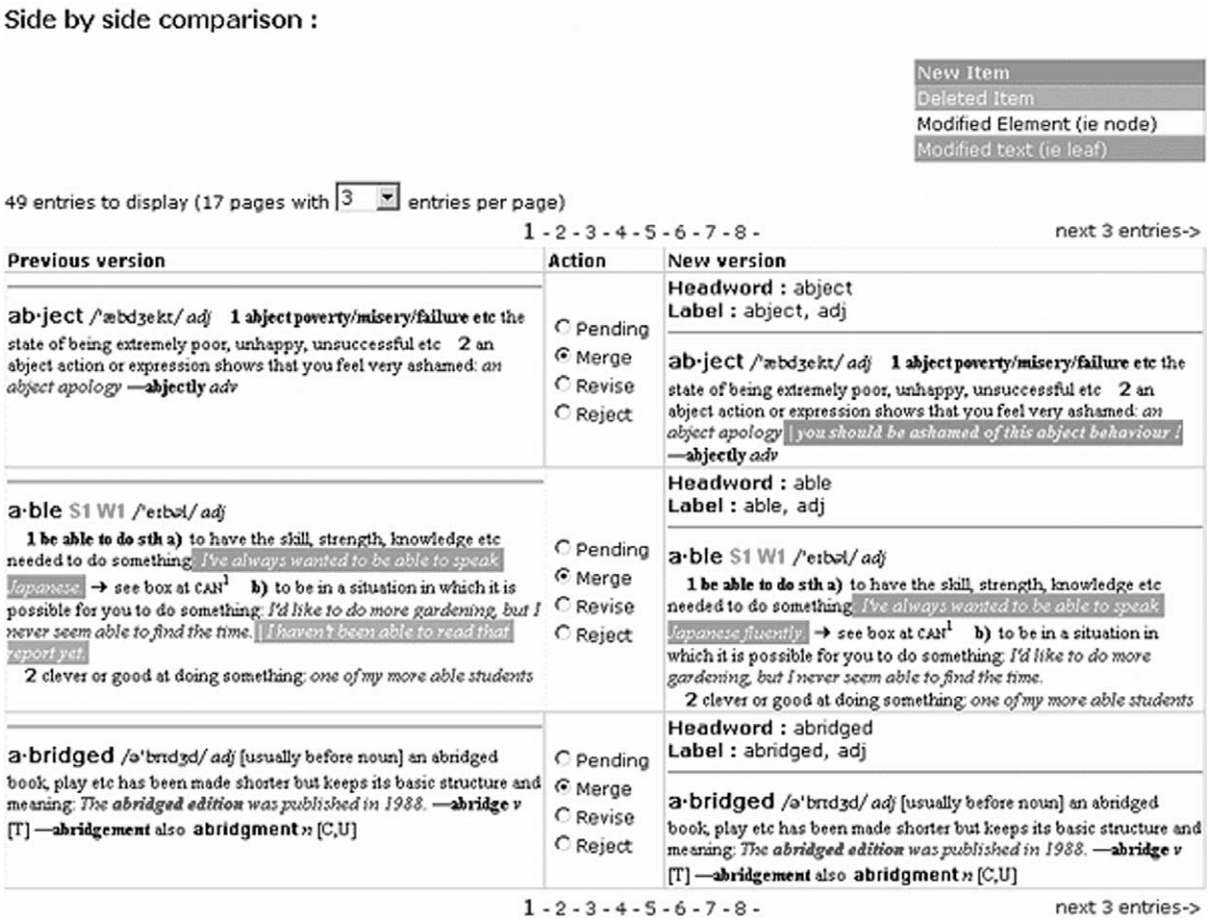

Figure 2 'Merge' tool for comparing the new version of an entry with the old, prior to replacing the old. Typically for the use of a senior team member, reviewing the work of a more junior colleague.

Urdang's system was improved and refined for the compilation of the first edition of *Collins English Dictionary* (1979), which was able to give far more extensive coverage to special-subject vocabulary (sciences, technologies, sports, etc.) than previous one-volume dictionaries. General-language editors, special-subject contributors, grammarians, etymologists, and pronunciation editors worked in parallel, again leaving alphabetical sorting to the computer. Sorting problems were corrected during a final copyediting pass. On this work, computer-aided typesetting came into its own with the use of the 'flying spot' Fototronic typesetting machine, resulting in an exceptionally economical use of page space, so that more information could be packed into clear and readable pages than would have been possible using conventional hot-metal or film setting.

Systems and the Marketplace

While it is possible to assemble a DWS from off-the- shelf components – database, editor, and project management tools – there will be substantial wasted time and effort associated with any failures of the tools to work smoothly together, and there is a strong case for a DWS being developed as a single application, meeting all the requirements sketched above.

Several systems have now been developed which do meet all, or most, of the desiderata. An early one was Gestorlex, developed in the late 1980s by a Danish company working with the Danish Dictionary Project and Longman Dictionaries. However it worked with the OS/2 operating system, and when, in the late 1990s, OS/2 was no longer supported, there were for a while no high-specification DWSs publicly available for sale. The situation has recently improved, and there are, as of late 2004, at least three systems meeting all the desiderata on the market.

Several large publishers have developed their own systems, which may meet all the desiderata listed but are not available for sale or for inspection.

The emphasis in this section has been on large dictionary projects involving whole teams. A different

scenario has been addressed by the Summer Institute of Linguistics (SIL) (*see* **Bilingual Lexicography**), an organization with its roots in Bible translation, which works particularly on the documentation of languages without a written tradition. The prototypical case is that of a field linguist visiting a remote community to learn and record their language. SIL have produced the widely-used tools ShoeBox and LinguaLinks with this situation in mind. They offer less flexibility than a system which allows a new dictionary grammar to be developed for each new project, because they work with a fixed set of information fields, but this is suitable for a scenario in which the field linguist does not have a support team and would not know how to prepare a dictionary grammar. A recent entry into the field, Tshwanelex (Joffe and de Schryver, 2004) aims to meet the needs of both the field linguist and larger dictionary teams.

Another variable is the type of dictionary. Since the late 1980s, one brand of lexicographic work has been the production of WordNets in various languages (*see* **WordNet(s)**), and several dedicated DWSs have been developed for them, with their particular requirements of hierarchical structure and interoperability with other WordNets.

One recent development is a series of international workshops on DWSs, sponsored by EURALEX (European Association for Lexicography). More details can be found online.

Corpus Query Systems (CQSs)

How should the lexicographer approach the core task of working out what to say about a word?

Two possibilities are to look (1) in their own head (introspection), and (2) in other dictionaries. The former is central to lexicography, and any good lexicographer needs a keen awareness of how words behave and what they mean, but it suffers the limitations that, first, it is very easy to miss things, and second, it is subjective: different individuals will have different ideas of what is important or central or salient. The latter is obviously derivative.

The third possibility is to look at a corpus (*see* **Corpus Lexicography; Corpora; Corpus Linguistics**). People writing dictionaries have a greater and more pressing need for a corpus than most other linguists, and have long been in the forefront of corpus development.

The first age of corpus lexicography was pre-computer. Dictionary compilers such as Samuel Johnson and James Murray worked from vast sets of index cards, their 'corpus.' The data lying behind the *Oxford English Dictionary* comprised over 20 million index cards, each with a citation exemplifying a use of a word.

KWIC Concordances

The second age commenced with the COBUILD project, in the late 1970s (Sinclair, 1987). Sinclair and Atkins, its devisers, saw the potential for the computer to do the storing, sorting, and searching that was previously the role of readers, filing cabinets, and clerks and, at the same time, to make it far more objective; human readers would only make a citation for a word if it was rare, or where it was being used in an interesting way, so citations focused on the unusual but gave little evidence of the usual. The computer would be blindly objective, and show norms as well as the exceptions, as required for an objective account of the language. We call the piece of software which holds the corpus, and which allows the user to extract data and reports from it, the Corpus Query System (CQS).

The KWIC (Key Word in Context) Concordance is the basic tool for using a corpus. It shows a line of context for each occurrence of the word, with the word centered, as in Figure 3. The lexicographer can now scan the data and quickly get an idea of the patterns of usage of the word, quite likely spotting meanings, compounds, etc., that they might have missed had they relied on introspection.

There are several additional functions that make the CQS more useful including sorting, sampling, filtering, 'more context,' and complex searches.

Sorting Sorting the concordance lines will often bring a number of instances of the same pattern together, making it easier for the lexicographer to spot it. In Figure 3 the corpus lines are sorted by the beginning of the first word to the left of the nodeword, which brings together the six instances of foreign language(s), indicating that it is an expression worthy of mentioning in the dictionary entry (depending, of course, on dictionary size, function, etc.). Different patterns will be highlighted according to how we sort; a sort according to the word to the right of the nodeword throws up *language development, language learning,* and *language teaching* as common collocations. The three buttons next to the word 'Sort,' in Figure 3, allow the user to sort the concordance according to left context, nodeword (since some searches will match a number of nodewords), and right context, while if they click on the word 'Sort' itself, they are taken to an 'advanced sort' dialogue box where other sorting strategies, for example sorting according to word endings or according to the word two to the left of the nodeword, can be specified.

KWIC/SentenceView options **Sample** **Sort**

First | Previous Page 5 of 13 Go Next | Last

HYE	year before. It did very well with English **Language** Teaching sales er, in Europe and Asia as
G4V	degree of tolerance erm for the different erm **languages**. And then the other one is the one that
HXY	are present, to some extent, in every **language** situation. Focusing involves a speech community
KRG	which it is hard to learn to use existing **languages**. Many features of these languages which
CG6	challenging activities intended to facilitate **language** development is likely to be more easily
AMT	but of certainty. Despite the familiar **language** from the confessional about ` having doubts
FUA	occasional short sequence that features **language** you are studying in class. We will go on
CGF	positive: the quest for an authentic female **language**, whether this is taken to reflect some
ACN	apparently he can grunt monosyllables in five **languages**. But he's still mainly known either for
F9K	but insists that we can not account for **language** learning as an empirical activity, unless
HTD	The CALL Centre (Communication Aids for **Language** and Learning); the Centre for Research
G0W	In addition, there is a growing demand for **language** courses coupled with a shortage of trained
HTX	perfecting his Arabic. Owen had a facility for **languages** and had learned his lessons well. He spoke
BNK	The Department taught English as a foreign **language** in the post-war years to French, Germans
C9U	acting, and without knowledge of a foreign **language**, he had to make a huge mental effort.
CNE	roducing and printing manuals, doing foreign **language** translation, packaging and assembly, and
H88	English, science and the first foreign **language** are used to reallocate some pupils to a
EE5	disciplines and because, having studied foreign **languages** at A Level, it seemed natural to develop
H0Y	learners are allowed to continue their foreign **language** study over a period of three or four years
F9W	the kind used as the basis of functional **language** courses -- the ones which use the term in

Figure 3 A CQS showing KWIC concordances, sampled and left-sorted.

Sampling Sampling is useful because there will frequently be too many instances for the lexicographer to inspect them all. When this is the case, it is hazardous just to look at the first ones shown by the CQS, because they will, in general, all come from the first part of the corpus. If, arbitrarily, there are a few texts about *language development* near the beginning of the corpus, then it is all too likely that the user gets an exaggerated view of the role of that term, while missing others. The sampling button allows the user to take a manageable-sized sample from the whole corpus. In Figure 3, the extract is from a left-sorted sample of 250 instances taken from a population of 21 955. The first/previous/next/last buttons are for navigating around the 13 pages of results for this sample, and here, at 'e' and 'f' in the alphabet, we are on the fifth of those pages.

Filtering Filtering functions relate to the classification of the documents in the corpus. If one part of a corpus is, for example, spoken language, then the CQS should allow the lexicographer to view just the concordance lines for that part. Many words show different meanings and patterns of use in different varieties of language, and the lexicographer needs to be able to explore this kind of variation.

The prerequisites are that

- all the text in the corpus comes packaged in 'documents,'
- each document comes with a 'header,'
- the header states facts about the type of text contained in the document, and does so in a way that the CQS can interpret.

Each corpus will have its own scheme of text types. (Classifying all the corpus documents according to the scheme is a large corpus development task). In general the scheme will be specified as a number of features, with each feature having a range of possible values. Thus, the feature 'w/s' may have values <written, spoken>, the feature 'mode,' <newspaper, magazine, academic-journal, book, unpublished>, and the feature 'time,' <early, 18th-century, 19th-century, 1900–1949, 1950–1989, 1990–2005>.

In Figure 3, the left-hand column contains an identifier for the document, and by clicking it, the user can see a brief description of the document that the line is taken from. (It is also possible to specify that the value for a particular feature be shown, for each concordance line, in an additional column.) Searches can be constrained according to text type by first defining a subcorpus, for example 'all the spoken

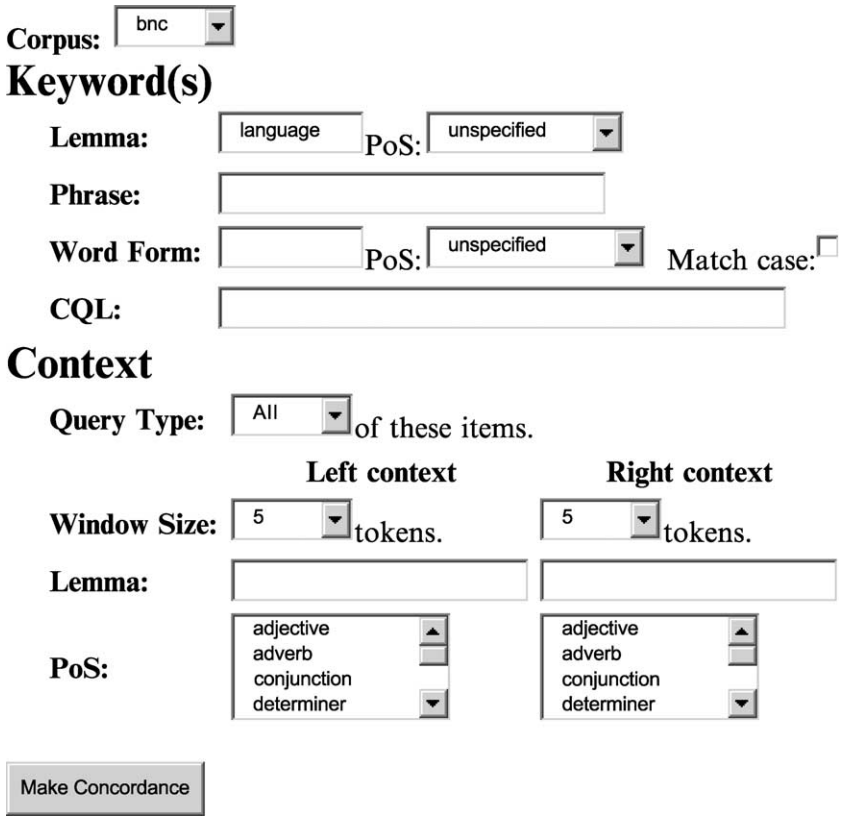

Figure 4 A CQS screen used for complex searches.

material' (all documents for which w/s = 'spoken'), and then searching in that subcorpus.

More Context 'More context' functions allow the user to see more of the text, where the truncated KWIC line does not tell them enough. (This happens only occasionally in lexicography, but is a common issue for linguists using the CQS to study syntax, prosody, or discourse structure.) In the CQS used for Figure 3, if the word is clicked, a window opens up at the bottom of the screen showing additional context, which can then be scrolled left or right. Another option is for the user to click the KWIC/Sentence button, which toggles between showing the KWIC line and the full sentence. (For this, it is a prerequisite that the sentences are identified.)

Complex Searches In addition to simple searches for single words, users may often want to search for a phrase or some other more complex structure. A good CQS will support complex searches, while keeping the interface simple and user friendly for the simple searches that users most often want to do. One solution is shown in Figure 4. This is the screen at which the user specifies the search. If they want to simply specify a word, they input it in the first box and hit 'return' (or click 'Make concordance') to get the concordance. If they wish to specify an exact phrase, they insert it in the phrase box. If they want to specify a pair of collocates more loosely, they can give the one pair of the two in the first box, and then specify the other in either the 'right context' or left context' box (depending on whether it is expected to fall to the right or the left of the first term).

Searching is much improved if the corpus is, first, lemmatized and, second, part-of-speech tagged. Lemmatization (also known as morphological analysis) is, for current purposes, the process of identifying the dictionary headword and part of speech for a corpus instance of a word. Thus, in Figure 3, the node word sometimes has the form *languages*, sometimes *language*. The lemmatization process has identified *language (noun)* as the lemma, and the search has found all examples of the lemma *language*.

In a language such as English, many corpus words may be instances of more than one lemma. Thus, *brushes* may be the plural of the noun, or the present tense third person singular form of the verb. The process of identifying which one applies in a particular context, by computer, is called part-of-speech tagging (*see* **Part-of-Speech Tagging**). Once all words in a corpus are lemmatized and part-of-speech tagged (and this information is made available to the CQS),

each word in the corpus can be thought of as a triple, <wordform, lemma, POS-tag>, and searches can be specified in terms of any of these. Thus, in Figure 4, the user can specify a lemma or a word form (either with an associated word class or without, which would cover, for example, both noun *brush* and verb *brush)*. In the left and right context, the user may specify word classes, as well as lemmas or wordforms. (The contents of the text items are interpreted as either lemmas or wordforms.)

The one box unexplained so far is the CQL box. CQL (for Corpus Query Language) is a formalism for corpus querying developed at the University of Stuttgart (Christ, 1995), which approaches the status of a standard for the field. It allows one to build sophisticated structured searches, matching all- or part-strings, for as many fields of information for the word as are provided. (We have only, to date, seen *wordform, lemma,* and *POS-tag,* but there could be more.) The CQL box allows the advanced user to interact with the corpus directly in CQL.

Summary

Since COBUILD, lexicographers have been using KWIC concordances as their primary tool for finding out how a word behaves. This has been a revolution in lexicography (*see* **Corpus Lexicography**; **Corpus Approaches to Idiom**). For a lexicographer to look at the concordances for a word is a most satisfactory way to proceed, and any new and ambitious dictionary project will buy, borrow, or steal a corpus and use one of a number of CQSs to check the corpus evidence for a word prior to writing the entry.

But corpora get bigger and bigger. As more and more documents are produced electronically, as the Web makes so many documents easily available, so it becomes easy to produce ever larger corpora. Most of the first COBUILD dictionary was produced using a corpus of under 8 million words. Several of the leading English dictionaries of the 1990s were produced using the British National Corpus (BNC), of 100M words. The Linguistic Data Consortium has recently announced its Gigaword (1000 M word) corpus, and the Web is perhaps 10 000 times bigger than that, in terms of English-language text alone. This is good. The more data we have, the better placed we are to present a complete and accurate account of a word's behavior. But it does present problems.

Given 50 corpus occurrences of a word, the lexicographer can simply read them. If there are 500, it is still a possibility but might well take longer than an editorial schedule permits. Where there are 5000, reading all of them is no longer at all viable. Having more data is good – but the data then needs summarizing.

Collocation Statistics

The third age of corpus lexicography began with the paper that also inaugurated the new subfield of collocation statistics, by Church and Hanks (1989). They proposed the measure (from information theory) of mutual information (MI) as an automatic way of finding a word's lexicographically interesting collocates.

Given a node word, we find all the words that occur within, for example, a five-word window of it in any of its corpus occurrences. We count how often each of these words occurs in the window. We can then compute how much more often the word was found than it would have been by chance, if there was no systematic relation between the two words. The ratio of how many more times the word is found than it would have been by chance (strictly, the logarithm of the ratio) is the mutual information that each word holds for the other.

Table 1, adapted from Church and Hanks (1989), shows the highest-mutual-information collocates found in a window of one to five words to the right of *save* (with a frequency threshold of five; collocates are only shown if they occurred with *save* more than five times.) Thus, we *save forests, lives, jobs, money* (in various forms) and *face*.

This is useful lexicographic information and shows that we can automatically summarize the corpus data, presenting just a list of salient collocates to the lexicographer.

The approach generated a good deal of interest among lexicographers, and leading CQSs such as WordSmith (Scott, 1999) and the Stuttgart tools (Christ, 1995) now provide functionality for identifying salient collocates, along these lines. One flaw of the original work is that MI favors rare words (and an *ad hoc* frequency threshold has to be imposed or the

Table 1 Collocates within a 1–5 word window to the right of *save*, From Church and Hanks (1989)

Word	*f(x + y)*	*f(y)*
forests	6	170
$1.2	6	180
lives	37	1697
enormous	6	301
annually	7	447
jobs	20	2001
money	64	6776
life	36	4875
dollars	8	1668
costs	7	1719
thousands	6	1481
face	9	2590
estimated	6	2387
your	7	3141

list would be dominated by very rare items). This problem can be solved by changing the statistic, and a number of proposals have been made. A range of proposals are evaluated in Evert and Krenn (2001) (though the evaluation is from a linguist's rather than a lexicographer's perspective).

There are several other points at which Table 1 could be improved. First, it contains both *life* and *lives*. As discussed above, we could count lemmas rather than word forms; then these two would be merged. Other concerns include:

- the arbitrariness of deciding to look at the five words to the right; in practice, lexicographers often try a number of window sizes and positions, to capture different kinds of collocates. Some CQSs include a tool which shows the user the highest-salience collocates in each position between –5 and +5, though this solution gives the user a lot of information to wade through and fails to merge information about the same word occurring in different positions.
- assorted noise, of no linguistic interest (*$1.2, your*).
- the inclusion in the same list of words that might be the object of the verb (*forests, lives, jobs, money* and *face*), an adverb (*annually*), another associated verb, or a preposition, or – of less interest – modifiers of the direct object (*enormous, estimated*).

Word Sketches

These three limitations can be addressed at once by applying grammar. Up to this point, collocation-finding has been grammatically blind. It has considered only proximity. However, lexicographically interesting collocates are, in most cases, words occurring with the node word in a particular grammatical relation. An alternative to looking at a window of words is to look for all words standing in a specific grammatical relation to the headword.

This task is parsing, and parsing is hard. It has been the core problem for Natural Language Processing (NLP) since the field was born (*see* **Parsing and Grammar Description, Corpus-Based**), and the best current parsers still make many mistakes. However, this application is error-tolerant, since statistics are applied to the output of the parser, and collocates will only be shown to the lexicographer if they occur repeatedly and with high salience; it is less likely that errors will occur repeatedly with the same collocates.

Once a corpus is parsed, a word sketch (Kilgarriff *et al.*, 2004) can be produced. A word sketch is a one-page summary of a word's grammatical and collocational behavior. Figure 5 shows the word sketch for the noun *language* produced from the British National Corpus (BNC, 1995).

Word sketches were first used for the *Macmillan English Dictionary* (Kilgarriff and Rundell, 2002; Rundell, 2002). In the CQS which provides word sketches, the Sketch Engine, the word sketches are integrated with concordancing functions, so the user can move easily between sketch and concordances. The tool also provides a data-driven thesaurus and the 'sketch diff' function which contrasts collocates of near-synonyms.

For word sketches to be built, the system must be told what the grammatical relations are for the language, and where in the corpus they are instantiated. There are two ways to do this. The input corpus may already be parsed, with grammatical relations given in the input corpus. Such a corpus is occasionally available.

The other way is to define the grammatical relations and parse the corpus within the tool. To do this, the input corpus must be part-of-speech tagged. (It should also be lemmatized.) Then each grammatical relation is defined as a regular expression over part-of-speech tags, using the CQP formalism (Christ, 1995). The regular expressions are used to parse the corpus at the compiling stage, giving a database of tuples such as <*object, sip, whisky*, 14566778> where *object* is a grammatical relation holding between the verb *sip* and the noun *whisky* at corpus reference point (for *sip*) 14566778. The 100M-word BNC gives 70M tuples. From the tuples database, we can produce word sketches and sketch differences quickly on demand. The tuples are also used to create (at compile time) the thesaurus and sketch differences.

Web Concordancers

The Web can be viewed as a vast corpus, with very large quantities of texts for many languages, and lexicographers frequently use it in this way (Kilgarriff and Grefenstette, 2003).

The simplest approach is just to use the search engine directly as a CQS. Thus, Google will give snippets of context, typically around 10 words, for each search hit, and sometimes these will be sufficient to show the lexicographer or linguist what they want to know about a word. At the next stage of sophistication, there are several Web concordancers available; they take a search term and a set of options, and pass on the term (in a way or ways specified in the options) to one or more search engine. They then receive the search hits from the search engine, extract the snippets, and present them to the user in KWIC form. A leading system is Webcorp (Kehoe and Renouf, 2002).

These approaches rely on search engines, which is problematic in various ways:

language **bnc freq = 21955** change options

and/or	3140	1.2
literature	414	41.58
culture	16	37.67
dialect	37	33.43
linguistics	28	30.35
mathematics	40	30.28
english	61	27.8
language	610	27.6
religion	34	23.08
imagery	14	20.87
custom	25	20.81
literacy	13	19.29
science	37	18.69
communication	30	17.99
history	40	17.28
learning	21	17.21

object_of	3587	1.9
speak	391	54.8
learn	266	45.12
use	639	39.86
program	28	29.86
teach	75	28.98
study	69	28.12
understand	86	26.7
master	22	25.98
talk	36	21.86
acquire	33	20.03
sign	35	19.61
process	18	19.46
analyse	20	17.34
develop	42	16.59
present	33	16.0

subject_of		1.2
teach	77	36.44
learn	34	23.81
interpret	20	22.74
process	12	19.35
become	33	14.84
reflect	13	13.63
serve	12	12.92
enable	12	12.66
use	32	12.09
work	14	11.88
suggest	13	11.11
seem	17	10.66
allow	15	10.03
come	16	8.83
mean	12	8.66

adj_subject_of	565	3.1
english	23	22.36
available	17	17.98
different	19	15.96

a_modifier	6227	2.5
spoken	234	60.74
english	462	49.06
written	220	48.99
foreign	377	45.2
native	87	36.89
high-level	38	35.48
sexist	34	34.7
modern	156	33.01
indigenous	42	31.23
official	96	30.88
everyday	54	30.86
natural	130	30.74
foul	29	29.32
ordinary	78	28.72
literary	56	28.25

n_modifier	2118	1.0
sign	327	55.82
indexing	61	48.03
programming	95	47.35
body	247	38.35
target	98	35.43
query	35	33.19
description	62	31.13
Postscript	20	30.77
community	115	29.38
assembler	13	29.28
minority	40	27.79
page	49	24.93
generation	24	19.4
assembly	24	19.07
command	18	18.36

modifies	4607	1.0
learning	23	46.65
teaching	228	45.69
helper	79	43.13
indexing	44	38.18
acquisition	105	37.91
learner	69	37.75
processing	75	31.72
use	152	28.2
teacher	126	27.88
skill	100	26.55
comprehension	22	26.02
laboratory	45	24.41
barrier	36	23.66
interpreter	18	22.86
pedagogy	12	22.78

pp_other than-p	39	58.3
english	33	42.69

pp_as-p	153	3.1
system	14	14.2

pp_across-p	18	2.6
curriculum	15	33.79

predicate_of	27	2.5
language	14	17.23
part	14	14.6
system	13	11.39

pp_of-p	1232	1.2
love	32	22.55
text	18	17.12
instruction	12	15.01
communicatio	12	13.22

pp_for-p	145	0.6
purpose	12	19.89

pp_in-p	577	1.2
educatio	53	27.67
use	35	23.08
context	16	19.5
school	19	13.66

Figure 5 Word sketch for the English noun *language*, built automatically from the BNC.

- There is a limit (for Google, 1000) on the number of hits the user has access to for any search.
- The snippets, at 10 words, are too short for many purposes.
- The corpus lines are sorted according to the search engine's ranking criteria.
- Most search engines limit the number of searches to, e.g., 1000 searches a day for a user.

- Search engines do not currently build in facilities for lemmatization or POS-tagging.
- The 'numbers of hits' provided by search engines are potentially useful for identifying collocations, but are also problematic; the numbers are not always accurately computed, and may depend on extraneous factors like search engine load.

Alternatives to using commercial search engines include using snapshots of the Web (such as the Internet archive, see Resnik and Smith, 2003), or bulk downloading of Web material to build a Web-sourced corpus, which could then be loaded into any CQS (see, e.g., Baroni and Bernardini, 2004) or setting up a noncommercial search engine specifically to meet linguists' needs. All of these options are, at the time of writing, being vigorously investigated.

See also: Collocations; Computational Lexicons and Dictionaries; Controlled Languages; Corpora; Corpus Approaches to Idiom; Corpus Linguistics; Corpus Lexicography; Lexical Acquisition; Lexicography: Overview; Mark-up Languages: Text; Parsing and Grammar Description, Corpus-Based; Parsing: Statistical Methods; Part-of-Speech Tagging; WordNet(s).

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Computers in the Linguistic Humanities: Overview

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Basic Concepts

The literary and linguistic humanities studies four things: authors of texts, readers of texts, texts themselves, and the language technologies that govern their interrelationships over time. Typically, researchers in these four fields publish, respectively, biographies, critical or cultural histories and reader response, literary criticism, and textual criticism and editing (sometimes termed the higher bibliography). Most research is independent of linguistics and computational linguistics. Computing humanists,

- Search engines do not currently build in facilities for lemmatization or POS-tagging.
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the exception to this generalization, use concordances and statistics to determine the idiolects of authors, often for authorship attribution. They analyze readers by applying statistical measures to observations of how they perform. The by-now-ancient New Criticism that prevailed ca. 1930–1960 analyzed texts independently of authors, readers, and factors of contamination or transformation in the publication process. Texts ticked along like semantic and prosodic clocks. Once a reader-critic understood the machinery of a text, within itself, statements about its form and content could be made, supported by evidence from the text, and contested. Computing humanists have successfully enhanced such readings. In the fourth field, textual criticism, computing humanists compare transcriptions of versions of a text over time. Once compared, analyzed for variation, and visualized with software employed in genetic or biological research, these texts make possible well-supported hypotheses about stemmas, that is, about which versions come first, and which texts descend from common ancestors. Editors profit from any research that contributes knowledge about textual transmission.

Text-analysis researchers form an enclave within the humanities and gather in international societies like the Association of Literary and Linguistic Computing (ALLC), the International Computer Archive of Modern and Medieval English (ICAME), the Association for Computing and the Humanities (ACH), and the Consortium for Computers in the Humanities (COCH/COSH). They publish their findings in specialized journals like *Literary and Linguistic Computing*, *Computers and the Humanities*, *Computing in the Humanities Working Papers*, and *Text Technology*. Within the Modern Language Association, they form the discussion group for computer studies in language and literature, which sponsors sessions at the annual MLA congress, held annually in America in late December.

In premodern times, literary researchers discussed authors and their texts, but over the past 40 years, a philosophy of doubt has shifted research onto the reader and the ways that the transmission of texts to that reader problematizes the very ideas of author and text. Barthes' influential denial that the author exists and can be studied has prompted debate (Craig, 2000; Merriam, 2002). Established canons have evaporated along with the authors that populate them. Postmodernism generally deconstructs texts to show how they convey profound ironies, unresolvable ambiguities, and crippling uncertainty rather than information, feelings, and ideas. At its most extreme, postmodernism questions the viability of language itself. All that is left to study then are how texts acknowledge self-defeating conditions of noncommunication, and how readers, isolated solipsistically, create what they want from texts. Readers and historical interpretive communities, in effect, become the new authors, creators whose utterances can be observed and problematized if not contested.

To the degree that computing humanists share a common theoretical framework, it is cybernetics by Norbert Wiener (1894–1964), not postmodernism. He formulated the theory of how humans and machines exercise control over communication. The term 'cybernetics,' from the Greek word *kubernetes*, which means 'steersman,' names a 'theory of messages' (Wiener, 1950/1967: 106; Masani, 1990: 251–252). Because these acts of communications include both utterances and feedback responses to them, they should not both be termed messages: the word 'cybertexts' (coined by Aarseth, 1997) suits both messages and feedback. They flow from sender (speaker, author) to receiver (listener, reader) as messages, and back from receiver to sender as feedback, through a channel assaulted by noise. Wiener's contemporary Claude Shannon (1949) developed the mathematical theory underpinning cybernetics into what we now know as information theory (Pierce, 1961/1980). Other disciplines, such as bioinformatics and computer science, have incorporated aspects of cybernetics into their thinking. The humanities does so in literary and linguistic computing.

Consider the four things it studies: authors, readers, texts, and textual transmission. Authors encode redundant data in Wienerian cybertexts that so that they can withstand damage and reach readers in a comprehensible state. The information that authors hope to communicate is the content of a cybertext, and its rhetorical and idiolectal style is this redundant encoding. As redundancy increases, information density (the text's entropy) lessens. Inadequate encoding, and persistent extraneous noise, can lead any reader to mistake or doubt what a text says. Textual criticism – like deconstruction theory – studies noise, that is, the effects that the channel itself (e.g., publishing a manuscript by means of a printing press) and extraneous noise (e.g., the interpretative readings that scribes and compositors sometimes impose on texts that they are copying) have on cybertexts. Viewed in this light, literary and linguistic computing, studies aspects of what has been called cybertextuality (Lancashire, 2004b).

Literary and linguistic computing builds hypotheses about authors, readers, texts, and textual transmission on the basis of language patterns that computer programs detect in cybertexts. Software often is adapted from computer science (e.g., *n*-gram statistical software, data-mining engines), the social sciences (statistical systems), and phylogenetic systematics

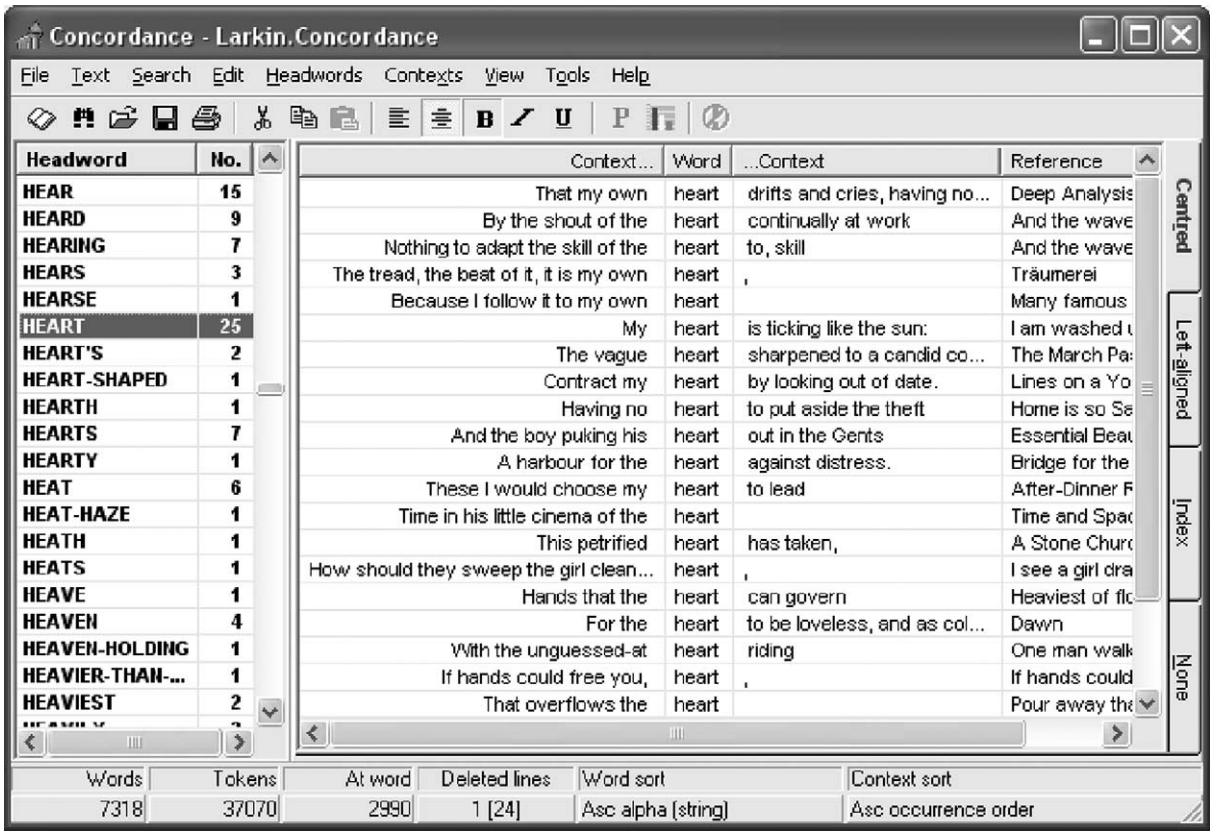

Figure 1 *Concordance* screen: interactive concordance of the word 'heart' in Philip poems. Courtesy of R. J. C. Watts.

(cladistics programs). Humanities computing researchers, however, have created one class of software specifically for their analysis of texts: the concordancer (Alex and Zuell, 1999; Condron, 2000). This software derives from the automatic kwic (keyword-in-context) index originally devised in the 1950s, and from UNIX text utilities. Traditional concordancers such as *Oxford concordance program* (Hockey, 2000), *Wordcruncher*, and *TACT* (Lancashire *et al.*, 1996), and newer programs like *Wordsmith Tools* (Scott, 1996), *MonoConc*, *Concordance* (Watt, 1999; see Figure 1), *HyperPo* (S. Sinclair, 1996), and *Collocate* (Barlow, 2004), all generate hybrids of a text, usually some form of string-, word-, or collocate-list or index in which words appear with reference information (such as text title, author name, date, page number, speaker, etc.). In general, a concordancer identifies the repeating patterns in them and sometimes does statistical tests of their significance. For example, a kwic concordance is a hybrid text, a list of repeated collocates for any keyword is one pattern exhibited by this data, and mutual information (Church *et al.*, 1991) is a statistical test often used to determine whether a repeated collocation of words or fixed phrases is statistically significant.

To the extent that any person's analysis of a text consists of generalizations about it derived from selected information remembered from a reading of the text, any statistically significant language pattern that is detected by software in textual data may be described as a reading. Readings by human and by machine, at least, fall within Norbert Wiener's 'theory of messages.' It is cybernetics that enables humanists in literary and linguistic studies to bring together machines and human beings in studies of communications: authoring, reading, cybertexts, and cybertextual transmission.

Content Analysis and Text Analysis

Computer-collection and analysis of data from a living author's composing have very seldom been tried. Sequences of time-stamped keystrokes, the data, pose problems. It is an open question how to segment these sequences, given the variable language unit (character, word, sentence), act (continuation, deletion, transposition, grammatical transformation), and duration of time between acts. Most writers also manually pen notes, both in books and on loose paper; not every authorial act is mediated by a computer, registerable and time-stamped. The same holds true for

living readers. Little research in this field is being done to enumerate and categorize reading acts and detect the patterns into which they may fall. Information scientists do usability tests on readers by studying their eye movements or by direct questioning, but the humanities shies away from studying human subjects. Most literary and linguistics analysis, for that reason, studies authorship and readership through the Wienerian cybertext rather than by directly observing how the author creates a message, and the reader the feedback to that message.

The study of cybertexts uses two methods. Content analysis encodes or annotates the cybertext with the researcher's own categories, feature-names qualified by specific instances (e.g., <politics type = 'democratic'>. Codes may be used to represent semantic concepts and their relations (Popping, 2000: 55). By counting and graphing this added information, the researcher measures how a text displays the results of his or her own beliefs about it (Roberts, 1997). The other method, known as text analysis (Stubbs, 1996; Lancashire, 1996; Burrows, 2004), may add some factual, bibliographical tags as reference markers so that concorded list-items can be located in the full text, but it adds little to the cybertext before analysis. Patterns emerge only from the frequency and position of words in the text.

Content analysis characterizes text-segments with information that is only implicit in the document. Social-scientific software like the *General inquirer*, a product of the 1960s, modifies words, phrases, or clauses with codes that, for example, might name an underlying belief or an affective bias. The political bias of a cybertext might then be identified quantitatively. In literary studies, plays are typically encoded for act, scene, classical scene, line numbers, speech, and speaker, works of prose fiction for book, chapter, paragraph, and direct or indirect dialogue, and poems for canto or book, stanza, end-stopped line, and rhyming word. A researcher might identify a theme in a text as present when one or more words from a group appear and then, by graphing the frequency of those tagged words, visualize a thematic rhythm in that text.

Concordancers routinely enable researchers to declare the form and name of tags so that any output list items can be identified and thus referenced by them. Early concordancers would sometimes offer standard tag vocabularies, but beginning in 1987, the Text Encoding Initative developed a schema of SGML (now XML) elements that name the important elements of text-types, as well as reflect their hierarchical or lattice-like structures. TEI encodes the content of texts, not their display. Its encoding language represents a consensus by text-based researchers about elements and their structures. Because most concordancers cannot analyze texts as SGML or XML documents, TEI prepares texts as much for archiving as for content analysis.

Text-analysis research has increased over the past decade for two reasons. First, Internet e-text libraries and text-analysis software have enabled researchers, for the first time, to analyze texts without first converting texts to digital form or writing software. Institutions like Oxford University (in *Oxford concordance program*), Universität Tübingen (in *TUSTEP*), Brigham Young University (in *WordCruncher*), and the University of Toronto (in *TACT*) disseminated concordancers. Tools operating on up-to-date platforms and operating systems have appeared since then. Second, Google and other search engines on the Internet have educated the humanities in using basic text-analysis tools.

Authorship and Stylometry

Most published text-analysis research studies idiolect through stylometry, which has enjoyed notable successes in the past decade (for a history, see Holmes, 1998). Binongo (2003) has just used high-frequency function words to show conclusively that R. P. Thompson, not L. F. Baum, wrote *The royal book of Oz*. In one celebrated identification, Donald Foster used *WordCruncher*, and nonhigh-frequency content words – but without the help of statistics – to name Joe Klein as author of the anonymous American novel, *Primary colors* (1996b), in response to a challenge by the Washington Post. Foster announced his discovery in *New York* magazine and was vindicated when Klein eventually confessed. Previously, Foster (1996a, 2000) had attributed the anonymous *Funeral elegy* by W. S. to Shakespeare. Although Foster had supporters (Abrams, 1997; Lancashire, 1997), the contested identification (Craig, 2002) was conclusively proved wrong by Monsarrat (2002). Thomas Ford, a contemporary dramatist, wrote the poem. Other more successful attributions to Shakespeare include the anonymous play *Edward III*, an identification made persuasively by Eric Sams (1996). Computational research by M. W. A. Smith (1991) contributed to this attribution. Brian Vickers (2002) used various textual traits to argue that other playwrights co-authored five of Shakespeare's plays, including *Titus Andronicus* and *Pericles*. The progress of text analysis, buoyed by such research, has been "quiet but worthwhile" (Burrows, 2003b: 7).

Controversy has dogged computer-assisted authorship attribution. Thomas Merriam noted that the editor of the Shakespeare apocrypha, Richard Proudfoot, believes that stylometry "doesn't know what it is

counting" (Proudfoot, 2001: 91, 93; Merriam, 2002: 187). The humanities also perceives the computational methods of this field as "black box science" (Merriam, 2003: 379), a phrase denoting both the computer and the human brain. Humanities researchers are skeptical because they are untrained in statistics, because stylometrists (like everyone else) are not sure what language traits contribute distinctively to personal idiolect, and because no one understands language cognition very well. A thousand known measurable textual features exist (McMenamin, 1993), including letter sequences (Hoorn *et al.*, 1999), and case studies use many statistical tests of significance, but there is no consensus yet about which are fruitful in discriminating among authors (Rudman, 1998: 360–361). Good scientific research, however, often begins in doubt. By testing for different textual features with multiple statistical methods, stylometrists have learned a great deal recently.

Scholars in classics and Biblical studies pioneered in the methods of authorship attribution (Morton, 1978; Ledger, 1989; Mealand, 1995), but most applications recently have been in English studies. John Burrows, an Australian, has pioneered these efforts since 1987, when he published his critical study of how Jane Austen could tailor function-word usage to her characters (1987). Burrows's recent case studies de-select the top 40 high-frequency words in an author's writings because they tend to mark literary genre rather than idiolect: he studies the remainder of the upper 150 words (2003b: 28). Because authors evidently share their highest-frequency terms with almost everybody, idiolectal differences must rely on less used (content rather than function) words. It is a marked advance in method that researchers who look to high-frequency words for their data recognize that they must "neutralize the effects of changes in setting, character, narrator, subject matter, plot, and point of view" (Hoover, 2003b: 350). An additional problem is deliberate parody (Somers and Tweedie, 2003). Tirvengadum (1998), for example, has shown that an author's function-word usage can be imitated. From the available array of statistical tools, Burrows then employs principal components analysis to display whether or not different candidate authors resemble one another, and (next) cluster analysis and his new 'delta' measure to highlight their differences, that is, to give direct tests of authorship. Different methods employed with some success include neural networks (Lowe and Matthews, 1995; Waugh *et al.*, 2000), t-tests (Binongo and Smith, 1999), intertextual distance (Merriam, 2003: 386; Labbé and Labbé, 2001), and cusum (Hilton and Holmes, 1993; Bissell, 1995; Farringdon, 1996; Holmes and Tweedie, 1995). Stylometrists who follow Burrows include Smith (1991, 1999), Craig (1999), Merriam (2003), and Hoover (2001a, 2003b). (For a survey of authorship attribution in detail, *see* **Authorship Attribution: Statistical and Computational Methods**.)

A computational test of Lucy Hutchinson's authorship of two anonymous 17th-century poems, 'Order and Disorder' (print and manuscript versions) and an anti-panegyric poem, illustrates the method of Burrows and Craig (2001). They subjected the frequencies of the top 99 words in representative samples of 25 Restoration poets, including the shorter poems of Hutchinson, to multiple principal component analyses. The last two scattergrams (see **Figure 2**), showing which words among 73 Hutchinson 'markers' especially characterize which authors, very clearly associate the anonymous poems (marked as p/m and x) with Hutchinson's known word-preferences and known works (marked U and V, whereas Milton's works are coded L and R, and Dryden's T). Burrows and Craig confirm David Norbrook's assignment of the anonymous poems to Hutchinson, but their model statistical study is important well beyond Lucy Hutchinson studies. The 56-passage and 73-word scattergrams (**Figure 2**) show that, in function-word usage, several works attributed to Hutchinson (labelled p, m, and x) resemble her known works (U, V), not ones by contemporaries Nicholas Billingsley (I), John Dryden (T), and John Milton (L, R). The scattergrams map the same data differently: texts associated by their function-word usage (top), and function words associated by their distribution among the passages (bottom).

David Hoover carries on Burrows' stylometric research, both in a book (1999) on the style of a major English novelist, William Golding's *The inheritors*, and in an article that refined the computational methods of authorship attribution. Hoover's book took as a point of departure the attack by Stanley Fish (1981; Milic, 1985) on M. A. K. Halliday's linguistic analysis of Neandertal and *homo sapiens* language in *The inheritors*. Painstakingly, employing *TACT* and other software, Hoover – as Burrows had analyzed Jane Austen – shows how Golding crafts the lexicogrammatical languages of Golding's two prehistoric peoples. Recently, Hoover has conducted experiments in authorship attribution. Analyses based on frequent collocations in novels or works of criticism, Hoover explains, "are more accurate for several groups of texts, sometimes producing more completely correct attributions than analyses based on either words or sequences and sometimes producing the only completely correct attributions" (2003a: 261; see **Figure 3**). By testing texts whose authors are already known, and by using a variety of text traits, including a neglected one, pairs of words found repeatedly in

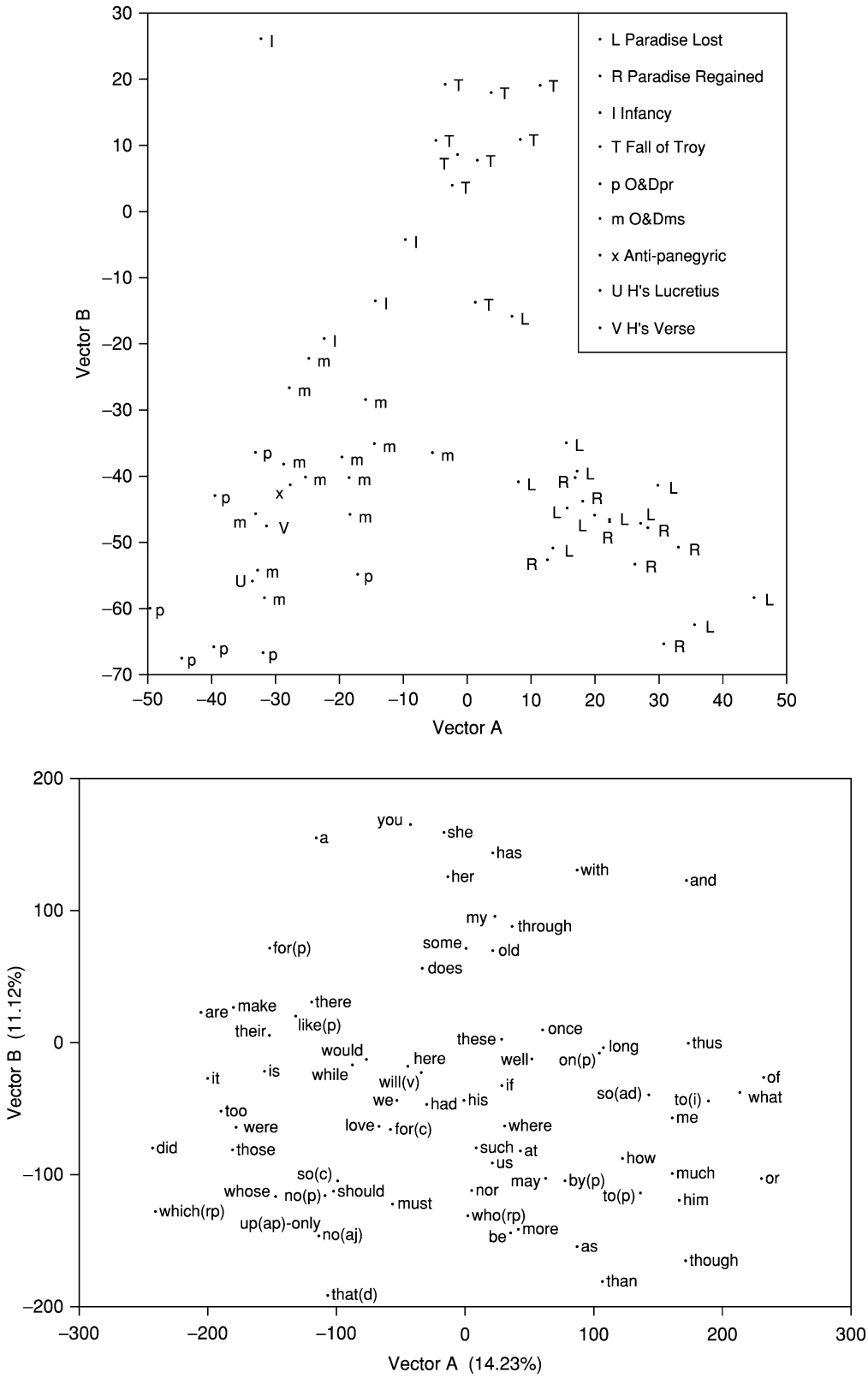

Figure 2 Scattergrams: Lucy Hutchinson's authorship (Burrows and Craig, 2001: Figures 6a and 6b). From *The Seventeenth Century 16*: 259–282. By permission of Hugh Craig and John Burrows.

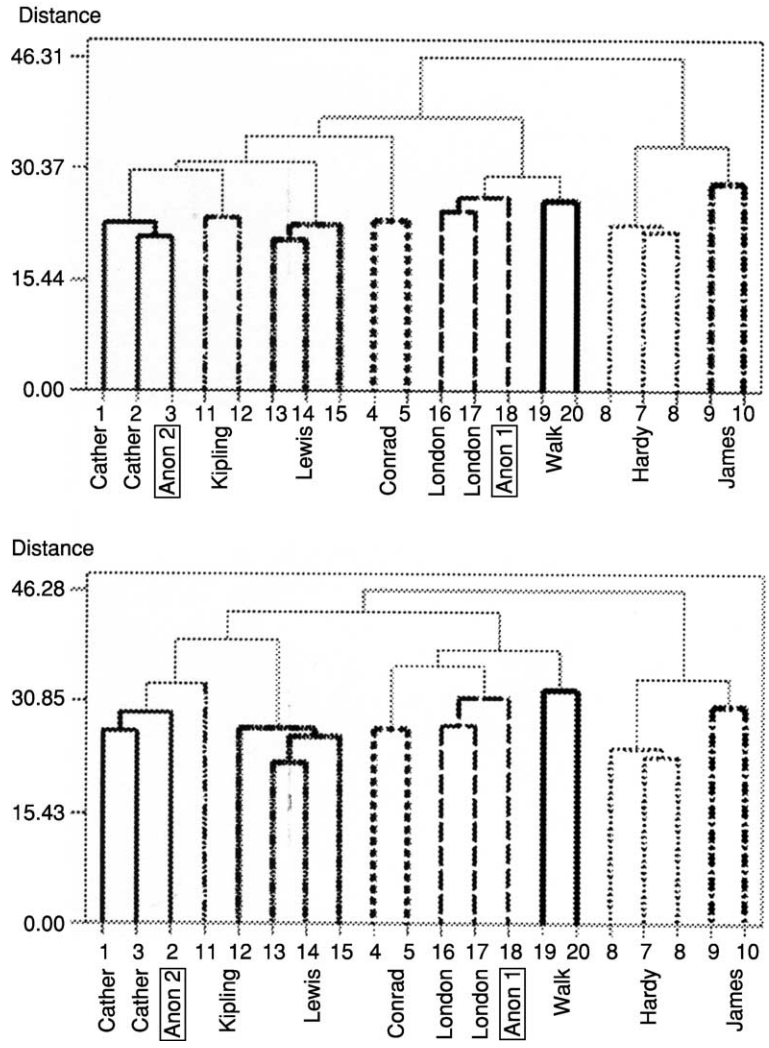

Figure 3 Dendograms: authorship simulations for eight authors based on 400 most frequent collocations (Hoover, 2003a: Figures 17–18). From *Literary and Linguistic Computing*. Permission granted by David Hoover.

each other's company, Hoover advances our understanding of idiolect itself. He obtains his data from *Collgen*, a *TACT* program designed not specifically for authorship attribution but for exploration of the patterns exhibited by the vocabulary in a text (see Figure 4).

Hoover does not speculate why repeated collocations should outperform high-frequency words, but others have an explanation. Very early, Milic (1971) argued persuasively that style reflects the largely unconscious mental behavior of authors. Roberto Busa, whose work on Thomas Aquinas makes him the first pioneer of textual computing, justifies quantitative text analysis by emphasizing how much light it sheds on the ideas of authors. "Each writer expresses his conceptual system in and through his verbal system" (1980: 84). Andrew Morton championed collocations in the 1980s, although his cusum method failed in 1993. To explain an author's idiolect by reference to his or her mind might seem to resort to a neurological, rather than a statistical, 'black box.' Are we much better off? The past 30 years' research in cognitive psychology and neuroscience shows that we may be.

Collocations form patterns that are consistent with what scientists know of our mind's language processing. Collocates have long been studied in Firthian corpus linguistics (Berry-Rogghe, 1973), but not so much in cognitive sciences, which studies living patients rather than the texts they create. John Sinclair's two books on concordances and collocations (1991, 2003) elucidate many of their formal characteristics, but cognitive studies illuminate them as mental phenomena. Observed collocations – except for those committed by rote to long-term memory – do not exceed the maximum length of

```
          General Collocation Generator for the TACT System
            COLLGEN Version 2.1.4   (June 1995)

   Input .TDB Filename:      C:\TACT\TEXTS\VOLPONE.TDB
   Temporary File Area:
   Span Context: 2   to 10  Words
   Number of Repetitions to Keep: 2   to 65535
   Boundaries:
   Output Formatted With:    Tabs: X     or   Spaces:

   Generate Fixed Phrases:   Yes: X    No:
   Fixed Phrase Filename:    C:\TACT\TEXTS\VOLPONE.COL
   Fixed Phrase Format:      Maximal: X     or  Permuted:

   Generate Node Collocate Pairs:    Yes: X     No:
   Count Overlapping Collocates:     Yes:       No: X
   Node-Collocate Filename: C:\TACT\TEXTS\VOLPONE.NOD

   Generate Fixed Phrases Query File:     Yes: X     No:
   Query Filename:           C:\TACT\TEXTS\VOLPONE.QUE

F1: Help       F9: RUN, Generate Collocations      F10: QUIT, No Collocations
F6: Credits          (c) 1995 TACT Group, University of Toronto
```

Figure 4 *Collgen* command screen (Lancashire, 1996: Figure 30). By permission from Ian Lancashire.

auditory text, seven units plus or minus two, that people can hold in their conscious memories. Alan Baddeley's model for our working (formerly short-term) memory calls this verbal store the phonological loop because we must rehearse (repeat) it consciously in order to keep it before our minds (Gathercole and Baddeley, 1993). This size constraint may impose a maximum limit to the number of words we can consciously process at any one moment, whether as a fixed phrase or as a group of words (collocation) linked by an author within some unit of discourse (phrase, clause, sentence, or passage). It is not known whether this putative maximum arises from a constraint imposed by the general associativity of long-term memory, by semantic comprehension, by conscious attention, or by something else. Working memory seems to deposit its holdings in, and to withdraw them from, long-term memory, long believed to be associational (Collins and Loftus, 1975). Neural networks and verbal collocations seem to go hand-in-hand.

Harold Love describes one of the developers of *TACT*, Ian Lancashire, as the theorist of attributional stylometry, "as far as it has one" (2002: 149). He proposed that we try to bridge cognitive psychology and idiolectal analysis, both to characterize the style of a known author, and to attribute anonymous pieces to their true authors (Lancashire, 2004). Uttering natural language, whether in speech or on paper or screen, is a cognitive activity that we can recall only in the doing. Remembering how we create utterances, or watching how utterances take shape mentally before their actual uttering, draws on what cognitive psychologists call procedural memory. No memories of the details of sentence-making exist to fall into our episodic long-term memory. Can we analyze our cybertexts to detect anything of an author's language-creation activity, given that we are all blind to how it happens in ourselves, given that each person's long-term memory, and its overall networks, are believed to be unique to them? Holmes and Singh (1996) have so far applied stylometry to analyze the speech of aphasics. Such empirical studies may detect idiolectal traits that distinguish one author from another. Lancashire's articles on texts by Chaucer and Shakespeare (1992, 1993, 1996, 1999) studied how repeated collocations, which he calls repetends, take a form that may reflect, in Busa's words, their 'conceptual systems.' Hoover (2003a) confirms the interest that repeated collocations hold for authorship discrimination.

If they are evidence of what Antonio Damasio (1994) terms neural 'convergence zones,' lexical clusters must exhibit a complex of semantic, prosodic, syntactic, and affective characteristics that await investigation (cf. Baayen *et al.*, 1996). Computational linguistics has independently explored collocations (Smadja, 1994) and proposed semantic distance measures (Budanitsky and Hirst, 2001). Assigning authorship to anonymous or disputed texts, which has important uses in the law, deserves to be recognized as a grand-challenge research problem. We are perhaps at the end of a beginning in proposing a solution.

Reading Dynamically

David Miall (1995) reminded text-analysis researchers that little has been done, computationally, to investigate how living readers understand literary text (but see the exceptional work of Nardocchio, 1992).

***TACT* Index [KWIC] display**

```
Hamlet (Q2): 1.1.7     twelfe, get thee to >bed {Francisco.} | {Fran.} For
Hamlet (Q2): 1.2.29     | Who impotent and >bedred scarcely heares | Of
Hamlet (Q2): 1.5.60  selfe in a celestiall >bed | And pray on garbage. |
Hamlet (Q2): 1.5.86   | Let not the royall >bed of Denmarke be | A couch
Hamlet (Q2): 3.2.167  husband kisses me in >bed. | {King.} I doe belieue
Hamlet (Q2): 3.2.297  closet ere you go to >bed. | {Ham.} We shall obey,
Hamlet (Q2): 3.3.36     you ere you goe to >bed, | And tell you what I
Hamlet (Q2): 3.3.93        pleasure of his >bed, | At game a swearing, or
Hamlet (Q2): 3.4.100  sweat of an inseemed >bed | Stewed in corruption,
Hamlet (Q2): 3.4.132  in th'alarme, | Your >bedded haire like life in
Hamlet (Q2): 3.4.171  goe not to my Vncles >bed, | Assume a vertue if you
Hamlet (Q2): 3.4.195  temp't you againe to >bed, | Pinch wanton on your
Hamlet (Q2): 4.4.64   to their graues like >beds, fight for a plot |
Hamlet (Q2): 4.5.58   hadst not come to my >bed. | {King.} How long hath
Hamlet (Q2): 4.5.183      goe to thy death >bed, | He neuer will comeTACT
```

***TACT* Distribution displays**

```
Barnardo    1  |*
Claudius    1  |*
Gertrude    1  |*
Ghost       2  |**
Hamlet      5  |*****
Ophelia     2  |**
Player Que  1  |*
Polonius    1  |*
Rosencrant  1  |*

1.1    1  |*
1.2    1  |*
1.5    2  |**
3.2    2  |**
3.3    2  |**
3.4    4  |****
4.4    1  |*
4.5    2  |**
```

***TACT* Collocation display**

Collocates	Collocate Freq	Type Freq	Z-score
excrements	1	1	14.240
game	1	1	14.240
garbage	1	1	14.240
honying	1	1	14.240
impotent	1	1	14.240
inseemed	1	1	14.240
pinch	1	1	14.240
plot	1	1	14.240
reliefe	1	1	14.240
stewed	1	1	14.240
temp't	1	1	14.240
th'alarme	1	1	14.240
th'incestious	1	1	14.240
vncles	1	1	14.240
celestiall	1	2	10.020
cheeke	1	2	10.020
couch	1	2	10.020
francisco	1	2	10.020
graues	1	2	10.020
hadst	1	2	10.020
haire	1	2	10.020
scarcely	1	2	10.020
swearing	1	2	10.020
sweat	1	2	10.020
assume	1	3	8.141
closet	1	3	8.141
corruption	1	3	8.141
heares	1	3	8.141
kisses	1	3	8.141
twelfe	1	3	8.141
wanton	1	3	8.141
ere	2	14	7.389
fight	1	4	7.016
pleasure	1	4	7.016
royall	1	4	7.016
sleeping	1	4	7.016
goe	4	64	6.603
go	1	5	6.244

Figure 5 *TACT* concordance, distribution graph, and collocates display of the word 'bed' in Shakespeare's *Hamlet* (Steele, 1991: 28). Available freely online.

In reading for information, people gradually build up a clear conceptual model of the subject. Technical writers assist this process of summarization by turning out transparent prose, as lean, nonmetaphorical, and unambiguous as possible. Literary authors, on the other hand, unfold their subject with allusive, indeterminate language full of analogies, comparisons, and sudden, inchoate 'epiphanies' in which single sentences, images, or phrases lead the mind into new perspectives. Computational text analysis, however, interprets text traits as firmly determined objects that can support fact-based modeling. Literary critics have shied away from using text-analysis tools because they believe that meaning does not exist objectively except in the individual reader's response.

Computer-assisted literary text analysis generates hybrid versions of that text to help the critic's mind grow alternate readings of it. The critic creates significance rather than tests for it. J. B. Smith's 'computer criticism' (1978, 1980), a form of Marxist structuralism, traces interwoven themes in works of prose fiction, notably James Joyce's *A portrait of the artist as a young man*. Like Paul Fortier in French literary criticism (1981, 1988, 1991), Smith identified themes with groups of terms and images and depicts their rise and fall throughout the work in distribution graphs. Once concordancers like *WordCruncher* and *TACT* appeared in the late 1980s, they enabled others to build critical interpretations on quantitative data. The study of topoi (S. Sinclair, 2003b), especially in French, has thrived in Europe and Canada. Publication of a *TACT* guide by the Modern Language Association in 1996 also nurtured critical experiments with concordancers. The best introduction to this research is by Susan Hockey (2000; cf. Potter, 1991; Corns, 1991; Burrows, 1992; Sutherland, 1997). Let five examples suffice.

Kenneth Steele used *TACT* displays to illustrate the explicit (formal) structures of Shakespeare's *Hamlet* (1991): who says a given word, when, and in what verbal company. Three displays, a concordance, a distribution graph, and a collocation table, reveal how the word 'bed' is "associated repeatedly with sexual violation, incest, and death, but not with rest or dreaming, as one might expect (remember, Hamlet Senior sleeps in his garden, not in the royal bed of Denmark)" (1991: 29; see Figure 5). Willard McCarty (1991; see Figure 6) employs similarity and anagram functions to display verbal echoes in Ovid's *Metamorphoses* (1991) to interpret a passage in which Phoebus warns his son Phaeton about flying too close to the sun. McCarty highlights repeated strings – "the pairs *et*/*te* ('and/[to, for] you') and *ut*/*tu* ('so that/you')" (as well as *tibi* and *et*) – typographically and believes that Ovid was prosodically uttering an 'accusatory murmur' in the passage (1991: 72–74). Geoffrey Rockwell and John Bradley studied the concept of skepticism in David Hume's *Dialogues concerning natural religion* (1999: 8; Bradley and Rockwell, 1996). A distribution graph of terms for skepticism reveals unnoticed details: the terms' scarcity outside the first of the twelve dialogues, and their absence from the lexicon of Hume's orthodox theologian, Demea. Rockwell and Bradley stop short of interpreting these things. In studies (1996, 1999) of collocations in Shakespeare's *Hamlet* III.i ('the nunnery scene'), and in Agamemnon's opening lines in his *Troilus and Cressida* (I.iii.1–29), Lancashire uses *TACT* to make miniature hybrids of these passages that illustrate the playwright's phrasal 'repetends' (both fixed and unfixed collocations). Repeating

Phoebus, the sun-god, warns his son Phaethon about the dangers of driving the sun-chariot, urging him not to take up the unconditional boon he has been granted as proof of his paternity.

adde quod adsidua rapi**tu**r vertigine caelum
sideraque alta trahit celerique volumine torqu**et**
nitor in adversum nec me qui ce**te**ra vincit
inpe**tu**s **et** rapido contrarius evehor orbi
finge datos currus quid ages po**te**risne rotatis
obvius ire polis ne **te** ci**tu**s auferat axis
forsitan **et** lucos illic urbesque deorum
concipias animo delubraque ditia donis
esse per insidias i**te**r est formasque ferarum
utque viam **te**neas nulloque errore traharis
per tamen adversi gradieris cornua tauri
Haemoniosque arcus violentique ora leonis
saevaque circui**tu** curvan**te**m bracchia longo
scorpion atque ali**te**r curvan**te**m bracchia cancrum
nec **tibi** quadripedes animosos ignibus illis
quos in pectore habent quos ore **et** naribus efflant
in promp**tu** regere est vix me patiun**tu**r ubi acres
incaluere animi cervixque repugnat habenis
at **tu** funesti ne sim **tibi** muneris auctor
na**te** cave dum resque sinit **tua** corrige vota
scilic**et** **ut** nostro geni**tu**m **te** sanguine credas
pignora certa p**et**is do pignora certa timendo
et patrio pa**te**r esse me**tu** probor adspice vul**tu**s
ecce meos **ut**inamque oculos in pectora posses
inserere **et** patrias in**tu**s deprendere curas
denique quidquid hab**et** dives circumspice mundus
eque tot ac tantis caeli **te**rraeque marisque
posce bonis aliquid nullam patiere repulsam
deprecor hoc unum quod vero nomine poena
non honor est poenam Phaethon pro munere poscis
quid mea colla **te**nes blandis ignare lacertis
ne dubita dabi**tu**r Stygias iuravimus undas
quodcumque optaris sed **tu** sapientius opta
finierat moni**tu**s ...

Figure 6 Repetitions in Ovid's *Metamorphoses* 2.70–103 (McCarty, 1991: 73). Available freely online. By permission of Willard McCarty.

1	**Princes**, what **grief** hath **set** these JAUNDIES o'r your **cheeks**?	(1a) queries princes' cheeks
2	The **ample** PROPOSITION that **hope makes**	
3	In all designs begun on **earth below**	
4	Fails in the promised LARGENESS. **Checks** and **disasters**	
5	**Grow** in the **veins** of **actions highest reared**,	(1b) their actions are
6	As **knots**, by the CONFLUX of meeting **sap**,	
7	**Infects** the sound **pine** and diverts his grain	
8	TORTIVE and errant from his course of growth.	
9	Nor, **princes**, is it **matter new** to us	(1c) the matter;
10	That we **come short** of our suppose so far	
11	That after **seven years'** siege yet **Troy walls** stand,	
12	Sith every **action** that hath gone before,	(1b) each action
13	Whereof we have **record**, **trial** did **draw**	(1d) in trial
14	**Bias** and thwart, not **answering** the aim	
15	And that UNBODIED figure of the **thought**	(1e) lacks body or shape.
16	That **gave** 't surmised **shape**	
	Why then, you **princes**,	(2a) queries princes' cheeks;
17	Do you with **cheeks** ABASHED **behold** our **works**,	(2b) their works (=actions)
18	And **call** them **shames**, which are indeed naught else	
19	But the PROTRACTIVE **trials** of **great Jove**	(2d) are trials that make the
20	To **find** PERSISTIVE **constancy** in **men**?	
21	The FINENESS of which **metal** is not found	
22	In **fortune's love,** for then the bold and coward,	
23	The **wise** and **fool**, the artist and UNREAD,	
24	The **hard** and **soft**, seem all affined and kin.	
25	But in the **wind** and **tempest** of her **frown**	
26	Distinction with a broad and powerful **fan**,	
27	**Puffing** at all, **winnows** the **light** away,	
28	And what hath **mass** or **matter** by itself	(2c) the matter
29	Lies **rich** in **virtue** and UNMINGLED.	(2e) visible.

Figure 7 Agamemnon's first speech in Shakespeare's *Troilus* encoded for lexical frequency (Lancashire, 1999: 731). By permission of Ian Lancashire.

collocations overlay the texts in close readings of a scene or a single problematic speech. See Figure 7.

Gary Shawver's analysis of the semantics of 'storie' and 'tale' in Chaucer's works (1995, 1999) are exemplary. Using *Collgen* from the *TACT* system, Shawver showed that the collocates of the lemmatized form 'tale' associate with a narrator, and with the time of narrating, while the collocates of 'storie' associate with a "character and the time past of the narrated" (1995). This use of clusters goes well beyond the lexical. Shawver employs Larry Benson's astonishing lemmatized Chaucer to define the cluster semantically as the complex of all its inflectional forms and variant spellings (see Figure 8). Shawver also links, to these two lexical clusters, their grammatical roles with respect to the verb 'tell': "Tales are always told; they never tell. Stories tell as often as they are told" (1995). Tales belong in the present, with a living teller, whereas stories come from long ago and possess the authority of history. Whether this distinction marks Middle English, or Chaucer's idiolect, is unclear, but methodically it shifts the definition of literary collocation towards how ideas are represented in long-term memory.

Recent research integrates new, modular, nonstatistical text-analysis procedures with literary texts to explore linguistic and thematic patterns in interpretation. One tactic places modular tools openly online. The TAPoR (Text Analysis Portal for Research) project at McMaster University puts its taporware tools on the Web so that anyone can use them with any text, public or private. Researchers unfamiliar with text-analysis techniques are encouraged to harness simple tools in unconstrained mental play with both the words and phrases of the literary work, and the XML content encoding that sometimes accompanies it (Ramsay, 2003; Rockwell, 2003; S. Sinclair, 2003a). Another promising strategy integrates text-analysis tools in dynamic editions of works by major authors (Siemens, 2002). *Representative poetry online* (1994–present) includes a concordance function. A variant of this approach floats electronic versions of conventionally-printed critical monographs and histories on top of encyclopedic or linguistic databases

Partial Collocate Displays from Unlenmatized and Lenmatized Texts

UNLEMMATIZED

Collocates	Coll Freq	Type Freq	Z-score
pencel	2	2	18.334
memorie	4	11	15.473
consistorie	2	3	14.925
grisely	2	3	14.925
memorye	2	3	14.925
victories	2	3	14.925
victorie	4	14	13.654
*********hapax legomena*******			
credence	2	4	12.887
olde	13	179	11.649
telleth	6	42	11.577
approved	1	2	9.113
baye	1	2	9.113
bilongeth	1	2	9.113
conqueroures	1	2	9.113
deiphebe	1	2	9.113
desirest	1	2	9.113
doghty	1	2	9.113
dryvynge	1	2	9.113
enditeth	1	2	9.113
eterneel	1	2	9.113
halydayes	1	2	9.113
launcelot	1	2	9.113
oratories	1	2	9.113
phitoun	1	2	9.113
portraied	1	2	9.113
recomende	1	2	9.113
reppleet	1	2	9.113
skylful	1	2	9.113
soutil	1	2	9.113
strondes	1	2	9.113
suffisance	1	2	9.113
tasseled	1	2	9.113
tirauntz	1	2	9.113
titus	1	2	9.113
valerius	1	2	9.113

. . . . . .

Mini-text: 1602 Total Text: 272423

LEMMATIZED

Collocates	Coll Freq	Type Freq	Z-score
memorie@n	6	15	19.905
victorie@n	6	17	18.660
consistorie@n	2	3	14.925
********hapax legomena********			
credence@n	2	4	12.887
feue@pron	2	6	10.459
olde@adj	14	247	10.416
appreven@v	1	2	9.112
bende@nl	1	2	9.112
calistopee@n	1	2	9.112
fals@n	1	2	9.112
launcelot@n	1	2	9.112
phitoun@n	1	2	9.112
plein@adv	1	2	9.112
recommenden@v	1	2	9.112
repentaunt@adj	1	2	9.112
replete@ppl	1	2	9.112
south@n2	1	2	9.112
suetonius@n	1	2	9.112
tasselen@v	1	2	9.112
valerius@n	1	2	9.112

. . . . . .

Mini-text: 1602 Total Text: 272410

Figure 8 Partial collocate displays from unlemmatized and lemmatized texts. Freely available online (Shawver; http://homepages.nyu.edu/~gs74/thesisintro/tablea.html). By permission of Gary Shawver.

so that a reader can expand the scope of examples in the work beyond what the writer had originally conceived. Readers, in this way, have built-in resources identical to those used by the original writer. The Orlando project (Grundy *et al.*, 2000), an in-progress history of women writers in Great Britain, experiments in this way. What results is a new genre of e-scholarship where the roles of the writer and the reader merge.

These open-ended strategies conceivably popularize text-analysis tools at a price. Stylometric studies not only discover lexical patterns in texts but also employ statistics to winnow what is accidental from what has significance. Unconstrained play over a text can potentially mislead critics to overvalue impressionistic patterns. It should be possible to make scientific findings by such as Burrows, Craig, Hoover, Merriam, and Smith more accessible to critics skeptical of, or intimidated by, the 'black box.' A yet-untried strategy would be to publish all text-analysis articles and books electronically, linking the data in their statistical graphs – visualizations like the scattergram and the dendogram – to Siemens' dynamic editions of the texts those stylometrists analyze.

Textual Transmission

Several researchers hint at how the integrated dynamic edition, theorized by Siemens, might look. Peter Robinson's monumental work on the Chaucer manuscripts used cladistic software to generate maps of variant readings, and stemmas, that is, chronological trees showing the descent of one or more manuscript exemplars into many textual versions partially or wholly indebted to them (Chaucer, 1996, 2003,

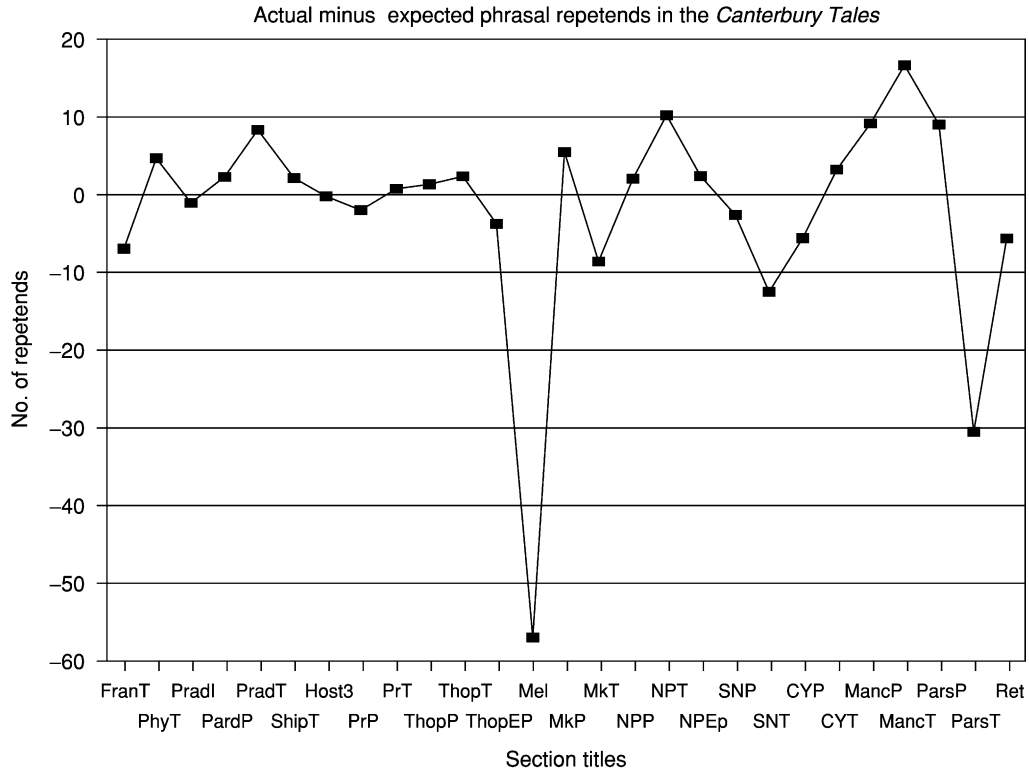

Figure 9 Phrasal repetend graphs of Chaucer's *Canterbury Tales* (Lancashire, 1992: 357–358, Figures 9–10). By permission of Ian Lancashire.

2004). Robinson's editorial software, *Anastasia*, allows editors to link these trees and maps to transcriptions and facsimiles of the originals. Another integrated editorial system, the oldest in the humanities, is *TUSTEP* (Ott, 2000). It collates all variants among different surviving texts of the same work, semiautomatically choosing substantial variants, and last generating a critical apparatus. Ott's tools, with which H. W. Gabler (2000) produced a print critical edition of James Joyce's *Ulysses* (1984–1986), can be used to create electronic editions. The *Arden Shakespeare* CD-ROM (1997) pioneered the dynamic edition with SGML-aware DynaText software. It ties the complete texts, introductions, annotations, textual variants, facsimile images, sources, grammar, glossary, and bibliography to a comprehensive search facility (Siemens, 1998).

Were an electronic edition to have the tools that stylometrists like Burrows, Craig, Hoover, and others employ in attributional research, readers might well extend computer-based investigation into textual criticism. *TACT*'s Collgen enabled Lancashire to analyze how the fixed and unfixed collocations in Chaucer's General Prologue are distributed through his *Canterbury Tales*. See Figure 9. This graph gives evidence that Chaucer's phrasal lexicon changed over that period of time. An unusual number of collocations in the General Prologue reappear in 'The Manciple's Prologue and Tale,' which occurs in most manuscripts at the end of the Tales. See Figure 10. This phrasal kinship indicates that collocation distribution has promise in helping put an author's texts in chronological order of composition.

The integration of text analysis functions with general scholarship is being managed, over time, now that dynamic editions have common standards such as the Text Encoding Initiative. The critical mass for this experimentation exists already in Web libraries. The Perseus Project (Smith *et al.*, 2000) has built an astonishing digital library of Greek, Latin, and English works that readers can interrogate with searches that link texts with morphological lexicons and terminological, spatial, and visual databases. The Internet Shakespeare Editions, as its newly-attributed *Edward III* shows, integrates electronic search functions with transcriptions of early quarto and folio versions, scholarly editions from the 18th century on, and new ISE editions with full scholarly apparatus (Best and Rasmussen, 2004). TEI-conformant editorial projects now underway treat authors as diverse as Boccaccio, Chaucer, Henrik Ibsen, John Foxe, Newton, and British Women Writers.

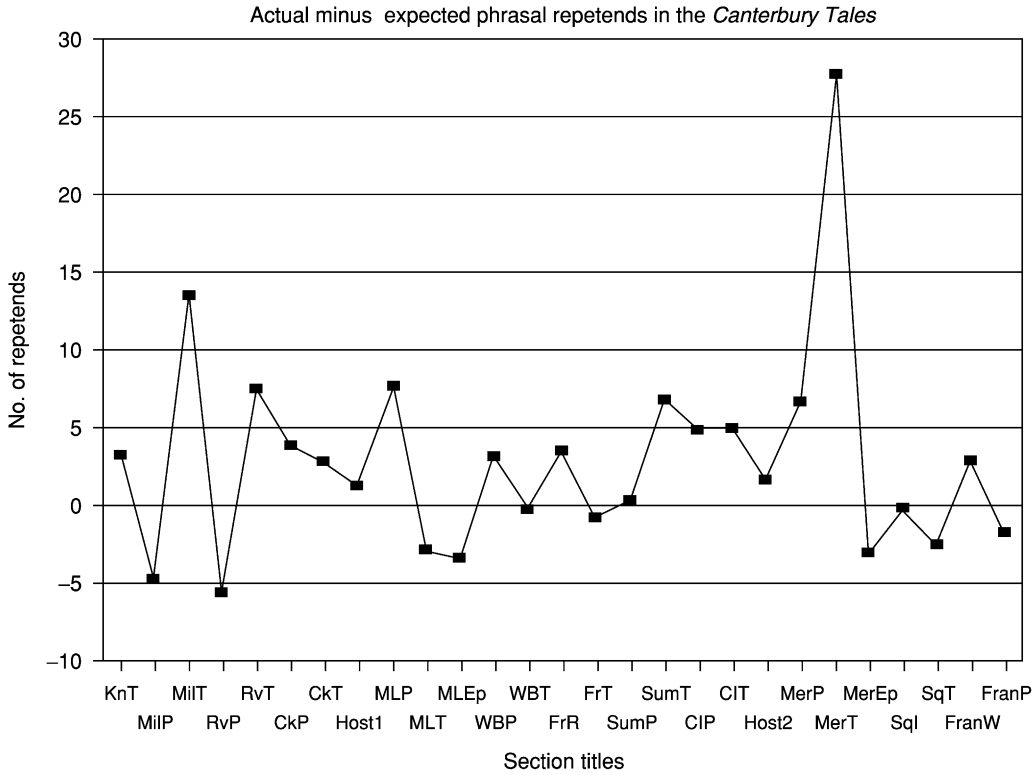

Figure 10 Phrasal repetends in the juncture of Chaucer's 'Manciple's Prologue and Tale' (Lancashire, 1993: 118, Table VIII). By permission of Ian Lancashire.

Computational research in the literary and linguistic humanities over the past two decades has advanced steadily, building on pioneers like Louis Milic, John Smith, and John Burrows. Text analysis is still a science-in-waiting, but not for long.

See also: Applied Forensic Linguistics; Authorship Attribution: Statistical and Computational Methods; Cladistics; Collocations; Computational Stylistics; Concordances; Drama: Stylistic Aspects; Genre and Genre Analysis; Idiolect; Information Theory; Literary Theory and Stylistics; Structuralism; Stylistics, Cognitive; Text and Text Analysis; Thematics; Theme in Text.

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Computer-Supported Writing

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Introduction

The concept of computer-supported writing has been evolving and continues to evolve as new computer technologies emerge. As a result, it has at least three current meanings. In some contexts, computer-supported writing refers to various hardware and software tools or aids that often allow writers to be more efficient. For example, this perspective would highlight the claim that writers can revise texts more easily by moving words around in a word processor file than they can by using pen and paper. From a second perspective, computer-supported writing refers to the technologies that allow people at a distance to collaborate on texts. In other words, the concept refers to a particular type of

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Bernard Comrie, one of the world's leading figures in the field of language universals and linguistic typology, was born on May 23, 1947, in Sunderland, England. He studied at the University of Cambridge, from which he received a B.A. in modern and medieval languages (1968) and a Ph.D. in linguistics (1972). At Cambridge, he was Junior Research Fellow at King's College (1970–1974) and subsequently became University Lecturer (1974–1978). In 1978 he joined the faculty of the University of Southern California, Los Angeles, first as Associate Professor (1978–1981), then as Full Professor (1981–1998), of linguistics. Comrie is currently Director of the Department of Linguistics of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany (since 1997). He is also Honorary Professor of Linguistics at the University of Leipzig (since 1999), and Distinguished Professor of Linguistics at the University of California, Santa Barbara (since 2002). Honors conferred upon him are Member of the Saxon Academy of Sciences, Leipzig (1999), Corresponding Member of the British Academy (1999), Foreign Member of the Royal Netherlands Academy of Arts and Sciences (2000), and Doctor of Letters Honoris Causa, La Trobe University, Australia (2004).

Comrie's intellectual interests have centered around general questions of language universals, with emphases on syntax and semantics. From his

earliest work he has held that our understanding of language as a general phenomenon depends on examination of data from a wide range of languages. With respect to syntactic universals he disagrees with the emphasis of generative grammarians on structure-internal explanations and instead advocates reference to external factors such as meaning, discourse, and cognitive structures. Linguistic fieldwork is his abiding interest; the languages he has worked on include Russian, Chukchi (Chukot), Arabic (Arabic, Standard; Arabic, Moroccan Spoken; Arabic, Tunisian Spoken), Maltese, Malayalam, Huichol, Kala Lagaw Ya, Tsez (Dido), and Bezhta, to name just a few; in 1985–1986 he carried out 11 months of fieldwork on the Haruai language spoken in the Highlands of Papua New Guinea.

At the Max Planck Institute for Evolutionary Anthropology, with the conviction that new insights into prehistoric human migrations can be gained by an interdisciplinary approach that combines linguistics, genetics, and archeology, Comrie leads a team conducting multidisciplinary research, including the documentation of endangered languages, the study of human linguistic diversity and the historical processes underlying this diversity, and the investigation of the contribution of common ancestry and language contact to non-universal similarities across languages; this last topic involves cooperation with specialists in genetics and archeology.

Some of Comrie's highly influential books have been translated into Spanish, Italian, Chinese, Japanese, and Korean. He is Managing Editor of the journal *Studies in Language*.

See also: Arabic; Aspect and Aktionsart; Endangered Languages; Linguistic Universals, Greenbergian; Malayalam; Maltese; Morphological Universals; Papua New Guinea: Language Situation; Russian Federation: Language Situation; Tense.

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Concepts

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In cognitive science, concepts are generally understood to be structured mental representations with subpropositional content. The concept CHAIR, for example, is a mental representation with the content *chair*. It is implicated in thoughts about chairs and is accessed in categorization processes that function to determine whether something is a chair. Theories of concepts are directed to explaining, among other things, the character of these processes and the structure of the representations involved. Related to this is the project of explaining what conceptual content is and how concepts come to have their content. In the study of conceptual structure, four broad approaches should be distinguished: (1) the classical theory, (2) probabilistic theories, (3) the theory-theory, and (4) conceptual atomism. For recent overviews of theories of concepts, see Margolis and Laurence (1999) and Murphy (2002).

The Classical Theory

According to the classical theory, concepts have definitional structure. A concept's constituents encode conditions that are individually necessary and jointly sufficient for its application. A standard illustration of the theory is the concept BACHELOR, which is claimed to be composed of the representations UNMARRIED, ADULT, and MALE. Each of these is supposed to specify a condition that something must meet in order to be a bachelor and, if anything meets them all, it is a bachelor.

The classical theory has always been an enormously attractive theory. Many theorists find it to be intuitively plausible that our concepts are definable. In addition, the theory brings with it a natural and

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The classical theory has always been an enormously attractive theory. Many theorists find it to be intuitively plausible that our concepts are definable. In addition, the theory brings with it a natural and

compelling model of how concepts are learned. They are learned by assembling them from their constituents. The classical theory also offers a straightforward account of categorization. Something is deemed to fall under a concept just in case it satisfies each and every condition that the concept's constituents encode. Finally, the theory appeals to the very same resources to explain the referential properties of a concept. A concept refers to those things that have each and every feature specified by its constituents. Of course, all of these explanations depend upon there being a separate treatment of the primitive (i.e., unstructured) representations that ultimately make up the concepts we possess. But the classical theory supposes that a separate treatment can be given, perhaps one that grounds all of our concepts in perceptual primitives in accordance with traditional empiricist models of the mind.

The classical theory has come under considerable pressure in the last thirty years or so. In philosophy, the classical theory has been subjected to a number of criticisms but perhaps the most fundamental is that attempts to provide definitions for concepts have had a poor track record. There are few – if any – examples of uncontroversial definitional analyses. The problem isn't just confined to philosophically interesting concepts (e.g., JUSTICE) but extends to concepts of the most ordinary kind, such as GAME, PAINT, and even BACHELOR (Wittgenstein, 1953; Fodor *et al.*, 1980). What's more, Quine's (1951) influential critique of the analytic-synthetic distinction has led many philosophers to suppose that the problem with giving definitions is insurmountable.

For psychologists, the main objection to the classical theory has been that it appears to be at odds with what are known as 'typicality effects.' Typicality effects include a broad range of phenomena centered around the fact that certain exemplars are taken to be more representative or typical (Rosch and Mervis, 1975; Rosch, 1978). For instance, apples are judged to be more typical than plums with respect to the category of fruit, and subjects are quicker to judge that apples are a kind of fruit than to judge that plums are and make fewer errors in forming such judgments. Though not strictly inconsistent with these findings, the classical theory does nothing to explain them.

Probabilistic Theories

In response to the failings of the classical theory, Eleanor Rosch and others began exploring the possibility that concepts have a structure that is described as graded, probabilistic, or similarity-based (Smith and Medin, 1981). The difference between these approaches and the classical theory is that the constituents of a concept are no longer assumed to express features that its members have by definition. Instead, they are supposed to express features that its members tend to have. For example, a standard treatment for the concept BIRD incorporates constituents picking out the features *has wings*, *flies*, *eats worms*, etc., but probabilistic theories don't require all of these features to be possessed by something to count as a bird. Instead, something falls under the concept when it satisfies a sufficient (weighted) number of them (or on some accounts, something falls under the concept to a degree corresponding to how many are satisfied; then nothing is a bird absolutely but only a bird to degree *n*).

Like the classical theory, probabilistic theories explain concept learning as a process where a concept is assembled from its constituents. And like the classical theory, probabilistic theories offer a unified treatment of reference and categorization. A concept refers to those things that satisfy enough of the features it encodes, and something is judged to fall under a concept when it satisfies enough of them as well. Categorization, on this account, is often described as a similarity comparison process. An item is categorized as belonging to a given category when the representations for each are deemed sufficiently similar, where this may be measured in terms of the number of constituents that they share.

One advantage of probabilistic theories is that a commitment to probabilistic structure may explain why definitions are so hard to come by. More important, however, is the way that probabilistic structure readily accommodates and explains typicality effects. This is achieved by maintaining that typicality, like categorization, is a similarity comparison process. On this model, the reason apples are judged to be more typical than plums is that the concept APPLE shares more of its constituents with FRUIT. Likewise, this is why apples are judged to be a kind of fruit faster than plums are.

Probabilistic theories continue to enjoy widespread support in cognitive science, but they aren't without their own problems. One concern is that many concepts appear to lack probabilistic structure, especially concepts that correspond to phrases as opposed to words. For example, Fodor (1981), (1998) notes that while GRANDMOTHER may have probabilistic structure (encoding the features *gray-haired*, *old*, *kind*, etc.), there is no such structure for GRANDMOTHERS MOST OF WHOSE GRANDCHILDREN ARE MARRIED TO DENTISTS. Fodor also challenges probabilistic theories on the grounds that even when phrasal concepts do have probabilistic structure, their structure doesn't appear to be compositionally determined. This is a

problem, since it's the compositionality of the conceptual system that explains the productivity of thought, viz., the fact that there is no upper bound on the number of distinct thoughts that humans can entertain. Fodor points out that the probabilistic structure associated with PET FISH encodes features (*colorful*, *tiny*, *lives in a bowl*, etc.) that aren't drawn from the probabilistic structures associated with PET (*furry*, *cuddly*, etc.) and FISH (*gray*, *lives in the ocean*, etc.).

Another common criticism of probabilistic theories is that they leave out too much. They don't sufficiently incorporate the causal information that people appeal to in categorization and don't do justice to the fact that reflective categorization isn't always based on similarity (Murphy and Medin, 1985; Keil, 1989; Rips, 1989). For example, when time is short and when given little information about two animals apart from the fact that they look alike, people may judge that they are both members of the same category. But when asked for a more thoughtful answer about whether, for example, a dog that is surgically altered to look like a raccoon is a dog or a raccoon, the answer for most of us – and even for children – is that it is remains a dog (see Gelman, 2003, for an overview of related literature).

The Theory-Theory

The theory-theory is largely a reaction to the last problem associated with probabilistic theories. It explains categorization, particularly reflective categorization, as a process of causal-explanatory reasoning. On this approach, conceptual structure is a matter of how a concept is related to other concepts in relatively stable causal-explanatory frameworks. The designation 'theory-theory' sometimes implies little more than this. For some psychologists, it is meant to indicate that the explanatory frameworks are comparable to explicit scientific theories and that the mechanisms for acquiring them are identical with the cognitive mechanisms that underlie scientific reasoning. On this more extreme version of the theory-theory, conceptual development is likened to radical theory change in science (Carey, 1985; Gopnik and Meltzoff, 1997).

Many objections to the theory-theory are directed to its more extreme forms, particularly the commitment about conceptual development. The claim that infants are like little scientists has generated a great deal of criticism (e.g., Segal, 1996; Stich and Nichols, 1998). One objection focuses on particular examples, especially of concepts that are fundamental to human cognition (e.g., OBJECT, AGENT, and BELIEF). Although theory-theorists often cite these as examples where substantial conceptual change occurs – change that is supposed to illustrate the theory-theory's model of cognitive development – others would argue that these are innate concepts that remain invariant in important respects throughout development (e.g., Leslie, 1994). A more basic objection to the theory-theory is that the appeal to causal-explanatory reasoning is minimally informative. It may be true that categorization is somewhat like scientific reasoning, but scientific reasoning is itself in need of a great deal of clarification. The result is that the model of categorization is extremely sketchy and somewhat mysterious.

A third objection to the theory-theory, one that has been especially influential in philosophy, is that it makes it difficult to maintain that different people have the same concepts. This objection is directed to versions of the theory-theory that are especially lenient in what counts as a theory. On these versions, just about any belief or inferential disposition associated with a concept is part of a 'theory.' The problem with this approach, however, is that people are bound to have different beliefs than one another and hence different theories. But since a concept's identity and content are supposed to be a matter of its role in one's mental theories, people will be unable to share concepts (Fodor and Lepore, 1992).

Conceptual Atomism

The last of the four theories of conceptual structure is that lexical concepts – word-sized concepts – have no structure at all (Fodor, 1998; Millikan, 2000). Concepts such as BIRD, CHAIR, NUMBER, and RUN are all primitives. Of course, conceptual atomism needs an account of how these primitive concepts are to be distinguished from one another and how their contents are fixed. A standard approach is to appeal to the mind-world causal relations between a concept and the object or property it refers to.

Conceptual atomism is motivated in light of the problems with other theories, especially the problem of providing definitions (the classical theory), the problem of compositionality (probabilisitic theories), and the problem of shared concepts (the theory-theory). If concepts lack structure, then it is no surprise that we have difficulty providing definitions for them. Also, it doesn't matter that probabilistic structure doesn't compose, since **complex** concepts can still be composed on the basis of atomic constituents. And sharing a concept is no longer a challenge. It isn't a matter of having the same beliefs so much as having representations that stand in the same mind-world causal relations.

Conceptual atomism is sometimes rejected outright on the grounds that unstructured concepts can't be

learned and hence that atomism implies an untenably strong form of concept nativism (*see* **Innate Ideas**). The main concern with conceptual atomism, however, is that without structure, there is nothing to explain how concepts are implicated in categorization and other psychological processes. Nonetheless, atomists see this as an advantage rather than a problem, maintaining that people can have the same concept despite widely varying psychological dispositions. For this reason, the structures that are accessed in categorization and other psychological processes are said to be associated with a concept but not constitutive of it.

See also: Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; Causal Theories of Reference and Meaning; Compositionality: Philosophical Aspects; Definitions: Uses and Varieties; Holism, Semantic and Epistemic; Innate Ideas; Mentalese; Representation in Language and Mind.

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Concessive Clauses

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Together with terms like 'temporal,' 'conditional,' 'causal,' 'instrumental,' and 'purposive,' the term 'concessive' belongs to the terminological inventory that traditional grammar makes available for the characterization and classification of adverbials and adverbial clauses. Concessive clauses are separately identifiable on formal grounds in a wide variety of languages, but many other types of adverbial clauses may also have a concessive use. As one type of adverbial clause, concessive clauses share numerous syntactic properties with other adverbial clauses, from which they are distinguished mainly on the basis of semantic criteria. They also manifest, however, specific formal properties in addition to their semantic properties.

Meaning and Syntactic Properties

In uttering a complex sentence with a concessive clause, i.e., a sentence of the type *Even though p, q*

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Together with terms like 'temporal,' 'conditional,' 'causal,' 'instrumental,' and 'purposive,' the term 'concessive' belongs to the terminological inventory that traditional grammar makes available for the characterization and classification of adverbials and adverbial clauses. Concessive clauses are separately identifiable on formal grounds in a wide variety of languages, but many other types of adverbial clauses may also have a concessive use. As one type of adverbial clause, concessive clauses share numerous syntactic properties with other adverbial clauses, from which they are distinguished mainly on the basis of semantic criteria. They also manifest, however, specific formal properties in addition to their semantic properties.

Meaning and Syntactic Properties

In uttering a complex sentence with a concessive clause, i.e., a sentence of the type *Even though p, q*

(e.g., *Even though it is raining, Fred is going out for a walk*), a speaker is committed to the truth of both clauses *p* (*It is raining*) and *q* (*Fred is going out for a walk*) and asserts these two propositions against the background of an assumption that the two types of situations, *p* and *q*, are generally incompatible. This background assumption or presupposition can roughly be described as follows: if *p*, then normally not-*q* (*If it is raining, one normally does not go out for a walk* or *The more it rains, the less people go out for a walk*) (cf. König, 1988; Azar, 1997). How it is to be spelled out precisely is still a puzzle. What is clear, however, is that the situation described by a sentence with a concessive clause is an exception to a general tendency and therefore remarkable.

Concessive clauses generally occur in all positions where adverbial clauses are permitted in a language. In English, for example, they may either precede or follow the main clause. Concessive clauses differ, however, from other types of adverbial clauses in a number of ways:

a. In contrast to most other types of adverbial clauses, there does not seem to be a concessive interrogative adverb in any language, analogous to English *when, where, why, how*, etc.
b. Concessive clauses cannot be the focus of a focusing adjunct (focus particle) such as *only, even, just,* and *especially* (cf. *Only because it is raining* versus **Only although it was raining*...).
c. Concessive clauses cannot occur as focus in a cleft sentence (**It was although it was raining that*...).
d. Concessive clauses cannot be the focus of a negation or a polar interrogative (cf. *Was he harassed because he was a journalist?* versus *Was he harassed, although he was a journalist?*).

All of these divergent properties seem to be manifestations of a single syntactic constraint on the use of concessive clauses: They cannot be focused against the background of the rest of the sentence, a property that they share with causal clauses introduced by *since* and resultative clauses introduced by *so that*. This constraint with regard to focusability is generally taken to indicate that the relevant clauses are less tightly integrated into a main clause than other types of adverbial clauses. To a certain extent, sentences with concessive clauses exhibit properties of paratactic rather than subordinate structures and in spoken discourse concessive relations are much more frequently expressed by paratactic structures, particularly by adversative conjunctions such as *but*. Whether this constraint is also a sign of greater semantic complexity relative to other types of adverbial clauses is not so clear. A certain support for the assumption that concessive constructions are especially complex semantically can be derived from the fact that they tend to develop in connection with the introduction of written forms of a language and are also acquired much later by children than other types of adverbial clauses.

Concessive Connectives

Concessive relations between two clauses or between a clause and an adverbial are not only expressed by conjunctions such as *even though* and *although* in English, but can also be signaled by prepositions such as English *despite* and *in spite of*, and by conjunctional adverbs such as English *nevertheless, nonetheless, still*, and *yet*. The near-synonymy of the following constructions shows that the term concessive is applicable to all three groups of connectives and that the selection of a specific subcategory depends on the syntactic environment: *Fred is going out for a walk although it is raining. – Fred is going out for a walk in spite of the rain. – It is raining. Nevertheless Fred is going out for a walk*. A cross-linguistic investigation of all three types of concessive connectives provides interesting information on the affinity between concessivity and other semantic domains, as well as on the historical development of concessive connectives. Such a comparison shows that concessive connectives are typically composite in nature (e.g., *al-though, never-the-less*) and that in most cases earlier and more basic meanings can easily be identified for these components. These earlier meanings as well as the other uses of the components that enter into the formal make-up of concessive connectives provide important insights into the relatedness of concessivity to other semantic domains. Five different types of connectives can be distinguished on the basis of their etymology and their historical development:

a. Members of the first group derive from notions such as 'obstinacy,' 'contempt,' and 'spite,' that is, from notions originally applicable only to human agents or experiencers. Examples are English *in spite of*; Spanish *a pesar de* (cf. *pesar* 'sorrow, regret'); Dutch *ondanks* ('ingratitude, thoughtlessness') and *in weerwil van*; Italian *malgrado che*; and Finnish *huolimatta* ('heedless, careless').
b. There is a close relationship between concessivity and free-choice quantification as expressed in English by *any* or *whatever*. In a wide variety of languages, concessive connectives contain a component that is also used as a free-choice quantifier: English *albeit*, *however*, and *anyway*; Latin *quamquam*; Hungarian *habár* (cf., *ha* 'if'; *ki* 'who'; *bárki* 'whoever'); and Maori *ahakoa* ('whatever-indeed').
c. In many languages, concessive connectives are composed of an originally conditional or temporal

connective (e.g., French *quand*) and/or an additive focus particle (e.g., English *also* and *even*). This type, probably the most frequently occurring in the world's languages, is exemplified by English *even though*, German (Standard German) *wenn-gleich*, French *quand même*, and Bengali *jodi-o* ('if-also').

d. Concessive connectives may also derive from expressions originally used for emphatic affirmation. Expressions with the original meaning 'true', 'indeed', 'fact,' or 'well' are frequently grammaticalized as concessive connectives. English *true*, German *zwar* ('it is true'), Bahasa Indonesian *sungguh-pun* ('true-even'), and Mandarin (Mandarin Chinese) *gùrán* ('of course, true, to be sure') are cases in point. Typically, such connectives are more often used in a more general adversative sense, rather than the more specific concessive sense (cf. English *True p*, *but q*).

e. Members of the fifth type all derive from expressions originally used to assert remarkable co-occurrence or coexistence in some form or another. This type is exemplified by English *nevertheless, notwithstanding, still*; French *n'empêche que* ('does not prevent'); Portuguese *contudo* ('with everything'); Turkish *bununla beraber* ('together with this'); and Hopi *naama-hin* ('together thus').

As is shown by this typology, the historical development of concessive connectives and the original, or at least earlier, meaning of their components directly reflect various aspects of the meaning of these connectives: the factual character of these constructions, the presupposition (or 'implicature') of general dissonance (incompatibility, conflict) between two situation types, and the remarkable fact of their co-occurrence in specific instances. Moreover, this typology also reveals a close relationship between concessive constructions and certain types of conditionals.

Relationship to Other Types of Adverbial Clauses

Further insights into the form and meaning of concessive constructions can be gained by comparing them to and delimiting them from other types of adverbial clauses, notably conditionals and clauses of cause and reason. As was already mentioned, concessive clauses are closely related to certain types of conditionals and frequently derive from such conditionals. In a wide variety of grammar handbooks and specific analyses of the relevant area, both traditional and modern, the following sentence types are also discussed under the heading 'concessive': *Whatever his prospects of finding a job are, he is going to marry Susan next month. – Whether or not he finds a job, he is going to marry Susan next month. – Even if he does not find a job, he will marry Susan next month*. A closer look at these sentences reveals, however, that they are basically conditionals. Where they differ from standard forms of conditionals (if *p*, then *q*) is in the nature of the antecedent. Instead of relating a simple antecedent to a consequent, as standard conditionals do, the 'concessive conditionals,' as they are also and more appropriately called, relate a series of antecedent conditions to a consequent (*He will marry Susan next month*). This series of antecedent conditions can be expressed by a quantification (e.g., *wh-ever*), by a disjunction (e.g., '*p* or not-*p*'), or by a scalar expression that denotes an extreme (e.g., highly unlikely) value on a scale.

In addition to being similar to standard conditionals, these concessive conditionals share certain properties with the factual concessive sentences discussed thus far. In each of the three types of concessive conditionals, a conditional relation is asserted for a series of antecedents that includes an unlikely and thus remarkable case and it is this dissonance and conflict that have led to labels such as 'unconditionals,' 'irrelevance conditionals,' 'hypothetical concessives,' just to mention only those most frequently used. In order to draw a clear terminological distinction between the factual concessive clauses introduced in English by *although* or *even though* and the three types of conditionals under discussion, it seems advisable to reserve the term concessive for the former and to use the label 'concessive conditional' for the latter.

Concessive conditionals with focus particles, i.e., conditionals of the type *even if p, q*, are particularly difficult to keep apart from factual concessive clauses. In the core cases, the distinction seems to be clear enough: The distinction is expressed by the connective (e.g., English *even if* versus *even though*, Japanese *temo* versus *noni*), by the mood (subjunctive versus indicative) of the adverbial clause (e.g., Spanish *aunque llueva* 'even if it rains' versus *aunque llueve* 'even though it is raining'), or by some other inflectional contrast marked on the verb. The boundary between these two types of constructions, however, seems to be a fluid one in a wide variety of languages. In many, and perhaps all, languages, concessive conditionals with focus particles can be used in a factual sense, i.e., in exactly the same way as genuine concessive clauses (e.g., English *Even if he IS my brother, I am not going to give him any more money*). Furthermore, as pointed out above, concessive conditionals with focus particles frequently develop into genuine concessive constructions. English *though*, for instance, was still used in the sense of 'even if' at the time of Shakespeare, as the following quotation from Hamlet shows: *I'll speak to it though hell itself should gape*

and bid me hold my peace. In Modern English, by contrast, *though* is used only in a factual, concessive sense, apart from certain relics like *as though*. The fact that in some languages (e.g., French) the subjunctive is used in standard concessive clauses (i.e., after *bienque, quoique*) is a further indication of such developments from conditionals, for which the use of the subjunctive is more clearly motivated.

Sentences with concessive clauses have always been considered to be related to, and in fact to be in some way opposed to, clauses of cause and reason. This intuition is most clearly reflected in terms such as 'anticause,' 'incausal,' 'inoperant cause,' and 'hidden causality' that have often been proposed as more suitable replacements for the traditional term concessive. That concessivity expresses the negation of a causal relationship is suggested by the fact that in some languages (Cambodian (Central Khmer), Japanese, Lezgian (Lezgi), Mundari, and Indonesian) concessive connectives can be derived from causal connectives through the addition of certain particles. Moreover, negated causal expressions are frequently used as markers of concessivity. Connectives such as German *ungeachtet*, English *unimpressed* and *regardless*, French *n'empêche que*, and Dutch *ondanks* are cases in point. As is shown by the equivalence of the following pair of sentences, the external negation of a causal construction may be equivalent to a concessive construction with a negated main clause: *This house is no less comfortable because it dispenses with air conditioning. — This house is no less comfortable, although it dispenses with air conditioning*. In the first sentence, which is to be read as one tone group, the negation affects the whole sentence ('It is not the case that this house is less comfortable because…'). In the second example, by contrast, only the main clause is negated and it is exactly in such a situation that a causal construction may be paraphrased by a suitably negated concessive one. This 'equivalence' between the external negation of a sentence with an operator O and the internal negation of a sentence with an operator O′ (not((because p) q) ≡ (although p) not-q) looks like a case of duality (König, 1991; Di Meola, 1998; Iten, 1998), but since such paraphrases are not possible for sentences with external negations of concessive clauses (not ((although) p, q)), the relevant relationship between causality and concessivity cannot be assumed to be an instance of this general phenomenon (cf. König and Siemund, 2000).

Types of Concessive Clauses

Under the right contextual conditions, many types of adverbial clauses may receive a concessive interpretation:

a. Temporal clauses (*There was a funny smile on D.'s face as if D. were pulling his leg by pretending to fall in with his plan, when he had not the least intention to fall in with it.*);
b. Comparative clauses (*Poor as he is, he spends a lot of money on horses.*);
c. Conditionals (*If the aim seems ambitious, it is not unrealistic. Considering his age, he seems quite fit.*), concessive conditionals, etc.

These interpretations are, however, the result of certain processes of interpretative enrichment on the basis of contextual inferences and none of the relevant clauses would be considered a concessive clause in the narrow sense of the term. Concessive clauses, identifiable as a separate category in numerous languages on the basis of the formal properties discussed above, are never augmented in their interpretation in this way and thus seem to constitute an end-point beyond which such interpretative processes never go.

Thus far, concessive constructions have been differentiated only from other types of adverbial clauses. Further distinctions can be drawn within that category itself and these distinctions seem to be a consequence of the general phenomenon that adverbial relations can be applied in parallel ways to different conceptual domains or levels (e.g., the content domain, the epistemic domain, the illocutionary domain, and the textual domain) in the sense of Sweetser (1990) and Crevels (2000).

Not all concessive constructions allow the inference that the two sentences asserted to be true are instances of situations that do not normally go together. In many cases, it is not the factual content of the two clauses that is incompatible. The incompatibility may lie in the conclusions or arguments that are based on these assertions. Such rhetorical concessives, as they are often called (cf. Anscombre and Ducrot, 1977; Azar, 1997), are typically introduced by a connective of type (d) and/or by the adversative conjunction *but* and may thus be indistinguishable from adversative sentences (*True he is still very young, but he has proved very reliable so far.*). In English, the modal verb *may* is another frequently used indicator of this type of concessive construction, but *although* and *though* may also be used in this function (*He may be a professor but he is an idiot.*). Sentences of this type are used to concede the first assertion and to emphasize the second. It is for these constructions that the term concessive is particularly appropriate. Another subtype of concessive clause that is frequently singled out in descriptions of European languages is the so-called 'rectifying' concessive clause (e.g., A. *Yes, it has come at last, the summons I know you*

have longed for. — B. *I, too, though it has come in a way I cannot welcome.*). Whereas in the standard case the content of the main clause is emphasized and made remarkable through the addition of the concessive clause, the content of the main clause is weakened whenever a rectifying clause follows. In English, such rectifying clauses are marked by *although, though*, *but then*, *except*, *not that*, etc.; in French *encore que* invariably indicates such a function of weakening the import of a preceding assertion (cf. Ranger, 1997). Concessive clauses of this type always follow the main clause and are only loosely linked to that main clause. Moreover, they typically exhibit main clause word order in those languages in which main and subordinate clauses are distinguished on the basis of word order (German *Er wird das sicherlich akzeptieren, obwohl bei ihm kann man das nie wissen*. 'He will certainly accept that, although you never know with this guy.').

What such discussions about subdivisions within the class of concessive clauses and adverbials clearly show is that one cannot assume synonymy for all the concessive connectives that a language has at its disposal. Concessive prepositions (e.g., English *despite, in spite of*) and certain conjunctions (e.g., English *even though*) are not used in a rectifying or rhetorical function, some conjunctions (e.g., French *encore que*) are used exclusively for rectification, and still others (e.g., English *although*) can be used in all functions. What is also clearly revealed is that different subtypes of concessive clauses manifest different degrees of subordination to and integration into a main clause.

See also: Adverbs; Conditionals; Focus; Grammatical Meaning; Negation; Presupposition.

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Concordances

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What Are Concordances?

Definitions of 'concordance' vary considerably but agree on the main features: an alphabetical list (or index) of the words (or ideas; some restrict this to the principal or significant words) in a text or group of texts (or a particular author's works), giving the textual locations (chapter, verse, act, scene, line number, etc.) of each word's occurrences, and citations or contextual passages. The purpose of concordances seems to be both to establish which are the significant words in the text (e.g., by their frequency) and to illustrate their usage.

Concordances to the Bible, Shakespeare, etc.

Concordances to the Bible were compiled from the 14th century onward, and were used by scholars to identify and study biblical themes and their treatment. Concordances of the works of Shakespeare, and poets such as Tennyson, Shelley, and Blake, were subsequently used in literary studies. Lexicographers, however, requiring a much wider range of texts, too many to create concordances for manually, relied on individually remembered or encountered citations until computer technology became available and large corpora of general language could be created.

Computer Corpora and Electronic Concordancing

Until the 1980s, the few, relatively small, corpora (1 million words of text) were only used by a handful of linguists and language teachers. The lexicographical use of computer-generated concordances was initiated by Cobuild, a joint project by Collins publishers and Birmingham University. Technological limitations meant that initially their corpus had to be handled in million-word batches, and concordances were only printed out as and when required, from microfiche. By 1983, the batches were merged, and the frequency list from the 7.3-million-word corpus became the main basis for their dictionary headword list. Concordances for every word form in the corpus were printed out, and lexicographers analyzed them as the principal source of their dictionary entries.

The KWIC (Key Word in Context) concordance format displayed each occurrence of a word in the middle of a line of text (100 characters, roughly 20 words of context), with a source text identification code in a separate column. Lexicographers copied typical examples onto paper slips, grouped them by word class and meaning, and then wrote definitions for each group.

The concordances were sorted alphabetically by the word after the keyword (English being a left-to-right language), so linguistic patterns following the keyword (right-context patterns) became quite evident, although their quantitative analysis for frequent words remained impressionistic. However, patterns preceding the keyword (left-context patterns) were much more difficult to detect. And the 100-character context limit caused considerable problems for lexicographers needing, for example, to look at the beginning or the end of the sentence containing the keyword.

By the late 1980s, corpus sizes had increased (20–50 million words) and computer technology had improved, so concordances were now viewed on screen, and single keystrokes allowed users to dictate subcorpus sampling and sample size; to select single words, word families, or multiword units; to resort concordances to the left or right; to vary the amount of context; to restrict concordances by word class, genre, variety, or collocational information. In general, lexicographers would gain an overview of the item or items first, and only then look at concordances for more detailed patterning and usage features. Statistics, analyses, and examples could of course be easily stored in databases, and extracted for use in dictionary entries at a later stage.

Since the 1990s, several other UK publishers (Longman, Oxford University Press, Cambridge University Press, Macmillan) have been using very large corpora (100–500 million words) and concordances in their dictionary compilation procedures, mainly for EFL products. Some publishers, e.g., Oxford University Press and Collins (now HarperCollins), have additionally used them for native-speaker and bilingual dictionaries.

Each feature of modern corpus software has yielded benefits for lexicographers, and their effects can be seen in the resulting dictionaries. For the impact of corpus frequency lists, and subcorpus distribution information, *see* **Corpus Lexicography**; for more details about collocation, *see* **Collocations**.

The Impact of Electronic Concordancing on Lexicography

Information about the source texts enables lexicographers to provide accurate labels for each sense/meaning distinction, such as 'used mainly in UK

broadsheet newspapers,' 'in American radio broadcasts,' or 'in UK informal speech.' Sentence-length concordances provide accurate information on the behavior of the word in sentences (e.g., positional, syntactic); more extended contexts allow sharper delineation of pragmatic functions, especially in speech (emphasis, disapproval, humor, etc.), and discourse functions (e.g., signaling change of topic or closure of conversation).

The ability to view concordances for individual word forms and for groups of word forms allows the lexicographer to identify forms that are significantly associated with specific senses or word classes (e.g., the *-ing* form of a verb may be used as a noun or adjective mainly in a specific sense, such as *counting* mainly with elections and votes, *budding* mainly with careers and situations), and senses that are generally available for all forms of a headword. The traditional practice of adding derivative forms at the end of an entry (e.g., *-ly*, *-ness* at the end of adjective entries) has given way to placing derivatives only at senses for which they are particularly used (e.g., *lamely* for excuses, arguments, remarks rather than for 'walking with difficulty').

The ability to sort concordances alphabetically to the left or right of the keyword (and specify which position to sort on, e.g., two words before or three words after) allows greater specification of variations in phrases, collocational positions, semantic preferences, etc. Right-sorting may identify, for example, verb and noun complementation patterns (e.g., *like* + *to*-infinitive/*-ing*, but *enjoy* + *-ing* only; *authority* + *to*-infinitive, or + *in* with location in place/time, or + *on* with topic/domain), the adverbs associated with a verb (e.g., *argue* + *convincingly* or *successfully*, etc., but rarely *argue* + *well*), the noun objects of a verb (e.g., *aim* + weapons, but rarely *weapon[s]* itself), the nouns modified by an adjective (e.g., *crisp* with specific nouns meaning food, weather, cloth or paper, leaves or snow, and writing or speech).

Left-sorting may indicate the subjects associated with a particular verb (e.g., anyone can *authenticate* something, but only people in authority usually *authorize* something, only famous people usually *autograph* something; only cities or buildings tend to *be blitzed*, etc.), nouns that tend to be the object of specific verbs (e.g., *commit* + *crime[s]*), the adjectives that modify a particular noun (e.g., *bystanders* is usually modified by *innocent*, but occasionally by *curious*, *passive*, *bemused*, *interested*, *hapless*, etc.), the prepositional phrases that a noun is head of (e.g., *time: at the time*, *by the time*, *from the time*, *for the first time*; *at a time*, *for a time*; *at the same time*, *for some time*, *for a long time*; etc.), or the verbs that are typically modified by an adverb (e.g., *crisply* with verbs of speech). Sorting in either direction will show up nominal compounds (e.g., *birth control*, *fibre optics*, *package deal*).

Sinclair's corpus analysis of the collocation *naked eye* showed how sorting concordances by one position at a time (in this case to the left) can be very revealing of lexical phraseology. Firstly, *naked eye* is usually preceded by *the*; *the naked eye* is usually preceded by a preposition (*with*, *to*, *by*, *from*, *as*, *upon*, *than*; i.e., a weak colligation, word class + lexical phrase, rather than word class + word class); the preposition is preceded by one of two word classes, a verb (e.g., *see*) or an adjective (e.g., *visible*), so cannot be called colligation; but on closer inspection all the items in this position (*detect*, *spot*, *appear*, *perceive*, etc.; *invisible*, *apparent*, *obvious*, *evident*, etc.) share the semantic notion of visibility, so Sinclair terms this feature 'semantic preference.' Strict positioning weakens here, but the leftward context almost invariably contains items indicating difficulty, whatever their word class (e.g., *small*, *faint*, *weak*, *difficult*; *barely*, *rarely*, *just*; negative words or morphemes such as *not*, *invisible*; modals such as *can*, *could*; etc.), which Sinclair labels 'semantic prosody.' Sinclair notes that variation is negligible at the 'core' of the lexical phrase, and increases further away to allow it to fit in with previous context.

Concordances are now a relatively everyday and unremarkable part of the lexicographer's toolbox, and it is hard to conceive of any significant improvement in their format. Some attempts have been made to create software that automatically selects the 'most typical' concordance lines (weighting such factors as lexical frequencies, collocations, grammatical structures, etc.), and would represent another leap in the methodology, but unfortunately they are either kept under proprietorial lock and key by their dictionary-publisher proprietors or have not so far been completely successful.

Concordances and Pedagogical Applications

However, it is now in the field of pedagogy that rapid developments are taking place. Tim Johns's pioneering efforts in using concordances in language teaching have gained ground (with later contributions from Chris Tribble and others) and become a recognized field: data-driven learning (DDL). A major problem for language learners has been that they come across individual items (words, patterns, or structures) too infrequently, and therefore have to practically relearn them at each encounter.

Concordances enable learners to view many examples of the same item simultaneously, and make and

internalize generalizations about the item in their own way and at their own pace. Retention is improved, confidence is strengthened, and motivation and general linguistic awareness are heightened by such discovery procedures. Teachers can also edit concordances for teaching materials and classroom exercises, for example by deleting keywords (often called 'gapped concordances') or elements in the contextual environment. The greater public availability of concordancing software (e.g., Wordsmith Tools, MonoConc, Conc, Free Text, etc.) and the realization that smaller user-built corpora are sufficient for many pedagogical (as opposed to lexicographical) purposes have contributed to the popularity of concordancing as a learning/teaching tool.

Conclusions and the Future

Although the initial thrust and major developments concerned the English language, concordances are now used worldwide in lexicography and pedagogy for many other languages. Bilingual concordancing, providing concordances of source texts and their translations simultaneously and adjacently, is still in its relative infancy (e.g., software such as ParaConc and MultiConcord), but seems likely to prove useful to translators, interpreters, and language learners in the future. For example, early research by Church & Gale showed that the ambiguity of *drug* in English could be resolved by parallel concordances in French, which separated instances of illegal substances (*drogues*) from prescription drugs (*médicaments*). Concordancing is also being used in other linguistic fields, such as forensic linguistics.

See also: Collocations; Corpus Lexicography.

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Condillac, Etienne Bonnot de (1714–1780)

D Droixhe

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Condillac was born in Grenoble on September 30, 1714. His *Essai sur l'origine des connaissances humaines, ouvrage où l'on réduit à un seul principe tout ce qui concerne l'entendement humain* (1746) solemnly broke with the religious dogma of the divine gift of language, and radicalized the Lockian revolution as to the relationships between signs and thought. The Cartesian and Port-Royalist traditions considered words to be 'expressions' of an autonomous thinking. Condillac associated mind and language in a circle of genetic interdependence. He is "unquestionably the philosopher of his time who granted the greatest importance to language in his theory of knowledge" (Auroux in Sgard, 1982). He died on August 2, 1780.

The most famous and influential part of his *Essay* finds the roots of the origin of language in a *language d'action* mixing gestures and emotional sounds, from which also arose dance and music. 'Natural or accidental signs' were supposed to have given birth, with the help of 'imagination,' to 'artificial' ones (*signes d'institution*) – which constitute the fundamental tools of human mental ability and progress. But Herder (*see* **Herder, Johann Gottfried (1744–1803)**) stressed Condillac's failure to "shape the animal cry" so that "a fact ruled by a law of nature becomes the human language, expression of man's will," it is well known that Herder tried to cross the gap by an acute analysis of the faculty of 'reflection.' Turgot (*see* **Turgot, Anne Robert Jacques (1727–1781)**) also pointed critically at the circle involving the primitive invention of signs, and the degree of consciousness implied by the operation, and Rousseau (*see* **Rousseau, Jean-Jacques (1712–1778)**) added to this the difficulty of separating the birth of language from the formation of some form of society.

The semiotic *objectivation* of the material world determines the appearing of the *parties du discours* and the elaboration of 'sensible words' into abstractions. According to the *Essay*, the linguistic signs arose in the following order: substantive, adjective, adverb, verb – the concept of the latter culminating in the invention of *to be*. That genetic point of view was the basis of the conceptions expressed in the *Grammaire* and the *Art d'écrire* written *pour l'instruction du prince de Parme* (1775). Condillac's *Grammar* aims to reconstruct, historically and functionally, how a total perception, or mental image, is fragmented and transmitted by a more and more elaborated system of general signs. "Four kinds of words of words only are required to express all our thoughts: substantives, adjectives, prepositions, and one verb such as *être*." So, Condillac moves away from a tradition dealing essentially with common logico–semantic categories, towards a grammar where the possible universals are defined by the role assumed from a primitive stage of holophrasis (where the total perception was expressed by a single word). That is why, especially, the grammatical analysis begins with the sentence, then descends to the proposition, and after this to its elements. Their description is governed by the principle of the *genetic situation*,

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which inverts the procedure of the *Grammaire générale*, in which "one starts from the elements to reach the different ways of combination." From this, Condillac developed an original conception of the subordinate proposition.

"*L'analogie et l'analyse. Voilà à quoi se réduisent, dans le vrai, tous les principes des langues*." The famous axiom of the *Grammar* (Sect. I.1) opens up a varied but highly coherent prospect. Historically, it legitimates a regular genealogy of modern discourse, tracing back abstract to concrete designations, pronouns to adjectives (Latin *ille* > French *il*), prepositions to nouns of spatial or temporal meaning, etc. It also led to a very dynamic conception of the vocabulary, whose 'artificial' elements work together to cover reality (*Dictionnaire des synonymes*, only published in the 20th century). So, Condillac introduced into the French tradition the idea – so strongly expressed by Vico – that languages have a special value as cultural imprints and 'measure of the ideas' (as Turgot was to say). From that point, the topics of linguistic relativism and *génie des langues* quickly developed (see Maupertuis's *Plans d'idées* in 1748) and could foster conceptions usually assigned to German romanticism (Aarsleff, 1974; Christmann, 1976).

On another side, which left a deep mark on Condorcet and the politics of language of the French Revolution, Condillac renewed the project of a linguistic improvement which would restore a true *liaison des idées* by a logical combination defying any arbitrariness. 'Toute langue est une méthode analytique et toute méthode analytique est une langue.' In other words – to quote an equally famous statement of the *Logique* (1780) and the *Langue des calculs* (published in 1798): '*Une science bien traitée n'est qu'une langue bien faite*.' After 1789, the Idéologues were to base on that belief a democratic reform of education, where *grammaire générale*, working on the naked spirit of the average citizen, would allow him to master the unlimited combination of his ideas through the hierarchy of human faculties, and climb the whole scale of social functions.

Developing with great acuteness the genetic and functional aspects of signs, Condillac appears in the long run to have laid the basis for a historical orientation that the systematic one was still actively challenging. In his lectures on *General and comparative grammar* of 1797 for the Lycée des Etrangers, François Thurot was to express his concern (as noticed by Coseriu) to strike a balance between the most visible part of the sensualist legacy and a more discreet current of Enlightened linguistics: "analysis, analogy and etymology."

See also: Herder, Johann Gottfried (1744–1803); Rousseau, Jean-Jacques (1712–1778); Turgot, Anne Robert Jacques (1727–1781).

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Conditionals

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Form and Meaning

Conditionals are complex sentences built up from two constituent clauses, called the *antecedent* and the *consequent*; alternatively, the terms *protasis* and *apodosis* are found in the linguistic literature. English conditionals are typically of the form *if A, (then) B*, where *A* and *B* are the antecedent and consequent, respectively. Some examples are given in (1).

(1a) If the sun comes out, Sue will go on a hike.
(1b) If the sun came out, Sue went on a hike.
(1c) If the sun had come out, Sue would have gone on a hike.

In the linguistic and philosophical literature, a distinction is commonly drawn between *indicative* conditionals, such as (1a) and (1b), and *subjunctive* or *counterfactual* conditionals, like (1c). This classification is not uncontroversial: some authors would draw the major dividing line between (1a) and (1c) on the one hand and (1b) on the other. However, we adopt the standard classification and focus on indicative conditionals (*see also* **Counterfactuals**). The class of indicatives may be further divided into *predictive* and *nonpredictive* conditionals, illustrated in (1a) and (1b), respectively. Despite subtle differences, these share a common semantic core and have similar logical properties. We do not distinguish between them in this discussion.

In general, *if A, B* asserts that *B* follows from, or is a consequence of *A*, without asserting either *A* or *B*. Often the relation in question is causal (*A* causes *B*) or inferential (*B* is inferable from *A*). Other uses include the statement that *B* is *relevant* if *A* is true (2a), conditional speech acts (2b), and metalinguistic comments on the consequent (2c).

(2a) If you want to meet, I am in my office now.
(2b) If you will be late, give me a call.
(2c) If you excuse my saying so, she is downright incompetent.

The form *if A, B* is neither necessary nor sufficient for the expression of conditionality. Inverted forms, as in (3a), are used as conditional antecedents. Sentences like (3b) and (3c) also typically have conditional interpretations.

(3a) Should the sun come out, Sue will go on a hike.
(3b) Buy one – get one free.
(3c) Give me $10 and I will fix your bike.

On the other hand, some *if-then* sentences do not fit the semantic characterization and are not considered conditionals, as in (4).

(4) If these problems are difficult, they are also fascinating.

Despite these marginal counterexamples, *if* is clearly the prototypical conditional marker in English. Other languages show more diversity in their expression of conditionality. The German conditional maker *falls* is freely interchangeable with *wenn* 'when/if', which also functions as a temporal conjunction. Japanese employs a family of verbal suffixes and particles (*-ba, -tara, -tewa, nara, to*), each of which adds subtle semantic and pragmatic constraints to the conditional meaning and some of which may also express temporal relations without conditionality (*-tara* 'and then'; *A to B* 'upon *A, B*'). Languages also vary in the extent to which they overtly mark (non)counterfactuality. In Japanese, the distinction is usually inferred from context; Classical Greek, on the other hand, has an elaborate inventory of markers of different degrees of hypotheticality.

In all languages, the interpretation of conditionals is determined and constrained by expressions of temporal relations, modality, quantification, and a variety of pragmatic factors. For instance, the differences in (1a) through (1c) arise from the interaction of the marker *if* with the tenses and modal auxiliaries in the constituent clauses.

For descriptive surveys of conditionals in English and other languages, see Traugott *et al.* (1986), Athanasiadou and Dirven (1997), Dancygier (1998), and Declerck and Reed (2001).

Truth-Conditional Semantics

The formal semantic approach in linguistics and philosophical logic is concerned with the truth conditions of sentences and their logical behavior. Conditionals are among the most extensively studied linguistic constructions in this tradition and pose specific challenges, which have been addressed in a number of ways.

Material Conditional

In classical Fregean logic, *if A, B* is interpreted as the *material conditional* (also called material implication) '→':

(5) $A \rightarrow B$ is true iff either *A* is false, or *B* is true, or both.

The material conditional is a truth function on a par with conjunction and disjunction. However, while there is general agreement that the latter are well suited to capture the truth conditions of *and* and *or*, the logical properties of the material conditional do not well match those of conditional sentences. For example, $A \rightarrow B$ and $A \rightarrow \neg B$ are mutually consistent, and the falsehood of A is sufficient for the truth of both, hence of their conjunction. But (6b) is intuitively contradictory and does not follow from (6a). Likewise, the negation of $A \rightarrow B$ is equivalent to $A \wedge \neg B$, but (6c) and (6d) are not intuitively equivalent.

(6a) Today is Saturday.
(6b) If today is Friday, it is raining, and if today is Friday, it is not raining.
(6c) It is not the case that if the team wins, I will be happy.
(6d) The team will win and I will be unhappy.

Strictly truth-functional theories employ the material conditional in spite of these shortcomings, since no other truth function comes any closer to capturing our intuitions about conditionals. One way to reconcile the approach with linguistic intuitions is to augment the truth conditions with pragmatic conditions on use. Jackson (1987), building on Grice's original proposals, appealed to probabilistic 'assertibility' conditions. For *if A then B* to be assertible, two conditions must be met: $A \rightarrow B$ must be highly probable, and it must remain highly probable in the event that A turns out true. Jackson noted that this comes down to the requirement that the conditional probability of B given A be high.

(Variably) Strict Implication

An alternative reaction to the problems of the material conditional is to conclude that conditionals do not express truth functions. Instead, most current theories assume that *if A then B* asserts that *A cannot* be true without *B* also being true. This is typically spelled out in the framework of *possible worlds:*

(7) *If A then B* is true at a possible world w relative to an accessibility relation R iff for all possible worlds w' such that wRw' and A is true at w', B is true at w'.

The relation R determines the *modal base* (Kratzer, 1981), the set of possible worlds that are relevant to the truth of the conditional at w. Definition (7) subsumes the material conditional as the special case that R is the identity relation, so the only world relevant at w is w itself. At the other end of the spectrum lies *strict implication*, under which *all* possible worlds are relevant and the conditional is true iff B is a logical consequence of A.

These extreme cases are rarely relevant in linguistic usage. Usually, conditionals are evaluated against speakers' beliefs, the conversational common ground, the information available in a given situation, possible future courses of events in branching time, or other background assumptions. All of these interpretations correspond formally to different choices of the accessibility relation. The fact that the intended reading need not be overtly marked is a source of versatility and context dependence. A given conditional can be simultaneously true with respect to one modal base and false with respect to another. Thus, (8) may be objectively true, but believed to be false by a speaker with insufficient information or false beliefs.

(8) If this material is heated to 500 °C, it will burn.

The definition in (7) makes room for variation and context dependence of the modal base and overcomes some of the limitations of the material conditional. However, like the latter, it fails to account for the invalidity of certain *nonmonotonic* inference patterns involving conditionals. For instance, under both analyses, a true conditional remains true under Strengthening of the Antecedent (*if A then B* entails *if C and A then B*). Intuitively, however, it is possible for (8) to be true while (9) is false.

(9) If this material is placed in a vacuum chamber and heated to 500 °C, it will burn.

There are several ways of addressing this problem. We will describe two of them, each departing from definition (7) in a different direction.

Relative Likelihood

The first approach takes examples (8) and (9) to show that in cases like (8), not all A-worlds in the modal base are relevant for the truth of the conditional, but only those that satisfy implicit defaults or 'normalcy' assumptions. The listener will assume that air was present (as in [8]) unless this is explicitly denied in the antecedent (as in [9]).

Kratzer (1981) represented such assumptions as an *ordering source*, a set of propositions that are 'normally' true at w. This set induces a preorder on the worlds in the modal base: w'' is at least as normal as w' iff all the propositions in the ordering source that are true at w' are also true at w''. The interpretation of conditionals is sensitive to the relation in (10).

(10) *If A then B* is true at w relative to a model base MB iff for every A-world w' in MB, there is an AB-world in MB that is at least as normal as w' and not equalled or outranked in normalcy by any A-world in MB at which B is false.

This offers a solution to the problem posed by (8) and (9). Suppose the material is normally not placed in a vacuum chamber. Then every antecedent-world at which it is, is outranked in normalcy by one at which it is not; thus, (8) may be true while (9) is false.

Formally, the order induced by the ordering source is similar to the relation of 'comparative similarity' between possible worlds that is at the center of the Stalnaker/Lewis theory of counterfactuals (*see* the article **Counterfactuals** for details; Lewis, 1981, for a comparison; and Stalnaker, 1975, for an account of indicative conditionals that refers to this notion). The term 'relative likelihood' is applied to such orders in artificial intelligence (Halpern, 2003). Like the modal base, the ordering source is subject to underspecification and context dependence. Different ordering sources correspond to different readings of the conditional. Besides normalcy, Kratzer (1981) considers ordering sources that rank worlds according to desires, obligations, and other criteria.

Probability

The second approach to dealing with the nonmonotonicity of conditionals does not manipulate the modal base but instead rejects the universal quantification over possible worlds as ill suited for modeling the notion of consequence that speakers employ in interpreting conditionals. On this account, *if A then B* asserts not that all *A*-worlds are *B*-worlds but rather that the conditional probability of *B*, given *A*, is high. In other words, the posterior probability of *B* upon learning *A* would be high, or, alternatively, a world that is randomly chosen from among the *A*-worlds would likely be one at which *B* is true. Different modal bases and ordering sources correspond to different (subjective or objective) probability distributions over possible worlds. Adams (1975) developed a theory of *probabilistic entailment* in which just those inference patterns that are problematic for the classical account, such as Strengthening of the Antecedent, are no longer predicted to be valid.

The intuitive appeal of the probabilistic approach is offset somewhat by the fact that it necessitates a rather profound rethinking of the logical basis of semantic theory. Lewis (1976) showed that a conditional probability cannot in general be interpreted as the probability that a proposition is true, hence that the central premise of the probabilistic account is at odds with the idea that conditionals denote propositions (for detailed discussions see Edgington, 1995; Eells and Skyrms, 1994). Some authors conclude that conditionals do not have truth values (Adams, 1975) or that the conditional probability is only relevant to their use and independent of their truth conditions (Jackson, 1987). Another approach is to assign nonstandard truth values to conditionals in such a way that the problem is avoided (Jeffrey, 1991; Kaufmann, 2005).

Summary

Kratzer's theory is the most influential one in linguistics. The probabilistic approach has been studied extensively in philosophy and, more recently, artificial intelligence. Many other options have been explored. In addition to the works cited above, for overviews and specific proposals the reader is referred to Bennett (2003); Gärdenfors (1988); Harper and Hooker (1976); Harper *et al.* (1981); Jackson (1991); Nute (1980, 1984); Sanford (1989); Stalnaker (1984); Veltman (1985); and Woods (1997). It is not always clear whether there are empirical facts of a purely linguistic nature that would decisively favor one approach over another. With such criteria lacking, the choice depends on the purpose of the analysis at hand and other extralinguistic considerations (e.g., assumptions about rational behavior or psychological reality, or tractability in computational modeling).

See also: Counterfactuals; Formal Semantics; Inference: Abduction, Induction, Deduction; Modal Logic; Possible Worlds: Philosophical Theories.

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Conference Interpreting

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Introduction

Conference interpreting is the type of interpreting that first attracted public attention and that was the first to generate substantial literature on training and theoretical issues. This article highlights some of its aspects, starting with a definition and characterization, following with a presentation of the conference interpreting profession and concluding with a discussion of research in the field. This review is necessarily incomplete. For further insight into practical aspects of conference interpreting, see Jones (1998). For a thorough and comprehensive review of research into interpreting – albeit with debatable evaluative comments – see Pöchhacker and Shlesinger (2002) and Pöchhacker (2004). Milestone works in the field are Gran and Dodds (1989), Gerver and Sinaiko (1978), Gambier *et al*. (1997), and Garzone and Viezzi (2002). There are other good reference books in Chinese, Czech, French, Italian, Japanese, Russian, and Spanish, which cannot be listed here (the CIRIN Web site at http://perso.wanadoo.fr/daniel.gile/ offers regular bibliographic information on conference interpreting research or CIR).

Conference Interpreting: A Social Definition

In spite of what the name conference interpreting suggests, conference interpreters work not only in conferences but also in other settings, including meetings of committees and working groups in international organizations, visits of personalities, meetings of boards of directors of large corporations, medical, information technology, economic and other scientific and technical training seminars, TV programs, arbitration proceedings, and even court trials. In other words, their activity partly overlaps with liaison interpreting, court interpreting and media interpreting.

Conference interpreting is sometimes confused with simultaneous interpreting (see, for example, Christoffels, 2004: 1), in which the interpreter sits in a booth and speaks at the same time as the speaker s/he is translating. Actually, conference interpreting as a profession started in the exclusive form of consecutive interpreting (the speaker makes an utterance, stops for the interpreter to translate it, then resumes his/her speech, stops again for the interpreter to translate the second passage, and so on). Although simultaneous interpreting (SI) has become the most popular mode of interpreting, the consecutive mode is still much in demand, especially for one-to-one interaction, both in politics and in business. By contrast, SI is also used in court interpreting.

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If neither the setting, nor interpreting modalities can be used to define conference interpreting, can it legitimately be viewed as categorically different from other types of interpreting? Pöchhacher (2004) speaks of a spectrum of interpreting forms, analyzes traditional categories of interpreting in terms of interaction constellations, language modality, working mode, directionality, use of technology and professional status, and shows the commonalities between them. And yet, in the West, and particularly in Western Europe, conference interpreters have a strong awareness of their identity as distinct from that of other types of interpreters (in other countries, including China, countries of Central and Eastern Europe and Japan, a rich, industrialized country, the distinction is not so sharp). Rather than objective parameters, sociological factors may be the strongest determinants of conference interpreting. This is probably best understood in the context of a historical analysis. When conference interpreting emerged as a profession in the League of Nations and International Labor Office between the two world wars, interpreters worked in the same room as the 'delegates' (the generic term used by conference interpreters for users of their services) and were very visible to the delegates, to journalists and to other observers, who admired and praised them for their skills. Many of these interpreters were academics or came from the same social circles as the people they worked for. Their image in the public eye was thus very prestigious. This prestige was maintained in the early years of interpreting in the United Nations where most interpreters were veterans of the League of Nations (Baigorri-Jalón, 2000, 2004). When AIIC, the International Association of Conference Interpreters, was set up in 1953, its rules were inspired by this image of interpreters as top-level professionals with a high social prestige, and major interpreting schools in Geneva, Heidelberg and Paris followed the same example. Nowadays, many conference interpreters come from less demanding training programs and many are not members of AIIC, but the (idealized) social identity of the conference interpreter is still one of high-level professionals, and conference interpreters are reluctant to be assimilated to interpreters with a lower status such as court interpreters, business interpreters and community interpreters, regardless of the technical similarities in part of their work (and of the fact that their contribution to society can be claimed to be more important than the conference interpreters'). Thus, conference interpreters may be prototypically characterized as people who have skills in consecutive and simultaneous interpreting, who interpret at important technical, political, scientific and other meetings, who are supposed to meet high quality standards and who consider themselves part of the conference interpreting community.

The Conference Interpreter's Professional Environment

There are probably fewer than 10 000 conference interpreters worldwide, about 2500 of whom are members of AIIC. Most of them are freelancers and work for intergovernmental organizations such as UN agencies, the European Commission or OECD, for regional organizations, for nongovernmental organizations, for government agencies, industrial corporations and the media. There are also staff interpreters who work as employees of intergovernmental organizations and some government agencies, but few are employees in the private sector (with exceptions such as broadcast interpreters in Japan – see BS Broadcast Interpreters' Group, 1998). Most of their work is done in the simultaneous mode, but the consecutive mode is still used actively. Most conference interpreters have two or three working languages, including their A language (native or native-like), B languages (which they master well enough to interpret into them from their A language), or C languages (passive languages, from which they interpret into their A language). Over the past decade or so, the extension of Europe has induced more and more interpreters working for the European Union to add further European languages to their language combination, but in many other parts of the world, a two-language combination, generally English and the relevant country's language, is still the most frequent.

Interpreting assignments are billed by the day, and generally last one to five days, except for some general conferences and similar events in intergovernmental organizations, which may last several weeks. In countries where the market is active, interpreters work on average between 100 and 150 days a year, which is enough to make a decent living (and to leave interpreters exhausted). Conference interpreting can be and is a full professional occupation for many. In countries where the market is slack, many of them are part-time interpreters and also work as translators, journalists or academics.

Although in the early days most of the speeches interpreters had to translate may have been fairly general, nowadays many are highly technical, one extreme being the (very common) written technical or scientific paper read at full speed by its author at a technical meeting with the interpreter having to interpret it simultaneously on the spot, often without even having a copy of the paper before him/her. Even

less extreme cases can be very taxing, and in the simultaneous interpreting booth, interpreters generally take turns and do not interpret for more than 30 minutes at a time, meaning that they work in teams, with a minimum of two interpreters per booth. Although the first generation of interpreters was almost exclusively masculine, the vast majority of conference interpreters nowadays are women. It has been claimed that it is easier for them to accept a career as interpreters, whereas male interpreters are frustrated by the lack of social recognition.

The Interpreting Process and Product in a Nutshell

Basically, interpreting involves speech comprehension (the original speaker's) and speech production. In consecutive interpreting, they correspond to two successive phases, and throughout history and until after World War I, the process was apparently taken for granted. Consecutive interpreting only started to attract public attention when League of Nations speeches by political personalities were brilliantly interpreted by outstanding interpreters (see Baigorri Jalón, 2000). Even then, what was perceived as their outstanding memory and command of languages became the focus of attention rather than the process itself. Consecutive interpreting is now considered a technical skill which requires training but probably not higher-than-average memory.

Consecutive interpreting seems natural, but simultaneous interpreting, in which the speaker and interpreter speak at the same time, appears more mysterious. Laypeople tend to admire the speed of translation. Linguists and cognitive psychologists have other questions: How do interpreters manage not to code-mix the two languages? How do they manage their cognitive resources between listening and speaking? Do they monitor themselves? How does 'language transfer' occur? To what extent do they really understand what the speaker is saying? One of the first messages of interpreting community leaders and trainers was that interpreting is not tantamount to 'transcoding,' a mere replacement of language units in the source language by language units in the target language; interpreters actually listen to and understand the source speech, and then reformulate it on the basis of its meaning rather than on a word-correspondence basis. Moreover, their comprehension process involves analysis, with a contribution of both their linguistic knowledge and extralinguistic knowledge. This strong, fundamental message describes interpreting as essentially very similar to translation. Ironically, the most vocal promoter of this idea, Danica Seleskovitch of ESIT, Paris, misperceived written translation as more akin to transcoding – until translators told her otherwise.

The second important fact about interpreting, both simultaneous and 'true consecutive' (conference interpreters use that name to refer to a type of interpreting where speech segments to be interpreted are long enough to require note-taking as opposed to sentence-by-sentence interpreting), is that it is an intrinsically difficult exercise. In translation, most fundamental difficulties arise from the lack of culturally and linguistically matching words and syntactic structures in the source language and target language. In interpreting, this is less of a problem because of some features of spontaneous speech production and reception, and in particular less stringent stylistic constraints on the target speech. By contrast, cognitive load is very high, so much so that it probably accounts for a large number of errors and omissions in the interpreters' output, many more than the conference interpreting community has been willing to acknowledge officially. Many of the interpreters' strategies are aimed at either reducing cognitive load or containing the potential damage resulting from saturation of their attentional resources, whereas the translators' strategies deal mostly with problems arising from the lack of interlinguistic and intercultural correspondences, from lack of clarity and other weaknesses of the source text, and from gaps in their own thematic knowledge of the relevant field.

In major interpreter training programs, conference interpreters are trained to produce 'the same speech' as the speaker's in the target language. In written translation in certain types of texts such as scientific papers, user's notices or press statements, the written counterpart of this aim can be considered realistic insofar as the information content of both the source and the target version may be virtually identical, and readers who understand both languages may not find a difference between them. In interpreting, several factors make the interpreter's presence more visible. Firstly, both in conference settings and in media interpreting, listeners can hear the speaker's voice, albeit at a lower volume level than the interpreter's. Another aspect is the interpreter's prosody, including both an interpreting-specific intonation and a somewhat unnatural pause pattern (see for instance Shlesinger, 1994; Ahrens, 2004). Both may be largely attributed to cognitive factors: pauses correspond to hesitations (see Mead, 2002) and to interpreting strategies, and unnatural prosody may be partly explained by the fact that the interpreter's intonation control is affected by source–speech input. When listeners have a good view of the speaker, lack of synchronicity between his/her facial and body language also makes the interpreter visible.

In addition to delivery parameters, the question is whether content-wise the interpreting product is the same as the original speech. The difficulty of interpreting has always been clear to all and problem triggers are often discussed in the literature. However, until recently, investigators tended to ignore its actual implications in terms of the interpreter's output, possibly because nearly all of them are practicing interpreters and interpreter trainers themselves, and there is a conflict between their professional interests and the unveiling of some of their weaknesses. Gile may have been the first to stress repeatedly in his publications the relatively high frequency of errors and omissions in interpreting output but was not very specific. In his recent paper on the interpreting output of Formula One press conferences, Straniero Sergio (2003) reports that 249 interpreted versions of Formula One drivers' answers to questions from journalists in press conferences, that is, close to half of the 512 interpreted renderings in his corpus, were incorrect. In a recent doctoral dissertation that examined speeches at the European Parliament, Vuorikoski (2004) presents and discusses many examples of errors and omissions, and though no quantitative indications are given, the general tone of her analysis suggests that much gets lost in the process, at least as far as rhetorical devices are concerned. By contrast, in many cases, the propositional content of the source speech is identical or nearly identical to the target speech content. Moreover, by correcting slips of the tongue and various types of errors in the source speech and by speaking more clearly than poor speakers or speakers with a strong accent or a poor command of the language they use, interpreters may actually get more information across to listeners or make the speaker's point better than the speaker him/herself, just as good translations sometimes serve the authors' purposes better than the source text. Actual losses and gains are yet to be explored.

An Overview of the History of Research into Conference Interpreting

Although the first research contribution in the field may well be a study by the Spanish psychologist Jesús Sanz on the work and abilities of conference interpreters published in 1931 (see Pöchhacker, 2004), this was an isolated case. Until the late 1960s, with the exception of an M.A. thesis by the interpreter Eva Paneth defended in 1957, introspective and prescriptive papers, handbooks and other publications by interpreters made up the literature on conference interpreting. Two of these are considered *the* classics. Jean Herbert's *Manuel de l'interprète* (1952) is the first general handbook of conference interpreting, and Jean-François Rozan's *La prise de notes en consécutive* (1956) sets out the principles of note-taking in consecutive interpreting which are still applied by a majority of interpreters worldwide.

In the 1960s, a few psycholinguists and cognitive psychologists (Oléron and Nanpon, Goldman-Eisler, Barik, Gerver) started showing interest in the "complex skills of simultaneous interpreting" (Gerver, 1976: 166). SI was seen as an interesting model, in particular in the context of a discussion of single-channel theories of human information processing, of the motor theory of speech perception and of issues in bilingualism. A small number of experimental studies were carried out, which focused mostly on the lag between the source speech and the target speech as an indicator of complex processing, on the use of the speaker's pauses by the interpreter, and on errors and omissions. Gerver also investigated other issues such as the effect of speed and the effect of noise on interpreting output. The best review of these early studies is probably Gerver (1976). The psychologists' work was strongly criticized by interpreters who took up research on their own in the next stage of the history of CIR, mostly for poor ecological validity in the design of the task, the interpreting environment, the choice of subjects and assessment methods. Many of the tasks performed in the laboratory were remote from real-life interpreting. Neither did the psychological interlude contribute major findings to the knowledge of interpreting. However, as can be seen in papers edited in Pöchhacker and Shlesinger (2001), the psychologists were aware of the complexity of the task and were realistic and less ambitious than their successors from within the interpreting community, who tried to find *the* key to the process through introspection. Psychologists did not claim to do more than attempt a first, exploratory approach to interpreting. Moreover, many of the basic techniques they used and many of the questions they asked remain topical and have been taken as a basis for further investigation since the 1990s. For these and other reasons, their contribution remains important.

In 1977, Gerver and Sinaiko organized a symposium bringing together researchers from psychology, linguistics and sociology on the one hand, and practitioners of interpreting on the other, to see whether cooperation was possible (Gerver and Sinaiko, 1978). This initiative was not successful, probably due to a large extent to the interpreters' unwillingness to submit their craft and actual performance to experimental investigation by linguists and psychologists who, they felt, did not understand the true essence of interpreting. This conference may be taken symbolically as the starting point of a takeover of research by interpreting practitioners, who chose to ignore both their

predecessors' methods and their findings (as reflected by an almost total absence of citations of their studies in the literature) and to engage in their own mode of investigation. Research into interpreting during this period, roughly from the mid-seventies to the late 1980s, was dominated by the ideas and the charismatic personality of Danica Seleskovitch, who set up a doctoral program in Translation Studies at the Ecole Supérieure d'Interprètes et de Traducteurs (ESIT) of Université Paris III. Her advocacy-type research into interpreting was centered on her *Théorie du sens* ("theory of sense"), which essentially postulates total deverbalization between comprehension of the source speech and production of the target speech by the interpreter, denies language-pair specific processes and ignores linguistic and cognitive difficulties. Seleskovitch also rejected any intervention of linguistics or cognitive psychology in research on interpreting, as well as experimental research – note that her own doctoral dissertation (Seleskovitch, 1975) was based on an experiment, albeit a very unsophisticated experiment – see later. Under her leadership, many papers and several doctoral dissertations on interpreting were produced, and ESIT became the source of inspiration of aspiring interpreting researchers in the West (in East European countries, Chernov and other Russian investigators took a different path, interacting with psycholinguists, but their work was not available in the West). During this period, interpreting practitioners and interpreter trainers had ample opportunity to reaffirm fundamental aspects of interpreting. They also stressed that consecutive interpreting was an important preliminary step in conference interpreter training because it gave trainees the appropriate analytical approach, whereas learning SI without this preparation entailed the risk of 'parrot-like' transcoding. This 'Practitioners' period' also provided the initial stimulus and motivation for interpreting practitioners to take up research, perhaps because the kind of rationale and writing promoted at that time did not involve abstract theoretical concepts or a complex and rigorous testing procedure, and was perceived as less intimidating and taxing than more conventional types of research. By contrast, these very features of the literature and the rejection of theory and methods from cognate disciplines were self-limiting. Although reflection brought awareness and probably advances in training methodology (see Seleskovitch and Lederer, 1989), it is difficult to pinpoint actual scholarly advances made during that period. Moreover, with its strong stance against experimental disciplines and quantitative, experimental methods, the prevailing paradigm prevented interdisciplinary ventures from being developed, and monopolized research into interpreting to such an extent that individual initiatives which followed different paradigms (such as Barbara Moser's theoretical cognitive–psychology based model, or Linda Anderson's experimental testing of the influence of previous knowledge of the speech and of the availability of the speaker's image) could not be heard. In terms of theoretical and empirical advances, the Practitioner's period was a period of virtual stagnation over 10 years (see Fabbro's warning in Gambier *et al*., 1997: 17).

Actually, many interpreters and interpreter trainers disagreed with some of the premises of the prevailing paradigm, and in particular with the idea that language-specific differences were irrelevant to interpreting performance. A number of them also felt that introspection and prescriptive claims were not enough, and that more systematic scrutiny and testing of the claims were called for, with more scientific criteria, taking inspiration from work done in existing disciplines. Gradually, their views gained strength and visibility. A paradigm change started to emerge, as illustrated and partly triggered by a conference on interpreter training organized by the Translation and Interpreting School (SSLMIT) of the University of Trieste in November 1986 (Gran and Dodds, 1989). The distinctive feature of this conference, convened by a training institution which was not well known at the time, was probably the fact that individual interpreting trainers and representatives of many other training institutions were able to speak out as equals in a setting where representatives of the more prestigious schools were a minority and some of the prevailing ideas were publicly and openly challenged for the first time in a formal meeting of interpreters. At the same conference, the SSLMIT presented its research policy, with an important interdisciplinary component through partnership with neurolinguists. This was the first time that an interpreter training institution formally announced an interdisciplinary research policy. The SSLMIT Trieste also launched *The Interpreters' Newsletter*, the first journal devoted to interpreting research, and followed up with a series of empirical research projects, many of which were conducted for and reported as graduation theses, many of which were conducted with the help or under the supervision of researchers from cognate disciplines. The general orientation chosen by the SSLMIT was subsequently adopted in the CIR community as the new research model which is still followed to this day.

The CIR Community and Its Research Production

Except for occasional authors from the cognitive sciences who are invited to write about their

Table 1 CIR publications production over time

Year	*Total*	*Growth*	*A*	*ACV*	*ACV/A*	*E*	*E/Total*	*M*	*M/Total*	*ME*	*ME%*	*PhD's*
1970–74	63		31	10	32%	12	20%	5	8%			2
1975–79	124	97%	49	26	53%	10	8%	9	7%			5
1980–84	187	51%	85	41	48%	16	9%	19	10%			6
1985–89	316	70%	125	107	86%	35	11%	31	10%	10	32%	11
1990–94	577	83%	244	185	78%	93	16%	57	10%	19	33%	8
1995–99	798	38%	301	201	67%	201	25%	170	21%	75	44%	17
2000–04	938	17%	275	378	138%	316	34%	155	16%	125	81%	18

Figures for 2000–2004 are extrapolated from figures available for 2000–2003.
Column 3: A – articles in journals.
Column 4: ACV – articles in collective volumes.
Column 6: E – empirical studies.
Column 8: M – theses (nondoctoral).
Column 10: ME – empirical theses.
Column 11: ME% – percentage of empirical theses.
Column 13: CV – collective volumes.

disciplines and how they could contribute to CIR, virtually all authors of CIR are interpreter trainers and graduating students. The interest of cognitive psychologists and linguists in interpreting seems to be essentially limited to SI as a model to test their theories. Moreover, the conference interpreting environment is not favourable to experimental research, as is explained later in this article.

Conference interpreters generally earn more money than researchers; students who show talent for research and write good theses tend to go into professional life after graduation, perhaps after writing one paper summarizing their thesis at the request of their supervisors. This also explains why continued commitment to research, especially labour-intensive empirical research, is difficult to find among other members of the CIR community, most of whom are successful interpreters themselves.

Another typical feature of conference interpreters is their educational background: most of them have studied languages, translation or interpreting, but few have studied academic disciplines in curricula offering formal training in research methods (psychology, sociology, the natural sciences, etc.), and only a fraction of those who have completed a Ph.D. in interpreting (fewer than eighty so far) have worked under supervisors with such formal training. This is reflected in some qualitative characteristics of CIR discussed further down.

The data presented here are taken from the CIRIN database, a systematic collection of bibliographical information about conference interpreting. They probably cover rather well books and papers published in the West. Its coverage is more uncertain with respect to MA theses and to publications in East-European, Asian, and Latin-American countries, which are not followed by publications in mainstream journals. Table 1 presents general productivity trends since 1970. At the time this article was written, most of the data for the years 2000 to 2003 was available, and a linear extrapolation over the period 2000–2004 was done on the basis of this information. The following general trends emerge:

1. The total volume of CIR publications, theses and dissertations is small, about 3000 items. There was a spectacular rise in the yearly production from the early seventies to the mid-nineties, with growth rates between 51 and 97% from each five-year period to the next. Growth has continued since, but at a slower rate, between 18 and 38%, with fewer than 200 new texts every year. The fast growth period may correspond to the unused potential of interpreter training programs being realized: interpreter trainers may have been more exposed and attracted to research than in the past, and graduation theses of interpreting students, which used to be devoted to either translation or terminology, were redirected towards research into interpreting. The slower growth in the past few years may indicate that this process has now come to maturation and that the pool of human resources potentially available for research into interpreting, composed almost exclusively of interpreting instructors and interpreting students, is no longer growing significantly.
2. The number of articles in collective volumes is also increasing. From the late 1980s on, they were almost as numerous as papers published in journals. Over the past few years, they have actually been more numerous than papers published in journals. This may be explained by the large number of Translation Studies (TS) conferences

Table 2 Authors of at least four bibliographical CIR items per period since 1980

Country	*1975–79*	*1980–84*	*1985–89*	*1990–94*	*1995–99*	*2000–2004*
Austria		1	2	3	2	2
Bulgaria				1	1	
Canada			1	1		
China					1	6
Czech Republic				2	1	1
Denmark				1	2	1
Finland				1	2	
France	3	5	3	3	3	2
Germany	1	1		3		4
Israel				1	1	1
Italy			1	6	12	6
Japan				4	4	1
Korea						3
Russia	1				1	1
Spain					4	3
Switzerland				1	2	2
UK			2		1	
USA			3	4	2	
UN				1	1	
Total	5	7	12	32	40	33

organized by universities with translator and interpreter training programs in which interpreting researchers take part. These conferences are most often followed by proceedings.

3. The proportion of empirical studies in CIR has been increasing. After the experimental interlude, during which it was relatively high (20% in the first half of the 1970s), it dropped to around 10% during the Practitioners period. In the Renewal period, with its aspiration to more scientific methods, it picked up again, rising regularly to more than 30% in the past few years. Note that the proportion of theses reporting empirical research has been rising to even higher levels, more than 80% over the last five-year period. As theses account for up to close to 20% of the overall production and many of their authors subsequently summarize them in papers, they seem to be good promoters of empirical research.
4. The total number of doctoral and postdoctoral dissertations remains very low, fewer than five a year. This rate is not likely to increase spectacularly, due to economic reasons as explained above. In countries in which the market is relatively slack and getting tenure at university in an interpreter training program requires a Ph.D., as has become the case in Spain recently, there may be more Ph.D.'s in the coming years than in countries in which the market situation is better (Belgium and France, for example), or in countries where teaching positions do not require Ph.D.'s (such as Italy and Japan).

Over the years, the most active centres in terms of publications have shifted. Although in the 1970s French and German authors were the most prolific, in the data available so far on years 2000 to 2004, Italian authors account for 130 bibliographical items, that is, 16% of the total, Chinese authors for 104 items, Spanish authors for 64 items, and Korean and German authors for 47 items each. However, these numbers should be taken with a grain of salt. First, as explained earlier, many authors write a single graduation thesis and never write again, especially in countries such as Finland, Italy, and Spain, where graduation theses are a requirement and supervisors suggest strongly that they be research theses as opposed to annotated translations or glossaries. Second, in some countries, and in particular in mainland China, republication and rerepublication of the same paper are frequent. Third, the number of bibliographical items authored in Interpreting Studies, a recent discipline without a strong research culture (see below), is not necessarily a good indicator of actual research production. A somewhat better indicator is probably the number of active authors in each centre. Most of them try to renew themselves over time, and most of them have some influence on research, if only by inspiring, and sometimes advising newcomers. Table 2 takes as a minimum activity criterion four papers over each five-year period (except for the last period, 2000–2004, for which data were incomplete at the time this article was written). As can be seen, except for a peak in Italy after the Trieste initiative, there are no more than six such

Table 3 MA and graduation theses by country

	Total	*Italy*	*Finland*	*Cz*	*Spain*	*China*	*Germany*
1970–74	5	0	0	3	0	0	2
1975–79	9	0	0	7	0	0	0
1980–84	19	1	0	12	0	0	2
1985–89	31	10 (32%)	0	3	0	0	8 (26%)
1990–94	57	8 (14%)	17 (30%)	3	0	0	18 (32%)
1995–99	170	41 (24%)	30 (18%)	21 (12%)	12 (7%)	15 (9%)	7
2000–03	124	58 (47%)	14 (11%)	11 (9%)	4	23 (18%)	3

active authors in every country. Considering that in the most 'productive' countries, authors come from at least two distinct universities, it is difficult to talk about 'research centers,' possibly with the exception of ESIT during the Practitioners' period, of the Italian translation and interpreting schools at Trieste and Forlì, and of JAIS (the Japan Association for Interpretation Studies). Interestingly, all authors from ESIT were experienced conference interpreters cum interpreter trainers. In Italy, some of the authors are interpreters and interpreter trainers from various universities, and some are graduating students. In Japan, initially, almost all authors were interpreter trainers without any academic affiliation (most of the training is done in private schools): over the past few years, an increasing number of academic authors are not interpreters themselves. All of these features are reflected in both the issues addressed and the type of research carried out.

In a previous analysis of CIR production on data up to and including 1999 (Gile, 2000, Table 3), training accounted for the highest proportion of bibliographical items, around 20%. In the 1990s, it was followed by language and linguistic issues (14%) and by professional issues (12%). Since the year 2000, proportions have not changed much: items addressing training issues still account for 20% of total production, language and linguistic issues account for 14%, and professional issues for 8%.

Because M.A. theses account for a large number of empirical studies and herald the arrival of the next generation of interpreting researchers, it is interesting to take a closer look at their distribution over time (Table 3). It appears that although Charles University, Prague, has had a tradition of graduation theses on interpreting for many years, Italian centers took over the leading rank from the mid-1980s on. Initially, the SSLMIT Trieste was virtually the single contributor to this development. Later, the SSLMIT Bologna in Forlì joined it with a regular, intensive production of theses, most of them empirical. Also note the contribution of Finland, another country with a tradition of theses at the end of translation and interpreting courses. Interestingly, a relatively large number of M.A. theses have been defended in China in the past few years; most of them are not empirical.

For institutional reasons and in view of the limited social importance of conference interpreting (as opposed to court interpreting and community interpreting), this overall pattern does not seem likely to change much in the near future, though more input can be expected from newcomers to the European Union and even more from China, as they join the global movement with their still unused human resources. Some leading members of the CIR community may also turn to court interpreting and community interpreting, when government interest in social and legal issues associated with immigrants and ethnic minorities results in programmes and funds for research in these fields.

Major Issues in the Literature

Training

Training issues have been the most numerous in the literature throughout the development of CIR. There are two main reasons for this: first, training is the one topic that is relevant to all interpreter trainers, that is, virtually all authors in the CIR community; second, texts about training can be descriptive, analytical or prescriptive, and do not require abstract theory or rigorous empirical designs, which makes them easier to write. Indeed, save for a few exceptions, mostly experiments with admission test methods and some investigations on the personality of interpreters which could contribute to better selection of candidates (see for example Kurz, 1996), there are few reports of actual research on training issues. Besides a rather large number of general textbooks (33 in the CIRIN bibliography, including 9 books since 2000), most texts deal with the principles of interpreter training, with ideas about testing, with descriptions of curricula and of specific training methods, with the strengths and weaknesses of specific training exercises, with training approaches, and are written in the form of descriptions, prescriptions and essays.

Conference interpreter training programs share common ground with professional translator

programs: they distance themselves from language acquisition which they place upstream of translator/interpreter training, and focus on skills, in particular analytical skills and strategic decision making. A difference in focus between the two disciplines is that there is much domain-specific training in translation and little domain-specific training in conference interpreting, perhaps because few conference interpreters are specialized in a particular field. Another intriguing point about investigation into conference interpreter training is that there is a resurgence of interest in teaching and learning consecutive. At first sight, this seems surprising, as consecutive has been said to be declining strongly over the past decades. By contrast, training in consecutive is considered indispensable by many trainers, not only as a professional skill which is still in demand but also because it forces students to listen closely and analyze the source speech carefully before reformulating it in the target language, thus teaching and strengthening the right approach before students start learning simultaneous interpreting. What may be even more important is that research into consecutive, and especially training in consecutive, is convenient: consecutive notes are good indicators, there is a large pool of students for naturalistic and experimental studies, and the classroom environment is valid both for training and for research.

Language Issues

During the Practitioners' period, discussion of linguistic theories and language-related issues was not encouraged: proponents of the mainstream school of thought claimed that they belonged upstream of interpreting, that the interpreting process was language-independent, and that any study of particular characteristics of single languages or language pairs (in contrastive studies) in the framework of discussions of interpreting would confuse issues from different realms. A radical change occurred in the late 1980s, at the start of the Renewal period. A number of authors, including interpreting instructors and graduating students, started examining the problems and strategies associated with interpreting in specific source-language target-language combinations. Although most authors in the Practitioners' period referred to English, French and German, authors now draw on their experience with other languages, including East-European and Asian languages. The influence of text linguistics is also felt, in particular with some interest in cohesion and coherence. However, as is explained below, the main focus of CIR is cognitive, and language issues are mostly analyzed against this background, in particular with a strong presence of pragmatics (Setton, 1999).

Cognitive Issues

SI involves heavy cognitive pressure. This is partly what attracted cognitive psychologists in the 1960s, and this is probably the most central issue around which most of CIR gravitates, just as the 'free-versus-literal' translation issue has always been central to translation theory. Several statements found in the writings of proponents of ESIT's 'theory of sense' show that they were aware of the problem, but they never integrated it into their theory, possibly in an effort to keep linguistics and psychology outside CIR. Note that, during the same period, the interpreter's cognitive limitations were incorporated into Ghelly Chernov's 'probability prediction model,' which centered around the idea that human speech contains much redundancy and that interpreters can interpret simultaneously despite the difficulty of the task by anticipating the speech to an increasing extent as it unfolds. Chernov's model was never cited by ESIT authors, and further investigation into cognitive aspects of interpreting had to wait for the Renewal period before being taken up widely. Also in the mid-1970s, Barbara Moser, a young graduate of the interpreting program in Innsbruck, developed an information-processing model of interpreting (see Moser, 1978; also see Setton, 2003) based on Massaro's model of speech comprehension, and basically traced the flow of information from the perception of sound patterns to feature detection to words, phrases, then to higher level units in successive steps, with the recurring storage of output units in 'generalized abstract memory.' This relatively detailed information-processing model does not incorporate elements to account for difficulties interpreters have in either understanding the source speech or reproducing the target speech (see later), or strategies they use to overcome them. Hella Kirchhoff from Heidelberg may have been the first interpreter to devote serious theoretical thought to the issue of cognitive load (see her 1976 paper in Pöchhacker and Shlesinger, 2002) and to the results of saturation of the interpreter's available cognitive resources. In the early 1980s, Gile, who was not aware of Kirchhoff's work (during the Practitioners' period, little information was being disseminated on research outside the prevailing paradigm – the IRTIN network, now renamed CIRIN, was set up in 1990 to change this), developed a set of 'Effort Models' in a similar mindset: he considered that both simultaneous and consecutive interpreting were taxing cognitive operations which easily saturated available processing capacity

and caused weaknesses in the interpreter's output (see for example Gile, 1995). In his model of SI, he divided operations into a Listening and Analysis Effort, a (short-term) Memory Effort, and a (target speech) Production Effort. Each of these Efforts had nonautomatic components and therefore required processing capacity, and managing attention between the Efforts required a further Coordination Effort. According to the model, interpreting could only function if:

1. The interpreter's total available capacity exceeded the total requirement of these three Efforts and the Coordination Effort.
2. At any time during the interpreting process, enough processing capacity was allocated to each of the Listening, Memory and Production tasks at hand.

Gile attributed most of the errors, omissions and other weaknesses in interpreting output to failure to meet these conditions due to capacity overload or capacity management errors. This accounted for many problems observed in daily practice and noted in the literature, including difficulties with read speeches, with fast speakers, with strange accents, with enumerations, numbers and proper names, and explained through a 'carryover effect,' some errors and omissions in source speech segments without identifiable difficulties. Gile's "tightrope hypothesis" posits that interpreters work close to saturation, and many events occurring during interpreting tip the scales and generate errors and omissions.

Saturation phenomena also account for many problems in consecutive interpreting, which consists of two phases. During the listening phase, the interpreter's attention is shared between listening and analysis, memory, and note production in much the same way as it is shared between listening, memory, and speech production in simultaneous interpreting. The reformulation phase is less critical (Gile, 1995).

The main functions of online strategies in simultaneous interpreting are to prevent such problems from occurring or to contain their effects, typically by controlling cognitive load. Such online strategies include stalling until further information comes in, using hypernyms, lowering memory load by unloading information in neutral sentence beginnings, anticipating, etc. (see *inter alia* Gile, 1995). Some strategies are language-pair specific, in their frequency if not in their nature. For instance, when word-order differences between source- and target language are likely to force interpreters to wait until they can reformulate the relevant source speech phrase or sentence, they often start with neutral sentence beginnings rather than commit themselves or wait until the full source-speech sentence is available before they start reformulating it. In consecutive, most strategies also have a strong cognitive-load management component and are related either to note-taking and note-reading or to target speech reformulation.

Interpreting directionality (working from one's foreign or B language into one's native or A language, or the other way around) can also be discussed in terms of cognitive load and the tightrope hypothesis: assuming processing capacity required for comprehension and production is lower in one's A language than in one's B language, when conditions are such that comprehension is difficult (strange accent, poor listening conditions, etc.), it makes sense to work from one's A language; when production is likely to be more difficult (when the speaker is fast, when it is particularly important to use elegant language, etc.), it makes sense to work into one's A language. Under simultaneous interpreting conditions, there may also be language specific difficulties: accents and dialects may be more of a problem in Arabic, Chinese, and Swedish than in French, English, and Spanish, and production may be more difficult in languages with numerous embedded structures, in which the content of the beginning of a sentence must be kept in working memory longer on average than in languages with fewer embedded structures, and in languages with a rigid word order, where syntactic decisions must be made early on in the sentence and may force interpreters to wait longer before making such decisions. Interpreting directionality is far less critical in consecutive, since the two languages are not simultaneously present in working memory and word order and ambiguity do not pose online problems: most of the time, consecutive interpreters can base their production decisions on far larger chunks than simultaneous interpreters (several sentences as opposed to a phrase or single sentence). This could explain the fact that many conference interpreters who refuse to work into their B language in simultaneous do accept assignments in consecutive in the same A-into-B direction.

All these issues point to the essential role of working memory in interpreting. This topic has attracted much attention over the past two decades or so, the main question being whether interpreters have an especially efficient working memory which allows them to handle at the same time comprehension of the incoming source speech, production of their target speech, monitoring of their target speech, and problem-solving when difficulties arise. In her doctoral dissertation defended in 1995, Presentación Padilla found higher memory spans in interpreters than in non-interpreters. In a more recent dissertation, Minhua Liu (2001) found that the interpreters'

advantage resides not in a higher overall working memory capacity, but in more efficient processing of domain-specific operations. Christoffels (2004) also found higher memory capacity in interpreters than in other subjects. The most recent and sophisticated cognitive model of interpreting is Setton's (1999) relevance theory and mental models theory-based construct. Setton assigns much weight to pragmatic markers, which, he claims, counterbalance to a large extent the potential effects of syntactic differences between source language and target language.

Neurolinguistics

The important role neurolinguistics played in the development of CIR in the early 1990s is mostly due to the partnership established in Trieste between interpreter trainers and neurolinguist Franco Fabbro. Much of the work was focused on investigating lateralization patterns in interpreters, but initial findings suggesting more balanced involvement in both hemispheres in interpreters were contradicted by ulterior results, and at this point, the evidence is inconclusive (see Pöchhacker, 2004: 114).

Neurophysiological indicators in the form of EEG tests, PET tests, hormone tests, skin conductance tests, pupil dilation tests, blood pressure measurement, etc., also were used for other investigations, in particular as indicators for cerebral and other physiological activity in various tasks including interpreting into A and into B and for stress investigations. Some interdisciplinary initiatives with neurophysiology were taken by Ingrid Kurz in Vienna (see Kurz, 1996), and others by Jorma Tommola in Finland and Barbara Moser-Mercer in Switzerland. However, technical and methodological problems make it difficult to use such tests widely, and as pointed out by Michel Paradis and others during discussions in various conferences, findings of brain imaging techniques such as irrigation patterns and electrical activity in different parts of the brain are difficult to interpret with respect to issues interpreters are interested in.

Quality

Interpreting quality is probably the topic on which the largest amount of empirical research has been carried out so far. Starting with a survey among interpreters by Bühler in 1986, several other surveys, in particular by Ingrid Kurz, tried to determine the relative weight given to various aspects of interpreting quality (including content parameters, language parameters and delivery parameters) by various groups of users of their services. On the whole, user expectations tend to focus on content rather than on form, and some differences can be observed in the priorities of users from different groups. However, actual user reactions to interpreting output seem less clear cut. In particular, intonation and voice quality may be far more important than conceptual hierarchization in user expectation surveys suggests (see, for instance, Collados Aís *et al.*, 2003; Shlesinger, 2004). In addition to variability in quality expectations, there seems to be high variability (and low interrater reliability) in actual evaluations (see, for example, Gile in *Target* 7:1, Gile, 1999). This may be due to variability in personal norms and preferences (see for instance Kopczynski, 1994; Gile, 1999), to variable interindividual sensitivity and to attention fluctuations. In some cases, interpreters know their clients' preferences: summarizing in some circumstances, translating as accurately as possible every phrase in the source speech, focusing on synchronicity (when interpreting for the media), etc. When such preferences are not known, the interpreters' norm by default seems to give the highest priority to restitution of informational content, followed by clear and pleasant delivery.

Methodological Issues

Until the late 1980s, research into interpreting was mostly carried out in two very distinct ways. Interpreting practitioners proceeded mostly by introspection and intuition, and illustrated their theories with examples rather than backing them with strict hypothesis-testing. The prevailing idea was that naturalistic research was the only ecologically valid one, though interestingly, Seleskovitch's only empirical study, carried out for her doctoral thesis (see Seleskovitch, 1975), was experimental: she asked 12 interpreters to do a consecutive interpretation of two English speeches into French and looked at their notes for indicators of the process. The actual data collected in the few empirical studies carried out by interpreting practitioners who followed the same stream were mostly examples of specific words or phrases found by interpreters to render ideas expressed by specific words or phrases in the source speech, and inferences were made on that basis only.

This 'liberal arts paradigm,' as it was christened by Barbara Moser-Mercer (1994), is one conventional type of academic discussion, an extension of the classical philosophical and religious debate. In the case of written translation, it has a long-standing tradition and still accounts for a large number of texts in the literature. There are, however, three reasons that might explain why the way it was implemented in CIR during the Practitioners' period has generated strong opposition. First, in contrast to the conventional type of procedure in the humanities, authors

tended to proclaim their own ideas and ignore authors with different opinions. Strong claims were made, some of which went against what other interpreters and interpreter trainers believed was true. Some interpreters and interpreter trainers with a different mindset considered that making such claims without seeking to back them with systematic evidence was counterproductive. The most controversial point was perhaps the exclusion of language-specific issues from public debate.

From the early 1980s on, interpreters who aspired to more systematic exploration of reality and testing of theories (Linda Anderson, Daniel Gile, Jennifer Mackintosh, Barbara Moser-Mercer, Catherine Stenzl, and others) started to call for a different way of doing research on interpreting. Stenzl and Gile, in particular, pleaded for naturalistic studies which would provide more data on what actually happens in the field. This call is in line with a classical exploration pattern in empirical disciplines, where naturalistic studies give rise to theories, which are then tested by experimental methods. Interestingly, in interpreting studies, development was different. Psychologists started out with experimental exploration right away, thus missing the opportunity to gather data that might have helped prevent some methodological weaknesses, whereas interpreting practitioners chose an introspection-based prescriptive path. These choices are understandable: psychologists had already developed theories and tried to apply them to and to test them through interpreting, while interpreters had the feeling they knew their trade inside out and did not see the need to test their knowledge step by step in a slow process. Moreover, they correctly identified ecological validity issues in the psychologists' work, and apparently did not see how to bridge the gap. As aspiration to more scientific exploration of interpreting gained influence, investigation of interpreting in the interpreters' community divided into two streams. One was the liberal arts paradigm, and the other, which seems to have become the prevailing approach, is what Moser-Mercer calls the 'natural science paradigm,' and corresponds to what is traditionally known as the 'scientific approach' or 'scientific method.' This second stream can also be divided in two substreams. The first implements the more traditional experimentalist approach, generally with specific hypotheses, classical experimental designs and inferential statistics as the decision-making tool. This is the line followed by researchers from the cognitive sciences, such as Fabbro, Lambert, Liu (2001), and, most recently, Christoffels (2004). However, in the CIR environment, this type of research encounters serious obstacles, the two most important ones being the following:

1. Variables that exert strong influence on interpreting output are numerous. They include the source language, the target language, the spontaneous, semispontaneous, or prepared nature of the speech, delivery speed, the speaker's intonation, the speaker's accent, the logic of the speech, information density of the speech, syntactic structures in the speech, including the length of sentences and the number of embedded structures, the quality of the sound reaching the interpreter, the interpreter's knowledge of the subject matter, experience, training, mental and physical state, motivation, visibility of the speaker from the booth, the number of delegates who listen to interpreting, the interpreter's relations with other colleagues in the team, etc. This results in much variability (highlighted in particular in Lamberger-Felber, 1998), hence the need for large samples and many replications of experiments before findings can be considered robust.
2. Only a few hundred interpreters at most are concentrated in interpreting centers such as Brussels, Paris, London and Tokyo, only a fraction of these are willing to serve as subjects for experiments, and only a fraction of potential volunteers have the required language combination, experience, specific type of training and working languages required for a given experiment or set of experiments. In practical terms, it is therefore very difficult to find enough subjects for experimental studies to cover all the experimental conditions being investigated in a sufficient number of specific constellations of values of relevant parameters.

As a result, few studies fulfilling the standard requirements of experimental research have been carried out so far, and the pool of confirmed findings of such studies is still very small. When replications are carried out, findings are often contradictory (see, for example, Christoffels's data on recall as opposed to Gerver's or Lambert's in Christoffels, 2004).

The second stream of research in the 'natural sciences paradigm' is compatible with the same fundamental principles but does not seek the same level of precision. Rather, it conducts naturalistic research and experimental research with generally simple design and mostly less sensitive/accurate tools. Typically, studies in this category involve interpreting of authentic or quasiauthentic speeches at different delivery speeds, with or without prior preparation, with or without particular accents, with or without body language, interpreting the same speech in simultaneous and consecutive and comparing the two, interpreting

the same speech into different languages and comparing strategies, etc. Typically, assessment of the output is based on examination of errors and omissions, strategies, retrospective comments, etc., and no inferential statistics are used. This approach possibly represents the best compromise in the conference interpreting environment in its present state:

1. It is a way of increasing substantially the volume of empirical studies in CIR: such studies can be carried out without much training and skills in sophisticated experimental design and without much manipulation, and are therefore within the reach of motivated interpreter trainers and graduating students. Moreover, without inferential statistics, they can be conducted as small scale studies (no minimum sample size is rerquired) and replicated often (see the methodological discussion in Gile, 1999).
2. Ecological validity is better in such studies than in experimental setups involving control of every feature of the source speech and where recall tasks, articular suppression, the presence of physical devices such as electrodes or chin rests and other extraneous factors may interfere with the process or the interpreter's output.
3. The lesser precision of the tools used is not necessarily a problem, due to high variability in interpreting. Significant but small differences found on small samples without replications and under uncertain ecological validity may be less relevant to the interpreting community than differences large enough to be detected with blunt tools in ecologically more valid experiments which can be replicated more easily.

In other cases, modern technology and the nature of the phenomena being studied do make it possible to be very precise when maintaining ecological validity. For instance, it is now possible to measure the interpreter's lag behind the speaker, or compare the speaker's and interpreter's pauses, or analyze prosody very accurately with inexpensive sound processing software, and these possibilities are being leveraged by interpreting researchers (see, for instance, Mead, 2002; Ahrens, 2004).

Over the past decade or so, many empirical studies based on good ideas were published by interpreter trainers and graduating students. The status of their findings, however, is often uncertain, due to severe methodological flaws (shared by authors of research into written translation – see for example Gile and Hansen, 2004). These reside more in the rationale than in the implementation of research techniques, and include designs which do not take into account confounding variables, unsubstantiated claims, incorrect inferences, comparison of noncomparable entities, invalid indicators, overgeneralization, etc.

Interestingly, such flaws are found not only in studies by graduating students but also in the work of highly motivated, thorough interpreters who have acquired considerable theoretical knowledge. Their root cause is most probably the fact that they were never trained in empirical research methods and never acquired the norms of rigorous rationale which are an essential part thereof. There is also some tension between proponents of the more scientific approach, who have claimed that followers of the liberal arts paradigm are not rigorous enough and make many unsubstantiated claims, and the latter, who accuse the former of empiricism and of neglecting theory (see, for example, Pöchhacker's criticism and Gile's response in Schäffner, 2004).

Interdisciplinarity

Linguistic aspects of interpreting and attention-sharing phenomena clearly call for interdisciplinarity with linguistics and cognitive psychology in research into conference interpreting (Gran and Dodds, 1989; Kurz, 1996), and other fields such as sociology, law, and communication theory are clearly important in the study of community interpreting, court interpreting and interpreting for the media. After the Practitioner's period, conference interpreting researchers turned to cognitive science, and many authors have massively used theoretical concepts from linguistics and cognitive science, in particular Kurz, Moser-Mercer, Padilla, Setton and Liu. Authors from cognate disciplines have not reciprocated and do not use concepts and theories from CIR. This can be partly explained by gaps between the respective foci of the two communities. Even when they write about conference interpreting, some mistake it for simultaneous interpreting, some assert that consecutive interpreting requires special long-term memory skills whereas authors in the literature explain their view that this is not the case, some make assumptions about the history of the interpreters' bilingualism without regard to studies in which interpreters provide relevant data about the issue. These few examples can be taken as an indicator of their lack of regard for the CIR literature. Perhaps most CIR publications fail to meet their standards, as suggested by a statement by Gran and Fabbro to that effect in Gambier *et al.* (1997: 19). Most of their publications remain within the paradigms, theories and bibliographical references of their own disciplines, and only a few refer to more than a token sample of CIR publications. In addition to methodological issues, this asymmetry is probably due to the lower sociological status of

interpreting research. Most of the successful co-operative ventures between interpreters and researchers from cognate disciplines were carried out within the relevant cognate discipline with respect to both the methods and research questions (in particular working memory issues and neurolinguistic issues), and promoters of interdisciplinarity such as Gile, Pöchhacker, and Shlesinger have recently expressed disappointment with the results so far. The effective evolution of interdisciplinarity is still an open issue.

The Future

The future of conference interpreting is uncertain. In the world of science and technology, an increasing number of delegates now use English and do without interpreting services. Even in international organizations, there is an increasing tendency to hold meetings in English. In future years, the conference interpreting market may stagnate or even shrink, and migration from CIR toward research into other forms of interpreting may occur. This may result in some loss with respect to research on the specific features of conference interpreting and conference interpreters, but may also be associated with some gain, in particular as regards psychosociological aspects of interpreting (see, for example, Schäffner, 2004).

See also: Sign Language: Interpreting.

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Configurationality

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In most of the languages explored in depth by contemporary linguistic theory, subjects and objects can be distinguished from one another by structural configuration. In these languages, a variety of phenomena suggest that there is a structural asymmetry between subjects and objects, such that verbs and their objects form a constituent (traditionally called a 'predicate' or, more recently, a 'verb phrase' (VP)) that excludes the subject. The resulting structure for a sentence can thus be represented as in (1) (order not relevant):

(1)

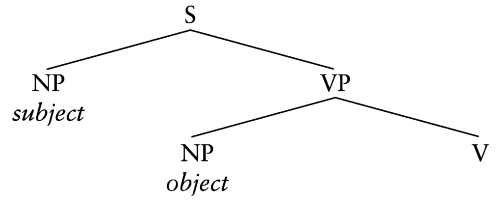

Evidence for this comes principally from word order, substitution, idioms, and binding asymmetries. In terms of word order, it is observed that most languages have a basic identifiable order in which the object is adjacent to the verb (SOV or SVO), and other permissible orders are derived from this (even languages whose basic order is VSO, in apparent contradiction of this claim, have been persuasively argued to derive this order from an underlying representation in which verb and object are adjacent; e.g., for Irish, see McCloskey, 1983). Furthermore, it is usually possible to move the object alone, or verb and object as a unit, but not the verb and subject, without the object:

(2a) Hamlet loves his mother
(2b) his mother, Hamlet loves
(2c) loves his mother, Hamlet does
(2d) *Hamlet loves, does his mother

Note also the evidence from substitution in (2): the pro-form *do* can stand in for a verb plus its object, but not a verb plus its subject (without the object). Likewise, coordination of verb plus object is more grammatical than coordination of (transitive) verb plus subject, without object:

(3a) Hamlet loves his mother and hates his uncle
(3b) ??Hamlet hates and Gertrude loves Claudius

Although many speakers find (3b) acceptable, almost all agree that it is at least questionable compared to (3a).

It has been observed that languages often have idiomatic expressions composed of a verb and its grammatical object, where these units have a special noncompositional meaning. Examples from English include *kick the bucket* (meaning 'die') and *shoot the breeze* (meaning 'engage in idle conversation'). No such fixed idioms consisting of a transitive verb and its subject (but with an object varying in reference) have been found to exist.

The difference in hierarchical depth between subject and object, indicated in (1), is held to be responsible for asymmetries in the use of pronouns and anaphors, as in (4). The precise structural conditions on binding of pronouns and anaphors have been

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Configurationality

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In most of the languages explored in depth by contemporary linguistic theory, subjects and objects can be distinguished from one another by structural configuration. In these languages, a variety of phenomena suggest that there is a structural asymmetry between subjects and objects, such that verbs and their objects form a constituent (traditionally called a 'predicate' or, more recently, a 'verb phrase' (VP)) that excludes the subject. The resulting structure for a sentence can thus be represented as in (1) (order not relevant):

(1)

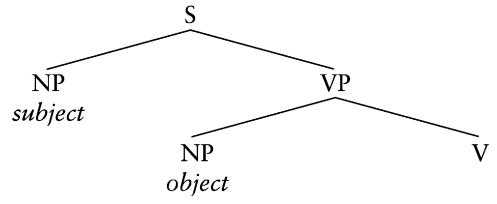

Evidence for this comes principally from word order, substitution, idioms, and binding asymmetries. In terms of word order, it is observed that most languages have a basic identifiable order in which the object is adjacent to the verb (SOV or SVO), and other permissible orders are derived from this (even languages whose basic order is VSO, in apparent contradiction of this claim, have been persuasively argued to derive this order from an underlying representation in which verb and object are adjacent; e.g., for Irish, see McCloskey, 1983). Furthermore, it is usually possible to move the object alone, or verb and object as a unit, but not the verb and subject, without the object:

(2a) Hamlet loves his mother
(2b) his mother, Hamlet loves
(2c) loves his mother, Hamlet does
(2d) *Hamlet loves, does his mother

Note also the evidence from substitution in (2): the pro-form *do* can stand in for a verb plus its object, but not a verb plus its subject (without the object). Likewise, coordination of verb plus object is more grammatical than coordination of (transitive) verb plus subject, without object:

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The difference in hierarchical depth between subject and object, indicated in (1), is held to be responsible for asymmetries in the use of pronouns and anaphors, as in (4). The precise structural conditions on binding of pronouns and anaphors have been

treated by a number of researchers (e.g., Chomsky, 1981).

(4a) Hamlet doubted himself
(4b) *himself doubted Hamlet
(4c) *he_i doubted $Hamlet_i$

The notion of a configurational distinction between subject and object was taken for granted in many theories of grammar until the 1980s, and it was even claimed to be universal. In many modern Generative theories (e.g., GB theory (Chomsky, 1981) or the 'minimalist program' of Chomsky (1995)), the notion of configuration is so central that the grammatical functions of subject and object are defined by their hierarchical position in phrase structure.

The Problem of Nonconfigurationality

The universality of structural subject–object asymmetries was challenged by a swathe of articles in the early 1980s, based on hitherto lesser known languages such as Warlpiri (Hale, 1980, 1983) and Papago (Jelinek, 1984).

These languages, it was argued, showed very little evidence that subject and object are in an asymmetrical configurational relationship. Most of the tests for configurationality, described previously, do not apply in these languages. Constituent order is very free indeed, to the point where a basic order of subject, verb, and object cannot be identified (and therefore orders in which the subject intervenes between the verb and its object cannot be said in any meaningful sense to be derived from orders in which verb and object are adjacent). These languages lack pro-forms such as English *do* that can stand in for a verb plus its object, and the sorts of binding asymmetries demonstrated in (4) do not exist.

Such nonconfigurational behavior is actually typical of a very large number, if not the majority, of Australian languages, some of which provide even stronger arguments against configurational structure than does Warlpiri (e.g., Jiwarli (Mangala), discussed in Austin and Bresnan, 1996).

These languages tend to have not only very free constituent order but also free word order altogether so that two words, both construed with the same argument, can be separated by other material. The resulting structures are often referred to as 'discontinuous NPs' or 'discontinuous constituents.' The following example is from Jingulu (Djingili; Pensalfini, 2003):

(5a) murrkulyi miyi-ngirru-nu karruji
three *kill–1PL.EXCL-PAST* *spider*
'we killed three spiders'

(5b) dardu-wala-rni maja-ni-ngurru-ju
many.people-ERG *get-INVERSE–1PL.INCL-PRES*
wajbala-rni
whitefella-ERG
'lots of white people took photos of us'

In (5b), for example, the words *darduwalarni* and *wajbalarni* could both be said to be part of the subject (both are marked with the Ergative suffix, which marks transitive subjects), but they are separated by the verb. In languages such as Jingulu, a sentence consisting of n words can be expressed in $n!$ ($n \times (n\text{-}1) \times (n\text{-}2) \times \ldots, \times 1$) different orders without altering the basic meaning of the sentence, regardless of how those words group into larger constituents. That is, a three-word sentence has 6 ($3 \times 2 \times 1$) different possible orders, a four-word sentence has 24 ($4 \times 3 \times 2 \times 1$) different possible orders, and a six-word sentence would have 720 ($6 \times 5 \times 4 \times 3 \times 2 \times 1$) different possible orders. It has been observed, however, that different orders tend to focus different elements of the sentence (Blake, 1983).

Generative syntax has long assumed that linear ordering of words is indicative of hierarchical grouping, that elements which form structural constituents will occur as groups of adjacent words. This has been clearly formalized in Kayne's (1994) notion of antisymmetry. Nonconfigurational languages, with their freedom of constituent order and discontinuous constituents, posed an immediate problem for syntactic theory.

What Is a Nonconfigurational Language?

It was soon observed that nonconfigurational languages often show clusters of properties other than freedom of word order (Jelinek, 1984). The lack of apparent binding asymmetries such as those exemplified in (4) is an example. These languages also typically allow the subject and object of a sentence to remain unexpressed by overt NPs (null anaphora). Many have rich agreement systems (although others lack agreement systems altogether, as pointed out by Austin and Bresnan, 1996).

Freedom of word order, however, was the property that continued to dominate discussions of nonconfigurationality, such that by the late 1980s, researchers were claiming the label 'nonconfigurational' for any language that showed relative freedom of constituent order, such as German and Japanese. Hale (1989) argued that there was no one set of properties that all nonconfigurational languages shared. Pensalfini (1992) showed that even within one language family, the Pama–Nyungan languages of Australia, there was significant variation in how much freedom of word

order was allowed among 'free word order languages,' with free constituent order, discontinuous constituents, and free word order within NP constituents being essentially independent properties.

It was soon demonstrated, however, that many of the languages with relatively free constituent order could be accounted for by way of movement from a basic underlying order. For many languages, such as German (Webelhuth, 1989) and Japanese (Saito, 1989), a basic order was easy to determine, and deviations from it could be explained by way of a movement for focusing or other pragmatic purposes that is known as 'scrambling.' Further exploration of pragmatically based ordering in Hungarian led Kiss (1995) to propose the 'discourse configurational' type of language.

Even some kinds of NP discontinuity could best be explained in this way. In both Polish (Siewierska, 1984) and Panyjima (Panytyima; Dench, 1991), two words both associated with object function can be found straddling the verb, as in (6) (Panyjima; Dench, 1991: 182):

(6) ngunha yukurru **ngatharntu-ku**
that *dog* *my*-ACC
ngarnha-nha **mantu-yu**
eat-PAST *meat*-ACC
'that dog ate **my** meat'

In these cases, the preverbal component of the NP is typically a demonstrative or pronoun, and the element is associated with focus, so that these are best analyzed as involving movement to a preverbal position associated with that pragmatic function. A basic word order is easily identified in these languages.

However, the problem of the original nonconfigurational languages such as Warlpiri still remains. Although some attempts have been made to describe word order in these languages as being motivated primarily by pragmatic concerns (Blake, 1983; Mithun, 1987), these cannot explain the choices between all possible orders (there are not as many shades of meaning as there are available orders in a six-word sentence ($6! = 720$ orders)). These truly nonconfigurational languages pose the significant question of whether there are languages whose structure is radically different, 'flatter,' than that of familiar languages, and thereby to what extent the notion of a universal syntactic base (as argued by Chomsky and many others for decades; e.g., Chomsky, 1987) is viable.

Several researchers have argued that despite their apparently unconstrained surface syntax, there is strong evidence for a structural asymmetry between subjects and objects even in nonconfigurational languages. Laughren (1989), working on Warlpiri, for example, points to the fact that reflexive/reciprocal morphology can only ever bind objects to subjects and not vice versa, as well as the fact that in nonfinite eventive clauses it is only ever the subject that can be controlled (and it alone cannot be overtly expressed).

Analyses of Nonconfigurationality and Their Consequences

Analyses of nonconfigurationality generally fall into one of two camps: the flat-structure analyses, which deny the presence of subject–object asymmetries in phrase structure (in these languages), and those that claim that the standard structural asymmetries apply but are obfuscated by other considerations. In fact, the question of nonconfigurationality is one to which different theoretical formalisms pose very different answers.

Into the first camp fall modular theories of syntax, such as lexical functional grammar (LFG; Bresnan, 2001), autolexical syntax (Sadock, 1991), and generalized and head-driven phrase structure grammars (Gazdar *et al.*, 1985; Pollard and Sag, 1994). In these approaches, grammatical relations are not constructed by hierarchical constituent structure but by other parallel yet independent modules of grammar (in LFG, 'subject' and 'object' are in fact syntactic primitives). Distinctions between subject and object therefore need not be reflected by different hierarchical embedding in phrase structure. These theories typically have no problem accounting for the most readily identifiable characteristics of nonconfigurationality: free word order, discontinuity, and null anaphora. These theories typically do not make use of movement or empty categories.

The clearest account of nonconfigurationality in a modular theory is that of Nordlinger (1998). Nordlinger argues that case or agreement morphology can construct grammatical relations such as subject and object in a level of functional structure, distinct from configurational phrase structure, and that therefore no appeal to phrase structure asymmetries is needed to define grammatical relations.

On the other hand, serial derivation approaches, such as GB theory (Chomsky, 1981) and minimalism (Chomsky, 1995), rely crucially on the notion that basic grammatical relations are constructed in phrase structure, and therefore surface syntax must contain a reflex of the asymmetry between relations. Any surface phenomena that do not directly reflect these asymmetries must be relatable to an asymmetrical structure by way of constrained movement or relations between overt and null elements in syntax.

Proponents of serial derivation approaches, such as Baker (1996, 2001) and Pensalfini (2004), have

argued that asymmetrical subject and object argument positions occur in nonconfigurational languages as in all others, but that in these languages these positions cannot be filled by overt material. Rather, these positions are obligatorily filled by null arguments (*pro*) that are linked to overt material (typically noun phrases) by a variety of syntactic devices that are also found in configurational languages.

Evidence for these claims is drawn primarily from the fact that even the most highly nonconfigurational languages show some evidence of structural determination of grammatical functions. As previously discussed, this evidence includes the existence of interclausal control and binding of reciprocal/reflexive elements. Manning and Sag (1999) showed that within modular theories of syntax, some of these asymmetries can be accounted for without reference to phrase structure. However, further evidence for structural asymmetries remains, such as the existence of incorporation hierarchies and strict ordering in certain kinds of subordinate clauses in Warlpiri. Incorporation in Mayali (Gunwinggu), otherwise a classically nonconfigurational language, provides particularly strong evidence for phrase structure asymmetries. In Mayali ditransitive clauses, a direct object can be incorporated only if the indirect object has been incorporated, but an indirect object can be incorporated independently of the direct object (Evans, 1994):

(7a) an-barndadja (an-mim)
CLASS-*owenia_vernicosa* CLASS-*fruit*
gu-wukku ngarri-wo-ni
LOC-*water* 1A-*put*-PAST.IMPERF
'we used to put Owenia vernicosa (fruit) in water'

(7b) (an-barndadja)
CLASS-*owenia_vernicosa*
ngarri-mim-bo-wo-ni
1A-*fruit-water-put*-PAST.IMPERF
'we used to put the fruit (of Owenia vernicosa) in water'

(7c) an-barndadja (an-mim)
CLASS-*owenia_vernicosa* CLASS-*fruit*
ngarri-bo-wo-ni
1A-*water-put*-PAST.IMPERF
'we used to put Owenia vernicosa (fruit) in the water'

(7d) * an-barndadja gu-wukku
CLASS-*owenia_vernicosa* LOC-*water*
ngarri-mim-wo-ni
1A-*fruit-put*-PAST.IMPERF

In most contemporary theories of grammar, the indirect object in a ditransitive is held to be configurationally 'closer' to the verb than the direct object (Larson, 1988). The data in (7) show that incorporation follows the head movement constraint (Travis, 1984), with the closest argument being incorporated before more distant ones.

Clearly, the debate over nonconfigurationality, and whether it provides evidence for one particular architecture of grammar over another, is far from over. The ramifications of this debate are far-reaching, having implications for universal grammar and language acquisition. If a structural asymmetry between subject and object relations is indeed universal, then asymmetrical hierarchical structure could be posited as something that comes 'for free,' as part of the biological endowment of the human species. If, on the other hand, it is shown that some languages do not have these asymmetries in phrase structure, asymmetrical hierarchical phrase structure is something that must be learned.

See also: Australian Languages; Autolexical Syntax; Constituent Structure; Head-Driven Phrase Structure Grammar; Idioms; Incorporation; Minimalism; Polysynthetic Language: Central Siberian Yupik; Warlpiri; X-Bar Theory.

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Congo, Democratic Republic of: Language Situation

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The Country

The Democratic Republic of Congo (D.R.Congo) is the third-largest country of Africa, after Sudan and Algeria. It occupies most of central Africa and stretches from the Atlantic Ocean in the west to the great lakes and volcanic ranges of the of the Great African Rift Valley in the east (Lake Albert, the Ruwenzori Mountains on the border with Uganda, Lake Edward, Lake Kivu, and Lake Tanganyika). Most of the country lies in the vast Congo River basin, but in the northeast, its waters flow to the Nile River. Across the northern part of the country stretches the Ituri rain forest, Africa's largest remaining forested area, inhabited among others by a number of Pygmy groups.

The country has had various names: during the colonial period, it was first called Congo Free State, then Belgian Congo. At independence in 1960, it became Republic of Congo. Under President Mobutu Sese Seko it was first called Democratic Republic of Congo, but in 1971 he changed the name of the country as well as the name of its major river to Zaire. When President Laurent Kabila took power in May 1997, he immediately changed the name of the country back to Democratic Republic of Congo. It is also called Congo-Kinshasa to distinguish it from its neighbor to the west, Congo-Brazzaville, a former French colony.

The People

The population of D.R.Congo exceeds 50 million. The majority, especially those who speak Bantu languages, are agriculturalists. Similarly, speakers of most Central-Sudanic languages also lead an agricultural lifestyle, which they supplement with livestock, like goats and chickens. The Nilotic groups are traditionally seminomadic cattle herders, although many of them live a settled life and have agricultural activities as well.

The languages of the pastoral groups are rich in specific cattle terms: different lexical items are used for specific types of cattle according to the shape of their horns, their skin color, and sometimes details about their tail. A number of these pastoralist people have mixed and intermarried with people speaking

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Central-Sudanic or Bantu languages in the east of the country, and some have adopted the language of the people with whom they have mixed. In particular, the northern Hema (Gegere) in the northeast, who have mixed with the agricultural Lendu people, have adopted Lendu as their language, but they have not abandoned their original cattle culture.

The BaShi, who speak the Bantu language MaShi, live around Bukavu. They are cattle people, as are the BanyaMulenge, who live south of Bukavu, and whose language is most closely related to the Bantu language KinyaRwanda [Rwanda]. In the northern forest live bands of Pygmies. They are hunter-gatherers, and generally speak the language of the people with whom they most interact: some speak Central-Sudanic languages such as Lese; others speak Bantu languages.

The Language Situation

The language situation in D.R.Congo is complex in that the country has an official language, four languages of wider communication (LWCs), and over 200 local languages.

Official Language

The official language of the D.R.Congo is French, a legacy of the colonial era. It is the language used in the politico-administrative system, in international commerce, in the educational system beyond the first few years of primary school, and for all other official purposes.

Languages of Wider Communication

Between French as the official language and the more than 200 local languages, there are four major lingua francas or languages of wider communication: Lingala/Bangala, Swahili, Kikongo/Kituba, and Tshiluba [Luba-Kasai]. All of these are Bantu languages, which have acquired many millions of second-language speakers. In urban environments, many children grow up speaking one (or more) of these LWCs. The schools, which are for the most part administered by the various Christian denominations, use the LWC of the area as a medium of instruction in the first few years of primary school. This means that children acquire their basic reading skill in one of these LWCs, while at the same time beginning to learn oral French, the language in which they continue their education.

Lingala/Bangala The origin of Lingala is found in the northwestern Equateur province, in the area of the Ubangi River and its tributaries. It has gradually developed into a language of wider communication both in a southwesterly direction, towards the capital Kinshasa, and to the northeast as far as Isiro and Aba, at the border with Sudan and Uganda. The pidginized variety of the northeast is called Bangala; it has many words in common with the traditional Congolese variety of Swahili, Kingwana. The language as it is spoken in Kinshasa today has incorporated many loan words from French, while still using the Lingala grammatical structures. Lingala is probably the fastest-spreading language of the four LWCs, since it is the language of the army, and the language of popular music.

Swahili/Kingwana Swahili is spoken as a second language in the eastern part of D.R.Congo, from Lake Albert in the north to the Zambian border in the southeast, with Kisangani as its western boundary. Present-day Congolese Swahili differs from the Tanzanian standard, both grammatically and lexically. Words are borrowed from French, rather than from English, as in Tanzania and Kenya. Certain grammatical features of Tanzanian Swahili are not used in Congolese Swahili, and conversely, speakers of Congolese Swahili employ certain grammatical constructions that are nonexistent in East African Swahili. It must be said that there is still considerable regional variation, and a standard Congo Swahili has yet to emerge. In spite of the differences, speakers from Bunia, Kisangani, Bukavu, and Lubumbashi understand each other.

In addition to the regional variations, each person has at least two varieties or 'levels' of Swahili at their disposal: a colloquial Swahili, for daily use, and a 'higher' variety, used for more official purposes, in which they try to speak a variety as close to East African Swahili as possible, to the extent that the speakers have mastered it at school. East African Swahili is in the eyes of many speakers the 'real' Swahili. There is a lot of code-switching between local languages, Swahili, and French when people converse informally.

Swahili entered Congo from the east, through the activities of Tippu Tip, a Zanzibari who led trading expeditions for gold, ivory, and slaves through Tanzania into Congo. The towns of Kasongo and Kabambare were centers of his activities, and in this area (southwest of Bukavu) to this day, a variety of Swahili is spoken that is closest to the Tanzanian standard. His trading routes led him all the way to Kisangani, which is the westernmost point of the Swahili-speaking area today.

Kingwana is an old and very simplified variety of Swahili which was probably heavily influenced by native languages of the area. It was widely spoken in the east of Congo, and was considered the

language of the Muslims. These days, it is not commonly heard. Over time, many of the peculiarities of vocabulary, pronunciation, and grammar that distinguished Kingwana from Swahili have disappeared.

KiKongo This language is referred to by a variety of names: Kituba, Monokutuba or Munukutuba, and Kikongo ya leta (State KiKongo). Its heartland is the area between the Kwangu and Kwilu rivers, in Bandundu Province. This language is also spoken in Brazzaville, and to a degree also in Kinshasa. Munukutuba is the LWC of the southern part of Congo-Brazzaville.

KiKongo originated as a pidgin in the late 15th century, as a contact language between speakers of mutually unintelligible varieties of KiKongo who were involved in trading along the Congo River, prompted by the Portuguese presence on the coast. At that time, it did not develop into a creole language, with native speakers perpetuating its use. However, the construction of the Brazzaville–Pointe Noire railroad at the beginning of the 20th century gave it new life, and by the 1940s, it had gained a community of native speakers. It can be considered an African-based creole, and has developed a written form.

Tshiluba Tshiluba (Luba-Kasai) is both a vernacular and a widespread lingua franca in the southern provinces of Western and Eastern Kasai. It should not be confused with KiLuba, a vernacular language of Katanga.

Local Languages

The majority of the more than 200 local languages spoken in D.R.Congo are Bantu languages. They belong to the Niger-Kordofanian language phylum. The Adamawa-Ubangi subfamily of Niger-Kordofanian is also represented in D.R.Congo by languages of the Ubangi subgroup in the north and northeast of the country. The second major language phylum to which a number of Congolese languages belong is Nilo-Saharan. They belong to two subgroups: Central Sudanic and Nilotic. The non-Bantu languages are situated in areas bordering Uganda, Sudan, and the Central African Republic. The Bantu languages stretch out towards the west, south, and east, bordering a number of other African countries where Bantu languages are spoken, from Congo-Brazzaville and Angola in the west and southwest to Uganda, Rwanda, Burundi, and Tanzania in the east, and Zambia in the southeast.

Bantu The Bantu languages spoken in D.R.Congo belong to zones B, C, D, H, J, K, L, and M of Guthrie's (1967–1971) classification. Some of these languages are very closely related, e.g., MaShi and Haavu [Havu] (spoken near Lake Kivu and on Ijwi Island in Lake Kivu respectively), to the point of (near) mutual intelligibility. Others have a surprisingly low number of cognates with neighboring Bantu languages, e.g., KiTalinga [Talinga-Bwisi] (on the southern foothills of the Ruwenzori mountains, and called LuBwisi in Uganda) and neighboring Nande, a language spoken by some three million people in the North Kivu province.

There are several so-called border-Bantu or semi-Bantu languages situated in the northeast, bordering languages from the other three subfamilies. Although they have substantially different vocabulary from Bantu languages spoken further south, the main reason for calling them border-Bantu or semi-Bantu lies in the fact that they have partly or wholly lost a functioning noun-class and agreement system. Komo, Bira [Bera], Bila, Bhele, and Humu (called Amba in Uganda) are a group of related languages, which show an animate–inanimate distinction in nouns (visible in plural forms and agreement markers), rather than a noun-class system. Still, they have vestiges of a former noun-class system in the form of petrified prefixes. Budu, Ndaka, Nyali, and Vanuma are another group of related languages which have a reduced noun-class system. This last group has another interesting feature, namely the existence of nine-vowel systems with Advanced Tongue Root (ATR) vowel harmony. Bantu languages farther south have seven-vowel systems with ATR harmony (Nande, KiTalinga) or without ATR, and five-vowel systems. Some of the noun classes in a few languages (Bua, Lika) have class suffixes. This trait seems to have characterized a number of other languages now probably extinct. Nyanga-li and Gbati-ri are two of these, here written with a hyphen to show the presence of a noun-class suffix in the language name itself.

Ubangi Ubangi forms the eastern branch of Adamawa-Ubangi (formerly Adamawa-Eastern). Ngbandi, Ngbaka, and Zande are major languages within this group, spreading into the Central African Republic and Sudan. Sango, the national language of the Central African Republic, is a Ngbandi-based creole.

Central Sudanic All four subgroups of Eastern Central Sudanic (also called Moru-Mangbetu) are represented in the Orientale province: Moru-Madi (also in Uganda and Sudan), Lendu (with Lendu and Ngiti), Mangbetu-Aswa, and Mangbutu-Efe. The latter two comprise a number of closely related speech varieties, some of which are spoken by Pygmy bands.

Nilotic Only two languages represent this subfamily in D.R.Congo: Kakwa (Eastern Nilotic) and Alur (Western Nilotic), which forms the end point of the Alur-Acholi-Lango-Luo continuum, which stretches through Uganda and Sudan as far as Kenya.

See also: Adamawa-Ubangi; Bantu Languages; Nilo-Saharan Languages; Swahili.

Language Maps (Appendix 1): Maps 5, 8–11.

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Congo, Republic of: Language Situation

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The Republic of Congo (pop. 3 447 000 in 2000; U.N. 2001 estimate) consists of two primary linguistic zones: a northern zone, where Lingala is the lingua franca, and a southern zone, where Munukutuba is the lingua franca (see **Figure 1**). Lingala and Munukutuba have the status of 'national' languages, while French is the 'official' language of government and education. Local vernacular languages have no official status in Congolese language policy. Christian missions and nongovernmental organizations are permitted nonetheless to work in the local languages, and several vernacular Bible translation and literacy projects are underway. For helpful overviews of Congolese and Bantu languages, see the *Atlas linguistique du Congo* (1987), Grimes (2000), Guthrie (1967), Jacquot (1971), and Nurse and Philippson (2003).

Lingala Zone Vernacular Languages

The Lingala zone languages are mainly of the Mbosi group (Guthrie's C–10, C–20; 1967) and the Teke group (C–30 and B–70) but there are also a few Guthrie A languages in the far north near the Cameroon border and a few other Guthrie B languages along the western border with Gabon. There are a small number of non-Bantu Adamawa-Oubangian languages in the north as well. The numerically and politically important language groups in the Lingala zone are Teke B–70 and Mbosi C–20. The authors identify 38 vernaculars in the Lingala zone (see also Grimes, 2000, for comparable statistics). Detailed lexical, grammatical, and phonological studies are available for many Lingala-zone Congo languages. See, for example, Bedrosian, 1996; Dzokanga, 1979; Gardner, 1990; Kourata, 2001; Leitch, 2003; and Nzete, 1975.

Munukutuba Zone Vernacular Languages

The Munukutuba (also called Kituba) zone languages are primarily Guthrie H–10 languages, all closely related culturally and all deriving from the ancient Kongo (or 'Koongo') Kingdom. These languages are

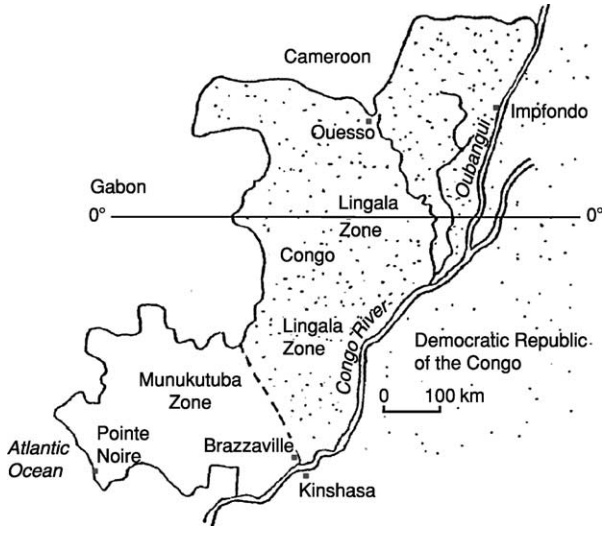

Figure 1 Map of the two lingua franca zones in Congo.

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See also: Adamawa-Ubangi; Bantu Languages; Nilo-Saharan Languages; Swahili.

Language Maps (Appendix 1): Maps 5, 8–11.

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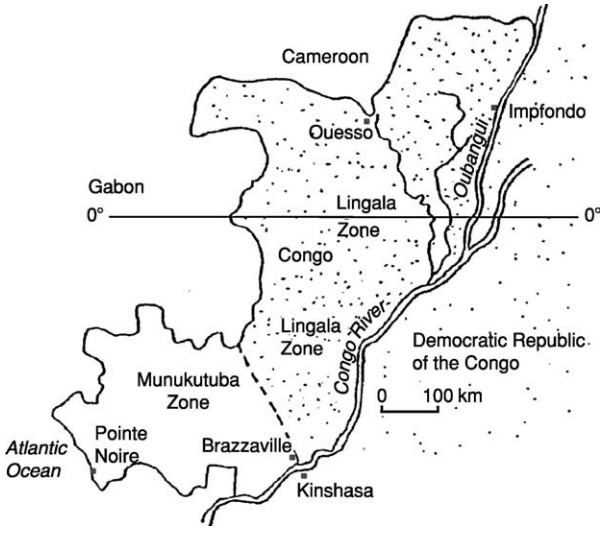

Figure 1 Map of the two lingua franca zones in Congo.

spoken from Brazzaville all the way to the Atlantic coast, and there is a high degree of mutual intelligibility between them. There are also a smaller number of Teke, Eshira-type, and Nzebi-type languages in the south close to the Gabon border. The authors identify 25 distinct vernaculars in the Munukutuba zone. Numerous linguistic studies have been published on these languages, some of them quite old. See, for example, Bentley, 1887; Buchanan, 1996; Jacquot, 1982; Laman, 1936; Lumwamu, 1973; and Ndamba, 1977.

Multilingualism

There is a pervasive pattern of trilingualism in Congo involving vernaculars, lingua francas, and French (see Leitch, 1989; Ndamba, 2000). Vernacular monolingualism is rare but attested in isolated corners of both the north and the south. In some isolated areas, vernacular usage dominates lingua franca usage, as with the Babole people who live in Epena District (Leitch, 1990). More commonly, especially in rural areas with easy access to urban centers, vernaculars and the lingua franca compete to varying degrees. In large regional towns like Impfondo (north) and Nkayi (south), the lingua franca dominates, and vernacular varieties can be threatened where traditional village territories and urban settlements correspond. This is the case with the Mbonzo community in Impfondo and the Ifumu (Teke) communities near Brazzaville.

French is dominant in most written domains and in many middle-class urban families. The use of Lingala and Munukutuba in radio and television is significant, because news, religious programs, and family health information are regularly broadcast in these languages, competing successfully against entrenched French usage in these domains. To date, written Lingala and Munukutuba have not made significant inroads, and French is the primary written language. The Kongo dialect Lari enjoys a special status in the Pool region and some neighborhoods of Brazzaville, where it is learned as a lingua franca instead of or in addition to Munukutuba or Lingala.

Brazzaville

Brazzaville, the capital of Congo, has seven municipal divisions ('arrondissements'), each with unique sociolinguistic dynamics resulting from the mixing of populations drawn to the city from the northern and southern zones. The population of Brazzaville has grown rapidly: from 340 000 in 1975 to 1 306 000 in 2000 (U.N., 2001b). In 2000, Brazzaville held about 37% of the population of Congo. Ndamba *et al.* (1992) documented language use in major markets of four of the seven arrondissements of Brazzaville; the results are shown in Table 1.

In official usage the neighborhoods are numbered as shown in the left column of Table 1. Although all three of the Lingala-dominant 'northern' neighborhoods are 'mixed,' Moungali is **more** mixed than the other two, with a relatively lower rate of Lingala usage and proportionately higher rates of Munukutuba and Lari usage. The dominance of Lari is especially dramatic in the Bacongo market figures. Together, Lari and Munukutuba make up over 80% of the Bacongo market language use, reflecting the dominant southern makeup of that quarter. It is worth noting that Lari usage dominates Munukutuba usage even in the primarily Lingala-speaking neighborhoods. In general, vernacular usage is shown to be quite limited in Brazzaville urban markets (Ndamba *et al.*, 1992).

In related research, Ndamba (2000) (see also Nkouka, 2000) showed that urban youth are shifting toward usage of French and lingua francas. The group studied claimed to no longer be learning the vernacular languages of their parents, even when both parents spoke the same vernacular. The late elementary school and high school adolescents in the Ndamba (2000) study claimed language use profiles as in Table 2.

What was particularly noticeable in the Ndamba (2000) study of Brazzaville youth was the lack of reported vernacular usage in all cases and the preponderance of French dominance. Most of the students claimed French dominance and a slightly smaller

Table 1 Language usage in Brazzaville markets (Ndamba, 1992)

#	*Arrondissement*	*Provenance*	*Market languages of Brazzaville*				
			Lingala	*Munukutuba*	*French*	*Lari*	*Vernaculars*
1	Makélékélé	Mainly south					
2	Bacongo	Mainly south	4.48%	15.73%	12.20%	**64.44%**	2.37%
3	Poto-Poto	North but mixed					
4	Moungali	North but mixed	**62.37%**	11.49%	6.10%	18.03%	1.75%
5	Ouenzé	North but mixed	**75.4%**	2.71%	7.25%	9.9%	4.55%
6	Talangai	North but mixed	**78.9%**	3.18%	8.50%	7.80%	1.62%
7	Mfilou	Mainly south					

Table 2 Home languages of adolescents in Brazzaville (Ndamba, 2000; Nkouka, 2000)

#	*Arrondissement*	*Provenance*	*Adolescent language use in Brazzaville*					
			Lingala	*Munukutuba*	*French*	*Lari*	*Bilingual*	*Other*
2	Bacongo	Mainly south	4%	9%	**31.88%**	23%	29.68%	2.44%
4	Ouenzé	North but mixed	26.22%	0.72%	**33.60%**	2.45%	35.73%	1.28%

number claimed lingua franca dominance: Bacongo, 23% Lari and Ouenzé, 25% Lingala. Munukutuba dominance was claimed at 9% in Bacongo, and only weakly in Ouenzé, overall relatively insignificant. About a third claimed to be equally fluent (bilingual) in French and the lingua francas. These same tendencies were observed in the larger urban centers of Pointe Noire, Dolisie, and Nkayi. In 2000 the overall urban population of Congo was 1 800 000 (U.N., 2001b), so slightly over half of all Congolese lived in urban settings in 2000. Pervasive urbanization, rural exodus, and lingua franca dominance are correlated. The lingua francas French, Lingala, Munukutuba, and Lari all have considerable prestige status, as they are associated with urban life and economic activity, with French at the top of the status pyramid and the lingua francas ranged below, their relative status depending on factors already mentioned. Urban attitudes toward vernaculars correspondingly tend to be negative, with local languages being associated with the village and with old age or childhood, presumably because anyone in between would have already moved to the city and learned a lingua franca. The lingua francas are thus becoming the new urban vernaculars, the mother-tongues of a whole generation of urban Congolese (Ndamba, 2000). However somber this picture is of local language attrition in favor of French and lingua francas in general, local vernaculars still thrive in some settings, such as the Babole communities along the Likouala-aux-Herbes River in the Lingala zone (Leitch, 1989). Urban poverty and unemployment mean that at least some rural areas are still attractive to the current generation of younger Congolese.

See also: Bantu Languages; Language Maintenance and Shift; Multilingualism: Pragmatic Aspects.

Language Maps (Appendix 1): Maps 5, 8–11.

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Connectives in Text

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Connectives are one-word items or fixed word combinations that express the relation between clauses, sentences, or utterances in the discourse of a particular speaker. More generally, a connective indicates how its host utterance is relevant to the context. Often, discourse segments are not explicitly introduced by connectives. However, languages provide extensive repertoires of connective expressions. This article reviews work on connectives in monological stretches of discourse; a considerable part of this work, which has become an important topic for linguists, discourse analysts, and psychologists, has also been motivated by a more general interest in the structure of discourse and of linguistic communication.

The category of 'connectives' differs from that of 'discourse markers' in several respects (Schourup, 1999; *see* **Discourse Markers** and **Particles in Spoken Discourse**). Whereas discourse markers are commonly regarded as not affecting the truth conditions of their host sentences and are typically only loosely connected to their host sentence in terms of syntactic structure, connectives may be either truth-functional or non-truth-functional and may be tightly integrated in the syntactic structure of the sentence. Common examples of discourse markers are *anyway* and *well*. Common examples of connectives are conjunctions (*and*, *because*, *so*), but in many languages adverbial expressions may also relate sentences, such as *hence* in English, *daarom* in Dutch, or *darum* in German. The categories of discourse markers and connectives overlap for non-truth-functional conjunctions such as *so*.

Some authors have argued that discourse markers may evolve out of connectives (Traugott, 1995). For instance, Günthner (2000) has shown that the German subordinating conjunction *obwohl* is increasingly used for introducing sentences with main clause word order; this use no longer expresses the usual concessive relation but rather a restriction on the validity of the preceding utterance (*see also* **Concessive Clauses**). Again, the degree of syntactic integration seems to be the defining feature here for discourse marker status.

In this article, the discussion is confined to written discourse. Interesting as it may be, analyses of the use of connectives in conversations are not pursued, other than mentioning the work of Günthner (2000) and comparing the work of Schiffrin (1987), Ford (1994), and Couper-Kühlen (1996) (*see also* **Particles in Spoken Discourse**). Two questions regarding connectives are addressed:

1. What do they mean and how can their meanings be classified?
2. What role do they play in language learning, language acquisition, and discourse processing?

The Semantics of Connectives

The meaning of connectives has been investigated by linguists from different theoretical traditions, such as relevance theory (Blakemore, 1988a; Carston, 1993), discourse representation theory (Jayez and Rossari, 2001; Txurruka, 2003; *see also* **Discourse**

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Connectives in Text

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Connectives are one-word items or fixed word combinations that express the relation between clauses, sentences, or utterances in the discourse of a particular speaker. More generally, a connective indicates how its host utterance is relevant to the context. Often, discourse segments are not explicitly introduced by connectives. However, languages provide extensive repertoires of connective expressions. This article reviews work on connectives in monological stretches of discourse; a considerable part of this work, which has become an important topic for linguists, discourse analysts, and psychologists, has also been motivated by a more general interest in the structure of discourse and of linguistic communication.

The category of 'connectives' differs from that of 'discourse markers' in several respects (Schourup, 1999; *see* **Discourse Markers** and **Particles in Spoken Discourse**). Whereas discourse markers are commonly regarded as not affecting the truth conditions of their host sentences and are typically only loosely connected to their host sentence in terms of syntactic structure, connectives may be either truth-functional or non-truth-functional and may be tightly integrated in the syntactic structure of the sentence. Common examples of discourse markers are *anyway* and *well*. Common examples of connectives are conjunctions (*and*, *because*, *so*), but in many languages adverbial expressions may also relate sentences, such as *hence* in English, *daarom* in Dutch, or *darum* in German. The categories of discourse markers and connectives overlap for non-truth-functional conjunctions such as *so*.

Some authors have argued that discourse markers may evolve out of connectives (Traugott, 1995). For instance, Günthner (2000) has shown that the German subordinating conjunction *obwohl* is increasingly used for introducing sentences with main clause word order; this use no longer expresses the usual concessive relation but rather a restriction on the validity of the preceding utterance (*see also* **Concessive Clauses**). Again, the degree of syntactic integration seems to be the defining feature here for discourse marker status.

In this article, the discussion is confined to written discourse. Interesting as it may be, analyses of the use of connectives in conversations are not pursued, other than mentioning the work of Günthner (2000) and comparing the work of Schiffrin (1987), Ford (1994), and Couper-Kühlen (1996) (*see also* **Particles in Spoken Discourse**). Two questions regarding connectives are addressed:

1. What do they mean and how can their meanings be classified?
2. What role do they play in language learning, language acquisition, and discourse processing?

The Semantics of Connectives

The meaning of connectives has been investigated by linguists from different theoretical traditions, such as relevance theory (Blakemore, 1988a; Carston, 1993), discourse representation theory (Jayez and Rossari, 2001; Txurruka, 2003; *see also* **Discourse**

Representation Theory), systemic functional linguistics (Halliday and Hasan, 1976; Martin, 1992), and cognitive linguistics (Pander Maat, 1999; Pit, 2003; *see also* **Cognitive Linguistics**). Some linguists concentrate on a particular connective (e.g., Txurruka, 2003) and others compare or classify connectives (e.g., Knott and Sanders, 1998).

A much debated issue in analyses of particular connectives is whether the different contexts of use for a connective can be subsumed under a general, abstract meaning (the minimalist view) or whether different uses should be distinguished (the maximalist position). Consider *and* (Carston, 1993; Pander Maat, 2001; Txurruka, 2003). The general issue here is whether *and* has any specific content beyond its traditional truth-functional interpretation of '&'. Authors who propose an affirmative answer to this question propose fairly abstract meanings; for instance, Pander Maat (2001) and Txurruka (2003) seemed to agree that *and* signals the existence of a common discourse topic for the related utterances, although they offered different conceptualizations for the notion of discourse topic and used different methodologies.

Connectives other than *and* – for instance, *but* – have an even wider range of uses. As an example of the minimalist approach, Janssen (1995) proposed such a general meaning for the Dutch *maar* ('but'), which covers meanings that are differently lexicalized in other languages: German has both *aber* and *sondern*, Spanish has *pero* and *sino*; the second item expresses only so-called substitutive adversativity, such as in *he is not rich but poor* (see Rudolph, 1996: 131–144). Janssen argued that this substitutive interpretation shares the notion of restriction with the more general adversative meaning in *he is short but brave*. Another example of a unification attempt is provided by Vlemings (2003), who explored the relation between discourse marker uses of French *donc* ('so') and its use as a marker of argumentative inference. Unlike the inferential uses, the discourse marker *donc* may be used in isolated utterances – that is, without referring back to the linguistic context. For instance, a mother may suddenly say *tais-toi donc!* to her noisy child in the theater. Vlemings argued that on a higher level of abstraction, even the discourse marker use may fit into the inferential scheme of modus ponens, when the extralinguistic context is considered as providing the minor premise.

It is quite difficult to formulate unified accounts of various extensions of connectives in such a way that they can be tested empirically. Typically, unification proposals allow for interactions between contextual features and the categorical meaning that may result in quite specific and very subtle interpretations. In our view, corpus data and reader response data should be used to lend some empirical substance to the postulated interpretational procedures. After all, the decisive issue is not whether some unifying semantic bridge can be constructed between various uses: this is only to be expected, given that they are diachronically related. What really counts is whether the postulated abstract meaning is relevant for language users producing and understanding particular uses of the connective.

Another approach to the analysis of connectives compares and classifies connective meanings in terms of the discourse relations they may express. This line of work takes as its starting point a classification of coherence relations in discourse (for more discussion on discourse relations, *see* **Clause Relations**, and **Rhetorical Structure Theory**). For example, Sanders *et al.* (1992) have proposed several cross-cutting parameters to order the set of coherence relations. Consider the following examples:

(1) Gareth gets on well with Betty. He loves disco music; she loves it *too*.

(2) Gareth and Edith have different musical tastes. He loves disco music, *while* she despises it.

(3) Gareth grew up during the 1970s, *so* he loves disco music.

(4) Edith grew up during the 1970s, *but* she despises disco music.

The relations in Examples (1) and (2) have something in common, because they both compare two individuals. The relations in Examples (3) and (4) can also be argued to have something in common, because they both rely on a piece of presupposed knowledge, namely, that people who grew up during the 1970s are likely to love disco music. Note also that the difference between Examples (1) and (2) resembles the difference between Examples (3) and (4). If you negate the last clause in Examples (1) and (3), the resulting relations are the same as those in Examples (2) and (4), respectively, and the conjunctions must be changed to restore coherence. We can hypothesize that the relations in these examples are composite constructs, defined in terms of two primitive bivalued parameters: one parameter might distinguish between *comparative* (or *additive*) and *causal* relations, and the other might distinguish between *positive* and *negative* relations. Elaborating this simple account of relation semantics involves framing suitable definitions for these and other parameters. Combinations or parameter values yield a considerable range of relational types.

One of these further parameters might be called the *discourse level* of the relation: many authors have

proposed a distinction between a *semantic* (or *ideational*, or *external*) level of relations and a *pragmatic* (or *internal*) level (the first of them being van Dijk (1979) and Halliday and Hasan (1976); see also Redeker (1990) and Sanders *et al.* (1992)). 'Semantic' relations hold between the propositional content of the two related discourse segments, i.e., between their locutionary meanings; 'pragmatic' relations, on the other hand, involve the illocutionary meaning of one or both of the related segments. To illustrate, consider the following examples:

(5) The neighbors left for Paris last Friday. *So* they are not at home.

(6) The lights in the neighbors' living room are out. *So* they are not at home.

The relation in Example (5) can be interpreted as semantic because it connects two events in the world; our knowledge allows us to relate the segments as coherent in the world. A relation like that in Example (5) could be paraphrased as 'the cause in the first segment (S1) leads to the fact reported in the second segment (S2)' (Sanders, 1997). In Example (6), however, the two discourse segments are related because we understand the second part as a conclusion from evidence in the first, and not because there is a causal relation between two states of affairs in the world: it is not because the lights are out that the neighbors are not at home. The causal relation in Example (6) could be paraphrased as 'the description in S1 gives rise to the conclusion or inference formulated in S2'. Hence the relation in this example is pragmatic. The use of the connective *so* in both examples suggests that it can operate at different levels of representation within a discourse, indicating a causal relation either at the level of propositional content or at the level of speaker intentions or illocutionary force (see the various contributions to Knott *et al.* (2001)).

A classification like this may be used both for analyzing discourse relations and for analyzing the meanings of connectives. One of the questions it leads to is: to what degree do connectives have specialized meanings, in that they express specific values of classificational parameters? For instance, *but* expresses all kinds of contrastive (negative) relations (Spooren, 1989), whereas *although* seems to specialize in causal negative relations (Pander Maat, 1998). A classification also invites the analysis of semantic contrasts and parallels. For instance, when *but* is taken to indicate negativity, may *and* be considered to be its parallel on the positive side? Finally, we may ask whether different parameters are entirely independent. For instance, the orthogonal design of the classification implies that both positive and negative relations may be semantic and pragmatic. However, an inspection of negative relations when indicated by connectives shows that expectations are being denied here. Expectations can be seen as a kind of inference of speakers and hearers, so that it may be asked whether negative relations are not pragmatic (epistemic) by definition (Pander Maat, 1999).

We now focus on the particular relational subdomain of positive causal relations. There has been a lively debate about the degree to which causal connectives indicate the discourse level of the causal relation. As mentioned previously, many authors have presented a dichotomy between semantic and pragmatic levels of relations. Some authors propose finer distinctions, such as Sweetser's (1990; see also Verstraete, 1998) threefold distinction between *content* relations (roughly the same as semantic relations (see Examples (7) and (8)), *epistemic* relations (see Example (9)), and *speech act* relations (see Example (10)):

(7) The baby is crying because it is hungry.

(8) I went home because I felt tired.

(9) The baby is hungry, because it is crying.

(10) What are you doing tonight, because there is a good movie on.

That is, the level of coherence may be further distinguished according to whether inferences or speech acts are being related to earlier information. The notion of epistemic coherence has also been approached in terms of polyphony (Ducrot, 1983) and mental spaces (Verhagen, 2000; Dancygier and Sweetser, 2000).

A number of publications have dealt with the question whether connectives specialize in expressing semantic or pragmatic relations. In English, *because* may express both interpretations, whereas *since* seems to be specialized for pragmatic interpretations. Similar observations have been made for German, French, and Dutch connectives (see Pit, 2003), with the difference that these languages have a more differentiated repertoire of connectives than English seems to have. The same kinds of differences have been observed for forward-looking causal connectives such as English *that's why* and *so*, Dutch *daarom* and *daardoor*, and French *de ce fait* and *c'est pourquoi* (on the one hand) and *alors* and *donc* (on the other) (Pander Maat and Degand, 2001; Jayez and Rossari, 2001). The general picture emerging from these studies is that connectives do specialize, although their semantic interrelations are more complex than a simple one-to-one assignment from

connectives to classes of coherence relations would suggest (Knott and Dale, 1994; Knott and Sanders, 1998).

Besides these empirical issues, researchers in this field have embarked on a conceptual debate on how this distinction should be defined. As another approach to the differences exemplified in Examples (7)–(10), a number of authors have tried to provide a unified analysis of discrete distinctions, such as semantic-pragmatic and content-epistemic-speech act, in terms of a scalar feature, i.e., degree of subjectivity (Pander Maat and Sanders, 2001; Pander Maat and Degand, 2001; Pit, 2003). This proposal was motivated by a number of recurrent problems that could not be solved in terms of discrete twofold or threefold distinctions. For one thing, there appear to be two kinds of content causal relations: volitional causality concerns reasons for actions (see Example (8)) and nonvolitional causality concerns causes and consequences. Many languages encode this distinction between volitional and nonvolitional causality in their connective repertoire, but this distinction cannot be accounted for in the current frameworks. Second, many connectives that may express epistemic relations may also express volitional relations, but not nonvolitional relations. This suggests that volitional and epistemic relations have something in common that is lacking in nonvolitional relations. Third, some connectives (e.g., Dutch *daarom* and French *c'est pourquoi*) may be used to express epistemic relations based on forward causality (see Example (11)) but not epistemic relations based on backward causality ('abductive relations'; see Example (12)). And connectives that may express abductions (e.g., Dutch *dus*, French *donc*, and English *so*) may also express speech act relations (see Example (10)):

(11) The baby misses its mother. It will probably start crying soon.

(12) The baby misses its mother. It has been crying for half an hour now.

Observations such as these have led to the hypothesis that connective meanings encode different degrees of subjectivity. Subjectivity is defined here as the degree to which a subjective participant is implicitly responsible for the causal relation. The present speaker is taken to represent the maximal degree of subjectivity for a participant, so that subjectivity can also be called the degree of speaker involvement. The scale of subjectivity seems to run as shown in Figure 1. The subjectivity hypothesis has been supported by corpus findings indicating that, for instance, Dutch *dus* and French *donc* ('so') systematically occur more in subjective environments than their counterparts *daarom* and *c'est pourquoi* do, though there is a certain overlap (Pander Maat and Degand, 2001). In a larger study, Pit (2003) found analogical subjectivity differences between *omdat* and *want* in Dutch, *parce que* and *car* in French, and *weil* and *denn* in German. Of course, the subjectivity of the connective context is not evidence alone for a claim concerning the subjective meaning of the connective, though it certainly points in a certain direction. Hence it is important to back these claims up further by experimental evidence. For instance, Pander Maat and Sanders (2001) had participants choose the most appropriate connectives to fit into contexts that differed on subjectivity variables.

Such a scalar conceptualization allows for a number of specific predictions concerning the semantics of connectives. For instance, connectives should occupy a contiguous area on the scale: we should not encounter connectives that encode volitional relations and noncausal epistemics, but not causal epistemics. An important advantage of such an approach is that it may explain how the choice of a connective may contribute to the relational interpretation. For instance, somebody motivating his actions using *donc* strongly presumes that his decisions follow a generally acceptable pattern of reasoning.

Relevance theorists (*see* **Relevance Theory**) have chosen a quite different approach for handling semantic differences such as the ones in Examples (7)–(10). These theorists are critical of the entire notion of connectives 'expressing' discourse relations (Blakemore, 1988b; Rouchota, 1998). Instead, they propose two distinctions. The first is between conceptual and procedural meaning (*see* **Meaning, Procedural and Conceptual**). Conceptual connectives such as *because*, like most words, encode constituents of conceptual representations of utterances. Other causal expressions, such as *because of* and *bring about*, do exactly the same. By contrast, 'procedural' connectives such as *but* and *moreover* encode information about the inferential process needed to provide an optimally relevant interpretation of an

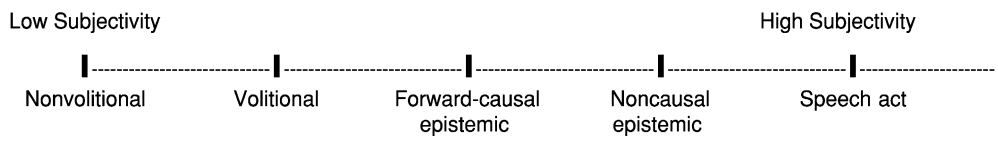

Figure 1 Causal relations scaled in terms of subjectivity.

utterance. The second distinction is the one between truth-conditional and non-truth-conditional meaning (*see also* **Truth Conditional Semantics and Meaning**). Generally, conceptual connectives affect the truth conditions of utterances. An utterance *X because Y* differs in its truth conditions from *X and Y*, because it is true only if *X causes Y*. But procedural connectives need not affect truth conditions. For instance, *but* is taken to suggest some contrast between the conjoint utterances. But is this contrast part of the truth conditions? This does not seem to be the case, because the truth conditions of the following two complex utterances do not differ:

(13) If Tom is here *and* Anne isn't then we cannot play bridge.

(14) If Tom is here *but* Anne isn't then we cannot play bridge.

Both utterances state that we cannot play bridge if (a) Tom is here and (b) Anne is not here.

It seems only natural that procedural connectives do not contribute to truth conditions, since the question of truth of falsity does not arise for the computations they encode: the computation may just run successfully or fail. Yet, other procedural connectives do not give such clear results in the test of conditional embedding. For instance, *so* has been dubbed procedural by relevance theorists (Blakemore, 1988a), but it in the following examples it certainly seems to affect truth conditions in that it introduces a cause–consequence relation into the propositional interpretation:

(15) The mushrooms served at the restaurant were poisonous. So, Bill died.

(16) If the mushrooms served at the restaurant were poisonous and so Bill died, then his family should be compensated.

Conversely, conceptual connectives have speech act uses in which their effects on truth conditions are less than clear:

(17) Will Mary resign? Because she keeps on fighting with the boss.

Rouchota (1998: 39) proposed to deal with this kind of use in terms of what relevance theorists have called 'higher level explicatures,' i.e., a secondary proposition (see the italicized part in Example (18)) framing the primary one:

(18) *I ask you* whether Mary will resign *because she keeps on fighting with the boss*.

By considering the secondary proposition as truth evaluable in its own right, one could rescue the notion that conceptual connectives affect truth conditions.

To sum up, the relevance theoretic approach tries to capture the differences in the 'levels of interpretation' in terms of two dichotomies, ending up with four categories of connectives:

- Conceptual/basic proposition (e.g., *because* in Example (7))
- Conceptual/higher level explicature (e.g., *because* in Examples (10) and (17))
- Procedural/affecting truth conditions (e.g., *so* in Example (15))
- Procedural/not affecting truth conditions (e.g., *but* in Example (14))

How does this approach relate to the subjectivity approach sketched previously? There is certainly a relation between subjective involvement and procedural meaning, in that procedures focus on inferential computations that have no counterpart in external reality but are related to cognitive operations performed by subjects of consciousness. A major difference between the relevance theoretic approach and the work reviewed previously is that relevance theorists assume that the semantic status of connectives is fixed: *because* encodes a concept, whereas *so* encodes a procedure, no matter their context of use. The theorists on subjectivity, including others such as Jayez and Rossari (2001), consider connectives as flexible operations that may take different kinds of entities as their input (real-world situations, beliefs/epistemic states, and speech acts), although not every input is allowed. That is, *so* may operate both on epistemic entities and real-world situations, but imposes constraints on the types of input (in the subjectivity approach, these constraints relate to subjectivity) and on the kinds of relations between the inputs. It is unclear how such flexibility could be handled in the relevance theoretic view. Another difference between the two approaches is that the work on subjectivity uses corpus research as its main methodology, whereas relevance theorists work with constructed examples.

Connectives in Language Development and Discourse Processing

If categorizations of coherence relations and connectives indeed have cognitive significance, they should show relevance in areas such as language development – both diachronic (grammaticalization (cf. Sweetser, 1990; Traugott, 1988; Traugott and Heine, 1991)) and synchronic (language acquisition), and in discourse processing. In all three areas, substantial studies are under way, and there already exists suggestive evidence.

Research on first-language acquisition suggests that the order in which children acquire connectives reflects increasing complexity, which can be accounted for in terms of the relational categories mentioned previously: additives (*and*) before causals (*because*) and positives (*and*, *because*) before negatives (*but*, *although*) (Bloom, 1991; Spooren, 1997; Evers-Vermeul, 2005). However, concerning the level of the relations, the results are less clear. In a corpus of naturalistic data, Kyratzis *et al.* (1990) found that speech act causal relations are used frequently even at a very early age, whereas epistemic causal relations are acquired very late (they hardly occur, even in the oldest age group (6.7–12.0 years) studied by Kyratzis *et al.*). An interesting issue is how to relate the relational idea – that cognitive complexity of coherence relations predicts acquisition order – to so-called usage-based or input-based accounts of language acquisition (Tomasello, 2000; Evers-Vermeul, 2005).

In research on diachronic development, the classification categories of connectives also prove to be relevant. Sweetser (1990) originally introduced her three-domain distinction to cover the semantics of a umber of related phenomena such as verbs of perception, modal elements, and connectives. She argued that these linguistic elements have developed diachronically from a content meaning through metaphorical extension to the more subjective epistemic and speech act domains. Examples of such developments in the realm of connectives have been presented by König and Traugott (1988) and Traugott (1995): the connective *still* originally meant 'now as formerly'; the change is that simultaneity has become denial of expectation; *while* developed from a marker exclusively expressing simultaneity (*at the time that*) to a marker that can nowadays be used to express contrast and concession; German *weil* had the same root meaning, but developed into a causal connective. Traugott (1995: 31) considered this a case in which "subjectification: meanings become increasingly based in the speaker's subjective belief state/attitude toward the proposition." Compare Examples (19) and (20):

(19) Mary read while Bill sang.

(20) Mary liked oysters while Bill hated them.

Is there any psycholinguistic work on discourse processing (for a general overview, *see* **Discourse Processing**) showing the relevance of these ideas of connectives as processing instructors? The function of linguistic markers has been examined in various online processing studies; these studies have primarily aimed at the investigation of the processing role of the signals *per se*, rather than on more sophisticated ideas such as the exact working of 'space building'. The experimental work typically includes the comparison of reading times of identical textual fragments that have different linguistic signals preceding them. Studies on the role of connectives and signaling phrases show that these linguistic signals affect the construction of the text representation (cf. Cozijn, 2000; Millis and Just, 1994; Noordman and Vonk, 1997; Sanders and Noordman, 2000). Millis and Just (1994), for instance, investigated the influence of connectives such as *because* by questioning participants immediately after they read a sentence. After participants had read two clauses that were either linked or not linked by a connective, they judged whether a probe word had been mentioned in one of the clauses. The recognition time to probes from the first clause was consistently faster when the clauses were linked by a connective. The presence of the connective also led to faster and more accurate responses to comprehension questions. These results suggest that the connective *does* influence the representation immediately after reading.

Using eye movement techniques, Cozijn (2000) studied the exact location of the various effects of using *because*. Using *because* implies making a causal link between the related segments. Cozijn found that words immediately following the connective were read faster whereas reading slowed down for words at the end of the clause, compared to the no-connective condition. This suggests that connectives help to integrate linguistic material (thus leading to faster reading when the connective is present), and at the same time they instruct the reader to draw a causal inference (thus slowing down clause-final reading). According to Noordman and Vonk (1997), these findings illustrate the integration and inference functions of text connectives.

In sum, several studies show the influence of linguistic markers on text processing. However, studies of the influence on text *representation* show a much less consistent pattern (for an overview, see Degand *et al.*, 1999; Sanders and Noordman, 2000; Degand and Sanders, 2002). On the one hand, some results show that linguistic marking of coherence relations improves the mental text representation. This becomes apparent from better recall performance, a faster and more accurate response on a prompted recall task, a faster response on a verification task, and better answers on comprehension questions. On the other hand, a number of studies have indicated that linguistic markers do *not* have this facilitating role, as shown by a lack of effect on the amount of information recalled or a lack of better answers on multiple-choice comprehension

questions. Some authors even claim a negative impact of connectives on text comprehension (Millis *et al.*, 1993).

There are several plausible explanations for the reported contradictions (Degand and Sanders, 2002). One is that the category of linguistic markers under investigation is not well defined. For instance, in the signaling literature, different types of signals seem to be conflated. A second explanation is that some experimental methods, such as the recall task, are simply too global to measure the effect of relational markers. Other methods, such as recognition, question answering, or sorting (Kintsch, 1998), might be more sensitive in this respect. Indeed, Degand *et al.* (1999) and Degand and Sanders (2002) provided evidence for the claim that under average conditions (i.e., in natural texts of normal text length and with a moderate number of connectives), causal connectives do contribute significantly to the comprehension of the text. In sum, connectives and cue phrases seem to affect both the construction process and the representation, once the text has been processed, but the effects are rather subtle and specific measurement techniques are needed to assess them.

Having briefly discussed the role of connectives (and other signaling phrases) in discourse processing, a preliminary conclusion might be that they can indeed be treated as linguistic markers that instruct readers how to connect the new discourse segment with the previous one (Britton, 1994). Given what is known about text processing, it is plausible to expect that text connectives also play a role in discourse production. Bestgen (1998) argued that this is the case, and showed how connectives such as *and* can be traces of production difficulties that occur when a new topic is introduced. This illustrates the segmentation function of connectives.

Conclusion

The various approaches to the study of connectives represent a perplexing variety of conceptual frameworks and methodologies. Consider, for instance, the issue concerning what counts as data for the various approaches. Some theorists rely entirely on intuitions regarding the appropriateness of connectives in constructed examples. Others concentrate on naturally occurring language use, but without actually testing their hypotheses against corpus data. Still others present corpus data that have been coded and quantified. And finally, researchers in discourse processing and production tend to prefer experimentally elicited reactions to texts, or experimentally elicited language use.

Each kind of data has strengths and weaknesses. Constructed examples, for instance, can be disputed for reasons of biased sampling; but only constructed examples may make us aware of what *cannot* be done with connectives. In-depth analyses of naturally occurring discourse may provide insights into the intricate interaction between semantic features and interactional conditions, but do not enable us systematically to tease out the contributions of these two factors. Corpus research may compare larger numbers of connective uses in both linguistic and contextual factor frameworks, but every corpus analyst in this field acknowledges that the interpretation of discourse relations may differ among coders, so that substantial energy has to be spent in ensuring a satisfactory degree of intercoder agreement. Finally, experimental research into connective effects is a superior way of supporting causal models, but the often very short texts used in these experiments have sometimes rightly been criticized for their lack of external validity (Graesser *et al.*, 1997).

From a methodological point of view, it can be concluded that the integration of cognitively plausible theories with empirical testing is the ultimate aim, a situation that has not yet been realized (Sanders and Spooren, in press). One way to realize this goal is to proceed with the thorough investigation of the corpora of actual language use. Digital corpora enable researchers to do this on a larger scale than ever before. It is especially important to extend corpus research in the direction of spoken discourse. Results from text-linguistic studies presented here are largely based on the study of written discourse. To what extent can they be generalized to spoken discourse? And what do the specific insights from the linguistic analysis of spoken discourse add to the picture we have so far?

Integration of text and psycholinguistic insights is a second way to realize the goal of interaction between theory and empirical testing. The subtle semantic distinctions proposed by linguists on the one hand, and the processing effects revealed by psycholinguistic research on the other hand, still need to be linked. For instance, the general processing effects of *because* and *and* have been investigated (e.g., Millis *et al.*, 1995), but we are not aware of any experimental research into the processing instructions encoded by connectives that differ in specificity (e.g., *but* versus *although*), or between connectives dubbed conceptual and procedural in relevance theory (e.g., *because* versus *after all*), or into the difference between connectives and corresponding lexical signals (e.g., *because* versus *the reason is that...*). Psycholinguistic work based on such linguistically sophisticated analyses would lead to further progress in the research field of connectives.

See also: Approaches to Translation: Relevance Theory; Clause Relations; Cognitive Linguistics; Concessive Clauses; Discourse Markers; Discourse Processing; Discourse Representation Theory; Meaning, Procedural and Conceptual; Particles in Spoken Discourse; Relevance Theory; Rhetorical Structure Theory; Truth Conditional Semantics and Meaning.

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Connotation

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Based on the distinction made by medieval schoolmen such as Duns Scotus (ca. 1300) between *connotatum* and *significatum*, Mill (1843) contrasts connotation with denotation much as Frege (1892) contrasts *Sinn* with *Bedeutung* and later writers sense with reference and intension with extension – although these contrastive pairs are not quite synonymous with one another. There is, however, another use of connote that distinguishes it from sense and intension. It is similar to what Leech (1981) calls affective meaning: 'The connotations of a language expression are semantic effects that arise from encyclopedic knowledge about its denotation (or referent) and also from experiences, beliefs, and prejudices about the contexts in which the expression is typically used.'

Connotations vary between contexts and speech communities independently of sense, denotation, and reference. For example, *Mike* and *Michael* can have the same reference but different connotations. Just as *John* is an unsuitable name for your new-born daughter, so is *Springtime in Paris* an inappropriate

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name for a 1200-cc Harley-Davidson motorbike or an auto-repair shop. *Wheels and Deals* might be a good name for a used car mart, but not for a new strain of corn or for a maternity boutique. People are well aware of these facts, and marketing folk exploit such knowledge to the full. Lehrer (1992b) reviewed the proper names of car models, rock bands, beauty salons, streets, and university buildings and found that baptisms (Kripke, 1972) are mostly systematic and that each genre develops its own naming themes and styles based on connotation.

Take the different connotations of (1) and (2):

(1) Tom's dog killed Jane's rabbit

(2) Tom's doggie killed Jane's bunny

As Gazdar (1979: 3) pointed out (without, incidentally, mentioning connotation), in (2) the speaker "is either a child, someone posing as a child, someone who thinks that they are addressing a child, or someone posing as someone who thinks that they are addressing a child." A dog can be referred to by any of the nouns in (3).

(3) dog, dish-licker, bow-wow, cur, mutt, mongrel, whelp, hound

Dish-licker smacks of dog-racing jargon; and *bow-wow* is either racing slang or baby-talk (compare *gee-gee*). *Cur* is pejorative along with *mutt, mongrel,* and *whelp*, which have additional senses, as does *hound*, except that it connotes a noble animal. *Dog*, however, connotes nothing in particular, being the unmarked lexeme among the others. Because of the blocking principle (Aronoff, 1976; Lehrer, 1992a), it is rare to find words that are synonymous enough that they can substitute for one another in every context; each takes on distinctive connotations from the various contexts in which it is used.

The effects of connotation can be either euphemism or its opposite, dysphemism (Bolinger, 1980; Allan and Burridge, 1991). For instance, racist dysphemisms occur when a speaker refers to or implicates the hearer or some third person's race, ethnicity, or nationality in such terms as to cause a face affront. Among the racist dysphemisms of English, are *frog* for a French person, *kraut* and *hun* for a German, *chink* for a Chinese, and *slant(ie)* for any East Asian. Many such racist terms can be disarmed by being used, without irony, as in-group solidarity markers by the targeted group. For example, Folb (1980: 248) glosses *nigger* as follows:

> **nigger** Form of address and identification among blacks (can connote affection, playful derision, genuine anger, or mere identification of another black person; often used emphatically in conversation).

Similarly, Greek Australians, for instance, often refer to themselves as *wogs*, although it is perceived as derogatory when used by *skips* – Anglo-Celtic Australians (sourced, perhaps, from a 1960s television series *Skippy the Bush Kangaroo*).

The connotations of some existing word often lead to its replacement by another word or phrase, usually with some revision of meaning. Gendered words such as *man(kind)* 'human beings, people', *chairman* 'chairperson, chair', or *actress* 'female actor' have been regarded as discriminatory and are dispreferred by many and taboo to a few. *Waiter* or *waitress* have given way to *server* or *waitperson; salesman* has given way to *salesperson*. These novelties are usually euphemistic and have positive connotations. It is not the denotation but the connotations of offending vocabulary items that are dispreferred. This is also true for a whole batch of euphemisms for avoiding the mildly distasteful, upgrading what is favored and downgrading what is not. Consider (4) from *Time Australia* (April 17, 1989: 36):

(4) "Bribes, graft and expenses-paid vacations
are never talked about on Capitol Hill.
Honorariums, campaign contributions
and per diem travel reimbursements are."

The terms *honorarium*, *campaign contributions*, and *per diem travel reimbursements* are used as alternatives to the dispreferred expressions *bribes*, *graft*, and *expenses-paid vacations* because they have positive instead of negative connotations. *we'll have to let you go* replaces *you're fired*, even when the *dehiring* is merited. People arrested but not yet charged are *helping the police with their enquiries*. If a soldier is hit by *incontinent ordinance* (a kind of *friendly fire*) she or he may suffer a *ballistically induced aperture in the subcutaneous environment* or worse. If you jump out of a 10th-storey window, you will not just *go splat* when you hit the ground, you will *suffer sudden deceleration trauma*. The final remark on the hospital chart of a case of *negative patient care outcome* was "Patient failed to fulfill his wellness potential" (Lutz, 1989: 66); it is not reported whether this resulted from *therapeutic misadventure*. Simple dieting will involve you in *negative expenditure*, but you will have to pay for *nutritional avoidance therapy*. A *sanitation engineer* sounds more exalted than a *garbage collector*; the *vermin control officer* has replaced the *rat catcher*. A *preloved* object sounds more attractive than a *second-hand* or *used* one does; they can be found in an *opportunity shop*, which specializes in *reutilization marketing*. We are, at best, *comfortably off* ourselves; other people are *wealthy* or even *filthy rich*. Many words suffer pejorization through society's perception of a word's

tainted denotatum contaminating the connotations of the word itself. Throughout the ages, country folk have been held in low esteem by townies. Latin *urbanus* 'townsman' gives rise to *urbane* 'sophisticated, elegant, refined' versus *rusticus* 'rustic' with connotations of 'clownish, awkward, boorish.' *Boorish* means 'ill-mannered, loutish, uncouth' and derives from the noun *boor* (Old English (*ʒe*)*búr* 'dweller, husbandman, farmer, countryman'; cf. Dutch *boer* 'farmer'); the old meaning lives on in *neighbor* ('near-dweller'). English *churl* once meant 'countryman of the lowest rank,' and by the Early Middle English period *churlish* already meant 'ill-tempered, rude, ungracious.'

Taboos on the names of gods seek to avoid metaphysical malevolence by counteracting possible blasphemies (even, perhaps, profanities) that arouse their terrible wrath. Thus, in the Holy Communion service of the Anglican Church, the minister says, "Thou shalt not take the Name of the Lord thy God in vain: for the Lord will not hold him guiltless, that taketh his Name in vain" (*The Book of Common Prayer*, 1662). To avoid blasphemy, the word *God* is avoided in euphemistic expletives such as the archaic *'Od's life! Zounds! by gad! 'Sbodlikins!* and *Odrabbet it!* and in the more contemporary *Gosh! Golly! Cor! Gordon'ighlanders! For goodness sake!* and *Good gracious!* These examples demonstrate the generation of new vocabulary by various kinds of remodeling, including clippings and substitutions of phonetically similar words. *Jesus* is end-clipped to *Jeeze!* and *Gee!* (which is also the initial of *God*); *Gee whiz!* is a remodeling of either *jeeze* or *jesus*. More adventurous remodeling are *By jingo! Jiminy cricket! Christmas! Crust! Crumbs!* and *Crikey!* Note that the denotation of *Gee! Jeepers!* and *Jesus!* is identical. From a purely rational viewpoint, if one of them is blasphemous, then all of them are. What is different is that the first two have connotations that are markedly different from the last. Connotation is seen to be a vocabulary generator – or, more precisely, reactions to connotations are.

The connotations of taboo terms are contaminated by the taboo topics that the terms denote; but, by definition, euphemisms are not – or not yet – contaminated. Euphemisms often degenerate into taboo terms through contamination by the taboo topic. For example, in 45 B.C.E., Cicero observed that Latin *penis* 'tail' had earlier been a euphemism for *mentula* 'penis': "But nowadays," he wrote, "*penis* is among the obscenities" (*Epistulae ad Familiares* IX, xxii). As a learned term borrowed from Latin, it is not among the obscenities of present-day English; it is an orthophemism (Allan and Burridge, in press). English *undertaker* once meant 'odd-job man, someone who undertakes to do things', which was used as a euphemism for the person who takes care of funerals; like most ambiguous taboo terms, the meaning of *undertaker* narrowed to the taboo sense alone and is now being replaced by the euphemism *funeral director*. Such euphemisms often start off with a modifying word, *funeral* in *funeral undertaker*; then the modifier is dropped as the taboo connotations displace other senses of the head noun. Other examples are *deranged*, derived from *mentally deranged* ('mentally disordered'), and *asylum* from *lunatic asylum* ('place of refuge for lunatics'). The connotations of taboo terms such as those for body parts connected with sexual reproduction, defecation, and the correlative effluvia give rise to a belief, be it ever so vague, that the language expression somehow reflects the essential nature of the taboo topics they denote. This is exactly why the terms themselves are often said to be unpleasant or ugly-sounding and why they are miscalled dirty words; it is the result of the powerful hold that naturalist beliefs of an intrinsic link between form and content have upon the community.

A word or longer expression with bad connotations (however unjustifiable) will suffer pejorization; hence, the proverb *give a dog a bad name*. Polysemous words with taboo senses are downgraded by semantic narrowing to the taboo senses alone. Words with a taboo homonym tend to be downgraded out of use. It is rare for euphemisms to be degraded into taboo terms and later come back from the abyss after they have lost their taboo sense. During the 17th and 18th centuries the verb *occupy* meant 'copulate' (for reasons you can well imagine); at the same time, its nontaboo senses lapsed. *Occupy* reentered the lexicon in its current sense of 'inhabit, take up' only after it had ceased to be used dysphemistically.

Where there is little likelihood of a speaker being misunderstood, the homonyms of a taboo term are likely to persist in the language. Connotations are not a function of the form alone. For instance, *queen* 'regina' is under no threat from the homonym meaning 'gay male' simply because one denotatum is necessarily female and the other is necessarily male. The converse holds for the end-clipped American epithet *mother* 'motherfucker'. Similarly, we experience no constraint in saying *it's queer*, but we generally avoid saying *he's queer* if we mean 'he's peculiar', preferring *he's eccentric* or *he's a bit odd*. *Bull* meaning 'bullshit' is dissimilated from *bull* 'male, typically bovine, animal' because it heads an uncountable NP instead of a countable one.

In this article, it has been shown that the connotations of a language expression are semantic effects that arise from encyclopedic knowledge about its denotation (or reference) and also from experiences,

beliefs, and prejudices about the contexts in which the expression is typically used. The connotation of a language expression is clearly distinct from its sense, denotation, and reference. Identifying the connotations of a term is to identify the community attitude toward it. For instance, the connotations of English *octopus* and the Japanese translation equivalent *tako* are very different: an *octopus* is a sinister, alien creature; *tako* is edible and endearing (Backhouse, 2003). Connotation is intimately involved with notions of appropriateness in language use, conditioning the choice of vocabulary (including proper names) and style of address. Connotation is involved in choosing expressions that upgrade, downgrade, and insult. It plays a part in the loaded weapon of dysphemism and the euphemistic avoidance of dispreferred expressions judged discriminatory, blasphemous, obscene, or merely tasteless. Reactions to connotation motivate semantic extension and the generation of new vocabulary.

See also: Denotation versus Connotation; Direct Reference; Extensionality and Intensionality; Meaning, Sense, and Reference; Reference: Philosophical Theories; Reference: Psycholinguistic Approach; Reference: Semiotic Theory; Reference: Stylistic Aspects; Sense and Reference: Philosophical Aspects; Taboo; Taboo, Euphemism, and Political Correctness; Taboo: Verbal Practices; Taboo Words.

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Consciousness, Thought and Language

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Introduction

There are many areas of contact between consciousness and language. They can be found in such diverse disciplines as linguistics, communication studies, psychology, anthropology, and intellectual history. In this article, we will briefly cover the following areas:

- Semantic analysis of terms and concepts related to consciousness,
- Dynamic or genetic approaches to language and consciousness,
- Individual and collective consciousness,
- How language is related to thought,
- Fundamentals of semiotics and consciousness.

In the section on semantic analysis, we briefly discuss four kinds of analysis of the term 'consciousness.' The section on dynamic/generic approaches considers how various types of change relate to language and consciousness. The third section treats how language on the one hand can be related to individual consciousness and on the other hand also

beliefs, and prejudices about the contexts in which the expression is typically used. The connotation of a language expression is clearly distinct from its sense, denotation, and reference. Identifying the connotations of a term is to identify the community attitude toward it. For instance, the connotations of English *octopus* and the Japanese translation equivalent *tako* are very different: an *octopus* is a sinister, alien creature; *tako* is edible and endearing (Backhouse, 2003). Connotation is intimately involved with notions of appropriateness in language use, conditioning the choice of vocabulary (including proper names) and style of address. Connotation is involved in choosing expressions that upgrade, downgrade, and insult. It plays a part in the loaded weapon of dysphemism and the euphemistic avoidance of dispreferred expressions judged discriminatory, blasphemous, obscene, or merely tasteless. Reactions to connotation motivate semantic extension and the generation of new vocabulary.

See also: Denotation versus Connotation; Direct Reference; Extensionality and Intensionality; Meaning, Sense, and Reference; Reference: Philosophical Theories; Reference: Psycholinguistic Approach; Reference: Semiotic Theory; Reference: Stylistic Aspects; Sense and Reference: Philosophical Aspects; Taboo; Taboo, Euphemism, and Political Correctness; Taboo: Verbal Practices; Taboo Words.

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Consciousness, Thought and Language

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Introduction

There are many areas of contact between consciousness and language. They can be found in such diverse disciplines as linguistics, communication studies, psychology, anthropology, and intellectual history. In this article, we will briefly cover the following areas:

- Semantic analysis of terms and concepts related to consciousness,
- Dynamic or genetic approaches to language and consciousness,
- Individual and collective consciousness,
- How language is related to thought,
- Fundamentals of semiotics and consciousness.

In the section on semantic analysis, we briefly discuss four kinds of analysis of the term 'consciousness.' The section on dynamic/generic approaches considers how various types of change relate to language and consciousness. The third section treats how language on the one hand can be related to individual consciousness and on the other hand also

to collective consciousness and collective thought. The fourth section presents an overview of the discussion concerning the relationship between language and thought, and in the fifth section, we will take a look at how certain fundamental semiotic concepts can be related to language and consciousness.

Semantic Analysis of Terms and Concepts Related to Consciousness

Many of us probably feel that we have intuitions about the nature of consciousness, but that we really do not know what it is and that we would be hard put if we were asked to collect our intuitions into a definition of the concept of consciousness. All the same, one of the contact points between language and consciousness is to try to use semantic and conceptual analysis of language to try to come to grips with the phenomenon of consciousness. There are several ways to do this. Below we will briefly consider four of these:

1. The etymology of the term 'consciousness.'
2. Investigating the meaning potential of the term 'consciousness.'
3. Investigating the semantic field of the term 'consciousness.'
4. Attempting to find a definition and an operationalization of the concept of consciousness.

In the discussion below, we will not systematically distinguish between words or terms and concepts. The reason is that the words and terms involved will normally be taken to express concepts and that the concepts involved will normally be taken to be expressed by words or terms. Thus, we will mostly assume a one-to-one mapping between concepts and words/terms.

Etymology

The first approach to meaning is historical, giving us a brief history of the term and concept of 'consciousness.' Etymologically, 'conscious' comes from Latin *con* ('with') and *scious* ('know'). From the point of view of etymology, 'conscious' and 'consciousness' thus come close to 'conscience,' which, in fact, has the same origin. In some languages such as French or Spanish the two concepts, in fact, are expressed by the same word 'conscience.'

Meaning Potential of Consciousness

The second type of semantic analysis is an analysis of the meaning potential of the term 'consciousness.' This basically involves taking a look at what meanings a word can take on in different contexts and collecting all of these as potential meanings of the word. The analysis starts by finding the root of the word, in this case *conscious*. The next step is to determine which expressions can be derived from the root. The derivations constitute a sort of minimal (morphological) context for the word.

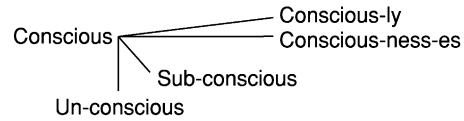

Figure 1 Expressions derived from 'conscious.'

Conceptually, Figure 1 could be interpreted the following way. The root *conscious* denotes a property or a state. This state or property can, by adding the ending *-ness*, conceptually be made into an abstract entity *conscious -ness*. By further adding *-es* to this, we get a set of such entities *conscious -ness -es*. By adding *-ly*, it can also be made into a second-order property *conscious -ly*, as in the sentence *He consciously talks too much*, where *consciously* is a second-order property of the first-order property *talking*. The root *conscious* therefore, over and above expressing a property or a state, has the potential of expressing an abstract entity or a second-order property, given addition of the right endings.

The state or property of being conscious can also be negated in several ways: *not conscious, subconscious, unconscious*. If we investigate the effects of adding (*sub-*) or (*un-*), we find that the difference between the terms *un-conscious* and *sub-conscious* point to *consciousness* as being a matter of degree. *Sub-conscious* processes are perhaps closer to consciousness (they are in some sense potentially conscious being just 'under' (*sub*) consciousness) than *un-conscious processes*. One reason to believe that unconscious processes exist is that we can be in a state of unconsciousness, while yet being alive (i.e., being kept alive by unconscious processes). Unconscious processes might be vital processes that are not, or only with great difficulty, accessible to consciousness. Continuing the argument, we get a picture where there is a basis of vital unconscious processes connected to subconscious processes that are only potentially conscious, ending up with processes that are actually conscious. It is tempting to relate this picture to the Aristotelian view of consciousness (cf. Ross, 1961) as being composed of three types, i.e., plant consciousness, animal consciousness, and human consciousness, where human consciousness also includes plant consciousness and animal consciousness, but according to many writers in the field is distinguished from the latter two by its connection to language.

Carrying on the analysis from a morphological to a syntactical context, we may note that *conscious* can be both a property and a relation. Compare the following examples:

1. *He is conscious now* (rather than unconscious)
2. *He is conscious of the rain*
3. *He is conscious that it is raining*
4. *He is conscious that steam engines are no longer very popular.*

The four examples show that the term 'conscious' can denote a property (example 1) and that it with the addition of the preposition *of* (*conscious of*) and the conjunction *that* (*conscious that*) can denote a relation to an object of consciousness (examples 2–4). The examples further show that this object can be an entity (or process viewed as an entity). They also show that it can be a fact (example 3) or a more indirectly concluded state of affairs (example 4). The linguistic evidence used to analyze the meaning potential of the term 'conscious,' therefore seems to point to consciousness as being a fairly complex mental property.

The Semantic Field of Consciousness

The third kind of analysis involves the notion of a semantic field (or in German *Bedeutungsfeld*), which originates in German 19th century philology. One of the clearest formulations of the notion was given by Jost Trier (1934). The basic idea in studying a semantic field is to collect words that are similar in meaning and then try to analyze the relationship between them or try to compare a semantic field in one language with a semantic field in another language. In this way, for example, the color terms of different languages have been compared to each other (cf. Berlin and Kay, 1969). If nothing else, putting a word in relation to other words that have a similar meaning is often useful, since comparison with the other words by contrast can help to highlight the properties of a particular word.

One of the main ways to carry out an investigation of this sort is to inquire if a given concept is a necessary or sufficient condition of another given concept, or to give the same question a different formulation, to ask if concept X requires concept Y or vice versa. Below, we will exemplify this type of inquiry in relation to the concept of consciousness.

What is presented here is not a full-scale analysis of the semantic field of the term 'consciousness,' rather only examples hinting at what would be involved in carrying out an analysis of this kind. Some of the terms that should be included in an analysis of this kind are presented in Figure 2.

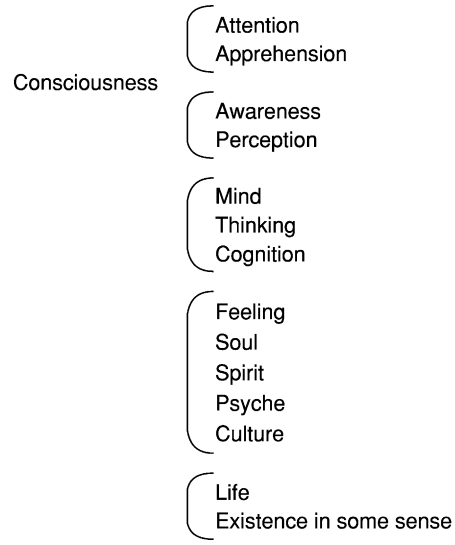

Figure 2 Parts of the semantic field of consciousness.

Definition of 'Consciousness'

The fourth attempt at analyzing 'consciousness' semantically is to try to give a definition of the term/concept. Given the linguistically based analysis, discussed in the three preceding sections, one suggestion for a definition of 'consciousness' or rather its root 'conscious' is the following:

X is conscious of Y if and only if

X is causally reactive to Y
X can discriminate Y
X can recognize Y
X can identify Y
X can communicate Y
X is self aware.

Since it might be the case that some of these conditions are met without all of them being met, this definition has the consequence of making 'conscious' into a gradable property, where any person or other agent X might be more or less 'fully' conscious of Y.

Dynamic and Genetic Approaches to Consciousness, Thought, and Language

The relationship between consciousness, thought, and language is not static but has changed over time. We might distinguish four different perspectives on the nature of these changes.

1. Phylogensis
2. Ontogenesis
3. Macrogenesis
4. Microgenesis.

Given a phylogenetic perspective, we are interested in how *Homo sapiens* as a species have evolved consciousness, thought, and language. Have the three phenomena evolved together simultaneously and been preconditions of each other, as the German philosopher and philologist Johann Herder (cf. Herder, 1772) held in the 18th century, or have they evolved separately, in some way sequentially?

If we adopt an ontogenetic perspective, we instead focus on the development of consciousness, thought, and language in single human beings. How do the three phenomena develop through life, from childhood through youth, adulthood, and old age? Two of the main questions here will be to what extent each of the phenomena are innately (genetically) conditioned and also whether the relationship between them is innate. These questions will be accompanied by a third complementary question concerning the extent to which they are the product of experiential learning and culture.

A macrogenetic perspective means that we are interested in the historical development of consciousness, thought, and language. Is our presently experienced quality of consciousness essentially different from that of Stone Age man? Do we think and use language in ways that are very different from Stone Age ways? The answers here are strongly related to the questions concerning the role of innate knowledge in ontogenetic (and phylogenetic) development. If we believe strongly in the role of genetic, innate factors, we are likely to think that we are fairly similar to Stone Age people, since genetic changes are mostly believed to be slow. Conversely, we might say that the less we believe in the role of genetic endowment, the more we will believe in the role of culture and historical development and the more we will probably be willing to accept that there are radical differences between ourselves, higher primates and Stone Age man.

The fourth perspective is the microgenetic perspective. In this perspective, we are focusing on the act of communication moving from an internal impulse to communicate to a verbally articulated utterance. As in the case of phylogenesis, we may again ask: Do consciousness, thought and language develop simultaneously in the act of communication, being dependent on one another, or are they sequential, e.g., first there is consciousness of what is to be communicated, then there is the thought to be communicated, and finally there is its verbal expression in an utterance? Are the three to be seen as aspects of one complex process or as separate processes? We may also ask if dialog, with interactive acts involving consciousness, thought, and language results in some form of interactive and collective consciousness.

Individual and Collective Consciousness

The properties of consciousness depend on many factors, the most obvious one being the structure of the brain of the organism that is supposed to have consciousness. However, more generally, other factors might also be important. In addition to the brain, other parts of the body, the immune system, and the nervous system might be important. But consciousness might also depend on the behavior of the organism. In particular, it might be dependent on the interaction an organism has with its environment. Different types of consciousness might be the result of different types of interaction with the environment. Of particular interest in this connection are the effects on consciousness of linguistic interaction and language.

This leads to the question of how consciousness depends on human coordinated and cooperative activities and their stabilization in social institutions and culture. More specifically, we can raise the question of whether in addition to individual consciousness, there is also interactive and collective consciousness. Individual consciousness might then be conditioned by the interaction of single individuals in isolation with their environment, while interactive consciousness arises in interaction between individuals, and collective consciousness arises as a special case of interactive consciousness, when interactively shared consciousness can be maintained and preserved by external factors. Such factors might be tools, houses, objects of art, spoken language and, even more, written documents.

Focusing on language, we might say that language adds interactive, collective information processing to individual information processing and, in this way, it adds increased possibilities of collective coordination of thought and actions. It adds a kind of fine tuning of states of consciousness through the information structuring power of different kinds of linguistic operators. Moreover, it adds fine tuning of interaction through the interaction structuring power of other linguistic operators. Finally, it also adds a kind of collective memory, through the conceptual classifications that are codified in the language. It is to this collective memory and more generally to the question of how language is related to thought that we turn in the next section.

How Is Language Related to Thought?

Are Language and Thought Independent of or Dependent on Each Other?

The debate on language's relationship to thought has deep roots in both Western and Eastern thought (see

Allwood, 1983). Quite schematically, one can say that there is a continuum of notions stretching out between two poles, one of which is made up of the notion that language and thought are independent of each other, and the other of the notion that language and thought are dependent on each other.

1. Language and thought are independent of each other.

The oldest notion is probably that language and thought are independent of each other. In classical philosophy, one often finds a sort of unreflecting universalistic philosophy that takes as unproblematic the assumption that humans around the world think in largely the same way (which also happens to be one's own way of thinking and speaking). The tradition was robust during the Enlightenment, where it found expression in notions of universal human reason. In our time, it is enjoying renewed popularity. An important manifestation of this view is, for example, to take as unproblematic the assumption that what can be expressed and thought with the help of one language, e.g., Greek, Latin, or English, must also be expressible and thinkable with the help of all other languages. Another possible manifestation is to render language invisible by discussing thoughts, action, and social organization without reference to the role of language in these phenomena. A third possibility is to ascribe to language a relatively limited role in human life. This is the case, for example, with the theories of the American linguist Noam Chomsky, where language's essence consists of its syntactic organization rather than of something having to do with the organization of concepts or content (cf. Chomsky, 1986).

2. Language and thought are dependent on each other.

The notion that language and thought are highly dependent on each other was articulated for the first time in Western civilization during the medieval debate on universals, where the so-called nominalists believed that language and thought could be equated with each other. In order to understand thoughts and concepts, nothing more than language is actually needed. Another variant of the notion that language and thought are highly dependent on each other found grand expression in the medieval modistic speculative grammar, where the categories of language, thoughts, and the world are described as mirroring (Latin *speculum* 'mirror') each other.

The strong connection between language and thought was taken up again in the 18th and 19th centuries' romantic theorizing about ethnical and national differences. Different languages now become something like easily accessed windows to the "soul of a nation." Language and thought are seen as mutually dependent. The German philosopher Johann Herder wrote, for example, that the origins of language and thought among humankind were inseparable both phylogenetically and ontogenetically; no thought without language and no language without thought.

Are Languages Different in Content?

One of the questions that have played a major role in the debate about language and thought (world view) is the question of how great the differences are between languages from a semantic point of view. This question has not yet been answered in any conclusive way, but rather there are a number of more or less reliable examples and analyses. One major challenge is that there are between 4000 and 8000 languages in the world, while it is virtually impossible for a person (even a linguist) to master more than 10–30 languages. This means that one must rely on paraphrases and translations. Let us look at some of the kinds of differences that exist between languages' vocabularies.

If we look more closely at the debate about semantic differences between languages, it has often revolved around two main themes:

1. The first main theme is that languages can differ from each other with regard to which linguistic means are employed in order to represent a certain phenomenon. The following are the principle means that are employed.

i. Where words are concerned, one can distinguish between compound and simple words, between root morphemes, inflectional morphemes, derivational morphemes, or prosodic patterns as well as word tones.
ii. Where combinations of words are concerned, one can study what different phrase and clause types express.

In general, content that is represented grammatically, i.e., with the help of inflection, derivation, or phrase and clause types, tends to be regarded as more integral to language and culture than that which is expressed with single words or descriptions. If one ignores differences of this kind, one can claim that all content can be expressed in all languages. It is just a matter of taking in enough good descriptions or paraphrases, or of coining new words.

2. The second main theme concerns which content is expressed by those words, syntactic patterns, and

inflectional/derivational morphemes that are present in the language. Here it is established that at least the following content differences can exist between languages.

i. A language has words for something another language lacks words for.
ii. Languages differ with regard to how specific their vocabularies for a certain area of reality are.
iii. Languages can also differ in where they draw the boundary for a given level of specificity.
iv. Languages can differ with regard to which phenomena they express with the same words (the words' polysemy structure differs).
v. Languages can differ in basic conceptualizations?

More speculatively than is the case for the differences discussed thus far, it has been claimed (see Whorf, 1956) that languages can maintain different basic conceptualizations of reality.

While in Western languages, things (entities) are perceived as fundamental (they bear traits and relationships and participate in processes), it has been claimed that there are cultures where processes are more fundamental, e.g., certain Indian languages in the southwestern United States where one might encounter utterances of the type *the running is buffaloing*. What we would normally regard as a process is reified – *the running* – and portrayed as being individuated into buffaloes – *is buffaloing*.

vi. Languages can also differ pragmatically, i.e., with regard to which speech acts and interactional relationships they support. For example, can one promise, swear, congratulate, and condole in all languages? This question can be understood on two levels. The most basic question has to do with whether one can use the language at all to achieve the effects one usually achieves by promising, swearing, congratulating, and condoling, and the less basic question has to do with whether there are words in the languages to describe these phenomena.

Universals

The above examples show that languages' content can vary in numerous ways. However, languages are also similar to each other, and research has produced a long list of candidates as to similarities between languages. To some degree, any acceptance of similarities or differences between languages depends on how abstract one permits oneself to be. For example, at a relatively high level of abstraction, one can say that all languages can indicate temporal anchoring without going further into the way in which time is divided up, with which linguistic means it is divided up, or whether it must be expressed in an implied manner. On a lower level of abstraction, one can be more concrete and specific and say that not all languages have tense endings on verbs.

As possible examples of semantic universals, perhaps all languages can express:

i. statements, questions, requests, and exclamations
ii. negation
iii. quantification (*all*, *many*, *few*)
iv. temporal and spatial anchoring
v. speaker and listener anchoring
vi. things, qualities, processes, relationships, states, occurrences, and courses of events.

Do Semantic Differences between Languages Lead to Differences in Modes of Thought/Behavior between the Languages' Speakers?

Do people with semantically different languages think and behave in different ways? The answer to this question depends, *inter alia*, on how different languages manifest themselves semantically, and on how strong the link between language and thought is considered to be. In Table 1 I juxtapose these two dimensions.

A moment's contemplation of Table 1 reveals that it is actually only square 2 that is connected with linguistic relativism in its strong formulation, i.e., the position in which it is assumed that there are large semantic differences between languages, and further that language and thought are strongly dependent on each other and that these two relationships lead speakers of semantically different languages to think and behave differently.

Similarly, the assumption of small semantic differences between languages and a minor interdependence between language and thought leads fairly directly to the conclusion that linguistic differences are inessential to understanding differences in thought and behavior between people in different parts of the world. Squares 1 and 4 are more

Table 1 Semantic differences between languages and language/thought interdependence

Language/thought interdependence	*Semantic differences*	
	Small	*Large*
Large	1	2
Small	3	4

problematic. One who believes that the semantic differences between languages are small, but that the dependence between language and thought is large, will not expect large differences in thought and behavior between speakers of different languages either. On the contrary, by studying the semantic similarities between languages, one could presumably facilitate communication between people from different parts of the world quite effectively.

Square 4 offers a further variation. Here one assumes that the semantic differences between languages are large, but that the dependence between language and thought is minor. The semantic differences do not play any considerable role in this case, since they do not affect thought and behavior anyway. Conceivably, this view could easily lead one to regard human languages as an anachronistic, irrational holdover from an earlier stage in the history of humankind – a linguistic diversity which humankind would do well to rid itself of, in favor of a single language. On practical political grounds, this language would be English.

Fundamentals of Semiotics and Consciousness

Levels of Intentionality and Awareness in Human Communication

Finally, we will consider some requirements on consciousness raised by some very basic semiotic properties of communication. Table 2 gives an impression of the levels of intentionality, awareness, and processing that are involved in human communication. Human communication normally involves at least two participants. Each participant is simultaneously a sender and a recipient of information, although one or the other function is normally allowed to predominate in a turn-taking fashion. The point of the table is that information is both sent and received at several levels of intentionality, awareness, and processing simultaneously (cf. Allwood, 2002).

If we start with the processes that characterize the sending of information, the table suggests that, for analytical purposes, we can subdivide what in reality is a continuous scale into three stages.

Table 2 Levels of intentionality, awareness, and processing in human communication

Sender	*Recipient*
Indicate	Be influenced
Display	Perceive
Signal	Understand

As a sender, a speaker 'indicates' information, if a recipient in virtue of his/her experience can pick up the information. Indicated information depends only on causality and/or proximity (red spots indicating the measles) and does not involve the sender intending to communicate anything.

The information is 'displayed' if the sender intends that the recipient should perceive and understand the information.

It is 'signaled' if and only if the sender intends that the recipient should perceive and understand that he is displaying the information. Displaying is like showing and signaling is like showing that you are showing. Signaling is the mode normally associated with spoken vocal verbal communication.

In normal human communication, a sender is simultaneously indicating, displaying, and signaling information. For example, he or she might be indicating geographical origin by accent without being aware of this or intending to do so. Simultaneously he or she could be displaying friendliness by smiling and signaling by speaking. Producing information thus involves a complex simultaneous interaction between several levels of intentionality and awareness.

Similarly, on the recipient side, information is being activated with varying degrees of processing and awareness. Some information is subconsciously influencing the recipient, while other information is being consciously perceived and in some cases further processed and understood. On the sender side, several modalities of production, words, prosody, gestures, etc., are involved, and on the recipient side several modalities of perception (sight, hearing, touch, etc.) are being integrated. On both sides, factual information is being continuously embedded and integrated with attitudinal and emotional information. Table 3 gives a picture of the situation in normal communication in relation to the three basic types of representation: index, icon, and symbol.

The terms come from C. S. Peirce, who introduced them for three basic ways of representing information (cf. Peirce, 1931). 'Indices' carry information in virtue

Table 3 Simultaneous levels of intentionality and awareness and types of representation

	'Happy voice' *Index*	*'Caricature'* *Icon*	*'Jag är här'* *Symbol*	
Indicate	XX	X	X	Be influenced
Display	X	XX	X	Perceive
Signal	X	X	XX	Understand

of contiguity and causality. Black clouds are an index of rain. 'Icons' carry information in virtue of similarity. A portrait is an icon of a person. Symbols carry information in virtue of convention. Words are symbols of the information they represent. The three types are not always distinct, rather a sign can often carry information in virtue of all three types of semiotic relation.

In Table 3, all squares are possible but there is perhaps a preferential relationship between

1. Indicating, index, being influenced
2. Displaying, icons, perception
3. Signaling, symbols, understanding.

This relationship is somewhat weaker on the recipient side, so that symbols and icons are normally both perceived and understood, while indices do not only influence but are often perceived and sometimes understood.

Content of Consciousness and Intentionality

One of the puzzles concerning consciousness is related to the content of consciousness. Can consciousness exist without content or must it, like the phenomenological tradition of Brentano and Husserl claimed, be intentional, i.e., directed toward an object (cf. Spiegelberg, 1982)? Being conscious means being conscious of perspectivally selected aspects of some phenomenon.

Emotions are sometimes brought up as a counter example to the thesis that consciousness must be intentional. It is claimed that it is possible to be happy (cf. Segelberg, 1999) without being happy about something, so that there could be a conscious state of happiness that is not directed to an object. Turning to language, it does, however, seem reasonable to adopt the intentionality thesis. Language and communication seem to always involve at least a three-part relation between a sender, a recipient, and an information-carrying sign and thus indicate that 'consciousness' is consciousness of at least a sign and its content.

Some Conditions of Consciousness

Many discussions of consciousness assume that the preconditions of consciousness are merely physical or biophysical/biochemical. Even if this might be so for consciousness it is not a plausible view in relation to what must be assumed as preconditions for language. As preconditions for communication and language, we must probably assume a group of organisms capable of memory (probably conscious) actions and interactions. For many types of language, we must also assume organized social activities and social institutions as well as some sort of collective thinking, which we might call culture. The question is whether some of the same preconditions are necessary for the development of consciousness, i.e., are not many kinds of conscious connected with there being action and interaction of several organisms in a group? This question is, in turn, strongly related to the question of whether consciousness is assumed to be merely an individual phenomenon or whether it can also be a collective phenomenon. If we admit collective consciousness as a kind of consciousness, it seems very likely that language and groups of organisms have to be assumed to be necessary preconditions for the development of this type of consciousness.

Some Implications of Linguistic Communication for Consciousness

In discussing the relationship between language and consciousness, one of the problems that needs to be addressed is that consciousness, to a greater extent than language, is a heterogeneous phenomenon. There seem to be many varieties or types of consciousness. Part of this variation is connected with what has often been called levels of consciousness.

It has often been assumed that organic life, besides being capable of consciousness, can exist at an unconscious, subconscious, or preconscious level. Just as we have seen in the semantic analysis in 'Semantic Analysis of Terms and Concepts Related to 'Consciousness,' this raises the question of whether the development of consciousness and consciousness itself is a gradual scalar phenomenon. Since it is possible to hold that much of our linguistic processing is not conscious but rather unconscious, subconscious, or preconscious, it also raises the question of whether language, besides being related to consciousness, is also related to a more fundamental level of organic life and to several levels of consciousness.

Linguistic communication, however, also points to another feature of consciousness, namely modal integration. Much of conscious processing takes place in the sensory modalities: sight, hearing, touch, smell, and taste. Language, however, requires an integration of modalities. Given a word such as *horse*, we can potentially activate and integrate information from all modalities. A horse is not just a visual horse, but a creature with sounds and smells. Thus, linguistic communication requires that consciousness is capable of modal integration. Perhaps language has in fact been a contributing factor in giving consciousness this capability.

Linguistic communication further strongly suggests that consciousness is connected with abstraction. The word 'horse' has a content that is independent of any particular horse (regarding, for example, color, shape, or smell). We are conscious of something more abstract. Powers of abstraction are also necessary to understand the function and meaning of such words as *or*, *and*, *not*, or *if*.

Thirdly, as hinted at above, language probably makes it necessary to assume the existence of a sort of collective consciousness. Without some sort of collective consciousness, it would be hard to explain how the extremely finely tuned joint processing of information that we see in dialog (cf. Allwood, 1997) could take place.

Thus I have pointed out five properties of consciousness that seem to be necessary to assume, if we are going to relate consciousness to language and communication, i.e., consciousness should be capable of:

i. multilevel organization,
ii. intentionality,
iii. modal integration,
iv. abstraction,
v. collective sharing.

Given the discussion above, one possible picture of the relationship between consciousness, thought and language is that of a gradual development involving a continuous interaction, where developments in one of the three phenomena lead to developments in the others as well.

See also: Animal Communication: Deception and Honest Signaling; Apes: Gesture Communication; Bats: Communication by Ultrasound; Cognitive Basis for Language Evolution in Non-human Primates; Cognitive Science: Overview; Distributed Cognition and Communication; Figurative Language: Semiotics; Frog and Toad Communication; Language Education: Language Awareness; Language of Thought; Languages of Wider Communication; Lexical Fields; Modularity of Mind and Language; Non-human Primate Communication; Philosophy of Mind; Synesthesia and Language; Thought and Language: Philosophical Aspects.

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Conspicuity

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It is normally assumed that for communication to work efficiently, we should avoid the multiplication of meanings. This is supported by Grice's description of the Maxim of Manner, according to which we have to "be perspicuous," and therefore, among other things, "avoid ambiguity" (Grice, 1975) (*see* **Grice, Herbert Paul (1913–1988); Maxims and Flouting**). However, in ordinary conversations, speakers often put much more into their utterances than is obvious from the surface of the sentence, and hearers generally take out much more than is presented to them on the surface. To understand this multiplication of

Linguistic communication further strongly suggests that consciousness is connected with abstraction. The word 'horse' has a content that is independent of any particular horse (regarding, for example, color, shape, or smell). We are conscious of something more abstract. Powers of abstraction are also necessary to understand the function and meaning of such words as *or*, *and*, *not*, or *if*.

Thirdly, as hinted at above, language probably makes it necessary to assume the existence of a sort of collective consciousness. Without some sort of collective consciousness, it would be hard to explain how the extremely finely tuned joint processing of information that we see in dialog (cf. Allwood, 1997) could take place.

Thus I have pointed out five properties of consciousness that seem to be necessary to assume, if we are going to relate consciousness to language and communication, i.e., consciousness should be capable of:

i. multilevel organization,
ii. intentionality,
iii. modal integration,
iv. abstraction,
v. collective sharing.

Given the discussion above, one possible picture of the relationship between consciousness, thought and language is that of a gradual development involving a continuous interaction, where developments in one of the three phenomena lead to developments in the others as well.

See also: Animal Communication: Deception and Honest Signaling; Apes: Gesture Communication; Bats: Communication by Ultrasound; Cognitive Basis for Language Evolution in Non-human Primates; Cognitive Science: Overview; Distributed Cognition and Communication; Figurative Language: Semiotics; Frog and Toad Communication; Language Education: Language Awareness; Language of Thought; Languages of Wider Communication; Lexical Fields; Modularity of Mind and Language; Non-human Primate Communication; Philosophy of Mind; Synesthesia and Language; Thought and Language: Philosophical Aspects.

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It is normally assumed that for communication to work efficiently, we should avoid the multiplication of meanings. This is supported by Grice's description of the Maxim of Manner, according to which we have to "be perspicuous," and therefore, among other things, "avoid ambiguity" (Grice, 1975) (*see* **Grice, Herbert Paul (1913–1988); Maxims and Flouting**). However, in ordinary conversations, speakers often put much more into their utterances than is obvious from the surface of the sentence, and hearers generally take out much more than is presented to them on the surface. To understand this multiplication of

meaning, another Maxim of Manner should be introduced, according to which we have to "be conspicuous" and therefore "relish ambiguity." This maxim subsumes two general pragmatic principles: "Make your conversation as interesting/witty/surprising as possible" and "Make your utterance/text as expressive as possible, but still accessible." It can be linked to two of Leech's principles of pragmatics, the Interest Principle, which is part of interpersonal rhetoric, and the Expressivity Principle, which is part of textual rhetoric (*see* **Rhetoric, Classical**). According to the Interest Principle, we prefer a conversation that is interesting, in the sense of having unpredictability or news value, to a conversation that is predictable (Leech, 1983: 156). It tells you to be witty. Conversations as mere exchanges of information can be boring, whereas conversations that force us to infer more from the utterances then we actually get on the surface are the ones that we love to engage in, provoke, and prolong. Meaning depends on the information people can take out of an utterance, rather than the information that is already in it. What counts is semantic depth on the one hand (the depth of conversational implicatures) (*see* **Implicature**) and the witty exploitation or creation of multiple meanings on the other. Leech's Expressivity Principle is "concerned with effectiveness in a broad sense which includes expressive and aesthetic aspects of communication, rather than simply with efficiency" (Leech, 1983: 68). Research therefore is needed to answer questions such as: How do people use polysemous words in their daily linguistic interaction? How do they become aware of the existence of multiple meanings? Do they use them to achieve certain rhetorical, communicational, and social effects? (see Nerlich and Chamizo Dominguez, 1999; Nerlich and Clarke, 2001) Normally, the injection with and extraction of a 'surplus' of meaning from utterances (based on established polysemies or on conversational implicatures, or a mixture of both) goes unnoticed, because this surplus is congruent with the surface forms thathint at it and with the context in which they are used (*see* **Polysemy and Homonymy**). This normal contextual unfolding of that which is implicated (meant) by an utterance used in context, but not 'said,' has been studied in a Gricean framework, using notions such as conversational implicature and speaker meaning vs. sentence meaning (see Mey, 2001: 43). There are, however, also cases when the inherent multiplicity of meanings is itself brought to the surface, is exposed in our daily conversational interaction, when we challenge the 'principle of conventionality' through the introduction of incongruity and dissonance. Although Grice implied in his writings that implicatures are an everyday phenomenon, he stressed that ambiguity, irony, and so on are violations of the communicative norm. And yet, it is this 'violation', this 'flouting' of conversational maxims that makes conversations interesting, that makes people actually engage in and enjoy conversations.

See also: Cooperative Principle; Grice, Herbert Paul (1913–1988); Implicature; Maxims and Flouting; Neo-Gricean Pragmatics; Polysemy and Homonymy; Pragmatics: Overview; Relevance Theory; Rhetoric, Classical.

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Constant Rate Hypothesis

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What Is the CRH?

With lexical change as probably the sole exception, all language change takes place over the set of relevant linguistic environments in which the linguistic variable is embedded. Thus, a sound change occurs in contexts defined by such factors as preceding or following environments, prosodic features, etc., each of which affects the change to a different degree. A following nasal, for example, may be a more favorable environment for some phonological changes than other environments, so that a greater number of innovative variants is observed in this environment than elsewhere.

A question that arises here is: does language change proceed faster in favorable environments than less favorable ones? The Constant Rate Hypothesis (CRH, also known as the Constant Rate Effect) proposed in Kroch (1989), says 'No' to this question. The CRH predicts that the rate of change is uniform across the linguistic environments in which the change occurs. To cite the original definition in Kroch (1989: 200),

> ...when one grammatical option replaces another with which it is in competition across a set of linguistic contexts, the rate of replacement, properly measured, is the same in all of them. The contexts generally differ from one another at each period in the degree to which they favor the spreading form, but they do not differ in the rate at which the form spreads.

One alternative to CRH would be a model in which an innovative form spreads at different rates in different contexts, so that, for example, in some 'accommodating' contexts where innovative forms appear more frequently, the change proceeds at a faster rate, whereas in other contexts, such forms appear only rarely, and the change chugs along slowly. Basically, this was the idea of the Wave Model (WM) by Bailey (1973). The WM holds that language change proceeds in an S-curve fashion, a point that Kroch (1989) agrees with as well; but the WM also equated the favorableness of each context with the rate of change and the order of appearance of change in each context, so the rate of change is not equal across environments. If the innovative form appears first in a given context, the rate of change is higher there than elsewhere. The situation is best summarized in Bailey's own words, "[W]hat is quantitatively less is slower and later; what is more is earlier and faster" (Bailey, 1973: 82). This is exactly opposite to what the CRH predicts.

Originally, Kroch based his hypothesis on four historical syntactic changes (Kroch, 1989): the replacement of *have* by *have got* in British English (Noble, 1985), the rise of the definite article in the Portuguese possessive NP (Oliveira e Silva, 1982), the loss of V2 order in Middle French (Adams, 1987), and the rise of periphrastic *do* in Modern English. Subsequent research added examples from Old English (Pintzuk, 1995) and Yiddish (Santorini, 1993) as well. Most of these syntactic changes involve a change in the abstract level of grammar, and not a mere alternation of linguistic elements at the surface level, and this is a rather important point in the research program of the CRH. This is because the constant rate effect is seen as a direct result of the fact that, as far as a single syntactic change occurring in related contexts is concerned, the change occurring in those contexts is due to a single change in parameter settings, just like a reflex (or reaction) to a single stimulus being realized in different muscles or organs simultaneously. Kroch further extends this view to claim that a speech community where the change is in progress is in a state of diglossia with respect to a given parameter setting, with two different grammars in competition; which setting is used in a given moment of production is now seen as stylistic preferences or psycholinguistic processing effects, a clear move away from the classical variationist paradigm that would incorporate such frequencies into the grammar (Kroch, 2001).

The CRH in Statistical Terms

The meaning of the CRH can be easily captured in statistical terms. When there are two variables *X* and *Y*, and one wants to predict the values of *Y* based on those of *X*, the most popular statistical analysis to use is a linear regression of the form shown in (1):

$$(1)\quad Y = aX + b$$

where *a* is a slope and *b* is an intercept. Linear regression, however, is possible only for variables of ratio or interval scale (e.g., sound frequencies, test scores, etc.) and linguistic variation data is most commonly nominal (the assignment of items into categories: male/female, following consonants, etc.). The only statistical operation possible for nominal data is taking the frequency of its variant and computing its ratio to the total, varying from 0 to 1. But this would mean that the *Y* value in (1) cannot exceed that range. Also, the graph of the change is not linear (a straight line) as (1) implies, but S-curved.

Alternatively, one can transform Y into a logit (a natural log of *Y* over *1–Y*). Because the logit term varies from $-\infty$ to $+\infty$ as the *Y* value changes from 0 to 1, the upper limit issue no longer poses a problem.

$$(2)\ \ \ln(Y/(1-Y)) = aX + b$$

The graph of (2) would still be a straight line, but of course the vertical axis now has a different scale. Equation (2) is solved with respect to *Y* as in (3):

$$(3)\ \ Y = e^{ax+b} / (1 + e^{ax+b})$$

This is the logistic equation. The graph of this equation forms an S-shape and so is an ideal statistical tool for analysis of change phenomenon. Indeed, since its first use for the analysis of coronary heart disease in the 1960s (Truett *et al.*, 1967), logistic regression has been used extensively in such diverse fields as medical science, political science, biology, and a number of other scientific fields. Thus, its extension to the study of language change was a very natural move.

So, how does the CRH translate into a logistic equation? Before answering this question, one should note that the very first model of linear regression had only one independent variable, namely, *X*. But as case after case reported by sociolinguists demonstrates, most language variation is multivariate, in the sense that there is more than one factor controlling the variation. These can be internal factors (grammatical, phonological) or external ones (stylistic or sociological). If we add multiple independent variables (*X*, *Z*, ...) and the intercept *w*, the simple equation (1) is extended to multiple regression in (4), and correspondingly, to its logit counterpart in (5):

$$(4)\ \ Y = aX + bZ + \ldots w$$

$$(5)\ \ \ln(Y / (1-Y)) = \ln(X / (1-X)) + \ln(Z / (1-Z)) + \ldots w$$

The equation in (5) is actually the model underlying the VARBRUL program, a specialized multivariate logistic regression analysis freeware for variation analysis (Rousseau and Sankoff, 1978; Rand and Sankoff, 1990). For example, suppose one is looking at a variable use of the accusative case marker attached to an NP (say we code '1' for the presence of the marker), and we picked out two factors, *X* and *Z*, as independent variables, each denoting, respectively, (a) the polarity of the sentence (negative/affirmative) and (b) whether or not the NP is a pronoun. For negative sentences with a pronoun, the model for predicting the case marker's presence would be as in (6):

$$(6)\ \ \ln(Y_c / (1-Y_c)) = \ln(X_n / (1-X_n)) + \ln(Z_p / (1-Z_p)) + w$$

where *Yc* refers to the probability of the case marker's presence, X_n and Z_p are weights (or parameter values) for the negative context and the pronoun context, respectively, and *w* is an intercept (or input probability in VARBRUL terminology).

Since logistic regression allows a continuous variable as one of its factors, we could add another term for the time factor, *f(t)* to (6):

$$(7)\ \ \ln(Y_c / (1-Y_c)) = f(t) + \ln(X_n / (1-X_n)) + \ln(Z_p / (1-Z_p)) + w$$

Now, what the CRH predicts here is that the effects of *X* and *Z* are not affected by the value of *f(t)*, so that whatever point the time factor may indicate, all four parameter values for *X* and *Z* (negative/affirmative and pronoun/nonpronoun) remain constant. This is the meaning of independence in statistics; and the central tenet of the CRH is simply that the contextual effect is independent of time. When the independence does not hold, equation (7) requires an additional interaction term made up of the two or more variables that interact with each other. Note here that the VARBRUL program, as seen in the model in (5), assumes independence among the variables by default. Previous research has shown that this assumption generally applies to internal factors (but cf. Sigley, 2003), so that linguistic factors rarely interact with each other, while social variables such as sex, age, or social class often exhibit intricate interaction patterns (Labov, 2001).

It is important to note here that the 'constant' part of the CRH lies in the constancy of the rate of increase of the innovative form across contexts, which, in visual form, would result in a series of parallel lines connecting the frequencies (in their logit transforms) of the innovative form occurring in that environment. The rate of change in a single context also remains the same throughout the course of the change (thus the line becomes nearly straight), but this is simply because the raw frequencies are transformed into logits. That is, a logit transform is just a convenient way of representing the slope of an S-curve (where the slope changes continually) in a single value.

Further Issues

The CRH is an important hypothesis for the theory of language change, but its impact seems to be spreading quickly in related problems in language variation and change in the broad sense. Language acquisition is programmatically explored by Kroch himself within the aforementioned idea of a parametrically diglossic speech community (Kroch, 2001: 722). There has also been an attempt to relate the CRH to age-grading. Matsuda (2003) showed that by replacing

'time' with 'age' and taking its contrapositive, it is possible to predict whether an observed synchronic age-correlation is a case of ongoing change or an age-grading. The resulting proposition (the Extended Constant Rate Hypothesis) reads as follows:

(8) If the linguistic contextual effect shows interaction with age, the observed age-correlation cannot be a case of language change (and thus, it must be a case of age-grading).

On the other hand, if the contextual effect does not interact with age at all, (8) does not say anything at all, meaning that the data is consistent with either a change or an age-grading. It then follows that there are two different types of age-grading: one that exhibits interaction between contextual effect and age and another that does not. Matsuda claimed the age-grading pattern of English *t/d*-deletion (Guy and Boyd, 1990) is the former type, while the classical cases of age-grading fall into the latter type.

As a final note on the CRH, it must be mentioned that the evidence for the CRH so far comes from past syntactic changes, and this raises two interesting topics for future research: firstly, whether the CRH applies to nonsyntactic changes, especially phonological changes (Kroch, 1989: 240, fn.3). At this point some interesting counter-evidence emerges from the very first variationist study: the centralization of diphthongs in Martha's Vineyard involved an interaction between age and the weight of the following segment (Labov, 1963), a scenario that should not be possible under the CRH. Since such a reorganization of environments does not seem so uncommon in phonological changes, one may wonder whether the CRH is mainly valid for morphosyntactic changes.

The second topic for future research would be a demonstration of the CRH in a real-time study of language change in progress. The Labovian methodology of observing language change in progress has revealed much about the nature of language change (Labov, 1994, 2001), and it is expected that the CRH should also benefit from real-time study of speech communities, a practice that has grown rapidly in recent years in variationist sociolinguistics (Yoneda, 1997).

See also: Age: Apparent Time and Real Time; Aging and Language; Bilingual Language Development: Early Years; Bilingualism; Corpora in Studies of Variation; Corpora; Corpus Linguistics; Formal Models and Language Acquisition; Generative Grammar; Grammar; Grammaticalization; Hockett, Charles Francis (1916–2000); Labov, William (b. 1927); Language Change and Language Contact; Language Change: Probabilistic Models; Register Variation: Core Grammar and Periphery; Sociophonetics; Speech Community; Statistical Testing of Variation; Statistics; Synchronic and Diachronic Variation; Syntactic Development; Variation and Language: Overview; Variation in French; Variation in Pidgins and Creoles; Vowel Shifts and Mergers.

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Constants and Variables

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'Constant' and 'variable' are terms used in linguistics, logic, mathematics, physics, economics, and elsewhere. In linguistics, constant and variable are antonymous terms that are used in two different ways: one derives from the jargon of logic, the second from consideration of meanings and change in the form of words.

In propositional calculus, a logical constant is the part of a formula that expresses truth conditions in a combination of propositions and is represented by connectives such as 'and,' 'or,' 'if ... then,' and so on. Truth-values of propositions depend on truth-values of constants used. By contrast, a variable is, so to speak, an empty place that can be replaced by any assertion about reality. A typical combined proposition like 'p & q' is true only if truth-values of 'p' and 'q' are true, whereas it is false in the other three possible cases. Given that logic was developed as a calculus, this analysis can be applied to ordinary language as long as we pay attention only to the connective functions of logical constants, and not their translations into ordinary language. So, for instance, logicians consider conjunctions 'and' and 'but' as synonyms for calculus purposes and both are symbolized '&.' Thus, according to classical propositional calculus (1) and (2) have the same logical form 'p & q.'

(1) John visited the barber's shop and got a nice haircut.
(2) John visited the barber's shop but his hair remained hideous.

This reduction disregards the fact that 'and' and 'but' are more than mere connectives in ordinary language and they are not synonymous. Although truth conditionally 'and' and 'but' are identical with the logical constant '&,' they differ from a pragmatic point of view. 'And' often has the meaning of 'and then' in ordinary language, while 'but' implies that 'q' is an objection to what is expected given 'p.'

In predicate logic, a sentence such as (3) is analyzed as describing a state of affairs in which a property 'is tall' is predicated of an individual 'Jack.'

(3) Jack is tall.

Individuals are symbolized by variables x, y, ... ; predicates are symbolized by variables P, Q, ... However, in (3) the individual is named and so is represented by the 'individual constant' j; the predicate is also named and so is symbolized by a predicate constant T. Thus, in the language of predicate logic, (3) is translated T(j). Individual constants may be mnemonic, like this, or be drawn from the letters a, b, ... Thus, (4) may be symbolized as G(a).

(4) The book is green.

Generalizing over (3) and (4) is the (variable-using) formula P(x). Generally speaking, the proper nouns and predicates of ordinary language function as constants whereas pronouns work as variables because they are used to refer to many different things. Ordinary language terms are only relatively constant or variable. So, for instance, the Spanish possessive pronoun *suyo*, in an utterance such as *El libro es suyo*, is more variable than its five English equivalents *his*, *hers*, *its*, *yours*, and *theirs*.

From a narrowly semantic point of view, monosemous words could be considered constants and polysemous words variables. From a morphological point of view, adverbs are typically constant in form (i.e., 'invariable'), whereas verbs and nouns are variable. In English, adjectives do not inflect for number or gender and may be considered morphologically constant; in languages such as Latin, Spanish, and Russian, they are variable. Isolating languages such as Chinese or Vietnamese characteristically have morphological constants. Inflecting languages with variable morphology typically have freer word order because the syntactic function of words is indicated by word endings. There are six possible sequences (with different nuances of meaning) for the Latin words *puer amat puellam* but normally only one in the English phrase *The boy loves the girl*.

See also: Inflection and Derivation; Logic and Language: Philosophical Aspects; Markedness; Ordinary Language Philosophy.

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Constituent Structure

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It has been widely claimed that a sentence of a natural language is not just a sequence of words, but that this sequence also has a structure – generally called the constituent structure of the sentence. After developing this notion in a somewhat informal and intuitive way, this article turns to a variety of evidence that has been put forth for this claim. There are, however, several open questions and controversies surrounding the precise nature and role of constituent structure, and so we then consider some different (although closely related) approaches to sentence structure. The remarks here are developed using the assumptions and terminology of Generative Grammar, but many of the basic observations concerning constituent structure hold in other views of grammar as well. Indeed, the notion of constituent structure was first made explicit in works like Bloomfield (1933), Harris (1946), and Wells (1947), all of which predate Generative Grammar. In fact, much of the motivation for the development of early Transformational Grammar derived from one view as to how to model the notion of a 'discontinuous constituent' (see the section 'Discontinuous Constituents'), a notion that had been discussed in earlier work. The bulk of this article uses English and English examples to illustrate the points; in the final section, we turn very briefly to the relevance of this notion for languages that are typologically quite distinct from English.

The Notion of Constituent Structure

The aim of this section is to present the basic idea and terminology as background for the remaining discussion. Consider an English sentence like (1):

(1) Someone who knows everyone in the room said that Tom hates Bill.

In this sentence, the sequence *someone who knows everyone in the room* forms a unit; the sequence *everyone in the room* forms a unit within the larger unit; the sequence *Tom hates Bill* forms another unit, and so forth. Each such unit is called a constituent. Since a single constituent such as *everyone in the room* can occur within a larger constituent, the entire sentence has a hierarchical structure. Moreover, expressions like *Tom*, *Bill*, *someone*, *someone who knows everyone in the room*, *everyone*, *everyone in the room*, and *the room* are all units of the same type. What this means is that roughly speaking, each of these could be substituted for any of the others to still yield a sentence, as in, for example, *Tom said that Bill hates everyone in the room*. Of course, some of these substitutions will result in rather strange sentences (e.g., *The room said that Tom hates Bill*), but this sentence arguably does not violate any principle of English syntax but is strange only by virtue of facts abut the world. (Thus, one could actually imagine a situation where this sentence made sense.)

Thus, the constituent structure of a sentence like (1) can be represented either as the bracketed structure shown in (2) or as a tree, as in **Figure 1**. These two representations are merely different graphical conventions to represent the same information; in this article we use both kinds of representations according to which is more convenient for the purpose at hand. Such representations both show the hierarchical structure and provide names (i.e., grammatical categories) for each constituent. The names themselves are arbitrary; the important point is simply that any two constituents of the same type will have the same name. Here we label these constituents with names that are both mnemonic and relatively standard; the abbreviations in the representations in **Figure 1** can be read as follows: S = Sentence; NP = Noun Phrase; VP = Verb Phrase; PP = Prepositional Phrase; R = Relative Clause; CP = Complementizer Phrase; N = Noun; Det = Determiner; C = Complementizer; P = Preposition. (In some current work within Generative Grammar, one finds the label DP [for Determiner Phrase] instead of NP, and TP [Tense Phrase] or IP [Inflection Phrase] instead of S. Here, however, we use the more traditional labels.) Moreover, while words like *die*, *kill*, *dash*, *say*, etc., are often labeled V (for verb), these actually have somewhat different distributions. The word *die* is intransitive and occurs without any object; *kill* must be followed by an NP; *dash* must be followed by a PP; and *say* takes a sentential (or CP) object. Accordingly, we provide different names for these: V_1 will refer to an intransitive verb like *die*, V_2 to an ordinary transitive verb (like *kill*), V_3 to verbs like *dash*, V_4 to verbs like *say* and *hope*, and so forth.

(2) $[_{S}\ [_{NP}$ someone$]\ [_{R}\ [_{NP}$ who$]\ [_{VP}\ [_{V2}$ knows$]$
$[_{NP}\ [_{NP}$ everyone$]\ [_{PP}\ [_{P}$ in$]\ [_{NP}\ [_{Det}$ the$]$
$[_{N}$ room$]]]]]]]\ [_{VP}\ [_{V4}$ said$]\ [_{CP}\ [_{C}$ that$]$
$[_{S}\ [_{NP}$ Tom$]\ [_{VP}\ [_{V2}$ hates$]\ [_{NP}$ Bill$]]]]]$

It should be noted that many of the details of these representations are unclear or controversial; the aim here is simply to illustrate the basic notions rather than to justify these particular representations.

Here, some terminology concerning trees will be useful. A tree is a sequence of points or nodes; in the tress used to represent constituent structure, each node has a label (such as NP or VP). A node A *dominates* a node B if there is a downward sequence of lines connecting A to B. (Under some definitions of *dominates* each node dominates itself; for convenience we will define 'dominates' here in such a way that no node dominates itself.) For example, in the tree in Figure 1, the node labeled PP dominates the nodes labeled P and the 'lowest' nodes, labeled NP, Det, and N. The words themselves (also called *terminal elements*) are also considered to be labels of nodes, and hence the node labeled PP in (3) also dominates the nodes labeled *in*, *the*, and *room*. For expository ease, we will henceforth refer to a node by the name of its label. Consider any sequence of words in a sentence. If there is some node A that dominates each word in that sequence and no other words, then that sequence forms *a constituent*. Thus, in Figure 1 the whole sentence is a constituent; the sequence *who knows everyone in the room* is a constituent; *everyone in the room* is a constituent; etc. On the other hand, *said that Tom* is not – for every node dominating these words dominates other words as well.

Since constituent structure is hierarchical, we can speak not only of the constituents of a sentence but of the constituents of smaller units as well. Thus, *everyone in the room* is a constituent not only of S but also of R (and also of the VP *knows everyone in the room*). If a sequence of words x is a constituent of some larger sequence y, and if there is no other sequence z such that x is a constituent of z and z is a constituent of y, then x is an immediate constituent of y. In the example in Figure 1, then, this means that the immediate constituents of S are *someone who knows everyone in the room* and *said that Tom hates Bill*; the immediate constituents of *knows everyone in the room* are *knows* and *everyone in the room*, and so forth.

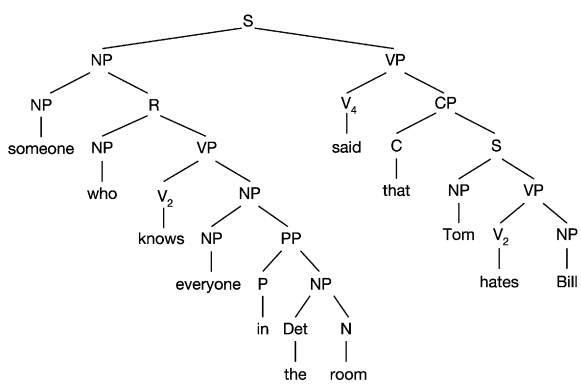

Figure 1

Motivation

Distributional Considerations

The fundamental motivation for the notion of constituent structure is hinted at in the previous section: this centers on distributional facts. (Wells [1947] provided a classic and thorough discussion of this, although the discussion there was phrased in somewhat different terminology from that adopted here; see also Harris, 1946). The basic idea is perhaps easiest to illustrate with an artificial 'language.' One way to view a language is as a set of sentences, and so we can create a mini-'language' whose 'words' are *a*, *b*, *c*, *d*, and *e* and whose 'sentences' are only the following sequences of 'words': *abcab*, *adcab*, *edcab*, *ddecab*, *abcad*, *adcad*, *edcad*, *ddecad*, *abced*, *adced*, *edced*, *ddeced*, *abcdde*, *adcdde*, *edcdde*, *ddecdde*. Call this language L_1. L_1 is of course not really analogous to a natural language, in that it has only 16 sentences, but it will nonetheless serve to illustrate several points.

Consider how one could describe the sentences of this language. One way is to simply list them (as is done in the previous paragraph). But in fact there are simpler ways to characterize these 16 sentences. Note first that each sentence contains a *c*. Note further that immediately before the *c* can go any of the sequences *ab*, *ad*, *ed*, *dde*, while immediately following the *c* can go any of the sequences *ab*, *ad*, *ed*, *dde*. The interesting point, then, is that what can precede the *c* and what can follow it is the same set of sequences. This can be described by creating an arbitrary name for this set – call it A – and by stating that the strings of this language consist of an expression drawn from the set A followed by *c*, followed by an expression drawn from the set A. To put this in slightly different terms, we can posit the existence of a grammatical category A, and we specify that the sentences of this language consist of an expression of category A, followed by *c*, followed by an expression of category A. To complete the description, we specify that the expressions of category A are the sequences *ab*, *ad*, *ed*, and *dde*.

Before returning to natural languages, we briefly digress to discuss the notion of phrase structure rules, for the distributional facts that motivate the notion of constituent structure are intimately tied up with this notion. Much of modern grammatical theory (particularly within the tradition of Generative Grammar) treats a grammar of a language as a set of rules to explicitly predict which sequences of words are or are

not sentences of the language. Among the types of rules that have been most studied are what are known as context-free phrase structure rules (referred to hereafter simply as phrase structure rules), and many current grammatical theories posit that the grammars of natural languages contain such rules (among, perhaps, other types of rules as well). The description of L_1 developed previously in this article serves to illustrate the general concept. This description can be seen as a grammar that contains five rules. These rules are stated in prose in the left columns in (3), and each prose description is rewritten in the right column, using the standard notation for phrase structure rules (again, the information on the left and on the right is exactly the same; these are merely different notations for the same thing). These rules need not 'apply' in any particular order; they are merely static statements that taken together define the set of sentences of L_1. The numbering on the rules is for expository purposes only.

(3)	i. S (a sentence) may consist of A followed by *c* followed by A	S → A *c* A
	ii. A may consist of *ab*	A → *ab*
	iii. A may consist of *ad*	A → *ad*
	iv. A may consist of *ed*	A → *ed*
	v. A may consist of *dde*	A → *dde*
	(A set of rules such as those in (ii) through (v) can be abbreviated as a single rule schema as follows:	A → *ab* | *ad* | *ed* | *dde*)

Given a grammar with phrase structure rules, a tree (or the equivalent labeled bracketed representation) is a representation of how the rules of the grammar specify the sentence as well formed. Continuing to use L_1 for illustration, the sentence *abcad* is well formed according to (3), because it can be analyzed in the way shown in the following representation: $[_S\ [_A\ ab]\ c\ [_A\ ad]]$. Thus, *ab* is a constituent of this sentence according to the rules in (3). In other words, the constituent structure of any sentence is a by-product of the rule system: a sequence *x* forms a constituent in some sentence according to some grammar G if the rules of G provide an analysis of that sentence according to which *x* is an expression of some grammatical category. Thus, the claim that a particular sentence in some language L has a particular constituent structure is a claim about what is the 'actual' or 'correct' grammar for L (we return to the notion of the 'correct' grammar below); constituent structure cannot be determined independent of a hypothesis about the grammar. We should further note that a given phrase structure grammar might provide more than one structure for a given sentence. Consider, for example, a grammar with the rules S → A *c* A and A → *ac* | *acc* | *ca* | *a*. This grammar assigns two different structures to the sentence *accca:* $[_S\ [_A\ acc]\ c\ [_A\ a]]$ and $[_S[_A\ ac]\ c\ [_A\ ca]]$.

The above discussion focused on an artificial 'language,' but let us now apply this to the situation for a natural language, such as English. Before we do this, one further assumption underlying most treatments of constituent structure should be made explicit. In the artificial language L_1, the simplest set of rules to describe the sentences of this language is the grammar in (3). But there are other sets of rules (that is, grammars) that describe the same language. For example, one grammar of L_1 specifies that a sentence of L consists of an A followed by *c* followed by a B, where A can be *ab*, *ad*, *ed*, or *dde* and B can be *ab*, *ad*, *ed*, or *dde*. Since L_1 is not a natural object, there is really no sense in which the grammar in (3) is the 'correct' one – it is merely the simplest. But natural language is a different matter. While here, too, there might be several different rule systems that yield the same set of sentences, it is generally assumed that only one of these is the 'correct' rule system. Underlying the claim that one grammar is correct is the assumption (made explicit within Generative Grammar) that a grammar is a set of rules that speakers actually 'know' (in some unconscious way) and that allows them to judge certain sequences of words as well-formed sentences of the language. In this view, the correct grammar is the one that is a (reasonably) close model of a speaker's actual mental representation of the linguistic system. (To forestall confusion on this point, it should be noted that no one believes that the notation standardly used to represent things like phrase structure rules is what is actually 'in the head' of a speaker, but the hope is that a formal representation of the grammar will map in some way onto the mental representation and that when there are competing formal systems that describe the same object, one of these is the closest approximation to the actual mental representation.) When two different grammars describe the same language, it is obviously very difficult to determine which is correct. But a working principle ascribed to in most research within linguistic theory is that the simplest among competing grammars is the correct one. In view of this, the claim that some sequence of words within a sentence forms a constituent amounts to the claim that the simplest set of rules to describe the language treats this sequence as a unit.

We can now illustrate this principle by consideration of a portion of English. Consider, for example, sentences of the form *x resembled y*, where *x* and *y*

are any sequences of words that can be substituted in here to yield a well-formed sentence. Note that there is a very large set of sequences that can occur in the position marked *x* and a very large set that can occur in the position marked *y*. But what is particularly striking is the fact that these two sets are the same. To give just a few examples, all of the following are well-formed sentences: *The man resembles the rock*; *The man resembles the boat*; *The man resembles the woman*; *The rock resembles the man*; *The boat resembles the man*; *The woman resembles the man*. Moreover, this is also exactly the set of expressions that can follow a preposition, as in, e.g., *The woman sat on the rock*; *The woman sat on the boat*; *The woman sat on the man*. Hence, the simplest grammar for English will contain rules to define a set of well-formed Noun Phrases (NPs) and will specify that an NP may precede a verb like *resemble*, may follow a verb like *resemble*, or may follow a preposition. Note, too, that NPs themselves can be complex and can contain other NPs, as in *the front of the rock*, *the front of the man*, etc. When one puts together these various observations (along with others that readers may wish to construct for themselves), it is reasonable to hypothesize that English grammr contains, among others, the phrase structure rules shown in (4) (we turn here to the motivation for positing a VP constituent).

(4)
i. $S \rightarrow NP\ VP$
ii. $NP \rightarrow Det\ N$
iii. $NP \rightarrow NP\ PP$
iv. $PP \rightarrow P\ NP$
v. $VP \rightarrow V_1$
vi. $VP \rightarrow V_2\ NP$
vii. $VP \rightarrow V_3\ PP$
viii. $Det \rightarrow$ the | a | every | . . .
ix. $N \rightarrow$ woman | man | rock | . . .
x. $V_1 \rightarrow$ die | walk | . . .
xi. $V_2 \rightarrow$ resemble | kill | . . .
xii. $V_3 \rightarrow$ dash | sit | lie | . . .
xiii. $P \rightarrow$ on | under | . . .

The same sort of reasoning can be used to justify some of the other details of the constituent structure shown in **Figure 1**. Take, for example, the claim that *Tom hates Bill* is a constituent, and a constituent of the same type as the entire sentence. This is motivated by the fact that sequences like this can occur as full sentences in their own right and, conversely, that any sequence that constitutes a well-formed declarative sentence can occur in the position following *that* in (1). Consider further the claim that *that Tom hates Bill* is a constituent (which we have labeled CP). The evidence for this comes from the fact that sequences of the form *that S* occur in a variety of positions. These can, for example, occur in subject position, as in (5a), and they can also follow an NP, as in (5b):

(5a) That Tom hates Bill bothered Mary.
(5b) I told Mary that Tom hates Bill.

These distributional facts can be accounted for rather simply by adding the rules in (6) to the phrase structure rules in (4) (again, it should be kept in mind that some of these rules are controversial, but they serve to make the general point).

(6)
xiv. $S \rightarrow CP\ VP$
xv. $VP \rightarrow V_4\ CP$
xvi. $VP \rightarrow V_5\ NP\ CP$
xvii. $CP \rightarrow C\ S$
xviii. $C \rightarrow$ that
xix. $V_4 \rightarrow$ say | believe | think | . . .
xx. $V_5 \rightarrow$ tell | persuade | . . .

While we will not attempt to justify all of the other details of the structure in **Figure 1**, we will briefly mention the motivation for positing a VP constituent. Note that there are a large number of sequences that can follow subjects; some of these are illustrated by the italicized material in (7).

(7a) Mitka *howled*.
(7b) Mitka *killed the squirrel*.
(7c) Mitka *dashed into the yard*.
(7d) Mitka *reported that Kolya ate*.
(7e) Mitka *told Ginger that Kolya ate*.

But exactly this same set occurs in a variety of other environments. For example, this is exactly the same set that can follow *Louise helped Mitka* in sentences like those in (8).

(8a) Louise helped Mitka *howl*.
(8b) Louise helped Mitka *kill the squirrel*.
(8c) Louise helped Mitka *dash into the yard*.
(8d) Louise helped Mitka *report that Kolya ate*.
(8e) Louise helped Mitka *tell Ginger that Kolya ate*.

(We ignore here the fact that the verbal morphology is slightly different than in the examples in [7].)

Thus, suppose that the italicized sequences in (7) were not treated as constituents. This would mean that English does not contain the phrase structure rules shown above in (i), (v), (vi), (vii), (xv), and (xvi). Rather, in place of these rules, it would contain these rules:

$S \rightarrow NP\ V_1$; $S \rightarrow NP\ V_2\ NP$; $S \rightarrow NP\ V_3\ PP$;
$S \rightarrow NP\ V_4\ CP$; $S \rightarrow NP\ V_5\ NP\ CP$.

But although these rules account for the sentences in (7), they do not account for those in (8). Since these are also well-formed sentences, English grammar would need several additional rules:

$S \rightarrow NP\ V_6\ V_1$; $S \rightarrow NP\ V_6\ NP\ V_2\ NP$; $S \rightarrow NP\ V6\ NP\ V_3\ PP$; $S \rightarrow NP\ V_6\ NP\ V_4\ CP$; $S \rightarrow NP\ V_6\ NP\ V_5\ NP\ CP$; $V_6 \rightarrow$ *help* | *make* . . .

Moreover, there are even longer sentences, like (9), and so yet additional rules would be needed.

(9a) Louise helped Mitka help Kolya eat.
(9b) Louise helped Mitka help Kolya kill the squirrel.

But under the hypothesis that English grammar contains a category VP, there is a much simpler set of rules available to account for all of these sentences. Assume, then, that (i), (v), (xi), (vii), (xv), and (xvi) are among the phrase structure rules of English. Then all of the sentences in (7) and (8) can be accounted for with just two additional rules:

xxi. $VP \rightarrow V_6\ NP\ PP$; and
xxii. V6 → help | make | . . . .

Before concluding this section, we should point out that most current theories of phrase structure rules within Generative Grammar do not contain lists of individual rules as shown in the grammar developed thus far in this article, but more abstract 'rule schemata' that abbreviate a set of phrase structure rules (see, for example, Chomsky, 1970, and Gazdar *et al.*, 1985, and the works within Categorial Grammar discussed in the section 'Constituent Structure in Categorial Grammar') Moreover, the architecture of the grammar under the Minimalist Program (Chomsky, 1993) is such that phrase structure rule schemata are couched in a somewhat different form, but the apparatus therein still gives rise to structured objects. But these differences will not affect the basic point(s) of this article: the motivation for constituent structure in general and for chosing one structure over another are rooted in the phrase structure rule schemata (or similar devices) within the grammar of an individual language.

Semantic Considerations

While the major motivation for constituent structure centers on distributional facts, the intuition that certain phrases form a unit also receives some confirmation from semantic considerations. Consider a sentence like (10).

(10) Everyone who ate the beef which was raw said that Bill left.

Distributional evidence indicates that *everyone who ate the beef which was raw* is a single constituent (an NP), as is *the beef which was raw*. Moreover, in terms of the meaning, it is clear that *who ate the beef which was raw* 'goes with,' or modifies, *everyone* and not *said*. By the same token, *which was raw* goes with *the beef* (or, perhaps, *beef*) and not with *said*. In view of this, there is a close correspondence between the syntactic constituents and the semantic units. Along these lines, *that Bill left* seems to form a meaningful unit in a way in which, e.g., *said that Bill* does not (see 'Constituent Structure in Categorial Grammar,' however), and the distributional evidence discussed earlier in this article similarly shows that *that Bill left* is a constituent.

That syntactic constituents generally also behave as semantic units is not surprising if a tree not only represents the way in which the rules of the grammar work so as to predict that a sentence is well formed but also represents the way in which the meanings of words are put together to give the meanings of larger expressions. Put differently, one hypothesis regarding the interaction of syntax and semantics is that each phrase structure rule in the grammar is coupled with a semantic rule specifying how the meaning of the immediate constituents of some expression combine to give the meaning of the whole expression. Just what these semantic rules look like is beyond the scope of this article; suffice it to say that under this conception, each syntactic constituent has some kind of meaning, and conversely each semantic unit should therefore be a syntactic unit.

The notion that the semantic composition of a sentence is mirrored by its constituent structure yields interesting accounts of certain ambiguous sentences. As noted in the section 'The Notion of Constituent Structure,' phrase structure grammars have the property that a single phrase structure grammar might assign more than one constituent structure to a single sentence. In certain cases, these dual analyses correspond to distinct meanings. A classic example is a sentence like (11).

(11) Mary saw the man with the binoculars.

Note first that PPs can in general occur with any VP – as in (12a) and (12b) – and (12c) shows that more than one PP can occur here.

(12a) Mary killed several flies with a fly-swatter.
(12b) Mary sang in the park.
(12c) Mary killed several flies with a fly-swatter in the kitchen on Friday.

To account for this, assume that in addition to the rules discussed so far, English grammar also contains a rule (xxiii) $VP \rightarrow VP\ PP$. Assume further that the associated semantic rule says that the meaning of the PP modifies that of the VP (we do not attempt here to give a more precise definition of the notion 'modify'). Recall, however, that English grammar also contains the rule (iii) $NP \rightarrow NP\ PP$. Assume that this, too, has an associated semantic rule to the effect that the PP modifies the NP. Given these rules, there are two different structures for (11). (These trees show only those parts of the structure relevant for the point at hand; a triangle above some sequence indicates that that constituents has further internal structure not being shown in Figure 2).

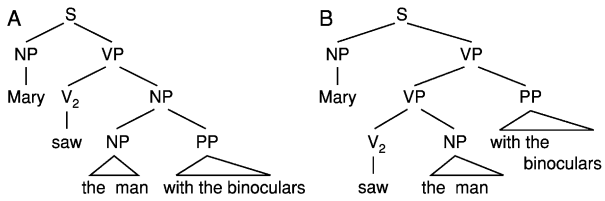

Figure 2

These two correspond to the two different meanings. Under one meaning, the phrase *with the binoculars* modifes *the man*, and this is represented by the tree in Figure 2. Under the second meaning, *with the binoculars* describes the way in which the seeing of the man took place, and this is represented by B in Figure 2.

Before we leave this, it should be noted that not every sentence with more than one structure is necessarily ambiguous; the semantic rules might be such that two different structures will have the same meaning. Take, for example, the case of sentences connected by *or*, as in *John left or Bill stayed*. Such sentences can be accounted for by a phrase structure rule:

xxiv. *S*→ *S or S*.

The corresponding semantic rule states that the entire sentence denotes a proposition that is true just in case at least one of its immediate constituent sentences denotes a true proposition. Consider now a sentence like (13).

(13) John sang or Mary danced or Sue jumped.

Given the rule (xxiv), (13) has the two constituent structures shown in (14).

(14a) $[_S\ [_S\ [_S$ John sang] or $[_S$ Mary danced]] or $[_S$ Sue jumped]]

(14b) $[_S\ [_S$ John sang] or $[_S\ [_S$ Mary danced] or $[_S$ Sue jumped]]]

However, the semantic rule associated with (xxiv) is such that these two structures correspond to the same proposition. In either case, the entire sentence denotes a proposition that is true just in case at least one of the three sentences *John sang*, *Mary danced*, and *Sue jumped* denotes a true proposition.

Additional Considerations

There are a variety of other considerations that have been used both to support the claim that sentences have a constituent structure and to give evidence for the particular structure (or, structures) for any given sentence. Many of these considerations are somewhat controversial and/or yield unclear results; we will nonetheless mention a few of these here (along with some of the controversies surrounding them).

Prosodic Evidence Although we have been using written sentences as a medium for discussing English, linguistic theory generally takes the spoken language to be the primary object of description. And sentences when spoken have a prosodic structure – this refers to the intonation contour and pause breaks. It has often been claimed that the prosodic structure of a sentence meshes – at least to some extent – with its constituent structure. To develop this claim, consider again the tree in Figure 1. Here there is what is called a more major constituent break between *room* and *said* than between *everyone* and *in*: a more major break is one that occurs higher in the tree.

The claim, then, is that more major constituent breaks are marked by special prosodic cues: these cues can be longer pauses and/or rising intonation. Thus, the spoken version of (1) will in general have a longer pause between *room* and *said* than between *everyone* and *in*. Or consider again the ambiguous sentence (11). If this is spoken with a longer pause between *man* and *with* than between *saw* and *the*, then the natural interpretation is the one in which *with the binoculars* modifes *saw the man*. If the longer break is between *saw* and *the*, then the other interpretation is more natural. Hence the pause breaks are taken as cues to the syntactic structure, and the two different structures in turn reflect the two different meanings.

Unfortunately, while the example in (11) demonstrates that there is indeed some connection between the prosodic structure and the constituent structure, this connection is certainly not absolute. For example, even with a longer pause between *man* and *with* than between *saw* and *the*, one can still understand (11) on the meaning represented in A of Figure 2, although this interpretation is less natural or less readily accessible than the reading in B of Figure 2. There are, moreover, well-known cases where the most natural prosodic structure does not correspond well with the (apparent) constituent structure. A famous case of this sort is shown in (15).

(15) This is the cat which chased the rat which ate the cheese.

Distributional evidence of the type discussed in the section 'Distributional Considerations' leads to the hypothesis that the structure for this sentence is roughly Figure 3 (again, some of the details are controversial, but these controversies will not affect the point of the example).

Hence the constituent break between *is* and *the* is more major than the break between *cat* and

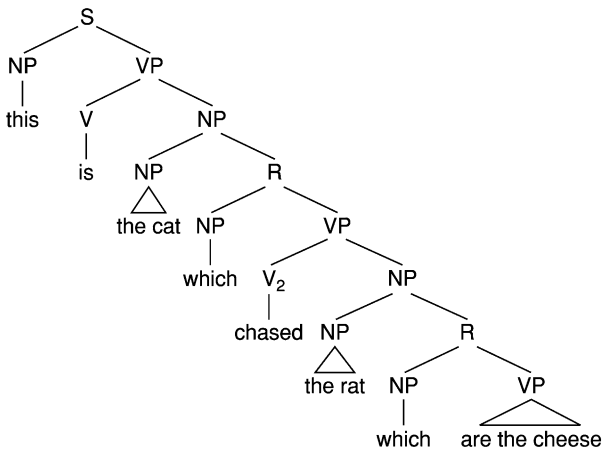

Figure 3

which. By the same token, the break between *which* and *chased* is more major than that between *which* and *ate*. Yet the sentence is generally pronounced as shown in (16), where || indicates the major pause breaks.

(16) This is the cat || which chased the rat || which ate the cheese.

If the constituent structure were directly mapped into the prosodic structure, we would expect a significant break between *is* and *cat*, but such a break is extremely unnatural.

Interestingly, the question of just how direct is the mapping between constituent and prosodic structure has been reopened in recent work, especially within Categorial Grammar, which posits a somewhat more 'flexible' notion of constituent structure, as is detailed in the section 'Consitution Structure in Categorial Grammar.' For example, Steedman (2000) speculated that prosodic structure is in fact a rather direct reflection of the constituent structure – it is just that our original ideas about some of the particulars of constituent structure need rethinking.

Interpretation of Pronouns Another phenomenon that is often adduced in support of the claim that sentences have a structure centers on the distribution and interpretation of pronouns. Pronouns can, in general, be understood as having the same referent as some other NP in a sentence (or in a prior sentence), as in (17) and (18).

(17a) John said that he won.
(17b) John knew the woman who wrote to him.

(18a) That John lost bothered him.
(18b) The woman who wrote to John knew him.

In all of these, *he* or *him* can be understood as referring to John; in this case, we will say that *John* and *he* or *him* are 'coreferential.' (The pronouns may, of course, also be understood in all of these sentences as referring to someone else, and so these sentences are ambiguous.)

Interestingly, a pronoun can also be understood as coreferential to a nonpronominal NP even if the pronoun precedes the NP, as in (19).

(19a) That he lost bothered John.
(19b) The woman who wrote to him loves John.

But in some cases this is impossible, or at least quite difficult, as in (20).

(20a) He said that John won.
(20b) He loves the woman who wrote to John.
(20c) I made him write to the woman who loves John.

Incidentally, the sentences in (19) are also quite unnatural unless one imagines some appropriate prior discourse context. Still, there is a fairly robust contrast between (19) and (20); even with prior discourse context, it is difficult to understand *he* or *him* as coreferential to *John* in (20).

One very common explanation for these facts invokes the notion of the structure of the sentence. The exact conditions under which the coreferential interpretation is impossible is the subject of some controversy, but most formulations of the relevant principle make use in some way of the notion of structure. To develop one standard account (see Reinhart, 1983), we introduce two further terms concerning trees. A branching node is a node that immediately dominates at least two other nodes; thus, in Figure 1 the branching nodes are S, VP, CP, PP, and some of the nodes labeled NP. A node A c-commands a distinct node B if and only if neither A nor B dominates the other, and the lowest branching node dominating A dominates B. So, for example, in Figure 1, the terminal node *said* c-commands all of the nodes pictured to its right (CP, C, S, NP, VP, V_2, NP, *that*, *Tom*, *hates*, and *Bill*). With this apparatus, the condition governing the interpretation of pronouns can be described thus: A pronoun may not be understood as coreferential to any nonpronominal NP that it c-commands. The reader can verify that given the rules developed in this article, the pronoun in each of the sentences in (20) c-commands *John*, but it does not do so in (17) through (19).

This account is, however, controversial: many researchers have concluded that the interpretation of pronouns is governed not by structural considerations but by fine-grained considerations of meaning and of the way in which information is packaged in a

sentence and in a discourse. Space precludes elaborating on that in this article (for one such nonstructural account, see Kuno, 1987).

Conjunction One additional and very interesting phenomenon that has been used as a diagnostic for constituent structure is conjunction. Note first that there are a variety of sequences that can be conjoined in English, as in (21).

(21a) The men and the women left.
(21b) John saw Mary and said that Bill left.
(21c) John believes that Mary left and that Sam came.
(21d) John believes that Mary left and Sam came.

It has often been claimed that the correct generalization regarding conjunction is this: only constituents may conjoin with other constituents (see Chomsky, 1957); the two constituents must be of the same category; and the two conjoined constituents themselves form a constituent of the same category as each of the conjuncts (see, e.g., Gazdar, 1981). In other words, the relevant portions of the structures for, e.g., (21a) and (21b) is shown in (22).

(22a) [$_{NP}$ [$_{NP}$ the men] and [$_{NP}$ the women]] left.
(22b) John [$_{VP}$ [$_{VP}$ saw Mary] and [$_{VP}$ said that Bill left]].

If the generalization in the previous paragraph is correct, then it can actually be accounted for in a simple and elegant way. As mentioned in the section 'Distributional Considerations,' many current theories assume the grammars of natural languages contain not just phrase structure rules but also phrase structure rule schemata, where a rule schema is an abbreviation for a set of phrase structure rule. Then English grammar can contain the rule schema (xxv) $X \rightarrow X$ *and* X, where X is a variable over any category. This allows NP constituents that are of the general form *NP and NP* (as in [21a]), CP constituents of the general form *CP and CP* (as in [21c]), etc. If, moreover, this is the only rule or rule schema introducing conjoined material, then the above generalization follows. In other words, it follows that if two sequences x and y can conjoin to form a sequence x *and* y, then x and y are single constituents, and are constituents of the same type.

But there are open questions surrounding the conjunction evidence as a test for constituency, for there are many well-known cases of so-called nonconstituent conjunction. Consider, for example, the sentences in (23) and (24).

(23) John likes and thinks that Bill hates everyone who was here.

(24) John likes and Bill hates semantics.

Given the sort of evidence discussed in this article, many researchers are leery of positing that *thinks that Bill hates* is a constituent, for this kind of sequence does not occur in a wide variety of environments. Yet here it conjoins with the constituent *likes*. Similar remarks hold for (24) in which the apparent nonconstituent *John likes* is conjoined with another apparent nonconstituent (*Bill hates*).

Refinements, Questions, and Alternative Conceptions

Having presented the basic notion of constituent structure and some of the motivation for it, we now turn to further open questions surrounding this notion and (briefly) to some alternative conceptions regarding sentence structure.

Binary Immediate Constituents

The reader may have noticed that almost all of the phrase structure rules discussed in this article for English provide trees in which a node immediately dominates at most two other nodes. Put differently, every constituent that contains smaller immediate constituents contains exactly two immediate constituents. In fact, almost all of the rules above are of the general form $A \rightarrow B\ C$ where B and C are labels for grammatical categories (called nonterminal labels) or of the form $A \rightarrow a$ where a is a single terminal. Grammars with only rules of this form are called grammars in Chomsky Normal Form. There are a few exceptions to this; rules (xvi) and (xxi) allow a node to immediately dominate three nonterminals; and rule (v) allows a nonterminal (VP) to dominate a single nonterminal (V_1). (v), however, could be reformulated as $VP \rightarrow die \mid walk \mid \ldots$ and we return subsequently to (xvi) and (xxi). The rule schema in (xxv) is also an exception, but this schema can also be reformulated in such a way that a constituent like *John and Mary* contains the two immediate constituents *John* and *and Mary* (see, e.g., Gazdar *et al.*, 1985). In fact, the interested reader can verify that any set of phrase structure rules that are not in Chomsky Normal Form can be converted to an equivalent set that is (by 'equivalent,' we mean that it will describe exactly the same language, although of course the constituent structures that it assigns to sentences may be different). However, the two grammars might well not be equally simple, and so the question of which is the 'correct' grammar is not immediately settled simply by this observation.

The fact that a constituent in English usually contains two immediate constituents was observed in

much of the work in Structural Linguistics (for discussion, see Wells, 1947). Whether or not this is an accidental fact about English grammar or it follows from some more general principle regarding natural language has been the subject of a certain amount of controversy throughout at least the past 60 years. Some current theories within Generative Grammar assume that indeed all branching structures must be binary (see, e.g., Kayne, 1984, and see also work within Categorial Grammar, such as Dowty, 1982). Others deny this (see in particular work within Head Driven Phrase Structure Grammar, such as Pollard and Sag, 1994). It is interesting to note in this regard that grammars in Chomsky Normal Form have played a special role in the work on parsing within computational linguistics. Parsing refers to the process by which a listener (or, perhaps, a computer program) can recover the constituent structure of any sentence given the grammar for the language; if the constituent structure is indeed an indication of the semantic composition, then presumably this would be part of the process of arriving at a meaning for a sentence. Much of the work within computational linguistics seeks to provide an explicit algorithm according to which a sentence can be assigned its constituent structure (or structures), and if such models are to reflect what it is that humans actually do, then the parsing algorithm must be as efficient as possible, since humans process a sentence almost instantaneously. Interestingly, some of the well-understood algorithms for efficient parsing make use of grammars in Chomsky Normal Form. In other words, such grammars have been shown to lend themselves to (reasonably) efficient parsing algorithms.

Discontinuous Constituents

The earlier section 'Motivation' develops a view of grammar according to which material that forms a single constituent must be contiguous. This is because a phrase structure rule defines a well-formed expression of some category A by specifying that it may consist of some continuous sequence of smaller expressions. Moreover, if each semantic unit corresponds to a syntactic constituent, then we would expect each semantic unit to be a contiguous sequence within a sentence.

Yet there are numerous instances where what appears to be a single semantic unit is a discontinuous sequence, and such cases are often referred to as discontinuous constituents (see Pike, 1943). Consider, for example, the sequences in (25).

(25a) Everyone who was invited arrived.
(25b) Everyone arrived who was invited.

In (25b) *who was invited* modifies *everyone*, exactly as it does in (25a). Yet in (25b) *everyone who was invited* is not a continuous sequence.

There are many other examples that appear to be discontinuous constituents; we mention just two others here. One is exemplified by what is known as the Topicalization construction, shown in (26).

(26) Beans, I like.

In (26), *like* is a V_2 and so normally occurs only with a following NP object; thus, (27) is not a well-formed sentence.

(27) *I like.

In (26), however, *like* is not followed by an NP object, but there is an NP at the beginning of the sentence that functions as the object of *like*. Thus, here *beans . . . like* (or, *like . . . beans*) is arguably a unit in much the same way that it is in (28), even though in (26) it is discontinuous (and in [26], unlike in [28], the object precedes the verb).

(28) I like beans.

Finally, it is mentioned in the preceding section that rules such as (xvi) and (xxi) are unusual in that they allow for constituents with three rather than two immediate constituents. However, it has often been proposed that these rules are incorrect (for discussion of a related case, see Chomsky, 1957). Rather, in a sentence like *John made Mary leave*, *made . . . leave* is actually a single discontinuous constituent; hence it is a complex V_2. If this is correct, then here, too, the constituent structure is binary; the VP contains the two immediate constituents *made . . . leave* and *Mary*, and *made . . . leave* is a discontinuous constituent consisting also of two immediate constituents.

Discontinuous Constituents in Transformational Grammar The phenomenon of discontinuous constituents is so widespread that a large portion of the research in grammatical theory for the past several decades has been centered on how best to account for this phenomenon. The best-known approach to this phenomenon is that which is taken in Transformational Grammar (and most of its descendants). Although Transformational Grammar has undergone considerable evolution since its inception close to 50 years ago, we will present here what is sometimes referred to as the 'Standard Theory,' which was developed in Chomsky (1965). Under this theory, the grammars of natural languages contain phrase structure rules of the sort discussed in the section 'Motivation,' but there are additional rules – known as

transformations – that map trees into other trees. The phrase structure rules themselves, then, do not define the set of well-formed sentences of a language but rather define a set of well-formed deep structures. A deep structure may be mapped into a different tree by a transformation, and since several transformations may apply in succession, the resulting tree may in turn be mapped into yet another tree. A sequence of trees formed in this way is called a derivation, and the last tree in such a sequence is the surface structure. A sentence is well formed if and only if it is the 'bottom line' (the sequence of terminal symbols) of the last tree in a well-formed derivation; a derivation is well formed if and only if its first tree is well formed according to the phrase structure rules and each adjacent pair satisfies the description of some transformation. (A derivation can also consist of just a single tree – in this case, no transformation has applied.) The key to discontinuous constituents is the existence of 'movement rules' – rules that map one tree into another by moving one part of an expression to some other site within the sentence. Transformational Grammar as defined in this article has undergone numerous revisions, but the notion of 'movement rules' remains central to many of the descendants of this theory.

We can thus illustrate this with a consideration of the examples in (25). In addition to the phrase structure rules developed in previous sections, assume that English grammar also has the rules: (xxvi) *NP* → *NP R* and (xxvii) *R* → *NP VP*. These rules, combined with the other rules discussed, will account for a sentence like (25a) and will assign it the structure in (29).

(29) $[_{S}\ [_{NP}\ [_{NP}$ everyone$]\ [_{R}$ who likes Bill$]]\ [_{VP}$ left$]]$

Suppose that there is a transformation that – informally stated – allows any R constituent to 'move' to the end of the sentence, where it will be attached directly under the S-node. This means that (25b) is well formed, since, we see that Figure 4 is a well-formed derivation.

The first tree in Figure 4 is the deep structure for both (25a) and (25b). The sentence in (25a) is derived by a derivation in which no transformation applies, while (25b) involves the application of a transformation.

Thus, within Transformational Grammar (and many of its descendants), a 'discontinuous constituent' is a sequence of material that forms a single constituent in deep structure but that is broken up by the application of one or more transformations. If deep structure also represents the way in which the meanings of the parts are put together to give the meaning of the whole sentence, then semantic units

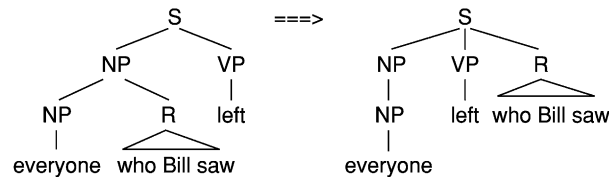

Figure 4

will be contiguous in deep structure but need not be at surface structure. Moreover, within this theory the application of transformations themselves are also used as a test for constituent structure. Consider the Topicalized sentence in (26). This can be accounted for under the assumption that the deep structure of (26) is the same as the deep structure of (28), where there is a transformation allowing any NP to 'move' to the front of the sentence. However, it is not only NPs that can front in this way – PPs and CPs (among others) may also prepose, as in (30) and (31).

(30a) I often sit on the table.
(30b) On the table, I often sit.

(31a) I fervently believe that Mary left.
(31b) That Mary left, I fervently believe.

Interestingly, it appears that only single constituents may prepose (and the rule does not apply to its own output). Thus, for example, the example in (32) is bad, where an NP–CP sequence that does not form a constituent has preposed.

(32a) I told Mary that Bill left.
(32b) *Mary that Bill left, I told.

However, while the preposability of some sequence *x* indicates that *x* is a single constituent, constituency is not a sufficient condition for preposability. There is evidence that the italicized material in (33a) forms a single constituent, but it cannot prepose, as shown in (33b). Nor can the italicized S-constituent in (34a) prepose.

(33a) I know the woman *who wrote to Mary.*
(33b) *Who wrote to Mary, I know the woman.

(34a) I think that *Bill left.*
(34b) *Bill left, I think that.

Other Views of Discontinuous Constituents While Transformational Grammar (or any of its descendants that allow for movement rules) provides perhaps the best-known account of discontinuous constituents, it is by no means the only available account of this phenomenon. A number of theories provide rules that directly allow a sentence to be represented as a treelike object with 'crossed branches';

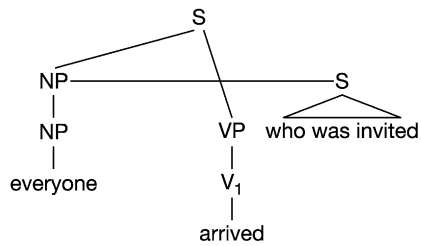

Figure 5

thus, the structure for a sentence like (25b) would be represented as in Figure 5.

The basic idea behind rule systems that provide representations like Figure 5 is that there are rules roughly like phrase structure rules that specify well-formed expressions in terms of smaller expressions, but that these rules do not require the immediate constituents of some expression to be contiguous. Rather, they can allow pieces of smaller expressions to be interrupted by other expressions. Put differently, these rules allow one of the combining expressions to be infixed into the other. (As such, they are reminiscent of infixation processes in morphology.) Hence, the NP *everyone who was invited* in Figure 5 can be interrupted by the VP (which acts like an infix), with which it combines to form an S.

The exact formal nature of the rules that yield representations like Figure 5 vary considerably, as such systems have been explored within a variety of theories. Hence we will not attempt to formalize these systems here; proposals along these lines may be found in Harman (1963), Bach (1979), and McCawley (1982) (although McCawley actually derived these structures by transformational rules). There are a variety of other accounts of the phenomenon of discontinuous constituents (for an interesting sample of such approaches, see Huck and Ojeda [eds.], 1987).

Other recent theories take a different approach to at least some kinds of apparent discontinuous constituents, such as the case of Topicalization, exemplified in (26) and (30) and (31). Thus, Generalized Phrase Structure Grammar (Gazdar *et al.*, 1985) and the related theory Head Driven Phrase Structure Grammar (Pollard and Sag, 1994) allow for these sentences by enriching the phrase structure rules in such a way that the rules can 'track' the fact that there is an expression of some category A at the front of the sentence, and the rules eventually allow a node that normally dominates an expression of category A to simply fail to have such an expression as an immediate consituent.

Alternative Conceptions of Sentence Structure

While space precludes a detailed discussion of radically different conceptions of sentence structure, it is worth briefly mentioning two aspects of the view previously described that have been questioned in alternative conceptions. One concerns the fact that a single expression occurs only once within a constituent structure representation; this is because the rules that define these representations simply do not allow for an expression to be in 'more than one place.' There are, however, alternative conceptions of structure and of the grammatical systems underlying these structures that do allow a single expression to be an immediate 'constituent' of more than one expression. This kind of device can be used to give an analysis of cases where a single NP appears to be the subject of two different verbs, as in *John wants to leave*. Thus, Relational Grammar (see Perlmutter [ed.], 1983) posits structures of this type. A closely related idea has been put forth within Word Grammar (Hudson, 1984).

Second, the view of constituent structure described in this article does not make any distinction between the two (or more) immediate constituents of some expression (other than the fact that they are of different categories). Returning to the tree in Figure 1, the immediate constituents of the topmost S are the two expressions dominated by NP and by VP, but these categories are simply two 'branches' in the tree. In Word Grammar, on the other hand, there is an asymmetry, in that the theory directly expresses the fact that one expression 'depends' on another. (The intuition here is that a verb is a central core part of a sentence on which an NP depends. A similar notion is embodied by the notion of a 'head' within X-bar theory; see Chomsky, 1970).

Constituent Structure in Categorial Grammar

We conclude this section with a detailed look at the view of constituent structure taken within some recent versions of Categorial Grammar – since it is one of the most unorthodox views of constituent structure within the general program of Generative Grammar. Categorial Grammar (hereafter CG) is a theory that derives from the work of Ajdukiewicz (1935), Lambek (1958), Bar-Hillel (1964), and others, and it has enjoyed a recent resurgence of interest. (There are a number of slightly different versions of CG; we primarily discuss just one here.) In some sense, the view of constituent structure within CG is quite close to that discussed in the section 'Motivation'; here the grammar contains phrase structure rule schemata, and hence the structure of a sentence can be represented

as a tree that itself is a representation of how the phrase structure rules work to specify a sentence as well formed. Where the version of CG to be developed here differs from other accounts, though, is that any given sentence has a large number of constituent structures – some of which are quite surprising.

To develop this, we turn first to the notion of a syntactic category in CG. Rather than posit a large number of categories, such as NP, VP, and V_2, CG posits a small set of basic categories, and all other categories are functions from categories to categories. The basic idea is easiest to illustrate by example. Consider a verb like *see*. In an earlier section, this is treated as an item of category V_2 where there is a phrase structure rule $VP \rightarrow V_2\ NP$. One can, however, recast this information by viewing the syntactic category of *see* as a function that maps expressions of the category NP into expressions of the category VP; in particular, *see* combines with an NP to its right to yield a VP. We will use the notation $A/_RB$ to designate the syntactic category of any expression that combines with an expression of category B to its right to yield an expression of category A. (Readers should be warned that this is not entirely standard; in many works within CG, such a category is notated simply as A/B, without the subscript.) Thus, the category of *see* is $VP/_RNP$. However, this can be broken down further. A VP itself need not be viewed as a primitive category, for it can be recast as something that combines with an NP to its left to yield a S. In other words, a VP like *see Bill* maps an NP like *the women* into the S *the women see Bill*. Hence, the category that we have been calling VP can be represented as $S/_LNP$. In general, then, we use $A/_LB$ to mean something that takes a B to its left to yield an A. (Again, this is not completely standard. In some works within CG, this is represented instead as A\B. But in an unfortunate bit of notational collision, other researchers within CG represent an item that takes a B to its left to yield an A is instead represented as B\A.) Given this, the category of *see* is $(S/NP)/_RNP$; a simple intransitive verb like *die* is of category $S/_LNP$; a verb like *say* is of category $(S/NP)/_RCP$; *that* is of category $CP/_RS$; a preposition like *on* is of category $PP/_RNP$, etc.

Notice, then, that much of the information contained in phrase structure rules is 'packed into' the categories of the words. In fact, with this view of syntactic categories, the grammar can contain just a few general phrase structure rule schemata. Two of these are (i) $A \rightarrow A/_RB\ B$ and (ii) $A \rightarrow B\ A/_LB$, for A and B variables over any category. (Note that, these rules provide only for structures in which each constituent contains two immediate constituents.)

So far, this provides constituent structures that are much the same as in standard accounts. A sentence like *Everyone saw Bill* is well formed because the rules provide this analysis of the sentence (we omit the directional subscripts here): $[_S\ [_{NP}everyone]\ [_{S/NP}\ [_{(S/NP)/NP}\ saw]\ [_{NP}\ Bill]]$. The category labels here are of course different from the labels used in the section 'Motivation,' but the only significant difference between this structure and the more standard one is that the more standard one encodes an asymmetry between the two immediate constituents of any expression – one (the one whose category is of the form A/B) is the function, and the other (whose category is B) is the argument.

But certain versions of CG include rule schemata in addition to those in (i) and (ii). The first pair of additional schemata (known as function composition) are these:

iii. $A/_RC \rightarrow A/_RB\ B/_RC$ and
iv. $A/_LC \rightarrow B/_LC\ A/_LB$.

The second pair are nonbinary rules (these allow a single nonterminal to immediately dominate a single nonterminal) and are known as type lifting. These schemata are as follows:

v. $B/_R(B/_LA) \rightarrow A$ and
vi. $B/_L(B/_RA) \rightarrow A$.

These schemata may look rather *ad hoc*, but under the view of syntactic categories as functions that map expressions of one category to expressions of another, they actually correspond to very natural operations on functions. We do not pursue this here (for discussion, see Oehrle *et al.* [eds.], 1988).

What is especially interesting about these rule schemata is that they allow a single sentence to actually have a number of different constituent structures. To take just one example, consider a sentence like *John thinks that Bill hates Tom*. Under 'standard' theories, this has only the following structure (the labels on the constituents and all of the innermost brackets are suppressed here): *[John [thinks [that [Bill [hates Tom]]]]]*. This is also a possible structure under CG and is, in fact, the structure that would be obtained by using only the rule schemata in (i) and (ii). But because of the additional schemata, there are other structures. Another one, for example, would be as shown in **Figure 6** (where we also show the rules that have applied at each point).

Note, then, that *thinks that Bill hates* is a constituent, and is a constituent of the same category as an ordinary transitive verb like *likes*. Although there will be a great number of constituent structures for every sentence, the semantics is set up in such a way that these extra structures do not yield extra meanings. Note, too, that in view of the remarks in this article regarding the fit between the syntactic constituent

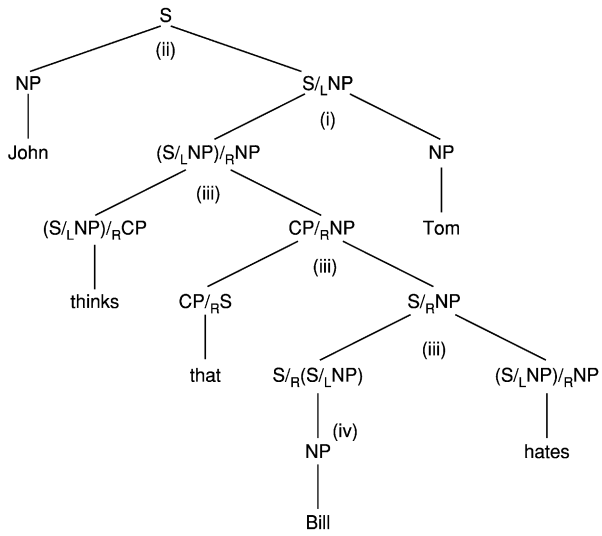

Figure 6

structure and the semantic composition, it follows that a constituent like *thinks that Bill hates* is a semantic unit. While such a result appears counterintuitive at first blush, it can perhaps be made more intuitive by comparing the meaning of such a unit with that of a simple transitive verb. An ordinary transitive verb like *likes* can be thought of as denoting a relation between two individuals: in any situation it will 'pick out' all the pairs of individuals (x,y) such that *x* stands in the liking-relation to *y*. A complex transitive verb like *thinks that Bill hates* similarly denotes a (c-complex) relation between two individuals. It, too, will in any situation pick out all pairs of individuals (*x,y*) such that *x* stands in the thinking-Bill-hates relation to *y*.

Recall now the discussion in the section 'Conjunction.' There it is pointed out that one hypothesis regardging conjunction is that only constituents may conjoin, and the two constituents must be of the same category. As noted earlier, however, there are apparent counterexamples to this involving cases of so-called nonconstituent coordination. But in CG these counterexamples disappear, for the flexibility in the constituent structure means that each such case involves constituent coordination. To clarify, assume that in addition to the rule schemata discussed in the previous paragraph, English also contains the schema (xxv) discussed earlier ($X \rightarrow X$ *and* X, where X is a variable over any category). Now consider the case of conjunction in (23) (*John likes and thinks that Bill hates everyone who was here*). As shown above, within CG *thinks that Bill hates* can be analyzed as a constituent of category $(S/_L NP)/_R NP$; this is the same as the category of an ordinary transitive verb like *likes*. It thus follows that they can conjoin. Similar remarks hold for (24); if we use the schemata above, there is an analysis of this in which *John likes* is a constituent (of category $S/_R NP$) and *Bill hates* is also a constituent of this category, and so the two may conjoin.

The CG apparatus discussed in this article has been explored (with some modifications) especially in Steedman (2000), among others, and in many of the papers in Oerhle *et al.* (1988). A slightly different but related perspective can be found in the work within Type Logical Grammar (a kind of CG) (for an introduction, see Carpenter, 1998).

Free Word Order Languages

This article has focused exclusively on English as a way to demonstrate the notion of constituent structure and some of the controversies surrounding this notion. But what about languages that are typologically very different from English? In particular, many languages have much greater freedom of word order than does English. In fact, it has often been noted that English has extremely fixed word order compared with many other languages; at the opposite end of the spectrum are many Australian languages with very free word order (and many languages are between these two poles). The question arises, then, as to whether the sentences of such languages also have a constituent structure where there is simply a great deal of 'discontinuous constituents' or whether instead the entire notion of constituent structure (and the theory of grammatical rules that go along with it) needs drastic modification for such languages. Indeed, free word order languages are occasionally referred to as 'nonconfigurational' languages, a term that itself implies that constituent structure trees (or some similar object) are inappropriate representations for the sentences of such languages. It should be stressed that the question here is not just an issue of representation. As discussed earlier, a structure itself is simply a representation of how the rules of the grammar work to specify a sentence as well formed. Thus, if the sentences of free word order languages do not have a constituent structure in the way that English sentences do, this means that the grammars for such languages work on rather different principles.

Although the correct analysis of such languages remains controversial, many researchers have concluded that the sentences of such languages do indeed have a constituent structure of (roughly) the familiar sort and that the grammars of these languages simply allow for a great deal of discontinuous constituents. (A slightly different view was taken in Lexical Functional Grammar [Bresnan, 2001]; here, too, free word order languages did indeed have a constituent

structure, but the trees in such languages tended to be 'flatter.') That there is at least a certain amount of structure is evidenced by this consideration: while the word order in, for example, many Australian languages is quite free (modifiers may be separated from the nouns that they modify: nouns and verbs may appear in any order, etc.), it is not completely free. In many such languages, words may freely 'scramble' within a single S, but words in a subordinate clause may not be freely mixed with words from a higher clause. (A subordinate clause is an S that in constituent structure terms is dominated by a higher S-node.) Hence, Blake (1983) reported that Kalkatungu (Kalkutung) sentences obey this principle. Dixon (1972) noted a related phenomenon in his classic study of Dyirbal (a language with considerable word order freedom compared with English). He provided a detailed discussion of this general issue and provided an analysis of Dyirbal that relied heavily on the notion of constituent structure.

But even if it is correct that so-called nonconfigurational languages do have a constituent structure in which there can simply be a great deal of discontinuous constituents, it of course remains an open question as to how the general phenomenon of discontinuous constituents is best accounted for. This has for decades been one of the questions driving the development of syntactic theories, and will doubtless continue to be a fundamental question as our understanding of syntactic theories evolves.

See also: Combinatory Categorial Grammar; Configurationality; Discontinuous Dependencies; X-Bar Theory.

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Constraint, Pragmatic

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Rules, processes, and representations in pragmatic theory can come with conditions, or restrictions. Such restrictions, or constraints, pertain to the scope of application of a rule, the spread of the process, or the well-formedness of a representation. They can be seen as external restrictions delimiting, for example, an application of a theory, or as an integral part of the theory (*see also* **Pragmatics: Overview** and **Metapragmatics**).

In optimality-theory pragmatics (e.g., Blutner, 2000; Blutner and Zeevat, 2003), constraints constitute an integral part of the theory (*see* **Pragmatics: Optimality Theory**). Because linguistic meaning underdetermines the proposition expressed, a pragmatic mechanism of completion of this meaning is proposed. It is conceived of as an optimization procedure, founded on the idea of the interaction of violable and ranked constraints. The selected, optimal proposition is the one that best satisfies the constraints. This selection is performed by the pragmatic system whose role is to interpret the semantic representation of a sentence in a given setting. This system is founded on the principles of rational communication worked out by Grice and subsequently by Horn (1984) and Levinson (1987, 2000) in the form of the Q-principles and I/R-principles (*see also* **Implicature; Inference: Abduction, Induction, Deduction; Grice, Herbert Paul (1913–1988); Neo-Gricean Pragmatics; Pragmatics and Semantics**). The I/R-principle compares different interpretations of an expression, while the Q-principle assesses the produced structure as compared with other unrealized possibilities: It blocks interpretations that would be more economically connected with alternative forms. Examples of interpretation constraints are STRENGTH (preference for informationally stronger readings), CONSISTENCY (preference for interpretations that do not conflict with the context), FAITH-INT (faithful interpretation, interpreting all that the speaker said). FAITH-INT precedes CONSISTENCY which precedes STRENGTH in the ranking (see Zeevat, 2000).

Another example of constraints that are constitutive of the theory is Segmented Discourse Representation Theory (SDRT) (e.g., Asher and Lascarides, 2003, *see also* **Discourse Representation Theory**). In SDRT, rhetorical relations spell out constraints on discourse interpretation. The interpretation of discourse is founded on constraints on discourse coherence. For example, a relation between two propositions can be Narration, Explanation, or Elaboration.

Theory-external constraints can be exemplified by particular lexical items that provide certain restrictions on interpretation. For example, it has been observed by Grice that there are certain words that do not contribute to the truth-conditional content of an expression. Among such words are 'but,' 'moreover,' and 'therefore.' While Grice classified them as conventional implicatures, it was subsequently suggested (Blakemore, 1987) that they do not have conceptual content but instead are indicators of pragmatic inferences to be performed by the addressee. 'After all,' 'you see,' 'also,' and other such indicators also belong to this category:

A: '*Oscar and Lucinda* is worth reading. After all, one of the best novelists wrote it.'

'After all' functions here as an indicator that the second sentence is to be taken as evidence for the claim made in the first. By Blakemore's account, such indicators contain procedural (rather than conceptual) meaning and they act as constraints on inference in communication (*see also* **Meaning, Procedural and Conceptual**). This approach to constraints on inference has been developed and plays a major role in relevance theory. Blakemore (1987) calls such indicators constraints on the relevance of a proposition. Moreover, it has since been observed (Wilson and Sperber, 1993) that there are also procedural items that constrain the proposition expressed, such as pronouns, as well as markers such as 'please' and 'let's' that constrain the process of inferring the propositional attitude of the speaker or the speech act. The scope of the category of such constraints, as well as the binary conceptual-procedural distinction, still remain a contentious matter (see, e.g., Blakemore, 2002; Lee, 2002) (*see* **Relevance Theory**).

See also: Discourse Representation Theory; Grice, Herbert Paul (1913–1988); Implicature; Inference: Abduction, Induction, Deduction; Meaning, Procedural and Conceptual; Metapragmatics; Neo-Gricean Pragmatics; Pragmatics and Semantics; Pragmatics: Optimality Theory; Pragmatics: Overview; Relevance Theory.

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Construction Grammar

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Introduction

Theories of sentence meaning describe the relationship between the meaning of a sentence and the meanings of the words of that sentence. In compositional theories of sentence meaning, the semantic and syntactic requirements of the word (its argument structure) can be used to predict the semantic and syntactic type of a phrase in which that word is the syntactic head. According to this view, known as the principle of lexical projection, words constrain potential sisterhood relations by specifying the types of complements, adjuncts, and determiners that they either require or welcome (Zwicky, 1995; Jackendoff, 1997: Chap. 3; Sag *et al.*, 2003: Chap. 4). In projection-based models of sentence meaning, concepts – like entities, events, and properties – are expressed exclusively by words (Jackendoff, 1997: 48). Rules of syntactic combination assemble words and their dependent elements into phrases, and the phrases denote complex concepts like predicates and propositions. The rules of combination do not add conceptual content to that contributed by the words and therefore do not alter the combinatory potential of words. Thus, on the projection-based view, sentences have meaning but sentence patterns do not.

The projection-based view of sentence meaning articulates closely with models of syntax based on principles and parameters. In such models:

> [a] language [is not] a system of rules, but a set of specifications for parameters in an invariant system of principles of [universal grammar], and traditional grammatical constructions are perhaps best regarded as taxonomic epiphenomena – collections of structures with properties resulting from the interaction of fixed principles with parameters set one way or another (Chomsky, 1989: 43).

On this view, the syntactic patterns of a language are not licensed by the grammar of that language; they are simply artifacts of the interaction between universal and language-particular constraints. Construction Grammar (CxG) was devised in part to counteract the reductionist views of syntax and semantics described above, but at the same time it represented a return to a traditional, 'taxonomic' mode of grammatical analysis. Proponents of CxG have sought to show that there are constraints on form and interpretation that cannot be explained except as the products of grammatical constructions, form-meaning pairings of varying degrees of productivity and internal complexity. In CxG, grammar is viewed as a structured inventory of such pairings. Extensive discussion of the implications of this view for syntactic theory can be found in Fillmore *et al.*, 1988; Kay and Fillmore, 1999; Kay, 2002; Zwicky and Pullum, 1991; Zwicky, 1994, 1995; Goldberg, 1995, 2002; Michaelis and Lambrecht, 1996; Michaelis and Ruppenhofer, 2001; Goldberg and Jackendoff, 2004; Fillmore *et al.* (in press).

Grammatical constructions have been a fundamental tool of linguistic description since ancient times (Harris and Taylor, 1997), and for most of that history they have been treated no differently from words – forms with specific meanings and functions. It was only with the advent of generative grammar that constructions fell into disrepute. It is easy to understand

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why: the idea that patterns of word combination could be intrinsically meaningful simply cannot be accommodated within the logical structure of the projection-based view. If, for example, we change the associations within an arithmetic sequence like *2 x (3 + 4)* so as to create the sequence *(2 x 3) + 4*, we change what the sequence denotes (from 14 to 10), but not what the numbers denote. If we apply the same logic to syntax, we conclude that changing the syntactic associations in a string of words changes only what the word string means, not what the words in that string mean. While this conclusion is well founded, proponents of CxG have argued that it is based on an inappropriate analogy: content words (like nouns and verbs) do not designate in the way that numbers do, because syntactic context determines what kind of event, property, or entity the word denotes and, in turn, what the combinatory behavior of that word is (Goldberg, 1995; Michaelis and Ruppenhofer, 2001; Goldberg and Jackendoff, 2004). We will refer to this effect of syntactic context as *type shifting*.

In the second section, we will look at the treatment of type shifting in a construction-based model of syntax, with particular attention to verbal argument structure and nominal syntax. As we will see, the CxG model of semantic composition is integrative rather than projection-based: like words, constructions denote semantic types (e.g., events and entities) and, like words, constructions license syntactic and semantic dependents; therefore, the interpretation of a phrase involves combining the interpretive and combinatoric constraints of the phrasal pattern with those of the word that is the head of the phrase. In the course of this discussion, we will explore the formal representation of these constraints and the procedure used to combine them.

In the third section, we will discuss additional arguments in favor of construction-based grammar; these arguments involve idiomatic patterns, functional oppositions in grammar, exceptions to 'transconstructional filters' and deficiencies of rule-based grammatical generalizations. A concluding section will suggest connections between construction-based grammar and usage-based theories of language acquisition and processing.

Type Shifting as Evidence for Construction-Based Meaning

Argument Structure

Projection-based theories of the syntax–semantics interface, including Lexical Functional Grammar (Bresnan, 2001), Head-Driven Phrase Structure Grammar (Pollard and Sag, 1994), and Role and Reference Grammar (Van Valin and LaPolla, 1997), tend to focus on verbal argument structure, and for good reason: the relationship between a verb's semantic requirements and the meaning of the clause built around that verb appears highly transparent. For example, (1) denotes an event of transfer – involving an agent, a 'gift,' and a recipient – because the verb *give* denotes a scene of transfer, and likewise requires the presence of these three participants:

(1) We gave the account to her.

Models of sentence meaning based on lexical projection provide a straightforward picture of the syntax–semantics interface: while the verb determines **what** the sentence means, syntactic rules determine **how** it means. For example, in (1) the verb and the two arguments that follow it are grouped together into a verb phrase (the predicate), which then combines with a noun phrase (the subject) to form a sentence. In addition to constituent-building rules, syntacticians have proposed realization rules, called linking rules, that assign each of the verb's thematic roles (e.g., agent or patient) to a unique grammatical role (e.g., subject or object). Linking rules, which are typically assumed to have crosslinguistic validity (Bresnan, 1994; Van Valin and LaPolla, 1997), are used to represent the fact that there is usually more than one way to express the semantic arguments of a given verb. For example, the verb *give*, in addition to allowing realization of its recipient argument as a prepositional phrase (e.g., *to her*), as in (1), it allows that recipient argument to be realized as a direct object, as in (2):

(2) We gave her the account.

Thus, a given verb may be subject to several (mutually incompatible) linking rules. These linking rules are assumed to add syntactic–realization constraints to verb entries in which "[a]rgument roles are lexically underspecified for the possible surface syntactic functions they can assume" (Bresnan, 1994: 91). These rules do not add to, subtract from, or alter the array of thematic roles associated with the verb. For example, Bresnan (1994) represents locative inversion, a presentational construction found in both English and the Bantu language Chichewa, as one linking possibility for verbs like *stand*, which license both a location argument and a theme argument. Such verbs are subject both to the linking rule that produces the pattern in (3) and to the linking rule that produces the 'inverted' pattern in (4):

(3) Two women stood in the plaza.

(4) In the plaza stood two women.

However, attested examples of locative inversion like that in (5) are difficult to square with the model of argument linking outlined above:

(5) Down at the harbor there is a teal-green clubhouse for socializing and parties. Beside it **sparkles** the community pool (*Vanity Fair*, August 2001).

Examples like (5) are problematic in Bresnan's framework because the verb *sparkle* does not assign either a locative role or a theme role – it is an intransitive verb of light emission – and yet it is welcomed by the locative–inversion argument–structure pattern. In examples like (5), Bresnan argues (1994: 91), a locative-theme argument structure imposed by the pragmatic requirement of presentational focus is 'overlaid' on the argument structure of the verb. However, if argument structures are merely alternate possibilities for the realization of the semantic roles licensed by the verb, and not independent form-meaning pairings, the source of the 'overlay' is mysterious.

Adherence to the projection principle results not only in *ad hoc* devices such as an 'overlay theme' in cases like (5), but also, as Goldberg points out (1995, 2002), appeal to implausible verb senses. Goldberg's construction-based model of argument structure accords a central place to innovative verb uses like that in (5) and those in (6–8):

(6) Most likely they were fellow visitors, just **panting** up to the sky-high altar out of curiosity (Lindsey Davis, *Last Act in Palmyra*, p. 28).

(7) When a visitor passes through the village, young lamas stop picking up trash to mug for the camera. A gruff 'police monk' **barks** them back to work (*Newsweek* 10/13/97).

(8) Although he professed to like the sweater she **knit** him for his birthday, he wouldn't wear it in public [...] (www.knitty.com/ISSUEwinter02/FEATsweatercurse.html).

Goldberg argues that if argument structure were determined exclusively by the lexical verb of the clause, we would have to posit a special verb sense for each of the usages exemplified in (6–8). Sentence (6) would require a special sense of *pant* in which it means 'move while panting,' (7) would require a special sense of the verb *bark* in which it means 'cause to move by barking,' and (8) would require a sense of the verb *knit* that would be captured by the paraphrase 'knit something in order to give it to someone.' Such word senses, as Goldberg argues, are not only *ad hoc* and unintuitive, but also entail radical and unconstrained verb polysemy.

In the construction-based model of argument structure proposed by Goldberg, verb meaning is constant across syntactic contexts. No additional lexical entries are created to represent the meanings and projection properties of verbs found in nonce patterns like those in (5–8). Instead, verbs combine with verb-level linking constructions, which denote event types. These linking constructions assign grammatical functions to participant roles contributed by the verb. Because these constructions denote event types, each licenses the array of thematic roles entailed by its particular event type. Take, for example, the ditransitive construction, exemplified in (8). According to Goldberg (1995: Chap. 2), this pattern, which she represents as a sentence type of the form NP V NP NP, denotes an array of closely related event types, including actual transfer, intended transfer, metaphorical transfer, and denial of transfer. Because of the event type it designates, the ditransitive construction licenses three thematic roles: an agent, a theme, and a recipient. The set of thematic roles licensed by the construction may properly include the set of roles licensed by the verb, that is, its valence. In such cases, the construction augments the verb's valence. For example, the verb *knit*, as a verb of creation, licenses two thematic roles, an agent and a theme. In (8), however, *knit* is accompanied by three thematic roles: its valence has been augmented up to that of a verb of transfer because the construction in which it is embedded (the ditransitive) designates an event of transfer. While verbal argument structure cannot vary as a function of syntactic context in projection-based models of argument structure, valence augmentation is a predictable side effect of semantic composition in construction-based models, which assume two sources of thematic structure (the verb and the construction), rather than a single source (the verb).

How are the semantic contributions of verb and construction combined? The mechanism proposed by Goldberg involves fusion: the identification of the verb's participant roles with semantically compatible roles licensed by the construction (Goldberg, 1995: 50–66). Goldberg proposes a limited set of semantic integration relationships that may hold between verb and construction (Goldberg, 1995: 65–66). One such integration relationship is the instance relationship, as exemplified in (2). Here, the event denoted by the verb *give*, and correspondingly the valence of *give*, is identical to that of the ditransitive construction, which similarly designates a transfer event. Other

integration relationships entail valence augmentation. Among these is the manner relationship, as exemplified by (6): the verb *pant* designates an activity that occurs during the course of an event of directed motion, the latter of which is denoted by the construction. In this case, the valence of the single-argument verb *pant* is augmented up to that of a directed-motion event, which entails both an agent and a goal argument (see also Goldberg and Jackendoff, 2004). An additional integration relationship proposed by Goldberg is the means relationship, as exemplified in (7): barking is the means by which the agent causes the theme argument to move. As in the case of *pant* in (6), the valence of the one-argument verb *bark* is augmented up to that of the construction: in (7), the construction, which designates an event of caused motion, has added both a theme argument and a directional argument to the valence of *bark*.

The formal representation of verb-construction combinations in Construction Grammar, as in Head-Driven Phrase Structure Grammar (Sag *et al.*, 2003), is based on typed feature structures, nested lists of attributes and their values, and unification, a procedure for combining feature structures (Fillmore and Kay, 1993; Goldberg, 1995; Michaelis and Ruppenhofer, 2001; Sag *et al.*, 2003). Unification grammar can be described metaphorically as the superimposition of one slide upon another. If we imagine that each slide has some information written on it, the constraint on slide superimposition can be stated as follows: any slide can be placed on top of any other slide as long as all of the information on each slide 'shows through.' Conflicting specifications would appear as blurs – that is, they would be illegible, and would therefore create unification failures. In unification-based grammars, grammatical concord (e.g., agreement) and identity of values (as between a head and its daughter) are represented by means of numbered unification indices, e.g., (2).

Figure 1 gives a representation of the ditransitive construction that combines the formalisms developed by Goldberg (1995), Fillmore and Kay (1993) and Sag *et al.* (2003). **Figure 1** includes the integration relations posited by Goldberg, as values of the feature 'integration' (INTGN), but it differs from Goldberg's ditransitive construction (1995: 50) in that it is schematic verb entry rather than a sentence type of the form NP V NP NP. As Fillmore and Kay (1993: Chap. 8) point out, the constraints that define the ditransitive construction are operative whether the recipient argument is realized as a postverbal accusative NP, as in an active sentence, or as a preverbal nominative NP, as in a passive sentence, e.g., *We were given the book*. For this reason, we will assume, as they do, that the ditransitive is a schematic (i.e., nonlexically specified) verb entry, in which the grammatical functions of the agent and recipient arguments are unspecified. In the Fillmore and Kay implementation, verb and argument-structure construction are near copies of one another. The lexical entries of verbs that combine with argument–structure constructions contain theta frames, ordered sets of thematic roles containing one distinguished argument (DA), but these lexical entries do not, under ordinary circumstances, specify which grammatical functions (GFs) are linked to those thematic roles; this is what argument–structure constructions do, and they do it in an incremental fashion: observe in **Figure 1** that only one thematic role, the theme, is linked to a grammatical function (oblique) by the ditransitive construction.

Following Fillmore and Kay (1993), we assume here that each linking construction specifies only a single linking constraint. By not specifying the grammatical-function realizations of the agent and theme arguments, we enable the ditransitive construction to unify with both passive and active argument–structure constructions. Let us use the case of a passive ditransitive to describe the way in which multiple linking constructions interact. In this case, the recipient argument will link to the subject grammatical function by default. How does this work? The theme cannot be linked to subject because the ditransitive construction, as shown, links the theme to an oblique grammatical function. Thus, the model correctly predicts the ungrammaticality of the passive sentence **A gift was given Pat*. The linking of agent to subject is similarly preempted: the passive construction links agent to an oblique grammatical function (Fillmore and Kay, 1993: Chap. 8). According to a constraint that Fillmore and Kay refer to as the subject principle, some thematic role must receive the grammatical function subject. Since the goal argument is the only otherwise unlinked thematic role once the ditransitive and passive constructions have been unified, it becomes the subject by default. By assuming subject linking by default, we capture the observation that subject is the least semantically constrained of the three case roles: subject, object, and oblique.

As per Sag *et al.* (2003), **Figure 1** contains a valence (VAL) feature, whose two values are also features: specifier (SPR), a category that contains either a subject or a determiner, depending on the projection properties of the lexical head, and complements (COMPS), a category that includes any additional arguments assigned by the lexical head. Following

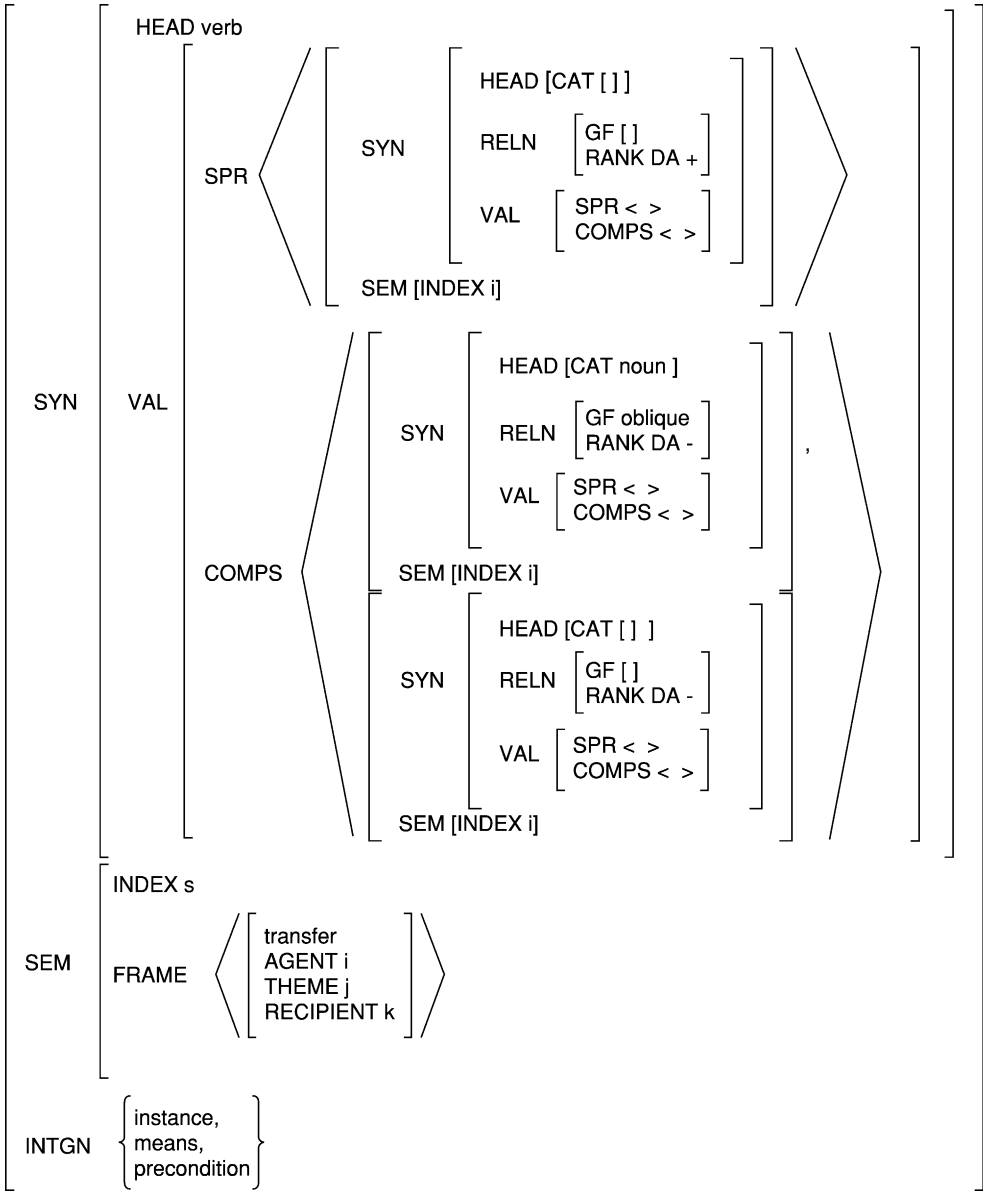

Figure 1 The ditransitive construction.

Sag *et al.* (2003), we assume that members of both the SPR and COMPS lists are 'canceled out' to signal the satisfaction of valence requirements represented in the SPR and COMPS sets. The satisfaction of a valence requirement is reflected in the valence set of the construction whose daughters are the valence-taking element and its required valence member(s). Thus, as we see, the ditransitive construction has two NPs (coindexed with the theme and recipient arguments) in its COMPS set. Once combined with those two NPS, the ditransitive verb can be the head of the VP construction, whose COMPS set is empty but whose SPR set contains one member, a subject NP. This SPR requirement is satisfied once the VP is combined with a subject via the subject– predicate construction, another constituency construction. Thus, valence requirements are passed from daughter to mother until they are canceled via satisfaction, i.e., once the head daughter's required sister is supplied by a phrase-building construction.

Coercion

The model of argument structure described in 'Argument Structure' has been extended to semantic type-shifting, sometimes referred to as coercion. Coercion, according to De Swart (1998: 360) is "syntactically

and morphologically invisible: it is governed by implicit contextual reinterpretation mechanisms triggered by the need to resolve [semantic] conflicts." Coercion effects have been identified in nominal syntax (De Swart, 1998), verbal aspect (Moens and Steedman, 1988; Michaelis, 2004), and pragmatically specialized sentence types (Michaelis and Lambrecht, 1996). Coercion effects are of essentially two types. The first type, the endocentric type, comes from the violation of selectional restrictions of a lexical head, e.g., a verb. A simple example is that in which a semantic feature of an argument is overridden by the verb semantics, as in the sentence *I bent the rock*. Here, the rock is necessarily construed as a flexible object, as required by verbal semantics. The second type, the exocentric type, is that in which a word that is not a head, e.g., a determiner, does something that usually only a head does – semantically constrain the elements with which it combines (Zwicky, 1985). For example, a mass noun like *tea* receives an individuated construal when it is paired with the indefinite article (9), and a count noun receives a mass construal when paired with unstressed *some*, as in (10):

(9) I had a *tea*.

(10) Give me some *blanket*

Endocentric and exocentric coercion effects have often been treated together, but they have distinct implications for the syntax–semantics interface. The endocentric cases are merely extended cases of lexical licensing: the relevant semantic effects on arguments can be attributed to the imposition of semantic requirements by the lexical head. Exocentric coercion effects cannot be attributed to lexical licensing. Therefore, they present a significant challenge to theories of sentence semantics based upon the projection properties of lexical words. Since word combination in projection-based syntax is tied to phrase building, the drivers of sentence semantics are not simply words but, more particularly, the heads of syntactic projections.

In CxG, a semantic licensor need not be the head of a phrase. In fact, as we have seen, a semantic licensor may be a skeletal syntactic pattern (e.g., an argument–structure construction) rather than a word. In the case of constructions that define phrases like NP, which Zwicky (1994) refers to as constituency constructions, it is mutual invocation of one daughter by the other, rather than unilateral lexical-head licensing that determines what words comprise the phrase. Constructions have heads, in the limited sense that one daughter determines the syntactic category of the mother, but the head does not license its complement any more than the complement licenses the head. Because syntactic combination is not head-driven in CxG, the framework captures exocentric coercion effects in a straightforward and principled way (Michaelis, 2004). The coercion effects triggered by determiners, as exemplified by (9, 10), need not be taken as evidence that determiners are heads, as assumed in syntactic theories based on functional projections (Longobardi, 1994). Such accounts encounter problems when faced with bare nominals (mass and plural nouns), as in (11a, b):

(11a) She drank *beer*.

(11b) She bought *shoes*.

In such cases, proponents of the DP model must posit phonetically unrealized determiners in order to account for the existential and generic quantification of undetermined nominal expressions in contexts such as (11a, b). The CxG model retains the insight that nouns are the syntactic heads of NPs while also capturing the mutual licensing relationship that holds between noun and determiner in the NP. The NP construction that licenses indefinite determination, given in Figure 2, will be used to exemplify this model of NP syntax.

In Figure 2, which is based on treatment of nominal syntax found in Sag *et al.* (2003: Chap. 4), the nominal daughter corresponds to both N and N′ in traditional X′-based approaches: it is simply a noun or noun projection whose specifier requirement is unsatisfied. The mother corresponds to NP, as in traditional X′-based approaches, but unlike those approaches, the current one does not use nonbranching domination to represent nominal expressions like those in (12). Each of these nouns consists of a single noun that either disallows a determiner or does not require one:

(12) *Pat* gave *him money*.

In the present approach, proper names, bare mass nouns, plural nouns, and pronouns are represented simply as nouns whose SPR requirements are satisfied inherently, because these nouns denote intrinsically quantified variables (see Sag *et al.*, 2003: Chap. 5 for discussion). A lexical entry for one such noun is shown in Figure 3, which is based on Sag *et al.* (2003) and Fillmore *et al.* (in press).

In this lexical entry, the semantic type of the mass noun is represented by the ontological index *c*, which stands for the cumulative type (masses and groups). In order to represent the fact that bare mass nouns have existentially quantified interpretations (that is, that they refer to instances of the substance in question), the entry contains semantic frames representing

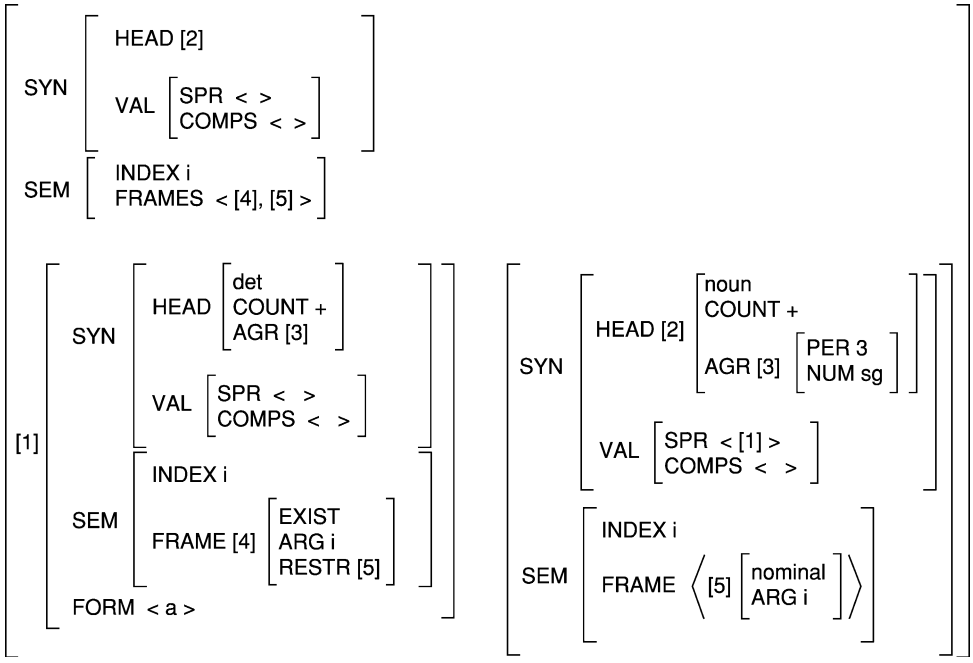

Figure 2 The indefinite determination construction.

both the nominal type and existential quantification. In the latter frame, the ontological index *c* is the variable bound by the quantifier and the nominal type is the restriction (RESTR) of the quantifier. In other words, bare mass nouns are 'self-quantifying.' Since mass nouns can also unify with various determination constructions, Fillmore *et al.* (in press: Chap. 2) propose a derivational rule, called quantifier pumping, which relates the lexical entries of mass nouns that require a specifier – and thereby a quantifier – to the lexical entries of those mass nouns that do not.

Those nouns that have empty SPR sets can unify directly with constituency constructions such as the VP and subject–predicate constructions, which restrict their nominal arguments to those nominal expressions that, at the grammatical level, have satisfied SPR requirements and, at the semantic level, denote bound (quantified) variables. Thus, by assuming both that valence requirements are canceled once satisfied and that certain subclasses of lexical entries have empty SPR lists from inception, we can account for the fact that certain nominal expressions can be arguments without the help of determiners, phonetically unrealized or otherwise.

The foregoing assumptions are crucial to the construction-based model of coercion effects involving nominal types. In order to see how this model works, let us look at the determination construction in Figure 2. In this figure, the left daughter, the indefinite article, is a specifier of its nominal sister, while it also invokes its nominal sister, as an argument of its semantic frame, the EXIST frame. This frame represents the quantificational force of the indefinite article: it is an existential quantifier, and the variable that it binds is the semantic index of the nominal daughter. The restriction (RESTR) on this quantifier is the semantic type of the nominal daughter. In accordance with Fillmore *et al.* (in press), the index *i* is used to indicate that the ontological type of the nominal is that of an individual. This semantic type has a parallel grammatical type, the count type; this type appears as a value of the head feature in both of the construction's daughters, representing the grammatical concord relationship that exists between the indefinite article and its count noun sister within the NP.

Together with principles governing lexical-feature overrides, as discussed in Michaelis (2004), the CxG model of nominal syntax predicts the coercion effects shown in (9, 10). These principles amount to the following: to resolve conflict between lexical and constructional constraints, interpreters shift lexical feature-values that are in conflict with constructional feature-values. Shifting results in the portion or type reading of mass nouns like *tea* in (9) and the mass reading of count nouns like *blanket* in (10). Thus, for example, when a count noun like *blanket* is combined with unstressed *some*, a determiner that seeks the mass type, the lexical representation of the

$$\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{noun} \\ \text{COUNT} - \\ \text{AGR} & \begin{bmatrix} \text{PER 3} \\ \text{NUM sg} \end{bmatrix} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} \ \langle\ \rangle \\ \text{COMPS} \ \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX c} \\ \text{FRAMES} \ \left\langle [1] \begin{bmatrix} \text{nominal} \\ \text{ARG c} \end{bmatrix}, \begin{bmatrix} \text{EXIST} \\ \text{ARG c} \\ \text{RESTR [1]} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

Figure 3 A schematic mass noun lexical entry.

count noun will shift to that of the schematic lexical entry in Figure 3. This shift entails changing the ontological index of the noun from an individual to a cumulative entity. Crucially, the construction-based model of coercion accounts for nominal coercion effects that lack morphological triggers, as in (13):

(13) You have *apple* on your shirt.

In (13), a count noun (*apple*) receives a mass interpretation, but this type shift cannot be attributed to the presence of a determiner that selects for a mass noun, as it can in (10). Nor can the shift be attributed to the selection properties of the verb that takes the bare noun *apple* as an argument: the verb *have* is just as likely to select an individuated entity for its second argument as a mass-denoting entity. However, the type shift in question can be attributed to the VP construction with which the noun *apple* has combined.

Recall that the VP construction, like the subject–predicate construction, requires nominal expressions satisfying its argument roles to have empty SPR sets, or, equivalently, to denote quantified variables. Let us assume that type shifts are conservative, in the sense that they produce lexical entries that (a) replicate existing entries, and (b) are minimally distinct from the input entry. Under this assumption, it makes sense that the type shift triggered by the VP construction in (13) would produce a lexical representation for the word *apple* that has the properties of the mass entry in Figure 3, rather than, say, one with the properties of a plural noun entry or a proper noun entry. Within the taxonomy of nouns, only the shift from count to mass leaves frame and person–number values unchanged (see Sag *et al.*, 2003: 236–240 for a hierarchical representation of nominal types).

Thus far, we have seen that, by admitting 'top-down' constructional meaning in addition to 'bottom-up' word meaning, CxG provides principled accounts of both verbal valence augmentation and exocentric coercion. In the next section, we will briefly explore several additional arguments for construction-based grammar that have been advanced by its proponents.

Additional Arguments for Construction-Based Grammar

The arguments that we will consider here are based on: the existence of formal idioms and relations of 'family resemblance' among such patterns (Lakoff, 1987; Fillmore *et al.*, 1988; Michaelis and Lambrecht, 1996; Culicover, 1997; Goldberg and Jackendoff, 2004), paradigmatic effects in morphosyntax (Michaelis, 1998; Ackerman, 2003), the inadequacy of parameter settings as a model of typological variation (Pullum and Zwichy, 1991; Van Valin and LaPolla, 1997; Croft, 2002), and the failure of derivational rules to capture generalizations over the putative 'input' forms (Goldberg, 1995; Bybee, 2001; Michaelis and Ruppenhofer, 2001; Croft and Cruse, 2004).

Idioms and Inheritance

It has long been observed that complex expressions in a given language can mean what they mean in the same way that words do – by convention rather than composition. Such complex expressions are called *idioms*. Fillmore *et al.* (1988) point out that while a great deal of attention has been paid to substantive, or lexically filled, idioms (e.g., *hit the nail on the head*, *light a fire under x, take x to task*), less attention has been paid to formal idioms, syntactic patterns that are grammatically irregular with regard to either their interpretation or their syntactic composition. An example of a syntactically irregular formal idiom that has been discussed in the CxG literature is the correlative conditional, e.g., *The faster we run, the slower they run* (Fillmore, 1986; Michaelis, 1994; Culicover and Jackendoff, 1999). While the construction has conditional semantics, no phrase-structure rules of English allows paired comparative phrases of exactly this type. An example of a syntactically regular but semantically irregular formal idiom is the WXDY construction, e.g., *What's that fly doing in my soup?* (Kay and Fillmore, 1999). While a naïve speaker might interpret this pattern as questioning the purpose of an activity, it is actually used to ask why a given state exists.

Fillmore *et al.* (1988) and Culicover and Jackendoff (1999) argue that formal idioms are highly productive patterns, and that they therefore constitute aspects of linguistic competence that a generative

grammar must account for. As Zwicky (1995) observes, CxG is uniquely well suited to this task, because it eschews two assumptions common to competing phrase–structure grammars: local licensing and head-driven category determination. Since constructions have daughters, and daughters may have daughters, constructions can be used to represent what Zwicky refers to as niece licensing: a situation in which a construction's daughter calls for a sister with a daughter of a particular type. The spoken English sentence type referred to by Brenier and Michaelis (2005) as hypotactic apposition illustrates the role played by niece licensing in the representation of formal idioms. An example of this construction is given in (14):

(14) That's the real problem is that you never really know.

Hypotactic apposition is a nonstandard presentational pattern that consists of a 'set up' clause containing a cataphoric demonstrative pronoun (e.g., *that*) followed by a 'counterweight' clause introduced by a finite form of the verb *be*. The pattern qualifies as an idiom because the phrase–structure rules of English do not permit the adjunction of a nonsubordinate finite clause and a finite VP. Representing hypotactic apposition requires appeal to niece licensing because the construction requires not simply a VP daughter but one whose head daughter is, in turn, a finite form of the copula.

Other formal idioms violate head-driven syntactic category determination, according to which the head of the phrase determines the syntactic distribution of the phrase. An example of such a violation is provided by adjective phrases containing the correlative degree word *as*, e.g., *as competent as she was*. While such expressions constitute adjective phrases in contexts like (15a), they have the external distribution of concessive clauses in contexts like (15b):

(15a) She was *as competent as she was*.
(15b) *As competent as she was*, she wasn't able to find work.

In addition to providing representational conventions appropriate to formal idioms, CxG also captures semantic and syntactic relationships between idiomatic patterns and more regular patterns. For example, Fillmore (1986) observes that the English correlative conditional, despite having numerous idiomatic properties, partakes of general syntactic and semantic properties of the conditional sentence type, including having an antecedent clause that is a polarity context. Relationships of this nature are represented in CxG by inheritance networks, in which like constructions have partially overlapping representations (Goldberg, 1995: Chap. 3). Inheritance networks have been used to capture syntactic and semantic commonalities among deictic and existential *there*-constructions (Lakoff, 1987), exclamatory constructions (Michaelis and Lambrecht, 1996), subject–auxiliary constructions (Fillmore, 1999), and resultative constructions (Goldberg and Jackendoff, 2004).

Paradigmatic Effects in Morphosyntax

Inference based on oppositions in a language is central to the Gricean model of conversational logic (Horn, 1984). For example, if a speaker asserts *Leslie caused the train to stop*, the hearer can reason, via Grice's second maxim of quantity ('Do not say more than you must') that since the speaker chose not to use the less prolix formulation *Leslie stopped the train*, the default situation (direct causation) did not apply. In such cases, the interpretation of the periphrastic form depends upon the existence of a synonymous unused form. Proponents of construction-based syntax have also identified paradigm-based inference as a source of morphosyntactic constraints and affordances. For example, Michaelis (1998: Chap. 5) argues that the constraint that prevents past-time adverbial reference in present perfect sentences (e.g., **I have visited Rome **in 1999***) is an effect not of semantics but of a discourse-pragmatic opposition between the present perfect and the simple past in English: the present perfect functions to introduce a past-time interval rather than invoking an already established past interval. Paradigmatic effects have also been used to motivate constraints on argument–structure constructions. Goldberg and Jackendoff (2004: 540–541) observe that the constraint barring the intransitive resultative construction (16a) from expressing accompaniment to motion (16b) can be attributed to the existence of a nearly synonymous construction, the *way*-construction (16c), which can:

(16a) She skipped into the garden.
(16b) *She whistled into the garden.
(16c) She whistled her way into the garden.

Paradigmatic effects of the nature require a model in which the grammar consists of a structured inventory of form-meaning pairings analogous to the lexicon, i.e., a 'constructicon.' It is only in such a grammar that constructions may enter into usage-based oppositions. Because CxG is such a model, it appears uniquely equipped to describe paradigm-based constraints in syntax.

The Inadequacy of Transconstructional Filters

In an early paper in the CxG tradition, Pullum and Zwicky (1991) argue that the so-called double-*ing*

constraint cannot be a general morphosyntactic constraint of English. Examples that were used to motivate the constraint include that in (17), but, as Zwicky and Pullum observe, there are systematic exceptions, exemplified in (18, 19):

(17) Robin was starting going to concerts more frequently.

(18) Robin was enjoying going to concerts more frequently.

(19) Robin was not starting, nor did she intend to start, going to concerts.

Pullum and Zwicky propose that the double-*ing* constraint is not therefore a transconstructional filter but instead a constraint on a single constituent-defining rule: "[The VP constituency construction] is inapplicable if its head V and an immediately following head of a complement VP are both in Present Participle form" (Pullum and Zwicky, 1991: 254). The significance of such findings is that they vitiate a model of typological variation based on parameter settings and support one based on constructions. Construction-based typological models include those of Croft (2001), who argues that grammatical-function coding is derivative of constructionally determined semantic relations, and Van Valin and LaPolla (1997), who argue that the pattern of semantic neutralization that characterizes the pivotal syntactic argument in the clause varies not only from language to language but also from construction to construction. For example, while English is widely analyzed as a nominative–accusative language, there are highly productive constructions of English that require other patterns of semantic restriction and neutralization. For example, in English imperatives, the null instantiated element represents an agent rather than a subject. Further, in English resultative sentences the argument of the secondary predicate can be either a subject or an object, as shown by (20, 21), but it must be a patient-type argument, as shown by (22):

(20) The cake fell flat.

(21) She hammered the metal flat.

(22) She ran *(herself) tired.

What this suggests is that the murkily defined 'ergative undercurrents,' sometimes identified in nominative–accusative languages, are simply reflections of the fact that different constructions in a given language require different pivotal arguments. By the same token, split-case systems need not be seen as trending in one direction or another (e.g., away from ergative-absolutive organization and toward nominative–accusative organization). That a given language should use different patterns of semantic neutralization for different syntactic purposes is expected if constructions are the basis of syntax, but not otherwise.

Product-Oriented Generalizations

In Bybee's (2001) schema-based model of inflection, the rule-rote distinction is replaced by a 'superpositional memory' in which like forms overlap, e.g., the irregular past tense forms *sang*, *rang*, and *drank*. Affixes, roots, and stems do not have independent representations; they exist only as similarity relations among words. These relations are captured by product-oriented schemas. Product-oriented schemas represent similarities among forms of a specific category, but do not derive one category from another. In this model, the main determinant of productivity is the type frequency of the schema – the number of different words that represent the schema.

While it might appear that product-oriented schemas would miss source-oriented generalizations, Bybee shows that template can be used to capture similarities among schemas that participate in an opposition. For example, the template [sVN] could be used to capture the phonetic and semantic similarity among the members of the ablaut relation exemplified by the triad *sing-sang-sung*. Further, Bybee shows (2001: 126–127) product-oriented schemas are superior to source-oriented schemas in that the former are not derailed when we cannot find generalizations across the putative source forms. She bases this argument on English past tenses in [Λ] (*string, cling, fling*). The addition of new members to this class (e.g., *struck*, *stuck*, *dug*, *snuck*), made a source-oriented generalization impossible: the present tense counterparts of the newly added past tense verbs lack a nasal coda and have a variety of vocalic nuclei, among them ([i], [ai], and [ɨ]). However, a product-oriented generalization *is* possible, as captured by the schema $C\Lambda C_{[velar]}$.

Construction grammarians (e.g., Goldberg, 1995 and Michaelis and Ruppenhofer, 2001) also use the lack of valid source-oriented generalizations to argue for product-oriented ones. In particular, they argue that verbal linking patterns are produced by constructions rather than by lexical rules. As discussed in 'Argument Structure,' lexical-rule-based approaches to verbal argument structure assume that thematic structure is unaffected by the application of a lexical rule, but the word that constitutes the 'input' to a putative lexical rule may (a) lack the necessary thematic roles (as do verbs of creation with respect to the ditransitive pattern; see 'Argument Structure' above) or (b) lack thematic structure altogether, as do nonce denominal verbs. Example (23), taken from

Michaelis and Ruppenhofer (2001: 4–5), illustrates the latter problem with respect to the German applicative pattern, in which a locative argument is linked to a nonoblique grammatical function (either subject or object) and the inseparable prefix *be-* is attached to the verb:

(23) Es mag ja lustig sein, zwei hartgekochte Eier wie Clownsköpfe mit angekeimten Sojabohnen zu *behaaren* und sie auf Gurkenscheiben zu stellen [...].
'It might be funny to be-hair two hard-boiled eggs like clowns' heads with germinating soy beans, to stand them up on cucumber slices [...].'

In (23), an active voice, trivalent applicative predication, the base form is the noun *Haar* ('hair'). This word is inherently nonrelational, as it has no verbal counterpart outside of this context: German lacks a transfer verb **haaren* ('hair'). The applicative predication in (22) designates a transfer event of the type denoted by trivalent applicative verbs like *beladen* ('load'), and yet the thematic roles present in (23) are evidently not licensed by the stem *Haar*, because *Haar* is not a verb, let alone a transfer verb. Instead, as Michaelis and Ruppenhofer (2001) argue, the applicative pattern imposes its own thematic structure, and therefore it is a construction rather than the output of a lexical rule.

In addition, proponents of argument–structure constructions have argued against lexical-rule-based approaches on the grounds that such 'rules' may have no uniform 'product' (Goldberg, 1995: 31–39). For example, German applicative verbs designate a variety of image- and force-dynamic schemas, including coverage, intensive action, repeated action, and benefaction (Michaelis and Ruppenhofer, 2001). Because constructions, like words, are potentially polysemous (Michaelis, 1994), the construction-based model of verbal argument structure can readily accommodate this semantic variety (Goldberg, 1995). In such accounts, distinct senses of a given argument–structure construction are related via inheritance, as described in 'Idioms and Inheritance.'

Conclusion

Because constructions, like words, freely combine semantic constraints (like event representations) with pragmatic constraints (like use conditions), describing constructional meaning requires us to combine cognitive and discourse-functional explanation. This integrated approach characterizes much of the current research on language and mind: studies of language acquisition and sentence processing increasingly emphasize the role of usage factors, in particular the relativity frequencies of words and morphosyntactic patterns. Such studies have shown, for example, that the onset of verb overregularization errors in early child language is triggered by an increase in the proportion of regular to irregular verbs in the child's vocabulary (Marchman and Bates, 1994) and that the likelihood of a garden-path 'detour' during sentence processing is a function of the prior probability of a given constituent structure (e.g., reduced relative vs. main verb) combined with the transitivity bias of the lexical verb (Narayanan and Jurafsky, 1998). Such studies support the view that linguistic knowledge is the knowledge of routines (Langacker, 1987; Bybee, 2001; Tomasello, 2001, 2003; Croft and Cruse, 2004) and that language acquisition is the "mastery of artifacts and conventions" that children "may adapt for creative uses as their mastery progresses" (Tomasello, 2001: 160). If these theorists are correct, knowledge of language is the product of acculturation, and grammatical constructions are the basis of syntax.

See also: Declarative Models of Syntax.

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Constructivism

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Reading the educational research literature of the last 10 years, one encounters many instances of the terms 'constructivist' and 'constructivism.' Here education is following its parent discipline, psychology, where the occurrence of these terms "multiplied five-fold . . . between 1980 and 2000" (Mahoney, 2003). Unfortunately, one might also emerge from these encounters without a very clear idea of what these terms actually mean. In recent classroom-based research, constructivism often seems loosely associated with any type of student-centered or project-based learning. In more theoretical research, the situation is no more clear. In *Constructivism in education,* Steffe and Gale (1995) identify no fewer than six core paradigms of constructivism, namely social constructivism, radical constructivism, social construct**ion**ism, information-processing constructivism, cybernetic or systems constructivism, and sociocultural or mediated-action constructivism (Steffe and Gale, 1995: xiii). It is somewhat difficult to determine (or indeed 'construct') any sense of what is common across these approaches, partly because of their proponents' tendency to wage private battles against each other rather than a common foe.

And yet there is a common foe implicitly known to all constructivists, if not always stated, and that is the epistemological claim (variously designated as dualist, positivist, objectivist, or Cartesian) that knowledge in the head is both separate from and an objective representation of an out-there reality, and further, that the transmission of whole, objective representations from out-there to in-here is the main business of education. The positions can be distinguished by differing stances toward external reality:

- it does not exist, or it may exist but we have no way of knowing much about it (von Glasersfeld);
- it exists objectively, but it cannot enter a learner's head whole from out-there, rather must be reconstructed in-here through piecemeal encounters with previously unencoded data (Spiro);
- the success of this depends hugely on what has been constructed previously (Bruner);
- it exists intersubjectively, and must be reconstructed by each learner, but this works best as a social not individual operation (Vygotsky).

For a more detailed linking of names to ideas, see Ryder's excellent online collection of hundreds of new and classic constructivist documents, or an insightful review of Steffe and Gales' book by Jaworski, both online.

For psycholinguists, the particular reality that must be reconstructed piecemeal from data by each language learner is, of course, the grammar of a language. For Chomsky (e.g., 1980), a universal grammar exists in each human mind, whole and prior to the arrival of any linguistic data, and indeed is the precondition for building a system out of such data. But this idea has been strongly disputed since the mid-1980s by constructivists, emergentists, construction grammarians, and connectionists, whose neural-network computer simulations seem to show that grammatical systems could be constructed from interacting instances alone, i.e., from raw data. On this view, the rules and structures of language do not precede instances but rather "emerge from simple developmental processes being exposed to massive and complex environmental input" (in the words of Nick Ellis, whose 1998 paper provides a broad review of the idea; Ellis, 1998). In approaches to language acquisition, then, constructivism is an important and novel idea.

Against such a background, it seems truly amazing that if you enter the term *constructivism* into the search engine of a major journal in applied linguistics, you come up with a resounding 'not found.' The journals *Applied Linguistics* and *Language Learning*, at least in the years covered by their online collections, apparently offer no titles or references whatever bearing this term. Why is this? Let me introduce a perspective on this question through a homely analogy.

The Ministry of Education in Quebec, Canada, has recently launched a major reform in the public school system. Everything from textbooks and teaching methods to classroom organization has been affected. The word 'constructivism' is writ large across the many documents accompanying this reform; we are effectively living through a constructivist revolution. And yet, as many of the province's language educators point out, the 'new' recommendations for science and mathematics classrooms seem to be about doing precisely what ESL (English as a Second Language) and FSL (French) language educators have been doing for a long time: group work, project work, emphasis on active use rather than passive understanding, emphasis on what the learner does rather than on what the teacher does, concern for the key roles of motivation and prior knowledge – and many others in the constructivist line-up.

The language educators' observations are more than coincidental. When applied linguistics, and

more broadly modern approaches to language learning, departed from the behaviorist agenda in the late 1970s, they did so in ways that anticipated the more general adoption of constructivism in educational thinking. Consider several of the key learning principles in the constructivist agenda:

1. The to-be-learned knowledge, a human language, is not exactly out-there in any objective sense. (Who imagines that if there were no humans to speak it, a language could be said to exist?)
2. Fully formed knowledge representations cannot be successfully 'transmitted' to passive learners, conceived as 'containers,' in Bereiter's (2002) metaphor. (Who would dispute that a language learner must **use** a language in order to gain control of it or truly know it? There is a large body of literature in applied linguistics devoted to the 'output hypothesis,' e.g., Swain, 2005.)
3. Knowledge can be constructed collaboratively. (There are long-standing research traditions in applied linguistics in both interaction and group work as a main source of learning, e.g., Long, 2001, and specifically Vygotskian manifestations of this idea, e.g., Lantolf, 2004.)
4. Constructed knowledge is difficult to test, since learners will construct individual representations of any to-be-learned content. (Who would dispute that my mental representation of English or French is inevitably and legitimately different in large ways from anyone else's?)

At some point in the 1970s, it seems that most applied linguists departed from audiolingualism-behaviorism, our own brand of objectivism, and adopted, instead of the Chomskyan principles that were the official alternative (but that never really lent themselves to a useful pedagogy), a proto-constructivism. There were, after all, two roads out of behaviorism for language, Chomsky's innatism and Piaget's constructivism (Piatelli-Palmarini, 1980). Applied linguists and language educators paid lip service to the former but in truth were closer to the latter.

And having gone into constructivism earlier, applied linguists have run into some of its problems earlier. For example, in second language vocabulary acquisition, which has been a test-bed for many constructivist ventures, a major proposal from Brown *et al.* (1989) is that learners should not be handed fully formed or 'pre-emptively encoded' word meanings, but rather should grapple with raw evidence, constructing their own meanings out of numerous partial encounters with instances. This is a rather familiar idea to applied linguistics researchers. Under the headings of 'inductive' or 'data-driven' learning (e.g., Johns, 1991), a number of studies have looked into the value of this approach. In fact, such approaches, for all their theoretical appeal, have a mixed track record in the language classroom. In vocabulary studies, there is a long bibliography of research findings showing learners unable to make much use of raw data for the purpose of inferring word meanings (Laufer and Sim, 1989; Schatz and Baldwin, 1986) or for inferring rules for grammatical forms. Grammatical rules and word meanings may be constructible over a lifetime, but classrooms work in a somewhat shorter time frame. And where constructivist approaches have been successful, they are known to interact strongly with learning style, intelligence, and (in one of my own studies, Cobb, 1997a), gender.

In education, the case for constructivism tends to be argued from nature and first principles: if reality and the human mind are thus constituted, here is what a classroom should look like. In applied linguistics, with our longer experience, the case is more likely to be argued in relative terms and judged by outcomes. Second language learning is known from the beginning to be a somewhat unnatural enterprise, where one is typically acquiring a selected portion of a human language, often as an adult rather than a child, usually in a few months rather than 15 years, and so on. If constructivism is to have any value in the practice of language learning, it will be on the grounds of utility, not nature. And is there a case for utility?

A hue of constructivism that seems relevant to learning a first or second language is one proposed by Spiro *et al.* (1991) within the information-processing paradigm mentioned above. This paradigm proposes a number of specific and verifiable benefits to be realized through a constructivist approach, especially within ill-structured domains including language acquisition. One is that representations constructed from grappling with raw data, as opposed to representations resulting from someone else's having grappled, are not just generally 'better' in some vague way but specifically are more successfully transferred to novel contexts and form a better preparation for further independent learning. This paradigm also proposes a methodology for helping learners perform this grappling with raw data, namely the adaptation of the tools and methods that experts have developed over the years to help them with their own grappling. Like learners, experts in any domain experience difficulties in their encounters with unencoded data, but unlike learners they have developed tools and methods to overcome these difficulties.

I have argued (in Cobb, 1999) that constructivist ventures in language education would involve pedagogical adaptation of the tools and procedures of relevant language experts, such as lexicographers and

computational linguists. For example, the word-learning task facing a learner and a lexicographer are essentially the same, and are essentially 'constructivist.' Both must make sense of an overwhelming amount of raw and distributed information in an artificially brief amount of time. Lexicographers use a corpus and concordance to assemble in moments and force the patterns out of data that would otherwise require years, and it is not inconceivable that learners might also be able to do some scaffolded version of this. In two controlled experiments (Cobb, 1997b; Cobb and Horst, 2001), a strong transfer-of-learning effect was found for constructing word-meanings from learning-adapted corpus and concordance tasks, as compared to learning preconstructed meanings from dictionary definitions. Work is currently underway to extend this approach and technology to grammar (Gaskell and Cobb, 2004).

It is often noted that the exploitation of information technology in language education is proceeding without a theoretical underpinning. A learner-as-linguist variant of constructivism might provide this underpinning. It might also provide what was often missing from the inductive, discovery, and constructivist approaches of the past – the tools learners need to induce, discover, and construct.

See also: Communicative Language Teaching; Corpus Studies: Second Language; Interlanguage; Teaching Technologies: Second Language; Vocabulary: Second Language.

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Contact-Induced Convergence: Typology and Areality

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Introduction

Language typology basically has two aims. It tries to understand the range of structural variance across human languages by discovering systematic cross-linguistic patterns, and it tries to account for these patterns in terms of the properties of human cognition and the communicative function of language. Research on areality deals with structural convergence across languages through the geographic adjacency of language communities. Thus, studies on areality depend on contact linguistics as first introduced by Weinreich (1953) and its findings on how social factors and changes in language structure interact.

The two linguistic fields of typology and areality are joined together in this article to show to what extent they are related or even mutually dependent. That they belong together for a deeper understanding of the properties of human language follows from the perspective of integrative functionalism as defined by Croft (1995). While external functionalism looks at grammar as an arbitrary and self-contained system, integrative functionalism denies the self-contained nature of grammar. Thus, not only is grammar the result of competing motivations such as iconicity and economy, but there is also external influence. If one looks at grammar from the level of what is going on in an individual speaker and the variability within his or her grammar, it turns out that the criteria for him or her to select a particular structure from a set of grammatically possible variants are also determined by grammar-external social factors relevant within a given speech situation. On a more general level, this means that language change, which ultimately depends on individuals who follow it, is subject not only to grammar but also to external social motivations that lead a whole community of individuals to give in to it. This also applies to language contact and contact-induced change or convergence. It is social factors that primarily determine the structural results of language contact. Of course, grammatical factors are relevant as well, but they are of secondary importance – given the right social situation, any change is possible no matter what language-internal reasons may be against it (Thomason and Kaufman, 1988).

Language contact and its dependence on social factors matters for typology as soon as contact-induced convergence covers a large enough area to significantly influence the distributional statistics of structural types. That contact-induced convergence may cover considerable geographic areas and a considerable number of languages can be seen from what are called 'zones of structural convergence' and large areas of continental size (cf., the section 'Typological Finding and Genetic and Areal Closeness,' on Dryer, 1989). Talking about contact in such areas does not imply that the speakers of all the languages are in real contact. There are also forms of indirect contact, as in the following example. Two nonadjacent areas, A and C, with limited or no contact share certain features through the intermediary of area B, situated between them.

Given the existence of far-reaching convergence, typologists have to develop statistical methods that make sure that their typological conclusions do not reflect sociohistorical accidents but real universals that are founded more deeply in human cognition. As it seems, there is no fully reliable method to come up with watertight typological universals. If one looks at the discussion of markedness in typology and in research on language contact, one may well conclude that the two fields are mutually dependent (cf., the section 'Markedness, Language Contact, and Typology').

Given the mutual relevance of the two fields, this article presents a survey of both. In the section 'Social Factors and Their Structural Consequences,' the relevance of social factors in language contact and language change is shown. The section 'Linguistic Areas (*Sprachbünde*) vs. Zones of Structural Convergence' deals with areal constellations of convergence. It is shown that there are a number of reasons that it is impossible to provide an exact definition of a linguistic area (*Sprachbund*). The concept of 'zone of structural convergence' is introduced as a more open and more viable alternative. Language typology and its methods of how to improve the reliability of its generalizations in the light of contact-induced convergence are discussed in 'Typology and the Areal Factor.'

Social Factors and Their Structural Consequences

The first section introduces social models of language change. Some mechanisms forming potential bases of language change are dealt with in 'Mechanisms of Contact-Induced Change.' Finally, the section 'Results of Language Contact' presents some possible consequences of contact-induced change and their correlation with certain social patterns.

Social Models of Language Change

General Factors A crucial factor determining the outcome of contact-induced change is intensity of contact, a factor that is hard to quantify and hard to define. Thomason (2001) mentioned the following three of its components: the duration of the contact period, the population size of the groups in contact, and socioeconomic dominance. One may easily add other factors, such as cultural prestige or attractivity, as in the case of the influence of Ancient Greece on the Roman elites and their language, or the spreading of religious creeds, as one can see from the influence of Arabic in many non-Arabic-speaking Muslim cultures or from the translation of Buddhist texts from Pali and Sanskrit into East and South East Asian languages and its lexical and sometimes structural impact. For more detailed predictions based on intensity of contact, Thomason (2001) discussed the absence vs. the presence of imperfect learning and the speakers' attitudes toward the languages involved.

In the rest of 'Social Models of Language Change,' three more systematic social models of language change – which Croft (2000) called 'utterance-based theories' – are sketched, i.e., the social-network theory, findings on leaders of language change, and the invisible-hand model. Finally, the factors defining contact intensity are briefly taken up again in the light of those three models. Thomason's (2001) predictor of the speakers' attitudes is discussed in the section on the invisible-hand theory under the term 'maxims of language use.' Finally, a more integrated discussion of imperfect learning takes place in the section on borrowing vs. maintenance.

Network Theory: Strong vs. Weak Ties The social-network model looks at language change from the perspective of individual actors and the quality of their relations to other individuals. In network theory, individuals can be graphically represented as points, while the relations between them are marked by lines, which may vary in shape according to the qualities of these relations. As it turns out, successful diffusion depends on the strength of the ties between individuals in contact. The main distinction is between individuals with strong ties and individuals with weak ties. Strong ties are defined by frequent and reciprocal contacts for a number of different reasons (sports, friendship, shopping, child care, etc.). Weak ties are based only on one reason, they are not necessarily reciprocal, and they are more frequent because they can be established more easily. As has been shown by Milroy and Milroy's (1985) case study of Belfast English, changes diffuse within weak network structures. Individuals participating in a number of different weak networks are liaisons by which innovations get disseminated. Only after a change has spread through a large enough number of weak networks will it be taken up by local influentials, who will integrate it into their strong network structures to keep their position within these structures.

Leaders of Language Change In Labov's view, social networks are necessary, but not sufficient to account for the successful diffusion of innovations. For understanding the diffusion of innovations, one needs to look at the leaders of language change. From this perspective, "[t]he social networks effects are not the largest, but they add essential information to the description of the leaders of linguistic change" (Labov, 2001: 341). As it turned out from Labov's (2001) study of language change in Philadelphia, men and women have different styles of social interaction, and it is the style of women that supports the diffusion of language change. Thus, the leaders of language change are women, who are "centrally located in the socioeconomic hierarchy." They have "intimate contacts throughout their local groups," but they also have "intimate friends in the wider neighborhoods." Since these wider contacts are across different social statuses, "influence spreads downward and upward from the central group" (Labov, 2001: 306).

The relevance of analyzing individuals saliently involved in the diffusion of change is undeniable. The problem is whether Labov's findings are universal enough to be applied to any language community within any cultural environment. Of course, this question needs a lot more research.

The Invisible-Hand Model and Maxims of Language Use The invisible-hand model addresses the problem that the actions of a large enough number of individuals following at least partially similar purposes on a microlevel yield causal consequences at a macrolevel that cannot be predicted from the knowledge of the purpose operating on the microlevel. Keller (1990/1994) introduced this model into linguistics from economics (Adam Smith). In Keller's presentation, the purposes guiding individual speakers' actions are maxims of language use of the following type:

(1) Keller's phatic maxims (1994: 100):
   a. Talk like others talk.
   b. Talk in such a way that you are not misunderstood.

(2) LePage and Tabouret-Keller (1985):
   Talk in such a way that you are recognized as a member of the group you wish to identify with.

As far as the selection of the structural properties or linguistic types to be diffused depends on maxims of language use, linguistic structures attested in the population of the world's languages are invisible-hand products. This also applies to language contact and its consequences. If contact-induced change is an invisible-hand phenomenon, predictions concerning its outcome are impossible.

Synopsis The network model has the potential to provide the necessary tools for quantifying the intensity of contact more exactly by integrating questions of frequency of contact, the reasons responsible for contact, and the overall structure of the network. Ultimately, the intensity of contact and its reflections in a network model can be seen as products of an invisible-hand process, i.e., as products of purposeful communicative actions of individuals.

If we look at duration as one of the factors determining intensity of contact in terms of Thomason (2001), there must be motivations of purposeful action – such as constellations of political power, economic dependencies, and cultural prestige – for the situation of contact to go on. Individual leaders and leaders of language change, with their attitudes toward contact and their attitudes toward the languages involved, will also be of crucial importance. The population sizes of the groups of course have their impact on power, but on a more basic level they also have their impact on network structures. If, for example, the population of group A is much smaller than that of group B, there will simply not be enough liaisons of group A within group B to show significant impact of A on B. Finally, the socio-economic factor provides a plethora of maxims for purposeful actions constituting networks and their particular structures, which either favor or block language change.

Mechanisms of Contact-Induced Change

This section briefly discusses the mechanisms enumerated by Thomason that may be responsible for contact-induced change. Thomason (2001: 129) was certainly right in assuming that "[t]hese may well not be the only mechanisms that exist."

Code Switching The phenomenon of code switching may best be illustrated by the title of Poplack's (1980) scene-setting paper 'Sometimes I'll start a sentence in Spanish Y TERMINO EN ESPAÑOL.' A comparatively neutral definition of code switching is the following by Thomason (2001: 132): "Code switching is the use of material from two (or more) languages by a single speaker in the same conversation." Depending on the purposes followed by individual authors, there are also more specific definitions of code switching, such as the following by Myers-Scotton (1993: 3), for whom "codeswitching . . . is the selection by bilinguals or multilinguals of forms from an embedded variety (or varieties) in utterances of a matrix variety during the same conversation."

Although code switching is a well-studied phenomenon, its relevance as a motor of language change seems to be limited – it certainly does not apply universally. Most often, scholars supporting the relevance of code switching for language change refer to the development from code switching to borrowing. The problem with this approach is that there is a fuzzy borderline between the use of a code-switched word and a stabilized loanword or a stabilized product of interference in general. Even if there is a continuum from code switching to borrowing, linguists don't really understand by what cognitive/psychological processes a speaker gets from the pole of code switching to the pole of loanwords. Another argument against the central role of code switching in contact-induced language change is the observable fact that in many bilingual speech communities, code switching does not happen. Thus, if there is contact-induced change in such a community, it cannot be the result of code switching.

Code Alternation In code alternation, bilinguals use their two languages in different sets of environments. A typical case is the use of one language at work and the other language at home. To what extent this phenomenon is involved in contact-induced change and to what extent its consequences can be distinguished from those of code switching is unclear.

Passive Familiarity Passive familiarity is relevant for contact-induced change if a speaker integrates a structural property from a language he or she understands at least to a certain extent without speaking it actively. Thomason (2001) pointed out that the cases she knew of comprised only closely related languages or sometimes even only dialects of the same language.

Negotiation This term does not imply that in a multilingual situation, speakers deliberately or consciously discuss structural properties of their languages and then decide which structures they are going to select. What this term means is that a speaker of language A makes assumptions of his or her interlocutors' language B and then tries to approximate B structures in his or her speech. This mechanism occurs in several situations. It is relevant if nobody knows anybody else's language, i.e., at the

initial phase of a pidgin. The speakers then make guesses of how their interlocutors may express a certain concept when they address them. Right guesses tend to become part of the grammar of a pidgin; wrong guesses will be abandoned. In cases of language shift, the shifters do not have full access to the target language and thus have to integrate their guesses into their version of that language. Finally, there is the situation that bilinguals "adjust features of their language's structure (A) to approximate those of another language (B)" (Thomason, 2001: 143).

Bilingualism/Bilingual First-Language Acquisition Thomason (2001) pointed out that there was not enough research dealing with the effects of children's learning two languages as first languages. For that reason, one cannot know its impact on contact-induced change. What is clearer is the effect of bilingualism on structural convergence in general. This was shown by Silva-Corvalán on English/Spanish bilinguals in Los Angeles. The main hypothesis of her study was "that, in language contact situations, bilinguals develop strategies aimed at lightening the cognitive load of having to remember and use two different linguistic systems" (Silva-Corvalán, 1994: 6). The consequences of these strategies are the following (Silva-Corvalán, 1994: 6):

- Simplification of grammatical categories and lexical oppositions
- Overgeneralization of forms, frequently following a regularizing pattern
- Development of periphrastic constructions, either to achieve paradigmatic regularity or to replace less semantically transparent bound morphemes
- Direct and indirect transfer of forms from the superordinate language
- Code switching

Second-Language Acquisition The following strategies used by second-language learners are listed to contribute to contact-induced change by Thomason (2001): In using a second language, a speaker may insert material from his or her first language if he or she does not know how to express a given concept (gap-filling approach). The speaker may project structures from his or her first language onto the second language. A typical example is the case of native speakers of English who use SVO word order in German subordinate clauses, which actually have SOV word order. Finally, second-language learners tend to ignore distinctions that are not present in their mother tongues. This particularly applies to marked distinctions.

Deliberate Decision Language change can also be the result of deliberate decisions. A reason for introducing deliberate changes can be the wish of a group of people to be different from another group in their community or the desire to be unintelligible to outsiders. The most interesting results of contact-induced change due to deliberate manipulation by bilinguals are mixed languages, as discussed in the section 'Mixed Languages.'

Results of Language Contact

After a general discussion of what can be copied in language contact, these results of contact are presented: maintenance vs. shift, pidgin and creole languages, mixed languages, language death, and the emergence of new types.

What Can Be Copied from One Language into Another A number of constraints on what can be copied from one language into another have been postulated in publications on language contact. The major insight of Thomason and Kaufman (1988) was that depending on the social situation, just about everything goes. For that reason, the following three general types of constraints are formulated only in terms of tendencies (also cf., Thomason, 2001: 63–66):

- Marked features are less likely to be copied than unmarked features.
- Features that are loosely integrated morphosyntactically are copied more easily than tightly integrated ones.
- There is a certain preference to copy typologically similar structures.

Although the concept of markedness may seem intuitively clear, there are a number of definitions. Thomason and Kaufman (1988) defined it in terms of typological frequency (typologically widely attested structures are relatively unmarked) and in terms of first-language acquisition (what is learned first and what is learned easily are relatively unmarked). The section 'Markedness, Language Contact, and Typology' describes the problem that arises if typological research and research on the effects of language contact share too much of a common basis.

Research by Stolz and Stolz (1996) and Matras (1998) showed that there is some functional motivation for the constraint of morphosyntactic integration. Both papers showed that the first markers copied from one language into another are those used for the organization of text, i.e., the markers operating at the level of discourse. Since there is a certain functional overlap between markers used for discourse organization and markers used for clause

combining, the next level accessible for copying is clause-level syntax. From there other, lower levels of syntax and morphology can be reached by way of parallelisms between coordination and subordination, the clause level and the phrase level, etc. (Stolz and Stolz, 1996). Matras (1998) argued that markers at the discourse level are like gestures, which have the function of integrating a given state of affairs into discourse. Their use is automatic, without the speaker's consciousness. Since Silva-Corvalán's (1994) cognitive strategy of reduction (cf., this article's section 'Bilingualism and Bilingual First-Language Acquisition') is particularly strong if no consciousness is involved, as is the case with gestures, markers at the discourse level are the candidates most likely to be copied. As both authors pointed out, the discourse markers that will actually get copied are always those of the dominant, socially prestigious language. At the lower levels, additional criteria – such as semantic transparency (the monofunctionality of a marker, meaning only one grammatical category is marked) and morphotactic transparency – need to be considered as well.

The constraint of typological closeness implies that even highly marked or morphosyntactically tight features can be copied across typologically similar systems (also cf., Weinreich, 1953, with regard to structural congruence and facility of transfer). This is certainly true. Nevertheless, one has also to reckon with the emergence of typologically rare or unattested structures from situations of language contact (cf., the section 'On the Emergence of New Types').

Maintenance/Borrowing vs. Shift Thomason and Kaufman (1988) distinguished two basic types of contact-induced change: language maintenance (or borrowing) and language shift. In the former case, native speakers of language A maintain their language but introduce into A elements from another language, target language B. In the latter case, speakers of A abandon their language in favor of B. The factors responsible for contact-induced change as discussed by Thomason and Kaufman (1988) are duration of contact, population size, and socioeconomic dominance, i.e., the factors that determine intensity of contact.

Borrowing is limited to nonbasic vocabulary if there is low intensity, i.e., if there is only casual contact and if only a small number of bilinguals are speaking A as well as B in the community of speakers of A. With increasing intensity of contact and with an increasing number of bilinguals, there will be more lexical borrowing, up to moderate or heavy structural borrowing. The structural consequences of shift depend on the population size of the groups involved and on the number of bilingual native speakers. The general motivation for shifting from A to B seems to be socioeconomic. The number of bilingual speakers determines the degree to which the target language B is accessible among speakers of A. This, in turn, has its impact on the degree of imperfect learning, a consequence that is irrelevant for maintenance/borrowing, because the speakers of A do not abandon A even if they adopt a lot of properties from B. If the group of shifters is significantly smaller than the group of the speakers of target language B, that language will be learned perfectly, language A will disappear, and there will be no linguistic evidence of A at the synchronic level once the shift to B has taken place. If the shifting group is large and the number of bilinguals within it is relatively small, the shifters won't have access to sufficient B input. As a consequence, their variety of B will preserve a number of structural properties of A.

Although the structural consequences of maintenance and shift seem to converge in the case of maintenance with very intensive contact and in the case of shift with a large shifting group and imperfect learning, they differ in principle. In the case of maintenance, the primary object of change is the lexicon, followed by phonology and syntax. In the case of shift, we get the reverse picture: the primary objects of change are phonology and syntax, while changes in the lexicon are of minor importance. This finding is very revealing, because it shows that there is a correlation between the social factors that apply to a contact situation and the linguistic properties of language change.

The social situations responsible for maintenance/borrowing and shift can be integrated into network theory and into the invisible-hand theory. Weak borrowing limited to the lexicon is based on weak contacts with a rather small number of bilingual speakers. These bilinguals form liaisons to their respective speech communities, but their number is too small to produce any significant effects. If the speakers of target language B enjoy a certain prestige among the speakers of A, the introduction of lexical items from B can also be explained, again, in terms of LePage and Tabouret-Keller's (1985) maxim "Talk in such a way that you are recognized as a member of the group you wish to identify with" (2). If contact intensity increases over a certain period of time, not only will there be more bilingual liaisons, but there will also be a wider acceptance of changes even beyond the lexicon.

Complete shift is based on a small number of bilinguals that simply give up one of their languages for the benefit of the other. This is the case in a network with strong ties in which the integration of

an external individual is possible only via his or her complete adaptation, linguistic and otherwise. In such a situation, maxim (2) applies to its maximal extent: the speakers simply have to adapt. The prestige and the importance of a new target language B can also be strong enough in terms of maxim (2) if its accessibility is only limited. Even though there may be a considerable number of bilinguals in the function of liaisons, their percentage among the number of shifters is not large enough to grant perfect learning. As a consequence, a new variety of target language B with properties of A will emerge.

Pidgin and Creole Languages The emergence of pidgins is characterized by extreme social conditions in which speakers of at least three different languages have no common basis for communicating with one another. Pidgins have no native speakers, while creoles are characterized by the existence of native speakers even though this distinction is not always easy to make.

The status of creoles as far as universal properties of language are concerned has been subject to extensive discussions in typology as well as in formal linguistics since Bickerton's (1981) theory that the structure of early-creolized languages or abrupt creoles is the result of an innate 'bioprogram.' According to this theory, children do not have access to a well-formed target language in the extreme situation of early-creolized languages and thus have recourse to their bioprogram.

The bioprogram is problematic for two reasons. The first refers to the role of children in the process of creolization. It is highly controversial whether children alone can be responsible for the structure of a language. What is more important from a typological perspective is the second reason, which departs from the rule that the one who introduces a hypothesis bears the burden of proof. This means that for the bioprogram to be convincing, there should be structural properties of abrupt creoles that cannot be explained by other motivations. As it turned out (cf., McWhorter, 1997), the properties of creoles that Bickerton (1981) ascribed to the bioprogram could also be accounted for in terms of the languages involved and in terms of general typological findings. Finally, some properties may also need further empirical corroboration.

From the perspective of markedness, "more diversity among original substrate languages means fewer marked features in the emerging creole that are to be attributed to the substrate languages" (Thomason and Kaufman, 1988: 158). "[T]he only marked features that are likely to appear in an emerging pidgin are those that are shared by all or most of the languages whose native speakers are developing the pidgin" (Thomason and Kaufman, 1988: 52). Since the number of languages involved in the formation of pidgins and creoles is rather large, the likelihood that marked structures are frequent enough to be selected as part of the grammar is relatively low. Thus, the dominance of unmarked structures may be accounted for in terms of what generally happens to markedness in language contact (as far as markedness patterns can be conclusive, cf., the section 'Markedness, Language Contrast, and Typology').

Given the difficulty of finding structural properties that cannot be explained otherwise, one might conclude that abrupt creoles do not provide more direct access to universal properties of language. As a consequence, they are to be treated just like all the other languages in typology.

Mixed Languages The phenomenon of mixed languages was introduced by Bakker and Mous (1994). The most commonly applied definition of mixed languages in terms of "a bilingual mixture, with split ancestry" (Matras and Bakker, 2003: 1) is quite straightforward even if it does not cover all the languages discussed under this heading. Mixed languages "arise either in communities with mixed households accompanying the formation of new ethnic identities, or through rapid acculturation leading to the adoption of a hybrid group identity, or through continuous socioethnic separateness resisting pressure to assimilate" (Matras and Bakker, 2003: 14). The process by which they emerge is postulated by a number of researchers as that of a conscious creation (cf., the section 'Deliberate Decision').

Prototypically, the mixture of languages is conventionalized as in the following example from Media Lengua (Ecuador), in which the lexical items are Spanish (*italics*) and the grammatical system is that of Quechua (Media Lengua) (**bold**):

(3) Media Lengua, Ecuador (Matras and Bakker, 2003: 6):

Isi-**ga**	*asi nustru*	*barrio*-**ga**
This-TOP	thus our	community-TOP
asi	*kostumbri*-**n**	*abla*-**na.**
thus	accustomed-3	talk-NML

'In our community we are accustomed to talking this way.'

The phenomenon of mixed languages is extremely interesting from the perspective of language contact. To what extent this is also true from a typological perspective needs to be seen. Mixed languages seem to be typologically conservative, in the sense that they do not lead to new types. Media Lengua as illustrated

in (3) still belongs to the same type as Quechua, from which it adopted its grammatical structure.

Language Death Language death is a subject that is understudied. There is a trivial reason that it matters for typology. If a language disappears from the map, it usually doesn't leave traces. Consequently, insights into types that are not attested today are impossible, and insights into earlier distributions of types are extremely vague, because we don't know about the presumably vast number of unknown and extinct languages of the past (see the section 'The Problem of Stationary Distribution in the Light of Language Contact').

On the Emergence of New Types If languages with particular types get in contact, new types may emerge. This will be illustrated by Baiso (Afro-Asiatic, Cushitic, East, Western Omo-Tana). This language has verb-final word order, with the genitive following the noun (NGen) and the adjective preceding it (AdjN). This covariation pattern (OV with NGen and AdjN) is excluded by Greenberg's universal 5 (corroborated by Hawkins, 1994: 320), shown in (4).

(4) Greenberg's (1966: 110) universal 5:
If a language has dominant SOV order and the genitive follows the governing noun,
then the adjective likewise follows the noun.

If we look at the languages around Baiso, we get two geographical groups of languages, called Highland East Cushitic (HEC) and Lowland East Cushitic (LEC) by Tosco (1994: 416–417, also cf., Bisang, 2004: 37), on whose work this short description is based. These groups are characterized by the word-order covariations in (5).

(5) HEC: OV with AdjN and GenN
LEC: OV with NAdj and NGen

Since Baiso belongs to a contact zone between HEC and LEC, the extraordinary covariation of NGen and AdjN in an OV language is due most likely to its position between OV languages with AdjN and GenN (HEC) and NAdj and NGen (LEC).

Linguistic Areas (*Sprachbünde*) vs. Zones of Structural Convergence

The concept of a *Sprachbund* ('linguistic area' in English) was introduced at the First International Congress of Linguists by Trubetzkoy (1928/1930). It is based on the observation that structural similarities across languages are attested not only among genetically related languages but also across unrelated or loosely related neighboring languages. In terms of Trubetzkoy's definition, linguistic areas are characterized by great syntactic and morphological similarities, by a great number of common cultural words, and sometimes by a certain similarity of the phonological inventory in the structures of the languages involved. Explicitly exluded from this characterization are systematic sound laws, correspondences in the phonological material of morphological elements, and common basic vocabulary, because these factors indicate genetic relatedness.

Trubetzkoy's definition is rather vague in various ways. It does not state anything about the quantification of the syntactic, morphological, etc., factors that make a linguistic area, and it only implicitly refers to the geographic factor by using the term 'groups consisting of languages' (*Gruppen bestehend aus Sprachen*). Given the openness of Trubetzkoy's definition, it comes as no surprise that linguists of later generations tried to present more precise definitions. Unfortunately, their striving for precision did not lead to uniformity – there are now a large number of sometimes rather divergent definitions. This situation is to be expected – finding an absolutely clear-cut definition of a linguistic area is systematically impossible. Before this article takes up that discussion, however, two more definitions and some examples are presented.

The definitions presented are from Emeneau (1956/1980) and from Thomason (2001). Both definitions may be called well-balanced compromises that somehow cover most of the areas that have been claimed to be linguistic areas.

> A linguistic area is "an area which includes languages belonging to more than one family but showing traits in common which are found not to belong to the other members of (at least) one of the families" (Emeneau, 1956: 16, note 28).

> . . . a linguistic area is a geographical region containing a group of three or more languages that share some structural features as a result of contact rather than as a result of accident or inheritance from a common ancestor. (Thomason, 2001: 99)

The most famous linguistic area is the Balkan *Sprachbund* (Sandfeld, 1930). Other linguistic areas are the Circum-Baltic area (Dahl and Koptjevskaja-Tamm, 2001), the Ethiopian area (00000), South Asia (Masica, 1976), East and Mainland Southeast Asia (*see* **Southeast Asia as a Linguistic Area**) and Meso-America (Campbell *et al.*, 1986). To give an idea of what is relevant for a linguistic area, some features discussed for the Balkan area (in Table 1) and the Ethiopian area (at [6]) will be presented.

Table 1 Features discussed for the Balkan Area and their presence in four of its languages

	Bulgarian	*Modern Greek*	*Albanian*	*Romanian*
Postnominal article	+	−	+	+
Analytic case marking (number of morphological cases)	−	3	3	2
Future marker is derived from a verb of volition	+	+	+ (only in the Tosk dialect)	+
Presence of evidentials	+	−	+	?
Lack of an infinitive	+	+	+	+
Parataxis with 'and'	+	+	+	+
Analytic comparative	+	+/−	+	+
Identity of the wh- words 'where' and 'where to'	+	+	+	+
Possession is expressed with pronouns in the genitive/dative	+	+	−	+
Double object marking	+	+	+	+

(6) Features discussed for the Ethiopian area:

1. Presence of glottalized consonants/ejectives
2. Presence of pharyngeal fricatives
3. Basic word order: SOV
4. Subordinated clauses occur in front of the matrix clause
5. Adjectives precede their head noun (AdjN)
6. Main verbs precede auxiliaries
7. Use of converbs for expressing coordination
8. Postpositions
9. "Quoting clauses," i.e., quoted speech is marked by a verb of saying
10. Compound verbs with verbs of saying, living, or being.

As can be seen, there is no overlap between the features relevant for the Balkan area and those relevant for the Ethiopian area. In addition, the two areas are rather different as far as the number of languages and the complexity of the whole contact situation are concerned. In the case of the Balkan, only a relatively small number of languages belong to the core of this area: Bulgarian, Macedonian, modern Greek, Albanian, and Romanian. The Ethiopian area consists of some 80 languages belonging to two subfamilies of Afroasiatic: Semitic and Cushitic, and Nilo-Saharan. Given the more complex language situation of that area, it can be divided into a number of more local subareas.

A brief look at these two areas – the Balkan and the Ethiopian – reveals the extent to which linguistic areas may differ with regard to the grammatical structures involved and with regard to the number of languages involved. In addition, the languages involved show different degrees of genetic closeness. The languages of the Balkan area are all Indo-European, even though they belong to different immediate subbranches of that family and thus are not in close genetic relationship. Most of the languages involved in the Ethiopian area are either Semitic or Cushitic. Thus, they share the same genetic ancestors. In other areas, such as East and Southeast Asia, the languages involved belong to different families.

In addition to the diversity of structures relevant for different linguistic areas and the diversity in number and genetic closeness of the languages involved, there is the other, even more far-reaching problem of how to define a linguistic area. It is systematically impossible to come up with a clear-cut definition of what makes a linguistic area, because the criteria necessary for such a definition are either arbitrary or difficult to apply.

Criteria such as the minimal number of languages, the minimal number of families, and the minimal number of features that constitute a linguistic area are arbitrary as long as nothing else follows from them, i.e., as long as one cannot prove that there is a significant correlation between the presence of an exact number of items in any of the above criteria and either a certain linguistic structure attested in a number of areas or a certain social pattern common to a number of areas. Another arbitrary criterion is exclusivity of features, i.e., the constraint that a feature associated with a certain linguistic area must not be present in the languages that do not belong to that linguistic area but are from the same families. How would one treat a feature that by some accident happens to be present not only in a given linguistic area but also in a language adjacent to it? Finally, there is an arbitrary criterion that has to do with clear boundedness. This criterion requires internal homogeneity and discreteness of a linguistic area in the sense that it is clearly determined which languages are to be included into a given linguistic area and which ones are to be excluded. Drawing a clear-cut borderline between the languages that belong to a given linguistic area and those that do not is most likely impossible unless one takes recourse to arbitrarily choosing some particular features or a particular number of features.

The criteria that are difficult to apply discussed in this article are the requirement that the relevant features be defined with absolute exactness and the postulate that linguistic areas emerge exclusively out of contact with multilateral diffusion without any relationship of dominance. The experience that exact identity of morphosyntactic properties across languages is unattainable is shared by functional and formal linguists alike. Croft pointed out in his *Radical construction grammar* (2001) that it is impossible for systematic reasons to compare constructions across languages. Generative linguists have said that what looks structurally identical at the surface may differ considerably if analyzed at a deeper level in terms of Universal Grammar.

The second criterion that is difficult to apply has to cope with the problem pointed out by Dahl (2001) that almost every case of language contact is somehow asymmetric. If diffusion of linguistic structures within so-called linguistic areas ultimately does not differ from diffusion elsewhere, i.e., if it proceeds in terms of social networks or leaders of language change, the presence of asymmetric social constellations is almost inevitable. Thus, we may end up with no linguistic area if the criterion of symmetry is applied too strictly.

Now that an exact definition of a linguistic area has turned out to be impossible, one may ask what would be the advantage of such a definition. As I pointed out in Bisang (2004: 28), two reasons may justify such a definition in principle:

- The possibility of drawing typological conclusions from the existence of a linguistic area. X is a linguistic area; thus, it must have certain structural properties.
- The fact that X is a linguistic area allows for some concrete conclusions concerning social and/or historical properties of a speech community. X is a linguistic area. As a consequence, it has social structure Y.

Since an exact definition of a linguistic area is unlikely to contribute to either of the above questions, it seems inevitable that the concept of a linguistic area will be abandoned. Of course, this does not imply that there is no structural convergence within geographical areas with prolonged contact across different language communities, due to trade and many other purposes. It is for that reason that I have suggested the term of "zones of structural convergence" (Bisang, 2004: 28–29). This term allows a more open approach that combines concepts similar to geographical dialect continua with sociohistorical and cognitive motivations without asking the highly problematic question of what a linguistic area may be.

Typology and the Areal Factor

This section starts with the general method used by typologists for discovering language universals. Of particular relevance are statistical approaches that try to take into account the effects of contact-induced convergence. The section 'Typological Findings and Genetic and Areal Closeness' concentrates on the sampling methods suggested by Rijkhoff *et al.* (1993), Rijkhoff and Bakker (1998), and Dryer (1992). Both of these methods do not integrate the question of whether linguistic types as attested in the world's languages today are in a stationary distribution. This question was asked by Maslova (2000), whose method is presented in the section 'The Problem of Stationary Distribution in the Light of Language Contact.' As it turns out, her method of dealing with stationary distribution is questionable from the contact perspective. Thus, there do not seem to be any conclusive statistical methods that grant fully reliable typological generalizations. Finally, it is asked whether our understanding of typological markedness may be hampered by the mutual dependency of research on typology and research on language contact.

Language Typology and Language Universals

The basic condition for any successful typological study is crosslinguistic comparability, i.e., the phenomenon to be analyzed must have properties that grant crosslinguistic comparison. In typology, the basis of comparison is defined in terms of semantics/cognition (and, in some studies, on pragmatics). This was clearly pointed out at the very beginning of typological research in Greenberg's seminal paper 'Some universals of grammar with particular reference to the order of meaningful elements':

> I fully realize that in identifying such phenomena in languages of differing structure, one is basically employing semantic criteria (Greenberg, 1966: 74).

As a consequence, one may say that the well-known generalizations concerning basic word order, as represented by S (subject), O (object), and V (verb), ultimately reflect the positional options of the morphosyntactic realizations of agent, patient, and predicate.

Once the basis of comparison is determined, typologists look for the expression formats in which the phenomenon to be described can be expressed and for correlations between attested patterns of types cooccurring in a language and their crosslinguistic correlation with other types. On the whole, there are thus three standard research strategies of typology, as listed in (7).

(7) Standard strategy for typological research:

1. Determine the particular semantic (-pragmatic) structure or situation type that one is interested in studying.
2. Examine the morphosyntactic construction(s) or strategies used to encode that situation type.
3. Search for dependencies between the construction(s) used for that situation and other linguistic factors . . . . (Croft, 2003: 14).

Implicational universals form particularly interesting patterns of covariation between parameters and their values. Research on implicational universals departs from two mutually independent binary parameters (P and Q) of which each value represents a possible type (P, -P; Q, -Q). As it turns out in a considerable number of cases, only three of the logically possible four combinatorial language types are attested in a statistically significant way in the languages of the world. The combination that is not attested is P and -Q. Since this is parallel to implications in propositional logic in which an assertion consisting of P and Q is false if the first part of the assertion is true and the second is false, typological covariation patterns of this type are called implicational universals (sometimes symbolized by ⊃ 'implies'). The example shown in (8) illustrates this. If one looks at the two word-order parameters concerning the position of the genitive relative to the head noun (GenN and NGen) and the relative clause relative to the head noun (RelN and NRel), it turns out that the combination of NGen and RelN is unattested.

(8) Hawkins (1983): Universal (IX'): NGen ⊃ NRel
If in a language the genitive follows the noun, then the relative clause follows likewise.

If represented in a tetrachoric table (see Table 2), the implicational correlation between NGen and NRel may become even more evident. Implicational universals can be combined to chains of implicational hierarchies. Two hierarchies are briefly discussed in this article. The first one, described by Hawkins (1983, 1994) under the heading 'Prepositional Noun Modifier Hierarchy,' reflects the relative instability with which the five modifiers of the noun (Dem = demonstrative, Num = numeral, Adj = adjective, Gen = genitive, Rel = relative clause) keep modified-modifier word order in languages with prepositions. As it turns out, Dem and Num are more unstable than Adj, Adj is more unstable than Gen, and Gen is more unstable than Rel. Thus, if the NP structure in a prepositional language deviates from the modified-modifier word order, it is Dem and/or Num that occur first in the prenominal position. If they are in the prenominal position, the next category that can occur prenominally is Adj, followed by Gen, and finally by Rel. This yields the hierarchy shown in (9).

Table 2 Tetrachoric representation of Hawkins' (1983) Universal IX'

	NGen	*GenN*
NRel	+	+
RelN	−	+

(9) Prepositional Noun Modifier Hierarchy (Hawkins, 1983, 1994):
Prep ⊃ ([NDem/NNum ⊃ NA] & [NA ⊃ NG] & [NG ⊃ NRel])

The second hierarchy to be presented is the animacy hierarchy. In its extended version, it integrates the factors of person, referentiality, and animacy. There are several possible specifications of this hierarchy. The textbook representation is shown in (10).

(10) Animacy hierarchy (Croft, 2003: 130):
first/second person pronouns < third person pronoun < proper names < human common noun < nonhuman animate common noun < inanimate common noun.

This hierarchy shows up in a number of grammatical phenomena, such as number distinctions in nouns, pronouns, and other grammmatical categories; assignment of gender; split ergativity; direct-inverse marking; and the coding of direct objects (differential object marking).

Typological Findings and Genetic and Areal Closeness

Although the standard strategies as described in (7) are relevant for typological research, they alone do not warrant the validity of typological generalizations, because they do not address the question of whether the languages selected for analysis provide a statistically neutral picture of the distribution of structural types across the world's languages. If certain types are overrepresented to the detriment of other types in the sample of languages to be analyzed, this will lead to inadequate generalizations. To avoid this, a sample needs to meet certain criteria. The two most important criteria – the genetic relatedness and the areal proximity of the languages involved – are based on the observation that languages whose speakers are in some way close share similar structures. (For other factors – such as cultural similarity, bibliographic accessibility of grammatical descriptions, existing knowledge on the phenomenon

to be analyzed, and the stability through time of that phenomenon – cf., Rijkhoff *et al.*, 1993).

Genetical relatedness or historical closeness is founded on the assumption that there is a certain structural coherence among languages derived from a speech community that is historically more or less homogeneous but that then splits up into a set of different speech communities. Conclusions concerning genetical relatedness follow the traditional methods developed in Indo-Europian studies. They are mainly drawn from the number of changes in the basic vocabulary over time and from the possibility that sound laws can be established that can account for the phonological change of a word from one language to another. This method allows the ordering of languages into larger, historically related groups on the basis of the family-tree metaphor.

Areal proximity or geographical closeness is based on language contact that induces structural convergence even in genetically unrelated languages, i.e., in speech communities that cannot be traced back to a common origin. Thus, in socially extreme situations of contact, the family-tree metaphor with one common ancestor language no longer works (cf. the sections on 'Pidgin and creole languages' and on 'Mixed languages').

Although both of the above criteria are relevant for avoiding a statistically biased sample, Rijkhoff *et al.* (1993) and Rijkhoff and Bakker (1998) integrated only the genetic criterion into their highly elaborate sampling method. Their method aimed at what they called a "variety sample," i.e., a sample used for discovering the full range of possible variation for expressing a given semantic/cognitive or pragmatic phenomenon. They presented a matrix that showed how many grammars needed to be selected from each of the world's language families, from pidgin and creole languages, from language isolates, and from unclassified languages in order to construct a sample of x languages (with x being minimally 30). The calculation of this matrix was based on the assumption that larger genetic distance implies greater structural diversity. Based on the complexity of the family tree and on the number of its branching nodes in particular, a diversity value was calculated for each family, from which one could then derive the proportional weight of that family in the set of the world's languages as a whole. Ultimately, the authors did not deny the relevance of areal proximity, but they argued that migration and variable distances between languages depending on population density could not be adequately quantified and thus could not be properly integrated into a statistically rigid method of sampling.

Another highly elaborate method of sampling that did integrate areal proximity (as well as genetic relatedness) is the one developed by Dryer (1989, 1992). This method was designed for what Rijkhoff *et al.* (1993) called a "probability sample," a sample used for finding correlation pairs. The purpose of Dryer's typological study was to see what binary word-order sequences covaried with the order of verb-object (VO) vs. object-verb (VO).

As Dryer (1989, 1992) pointed out, the criteria of closeness – historical-genetic as well as areal – were relevant because of the existence of what he called "large linguistic areas." He illustrated this with the data in Table 3, on basic word order, from Tomlin's (1986) statistically balanced sample of 402 languages.

Although Tomlin's sample was statistically representative, the data did not allow conclusions of what may be typical or normal properties of languages. This becomes immediately evident if one considers the fact that some 71% of all the VSO languages belong to the Austronesian family. Without the successful expansion of the speakers of Austronesian languages, the VSO type would probably be attested by only some 3% of the world's languages. Similarly, some 40% of all the SVO languages are part of the Niger-Congo family. Without this family, there would be considerably fewer SVO languages in the world (cf., Dryer, 1989). Thus, Dryer rightly concluded that "the set of existing languages does not constitute a reliable frame from which inferences about the universe can be drawn, primarily because of the distorting effects of large families" (Dryer, 1989: 261). These distorting effects are due not only to the genetic factor but also to areal proximity and contact. Together, these two factors constitute large linguistic areas that Dryer intended as areas "in which at least one linguistic property is shared more often than elsewhere in the world to an extent which is unlikely to be due to chance, but which is probably due either to contact or remote genetic relationships" (Dryer, 1989: 266).

To come up with more robust typological generalizations, Dryer (1992) did not base his statistics on

Table 3 Distribution of word-order types across the world's languages (adapted from Tomlin, 1986: 22).

SOV:	180 languages = 44.78%
SVO:	168 languages = 41.79%
VSO:	37 languages = 9.20%
VOS:	12 languages = 2.99%
OVS:	5 languages = 1.24%
OSV:	0 languages = 0.00%

individual languages, and he integrated the areal factor by distinguishing large linguistic areas of continental size. The basic unit of his statistics is the *genus*, a group of languages that can roughly be compared to a subfamily of the Indo-European family (Germanic, Indo-Aryan, Slavonic, Romance, etc.). The languages that belong to one of Dryer's 252 genera are assumed to share a relatively large number of structural types. As soon as a type is represented in at least one language of a genus, that genus will get the value 1 for that type. To account for the problem of areal proximity, Dryer (1992) divided his 252 genera into six large linguistic areas.

- Africa
- Eurasia
- Southeast Asia and Oceania
- Australia and New Guinea
- North America
- South America

For a pair of parameters – e.g., the existence of prepositions (P NP) vs. postpositions (NP P) – to be a covariation pair with V and O, the two values of that pair need to covary equally through all six large linguistic areas. Since there is a statistically relevant predomination of genera with OV and Postposition over OV and Preposition through all of the six areas and since there is an identical dominance of VO and Preposition over VO and Postposition, the position of V relative to O covaries with the position of the adposition P relative to NP (for the data in detail, cf., Dryer, 1992: 83). If we assume that the six large linguistic areas are mutually independent, there are $2^6 = 64$ ways in which one value of a parameter (e.g., VO/OV) can covary with the parameter Pr (= Preposition)/Po (= Postposition). The likelihood that we will find the same value with the same type throughout the six large linguistic areas is 1/64 (= 0.015625). Thus, Dryer (1992) concluded that the statistical as well as the typological significance of his covariation pairs was granted.

The Problem of Stationary Distribution in the Light of Language Contact

Generalizations in terms of typological universals work only under the methodological assumption that the linguistic types in a sample are mutually independent. Sampling criteria such as genetic relatedness and areal proximity are a prerequisite for granting the mutual independence of types, but they are not sufficient. As Maslova (2000: 307) pointed out, methods based on these criteria do not allow us to "distinguish between general distributional universals and accidental statistical properties of the current language population."

Statistically significant typological generalizations are possible only if the linguistic types across the world's languages have reached stationary distribution, i.e., a random distribution that is not biased by former typological properties of a given language or family. The distribution of types within the population of languages at a given time depends on language death and language birth. Since we do not have enough information on these two processes or on diachronic processes of language change in general and on type shift (a language shifts from one type to another) in particular, the crucial question concerning the reliability of typological generalizations – the question of whether there is stationary distribution of types in the present population of languages – cannot be answered. Maslova (2000) suggested a method to overcome this impasse. Her basic idea was to calculate estimates of transition probability, i.e., the probability that a language shifts from a type A to a type B within a given period of time. These estimates could then be integrated into the calculation of typological generalizations for making them altogether more reliable. For the calculation of transition probabilities (cf., Maslova, 2000), one needs a sample of languages of which one can say that they belonged to type A a certain time ago. By comparing the frequency of type A with the frequency of a new type B across the same languages in their present state, one can estimate the probability with which a language shifts from type A to type B in a given time interval.

This method tacitly assumes that "the random effects of socially determined diffusion of variants should even out across a large enough sample" (Croft, 1995: 524). This assumption may be true from a language-internal perspective. Innovations within a language are due to purely cognitive or discourse-related factors, and their diffusion within the whole speech community of that language is due to social factors (Croft, 1995). If this happens in each of the languages of a sample independently, the social factor may in fact be a good guarantor of a random distribution of types in a large enough sample. However, the picture changes as soon as language contact comes in. If social factors such as maxims of language use (cf., the section 'The Invisible-Hand Model and Maxims of Language Use') lead to socially motivated preferences over a large enough area with a large enough number of languages, the calculation

of transition probabilities is unreliable. In addition, the time interval within which a given type shift takes place turns out to be arbitrary if that shift depends on social factors involved in language contact. In this case, there are no cognitive or discourse motivations that allow for predictions concerning the time span needed for a change from type A to type B. If this is true, it seems there are no watertight proofs of typological generalizations.

Markedness, Language Contact, and Typology

Typological markedness is a central concept of typology (Croft, 2003). Markedness patterns are generalizations from crosslinguistic comparison as described in 'Language Typology and Language Universals.' In particular, they reflect crosslinguistically attested relative asymmetries between the formal expression of different values of a category. Markedness patterns are explained by the interplay of two competing motivations, i.e., economy and iconicity (cf., the introduction of this article; other somehow related pairs are economy vs. explicitness, and ease of learning vs. ease of perception, the latter being relevant for Thomason and Kaufman, 1988).

If markedness constraints are used to account for contact-induced change, these statements are founded on typological findings whose solidity ultimately depends on the statistic diffusion of structural types across the population of the world's languages. The statistic diffusion in turn is subject to contact-induced change, which may favor certain structural types over others. If the extent to which the diffusion of types depends on contact-induced change is large enough, research on language contact and research on language typology get into inextricable mutual dependencies. Indicators that this influence may be significant enough are zones of structural convergence of some geographic extension (see the section 'Linguistic Areas [*Sprachbünde*] vs. Zones of Structural Convergence') and large areas in the sense of Dryer (1992) (as is discussed in the section 'Typological Findings and Genetic and Areal Closeness').

Conclusion

It has been shown that dealing adequately with areality or contact-induced convergence is crucial for the reliability of typological generalizations. Areality is an important reason that nothing conclusive can be said about the validity of typological findings, even if it seems that some generalizations are more reliable than others. It is also true that knowing what is behind typological generalizations is important for linguists dealing with language contact. If they use typological patterns of markedness to explain processes of change, they have to be aware that these patterns may in turn be influenced by contact.

See also: Ethiopia as a Linguistic Area; Ethiopia: Language Situation; Language Change and Language Contact; Language Maintenance and Shift; Markedness; Southeast Asia as a Linguistic Area.

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Content Teaching and Learning and Language

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For the past 20 years, language educators have seen major growth and development in the integration of language and content (ILC) teaching and learning. The conceptualization of language proficiency (Cummins, 1980) as the ability to use language in both social and academic settings propelled educators to place more emphasis on developing the academic end of the spectrum. Seminal works appeared in the 1980s (Cantoni-Harvey, 1987; Coelho, 1982; Crandall, 1987; Mohan, 1986) that provided the impetus for K–12 and higher education programs to integrate second language objectives with content knowledge. Models for ILC teaching and learning evolved from the communicative language approach as educators realized that the latter did not provide all the skills and vocabulary students needed to be successful in academic, mainstream classes once they exited a second language (e.g., ESL) program. Without competence in the language of instruction, students were hard pressed to learn through that language and use it to demonstrate their knowledge. Motivation to develop a pedagogy incorporating language and content was enhanced by pressure in the United States and elsewhere for program accountability and student success in the K–12 and higher education arenas. Positive features from the communicative approach, such as inclusion of meaningful activities, a focus on learner needs, and promotion of student interaction, were incorporated.

At present, ILC is viewed as an effective way for second/foreign language learners to develop their language and academic skills at the same time. The United States' national *ESL standards for pre-K–12 students* (Teachers of English to Speakers of Other Languages, 1997) reflect the importance of language and content integration, calling for students to be able to use English to achieve academically in all content areas so that they can:

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1. interact in the classroom;
2. obtain, process, construct, and provide subject matter information in spoken and written form;
3. use appropriate learning strategies to construct and apply academic knowledge.

Programs that use ILC include content-based ESL, sheltered instruction, total and partial foreign language immersion, two-way immersion, developmental bilingual education, early foreign language programs (e.g., content-based FLES), and more.

Second Language Education

Early ILC efforts led to the content-based language approach (also known as content-based instruction) in ESL programs. These content-based ESL classes, designed for second language learners only, are taught by language educators whose main goal for students is English language development but whose secondary goal is preparing them for the mainstream, English-medium classroom. Teachers develop the students' English language proficiency by incorporating information they have selected from subject areas that students are likely to study, or from courses the students may have missed if they are new to the school system. Content-based instruction is often accomplished through thematic or interdisciplinary units, such as a rain forest ecology unit, and lessons could include objectives drawn from life sciences, history, or mathematics as well as ESL. Throughout the course syllabus, different content areas and topics are usually covered.

The content-based language approach creates a forum for subject area knowledge generation, application, and reinforcement by addressing key topics found in grade-level curricula. Students acquire academic, subject-specific vocabulary, background knowledge of multiple concepts, and practice in academic skills and tasks common to mainstream classes. The sophistication of the material presented varies according to the grade level and language proficiency of the students, but is nonetheless relevant and meaningful to them because it is tied to school subjects. Attention to language development is paramount with focus on both form and function within the content themes.

Content-based language instruction, however, has not been sufficient to help all second language learners succeed academically. In the United States, for example, the growth in the number of students learning English as an additional language, the shortage of qualified ESL and bilingual teachers, the pressure to meet academic standards, and the focus on high-stakes assessments have extended the need to teach content to students outside the language classrooms. As a result, ESL educators developed the sheltered instruction approach in conjunction with content teachers. In sheltered instruction, language and content objectives are systematically woven into the curriculum of one particular subject area, such as geometry or world history, and teachers modify the pedagogy to make the information comprehensible to the students. The goal is to teach content to students learning English through a developmental language approach. A series of courses may constitute a program called Content-ESL, Sheltered Instruction, or Specially Designed Academic Instruction in English (SDAIE). One research-based approach is known as the SIOP Model.

Sheltered instruction may be provided to classes composed entirely of second language learners or to a mix of native and non-native speakers of the target language. Bilingual, ESL, and content teachers may be the instructors, although at the high school level, sheltered courses are usually taught by content teachers so that students may receive core, not elective, graduation credit. To integrate language and content effectively, bilingual and ESL teachers need to learn the content curriculum or have an educational background in the subject. Content teachers must learn ESL methods and second language acquisition theory so they can make their instruction more accessible to students learning through the new language.

The approaches described above – content-based language teaching and sheltered instruction – represent the two ends of the continuum for integrated language and content teaching and learning. One focuses more on proficiency in the new language; the other, comprehension of grade-level subject curricula. Together, these courses are proving to be a promising combination when implemented throughout a school. Content-based language instruction occurs at the elementary level in pull-out ESL classes and at the secondary level in self-contained periods of ESL instruction. Sheltered instruction is also found at elementary and secondary levels, particularly for core content areas such as mathematics, science, history, and language arts.

In higher education, the best known ILC course is the adjunct course. In this setting, a university student who is enrolled in a psychology course, for example, is also enrolled in a companion (i.e., adjunct) course that supports his/her academic language learning. This course may be co-taught with a language specialist and a content specialist. The instructors help the student develop background knowledge, key vocabulary, and reading comprehension strategies, and assist with academic tasks, such as writing reports. Another higher education design is sustained content

language teaching. In this model, teachers engage students in a multidisciplinary exploration of content over an extended time period. Students have greater opportunities to learn language in context and develop a level of expertise about the topic that the teacher, or teacher and students together, have chosen.

English for specific purposes (ESP), English for academic purposes (EAP), and English for occupational purposes (EOP) are additional programs found in tertiary instruction. As the names indicate (and other languages could be substituted for English, but English is most prevalent), the purpose of the course is focused on learner needs, such as use of the second language for business.

Language and content teaching and learning is also found in adult second language education. A common course is a workplace language course that may be held at the job site. Literacy skills are practiced with authentic, work-related materials and on-the-job communication patterns are stressed.

In general, integrated language and content teaching and learning can occur in any setting where subject area material is being taught through the second language of some of the students. Although early implementation of this pedagogy occurred in K–12 and university ESL programs in the United States and Canada, ILC is now found in multiple program models around the world. English is often the second language being learned, but not exclusively. In the Netherlands, for example, content-based Dutch is taught to immigrants from Turkey and Indonesia.

Foreign Language Programs

Foreign language (FL) programs also integrate language and content. FL immersion programs are well-known models and developed on a parallel path with content-based second language programs. In these programs, speakers of the majority language (in the society) study grade-level curricula through the minority language using similar pedagogical techniques to content-based and sheltered instruction. Students remain in these programs for several years (i.e., throughout elementary school), and as their proficiency develops, the need for ILC techniques lessens.

A number of FLES (foreign language in elementary schools) programs incorporate content in their curricula as well. Although the amount of time devoted to FLES is more limited than typically found in other ILC courses, the content themes are meaningful and teachers make connections with other grade-level activities. Content-based foreign language courses at the secondary level, however, are less common. Secondary FL courses may integrate some culture or literature but less frequently incorporate objectives from core subject areas.

In higher education, there is a growing interest in language across the curriculum courses. A degree program in business, for example, may offer a content course through Spanish, Mandarin, or German so the students experience content-based instruction and learn to apply their content knowledge through the new language. Some courses have a focus on reading authentic texts in the foreign language; others on oral interaction. Goals include advanced levels of proficiency and intercultural understanding.

Bilingual Programs

Integrated language and content teaching and learning should be part of any program that aims to develop bilingualism. To be considered a competent bilingual, students must understand and use content information in both languages. Nonetheless, ILC instructional techniques are employed most often in developmental bilingual, dual language, and two-way immersion programs as students develop proficiency over several years, as in FL immersion programs.

Instructional Practices

As teachers plan lessons to integrate language and content, they must make key decisions about which language objectives to select and which content topics to cover. For content-based courses, the language objectives are derived from the language curriculum (which may have a functional orientation), but the teacher selects the content topics to address. In the case of sheltered courses, the content is predetermined by the subject area curriculum, but the language objectives need to be carefully aligned to how the academic language used in the subject, namely, to the content register. Usually lessons that integrate language and content also combine practice with all four language skills – reading, writing, listening, and speaking.

ILC teachers modulate the level of the new language used with students and make the content comprehensible through varied techniques, such as the use of visual aids, modeling, demonstrations, graphic organizers, vocabulary previews, cooperative learning, peer tutoring, and native language support. They make specific connections between the content being taught and students' experiences and prior knowledge and focus on expanding the students' vocabulary base. Teachers guide students to construct

meaning from texts and classroom discourse and to understand complex content concepts by scaffolding instruction. They pay careful attention to students' capacity for working in English, beginning instruction at the current level of student understanding and moving students to higher levels through tailored support. One way they do so is by adjusting their speech (e.g., paraphrasing, giving examples, elaborating student responses) to facilitate student comprehension and participation in discussions. Another way is by adjusting instructional tasks so they are incrementally challenging (e.g., preteaching vocabulary before a reading assignment, having students write an outline before drafting an essay) and students learn the skills necessary to complete tasks on their own.

In effective ILC lessons, there is a high level of student engagement and interaction with the teacher, with each other, and with text that leads to elaborated discourse and critical thinking. Students are explicitly taught functional language skills, such as how to negotiate meaning, confirm information, and express opinions. To enhance the interaction, teachers strive to create a nonthreatening environment where students feel comfortable taking risks with language. They plan activities that tap into the auditory, visual, and kinesthetic preferences of the students and often include multicultural content. Besides increasing students' declarative knowledge (i.e., factual information), teachers highlight and model procedural knowledge (e.g., how to accomplish an academic task, such as conducting research on the Internet) along with study skills and learning strategies (e.g., note-taking, self-monitoring comprehension when reading).

ILC classes also use supplementary materials to support the academic text and create a literacy-rich classroom. The materials may include related readings (e.g., trade books), graphs and other illustrations, audiovisual and computer-based resources, adapted text, and the like. The purpose for these materials is to enhance student understanding of key topics and details in the content concepts being taught through alternate means than teacher lecture or textbook prose.

Depending on the students' proficiency levels, ILC teachers offer multiple pathways for students to demonstrate their understanding of the content. For example, teachers may plan pictorial, hands-on, or performance-based assessments, group tasks or projects, oral reports, written assignments, portfolios, and paper and pencil tests to check on student comprehension of the subject matter and language growth.

Teacher Preparation

In countries with large numbers of second language learners, teacher education programs that offer certification in second language teaching are increasingly focusing on content-based language and sheltered instruction in their methodology courses. However, pre-service education for elementary and secondary content teachers has not kept pace with changes in student demographics. Most teacher training institutions in these countries do not require these teacher candidates to take courses in ESL or sheltered instruction methods, in effect underpreparing them for effective instruction in their classrooms. As a result, it is through in-service professional development or graduate coursework that these teachers learn strategies and techniques for working with second language learners in content courses. This is clearly an area for a shift in teacher education policy.

Future Directions and Research

Language and content teaching and learning is an expanding area in the field of second and foreign language education. As such, it is important to conduct research that examines student outcomes, evaluates programs, identifies effective literacy and assessment practices, and monitors teacher change. The following questions represent a small sample of possible research directions.

- Are certain instructional strategies and techniques more effective with specific profiles of learners, considering, for example, learners who are literate in their mother tongue vs. learners who have had limited formal schooling vs. bilingual learners studying curricula through two languages?
- How much content knowledge (at the conceptual level) should a second language teacher have (whether in an adjunct course, sustained content teaching course, or content-based ESL course) in order to integrate language and content effectively and accurately?
- How does teacher/faculty collaboration across courses or within a school improve both language and content teaching and learning?
- What features of language are particularly salient in sheltered content courses? What aspects of the content register must students become proficient in so they can work independently?
- What is the relationship among input, output, and learner feedback in content-based second and foreign language courses?
- Which assessments best measure a student's academic language development?

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Context and Common Ground

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People talking to each other take much for granted. They assume a common language. They assume shared knowledge of such things as cultural facts, news stories, and local geography. If they know each other, they assume shared knowledge of earlier conversations and other joint experiences. And if they are talking face to face, they assume shared knowledge of the scene around them. 'Common ground' is the sum of the information that people assume they share. Although the notion is often treated informally, it has a formal definition that has been essential to the study of semantics, pragmatics, and other areas of language.

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Context and Common Ground

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People talking to each other take much for granted. They assume a common language. They assume shared knowledge of such things as cultural facts, news stories, and local geography. If they know each other, they assume shared knowledge of earlier conversations and other joint experiences. And if they are talking face to face, they assume shared knowledge of the scene around them. 'Common ground' is the sum of the information that people assume they share. Although the notion is often treated informally, it has a formal definition that has been essential to the study of semantics, pragmatics, and other areas of language.

History

'Common knowledge' as a technical notion was introduced by David Lewis (1969) to account for how people coordinate with each other. Suppose A, B, and C agree to meet at city hall at noon. The three of them take it as common knowledge that they intend to go to city hall at noon if and only if: (1) all three believe that the agreement holds; (2) the agreement indicates to all of them that they believe the agreement holds; and (3) the agreement indicates to all of them that they intend to go to city hall at noon. In Lewis's terminology, the agreement is the 'basis' for A, B, and C's common knowledge that they intend to go to city hall at noon. Common knowledge is always a property of a community of people, even though the community may consist of just two people.

The notion of 'common ground' was introduced, in turn, by Robert Stalnaker (1978), based on Lewis's common knowledge, to account for the way in which information accumulates in conversation:

> Roughly speaking, the presuppositions of a speaker are the propositions whose truth he takes for granted as part of the background of the conversation . . . Presuppositions are what is taken by the speaker to be the **common ground** of the participants in the conversation, what is treated as their **common knowledge** or **mutual knowledge** [p. 320, Stalnaker's emphases].

In this view, people in conversation take certain propositions to be common ground, and when they make assertions, they add to this common ground. When A tells B, *George arrived home yesterday*, A takes it as common ground with B who George is, what day it is, and where George lives. A uses the assertion to add to their common ground the proposition that George arrived home the day before. Common ground therefore also includes common (or mutual) beliefs, and common (or mutual) suppositions (Clark and Marshall, 1981; Clark, 1996).

Common ground is a reflexive, or self-referring, notion (Cohen, 1978). If A takes a proposition as common ground with B, then A takes the following statement to be true: A and B have information that the proposition is true **and that this entire statement is true.** (*This sentence has five words* is reflexive in the sense that **this sentence** refers to the sentence that contains it.) Because of the self-reference, people can, technically, draw an infinity of inferences from what they take to be common ground. Suppose A takes it that A and B mutually believe that George is home. A can infer that B believes that George is home, that B believes that A believes that George is home, that B believes that A believes that B believes that George is home, and so on *ad infinitum*. In practice, people never draw more than a few of these inferences. These iterated propositions are therefore a derivative and incomplete representation of common ground. The reflexive notion is more basic (Lewis, 1969; Clark and Marshall, 1981; Clark, 1996).

Bases for Common Ground

In conversation and other joint activities, people have to assess and reassess their common ground, and to do that, they need the right bases. These bases fall into two main categories: community membership and personal experiences (Clark, 1996).

Communal Common Ground

Common ground is information that is common to a community of people. Some of these communities are built around shared practices or expertise, such as the communities of ophthalmologists, New Zealanders, or English speakers. Once A and B mutually establish that they are both ophthalmologists, New Zealanders, or English speakers, they can take as common ground everything that is taken for granted in these communities. Even if A and B mutually establish that A is a New Zealander and B is not, they can take as common ground everything an outsider would think an insider should know about New Zealand. Common ground based on community membership is called 'communal common ground.'

Everybody belongs to many communities at the same time. Some of these communities are nested (e.g., North Americans, Americans, Californians, San Franciscans, Nob Hill residents), and others are cross cutting (Californians, lawyers, football fans, Christians). Both nesting and cross-cutting communities lead to gradations in common ground. Any two Californians might readily presuppose common knowledge of the Golden Gate Bridge on San Francisco Bay, but only two San Franciscans would presuppose common knowledge of Crissy Field right next to it.

People have both direct and indirect ways of establishing which communities they jointly belong to. When people meet for the first time, they often begin by exchanging information about their occupations, residences, hobbies, and other identities. They display other communal identities indirectly – in their choice of language, dialect, and vocabulary; their choice of dress and accoutrements; and their age and gender. It is remarkable how many cultural identities people can infer as they talk and how useful these are in establishing communal common ground.

Personal Common Ground

The other main basis for common ground is joint experience. The joint experience may be perceptual. When A and B look at a candle together, they can take their joint experience as a basis for certain mutual beliefs – that there is a candle between them, that it is green, that it smells of bayberry, that it is lit. Or the joint experience may be linguistic or communicative. When A tells B (on April 8), *George arrived home yesterday,* and once they mutually establish that B has understood A, the two of them can take it as common ground that George arrived home on April 7. Common ground that is based on joint perceptual or linguistic experiences between two people is called their 'personal common ground'. It often holds only for the two of them.

Conversations and other joint activities depend on the orderly accumulation of personal common ground. Suppose A and B are assembling a television stand together. To succeed, they need to establish as common ground what each is going to do next. Part of this they accomplish linguistically, in their spoken exchanges, as when A proposes, *Let's put on this piece next,* and B takes up the proposal, *Okay.* But other parts they accomplish perceptually, as when A hands B a board, screw, or screwdriver, or when A holds up a board and they examine it together. Most face-to-face conversations depend on a mix of linguistic and perceptual bases for the accumulation of personal common ground. Telephone conversations depend almost entirely on linguistic bases.

Language and Communal Common Ground

Communal common ground is fundamental to account for the conventions of language, what are termed the 'rules of language'. These include conventions of semantics, syntax, morphology, phonology, and pragmatics (Lewis, 1969).

Speakers ordinarily try to use words that their addressees will understand, and that requires a 'shared lexicon.' The problem is that every community has its own 'communal lexicon' (Clark, 1996). Once A and B jointly establish that they are both speakers of English, they may presuppose common knowledge of a general English-language lexicon. But because other communities are nested and cross cutting, so are the lexicons associated with them. There is a nesting of communities that speak English, North American English, New England English, and Bostonian. Although words such as *dog* and *in* are common to English in general, others are common only to one or another nested community; in Bostonian, for example, a *barnie* is a Harvard student. Indeed, every community (Californians, lawyers, football fans, ophthalmologists) has a specialized lexicon. The lexicon for lawyers includes *tort*, *mortmain*, and *ne exeat*. The lexicon for ophthalmologists includes *tonometry*, *uveal*, and *amblyopia*. To use *barnie* or *mortmain* is to take as common ground a Bostonian or legal lexicon. Communal lexicons are sometimes called jargon, dialect, patois, idiom, parlance, nomenclature, slang, argot, lingo, cant, or vernacular; or they consist of regionalisms, colloquialisms, localisms, or technical terminology (*see* **Jargon**).

Speakers also try to use syntactic constructions, or rules, that they share with their addressees. For example, in English generally, it is conventional to mention place before time (*George is going to London tomorrow*); yet in Dutch, a closely related language, it is conventional to mention place and time in the reverse order (*Pim gaat morgen naar London*, 'Pim goes tomorrow to London'). The rules of syntax, however, vary by nested communities. It is conventional to say *He gave it me* in British English, but not in English generally. It is conventional to say *My car needs washed* in Western Pennsylvania English, but not in North American English. Many rules of syntax are tied to specific words in a communal lexicon, and these vary from one community to the next.

Speakers also try to use, or adapt to, the phonology of their cultural communities. Indeed, pronunciations vary enormously from one community to the next. The vowel in *can't*, for example, changes as one goes from British to North American English, from northern to southern dialects of American English, and even from one social group to another within a single school. Also, the same person may pronounce *singing* as 'singing' in an informal setting but as 'singing' in a classroom or a court of law.

Discourse and Personal Common Ground

Personal common ground is essential to the processes by which people converse. To *communicate* is, according to its Latin roots, to *make common* – to establish something as common ground. To succeed in conversation, people must design what they say (1) against the common ground they believe they already share with their interlocutors and (2) as a way of adding to that common ground (Stalnaker, 1978). Two consequences of trying to make something common are 'information structure' and 'grounding.' 'Information structure' is a property of utterances. When A tells B, *What the committee is after is somebody at the White House,* A uses the special construction to distinguish two types of information (Prince, 1978). With the Wh-cleft *What the committee is after,* A provides information that

A assumes B is already thinking about. It is one type of 'given information.' In contrast, with the remainder of the utterance 'is somebody at the White House,' A provides information that A assumes B doesn't yet know. It is 'new information.' Given information is assumed to be inferable from A and B's current common ground, whereas new information is not. New information is, instead, what is to be **added** to common ground. The way people refer to an object in a discourse (e.g., the committee, somebody, of the White House) depends on whether they believe that the object is readily evoked, known but unused, inferable, or brand new in their common ground for that discourse (Prince, 1981).

'Grounding' is the process of trying to establish what is said as common ground (Clark and Schaefer, 1989; Clark and Brennan, 1991). When A speaks to B in conversation, it is ordinarily not enough for A simply to produce an utterance for B. The two of them try to establish as common ground that B has understood what A meant by it well enough for current purposes. In this process, B is expected to give A periodic evidence of the state of his or her understanding, and A is expected to look for and evaluate that evidence. One way B can signal understanding is with back-channel signals such as *uh-huh, yeah,* a head nod, or a smile. Another way is with the appropriate next contribution, as when B answers a question asked by A. But if B does not manage to attend to, hear, or understand A's utterance completely, the two of them will try to repair the problem. One way is illustrated here:

A (on telephone): Can I speak to Jim Johnstone, please?

B: Senior?

A: Yes.

B: Yes.

In turn 2, B asks A to clear up an ambiguous reference in A's question, and in turn 3, A does just that. Only then does B go on to answer A's question. Turns 2 and 3 are called a 'side sequence' (Jefferson, 1972). Grounding takes many other forms as well.

Common ground is central to accounts of language and language use. It is needed in accounting for the conventions, or rules, of language and to explain how people contribute to conversation and to other forms of discourse.

See also: Context, Communicative; Contextualism in Epistemology; Conventions in Language; Information Structure in Spoken Discourse; Jargon; Pragmatic Presupposition; Presupposition.

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Context Principle

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It is a near truism of the philosophy of language that a word has meaning only in the context of a sentence; this principle is sometimes formulated as the claim that only sentences have meaning in isolation. This is the context principle, first emphasized in Western philosophy by Frege (1884), endorsed early on by Wittgenstein (1922: 51), and sanctioned more recently by Quine (1951: 42), among many others. The Principle and several different ways of understanding it seem to have been foreshadowed in classical Indian philosophy. (See also Matilal and Sen, 1988.)

A assumes B is already thinking about. It is one type of 'given information.' In contrast, with the remainder of the utterance 'is somebody at the White House,' A provides information that A assumes B doesn't yet know. It is 'new information.' Given information is assumed to be inferable from A and B's current common ground, whereas new information is not. New information is, instead, what is to be **added** to common ground. The way people refer to an object in a discourse (e.g., the committee, somebody, of the White House) depends on whether they believe that the object is readily evoked, known but unused, inferable, or brand new in their common ground for that discourse (Prince, 1981).

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In this article, I provide some background to the Principle, describe three ways of reading it (a methodological reading, a metasemantic reading, and an interpretational/psychological reading). I offer some reasons for endorsing the Principle, and some reasons for being skeptical.

The heated exegetical controversies over Frege's relationship to the Principle are not presented in this article. Some believe that Frege would have applied it to both sense and reference; others disagree. Some believe that Frege rejected the Principle in his later work, others that he retained it throughout. In addition, different authors take Frege to endorse different readings of the Principle: nearly everyone would agree that he accepted the methodological reading, but it is less clear whether he endorsed the metasemantic or interpretational/psychological reading. Such scholarly issues are not my concern in this article. For a thorough discussion, see Dummett (1981: 369ff, 1993a).

Sentence Primacy: Three Interpretations of the Context Principle

The context principle gives primacy to sentences. Specifically, sentences are taken to be semantically prior to the words that make them up. The Principle is, in this regard, a member of a family of theses that have some whole to being somehow 'prior' to its parts. As with all such doctrines, one obtains a holistic primacy thesis by specifying what the whole is, what its parts are, and in what sense the former is prior to the latter. Most important for present purposes, one can mean different things by 'prior.' Of particular interest here, one can take sentences to be methodologically prior, metasemantically prior, or interpretationally prior to the words that compose them.

Let me begin with the methodological reading of the Principle. In his *Foundations of Arithmetic*, Frege (1884: x) famously promised to keep to the following fundamental constraint: "never to ask for the meaning of a word in isolation, but only in the context of a sentence." Taken as a methodological precept, this principle essentially tells the lexical semanticist only to contemplate the effect that a word can have on sentences in which it may be embedded. For instance, to find out the meaning of the word 'one' (an example of great interest to Frege), the lexical semanticist should reflect upon such questions as the following: What whole sentences containing 'one' have in common (e.g., "One apple fell" and "One dog died"); how sentences that contain words slightly different from 'one' differ systematically in meaning from maximally similar sentences containing 'one' (e.g., "One dog died" versus "No dog died"); and so on. What the lexical semanticist should never do is try to figure out the meaning of 'one' just by thinking about it – that phrase – in isolation (where in isolation means not embedded in any larger syntactic structure).

The second reading of the context principle considered in this article is the metasemantic reading. A metasemantic view is a view about the source of meaning. It poses an "in virtue of what" question. Here's an example. Suppose we ask

(1) In virtue of what is the sound **/to:fu/** meaningful? In virtue of what does it mean "a pale curd of varying consistency made from soybean milk," rather than "sea lion" or "watch"?

Notice that we are not asking, in (1), what the sound **/to:fu/** means. Rather, we are asking why it means what it does. Nor is this the causal-historical question about the steps whereby **/to:fu/** came to have this meaning. It is, instead, the issue of what more primitive present facts make for this less primitive present fact: how do the 'higher' facts emerge from 'lower' ones? For example, compare these two questions: what makes it the case that things have the monetary value they do, or what makes it the case that certain things are illegal, or rude, or immoral? These too are "in virtue of what" questions.

Some philosophers seem to have taken from Frege's discussion of "not asking for the meaning of a word in isolation" a claim about what makes words meaningful and what makes them have the meaning they do. The claim is that, fundamentally, only sentences have meaning. This is not to say that subsentences are gibberish. Rather, the entities that have meaning in the first instance are sentences. Unlike the first reading of the Principle, this doctrine is not about where one should look to find out about meaning; it is, rather, a doctrine about where meaning comes from, i.e., the basic source of meaning. What the Principle says is that the only things that have meaning non-derivatively are sentences, so it must be in virtue of their role within sentences that subsentential expressions have meaning at all.

Here is the same idea put another way: suppose that some expressions obtain their meaning from how they alter the meanings of larger wholes. Suppose, indeed, that this is how words/phrases obtain their meaning; they therefore have meaning only derivatively, not fundamentally. Now, it cannot be the case that all expressions obtain their meaning in this way or there would be an infinite regress. The claim says that the things that have meaning non-derivatively are sentences.

Does this mean that one must first grasp the meaning of each of the infinite number of sentences in the

language and only then solve for word meanings? No, not least because doing so is not humanly possible. To avoid this problem, proponents of the metasemantic version of the context principle can make several claims. First, they may insist on a sharp difference between (1) a psychological story about how humans grasp word and sentence meanings and (2) a philosophical story about the metaphysical underpinnings of word and sentence meaning. They may then eschew any claims about the first of these, stressing that they only mean to address the second (see Dummett, 1973: 4 for this approach). Second, the proponents of the context principle, read metasemantically, could propose that there is some finite cluster of simple sentences, the meaning of which one grasps from use; one then presumably solves for the meaning of the words and for the contribution of syntax, using just those sentences. Performing this finite task then gives the person the capacity to understand new sentences, a potential infinity in fact, on the basis of the (familiar) words in the (unfamiliar) sentences and how those words are structured. Either move would save the proponents of the metasemantic thesis from endorsing the absurd view that one first understands all sentences and only then understands any words.

So far we have examined two readings of the context principle. The first was merely methodological, a claim about how to find out what particular words mean: To find word meanings, look at what they contribute to sentences. The second reading was metasemantic, a claim about why words have the meanings they do: words only have meaning because of how they affect sentence meanings. The third reading of the Principle is interpretational/psychological. It is an empirical claim about the psychology underlying comprehension. Dummett (1993b: 97) discusses the view that "it is possible to grasp the sense of a word only as it occurs in some particular sentence."

In a way, this reading of the Principle is the most straightforward of the three: the idea underlying it is that the only things we are psychologically able to understand are whole sentences. Put in terms of generative capacity, the claim would amount to this: the only thing that our semantic competence generates are meanings for whole sentences; it does not output meanings for words/phrases (though it presumably uses word/phrase meanings in generating meanings for whole sentences, they just are never 'output'). Thus, we can understand words only when they are spoken within whole sentences. Even this most straightforward of the three readings admits of further subreadings, however. Dummett (1993b: 109), for instance, contrasted two varieties of "grasping a sense," one dispositional and the other occurrent. He granted that one may dispositionally grasp the sense of a subsentence outside the context of any sentence. However, he apparently denied – or anyway, has Frege deny – that one can, in the occurrent sense, grasp the sense of a word/phrase without grasping the sense of a sentence within which that word/phrase occurs. This would mean that one could "know the meaning" of a word in isolation, but that whenever one put that knowledge to work, in actual understanding, it would have to be in grasping a sentential content. This last is what the context principle would come to, on this weaker subreading of the interpretational/psychological principle.

Motivating the Context Principle

Having explained three senses in which one could take whole sentences to be prior to the words that make them up, let us consider reasons for endorsing sentence primacy. Some of these reasons support just one reading of 'priority.' Some support more than one. Given the limited space, I present only three such reasons and for the most part leave for the reader the question of which reason supports which reading of "Sentences are prior."

Frege believed that, in failing to obey his methodological constraint, "one is almost forced to take as the meanings of words mental pictures or acts of the individual mind" (Frege, 1884: x). Thus in the case of number-words, the failure to respect the principle could easily lead one to suppose that 'one' stands for a mental item, and hence that mathematics is somehow about mental entities, which in Frege's view is an extremely serious error (see Frege, 1884: 116). However, when one obeys the principle, one comes to the right view: the meaning of a word is not some idea that we associate with it, but is instead the thing that the word contributes to the meaning of larger expressions. Frege writes (1884: 71):

> That we can form no idea of its content is therefore no reason for denying all meaning to a word, or for excluding it from our vocabulary. We are indeed only imposed on by the opposite view because we will, when asking for the meaning of a word, consider it in isolation, which leads us to accept an idea as the meaning. Accordingly, any word for which we can find no corresponding mental picture appears to have no content. But we ought always to keep before our eyes a complete proposition. Only in a proposition [Satz] have the words really a meaning.

So, one advantage of endorsing the Principle is that it keeps us from making such a mistake.

Consider this related motivation: starting from the top – focusing on whole sentence meanings and only then considering what the parts must mean, in order for the observed whole meaning to be

generated – opens up the possibility of novel and surprising accounts of what the parts mean. Indeed, it becomes possible to conceive of syntactic parts that, though they have some sort of impact on meaning, do not themselves have a meaning in isolation. Such parts receive only what is called a 'contextual definition.' This concept is best explained by appeal to an example. If we start by looking at the phrasal parts of "The king of France is bald," asking what they mean, it can seem inevitable that the phrase, "The king of France," must stand for an object. What else could its meaning be, in isolation? This, of course, raises all manner of ontological issues: What is this bizarre object, since there is, in reality, no king of France? How can such an unreal entity be bald or not, so as to render this sentence true or false? And so on. Crucially, however, if we pursue the methodology suggested here and start with the whole sentence, we may notice, with Russell (1905), that the sentence as a whole means the following: there is exactly one king of France, and every king of France is bald. We may further notice that this whole meaning can be generated without assigning any reference at all to the phrase, "The king of France." This is not to say that this phrase makes no difference to what the whole means; patently it does make a difference. However, in place of a meaning-entity for "The king of France," all we need is a rule, a contextual definition, that says:

(2) A sentence of the form "The *F* is *G*" is true iff exactly one thing is *F* and everything that is *F* is *G*.

Taking this contextual definition to be the meaning-determining rule, we simply avoid the issue of what the phrase, "The king of France," stands for, since the phrase itself, upon analysis, does not contribute a constituent to the whole meaning. Another methodological advantage of the context principle, then, is that it is rather easier to arrive at this kind of contextual definition than if we begin with what the parts mean, in isolation.

A second kind of advantage is that, by strictly obeying the context principle, we automatically meet a key constraint of semantic theories: compositionality. Roughly speaking, compositionality says that the meaning of a whole expression is exhausted by (1) what its parts mean, and (2) how those parts are put together (*see* **Compositionality: Semantic Aspects**, **Compositionality: Philosophical Aspects** for more details.) Compositionality is accepted as a constraint for two related reasons. First, insofar as these are the sole determinants of whole meanings, we can explain why people understand complex expressions that they have never encountered before: they understand them by calculating the whole meaning from precisely these two elements, both of which are familiar. Second, were whole meanings not compositional, it would be an utter mystery how we finite beings could in principle know the meaning of the infinite number of sentences that, though we have never heard them, we would, but for our finite lifetime and memory, be capable of understanding. That is, compositionality accounts for an observed ability in practice and a different though related ability in principle. Notice, however, that compositionality is one side of a coin, the other side of which is the context principle. Compositionality says that whole meaning is entirely a function of part meanings plus structure:

(3) Whole meaning = <part-meaning$_1$, part-meaning$_2$, . . . , part-meaning$_i$, . . . part-meaning$_n$> + structure

The context principle employs this same equation to solve for a part meaning, i.e., taking part meaning to be entirely determined by the whole meaning, the meanings of the other parts, and the structure:

(4) Part-meaning$_i$ = Whole meaning – (<part-meaning$_1$, part-meaning$_2$, . . . part-meaning$_n$> + structure)

So, if we assign part meanings in line with (4), the context principle, we cannot help but get the desired result vis-à-vis (3), i.e., compositionality. (Note: obviously the manner of combination of part meanings and structure is not literally addition. Nevertheless, I use the symbols '+' and '–' to simplify presentation.) Automatically satisfying the compositionality constraint in this way is thus another advantage of endorsing the context principle.

A third kind of motivation for endorsing the Principle is that it seems to be connected with several other holistic primacy theses, each of which is allegedly independently motivated. (Unfortunately, space does not permit me to explain what the independent motivation is for these other theses. See Brandom, 1994, chapter 2, sections II and III, for discussion and an overview of the relations among these various primacy claims.) Kant (1787) famously insisted that judgment is prior to perception of individuals: seeing that María is a female, a person, tall, and the like is prior to seeing María. Put otherwise, whereas classical empiricists started with representations of individual objects and of universals and then built up complex mental representations that could be true/false, Kant turned this on its head: the whole representation (i.e., what is judged) is prior to the object-denoting parts that make it up. The early Wittgenstein (1922: 31) also insisted that facts are

prior to the objects and properties that make them up: "the world is the totality of facts, not of things." In a related move, Dummett (1973) has urged, following the later Wittgenstein, that the practice of assertion – and other full-fledged "moves in the language game" – is prior to the act of referring. As Wittgenstein (1953: 24) put it:

> For naming and describing do not stand on the same level: naming is a preparation for description. Naming is so far not a move in the language-game – any more than putting a piece in its place on the board is a move in chess. We may say: *nothing* has so far been done, when a thing has been named. It has not even *got* a name except in the language-game. This was what Frege meant too, when he said that a word had meaning only as part of a sentence.

Adopting these primacy theses can, each in their own way, lead one to expect sentences to be primary as well. Goes the idea, what is judged are sentential representations; the linguistic item that corresponds to a fact is a sentence, and the linguistic item that we assert with is the sentence.

Dummett's point about sentence use deserves to be expanded upon, since it underlies several of the points made above. Dummett suggested that the only things that can be used in isolation – that is, used without being embedded in a larger structure – are sentences. He wrote (1973: 194):

> A sentence is, as we have said, the smallest unit of language with which a linguistic act can be accomplished, with which a "move can be made in the language-game": so you cannot *do* anything with a word – cannot effect any conventional (linguistic) act by uttering it – save by uttering some sentence containing that word.

Yet, as a famous Wittgensteinian slogan says, meaning comes from use (see Wittgenstein, 1953 and elsewhere). Thus, the things that have meaning fundamentally have it because of their use: an expression has the non-derivative meaning that it does because of the kinds of actions speakers can perform with it. However, as suggested just above, those just are the sentences. So words must get their meaning because they appear in meaningful sentences. Dummett, expanding on this Wittgensteinian theme, put the general lesson as follows:

> Indeed, it is certainly part of the content of the dictum [i.e., the context principle] that sentences play a special role in language: that, since it is by means of them alone that anything can be *said*, that is, any linguistic act (of assertion, question, command, etc.) can be performed, the sense of any expression less than a complete sentence must consist only in the contribution it makes to determining the content of a sentence in which it may occur (1973: 495; see also Dummett, 1993a).

A Possible Objection to the Context Principle

Having noted three kinds of reasons for embracing the context principle, let me end with an objection that may come immediately to mind. First, it seems that adults speak in subsentences all the time. I see a woman wearing a lovely garment and say to my wife, "Nice dress." I receive a letter in the mail, hold it up, and say to my companion, "From Spain." Such talk is absolutely ubiquitous. (For empirical support, see the papers in Elugardo and Stainton, 2004, and the many references cited there; for an overview, see Stainton, 2004.) Second, children learning a language seem to start with subsentences – which makes it equally hard to see how grasping a sentential meaning could be a prerequisite for grasping a subsentential one. Let us consider the problem that such subsentential speech might pose for the Principle.

Start with the methodological reading. It is a bit strong to demand that one never consider the word in isolation if words/phrases can be used unembedded to perform speech acts. More appropriate, and still in the broadly Fregean spirit, would be this claim: never *only* consider the word in isolation, but instead *also* consider its behavior when embedded in whole sentences. Non-sentential speech does not conflict with this latter, more inclusive, methodological precept. In addition, the methodological point of the context principle – to cure one of the habit of taking mental images and such as meanings – is met even on this weaker reading. Hence subsentence use actually poses no problems for the Principle, on this first reading.

What of the metasemantic doctrine? Notice that a key premise in the argument for the doctrine was that only sentences can be used to perform speech acts. Words and phrases cannot be: that is why they were denied meaning, fundamentally speaking. Yet, this key premise looks false, if words really can be used in isolation. Therefore, without this premise, some other argument must be given for the conclusion that only sentences have meaning fundamentally. Thus subsentence use, if genuine, does not falsify the Principle read in this way, but it does leave one in need of an empirically adequate argument for meaning having to come from sentences alone.

It might seem that a better argument for the claim that meaning must still come from sentences is at hand: Surely this doctrine is required to preserve compositionality. As I stressed above, you do not get (3) above unless you also accept (4) and (4) requires that word meanings – the meaning of the parts – not exceed what they contribute to full sentences. In fact, however, compositionality does not, on its

own, support the metasemantic doctrine, which makes two claims: first, sentences are a metaphysical *source* of word meaning, and second, they are the *only* such source. Neither of these claims, however, can be inferred from compositionality *per se*. All (4) gives us is a constraint: Whatever story we tell about where a word's meaning comes from, it must be consistent with sentence meanings being exhausted by what their parts mean. This does not support any claim about sources. Moreover, if words are used in isolation, then, though sentence use might be one source, it surely would not be the only one.

To see why compositionality does not, taken alone, support the metasemantic doctrine, consider an analogy. Take this proposal: facts about what art works are beautiful derive from facts about what works are attractive to (most) art experts. That is, it is in virtue of the judgment of (most) experts that art works are beautiful or not. Suppose one tried to defend this meta-esthetic view by saying: "Look, it can't be that most genuine experts are wrong about what's beautiful. They wouldn't be experts otherwise." This defense would not really succeed as an argument for the meta-esthetic view because, even granting it, one could only infer that it is a constraint on where beauty comes from that most experts are right about what is beautiful. This fact would not, on its own, support the idea that beauty comes from expert judgment. Nor would it support the even stronger idea that beauty comes solely from expert judgment. In the same way, compositionality may well impose a constraint on metasemantic theories: one might well contend that any successful metasemantics must have whole meanings exhaustively determined by part meanings and linguistic structure. Yet, one cannot go from such a constraint immediately to conclusions about where meaning-facts emerge from; still less can one move from such a constraint to a conclusion about the sole thing from which they emerge. In sum, given subsentential speech, we are still in need of a reason for embracing the metasemantic reading of the context principle.

Let me now make a brief detour into a related issue. One reason that it matters whether the metasemantic doctrine is upheld is this: If sentence meaning is the only source of word meaning, then it is arguable that the latter is indeterminate. That is, there might be no fact of the matter about what individual words "really mean." The argument goes like this. We can hold constant the meaning of every sentence in the language while varying the contribution that we assign to the words within those sentences. To give a highly simplified example, one way to assign the right meaning to the Spanish sentence, "María no fuma" ["María doesn't smoke"] is to assign the person MARIA to 'María', SMOKES to 'fuma', and DOESN'T to 'no'. Another way, which still gives the right meaning for the whole sentence, is to assign the person MARIA to 'María no' and DOESN'T SMOKE to 'fuma'. Now, with respect to this highly simplified example, we can find reasons for picking the first over the second option: 'fuma', 'no' and 'María' show up in lots of sentences, and their contribution in those other sentences is, surely, SMOKES, DOESN'T, and MARIA, respectively. So that is what they contribute here too. However, suppose we revised our view of the meaning of the other parts in all sentences containing 'fuma', 'María' and 'no'. Surprisingly, it has been suggested that this sort of rearrangement is something we could systematically do. The result would be that the complete set of sentences containing a given word leaves us with various options about what the word means. Further, assuming that the meaning of all sentences in which a word occurs is the sole thing that metaphysically determines its meaning, there can be no single thing that is "the meaning of 'fuma.'" This is the thesis of indeterminacy (see Quine, 1960 and Putnam, 1981 for worked-out examples).

I introduce the indeterminacy thesis because it highlights the sense in which the metasemantic version of the context principle says more than "the meanings one assigns to words must fit with the meanings one assigns to sentences containing those words." It also says that the word meanings are *exhausted* by sentence meanings – in a way that can lead to indeterminacy. In contrast, if word meanings depend also upon how words are used on their own, then even if the complete set of sentence meanings does not fix the meaning of individual words, we cannot yet conclude that word meaning is indeterminate. For word meaning might be more completely fixed by how words in isolation are used (for more on this connection between the context principle and indeterminacy, see Stainton, 2000).

We have seen that subsentence use is consistent with the methodological reading of the context principle. It is also consistent with the metasemantic reading, though it leaves this latter doctrine in need of an empirically adequate supporting argument. Consider finally the interpretational/psychological doctrine. It says that, as a matter of our psychology, we cannot understand a word, when uttered, unless it is embedded in a sentence. This reading of the context principle seems simply false, given the existence of subsentential speech. There is no hope for making it consistent with genuine subsentence use. Apparently, hearers understand subsentential expressions in isolation; hence their semantic competence must generate a meaning for such expressions in isolation. The best

hope for the Principle read in this strongest way is thus to deny that the phenomenon of subsentential speech is genuine: adults do not actually speak in subsentences, they merely appear to do so. What is really going on is that adults speak 'elliptically' in some sense – they produce sentences, but those sentences somehow "sound abbreviated" (see Stanley, 2000 for this sort of idea). As for children, who seem to grasp word meanings long before they grasp the meanings of any sentences, proponents of the interpretational reading of the context principle must make some fairly implausible suggestions. They may insist that children actually do understand sentence meanings even though they do not speak in sentences; or they may claim that what children mean by their words (e.g., 'doggie') is not what the adult word means. The child's expression, they might insist, is actually a one-word sentence meaning, "There is a dog," and hence is not synonymous with our word. (That is, on this second disjunct, the idea would be that children actually do not employ/understand *our* words outside sentences, but rather they employ homophonous sentences – until, that is, they are also competent with *our* sentences.)

Does this inconsistency with the interpretational/psychological reading mean that the other primacy doctrines – of judgment, facts, and assertion – are also required to make these implausible empirical claims? After all, it was suggested that those doctrines supported sentence primacy. The answer is no, because these other primacy doctrines really do not entail anything about only sentences being used and only sentence meanings being graspable occurrently. At best what they lend credence to is the primacy of a certain sort of content, namely the proposition. For, strictly speaking, it is propositions that are judged, propositions that correspond to facts, and propositions that are exchanged in assertion. Further, subsentential speech does not call the centrality of propositions into question: When I say "Nice dress" or "From Spain," *I* still convey something propositional; that is, a proposition about the salient dress to the effect that it is nice, and a proposition about the letter to the effect that it is from Spain, respectively. I merely do so using *linguistic expressions* that are not propositional. So, subsentential speech leaves proposition primacy intact. To move immediately and without further argument to any conclusion about the syntactic structures that (purportedly) express propositions, however, is to commit some kind of global use/mention error, running together features of a content (i.e., a proposition) with features of its supposed linguistic 'vehicle' (i.e., a sentence). In short, even if one takes judgments, facts, or assertions to be primary, one need not endorse the context principle vis-à-vis interpretation – since the latter is about the centrality of a certain class of syntactic items.

In summary, I have presented three different ways of reading the context principle: methodological, metasemantic, and interpretational/psychological. I then noted three rationales for embracing the Principle: to avoid the errors of psychologism, to enforce compositionality, and because of links to other independently motivated 'primacy doctrines.' I ended with an objection to the Principle, from non-sentence use. The suggested result, in the face of this objection, was two parts consistency and one part inconsistency: (1) the first reading of the Principle would be untouched, (2) the second would be left unsupported, but (3) the third reading would be outright falsified, so that the proponent of this reading of the Principle must make some (implausible) empirical claims to the effect that people do not actually speak subsententially.

See also: Compositionality: Philosophical Aspects; Compositionality: Semantic Aspects; Dummett, Michael Anthony Eardley (b. 1925); Frege, Gottlob (1848–1925); Holism, Semantic and Epistemic; Indeterminacy, Semantic.

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Context, Communicative

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Introduction

One of the central foci of research on language over the last several decades has been the relation between language and context. Work in linguistic anthropology, sociolinguistics, pragmatics, psycholinguistics, and philosophy of language has demonstrated a wide variety of ways in which language and verbally communicated information of various sorts are informed and even shaped by the social and interpersonal contexts in which speech occurs (see Duranti and Goodwin, 1992). Overlapping lines of research have also demonstrated various ways in which language **constitutes** context, including the social effects described in speech act theory (*see* **Speech Acts**), the formulation and attribution of beliefs in relevance theory (Grice, 1989; Levinson, 2000; Sperber and Wilson, 1995) (*see* **Relevance Theory**) and the 'creative use' of indexical terms such as pronouns, deictics, and other shifters (Silverstein, 1976) (*see* **Indexicality: Theory**). The focus on context, as both a constraining factor and a product of discourse, has led to increasingly fine-grained approaches to speech, since it is primarily in the formation of spoken or written utterances that language and context are articulated. The significance of these developments for linguistics lies in the increased precision with which linguistic systems, cognitive processes, and language use are co-articulated. For anthropology, it lies primarily in the fact that communicative practice is integral to social practice more generally. Language is a factor, if not a defining one, in most of social life, and ideas about language have had a basic impact on social theory for the last century.

Given the scope of these developments, it is unsurprising that there are various approaches to context corresponding to the disciplinary predilections of researchers. Speech act theory zeroed in on the relation between speech forms and circumstances as captured in felicity conditions and the doctrine of (illocutionary) force (Austin, 1962). Gricean approaches to conversation focus on inference and belief ascription under the assumption that speech is a cooperative engagement, subject to the maxims of quality, quantity, relation, and manner (Grice, 1989) (*see* **Maxims and Flouting**). Relevance theory shares a focus on inference as a central feature of speech, but dispenses with the Gricean cooperative principle (*see* **Cooperative Principle**), maxims, and the tasks of calculating and testing for implicatures (*see* **Implicature**). In their place, it proposes to explain inferential processes in terms of a single principle of relevance according to which logical, encyclopedic, and lexical information are combined. Speech act, implicature, and relevance theories are all closely associated with linguistics and have in common that they treat context as built up utterance by utterance in the course of speaking.

From a social perspective, ethnomethodology (*see* **Ethnomethodology**) and conversation analysis have made major contributions to our understanding of language in interaction (*see* **Conversation Analysis**). Both assert that face-to-face interaction is the primordial context for human sociality (Schegloff, 1987: 208) and the most important locus of observation of language. While they may rely on the pragmatic and inferential processes studied by linguists, their focus is different. Conversation analysis (CA) has emphasized the temporal and hence sequential organization of verbal exchange (Sacks *et al.*, 1974), the existence of procedural rules guiding turn taking in talk, the phenomenon of conversational repair, and the micro-analysis of actually occurring verbal interaction. Psycholinguists and cognitive linguists treat context as a matter of mutual knowledge and cognitive representation, hence as a basically mental construct.

The approaches mentioned so far have in common that they treat context as a radial structure whose center point is the spoken utterance. They share a commitment to methodological individualism, which prioritizes the individual over the collective

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and seeks to reduce social structures to individual behaviors. Starting from the perspective of the participant(s) in speech production, they derive context from relevance, mental representation (including attention focus and practical reason), and the momentary emergence of the speech situation. From this viewpoint, context is a local concomitant of talk and interaction, ephemeral and centered on the emergent process of speaking. Whether one places primary emphasis on actual language use as attested in the field or on constructed examples, the ultimate frame of reference and explanation is individual speech activities and the verbal interactions in which they occur.

From the opposite viewpoint, others have developed approaches to language and discourse in which context is neither local nor ephemeral, but global and durable, with greater social and historical scope than any localized act. There are several shifts here worth distinguishing. Whereas the first set of approaches is grounded in linguistics, psychology, and microsociology, the second is based in large-scale social theory and history. Utterance production is not assumed to be the generative center of context, as it is for individualist approaches. Rather, the explanatory frameworks are social and historical conditions that are prior to discourse production and place constraints on it. Standard linguistic description is a case in point, because it claims that individual uses of language depend for their intelligibility on linguistic systems (grammatical and semantic) that are logically prior to any act of speech. To the extent that such perspectives treat discourse production at all, the relevant units are either analytic abstractions (the idealized Speaker of linguistics) or collectivities (communities, classes, social networks, kinds of agent defined by gender, age, profession, residence, etc.). Similarly, the temporal frame of discourse production is not the momentary unfolding of utterances in what individualists call real time, but the conjunctural time of collective systems and historical processes.

Just as there are various local approaches to context, there are also diverse global ones. In a Foucaultian view, for example, if there can be said to be a basic context for language, it is neither interaction nor the individual strips of speech or text familiar to linguists. On the contrary, the frame of reference is 'discourse,' meaning large-scale formations of beliefs and categorizations pervaded by power relations and articulated in 'assemblages.' (*see* **Discourse, Foucauldian Approach; Power and Pragmatics**). Similarly, Bourdieu has argued that language forms and varieties should be analyzed relative to linguistic markets in which they bear various sorts of symbolic and cultural capital (Bourdieu, 1993). Both Foucault and Bourdieu take as their point of departure collective facts and set out views contradictory to methodological individualism (a predictable corollary of the structuralist orientation of both thinkers). Critical discourse analysis (CDA) offers another clear example (nicely reviewed in Blommaert and Bulcaen, 2000). In this approach, discourse is treated under three perspectives: as text endowed with linguistic form, as 'discursive practice' through which texts are produced, distributed, and consumed and as 'social practice' which has various ideological effects, including normativity and hegemony. CDA emphasizes power, exploitation, and inequality as the social conditions of language, tracing them through various contexts including political and economic discourse, racism, advertising and media, and institutional settings such as bureaucracies and education. Notice that, while these forces may be played out in individual speech events, the frame of reference is broader than, and logically prior to, any given event. Moreover, the focus on speakers' intentions as the source of meaning that is common to methodological individualist approaches is absent in all large-scale approaches (*see* **Critical Discourse Analysis**).

The linguistic, psychological, and microsociological approaches from which we started are largely complementary to the large-scale approaches just mentioned. The local settings of utterance and face-to-face interaction that are central to the first group are absent or at best marginal in the second. Conversely, the collective facts central to social definitions of context are marginal or simply ignored in individualist approaches. This polarization gives rise to overstatement and many missed opportunities for productive research. It becomes unclear how to articulate different levels of context analytically, or even whether such articulation is an appropriate aim. Given that discourse responds to context at multiple scales, and that any actual social setting can be characterized under either micro- or macro-perspectives, the two are inevitably pitted against one another. In its strong forms, methodological individualism claims that the collective facts studied by sociologists and anthropologists are epiphenomena of individual actions, whereas a proponent of collectivism may claim with equal conviction that individual utterances and face-to-face interactions are the trivial precipitates of larger social forces. Thus, the dichotomies of scale underwrite contradictory claims about what is most basic to context.

While much of the literature bearing on context can be placed on one or the other of these extremes, linguistic anthropology has been the exception because it has attempted to integrate levels (*see* **Linguistic Anthropology**). One motivation for this is the empirical fact that speech practices are shaped by

and help shape contexts at various levels. Another is the patent inadequacy of all bipolar accounts, which inevitably distort the relative significance of contextual features and produce a vacuum at one level or the other. As an interdisciplinary enterprise, linguistic anthropology has always straddled grammar and actual language use in socially and historically defined settings. The focus on speech requires detailed analysis of locally emergent facts both linguistic and ethnographic (hence 'micro'), while the focus on linguistic and social-cultural systems requires equally careful analysis of formal and functional regularities whose motivations lie far beyond individuals and their actions (hence 'macro'). Thus, the ethnography of speaking combined such descriptive units as the speech event, the community, and verbal repertoires in an attempt to bring the ethnographic setting of utterances to bear on their formal and functional properties. In recent decades, linguistic anthropologists examined the relation between language and political economy and what has come to be known as language ideologies, both of which combine phenomena from different scales (Silverstein, 1979; Schieffelin *et al.*, 1998). Any study of context that seeks to account for the formal specificity of utterance practices **and** their social embedding must reject familiar divisions between micro- and macrolevel phenomena.

Context is a theoretical concept, strictly based on relations. There is no 'context' that is not 'context of,' or 'context for.' How one treats it depends on how one construes other basic elements including language, discourse, utterance production and reception, social practice, and so on. It is by now widely recognized that much (if not all) of the meaning production that takes place through language depends fundamentally on context and further, that there is no single definition of how much or what sorts of context are required for language description. There is therefore no reason to expect that any single model or set of processes will be analytically sufficient for all research (and good reason to be skeptical of universal claims). At the same time, it is clear that there are principles and kinds of relations that recurrently organize contexts. We are concerned here with both the semiotic specificity of discourse practices and their social and historical embedding. What are the units and levels of context one needs to distinguish in order to give a rigorous account of language as practice? What are the relations and processes that give rise to different contextual units and levels? How does one analyze actual contexts without falling into a morass of particulars?

My way into these questions is through two broad dimensions of context, which I will call emergence and embedding. The former designates aspects of discourse that arise from production and reception as ongoing processes. It pertains to verbally mediated activity, interaction, copresence, temporality, in short context as a phenomenal, social, and historical actuality. Embedding designates the relation between contextual aspects that pertain to the framing of discourse, its centering or groundedness in broader frameworks. So stated, there is an initial alignment of emergence with the highly local sphere of utterance production, on the one hand, and embedding with larger scale contexts on the other. This is the way the two are usually discussed in the literature on language. Emergence is associated with so-called real time utterance production and interaction, and embedding describes the locatedness of utterances in some broader context. However, emergence can easily be conceived at different temporal levels, as any historian knows, just as embedding applies within the most local fields of utterance production. To see this, let us turn to a more detailed look at each of the dimensions, starting with emergence.

Emergence

Context as a Sheer Situation

In an interesting discussion of the micro–macro problem from the viewpoint of conversation analysis, Schegloff (1987: 208) asserted that interaction, minimally involving two people, is the primordial site of sociality. This view is rooted in a significant history of thought about both sociality and interaction (Schutz, 1970a). The former term is seldom defined precisely, but in Schegloff's pithy claim, it stood for the human propensity to engage with others, with the invited inference that this propensity is a basic aspect of human society. The primordial importance accorded interaction can be traced to the phenomenological sociology of Alfred Schutz. Schutz set about to merge the social theory of Max Weber with the phenomenology of Edmund Husserl (with a healthy dose of William James and Gestalt psychology). In his view, social subjects develop in a world of intersubjective relationships, in which others are given to them both as objects in space and as other selves (Schutz, 1970a: 163). They partake of a primitive reciprocity in the sense that each exists in relation with the other. They are parties to a mutual 'we,' each located in a world also occupied by the other. In interaction relationships (as opposed to relations among contemporaries or predecessors), the parties are copresent corporeally, which entails their being in the same place at the same time and in what phenomenologists call the 'natural attitude' (wide awake, in their senses, with access to common sense). For each party to interaction, the other's bodily gestures

(including utterances) present themselves as expressions that project and make perceptible inner states of consciousness. In interaction, the other's body is primarily a field of expression presumed to be meaningful, not a mere object perceived (*see* **Gestures: Pragmatic Aspects**). As a corollary of copresence, the two are in the same temporal stream, and each can perceive the other's expressions as they emerge from moment to moment. The mutual copresence and reciprocal access of interactants takes the shape of a more exacting reciprocity: until further notice and for all practical purposes, each party can put himself in the shoes of the other, taking on, or at least entertaining, the other's perspective.

Goffman (1972) helped formulate a Schutzian view of context in his influential paper "The neglected situation" (*see* **Goffman, Erving (1922–1982)**). Goffman critiqued the then widespread treatments of social context in terms of correlations between macrolevel sociological variables, such as gender, class, profession, and institutional roles. He argued that situations have their own properties that follow from the fact of copresence between two or more people. A situation is a space of mutual monitoring possibilities within which all copresent individuals have sensory access to one another with the naked senses. Hence, the following conditions apply:

1. There are at least two parties who cooccupy the same objective time (which Schutz [1970a: 165ff.] distinguished from inner time and the constituted experience of space-time), in which perceptions and expressive gestures unfold sequentially.
2. Each party to the situation is present in body, both perceivable and capable of perceiving the other.
3. The situation is a field of mutual monitoring possibilities, which entails the capacity of the co-occupants to notice and attend to each other.

These three conditions imply mutuality (we share this), cooccupancy of the same space-time (we are both here-now) and reciprocity (I perceive you and you perceive me). Notice that a situation is not a field of **actual** mutuality, reciprocity, and cooccupancy, but a field in which these are alive as **potentials**. (This is another factor reminiscent of phenomenology in the idea of the 'horizon'.) It is minimally structured, logically prior to any utterance, and notably lacking any object beyond the copresent parties. From the perspective of language, the situation provides a sort of 'prior outside' into which speech and language are projected through utterance acts.

Given what we have said so far, all of dialogic speech could be described as situated insofar as it occurs in situations. The utterance *the curry is done* is situated, let's say, when produced by a cook in response to the question *when will dinner be ready?* Both question and response are situated in the perceptible, interactive relationship between the parties, and all three of the above conditions apply. But Goffman distinguished between "merely situated" and inherently situated factors. The former include linguistic and symbolic structures that are instantiated in utterances but do not really depend on the situation for their definition. In contrast, timing and delivery of utterances reflect the *in situ* mutual adjustments between interlocutors and are inherently situated. Goffman's situation, then, represents a layer of context that is prior to language, but with which we can distinguish between merely and inherently situated aspects of the speech stream. A great deal of research over the last decades has demonstrated the significance of this framework, and the ways in which speech transforms and adapts to situations. It has become an article of common sense that context is situated, whatever else it is.

Relevant Settings

The situation thus defined is insufficient to describe interaction because it lacks several basic features. Whereas any situation exists in time, it lacks such temporally grounded distinctions as early vs. late and middle vs. beginning or ending. The latter terms can only be applied to a course of activities in which there are act units and expectations. Furthermore, at the level of the situation each party is potentially aware of the presence of the other, but is not attending to the expressive meaning of the other's gestures. As a mere field of copresence (what Schutz [1970b] called a 'pure we relationship'), a situation has no meaningful structure: nothing in particular is going on or is especially relevant. If we layer onto the situation socially identifiable acts, expectations, mutual understanding among parties, and a framework of relevance, we arrive at a contextual unit closer to interaction and considerably more structured. We will call this new unit the *setting* (Sacks, 1992: 521–522).

If a speaker says, *I am here to meet with Martin*, *this is a great party*, or *I'm asking you to help* (s)he has in each case **formulated** the setting in which the utterance occurs. In the language of CA, a formulation is a description, hence a categorization, as opposed to indexical expressions that invoke the setting, but do not formulate it since they lack descriptive content. In paradigm cases, the formulation applies reflexively to the very speech setting in which it occurs. What most concerns us at this point is that formulations are internal to interactive context, they display the participants' judgments of what is relevant and going on, and they illustrate the conversion

of a mere situation into a social setting (Schegloff, 1987).

To introduce the concept of relevance is to transform fundamentally the idea of context. On the one hand, judgments of relevance always imply a theme or point of interest from which the relevance relation is established. On the other hand, this relation is rooted in actors' previous experiences, in light of which the interest arises (Schutz, 1970b: 5). A theme, like a focal point, implies a background or horizon against which it is distinguished and in relation to which it functions as a center point. This in turn implies that any context in which thematic relevance operates is a bilevel structure (usually described as foreground/background, or theme/horizon). The reference to the biographical history of the actors for whom something is thematic effectively expands the temporal scope of context from the vivid present of situated perception to a past remembered and sedimented through habitual experience. In short, as soon as we introduce relevance, context becomes a hierarchical structure connected to a nonlocal history.

In addition to the distinction between theme and horizon, Schutz (1970b) developed a three-way contrast between kinds of relevance, which he calls topical, interpretive, and motivational. The first centers on the object or matter to which actors turn their attention. The second has to do with which aspects of the object are relevant to the question at hand, and which parts of the actor's background knowledge are brought to bear on it. The third pertains to the actor's prospective purpose (which Schutz called "in order to motives") and the past conditions that give rise to that purpose (Schutz's "because motives"). The combined effect of these three sorts of relevance is to create a multistranded relevance system in the setting, encompassing both memory and anticipation. While Schutz's probing study makes further distinctions, these will suffice to underscore that interactive context, even at the relatively primitive level of the setting, is hierarchical along several dimensions, both local copresent and nonlocal.

Semiotic Field, Symbolic and Demonstrative

Although we introduced the function of formulation in order to clarify the difference between a situation and a setting, our framework is as yet impoverished from the perspective of language structure and semiotics. This is the next element we must introduce in order to approximate a notion of context adequate for linguistic description. We will do so by way of the theory developed by Karl Bühler (1990 [1934]), which had a profound impact on subsequent linguistic and semiotic approaches to context (particularly the ethnography of speaking, linguistic treatments of deixis and contemporary linguistic anthropology). Bühler distinguished two aspects of the context in which any sign is used: (i) the *Symbolfeld* 'symbolic field,' consisting of words, other signs, and the concepts they represent, and (ii) the *Zeigfeld* 'demonstrative field,' which is the immediate interpersonal setting in which an utterance is produced. These two elements combine in various ways in Bühler's treatment, for instance anaphora and "imaginary deixis," (*see* **Deixis and Anaphora: Pragmatic Approaches**) and the resulting model of context is pervasively semiotic. It inherits all the features of settings as laid out above, but these are transformed by signs (symbolic, indexical, iconic), sign relations (syntactic, semantic, pragmatic), the presence of objects stood for, and various functions including individuated reference and directivity (purposive orientation of an interlocutor's attention by word and gesture).

Bühler summarized the *Zeigfeld* as "Here Now I," thus foregrounding its relation to the linguistic system(s) of the participants. These three terms are the prototypical deictics: they are referring expressions whose conventional meanings belong to the linguistic code, and yet, as indexicals, their reference on any occasion of use depends strictly on the context of utterance. Deixis is the single most obvious way in which context is embedded in the very categories of human languages. Recall that in Sacks' terms, deictics 'invoke' the setting, because they are indexicals, but do not 'formulate' it, because they lack descriptive content. Contrast *I am here* with *I am in the dining room of my home*. It has also become common in the literature to distinguish between referential indexicals, (e.g., deictics, pronouns, presentatives, certain temporal adverbs) and nonreferential or social indexicality (Silverstein, 1976). The latter would include such phenomena as regional or other recognized accents, stylistic registers, and honorifics (Agha, 1998; Errington, 1988) insofar as these features of language signal aspects of utterance context without actually referring to or describing it. Contrast an utterance spoken with a heavy New England accent, which nonreferentially indexes the provenience of the speaker, with *I am from New England*, which states it. What is most relevant about indexicality for present purposes is the way that both referential and nonreferential varieties serve to articulate language as a general system with utterance context. The deictic categories of any language, and the combination of those categories into phrases, sentences, and utterances, reveal schematic templates for context.

The demonstrative field therefore converts the interactive setting into a field of signs. For Bühler, it includes gestures and other perceptible aspects of the participants, such as posture, pointing, directed gaze,

and the sound of the speaker's voice, all of which orient the subjective attention focus of the participants. Like Goffman and the conversation analysts, Buhler assumes that the participants are in the "natural attitude": wide awake, oriented, each with a sense of his or her own body, synthesizing sensory data from vision, hearing, and touch in a system of coordinates whose origo is the here-now-I (Bühler 1990: 169ff.). Within this phenomenal setting, utterances, in both their symbolic and indexical dimensions, both reflect and transform context. They orient participants attention, thematize objects of reference, formulate, invoke, and construe the setting, operate on relevance systems, in short, they produce context.

The situation, setting, and demonstrative field are emergent in the sense that they unfold in time. This is one consequence of the fact that linguistic practice produces context in an ongoing fashion. It gives rise to duration, sequence, simultaneity, synchronization, and it forces us to include memory, anticipation, and teleology in our model of context. Time is central to the study of conversation and sequence is basic to turn-taking systems, anaphora, and thematic coherence, the interactive production of sentences (Goodwin and Goodwin, 1992), and the organization of a host of conversational structures. It is also at the root of the concept of adjacency in conversation analysis, the relation between contiguous units in talk.

Notice that emergence entails time but is different from it, since it describes the relation between various units of discourse production. When individuals co-engage in a setting, their perceptual fields are oriented by relevance and when they coparticipate in a demonstrative field, they are reoriented by signs. So too temporal relations are converted in the passage from situation to setting to demonstrative field. Diachrony is an existential condition of context at any level of analysis, but it denotes different processes according to the level. For example, the inner duration of experience, the simultaneity of pure we relations, the production of utterances, the taking of turns at talk, the opening, middle, and closing of conversational units, and the prospective projection implied by intention and strategy are different diachronies. Emergence is everywhere in relation to structure, and to describe context as emergent implies that it is structured.

Embedding

The progression from situation to setting to demonstrative field is neither a temporal sequence nor a set of inclusion relations. It is a matter of logical ordering, from the relatively primitive level of the sphere of perceptual awareness through the semiotically entangled demonstrative field. The setting inherits features of copresence from the *situation*, transforming it by way of relevance relations and socially recognized units of action. The symbolic–demonstrative field inherits an interperspectival relevance system from the setting, but transforms it by means of multifunctional semiotic systems (most notably language). The model of context implicit in the demonstrative field is the minimal starting point for the study of discourse.

Whatever else is true about discourse context then, it entails bodies and perceptual fields, relevance systems, act types, and the expectations they engender, semiotic systems and the transformations they effect. As emphasized above, all of these contextual formations are emergent in that they involve duration, sequence, simultaneity and, in the more complex formations, memory and anticipation. In virtually all of ordinary communicative practice, the three levels combine and the distinctions between them are analytic: a setting is merely what is left when we analytically peel away the effects of semiosis; a situation is what remains when we bracket off relevance. Such analytic separation has the advantage of clarifying how discourse contexts hang together and fall apart, and how language and discourse differentially tie into the distinct orders of context. It should not suggest that the three lead separate lives, as it were: in the course of social life, there is no situation that is not tied into a setting and no setting that is cut loose from semiosis. This relation of ordered entailment and tying in we will describe as embedding.

To study context is to study embedding. If contextual formation X is embedded in Y, then the following statements are true:

i. Y entails X, but X does not entail Y;
ii. Y inherits certain properties from X but introduces other properties;
iii. Y transforms X, altering inherited properties and introducing new principles of organization (via rearrangement, reweighting, etc.);
iv. If any part of X becomes a thematic focus, either for participants or for analysts, then Y is the relevant horizon.

For example, a setting entails the possibility of mutual monitoring among participants, but a situation does not entail a relevance structure (i). The symbolic–demonstrative field inherits act units and relevance relations from the setting, but reconstitutes it via multifunctional semiosis (ii). The relevance system of a setting organizes how participants monitor one another in the situation, and the semiotic functions of the symbolic–demonstrative field transform relevance

via thematization (iii). If a problem arises in mutual monitoring among copresent participants, then it is dealt with in light of the setting, which establishes the expectations and relevance requisite to identifying or rectifying the problem. Similarly, if a problem of (ir)-relevance or failed expectations arises, then it is grasped and dealt with in the light of the ongoing symbolic–demonstrative field, which invokes, formulates, and provides the means to construe the setting (iv). The upshot of these remarks is that contextual embedding is never a mere add-on or external surround to features of discourse or interaction. At whatever level we examine it, context **is** embedding relations.

Research in linguistic anthropology over recent decades provides abundant and forceful evidence that embedding is not limited to the contextual levels so far adduced. No symbolic–demonstrative field exists in a social vacuum and however strong the impulse to generalize by way of rules, invariant structures, or procedures, contexts vary more radically than so far suggested, and on parameters not yet mentioned. This comes as no surprise to ethnographers, but it poses a real challenge to linguists because linguistic systems and practices articulate precisely and in detail with social phenomena beyond the reach of even the most sophisticated semiotics. How are we to explain the impact on context of such systematic phenomena as the difference between expert and novice practice in institutional settings (Cicourel, 2001), the role of ideology on discursive practice, the differential affects of national, ethnic, or class identities on discourse production, the values that attach to different ways of speaking, writing, or other mediated forms of discourse that do not assume the face-to-face situation at the heart of the demonstrative field? For example, it is clear that persons and objects in the demonstrative field have, for the participants, values of various kinds. They are good, bad, beautiful, ugly, mine, yours, costly or cheap, coveted or to be avoided, yet such values derive from social systems and experiences beyond the scope of the demonstrative field. In actual practice, as opposed to theory-driven proxies of practice, discourse circulates in contexts that are themselves embedded in social formations only partly explainable by discourse. In Bühler's demonstrative field, participants and objects are anonymous, the accidental occupants of semiotically defined positions and roles. Yet in ordinary discourse, actual persons, groups, objects, and settings are in play, and these are, for the most part, familiar and valued.

This is one of the most difficult problems in the study of context: in order to achieve a general account, we formulate schematic regularities, yet in order to actually engage in discourse, speakers and addressees must come to grips with emergent particulars. Semiotic accounts seek to overcome this difficulty by distinguishing types (generalities) from tokens (particular instances), or by combining structures (e.g., linguistic systems) with phenomenology (Bühler's solution). The problem with these approaches is that they treat actual practices as merely situated instantiations of general laws, which domesticates particularity by making it a mere instance of the general. At the same time, they preserve a radial definition of context, according to which the individual, utterance, or situation is the center point and all other factors are defined in relation to it. This is a productive solution to certain problems, such as the semantics of indexical reference, where the sign stands for its object in an aboutness relation. But what of an organizational context like a hospital, a university campus, or a courtroom? Most of the interactions that occur in these contexts are shaped in part by institutional frameworks, credentialing processes, and social divisions that exist before and beyond any demonstrative field, that may be nowhere signaled in the discourse, and yet shape the context and constrain participants' access to discourse. We need a way of analyzing contextual dimensions that are not radial to the utterance or the field of copresence, but that shape it significantly. Relegating such factors to the social setting is a convenient shorthand, but it fails to explain how they impinge on discourse. To require that they be relevant to the participants is to require that they be thematized, whereas much of the social formation impinging on discourse contexts is unnoticed. To label them background knowledge begs the question, since most individuals in institutional settings have fragmentary or systematically skewed knowledge of the forces that objectively shape the contexts in which they interact.

Social Field

We have said that when one contextual level or sphere is embedded within another, the embedding level inherits certain properties from the embedded one, that it transforms it, and that it serves as the operative horizon against which the embedded level is grasped. In these terms, we can say that any demonstrative field is embedded in one or more social fields. The term 'social field' as used here is adapted from practice sociology and designates a bounded space of positions and position takings, through which values circulate, in which agents have historical trajectories or careers, and in which they engage on various footings (e.g., competitive, collaborative, collusive, strategic). Thus defined, a social field is neither radial

nor discourse-based, although discourse circulates in most fields, but there are interactive settings embedded in any social field. What is different about a social field is its scope (nonlocal), the way it is organized (nonradial), the character of the boundary (credentials and limited access as opposed to the gradual boundaries and relatively open access to demonstrative fields), and the values that circulate in it (e.g., economic, symbolic capital and power as opposed to meaning production through indexicality, reference, and description). Moreover, whereas participants in discourse production are traditionally conceived as individuals (hence interaction means intersubjective engagement), the agent positions in a social field can be occupied by collectivities (e.g., professional organizations, 'communities,' classes, departmental staff), whose interactions are typically mediated by writing, electronic media, and other instruments. Under this definition, a hospital, university, profession, academic discipline, a courtroom, a supermarket, an airport, a religious congregation, and a neighborhood are all social fields. This does not mean they are all equivalent or that any one of them may not itself be embedded. It does mean that these and other social formations provide critical embedding contexts that shape radial, interactively centered demonstrative fields.

The social field places constraints on who has access to the participant roles of Speaker (Spr), Addressee (Adr), overhearers (ratified and unratified), the sanction to participate in a capacity, the requirement to manage face in specific ways (Goffman, 1967), and so on (*see* **Face**). In the demonstrative field as such, there are no constraints on who can play what role in acts of reference, directing of joint attention, or semiotically proper indexicality. It suffices that the participants master the language and be in the natural attitude. But this is not true in a social field, in which access to different positions is constrained, the authority to speak in certain terms and to specific others is restricted, and the capacity to monitor another is a selective right or even a responsibility, not a mere existential condition.

In the kinds of organizational fields listed above, there are also many virtual counterpart relations, such as the correspondence between the patient and the X-ray image, the cash register number and the cashier, the evidence and the now-past actions that produced it, the paper and its author. These correspondences create networks of counterpart relations between objects in the immediate demonstrative field and ones that are absent (in other places or other times). Careful study of deictic practice shows that such counterpart relations play a formative role in how participants resolve indexical reference. The implication is that in order to understand simple indexical practices, we are forced to look beyond the immediate field of copresence, just as participants must do in order to get the point of utterances. In order to explain the actual functioning of the *Zeigfeld*, then, we are obliged to look beyond it to the social field. These are all embedding effects and the social field is unavoidable in any description of indexical practice.

Settings and demonstrative fields are designed so as to project them into further embeddings. Any relevance system ties its thematic focus into a history of other engagements with the object, a horizon of other related objects, a set of judgments regarding what is interpretationally relevant and what can be ignored. Hence, the setting is already rooted in a world beyond itself. Once we introduce semiosis, we have aboutness relations, and not all objects stood for are copresent in the situation. Furthermore, the symbolic categories themselves tie the sign and its object into other signs and objects *in absentia,* as Saussure put it (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**).

Two rather different transformations take place in the embedding of a demonstrative field in a social one. The social field is made actual, we might say, localized, by its articulation via relevance, symbolization, and indexical invocation (all the better if it is explicitly formulated, although this is not necessary, as we have seen). This is a genuine transformation because the social field does not owe its structure or existence to the kind of radial, intentional structures into which it is recruited by signs (the world is not organized in the same way as the language that refers to it). The second mode of embedding is occupancy: the actor occupies a participant role, which occupies an agent position (Dr. Jones speaks as an expert performing a procedure). The copresent setting occupies a socially defined site (the relevance system and actions in progress are procedures in a medical clinic). The referent-object occupies a socially defined position (the needed instrument in an ongoing procedure). Hence, the embedding social field provides a space of positions (including referent positions) and those positions are occupied or taken up by the various elements inherited from the embedded demonstrative field.

Embedding is a process in time, and a proper study of context at the level of social fields must attend to the temporal order of occupancies, including the careers of persons, objects, places, and actions in the time course of the organization. The social field has a history that transcends any particular occupancy. The clinic outlasts Dr. Jones, just as it outdistances the single office he occupies on such and such an occasion. Utterance-to-utterance temporality at the level

of the demonstrative field is embedded, and hence transformed, in the broader history of the field.

Looking across the communicative practices embedded in one or more social fields, it becomes possible to ask which elements remain relatively invariant across embeddings, and which ones are subject to transformation. The distinctions between Spr, Adr, Object, the semiotic means of thematization, the omni-relevance of perception and the procedural organization of turn-taking (Schegloff, 1987) may remain constant, for instance, even if differentially realized and constrained in different fields. Such invariance contributes to the partial autonomy of the demonstrative field across embeddings. Inversely, certain features of social fields may function as relatively constant constraints or resources for any demonstrative field that emerges within their scope of embedding. To that degree, these factors contribute to what Bourdieu (1993) called the "heteronomy" of the embedded fields. Autonomous features of any field derive from the field's own organization, whereas heteronomous (nonautonomous) features derive from its embedding in some other field. Thus, we can ask of any discourse context: in what measure and in which features is it autonomous? It is standard in the literature on language to describe speech contexts as if they were highly autonomous, such as Bühler's generalized *Zeigfeld* or the hackneyed Speaker–Hearer dyad of linguistics. But this nomothetic bias toward autonomous schemas hides heteronomous effects that are systematic and consequential for a theory of context.

The participants in any process of discourse production are clearly a key part of the context, whether they engage as individuals or groups and whether we treat context in local or nonlocal terms. In the discussion so far, there is an implicit series of embeddings of participants, from the individual subject to intersubjective copresence (situation), to coengagement (setting) to participant roles (demonstrative field) to agent positions (social fields). In a series of influential studies, Goffman (1963, 1981) brought attention to the differential kinds and degrees of involvement that parties to discourse sustain in social practice. He distinguished, for example, unfocused from focused interaction, the former pertaining to mere situations and the latter to settings in which the participants share a common attention focus and orientation (which he dubbed "encounters"). Given a focused interaction, the question arises as to the degree of intensity of involvement and the distribution of involvement among participants (over time). This in turn led Goffman to distinguish among contexts according to how they regulate involvement, the embodiment of that regulation in space and physical conduct, the penalties for inappropriate involvement (invasion, exclusion, drifting away, excess intensity), and the overall "tightness or looseness" of contexts (Goffman, 1963: 198–210). Although this entire discussion is rooted in the phenomenological sense of subjective engagement, it can be analogically projected to the level of social field and the agent positions they entail. Here, involvement has to do with modes of occupancy of positions, how tight or loose a field or a position is, the degree to which occupying one position precludes or requires engagement with other positions, the vectors of access or exclusion provided by given positions, the means of displaying or concealing involvement, the varieties of collusion or competition that are differentially built into sectors of the field. In short, the embedding of discourse production in social fields defines a space of involvement among agents.

Whereas most of Western language theory has posited a speaking subject endowed with free will and uncurtailed intentionality, social theory has long debated the extent to which social actors and actions are determined by social forces external to them. This has given rise to a host of concepts significant in the study of context, including structuration, subjection, ideological state apparatuses, and habitus (Bourdieu, 1977). Notwithstanding significant differences among them, these ideas have in common the basic observation that social actors, from subjects to collectivities, are not given by nature but are, in critical ways, produced by society. Such ideas turn individualism on its head by asserting that not only is the 'natural subject' not the starting point from which society is produced, but the subject is itself, already, a social production. The importance of this line of thought for a study of context lies in the challenge it poses to any theory of meaning production that starts with individual intentions and phenomenal situations in order to then derive context by addition of external factors (a view pervasive in language sciences). From the vantage point of social fields, the corresponding question would be to what extent engagement in a field shapes the participants not only in their agent-based external engagements, as it were, but more pervasively in their habits, dispositions, and intentions. In other words, there is a tipping point at which context ceases to be conceivable as the layering of structure upon intersubjective copresence and becomes the very **production** of subjects and the condition of possibility for intersubjectivity. Our definition of embedding as entailment, partial inheritance, transformation, and the necessary horizon for any contextual factor foreshadowed this shift.

In practice theory, the idea of a field is intimately related to the notion of habitus. The former defines

the space of positions and position takings and the latter defines the social conformation of agents who engage in the space. There are four principal sources of the idea of habitus, which will help clarify its meaning. First, the Aristotelian idea of hexis, which joins individual desire or disposition with the evaluative judgment of what is good. If these two are aligned, we might say, the person is disposed to act in ways that are good. A linguistic analog might be interactive hexis, as evidenced in the spontaneous desire that good speakers have to be cooperative interlocutors or to say the right thing at the right time. Second, the phenomenological idea of habit and habituation as developed in the writings of Husserl, Merleau-Ponty, and Schutz. The idea is that in the course of ordinary experience we habitually engage in certain ways, we tend to routinize and typify. Under various guises, the idea that Sprs use language in habituated, routine ways has been a staple in the study of language for the last half century or more (cf. phenomenologists, Sapir, Whorf, Garfinkel, conversation analysis, ethnography of speaking). The third source of habitus is the idea, made prominent by Mauss (1973), that human beings conduct themselves physically in culturally patterned, habituated ways. Mauss was concerned with such phenomena as walking gait, posture, ways of carrying oneself, the management of body space in social settings (like waiting in line), socially standardized gestures (whether actually conventional, like the thumbs up gesture, or not), standard ways of holding objects, such as tools, of covering or revealing parts of the body. Mauss' insight was that these myriad aspects of how social actors inhabit and act through their bodies are socially patterned. Notice that, while some of this is explicitly taught to children and sanctioned, such as proper modesty or table manners, other aspects are merely instilled by habit and the tendency of human groups to routinize. The linguistic analogue to this would be utterance production as a corporeal activity, subject to habitual voice modulation, pacing, posture, degrees of involvement, and their embodiments.

The fourth source is the scholastic philosophical idea of habitus, meaning mental habits that regulate acts. This idea most decisively entered into practice theory through the writings of the art historian Erwin Panofsky, whose work Bourdieu translated and considered fundamental to his theory of practice. For our purposes, the most salient lines of argument in Panofsky (1976) were these:

1. In a given historical conjuncture, there exist underlying mental habits that guide people's cultural production in different spheres (such as philosophy and architecture in 12th–13th century Paris).
2. These habits are instilled through education.
3. They come to guide both how actors act and how they evaluate acts.
4. They are realized in works.

Thus stated, the habitus is a *modus operandi*, flexible enough to be realized in different works, every one of which is unique, and in different spheres of work, which may differ widely. From a language perspective, the habitus would involve discourse genres (Hanks, 1987; Briggs and Bauman, 1992), routine ways of speaking and interpreting speech, and the habits of mind implicit in standard ways of representing the world in language.

As used in practice theory, the term habitus bundles these four sources into a single idea. It therefore claims that there is a basic unity between the disposition to speak in certain ways, the evaluation of speech, the bodily habits enacted in speech production, and the mental habits instilled in speakers as social beings. What unifies this set of features is not logical necessity, but historical necessity. Habitus is individual, since it forms individual persons, and collective, since it is a social formation. It joins the body with the mind rather than asserting the division and priority of either one over the other, as is more typical in language studies long dominated by mentalism. Finally, it is an alternative vision of the speaking subject, openly contradictory of the traditional idea that speakers are freely intending persons whose inner mental states (propositional attitudes, intentions) are the source of discursive meaning.

The relation between habitus and field is subtle and far-reaching. On the one hand, the habitus is usually associated, in writings on practice, with the social provenance of the individual in terms of class, gender, ethnicity, and other macro-sociological divisions. It is inculcated in childhood, primarily in the domestic field and through more or less formal education. It is reinforced and reproduced in ordinary social life in these spheres and also in labor practices, which exert particular influences (including agriculture among farmers, research, writing and teaching for an academic, painting for a painter and so on, driving for a cabby, etc.). Any form of ritual practice has a potentially strong impact on habitus, by dint of engaging the dispositions, evaluations, body and mental orientations of practitioners through the repeated doing of practice. The important point is that there is a dynamic (if not dialectical) relation between contextual embedding and the formation of the actors who engage contexts. Language and discourse are among the central modalities through which the dynamic is articulated.

How do participants enact their positions in the field so as to achieve their communicative goals? How do they decide on goals and plausible ways of achieving them? Which strategies and moves are permissible or effective in a given field, and which are ineffective or impermissible? The idea that speakers are strategic is widely accepted in discourse studies. Gumperz's (1992) work on discourse strategies effectively shows that with contextualization cues, speakers strategically position themselves and frame the interpretation of their utterances for their own ends. Grice's (1989) theory of implicature rests on a model of the speaker as one who pursues communicative ends through "implicitation," by deriving and conveying complex conversational meanings with underspecified statements, formulated so as to be expanded by inference. The speaker in an inferential language game must be strategic if only to properly attain such subtle and understated affects. Similarly, conversation analysis envisions the speaker in interaction as an active maker of context, one who masters the procedural system of turn taking, the conditional relevances of conversational moves, knows how to hold the floor, call for a repair, invite or block certain inferences. In general, the exemplary speaker talks on purpose and pursues practical ends by more or less effective means, in more or less locally defined contexts. To call this 'strategy' invites the assumption that it is elaborately thought out, which is sometimes true, but not always. Whether full-blown strategies or mundane purposive gambits, discourse strategies have a double relation to the field: they may be called forth by context or they may produce it anew. If context bears an unavoidable relation to the habitus of those who occupy it, it is also subject to the purposive projects and strategies they pursue.

Contextualization Processes

In the course of spelling out a minimal architecture for discourse context based on embedding and emergence, we have made reference to a number of processes. As we have emphasized, all of the units involved emerge in time, albeit at different levels, and embedding itself is a dynamic process. At this point I want to draw together and offer a preliminary summary of the processes through which context occurs. The first class of processes involves intentionality, in both senses of representation and purpose. Thus, when a speaker pays attention, thematizes, formulates, or invokes context, he or she converts it into a semiotic object in a standing-for relation. Similarly, when the speaker uses grammatical, intonational, or gestural means to cue his or her current footing and to contextualize the current utterance, semiotic relations are produced between the expressive stream and the context of its expression. In deictic usage, speakers construe context, signaling both the referent and the perspective under which it is individuated. Austinian performatives (Austin, 1962) rest partly on the intentionality that links the propositional content to the conventional act type, the locutionary act to the illocutionary (*see* **Speech Acts and Grammar**). The kinds of creative indexicality revealed by Friedrich (1979), Silverstein (1976), and others all involve the consequential use of signs to invoke contexts and thereby bring them about. Through intentionality, signs and expressions project their objects and thereby alter context. Inferential processes (interpretation, extrapolation, implicitation, contextual enrichment) also operate on expression forms in the light of contexts, with special importance given to relevance structures. All of these processes rely critically on the capacity of participants to produce and evaluate signs of context, and to do so on purpose. Strategy and improvisation are ways of exercising this capacity.

But we have also mentioned processes that are not subject to the intentionality of participants, at least not necessarily. This is a different class of phenomena. From situations to settings, demonstrative fields, and embedding social fields, we have said that objects, persons, and groups occupy positions in context. This occupancy is not a standing-for relation, and it may or may not be subject to the purposes of the actor. If a police officer calls to me on the street, I am interpolated into a position, whether or not I wish and whether or not I produce a sign of my position. When I go to the airport and pass through security, I occupy the position of a ticketed passenger to be inspected whether I wish to or not, just as I become a customer when I sit in a restaurant. Occupancy can be described as 'taking up a position' but it also designates 'finding oneself in' and 'being put in' a position. When persons or objects are referred to in discourse, they are thereby thrust into positions and the social relations that define them. The key point is that the positions and the process of occupying them are social facts at least partly independent of the intentional states of the participants.

Another contextual process whose source is beyond the scope of intentional action is what might be called over-determination. The social field in which an interaction is embedded does not determine what participants do, or how context emerges. But it does make certain contextual configurations and actions more likely and predictable. It reinforces and calls for them the way the operating room calls for a certain engagement from the medical experts working in it, or the courtroom calls for specific forms of engagement on the part of its occupants. The acquired habitus of a practitioner of any profession

is reinforced constantly by the settings, rights, responsibilities, and routine practices that make up the field. Along with the training that inculcates ways of seeing appropriate to the profession, these aspects of the field reproduce, sanction, and guide contexts and ways of occupying them. We will say that embedding over-determines context when habitus, field, built space, and sanctioned practice align to impose or induce specific features of context. Organizations, religious and missionary settings provide clear examples of this, but the effect is much more widespread.

Social fields also authorize and legitimate certain contexts and modes of engagement, but not others. A cashier has the authority to tell you how much you owe for a product, just as a doctor has the authority to classify your body states and a teacher is authorized to evaluate your work. This authority is enacted in intentional processes, but its source is the field, not the intentional states of individuals. We describe it as a process and not an attribute in order to foreground the dynamic whereby authority is conferred on certain contexts and agents in them. Legitimacy could also be conceived as an attribute of contexts and actions, but is more productively viewed as the process whereby they are aligned to the values of the field. In the same family of phenomena, Ide (2001) distinguished between volitional aspects of discourse production and nonvolitional 'discernments' of context. The latter designated the process whereby participants construe and align themselves to the field-based requirements of context, such as when they use Japanese honorifics unreflectively and automatically, out of a habitus-like sense of what is called for. Any of these processes may involve intentionality, but they illustrate the capacity of fields to exert a structuring influence apart from intentionality.

Conclusion

Discourse context cannot be formulated as a set of correlations between global, macrolevel social features and local, microlevel ones: correlation is far too crude for the kinds of articulation in play. It cannot be described as the reproduction of macrolevel types at the token level: speech is productive and inherently situated. It cannot be derived by sheer seat-of-the-pants creative expression guided by purely local intentions and relevance systems: we do not simply fabricate the contexts of our discourse whole cloth. In short, the social horizon of discourse production requires that we use a different vocabulary. Two key terms in this new lexicon are emergence and embedding, and together they define a space of contextualization more productive and realistic than any of the familiar divisions of scale. Embedding describes the relation that holds between situations, settings, demonstrative fields, social fields, and habitus. These have the status of analytically isolable levels in the overall architecture of context. For any level X embedded in Y, Y entails X, Y inherits features from X and adds others, Y transforms X on several distinguishable dimensions (temporality, participation, weighting of factors), and Y serves as the presumptive horizon of X, held ready for thematization and relevance relations. Embedding is more basic than correlation, instantiation, or reproduction, because it is the objective condition under which these occur.

Some features of context follow from the distinct logic of the level at which they arise, whereas others are imposed by embedding. The sheer copresence of the situation, the relevance of the setting, the semiosis of the demonstrative field, the constraints and resources of the social field, the bodily dispositions of the habitus – any of these may be relatively free from the structuring effects of the fields in which they are embedded. To the extent that this is so, the contextual level to which they belong is relatively autonomous. By contrast, to the extent that some process at a given level is determined by its embedding in another field, it is nonautonomous. The functions that make up the demonstrative field, for instance, are relatively autonomous, whereas those that count as mutual monitoring and relevance are not, because they depend on the field in which they are embedded. Similarly, the resolution of ordinary indexical reference is nonautonomous.

Emergence is a pervasive feature of context, which is dynamic along several trajectories at several levels. What we might call context time precipitates from the interaction between distinct temporalities at the levels of situation (body time), setting (act time), demonstrative field (time formulated and invoked with signs, themselves produced in time), social field time (careers, historical revaluation of positions, objects, and what is at stake), and habitus time (embodied mental and physical habits, routinizations, alignments of disposition with evaluation). Just as time and participation are defined by copresence at the level of the situation, by cognitive engagement at the level of the setting and agent positions at the level of the field, so too other aspects of context emerge in different temporal streams. It is only in practice, especially communicative practice, that they are synchronized to one another. Context occurs when multiple temporal relations are articulated to one another in the emerging actuality of practice.

Behind the standard divisions of scale in context lies a more basic distinction between context-building processes that presuppose individual intentionality, and those that do not. The latter derive directly from the field in which communicative practice is embedded. Intentionality encompasses purposes (as in I intend [to] X) and aboutness relations (I am talking about X). For any student of language, it is doubtful whether the dispositions, mental habits, and embodiments of the habitus can replace intention as a motor for action, as Bourdieu suggested. It is difficult to imagine a theory of language or discourse context that exempted itself from aboutness relations or purposive action. Yet the habitus and the current state of the field cooperate on the intentional states of those that occupy them. They provide a ready-made universe of objects and agents, frames of reference, spaces and evaluative stances – the very stuff of context.

See also: Critical Discourse Analysis; Cultural and Social Dimension of Spoken Discourse; Discursive Practice Theory; Environment and Language; Indexicality: Theory; Linguistic Anthropology; Pragmatics: Overview; Social Aspects of Pragmatics; Social Construction and Language.

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Contextualism in Epistemology

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For a subject to truly be said to 'know' a proposition *p*, *p* has to be true, and the subject has to have a belief that *p* meets certain standards of justification. The invariantist will argue that, for any given proposition, the *same* standards are always in place. (The skeptical invariantist will usually take these to be very high standards, while the dogmatist will usually take them to be comparatively low.) By contrast, contextualists argue that the standards for the truth of knowledge attributions can vary from context to context. Consequently, in some contexts being able to answer skeptical doubts about our being, say, brains in vats tricked into thinking that we are experiencing a physical environment rather than a machine simulation, may be required to count as knowing that we have hands, while no such requirement may be in place in other contexts.

According to the contextualist, just as context shifts the satisfaction conditions of words like 'he' or 'tall,' context can shift the satisfaction conditions for 'know.' Contextualism has considerable appeal, since it seems clear that the standards associated with our use of 'know' show *some* sort of contextual variation. In everyday contexts, we claim to know all sorts of things; if the stakes are higher, we may claim to know less, and when faced with skeptical arguments, we may admit to knowing almost nothing. Contextualists can take the truth conditions of knowledge claims to vary the way our practice suggests. It thus both explains the intuitive pull of skepticism (skeptical arguments raise the standards for knowledge attribution) and allows that the soundness of skeptical arguments doesn't undermine the truth of everyday knowledge claims.

Nevertheless, invariantists have argued that the contextual variation in our use of 'know' should not be reflected in the term's semantics. Instead, they suggest that some aspect of our practice (either the everyday knowledge claims or our capitulation to skeptical arguments) is either (1) systematically in error, or (2) motivated more by pragmatic rather than semantic considerations. Both strategies have the advantage of positing a simpler, context-invariant, semantics for 'know,' but the required supplementary explanations of why our use of the term varies from the proposed semantics have often seemed suspiciously *ad hoc*.

However, even if we were to admit that the semantics of 'know' is context sensitive in some way, there is still a question of which context it is sensitive to. Three possible candidates for this context are the following:

1. The subject's context: The context in which the purported knower is in.
2. The attributor's context: The context in which the claim is made that the subject does, or does not, know a given proposition.
3. The assessor's context: The context in which the claim about the subject's (lack of) knowledge is evaluated as either true or false.

When one considers one's own first-person present-tense knowledge claims such as "I know that it's raining," all three contexts can overlap. However, if A claims, "It's raining," and B later claims, "A knew that it was raining," the subject's and attributor's context will be different. Furthermore, if C goes on to claim that "B's claim that A knew that it was raining was false," the context of assessment will be different from the former two as well.

How radical a doctrine contextualism will turn out to be will depend largely on which context knowledge claims are taken to be relative to.

The least radical of these takes the subject's context to be the relevant one. For instance, if A sees his cell phone across the table, and nothing much hangs on the issue, then he may count as knowing that his phone is nearby. On the other hand, if A is expecting a particularly urgent call on his phone, he might not count as knowing without picking the phone up to make sure that it is his rather than just another phone of the same type. Still, there will be nothing subjective about whether or not a person counts as knowing a given proposition. If the subject is

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in the low-standards context, then anyone who denies that the subject knows that his phone is in the room will be mistaken, no matter what context the particular attributor is in.

However, subject-based contextualism does not seem to capture the way in which the standards associated with our use of 'know' seem to vary. For instance, if the subject's context changes such that he will no longer be able to claim that he knows that his phone is across the room (say, he receives an e-mail telling him to expect the urgent call), he will not say that, five minutes prior to this change he did know, but now he no longer does. Rather, he will now say that he didn't know before either, which suggests that the standards vary not according to the context that the subject is in, but rather with something else (DeRose, 2002; Hawthorn, 2004).

Of course, it will be possible to explain the differences between these aspects of our use of 'know' and the first sort of contextualism by appealing to linguistic error or pragmatic factors to explain the divergence, but to the extent to which one claims that we are simply mistaken about the truth conditions of our knowledge claims, the contextualist's methodological advantage over the invariantist will seem to disappear.

On the other hand, cases like that just mentioned can be handled if we take the context of attribution to be the relevant one. On such attributer-based contextualism, it will be possible for two attributors to make seemingly conflicting true claims about whether A knows that his cell phone is in the room. If attributor B is in a low-standards context, he may truly claim that A knows that his phone is in the room, while if attributor C is in a context with higher standards, he may truly claim that A does not know this. The standards that are relevant for knowledge are determined not (exclusively) by A's situation, but also by B's and C's contexts, and considerations that are relevant for B and C might not be so for A. Knowledge attributions will thus be in an important sense, relative, since B and C can make seemingly conflicting true claims about A. The relativism involved here is, however, comparatively harmless, since there is a good sense in which B's and C's claims do not really conflict. Again, 'know,' on such an account, would be context sensitive in the way that, say, 'tall' is. If my 10-year-old cousin is 5′6″, he may be described as "tall" when we are discussing the prospects of his third-grade basketball team, or he may be described as "not tall at all" when we are discussing which members of my family could still sit comfortably in the back seat of a compact car. The second claim needn't contradict the first, and many would say that both claims can be true, it's just that the standard for being 'tall' is different in the two contexts.

While such attributer-based contextualism is probably the most popular version of the view (DeRose, 1992, 1995, 2002; Lewis, 1996; Neta, 2002, 2003; Williams, 1991), it fails to track some fairly well-entrenched aspects of our use of 'know.' In particular, when the standards for knowledge attributions go up, not only do we (1) refuse to claim that we know things that we claimed to know before, and (2) no longer claim that we knew those things in the past, but we also (3) claim that our earlier claims to know them were false (Hawthorn, 2004; MacFarlane, 2005). We will take back earlier knowledge claims, even if we recognize that the context of attribution has changed. In this respect, 'know' seems quite different from words like 'tall,' which are more plausibly tied to their contexts of attribution. When I move from a third-grade to an adult context, I will no longer refer to my 10-year-old cousin as 'tall,' but I will not take back my earlier characterization of him as tall or admit that it was mistaken. I'd be more likely to flag the original context of attribution, saying something like, "I meant tall for a 10 year old," than concede that my original claim was false. By contrast, when the skeptic challenges my knowledge claim, I'm not inclined to simply respond with something like, "I meant 'know' in the 'easy' sense." Rather, if I find the skeptic's arguments convincing, I'll come to view my older knowledge claims as false.

Cases like this last one can be handled by adopting the more radical stance of claiming that the assessor's context determines which standards are relevant for knowledge attributions (MacFarlane, 2005). Such assessor-based contextualism will lead to a much more robust relativism about knowledge. On such a view, relative to C's context, not only will A not know that his cell phone is in the room but B's claim that A does know this will also be false. In much the same way, relative to B's context, A knows that his cell phone is in the room, and C's claim that he doesn't know this is false. On this view, then, not only can a particular sentence ("John is tall" or "Peter knows that it is raining") be true when asserted in one context and false when asserted in another but also the same assertion of a sentence can be true relative to one context of assessment and false relative to another.

This last form of contextualism may do the best job of tracking our own use of epistemic terms, but the degree to which it requires us to complicate not only our general semantic framework but also our conception of truth may seem too radical for some. For these, it may seem more promising to simplify the

semantics by trying to explain away those aspects of our practice that support the assessor-based view. Once again, however, more moderate contextualists will risk sliding to invariantism if these same strategies for explaining away part of our practice can be extended to the rest of those aspects of our use that conflict with invariantism.

See also: Analytic Philosophy; Epistemology and Language; Indexicality: Philosophical Aspects; Meaning: Overview of Philosophical Theories; Pragmatic Determinants of What Is Said; Truth Conditional Semantics and Meaning.

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Carlo Conti Rossini was born on April 25, 1872 in Salerno, Italy, and developed careers in both public service and Ethiopic scholarship. He studied law at the University of Rome, graduating in 1894. He became Director (Secretary General) of Civil Affairs in Eritrea from 1900 to 1903, the representative of the State Treasury to Paris from 1907 to 1910, Secretary General for Political and Civil Affairs in Libya (*Tripolitania*) from 1914 to 1915, Director General of the Ministry of the Treasury from 1917 to 1925, and State Councillor in 1925.

In 1890, at the University of Rome, he was influenced by Ignazio Guidi and decided to pursue Ethiopian studies at the time Italy was establishing Eritrea as a formal colony. Conti Rossini was a professor of Abyssinian (Ethiopian) history and languages at the University of Rome from 1920 until 1949. In 1914, he became a corresponding member of the *Accademia dei Lincei* and a national member in 1921. He was Vice-President of the reconstituted *Accademia dei Lincei* in 1948 and Vice-President of the Italian Institute of Anthropology from 1947 to 1949.

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semantics by trying to explain away those aspects of our practice that support the assessor-based view. Once again, however, more moderate contextualists will risk sliding to invariantism if these same strategies for explaining away part of our practice can be extended to the rest of those aspects of our use that conflict with invariantism.

See also: Analytic Philosophy; Epistemology and Language; Indexicality: Philosophical Aspects; Meaning: Overview of Philosophical Theories; Pragmatic Determinants of What Is Said; Truth Conditional Semantics and Meaning.

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See also: Cushitic Languages; Eritrea: Language Situation; Ethiopia: Language Situation; Tigrinya.

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Control and Raising

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Background

Raising and control refer to two families of related constructions that have been the focus of intense scrutiny during much of the era of generative linguistics. The paradigm examples of these constructions are exemplified in the pairs of sentences in (1) and (2).

(1a) The students seemed to understand the issue.
(1b) The students tried to understand the issue.

(2a) The teacher expected the students to help the visitors.
(2b) The teacher persuaded the students to help the visitors.

The (a) sentences in (1) and (2) are referred to as 'raising' (more precisely, raising to subject and raising to object, respectively) because under some influential analyses, what is taken to be the subject of the embedded clause (*the students* in both cases here) raises out of the complement to become a dependent of the matrix clause. The (b) sentences are referred to as 'control' (subject control and object control, respectively) because a matrix dependent, *the students* in (1b) and (2b), is said to control (or determine) the reference of the nonovert subject of the embedded clause. Only the subject of the clausal complement participates in raising and control. No other embedded dependents are affected.

The key difference between the constructions is as follows. Raising constructions involve an overt NP that appears to be syntactically disconnected from the element that assigns it its semantic role. Thus, in (1a),

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The key difference between the constructions is as follows. Raising constructions involve an overt NP that appears to be syntactically disconnected from the element that assigns it its semantic role. Thus, in (1a),

the students is the semantic subject of *understand* and the syntactic subject of *seem*. In (2a), *the students* is the semantic subject of *help*, and although it is in the appropriate position to be its syntactic subject as well, its morphology (accusative case) suggests that it is the syntactic object of *expect*. This is made more salient in (3), where *the students* in (2a) is replaced by the accusative pronoun *them*.

(3) The teacher expected them to help the visitors.

Control constructions involve a single overt NP which appears as the syntactic and semantic argument of one predicate, but which also functions as the semantic argument of another. In (1b), *the students* is the semantic and syntactic subject of *try*, and is also the semantic subject of *understand*. In (2b), *the students* is the semantic and syntactic object of *persuade*, and is also the semantic subject of *help*. Both raising and control are (largely) lexically governed constructions. That is, the choice of matrix verb in each of (1) and (2) determines whether raising or control may apply in each case to the complement clause.

Traditional Empirical Distinctions

Despite having identical surface strings NP-V(-NP)-*to*-VP, the raising and control constructions are distinguished by a number of properties. The following discussion touches on some classic, well-established differences between these two constructions.

As noted above, raising and control structures have distinct thematic structures. In raising structures, the matrix subject of an intransitive verb appears to have a thematic relation only in the state of affairs of the complement. Thus (1a) is truth-conditionally equivalent to (4).

(4) It seemed that the students understood the issue.

In (4), *the students* has a role of 'experiencer' as the subject of *understand*, whereas the pleonastic subject *it* receives no thematic role at all: the predicate *seem* need not assign a thematic role to its subject. The thematic structure of (1a) is identical to (4). *The students* is an experiencer, but has no other thematic role assigned. In the control construction in (1b), *the students* has two roles in the sentence, one as experiencer of *understand* and one as agent of *try*. The control verb *try*, unlike the raising verb *seem*, assigns a thematic role to its subject. Thus, intransitive raising and control verbs have different thematic structures.

Transitive raising and control verbs exhibit a similar difference, one residing in the postverbal argument. In (2b), *the students* bears two thematic roles: agent of the embedded verb *help* (i.e., the helper) and object of persuasion (i.e., the persuadee) of the verb *persuade*. *Persuade* assigns three thematic roles: agent, persuadee, thing persuaded of (the clausal complement). In (2a), *the students* bears a single thematic role, agent of *help*. That is, (2a) is truth-conditionally equivalent to (5).

(5) The teacher expected that the students would help the visitors.

In (5), as in (2a), *expect* has two thematic roles to assign – experiencer to its subject and theme to the clausal complement. Thus, transitive raising and control predicates have distinct thematic structures, just as intransitives do.

Embedded Passive

As first reported by Rosenbaum (1967: 59–61), raising and control behave differently when the complement clause is passive. For raising predicates such as *seem*, a sentence that takes a passive complement is synonymous with the same sentence taking an active complement (6).

(6a) The physician seemed to have examined the patient.
(6b) The patient seemed to have been examined by the physician.

In the case of an intransitive control verb, the sentences that take embedded passive are not synonymous with the active, and, an embedded passive is sometimes precluded.

(7a) The physician tried to examine the patient.
(7b) The patient tried to be examined by the physician.

(8a) The students tried to read the book.
(8b) #The book tried to be read by the students.

The sentences in (7) are not synonymous. In (7a), it is the physician who attempts the examination, whether or not the attempt is successful. Conversely, in (7b), it is the patient who makes the attempt, regardless of the outcome. In (8), the embedded passive is not possible because the thematic structure of *try* assigns the agent role to its subject, which must be a sentient, volitional entity as subject.

A similar situation is evident with transitive raising and control predicates. With raising predicates, sentences with embedded passive and active are truth-conditionally equivalent; (9a) and (9b) are synonymous.

(9a) The teacher expected the students to help the visitors.
(9b) The teacher expected the visitors to be helped by the students.

The teacher's expectation in both sentences is that the students help the visitors. With control predicates, however, the embedded passive and active are not synonymous. The state of affairs expressed in (10a) is not the same as (10b).

(10a) The teacher persuaded the students to help the visitors.
(10b) The teacher persuaded the visitors to be helped by the students.

In (10b), the teacher must persuade the visitors of the need for the help while in (10a) it is the students that must be persuaded. The synonymy or nonsynonymy of sentences with active and passive complements thus provides a second diagnostic for distinguishing raising and control.

Selectional Restrictions

Raising can be distinguished from control based on selectional restrictions imposed by embedded predicates.

(11a) The rock is granite.
(11b) #The rock understands the problem.

Sentence (11a) is well formed; the predicate *be granite* selects for a subject that can in fact be granite, such as a rock. But (11b) is semantically ill formed; the predicate *understand* requires that its subject be sentient, which rocks are not.

In raising, the selectional restrictions of embedded predicates affect well-formedness (12), while in control they do not (13).

(12a) The rock seems to be granite.
(12b) #The rock seems to understand the problem.

(13a) #The rock tried to be granite.
(13b) #The rock tried to understand the problem.

Comparing (12) with (11), it is clear that the embedded predicate is responsible for semantic well-formedness. Just where the matrix subject *the rock* is incompatible with the embedded predicate (12b), the sentence is semantically ill formed. With control, however, it is clear that the embedded predicate wields no influence over the judgments of acceptability. Both (13a) and (13b) are semantically ill formed, and this oddness results from the semantic requirements of *try*, which assigns the agent role to its subject, and thus requires a subject capable of volition. Transitive raising and control predicates exhibit parallel behavior, (14) and (15).

(14a) Sam expected the rock to be granite.
(14b) #Sam expected the rock to understand the problem.

(15a) #Sam persuaded the rock to be granite.
(15b) #Sam persuaded the rock to understand the problem.

Pleonastic Subjects

The fact that control predicates assign a thematic role to the controller, while raising predicates assign no thematic role to the corresponding argument, can also explain the distinct behaviors of the two classes with respect to embedded passive and selectional meteorological expressions and existential *there*. Either can be the subject of an intransitive raising predicate such as *seem* (16), but neither is possible with control predicates (17).

(16a) It seemed to be raining.
(16b) There seems to be a unicorn in the garden.

(17a) *It tried to be raining.
(17b) *There tried to be a unicorn in the garden.

As they are semantically empty, pleonastic elements can be assigned no thematic role. Therefore, they cannot occur with a predicate such as *try,* which assigns the agent role to its subject; hence the ungrammaticality of (17). However, pleonastic elements are compatible with raising predicates, which assign no thematic role to their subjects (16).

Again, parallel data are found with transitive raising and control predicates.

(18a) Sam expected it to have rained.
(18b) Sam expected there to be a unicorn in the garden.

(19a) *Sam persuaded it to rain.
(19b) *Sam persuaded there to be a unicorn in the garden.

The ungrammaticality in (19) is due to the fact that *persuade* has a thematic role to assign to the postverbal NP, its object, and this role cannot be assigned to semantically empty elements such as *it* and *there*. This is not true of raising predicates.

Idiom Chunks

Finally, raising and control constructions differ with respect to idioms. The ambiguity of the expression *the fur will fly* or *the fur flew* is preserved in raising but not control.

(20a) The fur seemed to fly at the last committee meeting.
(20b) ?The fur tried to fly at the last committee meeting.

(21a) Tina expected the fur to fly at the last committee meeting.
(21b) ?Tina persuaded the fur to fly at the last committee meeting.

With raising predicates, expressions can retain their idiomatic interpretation: (20a) and (21a) can still be interpreted as describing situations in which the fur flying refers to an argument or confrontation. Conversely, with control predicates, the idiomatic interpretation is no longer possible: in (20b) and (21b) *the fur* can only be interpreted as referring to the hair of an animal.

Analyses of Raising and Control

The foregoing differences have, in most cases, led syntacticians to propose distinct analyses for the constructions. Accounts of the raising/control distinction have depended in some measure on empirical differences (such as those above) and in some measure on prior theoretical assumptions.

Going at least back to Bach (1977), some have adopted the position that the difference between the (a) and (b) sentences in (1) and (2) is better accounted for through compositional semantics than by means of any structure-changing or structure-dependent rule. Such an approach can be represented as in (22) and (23).

(22a) the students [$_{VP}$ seemed [to understand the issue]]
(22b) the students [$_{VP}$ tried [to understand the issue]]

(23a) the teacher [$_{VP}$ expected [the students] [to help the visitors]]
(23b) the teacher [$_{VP}$ persuaded [the students] [to help the visitors]]

In (22a)/(22b) and in (23a)/(23b) the structure of the matrix VP is the same. In (22a), the infinitival complement of *seem* passes its thematic role up through the matrix VP and assigns it to the matrix subject *the students*. In (22b), the infinitival complement of *try* does the same thing, but *try* also assigns a thematic role to the matrix subject, such that *the students* is the semantic subject of both the matrix and embedded verbs. In (23a), *the students* is the matrix direct object of *expect* (accounting for its being an accusative pronoun), but gets its thematic role from the infinitival complement to its right. Example (23b) is the same as (23a), except that *the students* also is the semantic object of *persuade*.

Bach's analysis is related to an entire family of nonderivational syntactic solutions, including Montague grammar and its derivatives (categorial grammar [see Jacobson, 1992] and generalized phrase structure grammar [see Gazdar *et al.*, 1985]) along with lexical functional grammar (see Bresnan, 1982) and head-driven phrase structure grammar (Pollard and Sag, 1994).

The transformational/derivational alternative to (22)/(23) involves operations of movement or promotion for the raising cases, and Equi(valent NP deletion) for the control class of constructions. This analysis goes back to Rosenbaum (1967) and is subsequently developed in much greater empirical detail in Postal (1974). It is roughly represented in (24)/(25), in which the deep structure (DS) and surface structure (SS) for each sentence is presented.

(24a) DS: [$_{VP}$ seemed [the students to understand the issue]]
SS: the students [$_{VP}$ seemed [to understand the issue]]
(24b) DS: the students [$_{VP}$ tried [the students to understand the issue]]
SS: the students [$_{VP}$ tried [~~the students~~ to understand the issue]]

(25a) DS: the teacher [$_{VP}$ expected [the students to help the visitors]]
SS: the teacher [$_{VP}$ expected the students [to the students help the visitors]]
(25b) DS: the teacher [$_{VP}$ persuaded the students [the students to help the visitors]]
SS: the teacher [$_{VP}$ persuaded the students [~~the students~~ to help the visitors]]

Underpinning the transformational analysis is the theoretical assumption (the Katz–Postal hypothesis, 1964) that two clauses with logically equivalent meaning share a common underlying structure (DS). In this regard, the underlying synonymy of (2a) and (26) would be deemed relevant.

(26) the teacher expected [the students would help the visitors]

If (2a) and (26) are logically equivalent and if (26) has a sentential complement in DS, then so must (2a). Under the transformational approach to raising in (24a) and (25a), *the students* in each case occupies the embedded subject position of the infinitival clausal complement at DS, and then moves (i.e., 'raises') to the matrix subject and object positions, respectively, at SS. In the control constructions, (24b)/(25b), the subject of the embedded infinitival complement is paired with a matching (i.e., 'equivalent') subject or object NP in the matrix clause. The lower (infinitival) subject is deleted at SS under identity with its higher counterpart. The analyses in (24) and (25) form the basis of formalisms applied to these constructions in

arc pair grammar (Johnson and Postal, 1980) and relational grammar (Perlmutter and Postal, 1983a, 1983b).

A raising approach to (1a) as depicted here is maintained in the government and binding (i.e., principles and parameters) approach in which a general rule 'Move NP' or 'Move α' replaces specific rules such as raising. Chomsky's approach to (2a), however, diverges from the analysis given in (25a). Chomsky (1973) rejects a rule-based model of transformations (i.e., a model in which individual structures are generated by the application of specific transformational rules) in favor of a model in which generalized transformations are restricted by a set of 'conditions' on their application. This leads to his rejection of the raising account for (2a). Instead, he proposes something along the lines of (27).

(27) DS: the teacher [$_{VP}$ expected [the students to help the visitors]]
SS: the teacher [$_{VP}$ expected [the students to help the visitors]]

In his account, the difference between (26) and (27) lies in the presence/absence of tense in the lower clause. Chomsky's Tensed-S condition provides that a tensed S(entence) is a barrier to any operation involving an element outside the tensed S and one inside it. Thus, the verb *expect* may not assign accusative case to the embedded subject of its complement in (26) because the presence of tense in the lower clause blocks it. In (27), the lower clause is untensed and case marking from outside is possible. This basic approach is further articulated in Chomsky (1981), and integrated there into a model in which the projection principle, theta theory, and case theory all play a role. In the GB model, sentences such as (2a) involve exceptional case marking (ECM, i.e., case marking **into** an adjacent complement, rather than Case marking **of** an adjacent complement), while sentences such as (1a) are still deemed to involve NP movement (i.e., raising). The distinction between the 'raising to object' and 'ECM' perspectives, initiated in Chomsky (1973), remained fairly stable in the syntactic literature until the publication of Lasnik and Saito (1991), wherein the raising approach was reconsidered favorably within the MIT/Chomskyan tradition.

Also introduced in Chomsky (1973) was a new approach to control. In some instances, Equi was no longer invoked, but a null pronominal PRO was generated as the subject of the complement clause in the underlying structure. PRO received its interpretation through co-indexation with a matrix clause argument, the controller. In this analysis, (24b) would have the underlying and surface representation in (28a), and (25b) the representation in (28b).

(28a) the students$_i$ tried [PRO$_i$ to understand the issue]
(28b) the teacher expected the students$_i$ [PRO$_i$ help the visitors]

The PRO analysis of control was strengthened and extended to all cases of control in GB and is currently the most widely accepted analysis in derivational approaches to syntax.

Raising and Control in Other Languages

Raising and control are generally assumed to be in the inventory of mechanisms available to all human languages and have been proposed in a great many grammars.

Raising and Control with Nonfinite Complements

In French, some infinitival complements have been analyzed as instances of raising (29) and others as instances of control (30) (from Ruwet, 1991).

(29) l'auteur de ce livre semble être génial
the.author of this book seems to.be brilliant
'the author of this book seems to be brilliant'

(30) l'auteur de ce livre prétend être génial
the.author of this book claims to.be brilliant
'the author of this book claims to be brilliant'

In Tsez (Dido), a Nakh-Daghestanian language of the Caucasus, some nonfinite complements have a control structure (31) (Polinsky and Potsdam, 2002).

(31) užiᵢ-r [PROᵢ t'ek magazin-y*ā*y yis-a]
boy-DAT *book*.ABS *store*-ABL *take*-INF
suλ'i-s [= Polinsky and Potsdam, 2002: 253 (9)]
forget-PAST.EVID
'the boy forgot to buy a book from the store'

In (31), the matrix subject *uži* 'boy' is co-indexed with and thus gives the interpretation to the infinitival complement PRO subject.

Raising has also been proposed for Niuean (Niue), an Austronesian language, to account for the sentence in (32b) (Seiter, 1983).

(32a) kua kamata [ke hala he tama e akau]
PERF *begin* SUBJ *cut* ERG *child* ABS *tree*
'the boy has begun to cut down the tree'

(32b) kua kamata e tama [ke hala e akau]
PERF *begin* ABS *child* SUBJ *cut* ABS *tree*
'the boy has begun to cut down the tree'

The raising analysis accounts for the change in word order and the absolutive case for *tama* 'child' in (32b).

Raising out of Tensed Complements

While it is unclear whether or not the complement clause in Niuean is finite or nonfinite, there are cases in which raising from clearly tensed complements has been proposed. Imbabura Quechua (Imbabura Highland Quichua) (Cole and Hermon, 1981) is one such case.

(33a) Maria-ca yacha-n [Francisco
Maria-TOP *know-3* *Francisco*.NOM
cay-pi ca-j-*ta*]
this-in *be*-PRES-ACC
'Maria knows Francisco to be here'

(33b) Maria-ca Francisco-ta yacha-n
Maria-TOP *Francisco*-ACC *know-3*
[cay-pi ca-j-ta]
this-in *be*-PRES NOM-ACC
'Maria knows Francisco to be here'

In (33b), *Francisco*, the embedded subject of (33a), occurs as a matrix clause dependent with accusative case.

A similar case is found in Japanese. The Japanese example (34b) has been assessed (first by Kuno, 1976) as a raising to object clause.

(34a) Yamada wa Tanaka ga baka da
Yamada TOP *Tanaka* NOM *fool* *is*
to omotteita [= Kuno(17a)]
COMP *thought*
'Yamada thought Tanaka to be a fool'

(34b) Yamada wa Tanaka o baka da to
Yamada TOP *Tanaka* ACC *fool* *is* COMP
omotteita [= Kuno (17b)]
thought
'Yamada thought Tanaka to be a fool'

In (34b), the accusative marked noun *Tanaka* is the subject of the embedded predicate phrase *baka da* 'is a fool.'

These Japanese and Quechua raising to object constructions differ in a very salient way from their English counterparts. In English, the alternation of raised and nonraised nominals correlates with the presence or absence of tense, i.e., finiteness. Raising is only possible when the complement clause is infinitival and not possible when it is finite, as in (35).

(35a) Mark believes him/*he to be late.
(35b) Mark believes he/*him is late.

In Japanese, raising to object constructions, such as (34b), distinguish themselves from their English counterparts in that the embedded clause is tensed (and has an overt complementizer *to*) and the 'raised' object can also optionally appear with nominative subject marking as in (34a). In the Quechua example (33b), the raised nominal *Francisco* appears to the left of the matrix verb while the tensed embedded clause *cay-pi ca-j-ta* from which it raised appears to the right.

Other Types of Raising and Control Constructions

The data considered to this point constitute the prototypical cases of raising and control. Other constructions also fit into the categories of raising or control.

Copy Raising

Constructions in which a subject or object appears to have raised into a matrix clause yet leaves a pronominal copy in the complement clause have been referred to as copy raising. Copy raising has been proposed for the predicates *seem like*, *look like*, *sound like*, and some others in English, as in (36b) and (37b).

(36a) It seems like Richard is in trouble.
(36b) Richard seems like he is in trouble.

(37a) It looks like the students understand the problem.
(37b) The students look like they understand the problem.

In the copy raising analysis, *Richard* (36b) and *the students* (37b) raise into nonthematic subject positions and leave pronominal copies (*he*, *they*) in their base-generated embedded subject positions. Rogers (1974) was the first to propose the analysis, arguing for it on the basis of the typical diagnostics for raising discussed above in the 'Traditional Empirical Distinctions' section, e.g., thematic interpretation, behavior of embedded passives, idiom chunks.

Copy raising has been proposed for a large number of languages, the pronominal copy frequently occurring as agreement morphology on the predicate of the clausal complement, as in the Greek example from Joseph (1976) (38b) and the Turkish example from Moore (1998) (39b), in which the embedded morphology is boldfaced.

(38a) theoro pos o-yanis
*consider.1*SG COMP NOM-*John*
ine eksipnos
*be.3*SG *smart*.NOM
'I consider John to be smart'

(38b) theoro ton-yani pos **ine** eksipnos
*consider.1*SG ACC-*John* COMP *be.3*SG *smart*.NOM
'I consider John to be smart'

(39a) san-a biz viski-yi iç-ti-k
you-DAT *we*.NOM *whiskey*-ACC *drink*-PST-*1*PL
gibi görün-dü
like *appear*-PST-*3*SG
'it appeared to you that we drank the whiskey'

(39b) biz san-a viski-yi iç-ti-**k**
we.NOM *you*-DAT *whiskey*-ACC *drink*-PST-*1*PL
gibi görün-dü-k
like *appear*-PST-*1*PL
'we appeared to you to have drunk the whiskey'

Copy raising is sometimes referred to as 'super-raising' because the subject usually raises from a tensed complement.

Possessor Raising

Possessor raising is another variety of raising widely attested in the world's languages. In this construction, a subject or object nominal dependent of a clause is interpreted as the possessor of another NP in that clause. Kinyarwanda (Rwanda), a Bantu language of Rwanda, illustrates this (Kimenyi, 1980).

(40a) Ingurube z-a-ri-iye ibíryo by'ábáana
pigs *they*-PAST-*eat*-ASP *food* *of.children*
'the pigs ate the children's food'

(40b) Ingurube z-a-ri-ir-iye ábáana ibíryo
pigs *they*-PAST-*eat*-APPL-ASP *children* *food*
'the pigs ate the children's food'

In (40b), *ábáana* 'children' functions as the direct object of the clause and is interpreted as the possessor of *ibiryo* 'food'; (40b) thus is propositionally equivalent to (40a), in which *ábáana* occurs as a prepositional modifier of *ibíryo*. In possessor raising (40b) is derived from the same underlying structure as (40a), the possessor having raised from the NP *ibíryo by' ábáana*.

Possessor raising is often a type of copy raising, a pronominal copy of the raised possessor occurring in the possessed NP, as in (41b) from Chamorro, an Austronesian language of Guam and Saipan (Crain, 1979).

(41a) Ha-sakki si Juan i biskletan
*3*SG-*steal* *the* *Juan* *the* *bicycle*
i famagu'un
the *children*
'Juan stole the children's bicycle'

(41b) Ha-sakkeng-guan si Juan i
*3*SG-*steal*-APPL *the* *Juan* *the*
famagu'un ni i biskeltan-**niha**
children OBL *the* *bicycle-their*
'Juan stole the children's bicycle'

Other Nonsubject Raising

Some have proposed that in some languages embedded dependents other than subjects can participate in raising. One such proposal is Seiter's (1983) analysis of (42).

(42) Kua kamata e akau [ke hala he tama]
PERF *begin* ABS *tree* SBJ *cut* ERG *child*
'the boy has begun to cut down the tree'

In (42), the complement object *akau* 'tree' occurs as the matrix clause subject. The status of raising nonsubjects in various languages is somewhat unclear.

Nonobligatory Control

Control is distinguished from raising in that it involves a null clausal subject that does not arise out of movement or syntactic displacement (i.e., a base-generated null subject), and whose reference is obligatorily determined by another nominal in a higher clause. In English (and many other languages), obligatorily controlled subjects only occur in nonfinite clauses, and the subject position of such clauses has been analyzed (as noted above) as PRO. If infinitival subjects are uniformly PRO, then alongside controlled PRO are occurrences of noncontrolled PRO. Consider the following contrast.

(43a) I convinced him$_1$ [PRO$_1$ to study hard]
(43b) I convinced him that [PRO$_{arb}$ to study hard] is an important key to success

Sentence (43a) is an example of obligatory object control (*him*, the object of *convince*, obligatorily controls the subject of *to study*). In (43b), PRO is inside the clausal subject of the complement of *convince* and is no longer in a position to be the controllee (recall that raising and control typically target embedded subjects). In this position, PRO has 'arbitrary' reference, corresponding to something like 'one' as in *for one to study hard*. The null subject of *to study* in (43b) has been called 'nonobligatory controlled PRO' or 'PRO-arb'.

Backward Control

There has been a significant amount of attention paid recently to control constructions in which the single overt nominal is in the lower clause. Polinsky and Potsdam's (2002) analysis of 'backward control' in Tsez is foremost among these. In addition to the more usual control structure in (31), Tsez has a control construction in which the controller surfaces as the overt subject of the embedded clause, and the controllee is a null matrix subject. The construction is exemplified in (44), where ERG(ative) case on *kidbā* 'girl' is an indication that it is a surface subject of the embedded clause.

(44) $\Delta_{i/*k}$ [kidbā$_i$ ziya bišra]
girl.ERG *cow*.ABS *feed*.INF *began*
yoqsi [= Polinsky and Potsdam, 2002: 246 (2)]
'the girl began to feed the cow'

The "silent element Δ [i.e., the null matrix subject] is obligatorily coindexed with the subject of an infinitival complement clause" (Polinksy and Potsdam, 2002: 246). Polinsky and Potsdam present substantial evidence for the null matrix subject and for its being (backward) controlled by the subject of the complement clause.

Control (but Not Raising) in Nominals

There is general agreement that control in nominalizations behaves differently from control in VPs. Nevertheless, one does find control structures in both. Raising is also distinct in nominalizations – it doesn't apply. So contrasting with (45a), a raising to subject clause, we find its nominal analogue in (45b) to be ill formed.

(45a) John appears to be polite.
(45b) *John's appearance to be polite. [cf. *the appearance to be polite*]

(46a) John attempted to leave.
(46b) John's attempt to leave.

As Jackendoff and Culicover (2003) pointed out, these facts were among the reasons given by Chomsky (1970) for **not** deriving nominalizations from sentences. This contrasts with the control construction in (46a) involving the control verb *attempt*. In the nominalization (46b), control is still observed.

See also: 20th Century Linguistics: Overview of Trends; Argument Structure; Chomsky, Noam (b. 1928); Combinatory Categorial Grammar; Constituent Structure; Formalism/Formalist Linguistics; Generative Grammar; Grammatical Relations and Arc-Pair Grammar; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Modern Linguistics: 1800 to the Present Day; Principles and Parameters Framework of Generative Grammar; Subjects and the Extended Projection Principle; Syntactic Constructions; Syntax-Semantics Interface; Thematic Structure.

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Controlled Languages

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A 'Controlled Language' (CL) is a language standard with restricted grammar, style, and vocabulary. Controlled Language standards are usually writing standards that apply to technical writing, but they can refer to spoken standards. Their general goal is to simplify or clarify the text by rendering it less ambiguous and more predictable. More specifically, people design CLs for two different purposes: to make language easier for people to understand, particularly nonnative speakers of a language, and to make language easier for machines to process (Huijsen, 1998). To keep the two purposes distinct, a CL that is designed just for machine interaction with humans will be called a 'computer-processible language' (CPL). The literature on CLs does not often distinguish between the two types of CL, but the different purposes can have different effects on the design of the CL.

Controlled Languages should not be confused with domain-restricted sublanguages. A linguist who describes the limited grammar, style, and vocabulary of a technical domain might well call the description a 'sublanguage.' Controlled Languages are not descriptive in nature. They artificially prescribe the language to be used in a technical domain. They often exclude expressions that would be part of a sublanguage description, but the restricted vocabulary and style are carefully chosen to minimize ambiguity and maximize clarity.

History of Controlled Languages

The idea of a CL is thought to have been first proposed in 1930 by Charles K. Ogden (Ogden, 1968). Ogden defined a standard that he called 'Basic English' (BE), a restricted subset of English that could be mastered easily by language learners. Ogden listed 850 words in his BE dictionary, but these words were not intended to be unambiguous in the modern sense of a CL. Rather, Ogden proposed that they be used in their fully ambiguous forms in a wide variety of constructions. For example, he proposed that *come* be used in expressions such as *come up against* and *come to a stop*, even though such idiomatic usage would not necessarily translate well into other languages. It was not until the 1970s that Ogden's work inspired the Caterpillar Tractor Company to create the first industrial CL: Caterpillar Fundamental English (Kamprath *et al*., 1998).

Caterpillar Fundamental English differed from later CLs in that it adopted Ogden's principle of maximally useful ambiguity. That approach wassoon abandoned in favor of one that assigned minimal ambiguity to approved words in the standard. The writing standards that evolved from Caterpillar Fundamental English – the International Language for Service and Maintenance (ILSAM) and the Plain English Program – gave rise to several industrial CLs, but most descend from ILSAM. The best known industrial CL in use today is The European Association of Aerospace Manufacturers (AECMA) Simplified English (SE) (Hoard *et al*., 1992), which has recently changed its name to Aerospace and Defense Association of Europe (ASD) Simplified Technical English (ASD, 2005). SE has become something of a model for new CLs because it is one of the few CL standards that is not proprietary to a single company. It is owned and maintained by the international aerospace industry. Other well-known CL writing standards are Alcatel's COGRAM (Schreuers and Adriaens, 1992), Perkins Approved Clear English (PACE) (Pym, 1993), Controlled Automotive Service Language (Godden, 2000), IBM's EasyEnglish, Caterpillar Technical English, KANT Controlled English (Nyberg and Mitamura, 1996), Attempto Controlled English (Fuchs *et al*., 1999), and Controlled English to Logic Translation (CELT) (Pease and Murray, 2003). Spoken CLs are less common, but some examples are Airspeak, Seaspeak, and Policespeak (Johnson, 1996).

Design of a Controlled Language

Typically, CLs have two components: a dictionary of approved words and a list of grammar and style restrictions. The dictionary may make a distinction between a closed set of general words and a more open-ended set of technical words. For example, the

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Typically, CLs have two components: a dictionary of approved words and a list of grammar and style restrictions. The dictionary may make a distinction between a closed set of general words and a more open-ended set of technical words. For example, the

basic dictionary for the CL writing standard of aerospace documents, AECMA SE, lists just about 850 general words, such as *put, take, know, calculate, person, data, assembly, up, down, but, yes, no,* and so on. The verbal prefixes *pre-* and *post-* are the only ones that can be added to verbs.

Technical names and technical verbs are not listed in the SE dictionary. AECMA SE has 20 categories for approved technical names and three major categories for technical verbs. Technical name categories include such terms as colors (*red, white*); numbers (*three, third*); part names (*main landing gear, thrust reverser*); locations on the aircraft (*wing, fuselage*); and personnel (*pilot, controller*). Technical verbs include manufacturing verbs (*grind, polish*, *flame-spray*); description and operation verbs (*refract, reflect*); and computer verbs (*load, click, boot*).

In addition to restrictions on the set of words, the standard also restricts the meaning of approved vocabulary. For example, the verb *follow* in SE can only be used to mean 'come after', not 'obey'. It is possible to have a CL in which the entire vocabulary is listed in the dictionary, but this is not practical for complex technical domains. The SE dictionary also includes a thesaurus of common but unapproved words, with suggested approved alternatives. For example, the unapproved verb *raise* has *lift, increase,* and *retract* listed as suggested approved alternatives. Although a thesaurus is not a necessary component of a CL, it is a practical necessity. CLs are very difficult to use without aids to help authors revise their wording.

Grammar and style restrictions minimize ambiguity and complexity by reducing allowable syntactic constructions and limiting the length of those constructions. Here is a partial list of grammar restrictions in the AECMA SE standard:

- Sentence length can be no more than 20 words for procedural text and 25 words for descriptive text.
- Paragraph length can be no more than six sentences.
- Noun cluster length can be no more than three words.
- The only permitted auxiliary verbs are *do, must, can,* and *will*.
- The *-ing* form of the verb may not be used.
- Only active voice in procedures should be used; passive should be used only rarely in descriptive text.
- Noun phrases should be begun with articles wherever possible.
- Simultaneous steps should be put into the same sentence, but sequential steps should be placed in separate sentences.

AECMA SE is an industrial writing standard that is maintained largely by representatives of the technical writing community. It was not designed as a CPL, so it includes many rules that cannot be easily detected by a computer program. Some examples of such rules are:

- Begin all paragraphs with a topic sentence.
- Only use word meanings that are specified in the dictionary.
- Avoid jargon and vagueness.
- Present complex information slowly.

The intent of AECMA SE is not always just to make the language simpler and more readable, but also to cause the writer to add necessary language and remove unnecessary language. Thus, it does not always lead to a simple, straightforward translation of the source text. Consider the following paragraph, which is taken from an unpublished handout in an AECMA SE training course.

> It is equally important that there should be no seasonal changes in the procedures, as, although aircraft fuel system icing due to water contamination is more often met with in winter, it can be equally dangerous during the summer months.

There are many ways to rewrite the paragraph in SE, but the following sentence illustrates the clarifying effect that is intended by the standard. The important thing to notice here is that the revision does not preserve the full meaning of the source paragraph.

> Always use the same procedures because water in the fuel system can freeze during summer or winter.

Applications and Research Issues

The greatest obstacle to the success of CLs is acceptance by writers. It is difficult to learn to express technical material well in a CL. Therefore, a number of commercial CL checking tools have been developed to support authors, for example, the Boeing Simplified English Checker, John Smart's MAXit, and Tedopres's HyperSE. Typically, these systems check for noncompliance with grammar rules and vocabulary usage, but they do not support all CL restrictions. For example, they are not very good at detecting word sense violations. Also, these systems do not automatically translate the text into a target CL. The Simplified English Grammar and Style Checker/Corrector (Adriaens, 1996) was an early attempt to develop more fully automated correction. Future development will emphasize more intelligent correction in the revision process, but the fact that CLs do not attempt to preserve full meaning makes this a difficult challenge.

Controlled Languages are often closely associated with machine translation, and some systems have

already been deployed in industry. Many believe that the use of a CL can substantially reduce human translation costs, although there has been little research to prove this (Shubert *et al.*, 1995). Nevertheless, companies such as General Motors (Controlled Automotive Service Language) and Caterpillar have been pioneers in this field. KANT Controlled English has been applied to a number of technical writing domains. The CLs associated with machine translation tend to be closer to CPLs, in that their authors pay more attention to the reduction of structural ambiguities than AECMA SE does. For example, KANT Controlled English uses an interactive approach to disambiguation, and it is currently one of the most advanced systems for controlling word senses and structural attachment ambiguities.

Two of the newest areas of application for CLs are knowledge representation (Sowa, 2000) and human-machine interfaces. Attempto Controlled English (Fuchs *et al.*, 1999) was intended to formalize software specifications, but it has served to inspire CELT (Pease and Murray, 2003). The idea of CELT is to improve the efficiency of knowledge engineers to build ontologies and reasoning systems. CELT sentences can be translated directly into Knowledge Information Format. In theory, a domain expert should be able to add specialized knowledge to a system that would be able to integrate it with an existing knowledge base. Controlled Language technology offers the possibility of capturing human expertise as formal knowledge.

Controlled Languages have not yet had a large impact on human-machine interfaces, but the growing need for autonomous systems is putting pressure on researchers to come up with new ways to have complex interactions with machines. Command and control speech interfaces have been *de facto* CLs in that humans normally have to learn very restricted vocabulary. An example of a machine command CL is SRI's CommandTalk (Stent *et al.*, 1999), which was designed as a spoken language interface to a battlefield simulator. In the future, it is possible that CL technology will evolve to support the need for complex interactions between humans and autonomous intelligent systems.

See also: Description and Prescription; Ogden, Charles Kay (1889–1957); Speech Interface Design; Standardization; Terminology and Terminological Databases.

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Conventions in Language

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Independently of the question of what exactly linguistic meaning is (*see* **Meaning: Overview of Philosophical Theories**), a question arises as to the nature of its attachment to linguistic expressions: why does the word 'banana' mean what it does rather than something else? Why doesn't some other word have the meaning that 'banana' actually has? The answer almost everyone agrees upon is that it is a matter of convention that words mean what they do. Had there been different conventions of language, then words would have had different meaning. Views diverge, however, on the significance of the conventionality of language, on the question of what exactly a convention of language is, and on the extent to which meaning is conventional (as opposed to, say, inferential). In what follows the focus will be mainly on the second of these issues, i.e., on the nature of linguistic conventions.

Convention and Analyticity

In the background of current thinking on language conventions is the attempt of the logical empiricists to explain *a priori* knowledge as knowledge of analytic truths, i.e., propositions that are true in virtue of meaning (Carnap, 1947; Ayer, 1946; *see* **Analytic/Synthetic, Necessary/Contingent, and *a priori/a posteriori*** and ***A Priori* Knowledge: Linguistic Aspects**). An example are the truths of arithmetic: while Kant had thought they were synthetic (not true in virtue of meaning), Ayer and Carnap followed Frege in claiming that they are analytic, i.e., true by definition. Carnap extended this approach to modality: necessary truths are just those that are true in virtue of linguistic rules.

Conventionalism was opposed by Quine, who argued against Carnap that there is no coherent way of drawing a distinction between analytic and synthetic truths (Quine, 1951, 1960). According to Quine, it is impossible to separate the conventional from the empirical ingredient of any truth, because every attempt to explicate analyticity will ultimately rely on some other inexplicable semantic notion, such as synonymy or possibility.

The debate between Carnap and Quine forms the historical background for recent efforts to explain in detail how language is conventional. The most influential account is that by David Lewis (1969, 1983), who provided a game-theoretic account of convention in general and then explained the specific nature of conventions of language within this framework. However, Lewis's account built on Grice's earlier analysis of linguistic meaning in terms of speaker intentions.

Grice

Grice claimed that linguistic meaning is ultimately a matter of the communicative intentions of speakers (Grice, 1989). Grice started by defining a notion of speaker meaning ('non-natural meaning') in terms of speaker intentions and then analyzed the meaning of expression types in terms of their use by speakers to speaker-mean something with them (*see* **Grice, Herbert Paul (1913–1988)** and **Expression Meaning versus Utterance/Speaker Meaning**). He defined speaker-meaning as follows: a speaker *S* speaker-means that *p* by uttering *s* just if in uttering *s S* intends his or her audience to think that (*S* believes that) *p* on the basis of the audience's recognition of that very intention (Grice, 1989: 213–223, 123). For Grice, the meaning of expression types depended on what speakers in a speech community use these types to speaker-mean on particular occasions of use. A little more precisely, the dependence is as follows: a sentence type *s* means that *p* in a community *C* just if members of *C* have the habit of speaker-meaning that

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p by uttering *s*, and they retain the habit conditionally upon other members doing likewise. In short, words mean what they do because speakers use these words habitually with certain communicative intentions, and this habitual procedure is conditional upon other speakers doing likewise. (For the fine details of the account, see Grice, 1989: 124–128.)

Lewis

Grice's analysis of linguistic meaning in terms of speaker intentions was initially perceived to be in competition with accounts offered by formal semanticists (see e.g., Strawson, 1969). The formal semanticist's central notion in the explanation of meaning is not that of intention but that of a 'truth condition.' However, it now seems that the two approaches can complement each other, and need not be viewed as competitors. Formal semanticists study artificial languages (which often serve as models of fragments of natural languages) with the aim of elucidating phenomena of compositionality (*see* **Compositionality: Philosophical Aspects** and **Formal Semantics**). Grice's framework does not address questions of compositionality, but it can in fact accommodate the formal semanticists' approach. David Lewis's theory of linguistic conventions not only showed how the insights of formal semantics can be appropriated within Grice's theory of communicative intentions; it also offered a detailed explication of the notion of convention itself (Lewis, 1969, 1983).

According to Lewis, there is a vast range of possible languages. Restricting himself initially to simple cases (languages with only context-insensitive declarative sentences), Lewis thought of a possible language as a function from a domain of sentences into a range of truth conditions. Many of the languages described by formal semanticists are possible languages in this sense. Most possible languages, however, are not used by anyone. According to Lewis, this is where convention plays a key role. He used his game-theoretic notion of convention to specify under what conditions a possible language is an actual language, i.e., is actually used by a population of language users.

Lewis's General Notion of Convention

Any word could in principle be used to mean anything. If two language users are to communicate successfully they therefore need to coordinate their use of words and make sure they use the same words with the same meaning. This type of situation, where several agents have a common interest in coordinating their actions, is called a 'coordination problem.' Conventions are a way of solving coordination problems – linguistic conventions are just a special case of this more general phenomenon.

According to Lewis, conventions (linguistic or not) are regularities in the behavior of the agents of a population. These regularities arise from the common interest of the agents to coordinate their actions and is sustained because each agent expects the others to conform to the regularity and prefers to conform him- or herself if the others conform. There are potential alternative regularities which could also secure coordination, hence the need for a convention.

For example, if our phone conversation is interrupted and we have the common aim of continuing the conversation, then there are two alternatives: either I phone back and you wait, or you phone back and I wait. No other combination of actions will achieve our common aim. Each of us prefers to phone back if the other waits and prefers to wait if the other phones back. But how do we know what the other is doing? If the problem is a recurrent one, then a convention can help. For example, if each of us expects the other to phone back just if the other was the original caller and not to phone back otherwise, then each of us will prefer to phone back if and only if he or she was the original caller.

Lewis's definition of convention is roughly as follows (see Lewis, 1983: 165 for full details): a regularity *R* is a convention in a population *P*, just if

1. everyone conforms to *R*;
2. everyone believes that the others conform to *R*;
3. the belief that the others conform to *R* gives everyone a decisive reason to conform to *R* him- or herself;
4. *R* is not the only regularity meeting (3);
5. (1)–(4) are common knowledge among *P*: they are known to everyone, it is known to everyone that they are known to everyone, etc.

Conventions of Language

Lewis used the above definition of convention in his explication of what it is for any of the many possible languages (as described by a semantic theory) to be the language actually used by a population. According to Lewis, a population *P* uses a possible language *L* just if members of *P* have a convention of uttering sentences of *L* only if they are true in *L*, and of coming to believe in the truth in *L* of sentences that are uttered by others. The relevant coordination problem for a population here is the problem of converging on one possible language. It is in the interest of each member to use the language the other members are using because there is a common interest in communication. Lewis called this a "convention of truthfulness and trust."

There are some difficulties of detail that can be resolved by further refinements. For example, the proposal as sketched above does not take into account indexical languages or languages with non-declarative sentences (e.g., interrogative sentences). Lewis himself discussed how his approach can be suitably extended (Lewis, 1983). Another difficulty is the fact that too few speakers try to utter only sentences that are true in their language, and similarly too few speakers believe everything they are told. There is therefore no convention of truthfulness and trust in English among English speakers. Lewis's account can be modified to deal with this problem. For example, instead of saying that users of a language try to utter only sentences that are true in that language, Lewis could say that they utter sentences only if they **accept**, or want to commit themselves to, their truth for the purposes of the conversation.

A Basic Difficulty for Grice–Lewis

There are also some more fundamental difficulties, which concern the basic assumptions on which the Grice–Lewis approach is built. It is part of both Grice's and Lewis's accounts to attribute to language users highly complex mental states. On both accounts, language users are required to have unrealistically complex iterated preferences and beliefs concerning other language users (see definitions above). Typical language users, however, do not report these mental states. Lewis's response to these doubts concerning the psychological reality of these mental processes was to say that they are merely 'potential': users would explicitly have these cognitive states if they bothered to think hard enough (Lewis, 1983: 165) and presumably they would also be able to report these intentions if they thought hard enough. However, it is unclear whether the phrase 'hard enough' is substantial enough to render the theory empirically testable. Would Lewis accuse anyone denying the psychological reality of the account of not thinking hard enough?

Some psychological findings seem to add weight to this line of objection. The fundamental assumption behind Grice's and Lewis's approaches is that linguistic behavior is a product of a special case of instrumental reasoning. This much seems to be implied by Grice's idea that linguistic meaning is a matter of communicative intentions and linguistic behavior a special case of intentional action. As Laurence (1996) pointed out, however, there are cases which suggest that language processing and instrumental reasoning are independent faculties. A disability in instrumental reasoning can be accompanied by full linguistic abilities. Conversely, lack of linguistic abilities can be accompanied by fully functioning instrumental reasoning.

Chomskyan Accounts of Linguistic Convention

A Chomskyan view of language processing lends itself to a different account of linguistic convention. Any account of linguistic convention needs to preserve the idea that what a given word means is a contingent and largely arbitrary matter; that words could have meant something other than what they actually mean, and that other words could have meant what they actually do. Laurence (1996) argued that a Chomskyan view does preserve this idea.

On such a Chomskyan view, language processing is performed by a special language-processing faculty. This faculty processes language at various levels, phonologically, syntactically, and semantically. At each level, the faculty associates certain representations with utterances. On this view, one might say that the various representations the language faculties of a group associate with a given utterance determine that utterance's meaning in the language of that group. The meaning of an expression type would then be a function of the representations the language faculties would associate with any utterances of that type.

On this view of the meaning of expression types, it does indeed turn out to be contingent: each type might have meant something other than it actually means, etc. For the precise working of the language faculty in an adult is partly the result of environmental influences. Within the constraints of universal grammar, children learn the language spoken in their surroundings. Thus, the representations computed by a given language faculty will depend in part on the language-learning environment. Had the environment been different, the representations associated by the language processor would have been different, thus its meaning would have been different.

This model works best for the conventions of a language spoken by people who have learnt the language in the natural way. But it would also explain explicit linguistic conventions (e.g., when a new technical term is explicitly introduced in a scientific paper, or when an adult learns a natural language). Presumably, these are cases where instrumental reasoning provides input for, and interacts with, the separate language-processing faculty.

Convention versus Inference

The controversy between Griceans and Chomskyans concerns the role of instrumental reasoning in the

determination of what expressions conventionally mean. There is another controversy, again involving Grice at centre stage, concerning the extent to which the meaning of utterances is the product of the conventional meaning of the expression types used as opposed to other, linguistically unanticipated, inferences. Grice distinguished between what is literally said by an utterance from what is 'implicated' (*see* **Semantics–Pragmatics Boundary**). What is literally said is more or less determined by the conventional meaning of the expressions used. However, language users often aim to convey messages that go beyond what is literally said, such as the polite referee in Grice's famous example: when the referee says "the candidate has an excellent command of English" he is relying on the audience's ability to infer that he wished to convey that the candidate is no good at philosophy (see Grice, 1989: 33).

The controversy concerns which aspects of communication should be viewed as arising from pragmatic inferences, as in the case of Gricean implicatures, and which aspects should be viewed as pertaining to literal meaning. (Another related question is whether any implicature can be conventional.) Davidson is at one end of the spectrum of possible views here: he practically denies (in good Quinean fashion) that there is any conventional meaning. It may be helpful in interpreting an utterance to start with a conjecture that the expression types uttered have certain stable meaning, but ultimately such a conjecture is merely a 'crutch' (Davidson, 1984: 279). (For more on these questions see Recanati, 2004; also **Semantics–Pragmatics Boundary** and **Nonstandard Language Use**).

See also: Analytic/Synthetic, Necessary/Contingent, and *a priori/a posteriori*; Compositionality: Philosophical Aspects; Expression Meaning versus Utterance/Speaker Meaning; Formal Semantics; Grice, Herbert Paul (1913–1988); *A Priori* Knowledge: Linguistic Aspects; Meaning: Overview of Philosophical Theories; Natural versus Nonnatural Meaning; Nonstandard Language Use; Semantics–Pragmatics Boundary.

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Converbs

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Definition

The term 'converb,' coined by Ramstedt (1903: 55), is adopted from the Altaic linguistic tradition. It is becoming increasingly used to describe a dependent verb form traditionally known in the literature by the labels gerund, adverbial participle, and absolute construction (in European, and particularly Romance, languages), *gérondif* (specifically in French), conjunctive or absolutive participle (in South Asian languages) and *deepričastie* (in Russian, and in descriptions of languages of the Caucasus, Northern Asia, and Central Asia). Recent typological research has sought to establish whether these various terms, born of their different descriptive traditions, actually represent a single grammatical category.

A converb is a type of verb form that functions as a clause linking device. The clause containing the converb stands in a dependent relationship to a matrix clause and encodes a restrictive (modifying) or nonrestrictive (nonmodifying) proposition with respect to its matrix clause predicate. Languages of Western Europe tend to have either no converbs at all or just one or two forms, such as the participle VERB-*ing* form of English that functions as an adverbial adjunct and the *gérondif* of French (examples [1] and [16], respectively). At the other extreme are languages with highly complex converb systems, such as Korean, which has at least

determination of what expressions conventionally mean. There is another controversy, again involving Grice at centre stage, concerning the extent to which the meaning of utterances is the product of the conventional meaning of the expression types used as opposed to other, linguistically unanticipated, inferences. Grice distinguished between what is literally said by an utterance from what is 'implicated' (*see* **Semantics–Pragmatics Boundary**). What is literally said is more or less determined by the conventional meaning of the expressions used. However, language users often aim to convey messages that go beyond what is literally said, such as the polite referee in Grice's famous example: when the referee says "the candidate has an excellent command of English" he is relying on the audience's ability to infer that he wished to convey that the candidate is no good at philosophy (see Grice, 1989: 33).

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34 forms (cf. Sohn, 1999: 307–308). Languages with extensive converb systems are widely observed to make limited or no use of conjunctions in clausal syntax (Johanson, 1995: 316; V. P. Nedjalkov, 1995: 100; I. V. Nedjalkov, 1998: 340; Lamberti and Sottile, 1997: 128).

(1) English (Quirk *et al.*, 1985: 993)
Leav-ing the room
*leave-*ING*(=*CONV*)* *the room*
he tripped over the mat.
he tripped over the mat

(2) Huallaga Quechua (Quecha, Huánuco, Huallaga) (Weber, 1989: 305)
tsiki-ma-r-qa
*hate-me-*ADV*(=*CONV*)-*TOP
maqa-ma-n.
hit-me-he
'He hits me because he hates me.'

(3) Evenki (V P Nedjalkov, 1995: 456)
asatkan-me ajav-mi
*girl-*ACC *love-*CONV
asila-mča-v.
*marry-*SUBJUNC*-1*SG
'If I loved this girl I would marry her.'

(4) Malayalam (Asher and Kumari, 1997: 80)
avan muuɭi paaʈʈə paaʈi
*he hum.*PP *song sing.*PP
*(=*CONV*)* *(=*CONV*)*
kuɭimuriyileekkə pooyi.
*bathroom.*ALL *go.*PAST
'Humming a song, he went to the bathroom.'

(5) Korean (Sohn, 1999: 308)
nay ka ka-to
I NOM *go-though(=*CONV*)*
nami nun an ka-n-ta.
Nami TOP NEG *go-*INDIC*-*DECL
'Even though I go, Nami will not.'

(6) Turkish (Johanson, 1995: 313)
ali gel-ince
*Ali come-*CONV
osman şaşır-d-ı.
*Osman be.surprised-*TRM.PAST*-*3SG
'When Ali came, Osman was surprised.'

Recent definitions of the converb are based upon a combination of syntactic, semantic, and morphological criteria. Not all of these criteria are necessarily found to coincide in all languages with dependent verb forms used as adjuncts. This lack of uniformity presents a significant obstacle to establishing a concise formulation as to what constitutes the converb category. Currently there is no consensus as to how widely or narrowly the definitional net should be cast.

Haspelmath (1995: 3–8) defines a converb as "*a non-finite verb form whose main function is to mark adverbial subordination*" (the definition is italicized in the original). He proposes that converbs: (i) form part of the inflectional paradigm of verbs; (ii) are nonfinite; (iii) are adverbial, in the sense that they modify verbs, clauses, or sentences but never nouns or NPs; and (iv) are subordinate, i.e., embedded into a superordinate clause. In other words, a converb is a verbal adverb, distinct from verbal nouns functioning as clausal arguments and from participles functioning as adnominal modifiers.

Some languages use converbs in a more coordinative manner for linking a series of sequentially ordered predications in dependent clauses, with the sentence terminating in a matrix clause. This is often referred to as clause chaining (see Longacre, 1985: 263ff.), a term originally used to describe strings of dependent medial verbs in Papuan languages, but now also applied to similar structures formed with converbs (and alternatively known as narrative chaining in the literature).

(7) Kirghiz (Johanson, 1995: 329)
men erteŋ menen tur-up, zaryadka žas-ap,
*I morning with stand.up-*CONV *gymnastics do-*CONV
kiy-in-ip, žuː-n-up, čaay ič-ip, mektep-ke
*dress-*PASS*-*CONV wash-*PASS*-*CONV *tea drink-*CONV *school-*DAT
bar-a-žat-am.
*go-*PRES*-1*SG
'In the morning I stand up, do gymnastics, dress, wash myself, drink tea, and go to school.'

(8) Mongsen Ao (data from fieldnotes)
imtisàŋpàʔ tʃu aji tʃu tatsàŋ à
Imtisangba that rice. beer that bamboo. cup one
atʃət-lak-əɹ, tʃəm-əkə,
*squeeze-*DIR*-*CONV *drink-*CONV
atʃuŋ kàʔ kusu ku ami
shield also fireplace.shelf LOC *spear*
mətuŋ-tʃak-əɹ, atʃuŋ kàʔ,
*be.upright-*LEAVE*-*CONV *shield also*
anuk tʃu kàʔ hɹuŋ-si-əɹ
*machete that also hone-*REP*-*CONV
hàmət-əɹ aji tʃu tʃəm-əkə
*hold-*CONV *rice.beer that drink-*CONV
pa mən-əɹ làʔ.
3SG *sit-*CONV *wait.*PAST
'Imtisangba squeezed some rice beer into a cup, drank, propped the shield and the spear against the fireplace shelf, the shield also, honed the machete and held [it] drinking the rice beer [as] he sat and waited.'

Haspelmath (1995: 7–8) observes that while this usage of converbs is not typically adverbial or modifying according to his definition, it can be difficult to distinguish clearly between temporal adverbial subordination and clause chaining. Nevertheless, he insists on including the feature 'adverbial' in his definition in order to exclude masdars/verbal nouns and participles.

Some languages must rely on the contextual setting to distinguish between an adverbial modifying or clause-chaining function of a converb. In Hindi, for instance, alternative adverbial and sequential interpretations are sometimes apparent for the same converb clause.

(9) Hindi (Davidson, 1986: 1)
mujhee un-ciizõõ- koo deekh-kar
me.DAT *those*.OBL-*things* DAT *see-*CP(=CONV)
bahut gussaa aayaa.
great *anger* *come*.PERF
'When I saw those things, I became very angry.'
'Having seen those things, I became very angry.'

Converbs are widely employed for clause chaining in languages of South, Central, and East Asia, as well as in Semitic languages of Ethiopia (cf. Gasser, 1983: 101ff.; Lamberti and Sottile, 1997: 222ff.). Comparable sequences of multiple clauses are a structural impossibility in European languages because European converbs are typically constrained to encoding purely adverbial propositions with respect to their matrix predicates. This modifying function usually limits them to biclausal structures.

The ubiquity of clause-chaining converbs in numerous languages of Asia and Ethiopia raises the question of whether the notion 'adverbial' should be maintained as a prototypical characteristic of converbs if all members of the category do not necessarily express a restrictive adverbial proposition (see 'Semantic Typology' for further discussion).

V. P. Nedjalkov (1995: 97) defines the converb in terms of broader parameters, prefacing his criteria with the following statement. "As a first approximation, we can define a converb as a verb form which depends syntactically on another verb form, but is not its syntactic actant, i.e., does not realise its semantic valencies." He proposes that a canonical converb can occupy the position of an adjunct (i.e., an adverbial), but cannot occupy the positions of the only predicate of a simple sentence; of a nominal attribute (i.e., a participle); of a clausal actant, i.e., it cannot function as the complement of verbs such as *begin*, *order*, etc. (i.e., infinitives); and it cannot occupy the position of a nominal actant (i.e., a verbal noun).

Note that Nedjalkov's definition makes no claims with respect to nonfiniteness. On the one hand, this has the potential advantage of accounting for languages with finite dependent verb forms that would otherwise be excluded by Haspelmath's italicized assertion. On the other, it makes the definition less restrictive by allowing virtually any adjunct clause that is marked by a verbal affix to be identified as a converb (Bickel, 1998: 382). Nedjalkov's notion of the converb thus extends to the finite but dependent verb forms found in the Ethiopian languages Amharic and Wolaytta, and the finite, dependent verb forms of Greenlandic Kolyma Yukaghir, and a considerable number of other languages of Eurasia. As opposed to Haspelmath (1995: 23–27), it also encompasses the clause-chaining medial verbs of a number of Papuan and South American languages that are marked for person and number (e.g., see Longacre, 1985).

(10) Amharic (Gasser, 1983: 100)
bɨrhanu dä̆bdabbe-u-n at'f-o,
Bɨrhanu *letter-the*-ACC *fold*.CONV-*he*
qutʃ'tʃ'bɨl-o,
sit.CONV-*he*
m-assä̆lasä̆l dʒä̆mmä̆r-ä̆.
INF-*think.over* *start*.PAST-*he*
Bɨrhanu folded the letter, sat down, and started to think (things) over.

(11) Wolaytta (Lamberti and Sottile, 1997: 150)
nu ootiidde biida.
we *we.work*.CONV *we.go*.PAST
'We went while we were working.'

(12) West Greenlandic (Inuktitut, Greenlandic) (Fortesque, 1984: 55)
irnir-luŋa isir-puŋa.
do.hurriedly(=CONV)-*1*SG.CONT *go.in-1*SG.INDIC
'I entered quickly/in a hurry.'

(13) Yukaghir (Maslova, 1994, cited in I. V. Nedjalkov, 1998: 348)
taːt joːnro-lu-ge tudel pon' oː-l'el.
so *forget-1*PL-CONV *he* *remain-3*SG
'Since we forgot him, he remained alone.'

Tikkanen (2001: 1113) suggests that it may be expedient to distinguish between conjugated and nonconjugated converbs. This refinement would allow Haspelmath's nonfinite criterion to be maintained with respect to the inability of converbs to serve as matrix predicates, since conjugated converbs lack the expression or implication of mood that is required by independent predicates. Cross-linguistic evidence indicates that the finite/nonfinite opposition can be more of a gradual than an absolute phenomenon (Lehmann, 1988: 193ff.; Koptjevskaja-Tamm, 1994;

Ebert, 1999), varying according to the number of delimiting morphological properties that are expressed by a functionally dependent verb form. Alternatively, the precision with which the definition of the converb applies might be considerably enhanced by excluding finite verb forms that do not conform to a more restrictive set of criteria.

A further issue is raised by the term 'subordination' in any definition of the converb. Analogously to the notion of the converb, the concept of subordination is based upon no single unitary grammatical category (Haiman and Thompson, 1984). This has given rise to differing schools of thought with respect to what constitutes subordination. Haspelmath (1995: 48, fn. 7) acknowledges that his criteria for subordination – embedding in a discontinuous superordinate clause, variable position with respect to the superordinate clause, backwards pronominal anaphora, semantic restrictiveness, and the possibility of extraction – differ from those proposed in Haiman and Thompson (1984). Foley and Van Valin (1984: Chap. 6) define the term differently again, distinguishing between coordination, cosubordination, and subordination in their typology of nexus relations. Given the inconsistency with which the term 'subordination' is defined and used (e.g., cf. Haiman [1985: Chap. 4] for yet another interpretation), converbs might instead be recognized as simply 'dependent,' an unambiguous term for which there appears to be a consensus of understanding in the linguistic literature. Such an approach is advocated by Johanson (1995: 340, fn. 3) in his typology of Turkic converb clauses. It is also adopted by V. P. Nedjalkov (1995: 97) in his definition of the converb, and by Genetti (2005) in an analysis of the Dolakhā Newar converb.

Formal Properties of Converbs

Structure

A converb is usually marked by an affix on a verb stem. Suffixal morphology represents the dominant pattern. The structure of the converb clause can range from a single inflected verb form to a maximally specified clause containing core and oblique arguments. Converb clauses tend to precede their matrix clauses and thus accord with the predominantly head-final characteristics of the languages in which they are commonly found. This is not a syntactic requirement of converb clauses in all languages, however. In Hindi the converb clause can occur intrusively within the matrix clause, and in Russian it may follow the matrix clause. Similar ordering possibilities are reported for Malayalam (Asher and Kumari, 1997: 81).

(14) Hindi (Davidson, 1981: 107)

a. [akeelee baiṭh-kar] caay pii thii.
alone-OBL *sit*-CONV *tea* *drink*.PERF.FEM *be*.PST.FEM
'He used to sit alone and drink tea.'

b. caay [akeelee baiṭh-kar] pii thii.
tea *alone*-OBL *sit*-CONV *drink*.PERF.FEM *be*.PST.FEM
'He used to sit alone and drink tea.'

(15) Russian (Haspelmath, 1995: 13)

a. vernuvšis' domoj, xèvgun načal novoju žizn'.
return.PERF.CONV *home* *Khevgun* *began* *new* *life*
'Having returned home, Khevgun began a new life.'

b. xèvgun načal novoju žizn', vernuvšis' domoj.
Khevgun *began* *new* *life* *return*.PERF.CONV *home*
'Khevgun began a new life (after) returning home.'

Converb clauses differ from coordinate clauses in that such structural variations may modify stylistic emphasis, but do not essentially result in a change in interpretive meaning.

Referential Control

Complex sentences formed with converb clauses demonstrate different possibilities for the referential control of converb 'subjects' (see V. P. Nedjalkov, 1995 and Haspelmath, 1995 for an overview). The most common crosslinguistic pattern is for an implicit subject of a converb to be coreferential with an explicit subject of a matrix clause (cf. examples [1–4]). Many languages require the subject of a converb clause to be omitted when it is coreferential with the matrix clause subject. Less commonly, the predicates of both the converb and matrix clauses can have independent, explicit subjects (cf. examples [5–6]).

A third possibility is for the implicit subject of the converb to be coreferential with a salient referent that is external to the sentence. This is demonstrated in the French example of (16), in which the referent of the first sentence pragmatically governs the converb in the second sentence despite being unmentioned in the latter sentence.

(16) French (Halmøy, 1982: 179, cited in Haspelmath, 1995: 35)

Il pensa une seconde que c' etait sans doute cela qui
he *thought* *a* *second* *that* *it* *was* *without* *doubt* *that* *which*

l'	avait	sauvé,	lui,	trios	mois
him	*had*	*saved*	*him*	*three*	*months*
plus	tôt,	mais	en	même	
more	*early*	*but*	*at*	*same*	

temps,	il	cherchait	un	moyen
time	*he*	*sought*	*a*	*means*
de	lui	prouver	le	contraire.
to	*to.him*	*prove*	*the*	*opposite*
En	y	réfléchissant,	c'	était
CONV	*about.it*	*think.*CONV	*it*	*was*
elle	qui	dès	le	début
her	*who*	*from*	*the*	*beginning*

de	leur	liaison	avait	pris
of	*their*	*relationship*	*had*	*taken*
toutes	les	initiatives...		
all	*the*	*initiatives*		

'He thought for a second that that was perhaps what had saved him three months earlier, but at the same time he was looking for a means to prove the opposite to him. Thinking about it, it was she who has taken all the initiatives from the beginning of their relationship ...'

Referential control of an implicit converb subject is therefore sometimes determined by a pragmatically salient participant rather than by a syntactically defined pivot. The most pragmatically salient argument often coincides with the matrix clause subject, but need not do so. Possible nonsubject controllers also include dative experiencers and possessors of participants (see Haspelmath, 1995: 32ff.). This suggests that the referential control of a converb subject may ultimately be licensed by contextual pragmatics, reflecting language-specific degrees of sensitivity to topicality, agency, and other parameters external to the domain of syntax.

Referent Tracking

Some languages morphologically encode the presence or absence of crossclausal coreference, (i.e., switch reference) by means of same-subject, different-subject, and varying-subject (i.e., open reference) converbs (I. V. Nedjalkov, 1998). The same-subject converb marker is usually monomorphemic, whereas different-subject and varying-subject converb markers can be morphologically complex and involve possessive, reflexive, and agreement morphemes.

(17) Evenki (I. V. Nedjalkov, 1998: 341–342)

a. d'u-la-vi — eme-mi
house-ALL-REFL.POSS — *come*-CONV(=SS)
d'ep-te-n.
eat-NONFUT-3SG
'Having come home, he ate.'

b. d'u-la-vi — eme-reki-n
house-ALL-REFL.POSS — *come*-CONV-3SG(=DS)
asi-n — d'ep-te-n.
woman-3SG — *eat*-NONFUT-3SG
'After he returned home, his wife ate.'

I. V. Nedjalkov (1998: 341) reports that varying-subject converbs are the most frequent type in the Tungusic language Evenki and are used in both same-subject and different-subject constructions. The overlapping functions of a varying-subject converb are illustrated in (18). Coreferentiality is encoded by a reflexive-possessive suffix; noncoreferentiality is encoded by a personal-possessive suffix.

(18) Evenki (I. V. Nedjalkov, 1998: 341–342)

a. d'u-la-vi — eme-chele-vi
house-ALL-REFL.POSS — *come*-CONV-REFL.POSS(=SS)
d'ep-te-n.
eat-NONFUT-3SG
'Having come home, he ate.'

b. d'u-la-vi — eme-chele-n
house-ALL-REFL.POSS — *come*-CONV-3SG(=DS)
asi-n — d'ep-te-n.
woman-3SG — *eat*-NONFUT-3SG
'After he returned home, his wife ate.'

Languages that encode referent tracking in their converb systems include Quechuan languages (Cole, 1983; Weber, 1989), languages of the northeast Caucasus (Nichols, 1983), Burushaski (Tikkanen, 1995), and Paleoasiatic and Tungusic languages of northeast Siberia and the Far East of Russia (I. V. Nedjalkov, 1998).

Semantic Typology

Meanings of Converbs

The kinds of semantic propositions expressed by converbs include those of anterior or posterior sequence, overlapping temporality, manner, durativity, condition, concession, cause, reason, iterative alternation, substitution, circumstance, and purpose. The more complex a converb system is in a language, the more likely it is for individual forms to be dedicated to expressing specific semantic functions. Conversely, the fewer converb forms in a language, the more likely it is for a range of meanings to be expressed by the same form, and for the interpretation of those meanings to depend on contextual or pragmatic factors. V. P. Nedjalkov (1995: 106–110) differentiates the former and latter semantic types of converbs by the terms 'specialized' and 'contextual,' respectively. In addition, he posits a third semantic category of 'narrative' converbs. These can be used for combining a string of successive events that incrementally advance the plot towards its end point (e.g., cf. the function of the Turkic narrative converb formed with *-Ip* in [7]).

Contextual converbs in languages with a limited number of converbs are furthermore likely to

demonstrate semantic functions that overlap Nedjalkov's tripartite classification. The Nepali contextual converb formed with *-era*, for example, conflates adverbial modification with a narrative chaining function. According to Bickel (1998: 394–395), the conflation of these two functions in many languages of South and Central Asia constitutes primary evidence by which a major type of 'Asian' converb can be distinguished from the strictly clause-chaining medial verbs of Papuan languages and the adverbial modifying converbs of European languages.

(19) Nepali (Bickel, 1998: 395)
a. hiḍ-era āun-chu.
walk-CONV *come-1*SG.NONPAST
'I will come by foot.'
b. ek chin u saŋga kurā
one *moment* *he* *with* *talk*
gar-era āun-chu
do-CONV *come-1*SG.NONPAST
'I will talk to him for a moment and then I will come.'

Johanson (1995: 321–322) proposes a fundamental distinction between the modifying and nonmodifying functions of Turkic converb clauses. Converbs in a modifying function are propositionally restrictive and express meanings that correlate with adverbial interpretations, such as temporal modification, causality, concession, manner, and condition. The information they encode may be interpreted as 'backgrounding.' Converbs in a nonmodifying function are not propositionally restrictive, which allows the information they represent to be interpreted as foreground. This permits them to represent multiple events of equal narrative rank with their matrix clause events, potentially resulting in the distinctive chaining pattern that is characteristic of the syntax of many Central and South Asian languages.

Matrix Clause Operator Scope and Focusability

Matrix clause operators – i.e., tense, aspect, mood, and negation – may or may not have scope over dependent converb clauses, depending upon the semantic function of the converb in the reported instance of use. In Turkic languages, converbs used in a modifying function are outside the scope of their matrix clause operators, whereas converbs used in a nonmodifying function fall within their scope (cf. examples [20a, b]).

(20) Turkish (Johanson, 1995: 323–324)
a. ali gel-ince git-t-in mi?
Ali *come*-CONV *go*.TRM.PAST-*2*SG Q
'Did you go when Ali came?'
(=When Ali came, did you go?)
b. gel-ip gör-sün mü?
come-CONV *see*-OPT.3SG Q
'Shall he come here and see?'
(=Shall he come here and shall he see?)

The modifying, propositionally restrictive converbs of Turkish are also focusable, which allows them to be independently specified for operators. For instance, an interrogative particle can be shifted to a modifying converb clause to restrict its scope of application (cf. example [21]). Nonmodifying converb clauses cannot be autonomously marked by an interrogative operator because they are unfocusable (Johanson, 1995: 323–324).

(21) Turkish (Johanson, 1995: 323)
ali gel-ince mi git-t-in?
Ali *come*-CONV Q *go*.TRM.PAST-*2*SG
'Was it when Ali came that you went?'

The contrast between propositionally restrictive converb clauses that are outside the scope of matrix clause operators and propositionally nonrestrictive converb clauses that fall within their scope may be formally maintained by different types of converbs. But if a language uses contextual converbs in both propositionally restrictive and nonrestrictive functions, then the scope of operators is determined by semantic and pragmatic factors in the specific context of use. Often the scope of an operator may have more than one interpretation when a sentence is taken out of its context. This is particularly apparent for matrix clause negation in many languages.

(22) Mongsen Ao (data from fieldnotes)
pa aki nə wa-əɹ
*3*SG *house* ALL *go*-CONV
mə̀-tʃàʔ-la.
NEG-*eat*-NEG.PAST
'After going to the house, he didn't eat.'
'He didn't go to the house and eat.'

The fact that the same converb clause can demonstrate semantically and/or pragmatically motivated differences in operator scope has important ramifications for syntactic theory, since it is claimed that differences in the scope of clausal operators are universally diagnostic of differences in syntactic structure (e.g., Foley and Van Valin, 1984).

Diachronic Origins of Converbs

Postpositions and other nominal morphology provide the most widely attested diachronic source for converbs. Some crosslinguistically attested patterns are for ergative, instrumental, and ablative case postpositions to develop temporal and causal meanings, for dative and allative case postpositions to evolve purposive meanings, and for locative case postpositions

to grammaticalize conditional, concessive, and temporal meanings (Genetti, 1986). Converbs that grammaticalize from postpositions thus closely correlate with the specialized converb category that is used to express propositionally restrictive meanings in many languages.

Converbs have grammaticalized from (noun-modifying) participles and verbal nouns in Slavic languages (Haspelmath, 1995) and in Burushaski, Uralic, Turkic, Mongolic, Yeniseian, and Tibeto-Burman languages (Tikkanen, 1995, 2001). Verbs provide a diachronic source for converbs in some regions of Eurasia. The verb *to say* is a recurrent target of grammaticalization in Tibeto-Burman, Indo-Aryan, and Dravidian languages of the subcontinent, where it is widely found to function as both a quotative complementizer and a converb expressing purpose and causality (Saxena, 1988).

Extended Functions of Converbs

Converbs are often used for recapitulation, which Thompson and Longacre (1985: 208ff.) refer to as tail-head and summary-head linkage. The finite verb of a preceding matrix clause is followed by the same verb as the head of a converb clause, with coreferentiality holding between the subjects of the linked clauses, e.g., ... *Harry ate his meal. Having eaten, he* .... Tail-head linkage provides cohesion to narrative discourse and helps to build on the text by means of accretion.

(23) Dolakhā Newar (Genetti, 2005: 49)
gaŋgā debi bihā yeŋ-an
*Ganga Debi wedding do-*PART *(=*CONV*)*
hār-ju. gaŋgā debi bihā
*bring-3*SG.PAST *Ganga Debi wedding*
yeŋ-an hā-ene
*do-*PART*(=*CONV*)* *bring-3*SG.PART *(=*CONV*)*
āme khu-mā mucā
*3*SG.GEN *six-*CL *child*
janm-ai jur-a
*born-*BV *happen-3*SG.PAST
'He married Ganga Debi. Having married Ganga Debi, her six children were born.'

In a further development, constructions involving converbs have lexicalized and taken on conjunctive functions in some languages. In Mongsen Ao, a verb root with the original lexical meaning of 'do' has evolved a generic meaning and occurs with a quotative complementizer and a narrative converb marker. This lexicalized collocation expresses the equivalent of 'and then' when it follows a finite clause. The quotative complementizer can also occur alone with a number of specialized converb markers. These syntactically headless constructions summarize preceding information and relate it to the following discourse.

(24) Mongsen Ao (data from fieldnotes)
tə̀-pàla kútákəɹ kútə́ tʃhà-əɹʔ
QUOT- *heavenly. what do-*PRES
COND.CONV *being*
'If that be the case, what are the heavenly beings doing?

Turkish is another language in which a conjunctive function has developed out of converb forms (Johanson, 1995: 316). For analogues in European languages, see Lehmann (1988: 210ff.).

Geographical Distribution

Converbs are predominantly a typological phenomenon of verb-final languages of Eurasia and have an extensive distribution across the continent. They are found in English, Romance languages, Eastern Baltic languages, Slavic languages, Greek, Finno-Ugric languages, Mongolic, Turkic, and Tungusic languages, Persian, Indo-Aryan languages, Munda languages, Dravidian languages, Japanese, Korean, Paleoasiatic languages, Tibeto-Burman languages, and Ethiopian Semitic languages. Their distribution leads Masica (1976) to posit an Indo-Altaic area, in which converbs are characteristic of clause linkage. This linguistic area extends to the Ethiopian highlands of East Africa but excludes the rest of Africa, the Arabian Peninsula, Southeast Asia, and China. Outside of Eurasia and Africa, nonfinite verb forms that correlate with Eurasian converbs occur in Quechuan languages of South America. Whether the clause-chaining medial verbs of Papuan languages should be grouped with Indo-Altaic converbs remains a matter for further consideration.

See also: Adverbs; Altaic Languages; Concessive Clauses; Conditionals; Ellipsis; Ethiopian Semitic Languages; Head/Dependent Marking; Indo–Aryan Languages; Mood, Clause Types, and Illocutionary Force; South Asia as a Linguistic Area; Subordination; Switch Reference; Topic Chaining Constructions.

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Conversation Analysis

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Introduction

What kinds of social organizations are used as resources when people communicate through talk in interaction? It is this question that conversation analysis attempts to answer. Conversation analysis (CA) studies the methods participants orient to when they organize social action through talk. It investigates rules and practices from an interactional perspective and studies them by examining recordings of real-life interactions.

Although conversation analytic research may be subsumed in typically linguistic disciplines such as pragmatics, discourse analysis, or (interactional) sociolinguistics, it started in American sociology. In particular, the sociologists Erving Goffman (*see* **Goffman, Erving (1922–1982)**) and Harold Garfinkel prepared the ground in which CA arose – Goffman with his study of cultural rules and rituals in face-to-face interaction (Drew and Wootton, 1988), and Garfinkel with his investigations into the situated and normative character of shared understanding in everyday courses of action (Heritage, 1984). Enabled by the spread of recording techniques that opened new ways of inspecting interactional data, Harvey Sacks (†1975) and Emanuel Schegloff established a novel paradigm for researching the organization of human action in and through talk in interaction (Schegloff, 1968; Schegloff and Sacks, 1973; Sacks, 1992) (*see* **Telephone Talk; Sacks, Harvey (1935–1975)**). Although the foundational work in CA focuses on talk in conversations, the framework has gradually been extended to research of other types of talk such as medical and clinical interaction, lessons, or news interviews. This is why the more general characterization 'talk in interaction' nowadays is often preferred over 'conversation.'

Studying Transcriptions of Recorded Talk

In conversation analysis, the investigation begins with making an audio and/or video recording of naturally occurring talk. These recordings are carefully transcribed according to specific conventions first developed by Gail Jefferson (see Jefferson, 2004). The *CA transcription notation* is designed for rendering details that contribute to the organization and intelligibility of talk. It helps to retain features of prosody and turn positioning in the transcription. Together with the original recording, the transcription enables researchers to examine the forms of language use that were available to the participants in the recorded interaction itself.

A CA transcription is still readable without considerable expert knowledge. The transcript does not represent speech production at the level of its mechanical reproducibility (the *etic* approach that is typical of phonetics). Rather, the transcription provides an empirically reliable approximation of the interpretative assemblies that participants in talk are working with (the *emic* approach). A transcription is the combined result of carefully listening to how and where utterances are produced and the interpretative work of the transcriber as a competent member of the culture under investigation.

Extract (1) exemplifies this way of transcribing talk. It documents a short episode – just 7 seconds – from a Dutch telephone conversation (the original text is followed by an English translation in italics):

Extract (1). Telephone call between brothers. Background information: Jan is calling his brother Ton from their Rhine barge. Their parents sail a barge as well. Ton is in the office of the shipping exchange. Caller Jan is inquiring whether their mother is also at the shipping exchange.

54 Jan:	mamah, (0.2) is die d'r ook?
	mama (.) is she there too?
55	0.4
56 Ton:	HÈ↑:h?
	huh?
57	(.)
58 Jan:	mama:h
	mama
59	0.6
60 Ton:	waa:r
	where
61	0.3
62 Jan:	is die daa:r?
	is she there?
63	0.3
64 Ton:	↑hie↑:r?
	here?
65	(.)
66 Jan:	j [ah
	yes
67 Ton:	[nEEj!
	nO!
68	(.)
69 Jan:	°oh:.°
70	0.6

In order to be able to read a transcription like this one, the reader has to know the conventions. Notice

first that each speaker contribution – or *turn* – has a separate line. This indicates the turn's chronological position relative to its predecessor and its successor. Other notation conventions include:

- 0.6 — The length of silences between and within turns is measured in tenths of seconds.
- (.) — A dot between brackets (.) indicates a short silence of less than 0.2 seconds.
- [— In the case of simultaneous talk, the onset of the overlapping turn is located by a *left square bracket* in the overlapped turn.
- . , ? — A *period* indicates a falling final pitch contour, a *comma* a slightly rising pitch contour, and a *question mark* a strongly rising one.
- ↓ ↑ — Vertical arrows provide information about local pitch movements within syllables or at the level of a single syllable. A *downward arrow* signals a falling tone movement, an *upward arrow* a rising one.
- word — *Underlining* signals salient stress.
- wor:d — A *colon* renders a noticeable sound stretch.
- sto- — The *hyphen* is used as a cut-off marker.
- >faster< — This utterance part is produced with higher pace than the talk surrounding it.
- <slower> — The pace is relatively slower.
- LOud — *Capitals* indicate relative loudness.
- °soft° — The *degree sign* signals that an utterance part is produced more softly than the surrounding talk.
- ·h — Hearable inbreath.
- hh — Hearable aspiration.
- (guess) — The transcriber is uncertain about the utterance part between parentheses.

Even the transcription of a brief episode such as the one documented in extract (1) already displays very basic features of talk in interaction. Note, for a start, how short turns may be. If the reader was expecting utterances in turns at talk to consist of complete, well-structured sentences, he will be surprised to find out how little the participants need to achieve meaningful verbal interaction. How do they do this? This question will be answered by looking at two levels of the organization of talk that are central in conversation analytic research: turn taking and sequence organization. The interaction in extract (1) shows that the participants know where and how to change the roles of speaker and listener. How they manage this is the subject of the section about the organization of turn taking. Second, the talk in this fragment is an interactionally coherent exchange of communicative actions. The episode starts with a question and it ends with the answer to that question (see lines 54 and 67, respectively). How are we able to recognize this kind of interactional order in a series of utterances? How is it achieved? This question is answered at the level of sequence organization, that is, the way in which participants coordinate actions in series of turns in order to effectuate interactional projects.

Turn Design and the Organization of Turn Taking

A remarkable feature of the interaction in extract (1) is that speaker change is coordinated smoothly. Both interruptions (or other kinds of simultaneous talk) and gaps are relatively rare. In a seminal paper first published in 1974, Sacks, Schegloff and Jefferson formulate these observations in more technical, organizational terms; the participants display an orientation to minimization of overlap, while at the same time, they also orient to minimization of gap. Sacks and his colleagues account for this fine organizational balance by a description of the systematics that conversationalists orient to when they coordinate the organization of turn taking.

The basic organizational problem that participants have to solve each turn anew is to determine when the speaker will complete the current turn. The recipient is not only figuring out what the turn is about and what the speaker is doing with it, he also has to be alert for the moment it might become his turn to speak. Recipients anticipate such organizationally relevant moments by building expectations as to what the utterance underway is going to look like. Turns are produced linearly in real time, but in the course of a turn's production, a recipient can make an informed guess about the structure of the whole unit by inspecting – in its environment of use – the part that is already there. The turn so far provides cues as to how the unit underway is constructed and when it will possibly be complete.

The building stones of turns are turn constructional units (TCUs). Each turn is built with at least one *turn constructional unit*. The design of a TCU may vary. A TCU can be built as a one-word unit, such as the turns with no more than the words *here, yes,* or *no* in extract (1). Other TCUs have a syntactically more elaborate design, such as the interrogative clause '*is she there too*.' Depending on the unit type the speaker is recognizably using for the construction of a TCU, the recipient will make different predictions as to when the ongoing turn may be complete.

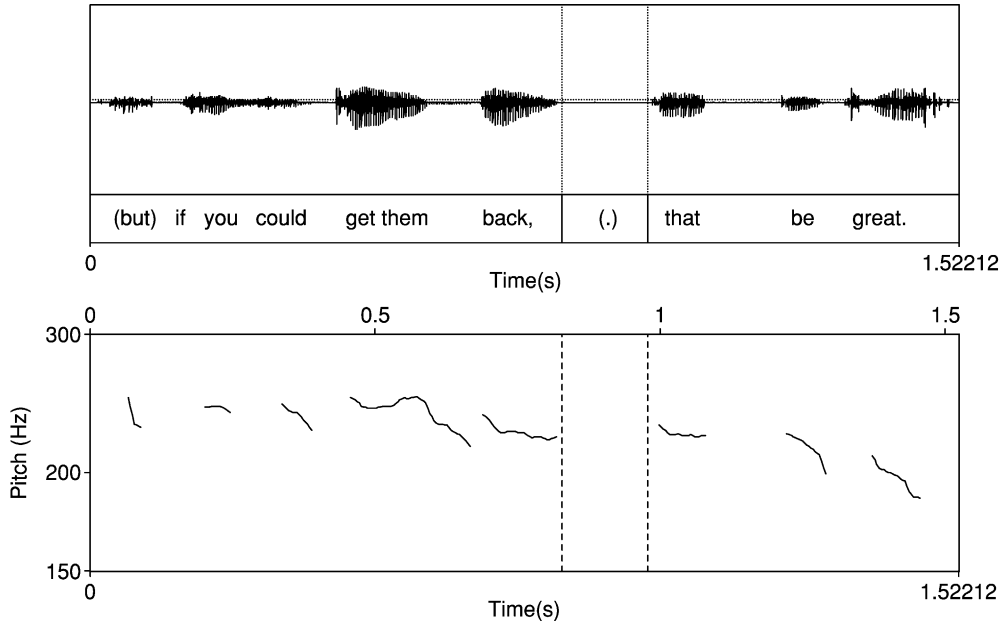

Figure 1 Prosodic analysis of the TCU in lines 321–322 of extract (2).

The more complex the unit type is, the more faceted the projection of completeness. Compare the extract below. Angela begins a TCU with a particular type of subordinate clause (*(but) if you get them back,* line 321). This makes the unit underway analyzable as the first part of a compound TCU with an [*if* . . . , *then* . . .] structure. The turn will not be complete until the speaker has finished the *then*-part that is projected by the *if*-part:

Extract (2). Telephone call between two 17-year old Californian girls. Angela has just complained that Corey's friend has not returned three of her CDs.

321.	Angela: →	·hhh (but) if you could get them
322.		back, (.) that be great.
323.		0.2
324.	Corey:	°'kay.°

Note that the recipient does not begin to speak when the speaker has finished the part with the *if*-clause. Even the short silence after it is not used as an opportunity for speakership transference. The recipient observably orients to the preceding clause as a preliminary component of a compound TCU with a two-part structure. It foreshows a continuation with a structurally specifiable type of second part as its final component. Only after the subsequent main clause implementing this latter part has reached completion, does the recipient take over (cf. Lerner, 1991, 1996).

Recipients may locate possible completeness on the basis of the interplay of syntactic and prosodic information. Whereas the TCU's construction type 'nominates' a place in an ongoing TCU as a syntactically plausible point of completeness, prosody can 'second' the nomination (Schegloff, 1998). For example, a speaker can stretch or reduce the vocalization of the intended last syllable of the turn, or mark it with a noticeable tone movement such as the falling pitch movement in the last word of Angela's turn in extract (2). Figure 1 makes the intonation contour of this TCU graphically visible with the help of *Praat,* a program for the phonetic analysis of speech.

The lower half of the graph shows the fundamental frequency – an acoustic correlate of pitch – of Angela's TCU in Hertz. Note that the last two words of the TCU move toward a final pitch level that is noticeably lower than the base level of the preliminary component.

Construction type and prosody are not the only dimensions within which participants negotiate turn rights, however. The issue of whether an utterance is possibly complete strongly depends on pragmatic factors, most notably on how the ongoing turn is related to its immediate interactional context (*see* **Context, Communicative**). Single words such as *mama, where?, here?, yes,* or *no,* for example, can only function as meaningful independent interactional moves when uttered in a context that lends them this type of intelligibility.

Each utterance provides an ensemble of various types of cues that together project a *possible completion point* of an ongoing TCU. The first possible completion point of a TCU is the place where turn

taking becomes an interactionally relevant issue. The participants of talk in interaction negotiate speaker transition around such *transition relevance places*. Conversationalists use specific techniques to allocate next turn. If current speaker selects another participant as next speaker before her turn has arrived at its first possible completion point (other selection), the selected party has both the right and the obligation to begin the next turn at this point. If no other speaker is selected, another participant may self-select as next speaker. If none of these options is used, current speaker may continue. The system then applies again as soon as current speaker arrives at the next possible completion point (Sacks *et al.*, 1974).

A TCU can function as an interactional move in its own right, and because of this, it may fill a turn slot on its own. On the other hand, turns may consist of more than one TCU (multi-unit turns). However, unless special provisions are made to maintain speaking rights over a longer stretch of talk – as is the case with, e.g., story telling (cf. Sacks, 1974) – each next possible completion point of a subsequent TCU is treated as a place where speaker transition is an organizationally relevant, negotiable issue.

Thus, the organization of turn taking is accounted for by describing it as a set of constructional practices that enable the co-participants to determine the place at which speaker transition becomes relevant and to then deal with that issue according to a structured set of interactional options. This way of modeling the organization of talk is characteristic for the CA approach. The methods that members orient to are described as formally and as generally as is necessary to account for the fact that people succeed in managing turn taking in an orderly way, innumerable times a day, in all kind of situations. At the same time, the description has to explain how participants are able to shape and recognize each time anew the particular context in which the rules for allocating next turn apply. CA thus studies the organization of talk as situated, socially organized sets of practices. It describes the methods members use for organizing talk as interactional structures that both shape the context in which they operate and enable its orderly, interactionally coordinated progression.

The general model sketched in the initial paper about turn taking has been developed further and refined in work on systematic practices of overlap positioning and overlap resolution (Jefferson, 1986; Schegloff, 2000a), collaborative turn construction through anticipatory completion of compound turns (Lerner, 1991, 1996), and the role of gaze, gesture, and body positioning (Goodwin, 1981) (*see* **Gestures: Pragmatic Aspects**).

The general characterization of the systematics of turn taking has appeared to be very robust across languages. Depending on the structural features of specific languages, however, the linguistic practices deployed to project possible completion points of TCUs may vary. The structure of English, for example, allows for early projectability of the design of TCUs. Its strict Subject-Verb-Object (SVO) word order in full clauses, for example, enforces early positioning of predicates. Function markers such as question words, imperatives, conjunctions, or quote attributions occur in sentence-initial position, just as the inversion of subject and auxiliary in yes/no interrogatives enables early recognizability. A language such as Japanese, on the other hand, is said to have an SOV- or OSV-type of word order, an agglutinative morphology, and a preference for postpositioning over prepositioning of markers of syntactic, semantic, and pragmatic functions. These properties result in a predicate-final design of clauses in TCUs. Consequently, the construction of TCUs may display a delayed projectability of possible completeness. On the other hand, Japanese has the option of explicit markers of possible completeness such as final verb suffixes or final particles (cf. Tanaka, 1999). The differences in language structure lead to partially different sets of grammatical practices that are deployed for the interactional organization of turn taking. The general principles of turn construction and completion projection are nonetheless the same.

Sequence Organization

We now turn to the question of how an exchange like the one in extract (1) is easily understood as a coherent episode. It is not just the linear temporal order of turns that accounts for our understanding. The series of turns has a structure. Some turns belong more together than others. The ways conversationalists link turns to each other as a coherent series of interrelated communicative actions is called sequence organization. A *sequence* is an ordered series of turns through which participants accomplish and coordinate an interactional activity.

A question followed by an answer is an example of a sequence. Other examples are a request and the decision that is made about it, an informative and its receipt, and a criticism and the reply to it. All these different types of two-part sequences are instances of a very tight type of sequence organization: the *adjacency pair* (cf. Schegloff, 1968; Schegloff and Sacks, 1973). When a recipient of a turn at talk hears the speaker's utterance as the first part of a particular type of adjacency pair, the appropriate thing to do next is to deliver an utterance that may count as

the second part of the same pair. For example, the appropriate reaction to a question is to answer it. The question is treated as the first pair part of a question/answer pair; the answer is its second part. Requests, invitations, offers, proposals, informatives, complaints, or accusations establish similar expectations with respect to a continuation with a fitting type of second pair part in the next turn (*see* **Speech Acts**).

Extract (3) documents several instances of question/answer pairs. The first one starts in line 33. The son asks his mother a question, and at the first possible completion point of his turn, the mother takes over to answer it.

Extract (3). Telephone call between a mother and her son. Background information: The mother has called her son from the family's Rhine barge. The son is in a boarding school for bargee children.

33 son:	nou↓: >waar zitteh jullie< nouw.
	well where are you $_{plural}$ *now.*
	0.2
34 mother:	i:: >Amsterdam.<
	i::(n) Amsterdam.
35	0.3
36 son:	waar moe(we) almal heen.
	where all do (we) have to go to.
	0.3
37 mother:	è↑:h?
	huh?
	(.)
38 son:	waar moewe heen
	where do we have to go to
39 mother:	naar Luik.
	to Liège.
	0.2
40 son:	naar Lui:k?
	to Liège?
41 mother:	jah.
	yes.

When the mother treats the utterance in line 33 as the first part of a particular type of adjacency pair, she is dealing with it as a specific type of social organization. She does not just hear an interrogative sentence that, under felicitous conditions, may count as a separate speech act; she hears it as an utterance that proposes her engagement in an interactional course of action. When an utterance is analyzable as the first pair part of a particular type of adjacency pair, it locally establishes a normative expectation toward what its recipient should do in next turn. The first part makes the delivery of a fitting second part *conditionally relevant*. That is, its recipient is expected to deliver the second part in his next turn. If it is absent,

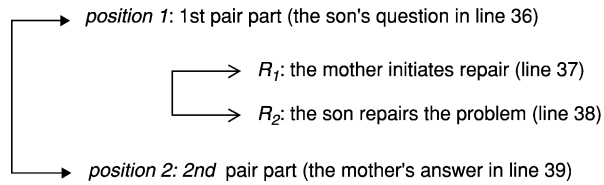

Figure 2 Sequential structure of the interaction in lines 36–39 of extract (3).

this is noticeable and accountable (cf. Schegloff, 1968; Heritage, 1984). The obligation to deliver the second pair part as soon as possible in next turn may be suspended, however. Compare, for instance, the mother's response to her son's next question in extract (3) ('*where all do (we) have to go to*'). '*Huh?*' is not an answer. Instead of answering the question, the mother initiates *repair* (cf. Schegloff *et al.*, 1977; Schegloff, 1992, 2000b). She signals that she is having a problem with prior turn. The son's subsequent, slightly modified repetition of his question apparently solves the problem, because the mother is able to answer now ('*to Liège*'). Unlike the first question/answer sequence in this episode, the answer is not delivered in next turn. A short repair sequence is inserted between question and answer. Schematically, this can be rendered as shown in Figure 2.

An *insertion sequence* like the repair sequence in lines 37–38 locally suspends the interactional expectation to deliver the second pair part in the turn following the one with the first part. The intervening interaction shows that the participants nevertheless are still oriented to the relevance of the second pair part. The repair sequence is recognizably supportive of the felicitous development of the base sequence in which it is embedded. The delivery of the answer is still pending. The urgency to answer is only temporarily postponed. Note that the questioner even renews the actuality of getting an answer by redoing his question in the repair itself, thereby creating another opportunity to hold onto the preference for next-positioning of first and second pair parts. And, by the way, note also that the inserted repair sequence is again structured by principles of adjacency pair organization!

Conditional relevance is also the key for understanding the structure of extract (1). We are able to understand the interaction in extract (1) as an orderly, methodically achieved sequential course of action on the basis of the adjacency pair structure. For the reader's convenience, the fragment is repeated below:

Extract (1). Telephone call between brothers.

54 Jan:	mamah, (0.2) is die d'r ook?
	mama (.) is she there too?
55	0.4
56 Ton:	HÈ↑:h?
	huh?
57	(.)
58 Jan:	mama:h
	mama
59	0.6
60 Ton:	waa:r
	where
61	0.3
62 Jan:	is die daa:r?
	is she there?
63	0.3
64 Ton:	↑hie↑:r?
	here?
65	(.)
66 Jan:	j [ah
	yes
67 Ton:	[nEEj!
	nO!
68	(.)
69 Jan:	°oh:.°
70	0.6

The question in line 54 urges its recipient to deliver an answer as soon as possible. Its delivery is, nonetheless, suspended three times by the initiation of repair from the part of the intended answerer (lines 56, 60, and 64). Each next repair initiation builds upon the result of the former one, until the recipient of the question finally is able to answer it in line 67. The sequential organization of this episode can be schematized as shown in Figure 3.

The interaction in extract (1) is tied together by the way the utterance in the first turn is sequentially related to the one seven turns later. The question in line 54 makes an answer conditionally relevant, and as long as this answer is not given, the participants work collaboratively toward an occasion in which it can be delivered. All intervening actions are recognizably designed as subsidiary to the task still pending. They should enable the recipient of the question to answer it, and as such, they account for the answer's postponement in each subsequent turn.

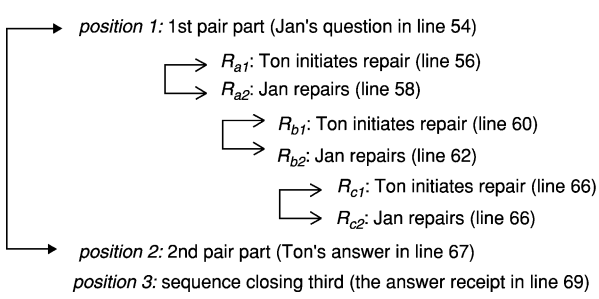

Figure 3 Sequential structure of the interaction in lines 54–69 of extract (1).

The interactions in extracts (1) and (3) clearly illustrate that the practices through which conversationalists make sense of turns at talk are based upon *sequential reasoning*. A turn such as '*in Amsterdam*' in extract (3) can only be interpreted within the context of the question it is answering. The expression is not just a place formulation. As a place formulation, it is answering the question where the family's Rhine barge is at the time of asking. The structure of the TCU as a lone standing prepositional phrase even signals the kind of action it is designed to accomplish in its environment of use. The combination of the turn's position and the composition of the TCU together signal answerhood. It informs the recipient about how the turn should be related to its local sequential context. The identification of this relation is part and parcel of determining what a speaker is saying and doing. Interpretative reasoning goes by lines of sequential organization.

Utterances in turns at talk accomplish actions that are part of social activities which are sequentially organized and have sequential implications for the participants. In this section we have only looked at one type of sequence organization – the adjacency pair structure – and the way it can be expanded by sequence insertion. Central to this perspective is the insight that utterances do not just simply count as isolated 'actions.' Participants in talk in interaction orient to them as moves in contextually situated social arrangements. Participants in talk in interaction do not attribute meaning to utterances by simply applying rules that are independent from and external to the interaction. They make sense of utterances in turns at talk by situated, sequential reasoning.

Conversation Analytic Methodology

Conversation analytic methodology is based upon the already discussed assumption that the sense-making devices that participants in talk in interaction orient to can be understood as forms of situated, interactional reasoning (cf. Heritage, 1984; ten Have, 1999). This kind of contextual reasoning can only be investigated from *within* the interaction. The central requirement of CA methodology – convergence between the analyst's perspective and the perspective of the participants – attempts to achieve this. The analyst has to make plausible that his or her results are indeed a description of the methods that the participants themselves orient to.

The Data

In order to avoid problems with respect to the ecological validity of data, naturally occurring interactions

are strongly preferred. They are recorded and transcribed according to the conventions discussed earlier. The transcriptions are used to generate initial ideas about how people communicate in talk in interaction. These ideas are worked out by looking at other instances of the same phenomenon. As a result, the description is gradually broadened and cyclically refined by falsifying or validating evidence. Additionally, transcripts allow the researcher to make her data available to the scientific community. The data are retrievable for the audience. Other students are enabled to redo and to check the analysis.

Analyzing Data

Conversation analytic methodology is strongly data driven. There are two kinds of studies. In a *single case analysis*, the researcher develops an analysis of the interaction in a single episode with respect to some interesting or relevant aspect. In a *collection study*, the analyst generalizes the results of a cumulative series of single case analyses with respect to a specific aspect. All cases are compared with respect to some feature by describing how, and the degrees to which they are the same, similar, or different.

Single case analyses serve purposes such as generating ideas that have to be grounded in a collection study, testing and applying the results of collection studies, or exploring the interplay of constellations of practices in episodes of talk in interaction. Collection studies have two phases (cf. Heritage, 1995). In the first phase, the analyst describes regularities with respect to some particular aspect of the data and develops a description of a candidate pattern by going from case to case in a corpus of transcripts. The description of phenomena is both formal and situated. A description is formal when it is formulated at a level of generality that allows for a characterization of the recognizability of a device across contexts. A description is situated when the context is specified. We can discern distinct levels of description: the level of turn design – practices of turn construction or 'packaging' – and the description of the kind of social action that is implemented by practices of turn construction at a sequential level.

In a second phase, the analyst attempts to meet the requirement of convergence between the participants' and the analyst's perspective, and has to prove that the participants observably orient to the candidate pattern. A keystone procedure to do this is deviant case analysis (cf. Schegloff, 1968); the analyst examines cases where some departure from the described pattern can be observed. Examination of deviant cases either results in a modification of the theory developed so far, or it can be shown that a boundary case eventually provides some kind of second-order validation of the basic pattern. The latter is frequently the case with conversational repair. Conversationalists frequently restore departures from the methods they use. Such cases convey how and to what extent the participants are oriented to the principle that the analyst tries to establish as a pattern. Remember, for instance, how departures from the principle of conditional relevance in extracts (1) and (3) eventually confirmed a participant orientation to that very same device. The participants maintain the rule of having to provide a fitting second pair part by solving the troubles they encounter in trying to obey to the rule. Usually, phases 1 and 2 are repeated recursively. The ideal is to achieve an exhaustive description that accounts for all instances of the phenomenon in question in the corpus.

Quantification may play a role in determining the distribution of the observed pattern. Quantitative processing of the data, however, is subsidiary to qualitative exploration of the phenomenon in phase 1 and to qualitative validation of the candidate description in phase 2. Distributions that confirm a hypothesis primarily establish regularities. The researcher still has to provide qualitative evidence that the participants observably orient to such a pattern as a normative interactional rule. If the analyst is able to demonstrate that conversationalists orient themselves by the principle in question and to give a plausible account of how they do this, this accounts for the regularities.

The next section gives a short demonstration of a conversation analytic way of working. A single case will be discussed in order to explain how it confirms a general pattern. The case analysis describes an aspect of sequence organization that is called preference organization. In this case, the preference of agreeing over disagreeing assessments will be looked at. The analysis shows that the orderly packaging of systematic sequential alternatives allows for inferences that are part of the interpretative procedures participants use to make sense of talk.

Preference Organization

The excerpt below is taken from a telephone conversation between spouses. The wife has called her husband late at night in his restaurant bar. The episode starts with the husband introducing a new topic. He tells how business is doing tonight. This report is concluded with a summary assessment: '*so u:h it's much better tonight than expected*' (lines 41–42). When his wife parsimoniously confirms this evaluation by only saying *yes,* the husband is not content with this response. It is challenged almost immediately ('*so what?*,' line 46):

Extract (4). Telephone conversation between spouses. Background information: In the preceding episode, Ans has blamed her husband for failing to answering the phone earlier that evening.

27	[3.2
28	[*((cutlery sounds in background))*
29 Bert:	nou e:::::h 't is (nog eh) lekker druk.
	well u:::::h it's (still uh) pretty busy.
30	0.6
31 Ans:	m:.
32	0.5
33	'k hoor 't jah
	So I hear uh huh
34	0.5
35 Bert:	°↑jah:°
	yes
36	1.2
37	°een twee drieh° (0.6) nou drie
	one two three (0.6) well three
38	(garnetborde) en twee drie vier zit-(.)
	(plate services) and two three four sit-
39	vijf zes: zitt'n 'r nog.
	five six still sitting there.
40	2.5
41	dus e:h dat valt
	so u:h it's
42	vana:vond reuze mee
	tonight much better than expected
43	(.)
44 Ans: →	·thHH j:Ah. hhh
	yes.
45	0.2
46 Bert: →	wat dan:?
	so what?
47	0.7
48 Ans:	*nou ja:h e:hh*
	well yes u:hh

In the aftermath of this exchange, a short dispute develops between the spouses. The wife's initial reaction is rather resistant. Yet when her husband keeps pushing her, she finally bursts out in an angry, reproaching tirade (lines 59–70):

Extract (5). 22 seconds later in the same episode (including a long, awkward silence).

58 Ans:	je:zus
	jesus
59	ik moet elk woor:d >wat ik zeg<
	I have to every word that I say
60	moet ik verantwoordeh
	I have to account for
61	moet ik vier keer uitLEGgehH
	I have to explain four times
62	(.)
63 Bert:	nee dat hoeft niet.
	no you don't have to.
64	1.3
65 Bert:	dat hoe[:-
	you don't-
66 Ans: →	[ALS IK zeg JA: van nou
	if I say yes like well
67	>met ander woordeh< da's dan
	in other words that's
68	PRIma eh dan=ehm: ·hHh
	fine then uh then uhm ·hhh
69	0.4
70 Bert:	↑neeh dat hoe:ft ↓nie:t,h
	no you don't have to,

The wife does the kind of metatalk we all know from our own quarrels. Acting as a competent lay linguist, she formulates explicitly what she meant with her response: '*if I say yes, (. . .) in other words, that's fine (. . .)*.' In her version, the husband has misunderstood her completely. When reacting with *yes,* she was giving an agreeing, even approving response. The question is, however, whether the husband indeed did misunderstand her. Did he have any conversational evidence for an alternative interpretation when he threw doubt upon his wife's response?

In order to be able to answer this question, we have to go back to the sequence that occasioned the dispute. The utterance '*so u:h it's much better tonight than expected*' (lines 41–42) is an assessment. It is an interactional property of *first assessments* that when its recipient is also knowledgeable about the evaluated object, a second assessment is expected from the part of that party. *Second assessments* have the property that they find their measure in the assessment they are responding to. Second assessments are never neutral; they either agree or disagree with the first one. Disagreeing assessments are more delicate actions than agreeing assessments. Participants in talk in interaction treat a disagreeing second assessment usually as a less preferred type of next action than its agreeing alternative. They are nonequivalent alternatives. Agreement is preferred and unmarked; disagreement is dispreferred and marked. Preferred second pair parts are delivered without delay and formulated in a frank, concise mode. Dispreferred seconds, on the other hand, are frequently delayed, mitigated, hesitantly produced, hidden away, put in a roundabout way or accounted for (Pomerantz, 1984; Schegloff, 1995).

The ranking of sequential alternatives with respect to their relative degree of preference is called *preference organization*. The preference for agreement is just one type of preference organization. A related type of preference organization is the preference for project success. It accounts for the preference for second pair parts of adjacency pairs that bring about the result targeted in the interactional project that is initiated with a first pair part, e.g., getting an answer

to a question, accepting an invitation, granting a request, affiliating with a complaint, etc. Participants' orientations to preference organization is a major source for *sequence expansion* of adjacency pairs (Schegloff, 1995). Participants may probe and try to preempt the likeliness of a dispreferred second pair part in a *presequence* (Schegloff, 1980). They may initiate repair on first pair parts in *insertion sequences* in order to provide an opportunity to adjust the preference structure of the preceding first pair part, or to at least delay the delivery of a dispreferred second pair part. And they may try to revise or to accommodate a preceding dispreferred second pair part in various types of *post-expansion* (Schegloff, 1995) – as in the kind of post-expansion that can be observed in extracts (4–5). The relational implications of types of interactional alignment and disalignment that are governed by preference organization are also investigated from the perspective how participants negotiate *epistemic rights* (Heritage and Raymond, 2005; Stivers, 2005). For example, a co-participant may claim or give evidence for primary epistemic authority by the way he responds to a first assessment, although the response itself has a kind of secondness because it is done in a sequentially second position.

The notion of preference does not refer to psychological dispositions. It is a description of interactionally observable orientations of participants. Preference organization provides the participants with a subtle and powerful apparatus for making interpretative inferences. In extract (4), the husband uses it as a resource when he challenges his wife's response. In a context in which an agreeing second assessment is preferred, his wife avoids taking a stance. When she reacts with '*yes,*' she merely acknowledges her husband's statement '*so u:h it's much better tonight than expected*.' She does not affiliate with her husband, but responds in an evasive manner instead. Her husband's reaction attends to precisely this aspect of her response. He challenges a weakly agreeing response in a sequential environment in which another alternative is more preferred. So, despite his wife's subsequent (re-)formulation of the meaning of *yes* as simply agreeing, the man nevertheless has good reasons to hear her response as a sign of reservation or even foreboding disagreement. From a sequential perspective, the response is not just acknowledging prior speaker's assessment. Saying *yes* in this context is rather deployed as a device to avoid agreeing. As a contextually specifiable selection of another alternative than the preferred one, it legitimizes the interpretation that is subsequently challenged by the husband.

The analysis of the origins of the argument in extract (4) demonstrates several aspects of the conversation analytic approach. First, it introduces another aspect of sequence organization: preference organization. Second, it shows one more time how the meaning of utterances is constituted along lines of sequential reasoning. An utterance in a turn at talk is not just what it says, but what it does in a particular sequential context. Third, the analysis illustrates that the methods by which participants make sense of their talk may be (re-)specified and (re-)negotiated in the course of the interaction. Finally, the discussion demonstrates some aspects of CA methodology discussed in the former section. The knowledge that first assessments invite a second assessment from its recipient stems from a collection study (Pomerantz, 1984). The interaction in extract (4) seems to contradict this pattern. Instead of continuing with a second assessment, the recipient responds with only an acknowledgement token. However, when this observation is combined with insight into the ways how preference organization operates, the interaction can be explained in terms of the very same mechanism. The analysis of a deviant case eventually provides a kind of second-order validation of the theory developed so far.

Extensions and Applications

The basic theoretical, analytical, and methodological framework of CA has been developed further into various domains and directions. Studies in the area of interaction and grammar explore the relationship between language structure, linguistic practices, and the organization of turn taking and of sequences in talk in interaction (Ochs *et al.*, 1996; Selting and Couper-Kuhlen, 2001; Ford *et al.*, 2002; Couper-Kuhlen and Ford, 2004).

The work of Charles Goodwin has given a major impetus to the study of the multimodal and embodied character of the organization of human action in talk in interaction – not only the role of gaze, gesture, and body positioning, but also the use of tools and other features of the setting (Goodwin, 2000; see also the workplace studies in Heath and Luff, 2000). Goodwin (2003) provides a collection of CA studies of the ways in which people with one or another form of language impairment use various types of sequential and situational reasoning in ordinary communicative situations (*see* **Institutional Talk**; **Family Speak**; **Computers in Lexicography**).

Talk in institutional, professional, or work settings is also studied by describing how it is constrained or modified in comparison to conversational interaction (Drew and Heritage, 1992). The research in this area has frequently the shape of studying genres or activity types in a specific domain, e.g., the news interview (Clayman and Heritage, 2002), judicial interaction (Atkinson and Drew, 1979), emergency calls (Whalen

and Zimmermann, 1990), meetings (Boden, 1994), telling good and bad news in clinical settings (Maynard, 2003), and gossip (Bergmann, 1993). The research here is sometimes called applied CA (see ten Have, 1999) (*see* **Institutional Talk**).

Wootton (1997) is an example of a CA study in the area of early language acquisition. The study of foreign language use in talk in interaction focuses on the organization of repair (see Schegloff, 2000b; Gardner and Wagner, 2004).

A primarily British group of social psychologists approaches typically psychological topics such as attitude, identity, and cognition from an interactional perspective, using CA as a central theoretical and methodological framework (Te Molder and Potter, 2004).

Journals that regularly publish CA papers are *Research on Language and Social Interaction, Discourse Studies, Human Studies, Journal of Pragmatics, Language in Society, Pragmatics,* and *Text*. Important centers of CA research are UCLA (Schegloff, Heritage, Clayman), UCSB (Lerner, Raymond), the University of Wisconsin (Maynard, Ford), The University of York (Drew, Local, Wootton), the University of Helsinki (Sorjonen), Odense (the Graduate School of Language and Communication), Bielefeld (Bergmann), and Max Planck Institut Nijmegen, Language and Cognition Group (Stivers).

Discussion lists with CA-oriented discussion are the Language-use list, the Ethno-Hotline, the German *Gesprächsanalyse*-list, or the Danish MOVIN-list. The Ethno/CA News website of Paul ten Have announces conferences, publications, and other news.

See also: Computers in Lexicography; Context, Communicative; Family Speak; Gestures: Pragmatic Aspects; Goffman, Erving (1922–1982); Institutional Talk; Sacks, Harvey (1935–1975); Speech Acts; Telephone Talk.

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http://www.paultenhave.nl – Ethno/CA News website of Paul ten Have.

Conversational Agents, Synthetic

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Embodied conversational agents (ECAs) are virtual humans (often life-size) who are capable of carrying on conversations with real humans. These virtual humans may serve many functions, both practical and theoretical. In the practical vein, they may act as the interface to a computer so that instead of choosing commands on a menu, one can carry on a conversation.

Figure 1 shows an ECA named REA who acts as the interface to a database of houses in the Boston area. Rather than having to type in search terms, users can tell REA what kind of property they are looking for, and REA will nod, reflect, and then find appropriate properties and describe them using a combination of descriptive hand gestures, head movements and spoken language.

ECAs can also serve as autonomously acting characters in video games. **Figure 2** shows an ECA that plays the role of a village leader that reacts to the soldier character played by the user. In this instance, the system is designed to teach Arabic in such a way that soldiers going into an unfamiliar culture learn appropriate body language as well as the necessary foreign words and phrases.

ECAs also allow linguists to model human linguistic behavior and to evaluate competing theories of language use by observing them in action. **Figure 3** shows an ECA that gives directions by speaking, gesturing, and tracing a route on a map. This system has allowed researchers to discover the role of nonverbal behaviors, such as eye gaze and head nods, in grounding, or the establishment of information as shared between two participants.

In all of these cases, the embodied conversational agents are modeled on human face-to-face conversation and therefore get their meaning across by employing not just text (as do regular computers with a mouse, keyboard, and screen) but also spoken speech with intonation, hand gesture, head movements, and facial expressions. Embodied conversational agents are defined by the following:

- The ability to recognize and respond to verbal and nonverbal input

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Figure 1 REA, the virtual realtor. Copyright MIT Media Lab.

Figure 2 The Tactical Language Training system: embodied conversational agents as autonomous game characters. Copyright by University of Southern California.

- The ability to generate verbal and nonverbal output
- The ability to deal with conversational functions, such as turn-taking, feedback, and repair mechanisms
- The ability to give signals that indicate the state of the conversation as well as to contribute new content to the discourse.

ECAs are inherently multidisciplinary endeavors, and they have piqued the interest of researchers in a number of different fields, from computer science (and its subfields of computer graphics, artificial intelligence, natural language processing, and human–computer interaction) to linguistics, psychology, and education. However, researchers have found themselves either relying on theories of human–human interaction and language use set forth by others or elaborating their own theories of these behaviors as a way of ensuring that their interfaces

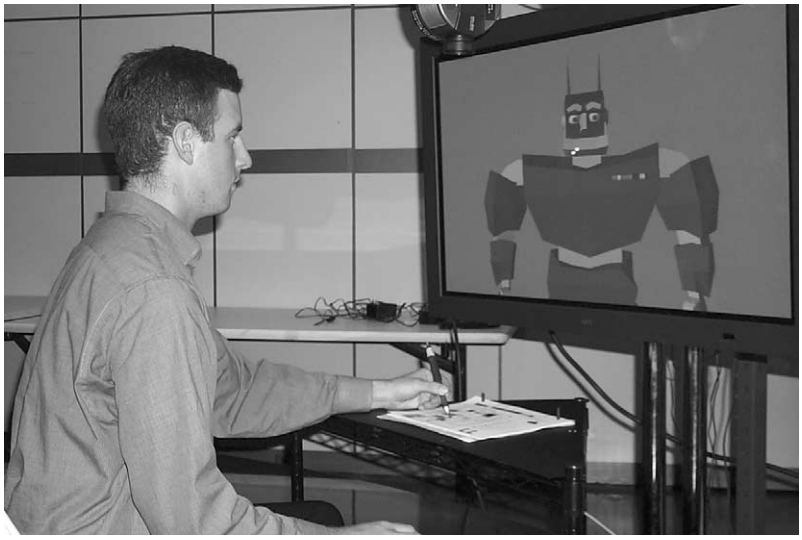

Figure 3 MACK, the Multimodal Autonomous Conversational Kiosk. Copyright MIT Media Lab.

share the conversational skills of human users. Thus, for example, Lester *et al.*'s (2000) COSMO character refers to the objects in his environment using pronouns, descriptions, and/or pointing gestures according to a complex algorithm based on the linguistic theory of referential ambiguity. Wang *et al.*'s (2005) pedagogical agent and Walker *et al.*'s (1997) virtual actor both rely on Brown and Levinson's (1987) theory of politeness and language use. Cassell *et al.*'s (2000) Sam virtual child character supports children's development of literacy skills through modeling the use of nondeictic referring expressions, spatial locatives and temporal adverbs according to theories of children's acquisition. Poggi and Pelachaud (2000) base the facial expressions of their ECA on Austin's (1962) theory of performatives.

In the following sections, I outline some of the linguistic issues that are evoked by ECAs and how these translate into conversational skills that allow humans to communicate with ECAs.

Sample Interaction with an ECA

REA is an ECA whose domain of expertise is real estate; she has access to a database of available properties for sale in Boston. She can display pictures of those properties and of their various rooms, and she can point out and discuss their salient features. Figure 4 is an excerpt from an actual interaction.

Mike approaches the projection screen. REA is currently turned side on and is gazing idly about. As Mike moves within range of the two cameras mounted above the screen, REA turns to face him and says:
REA> Hello. How can I help you?
MIKE> I'm looking to buy a place near MIT.
REA nods, indicating that she is following.
REA> I have a house to show you.
A picture of a house appears on-screen behind REA who blinks and looks at the house and then at Mike.
REA> It's in Somerville.
MIKE> Tell me about it.
REA briefly looks up and away while she plans what to say
REA> It's big.
REA makes an expansive gesture with her hands.
Mike brings his hands up as if he is about to speak and so REA does not continue; instead waiting for him to speak.
MIKE> Tell me more about it
REA> Sure thing. It has a nice garden.
REA sketches a curved gesture with her hands indicating that the garden extends along two sides of the house
MIKE> How far is it?
REA> It is five minutes to the Porter Square T station.
REA makes it clear that it is five minutes ***on foot*** *from the T station by making a walking gesture with her fingers*
MIKE> How big is the house?
REA> It has four bedrooms, three bathrooms. . .
And the house tour continues.

Figure 4 Conversation with REA.

Conversational Properties

In addition to demonstrating the use of several conversational modalities, such as speech, hand gestures, and head movements, REA is engaging in some very subtle human-like behavior that demonstrates four properties of face-to-face conversation: (1) the distinction between conversational behaviors (e.g., eyebrow raises) and conversational functions (e.g., turn-taking), (2) the importance of timing among conversational behaviors (and the increasing cotemporality or synchrony among conversational participants), (3) the distinction between interactional and propositional functions of conversation, and (4) the planning of how to convey a concept with maximal

Table 1 Examples of conversational functions and their behavior realization

Communicative functions	*Communicative behavior*
Initiation and termination	
React to new person	Short glance at other
Break away from conversation	Glance around
Farewell	Look at other, head nod, wave
Turn-taking	
Give turn	Look, raise eyebrows (followed by silence)
Want turn	Raise hands into gesture space
Take turn	Glance away, start talking
Feedback	
Request feedback	Look at other, raise eyebrows
Give feedback	Look at other, nod head

From Cassell and Vilhjalmsson (1999).

efficiency. Each of these properties is described next with reference to REA and Mike's conversation.

Distinction between Function and Behavior

In order to allow humans and computers to converse successfully, one cannot hard-code conversational behaviors into the system. That is, for example, it does not work to tell the ECA to nod at the user every time the user speaks because the ECA may not be able to nod if the head is already engaged in looking around the room. Instead, sometimes the ECA will want to signal that it is following by making agreement noises such as "uh huh." Instead of hard-coding, the emphasis has to be on identifying the high level structural elements that make up a conversation. These elements are then described in terms of their role or function in the exchange. Typical discourse functions include conversation invitation, turn-taking, providing feedback, contrast and emphasis, and breaking away. Then, one can establish mappings between functions and behaviors. Table 1 illustrates typical conversational functions and behaviors.

This is especially important for ECAs because particular behaviors, such as the raising of the eyebrows, can be employed in a variety of circumstances to produce different communicative effects, and the same communicative function may be realized through different sets of behaviors. The form we give to a particular discourse function depends on, among other things, current availability of modalities such as the face and the hands, type of conversation, cultural patterns, and personal style. Although such discourse functions have formed the object of many studies, particularly in the fields of ethnomethodology and conversational analysis, until the first ECAs, these observations had not been merged into one understanding of the interaction between different linguistic and nonverbal devices and the functions that they play in conversation.

The REA ECA generates speech, gesture, and facial expressions based on the current conversational state, the conversational function she is trying to convey, and the availability of her hands, head, and face to engage in the desired behavior. For example, when the user first approaches REA ('user present' state), she signals her openness to engage in conversation by looking at the user, smiling, and/or tossing her head. Once again, this approach comes directly from the conversational analysis literature on human–human conversation (Cassell, 2000). Table 2 summarizes Rea's current interactional output behaviors.

Importance of Timing

Behaviors that achieve a joint communicative goal occur in synchrony, and we assume that behaviors that cooccur carry meaning together. That is, the meaning of a nod is determined by where it occurs in an utterance, all the way down to the 200-millisecond scale (consider the difference between "you did a [great job]" (square brackets indicate the temporal extent of the nod) and "you did a [...] great job"). Thus, in the dialogue shown in Figure 4, REA says "it is five minutes from the Porter Square T station" at exactly the same time as she performs a walking gesture. If it occurred in another context, the same gesture could mean something quite different; if it occurred during silence, it could indicate Rea's desire to take the turn. Although it has long been known that the most effortful part of a gesture cooccurs with the part of an utterance that receives prosodic stress (Kendon, 1972), it was not until researchers needed to generate gestures along with speech in an ECA that it was discovered that it is the 'rhematic' (Halliday, 1967) or new contribution part of an utterance that receives the gesture.

One of the striking features of timing in conversation is the fact that during the course of a conversation, participants increasingly synchronize their behaviors to one another. Entrainment ensures that conversation will proceed efficiently (one of the functions that Brennan and Hulteen (1995) suggest are needed for more robust speech interfaces). REA cannot yet entrain her nonverbal behaviors to those of the listener. Human users, however, very quickly entrain to her, and begin to nod and turn their heads in synchrony with her within one or two conversational turns.

Division between Propositional and Interactional Functions

Some of the things that people say to one another move the conversation forward, whereas others

Table 2 Output functions

State	*Output function*	*Behaviors*
User present	Open interaction	Look at user, smile, toss head
	Attend	Face user
	End of interaction	Turn away
	Greet	Wave, say ''hello''
Rea speaking	Give turn	Relax hands, look at user, raise eyebrows
	Signoff	Wave, say ''bye''
User speaking	Give feedback	Nod head, paraverbal (''hmm'')
	Want turn	Look at user, raise hands
	Take Turn	Look at user, raise hands to begin gesturing, speak

simply regulate the conversational process. Propositional information corresponds to the content and includes meaningful speech as well as hand gestures that represent something. Interactional information regulates the conversational process and includes a range of nonverbal behaviors (quick head nods to indicate that one is following, or bringing one's hands to one's lap and turning to the listener to indicate that one is giving up the turn) as well as sociocentric speech ("huh?" and "do go on"). Both functions may be fulfilled by either verbal or nonverbal means. Thus, in the dialogue in Figure 4, Rea's nonverbal behaviors sometimes contribute propositions to the discourse, such as the gesture that indicates that the house in question is 5 minutes on foot from the T stop, and they sometimes regulate the interaction, such as the head nod that indicates that REA has understood Mike's utterance. For the most part, before the advent of ECAs, computational linguistics and work on dialogue systems concentrated on the prepositional functions of language. Adding a body to dialogue systems, however, brought home the need for the 'phatic communion' (Malinowski, 1923) or social aspects of conversational interaction between humans and machines.

Communicating Concepts with Maximal Efficiency

In e-mail, all of our communication goals must be translated into text (with the occasional emoticon). In face-to-face conversation, on the other hand, humans use every means at their disposal to communicate what they want to say. They use gestures to indicate things that may be difficult to represent in speech, and they depend on the ability to simultaneously use speech and gesture in order to communicate quickly. In this sense, face-to-face conversation allows us to be maximally efficient. In the dialogue reproduced in Figure 4, REA takes advantage of the hands' ability to represent spatial relations among objects and places by using her hands to indicate the shape of the garden (sketching a curved gesture around an imaginary house) while her speech gives a positive assessment of it ("It has a nice garden"). However, in order to produce this description, the ECA needs to know something about the representational properties of speech and gesture, something about how to merge simultaneous descriptions in two modalities, and something about what her listener does and does not already know about the house in question. These needs result in a new kind of computational architecture in which the planning of what the hands do and the planning of what language will do must be tightly coupled, and both must be linked to an information state module that keeps in mind the communicative goals and respective knowledge of both parties, as in Figure 5 (Kopp *et al.*, 2005).

Research Issues

The field of ECAs is still in its infancy. Although ECAs are far more capable of engaging in human-like face-to-face conversation than they were even 8 years ago, nobody would yet mistake them for humans. In fact, the development of ECAs has allowed researchers to uncover a host of behaviors that we take for granted, but that must be accounted for in a complete simulation of human communication. One large strand of current research on ECAs deals with the effect of emotion on verbal and nonverbal behavior in conversation (Andre *et al.*, 2000; Bui *et al.*, 2004; Chi *et al.*, 2000; Gratch and Marsella, 2004). Another examines personality and cultural differences and how these can be represented in ECAs (Loyall *et al.*, 2004; Trappl and Petta, 1997). Yet a higher-order concern is the social roles occupied by ECAs (Prendinger and Ishizuka, 2001), etiquette (Bickmore, 2004), and relationship building (Cassell and Bickmore, 2002). Finally, several researchers are constructing frameworks for evaluating the effects of ECAs on human–computer interaction (Ruttkay and Pelachaud, 2004). This issue is a thorny one. In this

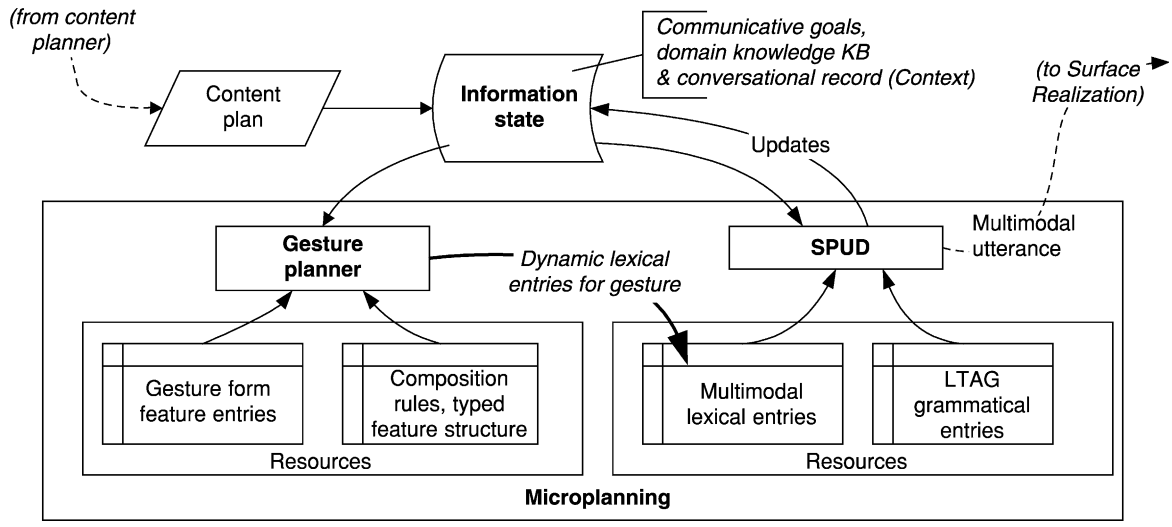

Figure 5 Multimodal microplanning.

article we have spoken of ECAs as both practical and theoretical constructs, and yet the jury is still out on exactly how practical they are as interfaces to computing power. Nevertheless, ECAs have allowed us to analyze human behavior by synthesizing it in a way that previous tools did not allow.

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Conversational Analytic Approaches to Culture

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Introduction

Conversation analysis (hereafter CA) is an approach to the study of social interaction which emerged in the 1960s in the work of Harvey Sacks, Emanuel Schegloff, and Gail Jefferson. Early work in CA drew upon the sociologies of Goffman and Garfinkel but quickly took on a distinctive set of methods and analytic questions specifically adapted to its chosen subject matter – the organization of talk-in-interaction (see Heritage, 1984). Today CA is practiced within a vibrant, international community of researchers distributed across a range of fields including sociology and anthropology, linguistics, psychology, and communication studies. CA is not associated with a specific theoretical construct of culture. However, the findings of various studies within CA are suggestive of an approach to culture and society as these are typically understood in the social scientific literature.

CA Methods

What distinguishes CA most clearly from other approaches is its methodology. CA research is based upon recordings (audio or audio-video) of human interaction (see Sacks, 1984 for the rationale). Analysis proceeds by unmotivated observation: that is, without looking for anything in particular (e.g., deictic particles, honorifics, talk about politics) the researcher attempts to isolate possible practices (relatively stable ways of performing actions). CA relies on unmotivated observation for the basic reason that – in working with conversational materials – it is not possible to adequately describe what one is looking for in advance of finding a set of instances (Schegloff, 1996a, 1997). Indeed, premature attempts to describe the phenomenon in the terms of some specialized vocabulary (e.g., linguistic, anthropological, sociological) often serve to obscure the very thing that is being investigated. A central point here is that a given practice need not be, and in fact rarely is, uniquely realized in a single form, i.e., there is no one-to-one mapping between forms and functions/practices. (This raises issues about the usefulness of traditional linguistic description in CA studies.) Take, for instance, other-initiated repair (Schegloff *et al.*, 1997). In English conversation, a wide range of formal devices may be used to initiate repair of a previous speaker's turn. These include 'open class' repair initiators such as 'huh?' (Drew, 1997); wh-words such as 'what?,' 'who?,' 'where?'; partial repeats, often with stress placed on the specific target of the repair initiator (e.g., '**You** opened it?'); and 'You mean X?' formulations, as well as combinations of wh-word and partial repeat. So the initiation of repair is accomplished by a range of different formal devices (often engendering alternate trajectories of action). At the same time, the formal devices used for initiating repair of a prior speaker's turn may also be used in quite other ways. 'Huh?,' for example, also occurs as a tag while partial repeats may be used to confirm what another has just said. The absence of a one-to-one mapping thus goes both ways. The consequences of such a situation are various. As already noted, in terms of method it requires that analysis proceed not by searching out forms but instead practices, which, at the outset of the analysis, remain by necessity partially described. A more basic consequence has to

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do with placement: if a given form may serve as the vehicle for a number of different actions, how do participants in conversation figure out – overwhelmingly correctly – which action is being done with a given form? In an early paper Schegloff and Sacks (1973) described this in terms of a 'placement problem' and noted that a form such as 'we::ll:' can be understood, by participants and analysts alike, as a 'possible preclosing' on the basis of its placement at the recognizable end of talk on a topic. In the same paper they went on to formulate a powerful analytic question which summarizes the conversation analytic understanding of the relation between form, placement, and action – 'why that now?' The question, which has become the *sine qua non* of conversation analytic research, also points to the importance of working back and forth between the particular instance – and its embedding in some specific course of action – and the larger collection of which it is apart since the 'that' is definable only in terms of such a dynamical relation (see Schegloff, 1998).

Once a practice is identified, it is collected. The resulting collection then serves as the basis of an analysis. The advantage of working with a collection – is that it allows for the identification of 'deviant' cases – instances in which the practice does not (for whatever reason) follow its normal course – a 'deviance' to which participants themselves orient. Such deviant cases frequently reveal participants' own orientations to the various contingencies involved in the execution of that practice – orientations which are typically unobservable in cases which conform to normative expectations and which are therefore literally unremarkable. In the context of an examination of practices for referring to persons, for instance, a collection of instances allows the analyst to distinguish cases in which just reference is being done from those in which something in addition to this is being accomplished (for instance, in cases where a locally subsequent form is used in a locally initial position, e.g., a spouse returns home from work and is met immediately with 'What did she say?'; see Schegloff, 1996b).

Collections allow, then, for the identification and description of practices of human interaction. A good deal of CA work is concerned to document and describe such practices – to add, as Goffman said, "another animal to the zoo." But there is also a more basic issue at stake in conversation analytic research. CA aims to understand the mechanics which underlie and organize the wide range of practices which have been described. To this end, conversation analysts have introduced a number of important conceptual tools for understanding this underlying mechanics of interaction – for instance, the concepts of conditional relevance and preference (see Schegloff, 1968; Pomerantz, 1984). However, work in this area is still in its infancy. Thus, we have very good descriptions of how, on the one hand, person reference is done in conversation and how, on the other, place reference is done, but, at this point, very little sense of the ways in which both might be organized in relation to a more basic system of reference in conversation (though see Schegloff, 2000).

Implications for Concepts of Culture and Society

In his early work on conversational and other materials, Sacks developed an approach which eventually came to be known as 'membership categorization analysis' (MCA). MCA had clear links to the work done by ethnoscientists as well as ethnomethodological researches which examined the logic of categorization as manifested in people's ordinary activities including conversation. In his well-known paper 'On the analyzability of stories by children,' Sacks examined a line from a child's story, 'the baby cried, the mommy picked it up,' and attempted to explicate how it was that a listener knew intuitively that it was the **baby's** mother (rather than some other 'mother') who picked the baby up. This he explained in terms of category-bound activities and rules for application (hearers' and viewers' maxims). MCA is essentially an examination of ordinary, vernacular logic and, as such, is quite clearly about 'culture.' Schegloff (2002) explains:

> Sacks had proposed that a core element of vernacular culture was composed of common-sense 'knowledge' about members of the society and others organized by reference to types or categories of person, categories which were themselves organized into collections of categories – such as [male, female], [Protestant, Catholic, Jew], [adult, child], [cat people, dog people], [Libra, Sagittarius, Leo], and so forth. Such collections were empirical objects; the grouping of categories into collections might be the case or not the case for some culture. The way I just exemplified the point was 'correct,' at least for American society and culture; it would have been for this culture incorrect to have proposed as a collection of categories [male, female, Sagittarius]; Sagittarius does not belong to that collection.

In the development of CA, MCA was superseded by the methods described above although its findings were to some extent incorporated into the analysis of sequence organization – specifically the analysis of person and place reference (see Schegloff, 1996b). Early work in MCA along with more recent developments in CA hold out the possibility of research into the culturally specific categorization techniques

associated with different languages and cultures (see Schegloff, 2002).

'Culture' and Conversational Practices – The Possibility of Comparative Research

On one of the relatively few occasions that Sacks discussed 'culture' in his lectures he defined it as a 'system for generating recognizable actions.' This characterization fits well with methods and research agenda described above and points, to the possibility of comparative studies. It suggests, that is, that cultures differ in terms of the actions (or practices) which they generate as recognizable. Most of the work in CA has examined English conversation and a question arises as to the extent to which the findings are generalizable to other languages, other cultures, or even contexts within the same culture.

'A simplest systematics for the organization of turn-taking for conversation' was a massively important paper within the development of CA. Not only did this paper provide one of the first systematic applications of CA methodology, it also described a very wide range of practices having to do the with the construction of turns at talk, the distribution of opportunities to speak, and the basic properties of sequence organization and recipient design. A somewhat implicit claim of the paper was that the basics of the system described should account not just for English conversation but for conversation in general – regardless of language, culture, social situation, or whatever. Conversational turn taking, it was claimed, is locally managed, by and for the participants on a turn-by-turn basis. In that sense, conversation differs from 'speech exchange systems' in which turn taking is pre-allocated. Some anthropologists had advanced alternate descriptions of turn taking in the cultures they had studied. Riesman (1974), for instance, described Antiguan creole conversations as 'contrapuntal,' even 'anarchic' and participants as having "no sense of interruption." One of the great benefits of CA methodology is that it allows such claims to be tested empirically on actual conversational materials. Sidnell's (2001) examination of turn taking in Caribbean creole conversations attempted to do just this and showed that Riesman's claims are not supported by the data. On the contrary, the basic features of the system which organizes opportunities to speak in Caribbean creole conversations do not differ significantly from those described by Sacks *et al.* for American English. Such research suggests that conversational turn taking is not subject to a great deal of crosscultural variation (and, of course, there are a number of evolutionary reasons why this might be the case – see Goody, 1995).

While a good deal of conversational organization is not subject to cultural variation, there are also many practices which are specific to a group (defined in terms of culture or language). Stivers, for instance, in examining African-American English data, has found an apparently distinctive way of expressing agreement (and alignment) which involves making the same assertion or assessment as a previous speaker but using a completely different set of lexical items and idiomatic phrases to do so. In recent work, Levinson (in press) has examined practices for referring to persons in data from Rossell. He finds that although the system is basically the same as that described for English (in terms of the underlying preferences for recognition and minimization), it is 'inflected' by local taboos that disallow the use of names to refer to certain classes of relatives. The interactional problem created by such taboos is solved by the use of eyebrow flashes as well as gaze and manual points which 'count as' inexplicit references and therefore as taboo-compliant behavior.

Social Organization and Culture as an Organization of Conversational Practices

In addition to the comparative type of research described above, a number of ethnographers have used CA to describe a social group (or culture) as an organization of conversational practices. Marjorie Goodwin's (1990) pioneering work on African-American children, for instance, analyzed the ways in which their social groups were built out of and realized within a set of practices of speaking. She found, for instance, that social groups were organized through the issuing and receipt of directives as well as the production of requests. More recently. Charles Goodwin (1994) has examined a range of professional settings (such as legal and archeological) in terms of the conversational practices which constitute their practical work.

CA eschews top-down theorizing and it is, perhaps, for this reason that a CA approach to culture has not been either a priority or an outcome of research to date. However, conversation analytic work is strongly suggestive of an approach to culture and other topics of traditional social-scientific inquiry. If such notions are to be a part of conversation analytic research they will need to be grounded in the conversational materials which constitute the empirical base of this approach.

See also: Conversation Analysis.

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Conversion

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Conversion is a word-formation process that changes the word class of existing words but not their form, for example, ***water*** versus *to* ***water*** *something*, *a good* ***buy*** versus *to* ***buy*** *something*, *a* ***shy*** *person* versus *to* ***shy*** *from something*, or *to go* ***back*** versus *to* ***back*** *someone*. Other approaches, less widespread, also allow for conversion whenever there is a change of syntactic subcategory within one and the same word class. Conversion is best known in English, where it is used frequently and rates as one of the major word-formation processes along with derivation and compounding. It operates there mainly between the categories noun, verb, and adjective, although not equally in all the possible directions. Conversion between members of other word classes is also possible, but is less productive.

Conversion has been given other names, the most common of which is 'zero derivation' or 'zero-affixation' (also 'functional shift' and 'transfer'). The former are preferred by an influential school of thought according to which the process is best understood as a type of affixation in which the affix is realized by a zero element. This view is based on the parallel that can be drawn between pairs such as *to write* : *writ**er*** and *to cheat* : *cheat-Ø*, or between *legal* : *to legal**ize*** and *clean* : *to clean-Ø*. This way of interpreting the derivational process leads to a more uniform theory of word-formation, but also must face

See also: Conversation Analysis.

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Conversion

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Conversion is a word-formation process that changes the word class of existing words but not their form, for example, ***water*** versus *to* ***water*** *something*, *a good* ***buy*** versus *to* ***buy*** *something*, *a* ***shy*** *person* versus *to* ***shy*** *from something*, or *to go* ***back*** versus *to* ***back*** *someone*. Other approaches, less widespread, also allow for conversion whenever there is a change of syntactic subcategory within one and the same word class. Conversion is best known in English, where it is used frequently and rates as one of the major word-formation processes along with derivation and compounding. It operates there mainly between the categories noun, verb, and adjective, although not equally in all the possible directions. Conversion between members of other word classes is also possible, but is less productive.

Conversion has been given other names, the most common of which is 'zero derivation' or 'zero-affixation' (also 'functional shift' and 'transfer'). The former are preferred by an influential school of thought according to which the process is best understood as a type of affixation in which the affix is realized by a zero element. This view is based on the parallel that can be drawn between pairs such as *to write* : *writ**er*** and *to cheat* : *cheat-Ø*, or between *legal* : *to legal**ize*** and *clean* : *to clean-Ø*. This way of interpreting the derivational process leads to a more uniform theory of word-formation, but also must face

the difficulties derived from the theory of 'zero-morpheme.'

The notion of conversion has been present in the description of English at least since the grammars of the mid-18th century, normally within the section of word-formation, although it may also appear in discussions of word classes and as an issue in its own right. All three approaches seem justified: it is generally accepted to produce new lexemes, it relies heavily on the concept of word class, and it is exceptional in a number of respects that have led to its interpretation away from the field of word-formation.

Although one of the requirements of conversion is that meaning modification and its subsequent word class change do not cause any formal alteration, the term has customarily been extended to cases in which minor formal changes occur that are not usually interpreted as affixes. These variations can be minor differences in segmental make-up and/or stress, as in *refuse* /ˈrefjuːs/ versus *to refuse* /rɪˈfjuːz/, *estimate* /ˈestimət/ versus *to estimate* /ˈestimeɪt/, or *thief* /θiːf/ versus *to thieve* /θiːv/. The former type of example has been recently interpreted as a separate but related suprasegmental process (*see* **Internal Modification**).

A different kind of formal change affects other more central aspects of conversion. Converted words may or may not adopt new inflections (the endings that each word class takes for the expression of grammatical categories such as number, person, tense, and degree). The usual approach is that, whenever converted words assume new inflections, conversion is said to be 'full,' 'total,' or 'complete,' e.g., *to man* in *Athens had built and* ***manned*** *200 ships*. When they do not assume new inflections but still show semantic and syntactic change, conversion has been described as 'partial,' e.g., *young* (not **youngs*) in *The* ***young*** *are more forgiving than adults*. The notion of partial conversion has been normally reserved for a limited range of cases, namely, adjectives without nouns, as in *the* ***young*** above, and nouns before other nouns, as in ***chocolate*** *cake*. The distinction full versus partial has been criticized on various grounds, and alternative views of partial conversion are preferred by some authors, such that a syntactic function forces a new environment on an existing word or, conversely, that it is plain conversion. The former does not necessarily mean that a new word has been formed, even if syntactic developments can in the course of time give rise to what would comply with the conditions of full conversion. The value of inflection in converted words has been weighed differently in the literature with respect to the separation between inflection and derivation and also with respect to the importance it may have in conversion. The issue of -ing words in examples such as *We know they're* ***acting*** *against nature*, *I should never have appointed her in an* ***acting*** *capacity*, and *The* ***acting*** *in the film is good* (or correspondingly variable uses of the *-ed* form) illustrates that the concept of conversion and what units can be said to have converted from one word class to another (here verb, adjective, and noun, respectively) may depend on whether the *-ing* (or *-ed*) is assumed to be an instance of inflection or derivation. Although the usual analysis of participial forms showing features of different word classes as in these examples is in terms of affixation, it has also been argued that they are instances of conversion.

Apparently equivalent instances of conversion may arise in different ways. First, there are historical processes, such as those that deleted the inflections formerly existing in English, thus resulting in formal identity when lexemes differed only in their inflections, for example, Contemporary English *love* versus *to love* respectively derived from the Old English noun *lufu* and verb *lufian*. These are separated from conversion whenever the aim is to describe the processes leading to identification of one form with several meanings and functions, not when it is to indicate the current state of the language. Second, syntactic processes may require a word to take on a position or end up performing a function typical of a different word class without any formal change. This corresponds in the main with what has been described as partial conversion. Finally, there is meaning modification in varying degrees that causes syntactic change, as in *A man* ***elbowed*** *to the front of the crowd* or *The dire light and dark shadows* ***foxed*** *him*. Meaning modification is usually light and goes along well-known semantic patterns described for the process, but conversion can be related to metaphorical extension of meaning too, as in *backward* in *a very* ***backward*** *agriculture*. In a narrow sense, not all these processes fully comply with the view of conversion as a word-formation process, and what can be viewed simply as sources for formal identity of a different kind is, however, usually included under conversion in a broader sense.

This is largely because the process is applied to word pairs matching the profile given above (that is, formal identity, syntactic variation, and lexical proximity), regardless of the relationship between them. In fact, although it is generally accepted that conversion is a process, it is not so clear whether it is a relationship too. Various specific relationships that could contribute to clearing up this issue have been suggested but have gained little recognition, for example, homomorphy (the same morphological form and different syntactic functions of lexemes allegedly belonging to different word classes). Other processes or relations involving association of the formal,

functional, and semantic features found in conversion also exist in the language, for example, homonymy, which has been linked occasionally with the process even if in homonymy the lexical proximity typical of conversion-related pairs does not occur, or else can occur between members of the same category or word class.

Another difficult area of conversion is the directionality of the process, that is, the identification of the base and the derived term that should exist if it is a word-formation process. Whereas in, for example, affixation the derived term is marked formally by a new element (the affix), other criteria are necessary to tell one from the other in conversion, as the semantic and syntactic changes from base to derived are not reflected in form. The traditional view is that identification of the base and the derived term is possible from their records in etymological dictionaries (the term with the earliest record is the base). However, this use of historical evidence has often been rejected for synchronic accounts of word-formation and, instead, present-day evidence has been proposed. This evidence is expressed in a set of criteria based primarily on meaning and then on other aspects such as the form, frequency, and use of each of the terms of conversion. Neither of these two approaches is without problems.

For a long time, grammars have described conversion as typical of English, where its ever-growing presence has been attributed to its expressive force and economy of use and to the gradual loss of inflections since Old English times. The connection between conversion and inflectional leveling largely depends on the value given to inflection, as noted above, and to what units the concept may be applied, whether words or stems. In the latter case, as in French ***rose*** versus ***roser*** (*pink* versus *to pink*), German ***Regel*** versus ***regeln*** (*rule* versus *to regulate*), or Spanish ***brill***o versus ***brill***ar (*shine* versus *to shine*), conversion is more widespread than initially assumed and becomes a frequent resource in a number of languages.

Although the form and the function of words have been for a long time the major source of evidence to decide whether conversion has taken place or not, meaning has gained back at least part of its due weight in the study of conversion. Assumption of new inflections and certain positions or functions can be symptoms of conversion, but they may not always be present (for example, in uninflected word classes or even in some of the inflected word classes), may not allow for associations between word class and syntactic function, or may be interpreted as syntactic developments alone. After all, if conversion is a word-formation process, lexical change and the nuances granted by the use of words must also be appraised.

See also: Affixation; English in the Present Day (since ca. 1900); Figurative Language: Semiotics; Inflection and Derivation; Internal Modification; Meaning: Cognitive Dependency of Lexical Meaning; Meaning, Sense, and Reference; Metathesis; Morpheme; Onomasiology and Lexical Variation; Polysemy and Homonymy; Structures and Processes; Syntax-Semantics Interface; Word; Word Classes/Parts of Speech: Overview; Word Stress.

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Cook Islands: Language Situation

Editorial Team

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The Cook Islands, first named so by Russian cartographers in honor of the 18th century English explorer-captain James Cook, are situated in the southwestern sector of the Pacific Ocean, and they cover an area the size of India. They are divided into northern Cook Islands, formed by a cluster of seven coral atolls, and southern Cook Islands, comprising eight hilly, volcanic islands where most of the population lives. After a short spell as a British protectorate, in 1900 the Cook Islands were transferred to New Zealand, and in 1965 the Islands' population chose self-government in free association with New Zealand. English is the official language of the Cook Islands, but a number of Polynesian languages are used widely on the islands, notably Pukapuka and several Tahitic languages and dialects, also known as Maori. Pukapuka, spoken on the northern Cook Islands of Pukapuka and Nassau, originated in western Polynesia and has links with the tongues of Samoa, Tokelau, and Niue. There are three Tahitic languages on the Cook Islands: Rakahanga-Manihiki, Penrhyn, and Rarotongan, the last of which can be subdivided into the dialects of Mangaia, Aitutaki, and Atiu/Mauke/Mitiaro. The people of Palmerston, one of the southern Cook Islands, speak English in the accents of Victorian Gloucestershire. This is because Palmerston was uninhabited until 1862, when a Gloucester man, William Masters, settled there with his three Polynesian wives and stayed till he died in 1899. The influential role played by the Masters family continued throughout the 20th century; in fact, nearly all the islanders are named Marsters – someone having added an 'r' to the original name. The Tahitic languages and dialects are mutually intelligible to a degree sufficient to allow most southern-group Cook Islanders to communicate with those from the far-flung northern atolls. It must be noted also that the considerable influx of people from the outer islands in search of opportunities in Rarotonga, on which the capital is situated, has resulted in greater homogeneity of language.

See also: Austronesian Languages: Overview.

Language Maps (Appendix 1): Map 145.

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Language Maps (Appendix 1): Map 145.

Cooper, Christopher (?1655–1698)

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Cooper's reputation rests primarily on his *Grammatica Linguae Anglicanae* (1685), the last grammar of English to be written in Latin. Almost half of it deals with pronunciation – since the intended readership was foreign learners of English. Cooper's *The English Teacher* (1687) is a revised version of this part of the *Grammatica*.

It is probable that Cooper came from a poor family and was helped to go to Corpus Christi College, Cambridge, in 1672 by Bishop Seth Ward, to whom his 1685 grammar is dedicated. Cooper took his B.A. in 1676 and M.A. in 1680, about which time he was appointed headmaster of Bishop's Stortford Grammar School, Hertfordshire and in 1686 the Vicar of St. Michael's in Bishop's Stortford. He died in 1698.

His *Grammatica Linguae Anglicanae* (1685) is a conservative work, designed primarily for foreigners but with the hope, unrealistic by that time, that it would also be used in schools. He maintains that it is the study of grammar which preserves the purity of a language: uneducated people need only express themselves so that they are understood, but the educated should express themselves aptly and elegantly. Nearly half the book is given to phonology, and it is this part, expanded and revised, which comprises the English version, *The English teacher* (1687). Here he deals only with pronunciation and spelling; there is no treatment of accidence and syntax. Cooper himself says that he owes much to both John Wilkins and to John Wallis (*see* **Wilkins, John (1614–1672); Wallis, John (1616–1703)**). He shares with Wallis a concern to consider English as it is and not to impose on it a categorical system taken from Latin. But Cooper is less successful than Wallis in achieving this, partly because he adopts some of Wilkins's metaphysical classifications. Cooper considered, with justice, that his discussion of homophones and homographs, and of silent letters, was fuller and deeper than that by any previous grammarian. He lists a number of dialectal pronunciations (amongst those which he labels 'barbarous') and many alternative spellings. Although *The English teacher* seems to have been issued again in 1688, and in 1698 as *The Compleat English teacher* (of which no copy has survived) Cooper's work received little attention until the 1950s. An unsatisfactory edition of the *Grammatica* was edited by J. D. Jones in 1911. Dobson, in his comprehensive account of Cooper's phonology, praises him as the equal of Wallis as a theoretician and even more exact in his analyses. Cooper's treatment of syntax, and his relationship with Wallis, is more fully discussed by Padley (1985).

See also: Wallis, John (1616–1703); Wilkins, John (1614–1672).

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Cooperative Principle

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The Principle Itself

In his William James Lectures at Harvard University in 1967, H. Paul Grice posited a general set of rules contributors to ordinary conversation were generally expected to follow. He named it the Cooperative Principle (CP), and formulated it as follows:

> Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged (Grice, 1989: 26).

At first glance, the Cooperative Principle may appear an idealistic representation of actual human

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> Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged (Grice, 1989: 26).

At first glance, the Cooperative Principle may appear an idealistic representation of actual human

communication. After all, as Grice himself has learned from his detractors, many believe "...even in the talk-exchanges of civilized people browbeating disputation and conversational sharp practices are far too common to be offenses against the fundamental dictates of conversational practice." Further, even if one discounts the tone of an exchange, "much of our talk exchange is too haphazard to be directed toward an end cooperative or otherwise" (Grice, 1989: 369).

However, Grice never intended his use of the word 'cooperation' to indicate an ideal view of communication. Rather, Grice was trying to describe how it happens that – despite the haphazard or even agonistic nature of much ordinary human communication – most discourse participants are quite capable of making themselves understood and capable of understanding most others in the course of their daily business.

What Counts as Cooperation?

Grice invites us to consider the following, quite unextraordinary exchange:

> A: I am out of petrol.
> B: There is a garage round the corner (Grice, 1989: 32).

Assuming A immediately proceeds to the garage, secures the petrol, and refills his car, we may describe B's contribution as having been successful. By what rational process of thought was A so quickly able to come to the conclusion that the garage to which B refers would fulfill his need for petrol? Why did B's utterance work? Grice's answer: because A and B adhere to the Cooperative Principle of Discourse.

It is not hard to imagine that two friends sharing a ride would want to help each other through a minor crisis; thus, 'cooperation' in this scenario seems quite apt.

But imagine the exchange went this way instead:

> A: I am out of petrol.
> B: (sarcastically) How nice that you pay such close attention to important details.

In this second scenario, not only does B refuse to assist A in solving the problem, he uses the occasion to add to A's conundrum an assault upon his character. Assuming A feels the sting, again B's contribution has been successful. So how and why in this case has B's contribution worked? How can such a sour response as B's callous retort be considered 'cooperative'? Again, Grice's Cooperative Principle proves a useful answer. The explanation requires closer inspection of the strictness with which Grice uses the term.

The Cooperative Principle and the Maxims of Cooperative Discourse

Grice explicates his Cooperative Principle of Discourse in 'Logic and Conversation,' the paper originally presented at Harvard University in 1967, later printed in Cole and Morgan (1975), and reprinted in a slightly revised version in Grice's *Studies in the Way of Words* (1989). We cite from his final version as we assume this is the one he considered most complete. In the essay, Grice is careful to limit use of the CP for describing only talk exchanges that exhibit the following three specific characteristics:

1. The participants have some common immediate aim.
2. The contributions of the participants [are] dovetailed, mutually dependent.
3. There is some sort of understanding (often tacit) that, other things being equal, the transactions should continue in appropriate style unless both parties are agreeable that it should terminate (Grice, 1989: 29).

Though he is careful to limit the CP's application to talk exchanges that exhibit these particular cooperative characteristics, this list should not be read as an admission of great limitation. For Grice finds that most talk exchanges **do** follow the CP because most talk exchanges do, in fact, exhibit the **cooperative** characteristics he outlines:

> Our talk exchanges ... are characteristically, to some degree at least, cooperative efforts; and each participant recognizes in them, to some extent, a common purpose or set of purposes, or at least a mutually accepted direction (Grice, 1989: 26).

Grice identified the Cooperative Principle as a 'super principle' or a 'supreme principle' (1989: 368–369) that he generalized from four conversational 'maxims' he claimed discourse participants ordinarily follow. With a nod to Kant, Grice identifies the maxims as:

1. Quantity (give as much information as is required, and no more than is required)
2. Quality (do not say what is false or that for which you lack adequate evidence)
3. Relation (be relevant)
4. Manner (be clear, be orderly, and avoid ambiguity) (1989: 28).

Clear fulfillment of these maxims may be demonstrated in the following exchange:

> A: Do you know where I can buy some petrol?
> B: You can buy petrol at the garage right around the corner.

Let us assume that B is sincere and knowledgeable, and A finds the garage right away based upon B's advice. It is the case then that B's response to A's question follows the maxims completely, giving exactly the right amount of information (quantity), information for which B has the required evidence (quality), information that is directly connected to A's question (relevance), and information given in a fashion effectively and efficiently understood (manner).

But Grice knew that people do not always follows these maxims as they communicate. (What dull business conversation analysis would be if they did!) Rather, interlocutors can fail to fulfill the maxims in a variety of ways, some mundane, some inadvertent, but others lead to what most consider the most powerful aspect of Grice's CP: conversational 'implicature.'

Failures to Fulfill Maxims and Implicature

Grice describes four ways in which maxims may go unfulfilled in ordinary conversation. The first three ways are fairly straight forward. One might **violate** or infringe a maxim. This infringement is often done with the intention of misleading; for example, one might say, 'Patricia was with a man last night' as a way of making Patricia's routine dinner out with her husband seem clandestine. One might **opt out**, making it clear that one refuses to cooperate in a conversation for some reason; for example, one may be legally bound not to provide information one has. Or, one might encounter a **clash** of maxims, facing the choice of violating one maxim or another. For example, one may not be able to give all of the information required (quantity) because one does not have adequate evidence for the information (quality).

Most interesting is the final possibility for the nonfulfillment of a maxim: **flouting** or **exploiting** a maxim for the purpose of implicating information (implicature). This case is the one in which even an apparently uncooperative response illustrates discursive or linguistic cooperation. Recall the examples with which this article was introduced.

A: I am out of petrol.
B: There is a garage round the corner.

In this instance, we may claim, that B – at first blush – appears to break the maxim of relation. For what does a garage have to do with petrol? Since drivers are aware that garages sell petrol, it is not long before A realizes that B has not broken the maxim of relation at all; it is, in fact, instantaneous. B's point is directly relevant. B is being cooperative in both the colloquial sense and the specialized sense Grice applies to the term. Grice's Cooperative Principle makes sense of the speed with which A is able to process the usefulness of B's contribution. A assumes B is following the maxims and would thus not mention the garage unless it had petrol.

In the next scenario, however, the exchange, and thus the rational process by which A makes sense of B's contribution, is markedly different:

A: I am out of petrol.
B: (sarcastically) How nice that you pay such close attention to important details.

In this instance, B flouts the maxim of quality by stating as true something for which he has specific and immediate evidence is untrue. One likely implication of B's remark is that A is an idiot for not paying attention to such an important detail as having enough petrol in the car. If A feels the sting of B's remark, A and B have exhibited discursive cooperation that resulted in an implicature directed to A from B (*see* **Maxims and Flouting**).

While one example hardly illustrates so many cases, Grice works out a number of possible forms of implicature: irony, metaphor, meiosis (understatement), hyperbole, social censure, deliberate ambiguity, and deliberate obscurity (for example, if one is trying to keep a secret from the children). In all of these cases, maxims are broken and the breaks result in specific information implied to and understood by the receiver of the utterance.

The power of the conversational maxims to describe rational processes by which speakers and hearers make sense of each other's utterances have energized many scholars of language and conversation across many fields. But, as the introduction to this article makes clear, the Cooperative Principle has not been free from serious critique.

Major Critiques of the Cooperative Principle

Problems with the Term 'Cooperation'

Despite the care with which he used the term "cooperation," Grice is regularly accused of promulgating a theory that assumes too friendly a spirit of communicative interaction among people. This charge is most commonly made in work outside of Grice's own field of linguistic philosophy. In effect, these detractors claim Grice is just too nice.

For example, Tannen (1986) claims that Grice's maxims of cooperative discourse can't apply to "real conversations" because in conversation "we wouldn't want to simply blurt out what we mean, because we're judging the needs for involvement and independence"

(1986: 34–45). Tannen assumes that Grice's maxims are prescriptions that conversations must follow strictly in order to be considered cooperative. Cameron (1985) makes a similar case, taking issue with Grice's application of the term 'cooperation' to all discourse. Cameron is quite correct in her claim that – at least in the colloquial sense of the term – assumptions regarding the appropriateness of 'cooperative' behavior have dogged women for centuries. But Cameron demonstrates a reductive view of Grice's use of the term 'cooperation' when she describes Grice's CP as an 'inflexible' and 'unproductive' apparatus that provides yet another way for both 'chauvinists and feminists' to believe that 'whereas men compete in competition, women use co-operative strategies' (1985: 40–41). Grice's version of cooperation is more flexible and less dogmatic than these critics assume.

Others have gone so far as to claim Grice **advocated** cooperation among conversational participants, believing Grice prescribed cooperation as the most effective way of engaging in meaningful communication with others.

Cooper (1982), interested in applying Grice to theories of written composition, claims that Grice advocates cooperation because

> what enables conversation to proceed is an underlying assumption that we as conversants have purposes for conversing and that we recognize that these purposes are more likely to be fulfilled if we cooperate (1982: 112).

The notion that discourse participants cooperate with each other and that they do so out of a mutual benevolence is a misreading of Grice's position on cooperative discourse; but it is one that persists.

Grice himself acknowledged the difficulty some have had interpreting his use of 'cooperation.' As a final chapter to his 1989 book, Grice wrote a 'Retrospective Epilogue' in which he considered criticism his theories had engendered. It has already been related that here Grice acknowledged that his theory suffers from a perceived naïveté. To combat the criticism, Grice adds useful information about what counts as cooperative in discourse. First, he reminds readers of the sort of utterances he seeks to elucidate: voluntary talk exchanges that require some form of "collaboration in achieving exchange of information or the institution of decisions." And, he points out that within exchanges intended to produce information or determine decisions, cooperation "may coexist with a high degree of reserve, hostility, and chicanery and with a high degree of diversity in the motivations underlying quite meager common objectives" (Grice, 1989: 369). Even as adversarial an exchange as a hostile courtroom cross-examination would at least simulate adherence to the CP.

To further explain the sort of cooperation to which Grice refers, it might help to borrow a term from classical rhetoric. The ancient Greeks used the term 'Nomos' to indicate cultural practices that defined a group of people. Two closely related connotations of the term are useful for the present discussion: (1) 'the mores" of a given collective (Ostwald, 1969: 33); and, (2) customs "which are generally observed by those among whom they prevail" (1969: 36). Nomos is not necessarily an explicit, prescribed set of conventions, but rather a set of conventions that are brought into existence by the very fact that people ordinarily follow them, perhaps without even realizing they are following a set of conventions. When American youths visit Europe, the locals can spot them in an instant by their footwear; but, in the United States, sneakers are simply what young people ordinarily wear.

Nomos applied to conversation, then, is a set of conventions, or rules (or maxims) for talk according to which a group of people ordinarily makes meaning. In the maxims, Grice believes he has found universal conventions that all people may regularly follow in their meaning-making talk exchanges. In order for such a set of conventions to function, a certain degree of at least tacit assent to those conventions is necessary. Thus, the term 'cooperation' is quite apt.

The crucial subtlety of Grice's theory is this: interlocutors do not necessarily cooperate with each other; they cooperate with a set of conventions that allows each interlocutor to produce approximate enough meanings for communication to work. This form of cooperation is not necessarily benevolent at all; even the bitterest of verbal fights require linguistic cooperation to work.

The aim for Gricean conversation analysis – and thus the CP and the maxims – is not to advocate benevolent cooperation, but to prove the rationality of conversation. "...observance [of the maxims] promotes and their violation [except in the case of implicature] dispromotes conversational rationality" (Grice, 1989: 370).

Although many have claimed Grice's writing on the CP is ambiguous and is on occasion inconsistent with terminology, this should not be said of Grice's measured use of the term 'cooperation.'

Precise readings of Grice's writing on cooperation demonstrate that he rarely, if ever, describes interlocutors as **being** cooperative. Rather, he claims that interlocutors' contributions to conversation **are**

cooperative. The contributions are uttered in cooperation with a set of conventions for producing meaning. In this sense, we might think of a pair of interlocutors as each operating according to the dictates of a set of conventions (the maxims) and thus they are 'co/operators': two operators of discourse operating at once.

Consider also, Grice's use of the term 'dovetailed' in describing the state of cooperative contributions to conversation (1989: 29). Dovetailed elements are placed within very close proximity to each other, maintaining the integrity of each separate element, but creating a stronger whole. Utterances remain utterances, but conversations take flight, implicating new meaning for hearers and speakers.

Problems with the Maxims: The Haphazardness of Communication and the Specificity of Maxims

The second major critique of the Cooperative Principle has been a topic of spirited discussion among linguistic philosophers since Grice first proposed it. Grice himself identifies the problem as resulting from the thought that communication is simply too "haphazard" to be described accurately as having a cooperative end. Some forms of communication are not appropriately described by the CP. For example, as Grice puts it, "Chitchat goes nowhere, unless making the time pass is a journey" (1989: 369).

Grice suggests the problem is two-fold. First, he agrees with critics that the maxims appear less "coordinate" than he would prefer. The maxim of quality appears in some ways more definitive of information than the other maxims. And, the maxims are not independent enough: relevance, as will be shown, has been often regarded as containing the essence of the other maxims. Second, Grice's selection of cooperation as the "supreme Conversational Principle" underpinning the rationalizing operations of implicature remains, to say the least, not generally accepted (1989: 371).

In his 'Conversational maxims and rationality' Kasher (1976), claims that cooperation is not a principle that accounts for all information conveyed by implicature because cooperation may be "contrary to [a speaker's] interest" (1976: 241). Kasher offers the following example: Man A. is asked by Man B. "Who is going to marry your sister?" Man A., who knows the proper name of the intended, replies, "A peacock dealer." Man A.'s reply, Kasher points out, does not satisfy the demands of full cooperation, and the CP, claims Kasher, cannot account for a situation in which there is no cooperation. As an alternative explanation for the operation of conversational implicature, Kasher poses the "Rationalization Principle," which stems from the idea that Relevance (one of Grice's maxims) is the only necessary element to explain a talk exchange. In a later work, Kasher renames his principle "the principle of rational coordination," which states: "Given a desired basic purpose, the ideal speaker chooses that linguistic action which, he believes, most effectively and at least cost attains that purpose" (Kasher, 1977). Kasher's well known critique thus began what has become 'Relevance Theory,' which is at its base a refinement of Grice's earlier work (*see* **Relevance Theory**). (See below for references to other work on Relevance.)

Though in his final work he admitted some misgivings and offered minor refinements of his maxims of cooperative discourse, Grice, up until his death in 1988, defended his selection of the Cooperative Principle as the 'supreme principle.'

Scholarship Influenced by the Cooperative Principle

Though critiques of the CP remain unresolved – and perhaps they always will be – there is nevertheless no denying that Grice's CP has had a dramatic influence on discourse studies across disciplines. The CP can probably not be considered definitive, but there is no denying it has proven quite generative.

Because Grice's Cooperative Principle has such cross-disciplinary appeal, any survey of work influenced by it is almost certainly incomplete. The sketch here is intended to acquaint the reader with some applications of major importance and to give readers a richer understanding of the depth and breadth of the influence Grice has had. (For more citations and commentary on work influenced by Grice's CP, see Lindblom, 2001.)

Grammar

Grammarians frequently view literal or sentence meaning as more important than any individual's intended meaning in making an utterance. Thus Chomsky, for example, has critiqued Grice's CP for being unprincipled (1975: 112) and has complained that Grice's approach to language study is behaviorist due to his focus on utterer's intention (Suppes, 1986: 121). Other grammarians influenced by Chomsky have used similar logic to critique the CP as too concerned with context.

Suppes, whose essay is an excellent synthesis of grammar studies using Grice, argues that these grammarians assume an even more closely rule-bound language governance, making their claims essentialist. Further, he argues, that Grice's CP is useful precisely because it is so context dependent. Chomsky's

positivism is not an issue in a Gricean analysis because Grice's work "bring[s] out the importance of context" (Suppes, 1986: 124).

Neo-Gricean Pragmatics

Grice's influence is most apparent in a branch of linguistic study that has become known among some as Neo-Gricean pragmatics. Scholars in this field have greatly revised Grice's maxims of cooperative discourse in a variety of interesting ways, but they have maintained the basic direction of Grice's work, especially in regard to the concept of conversational implicature. Huang (1991) usefully surveys a great deal of scholarship from well known scholars in this area, including Atlas, Levinson, Sperber and Wilson, Leech, and Horn (*see* **Neo-Gricean Pragmatics**).

As mentioned previously, Kasher developed a specific focus on one of Grice's maxims, thus establishing the field of Relevance Theory. Sperber and Wilson have also generated an important Relevance Theory, theirs influenced by Fodor's theory of cognitive modularity. According to Huang, Sperber and Wilson believe "one is always maximizing the informational value of contextual stimuli to interpret the utterance in a way which is most consistent with the Principle of Relevance" (Huang, 1991: 303). Along with texts by Kasher and Sperber and Wilson, important developments in Relevance Theory may also be found in Grandy and Warner (1986) and Tsohatzidis (1994).

More recently, a special issue of *Journal of Pragmatics* has focused exclusively on Gricean themes in pragmatic analysis. Although he resists the notion of a school of 'Neo-Gricean' approaches, the journal editor has nevertheless gathered a collection of papers that illustrates that Grice's CP and maxims are ideas that "shook the world of language study in the past century, and continue to move and inspire today's research" (Mey, 2002: 911). The special issue includes essays focused on social roles in Japan, maxim confluence among multi-lingual code-switchers, academic writing, and other current approaches to Gricean pragmatics.

The CP is not only applicable across cultures, it is also possible to use Gricean analysis to examine a 'theme' in discourse. For example, much interesting work is underway in the pragmatics of humor (for example, Attardo, 2003).

Politeness Theory

Politeness theorists use Grice's CP specifically to examine the ways in which maxims are exploited to indicate some special status of the hearer. For example, a lawyer would answer a judge, "Yes, your honor." The 'your honor' breaks the maxims of quantity – as surely the judge is aware of her title – but including the words 'your honor' implies the speaker's understanding that the judge holds a greater position of authority.

For a valuable survey of Politeness Theories, see Fraser (1990). In this piece Fraser examines politeness theories posited by Lakoff and by Leech, and he explains that both of these theories rely heavily on Grice's CP, though Lakoff reduces the maxims by two and Leech increases the number by six. The most influential Politeness Theory was developed by Brown and Levinson (1987).

Brown and Levinson's work is primarily influenced by Goffman, but they also claim "Grice's theory of conversational implicature and the framework of the maxims that give rise to such implicatures is essentially correct" (1987: 3). Goffman's influence may be seen in Brown and Levinson's concentration on the concept of 'face wants.' Their politeness theory examines the ways in which speakers and hearers use conversational implicature to fulfill the 'face wants' of higher-status participants in conversation. Like the CP itself, Politeness Theory is certainly not free from critique, but it has resulted in fascinating analysis and has generated much spirited debate (*see* **Politeness**).

Question Processing

Several works in the area of question processing have developed from Grice's Cooperative Principle. Questions and questioning patterns can result in implicatures regarding politeness, status, and authority, and they operate according to conventions that many have build upon Grice's maxims. Singer provides a useful assessment of the study of question processing in all of its stages: question encoding, question categories, selection of answering strategies, memory search, comparison, and response (1990: 261). He identifies 'response' as the category for which Grice's CP is the most powerful.

Most interesting in 'response' is Lehnert's theory of secondary questions. According to Singer, "If asked 'Are there oil wells in Manitoba?' a simple 'no' would appear rather blunt. Instead, in keeping with Grice's 'maxim of quantity' and Lehnert's theory of secondary questions, it is more appropriate to hypothesize the next logical question and answer, 'There are a few, but there is not much oil east of Saskatchewan.'" (Singer, 1990: 273).

Gender Studies

Though above we single out some scholarship in gender studies for applying superficial accounts of the CP, there is excellent scholarship in the field that

has used Grice's CP and maxims to examine behavioral and status differences between women and men. Brown, using the Politeness Theory she developed with Levinson, has used Grice to examine the socio-political situations of women in non-Western cultures (1990). Rundquist and Michell have looked at men's and women's use of conversational strategies in western culture.

Rundquist uses Grice to confront the "popular belief that women's speech is more indirect than men's" (1992: 431). She finds that men more frequently than women flout maxims to implicate information. Some of the purposes she identifies for which men tend to implicate information include to "give direction to their children," to "put themselves down as well as to tease others," "to be humorous," "to show themselves off to their best advantage in conversation," and perhaps most significantly for a study of gender, "to avoid direct confrontation" (Rundquist, 1992: 447). Michell (1984) questions if women often flout maxims to implicate information. She determines that women are far more likely to simply lie to protect themselves from verbal and physical abuse in a misogynist culture. For example, imagine a woman missed a meeting because she had painful menstrual cramps and because she had an important report to finish. This woman would be far more likely to claim she missed the meeting because of the report, leaving out the mention of cramps, even if the report was not even close to being the primary reason for her absence; her omission is an opting out, not an implicature (Michell, 1984: 376).

Teacher Research and Pedagogy

Studies in teacher research have approached Grice's Cooperative Principle for two important purposes: (1) to examine the discourse of the classroom situation; and (2) to establish effective pedagogical strategies.

Three valuable works serving the first purpose may be found in Edwards and Mercer (1987), Kleifgen (1990), and McCarthy (1987). The first two works focus closely on the ways in which the educational scenario highlights the need for listeners to fill in propositions implicated by speakers. Edwards and Mercer examine the ways in which children become more and more proficient in these skills through their educational training. Kleifgen suggests that teachers should look for the points in classroom discourse when students begin to predict the outcomes of teachers' questions so quickly that it is clear the students are ready to move on to a higher level of difficulty.

McCarthy's essay – probably the finest treatment of the CP from a pedagogy scholar – traces the development of a college student as he writes for his composition, cell biology, and poetry classes. Examining both the student's written assignments and the teachers' detailed responses to them, McCarthy uses Grice's CP to determine what is required for this student to cooperate as a writer in each class and whether or not he was successful. In McCarthy's judgment, the student was successful as a student because he was able to determine "what counted as 'cooperation'" in each of his classes (1987: 249). Thus, McCarthy uses the CP in a flexible, context specific manner consistent with Grice's own descriptions of it.

Other scholars with an interest in writing instruction have used Grice for productive ends. Though they are too likely to read Grice's CP as describing a benevolent, cooperative relationship between writer and reader, Cooper (1982; 1984) and Lovejoy (1987) have used the CP to positive effect in college writing classes. Lovejoy's very practical revising template using the maxims is especially useful for college students learning to write more sophisticated texts.

Professors of literature have also found Grice's CP of use in articulating abstract themes from literature. Pratt's (1977) work is probably the best known, but for a fascinating reading of Beckett's *Waiting for Godot* using Gricean analysis, see Gautam and Sharma (1986).

Conclusion

A cross-disciplinary examination of how Grice's Cooperative Principle has been put into practice clearly indicates that the CP has had tremendous appeal and influence. It is precisely the CP's flexibility and context-dependent nature that makes it of such broad value. However, that same flexibility and context-dependence has also generated a fair number of critiques that cite lack of specificity and a too-relativistic application to discourse. Thus, it seems, the CP's strength is also its weakness. Certainly a great diversity of scholars have found the Cooperative Principle of Discourse and its attendant Maxims of Conversational Cooperation useful as analytical tools toward a variety of ends. It is doubtful, however, that the notion of 'cooperation' among discourse participants will ever be universally accepted.

See also: Maxims and Flouting; Neo-Gricean Pragmatics; Politeness; Relevance Theory.

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Coordination

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The term 'coordination' refers to the combination of like or similar syntactic units into some larger group of the same category or status, typically involving the use of a coordinating conjunction, such as *and* or *or*, to name just two. The units grouped together by means of a coordinating conjunction are usually referred to as conjuncts (or conjoints).

Within syntactic theory, coordination enjoys a special status, for several reasons: first, the properties of a coordinate structure are not projected from a single syntactic head, unlike most major syntactic phrases, which generally conform to some notion of X′-syntax (Jackendoff, 1977). Instead, syntactic properties of the complex structure are almost always symmetrically

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Within syntactic theory, coordination enjoys a special status, for several reasons: first, the properties of a coordinate structure are not projected from a single syntactic head, unlike most major syntactic phrases, which generally conform to some notion of X′-syntax (Jackendoff, 1977). Instead, syntactic properties of the complex structure are almost always symmetrically

determined by all conjuncts. Second, coordination is characterized by a syntax–semantics mismatch: in syntactic terms, it is the conjuncts that should be regarded as (multiple) heads of the construction, determining, *inter alia*, the syntactic category of the complex structure, whereas semantically, it is the coordinating conjunction that acts as a functor, regulating how the semantic contribution of the individual conjuncts is composed into the meaning of the complex coordinate expression. Unsurprisingly, these two characteristics pose quite a strong challenge for syntactic theories such as Dependency Grammar, which postulates that head-dependent structures are always binary, featuring a unique head. Third, the treatment of coordination also becomes nontrivial for almost any syntactic theory to date, once we leave the domain of simple constituent coordination and investigate structures where conjuncts do not appear to be classical constituents (nonconstituent coordination) or else the units to be coordinated fail to observe strong notions of similarity.

The study of coordination phenomena has exerted a considerable influence on syntactic theory construction over the last three decades. In transformational syntax, the work on extraction islands pioneered by Ross (1967) has generated a good deal of interest in coordinate structures as well. Starting with Generalized Phrase Structure Grammar (GPSG), the perspective adopted by current syntactic theories, in particular Categorial Grammar (CG), Lexical Functional Grammar (LFG), and Head-driven Phrase Structure Grammar (HPSG) with respect to coodination phenomena, has shifted considerably, regarding it now as a core, rather than peripheral phenomenon of natural language that demands principled explanation. In these frameworks, the study of nonconstituent coordination and coordination of unlikes has attracted particular interest over the past few years.

Basic Properties

It is a distinguishing property of coordination that it can be applied to a wide range of syntactic categories: put differently, coordinating conjunctions do not appear to be highly selective as to the syntactic categories they combine with. As illustrated by the examples in (1), a coordinating conjunct such as *and* can be used to combine sentences, or constituents of any major category, such as VPs, NPs, PPs, or APs.

(1a) [[The moon goes round the earth]$_S$ and [the earth goes round the sun]$_S$]. (Grover, 1994)

(1b) Jack [[fell down]$_{VP}$ and [broke his crown]$_{VP}$]. (Grover, 1994)

(1c) She promised to send [either [a letter]$_{NP}$ or [a postcard]$_{NP}$]. (Grover, 1994)

(1d) A [[very sleek]$_{AP}$ but [rather fat]$_{AP}$] cat appeared in the garden. (Grover, 1994)

(1e) The journey took them [[across desert]$_{PP}$ and [through jungles]$_{PP}$]. (Grover, 1994)

Similarly, coordination does not seem to be confined to a particular level of projection: thus, besides clausal and phrasal categories, coordination of lexical categories is equally well attested.

(2a) We will [[attack]$_V$ and [beat]$_V$] the enemy. (Grover, 1994)

(2b) Fred was [both [angry]$_A$ and [upset]$_A$] about the incident. (Grover, 1994)

Coordination of unsaturated constituents, i.e., constituents with open valencies, is subject to the additional requirement that the conjuncts show the same degree of saturation.

(3) *We will [[attack the enemy]$_{VP}$ and [beat]$_V$]

While it is clear that all major lexical categories can undergo coordination, this is not always possible for all members of functional categories, such as determiners or complementizers. While coordinations of almost purely functional determiners such as *a* and *the* are hardly possible in English, other determiners do allow coordination, as in *some or all people*. In languages such as German, where determiners also encode number and gender information, coordination of definitites is easily possible: *der oder die Lehrer* 'the(m.sg) or the(pl) teacher(s)'.

Coordinating conjunctions, just like other conjunctions, are closed-class items, forming a very small set. Coordinating conjunctions can be further subdivided into noncorrelative conjunctions, such as *and, or, but*, and correlative conjunctions, which necessarily come in pairs: *neither* ... *nor, either* ... *or, both* ... *and*. In English (and German), the first part of the correlative pair is used to mark the first conjunct, whereas the second part will be used to mark any subsequent conjuncts. In other languages, the markers for first and subsequent conjuncts may not be distinct, e.g., French *ni* ... *ni* 'neither ... nor'.

Minimally, a coordinated structure is binary, i.e., it must contain at least two conjuncts. There is, however, no general upper bound on the number of conjuncts, the conjunctions *both* ... *and* or *but* being notable exceptions. The marking of such multiple coordinations differs between correlative and noncorrelative conjunctions: with correlative conjunctions,

every conjunct needs to be marked with an appropriate conjunction, whereas with noncorrelative conjunctions, either all conjuncts or only the final conjunct will be marked. In English and German, the latter constitutes the unmarked choice. As reported in Dixon (1972), there are also languages, such as Dyirbal, where coordinate structures are not marked by a conjunction at all. In English, such conjunctionless coordinations are also possible, although this appears to be a more marked option.

It is an often-made assumption that coordination involves the two central notions of likeness and constituency. Typically, the conjuncts in a coordinate structure are constituents of the same basic category and level of projection.

With respect to the likeness condition, morphosyntactic features do not seem to pattern alike: in the nominal domain, it is only case features that need to be identical between all conjuncts and the entire coordinate structure: all other common inflectional features, such as person, number, or gender, can assume different values in each of the conjuncts.

(4a) *der Vater und den Sohn
the.nom.sg.m father and the.acc.sg.m son
(4b) der Vater und die Söhne
the.nom.sg.m father and the.nom.pl.m sons
(4c) [der Vater] und [die Tochter]
the.nom.sg.m father and the.nom.sg.f daughter

Similarly, in the verbal domain, basic distinctions regarding verb form such as finiteness are required to be identical across conjuncts, whereas tense, mode, and aspect distinctions may well differ:

(5) He [[arrived yesterday] and [will leave again tomorrow]].

This different status of morphosyntactic features with respect to categorial identity is, of course, related to the primary function of coordination, namely that of creating aggregates of individuals or events: it is therefore a necessity that, for example, the number specification of a coordinated NP may differ from those of its conjuncts.

Exemption of person and number features from the identity requirement gives rise to interesting interaction with agreement relations: depending on the choice of coordinating conjunction, namely whether it is 'conjunctive' like *and* or 'disjunctive' like *or*, a coordination of singular NPs may show either plural or singular agreement. In languages such as German or Spanish, person agreement between a coordinated subject NP and the verb depends on whether one of the conjuncts refers to the speaker or hearer: if one of the conjuncts refers to the speaker or hearer, the verb inflects for 1st or 2nd person plural, respectively. Otherwise, it is inflected for 3rd person plural.

(6a) [José i yo] hablamos / *habláis / *hablan
Jose and I speak-1pl/speak-2pl/speak-3pl
(Dalrymple and Kaplan, 2000)
(6b) [José i tu] *hablamos/ habláis/ *hablan
Jose and you speak-1pl/speak-2pl/speak-3pl
(Dalrymple and Kaplan, 2000)
(6c) [José i Maria] *hablamos/ *habláis / hablan
Jose and you speak-1pl/speak-2pl/speak-3pl

In German, agreement patterns with 'disjunctive' coordinating conjunctions depend on the linear order of the conjuncts: as illustrated by the examples in (7), subject-verb agreement is determined by the conjunct that appears closest to the verb.

(7a) Gestern habe / *hast entweder ich
yesterday have-1sg / have-2sg either I
oder du geschnarcht.
or you snored
(7b) Gestern *habe / hast entweder du
yesterday have-1sg / have-2sg either you
oder ich geschnarcht.
or I snored

Phrase structure grammar approaches (Chomsky, 1957; Jackendoff, 1977; Gazdar *et al.*, 1985; Kaplan and Maxwell, 1988) typically invoke special phrase structure rules to license coordinate structures, e.g., (8), where XP is interpreted as a variable ranging over (major) syntactic categories:

(8) XP → XP conj XP

In HPSG, likeness of category and level of projection between conjuncts is enforced by the Coordination Principle (Pollard and Sag, 1994: 202), which requires sharing of category information, including valence and head features, between the mother and all conjuncts. HPSG draws a principled distinction between head features such as CASE, which are part of the categorial information (CAT), and INDEX features such as person, number, and gender, which are part of semantics (CONT). As a result, the different behavior of number and case features in coordinate structures is directly related to an independently motivated feature geometry in HPSG.

LFG uses phrase structure rules akin to (8) to model the constituent structure of coordination constructions. The f-structure representation of the entire coordinate structure is a set, consisting of the f-structures of the individual conjuncts. Following Kaplan and Maxwell (1988), constraints imposed on the f-structure of the mother node, e.g., external case requirements, will get distributed across all the element f-structures. In order to capture the apparent contrast between case and number or gender, features

are declared explicitly as either distributive or nondistributive. Grammatical functions and case are normally taken as distributive features; person and number gender features are taken as nondistributive.

While feature-based approaches to grammar have been successful in providing solutions for the agreement patterns in (6) (Dalrymple and Kaplan, 2000; Sag, 2003), the linear effects observed with German 'disjunctive' coordination still await treatment in the context of phrase structure grammar.

Coordination and Extraction

Coordination also witnesses theoretically interesting interactions with the syntax of extraction. Since Ross (1967), it is a quite well-known fact that extraction out of coordinate structures is subject to strong restrictions, as illustrated by the data in (10).

(9a) Nuclear physics$_i$, I have never understood $__i$. (Grover, 1994)
(9b) Who$_i$ did Fay send a letter to $__i$. (Grover, 1994)

(10a) *Nuclear physics$_i$, I have never understood [[organic chemistry] and [$__i$]]. (Grover, 1994)
(10b) *Who$_i$ did Fay [[send a letter to $__i$] and [forget all about it]]. (Grover, 1994)

While extraction *of* conjuncts is completely unacceptable, extraction *out of* conjuncts is only possible if it applies *across the board* (ATB), i.e., if the filler corresponds to a gap in every conjunct, as in (11).

(11a) Nuclear physics$_i$, [[Fay wants to study $__i$] and [May wants to drop $__i$]]. (Grover, 1994)
(11b) Who$_i$ did Fay send a letter to $__i$ and receive a reply from $__i$. (Grover, 1994)

There exist, at least in English, a few examples that might serve to question the validity of the ATB constraint on extraction from coordinate structures, superficially suggesting asymmetric extraction from the right conjunct only.

(12) Nuclear physics$_i$, Fay wants to try and study $__i$. (Grover, 1994)

Many researchers, however, agree that in these examples – termed asymmetric coordination or even pseudocoordination – the conjunction actually functions more like a complementizer. See, however, Lakoff (1986) for more harmful exceptions to the ATB constraint.

These restrictions, with the exception of ATB extraction, are captured by Ross's (1967) Conjunct Structure Constraint (CSC):

In a coordinate structure,
a. no conjunct may be moved
b. nor may any element contained in a conjunct be moved out of that conjunct.

This constraint obviously consists of two parts, essentially capturing independent observations: first, an absolute ban on the extraction of the conjuncts themselves, and second, an extension of the similarity requirement to the gaps contained in the conjuncts. The two individual clauses of the CSC are referred to as Conjunct Constraint and Element Constraint, respectively, a distinction introduced by Grosu (1973).

In contrast to other constraints on extraction, Transformational Grammar has long failed to provide a more principled account of the CSC and ATB extraction, as observed by Roberts (1997). Feature-based frameworks, however, such as GPSG, where information about extracted constituents is encoded by means of a SLASH feature, have been quite successful in deriving the Element Constraint as just another instance of categorial similarity (Gazdar *et al.*, 1985). The approach to constituent coordination taken by HPSG is essentially identical, requiring sharing of local syntactic features, including category, open valencies, and case, alongside sharing of nonlocal features (Pollard and Sag, 1994: 202). It is of note that Categorial Grammar, despite technical differences, arrives at a conceptually highly comparable solution, requiring identity of complex categories (Steedman, 1985, 1990). The extended notion of categorial similarity that encompasses properties of the gap can also straightforwardly capture the apparent requirement that gaps in ATB extraction must always be of the same type in each conjunct, as witnessed by the unacceptability of examples, such as **On whom does Fay rely _ and Kim dislike_*.

Although an extended notion of similarity including nonlocal features proves quite successful in deriving the Element Constraint and ATB restriction, it does not yet derive all instances of the Conjunct Constraint.

(13) *John, I saw [_ and _]

An interesting explanation for the impossibility of coordinating gaps has been offered by Pollard and Sag (1994): they argue that an account of the Conjunct Constraint follows naturally from traceless theories of extraction. In these theories, nonlocal dependencies are launched directly by the subcategorizing head, instead of being mediated by a phonetically empty syntactic element. Since none of the conjuncts selects the other, and since external heads do not subcategorize for individual conjuncts of the

coordinate structure, the Conjunct Constraint is merely a correlate of traceless theories of extraction.

In LFG, where extraction is treated by way of functional uncertainty, the ATB constraint is also a correlate of a more general theory of constituent coordination: since the f-structure of coordinated constituents is a set, and constraints imposed on this set are distributed over the element f-structures (Kaplan and Maxwell, 1988), the functional uncertainty constraint that relates the filler to the grammatical function governed by some predicate will have to be satisfied by all the f-structures in this set.

Nonconstituent Coordination

The coordination phenomena reviewed so far were mostly of a quite simple type, namely coordination of like constituents, be they lexical, phrasal, or clausal, which are composed into a complex constituent of the same type. By and large, constituent coordination does not pose any serious challenge for contemporary formal syntactic theories. Human language, however, also witnesses cases of coordination that appear to involve units that are generally not considered constituents, hence the cover term nonconstituent coordination (NCC).

(14a) Bill gave the girls spades and the boys recorders. (CR; Maxwell and Manning, 1996)
(14b) Bill likes and Joe is thought to like cigars from Cuba. (RNR; Maxwell and Manning, 1996)
(14c) Bill gave a rhino to Fred, and Sue a camera to Marjorie. (Gapping; Maxwell and Manning, 1996)

There are different ways of understanding NCC data in descriptive terms: one way is to think of NCC as involving not coordination of constituents, but rather coordination of sequences of constituents. An alternative view is to regard NCC as a subcase of constituent coordination, where identical material is either shared between the two conjuncts, or deleted, under identity, an interpretation that gives one of the conjuncts the status of an incomplete or 'elliptical' expression.

(15a) Bill gave the girls spades and (Bill gave) the boys recorders.
(15b) Bill likes (cigars from Cuba) and Joe is thought to like cigars from Cuba.
(15c) Bill gave a rhino to Fred, and Sue (gave) a camera to Marjorie.

There is, however, no consent yet as to whether all types of NCC should be given some unified treatment, or whether we are actually dealing with only superficially similar phenomena that call for independent solutions: while both Conjunction Reduction (CR) or VP-gapping (14a) and Right-Node Raising (RNR; [14b]), can be interpreted as sharing of peripheral material, it is central material that gets shared or elided in gapping constructions. The well-formedness of coordination involving peripheral sharing is often related to the fact that the well-formedness of a string 'A [X and Y] B' can be directly related to that of the strings 'A X B' and 'A Y B.' Gapping, on the other hand, does not appear to follow this general pattern.

Maxwell and Manning (1996) argue that verb medial gapping (or just gapping; [14c]) also differs from both CR and RNR in that it does not feature the same type of strict identity and parallelism requirements as peripheral sharing.

(16a) A bandicoot escaped today and more will tommorow. (Blevins, 1994; taken from Maxwell and Manning, 1996)
(16b) A lot of this material can be presented in a fairly informal and accessible fashion, and often I do. (Chomsky, 1982; taken from Maxwell and Manning, 1996)

As shown by the data in (16) above, the elided material in the second conjunct cannot be replaced verbatim with the corresponding string from the first conjunct. Similar observations can be made for true ellipsis. Maxwell and Manning (1996) suggest that gapping phenomena should be regarded outside the scope of syntactic theory and should be treated at the level of semantics, using more powerful devices such as higher-order unification, as suggested by Dalrymple *et al.* (1992) for the treatment of ellipsis.

Peripheral Sharing

According to Milward (1994), approaches to NCC can be assigned to one of two types: deletion accounts, or shared structure approaches. Contrary to what the terms may suggest, the main difference between these two types of approaches does not lie with the deletion vs. sharing or merging opposition – a more or less metaphorical issue – but rather depends on what role syntactic structure should play to restrict NCC, in addition to identity of peripheral strings of lexical items.

It is clear that pure surface identity cannot suffice to provide a restrictive theory:

(17a) [John will drive] and [Mary built the drive]. (Milward, 1994)
(17b) *[John will] and [Mary built the] drive. (Milward, 1994)

Minimally, identity of syntactic category must be taken into account as well, to rule out examples

such as (17) above. Most probably, identity requirements will also need to make reference to lexical meaning, if one wants to account for the marginality of (18), which are only acceptable as a rhetorical figure known as 'zeugma.'

(18a) *John bored [the new hole] and [his fellow workers]. (Milward, 1994)
(18b) *Mary came in [a hurry] and [a taxi]. (Milward, 1994)

Identity of reference, however, appears to be too strong a requirement, at least in the domain of events. In a sentence like (19), the shared verb *gave* clearly denotes two independent giving events.

(19) John gave Mary a book on Wednesday and several records on Saturday.

Similarly, even at the level of individuals, there is reason to doubt that sharing (or deletion under identity) presupposes identity of reference.

(20a) [John$_i$ bought] and [Bill$_j$ hired] a suit for his$_{\{i,j\},k}$ wedding.
(20b) Three men died [in Bagdad on Thurday] and [in Tikrit on Friday night]. (Beavers and Sag, 2004)

While it is quite uncontroversial that surface form, syntactic category, as well as lexical meaning constitute the minimal identity requirements for peripheral sharing at the word level, it is not fully clear to what degree structural or functional properties are necessary to ensure well-formedness of CR or RNR constructions. At least for RNR, identity of shared material is not reducible to mere identity of surface strings, but should also take into account the internal structural representation:

(21) *Sue saw$_i$ the man$_j$ [through the telescope]$_i$ and [with the troublesome kid]$_j$. (Milward, 1994)
(22a) I found [[a friend [of [Mary's]]] handbag].
(22b) I found [the manufacturer [of [[Mary's] handbag]]].
(22c) *I found a friend of and the manufacturer of Mary's handbag. (Milward, 1994)

With CR, acceptability also appears to degrade once structures fail to exhibit a certain degree of structural or functional parallelism: speakers of English seem generally divided as to the acceptability of examples like (23), where one conjunct exhibits dative shift, but the other one does not.

(23) (*) John gave Mary a book and a record to Peter. (Crysmann, 2003)

Although it may be tempting to relate the unacceptability of (23) to a mismatch in subcategorization requirements of the shared verb *give*, as suggested by Maxwell and Manning (1996), heavy NP shift patterns just the same for these speakers, even though subcategorization frames are identical across the two conjuncts. This is further supported by the observation that acceptability of (23) improves, once Dative Shift and Heavy NP Shift are combined, such that surface order of theme and goal arguments are again in parallel.

(24) (*) John gave a book to Mary and to Peter a very old and famous early Beatles record featuring vocals by Ringo. (Doug Arnold; Crysmann, 2003)

(25) John gave Mary a book, and to Peter, a record. (Robert Levine; Crysmann, 2003)

As argued by Whitman (2002), acceptability of the nonparallel cases also improves, once a suitable context is provided.

(26) Q: So Neal, did you give the dog that toy like you were planning to do?

(27) A: No, actually I changed my mind. I gave the dog a bone, and the toy to the cat.

Here, nonparallelism regarding syntactic form and the linear order of goal and theme arguments is apparantly motivated by considerations of information structure: in terms of given–new partitioning, both conjuncts are actually fully parallel.

To summarize, NCC imposes identity requirements on shared material, both at the lexical and at the structural level. Lexically, identity is restricted to surface form, syntactic category and core lexical meaning, but presumably excludes identity of reference. At the syntactic level, constituency of shared material appears to be a minimal criterion. As a result, Deletion Accounts, where identity is restricted to the lexical level, must be discarded (Milward, 1994). The question as to whether likeness of argument structure should be included as a necessary criterion is still not entirely settled. It appears, though, that strict identity of subcategorization frames may be violated, if some sort of parallelism between conjuncts is preserved, either by means of linear order of semantic role bearers, or else parallel information and structural partitioning.

The perspective on CR and RNR as sharing of peripheral material across two conjuncts – Milward (1994)'s Shared Structure approaches – is quite a popular approach, which can be found in different technical incarnations across frameworks, including multidimensional approaches, such as Goodall (1987) or Moltmann (1992), coordination of partial constituents (Maxwell and Manning, 1996), or

linearization-based accounts (Crysmann, in press; Yatabe, 2000, 2003). What is common to all these approaches is that they make rather conventional assumptions about constituent structure and rely on extraneous machinery to perform the necessary sharing or reconstruction of surface material. On the other side of the spectrum, we find the kind of analysis advanced within the framework of Categorial Grammar, in particular (Steedman, 1985; Dowty, 1988), which employs a somewhat weaker notion of constituency.

In Categorial Grammar, the central problem of NCC can be resolved, e.g., by means of an operation such as type raising, i.e., rules capable of converting a (sequence of) arguments into a functor. In these approaches, a sequence of two NPs such as *[the girls] [spades]*, or *[the boys] [recorders]*, respectively, will be type raised to a VP constituent lacking the verb. Such type-raised constituents can then be coordinated in the usual fashion. What makes this solution particularly attractive is that type raising is independently motivated in CG for the treatment of unbounded dependencies.

Even though type raising has proven to be a convenient tool to provide simple and elegant accounts of NCC, this approach has repeatedly been criticized (Milward, 1994; Maxwell and Manning, 1996; Beavers and Sag, 2004), mainly for its lack of restrictiveness: as detailed in Milward (1994) and Maxwell and Manning (1996), the unconstrained application of type raising essentially conflates differences regarding the internal structure of the conjuncts: as a net result, the ungrammaticality of sentences like (22) remains unaccounted for, similar to Deletion accounts. Beavers and Sag (2004) argue that the apparent attractiveness of having a single operation for extraction and NCC makes typologically wrong predictions, precluding languages, such as Hausa, which feature long-distance extraction but fail to allow RNR (Davis, 1993).

Phrase structure-based approaches to syntax have long failed to provide a satisfactory treatment of NCC phenomena in their entirety. Over the past decade, however, considerable progress has been made: owing to the fact that the commitment to classical constituents is somewhat stronger in LFG and HPSG than it is in CG, approaches to NCC in phrase structure grammar uniformly address the issue by "moving coordination up a level while maintaining classical notions of constituency" (Maxwell and Manning, 1996: 7).

In LFG, the treatment of NCC most crucially depends on an extension of the phrase structure rule formalism: given the two c-structure rules in (28), Maxwell and Manning (1996) suggest that the phrase structure component should be generalized in such a way as to also permit coordination of partial constituents, to be licensed by rules such as (29).

(28a) VP → VP and VP
(28b) VP → V (NP) (NP) PP*
(29) VP → V [[NP PP] and [NP PP]] PP

To achieve this, Maxwell and Manning (1996) suggest that the expansion of c-structure rules may be suspended at any point to permit coordination of partial constituents. Thus, c-structure node labels are augmented with states (stacks) that encode the current level of expansion, such that expansion can later be resumed. Thus, a node label VP-x will encode suspension of the VP rule in (28b) at some point, e.g., after the verb, whereas x-VP will correspond to resumption/continuation of the expansion. The coordination rule is then extended to permit coordination of partially expanded rules, provided their suspension and resumption states will match. In essence, the NCC constructions will receive a schematic c-structure representation as in (30)

(30) XP → XP-x [x-XP-y Conj x-XP-y] y-XP

Expansion states associated with the nodes are stacks, such that NCC involving more deeply embedded partial constituents will become possible, as witnessed by the example in (31), where expansion of both the VP rule and the PP rule is suspended.

(31) John flew to London on Monday and Paris on Tuesday. (Maxwell and Manning, 1996)

(32) [flew [to]$_{PP-y}$] $_{VP-x}$ [$_{x-VP}$ [$_{y-PP}$[L.] [on Mon]] and $_{x-VP[y-PP}$[P.] [on Tue]]].

These stacks of expansion states must match up. Maxwell and Manning (1996) then relate the unacceptability of (22) to the simple fact that right node raising in the first conjunct involves suspension of two rules, viz., of the outer NP and PP embedded in the prenominal possessive, whereas in the second conjunct, it only involves suspension of the complement PP.

HPSG approaches to NCC (Yatabe, 2000, 2003; Crysmann, 2003, in press; Beavers and Sag, 2004) uniformly build on the notion of complex order domains (Reape, 1994; Kathol, 1999), which was originally developed for the treatment of linearization in free word order languages. Complex order domains provide a flat, linear representation of the main constituents of a sentence that is partially independent of immediate constituency, and which therefore facilitates the expression of word order regularities in considerably larger domains (33).

The basic intuition behind HPSG accounts of NCC is that identical peripheral elements in an order domain can be collapsed in coordinate structures,

(33)
$$\begin{bmatrix} \text{VP} & \\ \text{DOM} & \left\langle \boxed{1}\begin{bmatrix}\text{V}\\ \text{gave}\end{bmatrix}, \boxed{2}\begin{bmatrix}\text{NP}\\ \text{the girls}\end{bmatrix}, \boxed{3}\begin{bmatrix}\text{NP}\\ \text{spades}\end{bmatrix}\right\rangle \\ \text{DTRS} & \begin{bmatrix} \text{HD-DTR} & \begin{bmatrix}\text{VP} & \\ \text{DTRS} & \begin{bmatrix}\text{HD-DTR} & \begin{bmatrix}\text{V} & \\ \text{DOM} & \left\langle \boxed{1}\right\rangle\end{bmatrix} \\ \text{COMP-DTR} & \begin{bmatrix}\text{NP} & \\ \text{DOM} & \left\langle \boxed{2}\right\rangle\end{bmatrix}\end{bmatrix}\end{bmatrix} \\ \text{COMP-DTR} & \begin{bmatrix}\text{NP} & \\ \text{DOM} & \left\langle \boxed{3}\right\rangle\end{bmatrix}\end{bmatrix}\end{bmatrix}$$

ence identity. Approaches differ, though, as to the way disjoint information coming from different conjuncts is resolved on the order domain of the coordinated structure: while Yatabe (2003) suggests composing conflicting features into disjunctive or distributive representations, Crysmann (2003, in press and Beavers and Sag (2004) require asymmetric sharing of entire domain objects between the mother and one of the conjuncts, and selectively equate across all conjuncts only those feature paths that are known to be necessary to ensure well-formedness of peripheral sharing, e.g., HEAD, PHON, and PRED. Crysmann (2003, in press) and Yatabe (2000) agree, however, that the entire nonshared rest is composed into a single domain object whose syntactosemantic information is equated with that of the entire construction. Following Crysmann (2003), a sentence like (14a) will receive a representation as in (35).

(34)
$$\begin{bmatrix} \text{ss} & \boxed{0}\begin{bmatrix}\text{LOC} \mid \text{CAT}\ \boxed{1}\end{bmatrix} \\ \text{DOM} & \left\langle \boxed{x_1}\cdots\boxed{x_m}\right\rangle \oplus \left\langle \begin{bmatrix}\text{PH} & \left\langle \boxed{a_1}\ \ldots\ \boxed{a_i},\ \boxed{0},\ \boxed{b_1}\ \ldots\ \boxed{b_j}\right\rangle \\ \text{ss} & \boxed{0}\end{bmatrix}\right\rangle \oplus \left\langle \boxed{y_1}\ \ldots\ \boxed{y_n}\right\rangle \\ \text{DTRS} & \begin{bmatrix}\text{CONJUNCTION} & \begin{bmatrix}\text{DOM} & \left\langle \boxed{0}\right\rangle\end{bmatrix} \\ \text{CONJUNCTS} & \left\langle \begin{bmatrix}\text{ss} \mid \text{LOC} \mid \text{CAT}\ \boxed{1} \\ \text{DOM} & \left\langle \boxed{x_1}\ \ldots\ \boxed{x_m}\right\rangle \oplus \left\langle \begin{bmatrix}\text{PH}\ \boxed{a_1}\end{bmatrix}\ldots\begin{bmatrix}\text{PH}\ \boxed{a_i}\end{bmatrix}\right\rangle \oplus \left\langle \boxed{y_1}\ \ldots\ \boxed{y_n}\right\rangle\end{bmatrix}, \begin{bmatrix}\text{ss} \mid \text{LOC} \mid \text{CAT}\ \boxed{1} \\ \text{DOM} & \left\langle \boxed{x_1}\ \ldots\ \boxed{x_m}\right\rangle \oplus \left\langle \begin{bmatrix}\text{PH}\ \boxed{b_1}\end{bmatrix}\ldots\begin{bmatrix}\text{PH}\ \boxed{b_j}\end{bmatrix}\right\rangle \oplus \left\langle \boxed{y_1}\ \ldots\ \boxed{y_n}\right\rangle\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix}$$

where identity includes basic syntactic category, or HEAD-values, surface form (PHON), the semantic key relation, as well as (partial) bracketing.

Somewhat simplifying, a phrase structure schema for coordinate structures with peripheral sharing can roughly be represented as in (34).

As mentioned above, the sharing of entire domain objects across the conjuncts is oversimplifying: since domain objects do contain full syntactosemantic information, including individual and event variables, sharing entire domain objects would make empirically wrong predictions, e.g., with respect to refer-

Although none of the published HPSG work on NCC mentions this explicitly, sharing nonparallel structure as in (22) can be ruled out, because order domains are partially structured representations.

Multidimensional (or 3D) approaches, such as Goodall (1987) or Moltmann (1992), are another subtype of Shared Structure Accounts, where shared phrase markers are merged between (sentential) conjuncts, yet phrase markers dominating nonshared material continue to reside on different planes. As detailed in Milward (1994), these approaches are well-equipped to ensure structural parallelism, as

(35)
$$\begin{bmatrix}
\text{SS} & \boxed{s}\begin{bmatrix}\text{LOC} \mid \text{CAT}\ \boxed{c}\end{bmatrix} \\
\text{DOM} & \left\langle \boxed{1}\begin{bmatrix}\text{PH}\ \boxed{i_1}\left\langle \text{Bill} \right\rangle \\ \text{HD}\ \boxed{j_1}\ \textit{noun[nom]}\end{bmatrix}, \boxed{2}\begin{bmatrix}\text{PH}\ \boxed{i_2}\left\langle \text{gave} \right\rangle \\ \text{HD}\ \boxed{j_2}\ \textit{verb}\end{bmatrix}\right\rangle, \left\langle \begin{bmatrix}\text{PH}\ \boxed{i_3} \oplus \boxed{i_4} \oplus \boxed{i_0} \oplus \boxed{i_5} \oplus \boxed{i_6} \\ \text{SS}\ \boxed{s}\end{bmatrix}\right\rangle \\
\text{DTRS} & \begin{bmatrix}
\text{CONJUNCTION}\begin{bmatrix}\text{PH}\ \boxed{i_0}\left\langle \text{and} \right\rangle\end{bmatrix} \\
\text{CONJUNCTS}\left\langle \begin{bmatrix}\text{DOM}\left\langle \boxed{1}, \boxed{2}, \begin{bmatrix}\text{PH}\ \boxed{i_3}\left\langle \text{the girls} \right\rangle \\ \text{HD}\ \textit{noun[dat]}\end{bmatrix}, \begin{bmatrix}\text{PH}\ \boxed{i_4}\left\langle \text{spades} \right\rangle \\ \text{HD}\ \textit{noun[acc]}\end{bmatrix}\right\rangle \\ \text{SS} \mid \text{LOC} \mid \text{CAT}\ \boxed{c}\end{bmatrix} \right. \\
\left. \begin{bmatrix}\text{DOM}\left\langle \begin{bmatrix}\text{PH}\ \boxed{i_1} \\ \text{HD}\ \boxed{j_1}\end{bmatrix}, \begin{bmatrix}\text{PH}\ \boxed{i_2} \\ \text{HD}\ \boxed{j_2}\end{bmatrix}, \begin{bmatrix}\text{PH}\ \boxed{i_5}\left\langle \text{the boys} \right\rangle \\ \text{HD}\ \textit{noun[dat]}\end{bmatrix}, \begin{bmatrix}\text{PH}\ \boxed{i_6}\left\langle \text{rec.} \right\rangle \\ \text{HD}\ \textit{noun[acc]}\end{bmatrix}\right\rangle \\ \text{SS} \mid \text{LOC} \mid \text{CAT}\ \boxed{c}\end{bmatrix}\right\rangle
\end{bmatrix}
\end{bmatrix}$$

in (22), but run into problems once NCC involves different numbers of adjuncts within each conjunct, as in the example (36) below.

(36) You can call me [directly] or [[after 3 P.M.] [through my secretary]].

To summarize, approaches to NCC generally agree that what we are dealing with is not really coordination of arbitrary nonconstituents, but rather a special case of constituent coordination that either involves coordination at some higher structural level (VP or S in LFG and HPSG), or a more abstract notion of constituency (CG).

The mere existence of NCC also has repercussions on the usefulness of coordination data as a constituency test: given that apparent nonconstituents can be combined by means of some coordinating conjunction, mere conjoinability of two syntactic units will not tell us anything about their status. The converse, however, is not true: failure to coordinate can still be regarded as an indicator of nonconstituency (or dissimilarity).

Gapping

In contrast to peripheral sharing, gapping constructions, where the shared material is central, not peripheral, are less well studied in Phrase Structure Grammar. As mentioned above, Maxwell and Manning (1996) argue to exclude it from the domain of syntax altogether. In the framework of HPSG, gapping phenomena have not received any detailed attention either, although it is highly conceivable to extend existing approaches to peripheral sharing in such a way as to permit sharing of head domain objects.

In Categorial Grammar (Steedman, 1990), gapping phenomena, just like peripheral sharing, is treated on a par with constituent coordination, building crucially on an extended notion of constituency, including 'nonstandard constituents' (Steedman, 1990) which result from the application of type raising and functional composition.

(37) Harry will buy bread, and Barry, potatoes. (Steedman, 1990)

In Steedman's account, the constituents of the gapped conjunct (*Barry potatoes*) are type raised to a sentence lacking the verb (=S/((S/NP)/NP)). The nongapped conjunct of category S, however, is decomposed by a special rule (the Left Conjunct Revealing Rule) into the verbal functor ((S/NP)/NP) and the remainder, again a sentence lacking the verb (=S/((S/NP)/NP)). Since these two categories are identical, they can coordinate to yield a constituent of the same category, which then recombines with the verb to produce a sentence.

The theory of gapping as advanced by Steedman (1990) also establishes a link between the direction of functional application and the linear order of gapped vs. nongapped conjuncts. As observed as early as

Ross (1970), there is a strong correlation in the languages of the world between basic word order (SVO/VSO vs. SOV) and the position of the gapped conjunct: in consistently head-initial languages such as English (SVO) or Irish (VSO), the gapped conjunct is noninitial, just like (most) arguments are, whereas head-final languages, such as Japanese (SOV), have the gapped conjunct precede the nongapped one.

(38) [watakusi wa sakana o] [Biru wa
I NOM fish ACC Bill NOM
gohan o] tabeta
rice ACC ate
'I ate fish, and Bill, rice' (Ross, 1970: 251)

Note, however, that gapping in strict SOV languages is not easy to distinguish from RNR.

Languages such as German, which is somewhat intermediate between a head-final and a head-initial language, do not seem to behave in typologically clear-cut ways: in subordinate clauses, where word order is strictly verb-final, the gapped conjunct may either precede the nongapped one (39a) or vice-versa (39b). In verb-second clauses, however, the gapped conjunct must follow the nongapped one, just like in English.

(39a) Ich vermute daß Peter Wein, und
I presume that Peter wine and
Marie Bier getrunken hat.
Marie beer drunk has
'I presume that Peter drank wine and Marie beer.'

(39b) Ich vermute daß Peter Wein getrunken
I presume that Peter wine drunk
hat, und Marie Bier.
has and Marie beer
'I presume that Peter drank wine and Marie beer.'

(39c) Peter trank Wein, und Marie Bier.
Peter drank wine and Marie beer
'Peter drank wine, and Marie beer.'

(39d) *Peter Wein, und Marie trank Bier.
Peter wine and Marie drank beer

Since (39a) may as well be interpreted as RNR, German appears to pattern with head-initial languages, despite its verb-final order.

SGF Coordination

Another NCC phenomenon that cannot be reduced to peripheral sharing is so-called SGF coordination (Subject Gaps in Finite/Frontal clauses), a term originally from Höhle (1983) and Wunderlich (1988). In this construction, which is typically found in languages such as German or Dutch, a subject internal to the first conjunct gets elided in the second. In English, a similar construction exists, involving Locative Inversion (40c).

(40a) [In den Wald ging der Jäger]
into the woods went the hunter
und [fing einen Hasen].
and caught a rabbit
'Into the woods went the hunter and caught a rabbit.'

(40b) [Wenn du in ein Kaufhaus
if you into a department store
gehst] und [hast kein Geld], ...
go and have no money then
'If you go to a department store and you do not have any money, ...'

(40c) [Into the room strode Robin] and [sat down on a chair].

The main challenge of SGF coordination is similar to that posed by gapping, i.e., that the shared subject is properly contained within one of the conjuncts. It is a distinguishing property of this construction that the second conjunct must be a verb-first (V1) structure, whereas the first conjunct may either be verb-second (V2, see [40a]), verb-first, or a complementizer-introduced verb-final structure; see (40b). The order of the two conjuncts is fixed. Furthermore, it is generally agreed that SGF coordination exhibits a strong subject–object asymmetry: neither can an object be elided in the second conjunct, nor can a nonsubject in the first conjunct be interpreted as coreferent with the missing subject.

Principle and Parameter approaches to the phenomenon typically invoke asymmetrical syntactic structures to model the properties of the construction (Höhle, personal communication; Heycock and Kroch, 1993; Wunderlich, 1988). See Kathol (1999) for a detailed synopsis. On the basis of data from Dutch, Steedman (1990) illustrates how his Categorial Grammar account of gapping can straightforwardly derive SGF coordination as well. His approach, however, has been criticized by Kathol (1995) for overgeneration, being able to equally derive sharing of conjunct-internal objects. Kathol (1995, 1999) suggests instead of reducing SGF to coordination at the VP level, and derives the differences in word order (V2 vs. V1) by means of word order constraints operating on complex order domains. Frank (2002) presents an LFG analysis of the construction that crucially exploits LFG's notion of grammaticalized discourse functions to account for the subject–object asymmetry and the word order effects in a symmetrical way.

Coordination of Unlikes

In our discussion of constituent coordination, we have made the rather common assumption that

conjuncts need to be identical to a certain degree in order to undergo coordination. *Inter alia*, we have assumed identity of syntactic category as a prerequisite for conjoinability. Work in GPSG (Gazdar *et al.*, 1985; Sag *et al.*, 1985), however, has devoted quite a lot of attention to examples where this fairly basic requirement appears to be violated:

(41) Kim is [[a Republican]$_{NP[PRD\ +]}$ and [proud of it]$_{AP[PRD\ +]}$].

The solution GPSG provided for what is now known as 'coordination of unlikes' involved the assumption that the featural specification of the mother node in a coordinate structure should be the intersection (or generalization) of the feature specification of the conjunct daughters. As shown, however, by Jacobson (1987), data such as (42) illustrate the systematic limitations of a generalization-based approach, like GPSGs:

(42a) Kim grew wealthy.
(42b) *Kim grew a Republican.
(42c) Kim grew and remained wealthy.
(42d) *Kim grew and remained a Republican.
(42e) *Kim grew and remained wealthy and a Republican.

If *grow* only subcategorizes for APs [N +, V+], and *remain* subcategorizes for APs or NPs ([N +]), coordination of the two verbs should yield the intersection of the two feature specifications, namely [N +]. But this weakened feature specification cannot account for the ungrammaticality of (42e), where the coordinated phrase [wealthy and a Republican] would carry exactly this feature specification.

Bayer and Johnson (1995) propose a solution to the above problem within the framework of Lambek's categorial grammar where functors correspond to logical implication. Thus, a functor "α/β can only combine with an argument β' to form if β' is logically stronger than β" (Bayer and Johnson, 1995: 70), or in other words, if the argument is subsumed by the antecedent of the functor category. As a result, the category of *remained*, which is VP/(NP ∨ AP), can be strengthened to VP/AP, which allows it to be coordinated with *grew*. By the same token, an NP or AP can be weakened to NP ∨ AP, which permits coordination of unlike categories, as in (41). Sentences like (42e) are then ruled out for the simple reason that the category NP ∨ AP of the coordinate structure is logically weaker than the antecedent of the conjoined functor category VP/AP. Bayer and Johnson (1995) relate the success of their approach to the fact that subsumption operates on predicate–argument relations, in contrast to unification-based approaches, where it is associated with coordination. An analysis of Coordination of Unlikes that is highly similar to this approach has recently been proposed by Sag (2003) for HPSG.

Work in unification-based frameworks such as LFG (Maxwell and Manning, 1996) or HPSG (Crysmann, in press; Beavers and Sag, 2004) has provided an alternative approach to the puzzle of coordination of unlikes, by way of assimilating it to NCC. Instead of constituent coordination of unlike categories, they propose to analyze these phenomena as left-peripheral sharing, at the level of VP or S: thus, a coordination of unlikes as in (41) is well formed, just because the shared verb can combine, individually, with an AP or NP constituent in each of the VP or S conjuncts.

Feature Neutrality

An issue related to Coordination of Unlikes is feature neutrality, or feature indeterminacy, as witnessed by the following example from German (Pullum and Zwicky, 1986):

(43a)	Er [findet$_{[OBJ\ acc]}$	und hilft$_{[OBJ\ dat]}$]	Frauen$_{acc/dat}$.
	he finds	and helps	women
	'He finds and helps women.'		
(43b)	*Er [findet$_{[OBJ\ acc]}$	und hilft$_{[OBJ\ dat]}$	Kindern$_{dat}$.
	he finds	and helps	children
(43c)	*Er [findet$_{[OBJ\ acc]}$	und hilft$_{[OBJ\ dat]}$	Männer$_{acc}$.
	he finds	and helps	men

The two verbs *finden* 'find' and *helfen* 'help' impose different restrictions on the case value of their respective objects. Still, they can coordinate at the word (or X^0) level and share an object, if this object is morphologically neutral between the conflicting case requirements.

Since Zaenen and Karttunnen (1984), it has been established that feature neutrality cannot be reduced to ambiguity in unification-based frameworks: if we assume that *Frauen* has a case specification *acc* ∨ *dat*, unification with the selectional requirements of *finden* will disambiguate it to *acc*, so it would no longer be compatible with the requirement imposed by *helfen*, and vice versa. It has been argued by Ingria (1990), that feature indeterminacy, besides Coordination of Unlikes, therefore poses a major challenge for unification-based grammar. Note also that a generalization-based approach to the coordination of *finden* and *helfen* will run into exactly the same problems as the GPSG account of Coordination of Unlikes discussed above, equally permitting the ungrammatical (43b) and (43c).

Bayer and Johnson's (1995) approach to feature indeterminacy is entirely analogous to their treatment of Coordination of Unlikes: at the heart of their account lies a principled distinction between neutral

or overspecified categories, like $np \wedge acc \wedge dat$, assigned to the neutral *Frauen* and underspecified categories, like $np \wedge (acc \vee dat)$ that they take to be the category of a coordination of case-distinct NPs, such as *Männer*$_{acc}$ *und Kindern*$_{dat}$. Functor categories like $vp/np \wedge acc$ or *findet* or $vp/np \wedge dat$ for *hilft* can be strengthened to $vp/np \wedge acc \wedge dat$, which can then be coordinated into a category of the same type. While neutral NPs like *Frauen* are exactly of this overspecified type, and hence can function as an argument to yield a VP, non-neutral NPs like *Männer* or *Kindern* cannot, since their respective categories ($np \wedge acc$ or $np \wedge dat$) are not subsumed by $np \wedge acc \wedge dat$.

Within the context of unification-based grammar, solutions similar to Bayer and Johnson (1995) have recently been developed for LFG (Dalrymple and Kaplan, 2000) and HPSG (Daniels, 2001; Levy and Pollard, 2001). Dalrymple and Kaplan (2000) suggest replacing equality-based checking of agreement features with a setbased approach: non-neutral NPs such as *Männer* or *Kindern* will be specified as $(\uparrow\text{CASE}) = \{\text{ACC}\}$ or $(\uparrow\text{CASE}) = \{\text{DAT}\}$, respectively, whereas neutral NPs such as *Frauen* will specify both cases as elements of their CASE set $(\uparrow\text{CASE}) = \{\text{ACC,DAT}\}$. Case checking by verbs will then be expressed as constraints on set membership, e.g., $\text{ACC} \in (\uparrow\text{OBJ CASE})$ for *finden*, or $\text{DAT} \in (\uparrow\text{OBJ CASE})$ for *helfen*. The f-structure of the V^0 coordination will simply contain the conjunction (or unification) of these set constraints, requiring the direct object's CASE set to contain both an ACC and a DAT element.

Within HPSG, Daniels (2001) has shown how the basic insight of the Bayer and Johnson approach to feature neutrality can be incorporated by refining the type hierarchies of case values (see also Levy and Pollard, 2001 for technically different, though conceptually identical approaches).

(44)

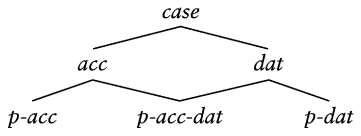

Building on an earlier proposal by Levine *et al.* (2001), he suggests distinguishing traditional case requirements such as *acc* or *dat* from the maximal (or 'pure') cases to which they may resolve, enabling him to include a neutral type *p-acc-dat* alongside the non-neutral types *p-acc* and *p-dat*. While the case values of *Männer* and *Kindern* will be the non-neutral types *p-acc* and *p-dat*, *Frauen* will be lexically specified as [CASE *p-acc-dat*]. This augmentation of the type hierarchy makes it possible to reduce feature neutrality to standard notions of unification: since *finden* will subcategorize for *acc* and *helfen* for *dat*, the unification of these requirements can only be satisfied by the case-neutral type *p-acc-dat*. A drawback of a type-based approach such as Daniels's is that the hierarchies needed to provide all necessary neutralizing types may grow factorial to the number of case distinctions. An alternative has been proposed by Sag (2003), who advocates subsumption checks, thereby likening the HPSG approach to that of Bayer and Johnson (1995) and Dalrymple and Kaplan (2000).

To conclude, current solutions to the puzzle of Coordination of Unlikes unanimously agree that likeness of constituents should still be regarded a defining property of coordinate structures, but that the definition of likeness is subject to further refinement. Solutions differ, though, as to whether resolution is sought at the level of the 'unlike' constituents themselves, using subsumption checks, or else at some higher level, likening the treatment of Coordination of Unlikes to that of NCC.

See also: Combinatory Categorial Grammar; Constituent Structure; Declarative Models of Syntax; Dependency Grammar; Ellipsis; Head-Driven Phrase Structure Grammar; Island Constraints; Lexical Functional Grammar; Long-Distance Dependencies; Right Node Raising; X-Bar Theory.

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Copenhagen School

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The general understanding of the term 'the Copenhagen School' is that it refers to the scholars, mostly Danes, who – together with Louis Hjelmslev and Hans-Jørgen Uldall – can be identified with 'glossematics,' one of the leading trends in European structuralism from the early 1930s until the early 1950s. Their forum of discussion was the 'Linguistic Circle of Copenhagen,' which was founded in 1931 (inspired by the Cercle Linguistique de Prague).

The theory that eventually came to be called 'glossematics' was developed by Hjelmslev and Uldall in the second half of the 1930s. Their *Outline of Glossematics* monograph was due to appear in 1937, but never appeared in full, and a comprehensive formal statement appeared only posthumously. Therefore, the theory became influential mainly through its basic claims.

A conspicuous feature of glossematic theory is its recognition of a full duality of linguistic structure: there is a 'content form' as well as an 'expression form.' The claim is that these forms are organized in similar ways, so that the categories of content and of expression can be defined in terms of the same kinds of relations. This was a further development of the Saussurean view of language as a semiotic comprising a *signifiant* and a *signifié*.

Glossematics was intended as a definitive and complete theory of language. Accordingly, Hjelmslev's contemporaries in the 1940s and 1950s made more or less successful attempts to apply it to descriptive linguistic work. The most extensive contribution was made by Danish dialectologists such as Børge Andersen, Anders Bjerrum, Poul Andersen, and Inger Ejskjær, who mostly concentrated on the expression side of language.

Danish theoretical linguistics around the World War II should, however, not be seen as a 'school' defined by wholesale acceptance of a particular approach. Rather, the milieu was characterized by lively debates on a high intellectual level.

Eli Fischer-Jørgensen, then a very young member of the group, had always taken a critical attitude towards Hjelmslev's theories, but with her expert knowledge she has been instrumental in getting much of the glossematic work of that period published, often posthumously. She wrote the best presentations of glossematic theory to date. Knud Togeby was strongly inspired by Hjelmslev but did not follow his ideas strictly. Paul Diderichsen was even more eclectic; he made an original and lasting contribution by inventing a position-based scheme for syntactic analysis, which for half a century has played a role in Nordic grammar work.

Some other very prominent scholars worked entirely outside the Hjelmslevian framework. Otto Jespersen had developed his own grammatical approach, and Viggo Brøndal established himself as an important figure within several fields of theoretical linguistics.

Danish linguists of later generations have seen the glossematic legacy mainly as an inspiration for distinguishing clearly between form and substance, and for basing syntactic analysis explicitly on meaning and function. The Copenhagen version of Functional Grammar, an offshoot of Simon Dik's theory – with inspiration both from glossematics and cognitive grammar – is perhaps the most distinctive trend in contemporary Danish linguistics.

Although the glossematic framework of linguistic analysis has become obsolete, Hjelmslev's ideas about semiotics continue to attract the attention of linguists and philosophers worldwide, notably in Italy and in Japan.

See also: Fischer-Jørgensen, Eli (b. 1911); Glossematics; Hjelmslev, Louis Trolle (1899–1965); Uldall, Hans-Jørgen (1907–1957).

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Copenhagen School

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The general understanding of the term 'the Copenhagen School' is that it refers to the scholars, mostly Danes, who – together with Louis Hjelmslev and Hans-Jørgen Uldall – can be identified with 'glossematics,' one of the leading trends in European structuralism from the early 1930s until the early 1950s. Their forum of discussion was the 'Linguistic Circle of Copenhagen,' which was founded in 1931 (inspired by the Cercle Linguistique de Prague).

The theory that eventually came to be called 'glossematics' was developed by Hjelmslev and Uldall in the second half of the 1930s. Their *Outline of Glossematics* monograph was due to appear in 1937, but never appeared in full, and a comprehensive formal statement appeared only posthumously. Therefore, the theory became influential mainly through its basic claims.

A conspicuous feature of glossematic theory is its recognition of a full duality of linguistic structure: there is a 'content form' as well as an 'expression form.' The claim is that these forms are organized in similar ways, so that the categories of content and of expression can be defined in terms of the same kinds of relations. This was a further development of the Saussurean view of language as a semiotic comprising a *signifiant* and a *signifié*.

Glossematics was intended as a definitive and complete theory of language. Accordingly, Hjelmslev's contemporaries in the 1940s and 1950s made more or less successful attempts to apply it to descriptive linguistic work. The most extensive contribution was made by Danish dialectologists such as Børge Andersen, Anders Bjerrum, Poul Andersen, and Inger Ejskjær, who mostly concentrated on the expression side of language.

Danish theoretical linguistics around the World War II should, however, not be seen as a 'school' defined by wholesale acceptance of a particular approach. Rather, the milieu was characterized by lively debates on a high intellectual level.

Eli Fischer-Jørgensen, then a very young member of the group, had always taken a critical attitude towards Hjelmslev's theories, but with her expert knowledge she has been instrumental in getting much of the glossematic work of that period published, often posthumously. She wrote the best presentations of glossematic theory to date. Knud Togeby was strongly inspired by Hjelmslev but did not follow his ideas strictly. Paul Diderichsen was even more eclectic; he made an original and lasting contribution by inventing a position-based scheme for syntactic analysis, which for half a century has played a role in Nordic grammar work.

Some other very prominent scholars worked entirely outside the Hjelmslevian framework. Otto Jespersen had developed his own grammatical approach, and Viggo Brøndal established himself as an important figure within several fields of theoretical linguistics.

Danish linguists of later generations have seen the glossematic legacy mainly as an inspiration for distinguishing clearly between form and substance, and for basing syntactic analysis explicitly on meaning and function. The Copenhagen version of Functional Grammar, an offshoot of Simon Dik's theory – with inspiration both from glossematics and cognitive grammar – is perhaps the most distinctive trend in contemporary Danish linguistics.

Although the glossematic framework of linguistic analysis has become obsolete, Hjelmslev's ideas about semiotics continue to attract the attention of linguists and philosophers worldwide, notably in Italy and in Japan.

See also: Fischer-Jørgensen, Eli (b. 1911); Glossematics; Hjelmslev, Louis Trolle (1899–1965); Uldall, Hans-Jørgen (1907–1957).

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Copula Variation

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Copula variation has been a central topic in variationist sociolinguistics since the inception of the field in the 1960s. In fact, it was through an analysis of copula variation in African American Vernacular English (AAVE) that Labov (1969) first introduced the notion of the variable rule to linguistics. Although there now exists almost 40 years of research on copula variation, it is still a robust and controversial topic, with many unresolved analytical and interpretive issues. Some of these issues include determining the variable context, choosing the method for calculating rates of occurrence, determining the linguistic relation between the variant forms of the copula, and determining the social and linguistic factors conditioning the variation. These issues have been of particular importance in the long-standing debate over the origins and development of AAVE and whether it derives from a prior creole.

The Copula and Its Variants

In English, the verb *be* serves to link a subject with a predicate that cannot carry tense and agreement morphology. This verb is a copula (from the Latin *copulare* 'to link') if the predicate is nonverbal (nouns, prepositional phrases, adjectives, adverbs) and an auxiliary if the predicate is verbal (progressive participles, past participles), although the two uses are commonly conflated under the term copula.

In all varieties of English, the copula can be variably realized as full or contracted (1a) and (1b). In AAVE, as well as in some varieties of nonstandard English, children's language, English-based creoles, and second-language English, the copula may also be absent (1c) or occur in an uninflected form (1d) and (1e). (Copula is in boldface.)

(1a) she **is** good
(1b) she**'s** good
(1c) she **Ø** good
(1d) she **be** good
(1e) she **be** singing

In AAVE, copula absence has been interpreted either as an extension of copula contraction (Labov, 1969) or as the relic of a prior creole stage and/or transfer from West African languages, in both of which the copula may be omitted in some syntactic environments (Baugh, 1980; Holm, 1984).

Variable Context

The initial stage in any analysis of linguistic variation involves determining the variable context, that is, where the variation can and cannot occur. In studies of the copula, this envelope of variation has remained controversial, but all studies agree in excluding a number of linguistic environments from consideration. Because neither contraction nor absence is possible if the copula is emphasized (2a) or occurs as an infinitive (2b), an imperative (2c), with contracted *not* (2d), in yes/no and tag questions (2e) and (2f), or clause-finally (2g), such constructions do not consitute instances of the variable. If the phonetic segment following the copula is identical to its contracted form (2h) and (2i), it is impossible to tell whether the copula has been contracted or omitted, and such neutralization contexts are normally excluded from consideration.

(2a) she **IS** coming
(2b) she has **to be** good
(2c) **be** good!
(2d) she **isn't** good
(2e) **is** she good?
(2f) she's good, **isn't** she?
(2g) nobody knows where he **is**
(2h) she(**'s**) sick
(2i) you(**'re**) right

However, opinion is divided on the inclusion of uninflected *be* (1d) and (1e). Although this form carries the same predicative functions as inflected forms, the fact that it cannot be contracted suggests that it does not enter into the variation. In addition, uninflected *be* in AAVE tends to convey a habitual or iterative interpretation rather than the durative interpretation conveyed by other copula forms. For example, (1e) is interpreted as 'she often sings', not as 'she is singing (right now)'. Because the use of invariant *be* changes the meaning of the sentence, many studies exclude it from analysis.

There is some disagreement about the inclusion of other linguistic environments (see Blake, 1997). Because *was* and *were* cannot contract, past-tense contexts are often excluded. However, copula absence does occur in the past tense in English-based creoles and because speakers of all varieties of English vary between past and present tense in referring to events located in past time (the historical present), contraction and omission may also occur in this environment. Many studies of AAVE restrict the variable context to declarative sentences because another variable process, subject-auxiliary inversion in *wh*-questions (3a), makes it difficult to determine where

the copula would have occurred had it not been omitted (3b). Studies of varieties in which *ain't* occurs (3c) often exclude negative sentences from consideration because the copula can never be contracted with this form. However, both contraction and omission can occur with *not* (3d) and (3e).

(3a) why she **is** here?
(3b) why (**is**) she (**is**) here?
(3c) she **ain't** here
(3d) she**'s** not here
(3e) she **Ø** not here

An unresolved issue is whether the variants of the copula can be compared across English, AAVE, and English-based creoles because each variety imposes different restrictions on nonverbal predication. For example, English requires a copula with all nonverbal predicates, whereas in AAVE and creoles zero copula occurs at different rates according to the type of predicate. If true, this consideration impedes the comparison necessary to determine the origins of AAVE.

Method of Calculation

Another unresolved issue that is central to the analysis of copula variation is the method used to calculate rates of contracted and zero forms. The choice of method reflects assumptions about the linguistic processes that give rise to the variation.

In the first analysis of copula variation, Labov (1969) viewed zero copula as the product of deletion, an extension of the more general process of contraction. He argued that, because deletion can only occur where contraction can occur and cannot occur where contraction cannot, it must be a process that is fed by contraction. In this scenario, two rules are ordered with respect to one another: a variable rule of contraction (Labov Contraction) removes the vowel from underlyingly full forms, and then a variable rule of deletion (Labov Deletion) removes the consonant from contracted forms. This ordering entails that we first calculate contraction as the number of contracted and deleted forms divided by all copula contexts (4a). Deletion is then calculated as the number of deleted forms out of all contracted and deleted forms (4b).

(4a) *Labov Contraction:*

$$\frac{\text{Contracted} + \text{Deleted}}{\text{Full} + \text{Contracted} + \text{Deleted}}$$

(4b) *Labov Deletion:*

$$\frac{\text{Deleted}}{\text{Contracted} + \text{Deleted}}$$

Alternatively, we could view contraction and deletion as unrelated and unordered processes. In this scenario, variable rules of contraction (Straight Contraction) and deletion (Straight Deletion) apply separately to underlyingly full forms (Rickford *et al.*, 1991). The number of contractions and deletions are both calculated for all copula contexts (5a) and (5b).

(5a) *Straight Contraction:*

$$\frac{\text{Contracted}}{\text{Full} + \text{Contracted} + \text{Deleted}}$$

(5b) *Straight Deletion:*

$$\frac{\text{Deleted}}{\text{Full} + \text{Contracted} + \text{Deleted}}$$

These two scenarios assume that there is an underlying copula that is subject to contraction and deletion, but a third possibility assumes that the copula is not present underlyingly but is variably inserted and that the inserted copulas are then variably contracted (Romaine, 1982). This scenario entails that we first calculate inserted (i.e., full and contracted) forms for all contexts (6a) and then calculate contracted forms for already-inserted forms (6b).

(6a) *Insertion:*

$$\frac{\text{Full} + \text{Contracted}}{\text{Full} + \text{Contracted} + \text{Zero}}$$

(6b) *Straight Deletion:*

$$\frac{\text{Contracted}}{\text{Full} + \text{Contracted}}$$

Rickford *et al.* (1991) demonstrated that the choice of method can drastically affect the overall rates of contracted and zero forms.

Each of the methods of calculation discussed here tends to be associated with different positions in the debate over the origins of AAVE. Those who view AAVE as a variety of nonstandard English tend to prefer Labov Contraction and Deletion, whereas those who argue that AAVE arose from a prior creole and/or transfer from West African languages prefer either Straight Contraction and Deletion or Insertion and Romaine Contraction. An alternative that has been explored less frequently is to choose the method on the basis of statistical rather than theoretical considerations, by performing analyses for each rule-ordering scenario and choosing the analysis that provides the best statistical fit to the data (Walker, 2000).

Factors Conditioning Copula Variation

A number of social and linguistic factors have been found to condition both contracted and zero copula. Since Early Modern English, contraction has been more commonly found in speech than in writing and has been associated with less formal social contexts. Copula absence is an even more stigmatized feature that also tends to be associated with less

formal contexts, as well as with rural and African American speech, especially in lower social classes. However, copula absence may also have positive value in some social situations if it serves to mark a social identity that the speaker wants to convey favorably. Although studies have consistently found contraction to be sensitive to considerations of setting, topic, style and intraspeaker accommodation, findings have been less consistent with respect to zero copula (see Rickford and McNair-Knox, 1994).

In contrast with social factors, linguistic factors exert a more powerful and consistent effect on copula variation and tend to remain constant even when the overall rate of contraction and omission varies.

Perhaps the most important linguistic factor is the inflected forms of the copula (*be*, *is/'s*, *am/'m*, and *are/'re*), each of which differs in its distribution and conditioning. We have already seen that uninflected *be* is often excluded from analysis because it cannot contract and it changes the meaning of the sentence. Of the inflected forms, *am* is the most restricted, occurring only after the personal pronoun *I*. In many studies, *am* occurs in its contracted form so frequently that it seems to have become a frozen or lexicalized construction. Because including such forms in the analysis disproportionately increases the rate of contraction, they are often excluded from calculation. Contracted *are* is similarly restricted in distribution, occurring only postvocalically and almost always after pronominal subjects. In addition, the absence of *are* intersects with another variable process that operates in some varieties, the deletion of postvocalic /r/. This intersection means that it is often unclear which process has given rise to the zero form. It is notable that the few reports of copula absence in nonstandard historical and regional varieties of English tend to occur in the context of *are*. Contracted *is* has the least restricted distribution of the inflected forms, occurring after consonants and vowels and after both pronominal and NP subjects. Although some studies analyze *is* and *are* separately, others have found that the linguistic factors conditioning contraction and omission of the two forms are sufficiently similar to group them together. Because nonstandard subject-verb agreement is also a feature of AAVE and English-based creoles (e.g., *we is here*), some studies have relied on the grammatical person of the subject instead of the postulated underlying form.

The phonological environment has long been recognized as an important linguistic factor affecting copula variation because contraction may be viewed as a phonological strategy for reducing structure by eliminating a syllable. However, in some cases reduction in this area of the phonology complicates other areas by creating consonant clusters. Proponents of the view that copula deletion is an extension of contraction argue that it is this complication that motivates deletion. Copulas preceded by vocalic elements, such as vowels and [r], tend to be contracted more often than those that are preceded by consonants, especially sibilants. The effects on copula absence are reversed, with preceding consonants promoting zero. We expect following vowels to promote contraction and inhibit zero because the contracted form could resyllabify as the onset of the following syllable, but this effect is inconsistent across studies (Walker, 2000).

The grammatical subject of the copula is another linguistic factor that conditions both contraction and omission. Pronouns tend to promote both processes more highly than full NP subjects. Differences that have been observed in the effect of individual personal pronouns (*I* vs. *you* vs. *she/he*) could reflect the effects of the morpholexical properties of each of the inflected forms (*am/is/are*) previously discussed. Other subjects, such as *they* and *it/what/that*, occur with such high rates of contraction that, as we have seen with *am*, they seem to be lexicalized forms, the inclusion of which will affect the overall rate of contraction.

The linguistic factor that has received the most attention in the study of copula variation, especially in the context of the AAVE origins debate, is the grammatical category following the copula. Labov (1969) was the first to note that zero copula in AAVE can occur before periphrastic futures (*going to* or *gonna*) (7a), progressive participles (7b), locative expressions (7c), predicate adjectives (7d), and noun phrases (7e) (examples from Labov, 1969).

(7a)	going to/ gonna:	'cause we Ø gon sneak under the turnstile
(7b)	V-ing:	he just feel like he Ø gettin' cripple up from arthritis
(7c)	LOC:	we Ø on tape
(7d)	ADJ:	he Ø fast in everything he do
(7e)	NP:	she Ø the first one started us off

In his study of New York AAVE, he found zero copula to occur most often with *gonna* and V-*ing*, less often with ADJ/LOC, and least often with NP.

Although Labov noted parallels in zero copula between AAVE and creoles, subsequent studies used this patterning to make a creole or West African origin more explicit. Baugh (1980), a reanalysis of Labov's data in which LOC and ADJ were separated, found that ADJ promotes zero copula more highly than LOC. Holm (1984) compared the AAVE results with data from Jamaican Creole (southwestern Caribbean Creole English) and Gullah (Sea Island

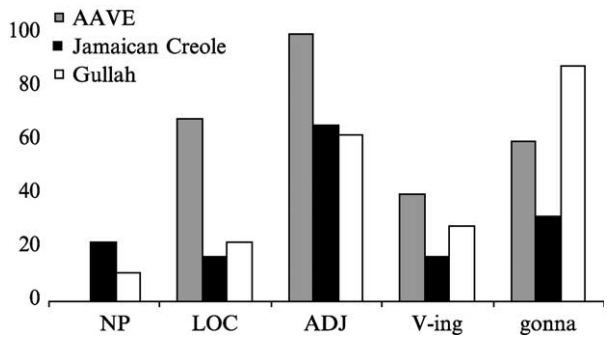

Figure 1 Rate of zero copula according to following grammatical category in AAVE (Baugh, 1980), Jamaican Creole, and Gullah (Holm, 1984).

Creole English) and found a similarly high rate of zero copula with ADJ (see Figure 1).

On the basis of these results, both studies suggested that this pattern reflects a creole origin for AAVE. In English-based Caribbean creoles, the copula occurs in only two environments: equative (when the predicate is a noun) (8a) and locative (when the predicate is a locative adverb or prepositional phrase) (8b). Predicate adjectives in creoles are characterized as stative verbs because they occur with preverbal markers of tense and aspect (8c) and are thus not true copula contexts. Similarly, participles and future constructions with *go* are not true copula contexts in creoles because the former corresponds to a preverbal durative marker (8d) and the latter to a preverbal irrealis marker (8e) (examples adapted from Winford, 1993).

(8a) mi a di bas
'I am the boss'
(8b) mi de hom
'I am at home'
(8c) mi sik, mi bin sik
'I am sick, I was sick'
(8d) mi a wok
'I am working'
(8e) mi go tell im
'I am going to tell him'

According to the creole-origin hypothesis, the hierarchy of zero copula in AAVE reflects the grammatical distinctions of a prior creole system: V-*ing*, *gonna*, and ADJ promote zero because the prior creole had no copulas in these contexts, whereas LOC and NP inhibit zero because the prior creole had a locative and an equative copula.

Although the creole-origin hypothesis predicts that ADJ should consistently promote zero over LOC, this prediction has not been confirmed in studies of contemporary and historical varieties of AAVE (Poplack and Sankoff, 1987; Poplack and Tagliamonte, 1991; Rickford *et al*., 1991; Singler, 1991) or by quantitative studies of English-based creoles (Rickford and Blake, 1990; Rickford, 1996; Weldon, 1996). Not only does ADJ inconsistently promote deletion, but its ordering relative to LOC also fluctuates more than that of any other two categories. This fluctuation makes it difficult to support the creole-origin hypothesis, at least in its original form.

This fluctuation has been explained as the outcome of a process of decreolization, in which the copula is inserted to make the creole more English-like. The sensitivity of copula insertion to specific grammatical environments is responsible for the observed differences in rates of deletion according to the following grammatical category (Bickerton, 1971; Singler, 1991; Winford, 1992). Bickerton (1971), a study of decreolization in Guyana, found that all forms of the copula, except equative *a*, were first deleted before being replaced by inflected forms of *be* and suggested that a similar process had ocurred in the history of AAVE. Singler (1991) and Winford (1992) expanded on this scenario, developing more elaborate models of decreolization and arguing that high rates of zero copula before adjectives should be observed only in basilectal varieties. These models have yet to be tested quantitatively on other situations of decreolization, and they leave open the question of why certain grammatical environments that do not take copulas in the creole are more resistant to copula insertion and why zero copula occurs with following NPs, which should never occur at any level of the continuum. In fact, there are surprisingly few variationist studies of the copula in the English-based creoles of the Caribbean (Rickford and Blake, 1990; Winford, 1992; Rickford, 1996), which makes it difficult to independently assess the proposed models of decreolization.

Current Issues in Copula Variation

Most of the current work on copula variation continues to explore the nature of the following grammatical category and the relation of AAVE to creoles.

One current issue is the relation of the findings of copula absence in AAVE to situations of second language acquisition (SLA). Winford (1998) reinterpreted the decreolization models discussed here as processes of shift resulting from imperfect SLA. In this multiple causation scenario, the acquisition of English by Africans brought to North America from Africa and the Caribbean formed a continuum, with more English-like varieties coexisting with varieties in which copula absence was more frequent. If this view is correct, we expect to find a similar pattern of occurrence in studies of copula deletion in second language acquisition. The few studies of copula

deletion in SLA situations (e.g., Mesthrie, 1992; Ho and Platt, 1993) suggest that two effects are operative: learner simplification strategies and first-language interference (consistent with the SLA frame of discussion). The first effect stems from the fact that speakers omit the copula in contexts where their first language would require it, whereas the second reflects the fact that speakers of languages that lack a copula tend to have higher rates of zero copula than those whose language features a copula.

Another issue involves the relevant distinctions in the following grammatical category. For example, Baugh (1980) divided the NP category into bare nouns and nouns modified by a determiner and found that the latter promotes zero copula almost as highly as adjectives. Poplack and Sankoff (1987) and Poplack and Tagliamonte (1991) note that following *wh*-clauses promote deletion more than all other categories, a finding not accounted for by the creole-origin hypothesis. Rickford (1996) divided the category of adjective into those derived from past participles (*gone*, *broken*) and underived adjectives, although he found little difference in their effect on rates of zero. Finally, in a multigenerational study of Texas AAVE, Cukor-Avila (1999) divided adjectives into stative (describing a stage-level or temporary property) and nonstative (describing an individual-level or permanent property) and found that the conditioning of zero copula has changed over time. Clearly, an important consideration in future work on the copula in both AAVE and English-based creoles is a determination of the appropriate categorization of copular predicates.

Finally, some work has addressed the effect that rhythmic or prosodic considerations play in conditioning copula variation. Although Labov (1969) noted the effect of stress on contraction, this line of research was not pursued until recently. Walker (2000) sought to explain both contraction and omission of the copula in Early AAVE in terms of the degree of prosodic complexity of the sentence. In this view, prosodically simple sentences, such as those with clitic subjects and short predicates, favor contraction over prosodically complex elements, such as NP subjects and longer predicates. Similarly, zero copula is a strategy for avoiding prosodic complexity in contexts where contraction is disfavored. Because no work has tested these predictions in modern AAVE and English-based creoles, it remains unclear what role prosody has played in the development of AAVE.

Conclusion

A vast body of work has grown out of the study of copula variation, arriving at a general consensus that social and linguistic factors condition copula contraction and omission. However, the details of this conditioning and their interpretation remain to be developed. These details are most important for understanding the history of AAVE and the development of English-based creoles, but the study of copula variation cuts across issues of methodology, analysis, language change, and acquisition.

See also: English, African American Vernacular; Labov, William (b. 1927); Neutralization; Pidgins and Creoles: Overview; Predication; Prestige, Overt and Covert; (R) as a Variable; Rule Ordering and Derivation in Phonology; Statistical Testing of Variation; Style and Style Shifting.

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Cordemoy, Géraud de (1626–1684)

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Géraud de Cordemoy was born on October 6, 1626 in Paris, where he died on October 15, 1684. He was a philosopher and a historian, as well as an attorney in the Paris Parliament, like his father. Due to his high position in Parliament, he was a familiar figure in the Cartesian circles and gained recognition with his books *Discernement du corps et de l'âme en six discours pour servir à l'établissement de la physique* (1667), and the famous *Discours physique de la parole* (1668a). He gradually moved away from his interest in philosophical work and started to study historiography. In 1673, Cordemoy was appointed tutor ('*lecteur ordinaire*') of the Dauphin (future Louis XV), thanks to his relationship with Bossuet. From 1675 on, he wrote *Histoire de France*, which made him famous enough to be elected at the Académie Française. He became director of the Académie in 1683. Cordemoy was a member of the *petit concile* ('small council'), along with Bossuet, Fléchier, Fénelon, Massillon, and Fleury.

Cordemoy's contribution to linguistics is found in the *Discours physique de la parole*. This work aims at analyzing the respective roles of body and soul in the use of language, in an attempt to bring new proofs of Cartesian dualism. Cordemoy first distinguishes between natural signs and conventional ('d'institution') signs. He then researches the mechanical laws at play in the production of sounds in language and gives detailed descriptions in articulatory and acoustical phonetics. These examinations are based on the study of language acquisition in children and nonnative speakers. Interestingly, Cordemoy notices that this study parallels the work of the grammarian who should go through the various stages of language acquisition, while coincidentally studying its principles. In addition, Cordemoy contributes to the discussion on semiotics by identifying several categories of signs used in human communication: 'natural,' 'ordinary,' and 'particular' signs. The first category encompasses signs of emotion; the second, signs of collective institutions; and signs established to facilitate private communication between people fall in the third category. Each category includes both uttered signs and physical gestures.

See also: Language Development: Pre-scientific Studies; Phonetics: Overview; Semiotics: History.

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Cordemoy, Géraud de (1626–1684)

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Géraud de Cordemoy was born on October 6, 1626 in Paris, where he died on October 15, 1684. He was a philosopher and a historian, as well as an attorney in the Paris Parliament, like his father. Due to his high position in Parliament, he was a familiar figure in the Cartesian circles and gained recognition with his books *Discernement du corps et de l'âme en six discours pour servir à l'établissement de la physique* (1667), and the famous *Discours physique de la parole* (1668a). He gradually moved away from his interest in philosophical work and started to study historiography. In 1673, Cordemoy was appointed tutor ('*lecteur ordinaire*') of the Dauphin (future Louis XV), thanks to his relationship with Bossuet. From 1675 on, he wrote *Histoire de France*, which made him famous enough to be elected at the Académie Française. He became director of the Académie in 1683. Cordemoy was a member of the *petit concile* ('small council'), along with Bossuet, Fléchier, Fénelon, Massillon, and Fleury.

Cordemoy's contribution to linguistics is found in the *Discours physique de la parole*. This work aims at analyzing the respective roles of body and soul in the use of language, in an attempt to bring new proofs of Cartesian dualism. Cordemoy first distinguishes between natural signs and conventional ('d'institution') signs. He then researches the mechanical laws at play in the production of sounds in language and gives detailed descriptions in articulatory and acoustical phonetics. These examinations are based on the study of language acquisition in children and nonnative speakers. Interestingly, Cordemoy notices that this study parallels the work of the grammarian who should go through the various stages of language acquisition, while coincidentally studying its principles. In addition, Cordemoy contributes to the discussion on semiotics by identifying several categories of signs used in human communication: 'natural,' 'ordinary,' and 'particular' signs. The first category encompasses signs of emotion; the second, signs of collective institutions; and signs established to facilitate private communication between people fall in the third category. Each category includes both uttered signs and physical gestures.

See also: Language Development: Pre-scientific Studies; Phonetics: Overview; Semiotics: History.

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Coreference: Identity and Similarity

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Defining Coreference

Coreference can in general be defined as the phenomenon whereby two or more anaphoric or referential expressions denote, or refer to, the same entity in the external world. This can be illustrated by (1).

(1) John said that he had won two Olympic gold medals.

In (1), if the anaphoric pronoun *he* refers to what its antecedent *John* refers to, then there is a relation of coreference obtaining between them; *he* is thus said to be coreferential with *John*. In contemporary linguistics, including generative grammar, coreference between two or more anaphoric or referential expressions in a sentence or discourse is usually marked by using identical subscript letters, as in (2) or numbers, as in (3).

(2) John_i said that he_i had won two Olympic gold medals.
(3) John_1 said that he_1 had won two Olympic gold medals.

Another common way of saying that *he* and *John* are coreferential is to say that they are coindexed. On the other hand, in (1) if *he* does not refer to what *John* refers to, then the two anaphoric/referential expressions are disjoint in reference. Disjoint in reference is typically marked by using different subscript letters, as in (4), or numbers, as in (5).

(4) John_i said that he_j had won two Olympic gold medals.
(5) John_1 said that he_2 had won two Olympic gold medals.

Identity

From a truth-conditional, semantic point of view, the anaphoric relation exhibited in (1) is called referential anaphora (e.g., Huang, 2000: 5). A referential anaphoric expression refers to some entity in the external world either directly, as in (6), or via its coreference with its antecedent in the same sentence or discourse, as in (1). In the latter case, as already mentioned, the referentially anaphoric expression refers to what its antecedent refers to, thus they are of referential identity.

(6) (Referent in the physical context, and with selecting gesture)
He's the robber!

Similarity

We move next to types of anaphoric relations that may be said to indicate some kind of anaphoric or referential dependency other than referential identity.

Bound-Variable Anaphora

Sentence (7) is an example of bound-variable anaphora.

(7) Every child_1 wishes that he_1 could visit the land of Lilliput.

Generally speaking, a bound-variable anaphoric expression does not refer to any fixed entity in the external world, as can be shown by sentences such as (8) below.

(8) Nobody_1 thought that he_1 would wish to live with the giants of Brobdingnag.

But it is interpreted by virtue of its dependency on some quantificational expression in the same sentence or discourse, thus seeming to be the natural language counterpart of a bound variable in first-order logic. As indicated by (7) and (8), the bound-variable anaphoric expression and its quantificational antecedent can be coindexed, but they are not considered to be coreferential.

One interesting characteristic of bound-variable anaphora is that different languages afford their speakers different types of anaphoric or referential expressions to encode such a dependency, (cf. Huang, 2000: 6). For example, to express a bound-variable anaphoric relation between a matrix subject and an embedded subject, while English normally allows neither gaps (or empty categories) nor reflexives, Serbo-Croatian

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allows gaps (or empty categories), Marathi allows reflexives, and Chinese allows both.

(9a) Gaps or empty categories (Serbo-Croatian cited in Huang, 2000: 6)
svaki student misli da ce Ø
every-M-SG student thinks that will
dobiti desetku.
get A
'Every student thinks that he will get an A.'

(9b) Pronouns
Every actress said that her career has been a roller coaster ride.

(9c) Reflexives (Marathi, cited in Huang, 2000: 6)
sarvããnaa$_1$ vaatta ki aapan$_1$ libral aahot.
everybody believes that self liberal is
'Everybody believes that he is liberal.'

(9d) Gaps and reflexives (Chinese)
mei ge ren dou shouØ/ ziji
every CL person all say self
xihuan zhongguocai.
like Chinese food
'Everybody says that he likes Chinese cuisine.'

Note next that crosslinguistically bound-variable anaphora occasionally can also be encoded by repeating the same lexical NP.

(10) Of every ritual bronze that was found in the tomb, it was subsequently discovered that the bronze belonged to the Chinese Northern Song élite.

Finally, as noted in Kempson (1988) and Huang (1994: 292), examples of the following kind can also have a bound-variable interpretation. On such a reading, the supervisor is interpreted as each Ph.D. student's supervisor. Of particular interest here is that this bound-variable interpretation is obtained only by virtue of the addition of the pragmatic inference that every Ph.D. student characteristically has a supervisor.

(11) Every Ph.D. student thinks that the supervisor is intelligent.

E-Type Anaphora

Somewhat related to bound-variable anaphora is E-type anaphora, also known as *donkey* anaphora, first discussed by Geach (1962: 128). It is called E-type anaphora in memory of the late Oxford philosopher Gareth Evans after Evans (1977). A classical example of E-type anaphora is given in (12).

(12) Every farmer who owns a donkey beats it.

For technical reasons, an E-type anaphoric relation is neither pure referential anaphora nor pure bound-variable anaphora, but appears to constitute a unified semantic type of its own (Evans, 1977). The main reason why it is neither pure referential anaphora nor pure bound-variable anaphora is this: the antecedent of the anaphoric pronoun *a donkey* is variable-bound by a quantificational expression *every farmer*, but unlike in the case of pure bound-variable anaphora such as (7), the antecedent does not syntactically bind the anaphoric pronoun, because the antecedent does not c-command the anaphoric pronoun. Put differently, in E-type anaphora, the anaphoric expression falls outside the scope of its binder (see also Heim, 1990; Kamp and Reyle, 1993; de Swart, 1998: 127–130).

Anaphora of Laziness

The following is a classical example of anaphora or pronoun of 'laziness' (e.g., Karttunen, 1976).

(13) The man who gave his paycheck to his wife was wiser than the man who gave it to his mistress.

Anaphora of laziness is so-called because it exhibits neither a referential anaphoric relation nor a bound-variable anaphoric relation. Rather, it functions as a shorthand for a repetition of its antecedent, which supplies the descriptive content for the anaphoric expression. In other words, it is a device for a repeated occurrence of the linguistic form, rather than the truth-conditional content of its antecedent. This can be illustrated by a consideration of (13). In (13), the referent of *it* is the paycheck of the second man rather than the paycheck of the first man. There is thus no coreferential relation between *it* and *the paycheck*. Anaphora of laziness is considered as a case of the semantically defined type of identity of sense anaphora, that is, anaphora in which the anaphoric expression and its antecedent are related in terms of sense. It is on a par with N-bar-anaphora, as in (14), and arguably with the sloppy reading of VP-ellipsis, as in (16b) (see Huang, 2000: 131–156 for further discussion of VP-ellipsis).

(14) Mary's favorite tenor is Pavarotti, but Jane's Ø is Carreras.

(15) John loves his wife, and Peter does, too

(16a) Strict reading
John likes John's wife, and Peter loves John's wife.

(16b) Sloppy reading
John likes John's wife, and Peter loves Peter's wife.

Identity of sense anaphora contrasts with the semantically defined type of identity of reference anaphora, that is, anaphora in which the anaphoric expression and its antecedent have identical referent, as (2) illustrates.

Bridging Cross-reference Anaphora

Bridging cross-reference anaphora is used to establish an association with some preceding expression or antecedent in the same sentence or discourse via the addition of background assumption (e.g., Clark, 1977; Huang, 1994, 2000). What is tacitly bridged is typically the information that is not structurally retrievable either from the sentence or discourse that triggers the inferential process. A typical example of bridging cross-reference is given below.

(17) John walked into a church. The stained glass windows were magnificent.

In (17), the anaphoric expression is *the stained glass windows*, and its antecedent is *a church*. The pragmatically inferred background assumption is that the church John walked into has stained glass windows.

As pointed out in Huang (2000: 249), bridging cross-reference anaphora has three characteristic properties:

1. The anaphoric expression, which is usually a definite NP, must occur in the appropriate context of its antecedent, which is usually an indefinite NP,
2. There is some semantic and/or pragmatic relation between the anaphoric expression and its 'antecedent,'
3. The anaphoric expression and its antecedent do not stand in a strictly coreferential relation. Rather, they are linked to each other via the addition of some pragmatic inference (see Huang, 2000: 249–253 for further discussion).

Other interesting cases of anaphoric or referential dependency other than referential identity may include split antecedence and overlap in reference.

See also: Anaphora and Coreference Resolution, Statistical; Anaphora, Cataphora, Exophora, Logophoricity; Anaphora: Philosophical Aspects; Deixis and Anaphora: Pragmatic Approaches; Discourse Anaphora; Donkey Sentences; Meaning, Sense, and Reference; Reference: Philosophical Theories; Reference: Psycholinguistic Approach.

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Cornish

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by others. John Davey, who died in 1891, was said to have been able to converse in Cornish on a few simple matters, and counting rituals in Cornish survived in fishing communities until the 1920s and 1930s.

Cornish is divided into three periods: Old Cornish (from the 9th to the 13th centuries), Middle Cornish (from the 13th to the mid-16th centuries) and Late or Modern Cornish for the final period. The main corpus of literature survives from the Middle Cornish period, notably the *Ordinalia*, *Beunans Meriask* ('The Life of St. Meriasek'), *Greans an Bys* ('The Creation of the World'), and the recently discovered (2002) *Beunans Ke* ('The Life of St Kea'). The Reformation ensured that these plays were seen as 'subversive,' and the Cornish rebellions of 1497 and 1549 – the latter explicitly against the introduction of English in Cornish church services – meant that the Cornish language too had become subversive. The post-Reformation loss of contacts with Brittany deprived Cornish of an important cultural resource, including access to a mutually intelligible language (Breton).

Although a group of Cornish scholars did what they could to encourage the survival of the language in the late 17th and early 18th centuries, when the Celtic scholar Edward Lhuyd visited Cornwall around 1700 he found that Cornish was spoken only in 25 parishes in the far west. Antiquarian interest continued throughout the 18th and 19th centuries, with edited versions of the several of the plays published, but it was not until the publication of Edward Jenner's *Handbook of the Cornish language* in 1904 that a serious revivalist movement emerged. In the inter-war period, Robert Morton Nance produced a synthesis that he dubbed 'Unified Cornish.' This remained the standard for Cornish learners until the late 1980s when competing forms based on Late/Modern Cornish and a phonemic form of Middle Cornish emerged. However, despite this dissension, Cornish was one of the indigenous British languages recognized by the British government in 2003 under the terms of the Council of Europe's Charter on Minority Languages.

See also: Breton; Celtic; United Kingdom: Language Situation.

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Corpora

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In less than half a century, language text corpora in electronic form have grown from being small, clumsy to use, and marginal in linguistic scholarship to their present position as interesting, valuable, accessible, and widely used repositories of information about language. Investigations have found a wealth of fine detail concerning meaning and usage that is not observable by any other means, and some of the emerging picture of language is rather unexpected. More and more students of language use corpora routinely, and there is a bewildering range of corpus and corpus-type material now available, both packaged and do-it-yourself. Users who are not expert in corpus affairs need to know about the main kinds of corpora, their uses and abuses, and to be aware of some of the pitfalls that could spoil their work.

This article traces the short history of corpus building and points to the main resources now available. It also discusses the issue of whether the corpus is here to stay, or is just a passing fancy.

Beginnings

Language text contains much of the evidence of civilization, and three ways of studying texts have grown up, each with different priorities.

a. Language has been studied from an early period simply for the information it contains; not by linguists particularly but by all kinds of scholars (*knowledge acquisition*).
b. It has also been studied in and of itself, in the work of linguistic scholars from the Sanskrit grammarians onward, including early glosses and explanations of the meanings of words, traditions that

by others. John Davey, who died in 1891, was said to have been able to converse in Cornish on a few simple matters, and counting rituals in Cornish survived in fishing communities until the 1920s and 1930s.

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See also: Breton; Celtic; United Kingdom: Language Situation.

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Corpora

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In less than half a century, language text corpora in electronic form have grown from being small, clumsy to use, and marginal in linguistic scholarship to their present position as interesting, valuable, accessible, and widely used repositories of information about language. Investigations have found a wealth of fine detail concerning meaning and usage that is not observable by any other means, and some of the emerging picture of language is rather unexpected. More and more students of language use corpora routinely, and there is a bewildering range of corpus and corpus-type material now available, both packaged and do-it-yourself. Users who are not expert in corpus affairs need to know about the main kinds of corpora, their uses and abuses, and to be aware of some of the pitfalls that could spoil their work.

This article traces the short history of corpus building and points to the main resources now available. It also discusses the issue of whether the corpus is here to stay, or is just a passing fancy.

Beginnings

Language text contains much of the evidence of civilization, and three ways of studying texts have grown up, each with different priorities.

a. Language has been studied from an early period simply for the information it contains; not by linguists particularly but by all kinds of scholars (*knowledge acquisition*).
b. It has also been studied in and of itself, in the work of linguistic scholars from the Sanskrit grammarians onward, including early glosses and explanations of the meanings of words, traditions that

grew into the discipline of grammar and the profession of lexicography (*language study*).

c. In between these two kinds of study, there has been a third kind of scholarly attention to texts that have major literary, philosophical, or religious status; in these texts the language, while still treated mainly as a repository of information and opinion, is also carefully examined at phraseological and lexical levels. Indexes and concordances to words and phrases in these works have been laboriously compiled (*great works*).

The idea of a corpus grew in the 1960s, deriving mainly from the tradition of lexicography, a branch of type (b) above (Francis, 1992). While Samuel Johnson, the reference point for English lexicography, used for his examples sentences quoted from great scholars such as Hume, Johnson's focus was on the meaning of the words in use, and not on the ideas expressed in the sentences. Well-known writers were cited because they were authority figures in a prescriptive tradition. But as well as gathering the words of the great and famous, another tradition of scholarship that grew with modern linguistics was that of the field linguists, who spread all over the world reaching ever more remote communities and building up records of the languages – usually spoken – that they found. Their informants were usually ordinary people, and their conversations were also ordinary. This is another instance of type (b). In between we find grammarians such as Jespersen (1909–1949), who built his immense grammar of English on thousands of quotations gathered from an eclectic reading habit.

The modern corpus was mainly based on these prior methods of acquiring data for language study. Nevertheless, the thought of compiling a collection of texts that would provide sound evidence of the state of a language was novel. Instead of capturing the great beacons of culture, the early corpora had modest aims, to collect a good variety of language in use by fairly ordinary people in order to study better the grammar and vocabulary currently in use. By the end of the 1960s there existed a few small corpora, constructed on diverse principles.

Timing

The timing of this development was strange, because the 1960s was the decade when transformational-generative grammar (TG) became by far the dominant model of language throughout the world. TG was indifferent to the supply of data on language in use, advocating reliance on introspection, so the leading theoretical linguists of the day gave no support to, and took little interest in, the new corpora. The Survey of English Usage, led by Randolph Quirk from its inauguration in 1959 (see website), was an exception to the trend, and accumulated a large database on file cards at University College London (see website). The survey was a truly transitional venture, because while it focused on the everyday linguistic interactions, spoken and written, of non-celebrities, there were no plans to computerize it until many years later.

It was not the linguistic climate but the technological one that stimulated the development of corpora. The computer was on the horizon, and although the first computers were extremely difficult to work with, their great potential was correctly assessed from an early date. Computational work on texts began with Father Busa's *Index Thomisticus* before 1950 (completed 1978, see Busa, 2000), continuing the scholarly tradition of making concordances to works of high status – type (c) above – but enlisting the clerical potential of the computer (Busa, 2000). There is now a large library of electronic versions of literary, philosophical and religious texts, and the word *corpus* often stretches to cover some of these collections. (See 'Special Corpora,' below.)

The digitization of a vast range of documents and cultural artifacts is of more recent origin. Starting with databases of legal and journalistic documents, the movement has grown in parallel with the access provided by the Internet, and the World Wide Web in particular. So all three of the original kinds of scholarly interest in language texts are accommodated in today's text computing; this article concentrates on those which are compiled principally for the study of language – type (b).

Early Corpora

The first electronic corpus of written language was the Brown Corpus, compiled in the 1960s at Brown University by Nelson Francis and Henry Kučera (Francis and Kučera, 1964–1979) and still very much in use (see website). This corpus contains a million words of American English from documents that had been published in 1961. Its design (see 'Sample Corpora' below) became almost standard for some years, and some 30 years later was repeated in the Frown corpus (see 'The Time Dimension' corpora, below).

Advances in technology also enabled the collection of spoken data through the invention of the tape recorder, and its predecessor, the wire recorder. Portable tape recorders were just coming on the market in the late 1950s, and speech could be played back again and again, and studied as a sound wave. A side-benefit of this activity was that speech events could be transcribed without using shorthand, and the first electronic corpus of spoken language was made at the

University of Edinburgh in the years 1963–1965. It contains 166 000 words of informal conversations in English, recorded and transcribed (Krishnamurthy, 2004). So the written and spoken corpora of the early 1960s were prepared over the same period, but the researchers were not initially aware of each other's work.

The 1970s was a period of consolidation and modest spread to a number of languages and different types of corpora. Development was slow, and this was also mainly because of the state of the available technology. Having enticed researchers with promises of a rosy future, the hardware and software of the 1970s was not up to the job. Computers were still calculating machines with small memories, and programming languages were not devised with the manipulation of character strings in mind. Nevertheless, one or two new positions were reached, notably corpora in excess of one million words, and annotated corpora; also a spoken corpus in a detailed phonological transcription, the spoken section of the Survey of English Usage (see London-Lund website). All of these advances came from Sweden, and Scandinavian scholars such as Sture Allén, Knut Hofland, Stig Johansson, and Jan Svartvik set the shape of mainstream corpus linguistics for a generation; they were not alone, however, and important corpus work was in progress with French, Hebrew, and Frisian, among other projects. The first corpus of a special variety of a language was JDEST, a million-word corpus of English for science and technology compiled by Yang Huizhong in Shanghai around the same time (see website).

This was the lull before the storm, and again the timing was the result of technological advances. The invention of scanners improved access to the printed word by a factor of twenty or so, and the growth of computer typesetting pushed the horizon out of sight. By about 1990 linguistics had changed from a subject that was constrained by a scarcity of data to one that is confused by more data than the methodologies can cope with. Some may even claim that it has not yet come to terms with this cornucopia.

Certain classes of data are still scarce, inherently so. Anything that is not available in electronic and alphanumeric form still has to undergo skilled and expensive processing at the input stage. The sound wave is still not amenable to automatic linguistic interpretation despite some successes in the field of speech recognition. Handwritten material has to be transcribed, and a lot of older printed material resists the best scanners. Meanwhile, advances in graphics and the emergence of animated text and mixed media communication have set new descriptive goals for which linguistics was ill-prepared.

The large corpora of today are bulked out with material from an essentially unlimited source – journalism. This feature of them maintains the controversies about balance and representativeness, which have been important issues since computer typesetting became almost universal. There is a clear risk that some features presented as characteristic of a language are actually characteristic mainly of its journalism. More recently the growth of electronic communication has given rise to several new and equally abundant sources, notably Web pages, e-mail, and blogging. All of these are uncharted territories whose communicative properties and characteristics are as yet unknown.

Summary of Historical Outline

In a rough-and-ready way, the relatively brief progress of electronic corpus building and availability can be seen as falling into three stages, or 'generations':

a. The first 20 years, c. 1960–1980; learning how to build and maintain corpora of up to a million words; no material is available in electronic form, so everything has to be transliterated on a keyboard.
b. The second 20 years, 1980–2000; divisible into two decades:
   i. The 1980s, the decade of the scanner, where with even the early scanners a target of 20 million words becomes realistic.
   ii. The 1990s, the First Serendipity, when text becomes available as the by-product of computer typesetting, allowing another order of magnitude to the target size of corpora.
c. The new millennium, and the Second Serendipity, when text that never had existence as hard copy becomes available in unlimited quantities from the Internet.

There are now so many corpora for so many purposes that it is impossible to list them, and only a sketchy classification can be attempted. The one offered here builds on the early attempts of an EC project some 10 years ago called EAGLES.

Different Types of Corpora

The majority of corpora concern a single language and these are called *monolingual* corpora. Two or more languages are found in *bilingual* or *multilingual* corpora, dealt with below. Most corpora are 'snapshots' in time, and although they may have been amassed over a period and deal with texts that cover twenty years or more, they aim to present a state of a language, with the time dimension frozen. These are

called *sample* corpora, and their main drawback is that they fall out-of-date rather quickly. See below under *monitor* corpora and *diachronic* corpora for discussion of this point, and for the introduction of the time dimension as a design factor in a corpus.

Sample Corpora

We will first describe the characteristics of sample corpora, because other kinds of corpora can usually be seen as sample corpora with additional features or specific variations. The primary aim of a sample corpus is to present the normal linguistic features of a language or variety in approximately the proportions found in general use. The Brown corpus, the original sample corpus, is still a very clear example of the way such a corpus is constructed. It is divided into Informative and Imaginative prose, then into 16 subcategories of these, and finally into 500 samples each containing approximately 2000 words. So, for example, the section of Periodicals contains 25 samples, approximately 50 000 words; this section, along with Books (23 samples) makes up the subcategory of Popular Lore, which is subcategory F of Informative Prose (books reappear as, e.g., Novels, in each of the six subcategories of Imaginative Prose). With 48 samples, Popular Lore is one of the larger subcategories, containing close to 10% of the corpus. The smallest subcategory is Science Fiction, with only six samples, and the largest is Learned, with 80 samples.

Putting hard figures to this kind of classification is an art and not a science, and the main requirement for the research community is that the design and the proportions are clearly documented. Someone seeking informal prose, for example, would not find much in the Brown corpus, just as someone seeking formal prose would not look in Internet chat rooms. Brown is admirably explicit, and many later corpus builders have followed suit, so it is usually possible to discover what is in a corpus.

When a sample corpus claims to be a reasonably reliable repository of all the features of a language, it can be called a *reference* corpus. Nowadays it will have to be quite large – a hundred million words is the typical size – and it will contain substantial amounts of all the main kinds of language that are found in a society. Language spoken and written, public and private, informative and fictional, etc., will all be there.

Corpora for Comparison

Two or more corpora can be designated *comparable* when they are built on the same design criteria and are of similar size. Although the term was first used to designate a variety of multilingual corpora (see below), corpora that were designed to be compared with each other had already been compiled in the monolingual area.

Geographical

The first corpus designed to be comparable is known as LOB, because of the three institutions that jointly compiled it – the Universities of **L**ancaster and **O**slo, and the Norwegian Computing Centre for the Humanities at **B**ergen. It was given the same design as the Brown corpus, but selected from British English, whereas the Brown corpus selected from American English. All the texts in both corpora were printed during the year 1961, and LOB was completed in 1978. The availability of this comparable resource led to a landmark publication in corpus linguistics – Hofland and Johansson, 1982.

The Survey of English Usage (see above) developed into a project to build a group of comparable corpora that would also facilitate varietal research, this time on a global basis – the International Corpus of English. Launched in 1990, the plan was to explore the worldwide varieties of English by building corpora of local varieties in many regions, using a design based on the survey's holdings. Each corpus contains only around a million words, but 20 varieties are under investigation, and six of the ICE corpora are now available (details at ICE website).

Historical

These corpora are designed to be compared along a time dimension – see below.

Topic

Some students of discourse like to collect texts organized by topic – e.g., a number of newspaper reports of the same event. These tend, however, to be very small.

Contrastive

There are also *contrastive* corpora. In principle, any pair of corpora can be compared and contrasted. But sometimes a corpus is built with the specific purpose of making contrasts within itself and declares at the outset that certain of its major components are expected to contrast sharply. A contrastive corpus is thus a single corpus whose principal components have been chosen to facilitate the study of variety. Whereas sample corpora are mostly designed so that the various differences among varieties blend into a general picture of the patterns of usage, a contrastive corpus is designed to bring out the characteristic patterning of distinguishable varieties. Clearly this is a matter of degree. Just as any two corpora can be

contrasted, any corpus with distinguishable components can be examined contrastively (but see below, 'Current User Trends'). But there are internal differences. Each principal component of a contrastive corpus is designed without reference to the others, so the comparability that is maintained in, say, Brown and LOB, is not found. An example of a contrastive corpus is that compiled by Biber, contrasting four varieties of modern English, which provides the evidence for a substantial grammar (Biber *et al.*, 1999).

Sample corpora, and the others described later in this article, are designed and built for fairly explicit linguistic purposes. However, once they exist they can be put to other uses as well. This point is taken up toward the end of this article, in the section 'Current User Trends.'

Special Corpora

At the beginning of this article, three types of study of textual data were identified, and the term *corpus* was associated with type (b), the study of language in and for itself; this was later narrowed to feature the ordinary, everyday language of normal people going about their daily business. Such corpora, it is assumed, will be a repository of evidence about a language or variety in its natural state; repeated patterns of occurrence in such corpora will provide evidence that is independent of the idiolect of one particular informant. If several apparently unconnected people are observed constructing patterns with strong similarities to each other, such patterns are likely to be patterns of *langue,* the shared area of meaning-creation in a speech community.

There are, however, collections of texts that do not provide this kind of evidence, but that are still referred to as types of corpora. The selection method, or the pool of texts from which the selection is made, are not designed to be representative of a language or variety. Many of these are important collections, and to mark both their importance and their difference from 'ordinary language' corpora they are called *special* corpora.

The first type of study, type (a), given at the beginning of this article, was study for the information contained in a text, and this is the principal use that is made of a text outside the language sciences. The methods developed for the automatic retrieval of information from a text are – at present – largely indifferent to the nature and provenance of the text; the architecture of a corpus is of little interest to a data miner. This point is developed below in the section 'Current User Trends.'

It is the third type of study, type (c), that creates special corpora, the collection of texts that have high status in the culture for one reason or another. The works of Shakespeare, Goethe or Proust are not reliable exemplars of contemporary English, German, or French; they are chosen not for their ordinariness but for their extraordinariness. It is the uniqueness of their language choices, and not the universality of them, that cause them to be collected (though the stylistic habits of an author have both an intrinsic interest and a role in determining the authorship of disputed texts). The same argument goes for religious texts, and the writings of major figures in the humanities, science, and politics.

Special corpora have been in use for many years, and the advent of computers offered a powerful platform for study; as noted above, the first project to transfer language text into electronic form concerned the works of St. Thomas Aquinas. One of the earliest corpora available to researchers was the Leuven Drama Corpus and Frequency List, made by L. K. Engels (see Goethals, 1990) and colleagues at the University of Leuven in 1975. This pioneering corpus consisted of 61 plays written between 1965 and 1972, written in standard English and in ordinary spelling. It was the same size as Brown, one million words, and part of its rationale was to offer an imitation of spoken dialogue to complement the exclusively written genres of the Brown corpus.

The class of special corpora is broad, and ultimately it is defined negatively – those corpora whose language is sufficiently at variance with the norms of everyday usage that they can only be used safely to exemplify a special area of language behavior – one indicated usually in the title of the corpus. Of course, this has the marks of a vicious circle, since (a) it is not possible to validate the classification in advance of making it, and (b) a fully comprehensive corpus should be able to accommodate even specialized texts in its language. Operationally, though, there are few problems with this classification, and those that there are reflect matters of theory as well as practice.

One doubtful area is that of corpora gathered under experimental conditions rather than by capturing language in everyday use. This is common practice with *speech* corpora (see 'Spoken Corpora'), and is one of the reasons why they are placed in the special corpus category. We do not know the precise effects that unusual or specialized conditions for their origin have on language text, but studies like Warren (1993) indicate that there is good reason for caution. So, for example, a well-used corpus like the

Edinburgh Map Task Corpus, scrupulously documented on its website (see Maptask), is clearly a special corpus because of the experimental conditions under which it was compiled.

The Time Dimension

Corpora that include the time dimension as a design feature are not very common, and are of two kinds. *Diachronic* corpora present snapshots at intervals of time, usually spanning at least a generation, while *monitor* corpora are devised so that language change can be plotted as it occurs.

The first diachronic corpus was the Helsinki corpus, which offers exemplars of English texts from c.750 to c.1700.

Since the first sample corpora come from the 1960s, it is now feasible to replicate their design with current texts and make detailed comparisons. There is now the *Frown* corpus, of similar architecture to its parent Brown but with a time interval of 30 years, so that it records the American printed English of a generation later than the Brown. The design of Frown is thus to make it *comparable;* it and its sister corpus *Flob* were assembled by Christian Mair at the University of Freiburg (see website), aiming to be updated versions of the Brown and LOB corpora, and encouraging four-way comparisons along the geographical and time dimensions.

These corpora are restricted to printed texts. For the spoken language the diachronic dimension is restricted to the period since the invention of sound recording techniques. A recently-completed venture is the DCPSE, a corpus that presents two spoken corpora dated a generation apart in a format that facilitates comparison. The corpora are the London-Lund Corpus, which is the spoken element of the Survey of English Usage, recorded in the 1960s, and the ICE-GB corpus, recorded in the 1990s. (For details see DCPSE website.)

Monitor corpora (see Clear, 1987) originated in attempts to keep synchronic corpora up to date. Instead of discarding material that was to be replaced with more recent exemplars, it was more prudent to retain it with a time tag, and thus add a diachronic dimension to the corpus. Because of the rapidly growing size of corpora, it required the uniformity and the substantial dimensions of newspaper publishing to make monitor corpora feasible. After several years of development, they are still in a provisional state because their intrinsic importance is not yet fully recognized. The first attempt was the Aviator project, which layered an annual 10 million words of *The Times* newspaper and devised software that would detect innovations of various kinds (see AVIATOR website).

Bilingual and Multilingual Corpora

The development of bilingual and multilingual corpora was initially tied to the perceived needs of mechanical translation, the original goal of computational linguistics (Kay, 2003). As so often, the beginnings lay in serendipity. The Canadian Parliament was both bilingual and technologically aware, and from about 1980 it was possible to obtain the Proceedings in both English and French, in electronic form. The first *parallel* corpus (see website, Canadian Hansard) began to take shape.

The texts were in parallel down to the paragraph at least, and usually match sentence by sentence; hence the first steps of alignment software required only occasional adjustments when the number of sentences in a paragraph differed between languages. On this firm foundation it was possible to get good results in matching translation equivalents, and the technique became extremely popular in the 1990s (Gale and Church, 1993).

This alignment procedure worked reasonably well for a wide range of bureaucratic, administrative, and legal documents, and encouraged the building of suitable corpora, for example in the European Union (e.g., BoLC; see website). However, the procedure relies on one particular kind of close translation, where translation equivalence is virtually guaranteed for units as small as the sentence. Other kinds of translation work to less rigid criteria, and offer a 'freer' translation that is claimed to be less dependent on the source text and more faithful to the phraseological conventions of the target language.

The notion that translation equivalence could be established in strictly parallel texts was gradually incorporated into the translation industry, and the units of translation were extended beyond single words to phrases, sentences, and even larger segments of text. This development was particularly important in the growing globalization of industry and the corresponding linguistic need for *localization* of the linguistic features of the product. For example, a new model of a manufactured item might differ only a little from its predecessor, but the accompanying manual would have to be translated into perhaps 20 languages to satisfy the major markets. It was seen as cost-effective to identify only the changes in the original texts and translate those; in most cases the remainder could be left as it was.

From this have grown large repositories of translation equivalents called *translation memories* (*see* **Translation Memories**) These offer translation equivalents through aligning large corpora of texts and their translations. They are particularly helpful when large quantities of restricted-domain material have to be translated – although not corpora as such, they are first-stage derivatives from large collections of textual exemplars.

Multilingual corpora based on a relationship of translation among the constituent texts are called *parallel* corpora. In a simple case, each group of input texts will consist of an original and one or more translations of it. In some cases, where parallel texts are issued without an explanatory history, it may not be easy to identify the original. One early parallel corpus gathered translations of Plato's *Republic* in many European languages including Modern Greek, but did not in the first instance include the Classical Greek original. So all the texts were translations of the same absent original. See the AHDS website, which will host this parallel corpus, along with other multilingual corpus resources.

One concern for researchers in the 1990s was that translated text might not be a good specimen of the target language in its normal usage, and this led to two developments.

a. The multilingual comparable corpus. Here the correspondence among participating languages is at the level of design rather than at the level of the choice of actual texts. As far as possible, given cultural differences, the same quantities of the same types of texts would be assembled. Usually all the texts are originals in the language they represent, to avoid any influence of the translation. Translation equivalence at the level of the sentence is thus not possible, but a more complex network can be built up to aid translation (Sinclair *et al.,* 1996). The comparable corpus has a wide range of applications, and the PAROLE corpus (see ELDA website) is an instance of its application to all the official languages of the EU at the time.
b. A corpus consisting of two sub-corpora, one of translated texts and the other of untranslated texts, in the same language. There is no translation relationship between individual texts because this corpus is designed to pursue Baker's hypothesis (1993: 245) that some linguistic features are characteristic of translated text, regardless of the source language. Such a corpus is therefore classified as *contrastive*. Formerly the general opinion was that where features of translated text differed from text that was independently composed in the same language, they would be explicable with reference to features of the source language. (See also, e.g., Kenny, 1998: 52 for a classification within Translation Studies.)

There are other variations on parallel and comparable corpora that are receiving attention at present. The English-Norwegian Parallel Corpus became a standard reference point around the millennium (see website) and has broadened out into the Oslo Multilingual Corpus. The Corpus of Translated Finnish (CTF) is a comparable corpus that consists of 10 million words altogether, consisting of both translations into Finnish in several genres, and comparable texts originally written in Finnish. It is held at the Savonlinna campus of the University of Joenssu, Finland.

Normativeness

The first corpora were deliberate attempts to record the normal usage of members of a language-using community. There was an implication that most if not all of the authors and speakers would be native speakers, and probably fairly accomplished native speakers, of the language concerned. The Brown corpus was called a 'standard' corpus, and by being restricted to printed documents it acquired all the features of standardization that are provided in the printing and publishing process. As corpora became more easily available, their use in providing models for language learners was appreciated; this has been a controversial area (see 'Introduction,' Sinclair, 2004) but corpora are now widely accepted despite some doubts concerning their reliability as repositories of 'correct' sentences.

One of the first multi-million word corpora, the Birmingham Collection of English Texts (Sinclair ed. 1987), the precursor of The Bank of English (see website) specifically set out to be normative, aiming at adult native speakers for the originators of the texts and advanced foreign learners as the recipients of the dictionaries, grammars and other publications that were produced from corpus evidence (see Cobuild website).

Normativeness is not an easy feature to realize in spoken text (see below), but is built into the normal practices of legal and administrative transcription – court reporting, Hansard, and the like. These, on the other hand, were among the first electronic representations of spoken language that became available. Normalization is of course absent from corpora of dialectal material, spoken or written.

The possibility of corpus building has led to reappraisals of standards, targets and models for non-native users of languages and ex-colonial varieties, which had generally low status. Following political

independence, there was no reason for the native speaker to reign supreme when corpora can be gathered of high-quality users of established local varieties. See for example the recent interest in English as a lingua franca (see ELFA website). Reference has already been made to the ICE project (see website), which may play a normative role in the future, though that is not seen as its principal function.

Non-Native Speaker Corpora

Corpora in the context of language learning have found other uses, and one popular one is corpora of learner language. By gathering instances of the usage of learners and comparing these with normative model corpora, the deviance of learners can be explored in a much more profound way than the previous work on error analysis was able to do. Learners may, for example, appear to have mastery of an area of usage, but deploy the choices in ways different from or even opposed to the characteristic usage of target users. The main work in Europe on learner corpora is at the University of Louvain-la-neuve in Belgium (CECL website), but there are many other projects in learner corpora around the world (see Nesselhauf, 2004).

Spoken Corpora

Several corpora of the spoken language have been mentioned in this article so far, but the distinction between corpora of spoken and written language has not figured importantly in the classification. Once documents or transcripts are put into electronic form, the procedures for managing them and processing them are identical. In the early years of corpus building, every piece of language had to be 'punched' in, character by character, so if the speech transcribers kept to the well-known conventions of the dictation secretary there was little difference in the effort of making an electronic version of a piece of written or spoken language.

Later, the difference in effort required began to show, and widened sharply for two reasons. One was the release of large quantities of written language through electronic typesetting, and the other was the attempt to record some of the phonetic and phonological features of spoken language, which led to a large expenditure of labor for expert analysts and corpora that were either unreadable, because the orthographic transcription had been replaced by a phonetic one, or heavily tagged (see below on tagging). Transcription conventions still vary a lot, and great care is needed when comparing two spoken corpora, to ensure that like is compared with like.

There are now many different kinds of collections of spoken language, whose electronic representations follow a host of different conventions. One group, called *speech* corpora, are built for the detailed study of individual sounds and phonetic features, and do not need to be continuous texts, nor do they need to be collected in natural situations. Many are recorded in high-tech laboratories in order to maximize the detail on the recorded version. Speech corpora are thus part of the class of *special* corpora (see above), those which for one reason or another are not intended to be representative of the ordinary language in its characteristic use as communication.

Large modern reference corpora usually incorporate some spoken material – typically around 10% – and this is couched in a simple orthographic transcription so that the query software will retrieve instances of a word or phrase in both spoken and written texts. But there is a growing number of spoken corpora that are adapting to the particular character of spoken language and offering new routes to study – in particular – impromptu language.

Throughout the period of access to corpora, and despite the prominence of the written corpus from Brown onwards, there has been a high value placed on the recording of impromptu language, typically conversations involving a few people known to each other. Whereas the more formal kinds of spoken language – lectures, speeches etc. – seemed reasonably familiar as minor variations of the written norms, there was a novel quality about capturing informal interaction that opened up the study of discourse, and made it absolutely clear that the received grammars were not constructed to cope with the meaningful patterns that emerged from the conversations; they were heavily biased in favor of written language of medium formality.

Renewed interest in the structure of the spoken language (Carter and McCarthy, 2005; Stenström *et al.,* 2002) has given us new and valuable corpora. The MICASE corpus of academic American English is freely available (see website), and the C-ORAL-ROM project has published a set of comparable corpora of spontaneous speech for the principal Romance languages, French, Italian, Portuguese and Spanish, about 1 200 000 words in all (Cresti and Moneglia, 2005; see also website). A particularly valuable feature of this product is text-to-speech synchronization.

The Internet accepts any type of any language, and some of the new varieties, such as e-mail, chat room and blogging, are mostly informal and subject to no conventions of usage. To some observers they seem to be close in style to ordinary spoken conversation, being a kind of written conversation and conducted often in real time. This has led to optimistic claims

that the Internet could overcome the technical logjam that prevents researchers from access to large quantities of speech; however the claim has not yet been validated, and speaking remains probably the most intricate of human activities.

Mark-Up and Annotation

The early corpora were prepared as plain texts, though attempts were made after a while to keep a record of some aspects of the document formatting which could help in interpretation – headlines, bold face etc. Texts rapidly became impenetrable because of the lack of any agreed conventions for digitizing them. In the 1980s, SGML (Standard Generalized Mark-up Language) became widely used for transferring texts from one host to another, and in 1986 it was accepted as ISO 8879 (*see* **Mark-up Languages: Text**). SGML established the convention of using diamond brackets to separate text from *tags* (*tag* became the universal word for whatever went inside the diamond brackets).

SGML gives no guidance on what the content of the tags should be, but prescribes only the form. It is therefore a flexible method for making notes of almost any kind on a text, not only for restoring lost formatting information. Once corpus providers had mastered SGML for document management and encoding, they were pleased to find other uses for the conventions. It was widely felt that the linguistic study of corpora would be aided if information about parts of speech could be made available, and many corpora now have each successive word followed by a tag indicating its part of speech. Other kinds of analysis, semantic, pragmatic, stylistic, etc. have been developed, and spoken texts are subject to the addition of tags concerning rhythm, tone, intonation, pausing, etc.

By the time SGML was accepted by ISO, pressure from electronic publishing interests grew to replace SGML with an even more flexible set of annotation conventions, called XML, eXtensible Mark-up Language, which is now widely recommended instead of SGML, and there are many other sets of recommendations available on how to apply the mark-up 'languages' to corpora. Unfortunately, they go out of date very quickly, and they require a large expenditure of human labor.

It is now necessary that a corpus which is offered for general use should be provided with detailed and accurate information on the tagging wherever it varies from the conventions of plain text, to avoid misleading information emerging from searches. For example, the widely-used British National Corpus (see website) often treats two or more successive words as a single unit. A list is available of these phrases, called Multiwords, but it is not easy to find (see Multiword website). It lists, for example, *in charge of* as a Multiword, but not *in charge*. Users who are unaware of this can get strange results, depending on the host platform.

This point is indicative of a widespread misunderstanding about the nature of annotation. For most corpus users annotations are of great value and efficiency in practical applications such as the compilation of grammars and dictionaries. The scheme of analysis must be agreed in advance so that the annotations can be made, because they have to be made wholly or partially by human intervention. But with that proviso, annotations are generally seen as useful additions to the corpus, often even as enhancements or enrichments – the corpus 'plus' – and they are very popular as a result.

Their use, however, is principally as a means of access to information in the corpus, and queries based on annotations can only retrieve whatever has already been annotated – the corpus 'minus.' This issue becomes critical in the more exploratory kinds of research, where annotations could obscure or distort the raw patterns of occurrence in the corpus. One branch of corpus linguistics, called *corpus-driven* linguistics (Bonelli, 2001) shows the type of insights that the researcher can gain from the analysis of unannotated corpus data, and works to keep available a supply of corpora in plain text format.

The Widespread Use of Corpora

Problems arising from the growing sophistication of corpus access are likely to get worse, because more and more corpora are being made available to the community of language students and to the public at large. Until recently it was not practical to make corpora available to others, often for reasons of commercial advantage. There were notable exceptions such as a large corpus of French that was accessible in public places like the Centre Pompidou in Paris in the late 1980s. Corpora for specific projects were held in informal collections, frequently altered and annotated in ways that would have little utility beyond the project for which they were provided. Before the World Wide Web became widely used, it was not easy to transport corpora because copying onto tape or disk could raise issues of intellectual property rights. The picture is now dramatically different. Often access is offered free of charge, or on modest subscription, and some corpora can be accessed in a number of different ways, using different query software. Heavily annotated corpora are being pressed onto CDs and bundled for sale with books.

While many large corpora are prepared carefully for wide distribution or access, there are an unknown number of small personal collections, informal corpora, even corpora compiled to settle a single point (Bowker and Pearson, 2002). Some of these could be recycled to the benefit of the community at large, and to this end a compendium of guidance has recently been compiled by OTA and is accessible over the Web, as well as in book form. Preliminary details are available on the linguistics section of the AHDS (OTA) website.

Each corpus, and each suite of software, incorporates a large number of conventions on what items are considered the same: how relative position is calculated, what is considered more or less significant, what policy is adopted about repeated word strings, and many other decisions that are necessary for the software to work unambiguously. These should all be fully documented, but it is easy to overlook some minor points which could lead to unusual results. Users should always be on their guard for results that are artifacts of the conventions, not meaningful patterns in the language.

In the present state of corpus development we can only hope for short-term, ad hoc solutions to these problems. Every few months the research community can expect developments in technology that open new horizons; this puts constant pressure on working practices to remain flexible, because those that cannot be quickly modified or replaced will hold back progress. If there has been substantial investment in these working practices, then vested interests can impede attempts to make use of new tools and techniques. In such conditions, all talk of 'standards' is premature and likely to stay so in the foreseeable future. Yet 'standards' and 'gold standards' are bandied about in the literature.

Despite the somewhat anarchic nature of the world of electronic corpora, there are advantages for research in a constantly shifting landscape. Access to corpus evidence is so smooth and easy nowadays that users can readily forget that they are not looking at language text but at electronic objects that have been created according to very complex programs. A slightly different program could deliver a substantially different set of objects, and the user in all probability has no idea about what is going on inside the programs.

In these circumstances we must accept that all results from corpus queries are provisional, and require checking. Direct checking – human reading of the entire corpus – is out of the question and unreliable anyway. The same queries asked of a different but comparable corpus will check on the reliability of the corpus, and the formulation of the same query (as closely as possible) using a different query language will check on the reliability of the query language. The closest to direct checking is to consult a plain text version of the corpus and formulate the query in one or more regular expressions; this can be laborious and will itself require checking, but it will expose most of the distortions that may be introduced by the more sophisticated software that is in daily use.

Current User Trends

Explicitness in the documentation of a corpus is particularly important because of a common type of use that is made of sample corpora. Instead of the whole corpus being searched as a complete entity, certain subcategories are selected and the rest set aside. Sample corpora are now being constructed to facilitate this kind of use, with a kind of pick-and-mix facility that allows the user to construct a unique corpus from within the total on offer. Applying this to the Brown corpus, the user could, for example, de-select Imaginative Prose, and search only the 374 samples of Informative Prose, three-quarters of the total.

Such selections have to be justified by those who make them; it is not enough to cite the authority of an established corpus if the corpus is not consulted as a whole. A corpus builder tries to ensure that each text or set of texts has the desired influence on the total picture of the language presented, and is not concerned whether or not some of the subordinate groupings are themselves good reflections of one variety within the whole. The 12 000 words of Science Fiction in Brown, for example, are selected to give a flavor of science fiction, which was a popular genre in the 1960s, but – taken by themselves – they may give neither a comprehensive nor an accurate representation of the language of the genre.

There are, then, two rather different styles of use of sample corpora – one where the corpus is searched in its entirety, where its unity and the balance of its components are considered to be important features, and the other where the various categories and subcategories are viewed as convenient repositories of language text that share certain features, but that do not aspire to such notions as representativeness. The latter type of use is becoming more popular, and could in time marginalize the notion of a corpus.

The original idea of a corpus was to be an improved version of the kind of data that a linguist gathers and examines in order to make statements about the structure of a language. Once large repositories of language became available, they were immediately seen as valuable for a variety of enterprises that did not have as their central objective the elucidation of

language structure. So corpora that are built for language study, type (b) from our original division, are increasingly used in activities of type (a), the general acquisition of knowledge.

In fact the size and richness of the modern corpora have stimulated new ventures, like data mining, which are attempts to resolve a continuing, deep-rooted problem, namely that the science of information retrieval gives very poor results when applied to language text. To help overcome this problem, many applications of knowledge mining are highly specific probes that make no attempt to interpret the text as a whole, but search for certain patterns from which desired information may be derived. The selected segments of text are then processed by a *local grammar* (Gross, 1993; Sinclair and Hunston, 2000), an analytic tool built just for the job of analyzing such segments. 'Named entity recognition' is typical of this attempt to attend to particular difficulties in coping with text (*see* **Named Entity Extraction**).

The pressure from this area, where computational linguistics is serving information science, is toward abandoning the idea that a corpus has an integrity that gives power and authority to the statements that are made about the language of its constituent texts. Type (a) investigations, concentrating on the acquisition of knowledge, simply push the language structure aside in order to derive predetermined kinds of meaning. In order to do this, of course, there has to be some understanding of the way language gives meaning, but this remains a means to an end, and the contributions to linguistics from this work are, so far, marginal.

The pressure of type (a) knowledge acquisition activities is compounded by similar pressure from another quarter – the statistical analysis of language, which often requires large amounts of text, but is not fussy about where it comes from. When the Linguistic Data Consortium was established in 1992 (see LDC website) the motto was 'There's no data like more data.' At the time this attitude helped to refocus activity away from the somewhat pedantic attention to text that characterized 'pre-corpus' linguistics to the appreciation that it was now possible to gather unlimited quantities of naturally occurring language, almost at will. The LDC now sells and licenses large collections of data, with a tough pricing policy. A similar body was established in Europe a few years later, ELDA (see website).

These bodies form a link between language study and the wider picture of document archiving, which in some areas completely dwarfs the kind of quantities that even the larger corpora deal in. 'Out there' are to be found vast and growing collections of documents that are digitized and often available free of charge – for example the Official Documents System of the United Nations offers 800 000 searchable parallel documents in Arabic, Chinese, English, French, Russian, and Spanish format, and is adding documents at a rate of 100 000 a year (see UDS website). These are the public communications of a large bureaucracy, and so are not likely to be fully representative of the languages in which they are written, but for a large range of linguistic studies they offer a wealth of rich data.

The statistical processing of language text has applications in all three of the types of study that were distinguished at the beginning of this article. For knowledge acquisition, statistical processing is much needed to distinguish the patterns to be selected; in language study itself, type (b) it is widely used in order to provide a basis for linguistic statement, and in many applications – speech recognition, for example, is based on the statistical analysis of the sound wave – while some machine translation projects rely on the alignment of statistical patterns in two languages for translation equivalence. The use of statistics in type (c) activity – great works – includes one of the earliest applications of corpus linguistics – authorship studies (see LLC website).

The needs of data mining and of statistical analysis in general are pressing and practical in origin, and they place a low priority on the details and integrity of corpus construction. Together they form a pincer movement that is likely in time to confine the notion of a corpus within linguistic studies if the particular features that distinguish a corpus from other collections of texts lose their value outside the community of empirical linguists.

The Future of the Corpus

From the point of view of linguistics this pressure is not at all an unfortunate turn of events. As this article shows in many places, the notion of a corpus has been strongly affected by movements external to language study, and for many users a corpus is just a convenient collection of texts. This ambiguity that surrounds the idea of a corpus can be exploited – not always deliberately – in the inflation of the status of data sources that have no claim to be considered corpora. We are aware of twin dangers for researchers who seek the safety of something called a corpus rather than just some convenient data. One danger is that the data may not be chosen on strict enough or clear enough criteria for the results of queries to be interpretable as statements about a language or variety; the other – very common – danger is that the corpus is just too small to carry any authority. Quite a lot of skill and experience is needed for the interpretation and

evaluation of query results. So there is no virtue in calling just any collection of texts a corpus.

It is up to the community of linguists, in their usage, to determine whether the particular merits of a corpus that motivated the pioneers of this development are worth preserving in the terminology, or whether the flood of language released by the creation of electronic text is of such a different order that the idea of a corpus will soon become a straitjacket, slowing down and confining the search for definitive information.

On the one hand, there is security, status, and stability in having 'a corpus of language X.' There are already several corpora that claim to be national corpora, suggesting that one of the trappings of statehood might in time be a corpus. It is claimed that the compilation of a dictionary of a language has this kind of effect, and since major dictionaries will be based on corpora in years to come, a corpus alongside the national dictionary would suit well. Subnational or cross-national communities could impress their identity on the global community by issuing a corpus of their language. Shortly after the Scottish people restored their own parliament around the millennium, a project started in Glasgow to build a corpus of the Scottish version of the English language (see SCOTS website). There is considerable controversy in the communities about whether Scots is a separate language from English or just a northern variety of British English, and the existence of a corpus of it raises substantial questions about what goes in the corpus, and will eventually provide solid evidence to fuel the arguments.

On the other hand, the labor of compiling a corpus is still considerable despite the vast improvements in technology in the last few decades. Even quite basic aspects of design are still not informed by serious research – such as the desirable proportions of spoken to written language in a sample corpus that seeks to represent the state of a language. The immediate fascination of corpus evidence has led to something akin to a gold rush – no one has the time to underpin the stages in development; problems are fixed superficially; and the whole edifice is shaky, very much in need of a return to the earliest assumptions, to revise them and to place today's corpora on a firmer theoretical footing.

In the absence of such buttressing, it would not be surprising if the corpus as an entity lost ground to the laissez-faire world of the Internet and the Web, because its unique contribution was not sufficiently marked and distinctive, and a corpus was just another collection of data. In the world of the quick fix, which is the prevalent atmosphere of computational linguistics and particularly of natural language processing, there is little interest in refining the design techniques and constructional methods that go into corpus creation. Corpora must also maintain a distance from document archiving, which, in the shape of digitization is a major enterprise at present. While the two fields overlap and can cooperate with mutual benefit, their priorities are different; a corpus builder requires only a sketch of the provenance of a document to know where to place it in a corpus, while for an archivist this kind of information is the prime target of the discipline.

From a global intellectual perspective, then, a corpus looks rather a fragile entity; buffeted by much more powerful forces from areas such as information science and 'language engineering.' Since languages are central to international communication, there has been continuous interest in, and financial support for, some enterprises from political and defense-based sources, which can cut across the priorities of science. Ultimately the only feature that a corpus can cling onto to remain distinctive is that it is designed to reflect as faithfully as possible the kind of language from which it is selected.

Such a feature could attract its own strong support, particularly if the normative tendency of corpus construction is emphasized. Many people view the language of the Internet with considerable concern for its lack of any attention to the kind of consistencies that are expected of the printed word; perhaps we are returning to the pre-Gutenberg world where each scribe had his own way of doing things (which makes the computer searching of corpora of medieval texts a nightmare). One feature of the Internet is that it is global, so the idea of everyone using the same set of conventions is probably a losing battle. Some corpus enthusiasts may join forces with those who feel that usage is forever deteriorating, in the hope that the existence of corpora as reference points might slow down the slide of language into a less rich vehicle for expression. Others, citing spoken language as a constant example, point out that face-to-face conversation worked out long ago how to overcome differences in language varieties, and enabled even lingua francas to arise spontaneously from pooling the resources of several local languages. Corpora have come a long way from the time that they were rejected by applied linguists on the grounds that their evidence could not be trusted by learners.

One feature of the working environment for linguists, however, will not go away, no matter what happens to the corpus. Linguists now work in a data-rich environment, and even if they make only minimal use of the resources now commonly available, they are able to make statements with greater authority than before, and with greater generality. Many researchers are already seeking ways of

understanding how to interpret search results from the Web, how to improve the quality of the information obtained, how to replicate results, or how to perform a similar task to replication in an ever-moving torrent of text. This kind of progress may lead to a new and more modern idea of a corpus – not the *sample* corpus from which almost all our present corpora are derived, but something closer to the notion of a *monitor* corpus, letting the text flow over a finely-tuned set of filters, continuously sampling, updating records, and maintaining a stable set of descriptive tools for users, rather than a stable description.

See also: Corpora in Studies of Variation; Corpora of Spoken Discourse; Corpus Linguistics; Corpus Studies: Second Language; Corpus Lexicography; Mark-up Languages: Text; Parsing and Grammar Description, Corpus-Based; Stylistics: Corpus Approaches; Treebanks and Tagsets.

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Relevant Websites

How to Find a Corpus:

The websites listed below are correct at the time the entry is submitted (February 2005), but websites are not at all permanent, and the most useful ones are often the personal projects of enthusiastic individuals, whose circumstances and affiliations are prone to change. While most of these sites will probably be valid during the life of this edition, it is recommended that they are frequently checked with a suitable

search engine such as Google. This will also bring to light any new ventures in an area. The search for, e.g., 'Portuguese corpus' brings ample references.

It is also useful to check the main portals from time to time; a further step, in case of difficulty, is to address a question to the Corpora List (see website below), whose members are knowledgeable and helpful. Anyone likely to work with corpora seriously is advised to join this List for daily updates.

The websites listed below are not always the 'home' sites of the corpora, but ones which are readily accessed, and at least semipermanent.

The places to start

David Lee's website – http://www.devoted.to/corpora.
Corpora List site – http://gandalf.aksis.uib.no/corpora/.

Other portal-type sites

Michael Barlow – http://www.rc.kyushu-u.ac.jp/~higuchi/text7/corpus.html.
Samples of spoken corpora – http://www-rcf.usc.edu/~billmann/diversity/DDivers-site.htm.

The websites referred to in the text

AHDS Literature, Languages and Linguistics – http://ahds.ac.uk/litlangling/about/about.htm.
http://ahds.ac.uk/litlangling/linguistics/index.html.
AVIATOR – http://rdues.uce.ac.uk/aviator.shtml.
BoLC – http://corpus.cilta.unibo.it:8080/bolc eng.html.
Brown corpus – http://helmer.aksis.uib.no/icame/brown/bcm.html.
Busa R (2000). 'Half a Century of Literary Computing: Towards a 'New' Philology' at http://www.uni-tuebingen.de/zdv/tustep/kolloq.html#50.
BNC – http://www.natcorp.ox.ac.uk/.
Canadian Hansard – http://www.ldc.upenn.edu/Catalog/CatalogEntry.jsp?catalogId=LDC95T20.
CECL – http://www.fltr.ucl.ac.be/fltr/germ/etan/CECL/cecl.html.
Cobuild – http://www.collins.co.uk/books.aspx?group=151.
C-ORAL-ROM – http://lablita.dit.unifi.it/coralrom/
http://www.elda.org/catalogue/en/speech/S0172.html.
Corpora List – http://gandalf.aksis.uib.no/corpora/.
DCPSE – http://www.ucl.ac.uk/english-usage/diachronic/index.htm.
EAGLES – http://www.ilc.cnr.it/EAGLES96/browse.html#topics.
ELDA – http://www.elda.org/rubriquel.html.
ELFA – http://www.uta.fi/laitokset/kielet/engf/research/elfa/corpus.htm.
English-Norwegian parallel corpus – http://www.hf.uio.no/iba/prosjekt/.
Frown website – http://khnt.hit.uib.no/icame/manuals/frown/INDEX.HTM.
Gale and Church K (1993). 'A program for aligning sentences in bilingual corpora' in ACL Anthology, http://acl.ldc.upenn.edu//P/P91/P91-1023.pdf. pp. 91–1023.
Helsinki Corpus – http://khnt.hit.uib.no/icame/manuals/HC/INDEX.HTM.
ICAME – http://helmer.aksis.uib.no/icame.html.
ICE – http://www.ucl.ac.uk/english-usage/ice/design.htm#.
JDEST corpus – http://sfl.sjtu.edu.cn/eng_edition/department/department_4.html.
JLLC (Journal of Literary and Linguistic Computing) – http://llc.oupjournals.org/.
LDC – http://www.ldc.upenn.edu/.
Maptask – http://www.hcrc.ed.ac.uk/maptask/.
MICASE – http://www.hti.umich.edu/m/micase/.
Multiword – http://www.comp.lancs.ac.uk/ucrel/bnc2/multiwd.htm).
Oslo Multilingual corpus – http://www.hf.uio.no/german/sprik/english/corpus.shtml.SCOTS corpus – http://www.scottishcorpus.ac.uk/corpus/
Survey of English Usage – http://www.ucl.ac.uk/english usage/.
London-Lund corpus – http://khnt.hit.uib.no/icame/manuals/LONDLUND/INDEX.HTM.
UDS – http://documents.un.org/.
General introduction to CL – http://www.essex.ac.uk/linguistics/clmt/w3c/corpus_ling/content/introduction. html.
General guide to corpora in many languages – http://www.bmanuel.org/.

scanner
special corpus
spoken corpus
statistical processing
tape recorder
web-as-corpus

Corpora in Studies of Variation

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Corpora in Studies of Variation

Corpus linguistics and studies of language variation show a broad overlap in objectives. The primary aim of corpus linguistics is the accurate qualitative and quantitative description of language use, based on representative samples of authentic usage. An essential part of this description is information about the distribution and frequency of different forms and functions under different linguistic and extralinguistic conditions (i.e., variation). Thus the corpus-based *Longman grammar of spoken and written English* (Biber *et al*., 1999) incorporates quantitative comparisons between American and British English, and between the genres of academic writing, reportage, fiction, and conversation. Similarly, the central task for any study of language variation or change is to demonstrate some difference in language usage (whether in language forms, in the functions of those forms, or in the relative frequencies or distributions of those forms or functions) under different conditions of use (distinguished by such features as time, place, purpose, style, or attributes of the participants). Though different types of data can be used to establish the existence of language variation (including social dialect surveys, questionnaires eliciting particular forms or expressions of particular functions, or surveys of attitudes towards usage, which can be helpful in interpreting any differences observed), the most direct and most generally useful type of evidence comes from quantitative comparison of samples of authentic language usage representing each of the conditions of use to be contrasted. Hence much of the study of linguistic variation is equivalent to comparative corpus analysis. The overlap is almost total for study of historical language change, which quite routinely depends on description and quantification of language features in some reference version of a particular text, or set of texts, representing different historical periods of a language – again, equivalent to a corpus.

Despite this considerable mutual interest in facts of distribution, however, there are also some important differences in emphasis between these enterprises. Social dialectology is most centrally concerned with adequately representing a language community, through achieving a carefully balanced mixture of speakers from different social categories. Priority is placed on achieving controlled comparisons between these social groups; thus social dialect surveys generally attempt to elicit language of a desired type, such that all informants perform matched tasks (which, however, may or may not be equally natural for every informant). By contrast, most corpora attempt to exhaustively represent a particular language variety, through including a balanced mixture of many different text types. Each text type is, in turn, usually represented by samples from a large number of different sources, allowing robust generalizations to be made about specific genres as well as about the target variety as a whole. The main collection priority for this purpose is to include real or authentic language events. In practice, some of the more 'private' speech events may have to be specially arranged for collection purposes, but even in such cases, participants are as much as possible recorded in familiar social groups and settings, without constraints on how the event develops. This practice has the result that different social groups are represented in corpora in their most typical linguistic activities, giving the most 'natural' data possible. However, to the extent that different social groups have different interests, activities, and ranges of everyday linguistic experience, it is effectively impossible for corpus data to achieve exact matching of all social groups by task or situation. Accordingly, the use of corpora has, to date, been extremely productive for variation linked to variety, situation, or linguistic function, but less so for social variation.

The Impact of the Computer

A key contribution to the utility of corpora for linguistic research has come from the possibilities opened up by computer processing. Indeed, the term 'corpus' is now usually understood as referring to a body of linguistic data in electronic form. Placing corpora on computer affords many important practical advantages. Foremost is the automation of tasks tedious and time-consuming to perform manually, such as searching for, counting, sorting, concordancing, and coding up items for analysis. A second advantage, following from the first, is greater accountability of data: automation allows analysis of considerably larger bodies of evidence – regarding the number of tokens, and the range of forms and functions – than would otherwise be practicable, so that target variables can be given a more comprehensive description. Thirdly, electronic corpora can be readily distributed throughout the academic community, through such organizations as the International Computer Archive of Modern and Medieval English (ICAME), or the Linguistic Data Consortium (LDC). Moreover, it has recently become possible to access

several corpora, such as the 100-million-word British National Corpus (BNC) (Aston and Burnard, 1998) directly over the Internet (as 'BNCweb'). Such widespread accessibility to researchers as a common or 'public' database (as discussed by Bauer 2001) facilitates replication and confirmation of findings, and additionally allows direct comparison and integration of analyses describing different but related phenomena (e.g., relativizer choice and preposition placement). Finally, various types of coding can be (and have been) added to the linguistic data to aid analysis. Corpora usually include some information about the source material, whether as merely a reference to a list of text sources (as in the Brown and LOB corpora – defined in the next section of this article), or a full set of comment tags describing features of the situation and participants (as found in the Helsinki diachronic corpus of English, and the component corpora of the International Corpus of English [ICE]). Since the late 1980s, automatic part-of-speech assignment has been accurate enough to allow corpora to be routinely released in a tagged form, in which each word form token has an associated code for part of speech. Several different conventions exist; one of the most widely used is the CLAWS tagset (Garside, 1987), which has been applied to most of the corpora modeled on Brown and LOB, and to the component corpora of ICE. The British component of ICE has additionally been parsed, i.e., assigned a hierarchical syntactic structure (a step that can be done more rapidly on computer, but still requires considerable human intervention), and is available with software (ICECUP) that enables the retrieval of user-defined variable elements called 'fuzzy tree fragments,' which can be specified to different levels of precision using sequences of lexical items, part-of-speech tags, nodes and/or surrounding structural elements.

The potential of corpora for variation studies has so far been rather unevenly exploited, largely as a result of practical limits on what kinds of data can be most easily collected and entered onto computer (and consequently, what kinds of contrast between usage conditions are most readily available); and on what information can be most easily added to the data (and consequently, what kinds of information can be retrieved from a corpus). While sizeable electronic corpora exist for many languages (including French, Spanish, German, Danish, Swedish, Norwegian, Hungarian, Arabic, and Maori), there is a wider range of corpora available for English than for all other languages combined, and as a result, most comparative studies so far using corpora have been conducted on varieties of English. Similarly, much larger datasets, and a wider range of datasets (and therefore, a wider choice of matched comparisons) are available for writing than for speech; this gap can be expected to remain as long as speech must be manually transcribed. It is thus relatively easy to obtain corpora suitable for comparisons of writing samples representing different time periods, different national standard varieties, and different genres or styles, but using corpora to investigate social variation in spoken language is considerably more problematic. Size constraints and sampling decisions also mean that most existing corpora allow only a limited range of comparisons, so that different sets of corpora are best suited to different types of comparisons, as surveyed below.

Comparisons of Regional Varieties

Somewhat inevitably, publicly available corpora most often tend to represent broad 'national standard' varieties, so that analysts interested in more localized regional varieties typically must compile their own corpus for comparison (though interviews representing rural British dialects, e.g., of Devon and Norfolk, as well as samples of Scots English, have been transcribed as modules of the Helsinki Corpus). Effective comparisons between national standard Englishes are readily performed using two sets of corpora specifically designed for that purpose: the set of 1-million-word corpora modeled on the 'standard' Brown University Corpus of 1961 edited written American English and the Lancaster-Oslo/Bergen (LOB) Corpus of 1961 edited written British English; and the various regional 1-million-word components of the International Corpus of English (ICE). In both sets of corpora, the 1-million-word total is made up of 500 text samples, each with a length of roughly 2000 running words.

The set of Brown/LOB 'clones,' all of which are available on the ICAME CD-ROM (Hofland *et al.*, 1999), is the more limited in scope, covering just five national 'standard' varieties: American English (represented by the Brown corpus), British English (represented by LOB), Australian English (the ACE corpus, compiled at Macquarie University using texts published in 1986), New Zealand English (the Wellington Corpus of Written New Zealand English [WWC], also using texts published in or after 1986), and Indian English (the Kolhapur corpus, sampling texts from 1978). These corpora are also limited stylistically in that they only contain edited writings (though for the Wellington Corpus at least, a companion 1-million-word spoken corpus [WSC] collected at roughly the same time is also available, as described in Holmes *et al.*, 1998). Partly because of these restrictions, these corpora are the most closely

parallel stratified samples available, containing, with only minor deviations, the same proportions of text types (press reportage, editorials, reviews, religious tracts, skills and hobbies, popular lore, biography and essays, official documents, academic writings, and fiction) as originally chosen for the Brown corpus and subsequently followed in LOB. Two more recent additions to this set are direct updates of Brown and LOB, using texts published around 1991 (and thus more closely comparable with the ACE and Wellington corpora); compiled under the supervision of Christian Mair at Freiburg University, these have been informally dubbed 'Frown' and 'FLOB' respectively. General stylistic comparisons of LOB with Brown (Biber, 1987) and of both together with the FLOB, Frown, and Wellington corpora (Sigley, 1999) suggest that overall stylistic differences between these corpora are negligible beside the stylistic range within each corpus; thus it is possible in most cases to interpret overall differences between these corpora as resulting from differences in national varieties of English. (However, analysts should also check how generally any observed differences hold across the range of text categories, since differences limited to a single text category may reflect differences in institutional editing norms, rather than properties of the national variety *per se*.)

When complete, the ICE corpus (described in Meyer, 2001) will offer a wider coverage, not only of nationalities (components representing East Africa, Jamaica, New Zealand, the Philippines, Singapore, Great Britain, and the United States are currently available; others representing Australia, Canada, Hong Kong, India, Ireland, and South Africa are in progress), but also in the range of language uses represented (including a balance of published and unpublished writings; scripted and unscripted spoken monologues; and public and private spoken dialogues). Comparisons using this set of corpora are less straightforward than for the Brown/LOB clones, as in practice not all of the genres suggested for collection could be readily sampled for all varieties. For example, the East African component had to reflect the reality that, in that region, English is not generally used by locals as a medium of casual conversation. Another difficulty is that whereas the British and New Zealand components, collected between 1990–1995, were able to include social letters, such communications had largely moved to e-mail by the time collection started on other components. These differences illustrate that any particular language variety may not be used for exactly the same range of functions in every society, by all social groups, or in all historical periods. Thus the collection goals of representativeness and comparability are not fully compatible, and corpus compilers are often forced to seek a compromise between the two. Consequently, to achieve fully comparable data for their specific purposes, analysts usually need to make a careful, informed selection from the texts present in a corpus, rather than relying merely on overall figures.

Genre Comparisons

Most if not all corpora representing regional varieties (e.g., the Brown/LOB clones; WSC; ICE; the British National Corpus [BNC]) contain a mix of text categories representing a range of situations, styles, and purposes. (Here the term 'text category' simply refers to the labels used by the corpus compilers. Differences between texts may also be described in terms of 'genre,' referring to commonly recognized varieties defined by external criteria; 'register,' more directly related to features of the situation; and/or 'style,' covering differences in usage by individuals. These terms are often used interchangeably, partly because individual linguistic features may function at all these levels simultaneously.) Almost all corpus-based descriptions of linguistic variation make some use of text category as a distributional axis, either using categories from within one corpus, or combining several different corpora for a more extensive range (e.g., using LOB together with the spoken data of the London-Lund Corpus (LLC), or the Wellington Corpus of Written NZ English (WWC) together with its companion spoken corpus (WSC)). However, one drawback to such comparisons is that not all text categories collected for corpora are equally well-defined linguistically, and thus it is sometimes difficult to determine exactly what the differences between two text categories (or more broadly, between samples of 'writing' and 'speech') actually signify. Moreover, it is desirable to have some objective way of contrasting different texts from within the same category, or even different parts of the same text. Such concerns have prompted an extremely influential series of studies investigating broad functional distinctions among texts, under a multidimensional framework developed by Douglas Biber.

The 'multifeature/multidimensional' (MD) approach detailed in Biber (1988, 1995) applies factor analysis to identify a number of different underlying functional dimensions accounting for linguistic differences between texts. In outline, the procedure consists of the following steps. First, a large and varied corpus is assembled, containing as wide a variety of spoken and written text types as possible (Biber, 1988, uses LLC and LOB). Second, an extremely large range of linguistic features is counted for each

text of this corpus. Biber (1988) uses 67 separate counts of various kinds, including function words (e.g., first-person pronouns, demonstrative pronouns, pro-verb *do*), functionally related sets of word forms (e.g., place adverbials, time adverbials, amplifiers, downtoners, hedges, public verbs, private verbs, suasive verbs), morphemes (e.g., past tense forms, nominalizations), general vocabulary measures (type/token ratio, mean word length), and syntactic constructions (e.g., agentless passives, *by*-passives, *wh*-clauses, sentential relatives, split infinitives, and stranded prepositions). These raw counts are normalized for differences in text length, and then converted to standard normal variates (z-values). Factor analysis is then used to identify axes of variation shared among the counts, with the aim of accounting for as much as possible of the total variation in counts across texts, within the fewest possible dimensions. Biber additionally uses 'rotation,' which attempts to relate the dimensions to separate subsets of the original counts as much as possible; rotation allows each dimension to be more easily interpreted in terms of a group of functions shared between its associated set of counts. Each text in the corpus can be given a factor score for each of the dimensions identified; the relative positioning of texts and text categories using these scores can help confirm the interpretations of the dimensions, by allowing a more direct check against situational differences.

Biber's analysis identifies seven distinct functional dimensions for his dataset, which collectively account for about half of the total variance in the original counts. Dimension 1 (contrasting such items as first and second person pronouns, private verbs, and contracted forms, with counts indicating complex noun phrases and more diverse, complex vocabulary) is interpreted as "involved interaction versus informational production"; Dimension 2 as "narrative versus non-narrative discourse"; Dimension 3 as "situation-dependent versus elaborated reference"; Dimension 4 as "overt expression of argumentation"; Dimension 5 as "non-abstract versus abstract style"; and Dimensions 6 and 7 more tentatively as "on-line informational production marking stance" and "academic hedging," respectively. Biber proceeds to characterize and evaluate existing text categories on these dimensions, demonstrating that genres distinguished along one dimension can simultaneously exhibit shared behavior on others of these scales. In addition to the studies within this framework collected in Biber and Finegan (1994) and Conrad and Biber (2001), subsequent applications of these dimensions have included: using cluster analysis of factor scores to arrive at purely linguistically-defined text categories (Biber, 1989); general stylistic comparisons of British and American writings (Biber, 1987); the direct study of stylistic drift in genres over time (Biber and Finegan, 1992), and study of register development or standardization associated with development of new functions for Somali (Biber, 1995: Chap. 8). Biber (1995) compares the factor structure of English with that obtained for samples of Tuvaluan, Korean, and Somali. This comparison is a particularly severe test of the general utility of these broad functional dimensions, not only because different counts are relevant to the description of each language, but because these languages are used in differing ranges of situations and functions. While there are clear differences in the resulting sets of dimensions, there is also at least one striking commonality: something very like Dimension 1 for English occurs in every model and can therefore be claimed as a universal dimension of language variation.

Nevertheless, Lee (2005) questions the generality of Biber's set of dimensions for description of English, by demonstrating that some equally valid choices regarding the initial balance of text types used, the selection and quantification of linguistic counts, the selection of how many factors to extract from the analysis, or the type of rotation method applied, can all result in different factor solutions, so that Biber's overall model is not the only one possible. (Several equally valid approaches to calculating factor scores for texts can give different rankings of texts and different cluster models.) Thus it seems likely that not all Biber's dimensions are equally generalizable to English as a whole; accordingly, Lee urges more caution when deciding whether particular dimensions are meaningful. Still, this caveat does not invalidate the overall importance of Biber's findings, nor the central tenet that textual variation is multidimensional, nor the practical utility of adopting some set of continuous functional or stylistic scales for variationist research. (Again, Dimension 1 is particularly stable, emerging in a recognizable form in all of Lee's analyses, which corroborates the results of Biber's cross-linguistic comparisons.)

An alternative approach to setting up robust stylistic continua is illustrated by Sigley (1997), who also uses a type of factor analysis to find shared variation among a large number of linguistic counts, but in a much simpler form, for a more restricted purpose. Instead of trying to account for all possible linguistic variation in one model, Sigley selects 29 counts, hypothesized to correlate with one target dimension (in this case 'formality,' to test specific hypotheses about distribution of relative pronoun choice across texts), and applies principal component analysis (PCA), without rotation, as a way of deriving one index score for the shared variation. (Using PCA

thus avoids much of the arbitrariness inherent in common factor analysis.) The 'formality' score is defined as a weighted sum of linguistic features associated with situational factors consistent with 'constrained' versus 'free' behavior; such a dimension, marking social cohesion versus individual freedom, is expected to be universally relevant, in any situation, for any society. Not too surprisingly, the composition of this dimension turns out to be largely equivalent to Biber's Dimension 1, which is thereby identified as corresponding not only to linguistic function, but also generally to social behavior. (Sigley (1999) uses a slightly simplified version of the same index, based on 25 counts, for an overall comparison of 'formality' among the Brown/LOB clone corpora; this index has also been used to check the comparability of data for different social groups within WSC.) To the extent that the initial hypothesis of shared function is correct, each PCA should produce only one fully interpretable dimension; but the same approach could be easily extended by choosing a different set of counts to capture each of any number of desired stylistic or functional dimensions.

Change Over Time

Historical change can be readily investigated using diachronic corpora containing samples representing different time periods. Some examples for English include the diachronic portion of the Helsinki corpus (approximately 1.5 million words, with a varied selection of texts covering periods between 750 and 1700); the 2.7 million word Corpus of Early English Correspondence (CEEC), which includes collections of letters written between 1418 and 1681; and the 1.7-million-word ARCHER project (Biber *et al.*, 1994), with a balanced sampling frame tracking 11 genres from 1650 into contemporary English. The Helsinki corpus and a 450,000-word subset of CEEC are included on the ICAME CD-ROM. A considerable body of research has been based on this data, including studies of particular grammatical constructions and functions as well as more general stylistic variation over time; two collections indicating something of the range of topics are Rissanen *et al.* (1993), focusing on the Helsinki corpus, and Raumolin-Brumberg *et al.* (2002).

An alternative approach for assessing more recent changes over a shorter period is to compare several synchronic corpora sampling texts published in different years: thus the LOB and FLOB corpora have been used to provide evidence of changes in British writings between 1961 and 1991, and similarly, differences between the Brown and Frown corpora indicate changes in written American English over the same period (Mair, 1997). Finally, an even more extreme form of real-time study is possible, using a 'dynamic corpus' with a content continuously updated from electronic sources (e.g., newsfeed), which allows ongoing language change to be monitored while it happens; this approach has been used to document the appearance of neologisms in press material (Renouf, 1993).

Social Variation

Emphasis on representing language varieties has led to a comparative neglect of social variation during corpus design. In many cases the only social restrictions on sampling are those required for identifying contributors as adult native speakers of the variety targeted. In addition, the genres most commonly represented (published writings and other 'public' events which, being much easier to collect in bulk, usually dominate a corpus sampling frame) are largely irrelevant for direct social comparisons, being subject to an editing process that tends to minimize differences in style attributable to individual authors or social groups. (Comparisons of some corpus text subcategories could, however, be used to investigate stylistic variation resulting from audience design.)

Several corpora (e.g., Helsinki, CEEC, WSC, ICE, BNC) include a certain amount of background information about the individual speakers or writers, which can in principle be used to divide the corpus into subsamples of language representing members of different social categories distinguished by (for example) age, gender, socioeconomic class, occupation, education, or ethnicity. In particular, CEEC was expressly designed to allow investigation of differences between letter writers by class and gender. More usually, however, fully balanced representation of social groups within the same text category is unavailable, which makes simple comparisons of raw percentages difficult to interpret. Worse, data may be entirely unavailable for many cells of a social/situational cross-product, which can defeat statistical models such as analysis of variance (ANOVA), log-linear modeling, or logistic regression analysis. Balanced samples of participants in 'public' events are not generally achievable (interviewers, newsreaders, teachers, scientists, judges, and politicians are not drawn randomly from the general population). Meanwhile, the practical difficulties involved in collecting adequate quantities of data for 'private' events often necessitate opportunistic samples, with resulting bias in social composition. Most existing corpora of spoken English – including LLC, WSC, and ICE – show some degree of bias towards educated speakers, largely as a result of being collected through social networks of university members.

Such problems were minimized for the BNC by starting with a demographically balanced sample of 124 adults (roughly evenly divided by age group, gender, and social class) who each recorded their normal daily interactions. Full speaker information is not always available for the collectors' interlocutors, and some mismatches remain for ethnicity and regiolect, but even so, the resulting 4.2-million-word 'demographically sampled' subset of the BNC – and the companion 0.5-million-word Bergen Corpus of London Teenage Language (COLT), collected under the same approach, and now available in audio form – is the best corpus data currently available for social variation in English speech. An even more rigidly controlled sampling frame, which approaches the design of a dialect survey rather than a corpus, was used to produce the 3.5-million-word Ottawa-Hull Corpus of Spoken French (Poplack, 1989).

Nevertheless, all spoken corpus data is subject to several further problems which make social comparisons over an entire text category extremely difficult to interpret. As already noted, it is impossible to control situational details of conversations (e.g., how many participants, the relationships between them, and whether or not they are matched by age, ethnicity and/or gender) in advance of recording without compromising naturalness. Since no rigorous sampling frame can solve this problem, the only alternative is to collect ever larger amounts of data in the hope of eventually filling enough cells to allow some situationally matched comparisons. Secondly, information available for speakers in corpora generally fails to capture several potentially important factors such as social aspirations, social network memberships, or even the precise relationships between the participants (as this last does not reduce to a simple category value if more than two people are present).

It is possible to circumvent at least the first of these problems by careful selection of text samples. For example, the 500 000-word Conversation category of WSC contains enough matched occupied cells to allow conditional comparisons over limited subsets of the data for age, gender, and ethnicity, social class or education; additionally a style contrast is possible for some cells using data from the second-largest category (Broadcast interviews). This has enabled statistical analyses of several phonetic variables in WSC (summarized in Holmes, 1997). Statistically meaningful comparisons on such reduced subsets are, however, possible only for extremely frequent variables such as phonological variables (which typically give 20–60 tokens per speaker in the WSC conversations). Unfortunately, corpus-based phonetic analysis has so far been hampered by sound recordings being largely inaccessible outside the institutions that collected them. This situation is now starting to be remedied by the release of CD-ROMs linking sound files and transcripts for subsets of corpus texts: for example, the first audio selections from the spoken component of ICE-US (also called the 'Santa Barbara Corpus') were released through LDC in 1999.

See also: Age: Apparent Time and Real Time; Computational Stylistics; Corpora; Corpus Linguistics; Corpus Studies: Second Language; Ethnicity; Gender, Grammatical; Genre and Genre Analysis; Parsing and Grammar Description, Corpus-Based; Quirk, Charles Randolph, Professor Lord (b. 1920); Researching Naturally Occurring Speech; Sociolect/Social Class; Spatial Variation (Geolinguistics); Style; Style and Style Shifting; Stylistics; Stylistics: Corpus Approaches; Synchronic and Diachronic Variation; Variation and Language: Overview.

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http://homepage.mac.com/bncweb/home.html – BNCweb.

Corpora of Spoken Discourse

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Typology of Spoken Language Corpora and Predecessors

A corpus (*pl*. corpora) in today's sense can be broadly defined as a collection of language data – of spoken or written origin – stored in electronic form. Spoken language corpora may include collections of isolated lexical units, phrases, or sentences pronounced by numerous different speakers about whom virtually no information is available, as well as extensive narrative or conversational texts uttered by speakers for whom detailed metainformation (such as age, education, or other sociolinguistic variables) is provided. The former type of corpora has in many cases been elaborated by commercial enterprises and is mostly used in computational linguistics and language engineering for technical purposes of natural language processing (NLP), such as speech recognition and human–machine interaction or automatic translation. The latter type of spoken language corpora, which constitutes the empiric base of spoken language studies (in a narrower linguistic sense) and which is the object of this article, is frequently accessible at moderate cost or for free. These corpora can be defined as structured collections of (relatively) naturally occurring speech organized in larger textual units and compiled in a systematic way with a (specific or general) linguistic aim in mind. The texts that form corpora of spoken discourse normally consist of transcriptions, i.e., written reproduction of the previously recorded oral speech event; these transcriptions might be completed by metadata in the form of annotations or background information, and may also be combined with multimedia components such as the transcribed audio or video recordings.

Linguists have been interested in documenting and analyzing spoken discourse, regarded as authentic and uncorrupted forms of language, at least since the Neogrammarians' days. A large amount of early

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Linguists have been interested in documenting and analyzing spoken discourse, regarded as authentic and uncorrupted forms of language, at least since the Neogrammarians' days. A large amount of early

collections of spoken language has been assembled by areal linguistics and dialectology since the end of the 19th century. However, methodological and technical limitations prevent much dialectologic data from being considered and used as corpus data in the modern sense. Examples of early repositories of recorded dialectologic data collections, including discourse genres of the ethnotext type such as folk tales or autobiographic narratives, are the Phonogramm-Archiv of Vienna (Austria) founded in 1899, or the Archives de la Parole in Paris (France, 1911). With important technical progress regarding recording devices from the 1950s on, dialectologists could collect more extensive data; projects such as the Survey of English Dialects (SED) relied on field recordings that could qualify as spoken discourse corpora.

While dialect corpora, despite their shortcomings, are linguistic in scope, samples of oral discourse that have been collected for anthropological, folkloristic, or historical purposes, such as oral history texts, are generally unsuitable for linguistic research, as these texts used to be purged of typical oral features such as repetitions, false starts, hesitation phenomena, etc., reducing their authenticity in linguistic terms.

Text Types and Data Collection Methodology

According to Kennedy's (1998) classification of corpora, spoken discourse corpora are a type of specialized – as opposed to general or balanced – corpora due to their focus on spoken language. However, Koch and Oesterreicher (1990) and Biber (1995), among others, have shown that orality, just as little as scripturality, is not a set of neatly separated, discrete medial manifestations of language, but that there is considerable conceptual overlap and that spoken discourse (as well as written language) may vary considerably according to factors such as formality, common ground and knowledge, spontaneity, etc. This is reflected both by text types and by the communicative or pragmatic setting of the transcribed discourse sample. To facilitate the collection of the data, spoken discourse corpora make frequent use of publicly performed monologues, dialogues, or conversations, particularly through broadcast recordings, or rely to a large extent on interviews. Such data can only cover a part of the continuum of orality between spontaneity and elaboration, with a drift to the less spontaneous pole. Unobtrusive recording devices such as mini-disk or hard-disk recorders today allow discrete recordings of unguided forms of oral interaction among peers, e.g., conversations among family members, groups of professionals, or friends, without succumbing to Labov's observer's paradox (to observe how people speak when they are not observed). However, surreptitious recordings, which had been included in earlier spoken discourse corpora such as the 'Habla culta' series (see 'Spoken Discourse Corpora for Selected Languages' below) or the oral component of R. Quirk's Survey of English Usage (1968) corpus, are less common now due to ethic considerations and no longer viable in many countries because of legal restrictions.

Transcription and Notation Schemes

Oral speech samples in dialectologic work have always been transcribed phonetically, and phonetic transcription continues to be used in nondialectologically oriented spoken discourse corpora, e.g., for nonstandard varieties. However, with the interest of spoken language studies having shifted toward areas such as syntax or discourse analysis, orthographic transcription has become more popular due to its better readability. In order to render norm-deviant forms in orthographic transcripts, so-called accommodations (or *trucages*, in Blanche-Benveniste and Jeanjean's [1987] terms) are used, whereby only selected items or parts of discourse are rendered phonetically.

The reproduction of multiparty interaction, involving two and more speakers, is an important challenge for the written transcript. Two main types of notation schemes can be distinguished: linear notation, where turns are organized on continual transcription lines like in a stage play manuscript, and score notations, where the turns of the different discourse participants are ordered time-iconically on vertically arranged lines, each of which is attributed to a specific speaker. An elaborate example of the latter type is K. Ehlich and J. Rehbein's HIAT notation scheme (see Edwards and Lampert, 1993 for details) (**Figure 1**). Score notations allow for an efficient representation of phenomena of floor competition, overlapping or simultaneous speech, but linear notations are less complex in the making and in processing with retrieval software and concordancers. However, current XML-based transcription software designed specifically for spoken language data, such as T. Schmidt's EXMARaLDA tool, allow for multiformat output – in linear or score layout – of the same transcript according to the respective requirements.

Most notation schemes provide for a minimum of prosodic features to be included in the transcript. The 'London-Lund Corpus' (LLC), the machine-readable version of the oral parts of the 'Survey of English

```
B  har lo doç   e lavetz              e drin de   metabisulfita  drin de
         süß    und dann                wenig von  Metabisulfit
   süßen zu machen  und dann          und ein bißchen Metabisulfit  ein wenig
C  har lo doç OUI          OUI OUI
   süßen zu machen                                                          36

B  sofre   de   temps en quan  e en  avant  la  musica (< esotirar >?)
   Schwefel        Zeit   in  als        vorne      Musik
   Schwefel  von   Zeit zu Zeit      und ab geht die Post                   37

A  e quan  lo      hèn      (      )
           AKK.3S.M mach.PRS.3P
   und wenn sie ihn machen
B                        e donc  que' ei  bon  OUI  MAIS -  qu'ei  traficat
                           also   ENZ  ist  gut              ENZ   gefälscht
                          also  er ist gut          aber   er ist gepanscht  38
```

Figure 1 Example of HIAT score notation with morphemic glosses and interlinear translation (author's elaboration).

Usage' published in the 1970s, included a rather detailed prosodic annotation achieved by few later corpora. The time-consuming effort of such annotation discourages most corpus designers, but there are promising projects of partially automating this task (see Campione and Véronis in Sampson and McCarthy, 2004). Paralinguistic or nonlinguistic features of the speech event, such as pauses, laughing, etc., comments on inaudible or incomprehensible segments, noises etc., formerly annotated in foot-notes or side-notes, or identification of and metainformation on speakers are given in most recent spoken discourse corpora according to the recommendations of the Text Incoding Initiative (TEI) whose 'Guidelines' were primarily designed to introduce structural markup for written documents but also contain an extensive section on particular tags for the specificities of spoken language.

Spoken Discourse Corpora for Selected Languages

In this section, some spoken discourse corpora or general corpora that include a significant amount of transcribed spoken language and that are publicly available and easily accessible will be presented.

As corpus linguistics in the modern sense developed largely in Great Britain and the United States, scholars of spoken English are well served with several mid-size and large discourse corpora. The above-mentioned LLC, with half a million words, was followed in the mid-1990s by the British National Corpus (BNC), which contains among its 100-million word data 10% from spoken sources. This oral component of the BNC is by far the most important spoken language corpus compiled hitherto and is based on both publicly and privately recorded material selected with regard to regional and sociolinguistic variables. A North American counterpart to the LLC is currently under construction in the form of the Santa Barbara Corpus of Spoken American English (CSAE), a multimedia corpus where, in its ultimate presentation, transcriptions will be linked to the corresponding sound files. An ambitious international corpus project embracing Britain, North America, and other parts of the English-speaking world is the International Corpus of English (ICE) (see Greenbaum, 1996). Its 18 one-million-word subcorpora, some of which are already published, contain 60% oral data, which will ultimately amount to 12 million words of spoken discourse, an important part of which will be obtained through public (broadcast) sources. The New Zealand spoken language component of ICE includes selected material from the one-million word Wellington Corpus of New Zealand English (WCNZE). For additional English spoken-language corpora, see Kennedy (1998) and McEnery and Wilson (2001, annex).

As for Germanic languages other than English, spoken German is documented in various corpora included with the COSMAS online database of the German Language Institute IDS (Institut für deutsche Sprache). These corpora amount to 1.3 million words. In the Netherlands and Flemish Belgium, a 10-million-word corpus of spoken Dutch is currently under construction. For Scandinavian languages, no comparable resources are at hand or underway.

Romance languages also lag far behind English as far as spoken discourse corpora are concerned, although some languages are relatively well documented, with Spanish boasting the most publicly available corpora: The 700 000-word 'Macrocorpus de la norma lingüística culta de las principales ciudades del mundo hispánico' on CD-ROM is a compilation of an important part of the European and Latin-American coordinated project known as the 'Habla culta' corpora, started in the late 1960s and originally published in printed form. This project is being

continued under the title 'Proyecto para el Estudio Sociolingüístico del Español de España y de America' (PRESEEA), of which the first electronic subcorpus was published in 2002. All these are interview corpora. The Spanish Language Academy RAE (Real Academia Española) gives free online access to their Corpus de Referencia del Español Actual (CREA), which contains approximately 12 million words of spoken language. CREA is a dynamic corpus, with new subcorpora being continuously added. In the 1970s, a coordinated spoken discourse corpus project comparable to the Spanish Habla culta enterprise was started for Brazilian Portuguese under the label Projecto Norma Urbana Culta (NURC). The corpora published hitherto within or in relation to this project total almost 800 000 words; many of the subcorpora are now available in electronic form also. The 90 000 word corpus 'Português falado, Documentos autênticos' published in 2001 by the Portuguese Camões Institute is a small but useful multimedia corpus on CD-ROM with aligned transcription and audio files covering European, Brazilian, and African varieties of Portuguese.

For spoken French, Leuven University's Linguistics department offers online acces to ELILAP (Etude linguistique de la langue parlée), which is a cumulative 1.1-million-word corpus consisting of different earlier spoken language projects, including the pioneering Orléans corpus recorded in the late 1960s. The 270 000-word Sherbrooke Corpus, also known as Corpus de l'Estrie, is still the most accessible resource for Canadian (Québec) French, although it is only partially available in machine-readable form through the Oxford Text Archive (OTA). For Italian, numerous but scattered and generally small corpora exist, many of them documenting dialects. The 500 000-word LIP corpus, an annex to T. De Mauro's Italian frequency dictionary (*Lessico di frequenza dell'italiano parlato*), is the only published mid-size corpus. The LABLITA research group also contributed the Italian section to the C-ORAL-ROM corpus published in 2005; this is a European multilingual corpus for French, Italian, Portuguese and Spanish containing a total of 1.2 million transcribed words synchronized with the corresponding audio data and distributed by ELRA/ELDA. For more Romance spoken discourse corpora, see Pusch in Pusch and Raible (2002).

As for Slavonic languages, for which some impressive written language corpora are available to linguists, no easily accessible spoken discourse resources seem to be available. This holds also for important non-European languages such as Japanese or Chinese, where only costly NLP corpora distributed by LDC (Linguistic Data Consortium) exist. For corpora – both spoken and written – in these and other languages, see the web-sites of M. Barbera and D. Lee.

An important, albeit peculiar spoken discourse corpus is the CHILDES (Child Language Data Exchange System) database on first language acquisition, comprising more than 20 idioms. CHILDES uses a specific transcription system (CHAT) and distributes its own analysis tools.

See also: CHILDES Database; Computational Linguistics: History; Corpora; Corpora in Studies of Variation; Corpus Linguistics; Dialect Representations in Texts; Machine Readable Corpora; Mark-up Languages: Speech; Natural Language Processing: Overview; Orality; Oral Traditions and Spoken Discourse; Phonetic Transcription: History; Quirk, Charles Randolph, Professor Lord (b. 1920); Spoken Discourse: Types.

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Relevant Websites

www.rrz.uni-hamburg.de/exmaralda – T. Schmidt's EXMARaLDA tool.

www.tei-c.org – Text Incoding Initiative.

www.natcorp.ox.ac.uk – British National Corpus.

www.ucl.ac.uk – International Corpus of English.
corpora.ids-mannheim.de – COSMAS online database of the German Language Institute IDS.
corpus.rae.es/creanet.html – Corpus de Referencia del Español Actual.
bach.arts.kuleuven.ac.be – Etude linguistique de la langue parlée corpus.
ota.ahds.ac.uk – Oxford Text Archive, Canadian French corpus.
lablita.dit.unifi.it – LABLITA resources, Florence University's Linguistics department.
www.ldc.upenn.edu – Linguistic Data Consortium.
www.bmanuel.org – M. Barbera.
edward.comp.lancs.ac.uk – D. Lee.
childes.psy.cmu.edu – Child Language Data Exchange System.
www.elda.org/catalogue – Information on C-ORAL-ROM and other ELDA/ELRA corpora.

Corpus Approaches to Idiom

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Introduction

From the beginning, the use of corpus data has had a profound impact on studies of English phraseology. This is most obvious in relation to collocation, where large corpora can now provide reliable co-occurence statistics and information about the lexicogrammatical patterning of individual words. However, there has also been an impact on studies of idioms and other multiword items. Descriptive studies now draw on corpus data to show when, where, and how idioms are used, while theoretical studies now have to take account of corpus phenomena in establishing models and typologies. The following discusses what corpus evidence demonstrates about English idioms, along with other figurative expressions such as proverbs and similes: **idiom** here is defined as an institutionalized multiword item with a metaphorical meaning.

Frequency and Distribution

Corpus data have demonstrated that many idioms and most proverbs and similes in English occur infrequently in text. Moon (1998) investigated the frequencies, forms, and functions of nearly 7000 current multiword items, including 2788 idioms, proverbs, and conventional similes, in an 18-million-word corpus of English of ca. 1990, the Oxford Hector Pilot Corpus. Rates of occurrence were as shown in **Table 1**.

Thus just 16% of English idioms, and almost no proverbs or similes, were found with frequencies of 1 per million or above, while over 50% of all items were either not attested or occurred with frequencies no better than chance. Moon's findings are supported by other corpus-based studies, including those with very much larger corpora: highly figurative idioms, proverbs, and conventional similes are generally infrequent, while other kinds of phraseological item, such as *take place, in fact, give up*, are very common. For example, in the 450-million-word Bank of English corpus (created by COBUILD at the University of Birmingham), there are 195 tokens of *bury the hatchet*; 577 of *call the shots*; 371 of *red herring*; 42 of the simile (*as*) *white as a sheet*; 239 of proverbial *don't put all your eggs in one basket*; and 260 of proverbial *you can't have your cake and eat it*. A raw frequency of, say, 195 for an item seems quite high: 195 tokens should be enough to analyze successfully its formal and semantic properties. Yet an item occurring 195 times is relatively infrequent, with less than 1 token per 2.3 million words of corpus texts: there are nearly 40 000 single-word lexemes more frequent than this in the Bank of English. Even *call the shots*, with 577 tokens, ranks well outside the top 20 000 lexemes. In contrast, there are tens of thousands of tokens of *take place, in fact*, and *give up*, and they rank within the top 2000, i.e., they form part of the central vocabulary of English.

Larger corpora, of 50 or 100 million words and above, provide information about the distribution of idioms, proverbs, and similes across text types. For example, in British English they are most dense in

Table 1 Frequencies of idioms, proverbs, and similes

Frequency range	*Idioms*	*Proverbs*	*Similes*
0	194	68	26
1–4	927	159	90
5–9	548	34	9
10–17	343	8	0
18–35	245	1	2
36–89	100	1	0
90–179	19	0	0
180+	14	0	0
Total	2390	271	127

www.ucl.ac.uk – International Corpus of English.
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180+	14	0	0
Total	2390	271	127

journalism of all kinds, though especially tabloid newspapers, followed by popular fiction; surprisingly infrequent in conversation (one-third of the density of tabloids); and rare in academic writing. Their sparseness in conversation is counterintuitive, since they are generally considered colloquial, informal, or 'folksy' items; furthermore, they are prominent in use. However, this prominence is misleading: it derives from their markedness, which results from infrequency, and from discourse position and function, since they often summarize, evaluate, or emphasize.

See, for example, Biber *et al.* (1999: 1024–1029), Moon (1998: 57–74), Moon (2001) for general discussions of frequencies and distributions in corpora of English; Aijmer (1996), Altenberg (1998), and De Cock (1998) for discussions of formulae in spoken corpora; Minugh (2001) for discussion of idioms in a corpus of song lyrics and talk shows; and Stubbs (2002) for a general discussion of methodology in corpus investigations of phraseological items.

Variation

Corpus data also provide evidence of the instability of the forms of many idioms, proverbs, and similes, and of ways in which they vary. This is contrary to the impression given by dictionaries, where generally only a single citation form is listed, and to that given by some theoretical characterizations of items as 'fixed' or 'frozen.' It is certainly true that many items are found not to vary lexically and to occur in a restricted range of grammatical structures or forms: *kick the bucket* and *a pig in a poke* are cases in point. Meanwhile, some variations are simply ad hoc exploitations, often humorous and/or topical, as in the following (examples here and elsewhere are drawn from the Bank of English corpus):

> . . . most private sector employees, who can find their working conditions and job description changed at the drop of a trilby [*at the drop of a hat*]

> Blair likes to have his tarte tatin and eat it. Europhile commentators are still summoned to Downing Street and told to keep the faith. [*You can't have your cake and eat it*]

However, corpus data show that many items do vary. Examples of simple lexical variation include *fit/fill the bill*, *drag one's feet/heels*, and *a tough/hard row to hoe*: in addition, there are American/British variations, such as *not see the forest/wood for the trees* and *blow one's own horn/trumpet*, where corpus evidence shows the increasing incidence of American variants in British English. Other variations reflect transitivity, aspect, causation, and other grammatical categories (see Čermák, 1994; Newmeyer, 1972, and Pulman, 1993 for general discussion of such variability). Examples include *burn one's fingers/get one's fingers burnt*; *break the ice/the ice breaks*; *get/keep the show on the road*; and *let the cat out of the bag/the cat is out of the bag*:

> So I let the cat out of the bag and he now knows it was me that night.

> Well, you may say, now that the cat is out of the bag, why make a fuss?

In more extreme cases, items may be better characterized as metaphorical idiomatic frames, clusters of recurrent wordings that represent institutionalized metaphorical conceits. The following are all attested in the Bank of English:

> shake in one's shoes
> shake in one's boots
> quake in one's shoes
> quake in one's boots
> quiver in one's boots
> tremble in one's shoes
> tremble in one's boots
> quake in one's loafers/size nines/Manolo Blahniks/jackboots (etc.)

> another nail in the coffin
> a final nail in the coffin
> nail down the coffin
> hammer the last nail into someone's coffin (etc.)
> drive the first nail into the coffin (etc.)
> bolt down the coffin lid

Moon (1998: 120–177) reports on different kinds of variation found in corpora and other sources.

Context and Patterning

Just as with individual words or senses of words, corpus data show that individual idioms and proverbs are often associated with particular grammatical structures, lexicogrammatical patterns, or discourse position. (Such co-textual fixedness can contrast sharply with the morphological variability of many items.) *Kick the bucket* only occurs as nonprogressive when finite, and *push up the daisies* only occurs as progressive: grammar here reflects an aspectual distinction in meaning between 'die' and 'be dead.' Corpora confirm their transformational/inflectional defectiveness:

> Your husband has passed away, people would lament. He has kicked the bucket, she would say, and a good riddance.

> . . . had it not been for a fortunate accident of timing, the nursery maestro could now be pushing up the daisies instead of selling them.

Other items cannot be considered defective, but clearly have preferences for certain structures or forms. *Shake in one's shoes* (etc.) typically occurs as progressive, *cook someone's goose* as nonprogressive, and *rock the boat* with negatives and/or modals:

> When he ferociously chastised a man in the audience for heckling, everybody was shaking in their shoes.
>
> I tried not to rock the boat because that would have had a detrimental effect on the team.

Similarly, corpus data show the collocational preferences of individual items. Sometimes these are so strong that they have been, or could be, considered a canonical part of an idiom. For example, *hook, line, and sinker* typically follows *swallow* or *fall for* and *a flea in one's ear* follows *send (away, with, etc.)*:

> There were leaks to the press, and the gullible chaps swallowed it hook, line, and sinker.
>
> Deutsche [Bank], for example, wanted to buy Crédit Lyonnais and Société Générale, but was sent away with a flea in its ear.

Strong collocates may be tied to grammatical slots. *Bear fruit* often occurs after *start/begin*, and its subject is typically *effort(s)*, *plan(s)*, or a word of similar meaning; *like wildfire* typically occurs after *spread*, with *disease, virus, rumour, news*, or other items, often negative in orientation, as subject:

> China's new economic reform policies were just beginning to bear fruit.
> Everyone knows everyone else in the radio and TV industry and rumours spread like wildfire.

Corpus profiling software produces evidence for this kind of clustering, where collocates seem to fall into sets: one *runs the gauntlet* of *hate/abuse/jeers* or of people designated as enemy; one *sows the seeds* of *doubt, destruction, discord, conflict*, or *success*, with negative collocates being much more numerous than positive.

Although corpus data focus attention on the immediate co-text, it is possible to retrieve information about discoursal context. Where items such as proverbs are strongly evaluative or deontic, they may well occur either in text-initial position as preface or text-final position as summary evaluation (in conversation in turn-initial and turn-final positions). The following example occurred at the end of a newspaper item:

> Central bankers are a cautious breed but even they might soon begin to think that just such a pre-emptive easing might be a prudent stitch in time.

Finally, extended corpus contexts provide information about pragmatic aspects of idioms, proverbs, and similes. The following examples are drawn from spoken corpus data, and demonstrate the complexity of the communicative functions of items:

> I suspect that there might just be an ulterior motive in her saying oh come on let's sort of bury the hatchet let's be friends let's be civilized let's be adults about it.
>
> . . . they actually come to it from a kind of fairly equal basis rather than being you know some kind of hierarchy with the Treasury kind of you know effectively you know calling the shots.

See McCarthy, 1998 for discussion of idioms in spoken English.

Ambiguity

A classic characterization of idioms is that they are not the sum of their parts and meanings cannot be retrieved from word-by-word decoding – *burying hatchets* does not involve the physical burial of physical hatchets and *red herrings* are not fish – although the meanings of some idioms are more transparent than others. This mismatch between compositional and idiomatic meanings implies that they are potentially ambiguous. Corpora provide very little evidence for any actual ambiguity, and in most cases, there are few or no instances of literal uses of items. This may be because the existence of an institutionalized idiomatic meaning leads to avoidance of the phraseology in literal contexts, or because the kinds of physical situation which provide the metaphors in many idioms are either rare or discussed rarely in everyday life: we do not often bury hatchets or see herrings that are red.

There are, however, cases where literal equivalents can and do occur: for example, *break the ice*, *get one's hands dirty*, or *in/into hot water*. These are not, of course, ambiguous in context, and corpus data show how lexicogrammatical patterning privileges one or the other reading. It is people in idiomatic hot water, things in literal; verbs collocating with the former include *be, land, find (oneself), get*, and with the latter *dip, dissolve, plunge, soak, wash*, and so on. *Get one's hands dirty* 'willingly become involved in menial work' seems confusable with *get/have dirty hands* 'be guilty, commit a crime': they represent opposite evaluations and near-opposite meanings. Furthermore, having hands that are literally dirty is a far from infrequent situation in both real life and corpus texts. Yet both phrases and literal uses are clearly distinguished in context, with instances of the idiom *get one's hands dirty* being almost entirely restricted to that phraseological form, and most instances of that phraseology being idiomatic.

When phraseologies associated with idiomatic meanings are used literally, this may be signaled by *literally* or other metalinguistic item:

> Towards the end of that week, everyone who had any part in the exercise was working literally night and day.

(In other contexts, *literally* may simply add emphasis to idioms and metaphors, rather than indicating literalness.)

Implications and Applications

While much has been learned already from corpus investigations of phraseological items, there is no doubt that more will emerge. Corpora are still largely synchronic: only large historical corpora will show how forms and usage change or remain stable. Large corpora of English are still skewed toward British and American English, and corpora of other varieties, such as the International Corpus of English, are still too small to provide robust information about such infrequent items, so that intervarietal comparisons are not yet really possible; however, there are likely to be significant differences between anglophone cultures. Cross-linguistic comparisons are still limited to a few language pairings, although here extensive corpus-building programs in Europe, Asia, and South Africa will lead to many further possibilities. See, for example, Čermák, 1998 and Cignoni and Coffey, 2000 for studies of proverbs in respectively Czech and Italian corpora; and Cignoni *et al.*, 1999 for a contrastive study of idiom variation in Italian and English.

From a more theoretical point of view, corpus data suggest that it is appropriate to revisit traditional phraseological classifications such as *idiom* and *proverb*, also the very notion of *lexical item* or *lexeme*. Evidence about the forms of multiword items, along with evidence about lexicogrammatical patterning in the lexicon, demonstrates that there is a continuum of fixedness: meaning is the main determinant of whether a string is classed as a multiword item (variable/invariable) or a collocation. Yet 'meaning' itself is an unreliable and variable concept, especially when meaning is being investigated through contexts: where does the meaning of a collocation or idiom begin and end? See, for example, discussions in Hanks, 2004, Hudson, 1998, and Sinclair, 1998.

Finally, there is already scope for applying what has been learned about phraseological items. Information derived from corpora can be fed into improved records of the lexicon that underpin work in language engineering and meaning recognition software. Text-centered studies, such as discourse analysis, are helped by data concerning norms and the full extent of collocational patterns. Perhaps the most obvious applications, though, are in dictionaries (see Hanks, 1999 for a corpus-based critique) and in language teaching materials. Here more than anywhere it is possible to see just how different a corpus-based representation of the lexicon is from those based on introspection and received ideas alone.

See also: Corpus Linguistics; Corpus Lexicography; Idioms; Idiom Dictionaries.

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Corpus Linguistics

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Introduction

A corpus is an electronically stored collection of samples of naturally occurring language. Most modern corpora are at least 1 million words in size and consist either of complete texts or of large extracts from long texts. Usually the texts are selected to represent a type of communication or a variety of language; for example, a corpus may be compiled to represent the English used in history textbooks, or Canadian French, or Internet discussions of genetic modification. Corpora are investigated through the use of dedicated software.

Corpus linguistics can be regarded as a sophisticated method of finding answers to the kinds of questions linguists have always asked. A large corpus can be a test bed for hypotheses and can be used to add a quantitative dimension to many linguistic studies. It is also true, however, that corpus software presents the researcher with language in a form that is not normally encountered and that this can highlight patterning that often goes unnoticed. Corpus linguistics has also, therefore, led to a reassessment of what language is like.

This article discusses the resources and methodologies used by corpus linguists and then moves on to some key observations relating to comparative frequency and to patterning. It also considers the importance of corpus linguistics for linguistic theory and presents some of the applications of corpus research.

Resources and Methodologies for Corpus Linguistics

Corpora

The basic resource for corpus linguistics is a collection of texts, called a corpus. Corpora can be of varying sizes, are compiled for different purposes, and are composed of texts of different types. All corpora are homogeneous to a certain extent; they are composed of texts from one language or one variety of a language or one register, etc. They also are all heterogeneous to a certain extent, in that at the very least they are composed of a number of different texts. Most corpora contain information in addition to the texts that make them up, such as information about the texts themselves, part-of-speech tags for each word, and parsing information.

Searches, Software, and Methodologies

Corpora are interrogated through the use of dedicated software, the nature of which inevitably reflects assumptions about methodology in corpus investigation. At the most basic level, corpus software:

- searches the corpus for a given target item,
- counts the number of instances of the target item in the corpus and calculates relative frequencies,
- displays instances of the target item so that the corpus user can carry out further investigation.

It is apparent that corpus methodologies are essentially quantitative. Indeed, corpus linguistics has been criticized for allowing only the observation of relative quantity and for failing to expand the explanatory power of linguistic theory (for discussion, see Meyer, 2002: 2–5). It is shown in this article that corpus linguistics can indeed enrich language theory, though only if preconceptions about what that theory consists of are allowed to change. Here, however, we leave that argument aside as we review corpus investigation software in more detail.

Search Items

Any corpus, including a 'raw' corpus (that is, a corpus that consists only of text, with no further information added), may be searched for instances of a single word (e.g., *day*). Most search software

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Relevant Websites

http://americannationalcorpus.org – American National Corpus (ANC). The first release of 11.5 million words is available. The site has samples of the corpus format and links to papers related to the ANC project.
http://info.ox.ac.uk – British National Corpus (BNC). 100-million-word multiregister corpus of spoken and written British English. The site also has links to many corpus-related resources.
http://www.hit.uib.no/icame.html – ICAME: International computer archive of modern and medieval English.
http://www.hti.umich.edu – MICASE: Michigan corpus of academic spoken English.
http://www.athel.com – MonoConc.
http://oup.com – WordSmith.

Corpus Lexicography

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Texts and Lexicography

As dictionaries gradually became descriptions of a language in general, rather than glosses to individual texts or 'hard words,' so the relationship between dictionary and source texts grew increasingly distant or invisible. Therefore, dictionaries seeking a more authoritative status re-established their connection with source texts by providing references or citations. Johnson's dictionary (1755) deliberately took its citations solely from 'the best writers.' The *Oxford English dictionary* (OED) (1884–1928), with its additional historical scope, greatly increased the numbers and types of texts consulted. But the necessary reliance on manual methods, even with thousands of readers selecting citations from thousands of texts, restricted its data collection. The *Longman dictionary of contemporary English* (LDOCE) (1978) selected some of its examples from the text extracts collected by the Survey of English Usage. However, citational evidence has an inherently limited validity because the selection depends on the reader's human frailties, preferences, and prejudices: rare words and uses may attract attention, common words and uses may be overlooked, or citations may be selected because they chime with the reader's intuitions. For example, J. A. H. Murray (the first editor of the OED) complained, "The editor or his assistants have to search for precious hours for examples of common words, which readers passed by . . . . Thus,

of *abusion* we found in the slips about 50 instances; of *abuse* not five" (Murray, 1977: 178). References to spoken usage other than common interjections were minimal and entirely intuitive.

Computers and Text Corpora

The rapid development and increasing availability of computer technology in the 1960s–1970s initiated the storage and analysis of language texts in computers for linguistic research, an example being the Brown corpus, consisting of one million words of written American English (Kučera and Francis, 1967). These corpora enabled an initial analysis of core grammar but proved woefully inadequate for lexicography (function words occur far more frequently than most lexical items). The first edition of the *American heritage dictionary,* in 1969, had a preface by Kučera and access to the Brown corpus, but the small corpus could provide little or no benefit to most entries. However, further lexicographic applications of computer corpora were already being envisioned (Wisbey, 1971).

The Cobuild dictionary project, set up by Collins publishers and Birmingham University in 1980, was the first to use a computer corpus as its main basis (Sinclair, 1987). Technological developments (e.g., the input of texts by keyboarding and optical scanning rather than on punchcards) enabled a speedy and substantial increase in corpus size (7.3 million words in 1982, 20 million by 1985). However, even 20 million words (i.e., tokens, or individual instances) were barely adequate for an English-as-a-foreign-language (EFL) dictionary (with just tens of thousands of headwords), let alone a native-speaker dictionary (with up to a hundred thousand). In the 1980s–1990s, Longman built a corpus of 30 million words, Oxford (OUP) created a consortium of publishers and universities to build the 100-million-word British National Corpus, and Collins initiated the Bank of English corpus (121 million words in 1993, over 500 million by 2002).

Corpus Developments and Lexicography

The major innovations in corpus lexicography took place in the 1980s and 1990s in British dictionaries for foreign learners, hence this article focuses on them (*see also* **Learners' Dictionaries**).

The Brown corpus was created for general linguistic research and contained 500 samples of 2000 words each from written texts, categorized into informative prose (with subcategories of press reportage, editorials, and reviews; religion; skills and hobbies, etc.) and imaginative prose (subdivided into fiction, mystery, science fiction, humor, etc.). Each subcategory was further divided into text types, such as books and periodicals; or novels, essays, and short stories.

The Cobuild corpus of 1980–1985 was designed specifically for EFL lexicography and therefore deliberately excluded some types of text (e.g., historical, technical, and regional texts, poetry, drama, children's language and literature) and favored others (recent, general, and international texts; popular adult literature; set books from EFL courses; spoken data).

Later corpora have reflected different strategies (e.g., random selection of texts, demographic sampling, the use of whole texts or text extracts), partly for theoretical reasons such as 'balanced composition' or 'representativeness,' partly for pragmatic reasons such as user and sponsor needs, cost, data availability, ease of acquisition, copyright permissions, etc.

The increasing availability of electronic data in general has led to debates on optimal corpus size for lexicography. For native-speaker dictionaries, the largest corpora currently available (over 500 million words) still cannot supply sufficient evidence to distinguish the normal use of rare words and phrases from chance and arbitrary usage. Evidence is also insufficient for items restricted to specific domains. So most corpora can be used at best only to enhance entries for commoner words. The continuing disparity between the data types available (e.g., huge amounts of journalistic data, relatively little spoken data) creates problems for corpus representativeness. The use of the entire Web as a corpus may serve some aspects of computational linguistics research, such as data storage and management, but is intrinsically unsuitable for lexicography: the data are highly dynamic and unstable, so no two entries would be based on the same data.

The pace of improvement in corpus software has slowed down. Most programs offer frequency lists, concordances, collocational information, and grammatical information (word-class tags and parsing). Annotation of corpora with linguistic (and nonlinguistic) information is ongoing, but as corpus research has already challenged many assumptions about language, it seems perverse to some that corpora should be annotated with traditional, precorpus concepts, which might coerce lexicographers into traditional descriptions.

The Impact of Corpora on Lexicography

The impact of corpora on lexicography has been enormous. Although the examples below are drawn from United Kingdom EFL dictionaries, the same phenomenon has been witnessed in many countries and involves many languages. New nation states, states which did not previously possess a national

dictionary, states whose national dictionaries were felt to be in need of renewal, and multilingual states in which some languages were inadequately recorded have all become highly active in corpus lexicographic endeavors. Problems of differing character sets and morphological systems have been rapidly overcome by software solutions, and the increasing availability of electronic data in most languages has fulfilled the evidential needs.

It would be impossible to list all the corpus lexicography projects currently in progress, but a visit to the websites of Euralex (the European Association for Lexicography, founded in 1983), Australex (1990), Afrilex (1995), and Asialex (1997) gives some indications of the rate of advance.

Lexicographic Details of the Impact of Corpora

During the 1990s, the major United Kingdom EFL dictionaries became increasingly influenced by corpus data, and the corpora rapidly increased in size (to 100 million words and more). There is substantial evidence of revolutionary changes in the dictionaries, despite many minor variations due to editorial judgments, marketing policies, etc.

The use of corpus frequencies in decisions on the inclusion or exclusion of forms (including spelling variations and multiword compounds) meant that many archaic or rarer words and meanings were excluded and many new words and meanings were added. The status of words changed: some main entries were reduced to cross-references, and vice versa; some verb entries became *-ed* adjective entries; some subordinate entries became main entries. Subsequently, frequencies were explicitly indicated in Cobuild, Longman, and Macmillan dictionaries.

The relative frequency of meanings in corpora led to their reordering in dictionaries, often overturning the traditional practice of placing 'etymological' meanings first (e.g., entries for *surge* place 'quantities, feelings, activities and crowds' before 'waves, sea, tides'; delexicalized or 'light' uses of common verbs like *take*, e.g., *take a bath, take a bite, take a chance, take an interest, take a look,* and *take a photo,* are given more prominence).

More accurate information about the use of words and meanings in specific text types and subcorpora allowed more precise labeling of register (e.g., formal/informal), variety (e.g., British/American), mode (e.g., spoken/written), genre (e.g., broadsheet/tabloid journalism, literature), and domain (e.g., medical, legal).

The in-depth information from corpora about the exact grammatical and phraseological patterns, collocations, semantic prosodies, pragmatics, and situational contexts can greatly enhance the dictionary entries (e.g., 'unpleasant things' *set in;* the *targets* people *overshoot* tend to be financial rather than relating to archery or gunfire; *cheers* is used in informal British English to say 'Thank you' or 'Goodbye'). Collocations are usually highlighted in entries, but phraseological variations sometimes result in complex citational forms (e.g., *give sb/get a rap on/over/across the knuckles*).

The abundance of corpus examples has eliminated the need to invent examples but presents lexicographers with new problems: selecting appropriate examples and deciding their exact extent (and in some cases when and how to amend examples). Overall, the wealth of information from the corpus has exhausted the space allowance in printed dictionaries but may find fuller expression in future electronic editions. The increasing frequency of editions (now every five years or so) may result partly from the use of corpora (and computer-assisted dictionary creation in general) but may also be due to increased competition, the global growth of EFL, and other factors.

Native-Speaker and Bilingual Lexicography

In the United Kingdom, the influence of corpora has spread from EFL dictionaries to native-speaker dictionaries. The *New Oxford dictionary of English* (NODE) was the first native-speaker dictionary to be based on a corpus, and its entries were shaped by a systematic analysis of the British National Corpus. Collins use their French, German, and Spanish WordBanks for their bilingual dictionaries. The *Oxford-Hachette French dictionary* used the British National Corpus and the Bank of French.

For most native-speaker dictionaries, corpora are still inadequate in size and are also slightly out of date by the time they are available to lexicographers. So 'reading-and-marking' of the latest newspapers and magazines, and attentive listening to radio and television broadcasts, are still a necessity. An additional problem for native-speaker dictionaries is that their users require a greater coverage of paradigmatic usage possibilities (rather than an outline of typical and common usage, as in EFL dictionaries; hence *overstaff* is usually listed as a verb, 'to provide an excessive number of staff' or 'to supply with too many employees,' rather than *overstaffed* as an adjective and *overstaffing* as a noun, as corpus data would suggest) yet demand that they should be arbiters of correct usage (hence United Kingdom dictionaries

still do not list the spelling *rarified*, accepted by many U.S. dictionaries and well attested in corpora).

NODE moved closer to the EFL style, making many more lemma forms into separate headwords, omitting many old and rare uses, highlighting the different types of information within each entry, and adding many notes that reflect common usage (e.g., 'split infinitives'; *they* as a singular gender-neutral pronoun; *media, data*, and *graffiti* with singular verbs) rather than tradition. It therefore undeservedly received the criticism of being 'dumbed-down' from reviewers who demanded authoritativeness but actually wanted conservatism.

As mentioned earlier, many major corpus-based dictionaries for national and regional languages are being produced, especially in central and eastern Europe, Africa, and Asia. However, corpora have not made the same lexicographical impact in the United States so far. This may represent a theoretical stance (i.e., reflecting a Chomskyan view of corpora as 'performance' data, inherently flawed, and the province of psychology rather than linguistics) or merely a financial reluctance to invest the large sums required to create lexicographic corpora, as the dictionary market in the United States is keenly competitive and delicately poised. U.S. dictionaries generally continue to use the manual citation–collection method. The release of the first 10 million words of the American National Corpus (Ide *et al.*, 2002), with the promise of 100 million words to follow, may affect this situation.

Bilingual dictionaries have until recently relied on monolingual corpora for their language pairs, but parallel corpora (consisting of translated texts or closely comparable texts) and software that can display concordances in both languages simultaneously are already available and are likely to increase in size and use. Corpora have perhaps strengthened the trend away from word-equivalence to phrasal equivalence. However, establishing authentic equivalence is still a highly problematic endeavor (and anomalies continue to exist: e.g., *cutting edge* is an entry in the English–French section of Oxford-Hachette, with *avant-garde* as its equivalent, but the entry for *avant-garde* in the French–English section offers *vanguard* and does not mention *cutting edge*).

Conclusions and the Future

The aims of lexicography remain unchanged. Dictionaries list the words that occur in the texts of a language and therefore contain generalizations about the word usage in those texts. However, few dictionaries in the past have supplied the textual evidence their entries were based on, so users have had to rely on the ability and probity of the lexicographer. Some dictionaries have given citations to validate word meanings or uses, but their sources were necessarily restricted.

Corpora can now provide substantial evidence and are a potential boon to lexicographers because computers can take over the more mundane tasks of data collection, storage, and management, as well as some routine elements of data analysis. Lexicographers should therefore be released for the tasks that require editorial judgment and human ingenuity in selection and presentation. Corpus lexicography still depends on the lexicographer to accurately reflect the evidence, so the user still relies on the lexicographer. However, as corpora become more widely available, lexicographic statements can be directly verified in a corpus. This switches the focus of attention to the validity of the corpus: is it large enough, is it truly representative of the language as a whole (for example, spoken data still forms a relatively small proportion of most corpora), etc. If software continues to become more sophisticated, to what extent might its masked procedures allow the outputs to become distorted?

The future of corpus lexicography remains uncertain. The dynamic progress of the 1980s–1990s has slowed. Costs remain high. Corpus size is less of a problem, but software development has slowed; semantics is still a major stumbling block; sense disambiguation is making slow progress. The restrictions of the printed page should be alleviated by the online dictionary (for instance, the OED) with numerous hyperlinks; print editions superseded by continual background updates.

See also: Australian Lexicography; Bilingual Lexicography; Collocations; Computational Lexicons and Dictionaries; Computers in Lexicography; Concordances; Corpora; Corpus Approaches to Idiom; Corpus Linguistics; Czech Lexicography; Data and Evidence; Dutch and Flemish Lexicography; English Lexicography; French Lexicography; German Lexicography; Hebrew Lexicography; Hungarian Lexicography; Japanese Lexicography; Korean Lexicography; Learners' Dictionaries; Lexicography: Overview; Phraseology; Polish Lexicography; Romanian Lexicography; Russian Lexicography; Scandinavian Lexicography; Slovak Lexicography; Slovenian Lexicography; Spain: Lexicography in Iberian Languages; Statistics; Turkish Lexicography.

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Eugenio Coseriu was born in Mihăileni in Bessarabia (then a part of Romania, now the Republic of Moldova). He studied Romance philology, Slavic philology, and philosophy at the universities of Iaşi (1939–1940), Rome (1940–1944), Padua (1944–1945), and Milan (1945–1949). He took a first doctoral degree in philology at Rome, then a second one in philosophy at Milan. From 1951 to 1963 he was Professor of General and Indo-European Linguistics at the University of Montevideo, Uruguay, and also Professor at the city's Instituto de Profesores. In 1963 he was appointed Professor of Romance Philology and, from 1966, also of General Linguistics at the University of Tübingen, Germany. Coseriu retired in 1989 but continued lecturing and attending conferences all over the world until his death in Tübingen in 2002.

Coseriu knew many languages, and as a young man translated poetry and wrote literature. In his research he combined his vast knowledge of the humanities in general and his flair for theoretical issues with detailed empirical analyses in a large number of languages and linguistic disciplines. His major contributions lie in the fields of language theory, the history of the language sciences, Romance philology, semantics, historical linguistics, functional grammar, text linguistics, and comparative linguistics. In these fields Coseriu's influence on modern research has been considerable throughout the world, except for the United States and the United Kingdom.

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Introduction

A corpus is an electronically stored collection of samples of naturally occurring language. Most modern corpora are at least 1 million words in size and consist either of complete texts or of large extracts from long texts. Usually the texts are selected to represent a type of communication or a variety of language; for example, a corpus may be compiled to represent the English used in history textbooks, or Canadian French, or Internet discussions of genetic modification. Corpora are investigated through the use of dedicated software.

Corpus linguistics can be regarded as a sophisticated method of finding answers to the kinds of questions linguists have always asked. A large corpus can be a test bed for hypotheses and can be used to add a quantitative dimension to many linguistic studies. It is also true, however, that corpus software presents the researcher with language in a form that is not normally encountered and that this can highlight patterning that often goes unnoticed. Corpus linguistics has also, therefore, led to a reassessment of what language is like.

This article discusses the resources and methodologies used by corpus linguists and then moves on to some key observations relating to comparative frequency and to patterning. It also considers the importance of corpus linguistics for linguistic theory and presents some of the applications of corpus research.

Resources and Methodologies for Corpus Linguistics

Corpora

The basic resource for corpus linguistics is a collection of texts, called a corpus. Corpora can be of varying sizes, are compiled for different purposes, and are composed of texts of different types. All corpora are homogeneous to a certain extent; they are composed of texts from one language or one variety of a language or one register, etc. They also are all heterogeneous to a certain extent, in that at the very least they are composed of a number of different texts. Most corpora contain information in addition to the texts that make them up, such as information about the texts themselves, part-of-speech tags for each word, and parsing information.

Searches, Software, and Methodologies

Corpora are interrogated through the use of dedicated software, the nature of which inevitably reflects assumptions about methodology in corpus investigation. At the most basic level, corpus software:

- searches the corpus for a given target item,
- counts the number of instances of the target item in the corpus and calculates relative frequencies,
- displays instances of the target item so that the corpus user can carry out further investigation.

It is apparent that corpus methodologies are essentially quantitative. Indeed, corpus linguistics has been criticized for allowing only the observation of relative quantity and for failing to expand the explanatory power of linguistic theory (for discussion, see Meyer, 2002: 2–5). It is shown in this article that corpus linguistics can indeed enrich language theory, though only if preconceptions about what that theory consists of are allowed to change. Here, however, we leave that argument aside as we review corpus investigation software in more detail.

Search Items

Any corpus, including a 'raw' corpus (that is, a corpus that consists only of text, with no further information added), may be searched for instances of a single word (e.g., *day*). Most search software

also allows a single search to find sets of words (e.g., *day*, *month*, *year*) and strings of words (e.g., *the next day*).

If the corpus is tagged for part of speech, the tags can form part of the search. Depending on the software, it is possible to search for a word when it is tagged for a particular word class only, such as *light* when it is tagged as an adjective, not as a noun or a verb; given sequences of tags, such as 'preposition + determiner + noun'; or individual words followed or preceded by given word classes, such as *fundamentally* followed by an adjective. Similarly, a corpus that is parsed will allow searches for particular clause types or structures. For example, Nelson *et al.* (2002) describe searching the International Corpus of English for sentences containing an *if* clause before or after the main clause.

Finally, corpora can be annotated for other kinds of information, such as semantic categories, categories of cohesion, or the representation of speech and thought (Garside *et al.*, 1997). Software can count the occurrence of such categories and, usually, compare their frequency in corpora of different kinds.

Word Lists and Frequency Information

A word list is a list, usually arranged either alphabetically or in frequency order, of all the words in a given corpus with information about the number of times that word occurs in the corpus. The simplest word lists interpret 'word' as simply a string of letters; so, for example, the number of occurrences of *run* is given without distinction between the noun and the verb, and the occurrences of *runs, running*, and *ran* are given separately. More sophisticated lists distinguish between, say, the noun and verb occurrences of *run* and give summary figures for a whole lemma, such as for *run, runs, running, ran*, all occurring as verbs (Leech *et al.*, 2001). Much more difficult, and indeed not publicly available, are word lists that distinguish between senses (e.g., between *run* meaning 'move in fast motion' and *run* meaning 'manage an event or organization').

Comparative Frequencies

Information about frequency is not very informative unless it is comparative. In the Nelson *et al.* (2000) study of *if* clauses, for example, it is noted that whereas in written registers and formal spoken registers these clauses are more frequent before the main clause than after, in informal spoken registers the reverse is the case. Thus, information about frequency is generally used to compare one corpus with another and, by implication, to compare two languages, varieties of a language, or text types.

Unless the two corpora being compared are exactly the same size, raw frequency information is of limited use. For example, the word *quite* occurs 11 441 times in a corpus consisting of issues of the *Times* (London) newspaper and 22 594 times in a corpus consisting of spoken British English. That is, there are about twice as many instances in the spoken corpus as in the *Times* corpus. However, the two corpora are very different in size. (Both corpora are part of the Bank of English corpus, owned jointly by the University of Birmingham and the publisher HarperCollins. The *Times* corpus contains about 51 million words, and the spoken corpus about 20 million.) It is more helpful to say how many times *quite* occurs, on average, in every million words of each corpus. This shows that *quite* is even more frequent, relatively, in the smaller, spoken corpus than the raw figures suggest. It occurs 1125 times every million words in the spoken corpus and 220 times per million words in the *Times* corpus. In other words, it is used about five times as frequently in the spoken corpus as in the *Times* corpus.

What is still uncertain from a calculation such as this one is how important such a difference is. Is the higher incidence of *quite* in the spoken corpus sufficient to consider it to be a marker of speech? Log likelihood calculations are often used to rank differences between corpora. According to Leech *et al.* (2001), *quite* is about the hundredth most different word in a comparison between the spoken and written components of the British National Corpus, with a very high log likelihood of about 8500.

A similar calculation is used to compare relatively small corpora of specialized texts with larger, more general corpora, using the Keywords program (part of the Wordsmith Tools suite, Scott, 1996). Keywords ranks the words in the specialized corpus in order of the magnitude of their difference from the general corpus. This indicates what makes the specialized texts different from English in general. Most Keywords are lexical words that reflect the specific content (or the 'aboutness,' in Scott's terms) of the text or small corpus. For example, a corpus of newspaper feature articles, when compared with a more general corpus of newspaper texts, is found to have Keywords such as *tax*, *European*, *war*, *education*, *schools*, and *church* (Scott, 2001: 116). These reflect the prevalent themes of the articles in question. Some Keywords, more surprisingly, are grammatical items, such as pronouns, prepositions, or *be* (Scott, 2001: 126). Such words often occur in specific phraseological sequences that are more frequent in the specialized corpus than in the general one. Gledhill (2000), for example, notes that sections of research articles can be distinguished in this way.

Collocations

Collocation is the tendency of some words to co-occur more frequently than others. The words that frequently cooccur with a node word are known as the collocates of that node word. Software that calculates the frequency of collocates has to work on a given 'span,' that is, a set number of words before and after the node. A span of 4:4 is often used (that is, four words before the node and four words after it), but most software allows the user to specify the span. The software then gives a list of the words that occur within the selected span.

The simplest collocate list is in order of raw frequency, but this tends to include words that are not particularly significant for a given node word but that are very frequent in the language as a whole. In English, for example, *the* tends to occur near the top of many collocate lists simply because it is so frequent overall. Statistical packages (such as *t*-score, *z*-score, or mutual information) are often used to correct for this. These calculations compare the actual number of occurrences of a given word as a collocate with the number of occurrences that would be expected if the words in the corpus were distributed randomly. Depending on the package used, a list of collocates ordered according to significance can prioritize words that are unusual outside the context of the node word (such as *unblinking gaze*, where *unblinking* is infrequent except when it occurs with *gaze*) or words that have a wider range of behaviors (such as *his or her gaze*, where the possessives of course occur with a multitude of nouns – it is, however, significant that *gaze* is often preceded by a possessive) (Hunston, 2002: 69–74).

Collocates can be shown as a simple list, or the list can be organized to show where in relation to the node word each collocate normally appears. For example, Table 1 shows a list of the 15 most frequent collocates of *gaze* (Hunston, 2002: 69–70).

The 10 most significant collocates occurring immediately before *gaze* are *his*, *her*, *'s*, *my*, *to*, *public*, *their*, *your*, *our*, *steady*. The 10 most significant collocates in the position immediately after *gaze* are *at*, *of*, *on*, *into*, *upon*, *out*, *from*, *was*, *and*, *fixed*. Significant collocates occurring two places to the left of *gaze* include *under*, *turned*, *followed*, *shifted*, *avert*, *fixed*, and *returned*.

Table 1 Collocates of *Gaze*

the	1511	he	277	under	154
his	822	from	228	their	140
her	628	with	225	public	109
's	442	she	213	fixed	102
on	333	my	177	then	86

Concordance Lines

All the software discussed so far carries out a number of statistical operations on items found in the corpus, ranging from simply counting the number of occurrences to measuring the degree of significance of occurrence. In contrast, software that presents concordance lines simply identifies the target item (usually a word or phrase) each time it occurs in the corpus and presents each instance, or as many as are required, to the corpus user. Usually this is done with the target item in the center of the screen and a few words to the left and right of that item. This 'key word in context' presentation, as it is known, has a number of uses. Even the small amount of context is usually enough to show what the word or phrase means, what phrases it often occurs in, and/or the discourse function that it has. Quantitative information about word meaning and function that is not available automatically can therefore be calculated.

Importantly, concordance lines can usually be sorted so that the word(s) coming before or after the node word are arranged alphabetically. This has the advantage of making more obvious the recurring phraseology that many words are part of and that are not revealed by lists of collocates.

Concordance lines are usually of a length so that they will fit neatly in a computer window or on a normal size piece of paper, with each 'line,' or instance of the target word, occupying one line of print (see Figure 1). This makes patterning easy to observe. It is, however, only a convenience, and often users find it beneficial to look at more context – that is, to look at concordance lines that are much longer than the width of a computer window. Most software will allow the concordance line to be expanded in this way.

Comparing Frequency of Occurrence

Most of the software mentioned thus far in this article is essentially comparative. Word lists and collocation software compare the frequencies of two items in a single corpus. Log likelihood and Keywords compare the frequency of items in more than one corpus. Comparative frequency is the essence of many kinds of corpus research.

Types of Comparisons Made

Comparisons are often made between different languages or varieties, between different registers or types of text, and between different historical periods.

Languages and Varieties

Studies that compare different languages use two kinds of corpora, here given the labels 'parallel corpora' (where one corpus consists of translations of texts in the other corpus) and 'comparable corpora' (where each corpus consists of the same kind of texts written originally in each language). These studies, which can show the difference in frequency of particular features, are often used to demonstrate the lack of direct equivalence between apparently similar aspects of related languages. For example, Johansson (1996) notes that although *wh-* cleft sentences, such as "What we need is a new car," occur in both English and Swedish, they are more frequent in English than in Swedish. Translations from English into Swedish tend to replace the *wh-* cleft construction with an alternative word order, while translations from Swedish into English only occasionally replace the alternative with a *wh-* cleft. As a result, texts that are English translations of Swedish contain an unusually low number of *wh-* clefts. Another example is the English word *and* and its translation equivalents in French (*et*) and Swedish (*og*). Comparable corpora that contain equivalent original texts of the three languages show that *et* is less frequent in French than *and* is in English and that *og* is more frequent in Swedish than *and* is in English (Allén, 1970). Comparing individual translated examples can be very revealing of how these differences in frequency come about. For example, Schmied and Fink (2000) notes that in their corpus the English word *with* is translated using the apparent German equivalent *mit* in fewer than half the instances. Translators sometimes use other prepositions (e.g., *with a city as compact as Cardiff* translated as *bei einer kompakten stadt wie Cardiff*), or other parts of speech (e.g., *with energy* translated using the adverb *energisch*) or choose an alternative way of expressing the idea (e.g., *the advent of secondary school for all children, with more democratic access to university* is translated with *und* 'and' joining the two noun phrases, instead of *mit*).

The work on collocation and meaning has also been applied crosslinguistically. Words that appear to be synonyms, because they are translated by a single item in another language, may be shown to have different collocates. Teubert and Čermáková (2004: 153), for example, show that while the French word *travail/travaux* can be translated as either *work* or *labor* in English, the collocates of *work* and *labor*, when these translate *travail*, do not overlap. In other words, although *work* and *labor* have the same translation into French, they are used in English in completely different contexts.

Varieties of a single language are also compared. Meyer (2002: 125), for example, compares the frequency of 'pseudo-titles' (e.g., *lawyer Freda Jones*) in newspapers from different countries where English is a major language. He confirmed what has long been known, that newspapers in the United States use such titles more than those in Britain. It might be expected, then, that the Philippines, influenced by America, would use such titles more than New Zealand, influenced by Britain. In fact, Meyer finds that pseudo-titles are more frequent in both the Philippines and the New Zealand press than they are even in the U.S. press.

U.S. and British English were extensively compared in Biber *et al.* (1999). Among their findings were the following:

- Progressive aspect is used much more frequently in American conversation than in British conversation, whereas the perfect aspect is used more frequently in British news reporting than in the American equivalent (462).
- The modals *will*, *(had) better*, and *(have) got to* appear more frequently in British conversation than in American, whereas *have to* and *be going to* appear more frequently in American conversation (488).
- British conversation uses more initial and final ellipses than American conversation does, whereas American conversation uses more medial ellipses than British conversation does (1108).
- Negative interrogatives were used about twice as often in British conversation as in American (1115).

Register

Much of the comparative work using corpora has compared a language such as English as it appears in different contexts. These contexts have sometimes been defined in line with a linguistic theory (e.g., in Matthiessen, 2005, where register is defined according to systemic theory), or according to a less theoretical, 'commonsense' view of where clear distinctions might lie. Biber *et al.* (1999), for example, take broad 'register' categories of conversation, fiction, news reporting, and academic prose. Others have made more refined distinctions: the CANCODE corpus of spoken English, for example, distinguishes between 'transactional,' 'professional,' 'socializing,' and 'intimate' contexts (Carter, 2004); Hyland

(2000) distinguishes between academic genres such as research articles, book reviews, abstracts, and textbooks and between different academic disciplines. Much of the work involved in register comparison has focused on explaining quantitative results qualitatively. Mostly, variation in frequency has been accounted for in terms of differences in communicative function or rhetorical purpose.

Comparisons between registers may focus on single words, or more usually on sets of words, phrases, or patterns that are known to share a meaning or function, with the aim of describing variation between registers in the realization of that function. Conrad and Biber (2000), for example, compare frequencies of stance adverbials in conversation, news reporting, and academic prose. They find that such adverbials are most frequent in conversation and that single adverbs expressing epistemic meaning are the most frequent, though prepositional phrases are relatively frequent in academic prose and news. Hyland (2001) compare the frequency of self-citation (where an author refers to other papers he or she wrote) in eight different academic disciplines, including physics, marketing, sociology, and mechanical engineering. He notes that self-citation is more frequent in sciences than in humanities or social sciences. Hyland argues that this difference can be accounted for by the greater reliance in science on a given body of previous work in a relatively small disciplinary area, whereas research in humanities tends to be drawn from a wider base and does not rely as much on immediately preceding research. Semino and Short (2004) take categories of representation of speech and writing (such as direct speech and free indirect speech) and compare their frequency in corpora compose of fiction, newspapers, and (auto)biography. They find that direct speech is the most frequent category overall and that it is particularly frequent in fiction. Newspapers use more indirect speech, and summaries of speech events, than fiction does. (Auto)biography comes between the two other corpora, in that it uses less direct speech than fiction and less indirect speech than newspapers.

Register comparisons focusing on grammatical categories are also common. The largest of these is Biber *et al.* (1999), which compares the frequency of almost all grammatical categories between conversation, fiction, news reporting, and academic prose. Among the categories are word class (more nouns in the written registers, more pronouns and verbs in conversation), clause types (there were more interrogative and imperative clauses in conversation than in the other registers), and tense and aspect (more present tense in conversation and academic prose, more past tense in fiction, about equal proportions in news).

Historical Period

Comparisons between historical periods are difficult because of the lack of truly comparable corpora. Although substantial numbers of texts from earlier periods are now available electronically, there is nowhere near the same quantity or variation as is available for contemporary texts. However, some work is possible, and this can show how both language and ideas have changed over time. Using the multidimensional approach described in this article's section 'Multidimensional Variation' for example, Biber and Finegan (2001) show that between 1650 and 1990 the conversations represented by a corpus of drama became stylistically closer to modern casual conversation, demonstrating 'involvement,' a personal style, and a close connection to the immediate situation. Medical prose, on the other hand, over the same time period became less involved, more impersonal, and more removed from the immediate context. Whereas in 1650, drama and medical prose were relatively close to each other stylistically, over the centuries they became more distinct in style, with drama adopting the characteristics that we now associate with speech, and medical prose adopting those associated with writing.

Using the same time period but a different methodology, Hundt (2004) traces the decline of the 'passival' (active clauses with passive meaning, such as *The house is building*) and the rise of the 'progressive passive' (e.g., *The house is being built*). In the part of the corpus dating from 1650 to 1800, only the passival was found. The progressive passive first appeared in the early 19th century, but it then increased rapidly in frequency, becoming far more frequent, relatively, than the passival ever was. By 1990 the passival had all but disappeared.

It is not only style and grammar that can be shown to change over time. Teubert (2004b) traces the development of the English word *guilt* through a succession of literary and other texts, including those by Shakespeare, Milton, and George Eliot. He shows that although current writers have often ascribed feelings of guilt to characters in those works, in fact *guilt* was not used as a word to describe feelings until the second half of the 19th century. He further argues that this represents a change in the collective consciousness in the English-speaking world at that

time and that the change in both language and consciousness is attributable to the work of some German writers, including Freud.

Issues in Comparison

A number of themes recur in discussions of comparison between registers and deserve special mention: the difference between speech and writing; multidimensional variation; and probability.

Speech and Writing The variation between spoken and written English has been studied through the use of corpora by, among others, McCarthy and Carter (2002) and Biber *et al.* (1999). Their findings can be summarized thus:

- There is a high incidence in spoken English of hesitations, false starts, repetition, and other features attributable to the difficulty of producing language quickly and spontaneously. These features are missing in written English.
- There is a difference in the frequency of some grammatical categories, attributable to various aspects of the contexts of speech and writing, such as the greater possibility of exophoric reference in face-to-face communication, which accounts for the higher incidence of pronouns in speech.
- There is a difference in the frequency of some semantic or pragmatic categories, such as the higher incidence of 'vague language' in speech, attributable to the affective and interpersonal qualities of speech.
- There are present in speech certain grammatical features that occur regularly and without speaker comment, which are not dialectal and yet which occur rarely in written English. Some of these would be considered 'ungrammatical' in formal written English. These include the following:

1. Ellipsis of the subject, or the subject and operator, where this is not recoverable from context ('situational ellipsis') – e.g., *Don't know* (for 'I don't know') or *Going clubbing tonight?* (for 'Are you going clubbing tonight?')
2. Occurrence of a noun phrase preceding or following a clause that repeats a clause element such as the subject or object – e.g., *That friend of yours, he's quite nice* or *He's quite nice, that friend of yours*
3. Occurrence of freestanding clauses beginning with a subordinator, such as *which*, and of freestanding nonclausal phrases, such as *Nice day*
4. Occurrence of verbs in progressive aspect that in written English are rarely or never progressive – e.g., *I was saying* or *I was looking*.

The question arises as to whether these features suggest that spoken and written English are different varieties warranting different descriptive categories or whether a single grammar will account for both, with differences in frequency and contextual constraints duly noted.

McCarthy and Carter (2002: 51) argue that "spoken grammars have uniquely special qualities that distinguish them from written ones." Carter and McCarthy (1995: 141) make the less radical claim that grammar based on written English only does not describe patterns that nonetheless recur in spoken English. Carter (2004: 57) describes speech and writing as a continuum. In all, they seem to suggest that the two modes share a good deal of common ground, but that some aspects of each need to be described separately, as a description based on one would not apply to the other.

Multidimensional Variation The notion of multidimensional variation was developed by Biber (1988). Biber noted that statistically features tend to cluster in texts, so the presence of one feature makes the presence of given other features more likely and the presence of others less likely. For example, present tense verbs tend to be positively associated with pronouns, *be* as main verb, contractions, hedges, and amplifiers and to be negatively associated with nouns, prepositions, attributive adjectives, and long words (Conrad and Biber, 2001: 23). Having identified this bundle of cooccurring features, Biber (1988) glosses the meaning of a high level of incidence of the features as 'involved,' while a low incidence is 'informational.' He then maps a number of registers (that is, corpora consisting of texts of the same type) onto this dimension. Informal spoken registers, such as conversations, appear high on the dimension – that is, they are highly 'involved.' Formal written registers, such as academic prose and official documents, appear low – that is, they are highly 'informational.' There is, however, considerable overlap between written and spoken registers: personal letters and interviews appear close to each other on the dimension, as do romance fiction and prepared speeches, professional letters and broadcasts. Biber identifies seven dimensions in all, although most work in this area highlights dimensions 1 and 2 (Conrad and Biber eds., 2001):

1. Involved – informational
2. Narrative – nonnarrative
3. Elaborated reference – situation-dependent reference
4. Overt expression of argumentation
5. Abstract style – nonabstract style

6. Online informational elaboration marking stance
7. Academic hedging.

What is most interesting about Biber's work is the observation that registers are not consistently like or unlike each other. For example, academic prose and press reportage score exactly the same on dimension 1, but on dimension 2 academic prose is strongly negative, while press reportage is slightly positive; on dimension 3 academic prose is strongly positive and press reportage is slightly negative. Work by Biber, Conrad, and others has used this multidimensional approach to compare corpora of texts from different historical periods, academic texts from different disciplines, and corpora of British and American English (Conrad and Biber, 2001).

Probability Halliday (1978) describes language as a semiotic system consisting, in abstract, of a series of interlocking networks. The networks represent series of choices that can be made in the language (for example, between interrogative, imperative, and declaration moods, or between present and past tenses, or between mental, material, and relational processes). Each choice can be assigned a probability of occurrence based on its actual frequency of occurrence in a large corpus. For example, Halliday and James (1993) calculate that in a large general corpus (the Bank of English), present and past tenses occur with approximate equal frequency, while positive clauses occur overwhelmingly more frequently than negative ones, in a proportion of about 9:1. A further stage in the argument, however, is that each register – that is, the discourse found in each contextual configuration – has a set of frequencies, and therefore of probabilities, that are different from the general overall probability. More accurately, the overall probability is an amalgamation of the probabilities of all the registers making up the whole. Furthermore, the probabilities of occurrence in each register are themselves the outcome of the frequency of a given feature in each of a number of texts.

Matthiessen (2005) illustrates this concept and notes that whereas some probabilities remain fairly constant across texts and across registers, others vary considerably. For example, comparing written news reports with spoken interviews, he notes that one news report that he studies uses almost 100% positive clauses, whereas one interview uses about 93% positive. The news reports as a whole use about 96% positive, showing the one sample text to be a fairly extreme example. This incidence of positive clauses is just a little higher than it is in all the written texts in Matthiessen's corpus (95%). The interviews taken together use about 90% positive, which is about the same as all the spoken texts. The overall proportion of positive to negative in Matthiessen's corpus is just over 9:1 – that is, about the same as Halliday's calculation for the Bank of English – and the most extreme variation, between all interviews at 90% positive and one news report at 99% positive, is not great. For process types, however, the differences are more pronounced. With the whole corpus taken together, material and relational processes occur with equal frequency. In all the spoken texts taken together, they also occur with nearly equal frequency, but in all the written texts taken together, material processes occur in more than 60% of clauses, whereas relational processes occur in fewer than 40%. In news reports, both material and relational processes occur proportionally less frequently than in written texts as a whole, the difference being accounted for by the greater frequency of verbal processes. Perhaps most interesting are the interview texts, which overall use a lower proportion of material processes and a greater proportion of relational processes than all spoken texts do. The one sample interview text highlighted by Matthiessen, however, does not follow this trend. In this text, the proportion of material processes is higher than the proportion of relational processes. In fact, the proportion of material processes in the sample interview text is about the same as that in the sample news report text.

Systemic linguistics emphasizes the interrelation between a single instance of language – a single text – and the register to which it belongs, and between that register and the language as a whole. Individual choices made in a single text affect the frequencies in the register and in the language, but at the same time those choices acquire meaning from their alignment with or difference from the norm for the register and for the language. Because probability and register are essential components of systemic linguistic theory, the assessment of frequency of the kind carried out by Matthiessen is an essential component of that theory.

Observing Patterned Behavior

Phraseology

Observing Repetition in Concordance Lines Concordances lines bring together and display instances of use of particular word from the widely disparate contexts in which it occurs. When concordance lines are sorted alphabetically, repetitions can be seen that are not obvious when the word is encountered in the ordinary course of reading or listening. The repetitions can be of individual words or of types of words. For example, Figure 1 shows 30 concordance lines for the word *fact*, randomly selected, using

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 1 ctions, according to him it remained a fact that the interactions tended t
 2 that I am not/do not look Caucasian, a fact that seems to have led the gue
 3  makes it not as simple as it seems, a fact that can discourage the housek
 4 o present what is taken-for-granted as fact, the presence of items disting
 5 chieved much better results and may in fact be able to read English reason
 6 sals: a number of students had not, in fact, been aware that faculty have
 7 s of the two groups of judges were, in fact, comparable, or whether the t
 8 o modify their utterances by hedges in fact demonstrates a scholarly order
 9  of text which is located close by: in fact, following immediately. On the
10 be no harsher than the ESL raters, in fact, if anything, the reverse. T
11  adequate.  Representativeness is, in fact, often regarded as being in di
12 r, we discovered that students are in fact present as architects of their
13 than in the other one Bell taught. In fact, there were so many questions
14 he highest in demand (Tsui, 1992); in fact, this study concluded that uni
15 cieties. What she was arguing for, in fact, was NA beyond the workplace.
16 cal production should not conceal the fact that  scientific production wo
17 draw the attention of students to the fact that their language choices r
18 the early 19th century was due to the fact that 19th century  Europe alr
19 issue is complicated, however, by the fact that our EAP classes are freq
20 mple B (real world).  In spite of the fact that flotation processes hav
21 rent perceptions of tasks reflect the fact that all views of them are so
22 est of clinical medicine. Despite the fact that the participants achieved
23 ch a possibility was indicated by the fact that strikingly  well-preserve
24 l pronouns, particularly I or we  The fact that the writer of a single-au
25  the humanities. On the contrary, the fact that two research students in
26 tion, his use of power over them. The fact that the students pay tuition,
27 nning of the talk what effect did the fact that the vehicle was a Japa
28 g from the students' feedback was the fact that, despite  their diverse n
29(Swales,1990). This was related to the fact that, at that time, human agen
30 ate directly to client policies. This fact may have an influence over the
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Figure 1 Instances of the word *fact*.

Wordsmith Tools, from the 350 instances of this word in a corpus of research articles in the field of applied linguistics. The lines have been sorted so that the words preceding and following *fact* are in alphabetical order.

It is immediately apparent that *in fact* and *the fact that* occur very frequently. Together these phrases account for 25 out of the 30 lines. To investigate further the behavior of *the fact that*, a random 24 lines from the same corpus are shown in Figure 2.

These lines reveal more repetitions: *due to the fact that* is relatively frequent, as are *given the fact that* and *reflect(s) the fact that*. More generally, the lines indicate that *the fact that* typically follows phrases that do one of two things:

- They indicate that a fact is or is not noticed: *take into account*; *take into consideration*; *conceal*; *neglect*; *points to*; *draw attention to* (lines 1, 3, 4, 12, 23, 24).
- They indicate the relationship between one fact and another: this relationship is often one of contrast (*despite*; *regardless of*), or cause (*reflect*; *attributed to*; *due to*), but other relationships are found (*compounded by*; *independently of*; *given*; *in addition to*) (lines 2, 6, 8, 9, 13, 14, 15, 16, 17, 19, 20, 21, 22). Lines 10 and 11, which have to be expanded to show more context before sense can be made of them, are other examples of 'addition': *An additional consideration . . . is the fact that . . . Another interesting issue . . . is the fact that. . .*

Phrases and Phraseology The discussion of *fact* illustrates the difference between phrases and phraseology. *In fact* is an example of a 'fixed phrase,' in that it always occurs in the same form and behaves like a single word. *The fact that* is a frequently recurring phrase that is nonetheless not fixed. *A fact that* is found, though it is not as frequent; occasionally other words interrupt the sequence, as in *the very fact that*. Also, other words can replace *fact*, giving sequences such as *the assumption that*, *the idea that*, *the notion that*, and *the view that* (all examples come from the same corpus as in the previous section). On the other hand, sequences such as *due to the fact that* are examples of the broader phraseological behavior of *fact*, which includes nonrecurring items that nevertheless share a type of meaning. In other words, even though the sequence *in addition to the fact that* occurs only once in the corpus mentioned in the previous section, and therefore cannot possibly constitute a phrase, *in addition to* is still part of the phraseology of *fact*.

There is a considerable amount of research that investigates the occurrence of phrases in corpora. 'Phraseology,' meaning the investigation of phrases, is a recognized topic in lexicography, for example, and has been invigorated by the introduction of corpus techniques, which make the identification of phrases more accurate (Cowie, 1998).

The study of phraseology, the tendency for words to occur in some environments more than others, is more recent and also arises from lexicography.

```
 1 However, if we take into account the fact that the students were studying
 2  schemata. This is compounded by the fact that the texts should ideally be
 3 al production should not conceal the fact that scientific production worl
 4 cially taking into consideration the fact that the `Bulgarian deviations'
 5 the humanities. On the contrary, the fact that two research students in su
 6 st of clinical medicine. Despite the fact that the participants achieved v
 7 ning of the talk what effect did the fact that the vehicle was a Japanese
 8 they and their peers make. Given the fact that we are dealing with academ
 9 th effective language use. Given the fact that English is the predominant
10 ing these exit-level courses is the fact that most students who have rea
11 brought about in the results is the fact that some choices can perform mo
12 hat this position also neglects the fact that most ESP/EAP learners need
13 uns and verbs, independently of the fact that, as previously pointed out,
14 onal interaction, regardless of the fact that it can be stored, retrieved
15 nt perceptions of tasks reflect the fact that all views of them are socia
16 ation across faculties reflects the fact that some of them are more favou
17 e (consider this in addition to the fact that these domain experts are ES
18 ten source can be attributed to the fact that scientific activity was—and
19 e early 19th century was due to the fact that 19th century  Europe alread
20    This may be partially due to the fact that Lecturer A had required gro
21 mdemn loss of body water due to the fact that the the loss of body water
22 end-list patterns can be due to the fact that the number of printed pages
23 then, this literature points to the fact that different disciplines ident
24 aw the attention of students to the fact that their language choices refl
```

Figure 2 Instances of the *fact that*.

Sinclair (2004) focuses on sequences that are not fixed but that show the kinds of recurrence demonstrated in the discussion of *the fact that* in the previous section. He proposes the concepts of 'core,' 'collocation,' 'colligation,' and 'semantic prosody' to account for these. Taking the example of the verb *budge*, he notes that it is used in sequences such as *refuse to budge*, *could not budge me from*, *I determined not to budge from it*, *two horses could not budge it*, *they won't budge from that position*, and so on. These are not phrases, as such, yet they clearly have a lot in common. Sinclair describes the behavior of *budge* as shown in Table 2.

Stubbs (2001: 87–88) renames 'semantic prosody' 'discourse prosody' and uses the term 'semantic preference' to indicate collocation with a set of semantically related items. As an example, he discusses the word *undergo*, which is used in examples such as *he was forced to undergo an emergency operation*; *his character appeared to undergo a major transformation*; *each operative had to undergo the most rigorous test*; *forced to . . . undergo further migration and further suffering* (Stubbs, 2001: 92). Stubbs describes the behavior of the word as shown in Table 3.

An additional point, made by Louw (1993), is that the semantic or discourse prosody of a word may be exploited to imply a meaning that is not stated outright. For example, an utterance such as 'To keep my family happy I had to undergo three weeks' holiday by the Mediterranean' implies that a holiday, for this speaker, is something unpleasant. A hearer might interpret this as irony, or humor, or sheer eccentricity.

Pattern and Meaning

Phraseology and Meaning One of the key points about phraseology is that it is closely connected to meaning. Corpus-driven lexicography has indicated that where a word has two or more distinct meanings, each will tend to occur in a specific phraseology. Sinclair (2003) gives several examples, one of which is *block*, a word that can be a noun or a verb. It has a number of meanings, but it is very rarely ambiguous, because the meaning is identifiable from the immediately surrounding phraseology:

- A building: *cell block, administration block*
- A group of buildings between two streets: *half a block, down the block*
- Something hindering someone: *stumbling block*
- A large piece of solid material: *block of stone*
- Stop someone or something from progressing: *block enemy penetrations*, *block the chemical signals*, *block such a move*
- Create an obstacle: *block your path*; *block your own good*.

Often, difference in meaning correlates with grammatical pattern. For example, the verb *maintain* has two main meanings: 'keep something in good condition' and 'say that something is true.' In the first meaning, the verb is usually followed by a noun phrase (e.g., *maintain a road*, *maintain a friendship*), while in the second meaning, it is usually followed by a *that* clause (e.g., *she maintained that . . .*).

Pattern Grammar A specific application of the observation that phraseology and meaning are linked

Table 2 Sinclair's analysis of *budge*

'core' (always present)
budge
'collocation' (strong association between two lexical items)
refuse, could not, won't
'colligation' (strong association between the core and a grammatical category)
negatives, modals
'refusal' when the verb is intransitive
e.g., *they won't budge*
'inability' when the verb is transitive
e.g., *two horses could not budge it*
'semantic prosody' (attitudinal, pragmatic meaning)
expressing frustration at the refusal or inability
e.g., *Do what they might, the British would not budge from their immigration policy*

Adapted from Sinclair, 2004: 142–147.

Table 3 Stubbs' analysis of *undergo*

'core':	*undergo*
'collocation':	*surgery, tests, treatment, change, training, test*, and so on
'colligation':	Preceded by passive or modal e.g., *forced to, must*
	Followed by adjective and abstract noun e.g., *further testing, major change*
'semantic preference':	Followed by nouns belonging to these sets: medical procedures; changes; nonmedical testing; other unpleasant things
'discourse prosody':	Indicates that a procedure is unpleasant
	Indicates that a procedure is involuntary

Adapted from Stubbs, 2001: 89–94.

is the notion of 'pattern grammar' (Francis, 1993; Francis *et al*., 1996, 1998; Hunston and Francis, 1999). This is a purely descriptive grammar of English that avoids abstract grammatical categories and that exploits the connection between phrase and meaning. Compiling a grammar of this kind involves the following:

- developing a notation that accounts for the colligational behavior of each lexical item to be included,
- collecting together all the lexical items that share a given notational sequence, and
- grouping those items according to meaning.

For example, the noun *fact* is frequently followed by a *that* clause that expands on the nature of the 'fact' concerned (that is, it is not simply a relative clause). A simple notation that captures this behavior is 'N that' (noun followed by *that* clause). Other nouns with the same notation include *assumption*, *idea*, *notion*, and *view*. These can be grouped according to meaning (Francis *et al*., 1998: 108–113):

- Nouns indicating speech or writing: *accusation, claim*, *declaration*, *explanation*, *insistence*, *message*, *objection*, *promise*, *recommendation*, *statement*, *warning*, and many others
- Nouns indicating ideas and thought processes: *assumption*, *belief*, *certainty*, *decision*, *faith*, *hypothesis*, *idea*, *knowledge*, *misunderstanding*, *presupposition*, *realization*, *speculation*, *theory*, *view*, *wish*, and many others
- Nouns indicating emotions: *amazement*, *concern*, *delight*, *fear*, *gratitude*, *happiness*, *indignation*, *joy*, *pleasure*, *regret*, *sadness*, *terror*, *worry*, and many others
- Nouns indicating evidence or signs that something is the case: *clue*, *demonstration*, *evidence*, *indication*, *proof*, *sign*, *symptom*, and others
- Nouns indicating likelihood: *chance*, *danger*, *guarantee*, *impossibility*, *likelihood*, *possibility*, *probability*, *risk*, and others
- Other nouns: *advantage*, *benefit*, *disadvantage*, *problem*, *consequence*, *result*, *reason*, and many others.

All words can be described in terms of the patterns they enter into, expressed as a series of elements. However, the link between pattern and meaning is most clearly made in relation to verbs, nouns, and adjectives. Another example is the pattern 'verb + noun phrase + *on* + noun phrase.' In traditional grammar, this would be described as a transitive verb followed by an adjunct. The pattern terminology makes it clear that the prepositional phrase beginning with *on* is directly related to the choice of verb. Examples of verbs with this pattern include these, from Francis *et al*. (1996: 403–410):

- Verbs meaning 'give something good': *bestow*, *confer*, *heap*, *lavish*, *press*, *settle*; e.g., *confer prestige on someone*
- Verbs meaning 'give something bad': *blame*, *dump*, *foist*, *impose*, *inflict*, *perpetrate*, *thrust*, and others; e.g., *blame a crime on someone*
- Verbs meaning 'talk about something': *advise*, *compliment*, *lecture*, *question*, *update*, and others; e.g., *advise someone on their actions*
- Verbs meaning 'put something somewhere': *cast*, *clip*, *load*, *place*, *put*, *sprinkle*, *throw*, and others; e.g., *sprinkle powder on something*
- Verbs meaning 'focus attention or effort': *center*, *concentrate*, *direct*, *fasten*, *fix*, *focus*, *pin*, *project*, *turn*, and others; e.g., *focus attention on someone*
- Verbs meaning 'building on something': *base*, *ground*, *predicate*, and others; e.g., *base a theory on facts*
- Verbs meaning 'spend money'; e.g., *blow*, *save*, *spend*, *waste*; e.g., *waste money on something*.

The outcome is a description of all the patterns in a given language, together with the lexical items that govern them.

Corpus Linguistics and Linguistic Theory

Corpus-Based Descriptions

As has been noted, corpus linguistics is essentially a methodology or set of methodologies, rather than a theory of language description. Essentially, corpus linguistics means this:

- looking at naturally occurring language;
- looking at relatively large amounts of such language;
- observing relative frequencies, either in raw form or mediated through statistical operations;
- observing patterns of association, either between a feature and a text type or between groups of words.

Reduced to its essence in this way, corpus linguistics appears to be 'theory neutral,' although the practice of doing corpus linguistics is never neutral, as each practitioner defines what is meant by a 'feature' and what frequencies should be observed, in line with a theoretical approach to what matters in language. Approaches to the use of a corpus that essentially rely on the existence of categories derived from noncorpus investigations of language are sometimes referred to as 'corpus based' (Tognini-Bonelli, 2001).

Studies of this kind can test hypotheses arising from grammatical descriptions based on intuition or on limited data. Experiments have been designed specifically to do this (Nelson *et al*., 2002: 257–283). For example, Meyer (2002: 7–8) describes work on ellipsis from a typological and psycholinguistic point of view that predicts that of the three possible clause locations of ellipsis in American spoken English, one will be much more frequent than the others. A corpus study reveals this to be an accurate prediction. On the other hand, the study of pseudo-titles mentioned in the section 'Languages and Varieties' shows how assumptions about language – in this instance about the influence of one variety of English on another – can be shown to be false. Biber *et al*. (1999: 7) comment that "corpus-based analysis of grammatical structure can uncover characteristics that were previously unsuspected." They mention as examples of this the surprisingly high frequency of complex relative clause constructions in conversation, and the frequency of simplified grammatical constructions in academic prose.

A clearer integration between linguistic theory and corpus linguistics is demonstrated by Matthiessen's work on probability (see the section 'Probability'). This work takes its categories from an existing description of English (Halliday's (1985) systemic-functional grammar), but the corpus study was more integral to the theory, as it was the only way that statements about probability of occurrence of each item in the system could be made with accuracy.

Corpus-Driven Descriptions

However, more radical challenges to language description can be found. Sinclair (1991, 2004) argues that the kind of patterning observable in a corpus (and nowhere else) necessitate descriptions of a markedly different kind from those commonly available. Both the descriptions and the theories that they in turn inspire are, in Tognini-Bonelli's (2001) terms, "corpus driven." Some of the challenges to tradition that corpus-driven theories involve are these:

- Lexis and grammar are not distinct, and grammar is not an abstract system underlying language
- Choice of any kind is heavily restricted by choice of lexis
- Meaning is not atomistic, residing in words, but prosodic, belonging to variable units of meaning and always located in texts.

Evidence for these claims is presented in the section 'Observing patterned behavior' above. The notion of pattern grammar focuses on the way that different lexical items behave differently in terms of how they are complemented. Grammatical generalizations about complementation cannot be made without describing that individual lexical behavior. Similarly, choice between features such as 'positive' and 'negative' depends to some extent on lexical item, as some verbs (such as *afford*) occur in the negative much more frequently than most. In other words, the probability of any grammatical category's occurring is strongly affected not only by the register but also by the lexis used. Finally, the evidence of phraseology is that it makes more sense to see meaning as belonging to phrases than to individual words. Findings such as these have led many writers to see a need for descriptions of language that are radically different from those currently available.

Sinclair (1991, 2004) proposes, for example, that meaning be seen as belonging to 'units of meaning,' each unit being describable in the way set out in Table 2. He criticized conventional grammar for distinguishing between structures (a series of 'slots') and lexis (the 'fillers'), such that it appears that any slot can be filled by any filler: there are no restrictions other than what the speaker wishes to say. This is clearly sometimes the case, and when it is, Sinclair

describes the language as following the 'open-choice principle.' Competing with that, however, is the 'idiom principle,' which is followed whenever units of meaning longer than a word are employed. In these cases, the speaker chooses the semantic prosody and the core word, and the rest occurs without choice.

Another theoretical approach to the nonrandomness of language in practice is Hoey's (2005) theory of 'lexical priming.' Like Sinclair, Hoey places lexis at the heart of his description of English, and like Sinclair he notes that words typically occur with specific collocations and in specific grammatical configurations. Hoey goes further in noting that certain words occur at the beginning of paragraphs or of texts or in lexical chains, with a greater (or lesser) frequency than would be predicted by random distribution, a phenomenon he calls 'textual colligation.' He argues that an individual's experience of words in context, over many years, 'primes' each lexical item for use in a particular collocational or colligational configuration or for playing a particular role in a text. This theory argues against absolutism in grammar and discourse: it cannot be said that a word or phrase belongs absolutely to a given class of items, but rather a word or phrase is primed to behave according to the norms of that category.

Hoey's work highlights an inevitable tension between the language experience of the individual, which is unique, and the desire to talk about language as a collective, shared experience, to describe 'a language' rather than 'an individual's language.' Teubert (2004a) raises similar issues in relation to corpus studies of meaning. Teubert sees the study of meaning as the main concern of corpus linguistics, and the area of linguistics in which the study of corpora is superior to other methods, because a corpus is a record of language as a social act (rather than as a psychological phenomenon), and meaning, too, is "a social phenomenon" (Teubert, 2004a: 97). On the other hand, meaning is not shared in an abstract sense: different individuals mean different things even when they use the same lexical item. Rather, Teubert argues, meaning is social because the meaning of a word or phrase resides in the sum of the ways in which that word or phrase has ever been used. He cites the word *school* (Teubert, 2004a: 190), which can be demonstrated to have been used in a wide variety of contexts, in each of which the word contributes something slightly different to the meaning of the discourse as a whole (e.g., *after school*, *tough time at school*, *school holidays*, *high school*, *medical school*, *skipped school*, *walk to school*). What we might think of as the 'dictionary' meaning of *school* is a generalization from all these instances, but each instance remains somewhat different from that generalization. To see what a word or phrase means, or what it meant at any time in history, we would have to examine each instance of the word. This is clearly impossible, but a corpus offers us a sample of instances, and the Internet, as a large if unplanned collection of texts, gives us even more.

In their different ways, these researchers all stress that descriptions of language – whether they try to account for rules or choices or meaning – are abstractions from a very large number of instances and that, as abstractions, they are always only partially correct. This interpretation arises from a focus on the lexical item as the primary object of study, which itself reverses the usual priorities found in linguistics.

Applications of Corpus Linguistics

Applied linguistics has been described as the use of knowledge about language to solve real-world problems. In recent years, the benefits of looking at large amounts of naturally occurring language, in the form of corpora, have been welcomed by applied linguists. Although corpora have many applications – notably forensic linguistics, stylistics, and critical discourse analysis – this section describes briefly just two of the more frequently encountered applications of corpus linguistics: language teaching and translation.

Language Teaching

Corpora have influenced language teaching in three distinct ways. Firstly, the findings from corpus research have been used extensively to improve reference materials for learners, such as dictionaries and grammars. Secondly, learners are increasingly being encouraged to explore corpora for themselves. Finally, corpus techniques have been applied to study of learners' language.

Since the publication in the mid-1980s of the first learners' dictionary based on corpus research (Sinclair *et al.*, 1987), corpora have become an indispensable resource for lexicographers and grammarians. Modern learners' dictionaries typically pay more attention to phraseology, and in particular to collocation, than previous ones did. Similarly, grammar books for learners pay more attention to register variation, to spoken usage, and to the role of lexis in grammar (Sinclair *et al.*, 1990; Biber *et al.*, 1999). To a lesser extent, course books have also changed, now placing more emphasis on collocation and phraseology than previously.

Corpora have influenced the method, as well as the content, of language teaching. Advanced learners are frequently invited to access corpora themselves and to engage in "data-driven learning" (Johns, 1991; Bernadini, 2000), in which they use a corpus to

make their own generalizations about language use. One of the consequences of this is that learners are exposed to all the complexity of a language, and the task of teaching explicitly every aspect of that language looks less viable than it did before. As a result, data-driven learning coincides happily with the view of language learning that stresses guided observation on the part of the learner rather than exposition on the part of the teacher (Willis, 2003; Bernardini, 2004).

Finally, the language of learners themselves has been studied extensively through the development of learner corpora (Granger, 1998), that is, corpora consisting of collections of written or spoken texts produced by learners of a language. These allow the learners' output to be compared with that of native speakers and for persistent errors in learner language to be identified. A common methodology is to identify features of language that occur significantly more or less frequently in the learner corpus than in a comparable corpus of native-speaker texts and to use such disparities as the starting point for more qualitative research. The features investigated include groups of words such as adverbials (Altenberg and Tapper, 1998) and modal auxiliaries (Aijmer, 2002), as well as more abstract categories, such as word class (Granger and Rayson, 1998) and sequences of part-of-speech tags (Aarts and Granger, 1998).

Translation

Corpora can be uses to train translators, used as a resource for practising translators, and used as a means of studying the process of translation and the kinds of choices that translators make. Parallel corpora are often used in these applications, and software exists that will 'align' two corpora such that the translation of each sentence in the original text is immediately identifiable. This allows one to observe how a given word has been translated in different contexts (see, for example, Teubert's work on *travail* and *work/labor* mentioned in the section 'Languages and Varieties'). One interesting finding is that apparently equivalent words – such as English *go* and Swedish *gå*, or English *with* and German *mit* (Viberg, 1996; Schmied and Fink, 2000) – occur as translations of each other in only a minority of instances. This suggests differences in the ways those languages use the items concerned.

More generally, examination of parallel corpora emphasizes that what translators translate is not the word but a larger unit (Teubert and Čermáková, 2004). Although a single word may have many equivalents when translated, a word in context may well have only one such equivalent. For example, although *travail* as an individual word is sometimes translated as *work* and sometimes as *labor*, the phrase *travaux préparatoires* is translated only as *preparatory work*. Thus, Teubert and Čermáková argue, *travaux préparatoires* and *preparatory work* may be considered to be equivalent translation units, whereas no such claim can be made for *travaux* and *work*.

As well as giving information about languages, corpus studies have also indicated that translated language is not the same as nontranslated language. Studies of corpora of translated texts have shown that they tend to have higher incidences of very frequent words and that they tend to be more explicit in terms of grammar (Baker, 1993). They may also be influenced by the structure of the source language, as was indicated in the discussion of *wh-* clefts in English and Swedish in the section 'Languages and Varieties.' In communities where people read a large number of translated texts, the foreign language, via its translations, may even influence the home language. Gellerstam (1996) notes that some words in Swedish have taken on the meanings of English that look similar and argues that this is because translators tend to translate the English word with the similar-looking Swedish word, thereby using the Swedish word with a new meaning, which then enters the language. One example is the Swedish word *dramatisk*, which used to indicate something relating to drama but which now, like the English word *dramatic*, also means 'substantial and surprising.'

Conclusion

Corpus linguistics is a relatively new discipline, and a fast-changing one. As computer resources, particularly web-based ones, develop, sophisticated corpus investigations come within the reach of the ordinary translator, language learner, or linguist. Our understanding of the ways that types of language might vary from one another, and our appreciation of the ways that words pattern in language, have been immeasurably improved by corpus studies. Even more significant, perhaps, is the development of new theories of language that take corpus research as their starting point.

See also: Corpora; Corpora of Spoken Discourse; Corpus Approaches to Idiom; Mark-up Languages: Text; Parsing and Grammar Description, Corpus-Based; Systemic Theory; Treebanks and Tagsets.

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Corpus Studies: Second Language

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Corpus linguistics has contributed to several areas of applied linguistics. In addition to core contributions in the areas of lexicography and grammar, corpus linguistics has also provided insights into the areas of register variation (e.g., spoken versus written language, across academic disciplines, stylistic variation), language change over time using historical or diachronic corpora, studies of gender differences, and, more recently, the area of second language studies (Reppen, 2001; Granger *et al.*, 2002; Granger, 2003). By using large, principled collections of naturally occurring language, corpus linguistics can accurately explore and describe linguistic characteristics and patterns associated with language use in different contexts (e.g., talking among friends, giving a formal speech, writing a friend, writing a research paper), across different speakers, and how language varies regionally. These descriptions can then be used to accurately describe patterns of variation and can also be used to inform pedagogy for second-language learners.

Corpora consist of large collections of spoken and/or written texts, are typically stored on computers, and are often grammatically annotated and/or marked up for certain text features (e.g., Biber *et al.*, 1998; Meyer, 2002; Reppen and Simpson, 2002). Because of their large size, often well over a million words, it is essential to have tools that allow users to effectively and efficiently search the corpora. There is a variety of computer programs available, ranging from concordancing software (e.g., MonoConc, WordSmith) that can generate word lists and identify specific words or combinations of words, to sophisticated programs that can perform comparisons that track features across a range of texts. Most users will interface with corpora through the use of concordancing software, most of which can be used with either an unannotated corpus or one that is annotated for grammatical or text features. A concordancing program allows users to generate word frequency lists, see target words in context, look for expressions, and also search for particular combinations, such as verb plus preposition, or what verbs frequently occur with complement clauses (if using a grammatically tagged corpus). Concordancing programs are useful

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tools for both language researchers and language students and teachers.

The development of learner corpora (e.g., Granger, 2003) has enhanced the ability of corpus linguistics to make contributions to the areas of second language acquisition and language pedagogy (Partington, 1998; Conrad, 1999, 2003; Burnard and McEnery, 2000; Biber and Reppen, 2002; Granger *et al.,* 2002; Meunier, 2002; Granger, 2003). Rather than relying on information from case studies or single examples, researchers are able to use corpora from second language learners to describe and explore the linguistic patterns of second language learners. As more second language corpora are developed, they will become powerful resources for cross-linguistic comparisons of different first language speakers producing different target languages. Researchers will be able to accurately describe the linguistic patterns of second language learners. This information will help shape teaching and language pedagogy to more accurately address the needs of second language learners.

In spite of second language or learner corpora only recently beginning to take hold, information from corpus linguistic research on English corpora is being used to inform second language instruction and assessment. Rather than relying on native speaker intuitions about how language is used, material developers and language teachers are now able to base pedagogical decisions on information from corpus-based research. Using information from detailed corpus studies based primarily on native English speakers (e.g., Biber *et al.*, 1999, 2004), teachers and material developers are able to produce lessons and instructional materials that target the needs and goals of the language learners. These corpora based on native English speakers contribute valuable information to the areas of second language research and pedagogy in two ways. First, they allow teachers and researchers to identify patterns of language use while also providing real language in context for second language learners to interact with in addition to textbooks and other course materials. Second, the native speaker corpora provide a starting point for cross-linguistic comparisons between the learner corpora and the native speaker corpora. These types of analysis will provide valuable insights into areas of similarities and differences for a variety of language learners (e.g., many different first languages) across a range of different contexts.

In addition to teachers using corpora to inform their teaching decisions, language teachers are also bringing corpora into the classroom and learners are interacting with corpora to explore questions of language use (Gavioli, 1997, 2001). For example, learners in an English for academic purposes (EAP) class can use a corpus to examine how certain phrases are used or to learn specialized vocabulary in their area of study. The MICASE (Michigan corpus of academic spoken English) site has over a million words of academic spoken language. This corpus, and the companion concordancing program available online, represents a range of academic disciplines and academic settings (e.g., lectures, advising sessions, class discussions). Lessons and activities based on the MICASE corpus can be of great use to advanced learners of English preparing to study at English-speaking universities. Another valuable EAP resource is the research done on the T2K-SWAL corpus – a corpus of over 2 million words of academic spoken and written academic English (Biber *et al.*, 2004). Although the T2K-SWAL corpus is not available for general use as is the MICASE corpus, research based on the corpus is available and provides insights as to the linguistic patterns in spoken and written academic English. In addition to these two corpora, which are valuable resources for academic English, there are also other available corpora that cover a wide range of aspects of English (e.g., American National Corpus, British National Corpus, ICAME). Involving learners in exploring language through the use of corpora in the classroom can serve as a strong motivator and also help promote autonomous language learning.

The role of corpus linguistics in the area of second language studies is just gaining momentum. The widespread availability and use of computers in language classrooms and increasing availability of corpora should serve as a catalyst for the development of additional tools and for corpora that can be used for both research and pedagogical purposes. With the development of more second language corpora, both spoken and written, the fields of second language studies and language pedagogy will change significantly over the next decade. The types of analysis and the insights gained as to cross-linguistic variation in different contexts will help to shape the areas of language research and pedagogy.

See also: Corpus Linguistics; Corpus Lexicography; Parsing and Grammar Description, Corpus-Based; Stylistics: Corpus Approaches.

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http://info.ox.ac.uk – British National Corpus (BNC). 100-million-word multiregister corpus of spoken and written British English. The site also has links to many corpus-related resources.
http://www.hit.uib.no/icame.html – ICAME: International computer archive of modern and medieval English.
http://www.hti.umich.edu – MICASE: Michigan corpus of academic spoken English.
http://www.athel.com – MonoConc.
http://oup.com – WordSmith.

Corpus Lexicography

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Texts and Lexicography

As dictionaries gradually became descriptions of a language in general, rather than glosses to individual texts or 'hard words,' so the relationship between dictionary and source texts grew increasingly distant or invisible. Therefore, dictionaries seeking a more authoritative status re-established their connection with source texts by providing references or citations. Johnson's dictionary (1755) deliberately took its citations solely from 'the best writers.' The *Oxford English dictionary* (OED) (1884–1928), with its additional historical scope, greatly increased the numbers and types of texts consulted. But the necessary reliance on manual methods, even with thousands of readers selecting citations from thousands of texts, restricted its data collection. The *Longman dictionary of contemporary English* (LDOCE) (1978) selected some of its examples from the text extracts collected by the Survey of English Usage. However, citational evidence has an inherently limited validity because the selection depends on the reader's human frailties, preferences, and prejudices: rare words and uses may attract attention, common words and uses may be overlooked, or citations may be selected because they chime with the reader's intuitions. For example, J. A. H. Murray (the first editor of the OED) complained, "The editor or his assistants have to search for precious hours for examples of common words, which readers passed by . . . . Thus,

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Coseriu, Eugenio (1921–2002)

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Eugenio Coseriu was born in Mihăileni in Bessarabia (then a part of Romania, now the Republic of Moldova). He studied Romance philology, Slavic philology, and philosophy at the universities of Iaşi (1939–1940), Rome (1940–1944), Padua (1944–1945), and Milan (1945–1949). He took a first doctoral degree in philology at Rome, then a second one in philosophy at Milan. From 1951 to 1963 he was Professor of General and Indo-European Linguistics at the University of Montevideo, Uruguay, and also Professor at the city's Instituto de Profesores. In 1963 he was appointed Professor of Romance Philology and, from 1966, also of General Linguistics at the University of Tübingen, Germany. Coseriu retired in 1989 but continued lecturing and attending conferences all over the world until his death in Tübingen in 2002.

Coseriu knew many languages, and as a young man translated poetry and wrote literature. In his research he combined his vast knowledge of the humanities in general and his flair for theoretical issues with detailed empirical analyses in a large number of languages and linguistic disciplines. His major contributions lie in the fields of language theory, the history of the language sciences, Romance philology, semantics, historical linguistics, functional grammar, text linguistics, and comparative linguistics. In these fields Coseriu's influence on modern research has been considerable throughout the world, except for the United States and the United Kingdom.

Coseriu had an inclination toward expressing his ideas through trichotomies rather than the more traditional dichotomies that are ubiquitous in the language sciences. Although these triadic distinctions have historical roots (Coseriu's thought is particularly indebted to Aristotle, Hegel, Humboldt, Saussure, Bloomfield, and Hjelmslev, among others), their form is unique and quite idiosyncratic. Furthermore, they are essential if one is to understand Coseriu's many writings, which exhibit a unusually high degree of mutual coherence. One of his best known conceptual distinctions is the inductive differentiation between the language system (*langue* in French, *sistema* in many of Coseriu's Spanish publications), traditions of discourse (Fr. *norme*, Sp. *norma*), and speech or discourse itself (Fr. *parole*, Sp. *habla*). *Parole* stands out as the only genuine manifestation of language. At the same time, however, speech is based on complex systems of paradigms, and these systems are historical products of the speech activity of the members of heterogeneous speech communities (*langues*). Language systems vary greatly, not only between different languages but also within individual languages; the latter kind of variation is called the 'architecture' of a language by Coseriu (cf. Uriel Weinreich's 'diasystem') (**Weinreich, Uriel (1926–1967)**). Yet speech is also framed by historical discourse practices that direct the realization of the language system in various, seemingly arbitrary, ways. They constitute the norms of speech (*normes*) and mediate between the infinite possibilities of the language system and the always unique speech realizations by individuals in particular settings. To the triad 'language system – norms – speech' Coseriu later added a fourth (likewise inductive) level called 'type,' which is at the center of his rather uncommon (Humboldtian) view of linguistic typology. According to Coseriu, every language represents a type, although several languages may correspond to the same type.

The above concepts can be related to the distinction Coseriu made (again following Humboldt and Aristotle) between three kinds of knowledge speakers have about language: knowledge of language as a creative activity (*enérgeia*), which partly makes use of an already acquired knowledge (*dýnamis*) and partly goes beyond and changes this knowledge in a creative way, and which eventually results in an ever-changing knowledge of the products of speech (*érgon*). Crucially, these three kinds of knowledge are paralleled by three distinct levels of linguistic content. Every speech act relates to what speakers know about the world and the objects they refer to when talking (cf. **Husserl, Edmund (1859–1938)**); this kind of content is labelled *Bezeichnung* (reference). It is to be distinguished from the language-specific meanings, i.e., the functional oppositions within the various lexical as well as syntactic paradigms of a given language from which the individual linguistic item derives its often highly abstract value (*Bedeutung*). Finally, on the basis of language-specific meanings and acts of reference, a third kind of content at the text level, called *Sinn* (sense), comes into being. It encompasses the speaker's intentions and assumptions while he or she engages in discourse, and is also the level at which translations operate (one never translates 'meaning' but only 'sense'). The triad 'reference – meaning proper – sense' successfully draws on the assets of the structuralist heritage in linguistics while at the same time overcoming its restrictions, giving rise to a well-balanced and truly integrative theory of language. To Coseriu, observing conceptual distinctions like those sketched above was particularly important to linguistics. For example, linguists very often treat as the 'meaning' of a linguistic item what is at best only a referential content or a particular textual sense, e.g., when the verb *to climb* is said to 'mean' an upward movement; for Coseriu, this verb only 'means' a particular kind of movement on a vertical or inclined plane, while the direction 'upward' has to be inferred.

Coseriu published most of his work in Spanish, German, French, and Italian, and only rarely in English. Most of his writings are dense and sophisticated, offering subtle lines of reasoning that require an unusual amount of preliminary knowledge of epistemological, historical, and philosophical issues. Still, Coseriu's texts are widely recognized as one of the best introductions to linguistic theory, and are seen as pivotal in the realm of the humanities.

See also: Bloomfield, Leonard (1887–1949); Hjelmslev, Louis Trolle (1899–1965); Humboldt, Wilhelm von (1767–1835); Husserl, Edmund (1859–1938); Leibniz, Gottfried Wilhelm (1646–1716); Saussure, Ferdinand (-Mongin) de (1857–1913); Weinreich, Uriel (1926–1967).

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Costa Rica: Language Situation

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An Overview of the Linguistic History of Costa Rica

The languages spoken before the 9th century A.D. in Costa Rica were all Chibchan. They were Rama (Voto, Corobicí) and Maléku Jaíka in the northern plains, Huetar (the lingua franca in pre-Hispanic Costa Rica) in the Central Valley and surroundings, Boruca in the southern Pacific watershed, Cabécar in the central Atlantic watershed and western part of the Talamanca Valley (southeastern Costa Rica), and Bribri in the eastern part of the Talamanca Valley. The entire country belonged then to the Lower Central America Linguistic Area.

During the 9th century, speakers of Chorotega, an Otomanguean language, took over most of northwestern Costa Rica, which became part of the Mesoamerican Linguistic Area.

The Spanish conquest during the 16th century began a process of expansion of Spanish which culminated in the 20th century. Since then, Costa Rican Spanish developed two varieties: one spoken in the central highlands of the country, with less Andalusian influence, and one spoken in the lowlands, at that time mainly in the Central and northwestern Pacific coast.

Spanish was not the only language moving into or around Costa Rica since. At the end of the 17th century, the speakers of Térraba, a dialect of Naso (Teribe is the other dialect) migrated from Panama to southwestern Costa Rica. During the second half of the 19th century, speakers of Western Caribbean Creole English, mainly from Jamaica, settled in the Atlantic coast. At the end of the 19th century, speakers of Bribri and Cabécar migrated to the Pacific slope of the Talamanca range. Finally, in the second half of the 20th century began the inmigration of Ngäbere speakers from Panama to southwestern Costa Rica that is still going on.

The expansion of Spanish also began a process of replacement of the indigenous languages. During the colonial times, Chorotega and Huetar became extinct, the most intense colonization having taken place in their territories. Rama became extinct in Costa Rica around 1930. The last fluent Térraba speaker died in 2003.

The Current Languages

The territorial languages currently spoken are seven: five indigenous ones – Boruca, Bribri, Cabécar, Ngäbere, and Maléku Jaíka – Western Caribbean Creole English, and Spanish.

The 2000 national census took languages into consideration, but only among the population on the Indian reservations. The following are the numbers of speakers for each language, excluding Boruca, which is near extinction (experts consider that only two fluent speakers and 25 semi-speakers with a good passive domain of the language remain): Bribri 5963 (61.8% of the ethnic group), Cabécar 8441 (84.5%), Ngäbere 2172 (84.4%), and Maléku Jaíka 276 (71.1%).

The 16 787 speakers of these languages constitute 74.5% of the population (22 529) of their ethnic groups on the reservations. In the census, 41 347 additional people identified themselves as indigenous. An interpretation of the figures suggests that a maximum of about 9180 among them could speak Costa Rican Indian languages. The number of speakers of territorial indigenous languages in Costa Rica would be then around 25 967, or 0.7% of the population of the country (3 810 179 in the year 2000).

There are no data on the number of speakers of Limón Creole (southwestern Caribbean Creole English; the local variety of western Caribbean Creole English), but according to the 2000 census, the members of the ethnic group are 72 784. Afro-Costa Rican sociolinguist Marva Spence considers that the language is spoken by roughly 70% of them, about 51 000 people (1.3% of the Costa Rican population).

Spanish is the language of the dominant ethnic group, which comprises 97% of the population of

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An Overview of the Linguistic History of Costa Rica

The languages spoken before the 9th century A.D. in Costa Rica were all Chibchan. They were Rama (Voto, Corobicí) and Maléku Jaíka in the northern plains, Huetar (the lingua franca in pre-Hispanic Costa Rica) in the Central Valley and surroundings, Boruca in the southern Pacific watershed, Cabécar in the central Atlantic watershed and western part of the Talamanca Valley (southeastern Costa Rica), and Bribri in the eastern part of the Talamanca Valley. The entire country belonged then to the Lower Central America Linguistic Area.

During the 9th century, speakers of Chorotega, an Otomanguean language, took over most of northwestern Costa Rica, which became part of the Mesoamerican Linguistic Area.

The Spanish conquest during the 16th century began a process of expansion of Spanish which culminated in the 20th century. Since then, Costa Rican Spanish developed two varieties: one spoken in the central highlands of the country, with less Andalusian influence, and one spoken in the lowlands, at that time mainly in the Central and northwestern Pacific coast.

Spanish was not the only language moving into or around Costa Rica since. At the end of the 17th century, the speakers of Térraba, a dialect of Naso (Teribe is the other dialect) migrated from Panama to southwestern Costa Rica. During the second half of the 19th century, speakers of Western Caribbean Creole English, mainly from Jamaica, settled in the Atlantic coast. At the end of the 19th century, speakers of Bribri and Cabécar migrated to the Pacific slope of the Talamanca range. Finally, in the second half of the 20th century began the inmigration of Ngäbere speakers from Panama to southwestern Costa Rica that is still going on.

The expansion of Spanish also began a process of replacement of the indigenous languages. During the colonial times, Chorotega and Huetar became extinct, the most intense colonization having taken place in their territories. Rama became extinct in Costa Rica around 1930. The last fluent Térraba speaker died in 2003.

The Current Languages

The territorial languages currently spoken are seven: five indigenous ones – Boruca, Bribri, Cabécar, Ngäbere, and Maléku Jaíka – Western Caribbean Creole English, and Spanish.

The 2000 national census took languages into consideration, but only among the population on the Indian reservations. The following are the numbers of speakers for each language, excluding Boruca, which is near extinction (experts consider that only two fluent speakers and 25 semi-speakers with a good passive domain of the language remain): Bribri 5963 (61.8% of the ethnic group), Cabécar 8441 (84.5%), Ngäbere 2172 (84.4%), and Maléku Jaíka 276 (71.1%).

The 16 787 speakers of these languages constitute 74.5% of the population (22 529) of their ethnic groups on the reservations. In the census, 41 347 additional people identified themselves as indigenous. An interpretation of the figures suggests that a maximum of about 9180 among them could speak Costa Rican Indian languages. The number of speakers of territorial indigenous languages in Costa Rica would be then around 25 967, or 0.7% of the population of the country (3 810 179 in the year 2000).

There are no data on the number of speakers of Limón Creole (southwestern Caribbean Creole English; the local variety of western Caribbean Creole English), but according to the 2000 census, the members of the ethnic group are 72 784. Afro-Costa Rican sociolinguist Marva Spence considers that the language is spoken by roughly 70% of them, about 51 000 people (1.3% of the Costa Rican population).

Spanish is the language of the dominant ethnic group, which comprises 97% of the population of

the country. It can be estimated that about 70% of this ethnic group uses the highland variety, called Central Valley Spanish, which has expanded to other areas of the country and is increasingly influencing the lowland varieties.

State of Retention of Minority Languages

In spite of some legal provisions in favor of the indigenous languages, all Costa Rican minority languages are endangered. According to J. Bauman's useful classification of the states of languages, the only flourishing language in Costa Rica is Spanish; Cabécar and Ngäbere in some of their territories can be classified as enduring; these same languages in other territories, Bribri, Maléku Jaíca, and Limón Creole are in a declining state, Boruca is in a state of obsolescence, approaching extinction.

There is a series of factors that weigh against minority languages. They are not compulsory in any aspect of public administration, and, therefore, do not give any advantages to their speakers. They are used only in activities in which the participants are all members of the same ethnic group, and normally stop being used when a monolingual speaker of Spanish intervenes. Their speakers constitute very small minorities that, accordingly, have little political influence. With the improvement of communications since the 1940s, isolation, which in the past had kept their speakers protected from outside influences, has been disappearing. The importance of isolation can be appreciated in the fact that Cabécar and Ngäbere, the languages spoken in the most inaccessible territories, are also those with higher percentages of retention.

See also: Chibchan; Endangered Languages; Spanish.

Language Maps (Appendix 1): Map 55.

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Costanoan *See:* Hokan Languages.

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Richard Malcolm Coulthard is a linguist and founding researcher, author, and teacher in the related fields of discourse analysis and forensic linguistics. Professor Coulthard's work and influence have extended the role of discourse analysis in Modern English and other languages, ensuring that both written and spoken discourse will continue as viable objects of linguistic and social study. Consistent with this effort to make discourse a central object of study, Dr. Coulthard has accomplished founding work in the related field of forensic linguistics. Through innovative work in this area, the study of language and law, his important achievements as distinguished educator, mentor, and editor continue.

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Malcolm Coulthard was born in Bradford, West Yorkshire, England on January 14, 1943. His career as a scholar in Modern English at Birmingham University began following a university preparation that reflected training and inspiration from leading linguists of the 1960s (Sinclair *et al.*, 1993: ix). His interest and work with contemporary scholars in classroom and educational discourse (Sinclair and Coulthard, 1975) resulted in early international recognition. This recognition and his work on the analysis of spoken interaction were soon followed by the publication of his renowned book *An introduction to discourse analysis* (Coulthard, 1977). As a leading member of the Birmingham Group, Coulthard set out a developmental approach to spoken language analysis that changed prevailing notions of linguistic description (Coulthard, 1992).

Dr Coulthard's innovative research ideas and curriculum development work in cooperation with colleagues at the University of Birmingham established the strength of English language study in an expanded framework of courses and new emphases. Through Dr Coulthard's emphasis on the analysis of both spoken and written texts (Coulthard, 1994) and his management of emerging ideas in general, he enhanced his established reputation (Sinclair *et al.*, 1993). From this vantage point he oversaw the transition from discourse to critical discourse theory (Caldas-Coulthard and Coulthard, 1996).

Dr Coulthard has energetically worked to extend discourse theory from the English language framework to other languages. Many of his publications treat translation as informed by discourse analysis and demonstrate the importance of a social approach to language study (Coulthard, 1991). In addition to his well-known work in Brazil, he has developed linguistics degree programs and courses in Malaysia, Japan, and Korea.

Dr Coulthard's expertise in critical discourse analysis steadily informs forensic linguistics. His leadership as Chair of the Founding Committee of the International Association of Forensic Linguists and as the founding co-editor of *Forensic Linguistics: the International Journal of Speech, Language and the Law* and his support for the establishment of new university programs have helped to make forensic linguistics a popular mainstream academic discipline. Through his work as an expert witness and his work on the detection of student and internet plagiarism, Dr Coulthard offers advice and recommendations that play a decisive role in both criminal court cases and damage award cases.

In addition to the 13 books he has written or edited, Dr Coulthard has published over 60 chapters and articles in books or scholarly journals. As leader in the field of forensic linguistics he inaugurated annual seminars and international conferences, and helped to found the journal *Forensic Linguistics*. His most recent book *Introducing forensic linguistics*, co-authored by Janet Cotterill, appeared in 2004. Law enforcement authorities rely upon his expert opinions in high- profile cases, and he appears in prominent television programs to inform the public about evidence and other issues of language and the law. His testimony has been instrumental in the outcomes of numerous high profile cases.

See also: Law and Language: Overview; Law on Language; Sinclair, John M. (b. 1933).

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Counterfactuals

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Counterfactuals are a class of conditionals, or *if-then* statements. They are interesting because they are instances of a semantically significant class of sentences, conditionals, and because of their intimate connections to modality, laws of nature, causation, dispositions, knowledge, perception, and other concepts, all of which are of central philosophical concern.

Counterfactuals are those *if*-sentences that have a modal auxiliary as main consequent verb and have in their antecedent and consequent clauses a backward shift of syntactic tense relative to notional tense that renders those clauses incapable of self-standing assertion (see Dudman, 1994). Some instances:

(1) If Osama had not existed, George would/might/could have created him.

(2) If Osama were to strike, George would defeat him.

Paradigmatically, counterfactuals are uttered in the knowledge that they have false antecedents, but this is not a characterizing mark. They may be issued when their antecedents are believed to be merely improbable. Furthermore, *indicative* conditionals may be asserted with known false antecedents; consider (3).

(3) If Bill Clinton was bald, no one knew about it.

There is some debate about where to draw the line between counterfactuals and, more broadly, subjunctives and indicative conditionals (see Jackson, 1987; Dudman, 1994; Bennett, 2003). This mainly concerns the status of future open conditionals like (4), which, as Dudman (1994) pointed out, has the same syntactic tense shift found in counterfactuals and has a consequent modal auxiliary.

(4) If Clinton goes bald, everyone will know about it.

Another issue is whether counterfactuals have truth conditions. There are strong arguments that indicatives, like (3), do not but that they do require a probabilistic assertability condition semantics (see Adams, 1975; Edgington, 1995). Unification of *if* indicates that counterfactuals should be treated similarly. But just how to provide a probabilistic semantics for counterfactuals is far from obvious (see Edgington, 1995; Barker, 1999).

Let us assume from now on that counterfactuals do have truth conditions. The central problem of counterfactuals is devising a noncircular specification of their truth conditions. Philosophers have tended to concentrate on the *would*-conditionals, conditions of the form *If P had been the case, Q would have been* (abbreviated $[P > Q]$), the assumption being that other counterfactuals, such as *might*-conditionals (*If P had been the case, Q might have been*, abbreviated $[P \Diamond\!\!\rightarrow Q]$), can be analyzed in terms of the former (for proposals, see Lewis, 1973, 1986c; Stalnaker, 1981).

There are broadly two forms of analysis of counterfactual truth conditions: *metalinguistic* analyses and *possible worlds* analyses. Both are said to be inspired by the idea, in Ramsey (1990 [1929]), that we evaluate a conditional by adding the antecedent to our stock of beliefs and adjusting for consistency, to determine if the consequent is in the resultant state.

The older approach is the metalinguistic one. Possible worlds are currently the entrenched view. Lewis (1973) argued that they are equivalent, which is open to dispute (see Barker, 1999).

Metalinguistic Approaches

On the metalinguistic approach, counterfactuals are like condensed arguments – roughly, P and laws of nature L plus facts cotenable with P (legitimate factual premises) entail, or probabilize, Q:

$$(P > Q) \text{ is true} \equiv \{P + \text{Cotenable factual premises} + L\} \rightarrow (\text{probable})\ Q$$

The challenge for metalinguistic theories is (i) to define in a noncircular way the conditions for A's being cotenable with P and (ii) to fashion a conception of law. Goodman (1965) famously found both of these to be insuperable challenges.

Goodman argued that the extensionally correct specification for a premise A to be cotenable with P is as follows:

$$\text{A is contenable with P} \equiv (P > \text{still A})$$

The conditional $(P > \text{still A})$ is a *semifactual*: a counterfactual with a true consequent A, expressing that P is causally benign with respect to A, as in *If the match had been struck it would still have been dry.* Goodman argued that the truth conditions of a semifactual are as follows:

$$(P > \text{still A}) \equiv \sim(P > \sim A)\ \&\ A.$$

But this introduces circularity into the analysis, since we have defined conditions of cotenability in terms of counterfactuals.

The second challenge – finding some acceptable analysis of natural laws – is to provide an explanation of why some generalities support counterfactuals and others do not. Goodman despaired of finding that mysterious counterfactual supporting feature. The current conception is that the problem of law is less acute, since irreducible modalities are now more palatable (for discussion of some of the issues, see Jackson and Pargetter, 1980; Sober, 1988).

After Goodman, various metalinguistic theories attempted to deal with the problem of cotenability, e.g., Pollock (1981), but were not successful. Kvart (1986) represented a very sophisticated breakthrough. Central to his analysis was the idea that counterfactuals presuppose indeterminism for their literal truth, since they involve a conception of reality's branching off from a time t_0 prior to the antecedent time t_P and developing through a *scenario of transition* to P – and orderly, lawful development of reality to P. Kvart showed that Goodman's cotenability condition was extensionally incorrect, since his truth conditions for semifactuals were wrong and he analyzed cotenability by using the notions of positive causal relevance and causal irrelevance, which in turn were reduced to probabilistic relations. Kvart's theory, however, could not capture certain cases (see Belzer, 1993).

Barker (1999) provided an improvement over Kvart with a quasialgorithmic approach to solving the problem of cotenability; Barker's approach invoked causal or more broadly connective relations. The truth conditions of a semifactual relative to a scenario S leading to P are given thus, where p_i is an event in S:

$$(P > \text{still } A) \equiv \sim(P \Diamond\!\!\rightarrow p_i \text{ causes } \neg A) \;\&\; A$$

To determine (P > Q) relative to a scenario S, we need to find an instantiated law-based generality (G1) linking P to Q via true A. To determine A's cotenability, we need to evaluate (P > still A). To determine that, we need to determine ($P \Diamond\!\!\rightarrow p_i$ causes $\neg A$). This can be evaluated directly if there is no instantiated law-based causal generality (G2) linking P, factual premise B, and the possibility of p_i causing $\neg A$. If there is no (G2), ($P \Diamond\!\!\rightarrow p_i$ causes $\neg A$) is false, (P > still A) is true, and so (P > Q) is true. If there is a (G2), then we ask if the might-conditional cotenability condition ($P \Diamond\!\!\rightarrow$ still B) is true, and that leads to a line of inquiry similar to that for (P > still A). The recursion is bound to terminate at some stage and provide a determinate answer about the truth values relative to S of the counterfactuals in the procedure. We do the same evaluation of (P > Q) for all the scenarios leading to P. A noncircular determination of (P > Q)'s true results. Unlike Kvart's account, Barker's approach can be extended to deal with probabilistic counterfactuals.

Possible Worlds Approach

Lewis (1973) proposed these truth conditions in terms of possible worlds and similarity relations:

> (P > Q) is true iff some (accessible) world where both P and Q is more similar to our actual world @, overall, than is any world where P is true and Q is false.

Stalnaker (1968) offered a variant that assumes that there is a unique closest P-world to the actual: Lewis's does not.

Lewis (1973) gave some evidence that this general approach captures the basic logic of counterfactuals – explaining the failure of transitivity, antecedent strengthening, etc. (Metalinguistic theories can do similarly through relativizing entailments to scenarios of transition.)

According to Lewis, would-counterfactuals have two readings: *forwardtrackers* and *backtrackers*. Forwardtrackers are meant to be those counterfactuals that are used in analyzing causation and that capture the sense in which the future depends causally on the past. Backtrackers carry information about the causal in the opposite direction.

Lewis (1986c) offered R as the criteria governing the similarity metric that determines relative similarity of possible worlds in the case of forwardtracking counterfactuals. R:

i. It is of first importance to avoid big, widespread, diverse violations of law.
ii. It is of second importance to maximize the spatiotemporal region throughout which perfect match of particular fact prevails.
iii. It is of third importance to avoid even small, localized, simple violations of law.
iv. It is of little or no importance to secure approximate similarity of particular fact, even in matters that concern us greatly.

The result of application of R is meant to be that the closest P-worlds to the actual @ will be worlds that diverge from @ at a time t_0 not too long before t_P, at which point a small miracle of divergence occurs, and thereafter develop in a law-governed way. *Miracle* has purely a technical meaning: miracle relative

to the laws of @, not with respect to the laws of the P-worlds, which remain unbroken. Laws of nature require nothing stronger than a Humean account. Laws are simply statements that feature in the most economical description of the pattern of matters of fact in a world in which perfectly natural properties are picked out.

Unfortunately, there is strong evidence that Lewis's analysis fails for deterministic cases (see Elga, 2000; Hausman, 1998), because the *de facto* temporal asymmetries of physical determination that Lewis thought provide the basis for counterfactual dependency of future on past, do not in fact deliver that result. There are strong reasons to think it fails for indeterministic cases and in particular for counterfactuals such as (5), which depends for its truth on a chance outcome: the coin's landing heads.

(5) If I had bet on heads I would have won.

If, following clause (iv) of R, approximate agreement of fact after t_P counts for nothing, Lewis's theory deems (5) false, because (I bet heads)-worlds in which the coin lands heads and I win and (I bet heads)-worlds where it lands tails and I lose are equally similar to the actual world. If we allow approximate agreement of fact to count, then it is still not obvious why (5) would come out true. Change the situation so that the end of the world will occur if I win, then (5) comes out false, even though my betting has no causal influence on the coin. It seems global similarity has absolutely nothing to do with the evaluation of (5). Indeed, it can be argued that causation is essential (see Barker, 2003). Lewis's analysis fails.

Some Issues

A pure analysis of counterfactuals without invoking causation looks dubious. There is real concern that Lewis's (1986b) project of a counterfactual analysis of causation will be circular (see Barker, 2003). A more general issue is the direction of counterfactual dependency. To date, both metalinguistic and possible worlds treatments have failed to provide an adequate account. Why does counterfactual thought involve divergence from past to future rather than the other way around? (For one interesting discussion of these matters, see Price, 1996.)

See also: Conditionals; Possible Worlds: Philosophical Theories.

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Court Interpreting

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Court interpretation transcends nearly all aspects of the intersection of Language and the Law. Whether it is in the realm of police work, pretrial lawyer/client conferences, or courtroom appearances, whenever a plaintiff, defendant, or witness cannot speak or understand the language of the law, there is a possibility that an interpreter's services will be requested. When such interpreter services are provided, their nature and quality vary enormously. This article reviews the major problematic issues in the field of court interpretation. Those issues include disagreement over role expectations – specifically, over the idealized 'conduit' model of interpreting – and the meaning of linguistic equivalence in sociolegal contexts. This review draws on research that is both ethnographic and experimental in design, as well as theoretical and empirical in approach.

Role of the Court Interpreter: Divergent Expectations

One striking finding that emerges from a survey of the research on court interpreting is that there is little consensus on what the interpreter's role should entail. Berk-Seligson's (1990, 2002a) ethnographic study, carried out in federal, state, and municipal courts in the United States, found that the American legal system would prefer that the court interpreter not have her own persona; that is, she should not exist as a distinct verbal participant in her own right. Rather, she should simply be an instrument through which one language – the source language – enters, and another – the target language – exits. In short, judges and attorneys would like the interpreter to be merely a conduit, akin to a mechanical device, which converts all speech that is not English into English for the benefit of judge, attorney, and the court record and turns English into the language of the Limited English Proficient (LEP) defendant, plaintiff, or witness for their benefit. The interpreter's function, from the standpoint of the court, is to enable the LEP person to participate in question/answer exchanges and to follow the examination of others who are being questioned. The legal basis for the right to an interpreter in common law types of judicial systems is the constitutional right to a defense, and for defendants to be able to defend themselves, they have to understand both the charges being leveled against them and, should their case go to trial, the testimony of opposing witnesses.

The conduit model of court interpreting is shared by professional interpreter practitioners, as evidenced by the widespread inclusion of wording in court interpreter codes of ethics cautioning interpreters that the output of interpretation must be a 'faithful' rendition of what was said in the source language. For example, the 'Code of Ethics and Professional Responsibilities' of the National Association of Judiciary Interpreters and Translators, a broad-based U.S. association that regularly holds nationwide and regional conferences, includes the following wording under its first canon, 'Accuracy':

> Source language speech should be faithfully rendered into the target language by conserving all the elements of the original message while accommodating the syntactic and semantic patterns of the target language. The rendition should sound natural in the target language, and there should be no distortion of the original message through addition or omission, explanation or paraphrasing. The register, style and tone of the source language should be conserved (NAJIT, 2004: 1–2).

The model code of interpreter ethics for the U.S. federal courts (Crooker, 1996:122), although far less explicit, has the same thrust, as the wording of its eighth canon demonstrates: "Official court interpreters fulfill a special duty to interpret accurately and faithfully without indicating any personal bias, avoiding even the appearance of partiality." The *Model guide for policy and practice in the state courts*, published by the National Center for State Courts – the institution that has established a consortium of U.S. states that share interpreter certification examinations – has "accuracy and completeness" as its first canon. Specifically, canon 1 states, "Interpreters shall render a complete and accurate interpretation or sight translation, without altering, omitting, or adding anything to what is stated or written, and without explanation" (Hewitt, 1995: 200).

One aspect of 'faithfully' and 'accurately' rendering source language speech into the target language is the preservation of speech style or register. This ability is expected of interpreters working both in federal courts (Mikkelson, 1998; Gonzalez *et al.*, 1991) and state courts alike (Hewitt, 1995). The rationale for conserving register in the target language is the court's desire that the LEP person be put on an equal footing with the monolingual English speaker. In particular, it is the desire of the courts that those with limited English proficiency not have their speech improved upon by court interpreters. Just as there are some monolingual English-speaking witnesses who may testify in a nonresponsive, rambling, or incoherent manner, at times peppering their testimony with

obscenities, the LEP witness speaking in his or her mother tongue may do so as well, and his or her speech should not be 'cleaned up' by the interpreter in the conversion to English, court administrators believe. Improving upon the speech of an LEP person would be giving him or her an advantage over a monolingual English speaker of a similar socioeconomic background. Thus, court interpreters are advised to render in the target language all hesitation phenomena, repetitions, slang words, and expletives.

In sharp contrast to the concept of the interpreter as an "impartial translation machine" is the notion of the "interpreter as linguistic and cultural bridge" (Morris, 1995; Mikkelson, 1998). In contexts other than legal ones (e.g., medical, social services), interpreters often find themselves explaining to health care and social service providers relevant differences between the culture of the service providers and that of the client. In contrast, in legal settings, particularly the courtroom,

> It is . . . not normally acceptable in court for an interpreter to point out to an examining lawyer that for cultural reasons a particular form of questioning is either impossible to render in the target language or would be understood erroneously by the non-English speaker; nor for the interpreter to explain the cultural implications of the witness's reply (Morris, 1999: 18).

Nevertheless, as Morris (1999) pointed out, formal guidelines given to interpreters and police officers in one jurisdiction of Great Britain explicitly state that there are occasions when interpreters should bring to the attention of authorities, as well as those being questioned, that some unstated cultural inference has been missed in the interaction. The code of ethics governing community interpreters, including court interpreters, in New Zealand similarly instructs interpreters to interrupt questioning whenever issues relating to "culture, creed and language" arise (Kasanji, 1995: 36, as cited in Mikkelson, 1998: 38). Berk-Seligson's (1990, 2002a) ethnography of the U.S. bilingual courtroom demonstrated that, in fact, some interpreters regularly halt the questioning routines of attorneys either to clarify for them cultural differences that are causing communication problems or to ask LEP witnesses about the meaning of certain terms with which they, the interpreters, are not familiar. Thus, at a hearing involving a Mexican undocumented man who had referred to having been brought illegally into the United States in a *troque*, the interpreter first rendered the term in English as 'truck' and then interrupted the examining attorney with the clarifying statement, "It could also, excuse me, it could also mean 'station wagon,' because *camioneta* means both things." This particular intervention by the interpreter served only to confuse the listener, because she introduced yet another Spanish lexical item, which resulted in the attorney's avoiding both glosses, referring instead to the object as "the vehicle," a semantically under-specified term. The clarification attempt demonstrates that efforts to serve the dual role of interpreter and intercultural mediator do not always succeed.

Despite the legal system's desire that the court interpreter not intrude upon court proceedings, the need for cultural explanations and culture-based clarifications arises regularly. A recent case of a Guatemalan 14-year old young girl who gave birth at home to a 2.7-pound breech-delivered infant, who died shortly thereafter, highlights an incident that from the very outset required cultural explanations of the events in question. The young mother, a speaker of Kanjobal, one of Guatemala's many indigenous languages, had been sold by her father to a middle-aged man when she was 11. She subsequently escaped from the man and entered the United States illegally to find shelter with her father and brothers, who at the time were living and working in Florida as agricultural laborers. When she arrived in Florida, she was already pregnant, but did not know it. The police found the dead baby in a bathroom garbage can, wrapped in a plastic bag, with toilet tissue stuffed in one ear and in her throat. They considered the presence of toilet tissue in the infant to be evidence of a homicide: death by suffocation. It took experts in Mayan culture to explain to the authorities that certain indigenous groups in Guatemala routinely put rags into the orifices of a body to dress it for burial. The interviews with the young girl conducted by the police were totally incoherent, because the girl did not speak or understand Spanish and the interpreter assigned to assist in the interviews knew no Kanjobal, only Spanish and English. No Kanjobal-speaking interpreter could be found for her preliminary court hearings either. Thus, whatever the girl said during those early stages of the judicial process could not be understood by anyone present, and she, in turn, did not understand anything said to her. She was charged with first-degree murder as an adult. Two years later, in 2004, she was released from jail, on probation, after pleading guilty to child neglect. Rather than being deported, she was allowed to live with a family that volunteered to house and educate her until she reached the legal age of adulthood. The insensitivity of the legal establishment to the linguistic and cultural facts of the case has resulted in an investigation of the affair by the U.S. Department of Justice, which at the time of this writing is looking into complaints of civil rights abuses.

The mishandling of this case by the police and prosecution is obvious. For 2 years, the press covered its twists and turns. However, countless cases involving the use of interpreters pass through American courts on a daily basis, many of them equally problematic in terms of providing adequate interpreting services. In other English-speaking countries that have large ethnolinguistic minorities, intercultural communication difficulties manifest themselves in similar ways in legal contexts. In Australia, for instance, Aboriginal people frequently are not provided quality interpreting services in their contact with judicial authorities (Eades, 1994; Walsh, 1994; Mildren, 1999; Walsh, 1999).

According to Eades, Mildren, and Walsh, the issue is not merely one of finding interpreters who are qualified to interpret between English and the various Aboriginal languages; the issue is also one of culture. All three of these scholars demonstrated that the culturally different ways of speaking that distinguish Australian Aboriginal people from middle-class white Australians disadvantage Aboriginal English speakers when they are questioned by legal authorities. Examples of communicative behaviors used by Aboriginal people that are misunderstood and evaluated negatively by non-Aboriginal Australians are the following: (1) avoiding direct eye contact with those speaking to them, because staring is considered to be impolite; (2) falling into long lapses of silence, whether during legal questioning or in ordinary conversation; and (3) gratuitous concurrence, that is, answering questions in the way that the person conducting the examination suggests that they be answered or simply agreeing with what is being asked (i.e., 'yeah-saying'). Each of these behaviors has negative consequences for an Aboriginal person giving testimony.

In light of the problems of intercultural communication in sociolegal settings, the question that must be asked is this: Is it the interpreter's responsibility to be an intercultural mediator? For some, the answer is "yes." Barsky (1994, 2000), for example, has taken this position. His investigation of political refugee hearings in Canada led him to the conclusion that at such hearings, "the competent interpreter, could, and in my sense should, play a role far beyond that of simply rendering the words of one language into another" (Barsky, 2000: 62). For Barsky, the political refugee hearing interpreter should be an intercultural interpreter, a "facilitator," someone who can compensate for the shortcomings of the hearing and "who can interpret language and intention, the verbal and the non-verbal, and then assist in the difficult process of contextualizing testimony and rendering it appropriate to the circumstance" (Barsky, 2000: 78). He gave the example of one Canadian-born English/Russian interpreter who would bring narratives, "even dull narratives, to life," adding relevant detail to the short, terse utterances of Russian-speaking claimants, in the process making their stories compelling and more believable (Barsky, 2000: 73). In effect, Barsky called for extending the role of the interpreter, arguing, "The desire on the part of judges and lawyers to have interpreters who limit themselves to verbatim translating can work against the interests of the accused person or the claimant, particularly when s/he testifies before a foreign judiciary, like the Immigration and Refugee Board" (Barsky, 2000: 63).

There are risks involved in allowing interpreters to go beyond faithful adherence to the source language text. One risk is that the interpreter may not act in good faith and may act against the interests of the party for whom he or she is interpreting (Barsky, 1994). Another risk is that the interpreter "may be perceived as favoring one side or the other by speaking for them or explaining their attitudes" and "would be acting as a witness rather than an interpreter" (Mikkelson, 2000: 46). This was the case in a multidefendant trial being prosecuted by the German federal courts against 18 members of the Kurdish Workers Party (PKK), accused of plotting to murder fellow members in civil-war-torn Lebanon. The trial involved two teams of interpreters, one assigned to the defense team and one assigned to the prosecution. Each team accused the other of bias toward the defendants, the interpreters for the defense claiming that the interpreters for the prosecution were partisans of the Turkish government, whose relations with the country's Kurdish minority had historically been a conflictual one. In 1990, Berk-Seligson observed the trial briefly in Düsseldorf, and what most stood out about the interpreting situation in the courtroom was the out-and-out conflict between the two interpreting teams. Their wrangling over each other's interpretations was partly to blame for the length of the multiyear, drawn-out trial. Perhaps because of cases such as these, Mikkelson, an academic who is also a practicing interpreter, cautioned against interpreter interventions aimed at clearing up culturally based confusion. She recommended instead that the court bring in a local expert on that culture, someone who is not involved in the case (Mikkelson, 1998).

A frequently held expectation among countries that practice common law jurisprudence is that interpreters should be impartial, or neutral, with respect to the parties for whom they are interpreting. This means that they are not supposed to side either with the defendant or plaintiff, or with witnesses, whether the witnesses are testifying on their behalf or against them. The prescription for interpreter impartiality

is evidenced in interpreter codes of ethics around the world. The notion of impartiality, in turn, is intertwined with the concept of conflict of interest, and codes of ethical conduct for court interpreters specify that interpreters must excuse themselves from assignments whenever a conflict of interest on their part either exists or merely has the appearance of existing. Two handbooks in use in the United Kingdom, *Non-English speakers and the English legal system: a handbook to good practice for those working in the legal system across language and culture* (Corsellis, 1995) and the syllabus for the *Diploma in public service interpreting* (Institute of Linguistics Educational Trust (ILET), 1996) refer to the need for impartiality and the requirement that the interpreter "disclose immediately if the interviewee or immediate family is known or related" (ILET, 1996: 29). The latter guide specifies that "the interpreter must be reasonably satisfied that ... s/he is, and is seen to be, in a position of neutrality. Interpreters should not accept assignments involving relatives or people with whom they are closely involved at work or at home or in situations where the interpreter's impartiality might be challenged without prior consent of both the English and non-English speaking clients" (ILET, 1996: 24).

In the United States, wherever states or state-related institutions have taken measures to guarantee quality interpreting in the judicial system, they have included the requirement of impartiality on the part of court interpreters. In its model guidelines for interpreting in state courts, the National Center for State Courts includes in its "Code of Professional Responsibility to Interpreters in the Judiciary System" canon 3: "Interpreters shall be impartial and unbiased and shall refrain from conduct that may give an appearance of bias. Interpreters shall disclose any real or perceived conflict of interest" (Hewitt, 1995: 202). Such norms of impartiality extend to interpreter contact with defendants/plaintiffs/witnesses at the very first stages of the judicial process; namely, police interviews. In England, for example, the *Metropolitan police handbook* warns interpreters to avoid "becoming personally involved in an investigation; assisting prisoners, witnesses or victims; having contact with anyone involved in a case (this includes families, witnesses, solicitors, etc., as well as the person you are actually interpreting for)" (Colin and Morris, 1996: 29). Mildren (1999: 137), writing about the situation of Australian Aboriginal people in the criminal justice system, faulted the Australian police for using friends of prisoners as their legal interpreters. Together with Cooke (1998), Mildren (1999: 137) believed that "the role of the prisoner's friend is in conflict with that of the interpreter. The latter must be impartial, but the former is required to be partisan. Prisoner's friends are rarely competent interpreters," because they act mainly to advise the suspect, and to help communicate to him his rights (i.e., the right to remain silent, the right not to incriminate himself, to have an attorney present at the questioning, etc.).

With the numerous ethical codes of conduct for judiciary interpreters proliferating around the globe, it may come as a surprise that reality comes nowhere near to the norms laid out in the canons of these codes. A review of appellate cases involving interpreting for the police (Berk-Seligson, 2000), for example, revealed that police officials routinely make use of persons who are not likely to be impartial in their *ad hoc* role as interpreters, specifically, other police officers and friends or relatives of detainees. In the context of police interrogations, such a practice can lead to a violation of a person's Miranda rights (Berk-Seligson, 2001, 2002b). Even when interpreters live up to judicial expectations, the persons for whom they interpret see them as being there to help them, as if they were members of the defense team (Berk-Seligson, 1990, 2002a) or even their savior, a linguistic and psychological haven (Morris, 1999). In some legal systems, such as that found in Malaysia, the interpreter, "typically is called upon not only to interpret but to provide legal and procedural advice in open court to unrepresented accused," because many defendants cannot afford professional legal representation (Ibrahim, 2004). In short, interpreters in Malaysian courts "are permitted and required to act as advocates" (Ibrahim, 2004).

Ethnographic observation of court interpreters at work has shown that, in fact, interpreters in various ways depart from the canons established for them by the judicial system, ironically often as a result of the actions of the judges and lawyers who work with them (Berk-Seligson, 1990, 2002a). Such a normative view of interpreting in general, court interpreting included, has been rejected as an ideal that not only cannot be attained but also should not be aimed at. Taking an interactional perspective on interpreting, such scholars as Wadensjö (1992), Laster and Taylor (1994), Roy (2000), Mason (1999), Jacobsen (2004), and Davidson (2000) have considered the conduit model of interpreting to be a normative one, in the sense of being prescriptive. Wadensjö (1992), rejecting the metaphor of the interpreter as a photocopy machine – someone who duplicates in the target language what was uttered in the source language, without any personal engagement – saw dialogue interpreting as the relaying and coordinating of talk. According to Wadensjö, relaying produces renditions of speech uttered by the source, and coordinating

results in moves, the consequence of which is that the interpreter becomes a gatekeeper in the interaction. Roy (2000), like Wadensjö, saw interpreting as dialogic discourse-based interaction. Mason (1999), viewing interpreting from a similar perspective, considered the interpreter to be a gatekeeper, coordinator, and negotiator of meanings within a three-way interaction. Jacobsen (2004), basing her conclusions on her empirical study of court interpreting in Danish district courts, found that the Danish judicial system, too, considers interpreters to be mechanical devices, similar to photocopying machines, but she felt that this view is misconceived. Jacobsen argued that the court interpreter should be considered an active participant in the interaction and that an important aspect of such participation is access to vital information about the case, information that normally is kept from her. In sum, all of these scholars rejected the normative view of interpreting, court interpreting included.

Interpreted Legal Discourse: The Pragmalinguistic Reality

If the court interpreter is a gatekeeper, coordinator, and negotiator of meanings, how does she affect the proceedings in which she is a key participant? For those whose concern is the preservation of meaning in the conversion of source language speech to the target language, an ancillary but highly important question is this: To what degree is pragmatic equivalence achieved, and what difference does it make when the gap between source message and target rendition is noticeably great? Several empirical studies have addressed these questions (Berk-Seligson, 1990, 1999; Hale and Gibbons, 1999; Rigney, 1999; Russell, 2000; Berk-Seligson, 2002a; Hale, 2004). In essence, these studies dealt with the question of accuracy.

Berk-Seligson's ethnographic study (1990, 2002a) of Spanish/English interpreting in U.S. federal, state, and municipal courts revealed that witness testimony is lengthened significantly by the court interpreter in the conversion of Spanish to English; this finding is contrary to what is expected, because translations of English source material into Spanish tend to be one-third longer in their Spanish renditions. Syntactic differences between the two languages account for this notable difference. When the interpretations of six interpreters of the testimony of 27 witnesses were analyzed, it was found that the English interpretations added hedges, inserted linguistic substance that was perceived to be underlying or 'understood' in the source utterance, used uncontracted forms, rephrased what the interpreter herself had just uttered in her interpretation, added polite forms of address, and added particles and hesitation forms.

Most of these mechanisms are characteristic of what O'Barr (1982) and O'Barr and Atkins (1980) have called 'powerless speech style.' This style has been shown by O'Barr and his colleagues to produce negative evaluations of witnesses by mock jurors. The use of uncontracted forms (e.g., "I will go," rather than "I'll go"; "She has seen it," rather than "She's seen it"), together with the insertion of linguistic material that is normally deleted in surface syntax, conveys the impression of hyperformality – a stilted, excessively formal style not usually used in spoken American English. This style has been found to produce negative social/psychological evaluations of witnesses (O'Barr, 1982). In contrast a series of verbal guise technique experiments (Berk-Seligson, 1990, 2002a) designed to test the impact of such interpreter-induced alterations in witness testimony on 551 mock jurors found that (1) politeness, although a feature of powerless speech style, in and of itself has a positive impact on mock juror evaluations of a witness's convincingness, competence, intelligence, and trustworthiness; (2) hyperformal testimony style, as rendered by interpreters, enhances the image of the witness; and (3) hedging in interpreted testimony produces negative evaluations of a witness's competence and intelligence among mock jurors of European descent, but has no negative impact on Hispanic mock jurors.

Hale (2004), too, has analyzed the impact of the interpreter on witness testimony style. She examined the following set of features: hesitations, hedges and fillers, discourse markers, pauses, repetitions and backtracking, ungrammaticalities, and unidiomaticalness. She found that, on the whole, "witnesses' speech styles are constantly being altered by interpreters" (Hale, 2004: 156). Interpreters generally would omit features that characterize powerless speech style, when such features were commonly found in the Spanish testimony of witnesses; at the same time, however, interpreters would sometimes add characteristics of powerless speech to their renditions of Spanish testimony when no such features were present in the Spanish. Hale's explanation for this contradiction was variability in the English proficiency of the interpreters, combined with variability in their interpreting skills.

Court interpreters not only alter the style in which witness testimony is rendered but they also affect lawyer's questioning strategies. One of the findings of Berk-Seligson (1990, 2002a) was that interpreters interrupt lawyers for various reasons, usually to clarify something that the witness has said that was problematic or something that the lawyer has said.

For this reason, the impact of interpreter interruptions was tested as well, through verbal guise experiments (Berk-Seligson, 1990, 2002a). It was found that when an interpreter regularly interrupted a lawyer – either for the sake of clarifying the wording of a witness's statement or to clarify the wording of the lawyer's question – the lawyer is evaluated as being significantly less competent than when the interpreter does not interrupt him or her at all.

Interrupting a lawyer is just one way of affecting his or her control over a witness. There are other ways in which interpreters have been found to have an impact on a lawyer's degree of control over a witness's answers. Berk-Seligson (1990, 1999, 2002a), Hale (2004), and Rigney (1999) examined Spanish/English empirical data in this regard. All three looked at the issue of equivalency in the interpreting of questions. They all emphasized the need to consider pragmatic meaning, beyond lexical and syntactic aspects of equivalence, and they all viewed questions from the perspective of the lawyer's control over the witness's answers. They therefore categorized questions along a number of syntactic dimensions: Rigney (1999), for example, looked at open *wh* questions, closed *wh* questions, modal questions, and yes/no questions, among others; Berk-Seligson (1999) identified prosodic questions, copy tag questions, checking tag questions, and confirmatory tag questions, among others (see Table 1). Hale (2004) distinguished between question types used during examination-in-chief (i.e., direct examination) and those employed during crossexamination and made fine distinction among similar question types, such as declaratives that are positive or negative with rising intonation or positive or negative with either a positive or negative tag. Many of the question types examined by these scholars overlap. Some, by dint of being part of Australian English questioning style (e.g., "I put it to you" declarative questions) were found frequently in Hale's data set, but not in Berk-Seligson's or Rigney's, because the latter two analyze courtroom proceedings conducted in American English. All three viewed question types from a functional perspective, namely, their degree of coerciveness or measure of control over the answer. Hale (2004) and Hale and Gibbons (1999), however, went beyond this perspective to characterize the question types according to tone (level of politeness, hostility, or friendliness), illocutionary point (e.g., request vs. command) and force or strength. These four studies concluded that court interpreters often reduce the coercive force of leading questions, which is something that is particularly problematic for lawyers engaged in hostile crossexamination.

Table 1 Leading questions

1. Didn't you enter the house at that time?
   (negative grammatical yes/no question)
2. You entered the house at that time?
   (positive prosodic question)
3. You didn't enter the house at that time?
   (negative prosodic question)
4. You entered the house at that time, did you?
   (copy tag question)
5. Is it true (correct) that you entered the house at that time?
   (positive truth-questioning question)
6. You entered the house at that time, (is that) right?
   (positive confirmatory tag question)
7. You didn't enter the house at that time, (is that) right?
   (negative confirmatory tag question)
8. You didn't enter the house at that time, did you?
   (negative checking tag question)
9. You entered the house at that time, didn't you?
   (positive checking tag question)
10. Isn't it true that you entered the house at that time?
    (negative truth-questioning question)
11. You entered the house at that time, isn't that right?
    (confirmatory negative tag question)
12. Did you enter the house at that time? Didn't you?
    (grammatical yes/no question + checking tag question)

Another aspect of lawyers' questioning routines that has been investigated in the context of court interpreting is the use of discourse markers. Hale (1999, 2004) has examined the use of 'well,' 'now,' and 'you see,' and found that lawyers frequently use these markers as a way of prefacing their questions. In direct examination ('examination-in-chief'), Hale (2004: 85–86) found, these markers are used primarily "to maintain control of the flow of information as well as to mark progression in the story line." In crossexamination, these markers play important roles in argumentation and confrontation, "mostly initiating disagreements or challenges" (Hale, 2004: 86), and in addition they provide coherence to questioning sequences. Hale's important finding was that interpreters routinely omit these markers from their interpretations.

Conclusion

This article has shown that one of the primary issues that confront the field of court interpretation is disagreement among interpreting/translating theorists, practitioners, interpreter trainers and educators, and key players in the judicial system over what role the court interpreter should play in multilingual socio-legal contexts. Research has shown that the courts expect the interpreter to be a conduit, analogous to a photocopy machine, whereas interpreting theorists have demonstrated the impossibility and, for some,

the inadvisability of adhering to such a role. Interpreter trainers tend to espouse the norms prescribed by the courts, teaching practitioners to abide by the profession's codes of ethics. Empirical studies of court interpreters in action reveal, however, that if 'fidelity' to source language speech is the goal to strive for in one's target language renditions, then interpreters often fall short of the mark, and where the discrepancies are most pronounced is in the realm of pragmatic equivalence. The research also shows that the legal system's desire for interpreter impartiality and neutrality often is not fulfilled; yet, for a number of scholars, this finding not only is not problematic but is rather something to be lauded, because they perceive the role of the interpreter in many types of legal proceedings to be that of facilitator, intercultural mediator, and even advocate. Clearly, what is most pressing is the need for dialogue between judicial officers, on the one hand, and court interpreter trainers and practitioners on the other, informed by scholars whose research orientations and analytical approaches derive from sociolinguistics, pragmatics, discourse analysis, and translation/interpretation theory.

See also: Applied Forensic Linguistics; Discourse Markers; Institutional Talk; Interactional Sociolinguistics; Intercultural Pragmatics and Communication; Interviewing and Examining Vulnerable Witnesses; Legal Pragmatics; Linguistic Rights; Minorities and Language; Police Questioning; Politeness; Power and Pragmatics; Pragmatics: Overview; Spanish; Translation: Pragmatics; Verbal Conflict; Witness Examination.

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Coustenoble, Hélène Nathalie (1894–1962)

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Hélène Nathalie Coustenoble, phonetician and language teacher, was born on October 27, 1894 at Bezons in southern France—her place of birth perhaps accounting for her later research interest in the Provençal language. Her parents, however, hailed from the north and soon after her birth returned to Lille. It was there that Coustenoble passed her formative years, receiving her education from a college in Abbeville.

She first came to London in 1912, with the ambition of becoming a language teacher. After some years spent teaching French in schools, she began to take an interest in phonetics and, having met Daniel Jones when attending a summer course in 1917, immediately became one of his most devoted followers. Jones was impressed by her practical linguistic abilities and despite her lack of formal qualifications offered her part-time work in his department at University College London. In 1919, she obtained a full-time post, and over the years gained subsequent promotion, eventually being appointed Reader in Phonetics in 1947.

Although she considered herself first and foremost a language teacher, Coustenoble also produced scholarly work of distinction, always reflecting a Jonesian practical approach to the subject, and drawing largely on her own empirical research. Even more than her mentor, Coustenoble would rely solely on her trained ears and direct observation for linguistic investigation, largely eschewing aid from instrumental or experimental techniques. After compiling her *Pronunciation dictionary of the French language* (1929), which was the first such reference work for French in modern format, she went on to co-author, with her UCL colleague Lilias Armstrong, *Studies in French intonation* (1934). Coustenoble's life's work was to be *La phonétique du provençal moderne en terre d'Arles* (1945), a meticulous survey that broke new ground with its synchronic description of the spoken form of Provençal, as opposed to the diachronic treatments of the language previously available. In 1947, in recognition of this publication, she was awarded a D.Lit. from London University.

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Coustenoble, Hélène Nathalie (1894–1962)

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Hélène Nathalie Coustenoble, phonetician and language teacher, was born on October 27, 1894 at Bezons in southern France—her place of birth perhaps accounting for her later research interest in the Provençal language. Her parents, however, hailed from the north and soon after her birth returned to Lille. It was there that Coustenoble passed her formative years, receiving her education from a college in Abbeville.

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See also: Armstrong, Lilias Eveline (1882–1937); French; Jones, Daniel (1881–1967); Synchronic and Diachronic Variation.

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Creativity in Language

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Speakers change languages all the time because their needs in using language change. One major type of change appears in the words people use and the meanings they assign to them. Speakers construct new words to add to their vocabulary, to talk about new trends and developments in society (*boycott, sabotage, space-station*) and to take into account technical and scientific innovations (*aviation, gene-splicing, parallel processing*, *flash-memory*). And they discard terms that no longer serve any purpose – some that are rarely used today include *barouche, jeroboam, wringer*. This is why dictionary making is endless. Lexicographers track how speakers change their words over time, and the vocabulary of a language is never fixed. Speakers continually add new terms for new categories and adjust existing meanings to take account of extensions (often metaphorical) and also shifts introduced by the addition of other words in the same domains, for example the shift from *guitar* to *acoustic guitar* under pressure from the contrast with *electric guitar*. Some new terms that speakers coin are taken up by others, eventually by the speech community as a whole, and so become part of the current conventional vocabulary. Other coinages are used once only, and then vanish again. In all of this, speakers effectively assign an indefinite number of meanings to a finite number of forms in the language they use. They do this by combining compositional meanings with pragmatic inferences dependent on the context, and so continually extend the resources available in new ways.

Coining Words

When speakers coin words, they do so to convey some meaning that is not covered by the meanings of existing words in the vocabulary. For example, a fairly new verb like *to farmer*, meaning 'play the role of farmer (without being a real farmer)' contrasts with its near-neighbor *to farm*, which designates the activity of being a (real) farmer. In constructing the forms of new words, speakers follow the rules for word formation in their language. In English, for example, they can have recourse to novel compound nouns (e.g., *the circle-group* vs. *the oval-group*, to describe two groups distinguished by insignia), to derived nouns and adjectives (e.g., among recent nouns *a peace-keeper*, *the polluter*; among recent adjectives *internationally minded*, *safety-challenged*), and to denominal verbs (*to medal* in an Olympic event, *to land* a plane even on water, *to e-mail* the message) (e.g., Clark and Clark, 1979; Marchand, 1969). Other languages may draw on a slightly different repertoire of options: French, for example, like other Romance languages and like Hebrew, makes little use of compounding and relies much more extensively on derivation for new words (e.g., Depecker, 2001; Guilbert, 1975). In making use of such word-formation patterns, speakers generally choose the most productive forms – the patterns currently favored by speakers – for the meanings to be expressed (Clark, 1993). This productivity of a pattern can change over time. For example, the Verb + Noun pattern used for forms like *pinch-penny, toss-pot*, and *pick-pocket* lost its productivity after this pattern acquired a generally negative connotation in the 1700s. Other patterns, such as N + V-*er* for agentive and instrumental meanings (as in *tomato-grower, cheese-cutter, picture-painter*), may remain highly productive over many years. But speaker preferences for particular patterns and affixes can shift, and this typically results in changes in the productivity of particular word-formation patterns and suffixes over time (Dubois, 1962).

Coinages are ubiquitous in everyday speech and in many kinds of writing. While temporary or nonce uses come and go, other coinages may be regulated in that language academies often make recommendations

See also: Armstrong, Lilias Eveline (1882–1937); French; Jones, Daniel (1881–1967); Synchronic and Diachronic Variation.

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Coinages are ubiquitous in everyday speech and in many kinds of writing. While temporary or nonce uses come and go, other coinages may be regulated in that language academies often make recommendations

about new terminology. This happens in many countries for new fields of enquiry where a language academy may simply keep track of the coinages that speakers come up with as the Swedish Academy does, or make active recommendations about the terms to use in specific domains, as in France or Israel (Berman, 1997; Clark, 1993). Most language academies tend to focus more on written than on spoken forms of the target language, yet it is in their everyday speech that people continually renew their language.

Children Coin Words, Too

Children start learning what the options are for constructing words – the ways to put together stems and affixes to express different meanings – from the earliest stages of acquisition. They may make use of some productive options in their language from as young as age 2. Like adults, they coin words to add to their vocabulary and so extend their range in talking about the objects and events around them. In doing this, they apply patterns observable in the established vocabulary in constructing new words: nouns such as *sleepers* for 'pyjamas', *climber* for 'ladder', *reacher* for 'someone who can reach a long way', and *drummist* for 'drummer', are typical of the forms constructed by 2- and 3-year-olds. They also construct new adjectives such as *windy* for 'blown by the wind', or *walky* for a path 'one can walk along', as well as new verbs like *crack out* for 'hatch', *oar* for 'row', *piano* for 'play the piano', or *untight* for 'loosen'.

Young children have much more limited vocabularies than adults at first, so they may coin many words illegitimately. That is, they coin a word to convey a meaning for which there is already a conventional term. They may come up with forms like *farsee-er* for 'telescope', *to car* for 'to drive', *to rug* for 'to vacuum [a rug]', or *to needle* for 'to mend' (Clark, 1993). These coinages are pre-empted by the conventional terms adults use for those meanings, and children give them up as they learn the appropriate terms. As children get older, they become more adept at coining words where there are no existing words with just the meanings they wish to express. They become sensitive to the relative productivity of specific patterns and affixes, and, like adults, favor more productive over less productive options. Also like adults, they continue to attend to transparency in meaning – 2-year-olds prefer a compound like *magic-man* over a derived form like *magician* in which the term *magic* is less discernible. They also attend to simplicity in form – 2-year-olds prefer making the least possible change when they construct a new word form.

Language Revival

The 20th century saw the revival of several languages. The best known of these perhaps is Modern Hebrew, adopted by early Jewish settlers in the Near East as their everyday language from the 1890s on. After the establishment of the state of Israel in 1948, Modern Hebrew was adopted as the national language. Speakers of Hebrew then had to create hundreds of new words for all the everyday things they needed to be able to talk about in modern life, from tractors and engine parts to postal systems and school-leaving exams. They borrowed extensively from other languages, through loan translations, and they coined words for whatever they needed in agriculture (including fish farming, raising turkeys, and meat packing), plumbing, child rearing, schooling, and marketing, as well as in politics, economics, and science (Blau, 1981; Bolozky, 1999; Ravid, 1995). Israel also set up an Academy of the Hebrew Language to make recommendations about new vocabulary as speakers expanded the existing resources from historical and ritual varieties of Hebrew. The Academy continues to make recommendations today, often lagging behind speakers who take the initiative before any official recommendation appears.

The Irish Gaelic language in Eire faced a similar challenge as the government pushed for its revival as people's everyday language (Watson, 2003; Wright, 1996). Reintroducing Irish in geographic areas where it had not been spoken for several generations, and adding the range of vocabulary needed so it could indeed be used for all everyday purposes presented a formidable challenge. Speakers who had retained their Irish tended to be from rural areas and rural occupations, so, as in Israel, the need for new vocabulary in many social and scientific domains was extensive. Welsh faces similar challenges in maintaining itself as a full everyday language (Aitchison, 2000), as does Scots Gaelic and many other minority languages that often received little official support.

Other languages currently undergoing similar attempts at revival include a number of Australian aboriginal languages and American Indian languages (e.g., Amery, 2000; Hinton and Hale, 2001). In many cases, linguists have been called on to help devise writing systems and help prepare teaching materials, so the languages in question can be (re-)introduced into the community at the nursery school level and up, within the local school system. Few of these revivals, though, have gone as far as Hebrew or Irish Gaelic in building up vocabularies adequate for all facets of modern life. Yet this infusion of vocabulary may be a vital ingredient for endangered languages:

speakers' willingness to invigorate the language with new words may well be essential if a language is to remain viable.

Syntactic Units and Combinations

Do speakers construct entirely original, new utterances on each occasion, using syntactic rules to put together new combinations of terms, or do they rely more on ready-made phrases, chunks, and idioms? Within generative grammar, the traditional claim has been that speakers can generate innumerable utterances that they have never produced before (e.g., Chomsky, 1986). That is, speakers are assumed to construct original syntactic combinations, each one built from scratch according to the rules. But does that claim really capture what goes on in most interactions? As native speakers, people have access to a large repertoire of words, phrases, idioms, and constructions, many of them very frequent in everyday speech.

So an alternative view is that speakers typically build their utterances from ready-made routines and a limited set of constructions. In relying on formulaic uses and routines in language, speakers tailor them to their needs by inserting words, idioms, and phrases that result in new combinations within a construction, and even thereby stretch the meaning of a construction. One reason for doing this is to take advantage of the chunks of language people store in memory (Bolinger, 1976; Fillmore, 1979). This view is consistent with recent work on the myriad syntactic forms, often designated as peripheral to a language, where 'the rules fail' (Culicover, 1999). Recent approaches have tackled these as exemplifying cases where a construction-based, rather than a rule-based, approach may prove more explanatory of how speakers use language. The hypothesis is that when people talk, they work with constructions and formulaic chunks where they can fill variable slots to express specific meanings on different occasions (e.g., Kay and Fillmore, 1999).

Extending Language in New Directions

Creativity in language – stretching meanings and coining words – is also a form of play, one delighted in by many writers who have stretched their language to new limits. In James Joyce's *Ulysses,* Keri Hulme's *The Bone People*, or Tibor Fischer's *The Thought Gang*, for example, each writer extends the meanings of existing words through new juxtapositions and figurative uses. And each writer coins many new words to express new meanings. Poets like Gerard Manley Hopkins (*daylight's dauphin, dapple-dawn-drawn Falcon*, or *golden grove unleaving*) or Dylan Thomas (*the windfall light*, *the round/ Zion of the water bead/ And the synagogue of the ear of corn*) are often major innovators in language, stretching meanings and adding new forms for new meanings. And many playwrights also extend the uses of a language. Here English speakers probably owe their greatest debt to Shakespeare whose plays are the source of innumerable metaphors, figures of speech, and phrases generally taken for granted until we are startled to hear them fresh-minted in a speech from one of his characters.

The extent to which speakers exploit established and novel figurative uses of language in everyday speech is unclear, but research on language processing shows that readers and listeners readily interpret new uses, figurative uses, and extensions of existing meanings without difficulty (e.g., Gerrig, 1993; Gibbs, 1994).

In summary, speakers are creative in their language use because language is never a precise map of what they wish to convey. Languages do not all select the same elements in a scene to encode, but they select enough to evoke events and their participants. Yet this mapping leaves unmentioned many a detail, as well as many changes in society itself. Speakers, writers, poets, and children remedy such gaps by stretching the meanings of the terms they have and by constructing new words for the new meanings they wish to convey.

See also: Construction Grammar; Word Formation.

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Cree

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The Cree language exhibits an extraordinarily rich morphology, traditionally compared in its profusion to that of Ancient Greek.

Inflexion

The epistemological import of a statement, for example, may not only be indicated by particles such as *êsa* 'reportedly' or *iska* 'by dream or revelation' or through direct quotation, but also inflexionally, e.g., in the dubitative form of the changed conjunct verb *wêhtinâkwê* 'there he must have obtained him' in such sentences as … *tânitê mîna wêhtinâkwê askihkwa*. '… I wonder where he got a pail.' The stem *ohtin-* 'thus or there obtain s.o.,' which requires an antecedent (*tânitê* 'whence'), is followed by the thematic suffix *-â-*, specifying a proximate (central) agent and an obviative (noncentral) patient of animate gender. The dubitative suffix *-kwê*, finally, combines with the ablaut (apophony) affecting the initial vowel of the word to express subordination to the interrogative and evidential modality.

Cree verbs are inflected in four major paradigms, with the stems themselves typically grouped into two derivational pairs. Stative verbs differ by the gender of the agent, *mihkwâ-* 'be red (inanimate),' *mihkosi-* 'be red (animate),' while transitive verbs are distinguished by the gender of the patient: *pakamah-* 'strike s.t. (inanimate),' *pakamahw-* 'strike s.o. (animate).' Verbs of this last class specify both agent and patient inflexionally.

Their overall complexity aside, the inflexional paradigms of Cree are also subject to substantial dialect variation, both in particular endings and in entire paradigmatic dimensions.

Number in Inflexion and Derivation

In the expression of grammatical categories, inflexion and derivation complement each other. The basic distinction of number, for example, is that of singular and plural expressed inflexionally, e.g., *iskwêw* 'woman; a woman; one woman' vs. *iskwêwak* 'women (more than one).' The singular is unmarked and in elevated prose may be used collectively, as in *kôsisiminaw* 'our grandchildren [lit. 'our grandchild']'; in a sentence like *kîspin êkâ iskwêw ôta kî-pakitinikowisit* 'if women [lit. 'Woman'] had not been put here [on earth] by divine powers,' both the noun *iskwêw* and the verb (in the simple [unchanged] conjunct mode and with the third-person suffix *-t-*) show the singular. Quantifiers such as *mihcêt* 'many' heighten the literary effect of this device, e.g., *mihcêt namôy kiskêyihtam* 'many do not [lit. 'does not'] know this.' Reciprocal stems construed as singulars, e.g., *ayisiyiniw k-âyimôhtot* 'that people [lit. 'a person'] should gossip about one another,' are a mark of high rhetoric.

The number system of Cree is remarkable for its range of associative plural constructions; for example, a first person plural verb accompanied by a singular noun (here flanked by the demonstrative *awa*) indicates a conjoint noun phrase including the first person: *kâ-sipwêhtêyâhk awa nisîmis awa* 'when we took off, my little sister [and I].' A third person plural verb construed with a singular noun is

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Their overall complexity aside, the inflexional paradigms of Cree are also subject to substantial dialect variation, both in particular endings and in entire paradigmatic dimensions.

Number in Inflexion and Derivation

In the expression of grammatical categories, inflexion and derivation complement each other. The basic distinction of number, for example, is that of singular and plural expressed inflexionally, e.g., *iskwêw* 'woman; a woman; one woman' vs. *iskwêwak* 'women (more than one).' The singular is unmarked and in elevated prose may be used collectively, as in *kôsisiminaw* 'our grandchildren [lit. 'our grandchild']'; in a sentence like *kîspin êkâ iskwêw ôta kî-pakitinikowisit* 'if women [lit. 'Woman'] had not been put here [on earth] by divine powers,' both the noun *iskwêw* and the verb (in the simple [unchanged] conjunct mode and with the third-person suffix *-t-*) show the singular. Quantifiers such as *mihcêt* 'many' heighten the literary effect of this device, e.g., *mihcêt namôy kiskêyihtam* 'many do not [lit. 'does not'] know this.' Reciprocal stems construed as singulars, e.g., *ayisiyiniw k-âyimôhtot* 'that people [lit. 'a person'] should gossip about one another,' are a mark of high rhetoric.

The number system of Cree is remarkable for its range of associative plural constructions; for example, a first person plural verb accompanied by a singular noun (here flanked by the demonstrative *awa*) indicates a conjoint noun phrase including the first person: *kâ-sipwêhtêyâhk awa nisîmis awa* 'when we took off, my little sister [and I].' A third person plural verb construed with a singular noun is

interpreted as including the extended family hunting band of the person specified by the noun: *ita nôhtâwiy k-âyâcik* 'where my father [and his people] live'; this construction is rare among the languages of the world.

The opposition of singular and plural is neutralized for both nouns and verbs in the obviative (noncentral) third person, e.g., *sîsîpa tahkonêw* 'she carried a duck/ducks,' where the number of the patient is not specified in the verb form and the noun *sîsîpa* itself is number-indifferent. In such contexts, it is not uncommon for the verb stem to be reduplicated, e.g., *ê-kî-miyikoyâhk mâna sîsîpa ka-tâh-tahkonâyâhkik*. 'he used to give us [each several] ducks to carry.' With the long vowel *-â-* and strong devoicing (*-h-*) before what is treated as a word-boundary (indicated by a word-internal hyphen in the standard roman orthography), this highly productive type of 'heavy' reduplication expresses iteration or distributive action, which here takes the place of inflexionally marked plurality.

High literary style also exploits a much less productive type of disyllabic reduplication, which does not introduce a word boundary; the reduplication syllable is 'light' (with the short vowel *-a-*), and the initial syllable of the stem itself shows lengthening of the vowel in accordance with rules that are largely those of the ablaut pattern illustrated in our opening example. This more archaic type of reduplication typically appears with paired referents, e.g., *ê-mamêhkwâpicik* 'they had their eyes painted red' (cf. *mihkwâpi-* 'have a red eye'), suggesting a kind of dual marking not otherwise reported for the Algonquian languages.

Derivation

The derivational morphology of Cree easily matches the exuberance of the inflexional paradigms. In the formation of primary stems from roots (or initials), optional medials and obligatory finals, the stems corresponding to the four major verb paradigms (with their pairings by gender) are thrown into sharp relief:

pakâsim- 'boil s.o. (e.g., a rabbit, a beaver) in water'
pakâhtâ- 'boil (it) (e.g., bones, clothes) in water'
pakâso- 'be boiled in water (animate; e.g., a rabbit, a beaver)'
pakâhtê- 'be boiled in water (inanimate; e.g., bones, clothes)'

(The root on which these stems are based refers to immersion; cf. the secondary stem *pakâsimo-* 'immerse oneself in water; swim.') Semantic sets are not necessarily fourfold or symmetrical, nor are they confined to a canonical stem, occasionally showing suppletion instead, e.g., *mow-* 'eat s.o. (a duck, bread),' *mîci-* 'eat (it).'

The initial constituent of the stem defines one paradigmatic set; e.g., *âyimôt-* 'speak unguardedly about s.t., gossip about s.t.,' *âyimôm-* 'speak unguardedly about s.o., gossip about s.o.' (and secondary stems *âyimômiso-*, *âyimôhto-* 'speak unguardedly, gossip about oneself, one another'), *âyimisi-* 'be of difficult disposition', *âyimî-* 'have a difficult life,' *âyiman-* 'be difficult.' An equally prominent set is defined by the final, e.g., the *-ôt-* which recurs in *mâmiskôt-* 'expound s.t.,' *tâhkôt-* 'discourse upon s.t.,' *tipôt-* 'discuss s.t. with authority.' In less specialized domains, initials such as *pimi-* 'in linear progression,' *sipwê-* 'departing,' *tako-* 'arriving' and finals such as *-ohtê-* 'walk,' *-pahtâ-* 'run' cooccur freely.

In secondary derivation, full stems give rise to further stems, e.g., the transitive *pakamahw-* 'strike s.o.' to the reciprocal *pakamahoto-* 'strike one another' or the inagentive verb of suffering *pakamahokowisi-* 'be struck by divine force'; or the parallel stem *pakamah-* 'strike s.t.' to the noun stem *pakamahikanis-* 'club, hammer.' Noun stems such as *maskisin-* 'moccasin, shoe' or *nîmihitowin-* 'dance, dance ceremony' (itself derived from the reciprocal verb stem *nîmihito-*) yield such verb stems as *maskisinihkê-* 'make moccasins, make shoes' or *nîmihitowinihkê-* 'hold a dance ceremony; give a dance.' Some highly transitive verbs permit the formation of patient nouns, e.g., *misw-* 'shoot s.o., wound s.o.,' *miswâkan-* 'wounded person,' which in turn is the base for *miswâkaniwi-* 'be wounded.'

Recursive suffixation is complemented by a highly productive pattern of deriving noninitial nominals from stems. While some of these deverbative medials closely resemble the full noun, others are distinct; the medials *-ihkomân-*, *-astimw-*, *-askisin-*, for instance, vary more or less obviously from the stems *môhkomân-* 'knife', *atimw-* 'dog; horse' or *maskisin-* 'moccasin, shoe,' as in *mistihkomân* 'big knife' or *manihkomânê-* 'take a knife,' *mihcêtwastimwê-* 'have many horses' or *kikaskisinê-* 'wear moccasins, wear shoes.'

Noun Incorporation

Transitive stems with animate patients may function as the base of an overtly incorporative stem consisting, for instance, of the stem *ohtin-* 'thus or there obtain s.o.' as the initial constituent, the derived medial *-iskwêw-* 'woman' and the verb-final forming intransitives, *-ê-*; the resulting stem *ohtiniskwêwê-* has the specialized meaning 'take a wife from there, take one's wife from there.'

Noun incorporation yields syntagmatically ordered series: the transitive stem *kanawêyim-* 'watch over s.o., guard s.o. with care,' when construed with the medial *-iskwêw-* 'woman' and the intransitive final *-ê-*, results in the incorporative verb *kanawêyimiskwêwê-* 'watch over one's wife/wives, carefully guard one's wife/wives.' It is then subject to further derivation, for instance as the transitive stem *kanawêyimiskwêwât-* 'guard s.o. as one's wife'; or with the noun final *-win-* forming the abstract noun *kanawêyimiskwêwêwin-* 'watching over one's wife/wives, carefully guarding one's wife/wives'; or with the habitual suffix *-ski-*, giving rise to *kanawêyimiskwêwêski-* 'habitually watch over one's wife/wives, jealously guard one's wife/wives at all times.'

Stems incorporating the same nominal constitute a paradigmatic set. They may not only be based on fully transitive stems, overt as in the above examples or covert as in *nâtiskwêwê-* 'seek a wife; fetch one's wife' (cf. *nât-* 'fetch s.o.'); but also on stems belonging to the paradigmatic class of mostly vowel-final stems that combines intransitive and transitive stems without marking the latter inflexionally, e.g., *mêkiskwêwê-* 'give a woman in marriage; give (her) in marriage' (cf. *mêki-* 'give [it/him] away'). Finally, they may also be primary, based on a mere root instead of a full stem, e.g., *nôtiskwêwê-* 'pursue a woman, court a woman.'

Even with intransitive stems, a medial such as *-iskwêw-* may function in an oblique relation, e.g., *âcimoskwêwê-* 'tell about one's affairs with women' (cf. *âcimo-* 'tell a story').

Such medials also appear in completely distinct constructions: with initial and medial forming a single larger constituent construed with the final *-ê-*, such verbs mean either 'have X,' e.g., *oskiskwêwê-* 'have a new wife,' *nîsôskwêwê-* 'have two wives,' or 'be X,' e.g., *kakâmwâtiskwêwê-* 'be a quiet woman.'

Parallel to the stative 'be X,' we find the denominal stem *kakâmwâtiskwêhkê-* 'give the impression of being a quiet woman' (with the *-êw-* of the noun and the suffix-initial vowel contracting to *-ê-*). The incorporative stems proper, on the other hand, give rise to further transitives, e.g., *nôtiskwêwât-* 'court s.o. as a woman'; this is true even for the oblique case: *âcimoskwêwât-* 'tell about one's affair with s.o. as a woman.' But note the difference in thematic structure in *nitomiskwêwât-* 'ask for a woman's hand of s.o.' (cf. *nitomiskwêwê-* 'ask for a woman's hand').

Finally, the incorporative verbs may even be construed with a full patient noun phrase. The full noun often appears in a separate clause, e.g., *... câh-cîki niwâhkômâkanak kitâcimostawin, ê-âcimoskwêwâtacik*. '... you told me about very close relatives of mine, telling of your affairs with them as women'; but it may also be part of the same clause, e.g., *... ôhi iskwêwa ôhi kâ-nôtiskwêwâtimiht*. '... the woman who was being courted.'

Verbal Art

Cree literary form liberally exploits the combined riches of inflexion, word formation, and word order. Parallel constructions, for instance, may have the verb repeated in full and both nouns in contrast position, preceding the verb: *kisêyiniwa ka-nâtâmototawêw, nôtikwêwa ka-nâtâmototawêw*. 'They will turn to the old men (*kisêyiniwa*), they will turn to the old women (*nôtikwêwa*).' Or the first noun may follow the verb (again repeated in full), and the second precede it, chiastically: *ôtê, nâway ahêw kêhtê-aya, nôtikwêwa ôtê ahêw*. 'The old people (*kêhtê-aya*) they have put over there in the background, they have put the old women (*nôtikwêwa*) over there.' Verbless sentences, here with the personal pronoun *niya* 'I' and the nouns *nêhiyaw* 'Cree,' *nêhiyaw-iskwêw* 'Cree woman,' show the same rhetorical structure: *êwako ohci mitoni niya nêhiyaw, nêhiyaw-iskwêw mitoni niya*. 'And because of that truly a Cree am I, I am truly a Cree woman.'

Both nouns may follow the verb: *pêyakosâp ihtasiwak nôsisimak, mihcêtiwak nitâniskotâpânak*. 'My grandchildren (*nôsisimak*) number eleven, and my great-grandchildren (*nitâniskotâpânak*) are many.' Much the same sentence (with the verbs in the changed conjunct) also shows the order of noun and verb inverted from one clause to the next: *pêyakosâp ê-ihtasicik nôsisimak, nitâniskotâpânak ê-mihcêticik*. 'My grandchildren number eleven, and many are my great-grandchildren.' This is the classical figure of chiastic reversal.

The relative position of nouns and verbs can be controlled even more dramatically when the nominal element is incorporated into the verb: *misatimwak kâ-nâtacik kâ-nitawi-minihkwahastimwêyan ... kâ-nitawi-minihkwêyâpêkinacik ôki misatimwak*. 'when you fetched the horses and went to do the watering of the horses ... when you went leading the horses to be watered.' In the second clause, instead of the noun *misatimwak* 'horses,' the verb (built on the transitive stem *minihkwah-* 'make s.o. drink') incorporates the medial *-astimw-*; the full noun precedes the verb in the first clause and follows it in the last.

Dialects, Speakers, Sources

Much more diverse than is traditionally acknowledged, the many dialects of Cree are spoken by isolated groups, derived from family hunting bands, which in many places persisted well into the 20th

century. While the exact size of the speech community has not been established, Cree has far more speakers than any other indigenous language of Canada; the published numbers, however, including the 100 000 of the 2001 Census of Canada, are mere guesswork, and even the 20 000 speakers of more realistic estimates must be viewed against the backdrop of a landmass that stretches for thousands of miles across the subarctic and the northern prairies of Canada.

Cree is spoken in a chain of dialects, each remote from the next, and though many speakers control more than one dialect, distant dialects are not mutually intelligible. (The situation is roughly analogous to that which held until the end of the 18th century and the rise of the nation-state for the Romance continuum or for the complex dialectological and sociolinguistic picture presented by Alemannic [or Swiss German], the Bavarian majority language of Austria, Standard High German, Low German, and Dutch.) None of the conventional classifications of the dialects is reliable. Even the definition of the language itself is uncertain: while some limit the term 'Cree' to the dialects spoken between Hudson's Bay and the Rocky Mountains, others include those spoken between Hudson's Bay and the Atlantic coast (otherwise called Montagnais-Naskapi but also Cri de l'Est or East Cree). The examples and textual extracts in the present article represent Plains Cree as spoken on the northern prairies.

The intricate dialect situation and the high incidence of bilingualism (especially with Ojibwe, a closely related Algonquian language with a comparable degree of dialect diversity) form the backdrop for the striking case of Michif, a language distinct from both Cree and French but combining a largely French-based nominal complex with a largely Cree-based verbal system and syntax. Negation, for example, employs both the declarative *nô* (reflecting French *non*), as in *nô wîhkât mîna nika-itostân*. (NEG-decl ever also I.will.go.there.INDEP) 'Never again will I go there.' and the deontic negator *kâya* (based on Cree), as in *kâya misčêt aštâ lisel!* (NEG-deont much put.(it).IMVE salt) 'Don't put much salt in!'

The 19th-century grammars and dictionaries of Howse, Lacombe and Watkins are important documents, built upon in the more technical analyses of Bloomfield and Wolfart (Plains Cree), Voorhis (Western Swampy Cree), Ellis and Béland (Eastern Swampy Cree, Moose Cree, Atikamekw) and, for the Québec and Labrador dialects of Cree-Montagnais-Naskapi, by MacKenzie, Mailhot, Martin and others. The turn of the 21st century is marked by a renewed pedagogical tradition, ideally personified in Freda Ahenakew, herself a Cree speaker, and a surge of syntactic studies pioneered by James and Dahlstrom and continued by Blain, Branigan, Brittain, Déchaine, Junker, Reinholtz, Russell, etc.

A large collection of authentic Plains Cree literature was recorded by Bloomfield in 1925 (Early Texts). Over the last third of the 20th century, a corresponding corpus of Modern Texts has been recorded and published by Wolfart and Ahenakew.

See also: Algonquian and Ritwan Languages.

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Creek

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Historical Background

When encountered by European explorers in the 16th century, the ancestors of the Native Americans belonging to what is now called the Creek and Seminole nations were living along the rivers of the present-day states of Alabama and Georgia. The English called the natives 'Creeks' because of the settlement patterns along the rivers, but these Native Americans called themselves *este maskoke* /isti ma(:)sko:ki/ 'the Muskogee people' and referred to their language as *este maskoke empunvka* /isti ma(:)sko:ki imponaka/ 'the language of the Muskogee people.' Conflicts with European settlers resulted in the removal of the Muskogee people (Creeks) from their ancestral lands. Some of these people joined with Hitchiti and Mikasuki speakers and fled into the swamps of Florida, becoming the 'Seminoles,' a term derived from Spanish *cimarrón* 'wild, untamed.' Others were forcibly moved to Indian Territory (the present state of Oklahoma) in the 1830s. After the Seminole Wars, a Florida contingent also settled in Indian Territory. These two Creek-speaking groups separated into the Creek (Muskogee) and Seminole nations. In Florida, the term 'Seminole' has come to refer to the political unit composed of Mikasuki and Seminole (Creek) speakers. The various population dispersals have resulted in three separate Creek dialects – Muskogee and Oklahoma Seminole, spoken by some 5000 descendants of those who settled in Oklahoma (Hardy, 2005), and Florida Seminole, spoken by fewer than 100 Creek speakers residing in Florida. The dialects differ mainly in vocabulary and are mutually intelligible (Martin and Mauldin, 2000).

On settling in Indian Territory, the Creeks were heavily missionized. With the help of educated native speakers, an alphabet was devised that is still in use today. Numerous religious publications, even a newspaper, were published in the language. Generations of Creeks learned to read and write their language using the traditional alphabet, and it remains a vital part of Creek culture and ethnic identity. The Creek language belongs to the Muskogean family along with the extant languages Choctaw, Chickasaw, Alabama, Koasati, and Mikasuki. The interrelationships among the various branches are a topic of current research.

Phonology

The traditional Creek alphabet is a semiphonemic representation of the language that does not indicate pitch. For accuracy, the data presented here are in phonemic notation. Because instructional materials use the Creek alphabet, the traditional symbols are enclosed in parentheses to better illustrate the correspondences between the two systems.

Creek has 13 consonants. The three stops and one affricate, *p*(*p*), *t*(*t*), *c* [tš] (*c*), and *k*(*k*), are articulated at the labial, alveolar, alveopalatal, and velar positions, respectively. They are lenis, unaspirated, and are voiced between vowels. There are four fricatives: *f*(*f*), which is bilabial in some speakers but labiodental in others; *ɬ*(*r*), a voiceless alveolar lateral; *s*(*s*), an alveolar sibilant that may be retroflexed in some speakers; and the glottal *h*(*h*). Resonants include two nasals, bilabial *m*(*m*) and alveolar *n*(*n*); the alveolar lateral *ɬ*(*l*); and two glides, alveopalatal *y*(*y*, *e*) and velar *w*(*w*, *u*, *o*). The vowel system consists of three phonemic short vowels, *i*(*e*), *a*(*a*, *v*), and *o*(*o*, *u*), contrasting with three corresponding long vowels, *i*:(*ē*, *e*), *a*:(*a*), and *o*:(*o*), and the diphthongs *ey*(*i*), *aw*(*vo*), and *oy*(*ue*).

Creek has a pitch accent system with three contrasting tones, high /´/, falling /ˆ/, and extra high /ˇ/. High pitch is primarily nonphonemic, with iambic assignment based on syllable structure. It is phonemic (fixed), however, in some lexemes and a few grammatical morphemes. Falling tone is both lexical and grammatical. Extra high pitch occurs only in the intensive stem grade (EGR; discussed later). In words with more than one accented syllable, a downdrift phenomenon occurs in which an accented syllable is one step lower in pitch than the accented syllable it follows (see Haas (1977) and Martin and Johnson (2002) for the specifics of Creek pitch).

Morphology

Creek is a largely agglutinating language with minimal noun morphology and extensive verb morphology. Prefixation, suffixation, infixation, vowel lengthening, tonal accent, and suppletion are used to mark grammatical categories.

Noun Morphology

Nominal case marking occurs only on indefinite nouns, *-t* for the nominative and *-n* for the oblique case. Definiteness is indicated by the lack of suffixation. Compare Examples (1) and (2), in which 'snake' is

indefinite in both examples, whereas 'dog' is indefinite in Example (1) but definite in Example (2):

(1) citto-t ifa-n ákkis
snake-SUBJ dog-OBL bit
'A snake bit a dog.'

(2) citto-t ifa ákkis
snake-SUBJ dog bit
'A snake bit the dog.'

Most nouns are unmarked for number, although Creek does have three lexically determined plural suffixes restricted to human referents: the collective-*âlki* in *masko:k-âlki* 'Creek people,' *-aki* in *acol-aki* 'old men,' and *-ta:ki* in *hopoy-ta:ki* 'children.'

Possession is indicated by one of two sets of nominal prefixes. Possessed nouns intimately associated with the possessor, such as most body parts and kin terms, take the inalienable (Type II) prefixes, as in *ca-cokwa* 'my mouth' and *ca-posi* 'my grandmother.' Nouns having a looser relationship with the possessor take the alienable (Type III) set of possessive prefixes, such as *an-coko* 'my house' and *an-hissi* 'my friend.'

Derivational morphology includes the productive diminutive *-oci* and augmentative *-łakko* (from *łákki:* 'big') suffixes (compare *ifa* 'dog' with *if-oci* 'puppy' and *ico* 'deer' with *co-łakko* 'horse').

Several derivational processes create nouns from verbs. Agentives are formed by suffixing *-a* to the verb stem with concomitant vowel lengthening: *ali:kc-a* 'a doctor' is formed from *alikc-ita* 'to cure.' The instrumental prefix *is*(*s*)- combined with the nominalizer *-ka* creates derived nouns, as in *is-lá:f-ka* 'knife' (*laff-ita* 'to cut with a knife'). Other nouns are formed with the instrumental and the infinitive, as in *is-łolak-ita* 'awl' (*łolak-ita* 'to pierce').

Verb Morphology

Creek has a complex system of inflectional verb morphology utilizing prefixes, suffixes, infixes, pitch, and suppletion to mark person, tense, aspect, and number. Although independent pronouns exist, they are used only for emphasis. The verb is obligatorily marked for person with one of two sets of subject affixes. Transitive and intransitive verbs in which an actor exercises control over the event are marked with the Type I suffixes: *-ey*/*-ay* 'I,' *-íck* 'you.SG,' *-i:*/*-iy* 'we,' *-á:ck*/*-á:cc* 'you.PL.' Third person is unmarked. The sentences in Examples (3a)–(3c) illustrate the conjugation of *hic-ita* 'to see' in the lengthened grade (LGR; see later) with the Type I suffixes:

(3a) hi:c-ey-s hi:c-i:-s
see.LGR-I-DECL see.LGR-we-DECL
'I see.' 'We see.'

(3b) hi:c-íck-is hi:c-á:ck-is
see.LGR-you.SG-DECL see.LGR-you.PL-DECL
'You see.' 'You see.'

(3c) hi:c-is hi:c-is
see.LGR-DECL see.LGR-DECL
'He sees.' 'They see.'

With stative verbs, the Type II prefixes are used: *ca-* 'I', *ci-* 'you,' *po-* 'we.' The third person is unmarked and there is no number distinction in the second person. These are the same prefixes that are used to mark inalienable possession on nouns. Examples (4a)–(4c) illustrate the conjugation of the stative verb *má:h-i:* 'tall':

(4a) ca-má:h-i:-s po-má:h-i:-s
I-tall-STATE-DECL we-tall-STATE-DECL
'I'm tall.' 'We're tall.'

(4b) ci-má:h-i:-s ci-má:h-i:-s
you-tall-STATE-DECL you-tall-STATE-DECL
'You're tall.' 'You're tall.'

(4c) má:h-i:-s má:h-i:-s
tall-STATE-DECL tall-STATE-DECL
'He's tall.' 'They're tall.'

A small set of intransitive verbs take either set of affixes. Note the difference in meaning between Examples (5) and (6):

(5) nockíhl-ey-s
sleepy.HGR-I-DECL
'I fell asleep.'

(6) ca-nockil-i:-s
I-sleepy-STATE-DECL
'I'm sleepy.'

The Type II prefixes also index direct objects, as in Example (7):

(7) ca-híhc-is
me-see.HGR-DECL
'He saw me.'

A third set of pronominal affixes is used to mark dative objects; they are the same as the prefixes used to encode alienable possession:

(8) in-háhy-ey-s
for.him-make.HGR-I-DECL
'I made it for him.'

Other pronominal verbal prefixes include the reflexive *i:*- 'one's self' (Example (9)) and the reciprocal *ti-* 'each other' (Example (10)):

(9) i:-nókł-eyc-is

REFL-burn-CAUS-DECL
'He burned himself.'

(10) ti-pak-ita
RECIP-join-INF
'to get married.'

The verb stem undergoes changes in pitch, vowel lengthening, and infixation, resulting in five aspectual ablaut grades. The zero grade is the unaltered stem, as found in the infinitive *hic-ita* 'to see.' In the lengthened grade (LGR), the stem vowel is lengthened (Example (3)), usually indicating the continuative aspect. The falling tone grade (FGR) encodes the resultative aspect, a state resulting from the action of the verb (see later, Examples (24) and (25)). The extra high pitch grade (EGR) involves nasal infixation (indicated by ^{n}), extra long vowel lengthening, and extra high pitch, signaling the intensive aspect. Examples (11a)–(11c) illustrate three degrees of smallness, the first with the unmodified verb, the second with the intensive morpheme, and the third with the intensive morpheme plus the EGR:

(11a) cótk-i:-s
small.SG-STATE-DECL
'It's small.'

(11b) cótk-ós-i:-s
small.SG-INTENS-STATE-DECL
'It's very small.'

(11c) cŏ::^{n}tk-ós-i:-s
small.SG.EGR-INTENS-STATE-DECL
'It's really, really small.'

The final stem grade, the *h*-grade (HGR), involves infixing an *h* with high pitch on the preceding stem vowel, as in Examples (5), (7), and (8). The HGR has multiple uses, the most common of which is to indicate an instantaneous or an immediate past action.

Creek has five past tenses marked by suffixes and stem change. Past I, the immediate past, marks events in the recent past, i.e., earlier today or last night. It is realized by using the HGR of the stem. Examples (5) and (8) showed one allomorph of the HGR. Past II, the recent past, refers to events happening up to a year ago. The tense suffix is *-ánk* and it cooccurs with the LGR, as in Example (12):

(12) hi:c-ay-ánk-s
see.LGR–I-PASTII-DECL
'I saw it (a while ago).'

Events occurring a year or several years ago take the intermediate past suffix -(*i*)*mát* (Past III) with the verb stem in the LGR, as shown in Example (13):

(13) hi:c-ey-mát-s
see.LGR-I-PASTIII-DECL
'I saw it (long ago).'

The remote past tense suffix *-ánta* (Past IV) marks events happening a long, long time ago; the verb stem is in the LGR, as in Example (14):

(14) hi:c-ay-ánta-s
see.LGR-I-PASTIV-DECL
'I saw it (long, long ago).'

Past V, the indefinite past, is reserved for events outside the speaker's sphere of reference. It is rarely used in conversation but is always found in traditional folktales. In Example (15), the tense suffix is *-ati:*; the stem vowel is not lengthened because it is in a heavy syllable:

(15) honanwa acól-i:-t leyk-ati:-s
man old-STATIVE-INDEF sit-PASTV-DECL
'Once upon a time there was an old man.'

Future time is marked by the future suffix *-áɬi:* in Example (16), and the intentive *-áha:n* in Example (17):

(16) ay-áɬi:-s
go.SG-FUT-DECL
'He will go.'

(17) ay-áha:n-is
go.SG-INTENT-DECL
'He's going.'

Creek marks the declarative, interrogative, and imperative modes, all with verb-final suffixes. The declarative -(*i*)*s* is exemplified in the preceding examples. The interrogative *-a* occurs on yes/no questions, as in Example (18), whereas *-a:* is the final suffix in questions seeking information, as in Example (19):

(18) níhs-íck-a
buy.HGR-you.SG-INTERROG
'Did you buy it?'

(19) nâ:ki-n níhs-íck-a:
thing-OBL buy.HGR-you.SG-INTERROG
'What did you buy?'

The affirmative imperative is formed with *-as* in the singular and *-aks* in the plural, e.g., *pap-as* 'eat it' (to one person) and *homp-aks* 'eat' (to more than one person). For the hortative, the suffix *-ík* is added before the imperative ending, as in *lít-ík-as* 'let him run.'

Negative statements are formed with *-íko* suffixed to active verbs (Example (20)) and *-íko:* suffixed to stative verbs (Example (21)):

(20) nâ:k-n nis-íko-t ɬ-aláhk-is
thing-OBL buy-NEG-SS went.and-arrive.here.
HGR-DECL

'He went and came back without having bought anything.'

(21) sataɬakko ci-yá:c-íko:-t ô:m-a
apple you-like-NEG-SS be.FGR-INTERROG
'You don't like apples?'

Derivational verb morphology includes instrumental and locative prefixes and a causative suffix. The instrumental *is*(*s*)- 'with' is an applicative suffix that adds an additional argument to the verb, as in Example (22):

(22) iss-ála:k-is
INSTR-come.back.SG.LGR-DECL
'He's coming back with it.'

Creek has a number of locative verbal prefixes. Three mark the static position of a referent with respect to a particular plane, usually the ground; *oh*(*h*)- in Example (23) and *tak*(*k*)- in Example (24) locate their referents with respect to the ground. In Example (25), however, the plane of reference is the table. The locative *ak*(*k*)- is always used to refer to objects situated in the water.

(23) oh-léyc-as
on.above-set-IMP
'Put it on it (e.g., a table).'

(24) takk-apô:k-i:-s
on.ground-sit.PL.FGR-we-DECL
'We're seated on the ground.'

(25) sampa-t ohhompita lica-n ak-lêyk-is
basket- table under- down.low-
SUBJ OBL sit.FGR-DECL
'A basket's sitting under the table.'

Other locative prefixes refer to motion, as in (*i*)ɬ 'arrive over there and ...' in Example (26) and *y*(*i*)- 'arrive here and ...' in Example (27). The prefix *acok*(*h*)- specifies motion toward the speaker, with no implied arrival (Example (28)).

(26) ɬ-in-tac-ácc-as
go.and-for.her-cut-you.PL-IMP
'Go over there and cut it for her.'

(27) yi-náfk-as
come.and-hit.INSTANT-IMP
'Come here and hit it!'

(28) acókh-a:t-is
towards.speaker-come.SG.LGR-DECL
'He's coming towards me.'

The causative suffix *-ic* combines with an underlying verb-final vowel to produce the allomorphs *-eyc* (*a* + *ic*), *-i:c* (*i* + *ic*), *-oy* (*o* + *ic*), and *-ic* (C + *ic*), e.g., *il-ita* 'one to die' and *il-i:c-ta* 'to kill one.'

Although the Creek language rarely distinguishes singular and plural nouns, several Creek verbs mark number with suppletive forms, i.e., there are different verb roots for singular vs. plural or singular, dual, and plural. The majority of verbs that supplete are positionals (e.g., 'sit,' 'stand,' and 'lie') or verbs of motion (e.g., 'come' and 'go'). Intransitive suppletive verbs indicate subject number. The verb 'sit' has three forms, *leyk-ita* 'one to sit,' *ka:k-ita* 'two to sit,' and *apo:k-ita* 'three or more to sit,' as does the verb of motion, 'run': *litk-ita* 'one to run,' *tokoɬk-ita* 'two to run,' and *pifa:tk-ita* 'three or more to run.' Transitive suppletive verbs mark object number, as in *is-ita* 'to take one' and *caw-ita* 'to take more than one.' A small number of nonlocative verbs have suppletive roots as well, such as *il-ita* 'one to die,' as opposed to *pasatk-ita* 'more than one to die.' One stative verb is suppletive, i.e., *cótk-i:* 'small.SG' and lopóck-i: 'small.PL.' Still other verbs differentiate number by suppletion, affixation, and reduplication in various combinations.

Syntax

A Creek sentence consists of an inflected verb. With overt noun phrases, the order of constituents is subject-object-verb, as was shown in Examples (1) and (2). Rarely, however, does more than one overt noun occur in a clause. Modifiers follow the noun (*ico hámkin* (deer one) 'one deer'). Postpositions follow their heads, as in *lica* 'under' (see Example (25)).

Constructions with an auxiliary verb are common (see Example (21)), such that the auxiliary *om-ita* 'to be' follows the main verb. Certain verbs of motion, such as *wilak-ita* 'two to go about' in Example (29), function both as independent verbs and auxiliaries. Clause participants are indexed by a switch reference system, whereby a clause-final suffix indicates whether the subject of the following clause is the same (SS) or different (DS) from the one in the marked clause. The English translation in Example (29) is opaque without the subscript numbers to track the participants, but the Creek sentence is clear because of the different subject suffix:

(29) nafêyk-in a:-nafêyk-in s-tak-wila:k-ey-s
hit.HGR-DS away-hit.HGR-DS INSTR-on.ground-go.about.DU.LGR-PASTI-DECL
'He$_1$ hit him$_2$, and he$_2$ hit him$_1$ back with it.'

For an example of the same subject suffix, see Example (20).

For Further Study

Two published Creek grammars are available for more in-depth language study. Hardy (2005) contains a text with an extensive linguistic sketch. Innes *et al*. (2004) is the first in an anticipated series of pedagogical texts. A comprehensive dictionary by Martin and Mauldin (2000) has entries in the traditional alphabet, with transliterations in phonemic transcription. A volume of traditional folktales by Martin *et al*. (2004) has the Creek text and free English translation in parallel columns (for earlier works on Creek, see Booker (1991)).

See also: Adjectives; Adpositions; Articles, Definite and Indefinite; Aspect and Aktionsart; Diminutives and Augmentatives; Future Tense and Future Time Reference; Imperatives; Muskogean Languages; Negation; Number; Perfectives, Imperfectives, and Progressives; Perfects, Resultatives, and Experientials; Possession, Adnominal; Suppletion; Switch Reference; Tense; Tone: Phonology; United States of America: Language Situation; Verbs.

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Creo *See:* Krio.

Creole *See:* Krio.

Crioulo *See:* Cape Verdean Creole.

Critical Applied Linguistics

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Doing Applied Linguistics Critically

Although the term 'critical applied linguistics' is relatively recent (see Pennycook, 2001), it draws on a far longer history of critical work in related domains, work that can be traced back at least to the early part of the 20th century. In this first section, however, I will present critical applied linguistics in its contemporary forms by providing a brief summary of interlocking domains of applied linguistic work that operate under an explicit critical label, including critical discourse analysis, critical literacy, critical pedagogy, or critical language testing, as well as both areas that have developed a critical focus without using the label, such as critical approaches to translation or language policy, and those that have used alternative critical banners, such as feminism, antiracism, and so on (Table 1). By and large, this work can be characterized as dealing with applied linguistic concerns (broadly defined) from a perspective that is always mindful of the interrelated concerns (adapting Janks, 2000) of dominion (the contingent and contextual effects of power), disparity (inequality and the need for access), difference (engaging with diversity), and desire (understanding how identity and agency are related). Thus, in their discussion of critical literacy, Luke and Freebody suggest that "although critical literacy does not stand for a unitary approach, it marks out a coalition of educational interests committed to engaging with the possibilities that the technologies of writing and other modes of inscription offer for social change, cultural diversity, economic equity, and political enfranchisement" (Luke and Freebody, 1997: 1).

Probably the best known work has been in the related areas of critical discourse analysis (CDA) and critical literacy, which share a concern to understand texts and practices of reading and writing in relationship to questions of power, equity, diversity, and change. Whether as a mode of research (analyses of texts or of literacy contexts) or as a mode of pedagogy (developing abilities to engage in critical text analysis), these approaches to textual analysis are concerned with relations among texts, discourses, ideologies, and the wider social and political order. Norman Fairclough, whose approach to CDA has achieved considerable popularity, explains that critical discourse analysis "aims to systematically explore often opaque relationships of causality and determination between (a) discursive practices, events and texts, and (b) wider social and cultural structures, relations and processes; to investigate how such practices, events and texts arise out of and are ideologically shaped by relations of power and struggles over power" (Fairclough, 1995: 132). CDA and critical literacy have also been combined under the rubric of critical language awareness, since the aim of this work is to "empower learners by providing them with a critical analytical framework to help them reflect on their own language experiences and practices and on the language practices of others in the institutions of which they are a part and in the wider society within which they live" (Clark and Ivanic, 1997: 217).

A textual domain that has received much less attention is critical work in translation studies (a minority focus within applied linguistics itself). And yet, it is clear that a focus on dominion, disparity, difference, and desire underpins various forms of work, from studies of how particular translations can clearly be read as ideological formations (see Hatim and Mason, 1997) to studies of the role translation has played within different historical formations, from colonialism to globalization. Indeed, Venuti's approach to translation takes the position that to "shake the regime of English, a translator must be strategic both in selecting foreign texts and in developing discourses to translate them. Foreign texts can be chosen to redress patterns of unequal cultural exchange and to restore foreign literatures excluded by the standard dialect, by literary canons, or by ethnic stereotypes" (Ventui, 1997: 10–11). Such work surely needs to be included within critical applied linguistics since it is based on an antihegemonic stance, locates itself within a view of language politics, makes an ethics of difference central, and tries, in its practice, to move toward change.

Also focusing on the global hegemony of English and the need to promote diversity is critical work in language policy and planning. While much work in language policy has been remarkable for its political quietism, debates around the global spread of English and the destruction of the world's linguistic diversity have developed a clearer critical agenda. Central here has been Phillipson's (1992) accusation of (English) linguistic imperialism, and his argument that English has been spread for the economic and political advantage of the core English-speaking nations. As Tollefson (2000) explains, Phillipson's work differs markedly from mainstream sociolinguistic work focusing on the global spread of English since he "focuses on the unequal distribution of benefits from the spread of

Table 1 Domains of critical applied linguistics

Domains	*Key works/authors*	*Orientation*
Critical applied linguistics	Pennycook A (2001). *Critical applied linguistics: a critical introduction*. Mahwah, NJ: Lawrence Erlbaum	''Critical applied linguistics . . . is more than just a critical dimension added on to applied linguistics: It involves a constant skepticism, a constant questioning of the normative assumptions of applied linguistics. It demands a restive problematization of the givens of applied linguistics, and presents a way of doing applied linguistics that seeks to connect it to questions of gender, class, sexuality, race, ethnicity, culture, identity, politics, ideology and discourse'' (Pennycook, 2001: 10)
Critical discourse analysis	Fairclough N (1995). *Critical discourse analysis*. London: Longman.	CDA ''aims to systematically explore often opaque relationships of causality and determination between (a) discursive practices, events and texts, and (b) wider social and cultural structures, relations and processes; to investigate how such practices, events and texts arise out of and are ideologically shaped by relations of power and struggles over power'' Fairclough (1995: 132).
Critical literacy	Muspratt S, Luke S A & Freebody P (eds.) (1997). *Constructing critical literacies: teaching and learning textual practice*. St Leonards, NSW: Allen & Unwin Clark R & Ivanic R (1997). *The politics of writing*. London: Routledge	CL ''marks out a coalition of educational interests committed to engaging with the possibilities that the technologies of writing and other modes of inscription offer for social change, cultural diversity, economic equity, and political enfranchisement'' (Luke and Freebody, 1997: 1).
Critical language awareness	Fairclough N (ed.) (1992). *Critical language awareness* London: Longman.	''People cannot be effective citizens in a democratic society if their education cuts them off from critical consciousness of key elements within their physical or social environment. If we are committed to education establishing resources for citizenship, critical awareness of the language practices of one's speech community is an entitlement'' (Fairclough, 1992: 6).
Critical approaches to translation	Venuti L (1997). *The scandals of translation: towards an ethics of difference*. London: Routledge.	''To shake the regime of English, a translator must be strategic both in selecting foreign texts and in developing discourses to translate them. Foreign texts can be chosen to redress patterns of unequal cultural exchange and to restore foreign literatures excluded by the standard dialect, by literary canons, or by ethnic stereotypes'' (Venuti, 1997: 10–11)
Critical approaches to language policy	Phillipson R (1992). *Linguistic imperialism*. Oxford: Oxford University Press.	Phillipson's work ''places English squarely in the center of the fundamental sociopolitical processes of imperialism, neo-colonialism, and global economic restructuring'' (Tollefson, 2000: 13).
	Ricento (ed.) *Ideology, politics and language policies: focus on English*. Amsterdam: John Benjamins. 9–24.	Language policy and planning ''must deal with issues of language behavior and identity, and so must be responsive to developments in discourse analysis, ethnography, and critical social theory'' (Ricento, 2000: 22–23).
Critical sociolinguistics	Williams G (1992). *Sociolinguistics: a sociological critique*. London: Routledge. Wodak R (1996). *Disorders of discourse*. London: Longman.	''Discourse sociolinguistics, like critical linguistics . . . aims at de-mystifying . . . disorders [in discourse] . . . in the two domains of discourse, in actual language use in institutions and in the intersection of institution and everyday life. In both cases, we will also pose the question of possible changes'' (Wodak, 1996: 3).
Critical approaches to second language education	Canagarajah S (1999). *Resisting linguistic imperialism in English teaching*. Oxford: Oxford University Press.	''It is important to understand the extent to which classroom resistance may play a significant role in larger transformations in the social sphere'' (Canagarajah, 1999: 196).
	Norton B (2000). *Identity and language learning: gender, ethnicity and educational change*. Harlow: Longman/Pearson.	We need a ''concept of the language learner as having a complex social identity that must be understood with reference to large and frequently inequitable social structures which are reproduced in day-to-day social interactions'' (Norton Peirce, 1995: 579).
Critical pedagogy and second language education	Morgan B (1998). *The ESL classroom: teaching, critical practice and community development*. Toronto: University of Toronto Press.	''ESL teachers, through both their responses and their silence, define what is appropriate and what might be possible in a new country'' (Morgan, 1998: 20).

Table 1 Continued

Domains	*Key works/authors*	*Orientation*
	Norton B & Toohey K (eds.) (2004). *Critical pedagogies and language learning*. Cambridge: Cambridge University Press.	''Advocates of critical approaches to second language teaching are interested in relationships between language learning and social change'' (Norton and Toohey, 2004: 1).
Critical English for academic purposes	Benesch S (2001). *Critical English for academic purposes: theory, politics, and practice*. Mahwah, NJ: Lawrence Erlbaum.	''The overarching goal of critical EAP is to help students perform well in their academic courses while encouraging them to question and shape the education they are being offered'' (Benesch, 2001: xvii)
Critical bilingualism	Walsh C (1991). *Pedagogy and the struggle for voice: issues of language, power, and schooling for Puerto Ricans*. Toronto: OISE Press.	CB implies ''the ability to not just speak two languages, but to be conscious of the sociocultural, political, and ideological contexts in which the languages (and therefore the speakers) are positioned and function, and the multiple meanings that are fostered in each'' (Walsh, 1991: 127)
Critical multiculturalism	Kubota R (2004). 'Critical multiculturalism and second language education.' In Norton B & Toohey K (eds.) *Critical pedagogies and language learning*. Cambridge: Cambridge University Press. 30–52.	CM ''critically examines how inequality and injustice are produced and perpetuated in relation to power and privilege'' (Kubota, 2004: 37) exploring ''a critical understanding of culture'' (Kubota, 2004: 38), and involving all students ''in critical inquiry into how taken-for-granted knowledge, such as history, geography, and lives of other people, is produced, legitimated, and contested in power struggles'' (Kubota, 2004: 40).
Critical classroom discourse analysis	Kumaravadivelu B (1999). 'Critical classroom discourse analysis.' *TESOL Quarterly 33(3)*, 453–484.	CCDA draws on critical ethnography as a research tool, has ''a transformative function'' and ''seeks to play a reflective role, enabling practitioners to reflect on and cope with sociocultural and sociopolitical structures that directly or indirectly shape the character and content of classroom discourse'' (Kumaravadivelu, 1999: 473).
Critical language testing	Shohamy E (2001). *The power of tests: a critical perspective on the uses of language tests*. London: Longman.	CLT ''implies the need to develop critical strategies to examine the uses and consequences of tests, to monitor their power, minimize their detrimental force, reveal the misuses, and empower the test takers'' (Shohamy, 2001: 131).

English." Rather than viewing the spread of English in positive terms and focusing on descriptions of varieties of English, Phillipson's work "places English squarely in the center of the fundamental socio-political processes of imperialism, neocolonialism, and global economic restructuring" (Tollefson, 2000: 13). These concerns have then been allied with accusations of linguistic genocide and the need for linguistic human rights to protect the global diversity of languages (Skutnabb-Kangas, 2000). While these arguments have raised considerable debate, especially in relation to the need to understand how the global position of English is resisted and appropriated (Canagarajah, 1999; Pennycook, 2001), the focus on the politics of language and an agenda for change clearly provide a significant critical dimension to any understanding of the dominance of English and continued linguistic diversity.

Sociolinguistics more generally has also been taken to task for lacking a critical dimension, Mey calling for a "critical sociolinguistics" that can "establish a connection between people's place in the societal hierarchy, and the linguistic and other kinds of oppression that they are subjected to at different levels" (Mey, 1985: 342). While sociolinguistics would appear to have the tools to deal with questions of language and power, the argument here is that ways in which power operates in relation to class, gender, or race have not received adequate attention or a focus on possibilities of intervention. Some of these challenges have been taken up in work on language use in workplace settings, which aims not just to describe inequitable practices but also to change them. Wodak's study of hospital encounters, for example, looks not only at the ways in which "doctors exercise power over their patients" (Wodak, 1996: 170) but also at ways of intervening in this relationship. Other work in this domain has looked at language use in a range of institutional settings – language and the law, language in medical settings, language and education – to reveal how the complex relations between institutional power and the larger social context create inequitable but potentially changeable relations through language.

Critical approaches to language education – sometimes under the rubric of critical pedagogy – have had

fairly wide coverage. As Norton and Toohey explain, "advocates of critical approaches to second language teaching are interested in relationships between language learning and social change" (Norton and Toohey, 2004: 1). As with the related domains of critical literacy and discourse analysis, critical approaches to language education can be viewed as both a critical research enterprise and as a domain of practice. Significant research in the first category would include work such as Canagarajah's critical ethnographies of 'periphery' students' and teachers' forms of resistance to English and English teaching methods: "it is important to understand the extent to which classroom resistance may play a significant role in larger transformations in the social sphere" (Canagarajah, 1999: 96); and Bonny Norton's work on ways in which gender, power and identity are interlinked in the process of language learning (Norton, 2000). Morgan (1998) and many others (see Norton and Toohey, 2004; Pennycook, 1999), meanwhile, look more directly at how forms of critical pedagogy in second language classrooms may bring about change.

Interrelated fields of research and practice have also emerged here, including Benesch's *Critical English for academic purposes*, which "assumes that current conditions should be interrogated in the interests of greater equity and democratic participation in and out of educational institutions" (Benesch, 2001: 64); Walsh's notion of critical bilingualism, which she explains as "the ability to not just speak two languages, but to be conscious of the sociocultural, political, and ideological contexts in which the languages (and therefore the speakers) are positioned and function, and the multiple meanings that are fostered in each"(Walsh, 1991: 127); Kubota's argument for critical multiculturalism, which "critically examines how inequality and injustice are produced and perpetuated in relation to power and privilege" (Kubota, 2004: 37) by focusing directly on issues of racism – on "collective, rather than individual, oppression" (Kubota, 2004: 37) – by problematizing, rather than presupposing difference, exploring "a critical understanding of culture" (Kubota, 2004: 38), and involving all students "in critical inquiry into how taken-for-granted knowledge, such as history, geography, and lives of other people, is produced, legitimated, and contested in power struggles" (Kubota, 2004: 40); and Kumaravadivelu's critical classroom discourse analysis, which, drawing on critical ethnography as a research tool, has "a transformative function" and "seeks to play a reflective role, enabling practitioners to reflect on and cope with sociocultural and sociopolitical structures that directly or indirectly shape the character and content of classroom discourse" (Kumaravadivelu, 1999: 473).

The related domain of language testing has also taken a critical turn in recent years. In Spolsky's history of the development of the TOEFL exam, it is clear from the outset that "testing has been exploited also as a method of control and power – as a way to select, to motivate, to punish." So-called objective tests, he points out, by virtue of their claims to scientific backing and impartiality, are "even more brutally effective in exercising this authority" (Spolsky, 1995: 1). These concerns have been pursued furthest by Shohamy in her notion of critical language testing (CLT) which "implies the need to develop critical strategies to examine the uses and consequences of tests, to monitor their power, minimize their detrimental force, reveal the misuses, and empower the test takers" (Shohamy, 2001: 131). Shohamy's proposal for critical language testing clearly matches many of the principles that define other areas of critical applied linguistics: her argument is that language testing is always political, that we need to become increasingly aware of the effects and uses of tests, and that we need to link preferred visions of society with an ethical demand for transformative practice in our own work as (critical) applied linguists. Doing applied linguistics critically, then, implies an interest in the workings of power, a concern with issues of inequitable access to and through domains of language, consideration of the effects of social and cultural difference, and attention to the ways in which people are located, understand themselves, and have opportunities to change.

The Critical in Applied Linguistics

The emergence of these various critical projects has been met with mixed responses. For some, critical applied linguistics is little more than a critique of other orientations to applied linguistics; thus, Davies provides the following definition: "a judgmental approach by some applied linguists to 'normal' applied linguistics on the grounds that it is not concerned with the transformation of society" (Davies, 1999: 145). Yet it is clear from the previous section that critical applied linguistics is not so much a critique of 'normal' applied linguistics (though it certainly may engage in such critiques) but is rather a different, alternative, or even transgressive way of doing applied linguistics. A central concern in discussing critical applied linguistics, then, is what is actually meant by the term 'critical.' One position would argue that all good academic work is by nature critical, entailing an open mind, a degree of skepticism, and an ability to keep a form of academic distance from the objects of inquiry. From this point of view, it is crucial to avoid bringing one's own judgments into

any form of academic inquiry. Thus, Widdowson, for example, in arguing for a "critical, not a hypocritical, applied linguistics to take us into the future" (Widdowson, 2001: 16), is concerned that by taking an *a priori* critical stance, critical applied linguistics may impose its own views on the objects of inquiry, taking inappropriate stances on the social world rather than maintaining a critical distance. For Widdowson, it is impossible **as an applied linguist** (though not necessarily as an individual) to choose between different ethical and political concerns, and thus critical applied linguistics hypocritically fails to maintain a critical distance.

An alternative position, however, turns the tables on Widdowson's dichotomy, suggesting that it is mainstream applied linguistics that is hypocritical by dint of its inability or unwillingness to grapple adequately with the social, political, and ethical concerns that inevitably come to bear on any applied linguistic context. By making claims to deal with real world issues to do with language, but by failing to engage with questions of power, inequality, racism, sexism, or homophobia in relation to discourse analysis, translation, language learning, literacy, or language in the workplace, mainstream applied linguistics might therefore be described as espousing a form of liberal ostrichism (Pennycook, 2001) in its relativistic refusal to engage with the social, political, ethical, and epistemological concerns of an inequitable world, and the tendency for applied linguists to bury their heads deep in the sand and eschew engagement with the broader context of applied linguistic work. This second sense of the critical, to which Widdowson objects, is one which draws on a long history of critical theory, and takes as its starting point the analysis of power and inequality in the social world. From this point of view, academic responsibility requires more than critical distance; rather, it demands that we attempt to address social, cultural, and political concerns head on, with an explicit political agenda.

If a strong case can thus be made for the unavoidability of political engagement, the concern nevertheless remains that critical applied linguistic research may be blinkered by its political normativity. Indeed, it may be argued that much of critical applied linguistics operates with a normative, leftist political agenda and a conservative applied linguistic epistemology. That is to say, it follows a modernist emancipatory framework (Pennycook, 2001), bringing together a static politics based on various forms of neo-Marxian analyses of inequality and emancipation, with an equally static applied linguistic epistemology. In addition to a political focus on inequality, then, critical applied linguistics also needs a form of problematizing practice. From this point of view, critical applied linguistics is not only about relating micro-relations of applied linguistics to macro-relations of social and political power; nor is it only concerned with relating such questions to a prior critical analysis of inequality. A problematizing practice, by contrast, suggests a need to develop both a critical political stance and a critical epistemological stance, so that both inform each other, leaving neither the political nor the applied linguistic as static. From this point of view, then, critical applied linguistics maintains both a consistent focus on issues of dominion, disparity, difference, and desire while at the same time maintaining a constant skepticism toward cherished concepts such as language, grammar, power, man, woman, class, race, ethnicity, nation, identity, awareness, and emancipation. Remaining aware of the diverse contexts in which it may hope to be applicable, this transgressive applied linguistics remains wary lest the very terms and concepts of any critical project at the same time inflict damage on the communities it is aiming to assist. This form of critical applied linguistics is far more than the addition of a critical/political dimension to applied linguistics; rather it opens up a whole new array of questions and concerns about language, identity, sexuality, ethics, and difference.

Applied Linguistics and the Critical

Elder suggests that "the very existence of a transgressive critical applied linguistics which attacks the foundations and goals of applied linguistics is perhaps a sign that applied linguistics is a discipline which has come of age" (Elder, 2004: 430). The emergence of critical applied linguistics, however, has broader implications for applied linguistics than mere maturity. By drawing on a far more extensive range of external domains than is often the case with applied linguistics, critical applied linguistics not only opens up the intellectual framework to many diverse influences, but also makes old debates over linguistics applied versus applied linguistics (for example, Widdowson, 2001) little more than a red herring. As Rajagopalan suggests, we may now start to view applied linguistics as a "*trans*disciplinary field of inquiry," which means "traversing (and, if it comes to the push, *trans*gressing) conventional disciplinary boundaries in order to develop a brand new research agenda which, while freely drawing on a wide variety of disciplines, would obstinately seek to remain subaltern to none" (Rajagopalan, 2004: 410). Thus, by taking not only a broad view on knowledge but also a political view on knowledge, critical applied linguistics transcends a conception of applied linguistics as a fixed discipline, or even of applied linguistics as a domain of interdisciplinary work, and opens the doors to a

diversity of epistemological influences. While Davies may lament such a position as being "dismissive totally of the attempt since the 1950s to develop a coherent applied linguistics" (Davies, 1999: 141), critical applied linguistics will always be concerned about the interests behind such constructions of coherence.

Critical applied linguistics in fact plays a crucial role in opening the narrowly defined domains of a coherent applied linguistics to a range of different theoretical positions. It is responsive not so much to shifts in mainstream linguistic and applied linguistic theory, but rather to the linguistic, somatic, and performative turns elsewhere in the social sciences. To the extent that applied linguistics remains partially dependent on linguistics, it has been hampered by the inability of linguistics to deal with the linguistic turn in the social sciences. Thus applied linguistics has been desperately slow to address such concerns. It is only recently, as Canagarajah puts it, that we have started to "redefine our understanding of the human subject. We have borrowed constructs from disciplines as diverse as philosophy, rhetoric, literary criticism, and the social sciences. We have adopted different theoretical positions ranging across feminist scholarship, language socialization studies, Bakhtinian semiotics, and Foucauldian poststructuralism. These schools have helped us understand identities as multiple, conflictual, negotiated and evolving. We have traveled far from the traditional assumption in language studies that identities are static, unitary, discrete, and given" (Canagarajah, 2004: 117). Understandings of the role of discourse in constituting the subject, of the subject as multiple and conflictual, of the need for a reflexivity in knowledge production, are slowly starting to emerge in applied linguistics, led by work in critical applied linguistics.

At the same time that the linguistic turn has swept across the social sciences, there has also been a somatic turn, a turn towards the body. For some, the somatic turn runs counter to the perceived logocentrism of the linguistic turn, though others suggest it is more of a redressing of this imbalance so that we can see that the social order is both textual and corporeal. For Bourdieu, the somatic turn has been part of an attempt to understand how dispositions are written onto our bodies, how cultural capital is not something we pull on and take off but is deeply bound up with how we act. "The sense of acceptability which orients linguistic practices is inscribed in the most deep-rooted of bodily dispositions; it is the whole body which responds by its posture, but also by its inner reactions or, more specifically, the articulatory ones, to the tension of the market. Language is a body technique, and specifically linguistic, especially phonetic, competence is a dimension of bodily hexis in which one's whole relation to the social world, and one's whole socially informed relation to the world, are expressed" (Bourdieu, 1991: 86). Applied linguistic orientations to the body have to date generally been limited to versions of nonverbal communication, but again, as critical applied linguistics opens up this orientation to understanding the relation between the social order, language, and the body, it is starting to push more mainstream work in new directions.

Finally, the growing interest in identity across other fields of inquiry is increasingly affecting (critical) applied linguistics (see, for example, Norton, 2000). At the forefront of this focus on identity is the performative turn, and the crucial insight that identities are **per**formed rather than **pre**formed. Central to this move toward the performative has been Butler's argument that "gender proves to be performative – that is, constituting the identity it is purported to be. In this sense, gender is always a doing, though not a doing by a subject who might be said to preexist the deed" (Butler, 1990: 25). These arguments have been most influential in queer studies, where the questioning of categories of sexual and gender identity has allowed a framing of sexuality that goes beyond lesbian and gay identification and instead embraces the broader category of queer (Nelson, 1999). Cameron points out that such a position has serious implications for sociolinguistics and studies of language and gender, since "sociolinguistics traditionally assumes that people talk the way they do because of who they (already) are," whereas a performative approach to identity "suggests that people are who they are because of (among other things) the way they talk" (Cameron, 1997: 49). The question for language and gender studies (or any other focus on language and identity), then, is not how men and women talk differently, as if males and females preexisted their language use as given categories of identity, but rather how to do gender with words. This does not mean that we do not constantly perform gendered identities through language but rather that we constitute through language the identity it is purported to be. It is in the performance that we make the difference. Again, cutting edge work in critical applied linguistics is starting to open up applied linguistics to such perspectives.

This view suggests, then, that a transgressive, critical applied linguistics has become far more than a political add-on to mainstream applied linguistics. It has now, by contrast, become the gateway through which new theories and ways of thinking about applied linguistics are entering and changing the

discipline. A newly emergent approach to critical applied linguistics has superseded the static politics and epistemologies of the modernist emancipatory framework, and started to take on board the implications of the linguistic, somatic, and performative turns, with major implications for applied linguistics more broadly. It accepts that we have to confront the crisis of realist representation in Western academic life and the need for reflexivity in knowledge production, that we need to understand the role of discourse in constituting the subject, and that the subject is multiple and conflictual. At the same time it acknowledges that the logocentric idealism of an overemphasis on discourse overlooks the ways in which the social order is not only about language, textuality, and semiosis but is also corporeal, spatial, temporal, institutional, conflictual, and marked by sexual, racial, and other differences. The somatic turn allows applied linguistics to readdress the embodiment of difference, while the performative turn suggests that identities are formed in the linguistic and embodied performance rather than pregiven. This in turn provides the ground for considering languages themselves from an antifoundationalist perspective, whereby language use is an act of identity that calls that language into being. These are the concerns of an exciting new era of transgressive applied linguistics.

See also: Discourse, Foucauldian Approach; Discourse Studies: Second Language; Discrimination and Language; Discursive Practice Theory; Education in a Multilingual Society; Educational Failure; Educational Linguistics; Endangered Languages; English: World Englishes; Foreign Language Teaching Policy; Gender and Language; Gender and Political Discourse; Gender, Sexuality and Language; Identity and Language; Identity: Second Language; Integrational Linguistics and Semiology; Language Education and Gender; Language Education for Endangered Languages; Language Ideology; Language Planning and Policy: Models; Language Politics; Law and Language: Overview; Linguistic Rights; Literacy Practices in Sociocultural Perspective; Nonnative Speaker Teachers; Politics of Teaching; Power and Pragmatics; Pragmatics: Linguistic Imperialism; Queer Talk; Reading and Multiliteracy; Second and Foreign Language Learning and Teaching; Sociolinguistic Crossing.

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Critical Discourse Analysis

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Introduction

Critical discourse analysis is founded on the insight that text and talk play a key role in maintaining and legitimating inequality, injustice, and oppression in society. It employs discourse analysis to show how this is done, and it seeks to spread awareness of this aspect of language use in society, and to argue explicitly for change on the basis of its findings.

Critical discourse analysis is not associated with a specific school of linguistics or discourse analysis. Many have followed Fairclough (1989) in drawing primarily on the systemic-functional linguistics of Halliday (1989). According to Halliday, the resources of language simultaneously fulfill three major functions: the **ideational** function of constructing representations of the world; the **interpersonal** function of constituting social interactions; and the **textual** function of creating cohesively structured texts and communicative events. This suits the purposes of critical discourse analysis, which engages both with the way language is used to construct and disseminate discourses – ideologically specific representations of some aspect of the world – and with the way language is used to enact hegemonic genres – specific ways of using language to achieve purposes of social domination. Fairclough (1993: 134; 2000: 14, see also van Leeuwen, 2005) added styles – uses of language to construct and enact social identities.

But many critical discourse analysts use other methods, including, for instance, argumentation strategies (e.g. Wodak and Matouschek, 1993), narrative analysis (see e.g. Mumby, 1993), forms of conversation analysis that go beyond the constraints stipulated by proponents such as Schlegoff (1997) and link conversational data to their wider social context (e.g. Ehrlich, 1998), and more. While Fairclough and others (e.g. van Leeuwen, 1996) have adapted and elaborated systemic-functional linguistics for purposes of critical discourse analysis, van Dijk (e.g. 1993a) and others have demonstrated that a much wider range of methods can usefully be applied in critical discourse analysis, arguing for a multidisciplinary approach which "chooses and elaborates theories, methods and empirical work as a function of their relevance for the realization of socio-political goals" (1993a: 252). The methodological diversity of critical discourse analysis is well demonstrated in the pages of *Discourse and Society*, which has been the key journal for critical discourse analysis over the past 17 years.

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critical social theory (see Chouliaraki and Fairclough, 1997). Strongly influenced by Marx and Gramsci, Fairclough's work also engages with Foucault, Bourdieu, Habermas, Harvey, and Giddens, to mention just a few names. But, again, there is no theoretical orthodoxy in critical discourse analysis. With regard to the key concept of **ideology**, for instance, van Dijk (1993a: 258; 1998), sees 'ideologies' as the 'worldviews' that constitute 'social cognition': "schematically organized complexes of representations and attitudes with regard to certain aspects of the social world, e.g. the schema (...) whites have about blacks, which may feature a category 'appearance'," while Fairclough has a more Marxist view of ideology in which ideologies are "constructions of practices from particular perspectives (...) which iron out the contradictions, dilemmas and antagonisms of practices in ways which accord with the interests and projects of domination" (Chouliaraki and Fairclough, 1997: 26). But this has not led to divisions within critical discourse analysis. What unites critical discourse analysis is neither methodology nor theoretical orthodoxy, but a common goal: the critique of the hegemonic discourses and genres that effect inequalities, injustices, and oppression in contemporary society.

The issues critical discourse analysts have explored over the past 20 years have also varied widely. A great deal of work, particularly by Wodak (e.g. Wodak *et al.*, 1990; Wodak and Matouschek, 1993) and van Dijk (e.g. 1991, 1993b) and their associates has focused on racism and antisemitism, and more recently also on immigration and asylum (e.g. Van Leeuwen and Wodak, 1999). The discourses of neoliberalism and their role in the neocapitalist policies and practices of governments, the business world, and other institutions have become another important focus (e.g. Fairclough, 1993, Chouliaraki and Fairclough, 1997, Fairclough, 2000). But the pages of *Discourse and Society* and collections such as Toolan (2002) show that critical discourse analysts have addressed many other issues as well, including gender, education, doctor-patient communication, war and terrorism, and welfare and unemployment, to mention just a few. The data used by critical discourse analysts also vary. Although there has been a tendency to focus on speeches by politicians, parliamentary debates, and media reports and editorials, critical discourse analysts have also analyzed school textbooks, advertisements, the books of management gurus, transcripts of doctor-patient and workplace meeting interactions, and much more. And as a glance at the contents of *Discourse and Society* will demonstrate, this work has increasingly come from all corners of the world.

Critical Linguistics

The immediate forerunner of critical discourse analysis was critical linguistics, a movement that started at the University of East Anglia in the mid–1970s (Fowler *et al.*, 1979; Hodge and Kress, 1993). Halliday's systemic-functional linguistics provided the fundamental insight that made it possible to move linguistic analysis beyond formal description and use it as basis for social critique (1989: 101):

> Grammar goes beyond formal rules of correctness. It is a means of representing patterns of experience (...) It enable human beings to build a mental picture of reality, to make sense of their experience of what goes on around them and inside them.

Critical linguists added two further steps. The first was inspired by Marx. The "patterns of experience" Halliday refers to, they argued, are not necessarily neutral. They are patterned the way they are to suit the needs and interests of those who use them both to understand and to enact their reality, and if such interests include domination, they are ideological. The second was inspired by Whorf. If different languages can encode different "patterns of experience" (and different ideologies), they argued, so can different uses of one and the same language. In a study that has rightly become a classic, Tony Trew (1979: 106–107) described how, when the Harare police, in what was in 1975 still Rhodesia, fired into a crowd of unarmed people and shot thirteen of them The *Rhodesia Herald* wrote: "A political clash has led to death and injury," while the *Tanzanian Daily News* wrote, "Rhodesia's white suprematist police (...) opened fire and killed thirteen unarmed Africans." Analyzing texts of this kind, Trew demonstrated that political views are not only encoded through different vocabularies (of the well-known freedom fighter versus terrorist type) but also through different grammatical structures, here for instance through the coding of the same event as either a noun ('death') or a verb ('kill') that, for its grammatical completion, requires an active subject ('police') and an object ('Africans'), so that both the perpetrators and the victims must be referred to explicitly. Another key example of what critical linguists have called "ideological transformations" is passive agent deletion: if the Tanzanian version were to be passivized ("Thirteen unarmed Africans were killed ... ") it would no longer be necessary to name the police as the agent of the killing.

With work of this kind, critical linguists took the fundamental step of interpreting grammatical categories as potential traces of ideological mystification, and broke with a tradition in which different

ways of saying the same thing were seen as mere stylistic variants, or as conventional and meaningless indicators of group membership categories such as class, professional role, and so on. Without their work, critical discourse analysis would not have been possible.

Critical Discourse Analysis

Critical discourse analysis started in the mid–1980s as a new direction in the work of Fairclough, van Dijk, Wodak, and others. As a movement it began in 1992, at a meeting in Amsterdam with presentations by van Dijk, Fairclough, Wodak, Kress, and van Leeuwen, which were later published as a special issue of *Discourse and Society* (*4, 2*,1993). The group gradually expanded and continued to meet annually from 1992 onward. Another early collection of influential papers was published a few years later (Caldas-Coulthard and Coulthard, 1996). Since then critical discourse analysis, now usually referred to as CDA, has been a fast growing and increasingly interdisciplinary movement. A first large-scale international conference was held in 2004 in Valencia. Two new journals started in the same year, *Critical Discourse Studies* and the *Journal of Language and Politics*.

Critical discourse analysis moved beyond critical linguistics in a number of ways. The first has already been mentioned: the attempt to ground critical discourse analysis in critical social theory and to articulate the relation between discourses and the social practices in which they are embedded. By the early 1990s, discourse had also become a key term in postmodern philosophy and cultural studies, and critical discourse analysis explicitly distanced itself from the dominant tendency in these fields to reduce the social to discourse, and discourse only. Concepts such as marketization (Fairclough, 1993) could incorporate both changing practices (the market practices that are now introduced in many institutions, including universities) and the changing discourses that played a key role in this process by proposing and legitimating changes, training people in new practices, requiring them to learn new ways of talking and writing, and so on. As universities had to learn to compete with each other for students, treat students as customers, and so on, their discourses were also marketized. Job advertisements, for instance, changed from traditional forms such as "Applications are invited for a lectureship in the Department of English Literature ... " to forms such as "The Department of Law is a thriving department committed to excellence in teaching and research ... ," to accommodate the new emphasis on and entrepreneurial ethos and self promotion. Fairclough stressed the interdiscursivity of such genres. The old continues alongside the new, certainly for as long as the new practices still cause tension and have not stabilized.

Critical discourse analysis also moved beyond critical linguistics in adopting a much more fully interdisciplinary approach, studying not only texts and transcripts of talk, but also their contexts, whether by historical or ethnographic methods. Wodak's 'discourse-historical approach' set the example here, increasingly involving collaborations between discourse analysts, on the one hand, and historians, political scientists, anthropologists, and sociologists on the other hand, as well as stimulating reflection on interdisciplinarity itself (e.g. Weiss and Wodak, 2003).

Critical discourse analysis has also moved beyond language, taking on board that discourses are often multimodally realized, not only through text and talk, but also through other modes of communication such as images. Kress and van Leeuwen (1996) developed methods of visual analysis that were strongly inspired by Halliday's systemic-functional linguistics and demonstrated how these methods could be used for purposes of critical discourse analysis. To mention an example, van Leeuwen (2000) shows how 'visual racism' is realized not just by the most obvious racist stereotypes, but also through subtler methods. The members of some social groups, for instance, are never personalized, never depicted as individuals with unique characteristics. They are represented *en groupe*, often in highly similar or identical poses. This can then create a 'they are all the same' or 'you can't tell them apart' effect. Again, the members of some social groups are consistently depicted in 'long shot', which, literally and figuratively, 'distances' them from the viewer.

Overall, then, critical discourse analysis has moved towards more explicit dialogue between social theory and practice, richer contextualization, greater interdisciplinarity and greater attention to the multimodality of discourse.

Critiques

Critical discourse analysis is no longer of interest only to linguists. The work published in journals such as *Critical Discourse Studies* and the *Journal of Language and Politics* shows that social scientists from a range of different fields are actively engaging with critical discourse analysis. By contrast, CDA has received some strong-worded critiques from within linguistics. These have often been included in collections of CDA papers (e.g. Toolan, 2002) and in the prescribed reading lists of university courses in linguistics departments, thus encouraging a certain

suspicion of critical discourse analysis, especially in contexts where linguistics is taught and practiced as a neutral scientific enterprise.

In one of the most widely quoted critiques, Widdowson (1995, 1996) argues that it is the business of discourse analysis to describe formal patterns 'above the sentence' and that critical discourse analysts confuse discourse analysis with textual interpretation. In a similar vein Stubbs (1997) calls the analysed of critical discourse analysts 'textual commentaries.' Like Widdowson, Stubbs mainly targets Fairclough, conveniently ignoring the wide range of critical discourse work published over the years in *Discourse and Society* and elsewhere. The text analysed in Fairclough (1989), which are often pedagogical examples to demonstrate methods of analysis in what is essentially a textbook, are, according to Stubbs, "fragmentary" and "insufficient" because they do not constitute a representative sample and do not involve the kind of large scale quantitative work in which many linguists are now engaged.

Most of all, however, these critiques take offense at the explicit social and political goals of critical discourse analysis. Widdowson, for instance, argues that texts are differently interpreted by different readers and that critical discourse analysts unfairly privilege their own interpretations. From the point of view of critical discourse analysis (see e.g. Fairclough, 1996), traditional sociolinguistic and stylistic approaches to the study of language in social life may have succeeded in describing patterns of language use and patterns of language change, but they have not explained them. They have treated them as more or less meaningless conventions and autonomous evolutionary processes. Critical discourse analysts are seeking to explain why texts are the way they are, and why they change the way they do, and following Halliday, they look for the answers to these questions in the social, economical, and political world.

Critical discourse analysts are aware that their own work, too, is driven by social, economical, and political motives, but they argue that this applies to all academic work. Social divisions of labor have traditionally ensured that scientists and other academics do not have to confront the conditions that make the continuation of their work possible and the place it has in the wider scheme of things. Critical discourse analysts at least make their position explicit and feel they do not need to apologize for the critical stance of their work; on the contrary, by contributing to debates on issues that are of crucial importance to society, they continue the tradition of reasoned debate that has been fundamental to democratic societies since antiquity, feeling that their work as scholars entails greater social responsibilities than providing facts for others to interpret and use.

See also: Critical Applied Linguistics; Discourse, Foucauldian Approach; Discrimination and Language; Discursive Practice Theory; Media and Marginalized Groups; Media, Politics, and Discourse: Interactions; Political Rhetorics of Discrimination; Politics and Language: Overview; Politics, Ideology and Discourse; Power and Pragmatics; Social Construction and Language.

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Croatia: Language Situation

Editorial Team

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The official language of Croatia is Croatian (Serbo-Croatian). The writing system is based on an adopted version of the Roman alphabet. The same language is referred to by different names, Serbian (srpski), Serbo-Croat (in Croatia: hrvatsko-srpski), Bosnian (bosanski), based on political and ethnical grounds. Minority languages (Serbian, Italian, Albanian, Hungarian) are not numerous and are not in official use.

Croatia became an independent country after the breakup of Yugoslavia in 1992. Language politics have been heavily involved in the numerous ethnical conflicts that took place from 1990 to 1996, and it is still a very sensitive issue in the whole area of the Balkans. The language situation in Croatia has undergone a twofold change in the following period. First, there was a very active engagement of the government and other national institutions trying to stress the differences between the Croatian and other varieties of Serbo-Croat. Second, a large number of Serbs (estimated to several hundreds thousands of people) fled the country in the year 1995, which resulted in an abrupt change in the numbers of speakers who declare to speak Serbian.

One linguistic consequence of the political and ethnical processes during the 1990s is that the language that used to be officially called Serbo-Croat has gotten several new ethnically and politically based names. Thus, the names Serbian, Croatian, and Bosnian are politically determined and refer to the same language with possible slight variations. The language has two major dialects, the Ekavian and Ijekavian, the former being spoken by the majority of Croatians. Still, these dialects do not coincide with the ethnically motivated names, because they both are spoken by more than one ethnic group.

The official language of the Republic of Croatia is Croatian (with over 4 250 000 speakers in the territory of Croatia without Kosovo, or 96% of the population). Minority languages are Serbian (around 45 000 speakers), Italian (20 500 speakers), Albanian (14 500 speakers), and Hungarian (12 500) and several more with under 10 000 speakers.

See also: Language Policies: Policies on Language in Europe; Serbian–Croatian–Bosnian Linguistic Complex; War Rhetoric.

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Croatian *See:* Serbian–Croatian–Bosnian Linguistic Complex.

Croatian Lexicography

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Although there were traces of lexicographic interest on the Croatian side of the Adriatic in medieval Beneventan monasteries, in notes in the margins or at the ends of manuscripts, the first Croatian dictionary was not preserved from that source. The *Opera nuova che insegna a parlare la lingua schiavonesca* . . . was completed in Ancona (1527), and the author of this short Italian–Croatian dictionary for tradesmen, with a supplement on conversation, is believed to have been Petar Lupis Valentinian. The first Croatian dictionary published as a separate book was *Dictionarium quinque nobilissimarum Europae linguarum Latinae, Italicae, Germanicae, Dalmaticae et Ungaricae* by Faust Vrančić (1595). Including more than 5800 Croatian words, it stands as the first printed dictionary not only in Croatian, but also in Hungarian (*see* **Hungarian Lexicography**). Words from five languages were organized in columns, with translation equivalence represented in rows. Until the establishment of 'Croatian' as the national name in the 19th century, following the Latin tradition, Croatian was often called 'Lingua Illyrica, Dalmatica, S(c)lavonica,' and this practice was reflected in the titles of many dictionaries. *Razlika skladanja slovinska* by Bartol Kašić was completed in 1599 but left in manuscript form. It is the first dictionary organized around Croatian headwords and noting accentuation. Mikalja's *Blago jezika slovinskoga* (1649) gave several meanings of headwords, usually accompanied by idioms. *Gazophylacium* by Belostenec (posthumously published, in 1740), written primarily for schools and thus widely accepted, spread the ideas of the Ozalj circle re the standardization of Croatian by amalgamation of three dialects (Čakavian, Kajkavian, Štokavian) by mixing them on both sides of the dictionary. In contrast, Habdelić's *Dictionar* (1670) followed the Jesuit doctrine of building the standard on a single dialect (in this case, Kajkavian). In the *Dizionario Italiano-Latino-Illirico* (1728), Della Bella enriched lexicographic practice by introducing a list of sources and examples from literature. Morphological information was also introduced, with supplementary inflectional and derivational word forms, along with a clear overall organization. Stulli's trilogy of dictionaries (1801, 1806, and 1810) is the first example of an inverted dictionary, which gave readers the opportunity to search by Croatian, Italian, or Latin headwords.

Dictionaries by Mažuranić and Užarević (1842), Parčić (1858), and Šulek (1860; 1874–1875), in addition to their developed metalinguistic apparatus, introduced many new words required as a result of the industrial and scientific progress that took place during the 19th century. Šulek's work (1874–1875) stills serves as a basic guide to modern Croatian scientific terminology.

These are the last important lexicographic works not affected by south Slavic (predominantly Serbian) influence, which was introduced by the romantic ideology of the Illyrian movement, which tried to politically unite the south Slavic nations. Following that ideology and the linguistic model of Vuk Karadžić of Serbia, the most influential Croatian philologists at the end of 19th century called themselves 'Croatian Vukovians,' thus opening the gates for the attempts at amalgamation of Croatian and Serbian – two languages that are genetically close but have completely different cultural traditions. The compiling and publishing of *Rječnik hrvatskoga ili srpskoga jezika* (*Dictionary of the Croatian or Serbian language*) started in 1880 in Zagreb at the Yugoslav Academy of Sciences and Arts, giving an example of this amalgamation in the very name of the dictionary. This process was highly asymmetrical. With the establishment of Yugoslavia after World War I, the political center of the country in Belgrade banned the usage of 'separate' Croatian and even Slovenian language names, calling the official language of the country 'Serbo-Croato-Slovenian.' Although it was given a single language name, the *Hrvatski rječnik* (Broz and Iveković, 1901) in its preface subscribed completely to this newly established ideology. This 'equal situation' (with the 'state language' named Serbo-Croatian but in fact predominantly Serbian) was perpetuated after World War II in Communist Yugoslavia, culminating in severe opposition to *Rječnik hrvatskosrpskoga*

književnog jezika (Declaration of the name and status of the Croatian literary language, 1967), which was compiled by Croatian writers, linguists, lexicographers, and the general public. It was only after the Republic of Croatia left the Yugoslav Federation that another general-purpose Croatian dictionary could be published under its natural name.

The Present: Monolingual, Multilingual, and Specialized Dictionaries and Corpora

Although by the late 20th century Croatian bilingual lexicography was very well developed, covering all the major world languages in both directions, no monolingual dictionaries under the name 'Croatian' had been published since 1901. The appearance of Anić's *Rječnik hrvatskoga jezika* (1991) excited the widest possible interest and was soon followed by additional printings, with the fourth edition (2003) appearing for the first time on CD-ROM. The competitive *Rječnik hrvatskoga jezika* appeared in 2000 but only in print, not in an electronic format. Specialized mono- and bilingual dictionaries (for loanwords, etymology, law, electrical engineering, information technology, linguistics, etc.) were also compiled during the second half of the 20th century and particularly in the 1990s. The large *Hrvatski enciklopedijski rječnik* appeared in 2002 (Matasović and Jojić), providing encyclopedic information in a general-purpose dictionary. Important lexicographic publishers include the Lexicographic Institute Miroslav Krleža, Školska knjiga, Novi liber, Ljevak, Institute of Croatian Language and Linguistics, and Globus.

For corpus building in Croatia, the Institute of Linguistics, Faculty of Philosophy, University of Zagreb is the referral institution. In addition to the corpora of old Croatian writers, it produced the *One million dictionary of Croatian literary language,* compiled by Milan Moguš (1976–1996) and comprising texts from five genres dating from 1938 to 1978. This was used as the source for the first frequency dictionary (*Hrvatski čestotni rječnik,* Moguš, 1999). At the same institution, the *Croatian national corpus* has been collected since 1998 and now comprises some 75 million entries (also Internet-searchable). It was followed by *Croatian–English parallel corpus* (3.5 million entries, sentence aligned) and the Internet-searchable *Croatian morphological lexicon,* which provides all the inflectional word forms for 33 500 lemmas, generated automatically. Unfortunately, Croatian lexicographic publishers have not yet realized the full advantages of corpus-based lexicography, so there are still no commercially based large corpus building projects underway; rather, this is being done only by the academic community.

See also: Hungarian Lexicography; Italian Lexicography; Serbian Lexicography.

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Croce, Benedetto (1866–1952)

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Croce exercised a kind of benevolent dictatorship over the literary and philosophical life of his country for half a century. Historian, philosopher, critic, and statesman, he was not directly interested in linguistics; the only reason for including him in this encyclopedia is the major influence he had on some contemporary linguists, especially in Italy and Germany. In view of the specific scope of this article, the information given here is necessarily incomplete and one-sided.

Croce was born on February 25, 1866 at Pescasseroli in the Abruzzi and spent almost his whole life in Naples; he never attempted to obtain an academic degree.

In 1903, he founded the review *La Critica* in which he published nearly all his writings up to 1944. Twice in his life, under prime ministers Giolitti in 1920–1921 and Badoglio in 1944, he was minister of education.

In 1925, Croce became the symbol of the opposition to Fascism in his country, but in view of his international reputation the Fascists dared not interfere seriously with his work. From 1943 to 1947, he was head of the Liberal party. Once this last public mission was fulfilled, he returned to his studies, establishing the Italian Institute for Historical Studies. He died at work, as he had promised his friends, on November 20, 1952 in Naples.

Croce was neither a linguist nor a language philosopher *sensu stricto*. The strong influence he exercised on a number of linguists, for instance the 'neolinguists' in Italy and the 'idealistic philologists' in Germany, resulted from his 'philosophy of the spirit' which met with considerable response in some European countries. In this philosophical system reality is reduced to the (world-immanent) 'spirit,' which appears in a theoretical and in a practical 'phase' (or 'moment'). Both can assume an 'intuitive' or a 'conceptual' form and accordingly four fundamental categories of the spirit are to be distinguished:

	intuitive	conceptual
theoretical	aesthetic	logical
practical	ethical	economic

As language belongs to the theoretical–intuitive category of the spirit, it is nothing other than a 'popular' form of art ('intuitive' in Croce's terminology refers not only to knowledge but also to 'expression' or 'representation'). This quasiidentification of language with art, which can be inferred from the surprising title of his first important book, *Aesthetic as science of expression and general linguistic* (Croce, 1902), was qualified by the Italian linguist Tullio De Mauro (1954) – a representative of the subsequent, less 'idealistic' generation – as 'a bomb filled with explosive foolishness.' In a later version of his system, Croce endeavored to reconcile his position withmore commonsensical conceptions, introducing the distinction between an intuitive–expressive (i.e., 'poetic') and a conceptual–communicative (i.e., 'prosaic') kind of language.

Croce's influence has been strong among Romance scholars in Italy and Germany and to a lesser extent in Spain and in Latin America. In the English-speaking countries it is confined to historiography and literary criticism; in France and Russia it is almost nonexistent. His negative statements concerning language and linguistics are of particular interest: as language is an *a priori* category, it makes no sense to ask after its origins or its 'development'; as language is a spontaneous manifestation of human creativity, the categories of universal grammar (and *a fortiori* those of normative grammar and rhetorics) are 'pseudoconcepts' of merely practical value; as every linguistic utterance forms an organic whole that cannot be divided into form and content, translation is strictly impossible – although Croce himself had no objection to his works being translated into foreign languages.

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Cross-Linguistic Comparative Approaches to Language Acquisition

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An adequate theory of child language acquisition must work for all languages, spoken as well as signed. Such a theory must be compatible with language universals and with general processes of psychological learning and development. The adequate theory lies in the future, but it will require extensive documentation of the course of acquisition of a range of languages. Cross-linguistic studies of child language seek to compare the acquisition of comparable and contrasting languages in order to discover the mechanisms and processes that drive the course of development in general. The focus of this article is on monolingual first-language acquisition, leaving aside issues of early bi- and multilingualism (see Döpke, 2000; Bialystok, 2001). The diversity of languages provides a remarkable natural laboratory for the investigation of processes of learning. The starting assumption is that these processes are universal to the species, and that all languages are learnable in the first several years of life, as those processes are brought into play in the course of language acquisition. Several centuries of child language research confirm striking parallels in the rate and stages of development, independent of language type, modality (spoken or signed), and sociocultural setting. At the same time, details of variation across languages reveal subtle interplays in development between phonology, morphosyntax, semantics, and pragmatics. Documentation and understanding of these interplays is essential to psychology, in attempting to define learning mechanisms, and to linguistics, in the search for both universals and the limits of constrained variation (linguistic typology). The cross-linguistic comparative approach is important for biological theories of linguistic nativism, for historical theories of language evolution and change, and for psycholinguistic theories of the balance of competences that make human language possible.

Until the middle of the last century, cross-linguistic investigations were almost entirely limited to the dominant European languages, as linguists, philosophers, and psychologists studied the language development of their own children, and as educators studied child language for pedagogical purposes. Given the great typological similarity of the languages (Germanic, Romance, Slavic), common developmental patterns were readily observed (e.g., Gvozdev, 1928; Stern and Stern, 1907). The past half-century has seen a tremendous flowering of child language studies, both observational and experimental, around the world. Comparable reports of the acquisition of 28 different languages, representing 14 major groups, can be found in the five volumes of *The crosslinguistic study of language acquisition* (Slobin, 1985–1997). The collection includes the following, based on the classification of language families established by Ethnologue:

- Afro-Asiatic / Semitic / Hebrew
- Altaic / Turkic / Turkish
- Australian / Ngarga / Warlpiri
- Austronesian / Oceanic / Samoan
- Deaf Sign Language / American Sign Language (ASL)
- Eskimo-Aleut / Inuit / Greenlandic Eskimo (Greenlandic Inuktitut)
- Indo-European / Germanic / Danish, English, German, Norwegian, Swedish
- Indo-European / Greek / Modern Greek (Greek)
- Indo-European / Romance / French, Italian, Portuguese, Romanian, Spanish
- Indo-European / Slavic / Polish
- Japanese / Japanese
- Language isolate / Korean
- Mayan / Quichean / K'iche' (Quiche)
- Niger-Congo / Bantoid / Sesotho (Southern Sotho)
- Sino-Tibetan / Chinese / Mandarin (Mandarin Chinese)
- South Caucasian / Georgian
- Trans-New Guinea / Bosavi / Kaluli
- Uralic / Finno-Ugric / Estonian, Finnish
- Uralic / Ugric / Hungarian

A major source of data is provided regularly by the *Journal of Child Language*. In the four volumes from 2000–2003 containing 3684 pages, studies of various sorts, using a range of methods, report on children's development in the following languages: British Sign Language (BSL), Cantonese (Yue Chinese), Catalan (Catalan-Valencian-Balear), Dutch, English, Esperanto, Finnish, French, German, Greek, Hebrew, Italian, Japanese, Korean, Langue des Signes Québécoise (LSQ) (Quebec Sign Language), Mandarin (Mandarin Chinese), Navajo, Polish, Quechua, Sesotho (Southern Sotho), Spanish, Swedish, and Tamil. In addition, there are increasing numbers of monographs devoted to the acquisition of individual languages, often combining observational, experimental, and ethnographic data, as well as conference volumes dealing with specific issues across languages (e.g., Bowerman and Levinson, 2001). The database

is rich, and the field has not yet reached a stage of formulating and testing broad cross-linguistic hypotheses and models. The trained linguist will notice, in perusing the lists of languages above, that there are major gaps in coverage with regard to language typology. Much work is needed to fill in those gaps: child language research is exceptionally time consuming, and can only progress on the basis of detailed linguistic description of each language under investigation.

From the point of view of developmental psychology, general patterns hold up across languages. Children take off from a babbling period (experimenting either in the vocal or gestural domain), moving on to 'first words' around the beginning of the second year of life. The perceptual system, at first quite open, is rather quickly tuned to the phonological categories of the exposure language. The processing span is at first quite limited, whether counted in words or morphemes. An early period of two-word or two-morpheme utterances is widely attested. First words, and early grammatical constructions, are lexically and contextually specific. Gradually such constructions give way to generalization, and often overgeneralization, such as the familiar overregularizations of the English past tense ('falled,' 'breaked,' etc.). Although basic grammatical devices are in place in the fourth year of life, fine tuning of linguistic structures continues through childhood.

Children are quite able to zero in on the dominant morphosyntactic devices of the exposure language, and by age 2 or so are able to attend to word order patterns in a language such as English, as well as to various types of morphological constructions in languages such as Georgian, Turkish, K'iche' Mayan (Quiche), or Greenlandic Eskimo (Greenlandic Inuktitut). Thus there is no 'starting preference' for one type of morphosyntax or another.

Several research strategies allow for sorting out of formal (phonological, morphosyntactic) and functional (semantic, pragmatic) dimensions in acquisition. Space only allows for a hint at these directions.

On the **formal** level, researchers can pick a formal device and compare its development across languages. Research of this sort is useful in revealing the mix of factors that influence acquisition. For example, Turkish and Russian indicate the case roles of nouns by means of suffixing. In Turkish, the suffixes are completely regular and predictable, whereas in Russian there are many sources of difficulty, due to intersecting factors of number, gender, and animacy, along with irregularities. Compare the nominative and accusative forms of 'hand' in the two languages: Turkish *el / eli*, Russian *ruka / ruku*. The Turkish form is agglutinative, adding a vowel; the Russian form replaces one vowel with another. Furthermore, there is only one type of accusative suffix in Turkish, while Russian has forms that add a vowel (*syn / syna* 'son') or do not change (*dom / dom* 'house'). Before age 2, both Turkish and Russian children acquire the device of suffixing to indicate a noun's role; but the task is complete for the Turks, while it takes the Russians several more years to sort out the system. Comparisons such as these reveal a general acquisition strategy: attention to variation in the ends of words to express role relations, as well as more specific strategies: formation of paradigms based on the intersection of several features (case, number, gender, animacy). Fine-grained comparisons of comparable systems reveal differential roles of perceptual salience of forms, frequency of occurrence, and contextual conditioning (see, for example, the comparison in Smoczyńska, 1986 of the acquisition of Polish and Russian noun inflectional paradigms, isolating a critical factor of vowel reduction). Ann Peters has proposed a number of principles that guide children in the identification and segmentation of linguistic units, on the basis of definable phonological and prosodic properties of the exposure language (Peters, 1997).

Another type of research strategy selects a **semantic** domain and compares its acquisition in languages that differ in the organization of the domain. Research of this sort is important to psychological theories about universal, and possibly innate, bases of cognitive organization. Melissa Bowerman and Soonja Choi have pioneered in this type of research (Choi and Bowerman, 1991; Bowerman and Choi, 2001). For example, in the domain of locative placement, English orients to topological relations between figure and ground, singling out dimensions such as containment ('put it **in**') and support ('put it **on**'). Korean, by contrast, orients to dynamic factors, such as tightness of fit. For example, the verb *kkita* 'put into a relation of tight fit', cuts across the English categories of containment and support; it is equally applicable to situations such as putting a videocassette **into** a case and fitting one interlocking Lego block **onto** another. A program of experimental and observational study of infants and toddlers demonstrates that neither type of spatial organization is primary; well before age 2, English-learning babies distinguish containment from support, regardless of tightness of fit, whereas Korean-learning babies distinguish tightness of fit, regardless of containment or support. Here, child language research is part of a larger research program of recent decades, devoted toward reassessment of 'linguistic relativity' (Levinson, 2003). (Implications of linguistic relativity for child language and cognition are explored by Berman and Slobin, 1994, and in numerous chapters

in Gentner and Goldin-Meadow, 2003. Eve Clark presents a thorough analysis of lexical acquisition, proposing principles that apply to children's learning of words, as well as coining of new words, across a large collection of languages [Clark, 1993].)

Cross-linguistic acquisition research in recent decades has posed challenges to both syntactic and semantic models. Findings that children easily acquire a range of forms and form–function mappings raise doubts about models based on a limited sample of languages or types of languages. Although linguists have striven, for centuries, to find an underlying uniformity across languages, it now seems that many of the most interesting universals are revealed in systematic patterns of constrained variation, rather than in variants of a single pattern. When universals are treated as emerging from a collection of dimensions or parameters, systematic **typological** analysis is possible. The role of child language research, in this regard, is to help specify the relevant dimensions and their interactions.

Finally, it must be stressed that cross-linguistic investigation is inevitably also cross-cultural. However, little of the current and recent research that focuses on acquisition of linguistic structures concerns itself with a comparable level of ethnographic detail. This point has been made most forcefully by anthropologically oriented child language researchers, such as Elinor Ochs (Ochs, 1988) and Bambi Schieffelin (Schieffelin, 1990). In their studies of child language in Samoa and New Guinea, they demonstrate that grammatical and lexical acquisition cannot be separated from the interplay of systems of values and interpersonal relations in the world around the child. It is also important to note that the comparative method is equally applicable to the study of individual differences between children learning a particular language. Elena Lieven has searched for individual differences in a cross-linguistic context, examining the few available records on variability in acquisition in different languages (Lieven, 1997).

See also: Infancy: Sensitivity to Linguistic Form; Language Development: Morphology; Language Development: Overview; Meaning: Development; Morphological Typology; Morphological Universals; Morphology and Language Processing.

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Relevant Website

http://www.ethnologue.com.

Crow

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Location, Speakers, and External Relationships

The Crow, or *Apsáalooke*, language is spoken primarily on and near the Crow reservation in southeastern Montana. There are over 4000 speakers, most of whom are adults, although there are a few children who still speak the language, and many more who understand it. For most adults, Crow is still the language of the home and the preferred language for interaction with other tribal members.

Crow, along with Hidatsa, is a member of the Missouri River subgroup of the Siouan language family (*see* **Siouan Languages**). Crow and Hidatsa have diverged considerably from the other languages of the family, suggesting that this subgroup may have been the first to separate from the protolanguage.

Orthography and Phonology

Crow is written in a practical orthography developed by the Crow Agency Bilingual Education Program and the Wycliffe Bible translators in the late 1960s. The values of the letters are roughly as in English, with the following exceptions: *ch* = /č/, *sh* = /š/, *tch* = /čč/, *ssh* = /šš/, *sch* = /šč/, *?* = glottal stop, and *x* represents the velar fricative. Long vowels are written as digraphs: *aa, ee,* etc.

The consonant sounds of Crow are given in Table 1. The voiced sonorants *m* and *n* have three allophones: *w* and *l* between vowels, *b* and *d* word-initially and following an obstruent, and *m* and *n* elsewhere; *m* occurs in free variation with *b* word-initially, although *b* is the more common realization. The glottal stop (written with the question mark) is a defective phoneme that occurs only as the sentence-final marker of an interrogative. Crow has a single stop series. Stops are aspirated word-initially and -finally, and as the second member of a cluster. Geminate stops are treated as clusters and are aspirated. Single stops between vowels are lax, unaspirated, and often voiced. The *k* is palatalized after *i*, *ih*, *e*, *eh*, *ch*, and *sh*. Fricatives are lax (and sometimes voiced) intervocalically.

The vowel inventory of Crow is given in Table 2. The diphthongs are realized as long vowels followed by an off-glide; *ea* is a marginal diphthong that occurs in only two stems. Crow and Hidatsa lack the nasalized vowels found in other Siouan languages. Length is phonemic in Crow (e.g., *báalaa* 'winter', *bálaa* 'money') with the exception of the mid vowels, which are always phonemically long, although users of the practical orthography often spell words with short *e* and *o*. Crow has a pitch-accent system that contrasts long falling, long high, and short accented vowels (*chíisa* 'tail', *chií* 'pack on back', *axíchi* 'wet'). Long vowels preceding the accent are high in pitch, and all vowels following the accent have low pitch. Short vowels that occur between a high vowel and the accent assimilate to high pitch. The accent may occur on any syllable of the word. Accent is distinctive in Crow: there are minimal pairs that differ only in the placement of the accent, as in *húupa* 'handle' and *huupá* 'shoe'.

Morphology

Nouns are inflected for possessor with two different inflectional patterns, one for alienable possession and the other for inalienable possession (kin terms, body parts, and a few other objects closely associated with a person, such as items of clothing). The following examples demonstrate alienable and inalienable paradigms:

Alienable	Inalienable
bas-búupche 'my ball(s)'	b-apé 'my nose'
dís-buupche 'your ball(s)'	d-ápe 'your nose'
is-búupche 'his/her balls(s)'	ø-apé 'his/her nose'
bas-búupt-uua 'our ball(s)'	b-ap-úua 'our noses'
dís-buupt-uua 'your ball(s)'	d-áp-uua 'your (PL) noses'
is-búup-tuua 'their ball(s)'	ø-ap-úua 'their noses'

Table 1 Crow consonant inventory

Consonant	*Labial*	*Alveolar*	*Palatal*	*Velar*	*Glottal*
Stops	p	t	ch	k	(?)
Fricatives		s	sh	x	
Sonorants	m	n			h

Table 2 Crow vowel inventory

Vowel	*−Round*		*+Round*	
	Long	*Short*	*Long*	*Short*
High	ii	i	uu	u
Mid	ee		oo	
Low	aa	a		
Dipthongs	ia (ea)		ua	

There are several other inflectional paradigms for inalienably possessed nouns. The plural marker (*uua* in these examples) on a possessed noun indicates that the possessor is plural; the forms are ambiguous as to whether the possessum is singular or plural. Crow has a series of articles that are suffixed to the final word of a noun phrase: *iichíil-eesh* 'the horse' (definite), *iichíili-m* 'a horse' (indefinite specific), and *iichíil-eem* (indefinite nonspecific). Plural number for both nouns and verbs is marked by a suffix: *uu*(*a*) after short vowels and *o* or *u* after long vowels.

Verbal morphology is considerably more elaborated in Crow. Crow verbs are inflected according to an active/stative pattern, with the subjects of some intransitive verbs utilizing the same pronominal prefixes as the objects of transitive verbs:

Object of transitive active	Subject of stative
bii-lichík 'he hit me'	bii-waakuhpáak 'I am sick'
dii-lichík 'he hit you'	dii-waakuhpáak 'you are sick'
ø-ø-dichík 'he hit him/her'	ø-baakuhpáak 'she/he is sick'
balee-lichík 'he hit us'	balee-waakuhpáak 'we are sick'
dii-lit-úuk 'he hit you all/ they hit you all'	dii-waakuhpáauk 'you all are sick'
ø-ø-dit-úuk 'they hit/him/ her/them'	ø-baakuhpáauk 'they are sick'

Both active and stative verbs lack an overt third-person pronominal prefix for either subject or object. Other pronominal prefixes mark the subjects of active verbs, both transitive and intransitive:

Intransitive active	Transitive active
baa-xalússhik 'I run'	dii-wah-kuxshík 'I helped you'
da-xálusshik 'you run'	bii-láh-kuxshik 'you helped me'
ø-xalússhik 'she/he runs'	ø-ø-kuxshík 'she/he helped them'
baa-xalússuuk 'we run'	dii-wah-kuxsúuk 'I helped you all'/'we helped you'
da-xálussuuk 'you all run'	bale-láh-kuxsuuk 'you all helped us'
ø-xalússuuk 'they run'	bale-ø-kuxsúuk 'they help us'

Object prefixes ordinarily precede the subject prefixes. With second-person objects, there can be ambiguity as to whether subject or object is singular or plural.

Crow has a number of different inflectional patterns for active verbs that have arisen from the combination of pronominal prefixes with locative and instrumental prefixes. The following examples demonstrate these paradigms:

du(u)- 'by hand'	1.SG-bulusshúak	2-dilússhuak	3-dússhuak 'bend'
da(a)- 'by mouth'	1.SG-balapxík	2-dalápxik	3-dáapxik 'bite'
ala- 'by foot'	1.SG-baatshík	2-dáatshik	3-alatshík 'slip'
pa- 'by pushing'	1.SG-bapchílek	2-dápchilek	3-páachilek 'push'

A variety of suffixes may follow the verb stem. Some encode aspectual notions, as in *áhi* 'punctual, instantaneous' and *i* 'habitual'. Others function as manner adverbials; examples are *aachíllichí* 'rather, like' (approximative), *aahi* 'here and there' (distributive), *kaáshi* 'very much, really' (augmentative), and *káata* 'little' (diminutive). Reduplication of a portion of the stem adds a distributive or augmentative sense, as in *dappaxí* 'split', *dappáppaxii* 'chop into little pieces' and *ihchipúa* 'jump', *ihchipúpuahi* 'jump up and down'.

Morphosyntax

Although Crow is a head-marking subject-object-verb language, overt noun phrases need not be present to constitute a grammatical sentence; the verb and its pronominal prefixes are sufficient. Crow morphosyntax tends strongly toward polysynthesis and incorporation; as a result, a sentence often consists of a single morphologically complex phonological word:

baa-w-aash-baa-lée-wia-waa-ssaa-k
INDEF–1-hunt–1-go-want.to–1-NEG-DECL
'I'm not going to go hunting'.

This sentence consists of three verbs: *aashí* 'hunt', *dée* 'go', and *wiá* 'want to' (auxiliary verb). Each of the verbs is marked for person of subject. *Baa* marks the object of 'hunt' as indefinite. The final declarative marker *k* is preceded by the negative suffix *ssaa*.

Nominal object incorporation is also common when referring to habitual activities, with the incorporated object preceding the verb, as in *íilii-laxxoxxi* 'peel teepee poles', *bálaa-kaali* 'ask for money', *iichíil-aakinnee* 'ride horseback', and *bil-isshíi* 'drink water'. When transitive verbs lack a specific object, *baa* (indefinite object) is prefixed to the verb stem, as in *baa-kaali* 'ask for (things)' and *baa-isshíi* 'drink, be drinking'.

Crow sentences end with one of a series of final markers of utterance type. The principal ones are *k* (declarative), *h* (imperative), and ? (interrogative):

Baáhpuuo kuss-baa-lée-k	'I went to Pryor' (declarative)
Baáhpuuo kuss-da-lée-?	'Did you go to Pryor?' (interrogative)
Baáhpuuo kuss-dáa-h	'Go to Pryor!' (imperative)

Other sentence-final markers code evidentiality:

Baáhpuuo kuss-dée-sho	'He must have gone to Pryor' (indirect evidence)
Baáhpuuo kuss-dée-wis	'She probably went to Pryor' (probability)

Subordinate clauses are marked by a clause-final suffix, as in *huu-lák* 'if he comes', *baakuhpáa-lasshen* 'because she is sick', and *xalaá-lahtaa* 'even if it rains'.

Crow marks switch-reference in nonindependent clauses: clause-final *ak* indicates that the subject of the following clause will be the same, whereas *m* indicates that the subject of the following clause will be different. It is not unusual to find long chains of clauses linked by *ak* and *m*, with only the final clause in the series terminating in declarative *k*. In noun phrases, demonstratives precede nouns, and other modifiers follow. The determiner is phrase-final, as in *hinne bachée-sh* 'this man-DEF'. Relative clauses are internally headed, and the head noun is marked with the indefinite specific determiner *m*. The agentive subject of the relative clause is marked by the relativizer (REL) *ak*:

[hileen bachee-m	ak-húua-sh]	aw-ák-uu-k
these men-INDEF	REL-come-DEF	1-see-PL-DECL

'We saw these men who were coming'.

Crow has a limited set of postpositional suffixes that combine with nouns, demonstratives, or other postpositions to form complex postpositions: *n* 'at, in, on' (location), *ss(aa), ss(ee)* 'to, toward' (goal), *taa* 'along' (path), and *kaa* 'from' (source):

ótchia héelapee-n
night middle -at
'in the middle of the night'

bin-náaskee-taa
water-edge-along
'along the water's edge'

awaxaawé ku-ssee
mountain it -toward
'toward the mountain'

Under certain conditions, postpositions may be incorporated by the following verb:

Ammalapáshkua	ku-ss-dée-k
Billings	it-to-go-DECL

'She went to Billings'.

See also: Endangered Languages; Lakota; Omaha-Ponca; Polysynthetic Language: Central Siberian Yupik; Reduplication; Siouan Languages; United States of America: Language Situation.

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Crowther, Samuel Ajayi (1806/08–1891)

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Samuel Ajayi Crowther (other spellings: Ajai; Adjai) was born in 1806/08 to Yoruba parents in Osogun in Western Nigeria. At 13, Crowther was captured as a slave and eventually sold to Portuguese traders, whose vessel was intercepted by the British anti-slavery navy patrol. He was freed and taken to Sierra Leone in 1821. Ajayi was educated by the Church Missionary Society (CMS) and in 1825 became a baptized Christian, adopting the name Samuel Crowther. He graduated from the Fourah Bay Institute and became a schoolteacher for the CMS. He was a pioneer of Yoruba services in Freetown.

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Crowther served as the catechist on the first Niger expedition in 1841. With this journey, he played a significant role in the introduction of Christianity in areas such as Aboh, Onitsha, Idah, Gbobe, Bonny, and Lokoja. In 1843 he was ordained in England, and he became a missionary to Sierra Leone and Yorubaland. He served again on the Niger expeditions of 1854 and 1857. These expeditions confirmed Crowther's belief that the successful evangelization of the interior of Africa must be by Africans and in the indigenous African languages. He was able to learn and evangelize in local Nigerian languages.

As part of his missionary work, Crowther contributed significantly to the development of many Nigerian languages, including Yoruba and Igbo. He translated the Bible and various CMS prayer books into the Yoruba language, completed this work between 1848 and 1850. In 1857 he produced the first book in Igbo, *Isoama-Ibo Primer*, and in 1882 he wrote the first comprehensive dictionary in Igbo. These works aided the initial efforts at corpus planning and also served as primary sources for later linguistic inquiries. His other nonlinguistic writings included *Journal of an expedition up the Niger and Tshadda rivers* (1855) and *The Gospel on the banks of the Niger* (1859, with J. C. Taylor).

Education was one of Crowther's effective tools for missionary work. He perceived literacy as the best way to elevate the status of the African, even though the primary aim of the missionary education was to teach the converts how to read the Bible. Gradually, building schools became his passion and his primary method of evangelization. Crowther and his supporting missionaries introduced a commendable educational and health program. They advocated gender equality, discouraged polygamy, and worked tirelessly to end slavery. He served in his missionary office until 1864, when he became the Bishop of 'Western Equatorial Africa' beyond the Queen's Dominions. He was the first African Anglican Bishop in sub-Saharan Africa. Samuel Ajayi Crowther held this position for 26 years and resigned in 1890. He died in 1891.

See also: Niger-Congo Languages; Yoruba.

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Cuba: Language Situation

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Spanish is spoken in many nations, and it is considered the mother tongue of 400 million people worldwide. It is evident that the spreading of this language has resulted in the existence of distinct variants in different geographical regions, especially in regard to pronunciation and lexicon. When compared with other Spanish-speaking countries, the Spanish spoken in Cuba is different in the phonic and lexical plane, although it is not too different from the variants found in the neighboring Caribbean countries.

The Cuban Spanish is characterized by a series of linguistic variants resulting from various phenomena that condition the existence, on the one hand, of a cultivated and normative variant and, on the other, of a variant that makes up the vernacular speech. Moreover, there are diastratical and diatopical variants that also contribute to shape the features of Spanish in Cuba. Both the cultivated and the vernacular variants make up a unity whose components interact, are interrelated, and complement each other.

The Cuban variant of Spanish has its origins in the language spoken by the Andalucians and the people from the Canary Islands, who mostly populated the Island during the Spanish colonial rule between 1492 and 1902.

The pronunciation of these speakers has the following characteristics:

Crowther served as the catechist on the first Niger expedition in 1841. With this journey, he played a significant role in the introduction of Christianity in areas such as Aboh, Onitsha, Idah, Gbobe, Bonny, and Lokoja. In 1843 he was ordained in England, and he became a missionary to Sierra Leone and Yorubaland. He served again on the Niger expeditions of 1854 and 1857. These expeditions confirmed Crowther's belief that the successful evangelization of the interior of Africa must be by Africans and in the indigenous African languages. He was able to learn and evangelize in local Nigerian languages.

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Table 1 Lexical comparison between Cuban Spanish and the Spanish used in Spain

English	*Spain*	*Cuba*
to hurry	apresurarse	apurarse
ticket	billete	pasaje, boleto
pretty	bonito	lindo
cycling (adj)	ciclista (adjetivo)	ciclística (adjetivo)
thin	delgado	flaco
money	dinero	plata
to get mad	enfadarse	enojarse
to be mad	(estar) enfadado	(estar) bravo o guapo
to be late	tardarse	demorarse

Table 2 Lexical comparison between the Spanish used in the eastern and western regions of Cuba

English	*West*	*East*
wardrobe	escaparate	armario
bucket	cubo	balde
pig	cerdo	macho
sandal	chinela o sandalia	cutara
creole rice	moros y cristianos	congrí
zapote	mamey colorado	zapote
banana	platanito	guineo
rocking chair	sillón	balance
faucet	pila	pluma
fried green plantain	chatino	tostón
grocery store	bodega	tienda

- convex Predorsalalveolardental realization of [s];
- omissions and aspirations of [-s] at the end of words;
- changes of [r] by [l], of [l] by [r], and occasionally, the vowelization of these phonemes;
- seseo (substitution in the speech of phoneme /θ/ by phoneme /σ/; example: *feliz* by *felis*, happy) and yeismo (substitution in the speech of phoneme /λ/ by phoneme /j/; example: ***lluvia*** by ***yuvia***, rain), a phenomenon shared with the majority of the Latin American nations.

Cubans inherited these characteristics at the phonic level of Spanish.

Regarding intonation, Cuba is different from other Spanish-speaking countries such as Mexico and Argentina, but there are similarities with the Dominican Republic, Venezuela, and other countries of the Caribbean.

Due to historical and cultural reasons, remnants of the Arawak language can be traced in Cuba's current lexicon. Words such as *canoa, batata, bohío, cabuya, cacique, ceiba, hamaca, maíz, maní, sabana,* and *tabaco* originate in that language.

The languages spoken by the slaves brought from Africa by the colonizers also have had an influence in the Spanish that is spoken today.

Cubans use words such as *conga, ampanga, macuto, quimbombó*, etc. that are borrowings from African languages. Other words related to Afro Cuban religions, such as the names of deities, *Babalú Ayé, Oshún, Obbatalá, Oggún*, and many others are in vast use by the people of the island.

Another aspect to be considered is the preference in the Cuban lexicon of some synonyms of words used in Spain (Table 1).

There are some lexical variants within the island itself, which have traditionally differentiated the speakers from the Eastern provinces (Santiago de Cuba and Guantanamo) from those of the West (which includes Havana, the capital) (Table 2).

Cuba is a country with an outstanding linguistic unity that corresponds to the island's political, economic, and sociocultural interests. Education, the media, and cultural development of the Cuban people make possible the presence of Spanish as one of the primary elements of the island's identity.

Acknowledgments

This article was translated by J Ruiz Miyares.

See also: Dominican Republic: Language Situation; Venezuela: Language Situation.

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Culioli, Antoine (b. 1924)

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Antoine Culioli (born 1924), a French linguist, is known mainly for developing an original theory of semantics that he calls the 'theory of *énonciative* operations.'

He was born in Marseille, France, to a Corsican family, and studied there and in Lyon until his admission to *Ecole Normale Supérieure* in 1944. After majoring in classical studies (Latin and Greek), he specialized in English and obtained his *Agrégation* in English in 1948. He taught at the Sorbonne (Paris), beginning in 1949, and was elected as Assistant Professor in Nancy in 1954. There, he founded the English Philology Section and General Linguistics Teaching. In 1960, he defended a thesis on Transformation of the modal system in medieval English: The disappearance of the subjunctive, and Dryden, translator of Chaucer and Boccace (as a secondary thesis). In 1961, he returned to the Sorbonne, where he taught English linguistics, and in 1970, he co-founded, with natural scientists and physicians, the new pluridisciplinary University of Paris VII. He was, until 1992, the head of the Department of English and American Studies, which he had created. In the meantime, he started, at *Ecole Normale Supérieure*, a seminar on Formal Linguistics that is still active, despite his retirement from the University in 1992. During his career, he received multiple academic and national distinctions. During the 1970s, he was highly concerned by issues about reforming studies and examinations both at the University and at the school system for elementary/secondary students throughout France. He is well known mainly for his oral teaching and his many foreign students who apply his theory to their own languages, such as Japanese, Chinese, Arabic, several African languages, Russian, and Basque. His lectures and articles were only recently published as books.

His theory's axis is, in his own words, as follows: "Language activity apprehended through the diversity of languages and texts"; by texts, he means spoken as well as written phrases in everyday language. Through a vast empirical research in many languages, he aims at unveiling invariance in what he calls 'epilinguistic operations,' that is, mental operations considered to be indiscernible from the various realizations in languages; for this reason, he is at the same time close to cognitivism and quite different in his refusal to separate mental and language activities. The scope of the theory includes three levels: the first, which is unconscious and never directly accessible, is the setting of hypotheses on operations (the epilinguistic level); the second is the locus of empirical observations and transformations (the linguistic level); and the third is in an attempt at schematization (the metalinguistic level). This specific level is elaborated by a special terminology of his own, using for a great part everyday language (for instance, *frontiers, bifurcation,* and *markers*). The core of the theory is an attempt to link the three levels dynamically. He understandably holds a truly important and original position in the French linguistics field.

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http://www.sil.org/linguistics/glossary-fe – French/English Glossary of English Terms.

Cultural and Social Dimension of Spoken Discourse

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'Spoken discourse' is a fancy name for the sort of language we live with in the course of ordinary life, the source from which we all acquire not only language itself but, indeed, major aspects of our social and cultural worlds. It is largely through spoken interaction with others that we learn not only what sorts of social identities there are, and how to recognize them, but in fact how to construct and present ourselves as persons. Insofar as most meaningful social action is accomplished in large part discursively, it is also through speech that we carry out much of the business of our lives.

Within linguistics, the study of discourse is frequently distinguished from other structural inquiries simply by the size and scope of the units of analysis. When one looks at linguistic entities larger than sentences, takes into consideration the organization of textual fragments, or begins to encompass turns at talk across different speakers, tools that were useful in analyzing sounds, words and their parts, or clauses become insufficient. It is in the choice of larger bodies of language, too, that the communicative traditions of specific social and cultural communities become immediately and unavoidably relevant. For what warrants selecting some particular fragment of speech as a unit in the first place? What gives it coherence and separates it from other surrounding talk?

Cultural considerations are always at work in such judgments. What makes a stretch of talk into a complete 'conversation' or 'mathematics lesson' or 'curing ceremony' or 'farewell'? Local criteria for what constitutes 'talk' in the first place can vary widely. From the beginning of anthropological attention to speech, theorists have grappled with differing notions of what is *real* talk – often highly specialized genres like prayer ('talk with God'), or denunciation and declamation in ritual or highly public settings – versus what is simply 'small talk' (gossip, a casual conversation, a greeting on the path), or not even 'talk' at all (perhaps a gesture, the babbling of an infant, the calls of animals, or the voice of the wind – for some communities real communication, if by nonhuman interactants, whereas for others even true discourse with intentional, albeit not volitional, participants).

Equally variable, then, are the sorts of participants spoken discourse admits. Discourse requires interlocutors, and these come in different flavors, not all equally endowed with voices or privileges to use them. (In some communicative traditions, 'children are to be seen and not heard'; in others, wisdom comes 'out of the mouths of babes.') Different genders, castes, classes, ages, and ethnic identities may be differentially voiced or devoiced, and the resulting discourses will be differentially marked by what have been called 'participation frames': matrices of interlocutors, with different sorts of rights and obligations for speaking, differential access to the speech of others, and different sorts of statuses – whether recognized, ratified, authoritative, or the reverse – and stances (authoritative, indifferent, oppositional, etc.) in relation to the resulting talk.

The provenance of every piece of discourse is thus some social occasion for talk, and the textual sediment of the discourse will therefore always carry traces of its sociocultural (and political and historical) origins: why people had the linguistic interchange, and what happened (to them, between them, for them) when they did. An incidental but important consequence for research on spoken discourse is thus ethical: the identities and purposes of interlocutors may require careful treatment in any empirical description or analysis, since unlike canonical sentences, rarely are discursive fragments generated in the (relatively) neutral social and political climate of elicitation or introspection.

The social character of spoken discourse is also clear in the texture of speech itself. (Aspects of the spoken medium, incidentally, have analogues in other linguistic modalities, such as sign, a topic beyond the scope of this article.) By definition we think of the medium as verbalization – spoken words – but other sorts of signals are routinely involved. Spoken discourse routinely includes vocal sounds other than phonation, voice qualities, nonspeech vocalizations (e.g., sighs, laughs, grunts), and other noises, which may have local and partly conventionalized import (a finger snap, a clap, a stomp, a slap, even a slammed door, a tapping pencil, or a spoon on a glass). Moreover, gestures and in general motions and attitudes of the body – themselves subject to cultural shaping (think of a nod, a bow, a wink, or a shrug) and to ideological shading ('it's not polite to point') – may form a central part of interaction, coordinating the

discourse itself or complementing other signaling modalities. The popular idea that one can tell where people are from or who they are by watching them interact – whether true or not – confirms how folk linguistics understands that discursive *styles* are cultural products.

Discourse is intrinsically four-dimensional, unfolding in both space and time in a way that defies the often linear idealizations of linguistic analysis at the clause level. Discourse is also typically both polyphonic and polyvocal, combining multiple voices sometimes simultaneously and sometimes in orchestrated and partially overlapping sequences. Both aspects of spoken discourse are complicated by the sociocultural matrix in which it is produced.

Because it always unfolds in space and typically involves multiple participants, discourse can be structured in part by how interactants are arranged: how they stand or sit with respect to one another, how they are distributed in the physical environment, how they orient themselves to one another, and what sort of access (visual and aural, if not tactile and olfactory as well) they have both to other interactants and to other entities in the surrounding environment. Cultural structuring of space is thus the fundamental grounding of the resulting talk.

More insistent still is temporal structure in discourse, which always emerges as sequences of smaller linguistic units. When there are multiple interlocutors, units can overlap, be truncated, or abort prematurely. Sequences can stop and restart or can embed themselves within one another. There can be gaps, long or short. Generally time is the platform for speech, so that interlocutors can play with rhythm, synchrony, and asynchrony. Differences in temporal styles, then, can also emerge, distinguishing cultures, event or activity types, and individuals, often with value judgments and cultural stereotypes attached ('fast talkers' do not simply talk fast).

The four-dimensionality of spoken discourse merges most directly with its sociocultural underpinnings in the turn-taking system. Because there can be competition for discursive resources – the 'floor' (or its avoidance, through reticence or silence); the topic, the story line, or the punch line; authority and responsibility (and their ducking or shirking) – speaking is always a matter of politics, though the power involved may be microscopic and subtle. Who gets turns, who takes turns, and who is denied turns – and how these turns are shaped – are thus always matters of social import. Society also defines who (and what) can be addressed, who can hear, and who must not. Accordingly, there are miniature social and political structures implicit in different systems of turn allocation (contrast a courtroom or a barroom with a classroom or a locker room).

Structures of participation in spoken discourse have a further sociopolitical dimension, in that interlocutors never interact in a biographical vacuum. Their identities and personal histories, to a greater or lesser extent, public and shared between interactants, shape their talk as well as talk directed to them or around them. Some discourse theory concentrates on the mutual building of 'common ground,' or shared knowledge, between interactants in talk, but discourse begins with most shared belief already in place, legislated by prior experience (centrally including prior discourse). The sometimes covert sociopolitical structure also gives rise to 'recipient design': the fact, noted long ago by Bakhtin, that discursive 'moves' – turns at talk – are specifically tailored, in the moment, both to the purposes at hand and to the specific social personae present. Not only 'semantic' content but everything from syntax and lexicon to accent and eye gaze is part of the 'design' of talk in relation to its socially constituted targets.

There are processing consequences of the sociocultural embedding of discourse, also a product of temporality overlain by participation structures. For some theorists (Clark (1996), for example), the hallmark of talk is that it is a prototypical joint and collaborative activity that requires coordination of various kinds between interlocutors. It cannot be done alone, and to talk at all requires participants to find ways to coordinate, often without knowing exactly what is going to happen next. Both cognitive skills – the ability to infer meaning and intention, for example – and cultural routines (various 'scripts' that allow cultural experts to anticipate what will or should come next) may be involved in producing such coordination. Nonetheless, a hallmark of spoken discourse is that it is ordinarily neither preplanned nor (except in limited ways) editable, and thus it requires interlocutors to stay on their communicative toes. It is perhaps the extemporaneous quality of much spoken discourse that makes it, in Bakhtin's (1986) terms, a primary genre, a source of raw material that other sorts of language draw upon.

Spoken discourse is usually also employed for other cultural purposes: it is part of activity. Since multiple

things can be happening within a single turn (Goodwin, 1981), 'parsing' discourse is not strictly a structural matter but rather requires both interlocutors and analysts to calibrate a wider context of activity and participation with the specific internal dynamics of an utterance. Such parsing is 'online' – immediate to the context and concurrent with anything else that may be going on – so that the indexical links between whatever is happening and forms of talk (the ways that speech indicates what is happening and that action partly determines the accompanying talk) are constantly in a process of revision and update. Discursive interlocutors can start off 'doing' one thing and end up accomplishing another, with multiple other 'speech acts' flitting in between.

The fact that spoken discourse ordinarily takes place 'face-to-face' also has social consequences. Some of these stem simply from the physical presence of interactants, equipped with all their bodily trappings and sensibilities. For example, physical copresence means that corporal expressions of a cultural milieu are immediately available for discursive exploitation and incorporation. Smell and touch can be invoked as much as sound or sight, and the orientation and disposition of bodies in interaction is usually significant for discourse, signaling aspects of participation (or exclusion) and commitment to the discursive task at hand, and is sometimes itself socially regimented (the seating arrangements at a *fono*, or a dinner table). Copresence means, too, that the *absence* or withholding of explicit signals may also be communicative; silence may do social work within conversation, as can avoidance of eye contact and physical distance and withdrawal.

Similarly, speech occurs in a wider physical environment, mapped and rendered significant by cultural treatment. (Recall Goffman's (1981) example of the outrageous hat that served as direct referent to the anaphoric 'it' in 'I don't like it.') Not only may physical objects have cultural significance for discourse to feed on (the colored and significantly textured patches of ground in an archeology dig, for example), but so may the environment be populated with otherwise invisible 'cultural entities' (the space where a historical figure's house once stood, for example, serving as an invisible mnemonic sign for the person himself).

Finally, consider the cultural wrappings around both the digital and analogue signaling channels in spoken discourse. Words and morphemes in the stream of speech are of course subject to the familiar sociocultural and historical fashioning that produces any linguistic code. Additionally, culturally specific emblems – gestural holophrases – conventionally complement or substitute for speech, and these clearly differ from one speech tradition to the next. (Think of the different significance across the world of gestures with different raised fingers, for example.) Conventions of form as well as meaning apply (a 'thumbs up' gesture is not the same with any other finger or with the thumb placed slightly at an angle). Beyond the hands, there are nods, shrugs, and a variety of other conventionalized bodily signs that punctuate and modulate the ordinary linguistic channel.

However, many analogue signaling devices characterize spoken discourse, and these, too, may be subject to cultural shaping.

Discourse depends – minimally for successful reference – on indexical links between discursive elements and contextual entities. *Pointing* is a device for indexically picking out a referent in the neighborhood (variously scaled and constructed) of interlocutors, and similar semiotic processes are involved in what Clark (2003) called *placing* – manipulating or moving entities in the environment as a way of incorporating something into discourse. Cultural convention often conditions how one is to point; e.g., in many Australian languages (and probably elsewhere), referents – even imaginary ones – are carefully located in space with respect to cardinal directions or other cultural standards. Analogue indexical devices are also typically ideologically charged. There may be socially polite and impolite ways to point or to handle things – for example, to pass them from one person to another. Speech that involves such gestures inherits properties from its component communicative acts. It also draws upon cultural conventions when, for example, the formation of 'iconic' gestures draws on local standards of 'similarity.'

A further analogue signaling device prominent in spoken discourse is gaze. Where interlocutors look can show both a speaker's bid for an addressee's attention and the other's acquiescence, although here, too, cultural factors may alter both expectations (as when people 'avert their eyes' or 'cannot meet your gaze'). Gaze can also be used to signal withdrawn or withheld attention. There are often accompanying ideologies (the admonition 'Don't stare!' or the detective's assessment of a 'shifty look.')

Facial expression more generally modulates the effects of speech: imagine an ironic smile accompanying

rebuke or insult, or an angry look on top of an overpolite request. In sign languages, indeed, the face is one of the major 'phonological' articulators. In the verbal medium, of course, the most obvious counterpart is the voice, the final analogue signaling device to be mentioned.

Some speech communities conventionalize affect and emotion with ways of using the voice, and local theory may speak informally of, say, an 'angry voice' or relate a certain named voice quality ('whispered' or 'hoarse') to a particular communicative intent or to certain sorts of social identities ('falsetto' voice among Maya women, or 'question intonation' as a gender stereotype). The existence of such distinguishable speech symptoms also makes possible deliberate imitation or representation. 'Voicing' a protagonist by using his or her words and also his or her voice or bodily attitudes is the stock-in-trade of discursive virtuosi, among the most characteristic and versatile of cultural experts.

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Cultural, Colonialism and Gender Oriented Approaches to Translation

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The 1990s saw an expansion of research in the field of translation studies, with some of the most exciting work following what has come to be termed the 'cultural turn.' In their preface to a collection of essays published in 1990, dealing with the role played by history and by cultural issues in general in translation practice, Bassnett and Lefevere argued that any study of translation needs to take into account the double context of both source and target cultures. (Bassnett and Lefevere, 1990). An understanding of the translation norms operating at any given moment in time needs to be contextualized, since translation always takes place in a continuum, never in a vacuum.

In order to explain changes in modes of translation and the strategies employed by translators, it is necessary to consider when and where a translation takes place, for whom it is intended, and what the processes of textual production have been. Such investigation needs to be set within an overarching frame that examines the diversity of textual and extratextual power relationships that operate in different ways, in different places, and at different times. Such power relationships are culturally determined.

The cultural turn in translation studies mirrored similar tendencies in linguistics and in literary studies. However, it is also the case that cultural questions had

Cultural Evolution of Language

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Introduction

Language is a culturally transmitted system – children learn the language of their speech community on the basis of the linguistic behavior of that community. This cultural transmission can lead to the cultural evolution of the linguistic system, whereby language changes over time as a consequence of pressures acting on it during its cultural transmission.

Cultural evolution potentially offers an explanation for the **origins** of a linguistic system with the design features and functionality of human language, as well as an explanation for the subsequent **change** of such systems – the processes that explain the ways in which languages change on a historical timescale can also explain how languages themselves emerged.

Furthermore, the fact that languages themselves can evolve has implications for linguistic theories more generally. One goal for linguistic theory is to achieve **explanatory adequacy** (Chomsky, 1965) – an explanation of how language is acquired on the basis of linguistic data. This goal for linguistic theory explicitly links features of language with components of an innate capacity for language. However, the evolutionary dynamics arising from cultural transmission mean that we cannot infer the characteristics of the language faculty directly from a single episode of language acquisition, but must consider how any innate language faculty will interact with cultural transmission to shape languages over cultural time.

I begin by explaining exactly what is meant when we say that language is culturally transmitted and that this cultural transmission leads to cultural evolution and then I discuss what kinds of linguistic phenomena can be explained in these terms. I then go on to consider three theories of the cultural evolution of language, each of which proposes rather different mechanisms for cultural evolution. Note that this is not an exhaustive list of all possible mechanisms – rather, these three theories offer a contrasting range of accounts for the evolution of linguistic structure. Finally, I consider the ways in which cultural evolution has significance for the wider linguistic community. Although such evolutionary processes have obvious implications for our understanding of language origins and language change, their impact potentially runs deeper, to goals that lie at the heart of classic synchronic linguistics.

Cultural Transmission and Cultural Evolution

Children learn language from examples of language use, often called the Primary Linguistic Data (PLD). The PLD must be the linguistic behavior of other language users, as children acquire the language of their linguistic community. This linguistic behavior is a consequence of the internalized linguistic knowledge of these other individuals, and the PLD therefore reflects the linguistic knowledge of the individuals in a child's speech community. These individuals have grammars that define their knowledge of language and that knowledge of language guides their linguistic behavior. The child is therefore attempting to acquire a system of linguistic knowledge, a grammar, based on data that are the consequence of the linguistic knowledge, or grammars, of other individuals. Andersen summarizes this relationship between linguistic data and mental grammar as follows: "the verbal output of any speaker is determined by the grammar he has internalized . . . any speaker's internalized grammar is determined by the verbal output from which it has been inferred" (1973: 767).

Language therefore matches the sorts of general definition of culturally transmitted systems given by anthropologists or evolutionary theorists concerned with culture (e.g., Boyd and Richerson, 1985). Language, like other cultural systems, is transmitted from generation to generation via a process of learning from the behavior of others.

What are the basic steps in this transmission of language? Obviously, internalized knowledge of language (a mental grammar) is not directly physically transferred from individual to individual. Rather, language is transmitted via a more indirect route – following Andersen (1973), Hurford (1990), and Kirby (2002), Hurford explains that "a language persists historically through successive instantiations in two quite different media: (1) mental grammars of individuals, and (2) public behavior in the form of utterances" (Hurford, 2002: 302). Hurford dubs this the '**expression/induction**' cycle. Language is transmitted via expression (application of internal knowledge to produce observable behavior) and induction (acquisition/learning of a mental grammar based on some observed set of behavior).

The cultural transmission of language, based on its repeated transformation from grammar to data to grammar and so on, leads to the possibility of **cultural evolution**. Cultural evolution, in the broadest possible terms, is change in a culturally transmitted system

over time. The cultural evolution of language, then, is change in a linguistic system over time as a consequence of its cultural transmission.

What determines the way in which a culturally transmitted system, such as language, will evolve? I briefly outline below some mechanisms that drive cultural evolution. However, before doing so, it is worth considering how far such an account can take us.

One obvious goal would be to explain language change on a historical timescale – language change is manifestly a consequence of the cultural transmission of language. One theory to be discussed below (Croft, 2000) takes this as a primary goal. But how far back in time must we go before cultural transmission and evolution stop being relevant? 100 years? 1000 years? 100 000 years? As long as language has been culturally transmitted, cultural processes and cultural evolution will have been at work. Consequently, theories of the cultural evolution of language are increasingly regarded as useful tools for explaining the **origins** of aspects of linguistic structure.

The appeal of taking the process of cultural evolution to its logical explanatory limits is that it potentially offers a single, unified mechanism or set of mechanisms that can explain the origins of linguistic systems and also their subsequent change. In other words, cultural transmission potentially offers a uniform mechanism that explains both the genesis of language (a qualitative shift from a nonlinguistic system to a linguistic system) and language change (subsequent quantitative shift), at whatever temporal granularity is required. Of course, this is not to deny that biological evolution plays a role in explaining the origins of language – even if we subscribe to the strongest cultural account, we must still explain the emergence of the capacity for a culturally transmitted system of communication. Indeed, there may have been significant interactions between biological and cultural evolution during this process (see, e.g., Deacon, 1997).

Mechanisms for Cultural Evolution

What causes a linguistic system to change over time? There are several possible mechanisms for the cultural evolution of language. I outline three prominent theories that tackle this question in rather different ways and offer a range of possible answers. Briefly, the three mechanisms proposed to drive the cultural evolution of language are as follows: (1) cultural transmission itself; (2) language use; and (3) ultimate function for reproduction.

Cultural Evolution as a Consequence of Cultural Transmission

The very fact of cultural transmission can drive the cultural evolution of language. This theory as outlined here is based on ideas presented and developed by Simon Kirby, Jim Hurford, Morten Christiansen, and Terry Deacon (see, e.g., Christiansen and Devlin, 1997; Christiansen and Ellefson, 2002; Deacon, 1997; Hurford, 2002; Kirby, 2001, 2002). For convenience, I refer to these theories as **transmission theories**.

In order for a language to survive over repeated episodes of cultural transmission, it must be possible for language learners to learn that language from the PLD, and so languages must be **learnable**. The key insight of transmission theories is that this learnability constraint introduces an evolutionary pressure that results in languages themselves changing over time so as to become more learnable. Transmission theories therefore emphasize the fact that language itself adapts to its medium of transmission.

I summarize two ways in which the learnability of linguistic systems can vary: due to their generalizability from a finite set of data (**bottlenecked transmission**) and due to learnability considerations arising from the biases of language learners (**biased transmission**).

Language Evolution as a Consequence of the Data Bottleneck If a linguistic system is to persist over cultural time, it must pass through the cycle from data to grammar to data multiple times. One consequence of this passage through the medium of linguistic data is that language must be learnable from a finite set of data produced under real-world conditions.

Languages are capable of expressing an infinite range of concepts, and any member of this infinite array of expressions is interpretable in turn. Acquiring a language therefore entails the acquisition of a system for producing and understanding such an infinite set of meaningful utterances. However, the system for generating this infinite set of utterances must be acquired from a finite set of data – it is necessarily true that language learners do not see all the sentences of a language during the language learning process, because this would take an infinite amount of time. This data **bottleneck** is one aspect of the **poverty of the stimulus problem**, which is typically advanced as an argument suggesting that linguistic structure must be largely prespecified in language learners.

Simon Kirby and colleagues (see, e.g., Kirby *et al.*, 2004 for references) have argued that this data bottleneck introduces a pressure for recursively compositional linguistic structure. In other words, two significant **design features** of language (recursion

and compositionality) can be explained as a consequence of the cultural transmission of language and its subsequent cultural evolution. Bottlenecked transmission theories therefore provide a causal link between a feature of language's cultural transmission (the data bottleneck) and universal properties of linguistic systems.

Kirby argues that the data bottleneck results in pressure for certain types of linguistic structure: "This learning bottleneck leads inevitably to the emergence of a language in which structure is preserved in the mapping between semantics and strings" (Kirby, 2002: 199). Structure-preserving mappings, ubiquitous in language, are manifested in compositional syntax and regular morphology. These systems are structure-preserving in that similar signals (either syntactically or morphologically structured) convey similar (once again, structured) meanings – structure in semantic space is reflected in the structure of signals, as a consequence of the regular and compositional process of forming complex signals.

The distinctive feature of regular and compositional morphosyntactic systems is that they are **generalizable**: Individual structured meaning–signal associations in a compositional system can be generalized from other meaning–signal associations generated by that system, by virtue of identifying the relevant generalizations. Consequently, a regular and compositional system can be stable over multiple generations of cultural transmission even if language learners do not observe the full set of possible meaning–signal associations in the data they learn from. This is, of course, the situation that language learners face – they are attempting to acquire a system that is capable of producing an infinite set of meaning–signal associations on the basis of a finite set of examples.

In contrast, noncompositional or irregular systems are not generalizable. By definition, the signal associated with a particular meaning in such a system is arbitrary in terms of structure preservation, and there is no compositional or regular relationship between elements of meaning and components of signal. Language learners must observe these idiosyncratic, unstructured associations in order for these associations to survive. Given the data bottleneck, this cannot be the case for all meaning–signal associations produced by a noncompositional system. Consequently, noncompositional systems are unstable over cultural time.

The data bottleneck implicit in cultural transmission therefore introduces a pressure for generalizability. Linguistic systems (or subparts of linguistic systems) that are highly generalizable, such as recursively compositional syntax or regular morphology, will be more likely to survive cultural transmission intact than systems that are not generalizable. Languages themselves will evolve over cultural time to be more and more structured and more and more generalizable, as a consequence of the pressure introduced by the data bottleneck. Regular morphology and recursive compositionality therefore represent adaptations by language in response to its cultural transmission.

This theory provides a cultural explanation for these basic design features of language. However, instances of irregularity and noncompositionality are not uncommon in language. Morphological paradigms exhibit some irregularity. Idioms are an obvious example of noncompositionality. More generally, it has been argued that certain social functions of language are encoded and expressed in a noncompositional way, as holistic associations between complex meanings and unanalyzed signals (Wray, 2002). Bottlenecked transmission theories also offer an explanation for such **deviations** from the general properties of regularity and compositionality.

It was assumed above that all meanings that language users wish to express are equally frequent. This is not the case – some concepts presumably need to be expressed more frequently than others. The signals associated with frequently expressed concepts will reliably occur in the data that language learners are exposed to, even in the presence of a data bottleneck, due to their frequency. Consequently, these associations are under little pressure to be part of a regular or compositional system. In contrast, infrequently expressed meanings are unlikely to make it into the PLD and are therefore under increased pressure to be expressed compositionally – the only way such meaning–signal associations can survive repeated episodes of cultural transmission is if they are capable of being generalized.

This frequency–irregularity prediction inherent in bottlenecked transmission theories matches the linguistic data. To take a specific example, the 10 most frequently used verbs in English have irregular past-tense forms. In morphological systems more generally, frequent forms tend to be irregular. Larger holistic units (e.g., idioms) also seem to occur frequently (Wray, 2002). This relationship between frequency and irregularity naturally falls out of the bottlenecked transmission account.

Language Evolution as a Consequence of Learning Bias Bottlenecked transmission theories link learnability to properties of the data available to language learners. Biased transmission theories focus on another aspect of the learnability problem: fit to the **biases** of language learners. Language learners must have some strategy for learning a language. If all aspects of linguistic structure are not equal under this

learning strategy – if some particular grammatical construction, or morphological paradigm, or configuration of lexical items, or phonological system, is more difficult to acquire than an alternative – then we should expect to see such constructions disappear from the linguistic system over time. As Deacon puts it, "[l]anguage operations that can be learned quickly and easily by children will tend to get passed on to the next generation more effectively and intact than those that are difficult to learn. So, languages should change through history in ways that conform to children's expectations" (Deacon, 1997: 110).

Morten Christiansen and colleagues (see, e.g., Christiansen and Ellefson, 2002 for references) explain certain typological distributions in terms of cultural evolution driven by the biases of language learners. To give one example, languages with a consistent ordering of heads across phrasal categories (e.g., either consistently head-initial or consistently head-final) are more common than languages that are inconsistent with respect to head order. Christiansen and Devlin (1997) explain this crosslinguistic tendency as a cultural consequence of the biases of a general-purpose sequential learning device (modeled using an artificial neural network). They found that such learning devices make more errors when attempting to learn languages with inconsistent head ordering and, furthermore, the patterns of errors made by their general-purpose sequence learning device mirrored the distribution of languages in the world. Crucially, cultural evolution driven by learner bias explains this link – languages that are hard to learn (e.g., because of inconsistent head ordering) are rare, because they do not conform to the biases of language learners and are therefore less likely to persist through repeated episodes of cultural transmission than easy-to-learn languages.

Other work on biased transmission has focused on how learning biases with respect to transparency of the meaning–signal mapping might impact language over cultural time. The developmental linguistics literature suggests that child language learners have difficulty with synonymy and homonymy – children expect that a single object will not have several possible names (Markman, 1989) and that a single word will not have several possible meanings (Mazzocco, 1997). These amount to child biases in favor of transparency in the lexical system, where each distinct meaning maps to a single unique surface form. At the morphosyntactic level, Slobin has claimed that child language learners "strive to maintain a one-to-one mapping between underlying semantic structures and surface forms" (Slobin, 1977: 186). Slobin explicitly linked the degree of transparency in morphosyntactic systems with the ease or difficulty with which children will acquire such systems.

Kenny Smith (see, e.g., Smith, 2004) has shown that the cultural consequence of these biases will be the evolution of linguistic systems that exhibit maximal transparency – systems where the lexicon exhibits a perfect one-to-one correspondence between meanings and words, and the morphosyntactic component exhibits a perfectly compositional, regular system for expressing complex meanings, with a single unambiguous token in the surface form for each element of meaning. This process of cultural evolution can potentially explain certain diachronic phenomena, such as various kinds of leveling and simplification of morphological paradigms. These same mechanisms can also explain the **emergence** of such transparent linguistic systems from unorganized, nonfunctional systems of meaning–signal mappings. Transparent linguistic systems are obviously optimal for communication, in that they allow every possible meaning to be expressed unambiguously. However, it is important to emphasize that such systems can evolve culturally without any specific pressure for communication. Transparent systems are simply the most learnable kind, assuming that language learners have the types of biases suggested by the developmental literature outlined above.

To summarize, the basic evolutionary mechanism provided by transmission theories is adaptation of **language itself** to its medium of transmission. This leads to adaptations that are functional from the perspective of language. This is not to say that these adaptations cannot also be of use to language users, but this is a side effect of the cultural evolution of language, rather than a driving force for linguistic evolution.

Cultural Evolution as a Consequence of Language Use

The second theory of cultural evolution that I review here is that presented in Croft (2000), which represents an interesting synthesis of both functional and sociohistorical accounts of language change. Croft's main aim is to provide a unified set of mechanisms for explaining a variety of processes of language change, and the level of linguistic detail supporting his argument is impressive. Croft proposes two primary mechanisms for cultural evolution. First, language users will introduce innovations into the linguistic system during the process of communication. Second, social factors determine the differential cultural transmission of the competing linguistic variants that these innovations introduce.

Croft proposes several mechanisms for functional innovation – the introduction of new linguistic forms or structures into a language. The two main mechanisms are **form–function reanalysis**, where 'function' is roughly synonymous with 'meaning,' and **intraference**.

According to Croft's theory, form–function reanalysis occurs during language use. Language use involves attempting to communicate a particular meaning between a speaker and a hearer using a set of linguistic conventions that relate form and meaning. However, the meaning behind an utterance is necessarily fuzzy, as is the system linking meaning and form – interlocutors have no way of perfectly identifying the communicative intentions of their partners, or of gaining direct access to the meaning–form mappings employed. Instead, both meaning and the system of meaning–form mappings must be inferred during use. This error-prone process of inference allows innovations to emerge in the linguistic system – an utterance that embodies a particular structured mapping between meaning and form for one interlocutor may be interpreted by another as encoding a somewhat different meaning and/or a different form–meaning mapping. Croft listed several types of form–function reanalysis that can occur due to this process of inference of meaning during language use. I focus here on **hypoanalysis** and **hyperanalysis**.

Hypoanalysis occurs when a particular element of meaning that is conventionally given by context – either the context in which the form is used or the linguistic context provided by other parts of an utterance – is reinterpreted by the speaker as being associated with a particular linguistic form. For example, the speaker may use form *F* in a context that provides meaning *M*. The hearer instead interprets *M* as being conveyed by form *F* and, for the hearer, form *F* acquires additional semantic content.

This process of hypoanalysis can be illustrated with respect to the umlaut change in Germanic languages. In Pre-Old English, plurality could be expressed using an -[i] suffix (e.g., singular [go:s] corresponding to Modern English 'goose', plural [go:si]). Anticipatory assimilation subsequently resulted in fronting of the stem vowel in the plural as a result of the -[i] suffix (e.g., singular [go:s], plural [gø:si]). In early Old English, the -[i] suffix was lost by a further phonological change, leaving, e.g., singular [go:s], plural [gø:s]. Under these circumstances, the alteration between back [o:] and fronted [ø:] acquires semantic content via hypoanalysis – the fronted version of the vowel now conveys plurality, as is the case in Modern English 'geese.'

The opposite of hypoanalysis is hyperanalysis. Hyperanalysis occurs when a particular element of meaning that is conventionally associated with a particular form is reinterpreted by a hearer as being provided by context (physical or linguistic). In other words, the speaker uses some form *F* to express a particular meaning *M*, but the hearer reinterprets the form–meaning mapping in such a way that *M* is provided somewhere else – say, in another part of the utterance. Consequently, the form *F* becomes semantically bleached – for the hearer, form *F* does not convey the meaning *M*.

In addition to outlining several other subtypes of form–function analysis, Croft suggests that processes such as grammaticalization (which is often described as depending on context-induced reinterpretation) can be subsumed under these general processes of form–function reanalysis.

What consequences will hypoanalysis and hyperanalysis have for a language? Croft suggests that the repeated application of these two types of reanalysis will result in the emergence of syntagmatic isomorphism – a one-to-one correspondence between elements of meaning and elements of form within each particular utterance. Forms that are associated with little semantic content will become increasingly bleached (via hyperanalysis) and will be eliminated or will acquire a specific semantic function (via hypoanalysis), resulting in semantic 'load' being spread out among the elements of an utterance. Biased transmission and form–function reanalysis therefore offer alternative explanations for linguistic transparency.

In principle, were hyperanalysis and hypoanalysis the only forces at play, we could imagine a linguistic system with a transparent but idiosyncratic meaning–form mapping for every distinct meaning–form pair. Croft introduces a further mechanism, **intraference**, which operates paradigmatically, across different individual structured form–meaning mappings. Intraference is driven by overlap in meaning or function – different linguistic forms may convey the same meaning, and language users may identify this semantic overlap. This allows overlapping forms to be used in innovative ways, as alternative ways of conveying the common meaning. For example, German underwent a similar umlaut change to English. Though the fronted-vowel means of expressing plurality in English never achieved high productivity, in Early New High German this means of expressing plurality was extended throughout large parts of the nominal system, via intraference (Croft, 2000: 128).

Intraference is essentially a mechanism for generalization – identification of the common meaning of two or more linguistic forms and subsequent use of either form to convey that meaning. Croft suggested that intraference is a mechanism for what is often called **analogical extension**, resulting in, for

example, regularization of morphological paradigms. Croft, in common with bottlenecked transmission theories, includes a caveat regarding frequency in his explanation of this regularization process. High-frequency meaning–form associations are less prone to intraference from other form–meaning mappings due to being "independently represented units in the mind. Frequent forms thus develop and maintain irregularities" (Croft, 2000: 149).

The mechanisms outlined above are Croft's mechanisms for **innovation** – introduction of new linguistic devices for fulfilling a particular communicative function. Croft also provides a mechanism for competition between alternative form–function mappings, which is essentially social. There is an established tradition in the sociolinguistic literature that accounts for the linguistic behavior of individuals in terms of prestige and covert prestige. In these terms, the choice of a particular linguistic form in preference to alternative forms constitutes an act of identity on the part of the speaker. In Croft's model, such acts of identification determine the cultural spread of particular (functionally motivated) systems of form–meaning mapping.

Can Croft's theory achieve the maximal possible explanatory reach – can it, in principle, explain both language change (its intended explicandum) and language origins? Croft's mechanism for the cultural transmission of linguistic variants is motivated by inherently arbitrary social considerations. However, Croft envisions a constant input of new, functional variants into the arbitrary, socially motivated process of propagation. This potentially provides a mechanism for the emergence and subsequent evolution of communicatively functional, grammaticalized linguistic systems.

Cultural Evolution as a Consequence of Reproductive Utility

A third mechanism for the cultural evolution of language is provided by Martin Nowak and colleagues (see Nowak and Komarova, 2001, for review). This is an instance of a more general theory of cultural evolution, sometimes called the "natural selection of cultural variations" (Boyd and Richerson, 1985), and is included here primarily as an example of a theory of cultural change that is heavily influenced by approaches adopted from evolutionary biology.

Nowak and colleagues, like Croft, see language as a means for communication. Languages, or elements of the linguistic system, are useful inasmuch as they further this goal. Whereas Croft envisages language changing as a consequence of reanalysis of form–meaning mappings during the continual negotiation for meaning inherent in communication, Nowak and colleagues see a much more direct link between language's function for communication and its cultural evolution.

The argument runs as follows: individuals in a population have different grammars, and different grammars vary in the communicative payoff that they offer an individual using that grammar (dependent, of course, on the proportion of the different grammars in the population). Successful communicators have disproportionate access to reproduction, and children acquire the grammar of their biological parent(s). Under these assumptions, those grammars that offer the highest communicative payoff increase in frequency in a population – grammars that maximize communicative (and therefore reproductive) success will be selected and will proliferate. This is essentially a process where cultural evolution closely mirrors biological evolution under natural selection – cultural evolution favors traits that lead to biological reproduction, because biological reproduction is the only route to cultural persistence.

Nowak *et al.* have used this general framework to look at the function-driven cultural evolution of vocabulary systems and to quantify how accurate language acquisition must be if a population is to converge on a shared grammar. In terms of broader application, their model of cultural evolution dovetails nicely with models of biological evolution to provide evolutionary explanations for the capacity for phonemic coding and compositionality. As such, it constitutes a useful and flexible tool for investigating a wide range of evolutionary questions about language, using established techniques from evolutionary biology.

The value of this theory is more questionable when we move beyond questions of language origins to consider the subsequent change in linguistic systems (although it should be emphasized this was not the primary explanatory goal of this theory). It is highly unlikely that the majority of attested language changes are driven by differential reproduction. The main problem with this biologically motivated theory of cultural evolution, then, is that it cannot (or should not) provide a uniform mechanism for thinking about the cultural origins and subsequent evolution of linguistic systems. This has been acknowledged by the proponents of this theory, who state that "Neutral [i.e., not reproductively driven] language dynamics provide an appropriate description for many language changes studied in historical linguistics" (Komarova and Nowak, 2003: 457).

Cultural Evolution and the Linguistic Enterprise

Theories of the cultural evolution of language interface at various points with other areas of linguistics. For example, such theories may be motivated by experimental evidence relating to children's language-learning biases, or by the rich range of data available on language change, or they might explain a particular typological distribution, or a characteristic design feature of language. These are all worthwhile links between theories dealing with the cultural evolution of language and other subfields of linguistic research and bode well for continuing integration of cultural ways of thinking into these fields.

As mentioned in the Introduction to this article, there is one further, more fundamental way in which an understanding of cultural evolution impacts on linguistic theory. Noam Chomsky, in his 1965 book *Aspects of the theory of syntax* and subsequent works, gives a set of criteria for evaluating the adequacy of a linguistic theory, the ultimate criterion being that linguistic theories should achieve **explanatory adequacy**. A linguistic theory achieves explanatory adequacy if it can account for how a language learner acquires a descriptively adequate grammar on the basis of exposure to linguistic data, where those linguistic data are of the sort that a language learner can expect to be exposed to.

Chomsky argues that such an explanatorily adequate theory must provide an account of children's innate linguistic knowledge, characterized informally as a 'language instinct' or more formally as "first, a linguistic theory that specifies the form of a possible human language, and second, a strategy for selecting a grammar of the appropriate form that is compatible with the primary linguistic data" (Chomsky, 1965: 25). As previously argued by, e.g., Hurford (1990), Kirby (2002), Kirby *et al.* (2004), and Brighton *et al.* (2005), the nature of these capacities cannot be considered in isolation of the dynamics of cultural transmission and cultural evolution.

First, cultural evolution resulting from the cultural transmission of language can act as an alternative mechanism that constrains the range of possible human languages. For example, the bottlenecked transmission account predicts that only highly regular and highly compositional systems will be possible human languages when viewed on any significant cultural timescale. Language learners may be capable of learning and representing systems of varying degrees of compositionality and as such these may constitute 'possible human languages' from the point of view of individual language learners. However, only highly regular, recursively compositional languages are culturally stable and therefore, ultimately, possible from the viewpoint of cultural evolution. To put it in cruder terms, we might be tempted to look at the linguistic systems of the world, recognize that all such linguistic systems are recursively compositional, and conclude that this recursive compositionality constitutes part of the learner's innate prespecification of a possible human language. The cultural account of this linguistic universal shows that this is not necessarily a valid conclusion to draw – the cultural transmission of language, and its concomitant evolution, offers another possible explanatory mechanism for this constraint on the possible forms of language. In more general terms, **any** cultural dynamic is likely to obscure the relationship between attested features of language and innate constraints, due to the fact that cultural evolution also acts to constrain the range of possible human languages. As such, the cultural transmission of language potentially plays a key role in the central goal of developing explanatorily adequate linguistic theories.

Second, taking cultural evolution seriously may also impact on the second foundation of Chomsky's explanatorily adequate theory, which requires that children be provided with a strategy for selecting a grammar of the appropriate form that is compatible with the linguistic data. The biased transmission theories of cultural evolution turn this issue on its head. Rather than the onus being on the child to identify a grammar consistent with the data, the onus is on **language itself** to ensure that it is identified by children from the data it produces. If a particular aspect of linguistic structure is routinely misidentified by language learners, it will not persist. Conversely, if language learners find it easy to identify a particular aspect of structure from data, they will themselves produce further examples of this structure, which will lead to the continued survival of that linguistic structure. Cultural evolution provides a mechanism by which languages can adapt so as to make themselves readily identifiable, rather than placing the burden of explanation on the child's innate knowledge of language.

A theory of language that does not reckon with these types of phenomena, arising from the cultural transmission of language, risks overestimating the burden placed on language learners and is consequently in danger of overemphasizing the role that innate linguistic knowledge must play in an explanatorily adequate linguistic theory.

See also: Design Features of Language; Formal Models and Language Acquisition; Formulaic Language; Levels of Adequacy, Observational, Descriptive, Explanatory;

Linguistic Universals, Chomskyan; Origin and Evolution of Language.

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Culture in Language Teaching

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Culture has always been an integral component of language teaching. Until World War II, culture used to be seen as the literate or humanities component of language study. After the war and following the communicative turn in language pedagogy, it became synonymous with the way of life and everyday behaviors of members of speech communities, bound together by common experiences, memories, and aspirations. These communities were seen as grounded in the nation – the national context in which a national language was spoken by a homogeneous national citizenry. In the last 10 years, this unitary conception of one language equaling one national culture has become problematic. National standard languages have come to be seen as arbitrary constructions of the 19th-century nation states as much as the social and political institutions that constitute national cultures. At a time of growing economic and political globalization, when cultural encounters are increasingly mediated by information technologies, whose and what culture(s) should we teach: national, regional, or global culture? Urban or rural culture? High brow or popular culture? Oral, written, or cyberculture? Gay culture? Marketing culture? And what disciplinary discourse should we

rebuke or insult, or an angry look on top of an overpolite request. In sign languages, indeed, the face is one of the major 'phonological' articulators. In the verbal medium, of course, the most obvious counterpart is the voice, the final analogue signaling device to be mentioned.

Some speech communities conventionalize affect and emotion with ways of using the voice, and local theory may speak informally of, say, an 'angry voice' or relate a certain named voice quality ('whispered' or 'hoarse') to a particular communicative intent or to certain sorts of social identities ('falsetto' voice among Maya women, or 'question intonation' as a gender stereotype). The existence of such distinguishable speech symptoms also makes possible deliberate imitation or representation. 'Voicing' a protagonist by using his or her words and also his or her voice or bodily attitudes is the stock-in-trade of discursive virtuosi, among the most characteristic and versatile of cultural experts.

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Cultural, Colonialism and Gender Oriented Approaches to Translation

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The 1990s saw an expansion of research in the field of translation studies, with some of the most exciting work following what has come to be termed the 'cultural turn.' In their preface to a collection of essays published in 1990, dealing with the role played by history and by cultural issues in general in translation practice, Bassnett and Lefevere argued that any study of translation needs to take into account the double context of both source and target cultures. (Bassnett and Lefevere, 1990). An understanding of the translation norms operating at any given moment in time needs to be contextualized, since translation always takes place in a continuum, never in a vacuum.

In order to explain changes in modes of translation and the strategies employed by translators, it is necessary to consider when and where a translation takes place, for whom it is intended, and what the processes of textual production have been. Such investigation needs to be set within an overarching frame that examines the diversity of textual and extratextual power relationships that operate in different ways, in different places, and at different times. Such power relationships are culturally determined.

The cultural turn in translation studies mirrored similar tendencies in linguistics and in literary studies. However, it is also the case that cultural questions had

long been central to the study of translation. The linguist J. C. Catford, writing in 1965, endeavored to distinguish between two types of untranslatability: the linguistic and the cultural (*see* **Approaches to Translation, Linguistic**). He maintained that linguistic untranslatability occurs when there is no lexical or syntactical substitute in the target language for a source language item. He then distinguished linguistic from cultural untranslatability, which occurs when there is nothing in the target language culture that corresponds to a situational feature in the source language culture.

Catford's attempt to distinguish between types of untranslatability, though the subject of much subsequent debate, reflects the translation research of its time, before the advent of translation studies as a distinctive field in its own right, which happened in the late 1970s and early 1980s. At the same time that Catford was formulating his linguistic theory of translation, Eugene Nida, whose translation theories derive from his expertise as a Bible translator, endeavored to systematize his translation practice by establishing what he called a 'science of translating' (Nida, 1964). Nida also distinguished between categories of untranslatability, formulating a theory of equivalence that roughly matches Catford's linguistic versus cultural dichotomy. Nida's formal equivalence focuses attention on the form and content of the message itself, while his dynamic equivalence is based on the principle of equivalent effect, in short on creating a relationship between message and receiver that should be equivalent in terms of what it does to the original relationship in the source language. Later, in the 1980s, a more sophisticated version of this approach, known as skopos theory, was elaborated by Hans Vermeer and Katharina Reiss (*see* **Functional Approaches to Translation: Skopos Theory**).

Nida was greatly influenced by the anthropological linguistics of Edward Sapir and Benjamin Lee Whorf. The Sapir-Whorf hypothesis posits a relativistic notion of human communication, stating that "no two languages are ever sufficiently similar to be considered as representing the same social reality." (Sapir, 1956:59). The relativist approach was very important in the early years of translation studies, when scholars such as Itamar Even-Zohar, James Holmes, Gideon Toury, and André Lefevere sought to approach the study of translation in an interdisciplinary manner, initially following the precepts of polysystems theory.

Polysystems theorists were principally concerned with literary translation, and their approach derived from a structuralism that had been inspired by the thinking of the Russian Formalists and Prague Linguistics Circle of a previous generation. Nevertheless, the polysystems approach to translation had cultural questions at its centre. As early as 1978, Even-Zohar was arguing that any model of a literary system must include translated literature, since the role played by translation in bringing innovation and change is of fundamental importance in most literatures. He endeavored to establish a model for the conditions under which cultures might translate more or fewer texts, suggesting that patterns of translation vary according to the needs of the target culture. The prevailing historical conditions determine the type and number of translations occurring at a given time.

Gideon Toury, Andrew Chesterman, and Theo Hermans are three scholars who have since developed the study of variations in norms governing translation activity, recognizing the significance of cultural factors.

Polysystems theory introduced a historical and ideological dimension into the study of translation. It was recognized that greater awareness of variations in translating can result from increased knowledge of the diversity of translation practices and the contexts in which translation has taken place at different moments in time. From the 1980s onward, there has been a huge increase in research into the history of translation in theory and practice, which has shed light on cultural variations in contemporary translations. A good example of the way in which translation studies has revisited earlier debates can be seen in the distinction between domestication and foreignization in translation practice. This dichotomy was identified and debated extensively by European translators in the 18th century and has acquired new resonance in the late 20th and early 21st centuries through postcolonial literary studies. The American scholar Lawrence Venuti distinguished between what he has called 'fluent' and 'foreignizing' translations, going so far as to advocate a theory and practice of translation that resists domestication as a means of foregrounding the important role played by the translator who has tended, in Western contexts, to be regarded as an invisible filter (Venuti, 1995).

Venuti's advocacy of a foreignizing strategy in translation has other implications. Eric Cheyfitz (Cheyfitz, 1991) has argued that translation can be viewed as the central act of European colonization and imperialism, a view shared by the Indian scholar, Tejaswini Niranjana (Niranjana, 1992). Many translation scholars around the world, notably

in India, Brazil, and Canada, have begun to investigate the history of translation from a postcolonial perspective, noting the unequal power relationships that prevailed for centuries as dominant cultures cherry-picked texts that would then be domesticated and made acceptable for home consumption. The most famous example of this kind of translation practice is Edward Fitzgerald's *The Rubaiyat of Omar Khayyam,* published in 1859.

Andre Lefevere linked the Sapir-Whorf hypothesis to contemporary sociological theory, notably the work of Pierre Bourdieu, by proposing the utilization of theories of cultural capital and of cultural grids in translation analysis. Lefevere notes that Western and non-Western cultural traditions are so diverse that translators have to engage in a process of cultural mapping, whereby non-Western cultures are constructed and located within Western categories. This strategy raises fundamental questions, not only about how meaning is manipulated and constructed, but also about the ethics of a translation practice that distorts the source it purports to be rendering accurately. (Lefevere, in Bassnett and Trivedi, 1999).

Ethical issues in translation came steadily into prominence through the1990s. As ideological aspects of translation practice were foregrounded from different perspectives, so the question of the transformation of otherness into an acceptable form for consumption by target language readers has been seen in new light. The Irish scholar Michael Cronin has written illuminatingly about the similarities between translation and travel writing, both forms that construct other cultures for a target specific audience. He uses the terminology of nomadism to explore the role of translators and interpreters in a world of ever-increasing mobility, where the relationship between the local and the global is unstable and transient. Cronin has also introduced the wider question of language politics into translation studies, through a discussion of minority languages and their increasingly precarious place in the global economy as English develops into an international lingua franca (Cronin, 2003).

Since the 1980s, translation scholarship has been particularly engaged with language politics, both in relation to bilingualism and multilingualism, and also in relation to gender. The Canadian writers Barbara Godard, Suzanne de Lotbiniere-Harwood, and Sherry Simon have all explored questions of translation and gender, both from a historical perspective and in terms of theorizing in-betweenness. Research into gender and translation has shown that translation tended for centuries to be seen as a lesser literary activity and was accordingly 'feminized' metaphorically, particularly in discussions of the importance of fidelity. Sherry Simon has pointed out that conventional views of translation for centuries contrasted an active, vigorous original text with a more passive, derivative, and subservient translation (Simon, 1996). More recently, Louise von Flotow, Rosemary Arrojo, and Vanamala Viswanatha have developed further lines of inquiry into the politics of gender and translation.

Underpinning all this thinking is a major shift in how translation is perceived. Once regarded as instrumental and as a textual activity taking place on the margins of literary and cultural systems, translation has come to be seen as a textual process of central importance. Through translation, societies acquire information and knowledge from beyond their own linguistic borders, and the impact of translated texts can be very powerful, both in shaping how other cultures are perceived and in directly influencing the target culture. Translation as a means of innovation is now well-documented. The expansion of research in translation studies in China in the 21st century, for example, is linked to the explosion of translation that has been taking place for some three decades, since China opened its borders to the rest of the world. As China reaches out to the West, so translations proliferate. Similarly, in India and in Brazil, where in different ways scholars and writers have engaged with the legacy of European colonialism, interesting new thinking about translation has emerged. In India, this is linked also to extensive translation practice within national boundaries, across Indian languages, which has the effect of raising the status of local languages in a multilingual society. Thinking about translation in Brazil has been strongly influenced by postmodernism, rather than by postcolonial theory, and perhaps the most important alternative perspective on the act of translating has been the Brazilian metaphor of translation as a form of cannibalism. This metaphor, which derives from the Brazilian anthropophagist movement of the 1920s, was related explicitly to translation by Haraldo de Campos in the 1980s, as he sought to reread Walter Benjamin's writings on translation from a specifically Brazilian perspective. Cannibalism, which combines nourishment with destruction, has become a way of talking about translation that avoids the discourse of faithfulness and binarism that has so dominated European thinking. The cannibalistic metaphor is one of the strongest alternatives to more traditional images of

translation as the subservient partner in a textual power relationship.

Cultural approaches to translation today are as diverse as the contexts from which they emerge. The common factor is a reevaluation of the role of translation in the transmission of knowledge across cultural boundaries and, in terms of approaches to the study of translation, a rapprochement with such disciplines as anthropology, sociology, ethnography, politics and international studies, and cultural studies. The cultural turn in translation studies means that the act of translation can be examined holistically, as a textual practice that is located in time and space and that has its own history. It would be far too simplistic to suggest that the cultural turn was a new phenomenon of the 1990s, since there was obviously a long tradition in the study and practice of translation that gave considerable weight to extratextual factors, but it is clear that what has happened in translation studies since the 1980s reflects similar parallel trends in other disciplines. To this extent, the cultural turn marks a shift in the study of translation that serves to raise the profile of translation and to underline its interdisciplinarity.

See also: Approaches to Translation, Linguistic; Functional Approaches to Translation: Skopos Theory.

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Culture in Language Teaching

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Culture has always been an integral component of language teaching. Until World War II, culture used to be seen as the literate or humanities component of language study. After the war and following the communicative turn in language pedagogy, it became synonymous with the way of life and everyday behaviors of members of speech communities, bound together by common experiences, memories, and aspirations. These communities were seen as grounded in the nation – the national context in which a national language was spoken by a homogeneous national citizenry. In the last 10 years, this unitary conception of one language equaling one national culture has become problematic. National standard languages have come to be seen as arbitrary constructions of the 19th-century nation states as much as the social and political institutions that constitute national cultures. At a time of growing economic and political globalization, when cultural encounters are increasingly mediated by information technologies, whose and what culture(s) should we teach: national, regional, or global culture? Urban or rural culture? High brow or popular culture? Oral, written, or cyberculture? Gay culture? Marketing culture? And what disciplinary discourse should we

draw upon to understand culture: cultural studies, anthropology, ethnography, sociology, education? To what extent is culture separable from power and ideology? The concept of culture has become in many respects politicized and embroiled in the controversies associated with the politics of ethnic identity, religious affiliation and moral values. Ethnic and regional cultures have been rallying points for the politics of identity and for ethnic claims by speakers of minority, heritage, regional, endangered languages. Religious affiliation has been turned into cultural affiliation, as in the controversy surrounding the headscarf for Muslim women in French public schools. And, given the sectarian meanings given to the term 'culture' in recent times, questions are being raised about the future of foreign language education in multicultural democracies.

When exploring these questions, various trends of thought become apparent, themselves manifestations of various cultures of nationalism or universalism that preexisted the advent of globalization and the Internet. I first survey how the cultural dimension of language study has been defined, taught, and researched for the teaching of English and other languages in the United States and Europe. I then review current interdisciplinary developments in the way culture is conceptualized and how it is now seen as integrating learners' historicities and subjectivities in language education.

The Cultural Dimensions of Language Study

There are roughly two different ways of looking at culture in language study, depending on one's disciplinary and political orientation, and on whose interests are being served: the modernist and the post-modernist perspectives. They both coexist today in the same language departments at the same universities.

The Modernist Perspective

In the pedagogic imagination of most language teachers around the world, the term 'culture' is associated with the context in which the language is lived and spoken by its native speakers, themselves seen as a more or less homogeneous national community with age-old institutions, customs, and way of life. Culture is seen either as a humanistic or as a sociolinguistic concept, with the concept of the intercultural, that characterizes the contact between people from different cultures, being of concern to researchers in communication studies and in education.

A Humanistic Concept As a humanistic concept, culture is the product of a canonical print literacy acquired in school; it is synonymous with a general knowledge of literature and the arts. Also called 'big C' culture, it is the hallmark of the cultivated middle-class. Because it has been instrumental in building the nation-state during the 19th century, 'big C' culture, as the national patrimony, has been promoted by the nation state and its institutions, e.g., schools and universities. It is the culture traditionally taught with standard national languages. Teaching about the history, the institutions, the literature and the arts of the target country embeds the target language in the reassuring continuity of a national community that gives it meaning and value. The fact that in the United States, foreign languages are still taught for the most part in departments of foreign language and literature, and the curriculum for foreign language majors still puts a heavy emphasis on the study of literature is a reminder that language study was originally subservient to the interests of philologists and literary scholars. In the 1980s, with the advent of communicative language teaching, the humanistic concept of culture gave way to a more pragmatic concept of culture as way of life. But the prestige of big C culture has remained, if only as *lieux de mémoire* in Internet chatrooms named, for example, *Versailles, Madison Avenue,* or *Piccadilly* – cultural icons of symbolic distinction.

A Sociolinguistic Concept With the focus now on communication and interaction in social contexts, the most relevant concept of culture since the 1980s has been that of 'little c' culture, also called 'small cultures' (Holliday, 1999) of everyday life. It includes the native speakers' ways of behaving, eating, talking, and dwelling, as well as their customs, beliefs, and values. Research in the 1980s was deeply interested in cross-cultural pragmatics and the sociolinguistic appropriateness of language use in its authentic cultural context. To study the way native speakers used their language for communicative purposes, the Herderian equation one language = one culture was maintained, and teachers were enjoined to teach rules of sociolinguistic use the same way they taught rules of grammatical usage (functional-notional syllabi of the 1970s), i.e., through modeling and role-playing. Even though it now related to the variety of native speakers' uses of language in everyday life, culture was seen as pretty monolithic, like the native speaker him/herself. Teaching culture has meant teaching the typical, sometimes stereotypical, behaviors, foods, celebrations, and customs of the dominant group or of that group of native speakers that is the most

salient or exotic to foreign eyes. Striking in this concept of culture is the maintenance of the focus on national characteristics and the lack of historical depth.

The sociolinguistic concept of culture takes on various forms depending on whether the language taught is a foreign, second, or heritage language. In foreign language (FL) classes taught outside of any direct contact with native speakers, culture is mostly of the practical, tourist kind with instructions on how to get things done in the target country. In second language (SL) classes taught in the target country or in native speaker run institutions abroad (e.g., British Council, Goethe Institut, Alliance Française), culture can also take the form of exposure to debates and issues of relevance to native speakers in the target country, or of discussions about living and working conditions for immigrants. In heritage language (HL) classes taught to native speakers who wish to connect with their ancestral roots, culture is the very *raison d'être* of language teaching. It is, not, however, without presenting major difficulties when the heritage community has either lost much of its original everyday culture (e.g., Native American languages, see Hinton, 1994), or when its speakers belong to a community that historically no longer exists (e.g., western Armenian or Yiddish). The teaching of culture in HL classes is very much linked to identity politics (Taylor, 1994).

Intercultural Education The term "intercultural" emerged in the 1980s in the fields of intercultural education and intercultural communication. Both are part of an effort to increase dialogue and cooperation among members of different national cultures within a common European Union or within a global economy (for a review, see Kramsch, 2001). Intercultural education as a component of a humanistic education is pursued with particular intensity in the Scandinavian countries (Hansen, 2004a, 2004b) and in Germany (for a review, see Königs, 2003).

In foreign language study, the concept of intercultural learning has emerged in recent years in Europe alongside the concept of communicative competence (Bausch *et al.*, 1994; Byram and Fleming, 1998; Zarate, 2004); it characterizes a form of language learning that is less focused on approximating a native speaker linguistic or pragmatic norm than it is based on the subjective experience of the language learner engaged in the process of becoming bi- or multilingual and struggling with another language, culture, and identity. The concept has been an object of controversy in Germany between discourse analysts (Edmondson and House, 1998) and educational linguists (Hu, 1999).

For Edmondson and House (1998), as for many researchers in pragmatics, conversation and discourse studies, entities like culture, power, and identity are constructed across turns-at-talk and in the minute-by-minute negotiation of face, stance, and footing. Since, in their view, communication is the *raison d'être* of language learning, language instruction should focus on the study of culture in discourse, i.e., the cross-cultural dimension of discourse pragmatics and the misunderstandings or successful understandings brought about by the discursive management of language itself. Language teachers should teach non-native speakers how to recognize and adopt the discursive behavior of the native speakers whose language they are learning, in order to find out ultimately how they think, what they value, and how they see the world. In short, foreign language instruction should focus on communicative competence and the cultural dimensions of discourse competence, not on intercultural competence.

Hu (1999) argues that the concept of culture as used by Edmondson and House is too restricted and essentialistic. To assume that 'German culture' speaks through the discourse of a speaker of standard German is an inappropriate assumption in our days of hybrid, changing, and conflicting cultures. For Hu, concepts like 'communication,' 'language,' and 'culture' cannot be taken at face value; their problems must be recognized. Hence the usefulness of the term 'intercultural,' which covers intra-as well as interlingual communication between people who don't share the same history, values, and worldviews. An intercultural pedagogy takes into account the students' culturally diverse representations, interpretations, expectations, memories, and identifications, that are, in turn, made thematic, brought into the open through personal narratives and multilingual writings, and discussed openly in class. Hu's perspective on culture, like that of many educators working with immigrants, is close to the post-modernist perspective discussed below.

The German debate surrounding the notion of intercultural is emblematic of the problematic role that culture plays in language teaching at a time when national and other collective cultures are more increasingly denationalized, de-territorialized, and hybridized. With the increased mobility of people and global markets, popular culture is shared by young people around the globe; with television and the Internet, attitudes and worldviews are no longer associated with geographical locations but interpenetrate one another in a myriad ways. Culture becomes a portable and variable concept, linked to historical stereotypes, personal memories and socialization patterns or *habitus* (Bourdieu, 1991), that are activated

by individual speakers in face-to-face interactions or internet communication and are always subject to change, depending on the interlocutor, the topic, and the circumstances. This more variable notion of culture is nowhere more apparent than in the teaching of English as a foreign or second language.

The Post-Modernist Perspective

In the teaching of English as the language of immigration, global employment, and global transactions, culture has taken on a radically different flavor than in traditional language teaching. Culture, in the territorial, hierarchical sense given by the modernist conception of the term, has been seen as a handicap to individual mobility, entrepreneurship, and change associated with the mastery of English as a second or international language. Culture in the teaching of English has therefore been re-signified as a post-modernist concept referring to 'Discourse,' identity, and power. This view of culture has influenced the teaching of other languages as well.

Culture as Discourse Drawing from post-modern theories of the multiple, conflictual, changing subject of our post-structuralist times and from the 'dialogic turn' in cultural theory, culture has become equated with what James Gee calls Discourse with a capital 'D,' i.e., "ways of using language, of thinking, feeling, believing, valuing, and of acting that can be used to identify oneself as a member of a socially meaningful group or 'social network'" (Gee, 1990: 143). Discourses, as identity kits, are inherently ideological, in the sense that they lead people to put forward certain ideas and values at the expense of others. Because they are the products of history, they are related to the distribution of social power and hierarchical structure in society. For example, the distribution of *tu* and *vous* in French everyday discourse reflects changes in social structure in various periods of French history. The *tu* of solidarity, that was common during the French revolution and the revolution of May 1968, became generalized among students, army comrades, and young adults in the democratic France of the 1970s and 1980s, but the hierarchical *vous* has recently surfaced again as a sign of distinction in the economically competitive France of the turn of the century.

This view of culture establishes a much closer link between language, thought, and culture than in the modernist conceptions (Kramsch, 2004). Culture as Discourse introduces the notion that every utterance is embedded in asymmetrical relations of power between communication partners, that culture in the form of language is embodied history, and that the meaning of this history is constantly renegotiated through language. For example, there have been various terms to denote those who oppose existing political regimes. The French who opposed German occupation during World War II were called 'resistants' by the French, 'saboteurs' by the Germans; the Iraqis who oppose the American occupation are called 'insurgents' by the Americans, 'guerillas' or 'martyrs' by the Iraqis; in Guatemala opposition to the regime was led by 'rebels' if you were on the side of the government, 'freedom fighters' if you were on the side of the opposition. The use of one or the other term said something about the political leanings of a newspaper and its readers. By placing culture squarely in Discourse, post-modernists have linked an individual's membership in a culture to his/her social and political identity.

Culture as Identity For Norton, identity signifies "how people understand their relationship to the world, how that relationship is constructed across time and space, and how people understand their possibilities for the future" (Norton, 1997: 410), which matches roughly Kramsch's definition of culture as "membership in a discourse community that shares a common social space and history, and common imaginings" (Kramsch, 1998: 10), but with the emphasis placed on the individual rather than on the collective. Shifting the emphasis from culture to identity in language teaching dissociates the individual learner from the collective history of the group; it gives people agency and a sense of power by placing their destiny in their own hands. For example, one of the immigrant women studied by Norton was able to draw strength from her identity as a mother to stand up to her landlord in front of her children and counter his image of her as a helpless non-native speaker of English from Czechoslovakia.

Atkinson echoes Norton as he reassesses the notion of culture in TESOL, which, he claims, has been underexamined up to now. In his post-modernist view of culture, he suggests that language (learning and teaching) and culture are mutually implicated, but that "culture is multiple and complex" (Atkinson, 1999: 647). He further posits that "social group membership and identity are multiple, contradictory, and dynamic" and that "all humans are individuals," but, he adds, "individuality is also cultural." Despite some dissenting voices, Atkinson's view of culture represents the dominant view of many teachers of English around the world, as well as TESOL's global and multinational ideology.

Ultimately, the lesser importance given to culture in the teaching of ESL than in other foreign languages might just be part of an ideology that likes to think of English as a multinational, culture-free language, or

lingua franca that speaks to all cultures and none in particular, and that can be appropriated and owned by anyone to express their own local meanings. Each person is seen as the intersection of an infinite number of partially overlapping cultures (Atkinson, 1999: 637). American pragmatism instinctively resists pigeonholing people according to where they come from and prefers to see alone standing individuals and cultures as "fluid, ever-changing, and nondeterministic," i.e., unimpeded by their history. This view also reflects a concern not to stereotype individuals and essentialize their national characteristics, for fear that culture might become political. But such an ideology risks mapping onto the rest of the world a culture of geographic and social mobility and of an individual pursuit of happiness that is itself political and quintessentially American.

Culture as the Moral Right to Be Heard and Listened To The paradox is that once a person has been stripped of her national culture and been made into a free-standing, rational, autonomous agent, the burden is on her to maintain her integrity and free will against the enormous pressure to conform to the will of the marketing industry and the demands of the national political majority. Cameron (2000) shows some of the pervasive ways of talking and thinking in a global culture that fetishizes 'communication,' 'partnership,' 'options and opportunities,' 'initiative,' and 'entrepreneurship.' In the United States, the nationalistic discourse of 'freedom,' 'democracy,' and 'homeland security' is equally constraining. Membership in a cultural group seems to be the only safeguard left against the domination of the market and the tyranny of the majority. Hence the growing demands for political recognition of individuals who define themselves not as free-standing individuals, but as members of cultural groups characterized by race, ethnicity, gender, occupation, sexual preferences, regional affiliation, etc.

A post-modernist perspective understands cultures to be in principle of equal worth, but in fact they are objects of moral and ideological struggle; hence the term 'culture wars' to denote the clash between different social and moral values that different cultures represent (Taylor, 1994). For example, the current debate about the wearing of the Muslim scarf in French schools highlights the dilemma of the French educational system that needs to maintain the hard won separation of church and state while preserving the right of each individual to his/her own culture. The popularity of social and cultural theory among language educators (Luke, 1996) shows how closely language is related to power in the teaching of culture in language study. Ultimately, the need to teach culture confronts the language teacher with a political dilemma, namely, how to teach cultural and moral difference without ignoring the incommensurable and even conflictual aspects of that difference. The increasingly polarized world we live in does not make the task of the language teacher any easier.

New Ways of Integrating Language, Culture, History, and Identity

Culture is being re-conceptualized to respond to the different needs of the learners of foreign, second, and heritage languages. Citizens of nation states need to learn the languages of citizens of other nation states, or **foreign** languages, for reasons either of employment or of national security. New immigrants to industrialized countries need to be integrated into the host societies by learning the host language as a **second** language. Long time resident immigrants feel the need to learn the language of their ancestors as a **heritage** language in order to reconnect with their roots. In all three cases, culture is seen as the indispensable key to understanding speakers' verbal behaviors and worldviews and the way they position themselves vis-à-vis others both in history and in the social structure.

Foreign Languages

Among foreign languages, English occupies a special position by virtue of its worldwide spread. Within the European Union, English is taught in schools side by side with other foreign languages, but its value is different and so is its perceived usefulness. Although the teaching of English in European schools is still very much oriented toward British or American national culture, research on English as the lingua franca of continental Europe is gaining momentum (Seidlhofer, 2003). This lingua franca is not necessarily a culture-free global English, but rather a supranational European dialect that takes on the cultural specificities of each host culture.

In Europe, there is a boom of interest right now in the teaching of languages other than English. New avenues of research focus, as mentioned above, on the intercultural components of language learning but also on its ecological aspects (Fill and Mühlhäusler, 2001) and on pluriculturalism as a dimension of plurilingualism (Busch, 2004; Zarate, 2004). This research draws heavily on insights from literary and cultural studies, sociolinguistics and pragmatics, anthropology, and from a long tradition of study abroad and student exchange. In Europe, language educators are particularly concerned about the effects of globalization and the weakening of national

institutions on the teaching of foreign languages. Hans Hansen, a humanities scholar from the University of Copenhagen, speaks for many when he says that foreign language teaching in an era of globalization (global market and global terrorism) means "reflecting theoretically upon the relation between entities like language, culture, identity, history and the self-knowledge and imaginary world pictures as they are represented in art and literature" (Hansen, 2004a: 115). He envisages a new role for culture: "Foreign Language Studies must learn to conceive of culture as an open, multi-voiced and dialogical interaction full of contradictions, rather than as the deterministic, homogeneous and closed structure that belonged to the era of the nation state" (Hansen, 2004b: 9).

The current tensions between the creation of a European community geared to the global market and the Europeanization of national communities geared to political national identities, are leading toward the creation of a "third sector," i.e., a European multilingual public sphere in the media and in professional life that includes national, regional, and local languages, minority and migrant languages, and sign languages. This multilingual sphere or "sprachenfreundliches Umfeld" (Busch, 2004: 164) is meant to sensitize Europeans of all walks of life to cultural diversity and encourage them to embrace public multilingualism and multiculturalism, understood as "a corrective against the interests of the nation state and a global market economy" (Busch, 2004: 289). This also prepares them for the eventual emergence of a multilingual political European identity. It includes the screening of foreign films with subtitles, the tolerance to untranslated code-switches in public statements, the symbolic use of untranslated languages in greetings, leave takings, etc., and the airing of bilingual TV programs like ARTE. It includes efforts by the Council of Europe to move from an emphasis on translation and linguistic diversity to efforts to develop a plurilingual education based on critical language awareness, plurilingual identity formation, and intercultural understanding. This shift entails a turn toward a more hermeneutic, reflexive, interpretive kind of teaching, in which 'text' can serve as a common ground: conversational texts, written texts, visual texts, not as objects of philological exegeses or structural analyses but as dialogically constructed culture in action.

In the United States, by contrast, the foundational field of research for all foreign language education is still second language acquisition (SLA) research. It has traditionally drawn its data predominantly from ESL or the beginning levels of foreign language instruction. Because of its mostly psycholinguistic and sociocognitive concerns, SLA research has not had much to say about the teaching of culture in language classes, except perhaps regarding learners' motivation to acculturate into a target community of native speakers, as is the case with many ESL learners. SLA research has been less interested in studying the cultural benefits of study abroad than in exploring the uses of computer-mediated communication to learn about foreign cultures without going abroad (Warschauer and Kern, 2000). It has aligned foreign language research with linguistics and psychology rather than with anthropology or cultural studies. It has thus exacerbated the split between the social sciences and the humanities, between language teachers and literature/cultural studies scholars in language departments at American universities. In the current political climate, U.S. federal funding is given in priority to research on the psycho- and sociolinguistic aspects of advanced language competencies for intelligence gathering purposes in the languages declared necessary for national security. It is not primarily concerned about their cultural or historical aspects.

Heritage Languages, Second Languages

In American domestic affairs, there is a notable rise of interest in heritage languages for **social and cultural** purposes: Native American ancestral languages, master-apprentice programs (Hinton, 1994), interest in western Armenian, Yiddish, Spanish, Chinese, Vietnamese, and Korean as heritage languages linked to vanished or distant cultures (Peyton *et al.*, 2001). This interest is in part an ecological concern for the preservation of endangered languages, in part a romantic need to reconnect with one's roots in the face of the impersonal forces of the market and of information technologies, in part a desire to exercise long-distance proselytism in one's country of origin (e.g., Cuba, Armenia, Vietnam). Yet, the issue of which culture to teach (Cuban culture or Cuban-American culture? North Vietnamese or South Vietnamese or Vietnamese-American culture?) when teaching Spanish or Vietnamese in the United States has not yet been addressed in the case of heritage languages, probably because it is a politically sensitive issue.

By contrast, teaching the national culture of the host country is part and parcel of the socialization of immigrants learning the language of the land as their second language. Until recently the pedagogy of English as a second language was unabashedly acculturationist, indeed, assimilationist. It taught immigrants mainstream middle-class American or British ways of speaking, thinking, and behaving in every day life. In view of the increasingly multicultural

nature of industrialized societies and following post-modernist conceptions of culture, new research is being drawn upon to conceive of culture in the teaching of second languages to immigrants. Language memoirs and personal testimonies of bilingual/multilingual individuals offer rich insights into the transcultural identities and subjectivities of language learners (Pavlenko and Lantolf, 2000). The notion of 'third place,' first introduced by Kramsch (1993), captures the need to think of culture as a subjective, portable, entity, linked to an individual's history and his/her variable subject position in variable contexts of language use. As a way of giving meaning to one's life, it is not a place to belong to but **a way of** belonging.

Resignifying Culture as Historicity and Subjectivity

The term 'culture' has come to cover a host of phenomena that mean different things to different people: literate tradition or high culture, level of civilization, way of life, ethnic membership, country of origin, nationality, ideology, religious affiliation, or moral values. It is difficult to find a common objective denominator. However, in our contentious times, culture has retained a sense of the irreducible, the sacred, that touches the core of who we are – our history and our subjectivity. Culture is embodied history. Theoretical perspectives on the cultural dimension of language research have thus drawn their inspiration from feminist and post-structuralist theories of the subject (Weedon, 1987; Bourdieu, 1991), and from theories of language as social semiotic practice (Kramsch, 2002), as historical intertextual practice (Hanks, 2000), as institutional and ritual practice (Rampton, 1995), as discursive and conversational practice (Moermann, 1988), and as ideological practice (Cameron, 2000). These theories provide fruitful ways of bridging the individual and the social in language use. They enable us to see culture as that precarious third place where our historical and subjective self gets constructed across utterances and turns-at-talk between the self we have just been and the self we might still become.

See also: Activity Theory; Anthropological Linguistics: Overview; Anthropology and Pragmatics; Applied Linguistics in Europe; Applied Linguistics in North America; Applied Linguistics: Overview and History; Bilingualism and Second Language Learning; Communication: Semiotic Approaches; Communicative Language Teaching; Communicative Principle and Communication; Context, Communicative; Conversational Analytic Approaches to Culture; Critical Applied Linguistics; Critical Discourse Analysis; Discourse Markers; Discourse, Narrative and Pragmatic Development; Discourse Studies: Second Language; Discursive Practice Theory; Educational Linguistics; English: World Englishes; Face; Foreign Language Teaching Policy; Frame Analysis; Gender and Language; Genre and Genre Analysis; Identity in Sociocultural Anthropology and Language; Identity: Second Language; Immigrant Language Education; Indexicality: Theory; Interactionism; Intercultural Pragmatics and Communication; Interlanguage; Interpretation: Theory; Language Ideology; Language Policy in Multilingual Educational Contexts; Language Politics; Language Socialization; Language Teaching Traditions: Second Language; Lingua Francas as Second Languages; Linguistic Anthropology; Linguistic Rights; Literacy Practices in Sociocultural Perspective; Multilingualism: Pragmatic Aspects; Narrativity and Voice; Nationalism and Linguistics; Performance in Culture; Politeness; Politics, Ideology and Discourse; Politics of Teaching; Postmodernism; Power and Pragmatics; Relativism; Social-Cognitive Basis of Language Development; Socialization: Second Language; Speech Genres in Cultural Practice; Teacher Preparation: Second Language; Teaching of Minority Languages; Teaching Technologies: Second Language; Thought and Language: Philosophical Aspects.

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Cupeño

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Cupeño is a Uto-Aztecan language in the Cupan group of the Takic subfamily. Until 1903, speakers lived primarily in two villages, Kupa and Wilakalpa, located at hot springs sites southeast of Mount Palomar in southern California. In 1903, the Cupeño were forced from their homes by the legal machinations of White landowners (Hyer, 2001). Many live today at Pala, California. The Cupeño continue to maintain close economic, social, and ritual ties with speakers of other Takic languages, including Luiseño and Cahuilla, and with speakers of the Iipay (Diegueño) languages, in the Yuman family. These connections are reflected in loan material in Cupeño (Hinton, 1991), including the name of their principal village, *Kupa*, from Iipay Aa *ha-kupin* 'water-warm.' No fluent first-language speakers of the language remain, but the language is studied and is used in song, including in original composition.

Cupeño is an agglutinative language in the sense summarized by Plank (1995), characterized by complex words consisting of long strings of affixes that largely retain a CV or CVC syllable structure, being loosely bound to word roots and to one another with relatively few morphologically conditioned word-internal alternations. (1) illustrates a minimal sample of the rich morphological apparatus for verb constructions (primary stress is on the first syllable of the word, unless it is marked with an underline; the symbol 'e' stands for a central vowel /ə∼ɨ/.)

(1a) mi = pem-chi̱'
them = they-gather
'they gathered them'

(1b) mi = ne-chi̱'-qal
them = I-gather-IMPERF.SING
'I was gathering, I would gather'

(1c) mi = chem-chi̱'-lyu-wen
them = we-gather-go.to-IMPERF.PL
'we were going in order to gather them, we would go in order to gather them'

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'we were going in order to gather them, we would go in order to gather them'

The examples in (2) illustrate nominal constructions. As in most Uto-Aztecan languages, nouns (except Spanish loans and a few words for plants and animals) must appear with one of the nonpossessed noun suffixes (in (2), the suffix *-ly(a)*). Animate nouns are always marked for object case, in which case demonstratives, quantifiers, and adjectives appearing with them in complex nominal constructions also bear object case (and plural number suffixation if the noun is plural). With inanimate nouns, only qualifying elements appear with the object case marker; the noun itself is usually unmarked.

(2a) axwesh achi-ly
that pet-NON.POSSESSED
'that pet'

(2b) axwechi-m ash-lya-m
that-PL pet-NON.POSSESSED-PL
'those pets'

(2c) axwesh-m-i ash-lya-m-i
that-PL-OBJ pet-NON.POSSESSED-PL-OBJ
'those pets (object case)'

(2d) i'i ne-ash
this my-pet
'this pet of mine'

(2e) ivi-y ne-ach-i
this-OBJ my-pet-OBJ
'this pet of mine (object case)'

Word classes do not exhibit rigid lexical discrimination; instead, the same root can appear in both nominal and verbal constructions. Example (3) shows the root *chi'* 'to gather,' seen in verb constructions in (1), in a nominal construction. Example (4) shows the root *ash* 'pet,' seen in nominal constructions in (2), in a verbal construction.

(3) ne-chi-'a
my-gather-POSSESSED
'my harvest'

(4) ne-'ash-lyu = 'ep
I-pet-VERBALIZER = REALIS
'I had a pet'

Turning to syntax, Cupeño word order is head-final, with occasional pragmatically driven departures from SOV order. Cupeño permits very rich discontinuous constituency, as seen in (5). The first discontinuous constituent is in boldface; the second, interrupted by the noun of the first constituent and the verb, is underlined. Both elements of the second constituent are marked with the locative suffix *-'aw* 'at, on.'

(5) **i'i** ivi-'aw **ku'a-l** hiw-qa ne-qwa'i-'aw
this this-at fly- stand- my-food-at
POSSESSED PRES.SING
'**this fly** is here on this food of mine'

Cupeño exhibits Suffixaufnahme, which Plank (1995) considered to be a regular typological feature of agglutinative languages. When genitive-noun expressions appear as objects of transitive verbs, both the possessor and possessed noun bear the object suffix, as in (6):

(6) ne'=ne mukikma-l-i
I=I.ERG bird-NON.POSSESSED-OBJ
pe-wek-'i-y tew-qa'
its-wing-POSSESSED-OBJ see-PRES.SING
'I see the bird's wing'

Cupeño has a highly developed auxiliary complex in the second position in the sentence. This complex includes clitics marking subject person, number, and case (as with *=ne* in example (6)). An example is seen in (7), with the auxiliary complexes in boldface.

(7) hani=**qwe**=**n**=**pe**
exhort=NONINSTANTIATIVE =I.ABS=IRR
nangini met'ish
PAY.HABILITATIVE MUCH
me=**qwe**=**pe** ichaa
AND=NONINSTANTIATIVE =IRR GOOD
miyax-wene
BE-CUSTOMARY.STATIVE
'if I had paid more it would be better for me'

Properties of special typological interest include dual agreement marking. Past-tense verbs (as in (1) and (4)) are head-marked, requiring prefixes (always nominative) encoding the person and number of the subject. In tenses other than the past, null subjects are common, although subject number is encoded in the present tense and imperfective aspect suffixes. However, multiple marking of subject values can also occur, with independent nouns and pronouns, clitics in the auxiliary complex or past-tense subject markers, and subject-number-marking aspect suffixes cooccurring in a single sentence. All verbs can appear with object proclitics (seen in (1)) that encode the person and number of the object. In non-past-tense verbs, clitics in the second-position auxiliary complex encode the person, number, and case of the subject. With imperative verbs, these clitics encode the object. However, the language also has dependent marking for case, with a generalized object case suffix *- i ~ -y* on quantifiers, demonstratives, adjectives, and nouns and pronouns, as seen in the examples in (2) and (5).

Cupeño exhibits an unusual split-ergative system in which past-tense clauses have nominative-accusative case alignment while nonpast clauses, with the subject marked in the auxiliary complex, exhibit ergative-absolutive alignment. As previously noted, nominal constructions mark object case and

the subject prefixes on past-tense verbs are nominative. However, the person-number clitics in the second-position auxiliary complex with nonpast verbs distinguish ergative (A) and absolutive (S, O) cases.

The many unusual typological properties of Cupeño hint that the language has undergone esoterogeny (Thurston, 1987), accumulating strategies for distinction from its neighboring languages. The split-ergative case system, the exuberant development of discontinuous constituency, and the Suffixaufnahme found in possessive expressions in questions are unattested elsewhere in Uto-Aztecan. Esoterogeny, using Thurston's characterization, is exactly what would be predicted in a language with very few speakers – probably never more than 1000 – incorporated into the linguistic ecology of aboriginal California, a classic example of an accretion or residual linguistic zone (Nichols, 1992). Golla (2000) has observed similar processes of accumulated distinctiveness in the California Athabascan languages, the other major case in which a language family that is widespread outside aboriginal California has a few members within that zone.

See also: Constituent Structure; Discontinuous Dependencies; Ergativity; United States of America: Language Situation; Uto-Aztecan Languages.

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Curtius, Georg (1820–1885)

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Georg Curtius was born April 16, 1820 in Lübeck. He received his academic training at the University of Bonn, where his teachers included Friedrich Ritschl, Christian Lassen, and August Wilhelm Schlegel, then at the University of Berlin, where he attended lectures by Karl Lachmann, August Boeckh, Leopold von Ranke, and Franz Bopp. He obtained his doctorate in 1942 and subsequently taught high school in Dresden. In 1845 he started his academic career in Berlin, left for Prague in 1849 to assume a professorship in classical philology and returned to Germany in 1854. For eight years he taught at the University of Kiel before finally settling in Leipzig in 1862.

During all of his scholarly career he was firmly entrenched in the grounds of classical philology. But his staunch adherence to well-established principles of the past did not prevent him from keeping open to change, even though this change originated within a framework of thought to which he found it – sometimes – difficult to accommodate.

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The French missionary and pioneer of Indology Gaston-Laurent Cœurdoux was born in Bourges, France, in 1691 and died in Pondicherry in the colony of French India in 1779. He joined the Jesuit order in 1715, departed for South India in 1732, and served as a member of Madurai Mission until his death. In 1744 he was named superior of the mission, a role he filled until 1751. Beside his missionary work, he showed keen interest both in science and in language studies. In addition to local Dravidian languages (Tamil and Telugu), he learned Sanskrit and was one of the first to note its resemblance with classical Greek and Latin (and German). In a well-known memoir, he demonstrated the relationship between Sanskrit and European languages well before Sir William Jones; he sent the text to Anquetil-Duperron to Paris for publication, but it remained in manuscript form and was printed only at the beginning of the 19th century (in *Histoire et Mémoires de l'Académie des Inscriptions et Belles-Lettres 49*, 1808: 647–667). Another work by Father Cœurdoux, a detailed account of South Indian customs, remained unpublished and was to a large extent copied by Abbé Dubois in the book he then published under his own name (published in French in 1825, in English translation 1817, rev. ed. *Hindu manners, customs and ceremonies* 1897). The original version is preserved in an abridged version that was published in 1987 by Sylvia Murr, who also showed Dubois's complete dependence on it. There are further some letters by Cœurdoux published in *Lettres édifiantes et curieuses,* a manuscript dictionary 'télougou–français–samskroutam [i.e. Sanskrit],' and some further manuscript works.

See also: Missionary Linguistics.

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Cognitive Anthropology

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Cognitive anthropology is the study of cultural knowledge and processes of cognition in a sociocultural context. While most cultural anthropologists study cultural knowledge, cognitive anthropologists do so distinctively by asking how specific people in a society think. Cognitive anthropology dates from the late 1950s, although there were many earlier precursors (e.g., the work of Evans-Pritchard).

In cognitive anthropology today, major schools can be distinguished by their answers to two questions. First, does the cultural part of cognition (D'Andrade, 1981) consist of mental representations or situated practices? Second, how significant are panhuman cognitive universals?

Cultural Cognition as Culturally Variable Mental Representations

An early, influential statement of this approach, cultural cognition as cross-culturally variable mental

the subject prefixes on past-tense verbs are nominative. However, the person-number clitics in the second-position auxiliary complex with nonpast verbs distinguish ergative (A) and absolutive (S, O) cases.

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philology via comparative studies to the minute analysis of phonological and analogical language changes that characterized the maelstrom of linguistic activities in the late 1870s and 1880s. Since, however, the achievements of these and all other Neogrammarian scholars began to captivate the minds of many of their contemporaries, at least some aspects of Curtius's work suffered curtailment and misrepresentation.

Ernst Windisch (1886: 128) adequately evaluated his importance: "Without Georg Curtius the history of linguistics is unthinkable. If he is left out, gaps will appear which destroy all continuity."

Curtius gained lasting recognition through his work in three areas:

1. Classical philology (e.g., Curtius, 1852; cf. also Steinthal, 1860). His *Grundzüge der griechischen Etymologie* (1858–1862) is considered the most important research project of his life.
2. Combining classical philology and comparative linguistics: As a master in these two fields of specialization, he recognized the strengths of both and managed in the ceaseless effort of a lifetime to impress upon scholars from both disciplines that a coordination of their research tools would create new strengths and eradicate old weaknesses (cf. Curtius, 1848).
3. Sound change: Curtius knew by the mid-1870s that the regularity in language transition had edged closer to an exceptionless state, but he also knew that there was no way of establishing an incontestable scientific proof. He therefore stuck to his position of admitting both regular and irregular changes (Curtius, 1885; Delbrück, 1885).

Curtius died August 12, 1885 in Hermsdorf near Bad Warmbrunn, Silesia, today Poland.

See also: Bopp, Franz (1791–1867); Braune, Wilhelm (1850–1926); Brugmann, Karl (1849–1919); Leskien, August (1840–1916); Neogrammarians; Osthoff, Hermann (1847–1909); Sievers, Eduard (1850–1932); Steinthal, Heymann (1823–1899).

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Cushitic Languages

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The Cushitic languages are generally thought of as forming a distinct family of the Afroasiatic superfamily or phylum, comprising four branches in distribution from north to south: Beja, Central Cushitic or Agaw, East Cushitic, and South Cushitic. Of these, East Cushitic is by far the largest both in terms of number of languages and of the overall number of speakers of those languages. East Cushitic is also the most complex branch insofar as it is further divided into several discrete sub-branches: Saho-Afar, Lowland East Cushitic, Highland East Cushitic, and as has been suggested Dahalo, a single language formerly subsumed under South Cushitic. Indeed, some now prefer to see South Cushitic (minus Dahalo) as a further sub-branch of

philology via comparative studies to the minute analysis of phonological and analogical language changes that characterized the maelstrom of linguistic activities in the late 1870s and 1880s. Since, however, the achievements of these and all other Neogrammarian scholars began to captivate the minds of many of their contemporaries, at least some aspects of Curtius's work suffered curtailment and misrepresentation.

Ernst Windisch (1886: 128) adequately evaluated his importance: "Without Georg Curtius the history of linguistics is unthinkable. If he is left out, gaps will appear which destroy all continuity."

Curtius gained lasting recognition through his work in three areas:

1. Classical philology (e.g., Curtius, 1852; cf. also Steinthal, 1860). His *Grundzüge der griechischen Etymologie* (1858–1862) is considered the most important research project of his life.
2. Combining classical philology and comparative linguistics: As a master in these two fields of specialization, he recognized the strengths of both and managed in the ceaseless effort of a lifetime to impress upon scholars from both disciplines that a coordination of their research tools would create new strengths and eradicate old weaknesses (cf. Curtius, 1848).
3. Sound change: Curtius knew by the mid-1870s that the regularity in language transition had edged closer to an exceptionless state, but he also knew that there was no way of establishing an incontestable scientific proof. He therefore stuck to his position of admitting both regular and irregular changes (Curtius, 1885; Delbrück, 1885).

Curtius died August 12, 1885 in Hermsdorf near Bad Warmbrunn, Silesia, today Poland.

See also: Bopp, Franz (1791–1867); Braune, Wilhelm (1850–1926); Brugmann, Karl (1849–1919); Leskien, August (1840–1916); Neogrammarians; Osthoff, Hermann (1847–1909); Sievers, Eduard (1850–1932); Steinthal, Heymann (1823–1899).

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Cushitic Languages

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The Cushitic languages are generally thought of as forming a distinct family of the Afroasiatic superfamily or phylum, comprising four branches in distribution from north to south: Beja, Central Cushitic or Agaw, East Cushitic, and South Cushitic. Of these, East Cushitic is by far the largest both in terms of number of languages and of the overall number of speakers of those languages. East Cushitic is also the most complex branch insofar as it is further divided into several discrete sub-branches: Saho-Afar, Lowland East Cushitic, Highland East Cushitic, and as has been suggested Dahalo, a single language formerly subsumed under South Cushitic. Indeed, some now prefer to see South Cushitic (minus Dahalo) as a further sub-branch of

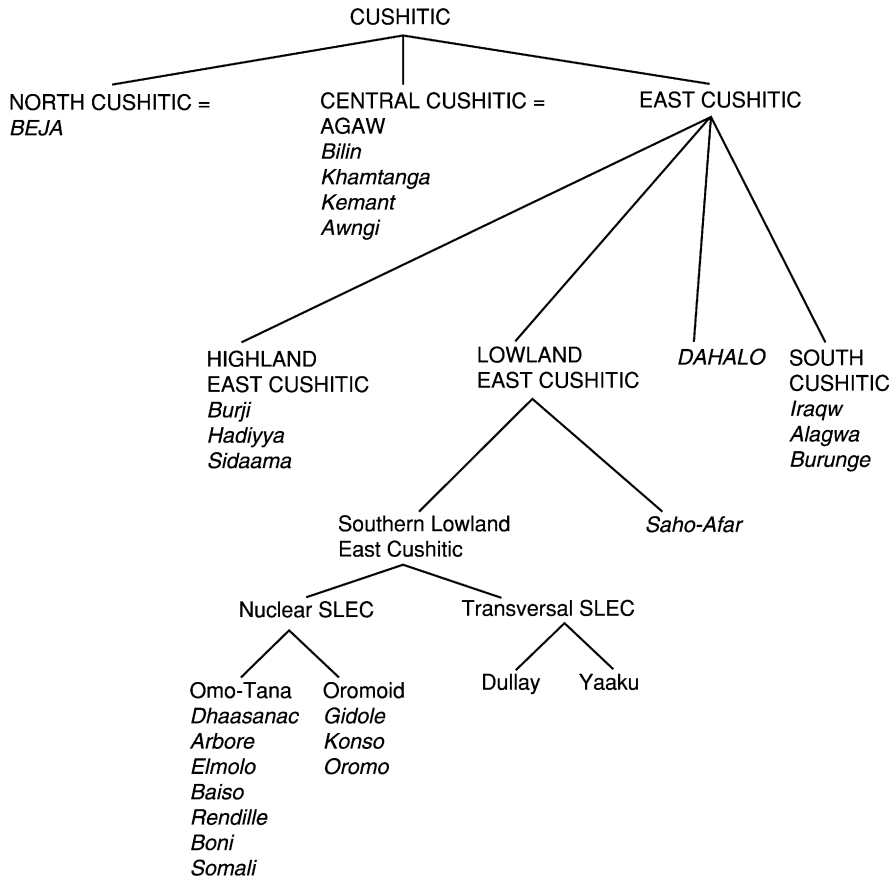

Figure 1 The Cushitic languages.

East Cushitic and not a separate branch of the family (see Figure 1).

In terms of numbers of speakers, most Cushitic languages are comparatively small, with a few thousands or tens of thousands of speakers, and occasionally with only a couple of hundred or fewer. Although available figures are not always reliable, the only Cushitic languages with more than 1 million speakers are Afar (1.5 million), Oromo (at least 18 million, all varieties), Sidamo (1.8 million), and Somali (between 10 and 11 million). The principal branches of the Cushitic family are as follows (see also Figure 1):

- Beja (or Bedawi, Bedawiye), though showing some dialect variation, is regarded as a single language and is the sole representative of North Cushitic.
- Central Cushitic or Agaw forms a fairly cohesive group of four small languages or dialect clusters, one of which, Bilen (Bilin), is spoken in Eritrea, the others in Ethiopia. The largest language is Awngi with about 300 000 speakers.
- The Highland East Cushitic group comprises five major languages with some variants that are sometimes considered separate languages, all spoken in the Rift Valley region of Ethiopia. The largest language is Sidamo (Sidaama) with about 1.8 million speakers, followed by Hadiyya with just under 1 million.
- The Lowland East Cushitic branch has the largest number of languages, about fifteen, stretching from Eritrea in the north to the south of Ethiopia, Somalia, and Djibouti, and beyond into Kenya and Tanzania. The Cushitic languages of Kenya are, in addition to Dahalo, extensions of those spoken to the north in Ethiopia and Somalia, and are all varieties of the two large Lowland East Cushitic languages, Oromo and Somali. The few Cushitic languages of Tanzania spoken by few people all belong to the South Cushitic branch, except for the probably extinct Yaaku, which has been seen as forming a discrete branch of Southern Lowland East Cushitic, perhaps linked to the Dullay (previously called Werizoid) languages of Ethiopia.

Oromo and Somali are the languages with the largest populations, at least 18 and 11 million speakers, respectively. Afar is the only other Lowland East Cushitic language with more than 1 million speakers, forming a separate sub-branch with the closely related Saho.

- The South Cushitic languages, all of which are spoken in Tanzania, and about whose position within the family there has been some debate, are all minority languages, and several are extinct or severely threatened.

The Question of Omotic

The ongoing re-analysis of the internal classification of Cushitic is not the only question regarding the nature of the family, nor the most recent one. For many years since the first attempts at classification of Cushitic, a further branch called West Cushitic was proposed, comprising a number of languages spoken in South West Ethiopia. There are sufficient substantial differences both in morphology and lexicon that set these languages apart from the rest of Cushitic, such that the erstwhile West Cushitic, now renamed Omotic, was proposed as a quite separate family of the Afroasiatic phylum (definitively in Fleming, 1969), and the majority of linguists working in the area now concur with this classification. It has also been suggested that only part of Omotic, the Aroid (also called Ari-Banna, or Southern Omotic) languages, form a separate branch of Afroasiatic, while the rest are part of Cushitic. These problems of classification essentially revolve around the questions (a) of how much that is similar between Omotic and Cushitic is due to shared archaisms from Afroasiatic, and (b) how much arises from convergence due to an extended period of geographical proximity. There are certainly many similarities at all levels of linguistic analysis that are best explained by contact and convergence. Further discussion of Omotic is excluded from what follows.

Typological Characteristics of Cushitic Languages

While there is considerable variety in details of linguistic types among the Cushitic languages, it is by and large possible to draw up a list of structural features that exemplify most Cushitic languages. This was done most clearly by Hetzron (1980: 14–53), and though some of the details are rather language-specific, what was said there is a sound statement. The features that he lists are all morphological, and it is indeed at the level of morphology (inflectional and derivational) that most of the strongest diagnostics can be found. A slightly different list is presented below, differing from Hetzron's principally only in its wider scope. Not all Cushitic languages obviously exhibit all of these features, but it is fair to say that a good part of them can be found or is traceable in probably all languages, and certainly in what Hetzron called the 'safe' branches of the Cushitic family: Agaw, Highland East Cushitic (his Rift Valley Cushitic), and Lowland East Cushitic (i.e., excluding South Cushitic). Lastly, what follows is by its very nature a generalization, and grammars of individual languages should be consulted for details.

Phonology

- a range of special coronal and velar consonants with secondary articulation, typically glottalized or implosive: e.g., t', ɗ, ts', tʃ', k', ɠ . . .
- a tone-accent system with an underlying high-low contrast, functioning more in the context of morphological marking than lexically: e.g., Somali libaax = /libæːħ/ 'lion' L.LL (subject case), L.HL (non-subject case), ɨnan = /ɨnan/ H.L (masc. 'boy'), L.L (fem. 'girl').

Morphology

- two genders, masculine and feminine, the latter being the marked form, either by suffix and/or tone, with concord marking in pronouns and verbs, and with gender marking in pronominal (demonstrative) particles being widely masc. k-, fem. t-.
- a primary case system with two terms: a marked nominative or subject case (probably originally only on masc. nouns), and an unmarked absolutive case. A special genitive or possessive case may probably be also added to the primary cases. Other case functions are variously expressed by postpositions, evolving variously into suffixes or verbal proclitics. The morphemes expressing these various case functions are also by and large common between languages: e.g., a dative/benefactive -s, also -k in some languages; a locative/allative -l or -d/-t, sometimes appearing with comitative function. The marked subject case is often -i, though the vowel -u is also used in some languages.
- heterogeneous noun plural formation by means of a wide array of suffixes and occasionally a degree of internal modification. In some languages, Lowland East Cushitic especially, gender polarity can

also be observed between singular and plural. The quantificational system of nouns often also includes categories such as collective, singulative, and paucal: e.g., Hadiyya fellaʔa 'goat(s)', fella-kkitʃtʃo '(one) goat', fella-ʔuwwa '(lots of) goats', fella-kkitʃtʃaʔa '(a few) goats'.

- person marking on verbs for subject with seven terms, gender being marked only in the 3rd person singular. (Here Beja differs, marking gender also in the 2nd singular.) The patterning of person marking morphemes employed is perhaps the most immediately visible diagnostic of the Cushitic languages, and indeed of their membership in the Afroasiatic phylum (see Figure 2). In some languages (e.g., Beja, Afar, Somali), there are two systems of person marking, one by means of prefixes to the verb stem (combining with suffixes for marking plural in the 2nd and 3rd persons), and the other by means of suffixes placed after the verb stem. The former is the more archaic, having direct correspondents in Berber and Semitic, while the second is a specifically Cushitic innovation, whereby an auxiliary inflecting after the archaic pattern became fused with the verb stem as a suffix element carrying both markers of person and tense-mood-aspect. The actual markers of person are the same in both types, except for the 3rd masc. and pl. where prefix y->-Ø. Figure 3 shows prefix and suffix inflecting paradigms in two tenses in Afar; the suffix –[V]h is required here in final position where the verb is focused.
- the finite verb has three primary tense-mood-aspect (TMA) forms: a past or perfective, a non-past or imperfective, and a subjunctive which typically has both modal and dependent functions. These are distinguished by vocalic variation, either in the suffixes in suffix-inflecting verbs, or originally by internal vocalic modification of the verb stem in prefix-inflecting verbs. In addition to these three primary forms, most languages have developed a range of other TMA forms, often including distinct negative paradigms, sometimes employing auxiliaries and sometimes additional suffix elements. So, for example, alongside Afar fakeh and fakah, etc., in Figure 3, there are also such forms as jussive fakay 'let me open', requestive fako 'may I open?', negative perfective ma-fakinniyo 'I didn't open', anticipatory fake-liyo 'I will open', negative present continuous fakah-maan 'I am not opening', and so on.
- the verb has a rich system of stem derivation expressing voice with such categories as passive, causative, autobenefactive or middle, reciprocal, etc. The markers of voice, which generally follow the lexical stem of the verb and come before person and TMA markers in suffix-inflecting verbs, show a marked degree of commonality between all Cushitic languages, with the causative marked by –[V]s, the passive by –[V]m, and the autobenefactive or reflexive by –[V]t, or elements that can be shown to have derived from such. Combinations of derivational suffixes also occur. Stem reduplication or partial reduplication is also typically employed in making iteratives, or sometimes reciprocal forms, often in combination with the primary stem derivational suffixes.

	SING.	PLUR.
1	ʔ	n
2	t	t ... -n
3MASC.	y > Ø	y > Ø ... -n
3FEM.	t	

Figure 2 The Cushitic 'block pattern' of person marking.

Syntax

- focus systems are common, often deriving from cleft constructions; special reduced subject-focus verb paradigms are also common: e.g., Oromo

obboleettii issa-tu foon nyaat-a
sister.ABS *his-FOCUS* *meat* *eat-3MASC.SING.IMPERF*
'it is his sister who eats meat / **his sister** eats meat' i.e., verb 3masc.sing and not in agreement with focused subject.

Contrast the same sentence with predicate focus:

obboleettii-n isaa foon ni nyaat-ti
sister-SUBJ *his* *meat* FOCUS *eat-3FEM.SING.IMPERF*
'his sister **eats meat**'

- clause chaining constructions, often including the use of special converbs, e.g., Hadiyya:

it't'i-m sigg-aa woʔoo-ma
it-and *cool-3MASC.SING.CONVERB* *water-DEF*
t'uut'-aa lasage k'ureʔe
suck-3MASC.SING.CONVERB *after* *pot*
giira-nne kaas-akkamo
fire-LOC *put-3POL.IMPERF*
'and after it has cooled and absorbed the water, one puts the pot on the fire'

	prefix perfect	prefix imperfect	suffix perfect	suffix imperfect
1sg.	u-duure-h	a-duure-h	fak-e-h	fak-a-h
2sg.	tu-duure-h	ta-duure-h	fak-te-h	fak-ta-h
3m.sg.	yu-duure-h	ya-duure-h	fak-e-h	fak-a-h
3f.sg.	tu-duure-h	ta-duure-h	fak-te-h	fak-ta-h
1p1.	nu-duure-h	na-duure-h	fak-ne-h	fak-na-h
2p1.	tu-duuree-n-ih	ta-duuree-n-ih	fak-teen-ih	fak-taan-ah
3pl.	yu-duuree-n-ih	ya-duuree-n-ih	fak-een-ih	fak-aan-ah

Figure 3 Person marking in the verb in Afar.

Additionally, subordinate clauses often use special verb forms that are either of a relative clause verb type, or are ostensibly derived from relative constructions.

- sentence word order is SOV, though both head-final and head-initial types of phrase (e.g., noun phrases) occur.

See also: Afroasiatic Languages; Chadic Languages; Eritrea: Language Situation; Ethiopia: Language Situation; Focus; Omotic Languages; Somali; Tanzania: Language Situation.

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Cyprus: Language Situation

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Cyprus is the third largest island in the Mediterranean. Its population (around 800 000) belongs to two main ethnic groups, Greek (78%) and Turkish (18%), while the remainder is made up of Armenians, Maronites, 'Latins,' Roma, etc.

The language situation in Cyprus reflects its turbulent history. The Cypro-Minoan script, which dates from the Bronze Age, is not deciphered. Mycenaean Greeks settled in Cyprus extensively from the 12th century B.C., and over the next millennia it underwent Phoenician, Egyptian, Persian, Macedonian, Roman, Frankish, Venetian (1489), Ottoman (1571), and British rule (1878–1960). The Turkish invasion of 1974 led to the segregation of the Greek- and Turkish-speaking populations.

Languages and Dialects of Cyprus

Cypriot Greek

The Cypriot Greek dialect belongs to the southeastern Greek dialect group. Written evidence of Cypriot Greek dates to the 12th century B.C.; the dialect has distinctive phonetic, morphological and syntactic features, and there is specific Cypriot vocabulary, much of which is common to Greek and Turkish Cypriot. (See Tables 1–4.)

The Cypriot Greek speech community is diglossic, with Standard Greek used in education and in written and formal oral communication. There is evidence for the emergence of a metropolitan Cypriot *koine*, which has shed features from the reported eighteen regional idioms and has undergone heavy lexical influence from Standard Greek. Hybrid forms are also in evidence. There is a semistandardized Cypriot orthography, which uses clusters of letters from the Greek alphabet to represent Cypriot phones (See Table 5).

Cypriot Turkish

Archival evidence shows that the first Turkish settlers originated from Konya, İçel, Antalya, Alanya, but later also from the Black Sea. The very few existing studies of aspects of Cypriot Turkish indicate that it displays distinctive phonetic, morphological, and syntactic features, most striking among which are consonant voicing, the survival of 'archaic' agreement paradigms, and the SVO order; the latter is variously attributed to the influence of English and Greek or to the historical origins of Cypriot Turkish. Diglossia between Standard Turkish and Cypriot Turkish is prevalent in Turkish-speaking Cyprus. Not much is known about Cypriot Turkish regional idioms.

Cypriot Arabic

Cypriot Arabic is spoken by the Maronite population, which settled in Cyprus mainly from the 12th century onward. Arabic Cypriot is heavily attrited, displaying morphological reduction and convergence with Cypriot Greek in phonetics and syntax.

Armenian

The majority of the Cyprus Armenian community immigrated to the island after the events of 1915–1923. Armenian is taught in community primary schools and there is an Armenian secondary school

Table 1 Phonetic properties of Cypriot Greek

Mainland Greek	*Cypriot Greek*	*Gloss & translation*	*Cypriot feature*
[ç'ɛɾi]	[ʃ'ɛɾin]	*hand.NOM/ACC.S* 'hand'	[ç] realized as [ʃ]
[cɛ]	[tʃɛ]	'and'	[c] realized as [tʃ]
[z'ʊmɛ]	[ʒ'ʊmɛn]	*live.1P* 'we live'	[z] realized as [ʒ]
['ɑ$^{(n)}$ɟɛlɔs]	['ɑ^{n}dʒ ɛlɔs]	*angel. NOM.S* 'angel'	[ɟ] realized as [dʒ]
[θɔɾ'ɔ]	[θɔɾ'ɔ] [xɔɾ'ɔ]	*see.1S* 'I see'	[θ] realized as [x]
[xɔɾ'ɔ]	[xɔɾ'ɔ] [fɔɾ'ɔ]	*fit.1S* 'I fit'	[x] realized as [f] (regional)
[mɑʎ'ɑ]	[mɑj'ɑ]	*hair.NOM/ACC.P* 'hair'	[ʎ] realized as [j]
[pɔli]	[pɔlː'i]	*many.NOM.P* 'many'	fricative lengthening, 'gemination'
[k'ʊpɑ]	[k'ʊp^{h}ɑ]	*cup.NOM/ACC.S* 'cup'	aspirated voiceless stops
['iðɑ]	['iɑ]	*see.PAST.1S* 'I saw'	intervocalic fricative deletion
[pɛðj'ɑ] [j] realized as [c]	[pɛθc'ɑ]	*child.NOM/ACC.P*	'children'
[xɔɾj'ɑ]	[xɔɾk'ɑ]	*village.NOM/ACC.P* 'villages'	[j] realized as [k]
[bɑb'ɑs]	[pɑp'ɑs]	*dad.NOM.S* 'dad'	absence of voiced stops
[to$^{(m)}$bɑb'ɑ]	[to^{m}bɑp'ɑ]	*the dad.ACC.S* 'the dad'	prenasalization & voicing of voiceless stops

Table 2 Morphological properties of Cypriot Greek

Standard modern Greek	*Cypriot Greek*	*Cypriot feature*
'ɛxʊn *have.3P* 'they have'	'ɛxʊsin *have.3P* 'they have'	Cypriot 3rd person plural morpheme
kɑt'ɑlɑvɑ *understood.1S* 'I understood'	ɛkɑt'ɑlɑvɑ *understood.1S* 'I understood'	Cypriot maintains the Ancient Greek 'augment' -*e* in all past tense forms
kɑtɑl'ɑvɑtɛ *understood.2P* 'you understood'	ɛkɑtɑl'ɑvɛtɛ *understood.2P* 'you understood'	Cypriot past tense 2nd person plural morpheme
'ɛxʊmɛ p'ɑi *have gone.1P* 'we have gone'	ɛp'ɪɑme *went.1P* 'we went/we have gone'	Cypriot does not distinguish perfective tenses morphologically
l'ʊstikɑ *wash.PAST.PASS.1S* 'I washed myself'	ɛl'ʊθikɑ *wash.PAST.PASS.1S* 'I washed myself'	Differences in passive morphology
p'ɔlɛmi *war.NOM.P* 'wars'	pɔl'ɛmi *war.NOM.P* 'wars'	Cypriot masculine nouns whose nominative ends in -*os* are stressed on the penultimate in the plural
tɔn ɛ$^{(ŋ)}$gl'ɛzɔn *the English.GEN.P* 'of the English'	tʊs ɛ^{ŋ}gl'ɛzʊs *the English.ACC.P* 'of the English'	Cypriot accusative morpheme denotes genitive (possessive)
nɛɾ'ɑci *water.DIMIN.S* 'a little water'	nɛɾ'ʊin *water.DIMIN.S* 'a little water'	Cypriot diminutive morpheme
pɛθ'ɛnɔ *die.1S* 'I die'	pɛθɑn'iskɔ *die.1S* 'I die'	Cypriot derivational morpheme -*isk*- with imperfective verb stems ending in -*m*, -*r*.

Table 3 Syntactic properties of Cypriot Greek

Mainland Greek	*Cypriot Greek*	*Cypriot feature*
tin 'iðɑ *her.CL.ACC saw. 1S* 'I saw her.' pɔs tin 'iðɛs? *how her.CL.ACC saw.2S* 'How did you see her?'	'iðɑ tin *saw. Is her.CL.ACC* 'I saw her.' 'i^{n}dɑlɔs tin 'iðɛs? *how her.CL.ACC saw.2S* 'How did you see her?'	Cypriot displays proclisis-enclisis alternation or Tobler-Mussafia (clitic-second) effects
st'ilɛ tɔ mu *send.2S it.CL.ACC me.CL.GEN* or st'ilɛ mu tɔ *send.2S me.CL.GEN it.CL.ACC* 'Send it to me.'	st'il mu tɔ *send.2S me.CL.GEN it.CL.AC*	In the imperative both Standard and Cypriot Greek display enclisis; Cypriot Greek only allows the order INDIRECT OBJECT > DIRECT OBJECT
pç'ɔs iɾθɛ? *who.NOM came.2S* 'Who came?' ti lɛs? *what.ACC say.2S* 'What are you saying?'	pc'ɔs 'ɛ^{m}bʊ 'iɾtɛ? *who.NOM {is-that} came.3S* 'Who {is it that} came?' 'indɑ ^{m}bʊ lɑl'is? *what.ACC is-that say.2S* 'What are you saying?'	Cypriot allows clefting in *wh*-questions
tɔ j'ɑni 'iðɑ *the Yani.ACC saw.1S* 'I saw JOHN'	ɛn tɔ jɑnː'i pu 'iðɑ *is.3S the Yanni.ACC that saw.1S* 'It is John that I saw.'	Cypriot has clefting where Standard Greek has syntactic focus movement

Table 4 Vocabulary of Cypriot Greek

Mainland Greek	*Cypriot Greek*	*Translation*
cɛf'ɑli	c^hɛl:'ɛ	head
ɛð'ɔ	ðɑm'ɛ	here
b'ɑlɑ	m'ɑp^{h}ɑ	ball
vɛɾ'ikɔkɔ	xɾis'ɔmilɔ	apricot
sp'iti	'ɛs:ɔ	(at) home

Table 5 Cypriot Greek orthographic conventions

Αν αρρωστήσω, μάνα μου, θέλω να σου μηνύσω, να 'ρτεις, Τρανταφυλλένη μου, να σε 'ποχαιρετήσω.
Μεν φοηθείς τον κύρην σου, μήτε τον αδερφόν σου.
Ελα, Τρανταφυλλένη μου, στον αγαπητικόν σου.

Convention 1:
Above are the opening lines of a Cypriot folk song.
The Greek letter χ is pronounced [x]/[ç] and the letter κ is pronounced [k]/[c]. The Cypriot diacritic ˘ indicates that they must be pronounced as [ʃ] and [tʃ] respectively. This convention is used mostly in poetry.

'Εσσιει έναν άστρον τζιαι ε μιτσίν μες στους εφτά πλανήτες, γιαλλουρούδα μου.

Convention 2:
Above is the first stanza of another well-known Cypriot folk song.
The clusters (σ)σι and τζ(ι) denote the Cypriot phones [ʃ] and [tʃ]/[dʒ] respectively. This orthographic convention, which does not involve extraneous, i.e. non-Greek, graphemes or diacritics, appears on the rare occasions when Cypriot Greek is written, i.e. in informal written communication, in the spelling of names and sometimes in signs.

in Nicosia. So far, there is no research on the linguistic properties of the Armenian of Cyprus.

See also: Arabic; Greek, Ancient; Greek, Modern; Turkic Languages; Turkish.

Language Maps (Appendix 1): Map 84.

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Czech

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Czech is a West Slavic language (with Slovak, Sorbian, and Polish). In 862 the ancestors of the Czechs became the first Slavs to achieve literacy in their own language when the Byzantine Saints Cyril and Methodius brought liturgical texts translated into Old Church Slav(on)ic. In the 12th to 14th centuries Czech underwent the 'přehláska' vowel-fronting changes that established 'hard' vs. 'soft' stem differentiations throughout the morphology. The 15th-century theologian Jan Hus is credited with the invention of diacritic marks to adapt the Latin alphabet to Czech phonology. Under the control of the Habsburg dynasty, particularly after the 1620 defeat at White Mountain, use of German was enforced at the expense of Czech. Czech endured decline and disuse before reasserting itself as a literary and official language in the early 19th century. The modern literary language is based on the 16th-century *Kralice* Bible, but vernacular Czech had continued to evolve, resulting in a pronounced gap between the literary and spoken language (involving phonology, morphology, syntax, and lexicon), often

Table 4 Vocabulary of Cypriot Greek

Mainland Greek	*Cypriot Greek*	*Translation*
cɛf'ɑli	c^hɛl:'ɛ	head
ɛð'ɔ	ðɑm'ɛ	here
b'ɑlɑ	m'ɑp^{h}ɑ	ball
vɛɾ'ikɔkɔ	xɾis'ɔmilɔ	apricot
sp'iti	'ɛs:ɔ	(at) home

Table 5 Cypriot Greek orthographic conventions

Αν αρρωστήσω, μάνα μου, θέλω να σου μηνύσω, να 'ρτεις, Τρανταφυλλένη μου, να σε 'ποχαιρετήσω.
Μεν *φοηθείς τον κύρην σου, μήτε τον αδερφόν σου.*
Ελα, Τρανταφυλλένη μου, στον αγαπητικόν σου.

Convention 1:
Above are the opening lines of a Cypriot folk song.
The Greek letter χ is pronounced [x]/[ç] and the letter κ is pronounced [k]/[c]. The Cypriot diacritic ˘ indicates that they must be pronounced as [ʃ] and [tʃ] respectively. This convention is used mostly in poetry.

'Εσσιει έναν άστρον τζιαι ε μιτσίν μες στους εφτά πλανήτες, γιαλλουρούδα μου.

Convention 2:
Above is the first stanza of another well-known Cypriot folk song.
The clusters *(σ)σι* and *τζ(ι)* denote the Cypriot phones [ʃ] and [tʃ]/[dʒ] respectively. This orthographic convention, which does not involve extraneous, i.e. non-Greek, graphemes or diacritics, appears on the rare occasions when Cypriot Greek is written, i.e. in informal written communication, in the spelling of names and sometimes in signs.

in Nicosia. So far, there is no research on the linguistic properties of the Armenian of Cyprus.

See also: Arabic; Greek, Ancient; Greek, Modern; Turkic Languages; Turkish.

Language Maps (Appendix 1): Map 84.

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described as diglossia between Literary Czech (LCz) and Colloquial Czech (CCz).

Most peripheral zones of the Czech Republic belong to no dialect group due to resettlement by Czech speakers from other locations after German inhabitants were ousted at the end of World War II. The two largest dialect groups are classified according to their treatment of certain etymologically long vowels as Bohemian (central and western) and Hanák Moravian (eastern). Northeastern Lachian Silesian and mixed Polish-Czech dialects serve as a transition to Polish, characterized by loss of vowel length, penultimate stress, and consonantism similar to Polish. Southeastern Moravian-Slovak dialects serve as a transition to Slovak, characterized by retention of *ů/ú* and of back vowels after palatal consonants.

Czech has the following consonant phonemes: voiced and voiceless bilabial, dental, palatal, and velar plosives; bilabial, dental, and palatal nasals; a dental trill; voiced and voiceless labiodental, dental, and postalveolar fricatives; a voiceless velar fricative; a voiced glottal fricative; voiceless dental and palatal affricates; a palatal approximant; and a dental lateral approximant. In addition, Czech has a double-articulation phoneme produced by simultaneous pronunciation of the dental trill and the voiced postalveolar fricative (*ř*). Final devoicing (*dub* [dup] 'oak') and regressive voicing assimilation of obstruents (*kdo* [gdo] 'who') is pervasive, and progressive devoicing occurs in certain word-initial clusters. Two subphonemic consonants are the velar nasal (an allophone of *n* before a velar, as in *banka* 'bank') and the glottal plosive, which appears before word-initial vowels and between vowels at the prefix boundary (eliminating vowel chains in Czech). Czech has a five-vowel system, consisting of short *a, e, i/y, o, u* and long *á, é, í/ý, ó, ů/ú*. There are seven native (*ij, ej, aj, oj, uj, ůj, ou*) and two borrowed (*eu, au*) diphthongs. The liquids *r* and *l* participate in both syllable peaks (as vowels in *smrt* 'death' and *vlk* 'wolf') and slopes (as consonants). The sole phonemic prosodic feature is vowel length. A non-phonemic stress falls on the first independent syllable of a phonological word (which may contain stressless proclitics and enclitics). CCz shows reflexes of *é>í/ý* and *ý>ej*. Since etymological *é* and *ý* figure as essential components of Czech morphology, these vowel changes are prominent in differentiating CCz and LCz morphology. Another hallmark of CCz is prothetic *v*-before word-initial *o*-, as in CCz *vocas* 'tail' (cf. LCz *ocas*).

Inflectional morphology is expressed as synthetic terminal desinences added to the stems of nouns, adjectives, verbs, and most pronouns. Inflectional desinences conflate all relevant categories: gender, number, and case for nouns and adjectives; person and number for non-past conjugations; and gender, person, and number for past conjugations. All native stems are inflected, as are the vast majority of foreign borrowings. Morphophonemic alternations include: vowel-zero alternations (*pes* 'dog'Nsg : *psi* 'dogs'Npl); qualitative vowel alternations (*moucha* 'fly'Nsg vs. *práce* 'work'Nsg); quantitative vowel alternations (*nést* 'carry' vs. *nesu* 'I carry'); and consonant alternations (*kniha* 'book'Nsg vs. *knize* 'book'Lsg).

All nouns have grammatical gender (masculine, feminine, neuter), and are declined for both number (singular, plural) and case (nominative, genitive, dative, accusative, vocative, locative, instrumental). Each gender has its own set of characteristic paradigms, including hard-stem types, soft-stem types, and special types. Masculine paradigms regularly signal animacy with distinctive animate endings in the Dsg, Asg, Lsg, and Npl. There are also special paradigm types that signal virile (male human) gender.

Adjectives are declined to match the gender, case, and number of the nouns they modify. Like nouns, adjectives have both hard- and soft-stem paradigms.

Pronouns have a mixed declensional type, using endings from both noun and adjective paradigms. Personal pronouns have both full (emphatic) and enclitic short forms.

Cardinal numerals are inflected for case, *jeden* 'one' and *dva* 'two' additionally distinguish gender, and *jeden* 'one' distinguishes number as well. Ordinal numerals are declined as adjectives.

Verbal morphology expresses aspect (perfective, imperfective; obligatory for all forms), mood (indicative, imperative, conditional), voice (active, passive), tense (non-past, past), person (first, second, third), gender (masculine animate and inanimate, feminine, neuter), and number (singular, plural); motion verbs distinguish directionality. Past conjugation uses the auxiliary verb *být* 'be' in the first and second persons. As a rule, non-past conjugation of perfective verbs signals future tense, whereas non-past conjugation of imperfective verbs signals present tense. Imperfective verbs form a periphrastic future tense with forms of *být* 'be'. Most simplex verbs are imperfective (*volat* 'call'), but some are perfective (*dát* 'give'). Perfective and imperfective verbs can be derived from simplex verbs by means of prefixation and suffixation.

Czech is a pro-drop language; nominative case pronouns are emphatic. Czech case indicates the syntactic function of a given noun phrase and the

relationship it bears to the verb and to other noun phrases and can also indicate pragmatic relationships. Word order is free, however there is a strict order of enclitics after the first stressed word in a clause.

See also: Czech Lexicography; Czech Republic: Language Situation.

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Czech Republic: Language Situation

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The Czech Republic is a linguistically homogeneous country, with the official language, Czech, being spoken by 95% of its population. Minority languages include Slovak, Polish, German, and Romany. Because of the concentration of Polish speakers in Northeast Moravia, Polish is taught in the schools there and materials are published in Polish. Within the West Slavic language family, Czech is closest to Slovak, although their mutual intelligibility – once estimated at 90% – has decreased since the breakup of Czechoslovakia in 1993.

Czech has a long written tradition, going back to the mid-13th century. The Latin alphabet is combined with additional diacritics indicating vowel length and consonant softness. Digraph *ch* represents the voiceless velar fricative.

Czech is stratified socially, geographically, and stylistically. Standard Czech, as described in normative grammars, has been absorbing innovations from the popular nonstandard variety, Common Czech, which is now spread widely throughout Bohemia and western Moravia. Regional variants that are most distinct from both Standard and Common Czech belong to the central Moravian, eastern Moravian, and Silesian macrodialects.

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Czech grammar, which is grounded in complex inflectional morphology, can be illustrated in the sentence displayed below.

v Praz-e	jsem	navštívi-l-a
in Prague-FEM.LOC.sing	*be.AUX.1.sing.PRES*	*visit-PAST-FEM.sing*

'In Prague I visited

slavn-ou	univerzit-u
famous-FEM.ACC.sing	*university-FEM.ACC.sing*

a famous university.'

Nominal grammatical categories include case, gender, and number. Animacy is relevant for declension of masculine words. A single suffix typically reflects several categories (*-u* in *univerzit-**u***). Pre-modifiers agree with the governing noun in number, gender, and case (*-ou* in *slavn-**ou***). Inflection or derivation

Czech Lexicography

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Early dictionaries of Czech (around 1350) start with three terminological bilingual works by Claretus de Solentia (Klaret) (mostly of Czech and Latin, called 'Nomenclators'), reaching their peak in the humanistic period with those of the printer and university master Daniel Adam of Veleslavín. In particular, his *Sylva quadrilinguis* (alphabetical Czech-Latin-Greek-German dictionary, 1598) was in use for several centuries and was a model for other works.

A major thesaurus by J. Amos Comenius was unfortunately destroyed following the Habsburg occupation, when Catholicism was reestablished and German was preferred as the official language. Nevertheless, his minor work *Orbis (sensualium) pictus* (1658) gained international status as a bestseller in several different versions. Later, in Baroque times, V. J. Rosa (1630–1689) compiled his *Thesaurus linguae Boëmicae* in four parts, having some 5000 entries, accompanied by other dictionaries on various topics, including etymology and proverbs (by Srnec z Varvažova).

Around 1800, over 14 new dictionaries appeared. This was due to the Czech National Revival, which was mainly focused on language. This upsurge culminated in two major dictionaries: Josef Dobrovský's *Ausführliches und vollständiges deutsch-böhmisches synonymisch-phraseologisches Wörterbuch I, II* (1802 and 1821) and Josef Jungmann's *Slovník česko-německý* (*Czech-German dictionary*, 1834–1839), with 5 volumes and 4700 pages, an impressive lexicographic monument. This trend continued with various other dictionaries, mostly terminological but also dialectal, which tended to build on those of Dobrovský and Jungmann.

The 20th century has an unparalleled record of Czech dictionaries. Alongside many bilingual works, there is a profusion of specialized dictionaries, on etymology (four different ones with Machek's standing as prominent, 1957/1968), foreign words (Petráčková-Kraus, 1995), place names and personal names, dialects, frequency (Jelínek-Bečka-Těšitelová, 1961), synonyms (Pala, 1994), and more, and two inverse dictionaries (especially that of E. Slavíčková, 1975). The largest bilingual dictionary is the *Comprehensive Czech-English dictionary* by J. Fronek (2000), with over 100 000 entries. One of the largest European dictionaries of idioms ever published is the *Dictionary of Czech phraseology and idiomatics* in four volumes by F. Čermák, J. Hronek, and J. Machač (*Slovník české idiomatiky a frazeologie:* I *Similes* 1983, II *Non-Verbal Expressions* 1988, and III *Verbal Expressions* 1994, with IV *Propositional Expressions*, 2005).

There are two smaller historical dictionaries (Bělič-Kamiš-Kučera, 1947, 1979) and an Old Czech dictionary (*Staročeský slovník*, a long-term project). *Příruční slovník jazyka českého* (*Reference dictionary of the Czech language,* 1935–1957) in nine volumes by the Academy of Sciences of the Czech Republic (Institute of the Czech Language) has 250 000 entries, covering the Czech vocabulary from 1880, and was based on an archive of some 10 million words. Because of its somewhat obsolete data, it was soon replaced by *Slovník spisovného jazyka českého* in four volumes (*Dictionary of the literary Czech language,* 1957–1971, supervised by B. Havránek *et al.*), which has some 150 000 entries, based on more recent data.

Twenty-first-century dictionaries will be able to draw on the Czech National Corpus, one of the largest European corpora, built under the supervision of F. Čermák. Currently, plans are being laid for a major corpus-based dictionary and other works. These include a new *Frekvenční slovník češtiny* (*Frequency dictionary of Czech*, F. Čermák, M. Křen, *et al.*).

See also: Czech; Slovak Lexicography.

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may bring about morphonological changes (*Prah-a* > *Praz-e*).

Verbal categories include tense, person, and mood. Central to the verbal system is the opposition of the perfective and imperfective aspect. The former denotes acts that are or will be completed (*navštívi-l-a* 'visited'). The latter can refer to progress or repetition of actions (*navštěvova-l-a,* 'visited repeatedly/attended'). The past/passive participle, marked by *-l/-n* and showing gender and number (*-a* in *navštívi-l-a*), combines with conjugated auxiliary *být* 'to be' to form the past tense/passive voice (*navštívi-l-a jsem* 'I visited').

With information about the subject marked on the verb, any subject pronoun may be dropped. Ordering of the verb and object is flexible and determined pragmatically (*Slavnou univerzitu jsem navštívila v Praze.)*. The richness of the Czech lexicon relies on its extensive derivational morphology *(návštěvník* 'visitor' MASC, *návštěvnice* 'visitor' FEM, *navštívenka* 'business card', *návštěvnost* 'attendance', *návštěvní* 'visiting' (hours), *návštěvnický* 'visitor's').

See also: Czech; Slavic Languages.

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Czermak, Johann Nepomuk (1828–1873)

J Kelly, Leeds, UK

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Johann Nepomuk Czermak, a Bohemian doctor and physiologist, responsible for establishing the laryngoscope as a tool in phonetic research, was born in Prague. He studied medicine at the universities of Prague, Vienna, Breslau (now Wrocław), and Würzburg and went on to produce, alongside much other work, a substantial body of research on the physiology of speech. Much of it was based on original observations with the laryngoscope. In 1851, he worked for a time in the Physiological Institute in Prague as assistant to Jan Purkynje, the distinguished experimental physiologist. By 1855, Czermak was Professor of Zoology at Graz; other professorial posts followed at Kraków, Jena, and Pest (now Budapest). It was in Pest in 1857 that he began his work in laryngoscopy. In 1860, he opened the private Neurophysiological Institute in Prague; nine years later, in Leipzig, he opened his Spectatorium, an institute for research and teaching in the physiology of the nerves and senses. He died in Leipzig.

Czermak did not invent the laryngoscope. A number of others, amongst them Manuel Garcia, a prominent singing teacher, Dr. Ludwig Türck of Vienna, and Dr. Benjamin Babington of London, had produced and reported on various prototypes. But a number of the problems and limitations that these previous experimenters had encountered were resolved by improvements made by Czermak, such as the provision of a satisfactory light source. He went on to give lectures and demonstrations of the new instrument. Lecturing in places as far afield as London, Dublin, and Edinburgh, he helped to bring it into general use in medical practice and research.

The introduction of this device meant that for the first time, the activity of the vocal cords and other parts of the larynx could be seen. The view was not direct, being mediated by mirrors, but even this represented an enormous advance on the previous situation, where knowledge of the workings of the vocal cords could be drawn only from observations made on cadavers or excised larynxes.

Many of Czermak's colleagues used the instrument largely to investigate cases of laryngeal pathology, but he himself was also interested in anatomy and physiology as it related to speech in general. He carried out some of the earliest investigations into phonetic phenomena that until his time had not been readily susceptible to examination; these included the Arabic 'laryngeals,' for which he used a native informant, and a number of modes of phonation, including whisper.

See also: Speech Production.

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D

Daic Languages *See:* Tai Languages.

Dakota *See:* Lakota.

Dalgado, Sebastião Rodolpho (1855–1922)

M Almedia, Thomas Stephens Konknni Kendr, Goa, India

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Sebastião Rodolpho Dalgado, the lexicographer, philologist, and folklorist, was born on May 8, 1855 in Assagão, Goa. After his priestly studies and ordination in Goa he went to Rome for his doctoral studies in law and in theology. Back in India, along with his regular priestly work he devoted a great amount of time to acquire a mastery over Sanskrit and Konkani, his native language. When posted to Goa, Sri Lanka, Calcutta, Savantvadi, and Honavar in South India he managed to learn quite a few Indo-Aryan and Dravidian languages of South Asia. The last 15 years of his life were spent teaching Sanskrit at the University of Lisbon. He died in Lisbon on April 4, 1922.

Dalgado published his Konkani–Portuguese dictionary in 1893. The good response it received and the urging of the Portuguese government inspired him to prepare his Portuguese–Konkani dictionary, published in Lisbon in 1905. Both these dictionaries are in use in Goa even today.

Comparative linguistics was Dalgado's favorite field of research. Bilingual from childhood, he had mastered the Portuguese language. As he learned South Asian languages he began to study the influence of the Portuguese language on them. On this subject he published *Influência do vocabulário Português em linguas Asiáticas* in 1913. Similarly, he made an extensive study on the influence of Asiatic languages on Portuguese and other European languages. On this subject Dalgado published two volumes of *Glossário Luso-Asiático,* in 1919 and 1921. In both these works he made use of philology and description of the phonological changes brought about in the course of deriving new words through borrowing from a foreign source.

Among Konkani speakers and folklorists Dalgado's *Florilégio dos provérbios Concanis* (1922) is well known for its comparative work on proverbs in Konkani, South Asian, and European languages. His other work consists of Portuguese dialects of South Asia, a student's grammar of Sanskrit, and translations of Sanskrit classics into Portuguese. Before he died he sent a draft of his Konkani grammar to Central Library, Panaji, Goa.

See also: Portuguese; Sanskrit; South Asia as a Linguistic Area.

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Dalgarno, George (ca. 1619–1687)

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George Dalgarno contributed significantly to the history of 17th-century British linguistics in that he developed a philosophical language (*see* **Universal Language Schemes in the 17th Century**) and an approach to teaching reading and writing to the deaf.

Dalgarno was born in ca. 1619 in Aberdeen, Scotland, and attended the university at New Aberdeen. He spent most of his life as an Oxford schoolmaster. Though he was not officially connected to any of the colleges at Oxford, his 'ideas on language planning were seminal enough to bring him in contact with some of the leading scholars there, notably John Wilkins, Seth Ward, Robert Boyle, and John Wallis' (Cram, 1990; *see also* **Wilkins, John (1614–1672)**; **Wallis, John (1616–1703)**). Moreover, he enjoyed the patronage of Seth Ward who disseminated his ideas widely. His notable work was *Ars signorum, vulgo Character universalis et lingua philosophica* (1661) in which he presented his philosophical language, and a lesser treatise was *Didascalocophus, or, the Deaf and Dumb man's Tutor* (1680) in which he outlined his method for teaching the deaf how to read and write. He died in 1687, and he is buried in the church of St Mary Magdalen in Oxford.

By 1656, Dalgarno was working on a philosophical language and, with the encouragement of Ward, he decided to collaborate with Wilkins. After a brief period, they both decided to resume working independently since they eventually differed on strategies to reach their goals. They disagreed over the number of symbols required of a philosophical language. Dalgarno preferred a system based on a minimum number of symbols which could be combined to produce more symbols while Wilkins insisted on a system which would have as many symbols as there were elements to be expressed (Cram, 1985). For Dalgarno, the Chinese system with its thousands of symbols was simply inappropriate while for Wilkins it was a model. Another significant difference between Dalgarno's and Wilkins's theories of philosophical language, as Formigari (1988) notes, was that Dalgarno built his system of expression more on general concepts while Wilkins built his more on specific words. However, both recognized the need to overlap concepts and words, and the difference in approaches was a matter of emphasis and not mutually exclusive objectives.

While Dalgarno certainly received less recognition from his contemporaries for his philosophical language than did Wilkins, it is still debatable among scholars how much Dalgarno influenced Wilkins and how significant was Dalgarno's contribution to the philosophical language movement (Formigari, 1988; Salmon, 1988). As more of his unpublished manuscripts come to light (as in Cram, 1990), he will undoubtedly enjoy greater prominence in the history of the seventeenth-century philosophical language movement (Subbiondo, 1992).

See also: Universal Language Schemes in the 17th Century; Wallis, John (1616–1703); Wilkins, John (1614–1672).

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Dance

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Dance as a Communicative Art

From the 1970s onward, scholarship on dance has grown significantly, reflecting a change of attitude toward dance. Contrary to a tradition in which dance was considered merely emotional behavior rather than a communicative art form J. L. Hanna in *To dance is human: a theory of nonverbal communication* (1979), published the first and generally most significant analysis of the phenomenon as "cognitive and language-like" (Hanna, 1987: xv). According to Hanna, dance could be defined "as a human behaviour composed, from the dancer's perspective, of (1) purposeful, (2) intentionally rhythmical, and (3) culturally patterned sequences of (4a) nonverbal body movements (4b) other than ordinary motor activities, (4c) the motion having inherent and aesthetic value" (Hanna, 1987: 19). Dance may appear to be a semiautonomous system that is distinct from any sociocultural context. When this occurs, it has an internal meaning, to be found in "the stylistic and structural manipulation of the elements of space, rhythm, and dynamics, and the human body's physical control" (Hanna, 1987: 24). Dance can be seen, however, as determined by an outside social structure that is responsible for the criteria of its creation and performance.

Within the domains of playful gestures, or *gestualité ludique* (Greimas, 1970: 70–81), and gestural texts (Greimas and Courtés, 1982: 136), dance is a form of nonverbal communication composed of a set of signifiers referring to things other than themselves. Borrowing from Goodman's (1969: 64–65) distinction between denotative and exemplificative elements, what is signified in dance can be concepts, objects, emotions, gestures of daily life, or simply rhythms and dynamic shapes that have no antecedent denotation. The communicative orientation of dance plays around the interaction of three modalities: energy, space, and rhythm. Energy is the source responsible for "the dynamic quality of movement and its subsequent meaning" (Ajayi, 1998: 18). Following Hawkins's (1964) distinction, Ajayi (1998: 18–20) discusses four types of movements that communicate different sensations. These are sustained movements resulting in "a sense of smoothness and stability" (Ajayi, 1998: 18); swinging movements whose effect is a "mid-air imbalance similar to a swaying or pendulum action" (Ajayi, 1998: 18); percussive movements "usually regarded as the outcome of high tension or bottled-up emotions which suddenly explode" (Ajayi, 1998: 19); and vibratory movements, which create "a high sense of excitement and sometimes of suspense" (Ajayi, 1998: 19). Space is the "receptacle" of the different expressions of energy (Ajayi, 1998: 19). Movements are articulated and acquire different meanings through the spatial structures. If aerial movements tend to arouse feelings of lightness, floor patterns are more likely to determine sensations of firmness and security. In the realm of space, communicative power is exercised through spatial dimensions of movements, directions followed by the performer, and the body balance. Thus, although vertical and horizontal patterns usually transmit a sense of stability, diagonal directions are perceived as imbalances. Rhythm is the component of dance that is responsible for its harmonious constitution and coordinates its manifestation in a continuous flow (Aiayi, 1998: 20).

The communication process through energy, space, and rhythm is activated by three key actors: the choreographer, the performer, and the observer. Performer and choreographer may be the same person. In fact, one performer can embody the entire communication process. The performer communicates mainly through the physical image of the body. Other channels of nonverbal communication can highly impact the perceived significance of a dance. These include both proxemic channels, such as the proximal relationship of dancer/dancers, dancer/audience, or dancer/objects; tactile and olfactory channels resulting from energetic movements; and kinesthetic channels playing on the sense of motion naturally imprinted in the human soul (Ajayi, 1998: 21–22; Argyle, 1975: 154–161).

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Dance Notation

According to Goodman (1969: 211–218), dance notation can be as influential as music notation. Indeed, advances in the semiotics of dance were fostered by attempts to record dance. 'Labanotation' is the most recognized system for transcribing movement by means of symbols. It is specifically used to archieve ballet. The system was originally developed in Vienna by Rudolf von Laban (1879–1958) as Kinetographie Laban. Further progress was made by a series of authors, among whom the most famous is Ann Hutchinson, who wrote *Labanotation* in the United States in 1954. At the core of Laban's invention was the desire to create "a literature of movement and dance" (Hutchinson, 1954: foreword) that could, first, facilitate the communication of movement ideas to other people and thus be a teaching aid and, second, enable the preservation and future reconstruction of ballets. Following a tradition that goes back to the Egyptian and Chinese movement symbols and continues with the attempts of Thoinot Arbeau (1588), Raoul Feuillet (1700), Arthur Saint-Léon (1852), Albert Zorn (1887), Vladimit Stepanoff (1891), and Margaret Morris (1928) (see Hutchinson, 1954: 1–4), labanotation is the first system of movement notation that captures the varied three-dimensional motions of dance. It offers a notation for revealing with clarity each of the specific movements of each performer. In this context, labanotation permits comparisons between different styles of dance and facilitates the reconstruction of complex techniques without the need of long verbal descriptions. The basic principle of labanotation is that movement must be first recorded in its essence and then described in its eventual modifications or embellishments resulting from the style of the performer. Movements are noted down by means of a staff consisting of three vertical lines. The columns between the lines register both gestures and the center and transference of weight. Additional symbols include quantity signs for recording whether steps are long or small or whether arms and legs are bent or extended; accent signs; and key signatures for demarking the general style of the dance (Hutchinson, 1954: 9–22).

Dance in Sociocultural Settings

Divisions of dance are not clearly established. Hanna enumerated the main oppositions between "primitive versus theatre, classical versus folk, social versus ethnic, ballet versus modern." Additional elements Hanna sets forth include "participation (purpose, recruitment pattern, motivation and participation action); elements of movement and body emphasized (movement elements, body parts pattern of motion and pose and exhibition of intention to move, movement transformation); genetic classification (independently invented, imposed, borrowed voluntarily, elaborated creation); and consciousness (transcendental or temporal-cognitive, temporal/transcendental)." (1987: 54–56)

In the different social contexts where it occurs, dance has the power to translate mental concepts in movements that transfer information about and for social exchanges. Because of its being "extraordinary," dance is "an attention-getting device, arresting and seductive" (Hanna, 1987: 101), with a unique capacity for impressing itself on human minds.

Aside from contexts in which dance is a form of social entertainment, it plays a significant role in the domain of religion. In the ancient Christian tradition, music, poetry, and dance were performed together, with the same rhythms, as a way to glorify God. Among the remarkable dances in the Bible, it is worth mentioning that of the prophetess Miriam after the passage through the Red Sea and that of David while moving the ark to Jerusalem (Exodus chapter 15, verse 20 and 2 Samuel chapter 6, verses 12–15). Although St. Tomas and St. Bonaventura warned their audience against the power that dance may have to provoke libido, the Church enhanced dancing as an instrument for strengthening morality and spreading belief (Pontremoli, 2003: 22).

From a more general point of view, Hanna recognized four main communication functions of dance in the religious field: "worship or honour," "conducting supernatural beneficence," "affecting change," and "embodying the supernatural" (Hanna, 1987: 106–125, with an extensive bibliography on the relevant ethnographic and anthropological studies). As part of the rituals of the African population, dance covers multifunctional roles. It can be a sign of reverence, an act of propitiation, an expression of a desire toward the divine, or more generally, a way of greeting. Through dance, individuals can become the mediators of supernatural power and instill desired gifts into others. Changes of status and emotions, such as the passage from childhood to adulthood and from the denial to the acceptance of death, can also be codified by certain dances. Finally, in possession and masked dance, the deity is seen as revealed through the movement of the captured body, and the dancer acquires the right of dictating a normative behavior.

In addition to religion, the efficacy of dance is mainly recognized for its social power over self and others. This power is enhanced by the combination of two factors: "one is that dance has cognitive

dimensions. Second, dance is an autonomic system with multi-sensory immediacy that causes excitement, fear, and pleasure for performers and observer" (Hanna, 1987: 147). While dancing in ballet especially, the trained body seems to free itself from the barriers of gravity; it shows its spirituality through corporeity and thus achieves what for others might appear unattainable. Dance is a device for marking sociopolitical status and magnifying the supremacy of states. It has been used to introduce competitions, influence the outcome of wars, or enhance social control. For its didactic nature, dance can be used as a vehicle to convey political messages or inspire values.

See also: Greimas, Algirdas J.: Theory of the Sign; Kinesics; Nonverbal Communication; Proxemics; Social Semiotics; Space: Semiotics.

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František Daneš belongs to the youngest generation of linguists of the Prague Linguistic Circle, active in the second half of the 20th century. He was born on July 23, 1919 in Písek, South Bohemia. His early years were influenced by World War II, when Czech universities were closed down. Unable to study during the war years, he commenced his university studies in 1945 at Charles University in Prague. Among his teachers at the Philosohical Faculty was Bohumil Trnka (*see* **Trnka, Bohumil (1895–1984)**), professor of English and former secretary of the prewar Prague Linguistic Circle. This is where he gained knowledge of the ideas of the prewar Prague linguistic school, predominantly those of Mathesius and Jakobson. This linguistic approach enabled him to view language structure as a complex phenomenon based on the mutual relationship of syntax and semantics, and events crossing sentence boundaries.

In the late 1940s he started work at the Institute of Czech Language, at the Czechoslovak Academy of Sciences, headed by B. Havránek, one of the Czech founders of Prague Linguistic Circle. In 1965 Daneš succeeded him as director of the institute, in which post he served until 1970, when he was removed for political reasons as a result of the Soviet occupation of Czechoslovakia in the fall of 1968. After the fall of Communism in 1989 he was reinstated to the post of director, which he held until 1994. As of 1992 he was a professor at Charles University. Even after retiring, he has remained active in the field of linguistics. In 2003 he was elected president of the World Linguistic Congress held in Prague.

Daneš' first book was *Sentence-intonation in present-day standard Czech* (in Czech) with a lengthy English summary, published in 1957. The basic concept introduced is *rhythm-unit* (RU), tone group or tone unit in contemporary phonology. The RU is determined by the specification of its boundaries. This approach was methodologically important for the development of Czech linguistics. The hierarchy of RUs in the utterance reflects the semantic structure of the sentence. The order of tone units corresponds to {theme, rheme} orderings and enables the realization of the intention of speakers and the corresponding rhythmic unit representation in text. The book contains numerous examples from Czech prose and poetry. Individual grammatical events are analyzed, e.g., the use of Czech clitics. He demonstrated individual grammatical events on various examples of artistic presentation of texts. This pioneering work remained the focal point of Daneš' later activities.

The theory of linguistic levels, published in 1964, further developed some of the ideas presented in *Sentence-intonation*. In *Travaux* (1964), he published a study entitled 'A three level approach to syntax,' in which he differentiated the grammatical and semantic structure of the sentence and the organization of utterance. The establishment of these levels was in reaction to the absence of a semantic level in Chomsky's prestandard theory. It was later introduced in Chomsky's *Aspects*.

According to Daneš, the role of the semantic level was to explain the functions of sentence parsed phrases such as subject, object, etc. He considers utterance in close relation to the sentence – and thus further develops Mathesius's Functional Sentence Perspective (FSP). The relation of text and sentence was the subject of various other Daneš studies, e.g., the book *Sentence and text* (in Czech, 1984), in which the explanation of intrasentential and intersentential relations played a dominant role.

Daneš' theoretical linguistic work is based on his observation of language and on analytical and interpretational studies of his native language; see *Sentence patterns in Czech* (1981) and *Syntax*, vol. 3 of *Czech grammar*, of which Daneš was editor-in-chief. His life-long systematic study of the Czech language has made him one of the world's leading Bohemicists.

See also: Havranek, Bohuslav (1893–1978); Jakobson, Roman (1896–1982); Mathesius, Vilém (1882–1945); Prague School; Trnka, Bohumil (1895–1984).

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Danish

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Danish is the native language of more than 5 million people in the Kingdom of Denmark, including the Faroe Islands and Greenland, where Danish is the second language for most of the inhabitants. It is the first language of some 50 000 people in South Schleswig, North Germany, and of more than 100 000 Danes currently living in other European countries, including Norway and Sweden. There are also some Danish émigré communities in the United States and Canada.

History

Danish belongs to the North Germanic group of the Germanic languages. The earliest language of this group, Ancient Scandinavian (c. 200–600), was common to the Scandinavian area, as indicated by runic inscriptions. Around the 9th century, the descendant language, Old Scandinavian, gradually developed into two distinct branches, viz., West Scandinavian (Old Norwegian and Old Icelandic (or Old Norse)) and East Scandinavian (Old Danish and Old Swedish). Historically, the Danish language may be divided into three periods: Old Danish (c. 800–1100) spans the Viking Age, Middle Danish (c. 1100–1500) was the language of the late Middle Ages, and Modern Danish covers the time from around the Reformation (and the first translation of the Bible) to the present. Of the Scandinavian languages, Danish is now closest to Norwegian *bokmål* and Swedish. For more than 400 years (1380–1814), Norway was part of a Dual Monarchy under the Danish Crown.

Early changes from Old Scandinavian to East Scandinavian saw some diphthongs develop into monophthongs (e.g., <ai> and <ei> > <e> and <au> and <øy> > <ø>) and the loss of <h> before <l, n, r>. In Middle Danish, a number of changes in sounds and spelling began to distance Danish (Da.) from Swedish (Sw.): (1) the full vowels <a, i, u> were weakened to <e> [ə] in unstressed syllables (e.g., Sw. *skriva*, Da. *skrive* 'write'); (2) the aspirated stops <p, t, k> became unaspirated <b, d [ð], g [j]> (e.g., Sw. *gata*, Da. *gade* 'street'); and (3) the sounds [d, g, v], when they did not disappear altogether, changed into [ð, j, w], respectively, with [j] and [w] often becoming the second element of diphthongs (e.g., Da. *dag* [daj] 'day,' *liv* [liw] 'life').

Orthography

Modern Danish has the same 26 letters as English has, plus the three additional vowels, <æ> [ɛ], <ø> [ø], and <å> [ɔ], which are placed last in the alphabet; the letters <q, w, x, z> occur only in foreign loans. Since there have been very few and only minor spelling reforms for centuries, Danish spelling does not accurately reflect the pronunciation. This is true concerning both consonants and vowels.

Pronunciation

Danish has some 15–20 consonant phonemes, comprising at least the stops /p t k b d g/, the fricatives /f v s ð/, the nasals /m n ŋ/, the lateral /l/, the uvular /r/, the glottal /h/, and the two 'semivowels' /j/ and /w/. All the stops are voiceless, so /p t k/ and /b d g/ are distinguished solely by /p t k/ having (strong) aspiration and by /b d g/ being unaspirated. However, in positions other than initially before /j, l, r, v/ and/or a full vowel, /p t k/ are pronounced [b], [d] or [ð], and [g]. Postvocalic /r/ becomes vocalic [ˆ], merging with the preceding vowels, e.g., in the <-(e)r> ending of the present tense and the plural of some nouns, as in *jeg læse-r* /ˈ1ɛ:ŝ/ 'I read' (cf. *at læse* 'to read') and *mange sted-er* /ˈsdɛ:ð̂/ 'many places' (cf. *et sted* 'a place'). The /h/ is pronounced initially only before a full vowel and is dropped before /j/ or /v/, as in *hjælp* /jɛlb/ 'home' and *hvad* /vað/ 'what.'

Danish has 11 vowel phonemes /i e ɛ a ɑ y ø œ u o ɔ/, all of which have a long and a short realization, so the real number may be said to be 22. There are eight front vowels – five unrounded /i e ɛ a ɑ/ and three /y ø œ/ rounded – and three rounded back vowels (/u o ɔ/). There are no unrounded back vowels. There are also some allophones, e.g., [œˑ] in relation to [œ], and [ɒ] in relation to [ɔ], both lowered by an adjacent /r/. The unstressed vowels [ə] and [ˆ] may be seen as allophones of /e/ and /r/, respectively. The number of front vowels (unrounded and rounded) is very large compared with most other European languages. In addition, there are two sets of diphthongs with an underlying long or short vowel, respectively, as the first element, and /j/, /w/, or /ˆ/ as the second, numbering over 20 in all.

Danish has a unique feature called *stød* (marked /ʔ/), which resembles the glottal stop in English but is more of a 'creaky voice' without complete closure of the vocal cords. It can occur when there is a so-called *stød* base in the form of either a long vowel or a short vowel + a sonorant (/l/ or a nasal), as in *hus* /hu:ʔs/ 'house' and *lyn* /lynʔ/ 'lightning.' Certain word pairs are distinguished in speech solely by the presence or

Table 1 Positions in main and subordinate clauses in Danish[a]

Clause	*Position*						
Main	**F**	**v**	**n**	**a**	**V**	**N**	**A**
	Han	har	—	altid	sendt	sin søster (IO) et brev (DO)	til jul.
	(He	has		always	sent	his sister a letter	for Christmas.)
Subordinate[b]	**k**	**n**	**a**	**v**	**V**	**N**	**A**
	at	han	altid	har	sendt	sin søster (IO) et brev (DO)	til jul.
	(that	he	always	has	sent	his sister a letter	for Christmas)

[a]Abbreviations: F, front position (subordinate clause: k, = conjunction); v, finite verb; n, subject (when not in F); a, central adverbial(s); V, nonfinite verb(s); N, object/complement; A, other adverbial(s). Note that an indirect object (IO) precedes a direct object (DO).
[b]Assume a preceding main clause: *Han siger* 'He says' (note that there is no change of order in English!).

absence of *stød* (*hund* /hunʔ/ 'dog' vs. *hun* /hun/ 'she'). Some southern Danish dialects are without *stød*, though.

There are no tones and no sentence accent in Danish, so the last stressed syllable shows no more prominence than other stressed syllables do. This can make Danish speakers sound rather dull and uninteresting to foreigners. The intonation contour of the stressed syllables is characterized by a gradual fall, but the first unstressed syllable in a prosodic stress group is on a higher pitch than the immediately preceding stressed one is. Both range of and variation in pitch are much narrower than in English, Norwegian, and Swedish.

Morphology

Danish nouns are inflected for number, gender, and case. There are two numbers (singular and plural), two genders (common and neuter), and two cases (unmarked case and genitive). Plural endings are *-e*, *-(e)r*, or *zero*-ending, though some foreign loans may retain a foreign ending, as in *faktum*, *fakta* 'fact(s)' and *fan*, *fans* 'fan(s).' The indefinite article is *en* in common gender and *et* in neuter (*en bil* 'a car,' *et dyr* 'an animal'); the definite article is either a front article (*den* or *det* (SG), *de* (PL)), used when an adjective follows the article, as in *den store bil* 'the big car,' *det store dyr*, *de store biler/dyr* 'the big car(s)/animal(s),' or an end article attached to the noun (*-(e)n* or-*(e)t* (SG), *-ne* (PL)), when there is no adjective, as in *bil-en* 'the car,' *dyr-et* 'the animal,' *biler-ne/dyre-ne* 'the cars/animals.' The genitive ending is *-s* (*bilen-s lygter* 'the car's lights').

Verbs have no person or number distinction and thus no agreement with the subject, as in *jeg/hun/de er/spiser* 'I am/eat, she is/eats, they are/eat.' There are four conjugations: three weak ones with the past tense endings (*-(e)de*, *-te*, *-de*) and one strong one with the *zero*-ending (*-t*), as in *leg-ede*, *hør-te*, *sag-de*; and *sang*, *fand-t* 'played, heard, said'; and 'sang, found.' The past participle ending is-*(e)t*, as in *leg-et* 'played and *hør-t* 'heard.' The infinitive ends in *-e* or a full vowel (*at leg-e* 'to play,' *at få* 'to get'), and the present participle ends in *-ende* (*løb-ende* 'running'). There are two passive forms, an *-s* passive and a form with the auxiliary verb *blive* + a past participle, as in *brevet sendte-s/blev sendt* 'the letter was sent.'

Most adjectives agree with nouns and articles and have the endings *zero* or *-t* (SG) or *-e* (PL) in indefinite forms, and *-e* in all definite forms: *god smag* 'good taste,' *god-t arbejde* 'good work,' *god-e kager* 'good cakes' (definite forms were mentioned previously). Comparison of adjectives is marked by the endings *-(e)r* (comparative) and *-(e)st* (superlative) or – with longer adjectives – the adverbs *mere* and *mest*. Most adverbs have the ending *-t* (*han løb hurtig-t* 'he ran fast').

Personal pronouns show case distinction (nominative vs. oblique) as well as person and number distinction, as in *jeg/mig*, *hun/hende*, *de/dem* 'I/me, she/her, they/them.' Some possessive pronouns inflect like adjectives (*min*, *din*, *sin* 'my, your, his/her/its [third-person reflexive]') and others have just one form in all uses (*hans*, *deres* 'his, their').

Syntax

Danish word order is relatively fixed, but a distinction must be made between main clauses and subordinate clauses. A sentence schema, devised by the Danish linguist Paul Diderichsen, can account for the order of most Danish sentences. As shown in Table 1, the two types of clauses consist of seven positions (to which can be added extra positions both initially and finally), but note the different order of **v**, **n**, and **a** (finite verb, subject (when not in front), and central adverbial, respectively). In main clauses, another element may move to the front (**F**) position for emphasis (i.e., topicalization), thus causing the subject (here: *han*) to move into the **n**-position. Note that the finite verb is always in second position, because Danish is a V2 language (**V** is the nonfinite verb). Examples of **A** (other

adverbials) (especially) or **N** (object/complement, both indirect and direct) moving to the front position are common:

F	**v**	**n**	**a**	**V**	**N**	**A**
Til jul	har	han	altid	sendt	sin søster et brev.	—
Sin søster	har	han	altid	sendt	et brev	til jul.
Et brev		har	han	altid	sendt sin søster	til

Examples with **a** or **VNA** (moving together) in **F** can also be construed, but are rarer.

Questions are formed either by inversion of subject (**S**) and finite verb (**v**) (**Sv** > **vS**), thus leaving **F** empty, or by having a question-word in **F** (e.g., *Hvorfor* 'Why'):

F	**v**	**n**	**a**	**V**	**N**	**A**
—	Har	han	altid	sendt	sin søster et brev	til jul?
Hvorfor	har	han	altid	sendt	sin søster et brev	til

When a main clause (MC) follows a subordinate clause (SC), there is inversion in the main clause:

		SC				MC	
Da	han	havde	sendt	brevet,	gik	han	hjem.
k	**S**	**v**	**V**	**DO**	**v**	**S**	**A**
(When	he	had	sent	letter-the,	went	he	home)

'When he had sent the letter, he went home.'

Language Authorities

Dansk Sprognævn (the Danish Language Council), which acquired legal status in 1997, monitors the development of Danish, including the adoption of new loanwords. The Council provides guidance on language matters and is the highest authority on modern Danish spelling.

See also: Denmark: Language Situation; Germanic Languages; Language Planning and Policy: Models; Norse and Icelandic; Scandinavian Lexicography.

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Dardic

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'Dardic' languages are spoken in northwestern Pakistan and Jammu & Kashmir state in India, and extend into Afghanistan. The region, commonly known as 'Dardistān,' i.e., 'the land of the Dard (people)', is composed of the whole mountainous territory of the Hindukush, Swāt, and Indus Kohistān, the valleys of the Karakoram, and the western Himalayas. Dardistān also includes some areas occupied by non-Dardic language speaking people. Situated between South and Central Asia, with Iranian languages on one side and Indo-Aryan on the other, Dardic languages are in contact with and influenced by languages of other language families, such as Sino-Tibetan, as well as the language isolate Burushaski. One of the characteristic features of Dardic languages is that they have similarities with both Indo-Aryan as well as Iranian, the two major branches of the Indo-Iranian languages.

Dardic languages were previously divided into three sub-groups: Kāfiri/Kāfir or (present-day) Nūristānī group, Khowār group, and the Dard group proper (Grierson, 1919; Kachru, 1969). However, scholars now believe that Nūristānī is a separate sub-group of Indo-Iranian, while other languages currently classified as Dardic are of Indo-Aryan origin (Morgenstierne, 1965; Bashir, 2003: 822). Based on historical sub-grouping approximations and geographical distribution, Bashir (2003) provides six sub-groups of the Dardic languages:

1. Pashai group, also called Laghmānī, Deganó, or Dehgānī (Chugani and Chalās-KuRangal forming the eastern dialects; Sum, Damench, and Upper and Lower Darra-i-Nur constituting the south-eastern dialects; and several western dialects)
2. Kunar group (Gawarbati, Shumashti, and Grangali-Ningalami classified as the Gawarbati-type; and Dameli)
3. Chitral group (Khowar and the Kalasha sub-group)
4. Kohistānī group (Tirahi; the Dir-Swat sub-group; and the Indus-Kohistānī sub-group)
5. Shina group (the Kohistān sub-group, including Chilāsī and other languages; the Astor sub-group including Astori, Drāsi, and other languages; Gilgit sub-group, including Gilgiti and Brokskat in addition to others; and Palula)
6. Kashmiri (Standard Kashmiri, Kashtwāri/Kishtwāri, Poguli, Sirāji, Rāmbani, and Bunjwali dialects).

Of these, only Kashmiri has a well-developed tradition of written literature dating back to the 13th century. Originally written in Shārada, the current officially recognized script for Kashmiri is a modification of Perso-Arabic/Nastālīq. Shina and Khowar have also developed a writing system by modifying the Perso-Arabic script.

Available information on the numbers of speakers of most Dardic languages is based on estimated figures. The total number of speakers is about 5000 for Grangali (in 1994; spoken in the valleys south of Pech River in Kandai, Afghanistan; *Ethnologue,* 2003); 5000–6000 or less for Kalasha (spoken in southern Chitral District in Pakistan, closely related with Khowar) and Dameli (spoken in Damel valley towards the left bank of Chitral River); 8000–10 000 for Gawarbati (mainly spoken in Afghanistan; some speakers were also displaced to Pakistan during war); 60 000 for Torwali (Rensch, 1992: 33; Bashir, 2003: 864; spoken in Swat valley and Chail side valley; most speakers are bilingual in Pashto, and more and more are becoming bilingual in Urdu); 60 000–70 000 for Swat-Dir Kohistānī (in 1995; Baart, 1997: 4; spoken in Swat Kohistan and Dir Kohistan; most speakers are bilingual in Pashto); 200 000 for Indus-Kohistānī (Hallberg, 1992: 89; spoken in District Kohistan); 300 000 for Khowar (spoken in Chitral; some speakers are also found in Yasin and Ishkoman, upper Swat, Peshawar, and Karachi); and over 4 million for Kashmiri (*Ethnologue,* 2003; Koul, 2003: 897; spoken in India, primarily in Kashmir valley and its surroundings, and also in Pakistan-administered Kashmir; most speakers are bilingual in Urdu and sometimes Punjabi or other languages).

Estimates for total Shina speakers in Pakistan vary greatly, from 0.5 million (Radloff, 1992: 93) to about 3 million (Schmidt, 1988: 107–108). There are approximately 20 000 Shins (Shina speakers) in India (Radloff, 1992: 93). Shina is spoken in Gilgit, Hunza, Astor valley, Tangir-Darel valley, Chilas, Indus-Kohistān, and in the gorges of Brog-yul in central Ladakh south of the Hindukush-Karakoram ranges. The inhabitants of Brog-yul, speaking the Brokskat dialect of Shina, prefer to be called Shins/Shrins but they are popularly known as Brokpas/Dokpas by their Ladakhi and Balti neighbors (Sharma, 1998: 1). Most Shina speakers are bilingual in Balti, Kashmiri (eastern dialects), Burushaski and Khowar (Gilgit dialect), and Pashto and Indus-Kohistānī (Kohistānī dialects) (Bashir, 2003: 878).

History and Development

'Dardic' is a cover term used for a group of geographically contiguous languages of Indo-Iranian origin that share several linguistic features characteristic of themselves. It is derived from another term 'Dard' (dental *d*), which was originally used to refer to an ancient tribe living in the present-day Dardistān. Dards have been variously mentioned in literature (Ptolemy's 'Daradrai,' Strabo's 'Derdai,' the 'Dardæ' of Pliny and Nonnus, and Dinysios Periêgêtês' 'Dardanoi'; Grierson, 1919: 1). 'Dārada'/'Darada' have also been referred to in Sanskrit literature (e.g., 'Dārada'/'Darada' by Kalhana in *Rājatarangini*). In Sanskrit the term *Dard* means 'mountain' and was perhaps used because most of the Dardic area is mountainous (Kachru, 1969: 285). Mohi-ud-Din (1998: 19) points to the possibility that the term *Dard* may be a corruption of *Dravad*, given the historical evidence that Dravidians inhabited a vast area, including northern India, before the advent of 'Aryans' into this land. He further claims that Dards were not an 'Aryan' race but they were the original inhabitants of this area while Aryans came later. The term *Piśachas* or *Paiśachas* ('flesh devourers'), a derogatory term, also used in literature for Dards, was probably used by 'Aryans' to refer to the natives who perhaps called themselves *Dards*.

There has been a considerable debate over the classification of Dardic languages in terms of whether they are a third branch of Indo-Iranian language family (other two being Indo-Aryan and Iranian), or (at least, some of them) are of pure Indo-Aryan origin. Dardic languages have preserved many archaic Indo-Iranian features otherwise lost in the modern Indo-Aryan languages. A defining feature of Dardic languages is that they have undergone only some of the major Middle Indo-Aryan (MIA) phonological and morphological changes. They have also developed certain areal features neither found in other Indo-Aryan (IA) nor in Iranian languages.

Phonological Characteristics

Dardic languages have descended from the northwestern group of the MIA languages. Non-Dardic members of the same group include Punjabi, Sindhi, and Lahnda. One of the characteristic features of the phonological system of Dardic languages is the retention of the three-way distinction of Old Indo-Aryan (OIA) fricatives/sibilants *-ś* (palatal), *s* (dental), and *ṣ* (retroflex), which merged into one (dental *s*) or sometimes two (palatal *ś* and dental *s*) in many New Indo-Aryan (NIA) languages. For example, Pashai, Shumashti, Dameli, Khowar, Kalasha, Swat-Kohistani, Torwali, Indus Kohistani, and Shina have retained all three sibilants, while Grangali, Tirahi, and Kashmiri possess two sibilants (*ś* and *s*). Dardic languages have also retained the consonantal component *r* in the derivatives of the OIA syllabic *r̥* that had a number of reflexes in MIA, viz., *a*, *i,* or *u*. Various OIA consonant clusters lost in other IA languages are retained in Dardic languages.

One of the major Dardic innovations is the (partial) loss of aspiration, mainly in voiced stops/obstruents (e.g., most Dardic languages, except Torwali, which has both voiced and voiceless aspirated stops), but sometimes also in voiceless obstruents (e.g., Pashai and Grangali). Loss of aspiration is a recent development in Dardic and could be a result of contact with Iranian languages where aspiration was lost at a very early stage. Traces of aspiration in Dardic are sometimes observed in the development of tonal contrasts (e.g., Khowar *buúm* 'earth' vs. IA *b^{h}uumi*; Pashai *duú^{u}m* 'smoke' vs. IA *d^{h}ũvãã* and OIA *d^{h}uumra*).

Another innovation of Dardic languages is the development of retroflex affricates *ç*, *ç^h*, *ʝ*, and *ʐ* from various OIA clusters. This change could also possibly be attributed to areal influence. Retroflex affricates are also found in Burushaski spoken in the northwest frontier province in Pakistan and in Dravidian languages (It is a well-established theory that Dravidians were the original inhabitants of the region before the advent of Aryans who pushed Dravidians down south. The assumption is further strengthened by the presence of Brahui, a Dravidian language, in Afghanistan). Dardic languages have also developed a contrast between voiceless and voiced fricatives (e.g., *s*/*z* and sometimes *x*/*γ*), a distinction absent in most NIA as well as OIA languages but present in the Iranian languages. The vowel systems of many Dardic languages have undergone several changes. Vowel inventories as large as the 16-vowel system of Kashmiri or the 20-vowel system of Kalasha are an example. Some of the phonological changes with respect to the vowels are vowel epenthesis, consonantal palatalization, and vowel harmony.

Morphosyntax

Like most areal languages, Dardic languages are typically postpositional with S(ubject)-O(bject)-V(erb) word order. The only exception, however, is Kashmiri, which is a V2 language (i.e., the inflected verb occurs at clause-second position). Most languages exhibit Split-Ergative case marking (e.g., Dameli, Gawarbati, Grangali, Pashai, Kalam Kohistani, Kashmiri), except a few that are Nominative-Accusative (e.g., Khowar and Kalasha) or fully Ergative (e.g., Shina). Complementizers in most Dardic languages are derived

from the verb 'say' (e.g., Kalasha, Khowar, Palula, and Shina), but in many others *ki/ke* (*ki/zi* in Kashmiri), also used in most contact languages, is employed as a complementizer. Relative clauses are mostly prenominal with a fully finite verb, sometimes without a relative pronoun, and a relative-correlative construction – a typical IA and areal syntactic feature. Overtly marked case-endings behave like postpositions. Nominals preceding postpositions appear in oblique case (another typical areal feature).

Agreement patterns vary across languages. Both subject and object pronominal clitics may appear on the inflected verb (e.g., Kashmiri). In many Dardic languages animacy has become grammaticized (e.g., Khowar, Kalasha, and Torwali). Feminine gender is often marked by consonantal palatalization (e.g., Pashai, Shumashti, and Kashmiri). Most Dardic languages have developed a vigesimal counting system with (10 + n) numeral structure (sometimes with modifications) as compared to the typical IA (n + 10) system. Kashmiri is an exception, with the IA (n + 10) numeral system. A significant morphological feature of Dardic languages is a three-term (or larger), instead of the typical two-term, deictic system. For instance, the three-fold demonstrative systems of Pashai (proximate *yo* 'this', distal *e-lo* 'this', remote *(e)-se* 'that'; Bashir, 2003: 828) and Kashmiri (proximate *yi* 'this', visible *hu/ho* 'that; masculine/feminine', invisible/remote *su/so* 'that; masculine/feminine').

See also: Afghanistan: Language Situation; Areal Linguistics; Brahui; Burushaski; India: Language Situation; Indo–Aryan Languages; Indo–Iranian; Kashmiri; Pakistan: Language Situation.

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Data and Evidence

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This article surveys the major kinds of data used by linguists, focusing on the properties that bear on their usefulness in linguistic analysis – what they can serve as evidence of, and what sorts of assumptions underlie their interpretation. Linguistic data is divided herein along two dimensions: its origin, i.e., the method or technique by which it was obtained, and its kind, i.e., the phenomenon from which it was drawn. Although these dimensions are in practice not fully orthogonal, the separation helps make the issues clearer.

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See also: Afghanistan: Language Situation; Areal Linguistics; Brahui; Burushaski; India: Language Situation; Indo–Aryan Languages; Indo–Iranian; Kashmiri; Pakistan: Language Situation.

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Sources of Data

Corpora

'Corpus data' can be characterized as (a collection of) preexisting samples of language – that is, language that was originally produced for some purpose other than directly answering linguists' questions.

The contents of corpora provide evidence that has not been biased by the researcher. Similarly, they can provide samples of language produced when the speakers/writers were not consciously reflecting on the form of their utterances. (This point is not trivial: Labov (1975) documented that speakers who denied that they would ever produce a certain construction went on to do so spontaneously during the very same interview.) Corpora may bring to attention phenomena that would not otherwise have come to mind. Because they typically contain extended passages of contiguous language, they supply evidence about phenomena that cannot be studied in isolated words or sentences, e.g., how referents are identified throughout a narrative or discourse. They also provide virtually the only kind of evidence about languages that are no longer spoken.

The ability to search a corpus by computer and calculate statistics on its contents provides detailed quantitative data – for example, about the relative frequencies of different forms or constructions – that cannot be directly obtained by other methods discussed in this section. For example, corpus data are increasingly being used to show that constructions that tend to sound artificial and awkward when presented as isolated examples in linguistics articles nonetheless may occur and sound natural in everyday language situations. A further benefit to corpora of spontaneous language is reflected particularly in studies of acquisition and speech production: One can find 'errors' in such corpora, whether systematic productions by children that are not possible in the adult language or sporadic speech errors (slips of the tongue).

The kind of evidence that a corpus can supply is limited, however: for a given form of interest (morpheme, word, construction, etc.), it can tell us whether or not that form occurs, and if so, how frequently and in what contexts. What such occurrences and nonoccurrences are evidence of has no general answer. Nonoccurrence in particular is a challenge to interpret: it could imply that the form is not possible in the language, that the intended message never called for its use, or that it is inappropriate to the genre/register/modality or some other property of the corpus. Absence from even a large corpus constitutes at best a weak piece of evidence for ill-formedness.

Taking the **presence** of a form in a corpus as evidence that it **is** part of the language might seem more straightforward, but here too there are caveats, since by definition there is no way to further question the person who produced the utterance to begin with. It is paramount to know the exact origins of the corpus. For example, many texts of dead languages have been copied by people who did not themselves speak the language in question; they might have (knowingly or accidentally) altered the text while copying it. Similarly, when searching the Internet, it is hard to be certain whether the source of a given utterance is a native speaker. Furthermore, to obtain evidence that is relevant to linguistic theories, one typically also needs to know what an attested form means. This may or may not be determinable from the corpus.

For practical reasons, most corpora today are collections of written rather than spoken language. Written language in general admits of ill-formedness that would not occur in speech, arising from the writing and editing process. In the composing or editing of text it is possible to make piecemeal alterations to a sentence without being forced to reread it to verify that it still hangs together as intended (as well as, of course, making typographical errors). Editing may also introduce structures that would not be producible in real time, such as multiple center-embeddings. Thus, a single instance can scarcely count as evidence of anything whatsoever. The typical course of action is to count: if a form of interest occurs enough times in a corpus (there is no standard for how many times is enough), it can be assumed not to be the result of a random editing or copying error; however, the confounds noted above could still apply. (A 'confound' is a factor that systematically affects the outcome of a study but is not deliberately manipulated by the researcher. In the present case, the outcome could consist of the distribution of words, sentence types, etc., in a corpus. This could be systematically affected by, for example, the editing process, which may be totally outside the scope of the researcher's interests if these involve spontaneous language production. What the researcher is manipulating might be anything that varies in spontaneous production, e.g., sentence length or who is speaking.)

Grammaticality Judgments

So-called 'grammaticality judgments' involve explicitly asking speakers whether some particular string of words is a possible utterance of their language, with an intended interpretation either implied or explicitly stated. (Analogous judgments can be sought for materials larger or smaller than a single sentence.) Grammaticality judgments provide evidence about the status of phenomena that occur so rarely in

spontaneous language use that we could not learn about them from studying corpora; in particular, they distinguish possible from impossible utterances among those that have never been naturally produced. Grammaticality judgments sometimes demonstrate knowledge of language in speakers whose behavior on other tasks does not evince the same degree of knowledge. For example, Linebarger *et al.* (1983) showed this experimentally for people with agrammatic aphasia, and it has been reported (e.g., Berko and Brown, 1960) that children will sometimes reject an adult's faithful repetition of an utterance they have just produced, apparently realizing that their own productions are not hitting the intended target. Another circumstance where speakers' judgments may diverge from their own usage, noted above, arises particularly when the phenomenon under study involves forms identified with social status. A way in which one can try to deal with such cases is to distance the judgment from the speakers themselves, by not asking, "Would you say this?" but rather, "Have you heard people say things like this?" or "Do you know anyone who talks like this?"

Although there are strings of words that seem unequivocally completely well-formed (*Mary saw John*) and strings that seem completely ill-formed (e.g., *Fred the the this*), most strings of linguistic interest lie in a vast gray area between these two extremes. For this reason, simply eliciting yes/no grammaticality judgments is of limited value. Two solutions are to elicit responses on a five- or seven-point scale (as is typical in psychology), or to elicit relative judgments that compare minimal pairs of sentences. The notation used to indicate the status of sentences has evolved to allow numerous gradations of well-formedness to be indicated, but even so, the **relative** status of examples is primarily what is being described; the same annotation does not always convey the same absolute level of well-formedness.

In some cases it is difficult to replicate relatively agreed-upon judgments of linguists while testing naïve subjects with no linguistic training (e.g., Gordon and Hendrick, 1997). Partly for this reason, and partly for sheer convenience, linguists rely heavily on other linguists for judgment data on some languages. Some consider this undesirable (cf. Spencer, 1973). Valian (1982) made a case in favor of using such 'expert' judgments, based on analogy to another domain: she noted that wine tasting, for example, relies on the acquired ability to detect subtle distinctions that inexperienced wine drinkers simply cannot make. Wine experts detect these subtleties easily, reliably, and consistently from one person to the next. Her suggestion was that linguists have the same skills with language. One practice that is clearly undesirable, however, is for investigators to use **their own** judgments as their primary evidence.

The nature of grammaticality judgments has sometimes been characterized with reference to traditions in psychology that might lead one to worry about the wisdom of using them as evidence in linguistics: they have been described as "introspective" judgments or "intuitions," but neither of these terms applies accurately (Carr, 1990; Schütze, 1996). They have more in common with the responses in psychophysics experiments, having the character of sensations or reactions to stimuli, or else reports about mental states (e.g., pain) or social-psychological judgments for which there is no objective external measure to compare them to, e.g., judging the seriousness of various crimes or the prestige of various occupations. There is also no basis for the occasionally encountered view that grammaticality judgments are somehow related to competence, while spontaneous production and comprehension data are related to performance; all are behaviors – hence performance data – but all can in principle provide evidence (indirectly) about competence (cf. Smith, 2004). For these reasons, Schütze (1996) argued that 'acceptability reactions' would be a more accurate and less confusing term, removing reference to the ambiguous and loaded notion 'grammar,' but the dominant usage is unlikely to be overturned.

Fieldwork

Much of our linguistic data is vanishing before our very eyes: at least 20% and perhaps as many as 50% of the languages spoken in the world, as of the year 2000, were not being learned by children and will thus cease to be spoken at all by 2100, unless dramatic changes occur (Krauss, 1996). This state of affairs has led to the suggestion that linguists should devote greater attention to documenting and helping to preserve endangered languages, which typically involves fieldwork with native speakers. Field linguists have a great influence over what kinds of evidence can subsequently be constructed from their data, by virtue of how they record the data (e.g., how detailed their transcriptions are), what forms they choose to elicit, and which of these they disseminate. Eliciting meaningful data is a specialized skill and art: one must, for example, avoid inventing utterances in the speaker's language and simply asking for good/bad judgments about them as one would do with a fellow linguist, because for various sociological reasons speakers tend to over-accept ungrammatical forms. At a minimum, one must verify that speakers can repeat the utterance back; if not, it probably is not really part of the language they speak (Munro, 2000).

Data gathering for ethnographic and sociolinguistic purposes, including dialectology, is also typically considered a type of fieldwork; it mainly involves language as it is naturally spoken when people meet and interact in their daily lives, rather than in a formal elicitation situation. Here, the issues that affect the collection and interpretation of data include a range of variables that are known to influence the way people talk, e.g., the identity of the speaker and addressee (sex, age, social status, education, ethnic heritage, power relationships) and properties of the situation (number of conversants, physical setting, level of formality, topic of conversation, social goals such as establishing group solidarity). To interpret this kind of data, one must face what Labov (1972) called the 'observer's paradox': when people know they are being observed or recorded, their way of speaking changes, but we want to study how they speak in situations when they are not being observed. A common attempt to minimize this problem involves introducing maximally engaging subject matter to draw speakers' attention, for example, by asking about emotional topics such as a life-threatening event, or how the world has changed since they were young.

Experiments

It has sometimes been suggested that claims made exclusively on the basis of grammaticality judgment data, do not necessarily bear on how the human language faculty actually works, unless their 'psychological reality' has been tested using some other sort of data, typically a formal experiment. This view belies a misunderstanding: grammaticality judgments are themselves data about human behavior that need to be accounted for; they are not intrinsically less informative than, say, reaction-time measures (in fact, one might argue the opposite). The elicitation of grammaticality judgments can itself be seen as a behavioral experiment, albeit one whose generally casual nature may leave it susceptible to certain kinds of confounds. (These can be a result, for example, of the limited number of types and tokens of items tested, the small number of participants questioned, or lack of randomized order of presentation.) Nevertheless, in this section, 'experiment' will refer to traditional formal experiments.

The most direct behavioral experiment one can perform to assess the status of sentences or other forms is essentially a more rigorous version of grammaticality judgment collection, typically done using a written questionnaire with a multivalued response scale. In the case of syntactically well-formed strings whose possible meanings are at stake (e.g., sentences with multiple quantifiers), a truth value judgment task may be appropriate for adults, just as it is for children (Crain and McKee, 1985). Beyond experiments that ask participants for their reactions explicitly, a large variety of experimental paradigms used in psychology can be employed to assess participants' language in more indirect ways. These generally involve a trade-off between reducing the influence of conscious reflection about language on the data and making response measures more difficult to interpret as evidence *vis-à-vis* linguistic issues. There have also been experimental paradigms developed expressly for (psycho)linguistic purposes, e.g., the so-called Wug test (Berko, 1958), lexical decision, self-paced reading, and naming. In some domains, experimental data collection can occur during 'normal' language-processing activities (e.g., from eye movements during reading), where the only 'abnormality' involves the physical restrictions imposed by the equipment.

Recent years have shown the promise that we might learn about the workings of language by direct measurements from the brain. Techniques used in this way have included event-related potentials (ERP), functional magnetic resonance imaging, positron emission tomography, and magneto-encephalography. In addition to expensive equipment, these all require special training in the use of the hardware and in statistical techniques for analyzing the data. While some of these techniques may provide a relatively fine-grained characterization of the parts of the brain that are most involved in processing certain aspects of linguistic stimuli, this localization is not terribly helpful as evidence about the particulars of linguistic structure. More provocative have been suggestions (mostly in the ERP literature) that the grammatical status of certain classes of stimuli (e.g., word or sentence types) might be reflected in characteristic patterns of activity (e.g., Neville *et al.,* 1991). For example, it has been claimed that syntactic vs. semantic anomalies have distinct signatures, and even that violations of different grammatical constraints show different patterns. Interpretation of these claims is still open to debate, however, in that it is not established whether a full range of superficially diverse sentence types that by hypothesis share a common grammatical property (e.g., violating Subjacency) have a detectable commonality in brain activity; if it turns out that each kind of ungrammaticality (e.g., extraction from a subject island versus an adjunct island vs. a complex NP island) produces a different ERP pattern, the value of this kind of data for theoretical purposes may be limited. The hope driving this line of research, however, is that if we can find reliable brain signatures for clear cases of certain linguistic properties, we can then compare them to brain measures in reaction to unclear cases

and take the brain data as evidence on how to treat those unclear cases.

Kinds of Data

Language Acquisition and Creolization

In addition to informing the study of language acquisition in its own right, data from children acquiring language may be relevant more generally as evidence about human language. By elucidating the 'starting state' of the language-acquisition process, it may yield insights into language universals and unmarked values of parameters, on the assumption that the initial state embodies these. Via the course of development, child grammars may arise that never surface as adult grammars, providing the only opportunity to study those grammars directly. In a similar but more dramatic vein, creolization provides evidence for the noninput-driven nature of knowledge of language, since in this case it is 'invented' (unconsciously) by children when there is no robust language present in the input. If one takes the view that language is a mental construct internal to the individual speaker–hearer, then in both normal acquisition and creolization situations, learners are doing the same thing: determining which of their possible internal grammars is most compatible with the ambient speech. What is unique to the emergence of a creole is the fact that the ambient speech is not being generated by any other human's internal grammar. As a result it might be compatible with a great many of the learners' possible grammars, or with none at all; in either case the learners must make 'decisions' on some basis other than what they are hearing. Thus, even more strongly than for other acquisition data, it is thought that creoles may provide fairly transparent evidence for the defaults of grammar.

Second Language

The language of nonnative speakers may illuminate how native language learning depends on special properties of childhood that do not persist over a lifetime, e.g., so-called 'critical period' effects. It may also inform us about which properties of a language should be identified with a single locus of knowledge, e.g., a parameter. As a hypothetical example, consider speakers of languages that have V-final clauses and P-final adpositional phrases. We could pursue the question of whether a single 'head parameter' is responsible for ordering in all lexical projections by asking whether such speakers make the same sorts of word-order errors with V as with P when learning a language that is V-initial and P-initial. Adult second-language learners also potentially provide data about language acquisition that are not obtainable from child acquirers due to independent limitations on cognitive ability, memory, attention span, articulatory control of the vocal tract, and so on. Of course it remains to be shown to what extent adult and child acquisition are parallel; in particular, it is hotly debated whether the starting state for second-language acquisition is the universal default from which infants begin, the grammar of the first language, or something else.

Bilingualism

Bilingual (or multilingual) speakers can provide a unique kind of data for linguists, in that they allow crosslinguistic comparisons that control for all factors other than language (cognitive abilities, cultural experiences, etc.). (This is true also of concurrent bilingual acquisition by children, given the mounting evidence that children separate the systems of their two languages early and easily.) Bilingual speakers additionally have a unique behavior, (intrasentential) code switching, that is constrained in ways that could bear on the grammar. Furthermore, given sufficient understanding of the ways in which two linguistic systems connect with each other and with a (presumably) common cognitive system, new experimental avenues may be opened up.

Language Disorders

Linguistic data from people with language disorders is often (but not uncontroversially) taken as evidence of how language works in unaffected speakers. This may seem paradoxical, since the presence of a disorder *ipso facto* indicates some divergence from the way language normally works. Nevertheless, for many disorders it is believed by numerous researchers that selective loss of language functions reflects the way language is implemented in the brain for affected and unaffected speakers alike, and hence can tell us which aspects of language depend on the same subsystems and which are relatively independent. This assumption might seem justified in the case of brain injuries, as opposed to congenital disorders, but even then, the brain can adapt to such changes, so that a person's speech may actually reflect the loss of some function **plus** an atypical mechanism developed in response to that loss. The fact that data from language disorders typically involve small numbers of speakers, often single case studies, provides further cause for using them cautiously as evidence about human language in general.

Performance Errors

Speech errors have proven to be a rich source of data on the organization of linguistic representations in

the mind/brain, as well as on the time course of language production. Certain kinds of speech errors can be experimentally induced, but these are limited and their ecological validity is questionable. Most of the work in this area has traditionally been based on observational collection of spontaneously produced slips assembled into sizeable databases. More recently there has been growing concern about the degree of bias in data collected this way – linguists tend to write down errors that have interesting properties, while letting relatively mundane ones pass by unrecorded. This is widely believed to lead, at the least, to a bias in the relative proportions of error types represented in informally gathered corpora. As a consequence, some researchers advocate culling errors only from recorded language samples that can be scrutinized exhaustively until no more errors can be found. What this kind of data gains in quality it loses in quantity: the amount of time required for this procedure would have been prohibitive for amassing the collections of tens of thousands of speech errors that were needed to establish basic generalizations. Those errors were produced, and certainly the kinds that occurred in reasonable numbers should be taken as evidence about human language.

Typology and Historical Change

Much can be learned from the range of attested variation across languages, as well as systematically unattested patterns. In addition to providing evidence for the range of possible human languages, such data provide evidence as to which properties of language necessarily covary and which are independent. For this purpose both 'macroparametric' variation (large-scale differences among typologically very different languages) and 'microparametric' variation (minimal differences between linguistically, and usually also geographically, very close languages) is relevant. The kinds of changes that occur in the same language over time can be seen as a special case of the latter, with the further benefit that historical records may allow us to identify the triggers for certain changes, providing evidence for causal connections between language input and grammatical development.

General Remarks

Variability

A problem linguists face every day is how to explain apparently conflicting data about a language, most commonly situations where different speakers of 'the same language' or even 'the same dialect' report different reactions (e.g., different well-formedness judgments) to identical stimuli. On the one hand, those who take a cognitive perspective are investigating what is in the mind/brain of each individual ('I-language'), rather than an abstract object out in the world ('E-language'), so there would be no contradiction in finding that speakers do not have identical I-languages. This could happen because the language input that speakers were exposed to during acquisition was not identical, or because their brains are not identical, i.e., universal grammar is subject to individual variation.

On the other hand, it is worrying if too many such differences are found, because it might be a sign that the judgments are reflecting, in heterogeneous ways, individual differences **outside** the grammar. The conundrum arises because any data collected from a single individual are susceptible to random confounds; the best way to eliminate such confounds is to consider multiple speakers and hope for convergence. An important emerging finding stressed by Cowart (1997) is that while the well-formedness of a particular sentence might be rated (say) 5 out of 7 points by one participant and 2 out of 7 points by another, there is much less individual variation in the **patterns** of responses – that is, in how sentences rate **relative** to one another. (Cowart also stressed the need to run appropriate statistical tests to determine this.) This is the reason why linguists are primarily concerned with contrasts, say between a sentence marked '??' (barely grammatical/marginally possible) and one marked '*' (ungrammatical/impossible), but not about how good or bad '??' really is in any absolute sense.

Thus, to the extent that numerous speakers show the same pattern of data, the odds of this pattern being the result of some random source diminish rapidly, and it can be taken as solid evidence. However, there is no way to apply the opposite logic: unique judgments of a particular speaker could be good evidence about their idiolect, but it is harder to be certain of this; certainty increases to the extent that the same speaker behaves consistently on different occasions and tasks. More generally, because no single kind of data is perfect, an efficacious approach to linguistic investigation is to seek converging evidence from a wide array of types of data whenever possible.

Data, Evidence, and Theory

There are an essentially limitless number of facts about languages that one could, in principle, document. Data collection therefore always involves selecting – either implicitly or explicitly – certain facts to use as data while ignoring other facts. Often, linguists collect data because they have a theoretical issue they want to pursue and are seeking

evidence that will bear on it. To take a syntactic example, linguists studying a particular language might want to know whether a construction they have identified involves (in Government-Binding terms) 'object control' versus 'raising-to-object' (e.g., *I ordered them to find the answer* versus *I believed them to know the answer*). They are seeking evidence that the crucial noun phrase (*them*) originates as an argument of the 'upstairs' verb or evidence that it originates in the 'downstairs' clause. They will therefore want to look for data (which might come from grammaticality judgments, if a speaker is available, or from a corpus) on such things as the possibility of the crucial noun phrase being an expletive, an entailment relation with related sentences lacking the complement clause, synonymy under downstairs passivization, etc. The choice of data to be collected is thus driven by the theory, which in turn determines the questions that are to be answered on the basis of empirical evidence. Even when linguists are not explicitly pursuing any theory, their choices of data to collect are guided by hypotheses or hunches about how languages tend to work, which aspects are relatively unpredictable, and so on, as well as possibly the immediate pragmatic goals of the task. So, if instead the aforementioned linguists had been writing the first grammar of this language, collecting these particular pieces of data might not have occurred to them at all, or if it had, it might have been considered of too little importance relative to other things that such a grammar should include.

A final point to be made about the relationship between data in its raw form and its application as evidence can be illustrated with a well-known, though often misrepresented, example from the early years of generative grammar: the 'derivational theory of complexity' (DTC). The idea was that a transformational model of syntax would be independently supported if one could find evidence from language processing for the application of transformations, assuming that a sentence should take longer to process if deriving it required applying more transformations. Data on this point were fairly easy to collect, and in some cases *prima facie* contradicted the predictions of the DTC: for example, passives without *by*-phrases took less time to process than their longer counterparts with *by*-phrases, while the former were supposed to be derived from the latter by one additional deletion transformation; the (full) passive versions of some sentences were sometimes faster to process than their active counterparts – e.g., when the active structure involved center-embedding and the passive converted this to right-branching – while passives were always supposed to be derived from actives by one additional transformation. At the time, these data were taken as evidence against the DTC, which was generally abandoned for several decades; it was concluded that transformations did not necessarily literally apply during the processing of a sentence, either because transformations were the wrong theory of syntax or because syntactic theory as a competence model could not be expected to have reflections in real-time language behavior.

But the leap from the data to what it was evidence of was a mistake. The error involved overlooking a *ceteris paribus* assumption: more transformations should imply more processing time **all else being equal**, but in the crucial cases just mentioned, there is good reason to think that all else was not equal. For example, processing time surely has a component that increases with the number of words in a sentence (just keep adding instances of the word *very*, for example), which could explain the *by*-phrase result. And center-embedding plausibly puts a burden on short-term verbal memory that could slow language processing in general, independent of any other properties of a sentence, which could explain the passives that were faster than actives. Thus, while the collected data are evidence about the overall processing load differences between pairs of transformationally related sentences, the hypothesis being tested concerned just processing load due to the application of the extra transformation. It therefore called for different data: the processing load differences between sentences that differed in the number of transformations applied, but **not** on any other property that might reasonably be expected to affect processing load. Only the latter kind of data should count as evidence bearing on the DTC.

See also: Bilingual Language Development: Early Years; Bilingualism and Second Language Learning; Code Switching and Mixing; Corpora; E-Language versus I-Language; Endangered Languages; Idiolect; Interlanguage; Language Acquisition Research Methods; Psycholinguistic Research Methods; Researching Naturally Occurring Speech; Speech Errors: Psycholinguistic Approach; Transformational Grammar: Evolution.

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See also: Gilliéron, Jules (1854–1926).

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Perhaps, next to W. V. Quine, Donald Davidson is America's most important philosopher of the 20th century. Davidson, almost single-handedly, developed the truth-theoretic approach to meaning. It forms the basis of a research program in the semantics of natural language that seeks to do its job without appealing to universals, properties, functions, or classes as the semantic values of predicates, or to facts or states of affairs as the semantic values of sentences.

According to Davidson, a semantic theory for a natural language *L* should specify what each sentence means, and it does so by delivering, for each sentence S of *L*, a theorem of the form 'S is true iff *p*,' based on an empirically adequate theory of truth for *L*. Davidson himself applied this program to action sentences ('Brutus killed Caesar'), the logical form of intensional sentences ('Galileo said that the Earth moves'), and the semantics of adverbial clauses ('John walked slowly') and developed proposals that were picked up, further developed, and criticized by many linguists and philosophers of language. In other areas, too, Davidson's work introduced new and fruitful ideas. With Noam

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Chomsky, but based on different considerations, he claimed that conventions do not play an essential role in language, speaking and understanding are always based on rational strategies (speakers aim at being understood and interpreters aim at understanding), languages are basically constantly evolving idiolects, there is no such thing as metaphorical meaning, and so on. Davidson himself saw his semantic program as part of a broader inquiry into the nature of rationality and the place of mind in a physical world. He famously (and controversially) claimed that mental or semantic predicates could not be reduced to physical predicates – the application of mental and semantic predicates is constrained by constitutive principles of rationality that have "no echo in physical theory." In epistemology, Davidson argued, against W. V. Quine, that experiences are causal but not epistemic intermediaries between our beliefs and events and objects in the world. Our conception of an objective world is crucially connected with our capacity to locate other persons and oneself (as a communicator with others) in a common, objective world with which both causally interact.

See also: Chomsky, Noam (b. 1928); Epistemology and Language.

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Veneeta Dayal, who started her linguistic career as Veneeta Srivastav was born December 5, 1956 in Patna, India. She completed her undergraduate education in English literature in 1976 at the University of Delhi, where she then continued her graduate studies, receiving the M.Phil. degree in English literature in 1981. Concurrently, Dayal worked as lecturer of English at Ram Lal Anand College, University of Delhi, and at Jamia Millia Islamia, Delhi. In 1983, she left India for the United States, and began her doctoral studies in linguistics at Cornell University in Ithaca, NY in 1984. Her doctoral dissertation, *WH dependencies in Hindi and the Theory of Grammar*, was written under the guidance of Gennaro Chierchia. She received her Ph.D. in 1991. In 1990, Dayal was appointed Assistant Professor at Rutgers University in New Jersey, where she is currently professor of linguistics. From 2002 to 2003, she was head of the South Asia Initiative at Rutgers University, and from 2003 to 2004, the director of the South Asian Studies Program. She has also served as visiting associate professor at the Department of Linguistics at Harvard University in 2003.

Dayal's primary research combines three major domains of study:

1. Formal semantic theory.
2. The nature of the semantics–syntax interface.
3. South Asian linguistics.

Her approach adopts a cross-linguistic perspective to elucidate aspects of a theory of universal grammar. Her formulation of scope marking is a case in point, arguing for a universal instantiation of scope marking in natural language, with crosslinguistic differences arising from the range of options available for languages to syntactically realize the semantic relation associated with scope marking structures. Her most well-known work, *Locality in WH quantification*, uses data from Hindi and English to argue that a

Chomsky, but based on different considerations, he claimed that conventions do not play an essential role in language, speaking and understanding are always based on rational strategies (speakers aim at being understood and interpreters aim at understanding), languages are basically constantly evolving idiolects, there is no such thing as metaphorical meaning, and so on. Davidson himself saw his semantic program as part of a broader inquiry into the nature of rationality and the place of mind in a physical world. He famously (and controversially) claimed that mental or semantic predicates could not be reduced to physical predicates – the application of mental and semantic predicates is constrained by constitutive principles of rationality that have "no echo in physical theory." In epistemology, Davidson argued, against W. V. Quine, that experiences are causal but not epistemic intermediaries between our beliefs and events and objects in the world. Our conception of an objective world is crucially connected with our capacity to locate other persons and oneself (as a communicator with others) in a common, objective world with which both causally interact.

See also: Chomsky, Noam (b. 1928); Epistemology and Language.

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Dayal, Veneeta

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Veneeta Dayal, who started her linguistic career as Veneeta Srivastav was born December 5, 1956 in Patna, India. She completed her undergraduate education in English literature in 1976 at the University of Delhi, where she then continued her graduate studies, receiving the M.Phil. degree in English literature in 1981. Concurrently, Dayal worked as lecturer of English at Ram Lal Anand College, University of Delhi, and at Jamia Millia Islamia, Delhi. In 1983, she left India for the United States, and began her doctoral studies in linguistics at Cornell University in Ithaca, NY in 1984. Her doctoral dissertation, *WH dependencies in Hindi and the Theory of Grammar*, was written under the guidance of Gennaro Chierchia. She received her Ph.D. in 1991. In 1990, Dayal was appointed Assistant Professor at Rutgers University in New Jersey, where she is currently professor of linguistics. From 2002 to 2003, she was head of the South Asia Initiative at Rutgers University, and from 2003 to 2004, the director of the South Asian Studies Program. She has also served as visiting associate professor at the Department of Linguistics at Harvard University in 2003.

Dayal's primary research combines three major domains of study:

1. Formal semantic theory.
2. The nature of the semantics–syntax interface.
3. South Asian linguistics.

Her approach adopts a cross-linguistic perspective to elucidate aspects of a theory of universal grammar. Her formulation of scope marking is a case in point, arguing for a universal instantiation of scope marking in natural language, with crosslinguistic differences arising from the range of options available for languages to syntactically realize the semantic relation associated with scope marking structures. Her most well-known work, *Locality in WH quantification*, uses data from Hindi and English to argue that a

more articulated semantics leads to a simpler syntax. More specifically, Dayal proposes that Logical Form, the level that mediates between syntax and semantics, is derived from S-structure by local movement. Novel types of local relationships that interrogative and relative clauses can enter into account for phenomena such as scope marking and correlatives, which are generally assumed to involve long-distance dependencies at LF.

Dayal's work on correlatives in Hindi ranks among the first contributions to a formal semantic account of 'exotic' constructions crosslinguistically. Dayal's scholarly contributions also extend to a range of topics in formal semantic and syntactic theory including the expression of genericity in different languages, Free Choice items, the semantics and pragmatics of questions, definiteness, binding and scrambling, partial wh-movement, clause structure in South Asian languages, and crosslinguistic variation in the expression of kind terms.

Dayal was founding editor of the South Asia Syntax–Semantics Newsletter, which disseminated information about research activities conducted in the languages of South Asia from 1991 to 1997. She has held several visiting positions at universities in Europe, including Potsdam, Konstanz, and Berlin. She has received multiple research grants and teaching excellence awards from Cornell University, Rutgers University, the American Institute of Indian Studies, and the National Science Foundation. She is currently holder of a Fulbright Senior Research award to study classifiers in South Asian languages.

See also: South Asia as a Linguistic Area.

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De Dicto versus *De Re*

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Philosophers of language and linguists often distinguish between *de re* and *de dicto* readings of certain locutions. For example, take the sentence, 'Juan believes that the man who wrote *Platform* is Belgian.' As a rough initial characterization, to read this sentence *de re* is to read it as saying that Juan has a belief *about the man himself* – namely, Houellebecq – that he is Belgian. Juan need not be thinking of Houellebecq as the author of *Platform* in order for the sentence – read *de re* – to be true. Juan may have said, 'Michel Houellebecq is Belgian,' or, pointing at Houellebecq, 'That man is Belgian.' The important thing is that Juan has a belief about that man, however he is characterized.

In contrast, to read this sentence *de dicto* is to read it as saying that Juan has the following belief: *the man who wrote* Platform *is Belgian*. Here, 'the man who wrote *Platform*' is a crucial part of the content of Juan's belief. For this *de dicto* report to be true, it is not even necessary that Juan knows who wrote the book *Platform*. Indeed, he may believe that the man who wrote that book is Belgian for reasons that have nothing to do with any information he has obtained about the man Houellebecq.

There are many conflicting ways of characterizing this distinction, and so even a preliminary characterization is controversial. There have been three key elements in traditional discussions of this distinction: syntactic representation, semantic interpretation, and

more articulated semantics leads to a simpler syntax. More specifically, Dayal proposes that Logical Form, the level that mediates between syntax and semantics, is derived from S-structure by local movement. Novel types of local relationships that interrogative and relative clauses can enter into account for phenomena such as scope marking and correlatives, which are generally assumed to involve long-distance dependencies at LF.

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Philosophers of language and linguists often distinguish between *de re* and *de dicto* readings of certain locutions. For example, take the sentence, 'Juan believes that the man who wrote *Platform* is Belgian.' As a rough initial characterization, to read this sentence *de re* is to read it as saying that Juan has a belief *about the man himself* – namely, Houellebecq – that he is Belgian. Juan need not be thinking of Houellebecq as the author of *Platform* in order for the sentence – read *de re* – to be true. Juan may have said, 'Michel Houellebecq is Belgian,' or, pointing at Houellebecq, 'That man is Belgian.' The important thing is that Juan has a belief about that man, however he is characterized.

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There are many conflicting ways of characterizing this distinction, and so even a preliminary characterization is controversial. There have been three key elements in traditional discussions of this distinction: syntactic representation, semantic interpretation, and

metaphysical import. These three elements are often tied together in such discussions, and it is the aim of this article to provide the reader with tools for keeping them distinct.

Usually, the distinction between *de re* and *de dicto* readings is made for complex sentences, where one sentence, such as 'Dimitri's plane is late,' is embedded in the context of what is often called a sentential-complement-taking clause or a sentential operator. Some sentential operators are 'Juan believes that...,' 'It is not the case that...,' "Howard denies that...,' and 'It is possible that...'

Take, for example, the sentence, 'Juan believes that Dimitri's plane is late.' It is commonly thought that there are two readings of this sentence – a *de re* and a *de dicto* reading. On the *de dicto* reading, the embedded sentence is, in a certain important sense, treated as a syntactic and semantic unit. The embedded sentence taken as a whole is treated as a key player in the semantics of the larger sentence in which it is embedded. To understand the *de dicto* reading then, we must understand what a sentence as a whole can contribute semantically.

Gottlob Frege (1948) proposed that the meaning of a sentence is the thought that it expresses. Bertrand Russell (1905) also was concerned with the thoughts or 'propositions' that sentences are used to express. Though Russell talked of propositions as the objects of belief, he thought that they could, in principle, be composed of ordinary objects and properties. In this he differed from Frege, who could make no sense of the idea that an object could be apprehended directly in thought. Frege argued that all thought about objects is mediated by representations of those objects – such representations or senses of expressions occur in Fregean thoughts or propositions, not the objects themselves. So, as key ingredients of a semantic theory, Fregean thoughts and Russellian propositions look like very different sorts of entities. In some writings, Russell seemed closer in his views to those who think sentences express (actual or possible) facts or states of affairs. Contemporary discussions of sentence meaning often involve the question of whether propositions must be 'structured' or can be represented as sets of possible worlds (often 'centered' with respect to an individual).

In summary, on a *de dicto* reading the embedded sentence is treated as a syntactic and semantic unit. Its semantic value as a whole plays a key role in the semantics of the sentence in which it is embedded – whether this semantic value is taken to be a thought, a proposition, a fact or state of affairs, or an abstract set theoretic entity.

Let us continue with the *de dicto* reading of the sentence, 'Juan believes that Dimitri's plane is late.' If you think, as did Frege, that sentences express thoughts, you will think that this sentence relates Juan to the thought content, *that Dimitri's plane is late*, and says that Juan believes *that*. If 'Dimitri's plane is late' is embedded in the context of 'It is not the case that...,' the embedded sentence might be taken to express the proposition *that Dimitri's plane is late*. The whole sentence could then be interpreted as the claim that this proposition is not true. If we embed the sentence, 'Dimitri's plane is late,' into the context of 'It is possible that...,' this could be interpreted as the claim that the state of affairs represented by the embedded sentence is a possible state of affairs.

These readings, which focus on the embedded sentence and the thought, proposition, fact, or state of affairs it represents, are in contrast with *de re* readings of the same sentences. On a *de re* reading of the sentence, 'Juan believes that Dimitri's plane is late,' Juan is said to believe *of* Dimitri's plane – of that very thing – that it is late. Philosophers, philosophical logicians, and linguists have found various ways of emphasizing the *de re* reading by using different syntactic forms – and often very awkward ones. Applied variously to the sample sentences above, the 'rephrasing' strategy might yield the following: 'Dimitri's plane is believed by Juan to be late,' 'Dimitri's plane is possibly late,' 'Dimitri's plane is such that it is fortunate that it is late,' and 'Howard denies, of Dimitri's plane, that it is late.'

The difference between the *de re* reading and the *de dicto* reading might not strike the reader as important and may be difficult to grasp, even with these reformulations. It becomes apparent, however, when we recognize the distinction between opaque and transparent contexts (or, less theoretically neutral, intensional and extensional contexts.) Consider the sentence, 'Juan believes that Dimitri's plane is late.' Suppose that Pamela Anderson is on Dimitri's plane, though Juan has no idea that this is the case. If so, then Dimitri's plane is also Pamela Anderson's plane. However, would we want to say that Juan believes that Pamela Anderson's plane is late? Contexts that do not allow substitution of co-designative expressions without change in truth value are called opaque. They are also called intensional contexts by those who, inspired by Frege, think that linguistic expressions (including sentences) have both an extension and an intension. According to a Fregean theory, the intension of a sentence is the thought it expresses, and the extension of a sentence is its truth value. What then accounts for the opacity of the sentence, 'Juan believes that Dimitri's plane is late'? That is, why can we not substitute 'Pamela Anderson's plane' for 'Dimitri's plane'? A Fregean would say it is because 'Juan believes that...' is an intensional context – the expressions occurring in this context

contribute their intension (thought content) to the semantics of the whole, not their extension (e.g., the plane itself that is being referred to by the two expressions).

However, this is not the whole story for the sentence, 'Juan believes that Pamela Anderson's plane is late.' Russell, for example, recognized a *de re* reading of the sentence. On the *de re* reading, this sentence does not say that Juan believes the proposition or thought content *that Pamela Anderson's plane is late*. It says that Juan believes, of a certain thing, namely a certain plane, that it is late. This plane happens to be Pamela Anderson's plane, Dimitri's plane, and the plane flown by Captain Marshall and First Officer O'Hare. However, on the *de re* reading it does not matter how we refer to the plane, so long as we refer to the right plane. If Juan has a belief about a thing, then it does not matter how we refer to that thing, so long as we manage to refer to it and to assert correctly what it is that Juan believes about it. Read *de dicto*, 'Juan believes that Dimitri's plane is late,' is opaque, as the substitution of co-designative expressions may not preserve the truth value of the sentence. Read *de re*, it is transparent. Any way of referring to the plane will preserve the truth of the sentence.

Though he used different terminology, Russell (1905) represented the two readings by means of the notion of scope. If the definite description, 'Dmitri's plane,' occurs within the scope of the sentential operator, then it occurs within an opaque context and the whole sentence is to be read *de dicto*. To represent the *de re* reading, Russell put the definite description outside the scope of the sentential operator, where it occurs transparently or extensionally, which means that the substitution of any co-designative (co-extensive) expression will preserve truth. We might gloss the two readings that result from the permutation of the relative scope of the sentential operator and the definite description as follows:

Giving widest scope to the sentential operator to represent the *de dicto* reading:
Juan believes that: Dimitri's plane is late.

Giving widest scope to the description to represent the *de re* reading:
Dimitri's plane is such that: Juan believes that: it is late.

Complex sentences that talk about the beliefs and other psychological attitudes of people are not the only types of sentences that allow for both *de re* and *de dicto* readings. For example, consider the sentential-complement-taking clauses typically called modal operators. Examples of modal operators are 'It is possible that…' and 'It is necessary that…' Consider this sentence, 'It is possible that Dimitri's plane is arriving 15 minutes late.' Read *de dicto,* it is supposed to be understood as the claim that the proposition expressed by the embedded sentence, 'Dimitri's plane is arriving 15 minutes late,' is possible. (When philosophers say that a proposition is possible, they usually mean that though it may not actually be true, it expresses a state of affairs that could have been true or is true in some possible world.) So, even supposing that Dimitri's plane is on time, it could very well have been late – if there was bad weather, congestion on the runway, or the like.

Now, suppose that Dimitri's plane is in fact the only plane that is on time this afternoon. Could we not therefore say, 'It is possible that the only plane that is on time this afternoon is arriving 15 minutes late,' substituting the phrase, 'the only plane that is on time this afternoon,' for the co-designative (co-extensive) 'Dimitri's plane'? If the resulting sentence is read *de dicto*, it would seem to claim that the following is a possible state of affairs: The only plane that is on time this afternoon is arriving 15 minutes late. However, this is not a possible state of affairs, because being the only plane that is on time precludes arriving 15 minutes late. If we are reading this sentence *de dicto*, we cannot substitute a co-referring expression for 'Dimitri's plane' without changing what the sentence says and possibly changing its truth value as a result. So, 'It is possible that…' seems to be an opaque context too, just as is 'Juan believes that…'

However, just as 'Juan believes that…' allows for a *de re* reading, so does 'It is possible that…' If we were to read the modal sentence *de re* – as stating of a certain plane, the very plane that as a matter of fact happens to be the only plane to arrive on time this afternoon – that it is possible that *that plane* should be arriving 15 minutes late, then it does seem to be true. All planes, even planes that happen to arrive on time, are subject to being delayed by 15 minutes. How we refer to the plane does not matter when the claim is a *de re* possibility claim, a claim about what is possible for a particular plane. *De re* modal claims, just as do *de re* claims about Juan's beliefs, allow truth-preserving substitution of co-designative expressions. This is in contrast to reading the possibility claim *de dicto*, where what is claimed is that a certain proposition or state of affairs is possible. On a *de dicto* reading it matters whether the embedded sentence is 'the only plane to arrive on time this afternoon is arriving 15 minutes late' or 'Dimitri's plane is arriving 15 minutes late.' As with belief statements, it has been customary to represent the *de dicto* and *de re* readings of modal sentences by means of Russell's device of scope:

Giving widest scope to the sentential operator to represent the *de dicto* reading:
It is possible that: the only plane to arrive on time this afternoon is 15 minutes late.

Giving widest scope to the description to represent the *de re* reading:
The only plane to arrive on time this afternoon is such that: it is possible that: it is 15 minutes late.

Notice that one of the sentential operators mentioned in the introduction – 'It is not the case that. . .' – does not create an opaque context. Suppose we read the sentence, 'It is not the case that John's uncle is on the plane,' *de dicto*. That is, we read it as stating that a certain proposition – *that John's uncle is on the plane* – is not true or as stating that a certain state of affairs does not obtain. Suppose John's uncle is also Dave's uncle and Saima's uncle, and so we substitute 'Dave's uncle' for 'John's uncle' and get this sentence, 'It is not the case that Dave's uncle is on the plane.' It seems that no matter how we refer to John's uncle, the truth value of the sentence as a whole is not going to change. If the proposition expressed by 'John's uncle is on the plane' is false, then the proposition expressed by 'Dave's uncle is on the plane' is likewise false; if the state of affairs picked out by 'John's uncle is on the plane' does not obtain, then neither does the state of affairs picked out by 'Saima's uncle is on the plane.' Unlike 'Juan believes that. . .' and 'It is possible that. . .,' the sentential operator – 'It is not the case that. . .' – does not seem to create an opaque or non-extensional context.

If that is the case, what is the difference between the *de dicto* reading of the sentence and the *de re* reading in this instance? Suppose we read the original sentence *de re*, as stating *of* John's uncle, that it is not the case that he is on the plane. If we are just talking about *that man* (who happens to be John's uncle, Dave's uncle, and Saima's uncle) and saying of him that he is not on the plane, then we can use any way of referring to him that we like. This follows as a matter of course from the *de re* reading. However, we have seen that, though it is forbidden to substitute co-designative expressions in certain *de dicto* contexts, making that substitution here does not affect the truth of what is said. If the difference between the *de re* and *de dicto* readings does not seem to make a difference, then why should we distinguish the two in cases where the operator in question does not seem to create an opaque context?

Here is where it becomes very important to distinguish between the notion of scope – which involves the structural relations among quantifiers, sentential operators, and other linguistic expressions – and the semantic interpretations of complex sentences that scopal disambiguations may or may not be thought to represent. So far we have been using examples where the embedded sentence includes a singular referring expression, such as 'Dimitri's plane' and 'the only plane to arrive on time this afternoon.'

Yet, consider complex sentences that contain quantifier phrases, such as 'someone,' 'every passenger,' and 'most planes.' The sentence, 'Juan believes that someone is responsible for the mistake,' can be read in two ways, usefully disambiguated as follows: (1) 'There is someone (in particular) whom Juan believes to be responsible for the mistake,' said when Juan has specifically blamed Geoff; and (2) 'Juan believes that someone (or other) is responsible for the mistake,' said when Juan has scoffed at the idea that the mistake was a result of a random computer glitch. The difference between the two readings could be explained as a result of a structural ambiguity concerning whether the quantifier or the operator has widest scope. This is how we represented it above. Alternatively, some have suggested that the ambiguity should be explained as the result of an ambiguity in the quantifier phrase itself, which might arguably be thought to allow for a 'particular someone' or a 'someone or other' reading. Likewise consider this sentence, 'Every robber jumped into a car.' This also seems to allow for the following two readings, represented by permutations of scope. The first reading is, 'Every robber is such that there is a car such that that robber jumped into it.' This would be true if, for example, every robber jumped into a different car. Contrast that reading with, 'There is a car such that every robber jumped into it,' which would be true only if every robber jumped into the same car.

In closing, the ambiguities that arise from the interaction of quantifiers with other quantifiers, and from the interaction of quantifiers with sentential-complement-taking phrases, can often be represented by means of the notion of scope (Montague, 1974). In a systematic theory of syntax and the logical structure of sentences, one may wish to acknowledge scopal ambiguities even when the results of scopal disambiguation are logically equivalent. In contrast, the *de re*/*de dicto* distinction for certain types of ambiguous sentences has typically involved a more robust semantic characterization of the distinct readings that result from disambiguation – even when these distinct readings are represented by means of a structural disambiguation, as above. This can be explained in part historically. The *de re*/*de dicto* ambiguity has historically been tied to particular sentential operators that have been the focus of philosophical scrutiny because of their close connections with topics central to logic, metaphysics, and epistemology.

The semantic treatment of sentences such as 'Juan believes that Dimitri's plane is late' has been mired

in controversy for over 100 years, because of the assumption that the semantics of belief sentences cannot be worked out until a theory of belief is developed. For example, some have argued that *de re* readings of 'believes that' sentences do not even make metaphysical sense, on the grounds that there is no direct belief about individuals, but only belief about those individuals under some manner of representing them (Kaplan, 1968). Likewise, the correct semantic treatment of sentences, such as 'It is possible that Dimitri's plane is late,' has been thought to depend on who, among logicians and metaphysicians, has the correct theory of modality (i.e., of necessity and possibility). In fact, some philosophers have argued that *de re* readings of modal sentences do not make metaphysical sense, because they rely on a purportedly dubious distinction between 'necessary' and 'merely contingent' properties of objects (Quine, 1956). It is essential therefore, when encountering discussions of the *de re*/*de dicto* distinction, to be clear on whether the discussion is about syntactic representation, semantic interpretation, or metaphysical import.

See also: Architecture of Grammar; Articles, Definite and Indefinite; Complement Clauses; Descriptions, Definite and Indefinite: Philosophical Aspects; Direct Reference; Epistemology and Language; Extensionality and Intensionality; Meaning, Sense, and Reference; Metaphysics, Substitution Salva Veritate and the Slingshot Argument; Object-Dependent Thoughts; Proper Names: Semantic Aspects; Propositional Attitude Ascription: Philosophical Aspects; Propositional Attitudes; Referential versus Attributive; Rigid Designation; Scope and Binding: Semantic Aspects.

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Tullio de Mauro, a leading Italian linguist, was born in the city of Torre Annunziata, near Naples. He received his master's degree in classics from the University of Rome in 1956. He was Lecturer of Philosophy of Language at the University of Rome (1957) and Lecturer of Linguistics at the Oriental Institute of Naples (1958–1960). He later became Associate Professor of Philosophy of Language at the University of Rome. In 1967 he was appointed Professor Ordinarius of General Linguistics and German Philology at the University of Palermo, and then of Linguistics of the University of Salerno, where he acted as director of the linguistic institute (1970–1974). He returned to the University of Rome 'La Sapienza' as Professor Ordinarius of Philosophy of Language (1974–1996) and of General Linguistics (from 1996 on). He gave a series of lectures in the Scuola Normale superiore di Pisa (1973) and has lectured at universities around the world.

His scholarly leadership positions have included the foundations and the presidencies of the Linguistic Society of Italy (SLI, 1969–1973) and the Società di Filosofia del Linguaggio (from 1993 on). He has also held a variety of high-level political offices, including Cultural Councillor of the Lazio Region (1975–1980), member of the European Research Committee

in controversy for over 100 years, because of the assumption that the semantics of belief sentences cannot be worked out until a theory of belief is developed. For example, some have argued that *de re* readings of 'believes that' sentences do not even make metaphysical sense, on the grounds that there is no direct belief about individuals, but only belief about those individuals under some manner of representing them (Kaplan, 1968). Likewise, the correct semantic treatment of sentences, such as 'It is possible that Dimitri's plane is late,' has been thought to depend on who, among logicians and metaphysicians, has the correct theory of modality (i.e., of necessity and possibility). In fact, some philosophers have argued that *de re* readings of modal sentences do not make metaphysical sense, because they rely on a purportedly dubious distinction between 'necessary' and 'merely contingent' properties of objects (Quine, 1956). It is essential therefore, when encountering discussions of the *de re/de dicto* distinction, to be clear on whether the discussion is about syntactic representation, semantic interpretation, or metaphysical import.

See also: Architecture of Grammar; Articles, Definite and Indefinite; Complement Clauses; Descriptions, Definite and Indefinite: Philosophical Aspects; Direct Reference; Epistemology and Language; Extensionality and Intensionality; Meaning, Sense, and Reference; Metaphysics, Substitution Salva Veritate and the Slingshot Argument; Object-Dependent Thoughts; Proper Names: Semantic Aspects; Propositional Attitude Ascription: Philosophical Aspects; Propositional Attitudes; Referential versus Attributive; Rigid Designation; Scope and Binding: Semantic Aspects.

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As a sociopolitical linguist activist, De Mauro promoted language primacy in Italy as the field of social communication, necessary condition for democracy ('res publica'). Beginning in 1989 he focused on applied Italian linguistics, and in 1999 he published *Il grande dizionario italiano dell'uso* (250 000 words, 130 000 compound nouns or polyrhematic lemmas, with usage markers on each different use of a word) as an essential tool for linguistic communication and education.

See also: Italian; Language Politics; Lexicography: Overview; Structuralism; Syntax of Words.

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Decipherment

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Civilizations ebb. Their scripts go out of use and are forgotten. Sometimes documents survive to be discovered and puzzled over; sometimes they yield their secrets to persistent inquiry and reveal facts of human history unclear, unknown, or even unsuspected from traditional sources. The decipherment of scripts, then, is an important phase of the historian's enterprise.

The standard dictionaries would have it that every time Assyriologists or Egyptologists read a cuneiform tablet or a hieroglyphic inscription they are engaged in deciphering. But as a technical term, 'decipherment' refers rather to the reading of some writing not hitherto understood. I. J. Gelb (e.g., 1973: 268) set up a typology of possible decipherments.

	WRITING	
LANGUAGE	known	unknown
known	0	I
unknown	II	III

Type 0 normally means everyday documents, a familiar language in its ordinary script. But it also comprises things such as Punic texts written in Greek letters, or Indian names in Chinese Buddhist compositions. Both of these can present knotty problems for the philologist, and must indeed count as deciphering words.

Under Type I, Gelb counts such decipherments as Phoenician and Ugaritic; but this is to play on an ambiguity in the word 'known.' If we distinguish 'identifiable' from 'familiar' languages, we may be more precise. Phoenician and Ugaritic were both readily identifiable – it was always known that certain inscriptions found lying around Europe and North Africa had been left by the Phoenicians – but there was no way to be sure that they would both be quite similar to Hebrew. Indeed, it was probably less obvious than hindsight suggests that the Ugaritic script on tablets discovered at Ras Shamra concealed a Semitic language, for the first dates provided by the archeologists were some half a millennium earlier than the earliest known Phoenician and Hebrew inscriptions. The dating has since been adjusted so that the latest Ugaritic texts and the earliest biblical passages – though not the earliest Hebrew inscriptions – are nearly contemporary. And what if the first Ras Shamra tablets had happened to include ones written in Hurrian? Similarly it was always known that Egypt's hieroglyphs preserved the language of the pharaohs, but it was one of several

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great insights that modern Coptic might represent the same language. Let us call such identifiable languages in unknown scripts Type IA, reserving Type IB for familiar languages in unknown scripts. This might include cases like Linear B, which writes archaic Greek, or Mayan glyphs, a logosyllabic script for ancestors of well-known languages.

Type II includes two different situations. The first is cryptanalysis, where the identity of the concealed language may be known, but it is written in some fashion devised to confound the reader not in possession of the key. Cryptanalysts, followed by Gelb, distinguish between codes and ciphers, the former operating at a semantic level, the latter at a phonetic (or, more likely, graphic) level. The other kind of Type II is languages that are quite pronounceable but not fully intelligible. This includes many languages that have been deciphered – the preferred term is 'interpreted' – to a greater or lesser degree, such as Sumerian, Hittite, Elamite, or Hurrian, as well as others that resist interpretation, such as Etruscan.

It is in Type III that most decipherments start out; they move into one of the other types as inspiration or toil provides the impetus. The best example is the triscriptal cuneiform inscriptions first found at Persepolis. Since this was Darius's city, it seemed likely that one of the languages was Persian of some sort; the inspiration, or luck, came in guessing correctly which one it was (it was the simplest of the three scripts and the one carved in the most prominent positions). The other two proved to be Elamite, which has not really moved out of Type II, and the Semitic Akkadian. Another well-known Type III was the Hittite hieroglyphs, which eventually turned out to conceal the similar Anatolian language Luvian.

Note the word 'inspiration.' Cyrus Gordon (1982) divides all scholars who work on unknown scripts into those who are decipherers and those who are not, based on whether they can have an original idea, stick to it when it seems to defy conventional wisdom, and abandon preconceptions when necessary. A true decipherer must have all three capacities, although the second and third might seem to exclude each other. An original idea is the notion that Coptic would be useful in reading Egyptian. An unlikely idea held on to was the notion that Ugaritic could have more than one letter for *Alep*. An abandoned preconception was that Linear B must be Etruscan. These strokes of genius make decipherment fascinating.

One reason, then, for studying decipherment is that attention to earlier strokes of genius might lead to one in the next unread script to be dealt with. Another is that the work of deciphering is like the work of learning a new language. It is not hard to see that this is externally the case – a speaker of something or other is confronted with an alien communication system—but it is interesting to discover that the filling in of details seems also to work the same way in both situations. First the broad concepts are elucidated, then the grammatical details on various levels.

But before decipherments can be considered typologically, they must be described individually. The facts of individual achievements are little known – it might be supposed that Champollion's reading of Egyptian hieroglyphics was the first such accomplishment; it is only the best known. Several scripts were deciphered earlier and several more afterward – the most celebrated being those of Old Persian, Ugaritic, and Linear B. All decipherments involve common methods and characteristics: accurate renderings, a familiar target language, a known related script, and bilinguals.

1. *Accurate renderings*. This observation might escape notice in the individual episodes of decipherment, but it becomes obvious when all decipherments are taken together: the absolute *sine qua non* of any decipherment is an accurate copy of the inscription in question; failures due to poor data are legion. We take this for granted today, with the photographer constantly in attendance, but in the 1830s – coincident with several decipherment projects – photography was just being invented by, among others, one of the pioneers in Mesopotamian cuneiform, H. W. Fox Talbot. But bits and pieces of inscriptions dribbled in from both Palmyra and Persepolis all during the 18th century and even back in the 17th. Some Himyaritic fragments arrived as early as 1803. All of these were uninterpretable – understandably, since it is indeed rather difficult to copy an inscription in unfamiliar letters when one has no idea what it says. But it was close to 150 years between the first publication of a Palmyrene text and the decipherment of the script – which was accomplished immediately when careful reproductions appeared in 1754 (Daniels, 1988). In every case, not until, and then immediately upon, the arrival of accurate copies could their interpretation be accomplished.

2. *A familiar target language*. Each of the Big Four decipherments was of a language closely related to a known one – Egyptian to Coptic, Old Persian to less old Persian, Ugaritic to Hebrew, Linear B to Greek (Type IA). Similarly, Palmyrene is nearly Syriac, the language of the early Indian Brahmi is an older Prakrit, Old North Arabic and Epigraphic South Arabian are just what their names proclaim (Type IB). On the other hand, Proto-Elamite, Indus Valley, Linear A, and pseudo-hieroglyphic of Byblos continue to resist decipherment, because their languages cannot be securely identified (Type III).

3. *A known related script*. The decipherer of Palmyrene, Jean-Jacques Barthélemy, noted that his alphabet resembled those of both Hebrew and Syriac (though he did not use such correspondences in his work). However successfully we can interpret Hurrian or Elamite or other obscure languages of the ancient Near East is due to their being written in cuneiform. But, looking at Etruscan, we see that being able to pronounce a language does not mean we can understand it. At least twice, though, a similar script was one of the keys to a decipherment rather than an interpretation (Type II as well as IB). Emil Rödiger and Wilhelm Gesenius were able to use a Himyaritic alphabet preserved in a few Islamic manuscripts for interpreting the South Arabian inscriptions; and James Prinsep could read successively earlier Indian texts whose scripts approached closer and closer to the Brahmi. (For brief accounts of most decipherments see Daniels, 1996.)

4. *Bilinguals*. Gottfried Wilhelm Leibniz is credited with the first comment on how to decipher a script. In 1714 he wrote:

> In Palmyra and elsewhere in Syria and its neighbouring countries there exist many ancient double inscriptions, written partly in Greek and partly in the language and characters of the local people. These ought to be copied with the greatest care from the original stones. It might then prove possible to assemble the Alphabet, and eventually to discover the nature of the language. For we have the Greek version, and there occur proper names, whose pronunciation must have been approximately the same in the native language as in the Greek. (quoted in Pope, 1999: 95)

Barthélemy seems not to have known this document; in 1754 he worked out these rules:

1. To decipher the alphabet of a nation whose language is unknown, it is not always a good rule to have recourse to the alphabet of a neighboring nation; and it is much worse to consider the alphabets of several different peoples. . . If it were possible to find monuments in an unknown language that represented without a doubt known words in another; if in placing each of these known words under each unknown word which ought to correspond to it, there would result on the two sides the same order and the same value: in a word, if the inscriptions written in an unknown language, combined with inscriptions in a known language, would themselves furnish an alphabet that tended to clarify them, or at least let them be read in a consistent manner, I think that in this case one would have to adopt this alphabet.
2. When a word, a man's name, for example, is found two or three times in the same inscription, it must be with the same letters; and if it appears in several inscriptions, no difference should be found beyond what comes from the difference between hands.
3. In the alphabets of the Oriental [Semitic] languages, one sees letters with different values but written absolutely or almost absolutely the same. . .
4. Finally the Orientals, when expressing Greek or Latin words in their language, suppress various vowels, and supply them by points that they do not always insert in the manuscripts, and still less often in the monuments. (quoted in Daniels, 1988: 433f. n. 54)

The most helpful of these means to a decipherment is a bilingual inscription. Both the earliest and the most celebrated decipherments involved Greek translations of texts. Many of the commemorative inscriptions at Palmyra are presented in both Greek and Palmyrene; and the Rosetta Stone includes a Greek and two Egyptian versions. As always, proper names proved to be the key: Barthélemy's first text began with the name of Septimios, and Champollion – acting, in fact, on a suggestion of Barthélemy's long before – compared royal names in the Greek with hieroglyphs enclosed in a cartouche and recognized Cleopatra (from a different inscription) and Ptolemy. In each case, various consonants emerged; fitting them into the texts suggested Syriac and Coptic forms respectively, and work could proceed.

India's other ancient script, the Kharoṣṭhi, was deciphered, again by Prinsep, on the basis of bilingual coin legends. An accompanying Phoenician text enabled the interpretation of the Cypriot syllabary. Vilhelm Thomsen interpreted the Turkic runes by way of a Chinese paraphrase inscribed on the same monument.

But that exhausts the list of decipherments involving bilingual inscriptions. Old Persian, Ugaritic, Luvian, and Linear B were interpreted from unilingual texts only.

G. F. Grotefend attacked the cuneiform inscriptions from Persepolis by looking for the formula "X, great king, king of kings, sone of Y the king . . ."—one word appearing four times, with inflections, with two different words to be the names. These had to be 'Darius' and 'Xerxes,' and he had fair approximations of the Persian originals of these Greek forms; in the end, and after various others' contributions, his insight was the key to Persian (and thence to Akkadian and Elamite).

Hans Bauer (and also Charles Virolleaud and Édouard Dhorme) looked at tablets from Ugarit and saw a format that seemed to be a ledger: lists of items with, perhaps, quantities. Among these quantities was one that had characters in the pattern *XYX*. In a Semitic language (and what alternative was there on the Levantine coast?), what could this be but *šālōš/ṯālāṯ*? And of course the letters in the number-names revealed inflections and particles, and within a few

weeks we could read Ugaritic. (For Luvian and Linear B, *see* **Aegean Scripts**.)

Four great achievements: but without bilinguals? No: in every case, a bilingual was used in the decipherment. Specific words – kings' names, place names, or numerals, known in similar languages, were applied to intelligently chosen passages in the unknown and provided the phonetic key. Without some bilingual, either a physical one or such a 'virtual' one, decipherment will be impossible.

Again looking over decipherments as a group, three approaches can be identified. The investigator studies proper names, as in Palmyrene and Egyptian; or the shapes of characters, as in Himyaritic and Brahmi; or the distribution of characters within a text (the most 'linguistic' approach), as in Ugaritic and Linear B. To decipher a script, be sure to (a) have accurate copies; (b) have a good idea of what language it ought to represent; and (c) know a similar, related script or (d) find a real or a very plausible virtual bilingual.

See also: Aegean Scripts; Mesopotamian Cuneiform Script; Scripts, Undeciphered.

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Declarative Approaches to Phonology

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Derivational Phonology

Proposals for phonological analysis – from phonemic phonology of the 1930s to contemporary approaches such as Optimality Theory – may be divided into two groups. In derivational approaches, such as Transformational–Generative Phonology, the phonetic form of a word is obtained by the application of rules to an underlying word-form that may differ in significant ways from the observed phonetic form. For example, according to the rules of Chomsky and Halle (1968), the pronunciation of the related words 'tone' and 'tonic' (in American English, [toʊn] and ['tanɪk]) are both derived from the underlying form /toːn/ If the suffix *-ic* is appended to this form, a rewriting rule of '*-ic* laxing' applies, which has the effect of shortening the /oː/ to /o/. The rule can be glossed in ordinary English as the imperative sentence 'change tense vowels into lax vowels when they occur before [ɪk].' Further rules of vowel lowering and unrounding change the vowel in other ways so that the final form ['tanɪk] is eventually produced. If *-ic* is *not* appended, a different rule applies to the underlying form /toːn/ to derive the diphthongized phonetic form [toʊn]. The addition of *-ity* to *tonic* triggers the application of more rules that modify the stress placement and vowel quality, and change the final [k] to [s], yielding the observed phonetic output [tə'nɪsəɾi], *tonicity*. All such rules can be read as imperative commands: starting from such-and-such an underlying form, first change it like this, then like so, etc.

This imperative and derivational style of phonological analysis was the mainstream approach for several decades from the 1960s until c. 1990, on account of its flexibility and explanatory power: explanatory, in that the variety of observed forms (e.g., [toʊn], ['tanɪk], [tə'nɪsəti]) were all related to a single, common underlying form. However, the ability of derivational rules to effect almost arbitrary changes to an underlying form, in order to obtain the right outcome, was viewed by many phonologists as undesirable, and potentially problematic.

Declarative Phonology

In contrast, declarative approaches to phonology do not use such rewriting rules and derivations. Instead, a phonological analysis employs two kinds of statements: realization rules and phonological constraints. Realization rules are statements of the relationships holding between phonological representations and their actual pronunciation. For example:

weeks we could read Ugaritic. (For Luvian and Linear B, *see* **Aegean Scripts**.)

Four great achievements: but without bilinguals? No: in every case, a bilingual was used in the decipherment. Specific words – kings' names, place names, or numerals, known in similar languages, were applied to intelligently chosen passages in the unknown and provided the phonetic key. Without some bilingual, either a physical one or such a 'virtual' one, decipherment will be impossible.

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See also: Aegean Scripts; Mesopotamian Cuneiform Script; Scripts, Undeciphered.

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Derivational Phonology

Proposals for phonological analysis – from phonemic phonology of the 1930s to contemporary approaches such as Optimality Theory – may be divided into two groups. In derivational approaches, such as Transformational–Generative Phonology, the phonetic form of a word is obtained by the application of rules to an underlying word-form that may differ in significant ways from the observed phonetic form. For example, according to the rules of Chomsky and Halle (1968), the pronunciation of the related words 'tone' and 'tonic' (in American English, [toʊn] and ['tanɪk]) are both derived from the underlying form /toːn/ If the suffix *-ic* is appended to this form, a rewriting rule of '*-ic* laxing' applies, which has the effect of shortening the /oː/ to /o/. The rule can be glossed in ordinary English as the imperative sentence 'change tense vowels into lax vowels when they occur before [ɪk].' Further rules of vowel lowering and unrounding change the vowel in other ways so that the final form ['tanɪk] is eventually produced. If *-ic* is *not* appended, a different rule applies to the underlying form /toːn/ to derive the diphthongized phonetic form [toʊn]. The addition of *-ity* to *tonic* triggers the application of more rules that modify the stress placement and vowel quality, and change the final [k] to [s], yielding the observed phonetic output [tə'nɪsəɾi], *tonicity*. All such rules can be read as imperative commands: starting from such-and-such an underlying form, first change it like this, then like so, etc.

This imperative and derivational style of phonological analysis was the mainstream approach for several decades from the 1960s until c. 1990, on account of its flexibility and explanatory power: explanatory, in that the variety of observed forms (e.g., [toʊn], ['tanɪk], [tə'nɪsəti]) were all related to a single, common underlying form. However, the ability of derivational rules to effect almost arbitrary changes to an underlying form, in order to obtain the right outcome, was viewed by many phonologists as undesirable, and potentially problematic.

Declarative Phonology

In contrast, declarative approaches to phonology do not use such rewriting rules and derivations. Instead, a phonological analysis employs two kinds of statements: realization rules and phonological constraints. Realization rules are statements of the relationships holding between phonological representations and their actual pronunciation. For example:

(C1) /oː/ (i.e., long /o/) corresponds to [oʊ] (in American English)

(C2) /ˈŏ/ (i.e., stressed short /o/) corresponds to [a] (in American English)

(C3) /ŏ/ (i.e., unstressed short /o/) corresponds to [ə].

(The last of these can be generalized to cover all non-high, short, unstressed vowels in most English varieties.) Note that these statements are in the declarative mood: we do not speak of turning /oː/ into [oʊ], or vice-versa. The form of expression is inherently neutral with respect to analysis or generation. Realization rules of this kind have been extremely widespread in many phonological frameworks. Statements like these are to be found in many, many phonemic analyses from the heyday of American and European structural linguistics of the 1920s to the 1950s, and persist to this day in descriptive grammars.

In order to express the generalization that *tone*, *tonic,* and *tonicity* have a common root morpheme, it is necessary to abstract away from the differences of vowel length and stress. The word-form /ton/ may, therefore, be regarded as *unspecific* about whether the vowel is long, short, stressed or unstressed. This representation is not a single form, but describes a *range* of possible forms. In a more explicit description, we may use disjunction (i.e., logical *or*) to say that the syllable may be stressed or unstressed and the vowel may be long or short. The second type of constraint, phonological constraints proper, resolves these underdetermined properties. Some of these are 'tied' to a specific word or class of words. For example, we need to say that the vowel of /ton/ is long when this syllable is word-final. Another constraint states that the vowel of the syllable preceding *-ic* is short. Among the general constraints on stress distribution are the following rules of 'Latinate' stress placement:

(C4) Stress falls on the final syllable if it is heavy (i.e., if it has a long vowel and/or a final consonant, as in *reserve*).

(C5) If the final syllable is light, stress falls on the penultimate syllable (e.g., *divisor* – the final *r* is either unpronounced or does not count).

(C6) If the final two syllables are light, stress falls on the antepenultimate syllable (e.g., *managerial*).

In addition, the suffix *-ic* is associated with its own specific constraint on stress placement:

(C7) Stress falls on the syllable before *-ic* (e.g., *tonic*), unless *-ic* is itself stressed (as in *tonicity*).

Although the constraints in the foregoing examples are stated rather informally, most work in declarative phonology emphasizes the importance of precise specification of constraints using the notations of formal language theory and/or logic (see, e.g., Bird, 1995). For example, a general rule such as 'nasal consonants are voiced' can be expressed in first-order logic as the statement:

(C8) $\forall x.\text{Consonant}(x)\ \&\ \text{Nasal}(x) \supseteq \text{Voiced}(x)$,

i.e., 'for all x, if x is a consonant and x is nasal, then x is voiced.' Logical conjunction is also used to combine the constraints: for example, the form *tonicity* observes all of the constraints (C1 to C8) given above (and others). When we say that a word is phonologically well-formed in English, we are saying that it observes the conjunction of constraints C1 & C2 & C3 & . . . & C8 & . . . . Since conjunction is commutative (that is, 'A & B' is true under the same conditions as 'B & A'), the order in which the constraints may be 'checked off' is immaterial: it does not make any sense to speak of the order of constraints in a framework in which they are combined purely conjunctively. Even exceptions to rules can be handled in a completely declarative, conjunctive manner. For example, constraints of the form 'if A then B, but elsewhere/otherwise C,' means the same as 'if A then B, and if not-A then C.' For example, constraint 7 above can be restated as:

(C9) If *-ic* is not stressed, then the syllable before *-ic* is stressed.

Whether or not *-ic* is itself stressed will depend on where it occurs: if it is followed by two light syllables, C6 applies, as in *tonicity*, so the 'if' part of C9 is not applicable.

An Example

The treatment of interactions between phonological phenomena is strikingly illustrated by Lakoff (1993), who showed how a complex sequence of derivational rules in the Northern Iroquoian language, Mohawk, can be replaced by an equivalent unordered set of correspondence constraints. According to the textbook derivational analysis, the surface form [yə̀krege̯ʔ] 'I will push it' is derived from the underlying sequence of morphemes /ye ʌ́k hrek ʔ/ via (at least) six rules. Thus, /ye ʌ́k hrek ʔ/ is turned into /yʌ́khrekʔ/ by a Vowel Deletion rule (1), then Stress Assignment (2) yields /yʌ́khrekʔ/. This becomes /yə̀khrekʔ/ by a Vowel Change rule (3), and then an Epenthesis rule (4) breaks up the last two consonants, to give /yə̀khrekeʔ/. The intervocalic /k/ is changed by a Voicing rule (5), producing /yə̀khregeʔ/, before a rule of *h*-Deletion (6) applies to give the output [yə̀krege̯ʔ]. In this derivation, the rules must be applied in a specific order. Stress Assignment must apply earlier than

Table 1 Stress assignments

				(2) Stress added to penultimate vowel ↓									
Phonology:	y	e	+	ʌ́	k	+	h	r	e	k		+	ʔ
	|	|(1)		|(3)	|		|(6)	|	|	|	|(4)		|
Phonetics:	y			ɔ̀	k			r	e	g (5)	e		ʔ

Epenthesis, for example, because stress placement is not really affected by the insertion of an extra vowel. Epenthesis precedes intervocalic Voicing, however, since the flanking vowels can be epenthetic or they may be present in the underlying word-form.

Lakoff's declarative alternative translates each of these rules into six constraints that all apply together to define the relationship between the phonological representation of the morphemes and the phonetic representation, that is, the pronunciation. (Lakoff employs three levels of representation, but in this case two levels suffice.) Four of these are correspondence constraints: Vowel Deletion (1) (a vowel in the phonological representation corresponds to an empty slot in the phonetic representation), Epenthesis (4) (a vowel in the phonetic representation corresponds to an empty slot in the phonological representation), Vowel Change (3) (phonological /ʌ́/ corresponds to phonetic [ɔ̀]), and *h*-Deletion (6) (underlying /h/ is not pronounced before /r/). The other two constraints, Stress Assignment and Voicing, are expressed as implications that hold at a single level. Stress Assignment (2) adds stress to vowels that are penultimate at the phonological level; Voicing (5) adds [+voice] to a consonant that is intervocalic at the phonetic level. (We can assume that voiceless consonants have no specification for [voice] at the phonological level.) The effect of combining these constraints is illustrated in Table 1 (each constraint is numbered).

A comparably complex case of rule interaction in English is discussed by Coleman (1995).

Prosodic Constraints

Morphophonological and allophonic variation are not the only phenomena that a phonological framework must deal with: the construction of prosodic structure (syllable structure and metrical structure) is another area of considerable importance. Prosodic structure is relatively straightforwardly defined in Declarative Phonology using constituent structure 'rules' such as the following:

(C10) A prosodic word consists of one or more feet.

(C11) Either the leftmost or the rightmost foot is strong (i.e., has primary stress).

(C12) A foot consists of one or more [in some languages, at most two] syllables.

(C13) Either the leftmost or the rightmost syllable is strong (i.e., stressed).

(C14) A syllable consists of an optional onset and a rime.

(C15) A rime consists of a nucleus and a coda.

Each of these rules is in fact a constraint that licenses a small piece of a complete prosodic structure. A structure is well formed if and only if it adheres to all of the prosodic constraints. Note that, C11, C12 and C13 are parameters, for which different settings are required in different languages. The constraints of a declarative phonology are not necessarily just parochial, language-specific statements, but may be crosslinguistic generalizations.

The order in which the constraints are employed (generatively) or checked (analytically) is irrelevant, except that different orders of constraint combination may yield alternative analyses: in other words, there may be prosodic ambiguity. This is not a weakness: it allows variation to be included in the grammar. For example, /ʃr/ is a syllable onset in 'shrink,' but may be divided between two syllables in 'mushroom' or 'ashram.' For more on prosodic parsing in Declarative Phonology, see Coleman (2000).

By effectively eliminating rule ordering, Declarative Phonology gets around some problems (e.g., rule order paradoxes, abstractness), though it raises others. For example, derivational phonology employs cyclic rule application and an interleaving of morphological and phonological rules. Space does not permit discussion of these more technical matters here; see Coleman (1995, 2000) for details of some declarative alternatives.

See also: Declarative Models of Syntax; Declarative Morphology; Generative Phonology; Iroquoian Languages; Rule Ordering and Derivation in Phonology.

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Declarative Models of Syntax

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Introduction

Theoretical linguistics – which from its earliest days has self-consciously modeled its working methodology on that of the natural sciences – continues to face a dilemma of long standing which does not seem to be an issue in the established empirical disciplines. On the one hand, parallel to the situation in other scientific domains, the investigation of the conditions characterizing well-formed human language is logically independent of the question of how a procedure can be implemented that produces or licenses grammatical utterances. Yet, at the same time, early generative syntax and more recent research in the wake of Chomsky (1995) does not separate the meaning of a theory from its procedural, computational realization. Instead, the theory itself is directly tied to the mechanism by which a given string is procedurally derived.

With linguistic generalizations directly tied to procedural mechanisms, progress in generative linguistics arguably has been hampered by ordering paradoxes and other theory-internal issues, and the procedural mechanisms or metaphors have stood in the way of more empirically adequate, declarative generalizations (cf. 'Empirical and Analytic Arguments' below) – deficiencies which have led to the development of declarative linguistic frameworks.

Declarative approaches to syntax, such as Head-Driven Phrase Structure Grammar (HPSG; Pollard and Sag, 1987, 1994), Lexical-Functional Grammar (Bresnan, 1982) and others (cf. Borsley and Borjars, forthcoming), follow the otherwise standard scientific practice of seeking a declarative characterization of the research domain and its properties, i.e., they investigate the constraints which are observed to hold of linguistic representations. Declarative models of syntax are not committed to any particular processing model or procedural mechanisms for deriving linguistic representations.

Representations

Declarative models of syntax are commonly identified with monostratal representations, i.e., the use of a single level of representation. This association requires some discussion since analyses in declarative frameworks do appear to make use of multiple levels of representation, at least until it is clarified what exactly is meant by a level of representation.

Within the HPSG paradigm, for example, Bouma *et al.* (2001) proposed a declarative approach to unbounded dependency constructions which is based on principles relating the argument structure (encoded under an attribute called ARG-ST), the dependents list (DEPS), and the valence attributes (SUBJ, COMPS). This essentially establishes three levels of representation, with the argument structure encoding the interface to the semantic arguments of a predicate and the valence attributes encoding which of these are realized how in the sentence. But crucially, all three representations are explicitly and transparently present in the model of the linguistic objects being licensed, i.e., they are a part of what procedural architectures often refer to as the syntactic surface structure. In other words, declarative approaches are monostratal in that all representations which play a role in licensing a particular string are simultaneously and completely part of the model of the linguistic object being licensed.

Compare this to the situation in a derivational paradigm, for which, e.g., Chomsky (1995: ch. 4) stated that "computation typically involves simple steps expressible in terms of natural relations and properties, with the context that makes them natural 'wiped out' by later operations, hence not visible in the representations to which the derivation converges." In other words, in place of the constraints on a single, transparent surface structure representation assumed in a monostratal, declarative approach, the derivational architecture relies on multiple levels which are connected by procedures that 'wipe out' evidence for their nature on the way to the observable surface representation. The derivational approach thus assumes hidden levels of representation and formulates grammatical principles on this sequence of procedurally related, underlying representational layers.

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In sum, a key characteristic of a declarative approach to syntax is that it involves an explicit data structure in which all information is simultaneously represented, i.e., the surface structure object that is licensed by the theory includes all information that plays a role in licensing it.

Locality and Modularity

The nature of the representations assumed in declarative and procedural architectures directly relates to another important issue: the nature of the domains in which grammatical relations are established.

In classical transformational grammar (TG; Chomsky, 1965), transformations can in principle apply to any of the nodes in the tree and have any effect; i.e., the grammatical relationships they establish can involve any of the elements in the domain of the entire tree. In the more recent derivational incarnation, Chomsky (1995) held that "in syntax, crucial relations are typically local, but a sequence of operations may yield a representation in which the locality is obscured." Common to the derivational approaches thus is that the model of the surface structure does not include direct evidence of the locality of grammatical relations.

This contrasts with declarative models of syntax, in particular in the HPSG paradigm, where constraints are generally formulated for local trees, and nonlocal relations are established by locally recording the nonlocal relationship. This local recording is empirically well motivated given the extensive and robust documentation of languages in the Indo-European, Bantu, and Austronesian families exemplifying the local recording of nonlocal connectivity through a diverse spectrum of morphological, syntactic, and phonological flags (cf. e.g., Zaenen, 1983; Hukari and Levine, 1995).

Since all relationships are locally recorded in the model of the surface structure, they form independent, exchangeable modules of linguistic expressions. Declarative syntax thus is modular in the sense that the entire syntactic representation results from the combination of local, modular representations.

Relevance of the Declarative/Procedural Distinction

The discussion of the declarative/procedural framework dichotomy at times seems to have a rather abstract quality, as though issues of analytic practice and the formulation of satisfactory hypotheses about particular phenomena could always be encoded equally straightforwardly in either approach. Movement and feature matching, for example, might be viewed as nothing more than different formulations of the notion of structural involvement, whereby two nodes in a structure are implicated in a dependency of some kind.

While hypotheses about linguistic structure and generalizations can indeed embody core insights which are portable from framework to framework, this does not change the fact that frameworks differ with respect to which language properties are modeled, how linguistic relations can be established, and how generalizations can be expressed. They both influence and restrict the kind of hypotheses that **can** be supplied, and, as a result, a solution which involves a natural application of one framework's resources may be impossible or extremely awkward to simulate in a different framework.

Before we turn to illustrating the empirical and conceptual differences arising from the choice of a procedural vs. a declarative framework in 'Emprical and Analytic Arguments,' it is important to mention that the choice of a procedural or a declarative model also has clear formal consequences. McCawley (1968) showed that context-free grammars can be interpreted in two distinct ways: as string/tree rewriting systems or as node admissibility conditions. The application of rules in rewriting systems is ordered, which gives rise to ordering paradoxes and questions of extrinsic ordering of rules – two issues we return to in the section 'Self-created Problems of Procedural Models.' These issues do not arise when interpreting the rules as node admissibility conditions; a tree is admitted if and only if all its nodes are admitted, so there is a logical conjunction of admissibility conditions, for which order is irrelevant. Interestingly, Peters and Ritchie (1973) showed that a generalization of node admissibility to context-sensitive rules still only licenses context-free languages (cf. also Perrault, 1984; Jacobson and Johnson, 1991; Oehrle, 2000). The formal question of the interpretation of a grammar in terms of rewriting or node admissibility thus has clear formal consequences in addition to the empirical/conceptual ones we are focusing on in this article (cf. also Johnson, 1994; Pullum and Scholz, 2001).

Declarative Explanations as the Standard in the Natural Sciences

As background for the declarative/procedural distinction in syntactic theorizing, it is instructive to consider the situation in other empirical sciences. Whether one is attempting to account for the behavior of matter and energy, the behavior and structure of land forms or life forms, or the large-scale organization and history of the universe, the form that explanatory theories take is invariably a set of conditions that must be met among certain fundamental elements; the world we observe is just the world that conforms

to these conditions. All such conditions consist in equalities (such as the conservation principles in physics) or inequalities (such as the uncertainty principle, which holds of all noncommuting operators corresponding to dynamical variables in quantum mechanics). Scientific theories of the natural world in general do not posit a series of procedures or quasi-events **as part of the constraint system constituting the explanatory hypothesis**, where the outcome of the procedure defines admissibility for a possible description of the system and therefore for some set of events in the world we are observing (cf. Johnson and Lappin, 1999: ch. 5 for a closely related discussion).

Empirical and Analytic Arguments

This section fills the claim with life that the differences in the linguistic architectures have direct consequences for the analyses which can be proposed in them. The advantage of declarative approaches to syntax becomes apparent in the analysis of phenomena in which grammatical relationships are established that go beyond the one-to-one correspondences readily established by movement in procedural approaches to syntax.

We discuss four classes of issues which showcase the advantage declarative approaches have over procedural ones: multiple gap constructions, where several gaps are satisfied by a single filler; phenomena where a single argument requirement is realized by two constituents; partial constituent phenomena; and the spurious problems resulting from procedural approaches by way of ordering paradoxes and multiple derivations with the same outcome.

Multiple Gap Constructions

The key procedural component to TG is, of course, the set of transformations themselves. Transformations are procedural in a particular sense which can be clearly illustrated by movement rules. Consider the relationship holding between a filler and a gap site in a sentence such as (1).

(1) **Who** do you think Robin believes the police will arrest __?

In transformational grammar, such a sentence is licensed by a series of steps, illustrated in (2).

(2a) You think Robin believes the police will arrest **who.**
(2b) You think Robin believes **who** the police will arrest __.
(2c) You think **who** Robin believes __ the police will arrest __.
(2d) Who you think __ Robin believes __ the police will arrest __.

There is a series of steps which must be carried out in a particular order so as to ensure that the various locality conditions which have been such a conspicuous part of linguistic theorizing since the early 1970s (cf. e.g., Chomsky, 1973, 1977, 1981) are respected. A movement of the filler *who* must result in its appearance in some left-peripheral position attached to the lowest clause before it moves to the next higher clause, and so on. Movement directly from the original position to the periphery of the second clause from the bottom is blocked, on one or another formulation of these locality requirements. Thus the extraction is licensed in separate steps, which must occur in a particular sequence.

It has sometimes been suggested that this mechanism could be replaced by a purely 'base-generated' account of filler–gap linkages, where empty categories were freely distributed and linked to overt fillers and each other, by co-indexation and declarative conditions on chains; Chomsky (1981: 89–92) raises this possibility, and essentially dismisses it as an uninteresting variation of the basic movement mechanism assumed from the earliest period of transformational grammar. But this view is seriously mistaken: the procedural treatment of extraction by a series of steps which must occur in a particular order is not equivalent to the free generation of empty categories in particular locations which must satisfy essentially the same conditions on the legal form of Ā chains. The discrepancy is not evident when links between an overt gap and a single filler are considered. But the picture is quite different when that filler is linked to an arbitrary number of gap sites, as it is in the case of across-the-board (ATB) coordination extractions, parasitic gaps, and related multiple gap phenomena.

Parasitic Gaps Consider examples such as

(3a) Who do you think the police will arrest after interrogating?
(3b) Who do you think the police will arrest and the prosecutor will indict for this crime?

Allowing empty categories in the base representation to remain unfilled with lexical content, and to freely co-index with the filler, yields legal representation of the form

(4) **Who**$_i$ you think $___i$ the police will arrest $___i$ after interrogating $___i$.

The procedural approach, however, must start with the representation in (5).

(5) The police will arrest **who**$_i$ after interrogating ***NP***$_i$.

The valence requirements of *interrogate* demand an underlying NP in object position, which must somehow correspond to a gap linked to the filler. But this solution cannot simply replicate the ordinary single filler–gap connectivity mechanism assumed for (1). The problem, as emphasized in Gazdar *et al*. (1982), is that the procedure implementing the transformation-based relation between filler and gap site, *wh*-movement, has never been defined for more than a single pair of positions in adjacent stages of a complete derivation. In the absence of any definition of the notion 'transformation' encompassing multiple targets of a single movement operation, the nature of the NP in (5) has to be interpreted as something other than a copy of the overt *wh* filler. There have been a number of proposals based on this strategy, each of which is burdened with serious conceptual and/or empirical weaknesses.

Chomsky (1982) took NP in (5) to be *pro*, a null pronoun which is interpreted at Logical Form (LF) as a variable, in accordance with his theory of mutable status for empty categories – a position he abandoned within a few years; Chomsky (1986) adopted Contreras's (1984) suggestion that parasitic gaps be regarded as the traces of extraction, entailing the existence of a movable covert filler at the parasitic gap site and a special relationship called 'chain composition' linking the true and parasitic chains in a manner consistent with the rest of the theory – an explicitly construction-specific treatment in the grammar along lines which Chomsky (1982) had heaped scorn on.

Frampton's (1990) treatment of parasitic gaps, a kind of hybrid of Kayne's (1994) connectedness with the null operator treatment in Chomsky (1986), incorporating the *wh*-deletion analysis of Chomsky (1977), is in effect a derivational reconstruction of the multiple licensing of extractions pathways linked to a single filler. Serious empirical difficulties with this proposal are discussed in Levine and Sag (2003) and Levine (2004), including the conspicuous irrelevance of certain data first noted by Kearney (1983), cited in both Chomsky (1986) and Frampton (1990), which seem to distinguish the reconstruction behavior of parasitic chains from that of true chains, an issue which becomes relevant in the discussion of ATB extraction below.

A different approach to the problem is offered in Cinque (1990), who took parasitic gaps to reflect the presence of a null resumptive pronoun with an Ā-position binder. The empirical basis for this proposal and related proposals has been extensively contra-exemplified; see Levine (2001), Levine *et al*. (2001). Thus the key empirical foundations of such analyses are unsupported.

It will be seen from this brief summary that the primary difficulty of procedural solutions to multiple gap extractions is in fact their reliance on a procedure – movement – which is undefined for more than a single gap. A declarative approach, however, faces no such problem, since multiple linkages via feature matching (as in Gazdar, 1981; Gazdar *et al*., 1985; Pollard and Sag, 1994) are possible and involve machinery no different from what is required for single filler–gap linkages. Similar observations apply to ATB extraction phenomena, which we turn to next.

ATB Extraction In emphasizing the importance of the already mentioned Kearney paradigm, Chomsky (1986) called attention to the putative separation those data induce between parasitic gap phenomena and what he refers to as 'multiple gap constructions,' without specifying the latter; it seems evident, however, that such constructions can be nothing other than ATB coordinate extractions. But when one tries to identify a robust transformational analysis of ATB extraction, the situation is no better, for reasons precisely parallel to the parasitic gap case: a single application of the TG movement rule cannot affect more than a single target and a single destination site. Thus, excluding theoretically eccentric positions such as Goodall's (1987) three-dimensional syntactic space solution, there seems no alternative to treating ATB extraction itself in terms of empty operator movement, and this is exactly the solution proposed in Munn (2001), which is virtually identical to Chomsky's (1986) treatment of parasitic gaps. The empirical soundness of this has, however, been sharply questioned in Borsley (1994), and Munn's approach gives every appearance of being motivated solely by the need to reconcile the existence of multiple gaps linked to a single overt filler with the limitation inherent in a transformational treatment of extraction. We note in passing that while Munn has argued for a parallel treatment of parasitic gaps and ATB extraction as justified by their shared immunity to weak crossover (WCO) effects, the WCO facts provide no support for the analysis that Munn proposes, viz., null pronominal interpretations at LF; see Levine and Hukari (2004) and also Postal (1993) for discussion of the empirical issues involved.

Multiply Realized Requirements

Conceptualizing linguistic relations in the procedural terms of movement has the consequence that an entity missing in one place is expected to be realized in exactly one other place, the one it has been moved to. As we saw in the previous section, this assumption is inadequate for phenomena involving a single

constituent being linked to multiple gap sites. The second, related possibility is that a single requirement could be realized by multiple constituents – and indeed, declarative approaches to phenomena such as the Split NP construction in German have shown that this possibility is well worth exploring.

The German Split NP construction, exemplified in (6), received some attention in the 1980s since the direct object seems to be split across two locations: the noun *Schokoeier* is fronted while the determiner *drei* occurs in the base position (often referred to as the *Mittelfeld)*.

(6) Schokoeier fand er drei.
chocolate eggs found he three
'As for chocolate eggs, he found three.'

Van Riemsdijk (1989) provides an account for this phenomenon in which the fronted element (e.g., *Schokoeier*) has been moved to this position, leaving some material (e.g., *drei*) behind. However, such a movement-based account of the construction runs into a significant obstacle in light of examples such as van Riemsdijk's (7).

(7) Ein Schwimm bad hat er sich noch
a pool has he REFL *yet*
keins/*kein gebaut.
none/no built
'As for a swimming pool, he hasn't yet built one.'

(8a) Er hat sich keins gebaut.
he has REFL *none built*

(8b) Er hat sich ein Schwimmbad gebaut.
he has REFL *a pool built*

Example (7) is of interest since shown in (8), the fronted *ein Schwimmbad* and the *keins* in the *Mittelfeld* appear to be two complete constituents. Even if one ignores the presence of the indefinite determiner *ein*, combining the fronted material with the supposed remnant in the *Mittelfeld* would result in *kein Schwimmbad*, i.e., a form of *kein* which is different from the one obligatorily showing up in (7).

The fact that both NPs behave like two autonomous NPs is entirely unexpected under a movement-based approach and van Riemsdijk resorts to positing that nonmaximal projections that have been moved can under certain conditions 'regenerate' structure to meet X-bar requirements at S-structure. However, even this *deus ex machina* cannot save the movement-based analysis in light of examples where the NP is fronted as part of a verbal projection, as is (9), taken from Kuhn (2001).

(9) [Einen Wagen gekauft] hat er sich noch keinen.
a car bought has he REFL *yet none*
'As for cars, he has not yet bought one.'

In conclusion, it is empirically inadequate to rely on movement to procedurally establish a relation between the two constituents in the German Split NP construction. A declarative analysis licensing both NPs independently does not suffer from the shortcomings of a movement-based account since it is not restricted to establishing such one-to-one relation. The properties of the Split NP construction are explained without recourse to movement, which has been worked out in terms of so-called 'base generation' approaches in the transformational framework (e.g., Fanselow, 1988; van Geenhoven, 1998) as well as by approaches in strictly declarative frameworks (e.g., Kuhn, 2001).

Partial Constituent Phenomena

The occurrence of partial constituents in German has received much attention in the literature since the phenomenon is a serious challenge to a theory of constituency. The data in (10), taken from De Kuthy and Meurers (2001), illustrate the phenomenon.

(10a) [Verkaufen] wird er das Pferd.
sell will he the horse
'He will sell the horse.'

(10b) [En Buch] hat Hans über Syntax ausgeliehen.
a book has Hans on syntax borrowed
'Hans borrowed a book on syntax.'

(10c) [Stolz] ist er auf seine Kinder gewesen.
proud is he of his children been
'He was proud of his children.'

In (10a), the transitive verb *verkaufen* has been fronted, leaving its complement, the NP *das Pferd*, behind. In (10b), the NP *ein Buch* is topicalized without its PP complement *über Syntax*. And in (10c), the AP *stolz* has been fronted, leaving its PP argument *auf seine Kinder* behind.

The two analysis ideas that have been proposed in the literature are that (i) the constructions involve movement of a constituent containing a trace, so-called remnant movement (Thiersch, 1985; Webelhuth and den Besten, 1987; Müller, 1996) or that (ii) the 'small' constituents which seem to occur in them are taken at face value and licensed by a **reanalysis** process (Fanselow, 1987, for partial NPs).

The idea, in principle attractive, behind the remnant movement account is to reduce certain patterns of ungrammaticality to general restrictions on movement, such as supposed subject–object asymmetries, specificity, and freezing effects. But, as De Kuthy and Meurers (2001) discussed in detail, there are counterexamples to each of the supposed restrictions and the general reduction of displacement to movement cannot explain the contrast between

scrambled and fronted constituents illustrated by (11) and (12).

(11a) *Er wird [das Pferd verkaufen] noch heute wollen.
he will the horse sell still today want to
'He will want to sell the horse today.'

(11b) [Das Pferd verkaufen] wird er noch heute wollen.
the horse sell will he still today want to

(12a) *Er wird [verkaufen] das Pferd noch heute.
he will sell the horse still today

(12b) [Verkaufen] wird er das Pferd noch heute.
sell will he the horse still today

Interestingly, one of the arguments against reanalysis fielded by Müller (1991: 175) is that a reanalysis rule cannot properly be expressed in a syntactic framework which relies on movement as its key explanatory device. The assumption of a derivational architecture thus turns into a straitjacket, ruling out the formulation of a potentially sensible analysis.

This contrasts with a declarative approach to syntax supporting constraints that go beyond the one-to-one relations established by movement. For the empirical domain at hand, De Kuthy and Meurers (2001) showed that a reanalysis-like approach can be formulated and made concrete in the form of declarative constraints on the explicit linguistic data structures assumed in the HPSG framework.

Self-created Problems of Procedural Models

By virtue of defining its licensing criteria as procedures, the transformational approach requires them to interact sequentially. The result is that grammars with a procedural architecture have difficulties built into them which are purely artifacts of the ordering possibilities associated with that architecture. Some illuminating examples of this problem are afforded by the very early history of TG, in which not only transformations but the rules of the base component were taken to be necessarily ordered. So, for example, Bach (1964) envisages a grammar for an imaginary language containing a VP expansion rule

(13) $$\mathrm{VP} \rightarrow \left\{ \begin{matrix} \mathrm{Verb}_i \\ \mathrm{NP} + \mathrm{Verb}_t \end{matrix} \right\}$$

and a rule for 'nominals'

(14) $$\mathrm{Nom} \rightarrow \mathrm{Noun} \left\{ \begin{matrix} \mathrm{Sg} \\ \mathrm{Pl} \end{matrix} \right\}$$

Bach (1964: 45–46) then observes that

> the rules are arranged in such a way that they may be applied one after the other without the necessity of returning to an earlier rule, although a single rule may be applied several times when necessary. For example, the verb phrase (VP), which may contain further instances of the noun, is developed before the latter is expanded. In general, rules that apply to a class of items should be placed before the rules that split the class into smaller subclasses, since if the other order is followed the general rule can be applied only naming each of the subclasses involved.

But if each of the rules simply identifies a class of (sub)trees which are to be regarded as legal objects, with other structures not explicitly sanctioned by rule defined as inadmissible, then clearly the order in which the NP and VP expansion rules are encountered is thoroughly irrelevant, making as little difference to the outcome as the order in which a human arithmetician combines pairs of numbers out of a large sequence of numbers to be added up in order to come up with a result. Conversely, a machine programmed to rewrite symbols on the basis of further information about those symbols would of course find it impossible to proceed if a symbol only introduced by a later rewrite operation was required before that operation had taken place. On a declarative interpretation of a set of phrase structure rules, where each rule does nothing more than specify a class of admissible structures, it is irrelevant to the denotation of the grammar – the class of objects admitted – in what order the well-formedness conditions are checked.

But it is not solely phrase structure rules which (under their early procedural interpretation) created purely internal problems which necessitated the introduction of otherwise unmotivated devices, such as rule ordering, in syntactic theory. Transformations themselves, the procedural technology *par excellence* that generative grammar made so theoretically central nearly half a century ago, create their own difficulties and assumption-bound contradictions, requiring solutions whose status is completely tied to that of the procedural model which in effect created them. A persistent example is the often-referred-to but never formulated 'recovery of deletion' principle (cf. e.g., Matthews, 1962); a much more recent instance is the notion of 'economy of derivation' (cf. e.g., Chomsky, 1995). We illustrate our point here with the notion of the cycle, introduced to overcome a problem arising from the interaction among externally ordered rules.

A concise description of some of the problems such interaction causes is given in Culicover (1976). Culicover notes examples such as

(15a) Mary expects John to visit George.
(15b) John is expected by Mary to visit George.
(15c) Mary expects George to be visited by John.
(15d) George is expected by Mary to be visited by John.

and observes that examples (b)–(d) appear to require a contradictory ordering arrangement: in (b), passive must precede raising (or *John* will not become a subject and hence will not raise; but in (c) *George* can only have been passivized after it raised, etc. He explains that

> the reason why this is not a contradiction of linear ordering is that . . . it appears to be possible to maintain the linear ordering of transformations if the transformations are applied in sequence first to the lowest S in the tree, then to the next highest, and so on. This method of applying transformations is called the Cyclic Principle . . . the linear ordering [Raising → Agent Postposing → NP Preposing can be maintained if the Cyclic Principle is adopted. Without this principle, the data constitute a strong counterexample to the principle of linear ordering.

The last sentence in this passage is the crucial point in terms of our argument, because it can be rephrased as follows: the cyclic principle is **justified** by the consequence that linear order among transformational steps can be maintained. But the existence of linear order is itself an entailment of a procedural architecture. Thus, the import of Culicover's discussion can be fairly summarized by the observation that the existence of the cycle is a question which only arises because of the assumption that the theory of grammar be couched in procedural terms, the application of structure-to-structure mapping rules whose joint generative yield depends on the order in which the procedures corresponding to each rule are carried out. Under a declarative architecture, the notion 'order of application' makes no sense, and therefore the notion of a 'cycle' is otiose, or more correctly, formally meaningless.

Summary

Generative syntax as originally developed was based on phrase structure trees as the exclusive syntactic data structure, which made derivations transforming one tree into another the key mechanism for expressing syntactic relations. The procedural nature of the application of rules and transformations leads to ordering paradoxes and other theory-internal complications. And the use of movement as a transformation relating two tree positions expresses one-to-one relations, which is empirically inadequate as a means to capture the one-to-many and many-to-one relations and the cases of flexible constituency exhibited in natural language.

Declarative models of syntax were developed to overcome these shortcomings by providing – in line with standard practice in the natural sciences – a logical, nonprocedural characterization of the empirical domain. They are based on an inventory of more general linguistic data structures, such as (typed) feature structures, which make it possible to explicitly model the full inventory of linguistic properties, and they support a wider range of constraints expressing linguistic relations and generalizations. Since declarative models support an explicit formalization of linguistic relations and generalizations that go beyond one-to-one relations, they can provide empirically adequate theories for a wider range of data. The rewriting steps and transformations are replaced with conditions that are required to hold of tree nodes, and, more generally, the linguistic objects modeled. The problematic sequencing of procedures thus is replaced with a logical conjunction of conditions which have to hold. Declarative models of syntax realize the scientific architecture typical for the natural sciences by separating the modeling of the domain and the logical characterization of the generalizations which hold in it from the design of algorithms which procedurally realize such models. Complementing the success of declarative models of syntax in the empirical domain, this has also made such models the first choice for natural language processing, where a wide range of algorithms, from parsers and generators to more general constraint resolvers, has been developed to process with them.

See also: Declarative Approaches to Phonology; Declarative Morphology; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar.

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Declarative Morphology

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Defining Properties of Declarative Approaches to Grammar

The declarative paradigm of linguistic research arose from discontent with transformational generative grammar in the early 1980s. The defining property of a declarative theory is its nonderivational character. The grammaticality of a linguistic expression is explained with reference to a single level of representation only (monostratality). Explanation is achieved by constraints that force a surface representation of a certain type to have a specific property. As opposed to constraints in optimality theory, declarative constraints are unviolable and unordered. A declarative constraint is a true generalization about a certain aspect of a linguistic expression. As a consequence, declarative constraints are first of all construction-specific and, naturally, language-specific (notwithstanding the possibly universal character of some constraints). Moreover, declarative theories are explicit in the sense that they are falsifiable, as far as theories about language, which, by its very nature, shows a certain number of irregularities, can be falsified. Terms related to declarative grammar are unification grammar and constraint-based grammar. The declarative paradigm stems from computational linguistics and places its main emphasis on work on syntax (generalized phrase structure grammar, GPSG, Gazdar *et al.*, 1985; head-driven phrase structure grammar (HPSG), Pollard and Sag, 1994) and on phonology (declarative phonology, Scobbie *et al.*, 1996), in addition to morphology.

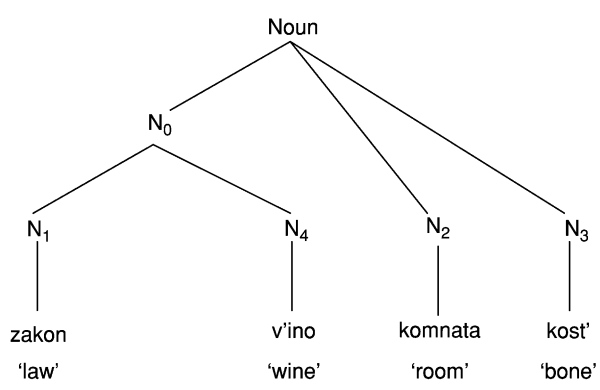

Figure 1 Russian nominal infections: excerpt from network.

Morphology and Lexical Organization

Generative grammar employs procedural rules to explain regular linguistic knowledge but declarative statements to deal with irregular knowledge. In order to standardize these modes of description, it seems to be natural to extend the techniques for the representation of irregular knowledge to cover regular aspects also. There are a number of declarative approaches to lexical organization, with 'lexical' meaning 'having to do with words.' These approaches are largely based on work in knowledge representation in the field of artificial intelligence.

Network Morphology

In network morphology (Corbett and Fraser, 1993), linguistic information is organized as a complex network consisting of different hierarchies. Knowledge concerning individual items is located at the bottom of the hierarchy while more general aspects of knowledge are distributed among several nodes further up in the hierarchy. In this way, nonterminal nodes describe sets of linguistic units that have shared properties. The central device in network morphology is default inheritance. The example of Russian nominal inflection in Figure 1 illustrates the way this device works (cf., Corbett and Fraser, 1993: 126).

This excerpt of the whole network of the Russian lexicon consists of nodes connected by branches. A node is a named location at which specific facts are stored. The top node comprises information shared by all nouns, for example, the fact that the form of the locative singular of each noun is a noun stem plus *-e*. The intervening nodes denote declensional classes, that is, subclasses of nouns that share specific inflectional properties. Node N_0 captures information shared by nouns of the *zakon* type and of the *v'ino* type, whereas information that distinguishes these types is linked to the lower nodes N_1 and N_4. The bottom line of the hierarchy contains lexical entries in the generative sense, that is, lexemes deprived of all redundant or predictable information. With regard to the lexeme *v'ino*, relevant information concerns the form of the stem (which is *vin*) and the meaning of the item.

Inheritance goes top down in the hierarchy. Default information of higher nodes is inherited to the lower nodes except if information of the same type is noted both on the higher and on the lower node. In this case, the special information on the lower node is more relevant. The noun *soldat* 'soldier,' for example, inflects for all categories like class N_1 except for the genitive plural, which is *soldat* instead of

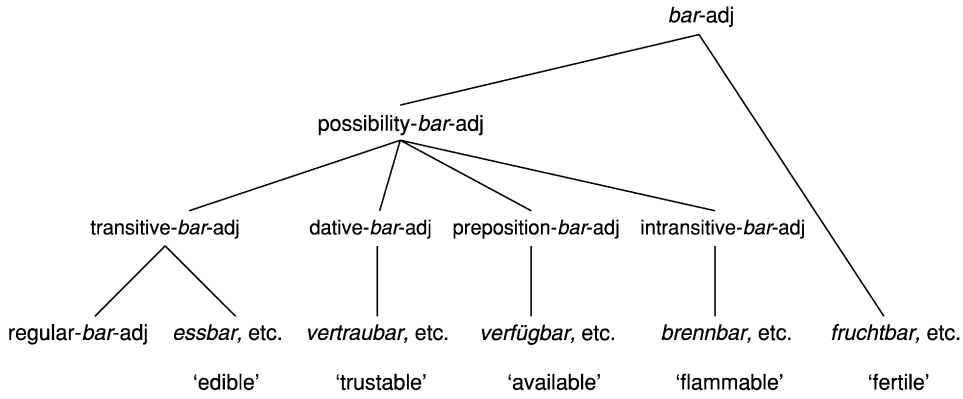

Figure 2 German *bar*-adjectives: excerpt from the hierarchical lexicon.

soldatov. This irregular feature connected to the terminal node *soldat* overrides the information concerning the genitive plural specified at its mother node. Thus, default inheritance is nonmonotonic.

A new lexeme can be inflected correctly if it is integrated into the relevant network. In the case of nouns, all that has to be known about the new lexeme in order to derive the full declensional paradigm is its part of speech, the form of the stem, and the declensional class it belongs to. The focus of research in network morphology is inflection, based on the notion of paradigm, but work on derivational morphology exists as well. Network morphology is expressed in the formally explicit DATR language. Related approaches are to be found in Daelemans (1987), Domenig (1989), and Cahill and Gazdar (1999).

Type-Based Morphology

Type-based morphology (Riehemann, 1998) is integrated into the HPSG framework in which all linguistic knowledge is expressed by feature structures. These feature structures are true but partial descriptions of properties of linguistic objects. Partial descriptions combine by unification to yield complete descriptions of linguistic objects. Feature values percolate along the head-projection line in hierarchically structured inheritance trees. Inheritance is strictly monotonic. Riehemann bases her assumptions on the notion of the existing lexicon, that is, the actual store of words of a competent speaker.

Figure 2 shows Riehemann's treatment of productive derivational morphology using the example of German *-bar* adjectives (adapted from Riehemann, 1998: 64). The bottom line of this hierarchy contains finite sets of lexical items, except for the first element, which denotes a variable for potential regular *-bar* adjectives. The properties of these potential words derive completely from the information specified at higher nodes in the hierarchy. For example, potential regular *-bar* adjectives have a transitive verb as their base (whereas irregular items may be based on dative verbs, preposition verbs, intransitive verbs, or even nonverbs). Semantically, they share a feature of possibility with most verb-based items. Other chunks of information are inherited from nodes further up in the hierarchy (which are omitted in Figure 2). The item *essbar* shows that Riehemann regards completely regular but already existing words as elements of the lexicon.

Interestingly, Riehemann does not assume the existence of heads in word structure. In a complex word, the basic root is represented explicitly, whereas the affix is not. Information about affixes is captured in features of complex stems.

(1) $[[\text{les}]_V \text{ bar}]_A$ 'readable'

Traditional affixes are kept within abstract schemas that comprise specific phonological, morphological, syntactic, and semantic information. These schemas are also regarded as morphological constructions. Subregular patterns emerge if a word that does not belong to the productive core of the schema is taken as the model for a new word. In this way, type-based morphology allows us to deal with semiproductive morphological data, as well as with conversion and nonconcatenative morphology. Sketches of alternative models are Krieger (1994) and Kathol (2000).

Morphology and Phonology

A second group of declarative theories of morphology focuses on the relation of morphology to phonology. To a certain extent, the two types of approaches complement one another. This holds especially for type-based morphology and sign-based morphology.

Sign-Based Morphology

Sign-based morphology (Orgun, 1996) employs constituent structures for complex words, explicitly

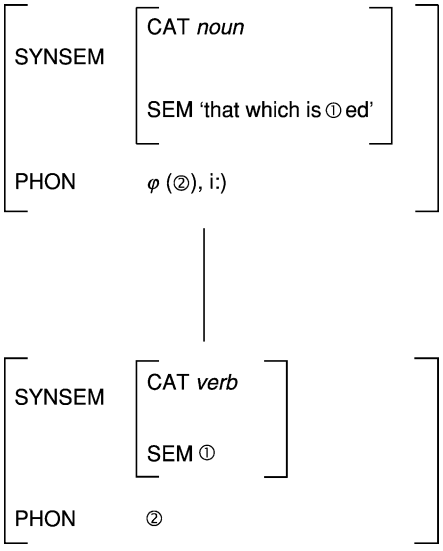

Figure 3 English *ee* nouns.

relying on HPSG-style notations. Root morphemes, taken from the lexicon, form the terminal nodes in the diagram. By allowing all features (including phonological ones) percolate to higher nodes, all nodes are signs (i.e., pairings of form and meaning). Nonterminal nodes may be subject to constraints. A word is well-formed if all nodes in a tree are well-formed. Whereas compounds show traditional binary branching, derived words are treated as nonbranching structures.

For example, Figure 3 shows the morphological construction of English *ee* nouns (cf., Orgun and Inkelas, 2001: 124). The sign at the bottom indicates the base, some verb. The information of the base concerning form and meaning percolates to the dominating node. A phonological function φ relates the form of the derived word to the form of its base. This phonological function may be the same for all morphological constructions, but may be different as well. In this case, the morphological construction is associated with a specific phonological function, called a cophonology. In effect, this can be regarded as affix- or construction-specific phonology. The affix itself is not taken as an element of the cophonology but as an argument of this function in order to guarantee that the cophonologies of a language do not differ too much from one another. Orgun (1998: 213) regards nondeclarative optimality theory as a suitable phonological sister theory to sign-based morphology.

Word Design

Based on a structuralist conception of the lexicon as a list of irregularities, word design (Neef, 1996) takes morphological categories (or constructions) as the subject of morphology, thus covering (regular) inflectional and derivational categories that are traditionally conceived as affixes. All information that is connected with a specific morphological category is said to be morphological. Hence, any condition on the form of a derived or inflected word is of this type, in particular both the form of the affixes themselves and all kinds of conditions on the sound structure. The role of phonology in this conception is to explain the general sound regularities holding for all words of a language. The mode of application of word design is exemplified using the English noun plural that is characterized by the properties in (2) (Neef, 2001).

(2) BASE: noun stem
FORM: i. Design condition of segmental ending [Z]
ii. Design condition of difference from the stem
MEANING: 'plurality'

Every morphological category has a base of a specific type. This may be a stem, a different morphological category, or a phrase. Due to the Main Principle of Morphology, instances of morphological categories are similar to their bases in all aspects except in those ones explicitly stated in the description of the morphological category (formalizable as nonmonotonic feature percolation). Minimally, a morphological category is associated with some semantic effect. Furthermore, there can be a change concerning the part of speech (as is often the case with derivational morphology) and the form (except for zero inflection and conversion). Formal changes are captured in design conditions. The first condition in (2) demands that every (regular) plural form has to end in [Z], that is, in an alveolar fricative underspecified for voicing. This segment is voiced if the phonology permits it and voiceless otherwise. Because voiced obstruents are phonologically not allowed when following a voiceless obstruent in the syllable coda, the plural of *cat* is [kæts] whereas the plural of *dog* is [dɑgz]. The second condition in (2) forbids the plural of *rose* being [roz] despite the adequate segmental ending because a stem and plural must not sound the same. The phonology allows schwa epenthesis to yield the form [rozəz], thereby fulfilling both design conditions. Because different morphological categories may be subject to the same design conditions, morphology can be seen as containing a pool of conditions that individual categories make use of in different ways.

Research in word design concentrates on the morphology of German, especially inflection and derivational types that are theoretically disputed

(circumfixation, conversion). Currently, word design has not been formalized. Its phonological partner theory is a declarative approach that is loosely connected to declarative phonology. Morphological approaches that strictly adhere to declarative phonology are Ogden (1999) and Walther (1999a, 1999b).

See also: Computational Linguistics: History; Declarative Approaches to Phonology; Declarative Models of Syntax; Generative Grammar; Pragmatics: Optimality Theory; Sign-Based Morpology.

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Default Semantics

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It is hardly contestable that the interpretation of the speaker's utterance by the addressee is frequently driven by the salience of some of the possible interpretations. This salience can be caused by a greater frequency of a certain meaning or by its simplicity, but ultimately it rests on knowledge of social and cultural conventions or the cognitive principles that govern our thinking. Default Semantics concerns such cognitive defaults.

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It is hardly contestable that the interpretation of the speaker's utterance by the addressee is frequently driven by the salience of some of the possible interpretations. This salience can be caused by a greater frequency of a certain meaning or by its simplicity, but ultimately it rests on knowledge of social and cultural conventions or the cognitive principles that govern our thinking. Default Semantics concerns such cognitive defaults.

Before laying out the principles of Default Semantics, it is necessary to situate the default-based views in the research on the semantics/pragmatics interface. According to the traditional view, in addition to lexical and syntactic ambiguities, there are also semantic ambiguities such as that between the wide and narrow scope of negation in (1), represented in (1a) and (1b) respectively. 'KoF' stands for 'present king of France'.

(1) The present king of France is not bald.
(1a) $\neg\exists x\ (KoF(x)\ \&\ \forall y\ (KoF(y) \supset y = x)\ \&\ Bald\ (x))$
(1b) $\exists x\ (KoF(x)\ \&\ \forall y\ (KoF(y) \supset y = x)\ \&\ \neg Bald\ (x))$

The ambiguity position, held by Russell, among others, has been successfully refuted. Instead, it has been proposed that such differences in meaning belong to what is implicated rather than what is said (Grice, 1975) (*see* **Grice, Herbert Paul (1913–1988)**), and subsequently that semantics can be underspecified as to some aspects of meaning and require pragmatic intrusion in order to arrive at the full propositional representation of the utterance (see, e.g., Carston, 1988, 2002) (*see* **Pragmatics and Semantics**). It is now usual to talk about the *underdetermination* of sense and *underspecification* of the logical form. According to some post-Griceans, such differences in meaning can be explained through default interpretations. The level of defaults has been conceived of in a variety of ways: as belonging (i) to semantics (as in Discourse Representation Theory, Kamp and Reyle, 1993, and its offshoots, such as Segmented Discourse Representation Theory, Asher and Lascarides, 2003) (*see* **Discourse Representation Theory**); (ii) to pragmatics (Bach, 1994); or (iii) to fully fledged social and cultural conventions, called presumptive meanings or generalized conversational implicatures (Levinson, 2000). All of these default-based approaches advocate some degree of semantic underdetermination, understood as conceptual gaps in the output of lexicon and grammar. In other words, the logical form, which is the output of the grammatical processing of a sentence, does not provide the totality of meaning of the proposition expressed by the speaker.

While this statement is certainly true, and while it also seems to be true that some pragmatic contribution is often required in order to get the correct truth conditions of the utterance, it does not mean that such an underspecified or underdetermined representation need be distinguished as an epistemologically real level in utterance processing. In Default Semantics, there is no semantic ambiguity, but there is no underspecification either. The logical form as the output of syntactic processing interacts with the information coming from the property of mental states of *having an object*, *being about* something, called their *intentionality*. So, if we ask where meaning comes from, we can point to two sources of meaning: (i) compositionality of the sentence meaning and (ii) intentionality of the mental state that underlies the sentence. Both are equally basic and equally important, and hence it would be incorrect to consider any information coming from intentionality as an additional, pragmatic level of utterance processing. They both belong to semantics. In dynamic approaches to meaning, such as Discourse Representation Theory, such a level of representation, called in Default Semantics an *intentionality-compositionality merger*, has been successfully implemented and seems to be more in the spirit of dynamic meaning than postulating any unnecessary underspecifications or ambiguities (see Jaszczolt, 1999a, 1999b, 2000).

Default Semantics is governed by three main principles: the Parsimony of Levels (PoL), Degrees of Intentions (DI), and the Primary Intention (PI):

PoL: Levels of senses are not to be multiplied beyond necessity.
DI: Intentions in communication come in various degrees: they can be stronger or weaker.
PI: The primary role of intention in communication is to secure the referent of the speaker's utterance.

In PoL, the principle of parsimony with respect to the proposed levels of meaning is taken further than in other post-Gricean approaches. Instead of discerning an underspecified logical form and pragmatic intrusion, both sources of meaning are treated on an equal footing and both contribute to a common level of representation (the intentionality-compositionality merger). DI and PI principles specify how intentionality contributes to the meaning representation. In agreement with the phenomenological tradition (Husserl, 1900–1901), we have defined intentionality as the property of beliefs, thoughts, doubts, etc., of being about an object. It is compatible with the definition of intentionality that this aboutness can be stronger or weaker. For example, a definite description 'the best Italian painter' can correspond to a thought about a particular individual, e.g., Michelangelo (and be used *referentially*); to a thought about a particular individual who does not correctly match the description, e.g., Picasso (i.e., there is a referential mistake); or finally to a thought about whoever happens to undergo the description (and be used *descriptively*). In the first case, intentionality is in the strongest form: as a property of the mental state, it reaches, so to speak, a real object. In the middle case, it is weaker: a real object is intended, but there is no such object corresponding to that

description, and hence it reaches a mental construct that is a composite of the real person and an incorrect description. In the final case, the intentionality is dispersed and does not reach an object.

Now, intentional mental states need vehicles of meaning, and language is one such vehicle. As a result, linguistic expressions share the property of intentionality, and hence we can talk about intentionality of utterances as well as intentionality of thoughts. On the level of utterances, this intending is realized as *intentions in communication*. Three types of such intentions are distinguished in Default Semantics: an intention to communicate certain content, to inform about certain content, and to refer to objects, states, events, and processes. In accordance with the DI and PI principles, information from the degree of intentionality of the mental state (or the strength of intending, informativeness of an utterance) merges with the information from compositionality and produces the complete propositional representation that conforms to PoL. So, Default Semantics offers a more economical alternative to the approaches founded on underspecified semantics in that it implements Occam's razor (the methodological principle of not multiplying beings beyond necessity) 'one level up.' Semantic representation structures of Discourse Representation Theory have been implemented as formalizations for such intentionality-compositionality mergers (Jaszczolt, 1999b, 2000, in press a).

The DI and PI principles, in recognizing degrees and strengths of intentions, explain how default interpretations can arise. In the case of definite descriptions such as 'the best Italian painter,' the hearer normally assumes that the speaker utters the description with a referential intention and that the description is used correctly. This assumption is further corroborated by the assumed intentionality of the speaker's belief: the intentionality is strongest when a particular, identifiable individual has been intended. By force of the properties of vehicles of thought discussed in this article, the stronger the intentionality, the stronger the speaker's intentions. In the case of definite descriptions, the stronger the intentionality, the stronger the referential intention. In the case of definite descriptions, there are three degrees of intentionality corresponding to the three readings distinguished previously: (i) the strongest, referential; (ii) the intermediate, referential with a referential mistake; and (iii) the weakest, attributive. The strongest intentionality corresponds to the default reading. This default reading arises instantly, as a compositionality-intentionality merger. Only if addressees have evidence from their knowledge base or from the context that this default is not the case does the default interpretation *fail to arise*. This procedure is an improvement on other default-based approaches where defaults have to be *canceled* or *overridden*. Cancellation of defaults is a costly process and should not be postulated lightly: if there is no evidence of such cancellation, it is better to do without it and assume a more economical model of utterance processing.

Similarly, cognitive defaults can be discerned for belief and other propositional attitude reports (*see* the article **Propositional Attitudes**). Sentence (2a) can give rise to a report, as in (2b).

(2a) The best Italian painter painted this picture.
(2b) Mary believes that the best Italian painter painted this picture.

Using the representation of the Discourse Representation Theory (Kamp and Reyle, 1993; Reyle, 1993), we can represent the possible readings of (2) as in Figure 1 (Jaszczolt, 1999b: 287):

The discourse referent *y* is enclosed by a box drawn with a broken line, which signals that *y* can belong to any of the three remaining boxes. If it belongs to the outermost box, the reading is *de re* (about a particular individual, say, Michelangelo). Placed in the middle box, it signals that Mary has a *de re* belief but is referentially mistaken, thinking, for example, of Picasso. Placing *y* in the innermost box corresponds to a belief about whoever undergoes the description, i.e., a belief in a proposition (*de dicto*) rather than about a particular individual. Analogously to the case of definite descriptions where referential use was the default, the *de re* reading of a belief report comes out as a default, because it corresponds to the strongest intentions and the strongest intentionality. So, Figure 1 comprises three possible representations (three possible compositionality-intentionality mergers).

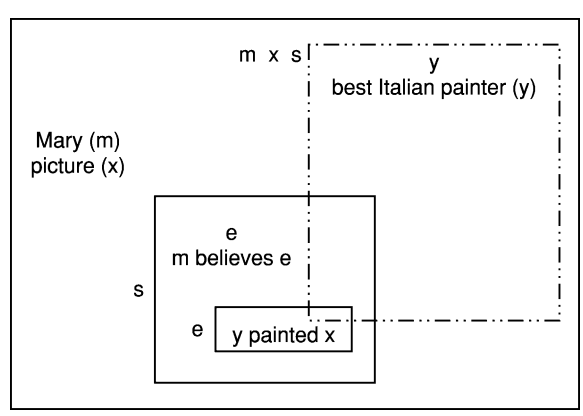

Figure 1 A combined DRS for the three readings of (2b).

In addition to definite descriptions in extensional and in propositional attitude contexts, the mechanism of the principles of Default Semantics has been applied to a variety of language expressions and constructions, including proper names (Jaszczolt, 1999b), presuppositional expressions (Jaszczolt, 2002a, 2002b), expressions of temporality and modality, and tentatively to numerals and sentential connectives (Jaszczolt, in press b, in press c). Naturally, the PI principle will not always be relevant. The referential intention will not always be present, and even when it is, it may not pertain to the assessment of the default or nondefault status of various readings. For example, in an assessment of the default meaning of *will* from among the epistemic necessity *will* in (3), dispositional necessity *will* in (4), and a marker of future tense in (5), it is the intention to inform the addressee about a certain content that is graded from the strongest to the weakest:

(3) Mary will be in the opera now.

(4) Mary will sometimes go to the opera in her tracksuit.

(5) Mary will go to the opera tomorrow night.

The Default-Semantic account of *will* also demonstrates that modal and temporal senses of *will* are traceable to one, overarching modal concept (akin to the sentential operator of *acceptability* in Grice, 2001). And since *will* is modal, it follows that the assignment of defaults has to be reversed as compared with the examples previously discussed: the weakest intentionality corresponds to the default sense of *will*, and this, predictably, turns out to be the regular future marker in (5) (for a formal account, see Jaszczolt, in press a).

Not all default interpretations are reducible to cognitive defaults. For example, the interpretation of possessives, as in (6), is dependent on the addressee's background knowledge and the context, rather than on the properties of mental states.

(6) Peter's book is about a glass church.

Similarly, inferences to a stereotype ('female nurse'), such as in (7), are not the case of the strength of intending but rather stem from the acquaintance with social and cultural practices.

(7) They employed a nurse to look after the patient.

Such default interpretations belong to the category of social and cultural defaults and are not always of central interest to semantic theory.

The phenomenon of negative-raising, i.e., the tendency for negation on the main clause to be interpreted as negation on the subordinate clause, is not an obvious cognitive default, but here we must be cautious. Neg-raising unpredictably applies to some relevant verbs but not to others, as (8) and (9) demonstrate.

(8) I don't think he is dishonest. (communicates, defeasibly: 'I think he is not dishonest.')

(9) I don't hope he will win. (does not communicate: 'I hope he will not win.')

The important question at this point is to ask about the scope of applicability of the theory. The question of the scope of applicability can be taken in the narrow and in the wide sense. In the narrow sense, we ask which default interpretations can be regarded as cognitive defaults, traceable to the properties of mental states. Cognitive defaults are rather widespread. In addition to the examples already mentioned, numerals seem to default to the 'exactly' meaning, rather than being underdeterminate between 'at least,' 'at most,' and 'exactly,' or having an 'at least' semantics. The enrichment of some sentential connectives such as *if* (to 'if and only if') and *or* (to exclusive *or*) can possibly also be traced to the strength of the informative intention and intentionality. This proposal concerning connectives and numerals is still highly programmatic and in need of further research. It is signaled here in order to shed some light on possible applications of cognitive defaults. In the wide sense, Default Semantics also comprises social and cultural defaults simply by assigning them an epistemological status that has nothing to do with the compositionality-intentionality merger.

To sum up: Default Semantics postulates a level of utterance interpretation called a compositionality-intentionality merger and thereby significantly decreases the role of underspecification in semantic theory. It distinguishes cognitive defaults and intention-based degrees of departures from these defaults, triggered by the addressee's knowledge base and the context. The theory also acknowledges the existence of social and cultural defaults whose source lies beyond semantics proper.

See also: Approaches to Translation: Relevance Theory; Compositionality: Semantic Aspects; Descriptions, Definite and Indefinite: Philosophical Aspects; Discourse Representation Theory; Grice, Herbert Paul (1913–1988); Husserl, Edmund (1859–1938); Implicature; *De Dicto* versus *De Re*; Neo-Gricean Pragmatics; Numerals; Pragmatics and Semantics; Presupposition; Proper Names: Semantic Aspects; Propositional Attitudes; Referential versus Attributive; Russell, Bertrand (1872–1970); Semantics–Pragmatics Boundary.

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Definite and Indefinite

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What Does 'Definite' Mean?

'Definite' and 'indefinite' are terms that are usually applied to noun phrases (NPs). In English, *the* is referred to as 'the definite article,' and *a/an* as 'the indefinite article.' Noun phrases (NPs) that begin with *the* (e.g., *the Queen of England*, *the book*), which are also called (especially in the philosophical literature) 'definite descriptions,' are generally taken to be prototypical examples of definite NPs in English. However, it should be noted that not all of them show the same pieces of behavior that have come to be taken as criterial for definiteness. Similarly, NPs that begin with *a/an* (*an elephant*, *a big lie*), 'indefinite descriptions,' are prototypical examples of indefinite NPs. (Plural indefinite descriptions use the determiner *some*.)

Uniqueness?

Exactly what differentiates definite from indefinite NPs has been a matter of some dispute. One tradition comes from the philosophical literature, more specifically Bertrand Russell's classic work on denoting phrases (Russell, 1905). On this tradition, what distinguishes *the* from *a/an* is uniqueness – more specifically the existence of one and only one entity meeting the descriptive content of the NP. So, while use of an indefinite description in a simple, positive sentence merely asserts existence of an entity meeting the description, use of a definite description asserts in addition its uniqueness in that regard. While (1a), on this view, is paraphrasable as (1b), (2a) is equivalent to (2b).

(1a) I met <u>an owner of El Azteco</u>.
(1b) There is at least one owner of El Azteco whom I met.

(2a) I met <u>the owner of El Azteco</u>.

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Definite and Indefinite

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What Does 'Definite' Mean?

'Definite' and 'indefinite' are terms that are usually applied to noun phrases (NPs). In English, *the* is referred to as 'the definite article,' and *a/an* as 'the indefinite article.' Noun phrases (NPs) that begin with *the* (e.g., *the Queen of England*, *the book*), which are also called (especially in the philosophical literature) 'definite descriptions,' are generally taken to be prototypical examples of definite NPs in English. However, it should be noted that not all of them show the same pieces of behavior that have come to be taken as criterial for definiteness. Similarly, NPs that begin with *a/an* (*an elephant*, *a big lie*), 'indefinite descriptions,' are prototypical examples of indefinite NPs. (Plural indefinite descriptions use the determiner *some*.)

Uniqueness?

Exactly what differentiates definite from indefinite NPs has been a matter of some dispute. One tradition comes from the philosophical literature, more specifically Bertrand Russell's classic work on denoting phrases (Russell, 1905). On this tradition, what distinguishes *the* from *a/an* is uniqueness – more specifically the existence of one and only one entity meeting the descriptive content of the NP. So, while use of an indefinite description in a simple, positive sentence merely asserts existence of an entity meeting the description, use of a definite description asserts in addition its uniqueness in that regard. While (1a), on this view, is paraphrasable as (1b), (2a) is equivalent to (2b).

(1a) I met <u>an owner of El Azteco</u>.
(1b) There is at least one owner of El Azteco whom I met.

(2a) I met <u>the owner of El Azteco</u>.

(2b) There is one and only one owner of El Azteco, and I met that individual.

It should be noted that Russell was concerned to capture the meaning of definite descriptions in a formal language of logic. Also, on his analysis both definite and indefinite descriptions are quantificational expressions (like explicitly quantified NPs, such as *every apple*, *no unwanted visitors*). The idea that definite descriptions are quantificational has been questioned by others, who view these NPs instead as referential. Fewer people question the idea that indefinite descriptions are quantificational, although some (primarily linguists, rather than philosophers) assume that they, too, are referential.

The uniqueness theory seems to accord well with our intuitions. It also is supported by the fact that when we stress the definite article contrastively, it brings out the sense of uniqueness. Example (3) seems to be inquiring as to whether there is more than one owner, or only one.

(3) Did you meet an owner of El Azteco or the owner?

It might seem that this approach would necessarily be confined to singular NPs. However, as argued by Hawkins (1978), the notion of uniqueness can be extended to plurals by employing the idea of exhaustiveness – the denotation of a definite consists of everything meeting the descriptive content of the NP. An NP like *the owners of El Azteco* would thus be held to be very similar to *all the owners of El Azteco*.

The first challenge to Russell's analysis of definite descriptions was put forward by P. F. Strawson, who argued that sentences containing definite descriptions are not used to assert the existence and uniqueness of an entity meeting the descriptive content in question. Instead, Strawson argued, definite descriptions are referential NPs, and the existence and uniqueness of a referent is presupposed (cf. Strawson, 1950; in this seminal work, Strawson did not use the term 'presuppose,' although it appeared very quickly in reference to the phenomenon in question). Strawson also argued that if the presupposition fails, the sentence as a whole is neither true nor false. Thus, in the case of (2a), should it turn out that no one owns El Azteco (perhaps it is a government installation), an addressee of (2a) would not respond "That's false!" but would correct the speaker's mistaken presupposition.

Another, more serious problem for Russell's analysis has attracted a lot of attention more recently, and that is the fact that in a great number of cases, perhaps the vast majority, the descriptive content of a definite description is not sufficient to pick out a unique referent from the world at large. One example of such an 'incomplete description' is in (4).

(4) Please put this on the table.

The sentence in (4) is readily understandable despite the fact that the world contains millions of tables. There are two main kinds of approach to dealing with this problem. A syntactic solution would propose that there is sufficient additional descriptive material tacitly present in the NP – e.g., *the table next to the armchair in the living room of the house at 76 Maple Avenue, Eastwood, Kansas, USA*. But it would be hard to explain how an addressee would guess which descriptive content had been left tacit. On a more plausible approach, the uniqueness encoded in definite descriptions should be understood relative to a context of utterance, which would include only those items in the surroundings of the discourse participants and those items mentioned in the course of the conversation or understood to be relevant to its topic. However, this runs into a problem with examples like (5), first pointed out by James McCawley (McCawley, 1979).

(5) The dog got into a fight with another dog.

David Lewis proposed that definite descriptions denote the most salient entity meeting the descriptive content (Lewis, 1979).

Familiarity?

The other main tradition concerning the meaning of definiteness generally cites the Danish grammarian Paul Christophersen. In Christophersen's view, what distinguishes definite from indefinite descriptions is whether or not the addressee of the utterance is presumed to be acquainted with the referent of the NP. In an often cited passage, Christophersen remarked: "Now the speaker must always be supposed to know which individual he is thinking of; the interesting thing is that the *the*-form supposes that the hearer knows it too" (Christophersen, 1939: 28). This approach appears to fare better with examples like (4), where, indeed, it seems that the speaker must be assuming that the addressee knows which table the speaker is referring to.

Within current linguistic theory, the familiarity approach was revived by the work of Irene Heim (1982, 1983). Like Strawson, Heim argued that definite descriptions are referential rather than quantificational; however, she also argued that indefinite descriptions are referential as well. Heim took the uses of definite and indefinite descriptions as they occur in (6) as typifying their semantics.

(6) Mary saw a movie last week. The movie was not very interesting.

In the mini discourse in (6), the indefinite NP *a movie* is used to introduce a new entity into the discourse

context. Subsequently that entity is referred to with a definite (*the movie*). Notice that we might as easily have referred to the movie in the second sentence of (6) with a pronoun: . . . *It was not very interesting*. Heim grouped pronouns and definite descriptions together as being governed by a "Familiarity" condition: use of a definite is permitted only when the existence of the referred-to entity has been established in the particular discourse. Indefinite descriptions, on the other hand, are subject to a "Novelty" condition: they presuppose that their referent is being introduced into the discourse for the first time. It's easy to see that this will solve the problem of incomplete descriptions. An example like (5) would be used only when the first dog referred to was presumed to be known to the addressee.

Though the familiarity theory is very plausible for a number of uses of definite descriptions, there are some kinds of cases it does not appear to cover very well. One of these is definite descriptions where the descriptive content of the NP is sufficient to determine a unique referent, no matter what the context. Some examples are given in (7).

(7a) Mary asked the oldest student in the class to explain everything.
(7b) Philip rejected the idea that languages are strictly finite.

Here we need not assume that the addressee is familiar with the referents of the underlined NPs or that these referents had been mentioned previously in the conversation. Note, too, that in this kind of case, the indefinite article is not allowed, as shown in (8). (The asterisk in front of these examples indicates that they are not well formed.)

(8a) * Mary asked an oldest student in the class to explain everything.
(8b) * Philip rejected an idea that languages are strictly finite.

And even when the descriptive content is not sufficient to determine a unique referent relative to the whole world, there are examples where the content may determine a unique referent in context. In these cases, too, the definite article may be used, even if the addressee is not assumed to know who or what is being talked about. An example is given in (9).

(9) Sue is mad because the realtor who sold her house overcharged his fee.

Adherents to the familiarity theory often invoke the idea of accommodation (following Lewis, 1979) to explain these uses. The idea is that addressees are willing to accept a definite description if they are able to figure out the intended referent.

Some Puzzling Cases

While most occurrences of definite descriptions are consistent with both the uniqueness theory and the familiarity theory, there are several kinds that don't match either theory. One group of examples is given in (10).

(10a) Horace took the bus to Phoenix.
(10b) The elevator will take you to the top floor.

It seems that with modes of transportation, a singular definite description can be used despite the fact that there are, e.g., many buses to Phoenix, and the building in (10b) may have many elevators. We also don't suppose that the addressee will be familiar with the particular bus or elevator in question. A different kind of case is illustrated in (11).

(11a) My uncle wrote something on the wall.
(11b) We camped by the side of a river.
(11c) She shot herself in the foot.

These sentences are well formed even though rooms typically have more than one wall, rivers more than one side, and people more than one foot. It may be relevant that these are locations. In all of these cases, as pointed out by Du Bois (1980), to use an indefinite article puts too much emphasis on the location, as though it were inappropriately being brought into focus.

A third kind of example shows some dialectal variation. The example in (12) is well formed in American English, although in British English the article would be missing from the underlined NP.

(12) My mother is in the hospital.

Compare the examples in (13), which are good in both dialects.

(13a) Bill went to school this morning.
(13b) If you're very good, you'll get to heaven some day.

The examples in (14), also good for English in general, indicate a certain amount of idiomaticity.

(14a) I heard it on the radio.
(14b) I saw it on TV.

It seems that some nouns simply require the definite article, while others are fine without it.

Finally, some adjectives call for the definite article in English, despite their not restricting the reference of NPs they occur in to either a unique or a familiar referent.

(15) She gave the wrong answer and had to be disqualified.

It is not clear whether these examples indicate the need for a brand-new theory of the definite

article in English or are just idiomatic exceptions to the rule.

Grammatical Phenomena

Sensitivity to definiteness of NP is called a definiteness effect, and a number of constructions are believed to have such an effect.

Existential Sentences

One of the earliest constructions showing a definiteness effect to be noticed was existential, or *there be*, sentences. Examples like those in (16) are quite natural, but the corresponding sentences in (17) sound peculiar, if not downright ungrammatical.

(16a) There is a book in the shop window.
(16b) There were some bachelors on board the ship.

(17a) * There is the book in the shop window.
(17b) * There were the bachelors on board the ship.

One complicating factor is the existence of a construction that is similar to the existential construction but that is used in a restricted set of circumstances. The latter kind of sentence, often called a list existential, typically seems to be used to offer entities to fulfill some role or purpose. However, this kind of existential does not allow a locative prepositional phrase to follow the focus NP. Examples just like those in (17) but where the prepositional phrase is an NP modifier, as in (17′), could be used in reply to the questions in (18).

(17′a) There is the book in the shop window.
(17′b) There were the bachelors on board the ship.

(18a) What can we get for Bill for his birthday?
(18b) Weren't there any people around to help?

The more common type of existential, like those in (16), can be called locative existentials. In this case, the prepositional phrase that follows the focus NP is a separate constituent that locates the item in question. It is only locative conditionals that show a definiteness effect, and these have been used as a test for definiteness, as we see in the section 'Other Kinds of Definite and Indefinite NPs.'

The Have Construction

Another construction, similar to existential sentences, is one involving the verb *have* when it is used to indicate inalienable possession. Here, too, we see a definiteness effect, in that the examples in (19) are natural, while those in (20) are not.

(19a) She had a full head of hair.
(19b) He had a sister and two brothers.

(20a) * She had the full head of hair.
(20b) * He had the sister and the two brothers.

It is perhaps not too surprising that these two constructions should show a similar definiteness effect, since *have* and *be* verbs are often used for similar kinds of propositions in the world's languages.

Other Kinds of Definite and Indefinite NPs

As shown in the first section, there is no commonly agreed on essence of definiteness or indefiniteness. Hence the need for some kind of diagnostic for these properties. Ability to occur naturally in a locative existential has become the main diagnostic used.

Other Kinds of Definite NPs

As noted in this article, Heim assumed that pronouns are definite, like definite descriptions. Others agree with this categorization. And as we might expect, pronouns do not go naturally in locative existentials. The sentences in (21) are not natural.

(21a) * There was it in the fireplace.
(21b) * There were them all over the floor.

Pronouns seem to fit both the uniqueness and the familiarity conceptions of definiteness. When they are used, it is assumed that there is a unique intended referent within the discourse context, and it is also assumed that the addressee will know who or what the speaker was intending to refer to.

Another subcategory of NP that is typically assumed to be definite consists of proper names. Like pronouns and definite descriptions, these do not occur naturally in locative existentials.

(22a) * There was Joan in the library.
(22b) * There is France in the United Nations.

Although it might not be so obvious as it is with pronouns, proper names also seem definite by both theories of definiteness. Proper names behave as though they have a unique referent; they cannot accept restrictive adjectives or other restrictive modifiers. And in fact in most contexts, each proper name does have a unique referent. On the other hand, we do not usually use a proper name unless we assume that our addressee has already been introduced to the referent.

A third kind of NP that is generally agreed to be definite would be those that have a demonstrative determiner: *this*, *that*, *these*, or *those*. These cannot occur naturally in a locative existential, as shown (23) and (24).

(23a) * There was that book over there in Mary's bag last Tuesday.
(23b) * There are these applicants waiting to see the dean.

In addition, NPs with a possessive determiner are usually classed as definite.

(24) * There was Mary's car in the driveway.

Indeed, NPs with possessive determiners are typically regarded as belonging to the category of definite descriptions.

Some kinds of quantified NPs cannot occur naturally in existential sentences, and this has led some people to consider them to be definite NPs. Some examples are given in (25).

(25a) * There were all the students at the party.
(25b) * There were most red buttons on the dress.

However, it is possible that these NPs should not be classified as definite and that there is some other reason that they cannot occur in locative existential sentences.

Bare NPs

One interesting kind of NP in English has received a significant amount of attention. So-called bare NPs do not have any determiner, and the head noun must be either plural or a mass noun. These NPs have (at least) two distinct uses. Sometimes they are interpreted generically, as in (26).

(26a) Mary likes sharpened pencils.
(26b) Water with fluoride in it is good for the teeth.

The sentences in (26) concern the whole category referred to by the underlined NP. On the other hand, sometimes these bare NPs have an existential interpretation, in that they are referring to just some members or a subpart of the category.

(27a) Mary bought sharpened pencils.
(27b) There was water with fluoride in it in the test tube.

As can be seen in (27b), when bare NPs occur in a locative existential sentence, they can have only the existential interpretation, and not the generic one.

Other Types of Indefinite NPs

In addition to indefinite descriptions, and bare NPs with the existential interpretation, there are other types of NPs that go naturally in locative existentials. Some examples of quantified NPs are shown in (28).

(28a) There are a few pieces of cake left.
(28b) There were few, if any, freshpersons at the school fair.
(28c) There are many problems for that course of action.
(28d) There are some big flecks of paint on the back of your coat.

If we use natural occurrence in a locative existential as a diagnostic, then these other types would also be classified as indefinite NPs.

In addition to these, there are some other unexpected cases of NPs that look as though they should be definite, because they have definite determiners, but that can appear naturally in a locative existential. One kind, noticed first by Prince (1981), uses the proximal demonstrative determiner (*this*, *these*), but with an indefinite reference, as in (29).

(29a) There was this strange note on the blackboard.
(29b) There are these disgusting globs of stuff in the bowl.

Note that this is definitely a different use of these determiners. The examples in (29) would not be used with any kind of pointing gesture, and indeed, they could be used in a phone conversation, where the addressee is not in the same perceptual situation as the speaker. Also, it is worth noting that this indefinite use of *this* and *these* is somewhat marked stylistically. Examples like those in (29) would not appear in a formal context.

Finally, there are some kinds of NPs that look like definite descriptions, but whose sense is indefinite, and that can appear naturally in existentials.

(30a) There was the nicest young man at the picnic!
(30b) There were the same nominees on both ballots.

As Prince (1992) pointed out, an NP like *the same nominees* can have two interpretations. One is anaphoric, as in (31).

(31) The Executive Committee came up with a list of nominees, and it happened that the Nominating Committee chose the same nominees.

Here *the same nominees* refers back to the Executive Committee's list and means that the Nominating Committee's choices were the same as the Executive Committee's. On this interpretation, *the same nominees* would be definite. However, the interpretation in (30b) is different: it means that the two ballots had the same choices. This interpretation is apparently indefinite, given the ability of this NP to occur naturally in the existential sentence in (30b).

Other Kinds of Categorizations

A simple binary distinction like definite vs. indefinite may be too crude, especially if we are trying

to classify NPs in general. Furthermore, it may be more useful to look at the role of NP form with respect to discourse function. A number of researchers have turned to the idea of information status – an extension of the familiarity idea, but with greater articulation.

Old and New

Prince (1992) argued that we need to distinguish two ways in which information can be novel or familiar, new or old. One is with respect to (the speaker's assumption about) the addressee, which Prince called Hearer-old and Hearer-new. The speaker assumes that the addressee is already acquainted with the referent of a Hearer-old NP, whereas Hearer-new NPs are assumed to introduce new entities to the addressee. On the other hand, entities can be new or old with respect to a discourse: Discourse-old or Discourse-new. Discourse-old NPs refer to entities that have already been mentioned in the current discourse, in contrast to Discourse-new NPs. Prince found that it was the category of Hearer-old/Hearer-new that correlated roughly with the definite/indefinite distinction, rather than Discourse-old/Discourse-new. This seems to agree more with Christophersen's than with Heim's conception of definiteness and indefiniteness.

The Givenness Hierarchy

Gundel *et al.* (1993) proposed a hierarchy of givenness corresponding to the degree to which the referent of an NP is assumed to be cognitively salient to the addressee. Each point in the hierarchy corresponds to one or more NP forms. At one end of the hierarchy is the weakest degree of knownness, which Gundel *et al.* labeled 'type identifiable.' This end corresponds to indefinite descriptions, and the criterion for their use is just that the addressee be familiar with the kind of thing denoted. At the other extreme, we find NPs denoting entities that are currently 'in focus,' and pronouns require this extreme of cognitive salience.

Definite descriptions are about midway in the hierarchy, requiring unique identifiability for their referents. Just to the weaker side are the indefinite *this/these* NPs. On the more salient side of definite descriptions are NPs with demonstratives (*this*, *that*, *these*, *those*) as determiners.

One special aspect of this treatment is that the criteria for each place on the hierarchy are increasingly stringent and subsume the criteria for all less stringent points; that is, the hierarchy is an implicational one. Hence, indefinite descriptions, which have the weakest requirement, can appear anywhere in principle – even when their referents are in focus. However, general conversational principles militate against using an indefinite description in such a situation, as it would be misleading in suggesting that only the weakest criterion had been satisfied.

The Accessibility Hierarchy

A third approach, similar to the one just mentioned but with its own distinct characteristics, was developed by Mira Ariel (1990, 2001). Ariel proposed an even more articulated accessibility hierarchy, reflecting the marking of NPs according to how accessible in human memory their referents should be. Upwards of 15 distinct categories are represented, ranging from full name plus modifier (at the least accessible end) to zero pronouns (represented with ø), which are found in constructions like those in (32).

(32a) Mary wanted ø to build a cabin.
(32b) Open ø in case of fire.

Full name plus modifier (e.g., *Senator Hillary Clinton*) is distinguished from full name, last name alone, or first name alone, each of which receives a separate spot on the hierarchy. Similarly long definite descriptions, with a lot of descriptive content, are distinguished from short ones, and stressed pronouns from unstressed pronouns. (The list does not contain quantified and [other] indefinite NPs, which, as noted in this article, are often considered not to be referential expressions.)

Ariel's claim was that the hierarchy of NP forms corresponds to accessibility, where the latter is determined by a number of factors, including topichood, recency and number of previous mentions, and how stereotypic the referent is for the context. The NP forms go generally from fullest and most informative to briefest and least informative, ø being the limiting case. The idea is that an NP form typically encodes an appropriate amount of information for the addressee to achieve easy identification of the referent.

Definite and Indefinite in Other Languages

The examples used so far in this article have been taken from English. However, many other languages have definite and/or indefinite articles, though by no means all of them. Lyons (1999) described the explicit marking of definiteness – whether with an article or a nominal inflection – as an areal feature that characterizes the languages of Europe and the Middle East in particular, although it can be found elsewhere in the world as well (Lyons, 1999: 48). Definite articles often seem to develop out of

demonstrative determiners, as was the case in English. Indefinite articles, on the other hand, often come from the word for 'one.'

Some languages, e.g., Irish (Irish Gaelic), have only a definite article, whereas others, e.g., Turkish, mark only indefinites explicitly. The examples in (33) and (34) are taken from Lyons (1999: 52).

(33) *Irish*
(33a) an bord 'the table'
(33b) bord 'a table'

(34) *Turkish*
(34a) ev 'house', 'the house'
(34b) bir ev 'a house'

Even among languages that have both definite and indefinite marking, the usages typically do not match exactly across languages. Thus, bare NPs in English have a generic use (as in the examples in [26]). French also has both definite and indefinite determiners but, unlike English, would use the definite determiner in examples like those in (26).

(35) *French*
(35a) Marie aime les crayons bien taillés.
(35b) L'eau au fluor est bonne pour les dents.

In languages that do not use articles or some other explicit marking for definiteness or indefiniteness, word order may affect interpretation in that way, as in the examples in (36) and (37), from Chinese and Russian.

(36) *Mandarin Chinese*
(36a) Zhuo-zi shang you shu.
table on have book
'There is a book (or books) on the table.'
(36b) Shu zai zhuo-zi shang.
book is located table on
'The book is on the table.'

(37) *Russian*
(37a) Na stolé lezhít karta.
on table lies map
'There is a map lying on the table.'
(37b) Karta lezhít na stolé.
map lies on table
'The map is lying on the table.'

However, it should be noted that word order variation also interacts with topicality and the distribution of new and old information in a sentence and that this affects the definiteness or indefiniteness of an NP's interpretation.

For a full discussion of the expression of definiteness and indefiniteness in a variety of the world's languages, see Lyons (1999).

See also: Accessibility Theory; Articles, Definite and Indefinite; Descriptions, Definite and Indefinite: Philosophical Aspects; Indefinite Pronouns; Pragmatic Presupposition; Presupposition; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects.

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Definition

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A definition is a statement of the meaning of a word, term, or symbol. This simple statement hides a wealth of philosophical and semantic issues, some of which have been the source of some confusion, in particular the question whether a definition of a word can arise from empirical observation of language in use or whether definitions are necessarily a matter of stipulation. The term 'definition' is also used in logic to denote an expression in propositional calculus that may be substituted for another expression (the definiendum) without affecting the truth value. Such definitions are transformation rules of a particular kind. In setting out the axiomatic basis (including definitions) of a propositional calculus, logicians are normally careful to avoid all reference to interpretation. The purpose is to identify a basic set of well-formed formulas, not to engage in interpretation. In setting out the definitions in a dictionary, lexicographers have the opposite goal. Their purpose is to offer an interpretation (or a menu of possible interpretations) of a word.

Traditionally, definitions are applied to classes of entities (physical objects or abstract concepts, as the case may be). A traditional definition consists of a **genus term** and any of a number of **differentia**. The genus term answers the question, 'What sort of thing is it?' The differentia distinguish it from members of related sets. Thus, the genus term in a definition of *canary* is *bird* (or, in a more fine-grained hierarchy an intermediate term, *finch,* of which the genus term is *bird*), while the differentia typically include mention of its size (small), its color (yellow), and its song (melodious). This tradition goes back to the Neo-Platonists, in particular Porphyry (*c.* 232–303 A.D.), who wrote an introduction in Greek (*Eisagogē*) to Aristotelian logic. Porphyry's *Eisagogē* was translated into Latin by Boethius, and it is through Boethius that the tradition of defining by genus and differentiae has been transmitted to us. The five concepts of Aristotle summarized in the *Eisagogē* are actually somewhat more elaborate than genus and differentia. They are:

Genus: e.g. a particular person (say, Socrates) is a member of the genus *animal*.
Species: e.g. Socrates is a member of the *human* species.
Differentia (distinguishing characteristics): e.g. humans are distinguished from other animals by *rationality*.
Properties: e.g. *laughter* is a property of humans. All and only humans laugh.
Accidents (particular characteristics): e.g. Paul is pale; Anna is dark.

The meaning statements found under each headword in a standard dictionary are commonly referred to as 'definitions' and are often worded according to genus and differentia. However, in languages with an established literary tradition, lexicographers almost universally assert or imply that their definitions are based on usage, denying any prescriptive or stipulative intention. Thus, they make no claim to be writing stipulative definitions. The desire to avoid ill-founded pontification is laudable. However, unfortunately, for the reasons explained below, the meaning of a word in a natural language cannot be satisfactorily determined by empirical observation of language in use. The large machine-readable natural-language corpora that have become available for all major languages during the 1990s and 2000s provide abundant evidence for words in use, and they show a profusion of

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Definition

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different uses of words with different shades of meaning in different contexts that defy unification into a single definition. To a native speaker, the meaning of each use is generally clear from the context. However, an enumeration of a different sense for each context would be quite impractical, firstly because it would lead to infinitely long dictionary entries (insofar as there is an infinite number of possible contexts for each word), secondly because it would miss the very generalizations that a dictionary is supposed to offer, and thirdly because the contexts themselves cannot be finitely enumerated: when one has found all the uses of a particular word in all the corpora that exist, one has not found all *possible* contexts.

Consider a simple example. What is the definition of the transitive verb *file*? It may seem obvious that when a person *files* a document, he or she places it on record in some way. However, an attorney filing a lawsuit is doing something very different from a clerk filing papers in a filing cabinet. An attorney who files a lawsuit by putting the papers in a filing cabinet is not doing what is required, namely presenting the papers to a court of law in order to activate a procedure. In the case of the filing clerk, the papers are merely placed in an appropriate place for possible subsequent retrieval, while in the case of the attorney, a procedure is activated. If these were the only two contexts for this verb, the problem could easily be solved by listing two senses. But they are not. Other normal contexts under the general heading of 'PERSON files DOCUMENT,' each with a slightly different set of implicatures generated by the context, include judges filing opinions, pilots filing flight plans, journalists filing news reports and feature articles, and many other procedures in different domains. When someone files a complaint of some kind, is this the same sense of file as the legal sense, or a different one? Worse is to follow: after all the normal uses of a word have been enumerated, the definer must also allow for the possibility of abnormal but perfectly sincere and meaningful uses of the word. These range from the metaphorical and facetious ('Do you always file your toothpaste in the fridge beside the milk?') to the serious but unusual ('He filed the seed packets alongside the gardening books'). The word *definition* implies setting limits, but actual usage seems to be unlimited, or rather the boundary between possible and impossible use of a word is a fuzzy grey area, not a clear-cut dividing line. The notion of setting limits explicitly denies an essential feature of common words, especially verbs, in ordinary language use, namely their availability for use in new and unusual contexts.

There is no problem with definitions of logical symbols or terms of art, as these can be unashamedly stipulative. For example, in the *Système International* of measuring units (SI units), a *second*, the basic unit of time, is treated as a term of art, defined as:

> the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium 133 atom.

This definition was agreed in 1967 by the CIPM (Comité International des Poids et Mesures), which in 1997 added a rider to the effect that it "refers to a cesium atom in its ground state at a temperature of 0° K." It undoubtedly defines, avoiding any possible ambiguity in the concept, but for ordinary language users it fails to explain. It is, of course, not aimed at ordinary language users. It would be of no use to a manufacturer of egg timers or even ordinary clocks. It is aimed at physicists and engineers who require absolute precision and the absence of ambiguity, rather than a model for practical applications such as clock making. It is a stipulative definition of a concept ('let a second be . . .'), not a definition of a term in any natural language. However, it should also be noted that this very precise definition of the concept 'second' depends not only on great sophistication in particle physics, but also upon the preexistence of a natural language in which the sophisticated concept can be expressed. The miracle is that physicists, logicians, and other high-level theoretical thinkers can, as it were, bootstrap their way to absolute precision using the ordinary words of natural languages, assisted by numbers (which are precise), even though the words themselves are fundamentally imprecise. Some linguists now believe that this imprecision is not a fault but a design feature of natural language, enabling speakers to use existing words to say new things and to use language rapidly. Natural languages are designed to enable speakers to trade precision for flexibility and speed – with unfortunate consequences for the notion of definition.

A distinction must be made, therefore, between explanatory definitions and stipulative definitions. The English word *define* and its European cognates are derived from Latin *definire* 'to set a boundary or limit to,' based on the root *finis* 'end, limit, boundary.' According to Lewis and Short's *Latin dictionary*, the word is "common in Cicero." Among the examples from Cicero cited in that dictionary are the following:

> *unum hoc definio, tantam esse necessitatem virtutis . . .* – *De re publica 1*, 1 "This one thing I define as being a necessary condition for manly virtue"

> *genus universum brevi circumscribi et definiri potest* – *Oratio pro Sestio 45*, 97 "A universal class can be briefly circumscribed and defined"

> *definienda res erit verbis et breviter describenda – De inventione rhetorica 1*, 8 "A thing must be defined in words and briefly described"

The first two of these are clearly stipulative definitions rather than empirical observations about the way the words *virtus* and *genus* were used by the Latin speakers of the day. The third is a proposal for the stipulative definition of concepts. Nevertheless, it is easy to see how the two could have become confused and the notion of stipulative definition been overextended.

Cicero wrote in a tradition that goes back to Aristotle's doctrine of essences and beyond that to Plato's doctrines of 'forms' or 'ideas.' Plato drew an analogy between knowing and perceptual activities such as seeing and smelling. Just as we see colors and smell odors, so we know knowable objects, which according to Plato are unchanging idealizations, not subject to change over time. The ideal triangle is always a triangle. Necessary conditions for being a triangle are being a geometrical figure, having three and only three straight lines, and having three angles. Moreover, these three conditions add up to a sufficient condition for being a triangle. If you stumble across something that has three straight line joined by three angles, it must be a triangle.

The aim of this approach to definition is to 'shrink-wrap' the conditions onto the concept so that together the necessary and sufficient conditions define all the triangles that there are or ever could be, and nothing except triangles ('all and only triangles').

Necessary and sufficient conditions work very well as definitional criteria for ideal concepts such as triangles; they are indeed an essential foundation of Western scientific and technical reasoning. However, they do not work so well for the meaning of everyday words. As we have seen, any attempt to establish necessary and sufficient conditions for *filing something* runs into insuperable difficulties, and the same applies to other ordinary-language terms such as *air* and *animal*. How shall *air* or *animal* be defined?

Because of this element of vagueness in natural language, a parallel vocabulary has built up consisting of terms used in scientific discourse, defined stipulatively, although in many cases they are influenced by the carefully recorded observations of empirical scientists. Thus, it may not be possible to define *air* with scientific precision, but terms such as *oxygen* and *hydrogen* were coined by scientists as terms that precisely correspond to scientific observation, whose definitions can therefore be stipulated. It is easy to point to an example of a typical *animal* (a cat or a fox, for example), but not so easy to delineate boundaries. Is a bird an animal? Is a fish? For many people, *bird, fish,* and *animal* are contrasting terms. Is a spider an animal? What about a sea anemone? What about an amoeba? *Animal* in modern English is a typical natural-language term, with a well-understood center but a very fuzzy perimeter. By contrast, *mammal* is a term of art, based on New Latin *mammalia,* coined in the 18th century as a genus term to denote all and only those animals that breast-feed their young.

Some 18th-century lexicographers made strenuous efforts to implement the substitution principle, a notion that can be traced back to Leibniz's dictum (1704) that two things are the same if the one can be substituted for the other without affecting the truth value (*salva veritate*). The idea was – and is – that a definition should be substitutable in any context for the word being defined (the definiendum).

A discussion of some traditional philosophical issues involved in the notion of definition, from Plato and Aristotle to Ogden and Richards, is in Robinson (1950).

The *Longman dictionary of contemporary English* (Procter, 1978) defines words in traditional dictionary style, but using a 'restricted defining vocabulary' of only about 2,000 words. The Polish-Australian philosopher of language Anna Wierzbicka (1985, 1987, 1996) has gone much further, proposing definitions in terms of 'universal semantic primitives' or 'atomic units of meaning' – words (or concepts) that are undefinable and that cannot be decomposed and explained in other words. The number of primitives in Wierzbicka's system rose steadily over the years from 14 in the 1970s to 55 in 1996. This part of her conception, though derived from a long tradition in philosophy and indeed endorsed by exponents of artificial intelligence such as Wilks (1977), is controversial. An example is given in Table 1. The **meaning** is defined in terms of primitives, but the **discussion** is in ordinary English.

In the late 20th century, some fundamental issues of definition were reconsidered, following the work of J. L. Austin (1975) on performatives. Some dictionaries discontinued the attempt to define **all** words by a substitutable phrase. Function words such as the definite and indefinite article are defined by their function in discourse (rather than substitutably), while the pragmatic contribution of other words (i.e. sentence adverbs such as *unfortunately* and *broadly*) was also recognized as not being suitable for substitutable definition.

One important question concerns whether a word can (or should) be defined out of context at all. In 1979, Hanks proposed the commonsensical notion that a dictionary entry cannot really hope to *define* the meaning of a word; instead, it can only hope to *typify* it. This developed into the idea that

Table 1 Wierzbicka's definition of *urge* (extracts)

Urge
Meaning
• I say: you should do X.
• I assume that you may not want to do it.
• I don't want to stop saying this because I want to cause you to feel that you have to do it.
• I say this, in this way, because I want to cause you to do it.
• I don't want you to think about it for a long time.
Discussion
• Urging is an attempt to get the addressee to do something.
• Unlike *ask* and *request*, it doesn't imply that the speaker is seeking a benefit for himself.
• Unlike *order* and *command* it doesn't imply that the speaker has power over the addressee.
• [It is] pressing and forceful.
• The speaker perceives or anticipates unwillingness on the addressee's part.
• There is usually some sense of urgency. The speaker wants the addressee to respond and to respond **now**. Unlike the case of *command*, however, it is not necessarily an external action which the speaker wants. Rather, it is a psychological response.

dictionaries do not really contain definitions of a word's meaning; instead they show its 'meaning potential' (Hanks, 1988). In the Cobuild dictionaries (Sinclair *et al.*, 1987, 1988), the definiendum is not the word but the word in context. Headwords are still listed in alphabetical order in these dictionaries, but the headword is encoded in a typical context before it is explained. Typical Cobuild definitions (from the *Cobuild Essential English dictionary*, 1988) are:

Gong
A **gong** is a flat circular piece of metal that you hit with a hammer to make a sound like a loud bell.
Instill
If you **instill** an idea or feeling into someone, you make them think it or feel it.
Swindle
If someone **swindles** you, they deceive you in order to get something valuable from you, especially money.
Syrupy (2) You can describe behavior as **syrupy** when it is sentimental in an irritating way.
Urge
If you **urge** someone to do something, you try hard to persuade them to do it.

The thinking behind the definition structure of Cobuild dictionaries is elaborated in Hanks (1987) and analyzed in some detail by Barnbrook (2002). Where Wierzbicka defines word meanings in the first person, aiming at explaining the thought processes that lie behind the use of a word, Cobuild's definitions are in the second person, i.e., Cobuild addresses the reader directly.

See also: Definitions: Uses and Varieties; English Lexicography.

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Definition/Rules in Legal Language

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Laws as Definitions

Laws are definitions. Most notably, criminal laws define conduct that is subject to punishment. For example, New York's burglary statute characterizes that crime as folllows:

> A person is guilty of burglary ... when he knowingly enters or remains unlawfully in a building with intent to commit a crime therein (N.Y. Penal Law § 140.20, defining Burglary in the Third Degree).

The law is a classical definition in that it lists elements that are individually necessary and together sufficient for a burglary to have occurred. A person is guilty of burglary only if that person:

1. knowingly;
2. enters *or* remains unlawfully in a building;
3. with intent to commit a crime therein.

By using the word *or,* the statute provides two different ways to meet the second requirement. Nonetheless, for a person's conduct to constitute a burglary, all three elements must be met one way or another.

This phenomenon is by no means an American one. A look at European criminal codes shows the same approach. For example, the German Penal Code (§ 154) defines perjury:

> Whoever falsely swears before a court or other office authorized to administer oaths shall be punished by imprisonment for not less than one year.

A separate provision (§ 15) requires the conduct to be intentional for criminal liability to attach.

Writing laws as definitions gives the legal system some important advantages. Most important, the structure of the classical definition, based on necessary and sufficient conditions, establishes a procedure for determining whether a person has committed a crime. One need do no more than ensure that a person's conduct matches each of the necessary elements of the crime. If any are absent, then the person did not commit the crime. For example, if a person breaks into a building with intent to retrieve his keys, which he inadvertently left there, then he has not committed burglary. He may have committed breaking and entering, which is a lesser crime, but it is not a burglary.

Establishing a procedure for determining whether a particular crime was committed enhances the rule of law. It does not matter who the judge or other official is. Anyone examining the situation will, presumably, come to the same conclusion. The result is that similar conduct will be treated similarly by the system of justice.

Drafting laws in this style is commonplace. Governments typically have offices of legislative counsel, which write statutes for approval by the legislature. The people working in these offices are trained in drafting laws whose elements are clearly separable.

The Limits of Definitions

In theory, there should be little more to say about laws as definitions. A body with political legitimacy writes laws that define proscribed conduct. People may then choose whether to obey the law, with whatever consequences follow. If someone drives through a red traffic light, that person has broken the law and faces a citation. It would hardly help to tell the police officer that there was no traffic, and that it is good environmental policy to save the fuel that would have been wasted by waiting at the traffic signal. If the conduct comes within the legal definition of a traffic infraction, then the driver has violated the law. Once the law is passed, the background justifications for having passed it fade into the background (Schauer, 1993).

This seems fair enough when it comes to the regulation of automobile traffic, or when the infraction is of the sort contemplated by the legislative body that enacted the law. But when we begin to look at laws defining serious crimes, we may not always think it fair to rely exclusively on definitions. Below are a few examples from American legal history.

A law makes it a crime to interfere with the delivery of the mail. When a local police officer arrests a postal worker for murder while the postal worker was delivering mail, did the police officer commit the crime of interfering with delivery of the mail? (*United States v. Kirby*, 74 U.S. 482 (1868)).

A law increases the punishment for individuals who 'use a firearm' during a drug trafficking crime. Has a person who attempts to trade an unloaded gun for cocaine violated that statute? (*Smith v. United States*, 508 U.S. 223 (1993)).

A law makes it a crime to acquire property through 'a pattern of racketeering activity.' The statute defines mail fraud as a racketeering activity. When a person writes two fraudulent letters as part of a single fraudulent scheme, has he engaged in a *pattern* of racketeering activity? (*H.J. Inc. v. Northwestern Bell Telephone Co.*, 492 U.S. 229 (1989)).

A law makes it a crime for people on American ships to commit manslaughter 'on the high seas.' Has a sailor who commits manslaughter on a ship docked on a river in China violated the statute? (*United States v. Wiltberger*, 18 U.S. (5 Wheat.) 76 (1820)).

In all of these cases, the laws, which are written as definitions, seem sensible enough at first glance. But the application of the statute in each of these four cases leads us to question whether the law is being applied justly. The first three cause us to ask whether the statute is overinclusive, and the fourth causes us to ask whether the statute is underinclusive. Logically, there are two possible explanations for the recurrence of these problems. One is that the endeavor of defining is the right one, but these definitions are deficiently drafted, and ought to be fixed. The second possibility is that because of the imperfect relationship between our ability to define generally and the kinds of things that happen in the world, it would be virtually impossible to avoid these problems. Although the first explanation at times has force, significance is reduced by the validity of the second. Aristotle recognized this in the *Nicomachean Ethics*, where he explained:

> The reason is that all law is universal, but about some things it is not possible to make a universal statement which shall be correct. In those cases, then, in which it is necessary to speak universally, but not possible to do so correctly, the law takes the usual case, though it is not ignorant of the possibility of error. And it is none the less correct; for the error is not in the law nor in the legislator but in the nature of the thing, since the matter of practical affairs is of this kind from the start (1137b).

Contemporary work in linguistics, psychology and philosophy suggest that Aristotle's focus was well placed. (See discussion in Schauer, 2003.)

Linguistics and the Use of Definitions

Linguists, philosophers, and psychologists have for decades been looking into the extent to which definitions play a role in our understanding of words. Although no strong consensus has emerged, some of the problems with definitions that legal systems have encountered repeatedly throughout the centuries now appear predictable as consequences of the ways we conceptualize and use words. For one thing, it is difficult, if not impossible, to find definitions that work to define all and only instances of a concept, for most words. (See, e.g., Fodor *et al.,* 1980). Try to define 'paint' so that the definition includes all and only instances of what you would call painting. It is very hard. As Murphy (2002) points out, experts do not even agree on definitions within their fields. Metallurgists are unable to define 'metal' so as to include all and only metals, for example.

Most scholars today do not believe that our knowledge of words can be characterized in terms of definitions that spell out necessary and sufficient conditions for the word's proper usage. There are, however, exceptions. Wierzbicka (1996) does argue that definitions suffice to capture the meanings of words. Her definitions, however, include information about prototypical scenarios and associated states of mind, making them more consistent with some of the theories described below.

Another reason for rejecting the definitional approach to word meaning is that definitions fail to account for many nuances in our understanding of words. Pioneering work by Eleanor Rosch and her colleagues in the 1970s demonstrated convincingly that our conceptual knowledge is not as crisp as a definitional approach to word meaning would predict (see, e.g., Rosch, 1975). First, word meanings become fuzzy at the margins. English speakers know the difference between a chair and a sofa, but if we elongate a chair incrementally, at some point one does not know exactly what to call it. Second, some things seem to be better members of a category than others. As far as definitions are concerned, either something has met the definition's criteria, or it has not. That, in part, is what makes definitions lawlike. However, we know that a chair with a back and arms is a better example of a chair than one with arms, but no back. In fact, we may be uncomfortable calling such a thing a chair at all. The definitional approach to word meaning does not capture this knowledge, which all of us seem to have. Rosch explained these facts by arguing that our knowledge of concepts includes knowledge of prototypes.

Most researchers now believe that prototypes play some role in our conceptualization, but it is not clear what role they play. In an important study, Armstrong, Gleitman and Gleitman (1983) found prototype effects with such natural categories as birds. People believe, consistent with Rosch's early results, that robins are better examples of a bird than say, ostriches. But when asked whether they believe an ostrich is a bird, people responded positively, and when asked whether *bird* is a graded category, they responded negatively. This work suggests that prototypicality plays a role in our understanding, but it may not be the case that prototypes provide a theory of how our concepts are constituted.

Fodor (1998: 137), using the concept *doorknob* as an example, puts the issue quite generally. To Fodor, our concept of a doorknob expresses "the property that our kinds of minds lock to from experience with good examples of doorknobs," "by virtue of the properties that they have as typical doorknobs." What kinds of minds we have for forming concepts has been a matter of intense study. Some claim that we conceptualize using typical features. Others opt for exemplars, whereas still others argue that we fit our concepts into larger theories about the world.

Many now believe that our concepts, and the meanings of words we use to express them, are multifaceted. They consist in part of definitional features, and in part of prototypical information, whether by virtue of exemplars or schemata (See, e.g., Johnson-Laird, 1987; Smith and Sloman, 1994; Sloman, 1996). How such information is built into larger systems of knowledge is an area of active research (see Murphy, 2002). Even standard dictionaries reflect this combination of different sorts of information. For example, *Webster's Third New International Dictionary*, a leading unabridged dictionary of American English, defines a chair as "a usu[ally] movable seat that is designed to accommodate one person and typically has four legs and a back and often has arms." The only part of this definition that is classically 'definitional' is the necessary condition that a chair be 'a seat that is designed to accommodate one person.' Everything else is noted as occurring 'often' or as 'usual' or 'typical.' Take away enough typical features, and one may be left with a divan or a stool – both of which are also seats designed to accommodate one person, but which are not chairs at all (See Solan and Tiersma, 2005: Chap. 2 for discussion).

Legal Reactions to Problems with Definitions

If contemporary linguists, philosophers, and psychologists are correct, then one might predict the problems with definitions that arise in everyday speech to arise in legal contexts as well. And they do. As noted earlier, at times a disputed event comes within the boundaries of the law, but could not have possibly been within the contemplation of those who wrote it. Often, the problem involves prototypes (see Winter, 2001). The disputed event is so far removed from the typical situation that originally motivated the law that no one at the time thought about the situation. Had they done so, they would have defined the law differently, or they would have carved out an exception. The same holds true when laws are underinclusive. Tax lawyers, for example, make their livings discovering new ways for taxpayers to come within the letter of the law, but to avoid paying taxes that the drafters of the tax code might have wanted to collect. Legal systems approach these conceptual problems in several ways, each the result of a particular political or philosophical orientation.

Proliferate Narrow Subrules One strategy for overcoming some of these problems is to proliferate narrow definitions in an attempt to fine-tune the law. Assume that in writing its burglary statute, a legislature has in mind what it thinks is a typical burglary: A perpetrator breaks into a house, steals some jewelry, and leaves. But the legal definition of burglary includes much more than the typical burglary. If not every burglary should be treated the same way, perhaps it would be better to define many different kinds of burglary as different crimes, and to assign punishments to each version depending on how immoral or dangerous that version appears. For example, a burglary in which the perpetrator injures someone might be punished more severely than a burglary consisting of nothing more than a break-in.

Legal systems often employ this technique. The New York burglary statute quoted at the beginning of this article has many variations, depending upon the circumstances in which the burglary was committed, whether a weapon was involved, and whether anyone was hurt (see New York Penal Law § 140.25). The French Penal Code defines various grades of larceny, depending on factors such as whether it was committed by a group, whether it was committed under the color of government authority, whether violence occurred, and if so, whether anyone was injured, the severity of any injury, and whether a weapon was used (French Penal Code, Articles 311–1–311–11). Examples abound.

The proliferation of subdefinitions around a core concept reflects an effort to preserve the definitional approach to law, while addressing some of its problems. In particular, it recognizes that some events are better examples of a concept than are others. By dividing a category into smaller ones, it is better able to match the legal consequence to the severity of the infraction.

This approach to legislation, however, can never be entirely successful. Statutes are not only definitions in their own right, but they are comprised of words, and the scope of each word is independently subject to dispute. For example, the American statute that makes it a more severe offence to 'use a firearm' during a drug trafficking crime distinguishes between ordinary firearms, on the one hand, and machineguns, on the other, imposing a harsher sentence on those who use the latter. This nuance, although addressing the problem that not all violations of this law are equally bad, leaves us with the problems of deciding which firearms should count as machineguns. Does a weapon have to look like a prototypical machinegun to trigger the harshest part of the statute? Can we define machinegun in such a way that manufacturers will not be able to engineer new weapons around the defining criteria? Moreover, even to the extent that it works, this approach comes at the cost of creating a complex legal system with a very large number of rules.

Revert to the Intent of the Legislature Aristotle's solution to the problem that applying legal definitions can lead to injustice was to revert to the intention of the legislature.

> When the law speaks universally, then, and a case arises on it which is not covered by the universal statement, then it is right, where the legislator fails us and has error by over-simplicity, to correct the omission – to say what the legislator himself would have said had he been present, and would have put into his law if he had known (*Nicomachean Ethics,* 1137b).

This approach is still used today by many judges whose job it is to interpret laws. Continuing with the statute that imposes harsher penalties for those who use a gun during a drug trafficking crime, how should we decide whether trading a gun or having a gun at the ready should count as using it? One possibility is to look at the historical record to see whether those who enacted the law would have wanted such conduct included within its scope. Among the most prominent American cases to employ this argument is the 1892 decision in *Church of the Holy Trinity v. United States* (143 U.S. 457 (1892)). A law made it illegal to pay the transportation into the United States of any person 'performing a service or labor of any kind.' The goal of the statute was to control the influx of unskilled workers into the country. A test case was brought to determine whether this law should apply to a church that had paid the transportation from England to New York of its new rector. A look at the legislative record showed that the legislators were aware when they enacted the law that it could be applied more broadly than they intended, and expected that the courts would interpret the statute narrowly enough to effectuate their purpose. The United Supreme Court obliged, and held that the statute did not apply.

Reference to legislative intent is commonplace in most European legal systems, including the European Court of Justice (see McLeod, 2004). In the United States, most judges are willing to make reference to the intent of the legislature, although there is currently a great deal of debate about the matter. The leading critic is Justice Antonin Scalia of the Supreme Court of the United States. In both his written opinions as a judge, and in his scholarly commentary (see Scalia, 1997), Scalia argues that extratextual materials, such as the legislative record, are irrelevant to the interpretation of statutes because that record was never enacted as a law, and only laws need be obeyed. He argues further that it is not coherent to consider the intent of an entire group, as large groups have no single intent. Nonetheless, courts continue to consider such material.

Create Rules to Resolve Hard Cases Even if one supports an investigation into the intent of the legislature, the effort may fail if the evidence of intent is either absent or equivocal. What if after looking at additional information the law remains vague or ambiguous and the intent of the legislature is not clear? For those cases, legal systems have devised substantive rules of decision to promote legal values. For example, the *rule of lenity* holds that ambiguities in statutes must be resolved in favor of the defendant. If it is not possible to tell whether a law should apply from reading it and studying the circumstances surrounding its enactment, it would be difficult to conclude that an individual charged with violating that law was on fair notice that his conduct could result in his being punished. At what point such a rule should apply has not been an easy question for legal systems. If *any* possible alternative interpretation were enough to trigger it, then a person accused of robbing a bank could simply argue that the bank robbery law should be applied only to river banks. Lord Blackstone (1766: *89) wrote of one case in which a judge held that a statute that punished those who steal horses did not apply to a person who stole a single horse. To protect the system from such arguments, courts typically apply lenity as a last resort after contextual information has been adduced in an effort to resolve indeterminacy in language.

Along these lines, both the common law and European civil codes contain a large number of internal rules for resolving difficult cases. They meet with varied success, as the rules sometimes conflict with one another, and it is not always clear which rule should apply. To take the examples already discussed, should the intent of the legislature always take precedence over the rule resolving ambiguities in favor of the defendant? These conflicts, which have been well-studied (see Llewellyn, 1950), limit their effectiveness.

Permit Decision Makers to Ignore Definitions when their Application would Lead to Unjust Results Legal systems tend to create a safety valve that permits courts to ignore statutory definitions altogether when they produce absurd results. Thus, the sheriff who arrested a letter carrier who was wanted for murder was held not to have committed the crime of interfering with the delivery of the mail, because such a result, while within the scope of the statute's definition, would be absurd. To take a more recent example, a statute calls for a person who violates the terms of his probation to be sentenced to 'one-third of the original sentence.' A person who had been sentenced to five years of probation failed a drug test. Had he been sentenced to prison and not been placed on probation, his term would have been six months.

The Court held that it would be absurd to interpret the statute literally to reduce his term of probation to only one third of five years (20 months), and sentenced him instead to two months in prison (*United States v. Granderson,* 511 U.S. 39 (1994)).

Define Terms Within the Laws Themselves If most battles over the meaning of a law are over the meanings of the words that the law contains, it would seem only natural to refer to the definitions of those words to resolve disputes. There are two ways of doing this. The first is to define each significant word within the law itself, in a special glossary. Many laws have such glossaries. For example, Section 121 of the German Penal Code criminalizes mutiny among prisoners. Who should count as a prisoner? Subparagraph (4) of the statute tells us: "Within the meaning of subparagraphs (1) through (3) [defining the crime], a prisoner shall include anyone who has been committed to an institution of protective custody." This practice is also commonplace in contracts and insurance policies. Insurance policies in particular define numerous terms. Predictably, disputes continue over both the meanings of the defined words, and the meanings of the words in the definitions.

Refer to Dictionaries as Authorities on Meaning A second way in which the law makes reference to definitions of legal terms occurs when judges refer to dictionaries as arbiters of meaning. This practice is most likely to manifest itself in common law jurisdictions (e.g., the United States, Canada, the United Kingdom, Australia), where judges often publish the reasons behind their decisions in written opinions, and varies widely from country to country even among those jurisdictions. A search using LEXIS, a computerized data base of legal decisions, reveals that during the 1990s, the Supreme Court of Canada used the word *dictionary* in 226 cases; the Supreme Court of the United States used it in 193 cases (sometimes in dissenting opinions); the High Court of Australia used it in 53 cases; and the House of Lords (both Scotland and England) used it in only 24 cases.

Courts have always referred to dictionaries for guidance. For example, when the meaning of a foreign or technical word is at issue, courts routinely turn to dictionaries of the relevant language or specialty to ascertain its meaning. Moreover, it is sometime appropriate to look at an older dictionary to determine whether a word used in a law enacted long ago had a different meaning at the time of enactment than it has now. And as noted earlier, it is not always easy to define a word. Dictionaries provide a good reference source for judges who need assistance doing so.

Today, however, especially in the United States, courts are using dictionaries as neutral arbiters to resolve disputes about meaning. This creates difficulties because the disputes often involve nuances in meaning that the lexicographers who wrote the dictionary did not intend to resolve in the few-line definition allotted to the word (see Landau, 1984).

To illustrate the problem, the same law that creates enhanced penalties for those who 'use' a firearm during a drug crime also creates longer sentences for those who 'carry' a firearm during a drug crime. The question in one case decided by the U.S. Supreme Court was whether a person who has drugs in the front of his car, and a hand gun in the back is *carrying* the gun within the meaning of the statute (*Muscarello v. United States,* 524 U.S. 125 (1998)). By a 5–4 vote, the Supreme Court held that he was carrying the gun, and therefore had to serve the longer prison term. The justice who wrote the majority opinion turned to a number of dictionaries, all of which supported the majority's position. For example, *Webster's Third New International Dictionary* has as its first definition *of carry*: "move while supporting (as *in a vehicle* or in one's hands or arms)." However, as the dissent points out, not all dictionaries support this position. The Sixth Edition of *Black's Law Dictionary*, typically regarded as the most authoritative American legal dictionary, defined *carry* in a way friendly to the defendant's position: "To wear, bear or carry them upon the person or in the clothing or in a pocket, for the purpose of use, or for the purpose of being armed and ready for offensive or defensive action in case of a conflict with another person." Both sides agreed that the 'ordinary' meaning of *carry* should carry the day, but the justices could agree on no definitive methodology for determining which meaning was the more ordinary.

Cases like this have generated a growing body of scholarly literature critical of courts' resort to the dictionary as a source of ordinary meaning (See, e.g., Aprill, 1998; Hoffman, 2002; Solan, 2003).

The American Jury

Definitions play a prominent legal role in another context: the jury system, especially in the United States. The United States Constitution guarantees the right to a trial by jury in criminal cases, and in some civil cases as well. Early in American legal history, it was up to the jury to decide first what happened, and then how the law should respond to the facts as the jury had determined them. Thus, a jury was empowered to decide that the law would be too harsh in a particular case and to acquit a defendant even when the language of the statute clearly applied.

This was considered an especially important right during the American colonial period, when laws enacted by the English Parliament were resented by those living in the American colonies. In fact, the American Declaration of Independence lists denial of the right to a trial by jury as a justification for the colonies breaking away.

Leaving so much power in the jury's hands comes with a cost. Similar conduct will be treated differently, depending on the whim of the jury. During the 19th century, this was first seen as unacceptable in commercial cases, because it undermined the development of a set of rules by which trade could occur with relative certainty. The result was a change in the jury system: it was up to a judge to instruct the jury on the law, and up to the jury to determine the facts of a case, and to apply the law as the judge had defined it. Later in that century, by then more than 100 years after the American Revolution, the jury's role in criminal cases was similarly diminished.

In modern American trials, after the presentation of evidence and summations by the lawyers, the judge reads to the jury a set of instructions that apprise them of the law under which they are to decide the case. Two problems arise. The first is that the jurors come to jury service with prior knowledge. People tend to think that a burglary involves breaking into a dwelling for the purpose of stealing something. As a legal matter, breaking into any building with the intent to commit *any* felony is a burglary. At the end of the trial, the judge instructs the jury on the proper definition of burglary. The question that remains is whether jurors will be able to set aside their own understanding of burglary, largely based on prototypes, and to adopt instead the legal definition set forth by the judge.

Research indicates that it is very difficult for jurors to replace their own prior knowledge with statutory definitions. In a series of experiments, the psychologist Vicki Smith (1993) first asked a group of individuals to identify the most typical features of various crimes, including burglary and kidnapping, among others. She then constructed stories, some of which contained many of the prototypical features, but failed to meet statutory definitions, and others of which met the statutory definitions, but lacked many of the prototypical features of the crime. The results demonstrated that people have difficulty replacing their ordinary sense of a crime with definitional criteria. Only by instructing participants in advance of both the legal definition and their obligation to ignore their own prior knowledge was it possible to dislodge their prototype and elicit more correct experimental responses. Other research has revealed serious problems in juror understanding of important terms, even in cases that involve the death penalty (see Tiersma, 1995).

Summary

Definitions play a significant role in legal systems around the world. Their advantage is their compatibility with rule of law values, and their ease of application. However, advances in linguistics, psychology and philosophy suggest that in nonprototypical cases, definitions may fail, and legal systems will have to look elsewhere for guidance if they are to avoid committing injustice. These alternatives meet with varying degrees of success.

Acknowledgments

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See also: Definition; Jury Instructions; Language of Legal Texts; Lexical Semantics: Overview; Lexicography: Overview; Prototype Semantics; Thought and Language: Philosophical Aspects; Truth Conditional Semantics and Meaning.

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Uses

'Definition' is the activity of explaining to an audience the meaning of an expression. 'A definition' is a product of that activity: a sentence the understanding of parts of which (the part of the sentence providing explanation, the *definiens*) can underwrite an audience's understanding of the rest (the part of the sentence being defined, the *definiendum*). For example, understanding 'is the activity of explaining the meaning of an expression' (*definiens*) might enable one to understand a meaning of 'definition' (*definiendum*). Notice that 'definition' needn't proceed via 'definitions.' Perhaps the first explanations of meaning to which a child is exposed don't come via sentences.

Besides the immediate purpose of underwriting explanations of meaning, a definition can serve countless others. One may stipulate that an expression is to enjoy a meaning – deploying a 'stipulative definition.' E.g., for purposes of this entry, let x be a *definition* if x is a sentence used to explain meaning. (Here and throughout, initial universal quantification is suppressed and use/mention distinctions ignored.) Other purposes of stipulation include abbreviation – hence, 'abbreviative definition' – itself at the service of tractability and comprehensibility – and marking out the *definiens* as of special interest, perhaps as carving at an important joint (Whitehead and Russell, 1910).

An alternative purpose is to describe the meaning an expression carries with respect to some language or population – a 'descriptive' or 'lexical definition.' Thus, in English, x is a *definition* iff x is a sentence used to explain meaning. Less immediate purposes here include illuminating a less well understood *definiendum* by appeal to a better understood *definiens*; revealing the basis of one's understanding of the *definiendum*; or establishing dependence of the *definiendum* on the *definiens*. But the basic purpose of descriptive definition – explaining the meaning of the *definiendum* – is independent of the viability of these other purposes. This is good, since it would be surprising if many expressions in use were redundant.

A third purpose is 'explication' or 'explicative definition.' Here one stipulates with the aim of approximating to the meaning of an ordinary expression. The aim is to balance two requirements: first, the new expression should be fit to do duty for the old, at least for some purposes; and second, the new expression should improve upon the ordinary along some valued dimension, perhaps clarity or consistency (Carnap, 1928, 1947). Explication is risky, as it is in general impossible to specify in advance the range of important duties an expression must perform. The definitions recently presented are sufficiently vague and ambiguous to meet the first requirement, if not the second.

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to articulate in detail, but can be illustrated. Someone who lacks the capacities needed to understand 'explain' will not gain understanding of 'definition' from the definition offered above. Moreover, it's plausible that, since true synonymy (sameness of meaning) is rare, most dictionary definitions rely heavily on audiences' knowledge and abilities, often supplying little more than hints from which the intellectually privileged are able to derive understanding.

Mention of contextual features is often suppressed, especially in logic. Suppression is motivated by aims, such as balancing maximal generality against formal tractability. Aiming for generality induces logicians to articulate assumptions and rely only on capacities widely possessed amongst thinkers. Seeking tractability induces restrictions on the range of uses of an expression that a definition is required to explain. Logicians typically require definitions to convey meaning to audiences competent with the logical apparatus and language of their logical theory, without relying on special capacities or features of the circumstances in which the definition is offered. It doesn't follow that definitions offered by logicians are more than comparatively context-free. Neither does it follow that explanations of meaning outside of logic are required to attain a similar level of context-freedom.

Varieties

Having seen something of the assortment of uses of definitions, we can consider some varieties of definitions. There are as many forms of definition as there are ways of using sentences to enable someone to discover the meaning of an expression. Those listed below are included for their exhibition of variety, and also because they illustrate the context sensitivity of definition. This is addressed more explicitly in the section 'Uses Again.'

Comparatively Context-Free Forms of Definition

Explicit definition involves assuming an audience to understand the *definiens* in advance, and presenting the *definiendum* as something that can replace the *definiens* for current purposes. For example,

(1) A **brother** is a male sibling

Here, an audience is informed that *brother* can be used wherever *male sibling* is used. An explicit definition accomplishes this by associating with the *definiendum* an expression that can serve in function-preserving replacements for that expression, perhaps through synonymy, or some weaker equivalence.

An interesting form of quasi-explicit definition is 'recursive' or 'inductive definition.' (Quasi-explicit since it fails to provide an independent expression that can be used wherever the expression to be defined can be used.) A recursive process is one that takes its own outputs as inputs, generating new outputs that can serve as inputs, and so forth. Use of recursive definitions enables us to characterize the meaning – e.g., extension – of expressions when that meaning can, or can only, be generated by a recursive process. For example:

(2) x is a **direct ancestor** of y iff x is a parent of y or x is a parent of a direct ancestor of y

Here, the *definiendum* appears in the *definiens* so that the extension of the *definiens* cannot be determined in advance of partial determination of the extension of the *definiendum*. This in turn cannot be determined in advance of partial determination of the extension of the *definiens*. This is apt to seem viciously circular, but it isn't. Vicious circularity is avoided because the basis clause, *x is a parent of y*, affords a means to start the recursive process independently of grasp of the meaning of *x is a direct ancestor of y*. The 'inductive step' – *or x is a parent of a direct ancestor of y* – can then make use of the output of the basis clause to generate a new input, and so forth.

Explicit definition is unhelpful when the framework in which it is given deploys the expression to be defined, or when an audience lacks other expressions able to do the same work. In such cases, one might deploy 'implicit (or contextual) definition.' An implicit definition explains an expression's meaning through appeal to other elements in the definition. But unlike an explicit definition, the other elements in an implicit definition need not be equivalent to the *definiendum*. Implicit definition involves stipulating the truth of sentences involving the *definiendum* in a way that fixes its meaning as the unique meaning able to sustain the truth of the sentences so stipulated.

One example was Bertrand Russell's account of definite descriptions, sentences of the form *The F is G* like *The King of France is bald*. Rather than presenting an explicit definition of *The* or *The F*, Russell explicitly defined whole sentences in which they occur, and thereby implicitly defined them, via (3):

(3) The F is G iff $(\exists x)\,(Fx \,\&\, (\forall y)\,(Fy \supset x = y) \,\&\, Gy)$

The right-hand side reads: there is exactly one F and every F is G (Russell, 1905).

Another example involves the use of a definite description to explain a proper name's reference. The reference of *Jack the Ripper* might be explained using the following sentence:

(4) **Jack the Ripper** is the perpetrator of the Whitechapel murders

Although (4) can be used to explain the meaning of *Jack the Ripper*, it does so without identifying it with the meaning of the descriptive phrase *the perpetrator of the Whitechapel murders*. Proper names – unlike

descriptive phrases – are 'rigid designators.' They refer, crudely, to the same object in every possible world. So, while *the perpetrator of the Whitechapel murders* denotes different individuals in different possible worlds – depending on who in those worlds committed the crimes – *Jack the Ripper* refers to the same person in each world: whoever committed the crimes in the actual world. It follows that (4) is only 'contingently' true (might have been false). But, arguably, since (4) is stipulated, it is knowable *a priori* (Kripke, 1980; Evans, 1979; Soames, 2003: 397–422). This effect is mediated by the audience's standing competence with the category of proper names. So this feature of context plays a role in mediating the transition from what is presented in a definition to the understanding conveyed.

Comparatively Context-Dependent Definitions More obviously context-dependent forms of definition involve appeal to examples, and so to the classificatory abilities of one's audience.

Ordinary explanations of meaning often employ 'ostension' – crudely, pointing. Thus, one may point to Hilary Putnam and utter (5):

(5) **That** is Hilary Putnam

thereby explaining the meaning of *Hilary Putnam*. This is an 'ostensive definition.'

An 'enumerative definition' serves to explain the meaning of an expression by listing at least some elements in the expression's extension. So, for example, (6):

(6) A **Beatle** is Ringo or John or Paul or George

Ostension can be used to facilitate enumeration:

(7) **This** (pointing to Ringo) and **that** (pointing to Paul) are **living Beatles**

Often, enumerative definitions give only partial lists and include an 'and so forth' clause:

(8) A **philosopher** is Hilary Putnam, or W. V. Quine, or Rudolf Carnap, or anything relevantly like those

In (8), since there are indefinitely many ways of continuing the list, we rely on our audience's capacities, in particular the continuations they find salient. In order to reduce reliance, we can give additional information concerning the similarities we expect our audience to track:

(9) A **philosopher** is Hilary Putnam, or W. V. Quine, or Rudolf Carnap, or other things similar to those with respect to academic expertise

An important range of cases involves ostensive enumeration and direction. So, for example,

(10) A sample is **water** iff it is the same liquid as that (pointing to a sample)

According to (10), whether a novel sample counts as water depends on the general requirements on sameness of liquid and on the nature of the original sample. As Hilary Putnam argued, both "... may take an indeterminate amount of scientific investigation to determine" (Putnam, 1975c: 225). Arguably, something close is true of definitions of many ordinary expressions, especially those that employ examples. Development of definitions that are less reliant on context for their functioning than ordinary definitions may require detailed investigation of elements in the circumstances of definition.

Uses Again

The utility of definition depends on how widely it is applicable. There are grounds for pessimism. One negative argument is that, in order for a definition to secure uptake, the *definiens* must be understood. Hence, some basic range of expressions must be understood in advance of any definition, and they will therefore be indefinable. If some expressions can be so understood, it becomes pressing to show that some others cannot. Another negative line is that the role of context in the explanation of meaning establishes that exposure to definitions is, in general, not necessary or sufficient to secure audience understanding. Exposure is insufficient, not only because of the role of context in enabling an audience to utilize a definition to fix on a meaning, but also because elements in the context can play a role in fixing a meaning incompatible with the explicit dictates of the definition. The role of context makes definitions only defeasible guides to meaning. The use of examples above in explaining the varieties of definition makes possible the development – or defeat – of the proffered general characterizations of that variety. Exposure to definitions is unnecessary for a related reason: just as contextual elements can defeat definitions, so they can enable understanding in the absence of definitions.

From the current perspective, these points do not apply to the activity of definition. Since we acquire knowledge of the meanings of many (if not all) of our expressions on the basis of others' explanations – understood to include their uses of expressions in contexts – many expressions with which we are competent are thereby definable. What the points suggest is that meaning can fail to supervene on information acquired just through understanding the *definiens*. (Supervenience of a set of properties Q on a set of properties P requires that no two possible worlds – or portions of a possible world – can differ in the distribution of Q-properties without differing in the distribution of P-properties.) But failure of meaning to supervene on the information carried by definitions is perfectly compatible with that information playing a role in sustaining knowledge of meaning. So the two lines of argument canvassed above indicate, at most,

that not every ordinary definition will exhibit the degree of freedom from context shown by definitions in logic. The importance of this (potential) result derives from the extent to which philosophers have aimed to offer definitions of key terms – e.g., knowledge, causation, or truth – in a (comparatively) context-free way. One of the major themes of late 20th century philosophy has been that the aim is inappropriate (Burge, 1993; Putnam, 1975a, 1975b, 1975c; Travis, 1989; Wittgenstein, 1953. Related issues arose from Quine's critique of the view that definitions have distinctive epistemic status: Quine, 1936, 1951, 1963).

See also: Analytic Philosophy; Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; Context, Communicative; Dictionaries and Encyclopedias: Relationship; Externalism about Content; Kripke, Saul (b. 1940); Meaning Postulates; Putnam, Hilary (b. 1926); Quine, Willard van Orman (1908–2000); Russell, Bertrand (1872–1970); Synonymy.

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Deflationism

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The label 'deflationary' is applied to different theories of and approaches to philosophical issues nowadays, and there is a bit of confusion as regards what it is that makes a theory deflationist, partly because it is not clear what all so-called deflationary theories have in common. At the risk of oversimplifying, let us say that a philosophical theory of X is deflationary just in case it does not accord to X a fundamental, or underlying, nature amenable to philosophical analysis.

A deflationary theory of X does not deny the existence of X or of things that are X; it doesn't have to deny that either X or the concept of X plays a role in

that not every ordinary definition will exhibit the degree of freedom from context shown by definitions in logic. The importance of this (potential) result derives from the extent to which philosophers have aimed to offer definitions of key terms – e.g., knowledge, causation, or truth – in a (comparatively) context-free way. One of the major themes of late 20th century philosophy has been that the aim is inappropriate (Burge, 1993; Putnam, 1975a, 1975b, 1975c; Travis, 1989; Wittgenstein, 1953. Related issues arose from Quine's critique of the view that definitions have distinctive epistemic status: Quine, 1936, 1951, 1963).

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A deflationary theory of X does not deny the existence of X or of things that are X; it doesn't have to deny that either X or the concept of X plays a role in

philosophical inquiry about other phenomena; it does not even have to deny that there may be an explanation of why something is X. The important point to remember is that a deflationary explanation does not constitute a philosophical analysis, nor does it presuppose that there is a uniform reason for being X for all things that are X, i.e., a general explanation of what makes something X – for that would presuppose that X has a nature. Here we will focus on two forms of deflationism that are of special interest to the Philosophy of Language: deflationism about truth and about meaning.

Deflationary conceptions of truth have been espoused under different guises by philosophers such as Gottlob Frege, Frank Ramsey, A. J. Ayer, Peter Strawson, and W. V. O. Quine. Main contemporary proponents include Hartry Field and Paul Horwich.

Ramsey (1927) and Ayer (1936) have both stressed in different ways Frege's remark that "nothing is added to the thought by my ascribing to it the property of truth" (1918), p. 88. To say of a sentence p, or of the proposition it expresses, that it is true does not add anything to saying p itself. In a similar vein, Quine remarked that "by calling the sentence ('Snow is white') true, we call snow white. The truth predicate is a device of disquotation" (1986), p. 12. This does not mean that the predicate 'is true' is useless, nor that it can be eliminated. Indeed, in some sense a deflationist may rest content with the claim that 'is true' expresses a property: contemporary deflationists accept that 'is true' functions grammatically like a predicate, so like every other predicate it can be said to apply a property to a subject. Nevertheless, it makes no sense to think of truth as the property that all true sentences, or true propositions, have in common, for what makes 'Snow is white' true is something having to do with snow and the physical phenomena involved in the reflection and perception of light, whereas what makes 'London is north of Barcelona' true has to do with the cities and their position on the planet; there is no one thing that these two sentences have in common that explains their being both true. This contrasts with the claim that the two sentences have in common their correspondence to facts in the world, as versions of the correspondence theory would have it, and it contrasts also with the claims that the sentences cohere with a system of beliefs or that they both have some sort of pragmatic value, as the coherence and the pragmatic approaches to truth would have. The predicate 'is true' is not eliminable, because it allows us to say things that we could not say without it – for instance, sentences such as 'Everything Tom says is true,' something that can be meaningfully said even when we do not know all the members of the set of things that Tom says. So, 'is true' has a useful application when it is meant to apply to a conjunction of statements not all of whose members are known, or when it is meant to apply to an infinite conjunction of statements. But observe that on such views the function of the predicate 'is true' is purely logical: there is nothing more to the nature of truth than the linguistic function of 'is true.' And as regards the concept of truth, the deflationist proposes that it is completely captured by Tarski's equivalence schema: p is true if and only if p.

Some contemporary versions of deflationism assume the instances of the schema to be about sentences, so the nature of truth is taken to be entirely captured by the list of instances: "'Snow is white' is true if and only if snow is white," "'London is north of Barcelona' is true if and only if London is north of Barcelona," . . . This approach, which finds its inspiration in Quine (1986), faces the objection that it makes truth relative to a language. So, what this version of the deflationist project really captures is the notion of 'true-in-English' or 'true-in Spanish,' something that is arguably at odds with the intuitive notion of truth. A different deflationary approach to truth, the minimalist approach championed by Paul Horwich (1990), regards the instances of the T-schema as being about propositions. So the minimalist view is that the nature of truth is entirely captured by instances of the schema: the proposition that p is true if and only if p. A proposition is what is expressed by an utterance of a sentence in a given context; utterances of, say, 'Snow is white' by an English speaker and of 'La neige est blanche' by a speaker of French express the same proposition. Thus the notion of truth so characterized is not language-relative.

Horwich's minimalist conception of truth has been widely discussed recently. I will not make an attempt here to give a summary of objections and replies. A good state-of-the-art perspective on the discussion can be obtained from Blackburn and Simmons (1999) and an exhaustive presentation of deflationism, its different versions, and the challenges they face can be found in Kirkham (1992). There is, however, a general worry about the deflationist perspective on truth that is worth mentioning. Robust theories of truth such as the correspondence theory take seriously the explanatory relationship between facts, the way things are in some portion of the world, and the truth of sentences that describe those portions of the world. Thus, we assume that snow's being white *explains* why 'snow is white' is true, something that the deflationist also accepts. So, let us then say: "that snow is white explains why 'snow is white' is true," or alternatively "that snow is white explains why the proposition that snow is white is true." The deflationist

seems committed to the claim that the latter says nothing over and above "that snow is white explains that snow is white." Perhaps the deflationist may want to answer to this worry by denying that the original intuition, that snow's being white *explains* why 'snow is white' is true, tells the whole story: that it is not snow's being white, but the physical (not philosophical nor semantic) phenomena about the reflection of light and its perception by the human eye that explain why 'show is white' is true.

There is another conception of truth that in a sense does not qualify as deflationary. Yet in another sense it does. This is the approach to truth explored in Cartwright (1987) 'A neglected theory of truth' (an approach for which Cartwright found inspiration in G. E. Moore), a view according to which truth is a simple, unanalyzable property. True sentences, or propositions, have the property, false ones do not, and that's all that can be said about true and false sentences or propositions. In some sense the view is everything but deflationary, for it accords to truth a nature and a substantial worldly presence. On the other hand, the stance on nonanalyzability goes hand in hand with other deflationary approaches. It is easy to dismiss Cartwright's 'neglected theory of truth' as a non-theory, for it postulates the existence of a property while denying that there is any explanation to be given as regards the conditions for its possession. This sounds akin to claiming that some sentences express necessary truths, while happily declaring that nothing else needs to be said about necessity and contingency. This form of criticism may be blind to an important distinction, one that is important for all forms of deflationism to highlight: it is one thing to reject the need for explanation, and a different thing to deny that there is a **philosophical** explanation of the conditions of possession of a property (or that there is a philosophical explanation of the conditions of application of a concept). Take for instance the concept red and the property of being red. There are lots of things that a physicist can tell us about the conditions for the possession of that property. In this sense, redness is ripe for explanation. Yet, from a philosophical point of view, one may wish to deny that the concept red is amenable to philosophical analysis, and one may regard the property of being red as a basic property that things either have or do not have.

Deflationary accounts of meaning have in common with deflationism about truth the idea that meaning is not some kind of analyzable property that certain signs possess. Use theories of meaning are deflationist, for they postulate that all there is to the meaning of an expression is the use that speakers make of it. Meaning, according to use theories, does not consist in a relation between words and some entity, mental or worldly. As Horwich (1998) put it: "the meaning of a word is constituted from ... the regularities governing our deployment of the sentences in which it appears" (p. 3).

In Horwich's view the meaning of, for instance, 'dog' reduces just to "its use being governed by such-and-such regularity" (p. 6). The appeal to use makes the explanation of the meaning of 'dog' non-semantic. In purely semantic terms all we can say about the meaning of 'dog' is that "'dog' means DOG."

As in the theory of truth, there is a conception of meaning, and in particular of the referential link between expressions and the things they name, that is deflationary in the sense that Cartwright's 'neglected theory' is deflationary. Proponents of Millianism, direct reference theorists, argue that there is no semantic mechanism (descriptive backup or Fregean mode of presentation) connecting a name and its bearer: that reference is direct and unmediated. As was the case with the Moorean theory of truth, it is easy to dismiss this position as a non-theory: if reference cannot be explained or analyzed, if we can say nothing about reference over and above saying that 'Aristotle' refers to Aristotle, it seems that our words refer to pieces of the world by magic. However, what the view really says is that there is no *philosophical* analysis or explanation that will tell us in virtue of what 'Aristotle' refers to Aristotle: the explanation, interesting as it may be, will involve perhaps social, historical, anthropological, physical, and psychological factors.

See also: Direct Reference; Frege, Gottlob (1848–1925); Quine, Willard van Orman (1908–2000); Reference: Philosophical Theories; Strawson, Peter Frederick (b. 1919); Truth: Theories of in Philosophy; Use Theories of Meaning.

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Deixis and Anaphora: Pragmatic Approaches

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'Deixis' is generally understood to be the encoding of the spatiotemporal context and subjective experience of the encoder in an utterance. Terms such as *I, here, now,* and *this* – the so-called 'pure deictic terms' – are heavily context dependent and represent a kind of cognitive center of orientation for the speaker. What, for instance is *here* for me, may be *there* for you. Clearly such terms pose problems in terms of both reference and meaning, and standard accounts have attempted to find a middle ground between lexical and pragmatic meaning (see Green, 1995). The difference between 'anaphora' and deixis is fairly straightforward again in standard accounts (see Jarvella and Klein, 1982), but an increasing pragmatic emphasis has made the distinction between the two less easy to define. In standard accounts, anaphora is seen as much more of an intralinguistic or intrasentential element. Consider the following sentences:

That man is very tall. He must have trouble buying clothes.

The deictic expression *that man* must be given a pragmatic interpretation, while the pronoun *he* is said to 'refer back' to the foregoing element. But as we shall see, the issue is not so simple.

Anaphora is generally understood to be the process whereby a linguistic element is interpreted derivatively from a foregoing unit – its 'antecedent.' Although it covers a range of expressions that the speaker may use in referring and picking out the intended referent, research has focused almost exclusively on pronominal referring expressions in discourse, for example:

Fred came into the room. He sat down.

The theory of anaphora deals with the relationship between *he*, *Fred,* and the objects that these elements describe or pick out. The most problematic and interesting of anaphoric phenomena are those that are crosssentential or discourse based. In the taxonomy of Hankamer and Sag (1977), the antecedent is not considered to be crucial, and where it is not explicitly stated, the process is known as 'pragmatically controlled anaphora.' However, this is not central to the kind of pragmatic approaches that have recently been explored and indeed is close to what Halliday and Hasan (1986) and Brown and Yule (1983) would call 'exophoric' reference.

Pragmatic approaches to anaphora are part of a larger set of (sometimes conflicting) theories that Breheny (2002) calls 'nondynamic.' Within these non-dynamic approaches there are two subsections: 'linguistic' and 'pragmatic' approaches, the latter including what has come to be known as (following Cooper, 1979) 'E-type approaches'. A nondynamic linguistic approach to the above example would stipulate that the pronoun in the second sentence is bound to the noun phrase in the first. However, one can still promote a 'linguistic' approach without the idea of crosssentential binding. In this approach, the pronoun serves as a proxy for a definite description and would therefore easily be accommodated within Hankamer and Sag's model. The relationship between antecedent and pronoun is not so much syntactic as paradigmatic; the pronoun deputizes for the noun phrase. Linguistic approaches nevertheless agree that some linguistic rule enables the description to be recovered, whether due to semantic or syntactic considerations (Heim, 1990; Neale, 1990) (*see* **Semantics–Pragmatics Boundary**).

Pragmatic approaches stress the absence of any generalized linguistic rule that would account for the recovery and interpretation of descriptions in anaphoric contexts. Rather, any principles about the process of recovery must be inferred from more general principles about discourse organization and context (*see* **Principles and Rules**). Consider the following example from Breheny (2002):

Frege G (1918). 'The thought: a logical inquiry.' Reprinted in Blackburn S & Simmons K (eds.) (1999). 85–105.
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Fred came into the room. He sat down.

The theory of anaphora deals with the relationship between *he*, *Fred,* and the objects that these elements describe or pick out. The most problematic and interesting of anaphoric phenomena are those that are crosssentential or discourse based. In the taxonomy of Hankamer and Sag (1977), the antecedent is not considered to be crucial, and where it is not explicitly stated, the process is known as 'pragmatically controlled anaphora.' However, this is not central to the kind of pragmatic approaches that have recently been explored and indeed is close to what Halliday and Hasan (1986) and Brown and Yule (1983) would call 'exophoric' reference.

Pragmatic approaches to anaphora are part of a larger set of (sometimes conflicting) theories that Breheny (2002) calls 'nondynamic.' Within these non-dynamic approaches there are two subsections: 'linguistic' and 'pragmatic' approaches, the latter including what has come to be known as (following Cooper, 1979) 'E-type approaches'. A nondynamic linguistic approach to the above example would stipulate that the pronoun in the second sentence is bound to the noun phrase in the first. However, one can still promote a 'linguistic' approach without the idea of crosssentential binding. In this approach, the pronoun serves as a proxy for a definite description and would therefore easily be accommodated within Hankamer and Sag's model. The relationship between antecedent and pronoun is not so much syntactic as paradigmatic; the pronoun deputizes for the noun phrase. Linguistic approaches nevertheless agree that some linguistic rule enables the description to be recovered, whether due to semantic or syntactic considerations (Heim, 1990; Neale, 1990) (*see* **Semantics–Pragmatics Boundary**).

Pragmatic approaches stress the absence of any generalized linguistic rule that would account for the recovery and interpretation of descriptions in anaphoric contexts. Rather, any principles about the process of recovery must be inferred from more general principles about discourse organization and context (*see* **Principles and Rules**). Consider the following example from Breheny (2002):

A man who walked in the park whistled.

Putting aside for the moment whether this is an appropriate sentence for analysis (that is, whether it is pragmatically plausible), two problems are evident here. The first is the problem of uniqueness, a particular difficulty when the antecedent is an indefinite (*a man*). In the model of Evans (1977) there must necessarily be only one man walking in the park; in other words, *a man* cannot be a disguised plural, giving rise to an 'attributive' (after Donnellan, 1978) reading of the phrase *a man who*. What linguistic rule tells us that this is so? The past tense of the verb *whistled* leads us away from any notions of generality as they tend to occur in timeless present contexts (*A man walking in the park whistles*). However, this by no means counts as a linguistic rule and is more readily interpreted through pragmatic means.

Another problem arises with contradictions. Again, consider the following from Breheny (2002):

A: Last night I met a Cabinet minister.
B: She was not a Cabinet minister.

Here, B does not ascribe to the description the property that A thinks it has. The pragmatic approach would have to rely on the notion of 'implicit content' to interpret this exchange. The proposition expressed by A cannot depend on the actual state of the referent. Clearly, pragmatic approaches can neatly sidestep both the uniqueness and contradiction problems, but they do so at a cost. The way the utterances are interpreted does not seem to rely upon any generalized notions of either discourse organization or contextualization. Rather, there is at most a general assumption about implicit communication, and we have no way of predicting which interpretation is correct or at least the most salient. As Breheny notes, this has led many to look further for some kind of **linguistic** rule; but there is no reason to suppose that because pragmatic rules are difficult to locate there must be a more formal linguistic answer (*see* **Constraint, Pragmatic**).

Where a pronoun is apparently bound to an indefinite expression without restriction, certain difficulties arise, as in the following example (the so-called 'donkey anaphora'):

Every farmer who owns a donkey beats it.

The problem for nonpragmatic accounts of anaphora here is that the indefinite (with its *wh*-clause) bound to the pronoun (*every farmer who owns a donkey*) is a quantificational noun phrase that actually has the pronoun in its scope.

Pronouns with definites as antecedents would appear to offer less of a challenge to pragmatic approaches, as in the earlier-cited example of *Fred came into the room. He sat down*. The traditional approach is to regard the pronoun as 'coreferring' to the name *Fred,* thus tying the pronoun variable to the noun phrase constant. But this makes the pronominal reference purely intralinguistic (as an element of 'cohesion') and wholly dependent upon its antecedent (*see* **Cohesion and Coherence: Linguistic Approaches**). A more pragmatic approach would be to see the pronoun as referring in a different way to that which *Fred* refers to. Just how different and in what way is difficult to specify, but certainly this approach makes pronominal reference of this kind very similar to deictic or exophoric reference; the line between deixis and anaphora is blurred. A problem with the traditional approach, which we might call the 'binding' or 'cohesive' approach, is that in indefinite contexts, what appears to be a straightforward binding of a quantificational expression and a variable (pronoun) does not represent a rule that can be generalized to a meaningful degree. In crosssentential examples such as *I had ten marbles but dropped them. I found nine. It had rolled under the sofa,* because the pronoun is not properly bound to its antecedent, there is no plausible interpretation. However, in the following example from Breheny, *Every boy left school early. He went to the beach,* the pronoun seems to convert the universal quantifier into an existential one.

There is a considerable body of work devoted to promoting pragmatic approaches to anaphoric interpretations (*see* **Pragmatic Presupposition**). In general these works share the view that anaphoric reference is interpreted by means of a range of inferential strategies. This is essentially a neo-Gricean approach, as evident in the work, particularly, of Huang (1994), who employs Gricean principles proposed by Levinson (1987) (*see* **Grice, Herbert Paul (1913–1988); Neo-Gricean Pragmatics**).

Much of the debate hinges on the very nature of pronouns and their contexts. Pronouns do not contain what is traditionally thought of as 'descriptive material,' and yet they are used to refer precisely to that material. This has led quite naturally to theories of anaphoric behavior broadly deemed 'substitutional.' Perhaps the most radical attack on these approaches was presented by Jones (1995), who declared the phenomenon of anaphora and its attendant substitution theories a 'hoax.' For Jones, reference is not an intrinsic property of particular language units and therefore not a property that some units have more than others. Broadly pragmatic, Jones's theory sees reference as a contextualized communicative action expressed in and through the properties of an utterance as a whole. Since, for Jones,

what is referred to by speakers is outside and beyond the means used to refer to it, there is no possibility of any linguistic constraints on reference. Such a radical view represents the ultimate pragmatic position, but most theorists have been content with a compromise, whereby linguistic elements routinely prompt a number of interpretive strategies. However, such a compromise is rarely satisfactory and often results in a weakened pragmatics, wherein what appears to be a contextual rule is in fact no more than a linguistic one, dressed up in the language of Gricean or neo-Gricean pragmatics (*see* **Metapragmatics**).

Furthermore, there seems to be evidence that anaphoric pronouns are not merely interpreted in a pragmatic fug of inferencing, but are, after all, subject to certain constraints. Jones's view therefore throws too much onto context and pragmatics; after all, if there were no constraints or intralinguistic rules, we would not be able to make the right kinds of inferences (*see* **Context, Communicative; Constraint, Pragmatic**).

As Heim states:

> . . . there are data which seem to point to the existence of tighter and somehow more 'syntactic' limitations on the range of reading that actually emerge (p. 165).

Deixis is much more easily subsumed under a pragmatic theory. Traditional accounts make a distinction between the indexical and symbolic meanings of deictic terms. The symbolic meaning of a deictic term might be said to be its semantic aspect, while the indexical meaning is its pragmatic aspect. For example, the expression *here* might be said to have a symbolic aspect roughly glossed as proximity to the speaker, while the indexical aspect would be the precise location to which *here* was referring. The terms 'indexical' and 'symbolic,' then, have much in common with the Fregean concepts of 'reference' and 'sense' (*see* **Frege, Gottlob (1848–1925); Sense and Reference: Philosophical Aspects; Reference: Philosophical Theories**). But the semantic aspect is so vague in certain contexts that many have felt that it cannot really be said to have any bearing on interpretation. Nunberg (1993) in particular has shown that, just as the indexical meanings of deictic terms change according to the contexts in which they occur, so too do the symbolic meanings (*see* **Indexicality: Theory**). This breaking down of traditional binarism has had important implications for pragmatic theory. Emphasis has shifted from the meaning and reference of terms in possible contexts to consideration of the cognitive methods that addressees employ in the interpretation of utterances. Pragmatic approaches have in general attempted to blur the line between deixis and anaphora, but the tendency to see one element (deixis) as essentially exophoric and the other (anaphora) as intralinguistic remains.

See also: Cohesion and Coherence: Linguistic Approaches; Constraint, Pragmatic; Constraint, Pragmatic; Context, Communicative; Frege, Gottlob (1848–1925); Grice, Herbert Paul (1913–1988); Indexicality: Theory; Metapragmatics; Neo-Gricean Pragmatics; Pragmatic Presupposition; Principles and Rules; Reference: Philosophical Theories; Semantics–Pragmatics Boundary; Sense and Reference: Philosophical Aspects; Syntax-Semantics Interface.

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Delattre, Pierre (1903–1969)

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Pierre Delattre was born in 1903, the 13th child of a Huguenot minister. He achieved international prominence in the field of experimental phonetics and French remedial phonetics and was recognized by numerous honors including designation as a Fellow of the Acoustical Society of America and the award of the *Chevalier de la Légion d'Honneur*, given by the French government.

An emigrant to the United States, Delattre enrolled at the University of Michigan, taught French at Wayne State University, and studied at the *Institut de Phonétique* of the Sorbonne. In 1941, he joined the faculty of the University of Oklahoma, and in 1944, he launched a well-known experimental French course that applied some of the procedures of the 'Army Language School Method.' In 1947, he joined the University of Pennsylvania, which placed him in propinquity to acousticians at MIT, Bell Telephone Laboratories, and Haskins Laboratories. In 1953, he started a move westward that took him to the University of Colorado and, a few years later, to the University of California at Santa Barbara.

Delattre began his career in articulatory French phonetics with a strong commitment to developing practical applications for teaching French to American speakers. Following the publication of *La durée des voyelles en français: Etude expérimentale sur la durée des E d'un Français* (1939), he published more than 40 articles on various aspects of French articulatory phonetics and pedagogical application.

Delattre's approach to remedial phonetics was heavily influenced by the early articulatory phoneticians: Rousselot (*see* **Rousselot, Pierre Jean, Abbé (1846–1924)**), Passy (*see* **Passy, Paul Edouard (1859–1940)**), and Jones (*see* **Jones, Daniel (1881–1967)**). It was not until relatively late, in his work *Comparing the phonetic features of English, French, German and Spanish,* that he worked explicitly with the notion of the phoneme (see Delattre, 1965). Rather than claiming to predict very specific points of phonological interference by comparing the phonetic inventories of the native and target languages, Delattre held that the inaccurate pronunciation of the target language stemmed mainly from transfer of the native articulatory set. For him, pronunciation was directly linked to articulatory motions rather than abstract linguistic units. That view is quite compatible with a weak version of linguistic interference theory anchored in physiology and, in a sense, pre-dated the switch in applied linguistics from contrastive analysis to the development of approximative linguistics systems in the 1960s. An articulatory set subsumes a variety of target language features, so the remedial phonetician needs to concentrate on intrasystemic relations rather than comparing native and target language feature by feature.

While at Pennsylvania, Delattre met with researchers at the Bell Telephone Laboratories who had produced the sound spectrograph. From spectrographs, hypotheses could be made as to what aspects of the total speech signal convey phonemic information. Delattre recognized the need for an additional research tool, namely, a device that would convert spectrograms into sound. He learned that F. S. Cooper, of the Haskins Laboratories in New York, had developed a successful synthesizer, the pattern playback. Delattre soon became part of the Cooper and Liberman research team. Together, they made the first major breakthroughs in acoustic phonetics, methodically discovering the principal perceptual cues for phonemes and developing a motor theory of speech perception.

Delattre did not draw a sharp line between pure and applied research, and he did not leave it to intermediaries to apply the results of his experimental studies to remedial phonetics. Much time and energy during his mature period was devoted to practical purpose – better teaching of foreign languages.

Pierre Delattre was a generous and affable host, and he displayed a charming and sparkling Gallic wit that one would hardly suspect in someone with such austere antecedents. Colleagues from the humanities who knew of his strong attachment to music and literature had difficulty imagining him as the white-smocked scientist surrounded by complex machines. But Delattre was and considered himself a humanist, and he had always been enchanted by the aesthetic qualities of the principal object of his studies, French sounds.

See also: Experimental and Instrumental Phonetics: History; Jones, Daniel (1881–1967); Passy, Paul Edouard (1859–1940); Rousselot, Pierre Jean, Abbé (1846–1924).

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Delbrück, Berthold (1842–1922)

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Berthold Delbrück was born on July 26, 1842 in Putbus on the Island of Rugen. He attended high school in Stralsund and Halle. After graduation in 1859 he started his university studies in Halle, initially embracing a large number of subjects: classical philology, Germanistics, history, geography, and French as well as comparative philology. In Halle his principal teachers were the linguist August Friedrich Pott (*see* **Pott, August Friedrich (1802–1887)**), the philosopher Johann Eduard Erdmann (1805–1892), and the philosopher and literary historian Rudolf Haym (1821–1901). When he moved to Berlin, he took courses with Franz Bopp (*see* **Bopp, Franz (1791–1867)**), the Sanskritist Albrecht Friedrich Weber (l825–1901), and linguistic philosopher Heyman Steinthal (*see* **Steinthal, Heymann (1823–1899)**). He obtained his Ph.D. in Halle before reaching the age of 21 with a dissertation entitled *De infinitivo Graeco*. In the same year, 1863, he also passed his *Staatsexamen,* required to teach in high school. He subsequently served as a private teacher in Livonia as well as a high school teacher in Marienwerder, East Prussia. After two years he moved to St. Petersburg to write his second dissertation *(Habilitation),* the precondition for entering a university teaching career. During his brief stay there, he won the friendship of the eminent Sanskritist Otto Boehtlingk (*see* **Böhtlingk, Otto Nikolaus (1815–1904)**). Equally important for his professional outlook was his lifelong relationship, established in St. Petersburg, with the orientalist Franz Anton von Schiefner (1817–1879) and Victor Hehn (1813–1890), famous for his inspiring presentations on natural history and numerous aspects of German cultural life.

Delbrück became lecturer in Halle in 1867, associate professor *(Extra-Ordinarius)* in Jena in 1870, and three years later full professor *(Ordinarius)* of Sanskrit and comparative philology. He declined offers from other prestigious universities (Heidelberg, Berlin, Strasbourg), making Jena his permanent home. In 1908–1909 the faculty elected him president *(Rektor),* a special distinction, as his term of office coincided with the 350th anniversary of the university. Many institutions of higher learning either awarded him honorary degrees (e.g., the Universities of Chicago and Athens) or conferred honorary memberships on him (e.g., the University of Kiev).

Delbrück belonged to the inner circle of the Neogrammarians, a group of dynamic young Indo-Europeanists and Germanists. Every one of them was above all a highly productive scholar, and each of them excelled in his particular specialty. Delbrück first and foremost distinguished himself by his work on syntax. He broke ground in that he established for historical and comparative syntax of the IE languages a level of accomplishment that so far had been achieved only in the field of phonology and, to a lesser degree, also in morphology.

Second, in his *Einleitung* (see Delbrück, 1880), he succeeded like nobody else of his generation in placing the major points of the Neogrammarian theories and practices in the historical framework within which they originated. And third, he intervened on two occasions in the public discussion on major aspects of the development of linguistic science at his time, first in 1885 by defending the Neogrammarian position against the attack of Georg Curtius (*see* **Curtius, Georg (1820–1885)**), and then in 1901 when he examined, mainly on the basis of Wilhelm Wundt's (*see* **Wundt, Wilhelm (1832–1920)**) notion of *Völkerpsychologie* (social psychology), the role of psychology in language development and language change from a Neogrammarian viewpoint.

In 1887 he created excitement as the *Reichstagskandidat* of the Coburg election district. He was considered to be the most gifted orator of his national liberal party. Since he was not elected, his political ambitions ended abruptly.

Delbrück died on January 3, 1922 in Jena.

See also: Bopp, Franz (1791–1867); Böhtlingk, Otto Nikolaus (1815–1904); Curtius, Georg (1820–1885); Pott, August Friedrich (1802–1887); Steinthal, Heymann (1823–1899); Weber, Albrecht Friedrich (1825–1901); Wundt, Wilhelm (1832–1920).

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Delirium and Language

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Delirium is an acute state of confusion characterized by disturbances in consciousness and cognitive functioning. Acute confusional state is used interchangeably with delirium and both conditions have been referred to as transient cognitive disorder (for reviews, see Levkoff *et al*., 1986; Lipowski, 1990; Tune and Ross, 1994).

Several studies have examined the prevalence and incidence of delirium. In a study with 325 participants, Levkoff *et al*. (1992) showed that, of the study participants, 10.5% met the criteria for delirium according to the third version of the *Diagnostic and statistical manual of mental disorders* (DSM-III) at initial evaluation, whereas 31.3% developed delirium subsequently. An additional 110 participants presented with symptoms of delirium without fully meeting the DSM-III criteria. Generally, among older adults who are hospitalized in medical units, approximately 10% are reported to present delirium on admission and another 10 to 15% may develop delirium while hospitalized (APA, 1994).

Delirium is most often reported among the elderly population and special populations, such as terminally ill or postoperative patients. Nevertheless, children can present cardinal features of delirium (Trzepacz, 1996; Prugh *et al*., 1980). In a 4 year retrospective study of the clinical presentation and symptoms of delirium in children and adolescents, Turkel *et al*. (2003) showed that symptoms of psychosis and disorientation were less distinctive in that population. However, they concluded that for the most part the presentation and course of pediatric delirium were similar to those of delirium in adults. They also established support for the usefulness of the current *Diagnostic and standard manual of mental disorders* (DSM) in the pediatric population.

Delirium typically has a sudden onset, a sharp rise, a fluctuating course, and a brief duration. Symptoms may arise abruptly (e.g., following a stroke or a head injury) or can be gradual (e.g., in older adults receiving multiple medications, experiencing pain, or experiencing a sensory loss). Reports on the onset and course of delirium are numerous and some have reported that delirium is worse at night, a phenomenon known as sundowning (Evans, 1987). In general, delirium develops over periods of time that vary from a few hours to a few days. If left untreated, symptoms may last several days or weeks, even months, especially in individuals with coexisting cognitive disorders due to a persisting or evolving medical condition. Prolonged memory impairment and incomplete recovery are common in similar cases (APA, 1994).

A number of conditions can cause delirium. The DSM-IV lists four subtypes of delirium according to presumed etiologies: delirium due to a general medical condition, substance-induced delirium, delirium due to multiple etiologies, and delirium not

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Delirium and Language

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Delirium is an acute state of confusion characterized by disturbances in consciousness and cognitive functioning. Acute confusional state is used interchangeably with delirium and both conditions have been referred to as transient cognitive disorder (for reviews, see Levkoff *et al*., 1986; Lipowski, 1990; Tune and Ross, 1994).

Several studies have examined the prevalence and incidence of delirium. In a study with 325 participants, Levkoff *et al*. (1992) showed that, of the study participants, 10.5% met the criteria for delirium according to the third version of the *Diagnostic and statistical manual of mental disorders* (DSM-III) at initial evaluation, whereas 31.3% developed delirium subsequently. An additional 110 participants presented with symptoms of delirium without fully meeting the DSM-III criteria. Generally, among older adults who are hospitalized in medical units, approximately 10% are reported to present delirium on admission and another 10 to 15% may develop delirium while hospitalized (APA, 1994).

Delirium is most often reported among the elderly population and special populations, such as terminally ill or postoperative patients. Nevertheless, children can present cardinal features of delirium (Trzepacz, 1996; Prugh *et al*., 1980). In a 4 year retrospective study of the clinical presentation and symptoms of delirium in children and adolescents, Turkel *et al*. (2003) showed that symptoms of psychosis and disorientation were less distinctive in that population. However, they concluded that for the most part the presentation and course of pediatric delirium were similar to those of delirium in adults. They also established support for the usefulness of the current *Diagnostic and standard manual of mental disorders* (DSM) in the pediatric population.

Delirium typically has a sudden onset, a sharp rise, a fluctuating course, and a brief duration. Symptoms may arise abruptly (e.g., following a stroke or a head injury) or can be gradual (e.g., in older adults receiving multiple medications, experiencing pain, or experiencing a sensory loss). Reports on the onset and course of delirium are numerous and some have reported that delirium is worse at night, a phenomenon known as sundowning (Evans, 1987). In general, delirium develops over periods of time that vary from a few hours to a few days. If left untreated, symptoms may last several days or weeks, even months, especially in individuals with coexisting cognitive disorders due to a persisting or evolving medical condition. Prolonged memory impairment and incomplete recovery are common in similar cases (APA, 1994).

A number of conditions can cause delirium. The DSM-IV lists four subtypes of delirium according to presumed etiologies: delirium due to a general medical condition, substance-induced delirium, delirium due to multiple etiologies, and delirium not

otherwise specified (if the cause is indeterminate). The most common etiologies for delirium include chemical intoxication (e.g., alcohol intoxication and withdrawal), metabolic disorders (e.g., hypoglycemia), structural brain diseases (e.g., vascular infarction, hemorrhage, brain tumors, brain abscesses), infections (e.g., acute meningitis, encephalitis), medications (e.g., anticholinergics), and environmental factors. Environmental factors include prior recent acute-care hospital admission and increased number of medications. Other major precipitating factors are advanced age, institutionalization, pre-existing cognitive impairment, dehydration, pain, and sensory loss. Rahkonen *et al.* (2000) examined delirium in elderly people without severe predisposing disorders. Among 51 healthy seniors, the most important primary causes of delirium were infections and strokes.

Diagnostic Criteria and Differential Diagnosis

The current diagnostic criteria for delirium are based on the *Diagnostic and statistical manual of mental disorders* (DSM-IV) and the *International classification of diseases* (ICD–10). The DSM-IV criteria focus on three essential features of delirium: a disturbance of consciousness (i.e., reduced awareness to the environment) with reduced attention (Criterion A); a change in cognition or the development of a perceptual disturbance that is not accounted for by a preexisting, established, or evolving dementia (Criterion B); and a disturbance that develops over a short period of time and fluctuates over the course of the day (Criterion C).

A study by Laurila *et al.* (2004) asserted that a clouding of consciousness, perceptual disturbances, and disorganized thinking are the most significant contributors to delirium diagnosis according to the DSM-IV among individuals with dementia. In a cross-sectional study, the authors compared the usefulness of criteria from earlier versions of the DSM and the ICD–10. They established that the DSM-IV criteria of delirium identified new, often nondemented, subjects as being confused, whereas the criteria from ICD–10 were overly restrictive.

Delirium is ordinarily associated with changes in sleep–wake patterns, disorientation to time and space, disordered or incoherent speech, visual hallucinations, and marked alterations in psychomotor activity. Individuals suffering from delirium commonly display neuropsychological deficits on tasks of attention and concentration, memory, language and visual spatial functions. The clinical presentation of delirium is heterogeneous by nature and may vary and change rapidly. The severity and progression of symptoms may vary noticeably from patient to patient and in the same patient at different times during the day, even within short periods of time.

It may be difficult to differentiate persisting delirium from dementia that occurs in clear consciousness. Dementia is most often characterized by a slow onset and a gradual rise and predominantly affects memory. Several screening instruments for delirium have been developed. The Delirium Rating Scale (Trzepacz *et al.*, 1987) and the Confusion Assessment Method (Inouye *et al.*, 1990) have become widely used assessment tools in medical units. Simple bedside tests of attention have also been reported to aid in identification of delirium in older adults (O'Keeffe and Gosney, 1997).

Changes in consciousness and cognitive functioning in delirium can arise in the absence of prior cognitive disorders or can be superimposed on conditions that present with cognitive impairment. The symptoms of delirium have been examined among elderly inpatients with or without dementia. Cole *et al.* (2002) studied the prevalence, frequencies, and coexistence of delirium symptoms in individuals with and without dementia. These researchers determined that symptoms appeared to be similar among both groups, although individuals with dementia had increased psychomotor agitation at the time of diagnosis and elevated levels of disorganized thinking and disorientation at subsequent assessment.

The clinical presentation of delirium often manifests signs and symptoms such as changes in personality associated with irritability, inappropriate behavior, and psychotic characteristics, including hallucinations and paranoia. Differential diagnoses also include other psychiatric disorders such as depression, substance intoxication, substance withdrawal, malingering, and factice disorders (APA, 1994).

Communication and Language in Delirium

The assessment of language impairment and communication disorders contributes to the diagnosis of delirium. Language disturbance is a cardinal feature of Criterion B in DSM-IV. However, formal assessment of language impairment in individuals with symptoms of delirium can be complicated if the individual is unable to interact for the purpose of communication. If the individual presents with a reduced awareness, diminished responsiveness, and reduced ability to be attentive (Criterion A), the assessment of language disturbance, other than a change in cognition, will be limited. In similar circumstances, a bedside interview that includes informal interaction, as well as a few simple, but strategic tasks, is enough to establish the presence or absence of language disturbance and thus facilitate the diagnosis and later

management of delirium. Beeson and Rapcsak (1998) suggested that the assessment of language impairment in individuals suffering from delirium be delayed because it does not provide a valid basis for assessment. Also, the examiner may consider an exhaustive review of an individual's medical files to obtain information from other sources, such as family members or caregivers.

The abrupt onset and fluctuating nature of delirium make formal assessment difficult. Nevertheless, the assessment of language impairment in individuals suffering from delirium, although limited, can be achieved with the use of a few tasks that target major domains of linguistic behavior, namely, conversational speech, auditory comprehension, confrontational naming, repetition, and reading and writing.

In comparison with the study of speech and language disturbance in the dementias, there is limited research that aims specifically at characterizing communication and language in delirium. This does not indicate an absolute lack of empirical data, as language disturbances in individuals suffering from delirium have been discussed as part of related research on dementia and other psychiatric disorders, including psychosis. Alternatively, language impairments in delirium, as in some psychiatric disorders, have been described as concurring with a global failure in cognitive processing, more specifically attention and perceptual deficits. However, a few patterns of language disturbances in delirium emerge from the literature.

Chedru and Geschwind (1972) provided one of the first descriptive studies of cognitive disorders in delirium, including speech and language. These authors reported that impaired reading, writing, and verbal fluency were the most common linguistic abnormalities in delirium. They also determined that individuals suffering from delirium exhibited naming and repetition abnormalities, but that spontaneous speech was relatively preserved. Naming deficits were often present. Wallesch and Hundsalz (1994) reported impairment on a naming and a language comprehension task in a small group of individuals suffering from delirium. They compared a group of individuals diagnosed with delirium with a group diagnosed with probable Alzheimer's disease (AD). They found that the number of naming errors was comparable for both groups. They found an effect of word frequency on naming success only for the AD group. In contrast, unrelated naming errors were significantly more frequent in the delirium group. Wallesch and Hundsalz (1994) showed that some of the overall unrelated naming errors in participants presenting with delirium were caused by visual misperceptions, thus supporting nonlinguistic influences on language. Additionally, behavioral strategies aiming at the target were more frequently exhibited by AD participants, among whom the lack of such strategies is consistent with a reduced clarity of awareness of the environment and diminished attention.

A number of studies have found writing deficits in participants presenting with delirium participants. Macleod and Whitehead (1997) have shown that writing is the most impaired of the language modalities in delirium. In a 6 month study, they compared the performance of a small group of individuals diagnosed with acute delirium with that of a control group. Their results provided further support for the predominance of writing impairments in delirium. They also showed that reading was the least impaired of linguistic functions. Additionally, Macleod and Whitehead (1997) used a short and simple test to substantiate writing errors in delirium, especially among frail and dying individuals. They requested each participant in their study to simply write their name and address. Interestingly, they found that the writing errors were invariably motor and that the most consistent error was the reduplication of letters. The fact that none of the individuals suffering from delirium could write their name and address without obvious motor errors is further support of a nonlinguistic influence on language in delirium. Aakerlund and Rosenberg (1994) have found similar results in postoperative delirium. They found that all individuals who developed postoperative delirium had severely impaired writing, with features such as reluctance to write, motor disability, and spatial disturbances. None of the individuals without delirium developed these disturbances. Their results suggested that testing of writing ability may be useful in the diagnosis of delirium.

Conclusion

Delirium is a highly variable clinical phenomenon that is difficult to study. More well-controlled and systematic studies are needed to fully describe and explain speech and language impairment in delirium.

See also: Dementia and Language; Psychosis and Language.

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Dementia and Language

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Introduction

Dementia is a generalized loss of functions that results from cerebral disease. Dementia occurs in absence of acute confusion (i.e., the deficits do not occur exclusively during the course of a delirium). According to the American Psychiatric Association's *Diagnostic and statistical manual of mental disorders* (DSM-IV), a dementia syndrome is characterized by multiple deficits in cognition, including memory impairment, which are the direct consequence of physiological changes. The DSM-IV criteria require that these deficits must be of a sufficient magnitude to impair social or occupational function. Historically, diagnostic classifications for dementia have included subtypes based on characteristics such as typical symptoms presentation, the progression and course of the disease, and psychiatric and behavioral features, as well as presumed causes (e.g., a general medical condition, persisting effects of a substance, multiple etiologies). The concept of dementia has evolved over the past hundred years. It has long been associated with a progressive decline of cognitive functions and with an irreversible course. Nowadays, definitions of dementia are descriptive and rely on typical symptoms presentation, and thus do not necessarily imply a progressive degeneration. However, the primary progressive dementias are most common and often present with language and communication disorders.

As the population in Western countries ages, the prevalence of progressive dementias resulting from

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As the population in Western countries ages, the prevalence of progressive dementias resulting from

brain diseases increases. Recent epidemiologic studies have suggested that the prevalence of dementia in industrialized countries is approximately 1.5% at age 65 years, rising to approximately 25% by age 80 years (Lobo *et al.*, 2000). For example, according to the Canadian Study of Health and Aging (1994), more than 364 000 Canadians over 65 suffer from dementia. Among these individuals, 65% presented with dementia of the Alzheimer's type (DAT) whereas the remaining suffer from vascular dementia (VaD) and other forms of dementia. Moreover, it is predicted that over three-quarters of a million Canadians will have Alzheimer's disease and related dementias by the year 2031. Thus, progressive dementia is becoming an increasingly important public health concern across the world.

Diagnostic Criteria and Differential Diagnosis

In recent years, with the growing concern for early diagnosis of progressive dementia (i.e., dementia resulting from a gradual degeneration of the brain), several researches have been conducted on prodromal forms of dementia. Mild cognitive impairment (MCI) refers to the clinical condition between normal aging and DAT in which persons experience memory loss to a greater extent than one would expect for age, yet they do not meet currently accepted criteria for clinically probable Alzheimer's disease. Work from Petersen and colleagues on MCI provided for the diagnostic criteria that are commonly accepted (Petersen *et al.*, 2001; Petersen, 2004). Recent studies suggest that a percentage of individuals presenting with mild cognitive impairment later developed typical symptoms of progressive dementia, especially DAT. According to Petersen *et al.* (2001), a clinical diagnosis of MCI requires a memory complaint, preferably corroborated by an informant, and an impaired memory function. Although a subtype of MCI may present with cognitive deficits other than memory, the amnesic type presents with salient memory failures in conjunction with a preserved general cognitive functioning and intact performance in activities of daily living. Individuals diagnosed with MCI are, however, not demented.

Because of the absence of biological markers or simple diagnostic methods, the early detection of dementia relies on various assessments, performed to rule out other possible causes and to identify specific forms of the disease (i.e., differential diagnosis). Neuropsychological testing plays an important role in the assessment of individuals with cognitive impairment. A large number of studies have sought to identify the neuropsychological features that distinguish the different forms of dementia. What emerges from these studies are descriptions of cognitive functioning among which some distinctions are useful for the differential diagnosis of dementia. For example, there are remarkable differences between patients with DAT and VaD with respect to verbal long-term memory and executive functions. However, these patients also presented with similar language, constructional ability, attention, and memory deficits (Looi and Sachdev, 1999).

This inconsistency and overlapping of cognitive deficits is certainly due to the important heterogeneity of neuropsychological manifestations in the early stages of the disease (for a review, see Rosenstein, 1998) as well as to methodological problems, including the application of diagnostic criteria, selection of neuropsychological tests (aiming at large cognitive domains instead of more precise components of cognition) and lack of adequate matching of patients groups. As we mentioned above, the definition of dementia continues to evolve. Current studies have refined clinical criteria of dementia and, for example, have made possible the distinction between the different presentations of frontal lobe disease.

Language Disorders in the Major Forms of Dementia

With respect to language impairments, neuro-epidemiological and neuropsychological studies propose clinical linguistic profiles usually associated with common forms of dementias. Recent neuropsycholinguistic studies also largely contribute to a better characterization of language deficits in dementia by specifically identifying functional localization of impaired and preserved processing components and subcomponents of the linguistic processing system. In the following sections we will review current data on language and communication disorders in the most frequent primary progressive syndromes of dementia, namely DAT, VaD and dementia with Lewy Bodies, as well as in specific forms of frontotemporal lobe disease, namely frontotemporal dementia (FTD), progressive nonfluent aphasia (PNA) and semantic dementia (SD).

Language Disorders in Dementia of the Alzheimer Type

DAT presents with an association of cardinal features that allow for differential diagnosis. It also refers to probable Alzheimer's disease because pathological verification is necessary for a definitive diagnosis, that is, a primary degenerative dementia with a distinctive pathology (i.e., neurofibrillary tangles and

senile plaques). According to McKhann and colleagues, a diagnosis of probable Alzheimer's disease requires that an individual presents with a dementia syndrome established by clinical examination and documented by screening tests and procedures such as the Mini-Mental State Examination and confirmed by neuropsychological tests (McKhann *et al.*, 1984). Furthermore, cognitive deficits in two or more areas of cognition are required. A progressive worsening of memory and other cognitive functions characterizes the progression of the disease. These symptoms occur in clear consciousness and usually onset between age 40 and 90 years. There must be an absence of systemic disorders or other brain diseases that in and of themselves could account for the progressive deficits in memory and cognition (For a review of concepts and diagnostic criteria of DAT, see Kennedy *et al.*, 2001).

As for other types of dementia, DAT does not begin with global impairment in cognitive functions, but usually progresses through different stages. The most pervasive characteristic of DAT is undoubtedly a progressive episodic memory loss associated with decline in other cognitive areas. During the prodromal stage, which generally lasts about 2 years, cognitive problems are usually too mild to clearly distinguish from age-related changes and are not always identified through extensive testing. With respect to language, DAT patients often complain about word retrieval difficulties at this stage of the disease. They also sometimes report having difficulties in initiating conversation or understanding inferences or humor. Language deficits are usually more prominent after approximately 2 or 3 years from onset. Symptoms of anomia are more marked, especially for less used vocabulary. In conversations, patients mainly produce circumlocutions as well as generic and imprecise terms while semantic errors are still scarce. At this stage of illness, phonetic, phonemic, and syntactic aspects of language are preserved. The patients perform relatively normally in tests exploring reading aloud, repetition, and auditory comprehension. However, they may show signs of impairment in writing, confrontation naming and fluency tasks. Language is much more affected in the middle or intermediate stage of DAT, a stage that generally occurs between the third and the fifth year from onset. Phonetic and phonological abilities are still preserved but spontaneous speech is characterized by severe reduction, stereotyped utterances, and important anomia manifested in the production of verbal and semantic paraphasias as well as by occasional neologisms. Repetition and reading aloud are still often preserved while there is an important worsening of comprehension and spelling. In the final stage of the disease (after the fifth to six year post onset), all linguistic abilities are impaired. There is a severe deficit of comprehension and oral expression is impossible or limited to automatisms, verbal perseverations or stereotyped expressions.

Even if a large proportion of DAT patients presented with this standard description of language impairments, recent group studies have shown that there is an important lack of homogeneity across patients, with respect to (1) the evolution of the disease, (2) the relative preservation or damage of the different cognitive functions, and (3) the relative preservation or damage of specific components in each cognitive function, including language (e.g., Schwartz, 1990; Price *et al.*, 1993). By resorting to cognitive models of language processing, neuropsycholinguistic studies have largely contributed to the identification of functional origins of language deficits in DAT. What emerges from these studies is that the main impact of the disease falls on semantic memory, a component of explicit long-term memory which contains the permanent information related to objects, concepts, words, and their meanings. Because of its central role to the processing of language, the deficit affecting semantic memory leads to important difficulties in word comprehension and production. Therefore, when tested with comprehensive batteries of language, DAT patients usually show poor performance in picture naming, word–picture matching, picture or word sorting, and semantic questionnaires, even at the first stage of the disease. Moreover, the consistency for individual items across tests (i.e., the same items are preserved or damaged across tests), as well as the relative preservation of superordinate knowledge as compared to specific and detailed knowledge (e.g., knowing that a zebra is an animal but not that it has stripes or lives in Africa), is suggestive of a deterioration of semantic representations instead of access damage to preserved semantic representations. This question is, however, controversial, other researchers having reported experimental data that rather support a normal organization of semantic memory and an access deficit in DAT (For an extensive discussion, see Luzzatti, 1999). Furthermore, with respect to semantic memory, recent studies have also investigated whether the semantic loss in DAT affects some categories more than others. Most of these studies conclude that DAT patients perform worse on biological concepts (i.e., animals, fruits, vegetables, etc.) than on artifacts (i.e., vehicles, furniture, tools, etc.) (e.g., Chertkow and Bub, 1990). However, the opposite pattern was also found in other studies, while yet others failed to demonstrate any category effects. (For a review, see Whatmough and Chertkow, 2002.)

Articulatory, phonological, and syntactic abilities are usually considered unscathed until the final stage

of DAT. Recent studies, however, showed that, with the progression of the disease, these abilities may be damaged. For example, Croot and her colleagues (Croot *et al.*, 2000) have shown that, in less typical cases of DAT, phonological and articulatory abilities may be impaired, sometimes as a selective deficit. Syntactic processes required for sentence production (e.g. Bates *et al.*, 1995) and sentence comprehension (e.g., Waters, *et al.*, 1995) may also be compromised in some cases of DAT, even at the early stage of the disease. Whether this deficit is really syntactic in nature or is more explicable in terms of working memory disorder or in terms of semantic interpretative processing remains unresolved.

Studies on reading and writing impairments in DAT also reflect a relative lack of consistency. As mentioned earlier, according to the standard clinical portrait of DAT, reading and spelling abilities are considered to be largely preserved in patients even at rather advanced stages of the disease. In contrast to this classical conception, several recent single-case and group studies, resorting to cognitive neuropsychological or to paralleled-distributed-processing models have shown that the ability to read aloud and to spell words is frequently affected in DAT. These patients often demonstrate characteristics of surface alexia and surface agraphia: they are better at reading/spelling orthographically regular than irregular words (i.e., words with exceptional or unpredictable sound-to-spelling and spelling-to-sound correspondences), they show a preserved ability to read/write nonwords, and they tend to produce regularization errors in reading (e.g., bread → /brid/) and phonologically plausible errors in spelling (e.g., crane → CRAIN). Recent group studies, however, have shown that different patterns of written language impairment may be observed in DAT, a result that contradicts the hypothesis that the disease selectively impairs lexical-semantic routes of reading and writing (for a discussion and a review, see Luzzatti, 1999; Graham, 2000; Noble *et al.*, 2000).

Language Disorders in Vascular Dementia

The concept of VaD significantly changed in the 1990s with the publication of international diagnostic criteria (e.g., Roman *et al.*, 1993). VaD may result from an array of causes. It includes all dementias following ischemic or hemorrhagic cerebrovascular accidents, i.e., single vascular insult (most typically to a critical area of the brain), repeated cerebral infarction (also referred to as multi-infarct dementia), and chronic ischemia without discrete infarction. According to Roman *et al.* (1993), a diagnosis of probable VaD requires a loss of cognitive ability (i.e., a decline in memory and intellectual abilities that impairs functioning in daily living). The decline should be demonstrated by a loss of memory and deficits in at least two other cognitive domains. Additionally, cerebrovascular disease (CVD) must be defined by the presence of focal neurological signs consistent with stroke (with or without a history of stroke) and relevant evidence of CVD on computerized tomography or other cerebral imagery techniques. A temporal relation between dementia and CVD as shown by onset of dementia within 3 months following a documented stroke, abrupt deterioration in cognitive functions, or fluctuating, stepwise progression of cognitive deficits is also required (for a review, see Bowler and Hachinski, 2003).

In contrast with the extensive literature on language deficits in DAT, the patterns of cognitive deterioration in other forms of dementia are much less known. Consequently, the identification of clear neuropsychological differences between the major progressive dementias remains difficult to establish. In VaD, for example, most of the reported descriptions related to cognitive deficits concern behavioral manifestations and large cognitive domains. The most commonly reported cognitive impairments in VaD are bradyphrenia (i.e., slowed cognition), dysexecutive symptoms (e.g., difficulty in problem solving and planning), and decreased initiation and spontaneity. There are very few studies that have systematically described language disorders in VaD. Most of them were conducted in an attempt to differentiate VaD from DAT. The majority of these studies suggested that there was no significant difference in language function between the two dementia syndromes. However, in a few recent studies, VaD patients performed better than DAT patients in initial-letter-based verbal fluency tests (e.g., Lafosse *et al.*, 1997), an assessment task that is usually thought to reflect executive dysfunction. As compared to DAT too, anomia is less severe in VaD patients. On a qualitative point of view, they also show a very similar pattern of general naming errors (i.e., visuoperceptual, semantic, and phonemic) when compared to DAT (e.g., Lukatela *et al.*, 1998).

As of now, the nature and the prevalence of reading and writing deficits in VaD remain almost completely unknown. A few recent studies that have included reading and writing tasks in the neuropsychological assessment found that both abilities appeared to be more impaired in VaD. It is, however, impossible to clearly determine the functional origins of written language deficits. For written spelling, different investigations are suggestive of peripheral impairments (e.g., difficulty in writing letters and copying of sentences). Others found that, as compared to DAT,

VaD patients produced more spelling errors and produced grammatically less complex sentences, therefore suggesting a central origin of the deficit (see Graham, 2000).

Finally, as compared to DAT, the speech of individuals with VaD is less empty and conveys more information but they tend to produce shorter and less grammatically complex phrases (Powell *et al.*, 1988). The same authors also have shown that VaD patients often present with abnormal prosody and articulation.

Language Disorders in Dementia with Lewy Bodies

Together with DAT and VaD, DLB is another common form of progressive dementia. However, this entity is a relatively recent one, and as such, there is debate on its classification. DLB is commonly regarded as a Parkinson-plus syndrome that bears the clinical features of both Alzheimer's disease and Parkinson's disease. Pathologically, the cortical neurons of individuals presenting with DLB contain, as the name implies, Lewy bodies or intracytoplasmic inclusion bodies. Clinically, the disease presents with a grouping of distinctive symptoms. According to McKeith *et al.* (1996), the clinical presentation must include a dementia plus two of the following: a fluctuating cognition with pronounced variations in attention and alertness, recurrent visual hallucinations, and spontaneous motor features of parkinsonism (i.e., parkinsonian extrapyramidal symptoms) (for a review see Salmon *et al.*, 2001).

In comparison with DAT, relatively little is known about the cognitive deficits in DLB. A few retrospective studies have compared the performance of DAT and neuropathologically confirmed DLB on a range of neuropsychological assessment, including language. As with DAT, DLB patients show significant impairments in all areas of cognition. Both groups display similar deficits in episodic memory and language (confrontation naming, semantically based verbal fluency) while attention, initial-letter-based verbal fluency, visuoperceptual/spatial abilities, and psychomotor speed are usually more affected in DLB. There is almost no study that specifically addresses the question of the deterioration of language abilities in DLB. As an exception, Lambon Ralph and his colleagues (Lambon Ralph *et al.*, 2001) have recently tested the hypothesis that semantic processing is affected in DLB. Through a group study of 10 DLB and 10 DAT patients, they have shown that semantic impairment is not limited to DAT. Both demented groups exhibited impaired performance in a semantic assessment battery. However, while DAT patients showed equivalent deficit in every modality, DLB patients demonstrated more severe deficits when they were presented with pictures than with words, a performance interpreted by the authors as the result of a combination of semantic and visuoperceptual impairment.

Language Disorders in Frontotemporal Lobe Disease

FLTD lobe disease refers to a heterogeneous group of neurodegenerative disorders and has been known under several different names, including frontal lobe dementia, Pick complex, and, more recently, frontotemporal lobar degeneration. FTLD is often used as an umbrella term to cover the different, but related, clinical presentations that involve a degeneration of the frontal and temporal lobes of the brain (McKhann *et al.*, 2001). According to recent updating of diagnostic criteria (Neary *et al.*, 1998; McKann *et al.*, 2001), three main types of FTLD may be described: (1) frontotemporal dementia or frontal lobe dementia (FTD), (2) progressive fluent aphasia or semantic dementia (SD), and (3) progressive nonfluent aphasia (PNA) . However, there is still a lack of consensus on the clinical classification of the FTLDs (for a discussion and a review, see Hodges and Miller, 2001). In the following subsections, we will briefly review current data on language and communication disorders in the three main types of frontotemporal lobe disease.

Language Disorders in Frontotemporal Dementia

According to Neary *et al.* (1998), FTD is marked by character changes and a disordered social conduct. These are the dominant features initially and throughout the disease's course. A diagnosis of FTD requires an insidious onset and gradual progression, an early decline in social interpersonal conduct, an early impairment in regulation of personal conduct, and an early emotional blunting and loss of insight (see Hodges and Miller, 2001). The detection of cognitive deficits at the early stage of the disease often remains problematic. Some patients show evident cognitive deficits at presentation while others may perform almost perfectly on a general neuropsychological battery. With respect to specific cognitive areas, memory is considered to be relatively spared in FTD but recent studies have shown that patients may present with impaired episodic and working memory, with a pattern different to what was encountered in DAT. In comparison to DAT too, instrumental functions of perception, spatial skills, and praxis are usually intact or relatively well preserved. Language also appears to be largely spared in FTD patients, who often show a reduction in spontaneous speech but perform

normally on tests exploring lexical-semantic abilities (e.g., naming, word–picture matching).

Language Disorders in Semantic Dementia

SD is a clinical syndrome that results from a degenerative disease of the temporal lobes. The core features of SD include: (1) the selective impairment of semantic memory, causing important difficulties in word production and comprehension, (2) the relative sparing of the grammatical and phonological structure of language, (3) normal perceptual skills and nonverbal problem-solving ability, and (4) relatively spared autobiographical and episodic memory (for a review, see Hodges *et al.*, 1998). In other words, semantic dementia is marked by a selective impairment of semantic memory with a relative sparing of nonsemantic aspects of language.

As already mentioned, semantic memory occupies a central place in cognition and language processing. Therefore, SD patients experience important deficits in every cognitive task requiring the activation of semantic representations. Spontaneous speech is usually fluent, well articulated and grammatically correct but present many signs of word-finding difficulties: miscarried sentences, latencies, and occasional semantic paraphasias. Repetition is typically well preserved for both words and nonwords while the ability to repeat short sentences or strings of unrelated words depends on the deterioration/preservation of their meaning. SD patients usually complain about loss of memory for words. This deficit is obvious in tests of naming to definition and confrontation naming in which patients mainly produce semantic errors consisting in the production of a superordinate (lion → animal) or a category co-ordinate (lion → tiger) concept. This pattern of errors reflects a loss of attribute knowledge along with preservation of general superordinate information. SD patients are also impaired on tests of verbal and nonverbal semantic memory. Spoken and written single-word comprehension is affected in tasks of word–picture matching, synonymy judging, word sorting, etc. The centrality of the semantic deficit is also confirmed by tests exploring nonverbal semantic knowledge, such as tests of semantic relatedness judgment on pictures, picture sorting, etc. Whether the semantic deficit in SD is more severe for one category of items than another (i.e., category specific) is also discussed in the literature (for a review see Garrard *et al.*, 2002).

Reading and spelling impairments have also been reported in many cases of SD. These patients often demonstrate surface alexia and surface agraphia characteristics. A relationship between semantic impairment on the one hand and impaired word reading (e.g., Funnel, 1996) and impaired word spelling (e.g., Macoir and Bernier, 2002) on the other has been proposed. This hypothesis is questioned, however, since there have been cases reported in which irregular words are read or spelled correctly without any evidence of comprehension.

Language Disorders in Progressive Nonfluent Aphasia

In 1982, Mesulam reported six patients who showed a syndrome of slowly progressive language impairment without associated cognitive or behavioral disorders. This progressive nonfluent aphasia (PNA) shares the features of FTD but a disorder of expressive language is the dominant feature initially and throughout the course of the disease (Neary *et al.*, 1998). Other aspects of cognition are intact or relatively well preserved. A diagnosis of PNA also requires an insidious onset and gradual progression with primarily nonfluent spontaneous speech and at least one of the following: agrammatism, phonemic paraphasias, and anomia. Other clinical features as the presence of stuttering or oral apraxia and the preservation of social skills also support the diagnostic.

Patients with PNA present with complaints of difficulties in expressing themselves and finding words. Their spontaneous speech is markedly slow, hesitant, and sometimes agrammatic. Articulation as well as prosody is affected. Semantic errors and circumlocutions are rare but patients often produce phonological errors. Other patients sometimes present with stuttering or slow dysprosodic speech with verbal apraxia. Because of the spoken output deficit, PNA patients perform poorly on words, nonwords, sentence reading aloud, and repetition tests. Naming tasks are also affected, with word-finding difficulties and production of phonological errors. Their performance is, however, unaffected in every test of semantic memory. Except for complex syntactic structures, comprehension is normal in the early stages of the disease. With disease progression, the breakdown of phonological abilities gradually compromises speech comprehension and production. At later stages, patients also present with difficulties in other cognitive areas.

Conclusions

In this article, we have briefly described verbal communication disorders accompanying the major forms of primary progressive dementia as well as vascular dementia. These disorders are often prominent symptoms of the disease and may occur as early symptoms. We have shown that substantial information is available for language disturbances in DAT, SD, and PNA. In contrast with the extensive literature on these dementing illnesses, relatively little is known about

the patterns of language deterioration in other forms of dementia. For example, the few available descriptions of cognitive deficits in LBD, VaD and FTD mainly concern behavioral manifestations and large cognitive domains. More specific abilities are almost completely ignored and it is still difficult to identify functional deficits to language components.

The concept of dementia continues to evolve. Current studies have refined clinical criteria of dementia and, for example, have made possible the distinction between the different forms of FTD. An improvement in clinical diagnosis should result from the study of more specific subcomponents of the different cognitive domains. In this respect, cognitive neuropsychology is surely useful in that it allows the fractionation of many cognitive domains into specialized subcomponents that can be selectively impaired by a neurological affection. For example, such an approach has led to extensive descriptions of language deficits in DAT and semantic dementia. Moreover, further research is also needed to better characterize the effect of the progression of the disease on the various language abilities and components.

See also: Classical Tests for Speech and Language Disorders; Delirium and Language; Narrative and Discourse Impairments; Primary Progressive Aphasia in Nondementing Adults; Speech Impairments in Neurodegenerative Diseases/Psychiatric Illnesses.

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Demonstratives

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The Semantic Properties of Demonstratives

Demonstratives are deictic expressions; examples in English include *this* and *that* or *here* and *there*. These expressions indicate the relative distance of a referent in the speech situation *vis-à-vis* the deictic center (cf. Brugmann, 1904; Bühler, 1936; Lyons, 1977; Fillmore, 1997). The deictic center is defined by the speaker's location at the time of the utterance. For instance, in the following example, the referent of the proximal demonstrative *this* is closer to the deictic center (i.e., the speaker's location at the point of the utterance) than is the referent of the distal demonstrative *that*:

(1) **This one** (here) is mine, and **that one** (over there) is yours.

All languages have at least two demonstratives that indicate a deictic contrast (cf. Diessel, 1999a, 2005a), but the use of demonstratives is not generally contrastive. For instance, in example (2), the distal demonstrative *that* does not indicate a spatial contrast: the referent of the demonstrative may be an element in close proximity to the speaker's location or it may be a referent in great distance:

(2) Can you see **that** spot (on the back of my hand/on the moon)?

In some languages, certain types of demonstratives do not carry a specific distance feature (cf. Himmelmann, 1997; Diessel, 1999: chap 3). For instance, the German demonstrative *das* does not indicate the relative distance of the referent to the deictic center. In order to differentiate between a proximal and distal referent, the locational adverbs *hier*, *da*, and *dort* can be added to *das*, as in example (3), German (Germanic):

(3) **Das** **hier** gefällt mir besser als
this/that *here* *like* *me* *better* *than*
das **da**(drüber)
this/that *over there*
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The same strategy is found in many other languages across the world (e.g., French *celui-ci* 'this [one] here' vs. *celui-là* 'that [one] there'). In general, all languages may indicate a deictic contrast between a proximal and distal referent, but some languages employ demonstratives that do not indicate a distance contrast unless they are combined with spatial adverbs (cf. Diessel, 1999: chap 3, 2005a). Moreover, many languages employ more than two distance terms. For instance, Hunzib (Daghestanian) distinguishes three deictically marked demonstratives: *bəd* 'proximal,' *bəl* 'medial,' and *əg* 'distal.' A somewhat different three-term system is found in Japanese, in which the medial term denotes a referent near the hearer: *kore* 'near the speaker,' *sore* 'near the hearer,' and *are* 'away from speaker and hearer.' Languages with more than three distance terms occur, but they are uncommon. Figure 1 shows the percentage of languages that employ two, three, or more distance-marked demonstratives (cf. Diessel, 2005a). As can be seen in this figure, in the vast majority of languages, demonstratives indicate a two- or three-way distance contrast. Systems with more than three distance terms are relatively rare, and all one-term systems have at least one pair of demonstratives that is deictically contrastive.

In addition to pure distance, demonstratives may carry other, more specific deictic features. For instance, they may indicate whether the referent is visible or out of sight, at a higher or lower elevation, uphill or downhill, upriver or downriver, or moving toward or away from the deictic center (cf. Anderson and Keenan, 1985; Diessel, 1999: chap 3). The occurrence of such specific deictic features is largely restricted to adverbial demonstratives (see later).

The Syntactic Properties of Demonstratives

Demonstratives occur in various syntactic contexts. Most studies distinguish at least between pronominal demonstratives, which substitute for a full noun phrase, and adnominal demonstratives, which accompany a cooccurring noun. In English (examples (4a) and (4b)), pronominal and adnominal demonstratives have the same morphological forms, but in French (examples (5a) and (5b)), they are formally distinguished:

(4a) give me **that** (one)
(4b) **that** book

(5a) donne-moi **celui-là**
give-me *that/this-there*
'give me that (one)'
(5b) **ce** livre-**là**
that/this *book-there*
'that book'

In about 70% of the world's languages, pronominal and adnominal demonstratives have the same form, and in about 30% they are formally distinguished (cf. Diessel, 2005b). If they are formally distinguished, they are commonly assigned to different word classes: pronominal demonstratives are pronouns, whereas adnominal demonstratives are determiners or articles (in traditional grammar, they are often classified as adjectives). However, when pronominal and adnominal demonstratives have the same forms, their categorical status is controversial. Some studies suggest that they are independent pronouns in both positions (cf. Van Valin and LaPolla, 1997) and other studies assume that they function as determiners (cf. Abney, 1987); yet other studies argue that the categorical status of demonstratives is language specific: when adnominal demonstratives are only loosely adjoined to a coreferential noun, they can be seen as independent pronouns in apposition to the noun, but when they are syntactically associated with a particular slot in a fixed noun phrase, they should be seen as determiners or articles (cf. Diessel, 1999: chap 4).

Apart from pronominal and adnominal demonstratives, all languages have locational deictics such as the English *here* and *there*, which indicate the relative distance of a location to the deictic center (cf. Himmelmann, 1997; Diessel, 1999a). Since the locational deictics tend to include the same deictic roots as pronominal and adnominal demonstratives, they are often seen as a particular subclass of demonstratives, called adverbial demonstratives (cf. Fillmore, 1982; Himmelmann, 1997; Diessel, 1999a). Across languages, adverbial demonstratives are almost always formally distinguished from demonstratives functioning as pronouns or noun modifiers (cf. Diessel, 1999a: chap 4).

In addition to pronominal, adnominal, and adverbial demonstratives, many languages employ a particular class of demonstratives in copular or nonverbal clauses (cf. Diessel, 1999a, 1999b). For instance, in Ponapean, the demonstratives *me(t)* 'near speaker,' *men* 'near hearer,' and *mwo* 'away from speaker and

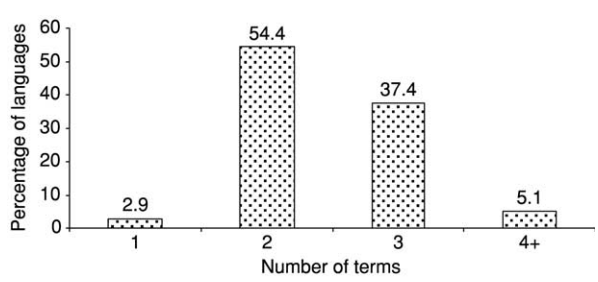

Figure 1 Number of distance contrasts in demonstratives.

hearer' are used as independent pronouns, whereas *ie(t)* 'near hearer,' *ien* 'near hearer,' and *io* 'away from speaker and hearer' occur exclusively in nonverbal clauses. Similarly, whereas the pronominal demonstratives in German are inflected for gender number and case, the demonstratives in copular clauses are invariable: the neuter-singular form *das* is the only form that may occur in copular constructions (see examples (6a) and (6b), German) (cf. Diessel, 1999a, 1999b):

(6a)	das / *die	sind	meine	Eltern
	DEM.N.SG / DEM.F.SG	*are*	*my*	*Eltern*
	'these are my parents'			
(6b)	das / *die	ist	meine	Katze
	DEM.N.SG / DEM.F.SG	*is*	*my*	*cat.F*
	'that/this is my cat'			

The Pragmatic Functions of Demonstratives

Demonstratives are primarily used to focus the hearer's attention on elements in the surrounding situation, but they may also refer to elements of the ongoing discourse or elements that are already in the hearer's knowledge store. Himmelmann (1996) distinguishes four basic pragmatic uses: (1) the exophoric use, (2) the anaphoric use, (3) the discourse-deictic use, and (4) the recognitional use (see also Diessel, 1999a: chap 5). The four uses are exemplified in examples (7)–(10):

(7) Look at **that** [speaker points to an element in the speech situation].

(8) The Yukon lay a mile wide and hidden under three feet of *ice*. On top of **this** ice were as many feet of snow.

(9) Speaker A: So why did you say Peter is a crook?
Speaker B: I didn't say **that**.

(10) I couldn't sleep last night. **That** lady downstairs was playing the piano all night.

Exophoric demonstratives (example (7)) function to orient the hearer in the outside world. In this use, demonstratives establish joint attention on an object, person, or location in the surrounding speech situation. Very often, exophorically used demonstratives are accompanied by a pointing gesture. Anaphoric demonstratives (example (8)) function to keep track of prior discourse referents. They are coreferential with a noun or noun phrase in the previous discourse. In contrast to other tracking devices (e.g., personal pronouns and pronominal affixes on the verb), anaphoric demonstratives are typically used to refocus the hearer's attention; i.e., very often, they function to shift the focus of attention to a new referent (cf. Comrie, 1998; Diessel, 1999a: chap 5).

Discourse-deictic demonstratives (example (9)) refer to propositions. Both anaphoric and discourse-deictic demonstratives are used with text-internal reference, but they serve different functions. Anaphoric demonstratives are used for reference tracking, i.e., they establish links between discourse participants, whereas discourse-deictic demonstrative function to combine chunks of the ongoing discourse (cf. Diessel, 1999a: chap 5). Recognitional demonstratives (example (10)) signal that the referent is familiar to the interlocutors (cf. Himmelmann, 1997). Speaker and hearer know the referent from their common history, thus recognitional demonstratives often suggest emotional closeness, sympathy, and shared beliefs (cf. Lakoff, 1974).

In the literature, the exophoric use is commonly seen as the basic use from which all other uses are derived (e.g., Brugmann, 1904; Bühler, 1936; Lyons, 1977; but see Himmelmann, 1996 for a different view). The basicness of exophoric demonstratives is reflected in several features (cf. Diessel, 1999a: chap 5): they tend to be structurally unmarked, they appear first in language acquisition, and they play a particular role in the process of grammaticalization: The grammaticalization of demonstratives can be seen as a cline ranging from exophoric demonstratives serving language-external functions (exophoric demonstratives focus the hearer's attention on elements in the outside world) to grammatical markers serving highly routinized language-internal functions. Anaphoric, discourse-deictic, and recognitional demonstratives are somewhere in between the two ends of the cline, referring to entities within the universe of discourse or in the hearer's knowledge store (cf. Diessel, 1999a: chap 5).

The Grammaticalization of Demonstratives

Crosslinguistically, demonstratives provide a common historical source for a wide variety of grammatical markers. The grammaticalization pathways are crucially determined by the syntactic functions of demonstratives (cf. Diessel, 1999a: chap 6, 1999b).

Grammatical Markers Derived from Pronominal Demonstratives

Pronominal demonstratives provide a frequent source for third-person pronouns. The development originates from anaphoric demonstratives keeping track of discourse referents that are difficult to access. Demonstratives are reanalyzed as third-person pronouns when their use is extended to discourse referents that are more easily accessible. As part of this process, demonstratives become destressed and

may turn into clitics, which may eventually disappear (example (11)):

(11) DEM PRO > third person PRO > clitic PRO > verb agreement > zero

Pronominal demonstratives are also frequently reanalyzed as relative pronouns. In the source construction, the demonstrative functions as an anaphoric pronoun in a simple (main) clause. In the target construction, the anaphoric demonstrative has been reanalyzed as a relative pronoun in a subordinate clause (example (12)):

(12) $[\ldots NP_i]_S\ [DEM_i \ldots .]_S > [[\ldots NP_i]_S\ [REL_i \ldots]_{SUB}]_S$

Like relative pronouns, complementizers are frequently derived from pronominal demonstratives. For instance, the English complementizer *that* evolved in the context of a correlative construction in which the second clause was introduced by a copy of a cataphoric demonstrative in the initial clause (see example (13), Old English). When the cataphoric demonstrative was no longer used to anticipate the second clause, the initial *þæt* was reanalyzed as a complementizer, i.e., a formal marker of a subordinate clause (Hopper and Traugott, 1993: 186).

(13) **þæt** gefremede Diulius hiora consul,
DEM arranged Diulius their consul
þæt **þæt** angin wearð
COMP DEM beginning was
tidlice þurhtogen
in-time achieved
'their consul Diulius arranged (it) that it was started on time'

Finally, pronominal demonstratives may develop into conjunctions linking clauses (or propositions). Very often, the nature of the link is specified by an adposition or adverb, as in example (14) from Hixkaryana, in which the demonstrative is followed by a causal adposition:

(14) nomokyaknano tuna heno. **ɨre**
it.was.coming rain QUANT DEM
ke romaraɨn hokohra
because.of my.field not.OCC.with
wehxaknano
I.was
'It was raining heavily. Therefore I did not work on my field'

Grammatical Markers Derived from Adnominal Demonstratives

Adnominal demonstratives provide a very common source for definite articles. The development has been described in many studies for a wide variety of languages (cf. Krámský, 1972; Ultan, 1978; Greenberg, 1978; Laury, 1997; Himmelmann, 1997). Apart from definite articles, various other grammatical morphemes may evolve from an adnominal demonstrative: nominal number markers (Frajzyngier, 1997), linkers (Himmelmann, 1997), relative markers (Sankoff and Brown, 1976), determinatives (Himmelmann, 1997), and specific indefinite articles (Wright and Givón, 1987).

Grammatical Markers Derived from Adverbial Demonstratives

Adverbial demonstratives are frequently reanalyzed as temporal adverbs. Across languages, spatial deictics such as *here* and *there* are often mapped onto the temporal domain, giving rise to temporal deictics such as the English *now* and *then* (cf. Anderson and Keenan, 1985). Moreover, adverbial demonstratives may develop into direction markers. Direction markers indicate the direction of an activity expressed by a verb. For instance, German has two direction markers, *hin* 'hither' and *her* 'hither,' that combine as prefixes with a wide variety of motion verbs (e.g., *hin-her-kommen* 'to come hither/thither'). The two direction markers developed from an old deictic root that survived only in *hin* and *her* and *hier* 'here' and *heute* 'today' (cf. Diessel, 1999a: chap 6).

Grammatical Markers Derived from Demonstratives in Nonverbal Clauses

Finally, the demonstratives in nonverbal clauses may be reanalyzed as copulas and focus markers. The development of copulas originates from a construction in which a topicalized noun phrase (NP) is resumed by a demonstrative of a nonverbal clause. This construction may develop into a copular construction in which the topicalized NP functions as subject and the demonstrative functions as copula (cf. example (15)). Copulas that evolved from demonstratives in nonverbal clauses occur, for instance, in Mandarin Chinese, Modern Hebrew, Kilba, Panare, and Wappo (cf. Li and Thompson, 1977).

(15) [NP]i [PROi NP]] ⇒ [NP SUBJ COP NP]

Like nonverbal copulas, focus markers may arise from demonstratives in nonverbal clauses. For instance, in Ambulas (see examples (16a) and (16b)), the distal demonstrative *wan* (example (16a)) is also used as a focus marker (example (16b)):

(16a) **wan** kiyadé-na kayékni?
that who-POSS reflection
'whose reflection is that?'

(16b) vête dé wak a [**wan** méné]
see-and he said ah FOCUS you
kaapuk yéménén
not you-went
'he saw him and said, "ah, so *you* did not go"'

The reanalysis occurred in a cleft construction in which the predicate nominal of a nonverbal clause was modified by a relative clause. In the target construction, the nonverbal clause has been reinterpreted as a noun phrase in which the demonstrative has assumed the function of a focus marker. The mechanism is shown in example (17):

(17) [[DEM NP] [REL-clause]] > [[FOCUS NP] . . .]]

The Diachronic Origin of Demonstratives and Their Status in Language

Although demonstratives form only a small class of linguistic expressions, the grammaticalization of demonstratives occurs so frequently that probably all languages have at least some grammatical morphemes that originated from a demonstrative. But where do demonstratives come from? What is their historical source?

Demonstratives are commonly seen as grammatical markers, and some linguists assume that all grammatical markers are eventually derived from symbolic expressions, i.e., from nouns, verbs, or adjectives. However, although all languages seem to have demonstratives, there is no evidence from any language that demonstratives developed from a symbolic source. What frequently happens is that demonstratives are reinforced by other lexemes. For instance, the French demonstrative *ce* can be traced back to an expression in which the weakened demonstrative *ille* was strengthened by the verb *ecce* meaning 'behold,' but this development did not create a new type of grammatical marker. In general, the deictic roots of demonstratives are not etymologically analyzable. It seems that demonstratives emerged so early in the evolution of language that we do not have any traces of their development. This suggests that demonstratives are part of the basic vocabulary of every language and should be kept separate from ordinary grammatical markers.

Though (some) demonstratives and certain grammatical markers (e.g., articles and third-person pronouns) serve basically the same syntactic functions, their pragmatic functions are very different. Grammatical markers either indicate relationships between elements of the ongoing discourse (e.g., prepositions) or they qualify the meaning of a content word (e.g., auxiliaries). By contrast, demonstratives serve language-external functions. In their basic use, they draw the hearer's attention on elements in the surrounding speech situation. In other words, demonstratives establish joint attention, which is one of the most fundamental prerequisites for the use of language (cf. Tomasello, 1999). Of course, anaphoric, discourse-deictic, and recognitional demonstratives serve more abstract, language-internal functions, but these uses are derived from the exophoric use; in fact, they can be seen as the initial stages of the grammaticalization process whereby demonstratives develop into grammatical markers (see earlier).

What is more, the use of (exophoric) demonstratives is often accompanied by a deictic point gesture. There is probably no other class of linguistic expressions that is so closely associated with a gesture than demonstratives. Deictic pointing gestures are of central significance to human communication. They establish joint attention and evolve very early in ontogeny. Moreover, the precursors of deictic pointing can be found in primate communication (cf. Tomasello, 1999). All of this suggests that demonstratives have a special status in language and should be kept separate from both symbolic expressions and grammatical markers.

See also: Adverbs; Articles, Definite and Indefinite; Deixis and Anaphora: Pragmatic Approaches; Gesture and Communication; Gestures: Pragmatic Aspects; Grammaticalization; Noun Phrases; Pronouns.

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Denmark: Language Situation

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Notwithstanding the smallness of Denmark in terms of both population (5.2 million) and territory (43 000 km^2), the work of 20th century Danish dialectology enumerates some 50 traditional dialects. Against this background, a main characteristic of the early 21st century language situation in Denmark is the total disappearance of the traditional dialects. The de-dialectalization process was particularly apparent during the 1960s and 1970s, when the local dialects ceased to be transferred to the younger generations in the decisive sense that children and adolescents no longer spoke the local dialect among themselves. An important explanatory factor is the fact that most Danish children spend their day in an institution from before they learn to talk, and the language of crèches, kindergartens, and schools, as of the media and public life in general, is always and everywhere the Standard language, which has its basis in Copenhagen speech. Today, the great majority of Danes speak the Standard language either in its Copenhagen version or in an accent with a slight regional coloring, mostly in terms of prosody only. In general, the Danish society is extraordinarily determined in its adherence to the Standard language ideology, and young Danes from all over the country have been shown to strongly downgrade their own regional accents in comparison to Copenhagen speech.

Parallel to the homogenization process outlined above, international mobility in recent decades (work migrants and refugees) has made the language situation in Denmark more heterogeneous. The linguistic minorities' proportion of the population has reached about 8% (2004). Out of these, roughly one-fourth are Nordic, EU, or North American citizens, while other large groups include speakers of Kurdish, Punjabi, Urdu, Farsi, Turkish, Bosnian, Tamil, Polish, Vietnamese, and Arabic. The teaching of Danish as a second language has gained a firm

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foothold in the educational system, whereas the political support for teaching of minority languages as mother tongues is far more precarious.

Linguistic minorities with a longstanding history within the Danish kingdom include the Faeroese and Greenlandic peoples (*see* **Faroe Islands: Language Situation** and **Greenland: Language Situation**), and part of the population in Southern Jutland close to the German border. Some 20 000 people here define themselves as German-minded and opt for German as their institutional language (i.e., to be used in schools), although Danish is the first language to most of them. A parallel speech community on the German side of the border comprises ca. 50 000 Danish-minded people having German as their first language and Danish as their institutional language. This rather special situation is the outcome of the long Danish-German history in the area, including wars and consecutive re-drawings of the border.

Typically a Danish pupil leaves compulsory schooling with two foreign languages: English, which is taught to all pupils from grade four to nine, and most often German. Whereas adult literacy commonly is said to be near total, recent studies indicate that ca. 20% are so-called functional illiterates.

See also: Faroe Islands: Language Situation; Germany: Language Situation; Greenland: Language Situation.

Language Maps (Appendix 1): Map 136.

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Denotation versus Connotation

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Introduction

The terminological opposition 'denotation' and 'connotation' has been variously used in philosophy, linguistics, semiotics and stylistics to indicate a number of diverse distinctions in the realm of meaning, in particular dichotomic distinctions between what different students have seen as fundamentally different kinds (or aspects) of meaning. Before embarking on a review of the diverse technical uses of 'denotation' and 'connotation,' it is perhaps useful to examine the semantic values suggested by their etymology and word formation. The deverbal noun *denotatio* attested in postclassical Latin, is derived from the compound verb *de-noto*, 'to mark out, point out, specify, indicate,' literally indicating the action of 'setting a mark (*nota*) on something in order to distinguish it.' The noun *nota* ('mark, sign, note') derives in turn from the verb *nosco* ('to come to know,' 'to become acquainted with' and also 'to recognize'). Thus the etymology of *denotation* generally suggests the idea of singling out an object by way of distinctive signs, or recognizing it because of its distinctive features. *Connotatio* and *connoto*, which are coined on the mold of *denotatio* and *denoto*, using the comitative prefix *con-* (the value conveyed is that of a secondary, accompanying or implied feature) are attested in Medieval Latin first in the theological literature, and then, in the 14th century, as technical terms in logic and grammar (Rosier, 1992).

It is customary to distinguish two broad uses of 'denotation' and 'connotation' as technical terms in semantics: a philosophical use and a semiotic-stylistic use.

Denotation, Connotation, Reference, and Sense

In the philosophical tradition, the pair denotation vs connotation is used to refer to a dichotomy analogous to those indicated by 'reference' (or 'denotation') vs 'sense' (or 'meaning'), or by 'intension' (or to use a more traditional philosophical term 'comprehension') vs 'extension.' Notably, we find this use in John Stuart Mill's *A system of logic* (1895): "The word 'white' denotes all white things, as snow, paper, the foam of the sea, and so forth, and, implies, or as it was termed by the schoolmen, connotes, the attribute whiteness." Of the two terms, 'denotation' is the one which has wider currency in contemporary philosophical and linguistic semantics, while the corresponding use of 'connotation' is nowadays rarer. The precise meaning of all the above terms is highly theory-dependent and varies in subtle but decisive

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Denotation, Connotation, Reference, and Sense

In the philosophical tradition, the pair denotation vs connotation is used to refer to a dichotomy analogous to those indicated by 'reference' (or 'denotation') vs 'sense' (or 'meaning'), or by 'intension' (or to use a more traditional philosophical term 'comprehension') vs 'extension.' Notably, we find this use in John Stuart Mill's *A system of logic* (1895): "The word 'white' denotes all white things, as snow, paper, the foam of the sea, and so forth, and, implies, or as it was termed by the schoolmen, connotes, the attribute whiteness." Of the two terms, 'denotation' is the one which has wider currency in contemporary philosophical and linguistic semantics, while the corresponding use of 'connotation' is nowadays rarer. The precise meaning of all the above terms is highly theory-dependent and varies in subtle but decisive

ways also within the same broad tradition of logico-philosophical semantics. 'Reference' and 'denotation' both concern the relation between linguistic expressions and things in the world and are often used interchangeably. Some authors (cf. Lyons, 1995 and Allan, 2001), however, draw a distinction between the two along the following lines: 'denotation' corresponds to the virtual relationship between a linguistic expression and a thing or set of things in the world (e.g. *dog* denotes the set of entities in the world which are correctly called *dog*), while 'reference' indicates the relationship between an expression and what the speaker is talking about by using this expression in a given utterance (e.g., the reference of *dog* in a particular utterance of the sentence *the dog barks*). Referring is sometimes seen as a sort of speech act and contrasted with the act of predication (singling out a certain dog vs predicating the property of barking of this same dog). This opposition can be interpreted in terms of discourse semantics as the contrast between introducing new referents in the discourse representation or retrieving them on the one hand, and updating the conditions on these referents on the other. In classic formal semantics, such a distinction is not taken into account: simply the denotations of phrases (*the dog*) and sentences (*the dog barks*) are functions of the denotations of the component expressions (such as *dog*, *the*, *bark*, etc.).

Similarly, on the side of 'sense,' 'intension' and 'connotation' we find significantly different conceptions. In the philosophical tradition the 'sense' or 'intension' of a linguistic expression is often seen as the set of all properties, conceived as real world modes of being, that their denotatum must have, while in a large part of the linguistic semantic tradition, for both structuralist (from Hjelmslev to Jakobson) and generativist (from Katz to Jackendoff), the linguistic meaning or sense of an expression is seen as metalinguistic paraphrase, usually cast in a (semi-) formalized language of semantic features. Finally, in the formal semantic tradition of Montague, the intension of an expression is reduced to a function from possible words to extensions in a particular world.

Denotation vs Connotation: The Semiotic-Stylistic Distinction

The so-called semiotic-stylistic use is more difficult to tackle. More precisely, one should speak of a family of loosely related uses the pair denotation vs connotation has acquired, a number of vaguely related uses in linguistic semantics, stylistics, and semiotics. The two terms have often been called forth to set apart what are seen as objective, descriptive meaning of a linguistic sign from the subjective emotive meanings (sometimes seen as including ethic and aesthetic value judgments), or from the stylistic and poetic values associated with it.

In a different perspective, the opposition is seen as between the stable, codified meanings of a linguistic sign and the variable, unstable, weakly suggested values or even idiosyncratic associations it evokes in the mind of the language users. These associations may consist, in turn, of emotions evoked by the sign, socially shared beliefs about either the referent of the sign or about the use of the sign or the people who use it, or, again, poetic, or, more generally, aesthetic values associated with the sign. In this perspective, the range of connotative association is seen as including the fact that some words or grammatical structures can function as sociolinguistic indicators or markers, pointing to a particular sociolect or to a particular register.

In some of its formulation in semiotics and European structural linguistics, in particular in those derived from the influential account of this distinction offered by Louis Hjelmslev (1961) in his *Prolegomena to a theory of language*, the opposition between 'denotation' and 'connotation' is not connected specifically with emotion, value judgments and style. Rather it is construed more broadly as a fundamental distinction between different ways of making meaning rather than between types of concrete contents (e.g., objective vs subjective).

In some of these broad interpretations, the opposition denotation vs connotation tends to overlap with a series of distinctions that have occupied the center stage in the recent debates on the relationship between semantics and pragmatics in the linguistic and philosophical literature: distinctions such as propositional (or truth-conditional) meaning vs nonpropositional (non-truth-conditional) meaning, literal vs nonliteral meaning, coded vs inferred meaning.

Theories of Denotation and Connotation in Medieval Logic and Grammar

The introduction of the philosophical use of 'denotation' and 'connotation' is often credited to Mill, but, in fact, as his mention of Scholasticism (schoolmen) testifies, it can be traced back to the late Middle Ages, and in particular to the work of William of Ockham. It is worth considering how the medieval notion of connotation differed from the current conceptions of sense or intension mentioned above. Ockham's notion of connotation emerges in the context of a long and very sophisticated debate on the semantics of the adjectives ad of the so-called denominative names (lat. *nomina denominativa*). Aristotle (*Categories*, n.1) calls denominatives (gr. *paronyma*) those beings

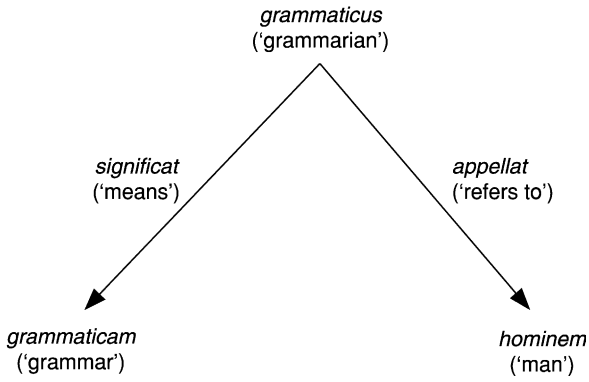

Figure 1 St. Anselm's theory of denominatives.

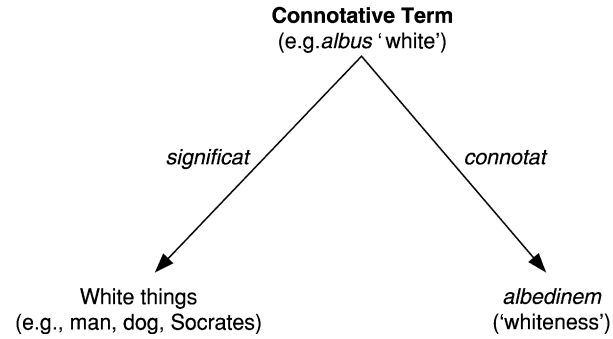

Figure 2 Ockham's theory of connotative terms.

whose name is derived from the name of something else, by way of a simple difference in morphological suffix: such as *grammarian* from *grammar* and *strong* from *strength*. While ancient grammarians considered denominatives as a morphological category, in the philosophical tradition of the Medieval commentators of Aristotle, the abstract name was always ontologically earlier irrespective of morphological considerations: for instance, when a man is called *strong* he takes his name from the quality that characterizes him, that is from strength. In his treatise *De grammatico* St. Anselm of Canterbury (12th century) proposed to analyze denominative terms such as 'grammarian' as signifying directly the property (the *grammar*) and indirectly the substance (the *man*). Thus, in the meaning of a denominative such as 'grammarian' one has to distinguish between their *significatio* (roughly 'meaning', the concept of *grammar*) from their *appellatio* (roughly 'reference', the *man* to whom the name refers) (see Figure 1).

This theory of denominatives was developed by later authors, which, like St. Anselm considered the conceptual meaning as being prior with respect to reference, which is signified indirectly and in a implicit way (*innuendo*).

In the 14th century, this analysis was reversed by Ockham's theory of connotation (cf. Pinborg, 1984 and Rosier, 1992 for a discussion of the reasons of this change of perspective). Ockham introduces a distinction between absolute and connotative terms: absolute terms correspond either to the names of substances (e.g., *homo* 'man') or to the names of qualities (e.g., *albedo* 'whiteness') and denote either an object or a class of objects. A connotative term, on the other hand, such as the adjective *albus* ('white') denotes first of all the white things to which it refers (e.g., *homo* 'man', *canis* 'dog', *Socrates*), while, at the same time, it connotes the quality *albedo* 'whiteness' (see Figure 2).

St. Anselm's version of the theory of denominatives, however, survived alongside Ockham's version, in logic as well as in grammatical theorizing. In this strand of theorizing, it was the reference to a substance, or object, which was called a connotation. We find this use in the treatment of the adjectives in an important Renaissance grammarian such as Scaliger, and later in the very influential *Grammar* and *Logic* of Port-Royal, again in the chapters concerning the adjective. But this use seems to be have disappeared from contemporary philosophical and linguistic terminology. Ockham's use, on the contrary, was to be revived by J.S. Mill.

On the Role of the Logic and the Grammar of Port-Royal in the Development of the Two Uses of 'Denotation' vs 'Connotation'

In Port-Royal we find three separate doctrines concerned with the opposition between denotation and connotation in its different uses. Two concern what we have called the philosophical use of these terms, while the third seems to be at the origin of the so-called semiotic-stylistic notion of connotation.

The term 'connotation' itself appears in the semantic characterization of noun (substantive) and adjective, both in the *Logic* (Part I, Chapter II; Part II, Chapter I) and in the *Grammar* (Part II, Chapter II). According to Port-Royalist doctrine, substantives (or absolutes) signify directly either things (e.g., *earth, sun, God*) or properties (e.g., *hardness*, *heat, justice*), while the adjectives, which are also called connotatives, have a double relation of signification as they indicate 'primarily but confusedly' the thing and 'secondarily,' albeit more 'distinctively,' the mode of being or property. Contray to Ockham's (and J. S. Mill's) use, in Port-Royal, the term 'connotation' refers to the primary and confuse signification ("confuse signification that we call connotation of a thing"), while the term 'denotation' is not used at all in this context. Thus the theory presented appears to blend aspects of Ockham's theory with the original

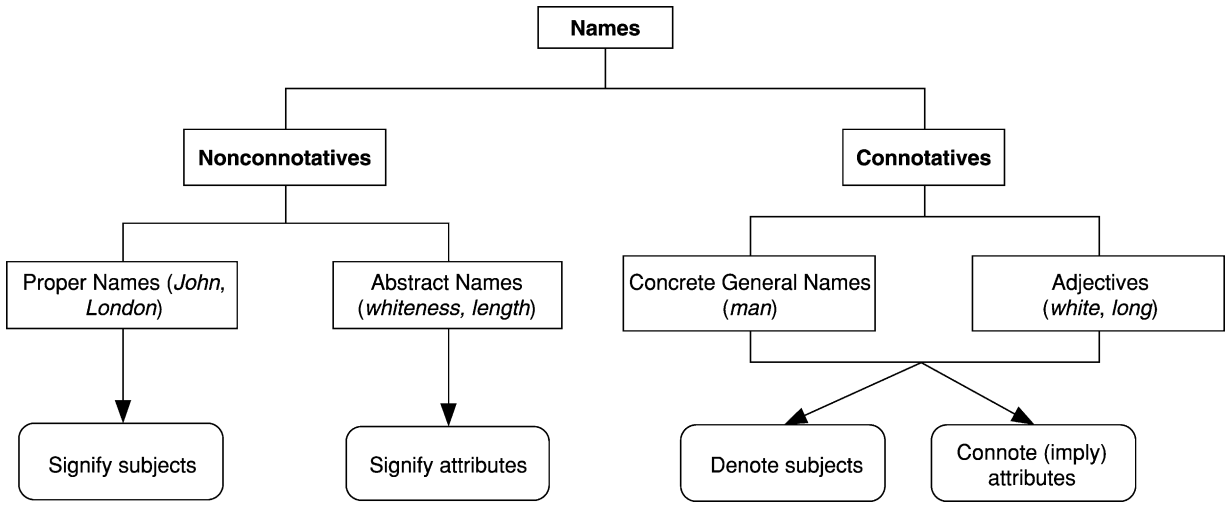

Figure 3 Connotative names in J. S. Mill's *System of Logic*.

theory of denominatives. In Port-Royal's *Logic* we also find a version of the philosophical-semantic distinction between *extension* and intension (here called comprehension). Comprehension is seen as the set of internal attributes of an idea (i.e., the ideas that make up its definition), while extension is seen as the set of ideas for which it can be asserted. The *Logic*, however, establishes only a remote connection between this doctrine and the notion of connotation, as discussed for the adjectives (see Part I, Chap. VIII).

In *Logic* Part I, Chap. XIV, Arnauld *et al.* (1972), discussing the problem of the definition of the meaning of words, draw a distinction between what they call the main signification of a word and the accessory ideas (fr. *idées accessoires*) connected to it. In the *Logic* accessory ideas are feelings, judgments or opinions either connected to a word or to a particular occurrence of a word in a certain utterance situation. In the latter case the accessory ideas do not arise from the word itself but the tone of voice, the facial expression, and by other types of natural signs that accompany its utterance. Discussing the accessory idea stably connected to a word, the *Logic* considers the case of words signifying the same thing but differing in the attitude associated to it. Two cases in particular are discussed: the different accessory ideas connected with the effects of simple vs figurative style, and the specific speaker's attitude connected to obscene, taboo words, as opposed to acceptable ways to refer to the very same things.

The range of phenomena mentioned in the *Logic's* chapter on accessory ideas corresponds with remarkable precision to the main phenomena that were to be treated as connotations in 20th century linguistic and stylistic literature. In fact, both the idea and the term 'accessory idea' were later to be found in discussions of poetic language of the 18th and 19th centuries and are likely to be the main source of the semiotic-stylistic notion of connotation.

Denotation, Connotation, and the Problem of Additional Connotations in J. S. Mill

J. S. Mill in his *System of Logic* (1895) revises Ockham's theory of connotation by limiting the class of nonconnotative, or absolute terms, to proper names, which signify individual subjects (*John*, *London*) and to abstract names signifying properties: concrete general names such as *man* are considered connotative together with adjectives such as *white* (see Figure 3).

It is interesting to observe that while Mill's theory of connotative terms is rightly taken as the prime example of the philosophical use of the pair 'denotation' vs 'connotation,' the *System of Logic* (Book IV, Chap. 4 and especially Chap. 5) also goes to some length to discuss a series of phenomena that are connected to the semiotic-stylistic use. In these chapters, J. S. Mill addresses the need of a language where general names have a meaning "steadily fixed and precisely determined" in order to carry out properly philosophical inquiry and argumentation, and analyzes the various obstacles natural languages set up to the fulfillment of this ideal requirement. One of these obstacles is the (diachronic) tendency of incorporating into the meaning of a term "circumstances accidentally connected with it at some time." Mill cites the examples of lat. *paganus* 'villager,' which came to connote 'paganism' as country people were the last to abandon the old religion and of fr. *vilain* (from lat. *villa* 'farmhouse, village') – in the Middle Ages "a proper legal designation of the people who were subject to the less onerous forms of feudal

bondage" – which became an insult, acquiring the connotations of 'crime' and 'guilt.' For J. S. Mill, the circumstances most likely to cling to a word by association and become 'additional connotations' are those connected with pleasure and pain, emotion and moral judgment. The negative influence of such affective and moral acquired connotations can be felt, in particular, according to Mill, in the reasoning about morals and politics. Throughout this discussion, the term 'connotation' retains its philosophical use; however, what J. S. Mill calls additional or acquired connotations are close to some of the semiotic-stylistic uses of the term, and are likely to have been one of their sources.

The Emergence of the Semiotic-Stylistic Notions of Denotation and Connotation in 20th Century Linguistics

The main ideas and distinctions which are focal to the semiotic-stylistic use of the 'denotation' and 'connotation' were introduced, with a different terminology, at the very beginning of the 20th century by the German linguist Karl Otto Erdmann. In his study of lexical semantics (Erdmann, 1910), he distinguished within the semantics of a word three dimensions: its main conceptual content (*Hauptbedeutung*), its secondary or associated representation or meaning (*Nebensinn*) and finally its emotional value (*Gefühlswert*). Erdmann showed how synonyms sharing the same conceptual content could be contrasted as concerns the associated representations or the emotional value attached to them. The latter two dimensions were later conflated in the notion of connotation.

The theme the emotional value of words was also prominent in Bally's theory of stylistics (Bally, 1909). The Swiss scholar conceives the stylistic study of the emotional aspects of linguistic expressions as involving the systematic establishment of series of synonyms sharing a core meaning but differing in the emotional values associated with them. He distinguishes two main types of emotional values associated with linguistic expressions: natural affective characters (which include attitudes and esthetic values directly associated with the expression) and effects based on the evocation of a milieu, which include all the choices among different stylistic, dialectal and sociolectal variants of expression that are expected to excite emotion indirectly by evoking the speech community (milieu) connected with the variant selected. The effect is considered to be particularly strong when the expression is used outside its natural milieu and when there is a readily available nonmarked alternative in the standard language to refer to the object denoted.

The terms 'denotation' and 'connotation' are finally used in connection to this sort of phenomena in Leonard Bloomfield's *Language* (Bloomfield, 1933). The treatise presents a rich exemplification of connotation phenomena but only an extremely sketchy theoretical characterization of the distinction. At first, 'connotation' is explained in terms of Bloomfield's behavioristic conception of meaning. Since in this conception the meaning of a linguistic form is identified with "the situation in which the speaker utters it and the hearer's response which it calls forth," connotation can be conceived as arising from partly deviant, individual, responses to 'very unusual' circumstances of utterance. The distinction between denotation and connotation seems to be conceived as a distinction between stable meaning and the variable idiosyncratic effects an expression can have on an individual. The examples of connotation presented immediately thereafter by Bloomfield, however, do not concern at all instances of deviant interpretation and the individual psychology of the language user. Instead one finds a wealth of examples of connotations connected to the social standing of the speaker, local provenience, archaism, learned vs ordinary language, foreign and semi-foreign words, and slang. After this exemplification, Bloomfield somewhat revises his previous explanation by saying that there are connotations which are shared in a speech community as well as individual, deviant ones and that the former are not easily distinguished by 'denotative meaning.' In fact, there is no way, in Bloomfield's extremely behavioristic conception of meaning, to distinguish denotations and connotations once one admits that connotations can correspond to generalized responses. Other connotation phenomena discussed by Bloomfield in some detail include improper speech forms seen as contrasting with acceptable forms 'with the same denotation' (*whore* vs *prostitute*), the avoidance of speech forms considered ominous in certain circumstances, the connotation associated with 'symbolic forms' (both in the sense of phonosymbolism and onomatopoeia), which illustrate more immediately their meaning with respect to 'ordinary' forms, nursery-forms (*papa* vs *father*) and hypocoristic forms (*Bob* vs *Robert*). Finally, discussing grammatical forms and syntax (Chap. X and Chap. XII), Bloomfield remarks that differences in word order can have connotative values, referring, in particular, to the so-called free word order languages such as Latin.

The Notion of a Connotative Semiotics in the Tradition of Louis Hjelmslev

Louis Hjelmslev (1899–1965) provided, in his *Prolegomena to a theory of language* (1961), a theoretical

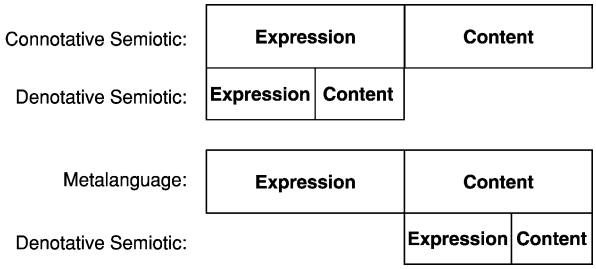

Figure 4 The relationship between denotative semiotic and connotative semiotic and between denotative semiotics and metalanguage according to Hjelmslev's formulation.

treatment of the distinction between denotation and connotation underlying the range of connotation phenomena that are usually listed in the semantics and stylistics literature. Hjelmslev's model of denotation and connotation has been very influential in semiotics and is the main theoretical source from which prominent French semiotics students such as Algirdas Julien Greimas (1917–1992) and, in particular, Roland Barthes (1915–1980) draw for their work on connotative language.

Due to its highly general and abstract nature, Hjelmsev's model, ends up as expanding the range of phenomena that are ranged under the label of connotation. Reinterpretations (and sometimes also misreadings) by later scholars of semiotics adopting Hjelmslev's conception expand this area even further.

For Hjelmslev (1961) the opposition between denotation and connotation does not concern the typology of meanings. Rather it concerns the typology of languages (or more generally semiotic systems), and, more precisely, the way in which they realize the semiotic function. A connotational language (or connotative semiotic), for Hjelmslev, is a language whose expression plane is in itself a language, relating a plane of expression with a content plane. A denotational language (or denotative semiotic), on the other hand, is a semiotic system whose plane of expression cannot be further analyzed as a semiotic system. Denotation is a relation connecting the expression and the content of a sign, while connotation takes a sign as the expression of a further content. In Hjelmslev's system connotational language stands in an inverse relation with metalanguage, as a metalanguage, in fact, is a semiotic system whose content plane is constituted by another language (see Figure 4).

Hjelmslev (1961) lists just a few examples of contents that can be expressed by connotation, without entering into too much detail. These types of content include national languages, dialects, styles, genres, and voices. For instance, a person speaking a certain language, say Danish, connotes the content 'Danish language' all along her/his discourse, while he or she goes on denoting various contents. Systems of connotative signs are not necessarily isomorphic with the systems of denotative signs that make up their expression plan. A unit of connotation, for example, can have as its expression plan several units of denotation, as it is the case, for example, with style. When connotation and denotation are isomorphic, the connotational language is said to derive from the form of the denotational one, while it is said to derive from its substance when the units of the two languages are articulated differently.

Despite the formal, geometric, and systematic appearance of Hjelmslev's formulation of the opposition between denotation and connotation, it is not easy to understand what was the intended scope and explanatory aim of the theory.

One interesting reconstruction of Hjelmslev's theory (Sonesson, 1989, 1998), based both on the definitions and on the few examples provided, sees connotation as residing in the meaningfulness of the choice of a particular expression to stand for a given content among a set of alternative, denotationally equivalent expressions, that is, connotation presupposes a set (or paradigm) of alternative expressions, which have the status of simple variant expressions for the same content at the denotational level but become relevant for the expression of a further level of meaning. Variants at the level of denotation become invariants at the level of connotation.

This paradigmatic dimension of choice between alternatives is implied by the very fact that Hjelmselv treated connotation as a secondary semiotic system for expressing meanings (dependent for its expression plane on another system) rather than just as secondary or accessory meanings. This reconstruction seems to fit well the case of stylistic choices, for example at the lexical level (e.g., choosing the word *steed* rather than *horse* to denote a certain animal in order to convey literariness), the use of euphemisms (e.g., *to pass away* rather than *to die*), the choice of a certain register, as well as the deliberate choice of a regional dialect or of a national language – both locally in code-switching and code-mixing phenomena, and more globally at the level of the entire communication event. The concept of choice, and the very notion of a semiotic connotative system, becomes more problematic, however, when we deal with the simple fact of speaking a certain linguistic variety, irrespective of whether this is the result of a deliberate communicative choice of the speaker. Hjelmslev, for instance, maintains that a foreign (non-native) accent in speaking a certain language connotes the content "I am a foreigner." Certainly a non-native accent, inasmuch as it leads to infer a foreign origin, can be considered as a natural sign or symptom of foreign

origin, an index in the sense of Peirce. It is far more controversial, however, if this inference is to be considered as encoded in a connotative semiotic system, and as the result of a choice within a paradigm of alternatives. Interestingly, the discussion of a borderline notion such as connotation raises the fundamental problem of the limits of a theory of semiotic codes.

In their readings of Hjelmslev, Barthes (1964) and Greimas (1970) assign to connotation phenomena, and consequently to semiotic codes, the widest interpretation. According to this line of thought, connotations exist as social facts independently of the communicative intentions of the speakers, and, consequently, the notion of choice evoked above cannot be taken literally as a choice of the speaker. Rather it is the simple actualization of one or another of the possibilities virtually present in the semiotic system. Barthes (1964), in particular, considers the scope semiotic codes coextensive with social realities and insists on the necessity of moving from a narrower semiotics of communication to a more encompassing semiotics of signification, which should not limit itself to the signs produced intentionally to communicate. For Barthes, Hjelmslev's notion of secondary, connotative, semiotic systems is one of the chief instruments for carrying out such a wider investigation of society *sub specie semioticae*. For Barthes (1964), connotative meanings can be identified with ideology, while connotative signifiers are identified with rhetoric. Rhetoric thus becomes the "signifying face of ideology."

In the practices of analysis of Barthes and other semioticians, the inventory of empirical phenomena ranged under the label 'connotation' increases enormously with respect to the original – mainly sociolinguistic – list found in Hjelmslev, while from a theoretical viewpoint the definition of denotation and connotation remains, at least nominally, based on Hjelmslev's schema. Barthes, for instance, applies the label 'connotation' to the semantic effects of figures of speech, but also, to all sorts of implicit meanings resulting from pragmatic inferences that take the explicit referential content as their starting point, as well as to the symbolic values (in the psychoanalytic, Freudian sense of 'symbol') of the people, things, events and situations referred to in the text.

The continuing relevance and explanatory power of Hjelmslev's schema for such a proliferation of diverse connotations have been, however, legitimately challenged. Kerbrat-Orecchioni (1977), for instance, observes that many inferences that Barthes treats as connotations, as well as the symbolic values, for instance, take the referents of the text as their starting point. Consequently, they do not depend, unlike sociolinguistic variants and figures of speech, on the choice of a particular expression to stand for a given content.

In a similar fashion, Umberto Eco (1976) refers to Hjelmslev's notions of a connotative semiotics, while applying the term 'connotation' to what can be described as implications drawn from the denotatum of a sign on the basis of "a stable social convention, a scholarly training, a system of expectations deeply rooted in the patrimony of common opinions." Eco illustrates this notion with the following example: in the alarm system of a dam, a certain signal, say *AB*, denotes 'danger level'; at the same time, the engineer operating the dam knows that the danger level corresponds to the event of a flood and that, in this case, she must evacuate the water. Both these implications are treated by Eco as connotations of the signal based on a connotative semiotic code, which coincides with the knowledge of the engineer about the functioning of the dam.

It is worth noting that, in this perspective, the logical relation of entailment between 'danger level' and 'flood,' which is part of the engineer's knowledge, is reduced to a semiotic relation 'danger level' means (or connotes) 'flood' encoded in the connotative system, and the actual inference drawn by the engineer on the basis of this knowledge is reduced to the decoding of a token connotative sign. Such an interpretation, however, does not really fit Hjelmslev's model. Again, as Kerbrat-Orecchioni (1977) observes, it is only the denoted content ('danger level'), and not the whole denotative sign that makes up the expression of the connotative sign.

The Place of the Semiotic-Stylistic Distinction between Denotation and Connotation in a Semantic and Pragmatic Account of Meaning

Apart from Hjelmslev's stratified model, there are only a few attempts at offering a definition of general import of the denotation vs connotation dichotomy capable of bringing together in a meaningful way either the whole range of connotation phenomena discussed in the literature or a significant portion of it. One such attempt is Kerbrat-Orecchioni (1977), which presents a general definition of the distinction between denotation and connotation alternative to Hjelmslev's model together with a typology of connotation phenomena. Kerbrat-Orecchioni's work has the merit of explicitly situating the semiotic-stylistic notions of denotation and connotation with respect to the philosophical distinction and represents at least an interesting starting point for the difficult

task of understanding the role of such a distinction in the study of meaning in its semantic and pragmatic aspects.

While in its philosophical sense the distinction between denotation and connotation sets apart the extension of an expression (the thing or set of things it refers to) from its intension, sense or meaning, in the semiotic-stylistic use denotation and connotation distinguish two aspects of sense (fr. *signification*). Following the linguistic tradition structural semantics, sense is identified by Kerbrat-Orecchioni with a set of meaning components, or semantic features. Within sense, denotation corresponds to those definitional features which are strictly necessary to the univocal identification of the referent, while connotation corresponds to supplementary features (cf. Figure 5).

The identification of linguistic sense, seen as including both definitional and supplementary features, with the philosophical notion of connotation is not, however, straightforward. Firstly, as Kerbrat-Orecchioni herself observes, philosophical connotation can be interpreted in a strict sense as consisting of the sole properties determining extension, and thus coinciding exactly with denotation in the semiotic-stylistic use. A second, more subtle, difference concerns the ontological status of the two notions: philosophical connotation, as conceived for instance by Stuart-Mill, is a property or set of properties, conceived metaphysically as real modes of being inherent in the denotatum, while sense, in the structural linguistics tradition, is a metalinguistic paraphrase, and while we can conceive definitional semantic features as corresponding to actual properties of the referent, the ontological status of the supplementary features is much more uncertain.

This approach to the semiotic-stylistic notions of denotation and connotation rests crucially on the possibility of distinguishing between the semantic features that are relevant for the identification of the referent of a linguistic expression and those that are not. It is not obvious, however, in what sense a meaning component can be irrelevant referentially. Kerbrat-Orecchioni illustrates the distinction with the French lexical units *pomme de terre* and *patate*: both units denote the same vegetable ('potato'), and thus have the same denotative semantic features, to these features the lexeme *patate* adds the connotative feature 'informal, casual register' (fr. *langue familière*). This feature is referentially irrelevant in the sense that it does not say anything about the properties of the vegetable referred to, but instead says something about the properties of the speech situation in which the lexical unit is used.

According to Kerbrat-Orecchioni (1977), when the information provided by a certain meaning

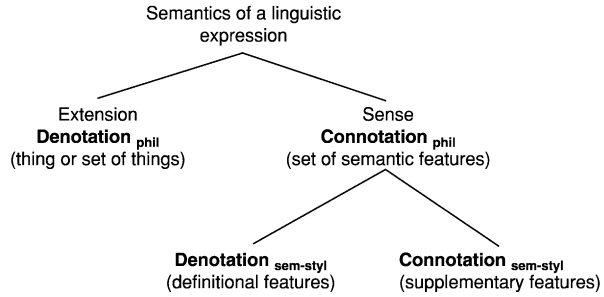

Figure 5 The relationship between the philosophical and the semiotic-stylistic notions of denotation and connotation. Adapted from Kerbrat-Orecchioni (1977: 12).

component does not concern the discourse referent, this is a sufficient condition to consider it as a connotation. Such connotative meaning components can appear both as additional meaning components of expressions that have a denotative meaning, as in the case of fr. *patate* discussed above, or as the sole meanings of particular means of expression that do not participate in the denotation. Such means of expression include phonetic features and prosody, but also specific grammatical constructions and specific derivational morphemes. For example, hypocoristic suffixes in languages such as Italian (Dressler and Merlini Barbaresi, 1994) often do not provide any information about the denotatum of the lexical unit, but rather concern the nature or the mood of the communicative situation, such as in the case of baby-talk:

*No non toccare l'acqu-**etta***!
no not touch the water-DIM

or modulate the speech act performed, such as in mitigated requests:

*Posso avere un caffe-**uccio**?*
can-I have a coffee-DIM

Honorific forms, in languages such as Japanese, are another area of morphology with essentially connotative function according to Kerbrat-Orecchioni's criterion.

Although the notion of meanings that do not participate in the individuation of the referent and are not "about the discourse referent" suggested by Kerbrat-Orecchioni (1977) is suggestive and appears plausible with respect to the examples discussed above; this concept still remains very vague, and there is no obvious way to make it precise.

Certainly the nonreferential nature of connotation cannot be construed as the aberrant idea that these are meanings without referents, that connotational concepts do not intentionate anything, that their meanings are not about something. Obviously connotations are about something, they are about speaker attitudes, values, emotions, social facts,

communicative situations, etc. A more plausible reconstruction would be to say that connoted meanings do not contribute to the act of reference when we are dealing with materials appearing in the context of referring expressions, and, more generally, that they are not part of the truth conditions of the proposition directly associated with the meaning of the sentence in which they appear, or in other words that they belong to nonpropositional meaning. This reconstruction highlights the fact that all phenomena habitually associated with connotation exhibit the basic properties shared by all nonpropositional semantic components (e.g., they are not part of the asserted content and cannot be negated). It is clear, at the same time, that this notion of nonreferentiality is too generic to single out connotation phenomena and to distinguish them from a variety of nonpropositional meaning phenomena including illocutionary meanings, nonpropositional epistemic and evaluative attitudes, presuppositions, information structure, conversational and conventional implicatures, etc.

The relationship between the phenomena ranged under the semiotic-stylistic use of connotation and the different theoretical categories that have been developed for the study of nonpropositional meaning in semantics and pragmatics remains a largely unexplored area.

See also: Barthes, Roland: Theory of the Sign; Connotation; Descriptions, Definite and Indefinite: Philosophical Aspects; Extensionality and Intensionality; Greimas, Algirdas J.: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Meaning, Sense, and Reference; Sense and Reference: Philosophical Aspects; Taboo, Euphemism, and Political Correctness.

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Dependency Grammar

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Introduction

Dependency grammar presents a particular perspective on how to describe the structure of natural language expressions. This perspective is based on the notion of a dependency structure, in which we connect heads immediately with the dependents that modify them, along named relations.

Theories of dependency grammar may differ in their specific interpretation of these notions. Typically, a head defines what dependents it can take and whether a dependent is optional or not. If we describe

communicative situations, etc. A more plausible reconstruction would be to say that connoted meanings do not contribute to the act of reference when we are dealing with materials appearing in the context of referring expressions, and, more generally, that they are not part of the truth conditions of the proposition directly associated with the meaning of the sentence in which they appear, or in other words that they belong to nonpropositional meaning. This reconstruction highlights the fact that all phenomena habitually associated with connotation exhibit the basic properties shared by all nonpropositional semantic components (e.g., they are not part of the asserted content and cannot be negated). It is clear, at the same time, that this notion of nonreferentiality is too generic to single out connotation phenomena and to distinguish them from a variety of nonpropositional meaning phenomena including illocutionary meanings, nonpropositional epistemic and evaluative attitudes, presuppositions, information structure, conversational and conventional implicatures, etc.

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Introduction

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Theories of dependency grammar may differ in their specific interpretation of these notions. Typically, a head defines what dependents it can take and whether a dependent is optional or not. If we describe

the level of surface form, then a head may also determine the inflectional form of a dependent, concord, and the grammatical category of the overall construction (cf. Hudson, 1984; Zwicky, 1985); at the level of semantics, the head identifies the meaningful object to which the meaning of a dependent contributes.

Theories may impose different constraints on dependency structures as such. Dependency structures are generally considered rooted structures, and all heads and dependents are connected. One point on which theories differ is whether these structures are to be trees (i.e., each dependent has a unique head; Mel'čuk, 1988; Sgall *et al.*, 1986) or can be graphs (Hudson, 1984). Another point concerns how we understand domain of a head as a linearization domain. The asymmetry between heads and dependents characterizes the vertical structural organization of an expresion since heads govern dependents. A dependency structure does not *a priori* impose any linearization constraints, as these concern horizontal organization.

One immediate advantage of dependency structures is that it is easier to capture nonprojectivity found in languages with a freer word order since the linearization domains of heads are by definition not constrained, unlike constituent structure, which focuses on the horizontal organization of a linguistic expression and was traditionally based on projective domains. Dependency is not so much an alternative type of representation to constituency though, but a complementary perspective. If we combine dependency with linearization constraints, then we are incorporating a notion of constituency, albeit a flexible one, and it is this combination that has proven to be crucial in the typology of word order (Greenberg, Hawkins).

Another advantage of dependency structures is that they provide a natural way to capture the meaning that the expression realizes. Because the meaning of the expression is based on the meaning of the heads that are involved, the notion of the valency of a head is central to this. The valency of a head describes the set of dependents it can take (i.e., a type of argument structure); although often contributed to Tesnière, this notion was introduced by Peirce in the late 1890s in his proposal for analyzing natural language using relational algebra (Peirce, 1898) and appeared in writings of Bühler (1934) and of De Groot (1949). In a valency frame, we minimally state for each dependent whether it is obligatory or optional and what *role* it performs (e.g., actor or patient) (cf. also thematic structure). Valency can form the basis for verb classifications (Panevová, 1975).

The roles we use in valency frames are more than mere labels. We can define for a role its interpretative import, which determines how the dependent contributes to the overall meaning captured by the head (Kruijff, 2001), as part of which it may introduce presuppositions that need to be satisfied in the larger discourse context. This follows the holistic perspective on interpretation Jakobson proposed based on Peirce's triadic sign, against De Saussure's binary sign structure. Interpretative import can also help explain why particular roles may bring about aspectual change (Kruijff, 2001).

Dependency grammar epitomizes a view on the structure of language that has a long history. Particularly its more recent developments are closely intertwined with the developments in modern formal grammar. Next, the basic concepts of dependency grammar are placed in this historical context to explain the concepts in more detail and to relate them to the larger context of formal grammar.

Early History of Dependency Grammar

The first formal grammar we know of, namely Panini's Ashtadhyayi (AD) grammar of Sanskrit dated ca. 350–250 B.C., includes traces of dependency. Panini's grammar was based on a long tradition of linguistic thought in India, rooted in the work of the Vedas about 5000 years ago. The AD grammar distinguishes two levels of linguistic description mediating between the surface form of an expression and its meaning. The *vibhakti* level describes the morphotactic structure of the expression, whereas the *karaka* level relates verbs and their dependents through six types of karaka relations: *karta* (agent), *karma* (patient), *karan* (instrument), *sampradan* (recipient), *apaadaan* (point of departure; cause), and *adhikaran* (location).

In the Arabic linguistic tradition (ALT), we find what is arguably the first systemic treatment of syntax based on concepts that now form the core of dependency grammar (Bohas *et al.*, 1990; Owens, 1988). Around the 8th century A.D., Arabic changed from being mainly an oral language to a language adapted for written use, in part due to a reform that made Arabic the sole administrative language of the Islam empire.

The discussions related to the Qur'an, and the collection and criticism of ancient poetry, formed the contexts in which the approach and problems of grammatical thought arose. The earliest comprehensive and systemic description of the Arabic language is the Kitab of Sibawayhi (ca. 798 A.D.), which covers phonetics, phonology, morphology, syntax, and semantics.

Sibawayhi's Kitab did not provide a theoretical model, though. Whenever the discussion concerned syntax, Sibawayhi would construct a class of related

utterances and then show by paraphrase how the individual utterances differ (Bohas *et al.*, 1990). Sibawayhi thus strongly relied on the reader's intuition to understand what to do with the data. Naturally, this left a lot of room for further interpretation. It was only in the early 10th century A.D. that a comprehensive and systematic model for grammatical theory was developed. The first explicit statement we know of this model is the Kitab al-Usul of Ibn al-Sarrag (d. 928).

The Kitab al-Usul codified the findings of Arabic grammar, as written earlier in Sibawayhi's Kitab. Al-Sarrag organized his system of syntax (*nahw*) around the Arabic conceptions of a head (*amil*) and its dependents (*ma'mul fihi*). Each grammatical construction had a meaning, and each part of the structure contributed its part to this meaning (Owens, 1988). Thus, we see that, for example, nominal dependents can have different roles, such as *fa'il* ('actor, subject'), *mafa'il* ('object'), as well as *mubtada* ('topic') or *khabar* ('comment'). The fact that roles are meaningful is also reflected by selectional restrictions between related items: heads only take particular types of dependents either if the head implies the existence of such a dependent or if the dependent and the head share certain features. In this context, Al-Sarrag discussed, for example, why some verbs can take locative complements – namely, if they imply a general location for the action to occur in.

In Medieval Europe, grammarians were familiar with the ALT due to the close interaction with the Islamic world through Moorish culture in southern Europe and the use of Hebrew by Jews all over Europe. Arabic grammar interested them because Arabic was a language different from Latin and had resulted in a different kind of grammar, thus raising the question whether there is a universal grammar. The major impact on linguistic thought came through the translated work of the ancient logicians and grammarians, which (re-)introduced the notions of syntactic and semantic dependency.

In Antiquity, logicians such as Aristotle focused on how propositions could be analyzed into their constituent parts. They distinguished two main word classes, namely nouns and verbs (credited to Plato), which when put together constitute a minimal proposition: the noun provides the subject and the verb provides the predicate for a proposition. The notion of dependency we find here is of a semantic nature. Without a verb, we do not have a proposition, as Aristotle observes in *On Interpretation*.

At the same time, the Antique grammarians concentrated on the interpretation of literary texts. Besides nouns and verbs, the grammarians also distinguished participles, articles, pronouns, prepositions, adverbs, and conjunctions as word classes. Although the grammarians did not adopt a logic-based analysis, the grammarians did inherit nouns and verbs as word classes from the logicians, and as such the two systems were not unrelated. For example, the grammarians conceived of the adverb as "a part of speech that complements or diminishes the meaning of the verb that it accompanies" (Percival, 1990, p. 31). This illustrates two implications (Percival, 1990). First, there is the notion of semantic specification: the function of some words is to clarify or add to the meanings of other words (i.e., semantic dependency). Second, there are asymmetrical relations: an adverb needs a verb to modify, but a verb does not necessarily need an adverb to be modified by (i.e., a syntactic dependency). These two ideas were elaborated in the work of Apollonius (2nd century A.D.). Later, the Latin scholar Priscian (ca. 500 A.D.) based his Latin grammar on Apollonius's ideas.

These notions came into European Medieval grammar through Boethius's (ca. 480–524/6 A.D.) interpretation of Aristotle's work. In his commentary on Aristotle's *On Interpretation*, we for the first time find a special term to refer to the supportive function of minor word classes, namely '*determinationes*' ('specifiers') (Percival, 1990). Boethius elaborates this notion in his *De Divisione* by saying that words in isolation are vague and need to be specified further. Determination thus cuts across word classes, adding an idea of semantic role to the major word classes.

The writings of Boethius were part of the *logica vetus* on which Medieval education was based. Under the influence of the newly accessible works of Aristotle and other Greek philosophers, this led to a revival of the view of language as developed by the Antique logicians. The scholastics wanted to explain the sciences on the basis of a set of propositions whose truth could be inferred conclusively by deduction from first principles and that naturally included grammar. Grammarians quickly adopted Boethius's *determinatio* and complemented it with the more syntax-oriented notion of *regimen* ('government'): a verb governs all the major nominal expressions in a sentence, determining, e.g., nominal inflection (which is similar to the notion of head in the ALT). Other government relations were *exigentia* ('requirement') between adverbs and verbs and *deservire* (or *servire*) between prepositions and nouns (Percival, 1990).

By the end of the 12th century, grammarians used both *regimen* and *determinatio*, and in the 13th century, Latin grammarians introduced, the term *dependentia*. This term was closely related to *determinatio*, and it expressed the affinity between syntactic and semantic dependency: "If A governs B, then B determines A, and hence A is dependent on B, with

'B terminating the dependency'" (Percival, 1990, p. 35). These notions were consequently used by speculative and modistic grammarians in the following centuries, particularly Thomas of Erfurt and Martin of Dacia (Covington, 1984).

In the 17th century, the logicians of Port Royal revived the ideas of speculative grammar. In 1660, they published their *Grammaire générale et raisonnée* and the *Logique*, with which they wanted to demonstrate how the structure of language is a product of reason, and that the different languages are varieties of a more general logical and rational system. At the time, grammarians added several important concepts to the notion of dependency. The Port Royal logicians introduced the notion of a dependent clause. Contributed to the French grammarian Claude Buffier (early 18th century) are the notions of modifiers and modification, wheres Girard introduced the notion of complement in 1747 (Percival, 1990).

Modern History

The modern advancements in dependency grammar are best seen within the larger context of the developments in formal grammar. At the end of the 19th century, Wundt (1932–1920) introduced an analytical perspective on natural language syntax in which we start with a sentence and attempt to decompose it into its parts, unlike the synthetic view of the Antiques and the Medieval grammarians who investigated how sentences result from combining words. The analytical perspective is evident in Bloomfield's immediate constituency hypothesis but finds its clearest expression in the formal frameworks that have been developed since the 1950s. Crucial to these developments was the groundbreaking work during the 1930s and 1940s on mathematical logic and on the theory of computers and computation. For example, Post's work on rewriting systems provided the formal basis for what later became phrase structure grammars (PSGs).

This was the background against which Chomsky could formulate his ideas that had a profound impact on the enterprise of modern theories of syntax: the mathematical results establishing formal language theory and the scale of types of grammar (the *Chomsky hierarchy*), the critical review of B. F. Skinner's (1957) *Verbal behavior* that spelled the end of descriptive behaviorism, and his book *Syntactic structures* (Chomsky, 1957). *Syntactic structures* not only presents a formalization of the immediate constituency hypothesis in the form of a PSG for English but also advances an important methodological point. The preface emphasizes the heuristic role of formalization in clarifying linguistic analyses. We can define the grammar of a language as a finite set of rules, which is a mathematical theory of the syntactic structure of that language. As such, we can compute its consequences and verify these against empirical evidence.

Chomsky proposed to view natural language grammar as a generative grammar. A generative grammar consists of a context-free (CF) component that generates 'kernel sentences' and transformations that derive complex representations from the kernel sentences, a division originating with Harris. Chomsky considered two variants of this system. In variant A, we generate a (finite) set of elementary sentences and then use transformations to obtain the class of representations of all sentences for a language. In variant B, we directly generate a (finite) set of representations for all sentences of a language and then use transformations to arrive at surface forms.

Variant B formed the basis for stratificational grammar, developed in Hays (1964) and Lamb (1966). In 1965, Chomsky also adopted variant B, combining the ideas of kernel and transformations into the notion of transduction. Together with the dependency theory of Hays and Tesnière, this gave rise to the first modern formal frameworks for dependency grammar.

The modern notion of dependency grammar is usually attributed to Tesnière, published posthumously as Tesnière (1959) (dating back to 1939). Tesnière aimed at a notion of grammar that would be useful in teaching foreign languages. His theory has two parts: the dependency theory and the translation theory. The dependency theory describes how to analyze a sentence in terms of *l'ordre structurel* and *l'ordre linéaire* – what we nowadays would understand as immediate dominance (or dependency) and linear precedence, respectively. To obtain the dependency structure of a sentence, Tesnière suggested to first divide the sentence into primitive elements called nuclei. A nucleus can consist of one or more words (possibly but not necessarily forming a contiguous sequence), although a nucleus can also be just a part of a word. Next, a syntactic structure is built by directly relating nuclei through connexions. A connexion is a directed and named relation from a regent (head) to a dependent. Each dependent has exactly one regent, and there is a single root nucleus, as a result of which Tesnière's dependency structures are trees – but unordered trees because they do not model linearization. Furthermore, where it concerned taxis (e.g., coordination), Tesnière proposed a separate dimension.

Tesnière's dependency trees, being unordered, left open the possibility for combining dependency grammar with a notion of (immediate) constituency [see Hocket's *Course in Modern Linguistics* (1958) and

Nida's *A Synopsis of English Syntax* (1966)]. Because of the close affinity between dependency grammar and categorial grammar, various authors have proposed to use categorial grammar to model the linearization aspect (Kruijff, 2001).

Employing Tesnière's ideas, various formalizations based on stratificational grammar were proposed. In the early 1960s, Sgall proposed a transductive approach, derived from Chomsky's variant B, which led to the first formulation of functional generative description (FGD) (Sgall *et al.*, 1969). FGD presents a purely dependency based formalism (Petkevič, 1987; Sgall *et al.*, 1986), in which a surface form is generated from a tectogrammatical representation through a sequence of *n* transduction steps over successive representational strata. Plátek and Sgall (1978) established that although the pushdown automata used as transducers do extend the generative strength of the approach beyond context freeness, the result does not reach context sensitivity.

In FGD, we see a symbiosis of Praguian functionalism (Mathesius, Jakobson) and structuralism. Tesnière suggested a purely structuralist approach to relating surface form and meaning, essentially considering a one-to-one mapping. FGD instead is based on the functionalist idea that every form is motivated by the underlying function it expresses, but it combines this with the idea that we should only distinguish functions if they are realized differently (Panevová, 1974). This sets FGD apart from purely functionalist approaches such as that of Fillmore (1968), according a crucial role to the form/function relation while at the same time FGD is functional in that meaning provides the basis for surface form.

Other stratificational approaches to dependency grammar are meaning-text theory (MTT) (Gladkij and Mel'čuk, 1975; Mel'čuk, 1988) in the Russian School and *Abhängigkeitsgrammatik* (Kunze, 1975) in the German School. The German School focused especially on the integration of valency theory into the general idea of dependency syntax (e.g., work by Helbig, Heringer, Kunze, and Engel; Helbig presented a substantial dependency grammar of German).

The MTT, first put forward in Moscow by Zholkovskij and Melčuk in 1965, is similar to FGD in that it consists of mapping, in successive stages, from the meaning of an utterance to its form or 'text.' MTT distinguishes, from deep to surface, levels for representing semantics, syntax, morphology, and phonology. At each of these levels, we may distinguish different dimensions of a representation; for example, in semantics we have communicative functions besides the semantic structure capturing propositional content. MTT formed the basis for one of the first substantial English grammars, which Melčuk and Pertsov developed in Russia during the early 1970s. The most fundamental difference between MTT and FGD is in their understanding of dependency. MTT assumes that each construction is headed, including coordination (Mel'čuk, 1988); FGD instead follows Tesnière's proposal to consider taxis a separate structural dimension.

Parallel to the development of MTT and FGD was Hudson's work on dependency grammar, inspired by Halliday's systemic (functional) grammar. An early proposal for daughter-dependency grammar (1976) adopted the goal of generative grammar (i.e., modeling the sentences of a language) but took a nontransformational approach: a sentence has only one representation (stratum), and there are no transformations – unlike MTT or FGD. This view prevails in Hudson's later work on word grammar (WG) (Hudson, 1984). WG is a dependency grammar in that its structures are built from immediate dependencies between words, with the dependencies indicating what grammatical relation the dependent fulfills. The resulting dependency structures are not trees but graphs ('networks'). WG presents language as a network of knowledge, using default inheritance in linking concepts about the meanings of words without strictly distinguishing linguistic knowledge from, for example, world knowledge. WG focuses first on a rich representation of the meaning of an utterance and less on aspects of its linearization.

In the 1960s and 1970s, developments in dependency grammar thus investigated both syntactic and semantic notions of dependency, the latter placed within the more general question on how semantics and syntax relate (cf. the issue of the autonomy of syntax). Semantic dependency was mostly investigated from the viewpoint of valency, exploring Tesnière's notions of *actants* ('arguments') and *circonstants* ('adjuncts'); see Panevová (1974, 1975) (FGD), Fillmore (1968), as well as work by Starosta on lexicase and the German School.

Formal language theory made it possible to ask for the generative power of a grammar, and for dependency grammar various authors had established such results. Hays (1964), Gaifman (1965), and Robinson (1970) all showed that a class of dependency grammars are weakly equivalent to context-free phrase structure grammars. However, Gross (1964) claimed that "the dependency *languages* are exactly the context-free languages" (p. 49). Similar mistaken claims were made frequently in the literature; unfortunately so, unfortunately because early on CFGs were shown to be inadequate to model natural language. This might have been the reason why, at the time, people lost interest in dependency grammar, at least in its syntactic exponents.

Traditional PSG (following Bloomfield) was also CF, but Chomsky (1957) added transformations on top of such a grammar to obtain greater generative power. However, this did not necessarily solve the problem. People criticized transformations for not having corresponding linguistic concepts, and Peters and Ritchie showed that formally, transformations are problematic in that generative strength cannot easily be restricted. However, it took empirical evidence to show that a dependency-based view on syntax does have merit, and it required further developments in formal frameworks to create stronger dependency grammars.

Empirical evidence came from the study of nonconfigurational languages, which started in the 1970s. These studies showed that relations rather than phrases are typologically significant, and that a relational view on structure is better capable to model varying degrees of word order freedom. This led to a reconsideration of asymmetric relations, giving rise in the early 1980s to new nontransformational grammar frameworks like relational grammar and lexical–functional grammar, which showed that a relational perspective can lead to better cross-linguistic generalizations.

Parallel lines of development in computer science, starting in the late 1970s and continuing through the 1980s, yielded new formal systems that went beyond CFGs. One line lead to systems that make more derivational power available in a restricted, or at least controlled, fashion. This dates back at least to the introduction of tree-adjoining grammar (TAG) in 1975. TAG presents a nontransformational formalization of Chomsky (1957) using mildly context-sensitive grammars. In the 1980s, combinatory categorial grammar introduced an algebraic system based on combinatory logic that is also mildly context sensitive, whereas linear logic provides the proof-theoretic basis for a family of categorial grammars that can increase to context sensitivity in a controlled fashion. Another line has led to the constraint-based or model-theoretic perspective on formal grammar. This finds its roots in feature logics, developed in the 1980s by Kasper, Rounds, Johnson, and Moshier, and in constraint programming. Feature logics were rapidly embraced in formal grammar (e.g., HPSG), whereas constraint programming provided a means to implement parsers for model-theoretic frameworks.

The importance of these developments for dependency grammar is twofold. First, many of the new (nontransformational) grammar formalisms include a dependency-based perspective, notably the inclusion of the head/dependent asymmetry in HPSG and several types of categorial grammar (Kruijff, 2001). Second, they have made it possible to present novel formalizations of dependency grammar and to renew the investigation into the complexity of dependency-based syntax (Neuhaus and Bröker).

TAG has provided the basis to model syntactic dependency (e.g., d-tree grammar) (Rambow *et al.*, 2001) and to give a formalization of MTT (Candito and Kahane, 1998). Similarly, Kruijff (2001) provides a nontransformational formalization of FGD based on categorial grammar, modeling dependency-based semantics using description logics in which also the interpretative import of dependency relations can be explicitly modeled.

Within the model-theoretic view on syntax, several novel formalizations of dependency grammar have been proposed. Dependency unification grammar (Hellwig, 2003) and Maxwell's (1995) unification dependency grammar are based on the idea of using unification to combine grammatical structures, as in HPSG. Duchier and Debusmann (2001) showed how powerful constraint programming techniques can be used to provide a dependency grammar formalism. They proposed a formalism in which several representations can co-constraint one another (e.g., immediate dominance next to linear precedence), whereby complex phenomena emerge from the interaction between these representations. To handle word order of any degree of freedom, they used topological fields; for a similar idea, see Gerdes and Kahane (2001) or Bröker (1997) (who uses modal logic). Debusmann *et al.* (2004) showed how any number of levels of representations can be included, for example, to model the syntax/semantics interface.

Examples of more processing-oriented approaches are Tapanainen and Järvinen's functional dependency grammar parser; the link grammar parser by Temperley, Sleator, and Lafferty; and various types of statistical (treebank-based) parsers by Collins, Giguet and Vergne, and Eisner.

See also: Categorial Grammars: Deductive Approaches; Combinatory Categorial Grammar; Computational Linguistics: History; Construction Grammar; Dependency Phonology; Functionalist Theories of Language; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Lexicase; Prague School; Valency Grammar.

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Dependency Phonology

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Historical Background and Relationships to Other Approaches

Dependency phonology (DP) is an approach to phonological representations. In the paradigmatic dimension of phonological representations ('segmental structure'), DP offers proposals for a set of ultimate primes or 'features' (i.e., the basic building blocks of phonological segments) and for their relationships within segments. In the syntagmatic dimension, DP proposes a set of structures ranging from the syllabic to the utterance level. As such, DP covers the full range of phonological structure, both at the segmental level and the suprasegmental (often called prosodic) level. DP originates from proposals developed in response to Chomsky and Halle (1968) and first published in Anderson and Jones (1974), the goal being to lay the foundations for a dependency-based approach to phonology, which would form a counterpart to Anderson's dependency-based work in syntax and morphology (*see* **Dependency Grammar**). As such, DP falls within the realm of dependency grammar, adding a novel perspective in that varieties and applications of this type of grammar are or have been mostly (perhaps almost exclusively) limited to morphosyntax (i.e., constructions with meaning). The idea that phonological and morphosyntactic structure should both be analyzed in terms of a particular construal of dependency relations reflects what Anderson (1985, 1992) has called the structural analogy hypothesis or assumption, viz., the idea that, all things being equal, both articulations of language make use of the same set of formal relations and principles.

The fullest statement of DP to date can be found in Anderson and Ewen (1987), a work that summarizes and elaborates more than a decade and a half of theoretical extensions and case studies of the original proposals. The corpus of work in DP both before 1987 and after is not large, the numbers of DP researchers being small compared to those in 'mainstream generative phonology,' to be characterized as work that has emerged from, or adopted by Morris Halle and his students and followers. DP work has failed to penetrate this mainstream and has thus been largely ignored. Ironically, many of the leading ideas that transformed linear generative phonology (as in Chomsky and Halle, 1968) into nonlinear generative phonology in the 1970s and 1980s were anticipated in the original DP conception. DP also bears a close resemblance to a model that emerged in the mid-1980s, viz., government phonology (*see* **Government Phonology**), which differs from DP in two ways. First, DP, in its explorations of alternative implementations of its basic ideas, has not put as much emphasis as government phonology has put on developing a narrowly defined, restrictive theory of primes and (segmental and suprasegmental) constellations; thus DP is more open ended, often considering alternatives. Second, in the treatment of phonological alternations, DP adopts the perspective of Chomsky and Halle's model in which language-specific (possibly extrinsically ordered) phonological rules map underlying representations into surface representations, whereas government phonology, rejecting language-specific, extrinsically ordered rules, attempts to derive alternations from the interplay between enriched underlying representations and universal principles and parameters.

Dependency and Constituency

A feature that is shared by all dependency graphs is that all terminals depend on some other terminal, except for one terminal, which does not depend on anything, i.e., it is the ultimate **head** of the structure. Although dependency grammar formalisms were originally construed as an alternative to constituency-based grammars, thus effectively lacking the notion of constituent and only representing adjunction relations between terminal elements (see Figure 1A), DP, by allowing a single terminal to be linked to more than one head (given that these heads dominate each other in terms of subjunction), has effectively reintroduced a close equivalent to constituency (cf. Figure 1B). The segment /ɪ/ is the head of /m/ and of /l/ in both representations in Figure 1, but only in Figure 1B is there a clear equivalent to the constituent rhyme. Formally, the main difference is that the sequence /blɪ/ is not directly headed by /ɪ/ in Figure 1B, whereas it is in Figure 1A. Thus a difference is created between the relationship between the vowel and prevocalic as opposed to

Figure 1 Dependency graphs.

postvocalic material. Most phonologists would agree that such a difference is real and is reflected in the absence versus presence of phonotactic constraints in these two relationships. Thus, DP adopts a marriage of constituency and dependency-based formalisms that is also characteristic of X-bar phrase structure grammar (*see* **X-Bar Theory**) or head-based approaches (*see* **Head Feature Principle and Feature Distribution Constraints**) in syntax. Though adjunction allows several elements to depend on one head, DP tends to favor structures in which each head can have only one dependent (thus, only allowing 'binary branching structures').

Unlike traditional constituent structures, dependency structures can also permit one daughter to be dependent on two heads, which, at the syllabic level, creates a structure that expresses the notion of ambisyllabicity, i.e., the linking of one consonant to two syllable nodes (as in the word 'city'; see Figure 2). However, it would be possible to restrict dependency relations such that each dependent can have only one head, again bringing the dependency structures one step closer to constituent structures that are augmented with head-dependent labels. Anderson and Ewen (1987) gave a detailed account of how dependency graphs can represent syllabic (including ambisyllabic and subsyllabic) structure and higher prosodic structure. Their work thus covered much the same ground as metrical phonology (*see* **Metrical Phonology**) and prosodic phonology (*see* **Prosodic Morphology**), fully compatible with, but being less explicit on, the cross-linguistic, parametric application to a wide variety of languages that we find in these mainstream approaches.

At the (intra)segmental level, DP also combines a dependency-based approach with constituency. Anderson and Jones (1974) and Lass (1976) put forward a number of specific arguments for the view that the matrix characterizing the phonological segment must be partitioned into at least two submatrices, called 'gestures' in DP. This subdivision reflects the fact that phonological processes can refer precisely to (e.g., can delete or spread) specific gestures, leaving other gestures unaffected (cf. the so-called stability effects of autosegmental phonology (*see* **Autosegmental Phonology**). Lass (1976) discussed cases of reductions of full consonants to the glottal consonant [h] and glottal stop [ʔ], as occurring, for instance, in many varieties of Scots; such cases show the independence of the laryngeal features *vis-à-vis* the oral (or supralaryngeal) features, a proposal also made in Thráinsson (1978) on the basis of Icelandic preaspiration data and subsequently in various versions of feature geometry (*see* **Feature Organization**). The DP arguments for subsegmental grouping of phonological primes are essentially analogous to the arguments that have been presented for feature classes in feature geometry.

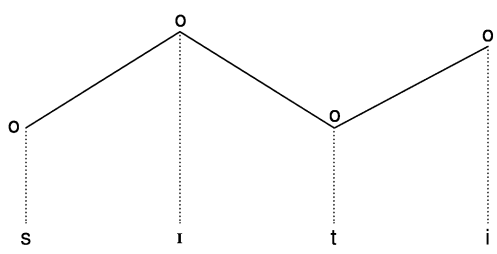

Figure 2 A dependency structure depicting ambisyllabicity for the word 'city.'

Subsegmental Structure in DP

Gestures and Subgestures

In early DP work, the bipartite division, referred to previously, into a laryngeal gesture (covering voice and glottal states) and a broad oral gesture (covering major class, manner, and place primes) was replaced by a proposal for a tripartite gestural organization (Anderson and Ewen, 1980a,b; Ewen, 1980; Lass, 1984), by splitting the oral gesture into a categorial gesture (for major class and mannerlike distinctions) and an articulatory gesture (for place distinctions); the laryngeal distinctions were now incorporated into an initiatory gesture (which represented laryngeal and airstream distinctions; Figure 3). This three-way division is essentially parallel to the laryngeal, manner, and place division proposed in Clements's (1985) proposal for a feature geometry. Ewen (1986: 205) then proposed to elaborate this model as in Figure 4, a model that is also used in Anderson and Ewen (1987). The label 'categorial' is now used for two subgestures: the initiatory subgesture (for laryngeal and airstream distinctions) and the (somewhat confusingly labeled) phonatory subgesture (for major class and manner distinctions). Under the label articulatory gesture, an oronasal subgesture (for nasality distinctions) and a locational subgesture (for place distinctions) have been formed. Nasality was formerly (i.e., in the structure in Figure 3) only expressed in terms of the categorial gesture (as a particular combination of the components |C| and |V|; see later). In the new proposal, nasality finds expression both

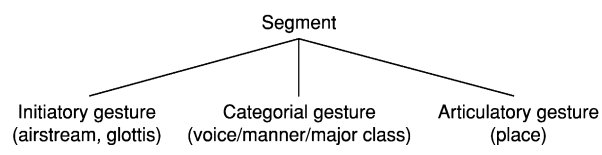

Figure 3 Tripartite gestural organization.

in the categorial–phonatory subgesture and as an independent component |n|. In addition, a tonological gesture is mentioned in the later DP works. In Figure 4, the symbols between upright straight lines represent some of the primes that DP has proposed. The proposals for the tonological gesture are sketchy at best (save for one tantalizing idea; see later).

The phonological primes (discussed later in more detail) occur with variable dependency relations when combined within a subgesture. 'Variable' means that the relationship between some element A and some element B can be either A-headed or B-headed, with both options representing different phonological (thus potentially contrastive) expressions. DP also explores the possibility of allowing the subgestures to enter into variable dependency relations. For example, to express a distinction between (egressive) glottalized and (ingressive) implosive consonants, it is suggested that the former display an initiatory component |G| 'glottalicness' governing a phonatory component |C| 'consonantality,' whereas the latter displays a reversed dependency. However, similar combinations for |K| 'velar suction' or |O| 'glottal opening' are not exploited. Anderson and Ewen (1987: 251) also exploited the possibility of allowing variable dependency between the two subgestures of the articulatory gesture to represent two distinctive degrees of nasalization. No variable dependency relationships between the two 'main' categorial and the articulatory gestures have been suggested. From a formal point of view, it is not obvious what distinguishes the variable dependencies that appear (or are claimed) to be contrastive and those that do not find such use. Thus, it might be said that the DP model suffers from overgeneration, or a lack of restrictiveness. In an attempt to restrict the DP model, Davenport and Staun (1986) proposed to dispense with intersubgesture dependency. van der Hulst (2004), who developed a somewhat different gestural organization, proposed to limit the relations between gestures to fixed (rather than variable) dependency relations.

The Phonological Primes

In motivating its primes and their combinations, DP's primary point of departure is the need to express a certain set of phonological contrasts. Thus, there is an implicit focus on phoneme inventories. The approach is not, however, exclusively focused on contrastivity and thus also includes the desire to admit representational differences that allow the expression of phonetic (noncontrastive crosslinguistic or crossdialectal) differences. Third, arguments for the adoption of primes are based on phonological processes.

The primes that DP adopts are not distinctive (binary-valued) features. Rather, DP adopts the view that the primes of segmental structure are (in an Aristotelian sense) 'substances' in themselves rather than 'properties of substances.' Whereas mainstream binary features are arguably properties of segments, DP primes are segments, an idea that is attributed to Foley (1977). Indeed, such primes can occur independently as fully pronounceable phonological segments (a view also found in government phonology). The requirement of independent occurrence is not obviously met in all cases, however. DP refers to the primes as components (or sometimes elements). In many ways, components function as the so-called unary features that were later proposed in various versions of mainstream generative phonology.

Major Class and Manner Distinctions The phonatory subgesture contains two components, |V| and |C|, which Anderson and Ewen (1987: 151) defined as follows: "|V|, a component which can be defined as 'relatively periodic,' and |C|, a component of 'periodic energy reduction.'" From the start, DP has adopted the view that the primary interpretation of components is acoustic, a position that is found in government phonology as well. These two components are, formally, unary building blocks that can be present or absent in a segmental structure. Furthermore, although seemingly antagonistic, |C| and |V| can be combined into a single segment, characterizing a

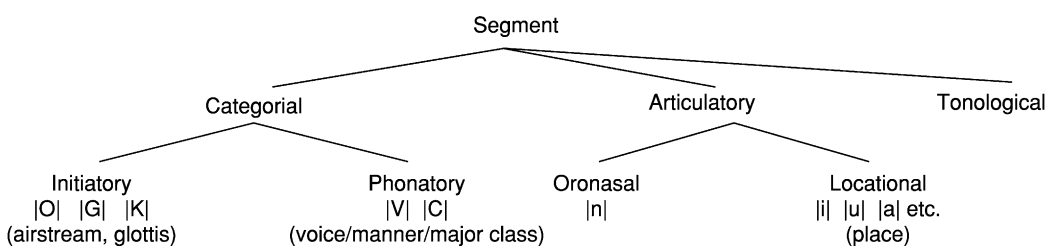

Figure 4 An elaboration of the tripartite model, producing subgestures: |O| 'glottal opening,' |G| 'glottalicness,' |K| 'velaric suction,' |C| 'consonantality,' |V| 'sonorant or vowel.'

segmental type with major class/manner characteristics that lie somewhere between segments that have only |C| or only |V|. (The formal option of a segment having neither has not been systematically explored in DP works.) Anderson and Ewen continued (1987: 151), "|V| and |C| differ from the [Jakobsonian] vocalic and consonantal distinctive features in that the presence of, say, |V| in a segment does not necessarily imply that the segment is in a simple binary opposition to an otherwise identical segment not containing |V|. Rather . . . the more prominent a particular . . . component . . . the greater the preponderance of the property characterized by that component." The key term here is 'prominence,' which is expressed in terms of a head-dependent relation. If a component is prominent, it can be present in a subgesture as a head (either by itself, or governing another component), the dependent role marking the relative absence of prominence.

Thus, in DP, components can be joined not only by simple, symmetrical combination, but they can also enter into a relationship in which either component is more important, the other component being dependent on it. In addition, two components can even entertain a relation in which neither is dominant, a relationship that DP calls 'mutual/bilateral dependency.' Thus, we arrive at the set of dependency relationships shown in Examples (1a)–(1c), which use two different notations to express the head-dependency relation:

(1a) {|X; Y|} or {|X → Y|} – Y is dependent on X.
(1b) {|Y; X|} or {|Y → X|} – X is dependent on Y.
(1c) {|X: Y|} or {|X ↔ Y|} – X and Y are mutually dependent.

These dependency relations hand DP the tools to express a number of major and manner segment classes in terms of combinations of |V| and |C|, as shown in Figure 5. The terms beneath the actual representations indicate which classes of segments they represent. Anderson and Ewen argued that the representations appropriately reflect a sonority ranking in which the classes of voiceless (vcl) fricatives (fric) and voiced (voi) stops are claimed to have equal sonority. The primary motivation for including voicing in the phonatory gesture is the participation of this property in lenition and fortition processes alongside more obviously mannerlike properties, such as continuancy.

There are five advantages of the DP proposals that remain valid, even if the details of the structures or their interpretations are modified:

1. By invoking dependency relations, DP can strike a balance between systems of phonological primes that allow (in principle, unrestricted) use of multivalued features and 'Jakobsonian' systems that allow only binary oppositions. The relations in Examples (1a)–(1c) allow a relative (yet restricted) expression of the prominence of any given component and thus the expression of scalar processes (such as lenition or fortition processes). In fact, DP allows formal expression of all three kinds of oppositions, as originally recognized by Trubetzkoy (1969). Privative oppositions involve the presence versus absence of a prime; equipollent oppositions involve the presence of a prime in one member of the opposition and the presence of another prime in the other member of the opposition, and gradual oppositions that can be expressed in terms of the way (head or dependent) in which a particular component enters in the composition of a class of segments.
2. By replacing binary features with constellations of unary components varying in complexity, representations adequately reflect the relative markedness of phonological major class and manner categories. In Figure 5, the categories vowel and voiceless stop are the least complex, which reflects their indisputable relative unmarked status. Fricatives are more complex than stops, and voiced obstruents are more complex than voiceless obstruents. This again reflects well-known and widely accepted claims regarding the relative markedness of these categories. Binary notations can capture such distinctions only by augmenting the basic apparatus with an *ad hoc* system of underspecification (*see* **Underspecification**).
3. If we assume (as most phonologists do) that phonological rules can reflect phonetic events only by manipulating phonological units, the structures in Figure 5 express that languages can 'spread voicing' (as an assimilatory process), but not the absence thereof. If this is empirically correct, representations as in Figure 5 are superior to binary feature systems in which [+ voice] and [− voice] have the same status and are both available for phonological manipulation. Independent of the correctness of this specific prediction, unary systems beat binary systems in terms of restrictivess (all other things being equal).
4. Given the addition of a head-dependency relation, an impressive reduction in the number of primes

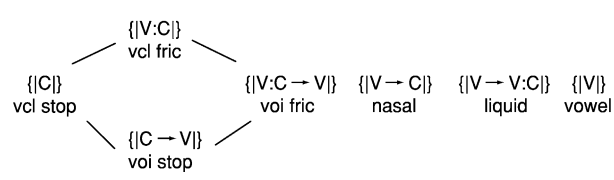

Figure 5 Classes of segments, showing voiceless (vcl) and voiced (voi) fricatives (fric) and stops.

can be achieved. In order to characterize major classes and manner distinctions in the feature system of Chomsky and Halle (1968) (or its feature geometric descendants), many features (such as [voice], [nasal], [lateral], [strident], [consonantal], [continuant], [sonorant], and so on) are needed, whereas DP uses just two single-valued primes, the components |C| and |V| and their interdependencies.

5. The CV constellations are constructed in such a way that often-observed affinities between the phonological categories that they represent are formally expressed. For example, in the structures in Figure 5, an ungoverned |V| can be glossed as [(+)sonorant], whereas a governed |V| forms the equivalent of [(+)voice]. This particular example reveals that DP manages to express distinct but clearly related phonological categories in terms of a single primitive appearing in different structural positions, whereas traditional feature systems must stipulate a relation in the form of *ad hoc* redundancy rules such as [+ sonorant] → [+ voice]. In DP, [+ sonorant] and [+ voice] are manifestations of one and the same component, viz., |V|. Thus, the relation between these two categories is 'built into' the basic vocabulary.

Anderson and Ewen allowed various additional structures composed of the components |C| and |V|, only some of which are used to deal with more specific manner types (such as lateralized obstruents, fricative trills, and the like), inviting the kind of criticism previously mentioned, viz., that the model seems to overgenerate. In an attempt to push back overgeneration, van der Hulst (1995, 2005) proposed to disallow mutual dependency, while accommodating the apparently necessary multiple occurrence of a single component, by assuming that the interpretation of a simple set of structures is dependent on the syllabic position in which the structure occurs.

Laryngeal and Airstream Distinctions We now turn to the second subgesture of the categorial gesture, viz., the initiatory subgesture. DP advocates the idea that the traditional concept of phonation (involving glottal states and vocal fold vibration) is relevant to two different gestures. Vocal fold vibration (voicing) is, as seen in Figure 5, expressed within the phonatory gesture. Glottal state distinctions are incorporated in the initiatory gesture. This subgesture contains the 'glottal opening' component |O| as well as two components used for the description of different types of airstream mechanisms, |G| (for glottalicness) and |K| (for velaric suction). Anderson and Ewen argued that the use of |O| is called for in three types of languages: languages that have a more than two-way distinction (e.g., Indonesian, which has voiceless, 'lax voice,' and 'tense voice'), languages that do not seem to use voice but rather aspiration (e.g., Icelandic), and languages that have an opposition between voiced and voiceless sonorants (e.g., Burmese, which has this for nasal and laterals). |G| is introduced not only to accommodate glottalized segments, but also in conjunction with the phonatory component |C| for implosive and ejective consonants (see earlier). |K|, finally, is an *ad hoc* component for clicks.

Place Distinctions Anderson and Ewen introduced the following DP place components: |i| 'palatality, acuteness/sharpness,' |u| 'roundness, gravity/flatness,' |a| 'lowness, sonority,' |ə| 'centrality,' |ɑ| 'advanced tongue root (ATR),' |l| 'linguality,' |t| 'apicality,' |d| 'dentality,' |r| 'retracted tongue root,' and |L| 'laterality.' Not all of these components play an equally important role in the theory. The heart of the set of place components is formed by the familiar 'iua' subset, which plays a key role in the representations of vowels and consonants. Two further components are added for vowels, |@| 'centrality' and |ɑ| 'ATR,' as well as a set of components that are mainly or exclusively used for consonants (the last five components).

Let us now have a closer look at DP's proposal for vowels. We note at the outset that the DP system differs from the SPE (sound pattern of English) system not only in the use of unary rather than binary primes, but also in choosing different parameters for characterizing the vowel space. Whereas the SPE system is bidirectional in that it uses only the high–low and the front–back dimensions in the description of vowels (lip rounding being 'superimposed' on these two dimensions), the feature systems of DP – and of other systems, such as government phonology, Schane's (1984) particle phonology, and the partly binary-valued theories of Goldsmith (1985) and Rennison (1987) – are tridirectional. From a phonetic point of view, the primes |i|, |u|, and |a|, which on their own represent the vowels /i/, /u/, and /a/, are clearly basic. They constitute the so-called quantal vowels (Stevens, 1972) – that is, they are the acoustically most stable vowels, in that their acoustic effect can be produced with a fairly wide range of articulatory configurations. In addition, these three vowels are maximally different, both from an acoustic and an articulatory point of view. Moreover, /i/, /u/, and /a/ are also basic as far as phonology is concerned. They constitute the canonical three-vowel system, and they are also the first vowels that children acquire. Hence, it turns out that the choice of |i|, |u|, and |a| as basic vocalic features is well motivated, both phonetically and phonologically. If we include the formal option of

mutual dependency, these three components can occur in three singleton representations, six doublet representations, and a rather large number of triplet combinations, of which Anderson and Ewen used only three (mostly by assuming that |i| and |u| act as a 'virtual unit' without contrastive dependency relations). The maximal number of combinations of |a|, |i|, and |u| is shown in Example (2):

(2)	{|i|}	/i/	{|u:i|}	/y/	–	/ɨ/	{|u|}	/u/
	{|i;a|}	/e/	{|ui;a|}	/ø/	–	/ə/	{|u;a|}	/o/
	{|a:i|}	/ɛ/	{|a:u:i|}	/œ/	–	/ɜ/	{|a:u|}	/ɔ/
	{|a;i|}	/æ/	{|a;u:i|}	/ɶ/	–	/ɐ/	{|a;u|}	/ɒ/
					{|a|}	/a/		

Lacking representations for central vowels, Anderson and Ewen introduced the component |ə|, which combines with the representation for the front rounded series to produce central vowels. This component can occur with any other representation to represent laxness (centralization) as well. Anderson and Ewen discussed at some length back unrounded vowels (such as /ɯ/) and concluded that their representation requires the components |i,u| in conjunction with |ə|. To represent the dimension of expanded/contracted pharynx (or advanced tongue root), Anderson and Ewen introduced two additional components, |r| 'retracted tongue root' (also used for pharyngeal consonants) and |α| 'advanced tongue root.' These two components are justified by arguing that languages may differ in terms of which pole in this dimension is dominant. Clearly, at this point, the number of possible representations 'explodes' into a set that goes well beyond what would be necessary to represent only phonological contrasts. Anderson and Ewen defended their approach by claiming that noncontrastive phonetic or dialectal differences must be expressible too. Finally, a placeless vowel (having just the phonatory component |V|) is reserved for a reduction, schwa-like vowel.

We will now briefly turn to consonantal representations. Anderson and Ewen adopted a component |l| 'lingual,' motivated by Lass (1976), to capture the natural class of high front vowels and tongue blade and tongue body consonants, which Lass claimed recur in 16 processes in the history of English. The |t| is meant to capture the contrast between apical and laminal coronals, and |d| distinguishes dentals from alveolars. The |r|, already mentioned, is introduced for pharyngeal consonants. The |L| is introduced to capture laterality, despite the fact that laterals are also captured in the phonatory gesture; this is similar to the dual treatment of nasality (see later). The |L| is needed for lateralized segments such as lateral fricatives. Example (3) shows some representative consonantal place representations:

(3)	{|u|}	{|l;t|}	{|t;l|}	{|l,i|}	{|l,u|}	{|l, u, q|}
	labials	laminal coronals	retroflex	palatals	velars	uvulars

Noteworthy is the use of the 'iua' set for consonantal places. The idea to use the same set of place primes for consonants and vowels can also be found in approaches within feature geometry and, of course, in earlier feature proposals by Roman Jakobson (*see* **Jakobson, Roman (1896–1982)**). As in the case of vowels, Anderson and Ewen were not concerned just with allowing a minimal set of potentially contrastive representations. This means that their calculus of primes overgenerates from a phonological point of view, which does not take away that the proposed representations capture most of the recurrent natural classes of phonological segments.

Nasality Then, finally, there is the oronasal subgesture, which contains precisely one component, |n|, for 'nasality.' Recall that there also is a phonatory characterization of nasals {|V → C|}. The question arises as to whether DP really needs a nasality component, or – if it turns out that such a component is necessary – whether this component should have a subgesture entirely for itself. With respect to the first question, Anderson and Ewen argued that nasal consonants not only form a natural class with other sonorant consonants by sharing certain characteristics in their categorial (particularly phonatory) representations, but that they also form a natural class with nasalized segments, which may have different specifications in the categorial gesture. In order for this latter natural class to be reflected by the DP representations of the segments in question, proponents of DP argue that we need a separate component, |n|. The question as to whether the nasality component should occupy a (sub)gesture of its own is rather more difficult to answer. In DP, phonetic considerations have always played a central role in the justification and motivation of its primitives and hierarchical organizations. Although Catford (1977) recognized only three functional aspects in the specification of speech (correlating with DP's phonatory, initiatory, and locational subgestures), Ladefoged (1971) distinguished four aspects required in speech specification: he added the oronasal aspect. On the basis of Ladefoged's subclassification into four aspects, Anderson and Ewen (1987: 148) concluded that "it seems possible, then, to account for the oronasal process as a distinct subgesture within the articulatory gesture," and that hence a subdivision into two subgestures, just as in the categorial gesture, "is perhaps not inappropriate for the articulatory gesture." Notice, though, that the motivation for a separate oronasal subgesture does not appear to be overwhelming.

Suprasegmental Structures

The idea to represent syllabic organization and stress in terms of dependency relations goes back to the earliest DP publications: "the syllable structure rules . . . and the stress rules are revealed as having . . . the common role of building successively more inclusive trees" (Anderson and Jones, 1977: 118). At the syllabic level, headedness was first claimed to correlate with sonority peaks (making sonorants heads of on sets and vowels heads of rhymes), but Anderson (1986) proposed to regard obstruents (sonority minima) as heads of onsets, an idea that is later found in government phonology as well. At the suprasyllabic level, Anderson and Ewen proposed structures that capture foot organization and prosodic organization at higher levels (see Figure 6). Noteworthy is their point that, given the notation that DP uses to express the head-dependent relation, trees embody the notion of grid structure (*see* **Word Stress**), a point that was later independently made in Hammond (1984) and Halle and Vergnaud (1987). Anderson and Ewen also proposed a distinction between word-level representations and utterance-level representations, remarking that "any sequence of word structures may be associated with several distinct utterance structures" (Anderson and Ewen, 1987: 122).

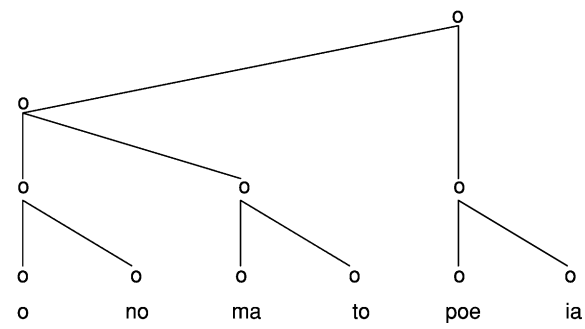

Figure 6 Suprasegmental structure.

Reductionism and Radical CV Phonology

In their excursus on representations for tonal distinctions, Anderson and Ewen (1987: 273) made the intriguing suggestion that the components |i| and |u| could be employed for high and low tone, respectively, as part of the tonological gesture. What is most noticeable in this proposal is the idea to use the same components, viz., |i| and |u|, in two different gestures. To emphasize that this strategy is present in the DP proposals, we can also refer to Anderson and Ewen's suggestion concerning the identity of |a| and |V| (1987: 215). In short, in two places, these authors suggest the strategy to employ the same components in different (sub)gestures, thus deriving similarities in phonetic interpretation, while attributing the differences to the fact that the (sub)gestural location of a component has a bearing on the phonetic interpretation. This shows that DP offers two possibilities for reducing the number of primes. First, fewer primes are needed due to the dependency relations. Two traditional features can be replaced by the dependent and head occurrence of a single prime, e.g., |V| for [voice] and [sonorant]. Second, given that we have grouping, fewer primes are needed: one particular component may occur in various groups, each time with a different phonetic interpretation, and thus replace two or more features (|V| for sonorant or vowel and for low, open place). These reduction possibilities are pushed to their extreme in the radical CV phonology (RCVP) developed in van der Hulst (1988a,b, 1995, 2005a,b). In these works, a variant of DP is developed that differs from standard DP, in aiming at allowing a precisely defined, restricted set of structures, needed for the expression of potential phonological contrast only. Restrictions are achieved by using just two components (more or less arbitrarily labeled |C| and |V|) in all subgestures for the expression of all phonological contrasts.

Conclusions

The preceding overview should have made it abundantly clear that DP never deserved the marginal position that it has occupied in the field of (generative) phonology. As it stands, DP does not prescribe a specific restricted theory, but this is typical of many other approaches in the field of linguistics. The approach can be criticized 'from the sidelines,' by saying that it needs more work (or worse: it can be ignored), or it can be studied carefully, leading to participation in its further development (or to teaching it, so that students can make up their own minds).

See also: Autosegmental Phonology; Dependency Grammar; Feature Organization; Government Phonology; Head Feature Principle and Feature Distribution Constraints; Head-Driven Phrase Structure Grammar; Jakobson, Roman (1896–1982); Metrical Phonology; Prague School; Prosodic Morphology; Underspecification; Word Stress; X-Bar Theory.

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Descartes, René (1596–1650)

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Descartes (Latinized: Cartesius) was born in La Haye (now La Haye-Descartes in the Touraine region of France) on March 31, 1596. He received his education at the Jesuit college of La Flèche (1606–1613/4) and at the university of Poitiers, where he studied law. In 1618 he went to Holland, putting himself at the service of Maurice of Nassau, and then went to Denmark and to Germany, where he enrolled in the Bavarian army. While spending the winter of 1619 in the garrison quarters of the Bavarian army in Ulm, he had time to reflect upon philosophical and mathematical problems; one winter night he had three visionary dreams, which he carefully wrote down in his notebooks. In 1620 he lived in Paris and worked on the principles for constructing a telescope. After travels to Italy (1623–1625) and another stay in Paris (1625–1627), he felt the need to construct a new system of philosophy. In 1628 he went to Holland, where he was to stay until 1649. He lived in various places (Franeker, Amsterdam, Utrecht, Leiden, Deventer, Santpoort) and established a network of relationships with prominent scholars (in various fields: medicine, philosophy, natural sciences, mathematics, theology), with inventors, and with experimenters.

In 1637 the *Discours de la méthode* was published in Leiden. This book, which contains the introductory methodical discourse to the treatises *La Dioptrique*, *Les Météores*, and *La Géométrie*, immediately aroused comments and criticisms. Descartes answered objections and engaged in oral and written discussions (sometimes leading to lawsuits forced upon him by his ideological opponents in Holland) about his philosophical and mathematical work. In 1641 the *Méditations métaphysiques* (dealing with knowledge, the existence of God, and the nature of the human mind) was published, which also contains objections (by Marin Mersenne, Thomas Hobbes, Antoine Arnauld, Pierre Gassendi, and a number of other scientists, theologians, and philosophers), and Descartes's replies. In 1642 Descartes moved to Egmond op den Hoef, where he prepared his *Principia philosophiae*, published in 1644, which contains chapters of his cosmological treatise 'On the World' (*Le Monde*), which he had started writing in the early 1630s (subsequent to Galilei's condemnation in 1633 Descartes had stopped working on the text).

Descartes extended his correspondence network and his relationships with scientists and philosophers (such as François Burman and Blaise Pascal), as well as with royalty: he wrote a *Traité des Passions*, published in 1649, for the German princess Elisabeth of the Palatine (a number of smaller works, also intended for her, were left unfinished). In the fall of 1649 Descartes left for Sweden to become the philosophical mentor of Queen Christina; shortly after his arrival he contracted pneumonia, and he died on February 11, 1650, leaving many of his writings unpublished.

Descartes was a scientist, a philosopher, and a society figure. Contrary to the impression of splendid isolation one may get from his *Discours de la méthode*, his work is rooted in the intellectual, scientific, and cultural climate of his time, which was to a significant extent shaped by Descartes's interaction with other scientists, philosophers, and politically influential persons, and by the diffusion of his ideas.

Descartes's importance for linguistics is twofold. On the one hand he exerted his influence, through his insistence on methodical, systematic, and analytically rigorous inquiry, on grammarians and philosophers of language, not only the Port-Royal authors, such as Antoine Arnauld and Claude Lancelot, but also on less known grammarians like Claude Irson and Denis Vairasse d'Allais. On the other hand, Descartes's philosophy of man (if one may use this term for that part of his philosophy that concerns human nature and the search for knowledge and truth) involved a sharp distinction between man and animal: both have a physicalist, material organization (insofar as they are *res extensa*, they can be described in mechanistic terms), but human nature is specific by virtue of having reason, which Descartes denies to animals. The faculty of reason accounts for the creative use of language, i.e., a system of expressive signs that can be used without being aroused by a particular stimulus and are not automatically bound to a given situation. Animals may be taught to produce sounds, but this is not language, not a system of meaningful signs, in Descartes's view: it is a purely organic, instinctive reproduction of input items, the meaning of which is not understood, and which are not creatively linked with a structural set of rules (nor can they be adapted by their reproductive users). Rejecting the hypothesis of a language automaton, Descartes claims that human language is creative, is not contextually determined, is meaningful, multifunctional, and conscious: in short, that it is the proper reflection of the human *res cogitans*.

Descartes's views on language are not exposed in a systematic way; the topic of language was not a central preoccupation of his. They are found in scattered

passages of his philosophical works, especially the *Discours*, the *Méditations*, and the replies to the objections, and in some of his letters exchanged with Arnauld, the Marquis of Newcastle, and Mersenne (with the latter he discussed the possibility of constructing a perfect language and the practical impossibility of imposing it worldwide). However, Chomsky has labelled as 'Cartesian linguistics' the scientific program in the Classical Age that put forward the basic theses of the creativity, innateness, context-independence, rule-based (rational) structure, and specificity of human language, thus foreshadowing the principles of the generative theory of language. Chomsky's claims have aroused much controversy concerning the term 'Cartesian linguistics' and the extension given to the concept, and also with regard to the general argumentation and to details of the historiographical analysis.

See also: Arnauld, Antoine (1612–1694); Chomsky, Noam (b. 1928); Lancelot, Claude (1615–1695); Port-Royal Tradition of Grammar.

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Description and Prescription

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In linguistics, a 'descriptive' approach involves, as far as possible, the objective and nonjudgmental description of language use. In contrast, a 'prescriptive' approach involves laying down, or prescribing, rules for correct use. The dichotomy between the two approaches most commonly surfaces in the area of grammar, though it is also relevant in other areas, such as vocabulary and phonology. The contrast between description and prescription can be illustrated in the following example: A descriptive linguist ('descriptivist') will study the use of *ain't* (as in, for instance, *I ain't ready yet*) in terms of regional and social variation, in terms of the distribution of the usage in formal and informal contexts, and will perhaps also study the history and development of the expression. A prescriptive linguist ('prescriptivist') will judge the expression as constituting either 'good' or 'bad' grammar, and will condemn its use if it is seen to fail to measure up to the norms of the standard language. In the broadest terms, then, the descriptivist aims to record language, while the prescriptivist aims to shape language. However, as will be shown, the two approaches are not quite as diametrically opposed as it may appear at first sight. The two approaches exist on the same spectrum.

For the vast majority of people, the prescriptive approach is by far the most familiar. Indeed, for most nonspecialists, the term 'grammar' is virtually synonymous with a set of prescriptive rules that distinguish between 'good grammar' and 'bad grammar', between the standard variety of a language and the nonstandard varieties, and between grammatical and ungrammatical expressions. In the study of the English language, prescription has had a long history, and one that continues to the present day. Indeed, almost all early grammars of English were

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largely prescriptive and have contributed an array of prescriptive rules with which most native speakers are very familiar. These include the following familiar axioms:

- Do not split an infinitive (e.g., *to boldly go*).
- Do not start a sentence with *and*.
- Do not end a sentence with a preposition.

Descriptivists would strongly disagree with these rules, since they have no basis in English grammar. These and other rules are the legacy of a long tradition of writing about English from a prescriptive or 'normative' point of view. As early as the Renaissance, many writers were concerned about foreign borrowings into English. Writing in 1561, Sir John Cheke was particularly forthright in his views: "I am of this opinion that our tung should be written cleane and pure, unmixt and unmangeled with borrowing of other tunges . . ." (quoted in Hughes, 2000: 155).

Underlying comments such as Cheke's is a notion of 'plain' or 'pure' English, which most Renaissance commentators associated with native, Anglo-Saxon vocabulary (Jones, 1953). This may be seen as the beginning of the prescriptive tradition in English, in which writers attempted to shape the language being used by identifying – however informally – a standard to which users should aspire. For Renaissance writers, this standard corresponded to 'purity' or 'propriety' of expression.

The prescriptive approach to English reached its height during the 18th century, to such an extent that the century became known in the history of English as the 'age of correctness' (Leonard, 1929). The approach is best exemplified in Jonathan Swift's *Proposal for correcting, improving, and ascertaining the English tongue* (1712). Swift proposed the establishment of an Academy for English, along the lines of the Académie Française, which would act as a final arbiter in linguistic matters. Together with many of his contemporaries, Swift felt that arbitration was needed, especially in matters of grammar and vocabulary:

> Besides the Grammar-part, wherein we are allowed to be very defective, they will observe many gross improprieties, which however authorised by Practice, and grown familiar, ought to be discarded. They will find many words that deserve to be utterly thrown out of our Language, many more to be corrected, and perhaps not a few, long since antiquated, which ought to be restored. [Jonathan Swift, *Proposal for correcting, improving, and ascertaining the English tongue* (1712)]

As Swift put it, his proposal was designed to find a way of "ascertaining and fixing our Language for ever", an aspiration that in varying degrees remains central to the prescriptive approach. For a variety of reasons – mostly political – Swift's proposal was never acted on, and English has never had a central regulating body like the Académie Française. Instead, it has had, and continues to have, a series of more or less self-appointed authorities on the language. In the 18th century, Robert Lowth became a highly influential authority on English grammar, following the publication in 1762 of his *A short introduction to English grammar*. In the preface to his grammar, Lowth set out his prescriptive approach unambiguously:

> The principal design of a Grammar of any Language is to teach us to express ourselves with propriety in that Language; and to enable us to judge of every phrase and form of construction, whether it be right or not. The plain way of doing this is to lay down rules, and to illustrate them by examples. [Lowth, 1762: x]

This is probably the clearest and most emphatic statement of the prescriptivist approach, at least insofar as it pertains to grammar. Prescriptivism is primarily didactic and regulatory. Lowth's work is replete with examples of 'false' grammar, taken from literature, which he then corrects in the most unambiguous terms. Thus, for example, he takes Locke to task for his 'improper' use of *who*: "'We are still much at a loss, *who* civil power belongs *to*'. Locke. It ought to be *whom*" (Lowth, 1762: 127). Lowth's work did, in fact, contain a great deal of grammatical description, based on a model of Latin grammar, but it is his prescriptivism – his emphasis on identifying and expunging errors – that is his lasting legacy. His work became a standard and highly respected authority on English grammar for many decades.

In vocabulary and word meanings, the same function was performed by Samuel Johnson's *A dictionary of the English language* (1755). In Johnson's work, however, we see the tension between prescriptivism and descriptivism being played out in a highly perceptive way. Johnson began his work in 1747, when he published his *Plan of a dictionary*. In that work, he set out his aims and objectives, and comes across as following firmly in the prescriptive tradition. To a large extent, he saw his role as a 'defender' or 'gatekeeper' of the language, regulating the vocabulary of English in the same way that Lowth sought to regulate its grammar. Of "barbarous or impure" words, he wrote, these "may be branded with some note of infamy, as they are to be carefully eradicated wherever they are found" (Lynch, 2002: 577). Johnson used an extensive range of usage labels, including 'bad', 'barbarous', 'low', 'ludicrous', and 'rustick'. His prescriptivism can be seen clearly throughout his dictionary, including in the following entries:

> *To bamboozle* v.a. A cant word not used in pure or grave writings.

> *To dumbfound* v.a. A low phrase.
> *Shabby* adj. A word that has crept into conversation and low writing; but ought not to be admitted into the language.

For modern readers, there is a curious tension between Johnson's recording the use of certain words, only to prescribe that they should not be used. In these examples, and in many others, his perception of the lexicographer's role as gatekeeper is quite clear. While on the one hand his role is to record the language, he also sees it as his duty to regulate the language, and to provide instruction to his readers. He may, in fact, have been aware of this tension himself, since in the *Plan* he alludes to his dual role: "[I]n lexicography, as in other arts, naked science is too delicate for the purposes of life. The value of a work must be estimated by its use: it is not enough that a dictionary delights the critic, unless at the same time it instructs the learner" (Lynch, 2002: 566).

Striking the balance between 'naked science' and didacticism remains a central problem in linguistics. In Johnson's case, and certainly in his *Plan*, the balance is strongly in favor of the didactic, prescriptive end of the spectrum. His stated objective was to produce "a dictionary in which the pronunciation of our language may be fixed, and its attainment facilitated; by which its purity may be preserved, its use ascertained, and its duration lengthened". His description of the lexicographer's work in terms of military invasion and conquest constitutes one of the strongest statements of the prescriptivist position:

> When I survey the Plan which I have laid before you, I cannot . . . but confess, that I am frighted at its extent, and, like the soldiers of Caesar, look on Britain as a new world, which it is almost madness to invade. But I hope, that though I should not complete the conquest, I shall at least discover the coast, civilize part of the inhabitants, and make it easy for some other adventurer to proceed further, to reduce them wholly to subjection, and settle them under laws. [Lynch, 2002: 579]

In the process of compiling the *Dictionary*, however, Johnson's view shifted somewhat toward a more descriptive stance. A comparison between the *Plan* of 1747 and the *Preface* of 1755 is instructive in this regard, since it rehearses many of the issues that still obtain in the description/prescription debate. At one level, Johnson simply discovered the enormity of the task he had originally set himself, and realized that it was impossible to achieve. But at a deeper level, he came to recognize two important aspects of language. The first of these is the inevitability of change:

> Total and sudden transformations of a language seldom happen; conquests and migrations are now very rare: but there are other causes of change, which, though slow in their operation, and invisible in their progress, are perhaps as much superiour to human resistance, as the revolutions of the sky, or intumescence of the tide. [Lynch, 2002: 41]

From this starting point, Johnson developed the idea of the inevitability of change in language, and specifically the notion of necessary innovation:

> The language most likely to continue without alteration, would be that of a nation raised a little, and but a little, above barbarity, secluded from strangers, and totally employed in procuring the conveniencies of life . . . . But no such constancy can be expected in a people polished by arts . . . . When the mind is unchained from necessity, it will range after convenience; when it is at large in the fields of speculation, it will shift opinions; as any custom is disused, the words that expressed it must perish with it; as any opinion grows popular, it will innovate speech in the same proportion as it alters practice. [Lynch, 2002: 41]

Johnson also came to recognize the importance of 'general agreement' among users of a language, as he put it, as an arbiter in linguistic matters. This led to his questioning the whole notion of authority in language, as it had been perceived by Swift and others. On a practical level, he observed that the academies of the kind Swift had proposed had been largely ineffective. They had been set up "to guard the avenues of their languages, to retain fugitives, and repulse intruders; but their vigilance and activity have hitherto been in vain; sounds are too volatile and subtile for legal restraints; to enchain syllables, and to lash the wind, are equally the undertakings of pride" (Lynch, 2002: 7).

As Johnson came to perceive it, the ultimate authority in language is invested in those who use it, or in 'general agreement' among the speech community. Thus he answered Swift's concerns about obsolete words in the following way:

> Swift, in his petty treatise on the English language, allows that new words must sometimes be introduced, but proposes that none should be suffered to become obsolete. But what makes a word obsolete, more than general agreement to forbear it? [Lynch, 2002: 42]

Though this was highly perceptive for its time, we should not equate Johnson's 'general agreement' with any modern concept of usage. For the most part, he invested authority in language in those literary writers that he himself considered to be the best – namely, English authors, from Philip Sidney to the Restoration, "whose works I regard as *the wells of English undefiled*" (Lynch, 2002: 36). Just as it was in the Renaissance, the notion of 'purity' as a linguistic ideal was still strong in Johnson's thinking about language. Perhaps the most modern expression of the authority of usage, in Johnson's own time, was made by Joseph Priestley, in *The rudiments of English grammar* (1761):

> We need make no doubt but that the best forms of speech will, in time, establish themselves by their own superior excellence: and, in all controversies, it is better to wait the decisions of Time, which are slow and sure, than to those of Synods, which are often hasty and injudicious. [Priestley, 1761: vii]

Between Johnson's time and our own, fundamental changes have taken place in our perceptions of language, and especially in our understanding of language change. Today, the descriptive approach is predominant among professional linguists, many of whom often use the word 'prescriptive' pejoratively. However, it would be naïve to think that prescriptivism has been displaced in modern linguistics. On the contrary, it is alive and well, most notably in public perceptions of language. Indeed, the view of grammar and its didactic role that works such as Lowth's expounded is still widely held today. The reason for this is not difficult to discern: a great many people look to grammars to provide guidance, whether on general grammatical points, on writing 'good' English, or on matters of disputed usage. The enduring popularity of usage books is testimony to this. In the 20th century, H. W. Fowler's *Modern English usage* has remained in print, in various editions, since 1926. More recently, the phenomenal commercial success in the United Kingdom of Lynn Truss's *Eats, shoots and leaves: the zero-tolerance guide to punctuation* (2003) shows that the market for prescriptive guides is as strong as ever. In almost every case, these prescriptive guides are written by people who are nonlinguists, but who care deeply about linguistic standards. They frequently see their role as defending the language against unnecessary or unwanted change, and sometimes contrast their work with that of professional linguists. The British novelist Kingsley Amis was another in this long tradition of defenders of English, as he made clear in *The King's English: a guide to modern usage* (1997: xii): "I am sustained by reflecting that the defence of the language is too large a matter to be left to the properly qualified, and if I make mistakes, well, so do they…". Here, there is an implied criticism of professional linguists, who are perceived to have failed in some way in their responsibility to defend the language.

Most professional linguists today make a very clear distinction between prescriptive rules (which generally deal with matters of disputed usage) and descriptive rules (which generally describe matters of undisputed usage, such as subject–verb agreement). In placing the emphasis on description, they would claim that their role is to describe language in actual use, and not to prescribe how it should be used. In the field of grammar, for instance, the urge toward description has been greatly intensified in recent years through the development of corpus linguistics – that is, the use of a large, computerized database (corpus) of samples of language as the basis of study. For example, the *Longman grammar of spoken and written English* (Biber *et al*., 1999) is based on a corpus of 40 million words of contemporary English, taken from a wide range of spoken and written sources. The *Oxford English grammar* (Greenbaum, 1996) is likewise based on a corpus of 1 million words of contemporary British English, and includes many illustrative citations drawn from sources such as private conversations, telephone calls, lectures, and business letters. In theory, at least, corpus-based grammars such as these are more 'objective' than, say, Lowth's, since the information they contain is not based exclusively on the grammarian's own intuitions or personal preferences, and is not shaped by his/her own subjective judgments on grammaticality and acceptability. Corpus-based grammars also recognize variation within language to a much greater degree than hitherto. By examining both speech and writing, and both formal and informal usage, the corpus-based grammars offer a more representative account of contemporary language. So as well as describing a grammatical feature, they also discuss its distribution, whether in terms of register, geography, or other sociolinguistic variables. In contemporary, descriptive grammar, the ultimate objective is to describe 'common usage', in a largely nonjudgmental fashion.

For some members of the general public, however, the rise of descriptive grammars, whether corpus-based or not, is often seen as an unwelcome development. From a prescriptive point of view, simply describing how people use a language is not good enough. The nonjudgmental approach adopted by the descriptivists is seen by many people as leading to the view that, in matters of usage, 'whatever is, is right'. Parents and teachers, in particular, may view this kind of anything-goes approach as, at best, unhelpful, and, at worst, irresponsible. This is often because it appears to many people that grammarians who refuse to be judgmental are denying the existence of standards altogether, and are refusing to make the crucial distinction between 'good' uses of language and 'bad' uses of language. For the prescriptivists, the grammarian's role in particular should be to make this distinction clear, just as it was for Lowth, so that in learning grammar, their children will learn, specifically, *good* grammar, and thereby develop their literacy skills.

The descriptivists and the prescriptivists have been poles apart for much of the 20th century. The distance between the two approaches is well illustrated in a recent (prescriptive) publication about standards of English, entitled *Lost for words: the mangling and*

manipulation of the English language (2004), by the British Broadcasting Corporation journalist, John Humphrys. Among other recent developments in English, Humphrys condemns the loss of the apostrophe in the word *let's*, in cases in which it has singular reference only (as in, *Let's give you a hand)*. He takes the professional (descriptive) linguist Jean Aitchison to task for her comments about this, in her book *Language change: progress or decay?* Taking a long-term view of language change, Aitchison described the loss of the apostrophe in *let's* in terms of grammaticalization, and continued with "*Let's*, perhaps now better spelled *lets*, is used as a simple exhortation, and is no longer thought of as a verb plus a pronoun" (Aitchison, 2001: 113). Taking a strongly prescriptivist stance, Humphrys (2004: 35) comments: "Can this be true? A respected academic condoning such vandalism?" He goes on to consider whether a sentence such as *I could of danced all night* will also be dismissed in the same way, as something that can be explained in terms of grammaticalization, and is therefore 'condoned', on that basis, by the descriptivists. He concludes: "Far from liberating the young, this sort of nonsense is more likely to harm them" (Humphrys, 2004: 36).

Of course, both sides in this debate have legitimate points to make, in their own terms. However, these points seem to be irreconcilable, because the ultimate objectives of each side are quite distinct. The objectives of the prescriptivists are short-term, immediate, and practical. They aim to provide clear-cut guidance for the general user of language. Their approach is motivated by a well-intentioned desire to maintain standards of literacy and to teach young people, in particular, the differences between good uses of language and bad uses of language. Few if any people – whether descriptivists or prescriptivists – could argue with this objective. On the other hand, the approach followed by Aitchison and other descriptivists is also legitimate, in its own terms. The objective here is to explain grammatical change over time, and in the context of broader linguistic processes, but it stops short of evaluating that change in any way. The two approaches also address quite different audiences: the prescriptivists write for nonspecialists, whereas the descriptivists, in general, write for fellow linguists. As we saw, Johnson identified this dichotomy quite early on: it is the ever-present dichotomy in language studies between 'usefulness' and 'naked science'.

Can anything be done to bridge the gap between these two approaches? The first point to consider is that the descriptive approach is not, in reality, quite as objective or as 'scientific' as we might be led to believe. Even descriptive grammarians make implicit value judgments about their material, and they will be influenced by their own intuitions about the language. In selecting a particular sentence, for instance, to illustrate a grammatical point, the grammarian is implicitly labeling it as 'grammatical', in contrast with the infinite number of ungrammatical sentences. In generalizing from observed corpus data, native-speaker grammarians, in particular, will often rely on their own judgments of acceptability. In writing the descriptive *Comprehensive grammar of the English language* (Quirk *et al.*, 1985), the authors freely admitted that "in the absence of sufficient evidence our evaluations sometimes relied on our own experience and feelings" (Greenbaum, 1988: 34–35). Indeed, the authors of that grammar also took account of the prescriptive tradition, on the grounds that it has had an impact on the language that people use, especially in the most formal contexts. They recommend that grammarians "should take account of prescriptive grammar in their descriptive grammars, since prescriptive norms affect use . . ." (Greenbaum, 1988: 34). In descriptive, corpus-based grammars, the selection of samples to include in the corpus may also be influenced by subjective or evaluative judgments. In dictionaries, too, usage labels such as 'informal' or 'formal' are frequently applied to words. Although these are less evaluative than those used by Johnson, they do provide evidence of the lexicographer making judgments about words on the basis of a perceived standard. The supposed objectivity of the descriptive approach is also called into question when we consider that all description is influenced, to some degree, by language theory, of whatever persuasion. The notion of a 'theoretically neutral' description of a language is more an ideal than a reality. In whatever subfield the linguist works, an entirely objective description of a language is rarely if ever achieved.

The second, more crucial point is the charge, implicit or explicit, that in adopting a descriptive approach, linguists are in some way shirking their responsibility to 'defend' language, or to maintain standards. Although few if any linguists today would see their role in this light, this is an important issue because it determines public perceptions of linguistics. In *Good English and the grammarian*, Sidney Greenbaum considers this issue, and proposes that professional grammarians should become actively engaged in public discussions about usage, bringing their professional training to bear on points of disputed usage. Recognizing that the term 'prescriptivism' is often used pejoratively by linguists, he suggests that the term 'language planning' should be used instead: "Let us then say that grammarians have a responsibility to be language planners" (Greenbaum, 1988: 38). According to Greenbaum,

language planners have a crucial role to play, particularly in areas in which no national standard has yet been established, such as in the nonnative Englishes that are emerging in some postcolonial African and Asian countries. In general, Greenbaum does not see a radical dichotomy between descriptivists and prescriptivists. Although they may be very different in terms of their views of language, their objectives, and the audiences they address, the two can come together in that the results of academic linguistic research will eventually filter down to pedagogic grammars and textbooks: "Scholarly grammars have a limited readership, but they eventually influence lower-level grammars, textbooks, and other teaching material, for native students and (in particular) for foreign students" (Greenbaum, 1988: 36).

See also: Grammar; Language as an Object of Study; Language Planning and Policy: Models; Linguistics: Approaches; Linguistics as a Science; Society and Language: Overview.

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Relevant Website

http://www.ucl.ac.uk – University College London online; source for a free course on grammar (access through the site index, *English, the Internet grammar of*).

Descriptions, Definite and Indefinite: Philosophical Aspects

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Definite descriptions in English take one of two forms: as the definite article *the* concatenated with a nominal (e.g., *table, husband, game*) or as either a possessive adjective (*her*, *my*) or noun phrase (*everyone's*, *John's*) concatenated with a nominal. Thus, *the table*, *her husband*, *everyone's favorite game*, *my cat*, and *John's bicycle* are all definite descriptions. In contrast, indefinite descriptions take a single form: as the indefinite article *a* (or *an*) concatenated with a nominal. Examples of indefinite descriptions are *a table*, *an employee*, *a thing I haven't mentioned, a friend of Mary's*. Although this classification is not perfect – *the friend of an acquaintance*, although intuitively indefinite, comes out as definite – it conforms to usage standard among philosophers, logicians, and linguists.

According to Bertrand Russell, descriptions – both definite and indefinite – are devices of quantification. That is, both *the F is G* and *an F is G* can be interpreted as expressing a relation between the properties F and G. Since Russell's treatment is by far the most influential approach to descriptions in the philosophical literature, this entry will focus on his views. It begins by briefly reviewing the motivations behind Russell's mature view on descriptions, which stem in part from inadequacies of his earlier approach, and proceeds to a statement of Russell's mature view. Challenges to this view are then considered, as are alternative proposals.

language planners have a crucial role to play, particularly in areas in which no national standard has yet been established, such as in the nonnative Englishes that are emerging in some postcolonial African and Asian countries. In general, Greenbaum does not see a radical dichotomy between descriptivists and prescriptivists. Although they may be very different in terms of their views of language, their objectives, and the audiences they address, the two can come together in that the results of academic linguistic research will eventually filter down to pedagogic grammars and textbooks: "Scholarly grammars have a limited readership, but they eventually influence lower-level grammars, textbooks, and other teaching material, for native students and (in particular) for foreign students" (Greenbaum, 1988: 36).

See also: Grammar; Language as an Object of Study; Language Planning and Policy: Models; Linguistics: Approaches; Linguistics as a Science; Society and Language: Overview.

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According to Bertrand Russell, descriptions – both definite and indefinite – are devices of quantification. That is, both *the F is G* and *an F is G* can be interpreted as expressing a relation between the properties F and G. Since Russell's treatment is by far the most influential approach to descriptions in the philosophical literature, this entry will focus on his views. It begins by briefly reviewing the motivations behind Russell's mature view on descriptions, which stem in part from inadequacies of his earlier approach, and proceeds to a statement of Russell's mature view. Challenges to this view are then considered, as are alternative proposals.

Russell's Theories of Description

Russell's Early Theory of Denoting

Intuitively, an utterance of the singular sentence *I met Tony Blair* expresses a proposition that, among other things, is about Tony Blair. In virtue of what does this relation of 'aboutness' hold? For Russell, *circa The principles of mathematics* (1903), the proposition that I met Tony Blair is about Mr Blair by virtue of containing him as a constituent. This in turn suggests an answer to a related question, namely, What is the contribution of the expression 'Tony Blair' to the aforementioned proposition? Russell identifies the contribution 'Tony Blair' makes to this proposition with the constituent that enables it to be about Tony Blair – namely, the individual Tony Blair himself (*see* **Direct Reference**).

How are we to understand the parallel contribution the syntactically complex denoting phrase *a man* makes to the proposition *I met a man*? Russell's answer was that it contributes, not an individual, but a certain complex concept – what he called a 'denoting concept.' Russell conceived of a denoting concept by analogy with what he called a 'class concept' (roughly, a property or condition that determines a class of entities). Whereas the nominal *man* contributes a class concept to the proposition that I met a man, the complex phrase *a man* contributes a denoting concept. However, as Russell noticed, denoting concepts possess a puzzling combination of features. For one, the relation between the denoting concept and its denotation is, as he later put it, 'logical,' and "not merely linguistic through the phrase" (Russell, 1905: 41). That is to say, the denoting concept denotes what it does because of something intrinsic to the denoting concept itself, not because of any facts attaching to the denoting phrase that expresses it. Second, a denoting concept is an 'aboutness-shifter' (Makin, 2000: 18). Although the denoting concept associated with *a man* is a constituent of the proposition *that I met a man*, the denoting concept is not what this latter proposition is about.

Third, denoting concepts fail to conform to a principle of compositionality, according to which the meaning of a complex expression is a function of its structure and the meanings of its constituents (*see* **Compositionality: Philosophical Aspects**). Russell was keenly aware of this deficiency. He remarked that *all men* and *all numbers* seem to be analyzable into a concept associated with the determiner *all* and the respective class concepts *men* and *numbers*, continuing:

> But it is very difficult to isolate any further element of *all-ness* which both share, unless we take as this element the mere fact that both are concepts of classes. It would seem then, that "all *u*'s" is not validly analyzable into *all* and *u*, and that language, in this case as in some others, is a misleading guide. The same remark will apply to *every*, *any*, *some*, *a*, and *the*. (Russell, 1903: 72–73)

The inability of the theory of denoting concepts to reflect the compositional nature of denoting phrases is a serious defect of the approach. Not only does surface grammar overwhelmingly suggest that *all men* and *all numbers* possess a common semantic feature; in addition, speakers familiar with the nominal *curator* and with the determiner *all* will understand sentences containing *all curators* in subject position (assuming familiarity with the other expressions), even supposing they have never come across that particular combination. An acceptable theory of denoting phrases cannot leave this phenomenon unexplained.

Russell's Mature Theory

Russell (1905) developed an approach to denoting phrases that avoided each of the difficulties noted above. His revision makes use of the doctrine of contextual definition, or 'meaning in use,' dispensing with the idea that denoting phrases can be assigned meanings 'in isolation.' Rather, each of the aforementioned denoting phrases is defined within its sentential context. While the treatment of indefinite descriptions, if not wholly uncontroversial, is straightforward (*an F is G* is defined as *something is both F and G*), the treatment accorded definite descriptions is rather less intuitive: *the F is G* is defined as *something is both uniquely F and G*. This is equivalent to the conjunction of three claims: *something is F*; *at most one thing is F*; *every F is G*. It can be seen that, in this analysis, *the F is G* will be false if either nothing is F, more than one thing is F, or some F is not G.

Definite Descriptions in *Principia mathematica*

Russell's favored expression of the theory of descriptions is in the formal language of *Principia mathematica*, where the theory is rendered as follows:

(R1) $\mathrm{G}(\iota x)\mathrm{F}x =_{\mathrm{def}} \exists x(\forall y(\mathrm{F}y \equiv y = x)\ \&\ \mathrm{G}x)$

The definiens is the formal analogue of *the F is G*, with the *iota* phrase corresponding to the definite article; the definiendum is the formal analogue of the sentence *something is both uniquely F and G*. As the definition shows, the surface grammar of $\mathrm{G}(\iota x)\mathrm{F}x$ is misleading with respect to its logical form. While $(\iota x)\mathrm{F}x$ takes singular term position, its logical role is not that of a singular term (that is to say, unlike a singular term, it does not even purport to refer).

Indeed, given the logical law $\tau = \tau$, taking descriptions to be singular terms allows the derivation of $(\iota x)(Fx \ \& \ \neg Fx) = (\iota x)(Fx \ \& \ \neg Fx)$; this in turn allows the further derivation of the absurdity $\exists x \ x = (\iota x)(Fx \ \& \ \neg Fx)$. (Note that logical systems permitting empty singular terms do not license the second inference; see Lambert, 2003.)

Russell's theory, as encapsulated in R1, avoided the difficulties that plagued the doctrine of denoting concepts: their mysterious ability to determine their denotations logically; their disruption of the aboutness-as-constituency doctrine; and their failure to conform to a principle of compositionality. (It also enabled Russell to explain how a sentence containing a nondenoting description can nonetheless be meaningful.) Since the denoting phrase $(\iota x)Fx$ disappears under analysis, and since the analysans introduces no new denoting phrases, the first two difficulties no longer arise. In addition, R1 shows how every context in which $(\iota x)Fx$ occurs can be replaced with a context that is fully compositional (although the fact that R1 puts logical form at variance with surface grammar has led some to question its usefulness in a compositional semantics for English).

Descriptions and Scope

R1 shows how to eliminate sentences containing $(\iota x)Fx$ and replace them with sentences containing only the familiar logical vocabulary of variables, predicate constants, connectives, and quantifiers. But the definition fails to provide a unique replacement strategy for sentences such as $G(\iota x)Fx \supset p$. Both of the following are consistent with our definition:

(1a) $\exists x(\forall y(Fy \equiv y = x) \ \& \ (Gx \supset p))$

(2a) $\exists x(\forall y(Fy \equiv y = x) \ \& \ Gx) \supset p$

The former corresponds to the reading in which the scope of $(\iota x)Fx$ is $G(\iota x)Fx \supset p$, and the latter corresponds to the reading in which the scope of $(\iota x)Fx$ is $G(\iota x)Fx$ (*see* **Scope and Binding: Semantic Aspects**). Russell's contextual definition of $(\iota x)\Phi x$ in *Principia mathematica* employs an awkward but effective device to eliminate such structural ambiguities:

(R2) $[(\iota x)\Phi x]\ \Psi(\iota x)\Phi x =_{\mathrm{df}} \exists x(\forall y(\Phi y \equiv y = x) \ \& \ \Psi x)$

The scope of $(\iota x)\Phi x$ is determined by the placement of $[(\iota x)\Phi x]$. The general rule is that the scope of an occurrence of $(\iota x)\Phi x$ is the entire context to which the scope operator $[(\iota x)\Phi x]$ is prefixed. Using Russell's notation, the readings corresponding to (1a) and (2a) are represented as (1b) and (2b):

(1b) $[(\iota x)Fx]\ (G(\iota x)Fx \supset p)$

(2b) $[(\iota x)Fx]\ G(\iota x)Fx \supset p$

Recent developments in syntactic theory provide a more natural method of indicating scope (see May, 1985). What Russell referred to as 'denoting phrases' are, in fact, natural language quantifiers. Since such quantifiers are invariably restricted, the most natural way to represent them is not in first-order logic – the language of *Principia mathematica* – in which quantifiers are unrestricted, but rather in a language permitting restricted quantification. In such a language, a quantifier is the result of concatenating a determiner, subscripted with a variable, with a formula (for example, [some_x: x is human]). As with unrestricted quantification, the resulting expression can itself combine with a formula to create a sentence. This allows us to express *the F is G* as [the_x: Fx] (Gx). Instead of the serviceable but unwieldy (1b) and (2b), we get (1c) and (2c), which are far more natural renderings of the respective contexts:

(1c) $[\text{the}_x\text{: } Fx]\ (Gx \supset p)$

(2c) $[\text{the}_x\text{: } Fx]\ (Gx) \supset p$

Note that in this interpretation, descriptions, like quantified noun phrases generally, can be assigned meanings in isolation. Just as the quantifier *all kings* denotes the set of properties possessed by all kings [$\lambda P\ \forall x(King(x) \supset Px)$] and *some kings* denotes the set of properties possessed by some kings [$\lambda P\ \exists x\ (King(x) \ \& \ Px)$], the definite description *the king* denotes the set of properties possessed by something which is uniquely king [$\lambda P\ \exists x(\forall y(King(y) \equiv y = x) \ \& \ Px)$]. In this approach, *the king is bald* is true just in case being bald is among the properties the king possesses. (For details see Westertåhl, 1986.)

This machinery pays off handsomely, disambiguating contexts involving the interaction of descriptions with modal operators and with verbs of propositional attitude (*see* **Modal Logic; Propositional Attitude Ascription: Philosophical Aspects**). In addition, it clarifies the relation between surface grammar and logical form, something that R1 leaves obscure.

Responses to Russell's Theory of Definite Descriptions

Strawson's Critique of Russell

For almost half a century, Russell's theory maintained the status of orthodoxy. But in an article published in *Mind* in 1950, the Oxford philosopher P. F. Strawson launched an influential attack. The attack focused on Russell's alleged disregard for ordinary usage, a disregard manifested in Russell's assumption that for every well-formed sentence-*type S* there exists a unique proposition expressed by *S*. In fact, Strawson noted,

the same sentence can be used on one occasion to assert one proposition, on a different occasion to assert another proposition, and on a third to assert nothing at all. In order to maintain his view, Russell is forced to provide what amounts to a logical guarantee that in even the least propitious situation a sentence would, however implausibly, possess a definite truth-value. To ensure that *the F is G* expresses a proposition come what may, Russell interpreted it as a complex existential claim, rejecting the intuitive classification of *the F* as a singular term. Strawson claimed that this analysis is contradicted by common usage. If Russell were correct, then the proper response to *The present king of France bald. Is this true?* would be a firm *no*. In fact, the proper response would address the belief betrayed by the utterance, that is, that France is at present a monarchy.

Strawson claimed that to understand the linguistic meaning of an abstract sentence-*type S* requires mastery of the 'rules of use' associated with *S*. In the case of *the present King of France is wise*, the rules require that it be used only when France is a monarchy. To use this sentence seriously and literally is, among other things, to present oneself as believing that the relevant conditions are fulfilled. If, in fact, the belief is false, then the utterance fails to express a proposition – it is something about which 'the question of truth does not arise.'

Yet Strawson's own theory is open to the following challenges. (1) It is not at all clear that utterances containing vacuous descriptions are devoid of propositional content. A contemporary utterance of *yesterday Mick Jagger met the King of France* is, *contra* Strawson, intuitively false. (2) The proposal fails to apply in any obvious way to relational descriptions bound by a higher quantifier. The description *each girl's mother* in (3a) is properly unpacked as *the mother of x*, with the variable bound by the quantifier *each girl*. This is made explicit in (3b):

(3a) Each girl's mother attended.
(3b) $\forall x(\mathrm{G}x \supset \mathrm{A}(\iota y)\mathrm{M}yx)$

How such descriptions can be said to refer is a mystery. While there are formal responses to this worry, they are far from being intuitively satisfying (Evans, 1982: 51–57).

Finally, it should be noted that Strawson partly misrepresented Russell's actual view, or at least provided an unnecessarily inflexible interpretation of it. For example, Russell could happily incorporate the distinction between sentence and utterance that Strawson accused him of overlooking. Indeed, Russell himself provided the context-sensitive expression *my only son* as an example of a description, indicating an awareness that different tokens of the same sentence may express different propositions. This reveals something Strawson failed to recognize: that the distinction has no direct bearing on the question of the logical form of description sentences. Contemporary Russellians, such as Stephen Neale (1990), accept the distinction, seeing in it no fundamental challenge to Russell's theory.

The Ambiguity Thesis

Keith Donnellan (1966) described a phenomenon that neither Russell nor Strawson had considered: that *the F* can be used to refer to a nonF. Donnellan gave as an example an utterance of *Smith's murderer is insane*, made in court on observing the bizarre behavior of a man (call him Jones) accused of murdering Smith. Even if the description 'fits' someone else, Donnellan claims, the utterance clearly refers to Jones, and not the actual murderer, whoever that might be.

But as Saul Kripke (1977) observed, appeals to usage alone cannot contradict Russell's theory. One can use a sentence to communicate a proposition that departs from its literal meaning, so data about usage are in themselves insufficient to mount a successful challenge to Russell (*see* **Referential versus Attributive**). What is needed is a decisive intuition that, in the imagined utterance, the speaker literally states that Jones is insane. Such an intuition would strongly favor the thesis that definite descriptions are ambiguous between a nonRussellian, 'referential' use and a Russellian, 'attributive' use. Yet few theorists are ultimately willing to commit to the view that, in the imagined utterance, the speaker has literally stated that Jones is insane.

A related argument, due initially to Strawson, provides a much stronger challenge. Utterances of description sentences typically exhibit incompleteness. That is, while the nominal is true of a plurality of objects, the speaker intends nonetheless to speak truly. For example, a librarian issues a polite reminder to a patron by uttering *the book is overdue*. For Russell, this utterance is true just in case there is exactly one book, and any book is overdue. This seems to get things wrong, as the librarian is clearly not intending to say – and is not taken to be saying – something that is, as things are, blatantly false.

Though some have argued that, intuitions notwithstanding, the utterance is, strictly speaking, false, few have found this idea appealing (but see Bach, 1988). Russellians have responded by claiming that the context of utterance can be relied on in such cases to provide the missing completing material. Thus, what the librarian intends to convey is perhaps that *the book you borrowed last month is overdue* or that *the book you just mentioned is overdue*, and so on.

Of course, the suggestion leads immediately to a worry. Typically, when a speaker utters a sentence containing a contextually incomplete description, there will be a multiplicity of completing properties to choose from. The question, Which completion is the one that both the speaker intended to convey and the hearer took the speaker to have intended? can receive no definite answer. And yet, such utterances are not typically accompanied by any indeterminacy or uncertainty as to what was said.

Incomplete descriptions are used almost invariably to refer to a contextually definite object – in our example, to a particular book. In such cases, the speaker succeeds in communicating a proposition containing (or somehow about) the entity in question. Given that such sentences are typically used to communicate just such 'referential' propositions, Howard Wettstein (1981) has suggested that in such contexts, a speaker literally asserts the relevant referential proposition. This hypothesis is, after all, consistent with the fact that the librarian's utterance was perfectly determinate, whereas the Russellian hypothesis, sketched above, is not.

Of course, there remains the case of non-referentially-used incomplete descriptions: for example, *the murderer is insane*, uttered at the scene of a brutal murder and without knowledge of the murderer's identity. Wettstein's suggestion is useless here. After all, such uses cannot be supposed to express referential propositions, since there is no referent. But to suppose, with Wettstein, that context provides completing information in such cases is no more plausible here than in the referential case.

Responses to Russell's Theory of Indefinite Descriptions

Referential Uses of Indefinite Descriptions

As we have seen, Russell defines *an F is G* in terms of the existential quantification, *something is both F and G*. As with definite descriptions, indefinite descriptions are often used referentially. Moreover, the relevant data seem open to the same response – that facts about usage cannot, by themselves, allow one to draw conclusions about literal meaning. But, as in the previous cases, matters are not so simple. Consider (4):

(4) There's a man at the door. He's selling linguistics encyclopedias.

If Russell is correct, then the first sentence asserts that at least one man is at the door. But how then are we to understand the second sentence? After all, intuition suggests overwhelmingly that the pronoun refers to the individual introduced by the indefinite 'a man.' Doesn't this force us to conclude that the indefinite is likewise referential? Not necessarily: as Lewis (1979: 243) noted, "What I said was an existential quantification; hence, strictly speaking, it involves no reference to any particular man. Nevertheless it raises the salience of the man that made me say it." And this fact allows a subsequent pronoun to make literal reference to the man.

This seems to settle the question in favor of Russell. But an example due to Michael Devitt raises a further difficulty for his theory:

> Several of us see a strange man in a red baseball cap lurking about the philosophy office. Later we discover that the Encyclopedia is missing. We suspect that man of stealing it. I go home and report our suspicions to my wife: "A man in a red baseball cap stole the Encyclopedia." Suppose that our suspicions of the man we saw are wrong but, "by chance," another man in a red baseball hat, never spotted by any of us, stole the Encyclopedia. (Devitt, 2004: 286)

In Russell's theory, the utterance comes out as true; Devitt claims that it is false. But Devitt's intuition seems mistaken. If the speaker uses the quoted sentence referentially, then his utterance is successful only if his audience in some way grasps the referential proposition intended. In other words, if the utterance is referential, it cannot be understood unless the audience has cognitive contact of some sort with the referent. Yet it seems clear that the hearer can fully understand the utterance even without any such contact with the speaker's referent. So, it would seem, the case against Russell fails. (See further Ludlow and Neale, 1991.)

An Alternative Nonreferential Account

Recently, theorists have considered a third option: that indefinites lack "quantificational force of their own" (Chierchia, 1995: 11). In this view, an indefinite description is not a quantifier, nor is it a referring expression. Rather, it resembles a free variable in that it can be bound by a quantifier that c-commands it, with the significant difference that, when not c-commanded by a quantifier, it is interpreted as bound by an existential quantifier (on c-command, *see* **Scope and Binding: Semantic Aspects**). For example, consider (5a):

(5a) Whenever a man owns a donkey, he beats it.

Here, *whenever* has universal force, binding any free variables within its scope. This reading is captured in (5b):

(5b) $\forall x, y\ (\text{man}(x)\ \&\ \text{donkey}(y)\ \&\ \text{owns}(x, y) \supset \text{beats}(x, y))$

A variant of this example – *if a man owns a donkey, he beats it* – receives the same analysis since, in the view in question, when an *if* clause lacks an overt quantifier, an unrealized universal quantifier is assumed to be present.

As indicated, when an indefinite is not within the scope of a quantifier, it is interpreted as bound by an existential quantifier:

(6a) Whenever a man owns a donkey, he beats it with a stick.

(6b) $\forall x, y\ ((\text{man}(x)\ \&\ \text{donkey}(y)\ \&\ \text{owns}(x, y)) \supset \exists z\ (\text{stick}(z)\ \&\ \text{beat-with}(x, y, z)))$

The analysis yields some counterintuitive results, however. Consider:

(7a) If Mary finds a copy of *Middlemarch* at Bookworms, she'll buy it.

(7b) $\forall x\ ((\text{copy-of-}\textit{Middlemarch}(x)\ \&\ \text{finds-at}(\textit{Mary}, x, \text{Bookworms})) \supset \text{buys}(\textit{Mary}, x))$

In the suggested analysis, this sentence is true just in case Mary buys *every* copy of *Middlemarch* she finds at Bookworms. But, intuitively, it can be true if, finding several copies, Mary, sensibly, buys just one.

One recent response to this difficulty is to take indefinites as introducing a choice function – that is, a function from a predicate *P* to a specific member of *P*'s extension (see Reinhart, 1997). Informally, the choice-function analysis of the previous example is as follows: for some choice function *f*, Mary buys $f(\text{copy-of-}\textit{Middlemarch}(x)\ \&\ \text{finds-at}(\textit{Mary}, x, \text{Bookworms}))$. This captures the desired truth conditions, but it seems unintuitive as an account of the literal meaning of the relevant sentence. It might, for example, be objected that speakers assertively uttering (7a) do not take themselves to be referring to, or quantifying over, functions; but this is precisely what the analysis implies.

There is, it should be added, a competing Russellian account in the literature, according to which unbound anaphora are concealed definite descriptions. This view has the potential to provide a truth-conditionally-adequate approach to the data without the awkward commitments of the current approach. (See Neale, 1990: chapters 5 and 6; also *see* **Anaphora: Philosophical Aspects**.)

See also: Anaphora: Philosophical Aspects; Compositionality: Philosophical Aspects; Demonstratives; Direct Reference; Logical Form in Linguistics; Modal Logic; Pragmatic Determinants of What Is Said; Pragmatics and Semantics; Presupposition; Propositional Attitude Ascription: Philosophical Aspects; Quantifiers: Semantics; Reference: Philosophical Theories; Reference: Philosophical Theories; Referential versus Attributive; Russell, Bertrand (1872–1970); Scope and Binding: Semantic Aspects.

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Design Features of Language

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Hockett (1960) proposed a list of 13 design features, of which 10 are shared with other animals. The first 5 features in the list are common to the vocalizations of many species of land mammals:

1. Use of the vocal-auditory channel: Whereas bees and sticklebacks communicate using dancing movements, human language (according to Hockett) is fundamentally spoken and heard.

   The next four features are a consequence of the former (though they are also found in visual communication systems).
2. Broadcast transmission and directional reception: When a speaker speaks, the sound waves travel outwards in many directions, so that they are not necessarily private and could be perceived by others in the vicinity. Nevertheless, the perceiver hears the sound as coming from a specific direction. This feature means that communication may be effective even between animals that cannot see each other, which may convey evolutionary advantages. For example, animals may use vocal calls to attract prospective mates, even in environments where they cannot easily be seen. Primates or early hominids might depend on this feature when using calls to coordinate the behavior of a group, such as a hunting party.
3. Rapid fading (transitoriness): The signal does not persist in the environment once uttered. By the time an utterance is part-way through, its beginning is already in the past. In this respect, spoken language is unlike written language, and is also different from e.g., scents or feces deposited by some animals to mark territory boundaries. Rapid fading leads to the need for short-term memory in which the signal may be temporarily retained by the hearer, as a prerequisite for working out what the signal means.
4. Interchangeability: Individuals can be both senders and receivers. When sounds are used as mating calls, in contrast, it may be that only members of one sex issue calls. Interchangeability is one of the bases of the interactive, social aspect of language.
5. Total feedback: A sender can also receive the signals that they emit.

Hockett considered the next three features to originate in primate communication systems, though in fact, they are clearly properties of calls in many other mammals and birds. For example, the danger call of the blackbird *(Turdus merula)* is just as specialized, meaningful, and arbitrary as the danger call of the gibbon.

6. Specialization: The signals do not serve any additional physiological function. In contrast, when a dog pants, or when a person coughs (unintentionally), the sound is a side effect of a behavior that is not intended to be communicative.
7. Semanticity: The signal is meaningful. In Hockett's words, "there are relatively fixed associations between elements in messages (e.g., words) and recurrent features or situations of the world around us." Hockett recognizes the danger call of the gibbon as meaningful in this sense, too.
8. Arbitrariness: The signal does not resemble the thing that it denotes. The sound of the word 'table' does not resemble a table. As Hockett noted, 'whale' is a small word for a large object, whereas 'microorganism' is a relatively large word for a tiny object. The opposite of arbitrariness, iconicity, means that the signal does resemble the thing that it denotes. Most spoken languages have a small number of iconic, onomatopoetic words that imitate sounds, such as *chiffchaff* (the name of a bird, in imitation of its song), *hiccup*, *cheep*, *chirrup*, *bong*, *whoosh*, etc. Such words are a small part of the otherwise mostly arbitrary vocabulary.
9. Discreteness: The signal can be divided into smaller, meaningless parts, each of which may be used in other combinations to form other signals. For example, Hockett claims that "the English words

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9. Discreteness: The signal can be divided into smaller, meaningless parts, each of which may be used in other combinations to form other signals. For example, Hockett claims that "the English words

'pin' and 'bin' are different to the ear only at one point" (i.e., there are discrete units /p/ and /b/ at the beginning of these words. However, we know from research into digital storage of signals that this property is true of **all** kinds of signals: it is what makes digital recordings of any sound possible.

The remaining four features were seen by Hockett as being specific to early hominoids and modern humans:

10. Traditional transmission: Though the means of communication (e.g., the larynx, ears etc.) may be provided as a consequence of one's genes, the meaningful details of the communication system are not instinctive, but are learned from other members of the species. Thus, although the language faculty rests upon our genetic endowment, we learn the specific words and grammatical structures of the language community in which we are raised.
11. Displacement: The referent of the message may be removed in time or space. Whereas the warning calls of a Diana monkey (*Cercopithecus diana*) may refer to immediate threats, human language may be used to talk about past experiences, future plans, or events in far-off places.
12. Productivity: The communications may be novel messages that have not been uttered or heard before. The sender has the ability to compose new messages, not just reproduce a fixed repertoire of instinctive or previously memorized calls.
13. Duality of patterning: Languages have at least two levels of structure. First, minimal meaningless units (cf. feature 9, discreteness) are combined into larger, meaningful units. Specifically, meaningless sounds are combined into meaningful words. Second, these minimal meaningful units can be combined into longer, more complex expressions. Thus, words can be combined to form phrases and sentences. This higher level of organization is the essential basis for productivity: even if the range of words were limited to a small, fixed repertoire (e.g., the 850 words of C. K. Ogden's *Basic English*), an enormous number of sentences can be made.

To these 13 features, Hockett and Altmann (1968) add a further three:

14. Prevarication: Speakers can make utterances that they know to be false, with the intent of misleading.
15. Reflexiveness: Speakers can use a language to talk about language. This indicates an additional level of complexity in meaning, beyond the simple referential function of e.g., bee dances or alarm calls.
16. Learnability: A person can learn any of a wide variety of languages, and is not constrained by their genes to learn only the language(s) of their biological parents. This ability seems to be an inevitable corollary of feature 10, traditional transmission.

Although this list of features applies to human language and nonhuman communication systems, it is clear from its use that one of Hockett's goals is to demonstrate the special and unique properties of human language. Columns A to F of Table 1 shows how Hockett (1960) treats the first 13 features as a checklist against which only human language wins 'full marks.' The same motivation underlies two other properties that are often proposed (initially by Noam Chomsky) as the unique, special characteristics of human language: structure dependence and recursion.

'Structure dependence' means that linguistic rules are sensitive to the grammatical structure of sentences, rather than the linear position of words. For example, in English, the subject of a sentence agrees in person and number with the first verb, even if a large phrase (such a relative clause) intervenes between the subject and the verb, as in: *The people* $_{\text{3rd pers. sing.}}$ *[who called and wanted to rent your house when you go away next year] are* $_{\text{3rd pers. sing.}}$ *from California.* As far as we know, this characteristic is unique to human language. However, that may be a consequence of our almost complete ignorance about the grammar of the more complex animal communication systems, such as the vocalizations of songbirds, whales, and dolphins, or certain monkey species. Although such calls seem to have a moderately complex structure, we do not really know what the 'words' are, nor what they mean, so we cannot determine whether they are distributed or show variant forms in a way that is comparable to structure-dependent operations of human languages.

'Recursion' means that one phrase can be embedded inside another, without any principled limit, as in: *[the rat [the cat [the dog chased] killed] ate the malt].* If such recursive embedding could in principle be continued without limit, mathematical linguistics has demonstrated that the language must employ hierarchical phrase structures of a higher order of complexity than mere repeated sequences of words. (*see* **Constituent Structure**.) However, practical obstacles make it extremely difficult to test whether a person or an animal's communication system definitely possesses this property. Formally, there are three challenges. First, it is necessary to show that the extended forms really do involve the embedding of one phrase inside another. It is perfectly possible

Table 1 Hockett's 'design features' of language and other animal communication systems

Features[1]	*A* *Crickets*	*B* *Bee dancing*	*C* *Western meadowlark song*	*D* *Gibbon calls*	*E* *Paralinguistic phenomena*	*F* *Spoken language*	*G* *Human sign languages*	*H* *Signing apes*	*I* *Alex, a Grey parrot*
1. Vocal-auditory channel	Auditory, not vocal	No	**Yes**	**Yes**	**Yes**	**Yes**	No	No	**Yes**
2. Broadcast transmission and directional reception	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
3. Rapid fading (transitoriness)	**Yes,** repeated	?	**Yes**	**Yes,** repeated	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
4. Interchangeability	Limited	Limited	?	**Yes**	Largely **yes**	**Yes**	**Yes**	**Yes**	**Yes**
5. Total feedback	**Yes**	?	**Yes**	**Yes**	**Yes**	**Yes**	No	No	**Yes**
6. Specialization	**Yes?**	?	**Yes**	**Yes**	**Yes?**	**Yes**	**Yes**	**Yes**	**Yes**
7. Semanticity	No?	**Yes**	In part?	**Yes**	**Yes?**	**Yes**	**Yes**	**Yes**	**Yes**
8. Arbitrariness	?	No	If semantic, yes	**Yes**	In part	**Yes**	Largely **yes**	Largely **yes**	**Yes**
9. Discreteness	Yes?	No	?	**Yes**	Largely no	**Yes**	**Yes**	**Yes**	**Yes**
10. Displacement		**Yes,** always	?	No	In part	**Yes,** often	**Yes,** often	**Yes**	No
11. Productivity	No	**Yes**	?	No	**Yes**	**Yes**	**Yes**	Debatable	Limited
12. Traditional transmission	No?	Probably not	?	**?**	**Yes**	**Yes**	**Yes**	Limited	Limited
13. Duality of patterning	? (Trivial)	No	?	No [Cotton-top tamarin: **Yes**]	No	**Yes**	**Yes**	**Yes**	**Yes**
14. Prevarication						**Yes**	**Yes**	**Yes**	No?
15. Reflexiveness						**Yes**	**Yes**	No?	No
16. Learnability						**Yes**	**Yes**	**Yes**	**Yes**

[1]Hockett's original 13 (1960) plus Hockett and Altmann's additional 3 (1968).

for a language to have arbitrarily long chains of iterative **but not recursive** structures, such as *[the rat] [and the cat][and the dog] … etc. [squeaked][and purred][and barked]* … Second, a proof of recursion must show that there must be the same number of elements in the first part of the phrase as in the second part, and that this matching of the number of elements is determined by the **grammar**, and not by, say, counting. Third, it is also necessary to demonstrate that the recursion can be repeated indefinitely. Since memory limitations may interfere with any test of recursion, it is necessary to show that any differences between human and animal performance are not due to memory limitations.

Hauser *et al.* (2002) argued that recursion is the only core grammatical computation that is central to human language, but the paucity of firm evidence for recursion in human languages makes this claim somewhat problematic. If recursion cannot be demonstrated in human languages, or if a nonhuman animal were found to be able to learn a recursive grammar, there would be no remaining qualitative difference between human and nonhuman communication systems. In an attempt to address this question, Fitch and Hauser (2004) showed that undergraduate students could learn patterns of syllable sequences of the form AB, or AABB, or AAABBB, whereas tamarin monkeys could not. Fitch and Hauser inferred from this disparity that humans, but not tamarins, can learn recursive grammatical structures. The inference is not valid, however, because the patterns they used did not force an interpretation in which the first A is matched by the last B, and so on, and the recursion was limited to a quite shallow depth of two embeddings. Such a language does not require a recursive grammar. Their experiment did not adequately satisfy all three of the necessary requirements listed above.

Since Hockett's pioneering work in the 1960s, research into human sign languages and attempts to teach human languages to other animals have added greatly to our understanding of the nature of human language. In some cases, it is apparent that revisions to the checklist are needed.

Sign languages (see Table 1, column G) employ the visual-gestural channel of transmission, rather than the vocal-auditory channel, and yet it has been conclusively demonstrated that sign languages of the deaf are fully-fledged natural languages, in no sense impoverished, deficient, or ungrammatical. Sign languages have all but one of the other features of language (i.e., rows 2–16), as well as all of the characteristic complexity of language, in phonology, grammar (including structure dependence), discourse, poetry etc. Children of two deaf parents who communicate using sign language acquire and use sign language according to the usual developmental sequence, and sign language has been found to use the same brain regions as spoken language. The one exceptional feature is 5, total feedback: when you are producing a sign, you do not see it from the same perspective as the observer. But the same is true of spoken language: the hearer's percept of your speech is not exactly the same as yours. Therefore, perhaps feature 5 should be changed to something like 'immediate feedback,' and feature 1 should not be regarded as an **essential** feature of human language. Although sign languages have a somewhat higher proportion of iconic words than spoken languages, most signs are arbitrary, and differ in quite unpredictable ways from one sign language to another.

Language in Humans and Other Animals

From the late 1960s onwards, a number of researchers achieved surprising levels of success in teaching modified and simplified forms of American Sign Language to chimpanzees and gorillas. In related research, A. J. Premack and D. Premack taught a chimpanzee to read and write using variously shaped and colored pieces of plastic, each representing a word. Comparison of columns G and H in Table 1 shows that the level of language competence attained by the apes in these studies falls short of that of humans in a number of respects. The productivity of ape language use is debatable, though many examples of spontaneously produced, novel utterances have been given in the literature. Traditional transmission is limited: the apes have learned from their human teachers, but it is not usually passed on by them to other apes (though there are occasional reports of this). Reflexiveness is unlikely: the apes' conversations are generally about fairly down-to-earth matters. Nevertheless, it is notable that apes' usage can exhibit displacement: for example, Premack and Premack's 'Sarah' learned to use symbols to ask for her desired fruit when it was not present. However, displacement is clearly not unique to human language: the bee dance, for example, indicates the direction and distance of food sources or new hive location (displacement in space) for other bees to use in their future behavior (displacement in time).

Prevarication is not unique to human language. Many animals use behavior explicitly designed to deceive or mislead, and signing apes have been reported as using their sign language to send food-competitors away by lying.

Ape sign language also exhibits 'duality of patterning': (1) each sign arranges a number of minimal meaningless components – hand shape, orientation,

movement, place of articulation – into a meaningful sign; (2) the signs are put together into more complex utterances (e.g., Premack and Premack's 'Sarah insert apple pail banana dish'). Two levels of structure can also be observed in the calls of cotton-top tamarin (*Saguinus oedipus*). Some bird songs are structurally complex (Yu and Margoliash, 1996) and have at least two levels of constituent structure: notes vs. phrases. However, the meanings of the various parts of tamarin calls or bird songs is not known, so our assessment of their linguistic abilities is limited by our present ignorance. It is clear that some degree of hierarchical structure (up to three structural levels), exhibiting duality of patterning, is far from unique to human language.

One of the more successful experiments in teaching language to an animal is Irene Pepperberg's work with Alex, a Grey parrot (*Psittacus erithacus*). The ability of parrots to merely imitate vocal sounds is well-known, of course: Pepperberg's novel training methods have led Alex to acquire and appropriately use spoken words for 50 different objects and foods. Combined with adjectives for attributes for color, material, and shape, Alex can identify, request, and describe more than 100 different objects with about 80% accuracy and can correctly classify an object on different dimensions (by correctly responding to questions such as 'What color?' or 'What shape?').

To conclude, it now seems that some of the design features originally thought to be essential or unique to human language are not. For example, human sign languages do not use the vocal-auditory channel, and many animal communication systems – natural calls and systems acquired through human training – exhibit features that were previously thought unique to human language. The long-cherished idea that human language is qualitatively different from animal communication and marks us as special and superior to other species appears increasingly insecure.

See also: Animal Communication: Overview; Constituent Structure; Hockett, Charles Francis (1916–2000); Language: Mathematical Complexity; Sign Language: Overview.

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Desnickaja was a Russian philologist and linguist, as well as teacher, who made important contributions to the organization of research in linguistics in Russia. Her works cover a wide range of subjects, such as Germanic, Indo-European, Albanian and Balkan linguistics, history of linguistics, and sociolinguistics.

Born in the family of the well-known philologist and outstanding public figure Vassily A. Desnicky, she graduated from the Leningrad Pedagogical Hertzen Institute, where she was studying Germanic philology under Victor M. Zhirmunski (Schirmunski). All of her subsequent activities were closely related to the Institute of Language and Mind, which in 1950 was turned into the Leningrad Branch of the Institute of Linguistics (Academy of Sciences, USSR): from 1963 to 1976, she was the Director of this institution and from 1976 to 1988, she was a

movement, place of articulation – into a meaningful sign; (2) the signs are put together into more complex utterances (e.g., Premack and Premack's 'Sarah insert apple pail banana dish'). Two levels of structure can also be observed in the calls of cotton-top tamarin (*Saguinus oedipus*). Some bird songs are structurally complex (Yu and Margoliash, 1996) and have at least two levels of constituent structure: notes vs. phrases. However, the meanings of the various parts of tamarin calls or bird songs is not known, so our assessment of their linguistic abilities is limited by our present ignorance. It is clear that some degree of hierarchical structure (up to three structural levels), exhibiting duality of patterning, is far from unique to human language.

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department head there (since 1992 the institute has been called Institute for Linguistic Research). She initiated teaching of Albanian at the Leningrad State University: in 1957, a department of Albanian Language and Literature was launched, and Desnickaja delivered lectures on theoretical subjects and held seminars and language practice classes at this program. From 1964, she was a Corresponding Member of the Academy of Sciences (USSR).

Desnickaja began her research career as a Germanist, being guided for some time by N. Ja. Marr's views, but soon she switched to the domain of Indo-European studies. In her second thesis (parts of which were published in Desnickaja, 1984) *On the development of direct object category in Indo-European languages* (1946) she put forth an original conception of the development of subject-object relations at an archaic stage of Indo-European protolanguage. The type of syntactic structure, reconstructed by Desnickaja for the protolanguage, corresponded in its essential traits to what was later labeled as 'active structure' (Georgij A. Klimov). This topic, chosen by Desnickaja, was a reason for her interest in the research of Emile Benveniste, who later became her friend. Desnickaja's subsequent works in the area of Indo-European studies largely deal with issues of historical-comparative grammar of Albanian and the genetic/areal relations of this language to Germanic and Baltic languages.

Desnickaja laid the foundation of Albanian studies in Russia, which she had been cultivating as a kind of a complex discipline, including folklore and literature besides language. This line complied with the tradition of Russian philology (as seen in the works by Alexander N. Veselovskij, Ignatij Ju. Kratchkovskij, V. M. Zhirmunskij) and also accorded with her personal inclinations and attitudes. She wrote extensively on the history of Albanian language and dialectology, lexicon and morphology, and standard language and language of folklore. Desnickaja put forward an innovative theory of the origin of Albanian language reckoning in the specific character of the romanization of southern Illyria. She demonstrated how the dialect map of Albania had been shaped by a number of geographical and historical factors over a period of last centuries; proceeding from Albanian linguistic data, she worked out a model of development of a standard language based upon supradialectal koine of oral poetry and on local vernaculars. This model is of certain interest for general linguistics as well. Desnickaja witnessed living Albanian folklore (including epics) and had good command of this material, which gave her the impetus for bringing up and solving various issues in linguistics, literature, and anthropology. She devoted a special study to the language of epic songs of northern Albania and to the pivotal role epic koine had played in the history of Albanian nation.

Desnickaja contributed extensively to the history of linguistics. She is the author of a number of works on the history of comparative and Balkan linguistics, and she also shed light on several periods in the history of linguistics in former USSR. Together with Solomon D. Kacnelson she initiated a book series entitled *Historiography of linguistics* (in four volumes).

See also: Albanian; Balkans as a Linguistic Area; Benveniste, Emile (1902–1976); Historiography of Linguistics; History of Linguistics: Discipline of Linguistics; Indo–European Languages; Marr, Mikolai Jakovlevich (1864–1934).

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Detachment Constructions

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Definition

The original meaning of the word 'dislocation' relates to a pathological process by which a body part is put out of its joint, as in *a jaw dislocation*. In linguistics, this word applies to a syntactic constituent that occurs in a position that seems to be a noncanonical one and has a relationship with a pronoun in the core of the clause. Such is the case in the following examples for *the driver,* coreferent with *he* (Miller and Weinert, 1998); *la mia malinconia,* with *l'* (Bonvino, 2003); and *à mon cousin,*with *lui* (Blasco-Dulbecco, 1999):

(1) ***The driver he***'s really friendly

(2) Lui, **la mia malinconia**, non **l'**accettava
'he, **my melancholy**, (he) did not accept **it**'

(3) J'osais plus **lui** parler ni rien, **à mon cousin**
'I did not dare to speak **to him** or something, **to my cousin**'

Left dislocation applies to constituents placed before the verb phrase on its left, as in (1), and right dislocation to constituents placed after the verb phrase on its right, as in (2) and (3). The pathological origin of the label has had an effect on linguistic analysis. Being considered nonnormative, dislocations were banished for a long time from grammar books and handled only as rhetorical processes (anacoluthon). They are still considered "nonstandard" (Lambrecht, 1988), "loose and informal speech" (Quirk *et al.*, 1985: 1416), "almost exclusively conversational" (Biber *et al.,* 1999), "standard informal" (Barnes, 1985), and typical of "unmonitored speech" (Lambrecht, 2001: 486).

The label 'dislocation' is convenient within a transformational framework that considers the element as having been moved from its canonical place. But it proves rather awkward in other linguistic frameworks refusing transformational movement (Miller and Weinert, 1998: 238):

> Like a number of labels that were coined during the classic phase of transformational grammar, this one carries a dynamic meaning: the metaphor is of the noun phrase originating in the clause and being dislocated to the leftmost position.

Other labelings were tentatively proposed: "detachment," "binary constructions" (Deulofeu, 1977), "syntactic pleonasm" (Berrendonner, 1997), "noun-phrase clauses" (Miller and Weinert, 1998), "prefaces" and "Noun Phrases tags" (Biber *et al.,*1999: 956). None was really accepted. Their widespread acceptance is the reason why, in spite of terminological bias, 'dislocation' and 'dislocated element' are used here, even though no transformational device is retained.

Constructions akin to dislocations can be found in many languages: Romance, Germanic, Slavic and Balkanian, Finno–Ugric, and many African languages. French is said to be the most dislocating among the Romances languages. Basing on what they called 'popular French,' some linguists even predicted that French would soon reach a state of affairs in which subject dislocation would become obligatory (Harris, 1978; Lambrecht, 1981; Ashby, 1988). Modern spoken corpora do not confirm this prediction (Blanche-Benveniste, 1994).

Framework

Left and right dislocations have been accounted for by several theoretical devices (Larsson, 1979). One question is to decide whether the relationship between the dislocated element, *the book I lent you* in example (4), and the pronoun (*it*) depends on grammar or on discourse (Quirk *et al.*, 1985):

(4) **the book I lent you**, have you finished **it** yet?

Has the dislocated element, *the book I lent you*, been moved from its canonical complement position? This was assumed for a long time in transformational frameworks, but later nonmovement analysis were given later (Cinque, 1990, in an optimality framework). Does it play a grammatical role by itself? Or is it only anchored inside the verbal phrase by the pronoun? Consider the French sentences in (5).

(5a) ce livre je l'ai lu
'this book, I read it'

(5b) je l'ai lu ce livre
'I read it, this book'

Looking at examples such as (5a) and (5b), Jones (1996: 34) gave the following explanation:

> It is generally assumed that dislocation does not involve movement of the element in question, because in the underlying structures, the direct object position is occupied by the pronoun. Rather, the dislocated element, *ce livre,* is inserted directly by phrase-structure rules in a position outside the core sentence (adjoined to S or S') and its function within the sentence is determined by the resumptive pronoun.

Dislocated elements were given a role as topics, and the left position outside the core sentence was called the left periphery (Rizzi, 1997). The main question

la maison,	il y a quatre ans que je **l'** ai faite
'the house	I made **it** four years ago'
[prenucleus, left dislocation]	[nucleus]

Figure 1 Left-dislocated elements in prenucleus position (Blasco-Dulbecco, 1999).

Lo preferisco anch'io	/ **il finocchio**//
'(I) prefer **it** me too	**the fennel'**
[nucleus]	[postnucleus dislocation]

Figure 2 Right-dislocated element in postnucleus position (Scarano, 2003).

(Hudson, 2003) is then whether a uniform structure can account for what happens in left periphery.

Functional linguists tend to describe dislocations with informational notions such as theme and rheme rather than grammatical structures (Halliday and Hasan, 1979; Givòn, 1990; Cresti, 2000). In (4), the theme, *the book I lent you,* realized as a tone group unit, conveys information that is considered to be already given or to be recoverable from the preceding discourse (what the speaker, I, was talking about before). The rheme is new information, *have you finished it yet*. In communicative frames that consider intentions and interactions between speakers as essential components, left-dislocated elements are, more precisely, what the speakers intend to expand their knowledge about.

Dislocations are described here in a grammatical and pragmatic perspective, without transformational operations. The methodology uses two analytic levels: microsyntactic, based on grammatical dependencies (mainly verb valencies); and macrosyntactic, based on constituents ordering, informational, and prosodic dependencies (Blanche-Benveniste *et al.*, 1990; Berrendonner, 1990; Cresti, 2000; Andersen and Nølke, 2002; Scarano, 2003). Macrosyntactic units are defined by their autonomy or lack of autonomy, by the prosodic pattern they are associated to, by the positions they are placed in, and by some main semantico–pragmatic relationships. A constituent that has the capacity of forming an autonomous utterance, with its own modalities, conclusive prosody, and final accentuation, is a 'nucleus' (Martin, 1987). Left-dislocated elements locate in the prenucleus position. Like left adjuncts, they have a characteristic non-conclusive, right-dependent prosody, as shown in Figure 1. Right-dislocated elements, located in a postnucleus position, have a postfinal contour, determined by the preceding prosodic sequence and realized as an echo, as shown in Figure 2.

Left and right dislocations share prosodic characteristics with other prenucleus and postnucleus constituents. Their specificity consists in the relationship they eventually have with the nucleus, for instance, *Anna-Luise* and the pronoun *her* (Figure 3A) and the pronoun *it* and *that shop* (Figure 3B).

The origin of the data plays an important part here because of several minute distributional details. As far as possible, the data have been taken from spontaneous spoken corpora. The description is given in two steps. Left and right dislocations are first presented straightforwardly, as simple devices that are well adapted to the usual patterns mentioned in the literature, having no complications with prepositions, pronouns, or coreference. More problematic data are introduced in a second step, especially for left dislocations, thus challenging the first conclusions. Although a larger scope would be better, the description is exemplified mainly with French and Italian utterances.

A First Approach to Left and Right Dislocations

In both left and right dislocation, a pause separates the dislocated elements and the core verbal phrase.

Left Dislocation

Left-dislocated elements have a nonfinal prosody that indicates that a support is to be found in what comes after. The intonative suspension correlates with a lexical need for information (Cresti, 2000). In the preceding French example, *la vie* 'life' is pronounced with a suspended [Low-High] melody and the nucleus main clause with a [High-Low] one, with a conclusive tone, as shown in Figure 4. In accordance with the coreference relationship, the syntactic function ascribed to the clitic pronoun *elle* (subject) is transmitted backwards to the dislocated nominal phrase *la vie*. (As long attested by grammarians, heavy subjects trigger a dislocation pattern in order to maintain the link between subject and verb as in the almost proverbial example from the famous author Blaise Pascal (XVII th): ***le nez de Cléopâtre, s'il** eût été plus court, toute la face de la terre aurait changé* '**Cleo's nose**, had **it** be shorter, the whole face of the world would have changed.') The same holds for complements in Italian examples (Bonvino, 2003; Scarano, 2003):

(6a) comunque, **benzina**, **l'**ho fatta subito
'anyway, **oil**, I had **it** full at once'

A	But **Anna-Luise** –	what could have attracted **her** to a man in his fifties?
	[prenucleus, left-dislocation]	[nucleus, PRO *her*]
B	Had **it** got double doors,	**that shop?**
	[nucleus, PRO *it*]	[postnucleus, right-dislocation]

Figure 3 Prenucleus and postnucleus constituents (Biber *et al.*, 1999).

La vie,	**elle** fait pas comme on veut
'Life	**it** does not go the way you wish'
[prenucleus]	[nucleus]
[LH]	[HL]

Figure 4 Intonative suspension in left-dislocated elements.

(6b) **i pomodori**/nessuno **li** ha toccati// ()
'**the tomatoes**, nobody touched **them**'

However, two formal limitations must be taken into account, one on subjects and one on prepositional complements. First, because most Romance languages have no subject clitic pronouns (the exception is French), no formal relationship can be morphologically marked except by personal inflections on the verb. For instance, in (7) the third-person inflection on Italian *accettava* matches the third-person *lui* in left dislocation (Bonvino, 2003).

(7) **lui**, la mia malinconia non l'**accettava**
'**he**, my melancholy **did** not **accept** it'

In fact, instead of subject dislocations, Italian could be said to show emphatic uses of subjects. The second limitation is found in all Romance languages: Prepositions seldom appear where they are expected. Handbooks mention them, as does Agard (1984: 118) for the pre-posed dative in five Romance languages.

(8a) Fr.: **à** Jean, on ne lui a rien dit
(8b) Sp.: **a** Juan, no le han dicho nada
(8c) Port.: **a** João, não lhe disseram nada
(8d) It.: **a** Gianni, non gli hanno detto niente
(8e) Rum.: **lui** Ion, nu-i au spus nimic
'**to** John, they told him nothing'

In attested data, however, prepositions scarcely ever occur with noun phrases, although they sometimes do occur with tonic pronouns, as shown in the French *ses fourmis* (9a) and *à nous* (9b) (Blasco-Dulbecco, 1999):

(9a) **ses fourmis**, il **leur** parlait
'**his ants**, he used to speak **to them**'

(9b) **à nous**, qu'est-ce qu'il **nous** reste d'autre?
'**to us**, what else does it remain **us**?'

As we show later, such limitations undermine the formal definitions given for left dislocations.

Left dislocations, acting as topics, relate the noun phrase to preceding occurrences of the same referent or to occurrences of the same lexical item in an antecedent context (Blasco-Dulbecco, 1999):

(10a) nous avons **un mirage** de l'occident et **ce mirage il** doit disparaître
'we have a western **mirage** and **this mirage it** must disappear'

(10b) Quand j'allais **au bal** euh il fallait que je rentre à 9h. **Le bal**, **il** commençait à 8h 30
'when I used to go **dancing**, I had to be back by 9. And the **dancing**, **it** began at 8:30'

Such topic continuities contribute to global text cohesion (Duranti and Ochs, 1979).

Right Dislocations

Standing in the postnucleus part of the utterance, right dislocations have low intonational weight: "The right-most position is intonationally the least prominent, the location of lowest volume and pitch" (Mithun, 1995). As underlined by Szendröi (2000: 290), they are "extra-metrical on the Intonational Phrase Level." Their postfinal prosody is copied from the preceding one (Martin, 1987), as in the 'afterthought' segments shown in Figure 5.

When related to oblique complements, most of the time right dislocations show the expected prepositions, *a tuo fratello* (11a) and *à ma fille* (11b), which may suggest they have a tighter syntactic bond with the main clause than left dislocations (Simone, 1997; Blasco-Dulbecco, 1999).

(11a) **gli** dirò il fatto suo, **a tuo fratello**
'I'll talk ***him*** straight, **to your brother**'

(11b) je **lui** donne pas tort, **à ma fille** ()
'I don't blame **to her**, **to my daughter**'

(Right dislocations may also, occasionally, lack prepositions, as noted by Deulofeu, 1977.)

A	**I** think **he's** getting hooked on the taste of Vaseline,		**this dog**
	[nucleus, final tone]		[postnuceleus dislocation, postfinal tone]
B	Secondo me,	stava sulla sinistra,	**la Roma-Fiumicino**
	'for me,	**(it)** was on the left,	**the Roma-Fiumicino highway'**
	[prenucleus adjunct]	[nucleus, final tone]	[postnucleus dislocation, postfinal tone]
C	je me demande comment **elles** font,		**les femmes**
	'I wonder how **they** manage,		**the women'**
	[nucleus, final tone]		[postnucleus dislocation, postfinal tone]

Figure 5 The postfinal prosody of right dislocations (Biber *et al.*, 1999; Blasco-Dulbecco, 1999; Bonvino, 2003).

Right dislocations provide confirmations of information already known ('anti-topic' in Lambrecht, 1981), mainly as confirmations of validity (Berrendonner, 2003). Very frequent cooccurrences of left and right dislocations in which the one on the right reasserts the one first given on the left sustain this interpretation (Blasco-Dulbecco, 1999; Scarano, 2003).

(12a) **les femmes**, tout le temps **elles** ont travaillé, **les femmes**
'**women**, always **they** have been working, **women**'

(12b) **ce pain-là**, j'**en** mange pas de **ce pain-là**
'**this bread**, I don't ea*t* of **it**, **this bread**'

(12c) //**la disposizione**/ vediamo se ce **l'**abbiamo noi/ **la disposizione**//
'**the disposition**, let us see if we've got **it**, **the disposition**'

Nevertheless, these two dislocations, left and right, are very distinct procedures, as pointed out by Cecchetto (1999): "Right Dislocation is not the mirror image of Left Dislocation." This argument was used by Kayne (1994) to propose an analysis based on asymmetry in grammar.

A Second Approach to Left and Right Dislocations

Special Cases to Be Discarded

Left and right dislocations must be distinguished from two other devices: clitic doubling and left focalization.

Clitic Doubling Clitic doubling occurs when a clitic pronoun appears at the same time as a nominal or pronominal complement, as if an argument were split into two pieces (Agard, 1984: 110):

> Spanish, Portuguese, Roumanian require 'clitic copying' regularly with certain specific nominals, while all of them require it whenever the object is preposed for pragmatic purposes.

For example, I see you (I see you at you) appears in Spanish as *yo **te** veo a **tí***, in Portuguese as *eu **te** vejo a **ti***, and in Rumanian as *eu **vă** văd pe **voi***. Some languages have it as a wholly grammaticalized process (as in the Balkanian languages for accusatives). It is almost obligatory in Spanish for a dative complement (Uriagereka, 1995):

(13) **le** mandaré dinero **a mi hermano**
'**to him** (I)'ll send money **to my brother**'

Although not wholly grammaticalized, it does exist in Italian (Bonvino):

(14) **a me**, Gerardo **me** l'ha fatto notare la prima volta
'**to me**, Gerardo made **me** notice it, the fist time'

It occurs in French with floating quantifiers (Kayne, 2001):

(15) elle **leur** offrira **à tous des bonbons**
'she **them** will offer **to all the bonbons**'

and to insist on the exclusive choice of one person among others:

FIDO,	they named **it**
[nucleus, argument]	[postnucleus, verbal phrase]

Figure 6 Nucleus of a focalization pattern (Prince, 1981).

Eux	viendront
'they,	will come'
[nucleus]	[postnucleus]

Figure 7 Focalized subjects.

A	**Only one saucepan**	we had
	[nucleus, argument]	[postnucleus, verbal phrase]
B	**Pas tout le monde**	s'appelle Paul Newman
	'not everyone	is called Paul Newman'
	[nucleus, argument	[postnucleus, verbal phrase]

Figure 8 Restrictive and negative modalities of focalized elements (Biber *et al.*, 1999; Deulofeu, 1983).

(16) il **m'**en a parlé **à moi**
'he **to me** of it talked **to me** [personally]'

The label 'dislocation' does not apply well here because there is no distinction between the topic and focus (Rizzi, 1997) and no dislocation pause. In (17), the French *moi je* 'me I' is pronounced in one tonal unit (Blasco-Dulbecco, 1999):

(17) **moi je** trouve que l'école c'est bien
'**me I** think that school is good'

Focalization Pattern One obvious focalization pattern is that of the anteposed complements, as in: *BROCCOLI, she wants now* (de Swaart and de Hoop, 2000), which is marked by noncanonical position and accentuation. No pronoun recalls the anteposed nominal phrase; however, there is much more to say about focalization on the macrosyntactic level. In this pattern, what constitutes the nucleus with conclusive tone is not the verb but, instead, an argument of the verb, for instance, in Figure 6, *Fido*, which is the argument of *they name it*.

The verbal phrase is given only a postnucleus prosody, similar to a 'tail,' with little salience, conveying presupposed meanings (Sabio, 1995). The nucleus arguments form utterances by themselves, as it happens in contrasts, restrictive phrases, and answers to previous questions:

(18) treize ans, elle avait, pas quinze
'thirteen, she was, not fifteen'

It applies to subjects, too, without any kind of anteposition, as in Figure 7. These focalized elements have their own negative or restrictive modalities, independent from the verb, as shown in Figure 8.

Because modalities automatically go with the nucleus part, they indicate nucleus and postnucleus positions even without the realized prosody. The segment *in Paris* is a prenucleus adjunct in (19a), whereas *only in Paris* is a nucleus in (19b).

(19a) in Paris, **I only go to the movies**
(19b) **only in Paris**, I go to the movies

This focalization is often underestimated because many people – including linguists – deny it exists (Fradin, 1990). One reason for this is that, although Romance languages favor it (as in (20a)), other languages, such as English, obtain the same effects with complements focalized *in situ* (as in (20b)):

(20a) **à sa mère** Pierre ressemble
a su madre, Pedro parece
'**to his mother**, Peter looks like'
(20b) Peter looks like HIS MOTHER

Another reason lies in the fact that focalization is often confused with left dislocation, although it is very different in prosody and meaning. Word order alone is not enough to tell the difference.

Left Dislocations Revisited

Functional Marks and Coreference. If dislocations are to be interpreted as giving two occurrences of the same function, one inside the core construction and one outside, then functional marks such as prepositions and clitic pronouns are essential clues. But real data in spontaneous speech do not exactly support this conclusion. We have already seen that prepositions are regularly lacking in left dislocations:

(21) **cette femme**, je **lui** fais pas confiance
'**this woman**, I don't rely **on her**'

In some dislocation-like devices, clitic pronouns may also fail to appear. Such differences can be interpreted as signs of more or less syntactically integrated structures (Miller and Weinert, 1998). We can set up a scale going from the most integrated structures (having a preposition in the dislocated element and a pronoun in the core construction), to less integrated ones (with a pronoun but no preposition and the reverse), and, finally, to the lest integrated ones (with no preposition and no pronoun) (see Figure 9). All these structures share the same prosodic and pragmatic patterns.

Integrated constructions show clear anaphoric networks, as we have seen before. But those networks do not act as one-to-one relationships. A nominal phrase may be related to more than one clitic pronoun, as it

A elle, je lui parle	—elle, je lui parle	à elle, je— parle	— elle, je— parle
'to her, I talk to her'	'—her, I talk to her'	'to her, I talk— '	'—her, I talk— '
[+prep, +pro]	[–prep, +pro]	[+prep, –pro]	[–prep, –pro]

Figure 9 Scale of most integrated to least integrated structures.

is the case in (22) for *le gâteau* 'the cake,' which is related to one complement and two subject clitics in the same utterance:

(22) **le gâteau**, si la femme elle **l'**a pas fait, **il** vient de Casino ou **il** vient de Tartempion
'**the cake**, if the lady she did not cook **it**, **it** comes from Casino or **it** comes from elsewhere'

This relationship (which should be called 'cataphora,' not 'anaphora') has a larger scope than previously stated. That is why it allows 'weak crossover effects' as in (Benincà, 2001):

(23) **Mario**, sua madre **lo** vizia
'**Mario**, his mother spoils **him**'

Clitic pronouns do not act only as anaphoric terms. They also mark semantic features, bringing different semantic interpretations to the nominal phrases they are related to (Blanche-Benveniste *et al.*, 1990). For instance, a French verbal construction such as 'I like tulips,' can be expressed with three pronominal choices: *les, ça,* or zero.

(24a) **les tulipes**, je **les** aime
(24b) **les tulipes**, j'aime **ça**
(24c) **les tulipes**, j'aime **Ø**

Three different meanings are involved here, *les* presenting the tulips as a determined set, *ça* presenting them as a general class, and zero introducing a change in the meaning of the verb to something like 'about tulips, I am a worshipper.' The lexical phrase alone, *j'aime les tulipes,* cannot express such differentiations, which could be the key to explaining many dislocations. Clitic pronouns, acting as nominal classifiers, are not merely formal indications of coreference.

At the other end of the scale are 'hanging topics,' with empty position in the verbal phrase. Verbs such as *love, like, dislike,* and *know,* having the double possibility of a realized complement or a zero complement, often show this construction (Sabio, 1995; Miller and Weinert, 1998; Berrendonner, 2002, 2003):

(25a) le chocolat, j'aime
'chocolate I love'
(25b) le parfum, j'adore
'perfume, I adore'

(Contrasting verbal sequences may also allow zeroing, as in *à sa mère il ressemble un peu, à son père pas du tout* (Akihiro 2000) and *she has two brothers, Tom and Jerry; she likes Tom a lot. Jerry she can't stand* (Givón, 1990). According to Berrendonner (2002: 33), the first part is a substrate and the second one the focus.)

Such constructions are more ambiguous than might be thought at first sight. In example (21), the meaning could be 'this woman, I don't rely on her,' even if the first nominal phrase has no complement marker. But the nominal phrase may also enter the utterance as an 'aboutness' adjunct. In this case, the verb, having no complement, takes a stative value and the meaning is 'with this woman around, I don't feel confident.' Nominal phrases with no functional markers (subjects or nonprepositional complements) can generally receive this double interpretation (Deulofeu, 1977):

(26) – des émigrés, il aurait – frappé
' – migrants, he would have hit – '

The first nominal phrase could be understood as a complement, 'he would have hit the migrants.' But it could also be understood as an adjunct to the verbal construction, 'with migrants around, he would have hit (someone else).' In hanging topics, semantic relations, not being guided by the verb valency, can waver among several closely related meanings with the intonation and word ordering remaining identical. Syntactic coreference seems to fade away according to the fading of functional marking. This should not be confused with lexical coreference, which may extend between adjuncts and the core phrase, as for instance *tulips* and *bulbs* in (27) (Lambrecht, 1994):

(27) tulips, you have to plant new bulbs every year?

Lexical relations provide guidance between the hanging topic *tulips* and a lexical item *bulbs* inside the core sentence, but there is no syntactic link.

Frame among Frames Left-dislocated elements share the prosodic features with left adjuncts, as shown in Figure 10. They take place in the prenucleus space with other elements expressing circumstances and acting as frames for the core construction. In (28), there first comes a dislocated pronoun *moi* (related to a subject clitic *je* in the core construction), then a dislocated noun phrase *Alexis* (related to a complement clitic *l'* in the core construction), and then a temporal adjunct:

A	**le bal**	**il** commençait à 8h30
	'dancing	**it** began at 8:30'
	[prenucleus, left dislocation]	[nucleus, verbal phrase with PRO *il*]
B	quand j'allais au **bal**	il fallait que je rentre à 9h
	'when I used to go **dancing**	I had to be back by 9:00'
	[prenucleus, temporal adjunct]	[nucleus, verbal phrase, without PRO]

Figure 10 Left-dislocated elements sharing the prosodic features of left adjuncts (Haegemann, 2003).

(28) **moi**, **Alexis**, pendant trois ans, il a bien fallu que **je l'**habille
'**me**, **Alexis**, during 3 years, **I** had indeed to provide **him** with clothes'

The hierarchy among different adjuncts and the way they rank in left-periphery ordering (prenucleus position) are very puzzling topics (Morel and Danon-Boileau, 1998). Elements seem to be sorted in a 'pile structure' hierarchy (Berrendonner, 2003) with inclusive patterns, the most salient and the most inclusive coming first. The whole package acts as a preparation phase for the ongoing action given in the core construction (Berrendonner, 2003). What concerns ego requires a special attention: it is one of the most frequent left-dislocated element (10 times more frequent in French for the first person, *moi je,* than for other persons, according to Blasco-Dulbecco, 1999). It often comes first, which is not surprising.

Conclusion

Do dislocations tend to replace nondislocated structures or do they coexist in the grammar? Ashby (1988) and Lambrecht (1987, 1994) insisted on the replacement analysis, especially for subjects in French (Lambrecht, 1987: 52):

> The subject-predicate relationship has been replaced by a topic-comment relationship [...]. French has changed from a subject-prominent into a topic-prominent language [...]. The presence of the French subject pronoun *il* is preferred in nonmonitored speech: *Mon pied, il me fait mal* [*my foot, it* hurts me]....

Actual data gathered in spontaneous spoken French do not confirm such statements. Only finite clauses used as subjects regularly trigger dislocations (Creissels, 1995):

(29) **ça** m'embête, **qu'il ne puisse pas venir**
'**it** annoys me, **that he cannot come**'

But noun phrases do not. Nondislocated nominal subjects do still exist, clearly related to genres. The amount varies from 0% in children's speech, to approximately 15% in familiar conversations, and to 100%, in professional and public conversations (Blanche-Benveniste, 1994). The impression of invasive dislocations could be an artifact of the new linguistic materials coming from oral corpora.

Are dislocations limited to modern oral languages? Some types of dislocations have been used for a long time in literature in several languages and still are (Harmä, 1990; Simone, 1997; Blasco-Dulbecco, 1999; Marchello-Nizia, 1999). From the stylistic and normative points of view, different values have been placed on dislocations, varying with the language and time. But only hanging topics seemed to maintain a bad reputation as being "limited to the colloquial style" (Benincà, 2001: 41, for modern Italian).

'Dislocation' is indeed a poor label because it hints about movements and pathological results; but 'left' and 'right' are also misleading terms because they refers only to the way we write these constructions. That is why 'prenucleus' and 'postnucleus' areas are preferred here. Word order proves not to be a sufficient criterion to deal with dislocations because different prosodic and syntactic patterns can be represented by the same word order. The description of 'dislocations' is thus a challenge for linguistic theories because it requires an integration of functional dependencies, word-order rules, coreference networks, pragmatic constraints, and prosodic dimensions.

See also: Clause Structure in Spoken Discourse; Expletives and Dummies; Focus; Spoken Discourse: Word Order; Theme in Text.

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Developmental Dyslexia and Dysgraphia

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Developmental dyslexia and developmental dysgraphia have been the focus of much interest from researchers, clinicians, and educators. Findings from research investigations have yielded information with important implications for our understanding of learning abilities as well as disabilities, of brain structure and function, and of assessment and intervention approaches. The word 'developmental' preceding the terms 'dyslexia' and 'dysgraphia' distinguishes this subtype of the disabilities as occurring as a result of abnormal learning during the normal course of development despite adequate learning and instructional opportunities and normal intelligence. This subtype is differentiated from acquired dyslexia and dysgraphia, which are disabilities arising as a result of brain injury, neurological conditions, or diseases, and entail a loss of previously intact skills. Dyslexia is frequently used to refer to disorders in reading skills and dysgraphia is used to refer to disorders in writing skills. These two disabilities may exist in isolation but more commonly they are 'comorbid,' that is, occurring with other disabilities, such as dyscalculia (mathematics), dyspraxia (motor), and attention deficit disorder with and without hyperactivity. It is these relations between underlying cognitive mechanisms and brain processing areas subserving reading and writing skills that have intrigued researchers and that have particular relevance to clinicians and educators.

Developmental dyslexia has been found to be the underlying basis for most cases of poor reading skills identified in the early childhood period and beyond. There has been extensive research on the causes of dyslexia and numerous theories have been proposed, such as the phonological processing theory, the temporal auditory processing theory, and the visual processing deficits theory. The phonological processing theory focuses on the abilities to link speech and print that are important for decoding words, the fundamental skill for reading. Phonological processing problems can occur at many levels, including phonological awareness (understanding that words are composed of individual sounds), phonological retrieval

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Development of Communication in Animals

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Research on developmental processes has played an important role in the history of animal communication. Communication signals constitute a behavioral system of discrete events that are relatively easy to define and to quantify and therefore valuable in testing various theories about behavioral development. Communication signals also provide complex, but biologically important, input for neurobiological investigations of development. Developmental studies of animal communication have been influential in providing models for study of human speech and language development and evolution. One example is a classic paper by Peter Marler on five parallels between birdsong and speech development: (1) both use an auditory modality; (2) both require auditory feedback to develop normally; (3) both require adult vocal input during a sensitive period after which acquisition of vocal skills is extremely difficult, if not impossible; (4) both require input from a tutor of the same species; (5) both require a period of practice (subsong, plastic song in birds or babbling in human infants) to develop adult signals (Marler, 1970). This model developed from birdsong has had great influence on studies of infant language development over the past 35 years.

Development of communication can be separated into three distinct components:

1. Production – what is the process leading to the production of adult forms of signals?
2. Usage – what is the process that leads to the production of signals in an appropriate context?

3. Comprehension – how does an individual come to understand the signals produced by others?

Although these distinct components are well recognized, in truth most of our current knowledge about development is based on studies of signal production. Within a species different developmental models may apply to each of these three components. Because one process describes development of production does not mean the same process will automatically apply to development of usage and of comprehension.

We can distinguish four broad types of developmental processes. Communication may be **innate** or genetically determined, present in all individuals. That is, signals are produced, used or understood with little or no social or experience-based modification. Several methods have been used to determine if communication is innate or not. Precocial birds such as chickens (*Gallus domesticus*) have been deafened at hatching with no noticeable effect on vocalizations compared to normally hearing birds. However, these birds have embryonic hearing abilities while in the egg. Thus, their ability to produce and recognize calls immediately after hatching is due to learning by the embryo. Therefore, one cannot define something as innate merely because it is present at birth and does not change thereafter.

Species reared in isolation with no contact with conspecifics may appear to have normal communication abilities. For example, studies on isolation-reared squirrel monkeys (*Saimiri sciureus*) reported that these monkeys gave normally structured calls when tested and also gave calls in appropriate contexts (predator alarm), suggesting that neither production nor usage of calls required environmental input. Hybridization between species of crickets (*Gryllus sp.*), subspecies of squirrel monkeys, and species of gibbons (*Hylobates sp.*) have shown offspring develop calls intermediate in structure to those of the parents, suggesting a genetic basis of signal production, although parental social input cannot be ruled out completely. Finally, animals of one species can be cross-fostered with another. If the infant emerges with the communication skills of a foster-parent, then early environment has been important, whereas if infants retain species-typical abilities despite rearing with another species, then innate mechanisms are likely. One study that cross-fostered rhesus macaques (*Macaca mulatta*) and Japanese macaques (*Macaca fuscata*) reported no change in infant vocal production, but found mothers understood the calls made by foster-infants.

The second developmental process is based on physical **maturation**. Communication skills may vary over time due to physical changes associated with growth. Thus, as an organism using a larynx or syrinx to produce sound grows, the vibratory membranes will increase in both length and thickness, leading to a lowering of the fundamental frequency of calls. An organism may also develop better control over pulmonary function, leading to longer calls (or sequences) and more precise control of vocal articulators (tongue, lips, beak, etc.). This may result as a function of maturation independent of any environmental input. Females of several species of anurans prefer males with lower voices and longer calls, but this apparently sexually selected trait may be simply an outcome of increased body size, reflecting physical maturation. In contrast, dominant male baboons (*Papio cynocephalus*) have higher-pitched calls than subordinate males independent of body size. Here the call characteristics associated with dominance cannot be due merely to maturation.

The third process is **closed-ended learning**, whereby an organism learns about communication during a limited period after which further leaning is difficult, if not impossible. If a developing organism requires exposure to a tutor producing the correct vocalizations and exposure is maximally effective during certain developmental stages, then this qualifies as closed-ended learning. Thus, white-crowned sparrows (*Zonotrichia leucophrys*) must be exposed to adult song during the period between 25 and 100 days after hatching in order to produce adult song several months later. If exposed to white-crowned sparrow dialects from populations other than their own, birds acquire the dialect they hear. However, they cannot acquire the relatively similar songs of other species. In contrast to chickens, isolation rearing and deafening prevent sparrows from developing normal songs, emphasizing the importance of social experience and learning. Once learned sparrow song becomes 'crystallized' and can be modified only minimally thereafter. Under closed-ended learning organisms appear to be preprogrammed to accept a limited range of stimuli and learning is restricted to a limited period of development.

A variant of closed-ended learning is **action-based learning**. An organism learns a large number of vocal signals during a sensitive period but through subsequent interactions with conspecifics deletes many of the signals in favor of the subset used by its neighbors. Action-based learning provides a potential explanation for why migratory birds exposed to one set of vocalizations when young produce a different subset of vocalizations following migration to an area with a different local dialect. Some have proposed that human infants can produce and understand all human phonemes when young but selectively retain the ability to produce and understand only those used in their native language.

The final model is **open-ended learning**, where organisms have the ability to learn new signals and to change communication abilities throughout their lives. Species as diverse as parrots, starlings, marine mammals and bats can learn new vocalizations throughout life, often in response to forming new social relationships. (For a more detailed discussion of birdsong and other learned vocalizations *see* **Animal Communication: Vocal Learning**.)

These four types of developmental processes provide useful heuristics for thinking about development but they cannot be completely independent of one another. Each species has constraints on what it can learn imposed by the anatomy of the vocal tract, the structure of supralaryngeal (or suprasyringeal) structures, and brain structures involved in motor control and perception. As a result, anatomical and physiological constraints will always limit the amount and type of developmental plasticity that can be expressed. These constraints can also be modified through development, making it difficult, if not impossible, to distinguish completely between nature and nurture. Nature is usually nurtured and nurture is affected by nature.

Strong inference methods cannot always be used to tease apart developmental processes. Although isolation rearing and deafening have been valuable in identifying innate and closed-ended communication in several bird species, use of these methods becomes more problematic with marine mammals, nonhuman primates and human primates.

Isolation rearing or altered social rearing can have unanticipated effects. Isolation can lead to degeneration of sensory systems, or drastically altered social behavior that makes difficult the interpretation of any apparent deficits in communication. Experimental alterations of natural social environments may create unanticipated results. In the cowbird (*Molothrus ater*), a nest parasite where no adult conspecific song model is available, young cowbirds group together in mixed-sex groups. Cowbirds reared with other species through this period develop normal, robust songs that prove attractive when played back to female cowbirds. However, these birds reared with other species direct their song not to other cowbirds but to the species they were reared with. Song production is normal but song usage is not. Young cowbirds reared only with other young cowbirds actually produce a more attractive song than that of young cowbirds reared in mixed-age groups (as measured by female response to playbacks). However, when these males first use these 'good' songs in mixed-age groups they become the targets of aggression from older male birds. Song learning for cowbirds is not only learning song structure, but also learning whom to sing to, as well as learning not to sing too well until one has the aggressive skills to support the quality of song. This example illustrates the importance of separating production, usage, and understanding. Cowbirds may produce exquisite songs but not use them appropriately.

Biological constraints are more likely to be seen in production than in usage or comprehension. Any species that benefits from identifying individual conspecifics on the basis of signals must be learning to recognize that individual. It is difficult to imagine a process of individual recognition without some form of learning. Many species can learn how to interpret the signals of others: as noted above, macaque mothers learn to understand the calls of cross-fostered infants from a different species. Among birds and nonhuman primates one species can learn to understand the alarm calls of a sympatric species. Primates can also respond to alarm calls of birds and hornbills in West Africa appear to learn the aerial-predator alarm calls of monkeys, but not the calls monkeys give to warn of terrestrial predators. Eagles prey upon hornbills and monkeys alike, but terrestrial predators such as leopards and chimpanzees prey on monkeys but not hornbills. Hornbills respond only to the monkey predator alarm call that affects them. Development of appropriate usage of signals appears intermediate between production and comprehension. Many nonhuman primate infants appear to have a general, but not specific ability to use calls that becomes refined through experience.

Nontraditional reward processes may guide development of communication. Species ranging from birds through marine mammals to primates demonstrate alterations in song or call structure when confronted with a new social group or partner. The specific mechanisms producing and maintaining this change are not known, but subtle social processes may be involved. Male cowbirds are extraordinarily attentive to subtle female cues such as brief wing strokes that reinforce singing behavior. Babbling, observed universally in humans (even manual babbling in deaf infants) and as well as in some monkeys, appears to elicit increased social responsiveness from caregivers. This responsiveness may not directly reward correct production, but rather may reinforce the process of vocal practice to sustain the behavior as an infant develops its motor skills. Statistical learning has been demonstrated in both human infants and in monkeys. When presented with short (2-minute) sequences of sounds that have a high probability of occurring together, these sound sequences are grouped perceptually in subsequent tests compared to sound sequences with a low probability of co-occurring. Statistical learning provides a rapid

method for learning which sounds to group together (as in words or call sequences) through purely associative processes without reinforcement.

Why is there such variation in developmental processes? Different developmental processes might have adaptive value for signals with different functions. Alarm calls or infant distress calls should be highly conserved in structure within a species with little plasticity in these calls. On the other hand, while some aspects of signals of courtship or affiliation should be conserved to ensure mating with the right species, these calls might also be adaptive if more flexible to allow mates or group members to recognize each other and behave positively toward a limited set of conspecifics. This is especially true for species that are more mobile and thus may encounter many individuals from distant areas. The white-crowned sparrows described under closed-ended learning were non-migratory, but a migratory subspecies of white-crowned sparrows have a much more open period for learning. Among mammals, those that move for long distances either in oceans (marine mammals) or in the air (bats) appear to have more plasticity in vocal production than terrestrial mammals that typically do not travel more than a few home range diameters from their natal group. Relative mobility may make vocal learning adaptive.

Individuals of many species benefit from recognizing individuals within their group on the basis of communication signals and can benefit from attending to signals produced by sympatric species especially with reference to predators. Thus, learning should play an important role in signal comprehension in all species, mobile or not.

Development of communication is complex, with multiple processes that may vary between production, usage, and comprehension, and may vary even within a species in terms of which types of signals develop by which processes. Only with increased clarity and precision about developmental processes in animal communication can animals become useful in developing models of human language development. Given the impossibility of having precise environmental control over human development, the careful selection of appropriate animal models is critical and provides a valuable way to test hypotheses about human language development and evolution.

See also: Animal Communication: Vocal Learning; Birdsong; Communication in Marine Mammals; Individual Recognition in Animal Species; Language Development: Overview; Non-human Primate Communication.

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Devoto, Giacomo (1897–1974)

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Giacomo Devoto was a historian of language and the founder of 'linguistic neo-historism,' an approach based on the assumption that all phenomena of language have found historical reification. For Devoto, linguistic data were 'sources of history.' He exhorted the historian to look outside traditional sources and the linguist not to stay within the boundaries of technicalities that are an end in themselves.

Born in Genoa on July 19, 1897, he received his education at the University of Pavia. After taking part in World War I, he graduated in 1920, producing a thesis that compared the development of Indian and Romanian phonetics (Devoto, 1923). From 1920 to 1924 he studied in Berlin, Basel, and Paris with, among others, Jakob Wackernagel and Antoine Meillet. In 1924 he received his *libera docenza* and

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Developmental Dyslexia and Dysgraphia

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Developmental dyslexia and developmental dysgraphia have been the focus of much interest from researchers, clinicians, and educators. Findings from research investigations have yielded information with important implications for our understanding of learning abilities as well as disabilities, of brain structure and function, and of assessment and intervention approaches. The word 'developmental' preceding the terms 'dyslexia' and 'dysgraphia' distinguishes this subtype of the disabilities as occurring as a result of abnormal learning during the normal course of development despite adequate learning and instructional opportunities and normal intelligence. This subtype is differentiated from acquired dyslexia and dysgraphia, which are disabilities arising as a result of brain injury, neurological conditions, or diseases, and entail a loss of previously intact skills. Dyslexia is frequently used to refer to disorders in reading skills and dysgraphia is used to refer to disorders in writing skills. These two disabilities may exist in isolation but more commonly they are 'comorbid,' that is, occurring with other disabilities, such as dyscalculia (mathematics), dyspraxia (motor), and attention deficit disorder with and without hyperactivity. It is these relations between underlying cognitive mechanisms and brain processing areas subserving reading and writing skills that have intrigued researchers and that have particular relevance to clinicians and educators.

Developmental dyslexia has been found to be the underlying basis for most cases of poor reading skills identified in the early childhood period and beyond. There has been extensive research on the causes of dyslexia and numerous theories have been proposed, such as the phonological processing theory, the temporal auditory processing theory, and the visual processing deficits theory. The phonological processing theory focuses on the abilities to link speech and print that are important for decoding words, the fundamental skill for reading. Phonological processing problems can occur at many levels, including phonological awareness (understanding that words are composed of individual sounds), phonological retrieval

(the ability to quickly and automatically name letters, objects, numbers, or colors), and phonological memory (the ability to code phonological information [e.g., a string of words or nonwords] into working or short-term memory). Phonological processing deficits as a basis for dyslexia have received a great deal of research support (for reviews see Fletcher *et al.*, 1999) and it is generally accepted that dyslexia has a basis in deficits in phonological processing and other specific language skills (Catts, 1996).

Theories of temporal auditory processing deficits have also been hypothesized as underlying dyslexia. Tallal (1980) has proposed that dyslexic children have difficulty in processing complex auditory tones when they are presented in quick succession but not when presented at slower rates. While research provides some support for a link between deficits in auditory temporal processing and dyslexia (Hari and Renvall, 2001), other researchers argue that processing difficulties for dyslexics may be due to speech-related processing problems rather than to general auditory processing problems (Mody *et al.*, 1997).

Deficits in visual processes also have been hypothesized as causes of dyslexia. Indeed, some of the earliest writings link visual problems with dyslexia (Bronner, 1917) and some evidence of the continuing view of a visual deficit as a basis for dyslexia persists in commercial products involving colored or other corrective lenses for people with dyslexia. Problems related to visual processing and dyslexia have been researched in studies of visual discrimination, visual memory, letter reversals, eye movement dysfunctions, or visual processing problems related to magnocellular pathway disruption. Research using functional brain-imaging techniques has explored relations between visual motion processing and dyslexia (Eden *et al.*, 1996). However, findings across studies have been inconsistent on the impacts of visual problems in reading skills, especially in comparison with the more consistent findings of the impacts of phonological deficits on reading skills (Fletcher *et al.*, 1999).

Genetics

Researchers have looked for the causes for dyslexia in genetics and family studies. These studies have supported a genetic basis for dyslexia (Pennington, 1999). In studies of identical and fraternal twins, Gayan and Olson (2001) found that genetic influences on phonological awareness and decoding skills range from 60% to 70% and deficits in word reading range from 50% to 60%. However, the role of the environment in these studies may be understated in accounting for only 30% to 50% of the variance because the environments within samples are similar and individual differences in the consequences of environmental impacts (e.g., due to perinatal risks or insults) also tend to be similar. There is evidence from this and other research studies that genes play an important but not exclusive role in developmental dyslexia (Gallagher *et al.*, 2000).

Linkage analyses have been used in studies of families with a history of dyslexia to locate genes and regions along genes that are responsible for dyslexia. Gayan and Olson (1999) identified genes on chromosome 6 that relate to deficiencies in phonological skills. Others have found genes on chromosome 6 related to phonological awareness and genes on chromosome 15 that link to word reading (Grigorenko *et al.*, 1997). Schulte-Korne *et al.* (1998) reported a link between poor spelling skills and chromosome 15. Although work is continuing to link specific gene regions to dyslexia, there is growing converging evidence supporting linkages between chromosomal regions and various phenotypes of dyslexia (Demonet *et al.*, 2004; Pennington, 1999). Ongoing behavior genetics work is seeking to understand how the genetic base for susceptibility to dyslexia interacts with environmental conditions to influence the expression of different levels of reading skills.

Brain Structure and Function

Numerous investigations of brain differences in dyslexic compared to nondyslexic populations have been published and have included studies of brain structure (i.e., different parts of the brain, such as the cerebellum) and brain function (i.e., the behaviors that are controlled by different brain structures, such as voluntary control of movements). Differences in the size of brain regions and structures have been reported, but replicability of such findings across studies is inconsistent (Filipek, 1995). Pennington (1999) reported a behavior genetics study of size variations in brain structure of reading-disabled and control subjects. Evidence of genetic influences on the subcortex and genetic plus environment influences on the cortex was found, supporting the hypothesis that some brain structure differences related to reading skills are genetically influenced.

Brain function differences have also been studied. In studies of developmental dyslexia, children at risk for dyslexia due to family history, as well as longitudinal studies of children later identified as dyslexic readers, have been reported. For example, Molfese (2000) reported that event-related potentials (ERPs) recorded to speech and nonspeech sounds in the newborn period are highly predictive of reading skills up to eight years later. In these studies, auditory ERPs were recorded from left and right frontal, temporal,

and parietal scalp regions during the newborn period and these children were subsequently tested within 2 weeks of their eighth birthday using a variety of reading and language measures. By eight years of age, a group of 48 children, comprising 17 dyslexics, seven poor readers, and 24 typical readers, was identified. The results indicated faster latencies in brain responses for the typical readers compared to dyslexic and poor readers. These data extended findings previously reported (Molfese and Molfese, 1985) on the strong relationship between neonatal speech discrimination and preschool language skills.

Similar findings are reported in studies of children at risk for dyslexia because of family history but whose eventual reading status was not yet known because of the young age of the children. Brain responses to speech sounds in these at-risk infants were identified that reliably characterized differences between them and the brain responses of control infants (e.g., Guttorm *et al.*, 2003). Distinctive hemisphere differences were found such that atypical responses to speech sounds were predictive of receptive vocabulary and verbal memory skills in the preschool period. It is anticipated that these measures will link with future difficulties that these children are likely to have in learning to read. Similar findings are reported in studies using auditory mismatch negativity as a method to investigate sensitivity to differences in specific speech sounds. These studies are consistent in finding that both children who are at risk because of their family history of dyslexia and children with dyslexia process speech sounds differently than do not-at-risk and typical reading children. The findings from these studies also support the growing evidence of a phonological processing basis for reading skills.

Dysgraphia

Developmental dysgraphia is a disorder of handwriting or written language that is present from childhood and is manifested in both spelling and motor coordination disabilities, resulting in slow, irregular, or illegible handwriting. The American Psychiatric Association establishes developmental dysgraphia as a "disorder of written expression" if the disability interferes with academic achievement or daily living activities. Lyon (1996) estimated that 8% to 15% of schoolchildren have writing disorders. A number of different types of dysgraphia are referenced in the literature, such as phonological dysgraphia (difficulty sounding out and writing words, especially in writing nonwords) and lexical dysgraphia (difficulty writing words letter by letter or in picturing words). Gubbay and deKlerk (1995) report that certain types of language-based dysgraphia (phonological, lexical, and dyslexic) and nonlanguage-based dysgraphia (motor apraxia and constructional apraxia) were more frequently found in a sample of schoolchildren compared to Gerstmann (characterized by dyscalculia, difficulties distinguishing right from left, and finger agnosia), semantic (characterized by semantic errors in writing), ideational (characterized by difficulties in spontaneous writing or drawing by not transcribing or copying), and other types of dysgraphia.

Differences in a variety of writing skills of children with dysgraphia have been studied and compared to control children in an effort to better understand the differences that exist. Vlachos and Karapetsas (2003) studied Greek schoolchildren (6 years 6 months to 12 years 5 months) who were diagnosed with dysgraphia alongside controls matched for sex, age, handedness, and grade. The children were tested in copying complex figures and during mnemonic reproduction (copying from memory). While no differences were found in their ability to copy the figures, the children with dysgraphia had poorer performance on the mnemonic task. The findings point to the involvement of visual memory skills in addition to other visual or perceptual processing problems. Furthermore, children with dysgraphia are characterized by writing errors in which they may reverse letters and numbers, write letters and words backwards, write letters out of order, leave words or letters unfinished, and mix print with cursive, upper with lower case, sizes of letters, and slants of letters. Simner and Eidlitz (2000) reported that four types of writing errors produced by a group of 320 first-grade children were particularly characteristic of children with dysgraphia. The children showed distortions in letter shape, distortions in relative size of letter parts, irregular spacing between letters, and crowding of words within sentences. Deuel *et al.* (1999) found that school-aged children with dysgraphia were distinguishable from their schoolmates by their motor acts when forming letters (e.g., where they started writing letters, redrawing already written letters, and the addition of extra elements unrelated to proper letter construction).

Researchers (e.g., Bowers *et al.*, 2003; Gubbay and de Klerk, 1995) recommend that several different tasks be used to diagnose dysgraphia, such as writing text from dictation, text generation and copying, fine motor and visual-perceptual skills, writing speed, spelling, and memory tests. All of these tasks can be used to explore the visual, motor, lexical, and memory aspects of writing. Posture, pencil grip, tremor, and specific motor behaviors in writing are also aspects that should be considered in diagnosing dysgraphia. Finally, because writing, reading, and oral language skills are related, the capabilities and disabilities in these three skill areas should also be evaluated.

From the research literature, a variety of different theories of writing disorders have been identified. Bowers *et al.* (2003) identified four theories: memory or working memory deficits, fine motor impairments, information-processing deficiencies, and neurological impairments. Swanson and Berninger (1996) have found that problems or deficits in working memory (information storage and processing) and short-term memory (information storage and reproduction) are linked to text writing and transcribing. Other researchers have also reported a link between memory span or capacity and writing behaviors (Torrance and Galbraith, 2005). The fine motor impairments theory focuses on the sequencing of fine motor skills that affect poor handwriting as well as the speed and spatial accuracy of writing skills. Researchers report that difficulties inhibiting and controlling motor movements impact handwriting skills and that the motor movement demands of writing impacts composition skills (Jones and Christiensen, 1999). For example, working memory has limited capacity for information processing. If working memory must be used for performing basic skills, such as forming each letter in a word, then there is less capacity for higher order thinking needed to understand what was written as well as for performing more complex, multistep tasks such as are needed for composition.

Information-processing theories focus on sequencing difficulties encountered in writing. Problems in sequencing and organizing thoughts and writing behaviors implicate executive function skills, such as initiative, set shifting, and sustaining attention, which have been found to differentiate poor from good writers (Hooper *et al.*, 2002). The neurological impairment theory looks at the different brain areas and systems involved in writing and hypothesizes that there are dysfunctions in how the areas and systems interact. Bowers *et al.* (2003) reported from their study of a referred sample of individuals with learning or academic problems that all the models they tested, with the exception of the neurological model, were related to writing behaviors.

Research on Dyslexia and Dysgraphia

Spelling disabilities are a good illustration of how reading and writing skills intersect. Spelling difficulties have been found to characterize most children who are diagnosed with dyslexia, or dysgraphia, or both. Because spelling relies on knowledge about the structure of language, deficits in the knowledge or use of this information are reflected in spelling errors. At a basic level, spelling involves incorporating phonological information from spoken language into written language. That is, beginning spellers must learn to translate the phonemes of spoken language into the letters and words of a written language. As young children become aware of the orthographic and morphologic structures of their spoken language, these too become incorporated into writing. Studies of spelling that have compared the skills of children with disabilities to those of younger children whose spelling skills are at a comparable level have found evidence that different linguistic components play a role in spelling skills.

Bourassa and Treiman (2001) reviewed the research evidence on linguistic factors affecting spelling and could not find evidence of clear-cut differences between children with spelling disabilities and spelling level controls based on phonological, orthographic, and morphologic bases *per se*. However, there was evidence of deficits appearing in some aspects of phonological, orthographic, and/or morphological skills in poor spelling. These deficits appeared to be related to the problems poor spellers have in accurately analyzing and consistently incorporating sounds, syllables, and morphemes into written language. Other researchers have investigated whether differences in auditory temporal processing skills underlie spelling disabilities as they are believed to underlie reading disabilities. Schulte-Korne *et al.* (1998b) studied children and adults with spelling and reading disabilities. However, no evidence was found that differences in auditory temporal processing skills distinguished children with spelling disabilities from control participants.

Researchers have been interested in understanding how information-processing demands of reading and writing tasks affect children's spelling abilities. For example, the processing demands of tasks differ and when the number of tasks needing to be engaged in concurrently increases, there are limitations on how individuals are able to perform the tasks. In the case of individuals with reading or writing disabilities, the multiple demands of reading or writing tasks create situations where some aspects of tasks may be attended to at the cost of less attention to other tasks. Mather (2003) studied competing task demands, also called dual task interference, in three groups of children. One group had poor reading and poor spelling skills (dyslexic), the second group had good reading and poor spelling skills (dysgraphic), and the third group had good reading and good spelling skills (controls). It was hypothesized that when these children (11 to 14 years) were engaged in performing two tasks concurrently, one task (tapping) would interfere with the performance of the other task (line orientation judgments). Information about hemisphere processing of verbal and nonverbal stimuli was inferred from the interference data. Concurrent task performance was hypothesized to vary according to how the two hemispheres of the brain are involved in processing the tasks. The results showed that children with dyslexia and dysgra-

phia differed from the controls in showing marked reductions in the rate of left-hand tapping while making line orientation judgments compared to the rate of right-hand tapping during the same judgment task. These findings were interpreted as reflecting differences in how children with dyslexia and dysgraphia process information in their left hemispheres and may reflect a limitation in left hemisphere processing.

In a more direct study of brain hemisphere processing, Richards *et al.* (1999) included children with dyslexia alongside controls matched for age, IQ, and head size. Brain activation was recorded during lexical, rhyming, and tone judgment tasks. Pairs of words and nonwords that were either rhyming or nonrhyming as well as pairs of tones were judged as the same or different. MRI was used to determine task-related differences in the brain processing of the children. Greater activation was noted in areas of the left hemisphere of the children with dyslexia and seems to indicate that these children were exerting greater mental effort during the phonological (rhyming) task, despite making more errors in judgment, compared to the control group. No group differences in brain activation were noted for the other conditions. Studies such as these point to possible brain-processing limitations linked to language and seem to reinforce phonological processing as an important skill that characterizes children who are dyslexic and/or dysgraphic.

Interventions – Dyslexia and Dysgraphia

Intervention approaches for dyslexia and dysgraphia must begin with diagnosing the capabilities and deficits of children in reading and writing skills. Knowing that there are skills needed for both reading and writing proficiency and additional skills that are specific to reading and writing proficiencies helps to focus diagnosis and intervention on targeted abilities. There is a large literature on intervention approaches for dyslexia and/or dysgraphia (for a review see Berninger *et al.*, 2003). Early diagnosis with explanation to the child, parents, and teachers is important for intervention success.

Among the different approaches to intervention are several that focus on the facilitating effects of reading and spelling interventions. Treiman (1998) reviewed an extensive literature to reveal how learning to spell benefits reading skills, such as phonemic awareness and segmentation, real word and pseudoword reading, and the alphabetic principle. Indeed, it is clear from the review that the skills gained by young children from spelling transfer to reading skills more than the reverse (i.e., reading skills transferring to spelling). Graham *et al.* (2003) reported an intervention approach with a focus on reading, writing, and spelling skills. Second-grade children with reading and writing problems, some of whom had diagnosed learning and behavior disabilities, participated in a spelling program. Compared to children in the control condition, who received mathematics instruction, the children in the spelling program showed improved skills in spelling, sentence writing, and word reading, with improved word-reading skills still seen 6 months after treatment. Castle *et al.* (1994) also reported benefits of an intervention focusing on phonemic awareness and letter–sound associations with kindergarten children who had poor phonemic awareness skills. Compared to the children in the control group, who spent time writing stories and inventing spellings, the children in the experimental group showed more pre-/posttest gains in phonemic awareness skills and on real word and pseudoword spelling tests. Clearly, there are advantages to interventions for young children that integrate skills needed for reading, writing, and spelling.

Other researchers have examined how the changes in reading and writing skills that are found from interventions are reflected in brain processing. Berninger *et al.* (2003) investigated changes in brain functioning of children with dyslexia before and after participation in a comprehensive reading instruction program. Children with dyslexia were compared to their age-matched controls on a number of measures. In addition to poor reading skills, the children with dyslexia also had low scores on phonological coding, rapid automatic naming, and spelling compared to both population means and the matched controls. Children with dyslexia participated in a 28-hour program across 14 days involving linguistic awareness, alphabetic principle, fluency, and reading comprehension. The children in the matched control group did not receive any treatment. Pre-/posttreatment improvements were noted for the children with dyslexia in skills on three tasks: pseudoword reading, letter–phoneme matching (judging whether the letters in two words represented the same sound), and letter matching (judging whether two letter strings matched exactly). In addition, fMRI data obtained from the children with dyslexia and the matched controls showed that the quantity and pattern of brain activation in multiple brain areas of the children with dyslexia after participation in the treatment program resembled that of the control children.

Consistent with these findings are those of Temple *et al.* (2003), who investigated how a remediation program influenced the oral language and reading skills of children with dyslexia and whether fMRI measures of brain processing reflected the influences of the remediation. Children with dyslexia were matched according to age, sex, handedness, and nonverbal IQ to controls. Remediation focused on auditory processing and oral language skills using

computer-based training in specific skill areas. After training, significant changes in behavioral scores for the children with dyslexia were noted for real word and pseudoword reading, and reading comprehension, with scores of the dyslexic group moving into the normal range. Data obtained by fMRI showed increased brain activation in multiple brain areas of the children with dyslexia, and the magnitude of activation increase was correlated with improved oral language skills. While these findings do not indicate that the brain processing of children with dyslexia was normalized by the treatment programs they participated in, there is clear indication that brain processing is influenced by treatment, such that there are changes in areas and levels of activation.

Together, studies of children with developmental dyslexia and developmental dysgraphia provide evidence of how these disabilities are manifested in behavior and also how they impact children's lives inside and outside of the classroom. These studies have also been helpful in understanding the similarities and differences in skills and skill development in children with disabilities and those of typical developing children. The focus of researchers not only on identification and diagnosis of disabilities but also on the identification and/or development of effective treatment programs for children is encouraging for children, parents, clinicians, and researchers.

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See also: Classical Tests for Speech and Language Disorders; Developmental Relationship between Language and Cognition; Language Development: Overview; Phonological, Lexical, Syntactic, and Semantic Disorders in Children.

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Developmental Relationships between Language and Cognition

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Rationale and Background

Questions about how people perceive, categorize, store, abstract, and generalize information are among the most interesting and important questions in all of science. In some sense, these questions precede all others. Human cognition is the lens through which we understand everything in the world around us. We are the only species on the planet that creates societies, religions, and governments, writes novels and operas, and invents pacemakers and airplanes. Why is human intelligence so unique? An obvious candidate for the unique nature of human thought is the development of human language. Yet between the 1960s and 1990s, anyone who even asked how language influences cognition was considered misguided. Two developments led to this view. One was the empirical work on the relation between color names and color discrimination. Variation across the worlds' languages in color words did not predict the ability of speakers of those languages to differentiate colors (e.g., Rosch, 1973). The second factor was the theoretical climate. The

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dominant position in the study of language was Chomsky's approach that emphasized modular and encapsulated language processes that functioned independently of cognition (Fodor, 1983). Modularity was hot and researchers in many areas adopted similar views. By the early 1990s, even aspects of children's social cognition was argued to be modular.

What changed in the last 10 years? First, the empirical landscape changed. The 1990s saw a number of studies suggesting language effects on cognition in domains as variable as conceptual development (Sera *et al.*, 1997) memory (West and Bauer, 1999), space (Choi and Bowerman, 1991; Levinson, 1996), and number (Miller *et al.*, 1995). Even the original color findings have come under fire (Özgen and Davies, 2002). Now even though there may be methodological issues with the recent studies (to be reviewed below), the consistency of findings across samples, tasks, and domains offer ample evidence that language affects cognition in many different and significant ways.

The theoretical landscape has also changed within the last 10 years. In the 1970s–1990s, modularity was married to nativism. Chomsky's idea that grammatical development consisted of 'recognizing' one's grammar from a limited set of possibilities was just as popular as his proposal that language was modular. This version of nativism was embraced by researchers studying a variety of different topics (object concepts, number concepts, semantics, theory of mind, etc.). Many researchers emphasized that 'core knowledge,' the most important seeds of human intelligence, were present at birth or shortly thereafter. By this view, nothing important was thought to develop. However, the hypothesis that language affects cognition is also a hypothesis about cognitive development. For language or any other type of environmental experience to have an effect on a cognitive process, that cognitive process must be malleable and changeable over time. The emphases on nativism and core knowledge directly contradict the possibility of significant language effects on cognition. However, the belief in preexisting core knowledge has diminished over the last 10 years. There are now connectionist and dynamic systems approaches that emphasize development, interaction, and change (Thelen and Smith, 1994; Elman *et al.*, 1996). There are also findings showing that the supposed 'core' aspects of human intelligence are present in animals, which has led even some of the most ardent supporters of innate core knowledge to abandon their views (Spelke, 2003).

Methods of Language–Thought Studies

Of course, it is not ethical to study the effects of language on cognition by keeping a randomly chosen group of children from learning language and then examining their cognitive development. So, researchers have to take advantage of naturally-occurring variability in language acquisition. Roughly stated, the primary methods used to study language–thought relations are: (1) thought without language studies; (2) before versus after language studies; (3) crosslinguistic studies, and (4) comparisons of linguistic versus nonlinguistic concepts. Each has different strengths and weaknesses. We summarize and briefly evaluate each approach below.

Thought without Language Studies

The 'thought without language' studies typically involve a comparison between two groups, one with and the other without language. The most striking of these are the reports of two 'wild' children, Victor and Genie, who were not exposed to language as children. Both were found at around 12 years of age, and after years of intense training, both were able to learn words. Genie, who was trained in both sign and spoken language, learned to combine words and phrases, but the sentences she produced were ungrammatical. Victor's and Genie's deficits in others areas were profound: Victor remained institutionalized throughout his life; Genie resides in a home for mentally retarded adults. The correspondence between the lack of language and cognition is dramatic in these two cases. However, no one knows if there was some preexisting cognitive deficit or other unusual aspects of their situations that prevented Victor and Genie from learning language, or whether their failure to learn language led to the other deficits.

There are also a few large-scale studies of deaf children who have not been exposed to a sign language. The advantage of studying the deaf is that one can be reasonably sure of their starting point – i.e., that deafness is the only difference with which they start. The first to use such an approach was Furth (1966). Furth compared concept acquisition in deaf children who had very little language to hearing children of the same age. Results were mixed, with deaf children showing no difference on some concepts (e.g., same/different) but consistently lagging in others (e.g., opposites). De Villiers and de Villiers have more recently used this approach to understand the role of language in developing knowledge of others' mental states. This study also suggests language-driven effects.

Along these same lines, there have been studies of nonverbal cognition in children with specific language impairments (SLI). Children with SLI have no hearing or motor deficits, no neurological trauma, and no signs of unusual social or emotional interactions. They have small vocabularies and their

sentences lack grammatical morphemes. They consistently show nonverbal cognitive deficits in symbolic play, mental imagery, and crossmodal mapping (Leonard, 1998). Long-term, they have difficulty with reading and mathematics, and the relation between SLI and IQ changes dramatically over time. Results consistently show a drop between 10 and 20 IQ points between elementary-school aged children with SLI and these same children as young adults. After 5–10 years, the decrease in IQ is so severe that over 20% of the children no longer qualify as just being language impaired. Importantly, children with SLI actually possess many aspects of language, so these findings **underestimate** the impact of language on thought. The main problem with these studies, however, is that there is probably no such a thing as just a specific language impairment. Recent evidence suggests slower processing speeds among children with SLI. Nonetheless, these findings illustrate the nature of language–thought relations. Small processing deficits lead to difficulty in the acquisition of grammatical morphemes. Failure to master grammatical morphemes leads to difficulty in processing complex sentences. Failure to process complex sentences seems to lead to difficulty in extracting varied and complex relations. A small cognitive deficit leads to a small language deficit which subsequently snowballs into broader cognitive delays.

Before and After Language Studies

Researchers also examine some cognitive ability before and after children acquire some aspect of language. This approach has been used to study children's developing theory of mind, their knowledge of the distinction between solid objects and substances, their number concepts, and the ability to represent spatial relations. Many findings suggest that the acquisition of certain words leads to other cognitive abilities. The major problem with this approach is that it is also correlational, so while language might appear to be causing some advance in cognition, there might be a third factor causing both the language and cognitive changes under study.

A related strategy involves teaching people or animals certain linguistic forms or symbols, and then comparing their performance to those who have not been trained. This methodology is a powerful one since it is not correlational, especially when it is coupled with other methods (Sera *et al.*, 2002). However, there are severe limits to the 'languages' that experimenters can create and that adults can learn in a few hours or sessions. Additionally, if language truly impacts cognition, then training adults who have already been affected by the language that they have learned may be limited. Language-learning in language training studies also differs greatly from the normal natural process through which people learn language. So findings from these studies also underestimate language's impact on thought.

Crosslinguistic Studies

Another common approach to the study of language-thought relations is the crosslinguistic design. These studies involve comparisons of the representations of some aspect of the world that are coded differently across speakers of different languages. The main advantage to these designs is that they involve a naturally-occurring 'manipulation' of language, so the criticisms that apply to correlational designs do not hold. The main disadvantage is that if differences are found, it is sometimes difficult to attribute that difference to language instead of some other difference between the groups. Crosslinguistic designs, however, have an added advantage: If language reflects cognition, and some evidence suggests that it does, then by studying contrasts marked by other languages, we stand to gain a broader picture of human knowledge and its development. There are two paradoxes to using this approach. One is that in order to tightly link the difference on some cognitive task to a difference in language, both the language contrast and cognitive task must be very specific. However, when such differences are found, critics often label these effects as relatively small and unimportant. The broader and more general the differences, the harder they are to attribute to language. The larger paradox of this approach is that the big ways in which language affects cognition probably do not vary across languages of the world. For example, we know of no language that has no words for objects, no relational terms, and no complex sentences. So crosslinguistic designs cannot reveal the larger, universal ways in which language influences thought.

Linguistic Versus Nonlinguistic Knowledge

A number of studies examine the relation between language and cognition by looking at the development of some concept in a verbal and nonverbal task. Most of these studies have been done among English-speaking children, and many but not all of the results from these studies suggest that nonverbal knowledge precedes knowledge of words. For example, Levine and Carey (1982) showed that 2.5-year-old English-speaking children performed better in a nonverbal task that tested their knowledge of the concepts of 'front' and 'back' when they had to make a parade, rather than when they were simply

asked to point to the backs and fronts of objects. Making a parade in which the front parts of several objects are aligned in one direction requires that children know the intrinsic front and back sides of particular objects (e.g., refrigerators, houses, people, etc.). Using a similar strategy, Smith (1984) showed that 2.5- and 3.0-year-olds performed better in a nonverbal 'follow-the leader' task in which children had to choose objects that matched those chosen by two experimental models of concepts such as 'same,' 'different,' 'tall,' and 'short.' Results from these studies also showed that early knowledge of attributes and dimensions precedes the learning of words.

One problem with these studies is that it may be impossible to formulate equally difficult verbal and nonverbal tasks of the same concept. Another problem is that these studies have to focus on relatively simple concepts that can be instantiated nonverbally in straightforward ways. A third problem is finding true nonlinguistic tasks. Every time an effect of language is found critics of linguistic relativity redefine the task as being a linguistic task, either directly or indirectly. The critics want a test of 'pure' cognition. But if human language is as pervasive in human thought as the evidence indicates, there may be no such tasks.

Cognitive Domains Affected by Language

Listing all the ways in which language affects human cognition and behavior would be a very long exercise. The most obvious way is that language plays a dominant role in **what** adults think about. Language dominates conscious thought. Cultures pass information from one generation to the next through human language. However, we believe a more interesting issue is whether language affects **how** we think. Thus, we limit ourselves to examining how language drives systematic changes in the organization and representation of knowledge.

Many areas within cognitive development have received attention recently with respect to language–thought questions. Language effects on cognition have been found in memory development, conceptual development, color perception, spatial representations, mathematical concepts, gender concepts, theory of mind, and many other areas. The domains that we review below are those that have received attention from different researchers using different methodologies.

Categorization and Perception of Color

Almost every textbook in cognitive psychology, linguistics, and psycholinguistics begins and ends their discussion of the role of language on cognition by reviewing the work on the relation between color names and the discrimination of colors. In the early 1950s, research showed that speakers of English were better able to recognize and remember colors that were more nameable, or on which most speakers agreed on names (see Özgen and Davies, 2002, for a recent review of empirical work). These findings were taken to support the Sapir–Whorf Hypothesis of Linguistic Relativity, which stated that languages vary widely in the way they organize reality and that the thoughts of speakers of a language are shaped accordingly (Whorf, 1956). The linguistic variability observed across languages implied differences between speakers of different languages in the perception of color. However, color names do not vary freely. If a language has only two color terms, they tend to refer to 'dark' and 'light'; languages with four color terms tend to refer to red, yellow, green and blue – the colors that English speakers can best recognize and remember (versus pink or brown). In short, color terms seem to vary in highly constrained ways. Moreover, Rosch's studies (Rosch, 1973) showed that speakers of a language with only two color terms and did not have names for 'red' or 'blue,' nonetheless showed an advantage in remembering these colors over other colors (e.g., pink). The case for linguistic relativity appeared to be dead when Bornstein, Kessen, and Weiskopf (1976) found that 4-month-old infants who have virtually no experience with color names categorize colors similarly as English-speaking adults. It is also known that receptors in primate retinas selectively respond to red, blue, yellow, and green. Thus, it seemed that language could have no effect on color perception.

However, questions began to arise, because participants in Rosch's tasks performed very poorly overall. Subsequent findings showed that differences in color naming systems across languages did affect color processing. Studies on infant color perception have more recently shown that infants do not perceive colors in terms of the same categories as adults. Most recently, Özgen and Davies (2002) report that adult native speakers of English can shift their color boundaries with three or four days of training. Clearly, language seems to play a larger role in the development of color perception than what was believed in the late 1970s.

The Representation of Space

Another source of evidence supporting the Sapir–Whorf Hypothesis is Levinson's (1996) work on language and spatial cognition. Languages differ in how they code spatial relations. For example, English and Dutch commonly use relative frames of reference

such as 'to the right' and 'to the left' when coding the positions of objects. Other languages use more absolute terms that approximate the meanings of 'north' and 'south.' The dialect of Tzeltal that is spoken in the Indian community of Tenejepa in Chiapas, Mexico is such a language. So, when asking for one of two cups on a table, a speaker of English might ask for the one 'on the right,' whereas a speaker of Tzeltal might ask for the 'northernmost' one. Levinson (1996) compared how speakers of Dutch and Tzeltal recalled spatial relations between pairs of objects that could be coded either in terms of a relative (right-left) or an absolute (north-south) frame of reference. He found that the speakers of Tzeltal used an absolute frame of reference, while speakers of Dutch used a relative frame of reference.

Crosslinguistic developmental studies by Choi and Bowerman spanning over the last 15 years suggest that language-driven differences in the coding of spatial relations emerge at a very young age. These researchers have focused on differences between English and Korean in the terms used to express containment. There are two Korean terms that both map onto 'in' in English. One (*kkita*) is used for tightly fitting containment relations, the other (*nehta*) for loosely fitting ones. Children learning Korean acquire the linguistic distinction easily and effortlessly (Choi and Bowerman, 1991). Interestingly, children exposed to English can make a nonverbal distinction between tight- and loose-fitting containment relations at 18 and 24 months of age. However, by 36 months of age children exposed to English were less sensitive to the tight-versus loose-fitting distinction unlike children learning Korean of the same age (Choi, 2005). These findings suggest that we are sensitive to a very broad range of spatial relations and that the semantic system of our language selects the ones we use.

However, the ability to code certain spatial relations may be completely driven by language. Spelke (2003) has recently argued that children's ability to encode certain spatial relations depends on acquiring certain words, namely the words 'right' and 'left.' In a reorientation task, participants are asked to search for an object after being disoriented in a small room. There are two distinctive features of the room that need to be used together in order for a participant to successfully find the hidden object. First, the room is rectangular. If participants use only the shape of the room to reorient, they will search equally in one of two opposite corners. Second, one of the walls is a distinctive color (e.g., blue). Participants who can combine their knowledge of these properties of the room will successfully reorient to find the hidden object. Spelke argues that it is language's specific ability to combine words that enables people to combine the information necessary to solve such tasks.

Knowledge about Misleading Appearances and Beliefs

As adults, we know that things are not always as they appear, and that our perceptions and beliefs can be misleading and incorrect. Knowledge that there exists a state of affairs different from what is in one's own mind also seems to be driven, at least in part, by language. The evidence for this view comes from crosslinguistic (Sera *et al.*, 1997), thought without language (de Villiers and de Villiers, 2003) and training studies (Lohmann and Tomasello, 2003).

First, Sera *et al.* (1997) examined the effects of language on developing knowledge of 'real' and 'apparent' properties by comparing the performance of monolingual and bilingual English- and Spanish-speaking preschoolers in a series of appearance-reality tasks. In a typical appearance-reality task, children might be shown a white lamb that is then placed behind a red filter. Children are asked, 'What color is the lamb right now, is it red or is it white?' Then, they are asked what color is the lamb really and truly, is it red or white? Young English-speaking 3-year-olds often say that the lamb appears red and that it is really and truly red. Thus, they take their own perceptions to reflect reality. On the other hand, the Spanish-speaking children are more likely to maintain that the lamb remains white. Spanish has two verbs translated as 'to be,' *ser*, which is used for permanent and/or inherent characteristics and *estar*, which is used for temporary and/or accidental properties. Thus, the Spanish language may facilitate the ability of young Spanish speakers to identify real properties.

Along the same lines, de Villiers and de Villiers (2003) have studied theory of mind development in deaf children who learned sign language later than other children typically acquire language. They also studied Deaf children of Deaf parents who use ASL. Deaf children of deaf parents acquire sign language at comparable ages to hearing children learning spoken languages. The de Villiers proposed that in order to form a representation of another's beliefs, one must have a language that offers verbs to represent another's mental state (e.g., to think, to know). The de Villers tested deaf children who were fluent in American Sign Language (ASL), deaf children who began learning ASL late, and hearing children. Deaf children who were native signers of ASL and hearing English-speaking children were able to accurately predict whether another person had a correct or erroneous understanding of a situation. In particular, children's ability to use an embedded proposition

(e.g., 'he thought that the dog was a cat.') appeared to play a causal role in children's ability to predict a person's thoughts about a situation. The main limitation to this study is that while it is clear that this very specific language ability was present when children passed the theory of mind task, it does not demonstrate that the acquisition of language *per se* caused this change.

However, Lohmann and Tomasello (2003) showed that training 3-year-old children with sentential complements improved their performance on false belief tasks. To encourage young children's acquisition of embedded complements children were asked to help an experimenter clarify what a protagonist in a story had done or said. For example, if one character, Ernie, says: 'This chair belongs to my grandfather. I know that!' The experimenter would ask, 'What does Ernie know?' To answer correctly, children had to use one clause as the complement of the other (e.g., Ernie knows that the chair belongs to his grandfather). This training had a huge impact on children's ability to understand sentential complements. Importantly, children received several types of training (training with deceptive objects, with verbs of mental states, etc.). However, training on sentential complements was the only type of training that reliably led to subsequent improved performance on false belief tasks. These findings offer strong evidence that language plays a central role in children's developing knowledge of other mental states.

Mathematical Knowledge

One of the most striking examples of how language may influence cognition comes from the literature on developing mathematical knowledge. Several findings indicate a relation between knowledge of number words and the ability to conserve. Conservation refers to the ability to determine when quantities change or remain the same in the face of misleading perceptual appearances. The classic Piagetian number conservation task involves presenting children with two arrays of objects, with too many objects in them for the children to count. Each object in one array is closely aligned with an object from the second array so the child agrees that each array contains the same number of objects. Then, the objects in one array are spread apart. Children are asked if the arrays are still the same or if one has more. Young children tend to claim that the amount in one array has changed. Gelman and Gallistel (1978) showed that 2- to 3-year-old children could succeed in conservation tasks that contained small numbers, if the array contained amounts that the children could count accurately. So counting – a language skill – enables children to succeed in conservation tasks. But how do children go from conserving up to the numbers they can count to conserving large amounts without counting? By counting, children prove to themselves that if nothing is added or subtracted quantities do not change. In other words, a language skill may drive the cognitive skill.

Crosslinguistic studies offer corroborating evidence. Recent findings by Gordon (2004) suggest that people whose language lacks number words also lack important mathematical knowledge. Gordon (2004) studied a tribe known as the Pirahã from Amazonia whose language does not code specific numerosities but only makes a distinction between one (or a few) and many. Across several different kinds of objects, Gordon found that members of that tribe could not establish whether groups of objects that contained 3 or more objects were the same or different. Of course, it is not clear whether there are other nonlinguistic factors that lead to the Pirahãs' pattern of performance, or if the Pirahã (Múra-Pirahã) actually **cannot** conceptualize exact numerosities as Gordon claims. And although Gordon's claims are extreme (corresponding to the apparent lack of number language in the Pirahã), other investigators studying languages who differ from English in their counting system similarly report differences between children who speak those languages in mathematical concepts (Miller *et al.*, 1995).

Training studies with animals also highlight the role of symbols in numerical judgments. When chimpanzees have to point to the smaller of two quantities in order to receive the larger quantity themselves, they fail. However, if they have learned symbols for the quantities, they can easily point to the smaller of two number symbols in order to receive the larger amount of a treat (Boysen and Bernston, 1995). Again, knowledge of number symbols encourages more abstract judgments.

The Distinction between Solid Objects and Aggregates or Substances

Several areas within categorization and conceptual development have received attention with respect to language–thought relations. However, the area that seems to have received the most attention has been the relationship between count-mass syntax and the conceptual distinction between solid objects and aggregates or substances. Count-mass syntax involves the distribution of the plural-*s*, determiners, quantifiers, and measure words. The English plural-*s*, and words such as 'a,' 'any,' 'some,' 'one,' 'two' cooccur with English count nouns (e.g., 'cup'); quantifiers such as 'much,' 'little,' and 'less' and unitizers such as 'pieces,' 'loaves,' 'glasses' accompany English mass

nouns (e.g., 'cup') which do not take an *-s* in their plural forms. Many researchers believe that English count nouns refer to solid individual objects with clear-cut shapes that can be counted, and that English mass nouns refer to substances or aggregates. Thus, the question comes up as to which comes first, the conceptual distinction between solid objects and substances or knowledge of count-mass syntax?

Soja, Carey, and Spelke (1991) asked whether 2-year-old-children, whose production of count-mass syntax was incomplete, would rely on a preexisting conceptual distinction between solid objects and substances when learning the meanings of novel nouns. They presented children with novel nouns that referred either to a solid object or a substance, and then asked whether children would generalize the noun to an item that matched the object in shape or one that matched it in substance. Children generalized the novel nouns to entities of the same kind, so Soja *et al.*(1991) concluded that a preexisting conceptual distinction between solid objects and substances guides children's acquisition of count-mass syntax.

However, productive language frequently underestimates language development, so Soja *et al.* (1991) probably underestimated children's mastery of count-mass syntax. Indeed in subsequent work, Samuelson and Smith (1999) showed that English-speaking children between 17 and 33 months of age do not systematically generalize names for solid objects by shape until they already know many English count nouns. The latter findings imply that children use the statistical correspondences between the objects for which they have names, the nouns' accompanying morphology, and the degree to which the nouns are defined by shape similarity as a basis for novel word generalization. Another problem with the idea that there preexists a conceptual distinction onto which count-mass syntax maps is that there are vast differences across languages in whether nouns are classified as 'count' or 'mass.'

Some languages, namely numeral classifier languages, do not seem to honor any syntactic distinction between count and mass nouns. In these languages, noun classifiers – words that appear between determiners and nouns – are obligatory. For example, in Mandarin Chinese, the classifier *zhi* (meaning something like 'lengths') must occur with the noun for pen (*bi)* as follows:

san zhi bi 'three Cl pen' 'three pens'
*san bi 'three pen'
zhe zhi bi 'this Cl pen' 'this pen'
*zhe bi 'this pen'

Thus, nouns in classifier languages seem to function like English mass nouns such as rice (*three rices). Like Chinese, Yucatec-Mayan (Maya, Yucatán) is also a classifier language. Lucy (1992) focused on differences between speakers of English and Yucatec-Mayan in classification. Lucy used pictured objects to test speakers of Yucatec Maya and speakers of English. He asked speakers of both languages to choose a picture that was more similar to a target picture. The participants had to choose between one picture that was similar to the target in shape and a picture that was similar to the target in material. He found that English speakers preferred the shape choice, and Yucatec Maya speakers preferred the material choice. He attributed this difference to the idea that all nouns in Yucatec Maya function like English mass nouns and thus denote substances rather than solid entities. Lucy has more recently shown that this difference between English and Yucatec speakers emerges around 9 years of age.

However, not all studies that have examined reliance on shape and material similarity between speakers of English and other classifier languages have found more reliance on material substance by speakers of classifier languages (Zhang and Schmitt; Imai and Gentner, 1997; Kuo and Sera, 2004). Some reports indicate that speakers of Chinese, a language in which the numerical classifiers are based on shape, actually rely on shape more heavily than English speakers. Thus, the relative salience of shape and other dimensions across the world's different classifier languages seems to depend on the nature of the classifiers themselves.

Relational Knowledge

One of the boldest claims regarding the relation between language and intelligence involves relational knowledge. Relational concepts enable us to make comparisons between objects or situations and so are not neatly packaged as perceptual units, unlike colors or objects. Some examples of terms that refer to relational concepts are 'same,' 'lie,' 'symmetry,' and 'predator.' These terms refer to a relationship across different kinds of objects and situations. They pick out patterns. Within the last 10 years, Gentner and her colleagues (Gentner, 2003) have proposed that relational concepts are the most unique aspect of human intelligence and that they are critically important for analogical reasoning. The role that analogical and relational thinking play in human intelligence is born out by the fact that such items are a large component of IQ tests. The bold part of Gentner's proposal is the claim that relational thinking is sometimes only made possible by relational language. For example, in a series of tasks that required 3-, 4-, and 5-year-old children to find hidden objects by

extracting a relational pattern, 3-year-olds could only extract the pattern when relational terms (e.g., 'on' the shelf) were used to describe the hiding places.

Gentner's claims about the role of relational language in higher order thinking is bolstered by work on primate cognition (Premack, 1983). It typically takes nonhuman primates hundreds or thousands of trials to learn a match-to-sample task. This task tests knowledge of the relational concept 'same.' In these tasks, animals are presented one sample object and then given two choices, one that matches the sample and one that does not. In a match-to-sample task, the animal has to pick the one that is the same as the sample. In a relational matching task, two items make up the sample, (e.g., two bananas). Then the animal has to pick between two pairs of objects, one that is the same (two oranges) the other that is different (an apple and a banana). Only if chimpanzees are taught the symbols for 'same' and 'different' can they then succeed in a relational matching task. Taken together with Gentner's findings, the case for relational terms enhancing relational thinking is very strong.

Language–Thought Dynamics

Cognitive processes are multidimensional, and caused and affected by multiple forces. Language and its development is also multidimensional. Thus, different aspects of cognition will influence language at different times and in different ways, and different aspects of language will influence cognition at different times and in different ways. For these reasons, there will be different mechanisms through which language and cognition interact. A great deal more groundwork needs to be done examining area by area and detailing the range of ways in which language and cognition interact.

Partial Mental Representations Precede Early Word Learning

Common sense as well as empirical evidence indicates that the initial learning of names for objects, actions, events, and relations depends on some initial preexisting mental representation of the world. Children and animals have to mentally represent something before they can map a symbol onto it. However, there is less agreement about how complete the initial representation needs to be before language is learned. Some believe that the preexisting representations are virtually complete and that language learning involves a simple selection of preexisting concepts and mapping words onto them (see Clark, 2003 for a contemporary example of this position). We believe that the evidence from different domains indicates that the initial representations of objects and relations are **very** incomplete and take their final form largely as a function of language learning (see Samuelson and Smith, 1999 for a recent example of this position). Exactly how does language shape the final form of human thought?

We believe that the general mechanism through which language affects cognition is by driving selective attention. Attention is the mechanism by which an organism singles out some particular piece/s of information to rely on when making judgments. We do not believe that selective attention is an 'add on' process but that it is part and parcel of every judgment. Nor is attention a conscious intentional process – even perceptual color judgments by pigeons require selective attention. Thus, a large part of understanding cognition is understanding how the distribution of attention changes with changes in context, task, language, and age. In the following paragraphs, we elaborate on how language drives attention. We borrow extensively from Gilbert Gottlieb's framework for understanding the roles of experience in development (Gottleib *et al.*, 1998).

Language Maintains Some Abilities

There are some biases and distinctions that preexist prior to the acquisition of language, and learning certain aspects of language enables the organism to keep these distinctions. That is not to say that these distinctions are innate and unaffected by any experience, just that they appear to emerge prior to and independently of language. It is clear from the work of Choi and Bowerman (1991) and from the work on color perception (Rosch, 1973) that some words are mapped onto some preexisting distinctions. It is also clear from this work that without continued use of these distinctions through language, the distinctions disappear. Children and adults who speak English are not as sensitive to tight-fitting relations as Korean speakers. The Berinmo who speak a language without terms for 'green' and 'blue' lose their sensitivity to the distinction between these colors, which presumably they had at some point, given their primate physiology. For many other areas, however, we simply do not know which distinctions preexist and which do not. For example, we do not know whether either absolute (north-south) or relative (right-left) reference points emerge before language.

Language Tunes-up Some Abilities

Other sources of evidence indicate that certain biases and distinctions that exist prior to the acquisition of language are made stronger and more salient as language is acquired. One such bias seems to be the reliance on shape or material substance as a basis

for classification. It appears that speakers of English and Chinese become more reliant on shape as a basis for classification as they learn their languages, whereas speakers of Yucatec Mayan become more reliant on material substance in their classifications. Much work in cognitive development suggests that cognition progresses shift from being holistic to being analytic. Thus, language plays a major role in picking out and magnifying the relevant dimensions for analysis.

Language Facilitates Acquisition of Some Abilities

It is also clear that language can accelerate the rate at which certain abilities are acquired. Focusing on differences between English and Spanish in the ways the languages mark the status of properties, Sera *et al.* (1997) suggested that language can lead children learning Spanish to discriminate 'real' from 'apparent' properties earlier than children learning English. The evidence on the role of language in false belief tasks also indicates that understanding sentential complements leads children to better understand that others can have thoughts that differ from their own. In these areas, language plays only a facilitative role, because without language these abilities may still develop. That is, there are other factors that can lead to the development of these same cognitive abilities.

Does Language Induce Some Abilities?

Are there some abilities that are **never** acquired if one lacks some critical aspect of language? If so, then language could be said to induce those abilities. Language appears to be a necessary but not sufficient component in the ability to reason about certain mathematical concepts, such as relationships between large numbers. At the very least, relational language facilitates the extraction, representation, storage, and/or retrieval of relational concepts. However, language may also induce some of these concepts.

Summary and Conclusion

The evidence garnered over the last 10 years on the relation between language and cognition is complex, confusing, and contradictory. The evidence is complex, because both cognition and language are multidimensional and affected by different factors at different times. Sometimes cognition has effects on language. Sometimes language has effects on cognition. Early in development, certain aspects of cognition are critical for getting language off the ground. With increasing development, however, language seems to play a larger and larger role in organizing knowledge. There is currently no neat framework that ties everything together.

See also: Classifiers and Noun Classes: Semantics; Cross-Linguistic Comparative Approaches to Language Acquisition; Developmental Dyslexia and Dysgraphia; Human Language Processing: Connectionist Models; Language Development: Overview; Logic and Language: Philosophical Aspects; Modularity of Mind and Language; Phonological, Lexical, Syntactic, and Semantic Disorders in Children; Specific Language Impairment.

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Development of Communication in Animals

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Research on developmental processes has played an important role in the history of animal communication. Communication signals constitute a behavioral system of discrete events that are relatively easy to define and to quantify and therefore valuable in testing various theories about behavioral development. Communication signals also provide complex, but biologically important, input for neurobiological investigations of development. Developmental studies of animal communication have been influential in providing models for study of human speech and language development and evolution. One example is a classic paper by Peter Marler on five parallels between birdsong and speech development: (1) both use an auditory modality; (2) both require auditory feedback to develop normally; (3) both require adult vocal input during a sensitive period after which acquisition of vocal skills is extremely difficult, if not impossible; (4) both require input from a tutor of the same species; (5) both require a period of practice (subsong, plastic song in birds or babbling in human infants) to develop adult signals (Marler, 1970). This model developed from birdsong has had great influence on studies of infant language development over the past 35 years.

Development of communication can be separated into three distinct components:

1. Production – what is the process leading to the production of adult forms of signals?
2. Usage – what is the process that leads to the production of signals in an appropriate context?

method for learning which sounds to group together (as in words or call sequences) through purely associative processes without reinforcement.

Why is there such variation in developmental processes? Different developmental processes might have adaptive value for signals with different functions. Alarm calls or infant distress calls should be highly conserved in structure within a species with little plasticity in these calls. On the other hand, while some aspects of signals of courtship or affiliation should be conserved to ensure mating with the right species, these calls might also be adaptive if more flexible to allow mates or group members to recognize each other and behave positively toward a limited set of conspecifics. This is especially true for species that are more mobile and thus may encounter many individuals from distant areas. The white-crowned sparrows described under closed-ended learning were non-migratory, but a migratory subspecies of white-crowned sparrows have a much more open period for learning. Among mammals, those that move for long distances either in oceans (marine mammals) or in the air (bats) appear to have more plasticity in vocal production than terrestrial mammals that typically do not travel more than a few home range diameters from their natal group. Relative mobility may make vocal learning adaptive.

Individuals of many species benefit from recognizing individuals within their group on the basis of communication signals and can benefit from attending to signals produced by sympatric species especially with reference to predators. Thus, learning should play an important role in signal comprehension in all species, mobile or not.

Development of communication is complex, with multiple processes that may vary between production, usage, and comprehension, and may vary even within a species in terms of which types of signals develop by which processes. Only with increased clarity and precision about developmental processes in animal communication can animals become useful in developing models of human language development. Given the impossibility of having precise environmental control over human development, the careful selection of appropriate animal models is critical and provides a valuable way to test hypotheses about human language development and evolution.

See also: Animal Communication: Vocal Learning; Birdsong; Communication in Marine Mammals; Individual Recognition in Animal Species; Language Development: Overview; Non-human Primate Communication.

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Giacomo Devoto was a historian of language and the founder of 'linguistic neo-historism,' an approach based on the assumption that all phenomena of language have found historical reification. For Devoto, linguistic data were 'sources of history.' He exhorted the historian to look outside traditional sources and the linguist not to stay within the boundaries of technicalities that are an end in themselves.

Born in Genoa on July 19, 1897, he received his education at the University of Pavia. After taking part in World War I, he graduated in 1920, producing a thesis that compared the development of Indian and Romanian phonetics (Devoto, 1923). From 1920 to 1924 he studied in Berlin, Basel, and Paris with, among others, Jakob Wackernagel and Antoine Meillet. In 1924 he received his *libera docenza* and

in 1926 started teaching at the University of Cagliari, followed by appointments at Florence and Padua. He came back to Florence in 1937, where he taught Indo-European languages, glottology, and Sanskrit until his retirement in 1967. He died on December 25, 1974, while still the untiring president of the Accademia della Crusca.

Latin, Greek, and Etruscan, with the Etruscan playing the role of intermediate between Greek and Latin, were a constant field of Devoto's research. He applied the combinatory method in his edition of the *Tabulae iguvinae* (Devoto, 1937), a ritual text and a reference text for ancient Italy. Devoto exalted the method of the 'internal proof,' which requires a known external to be imported into an unknown internal, so that all the imported external becomes part of a combinatorially established construct that marks the opening and the closure of an era.

Devoto's masterpiece, a profile of Italian (Devoto, 1953), found its beginning in his works of the thirties on the ancient Italics (Devoto, 1931) and on the history of language in Rome (Devoto, 1940). He proposed that the Indo-Europeization of Italian came about on the basis of (1) the factual assumption that Oscan and Umbrian are two distinct Indo-European dialects, whose diversifying traits are very ancient, and (2) the theoretical hypothesis that one should stop talking about Latin (or Proto-Latin) and Italic (or Proto-Italic), and talk instead of Latin and Italic languages that are anchored in space and time, because the dates of their coming to Italy are in some cases separated by thousands of years.

The father of Etruscology, Devoto was also a normative reference to all Italianists, the one that preceded and dominated his fellow scholars in Italian studies (Prosdocimi, 1991).

See also: Celtic; Combinatory Categorial Grammar; Greek, Ancient; Greek, Modern; History of Linguistics: Discipline of Linguistics; Indo–European Languages; Italian; Latin; Sanskrit.

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Dhivehi

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General

Dhivehi (Dhivehi Bas, Divehi, Maldivian) is the language of the Maldive Islands, where it is the official language, with approximately 3.2 million speakers (U.N., 2003). It is also spoken by about 3000 inhabitants on the island of Minicoy (Maliku), a territory of India, where it is known as Mahl. It is an Indo–European language of the Indo–Aryan family, and its closest relative is Sinhala of Sri Lanka, with which it forms a separate southern (island) subbranch. Though the two languages are clearly related and share many structural features, they are mutually unintelligible. The manner and date of their separation is uncertain, and serious scholars have proposed widely varying times. It has been suggested, on the one hand, that they represent a common source but separate settlements in the mid-first millennium B.C.E., the generally recognized date for the arrival of Sinhala in Sri Lanka. On the other hand, a date as late as the 10th century through the importation of Sinhala into the Maldives has been proposed. One problem is that some important sound changes that would appear to be common to the two, when examined closely, turn out to have slightly different conditions. Thus, there are signs of divergence as early as the 1st century B.C.E., but these are followed at several subsequent points by changes shared by the two languages that are of a kind that are uncommon elsewhere. Certainly the earliest and latest dates proposed seem extreme on the basis of more recent research, and one scenario might be that divergence began around the first century B.C.E. but was followed by Sinhala influence over time, together with some dialect admixture within Dhivehi and contact of both languages with South Indian Dravidian (for a detailed account see Cain, 2000).

The base vocabulary of Dhivehi is Indo–Aryan, but it has incorporated many words from other

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See also: Celtic; Combinatory Categorial Grammar; Greek, Ancient; Greek, Modern; History of Linguistics: Discipline of Linguistics; Indo–European Languages; Italian; Latin; Sanskrit.

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The base vocabulary of Dhivehi is Indo–Aryan, but it has incorporated many words from other

languages, including Arabic, English, and Dravidian as well as Sinhala.

The Maldives are a chain of over 1000 islands in atolls (a word borrowed from Dhivehi) ranging 450 miles north and south, and there are significant dialect differences within it. The standard language is based on the language of Malé, the capital, in the North. The speech of the southernmost atolls differs from the standard in important respects. There is also differentiation within the southernmost atolls (see Fritz, 2002). The Mahl of Minicoy is mutually intelligible with the Malé variety, and there is significant cultural interaction between Minicoy and the Maldives. Maldive literacy is high: almost 99% in 2001.

Although Dhivehi is the official language of the Maldives, and the first language of the regular inhabitants of the islands, there is widespread knowledge of English, and English is the medium of instruction in government schools.

Phonology

Like other Indo–Aryan languages, Dhivehi has voiced and voiceless consonants and a contrast between dental and retroflex stops. There are five vowels: *i, e, a, o, u,* that occur long and short. A retroflex grooved spirant /ș̌/ is unique to Dhivehi and derives from intervocalic retroflex /ṭ/, with the latter reintroduced through loanwords. Two notable features, shared with Sinhala, are the lack of any aspirated consonant series and a set of prenasalized stops /^{m}b, ^{n}d,^{n}ḍ, ^{n}g/ that contrast with nasal-stop clusters. Unlike in Sinhala, the consonant /f/ is of quite frequent occurrence, having arisen from a sound change /p/ > /f/, as well as from loanwords.

Orthography

The current Dhivehi script, known as 'Thaana,' is unique to that language. It is written left to right, and the characters are made to resemble Arabic, reflecting the influence of Islam. They are not Arabic, however, although the first nine letters were fashioned after Arabic numerals. The system is of the alphasyllabic type, with all consonants and vowels being written, but grouped in syllabic clusters. Vowels following consonants are written above or below them, as in many South Asian scripts, but unlike most Indic scripts, consonants do not imply an unmarked inherent vowel. Also, initial or independent vowels do not have their own signs but are are written using the a character *alifu* (ﻫ) which has no phonetic value by itself, but serves as as a vehicle for the same vowel diacritics that are used with consonants. Consonants not followed by a vowel are marked with *sukun* (◦). Thus, the name of the language in Thaana, with a transliteration (read right to left) and phonological representation (left to right) is:

ﻫﺒﻲﺪﻳ ﻫﺒﺲ =<s – sukun> + <ba> <hi> + <ve>
<dhí> =/divehi bas/.

(For a fuller account, see Gair and Cain, 2000). The basic Thaana alphabet is supplemented by a set of characters for the numerous Arabic borrowings.

There is also an official romanization, designed to avoid diacritics, that reflects some English influence. Thus, long *a* is written <aa>, long *e is* <ey>, long *o* is <oa>, and retroflex *ș̌* is <sh>. The combinations <th> and <dh> represent dental stops, as in *Dhivehi* and *Thaana*. Thus the <h> represents dental articulation (vs. retroflex), not aspiration, which is lacking in Dhivehi. (For a description, see Maniku and Disanayake, 1990 or the Thaana equivalents in Cain and Gair, 2000.)

Morphology

Although there are differences in inflectional forms across dialects, the major categories are shared (see Fritz, 2002; Cain and Gair, 2000).

Nouns are human or nonhuman in gender. They inflect for case (direct, dative genitive, instrumental, and locative), definiteness (definite, indefinite, and unspecified), and number (singular and plural, though the singular is generally unmarked in inanimate nouns).

The verbal system includes derivational relationships in stems between active, involitive/intransitive, and causative forms. There are finite and nonfinite forms based on three stems: present, past, and participial. Finite verbs inflect for three tenses (past, present, and future) and three aspects (habitual, present, and perfect). Person and number categories vary with the dialect.

Syntax

The basic constituent order in Dhivehi is subject–object verb, as illustrated in (1), though other orders are possible for pragmatic effect. It is a thoroughgoing 'right headed' language, with complements and modifiers preceding heads, as illustrated in (2). This includes relative clauses, which use a tensed relativizing (adjectival) form of the verb, as in (3). Note that, the singular of inanimate nouns is commonly used in the plural as well. An important feature of Dhivehi, shared with Sinhala, is the presence of a focus cleft construction of frequent occurrence in discourse. In Dhivehi, this is formed with a 'prefocus' form of the verb, as in (4).

(1) alī e mīhā duṣ.
Ali that person see.PAST
'Ali saw that person.'

(2) mi ra^{n}gaḷu tin fot
this good three book–Sg/Pl
'these three good books'

(3) [hassan alīy–aṣ din] fot
Hassan Ali–DAT give.PAST.REL book–Sg/Pl
'the book that Hassan gave Ali'

(4) aharen danī e avaṣaṣ.
I go–PRE.FOC that neighborhood–DAT
'It is to that neighborhood that I am going.'

See also: India: Language Situation; Indo–Aryan Languages; Maldives: Language Situation; Sinhala; Sri Lanka: Language Situation.

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Diachronic Aspects of Metathesis

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What Is Metathesis?

The term metathesis is used with two different, yet related, meanings in linguistics. The first is descriptive in nature, denoting a sound pattern in which a sequence of sounds is observed in one order in one context but in the opposite order in another context. In the Austronesian language Leti, for example, the order consonant + vowel occurs phrase-finally, [ukra##] 'finger,' but is vowel + consonant phrase-medially before a consonant, [ukar lavan] 'thumb, big toe' (van Engelenhoven, 1995; Hume, 1997). The second usage of the term metathesis assumes the meaning above yet, in addition, implies a **process** of reordering; that is, the order of sounds in a word is derived from an earlier (or underlying) form of the word which contained the opposite order. A sound change of this type is assumed for some varieties of French as a means of accounting for different orders of consonants and vowels in words at different stages of the language's development (Maze, 1969; Spence, 1990): Jersey French, *ʃɛvrɛt > ʃɛrvɛt 'shrimp'; Le Havre French *fərme > frəme 'closed, fermé.' It is likely that not all cases of metathesis result from a process of reordering. Blevins and Garrett (1998),

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for example, argue that some cases of diachronic consonant–vowel metathesis are the result of syllable reduction, while others involve epenthesis of a vowel identical to the preceding vowel with subsequent vowel deletion.

Metathesis has frequently been treated in the literature as a marginal and sporadic sound change. Research has shown, however, that while less common than processes such as assimilation and deletion, metathesis can be systematic within a language and is widely attested crosslinguistically occurring in the following, as well as other, language families: Afro-Asiatic, Altaic, Austronesian, Salishan, Carib, Dravidian, Indo-European, Mayan, and Mixe-Zoque. Further, like more common sound changes, metathesis is conditioned by phonetically natural properties, as well as by the phonological and lexical knowledge of the language users.

Explanations

The most well-developed explanations of why processes of metathesis occur are, at present, perceptual in nature (Blevins and Garrett, 1998, 2004; Hock, 1985; Hume, 1998, 2004; Steriade, 2001). It is widely agreed upon that an important factor contributing to metathesis is indeterminacy in the auditory signal regarding the linear ordering of a sequence of sounds. Indeterminacy refers to a listener's ability to parse a speech signal into meaningful linguistic units, that is, to correctly identify the sounds, sound sequences, and words in an utterance. A sequence's degree of indeterminacy is influenced in part by the quality of information in the signal; the better the quality, the more easily the sounds and their order can be recognized. The quality of information is, in turn, determined by the types of sounds involved and the context in which the sounds occur.

Pairs of sounds that undergo metathesis typically share one or more of the following properties that contribute to ambiguity. First, meaningful phonetic cues to the identification of at least one of the sounds are masked. The dependence of stop consonants on contextual cues for the identification of place and manner of articulation makes these sounds common participants in metathesis. For example, stops commonly change from preconsonantal to prevocalic position, as in Sidamo *gud-nonni* > *gundonni* 'they finished' (Hudson, 1975). Second, the phonetic cues of at least one of the sounds are of relatively long duration, as found in vowels, liquids, glides, and fricatives (Blevins and Garrett, 1998, 2004; Hume, 2004). Cues of this nature tend to extend over a domain that may encompass adjacent sounds, resulting in the overlap of important phonetic cues and uncertainty about the onset and offset of the sounds. The final property is auditory, or perceptual, similarity between the sounds involved; metathesis commonly occurs with sounds that share the same values for sonorancy, manner, or place of articulation. Similarity diminishes each sound's distinctiveness thereby rendering the sounds and their order less easily identifiable (Hume, 1998, 2004). The observation that metathesis typically involves adjacent sounds also contributes to similarity given that proximity enhances similarity (Pierrehumbert, 2002). Less common, though not unattested, are metatheses involving nonadjacent sounds, as in Bagnères-de-Luchon French (Grammont, 1933), e.g., *kápra > crabo 'goat.' It has been argued that cases such as this are the end result of more than one sound change involving adjacent sounds: the first being consonant–consonant metathesis, *kapra > karpa, and the second, consonant-vowel metathesis, karpa > krapa (crabo) (Mielke and Hume, 2001). Such an analysis seems reasonable given that each of these two metatheses is attested in other varieties of French (Jersey, Le Havre), as noted above.

While indeterminacy in the speech signal provides a favorable context for metathesis to occur, the influence of native sound patterns is also an important predictor of the process. The greater the indeterminacy, the more the listener will rely on familiarity with native sound patterns to infer the order of elements. This includes the particular sounds and sound sequences that occur in the language, as well as how often these elements are used. Hume (2004) claims, first, that the sound pattern resulting from metathesis must be an attested structure in the language with the relevant structure being defined in terms of subsegmental properties of sounds (e.g., place, manner of articulation), or suprasegmental properties, e.g., syllable structure. Second, less frequent language structures are replaced by those that are more frequent within that particular language. Since languages differ both in terms of their sound systems as well as in terms of the frequency with which the sound patterns are used, this approach correctly captures the fact that the result of metathesis can differ from language to language such that either order of a given sound combination can emerge as the result of metathesis in some language. For example, in Balangao, the sequence laryngeal (ʔ, h) + plosive reordered in some contexts (Shetler, 1976). The opposite change occurred in Basaa with the order consonant + laryngeal changing to laryngeal + consoconsonant (Schmidt, 1994). In each language, the sequence of sounds resulting from metathesis was a more frequent pattern in the language than the order that was replaced.

The account outlined also explains the observation that the sound sequence resulting from metathesis is most frequently better perceptually than the order that was replaced. The explanation combines facts concerning the type of sounds that undergo metathesis, and those regarding the types of sequences that are most likely to influence how a listener interprets a speech signal. On the one hand, sounds with strong phonetic cues are not good candidates to undergo metathesis since the listener would not generally have difficulty identifying the sounds or their order. On the other hand, sound sequences with weaker cues are prime candidates since there is a greater likelihood that their onsets and offsets will be ambiguous. Finally, sounds with robust cues tend to be more frequent in a system and will thus have a greater impact on how the speech signal is interpreted by the listener. This approach then provides a straightforward account of why metatheses where the process' result is perceptually less salient than the replaced sequence are so rare. Obtaining this pattern would require the sequence undergoing metathesis to have stronger cues than the result. However, clusters with good cues are less likely to be ambiguous, more easily identified, and so, less likely to undergo metathesis. This then suggests that the reason why improved perceptual salience is a characteristic of so many cases of metathesis is simply an artifact of the nature of the sequences that undergo metathesis and those that influence how an ambiguous speech signal is interpreted.

There are a number of resources available to readers interested in learning more about metathesis. A good starting point is the metathesis website, which contains information on approximately 100 cases of metathesis as well as a metathesis bibliography and other tools. Crosslinguistic surveys may also be helpful (see Ultan, 1978; Hock, 1985; Blevins and Garrett, 1998, 2004; Hume, 1998, 2004).

See also: Sound Change; Speech Perception.

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Diachronic Morphological Typology

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The morphology of various languages has been typed in terms of prefix, suffix, infix, and circumfix, although this omits some types, such as ablaut and subtractive morphology. This article considers the diachronic origins of these affix types and the diachrony of the so-called suffixing preference. Languages have also been typed as fusional, agglutinating, or isolating; the diachrony of these and related concepts is explored in the last section.

Diachronic Origins of Affixes

Prefixes and Suffixes

Most affixes are formed either from old affixes or from grammatical words through the process of grammaticalization. For example, the Old Georgian ergative case suffix, *-man*, is derived from the ergative singular case form of the definite article, *man* 'the,' which followed the noun and was unstressed. In Modern Georgian the ergative suffix is *-ma* or, after a vowel, *-m*. Prefixes are formed in a similar way, usually from grammatical material proclitic to a lexical item.

Infixes

An infix is a morpheme appearing within another morpheme. Alan C. L. Yu showed that typologically there are several phonological units to which infixes can be adjacent: first consonant, first vowel, final syllable, final vowel, stressed syllable, stressed vowel, stressed foot (Yu, 2003). Yu argued that the reason why an infix tends to be close to the boundary of the base to which it attaches is because it has been either a prefix or suffix historically. For example, the Proto-Muskogean plural **oho-* prefix developed into a prefinal syllable infix, *-ho-*, in Creek-Seminole (Muskogee) (e.g., *líkw-i:* 'rotten' → *likhow-í* 'rotten.PL') (Martin, 1994, cited in Yu, 2003).

Yu discussed four processes that give rise to infixes: entrapment, metathesis, reduplication mutation, and prosodic stem association. For example, in Proto-Muskogean the mediopassive proclitic **il-* appeared after the applicative **a-* and the plural **oho-*, which were later reanalyzed as part of the verb stem, entrapping the intervening affix **-il-* (e.g., **oho-il-icca* 'be shot' → Alabama *holicca* 'be shot') (Martin and Munro, 2005, cited in Yu, 2003). A case of metathesis causing infixation comes from Copainalá Zoque (CZ). The third-person marker was historically a prefix, **i-*, which later became a glide. Metathesis turned all **j* + C(onsonant) sequences into C*j* in CZ (e.g., *mula* 'mule' → *mjula* 'his mule') (Yu, 2003: 221). Reduplication mutation can also trigger infixation. In Pre-Trukic the durative form of **kasam^{w}ó:nu* 'pay chiefly respect to' was **kak-kasam^{w}ó:nu* 'be in the habit of paying chiefly respects to.' After the dropping of initial **k*, the reduplicated form became **ak-kasam^{w}ó:nu*, which was later reanalyzed as **akk-asam^{w}ó:nu*. The V(owel)*kk-* affix was generalized in other vowel-initial verbs. After a process took place in which a glide *w* was inserted verb-initially and became part of the base, V*kk-* turned into an infix. For example, in Trukese the durative form of *win* 'drink' is *w-ikk-in* 'be in the habit of drinking.' A case of prosodic stem association causing infixation is what Yu called "Homeric infixation" or "*ma*-infixation," a colloquial expression indicating "roughly attitudes of sarcasm and distastefulness" (Yu, 2003: 249). For example, *-ma-* in *whatchi**ma**callum* 'what you may call him' comes from the word 'may.' Because the construction with *-ma-* indicates colloquialism and *-ma-* usually appears between two metrical feet (e.g., ['*whatcha*]***ma***[ˌ*callit*], ['*thingu*]***ma***[ˌ*bob*]), speakers analyze it as an infix.

Circumfixes

A circumfix is a single complex affix composed of a prefixal and a suffixal part functioning together. The circumfix as a whole expresses a single meaning or category, and the parts of a circumfix are not affixed separately to the same base to which they are affixed together.

The Proto-Austronesian circumfix **ka–an* has two meanings, only one of which is described here. In some of the Formosan languages, and in languages of the Philippines and western Indonesia, *ka–an* forms nouns, often ones meaning a location or having some other concrete meaning. Proto-Austronesian also had a prefix **ka-*, which formed nouns, and a suffix **-an*, marking 'locative focus.' Thus, two Proto-Austronesian affixes may have come together, combining their meanings; these became a circumfix and no longer function as a distinct prefix and suffix, even though the prefix or the suffix is also continued in some languages (Blust, 2003).

We learn more by looking at the facts of Algic languages. In Algonquian, circumfixal pronominals are used in noun possession and the independent order, the set of verbal paradigms used in most main clause statements. These are reconstructed as follows:

(1)	1 PL exclusive	*ne–enaan-
	1 PL inclusive	*ke–enaw-
	2 PL	*ke–waaw-
	3 PL	*we–waaw-

Proto-Algonquian *-*enaan*- (first person exclusive) is cognate to Wiyot *hinód* 'we, us,' a separate word; Proto-Algonquian *-*waaw*- is cognate to Wiyot *wow*, a particle or postposition used only to pluralize the second person pronoun, *khíl*. Wiyot is a language of the Ritwan group, distantly related to Algonquian, the two groups together forming the Algic family. Thus, it appears that in Proto-Algonquian the independent words **enaan* and **waaw* came to be suffixed to forms already prefixed with **ne*- and **ke*- and that at some point these prefixal and suffixal pairs were reanalyzed as circumfixes (Ives Goddard, personal correspondence).

Summary

Prefixes and suffixes are most often derived either from old affixes, not illustrated here, or from grammatical words, usually with an intermediate stage as a clitic. Infixes are usually derived from prefixes or suffixes, and circumfixes from a combination of prefixes and suffixes. Usually affixes occur in the same position, relative to a base, as the clitic from which they derive.

The Suffixing Preference

The suffixing preference, first noted by Edward Sapir (Sapir, 1921), is the generalization that suffixing is far more frequent than prefixing crosslinguistically.

John A. Hawkins and Gary Gilligan set out to quantify the suffixing preference (Hawkins and Gilligan, 1988). Using a sample of about 200 languages, they studied the distributions of specific affixes of both nouns and verbs (e.g., case markers, tense markers) for distribution as prefixes or suffixes in relation to word order type (head final vs. head initial). Their findings show a strong suffixing preference for affixes of most types tested (but a slight prefixing preference for object markers and only a weak suffixing preference for markers of subject, negation, and voice). They state 18 implicational universals, several of them exceptionless, such as the first one below:

- If a language has case affixes on n[oun], they are always suffixed.
- If a language has SOV, causative affixes on v[erb] (if any) are suffixed with more than chance frequency.

Hawkins and Gilligan proposed an explanation of the suffixing preference in terms of competition between two forces. One is an independent head-ordering principle (HOP), which states that "heads are identically ordered relative to their modifiers at [morphological and syntactic] levels" (Hawkins and Gilligan, 1988: 220). The second component of the competition is a processing preference for ordering the important part of a word before the less important, and hence for stems before affixes; this is elaborated in Hawkins and Cutler (1988).

Christopher Hall observed a problem with the proposed explanation in terms of the HOP and processing preferences: it is incomplete in that it does not explain how processing preferences are linked to language types (Hall, 1988). That is, the notion of competition between the HOP and processing preferences provides no means of implementing these preferences. Hall proposes instead that the processing mechanism influences the diachronic changes that lead to the formation of prefixes or suffixes. Thus, suffixing is more common because the language processor influences diachronic processes that determine whether an affix will develop as a prefix or suffix.

Affixes in Verb Forms

Most grammatical affixes in verbs are derived from old verbal morphology, from auxiliaries, or from adverbs; new subject and object agreement affixes may originate as pronouns or as auxiliaries. In all instances, independent words usually become clitics before they go on to become affixes. It is widely assumed that the position of an affix is usually due to the position of the clitic from which it derives. This assumption is often attributed to Givón, 1971, but in fact it was made traditionally in historical grammar. Many linguists believe that the historical origin of an affix is one part of the explanation of its position as a prefix or suffix and thus that history plays an important part in explaining the suffixing preference.

Joan M. Bybee, William Pagliuca, and Revere Perkins studied the suffixing preference by surveying 71 languages (Bybee *et al.*, 1990). They observed that grammatical morphemes (e.g., adpositions, clitics, particles, and auxiliaries) following the stem are more likely to become affixes than are grammatical morphemes preceding the stem. Categorizing the languages in their sample into three groups based on word order type, i.e., V(erb)-initial languages, V-medial languages, and V-final languages, they distinguished bound and unbound grammatical morphemes in both preposed and postposed positions. They focused on the relation between verb stems and grammatical morphemes, specifically particles and auxiliaries.

Their data showed that postposed grammatical morphemes far outnumber preposed ones and have

Table 1 Position and boundedness of person/number markers in V-final languages

	Nonbound	*Bound*	*All*
Preposed	13% (10)	87% (80)	35% (90)
Postposed	0	100% (171)	65% (171)

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Table 2 Position by boundedness for nonperson/number grammatical morphemes in V-initial languages

	Nonbound	*Bound*	*All*
Preposed	19% (13)	81% (57)	53% (70)
Postposed	27% (17)	73% (46)	47% (63)

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a strong tendency to be bound. In the 32 V-final languages they studied, Bybee, Pagliuca, and Perkins found 1018 postposed grammatical morphemes, 80% of which are bound (i.e., are suffixes), and only 233 preposed grammatical morphemes. Based on the hypothesis that affixes that develop from lexical or grammatical forms stay in their original positions, they explain that in V-final languages auxiliaries, which typically follow main verbs and are a primary source of grammatical morphemes, become suffixes. Additionally, their data suggest that it is more usual for person/number markers to be suffixes in V-final languages (see Table 1). Table 1 shows that the number of postposed person/number markers (171) is almost twice that of preposed person/number markers (90), and all postposed person/number markers are bound (are suffixes) in languages of this type.

Putting aside the cases in which person/number markers postpose in V-initial languages, Bybee, Pagliuca, and Perkins observed no suffixing preference in V-initial languages. "The tendency for preposed grams [grammatical morphemes] to be bound [is] slightly stronger than the tendency for postposed grams to be bound, but … it is statistically not significant" (Bybee *et al.*, 1990: 13) (see Table 2).

Turning now to V-medial languages, Bybee, Pagliuca, and Perkins found that they show a slight preference for preposing grammatical material, together with a strong preference for these morphemes

Table 3 Position with respect to verb by boundedness for the 31 V-medial languages

	Nonbound	*Bound*	*All*
Preposed	60% (298)	40% (200)	54% (498)
Postposed	19% (82)	81% (341)	46% (423)

Reproduced from Bybee, Pagliuca, and Perkins, 1990. 'On the asymmetries in the affixation of grammatical material', in *Studies in Typology and Diachrony: Papers Presented to Joseph H. Greenberg on his 75th Birthday*, ed. by Croft, Denning, and Kemmer, 1–42. Amsterdam: John Benjamins 6. With kind permission by John Benjamins Publishing Company.

not to be bound (see Table 3). Their account of this dispreference for prefixing in V-medial languages is that clause-internal auxiliaries do not necessarily attach to verb stems; for example, they may "fuse with pronouns and with one another to form an auxiliary complex that occurs between the subject and the verb, or in second position in the clause, without ever fusing with the verb" (Bybee *et al.*, 1990: 31); prefixing is conditioned by the semantic relevance of clause-internal grammatical morphemes to verb stems.

On the basis of data from 237 languages, Anna Siewierska and Dik Bakker found that there is no suffixing preference for agreement markers (Siewierska and Bakker, 1996). They attributed this in large part to the inclusion in their sample of many languages of North America, a large number of which have subject or object agreement prefixes. However, even without the languages of North America, their data showed a slight preference for subject agreement prefixes, and only a slight preference for object agreement suffixes. Thus, they found no suffixing preference for agreement.

Studies that show us what happens to particular grammatical morphemes over time are especially valuable in understanding these issues. Comrie (1980) showed that Classical Mongolian (attested from the 13th century) had the word orders SOV and adjective-noun and lacked verb agreement. When the subject was a pronoun, the language permitted a variant of SOV, with an unstressed pronoun subject following the verb. The permitted orders in Classical Mongolian can be illustrated from contemporary Halh Mongolian.

(2a) bi med-ne
I *know*-PRES
'I know'

(2b) med-ne bi
know-PRES *I*
'I know' (Comrie, 1980: 90)

Buriat and other daughters have subject agreement suffixes derived during the historical period from the

variant in (2b). It is usually assumed that independent pronouns occur in the same basic position as full nouns, unless the pronouns cliticize, and this is recognized as the first stage on the way to grammaticalization as an agreement marker. What we do not know in this case is whether in a stage of Mongolian before the first attestation, free pronouns occurred only where full noun subjects occur, as usually assumed crosslinguistically, and then moved into enclitic position. If so, this trivializes the idea that we can explain the order in which affixes occur by the order of the words from which they derive.

We do know that in the history of French, object pronouns occurred after the verb in independent forms and later, when cliticized, moved into immediately preverbal position. SVO order, with object pronouns following the verb, was established in Latin as early as the 5th century. In Old French (SVO), stressed pronouns remained in the position used for full NPs, while unstressed pronouns were attracted to the verb, usually occurring immediately before it. According to many, these Old French clitics have developed into agreement prefixes in the modern language, though others consider them still to be proclitics (and they are still written as separate words). In either case, this is another example of a clitic developing in a position different from that of the stressed pronoun.

It is widely agreed that the position of an affix is very often determined by the position of its etymon before grammaticalization. New affixes most often develop from clitics, but the position of a clitic is largely determined by prosodic conditions. As discussed above, a pronoun may be cliticized in a position in which it did not occur before becoming a clitic, and a definite article may also cliticize in a new position. For prosodic reasons, clitics are attracted to certain positions relative to other words or relative to the clause as a whole. It is the position of a clitic, not that of the lexical item to which it corresponds, that largely accounts for the position in which it grammaticalizes as an affix.

Bybee (1988: 358) and Bybee *et al.* (1990) suggested that the apparently lower tendency of preposed grammatical material (in comparison with postposed) to grammaticalize as an affix may be due to the fact that other words intervene. Recent work on grammaticalization in progress seems to support this. Kraehenmann and Plank (forthcoming) shows that proclitic articles on their way to becoming prefixes in two German dialects seem to be prevented from doing so by the intervention of other lexical items, such as adjectives, between the article and noun. For additional discussion of the relation between order of words and order of morphemes from a historical point of view, see Harris and Campbell (1995: 199 ff.).

Affixes in Nominal Forms

When we turn to the issue of the suffixing preference in nouns, the facts are a little different. There are very few case prefixes in the languages of the world, and even where they do occur, it appears that there are no whole declensions consisting just of case prefixes.

There are several known sources for affixal case markers, including old case markers, definite articles, and adpositions. Greenberg (1978) showed that definite articles, themselves derived from demonstrative pronouns, often become gender class markers or case markers. For example, certain case suffixes can be shown to be derived from postposed definite articles in Georgian (see 'Prefixes and Suffixes' above), and whole new declensions may also be constructed in this way.

Postpositions often become case suffixes: for example, Votic (Vod), a Balto-Finnic language, still retains the comitative postposition *kāsa*, *kaaza*, and from it has developed a case suffix shown in *mineka* 'with what,' *jummalaga* 'with God,' *lehmīka* 'with cows' (Oinas, 1961: 36–40).

In Hungarian, inflected forms of nouns have been reanalyzed as complex cases. It appears, however, that these inflected nouns went through an intermediate stage as complex postpositions before becoming suffixes. Similarly, serial verbs may become case prefixes, but it is most likely that they are prepositions at an intermediate stage. Thus, we cannot be sure that nouns and serial verbs constitute distinct sources of cases; both are known to be sources of adpositions, and it is most likely that it is these that give rise to cases.

Greenberg (1978) documents in detail that in various languages, mostly African, the definite article can be preposed or postposed and may become a gender prefix or suffix respectively. As we have seen, definite articles may instead be grammaticalized as case markers, but virtually all of the latter are suffixes.

There is a great deal here we do not yet understand. In languages that have definite articles that precede nouns, do the articles not grammaticalize as case markers, or do they become enclitics and then grammaticalize as suffixal case markers? Whatever historical behavior results in only case suffixes, why does it apply to case marking and not to gender marking (or why does it apply to gender marking to a lesser extent)?

Summary

Research has confirmed the existence of a suffixing preference in both nouns and verbs. For V-final languages this preference is very strong, but for both

V-initial and V-medial languages suffixes are preferred in the verb less strongly than in V-final languages. There are also significant differences among different types of verbal affixes, with agreement markers more likely than most other types to be prefixes, looking at languages of all types together. There is also evidence that in at least some language types postposed grammatical material is more likely to be bound than is preposed grammatical material. In the noun we find an overwhelming preference for case suffixes; other noun affixes, such as markers of gender and number, exhibit a somewhat weaker preference for suffixal position.

The position of affixes is best explained historically and with reference to language processing. Historical explanation of affix position refers to the position of the clitics from which prefixes and suffixes derive, and to the additional events that result in the creation of infixes and circumfixes. There is still much to be learned about the positions in which clitics form diachronically.

Fusional, Agglutinating, Isolating

A morphological typology to which linguists have returned repeatedly designates languages as fusional, agglutinating, or isolating. A language is said to be fusional (or flectional or inflecting) if the separation between morphemes is not readily apparent. Characteristically, in such languages inflectional morphemes each express two or more categories (for example, number + case in the noun, or tense + person + number in the verb). Many Indo-European languages, such as Latin, Greek, and Sanskrit, are examples of this type. In Russian declensions, as shown in (3), each suffix indicates number and case, and some also indicate declension class.

(3)

	I		II	
	Singular	Plural	Singular	Plural
Nominative	stol	stol-y	komnat-a	komnat-y
Accusative	stol	stol-y	komnat-u	komnat-y
Genitive	stol-a	stol-ov	komnat-y	komnat
Dative	stol-u	stol-am	komnat-e	komnat-am
Instrumental	stol-om	stol-ami	komnat-oi	komnat-ami
Prepositional	stol-e	stol-akh	komnat-e	komnat-akh
	'table'		'room'	

If we consider here, for example, the genitive plural of *stol*, *stol-ov*, we cannot say that one part of *-ov* indicates the genitive, another the plural, and a third the first declension. Rather, *-ov* as a whole indicates all three of these values.

In an agglutinating language, words are made up of a sequence of morphs, each expressing a separate category, and the boundaries between morphemes are unambiguous. Turkish is often cited as an example of an agglutinating language, for here number and case are expressed by different morphemes in the noun, for example. Old Georgian (4) illustrates agglutination in the verb.

(4) Old Georgian 'write' in the optative

	Singular	Plural
1	v-c'er-o	v-c'er-o-t
2	s-c'er-o	s-c'er-o-t
3	c'er-o-s	c'er-o-n

In the Old Georgian verb paradigm in (4), the morpheme *v-* marks first-person subjects without respect to number, while *s-* marks second-person subjects. The optative is indicated by the suffix *-o*, and plurality of the subject by *-t*. These aspects of this paradigm are agglutinative, but some fusion is found in the third person, where one suffix, *-s*, combines the marking of person and singular number, while *-n* combines the marking of person and plural number.

In an isolating language the forms of words are invariable, and such languages are sometimes said to have no morphology. An isolating language depends more upon syntax to express grammatical categories and relationships among words. Vietnamese is often cited as an example; see (5).

(5) Khi tôi đến nhà bạn tôi,
when I come house friend I
chúng tôi bắt dầu làm bài.
PL *I begin do lesson*
'when I came to my friend's house, we began to do lessons'
(Comrie, 1988: 40)

Each morpheme in (5) is a word, with the possible exception of *bắt dầu* 'begin.' There is no morphological variation for either tense or case. Plurality is indicated by the addition of a separate word *chúng*.

This typology can usefully be broken down into two scales, each with a single criterion – the index of synthesis (based on the number of morphemes per word) and the index of fusion (based on the number of categories expressed per morpheme). These indices represent an advance, but to the extent that they require generalizing over an entire language, they are still abstract and subject to differing interpretations. That is, many languages mix types, even within a single paradigm (as illustrated in [4]), and, for this reason and others, two specialists could still reach different conclusions about the type to which a given language belongs.

When we look at historical aspects of this typology, we find that many languages or language families have changed type historically. An isolating language can become agglutinating by accumulating new affixes through one of the means described in 'Diachronic Origins of Affixes.' In an agglutinating

language, affixes may merge, and the language may then become fusional. A fusional language may lose its affixes, becoming an isolating language. For example, Old English had fusional markers in both the noun and the verb and has lost most of these, becoming more isolating (for additional examples, see Crowley, 1992: 134–136). Although it is sometimes implied that change cycles only in this direction – isolating → agglutinating → fusional → isolating, etc., – it is possible for a language to change in the opposite direction as well. An example of change from agglutinating in the direction of isolating is the Artašen dialect of Laz, which has lost all of its case markers, though it has retained most of its other morphology (Harris and Campbell, 1995: 216–217). Agglutinative affixes can be lost as well as fusional ones. Notice, too, that if a language goes in the direction specified but skips a step, that is equivalent to going in the opposite direction.

Closely related to this typology are the general labels 'synthetic' and 'analytic.' A construction, is said to be synthetic if several categories are expressed within a single word, while in an analytic construction, categories are expressed through periphrasis, that is, by combining words in a phrase. English *jumps* is synthetic, while *is jumping* is analytic because *jumping* is combined with *is*. In the history of French we can see a cycle from synthetic constructions in Classical Latin to analytic constructions and back to synthetic, for at least some forms. For example, the third person singular form of the imperfective future of the verb 'do, make' in Classical Latin was *faciet* 'he will do,' which in Vulgar Latin was replaced with the analytic (or periphrastic) expression *facere habet*, where the infinitive of 'do,' *facere*, is combined with an inflected form of the auxiliary 'have,' *habet*. In Old French this emerges as the single word *fera*, the third person singular of the future (Harris, 1978). In many ways this is a classic example of the synthetic-analytic cycle, but note that although the language moves from fusional to somewhat isolating and back to fusional, no agglutinative stage is involved. In a truly agglutinative verb form, person and number would be expressed by distinct morphemes, as in the Georgian example above, whereas at all stages of this change person and number are expressed together. When an auxiliary expresses person and number in a single morpheme, a natural outcome is for these categories to continue to be expressed in a single morpheme in the synthetic form derived from the auxiliary. A similar complete cycle can be seen in Egyptian, where Old Egyptian was synthetic, Middle and Late Egyptian analytic, and Coptic, its descendant, again synthetic (Hintze, 1947; Hodge, 1970).

The classifications fusional, agglutinating, and isolating provide very general ways of typing languages; not all languages fit well into any one of these types, since a language may combine types in various ways. Languages may change in the direction agglutinating → fusional → isolating → agglutinative etc., but changes in the opposite direction are also known. Cyclic changes are attested, but it is not clear that these necessarily include all types.

Summary

A historical approach, sometimes paired with insights from language processing, provides an explanation of typological phenomena, including the occurrence of morphemes of different types (prefixes, suffixes, infixes, and circumfixes) and the suffixing preference.

See also: Grammaticalization.

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Diacritics

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The origin of some letters that are now a standard part of the alphabet lies in the use of diacritics. The letter **G** was invented in Roman times as a variant of **C**, distinguished by the crossbar on the upstroke. The letter **J** was not distinguished from **I**, nor **U** from **V**, until the 16th century (Sampson, 1985: 110). The new letter **ŋ** is obviously a variant on **n** and so could be seen as incorporating a diacritic tail. Diacritics proper, though, are seen as marks attached to a base letter. In this sense, **j u ŋ** do not involve diacritics.

The extensive use of diacritics to supplement the Latin alphabet in cases where it was seen as inadequate for the sounds of other languages is generally attributed to the religious reformer Jan Hus (1369–1415), who devised a reformed orthography for Czech incorporating 'accented' letters such as **č ě ň ř š**.

Most diacritics are placed above the base letter with which they are associated. A few, however, are placed below it (as **ç**) or through it (as **ł**).

Latin letters come in lower-case and upper-case versions. Diacritics can be awkward with the latter, and there is a convention in French, for example, that under some circumstances the diacritics of **Ê**, **À**, etc., may be omitted.

The principal diacritics are as follows: an example is given of each, with the name of a language in whose orthography it is used. Those placed over the base letter are the acute (´ **á**, Spanish), the grave (` **à**, French), the circumflex (ˆ **â**, French), the caron (or háček, ˇ **č**, Czech), the breve (˘ **ă**, Romanian), the macron (¯ **ā**, Latvian), the dot (˙ **ė**, Lithuanian), the dieresis (¨ **ä**, German), the tilde (˜ **ã**, Portuguese), the double acute (˝ **ő**, Hungarian), the ring (˚ **å**, Danish), and the hook (ả, Vietnamese). Those placed through the base letter are the stroke (/ **ø**, Norwegian), and the bar (- **đ**, Croatian). The horn (' **ơ**, Vietnamese) is attached alongside. The principal diacritics placed under the base letter are the cedilla (¸ **ç**, Turkish) and its variant the comma (, **ş**, Romanian), the ogonek (˛ **ą**, Polish), and the dot (. **ạ**, Vietnamese). For exhaustive listings of the combinations of alphabetic

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letters and diacritics to be found in language orthographies, and what they stand for, see Wells (2001) and The Unicode Consortium (2003).

The same diacritic may be applied to very different purposes in different orthographies. For example, the acute accent on vowel letters can indicate word stress (Spanish), vowel length (Czech), vowel quality (French **é**), a diphthong (Icelandic **á**), high tone (Vietnamese), or rising tone (the Pinyin romanization of Chinese). In Dutch it signals emphasis or the strong form of a word (e.g., **één**). On consonant letters it indicates palatalization (Polish **ń**). Typographically, the acute accent should properly be at a steeper angle in Polish than in French or Spanish (Twardoch, 1999).

Equally, the same phonetic quality may be indicated by a range of different diacritics in different languages. The palatoalveolar [ʃ] is written **š** (Czech, etc.), **ş** (Romanian), **ş** (Turkish), **ŝ** (Esperanto), and **ṣ** (Yoruba).

The dot is not a diacritic in **j** nor, usually, in **i**. In Turkish, however, undotted **Iı** and dotted **İi** are treated as distinct, standing for back and front vowels, respectively.

Two or more diacritics may be combined on the same letter. This is frequent in the orthography of Vietnamese, where in **ẫ ắ ậ ờ**, for example, one diacritic indicates tone, the other vowel quality.

Letters bearing diacritics have always presented something of a problem to typographers. Both on the web and in print, combining a 'floating' one-size-fits-all diacritic with a base letter tends to give unsatisfactory results, since it is difficult to position the diacritic properly. In the days of typewriters, diacritics (if provided) were typically put on 'dead' keys, and the typist had to strike first the diacritic and then the base letter. Nowadays, in Unicode and therefore in HTML, the code for the diacritic must follow the code for the base letter. If possible, however, precomposed (ready-made) combinations are preferred. The Unicode standard provides separate code points for almost all combinations used in language orthographies (though not necessarily for those needed in phonetic transcription, philological work, or mathematics, logic, and physics). Those required for Western European languages (e.g., **á ç è î õ ü**) are to be found in the Latin-1 Supplement block, U+00A0 to U+00FF. Most of those needed for other Latin-letter orthographies (e.g., **ā ĕ ǵ ĥ ı̨ ł ő ţ ů ŵ**) are in the Latin Extended-A block, U+0100 to U+017F. Various unusual combinations are in the Latin Extended-B block, U+0180 to U+0236 (e.g., **ǘ ǽ ǰ ǿ ȍ**) or the Latin Extended Additional block, U+1E00 to U+1EDE (e.g., **ạ ḍ ḗ ḫ ầ**).

The localization of computer software and hardware includes the provision of special keyboards (physical or virtual) to facilitate access to the diacritics or diacritic-letter combinations required in local languages. Where a dedicated keyboard is not available, these special characters can be entered in other ways, e.g., by using an application such as Character Map or, in the most recent versions of Word, by typing the Unicode hex code number followed by Alt-X.

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1970. It deals with 22 language groups within six language families in 51 countries between Iceland and the Ural Mountains. Between 1975 and 2002, ten fascicles were published. The national committees have been responsible for the data collection; the president of the project, formerly M. Alinei, Utrecht, now W. Viereck, Bamberg, takes care of the computer processing and the publication. One example of ALE coverage is given in Figure 2. Similarly, broad geographic coverage is given in Wurm and Hattori's linguistic atlas of Asia and the Pacific.

Methods Of Dialect Representation in the Atlases

Area Emphasized Maps

Wenker (1881) was the author of the first German dialect atlas that was published. Wenker collected the data for his atlas by sending out written questionnaires to schools. The translation of the standard German texts was done by public school children as native speakers, assisted by their teachers, who wrote the

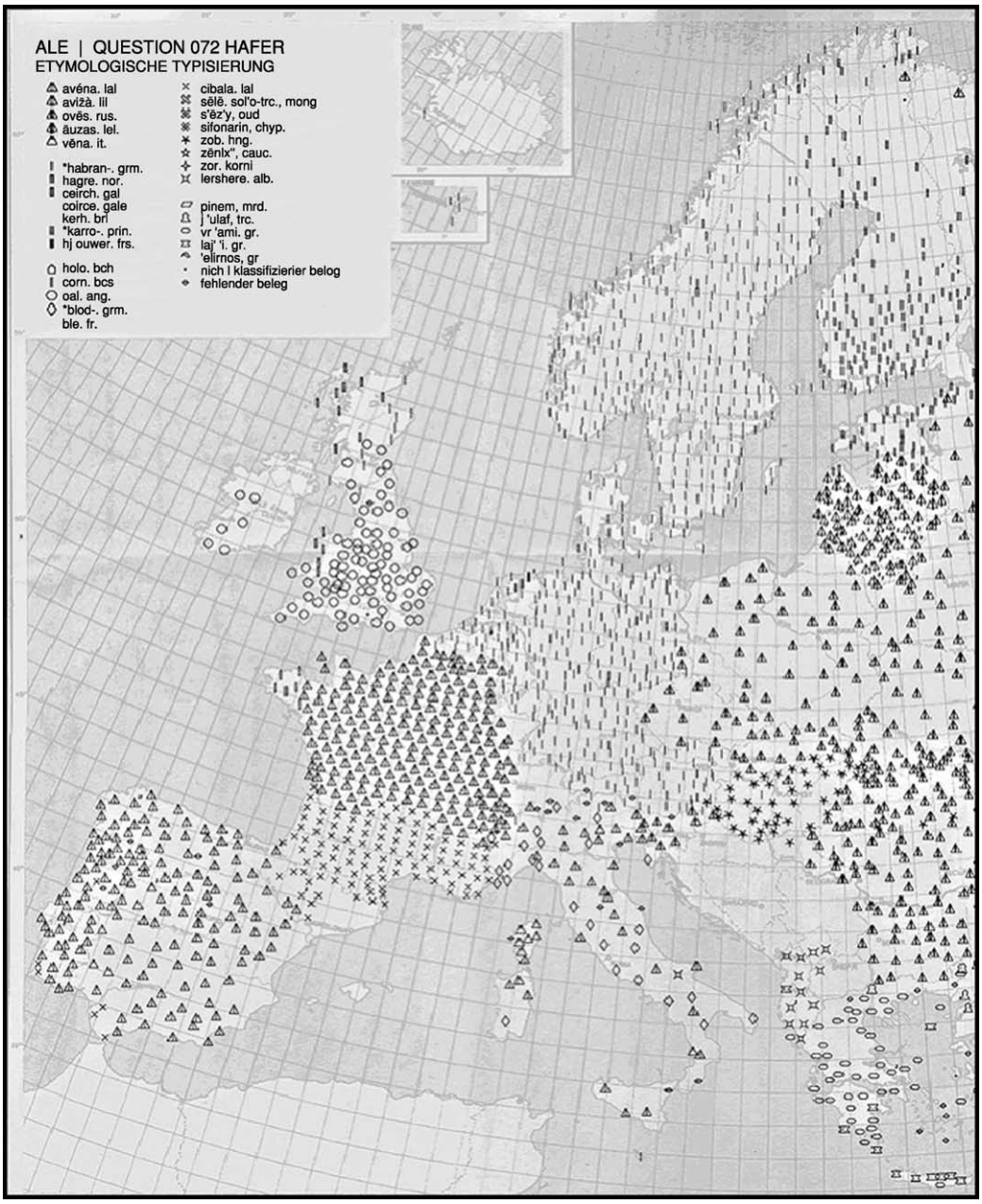

Figure 2 Map of the ALE, western part. Theme: 'oats.'

translations down ('indirect method') by using the alphabet of the written language. This way, there was no phonetic data, but there were answers from almost all locations of the area. The map-making was carried out by Wenker in two steps: at first, he assigned the word meant for cartography to each single documentary location; second, he generalized the area where the word occurred. Areas surrounded by isoglosses were the result. The particular word was written into that area. The example shown in Figure 3 stems from Wenker's unpublished atlas on pronouns (1886). Wenker's method of data collection and cartography was used for the DSA and the DWA as well, with the only difference being that, concerning these atlases, the exceptions from the main word ('leading form') were put into the area, not in writing but rather as symbols.

There are atlases with maps on which the use of isoglosses is extreme. One example is taken from an atlas on Latvian dialects (see Figure 4). Figures 3 and 4 illustrate the different approaches to representing detail in these atlases.

Location Text-maps

In the French tradition, including almost all French dialect atlases as well as the ALF and the NALF series, the data are presented as location text-maps. This

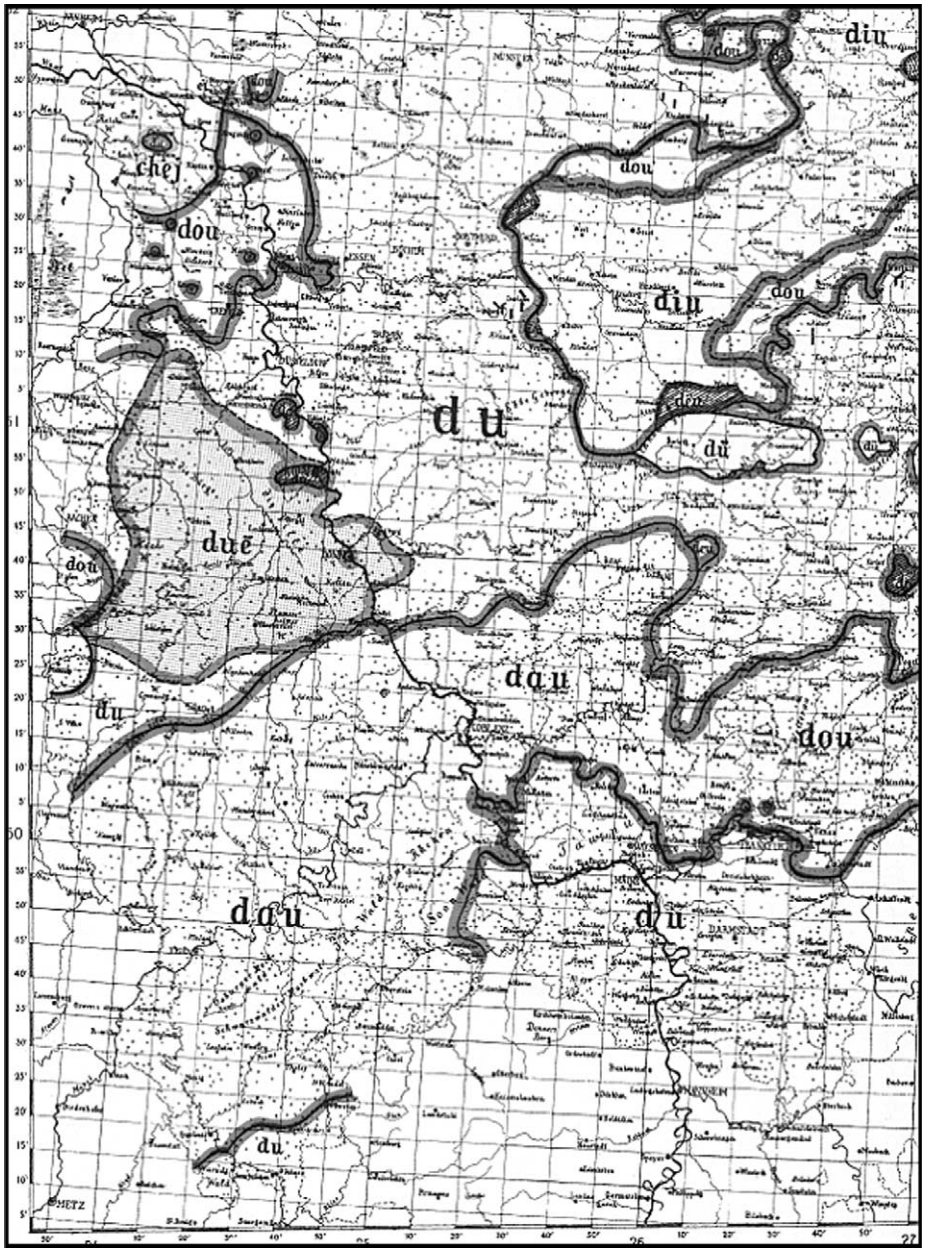

Figure 3 An area emphasized map – the pronoun *du* 'you'. (Extract from G. Wenker 1886, from Knoop *et al.*, 1982.)

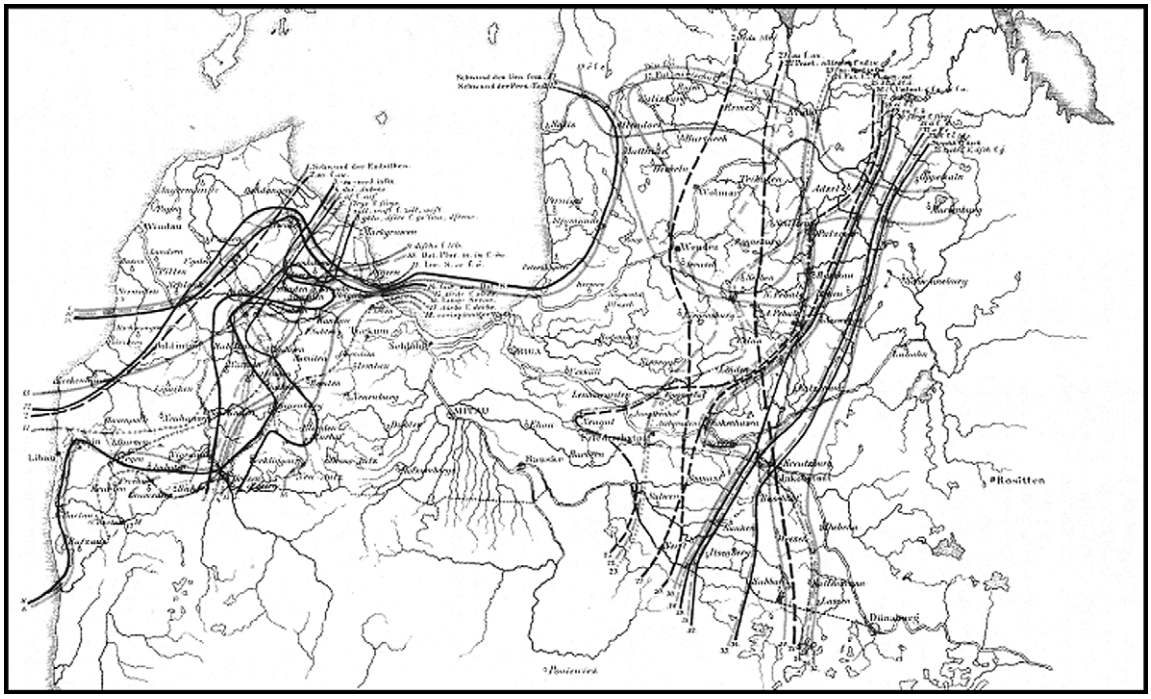

Figure 4 An area emphasized map: isoglosses combined to show all the Latvian dialects (from J. G. A. Bielenstein's Atlas 1892, after Händler and Wiegand, 1982).

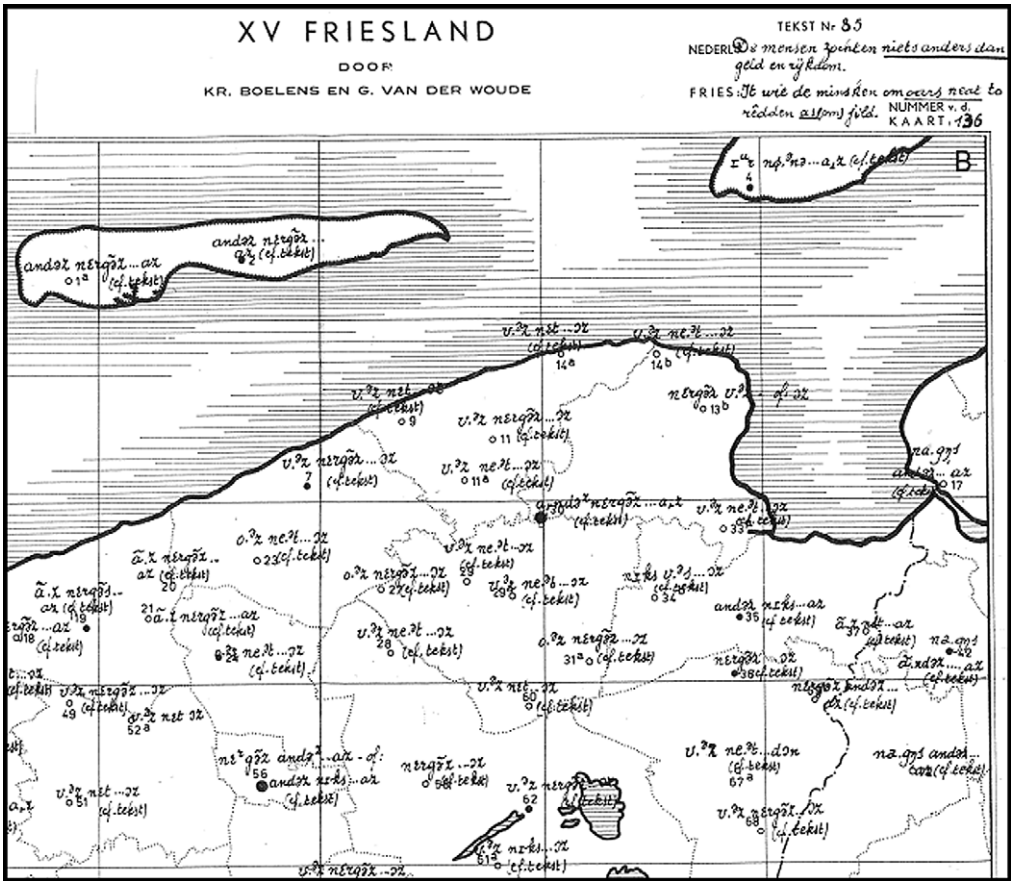

Figure 5 Location text-map in the Dialect-Atlas of Frisian. RNDA XV. 1955 (extract).Theme: Frisian *oars neat . . . as* 'not different from.'

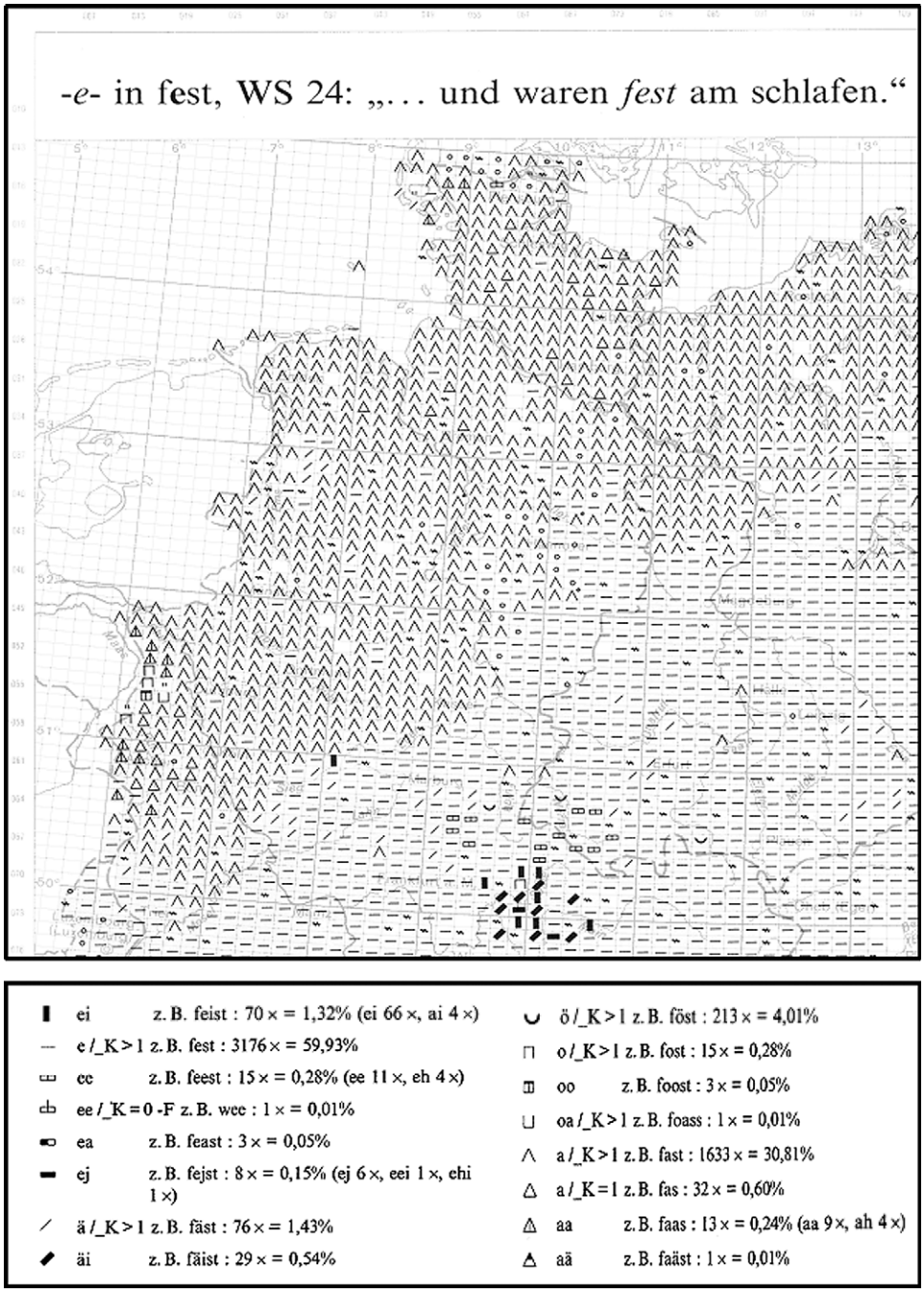

Figure 6 Extract from a KDSA location-symbol map (fest 'sound' (sleep)).

means that there is a text in phonetic transcription for each documentary location (*see* **Dialects: Early European Studies**, Figures 15 & 16). The same method was used for the AIS (*see* **Dialects: Early European Studies**, Figure 20) and Charpentier's atlas of Malakula (Vanuatu). The RNDA also adopted this kind of dialect representation (see Figure 5). The advantage of this method is, besides the phonetic transcription, that there is no interpretation of the data. The disadvantage, however, is that location-text-maps are difficult to read. Moreover, as far as phonology is concerned, this kind of map does not meet modern linguistic requirements in which vowels and consonants should be represented separately.

Location Symbol Maps

This type of map takes structural aspects into account. It can be applied to all levels of description, for example, to phonology, morphology, lexis, etc. Almost all modern dialect atlases use this method.

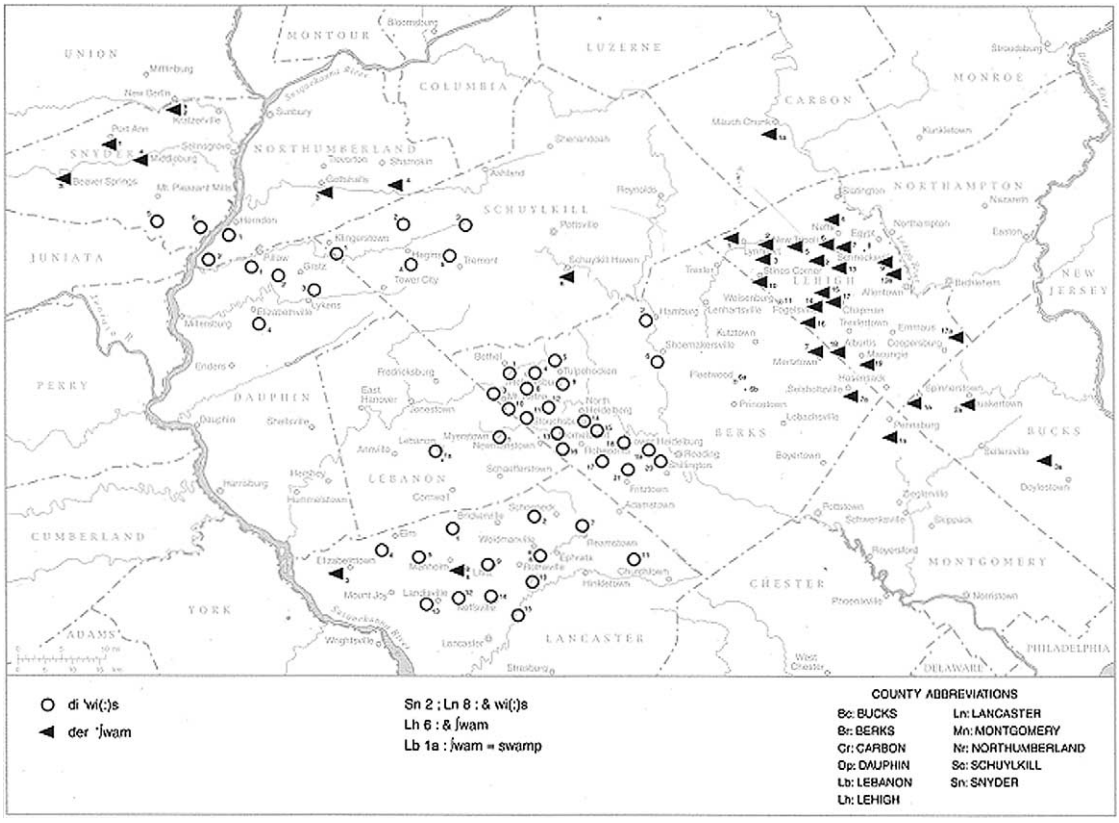

Figure 7 Standard (American) English as reference system in 'A Word Atlas of Pennsylvania German' (Seifert, 2001).

To represent the linguistic data, geometrical signs, such as lines, circles, triangles, etc., are put on the particular location. Related linguistic forms can be expressed by similar signs. Variants which are considered not to be relevant, are normally put together and symbolized by one sign (see Figures 6 and 2).

Reference Systems of the Atlases

Standard Language

Dialects are comprehensible only if they are contrasted with at least one other language system ('reference system'). In many dialect atlases, the dialect data is contrasted with the standard language, i.e., French dialects with standard French, German dialects with standard German, etc. This is true for all large-area atlases that have been considered here. For the ALE, dealing with a huge number of languages, German, English and French were chosen as reference systems. For the atlases of German dialects in France, standard French is the reference system. Figure 7 gives an example in which Standard (American) English is the reference system for Pennsylvania German dialects.

The special case where there is reference to ethnographic information is discussed in the article **Dialects: Early European Studies** (Figures 20 & 21).

Present-Day Dialects Derived from a Historical Proto-system

It was the tradition of the Neogrammarians to project the present-day language on a reconstructed, historical proto-system. The reason for this is that present-day phenomena can be explained as the result of language change. This idea was, and still is, very welcome in dialectology because this way, dialect variation can be explained much better than simply by contrast with the standard language. Some modern dialect atlases are still organized according to this method, e.g., the MRhSA. The authors (Bellmann G *et al.*, 1995–2002) take the Middle High German vocalism as the starting point for the maps in the first three volumes that represent the dialect vowels. The fourth volume, representing the dialect consonants, refers to West Germanic because, in this respect, language change began much earlier than in the Middle High German era. The innovation in this atlas is that the language of the older generation is contrasted with that of the younger generation ('biserial method'). The consequence for dialect cartography is that there are two contrasting maps: one for the older generation and one for the younger generation. The language change of the younger generation is marked in red on the second map (see Figure 8).

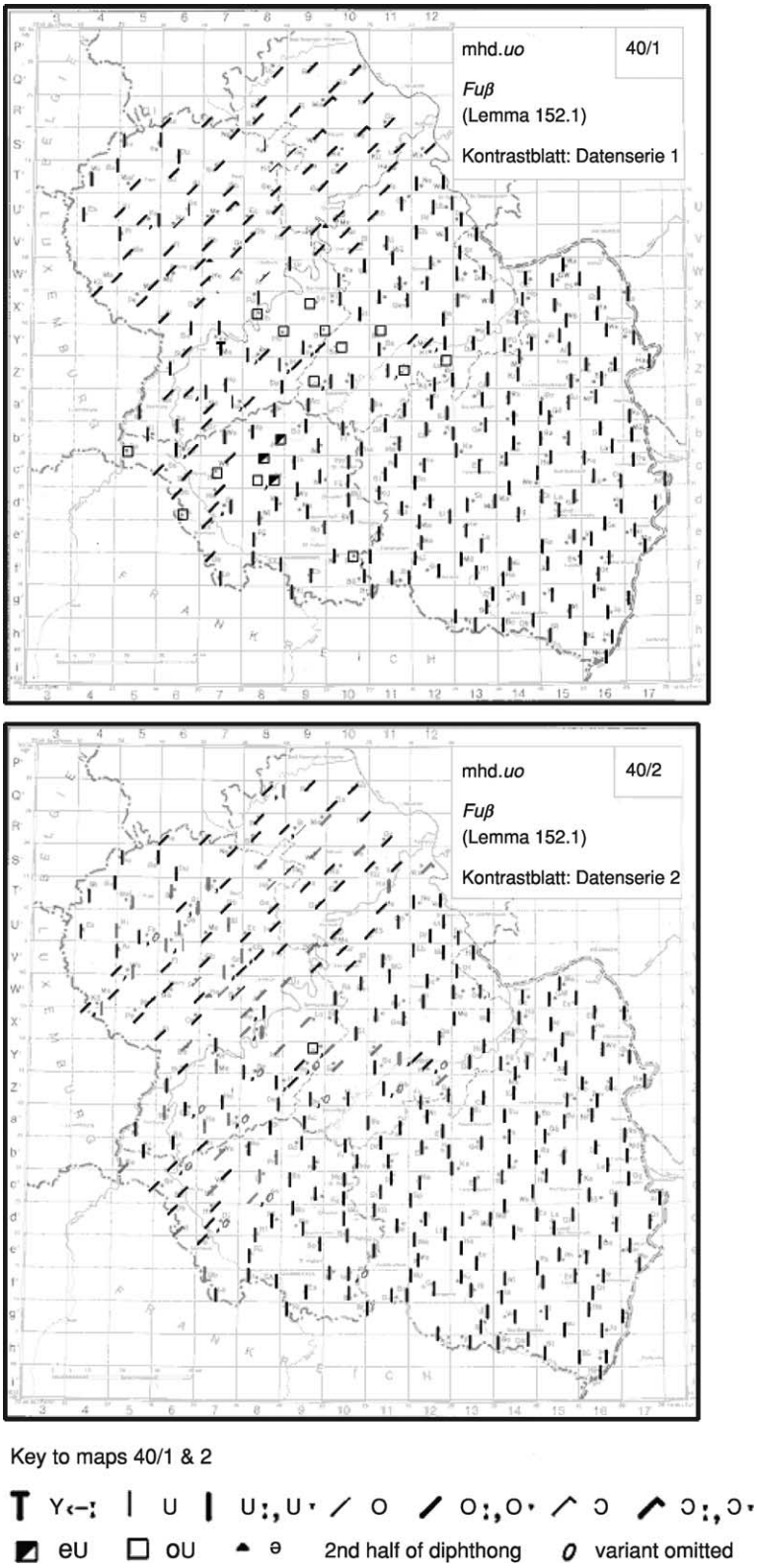

Figure 8 Biserial method in the MrhSA (MHG. uo > NHG u in Fuß 'foot'). 40/1 = older, 40/2 = younger generation. Gray symbols indicate language change within the younger generation.

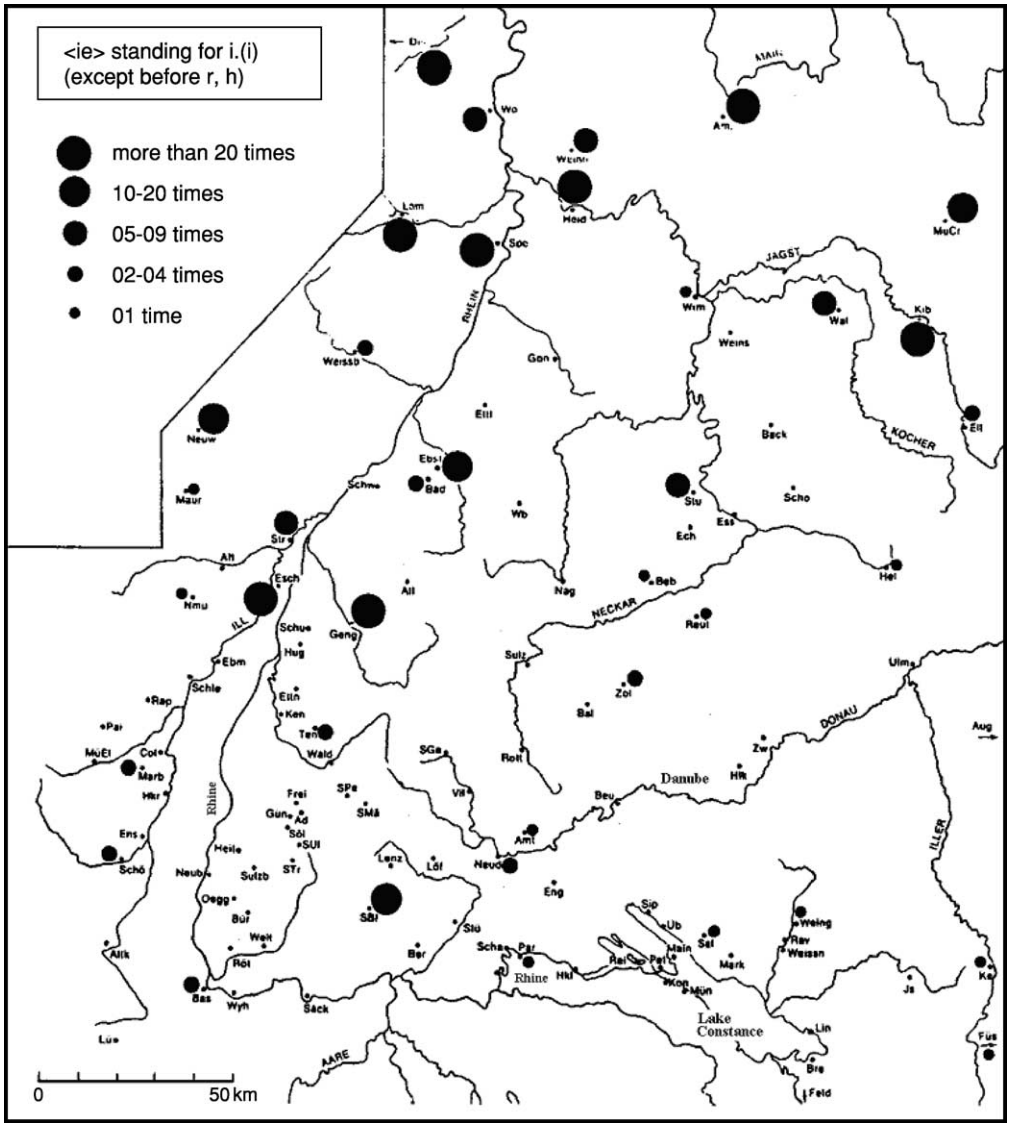

Figure 9 Medieval stages of language in the HSS – a quantitative method (text translated from German).

Medieval Stages of Language Represented in Dialect Atlases

Based on Middle Dutch documents of the 13th century, Berteloot published a 'sound atlas' (1984) covering this period. Five years earlier, a German team (Kleiber *et al.*) published the HSS (1979), which was based on documents of the 13th until the 15th centuries. The maps are based on a combination of qualitative and quantitative methods. In the sample map of Figure 9, one can recognize how many times the grapheme <ie>, standing for i.(i), is represented per location in the documents investigated over the centuries. The size of the dots corresponds to the number of references.

Dialect Atlases and the Electronic Media

Computer-Aided Dialect Atlases

Once special programs for data processing and computerized map-making had been developed, computer-aided dialect atlases could be produced. The first atlases based on these methods were the *Kleiner Deutscher Sprachatlas* (KDSA), vol. 1.1 (110 maps), and the *Atlas Linguarum Europa* (ALE), vol. I, fasc. 1 (11 + 1 maps), both published in 1984 (the latter one backdated to 1983). In both atlases, data are presented in location symbol-maps (see Figures 2 and 6). Vol. II of the ALA (published in 1985, but backdated to 1984) is also a computerized atlas while

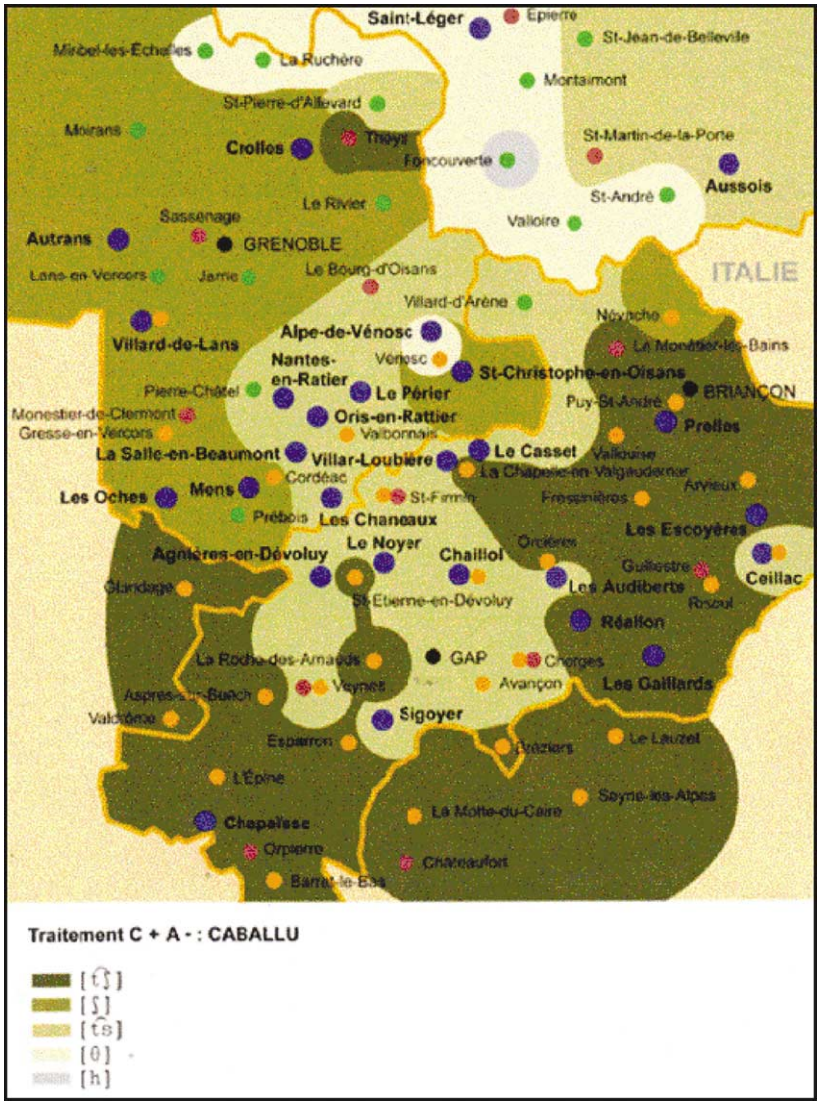

Figure 10 'Speaking linguistic atlas of an Alpine region' (1999). The pronunciation of <C> before <A> in CABALLU 'horse'.

Vol. I was produced in the traditional manner. It contains location text-maps that are less abstract than location symbol-maps and therefore much more easily programmed. Since the mid–1980s, the production of practically all new dialect atlases was computer-assisted, but almost all atlases were published in print and not on the Internet.

Audio-Visual Dialect Atlases on the Internet

Samples of dialects have been offered on the Internet for large and small dialect areas, e.g., by the 'American Dialect Web Links,' the 'International Dialects of English Archive (IDEA),' the 'English Accents and Dialects' (British Isles and overseas), the 'Linguistic Atlas of Kansas German Dialects,' and by the 'Deutscher Sprachatlas,' Marburg, Germany. But a complete audio-visual dialect atlas was first published in 1999 at the French University of Grenoble (*Atlas linguistique parlant d'une région alpine. Entre francoprovençal et occitan* ('Speaking Linguistic Atlas') by Marquet). The maps of this atlas show regional variants of a selection of items; 700 samples are programmed. By clicking a reference point, one can listen to the local pronunciation of the selected item (see Figure 10).

Another audio-visual dialect atlas has been projected by the University of Neuchâtel, Switzerland: the ALAVAL. It refers to the dialect variation in the Roman Valais. As early as 1880, this area was the subject of a dialect atlas published by the Swiss linguist Jules Gilliéron, who shortly thereafter became the founder of scientific dialectology in France. The new project provides audio-visual material – maps plus sound recordings – of 50 speakers

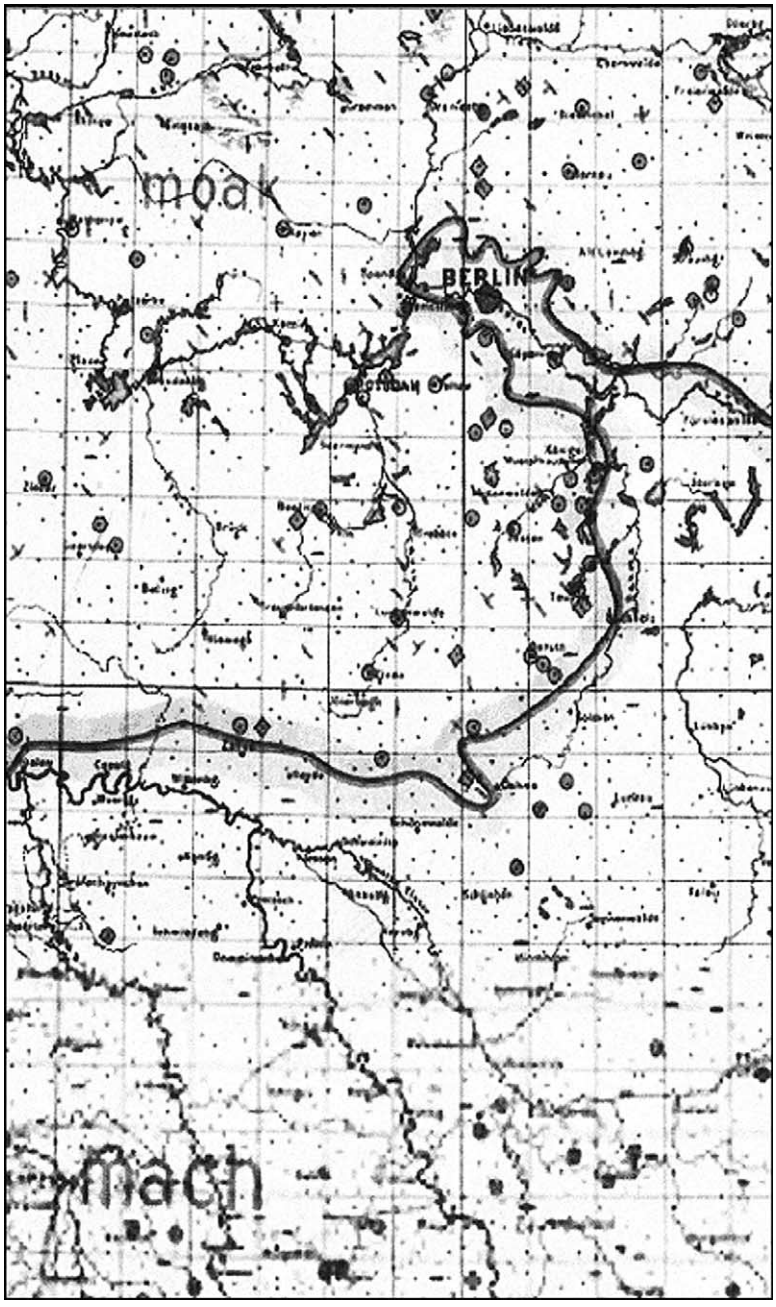

Figure 11 Digital Wenker Atlas Extract from the map *mach(en)* '(to) mak(e)' (area of Berlin).

(male and female) from 25 locations of the Valais. It is yet to be completed.

A third project is called VIVALDI—an acoustic linguistic atlas of the dialects and minority languages in Italy. The publication has started with the minority languages in Liguria (14 reference points), in the Aosta Valley (10 reference points), and on the islands of Sardinia (16 reference points) and Sicily (12 reference points). These areas are represented by maps and audio-visual material (per reference point, one utterance of one informant and a supplementary phonetic transcription of that utterance). The linguistic data is shown on the phonetic, morphological, lexical, and syntactical levels. Furthermore, translations of the parable of the prodigal son from the Bible are offered – a method which has been in use since 1807 (*see* **Dialects: Early European Studies**, Figures 14 & 18).

Digital Wenker Atlas

The first atlas that was published on the Internet is the Digital Wenker Atlas (DiWA). Each of its 557

maps was compiled from three hand-drawn maps. The atlas refers to 40 736 reference points (locations), much less than those of the DSA, because the Digital Wenker Atlas does not cover Austria and Switzerland, but only the territory of the "Deutsches Reich" (*see* **Wenker, Georg (1852–1911)**). The data collection (see 'Area Emphasized Maps' section) was done by Wenker between 1877 and 1887, but the color maps resulting from this were never published. There is no substitution, even by the DSA and the KDSA. The DSA is an extract consisting of 128 maps (mostly two colors, but in comparison with the Wenker maps, enlarged of Austria, Switzerland, etc.), and the KDSA – though computerized and based on the answer sheets of the investigation – is an atlas of 462 maps in two colors, but concerned with phonology only.

In the *Forschungsinstitut für deutsche Sprache – Deutscher Sprachatlas*, Marburg/Germany, the Wenker maps were scanned and, in using methods of area photography, put onto the internet. By zooming, it is possible to get information on each spot of a map, in addition parts of the maps can be copied and printed (see **Figure 11**). Overlays of (topographical) vector maps, also in split view, or of any thematic maps are possible.

See also: Dialects: Early European Studies; Gilliéron, Jules (1854–1926); Wenker, Georg (1852–1911); Standard and Dialect Vocabulary; Wrede, Ferdinand (1863–1934).

Dialect Atlases

AIS = *Atlante linguistico-etnografico dell'Italia e della Svizzera meridionale* [*Linguistic and ethnographic Atlas of Italy and south Switzerland*], Karl Jaberg & Jakob Jud, eds., vols. I–VIII. Zofingen 1928–1940.

ALA = *Atlas linguistique et ethnographique de l'Alsace* [*Linguistic atlas of the Alsace*]. Vol. II by Arlette Bothorel-Witz, Marthe Philipp & Sylviane Spindler. Paris 1985 [backdated to 1984].

ALAVAL = *Atlas Linguistique Audiovisual du Valais Romand* [*Audio-visiual linguistic atlas of the Roman Valais*]. Neuchâtel (2000). [http://www.dialecto.unine.ch].

ALE = *Atlas Linguarum Europae* [*Atlas of the European languages*]. Introduction ed. by A. Weijnen [u.a.] Assen 1975; maps ed. by Mario Alinei. Assen 1983–1990; ed. by Wolfgang Viereck. Rome 1997–.

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DWA = *Deutscher Wortatlas* [*German word atlas*] 1951–1980 by Walther Mitzka (from vol. 5 on with Ludwig Erich Schmitt [etc.]). 22 vols. Giessen.

HSS = *Historischer Südwestdeutscher Sprachatlas. Aufgrund von Urbaren des 13. bis 15. Jahrhunderts* [Historical Southwest German Linguistic Atlas. Based on ... documents of the 13th till 15th centuries] by Wolfgang Kleiber, Konrad Kunze & Heinrich Löffler. Vols. I–II. Bern, Munich 1979.

KDSA = *Kleiner Deutscher Sprachatlas* [*Concise linguistic atlas of German*]. Dialectology by Werner H. Veith. Computer assistance by Wolfgang Putschke & Lutz Hummel. 4 parts. Tübingen 1984–1999.

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MRhSA = *Mittelrheinischer Sprachatlas* [*Linguistic atlas of the Middle Rhine area*] by Günter Bellmann, Joachim Herrgen & Jürgen Erich Schmidt under collaboration with Georg Drenda & Heiko Girnth. 5 vols. Tübingen 1995–2002.

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Petit Atlas phonétique du Valais roman [*Concise Phonetic Atlas of the Roman Valais*] by Jules Gilliéron. Paris 1880.

Pronomina in Nordwestdeutschland [*Pronouns in northwest Germany*] by Georg Wenker 1886 (page proofs, 11 maps, unpublished).

RNDA = *Reeks Nederlandse Dialectatlassen* [*Series of Dutch dialect atlases*] by Edgar Blancquaert & Willem Pée (eds.), 16 vols. Antwerp 1930–1986.

SDS = *Sprachatlas der Deutschen Schweiz* [*Linguistic atlas of German Switzerland*], founded by Heinrich Baumgartner & Rudolf Hotzenköcherle. Ed. and rev. by Rudolf Hotzenköcherle, Rudolf Trüb [*et al.*]. 8 vols. Bern 1962–1997.

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Sprachatlas von Nord-und Mitteldeutschland [*Linguistic atlas of north and middle Germany*] by Georg Wenker. Strasbourg & London 1881.

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Dialect Chains

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In traditional agrarian societies, where most of the population is largely rural, relatively stable and has direct spoken contact primarily with speakers from their own or neighboring communities, the transitions between one linguistic zone and the next are typically gradual rather than abrupt. In terms of spatial variation (*see* **Spatial Variation (Geolinguistics)** or **Spatiality and Language**), this means that isoglosses separating varieties are more apt to be spread out than to bundle tightly, and speakers of neighboring geolects are likely to perceive each other's varieties as either the same language spoken somewhat differently or closely related varieties of the same language, rather than as completely different dialects or languages. Since differences separating adjacent varieties are typically cumulative, the further one travels from any one given speech community, the less direct contact there is between it and more distant communities, the greater the degree of linguistic difference (both real and perceived) is likely to be. When we compare the speech variety from an initial starting point with a more distantly related variety many removes away, there will usually be a greater number of empirical differences in linguistic features (*see* **Linguistic Features**) between them. Just as importantly, speakers are more likely to view the two widely separated varieties as distinct dialects of one language or even as different languages.

For each pair-wise comparison of adjacent varieties and even for pairs of not-too-distant near-neighbors only a few communities away, both the objective and the subjective reality is typically one of smooth or gradual transitions rather than abrupt changes (*see* **Speech Community** and **Speech and Language Community**). Yet the paradoxical nature of gradual linguistic transitions is such that somehow these small individual steps between similar but minimally different adjacent varieties add up, over a longer geographical space, to larger differences between language varieties that may in fact be mutually unintelligible, i.e., constitute different languages (*see* **Language Families and Linguistic Diversity**).

This sort of rainbow effect, whereby certain colors or speech varieties can be identified at various focal points in a (more or less) continuous spectrum, but without discretely identifiable boundaries between one speech community and the next, is what

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This sort of rainbow effect, whereby certain colors or speech varieties can be identified at various focal points in a (more or less) continuous spectrum, but without discretely identifiable boundaries between one speech community and the next, is what

dialectologists and variationists in general refer to as a dialect chain or a dialect continuum.

This linguistic state of nature likely characterized much of the linguistic landscape in many preindustrial societies, and certainly in those areas for which we have the most detailed geolinguistic data, such as Europe (*see* **Europe as a Linguistic Area**), this sort of gradual transition between geolects seems to have been the norm rather than the exception until very recently. Many of our classic examples of dialect chains are drawn from European language families (*see* **Indo–European Languages**), such as the Western Romance dialect continuum (*see* **Romance Languages**), which runs from Galician-Portuguese in the west (*see* **Galician** and **Portuguese**), through Asturian-Leonese (Asturian), Castillian (Spanish), Navarro-Aragonese, Catalan (Catalan-Valencian-Balear) (*see* **Catalan**), Aranese, Gascon, Occitan (Gascon) (*see* **Occitan**), Languedocien, Provençal, Piemontese, Ligurian, Lombard, Emiliano-Romagnolo, Italian, and so on down to Pugliese and Napoletano-Calabrese (*see* **Language Families and Linguistic Diversity**). Of course, each of the speech communities designated by these labels is subject to internal geographic variation and will contain its own continuum: along its western edge, Asturian blends into eastern Galician varieties, while southern and eastern Asturian varieties in turn blend into Leonese and Castillian, and so forth, without necessarily encountering abrupt transitions at any specific point (*see* **Speech Community** or **Language/Dialect Contact**).

Of course, this idealized, perfectly gradual view of the dialect chain is rarely so smooth in reality: both human and physical geography conspire to make the continuum smoother in some spots than in others. Obviously, natural barriers such as mountain ranges will disfavor face-to-face speaking interaction (*see* **Isolated Language Varieties**) and tend to break up a dialect continuum; similarly, there tends to be more linguistic contact (favoring a smoother continuum) within political, administrative, economic, and ecclesiastical boundaries than across them (which in turn favors more abrupt transitions; *see* **Environment and Language**).

For example, in the Iberian part of the Romance continuum described above (*see* **Spain: Language Situation** and **Spain: Lexicography in Iberian Languages**), Castilian in many ways stands out as the odd or outrider case: there are features shared by Galician-Portuguese, Asturian, Leonese, Aragonese and Catalan to which Castilian lacks, while Castilian displays some features absent from the others. Interestingly, it is this eccentric Castilian that rose to political dominance as the national language of Spain and was carried overseas as the language of the Spanish empire (*see* **Spanish**). Similarly, in the Gallo-Romance part of the Romance continuum, the different *langue d'oc* varieties of southern France form part of the chain between Iberian and Italian Romance varieties, but the national language French is drawn from Francien, one of the *langue d'oïl* dialects of northern France, which on the whole do not fit into the Romance continuum in quite the same neat way as the other varieties (*see* **France: Language Situation; Variation in French; French**).

Other well-known examples of this sort of pattern include the West Germanic (*see* **Germanic Languages**), the Northern Slavic, and the Southern Slavic dialect continua (Chambers and Trudgill, 1998: 5) (*see* **Slavic Languages**), but the phenomenon is not necessarily confined to Europe: a case can be made for an Inuktitut continuum (Creider, 1981) (*see* **Eskimo-Aleut**), and perhaps also for others among the Algonquian languages (MacKenzie, 1982; Valentine, 1994) and parts of the Bantu language families (Guthrie, 1967–1971) (*see* **Bantu Languages; Southern Bantu Languages**), to name just a few examples. It is probable that any reasonably large group of related language varieties spread over geographic space will display the characteristic gradual transitions of a dialect continuum, though in some cases we may lack sufficiently detailed data to describe them as such (*see* **Language Spread**).

In methodological terms, it should be that the prevalence of dialect continua casts serious doubts on the usefulness of traditional dialectology's primary descriptive and analytic tool, the isogloss (*see* **Spatial Variation (Geolinguistics)** or **Spatiality and Language**). At best, an isogloss can be seen as a sort of shorthand suggesting the net differences between adjacent regions: wherever we have sufficient data, it seems likely that around (or perhaps underneath) a given discrete isogloss we will find a transition zone. Even among bird species (*see* **Animal Communication: Overview; Birdsong**), where song dialects are sometimes conditioned by adaptation to environmental acoustic factors, there is evidence that those populations with ranges overlapping different faunal habitats (for example grasslands vs. woodlands) have variable song patterns corresponding to these different areas (Handford, 1988).

Of course, the extent to which one sees a smooth continuum or discrete dialects in a given linguistic territory is almost inevitably colored to some extent by ideological views about a nation-states' unity (or lack thereof; *see* **Language Attitudes; Language Politics**). Thus Ascoli's (1874) proposed division of Gallo-Romance into three areas (adding Franco-Provençal to the traditional *langue d'oc* and *langue d'oïl* areas mentioned above) was vigorously contested by French scholars such as Gaston Paris, who

saw the territory of France as more unified than divided and rejected the very notion of dialect divisions:

> . . . in a linguistic area with common origins, such as ours, there really are no dialects, . . . no real limit separates northern French people from those of the South . . . from one end of our nation to another a vast patchwork of varied hues blends together everywhere in infinitely blurred shades (Gaston, 1888: 134–135, our translation).

Since de Saussure in 1916 (*see* **Saussurean Tradition in 20th-Century Linguistics**), it is fairly widely recognized that there are no natural dialects but rather dialect features (*see* **Dialects: Early European Studies**) with greater or lesser geographic coverage, partly shared and partly differing between neighboring varieties. That said, the existence of discrete dialect areas remains pretty much in the eye (or ear) of the beholder. As Jochnowitz concludes, after examining the opposing points of view on the existence or nonexistence of Franco-Provençal as a linguistic entity, and after carefully weighing the geolinguistic evidence from the *Atlas linguistique de la France*, "all the disagreeing scholars [i.e., both sides of the debate as to whether or not there are dialect boundaries in France] are clearly right" (Jochnowitz, 1973: 180).

In a sense, dialect chains or dialect continua are the smaller-scale, finer-grained counterpart of the familiar family tree models used on a much larger scale in the historical reconstruction of language families and proto-languages (*see* **Language Families and Linguistic Diversity; Protolanguage**). As with the comparative-reconstruction method, our perception of a dialect chain depends crucially on our judgments (as linguists, of course, but ultimately, as speakers of human languages) of what constitutes relatedness or similarity among speech groups (*see* **Language Families and Linguistic Diversity; Language and Dialect: Linguistic Varieties**).

See also: Animal Communication: Overview; Bantu Languages; Birdsong; Catalan; Dialects: Early European Studies; Environment and Language; Eskimo-Aleut; Europe as a Linguistic Area; France: Language Situation; French; Galician; Germanic Languages; Indo–European Languages; Isolated Language Varieties; Language and Dialect: Linguistic Varieties; Language Attitudes; Language Families and Linguistic Diversity; Language Politics; Language Spread; Language/Dialect Contact; Linguistic Features; Occitan; Portuguese; Protolanguage; Romance Languages; Saussurean Tradition in 20th-Century Linguistics; Slavic Languages; Southern Bantu Languages; Spain: Language Situation; Spain: Lexicography in Iberian Languages; Spanish; Spatial Variation (Geolinguistics); Spatiality and Language; Speech and Language Community; Speech Community; Variation in French.

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Dialect Representations in Texts

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Introduction

The representation of dialect in texts becomes an issue only when the language concerned has been standardized and there is a norm for written usage against which dialects are judged to be deviant or different. Any text written in English before the 15th century is thus written in the dialect of its author and/or scribe, and, with a few notable exceptions – such as Chaucer's attempt to represent a northern dialect in 'The reeve's tale' – the deliberate use of dialect representation for comic or other purposes began in the 16th century. By this time, printed works produced anywhere in England were written in standard English, so any deviation in the text from this norm signaled the author's intention to introduce a 'provincial' character or some kind of local color, usually for humorous purposes. Perhaps the best-known example of this is the dialogue between Fluellen, MacMorris, and Jamy in Shakespeare's *Henry V*, in which the language of the Welshman, the Irishman, and the Scot are marked out as different from that of the Englishman, Gower.

> GOWER: Captain Fluellen, you must come presently to the mines; the Duke of Gloucester would speak with you.
> FLUELLEN: To the mines! Tell you the Duke it is not so good to come to the mines; for, look you, the mines is not according to the disciplines of the war; the concavities of it is not sufficient. For, look you, th' athversary – you may discuss unto the Duke, look you – is digt himself four yard under the countermines; by Cheshu, I think 'a will plow up all, if there is not better directions.
> GOWER. The Duke of Gloucester, to whom the order of the siege is given, is altogether directed by an Irishman – a very vallant gentleman, i' faith.
> FLUELLEN. It is Captain Macmorris, is it not?
> GOWER. I think it be.
> FLUELLEN. By Cheshu, he is an ass, as in the world: I will verify as much in his beard; he has no more directions in the true disciplines of the wars, look you, of the Roman disciplines, than is a puppy-dog.
>
> *Enter* MACMORRIS *and* CAPTAIN JAMY.
>
> GOWER. Here 'a comes; and the Scots captain, Captain Jamy, with him.
> FLUELLEN. Captain Jamy is a marvellous falorous gentleman, that is certain, and of great expedition and knowledge in th' aunchient wars, upon my particular knowledge of his directions. By Cheshu, he will maintain his argument as well as any military man in the world, in the disciplines of the pristine wars of the Romans.
> JAMY. I say gud day, Captain Fluellen.
> FLUELLEN. God-den to your worship, good Captain James.
> GOWER. How now, Captain Macmorris! Have you quit the mines? Have the pioneers given o'er?
> MACMORRIS. By Chrish, la, tish ill done! The work ish give over, the trompet sound the retreat. By my hand, I swear, and my father's soul, the work ish ill done; it ish give over; I would have blowed up the town, so Chrish save me, la, in an hour. O, tish ill done, tish ill done; by my hand, tish ill done!
> FLUELLEN. Captain Macmorris, I beseech you now, will you voutsafe me, look you, a few disputations with you, as partly touching or concerning the disciplines of the war, the Roman wars, in the way of argument, look you, and friendly communication; partly to satisfy my opinion, and partly for the satisfaction, look you, of my mind, as touching the direction of the military discipline, that is the point.
> JAMY. It sall be vary gud, gud feith, gud captains bath; and I sall quit you with gud leve, as I may pick occasion; that sall I, marry.
> MACMORRIS. It is no time to discourse, so Chrish save me. The day is hot, and the weather, and the wars, and the King, and the Dukes; it is no time to discourse. The town is beseech'd, and the trumpet call us to the breach; and we talk and, be Chrish, do nothing. 'Tis shame for us all, so God sa' me, 'tis shame to stand still; it is shame, by my hand; and there is throats to be cut, and works to be done; and there ish nothing done, so Chrish sa' me, la.
> JAMY. By the mess, ere theise eyes of mine take themselves to slomber, ay'll de gud service, or I'll lig i' th' grund for it; ay, or go to death. And I'll pay't as valorously as I may, that sall I suerly do, that is the breff and the long. Marry, I wad full fain heard some question 'tween you tway.

Techniques for Representing Dialect

Semiphonetic Spelling

Perhaps the most widespread method of representing dialect is the use of semiphonetic spellings. In Fluellen's speech, we see <p> where standard English would have <b>, as in <plow up>; <f> for <v> in <falorous>; and <ch> for <j> in <Chesu>, all suggesting the perceived Welsh devoicing. This technique is also used in representing the Irishman's (Macmorris's) speech, where <sh> for <s> occurs in <ish> and <Chrish>. The pronunciation indicated by the semiphonetic spelling in these cases is fairly clear: <p> represents /p/, <f> represents /f/, <ch> represents /tʃ/ and <sh> represents /ʃ/. Semiphonetic spelling relies on the reader's and the author's sharing the same view of the 'normal' relationship between sound and spelling: thus, in the reference variety, <sh> is pronounced /ʃ/, so the use

of <sh> in words where the reference variety would have <s> signals a 'deviant' pronunciation. In cases where reader and author may have different 'norms', the use of semiphonetic spelling becomes problematic. One example of this is the representation in 20th-century dialect texts of the 'northern' English /ʊ/ in, e.g., *up* with <oo>. This representation was used by one of the first authors to comment on this as a characteristically 'northern' pronunciation, the elocutionist John Walker:

> If the short sound of the letter *u* in *trunk*, *sunk*, &c., differ from the sound of this letter in the northern parts of England, where they sound it like the *u* in *bull*, and nearly as if the words were written *troonk, soonk*, etc., it necessarily follows that every word where that letter occurs must by those provincials be mispronounced. (1791: xiii)

To a speaker of received pronunciation or most southern varieties of British English, <oo> usually represents the pronunciation /ʊ/, and so the spelling <troonk> indicates the 'deviant', northern pronunciation of this word, with /ʊ/ rather than southern/RP /ʌ/. However, for northerners, <oo> usually represents /uː/ as in *cool* and, for some speakers, *cook*, while /ʊ/ is the normal pronunciation of <u>. Thus, in the following lines from George ('Geordie') Ridley's dialect song 'The Blaydon races' (1862), the <u> of <up> is not respelled, but the <oo> in <doon> represents the Tyneside pronunciation of Middle English *ō* as /uː/.

> We flew past Airmstrang's factory, and up to the 'Robin Adair,'
> Just gan doon te the railway bridge, the 'bus wheel flew off there ....

This song was written by a Tynesider to be sung by Tynesiders, so the semiphonetic spelling here reflects their shared norms rather than those of southern/RP speakers. This dependence on a known and/or shared 'normal' relationship between sound and spelling makes semiphonetic spelling at times difficult to interpret without prior knowledge of the accent represented. In the extract from *Henry V*, the vowels are more difficult to interpret than the consonants; thus, when the Scot, Captain Jamy, says, 'It sall be vary gud, gud feith', <vary> seems to suggest /a/ rather than /ɛ/, but what are we to make of <gud>? In Shakespeare's time, <oo> was more likely to represent /uː/, since the 'shortening' that led to the present-day /ʊ/ in such words was a sound change that had not been completed, though it was in progress. Thus, it may be that Shakespeare was signalling a short /ʊ/ in Scots here, but the representation is no longer transparent, if it ever was. *Henry V* is, of course, a drama, written to be acted rather than read, so Shakespeare needed to do no more than provide hints to the actors about the level and type of dialect to be used.

Regionalisms

Elsewhere in the speech of Captain Jamy, what might appear to be semiphonetic spellings of <sall> for standard English *shall*, <bath> for *both*, etc., are spellings that would have been found in the written Scots of the time and so are perhaps best classed as regionalisms. Other examples of regionalisms here are the use of Scots lexical items in Captain Jamy's speech (*ligge, tway*) and Fluellen's use of inversion, a stereotypical Welsh–English syntactic feature (*look you, say you*). Broadly speaking, regionalisms tend to represent lexical and morphosyntactic elements in the dialect, but in cases such as *sall, tway*, and *bath*, the distinction between semi-phonetic spelling and regionalism is not easily defined. Indeed, in a modern dialect text, *bath* could well be described as a semi-phonetic spelling. It is only the existence of a standard Scots, exemplified in texts such as the letters of James VI of Scotland to his cousin Queen Elizabeth I of England, that marks such forms out as regionalisms in Shakespeare's time. Shakespeare's use of regionalisms in the speech of Captain Jamy makes his representation of Scots fuller and less reliant on stereotypes than that of the Welsh–English and Irish–English of Fluellen and Macmorris.

Eye Dialect

Shakespeare's text, unlike many literary representations of dialect, makes little use of eye dialect, defined by Preston as "respellings which reflect no phonetic facts whatsoever, such as 'sez' for 'says' or 'wuz' for 'was'" (2000: 615). Eye dialect is often used when an author wishes to give the impression of lower-class and/or uneducated speech rather than an accurate portrayal of a specific regional dialect. Kipling's *Barrack Room Ballads* (1892), in which the poet attempts to portray the language of the common soldier Tommy Atkins, provides many examples of eye dialect. In the extract below, from 'Oonts,' we see the use of <wot> for *what*: while conservative RP speakers in Kipling's time might still have pronounced the initial <wh> as /ʍ/ or /hw/, there would be nothing dialectal or nonstandard about the use of the vowel /ɒ/. The use of the deviant spelling here was intended to give an impression of uneducated usage. Kipling likewise made frequent use of the apostrophe to indicate a 'missing' letter, representing the soldier as a speaker who never pronounces initial /h/ and always has final /n/ rather

than /ŋ/ in the suffix *-ing*. These two features, known popularly as 'h dropping' and 'g dropping' (the latter a misnomer, as only speakers of English West Midland and North west Midland dialects articulate a final /g/ in this suffix), are two of the most stigmatized features of nonstandard British accents from the 19th century onward. Kipling was thus marking the speech of Tommy Atkins as that of the common man rather than attempting to convey a specific regional accent.

> WOT makes the soldier's 'eart to penk, wot makes 'im to perspire?
> It isn't standin' up to charge nor lyin' down to fire;
> But it's everlastin' waitin' on a everlastin' road
> For the commissariat camel an' 'is commissariat load.
> O the oont, O the oont, O the commissariat oont!
> With 'is silly neck a-bobbin' like a basket full o' snakes;
> We packs 'im like an idol, an' you ought to 'ear 'im grunt,
> An' when we gets 'im loaded up 'is blessed girth-rope breaks.

Allegro Speech Respellings

The spelling of *and* as <an'> in 'Oonts' is an example of what Preston called "allegro speech respellings . . . which show such natural phonetic processes as, e.g., aphesis – ''cause' for 'because' or ''bout' for 'about'" (2000: 615). Although all speakers use such forms in informal registers, they tend to be used in texts only to represent dialectal or nonstandard usage. The use of allegro speech respellings is particularly prevalent in popular, humorous representations of dialect.

Dialect Literature and Literary Dialect

Both Shakespeare and Kipling were writing what Shorrocks termed "literary dialect . . . the representation of nonstandard speech in literature that is otherwise written in Standard English" as distinct from "dialect literature . . . works composed wholly (sometimes partly) in a nonstandard dialect" (1996: 386). The devices used to represent dialect in dialect literature are sometimes, though not always, more sophisticated than those used in literary dialect, largely because, as Shorrocks pointed out, the intended readership of the former will probably include speakers of the dialect, who are more likely both to understand what is being represented and to be willing to make the effort required to decipher an unconventional orthography. The poetry of Barnes and Tennyson provides good examples of the use of highly unorthodox spelling systems, including diacritics and extensive respellings, in an attempt to represent the dialect accurately and nonnormatively. The extract below, from William Barnes's '*The wife a-lost*,' illustrates this well.

> Since I noo mwore do zee your feäce,
> Up steärs or down below,
> I'll zit me in the lwonesome pleäce,
> Where flat-bough'd beech do grow;
> Below the beeches' bough, my love,
> Where you did never come,
> An' I don't look to meet ye now,
> As I do look at hwome.

Semiphonetic spelling is used here as in the *Henry V* extract: to represent the accent of Dorset, <z> is used for standard English <s> in *zee, zit* to indicate the voicing of initial fricatives, which is characteristic of traditional accents of the southwest of England. However, the level of detail in the semiphonetic representation is more meticulous, and hence less accessible to the reader. Barnes indicates a /w/ glide in <mwore, lwonesome, hwome> and uses a diaeresis to indicate a diphthong in <feäce, steärs, pleäce>. As Jacobs (1952) demonstrated, Barnes was a philologist as well as a poet, and used devices such as the diaeresis to indicate instances where the Dorset dialect had a phonetic distinction not found in RP. This device was used later in the 19th century by Tennyson, who wrote seven poems in the Lincolnshire dialect. Tilling told us that "in order to convey the sounds of the dialect as accurately as he could, Tennyson developed an elementary phonetic system by which the value of particular letters was changed by the addition of a dieresis" (1972: 89). Tilling also pointed out that Tennyson had at least one meeting with the famous phonetician A. J. Ellis and made alterations to the text of 'The northern farmer, new style' in the light of Ellis's comments.

On hearing him read the following lines:

> Why? fur 'e's nobbut a curate, an weänt nivir git naw 'igher,
> An' 'e maäde the bed as 'e liggs on afoor 'e coom'd to the shire.

Ellis queried the authenticity of the rhyme '*igher/shire* and Tennyson admitted that the two words would probably rhyme only in the speech of the educated. In later versions, the two lines were changed thus.

> Why? fur 'e's nobbut a curate, an weänt nivir git hissen clear,
> An' 'e maäde the bed as 'e ligs on afoor 'e coom'd to the shere (Tilling, 1972: 90–91).

Sullivan, referring to the representation of Irish English in plays, stated that writers are "primarily interested in . . . using the dialect as a literary device, and not in giving a linguistically complete representation of it," producing "a theatrical portrayal

indicative of . . . essentially social characteristics" (1980: 215, 205). This is true of Shakespeare's representation of the Scots, Welsh, and Irish characters in *Henry V* and of Kipling's depiction of the lower-class speech of Tommy Atkins. Barnes and Tennyson were much more interested in providing a "linguistically complete representation" of respective dialects. This could, of course, be a reflection on the degree of scholarly interest in dialect and philology in the second half of the 19th century; this was the period in which Ellis's (1869–1989) extensive survey of regional accents and Wright's (1905) *English dialect grammar* and (1896–1905) *English dialect dictionary* were being compiled. It could be argued that the more complete representation of dialect is characteristic of dialect literature, as opposed to literary dialect, but some 19th-century novelists – whose work must come under the heading 'literary dialect,' since nonstandard English is confined to the dialogue of certain characters – achieved a fair degree of detail and accuracy. Emily Brontë's portrayal of the Haworth dialect in *Wuthering Heights* was sufficiently detailed to be deemed inaccessible, and as such was bowdlerized by her sister Charlotte, who argued:

> It seems to me advisable to modify the orthography of the old servant Joseph's speeches; for thus as it stands it exactly renders the Yorkshire dialect to a Yorkshire ear, yet I am sure Southerns must find it unintelligible, and thus one of the most graphic characters in the book is lost on them (1850, cited in Bailey, 1996: 295).

Elizabeth Gaskell also took a scholarly interest in portraying the Lancashire dialect as accurately and fully as was consistent with accessibility. Melchers concluded that "although her phonetic representation is not complete, it is always accurate, and . . . she handles the subtle variations of the definite article and the second person singular form of the personal pronoun with consistency and mastery" (1978: 123). Indeed, as Melchers pointed out, Elizabeth Gaskell's novels were among the few cited in Joseph Wright's bibliography of secondary material used in compiling the *English dialect dictionary* (1896–1905) (others included works of Hardy and the Brontës, but not Dickens). These novelists were well aware of the need to balance authenticity and accuracy against accessibility. In a letter to *The Spectator*, October 15, 1881, Hardy defended himself against the accusation that the dialect in his novels was unintelligible, but regretted that in making his dialogue readable, he "compromises" the dialect:

> It must, of course, always be a matter for regret that, in order to be understood, writers should be obliged thus slightingly to treat varieties of English which are intrinsically as genuine, grammatical, and worthy of the royal title as is the all-prevailing competitor which bears it, whose only fault was that they happened not to be central and therefore were worsted in the struggle for existence, when a uniform tongue became a necessity among the advanced classes of the population (cited in Görlach, 1999: 211).

Representations of Dialect in Popular and Nonliterary Texts

All the novelists referred to in the previous section were writing for a national, if not an international, readership. The requirement of intelligibility is lessened where dialect literature is produced for a local readership familiar with the dialect concerned. Much of what Shorrocks terms "dialect literature" comes under this heading. The earliest examples of popular dialect literature came in the form of humorous dialogues, such as those of John Collier, a.k.a. Tim Bobbin. His *Tummus and Meary* was first published in 1746 but maintained its popularity throughout the 19th century. In Yorkshire, spoof 'almanacs' in dialect were popular from 1839 onward, especially in the West Riding, where the most popular and long lived was John Hartley's *Clock almanac*. Many examples of 'dialect literature' consist of texts that might not normally be thought of as 'literature': humorous dialogues, music-hall songs and 'recitations,' cartoons and 'spoof' dictionaries and phrase books. The representation of dialect in these more 'popular' genres differed from that of the 'literary' texts only in that it avoided the more esoteric techniques used by, e.g., Barnes and Tennyson, relying mainly on semiphonetic spelling and eye dialect, but presented a more detailed portrayal of the dialect than those provided by Shakespeare and Kipling in the extracts cited in this article. Indeed, these texts sometimes exaggerated the distinctiveness of the dialect, claiming what are essentially phonetic variants as distinct lexical items. In such cases, the use of semiphonetic spelling and allegro speech respellings gives the impression of greater distinctiveness than actually exists. An example of this is found in the spoof phrase book *Advanced Geordie palaver* (Dobson, 1970), in which 'Geordie' phrases were translated into 'English.' The 'Geordie' <Heyuhord abootwor Meggiesbadleg> ('Have you heard about our Meggie's bad leg') was translated as 'My maternal Aunt Margaret is incapacitated. Alas she cannot walk without assistance' and 'Omebellysbad' ('Oh, my belly's bad') as 'This indigestion is most distressing.' Apart from the semiphonetic spelling (<hord> for *heard*, <aboot> for *about*), the 'Geordie' was rendered artificially 'difficult' by the lack of

word boundaries, conveying an impression of extreme nonstandardness in contrast with the exaggeratedly formal language of the 'English' translation.

Ideological Issues Concerning Dialect Representations in Texts

Works such as *Advanced Geordie palaver* are, of course, intended to be humorous, so an accurate portrayal of the dialect cannot be expected. However, a similar tendency to emphasise the nonstandard nature of the language of certain speakers can be found in anthropological, ethnographic, and folkloric works. Preston was highly critical of this practice, dubbing it the "Li'l Abner syndrome" (1985). He pointed out that in the folkloristic texts that he examined, "transcripts of the speech of middle-class 'Northern' speakers . . . contained no eye-dialect . . . and almost no allegro speech respellings . . . . Such spellings, however, were very frequently used in the transcription of the speech of African Americans, Appalachians and nonnative speakers." Preston went on to ask, "[I]f one wants to give the flavour of natural speech, why is it that speakers of some varieties need to have more condiments used on them than others?" (2000: 615).

Preston's misgivings about the use of eye dialect and allegro speech respellings were confirmed by Jaffe and Walton (2000). They devised an experiment in which participants were asked to read out texts incorporating spellings such as <wuz> for *was* and then to describe the kind of person they envisaged as speaking. Jaffe and Walton found that after producing a performance of a 'Southern' accent and describing the persona as 'rural' and/or 'uneducated,' "several respondents pointed to 'wuz' . . . as one of the clues that told them 'how the person talks.' This is an interesting illustration of how orthography and identity can be fused, since 'wuz' is an eye dialect form that reflects no regional pronunciation" (2000: 572). Jaffe and Walton concluded that Preston was right to have been concerned about such representations: '[O]ur research suggests that it is almost impossible to avoid stigma in the nonstandard orthographic representation of others' low-status speech varieties' (2000: 582–583). This begs the question whether authors who represent dialect in their texts are politically or ideologically motivated to portray the speech of certain groups as 'deviant' or stigmatized. If we consider the extract from Shakespeare's *Henry V*, the presence of Welsh, Irish, and Scottish soldiers in Henry's army is, of course, historically accurate, but Shakespeare's decision to mark their speech as 'deviant' has been the subject of critical debate. While scenes such as this have often been filed under 'comic relief,' Blank regarded Shakespeare's representation of dialect as 'broken English' to be symptomatic of the growing hegemony of standard English in Shakespeare's time:

> The rise of the European vernaculars, in fact, did not entirely dismantle the old linguistic hierarchies, for the standardization – or, more precisely, the centralization – of these languages, well underway before the sixteenth century, quickly advanced new, prestige forms. In Renaissance England, grammarians, lexicographers, and spelling reformers were already concerned with advancing the King's English – the elite dialect that had already repossessed some of the domains of literature, religion and politics once held by Latin – as a 'unitary' national language . . . . Latin was dead – but long live the King's English (Blank, 1996: 14).

Jaffe pointed out that 'orthography is a tool of 'Abstandssprache': language by distance" (2000: 502). Thus, devices such as semiphonetic spelling, eye dialect, and allegro speech respellings serve to highlight the 'Abstand', the difference or distance between the dialect represented and the reference variety that serves as the norm. Whether this 'distance' reflects positively or negatively on the dialect and its speakers depends to a certain extent on whether the work was written by a speaker of the dialect, an 'insider,' or the view of the dialect is imposed from outside. Jaffe made precisely this point:

> Nonstandard texts written by outsiders to the community of speakers represented . . . offer no potential for representational control to those represented. As a consequence, they are almost always subject to 'darker' interpretations based on the well-known stereotypical conventions that link linguistic nonstandardness with stigma (2000: 509).

Even where 'dialect' texts were written by members of the speech community concerned, critics have been divided in their views of the political and ideological implications of the representation of the language of these groups as 'nonstandard.' In his introduction to his 1972 edition of Thomas Allan's *Tyneside songs*, Harker suggested that the music-hall songs, such as '*The Blaydon races*,' were intended for the entertainment of the middle classes and accused Allan (the original publisher) of trying to be 'more Geordie than the Geordies' in his use of semiphonetic spelling to represent the dialect. Harker argued, "[I]t is worthwhile emphasizing that any person who needed to have written down the so-called 'dialect' must have been an outsider either geographically or culturally" (1972: xxvi). However, as is noted in this article, it is often only 'insiders' who can easily interpret the representations of dialect in the songs and recitations produced by local printers in the 19th century. Joyce took

the opposite stance, arguing that dialect literature forged an identity for the northern working classes:

> The intellectual climate in which dialect literature developed was one in which language and literature carried versions of nation and people that offered the labouring classes the possibility of inclusion in the body of society rather than the exclusion so evident in other respects . . .. [Dialect] spoke to 'working folk' of all occupations and geographical locations, conferring on them citizenship in the nationalities of 'Lanky,' Yorkshire 'Tyke' or north-east 'Geordie.' (1972: 160, 172)

In certain circumstances, the use of nonstandard spellings to represent dialect in texts can be seen as asserting the separate identity of the dialect and its speakers, an act of 'Abstand.' Jaffe made this point when she stated that 'gratuitous' respellings, such as those used in Sebba's (1998) British Creole corpus, could be characterized as "acts of linguistic repossession: they repossess difference in a system that usually only represents sameness" (2000: 508). The crucial point here is that the respelling asserted and celebrated difference rather than imposed a normative view of the dialect as deviating from a norm.

Dialect Representations as Linguistic Evidence

Wakelin pointed out that "the dialect dialogues, poems and similar works composed by clergymen, antiquarians and other writers" (1986: 741) provided one of the very few sources of evidence for dialects of English between 1500 and 1900. The use of such evidence presented a number of problems, due to the limitations of the methods outlined in this article for representing dialect fully and accurately and to the tendency for humorous and 'popular' writers in particular to represent stereotypes. Semiphonetic spelling is, as this article points out, often difficult to interpret without prior knowledge of the dialect, and the features represented are those that can be conveyed by using the 'standard' alphabet. Thus, evidence for glottalization is not found in dialect texts, because there is no 'letter' that represents a glottal stop. Wakelin pointed out that in 'The Exmoor courtship' and 'The Exmoor scolding,' although the southwestern voicing of initial fricatives was indicated by the use of <v> for <f> and <z> for <s>, "no attempt is made to take this further by rendering initial /ð/ and /ʒ/ . . . which were also the regular south-western parallels to Standard English initial /θ/ and /ʃ/ at this time" (1986: 743). This is, presumably, because there is no obvious 'spelling' of these sounds in standard English, since both /θ/ and /ð/ are spelled <th> and there is no single spelling for /ð/. Since dialect humor often depends on known stereotypes, there is a tendency for these texts to continue representing features that may be recessive. Dickens made frequent use of the 'Cockney' interchange of /v/ and /w/, first introduced in the speech of Sam Weller in *The Pickwick papers* (1836). Although this feature had been identified by John Walker (1791) as a cockneyism, Smart, writing in the same year that *Pickwick papers* was published, suggested that it is "almost unnecessary to speak now of such extreme vulgarisms as the substitution of *v* for *w* or *w* for *v*" (1836, cited in Görlach, 1999: 59). While it would be unwise to rely on Dickens for an accurate and realistic representation of lower-class London speech in the 19th century, he did provide useful information about the perception of this dialect at the time: the "substitution of *v* for *w* or *w* for *v*" must have remained highly salient, or his readers would not have found the portrait of Sam Weller amusing. Thus, dialect literature can be used to trace the emergence and disappearance of salient features of nonstandard dialects. Beal (2000) demonstrated that the pronunciation of Middle English *ō* as /uː/ – in, e.g., *town* and *down* represented as <oo> – remained a salient feature of Tyneside English throughout the 19th and 20th centuries, as evidenced in a range of texts from 19th-century music-hall songs such as '*The Blaydon races*' (1862) to the speech of the 'Geordie' characters in the *Viz* comic, which still appeared in 2004. Although this feature is recessive in the dialect, it is still highly salient, and the dialect representations reflect this.

See also: Humor in Language; Language Attitudes; Literature and the Language of Literature; Oral Traditions and Spoken Discourse; Power and Pragmatics; Standard and Dialect Vocabulary.

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Relevant Website

http://eir.library.utoronto.ca/rpo/display/index.cfm (click on "poet index"; then "by Name", then under "William Barnes", find 'The wife a-lost') – Poetry Online.

Dialects in Birdsongs

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Sound recordings reveal that in many species, birds from locations only a few kilometers apart or less typically sing songs that, although following species-typical rules, have an entirely different phonological structure. This article focuses on such microgeographic variation of learned birdsongs, since most work has been carried out on these animals. However, other animals that learn signals, such as bats and marine mammals, have also been shown to have similar patterns of geographic variation (Janik and Slater, 2000; Noad *et al.*, 2000). Song learning is found in songbirds, hummingbirds, and parrots, which together comprise about half of the extant bird species (geographic variation in nonlearning bird species is limited and found only between genetically isolated populations; see e.g. Bretagnolle, 1996). Songbirds learn their songs (often with remarkable precision) from others, an example of cultural transmission. The relatively simple nature of birdsong 'culture' makes it an excellent subject for testing theories of cultural or 'memetic' evolution.

Since song is learned, and because variation appears to convey social information in some species (see below), some have referred to birdsong 'dialects.' The aptness of this analogy with language varies between bird species, however, as both the pattern of variation and its communicative function are highly variable. This variability has served as the subject of an active field of biological research that seeks to explain the causal factors that create patterns of song variation and to explore how birds adapt their communication behavior to take advantage of the extra information this variation provides.

Examples of Geographic Variation: Birdsong Dialectology

Geographic variation in birdsong has been most intensively studied in the white-crowned sparrow (*Zonotrichia leucophrys*). Their song is a distinctive 2-second combination of tonal whistles (**w**), buzzes (**b**), trills of simple elements (**t**), and more complicated unrepeated syllables (**cs**). Each male normally sings one song type, which it learns from adult males in its first year of life. On the northern Pacific coast of the USA, different types of variation are observed at different spatial scales (Baptista, 1977): all males within a range of 20 kilometers might share exactly the same trill, while complex syllables tend to vary over much smaller distances, and there are no clear geographic boundaries between the range of one **cs** type and another. At a scale of hundreds of kilometers, the order of syllables within a song also varies. Rather than a song comprised of the syllables **w/b/cs/cs/b/t**, the songs are now **w/cs/b/t**, for example. Further studies have found that the structure of geographic variation in this species also varies from one population to another. In some sedentary populations, mosaic patterns of variation, with sharp geographic boundaries between syllable types, have been found (such populations have been said to possess dialects), while in other more migratory populations, such as montane white-crowned sparrows, syllables are still generally more likely to be shared between nearby males, but there are no sharp boundaries between types, or easily defined dialect areas.

These findings have been reinforced by data from other species (reviewed in Mundinger, 1982). Mosaic patterns of variation have been found in relatively few species (e.g. corn buntings, *Miliaria calandra*, and brown-headed cowbirds, *Moluthrus ater*). More species show a general preference for sharing song types with neighbors, but without dialect boundaries (e.g. great tits [*Parus major*], song sparrows [*Melospiza melodia*]). Other species show no overall preference to share with immediate neighbors, although the geographical range of a given song type will nevertheless be limited because of the limited movement of individuals (e.g. chaffinches, *Fringilla coelebs*). In a few cases, the order of syllables (the song 'syntax') varies. House finches (*Carpodacus mexicanus*) were introduced to the east coast of the United States around 100 years ago, from the west coast, and have subsequently spread as far inland as the Midwest. Upon introduction, the sequencing rules of syllables within a song type became considerably less rigid than in the ancestral population. However, as the eastern population has grown, some parts of it have begun to develop more rigid western-style syntax again (Pytte, 1997).

The Neutral Model of Birdsong Cultural Evolution

A central issue in the study of geographical variation in birdsong is to build a theory to explain how it arises, and use this theory to understand differences between populations in the level of variation. As with human language, the vocalizations of songbirds are learned, and geographical variation could simply result from learning from nearby individuals. The simplest theory (referred to here as the 'neutral

model') is that song variation is analogous to the evolutionary theory of random drift (see Slater, 1989). New song variants are produced by random mutation (inaccurate learning, improvization, etc.), and individuals choose songs to learn at random from those that they hear. From this viewpoint, geographical variation in song does not necessarily hold any communicative meaning. The theory has been tested by Alejandro Lynch, who collected data about the frequencies of song types in nine species (Lynch, 1996). He found that the field data fitted the expectations of the neutral model very closely.

The components of the neutral model are therefore the rate of cultural mutation and factors that influence which songs are heard during learning. The latter category includes the timing of song learning, the dispersal of song types (the distance between the singer of a song and an individual that learns from that singer), and the population size. All of these components have direct analogies in the study of genetic evolution by drift. According to the neutral model, observed differences in geographical variation in song between populations should be explained by differences in these parameters.

There have been several attempts to measure cultural mutation rate, although the very limited comparative data do not indicate any differences between species. A problem faced by early studies was to separate the possibilities that a novel song type arose through mutation or through dispersal from outside the studied area. Recently, a spatially explicit simulation model was able to account for this source of error and estimated the cultural mutation rate (the probability that a new song type is generated in development) of chaffinch song types to be 0.01 (Lachlan and Slater, 2003).

Many empirical studies have noted the effect of population size on patterns of geographical variation in song. Typically, small island populations have less geographical variation than large continental ones, a result that matches the predictions of the neutral model. In the case of chaffinches, the decrease in song diversity on islands was exactly what the neutral model predicted, with a constant mutation rate of 0.01. In a contrasting case, black-capped chickadees' songs share the same phonology of two syllables ('fee-bee') across most of North America, but on several Massachusetts islands, considerable variety in structure appears.

Several studies have documented apparent differences in patterns of song dispersal. An important factor here appears to be migration. Migrating birds tend to acquire a territory further away from their parents than sedentary ones. Several North American species (e.g., rufous-sided towhees [*Pipilo erythrophthalmus*], white-crowned sparrows, song sparrows) have both migratory and non-migratory populations, providing useful natural experiments. Comparisons between these populations have shown that migratory birds tend to share songs with their neighbors less frequently than sedentary birds, and that only sedentary populations maintain a mosaic pattern of variation.

Although the neutral model has been successful at explaining how geographic variation in birdsong evolves, it does not rule out entirely the possibility that some songs are more successful than others. One intriguing example of this is selection for songs that transmit furthest through a bird's acoustic environment, a logical place to look for selection since songs are often long-distance communication signals. In great tits, for example, geographic variation has been successfully correlated to the birds' acoustic environment. Birds that live in urban environments with a lot of low-frequency noise have a higher minimum frequency to their songs. Similarly, great tits that live in dense forests have songs that change in frequency less abruptly, and can subsequently also transmit most accurately through their environment. However, studies of other species, such as chaffinches, have failed to find the expected relationship between song structure and acoustic environment.

Birdsong Sociolinguistics

The neutral model implies that birds are more or less oblivious to whether they share songs with their neighbors. However, as in human language, geographical variation in signals could provide useful information to receivers, and several studies suggest that social interactions between birds are affected by song sharing. In song sparrows and indigo buntings, males are likely to hold on to their territories longer, and have higher reproductive success if they share more songs with their neighbors. Indigo buntings are also more likely to hold a territory if they share their song with neighbors. One explanation for this is that males are more aggressive to nonconformists (for which there is some experimental support). An alternative explanation is that conformers are able to disguise their novelty. Nonconformists might betray themselves as either young birds or birds that have dispersed a large distance (weak birds tend to have to disperse further to find a territory).

Conformity might not only be a signal to neighboring males. Considerable research effort has been devoted to finding out whether females learn a preference for local song types. Although some of the early positive field results were flawed, some

controlled laboratory experiments are revealing that females do learn song preferences. It should be pointed out that in other species, nonconformity may be preferred, by both male and female behavior.

These results have led to a challenge to the neutral model (see Kroodsma, 1996). If geographical variation in birdsong has important social consequences, then song development should be adapted to maximize the probability that a male learns a socially acceptable song type. In favor of this idea is the observation that the mosaic form of geographical variation, with sharp edges between groups singing different variants, does not arise in a neutral model (with all else equal). Instead, it requires some sort of positive frequency dependence: a learning preference for the most common song type. As yet, however, there is little firm evidence for such behavior.

Summary

Although geographic variation in birdsong shares some similarities with aspects of language, the differences between the two are probably more revealing. The communication systems of the 4000 species of songbirds contain a wealth of different cultural evolutionary systems, and comparisons of these systems allow one to examine how differences in individual behavior affect population-level patterns of variation. For example, in some species of birds, there appears to be very little social information attached to song variants, whereas other species appear to pay close attention to patterns of song sharing.

See also: Animal Communication: Long-Distance Signaling; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Vocal Learning; Apes: Gesture Communication; Bee Dance; Birdsong; Categorical Perception in Animals; Communication in Marine Mammals; Development of Communication in Animals; Individual Recognition in Animal Species; Non-human Primate Communication; Traditions in Animals.

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Dialects: Early European Studies

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Germanic Dialectology

Dialects of German

General Survey Dialects of German (i.e., 'German dialects') comprise all dialects that structurally, historically, and so on can be identified as German, regardless of their areal distribution, for example, in Germany, Austria, Switzerland, France, Italy, or overseas. Scientific research began in the 19th century with dictionaries and grammars. Only by the end of the century did dialect atlases appear. **Figure 1** gives an overview of the major research, combined with a timetable.

Dialect Dictionaries

So-called Idiotika As elsewhere in Europe (e.g., Italy, France), German dialect description starts off with prescientific lexicography, mostly done by nonprofessionals (see **Figure 2**). This type of word collection is named '*idiotikon*' (< gr. *idiōtikós* 'concerning

Year	Activities
1806/12	Stalder, F. J. *Versuch eines Schweizerischen Idiotikon mit etymologischen Bemerkungen vermischt* (...) [Attempt of a Swiss dialect dictionary (...)]. Aarau. 1st vol. 1806, 2nd vol. 1812.
1819	Stalder, F. J. *Die Landessprachen der Schweiz, oder schweizerische Dialektologie* (...) [The customary languages in Switzerland, or Swiss dialectology (...)]. Aarau.
1821	Schmeller, J. A. *Die Mundarten Bayerns grammatisch dargestellt* [The dialects of Bavaria represented grammatically]. Munich.
1827–1837	Schmeller, J. A. *Bayerisches Wörterbuch ... mit urkundlichen Belegen, nach den Stammsylben etymologisch-alphabetisch geordnet* [Bavarian dictionary (...)]. 4 vols. Stuttgart, Tübingen; repr. in 2 vols.
1853	Weinhold, K. *Die Laut- und Wortbildung und die Formen der schlesischen Mundart* [The sound- and word-formation and the morphology of the Silesian dialect]. Vienna.
1858	Schambach, G. *Wörterbuch der niederdeutschen Mundart der Fürstenthümer Göttingen und Grubenhagen oder Göttingisch-Grubenhagen'sches Idiotikon* [Dictionary of the Low-German dialect of (...) Göttingen and Grubenhagen (...)]. Hannover.
1862	Lexer, M. *Kärntnisches Wörterbuch* [Carinthian dictionary]. Leipzig.
1863	Weinhold, K. *Alemannische Grammatik* [Alemannic grammar]. Berlin.
1866	Schöpf, J. B. *Tirolisches Idiotikon* (...) [Tyrolean dictionary (...)]. Innsbruck.
1867	Weinhold, K. *Bairische Grammatik* [Bavarian grammar]. Berlin.
1868	Vilmar, A. F. C. *Idiotikon von Kurhessen* [Dictionary of Electoral Hesse]. Marburg, Leipzig.
1876	Winteler, J. *Die Kerenzer Mundart des Kantons Glarus in ihren Grundzügen dargestellt* [The dialect of Kerenz, canton Glarus (...)]. Leipzig, Heidelberg.
1877–1888	Wenker, G. Data collection for the German linguistic atlas [including Luxemburg (1888)].
1878	Wenker, G. *Sprach-Atlas der Rheinprovinz nördlich der Mosel sowie des Kreises Siegen ...* [Rhenish linguistic atlas (...)] (unpublished).
1881	Wenker, G. *Sprach-Atlas von Nord- u. Mitteldeutschland* [Linguistic atlas of North and Central Germany]. Strasbourg, London.
1881ff.	Staub, F. & Tobler, L. *Schweizerisches Idiotikon* (...) [Swiss dialect dictionary (...)]. Frauenfeld (not accomplished, as yet).
1882/1883	Frischbier, H. *Preußisches Wörterbuch. Ost- und westpreußische Provinzialismen in alphabetischer Folge* [Prussian dictionary(...)]. 2 vols. Berlin.
1886	Holthausen, F. *Die Soester Mundart. Laut- und Formenlehre. Nebst Texten* [The dialect of Soest. Phonology, Morphology, Texts]. Norden, Leipzig.
1895	Fischer, H. *Geographie der Schwäbischen Mundart mit einem Atlas von 28 Karten* [Geography of the Swabian dialect with an atlas of 28 maps]. Tübingen.
1897	Schatz, J. *Die Mundart von Imst. Laut- und Flexionslehre* [The dialect of Imst (Tyrol), phonology, morphology]. Strasbourg.
1897–1899	Crecelius, W. *Oberhessisches Wörterbuch (...)* [Dictionary of Upper Hesse (...)]. 2 vols. Darmstadt.
1899-1907	Martin, E. & Lienhart, H. *Elsässisches Wörterbuch* [Alsatian dictionary]. Vols. I, II. Strasbourg.
1900	Weise, O. *Syntax der Altenburger Mundart* [Syntax of the Altenburg dialect]. Leipzig.
1904-1936	Fischer, H. *Schwäbisches Wörterbuch* [Swabian dictionary]. Accomplished by W. Pfleiderer. 7 vols. Tübingen.
1908	Serial 'Deutsche Dialektgeographie' [German dialect geography], founded by F. Wrede.
1911-1914	Müller-Fraureuth, K. *Wörterbuch der obersächsischen und erzgebirgischen Mundarten* [Upper Saxon dictionary]. 2 vols. Dresden.
1913	Bohnenberger, K. *Die Mundart der deutschen Walliser* (...) [The dialect of the speakers of German in the Valais (...)]. Frauenfeld.
1920	The 'Zentralstelle für den Sprachatlas des Deutschen Reiches und deutsche Mundartforschung' [Centre for the dialect atlas of the German Reich and for German dialect research], founded in Marburg/Lahn by F. Wrede.
1926-1933	Data collection on German dialects outside of Germany (mainly in Austria, Czechoslovakia, Switzerland, Southern Tyrol).
1926-1956	*Deutscher Sprachatlas. DSA* [German linguistic atlas] by F. Wrede, W. Mitzka & B. Martin. Marburg/Lahn (by instalments, 128 maps).
1928	Pessler, W. *Plattdeutscher Wortatlas für Nordwestdeutschland* [Low German word atlas for Northwest Germany]. Hannover.
1939-1942	Data collection for the *Deutscher Wortatlas. DWA* [German word atlas].
1951-1980	*Deutscher Wortatlas. DWA* [German word atlas], ed. W. Mitzka, L. E. Schmitt, *et al.* 22 vols. Giessen.
1984-1999	*Kleiner deutscher Sprachatlas. KDSA* [Concise linguistic atlas of German] by W. H. Veith, W. Putschke & L. Hummel. 4 parts, 462 maps. Tübingen (cf. *DSA*).

Figure 1 Dialects of German: major research from the 19th century on (cf. Löffler, 2003; Pop, 1950; Schirmunski, 1962).

Year	Author	Region
1743	Richey, Michael	Hamburg
1756	Strothmann, Johann Christoph	Osnabrück
1759	Bock, Johann Georg	Prussia
1767	Tiling, Eberhard	Bremen–Lower Saxony
1780	Popowitsch, Johann Siegmund V.	South Eastern dialects
1781	Dähnert, Johann Carl	Pomerania, Island of Ruegen
1785	Hennig, Georg Ernst Sigmund	Prussia
1787	Berndt, Johann Georg	Silesian
1788	Fulda, Friedrich Carl	Nationwide collection, not only dialects
1789	Zaupser, Andreas	Bavarian, Upper Palatinate
1792	Klein, Anton Edler von	More than one South German region
1795	Schmid, Johann Christoph	Swabian

Figure 2 'Idiotika' of German dialects in the 18th century (according to Püschel, 1987).

Frame	Filler	Frame
Consonants	**Vowels**	**Consonants**
1) *r*	ä, äu, o, u	***pf-***
2) *r*	a, ü	***ps-***

Figure 3 Form of article representation in early dialect dictionaries (Bavarian, Swiss, Alsatian – examples from the Bavarian dictionary).

the individual, ordinary, amateurish'), that is, a collection of words that are just different from the standard vocabulary, eventually considered as funny. Also, the Swiss idiotikon by F. J. Stalder of 1806/12 (cf. Figure 1) belongs to this category.

There are two perspectives for formulating a lemma: (1) from the viewpoint of the dialect speaker in which case the lemma must appear in a structured way allowing all possible dialect variants; and (2) from the viewpoint of the dictionary's user who may not be familiar with the dialect, in which case the lemma must appear in the standard language. Dictionaries of the latter type (standard → dialect) are purely alphabetic; they represent the majority of the dialect dictionaries and need no further discussion. The former type (dialect → standard), however, is characteristic of the beginning of the scientific research and therefore deserves special attention.

Early Scientific Dictionaries (dialect → standard) The first dialect dictionary to meet scientific conditions was the Bavarian dictionary (1827–1837) by Johann Andreas Schmeller, methodologically inspired by Jacob Grimm. It comprises Bavarian and non-Bavarian dialects (e.g., Swabian, East and Middle Franconian, dialects of the Palatinate, etc.), all spoken in the Bavarian kingdom. Schmeller's special way of presenting each entry of his dictionary as dialect → standard type served as a model which was imitated by, for example, the authors of the Swiss and the Alsatian dialect dictionaries. A kind of tagmemics was used with a slot-and-filler technique for vowels within a frame of consonants (see Figure 3).

Dialect words of Bavarian that meet this arrangement are represented as follows:

1. *räpfen, räupfen, ropfezen, rupfen*
2. *rapsen, rüpsen*

The frames govern the arrangement. They are in alphabetic order. Within the frames, the subordinate fillers are also in alphabetic order. In the example above, *r-pf* comes before *r-ps*, and then comes the order of the vowels within each frame. The reason for this quite modern organization of the articles in early dialect dictionaries is that the variants of vowels are distributed over a small area and the ones of consonants over a large geographical area. The users' problems had to be solved by an additional alphabetic index.

Outline of Later Developments There are some essentials for the dialect dictionaries of the 20th century: (1) the form and function of the things described had to be taken into account; and (2) the verbal description of competing geographical synonyms were very often replaced by maps. The first consideration traces back to the *Sachwortkunde* ['science of things and words'] by Hugo Schuchardt and Rudolf Meringer. The latter founded the journal *Wörter und Sachen* ['Words and Things'] (1909–). Schuchardt (1912) stated that things are primary, as they are stable forms of existence, and words are secondary.

In dialectology, these ideas were realized (a) for dictionaries, (b) for atlases, for example, for the 'AIS' [Italian-Swiss Atlas], or the 'New French regional

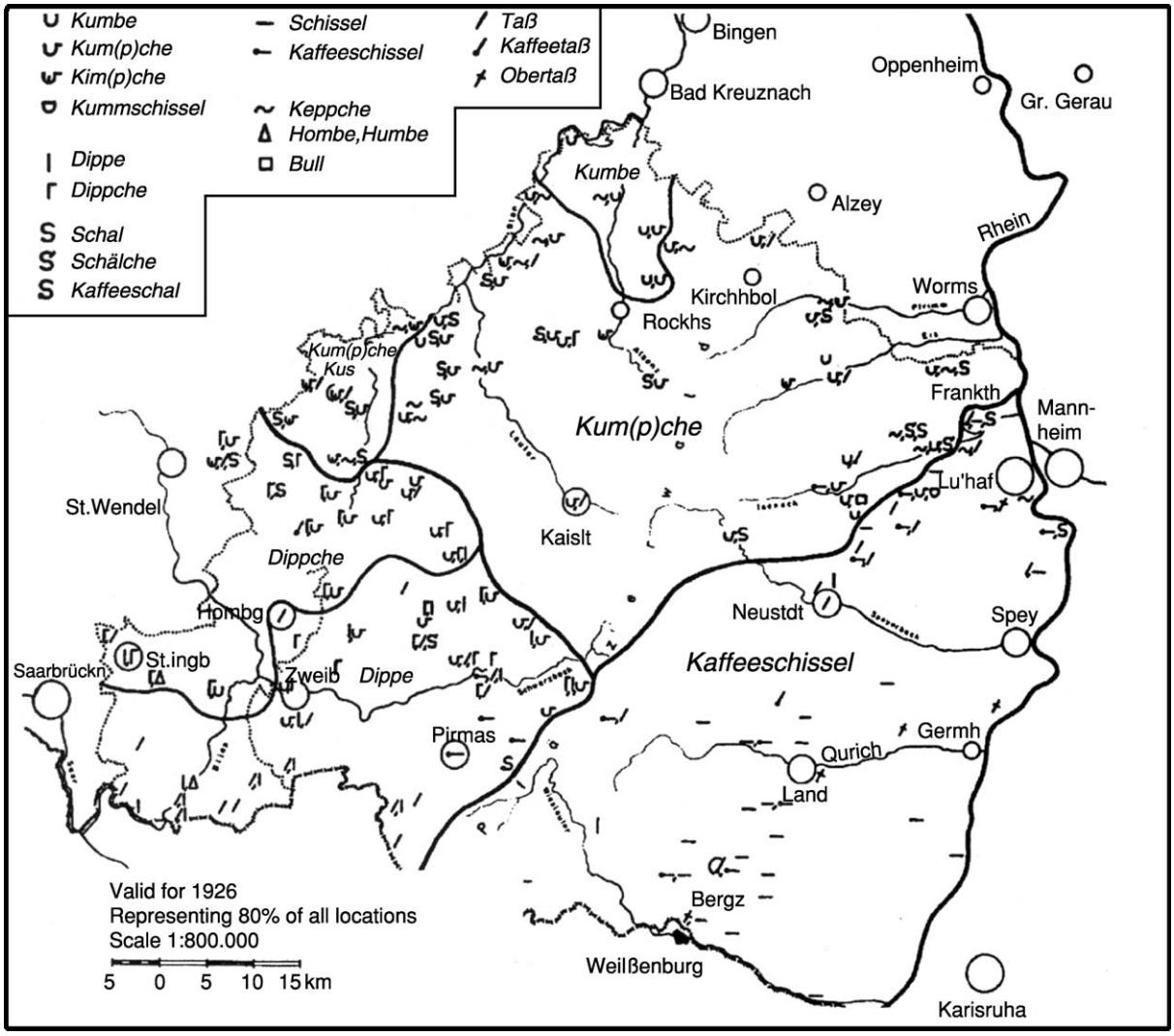

Figure 4 Geographical synonyms of the *coffee-cup* in the Palatinate. From: *Pfälzisches Wörterbuch* [Dictionary of the Palatinate]. (Vol. IV). 1981–1986.

dialect atlases'. The second consideration leads to regional 'word maps' included in an entry of a modern dialect dictionary. In the example of Figure 4, the geographical synonyms of *coffee-cup* in the Palatinate are shown, mainly *Kaffeeschissel* ['coffee bowl'], *Dippe* ['pot'], and *Kumpche* ['little bowl'].

Grammar In early dialect studies, there were two major types of dialect grammars, as shown in Figure 1: (a) area and (b) local grammars. Much later, a third type appeared: grammars of a central place and its surrounding area, for example, the one by Wix (1921). Early studies were descriptions of type (a): large areas of southern German dialects, as spoken in Switzerland (Stalder, 1819), Bavaria (Schmeller, 1821; Weinhold, 1867), Silesia (Weinhold, 1853), or in the entire Alemannic southwest (Weinhold, 1863). Such grammars refer to the territory of former Germanic tribes (Alemannic, Bavarian, etc.), much later ones refer to landscapes (*Landschaftsgrammatiken*), for example, to the Valais/Switzerland (Bohnenberger, 1913). The first scientific grammar of a local dialect (type (b)) was on the dialect of Kerenz, Switzerland, published by Jost Winteler in 1876, a scholar of the phonetician and Neogrammarian Eduard Sievers.

The Bavarian grammar by Johann Andreas Schmeller (1821) was exemplary for Early German dialectology. Like his dictionary, the grammar also comprised non-Bavarian dialects within the Bavarian kingdom. Schmeller's terminology was somewhat similar to the one of Klopstock (cf. Baudusch-Walker, 1958), for example, in using the term 'Umlaut', meaning 'historically conditioned sound change', like in English *foot*, pl. *feet* plus *sing*, *sang*, *sung* (Grimm's 'Ablaut') – Schmeller called the irregular

§ 95. Like standard German the Bavarian dialect knows a second *iu*, referring to the umlaut of *û*, developed since the 10th century; this *û* also turned into *eu*, see § 85.

This *iu* was joined by the one resulting from the lengthening of *ü*. We find rhymes with *iu* and *ü*: *friunde* ['friends'] : *sünde* ['sin'] Wien. Merf. 132 [as reference]. *friunden* : *sünden* 41. *gefiunden* ['found'] : *sünden* ['sins'] j. Tit.16, 4 [as reference]. *natiur* ['nature'] : *für* ['for'] Teichner Ls. 172, 10 [as reference].

Figure 5 A paragraph from Karl Weinhold's Bavarian grammar (1867), translated.

verbs 'Umlaut-Verba'. His method was first of all comparative, that is, dialect variants were contrasted (a) with each other, and (b) with 'Standard' German. It was also historical(-comparative), meaning that Schmeller (very often) went back to a historically reconstructed form in order to explain the nowadays variants. Schmeller developed his proper phonetic alphabet which allowed for a more exact description than did the normal alphabet. The grammar was verified by texts added in a large appendix (1821: 433–568).

Grimm's huge influence on the 19th-century grammarians, particularly on Karl Weinhold (1853, 1863, 1867; cf. Figure 1 and Figure 5), can be substantiated, for example, by regarding the structure of Weinhold's Bavarian grammar (1867): *phonology (sounds)*, *morphology*, *word formation*, *conjugation*, *declination*, and so on in their historical context and with reference to medieval texts.

It may be noted that in the late 19th and the first half of the 20th centuries most dialect grammars predominantly referred to the development of sounds plus 'forms' (morphology). The explanation is first, that dialect variation was considered to be mainly a historically conditioned variation of sounds, and second, that the Neogrammarians with their hypothesis of 'Sound-Laws' dominated that scientific era. Methodologically, the sounds were reconstructed from written documents and mostly depicted by the letters of those documents. In the 1870s, some Neogrammarians, amongst them the phonetician Eduard Sievers, tried to describe the sounds from the point of view of articulation ('physiology of sounds'). Sievers's scholar Jost Winteler was the first one to apply this method in 1876 on the local grammar of Kerenz, Switzerland (see Figure 1 and above). He described the 'physiological' nature of the consonants and vowels in the present-day dialect and related this description to the historical facts. Apart from sounds, 'forms' (i.e., morphology: conjugation, declination) were also described in Winteler's grammar, which served as a model for generations of dialectologists.

Dialect Atlases

The German Linguistic Atlas Dialect maps give a synopsis of dialect variation in a certain region. The first reliable dialect map was published in Schmeller's Bavarian grammar (1821). Thereafter, Georg Wenker (1852–1911) presented dialect maps that were empirically based on 42 (later on 40) Standard German sentences, the 40 'Wenker sentences' (altogether 475 words), which were composed under prestructural aspects with regard to the historical grammar. Their translation into local dialects was done by public school children as native speakers, assisted by their teachers who wrote down the translations ('indirect method'). The reliability of these written records depended on the teachers' skills in sound discrimination and in depicting the sounds they heard by using the inadequate alphabet of Standard German. This method of research was different from the direct one used for the French linguistic atlas, which was based on a phonetic transcription (see 'Dialects in France' below).

About 40 000 locations were explored by Wenker and, as a result of additional explorations, about 10 000 more by his successors (cf. Mitzka, 1952). In this way, almost all German dialects in Central Europe were represented in the atlas. By using this method, Wenker had made the Rhenish linguistic atlas of 1878 (unpublished) and the Linguistic Atlas of North and Central Germany (1881) (cf. Figure 1). The latter was integrated into the "Sprachatlas des Deutschen Reichs" [Linguistic atlas of the German Reich], then enlarged under Ferdinand Wrede (data collections in Austria, Switzerland, etc.; cf. *KDSA 1(1)* [1984], map E 3) and published from 1926 to 1956 after Wenker's death (1911) as *Deutscher Sprachatlas (DSA)* by Ferdinand Wrede, Walther Mitzka, and Bernhard Martin. The 128 maps of the *DSA* were an exemplary extract from the 1644 maps in manuscript existing in the Marburg archives (cf. Herrgen *et al.*, 2003: 104).

Figure 6 shows the southwestern part of the *DSA* map 17 with the shifted forms ($k > ch$) *chind, ching* (in the north of Switzerland and the south of the Black Forest) and with the unshifted forms *Kend* and *Kind* (in the rest of the map, like in Standard German). This is a method of cartography by which an area of a form in use is surrounded by an isogloss, and that form is inserted in writing. Exceptions from this 'headline form' are marked by little symbols which are explained in the map's legend. Most maps of this atlas show the lexical or morphological forms in total

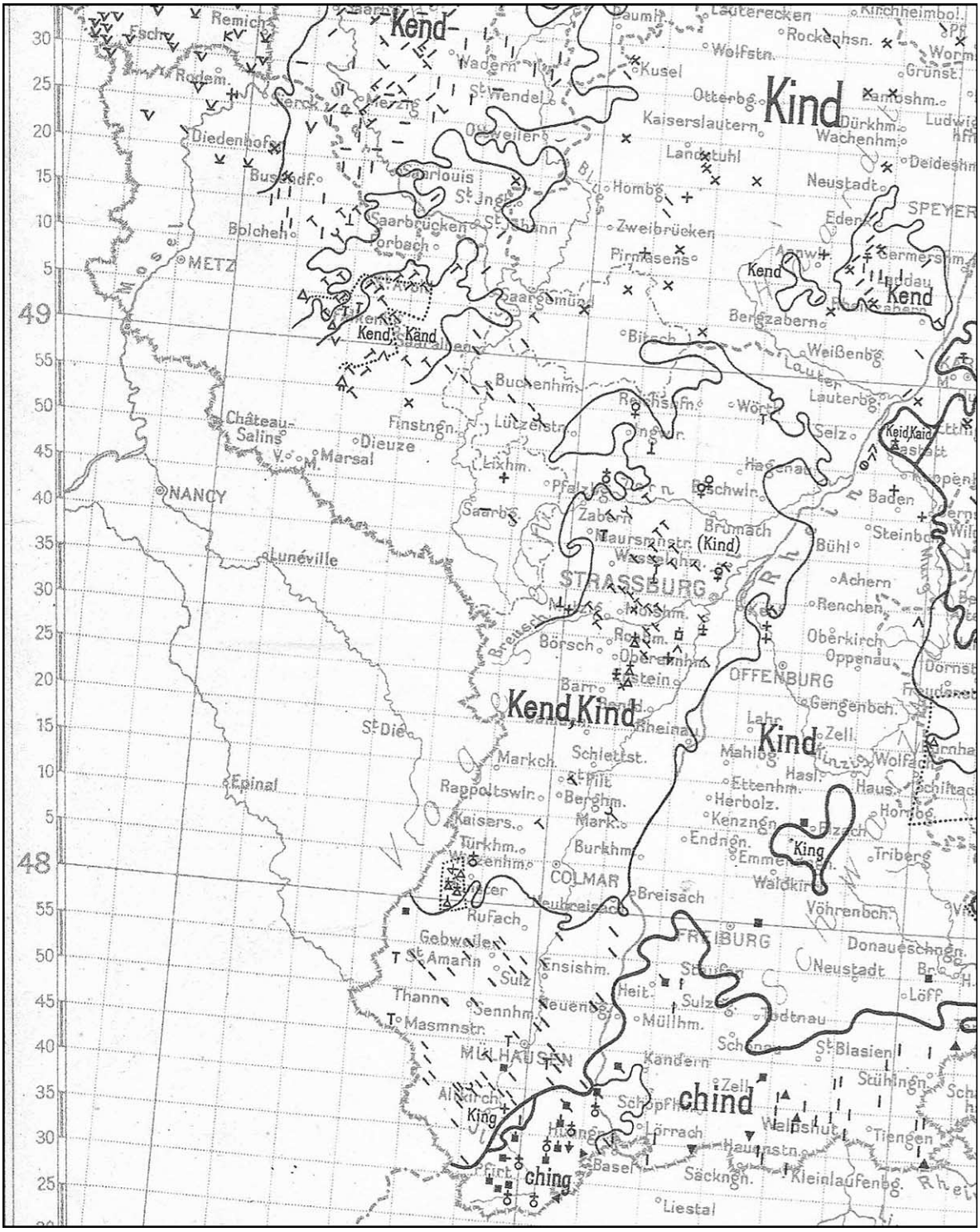
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Diedenhofen
Bergzabern
Weißenbg.
Lauterbg.
Selz
Baden
Bühl
Achern
Renchen
Oberkirch
Oppenau
OFFENBURG
Gengenbch.
Zell
Wolfach
Haslach
Hornberg
Triberg
Waldkirch
Vöhrenbch.
Donaueschingen
Neustadt
Löffingen
St. Blasien
Stühlingen
Tiengen
Lörrach
Weilbshut
Basel
Säckingen
Kleinlaufenbg.
Liestal
Mülhausen
Altkirch
Masmnstr.
Thann
Gebwiller
Rufach
Colmar
Breisach
Freiburg
Ensisheim
Sulz
Müllhm.
Kandern
Rappoltswir.
Markch.
Schlettst.
Sélestat
Bergheim
Kaisers.
Türkhm.
Burkhm.
Endngn.
Kenzngn.
Herbolz.
Ettenhm.
Mahlbg.
Lahr
Rheinau
Offenburg
Oberkirch
Bühl
Baden
Brumath
Zabern
Saarbg.
Lixhm.
Buchenhm.
Finstngn.
Dieuze
Marsal
Château-Salins
NANCY
Lunéville
Epinal
St. Die
Raon l'Etape
Saarburg
Saarlouis
Saarbrücken
Homburg
Zweibrücken
Kaiserslautern
Landstuhl
Neustadt
Speyer
Landau
Bergzabern
Weißenburg
Lauterecken
Kirchheimbol.
Rockenhsn.
Wolfstn.
Otterbg.
Kaiserslautern
Dürkhm.
Wachenhm.
Deidesheim
Grünstadt
Worms
Ludwigshafen
Wadern
St. Wendel
Merzig
Saarlouis
Saarbrücken
Saarbrücken
Forbach
Bolchen
Diedenhofen
Busendorf
Remich
Rodem.
Fischbach
Saarburg
Saarbrücken
Zweibrücken
Pirmasens
Kaiserslautern
Landstuhl
Neustadt
Speyer
Landau
Bergzabern
Weißenburg
Lauterbg.
Selz
Baden
Bühl
Achern
Renchen
Oberkirch
Oppenau
Offenburg
Gengenbch.
Zell
Wolfach
Haslach
Hornberg
Triberg
Waldkirch
Vöhrenbch.
Donaueschingen
Neustadt
Löffingen
St. Blasien
Stühlingen
Tiengen
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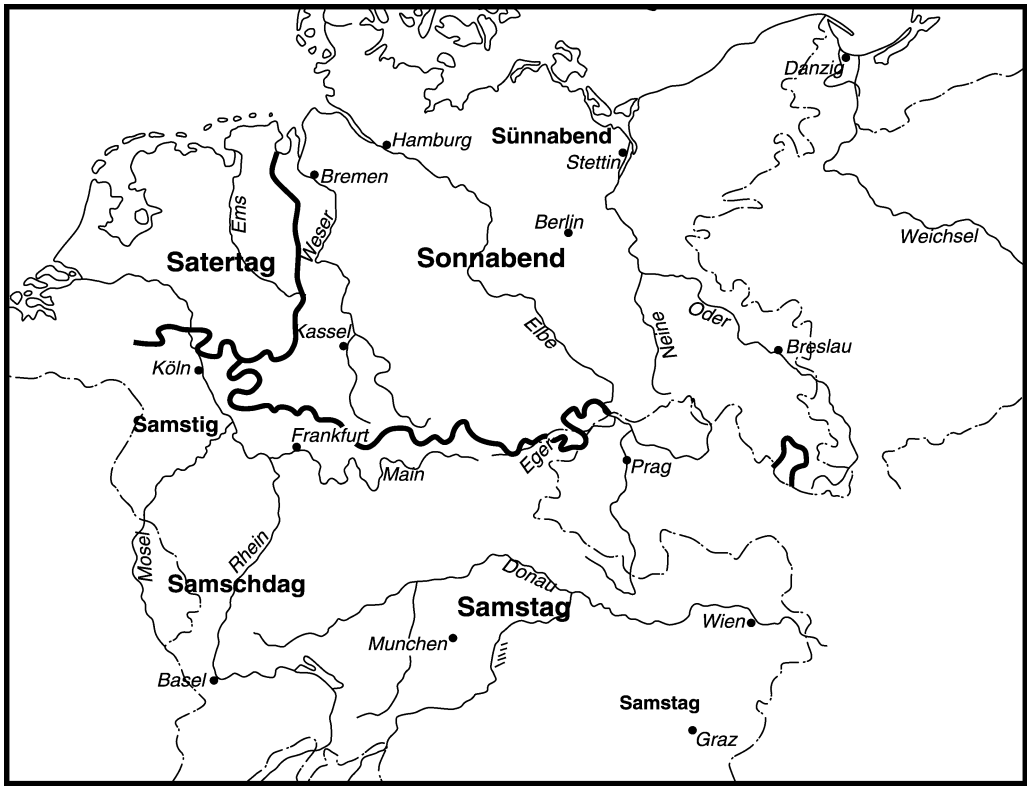

Figure 7 'Saturday' in dialects of German (Source: *DWA 16* [1968]; Hildebrandt [1983]).

on the Internet since 2001. The maps are copies of the original version.

A third project is aimed at publishing the expansion of the Wenker investigation on the Dutch dialects in the Netherlands and northern Belgium (1934 and following; see Figure 8: 1934 ff): the 'Concise linguistic atlas of Dutch and Frisian dialects' (cf. Veith, 2000). The Wenker atlas was replenished by dialect studies based on direct investigations and phonetic transcription. Most of them were published in the serial *Deutsche Dialektgeographie* ['German dialect geography'], founded in 1908 (cf. Figure 1).

Other Dialect Atlases of German The idea to produce regional atlases from about 1962 on was, in the German and in the French language areas as well (cf. 'Dialects in France' below), a consequence of the wide-area atlases. The new atlases were mostly based on direct investigations, for example, the SDS ['Linguistic Atlas of German Switzerland'] and the ones published in Marburg (cf. *Deutscher Sprachatlas. Regionale Sprachatlanten,* 1963–1972). Independent from the Wenker project, however, was the Swabian dialect atlas by Hermann Fischer (1895) and the Low (= Northern) German word atlas by Wilhelm Pessler (1928); see Figure 1. But the most important dialect atlas project after Wenker's was the German word atlas (*DWA. Deutscher Wortatlas*, 1951–1980), which, after preliminary research by Bernhard Martin, was initiated by Walther Mitzka (see Figures 1 and 7). The questionnaire consisted of 200 word questions. About 50 000 locations were reached through school teachers between 1939 and 1942. Mitzka used the same indirect method as Wenker whose atlas served as a model also for map making and data presentation (cartography); cf. Hildebrandt (1967, 1983).

Dutch, Scandinavian, and English Dialects

Dutch Dialects The study of Behrns (1840; see Figure 8) is considered to be a scientific forerunner, published in an unsuccessful periodical (Gerritsen, 2001: 1537). The 'South Netherlandic Society of Linguistics', founded in 1870, encouraged the compilation of Dutch dialect dictionaries in Belgium, for example, the one by De Bo in 1873. The *Dialecticon* by Johan Winkler of 1874 is not really a dialect dictionary but a compilation of texts achieved by translations of the parable of the prodigal son from the Bible into 186 dialects. This was a method practiced in France (Coquebert de Montbret in 1807; see Figure 14) and Italy (Giovenale Vegezzi-Ruscalla, 1830–1835; see Figure 18) in the early 19th century. By the end of the century it was also being used for Dutch. On a more scientific basis,

Year	Dutch dialects
1840	Behrns, J. H. 'Twentsche vocalen en klankwijzigingen' [Vowels and sound changes in Twente]. *Taalkundig Magazijn* 3: 331–390.
1870	'Zuidnederlandse Maatschappij van Taalkunde' [South Netherlandic Society of Linguistics] founded.
1873	De Bo, L. L. *Westvlaamsch idioticon* [Dialect dictionary of west Flemish]. Brugge [XX, 1488 pages]
1874	Winkler, J. *Algemeen Nederduitsch en Friesch Dialecticon* [General Low 'German' and Frisian dialect collection]. 2 vols. The Hague.
1879	Kern, H. A questionnaire ordered by the 'Aardrijkskundig genootschap' ['Geographical Society'], 184 questions, 284 replies from 212 locations.
1884	Jongeneel, J. *Een Zuid-Limburgsch taaleigen. Proeve van vormenleer en wordenboek der dorpspraak van Heerle* [A morphosyntax and a dictionary of a village dialect (Heerlen) in southern Limburg]. Heerlen.
1885ff.	Willems, P. Investigation of the southern Dutch dialects in Belgium. Questionnaire with over 2000 words, 337 locations.
1886	Tuerlinckx, J. F. *Bijdrage tot een Hagelandsch idioticon* [Contributions to a Dialect dictionary of Hageland]. Gent (*Bijvoegsel* [Supplement] 1904).
1887	Molema, H. *Woordenboek der Groningsche volkstaal* [Dialect dictionary of Groningen]. Groningen.
1891	Te Winkel, J. A new dialect investigation ordered by the 'Geographical Society', with 209 lists and 194 locations.
1892	Jellinghaus, H. *Die niederländischen Volksmundarten nach den Aufzeichnungen der Niederländer* [The Dutch dialects recorded by the Dutchmen]. Norden.
1899–1901	Te Winkel, J. *Noordnederlandse tongvallen. Atlas van taalkarten met tekst* [Northern Dutch dialects. Atlas of language maps with text]. 3 fascs. Leiden.
1896	Opprell, A. *Het dialect van Oud-Beierland* [The dialect of Oud-Beierland]. 's-Gravenhage.
1908–1922	Teirlinck, Is. *Zuid-Oostvlandersch idioticon* [Dialect dictionary of South East Flanders]. 3 vols. Turnhout.
1913–1914	Van Ginneken, J. *Handboek der Nederlandse taal* [Handbook of the Dutch language] (with new dialect isoglosses). s'Hertogenbosch.
1921	Frings, Th. & Vandenheuvel, J. *Die südniederländischen Mundarten.* I: *Texte* [The southern Dutch dialects. I: Texts (phonetic transcriptions)]. Marburg.
1925	Kloeke, G. 'Northern and southern Dutch dialect library' founded; Blancquaert, E. *Dialectatlas van Klein-Brabant* [Dialect atlas of Little Brabant] (as precursor of the *Reeks Nederlandse Dialectatlassen*). Antwerpen.
1930–1982	Blancquaert, E. & Pée, W. (eds.). *Reeks Nederlandse Dialectatlassen* [Series of Dutch dialect atlases]. 16 vols. Antwerpen.
1934ff.	Dialect investigation with Wenker's questionnaire in Dutch and Belgium schools, now taken as the data basis of the KNSA [Concise Dutch linguistic atlas] by W. H.Veith/L. Hummel (work in progress).
1939–1972	Kloeke, G.& Grootaers, L. *Taalatlas van Noord- en Zuid-Nederland* [Linguistic atlas of the north and south Dutch dialects]. 9 vols. Leiden.

Figure 8 Dutch dialects: early studies (selected) (sources: Gerritsen, 2001; Goossens, 1968a, 1968b; Heeroma, 1968).

many dialect surveys were initiated from 1879 on (see Figure 8). Only the one undertaken by Jan Te Winkel (1891) led to an atlas (1899–1901), the first one about Dutch dialects. The 'Series of Dutch dialect atlases' (1930–1982), edited by Edgar Blancquaert and Willem Pée, became most important, comprising all regions in Belgium and the Netherlands. A small atlas about the southern Dutch dialects was planned on the basis of the texts published by Theodor Frings and J. Vandenheuvel (1921), but never realized. These texts resulted from translations of the Wenker sentences, delivered by Belgian prisoners of war. Finally, the huge 'Linguistic atlas of the north and south Dutch dialects' (9 vols, 1939–1972) presented a magnificent overview over Dutch dialects as spoken in the Netherlands and in Belgium.

Scandinavian Dialects By now, the dialect division of the Scandinavian languages is well known even though research started relatively late. Braunmüller (1999) published overviews and dialect maps of all Scandinavian language areas, that is, Denmark,

Year	Danish dialects
1841	Molbech, Chr. *Dansk Dialect-Lexicon* [Danish dialect lexicon ('dictionary')]. Copenhagen.
1858	Lyngby, K. J. *Bidrag til en sønderjysk sproglære* [Grammar on south Danish dialects]. Copenhagen.
1862–1867	Kok, Joh. *Det danske Folkesprog ...* [The Danish folk language ...]. Copenhagen.
1879	Foundation of the Society for Danish language and dialects ('Universitets-Jubilæets Danske Samfund').
1886	Thorsen, P. K. *Bidrag til nørrejysk lydlære* [Contribution to the phonology of northern Jutland]. Copenhagen.
1886–1914	Feilberg, H. F. *Bidrag til en ordbog over jyske Almuesmaal* [Contribution to a dictionary of the Jutland dialects]. I–IV. Copenhagen.
1887	Thorsen, P. K. *Sprogarten på Sejerø* [Dialects on Sejerø island]. Copenhagen.
1898–1912	Bennike, V. & Kristensen, M. *Kort over de danske folkmål* [Maps of the Danish dialects] (Viii, 188 pp., 104 maps.) Copenhagen.
1927	Brøndum-Nielsen, J. *Dialekter og Dialektforskning* [Dialect and dialect research]. Copenhagen.

Figure 9 Danish dialects: early studies (selected) (sources: Andersen, 1968; Pop, 1950).

Year	Norwegian dialects
1848	Aasen, I[var]. *Det Norske Folkesprogs Grammatik* [Norwegian dialect grammar]. Kristiania.
1850	Aasen, I. *Ordbog over det Norske Folkesprog* [Norwegian dialect dictionary]. Kristiania.
1851	Aasen, I. *Søndmørsk Grammatik eller kort Underretning om Bygdemaalet paa Søndmør* [Grammar of the Søndmørsk dialect]. Eegsæt.
1853	Aasen, I. *Prøver af Landsmaalet i Norge* [An anthology of Norwegian dialect texts (Landsmaal)]. Kristiania.
1882	Vidsteen, Chr. *Oplysninger om bygdemaalene i Søndhordland* [Dialect of Søndhordland]. Bergen.
1885	Vidsteen, Chr. *Oplysninger om Bygdemaalene i Hardanger med et Anhang om Færöisk* [Dialect of Hardanger, with an appendix on Faroese]. Bergen.
1886	Larsen, A. B. *Oversigt over de trondhjemske dialekters slægt-skabsforhold* [Survey of the Trondhjem dialects]. Trondhjem.
1892	Larsen, A. B. *Oversigtskart over visse dialektfænomeners udbredelse i Kristianssands stift* [Outline map of certain dialect phenomena in the diocese of Kristianssand]. Kristiania.
1894	Larsen, A. B. *Lydlæren i den solørske dialekt* [Phonetics of the Solør dialect]. Kristiania.
1897	Larsen, A. B. *Oversigt over de norske bygdemål* [Survey of the Norwegian dialects]. Kristiania.
1900	Vidsteen, Chr. *Ordbog over Bygdemaalene i Søndhordland: med en kortfattet Lydlære og Bøiningslære samt Sprogprøver* [Dictionary of the Søndhordland dialect, with a shortened phonology, morphology, and texts]. Bergen.

Figure 10 Norwegian dialects: early studies (selected) (sources: Hoff, 1968; Pop, 1950).

South and North Norway, Sweden, Iceland, and the Faroes.

In 1841 there appeared a Danish dialect dictionary of some value (Chr. Molbech), then a grammar of south Danish dialects (1858). The important dialect dictionary by Henning Frederik Feilberg was published from 1886 to 1914, and, of no minor importance, the dialect atlas by Våldemar Bennike and Marius Kristensen in 1912. The atlas was centered on Old-Danish from which modern dialect forms were derived (see Figure 9), a method similar to the one used for modern German dialect atlases.

As elsewhere, Norwegian dialectology started with a grammar and a dictionary (1848, 1850, respectively; see Figure 10), both by the poet and linguist Ivar Aasen (1813–1896) who founded the *Landsmaal* ('country, folk language') based on dialects and used as a written language by many authors, now called *Nynorsk*. This variety competes with the second official language, the *Bokmaal* ('book language'),

Year	Swedish dialects
1862–1867	Rietz, J. E. *Svenskt dialekt-lexikon* [Swedish dialect dictionary]. Lund. [Repr. 1962].
1878	*Svenska Landsmål ock Svenskt Folkliv* [a journal on Swedish dialects and folklore] (with a phonetic alphabet), founded by J. A. Lundell.
1878	Freudenthal, A. O. *Ueber den Närpesdialekt* [About the Närpes dialect]. Doctoral thesis. Helsingfors.
1878	Freudenthal, A. O. *Bidrag till ordbok öfver Närpesmålet* [Contribution to a dictionary of Närpesmålet]. Helsingfors.
1880	Lundell, J. A. *Om de svenska folkmålens frändskaper och etnologiska betydelse* [On the Swedish dialect relationship and the ethnological background]. Stockholm.
1886	Freudenthal, A. O. & Vendell, H. A. *Ordbok öfver estländsk-svenska dialekterna* [Estonian-Swedish dialect dictionary]. Helsingfors.
1889	Freudenthal, A. O. *Vöråmålet: ljud- och formlära, ordlista med register, språkprof.* [Vöråmålet: phono- and morphology, word list with index, sample text]. Helsingfors.
1892	Vendell, H. *Pedersöre-Purmomålet. Ljud och formlära samtspråkprof* ['Pedersöre-Purmol-speech'. Phonology and Morpholoy with texts]. 1892.
1894	Hultman, O. F. *De östsvenska dialekterna* [The East Swedish dialects]. Helsingfors.
1904–1907	Vendell, H. *Ordbok över de östsvenska dialekterna* [Dictionary on the East Swedish dialects]. Helsingfors.
1905	Hesselman, B. *Sveamålen och de svenska dialekternas indelning* [Svealanguage and the Swedish dialect division]. Uppsala.
1914	Institutes of dialectology and folklore founded in Uppsala and Lund.
1917	Institute of onomastics and dialectology founded in Gothenburg.

Figure 11 Swedish dialects: early studies (selected). (sources: Benson, 1968; Naert, 1968; Pop, 1950).

Year	Insular dialects
1866	Edmondston, Th. *An etymological glossary of the Shetland and Orkney dialect with some derivations of names of places in Shetland.* Edinburg.
1891	Jakobsen, J. & Hammershaimb, V. U. *F□r□sk Anthologi II, Ordsamling og register* [Faroese anthology II. Word collection and index]. Copenhagen.
1897	Jakobsen, J. *De Norrøne Sprog på Shetland* [The Norn language in Shetland]. Copenhagen.
1897	Jokobsen, J. *The dialect and place names of Shetland. Two popular lectures.* Lerwick [2nd ed. 1925].
1914	Angus, J. S. *A glossary of the Shetland dialect.* London.
1908–1921	Jakobsen, J. *Etymologisk Ordbok over det Norrøne Sprog på Shetland* [An etymological dictionary of the Norn language in Shetland]. Copenhagen (translation by A. Horsbøl, London, Copenhagen, 1928–1932).
1927–1928	Jakobsen, J. & Matras, Ch. *Føroysk-Donsk Ordabok* [Faroese-Danish dictionary]. Tórshavn.

Figure 12 Insular dialects: early studies (selected). (source: Werner, 1968).

formerly called *Riksmaal*. Early, but no less important activities in Norwegian dialectology are tied to individuals, like Ivar Aasen, Christian Vidsteen (1832–1915), and Amund Bedersen Larsen (1849–1928); see Hoff (1968), Pop (1950), and Figure 10.

Swedish dialectology began with local dialect dictionaries which were on a pre-scientific level: like the early 'idiotika' (see 'Dialect Dictionaries' above), they were collections of strange words. The first scientific dictionary comprising almost all Swedish dialects was the one by Johan Ernst Rietz (1862–1867). In the important year of 1878, a journal on Swedish dialects was founded by Johan August Lundell and two studies on east Swedish dialects in Finland were presented by Axel Olof Freudenthal. Other dialectologists besides Freudenthal also did research on East Swedish dialects, for example, Herman Vendell and Oskar F. Hultman. The first classification of Swedish dialects was published by Johan August Lundell in 1880 (see Figure 11).

Insular Scandinavian mainly comprises *Shetland*, *Orkney*, *Faroese*, and *Icelandic*. Dialect variation is rare in Iceland (see Werner, 1968: 461ff). The first publications of some importance were presented by

Year	English dialects
1847	Halliwell, J. O. *Dictionary of archaic & provincial words.* London.
1857	Wright, Th. com. *Dictionary of obsolete & provincial English.* London.
1873	English Dialect Society (EDS), founded by Rev. W. W. Skeat.
1877	Bonaparte, Prince L.-L. 'On the dialects of Monmouthshire [...] with a new classification of the English dialects'. *Transactions of the Philological Society,* 1875–1876: 570–581.
1889	Ellis, A. J. *The Existing Phonology of English Dialects* [...] (900 pp., proper phonetic system, new dialect classification). London.
1898–1905	Wright, J., ed. *The English dialect dictionary.* 6 vols. London, Oxford: H. Frowde for EDS New York.
1905	Wright, J. *The English dialect grammar.* Oxford.
1962–1971	Orton, H., Halliday, W. J., *et al.* (eds.) *Survey of English Dialects* [SED]. 4 vols. Leeds.
1978	Orton, H., *et al. The linguistic atlas of England.* London.

Figure 13 English dialects: early studies (selected). (sources: Pop, 1950; Shorrocks, 2001).

Year	Major events in the development of early French dialectology
1790	Questionnaire (by correspondence) of the Abbé Henri Baptiste Grégoire.
1804	L'académie celtique ['Celtic academy'] founded, renamed in 1814 as 'Société royale des Antiquaires de France' ['Royal society of French archeologists'] with a program of language studies, published in the 'Mémoire' from 1817 on, therein several dialect studies.
1807	Written collection of French dialects by Ch.-É. Coquebert de Montbret [Parable of the prodigal son translated from the Bible text], published in 1824 (Mémoire, vol. VI).
1840	Schnakenburg, J. F. *Tableau synoptique et comparatif des idiomes populaires ou patois de la France ...* [Synoptic and comparative description of folk idioms or common patois of France ...]. Brussels.
As from 1872	Local and area grammars, e.g., Ch. Nisard (1872). *Étude sur le langage populaire ou patois de Paris et de sa banlieu* [Study on the folk language of Paris and surrounding areas]. Paris; F. Haefelin (1873). 'Die Mundarten des Kantons Neuenburg' [The dialects of the Neuchâtel canton (Swiss French)]. *Zeitschrift f. vergl. Sprachforschung* XX.
1875	A phonetic transcription system (for songs and tales of the Gruyère) drawn up by J. Cornu. *Romania* IV.
1876	Chabaneau, C. *Grammaire limousine* [Limousine grammar (= of the town Nontron, Dordogne, SW France)]. Paris.
1880	Gilliéron, J. *Patois de la commune de Vionnaz (Bas-Valais)* [Dialects of the Vionnaz community (lower Valais)]. Paris; *Petit Atlas phonétique du Valais roman* [Concise Phonetic Atlas of the Roman Valais]. Paris.
1887	Edmont, E. Transcription system drawn up on behalf of his 'Lexique saint-polois' [The Lexis of Saint-Pol (Normandy)]. *Revue des patois gallo-romans* I–V & suppl. [1897].
1891	Phonetic modifications in a family dialect (Charente, W France) by Abbé Rousselot [different generations; experimental phonetics as new methods].
1897–1901	Data collection for the *Atlas linguistique de la France 'ALF'* [French linguistic atlas] by E. Edmont.
1902–1910 1912 1914/15 1920	Gilliéron, J. & Edmont E. Publication of the *ALF.* Paris: Champion. [35 fascicles, 1920 maps with 639 dialects documented per map] *"Table"* [Index] of the *ALF.* Paris: Champion, 519 p. *ALF. Corse.* [Dialect atlas of Corsica]. Paris: Champion, 799 maps *ALF. Supplement.* Paris: Champion, 308 p.
1903	Guerlin de Guer, Ch[arles]. *Atlas dialectologique de Normandie ...* [Normandy dialectatlas ...]. Fasc. 1. Région de Caen [Caen region]. Paris.
1910	Millardet, G. *Petit atlas linguistique d'une région des Landes* [Concise linguistic atlas of a region of the Landes]. Paris.
1913	Bruneau, C. *Enquête linguistique sur les patois d'Ardenne* [Linguistic Survey of the patois of the Ardenne region]. 2 vols. Paris.
1915	Bloch, O. *Lexique français—patois des Voges méridionales* [French – dialect vocabulary of the southern Voges]. Paris.
1917	Bloch, O. *Atlas linguistique des Voges méridionales* [Linguistic atlas of the southern Voges]. Paris.
1939	Dauzat A, Initiation of the '*Nouvel Atlas linguistique de la France par régions (NALF)'* [New linguistic atlas of France by regions].

Figure 14 Survey of major events in the development of early French dialectology (cf. Pop, 1950: 6ff; Kratz, 1969: 98ff).

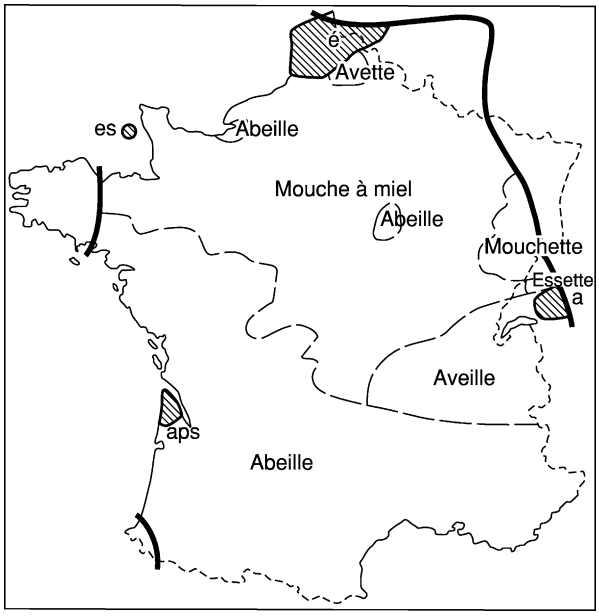

Figure 15 Generalisation of the ALF map 1 *Abeille* 'bee' vs. *Mouche à miel* 'honey-bee' plus derivates of lat. *apis* 'bee', hatched (from Guiraud, 1978: 84).

Th. Edmondston on Shetland and Orkney dialects, in 1866, on Faroese dialects by Jakob Jakobsen and V. U. Hammershaimb, in 1891. Jakobsen's activities brought up several studies on Shetland dialects and a huge etymological dictionary (1908–1921). With Ch. Matras, he also published a Faroese-Danish dictionary (1927–1928); see Figure 12.

English Dialects The prelude to English dialectology was formed by two dictionaries: the one by James Orchard Halliwell in 1847 and the one by Thomas Wright in 1857. However, "they fail to distinguish living terms from obsolete" and "many of the local glossaries are unscientific" (Shorrocks, 2001: 1556). The English Dialect Society (EDS), founded in 1873, initiated many projects (e.g., a bibliography, glossaries, and *The English Dialect Dictionary*, ed. 1898–1905 by Joseph Wright). The same editor wrote *The English Dialect Grammar* (1905). Prior to Alexander J[ohn]. Ellis (1889), the "first attempt at a somewhat more detailed classification of the Modern English dialects was made by Prince Louis-Lucien Bonaparte," in 1873 (Shorrocks, 2001: 1558). A survey of English dialects and a dialect atlas was only published in the second half of the 20th century (see Figure 13).

Romance Dialectology

Dialects in France

Survey of Territorial Investigation As a consequence of the French Revolution (1789), the Abbé Henri Baptiste Grégoire, member of the National Convent, sent out a questionnaire on language use. The result was alarming: only one million of 28 million inhabitants spoke a faultless French. The other 27 million inhabitants spoke 30 different dialects. This is why the message of the French Revolution and the communication with the people either had to be translated into these 30 dialects or – this was Abbé Grégoire's demand in his report of 1794 – people had to learn Standard French. Because Abbé Grégoire's policy was quickly realized, this was the beginning of the dialect destruction (see Pop, 1950: 6ff.). Linguistically important is the fact that dialects were considered as autonomous language systems and not as the degeneration of a Standard language.

Facing a decline of the dialects, in 1807 Charles-Étienne Coquebert de Montbret had the parable of the prodigal son translated from the Bible into French dialects (86 translations). He did this by correspondence. This way, he created the indirect method of data collection, 70 years before Wenker (Germany). Translations of this parable were also gathered later and even outside of France. After the first fall of Napoleon in 1814, several learned societies initiated the study of dialects, among them the important study of the Belgian J. F. Schnakenburg in 1840; see Figure 14. A language atlas of France, southern Belgium and the 'Romance Switzerland,' planned by the Belgian Pierquin de Gembloux in 1841, could not be brought to fruition.

In 1875, the Swiss Jules Cornu, professor in Basel and a student of Gaston Paris, drew up a phonetic transcription system which, in 1880, was used by his scholar Jules Gilliéron (1854–1926) for a local grammar and a regional atlas of the Valais dialect. After Gilliéron had become a professor of dialectology in Paris (1883), he and the experienced Edmond Edmont were the ideal team for the fundamental research on French dialects: the French linguistic atlas (ALF) (see Figure 14).

Linguistic Atlas of France (ALF) Edmond Edmont had drawn up an excellent system to transcribe dialect sounds, as exemplified in his study of the lexicon of his home town Saint-Pol (Normandy). This system was used for his ALF survey, started in 1897 and partly financed by the French office of education.

The Atlas has 639 documentary locations which is not many in comparison with the ca. 40 000 locations of Wenker's German linguistic atlas. The ALF was published between 1902 and 1910 (9 vols based on 35 fascicles with 1920 maps, altogether). It was accompanied and followed by additional publications, e.g., a dialect atlas of Corsica in 1914/15. In this period, several authors other than Edmont

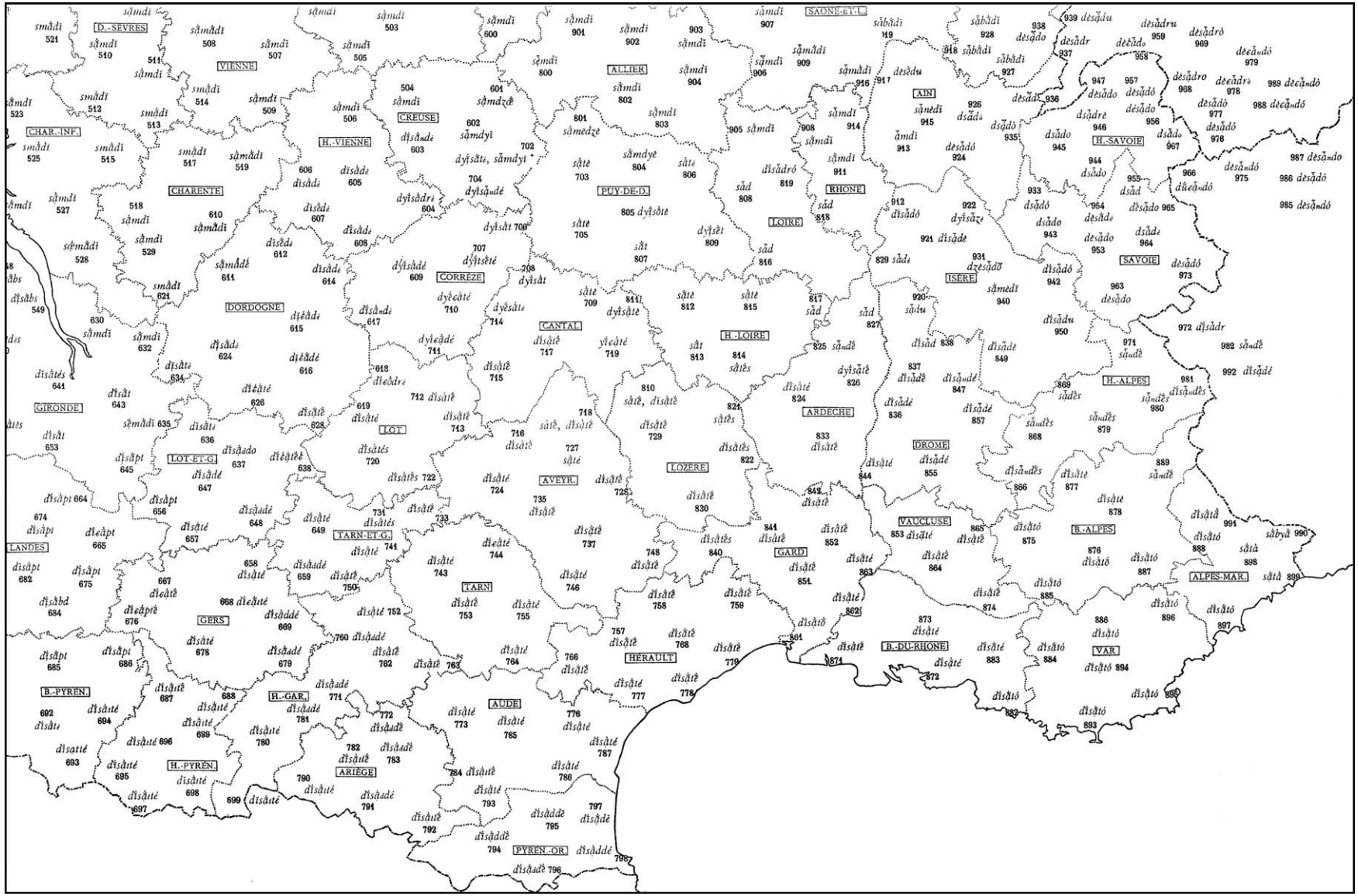

Figure 16 *Samedi* 'Saturday', ALF, Vol. IX (1906), map 1186 (South of Lyon to the Spanish border).

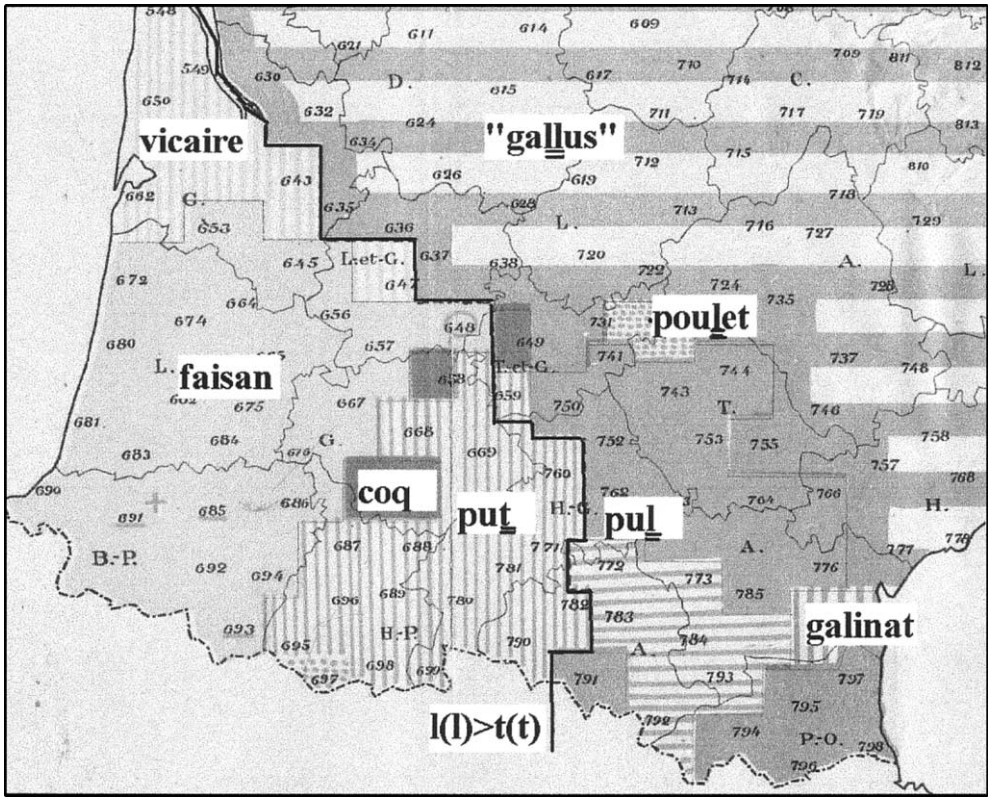

Figure 17 Gilliéron and Roques (1912). The cock in southern France (original in color, dialect words inserted from the legend).

and Gilliéron worked on regional dialect atlases (see Figure 14).

For each word of the questionnaire a map was produced showing the dialect translation of this word as phonetically noted down by Edmont (cf. Figure 16). The translations could be individual words or even phrases, shown, for example, in Figure 15. This method of data representation was different from Wenker's.

At a first glance, the map of Figure 16 is difficult to read because of the phonetic entries. There are two major geographical synonyms: variants of northern *samedi* (< vulgar Greek *sámbaton* 'sabbath' plus vulgar Latin *di* 'day', introduced by missionaries from southeastern Europe via Germany) and southern *disat* (< Latin *di(es)* 'day' plus *Sat(urni)* 'of Saturn' [the Roman god, cf. English *Saturday*). Maps of this type are extremely suitable for etymologies (*see* **Gilliéron, Jules (1854–1926)**) but for phonological research they have to be rewritten. This fact and the wide-meshed net of locations motivated Albert Dauzat to initiate, in 1939, the new French linguistic atlas by regions (*Nouvel Atlas linguistique de la France par régions* (NALF); *see* **Dialect Atlases**) so that the macrocosm of the ALF could be completed by a microcosm. This series covers 24 regions and was published until 1989 by different authors under the direction of the C.N.R.S. [French national center of scientific research]. On account of new linguistic developments (– 'words and things') each volume of the NALF constantly began with the formula *Atlas linguistique et ethnographique de* . . . [Linguistic and ethnographic atlas of . . .].

Pre-structural Studies Interpreting the ALF Data Gilliéron (& Roques) reconstructed a number of examples showing how the potential collision of homonyms had been avoided. One such example is given in Figure 17. In the southwest of France two homonyms, *gat*[1] meaning 'cock(erel)' (< Lat. *gallus*) and *gat*[2] meaning 'cat' (< Lat. *cattus*) would have been the result of several sound changes (such as: *-us* > Ø, *c-* > *g-*, *-ll-* > *-t(t)*). To keep communication working, *gat*[1] 'cock(erel)' was replaced by other dialect words in the southwest of the collision line where the change of *l(l)* to *t(t)* took place, as shown on the map. The replacing words are, for example, *vicaire* 'village judge' as a metaphor for the cock on the muck heap, *faisan* 'phesant', *put* (= *pul*) 'chicken', and, sporadically, *coq* 'cock'.

Dialects in Italy

Survey of Italian Territorial Investigation Italian dialectology began with pre-scientific dialect dictionaries,

Year	Major events in the development of early Italian dialectology
1811	Porru, Abbé V. *Saggio di grammatica sul dialetto sardo-meridionale* [Essay of grammar on the south Sardinian dialect]. Cagliari.
1830–1835	Vegezzi-Ruscalla, G. Translation of the parable of the lost son by correspondence, all Italy (cf. Coquebert de Montbret, 1807, **Figure 14**).
1832	Porru, Abbé V. *Nou dizionariu universali sardu-italianu* [New universal Sardinian-Italian dictionary]. Casteddu. 641 p. (data collected by correspondence).
1839–1853	Cherubini, F. *Vocabulario milanese-italiano* [Milan-Italian vocabulary]. 2nd ed., 5 vols. Milan.
1845/56	Monti, P. *Vocabolario dei dialetti della città e diocesi di Como* [Vocabulary of the dialects of the city and the diocese of Como] (1845); appendix: *Saggio di vocabulario della Gallia Cisalpina* [Essay on the vocabulary of the south-Alpine Gaul] (1856). Milan.
1851–1852	Spano, G. *Vocabulario sardo-italiano e italiano-sardo* [Dictionary Sardinian-Italian and Italian-Sardinian]. Cagliari.
1853	Biondelli, B. *Saggio sui dialetti gallo-italici* [Essay on the 'Gallo-Italian' dialects]. XLIX, 692 p. (mainly empirical, proper phonetic transcription system drawn up, dialects also as a meta-language for the description, glossary).
1856	Boerio, G. *Dizionario del dialetto veneziano* [Dictionary of the Venice dialect]. 2nd ed. Venice.
1856–1859	Malaspina, C. *Vocabulario parmigiano – italiano* [Parma – Italian vocabulary]. Parma.
1867	Tiraboschi, A. *Vocabulario dei dialetti bergamaschi antichi e moderni* [Vocabulary of the ancient and modern Bergamo dialects]. Bergamo.
1873ff.	Ascoli, G. I., ed. *Archivio glottologico italiano* (*AGI*) [Archive for Italian language studies].
1873	Ascoli, G. I. 'Saggi ladini' ('Essays on Ladin') *AGI I.* 1–537; d'Ambra, R. *Vocabulario napolitano–toscano* [Dictionary of Naples–Tuscany dialects]. Naples.
1875	Papanti, G. *I parlari italiani in Certaldo alla festa del V centenario di Giovanni Boccacci* [The Italian speakers in Certaldo (hometown of Boccaccio, 40 km south of Florence) on the occasion of B's 500th year of death]. XIV, 736 p. Livorno (translation of the 9th novella of the Decamarone, 703 versions).
1878	Ascoli, G. I. 'Schizzi franco-provenzali' [Outline of Franco-Provençal]. *AGI III.* 61–120. Nigra, C. 'Fonetica del dialetto di Val-Soana (Canavese)' [Phonetics of the Soana valley dialects (Piemont)]. *AGI III.* 1–60.
1907	Salvioni, C. Survey of the *Vocabulario della Svizzera italiana* [Vocabulary of Italian Switzerland] initiated.
1921	Parodi, E. G. Initiative for an Italian dialect atlas (ALI); Questionnaire 1926/1942; data collection stopped after the death of U. Pellis (1943) and M. Bartoli (1946). Ms. in Turino, copy in Leuven.
1928–1932	Bottiglioni, G. Survey of a new linguistic atlas of Corsica.
1928–1940	Jaberg, K.& Jud, J., eds. *AIS* ([Linguistic and ethnographic] Atlas of Italy and south Switzerland), vols. I–VIII. Zofingen. (Data collected by G. Rohlfs, P. Scheuermann, M. L. Wagner; presented by subject matter.)
1933–1942/52	Bottiglioni, G. *ALEIC = Atlante linguistico-etnografico italiano della Corsica* [Italian linguistic-ethnographic atlas of Corsica]. 10 vols [2001 maps]. Pisa. Introduction, Pisa 1935. Index, Modena 1952.

Figure 18 Survey of major events in the development of early Italian dialectology (cf. Pop, 1950: 467ff, 1180ff; Kratz, 1969: 100ff; Zolli, 1988).

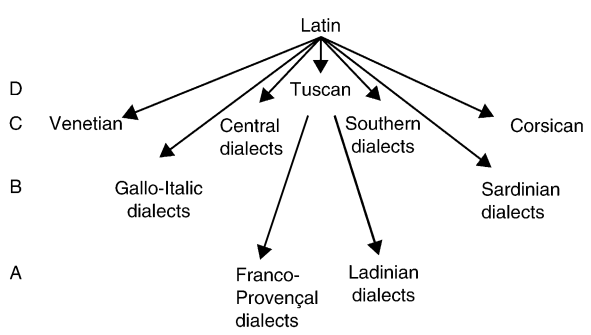

Figure 19 The Italian dialects after M. Cortelazzo (1988), based on G. I. Ascoli (here translated from the Italian).

mostly influenced by the famous *Academia della Crusca*, founded in Florence in 1582. A dictionary of the Milan dialect by G. Capis and G. A. Biffi (1606), for example, a vocabulary of Bologna by G. A. Bumaldi (1660), and some more referring to the 18th century (see Zolli, 1988) could be quoted. In a more scientific way, this tradition kept going in the 19th century. Extensive collections of dialect texts, mostly by correspondence (translation of the parable of the prodigal son as Coquebert de Montbret did in France in 1807; see Figure 14), were significant for the early 19th century.

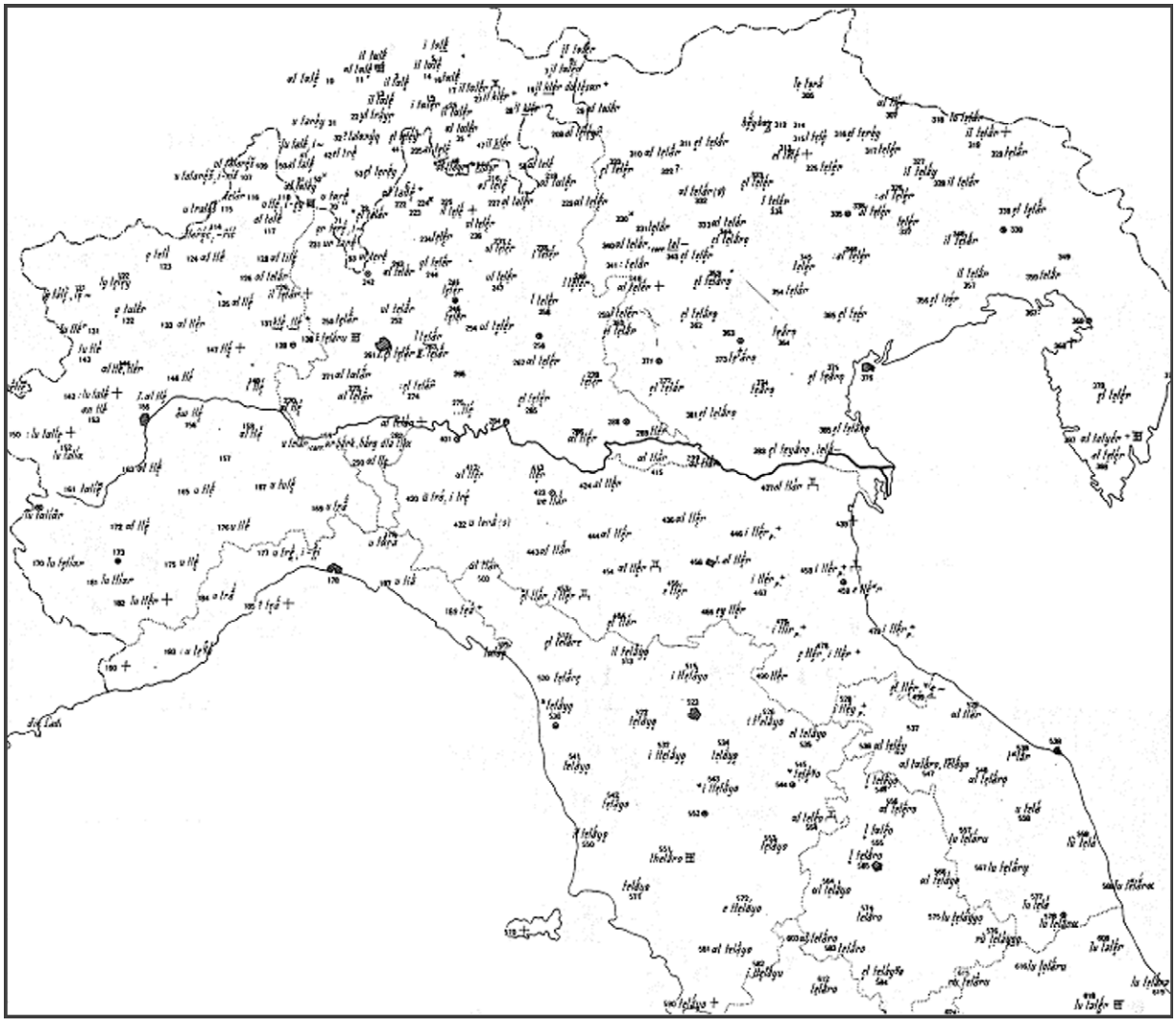

Figure 20 Extract from AIS, Vol. VIII (1940), map 1512 [north] – *il telaio* '[weaving] loom'.

The Essay on the 'Gallo-Italian' dialects (1853) by Bernardino Biondelli became quite famous because it was based on empirical data collected in the areas north and south of the Po River. Biondelli was the first Italian to draw up a phonetic transcription (notation) system. The founder of Romance studies in Italy and of Italian dialectology was Graziadio Isaia Ascoli (1829–1907). His essays on Ladin (*Saggi ladini*, 1873) and Franco-Provençal (1874) caused a polemic discussion with French linguists. From 1873 until 1901 Ascoli edited the periodical *Archivio glottologico italiano* (*AGI*) ['Archive for Italian language studies'], good for monographs, articles, and reviews on Italian dialects. Ascoli explained many exceptions of today's Italian dialects by a supposed pre-Latin, for example, Gallic substratum.

Analyzing dialect similarities and dissimilarities, Ascoli brought up the systematization of Italian and neighboring dialects, and also the solution of the 'language question', that is, proof that Standard Italian is based on the Tuscan (Florence) dialect; (*see* **Ascoli, Graziadio Isaia (1829–1907)**). The diagram shows the distance of the dialect groups from Latin and from each other (stages D – A) (see Figure 19). In the early 20th century, there were initiatives for a Swiss-Italian dictionary by Carlo Salvioni (1907) and for dialect atlases.

Italian Dialect Atlases Plans for Italian dialect atlases were successfully realized much later than those for the French ones (see Figure 18). Only after the First World War was there an initiative for an Italian dialect atlas, namely, by Ernesto G. Parodi in 1921, but this stopped after the death of Ugo Pellis (1943) and Matteo Bartoli (1946). From the French perspective, Gilliéron and Edmont had published a

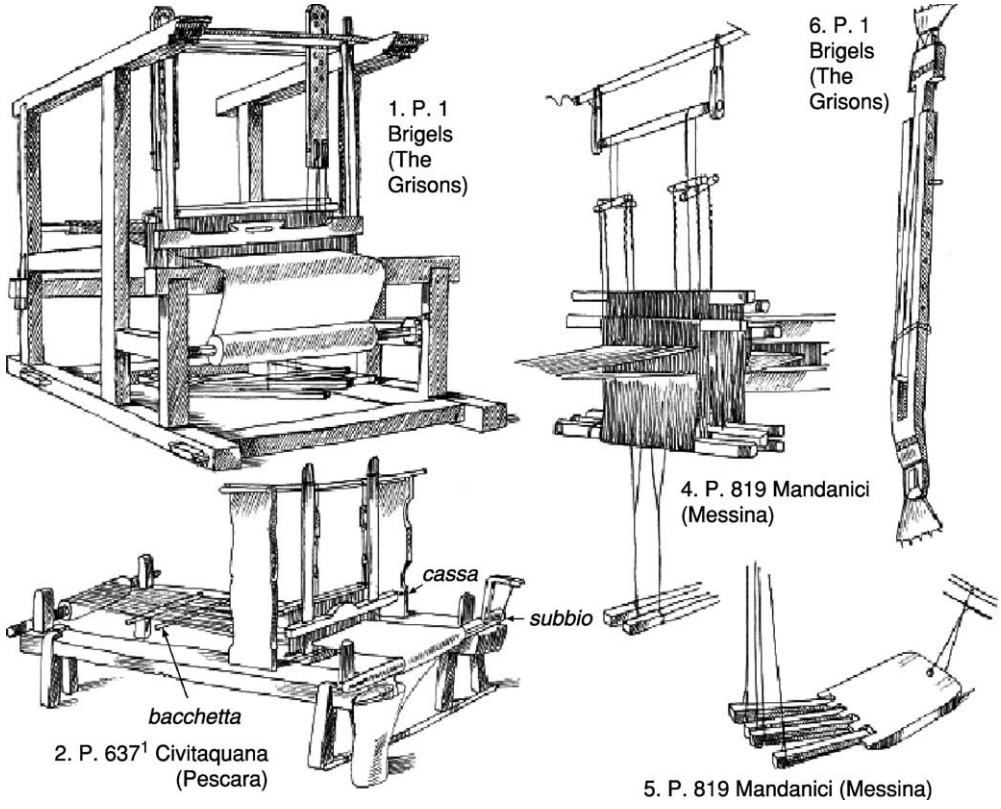

Figure 21 Sketch of the '[weaving] loom' (*il telaio*). AIS, Vol. VIII (1940), map. 1513 (cf. Pop, 1950: 585).

Linguistic atlas of Corsica, using the ALF questionaire in 1914/15 (see Figure 14). From the Italian viewpoint, Gino Bottiglioni managed to publish a new and very important 'Italian linguistic-ethnographic atlas of Corsica' (1933–1942/52), based on the survey of 1928–1932. Both atlases on Corsica were linguistic and ethnographic.

In the years 1928 to 1940 the (Linguistic and Ethnographic) Atlas of Italy and southern Switzerland (AIS) was published by the two Swiss Karl Jaberg and Jacob Jud. The order of the maps of the AIS was organized around ethnographical subject matter: *family* (e.g., *relatives, age, birth, marriage, death*, etc.), *human body, craft, tools*, and so on. The sample map (Figure 20) shows that the method of data presentation per map was similar to the one of the French ALF: phonetically transcribed texts were inserted into the map, point by point according to the dialect location. Because of this, the problems associated with the ALF were also true for the AIS of which 1,705 maps were published. Each map had 407 documentary places (see Pop, 1950: 562, 575). The importance of ethnography, the 'material culture' is documented by pictures, or rather sketches of the objects denoted on the maps (see Figure 21) – a method already set forth by Schuchardt (*see* **Schuchardt, Hugo (1842–1927)**).

Other Romance languages

Romanian Dialects Smaller monographs on several regions had appeared when the first important monograph (phonology) on Romanian dialects, in total, was written in German by the Slavicist F. v. Miklosich (5 vols, Vienna 1881–1882; see Pop, 1950: 673ff). In 1884, the Romanian Academy of Science decided to publish a 'Dictionary of the Romanian language', based on 206 questions and answers by correspondence; its publication began in 1913. Some monographs on southern Romanian dialects (e.g., Oltenia) were published from 1896 on. Research on Romanian dialects as expressed in dialect atlases began in 1909 with the *Linguistischer Atlas des dacorumänischen Sprachgebietes* ['Linguistic atlas of the Daco-Romanian language area'] by Gustav Weigand, Leipzig, covering the major dialect group of Romanian. More dialect atlases appeared in the years 1938–1942, 1956–1981, etc. (see Kratz, 1969; Pop, 1950; Veith, 1989). Because of the geographical situation, Romanian, besides Italian, has the strongest subdivision into dialects of all Romance languages (see Figure 22). Unfortunately, research started late.

The eight areas shown on the map are the major dialect areas of 'Daco-Romanian' within the Romanian state territory. Minor Romanian dialect areas are

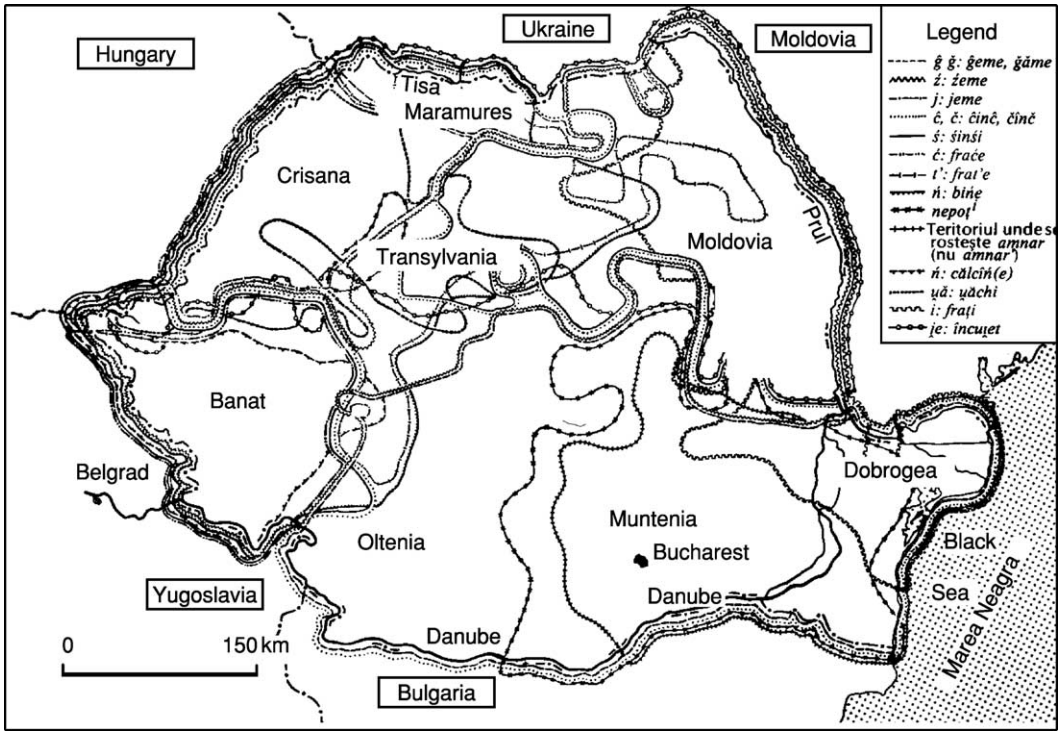

Figure 22 Romania, its major dialects in historical context (according to Caragiu, 1989; Petrovici, 1970).

excluded here, for example, those in Istria (Slovenia), in Macedonia, and in the north of Saloniki (Greece). The map follows the idea that only a few, but typical, phenomena are enough to characterize the dialects of a language area. Typical for Daco-Romanian is the development of the semi-occlusives *ĉ*, *ĝ* (from the Latin c, g before *e, i* in standard Romanian words like *cer* 'sky', *cinci* 'five', *cenuşa* 'ash', *ger* 'gel', *sînge* 'blood', *margine* 'margin' (see Caragiu, 1989: 416).

Ibero-Romance Dialects Much later than the dialect research of Romanian, the one of Ibero-Romance dialects began, in Europe and overseas, as well. The major studies took place after the Second World War, for example, the Linguistic and ethnographic atlases of Andalusia, Aragón, Navarra, and Rioja by Manuel Alvar (between 1952 and 1983), or the Linguistic and ethnographic atlas of Colombia by Luis Flórez (1981–1983). These and more atlases are listed in Veith (1989: 426ff).

Slavic Dialectology

Overview

The 'History of the Slavic languages' by Pavel Šafárik (1826) was not a dialect study although Slavic dialects were considered. The major impetus of Slavic dialectology in the late 18th and early 19th centuries came rather from ethnography (see Priestly, 2001). Many descriptions of Slavic dialects (see Figure 23) reflected the multinationality of the Austrian Empire, for example, the description of the Slovene dialect in Carinthia by U. Jarnik (1842), of Czechoslovak dialectology by A. V. Šembera (1864), of the Rož dialect in Carinthia by J. Scheinigg (1881/82), of Moravian dialectology by F. Bartoš (1886–1896), of southern Serbian dialects by O. Broch (1903), and, similarly, by Aleksander Belić in 1905. In Vienna, a new series was started in 1900, mainly for publishing dialect studies: *Schriften der Balkankommission* ... [Papers of the commission for the Balkans ... South Slavic dialect studies]. There were, in addition, several dialect studies in Poland and Russia at that time (see below). According to Priestly (2001: 1565) one reason for serious dialect research in the Slavic regions was the political situation before the First World War. There were problems with delimiting languages, dialects – and states, for example, between Bulgaria and Serbia.

Special Activities

In spite of the fact that the famous Italian dialectologist G. I. Ascoli (*see* **Ascoli, Graziadio Isaia (1829–1907)**) was born in the Italian/Austrian (Slovenian) border town of Gorizia, the real focus on Slovenian came from Jan Baudouin de Courtenay, then professor in Krakow, Poland, and 'spiritus rector' of the Kasan/St. Petersburg (Russian) school of linguistics.

Year	Activities
1826	Šafárik, P. *Geschichte der slavischen Sprachen und Literatur nach allen Mundarten* [History of the Slavic languages and literature according to all dialects]. Ofen (Hungary).
1841	Sreznevskij, I. I. 'O slavjanskix narečijax' [On Slavic dialects]. *Žurnal Minsterstva narodnogo prosveščenija 9,* 133–164.
1842	Jarnik, U. 'Obraz slovenskoga narečja u Koruškoj' [The form of the Slovene dialect in Carinthia]. *Kolo 1*, 41–57.
1864	Šembera, A. V. *Zakladové dialektologie ceskoslovenské* [Fundamental Czechoslovak dialectology]. Vienna.
1875	de Courtenay, J. Baudouin. *Opyt fonetiki rez'janskix govorov* [Sketch of the phonetics of the Resia subdialects]. Warsaw, St. Petersburg.
1881/2	Scheinigg, J. 'Obraz rožanskega narečja n na Koroškem' [The form of the Rož dialect in Carinthia]. *Kres 1,2* [in instalments, altogether 38 pages].
1886–1896	Bartoš, F. *Dialektologie moravské.* 1: *Nářeči slovenské dolské, valašské a lašské*; 2: *Nářeči hanacké a české* [Moravian dialectology. 1: The Slovak, Dol, Valach, and Lach dialects; 2: The Hanak and Bohemian dialects]. Brno.
1897–1910	Karskij, E. F. *Materialy dlja izučenija belorusskix govorov* [Materials for the study of the Belorussian dialects]. Vols. I-VI. St. Petersburg.
1900	Series started: *Schriften der Balkankommission: Linguistische Abteilung, I: Südslavische Dialektstudien* [Papers of the commission for the Balkans: Linguistic section, I: South Slavic dialect studies]. Vienna.
1900–1911	Karłowicz, J. A. *Slownik gwar polskich* [Dictionary of the Polish dialects] I–VI. Kraków: Akademia Umiejetności.
1903	Broch, O. *Die Dialekte des südlichsten Serbiens. Mit einer Dialektkarte* [The dialects of the most southern Serbia. With a dialect map]. Vienna.
1905	Belić, A. *Dijalekti istočne i južne Srbije* [The dialects of East and South Serbia]. Belgrade; *Dialektologičeskaja karta serbskogo jazyka* [Dialectological map of the Serbian language]. Belgrad.
1905/07	Nitsch, K. 'Dialekty polskie Prus Zachodnich' [The Polish dialects in West Prussia]. *Materiałi prace Komisji Językowej Akademii Umiejętności w Krakowie* 1905: 1/2, 101–284; 1907: 3, 305–395.
1915	Durnovo, N. N., *et al. Opyt dialektologičeskoj karty russkogo jazyka v Evrope s priloženiem očerka russkoj dialektologii* [Attempt of a dialectological map of the Russian language in Europe with an attached sketch of Russian dialectology]. Moskow.
1915	Ščerba, L. V. *Vostočnolužickoe narečie* [The East Lusatian dialect]. Petrograd [St. Petersburg].
1921	Assembly of scientists of the SU plans ethnographic and linguistic maps of the country (not carried out).
1921–1931	Vážný, V. Survey of Slovakian dialects by correspondence, 268 questions, 800 localities, published in parts, not as an atlas.
1924	Karskij, E. F. *Ruskaja dialektologija* [Russian dialectology]. St. Petersburg.
1925	Tesnière, L. *Atlas linguistique pour servir à l'étude du duel slovène* [Linguistic atlas to serve the study of the Slovenian dual]. Paris 1925. (Appendix to L. T's book on the forms of the dual in Slovenian. Paris).
1928	Buzuk, P. *Sproba linvističnaje geografij Belarusi* [Linguistic survey of the White-Russian geography]. Minsk (20 maps).
1933/36	Wirth, P. G. *Beiträge zum sorbischen (wendischen) Sprachatlas* [Contributions to the Sorb (Wend) linguistic atlas]. XII, 122 p., 91 maps. Leipzig.
1934	Małecki, M. & Nitsch, K. *Atlas jězykowy Polskiego Podkarpacia* [Linguistic atlas of Sub-Carpathian Poland]. 2 vols. (500 maps). Cracow.
1939	Pan'kevič, I. *Ukrajinśki hovory Pidkarpatśkoji Rusy i sumežnychoblastej* [The Ukrainian dialects of the Carpathians and neighbouring areas]. Vol. I: Phonology & morphology. Prague.
1949	Filin, F. P. & Malcow, M. D. *Lingvističeskij atlas rajona ozera Seliger* [Russian dialect atlas around lake Seliger]. 2 + 45 maps. Moscow, Leningrad.
1956–1964	Stieber, Zdzisław. *Atlas językowy dawnei Lemkowszczyzny* [Linguistic atlas of the old population of Lemberg/Ukraine]. 8 fscs. Lódž.
1957	Avanesov, R. I. *Atlas russkich narodnych govorov centralnych oblastej k vostoku ot Moskvy* [Atlas of the Russian dialects in the central areas east of Moscow]. 2 parts (279 maps). Moscow.
1958	Bernštejn, S. B., ed. *Atlas bolgarskich govorov v SSSR* [Atlas of the Bulgarian dialects in the Soviet Union]. 2 vols. Moscow.
1958, 1960	Dzendzelivskyj, J. O. *Lingvistycnyj atlas ukrainskych narodnych hovoriv zakarpatskoj oblasti URSR (Leksyka)* [Linguistic atlas of the back area of the Carpathian Mountains (vocabulary)]. 2 vols. Uzhorod.
1965 ff.	Avanesov, R. I., Hamm, J. *et al.*, eds. *Obščlavjanskij lingvističeskij atlas (OLA)* [Pan-Slavic language atlas]. Moscow.

Figure 23 Selection of activities. (sources: Karaś, 1969; Priestly, 2001; Veith, 1989).

He delivered a description of Slovenian in 1875. Jan A. Karłowicz was the author of the huge Dictionary of the Polish dialects (6 vols, 1900–1911). In 1905/1907, Kazimierz Nitsch published a study on Polish dialects of West Prussia. Russian dialects were described in 1915 by N. N. Durnovo *et al*. The French Slavist L. Tesnière, internationally better known as the founder of 'dependency grammar', was the first structuralist to do research on the Slovenian dual (grammar) combined with a Slovenian dialect atlas, published in 1925. At the 1st International Congress of Slavists in Prague (1929), he was asked to organize a Pan-Slavic language atlas (not accomplished; see Pop, 1950). It was after the Second World War (1965 and following) that a similar atlas appeared, edited by R. I. Avanesov *et al*.

Amongst the activities after the First World War, there were, besides the above mentioned Slovenian atlas by Tesnière (1925), Vaclav Vážný's Survey of Slovakian dialects by correspondence (1921–1931), the 'Linguistic survey of the White-Russian geography' by P. Buzuk (1928), and Paul Gerhard Wirth's 'Contributions to the Sorb (Wend) linguistic atlas' (1933/36). In 1934, the Atlas of Sub-Carpathian Poland by M. Małecki and K. Nitsch was published, comprising several Slavic languages: Polish, Czech, Slovac, and Ukrainian. The objective of the 'Ukrainian dialects of the Carpathians and neighboring areas' by I. Pan'kevič (1939) was similar, but done from the Ukrainian point of view. After the Second World War, several Russian, Polish, and Bulgarian dialect atlases were published (see **Figure 23**). Priestley (2001: 1568) sums up, "that language standardization had an important impact on descriptions of Bulgarian, Slovak and especially 'Serbo-Croation' dialects; and that political considerations had an impact."

See also: Ascoli, Graziadio Isaia (1829–1907); Dependency Grammar; Dialect Atlases; Gilliéron, Jules (1854–1926); Mother Tongue Education: Standard Language; Phonetic Transcription: Analysis; Pike, Kenneth Lee (1912–2000); Prague School; Schmeller, Johann Andreas (1785–1852); Schuchardt, Hugo (1842–1927); Standard and Dialect Vocabulary; Standard and Dialect Vocabulary; Structuralism; Tagmemics; Wenker, Georg (1852–1911); Winteler, Jost (1846–1929); Wrede, Ferdinand (1863–1934).

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ALF = *Atlas linguistique de la France* [Linguistic atlas of France] (1902–1910). Gilliéron J & Edmont E (eds.). (Vols I–IX). Paris: Champion.

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Dialogism, Bakhtinian

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'Dialogism' (along with 'prosaics') is one of two commonly used cover terms to describe the main theories of the Russian scholar Mikhail Bakhtin (1895–1975) about language, literature, culture, and the psyche. The theories also occur in the works of Bakhtin's colleagues and disciples, Valentin Voloshinov and Pavel Medvedev, who tried to reconcile them with Marxism, which Bakhtin did not do.

Dialogism describes an approach to culture in terms of dialogue, but Bakhtin used the term 'dialogue' to mean different things over the course of his long career. The term was central to his early study of Dostoevsky, *Problems of Dostoevsky's poetics* (1929), whose fifth chapter outlines a general theory of language in terms of dialogue. During the 1930s, Bakhtin developed his theory of language and applied it to his study of literary genres. He praised the novel as the most dialogic, and therefore the most realistic, literary genre. In the 1960s and 1970s, he extended some brief comments in his earlier works to suggest a dialogic approach to culture as a whole.

Because Bakhtin's usage of the term constantly changed, inconsistencies, sometimes amounting to flat contradictions, appear in his own writings and in those of his followers and explicators. 'Dialogic' in one sense may be opposed to monologic, but in another sense it may not allow for the existence of the monologic. Among Bakhtin's explicators, dialogue is often confused with Hegelian or Marxist dialectics, despite Bakhtin's explicit and vehement contrast of the two concepts. It is therefore worthwhile to distinguish which sense of 'dialogue' one has in mind. Among the many that appear in Bakhtin's works, three principal usages stand out most clearly.

1. 'Dialogue' in the first sense describes a general approach to language. Bakhtin contended that linguists have been mistaken in taking the sentence as the fundamental unit of language. To mean anything, and be part of language as it actually exists, a sentence must be transformed into an utterance, which is a part of a specific dialogue. Language is a matter of people speaking to each other on specific occasions for specific purposes, and many features of language will be overlooked if one focuses on the sentence. To be sure, linguists, when necessary, "smuggle into" their analyses of sentences some features of 'dialogue,' but they do not fully understand 'dialogue' or take it as their point of departure.

In this use of the term, all utterances are, by definition, dialogic. Sentences, so to speak, hang in the air; they have the potential to become parts of a dialogue if they are 'embodied.' A particular person must say the sentence to someone for a particular reason at a given moment. If that person should use the same sentence (such as, *What time is it?*) on a different occasion, its meaning will be different. Sentences are repeatable, but utterances in dialogue are not, because each moment and each dialogic exchange differs from every other. Another way Bakhtin expresses this point is saying that utterances, unlike sentences, possess 'addressivity'; they must be addressed to someone in order to exist as utterances at all, and this act of addressing shapes them from the outset (*see* **Addressivity**).

Speakers do not first formulate sentences and then utter them, and listeners do not just happen to hear them and passively decode them. The dialogic exchange does not resemble the delivery of a letter by post or the encoding and decoding of a message in Morse code. Rather, the listener actively shapes the utterance from the beginning. The speaker takes into account the listener's status, knowledge, beliefs, and values; anticipates possible responses; and shapes his or her utterance accordingly. If the listener is present and begins to react visibly to the utterance (which may be much longer than a single sentence) while it is being uttered, the speaker may shift its tone, style, and choice of words as he speaks. In a real sense, then, the speaker and listener are co-creators of the utterance during each dialogue. The utterance belongs to the speaker alone only in a purely physiological sense.

Similarly, every dialogue is about something, and whatever it is about has been discussed before. The topic is 'already spoken about' and words sometimes seem to carry with them the earlier contexts of their usage. At times, the word may be dense with remembered contexts, and the utterance has to weave its way among earlier uses, agreeing with some, parrying others, indicating ambivalent relations to many more. Thus, the dialogic aspect of utterances pertains not only to the present exchange in which they take part but also to the orientation of speakers and listeners to earlier dialogues on the same topic. Each dialogue is in dialogue with its predecessors.

Bakhtin understood the psyche to be largely linguistic in nature, by which he meant that we think in terms of dialogues. We address others silently, and the others who figure most prominently in our inner dialogues, the ones we address most often and whose imagined responses count the most, in large

part define who we are. Moreover, some expressions prominent in our culture may exist within us as simply authoritative words that we hold at a reverential distance and do not question, whereas other ways of speaking are more or less appropriated by us until they become our own. We make ourselves by gradually choosing among the meaning-laden ways of speaking given by our culture.

Each dialogic exchange is unique, but dialogues fit into patterns. It would be impossible to define all the presuppositions about meaning, fact, and purpose that enter into every speech exchange, and so we use templates, or what Bakhtin calls 'speech genres,' to get started. Each speech genre, whether it defines the purchase of a railway ticket, the psychological novel, or the exchange in a psychoanalytic session, pertains to a specific kind of dialogue, which speaker and listener (or writer and reader) may modify in the course of using it. Any given language – say, English or Russian – contains not only grammar, syntax, and vocabulary, but also, if we conceive of language dialogically, a set of speech genres. Those genres differ from language to language, and so people who know a language from study in school may still find themselves misunderstood or uncomprehending because they do not know that language's speech genres. Genres change over time. They alter according to the pressure of many individual dialogues and so represent essentially cultural transitions. They are a drive belt from experience to language. Moreover, individual words may carry with them the 'aura' of the context in which they are typically used. What is often described as a word's 'connotation' is in fact the trace of a speech genre (*see* **Genre and Genre Analysis**).

2. 'Dialogue' in the second sense refers to a specific type of dialogue (in the first sense). In the second sense of the term, not all utterances are dialogic; some are 'monologic.' A monologic utterance is directly oriented towards its topic and purpose. Although the words it uses may be shown to carry the traces of earlier dialogues, those traces do not constitute part of the utterance's 'task.' If heard, they would interfere with it. The speaker wants only one speech center, his own, to be heard and attended to. By contrast, we may (in the simplest case) cite someone else's words – the person before one or some generally known quotation – with an ironic intonation. In that case, the speaker has taken another's utterance and given a new semantic direction to it. The utterance's task depends on the listener hearing two speech centers, that of the original utterance and that of the present speaker. When an utterance depends on our sensing two speech centers in interaction, we have a 'double-voiced word,' and each double-voiced word is dialogic in the second sense. That is, within a single utterance, an entire dialogue resounds (*see* **Irony**; **Narrativity and Voice**).

Double-voiced words are immensely various. They are of course present in each case of reported speech, of covert or overt citation, and of stylization or parody. But they are much more widespread and various than that. An utterance may, so to speak, glance over its shoulder at a possible response and incorporate an ironic answer to that response. To understand such an utterance, we must see its double-voicedness. Double-voiced words figure in the psyche as well, and they complicate our inner speech (*see* **Reported Speech: Pragmatic Aspects**).

Drawing on Dostoevsky's novels, Bakhtin offers a catalogue of double-voiced words and mentions a number of them that occur in daily life. Each of these would be misunderstood if analyzed solely in terms of traditional linguistics, because their defining characteristic is the presence of two speech centers. Sometimes a cited word may even seem to overwhelm the citing one and bend it to its own purpose. Various forms of mental pathology may involve the activity of internalized hostile double-voicedness. An antipathetic other mocks our inner voice as we think.

In Bakhtin's view, the realist novel makes the most extensive use of dialogue in the second sense. Novels dialogize whole world views, as they are represented by the particular ways of speaking of given professions, generations, subcultures, and many other groups. Bakhtin calls the many different, value-laden ways of speaking in a given language 'languages of heteroglossia.' Novels dialogize heteroglossia, and so force the differing parts of a culture to confront each other. An apparently straightforward passage of novelistic prose may in fact contain complex implicit dialogues. Though spoken in the third person, the passage may in fact paraphrase what a given character would say in her own distinct language; that paraphrase may be implicitly subjected to an authorial commentary. Or we may hear how those words would sound to another character not present and so detect dialogues that might happen. If these characters' ways of speaking also reflect different languages of heteroglossia, then whole world views may be brought into interaction. Prior to Bakhtin, such effects, though sensed, could only be described by the catch-all term 'irony.' The concept of dialogue thus allowed Bakhtin to demonstrate the complex art behind novelistic prose and one reason that novels seem to offer both subtle social commentary and an especially rich sense of the individual psyche (*see* **Literary Pragmatics**; **Pragmatics of Reading**).

3. 'Dialogue' in the third sense refers to a world view. If we imagine that what happens in an especially rich dialogue characterizes the world as a whole, we may understand life itself dialogically. To live means to engage in dialogue, and all cultural activity is a giant symposium. In the richest dialogues, the interaction of speakers may lead to insights that neither had before, and so dialogue may be genuinely creative. It manifests 'surprisingness' (*see* **Conspicuity**). That is, it is one source of the world's indeterminism. Bakhtin thus used dialogue as an image of why a deterministic view of life is mistaken and why free choice is real. Dialogue therefore became part of his lifelong agenda to demonstrate the meaningfulness of ethical responsibility (literally, 'answerability' in Russian). If the world were simply the execution of ready-made causal chains, it would contain no freedom and so no responsibility. It would be a dead thing. But dialogue belies this view of the world and allows us to see that nothing in it is final or already given. Because it allows for the genuinely new and surprising, dialogue makes the present moment matter. In one rather vague passage, Bakhtin states that there is even a kind of truth that is essentially dialogic. Such truth cannot be paraphrased as a single, monologic utterance. The Socratic dialogues partially represent this sense of truth and it is fully present in Dostoevsky. Numerous critics have pointed out that this third concept of dialogue relates closely to Bakhtin's theology, to the dialogue between God and man, and perhaps, to the dialogue among the persons of the Trinity. This interpretation may be rejected by one who still accepts Bakhtin's account of dialogue in the first sense and second sense.

See also: Addressivity; Conspicuity; Genre and Genre Analysis; Irony; Literary Pragmatics; Narrativity and Voice; Pragmatics of Reading.

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Dialogue and Interaction

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Dialogue – one-on-one language use with a partner – is arguably the most common context in which people produce and comprehend language. Children learn to use language in interactive situations, and people who do not read or write still communicate in dialogue. Dialogue has processing demands and involves cognitive resources distinct from those involved in monologue or in language use in groups. It thus requires distinct explanatory schemes and research methods, as well as serious attention to insights from other disciplines beyond psycholinguistics.

Processing in dialogue is special in at least two important ways. First, dialogue is a joint activity to which both participants continually contribute. Consider this transcribed example (Tsui, 1994: 38):

C: Do you get satisfaction though?
B: Yes, I reckon you get more satisfaction as you go up the the scale as well.
C: What do you mean, the money scale?
B: No, the job the job.

This ordinary interchange is a masterpiece of give and take as tightly coordinated as dancing or shaking hands. Together this pair coordinates – each shaping the other's utterances – to make sure that C understands what B means by 'scale.' Based on C's evidence of misunderstanding, B amends the initial statement; this shift is an example of how speakers can alter what they say, even mid-utterance, as they get linguistic, paralinguistic, visual, or behavioral evidence of their partners' reactions. This pair also creates dialogue with no overlap and no serious gaps, an impressive millisecond-level feat of timing. B and C must be monitoring the syntax and intonation of each other's speech for when it will be appropriate for them to jump in, and initiating articulation of their own speech a few hundred milliseconds before the other party has actually finished. (Tolerance for overlap varies in different settings and different cultures, but the smoothness of the turn transitions in the example is typical.)

Second, although at first blush one might assume that psychological processes in dialogue are particularly complex, dialogue actually provides constraints on processing that make it *less* mysterious. Instead of creating the lexical items and syntax of an utterance from nowhere, a speaker in dialogue often already has important building blocks available from the processes of comprehending their partner's prior utterances (consider B's use of 'get satisfaction'). The choice of content and timing of an utterance can in fact be so highly constrained by a partner's prior utterance (as in the example, where C's question constrains B to answer, and B's answer leads to a clarification request) that the speaker's production choices are quite limited. Similarly, comprehenders' own prior choices can come back to them in the speaker's utterances, simplifying their own comprehension processes.

Speaker B's repetition 'the the' is an example of the kinds of disfluencies – pauses, *um*s and *uh*s, restarts – that are ubiquitous in dialogue, accounting for anywhere from 6 to 15% of what is said. Approaches that focus on form and content (e.g., Chomsky's) have often ignored these aspects of spoken language as mere performance errors. But they are an essential feature to be explained by a psychological theory of production and comprehension in dialogue. The evidence is that they are informative on multiple levels. In producing them, speakers provide evidence about the problems they are having with producing the primary content of what they are saying [see Clark's (1994, 1996) distinction between primary and secondary speech]; they produce them more frequently, for example, when they are having particular trouble with selecting words, when the upcoming noun phrase is more complex, or when they are trying to hold the floor. For comprehenders, disfluencies and self-corrections can be informative not only about the fact that speakers are having trouble, but in certain highly predictable situations, about what speakers do *not* mean (Arnold *et al.*, 2004; Brennan and Schober, 2001).

Although one might be tempted to think of psycholinguistic processing in dialogue as involving only the verbal aspects of the interaction, dialogue is better conceptualized as joint action on a continuum from the purely verbal to the entirely nonverbal (Clark, 1996). Most dialogues fall somewhere in between, involving verbal, paralinguistic, and visual behaviors. When people can see what a partner is doing, an action can stand in for a back channel or explicit confirmation (Brennan, 1990, 2004; Clark and Krych, 2004; Goodwin, 1981), sometimes replacing language entirely. A purely verbal transcript – like our example – may miss important psychological processes involved in responding to a partner's actions.

Dialogue takes place in many different arenas, with many different purposes, media, and kinds of participants. Obviously these dimensions of variability can affect speakers' mental processes, what they

say, and how they coordinate in saying it. So spoken face-to-face dialogue will differ in important ways from telephone dialogue, where visual cues like head nods and looks of confusion are unavailable; typed dialogue in a chat room will differ in important ways from spoken dialogue, which allows different kinds and frequencies of feedback about whether speakers have understood each other; signed dialogue will differ from spoken dialogue. Teasing during small talk at a party will differ in important ways from workplace task-oriented talk or a marital argument. Talk between spouses will differ from talk between strangers on a train; talk between parents and children, bosses and employees, therapists and clients, or native speakers and non-native speakers will also differ in important ways.

What is common across these different arenas is that speakers can use the resources available to them – ability to time utterances precisely, availability of visual information, what they believe is mutually known – to understand each other as precisely as they need to, given their current purposes.

Evidence for Psychological Claims about Dialogue

A psychological perspective on dialogue differs from a linguistic, ethnomethodological, or sociological perspective in that it attempts to account for the mental processes and products of each interlocutor. So beyond characterizing the structure of a conversation based on a transcript, the psycholinguist attempts to understand how ongoing mental mechanisms and behaviors lead to that transcript.

Methodologically, psycholinguists require independent evidence of mental process – evidence, preferably quantifiable, beyond the words themselves. They also require multiple observations sampled from the population of speakers and utterances to be confident about the generalizability of their findings. By examining different pairs of speakers in the same parameterized situation, psycholinguists attempt to account for the range of what people do. This methodological requirement contrasts with the case study approaches of, for example, conversation analysts or the example-based approaches of linguists; such case studies provide important fodder for psycholinguists' studies, but do not constitute psycholinguistic evidence.

Psychologists who study dialogue use two main complementary techniques for uncovering evidence of psychological processes. One technique is observing spontaneously occurring interactions as collected in large-scale corpora. When corpora are large enough to contain a sufficiently large sample of the phenomena of interest, psycholinguists can test hypotheses and quantify results. To pick one example, Fox Tree and Clark (1997) tested the hypothesis that English speakers pronounce the word 'the' as 'thee' (thiy) when they are having trouble formulating an utterance, in particular the noun phrase that follows the determiner. To examine this, the researchers selected 962 noun phrases (NPs) from 50 face-to-face conversations from Svartvik and Quirk's (1980) corpus of British English conversation, collected between 1961 and 1976. Half the NPs included one or more 'thee's, and half contained one or more 'the's and no 'thee's. The finding was clear: 81% of the instances of 'thee' were followed by a suspension of speech, compared to only 7% of the matched sample of 'the's. This quantified distributional analysis allows the reasonable inference that speakers (consciously or not, intentionally or not) signal their production difficulties through the variant pronunciation.

The second main technique is the laboratory experiment, which more fully exploits the precision of measurement of ongoing behavior and the power of experimental manipulation that is the hallmark of the psychological method. The challenge for experimental psycholinguists is to create situations that allow independent validation of interlocutors' mental states and processes without interfering too much with the contingencies of dialogue. Traditional experimental methods require highly precise control and comparability of stimuli, in order to allow researchers to confidently make claims about what causes what. Researchers studying dialogue achieve control in various resourceful ways.

The most common solution has been to examine task-oriented dialogue in 'referential communication tasks' (see Yule [1997] for a review of this task's history from Piaget in the 1920s onward), where the experimental participants must use language in order to accomplish a task together. Crucially, both parties don't have the same knowledge: one has information that the other needs in order to accomplish the task. Performance on the task thus gives independent evidence about what interlocutors intend and what they comprehend. The task can involve the description or manipulation of things like physical objects, abstract figures, photographs, spatial arrangements, or maps.

For example, in a task involving the ordering of photographs, one party is typically selected to be the 'director' or 'instruction giver' – the person who knows the target information. The director's task is to get the other party, the 'matcher' or 'follower,' to arrange his or her photographs in the same order as the director's photographs are arranged. If there is a visual barrier between the two parties, they must rely only on words to accomplish the task; if the interlocutors can see each other's faces, they can

also rely on information about where the other is looking. If they can both see the photographs, then they can also point and gesture. The same sort of division of labor has been set up in tasks like building a pump or Lego figures together, describing a route on a map, describing spatial locations, and various others.

Alternative kinds of referential communication tasks do not use physical objects to externalize what is going on in participants' heads, but have other externally validated evidence of what is intended and understood. For example, in methodological studies of survey interviews, researchers can have independent evidence about what interviewers mean by references in questions and how respondents have interpreted them. If researchers have independent access to the 'truth' about a respondent's life (through official records, through extensive post-survey interviewing, or by having respondents answer on the basis of fictional scenarios), they can then determine when respondents have interpreted a survey term as the interviewers intended. As with other referential communication tasks, corpora from this sort of task can be analyzed for linguistic, paralinguistic, and visual aspects of the interaction.

Referential communication tasks have the advantage of allowing an enormous number of parameters to be manipulated by researchers, while still preserving the relative naturalness of the interaction. Participants, in fact, become very engaged in such tasks, and they often do not realize that their language use is being measured; they simply focus on achieving the task. Researchers can manipulate the physical setting and affordances of a physical task. They can manipulate the conversational goals or agenda that the participants are trying to achieve. They can select different kinds of participants to see how relative levels of task-relevant expertise and mutual knowledge affect the discourse, for example, by selecting experts vs. novices, friends vs. strangers, participants with different levels of task-relevant abilities, or different group membership. Finally, such tasks allow researchers to manipulate the medium of communication: spoken vs. written, face-to-face vs. side-by-side vs. video-mediated vs. telephone; with immediate ongoing feedback of comprehension vs. delay, etc.

Tasks like these have been used to garner evidence for cognitive processes involved in selecting references, comprehending noun phrases and deictic expressions about location; aligning conceptualizations; adapting phonologically and syntactically; and coordinating on the timing of what is said. Corpora (audio, video, transcribed) of language use in referential communication tasks (some available to the broader research community on-line) allow measurement of the language used at various levels of specificity, phonological, lexical, syntactic, paralinguistic, and conceptual. And participants' own interpretations of what they believed happened during the interaction can be solicited after the fact, either through global ratings or by participants' judgments as they watch video or listen to audio recordings of their task performance.

Nonlinguistic aspects of task performance are also examined for evidence they give about the linguistic: the actions performed to succeed at the task, gestures, gaze direction, head nods. The advent of technologies for unobtrusively tracking the timing and positioning of eye gaze within a scene has led to a surge in measurement at a fine grain of detail. As an example of the kind of measurement these technologies allow, consider the study carried out by Metzing and Brennan (2003), in which participants' eye gaze was recorded using a head-mounted eye tracker. The study demonstrates that comprehension is partner-specific: addressees interpret exactly the same phrase differently when it is spoken by different speakers with whom the addressees have different dialogue histories. In the experiment, the participants were first instructed by (confederate) speakers to reposition objects in an array; they did this several times, evolving shared perspectives and terms for critical objects (e.g., 'the shiny cylinder'). Next, in the crucial trial, either the same speaker or a new one referred to the critical objects using either the familiar term or a new, equally good term (e.g., 'the silver pipe') for the same critical object (amid many other references that did not use different terms). When either speaker used the old term, addressees gazed immediately at the object. When a new speaker used the new term, addressees also gazed immediately at the object. But when the old speaker used a new term, addressees experienced interference, delaying their gaze to the target object by looking at other objects first. Metzing and Brennan argue that this partner-specific interference demonstrates that addressees are highly sensitive to the 'breaking of a conceptual pact,' and that the impact of pragmatic factors can occur extremely early in comprehension, rather than as an afterthought or late adjustment.

What has become clear over the years is that seemingly subtle methodological choices affect experimental results in important ways, suggesting that the particulars of dialogue settings really do matter for psycholinguistic theory. One choice is whether or not the study includes a live interlocutor who can respond spontaneously. For example, speakers describing the locations of objects produce descriptions from their own perspective ('on my left') more often when they have a live partner who can give evidence of having

understood them than when speaking into a tape recorder (Schober, 1993). And listeners understand references with greater accuracy when they are being addressed by a live speaker who can respond to their feedback than do eavesdroppers listening in on exactly the same dialogues (Schober and Clark, 1989; see also Kraut *et al.*, 1981) or listeners in other non-addressee roles (Wilkes-Gibbs and Clark, 1992).

Another choice is whether a study involves two participants who speak spontaneously and are naïve to the purposes of the study or whether the study involves a confederate who presents scripted utterances. (Obviously, scripting increases the level of experimental control.) Just how important this methodological decision turns out to be can be seen in comparing findings from Brown and Dell (1987) to those of Lockridge and Brennan (2002). Brown and Dell investigated whether speakers are sensitive to what their addressees know as they tell brief narratives. The finding was that speakers seem relatively insensitive, mentioning the instrument of an action (e.g., 'the ice pick' in a stabbing) just as often when they believed the confederate already knew about the instrument as when they believed the confederate did not. In contrast, Lockridge and Brennan carried out the identical study but using a non-confederate partner as the addressee. This time, speakers mentioned the instrument reliably more often when the addressee was ignorant. Confederates hearing the same story again and again may be unable to present subtle cues of comprehension and need for clarification that fully naïve participants present.

Illustrative Findings

A number of robust phenomena have emerged from experimental studies of dialogue (for extensive reviews see Krauss and Fussell, 1996; Schober and Brennan, 2003; Pickering and Garrod, 2004). Many of the phenomena deal with 'partner adaptation': how, when, and whether interlocutors adapt their language use – from the phonological and lexical to the semantic and conceptual – to each other.

To select an illustrative arena of adaptation, how speakers refer to objects changes upon repeated reference with the same partner. Referring expressions tend to become shorter as the addressee gives evidence of having understood them, so that what started out as 'the one that looks like a monk praying' eventually becomes 'the monk' (Clark and Wilkes-Gibbs, 1986; Krauss and Weinheimer, 1964). Repeated tokens of a word also become phonologically shortened (Fowler and Housum, 1987). This happens substantially more in dialogue than in monologue (Krauss and Weinheimer, 1966; McAllister *et al.*, 1994), which is consistent with the notion that this change reflects the accumulation of partner-specific knowledge rather than simple repetition (Bard *et al.*, 2000).

Referring has been shown to be highly adapted to particular conversational partners. Speakers who can assume their partners share relevant expertise can use shorthand expressions ("Take the Q to Union Square") that they can't use with non-expert partners ("Take the Manhattan-bound Q subway train to the Union Square station") (Fussell and Krauss, 1992; Isaacs and Clark, 1987). Speakers who have evolved the use of a particular referring expression with a partner are surprised when their partner uses a different term, but they do not expect a new partner to use the same term (Brennan and Clark, 1996; Metzing and Brennan, 2003). In general, speakers adapt their referring expressions on the basis of what they take to be mutually known or 'common ground' with their addressees (Clark and Marshall, 1981): what is in their shared perceptual and attentional fields (e.g., Boyle *et al.*, 1994), what has been said in the current or previous conversation, and what can be assumed based on the various communities to which both partners belong (families, professions, genders, age groups, nations, ethnicities).

At the level of individual processing, how and when does partner adaptation occur? One can imagine two extreme possibilities and a continuum of possibilities in between. At one end of the continuum, speakers always take their partners' points of view into account from the earliest moments of processing, perfectly tailoring their utterances to their addressees' precise comprehension needs (including appropriate word selection, appropriate syntax, appropriate intonation, appropriate volume, and appropriate timing.). Correspondingly, addressees perfectly take the speaker's point of view as they comprehend. At the other end of the continuum, speakers' and addressees' processing is initially egocentric, suited to what is most convenient for their own processing needs. In the first moments of processing, they do not take their partners into account; it is only some milliseconds or seconds later that they are able to monitor for their partner's intentions and needs, and then adjust accordingly (Horton and Keysar, 1996; Keysar *et al.*, 1998a; Keysar *et al.*, 1998b).

Neither extreme is fully supported by the experimental evidence. Speakers have notable failures in taking their partners into account, but they also have notable successes, and on some occasions they do seem to take their partners' perspectives even in the initial moments of processing (Hanna and Tanenhaus, 2003; Nadig and Sedivy, 2002). As constraint-based models of individual processing propose, speakers

make use of many sources of information at different stages of language processing; the use of information about one's partner may simply be another constraint, one which sometimes does and sometimes does not override other sources of information.

Another twist to the findings on partner adaptation is that apparent adaptation can mask undetected conceptual misalignment. Studies of survey interviewing have demonstrated that even though respondents usually believe they understand the terms in questions, they can actually interpret ordinary words like *bedroom*, *job*, and *smoking* quite differently than survey interviewers, and quite differently from each other (Conrad and Schober, 2000; Schober and Conrad, 1997; Schober *et al.*, 2004). For example, in one study (Suessbrick *et al.*, 2000), 10% of respondents who were asked the question 'Have you smoked at least 100 cigarettes in your entire life?' changed their answer when they were given a standard definition for what should count as 'smoking' (any puffs on any tobacco cigarettes, whether or not you bought the cigarette or finished it, but no marijuana). This suggests that using the same term as one's partner does not guarantee that one is conceiving of the referent in the same way.

Nonetheless, coordinating on the use of terms in dialogue has powerful effects. In fact, large-scale linguistic conventions can result from surprisingly few coordinated acts of referring in dialogue. In a clever demonstration, Garrod and Doherty (1994) showed that 10 pairs of strangers describing routes through a maze for each other tended to come up with their own idiosyncratic description schemes. But when the pairs switched partners and carried out the task a second time, the variability reduced; by the fourth and fifth partner switches, the entire set of speakers was using the same description scheme. This melding suggests that group linguistic conventions can emerge extremely quickly, without explicit management, from adaptations by each pair in dialogue.

Levels of Description: The Individual or the Pair?

Because dialogue is an emergent creation by two individuals, there is an inherent tension in determining the appropriate level of description – whether it should focus on the individuals or the pair. It is therefore not surprising that psycholinguistic accounts have different strains that reflect these tensions. Obviously it isn't the case that one level is correct and the other isn't; they simply reflect alternative perspectives on the emergent phenomena under consideration.

One approach starts with observed dyadic phenomena and works backwards, making claims about what psychological processes must be involved (Clark, 1996). From observing dialogue in referential communication tasks, for example, Clark and Wilkes-Gibbs (1986) argued that it makes more sense to conceive of referring as a joint process involving actions by two agents than as an individual process. Rather than forming their referring expressions by minimizing their individual cognitive effort, interlocutors seem to rely on principles of 'mutual responsibility' and 'least collaborative effort.' If one party is having trouble thinking of the right word or phrase, they can rely on the other to jump in and help. If this is so, then some part of people's processing must assess relative effort, if the pair's joint effort is to be minimized.

Another proposal in this vein is that people monitor and calibrate each other's actions at multiple levels during dialogue. Any utterance functions at several levels at once: in asking a question, a speaker (a) says words in order to (b) present a signal to the addressee, in order to (c) get the addressee to recognize the question, in order to (d) get the addressee to answer the question. The addressee can fail to understand at each level of this 'action ladder' (Clark, 1996), and speakers seek evidence of success or closure at each level (see Clark [1996] for further details). The implication for individual processing is that people allocate cognitive resources and mental representations to attend to evidence of comprehension at all these levels. How exactly this sort of account fits in with existing individualist accounts of processing and representation remains to be worked out (Horton and Gerrig, 2005).

The alternate approach starts with individual psycholinguistic processes and representations, and works at figuring out how these work in dialogue (Keysar *et al.*, 2004). Following the traditions of individual psycholinguistics, this approach has tended to focus on moment-by-moment processes. A serious claim in this vein is Pickering and Garrod's (2004) argument that conceptual alignment in dialogue is the natural byproduct of individual processing. The idea is that because both parties in dialogue have highly similar language processes, they can use their own production and comprehension processes to activate representations that are functionally the same as the other person's. When one party hears a word uttered by the other, the same phonological, morphological, lexical, syntactic, semantic, and pragmatic information is activated, which automatically leads to conceptual alignment. Under this view costly additional cognitive resources for modeling the partner are unnecessary; sufficient coordination emerges from what goes on in each individual's own processes.

Although these two approaches have been placed in opposition, they may not be inherently contradictory. By emphasizing different aspects of complex phenomena, they give different parts of the picture. The time course of individual processing is just as important at the pair's joint accomplishment; focusing on successes is just as interesting as focusing on failures. Ultimately, the different levels of description will need to be integrated.

Questions and Challenges

The integration of individual and dyadic perspectives is perhaps the greatest challenge that researchers on dialogue face. Technologies like eye-tracking, which can allow greater access to individual processing during more naturalistic interaction, can help to bridge the gap. As more and more data points are collected in more and more domains – face-to-face conversations, on-line chat rooms, telephone conversations, text messaging – broader understanding of the costs and constraints of dialogue in different settings can be developed (Clark and Brennan, 1991; Whittaker, 2003) that will allow broader theories about mental processing and representations of language use in dialogue.

But substantial methodological challenges still remain. So far, much of what has been learned about dialogue has come from task-focused cooperative tasks in the laboratory. To what extent do these findings generalize to other discourse settings? On the one hand, it can be argued that as referring is one of the central components of any dialogue, findings from these studies are relevant to all dialogue; the mechanisms for coordinating on timing and conceptualization are likely to be common across many different settings. On the other hand, it can be argued that the predominance of this sort of task has led to a narrow focus on cooperative dialogue situations involving physical objects and visual co-presence, and to situations in which goals are known and agreed upon in advance. There are presumably other important psychological processes involved in other dialogue settings, and these have been relatively understudied by experimental psycholinguists. What goes on in arguments, socially charged employment interviews, negotiations, and pillow talk can have motivations beyond simple cooperation (although obviously some kind of cooperation is essential for them to continue at all), and a good deal of discourse does not revolve around physical objects that are mutually visible. Note that studies of the affective processes involved in dialogue have largely been left to social psychologists [e.g., work on empathic accuracy (Ickes, 1997), work on marital interaction and relationship success (Gottman, 1998; Gottman and Levinson, 1999)]. But cognitive and affective processes no doubt interact in important ways, and ought to be part of a full psychological theory of language use.

The facts of dialogue stretch the limits of what should be considered language use. Speakers in dialogue can treat any actions by their partners – gestures, gaze movements, physical actions, silences – as meaningful in the same way as their words, and sometimes words are replaced by nonlinguistic behaviors. Although linguistic actions deserve their own accounts, their functional equivalence to other behaviors in dialogue – and speakers' treating them as equivalent – necessarily situates a theory of language use within a theory of joint action.

Focusing on the processes and representations involved in dialogue raises fundamental questions about the processes and representations for language more generally. Is (as most linguists presume) language fundamentally individual, and processing in dialogue a special case? Or is language fundamentally dialogic and interactive, with monologue a special case? If the latter, then it becomes less clear what the study of sentences in isolation, which is at the heart of much modern linguistics, shows. If monitoring one's addressee's comprehension is a central part of language production in dialogue, then how speakers produce language in monologue is actually the more mysterious case; the question becomes what kinds of imaginary partners monologists instantiate, and how this impairs ordinary processing. Similarly, if being able to influence a speaker is a central part of comprehending in dialogue, then comprehension without the ability to influence the message (which is what psycholinguists most often study) is perhaps the more difficult task that requires special explanation.

In any case, the rigorous methods that laboratory researchers use to examine dialogue contribute a new understanding to claims about the centrality of dialogue from some disciplines (Bakhtin, 1981; Schegloff, 1991; Vygotsky, 1962) and assumptions of the peripherality of dialogue from others (Chomsky, 1965). By carefully attending to the generality of claims from case studies, by sampling stimuli and situations, and by adding new tools for measuring moment-by-moment processing, experimentalists attempt to understand the connection between the individual and the collective: how dyadic processes emerge from and shape individual processes. Rather than being a secondary enterprise that focuses on mere performance (instead of the more important competence), the experimental study of language use in dialogue may end up being central to a general understanding of language processing and representation.

See also: Computer-Mediated Communication: Cognitive Science Approach; Conversation Analysis; Pauses and Hesitations: Psycholinguistic Approach; Psycholinguistics: Overview; Spoken Language Production: Psycholinguistic Approach.

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Dictionaries are reference works designed to give information on the lexical units of a language: their spelling, pronunciation, etymology, morphology, meanings, connotations, register restrictions, collocations, syntagmatic behaviour, etc. (*see* **Lexicography: Overview**). They have several characteristics that make them useful tools for translators. Like all reference works, they are made up of independent entries, which are short concentrates of information. Those entries are arranged according to a code (traditionally alphabetical order) that is accessible to all without preparation, so that the dictionary can be consulted quickly and easily. In addition, the information contained in each entry is presented in such a way that the users normally have no difficulty finding what they need: every entry contains the same items of information, which are always ordered in the same way. What makes dictionaries special among reference works is the fact that they are linguistic tools: the entries are lexical units, the information in the

entries is about those units, not about their referents (*see* **Dictionaries and Encyclopedias: Relationship**), and the sum total of the lexical units treated in the entries is representative of the lexicon, or of a clearly identified part of the lexicon, of a language. Because of these features the dictionary of a language, imperfect as it can be, is the only means of access to the 'whole' lexicon of a language.

There are several types of dictionaries (*see* **Lexicography: Overview**): large or small, for adults or for children; with or without illustrations; monolingual or bilingual (or trilingual, etc.); general or specialized (e.g., dictionaries of phrasal verbs or etymological dictionaries); linguistic or encyclopedic, alphabetically or semantically ordered; for expression, for comprehension, or for word puzzles; in paper or in electronic form, etc.

The type of dictionary that translators use most is the bilingual dictionary, in which the information about each lexical unit is its 'equivalent' in the other language (*see* **Bilingual Lexicography**). Equivalence is difficult to achieve because languages often differ in the way they create and use their lexical units, so that two equivalents are rarely 'equal' in meaning, connotation, usage, etc. (*see* **Translational Equivalence**). Translators also use monolingual dictionaries, where they can find items that are absent from bilingual dictionaries, such as definitions, literary quotations, and encyclopedic information.

The dictionaries used by translators must be accurate, reliable, extensive, and user-friendly. In terms of user-friendliness, extensiveness, rapidity, and ease of consultation, dictionaries are often inferior to other sources of information, such as search engines on the Internet. However, nothing can replace dictionaries as thesauruses of the linguistic 'norm': translators can use the word list of the dictionary to make sure that a lexical unit is 'part' of a language or a variety of language – even though the absence of a unit does not mean much. Also, they can use the contents of the entries to verify that the meaning, the connotation, the collocations, etc. of a lexical unit are what is accepted as normal by the community of the users of that language. Faith in the dictionary as guardian of the norm must not be exaggerated – after all, dictionaries are only human artifacts – but it should not be underestimated either: there is so much work put into a dictionary by a highly skilled team of lexicographers that it necessarily encapsulates more knowledge about the language than any other source. Dictionaries are arbiters of usage, to an extent that often goes even beyond the intent of the lexicographer.

One of the main defects of the dictionary, paper or electronic, is a consequence of the amount of work put into it: the dictionary text takes so much time and care to compile that it can never be as up-to-date as the translator would like it to be. It takes a while to accept a neologism, for example, and neologisms are precisely what translators are most likely to need help on. Other imperfections of the dictionary are consequences of our dictionary traditions. Bilingual dictionaries traditionally have no pictures and no definitions, which makes them useful only to people who bring with them, at the time of consultation, enough knowledge of the meaning of the source-language unit or of the target-language unit. Also, the traditional dictionary text, concerned above all to give as much information as possible in as little space as possible, tends to remain allusive and not to comment explicity on the information it gives. For example, it does not differentiate clearly between synonyms or between frequent and infrequent words, even *hapax legomena*. Finally, dictionaries have traditionally been content with representing linguistic facts by means of a discourse that is strictly linear, thus failing to represent the intricacies of language; for example, polysemy.

Modern dictionaries have been steadily improving: They now make use of corpora to indicate frequencies and various facts about actual usage that were hitherto unknown or not given, and they tend to do away with the more obscure coding traditions. Electronic dictionaries are incomparably easier to use; they allow consultations that are impossible with paper dictionaries, and they have begun to use multidimensional means, such as charts and video illustrations. Of course, dictionaries still fall short of representing all the complexities of a language: there are many aspects of the syntax and usage that no one is yet in a position to describe.

See also: Bilingual Lexicography; Dictionaries and Encyclopedias: Relationship; Lexicography: Overview; Lexicology; Translational Equivalence.

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assume that, because many proper names are shared by different name-bearers, there must be a stock of proper names located either partially or wholly in the dictionary);

c. explaining the formation of the verb *bowdlerize* from the proper name *Bowdler*;

d. making and understanding statements like

(1) Caspar Cazzo is no Pavarotti!

(2) Harry's boss is a bloody little Hitler!

(1) implies that Caspar is not a great singer; we infer this because Pavarotti's salient characteristic is that he is a great singer. (2) is abusive because of the encyclopedic entry for the name *Hitler*. Such comparisons draw on biodata that is appropriate in an encyclopedia entry for the person who is the standard for comparison but not a dictionary, which should identify the characteristics of the typical name-bearer, but not (contra Frege, 1892) any particular name bearer – any more than the dictionary entry for *dog* should be restricted to a whippet or poodle rather than the genus as a whole). Nonetheless, (3) is quoted from *Collins English Dictionary* (the name Pavarotti is not to be found, although it is in Pearsall, 1998).

(3) **Hitler** (ˈhɪtlə) *n*. **1. Adolf** (ˈædɔlf). 1889–1945, German dictator born in Austria. After becoming president of the National Socialist German Workers' Party (Nazi Party), he attempted to overthrow the government of Bavaria (1923). While in prison he wrote *Mein Kampf*, expressing his philosophy of the superiority of the Aryan race, and the inferiority of the Jews. He was appointed chancellor of Germany (1933), transforming it from a democratic republic into the totalitarian Third Reich, of which he became Führer in 1934. He established concentration camps to exterminate the Jews, rearmed the Rhineland (1936), annexed Austria (1938) and Czechoslovakia, and invaded Poland (1939), which precipitated World War II. He committed suicide. **2.** a person who displays dictatorial characteristics.

Strictly speaking, the information under **1** is encyclopedic; that under **2** is proper to a dictionary – a fact recognized in Hanks (1979). We see that, for practical purposes, lexicographers do not consistently distinguish the two.

Some people would regard (3)**1** as prejudiced. Yet the prejudices of language users are just as relevant to a proper account of language understanding as the true facts. Should the dictionary and encyclopedia institutionalize the mainstream stereotype at some index (time and world)? Both dictionary and encyclopedia need an archiving device to facilitate information incrementation and updating. Should the dictionary contain every word in the language and the encyclopedia contain exhaustive information on all branches of knowledge, or should both be modular, rather like a collection of human minds? For instance, a medic's dictionary is full of medical jargon and a medic's encyclopedia contains medical knowledge unknown to the average patient; a botanist knows more about plants than I do and has the dictionary to talk about that knowledge; and so forth through the community for different interest groups. Even if the common core of a dictionary and an encyclopedia can be identified, they will have to be connected to specialist modules with jargon dictionaries and specialist encyclopedias. Multiple dictionaries and encyclopedias would model individual human capacities and divide data and processing into manageable chunks.

Individuals in a community will have different mental encyclopedias comprehending partially different information (cf. Katz, 1977; Murphy, 2000). Suppose I say:

(4) I know four Annas.

There is no requirement that you know, or even know of, any of the Annas referred to. It does, however, call for lexical knowledge about the name *Anna*, because you will understand 'Speaker knows four female human beings each of whom is called *Anna*.' By contrast, I can only appropriately utter (5) to someone (whom I believe) able to identify further facts about the person spoken of because we have partially coincidental encyclopedia entries for the intended referent that are sufficient to establish common ground.

(5) I had an email from Anna yesterday.

The encyclopedia entry for *Aristotle* would be a refined version of (6) – in which numbers are addresses; f = formal, e = encyclopedic, s = semantic specifications. Entry $_{s^{e703}}$ is the kind of entry that an individual person might have in their mental encyclopedia; but clearly does not belong in a published encyclopedia.

(6) $_{f500,f^{e500}}$ **Aristotle** / ˈærɪstɒtl/
$_{f500}$N$_{s600}$
$_{s600}$ "bearer of the name $_{f500}$*Aristotle*, normally a male"$_{s^{e701–3}}$
$_{f^{e500}}$ Derived from Greek; *Αριστοτέλης*
$_{s^{e701}}$ – Ancient Greek philosopher, born in Stagira in C4 BCE. Author of *The Categories, On Interpretation, On Poetry* . . . Pupil of Plato and teacher of Alexander the Great . . . etc.

$_{se702}$ – **Onassis**, C20 CE Greek shipping magnate . . . etc.

$_{se703}$ – **Papadopoulos**, friend whose phone number is 018 111 . . . etc.

Combined (idealized) dictionary-encyclopedia entries should be networked as shown in Figure 1. The entry for Aristotle is sketched in Figure 2.

For simplicity's sake much requisite cross referencing is omitted from Figure 2: there is no encyclopedic information on N included, none on Ancient Greek philosophers, poetry, Stagira, Plato, etc. Further complexity would result from there being more than one encyclopedia or if a single encyclopedia is divided into cross-referenced modules. Strictly speaking, the information at $_{se701–703}$ in the encyclopedia is not of the kind that anyone should expect to find in a dictionary because it is not lexicographical information about a name in the language. However, as we have seen, practical lexicography does allow encyclopedic information about particular name-bearers into dictionaries. Similarly for information about things, whether natural kinds such as gold and dogs, or unnatural kinds such as polyester and computers. The whole encyclopedia entry can be accessed through part of the information in it, enabling the associated listeme and further information about the referent to be retrieved.

If given names are included in the dictionary, presumably the English dictionary lists such common family names as *Smith* and *Jones* with an entry such as 'bearer of the name *Smith*, normally a family name.' This recognizes that some names typically occur as family names and are retained in memory as such. Should exotic foreign family names such as *Sanchez, Papadopoulos*, and *Wong* have any entry in an English dictionary? Native speakers of English readily recognize some names as Scottish, or Welsh, or Cornish, or Jewish; and immigrants to an English-speaking country who wish to assimilate sometimes Anglicize their names: e.g., *Piekarsky* becomes *Parkes*, *Klein* becomes *Clyne*. So it seems that even family names have lexical properties. *Papadopoulos* should be tagged as originally a Greek name, and *Wong* Chinese. Once again, there exist desk-top dictionaries of first names and of surnames, e.g., Hanks and Hodges (1988, 1990), Hanks (2003), which include etymological data and information about place of origin. Barnhart (1954) has purely encyclopedic knowledge about name-bearers. Here is evidence for the modularity of information in dictionaries and encyclopedias.

Although the family name offers a clue to the bearer's ancestry, it gives no guarantee of it being a fact. This reflects a general truth about proper names which distinguishes them from common names: whereas one sense of the common name *cat* necessarily names something animal, the proper name *Martha* only probably names a female – a fact recorded in the dictionary. Unusual names such as *If-Christ-Had-Not-Died-For-You-You-Had-Been-Damned* or *Yahoo Serious* would presumably have empty dictionary entries leading directly to encyclopedic entries. However, like topographical names beginning *Mount* or *River*, these are interpreted via the dictionary as multiword listemes. Once the component meanings are assembled and an interpretation (or partial interpretation) determined for the name, a matching encyclopedia entry is sought and, if none already exists, a new entry is created. Where Hearer encounters a new proper name, a dictionary entry is established on the basis of its formal and syntactic characteristics, and any sense that is assigned to the dictionary entry derives from encyclopedic information about the name-bearer. The meanings of 'content words' – nouns, verbs, adjectives, adverbs – are influenced by the things that they denote and the circumstances in which the words are used. That is, semantic

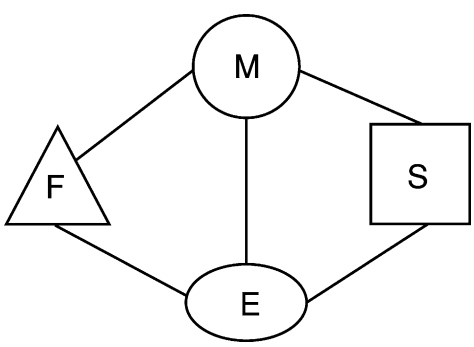

Figure 1 Networked components of the lexicon with the encyclopedia. Formal data, F, in the triangle, morphosyntactic data in the circle, semantic data in the rectangle, and encyclopedic data in the ellipse.

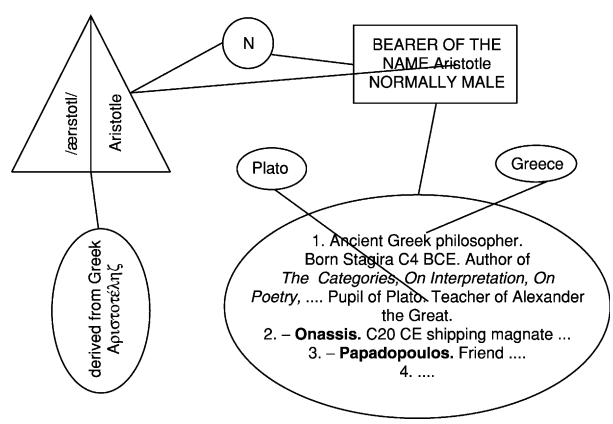

Figure 2 Networked fragment of the combined lexicon-encyclopedia entry for Aristotle.

information in a large part of the dictionary is distilled from encyclopedic information about the salient characteristics of typical denotata. It is this information from which the senses of isomorphic listemes are abstracted. Such abstraction from particulars is evident in the ontogenetic development of listemes by children. Clark (1973) reports a child's extension of *bird* to any moving creature (sparrows, cows, dogs, cats), *moon* to any round object, *bow-wow* to things that are bright, reflective and round (based on the dog's eyes) such as a fur piece with glass eyes, pearl buttons, cuff links, a bath thermometer. The same process operates when adults encounter a new name or a new use for a name. The idealized model of the encyclopedia and dictionary necessitates a heuristic updating facility of this kind. Suppose that Z has only ever encountered female bearers of the name *Beryl*, so that the semantic specification in Z's dictionary entry is "bearer of the name *Beryl*, normally a female." If Z comes across the name *Beryl* used of a man, not only is Z's encyclopedia expanded, but also Z's mental dictionary entry will be updated to 'bearer of the name *Beryl*, normally a female, but attested for a male.'

Strictly speaking, a dictionary is the part of an encyclopedia which stores information about the formal, morphosyntactic, and semantic specifications of listemes; for other views, see Boguraev and Briscoe (1989), Butterfield (2003), Hanks (1998, 2003), Hüllen and Schulze (1988), Jackendoff (1975, 1995, 1997), Lyons (1977), Mel'cuk (1992), and Pearsall (1998). Etymological and stylistic information are not strictly a part of the dictionary but encyclopedic data; this hardly matters if we assume that lexical information is just one kind of encyclopedic information, and that the encyclopedia is a general knowledge base of which the dictionary is a proper part. However, in practice, desktop dictionaries often include some encyclopedic information, although desktop encyclopedias do not seem to encroach on lexicography.

See also: Cognitive Semantics; Definition; Dynamic Semantics; Formal Semantics; Frame Semantics; Lexical Conceptual Structure; Lexicography: Overview; Lexicography: Overview; Lexicon, Generative; Lexicon: Structure; Metalanguage versus Object Language; Natural Semantic Metalanguage; Proper Names: Semantic Aspects; Prototype Semantics; Stereotype Semantics.

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Dictionaries and Inflectional Morphology

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Introduction

Modern lexicography considers dictionaries to be tools that are, or should be, conceived to assist a specific group of users in solving problems related to specific types of extra-lexicographic user situations. Any theory-based dictionary concept or criticism should therefore be based on a profound knowledge of the users' characteristics, the situations of use, and the specific type of problems that might arise for this type of user and situation. This means that a discussion of any particular lexicographic problem, such as the treatment of inflectional morphology in dictionaries, should take its users' needs as its point of departure. Accordingly, the incorporation or not of lexicographic data on inflectional morphology and the treatment of this data in dictionaries depends basically on the characteristics of the users, including whether or not they are mother-tongue or foreign-language speakers, and on the relevant extra-lexicographic user situations, including text reception, text production, translation, and the study of the language in question. This is the main reason lexicography differs from linguistics and constitutes itself as an independent scientific theory. The differentiated treatment of a lexicographic problem for users with different characteristics is normally a question of graduality, so the following discussion will be structured according to the four main user situations.

Inflectional Morphology in Terms of Text Reception

When any person has a problem understanding a given text, he or she might consult a dictionary for help. Problems in terms of inflectional morphology arise when users don't recognize a specific inflectional form, and also if they don't understand it, as is sometimes the case for foreign-language students, for example. In both situations consulting a dictionary could be useful if the dictionary is designed to solve these specific problems, but the way the lexicographic data is presented will be different.

The first kind of problem, failure to recognize an inflectional form in a given text, will normally occur when the inflectional form is irregular or unexpected. In order to solve this type of problem, the dictionary must provide access to the basic word form, which can be done by including irregular and unexpected inflectional forms in the word list as reference lemmata that refer the users to the basic word form or entry, where all relevant data on the word is given. To ensure that users have in fact arrived at the right entry, it is useful if the irregular or unexpected inflectional form is repeated there.

The second kind of problem, when users don't understand a specific inflectional form, such as the German subjunctive verb form or one of the two Spanish past tenses, will normally occur in the

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process of foreign-language learning. In this case, it is necessary to provide the above-mentioned data and also to explain the meaning of the specific inflectional forms. This, however, would normally not be done in the framework of individual dictionary entries as it would lead to an unnecessary repetition of the explanatory data and a very complex dictionary structure. Hence, if a dictionary provides for this kind of reception problem the explanatory data will normally be concentrated in a special section. In this respect, dictionaries might consist of different functional parts. The only compulsory part is the central word list, but apart from this, components such as a special dictionary grammar may be placed in the front or back matter of the dictionary and related to the central word list through a system of cross-references. This kind of grammar is essential when discussing the treatment of inflectional morphology in dictionaries and it is the only reasonable place to explain the meaning of the various forms of the inflectional paradigm.

Inflectional Morphology in Terms of Text Production

The selection and presentation of inflectional data for text production is different from text reception. In this case, it is assumed that the people producing a text already know the words they want to use but that they might not know the inflectional paradigm or feel completely sure about a particular inflectional form. In this case, there is no reason inflectional forms should be placed in the central word list.

Normally, inflectional forms are treated in individual entries or accessed from them. For quick accessibility it would be better to treat inflectional forms directly in the individual entries, but as this practice demands a lot of space, cross-references to the dictionary grammar are often used in printed dictionaries, and some scholars for didactic reasons even recommend that only irregular inflectional forms should be treated in the individual entries while the regular patterns should be presented in a separate grammar. But such decisions, apart from space and didactic approach, also depend on the characteristics of the inflectional paradigm in question. For example, if the total inflectional paradigm consists of only a few forms, whether regular or irregular, these can easily be treated in the individual entries. If the paradigm consists of a huge number of forms but only a few irregular forms, for example the Spanish verbal inflectional paradigm, the latter could be treated in the entry while the regular forms could be accessed through a reference to the regular inflectional paradigm in the dictionary grammar.

Various languages include inflectional paradigms with variants that compete with each other. If such inflectional variants can be presented as equal terms there may be no problems with text reception, but text production can give rise to a number of problems. If the dictionary provides two or more competing variants, then the users would have to choose the one to use. If the variants have the same frequency and usage, this actually constitutes no great problem, although it makes the dictionary consultation more complex. However, if one of the variants is rare or even old-fashioned, it could create serious problems for users if they are not told that this is the case. Any good dictionary for text production therefore furnishes recommendations in order to assist users in choosing the more adequate variant, and some dictionaries, such as foreign-language learners' dictionaries, even ignore the less frequent variants and only provide the recommended ones.

Inflectional Morphology in Terms of Translation

Apart from the transmission phase, which is not relevant for the treatment of inflectional data, the translation process consists of a reception phase, where the source-language text is read and understood, and a production phase, where the target-language text is produced. This means that the problem of regarding the lexicographic treatment of inflectional data in terms of translation presents itself as a combination of problems with reception and production.

During the reception phase, users may not know how to relate irregular or unexpected inflectional forms to the basic form. These forms should be included in the word list with a reference to the basic form, where they should be repeated in order to assure users that they have arrived at the right entry. Some users may not understand a specific inflected form, in which case the dictionary could include a separate dictionary grammar where the inflectional forms are explained. In the production phase, users may not know how to inflect a given word, and the corresponding lexicographic data should be given either in the entry or in the dictionary grammar. However, for the sake of text reception, irregular or unexpected inflectional forms should be included in the entries and the whole inflectional paradigm should be presented in a separate dictionary grammar. This makes it easy to combine the users' needs in

both the reception and production phases within the overall translation process.

Inflectional Morphology in Terms of Language Study

In cases where users need to raise their knowledge about a given language and its inflectional paradigms, for example during the language-learning process, consulting dictionaries can also be very useful. Although traditional grammars frequently satisfy this kind of need, and with good results, dictionaries still have some advantages compared with traditional grammars. While grammars normally deal with general problems and only provide a few illustrative examples of specific words, dictionaries can combine the general with the particular for each and every word. This is due to their special ways of structuring the data and especially the ways the data can be accessed. Data on inflectional morphology, for example, can be placed both in a separate dictionary grammar, in the individual entries of a word list, and in special reference entries (reference lemmata). Cross-references can be given from the reference lemmata to the individual entries, from the individual entries to the dictionary grammar, and from this back to the individual entries, thus relating all the inflectional data included anywhere in the dictionary and accessing them in various ways and from different positions.

Polyfunctional Dictionaries

In real life, dictionaries are seldom conceived with only one function, i.e., to solve problems that a specific type of user might have in a specific type of user situation. Normally, they are conceived and produced as polyfunctional dictionaries that can satisfy the needs of various types of users in various types of situations. As we have seen, the lexicographic treatment of inflectional morphology in terms of users with different characteristics, such as different mother tongues, is a question of graduality that can be solved quite easily by including the data necessary for most users. The same applies to differing user situations. As with translation dictionaries, the data related to the production and the reception phases can be combined, although it should be mentioned that this sort of combination sometimes results in a disadvantage to the less-demanding user who might find the search for the relevant data more difficult; but this should be considered a minor problem.

Printed Versus Electronic Dictionaries

The question of space and the possible inconvenience of including superfluous data for some users in specific situations is mainly relevant for printed dictionaries. Electronic dictionaries have fewer space constraints, and thus can include all the lexicographic data on inflectional morphology and at the same time provide differentiated search and access methods adapted to the needs of the particular user.

Conclusions

This article has presented the ideas and recommendations of modern lexicographic theory in terms of inflectional morphology. It should, however, be stressed that dictionary practice frequently differs quite a lot from these ideas, because many dictionaries, due to tradition or for other reasons, don't consider the specific needs of various types of users in different user situations. This ongoing schism between lexicographic theory and practice may provide the most precise characterization of the state of the art in dictionaries and their treatment of inflectional morphology.

See also: Dictionaries and Word Formation.

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Dictionaries and Word Formation

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Lexicography Is Not a Linguistic Discipline

Linguists usually regard lexicography as a linguistic discipline, sometimes as part of applied linguistics, sometimes as part of lexicology. This view is not shared in this article. This is not a denial of the fact that many linguists write about dictionaries or are themselves authors of dictionaries. But the same thing applies to biologists, physicians, and almost every other academic and nonacademic colleague. It would be just as odd to say that lexicography, like linguistics, is part of the science of biology or, much more surprisingly, that a biologist becomes a linguist once he is involved in dictionary work in his field. In every case, the lexicographer uses his scientific knowledge or makes special research when preparing a dictionary. The important argument is that the most important lexicographic considerations are not part of linguistics or biology, e.g., user surveys, dictionary structures, dictionary layout, or design. Naturally, this does not mean that a lexicographer should not make use of biological or linguistic theories. The important argument is that lexicographers – who are usually linguists – working with communicative-oriented or knowledge-oriented dictionaries about language are recommended not to begin with the choice of the right linguistic theory, in this case a theory of word formation. Instead, the starting point ought to be theories and considerations about the need for information of the intended users (*see* **Dictionaries and Inflectional Morphology** on dictionary functions). Depending on the functions, the dictionary is designed to fulfill the choice of a certain linguistic theory. The chronological order for lexicographic work proposed by many linguists, e.g., Burgschmidt (2004), is not suitable.

This does not mean that you must take every reference to user needs on the back page of a dictionary at face value. Every dictionary praises itself as being user-friendly, but this is often just an advertising gimmick to increase interest in the product or the result of speculations. You find similar contributions without any real knowledge of user needs and user habits from linguists, for example:

> "Thus, Dutch handappel 'eating apple' should be listed under *appel*, not under *hand*, because language users know that the word *handappel* stands for a subset of apple, not of hands, and will look for this word under the heading for *appel*." (Booij, 2003: 254)

From a linguistic point of view the argument might be correct, but you cannot be sure that the intended user is thinking in the exact same way. And much more important is that you should not make any lexicographic choices without considering the intended dictionary functions. If you have a text reception problem, you do not understand the word *handappel*; it is difficult to look up both under the headings for *hand* or *appel*. You need the individual entry word (lemma) *handappel* or hyphenated lemmas with *hand-* and/or *-appel*, in order to find help in solving the reception problem. If you have a text production problem, you do not know which word formation to use when explaining the meaning of 'an apple for eating.' Naturally, you would try under *apple* and never under *hand*, because you do not know the word. But if the dictionary only mentions this word formation as a naked item under the lemma *apple*, you still cannot be sure if this word has the exact meaning of the equivalent that you are looking for. If you use a bilingual dictionary for translating the word *handappel* into German, the word has to be found in the lemma list with a German equivalent. If this is not the case, there are other possibilities with a word formation item which contains an equivalent under *hand* or *appel* or both. It is more helpful to have the information in both entries, because you cannot know where the user will look in the first place. For knowledge-related dictionary functions, the solution should be a combination of all the possibilities mentioned above. In addition, it is especially important to have an integrated dictionary grammar of its own containing a chapter about word formation.

Word Formation Items as a Tool to Assist Text Reception Problems

The example *handappel* is in some way typical, because most frequently used word formations have a special meaning that is to be understood in such a way that the word A + B + C cannot be said to have the exact same meaning as the meaning of the morphemes A and B and C put together. In other cases, you can have a regularly composed word like that, but this does not mean that you do not have to say anything about such word formations in dictionaries. There are different kinds of word formation information in different places in the dictionary. First of all, you have implicit information about word formation if this is selected for the lemma list, e.g., in a German paper dictionary with a straight-alphabetical macrostructure:

(1) *Beamtenabbau*
'reduction of administrative staff'
(2) *Beamtenanwärter*
'candidate for a civil service position'
(3) *Beamtenapparat*
'civil service machinery'
(dictionary entries (1–3) from a German monolingual dictionary)

The selection of word formations for the lemma list is the most important and best way of solving reception problems in paper and electronic dictionaries. If the dictionary contains the word needed, the user will stand a good chance of solving his problem: The more lemmas, the better for using the dictionary as a tool to solve reception problems. This is also the case, but not quite so informatively, in a nest-alphabetical dictionary where only some but not all lemmas have a lexicographic explanation to the hyphenate lemma:

(4) ***Beamten-: -abbau**, der; **-anwärter**, der Anwärter auf eine Beamtenstelle*
'candidate for a civil service position'; **-apparat,** das [. . ..]
(dictionary entry (4) from a German monolingual dictionary)

This dictionary cannot help the user with reception problems in those cases where no explanation is offered. Here, the user is being helped with production problems, but only if he already knows the meaning of the word and wants to make sure that his assumption is correct. The same argument can be used for the so-called word formation items in the entry. Here, you normally have a cumulative list of word formations following a sign for the initial word formation items containing the lemma sign as part of the item:

(5) **Beamte**
'civil servant' . . .
• Beamtenabbau, -anwärter, -apparat . . .
(dictionary entry (5) from a German monolingual dictionary)

This kind of dictionary entry is not helpful in solving reception problems, because you do not find any kind of explanation. In every dictionary review the lemma list is nearly always criticized and sometimes also the word formation items, but in the end no dictionary can contain every single word in the object language. Therefore, you find lemmatized suffixes with information about the typical use of words containing this suffix (see dictionary entries 8 and 9 below). In that case, however, they do not offer any exact information, because the user cannot be sure that the word which he does not understand is formed in the systematic way explained in the entry.

Word Formation Items as a Tool to Solve Text Production Problems

All the arguments in favor of including many word formations in order to help solve reception problems are also valid in terms of production problems. But here the use of a cumulative list of unexplained word formations with the lemma sign can be useful for the native speaker who only wants to know that the word formation exists and how it is spelled or whether it is used with a linking morpheme or not. In the latter case you often have variants for which it is not sufficient to give information about the existence of variants. Instead, the user needs a recommendation for making his choice. At best, this can be done through a simple reference to the recommended word, for example:

(6) *blyant* NOUN • . . . blyantsholder [this spelling with -s- is unusual and not recommended], blyantholder
(dictionary entry (6) from a Danish monolingual dictionary; Danish *blyant*: English 'pencil,' Danish *blyantholder*: English 'pencil holder')

Such word formation items are important if the formation is irregular or somehow not predictable. This is often the case with nouns for people living in a country or a town or adjectives for something belonging to that part of the world. The user knows the name of the town or the country, but not the related noun or adjective, for example:

(7) *Ribe* NOUN • . . . ripenser, ripensisk
(dictionary entry (7) from a Danish monolingual dictionary; *Ribe* is a Danish town in Southern Jutland; a *ripenser* is someone from Ribe, *ripensisk* is from Ribe)

It is not sufficient to include those word formations as own lemmas, because the user will only find this lemma if he knows how it is formed. And that was the piece of information which he wanted to find.

Word Formation Items as a Tool to Solve Translation Problems

In modern dictionaries, you find hyphenated lemmas, which mean parts of words, stems, or affixes. Such lemmas are – as mentioned above – useful for solving production problems, and they offer some help in solving reception problems if the dictionary does not contain the word needed as an independent lemma. Much more rarely, such hyphenated lemmas are found in bilingual dictionaries, as in the following entry from a bilingual Malagasy–German dictionary for Malagasy users as the primary user group.

Therefore, it is necessary to use Malagasy and not German as an explanation language. The secondary user group, the Germans, understand German and do not need an explanation. They need an equivalent of the lemmatized word containing this suffix:

(8) *-los* tsirinteny atovana entimamorona sampanteny mpamaritoetra ary midika tsy fisian'ilay zavatra voalaza ao amin'ny teny fototra; sady mety noraiana no tsy norariana koa, oh.: *ärmellos* tsy misy tanany; *bartlos* tsy misy volombava
(dictionary entry (8) from a German–Malagasy bilingual dictionary)
-los Adjectives are formed by adding this suffix. The adjectives ending in *-los* stand for a missing object or matter. It can be a desired or an unwanted attribute, e.g.: *ärmellos*: sleeveless; *bartlos*: beardless.
(dictionary entry (8) from a German–Malagasy bilingual dictionary in translation)

The most important lexicographic help for translating problems is of course to select many word formations as lemmas. This is more important in a bilingual dictionary with lemmas in the native language (a L1→L2 dictionary) than in a L2→L1 dictionary, because the user has a better chance of guessing the equivalent in his own language.

Word Formation Items as Part of a Knowledge Bank

With the same two languages, the following entry from the Malagasy–German dictionaries has an important prefix, here explained in German, because the primary user group knows the function of this prefix. Note particularly here the reference to a dictionary grammar, i.e., a dictionary grammar written in both languages as part of the dictionary:

(9) *-a* verbal morpheme which is added to a word stem with two different functions
(a) used for forming action (agisive) verbs, e.g., adaboka (give up) → §1.5.4
(b) used for forming instrumental verbs, e.g., aharatra (shave) → §1.5.6
(dictionary entry (9) from a Malagasy–German bilingual dictionary in translation)

This use of a dictionary grammar as an integrated part of the dictionary with references from the dictionary entries to the grammar is rarely found. It would be a good idea if future dictionaries used this kind of lexicographic practice. A dictionary grammar – connected to the individual entries – is also a suggestion which could be adopted by dictionaries that are intended to be used as knowledge handbooks, if the user wants to know more about the language or some individual elements of the language. This is especially relevant to dictionaries intended for language learners.

See also: Bilingual Lexicography; Dictionaries and Inflectional Morphology; Lexicography: Overview.

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Diderot, Denis (1713–1784)

D Baggioni

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Denis Diderot, French writer and philosopher, is well known as the indefatigable editor of the *Encyclopédie* (*Dictionnaire raisonné des sciences et des arts*, 1750–1769).

Diderot, son of a factory manager, was born on October 5, 1713 in Langres, France. He received a good education in the Jesuit college of Langres; he then studied humanities in Paris in order to become a priest – he received his Master of Arts degree in 1732 – but renounced this career to pursue varied literary works including the translation of philosophy from English to French and the writing of more or less scandalous fiction challenging moral religious laws. This attracted the attention of some printers who asked him to translate Chambers' *Cyclopedia*, ancestor of the *Encyclopedia Britannica*. The philosopher devoted himself almost entirely to this great venture (collaborating with d'Alembert up until 1758); nonetheless, he managed to have enough time to write personal works, which often remained unpublished, such as essays, dramas, novels, art criticism, and correspondence, half literary, half philosophical, the importance of which has been appreciated only lately (Proust, 1982; Fontenay, 1984). The 'philosophe' died, in Paris, on July 30, 1784.

Diderot's contribution to the linguistic sciences is hard to separate from his encyclopedical and literary works, for example, Diderot, 1751b, 1751c, 1753–1754, and 1755. Among them one can trace the main ideas of a linguistic thought at the same time very close to and very different from that of the '*grammairiens-philosophes*' of that time. One can easily notice contradictions in his rich and diverse work, and can contrast the ideal of linguistic stability evoked in his article 'Encyclopédie' with the exalted praise of universal change in things and beings constantly developed in his philosophical writings. However, with the background of Locke's ideas on language, as known in France through their sensualist interpretation by Condillac (*see* **Locke, John (1632–1704); Condillac, Etienne Bonnot de (1714–1780)**), Diderot puts the emphasis on the idea of *continuity*, with the continuity in the chain of beings passing from molecule to universe through the human being, for whom a privileged place is reserved, and, on the other hand, historic, social, and geographic continuity, in which human speech is made a changing reality reflected in the physical continuum produced by human speech organs. Some linguists maintain that this 'continuist' conception anticipated the historic and comparative views of 19th century linguistics.

See also: Condillac, Etienne Bonnot de (1714–1780); Encyclopédie; Lexicology; Locke, John (1632–1704).

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Diez, Friedrich (1794–1876)

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Friedrich Diez studied classical philology and modern languages and literatures in his hometown, Giessen (1811–1816), and in Göttingen (1816–1818), and first worked as a librarian in Darmstadt and as a private preceptor in Utrecht. Influenced by Romanticism, Diez's first love was literature, especially poetry. He translated Byron, Scott, and some of the medieval Romance poetical works, and his translator's activity brought him to the study of literary history (*Literaturgeschichte*). To this subject, which until then had been the object of a purely esthetic approach, Diez wanted to give a scientific status. In 1821 he obtained his Ph.D. in Giessen and in 1822 his *Habilitation* in Bonn, where he was appointed as lecturer and later professor of medieval and modern languages and literatures. He remained in Bonn for the rest of his life; he died on May 9, 1876.

Diez lectured on both Romance and Germanic topics, teaching classes on Gothic, Old High German, medieval German love poetry, etc., but he is regarded as the founding father of Romance philology. Encouraged by Goethe, and in the footsteps of F. J. M. Raynouard, he studied Old Provençal language and literature, especially the poetry of the troubadours; he also edited medieval Romance texts of various linguistic areas: Gallo-Romance, Italo-Romance, and Ibero-Romance. He gradually concentrated his efforts on comparative Romance linguistics, publishing between 1835 and 1855 two pioneering works that constitute the foundation of historical-comparative Romance linguistics: the three-volume *Grammatik der romanischen Sprachen* (1836–1844) and an etymological dictionary of the Romance languages (1853). The latter work was updated and revised by Diez throughout the third quarter of the 19th century, and the fifth and last edition (1887) was revised by A. Scheler.

Diez's main achievement lies in the rigorous application of the historical-comparative approach, elaborated by Bopp and Grimm, to the exceptionally gratifying field of Romance languages. In his comparative work Diez dealt with the phonetics/phonology, morphology, and syntax of six Romance languages: French, Provençal, Spanish, Italian, Portuguese, and Romanian. With the exception of the once culturally very important Provençal language, all of these were already or were to become 'national' languages in the 19th century. However, Diez sporadically took into account Catalan (grouped with Provençal on historical-cultural grounds) and Sardinian (grouped with Italian), and he also referred to the Romansh (*Churwälsch* or *rumantsch*) variety of the Grisons canton in Switzerland, the scientific study of which began in Diez's lifetime. Clearly, Diez gave more weight to politically and culturally important languages, regarding other varieties as not sufficiently original or autonomous. Diez's etymological work is characterized by the strict application of what he himself calls the "critical method" (*kritische Methode*), i.e., the rigorous application of sound laws and the apparatus of historical-comparative grammar (mainly its phonological component).

A poor communicator with a somewhat melancholic nature, Diez exerted his influence through his writings and through his institutional prestige as the founding father of Romance linguistics; some of the later leaders of Romance research studied with Diez in Bonn, including Hugo Schuchardt, Gaston Paris, and Adolf Tobler. His two main works in the field of Romance linguistics not only offered the first scientifically reliable synthesis in comparative grammar and etymology; they also pointed to problems and topics that remained to be studied in more depth. His comparative grammar does not treat word derivation, but this topic is dealt with in Diez's last work on word formation (1875), perhaps his most original contribution to Romance linguistics.

See also: Bopp, Franz (1791–1867); Grimm, Jacob Ludwig Carl (1785–1863); Schuchardt, Hugo (1842-1927); Tobler, Adolf (1835–1910).

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Diffusion and Perfusion Imaging

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The classic method of identifying brain/language relationships is to identify brain-damaged patients with impairment in a particular language task (e.g., word comprehension), and then to determine the site of damage common to those patients by autopsy or structural imaging. It is reasoned that the area of the brain most commonly damaged among patients with the impaired language task must be the area responsible for the task that was disrupted. This reasoning seems straightforward. However, a limitation of this lesion/deficit methodology is that structural imaging and autopsy do not always reveal the entire region of the brain that is dysfunctional and that may contribute to the impairment. That is, strokes are often surrounded by hypoperfused tissue getting enough blood to survive, but not enough to function, which may cause language deficits. However, it is now possible to identify dysfunctional regions of brain that may be responsible for particular language impairments, using imaging that reveals both infarct and regions of low blood flow. While position emission tomography (PET) imaging is the current 'gold standard' for identifying dysfunctional brain tissue, it has drawbacks, including high expense, exposure to radiation, and a relatively long duration of the scan. Recent advances in magnetic resonance imaging (MRI), including dynamic contrast perfusion-weighted imaging (PWI) and arterial spin labeling (ASL) perfusion imaging, permit rapid identification of regions of low blood flow without exposure to radiation. In the same scanning session, diffusion-weighted imaging (DWI) can identify regions of dense ischemia or infarct that are unlikely to survive. DWI reveals areas of reduced diffusion associated with cytotoxic edema in acute stroke. Together with conventional MRI scans that reveal areas of old stroke or other brain damage, DWI and PWI may reveal the entire area of dysfunctional brain in the first hours after onset of stroke, allowing one to identify regions critical for specific functions before reorganization or therapy after stroke. This article will illustrate how such imaging can be used to evaluate the neural basis for language.

Dynamic Contrast Perfusion-Weighted Imaging

Dynamic contrast PWI requires intravenous injection of a bolus of contrast material (gadolinium). Images taken in rapid succession track the flow of contrast material in the brain. A variety of brain maps can be reconstructed that reveal different hemodynamic measures. These reconstructions include: (1) time-to-peak (TTP) maps, which show the peak arrival time of gadolinium in each voxel of the image; (2) mean-time-to-transit (MTT) maps, which show the mean time between arrival and clearance of the contrast material in each voxel; (3) cerebral blood volume (CBV) maps, which show the amount of gadolinium in each voxel between arrival and clearance; and (4) cerebral blood flow (CBF) maps, which estimate the rate of blood flow in each voxel. Most of the studies described in this article that utilize PWI have identified areas of relative hypoperfusion using TTP maps (defining hypoperfusion as more than 2.5 s delay in TTP, relative to the homologous region in the intact hemisphere). This approach has been demonstrated to reveal neural areas that are dysfunctional. However, other approaches (e.g., using MTT) may be equally useful for defining regions of dysfunctional tissue, while still others (e.g., use of CBV or CBF maps) may be better at revealing regions of the brain that will ultimately succumb to infarction in acute stroke.

Use of PWI and DWI to Identify Neural Bases of Lexical Processing

Neural regions of infarct and/or hypoperfusion associated with impairments of specific components of lexical processing have been identified through: (1) relatively detailed analysis of performance across lexical tasks to identify the impaired and spared components of lexical processing in patients within 24 hours of onset of stroke; and (2) DWI and PWI to identify the regions of hypoperfusion and/or infarct at the same time as the language impairment. Associations between imaging abnormalities in regions of interest (or individual voxels) and deficits are tested with Fisher's exact tests. When possible, intervention is provided to restore blood flow to hypoperfused

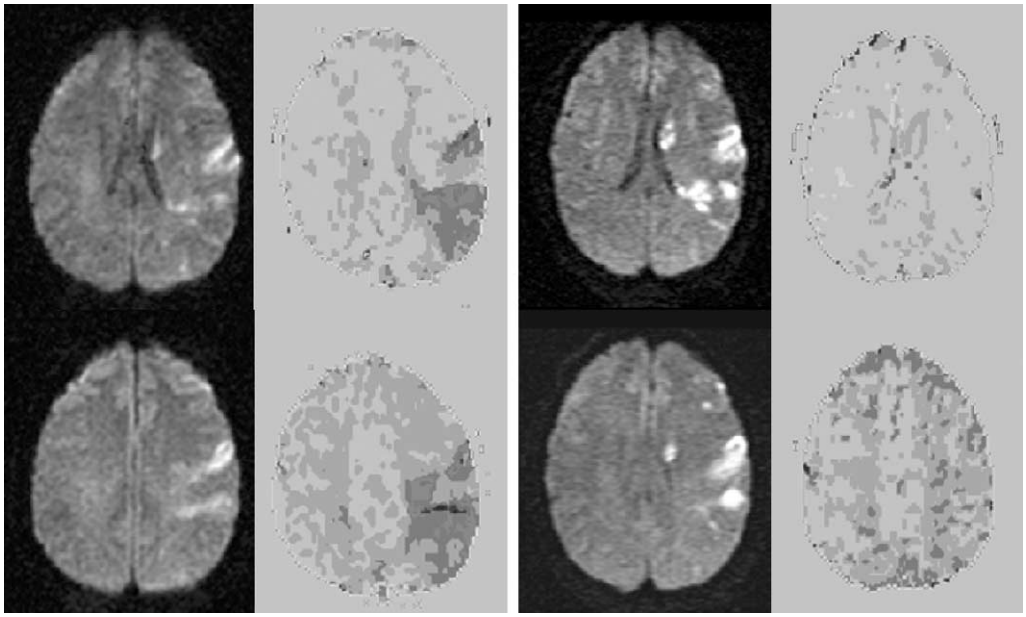

Figure 1 PWI and DWI scans of a patient with severe impairments in oral and written naming and reading on day 1 of her stroke, which improved on day 2. Panel A: DWI scans done within 1 hour of testing show an acute infarct in left motor strip and patchy areas of left BA 37 and 40; PWI scans show low blood flow (darker regions) in left BA 37, 39 (angular gyrus), and 40. Panel B: After intervention to improve perfusion, her deficit in oral naming partially resolved, and her deficit in written word comprehension completely resolved. Repeat PWI within 12 hours of initiation of treatment showed reperfusion of left angular gyrus in association with recovered written word comprehension, confirming the essential role of left angular gyrus in reading. Impaired access to phonological representations for naming only partially recovered with reperfusion of BA 37, since this region was partially infarcted before and after treatment.

areas that are not yet infarcted. Cases of successful reperfusion provide additional evidence that a particular brain region is essential for a specific cognitive function if that function is impaired when the region is hypoperfused and recovers as soon as the region is reperfused (Hillis *et al.*, 2002c, 2003).

To illustrate, in two large studies of patients within 24 hours of onset of stroke, the area of hypoperfusion and/or infarct most strongly associated with impaired access to lexical phonological representations for output (anomia) was Brodmann's area (BA 37) (posterior inferior temporal gyrus; Hillis *et al.*, 2002b), whereas the area most strongly associated with lexical-semantic impairment, characterized by poor spoken and written word comprehension, was left BA 22 (posterior superior temporal gyrus) (Hillis *et al.*, 2002a, 2002b). Furthermore, reperfusion of BA 22 resulted in recovery of word comprehension, and reperfusion of BA 37 resulted in recovery from anomia (Hillis *et al.*, 2002c, also illustrated in Figure 1). Other regions have been demonstrated to be critical for access to phonological representations of verbs, orthographic representations for reading and spelling, and articulatory mechanisms for speech production using this methodology (Hillis *et al.*, 2002a, 2002b, 2004a, 2004b).

Based on the finding that the presence of hypoperfusion in BA 22 was associated with the presence of word comprehension deficits, the relationship between severity of hypoperfusion in this region with severity of word comprehension impairment was then evaluated to determine if PWI could be used as a semiquantitative measure of dysfunction in a cortical region. From a consecutive series of 80 patients with acute ischemic stroke, 29 patients who showed no infarct in BA 22 were selected (because in the presence of infarct, the degree of hypoperfusion would be irrelevant to tissue function). The severity of hypoperfusion in BA 22 was determined by a technician blinded to language testing, who measured the mean time to peak arrival of gadolinium across the voxels in BA 22. There was a very strong correlation ($r = 0.84$; $p < 0.000001$) between the error rate in word comprehension (measured with spoken word/picture verification) and the severity of hypoperfusion in BA 22, indicating that PWI TTP maps can be used as a semiquantitative measure of regional dysfunction (Hillis *et al.*, 2001).

Use of PWI and DWI to Reevaluate Hypotheses about Brain–Behavior Relationships

While some of the lesion/deficit associations identified by carrying out language testing, DWI, and PWI in acute stroke have confirmed previous notions of the role of cortical regions in various language functions (e.g., the critical role of BA 22 in word comprehension),

other results have conflicted with results from chronic lesion/deficit studies. To illustrate, numerous previous studies have reported aphasia after stroke restricted to subcortical structures. However, a study of consecutive patients with infarcts restricted to left subcortical tissue – the basal ganglia, thalamus, or surrounding white matter – demonstrated that aphasia occurred only when there was concomitant cortical hypoperfusion, and aphasia resolved when blood flow was restored to the cortex, as demonstrated by repeat PWI (Hillis *et al.*, 2002d). The aphasia in these cases of subcortical stroke was attributed to cortical hypoperfusion caused by arterial stenosis that independently caused the subcortical infarct. The aphasia was not attributed to diaschisis (hypometabolism of the cortex caused by reduced input from the subcortical region that was infarcted), since the language impairment resolved when blood flow was restored to the cortex, despite the continued presence of the subcortical infarct that would have continued to cause diaschisis. Furthermore, the variable forms of aphasia due to similar subcortical stroke can be explained by different regions of hypoperfusion on PWI (Hillis *et al.*, 2004c).

Arterial Spin Labeling Perfusion Imaging

Another method of perfusion MRI is known as arterial spin labeling (ASL) (Alsop *et al.*, 2000). ASL does not require injection of contrast and provides a quantitative measure of cerebral blood flow by measuring the flow rate of molecules that are 'spin labeled' at the carotid artery. ASL perfusion imaging is more time consuming than PWI (and requires greater cooperation of the patient/subject to remain still during the time for imaging), but can be useful for identifying the neural substrates of language. For example, in ASL studies of dementia, Grossman *et al.* (2001) reported that reduced blood flow in the left temporal lobe around the superior temporal sulcus correlated with impairment of word meaning in patients with Alzheimer's disease, and reduced blood flow in left inferior frontal and dorsolateral prefrontal cortex correlated with poor scores on sentence comprehension in patients with frontotemporal dementia. These studies provide evidence that ASL can be useful for identifying regions of poor perfusion responsible for language deficits associated with brain damage.

ASL can also be used to reveal areas of increased blood flow with 'activation' of particular areas in response to a functional task. While the blood oxygen level dependent (BOLD) effect typically used in fMRI reveals areas where blood flow increases out of proportion to oxygen extraction, ASL more directly measures the blood flow response. Although ASL has not yet been used extensively to study areas of activation during language tasks in normal subjects, activation studies of motor and visual tasks demonstrate that ASL may be more sensitive and reliable than traditional fMRI using the BOLD effect (Aguirre *et al.*, 2002).

Summary and Future Directions

Neuroimaging techniques are changing rapidly. Recent developments allow imaging of brain regions with reduced blood flow or very recent ischemia that may contribute to the patient's language impairments in acute stroke. This PWI and DWI imaging, when carried out at the same general time as language testing, can be used to identify associations between regions of neural dysfunction and impairments of very specific language functions, before reorganization or therapy. Importantly, this methodology can also confirm the necessity of the region for a particular language function by determining if the language function recovers when the region is reperfused. Quantitative perfusion imaging, ASL, can also be used to identify areas of reduced blood flow associated with deficits in chronic stroke or dementia, or to identify areas of increased blood flow associated with 'activation' during specific language tasks in normal or brain-damaged subjects. Another recently developed imaging technique, DTI, can reveal lesions of particular white matter tracks, to identify the role of these tracks in language processing (e.g., Selnes *et al.*, 2002). Further refinements of these imaging modalities and additional applications in linguistic research are likely to emerge in the coming years, along with new MRI techniques for measuring blood flow and oxygen extraction ratios that vary as a function of brain activity.

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Digital Fonts and Typography

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The computer representation of text can be broken down into three process: input, storage, and rendering. Input is relatively straightforward. Computers use keyboard mappings to translate a key-press into a character to be stored or input methods to interactively map a series of keystrokes to one or more candidates for encoding, with the user making a final selection. Storage is handled by defining coded character sets (*see* **Character Sets**). The process of taking the characters and drawing something human beings can read is mediated by two different but related technologies: digital fonts and digital typography.

Digital fonts are the electronic equivalent of the hot-metal typefaces designed in the centuries after Gutenberg. They began with preset dot patterns drawn one at a time and have evolved into complex programs containing extensive information used by the computer to determine how to draw text.

Digital typography begins with the font and moves from there. Based on the information in the font and other settings established by the user, glyphs are set up, rearranged, resized, altered, moved, and tweaked to produce the final result.

Basics of Computer Text Drawing

Computers can be used with all kinds of output devices, of course. For years, output was dominated by the same sort of technology used in typewriters – pieces of metal striking paper through an ink-soaked ribbon. Little sophistication was available with this kind of technology. Hardware determined the set of symbols available, although this could sometimes be extended by swapping type elements. The position for each symbol was determined by moving the typing element back and forth and the paper up and down.

Other output devices were possible, some based on vector graphics, where a pen was placed against a piece of paper and moved around as instructed by the computer. Early screen-drawing technology was similar. Some screens used vector graphics, drawing lines on the screen the way a pen draws on paper. Others used bitmaps, predetermined patterns of dots. The computer screen is divided into a rectangle of dots called pixels, and the computer determines which dots to turn on and which to turn off based on the dot pattern associated with each symbol.

Most screens used fixed-point type: Each character fit into a uniform rectangle. The screen was divided into a fixed number of rows and columns, with one symbol in each. The user was limited to the one type style built into the computer and pretty much one point size. There was often little correlation between what the user would see on the screen and what the printer would produce.

The bulk of the rendering technologies used today are still based on the pixel but are far more sophisticated. The first step was the creation of WYSIWYG (what you see is what you get) technology at Xerox Palo Alto Research Center and popularized by the Apple Macintosh. Now, instead of using a fixed number of cells, the computer exercises extensive control over which individual pixels are on and which are off. Laser printing is similar: Small dots of toner are placed and fused onto a page.

The fonts used by the early WYSIWYG systems were still fixed dot patterns called bitmaps. However, no longer was there any requirement that they all

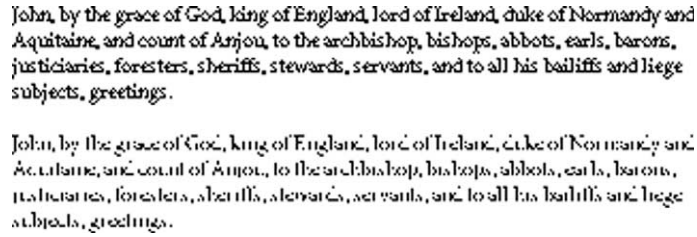

Figure 1 On-screen type with (top) and without (bottom) hinting.

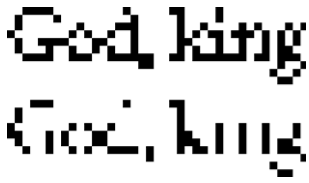

Figure 2 Detail of type from Figure 1.

have the same width, and it became possible to have the same characters drawn at multiple point sizes. In this, it more closely resembled hot-metal type, where the same letter would be drawn in the same style at different sizes and the typesetter could then select different pieces of type depending on the desired size of the text.

The main disadvantage of using bitmaps on computers was the difference between the size of the dots on the screen and on the printer. Dots on the screen are usually 1/72 or 1/100 inch in size. On early laser printers, the dots were 1/300 inch in size, and they have become progressively smaller throughout the years. Printing using the same bitmaps as used on the screen would mean making the characters smaller. The alternative is turning each dot in the bitmap into a small square of many pixels on the page, giving the text an unpleasant jagged look.

The solution came in the form of outline font technologies. Here, a glyph in a font is defined mathematically by a series of curves. The computer determines the size requested for the glyph and scales the curves. The interior is filled in and a dot pattern produced with the appropriate resolution, which is then transferred either to the screen or to the printer.

The three most important outline font technologies are Postscript, developed by Adobe Systems; TrueType, originally developed by Apple; and Metafont, invented by Stanford computer scientist Donald Knuth. The three differ in innumerable ways, most notably in the specific mathematics used to define outlines. Metafont is still popular in academic circles, and Postscript is still dominant in the printing industry, but the bulk of the advances in digital font technology have taken place in TrueType.

One weakness that digital fonts still have relative to hot-metal typography is that they use essentially the same curve for the same glyph at all point sizes. This means that if a glyph is drawn to look good at a large point size or high resolution, the computer can make significant mistakes when creating a bitmap for a small resolution and a small point size. Serifs and stems can vanish; letters can vary in height. Postscript and TrueType allow for the definition of hints to provide more information than just the raw outlines, letting the computer know how to compensate differences in pixel. Figure 1 shows a screen shot of text drawn in Adobe's Minion Pro font at 10 points with and without hints. Figure 2 is a section of the-text magnified 12 times. Note that the hinted text is difficult to read at such a small point size and low resolution, but the unhinted text is virtually impossible to read.

TrueType and Its Extensions

TrueType derives its advantages from its basic structure: Each TrueType font is divided into a series of tables. Each table has a four-character tag indicating the sort of data it contains. Figure 3 shows tags and sizes of the tables in SIL's Gentium font.

Some tables are required; every TrueType font must have them. One example is the 'name' table, which lists the various names or other user-visible strings associated with the font, such as copyright information, the URL for the designer's website, or a sample string illustrating what characters the font covers.

Other tables are optional. They give additional ancillary information that is not vital for drawing with the font. An example is the 'kern' table, which contains kerning information that can be used to improve the positioning of glyphs relative to one another. In the name 'Texas,' for example, it is perfectly acceptable to draw the left edge of the 'e' even with the right edge of the 'T,' but the word looks slightly better if the 'e' nestles slightly under the 'T' (Figure 4).

The TrueType design deliberately does not limit the set of defined tables. It can be extended and the extensions contain even more information. Such information is vital to provide even basic support for some of the world's more complex writing systems.

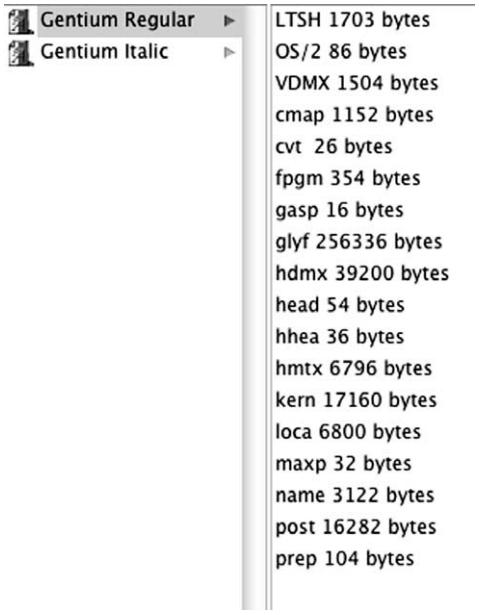

Figure 3 Tables found in a typical TrueType font.

Texas VA (kerning)
Texas VA (no kerning)

Figure 4 Type with (top) and without (bottom) kerning.

Modern Digital Typography

The original support for typography available on computers is adequate for English and most languages based on the Latin, Greek, or Cyrillic alphabets, particularly if one limits oneself to predrawn, accented letters. The letters are drawn one at a time across a horizontal line moving left to right. They do not change shape, and they do not rearrange themselves; they all sit on the same baseline. Primitive support for on-the-fly accents is nonetheless available by making the accents zero width. It is also adequate for Far Eastern typography, if one uses predrawn hangul blocks for Korean.

For other writing systems, however, such an approach is far from adequate. Indeed, even for a language such as English, complications can arise if one wants proper typesetting of text – something beyond the merely adequate. In Arabic, letters can change shape depending on their position in a word. In pointed Hebrew, the various points need careful positioning, particularly *dagesh*. Indic scripts have vowel marks that can appear before, after, above, or below their consonants, and complex ligatures (conjuncts) are common. Even in English, and even when using a standard book typeface such as Times, ligatures

Figure 5 Common (top) and unusual (bottom) ligatures in Latin fonts.

should typically form, such as when a lowercase 'f' is followed by a lowercase 'i.'

Much of this complexity is inherent to the scripts, no matter what typeface is used to draw them. Some of it is language specific: Turkish, for example, cannot ligate 'f' and a dotted 'i,' and German disallows ligation across syllable breaks. Also, some of it is font specific. Linotype's Latin typeface Zapfino, based on the handwriting of famed calligrapher and type designer Hermann Zapf, contains numerous ligatures that should form to more accurately imitate the actual appearance of handwritten text. Figure 5 shows a book typeface with standard ligatures and some of the unexpected ligatures found in Zapfino.

Three extensions to TrueType have been developed to deal with this complexity: Apple Advanced Typography, Graphite from SIL International, and OpenType from Microsoft and Adobe. All have similar capabilities and allow fonts to carry detailed information on their specific capacities to do a number of common tasks:

- Glyph ligation: This is the process by which two or more glyphs are coalesced into one. The formation of the 'fi' ligature from 'f' followed by 'i' has already been mentioned. Conjunct formation in Indic scripts is another example.
- Glyph insertion: This is the opposite process, whereby a single glyph is split into two pieces. Typically, this happens when a single glyph is split into two or more disjoined pieces that may have other glyphs drawn between them. A good example is the Thai letter *sara am*, ำ. If this follows a letter with a high tail, such as *fo fa*, ฟ, the circle from the *sara am* needs to move slightly relative to the remainder of the letter to avoid colliding with the tail. This is most easily accomplished by splitting the glyph into two pieces and positioning them separately.
- Glyph rearrangement: This is required in Indic scripts, in which a vowel pronounced after a consonant may be written after, before, or under the consonant. Such scripts are encoded in Unicode with vowels always following the consonant, and

Unicode:

0936 093E 0938 094D 0924 094D 0930 093E 0923 093F

Raw glyphs:

श ा स् त् र ा ण ि

Without glyph processing:

शास्त्राणि

With glyph processing:

शास्त्राणि

Figure 6 The stages in layout for a complex script.

the glyphs are then rearranged as necessary. In Devanagari, this means that a short 'i,' ि, must be drawn before the letter it follows in memory. To accomplish this, the glyph order is altered before the layout process is complete; the glyphs can then be drawn in appropriate positions relative to one another. Figure 6 illustrates glyph rearrangement and conjunct formation in Devanagari.

- Contextual substitution: This is required most notably by Arabic, in which letters regularly change shape depending on their position in a word. (Although Hebrew also has letters that come in final and medial forms, and Greek has medial and final forms for lowercase sigma, in actual practice the rules for determining when to use one or the other have too many exceptions for computers to handle them properly. As a result, the Unicode standard has encoded them separately.) Such substitutions used to be more common in Latin typography, as in the writing of 'Congress' as 'Congreſs' in the U.S. Constitution, much to the confusion of generations of schoolchildren.
- Noncontextual substitution: In this case, the user simply uses an alternate shape for a glyph for esthetic purposes, such as SMALL CAPS.

In all three technologies, AAT, OpenType, and Graphite, the rendering engine first transforms the text from a series of characters to a series of glyphs. This series of glyphs is then modified as needed, depending on information in additional tables within the font and options selected by the user. The result is a multistep rendering process that allows for the actual complexity of human writing systems, optional features on a per-font basis, and considerable control by the end user.

OpenType

The most successful extension to TrueType is OpenType. OpenType was jointly developed by Adobe and Microsoft and extends TrueType in three ways. It allows for digital signatures to be added to fonts, guaranteeing to users that they have not been tampered with; it allows Postscript outlines to be put in a TrueType package; and it uses the 'GSUB' table to control advanced layout.

OpenType also allows very precise control of kerning, the relative placement of two glyphs. This includes the definition of attachment points, where a glyph can specify where an accent should be placed. Attachment points allow the user to create new accented forms on an *ad hoc* basis.

Implementation of OpenType has been inconsistent, with different levels of support in Microsoft, Adobe, and third-party products such as Mac OS X 10.4 from Apple. Few, if any, products that provide OpenType layout support actually support everything OpenType can do. Support has been consistently improving, however, and within a few years support for OpenType and similar technologies should be fully available on all systems.

When that time arrives, it will be a major milestone in human cultural history: The possibility will then exist for all the cultures of the world to be electronically encoded, disseminated, and preserved.

See also: Character Sets; Printing and Typewriting; Typography.

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Dīkṣita, Bhaṭṭoji (ca. 17th Century A.D.)

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The author of the famous *Siddhānta Kaumudī* ('Moonlight of settled conclusions'), Bhaṭṭoji Dīkṣita came from a family of great writers and grammarians. His father, Lakṣmīdhara Dīkṣita, brother, Raṅgoji Dīkṣita, son, Bhānu Dīkṣita, nephew, Koṇḍā Bhaṭṭa, and grandson, Hari Dīkṣita, were all illustrious Sanskrit grammarians. Among the students of his grandson, Hari Dīkṣita, was the great 17th century grammarian Nāgeśa or Nāgojibhaṭṭa. Paṇḍitarāja Jagannātha, the court poet (1627–1656) of the Emperor Shahajahan (1592–1666), tells us in his *Manoramākucamardinī* ('Manorama-breast-ravisher') that Bhaṭṭoji Dīkṣita was a student of Seṣakṛṣṇa, the author of *Prakriyāprakāśa* ('Derivation-elucidation'). As Paṇḍitarāja Jagannātha himself was a student of Seṣakṛṣṇa's son, Vīreśvara, Bhaṭṭoji Dīkṣita must have lived and worked during the early part of the 17th century (Belvalkar, 1976: 39).

His *Siddhānta Kaumudī* is considered a masterpiece of a pedagogical grammar of Sanskrit. In order to appreciate its significance one must look at the context in which it was composed. Those who have studied Pāṇini's (5th century B.C.) grammar of Sanskrit, the *Aṣṭādhyāyī*, have been much impressed by the economy of its statements. But as time passed, the grammar became intelligible only when read with a commentary. The major commentaries on Pāṇini that followed were the *Vārttikas* ('Explanatory or supplementary rules' [from *vṛtti* 'explanation']) of Kātyāyana (3rd century B.C.), and the *Mahābhāṣya* ('The great commentary') of Patañjail (2nd century B.C.). But with the passage of time, the *Aṣṭādhyāyī* along with the *vārttikas* and *bhāṣyas* needed further illumination. The subsequent works that accomplished this include (i) the *Kāśikāvṛitti* or simply *Kāśikā* ('The gloss of [the city of] Kashi') of Jayāditya and Vāmana (7 A.D.), (ii) the *Rūpāvatāra* ('Formation of forms') of Dharmakīrti (11 A.D.) and *Prakriyākaumudī* ('Moonlight of [word] formation') of Rāmachandra (14 A.D.), and (iii) the *Siddhānta Kaumudī* of Bhaṭṭoji Dīkṣita, which, as its name, 'Moonlight of settled Conclusions,' signifies, is a work in which the grammatical rules or the *sūtras* of Pāṇini are arranged according to subjects, such as phonetics and declensions, and commented on concisely and clearly.

Bhaṭṭoji Dīkṣita organizes his text into two parts: the first part discusses the *sandhis*, compounds, and affixes introduced by Pāṇini in the fourth and fifth books of the *Aṣṭādhyāyī*. The second part discusses the affixes introduced in the third book of the *Aṣṭādhyāyī*. It begins with the description of the verbal paradigm arranged according to the classification of roots into ten *gaṇas* 'groups', providing every significant detail, ranging from classification to meaning and derivation. In addition, the *Siddhānta Kaumudī* has sections on the placement of accents on affixes, compounds, and roots in Vedic Sanskrit. In his discussions of the *sūtras*, Bhaṭṭoji Dīkṣita draws examples from traditional sources, which include earlier commentaries and literature. His Vedic examples come from the *saṃhitas*, *Brāhmaṇas*, *Araṇyakas*, *Mahabhāṣya*, and the *kāśikā*. In his discussions, Bhaṭṭoji Dīkṣita relies less on the *vārttikas* of Kātyāyana than his predecessors Jayāditya and Vāmana did in their *Kāsikāvṛtti*. It is also interesting to observe that when there are competing views among different commentators and grammarians, Bhaṭṭoji Dīkṣita generally gives importance to the views of Patañjali and often is critical of views expressed against Patañjali. (For an example of this, see Sharma, 1987: 26–31.)

The text of the *Siddhānta Kaumudi* begins with the verse *munitrayaṁ namaskṛtya taduktīḥ paribhāvya ca. / vaiyākarṇasiddhantakaumudīyaṃ viracyate*. 'Having saluted the Three Sages (Pāṇini, Kātyāyana, and Patañjail) and having reflected over their statements (*sūtras*, *vārttikas*, *and bhāśyas*) this Moonlight of Settled Conclusions is composed (by me).'

In reorganizing the *Aṣṭādhyāyi*, Bhaṭṭoji Dīkṣita does everything essential for a clear and concise understanding the *sūtras* of Pāṇini. For example, in the context of the derivational suffix *-eya*, in *sūtra* 4.2.96, Pāṇini says *kulakukṣigrīvābhyaḥ śvāsyalaṅkāreṣu* '(When the suffix *-eya* is added to the words) *kula* 'family', *kukṣi* 'cavity, womb, sheath', and *grīvā* 'neck', (the words thus formed mean) 'a dog', 'a sword', and 'an ornament'. Illustrating this rule, Bhaṭṭoji Dīkṣita (*Siddhānta Kaumudī*, 1316) gives the derived forms that also show the influence of other *sūtras*, and then adds to the list forms derived with another suffix, –a (aṇ): *kauleyakaḥ śvā. kaūlo'nyaḥ. kaukṣeyako'siḥ. kaukṣo'nyaḥ. graiveyako'laṅkāraḥ. graivo'anyaḥ. kula + eya = kauleya* 'a dog (lit., pertaining to a family)', *kukṣi + eya = kaukṣeya* 'a sword (lit., with reference to a sheath)', *grīvā + eya = graiveya* 'a necklace (lit., with respect to a neck)'. When not (for the meaning 'a dog,' 'a sword,' or 'an ornament' these words may take the suffix *–a*, in which case the derived forms are) *kaulaḥ* 'belonging to a family', *kaukṣaḥ* 'belonging to

a cavity, abdominal', and *graivaḥ* 'representing the neck'. Notice that without Bhaṭṭoji Dīkṣita's examples and comments, many may find the *sūtra* difficult to understand.

Generally acknowledged as a brilliant piece of work, Bhaṭṭoji Dīkṣita's *Siddhānta Kaumudi* enhanced the understanding of grammar in general and the *Aṣṭādhyāyi* in particular. With its meticulous details and interpretations it replaced not only the *Kāśikāvṛitti* of Jayāditya and Vāmana, but, since it included all of Pāṇini's *sūtras*, even the great *Aṣṭādhyāyī* itself. And as time passed the *Siddhānta Kaumudī* itself gave rise to a large ancillary literature of it own, including Bhaṭṭoji Dīkṣita's own commentary on it, which he named *Prauḍhamanoramā* ('Mature Manorama' or 'A Mature Beautiful Woman'). Another commentary on it, *Bālamanoramā* ('Young Manoramā'), was written by Vāsudeva Dīkṣita (18th century). An abridgment and simplification of *Siddhānta Kaumudī* is the *Laghusiddhānta Kaumudī* of Varadarāja (4th edn., 1896) which now serves as an excellent introduction to Pāṇini and his grammar. Paṇḍitarāja Jagannātha's *Manoramākucamardinī* ('Manorama-Breast-Ravisher'), which provides some biographical information on Bhaṭṭoji Dīkṣita, is another well-known critical commentary on Dīkṣita's *Prauḍhamanorama*.

In addition to, the *Siddhānta Kaumudi*, Bhaṭṭoji Dīkṣita also wrote commentaries on Pāṇini's *Dātupaṭha* and *Liṅgānuśāsana* and a voluminous commentary on Pāṇini's *Aṣṭadhyāyī*, which remained unfinished.

See also: Disorders of Fluency and Voice; Sanskrit.

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Diminutives and Augmentatives

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Diminutives and augmentatives, as these terms are traditionally understood, are words formed by derivational processes that add a semantic element having to do with size to the meaning of the word. Thus, in English, adding the suffix *-ette* to the noun kitchen yields the diminutive *kitchenette* 'small kitchen.' In Russian, adding the suffix *-išče* to the noun *dom* 'house' yields the augmentative *domišče* 'big house.' However, diminutives and augmentatives tend to be used in a multitude of ways, involving semantic and pragmatic elements that go far beyond a simple notion of size.

Although diminutives and augmentatives are extremely widespread in human languages, there is considerable crosslinguistic variation in their frequency and degree of elaboration. English is a language that has virtually no augmentatives and relatively few diminutives compared to some other European languages such as Spanish, Italian, and Russian, or even varieties close to English such as Scots. Still, English has more diminutives than Swedish, for example, where there is hardly any productive derivational process for forming diminutives, although a few lexicalized items exist (such as *fossing* 'footie' from *fot* 'foot'). As for degree of elaboration, we may compare German, which has, by and large, only two diminutive suffixes, *-chen* and *-lein*, the choice between which depends mainly on regional variety, with the highly complex system found in Russian, with dozens of diminutive and augmentative formations with different semantic and pragmatic properties.

Systematic typological data about the areal and genetic distribution of diminutives and augmentatives is still hard to come by. Jurafsky (1996) presents data on diminutives from about seventy languages, representing most larger phyla in the world, but in most cases relies on extant grammatical descriptions, which suggests that the sample is somewhat biased towards those languages whose systems of diminutives are salient enough to attract the attention of grammarians. A relatively safe crosslinguistic generalization is that augmentatives are universally less frequent and less elaborated than diminutives; consequently, there is also less to be said on augmentatives, and most of what follows concerns primarily diminutives.

Diminutives and augmentatives are frequently formed by affixation, but other means also exist, most notably reduplication and tone. The frequent occurrence in diminutives of "higher tonality, including high tones, high front vowels and fronted consonants" (Jurafsky, 1996: 534) suggests an iconic link between meaning and form. Diachronically, the most well-documented source of diminutives is 'child,' e.g., Ewe *ví* as in (b) *kpéví* 'small stone' from *kpé* 'stone' (Heine and Kuteva, 2002: 65). As noted by Jurafsky (1996: 569), there is, somewhat surprisingly, no evidence that lexical morphemes meaning 'little' develop into derivational diminutive affixes, although such words tend to develop functions similar to those of diminutives, English *little* being a case in point.

An elaborated system may contain several different affixes or other devices for forming diminutives and augmentatives, each of which may be restricted to certain types of stems, or may be connected with particular connotations (positive or negative). In addition, many languages allow for the simultaneous application of more than one diminutive/augmentative formative. As an illustration, consider the root *děv-* 'virgin, girl' which shows up in a multitude of forms in the Slavic languages. In Russian, the nonderived version *deva* still exists with the meaning 'virgin' or archaically, 'young woman.' The first-degree diminutive *dev-k-a* is a colloquial word for 'young girl' with possibly slightly negative connotations. The second-degree diminutives *dev-oč-k-a* and *dev-uš-k-a* are lexicalized with the meanings 'small girl' and 'young girl/woman,' respectively. The third-degree diminutive *dev-č-on-k-a* again has a slightly pejorative meaning, and can be further expanded into a fourth-degree diminutive *dev-č-on-oč-k-a*. Formations of this kind are particularly frequent in morepragmatically motivated uses, and may be explained through the need to renew forms that have undergone conventionalization or bleaching through extensive use.

Diminutives and augmentatives may develop beyond the simple indication of size in several different ways. It is not always easy to distinguish here what is productive in a language from what is rather the frozen result of earlier processes, or what is universally available from what is a language-specific conventionalization. Moreover, morphemes that are used to form diminutives and augmentatives can also have various other functions that at least synchronically seem to have little to do with size, inviting the postulation of homonymy. Thus, in Russian, nouns ending in *-ka* are often straightforward diminutives, as in *knižka* 'booklet' (from *kniga* 'book'), but *-ka* may also be a feminine ending, as in *švedka* 'Swedish woman' (from *šved* 'Swede') or function as a general nominalizer, as in *sotka*, which may denote anything related to the number 'one hundred' (*sto*), e.g., 'bus No. 100.' There is a strong tendency for diminutives

to become lexicalized, in which case they tend to develop special meanings: *cigarette* is not just a small cigar, and in Russian, *lampočka* (from *lampa* 'lamp') is 'light bulb' rather than 'small lamp.'

By a very general, possibly universal, mechanism, diminutives acquire connotations of affection or endearment. In fact, such connotations are not restricted to morphological diminutives but seem available to any expression whose semantics in any way involves smallness and are plausibly explainable in terms of a general tendency for humans to associate smallness with children, the latter being natural objects of affection and endearment. Jurafsky (1996: 564) goes further in hypothesizing that "diminutives arise from semantic and pragmatic links with children." Indeed, as was mentioned above, 'child' is the best attested historical source for diminutives, and diminutives are typical of what Dressler and Barbaresi (1994: 173) call 'child-centered speech situations,' where a child is either a participant or a topical referent or extensions of those, e.g., to situations involving pets, lovers, or playful adults. It follows from what has been said that there is a close connection between diminutives and hypocorisms, although the latter notion may be understood as including also truncated forms, such as *Ed* from *Edward*, which are not obviously diminutive. Jurafsky (1996: 654) quotes a number of cases where diminutives affixes have been claimed to have originated as affixes on names only.

The 'child' link can hardly provide the whole explanation for the existence of diminutives, however. While the 'affection' connotations are basically positive (meliorative), diminutives sometimes also have clearly pejorative meanings. Thus, in Russian, certain diminutive affixes are conventionally associated with negative connotations, e.g., *-iško* as in *domiško* 'small and pitiful house.' It is less clear how such readings arise. In augmentatives, on the other hand, pejorative connotations seem rather to be the unmarked case.

Another possibly universal aspect of diminutives is their pragmatic use for mitigating, downgrading, or softening a speech act. Cf. parallel examples from different languages such as Italian *Aspettami un' or-etta* '(lit.) Wait for me a little hour!', Spanish *Espera un minut-ito* '(lit.) Wait a little minute!' (Dressler and Barbaresi, 1994: 238) and Russian *Podoždi minut-oč-k-u!* (the same).

This function is not strictly limited to morphological diminutives but in principle works for any linguistic element that conveys a notion of 'smallness.' A straightforward example is when a person asks for a favor of some kind: the chance that the request will be granted increases if the favor is presented as insignificant, hence formulations such as 'I have a small request.' It may well be, however, that morphological diminutives are particularly suited to this function, being less obtrusive than other smallness-denoting expressions.

In the case of count nouns denoting concrete objects, the 'size' interpretation can be straightforward. Diminutives (and to a lesser extent augmentatives) can also be formed from other types of words, in which case a reinterpretation is necessary. With mass nouns, a common interpretation is 'small quantity of,' as in Russian *Pop'em čaj-k-u* 'Let's drink a little tea.' But there are also diminutives, or diminutive-like formations, from adjectives and verbs, in which case the most typical interpretation is 'to a limited degree or extent.' The following example of an Italian diminutive adjective simultaneously illustrates another pragmatic use of diminutives in ironic speech acts: someone may say of a very tall person *Un po' altino* 'A bit on the tall side' (Dressler and Barbaresi, 1996: 238). For verbs, an example could be German *hüst-el-n* 'to cough slightly' from *hust-en* 'to cough' (Dressler and Barbaresi, 1994: 238).

See also: Emotion: Stylistic Approaches; Inflection and Derivation; Lexicalization; Mitigation; Reduplication; Word Formation.

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Dinka

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Dinka is spoken by around 1.4 million people, mainly in the southern Sudan. Together with Nuer and Atuot, it forms a subgroup within Western Nilotic, one of the three primary branches of Nilotic (Nilo-Saharan). Dinka divides into four major dialects or regional variants: Padang (Northeastern Dinka), Bor (Southeastern Dinka), Rek (Southwestern Dinka), and a south-central variant known as Agar (South Central Dinka); in addition, there is a more deviant northwestern variant known as Ruweng.

Although Dinka has been studied for over 180 years, it was not until more recently, mainly as a result of investigations by the Danish scholar Torben Andersen, that important structural features of the language came to be better understood. As argued by Andersen (1987; 1990; 1993), the (Agar) Dinka vowel system involves seven vowel qualities: /i, e, ɛ, a, ɔ, o, u/, whereby each vowel can be either breathy or creaky; historically, the breathy/creaky distinction goes back to a distinction between [+advanced tongue root] and [-advanced tongue root] vowels (Andersen, 1990). According to Andersen (1987), there is a ternary vowel-length distinction (short vs. mid vs. long), at least in the Agar dialect of Dinka (see Table 1). In an alternative analysis of the same phenomena, Gilley and Remijsen (forthcoming) interpret this ternary length distinction in Rek (Southwestern) Dinka in terms of the interaction between a binary length distinction and a complementary quantity contrast. The latter feature is supposed to account for the observed covariation between centralization of vowels, nucleus and coda duration, and the realization of coda consonants in a more natural way.

Table 1 Two Dinka nouns, transcribed for segmental phonemes and quantity both in the singular and in the plural, in terms of Andersen's (1987; 1993) ternary vowel-length hypothesis, and in terms of the complementary quantity hypothesis advanced by Remijsen and Gilley (forthcoming)

		Ternary vowel-length hypothesis		*Complementary quantity hypothesis*	
'hand'	sg.	ciin	/VV/	cin	/VC/
	pl.	cin	/V/	cinn	/VCC/
'grass'	sg.	nooon	/VVV/	noon	/VVC/
	pl.	noon	/VV/	noonn	/VVCC/

Dinka distinguishes between high and low tones, which may also be combined to form a falling tone. It is an essentially monosyllabic language that nevertheless uses various layers in its derivational and inflectional morphology, involving segmental changes in the nucleus and the coda as well as tonal modifications (compare, for example, Andersen, 1993). This internal morphology corresponds to suffixation processes in more conservative Western Nilotic languages.

Whereas traditionally Dinka has been claimed to be a SVO language, Andersen (1991) has shown that the basic position of subjects in at least one variety of Dinka, Agar, is postverbally. Postverbal (but not preverbal) subjects are marked with Nominative case by way of tonal inflection, a feature also found in other Western Nilotic languages like Anywa (Anuak), Jur Lwo (Luwo), Päri, or Shilluk. Preverbal noun phrases are topics, whose underlying grammatical relation can be that of subject, object, adverbial, or possessor. Compare:

(1) bɛ̰̀ɲ ã̀-tõ̀oc d̪̰̀ɔ̰̀k
chief:ABS D-send boy
'the chief is sending the boy'

(2) d̪̰̀ɔ̰̀k ã̀-tṍooc bɛ̰̀ɲ
boy D-send:NTS chief:OBL
'the chief is sending the boy'

As further shown by Andersen (1991), such constructions are formally distinct from passives in Agar Dinka:

(3) d̪̰̀ɔ̰̀k ã̀-tṍoc (n)ɛ̰̀ bɛ̰̀ɲ
boy D-send:PASS PREP chief:OBL
'the boy is being sent by the chief'

When no topic is expressed, sentences may be verb-initial in Agar Dinka. It remains to be determined to what extent the structure of Agar Dinka is characteristic for the Dinka cluster as a whole.

See also: Nilo-Saharan Languages; Sudan: Language Situation.

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Diogenes the Babylonian (ca. 240–150 B.C.)

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Diogenes the Babylonian was born in Seleuceia, but studied in Athens. He later became the fifth head of the Stoic school, after Zeno of Tarsus. As a disciple of Chrysippus, Diogenes contributed to Stoic language theory with a 'treatise on voice' (*Tekhne peri phones*; the term 'voice' refers here to the articulation of sounds by a human subject), which has not been conserved (fragments in von Arnim, 1903: 214–215). Its contents are partly known through the report given by Diogenes Laertius in book VII of his *Lives of philosophers,* which constitutes our main source of information on the Stoic conception of grammar (book VII, §§ 55–58 are concerned with the views of Diogenes of Babylonian, as these were known to Diogenes Laertius through the work of Diocles of Magnesia). Diogenes the Babylonian had among his students Apollodorus of Athens, a scholar with philological interests, and Crates of Mallos, who later became the head of the library of Pergamon. In view of the fact that Diogenes gave lectures in Rome during his diplomatic stay there (156–155 B.C., together with the Platonist Carneades and the Peripatetic scholar Critolaus), one may assume that he left his mark on Roman philosophy and grammaticography, just like his pupil Crates of Mallos did, who had lectured in Rome around 168 B.C. It is likely that early Roman grammar as practised by Varro and Remmius Palaemon, and as depicted by Quintilian owed much to the introduction of Greek grammatical thought by the Stoic scholars, Diogenes the Babylonian and Crates of Mallos. After his diplomatic mission, Diogenes returned to Athens and probably died there, ca. 150 B.C.

Together with Aristotle's *Poetics*, the treatise *peri phones* of Diogenes the Babylonian constituted one of the foundational texts for later grammatical manuals. Diogenes's text seems to have contained a definition of grammar, a survey of letters/sounds, of accents, of meters, and a definition of the basic units of grammar (syllable, word, sentence), a discussion of word classes (and their meaning and properties), and possibly also a section on correctness (which appears only in later Latin manuals). It is not clear how original Diogenes's ideas were (especially in regard to Chrysippus's conceptions: both distinguished, according to Diogenes Laertius, five parts of speech: proper names, nouns, verbs, conjunctions, and articles), but he clearly provided a synthetic treatment of grammatical issues that influenced Greek and Roman grammaticography. The exact filiation of Diogenes's ideas with regard to both traditions (as well as their internal relation) has been a topic of scholarly debate in recent years.

See also: Chrysippos (ca. 282–208 BC); Quintilian (ca. 30–98 A.D.); Varro, Marcus Terentius (116–27 B.C.).

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Dionysius Thrax and Hellenistic Language Scholarship

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If the origins of medicine, or of arithmetic, stretching back to prehistoric times, run no risk of ever being examined by the historian of the sciences, the same is not true of grammar, which can only be a later development, for it presupposes the use of writing. Disregarding the short-lived use of the Mycenaean syllabary in the second millennium B.C., writing in Greece was not introduced (as a borrowing from the Phoenicians) until the early centuries of the first millennium. The adaptation of a Semitic alphabet, more or less by an empirical process of trial and error, mastery of its use, both for writing and reading, and transmission of this mastery resulted immediately in the invention of a specific *téchne* 'art,' namely grammar, or *téchne grammatiké* 'the art of letters.'

We can catch a glimpse of what the grammar of the Greeks must have been like in its beginnings. Indeed Plato, in several passages of his work, speaks of *grammatiké* as if it were a familiar discipline, known to all of Socrates' interlocutors; he is thus able to assume this familiarity in order to exploit grammar as a paradigm in philosophical analysis (*Philebus*, 18b–d; *Cratylus*, 424b–425b). This evidence represents a valuable, albeit frustrating, testimony in that, for this period in Antiquity, we have no grammatical text as such. As for teaching methods, we possess no direct knowledge of these either. We can nonetheless reasonably assume that they did not differ fundamentally from those documented by papyrological evidence from the Alexandrian period: a methodical inventory of the alphabet, rudiments of phonetics, exercises in reading aloud, especially metric texts – all of which, from the 5th century onwards, constitute a school subject, whose master was the *grammatistés* 'elementary school master.'

It was in the Hellenistic period, in particular in Alexandria, that a new form of the grammatical art was to appear, which consisted of scholarly practice based on explicit doctrine. This practice was no longer uniquely that of the school master (which had by then been readily renamed *grammatistiké*: 'little grammar'), but it was the elaborate and multifaceted art of the great correctors, editors, and text commentators, of the new *grammatikoí* such as, to mention only the most famous (and deservedly so), Aristophanes of Byzantium and Aristarchus. It was this milieu, at the cusp of the 2nd and 1st centuries B.C., and in particular his contact with Aristarchus, whose pupil he was, that formed the ideas of Dionysius Thrax.

Dionysius Thrax was a *grammatikós* as defined above, that is, a philologist, to whom ancient witnesses attribute (among other works of which only rare fragments are extant, cf. Linke, 1977) a *Téchne grammatiké*, a grammar handbook which, thanks to the Greek, Armenian, and Syrian manuscript tradition, has reached us today. It is in his capacity as the presumed author of this work – the first of its kind known to us – that Dionysius Thrax has become a symbolic figure in the history of grammar. On this point let us cite G. Uhlig, in the Latin preface to his edition of the *Téchne* (1883: VI):

> I could write volumes about the prestige which the handbook has enjoyed. It can actually be said, with good reason, that in the whole field of secular literature there exists no other work which has exerted such a significant influence, and that not only is this *téchne:* the distant ancestor of all grammars written in Europe, but it would be difficult to find any grammar from which the traces of its origin would be completely obliterated.

If the prestige of the work has reflected on its author, this was only to be expected. It is here that the situation deteriorates, as, from the Byzantine Middle Ages to the present, various voices have on numerous occasions spoken up to deny Dionysius' paternity of the *Téchne*, while other voices have defended the traditional attribution of authorship. The age-old debate will not be summarized here; suffice it to say, briefly, that two opposing standpoints are upheld today:

1. The *Téchne* was not written by Dionysius. Even if parts of its contents can indeed be traced back to Dionysius, the work such as we have it today is a later compilation, in any case postdating the work of Apollonius Dyscolus, the great Alexandrian grammarian of the 2nd century A.D.
2. The *Téchne* was for the most part written by Aristarchus' disciple, even if, as is true of any work of this kind circulating in Antiquity, its text has been subject to alterations in the course of its transmission.

Evidently each standpoint, which is carefully nuanced so as to address the most cogent arguments of the opposing faction, admits of versions tending to one direction or the other. A consultation of Law and Sluiter (1995) will give an idea of the current state of the debate, which remains an open question. The disputed issue of authenticity will be considered here as a secondary matter; instead, a brief description of

the contents of the *Téchne* will aim to give an idea of Alexandrian grammar as conveyed by this work.

The *Téchne* is a short handbook of around 4500 words, which can be divided into three parts:

1. Definition of grammar and instructions for reading (chapters 1–5 = ca. 300 words).
2. Writing and phonetics: elements and syllables (chapters 6–10 = ca. 1000 words).
3. The sentence and the parts of speech (chapters 11–20 = ca. 3200 words).

Definition of Grammar and Reading

Grammar, defined as the practical knowledge of what one reads in poetry and prose, comprises six parts: expert reading, explanation of poetic devices, elucidation of difficult words and of the narrative component, discovery of etymology, establishment of analogy, and critical appreciation of poetry – the latter part being declared the most beautiful (*kálliston*) of the six (chapter 1).

This last feature as well as the entire grammatical program shows to what extent Alexandrian grammar is a discipline that is more philological than linguistic. Furthermore, it is clear that we are dealing with (as the handbook puts it) a popularized, school version of the *grammatiké* of the great Alexandrian editor-commentators – hence the importance of reading (aloud, *anágno:sis*), which connects grammar to its modest origins as a practical mastery of letters for writing and reading. Consequently, of the six parts of grammar, it is only reading that gives rise to a small additional exposition in chapters 2 to 4: 'the impeccable pronunciation of poetry or of prose' requires a consideration of the genre of the text read (tragic, comic, epic, lyrical, etc., chapter 2), and also, technically, a good vocal interpretation of the stress patterns of the words (chapter 3) and of the punctuation of the text (chapter 4). No doubt this echoes, at least in part, school exercises whose aim was to teach how to interpret vocally the stress markings (*proso:díai*) and punctuation marks (*stigmaí*) with which the *grammatikós* (the scholar or the school master) has annotated the text in order to facilitate reading.

Writing and Phonetics: Elements and Syllables

Chapter 6 is a description of the Greek alphabet, with a phonetic classification of sounds corresponding to letters. In addition to the classification, which continues in a more elaborate and systematic form what can already be found in Plato's and Aristotle's work, the text provides a technical terminology that was to become canonical in the Greco-Latin tradition.

Chapters 7 to 10, which are dedicated to syllables, have as their sole purpose the classification of syllabic configurations according to the quantity (long, short, or neutral) that is attributed to each syllable. It is clear that this represents information which is indispensable to the writing and 'impeccable' reading of poetic texts, which are based on a quantitative meter.

The Sentence and the Parts of Speech

This section is both quantitatively and qualitatively the most significant of the whole work. In fact, it represents, at least for the modern reader, the first systematic account that we have of the analysis of (Greek) language into *mére: toû lógou*, Eng. *parts of speech*, Fr. *parties de la phrase* (or *du discours*), Ger. *Redeteile*, *Wortarten,* etc.

The outline of this section is simple. After a short chapter (11), entitled in our manuscripts 'On the word' (*Perì léxeo:s*), where the terms 'word' (*léxis*) and 'sentence' (*lógos*) are defined and an ordered list of the eight parts of speech is given – noun, verb, participle, article, pronoun, preposition, adverb, conjunction – chapters 12 to 20 are dedicated to the individual study of each of these *mére: lógou*. (With one exception: chapter 14, which follows the chapter on the verb, deals with 'conjugation' (*suzugía*), and presents a summary of the six inflectional classes of the Greek verb.)

Considerations of space do not permit an exposition of the contents of these chapters. Instead of pursuing such a study, this presentation will conclude with a series of observations of a historical kind, with the aim of allowing the reader to situate the *Téchne* in the tradition where it occupies a symbolic place.

1. The *Téchne* as a final outcome. From a typological point of view, the *Téchne* belongs to the Hellenistic genre of *compendium*, which, for a given discipline, assembles the fundamental elements of its doctrine and provides the reader with, among others, the technical terminology of this doctrine. From this standpoint, the *Téchne* represents a final outcome: whatever the date of its writing may be, it resumes and organizes preexisting knowledge and a preexisting instrumental corpus (metalanguage). In the state of the text that has reached us, this knowledge and this metalanguage quite possibly reflect a rather late doctrine, that is to say a doctrine postdating Apollonius Dyscolus, the great 2nd century A.D. Alexandrian 'expert' (*technikós*) on grammar (cf. Di Benedetto, 1958–1959).

2. The *Téchne* as a source of reference. If the point of view now shifts from its origin to its reception, the *Téchne*, despite its brevity and its elementary character, appears as a reference work of exceptional importance in the history of grammar (cf. the above quotation from Uhlig). In the Greek domain, in this case in the period ranging from late Antiquity to the most enlightened centuries of the Byzantine Empire, it seems that the teaching of grammar was in large part based on a study of the *Téchne*, discussed word by word, and accompanied by a vast collection of commentaries. (cf. the 600 or so pages of *Grammatici Graeci* I: 3). More broadly, but also less precisely, the entire tradition of Western grammar owes, if not to the *Téchne* itself, then at least to Alexandrian grammar which the *Téchne* reflects and condenses, the majority of its terminological vocabulary, and, at the highest level of functional analysis, the theory of the parts of speech.
3. What was the purpose of the *Téchne?* Let us first of all say what its purpose **was not:** to learn Greek. It is in fact clear that it was aimed at speakers of Greek, whose competence it was not designed to improve. It contains no useful information concerning morphology or (where written language is concerned) spelling: there is not one spelling guideline in the handbook, nor is there anything that would enable the reader to decline a single noun or conjugate a single verb. In fact, a glance through the 25 or so pages that make up the handbook reveals that it fulfils essentially the role of a taxonomic and terminological compendium: both in the case of phonography and of the parts of speech, the *Téchne* provides more or less sophisticated classifications and establishes a precise technical vocabulary which allows the designation, with minimal ambiguity, of the members of a class or a subclass. Therefore, rather than being compared to a 'grammar' in the modern sense of the word, the *Téchne* can be likened to a practical index of grammatical terminology – such as can be found, at least in France, with the aim of regulating and standardizing the use of grammatical metalanguage throughout the educational system. This, *de facto*, is the role which the *Téchne* has played during many centuries and which, thanks to translations and adaptations, it still plays today.

See also: Aristotle and Linguistics; Grammar; Greek, Ancient; Plato and His Predecessors

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Diphthongs

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A diphthong is two vowel-like sounds within the rhyme of a single syllable, such as English *buy* [baɪ], *bough* [baʊ], *boy* [bɔɪ]:

(1) American English diphthongs

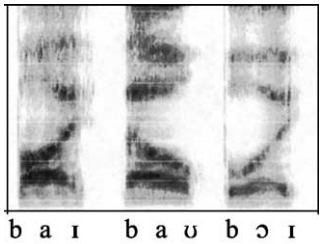

We ignore here sequences of vowels in separate syllables, so that *boing* [bɔɪŋ] has a diphthong but *Boeing* [bo.ɪŋ] does not. We ignore as well purely orthographic diphthongs like those in *guest* [gɛst], *laugh* [læf], and *thought* [θɔːt], which are monophthongs spelled as diphthongs.

At least one member of a diphthong is a vowel and there is often disagreement as to whether the other sound is a vowel in the nucleus of the syllable [aɪ, aʊ, ɔɪ] or a consonant in the coda [aj, aw, ɔj]. Because the exact degree of stricture of the second element may vary considerably, [ɪ, i, j] or [ʊ, u, w], and because there is no agreed-upon relation between the stricture of a sound and the phonetic symbol used to represent it, the decision to treat a given diphthong as *vowel-vowel* or as *vowel-glide* is often decided phonologically, by how the sounds pattern, rather than phonetically, by specifics of their articulation or acoustics. Languages rarely if ever contrast *vowel-vowel* diphthongs with *vowel-glide* diphthongs, so the question is probably moot as far as distinguishing differences in meaning is concerned. About a third of the world's languages have diphthongs, most (such as French) have only monophthongs [a, i], and a few reportedly have triphthongs [uaɪ, uiu]. No language is reported to have tetraphthongs, pentaphthongs, or the like.

Acoustically, diphthongs involve a trajectory across the vowel space, shown most clearly in the first two formants (yellow lines below). This trajectory is what distinguishes diphthongs from long vowels such as [iː] and [uː]. The percentage of a diphthong devoted to transition between the two vowels may be relatively small, so that the vowels appear fairly distinct [aɪ], or relatively large, so that the vowels seem to coalesce into a single trajectory [a͡ɪ]:

(2) American English 'I like Holita'

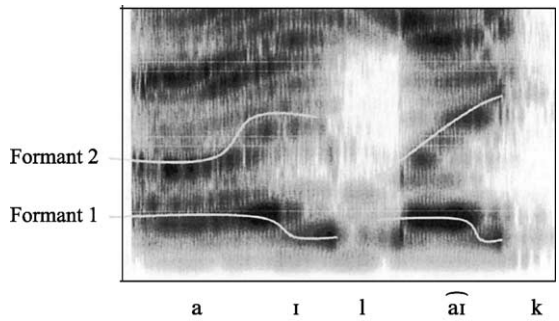

This degree of coarticulation varies within speakers (as here) and across languages so that the transition period in Arabic [ai, au] is only about 20% of the diphthong (like [aɪ] above), while the transition period in English can be as high as 75% of the diphthong (like [a͡ɪ] above). This is apparent if we superimpose the F1 and F2 lines from above on Arabic [ai]:

(3) Palestinian Arabic (South Levantine Spoken Arabic) zai 'letter z'

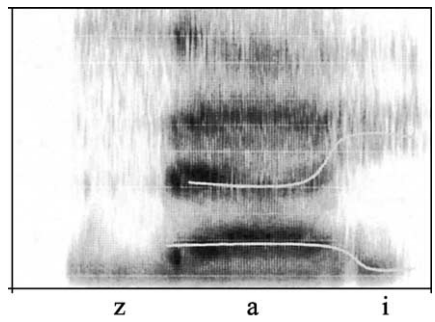

No language, however, contrasts such diphthongs: there seems to be no language in which [ba͡ɪ] means one thing, with its vowels coarticulated, and [bai] means another, with its vowels relatively distinct. The articulatory and acoustic targets of a diphthong's endpoints may be undershot, so that /ai/ is realized as [aɪ, ae, əɪ] or the like. In terms of the relative sonority of the two sounds involved, diphthongs may fall [ai, ao], rise [ia, oa], or plateau [iu, oe]. Some languages have centering diphthongs that move from the edges of the vowel space towards the center, such as RP English, where /ir/ and /ur/ are pronounced with a diphthong that ends in the central vowel [ə]: 'beer' [biə], 'poor' [puə].

Most languages have fewer diphthongs than monophthongs. The Maastricht dialect of Dutch, for instance has 21 monophthongs but only three diphthongs (Gussenhoven & Aarts, 1999). It seems that no language has all the diphthongs one could get by pairing each of the vowels of the language with all others, i.e., no language with five monophthongs

(a, e, i, o, u) has 20 diphthongs (ai, ei, oi, ui, ea, ei, eo, eu, etc.). Brazilian Portuguese (Cagliari, 1977) has more diphthongs (13, not counting nasal diphthongs) than it has short stressed monophthongs (seven) but still far fewer than if every vowel occurred with every other vowel in a diphthong (42).

(4) Brazilian Portuguese: diphthongs ending in [ɪ]

xeɪs	'kings'	xɛɪs	'cents'
boɪ	'bull'	dɔɪ	'it hurts'
paɪ	'father'	fuɪ	'I went'

Of particular interest here are pairs [xeɪs, xɛɪs] and [boɪ, dɔɪ], which differ primarily in the backness of the first half of the diphthong:

(5) Brazilian Portuguese

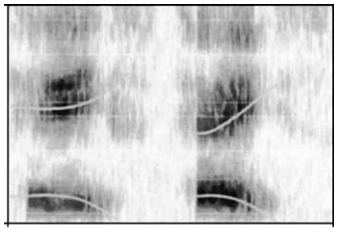

x e ɪ s x ɛ ɪ s

'kings' 'cents'

Similarly delicate contrasts are found with diphthongs ending in [ʊ]:

(6) Brazilian Portuguese: diphthongs ending in [ʊ]

seʊ	'yours'	sɛʊ	'sky'
soʊ	'I am'	sɔʊ	'sun'
sɑʊ	'salt'	suʊ	'south'
viʊ	's/he saw'		

Many languages have both rising (ia, ua) and falling (ai, au) diphthongs, despite occasional published claims to the contrary. Thus Hmong Daw (White Hmong) has three rising diphthongs (ai, au, aɨ) and two falling (ia, ua):

(7) Hmong Daw: falling and rising diphthongs

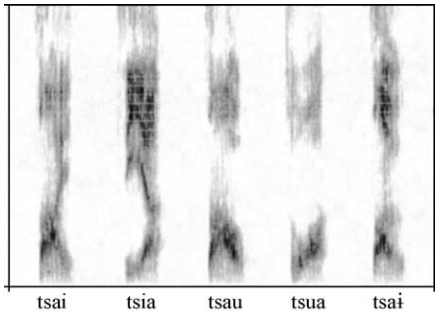

tsai tsia tsau tsua tsaɨ

'receive' 'cold' 'enough' 'connect' 'splash'

Diphthongs behave like two vowels in most languages with respect to height (ei/ie contrast), rounding/backness (oe/eo contrast), stress (diphthongs attract it if long vowels do), and tones (diphthongs can carry two tones if long vowels do). Diphthongs behave like one vowel with respect to phonation type (a̰ɪ/aɪ̰ do not contrast, a̤ɪ/aɪ̤ do not contrast), nasalization (ãɪ/aĩ do not contrast), and tenseness/laxness (eɪ/ɛi do not contrast). Note that the Brazilian Portuguese contrast between [xeɪs] 'kings' and [xɛɪs] 'cents' hinges on whether the centering that distinguishes [ɛ] from [e] occurs only in the first half of the zdiphthong 'kings' or throughout 'cents'; it does not hinge on whether the feature is in the first half or the second, which does not seem to contrast in any language.

Diphthongs count as long in most languages, though some languages such as Ancient Greek had contrasting short and long diphthongs, such that short [oi] behaved like a short vowel and long [oi] behaved like a long vowel. Certain dialects of Mixe have a three-way length contrast among diphthongs (Suárez, 1983):

(8) San José El Paraiso Mixe

[ʔoi]	'although'
[ʔoːi]	'he went'
[ʔoːːi]	'very'

Some vowel sequences that appear to be diphthongs are actually spread across the onset and nucleus of a syllable and should not be confused with the real thing. Thus, Romanian contrasts glide-vowel sequences (ja, wa) with acoustically very similar vowel-vowel sequences (ea, oa), but the former have the glide (j, w) in the onset, while the latter are fully contained in the nucleus (Chitoran, 2002). Similarly for Hmong Daw, which contrasts a glide + vowel sequence [jă] with a real diphthong [ìá]:

(9) Hmong Daw: fake and real diphthongs

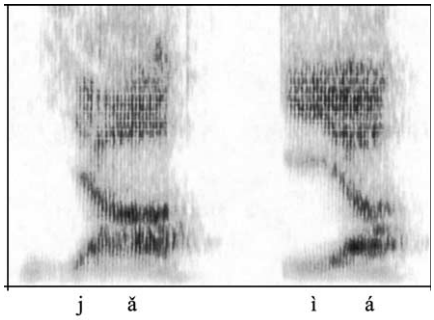

j ă ì á

'rod' 'glass'

The property of being a diphthong never spreads to nearby vowels, suggesting that it is not a feature of vowels in the same way that height and backness are. In many languages, the vowels within a root, stem, or word must agree in height, backness, rounding, nasality, or tongue root features, but nothing like this occurs with diphthongs. We find no

language in which polysyllabic roots, stems, or words contain *either* monophthongs or diphthongs but not both. This suggests that the trajectory within a diphthong is not a distinctive and transferable property of diphthongs but a result of the co-articulation of two vowels within the same syllable nucleus.

Diphthongs often arise from monophthongs, as during the Great Vowel Shift, when long high vowels (iː, uː) became diphthongs (aɪ, aʊ) in English:

(10)	Middle English	Modern English	
	wiːf, liːf, striːf	waɪf, laɪf, straɪf	'wife, life, strife'
	huːs, muːs, luːs	haʊs, maʊs, laʊs	'house, mouse, louse'

Conversely, monophthongs may arise from diphthongs: in many dialects of the American south, [aɪ] has monophthongized into [aː] in words like *tide* [tʰaːd] and *tie* [tʰaː].

Despite the fact that diphthongs are relatively marked sounds in the languages of the world, some children acquire them very early on. Stoel-Gammon and Dunn (1985) reported on a number of English-speaking children whose first words included the diphthongs [aɪ] or [aʊ]:

(11) Daniel (12 months)

[nænæ]	'banana'
[(d)ai]	'light'
[ʔʌʔoʔ]	'uh-oh'
[wəsæ]	'what's that?'

Sarah (11 months)

[bebi]	'baby'
[baɪbaɪ]	'bye-bye'
[dɔgi]	'doggie'
[dus]	'juice'
[mama]	'mama'

Will (12 months)

[(d)ada]	'all-done'
[dæ, dʌ, dau]	'down'
[di]	'light'
[tsis, θiz]	'shoes'
[ʌʔo, hʌho]	'uh-oh'

From out of the mouths of babes like these comes evidence that diphthongs are a natural part of human languages, more so than their relative scarcity in languages might otherwise suggest.

See also: Phoneme; Complex Segments.

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Direct Reference

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What Is Direct Reference?

Let us begin with a brief introduction to some essential terms. A *singular term* is an expression whose role is to specify a particular individual – proper names (e.g., 'John') and pronouns (e.g., 'she') are paradigm cases. A *proposition* is the meaning expressed by a sentence. A sentence whose subject-expression is a singular term (e.g., 'John is tall,' 'She is happy') expresses a *singular proposition*. (In contrast, a sentence whose subject-expression is a general term expresses a general proposition [e.g., 'Tigers are mammals'].)

Direct reference is a contrastive term; the contrasting view is 'mediated' or 'indirect' reference. (For brevity, I'll use the labels 'DR' for the former and 'IR' for the latter.) The classic IR position is developed by Frege (1892). On Frege's view, terms express a

language in which polysyllabic roots, stems, or words contain *either* monophthongs or diphthongs but not both. This suggests that the trajectory within a diphthong is not a distinctive and transferable property of diphthongs but a result of the co-articulation of two vowels within the same syllable nucleus.

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Direct Reference

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What Is Direct Reference?

Let us begin with a brief introduction to some essential terms. A *singular term* is an expression whose role is to specify a particular individual – proper names (e.g., 'John') and pronouns (e.g., 'she') are paradigm cases. A *proposition* is the meaning expressed by a sentence. A sentence whose subject-expression is a singular term (e.g., 'John is tall,' 'She is happy') expresses a *singular proposition*. (In contrast, a sentence whose subject-expression is a general term expresses a general proposition [e.g., 'Tigers are mammals'].)

Direct reference is a contrastive term; the contrasting view is 'mediated' or 'indirect' reference. (For brevity, I'll use the labels 'DR' for the former and 'IR' for the latter.) The classic IR position is developed by Frege (1892). On Frege's view, terms express a

sense that determines a referent. All IR views posit some such semantic mediator between words and referents, and the characteristic virtue of the IR approach is that it affords a clear explanation of how co-referential terms can differ in meaning. (For other examples of influential IR views, see Carnap [1947] and Searle [1983].)

One finds a very different approach to the semantics of (at least some) singular terms in the work of Mill and Russell. However, even though both Mill (1843: 20) and Russell (1919: 283) use the expression 'direct' in relevant contexts, the term 'direct reference' was first explicitly coined, and given a precise sense, by Kaplan (1977: 483). On Kaplan's usage, DR expressions do not conform to one particular tenet of the IR approach, according to which the semantic mediator, the sense or the manner in which the term presents its referent, is a constituent of the proposition expressed. Kaplan's (1977) central thesis is that indexical expressions (such as 'I,' 'yesterday,' or 'that duck') are DR. He also suggests (1977: 558–563) that proper names are DR. A central component of Kaplan's picture is an account of a kind of meaning he calls 'character' (1977: 505–507), which is intended to explain why it seems that co-referential DR terms can make distinct contributions to propositional content.

The heart of Kaplan's notion of DR is Russell's criterion for individuating singular propositions: "A name is merely a means of pointing to the thing, and does not occur in what you are asserting, so that if one thing has two names you make exactly the same assertion, whichever of the names you use…" (Russell, 1918: 245). If a term is DR, in Kaplan's sense, then the propositions expressed by sentences in which it figures are individuated solely in terms of the individuals and properties that they are about, as opposed to in terms of more finely grained senses or concepts. Because the contribution a DR term makes to propositional content is its referent, sentences that differ only in the interchange of co-referential DR terms express the same proposition.

The difference between the DR and IR views, then, is most stark concerning such pairs of sentences – e.g., 'That [pointing to the heavens] is Mars' versus 'Mars is Mars.' On the IR view, there is a clear difference between the propositions expressed by such pairs of sentences; for one has as a constituent the meaning or sense of 'that,' whereas the other has as a constituent the meaning or sense of 'Mars.' However, the price paid is that IR views posit mediators between terms and referents, and critics allege that these mediators create more problems than they solve. On the DR view, there are no semantic mediators – no senses or concepts – involved in the content of a singular proposition; proponents of the view argue that this affords a more satisfactory account of the content and truth-conditions of such propositions. (That is, singular propositions are about the relevant referents *per se*, not about whatever might happen to satisfy a certain sense or concept.) However, the DR view allows no room for the intuition that such pairs of sentences can express distinct propositions: if 'that' and 'Mars' are co-referential, there is no semantic difference between the propositions expressed by sentences which differ only in their interchange. (See later for more on this difference, and its consequences.)

Recanati (1993) is an important subsequent work on DR. (Recanati is heavily influenced by the works of Perry, collected in Perry [1993].) In the interim, Evans (1982) and McDowell (1986) had spurred a neo-Fregean approach to singular terms by arguing that many criticisms of Frege's views can be met if senses are conceived as object-dependent (and so 'rigid,' in Kripke's [1972] terminology). Recanati defines DR terms as those with a semantic feature that indicates that the truth-condition expressed by sentences containing them is singular or object-dependent, and argues that this gets to the core of the difference between referring expressions (such as names and indexicals) and quantified noun phrases (such as 'a man' or 'all Texans'). Recanati's notion of DR is weaker than Kaplan's, in that neo-Fregean singular terms (which express object-dependent senses) would be classified as DR in Recanati's sense but not in Kaplan's (because object-dependent senses figure as constituents of propositions for Recanati, which is inconsistent with Kaplan's Russellian criterion for individuating propositions). On Recanati's view, as distinct from Kaplan's, sentences that differ only in the interchange of co-referential DR terms, although truth-conditionally equivalent, express distinct propositions.

Neither Kaplan nor Recanati deny that DR expressions are semantically associated with something like a sense or manner of presentation. (This can hardly be denied for indexicals.) What Kaplan explicitly denies, in calling an expression DR, is that the sense or manner of presentation affects propositional content. What Recanati explicitly denies is that the sense or manner of presentation is truth-conditionally relevant. So, strictly speaking, the contemporary authorities use 'direct reference' to label an approach to propositional content, more so than as a label for any specific approach to reference.

Some Closely Related Concepts

Kaplan's DR is a part of an anti-Fregean tide that swept the philosophy of language in the 1970s. In

much of the secondary literature, the distinction between DR and other aspects of that movement – such as the causal-historical theory of reference, the notion of rigid designation, and the Millian view of proper names – is lamentably blurred. It is not uncommon to find a bundle of such notions lumped together under the umbrella term 'the new theory of reference.' The aim of this section is to be more discriminating about the relations between DR and these other concepts and views.

The Millian view has it that names are connotationless labels: "A proper name is but an unmeaning mark which we connect in our minds with the idea of the object…" (Mill, 1843: 22). This is no mere claim about truth-conditions; it is a very strong claim about the semantics of names. Mill even says that: "The name, therefore, is said to signify the subjects *directly*…" (1843: 20). Nonetheless, it is clear that Mill's notion of direct reference is quite distinct from Kaplan's. Witness the fact that indexical expressions (e.g., 'I,' 'yesterday') are the very paradigm of DR for Kaplan, but are clearly not unmeaning marks. Kaplan (1977: 520) discusses this "drawback to the terminology 'direct reference'" – that it "suggests falsely that the reference [of an indexical] is not mediated by the meaning, which it is." Explicitly, Kaplan (1989: 568) does not deny that DR terms are semantically associated with something like a sense. What he denies is that the sense is a propositional constituent.

In the case of proper names, though, this conflation of DR with the Millian view is more prevalent, and more difficult to rebut. One reason is that there are strong considerations against the view that names are semantically associated with a particular semantic mediator (see especially Donnellan [1970] and Kripke [1972]). So, in the case of names, as compared with indexicals, it is more difficult to identify anything that plays a semantic role akin to Kaplan's character, singling out the referent without affecting propositional content. Hence, although it is implausible to hold that indexicals are Millian (even if they are DR), it is not uncommon to encounter the idea that names are Millian (i.e., a name's meaning is just its referent) and that names are DR (i.e., a name's contribution to propositional content is just its referent) are two sides of the one coin. However, to the contrary, there is clearly conceptual space for the view that proper names are DR but not Millian (i.e., names are semantically associated with some kind of sense or meaning, but nonetheless that sense or meaning is truth-conditionally irrelevant, no part of propositional content).

Although a term could clearly be DR without being Millian, it is plausible that if a term is Millian then it is DR. That is, if all that there is to the semantics of a term is that it labels a specific referent, then it is hard to see what else but the referent could affect propositional content. A similar relation holds between Kaplan's DR and Kripke's (1972) rigid designation. (A designator is rigid if it designates the same thing in every possible world.) There are clearly rigid designators that are not DR (say, 'the even prime'), but nonetheless any DR term will satisfy the criterion for rigidity (see Kaplan [1977: 492–498, 1989: 569–571]). So, there are rigid terms that are not DR, and DR terms that are not Millian; but any Millian term would be DR, and all DR terms are rigid.

There is a nice fit between the semantics of DR and the causal-historical story of how reference is determined. Donnellan's (1970) and Kripke's (1972) influential arguments that the meaning of a proper name is not some kind of descriptive sense have been taken to demonstrate, or to suggest, general and fundamental problems with any IR approach to names. From here, it looks compelling to conclude that a name's contribution to propositional content is just its referent. Furthermore, it is possible that appeal to distinct causal-historical chains of transmission can explain why it seems that co-referential names differ in meaning. (More on this later.)

In any case, the present point is just that these are all are distinct doctrines, addressed to quite different questions. The Millian view is a bold conjecture about the semantics of names, DR is a somewhat weaker claim about propositional content, rigid designation is a still weaker modal claim about certain terms, and the causal-historical theory is a picture of how reference is determined. There are deep and interesting relations between these concepts and views, but they should not be conflated.

Problems with Direct Reference

The classic problems for DR are, not surprisingly, the very problems that led to the development of the IR view in the first place. The central problem concerns questions of substitutivity – that is, there are reasons to think that interchanging co-referential expressions fails to preserve propositional content. Substitutivity arguments against the DR view of names have been part of the canon since Frege (1892). Competent speakers can fail to recognize that co-referential names do in fact name the same object, and so sentences that differ only in the interchange of co-referential names seem to express distinct propositions. Clearly, similar things can happen with indexicals. Consider, for example, Kaplan's (1977: 537) case wherein he sees a reflected image of a man whose pants are on fire, then subsequently come to recognize that he is that man. Even though his initial 'His pants

are on fire' and subsequent 'My pants are on fire' are truth-conditionally equivalent, there are significant semantic differences between them.

So, the DR theorists need to accommodate the considerable reasons for thinking that sentences that differ only in the interchange of co-referential terms can express distinct propositions. Alternatively put, although the IR view issues in more finely grained propositions, which are better suited to capture the content of a belief, the DR view issues in propositions which are too coarsely grained for this purpose. (For example, believing that 'His pants are on fire' and believing that 'My pants are on fire' would prompt different actions; insofar as the DR view is committed to the claim that these beliefs have the same content, then, something is amiss.)

Kaplan's (1977) notion of 'character' is intended to solve this problem for the case of indexicals – i.e., to explain the differences between 'His pants are on fire' and 'My pants are on fire,' in a way that is consistent with the semantics of DR. The extent to which Kaplan's account is successful is one of the central points of controversy in the subsequent literature on this topic. Note also that there are cases, first raised by Perry (1977), which character cannot accommodate. The cases concern two uses of the same demonstrative – and so character remains constant – wherein, unbeknownst to the speaker, the same individual is referred to twice. (For instance, a speaker utters 'This ship (pointing to the stern of a ship through one window) is American but this ship (pointing to the bow of a ship through a different window) is Japanese.') Kaplan (1977: 514ff) makes some effort toward accommodating this kind of problem, but his remarks are sketchy, and have been contested. (Cf. Braun [1994] for discussion, and King [2001] for an overview of the burgeoning literature.)

In the case of names, DR theorists have drawn on the causal-historical theory of reference to explain why it seems that co-referential names differ in meaning. This explanation, developed by Kripke (1972), Kaplan (1989), and Stalnaker (1997), relies on a sharp distinction between the semantic question of what a word refers to and the metasemantic question of why a word refers to what it does. DR is a semantic claim (i.e., sentences containing names express Russellian singular propositions), and the causal-historical theory suggests a complimentary metasemantic claim (i.e., co-referential names are distinct words with different causal histories, and so there may be all manner of non-semantic differences between them). The thought is that these (non-semantic) differences can explain why uses of co-referential names can communicate different things, even though the names are semantically equivalent.

Whether such an account holds any promise of saving DR from Frege's problem is also much contested. For attempts to make the case, see Salmon (1986) and Soames (2002); for arguments against its promise, see Schiffer (1987, 2003: Chap. 2). These and other debates surrounding DR continue to be among the most vibrant in contemporary philosophy of language.

See also: Causal Theories of Reference and Meaning; Character versus Content; Empty Names; Object-Dependent Thoughts; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects; Propositional Attitudes; Reference: Philosophical Theories; Rigid Designation; Senegal: Language Situation; Sense and Reference: Philosophical Aspects.

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Disambiguation, Lexical

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Introduction

Lexical ambiguity is common to all human languages. Indeed it is a fundamental defining characteristic of a human language: a relatively small and finite set of words is used to denote a potentially infinite space of meaning and so we find that many words are open to different semantic interpretations depending on the context. These interpretations can be called word senses. From very frequent words such as *call* (28 verb senses in the Princeton WordNet 2.0) to medium-frequency words such as *bank* (10 noun senses) to infrequent words such as *crab* (4 verb senses) to very rare words such as *quoin* (3 noun senses), lexical ambiguity is pervasive and inescapable. **Table 1** lists some of the WordNet senses of these words.

Lexical disambiguation in its broadest definition is nothing less than determining the meaning of a word in context. Thus, as a computational problem it is thought to be AI-complete – it is as difficult as any of the hard problems in artificial intelligence including machine translation and commonsense reasoning. Of course, it is not an end in itself but an enabler for other tasks and applications of natural language processing such as parsing, semantic analysis of text, machine translation, information retrieval, lexicography, and knowledge acquisition. In fact, it was first formulated as a distinct computational task during the early days of machine translation in the late 1940s, making it one of the oldest problems in natural language processing.

Lexical disambiguation is at the intersection of several fields, including linguistics, cognitive science, lexical semantics, lexicography, and, of course, computational linguistics. But it is the last two fields that have had the most influence on the research, the majority of which has focused on more constrained versions of the problem.

In the field of computational linguistics, the problem is generally called word sense disambiguation (WSD): to computationally determine which sense of a word is activated by the use of the word in a particular context. For example, the context (in its broadest sense, including both the sentence and text itself and any other knowledge the reader might have of such situations) can disambiguate *call* in *She was called into the director's office*. Thus, WSD is essentially a task of classification; word senses are the classes. This is a traditional and common characterization of WSD that sees it as an explicit process of disambiguation with respect to a fixed inventory of word senses. Words are assumed to have a finite and discrete set of senses – a gross reduction in the complexity of word meaning.

This characterization has led to a dream that an accurate generic component for WSD will one day be developed. But we may never see this dream come true because WSD is highly application-dependent and domain-dependent. For one, a task-independent sense inventory is not a coherent concept: each task requires its own division of word meaning into senses relevant to the task. For example, the ambiguity of *mouse* (animal or device) is not relevant in English-French machine translation, but is relevant in information retrieval. The opposite is true of *river,* which requires a choice in French *(fleuve* 'flows into the sea' or *rivière* 'flows into a river'). Moreover, in any given domain of language use, many words are not ambiguous.

Second, completely different algorithms might be required by different tasks. In machine translation, the problem takes the form of target word selection. Here the senses are words in the target language, which often correspond to significant meaning distinctions in the source language (*bank* could translate to French *banque* 'financial bank' or *rive* 'edge of river'). In information retrieval, a sense inventory is not necessarily required because it is enough to know that a word is used in the same sense in the query and a retrieved document; what sense that is is unimportant.

Table 1 Examples of lexical ambiguity (senses from Princeton WordNet 2.0)

Word	*Number of senses*	*Examples*
call	28 verb senses, 13 noun senses	'to assign a name to', 'to get into communication by telephone', 'to utter a sudden loud cry', 'to lure by imitating the characteristic call of an animal', 'order, request, or command to come', 'order or request or give a command for'
bank	8 verb senses, 10 noun senses	'financial institution', 'sloping land'
crab	4 verb senses, 7 noun senses	'to direct an aircraft into a crosswind', 'to scurry sideways like a crab', 'to fish for crab', 'to complain'
quoin	3 noun senses	'expandable metal or wooden wedge used by printers to lock up a form within a chase', 'the keystone of an arch', 'solid exterior angle of a building; especially one formed by a cornerstone'

Third, explicit WSD has not yet been convincingly demonstrated to have a positive effect on any significant application. In many applications, lexical disambiguation occurs implicitly by virtue of other operations such as domain identification or a phenomenon called mutual disambiguation.

Nonetheless, as a scientific endeavor, explicit WSD is very attractive: it is easy to define, experiment with, and evaluate and, as a result, is leading us to a better understanding of word meaning and context.

Research has progressed steadily to the point where explicit WSD systems achieve consistent levels of accuracy on a variety of word types and ambiguities. The best performing systems use a supervised corpus-based approach, in which a classifier is trained for each distinct word over a corpus of manually annotated examples of each word in context. Bayesian learning and support vector machines have been the most successful algorithms to date, probably because they can cope with the very high dimensionality of the feature space. Virtually any feature derivable from the surrounding context of a word has been used. The field is particularly rich in the variety of techniques employed, from dictionary-based methods that use the knowledge encoded in lexical resources to completely unsupervised methods that cluster occurrences of words, thereby inducing word senses.

Current accuracy on the task is difficult to state without a host of caveats. On English, accuracy at the homograph level (a coarse-grained level of sense distinction) is routinely above 90%, with some methods on particular homographs achieving 96.5%. On finer-grained sense distinctions, 73% accuracy was reported at Senseval-3, an open evaluation exercise held in 2004. The baseline accuracy, the performance on the simplest possible algorithm of always choosing the most frequent sense, was 55%. An upper bound on accuracy, a measure of the difficulty of the task based on human performance, was 67% (this figure may seem low, but see the section on Evaluation). Unsupervised systems do not perform as well. At Senseval-3, the best unsupervised systems achieved approximately 58% accuracy (below the baseline). Performance is highly affected by many factors including the granularity of the sense distinctions, the quality of the sense inventory, and the words chosen for evaluation.

The rest of this article discusses these issues in greater detail. Note that although lexical ambiguity is pervasive in all human languages, to a large extent the methods of disambiguation are independent of any particular language. Thus, most of the examples in this article are drawn from the research done on English, the language most employed in research.

Making Sense of Words

> Humpty Dumpty said [...]: "There's glory for you."
> "I don't know what you mean by 'glory,'" Alice said.
> Humpty Dumpty smiled contemptuously. "Of course you don't – till I tell you. I meant, 'There's a nice knock-down argument for you!'"
> "But 'glory' doesn't mean 'a nice knock-down argument,'" Alice objected.
> "When I use a word," Humpty Dumpty said in rather a scornful tone, "it means just what I choose it to mean – neither more nor less." (Lewis Carroll, *Through the Looking Glass*)

Polysemy

Lexical semantics (*see* **Lexical Semantics: Overview**) is the theoretical study of word meaning, one aspect of which is lexical ambiguity, or polysemy. Word meaning is in principle infinitely variable and context sensitive. It is does not divide up easily into distinct or discrete submeanings. Lexicographers frequently discover in corpus data loose and overlapping word meanings and standard or conventional meanings extended, modulated, and exploited in a bewildering variety of ways. The result is that most sense distinctions are not as clear as the distinction between *bank* as 'a money lender' and *bank* as 'a riverside'. For example, the former *bank* has several closely related meanings including:

- the company or institution
- the building itself
- the counter where money is exchanged
- a money box (*piggy bank*)
- the funds in a gambling house
- the dealer in a gambling house
- a supply of something held in reserve
- a place where the supply is held (*blood bank*).

Ambiguity of this sort is pervasive in languages and is often difficult to resolve, even for people. A given use of a word will not always clearly fall into one of the available meanings in any particular list of meanings. Nevertheless, lexicographers do manage to group a word's uses into distinct senses, and all practical experience on WSD confirms the need for representations of word senses.

Lexical semantics defines a spectrum of distinctions in word meaning in terms of granularity, as shown in Figure 1. At the coarse-grained end of the spectrum (the top-left end), a word might have a small number of senses that are clearly different, but, as we move to finer-grained distinctions (the bottom-right end), the coarse-grained senses break up into a complex structure of interrelated senses.

At a coarse grain, many words do have clearly distinguishable senses. A word has part-of-speech ambiguity if it can occur in more than one part of speech. For example, *sharp* is an adjective ('having a thin edge'), a noun ('a musical notation'), a verb ('to raise in pitch'), and an adverb ('exactly'). Part-of-speech ambiguity does not necessarily indicate distinct meanings (e.g., the relation between a verb and its nominalization), but it can be resolved by part-of-speech tagging (*see* **Part-of-Speech Tagging**), a simpler and more accurate class of algorithms than the WSD algorithms given in this article. In the majority of WSD systems, part-of-speech tagging is used as an initial step, leaving the WSD algorithm to focus on within-part-of-speech ambiguity.

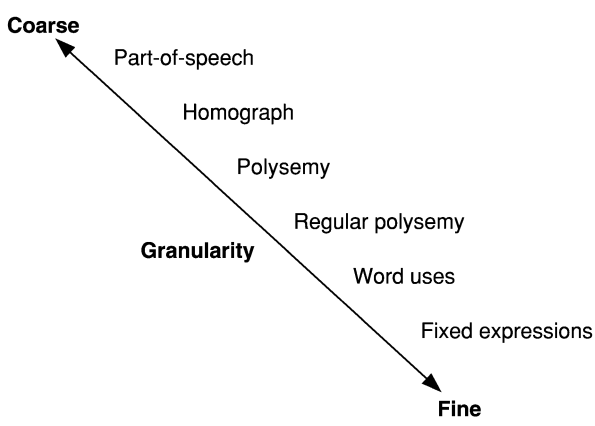

Figure 1 The spectrum of distinctions in word meaning.

A homograph is a word that has two or more distinct meanings, but the definition is somewhat arbitrary. Etymology (*see* **Etymology**) is a major source of homographs; for example, the *bow* of a ship derives from the Low German *boog*, whereas the *bow* for firing arrows derives from the Old English *boga*. (Incidentally, *bow* is a good example of the potential for WSD in a text-to-speech application to point to the right pronunciation.) Resolving homographic ambiguity routinely achieves above 90% accuracy and is generally considered a solved problem.

Hence, polysemy is the real challenge. Most common words have a complex structure of interrelated senses below the homograph level, as exemplified by *bank*. Even rare and seemingly innocuous words (e.g., *quoin*, see Table 1) have polysemous senses. Individual senses are often related by a process of extension or modification of meaning – it could be historical, functional, semantic, or metaphorical. For example, the *mouth* of a bottle, a cave, and a river are defined by analogy to the *mouth* of a person. Sometimes the relation is so close as to make disambiguation almost impossible without background knowledge on why the distinction was drawn. Consider two WordNet 2.0 (*see* **WordNet(s)**) senses of *national*: (1) 'in the interests of the nation' and (2) 'concerned with an entire nation or country'.

When the relation is systematic across a class of words it is called regular polysemy and includes ambiguities such as physical object/content (*book*) and institution/building (*bank*). Regular polysemy is not usually explicitly treated in dictionaries or in WSD, and indeed in some cases both senses can be active at once (*book* in *I'm going to buy John a book for his birthday*).

Many other phenomena make word meaning difficult to formalize, including slightly differing word use in context (e.g., *ball* as a *tennis ball* or *football* has different associations in text), fixed expressions (*piggy bank*), metonymy and metaphor (*crown* in *the lands of the crown*), and vagueness in context (*national* and *book*).

Words can have as many meanings and subtle variations as people give to them. So, is the very notion of word sense suspect? Some argue that task-independent senses simply cannot be enumerated in a list because they are an emergent (psychological) phenomenon, generated during production or comprehension with respect to a given task. Others go further to argue that the only tenable position is that a word must have a different meaning in every distinct context in which it occurs – words have an infinite number of senses.

Notwithstanding the theoretical concerns of the logical or psychological reality of word senses, the

field of WSD has successfully established itself by largely ignoring them. As with modern lexicography (*see* **Lexicography: Overview**), which is based on the intuition that word uses do group into coherent semantic units, the field has been defined by a practical problem, which happens to be well suited to empirical and computational techniques. The inherent difficulty of lexical disambiguation proper is, of course, acknowledged – our understanding of lexical semantics is just far from adequate.

Context and Disambiguation

If polysemy is an intrinsic quality of words, then ambiguity is an attribute of text. Whenever there is uncertainty as to the meaning that a speaker or writer intends, there is ambiguity. So, polysemy indicates only potential ambiguity, and context works to remove ambiguity.

Principles of effective communication would have us avoid vagueness and ambiguity. This would mean eliminating all potential lexical ambiguity by creating a context that forces only one possible interpretation of every word. Difficult to achieve, many a verbal dispute hinges on the confused multiple meanings of key terms. But sometimes ambiguity is desired and explicitly fashioned. Puns, for instance, require not only that two (or more) meanings be active simultaneously but that the reader recognizes the ambiguity: *time flies like an arrow; fruit flies like a banana*. Intentional ambiguity is not just for humor. Everyone is familiar with the politician who uses ambiguous or vague terminology in the service of diplomacy, equivocation, or the evasion of difficult questions. And sometimes potential ambiguity just does not matter and is not worth the effort to resolve because either reading is acceptable (e.g., *book* or *national*).

Now, in normal well-written text or flowing conversation, potential ambiguity generally goes unnoticed by people. The effect is so strong that some people cannot find the pun that is in front of their nose. Evidence suggests that people use as little as one word of context in lexical disambiguation. This indicates that context works very efficiently behind the scenes in disambiguation by people.

But to a WSD system, every polysemous word is ambiguous. It must resolve the ambiguity by using encoded knowledge of word meaning and the evidence it can derive from the context of a word's use. Thus, word meaning and context are core issues in WSD.

Measures of Difficulty

This section introduces several measures of the difficulty of WSD that can be computed from the distribution of word senses in text: average polysemy, the most frequent sense of a word, and the entropy of a sense distribution. A fourth measure, interannotator agreement, is discussed in the section on Evaluation.

How much potential ambiguity is there in text? First, consider dictionaries. In practical terms, there is a limit to the amount of polysemy that a vocabulary can bear; that is, only a finite number of concepts are lexicalized and granted the status of word sense. *Longman's Dictionary of Contemporary English* (LDOCE), for example, lists 76 060 word senses spread over 35 958 unique words (lexical units, to be precise). Of these unique lexical units, 38% (14 147) are polysemous, so the average polysemy of LDOCE is 3.83 senses per polysemous word. Every dictionary has a different division of meaning. WordNet 2.0 has an average polysemy of 2.96 senses per lexical unit (125 784 unique lexical units, 26 275 ambiguous covering 77 739 senses).

Now consider text. Table 1 provides a clue that the more frequent a word is in actual text, the more senses it is likely to have. This skewed distribution was first observed by George Zipf, who attributed it to his Principle of Least Effort (Zipf, 1949). Zipf argued that to minimize effort a speaker would ideally have there be a single word with all meanings, whereas the hearer would prefer each word to have a single different meaning. These competing pressures led Zipf to the Law of Meaning, a power-law relationship between the number of senses of a word, s, and its rank, r, in a list sorted by word frequency:

$$s \propto r^{-k}$$

He empirically estimated an exponent $k = 0.466$ using the Thorndike-Century dictionary. Zipf thereby explained the origin of word senses. (Note that this law is different from Zipf's Law about the distribution of word frequencies (*see* **Zipf, George Kingsley (1902–1950)**).)

Figure 2 graphs the skew of words in the British National Corpus (BNC) with respect to WordNet 2.0 senses. BNC words (root forms of nouns, verbs, and adjectives) in rank order by frequency in the BNC are plotted against the number of WordNet 2.0 senses per word. Each point actually corresponds to the mean number of senses in a bin of 100 words in rank order. The distribution is a power-law with the exponent $k = 0.404$, very close to Zipf's estimate. Clearly, a few very frequent words are very polysemous, and most words, on the tail, have only one or two senses. Thus, the average polysemy of a text, considering word occurrences, will be higher than statistics covering a dictionary suggest. The BNC has an average polysemy of 8.04 WordNet 2.0 senses per polysemous word (84% of word occurrences are potentially ambiguous) and 10.02 LDOCE senses (Table 2). Data

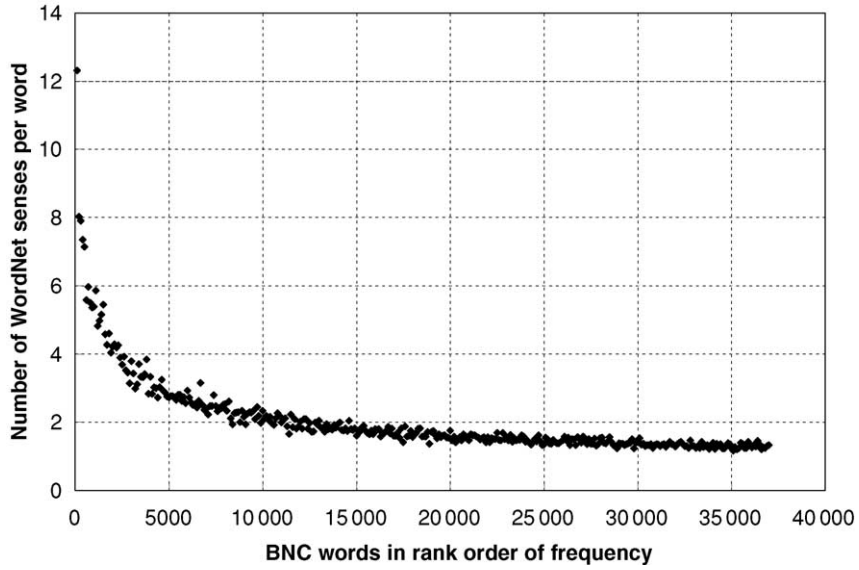

Figure 2 Skew of the distribution of words by number of senses. BNC words are plotted on the horizontal axis in rank order by frequency in the BNC. Number of WordNet senses per word is plotted on the vertical axis. Each point represents a bin of 100 words and the average number of senses of the words in the bin.

Table 2 Average polysemy of WordNet 2.0 and LDOCE and the BNC

Resource	*WordNet 2.0*	*LDOCE*
Number of words	125 784	35 958
Number of polysemous words	26 275	14 147
Number of senses	77 739	76 060
Average polysemy (all words)	0.618	2.12
Average polysemy (polysemous words)	2.96	3.83
Average polysemy of BNC (all words)	7.23	8.87
Average polysemy of BNC (polysemous words)	8.04	10.02

sparseness is unavoidable for most ambiguous words in the corpus, which implies there will be a problem in discovering the contextual clues for disambiguation.

Average polysemy is unsatisfactory as a measure of difficulty because it might actually be an overestimate – the division of meaning might not match the domain of discourse or the task. A heuristic called one sense per discourse states that words are not ambiguous within a single discourse; a given word will be used in the same sense throughout a given document or more strongly throughout texts in the same domain. For example, in weather reports, *wind* will always have the obvious sense and none of its other senses (8 noun senses in WordNet 2.0). Average polysemy would drop to 1.0, putting WSD out of a job. However, even domain-specific texts can contain potentially ambiguous words. For example, *line* in text about electronics can mean at least 'a wire in a circuit', 'a product line', 'a production line', and 'a bottom line'. One study reports that 33% of words in SemCor have multiple senses per document. So, a system has to decide for which words and domains the one-sense-per-discourse heuristic applies. Moreover, many applications are open domain, such as wide-coverage machine translation and web/news search engines, and would benefit from a domain-independent WSD component.

A more accurate way to calculate average polysemy is to use a sense-tagged corpus to count the senses that are actually attested in the corpus. SemCor is a 234 000-word corpus manually tagged with WordNet 1.6 senses. It has been extremely valuable in WSD research. The average polysemy of SemCor is 6.3 senses per word – not all senses are used in the corpus.

Not only is the distribution of words with respect to number of senses skewed but also the distribution of senses of a word. Figure 3 reveals that in SemCor, the most frequent sense of a word accounts for the majority of the word's occurrences. The distributions (power-law relationships again) of 12 word classes in SemCor ranging from 1-sense words to 12-sense words are shown in 12 columns. Senses are ordered bottom to top by the proportion of occurrences of the word that they account for, normalized per word, and averaged over all words in the class. Data sparseness is also a problem for the rarer senses of a word. Choosing the most frequent sense provides a high baseline to measure performance against; in SemCor it achieves 39% accuracy against 18% for random choices.

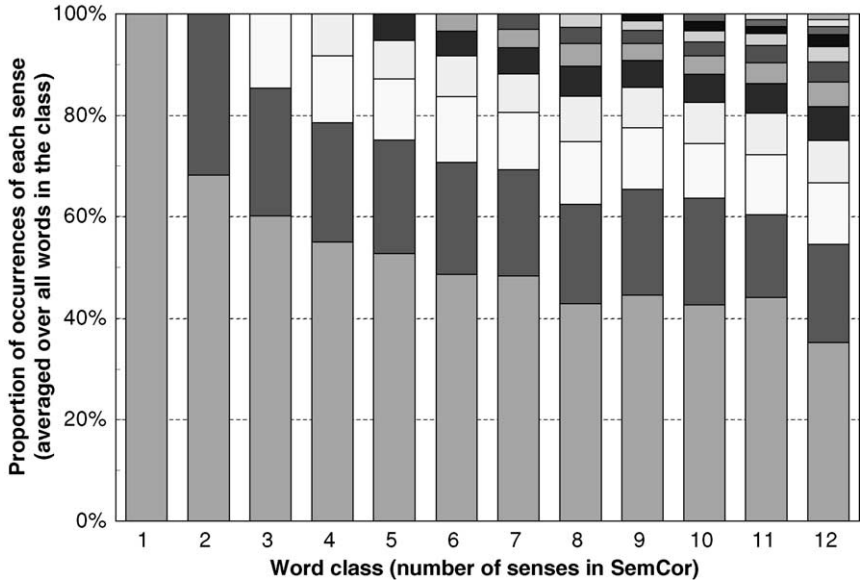

Figure 3 Skew in the distribution of the senses of words. The distributions for 12 word classes in SemCor ranging from 1-sense to 12-sense words. In each class (column), the senses are ordered by frequency, normalized per word, and averaged over all words in the class.

Difficulty can also be assessed with respect to an individual word, in terms of its number of senses, the proportion of its most frequent sense, and sense entropy. Sense entropy is a measure of the skew in a word's sense distribution. High entropy represents a less-skewed, and therefore more difficult, problem. Studies show that the accuracy of WSD algorithms (supervised learning methods, in particular, were analyzed) is roughly correlated with task difficulty according to any of these measures. For example, when the proportion of the most frequent sense exceeds 80%, algorithms do not do any better than the baseline of choosing the most frequent sense.

Applications and the Sense Inventory

A long-standing debate is whether WSD should be thought of as a generic component; a kind of black box that can be dropped into any application, much like a part-of-speech tagger; or as a task-specific component designed for a particular application in a specific domain and integrated deeply into a complete system. On the one side, research into explicit WSD has progressed steadily and successfully to a point where some people question if the upper limit in accuracy has already been attained. On the other side, explicit WSD has not yet been convincingly demonstrated to have a positive effect on any significant application. Only the integrated approach, with disambiguation often occurring implicitly by virtue of other operations, has been successful. The one side is clearly easier to define, experiment with, and evaluate; the other has applications and threatens the need for explicit WSD altogether. The majority of researchers who focus on WSD take the former side.

The debate can be explained in terms of the sense inventory. Every application of word sense disambiguation requires a sense inventory, an exhaustive listing of all the senses of every word that an application must be concerned with. The nature of the sense inventory depends on the application, and the nature of the disambiguation task depends on the inventory. The three Cs of sense inventories are clarity, consistency, and complete coverage of the range of meaning distinctions that matter. Sense granularity is a key consideration: too coarse and some critical senses may be missed, too fine and unnecessary disambiguation errors may occur. For example (repeated from the introduction), the ambiguity of *mouse* (animal or device) is not relevant in English-French machine translation, but is relevant in information retrieval. The opposite is true of *river (fleuve* 'flows into the sea' or *rivière* 'flows into a river').

Thus, the source of the sense inventory is the main decision facing all researchers and application developers. Next, the four main sources of sense inventories and three main application areas are described.

Four Sources of Sense Inventories

Dictionary-based inventories have their source in machine-readable dictionaries (MRDs). Because of their early availability, before large textual corpora, some of the seminal work in WSD relied on MRDs, and many current methods extract knowledge from

MRDs. LDOCE has seen the most use in WSD. It provides hierarchical sense distinctions from the homograph level down to a fine granularity, and entries include extra information useful in WSD such as subject codes and example sentences. LDOCE is a commercial product, but another dictionary, HECTOR, was developed primarily as a research tool by Digital Equipment Corporation and the Oxford University Press, one of whose goals was to support WSD research. HECTOR was used in Senseval-1 (see Evaluation section) and could have developed into a very well-used resource. It is linked to a sense-annotated corpus, from which the senses were derived. However, it is incomplete, covering approximately 1400 lexical entries. Dictionary-based inventories have several disadvantages. Dictionaries, whose market is people (not natural language processing (NLP) researchers or application developers), are subject to standard market pressures, which dictate the size of the dictionary, the coverage and depth, and crucially the granularity and interpretation of sense distinctions. As a result, the senses may not match those that are required by the application. Dictionaries also assume the vast knowledge of a human reader and so leave out commonsense information that is very useful in WSD.

A lexical database (or lexical knowledge base) is a step beyond the MRD. The main example, WordNet, has become the *de facto* standard in WSD research (for English; WordNets in other languages have also been used in WSD). WordNet shares many of the advantages and disadvantages of MRDs because, although it was designed for research, it was not specifically designed for WSD. It has the significant advantage that senses, or synsets, form a semantic network (primarily a hierarchy), which has been very useful in WSD, for example, to compute the relatedness between word senses. Its disadvantages are that it focuses on concept similarity rather than on what makes two senses different and that it is too fine-grained for applications and even for human annotators to reach high agreement. The latter disadvantage can be overcome by grouping closely related senses, depending on the task and corpus. A thesaurus, especially *Roget's International Thesaurus* with its extensive index, can also be used as a sense inventory: each entry of a word under a different category usually indicates a different sense.

A multilingual dictionary can also form a sense inventory. The translations of a word into another language can serve as word sense labels because the different meanings often translate into different words. This phenomenon is most consistent for homographs (e.g., *change* into French *changement* ('transformation') or *monnaie* ('coins')), but even very fine-grained distinctions are sometimes lexicalized differently, especially in distantly related language pairs (e.g., Chinese lexicalizes the building/institution polysemy of *church*: 教堂 'building, e.g., temple' and 教会 'institution'). One advantage of translations is to provide a practical level of sense granularity for many applications, especially machine translation. But the major advantage is the possibility of easily acquiring large amounts of training data from parallel texts. The disadvantage is that, outside of machine translation in the given language pair, the word senses do not always carry over to other language pairs or applications; for example, *interest* in three of its major senses ('sense of concern', 'legal share', and 'financial accrual') corresponds to a single word in French, *intérêt*. We also lose the extra information contained in MRDs and lexical databases.

Automatically induced sense inventories are a response to the disadvantages of dictionaries and other hand-built resources. By deriving a sense inventory directly from a corpus, the right level of sense granularity can be achieved and no external resources are required. A bilingual sense inventory can also be induced from a parallel corpus (i.e., a corpus in two languages) by word-aligning the corpus. The advantage of the approach is also its disadvantage: An inventory that directly characterizes the sense distributions of a corpus cannot be easily used with a different corpus. Also, it can be difficult to get a corpus that is large enough to contain evidence for each important sense (at least 50 instances per sense). The induced senses might not have human-readable labels, making it difficult to map the induced inventory to another (such as WordNet), which makes system comparison problematic.

Applications

Machine Translation Early researchers in machine translation (MT) (*see* **Machine Translation: Overview**) felt that the inability to automatically resolve sense ambiguity was a key factor in the intractability of general MT. However, explicit WSD has yet to be shown to be useful in real MT applications. Instead, implicit disambiguation, such as target word selection, has been used in MT.

Domain plays a strong role in disambiguation (recall the one-sense-per-discourse heuristic previously discussed). Most real MT systems rely on specialized dictionaries for each domain that leave most words unambiguous. Any remaining serious ambiguity can often be handled using hand-crafted rules. In fact, even general-domain MT systems, such as Systran, reportedly use extensive sets of hand-crafted rules to get major sense distinctions right. So, WSD is not

ineffective; it is just subsumed by a different semantic process, developing lexical resources.

Statistical MT systems resolve ambiguity in a different manner. Roughly, statistics model how a source word or sequence of words translates into the target language. The model induces a sense inventory with translation probabilities for target word selection. A good model of target language sequences is also required. For example, one early statistical MT system makes the following incorrect translation (from French to English):

Je vais prendre ma propre décision.
'I will take my own decision.'

This is because it chooses the most common translation of *prendre* 'take'; the model does not realize that *take my own decision* is improbable because it knows only about three-word sequences (trigrams). In this case, an explicit WSD component improved the accuracy of the overall system by 22% (Yarowsky, 2000). But this line was never pursued because it was thought to be better to improve the translation model itself by using a more structured representation of the context. Then, lexical disambiguation would occur implicitly, but would rely on the same type of contextual information as explicit WSD uses.

Lexicography and Information Extraction A broad range of applications in knowledge acquisition can make use of WSD. In particular, lexicography (*see* **Lexicography: Overview**) and WSD have a mutual relationship in that lexicographers build the sense inventories that WSD disambiguates to. In productive use, WSD and lexicography can work in a loop, with WSD providing rough sense groupings to lexicographers, who provide better sense inventories and sense-annotated corpora to WSD. The HECTOR project was the first attempt to do this, but it was never fully realized. Later efforts have occurred within the Senseval framework – senses that are difficult for human annotators or for systems are fed back to lexicographers for improvement.

Lexical resources and knowledge-bases are continuing to grow in many languages. WSD is playing a key role in mapping between resources to create consistent multilingual resources (for example, mapping between WordNets in different languages). WSD has been used to disambiguate the definitions and example sentences in dictionaries, to better link up the dictionary. End-user applications might include an intelligent dictionary that can find the right word sense given the context of a word, making dictionaries easier to use for second-language learners.

In other knowledge acquisition efforts, such as information extraction and filtering (*see* **Information Extraction, Automatic**) used in the intelligence community, word meaning is crucial. Information extraction has to build a database of, say world events, by linking textual references to the right concepts in the database or ontology. An information filtering system might be set up to flag references to, say, illegal drugs; false hits involving medical drugs would have to be avoided. Often such systems rely on hand-crafted disambiguators for the word and senses in question. Named-entity classification and co-reference determination (*see* **Named Entity Extraction**) is basically WSD for proper names.

Information Retrieval Information retrieval (IR) has seen the most work to prove explicit WSD in an application. Our intuition is that WSD should help to improve IR systems by removing those hits to a query in the wrong sense of a word in the query. Consider querying for banks to invest with and receiving results about the Amazon River. However, the general consensus in the IR community is that explicit WSD makes only marginal improvements in precision and, in some cases, degrades performance. The reasons are the same as for MT: either the IR system is domain-specific, which significantly reduces the problem, or mutual disambiguation occurs. Mutual disambiguation is the phenomenon that the natural co-occurrence of words in queries and in documents tend to disambiguate one another. For example, the query "bank to invest with" would retrieve a document containing *bank* and *invest* (because IR systems generally index and retrieve on words), in which *bank* most likely happens to be used in the financial sense (*bank* in its river sense would not tend to co-occur with *invest*). Mutual disambiguation is another form of implicit disambiguation, directly encoding the same type of contextual information as explicit WSD uses.

In IR, explicit WSD is applied by indexing word senses rather than words and then by performing WSD on any input query. It has been suggested that 90% accuracy is necessary to improve performance and that a 20–30% error rate is equivalent to no disambiguation at all. Anything more will degrade performance. Current WSD does not approach this level of accuracy except for homographs; but, then, it is often said that only homograph-level distinctions are relevant in IR because matches of different polysemous senses could well be desirable to the user. But consider the word *ball,* which has a fine-grained ambiguity with respect to different sports that could be relevant to a user's information need. This implies that choosing the right sense inventory is dependent not only on the collection but also on information needs of the users.

WSD would be potentially effective in two cases. First, it would improve performance on short two- to four-word queries (common on Web search engines), where mutual disambiguation does not work consistently. Unfortunately, short queries are also difficult for WSD techniques for the same reasons – lack of context. Second, when query expansion is used (i.e., to add synonyms and other related words to queries), WSD can ensure that only synonyms in the right sense are added. Cross-lingual IR does benefit from explicit WSD to translate and expand the query properly, avoiding the noise added by incorrect translations.

In several experiments to automatically induce a sense inventory from a IR collection, a 7–14% improvement in IR precision was observed (Schütze, 2000). The induced inventory can pick out the fine-grained ambiguities (such as *ball*) when they are present. Disambiguation errors, because of the mismatch between external sense inventory and collection, are reduced.

Finally, WSD has been applied in several IR-based end-user applications including news recommenders and automatic advertisement placement. For example, the word *ticket* in a query could trigger ads about airline tickets, traffic tickets, or theater tickets, depending on its sense in the query.

Historical Context

This section acknowledges a few of the visionaries, firsts, and influential works about WSD. It cannot come close to acknowledging all contributors.

WSD as a distinct computational problem has its roots in the first research on machine translation, and early researchers well understood the significance and difficulty of WSD. Warren Weaver, director of the Natural Sciences Division of the Rockefeller Foundation, circulated a now-famous memorandum in 1949, which already formulated the general methodology to be applied in all future work:

> If one examines the words in a book, one at a time through an opaque mask with a hole in it one word wide, then it is obviously impossible to determine, one at a time, the meaning of words. 'Fast' may mean 'rapid'; or it may mean 'motionless'; and there is no way of telling which.
>
> But, if one lengthens the slit in the opaque mask, until one can see not only the central word in question but also say N words on either side, then, if N is large enough one can unambiguously decide the meaning ... (Weaver, 1955)

Weaver also recognized the basic statistical character of the problem and proposed that statistical semantic studies be undertaken as a first step.

In 1949, George Zipf (*see* **Zipf, George Kingsley (1902–1950)**) published the Law of Meaning in his book *Human Behaviour and the Principle of Least Effort* (Zipf, 1949).

Abraham Kaplan, in 1950, called ambiguity the "common cold of the pathology of language" (Kaplan, 1955: 39). His study determined that two words of context on either side of the ambiguous word were equivalent to a whole sentence of context in resolving ambiguity. The 1950s then saw much work in estimating the degree of ambiguity in texts and bilingual dictionaries and in applying simple statistical models (e.g., choosing the most frequent sense) or a Bayesian formula to determine the probability of a sense given the domain.

By the mid-1960s, MT was in decline because the perceived intractability of general MT had reached a zenith. Yehoshua Bar-Hillel (*see* **Bar-Hillel, Yehoshua (1915–1975)**) argued that even the relatively simple case of the ambiguity of *pen* in the following now-famous example could not be resolved by "electronic computer" because of the need to model, in general, all world knowledge (Bar-Hillel, 1960).

> Little John was looking for his toy box. Finally he found it. The box was in the *pen*. John was very happy.

Arguments such as this led to the 1966 ALPAC report (*see* **Machine Translation: Overview**), which in turn caused the end of most MT research and of WSD research along with it.

In the 1970s, WSD revived within artificial intelligence research on full natural language understanding. Margaret Masterman and Ross Quillian had in the early 1960s pioneered the use of semantic networks (of words and senses) and spreading activation to solve WSD. Yorick Wilks then developed preference semantics, one of the first systems to explicitly account for WSD. The system used selectional restrictions and a frame-based lexical semantics to find a consistent set of word senses for the words in a sentence. The idea of individual word experts evolved over this time (Steven Small and Charles Rieger). Word experts encode for each word the constraints and procedural rules necessary to disambiguate it and interact with each other to disambiguate all words in a sentence. In the end, such work faced an impractical knowledge-acquisition bottleneck because of the hand-coding required, but the idea of word experts carried on within the statistical paradigm.

A turning point for WSD occurred in the 1980s, when large-scale lexical resources and corpora became available. Hand-coding could be replaced with knowledge extracted from the resources.

Michael Lesk's short but seminal work (Lesk, 1986) used the overlap of word sense definitions in the *Oxford Advanced Learner's Dictionary of Current English* to resolve word senses. The technique is often used as a baseline today. Other researchers used LDOCE subject codes (e.g., EC for Economics), which label domain-specific senses of words, and *Roget's International Thesaurus*.

The 1990s saw two main developments: the statistical revolution in NLP swept through and Senseval began. Consequently, there was an exponential increase in the research output on WSD, and it becomes difficult to single out any one researcher. Weaver had recognized the statistical nature of the problem. Early corpus-based work by Stephen Weiss in 1973 on WSD for IR and by Edward Kelley and Philip Stone in 1975 on content analysis demonstrated the potential of empirical evidence and machine-learning approaches, presaging the statistical revolution. Peter Brown and his IBM colleagues demonstrated the first use of corpus-based WSD in statistical MT. By the mid-1990s, a wide variety of supervised and unsupervised machine-learning techniques had been applied to WSD (David Yarowsky and his colleagues were influential), but it remained difficult to compare the various results because of disparities in the words, sense inventories, and corpora chosen for evaluation.

Senseval, a forum for the common evaluation of WSD, was first discussed in 1997 (Adam Kilgarriff and Martha Palmer). Senseval has provided a consensus on the appropriate tasks and framework for evaluation, three open competition-based evaluation exercises, and substantial resources (e.g., sense-annotated corpora) for WSD in many languages.

Statistical corpus-based techniques have now been extensively researched, and supervised learning algorithms consistently achieve the best performance on explicit WSD, given sufficient training data.

Methods for Word Sense Disambiguation

This section covers many of the methods for explicit, stand-alone WSD. Implicit disambiguation usually relies on similar contextual evidence and knowledge sources, but the algorithm is entwined with the other processes of an application. The methods are described at a high level of abstraction. Accuracy is given in some cases, but direct comparisons are difficult because the conditions of each experiment were different (see the Evaluation section).

Computational Formulation of the Problem

Explicit WSD is a natural classification problem: Given a word and its possible senses, classify each instance of the word in context into one or more of its sense classes. The features of the context provide the evidence for classification. WSD is characterized by having a very high-dimensional feature space. That is, the surrounding context of a word has many features that can bear on the classification of the word, including features of the surrounding words:

- Word strings (or root words or morphological segments)
- Part-of-speech tags (e.g., 'Noun', 'Transitive verb')
- Subject/domain codes (e.g., 'EC' for Economics in LDOCE)
- Sense classes (of disambiguated or partially disambiguated words)
- Semantic classes and selectional restrictions (e.g., 'Person', 'Drinkable')

features of the relational structure taken part in by the instance of the word:

- Syntactic relations (e.g., modification by an adjective)
- Collocational patterns (i.e., recurrent fixed patterns such as *river bank*)
- General co-occurrence relations (e.g., *invest* anywhere in the local context of *bank*)
- Semantic relations (e.g., similarity or hypernymy)

and features of the text as a whole:

- Topical features (e.g., words and concepts commonly found in wider contexts)
- Subject/domain codes or other classification of a text
- Genre (e.g., financial news)

Specific word order or syntactic structure is often crucial (e.g., the word *plant* to the immediate right of *pesticide* indicates a factory but in other positions indicates flora). The features nearest to the target word typically provide the most predictive power.

A separate classifier, or word expert, is constructed for each word based on various knowledge sources. Hand-construction is one possibility, as in the early artificial intelligence paradigm; automatic acquisition is more common, either from the knowledge in lexical databases (including definitions, example sentences, semantic relations, and subject codes), from corpora (sense-annotated or not), or both.

Some systems perform probabilistic classification, in which a word instance is assigned to multiple sense classes with a probability distribution, when they lack sufficient evidence for any one sense. This can be effective when combining multiple different sense disambiguators or in applications such as information

retrieval in which the later processing is probabilistic itself.

Two less-common formulations of WSD are as a filter and an inducer. A filter removes unlikely senses; for example, a single piece of evidence, say a selectional restriction, might immediately rule out a sense. A sense inducer discovers sense classes by clustering the contexts of a word's instances.

Finally, a note about computational processing required by all methods. Generally, the input text (and training corpus) is preprocessed by standard NLP components including part-of-speech tagging, stemming, morphological analysis and segmentation, and sometimes parsing. Feature vectors are then created in the required formalism. Beyond the basic lexical resources used, the training corpus is sometimes processed to build lexical networks and neighborhoods and bilingual word alignments. The computational complexity of WSD has not yet been a general concern except when it makes running hundreds or thousands of experiments infeasible.

Dictionary-Based Methods

In many respects, dictionary-based methods are the easiest to comprehend because it is obvious why they work when they work. The Lesk Method, as it has come to be known, was the first to use dictionary definitions, the obvious source of knowledge about word meanings. It is based on the hypothesis that words used together in text are related to one another and that the relation can be observed in the definitions of the words and their senses (cf. mutual disambiguation). Thus, the method disambiguates a word by comparing its definition to those of the surrounding words. In the case of two words, it considers all combinations of the senses of the two words, computing the overlap of every pair of definitions. The pair with the largest overlap is selected. For example, in *pine cone*, the senses 'seven kinds of evergreen tree with needle-shaped leaves' of *pine* and 'fruit of certain evergreen trees' of *cone* have the largest overlap (two words) of all combinations. One implementation achieved 50–70% accuracy on a small test set (Ide and Véronis, 1998). This basic method suffers from data sparseness and is sensitive to the exact wording of definitions. Simple extensions include additional elements in the overlap calculation: example sentences, definitions of words in the sense definitions, definitions of related word senses (e.g., by hypernymy in WordNet), and sentences from a sense-annotated corpus.

The Lesk Method is often inefficient for more than a few words because there are too many combinations of word senses to consider. (An approximate solution uses simulated annealing.) But, because of its simplicity, it is often used as a baseline to assess the performance of other systems.

The Lesk Method can be generalized to use general word-sense relatedness rather than definition overlap. For instance, a hierarchical lexical database such as *Roget's* or WordNet can be used to compute the semantic similarity of any two word senses. A very simple method of WSD is then to determine which sense of a target word has the greatest similarity to the words in its surrounding context. However, reported accuracy is slightly worse than Lesk using WordNet glosses and relations.

Roget's International Thesaurus is also a good source of knowledge about semantic relationships; the approximately 1000 heads under which all words are categorized can be thought of as semantic classes or word senses. Masterman's early work (see section on Historical Context) used *Roget's* for target word selection in machine translation by examining overlaps in the lists of heads that words fall under.

A second approach uses *Roget's* (or, actually, any lexical database with semantic categories including LDOCE's subject codes) as a source of word lists for the different semantic classes of an ambiguous word. A word-class classifier can then be trained on the aggregate context of all the members of each class (see section on Supervised Methods). For example, to disambiguate *crane*, a classifier is built to distinguish between the bird and machine classes using the word lists (*heron, grebe, hawk, . . .*) and (*jackhammer, drill, bulldozer, . . .*) and their respective contexts. Even though some of the words will add noise through their own polysemy, enough are monosemous to still build an effective classifier. This unsupervised method has achieved 92% accuracy on homograph distinctions (Yarowsky, 2000).

Selectional Restriction–Based Methods

A selectional restriction (*see* **Selectional Restrictions**) is a constraint on the semantic type of the argument or modifier of the head of a syntactic constituent. For example, to *drink gin* is to 'drink an alcoholic beverage', not to 'quaff a card game', because *drink* selects for an object of type liquid. Common in the artificial intelligence paradigm of semantic analysis, this method can be combined with syntactic analysis to progressively eliminate inappropriate senses and so compose a consistent set of semantic templates into a semantic representation of a sentence. Selectional restrictions are limited because they can be too general or too strict (e.g., *my car drinks gasoline* violates the restriction that the subject must be animate). One solution is to view selectional restrictions as preferences (Wilks's preference semantics) or as selectional associations. A selectional association is a probabilistic distribution

over the classes of a concept hierarchy, such as WordNet, that can express the likelihood of any class occurring as, say, the object of *drink* (e.g., Prob(BEVERAGE|*drink*) vs. Prob(GAME|*drink*)). The distribution is computed analogously to a word-class classifier by combining corpus statistics of occurrences of *drink* and its many syntactic objects with the semantic classes of the objects in the concept hierarchy, such as WordNet. Still, the improved method does not perform well enough on its own and should be treated as a filter.

Connectionist Methods

Connectionist methods are based on psycholinguistic theories that semantic priming plays a role in disambiguation in humans. In connectionist disambiguation, spreading activation operates over a network of word concept nodes and disambiguates all words simultaneously. Successive words in a sentence activate nodes in the network, and activation spreads to related concepts and inhibits other concepts. For example, *drink* activates the beverage sense of *gin* and inhibits the game sense. At the end of a sentence, the concept node with the highest activation for each word is output. Early experiments were not conclusive because building the networks was problematic, requiring manual intervention. However, lexical networks can be built from definition texts of MRDs in a version of the Lesk Method; the *Collins English Dictionary* was used in one experiment that achieved 71.7% accuracy (Ide and Véronis, 1998).

Domain-Based Methods

Domain-based methods make explicit use of domain information to filter out senses of a word that are inappropriate in the current domain. A basic approach first determines the domain of a text by finding the LDOCE subject code or similar code (e.g., WordNet DOMAINS, a domain-annotated WordNet) that has the maximum frequency over all content words. It then selects the sense of a word with the most frequent subject code. Improved versions determine the domain more accurately by, for example, considering only the words in a window around the ambiguous word and then choosing the sense that maximizes the similarity with a relevant domain in the window.

A different approach builds a domain-specific neighborhood of words or topic signature for each sense of an ambiguous word. In one such method, inspired by the Lesk Method, a domain-specific neighborhood of a word contains the words that co-occur significantly with the word over all sense definitions labeled by a given LDOCE subject code (e.g., word senses labeled with the Economics code that significantly co-occur with *bank* include *account, into, out,* and *money*). To disambiguate the word in context, the neighborhood with the greatest overlap with the context is chosen.

The one-sense-per-discourse heuristic has been used in at least two ways. First, if one instance of a word can be reliably disambiguated in a given text, then all other occurrences of the word can be labeled with that sense. Second, the contexts surrounding all instances of a word in a given text can be aggregated as evidence for a single sense.

A completely separate approach to domain-specific disambiguation is domain-tuning the sense inventory by removing unnecessary senses and words, grouping related senses together, and extending it with specialized senses and terms. Domain-tuning turns WSD on its head to determine which senses in an inventory are relevant to a given domain.

Supervised Corpus–Based Methods

Supervised machine learning has proven to be the most successful approach to WSD as a result of extensive research since the early 1990s. As a rule, supervised learning of WSD derives its model directly and predominantly from sense-annotated training examples, whereas unsupervised learning might make use of *a priori* knowledge but a secondary source. (Unsupervised methods are discussed in the next section.)

Supervised learning methods all follow the same basic methodology:

1. A training collection is created by hand-annotating a sufficient number of instances of each target word with their sense classes. Often hundreds of examples are required for each word. A subset of the collection is reserved for testing.
2. Each instance of a word and its context is reduced to a feature vector that contains features of the sort previously described.
3. For each word type, a training procedure builds a classifier using frequency statistics of feature occurrences within each class, gathered from the feature vectors.
4. The set of classifiers is tested on the reserved data, and more iterations are performed, modifying the conditions (e.g., selected features, training/test split, and algorithm parameters), until a conclusion is reached.

This methodology generates a set of classifiers capable of classifying new instances, represented by their feature vectors.

Many algorithms for supervised learning have been applied to WSD, including Bayesian networks,

boosting, decision lists, decision trees, *k*-nearest neighbor, maximum entropy, Naïve Bayes, memory-based learning, neural networks, support-vector machines (SVM), transformation-based learning, and vector similarity models (*see* **Language Processing: Statistical Methods**). A binary (two-class) classifier, such as an SVM, can be applied to WSD by building a separate binary classifier for each sense of a word, which classifies the word as a member or not of the sense class. A major result is that choosing the right feature space is more important than choosing the right algorithm. For example, eliminating a whole feature type (say collocations) has been shown to degrade performance more than changing the algorithm.

That said, the current best-performing algorithm for WSD is the SVM, because, in theory, SVMs can handle very high-dimensional feature spaces, make no assumptions about the independence of features, and allow the easy combination of multiple sources of evidence. However, its relative performance over, say, Naïve Bayes (which naively assumes feature independence) is quite small. In the Senseval-3 English task, SVMs, a modified Naïve Bayes, and ensembles were all in the top 10 (between 71.8% and 72.9% accuracy) separated by fractional percentages (Mihalcea *et al.*, 2004).

A general distinction can be made between discriminative and aggregative algorithms. The former base their classification on a few pieces (sometimes one piece) of evidence in any given context, whereas the latter accumulate all of the evidence in favor of each class. Experiments show that each method has its strengths and weaknesses depending on the word, its sense granularity, and sense distribution. A discriminative algorithm will be more capable in contexts where a single feature is decisive – often for verbs and adjectives and for many homograph-level distinctions. Aggregative algorithms perform better when many pieces of weak evidence combine to reach a level of confidence – more often in nouns and fine-grained sense distinctions.

Every learning algorithm has its biases, so combinations, or ensembles, of diverse algorithms tend to outperform single algorithms by a modest margin (up to 5%). Various combination strategies including voting (by count or confidence), probability mixture models, and metalearning have been explored, voting performing best.

Many common machine-learning issues arise in WSD, such as feature selection, determining the optimum size of the training data, and portability to new domains, but one problem that has defined the field over the past decade is the knowledge-acquisition bottleneck: Training data are difficult and expensive to produce. Senseval has alleviated the problem somewhat by organizing a wide-ranging data annotation effort (see Evaluation section); however, unsupervised methods have the potential to overcome the problem in the long run.

Unsupervised Corpus–Based Approaches

The holy grail of WSD is to learn to disambiguate without any training data. In their purest form, unsupervised approaches eschew any *a priori* knowledge of word meaning. This section describes two types of unsupervised approach. The first is sense induction, used to actually discover word senses in a corpus using no *a priori* knowledge of word senses, in effect acting as an automated lexicographer. (Note that the senses induced are often called word *uses* because their character is different to the word senses elucidated by lexicographers.) The second disambiguates to an existing sense inventory but requires a secondary source of knowledge such as a parallel corpus or small amount of seed data in an approach called bootstrapping. Hence, these second approaches are usually considered to be minimally supervised.

The underlying assumption of sense induction is that similar senses occur in similar contexts. Thus, the problem is characterized as clustering by similarity of context rather than as classification. Three methods differing in clustering technique are described next. The first method is to apply a clustering algorithm directly to the feature vectors (see previous discussion) of the instances of a word using a vector similarity function such as cosine similarity. Data sparseness is often a problem in smaller corpora and for the rarer senses of a word, but can be somewhat alleviated through dimensionality reduction. Nevertheless, rarer senses (e.g., smaller clusters) must still be removed from the model. Because senses are not labeled, merely discriminated one from another, direct comparisons to other methods of WSD are impossible. Applied to information retrieval, one experiment using a model called Context Group Discrimination yielded a 14.4% improvement in retrieval precision (Schütze, 2000).

The second method clusters the list of nearest neighbors of a target word, that is, the list of words that are semantically similar to the target word. Contextual word similarity, the degree to which two words occur in similar contexts, can be computed from the feature vectors. For example, *plant* has the neighbors *factory, facility, refinery, shrub, perennial,* and *bulb*. Clustering these words by their semantic similarity results in two clusters that represent two senses of *plant*: (*factory, facility, refinery*) and

(*shrub, perennial, bulb*). No results are available for its application to WSD.

The third method is also based on word similarity. It first builds a graph (i.e., network) of words linked by relations of semantic similarity and/or co-occurrence. The local graph surrounding a target word is then clustered using a graph-clustering algorithm. The intuition is that the senses of the target word will correspond to loosely connected components of the local graph (i.e., the words in each component will be related to one another more than they are to the words in another component). No results are available for its application to WSD.

A word-aligned parallel corpus can be used in minimally supervised WSD. It has been observed that an ambiguous word in a source language is often translated into different words in a target language depending on the sense of the word. The words in the target language may themselves be ambiguous, either sharing two or more senses with the source word or having other senses. However, the fact that multiple different source words will translate to the same target word can be used in WSD. For example, the three English words *disaster, tragedy,* and *situation* all translate to *catastrophe* in a English-French parallel corpus. Even though the three English words are ambiguous, a single sense for them ('calamity') can be determined using a variant of the Lesk Method. An implementation of this method achieved 53.3% accuracy using an English-French machine translated corpus (the second highest unsupervised score on Senseval-2 data) (Diab and Resnik, 2002).

The bootstrapping approach starts from a small amount of seed data for each word, either hand-labeled training examples or a small number of surefire decision rules (e.g., *play* in the surrounding context of *bass* almost always indicates the musical instrument). The seeds are used to train an initial classifier using any supervised method. This classifier is then used on the untagged portion of the corpus to extract a larger training set, in which only the most confident classifications are included. The process repeats, each new classifier being trained on a successively larger training corpus, until the whole corpus is consumed. Seed decision rules can be extracted from dictionaries, lexical databases, or automatically extracted collocations. One system using the last approach achieved 96.5% accuracy on a few homographs (Yarowsky, 2000). A further variant combines both a bilingual corpus (not necessarily word aligned or parallel) with bootstrapping: in each step, classifiers are trained for both languages simultaneously using previously classified data from both languages. Experiments achieve a 3–8% improvement over monolingual bootstrapping on the same data.

Finally, an unsupervised technique for determining the most frequent sense of a word in a corpus has recently been developed. It is closely related to the second clustering method. If we consider the list of nearest neighbors of a target word, then, following from the generalized Lesk Method and the skew in word sense distributions (**Figure 3**), a majority of its neighbors will be most similar to one of its senses, the most frequent sense. Although this method cannot disambiguate a word, it can be used as a back-up strategy when another method is not sufficiently confident. Alternatively, if one sense per discourse holds for a given target word, then WSD is replaced by the identification of the domain of the text.

Evaluation

To progress as a science, WSD needs to be evaluated on a common playing field; this has proven to be a serious challenge. Evaluating WSD is difficult because of the different goals involved in the research and application of WSD algorithms. To illustrate, just about every system in the previous section was evaluated on different words, sense inventories (crucially, of different sense granularities), and types of corpus and application, rendering direct comparison meaningless. Furthermore, a large reference corpus is required, with enough hand-annotated examples of each word to cover all of its senses in a representative mixture of contexts. Sense annotation by hand is labor-intensive, difficult to do reliably, and unlikely to carry over to another application. As a result, most systems had been evaluated on only a few words and often only at the homograph level. However, over the past decade, Senseval has established a common framework for the evaluation of explicit and generic WSD algorithms. And, in a reversal, the task of explicit WSD is now defined by the evaluation rather than the evaluation by the task.

Accuracy against a Reference Corpus

WSD can be evaluated *in vitro*, independent of any particular application, or *in vivo*, in terms of its contribution to an application such as information retrieval. *In vitro* evaluation, by far the most common method, allows for the detailed analysis of explicit WSD algorithms over a range of conditions, whereas *in vivo* evaluation provides an arguably more realistic assessment of ultimate utility of WSD and is the only way to evaluate implicit WSD. The rest of this section focuses on *in vitro* evaluation; evaluation in IR and other applications has already been discussed.

The basic metric for evaluation is simple accuracy: the percentage of correct taggings taken over all instances of all words to be tagged in a reference corpus. Creating a reference corpus is a process of manual annotation. The accepted practice is to use at least two trained annotators with a final arbitrator to resolve disagreements, possibly through discussion. Because annotation often uncovers inconsistencies or other problems in a sense inventory (such as missing or unclear senses), annotators can provide feedback to lexicographers. For reasons of objectivity and consistency, trained lexicographers should be used, but this view is challenged by the Open Mind Word Expert project, a large-scale Web-based annotation effort (Chklovski and Mihalcea, 2002).

Two types of reference corpus are available: sampled and running. The former annotates a sample of words and often provides only a short surrounding context for each instance. The latter annotates all words in running text. Table 3 lists the main reference corpora for English (Senseval has also provided many corpora in other languages).

The relative performance of a system is generally assessed against the baseline of selecting the most frequent sense, information readily available from many dictionaries (often, the first sense listed), from the manually annotated reference corpus, or indeed from an unsupervised method. The Lesk Method has also been used as a baseline, as noted earlier.

An upper bound on WSD is more difficult to come by: perfect disambiguation cannot be expected even from a person, given the nature of word meaning. Thus, as noted earlier, the natural upper bound is interannotator agreement, the percentage of cases in which two or more annotators agree before arbitration. Interannotator agreement also serves as an indication of the difficulty and integrity of the task. A low upper bound implies that the task is ill-defined and that WSD is without foundation. One early study reported the dangerously low value of 68% (Kilgarriff, 1999), and the Senseval-3 English lexical sample task had an equally low value of 67%, which was based on the agreement of the first two out of four annotators on a superset of the data used in the evaluation (Mihalcea *et al.*, 2004). However, interannotator agreement is a misleading upper bound on WSD because an arbitrator provides a third voice. Replicability is arguably a more sensible upper bound. Replicability is the level of agreement between two replications of the same annotation exercise, including arbitrators. A respectable 95% has been reported (Kilgariff, 1999); however, replicability has not been used in practice because it doubles the annotation workload.

Evaluation is not as simple as this. If a system can abstain from tagging a target word instance or give multiple answers, accuracy must be broken into precision (the percentage of system answers that are correct) and recall (the percentage of all test instances that a system answers correctly). An additional scheme reports fine-grained and coarse-grained scores, the latter grouping subsuming all fine-grained senses into a single coarse-grained sense so that choosing any of the senses is considered correct. This scheme is possible using a hierarchical inventory in which the coarse-grained level might represent homographs or other groups of related senses. A final scheme provides partial credit for tagging with a similar albeit incorrect sense of a target word.

One problem with averaging over all instances (and all senses) is that performance on particular words and word senses cannot be observed. Because the distribution of senses is so skewed, these metrics could cover up the actual performance of an algorithm that is only accurate on the most frequent senses but completely fails on the rarer senses.

Table 3 Manually annotated reference corpora in English

Corpus	*Number of word types*	*Size (tagged instances)*	*Sense inventory*
Line, hard, serve	3	12 000	WordNet 1.5
Interest	1	2369	LDOCE
HECTOR	300	200 000	HECTOR
SemCor	23 346	234 113	WordNet 1.6
DSO Corpus	191	192 800	WordNet 1.5
Senseval-1	41	8448	WordNet 1.6
Senseval-2 sample	73	12 939	WordNet 1.7.1
Senseval-2 running	1082	2473	WordNet 1.7.1
Senseval-3 sample	59	11 804	WordNet 1.7.1
Senseval-3 running	960	2041	WordNet 1.7.1
Open Mind Word Expert 1.0	288	29 430	WordNet 1.7.1
Open Mind Word Expert 2.0	60	21 378	WordNet 1.7.1

Compiled from Edmonds and Kilgarriff (2002), Senseval workshop proceedings, and personal contacts.

Senseval

Senseval has established through three open evaluation exercises, in 1998, 2001, and 2004, a framework for the evaluation of WSD that includes standardized task descriptions and evaluation methodology. It represents a significant advance in the field because it has focused research, produced benchmarks, and generated substantial resources in many languages.

Senseval defines two main tasks: the lexical sample task and the all-words task. The lexical sample task is to tag a small sample of word types. The sample is a stratified random sample that varies on part of speech, number of senses, and frequency. Corpus instances covering as many of each word's senses as possible are selected and manually annotated to create a sampled reference corpus. The all-words task is to tag all instances of ambiguous words in running text. Here, the issue is to select complete texts with a sufficient variance in terminology and average polysemy. The all-words task is a more natural disambiguation task because the whole text is provided as evidence for disambiguation and could lead ultimately to a generic component for WSD. However, the lexical sample task is arguably better science: it allows us to analyze a wider range of phenomena and to focus on problematic words or words that will have a significant impact on an application.

Other Ways to Evaluate

When there is no reference corpus to either train from or test on, pseudo-words provide an alternative. A pseudo-word is created by treating all the instances of two or more randomly selected words as the same word. For example, the pseudo-word *banana-kalashnikov* would replace all occurrences of *banana* and *kalashnikov* in a corpus. The artificially ambiguous word has as its senses the original words. WSD then proceeds normally. Accuracy is given in terms of the number of correct replacements of the original words. Pseudo-words seem attractive, but they have been criticized because (1) they do not necessarily have natural skewed word-sense distributions and (2) they do not have senses related to one another the way that a polysemous word's senses relate. Thus, it is questionable what we can learn about context and word meaning through pseudo-words.

Unsupervised sense induction cannot be easily evaluated against a reference corpus. *In vivo* evaluation is one option. A second option is to manually map the clusters to word senses, but this is subjective. If the clusters are labeled, as in the nearest neighbor approach, then automated alignment is possible; however, the alignments are unlikely to be perfect because of disparities between word uses and word senses. If a parallel corpus is used, then one method is to create the parallel corpus by machine translation of a reference corpus; however, this method could have problems because the MT system could easily make the same errors in target word selection that an explicit WSD algorithm would make.

Current Research Efforts

Explicit WSD to a fixed sense inventory (as a constrained case of general lexical disambiguation) is a robust task. The three evaluation exercises run by Senseval show that, over a variety of word types, frequencies, and sense distributions, systems are achieving consistent and respectable accuracy levels that are approaching human performance on the task. The main variation in accuracy is due to the sense inventory not meeting the three Cs (consistency, clarity, and coverage).

Disambiguating to the homograph level is essentially solved if greater than 90% accuracy is enough for the application. At finer levels, support-vector machines are currently the best method, followed closely by Naïve Bayes (both supervised corpus–based methods), achieving an accuracy of 73%. However, effective application-specific WSD is still an open problem.

Current research efforts are focused on:

- Error analysis to determine the factors that affect WSD and the specific algorithms; that is, what makes some words and senses easier to disambiguate than others?
- Unsupervised approaches to overcoming the data-acquisition bottleneck, especially through bootstrapping and machine-learning techniques such as co-training.
- Exploring the sense distributions of individual words and especially focusing on the rarer senses that are currently difficult for WSD.
- Developing better sense inventories and sense hierarchies.
- Establishing an evaluation framework for application-specific WSD (within Senseval).
- Domain-specific issues, such as domain tuning and domain identification.
- Treating named entities and reference as a WSD problem; that is, when do two occurrences of the same name refer to the same individual?

See also: Bar-Hillel, Yehoshua (1915–1975); Computational Lexicons and Dictionaries; Context and Common Ground; Corpus Lexicography; Etymology; Information Extraction, Automatic; Language Processing: Statistical Methods;

Latent Semantic Analysis; Lexical Semantics: Overview; Lexicography: Overview; Machine Translation: Overview; Named Entity Extraction; Part-of-Speech Tagging; Polysemy and Homonymy; Selectional Restrictions; Thesauruses; Vagueness; Word Classes/Parts of Speech: Overview; WordNet(s); Zipf, George Kingsley (1902–1950).

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Discontinuous Dependencies

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Introduction: Definition and Examples

Let *A, B, C, D* be four constituents of some word or phrase. *A* is said to be 'discontinuous' if and only if (i) *B* is a constituent of *A*, (ii) *C* is a constituent of *A*, (iii) *D* is *not* a constituent of *A*, and (iv) *D* is linearly ordered between *B* and *C*. Take, for example, the verb phrase *woke your friend up*. Suppose this phrase contained three constituents *woke, your friend*, and *up*. If *woke up* is a constituent of this phrase as well, then it would be discontinuous, as (i) *woke* would be a constituent of *woke up*, (ii) *up* would be a constituent of *woke up*, (iii) *your friend* would not be a constituent of *woke up*, and (iv) *your friend* would be linearly ordered between *woke* and *up*. One natural way of visualizing discontinuous constituents is as trees with crossing branches:

(1)

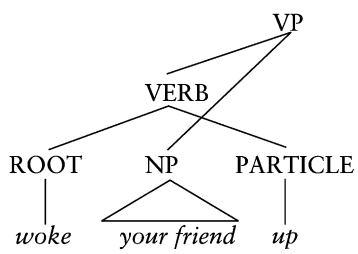

Phrasal verbs aside, constructions that have been argued to contain discontinuous constituents involve parentheticals (2) and other nonrestrictive relative clauses; extraposed (3) and other shifted constructions; scrambling in Latin (4) and other free word order languages; degree modifiers (5) – and so on. (To enhance perspicuity, the categories of these examples have been relabeled in accordance with the definition of discontinuous constituent given above.)

(2) *We* [$_B$ *talked*] [$_D$ *of course*] [$_C$ *about politics*]

(3) [$_B$ *Men*] [$_D$ *entered*] [$_C$ *who were wearing black suits*]

(4) [$_B$ *Huic*] [$_{D_1}$ *ego*] [$_{D_2}$ *me:*] [$_C$ *bello:*] *ducem profiteor.*
this I myself war leader proclaim
'For this war I proclaim myself leader.'

(5) *John was* [$_B$ *so*] [$_D$ *tall*] [$_C$ *that he hit his head*]

Moreover, *prima facie* examples of discontinuous morphological constituents come from infixation (cf. the English expletive *Cali-friggin'-fornia*), circumfixation (cf. the Standard German (German) participle *ge-frag-t* 'asked'), and templatic morphology like that of Standard Arabic (Arabic) verbs whose interleaved V_1V_2 and $C_1C_2C_3$ morphological tiers are two constituents that render each other discontinuous:

(6) [$_{C_1}$*k*] [$_{V_1}$ *á*] [$_{C_2}$ *t*] [$_{V_2}$ *a*] [$_{C_3}$ *b*] 'he wrote'

Early Transformational Grammars

Discontinuous constituents were first acknowledged by American structuralists. See, for example, Pike (1943, § 4.12), Harris (1945), Wells (1947: §§ 55–62), and Hockett (1958: §§ 17.6, 21.4). Discontinuous constituents were allowed in early generative grammars as well. For one thing, Chomsky (1955: 405) admitted permutations – elementary transformations whose only effect on a string was to reorder the terms of that string. Take, for example, the permutation in (7).

(7) (ROOT, PARTICLE, NP) ⇒ (ROOT, NP, PARTICLE)

This permutation will carry the string *woke up your friend* into the string *woke your friend up*. And, since permutations do nothing but reorder constituents, the constituents of the input will be preserved in the output. The permutation in (7) will therefore map the continuous tree in (8) into the discontinuous one in (1).

(8)

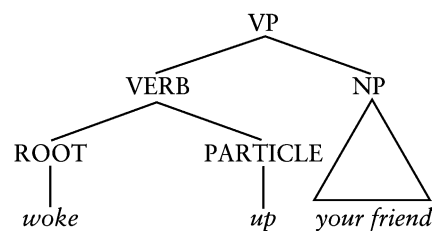

Similarly, the early generative grammar developed in Yngve (1960: 448 ff.), allowed constituent structure rules of the following form:

(9) A → B ~ C

Rules of the form in (9) were intended to map strings of the form *XADY* into strings of the form *XBDCY*, thus 'wrapping' a phrase [$_A$ *B C*] around a phrase *D* – but without turning *D* into a new constituent of *A*. Take, for example, the following rule:

(10) VERB → ROOT ~ PARTICLE

The rule in (10) can wrap the constituents of *VERB* around an ensuing *NP* as indicated in (11).

(11)

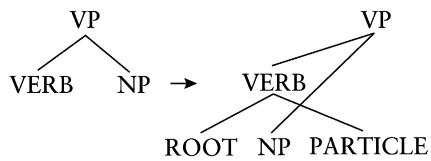

In so doing, it will generate a discontinuous constituent.

Classical Transformational Grammars

Although early generative grammars could accommodate discontinuous constituents, Postal (1964: 67–70) made an early case that analyses involving discontinuous constituents could – and should – be replaced by accounts that appealed only to continuous constituents. In short, his case was that only analyses in terms of continuous constituents (i) could account for the intuitive relations between phrases, (ii) could avoid stating selectional restrictions separately for phrases, and (iii) were generated by well-defined rules that (iv) provided a well-defined algorithm for the assignment of derived structure. Moreover, analyses in terms of discontinuous constituents called for (v) grammars of unknown generative power.

Consider once again the verb phrase *woke your friend up*. Notice that this phrase can be derived from (8) by deleting the particle *up* from within the verb and then restoring it, as shown in (12), after the direct object (and as an immediate constituent of the verb phrase).

(12)

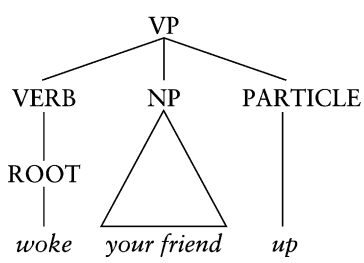

Crucially, this 'cut-and-paste' analysis of the verb phrase *woke your friend up* appeals only to continuous constituents. Moreover, since it is derived from *woke up your friend*, it accounts for the intuitive relation between these two phrases and preserves, in so doing, the selectional restrictions of its source (thus eliminating the need for stating the same selectional restrictions twice). Furthermore, it does this, as all transformations do, through a well-defined algorithm for the assignment of derived structure.

Postal's case against discontinuous constituents carried the day. Consequently, neither the permutations of Chomsky (1955) nor the wrapping rules of Yngve (1960) were seriously pursued in the ensuing literature. One year after the publication of Postal's work, Chomsky (1965: 144) went on to suggest the elimination of permutations in favor of deletions, substitutions, and adjunctions. In addition to being redundant, permutations were thought to lead to unnecessary complications in the theory of derived constituent structure (Chomsky, 1965: 226).

Now, if the notion of discontinuous constituents is idle, then constituent structure trees with crossing branches should be banned together with the constituents they were intended to represent. This ban on discontinuous constituent trees was not long in coming. As defined in Wall (1972: 149), constituent structure trees satisfy both an Exclusivity Condition and a Nontangling Condition. The Exclusivity Condition requires that every two nodes of a tree be ordered either in terms of dominance or in terms of precedence (but never in terms of both). The Nontangling Condition requires that if some node precedes another, then all the nodes dominated by the former must precede all the nodes dominated by the latter.

Taken in conjunction, these conditions ban the tree in (1). For example, take the nodes VERB and NP found therein. Since they are not related in terms of dominance, they must be related in terms of precedence (Exclusivity). Thus, all the nodes that they dominate must be related in terms of precedence as well (Nontangling). Yet, they are not; whereas one of the nodes dominated by VERB precedes the NP node, the other one follows it. (1) is therefore incompatible with the definition of constituent structure tree.

It is a testament to the success of Postal's arguments that Exclusivity and Nontangling continued to be part of the definition of constituent structure trees for more than two decades (see Partee *et al.*, 1993: § 16.3.3). And the incompatibility between the notion of discontinuous constituency and the notion of constituent structure tree, reinforced the general resistance to discontinuous constituents that has continued to this day.

Yet, contrary to what one might think, none of the above banished the term 'discontinuous constituent' from the vocabulary of theoretical linguistics; all it did was justify assigning it a new sense. To be more specific, let *A, B, C, D* be four constituents of a word or phrase. Let *B, D, C* be three constituents of *A*. Let *B, D, C* occur in that linear order. *A* is discontinuous (in the new sense) if and only if *A* is derived, transformationally, from a constituent A' such that (i) *B* is a constituent of A', (ii) *C* is a constituent of A', (iii) *B* precedes C under A′, and (iv) *D* is not a constituent of A' (cf. Postal, 1964: 67). The new sense of the term discontinuous constituent can be illustrated with the *VP* in (12). Just let $A = VP$, $B = VERB$, $D = NP$,

C = *PARTICLE*, and assume, with Postal, that the *VP* in (12) is derived, transformationally, from the *VP* in (8) (this VP would therefore be the constituent *A′* of the definition).

We thus arrive at two distinct senses for the term 'discontinuous constituent.' If necessary, we can distinguish between them by saying that a constituent is truly discontinuous if it is discontinuous in the original sense and seemingly discontinuous if it is discontinuous in the sense described in the preceding paragraph. Note that this choice of terms is justified by Postal's analysis, which regards truly discontinuous constituents as illusory.

Seen in retrospect, Postal's arguments against truly discontinuous constituents warranted closer scrutiny. Consider first discontinuous constituents generated by the permutation transformations of Chomsky (1955). Being transformations, permutations can assert relations between their inputs and outputs (and thus account for the intuitive relations between phrases); being equivalent to cut-and-paste transformations, permutations can ensure that any selectional restrictions preserved by said transformations will be preserved by permutations as well (so selectional restrictions do not have to be stated separately for the inputs and the outputs of a permutation); being among the elementary transformations of Chomsky (1955), permutations are well-understood formal devices with well-defined algorithms for the assignment of derived structure. And, since permutations have the same effect on strings as cut-and-paste transformations, the weak generative power of permutations will be the same as the weak generative power of the equivalent cut-and-paste transformations. In short, the truly discontinuous constituents generated by permutation transformations do not lead to any of the shortcomings that Postal feared.

Similar points can also be made about the truly discontinuous constituents generated by the wrapping rules of Yngve (1960), as these rules are string-equivalent to permutations (and hence to cut-and-paste transformations). The only thing to keep in mind is that wrapping rules are couched in a general framework that requires them to expand the nonterminal symbols of a tree (or a derivation) *from left to right*. Thus, as shown in (11), VERB must wrap around NP before the latter is expanded – in this case, as a determiner followed by a nominal. This ensures that the wrapping rules are formal devices with well-defined algorithms for derived structure.

Beyond this, notice that Postal's cut-and-paste analysis requires that any constituent that is ordered between two constituents of a seemingly discontinuous constituent *A* must itself be a constituent of *A*. Take for example the NP in (12). It is ordered between two constituents of VP and is, accordingly, itself a constituent of VP. Naturally, no such requirement holds *vis-à-vis* truly discontinuous constituents. See, for example, the NP in (1), which is ordered between two constituents of a VP without being a constituent of that VP. It follows that the external constituent structure of the material intruding in discontinuous constituents may provide grounds for deciding whether these constituents are truly discontinuous or only seemingly so.

Evidence bearing on such a constituent structure was presented in McCawley (1982). Consider, for example, the VP anaphora in (13).

(13) *John talked, of course, about politics . . .*
  (a) *. . . and Mary, you'll be surprised to hear, did too.*
  (b) *. . . but Mary, you know, would never do that.*
  (c) *. . . which is something that Mary would perhaps never do.*

In all these examples, the antecedent is only *talk about politics*; it is not *talked, of course, about politics* (nor is it just *talk*, for that matter). This means that the parenthetical *of course* is ordered between the constituents of a VP *talk about politics* without being itself a constituent of that VP – or that *talk about politics* forms a truly discontinuous constituent.

Further evidence for truly discontinuous constituents comes from constraints on extraction. For, as is well known, island constraints prevent material from being extracted from complex noun phrases:

(14a) *A man who was wearing a black suit entered.*
(14b) **What kind of clothing was a man who was wearing entered?*

But such extraction is inadmissible even after the relative clause of the complex noun phrase has been extraposed:

(15a) *A man entered who was wearing a black suit.*
(15b) **What kind of clothing was a man entered who was wearing*?

Clearly, we can provide a unified analysis of these facts if relative clauses formed a constituent with their head nominals after extraposition, as only then would we have a complex noun phrase in both (14) and (15). But if a relative clause forms a constituent with its head nominal after extraposition, then the verb *entered* is ordered between the constituents of the complex noun phrase (without being a constituent of the complex noun phrase), which would then be truly discontinuous. (See McCawley (1987, 1990), Baltin (1984, 1987), and O'Grady (1987) for further discussion.)

To generate the truly discontinuous constituents involved in parentheticals, extraposed relative clauses, and other constructions, McCawley (1982) in effect appealed to the permutation transformations of Chomsky (1955). To do so, McCawley had to adopt a theory of constituent structure that did not abide by the conditions of Exclusivity and Nontangling mentioned above. One way to develop such a theory so would be simply to define constituent structure as the output of syntactic rules rather than use constituent structure as a constraint on syntactic rules. Permutations could then be included in the set of admissible syntactic rules.

Alternatively, one could define constituent structure in a way that is consistent with truly discontinuous constituents. This is the approach followed in McCawley (1982), who weakened the Exclusivity Condition so that two nodes – say VERB and NP in (1) above – could be related neither by dominance nor by precedence. On the other hand, McCawley required (i) that all terminal nodes be linearly ordered, and (ii) that nonterminal nodes stand in an ordering relation if and only if all their descendents stand in the same relation. (It has been claimed that the condition requiring terminals to be fully ordered may be "a consequence of the application of the laws of nature to the human mouth: you can, in point of fact, just make one sound at a time" (Higginbotham, 1983: 151). If so, this condition would not have to be stated in linguistic theory proper. For further reformulations of constituent structure trees that allow for discontinuous constituents, see Ojeda (1988), Blevins (1990), and Bunt (1996).)

Finally, it should be pointed out that McCawley constrained discontinuous constituency by allowing only those discontinuous constituents that arise from movement transformations that preserve grammatical relations.

Generalized Phrase Structure Grammars

As McCawley was developing his case for discontinuous constituency, a renewed interest arose in (nontransformational) phrase structure grammars (Gazdar *et al.*, 1985). Discontinuous constituents presented a challenge for these grammars. On the one hand, both Postal's cut-and-paste account and McCawley's permutation accounts were irreducibly transformational. As such, they were barred from nontransformational grammars. On the other hand, phrase structure grammars cannot generate truly discontinuous constituents. For example let *A* be any constituent of a word or phrase. If *A* is discontinuous, then it must combine with another constituent *D* of that word or phrase – and must do so in such a way that part of *A* precedes *D* while part of *A* follows it. But this form of 'nonconcatenative composition' cannot be carried out by a series of phrase structure rules of the form in (16), as these rules may only combine constituents $B_1, \ldots, B_n$ by placing them either fully before or fully after each other (in the context of C_1 and C_2).

(16) $A \rightarrow B_1 \ldots B_n \,/\, C_1 __ C_2$

Thus, if phrase structure rules are to yield discontinuous constituents, they must undergo substantial generalization. One such generalization was proposed by Yngve (1960) and has been presented above. Another generalization that rewrites symbols around nonconstituents is given in Bunt (1996). A generalization in a different direction is proposed in Ojeda (1988). The point of departure of the latter proposal is the fact (see Gazdar *et al.*, 1985) that a phrase structure rule like (17a) can be split into a statement about immediate dominance (17b) and a statement about linear precedence (17b):

(17a) $S \rightarrow NP\ VP$
(17b) *S* may immediately dominate *NP* and *VP*.
(17c) If *NP* and *VP* are sisters, then the *NP* must precede the *VP*.

But suppose now that we had, in addition to statement (17c) of total linear precedence, statement (18) of partial linear precedence.

(18) If *NP* and *VP* are sisters, then the head of the *VP* must precede the *NP*.

Now, if constituent structures can be discontinuous, then the statement of immediate dominance in (17a) and the statement of partial linear precedence in (18) will license the truly discontinuous constituent VP in (19).

(19)

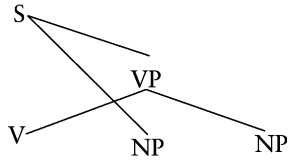

Notice that these statements provide a monostratal account of VSO word order that does not give up on VPs. (A statement to the effect that V must fully precede its sister NP will, of course, play a role in this as well.) Such an account may be applied to the description of VSO languages like Breton, as they have VPs but no underlying SVO orders (Anderson and Chung, 1977). And it may apply also to the phenomenon of subject–auxiliary inversion (Ojeda, 1988). Moreover, suppose we had statements of immediate partial precedence like (21).

(21) If *X* and *Y* are sisters, then (the head of) *X* must immediately precede (the head of) Y.

If we did, then we could also describe the cross-serial dependencies of Dutch in (22) and the cognate argument structure of English in (23) simply as what they appear to be – permutational variants of each other.

(22)

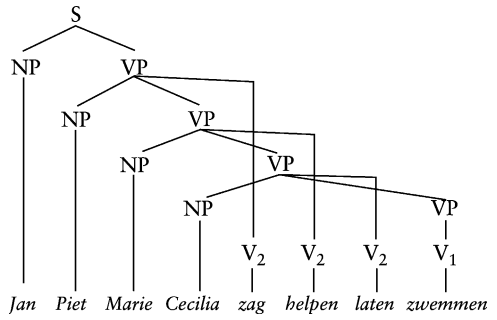

ID rules: S → NP,VP (S may consist of *NP* and *VP*)
VP → V_2, NP, VP (*VP* may consist of V_2, *NP*, *VP*)
VP → V_1 (VP may consist of V_1)
LP rules: NP < VP (*NP* precedes any sister *VP*)
V_2 << H(VP) (V_2 immediately precedes the head of any sister *VP*)

(23)

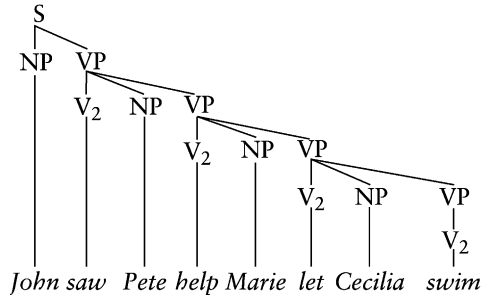

ID rules: S → NP, VP (*S* may consist of *NP* and *VP*)
VP → V_2, NP, VP (*VP* may consist of V_1, *NP*, *VP*)
VP → V_1 (VP may consist of V_1)
LP rules: NP < VP (*NP* precedes any sister *VP*)
V < X (*V* precedes all its sisters)

It should be borne in mind that cross-serial dependencies of this type are beyond the weak generative power of context-free grammars (Huybregts, 1984; Shieber, 1985). Since rules of immediate partial precedence can generate them, these rules affect the expressive power of phrase structure grammars in the most fundamental of senses.

Other Nontransformational Grammars

Drawing from the study of the formal languages of logic, Montague (1970) suggested that the syntactic rules of the natural languages of linguistics be triples of the form in (24), where F^n is an operation that builds new expressions out of old ones (taken n at a time), C_1 through C_n are (names of) categories of expressions, and C_{n+1} is likewise (a name of) a category of expressions.

(24) $(F^n, (C_1, C_2, \ldots, C_n), C_{n+1})$

Taken as a syntactic rule, the triple in (24) asserts that, if a_1 through a_n are expressions of categories C_1 through C_n (respectively), then $F^n(a_1, a_2, \ldots, a_n)$ is an expression of category C_{n+1}. To illustrate, consider the triple in (25).

(25) (*CONCATENATE*, (*NP, VP*), *S*)

Taken as a syntactic rule, the triple in (25) states that, if a_1 is a noun phrase and a_2 is a verb phrase, then the binary concatenation of a_1 and a_2, taken in that order, is a sentence.

Now, if n-place concatenations were the only operations F^n that could appear as the first terms of triples (24), then the syntactic rules defined in this way would be but notational variants of context-free phrase structure rules. As such, they would be incapable of generating truly discontinuous constituents. But there is nothing in Montague's proposals that requires concatenations to be the only operations available to syntactic rules. Indeed, Bach (1979) proposed a nonconcatenative binary operation WRAP such that WRAP (a_1, a_2) is the expression that results from placing expression a_1 after the first word of expression a_2. Take, for example, the rule in (26).

(26) (*WRAP*, (*NP, VP*), *S*)

If a VP is a constituent that consists of a verb followed by an object, then (26) will form a sentence by placing its subject between its verb and its object, thus producing a sentence with a *VSO* word order. Moreover, if we define the constituents of an expression generated by a rule *R* as the expressions *R* operated on (here an NP and a VP), then any *VSO* sentence produced by (26) would contain a VP constituent as well, thus accounting for the VPs of canonical sentences of VSO languages such as Breton (see Dowty, 1982: § 5.2).

Now, if a constituent structure tree is to represent the process whereby an expression is generated, then (27) is a constituent structure tree that represents the process whereby the *S Johnny will eat the crepes* is generated, by (25), from a NP *Johnny* and a VP *will eat the crepes*.

(27)

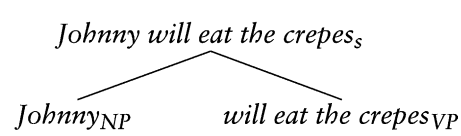

And, similarly, (28) is a constituent structure tree that represents the process whereby the Breton sentence *e-tebro Yannig krampouezh* 'Johnny will eat the crepes' is generated, by (26), from a noun phrase *Yannig* 'Johnny' and a verb phrase *e-tebro krampouezh* 'will eat the crepes.'

(28) *e-tebro Yannig krampouezh*$_S$

Yanning $_{NP}$ *e-tebro krampouezh* $_{VP}$

It should be clear that the nodes of the constituent structure trees in (27) and (28) need to be ordered only in terms of dominance, not in terms of precedence. All the information about the linear order of the constituents represented therein is encoded in the expressions mentioned at each node of the tree. For indeed, the nodes of these trees are 'categorized expressions,' not just expressions (as the terminal nodes of the preceding trees) or categories (as the nonterminal nodes of the preceding trees). To acknowledge the differences between these trees and the preceding ones, the former have been given a special name – 'analysis trees.'

It should also be clear that the analysis tree in (28) represents a truly discontinuous VP. Yet, it does not involve crossing branches. Again, this is because the linear order required by discontinuous constituency is not expressed by the linear order of the nodes of analysis trees, only by the expressions categorized at their nodes. See Huck (1984) for a more detailed discussion of discontinuity and wrapping operations.

Rules such as (25) and (26) have been proposed to handle discontinuous constituents in morphology as well. Consider by way of example the rule in (29), where $\boldsymbol{\tau}_{\mathbf{e}}$ is the category of trochee expletives that includes *friggin'* and *freakin'* (as well as others like them), and $\boldsymbol{\tau}_{\mathbf{pl}}$ is the category of words such as *California*, which consist of a plurality (two or more) of trochees.

(29) $(WRAP, (\boldsymbol{\tau}_{\mathbf{e}}, \boldsymbol{\tau}_{\mathbf{pl}}), \boldsymbol{\tau}_{\mathbf{pl}})$

As might be expected, (29) is a rule that combines a trochee expletive with a multiple-trochee word by appealing to a wrapping operation that places the expletive immediately after the first trochee of the word that it combines with (thus yielding another multiple-trochee word). The process whereby *Cali-friggin'-fornia* is generated by (29) is represented in (30).

(30) *Cali-friggin'-fornia*$_{\tau pl}$

friggin'$_{\tau e}$ *California*$_{\tau pl}$

Current Approaches

Generally speaking, grammars induce linear order by ordering sisters. But truly discontinuous constituents call for wrapping sisters around nonsisters and thus for ordering nonsisters. One could therefore ask whether the scope of linear order statements shouldn't be widened so that they can apply to both sisters and nonsisters. This is precisely the line of inquiry of a number of approaches to discontinuous constituency that are currently being explored.

Take, for example, Dowty (1996), who assumed that the default operation for combining two expressions syntactically is to merge their words into a single (unordered) multiset. Needless to say, this multiset needs to be ordered (or linearized) if it is to become a well-formed expression. Let us say then that such linearizations are admissible if and only if they abide by all the linear precedence statements made by the grammar. Now, since the multisets created by merging may contain nonsisters, the linear precedence statements of the grammar will apply, as desired, to both sisters and nonsisters.

Suppose by way of example that four expressions *A, B, C, D* were to combine syntactically (by default) as follows:

(31) $\{A, B, C, D\}$

$\{A, B\}$ $\{C, D\}$

A B C D

If there were no statements of linear precedence involving *A, B, C, D* (i.e., if these expressions were freely ordered), then all of the 24 possible linearizations of $\{A, B, C, D\}$ would be admissible. But suppose that there were two statements of linear precedence involving these expressions:

(32) $A < B$
$C < D$

Now, of all the logically possible linearizations of $\{A, B, C, D\}$, only 6 are admissible:

(33) *ABCD, ACBD, ACDB, CABD, CADB, CDAB*

Of these, all but the first and the last involve discontinuous constituents (we assume, of course, that constituency is determined by the rules that induced (31)).

But suppose that $\{C, D\}$ was a 'bounded domain' – say a sentence, whose constituents cannot generally mingle with constituents external to it. We could represent this fact by the marked form of syntactic composition represented in (34), where $\{C, D\}$ is an element rather than a subset of $\{A, B, \{C, D\}\}$.

(34)

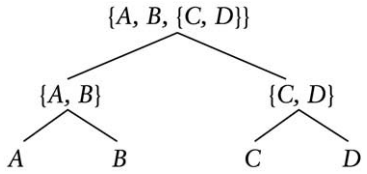

Now, given the statements of linear precedence in (32), only three linearizations of {*A*, *B*, {*C*, *D*}} are admissible. They are as follows:

(35) *ABCD, ACDB, CDAB*

Of these, the second involves a discontinuous constituent. Similar proposals have been developed, independently and in detail, by Reape (1996). Reape's proposals have been extensively developed in the context of Head-drive Phrase Structure Grammar. See, for example, Kathol (2000).

See also: Constituent Structure; Head-Driven Phrase Structure Grammar; Montague Semantics; Post-Bloomfieldians.

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Discourse Anaphora

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Introduction

Discourse anaphora is a means of managing the memory representation of the discourse being constructed by the speech participants on the basis of a cotext as well as a relevant context (for further details of this view, see Cornish, 1999, 2003; but *see also* **Anaphora, Cataphora, Exophora, Logophoricity; Anaphora: Philosophical Aspects** and particularly **Deixis and Anaphora: Pragmatic Approaches** in the present volume, for somewhat different perspectives). Where discourse is concerned, it is clear that not all referents will have been introduced via an explicit textual antecedent; it is also possible for them to be evoked 'obliquely' in terms of an association or a (stereotypical) inference of some kind (see especially example (1), which follows).

This article takes what might be termed a 'discourse – cognitive' view of anaphoric reference, rather than a textual–syntactic one. The use and interpretation of nonbound anaphors – that is, anaphoric expressions whose interpretation is not determined primarily by features of the clause in which they occur – require not only a relevant cotext as well as context, but also, crucially, a psychologically salient representation of the discourse evoked via what in previous work I have called the antecedent-trigger (an utterance token, gesture, or percept). See the section titled 'The Antecedent-Trigger' for a discussion of this term.

Some Useful Concepts and Distinctions in the Study of Indexical Reference: 'Anaphora,' 'Deixis,' and 'Textual/Discourse Deixis'

Let us start by drawing the more fundamental distinction between the dimensions of *text* and of *discourse* (*see* **Understanding Spoken Discourse** and **Macrostructure**). Very briefly, *text* refers to the ongoing physical, perceptible trace of the discourse partners' communicative or expressive activity. This includes not only the verbal content of an utterance, but also prosody, pausing, semiotically significant gestures (nonverbal signals: *see* **Nonverbal Communication**), and of course punctuation, layout, and other graphic devices in the written form of language (*see* **Text and Text Analysis**). The addressee or the reader exploits these textual features in order to infer the *discourse* being coconstructed by the participants. *Discourse* in this sense refers to the hierarchically structured product of the constantly evolving sequence of utterance, illocutionary, propositional, and indexical acts jointly performed by the discourse partners (see, for an illustration, representation (7) of the discourse corresponding to text (5)). This product is, of course, partly determined by the context invoked (*see* **Text World Theory** in the present section for a similar conception of discourse).

Discourse anaphora, then, constitutes a procedure (realized via the *text*) for the recall of some item of information previously placed in discourse memory and already bearing a minimal level of attention activation. It is essentially a procedure for the orientation of the interlocutor's attention, which has as essential function the *maintenance* of the high level of activation that characterizes a discourse representation already assumed to be the subject of an attention focus by the interlocutor at the point of utterance. It is not only the anaphoric expression that is used (typically, a third-person pronoun) that realizes (discourse) anaphora, but also the clause in which it occurs as a whole. This predicational context acts as a kind of 'pointer,' orienting the addressee toward the part of the discourse representation already cognitively activated and which will make it possible to extend in terms of an appropriate coherence relation (see Kleiber, 1994: Ch. 3; as well as the articles **Cohesion and Coherence: Linguistic Approaches** and **Coherence: Psycholinguistic Approach**).

(1) [*Fragment of dialogue in film*:]*Woman*: "Why didn't you write to me?" *Man*: "I did . . ., started to, but I always tore '*em* up." (Extract from the film *Summer Holiday*. Figure (5.5) from Cornish F (1999). *Anaphora, Discourse and Understanding. Evidence from English and French*. Oxford: Clarendon Press. 157. By permission of Oxford University Press (URL www.oup.com). Also reprinted as example (6d), p. 204 from Cornish (2005) by permission of John Benjamins Publishing Company.)

In (1), an instance of indirect anaphora, it is the illocutionary point of the woman's initial question, which bears on the nonexistence of a letter or letters that she had expected the man to write to her, together with the lexical–semantic structure of the verbal predicate *write* (in the sense "engage in correspondence"), that provides an interpretation for the unstressed pronoun '*em* in the third conjunct of the man's reply. The example clearly shows the extent to which inferences based on existing discourse representations, lexical, and general knowledge are

mobilized in the operation of discourse anaphora, which clearly does not require the copresence of an explicit textual antecedent, under the traditional cotextual account of anaphora, in order to exist (see also Blackwell, 2003, in connection with a study of Spanish conversations and spoken narratives, and Ziv, 1996).

Here is an example involving different possible continuations of the antecedent-trigger predication in terms of distinct anaphoric predications:

(2) Jason$_i$ witnessed a terrible accident$_j$ yesterday$_k$ at the Dunton crossroads$_l$. *He$_i$* was very shaken/*It$_j$* resulted in two deaths/#*It$_k$* was dull and overcast/?#*It$_l$*/*The place$_l$* is a known danger-spot.

Note: Subscripted letters indicate identity or otherwise of the intended referents of the expressions so marked. In (2), the first two argument referents introduced ('Jason' and 'the terrible accident Jason witnessed the day before the utterance of (2)') may be naturally continued via unaccented pronouns – but not the scenic referent 'the day before utterance time,' nor (or at least, not as easily as with the first two entity referents evoked) 'the Dunton crossroads,' which is expressed by an adjunct and which serves as a locative frame of reference for the situation evoked as a whole (see also the point made in regard to certain natural Spanish conversational data by Blackwell, 2003: 118, 122–3). The slashes here are meant to indicate alternative continuations of the initial sentence. The crosshatch preceding an example is intended to signal that, as a potential utterance, it is unnatural in the context at hand. Example (2) is intended to be discourse-initial, and not part of an earlier, ongoing discourse.

Deixis, on the other hand (*see* **Deixis and Anaphora: Pragmatic Approaches**), is a procedure that relies on the utterance context to redirect the interlocutor's attention toward something associated with this context (hence that is potentially familiar to him or her), but to which she or he is assumed not already to be attending. As Kleiber and other pragma-semanticists have observed, *deixis* causes a break in the continuity of the discourse at the point where the deictic procedure is used, so that in effect the interlocutor is invited to 'step out' of this discourse context to grasp a new referent in terms of the current situation of utterance – or, alternatively, another aspect of a same referent, which has already been focused upon. So deixis serves to introduce a new referent into the discourse, on the basis of certain features of the context of utterance.

Now, *textual* as well as *discourse deixis* provide a transition between the notions of deixis and anaphora, because they consist in using the deictic procedure to point to part of a pre- or postexisting textual or memory representation, but which is not necessarily highly activated. The interlocutor will therefore need to exert a certain cognitive effort in order to retrieve it. This interpretative effort will involve constructing an 'entity,' on the basis of the discourse representation in question, in order for it to be the subject of a predication, an anchor for the introduction of new information. Where there is a difference in topic-worthiness between the representation introduced by a trigger and the intended referent, the *discourse-deictic* and not *anaphoric* procedure must be used, as in (3), an attested utterance:

(3) [*End of the words of welcome uttered by the director of the Language Centre, at the start of a conference, University of Edinburgh, 19 September 1991*] "... We intend to record the guest speakers, so *these* will be available to participants at the end of the Conference ...." (Example (20) in Cornish, 2005: 212.) (Permission to reprint granted by John Benjamins Publishing Company.)

In order to access the referent targeted via the proximal demonstrative pronoun *these* (namely, 'the recordings of the guest speakers' papers'), the hearer will have to draw an inference of the type: "If the guest speakers' papers are recorded at time t_0, then at time t_n ($t_n > t_0$), there will be recordings of these papers." Unlike the indirect referent in (1) and the first two more 'direct' ones in (2), here the implicit referent has not attained the status of a potential *topic* (*see* **Thetic-Categorical Distinction** and **Topic and Comment**) by the time the initial clause is processed, for it is 'the guest speakers' that enjoys this status at this point. So it is predictable that the elaborative *so*-clause that immediately follows will continue to be about these entities. The demonstrative pronoun *these* in (3) directs the hearer's attention toward a referent that she or he must create on the basis of the representation introduced via the initial conjunct, as well as in terms of his or her knowledge of the world. So it is an instance of *discourse deixis* rather than of *anaphora*. Indeed, the (anaphoric) personal pronoun *they* in its place would have maintained the situation evoked via the initial conjunct, resulting in the retrieval of the only salient topic-worthy entity within it, 'the guest speakers' – an interpretation leading to quite severe incoherence here.

Three Essential Ingredients of the Operation of Discourse Anaphora: 'Antecedent-Trigger,' 'Antecedent,' and 'Anaphor'

The Antecedent-Trigger

This is not necessarily an explicit, textual expression (a phrase of some kind). It may also be a percept or a nonverbal signal (see Cornish, 1996, 1999: ch. 4). In (1) it is the illocutionary point of the woman's initial question, in conjunction with the use of the verb *write* that triggers the discourse representation in terms of which the pronoun *'em* refers, whereas in (2) it is the use of the descriptive noun phrases *Jason*, *a terrible accident,* and *the Dunton crossroads*. The broader notion of 'antecedent-trigger,' in relation to the traditional, canonical textual 'antecedent' of normative written prose, which is required to be morphosyntactically and semantically parallel to the anaphor, is useful in that it enables us to include both exophora and indirect anaphora (see example (1)) within the purview of anaphora *per se* – of which both these phenomena are instances (see also Cornish, 1999: 41–3).

The Antecedent

This is a psychologically salient discourse representation in terms of which the anaphor refers or denotes. As this characterization suggests, it is a unit of *discourse*, not of *text* (see the distinction drawn earlier) and may be constructed via direct interpretation of the cotext in terms of a relevant context or in terms of the context alone in conjunction with relevant aspects of mutual knowledge, or in terms of inferences from either of these. See, as an example, the informal description of the antecedent of the unstressed pronoun *'em* in (1): 'the set of unfinished, torn and unsent letters which the man had begun writing to the woman.' See also Dahl and Hellman (1995), Langacker (1996), van Hoek (1997), and Cornish (1999: 44–7). A given antecedent-trigger may give rise to several distinct 'antecedents' (in this sense), as a function of the possible drawing of inferences, of what is predicated of the former's referent, or of the functioning of the type of anaphor chosen to target it. Sample (4a, b) provide examples, where the antecedent-trigger *one of the new Toyota models* in the first sentence of (4a) gives rise to different 'antecedents' targeted by the pronouns *they,* the *it* in the second anaphoric continuation, and *one*; whereas the entire initial sentence acts as antecedent-trigger for the antecedents created via the anaphors *that* and the *it* in the final anaphoric continuation in this example:

(4a) John bought one of the new Toyota models yesterday. *They* are really snazzy cars/ *It* is standing outside his front door/ Mary bought *one* too/At least, *that*'s what he told me/*It* took only half an hour to complete.

(4b) "The grouse season begins today, and *they*'re being shot in large numbers" (*Today Programme*, BBC Radio 4, 10.12.04)

The Anaphor

This is a referentially dependent indexical expression. The relation is not exclusively between antecedent-trigger and anaphor (except in the case of metalinguistic occurrences, as in this example: A: *Psephism was much in vogue in those times*. B: *What does* ***that*** *mean?*: but these in any case, as Lyons (1977) points out, are instances of *textual deixis*). First, then, the anaphor refers, not to its antecedent(-trigger), but in terms of whatever its antecedent(-trigger) refers to (see Lyons, 1977, vol. 2: 660). Second, the discourse referent evoked via the antecedent-trigger is not necessarily the same at the point of retrieval via the anaphor as it was at the point of introduction: minimally, what will have been predicated of the referent concerned within the antecedent-trigger predication (and potentially within subsequent predications) will have altered that referent's representation – perhaps even radically. Third, it is not simply the anaphor on its own that retrieves the (updated) discourse referent at the point where it occurs in the cotext, but the anaphoric (or 'host') predication as a whole: compare the anaphoric continuations in examples (2) and (4a) in particular in this respect. So what is predicated of the referent of the anaphor acts as a filter, ruling out theoretically possible referents or denotata, and as a pointer, targeting and selecting a salient discourse representation that is compatible with what is predicated of the anaphor's referent (see also Yule, 1981; Dahl and Hellman, 1995).

As we shall see in analyzing text (5) in the next section, there is a variety of types of anaphor – zero forms; ordinary pronouns (*see* **Pronouns**); demonstrative pronouns (*see* **Demonstratives**); reduced proper names; demonstrative, definite, and possessive full NPs; ellipses of various kinds (*see* **Ellipsis**); and so on – which each have distinct indexical properties. As such, they each function to establish different kinds of discourse anaphoric structures and are each sensitive to specific types of discourse context and function. See Cornish (1999: 51–68) for some discussion. On the use of demonstratives in narrative discourse, see in particular Himmelmann's (1996) typological study.

The Text – as Well as Discourse – Sensitivity of Discourse Anaphora

The text we are going to analyze for illustration is taken from a British newspaper, *The Guardian* (1 July 1998, p. 3), reproduced under (5) (for convenience in the analysis that follows, the paragraphs are each numbered in the left-hand margin).

(5) ***Monet waterlilies set £20m record***
Luke Harding

1. *A painting of the most famous garden in the history of art last night sold for £19,801,500, shattering all records for a work by Claude Monet.*
2. *Two frenzied telephone bidders pushed the price for Monet's Waterlily Pond and Path by Water to almost £20 million at Sotheby's, suggesting that good times are back again for the fickle art market.*
3. *The price, reached after six minutes of bidding, comfortably shatters the previous £13 million record for a painting by the artist. Waterlily Pond is now the most expensive Impressionist work sold by a European auction house since 1990. Sotheby's had estimated the sale price more modestly at £4–£6 million.*
4. *The oil painting, executed in 1900, was acquired by a private British collector in 1954 and has not been shown in public since then.*
5. *The identity of the buyer is a mystery. "We are still totting up the figures for the total auction," a jubilant Sotheby's spokeswoman said last night. "It's been a very very good night."*
6. *Monet was passionate about flowers and intrigued by landscape architecture. In 1893 he purchased a plot of land which adjoined the rural house in Giverny, near Paris, where he had moved 10 years earlier. A small stream ran through the plot, and Monet turned the garden into a horticultural paradise.*
7. *Monet worked tirelessly during the summer months, producing 12 pictures in 1899 and six in 1900. The oil sold last night shows the left section of his water garden, with the Japanese-style footbridge and path gently curving through patches of purple irises and tall grass.*
8. *"It took me some time to understand my waterlilies," Monet said in a conversation with the author Marc Elder in 1924. "All of a sudden I had the revelation of how enchanting my pond was. Since then I have had hardly any other subject." Waterlily Pond and Path by the Water is now the 11th most expensive ever painting sold at auction. Its sale price is easily eclipsed, though, by another work completed just nine years earlier – Portrait du Dr. Gachet – by a then little-known artist, Vincent Van Gogh, which went for $82,500,000 (£55 million) in 1900.*
9. *Last night's sale follows a gradual recovery in the art market – unlike the overheated boom of the late 1980s, where it was focused in just one or two areas. Recent sales of Impressionist and Old Master works have been encouraging – despite allegations that many of Van Gogh's best-known works are fakes* (Example (8) in Cornish, 1998: 30–31). (Permission to reprint granted by *Guardian Newspapers* and *Cahiers de Grammaire*.)

In this text, there are several 'topic chains' (see Cornish, 1998, 2003 for further details). A topic chain is a sequence of mainly anaphoric (referentially dependent) expressions within a text that retrieve the same referent, which is thus the subject of several predications for a segment of the text. This referent may have been introduced explicitly via a *referentially autonomous* expression, such as a full proper name, an indefinite NP, or a full definite NP. This is the 'head' of the chain, the anaphoric expressions retrieving its referent then being the 'links.' We will adopt Dik's (1997: 218) definition of topic chains (what he calls 'anaphorical chains') in recognizing three theoretical discourse-functional positions within them: (1) the head of the chain, which introduces the topic referent into the discourse; (2) a second-link position (only exploited in 'macro'-topic chains), whose function is to 'reconfirm' the installation of the topic referent in question – that is, it has an essentially addressee-oriented function; and (3) a third position, which may be multiply filled, consisting of purely anaphoric retrievals of the topic referent whose function is to maintain the high-attention focus now accorded (or assumed to be so accorded) to that referent by the addressor. By the third link, then, the referent retrieved is taken as enjoying full topic status in the discourse.

The four most important topic chains in text (5) are the following: (1) the one dealing with the article's overall topic, the painting by Monet which had just been sold by auction for a record price; (2) the one bearing on the price fetched by the sale; (3) the one having to do with the artist himself; and finally (4) the one dealing with the plot of land that he had bought at Giverny in 1893, of which the stream that flowed through it served as a model for his painting. These chains are made up of the following successions of expressions:

1. *A painting of the most famous garden in the history of art … Monet's Waterlily Pond and Path by Water …. Waterlily Pond … The oil painting … ø … The oil sold last night … Waterlily Pond and Path by the* (sic) *Water … Its … ;*

2. *£19,801,500 … the price for Monet's Waterlily Pond and Path by Water … The price … the sale price … . Its sale price …*;
3. *Claude Monet … Monet … the artist … Monet … ø … he … he … Monet … Monet … ø … his … Monet*;
4. *A plot of land which adjoined the rural house in Giverny, near Paris, where he had moved 10 years earlier … the plot … the garden … his water garden …* .

Let us represent these four topic chains schematically, using the abbreviations 'R-A' for 'referentially autonomous expression' and 'R-NA' for 'referentially nonautonomous expression,' as follows ('H' = 'Head of chain,' 'L2' = 'Link-2,' and 'L3' = 'Link-3'):

(6) *Schematic representation of the four topic chains in (5)*

- **Topic Chain 1: H**: R-A; **L2**: R-A; **L3**: R-NA, R-NA, R-NA, R-NA, R-A, R-NA.
  ('the painting by Monet')
- **Topic Chain 2: H**: R-A; **L2** : R-A; **L3**: R-NA, R-NA, R-NA.
  ('the sale price reached by the painting')
- **Topic Chain 3: H**: R-A; **L2**: Ø; **L3**: R-NA, R-NA, R-NA, R-NA, R-NA, R-NA, R-NA, R-NA, R-NA, R-NA, R-NA.
  ('Claude Monet')
- **Topic Chain 4: H**: R-A; **L2**: Ø; **L3**: R-NA, R-NA, R-NA.
  ('Monet's garden')
  (Item (9) in Cornish, 1998: 32, slightly adapted.)
  (Permission to reprint granted by *Cahiers de Grammaire*.)

This representation points up the fact that referentially autonomous and anaphoric expressions do not occur indiscriminately in any position within a chain. For apart from the autonomous expression that occurs in fifth position within the link L3 in chain 1 (*Waterlily Pond and Path by the* (sic) *Water*), autonomous referring expressions always occur in the central positions within chains (positions H and L2); whereas anaphoric expressions appear only within link-position L3. See Ariel (1996) on the distinction between referentially autonomous and non-autonomous indexical expressions (particularly as far as the distinction between full and reduced proper nouns is concerned).

Interestingly, it is precisely in the two topic chains that are intuitively the most central to text (5) as a whole (namely, chains 1 and 2) that we find link L2 realized by an autonomous expression. The other two chains (3 and 4), where this same link is by hypothesis unfilled, evoke referents that are subsidiary within this discourse in relation to the referents developed by chains 1 and 2: the article deals, after all, with the particular work by Monet as well as with the record price it fetched in auction, rather than with the artist or his garden as such. Furthermore, the representation in (7) (following) of the discourse structure associated with (5) shows that although chains 1 and 2 are set up within central discourse segments (paragraphs 1–3, 5, 8b, and 9), chains 3 and 4 are restricted to background, subsidiary segments (the segments corresponding to paragraphs 4 and 6–8a). So it is not surprising that the last two topics should not have required an L2 link for their installation within the discourse.

Let us look now at the relationship between the occurrence of an expression realizing a given link in a chain and the discourse function of the unit in which it occurs, in terms of the structure of the discourse as a whole. Schema (7) represents the structure of text (5) as discourse (indentations indicate subsidiary segments):

(7) *Discourse structure corresponding to text (5)*

1. [Para 1: **Introduction of the global discourse topic**, the painting by Monet and its record price reached at an auction in London]
2. [Para 2: **Continuation** of the sequence of events surrounding 1]
3. [Para 3: **Development on the record price** reached by the sale of the work]
   4. [Para 4: **Background segment** on the history of the painting, from its inception to the present]
5. [Para 5: **Return pop to the central topic.** Introduction of two local topics (not developed in the remainder of the text): the buyer's identity, and the calculation of the total price of the sale]
   6. [Para 6: **Flashback** to the subject matter of the painting and its origin: the purchase by Monet of a plot of land near his country house in Giverny – the inspiration behind the work. No reference to the painting as such]
   7. [Para 7: **Development of this background topic**: what the painting shows of the garden]
   8a. [1st half of Para 8: **Continuation of the topic of Monet's inspiration drawn from his garden at Giverny**]
8b. [2nd half of Para 8: **Return to the central topic of the record price of the painting** and comparison with the astronomical price reached by another painting of the same period]
9. [Para 9. **Conclusion: Extrapolation to the art market in general –** the recovery of the art sale market precipitated by this auction. No reference to Monet's painting]
   (Item (10) in Cornish, 1998: 34)
   (Permission to reprint granted by *Cahiers de Grammaire*.)

The structure of the first two of the four topic chains in (5) in this respect is as follows. The title of the article already sets up the global theme, the sale of Monet's painting *Waterlily Pond and Path by Water* and the record price it fetched. In the introductory paragraph, this dual aspect of the global theme is made explicit in a complex sentence. As an introductory sentence-paragraph, it has a 'thetic' character, where the information it presents to the reader is entirely new (*see* **Thetic-Categorical Distinction**).

The second paragraph is an elaboration of the situation established by the first, dealing more specifically with the price of this sale at auction; but it also serves to *identify* the painting by Monet, which is the topic of the first paragraph. This cannot be an instance of *cataphora*, where the antecedent-trigger follows the 'cataphor,' for all that, given the referentially autonomous character of *both* nominal expressions used here (full indefinite NP and full proper name); so the referential dependency of anaphor on 'antecedent-trigger' does not obtain – that is, we have *coreference* without *anaphora* in the strict sense here. The use of two indexically strong (referentially autonomous) expressions at this point – *Monet's Waterlily Pond and Path by Water* and *the price for Monet's Waterlily Pond and Path by Water* – is no doubt motivated by the concern to promote their referents to global topics within the article, following their brief introduction in the initial paragraph.

The third paragraph continues this theme of the price fetched by the sale of the painting. Note that the two references to the dual global topics of the article are made via lexically explicit NPs (a reduced proper name for the painting (*Waterlily Pond*) and a definite, also reduced, NP for its price (*the price*)), and not via pronouns. (The fact that these are reduced NPs means that they are not referentially autonomous, but are potentially anaphoric, like pronouns.) See Geluykens (1994) on the question of anaphoric 'repairs' in spoken interactions, where the speaker mis-assesses their addressee's current attention state, and uses a reduced indexical form type (a pronoun of some kind), which she or he immediately corrects to a fuller form (a definite or demonstrative NP or a proper name). There are two reasons behind the use of *the price* as subject of the initial sentence of this third segment of the discourse: first, this reference is followed immediately by a nonrestrictive relative clause in apposition, a position from which unaccented pronouns (here *it*) are excluded (this is also the case with the lexical NP *the oil painting* in paragraph 4); and second, the repetition of the definite article and of the lexical head of the complex NP, which were used in the previous paragraph to 'topicalize' the referent at issue, signals at the start of this new segment that it will continue to be about it. In other words, the referent in question, though topical, is nonetheless reevoked at the very beginning of a *new* discourse segment and no longer within the one in which it was originally topicalized. See Fox (1987) in this respect, who argued that repeated proper nouns in English spoken and written texts may have this function, and also Blackwell (2003) in relation to her spoken Spanish data.

Similarly, the use of a proper noun, albeit reduced (*Waterlily Pond*), at the point in this segment where this reference occurs, is made necessary by the evident need to distinguish this referent from the other central referent, which has already been evoked in this paragraph ('the painting's sale price'), but which enjoys an advantage over it in terms of topic-worthiness at the point where the reference is made. The pronoun *it* used in its place would certainly have retrieved this latter referent, and not 'the painting' as such. This fits in well with what is stated by Levinson's (1995) "M-principle" (see also Huang, 2000: 208), to the effect that the use by a speaker of a phonologically and lexically more substantial expression where a more attenuated one could have been used in its place is normally intended and interpreted as *not* meaning the same as if the more unmarked expression had been used (*see* **Deixis and Anaphora: Pragmatic Approaches** for further details of this account).

As for the two references to these two macrotopics throughout paragraph 4, where the focus switches to background considerations relating to the central theme, the first is made via a definite lexical NP (*The oil painting*, in initial subject position of the segment) and the second by means of a null form, the ellipsed subject of the second conjunct of the clause, which realizes this segment. The motivation behind the use of the former expression type at the beginning of this segment is exactly the same as that of its counterpart *the price* in the same position at the start of the previous paragraph. Because it is followed by a nonrestrictive relative, a pronoun could not have occurred in its place; but even if one could, it would be excluded for reasons of anaphoric ambiguity: for the pronoun *it* here – leaving aside what is predicated of the referent of this expression in this context – would have retrieved the referent 'the sale price' evoked by the immediately preceding clause.

Paragraph 7, which falls together with paragraphs 6 and the first half of 8 in a background discourse segment, includes a reference to the painting, a reference that reevokes at the same time the event of the sale on June 30 (*the oil sold last night*). Once again, we have to do here with a definite (elliptical) NP; and just as in the previous cases, the reason for it is the existence of comparable referents that are in

competition in terms of topichood. The first half of paragraph 8 (8a) continues the theme of the subject of the painting ('Monet's garden'), a theme that is abruptly interrupted in the middle of this paragraph by the opening of a segment returning to the macrotopic of the record sale price reached by this painting at auction at Sotheby's.

Now, it is precisely by means of a full proper name that this transition to a segment dealing with the circumstances of the sale of the painting is carried out. As such, we can hypothesize that it corresponds to what Dik calls a *resumed topic*. It is this particular marked discourse function realized via this referentially autonomous expression that motivates its exceptional filling of the 'anaphoric' L3 link in this macrotopical chain (recall the structure of Chain 1 given in schema (6) earlier). Once its topic status has been reestablished within this new segment – which does not correspond this time to the start of a new paragraph in terms of textualization (see the *text/discourse* distinction mentioned earlier in the second section) – the next (anaphoric) reference may be realized by means of an unaccented pronoun: in this case, by the pronoun contained in the possessive determiner *Its*.

Conclusion

As we have seen in connection with text (5) in particular, the occurrence of different types of nonautonomous, potentially anaphoric expressions in a text is in large part determined by the discourse function of the unit of discourse corresponding to the textual segment in which that expression appears, as well as by its position within that segment. In the case of written newspaper articles of the kind seen in (5) at least, it is clear that initial position within a unit is reserved for lexically based NPs (reduced proper nouns and definite NPs, as well as demonstrative ones), whatever the degree of topicality and accessibility their intended referent may enjoy at that point; unaccented pronouns and of course null pronouns are virtually excluded from such positions, because they serve to mark the continuity of the attention focus established prior to their occurrence. We have also seen how the copresence of competing referents in the immediately prior cotext may favor the use of an indexically stronger form type than a pronoun or a null anaphor in order to avoid unintended anaphoric continuities.

Discourse anaphors, in sum, are sensitive to the hierarchical structure of the discourse that may be assigned to a given text, in conjunction with an appropriate context, and their choice by a speaker or writer is clearly a function of his or her ongoing assessment of the conditions under which their addressee or reader will be operating at the point of use. In the case of discourse anaphors, it is clear, in Dahl and Hellman's (1995: 84) colorful words, that their 'antecedents' "aren't just sitting there, waiting to be referred to, but rather ha[ve] to be created by some kind of operation": this is a reflex of the fact that anaphora operates within the dynamic, ongoing construction of *discourse*, rather than exclusively in terms of the more static dimension of *text*.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Anaphora: Philosophical Aspects; Coherence: Psycholinguistic Approach; Cohesion and Coherence: Linguistic Approaches; Deixis and Anaphora: Pragmatic Approaches; Demonstratives; Ellipsis; Macrostructure; Nonverbal Communication; Pronouns; Text and Text Analysis; Thetic-Categorical Distinction; Topic and Comment; Understanding Spoken Discourse.

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Discourse Domain

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A discourse domain **D** is a cognitive space for the middle-term storage of the information conveyed by subsequent utterances. The notion of discourse domain is part of the theory of discourse semantics, which holds that the interpretation of utterances is codetermined by the information stored in the **D** at hand. For an utterance *u* to be interpretable, *u* must be anchored in a given **D**. The anchoring of *u* requires, at least, that all referring expressions in *u*, including anaphoric pronouns, link up with an address in **D** that represents the object or objects referred to. The information conveyed by the main predicate in the sentence *S* underlying *u* is then distributed over the relevant addresses. This process is called the incrementation of *S* or i(S). When *S* presupposes *P*, *P* must be incremented before *S*. When **D** does not yet contain i(P), i(P) is supplied *post hoc* by accommodation (*see* **Presupposition**), unless blocked. **D**s are subject to a condition of consistency and a condition of cognitive support, ensuring the compatibility of accommodated increments with available world knowledge, unless **D** specifies otherwise.

A **D** contains object addresses, domain addresses, and instructions. Object addresses represent real or fictitious objects. A (singular or plural) object address is created, in principle, by an existentially quantified sentence, say, *There is a king*, resulting in a labeled address (where **n** is an arbitrary natural number):

(1) **d–n** [**a** | King(a)]

or 'there is an **a** such that **a** is a king' (disregarding tense). The sentence *He is rich* results in:

(2) **d–n** [**a** | King(a) // Rich(**n**)]

or '**n** is rich,' where **n** stands for 'the **a** such that **a** is a king.' In (1), **a** is an existential quantifier; in (2), **a** is a definite determiner – a function from the predicate extension [[King]] to an object (the reference value). The change is due to address closure, represented as //, which takes place when an open address is called on by a subsequent definite term. Address closure enables the semantic distinction between the open address in (3a) and the closed address in (3b):

(3a) John has few clients who are dissatisfied. (open address)
(3b) John has few clients. And they are dissatisfied. (closed address)

Some addresses are subdomains, representing what has been specified as someone's belief (hope, knowledge, etc.), as being possible or necessary, or the alternatives of an *or*-disjunction. There is an intricate system of interaction between the main $\mathbf{D_o}$ and subdomains $\mathbf{D_s}$. Information within $\mathbf{D_o}$ can be called on in any $\mathbf{D_s}$, unless blocked by contrary information in $\mathbf{D_s}$ (downward percolation). Likewise, unless blocked in $\mathbf{D_o}$, presuppositions accommodated in a $\mathbf{D_s}$ are also accommodated in $\mathbf{D_o}$ (projection).

A **D** may also contain instructions constraining its further development. Negation, as in not-S, is an instruction banning i(S) from **D**. This explains the incoherence of example (4), where the pronoun *it* calls on an address that has just been banned:

(4) !John has no car. It is in the garage.

The study of discourse domains is still in its infancy. Yet it already provides explanations for phenomena that have so far remained obscure.

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See also: Anaphora, Cataphora, Exophora, Logophoricity; Definite and Indefinite; Denotation versus Connotation; Discourse Semantics; Donkey Sentences; Presupposition; Projection Problem.

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Discourse Markers

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Discourse markers can be defined as those elements, such as *you know, I mean, well, oh, m, you see, look, listen,* that have a distinct prosodic entity, tend not to have a specific semantic meaning, and contribute to scaffold the pragmatic coherence of interaction (*see* **Scaffolding in Classroom Discourse**). Broadly speaking, discourse markers have often been described by their absence of traditional linguistic properties, since neither their use nor their meaning seem to resemble any of the traditional linguistic categories. In fact, these elements have been typically discarded from rigorous linguistic studies, and in different languages have been assigned the general vague name of 'particelle' (Italian), 'fillers' (English), or 'muletillas' (Spanish) – both the English and the Spanish terms evidence these markers' function of 'filling' or 'supporting' discourse. In some sociolinguistic domains, discourse markers were marginalized because they were traditionally attributed to incompetent and incoherent speakers of a language (Watts, 1989).

Schenkein (1972) and Jefferson (1978) were among the first that became convinced of the need to study these vague elements that seem to distort syntax and have a multiplicity of undefined meanings. As an instance, consider how Dik (1989: 45) characterized these elements as 'extra-clausal constituents'; their role in natural language was described as follows: "*any natural language text can be exhaustively divided into clauses and extra-clausal constituents . . . which are neither clauses nor part of clauses.*" In other words, discourse markers, for this author, belong to the realm of spoken language and need to be studied only with reference to the parameters of spoken language.

In the 1980s and early 1990s, some authors studied the general presence of discourse markers in several languages, with no special reference to any grammatical or syntactic model. Thus, for instance, Vicher and Sankoff (1989) described discourse markers in contemporary French; Bazzanella (1990) did the same for contemporary Italian, and Fraser-Gupta (1992) for Singapore colloquial English. Other studies delved into the use of a specific discourse marker in a language, giving a full description of its different functions; cf., for example, Tognini-Bonelli (1993) on 'actually' in British English.

Since then, several authors have tried to name, classify, and describe the nature and function of these seemingly 'elusive' elements. In my opinion, there are three main approaches to the study of discourse markers: the conversational, the grammatico-syntactic, and the discourse-cognitive.

The conversational approach concentrates on the role of discourse markers in the structure of conversation. For example, Schegloff (1984), who called them "continuers," stated that they are used by the speaker to show the listener that his/her speech forms a coherent whole in progress. In the same vein, Schiffrin (1987: 31) provides the following definition: "markers are sequentially dependent elements that bracket units of talk." Both authors (along with others) agreed on the essentially spoken nature of these elements; from their studies, one is led to conclude that discourse markers are better analyzed from an interactional than from an ideational perspective (following Halliday's (1994) macrofunctions of language) (*see* **Systemic Theory**). In fact, Schiffrin (1985: 281) pointed out that: "discourse markers . . . help speakers express interactional alignments toward each other and enact conversational moves"; elsewhere she stated (Schiffrin, 1987) that the presence of discourse markers in a conversation helps the mechanics of turn-taking, the organization of speech acts, the structuring of discourse ideas, the interactive structure of participants, and the presentation of information.

The second model corresponds to the grammatico-syntactic approach to discourse markers. Among others, Knott and Dale (1994: 45) described discourse markers as a "reasonably homogeneous group" that tends to be formed by "*simple* linguistic expressions [their italics] . . . that have become simplified because they correspond to constructs that are in continual use when we process text." In their description of

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the elements that can function as 'cue phrases' (the authors' term for discourse markers), they enumerate coordinators, subordinators, conjunct adverbs, and phrases that take sentential complements (e.g., 'it follows that,' 'it may seem that'). Also following this approach, in a comprehensive account of discourse markers, Fraser (1999: 938) explored the characteristics of these elements; discourse markers "impose a relationship between some aspect of the discourse segment they are a part of, call it S2, and some aspect of a prior discourse segment, call it S1." In other words, this author identified discourse markers with the elements that signal a two-place relationship between adjacent discourse segments, e.g., *therefore, however, and,* etc., and discards other elements that he calls "commentary pragmatic markers" (e.g., *frankly*), 'focus particles' (e.g., *even*), 'pause markers' (e.g., *hum, well*), and interjections (e.g., *oh*) (*see* **Interjections**). In my view, commentary pragmatic markers, and especially the latter two categories (pause markers and interjections) are the most outstanding and most frequently encountered in speech, because they are responsible for the scaffolding of interactional meaning in conversation. In fact, Fraser (1999: 943) considered that the three basic features of discourse markers are the following: they "do not constitute a separate syntactic category," their meaning is "procedural not conceptual" (1999: 944) and, "every individual discourse marker has a specific, core meaning" (1999: 945) (*see* **Meaning, Procedural and Conceptual**). This view somehow contradicts Schiffrin's (1987: 314) argument that not all markers have meanings; Fraser specifically mentioned the markers *oh* and *well* which, incidentally, are very common in English.

This apparent contradiction derives, in my opinion, from the fact that both the conversational and the grammatical-syntactic approach present a static view of discourse markers. By *static,* I mean that these approaches try to apply traditional linguistic parameters to a phenomenon that evades classical labeling and analysis. In my view, there are several issues to consider in this respect: first, it is not possible to discard from this category all the elements that serve to scaffold interaction in conversation and only accept those that fulfill certain syntactic parameters (as Fraser does), and second, it is not possible to say that some of these elements have meanings and others do not (as Schiffrin suggests).

To describe the phenomenon of discourse markers, I propose what I call a discourse-cognitive approach: discourse markers are elements that fill the discoursal and cognitive slots that spoken language needs in order to weave the net of interaction. This dynamic approach is geared to the description of the discourse and the cognitive status of the markers (Romero Trillo, 1994, 2001), but does not limit them to a closed-class repertoire. The approach intends to account for the two main issues at stake: the issue of a 'core meaning' for each marker, and the nature of an 'accepted' repertoire of discourse markers in each language. As to the first, the question of the core meaning poses many problems, since each element may appear in such a multiplicity of functional contexts, and with such a varied array of meanings, that it is very difficult to assign a core meaning, especially in the case of pause markers and interjections. Second, with regard to the elaboration of an accepted repertoire, it is my belief that what we find in discourse is not just a series of discourse markers; rather, we are dealing with discourse slots (functions), where any element – provided it fulfills several conditions related to context and prosody – can function as a discourse marker. In other words, the phenomenon of discourse markers shows that spoken interaction needs to have a pragmatic skeleton, consisting of such discourse slots, that holds the communicative force of the interaction together. The slots are filled by elements that may vary according to regional, ideolectal, or sociolinguistic features within one and the same language.

Due to this multiplicity of conditions that determine the choice of an element (multiplicity of functions and multiplicity of elements realizing each function), the challenge is to find a principled method of selection and a corresponding analysis of this phenomenon. In other words, how can we decide about the appropriateness of the meaning of an element in a specific discourse slot? What are the contextual interactions between the discourse marker and the slot in which it occurs?

When one looks at the elements that function as discourse markers, it becomes immediately clear that there are elements whose meaning is clear: *you know, I see*; alongside with them, we find other elements whose meaning it is difficult to trace: *mhm, aha*. This inclusion of discourse markers that have no apparent meaning or grammatical characterization, but play a role in the cognitive structure of interactants, has led me to develop the notion of 'discourse grammaticalization' (Romero Trillo, 2001) (*see* **Grammaticalization**). According to this view, discourse markers are elements that have undergone a process of discourse grammaticalization and have included in their semantic/grammatical meaning a pragmatic dimension that has interactional purposes. In other words, a grammaticalized marker becomes a homonym in a particular synchronic system that, when realizing a

discourse function, constrains the relevance of the proposition it introduces, as Hopper and Traugott (1993) have suggested.

Based on the work on grammaticalization by Heine *et al.* (1991) and Hopper and Traugott (1993), I have classified discourse markers as follows (Romero Trillo, 2001):

- Acategorial items such as: *yeah, yep, m, mhm, etc.*
- Lexical items such as: *listen, well, good, fine, etc.*
- Lexical composites such as*: I mean, you know, the thing is, oh my God.*

The discourse grammaticalization approach to discourse markers – an approach shared by other scholars such as Aijmer (2002) – addresses the question of the versatility of meanings and the nontransparent nature of these elements that may not have a unique pragmatic meaning.

The problem now is: how can we account for the alternative options that we have, for example, for showing feedback in a certain situation in a particular language? Clearly, several elements (*I see, I know, yes, yeap, m, mhm, aha, etc.,* . . .) could realize such a function. The only possible way out of this quandary is by appealing to the notion of appropriateness, defined as "the possibility to choose the most adequate element in the realization of a certain function in a specific context" (Romero Trillo, 2001: 531). By using the notion of appropriateness, I emphasize that the use of a particular form in discourse is not dependent on any kind of grammatical assessment (as a matter of fact, many discourse markers do not belong to any particular grammatical category, as I mentioned above), but on the frequency with which it appears in a significant corpus-based language sample (representing a native speaker's linguistic competence).

Appropriateness is based on the assumption that there are no preestablished rules that determine the correct or incorrect use of a given element as a discourse marker, but that speakers will rely on the regularities of certain parameters that are considered adequate to a given linguistic situation. These parameters are not only linguistic but also extralinguistic, such as social class, context of the situation, age of the speakers, etc. (*see* **Class Language; Context, Communicative**).

Another interesting feature of discourse markers is their autonomy in the development of a second language. In other words, teachers and learners of a language tend to concentrate on the acquisition of the grammatical and lexical elements that enable communication, but tend to disregard the study and development of the pragmatic weight that discourse markers add to language learning. In fact, several studies show that the pragmatic component of language learning that is formed by cognitive, affective, and linguistic elements (discourse markers) is difficult to reproduce in the nonnative language teaching class (Romero Trillo, 2002). This is the reason why nonnative speakers suffer from what I call 'pragmatic fossilization,' as it is especially evidenced in the use of discourse markers (Romero Trillo, 1997, 2002); that is to say, the evolution of the learners' interlanguage does not include a development in the use of discourse markers similar to the native-language speakers as to frequency and diversity (*see* **Variation in Second Language Acquisition**). In my study of the evolution of discourse markers, I made the general distinction between 'operative markers' (those dealing with managing concepts or tools), and 'involvement markers' (those dealing with social rapport). This comparative study showed that there is a similarity in the use of operative and involvement markers at an early age in native and nonnative children (*see* **Multilingualism: Pragmatic Aspects**). However, with learners' increasing age, involvement markers become difficult to acquire for nonnatives, a fact that leads to a pragmatic fossilization in their use of such markers (i.e., nonnative speakers tend to use the markers that they acquired when they were children). This fossilization is more evident when the native and the target language realize a certain function with divergent translational equivalent markers (see Romero Trillo (1997) on the use of attention-getting markers in Spanish and English). In fact, the fossilization of discourse markers reveals the shortcomings of learning a foreign language in a nonnatural environment, especially as to the use of the elements that contribute to the pragmatics of interaction.

See also: Class Language; Context, Communicative; Grammaticalization; Interjections; Meaning, Procedural and Conceptual; Multilingualism: Pragmatic Aspects; Scaffolding in Classroom Discourse; Systemic Theory; Variation in Second Language Acquisition.

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Discourse of National Socialism, Totalitarian

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Despite its brief duration of 12 years, the period of National Socialist dictatorship had more impact on 20th-century European history than any other historical period of the past century (Ehlich, 1989: 7). Thus, many efforts have been made in different disciplines to understand the multifaceted phenomenon of National Socialist totalitarianism. There have been lots of attempts to explain it through one-sided focuses on single determinants, such as ideological, socioeconomic, or linguistic determinants. However, any endeavor to comprehend National Socialism would fall short if it singled out one solitary factor and, for example, over-emphasized the "power of (manipulative) words" (Maas, 2000: 103; Nill, 1991: 14); this frequently happened in the first post-war decades, when the intricate interrelations between linguistic or – in a wider sense – semiotic and historical, economic, social (psychological), political-ideological, (everyday) cultural, educational, (pseudo)religious, (pseudo)scientific, bio-political, technological, mass-media related, or architectural factors, among others, were generally neglected. These elements altogether determined the phenomenon of National Socialist totalitarianism and should hence be integrated into a holistic, interdisciplinary view. Such a view leads to a more comprehensive understanding than isolationist monodisciplinary approaches and short-sighted theories, such as the 'Führer theory,' which considers fascism primarily a product of a leader, or the traditional theory of totalitarianism, which focuses first on the form and method of fascist dictatorships but ignores the specific content and aims that distinguished the fascist Nazi dictatorship from other totalitarian regimes of the last century (see Kühnl, 1990: 134–145).

In addition to this preliminary remark, three introductory caveats seem to be advisable: First, since the 1930s, so many studies have been carried out on the topic that it is impossible to treat the most important of them thoroughly in the present article (for a bibliographical overview, see Kinne and Schwitalla, 1994; Maas, 2000; Ehlich, 1998). Second, the language use related to National Socialist totalitarianism expanded to so many different social fields of action

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Discourse of National Socialism, Totalitarian

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Despite its brief duration of 12 years, the period of National Socialist dictatorship had more impact on 20th-century European history than any other historical period of the past century (Ehlich, 1989: 7). Thus, many efforts have been made in different disciplines to understand the multifaceted phenomenon of National Socialist totalitarianism. There have been lots of attempts to explain it through one-sided focuses on single determinants, such as ideological, socioeconomic, or linguistic determinants. However, any endeavor to comprehend National Socialism would fall short if it singled out one solitary factor and, for example, over-emphasized the "power of (manipulative) words" (Maas, 2000: 103; Nill, 1991: 14); this frequently happened in the first post-war decades, when the intricate interrelations between linguistic or – in a wider sense – semiotic and historical, economic, social (psychological), political-ideological, (everyday) cultural, educational, (pseudo)religious, (pseudo)scientific, bio-political, technological, mass-media related, or architectural factors, among others, were generally neglected. These elements altogether determined the phenomenon of National Socialist totalitarianism and should hence be integrated into a holistic, interdisciplinary view. Such a view leads to a more comprehensive understanding than isolationist monodisciplinary approaches and short-sighted theories, such as the 'Führer theory,' which considers fascism primarily a product of a leader, or the traditional theory of totalitarianism, which focuses first on the form and method of fascist dictatorships but ignores the specific content and aims that distinguished the fascist Nazi dictatorship from other totalitarian regimes of the last century (see Kühnl, 1990: 134–145).

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(encompassing most areas of life) and was semiotically associated with so many different forms of communication and text that an exhaustive consideration is by no means feasible in the given context. At best, a general description can be given in what follows. Third, neither the historical preconditions and genesis, nor the partial continuity of National Socialist language use after 1945 (see Kinne and Schwitalla, 1994: 8), can be followed up within the given text space. Thus, only the 12 years of dictatorship, from Hitler's attainment of power in January 1993 until the military capitulation on May 8, 1945, will be investigated in this article.

With respect to this period, two important clarifications have to be made, which will conclude this introductory section.

First, treating the 12 years of Nazi dictatorship as a homogeneous period would mean overlooking historical developments during the time in question (Maas, 2000: 111). The major diachronic changes between 1933 and 1945 took place within five stages (for this distinction see Maas, 2000: 105):

1. The time of the Nazi regime's consolidation extended from Hitler's empowerment in January 1933 to the end of 1935.
2. This period was followed by the rigorous militarizing of the German society and the preparation for war. The second phase lasted from 1936 until 1938 and included the occupation of the Rheinland, the *Anschluß* of Austria, and the annexation of the Sudetenland.
3. The third period was constituted by the first phase of World War II and carried on as long as the Nazi aggressors were militarily successful and expanded their dominion.
4. In the second phase of World War II, the military defeat on the Eastern front became apparent with the fall of Stalingrad in January 1943 and, as a result of this fall, the *Wehrmacht* became progressively more politicized and engaged in war crimes.
5. In the last stage, the war focused more and more on the territory of pre-war Germany, where a home front was set up.

Different communicative relations between the totalitarian Nazi regime and the German population predominated during these five stages. These differences have to be taken into consideration in the analysis of National Socialist language use between 1933 and 1945.

Second, while studies of the first two decades of the postwar era often presupposed the existence of a 'language of National Socialism,' researchers in the 1960s started to reject such an idea as an unhistorical misconception. They argued that a wording like 'language of National Socialism' implied the untenable assumption of a distinct language or language system and could at best be considered an undifferentiated metaphor that ignored linguistic conceptualizations of 'language' and neglected historical developments before 1933 and continuities after 1945 (see Sauer, 1978: 38–44; Ehlich, 1998: 280ff.; Nill, 1991: 14; Maas, 2000: 106ff.). It became clear that, from a linguistic point of view, it was inadequate to speak about a proper 'language' of National Socialist totalitarianism, since there was no discrete National Socialist grammar and lexicon. German linguists such as Kolb and von Polenz showed that even a phenomenon like the so-called 'inhumane accusative' (Sternberger *et al.*, 1970), which represented human individuals as passive patients of (material) manipulation and which in German was syntactically realized by verbs derived by means of the prefix "*be-*" (e.g., *behandeln*, *betreuen*, *bearbeiten*), could not be seen as a grammatical idiosyncrasy of National Socialist language use (see Kolb, 1970: 168–179). Nor could the alleged 'atrophy of verbs' (Sternberger, 1970: 241) be taken as a particular property of National Socialist language use, i.e., the tendency to replace a simple verb by a syntactic construction that consists of a nominalization, a local preposition, and an empty verb, e.g., the replacement of *erwägen* 'consider' with *in Erwägung ziehen* 'to take into consideration' (see von Polenz, 1970). Both of these linguistic phenomena were proven to be more general features of bureaucratic language use in times of increasing administrative rationalization. Furthermore, in spite of the numerous neologisms, acronyms, and compounds coined by National Socialists, and despite the intentional changes of word meanings (the negatively connoted German adjective *fanatisch* 'fanatic' was, for instance, reinterpreted positively), the lexical proliferation during the period of National Socialism was not so extensive as to justify the presumption of the existence of a whole National Socialist lexicon. Nevertheless, many dictionaries and thesauri have been published to date that collect Nazi terminology and especially words of those lexical areas that were enlarged by the German fascists (see Paechter, 1944; Berning, 1964; Brackmann and Birkenhauer, 1988; Michael and Doerr, 2002). Compounds and idioms based on lexical items like 'species' (e.g., *arteigen*, *artfremd*, *entartet*), 'blood' (e.g., *Blutschande*, *Blutsgemeinschaft*, *Blut und Boden*), 'race' (e.g., *Rassemensch*, *Rassenhygiene*, *Rassenschande*), 'house' (e.g., *Sippenamt*, *Sippenhaftung*), 'national' (e.g., *Nationalpolitische Erziehungsanstalt*, *nationale Erhebung*), '*Reich*' (e.g., *Drittes Reich*, *Reichsnährstand*, *Reichpropagandaminister*),

and 'people' (e.g., *völkisch*, *Volkskörper*, *Volksschädling*) belong to these semantic fields (cf. Ehlich, 1998: 286).

A Selection of Linguistic Features of National Socialist Totalitarianism

National Socialist totalitarianism shares several characteristics with other forms of totalitarianism, especially the fascist ones. This is the reason why some researchers (especially those of a Marxist tradition) emphasize the international character of Nazi fascism and prefer to write about 'language in times of fascism' rather than 'language in times of National Socialism' when dealing with language use during the Nazi dictatorship (see Ehlich, 1989; Nill, 1991: 22; Maas, 2000: 105). Both wordings have been criticized for mitigation. Marxist theorists, who interpret fascism primarily as an economic-capitalist phenomenon, have been reproached for playing down the extreme brutalities of the National Socialists by bringing National Socialism too close together with less violent forms of fascism, such as Italian fascism. Those who focus on 'National Socialism' without reference to a general theory of fascism have been criticized by Marxist scholars for ignoring more widespread political developments on an international scene. The present article will adopt a mediating position between these two theoretical extremes: it is important to stress common features of different forms of fascist totalitarianism, but these similarities must not blind analysts to National Socialist peculiarities such as, for example, the most radical racism of all fascist movements, i.e., the antisemitism realized through the industrial genocide of the European Jews.

The short span of National Socialist despotism can be characterized by several features of totalitarianism (for an idealized description of totalitarianisms, see Friedrich, 1958: 19ff.; Friedrich and Brzezinski, 1956; Kühnl, 1990: 135). They generally influenced numerous forms of public and private communication in Nazi Germany, although the specific political, social, economic, and military macro-conditions changed in the course of the above-mentioned stages of dictatorship, and with these changes, communication was altered in several respects.

Syncretistic Ideology

A first characteristic of National Socialist totalitarianism was its pseudo-religious, syncretistic ideology that promised a 'thousand-year empire' as if it were the end of history. A central pragmatic, i.e., illocutionary, aspect of the ideological messianism can linguistically be grasped by speech act theory and its concept of 'promise,' understood as the anticipation of a future of success and material welfare under the condition that the addressees supported the National Socialist 'movement' (Ehlich, 1989: 22f.). Neatly connected with the promises were a series of suggestive religious metaphors associated with 'providence,' 'mission,' and 'salvation.'

During all five stages of the dictatorship, promises were of great importance, although their illocutionary force was greatest during the first three stages (as well as in the years of political advertising before the changeover of power in 1933). First, the systematic preparation of war and the expropriation and expulsion of Jews gave the German economy an upturn, which seemingly backed the credibility of some National Socialist promises. After the series of military successes ended with the defeat in Stalingrad, the disillusionment of many previous expectations continuously increased.

The National Socialist ideology was not at all consistent but rather heterogeneous and partially contradictory. Among its main ingredients were (a) the extremely chauvinist glorification of a Great-German community; (b) an excessive sadomasochist authoritarianism; (c) a capitalist property-mindedness and vehement anticommunism on the one hand; (d) an anticapitalist attitude against 'big capitalists' on the other hand; (e) a series of discriminatory (racist, antisemitic, nationalist, ethnicist, xenophobic, homophobic, and antisocialist, as well as anticommunist) scapegoat projections that offered simple explanations of many political and social problems and easy targets of mass aggression (particularly Jews, Sinti and Roma ('Gypsies'), political opponents, and homosexuals); and (f) an excessive militarism and imperialism (see Kühnl, 1986: 84–99).

In the discourses of that time, these six elements were closely related. The totalitarian cult of community was, for example, often linked with the excessive cult of the leader. Such is the case in the poem *Der Führer,* written by Baldur von Schirach, the leader of the Reich's youth (*Reichsjugendführer*), for schoolbooks, in which the poem was reproduced as the very first text:

> *"Ihr seid viel tausend hinter mir, / und ihr seid ich und ich bin ihr / Ich habe keinen Gedanken gelebt, / der nicht in eurem Herzen gebebt. Und forme ich Worte, so weiß ich kein's, / das nicht mit eurem Wollen eins. Denn ich bin ihr und ihr seid ich, / und wir alle glauben, Deutschland, an dich!"* 'You are many thousands behind me / and you are me and I am you. I have not lived any thought, / that has not trembled in your hearts. And whenever I form words, I do not know any one / that is not in accord with your want. For I am you and you are me, / and we all believe, Germany, in you!'

Here, von Schirach assumes Hitler's perspective in order to 'let' the Führer deictically construct a direct interpersonal relationship with the addressed schoolchildren. The first-person perspective and the direct addressing are rhetorical means of increasing the persuasiveness of the unbelievable assertion that Hitler, as the absolute top of the Nazi hierarchy, can be equated with 'small' schoolchildren. The paradoxical collectivist assimilation and the almost total identification encompass thinking, feeling, wording, and volition. The assimilation and identification are linguistically realized by relational clauses reciprocally connected with each other in the first and the last rhyme of the poem, and with the help of the homogenizing deictic expression 'we' in the last line. In this line Hitler keeps spelling a nationalist creed for the pupils as members of the 'we-group' and verbalizes a pseudo-religious apotheosis of Germany.

Furthermore, both the totalitarian cult of community and the authoritarian glorification of the German dictator were linguistically realized in ritualized formulae, such as in the Nazi salute *Heil Hitler!*, which was accompanied by the right arm extended forward. This optative greeting fulfilled the interpersonal function of constituting a National Socialist phatic communion and of creating National Socialist identity (Ehlich, 1989: 21). It served as an obligatory 'in-group' marker and membership categorization device.

The ideological element of extreme authoritarianism, which was almost inextricably linked with militarism, culminated linguistically in the speech act of order, as well as the perlocutionary effect of blind obedience. In the given historical context, the totalitarian character of this illocutionary type consisted in the systematic attempt to eliminate the hearers' freedom to decide, since deviation from the speakers' intentions, verbalized by the command, was threatened with negative sanctions, culminating in physical coercion and violence, including torture and murder (Ehlich, 1989: 24). In denying opposition and resistance, the widespread system of command and obedience ordered speechlessness (Bauer, 1988). It repressed autonomous acting and discursive interaction in the sense of (rational) argumentation and counter-argumentation. The 'duty of justification,' a basic rule of rational discussion that expects everyone who advances an epistemic or deontic claim to defend it if asked to do so (see Van Eemeren and Grootendorst, 1994: 21), was widely suspended. In many fields of social action, even the smallest possibility to explicitly question or doubt the normative validity of a demand or the truth of a statement was prevented. In these domains, plausible argumentation was replaced by fallacious (and often very pathetic) argumentation (including tautological arguments such as *Befehl ist Befehl!* 'Command is command!') and dictated instruction.

The functioning of the authoritarian National Socialist system was, among others, guaranteed by the National Socialist education. This education was strongly rooted in the continuation of 'black pedagogy,' which was, among others, based on the principle of children's unconditional obedience to parents and adults.

The National Socialist system of order and obedience was not only backed by extreme terror but also by threats; by the above-mentioned persuasive promises; by the swearing of oaths on Hitler, the Reich and the German people; and by a penetrating system of denunciation (Ehlich, 1989: 24). This system began to crumble away only slowly in the very last phase of dictatorship, when Hitler tried to order the Germans to perish rather than surrender. Historical research showed that even those who acted under strict orders had some individual scope of freedom and could at least try to mitigate the negative consequences for Nazi victims (see *Hamburger Institut für Sozialforschung,* 2002: 34–35, 579–627). Thus, the exculpating topos of heteronomy ('I/they have only fulfilled my/their duty,' 'I/they had no choice') often heard in postwar Germany and Austria by ex-soldiers of the *Wehrmacht* and their advocates (see, for example, Wodak *et al.*, 1990) is, in the case of the Nazi war crimes, a fallacious argumentation scheme.

The racism and antisemitism of National Socialism were a bewildered syncretism, an ideological muddle of different pseudoscientific (especially biologist and linguistic) doctrines and of nationalist, ethnicist, culturalist, anticapitalist, and religious prejudices. Animalizing racist metaphors against Jews, such as 'parasite' (German: *Parasit*); (see Bein, 1964) and 'rat' (German: *Ratte*), which functioned as perverted implicit argumentation schemes that were used to fallaciously justify or back the mass murder, were motivated by social Darwinism. Philology and linguistics contributed ideologically to the National Socialist construction and categorization of races and the related legitimization of racism (cf. Römer, 1985; Huton, 1999). Apart from the racializing usurpation of the myth of the 'Aryan' (originally, 'Aryan' was the self-designating name for Persians living in Iran and in northwest India), philology and linguistics were responsible for at least three serious errors that provided the basis for the connection of race and language classifications (Römer, 1985: 41ff.):

- First, they are responsible for confusing language relationship and speaker relationship, for assuming that 'language family' and linguistic 'kinship' automatically imply 'blood relationship.'
- Second, linguistics and philology are to be blamed for a discriminatory Eurocentric hierarchy of languages and language types.
- Third, and in close relation with the second, they are responsible for the naturalizing and personifying descriptions of languages as organisms and quasi-human beings, and for confusing the forms and types of language with an alleged cultural level of the speakers.

Single Political Mass Party with a Strict Hierarchy and all Powers

A second significant feature of National Socialist totalitarianism was constituted by the antidemocratic installation of a single political 'mass party,' which usurped all powers in the state and was organized in a strict hierarchy, with Hitler at the top. This single party attempted to form a totality with the state and promoted the syncretistic ideology characterized by calculated ambiguity.

The calculated ambiguity manifested itself, first of all, in the synecdochic party name NSDAP, in so far as the acronym (literally, the 'National Socialist German Workers' Party') combined nationalist and socialist elements, although socialism traditionally propagates international views. The principle of calculated ambivalence, which was a central guideline of National Social rhetoric from the very beginning, enabled the propagandists to reach out to different groups of potential voters simultaneously, to achieve multiple addressing (Kühn, 1995). This principle was especially important in times of political advertising and recruitment before 1933, when the other political parties were not yet prohibited.

After the interdiction of all political opponents, the only remaining official party, the NSDAP, began to penetrate and politicize German civil society. Nevertheless, the National Socialist ruling apparatus never in fact reached centralized totality, which has been assumed by the idealising and static theory of totalitarianism (see Wippermann, 1996: 785 for a critique of Friedrich and Brzezinski, 1956). In fact, it seems to be more accurate to qualify the National Socialist dictatorship as a totalitarian polycracy in which totalitarian policy did not equally penetrate all policy fields and in which a plurality of National Socialist ruling organizations and power groups dominated the state, sometimes acting independently from each other, sometimes confusing competencies, and sometimes acting inefficiently as parallel organizations working on the same tasks (Schmidt, 1995: 638–641, 763, 960ff.).

Terrorist System of Control and Denunciation

A third totalitarian characteristic of National Socialism was the terrorist secret police, GESTAPO (the acronym stands for *Geheime Staatspolizei*). This terrorist executive organ fought all 'internal enemies' of the regime and installed a widely ramified system of observation, control, spying, persecution, intimidation, and torture. It aimed to discover, stop, and prevent all activities of political dissidence, contradiction, opposition, and resistance. The population was urged to collaborate in the system of denunciation and to report any suspicion of conspiracy and resistance against the Nazi regime. Denunciation became a mass phenomenon in the 'Third Reich' (Ehlich, 1989: 25). As a result of this, public expression of oppositional opinion and appeals to mobilize against the regime (for instance, through fliers, graffiti, and illegal press) had to be anonymous, and most of the resistance and its organization took place clandestinely, "in whispers" (Ehlich, 1989: 25f.). Making jokes about National Socialist politicians was seriously punished, as it was said to undermine National Socialist convictions. Nevertheless, "whisper jokes" (*Flüsterwitze*) circulated in everyday communication.

Monopolization of Public Media

A further crucial feature of National Socialist totalitarianism was the almost total monopolization of the means of mass communication and news production by the NSDAP. This monopoly emerged from the elimination of politics, the abolition of the process-oriented political dimension related to political competition, and the articulation of differences of opinion.

On the one hand, the monopoly led to censorship of the press, a ban on certain books (up to the burning of books) and, in general, to 'propositional reductionism' (Ehlich, 1989: 22). The latter concerned the ideational metafunction of language, i.e., the linguistic representation of social 'reality' and experiences. It consisted in oversimplification and intellectual impoverishment. This reduction was not least pursued by language planning, e.g., linguistic ruling (cf. Bork, 1970) and the reorganization of dictionaries, two tasks of the Ministry for Propaganda. Dictionaries such as the *Duden* integrated the stylistic features and typical vocabulary of the National Socialist ideology, including numerous technical expressions, political slogans, flag words, stigma words, hyper-German archaisms, euphemistic camouflage vocabulary, superlative neologisms, acronyms, collective

singulars, Germanizations, typical compounds and derivatives, and many lexicalized biologic metaphors related to the ideology of *Volk*, *Reich*, race, blood, and soil (Müller, 1994).

On the other hand, with respect to the interpersonal metafunction of language, the totalitarian monopoly on almost all public communication resulted in the phaticization of communication. With the help of new media technologies (such as microphones, loudspeakers, and outside broadcast units), the National Socialist orators aimed primarily to establish, hold, and intensify the contact with their audience and to suggest a pseudo-intimacy between themselves and their hearers (Göttert, 1998: 448f.). In highly ritualized mass meetings that in some respects showed liturgical forms comparable to religious masses, content came second to the 'phatic communion' of the participants. On specific 'acclamation relevance places' (see Reisigl, 2003: 405), the choreography of such meetings allowed for acclamations by the masses. That way, interaction and relevant participation were suggested, whereas the statistical form of mass participation did not include the political right to express an opinion and participation in procedures of political decision making (Ehlich, 1989: 21).

An important rhetorical means of intensifying the contact between a speaker and hearers in contexts of National Socialist mass communications, and at the same time of mobilizing hearers, was the highly pathetic, affective performance. Of all the National Socialists, Hitler is best known for an extremely emphatic *pronuntiatio*. Apart from his hyperbolic facial expressions and gestures, it was primarily Hitler's intonation that gave the impression of high speaker involvement, with which the 'Führer' systematically elicited emotions and acclamations from his audience. Among these intonation features were patterns of speaking in staccato, crescendo, and accelerando; intermediary segmenting pauses as well as relevance pauses; accents, changes of tone color, and the like (Reisigl, 2003: 397ff.; Beck, 2001). The highly phatic interchange between Hitler and his primary audience was, furthermore, strongly influenced by Hitler's frequent use of syntactic parallelisms and the rhetorical figure of the three/four, which, accompanied by marked intonation, often 'triggered' mass acclamations.

Before, during, and after mass meetings, many additional semiotic means related to mass communication were employed to establish a National Socialist phatic communion. The National Socialist propagandists pulled out all the stops to organize persuasive multimodal mass events. Already Hitler's 'people's speeches' were prepared with great propagandistic effort, for example, Hitler's speech on the occasion of Austria's *Anschluß* to the Third Reich, held in Vienna on March 15, 1938 (see Reisigl, 2003). The organization of the huge National Socialist party meetings after 1938, however, did not leave the smallest detail to chance – for at these party meetings, the whole primary audience was recruited by summoned claques.

The semiotic organization of a National Socialist mass meeting included (a) the intentional selection of a specific place and architectural scenery, possibly with a polyvalent political symbolism that allowed monumental fascist perspectivation and multiple addressing; (b) the announcement of the meeting by strategic media activities of political mobilization via fliers, press advertisements, appeals and organizational instructions on the radio, etc.; (c) the preparation of the speech(es) as the intended highlight(s) of the event (often, ghostwriters helped to produce the speech manuscripts); (d) the accurate preparation of the multimodal scenery and the rehearsal of the single contributions by the speaker(s), the soldiers, the party cadres, the claques and supernumeraries, the chorus, the musicians, the folkloric groups, the athletes, etc.; (e) the holding of the suggestive mass meeting itself (it sometimes was technically supported by a chorus of voices shouting and acclaiming in unison from a record played by a member of a party cadre on an outside broadcast unit near the scene and transmitted via loudspeaker vans); and (f) the mass-mediated distribution of those semiotic representations that best conformed to the ideological line and propagandistic intentions of the NSDAP. These one-dimensional representations were distributed by direct transmission via radio and, later, broadcasting via radio and film (e.g., newsreels), the sale of gramophone records of the meeting, press coverage, and the publication of photos and illustrated books. Thereby, the National Socialists tried to multiply and perpetuate the persuasive effects of the mass meeting. Almost all semiotic representations of the event that deviated from the official National Socialist version were repressed by censorship (cf. Rathkolb *et al.*, 1988).

Monopoly of the Use of Arms

A fifth feature of National Socialist totalitarianism was the almost total monopoly over the use of arms. The National Socialists excessively exploited this monopoly of force against internal and external 'enemies' to suppress, dominate, expulse, or murder them. Physical violence replaced argumentation. Such violence frequently laid the foundation of the illocutionary force of a threat. This type of speech act was often employed as a fallacious *argumentum ad baculum*, which consists in 'threatening with the stick' (Latin *baculum*), in verbally threatening to use

force against the antagonist instead of using relevant arguments. The *argumentum ad baculum* played an important role in National Socialist education. It served the purpose of drilling the mechanism of order and obedience into children. This socially generalized mechanism became a basic ingredient of the paramilitary organization of various domains of everyday social life (e.g., physical education, sports, and the Hitler Youth organization).

A special segment of National Socialist military vocabulary was formed by euphemistic camouflage words and paraphrases. In the different phases of dictatorship, these euphemisms had various functions. They seem to have been especially common during the last two stages of National Socialist totalitarianism. At this time, many of them concealed the systematic extermination of European Jews. To mention just one example: the paraphrase *Sonderbehandlung* ("special treatment" was introduced in 1939 as a camouflage word for execution. It first designated the execution of a single prisoner by the police. In the last three years of the dictatorship, the abstract circumlocution denoted the mass murder of Jews in concentration and extermination camps (Brackmann and Birkenhauer, 1988: 174). A second important function of euphemisms during the last two stages of the dictatorship, when Nazi propagandists issued more and more appeals to hold out, was the mitigation of military defeats. Instead of *Rückzug* ('retreat') there was talk of *Frontbegradigung* ('straightening of the front').

Policy over Economy

A last feature that has to be mentioned is the far-reaching primacy of policy over economy. The linguistic consequences of the political penetration and ideological control of almost all economic sectors (whether rural, industrial, or domestic) became an issue in discourse analysis only in the 1980s. Maas (1984: 21–90) presented stimulating studies on this topic. He analyzed different attempts of the NSDAP to put the economy under state control, for example, through advertised appeals to housewives and youth to recycle leftovers and not to waste kitchen scraps (for more on the National Socialist politicization of women see Horan, 2003), through weekly menu proposals in regional German newspapers, and through yearly harvest festivals highlighted by Hitler's speech to the *Nährstand* ('breadwinner estate'). These analyses once more illustrate the ideologically heterogeneous and polyphonic character of the National Socialist dictatorship.

Conclusion

Since the 1980s, discourse analytical studies have been published that approach the topic in question from a more comprehensive, interdisciplinary, and multimodal perspective than the studies that appeared in the first decades after World War II. These early studies were often concerned with single phenomena of the lexicon (often single words), grammar, style, and rhetoric, and frequently focused on single orators like Hitler and Goebbels. Further, they mostly subscribed to simple concepts of 'language' and 'linguistic manipulation.' Discourse analysts have recognized the methodological weakness of earlier studies and have opted for a more differentiated, integrative, and contextualizing approach. With respect to the complex problem under discussion, there is, however, still a need for an even more profound cooperation between linguistic discourse analysis, historical research, political science, psychology, and economic theory.

See also: Accent; Duden, Konrad (1829–1911); Formulaic Language; German Lexicography; Gesture and Communication; Intonation and Syntax; Metaphors in Political Discourse; Nominalization; Power and Pragmatics.

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Discourse Parsing, Automatic

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Introduction

Automatic discourse parsing is a young research area that finds itself in a somewhat awkward position today. From a natural language engineering perspective, the need for text-level processing systems is uncontroversial: because sentence-level processing modules (syntactic and semantic parsers, named-entity recognizers, language translators and generators, etc.) operate at sentential level, they are not able to make text-level inferences and/or produce outputs that are text-level coherent/consistent. Despite the clear need, two factors conspire to prevent rapid progress in the field:

1. On one hand, text/discourse linguistics is not sufficiently mature yet as a research field. Humans can, for example, examine two adjacent paragraphs in a text and immediately assert whether one elaborates on, contradicts, or provides supporting evidence for the other. However, these human intuitions and judgments are not formalized at a sufficient level of detail yet to enable computational linguists to standardize the process. Contrast this state of affairs with the state of affairs in syntax, for example, where sufficiently mature linguistic theories have been already adopted and employed by computational linguists to create open-domain syntactic parsers that operate at 90% levels of accuracy.
2. On the other hand, natural language engineers themselves perceive that discourse/text-level parsing is not a low-hanging fruit. On the 'most-likely-to-have-an-immediate-impact list' on the accuracy of popular end-to-end language applications, such as machine translation and speech recognition, discourse/text-level models are not a high priority. Solutions to apparently simpler problems, such as dealing with unknown words, names, morphology, and local syntax, are likely to have a larger immediate impact on the performance of these applications.

Given these factors, it is likely that the field of discourse parsing will have a quantifiable impact on many end-to-end applications, not immediately, but in a slightly more distant future. However, as adequate solutions to the apparently simpler problems are found and as progress is made in discourse linguistics, the field of discourse parsing is poised to drive significant advances in natural language and enable many new applications that we cannot even conceive of today.

The current state of the art in discourse parsing can be easily summarized along the following dimensions:

- Depending on the linguistic theory one subscribes to, discourse/text phenomena are represented using sequences of segments, trees, or graphs.
- Depending on educational background and personal bias, discourse/text phenomena are inferred by exploiting anything from simplistic observables, such as cue phrases, to sophisticated hidden variables, such as complete semantic representations.
- Reflecting recent algorithmic advances in other computational linguistics areas, the derivation of discourse/text structures employs techniques grounded in human encoded knowledge, supervised, and unsupervised learning techniques.

This article reviews the state of the art in the area of automatic discourse parsing in the context of the following structure. It first discusses several competing discourse-level representations that have proven influential in the field and the concept of 'discourse relation,' which is fundamental to many of these representations. It then discusses the sources of knowledge that have been exploited in the context of inferring discourse relations and the techniques used for making these inferences. It reviews the main approaches specific to discourse structure derivations and outlines several applications in which discourse parsing has been shown to have a positive or potentially positive impact. It ends with a list of public resources (data and programs) that can further progress in this field.

Discourse Structure Representations

There are three main abstractions that subsume discourse structure representations: sequences, trees, and graphs.

The simplest assumes that discourses/texts can be sequenced into labeled or unlabeled segments of topical continuity (see Hearst, 1997 and Burstein *et al.*, 2003 for representative examples). Since the automatic derivation of such representations is discussed extensively in another section of this encyclopedia, this article is not going to be concerned with that subject here.

The most ubiquitous abstraction reflects the assumption that discourse representations are trees. For example, a tree-like representation constructed in the style of Rhetorical Structure Theory (Mann and Thompson, 1988) of text fragment (1), is shown in Figure 1.

(1) [Mr. Roman also brushed aside reports about infighting between him and Mr. Phillips, his successor at Ogilvy.[1]] [The two executives could hardly be more different.[2]] [Mr. Roman comes across as a low-key executive;[3]] [Mr. Phillips has a flashier personality.[4]] [During time off, Mr. Roman tends to his garden;[5]] [Mr. Phillips confesses to a fondness for, among other things, fast cars and planes.[6]]

The representation makes explicit the text fragments that represent the minimal units of discourse (elementary discourse units) – the leaves of the tree. The internal nodes of the tree correspond to contiguous text spans. In Figure 1, each text span/discourse unit has a distinct nuclearity – a nucleus indicates a more essential unit of information, while a satellite indicates a supporting or background unit of information; nuclei are represented using straight lines, while satellites correspond to arc origins. Non-overlapping, adjacent text spans are connected via 'discourse relations' that make explicit the intentional, semantic,

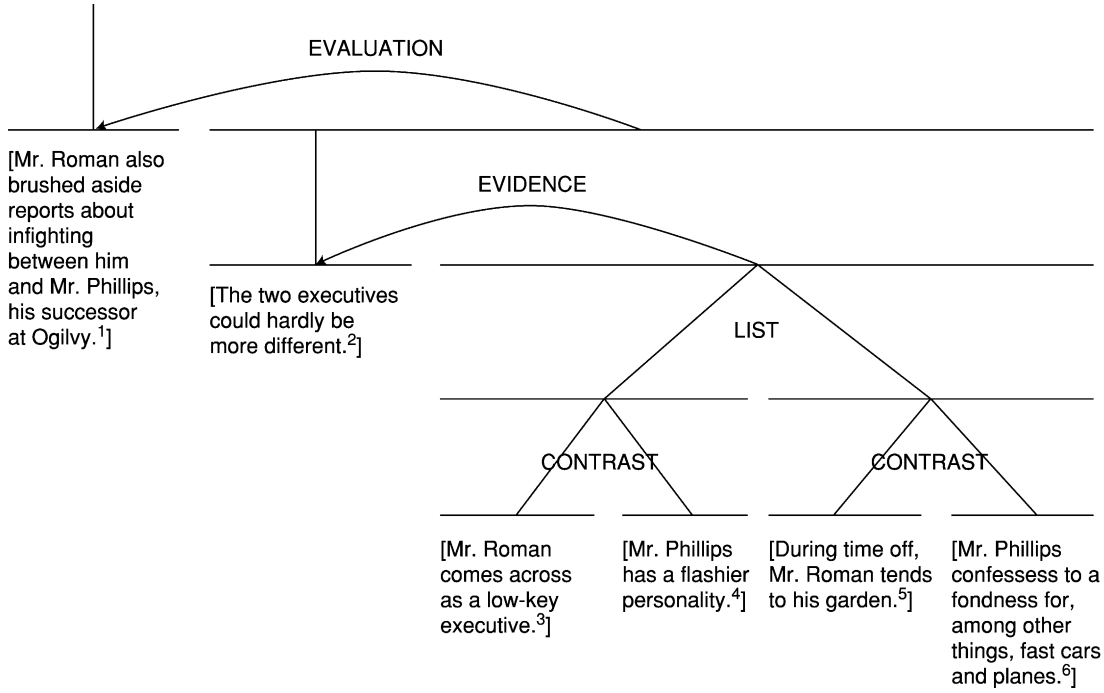

Figure 1 A rhetorical structure theory-like representation of text (1).

or textual relation that holds between two segments. For example, the text span that consists of units 2 to 6 enables the reader to evaluate the information provided in unit 1; and units 5 and 6 enable the reader understand the contrast between Mr. Roman's and Mr. Phillips' personalities.

There is no agreement as to the most appropriate level of granularity for defining elementary discourse units (subclauses, clauses, sentences, paragraphs); the nature and number of discourse relations (intentional, semantic, textual); whether the relations hold between adjacent or embedded segments; etc. But some discourse theories are more influential than others. The theories proposed by Grosz and Sidner (1986), Mann and Thompson (1988), Hobbs (1990), and Asher (1993) are among the most influential in the area of computational linguistics, so far. (See Marcu, 2000 for detailed discussions of these theories).

The least constrained abstraction favored by discourse theorists is the graph. Although graph-based discourse representations are used in the context of summarization applications, linguistically, they are the least well-understood/defined: very little can be said, for example, about a discourse graph being well-formed or valid.

Observables Used for Inferring Discourse Relations

The goal of a discourse parser is to take as input arbitrary texts and automatically construct their most likely discourse structures. Independent of the discourse theory that underlies it, and the mechanisms employed for discourse structure derivation and disambiguation, every discourse parser needs to infer whether and what discourse relation holds between two given text spans. There are significant differences with respect to the observables used for making this inference.

- Cue phrases: The simplest discourse parsers (Marcu, 2000) exploit discourse marker occurrences, i.e., phrases such as *for example, because*, and *but*, in order to hypothesize discourse relations that correlate with the usage of these markers.
- Cohesion: Cross-segment word-based similarity and other word-based correlations (Marcu and Echihabi, 2002) are also used as discourse relation indicators. Low similarities, for example, are assumed to correlate with topical segment boundaries and high-level text-based relations (Morris and Hirst, 1991; Hearst, 1997; Marcu, 2000).
- Syntax: Several discourse parsers assume that some syntactic constructs correlate with certain discourse relations – for example, interclause elaboration relations are more likely to have an SBAR as satellite than an S or an NP. Soricut and Marcu (2003) and Lapata and Lascarides (2004) describe discourse parsers and relation identifiers, respectively, that exploit such syntactic knowledge.
- Referential expressions: The choice of pronouns and other referential devices has also been shown

to correlate with discourse relation usages (see Kehler, 2002 for a comprehensive overview).

- Semantics: The knowledge-richest approaches assume access to fully fleshed semantic representations (Hobbs, 1990; Asher, 1993; Webber *et al.*, 2003). Traditionally, the derivation of these observables as well as the inference of discourse relations and discourse structures proceeds incrementally, in a compositional manner.

Algorithms

Algorithms for Identifying Discourse Relations

At the foundation of every discourse parser lies an algorithm that identifies whether and what discourse relation holds between two discourse elements. All discourse relation identification algorithms proposed to date are built with the assumption that the discourse relation identification component is necessarily ambiguous: one cannot assert with complete certainty that a given discourse relation holds between two elements. Depending on the context, the relation may span smaller or larger text segments; or the context may provide sufficient evidence that another relation is more likely to hold between two discourse elements than the given one.

The design patterns used to implement discourse relation identification algorithms are similar to those employed in many other natural language processing areas:

- Manually created rules: Depending on the discourse framework and observables used for identifying discourse relations, one manually creates rules that exploit constructs as simple as cue phrases (Marcu, 2000) or as sophisticated as logical expressions (Hobbs, 1990; Asher, 1993; Webber *et al.*, 2003) in order to solve the task at hand.
- Supervised and unsupervised learning techniques: By capitalizing on sufficiently large, manually annotated corpora (Soricut and Marcu, 2003) or automatically annotated corpora (Marcu and Echihabi, 2002; Lapata and Lascarides, 2004), some researchers use traditional supervised and unsupervised machine learning techniques to construct discourse relation identifiers. The learning frameworks provide a natural means for expressing the uncertainty specific to this task as the outputs of these algorithms have a probabilistic flavor.

Algorithms for Discourse Structure Derivation (Discourse Parsing)

The problem of imposing structure on top of sequences is specific not only to discourse parsing but to syntactic parsing as well. Hence, it comes at no surprise that many discourse parsing algorithms replicate, extend, and modify algorithms that have been already applied in the context of syntactic parsing.

- Discourse parsing as compositional semantics: Emulating earlier work in compositional semantics, some discourse parsers derive the discourse representation of a text in an incremental, compositional manner that exploits knowledge-rich constraints and inference mechanisms expressed in formal languages (Asher, 1993; Webber *et al.*, 2003). In an effort to manage efficiently the set of alternatives associated with each incremental step, such approaches often rely on discourse-specific constraints that are not usually formalized in syntactic parsing frameworks. For example, such parsers often assume that a new discourse unit can be attached only to a node on the right frontier of the partial discourse structure constructed up to processing the new unit (Polanyi, 1988).
- Discourse parsing as a bottom-up derivation process: Expanding on earlier work on bottom-up syntactic parsing (nonprobabilistic and probabilistic), bottom-up discourse parsers construct discourse trees from leaves and smaller discourse constituents to larger constituents up to the root, by systematically exploring a large number of choices that can be ranked according to some scoring functions. Marcu (2000) and Soricut and Marcu (2003) provide good examples of such parsers that use both arbitrary and well-formed probabilistic scoring models. Parsing in this framework is usually accomplished in two steps: in the first step, the elementary discourse units are identified; in the second, the discourse structure is built up.
- Discourse parsing as tree adjoining: Expanding on the tree adjoining syntactic parsing framework, lexicalized tree adjoining discourse parsers construct discourse structures using tree-level substitution and adjunction operations (Webber, 2004).
- Discourse parsing as a decision-based process: Emulating work on data-driven syntactic parsers, decision-based discourse parsers (Marcu, 2000) decompose the parsing process into a sequence of steps/decisions whose likelihood can be estimated from annotated data. In this framework, discourse parsing amounts to a search for the most probable sequence of decisions that consumes all the discourse units in the input and constructs a discourse tree that incorporates all the discourse units. The elementary discourse units are identified via separate mechanisms.

Performance

In contrast to work in syntactic parsing, discourse parsing is still in its infancy. Discourse parsers that employ techniques rooted in compositional semantics or tree-adjoining cannot be applied yet on open-domain documents. Also, to my knowledge, the accuracy of these parsers has never been reported, so it is difficult to estimate how good they are even in a limited domain. Evaluations carried out on open-domain parsers show that much remains to be done before these parsers can make a significant impact on a wide variety of applications. Identifying elementary discourse units can be done with an accuracy of approximately 84%; while the labeled recall and precision on discourse structure derivation is around 50–60% (Marcu, 2000; Soricut and Marcu, 2003).

The relation between syntax and discourse appears to be sufficiently well understood to yield sentence-level discourse parse trees that are very similar to those built by humans under the assumption that one has access to a perfect syntactic parser and not a state of the art one, which has an accuracy of only 90% (Soricut and Marcu, 2003). However, at the text level, too little is known about the correlates between discourse and other observable linguistic constructs to enable one to derive high-accuracy discourse parse trees.

In spite of this, not all hope is lost. Until we are able to understand better the relation between text structure, reference, and semantics, we may be able to find niches where crummy discourse parsers can have a positive impact on open-domain applications. For example, Marcu (2000) has shown that automatically produced discourse trees can be used to build high-performance summarization systems in the popular science genre. Exploiting discourse parsers in the context of machine translation and question answering applications also appears to be promising research directions.

Public Resources

The most comprehensive corpus available to researchers today is the RST Discourse Treebank (Carlson *et al.*, 2003). The corpus, which is made available via the Linguistic Data Consortium, provides access to RST-annotated trees for approximately one-sixth of the Penn Treebank. Another ongoing effort targets the annotation of coherence relations associated with discourse markers, including their argument structures and anaphoric links (Miltsakaki *et al.*, 2004).

Soricut and Marcu (2003) have also made their sentence-level discourse parser publicly available. These, and other annotation efforts, are likely to have a positive impact on subsequent developments in the field.

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http://www.ldc.upenn.edu – Linguistic Data Consortium.
http://www.isi.edu – Soricut and Marcu's sentence-level discourse parser.

Discourse Processing

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In our daily lives, we are often asked to comprehend language in units larger than the single sentence. For example, when we follow instructions for how to set the clock on our VCR, we need to develop our understanding of the situation over the course of several sentences (e.g., "Wait until you see the red light flashing. Then, hold down the 'Time' button and…"). When we have a conversation, the meaning of a particular utterance may be based on our understanding of previous utterances (e.g., the meaning of 'him' in the sentence "Ask him where the briefcase is" depends on our understanding of the referent's previous mention). When we read or listen to stories, the narrative is built up across many sentences, paragraphs, and typically chapters. The preceding examples of language use are examples of discourse, and discourse processing is the processing involved in building meaning across several sentences or utterances. Although research on discourse processing has grown to encompass work done in a range of fields (e.g., linguistics and education), the focus of this article will be research that has grown out of the field of psycholinguistics. We begin by discussing the research paradigms most widely used to explore issues in discourse processing. Then, we outline several of the major theories of discourse processing. We conclude by reviewing several domains in which discourse processing has been explored.

Methods of Studying Discourse Processing

Over the past several decades, discourse-processing research has focused on the comprehension mechanisms that operate while readers comprehend a text or listeners understand a conversation – as it unfolds. The methods used in this pursuit have been a mixture of both on-line and off-line measures. On-line measures are often timing-based measures designed to assess the moment-by-moment operation of the language comprehension system. Off-line measures are typically based on responses such as paraphrases and answers to comprehension questions; such measures are not necessarily intended to directly tap the moment-by-moment operation of the comprehension system.

On-Line Paradigms

There are two major methodological paradigms that are based principally on on-line measures: the inconsistency detection paradigm and the probe response paradigm. These paradigms use reading times, lexical decision times, and naming times (among other measures) as primary dependent measures.

Inconsistency Detection The inconsistency detection paradigm was introduced by O'Brien and Albrecht (1992). Participants are asked to read a passage such as the following:

> Jane woke up on Thursday morning in a panic. Her rent check was due the next day, but there was no money in her bank account. When she walked into the kitchen, she remembered that she hadn't yet deposited the large refund check that she had gotten from the IRS. After getting dressed, **she grabbed the check and drove to the beach**.

The narrative begins with a sentence or two designed to introduce a fact about (or a goal for) the main character. In this case, Jane needs to get some money into her bank account. At the end of the narrative, there is a critical sentence (or clause) that conflicts with information presented earlier in the passage. In the example narrative, the bold clause at the end of the passage is the critical one: if Jane needed to get the check to the bank, readers should find it strange that she took the check to the beach. If readers notice this inconsistency, they should have difficulty understanding the critical sentence. The comprehension difficulty slows the readers down, such that they read

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the critical sentence more slowly than a version of the same sentence that is consistent with the information presented at the beginning of the narrative (e.g., "After getting dressed, she grabbed the check and drove to the bank").

The inconsistency detection paradigm has been used to explore several issues in discourse processing. For example, the paradigm provides a means of assessing what information readers remember as they work their way through a narrative. If their reading times slow down for a sentence that is inconsistent with information provided earlier in the narrative, their slowed reading times suggest that they remember the previously presented information. The inconsistency detection paradigm has also been used to investigate how readers draw inferences during discourse processing. Sometimes the inconsistent information is inconsistent only with implicit rather than explicit information.

Probe Response The second major paradigm that has been used in studies of discourse processing is the probe response task. Participants are asked to listen to or read passages such as the example presented above, and at some point during the passage the participants are presented with a probe word (i.e., a word that may or may not be related to the theme of the narrative). For example, at the end of the 'rent check' passage presented above, participants might see the probe word 'bank.' In one version of the probe response methodology, participants are asked to make a lexical decision on the probe word. That is, they are asked to judge whether the probe is a real word or not ('nust' is an example of a nonword). If the concept named by the probe word (bank) is currently active in the comprehender's representation, they should respond to the probe word faster than they would respond to a probe word that is unrelated to the narrative (e.g., 'bird' is a word that is unrelated to the 'Jane' passage). If the concept named by the probe word is not currently active, it should not be responded to faster than an unrelated probe word. Other versions of the probe response paradigm use naming tasks as the primary dependent measure (i.e., participants are shown a probe word and required to pronounce aloud the word as rapidly as possible).

The probe response methodology has been used to study a wide range of topics in discourse processing. Variants of this task have been employed to assess when comprehenders draw inferences while processing narratives, the nature of the inferences drawn, the way that certain elements of a discourse remain active in memory (or not) as more of the discourse is processed, how comprehenders keep track of the characteristics and goals of the protagonists in a discourse narrative, and many other issues.

Off-Line Methods

Several kinds of off-line measures have been employed to understand the comprehension of discourse. Paraphrase tasks, in which participants are asked to paraphrase what they have heard or read, have been used to study what comprehenders remember about various aspects of a discourse (e.g., how much of the surface form do they remember? how many of the details do they remember?) and what inferences they have drawn. Another off-line measure that has been used is the question-answering task. Participants' answers to comprehension questions are used to assess the representations that comprehenders generated for a discourse. Think-aloud paradigms, in which participants are asked to think aloud about their developing understanding of a discourse, have been used to explore the comprehension strategies employed as comprehenders work their way through a discourse. Whereas there is some question about the extent to which these off-line measures provide a true reflection of the processing mechanisms that operate during, rather than after, comprehension, measures such as those listed above provide valuable information about the representations that are constructed from a discourse.

The Three-Pronged Approach

Arthur C. Graesser and colleagues (see Graesser *et al.*, 1997) have advocated a three-pronged approach to the study of discourse processing. This approach is a combination of on-line and off-line measures. The three prongs of this approach are (1) developing hypotheses from theories of discourse processing, (2) employing off-line measures to obtain a detailed understanding of the strategies used during discourse processing, including an understanding of the inferences drawn and constructs and elements best remembered, and (3) on-line measures to determine how these inferences and strategies are employed by the comprehension system to build a representation of the discourse in real time.

Theoretical Approaches to Discourse Processing

Several theories of discourse processing have been proposed over the past two decades. These theories differ in the cognitive mechanisms that are evoked to explain how discourse is understood, but they agree on several issues:

1. Comprehension of a discourse leads to a mental representation of that discourse.
2. Comprehenders routinely update their mental representations. Updating involves the integration of new information into their existing representation of the discourse.
3. Comprehenders draw at least some inferences during the comprehension of discourse. These inferences help to maintain discourse coherence at both global and local levels.
4. Some of the information from the discourse remains highly active in memory (i.e., in the foreground of the discourse), whereas other information is less active in memory (i.e., in the background of the discourse). Whether a given element is in the foreground or the background of the discourse depends on the current focus of the discourse.
5. The comprehension of a discourse can be affected by a number of variables, such as the genre of the discourse being processed and the comprehender's goals for understanding the discourse.

These themes of discourse-processing research have been integrated into and explained by a number of individual theories.

Construction-Integration Model The construction-integration model was proposed by Kintsch (1988). This model proposes that discourse is comprehended in two iterative stages. In the construction stage, the incoming text base, which is a representation of the content of the discourse but not of the actual words and phrases in the text) enters working memory; in working memory, the text base retrieves potentially relevant information from long-term memory. This stage of processing can be described as ballistic: it happens quickly and automatically. During the integration stage, the comprehension system begins to integrate the new information with the previously existing model of the discourse. The integration stage is comparatively slow and resource consuming, as the comprehension system pares down the information activated in the construction stage and integrates only the information that is most relevant to the present situation into the model of the discourse. The resulting representation is called a 'situation model.'

Structure-Building Framework The structure-building framework was outlined by Gernsbacher (1990). The theory proposes that discourse comprehension proceeds by building mental representations of the information presented in the discourse, with the initial process in building a structure called 'laying a foundation.' The foundation of the structure is based around the characters and events initially presented in the discourse. When new information is presented, it can either be mapped to the existing structure (i.e., it is attached to the existing structure), or it can prompt the comprehension system to shift to a new structure (i.e., the comprehender lays the foundation for a new structure). Finally, some information in the structure can be enhanced, made more available for further processing, whereas other information can be suppressed, made temporarily unavailable for further processing.

Event-Indexing Model The event-indexing model was discussed in Zwaan *et al.* (1995). It proposes that comprehenders continually monitor the discourse model to maintain coherence on five dimensions: protagonist (who is involved in the events being described?), time (at what time is the event taking place?), space (what are the spatial relations between the characters, objects, and events being described?), causality (are the events in the discourse causally related to each other?), and intentionality (is the incoming information relevant to the protagonist's goals and intentions?). Shifts on any one of those dimensions (e.g., if the discourse indicates some temporal delay between one event and the next) are typically associated with some processing cost as comprehenders update their representation. The largest processing costs tend to be associated with discontinuities on the time and protagonist dimensions.

Memory-Based Approach Myers and O'Brien (1998) described the memory-based approach to discourse processing. Whereas other models might posit the operation of 'active' processing mechanisms (in the sense that these mechanisms actively retrieve information when building a representation of the discourse), the memory-based approach is built on passive mechanisms of memory retrieval. The memory-based approach is based on Hintzman's (1986) MINERVA, and its 'resonance' process of memory retrieval. On this view, incoming information resonates both with the existing model of the discourse and with information in long-term memory. Information from memory is used to interpret the incoming sentence to the extent that it resonates with the new information.

For a more detailed review of these and other models of discourse processing, the reader is directed to Britton and Graesser (1996).

Theoretical and Empirical Issues

The final section of this article reviews a set of findings that bear on those aspects of discourse processing that have been most widely studied.

Integrating Sentences into a Coherent Discourse

One of the most basic questions in discourse-processing research is how comprehenders connect a series of utterances or sentences into a coherent whole. This issue can be separated into a series of smaller questions. First, how does the comprehender know that a series of utterances or sentences are intended to be interpreted as a connected discourse? There are several linguistic cues that signal the coherence of a discourse. David A. Robertson and colleagues asked comprehenders to process a series of sentences such as "The family rode together in a car" (Robertson *et al.*, 2000). When the series of sentences began with the definite article, comprehenders tended to interpret the series of sentences as part of a connected discourse. On the other hand, when the same sentences were presented with the indefinite article, comprehenders tended to interpret the sentences as being unrelated to each other. Thus, cues as subtle as the articles that are used in subsequent sentences indicate whether those sentences should be interpreted as related or not. Connectives such as *because*, *however*, *meanwhile*, and others play a similar role. For example, in the sentences "The mother was preparing food for the party. Meanwhile, the grandparents were loading the minivan," although the focus of the two sentences is different, the connective *meanwhile* indicates to comprehenders that both sentences should be interpreted as part of the same discourse model.

Once comprehenders have begun to integrate a series of sentences into their mental representation of a discourse, they must continue to process each subsequent sentence. There are several strategies tha might be used. Comprehenders might connect each incoming sentence to the most recently encountered sentence. In doing so, the comprehender is attempting to maintain local coherence (see, e.g., McKoon and Ratcliff, 1992) in their discourse model. On the other hand, comprehenders may attempt to maintain global coherence in their discourse model (see, e.g., Graesser *et al.*, 1994; Singer *et al.*, 1994). That is, comprehenders might connect each incoming sentence by virtue of the overarching themes of the discourse (e.g., the goals of the protagonist).

In general, comprehenders attempt to maintain both local and global coherence. Experiments using the inconsistency detection paradigm discussed above demonstrate the guidance afforded by global coherence. For example, if a narrative begins by presenting a goal for Jane (she needs to get money into her bank account), and several sentences later, the comprehender is told that Jane is going to the beach without meeting her goal, comprehension will typically slow down. The slowed comprehension suggests that the overarching goal – a component of global coherence – affects processing individual sentences (see, e.g., Albrecht and O'Brien, 1993). Additionally, it is clear that comprehenders attempt to maintain local coherence from sentence to sentence (see, e.g., McKoon and Ratcliff, 1992). If a given discourse has too little local coherence, it will be viewed as altogether incoherent.

Comprehenders pay attention to several elements of the discourse in attempting to maintain coherence. Chief among them are space (where are the events taking place?), time (when are the events taking place?), the protagonists being described, causality (is there a causal relationship between the events being described?), and the goals of the characters (Zwaan *et al.*, 1995). An incoming sentence can potentially violate coherence on these (or other) dimensions. The more dimensions that are violated by the incoming sentence, the more difficult that sentence will be to understand and to integrate into the existing representation of the discourse.

There is a considerable amount of evidence in support of the claim that these dimensions are important for maintaining the coherence of a discourse. Space has been shown to be important in several ways. First, when two objects are described as being in different locations, focusing the discourse on one of those objects makes the other less accessible to the comprehender (see, e.g., Glenberg *et al.*, 1987). Second, in studies in which participants study the layout of a building before reading a narrative about events that take place in that building, reading times are sensitive to the relative distances between the rooms in the building. Sentences that describe a character moving between adjacent rooms of the building are read more quickly than those that describe a character moving between nonadjacent rooms (see, e.g., Morrow *et al.*, 1987).

Time is less well studied than space (i.e., the spatial dimension) but has an equally strong effect on language processing. Zwaan (1996) asked participants to read passages which contained a shift in temporal perspective. The time shift was either small ("A moment later...") or large ("A day later..."). Comprehenders took more time to read sentences with a large temporal shift than to read sentences with a small temporal shift. Subsequent experiments have provided more support for claims about the importance of the temporal dimension (Rinck *et al.*, 2001).

The remaining elements outlined above – protagonist, causality, and intentionality – have received less attention than space or time. The research that does

exist on these topics is generally supportive of the claim that shifts on any of these dimensions can lead to processing difficulty. A more detailed understanding of how each of these dimensions works, and how the dimensions are used together during discourse comprehension, is needed.

Generating Inferences during Discourse Processing

To achieve successful comprehension, the comprehender must often fill in details that are not explicitly presented in the discourse. That is, the comprehender must generate inferences about the events being described in order to maintain a coherent representation of the discourse. For example, when they encounter a pair of sentences such as "It was very cold that winter morning. Joe slipped on the sidewalk," comprehenders need to draw the inference that there may have been snow or ice on the sidewalk in order to integrate the two statements into a coherent discourse model. The processes through which inferences are generated have been explored extensively over the past two decades.

One of the major research questions about inference generation during discourse processing has centered upon the issue of when inferences are generated and when they are not. According to the minimalist position (McKoon and Ratcliff, 1992), comprehenders mostly attempt to maintain local coherence when they process a discourse. The only inferences that are routinely generated by comprehenders are those that are required to maintain local coherence (such as the inference that there was ice on the sidewalk from the example in the previous paragraph). Comprehenders are capable of drawing more global inferences from discourse, but these inferences are only drawn under certain circumstances (e.g., when the comprehender is attempting to process the discourse more deeply than usual). In contrast, the promiscuous position maintains that comprehenders routinely generate a wide range of inferences from the discourse, including those that are not strictly necessary to ensure local coherence. These inferences include inferences about the goals of the characters, the emotional state of the characters, the cause-and-effect relationship between events in the discourse, the intent of the writer in conveying particular pieces of information, and so on.

A compromise between these extreme positions is the constructivist position. The constructivist position holds that comprehenders routinely draw inferences that meet their goals as comprehenders, inferences that maintain the coherence of the discourse, and inferences that explain why different events in the discourse are taking place. On this view, comprehenders may appear to behave in accord with the minimalist position under certain conditions and in accord with the promiscuous generation position under other conditions, depending on the nature of the discourse and the goals they have in comprehending that discourse. For example, if the comprehender is attempting to skim the discourse in an effort to quickly glean information, they may draw few inferences (in keeping with the minimalist position). On the other hand, if individuals are reading a discourse for enjoyment (say, if they are reading a detective novel) or if they are trying to learn about a new field of study, they may read the discourse more carefully and draw a wider range of inferences.

Another topic of import with regard to inference generation during discourse processing is the mechanism(s) through which the inferences are drawn. It is undoubtedly the case that many kinds of inferences (especially those relating to the local coherence of the discourse) are drawn by combining information from the incoming discourse with 'world knowledge' retrieved from long-term memory. For instance, when we read that it is cold outside, we can infer that it is probably wintertime. When we read that the character in the discourse has slipped on the sidewalk, the knowledge that snow and ice can be on the sidewalk during the winter is retrieved from memory, supporting the inference that the snow or ice has caused the character to fall. This sort of inference generation can be explained via the mechanisms of many of the theories outlined earlier. For example, the construction-integration model proposes that inference generation is supported by the rapid, automatic retrieval of world knowledge during the construction stage of comprehension. On the other hand, much less is known about how more global inferences (e.g., inferences about the goals of the characters, the purpose of the author in writing the discourse, and the theme of the discourse) are generated. It seems likely that world knowledge of the sort described above contributes to the generation of these global inferences. Additionally, metalinguistic knowledge about different genres of discourse (e.g., that newspapers are supposed to be balanced and factual, that detective stories should build suspense) may also help the comprehender to draw inferences about the purpose and structure of the discourse.

Determining Reference in Discourse Processing

When discourses are produced, they do not repeatedly use the same word to refer to a particular object or person. A character may be introduced as 'Jane,' and in the next sentence be referred to as 'she,' and later in

the discourse be referred to as 'the woman with the brown hair.' In order to maintain the coherence of the discourse, the comprehender must realize that 'Jane,' 'she,' and 'the woman with the brown hair' all refer to the same person.

The most well-studied case of reference in discourse processing is the comprehension of anaphoric reference, or reference to a person or object that has previously been mentioned (as in the above example). One factor that influences the comprehension of anaphoric references is the nature of the information currently active in memory (and foregrounded in the discourse). If there is one female character currently in the foreground of the model (Jane), then pronouns such as 'she' will be mapped onto Jane. If there is more than one female character in the foreground of the model, the pronoun will be mapped to the one whose representation is most active. In some cases, further knowledge is needed in order to determine the referent of an anaphor. When Jane is referred to as 'the woman with brown hair,' the comprehender needs to know that Jane has brown hair in order to easily understand the reference as intended.

The choice of reference for an entity in the discourse depends largely on the circumstances in which the entity is being mentioned. When a person or object is initially mentioned, it is usually marked with the article *a* or *an*, and the description provided is typically somewhat detailed. Subsequent references are less detailed, and may be made by pronouns or other 'shorthand' referring expressions. The more the entity has been mentioned in the discourse, the shorter the referring terms tend to be. The change in referring terms is related to the given/new distinction in language use. Information that is given (i.e., that is already established in the discourse) may be referred to in a shorthand manner because it is assumed that the comprehender already knows what is being talked about. Information that is new (i.e., information that is assumed to be unknown to the comprehender) is described in more detail to ensure that the comprehender has the relevant information to process subsequent discourse.

Conclusion

This article has presented a brief overview of the literature on discourse processing. We have discussed the overarching themes of this work, the major theories of discourse processing, and the subareas of discourse processing that have received the most attention in the literature. Nonetheless, our review has not done justice to the ways in which perspectives on discourse processing have been used in fields such as education, linguistics, communications, and communication disorders. Without a doubt, the field of discourse processing will continue to grow and flourish as researchers attempt to understand the complexity of the processing involved as comprehenders understand discourse.

See also: Coherence: Psycholinguistic Approach; Macrostructure; Psycholinguistic Research Methods; Reference: Psycholinguistic Approach.

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Discourse Representation Theory

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The Problem of Unbound Anaphora

The most straightforward way to establish links between anaphoric pronouns and their antecedents is to translate the pronouns as variables bound by their antecedents. This approach does not work when the link crosses a sentence boundary, as in example (1).

(1) *A man*$_1$ *met an attractive woman*$_2$. *He*$_1$ *smiled at her*$_2$.

It should be possible to interpret the first sentence of this discourse as soon as it is uttered, and then later on, while processing the second sentence, establish the links between the pronouns and their intended antecedents.

One possible solution is translating the indefinites by means of existential quantifiers with scopes extending beyond the sentence level and then allowing the variables for the pronouns to be captured by these quantifiers. But this will not do: at some point the scope of a quantifier must be 'closed off,' but further on another pronoun may occur that must be linked to the same antecedent.

The bound variable approach to anaphora also fails for cases where a pronoun in the consequent of a conditional sentence is linked to an indefinite noun phrase in the antedent of the conditional, as in example (2).

(2) *If a man*$_1$ *meets an attractive woman*$_2$, *he*$_1$ *smiles at her*$_2$.

A possible approach here would be to view (2) as a combination of the noun phrases *a man* and *an attractive woman* with a structure containing the appropriate gaps for antecedents and pronouns, viz., (3). This is the approach of *quantifying-in*, taken in traditional Montague grammar (*see* **Montague Semantics**).

(3) *If PRO*$_1$ *man meets PRO*$_2$, *PRO*$_1$ *smiles at PRO*$_2$.

This approach does not work here, however. Quantifying-in the indefinite noun phrases in (3), i.e., in a structure that has the conditional already in place, would assign the wrong scope to the indefinites with respect to the conditional operator.

Note that the meaning of (2) is approximately the same as that of (4).

(4) *Every man who meets an attractive woman*$_1$ *smiles at her*$_1$.

In this case as well, quantifying-in does not allow one to generate the most likely reading where the subject of the sentence has wide scope over the embedded indefinite. Sentences with the patterns of (2) and (4) have reached the modern semantic literature through Geach (1962). Geach's discussion revolves around examples with donkeys, so these sentences became known in the literature as '*donkey sentences*.'

As has repeatedly been remarked in the literature, there are quite striking structural parallels between nominal and temporal anaphora. The past tense can be viewed as an anaphoric element in all those cases where it is not to be understood as 'sometime in the past' but as referring to some definite past time.

(5) *John saw Mary. She crossed the street.*

In example (5), presumably the seeing takes place at some specific time in the past, and the crossing takes place immediately after the seeing. Again, we have an anaphoric link across sentence boundaries, and a traditional operator approach to tense does not seem to fit the case. Although tense is not treated in the pioneer papers on discourse representation, it is clear that the problem of temporal anaphora is a very important subproblem of the general anaphora

problem that discourse representation theory sets about to solve.

Basic Ideas

Discourse representation theory as it was presented in Kamp (1981) addressed itself specifically at the problem of the previous section, although confined to nominal anaphora. The basic idea of the approach is that a natural language discourse (a sequence of sentences uttered by the same speaker) is interpreted in the context of a representation structure. The result of the processing of a piece of discourse in the context of representation structure R is a new representation structure R'; the new structure R' can be viewed as an updated version of R.

The interpretation of indefinite noun phrases involves the introduction of '*discourse referents*' or '*reference markers*' for the entities that a piece of discourse is about. In the following, the term '*discourse referent*' will be used. Discourse referents are essentially free variables. Thus, indefinite noun phrases are represented without using existential quantifiers. The quantification is taken care of by the larger context. It depends on this larger context whether an indefinite noun phrase gets an existential reading or not.

The life span of a discourse referent depends on the way in which it was introduced. All 'alive' referents may serve as antecedents for anaphors in subsequent discourse. Anaphoric pronouns are represented as free variables linked to appropriate antecedent variables. Definite descriptions in their simplest use are treated in a way that is similar to the treatment of anaphoric pronouns: definite noun phrases in their anaphoric use are treated like indefinite noun phrases; i.e., they are translated as free variables, but give rise to additional anaphoric links. The treatment of other, functional uses of definite noun phrases (as in *A car crashed. The driver emerged unhurt.*) is more involved.

The difference between indefinite noun phrases, on the one hand, and definite noun phrases and pronouns, on the other, is that indefinites introduce ***new*** variables, whereas the variables introduced by definites and pronouns are always linked to an already established context. In other words, the difference between definites (including pronouns) and indefinites is that the former refer to entities that have been introduced before, i.e., to ***familiar*** entities, whereas the latter do not.

Quantifier determiners, i.e., determiners of noun phrases that are neither definite nor indefinite, can bind more than one variable. Specifically, they can bind a *block* of free variables, some of which may have been introduced by indefinites. Conditional operators (*if* ... *then* ... constructions) can also bind blocks of free variables. Not all variables introduced by indefinites are in the scope of a quantifier or a conditional operator. Those that are not are existentially quantified over by default.

The processing of a piece of discourse is incremental. Each next sentence to be processed is dealt with in the context of a structure that results from processing the previous sentences. The processing rules decompose a sentence, replacing the various parts by *conditions* to be added to the structure. Assume one is processing discourse (6) in the context of representation structure (7) containing just one discourse referent and one condition.

(6) *A man walked down the street. He whistled.*

(7) $(x)\ (street\ (x))$

As was mentioned before, indefinite noun phrases give rise to new discourse referents, and definite noun phrases are linked to existing discourse referents. The indefinite in the first sentence of (6) introduces a new discourse referent y and two conditions $man(y)$ and y *walked down the street*. The second condition can be decomposed further by introducing a fresh discourse referent in the structure, linking this discourse referent to an existing discourse referent, and replacing the definite noun phrase with the discourse referent in two new conditions. This gives three new conditions all in all: $z = x$, $street(z)$ and $walked\text{-}down(y, z)$. The discourse representation structure now looks like

(8) $(x, y, z)\ (street(x), man(y), z = x, street(z), walked\text{-}down(y, z))$

Processing the second sentence of (1) gives rise to a new link and a new condition. The final result is (9).

(9) $(x, y, z, u)\ (street(x), man(y), z = x, street(z), walked\text{-}down(y, z), u = y, whistled(u))$

All representation conditions in the above example are atomic. Quantified noun phrases or logical operators, such as conditionals or negations, give rise to complex conditions. The representation structure for (4) given in (10) provides an example.

(10) $((x, y)\ (man(x), woman(y), attractive(y), meet(x, y))) \Rightarrow ((\ ), (smiles\text{-}at(x, y)))$

Note the appearance of an arrow $\Rightarrow$ between components of the structure, glueing two nonatomic pieces of representation together. Note also that the right-hand component starts with an empty list ( ), to indicate that on the right-hand side no new discourse referents are introduced.

In the box format that many people are perhaps more familiar with, (10) looks like (11).

(11)
$$\begin{array}{|l|}\hline x\ y \\ \hline \textit{man } x \\ \textit{woman } y \\ \textit{attractive } y \\ \textit{meet}(x, y) \\ \hline \end{array} \Rightarrow \begin{array}{|l|}\hline \\ \hline \textit{smiles-at}(x, y) \\ \\ \hline \end{array}$$

Formal definitions and truth conditions for these representation structures are given in the next section.

Kamp (1981) and Kamp and Reyle (1990) spell out the rules for processing sentences in the context of a representation structure in all the required formal detail. An important feature of the rules is that they impose formal constraints on availability of discourse referents for anaphoric linking. Roughly, the set of available discourse referents consists of the discourse referents of the current structure, plus the discourse referents of structures that can be reached from the current one by a series of steps in the directions *left* (i.e., from the consequent of a pair $R \Rightarrow R'$ to the antecedent), and *up* (i.e., from a structure to an encompassing structure). The constraints on discourse referent accessibility are used to explain the awkwardness of anaphoric links, as in (12).

(12) **If every man*$_1$ *meets an attractive woman*$_2$, *he*$_1$ *smiles at her*$_2$.

Such data can be disputed, but space does not permit such indulgence here. Discourse referents for proper names are always available for anaphoric reference; to reflect this fact, such discourse referents are always included in the list of discourse referents of the top-level structure.

To account for deictic uses of pronouns, use is made of *anchored structures*. An anchored structure is a pair consisting of a representation structure R and a function f, where f is an *anchor* for a subset of the discourse referents of R; i.e., f assigns appropriate individuals in a model to these discourse referents. For example, structure (7) could be anchored by mapping discourse referent x to an appropriate street. Deictic pronouns are handled by linking them to anchored discourse referents.

Essentially the same approach to natural language analysis as was proposed in Kamp (1981) is advocated in Heim (1982). Heim uses the metaphor of a filing cabinet: the established representation structure R is a file, and additions to the discourse effect a new structure R', which is the result of changing the file in the light of the new information (*see* **Dynamic Semantics**).

The main program of discourse representation theory (in its generic sense) is an attempt to regard semantic interpretation as a dynamic process mapping representations plus contexts to new representations plus contexts. As Partee (1984) remarked, this shift from static semantics to dynamic semantics *cum* pragmatics means an enrichment of the enterprise of formal semantics and should therefore make it easier to establish contact with other schools of semantics and/or pragmatics. Partee's prediction was proved correct in subsequent years by the widespread use of discourse representation theory in computational linguistics and by the application of techniques of anaphora resolution from Artificial Intelligence in systems based on discourse representation theory.

Discourse representation theory has also provided new inspiration to traditional Montague grammarians, who tend to be less than satisfied with the contextual rules for analyzing discourse on the grounds that the influence of context makes it difficult to work out what contribution individual phrases make to the meaning of the whole. A suitable dynamic perspective on the process of interpretation has shown these compositionality qualms to be unfounded, and discourse representation theory has been instrumental in bringing about this dynamic turn (*see* **Dynamic Semantics** for details).

Heim (1990) contains a perceptive appraisal of various alternatives to the approach of discourse representation theory (in its generic sense) to the problem of unbound anaphora.

Discourse Representation Structures (DRSs)

Formally, a discourse representation structure R consists of two parts: a finite list of *discourse referents* and a finite list of *conditions*. The discourse referents in the list are called the discourse referents of R. The conditions of a structure R may contain discourse referents that are not included in the list of discourse referents of R. Conditions can be *atoms*, *links*, or *complex conditions*. An atom is a predicate name applied to a number of discourse referents, a link is an expression $t = r$, where r is a discourse referent and t is either a proper name or a discourse referent. The clause for complex conditions uses recursion; a complex condition is a condition of the form $R \Rightarrow R'$, where R and R' are discourse representation structures.

Next, one defines truth for discourse representation structures with respect to a model. Call $M = \langle D, I\rangle$ an appropriate model for discourse representation structure R if I maps the discourse referents of R to members of D, the n–place predicate names in the atomic conditions of R to n–place relations on D, the

names occurring in the link conditions of R to members of D, and (here is the recursive part of the definition) M is also appropriate for the structures in the complex conditions of R.

Let $M = \langle D, I \rangle$ be an appropriate model for structure R. An assignment in $M = \langle D, I \rangle$ is a mapping of discourse referents to elements of D. Assignment f verifies R in M if there is an extension f' of f with the following properties:

1. f' is defined for all discourse referents of R and for all discourse referents occurring in atomic or link conditions of R.
2. If $P(r_1, \ldots, r_n)$ is an atomic condition of R, then $\langle f'(r_1), \ldots, f'(r_n) \rangle \in I(P)$.
3. If $t = r$ is a link condition of R, and t and r are both discourse referents, then $f'(t) = f'(r)$; if t is a proper name and r a discourse referent, then $I(t) = f'(r)$.
4. If $R_1 \Rightarrow R_2$ is a complex condition of R, then every assignment for R_1 that verifies R_1 and agrees with f' on all discourse referents that are not discourse referents of R_1 also verifies R_2.

A structure R is true in M if the empty assignment verifies R in M. These definitions can be modified to take anchors into account in the obvious way, by focusing on assignments extending a given anchor.

Clearly, the expressive power of this basic representation language is quite limited. In fact, there is an easy recipe for translating representation structures to formulae of first-order predicate logic. Assuming that discourse referents coincide with predicate logical variables, the atomic and link conditions of a representation structure are atomic formulae of predicate logic. The translation function $^\circ$, which maps representation structures to formulae of predicate logic, is defined as $R^\circ = \bigwedge C_i^\circ$, where $\bigwedge$ indicates a finite conjunction and the C_i° are the translations of the conditions of R. The translation for conditions is in turn given by the following clauses.

- For atomic conditions: $C^\circ = C$.
- For complex conditions: $(R_1 \Rightarrow R_2)^\circ = \forall x_1 \ldots \forall x_n (R_1^\circ \Rightarrow \exists y_1 \ldots \exists y_m R_2^\circ)$, where $x_1, \ldots, x_n$ is the list of discourse referents of R_1 and $y_1, \ldots y_m$ the list of discourse referents of R_2.

It is easy to show that R is true in M under the definition given above if and only if R° is true in M for some assignment, under Tarski's definition of truth for first-order predicate logic.

A slight extension of the discourse representation language allows for the treatment of negation. Negated conditions take the form $\neg R$, where R is a discourse representation structure. Negations of atomic conditions are treated as negations of discourse representation structures containing just one atomic condition. The discourse referents of a negated structure are not available for anaphoric linking outside that structure.

The definition of satisfaction must take negated conditions into account. Here is the required extension of the definition. Assignment f verifies R in M if there is an extension f' of f with the following properties:

1–4. As above.
5. If $\neg R'$ is a complex condition of R, then no assignment that agrees with f' on all discourse referents that are not discourse referents of R' verifies R'.

Translation into predicate logic now must take care of negation as well. The translation clause for negated conditions runs as follows:

- $(\neg R)^\circ = \neg \exists x_1 \ldots \exists x_n R^\circ$

Here $x_1, \ldots, x_n$ is the list of discourse referents of R. It is easy to see that the given translation is meaning preserving. It is also not difficult to give a meaning-preserving translation in the other direction. This shows that the discourse representation language extended with negation has precisely the same expressive power as first-order predicate logic.

Extensions: Tense and Plurals

Partee (1984) gave a survey of proposals to extend discourse representation theory with discourse referents for times and events to exploit the parallels between nominal and temporal anaphora. In example (5) from section 1, where first reference is made to a seeing event in the past and then to an event of crossing the street that takes place immediately after the seeing event, an anchoring mechanism can be used to link the seeing event to the appropriate time, and an anaphoric link between events can constrain the time of the crossing event in the appropriate way. Also, the dynamic effect of shifting the reference time can be incorporated by using a designated discourse referent for the reference time and specifying that this discourse referent be updated as a side effect of the processing of sentences denoting events.

Next, there are examples where a reference is picked up to an indefinite time in the past.

(13) *Mary arrived during the day. She let herself into the house.*

In example (13), the arrival takes place at some indefinite time on a specific day (presumably anchored) in the past. The event of Mary's entering the house is then linked to the time of arrival. Again, all that is

needed is the introduction of an event discourse referent for the arrival event and an appropriate linking of this event discourse referent to the reference time discourse referent: the reference time discourse referent starts pointing at a time interval just after the time of arrival. The processing of the next sentence introduces an event that is constrained to be included in the reference time interval and has again as a side effect that the reference time discourse referent is shifted to refer to a time interval just after the house-entering event.

Sentence (14) provides an example of quantification over times.

(14) *When Bill called, Mary was always out.*

The example gives rise to a complex representation of the form $R \Rightarrow R'$, with an event discourse referent and a reference time discourse referent introduced in the left-hand structure, and a state discourse referent of the right-hand structure, with the state constrained to include the reference time interval.

An operator account of tenses and temporal adverbs has the awkwardness that the tense operator is redundant if a temporal adverb is present, as in (15), but not otherwise. Also, assigning the correct scopes to these operators poses problems.

(15) *Bill called last Friday around noon.*

In the discourse representation approach, where tenses translate into event or state variables linked to an appropriate reference time, temporal operators are simply translated as predications on the event discourse referent, and the awkwardness vanishes. See Kamp and Rohrer (1983) and Partee (1984), plus the references cited therein, for details.

As for the incorporation of the singular versus plural distinction, an obvious first move in any attempt to accommodate plural anaphoric pronouns is to make a distinction between singular and plural discourse referents. Singular pronouns are linked to singular discourse referents, and plural pronouns are linked to plural discourse referents. Plural indefinite noun phrases (*some women*, *three men*) introduce plural discourse referents, but it turns out that many other introduction mechanisms must be postulated to obtain a reasonable coverage of plural anaphoric possibilities.

Plural discourse referents may result from *summation* of singular discourse referents. This is to account for uses of *they* that pick up a reference to a set of individuals that have been introduced one by one. Next, plural individuals may be the result of *abstraction* from complex conditions. Consider example (16).

(16) *John bought every book Mary had mentioned. He started reading them straight away.*

Obviously, *them* refers to the set of all books mentioned by Mary. No plural discourse referent is introduced by the first sentence, so the only way to make one available is by calling it into being through abstraction.

So-called *dependent plurals* should be handled differently again, because here the plurality seems closely linked to syntax. Sentence (17) provides an example.

(17) *All my friends have children.*

It is clear that (17) is still true if each of my friends has exactly one child. Dependent plurals call for a kind of in-between discourse referent that is neutral between singular and plural. The chapter on plurals in Kamp and Reyle (1990) gives a very detailed account of these and related matters. **Plurality** provides further information on general issues of the interpretation of plurals.

Incorporating Generalized Quantifiers

Extending discourse representation theory with nonstandard quantifiers, and then getting the truth conditions right, is not completely straightforward.

(18) *Most farmers who own a donkey beat it.*

Applying a routine strategy for building a representation structure for example (18), one arrives at structure (19), where $R \Rightarrow_m \Rightarrow R'$ is true if most verifying assignments for R are verifying assignments for R'.

(19) $((x, y)(farmer(x), donkey(y), own(x, y))) \Rightarrow_m \Rightarrow$
$((\ )(beat(x, y)))$

This analysis does give the wrong truth conditions, because it quantifies over farmer–donkey pairs instead of individual farmers. In a situation where there are five kind farmers who each own 1 donkey and treat it well, and one cruel, rich farmer who beats each of his 10 donkeys, the analysis makes sentence (18) true, though intuitively it should be false in this situation.

The remedy (proposed in Kamp and Reyle, 1990) involves a complication in the notation. Generalized quantifiers are introduced explicitly in the representation structures. The revised representation for (18) is (20).

(20) $((x, y)(farmer(x), donkey(y), own(x, y))) \Rightarrow_x^{most}$
$\Rightarrow ((\ )(beat(x, y)))$

At the place of *most* in (20) one could in principle have any generalized quantifier (*see* **Quantifiers: Semantics**). In other words, for every binary generalized quantifier Q and every pair of representation structures R, R', the following is a complex condition: $R \Rightarrow_v^Q \Rightarrow R'$. The truth conditions are modified to reflect

what is expressed by the quantifier Q. Generalized quantifiers express relations between sets, so $R \Rightarrow_x^Q \Rightarrow R'$ is true in case the two sets are in the appropriate quantifier relation. The truth conditions must pick out the two relevant sets. Here is the new part of the definition. Assignment f verifies R in M if there is an extension f' of f with the following properties:

1–5. As above.
6. If $R_1 \Rightarrow_v^Q \Rightarrow R_2$ is a complex condition of R, then f' verifies this condition if the sets B and C are in the quantifier relation denoted by Q, where $B = \{b \mid f'$ has an extension g with $g(v) = b$, which verifies R_1 in $M\}$ and $C = \{c \mid f'$ has an extension h with $h(v) = c$, which verifies R_1 and R_2 in $M\}$.

It is left to the reader to check that this gets the truth conditions for (18) correct.

The following representation of (18) brings the incorporation of generalized quantifiers more in line with standard logical notation:

(21)

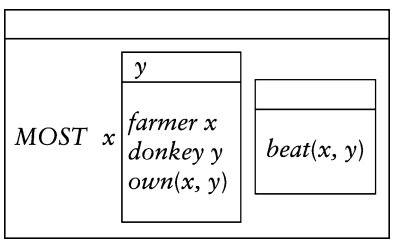

Discourse Structures and Partial Models

There is more than an occasional hint in the original papers of Kamp and Heim that discourse representation structures are closely connected to *partial* models. If the suggestion is not that these representation structures are themselves partial models, it is at least that they are intended to be interpreted with respect to partial models. That the structures are themselves partial models cannot be right: complex conditions are *constraints* on models rather than model components. They specify general properties that a model must satisfy the condition. Interpretation of discourse representation structures in partial models has never really been worked out. The truth definitions for representation structures, e.g., in Heim (1982), Kamp (1981), Kamp and Reyle (1990), define satisfaction in classical (i.e., 'complete') models.

Because the representation structures contain identity links and negated identity links, evaluation in partial models where not only the predicates used to translate the vocabulary of the fragment, but also the identity predicate receives a partial interpretation, is feasible. Interestingly, this sheds light on some puzzling aspects of identity statements. Current studies of partial model theory interpret identity as a total predicate (see Langholm, 1988). Partializing identity leads to a more radical form of partiality; it has the effect that the objects in the model are not proper individuals but rather proto-individuals that can still fuse into the same individual after some more information acquisition about the identity relation. Technically, this form of radical partiality can be implemented by evaluating discourse representation structures with respect to models where the identity relation is a partial relation.

The formal development of a theory of partial identity involves an interpretation of identity as a pair $\langle I^+, I^- \rangle$, with I^+ an equivalence relation that denotes the positive extension of identity, and I^- an anti-equivalence relation, that is to say, a relation that is irreflexive, symmetric, and anti-transitive, i.e., satisfying the requirement that if $I^- xy$, then it holds for all z that $I^- xz$ or $I^- zy$.

The assumption that proto-individuals rather than regular individuals populate the partial models is attractive from the point of view of knowledge representation: often human beings have only partial information about identities. Famous paradoxes and puzzles are based on this fact. One example is Frege's morning star, evening star paradox; see the article **Coreference: Identity and Similarity**. Another is Saul Kripke's Pierre puzzle. Pierre is a Frenchman who has read about a famous and wonderful city he knows as *Londres*, and because of his reading he thinks that *Londres* is pretty. Later on, he is abducted and forced to work in a slum in a city that, as he learns, is called *London*, and this new experience leads him to conclude that *London* is ugly. The important point to note is that as long as all this information is processed with respect to a partial model where *London* and *Londres* name different proto-individuals, Pierre's beliefs are not incoherent. They only become incoherent once it is discovered that *London* and *Londres* are identical, i.e., once Pierre acquires additional information about the extension of the identity relation. From outside, from a situation where *London* and *Londres* are anchored to the same individual, the belief may seem incoherent as well, but the point is that Pierre does not have full information about the nature of this anchor. The example is discussed in the context of discourse representation theory in Asher (1986), but the solution proposed there is still phrased in terms of classical models.

Reasoning with DRSs

The plausibility of using Discourse Representation Structures to model belief and other propositional attitudes is closely connected with the existence of cognitively plausible inference systems for DRSs.

Proof theories for DRSs are given in Saurer (1993), Kamp and Reyle (1996), and Van Eijck (1999). The calculus of Van Eijck (1999) is perhaps the simplest of these, and we present it here.

We switch to the version of DRT where DRS negation is primitive and $D_1 \Rightarrow D_2$ is defined in terms of negation. The precise definition is given below. A slight modification of the DRS definition is to make a distinction between the *fixed* discourse referents and the *introduced* discourse referents of a DRS (first proposed in Visser 1994). This allows for a natural definition of DRT consequence. If a DRS is inferred, its fixed discourse referents are supposed to be supplied by the premises of the inference. They are 'fixed by the context of the inference,' so to speak.

Thus, we view a DRS as a triplet consisting of a set of fixed referents F, a set of introduced referents I, and a set of conditions $C_1 \ldots C_n$ constrained by the requirement that the free variables in C_i must be among $F \cup I$. Concretely, the syntax of DRT looks like this (equality statements left out for simplicity of exposition):

Definition 1 (DRT)

$$\begin{array}{rcl} t & ::= & c \mid v \\ C & ::= & \mathrm{T} \mid Pt_1 \cdots t_n \mid \neg D \\ D & ::= & \begin{array}{|c|c|}\hline v_1 \ldots v_n & v_{n+1} \ldots v_m \\ \hline \multicolumn{2}{|c|}{C_1 \ldots C_k} \\ \hline \end{array} \end{array}$$

We will use $\bot$ as an abbreviation of $\neg \top$. The (active) discourse referents of a term t or condition C or DRS D are given by:

$$M(v) := \{v\},\ M(c) := \emptyset,\ M(\mathrm{T}) := \emptyset,\ M(Pt_1 \cdots t_n) := \cup_i M(t_i),$$

$$M\left(\begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C} \\ \hline \end{array}\right) := F \cup I,\ M\left(\neg \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C} \\ \hline \end{array}\right) := F$$

Conditions on the formation rule for a DRS

$$\begin{array}{|c|c|}\hline v_1 \cdots v_n & v_{n+1} \cdots v_m \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_k} \\ \hline \end{array}$$

1. $\{v_1 \ldots v_n\} \cap \{v_{n+1} \ldots v_m\} = \emptyset$.
2. $\cup_i M(C_i) \subseteq \{v_1 \ldots v_m\}$

We define the condition

$$\begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_n} \\ \hline \end{array} \Rightarrow D$$

as

$$\neg \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_n,\ \neg D} \\ \hline \end{array}$$

Here is a semantics for DRT in terms of partial assignments, following the original set-up in Kamp (1981).

Definition 2 (Semantics of DRT)

$$\begin{array}{lll} \mathcal{M}, f \models \mathrm{T} & & \textit{always} \\ \mathcal{M}, f \models Pt_1 \cdots t_n & \textit{iff} & \langle [\![t_1]\!]^{\mathcal{M}}_f, \ldots, [\![t_n]\!]^{\mathcal{M}}_f \rangle \in P^{\mathcal{M}} \\ \mathcal{M}, f \models \neg D & \textit{iff} & \textit{there is no } g \textit{ with } \mathcal{M}, f, g \models D \end{array}$$

$$\mathcal{M}, f, g \models \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_n} \\ \hline \end{array} \quad \textit{iff} \quad \begin{array}{l} f : F \to \mathrm{dom}\,(\mathcal{M}), \\ g : F \cup I \to \mathrm{dom}\,(\mathcal{M}), f = g \restriction F, \\ M, g \models C_1, \ldots, M, g \models C_n. \end{array}$$

Here $g \restriction F$ denotes the restriction of function g to the set F. The following definition of DRT consequence makes essential use of the distinction between fixed and introduced discourse referents.

Definition 3 (DRT Consequence)

$$\begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_n} \\ \hline \end{array} \models \begin{array}{|c|c|}\hline F \cup I & I \\ \hline \multicolumn{2}{|c|}{C_{n+1} \cdots C_m} \\ \hline \end{array}$$

iff for all $\mathcal{M}, f, g$ *with* $\mathcal{M}, f, g \models \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_n} \\ \hline \end{array}$

there is an h *with* $\mathcal{M}, g, h \models \begin{array}{|c|c|}\hline F \cup I & I' \\ \hline \multicolumn{2}{|c|}{C_{n+1} \cdots C_m} \\ \hline \end{array}$

A DRT calculus is given in Figure 1 (lists $C_1 \ldots C_k$, abbreviated as C). The calculus uses substitution in constraints and DRSs. This notion is defined by

$$\begin{array}{rcl} [t/v]\mathrm{T} & := & \mathrm{T} \\ [t/v]\ Pt_1 \cdots t_n & := & P[t/v]t_1 \cdots [t/v]t_n, \\ [t/v]\neg D & := & \neg[t/v]D \\ [t/v] \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{C_1 \cdots C_n} \\ \hline \end{array} & := & \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{[t/v]\ C_1 \cdots [t/v]\ C_n} \\ \hline \end{array} \end{array}$$

Of course, when a substitution $[t/v]$ is mentioned in a rule, it is assumed that t is free for v in D. It is also assumed that all DRSs mentioned in the rules satisfy the syntactic well-formedness conditions for DRSs.

Theorem 4

The calculus for DRT is sound.

Proof Induction on the basis that the test axiom is sound and that the rules preserve soundness. Here is one example soundness check, for the rule of marker introduction. Assume $\mathcal{M}, f, g \models D$. Then by the soundness of the premise, there is an h with

$$\mathcal{M}, g, h \models \begin{array}{|c|c|}\hline F & I \\ \hline \multicolumn{2}{|c|}{[t/v]\ C} \\ \hline \end{array}$$

Thus, $\mathcal{M}, h \models [t/v]\ C$. Since $v \notin F$, h' given by $h'(v) = [\![t]\!]^{\mathcal{M}}_h$, and $h'(w) = h(w)$ for all $w \neq v$ for which h is defined extends g. By (an appropriate DRT version of) the substitution lemma,

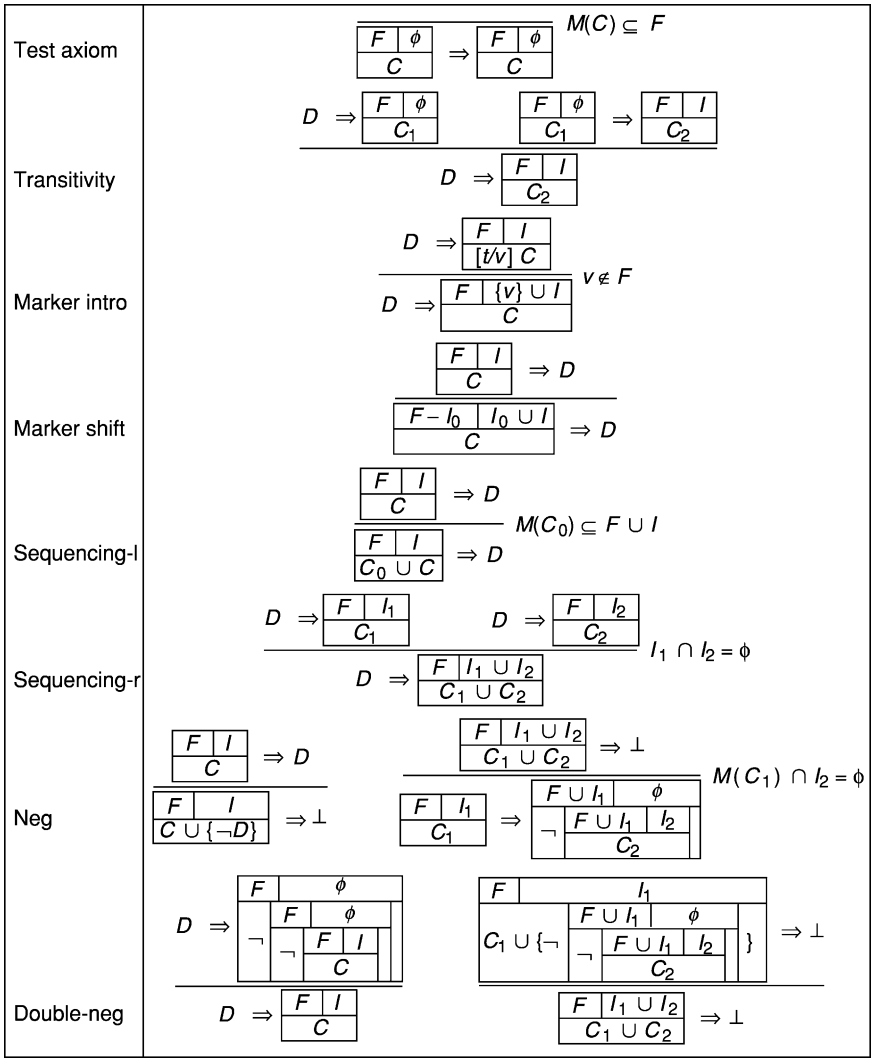

Figure 1 The calculus for DRT.

$$\mathcal{M}, g, h' \models \begin{array}{|c|c|}\hline F & \{v\} \cup I \\ \hline \multicolumn{2}{|c|}{C} \\ \hline \end{array}$$

This proves

$$D \models \begin{array}{|c|c|}\hline F & \{v\} \cup I \\ \hline \multicolumn{2}{|c|}{C} \\ \hline \end{array}$$

Theorem 5

The calculus for DRT is complete.

For the proof of this, we refer to Van Eijck (1999), where the proof system for DRT is related to a proof system for dynamic predicate logic (Groenendijk and Stokhof, 1991).

The Treatment of Ambiguities

If an expression of a formal language is viewed as a tree, a partial specification of how the expression is built up from its components can be given by means of a description of constraints on syntax tree construction.

This is the approach to the treatment of ambiguities taken in Underspecified DRT (UDRT) (Reyle, 1993). In UDRT, a DRS is viewed as a tree, and an UDRS is viewed as a set of constraints on tree formation.

(22) *All students found most solutions.*

To represent the scope ambiguity between the two quantifiers in (22), one needs a representation that is 'in between' the following two DRSs:

(23) 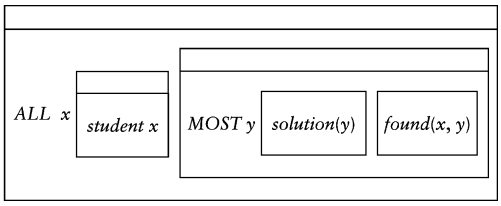

(24) 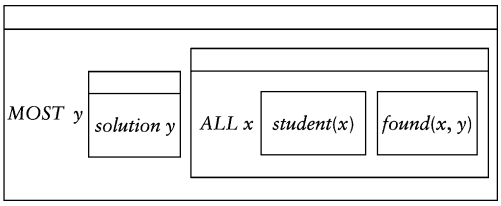

The UDRT solution is to take the DRSs apart, to label the parts, and to define an UDRS as a set of labeled DRS parts plus a list of constraints between labels. An UDRS for the example case has a top node $\top$ labeled l_0, nodes

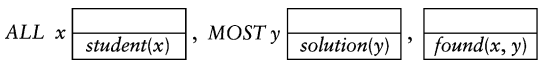

labeled l_1, l_2, l_3, respectively, and constraints $l_0 \leq l_1$, $l_0 \leq l_2$, $l_1 \leq l_3$, $l_2 \leq l_3$. Full disambiguation can be achieved by adding a further constraint. Adding the constraint $l_1 \leq l_2$ disambiguates the UDRS to (23), while adding the constraint $l_2 \leq l_1$ results in disambiguation to (24).

See also: Anaphora, Cataphora, Exophora, Logophoricity; Anaphora: Philosophical Aspects; Anaphora Resolution: Centering Theory Approach; Context and Common Ground; Coreference: Identity and Similarity; Donkey Sentences; Dynamic Semantics; Formal Semantics; Montague Semantics; Plurality; Propositional Attitudes; Quantifiers: Semantics.

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(see Seuren, 1985: 61–110), which makes them unfit for direct semantic interpretation. A grammar **G** is required relating SSs to their corresponding SAs and vice versa.

DSx thus posits two intermediate stages between SSs and whatever they be about in any **V**: the linguistic object SA and the mental proposition anchored in a given **D**. This **D** has open access to a knowledge base (KB) of encyclopedic and situational knowledge. A set of incrementation rules (**IC**) relates SAs to **D**s and vice versa. The overall structure of the theory is presented in Figure 1.

DSx is divided into two main sections, *incrementation* and *subdomain structures*. The former deals with the incrementation procedure of linguistic clauses to the appropriate (sub)domains, the latter with the embedding of subdomains.

Incrementation

The serial incrementation of sentences in a **D** is subject to semantic conditions, the most basic being the *sequentiality condition* (SC). SC does not apply to actual texts, which are hardly ever fully sequential (they would be unbearably verbose if they were), but to **D**s. SC consists of three subconditions, presuppositional precedence, consistency, and informativity. The first requires that presuppositions are incremented before their carrier sentence. The second requires that a **D**, at any stage, must have the possibility of being true and thus must be logically and semantically consistent. The third requires every new increment to be *informative* – that is, the set of situations in which **D** is true gets further restricted with each new increment (*see* **Presupposition**). Thus, sequences of the form 'A and possibly A', or 'A and (A or B)' are, though logically coherent (the first conjunct entails the second), discoursewise unacceptable. Besides SC there are other structuring principles for texts and **D**s not discussed here. Foremost among these is the principle of *topic-comment modulation*, based on the notion that each new sentence in a discourse is meant as an answer to an often implicit question. The emphasis in this section is on definite reference to individuals, quantification, and plurality.

Consider, as a possible starting point of **D**, the deceptively simple sentence (1a), with its (matrix-S) SA (1b), represented as a linguistic tree structure in (1c), and resulting in the **D**-address (1d):

(1a) There was a cat.

(1b) $an_x[be(x), cat(x)]$

(1c)

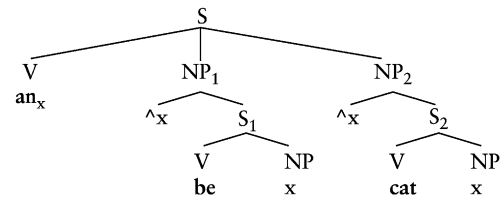

(1d) **d–1** [**a** | Cat(a)]

In (1b and 1c), *an* is the existential quantifier (aka ∃), treated as a binary higher-order predicate over pairs of sets, with the subject term *be(x)* and the object term *cat(x)*. The index *x* in an_x binds the variables *x* in *be(x)* and *Cat(x)*. *An* requires for truth that there be at least one element common to the sets denoted by the two terms.

In standard logic, the existential quantifier posits *actual existence* of the common element. But that will not do for language, given sentences like (2a), which do not entail that the cat in question actually existed:

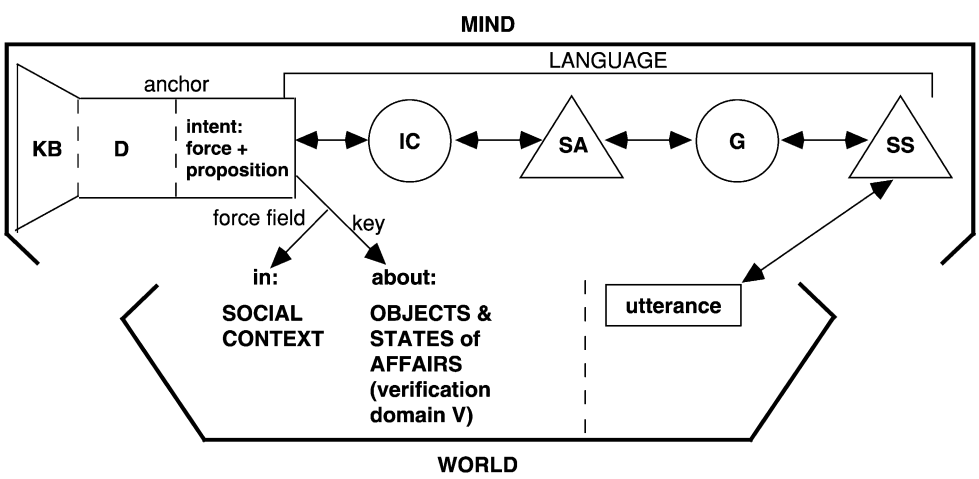

Figure 1 Overall structure of the theory.

(2a) A cat was worshipped there.
(2b) an_x[be worshipped(x), #cat(x)]
(2c) **d–2** [**a** | #Cat(a), Be worshipped(a)]

(3a) A child laughed.
(3b) an_x[laugh(x), child(x)]
(3c) **d–3** [**a** | Child(a), Laugh(a)]

For the semantics of language, it is stipulated that when one term of the existential quantifier has an intensional predicate denoting a cognitive process and capable of yielding truth also for thought-up entities (Frege's *thought predicates*), while the other term is extensional, yielding truth only for actually existing objects, the extensional term is intensionalized, so that it applies to thought-up entities as well. Since in (3b) both terms are extensional by nature, as only really existing individuals can truthfully be said to laugh or to be a child, (3a) is rendered as (3b). But in (2a) *be worshipped* is a cognitive intensional predicate as it may yield truth also for fictitious objects. Therefore, *cat(x)* is intensionalized to *#cat(x)*, where # indicates that the set denoted by *#cat(x)* may also contain virtual (thought-up) cats. This allows true existential quantification over virtual objects (*see* **Virtual Objects**).

Be(x) in (1) is taken to be intensional by nature (and thus not marked by #), denoting the axiomatically given nonnull set of actual or virtual objects that 'are there.' But since *be(x)* is not a thought predicate, it does not intensionalize the other term under *an* but is itself extensionalized when the other term is extensional. This ensures an entailment of actual existence for extensional terms, but also the absence of such an entailment for intensional terms, as in:

(4) There was an imaginary cat.

The SA-structure (1c) is the tree-structure counterpart of (1b). NP_1 is the subject term, NP_2 the object term, and ^ is a set-denoting operator: 'the set of things *x* such that ...' The grammatical process transforming (1c) into (1a) is not at issue here. (Roughly, NP_2 is incorporated into $_V$[an], forming the complex predicate $_V$[an-^x[cat(x)]], which is then lowered into the position of the subject term *x* of *be*. For details, see Seuren, [1996: 300–309].)

The present concern is the incrementation procedure **IC** turning (1c) into the **D**-address (1d). **IC** scans the SA-predicate first. *An* is an instruction to create a new singular address (a first-order address over individuals). An *address label* **d–1** is set up, identifying the address for later reference. The contents of the address is given between large square brackets. Here '**a**' is the *address head*, representing *an* and binding the variables. It stands for the first-order existential quantifier – a function from sets of individuals to truth values, typed ((e,t),t). The object term is incremented first, giving **d–1** [**a** | Cat(a)]. Normally, the subject term is then added, but not in the case of *be(x)*, it being axiomatically understood that there are (actual or virtual) things. Therefore, only NP_2 is incremented after the upright bar indicating the scope of **a**. (One notes the structural – but not the semantic – analogy of **d–1** with the Russellian formula ∃ x[cat(x)].) The address **d–1** has a truth value and is read as 'there is/was a cat'. Existentially quantified addresses are *open addresses*.

An open address is closed when denoted in a subsequent clause by a definite term. *Address closure*, symbolized by a double slash, changes the address head from being a function to truth-values to being a *reference function* selecting an object (the referent) from a set of objects. Reference functions over individuals are typed ((e,t),e) (taking a set and delivering an individual), and are thus *type-reducing*. The reference function has been a source of discomfort to modern semantics because it cannot be defined within the confines of standard compositional model theory: there is no way of selecting one individual from a plural set by mathematical means. For it to work, an external input from cognition is needed – a further indication that meaning is subservient to cognition.

Let **D** contain **d–1** as above and also an open address **d–4** [**a** | Mouse(a)]. Then a sentence like (5a), with the SA (5b), results in the two parallel increments (5c) and (5d).

(5a) The cat caught the mouse.
(5b)

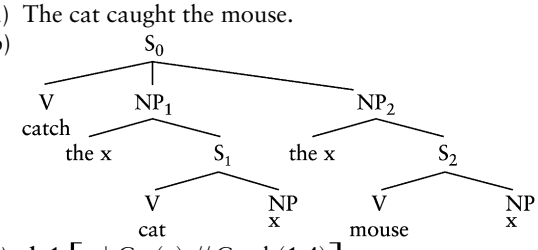

(5c) **d–1** [**a** | Cat(a) // Catch(**1**,**4**)]
(5d) **d–4** [**a** | Mouse(a) // Catch(**1**,**4**)]

NP_1 in (5b) reads 'the *x* such that *x* is a cat,' and analogously for NP_2. In (5c) and (5d), the head **a** has been retyped from ((e,t),t) to ((e,t),e); the propositional function preceding closure – *Cat(a)* or *Mouse(a)* – denotes the input set typed (e,t). *Catch(**1**,**4**)* is the proposition saying that the individual selected by the reference function ***a*** in **d–1** – the cat – caught the individual selected in **d–4** – the mouse. **IC** first scans the predicate of S_0. *Catch* being a binary lexical verb, **IC** is put to work on the definite NP_1 first, to be followed by the definite NP_2.

The *denotation procedure d* for definite NPs is as follows:

For any NP_i under a definite-NP operator *the*:

- *the* takes the predicate of the S under NP_i and selects the matching address **d–n**. There must, in principle, be only one such address in **D**.
- **d–n** is closed (if still open), and the SA-tree is added to the closed address, with the number ***n*** of **d–n** for the NP_i-constituent.

Thus, $d(NP_1)$ in (5b) selects **d–1** [**a** | Cat(a)], and NP_1 is replaced with **1**; **d–1** is closed and the SA-tree, with **1** in place, is added to the now closed **d–1**:

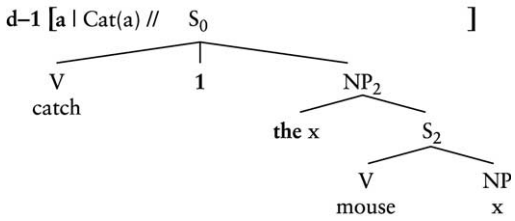

The procedure is repeated for NP_2 in **d–1**, yielding the two parallel increments:

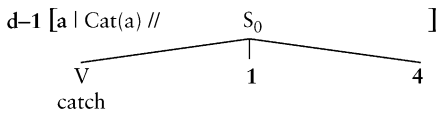

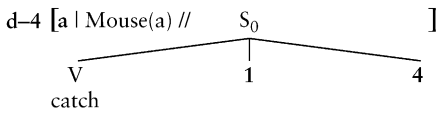

For practical reasons, trees are written as bracketed strings, giving (5c) and (5d), respectively.

A sentence like (6a), with SA (6b) is incremented as follows, with **D** containing **d–1** [**a** | Cat(a)]:

(6a) The cat caught a mouse.

(6b)

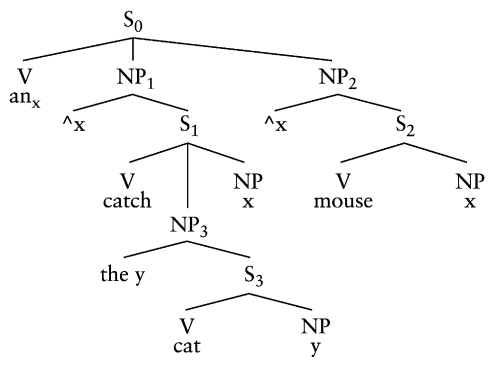

(6c) **d–4** [**a** | Mouse(a), Catch(**1**,a)]

(6d) **d–1** [**a** | Cat(a) // [**b** | Mouse(b), Catch(**1**,b)]]

The new **d–4**, created in virtue of $_V$[an], is fitted out with S_2 and S_1, in that order (with *a* for *x*):

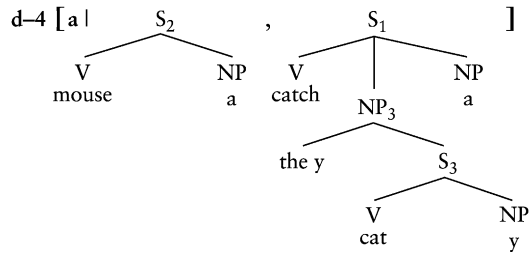

d–1 in (6d) contains a subordinate open address. An open address can be stored under another address **d–n** provided it contains either the variable bound by **d–n** (for open addresses) or the definite term **n** (for addresses after closure).

Double existential quantification is treated analogously. (7a), with SA (7b) yields the open address (7c):

(7a) A cat caught a mouse.

(7b)

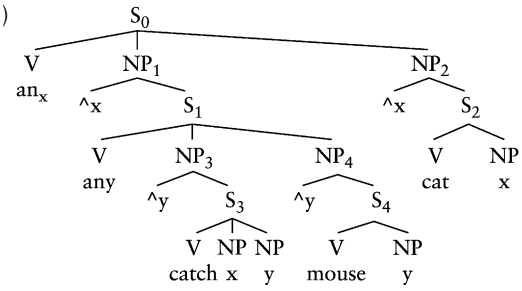

(7c) **d–1** [**a** | Cat(a), [**b** | Mouse(b), Catch(a,b)]]

IC causes **d–1** to be set up in such a way that the cat-address takes scope over the mouse-address: 'there is a cat *a* such that there is a mouse *b* such that *a* caught *b*'. Since, however, it is possible to refer subsequently to the mouse caught by the cat, an independent open address for the mouse in question is also required. To that end, an address of the form (8) is set up in virtue of a process of *inferential bridging*:

(8) **d–4** [**a** | Mouse(a), [**b** | Cat(b), Catch(b,a)]]

Here the mouse-address takes scope over the cat-address, but the difference is irrelevant, as the simple existential quantifier is symmetrical. The discourse may now continue with definite terms like *the cat that caught a mouse*, closing **d–1**, or *the mouse that was caught by a cat*, closing **d–4**.

Now to plurality, which requires the notion of *plural power set* ($\mathbf{P}_{pl}$). For any set *X*, $\mathbf{P}_{pl}(X) = \mathbf{P}(X)$ minus Ø and all singleton sets. Thus, if *X* has cardinality *n*, $\mathbf{P}_{pl}(X)$ has cardinality $2^n-(n+1)$. Moreover, to distinguish distributive from group readings, the type-raising distributive operator '::', defined over predicates, is required for the language of SAs.

Let [[P(x)]] denote the extension of P(x) – the set of individuals *x* such that *x* satisfies P – then [[::P($\overline{x}$)]] is defined as follows ($\overline{x}$ ranges over sets of individuals):

$$[[::P(\overline{x})]] = {}_{\text{Def}}\ \mathbf{P}_{\text{pl}}([[P(x)]])$$

The extension of ::P($\overline{x}$) is thus the set of sets of at least two individuals *x* such that each *x* satisfies *P*; '::happy(the children)' reads 'the set of children in question is among the sets of at least two individuals each of whom is happy'. When *P* is transitive and both of its terms are definite and plural, :: distributes indiscriminately over the subject and the object term referents. In the group reading, *The men carried the bags* reads as saying that the men as a group carried the bags as a group (while, say, the women carried the pots), leaving it open whether there were subgroups of men carrying subgroups of bags. The distributive reading says that each of the men carried one or more bags and each of the bags was carried by one or more men. The linguistic expression thus underdetermines the actual state of affairs.

An open plural address is normally of the form (9c), representing (9a) with SA (9b):

(9a) There were cats.

(9b)

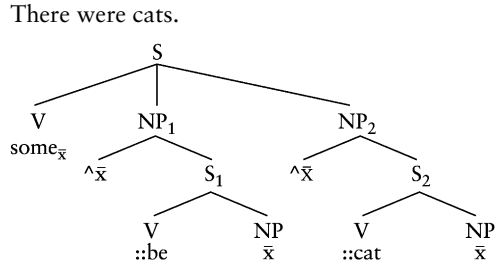

(9c) **d–5** $\left[\overline{\mathbf{a}} \mid ::\text{Cat}(\overline{a})\right]$

Some is the plural existential quantifier again yielding truth just in case there is a nonnull intersection of at least one plural set of individuals of the two term extensions concerned, which now are sets of sets of individuals. *Some* is again an instruction to set up a new address of the right type. In (9c), $\overline{\mathbf{a}}$ represents plural SOME and binds the variable. Example (9c) thus requires that there be at least one set of at least two actually existing cats.

When *Pred* is second order by nature, typed ((e,t),t), the distributive operator :: is not needed. Then **IC** gives Pred($\overline{a}$), with the variable $\overline{a}$, as in the singular address (10) with the second-order predicate *platoon* (army unit consisting of men), representing *There is/was a platoon:*

(10) **d–6** $\left[\overline{\mathbf{a}} \mid \text{Platoon}(\overline{a})\right]$

The two forms can be combined, as in:

(11a) **d–5** $\left[\overline{\mathbf{a}} \mid ::\text{Cat}\ (\overline{a}), \text{Disperse}\ (\overline{a})\right]$

(11b) **d–5** $\left[\overline{\mathbf{a}} \mid ::\text{Cat}(\overline{a}), 3(\overline{a})\right]$

representing, respectively, *Some cats dispersed* and *There were three cats*. Mathematically, an address can be of any order, yet language stops at second-order predicates requiring third-order addresses for their plurals, as in (12), which reads *There are/were platoons*. Any higher-order nouns are treated as second-order.

(12) **d–7** $\left[\overline{\mathbf{a}} \mid ::\text{Platoon}(\overline{a})\right]$

Plurals are difficult, and only some of the problems can be dealt with here. One such problem is the distinction between distributive and group readings. Group readings are incremented analogously to singular increments. Thus, given an open plural cat-address, such as **d–5** in (9c), the addition *They ran away* (group reading) is incremented as in (13a), where closure has turned $\overline{\mathbf{a}}$ into a reference function (((e,t),t),(e,t)), selecting a set from a set of sets:

(13a) **d–5** $\left[\overline{\mathbf{a}} \mid ::\text{Cat}(\overline{a})\ //\ \text{Runaway}(5)\right]$

(13b) **d–5** $\left[\overline{\mathbf{a}} \mid ::\text{Cat}(\overline{a})\ //\ ::\text{Runaway}(5)\right]$

To compute the truth value of 'Run away(5),' it is necessary to type-raise the predicate *run away* from (e,t) to ((e,t),t), so that it can process an input of type (e,t). Type-raising of a predicate *P* implies that, despite the transition from individuals to groups, the satisfaction conditions of *P* remain unchanged. This condition cannot be fulfilled by all predicates. Most nominal predicates, such as *cat, dog, tree, house*, being reserved for individual predication, disallow type-raising. Example (13a) is thus read intuitively as 'the set of cats referred to by $\left[\overline{\mathbf{a}} \mid ::\text{Cat}(\overline{a})\right]$ is a set of at least two individuals running away as a group'. The distributive reading of *They ran away* is incremented as in (13b), which lets the cats in question run away individually.

Typical group readings are found in sentences like:

(14a) The mice have been at the cheese.

(14b) The Americans were the first to land on the moon.

In their common reading, these do not imply that all the mice have been at the cheese, or that all Americans were the first to land on the moon, as they are about the mice, or the Americans, as a group.

Now consider (15a) with the SAs (15b) and (15c), each of which represents a group reading and a distributive reading.

(15a) The men carried a bag.

(15b)

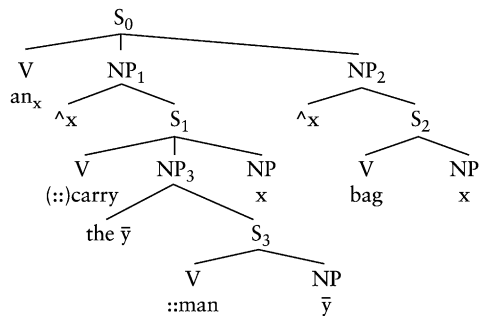

(15c)

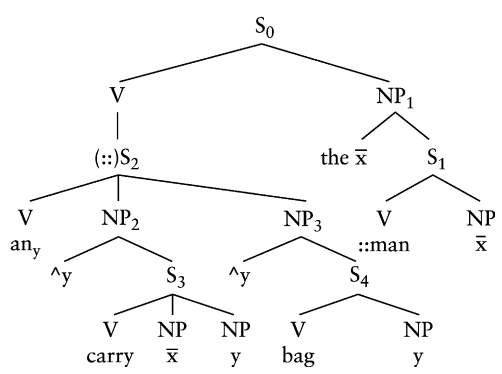

(15d) **d–8** [**ā** | ::Man(ā) // [**b** | Bag(b), (::)Carry(**8**,b)]]

(15e) **d–8** [**ā** | ::Man(ā) // (::) [**b** | Bag(b), Carry(**8**,b)]]

In (15c), the main predicate is the propositional function S_2, denoting the set of sets of at least two individuals that have a bag to carry, either as a group or individually. S_2 is the tree-structure version of what is known in logic as a *lambda predicate*. Like any other semantically appropriate predicate, S_2 can be placed under the distributive operator.

The four readings of (15a) are as follows ([16b$_2$] and [16c$_2$] are equivalent):

(16b$_1$) 'there was one bag carried by each of the men individually'
(16b$_2$) 'there was one bag collectively carried by the men'
(16c$_1$) 'each of the men carried a bag'
(16c$_2$) 'the group of men collectively carried a bag'

Let **D** contain an open address **d–8** [**ā** | ::Man (ā)]. Then for (15b) **IC** creates a new open address **d–9** [**b** | Bag(b), (::)Carry(**8**,b)], saying that there is/was a bag which the men of **d–8** carried collectively (without ::) or individually (with ::). **d–8** is now closed, analogously to **d–1** in (6d), representing the two readings (16b$_1$) and (16b$_2$). This gives (15d). Analogously for (15e). The group readings of (15b) and (15c) result in an identical **d–8**. Inferential bridging sets up an open singular bag-address in the group reading of (15e) – that is, (16c$_2$) – but the distributive (16c$_1$) requires an open *plural* bag-address, enabling subsequent reference to the bags that the men carried. The formal treatment of this form of inferential bridging has not been elaborated so far.

The closure operation is important for empirical reasons, as appears, for example, from (17a) and (17b), whose semantic distinction is unaccounted for in most semantic theories:

(17a) Nob sent few letters that were rude.
(17b) Nob sent few letters, and they were rude.

The difference corresponds with the closure operation. Let **D** already contain an address **d–10** [**a** | 'Nob' (a)]. Both (17a) and (17b) set up a new address **d–11** for the letters Nob sent. For (17a), **d–11** is left open, but for (17b), **d–11** is closed:

(18a) **d–11** [**ā** | ::Letter(ā), ::Rude(ā), ::Send(**10**, ā), Few(ā)]

(18b) **d–11** [**ā** | ::Letter(ā), ::Send(**10**, ā), Few(ā)// ::Rude(**11**)]

We now consider the universal quantifier *all*, as in (19a) with SA (19b) and the **IC**-result (19c) treated as a binary higher-order predicate. **D** already contains **d–12** [**ā** | :: Mouse(ā)] ('there are mice'):

(19a) All (the) mice escaped.

(19b)

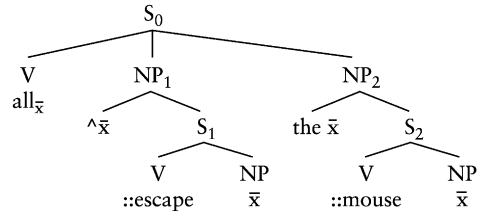

(19c) **d–12** [**ā**| ::Mouse(ā) // All ([::Escape(x̄)], (**12**))]

All takes a first-order definite plural object term and a second-order set-denoting subject term, delivering truth just in case the object set is an element of the subject set. This analysis provides a unified solution to the type problem caused by standard analyses for sentences like *All (the) mice dispersed*. The analysis ∀x(mouse(x) → disperse(x)) or, in generalized quantification, ∀x(disperse(x),mouse(x)) will not do as 'disperse(x)' is of the wrong type. **d–12** is closed, following the definite reference to a particular set of mice. '[::Escape(x̄)]' denotes the set of sets of at least two individually escaping individuals. 'All([::Escape (x̄)], (**12**))' says that the mice in question form a set of at least two individually escaping individuals.

This makes All([::Escape(x̄)],(**12**)) equivalent to ::Escape(**12**), and it gives *all* existential import, as in traditional predicate calculus. The difference between

all and plural *the* seems to be that while they both select the set *M* of elements defined by the address head after closure (the mice), and let the sentence say that *M* is a member of the set of sets *E* defined by ::*escape*, *all* specifically requires (redundantly) that no member of *M* be left out. This makes *all* unsuitable for higher order predicates like *numerous*, but suitable for other higher-order predicates like *disperse* or *sit in a circle*. *Every* distinguishes itself from *all* mainly in that *every* excludes group readings. The specifics of *each* are not touched upon here.

Finally, consider (20), which has both a group and a distributive reading. The existential predicates *few* and *many* say that the intersecting set required by the existential quantifier is small or large, respectively:

(20a) Few cats caught many mice.

(20b)

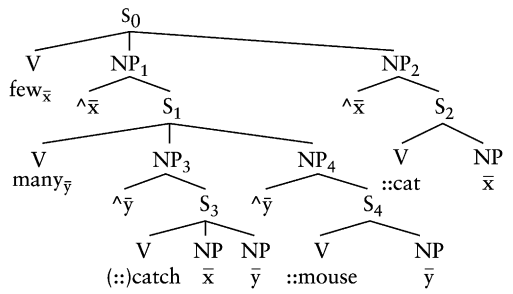

(20c) **d–7** $\left[\bar{\mathbf{a}} \mid ::\mathrm{Cat}(\mathrm{a}),\ \mathrm{Few}(\bar{\mathrm{a}}), \left[\bar{\mathbf{b}} \mid ::\mathrm{Mouse}(\bar{\mathrm{b}}),\ \mathrm{Many}(\bar{\mathrm{b}}), (::)\mathrm{Catch}(\bar{\mathrm{a}}, \bar{\mathrm{b}})\right]\right]$

The group reading is unproblematic: 'a small group of cats caught a large group of mice'. In this reading subsequent definite reference can be made to the large group of mice, as in *These mice had escaped from a laboratory*, which requires the inferentially added address:

(21) **d–12** $\left[\bar{\mathbf{a}} \mid ::\mathrm{Mouse}(\bar{\mathrm{a}}), \mathrm{Many}(\bar{\mathrm{a}}), \left[\bar{\mathbf{b}} \mid ::\mathrm{Cat}(\bar{\mathrm{b}}),\ \mathrm{Few}(\bar{\mathrm{b}}), \mathrm{Catch}(\bar{\mathrm{b}}, \bar{\mathrm{a}})\right]\right]$

But in the distributive reading, with ::Catch($\bar{\mathrm{b}}, \bar{\mathrm{a}}$), subsequent definite reference is not possible, which means that inferential bridging of the kind at issue must be blocked. The passive of (20a):

(22) Many mice were caught by few cats.

is equivalent to (20a) only in the group reading. In the distributive reading, scope differences destroy the equivalence. As with the distributive reading of (15e), the formal criterion for this blocking has as yet not been elaborated.

Negation is treated as an abstract predicate in SA-structure, like the quantifiers. Its subject-S is what is normally called its scope. Thus, (23a) has the SA (23b):

(23a) The mouse did not escape.

(23b)

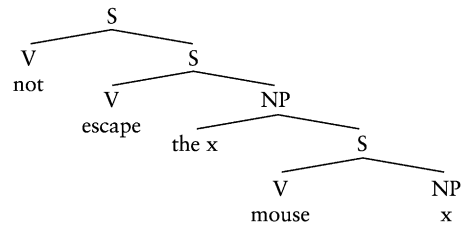

(23c) **d–4** $\left[\mathbf{a} \mid \mathrm{Mouse}(\mathrm{a})\ //\ {}^{*}\mathrm{Escape}(\mathbf{4})\right]$

For **IC**, negation is an instruction preventing the addition of the predication immediately following it to the address in question. The non-negated predication must be normally incrementable ('have the right papers'). **IC** takes the subject-S of *not* in the SA-tree and processes it first without negation. Subsequently, *not* places an asterisk before the predicate. In the case at hand, there must, therefore, be an appropriate mouse-address available in **D**. * Is presupposition-preserving and differs therefore from the negation in standard logic (*see* **Presupposition**).

Open addresses can be negated, as in (24a), incremented as (24b):

(24a) No mouse was caught.

(24b) **d–n** $\left[{}^{*}\mathbf{a} \mid \mathrm{Mouse}(\mathrm{a}), \mathrm{Be\ caught}(\mathrm{a})\right]$

This blocks the addition of '**a** | Mouse(a), Be caught(a)' to any address in **D**. Therefore, negated open addresses cannot be closed: there is nothing to close (but see [27] below).

Example (24a) is not equivalent with (25a) and (25b) but these are equivalent with (26a) and (26b).

(25a) All the mice were not caught.

(25b) **d–12** $\left[\bar{\mathbf{a}} \mid ::\mathrm{Mouse}(\bar{\mathrm{a}})\ //\ \mathrm{All}\left([{}^{*}::\mathrm{Be\ caught}(\bar{\mathrm{x}})], (\mathbf{12})\right)\right]$

(26a) None of the mice were caught.

(26b) **d–12** $\left[\bar{\mathbf{a}} \mid ::\mathrm{Mouse}(\bar{\mathrm{a}})//\ \left[{}^{*}\mathbf{b} \mid \in \mathbf{12}(\mathrm{b}), \mathrm{Be\ caught}(\mathrm{b})\right]\right]$

Subdomain Structures

A **D** may contain subdomains, which are either alternatives or subordinates. *Alternative subdomains* are created by *or* (disjunction) and *if* (implication). i(A or B) is 'A / not(A) and B' – with the alternative disjuncts 'A' and 'not(A) and B'. The truth condition is that at least one disjunct be true. The tacit exclusion (negation) of the first disjunct in the second rests on the *True Alternatives Condition* for **D**s, requiring that the alternative increments under disjunction be truly distinct. This explains the much debated

'exclusive' character of *or* as resulting from principles of coherent discourse construction.

Implication is like disjunction: i(if A then B) consists of two alternative increments: 'A and B / not(A)', with the tacit inference that when 'not(A)' is chosen, 'B' is excluded, since if 'B' is added after 'not(A)', the disjunction of 'A' and 'not(A)' has been vacuous.

This analysis accounts for definite anaphora after a negative existential disjunct, as in (27a), or a positive existential antecedent clause, as in (27b):

(27a) Either Nancy has no husband or *he* is Norwegian.
(27b) If Nancy has a husband, *he* is Norwegian.

Example (27a) is explained by the tacit incrementation of 'she has a husband' in the second disjunct, and (27b) by the fact that i(he is Norwegian) is made possible by the preceding i(Nancy has a husband) in the same alternative.

Subordinate subdomains are a special kind of address. Like ordinary addresses, they can be open or closed. They also have **D**-properties, in that they may contain their own addresses, increments, and instructions. They are represented both as a special kind of address and as an indexed domain. A sentence like (28a) is incremented as (28b), where the variable *D* ranges over virtual facts. ($28b_1$) reads 'there is a possible fact D'. *Possible* carries an instruction to set up a subdomain specifying the virtual fact in question. This subdomain is represented in ($28b_2$) read as 'there is a planet called "Minerva" and it is inhabited':

(28a) There may be a planet Minerva and it may be inhabited.

($28b_1$) **D–1** [**D** | Possible(D)]

($28b_2$) |→ **D–1: d–1** [**a** | "Minerva"(a), Planet(a) // Inhabited(**1**)]

It in (28a) refers opaquely, as it finds its antecedent within **D–1**. Transparent reference, with **d–13** given in the superordinate **D**, is shown in (29). In (29c), **d–13** is closed and the predication **D–1**[Inhabited(**13**)] is added, saying that **13** is represented as being inhabited in subdomain **D–1**:

(29a) There is a planet Minerva and it may be inhabited.
(29b) **D–1** [**D** | Possible(D)]
D–1: Inhabited(**13**)
(29c) **d–13** [**a** | "Minerva" (a), Planet(a) // **D–1** [Inhabited(**13**)]]

A few general principles hold for subdomains. First, addresses from the commitment domain 'percolate downward' into subdomains. As shown in (29), where **d–13** in **D–1** is taken from **D**. This downward percolation is stopped only if the subdomain in question explicitly blocks the address in question. Then, presuppositions of clauses incremented in subdomains 'percolate upward' into higher domains, including **D**, unless blocked either by their explicit negation or by lack of cognitive backing. This process is called *PROJECTION. Both processes follow from the principles of Maximal Unity (MaU) and Minimal Size (MiS), which serve the functional purpose of ensuring maximal unity and coherence in the overall **D**-structure.

Anaphora may delve into subdomains under intensional predicates. In (30), for example, the brother Marion believes she has is anaphorically referred to by *he* under the intensional predicate *be the talk of the town*:

(30) Marion believes that she has a brother, and he is the talk of the town.

The machinery of the incremental construction of discourse domains and subdomains is the main explanatory factor for the lack of substitutivity salva veritate in intensional contexts, which has been the dominant driving force in theoretical semantics.

See also: Anaphora: Philosophical Aspects; Extensionality and Intensionality; Negation; Presupposition; Virtual Objects.

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Discourse Studies: Second Language

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In the development of the field now known as Applied Linguistics over the past 40 years, we have seen a uniting of research on Second Language Acquisition (SLA; I use the term 'learning' synonymously with 'acquisition' to denote both tutored and untutored second and foreign language development) with studies in the area of discourse analysis (DA). The intersection of discourse studies and SLA research has lent theoretical illumination and practical applications to second language (L2) learning and pedagogy. By studying how language users employ their language(s) in a variety of contexts, with a variety of types of interlocutors, and on a variety of topical issues, teachers and other experts are enabled to create curriculum, materials, and assessment instruments based on natural, spontaneous data from mother tongue users, bilinguals, and language learners.

The present account of 'discourse for second language studies' focuses on recent approaches and theoretical frameworks relating to the study of spoken discourse for second language. Several of these have emerged over the past several years to shape our thinking about the processes involved in second language development.

Discourse and SLA

Early SLA research studied spoken discourse to ascertain the interactional features important to language learning (e.g., Gass and Varonis, 1985; Hatch, 1978; Long, 1983; Pica, 1988; Swain, 1985). This research viewed discourse from the perspective of negotiated interaction, either between native speakers and learners (NS–NNS) or between two or more learners (NNS–NNS). This kind of interaction encourages language learners to stretch their linguistic abilities in L2 by means of checking their understanding of the discourse until mutual comprehension is achieved.

Studies of negotiated interaction have been taken by some as a narrowly defined psycholinguistic approach to acquisition. A notable example of this stance is Firth and Wagner (1997), who opened up a controversial debate on this issue, in which they called for a reconceptualization of SLA in order to address what they saw as an imbalance biased toward a *cognitive* perspective on SLA that neglected *social interactional* perspectives. Their major claim is that SLA research has by and large viewed L2 development from a purely psycholinguistic point of view, with learners traversing an interlanguage continuum that has, at its hypothetical end-point, the abstract notion of the idealized native speaker. Movement toward the target proceeded along the linguistic dimensions of phonological, morphological, syntactic, lexical, and semantic growth. Pragmatic considerations have been studied in terms of 'interlanguage pragmatics,' a concept viewing the acquisition of norms of appropriate speech behavior largely through a lens of movement from L1 norms to L2 norms, with particular attention to pragmatic transfer (e.g., Cohen and Olshtain, 1981; Blum-Kulka *et al*., 1989; Wolfson, 1989).

Nonetheless, some early work in SLA did indeed take into account more sociolinguistically relevant points of view: Labovian sociolinguistic perspectives on SLA (see, for example, the early work on variation and SLA of Tarone, 1985, 1988), accommodation theory perspectives on SLA (e.g., Beebe and Giles, 1984; Beebe and Zuengler, 1983), acculturation theory perspectives (e.g., Schumann, 1978, 1986), and classroom discourse and interaction perspectives (e.g., Kramsch, 1985; Mehan, 1979; Stubbs, 1983).

However, while this rich body of research in Applied Linguistics was amassed over the past 40 years, the world changed dramatically. English continues to be the world's *lingua franca* with regard to commerce, trade, and diplomacy. Communication in the English language occurs, more often than not, among speakers none of whose first language (L1) is English (McKay, 2002). The constructs of 'native speaker,' 'learner,' and 'interlanguage' have consequently changed from how they were seen in early SLA research, at least for English. Discourse analysis of *lingua franca* users is now the main focus for ascertaining how successful communication occurs in social, workplace, and educational spheres.

Given the proliferation of 'Englishes,' major changes in SLA research have occurred, including an enhanced awareness of the sociolinguistic dimensions of language use. This state of affairs led Firth and Wagner to suggest a "broadening of the traditional SLA data base" (1997: 286). Their proposal gave rise to an important theoretical debate among SLA researchers published by the *Modern Language Journal* (*MLJ*) (see *MLJ*, *81(3)*, 1997, for a complete overview of the debate). The arguments in defense of psycholinguistic perspectives on SLA research are cogently outlined in Kasper's (1997) contribution to the *MLJ* debate. Though she argues that dropping the 'A' in SLA results not in study about

the developmental process of language learning but in the study of language 'use' as opposed to 'acquisition,' Kasper points out that the field of SLA has indeed seen more and more research of an ethnographic nature that clearly analyzes language learning in context and from an *emic* perspective. She points out that these studies are not about the acquisitional process from a cognitive perspective but are about L2 issues that focus on identity, insider–outsider perspectives, and issues of what it means to be a language user in a world of increasing globalization.

Indeed, discourse studies in recent years have enabled applied linguists to view language learning as more than a purely cognitive phenomenon, as the issue of the native speaker is obfuscated in a shrinking planet (cf. Boxer, 2002). Even in his rebuttal of Firth and Wagner, Michael Long agrees with this inarguable fact when he states, 'there are, however, of course, numerous multilingual settings in which most, even all, L2 users that a learner encounters will be other NNSs' (Long, 1997: 320). The issue, then, becomes, what it means to be a member of a 'community of practice' (Le Page and Tabouret-Keller, 1985), rather than what it means to become or be a member of any particular 'speech community.'

Given this state of affairs and change in the air, if we construe SLA not only as a psycholinguistic question of striving toward some 'target,' but also as a discourse issue, the endeavor of L2 learning becomes transformed from the way in which it was previously seen. This new perspective is congruent with a view of the world as it currently exists: one of transnationalism and globalization. Given these arguments, the question facing applied linguists at present is how to weave together a new view of discourse analysis that can inform L2 learning? Three theoretical frameworks lend new insights into this issue: (1) Language Identity, (2) Language Socialization, and (3) Sociocultural Theory.

Language Identity

The notion of discourse communities as 'communities of practice' has engendered among applied linguists an interest in the relationship between identity and second language development (e.g., Boxer and Cortes-Conde, 1997, 2000; McKay and Wong, 1996; Norton-Pierce, 1995; Norton, 1997; Pavlenko and Lantolf, 2000). These researchers have been interested in studying how incorporating an additional language and culture impinges on or impacts one's sense of who one is in the world. For immigrants, the issue of taking on a new and/or changed identity is a hallmark of one's linguistic and cultural development in the context of immigration. Even for those learning an L2 for more instrumental purposes, as the case with ESL/EFL as the world's *lingua franca*, adding a language to one's verbal repertoire necessarily entails modifying one's self-perception in relationship to others in the world. From this basic premise stems the relatively new heightened interest among applied linguists in language identity, largely studied through discourse analysis.

In their emphasis on 'agency enhancement' and 'identity enhancement,' McKay and Wong (1996) focused on the importance of fluid individual and social identities and their relation to multiple discourses (e.g., immigrant, minority, academic, gender). In their view, the identity of an individual in the process of second language learning is an extremely important consideration for such learning, affecting agency, a concept that differs from the traditional view of motivation. Agency enhancement derives from identities that afford learners a sense of power over their environment and thereby their learning.

In a somewhat parallel view, Norton (cf. Norton-Pierce, 1995; Norton, 1997) highlighted the importance of 'investment enhancement' in her discussion of identity in relation to language learning. She described investment as the relationship of social identity to power differences between learners and mother tongue speakers: 'An investment in the target language is also an investment in a learner's own social identity, which changes across time and space' (Norton, 1997: 411). In a similar vein, Pavlenko and Lantolf (2000) describe the process that immigrants go through when they confront and either appropriate or reject linguistic and cultural 'affordances' of the new language and culture. Here, affordances refers to aspects of the new language and culture that have the potential to transform one's sense of self.

Boxer and Cortes-Conde (1997, 2000) put forth the concept of 'relational identity' (RID), which differs from both individual and social identity. Relational identity is displayed and developed between and among specific interlocutors in their interactions over time. For language users and learners, relational identity reflects the comfort to build on sequential interactions that rest on rapport and solidarity. This relationship built between interlocutors leads naturally to further interaction and, consequently, increased opportunities for scaffolding and thus language development.

It seems likely that the first and foremost resource of those involved in additional language learning is social and interactional, involving face-to-face spoken discourse. Individuals involved in acquiring additional languages must grapple with fluid and shifting identities – individual, social, and relational – and come to terms with the power relations inherent in

them. Whether or not those in the position of taking on new linguistic and cultural identities choose to appropriate or reject the affordances of the new language/culture may depend largely on the lived histories of the individuals, the contexts of their interactions, and the power relationships inherent in these contexts.

Language Socialization

The Language Socialization framework of studying linguistic and cultural development emanates from the early work of Schieffelin and Ochs (e.g., 1986), who focused on L1 socialization (e.g., Samoa). The applications of a language socialization model to L2 learning have been most notable in studies focusing on second language *classrooms as communities of practice*. Socialization practices of such communities are reflected in the classroom discourse and interaction of second language classes in which talented teachers take on the role of socializing agent, much in the fashion of adults vis-à-vis children for L1 acquisition (cf. Ohta, 2001). The applications of socialization theory to SLA are principally in the realm of discourse and pragmatic development (see Kasper, 2001 for an overview of this research).

These two frameworks, Language Identity and Language Socialization, are clearly overlapping and compatible with each other.

Sociocultural Theory

A contingent of applied linguists spearheaded most notably by James Lantolf has been actively engaged in adapting the theoretical perspectives of Vygotsky (e.g., 1978, 1981, 1986) to the acquisition of language (first and subsequent) as a sociocultural phenomenon linking the social/interactional with the cognitive. Sociocultural Theory, in contradistinction to the Language Identity and Language Socialization models described above, specifically connects the role of discourse as a mediating tool between social interaction and the development of higher order mental processes. This theoretical perspective calls for elucidating the connection between internal, mental representations of learning and language development stemming from interactions between and among interlocutors of differing levels of expertise. Vygotsky's notion of 'Zone of Proximal Development' (ZPD) is useful in envisioning how the expert/novice paradigm of sociocultural interaction leads to new mental representations in learners.

Sociocultural theory is a lens through which we can view more clearly both tutored and untutored second language development. Scaffolding occurs through the various configurations of social interaction between the expert and novice. Gradually, the novice becomes more adept, and that which began as an intermental, socially mediated activity becomes an intramental, cognitive developmental process. In contrast to a more traditional SLA view of the learner as a 'deficient version of an idealized monolingual expert in linguistics' (Hall, 1997: 303), a sociocultural theoretical view of SLA treats the learner as 'an active and creative participant in what is considered a sociocognitively complex task' (Hall, 1997: 303).

The three frameworks described above, Language Identity, Language Socialization, and Sociocultural Theory, are important recent theoretical perspectives for studying second language development. Given a world of more fluid boundaries owing to globalization and transnationalism, the notion of language use in communities of practice has become the relevant focus for weaving together a picture of discourse and L2.

See also: Applied Linguistics: Overview and History; Applying Pragmatics; Classroom Talk; Communicative Competence; Context, Communicative; Conversation Analysis; Corpora of Spoken Discourse; Cultural and Social Dimension of Spoken Discourse; Dialogism, Bakhtinian; Identity and Language; Identity in Sociocultural Anthropology and Language; Identity: Second Language; Interlanguage; Socialization: Second Language.

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Discourse, Foucauldian Approach

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> There exists today a problem which is not without importance for political practice: the problem of the status, of the conditions of existence, of functioning, of the institutionalizing of scientific discourses. That's what I have undertaken to analyze historically – by choosing the discourses which have, not the strongest epistemological structure (mathematics or physics), but the densest and most complex field of positivity (medicine, economics, the human sciences). (Foucault, 1978: 20)

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> There exists today a problem which is not without importance for political practice: the problem of the status, of the conditions of existence, of functioning, of the institutionalizing of scientific discourses. That's what I have undertaken to analyze historically – by choosing the discourses which have, not the strongest epistemological structure (mathematics or physics), but the densest and most complex field of positivity (medicine, economics, the human sciences). (Foucault, 1978: 20)

> I am not just amusing myself by making the game more complicated for a few lively minds. I am trying to define in what way, to what extent, to what level discourses, and particularly scientific discourses, can be objects of a political practice, and in what system of dependency they can be in relation to it. (Foucault, 1978: 23)

This article looks at the relatively early works of Michel Foucault, especially *The order of things* (1970) and *The archæology of knowledge* (1972). These are the two major works that stem from a time when Foucault was critically interested in the concept of discourse and how it might be taken out of its hitherto (very broadly) 'linguistic' context and reconnected with his own discipline, which he called the history of systems of thought. The article is more or less confined, then, to that period of his thinking, though with some excursions into the so-called 'middle period' when Foucault's main concern centered more around the idea of power. By this later time, the concept of discourse had all but disappeared from the surface of Foucault's writings, to be displaced by the concept of apparatus (*dispositif*) and, at a later stage, by the idea of technologies of the self (cf. Hunter, 1991).

Among critical discourse theorists such as Foucault, the term 'discourse' refers not to language or social interaction as formal systems or as matters for empirical analysis but to relatively well-bounded areas of historically specific knowledge that determine what a human subject can possibly be or become at a given time. That is, it is deeply connected with what might be called the politics of the self and identity, and with exceptions, it is almost impossible to find this use of the term in other – largely Anglo-American – approaches to discourse. (One exception is, of course, the approach called New Historicism, and Foucault himself makes acknowledgment of this in his preface to *The use of pleasure* [1986].) If our prior conceptions of discourse have been mainly linguistic or quasisociological ones, to understand Foucault's approach, we may now have to completely rethink the idea. We may even need to be prepared to think of it as a totally different concept in a totally different field that just happens to have the same name as something we already know and take for granted as discourse analysts. (Though, for a recuperation of Foucault into linguistically based forms of discourse analysis, see Fairclough [1989].)

According to this approach, in any given historical period we can write, speak, or think about a given social object, practice, or positioning – madness, for example, or gender – only in certain specific ways and not others. (On madness, see Foucault (1967), and on gender, see Sawicki (1991).) The overall point is that discursive categories such as, say, 'schizophrenic' or 'homosexual,' are historically distinct ways of thinking about ourselves and others. They cannot be presumed to have existed 'essentially' throughout time and space.

'A discourse' would then be whatever constrains – but also enables – writing, speaking, and thinking within such definite historical limits, and we must deliberately refer to 'a discourse' or 'discourses' in the count-noun form, for even though Foucault frequently uses the mass noun 'discourse,' he is typically keen to point out that this is something of a theoretician's shorthand, a way of signaling some common and general properties of particular discourses. Historically specific discourses (e.g., medicine and protopsychology in the nineteenth century) are quite distinct from one another as well as from earlier and later forms of 'themselves' that may or may not have the same names.

However, these discourses can also overlap and intersect as they change historically, such as those discourses on life, labor, and language we call biomedicine, economics, and linguistics. Foucault tried to trace these complex comings together and departures in *The order of things* (1970). Sometimes he treats the discourses separately; at other times he looks at their contribution to the possibility of each period having an overall view of the world (which he calls the Western episteme). For example, he finds that, in the 16th century, the 'table' of the human sciences had no concepts of life and labor at all. Nor was language thought of as a signifying system or 'medium': it was simply there as "one of the figurations of the world" (1970: 56), a naturally useable substance like air or water. Moreover – and this may be difficult for contemporary readers to appreciate – there was no concept of 'man' or 'humanity' at this time. In fact, Foucault argues that what we now call 'humanity' had no way of conceptualizing its separateness until the 19th century. 'Man,' in this account, is barely a couple of centuries old. Before this, there were different connections and separations to be made.

We should note here that *The order of things* is clearly dependent, in many respects, on Martin Heidegger's deep suspicions concerning the historical fragility of the concept of 'man' – though Foucault's work makes no direct acknowledgment to any such source. This may be because Heidegger's own dating of 'man' has the concept arrive much earlier than does Foucault's (for details, see Heidegger, 1997).

To take an example from before the centrality of the idea of 'man,' the discipline called 'natural history' in the 17th and 18th centuries was purely descriptive and taxonomic. It dealt with tables of types; in

this case, tables of life-forms. Natural historians merely collected, described, and tabulated species and types; they never tried to form overall theories of life in general (as did, e.g., Darwin in the 19th century). Such forms of thought simply were not available, and the same was true of the discourse concerning labor in these earlier times. The discipline then known as the 'analysis of wealth' merely tried to examine forms of exchange and trade, as though what we would now think of as humanly produced ('man-made') commodities were 'natural' things to be bought and sold. There was also, at this time, a discourse that dealt with language called 'general grammar.' Just as natural history collected and tabulated species, and the analysis of wealth categorized forms of exchange, however, so did general grammar seem happy to separate language into, for example, nouns and verbs and to create taxonomies of their types.

By the early 19th century, however, these three discourses had become much more distinct. They had become separate sciences: early biology (whose major figure is Cuvier), early economics (Ricardo), and philological linguistics (Bopp). As the period known as the Enlightenment (Rabinow, 1987: 32–50) – and particularly Kant's analysis of the limits or finiteness of what knowledge could achieve – began to have its belated effect beyond philosophy proper, these separate discourses appeared to have a previously unforeseen object in common: 'man' as both the one who was able to 'know' and, simultaneously, as the area or object to which knowledge should primarily be applied. (Again, this version of 'man' in Foucault is highly dependent on Heidegger's [1997] analysis of the emergence of 'man' as *subjectum* in/as the earliest moments of modernity.) It only then became possible to say, think, or write that man lives, man labors, and man speaks. This makes possible the field of the human sciences as Foucault knew it in his day, so that there emerged new objects requiring new analyses, with distinct discourses covering each of the three areas: psychology (human life), sociology/economics (human labor), and literature and myth (human signification, as it were, 'man' to 'man').

Then, in the 20th century, structuralism announces the supposed 'death of man,' the idea that this seemingly old, but actually quite recent, conception of man is a fiction and has always been 'really' absent, and that what we strangely confine to the category of 'humanity' is a highly delimited conception of being. With respect to 'life,' psychology is (we hear) replaced by psychoanalysis, which assumes that a uniform structure known as 'the unconscious' inhabits each of us in more or less identical ways. (The unmarked figure is Lacan.) As for 'labor,' ethnology now replaces general sociology/economics, and structural conditions situate human societies as mere responses (albeit differentiated) to universal conditions and needs (Lévi-Strauss, perhaps?). In the case of 'language,' structural linguistics looks for universals beneath the specific, local, and unique bits of language that are actually written and spoken (Chomsky?). At this point, contemporary discourses (including, we might add, the discourses on discourse itself) are put in their historical position. They are pluralized so that they no longer seem to have unique access to fundamental truths. Truth becomes a function of what can be said, written, or thought, and Foucault's (1981: 6) poststructuralist project becomes one of exposing the historical specificity – the sheer fact that things could have been otherwise – of what we seemed to know during Foucault's own 'today' (i.e., c. 1970) with such certainty.

Our more immediate question is, after all, what does Foucault mean by 'discourse'? After working on what he called the discourses of life, labor, and language in *The order of things*, Foucault (1972) immediately began to try to theorize the concept of discourse as such in his next book, *The archæology of knowledge*. This is perhaps Foucault's most difficult work. *The order of things* is complex enough as it is, but to trying to read a complicated theoretical reflection on it (which is what *The archæology of knowledge* is) in the absence of *The order of things* is a near impossibility. Still, *The archæology of knowledge* is the main work in which Foucault tries to spell out what he means by 'discourse.' The best way to deal with Foucault's approach to discourse, however, is to work carefully through *The order of things* (despite its seemingly arcane history of the human sciences) and then to read *The archæology of knowledge* for a more theoretical formulation of Foucault's rethinking of this topic.

Because the type of 'discourse theory' to which Foucault contributed is less well known in English-speaking circles than are formal and empirical approaches, a brief historical preamble is in order. Pre-Foucauldian critical discourse theory originated in continental, largely French, philosophical traditions. It had its most cogent application in relation to the history of ideas rather than to the analysis of either formal language systems or social structures. O'Sullivan *et al.* (1983: 72–73) argue that it began with structuralism itself and its opposition to those "inherited habits of thought and analysis" which assumed that social and cultural 'objects' existed in the 'real world' ready to be seized or (as one said in those days) 'adequated.' The structuralists, particularly

the early Roland Barthes, tried to show that, on the contrary, these objects exist only "as *products*, not *sources*, of ... signification." But this position on discourse – which still differs from Foucault's in that it attaches discourse primarily to signification – did not mean that 'anything goes.' Because 'objects' are said to be 'discursively produced,' this does not imply that we can make the world into anything we want simply by speaking, writing, or thinking in a certain way (Macdonell, 1986). Instead, structuralist and semiotic approaches to discourse were intended as critiques of individualism and idealism. According to this position, what we can imagine (let alone put into practice) is both permitted and constrained by the structurally available discursive possibilities at our disposal.

Foucault, however, argues that both formal and empirical approaches to discourse have tended to work on the side of the enunciation (*énonciation*) of discourse. By 'enunciation,' he means the techniques, the structures, the forms of know-how by which people are able to produce and recognize utterances. Such a narrow focus can include only the surface of language use, the ways and means by which concepts and meanings are spoken or written. In place of this emphasis, Foucault (1972) proposes to look at discourses (again in the plural) – historically specific bodies of knowledge – at the level of the enounced (*énoncé*) or, as his translators have it, the 'statement.' This change of emphasis moves discourse away from being simply a technical accomplishment (linguistic or interactional) on the part of preexisting subjects and redirects it toward the questions: What can possibly be said? And what can possibly be thought? Ergo: What can a subject be?

Referring back to his historical analyses in *The order of things*, Foucault (1972: 80) considers his failure there to specify the terms 'discourse' and 'statement' (*énoncé*):

> Instead of gradually reducing the rather fluctuating meaning of the word 'discourse,' I believe that I have in fact added to its meanings: treating it sometimes as the general domain of all statements, sometimes as an individualizable group of statements, and sometimes as a regulated practice that accounts for a certain number of statements; and have I not allowed this same word 'discourse,' which should have served as a boundary around the term 'statement,' to vary as I shifted my analysis or its point of application, as the statement itself faded from view? (Foucault, 1972: 80)

To clear up this confusion, Foucault asks whether we could think of the statement as a unit of (a) discourse, just as the sentence is a unit of (a) language. If so, it is then necessary to ask what kind of unit it is. For example, would it be exactly the same as a proposition, a sentence, or a speech act? Let us take these in order.

First, a statement cannot be the same as a proposition. The proposition is the basic unit of logical analysis: a declarative utterance describing an actual state of affairs, or else a 'truism.' Taking Foucault's (1972: 81) own example, the propositions "No one heard" and "It is true that no one heard" have identical propositional 'contents' – to all intents and purposes they are the same proposition. But they may constitute two different statements. We can see this by asking what they state in particular circumstances. If each were to occur as the first line of a novel, for example, Foucault (1972: 81) continues, they could provide the scene-setting for quite different kinds of narrative. The first – "No one heard" – could be "an observation made either by the author, or by a character," whereas the second "can only be in a group of statements constituting an interior monologue, a silent discussion with oneself, or a fragment of dialogue, a group of questions or answers".

According to this theory, Foucault's first criterion for a statement is that it should be responsive to what Pêcheux (1975) calls 'functioning.' Propositional content, at least in traditional logic, is thought to remain constant across different local usages. But unlike propositions, statements – as components of discursive formations – have to be thought of primarily as functional units. They do things, bring about pragmatic effects, rather than merely 'represent' states of affairs.

Second, Foucault argues, a statement is not the same as a sentence, at least as far as we can tell. Truncated 'sentences' – such as 'Absolutely!' – can, it is true, carry the force of statements. They can do things and create pragmatic effects, but this objection is trivial. Even formalist approaches acknowledge that such truncations can count as sentences. In fact, the sentence (according to any of the various schools of linguistics) is itself very difficult to define, and so we will never be in a position to decide clearly one way or another about the correspondence (or lack of it) between sentences and Foucault's statements. However, there is some relatively firm ground, for it is possible to say that certain word groupings that are clearly not sentences do carry the force of statements. Foucault's (1972: 82) example is the paradigm of the Latin verb *amare* – *amo*, *amas*, *amat* ... – which schoolchildren once had to recite in class. Obviously, and perhaps even by definition, this is not a sentence, for it lists the forms that can 'fill slots' (verb positions) in actual Latin sentences. Yet it is still a statement, a "statement of the different personal inflections of the

. . . verb." Thus, classificatory schemata, tables, maps, and taxonomies, though rarely expressed as sentences, can be statements. The periodic table of the elements is a statement, and so is a price schedule or a timetable.

More importantly, these examples show clearly how groups of statements (where 'groups of statements' is approximately equal to 'discourses') act to both constrain and enable what we can know. Statements, that is, cannot be characterized by their syntactic or grammatical forms. Expressions that do not use verbal language can be statements: "a graph, a growth curve, an age pyramid, a distribution cloud" (1972: 82). The important thing (and this is Foucault's second criterion for a statement) is that statements should be component parts of knowledge systems ('systems of thought').

Third, a statement cannot be the same as a speech act. Austin (1975) argued that speech acts (e.g., saying "I do" during a wedding ceremony – a performative utterance that accomplishes an event in and by its very saying), to be successful, must meet certain 'felicity conditions.' Not all instances of "I do" will count: it must be said in front of someone who is vested with the authority to conduct marriages, the two parties must consent, and so on. It is true that both Austin's speech acts and Foucault's statements can be said to 'accomplish' events and create effects, but equivalences between (some) speech acts and (some) statements are merely coincidental.

Can we say, for instance, that there is equivalence between "I promise" when it is said as a proposal of marriage within the discourse of medieval romance and "I promise" when it is said as an agreement to meet for lunch? Perhaps these are equivalent speech acts (strictly, they are both 'commissives'), but each is a different statement. The two statements occur in totally different social 'technologies' and historically formed discursive practices. Each, if successful, produces distinct kinds of human subjects: lovers and lunchers; each, again if successful, (re)creates and maintains political institutions as different as love and lunch. Hence the third criterion for a statement is that it should be part of a technique or techniques for the production of human subjects and institutions.

Returning to Foucault's initial question about whether statements are perhaps 'units' of discourses, we can see that the answer is a qualified 'no.' A statement is not strictly a unit at all in the way that the proposition, the sentence, and the speech act may be. Instead, it is a "function that operates vertically in relation to these various units, and which enables one to say of a series of signs whether or not they are present in it" (Foucault, 1972: 86). It is "not itself a unit, but a function that cuts across a domain of structures and possible unities, and which reveals them, with concrete contents, in time and space" (1972: 87). Statements can therefore be understood not as fixed components, but only via the rules that govern their functioning. However, these rules are not like, for example, grammatical rules: They have to do with historically variable bodies of knowledge, they are the rules for what it is possible to know. Hence, they are not susceptible to (nor can they help us arrive at) a general theory of language.

Statements and the rules that govern them are not purely linguistic (indeed, we have seen that they can be completely nonlinguistic), nor are they purely material, but in fact, they connect these two domains. To analyze or describe discursive rules, in Foucault's sense, we must always turn to specific historical conditions – to the piecemeal, the local, and the contingent. Events, no matter how specific, cannot happen just anyhow. They must happen according to certain constraints, rules, or conditions of possibility. These restrictions mean that discourses always function in relation to power relations in Foucault's rather idiosyncratic sense of the term. Because power is crucial to any understanding of Foucault's theory of discourse, we must consider it here briefly, if prematurely.

For Foucault, 'power' is very different from traditional sociopolitical conceptions of it. Discourse is not a mere effect or end-product of preexisting Power (with a capital 'P'). Nor is power 'owned' by some privileged person or group and exercised "simply as an obligation or a prohibition on those who 'do not have it'" (Foucault, 1977: 27). Power, for Foucault, is not just the ruthless domination of the weaker by the stronger (to paraphrase Nietzsche); in fact, it is not to be 'had' at all.

> Power is everywhere; not because it embraces everything but because it comes from everywhere . . . . Power comes from below; that is there is no binary and all-encompassing opposition between ruler and ruled at the root of power relations, and serving as a general matrix – no such duality extending from the top down and reacting on more and more limited groups to the very depths of the social body. One must suppose rather that the manifold relations of force that take shape and come into play in the machinery of production, in families, limited groups and institutions, are the basis for wide-ranging effects of cleavage that run through the social body as a whole. (Foucault, 1979: 93–94)

Eco (1986: 244), however, argues that this radical rethinking of power by Foucault does not mean that it has no possible connections with language. Instead, Foucault's

> image of power closely recalls the idea of the system that linguists call ***the given language***. The given language is, true, coercive (it forbids me to say "I are him," under pain of being incomprehensible), but its coercion doesn't derive from an individual decision, or from some center that sends out rules in all directions: It is a social product, it originates as a constrictive apparatus precisely through general assent . . . . I'm not sure we can say that a given language is a device of power . . . but it is surely a model of power. (Emphasis added)

So, as an illustration of how far we have come now from formalist conceptions of discourse as language, we can now see that the linguistic system (the *langue*) itself, far from being the source of discourse, is just one instance of power where power is considered as a set of relations of force. Because these relations are local and historically contingent, they cannot be 'predicted' by a general theory. Only particular investigations – what the early Foucault calls 'archæological' investigations, investigations of a specific 'archive' – can specify them.

Returning to the level of the statement: statements are best approached not individually, but in terms of the organizations or archives of which they form a part. Hence, what can be said or not said about something is neither absolutely fixed (because it varies historically) nor open to the whims of the moment. For

> the archive . . . determines that all these things said do not accumulate endlessly in an amorphous mass, nor are they inscribed in an unbroken linearity, nor do they disappear at the mercy of chance external accidents; but they are grouped together in distinct figures, composed together in accordance with multiple relations, maintained or blurred in accordance with specific regularities. (1972: 128)

Even though it can (by chance perhaps?) take a linguistic form, the statement is a sociohistorical function rather than a strictly linguistic one. Yet because statements can still be located in talk and texts, we can work from collections of statements to their organizing archives. This archaeological method shows that social histories of thought, knowledge, and power are both unique and specific as well as having general properties. Foucault (1981) called this method of tracing the systematic (archival) properties of unique and local affairs 'eventalization.' It is no accident, then, that he refers to the archive as "the very root of the statement-***event***" (1972: 129; emphasis added).

However, Foucault's idea of the discursive archive does not simply replace concepts like 'system,' 'structure,' '*langue*,' and so on. Rather, analyses of an archive as a condition of 'stating,' as a relatively stable system of functioning (at specific places and times), must be taken together with analyses of its historical flux, of "the general system of the formation and transformation of statements" (1972: 130). 'Archive' is a much more mobile and fluid term than the relatively fixed concept of 'episteme' (1970). The concept of an archive "deprives us of our continuities" (1972: 131) and establishes the fact that human subjects and historical events are not firm and discrete (id)entities but are fragmented and changing sites across which the flows of power move – and sites that, in turn, themselves move the flows of power. The archive, more radically, "establishes that we are difference, that our reason is the difference of discourses, our history the history of difference, our selves the difference of masks" (1972: 131). Hence, in another work of self-commentary, Foucault (1978) argues for three radical modifications of our (then?) current conception of discourse.

Instead of thinking of discourse (in the singular) as a global 'language' pertaining to a global history, so that everything (even silence) refers back to a hidden 'meaning' that the historian or philosopher must find and interpret, Foucault argues that discourses (in the plural) are "limited practical domains" (1978: 16) that have their own "rules of formation" and "conditions of existence" (1978: 16). There is no metadiscourse, or higher discourse, that grounds specific discourses.

Instead of thinking that a totally free and unlimited human subject merely 'uses' the techniques of discourse to express itself, that is, to construct meanings from prelinguistic 'cognitions,' Foucault argues that the historian of ideas can find, as part and parcel of a discourse, "the operations exercised by different 'discoursing' subjects" (1978: 16). This is just one constituent of discourse analysis (as history of ideas). It gives no priority or privilege to the human subject, although it by no means, as in severe versions of structuralism, 'deletes' the subject (Althusser, 1976). In fact, in his later work, Foucault went on to give detailed attention to those discursive operations he called the techniques of the self and described what he was doing as the history of the human soul.

Instead of thinking that history once had a definite origin so deeply buried in the past that we have lost touch with it, so that we must now remember it afresh as the 'real' starting point and purpose of humanity's 'being in the world,' Foucault suggests that history itself – the medium in which we are condemned to have our being – is differentiated and fragmented into particular discourses, and that each fragment (each discourse) has a temporal threshold, a process of coming-into-being, and an equally complex process of disappearance that can be analyzed and described.

For any Foucauldian approach, discourse then turns out to be more important than mere linguistic or social structure (or, indeed, their combinatory possibilities). It is intimately connected with the necessary historicity and finitude of our being in the world and the (perhaps paradoxical) fragility of that condition. It has, ultimately, to do with what we can know in any particular evental circumstance – and how that knowing makes us what we are as historically located subjects. To make a travesty of a long-forgotten beer commercial: It refreshes the parts of our being that other discourse theories cannot reach.

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See also: Constraint, Pragmatic; Port-Royal Tradition of Grammar; Power and Pragmatics; Pragmatics: Overview; Principles and Rules; Psychoanalysis and Language; Speech Acts; Speech Acts and Grammar.

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Discourse, Narrative and Pragmatic Development

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Discourse, Narrative, and Pragmatics

In linguistics, the term 'discourse' refers to a structural unit larger than the sentence. Of the many definitions for it in a standard dictionary, linguistics picks out length and coherence as criterial. Discourse involves more than one sentence, and the sentences must be contingent. Just as every string of words is not a sentence, not every sequence of utterances is considered a 'text.' For discourse, there are requirements of relevance in form and especially in meaning. Texts can be created by more than one participant, as in conversation or in various forms of monologue, most notably narrative and exposition.

The study of discourse is generally considered the province of pragmatics in that it involves the uses of sentences (the products of a syntax), when people attempt to communicate information. Analogous to 'syntactic competence,' learners must also develop 'communicative competence' (Hymes, 1972), where utterances are judged less in terms of form than with respect to how well they meet the requirements of various speech situations. However, to the extent that there are formal dependencies across sentences, for example, relationships of coreference or structural mappings governing ellipsis, the study of discourse may fall under syntax; and the description of degrees

For any Foucauldian approach, discourse then turns out to be more important than mere linguistic or social structure (or, indeed, their combinatory possibilities). It is intimately connected with the necessary historicity and finitude of our being in the world and the (perhaps paradoxical) fragility of that condition. It has, ultimately, to do with what we can know in any particular evental circumstance – and how that knowing makes us what we are as historically located subjects. To make a travesty of a long-forgotten beer commercial: It refreshes the parts of our being that other discourse theories cannot reach.

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Discourse, Narrative and Pragmatic Development

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Discourse, Narrative, and Pragmatics

In linguistics, the term 'discourse' refers to a structural unit larger than the sentence. Of the many definitions for it in a standard dictionary, linguistics picks out length and coherence as criterial. Discourse involves more than one sentence, and the sentences must be contingent. Just as every string of words is not a sentence, not every sequence of utterances is considered a 'text.' For discourse, there are requirements of relevance in form and especially in meaning. Texts can be created by more than one participant, as in conversation or in various forms of monologue, most notably narrative and exposition.

The study of discourse is generally considered the province of pragmatics in that it involves the uses of sentences (the products of a syntax), when people attempt to communicate information. Analogous to 'syntactic competence,' learners must also develop 'communicative competence' (Hymes, 1972), where utterances are judged less in terms of form than with respect to how well they meet the requirements of various speech situations. However, to the extent that there are formal dependencies across sentences, for example, relationships of coreference or structural mappings governing ellipsis, the study of discourse may fall under syntax; and the description of degrees

of relevance or coherence between sentences places it within various semantic frameworks. (Poetry, a specialized form of discourse, exploits sound patterns as well to create links between successive lines, but those phenomena are only rarely treated within phonology.)

Research on the acquisition of pragmatics in first language learning focuses on four major aspects of communicative competence.

1. Developing 'speech acts,' or the communicative functions of sentences in conversation. For example, using utterances to report events, make statements (or declarations) about the world, request information or action, or prohibit action (Dore, 1975; Searle, 1969).
2. Emerging 'conversational skills' in face-to-face verbal interaction. These include knowing when and how to take a turn in conversation; how to initiate, elaborate, or terminate a topic; and how to respond to a speaker in keeping with the pragmatic constraints set by the preceding utterance (e.g., direct question forms demand answers; indirect questions [*can you pass the salt?*] demand actions). They also include skills in detecting the presence and source of any breakdown in communication and knowing how to repair such breakdowns (Garvey, 1984; McTear, 1985).
3. Adjusting one's language to fit the social context of the conversation in keeping with cultural conventions and social roles. These involve issues of politeness, formality, and the age or status of one's listener in what have been called 'styles' or 'registers' of speech.
4. Taking an extended turn to tell a story ('narration'), explain an event, give directions on how to make something or how to get somewhere, or persuade one's listener in an argument ('exposition'). These are referred to as different 'genres' of extended discourse and require the organization of utterances into coherent and cohesive messages.

Early Pragmatics Development

A useful framework for understanding early pragmatics development derives from the theory of speech acts (Austin, 1962; Searle, 1969). According to Austin, speaking was 'doing things with words.' All sentences are speech acts, but the clearest illustration is the performance of those acts that can only be done with words, like promising or marrying. For example, the sentence *I now pronounce you husband and wife* is not a description of an event, but its utterance is the event. The marriage pact is not made until those words are spoken by a qualified person in the context of a wedding ceremony. In Austin's view, sentences have three components: intended function, 'illocutionary force'; form, 'locution'; and effect on the listener, or 'perlocution.'

By moving speech into the sphere of action, Speech Act theory points to nonverbal behaviors as precursors to speaking. Using the framework of Speech Acts, Bates *et al.* (1975) identified three phases in the earliest pragmatic development of children: the perlocutionary, illocutionary, and locutionary phases. For example, while stretching for something out of reach, an infant might make an involuntary effort noise. If the noise alerted a helpful adult to the child's activity, and she or he handed the object to the child, one could say that the child's behavior had an effect, but not that the child intended to communicate. The act would be perlocutionary, but not illocutionary. A slightly older child might look intently at the adult and grab for a toy in the adult's hand. Bates and her colleagues would have ascribed intention to the action with the intent look that accompanied it and called it illocutionary. The final locutionary phase begins when the child has the intention to communicate and uses words to do so (whether or not the perlocution, or effect, is the same as the one intended).

In this vein, Dore (1975) reported on a child in the one-word stage, who used intonation to change the illocutionary force of a single locution: 'mama' with a falling contour to name her, a rising contour to make a question, and an abrupt rise-fall to call her. As their linguistic repertory grows, children can move from 'protoimperatives' or 'protodeclaratives' to actual imperatives and assertions, and eventually to the whole range of functions that words make possible: requesting, prohibiting, greeting, cursing, promising, labeling, etc.

Conversation as Discourse

Among the pragmatic functions toddlers master toward the end of the second year, such as answering, repeating, and requesting, those that elicit further speech are key. When children can both speak and elicit speech, they have the basic tools for creating discourse through conversation. Conversations in turn have sets of rules to be mastered.

Grice (1975) and Sacks *et al.* (1974) have described such sets of rules based on observations of successful and unsuccessful conversations. The most basic principles are (1) to take turns and (2) to be 'cooperative.' Grice defined cooperation in terms of four 'maxims,' the Maxims of Quantity, Quality, Relevance, and Manner. When it is a person's turn in conversation, his or her contribution should provide neither too much nor too little information, and it should be relevant, clear, and true.

The first of these behaviors to show development is 'turn-taking.' In many cultures, mothers will treat their infants and toddlers as conversational partners well before the children are capable of effective turn-taking. One may respond to the child's smiles and burps as well as his vocalizations, thus modeling responses in a turn-taking rhythm and extending periods of 'joint attention' with the child. Following another's gaze and establishing joint attention about an object appear to be themselves important precursors to conversation. Research shows that time spent in joint attention at six to eight months predicts later language measures (Mundy and Gomes, 1998). Indeed, periods of joint attention are the necessary context for conversation. Over the second year, children move from responding to others' vocalizations with actions to responding mostly with other vocalizations, i.e., conversing.

A second key to promoting conversation is learning to be relevant. The second speaker must make his or her responses share the first speaker's topic and add new information to it. As novice conversationalists, children depend heavily on assistance (or 'scaffolding') from their conversational partner. In general, children have been shown to respond more to questions than nonquestions, and the questions help by directing the nature of the response. Caregivers encourage children's contingent responses by asking questions and doing what Kaye and Charney (1980) called 'turnabouts,' turns that first respond to the child's prior utterance and then request further response. Still, the ability to give contingent responses, despite mothers' scaffolding of children's efforts, is slow to develop.

Preschool conversations between toddlers are tentative at best when neither party can reliably be relevant. Even in adult-child dialogue, 2-year-old children's responses tend to be mainly noncontingent. In a longitudinal study of dialogues between two young girls between the ages of four and six, McTear (1985) traced the emergence of greater and greater thematic continuity in their conversation as utterances came to serve the dual role of responding to a preceding utterance, as well as providing for further talk. However, Dorval and Eckerman (1984) showed that second graders (8-year-olds) were nearly as likely to give noncontingent responses as contingent ones, with significant improvement not seen until fifth grade (age 11 or so).

Skill at conversational exchanges also involves being aware of when a turn is not successful. Efforts at repairing misunderstood turns are seen before age three (Garvey, 1984). The youngest children tend to simply repeat their failed messages, while children older than three are more likely to revise their messages (Tomasello *et al.*, 1984). 3- to 4-year-old children respond appropriately to a variety of requests for clarification from the caregiver, including those that request simply a repetition of an element of the child's utterance, a confirmation of what was heard, or further specification of an element in the child's message (Garvey, 1984). However, use of such clarification requests by the child herself to repair her own understanding is still inconsistent in the preschool years. In a variety of communication tasks, preschoolers often fail to question ambiguous information and do not themselves provide maximally informative messages (Garvey, 1984).

Finally, preschool children are also learning how to change their style, or register, of speech according to the needs and desires of their interlocutor. Politeness forms begin to emerge in 2-year-olds (Ervin-Tripp, 1977), who have demonstrated that they know to change the degree of directness of their requests when prompted to say it "even more nicely." 4-year-olds have also shown that they speak differently to a 2-year-old than to another 4-year-old or an adult, making some of the accommodations associated with motherese for the younger children (Hoff-Ginsberg and Kreuger, 1991). Where different dialects are involved, observers have recorded instances of code switching among 3- and 4-year-olds; the children used a more formal, mainstream dialect with adults, but more dialect features when addressing peers (Wyatt, 1991).

In the preschool years, children take many steps toward learning to produce discourse. In the context of conversation, they gradually move from observations and comments on ongoing activity to discussions of absent people and things involved in past or future events. That is, face-to-face conversation provides the option of using the nonlinguistic context to support the interpretation of what is being said. When the speaker cannot rely on the hearers having had the same experiences to help them understand the message, the speech must be more independent of the speaking context, or 'decontextualized.' It must be more explicit and will typically require more complexity in syntax and cohesion (Tannen, 1982). Early moves to decontextualized speech in a conversational setting retain the potential benefit of interaction – questions and answers back and forth that help the speaker know what the hearer did not understand and to progressively refine her meaning. Thus, conversation provides both the motivation and the medium for children to take longer and longer solo turns.

From Conversation to Longer Texts, Narrative, and Expository

Longer turns in the context of scaffolded conversations with a mature speaker lead children toward their first narrative and expository texts. Narratives are essentially connected passages relating past events (Labov and Waletsky, 1967). Even among adults, they can commonly be 'co-constructed' in conversation with contributions from two or more participants, but a classic narrative is a self-contained production by one speaker (or writer).

Expository texts share many characteristics of narratives. They, too, are extended turns of decontextualized speech or writing, but their primary purpose is to convey information. There is no requirement that explanations relate events, although they often incorporate narrative passages. Different genres of exposition are more or less structured depending on their purposes and the amount of information that they need to package. A narrative or exposition must be structured to both impart information and govern the flow of the information. Through various linguistic forms, they distinguish what is background from what is highlighted, and what is given from what is new (Hickmann, 2003; Berman and Slobin, 1994).

Mature narratives present not only 'what happened' but further engage the listener in giving a perspective on the motivations and consequences of the events related. Using the same words and structures available for individual sentences, stories construct a 'hierarchical framework' for the whole text. For example, articles in English (*a* and *the*) identify definite versus nondefinite noun phrases within the sentence, but also function across sentences by signaling what is given (what has come before) from what is being currently introduced. Languages without articles, like Chinese, recruit other forms, e.g., word-order shifts, to perform the same functions (Hickmann, 2003). In both languages, such linguistic devices are 'multifunctional,' having one function within the sentence and at the same time another function in the discourse.

In addition, stories set up implicit expectations on the part of the narrator and also the characters in them. Such expectations derive both from world knowledge, of the usual sequence of events, and from the particular circumstances of their setting in a given story. The economical expression of the different levels of perspective and expectation represented by the characters, distinct from those of the narrator, requires the integration of sophisticated cultural, linguistic, and cognitive skills by the speaker. The 5-year-old, often considered in command of his syntactic system, is still very much a novice in creating sustained discourse. Many of the elements of successful narration and exposition are still developing as children move into adolescence (Hickmann, 2003: 324).

Relatively little research has been done on children's engagement with expository texts, although they clearly play an important part in their developing understanding of the world. The majority of children's school texts outside of 'language arts' are exposition and there is perhaps reason to include it more in early education.

Narrative Development

Much more attention has been given to narrative in research and in early schooling. Labov (Labov and Waletsky, 1967) and later Bruner (1986) argued that narratives are a fundamental way in which humans encode and make sense of their experiences. It is a daunting task to understand and describe the many strands of development involved in the process of narration, but much progress has been made since Labov (Labov and Waletsky, 1967; Labov, 1972) brought the attention of linguists to naturally occurring narratives in people's everyday lives and sought to apply the basic techniques of structural linguistic analysis to narrative functions. Just a few years later, Halliday and Hasan's (1976) seminal work paved the way for focused study of microstructures, or the specific links creating cohesion across sentences.

The distinction between 'cohesion' and 'coherence' in narrative is generally framed in terms of the contrast between linear or 'local' versus hierarchical or 'global' discourse organization. So, "linguistic cohesion" is seen for the most part in adjacent clauses, while "thematic coherence" pertains more to macrostructures at the global level of plot organizations. By studying narratives from different languages and cultures, studies can use the contrast of stories made both within and across groups, finding elements subject to individual differences, and finding candidates for discourse universals in the commonalities of macro- and microstructures across cultures.

Looking at development across time of the ways discourse functions are mapped onto forms in the stories of different age groups in different language communities, researchers have picked out a general progression of which functions are successfully encoded at what age. One can also see how different languages make encoding one or another function more or less difficult to achieve. For example, in

English the presence of an early acquired inflectional morpheme for progressive aspect (*-ing*) encourages early marking of events as ongoing. In contrast, children learning German (German, Standard) or Hebrew, which both lack a similar inflection for aspect, do not have a comparable signal of the distinction and thus may be later in recognizing the need to recruit available forms for it, like adverbs (Berman and Slobin, 1994: 34).

Another area of important development in narratives involves the child's Theory of Mind (ToM). Bruner (1986) made the distinction between the "landscape of action" (i.e. the events that took place) and the "landscape of consciousness" (i.e., the protagonists' reactions, intentions, and interpretations of the events). The ability to understand and express the landscape of consciousness involves a child's growing awareness of and ability to reason about the mental states of other people (Astington, 1993) as well as the child's mastery of the language forms that refer to mental states, especially noun clause complements, e.g., "thinks that something is true," "does not believe what he sees" (de Villiers and de Villiers, 2000). Such clauses permit the expression of two propositions with different truth values in one sentence; for example, a false clause can be embedded in a true clause so that the narrator can express something about the character distinct from his own thoughts.

Research Frameworks for Narrative Development

Several comprehensive studies of narrative development have ensued in the last three decades. Some focused on the macrostructure of the event sequences in the form of 'story grammars': e.g., Labov himself (Labov and Waletsky,1967; Labov, 1972), Mandler (1978), Stein (1982), Applebee (1978), McCabe and Peterson (1991). Others focused on the microstructure, and still others treated the relationships between micro- and macrostructure (Berman and Slobin, 1994; Hickmann, 2003).

Berman and Slobin (1994) merits particular attention in both the breadth and depth of their study, reported comprehensively in a 1994 volume, and in the host of studies their project has spawned. These 'frog stories,' like the pear stories (Chafe, 1980), the bear story (Snow *et al.*, 1995), the cat and horse stories (Hickmann, 2003), and many others, use a single set of stimulus pictures presented to different populations under the same conditions. For example, Mayer's frog stories, especially *Frog, where are you?* (1969) have been told by adults and children of different ages, speaking languages of different typologies, with different language handicaps (Downs syndrome, deafness, Williams syndrome), different linguality (bi- and trilingual), and so forth.

Developing Narrative Coherence

Models of plot structure (or 'story grammars') provide the frame for describing and analyzing children's growth in coherence. Labov's influential schema (Labov and Waletsky, 1967) is one of the first to define the minimal characteristics of a well-formed story. It should have an onset, an unfolding, and a resolution (roughly, a beginning, middle, and end). In a later formulation (Labov, 1972), the onset of a fully formed narrative has an abstract, a brief statement of what the story is about, and it also provides an orientation or setting, the 'who, where, and when.' The unfolding is the obligatory nucleus of the story and consists of one or a series of complicating actions, which lead to a high point and then the resolution or result. At the end of the story, the narrator provides a coda, a short passage that indicates that the story is over and may bridge back to the conversation in which the story was embedded. In this schema, the strictly 'narrative' clauses recall the temporally ordered experience being recounted; the 'free' clauses or 'evaluative' elements have no fixed position in the text but occur throughout, and together give the motivation or commentary to the story. Evaluative statements convey the narrators' personal involvement in the story through expressing their own or the characters' desires, intentions, thoughts, or opinions – Bruner's 'landscape of consciousness.' Evaluation is found in 'free' clauses or can be embedded in the fixed narrative clauses in the form, for example, of intensifiers, similes, hypotheticals, etc., which go beyond a simple direct telling of what actually happened.

Stein's model (1982) was similar to Labov's but focused more attention on the unfolding components of the story. In her story grammar, after a 'setting,' there are 'episodes,' each with an 'initiating event' and an 'internal response,' which motivate an 'attempt' leading to a 'consequence' and resulting in a 'reaction.' One aspect of growth in children's stories, then, occurs in their progressively more complete episode structure. (See also Mandler, 1978; McCabe and Peterson, 1991; Trabasso and Rodkin, 1994; Berman and Slobin, 1994: Part IIa.)

Some authors have highlighted different schema for stories in various cultures and subcultures (Gee, 1989). Still, a basic sequence for the development of children's ability to tell a story from a set of pictures, like those reported in Applebee, 1978, or Berman and Slobin, 1994, is more or less as follows:

1. 3- to 4-year-olds only occasionally provide minimal narrative sequences (two or three dynamic events related in a temporal chain), but more often respond to the request to "look at the pictures ... and then tell a story" with picture descriptions which treat each scene as an isolated event. Applebee (1978) elaborated further on pre-narrative development, characterizing children's most primitive stories as 'heaps,' lists of unrelated referents and events.
2. In a second phase, children organize 'chains' of events ordered in time. These tend to focus on the most salient pictures, rather than the events that advance the story.
3. Next, a 'causal structure' emerges (Trabasso and Rodkin, 1994). Early causal relationships generally begin by relating local or adjacent events and only later become more global.
4. At an intermediate level, children may manage one or two well-formed 'episodes,' but they are not able to sustain the organization throughout. Among the many stories analyzed by Peterson and McCabe (1991), one frequently seen category includes those that end at the high point, (i.e., do not manage to bring the story to a resolution).
5. The most mature stage projects a causal structure over the whole story, where events relate to an initial goal and attempts to reach the goal. The outcome is coordinated with respect to the goal and includes evaluative commentary, all organized in what Berman and Slobin (1994), following Guiora, called an 'action-structure' that communicates beyond its content through its organization the hierarchy of importance within the story.

Support for these stages also comes from studies of children's comprehension of and judgments about texts. Esperet (cited in Hickmann, 2003), for example, presented children with four types of candidate texts: (1) unconnected sentences; (2) event scripts, with a temporal order but no episodic structure; (3) incomplete stories; and (4) complete stories. Consistent with the findings from production studies, the 5- to 7-year-olds could differentiate true stories from unconnected sentences, but only the older children, the 9- to 11-year-olds showed sensitivity to the difference between complete and incomplete stories and scripts.

Well-formedness also appears to affect children's processing of stories. When subjects are presented with 'canonical' stories and stories where different narrative units are deleted or displaced, even 5-year-olds will show better recall for the canonical stories, and generally will repair anomalous stories in retelling by making them more compatible with their canonical versions (Mandler, 1978).

Developing Narrative Cohesion

The most influential framework underlying discussions of development in this area derives from Halliday and Hasan's *Cohesion in English* (1976). They described (and proposed coding for) the microstructure of a text, the 'semantic links' between elements across sentences. Halliday and Hasan presented a comprehensive taxonomy for five types of cohesion – Reference, Substitution, Ellipsis, Conjunction, and Lexical. They listed over a dozen subtypes for each, and in their coding indicated the direction, distance (number of intervening sentences) between the cohesive element and its source, and whether the link was direct or 'mediated,' i.e. linked to its source through another cohesive element that is also linked to the same source. Most links are considered to be 'anaphoric,' referring to an element in the preceding text, but can also be 'cataphoric,' referring to an element in text that follows. Reference that can be determined only from the situation outside the text is 'exophoric,' as opposed to textual or 'endophoric' links.

In general, as children get older, one sees fewer instances of deixis and exophoric references, and more connectivity within the text. The most crucial ties concern those that maintain 'reference' to the entities in the stories and those that locate the events in 'space' and 'time.' For tracking shifts in spatial location, one element is established as an 'anchor,' and then subsequent actions take place in some relation to the anchor. For time, the story sets a tense for the 'event time,' and then moves back and forth on a time line between the event time and the 'utterance time' (Hickmann, 2003).

The key principle is that the text, whether narrative or expository, must establish its own reference points in a way that does not presuppose prior knowledge of them. Once they are established, reference to them must be maintained consistently, until new elements are introduced and become available for 'presupposition' by subsequent elements. Managing presupposition is a task that requires both linguistic knowledge of the particular forms used in a given language and conceptual awareness of the knowledge state of the listener. For example, in English, use of the definite article *the* or a personal pronoun (*she*, *it*, *they*) presupposes an antecedent. To use them in a 'first mention' without an antecedent is anomalous or immature. But once an entity has been mentioned, it becomes anomalous not to use the presupposing forms. Ex. *John returned from a trip. He brought*

news of his travels, not **he brought news of a trip*. Younger children will generally use these forms in relation to their own knowledge base. In telling a narrative, though, the knowledge of the hearer is almost always different from that of the speaker, so the narrator must suppress his or her own reference points and maintain the ties from the listener's point of view – or in some cases, from the character's.

A fundamental error for young narrators is to use a presupposing form for first mention and indeed we see that 4- and 5-year-olds give appropriate 'newness marking' of first mentions at or below chance levels, whereas by nine or ten years old, they reach near adult levels (92%, Hickmann, 2003: 196). Note that young Chinese speakers have the same task of marking newness, but their language does this with word order, whether the element comes before or after the verb. Since word order has so many other functions linguistically, the task of marking newness is even more complicated for those learning Chinese.

Similarly, for 'maintaining reference' in English, one option is to use a zero form (ellipsis), e.g., 'He went up the rock and 0 called for the frog.' The choice of the null subject requires both discourse knowledge of when it is appropriate and syntactic knowledge of how to conjoin verb phrases. Berman and Slobin (1994: 181) reported that nearly all of the English preschoolers used null subjects in their stories, but not for discourse purposes. Unlike subject ellipsis among older narrators, the preschoolers used them either ungrammatically or conversationally, in response to questions their listeners used to prompt them to continue. Here, the obstacle appeared to be that the younger children had not completely mastered the conditions on phrasal conjunction ('he went and 0 called').

Cohesion is also enhanced by communicating a clear temporal order. Early stories tend to give no indication of the relative timing of events. By kindergarten, half of the children give adverbial sequencers like 'then,' 'and then,' or 'next.' By second grade or so, more children begin to use adverbial time clauses and create complex relationships between events (Pearson and Ciolli, 2004). (See also Berman and Slobin, 1994, for a description of the emergence of temporal links in the frog stories.)

Developing the Evaluative Function

Stories must have coherence and cohesion to be interpretable, but they must develop evaluative elements to be meaningful. Actions make the most sense when we know the actors' motivation and intentions, and stories are more engaging when they relate the actors' emotions and desires and the narrator's reactions. The narrator must paint the 'landscape of consciousness' for the listener.

The earliest references to mental states in young children's narratives talk about the simple emotions or desires of the characters – happiness, sadness, fear, and anger in the case of emotion, and what they want or like in the case of desires. However, such expressions of mental state are still rather rare in the narratives of 5-year-olds although children at this age have a fairly well developed Theory of Mind (Astington, 1993). Between 5 and 9 years of age, children begin to incorporate more and more of the landscape of consciousness into their stories. More complex emotions like surprise, guilt, or jealousy, and references to the characters' cognitive states (what they believe, know, or are thinking about) begin to emerge (Berman and Slobin, 1994; Pearson and Ciolli, 2004).

Relation to Emerging Literacy

The relationship between Theory of Mind and discourse appears to be reciprocal. In order to tell an authentic story, rich with the internal reactions and cognitions of the characters, the child must have a conceptual understanding of mental states, a well-developed Theory of Mind. Similarly, a mature communicative competence requires the child to be able to judge the communicative intentions and desires of their interlocutors as well as infer their state of knowledge or ignorance about the topic of discourse. At the same time, the rich narratives that are told or read to children, and their active participation in back and forth conversation about them, provide developing children with some of the best evidence from which to build a Theory of Mind (Nelson, 1996).

Indeed, the pragmatic frameworks which guide the interaction of speakers in communicative situations build, with each new element of mastery, the tools to take the child to the next step, continually closer to adult norms for discourse. Many aspects of children's oral language predict their later skill with written discourse through the middle school years (Tabors *et al.*, 2001).

See also: Bruner, Jerome (b. 1916); Coherence: Psycholinguistic Approach; Cohesion and Coherence: Linguistic Approaches; Communicative Competence; Conversation Analysis; Dialogue and Interaction; Discourse Anaphora; Evaluation in Text; Evolution of Pragmatics; Foregrounding; Genre and Genre Analysis; Labov, William (b. 1927); Macrostructure; Metapragmatics; Neo-Gricean Pragmatics; Oral Traditions and Spoken Discourse; Referential Relations in Spoken Discourse; Register: Overview; Relevance Theory; Representation in Language and Mind; Sacks, Harvey (1935–1975); Speech Acts: Definition and Classification; Speech Acts, Literal and Nonliteral; Syntax-Pragmatics Interface: Overview; Tannen, Deborah (b. 1945); Variation and Language: Overview.

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Discrimination and Language

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Various forms of linguistic discrimination throughout the world result from unique local circumstances. This article concentrates on linguistic perspectives, which intersect with historical, political, economic, educational, and other social influences that determine the stratification of dominant-to-subordinate groups everywhere. Those who hold political power tend to be linguistically dominant, and those who lack political clout are often linguistically subordinate. In some countries these sociopolitical linguistic circumstances become confused with popular conceptions of proper and improper uses of language (see Zentella, 1997).

Linguists from various backgrounds working in communities around the world have either directly or indirectly exposed forms of linguistic discrimination. Einar Haugen proved to be an exceptional pioneer regarding matters of linguistic discrimination derived from studies of bilingualism and its consequences. His article 'The stigmata of bilingualism' (Haugen, 1972) overtly recognizes that people who are fluent in two languages or who have partial competence in a second language speak with relative prestige based upon their fluency and the corresponding stature of those languages depending upon immediate circumstances.

Ferguson (1959) identified linguistic boundaries that coincided with related real or potential forms of language discrimination when he formulated the concept of , that is, where high and low forms of a language coexist with established linguistic functions regarding literacy, religion, education, etc. The 'High' (H) form is used for formal, religious, and scholarly purposes, while the 'Low' (L) form represents the colloquial vernacular that reflects many significant linguistic differences from the H form. He noted diglossia in Arabic, Greek, Swiss-German, and Haitian Creole, observing that the H form always had a strong formal literary tradition and that H was never acquired as a native dialect, but was always introduced through formal education.

Although Ferguson goes to great pains to restrict the concept of diglossia to H and L forms within a language, Fishman *et al.* (1971) found this concept to be so compelling that they extended it to include bilingual communities, such as those described by Haugen (1972). Linguistic purists often insist that diglossia must adhere to Ferguson's (1959) original monolingual depiction, albeit with explicit accounts of the H and L forms. Others may be attracted to Cooper *et al.*'s (1971) extended definition, which has been applied to socially stratified bilingual communities in which H is aligned with the dominant language and L is associated with the subordinate language. Such a distinction has proved useful to bilingual scholars who seek to make clear differences between countries such as Canada, with two official languages that coexist in law, and the United States, where speakers of languages other than English confront greater linguistic disadvantages.

Thus far our orientation toward discrimination has focused on linguistic prejudice against people who are engaged in face-to-face (or telephonic) conversation, but there are other interpretations of linguistic discrimination that are more socially favorable when viewed in terms of those who are concerned with upholding linguistic standards. In this sense the Académie Française may be thought of as engaged in linguistic discrimination, in this instance, to ensure the purity and longevity of Standard French. While evidence of linguistic prescriptivism is abundant, another interpretation of linguistic discrimination can be found in the pioneering work of Brown and Gilman (1960), who observed that formal and informal uses of *tu* and *vous* in French resulted from a keen sense of social awareness about relations among individuals within the French speech community. Use of *tu* and *vous* was not only influenced by linguistic constraints, appropriate usage required the ability to discriminate between those who are peers of comparable or lower social standing, and interlocutors who are more senior and therefore deemed worthy of the more formal *vous*. Deferential kinship terms of reference require similar capacities to discriminate between those who are elder or younger among speakers of Chinese, Japanese, and Korean, among others. In Paris or Tokyo the native speaker of the local dominant language must discriminate between those who are deemed worthy of linguistic honorifics and those whose social standing is subordinate to that of the speaker.

Fastidious scholars have taken care to specify the forms of linguistic discrimination that can be gleaned from their research. One of the most illuminating accounts of research that helped dispel racial stereotypes about language can be found in Labov's groundbreaking essay 'The logic of nonstandard English' (Labov, 1972a). Labov (1972b) also used studies of American minority languages and dialects as the foundation for developing rigorous quantitative interdisciplinary studies of linguistic variation; he used conversational evidence as well as

speech that is strictly controlled under experimental conditions.

In the wake of the U.S. Civil War and ensuing racial strife that has lingered since the emancipation of American slaves, many unflattering and uninformed linguistic stereotypes and misconceptions about the intelligence of African-Americans has flourished and helped to perpetuate anti-black racism in America. Labov *et al*. (1968) built extensively upon Labov's major study of the social stratification of English in New York City (Labov, 1966). With support from programs intended to advance racial equality, Labov began the massive task of documenting the linguistic details of Puerto Rican and African-American English in New York City, and in so doing he challenged and debunked many of the prevailing myths about low intelligence among African Americans and those who have not learned English natively.

Many groups have experienced discrimination, but linguistic discrimination can be associated with individuals as well as groups. This article is devoted more broadly to groups of people who share voice qualities that belie their membership within one or more groups, that is, based on race, sex, sexual orientation, age, education, region, religion, ethnicity, class, etc. Goffman (1959) eloquently described the multiplicity of these groupings as they apply to individuals in their daily lives, as well as the various settings and situations in which individuals from one or more groups find themselves at any given moment.

Linguistic prejudice and discrimination frequently grow in postcolonial contexts that give rise to the birth of pidgin and creole languages (see Pennycook, 1998; Hymes, 1971; Romaine, 1988). Pidgins are born when two groups of speakers are in contact and draw upon features of their mother tongue and the unfamiliar language of their interlocutor. As such, a pidgin has no native speakers. However, once children acquire a pidgin language natively, it is transformed into a Creole. Throughout history most pidgins and the Creoles they gave birth to resulted from human conquests, where those who were enslaved and/or colonized came to speak nonstandard versions of foreign tongues that were spoken by more powerful colonizers or slave traders.

Linguistic stratification born of slavery, colonization, or other forms of human subjugation yield social conditions that repeatedly give rise to strong senses of linguistic superiority or inferiority that will vary greatly from one situation to another. For example, Trudgill (1982) observes 'covert prestige' associated with working-class speech in England, which at first blush may seem counterintuitive, however, the language of the popular masses will hold considerable esteem to those who preserve it and nurture it through their daily language usage.

India represents a postcolonial nation where colonialism has left indelible linguistic impressions to the point that English still serves as a lingua franca throughout the country, while India's native languages are more strongly associated with diverse groups from different regions. This linguistic hierarchy may be replicated in other colonial contexts to which Indians migrated, such as South Africa (Mesthrie, 1992).

Changing political circumstances that transformed Europe when the former Soviet Union disbanded resulted in linguistic discrimination of a different kind. Reisigl and Wodak (2001) and Wodak and van Dijk (2000) observe profound linguistic opinions and overt anti-Semitism in the writing of journalists as western European nations absorbed growing populations of citizens from other eastern European countries. Indeed, the linguistic plight of immigrants in various communities frequently trigger negative reactions from locals who dislike the speech of foreigners. These linguistic opinions are relative and often exist within a nation, typically with clear knowledge of regions where speech is distinctive. In this way, a double-edged object may be forged, of linguistic adoration (among insiders) and potential linguistic ridicule (from outsiders).

Very often government language policies can exacerbate linguistic conflict or social coherence. Switzerland is well known for linguistic egalitarianism because of having four official languages, whereas official language movements that are highly nationalistic may, perhaps inadvertently, foster social conditions for intolerance against those who lack fluency in dominant linguistic norms.

While these observations are devoted centrally to linguistic matters that are clarified by linguistic research, anthropologists, educators, sociologists, psychologists, and many others confirm that linguistic discrimination intersects with other dimensions of social strife that accentuate linguistic behavior as a sign of inclusivity or exclusivity.

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Discursive Practice Theory

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Introduction

Practice theories try to account simultaneously for the ways that human action is constrained by the social-cultural order ('structure') as well as for human agency, which reproduces and/or transforms 'structure.' Key figures in the formulation of practice theory in the social sciences include Pierre Bourdieu (1977), Anthony Giddens (1979), and Michel de Certeau (1984), promising a way out of the enduring dichotomies between individual and totality, structure and agency, and activity and system.

Distinctive Features of Practice Theory in Linguistic Research

Two features distinguish practice theory as it has been developed in linguistic theory. First, in addition to the work of Bourdieu and Giddens, the work of Soviet psychology (especially the Vygotskian school of activity theory) and Peircean semiotics has been particularly significant. Second, what structure might mean, and thus the tools needed to go beyond a structuralist theoretical model, varies more from work to work than in other disciplines; linguists often grapple with the influence of social structure (the area focused on by practice-based accounts in most other disciplines), but sometimes they must also deal with the effects of grammatical structure or cognitive structure. In addition, they sometimes revisit ideas about the intersection of all three, for example in considering how language structures perceptions of the social world (especially in debates about the Sapir-Whorf hypothesis). Discursive practice theory often attempts to transcend the dichotomy between an objective view of language as a system unto itself (Saussure), and a subjective view, emphasizing the transitory creations of speaking subjects (phenomenological approaches). Also relevant are attempts to challenge dichotomies of type/token, form/use, synchrony/diachrony, and production/reception.

Practice theories challenge the view of social behavior as fundamentally ordered by rules and norms, which is evident in many formal and certain sociolinguistic approaches to language by focusing instead on the interplay of relatively stable schematic aspects of social life, and emergent, unformalizable ones. Instead of focusing on grammar, or even on the conventionalized, automatic correspondence between linguistic forms and context, a practice approach characterizes speech as a form of action, and language as fully interpenetrated by other modes of human engagement with the world (Hanks, 1996: 229–230). Practice theory thus effectively decenters language from its privileged place in linguistics. In addition, while the unit of speech in formalist

linguistic models is typically taken to be the isolable sentence of the individual speaker, in a practice approach it is the socially defined relation between agents and the social field that 'produces' speech forms (Hanks, 1996: 229–230). In this way, it rejects the attempt to reduce language use to conceptual models or individual psychology.

Two Examples of the Impact of Practice Theory in Linguistic Analysis

Genre Analysis

Genres are key units of description for the analysis of communicative practice. They are units greater than an utterance, but less than a language, and they are enduring conventions used to perceive the world and act on it (Hanks, 1996: 242). Earlier studies focused on structural definitions, trying to resolve which features constituted a sufficient or adequate basis for defining a genre (see Briggs and Bauman, 1992 for a review). Later studies, influenced by the ethnography of speaking and ethnoscience, investigated more locally relevant classifications but continued to use a taxonomic approach to classifying genre. Though Mikhail Bakhtin also used this approach, he also 'challenged the notion that genres are static, stylistically homogeneous, and nonoverlapping units,' and he introduced the need for considering the linguistic aspects of genres in terms of their ideologically mediated connections with social groups (Briggs and Bauman, 1992: 145). Hanks (1987) synthesized Bakhtin's 'sociological poetics' and Pierre Bourdieu's theory of practice, each of which he sees as inadequate on their own, to develop a notion of genre as an orienting framework for the production and reception of discourse. In his work, genres are not conceived of as unitary wholes, as in formalist approaches, but as schemes and strategies, focal elements which actors use variously and which never become fixed in structure. Hanks's (1987, 1996) analysis of texts produced in early colonial Maya society in Mexico shows how novel genres were being produced at a time when social conventions of all kinds were contested. The focus on historical materials, however, forced him to extrapolate about conditions of production and reception when his own theory of practice would ultimately require a fuller account (see also Hanks's (1990) detailed account of the relationship between deictics in Yucatec, which retheorized reference as a form of social practice).

Bauman and Briggs's perspectives on genre emerged from an interest in creating more space for analysis of verbal artistry with the notion of performance, which had some affinities with the notion of practice. A focus on performance also shifted attention away from the formal patterning and symbolic content of texts to the emergence of verbal art in social interactions between performers and audiences (Bauman and Briggs, 1990: 59–60). However, as they noted, a focus on performance could also risk simply broadening the focus of analysis without transforming it. They signaled a shift in focus from product to process and from structures to agency by focusing on entextualization, decontextualization, and contextualization instead of text and context (see also Silverstein and Urban, 1996). This focus emphasizes the intertexuality of genre, emphasizing the ways that interpretation of discourse is shaped by being linked with a genre. Crucially, however, not everyone has the power to engage in these processes: "by invoking a particular genre, producers of discourse assert . . . that they possess the authority needed to decontextualize discourse that bears these historical and social connections and to recontextualize it in the current discursive setting" (Briggs and Bauman, 1992: 148). These approaches both highlighted that genres cannot be understood in terms of form and function alone; analysis required addressing questions of political economy, ideology, and power, though the significance of ideology was better elaborated in Briggs and Bauman's work.

Studies of Language and Gender In social theory, theories of practice have tended to focus more broadly on class relations, bureaucratic structures, or culture (Ortner, 1996). In sociolinguistics and linguistic anthropology, however, one of the key sites for the elaboration of practice theory has been in studies of language, gender, and sexuality. Feminist theorists challenge biologically or culturally reductive accounts of gender by pointing out that gender is not something one has but something one does. A variety of metaphors have arisen to capture this idea: gender as activity (Goodwin, 1990), performance (Hall, 1999), accomplishment (West and Fenstermaker, 1993), or practice (Eckert and McConnell-Ginet, 1992). Fine-grained sociolinguistic analysis seems to be particularly useful for demonstrating the way gender is done in everyday practices. Marjorie Harness Goodwin drew on Vygotskian psychology to argue that activities, rather than cultures, individuals, or gender, should be the basic unit of analysis for the study of interactive phenomena. Goodwin examined the different social structures created by African-American boys and girls in a range of speech and play activities. In some activities she found girls and boys building systematically different social organizations and gender identities, while in others

she found them building similar ones. Her focus on activities suggested that behavior is not the implementation of social scripts or cognitive schemata, but rather the (re)construction of each event anew as it unfolds. The focus on activities thus usefully replaces essentializing analytic categories. Nonetheless, like some phenomenological accounts, it also seems to accord speakers a lot of agency and tends to focus on gender as constructed in individuals vs. institutions, in a way which perhaps betrays the psychological origins of activity theory. Goodwin's focus on activities also left her work vulnerable to a critique more widely made of practice theory: that the move beyond the focus on the contingency and locality of practices towards an account of how these practices articulate with larger social systems is endlessly deferred (Connell, 1987; McElhinny, 2003; Smith, 1999).

The work of Penny Eckert and Sally McConnell-Ginet kept a macrosociological picture more clearly in focus, in part because their model was meant to challenge a structuralist-functionalist paradigm widely used in variationist sociolinguistics that places class at the center of analysis. Language has often been seen in this tradition as a passive marker of the speaker's place in the socioeconomic hierarchy (Eckert and McConnell-Ginet, 1992: 468). Eckert and McConnell-Ginet replaced a functionalist definition of community with the concept of community of practice. A community of practice "is an aggregate of people who come together around mutual engagement in an endeavor. Ways of doing things, ways of talking, beliefs, values, power relations – in short practices – emerge in the course of this mutual endeavor" (1992: 464). They argued that discussions of gender and other aspects of identity "all draw on reifications that emerge from and constitute conventional maps of social reality. These reifications structure perceptions and constrain (but do not completely determine) practice, and each is produced (often reproduced ...) through the experience of those perceptions and constraints in day-to-day life" (Eckert and McConnell-Ginet, 1995: 470). Eckert (2000) applied this concept to a study of a Detroit high school; Ehrlich (1997) applied it to studies of gender in second-language learning classrooms. A community of practice identifies a somewhat larger analytic domain than does activity, and it thus serves as a mediating region between local and global analysis. The notion of community of practice stops short, however, of social-theoretical analysis of large-scale inequalities (for some critical evaluations of the strengths and limits of the concept see Holmes and Meyerhoff, 1991).

Judith Butler's (1990) argument that gender works as a performative, constituting the very act that it performs, built on the definition of performative utterances in Austin (1962) and Searle's (1969) work on speech act theory. Her argument that there is no prediscursive event, that even our understanding of biology is discursively produced, placed significant emphasis on what analysis of discourse might reveal about how speakers manipulate feminine and masculine ideologies. The utility of the concept of performativity for ethnographic and sociolinguistic work is currently debated, as is the contribution Butler's work made to practice theory (Hall, 1999; Livia and Hall, 1997; McIlvenny, 2002; McElhinny, 2003). Sometimes her work was seen as granting speakers too much agency (Cameron, 1997), but she had also been critiqued for failing to grant actors enough agency (Hall, 1999).

Conclusions

The critiques of Butler's work are representative of the way practice theory has generally been received. While practice theory emerged out of the conviction that it is possible to mediate between the opposed shortcomings of subjectivism and objectivism, the theoretical responses to this apparent antinomy are invariably met with the critique that they fail to transcend this dilemma. Bourdieu's work had been especially susceptible to this critique (Schatzki, 1997; King, 2000). King argued persuasively that Bourdieu's formulation of habitus, defined as enduring social knowledge in the form of unreflective habits and commonsense perceptions, slipped back into the objectivism it attempted to refute since the dispositions that comprise habitus are directly derived from individuals' socioeconomic or structural positions. Many sociolinguistic accounts which rely extensively on Bourdieu have yet to engage with this critique. Another strain of practice theory inspired by Ludwig Wittgenstein, Gilbert Ryle, and Martin Heidegger had called into question the possibility and relevance of theorizing practice in the first place (Stern, 2003: 187). These influences have, as yet, been less well-developed in linguistic theory, though see Duranti, 1997 and Sidnell, 2003. While this approach to practice theory may rightly caution against a re-theorizing of practice, it also points to the inherently precarious position that practice theory occupies. 'Practice' approaches attempt to offer a rigorous theory of society and to maintain an orientation that closely attends to the details of local organizations of activity. While this makes it useful in its promise to resolve analytic tensions, it also means that practice

theory, perhaps appropriately enough, remains inchoate. For this reason some scholars have suggested that the insights of practice theory might be better understood as a project or method than a theory.

See also: Activity Theory; Austin, John Langshaw (1911–1960); Bakhtin, Mikhail Mikhailovich (1895–1975); Chomsky, Noam (b. 1928); Communities of Practice; Conversation Analysis; Ethnomethodology; Gender and Language; Gender, Sexuality and Language; Genre and Genre Analysis; Heidegger, Martin (1889–1976); Interactional Sociolinguistics; Levi-Strauss, Claude (b. 1908); Marxist Theories of Language; Performance in Culture; Rules and Principles; Rules and Rule Following; Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Speech Acts; Speech Genres in Cultural Practice; Structuralism in Anthropology; Structuralism; Structures and Processes; Vygotskii, Lev Semenovich (1896–1934).

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also considerably improves with choral reading, speaking in cadence with a metronome, or when loud, broadband noise prohibits them from hearing their own speech. Delayed auditory feedback improves stuttering, as does speaking during inhalation or repeating the same passage (adaptation effect) (Bloodstein, 1995).

Genetics

There is a strong male prevalence among stutterers. Eighty percent of children 'outgrow' their stutter, but 20% do not. This confounding variable necessitates the importance of identifying current stutterers as well as past stutterers in any genetic investigation. Genetic investigations in stuttering have often focused on concordance rates among monozygotic versus dizygotic twin pairs, as well as analyses of pedigrees in different families. Many investigations of stuttering among twins are hampered by small sample size, as well as difficulty ascertaining twin status and assessing speech disruption. Howie (1981), directly examining twin pairs of stutterers, observed that 63% of 16 monozygotic twin pairs and 19% of 13 dizygotic twin pairs were concordant for stuttering. Andrews *et al.* (1991), investigating 3800 twins through self-employed reporting, determined 20% concordance among 50 monozygotic twin pairs and 3% concordance among 85 dizygotic twin pairs. These investigations indicate that heredity is an important factor in the genesis of stuttering but may not be a sufficient condition, as the concordance among homozygous (identical, same genetic code) twins was not 100%. Thus, environmental factors may also be a factor in the genesis of stuttering.

Another focus of genetic investigation of stuttering involves analysis of stuttering aggregates within families. Relatives of persons who stutter have an increased risk of stuttering, ranging from a three- to a 10-fold increase. The segregation patterns of stuttering in these families do not indicate a single-gene, fully penetrable transmission model of inheritance, such as autosomal dominant, autosomal recessive, or x-linked. Current studies indicate a diallelic model, with penetrance affected by whether a parent stutters and by the sex of that parent stutterer (penetrance is higher among male stuttering parents; Cox *et al.*, 1984; MacFarlane *et al.*, 1991; Ambrose *et al.*, 1993; Viswanath *et al.*, 2001).

Brain Imaging

Employing volumetric magnetic resonance imaging, Foundas *et al.* (2001) observed abnormalities in stutterers' brains. Stutterers had qualitative differences in frontal lobe gyral patterns, involving Broca's area, and quantitative differences in the posterior temporal lobe regions, involving Wernicke's area. Given that most right-handed fluent speakers have a larger left superior posterior temporal area (Brodmann's Area 22, Planum Temporale), primarily consisting of Wernicke's area, the most robust finding of the researchers was that Wernicke's area on the left and its corresponding area on the right were bilaterally larger but less asymmetric in stutterers than in normal speakers.

Foundas *et al.* (2001) suggest that these brain abnormalities permit normal development of language but can produce abnormalities in the motor output of language – primarily speech. They query whether the perisylvian (includes Broca's and Wernicke's areas) speech-language cortex compromise contributes to an instability in interaction between an outer 'linguistic' loop and an inner 'phonatory' loop, resulting in stuttering (discussed below in greater detail; Nudelman *et al.*, 1992; Anderson *et al.*, 1999). They note that abnormalities in the anatomic substrates of language might be different among stutterers, with some having difficulty in processing speech-motor control as a result of aberrancies in frontal opercular areas, and others having a compromise near the Wernicke's area.

Sommer *et al.* (2002) also detected abnormalities in the structure of stutters' brains. Employing diffusion tensor imaging of the brain, a technique that highlights white-matter neural fibers, these researchers noted that stutterers had fewer white-matter fibers in the left brain immediately below the representation of the tongue and laryngeal areas, leading the authors to posit a disconnection between the representation of the oropharynx (Brodmann's area 43) and the sensorimotor cortex.

In addition to the above investigations of abnormal brain structure in stuttering, which could cause or result from stuttered speech, there have been investigations of possible altered brain function in stuttering, primarily employing positron emission tomography (PET) or functional magnetic resonance imaging (fMRI). PET experiments, including reading aloud, reading silently, and choral reading, indicate different activation patterns in stutterers versus nonstutterers (Fox *et al.*, 1996; Braun *et al.*, 1997; DeNil *et al.*, 2000). Despite differences in experimental design, these investigations highlight the fact that right-handed stutterers lateralize activations to the right hemisphere, in contrast to nonstutterers, who lateralize activations to the left hemisphere. Fox *et al.* (1996) noted that stuttering during solo reading induced widespread activation of motor systems in both the cerebrum and cerebellum, with a right

dominance. Consistent with this finding, Braun *et al.* (1997) noted in stutterers that regional responses were absent, bilateral, or lateralized to the right hemisphere when the subject engaged in speech production during stuttering episodes. DeNil *et al.* (2000) supports this conclusion by observing a proportionately greater right-hemisphere activation in stutterers while they read individual words overtly or covertly, in contrast to proportionately greater activation in the left hemisphere in nonstutterer controls. Fox *et al.* (1996) and Braun *et al.* (1997) reach similar conclusions with regard to fluency evoked by chorus reading and prolonged speech. These studies indicate that brain activation patterns of stutterers differ from those of nonstutterers not only during stuttered speech but also during fluency.

Some investigators attempt to combine the excellent spatial resolution capability of fMRI with the excellent temporal resolution of magnetoencephalography (MEG), a technique permitting investigation of the timing of cortical activation sequences in various tasks. MEG provides excellent temporal resolution, with good accuracy of localization of active cortical areas, and is useful for characterizing an activation sequence from visual perception to oral output and for identifying cortical correlates of the disorders of these processes. Salmelin *et al.* (2000) had stutterers and controls read isolated nouns aloud in a delayed reading paradigm. The stutterers were fairly fluent in this task. Despite similar overt performance between the two groups, however, the cortical-evoked patterns revealed clear differences both in the evoked responses, which were time locked to word presentation and mouth movement onset, and in the task-related suppression of 20-Hz oscillations. Within the first 400 milliseconds after seeing the word, processing in fluent speakers advanced from the left inferior frontal cortex (articulatory programming) to the left lateral central sulcus and dorsal premotor cortex (motor preparation). This sequence was reversed in stutterers: they had early left motor cortex activation followed by delayed left inferior frontal signals. Stutterers seem to initiate motor programming before preparation of the articulatory code. Suppression of motor cortical 20-Hz rhythms, caused by neuronal-related processing of tasks, occurred bilaterally in stutterers and fluent speakers, but the suppression was dominant in the right hemisphere in the stutterers, whereas it was dominant in the left hemisphere in fluent speakers. Accordingly, the right frontal cortex was very active during speech DS but did not generate synchronous time-locked responses. The authors postulate a dysfunctional network of the left inferior frontal cortex and right motor/premotor cortex network in stutterers.

Theories of Stuttering

Stutterers have difficulty controlling their laryngeal sound source. Investigators have shown that the adductor as well as the abductor muscles of the larynx cocontract during dysfluencies, rendering normal speech output impossible. When stutterers try to 'fake' these dysfluencies, or if fluent speakers try to produce these cocontractions, they do not produce them. The electromyographic relationship between laryngeal abductor and adductor muscles is abnormal during moments of the stutterer's dysfluency (reviewed in Bloodstein, 1995). Further, other investigators have observed that stutterers with laryngeal cancer who subsequently underwent laryngectomy and spoke with an electronic voicer were all totally fluent with this electronic voicing apparatus (Rosenfield and Freeman, 1983).

There have been theories that aberrant cerebral laterality of language causes stuttering. There are multiple extensions of theories of handedness, resulting in the exploration of cerebral laterality as a cause for stuttering. Because right handedness reflects left laterality for language, and left-handedness reflects mixed or right laterality for language, some query whether stutterers lack normal language laterality for language. Investigations exploring handedness and laterality testing, ranging from dichotic listening to presentation of visual stimuli to competing hemispheres, have made this theory enticing, but it has not been confirmed. Being left- or right-handed has never been demonstrated to be a necessary or sufficient condition for stuttering (reviewed in Bloodstein [1995] and in Rosenfield [1997]).

Some maintain that stuttering relates to abnormalities in auditory self-monitoring of speech. When loud, broadband noise prohibits a stutterer from hearing his speech, fluency markedly improves. This has also been observed with delayed auditory feedback – a setting in which a stutterer hears what he says 250 milliseconds after he or she speaks. Frequency-altered feedback, in which the person who stutters hears what he or she just said with an altered frequency, also promotes fluency (Kalinowski *et al.*, 2000). Disruption of auditory processing and input is further highlighted by investigations of dichotic presentation of meaningful linguistic stimuli; many stutterers lack the normal left-brain (i.e., right-ear) advantage (Curry and Gregory, 1969; Rosenfield and Goodglass, 1977; Hall and Jerger, 1978).

Other investigators contend that stuttering reflects periodic irregularities in the timing of muscle movements within the speech motor control system (SMCS) (Zimmermann, 1980). When background muscle tension is elevated, as may be the case in DS (Freeman

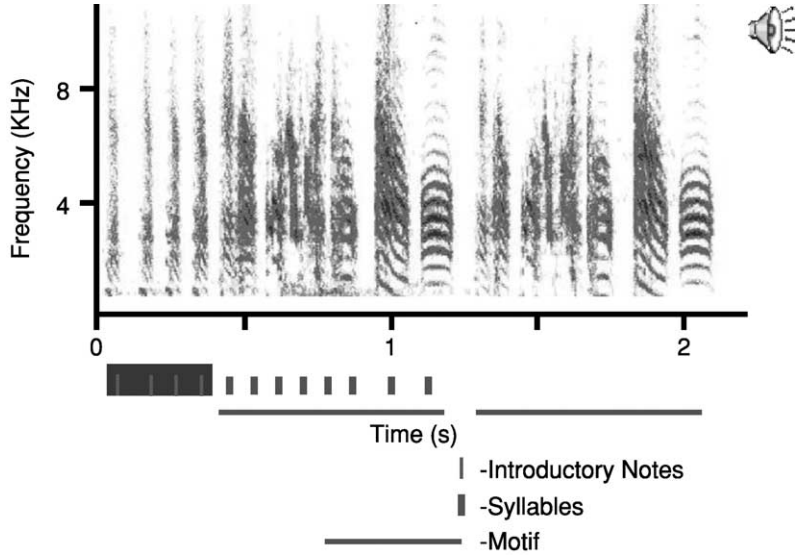

Figure 2 Normal Zebra finch birdsong. These are spectrograms of birdsong, the horizontal axis again reflects time, and the vertical axis reflects frequencies. Note that the Zebra finch bird song is spectrally complex and changes over time, sharing these properties with humans.

and Ushijima, 1978), high-precision adjustments needed during speech are difficult to perform, and movements are not smooth. Stutterers have poor coordination of antagonist laryngeal muscles (Freeman and Ushijima, 1978) and are systematically slower in initiating phonation than are fluent speakers (Bloodstein, 1995). Caruso (1991) suggests that the supplementary motor area is dysfunctional in stuttering, resulting in poor motor planning of the speech output.

The above theories primarily note a difference between a group of stutterers and nonstutterers and posit mechanisms that are not common to all the stutterers, as some of the stutterers do not have the abnormalities noted. One theory, which lacks anatomic or actual physiologic verification, does explain the necessary and sufficient conditions for a dysfluency to occur. It is complex, involves mathematical modeling, and involves control theory. We present here a basic discussion of control theory and its subsequent modeling of the necessary and sufficient conditions for stuttered dysfluencies to occur.

Employing control theory, researchers (Nudelman *et al.*, 1989; Rosenfield *et al.*, 1991) model the speech motor control system as consisting of two nested loops – an inner phonatory loop that produces sound, and an outer linguistic loop that selects the sounds to be produced. Stuttering occurs when the timing between these 'functional loops' is disrupted; evidence indicates that stutterers have a slowing within the outer loop. Some data (Anderson *et al.*, 1999; Foundas *et al.*, 2001) suggests that perisylvian speech-language cortex mediates the outer loop, whereas cortico-striatal-thalamo-cortical circuits mediate the inner loop. Anderson *et al.* (1999) have further corroborated this hypothesis by noting that dopamine blockade and Parkinson disease slow the inner cortical-basal ganglia loop, reducing dysfluency in stuttering.

We have developed an animal model of stuttering (Figures 2–7), hoping to investigate the neurophysiology and neuropharmacology underlying fluent and dysfluent production of birdsong. Whereas human beings have a unique system of language, animals have a system of communication. An animal can signal danger or food to another animal, but it is not able to produce a rich language akin to ours. Within this context, however, some animals do share with us mechanisms of sound production. For instance, Zebra finches (*Taenopygia guttata*) share with human beings many features pertaining to communication and sound production. Both have critical periods during development, during which they must hear the sounds of their respective communication/language they are to produce, and there are specific periods during which they must hear these sounds and practice them. For instance, a Zebra finch must hear songs from its adult tutors by day 65 and practice them by day 90. If disruption in hearing or social isolation prohibits this time course, the animal will not learn normal adult bird song. Similarly, young children must hear and practice the sounds they are to make if they are to acquire the language of their parents.

Zebra finches and humans have a spectrally and temporally diverse sound output (i.e., multiple

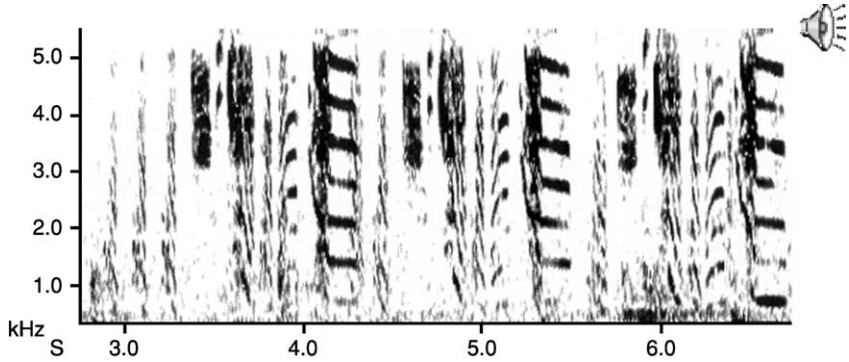

Figure 3 Another spectrogram of normal Zebra finch birdsong demonstrating spectral complexity and temporal changes.

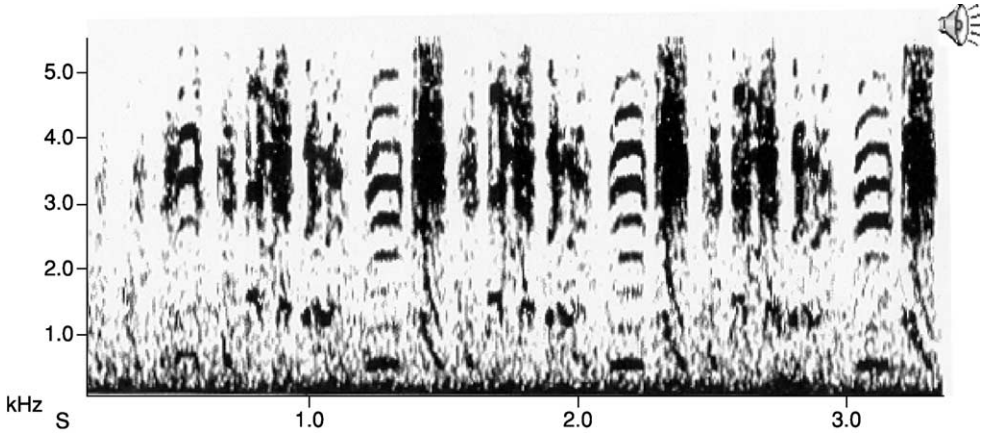

Figure 4 Spectrogram of normal Zebra finch birdsong.

frequencies and changes in frequencies over time). Both the finches and humans have brains that control these sound outputs, and both have an established hierarchy (reviewed in Helekar *et al.*, 2000, 2003).

Our laboratory has demonstrated that ~5% of Zebra finches born to normal parents and raised among normals will have phonatory iterations similar to stuttering. When these birds raise other birds, born to normals, ~60% of these birds stutter. However, although the latter have multiple phonatory iterations, they do not repeat the spectral content of the birds from which they learned to stutter. In other words, they learn to make an error in timing, but not in the frequency domain. They have considerable improvement in these abnormal repetitions when they are placed in isolation or among normal singers. Thus, there appears to be a 'rule to repeat' in birdsong. Some birds (~5%) are born repeaters, perhaps reflecting a genetic mandate. Other birds learn to repeat abnormally and can improve toward normalcy with time but still exhibit stuttering (Helekar *et al.*, 2003).

Zebra finches provide a good animal model of stuttering. Similar to human stutterers, the birds' stuttering is position specific, although it is at the end of the motif, whereas humans stutter at the beginning of sentences and phrases at the end of a motif (see Figures 5, 6 and 7). The birds' and humans' errors are repetitive and nonvoluntary, as indicated by the regularity of the iterations (Helekar *et al.*, 2000). One presumes that the birds, similar to humans, prefer not to stutter, given that the tutored repeaters improve significantly when they are placed among normal singing adults (Helekar *et al.*, 2003). It is not known whether the birds that stutter are distraught by their abnormal iterations or whether their colleagues perceive them as different. We are currently investigating this.

If one disregards the abstract linguistic and cognitive elements of speech and focuses on vocal motor components, songbird vocalization can provide substantial insight into human speech motor control disorders. Similarities between birdsong and speech

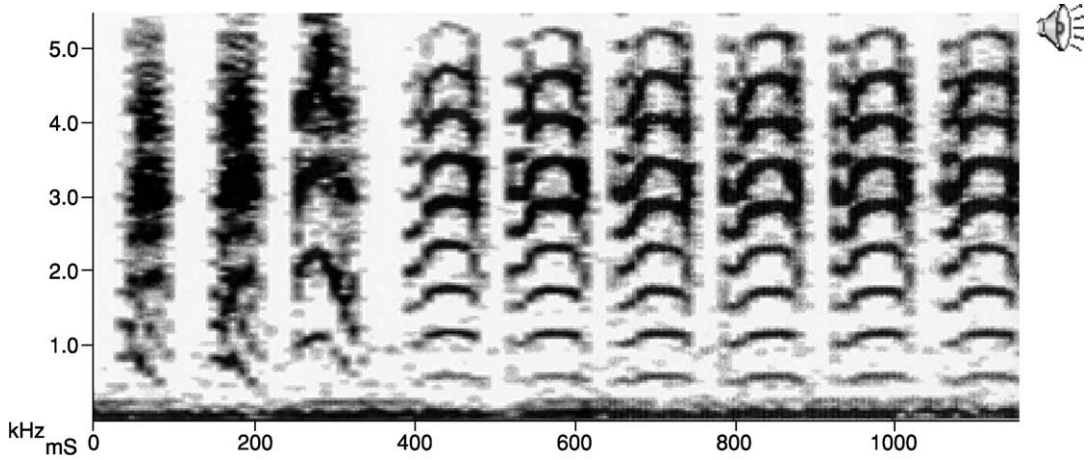

Figure 5 These spectrograms describe phonatory iterations in a bird. Note the repetition of the 'syllable' at the end of each motif.

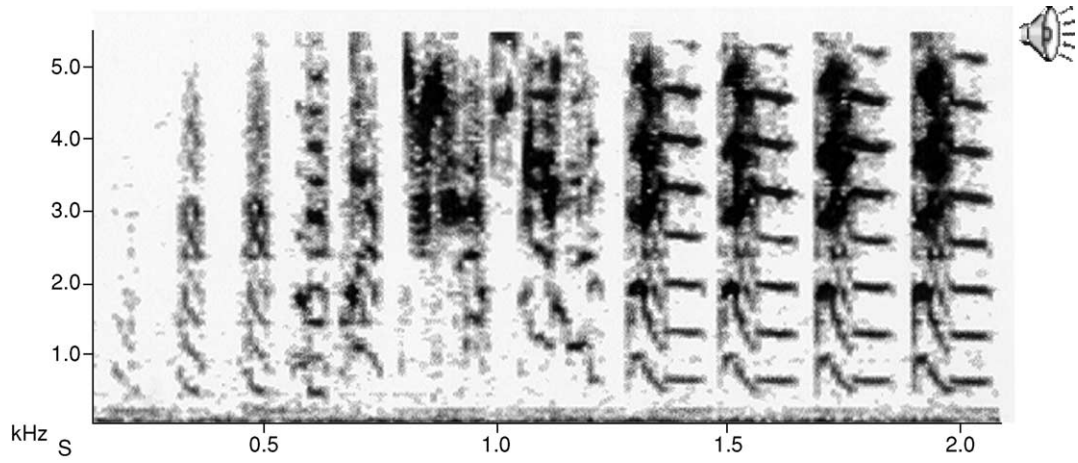

Figure 6 These spectrograms describe phonatory iterations in a bird. Note the repetition of the 'syllable' at the end of each motif.

can help understand the pathophysiology of human dysfluencies and possibly in testing neuromotor theories of stuttering.

Acquired Stuttering

Acquired stuttering (AS) was initially reported by Rosenfield in 1972 and has been substantiated by many other investigators. As noted in that report, AS differs from DS in that a person with the former is dysfluent throughout the sentence, stutters when he or she sings, and is oftentimes not emotionally disturbed by his or her dysfluencies. AS can result from injury to the brain in either hemisphere or in multiple locations. The injury is usually mild. The prognosis is good if the damage is unilateral but less so if brain damage is bilateral. In some AS patients, there may be psychogenic factors (Helm *et al.*, 1978; Rosenfield and Barroso, 2000).

Whereas people with DS have difficulty achieving the target sound (i.e., "ba-ba-ba-book"), those with AS achieve the target sound, but repeat it (i.e., "boo-boo-book"). This difference is often clinically perceptible at the bedside.

Cluttering is sometimes confused with stuttering. Clutterers produce abnormal speech, characterized by excessive speed, repetition, interjections, drawling, disturbed prosody, and monotonous sound. Sometimes, they also have inconsistent articulatory disturbances. Some investigators contend that clutterers also have grammatical difficulties, are hyperactive, and have poor concentration and poorly integrated thought processes. Many clutterers omit sounds, syllables, and whole words and invert the orders of sound, repeat the initial sound, and prolong several syllables of the word. Their rate of speech is usually very rapid, and the listener often complains about the rapidity of the speech. As opposed to people with DS,

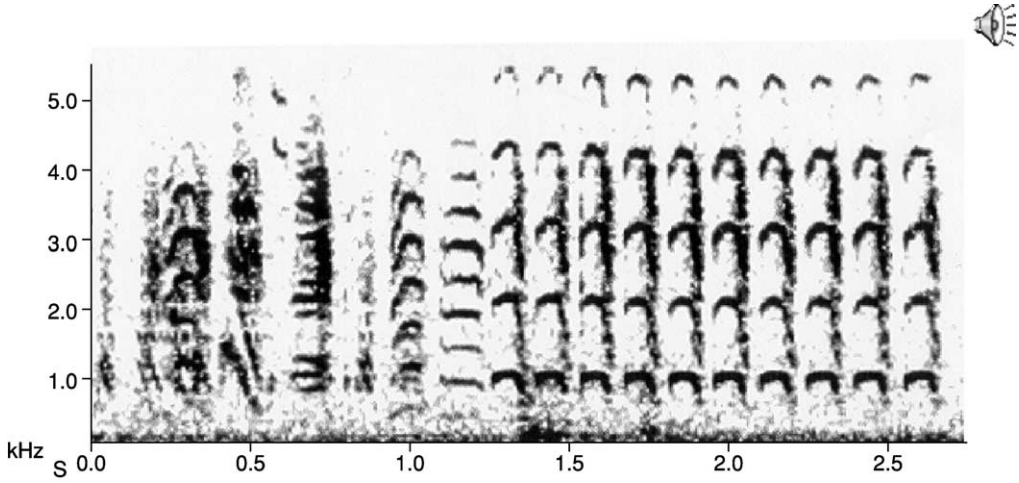

Figure 7 These spectrograms describe phonatory iterations in a bird. Note the repetition of the 'syllable' at the end of each motif.

Table 1 Differential diagnosis of dysfluency

	Developmental stuttering	*Acquired stuttering*	*Cluttering*
Locus of lesion	Unknown	Usually cortical, but subcortical cases have been reported	Unknown
Cause	Unknown	Vascular, metabolic tumor	Unknown
Duration	80% of children outgrow; adults have a worse prognosis	Unilateral: good prognosis; bilateral: poor prognosis	Varies
Locus of dysfluency	Beginning of sentence or phrase	Frequently scattered throughout sentence	Varies
Singing	Fluent	May improve somewhat, but still not totally fluent	Varies
Onset	Subacute	Subacute or acute	Gradual
Reaction to dysfluencies	Anxious	Not anxious	Not usually concerned

clutterers frequently lack concern about their speech deficits (see Table 1; Bloodstein, 1995).

Conclusion

Stuttering is a complex disturbance reflecting abnormal cerebral processing of speech-related signals. There is probably a strong genetic component to stuttering, based at a minimum on studies of twin pairs, but a genetic predisposition may not be sufficient to cause stuttering. The current investigation, employing clinical studies as well as genetic and brain imaging studies, coupled with studies in animals, may provide more insight into this pan-cultural, global disturbance.

Acknowledgments

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See also: Apraxia, Handedness and Language Laterality; Imaging Brain Lateralization.

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Disorders of Morphology

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Introduction

Aphasia can have a profound impact on an individual's ability to recognize the meanings of words and to retrieve the word forms that correspond to particular meanings that he or she wishes to express. It can also affect how words are built up and taken apart in language production and comprehension. The reason for this is that, in English and other languages, most words are not atomic units, but rather are complex structures made up of simpler meaningful forms called morphemes. Consider the word *form* itself. Although in the English language it can be used as a simple monomorphemic word, it also appears in the prefixed multimorphemic forms *inform*, *reform*, and *deform*. It can be suffixed in the words *forming*, *formation*, and *formless*. It can also occur as part of a compound word *freeform*, and in very complex structures such as *well-formedness*. For unimpaired language users, the comprehension and production of such multimorphemic words pose little difficulty. Rather, the morphological ability that is an integral part of language competency provides distinct advantages. It allows us to create and understand a very large number of words from a relatively small number of morphemes. It allows us to co-index words in our vocabulary on the basis of the morphemes that they share, so that words such as *blueberry*, *strawberry*, and *raspberry* are automatically represented as types of *berry*. It also provides us with a substantial head start in the understanding of new words. If one knows that *aphasia* is the loss of language ability as a result of damage to the brain, then it is morphological ability that most likely enables us to infer that the term *aphasics* refers to individuals with this language loss.

In some ways, however, morphological ability can be considered to be a double-edged sword for lexical comprehension and production. The fact that the words *blueberry*, *strawberry*, and *raspberry* may be represented in the mind in terms of the morphemes that they share also carries with it the danger that one may be selected or activated instead of the other. The fact that the morphological complexity can have both advantages and disadvantages for language processing has led to considerable interest among both psycholinguists and neurolinguists, which has contributed a great deal to our overall understanding of the fundamental nature of lexical processing as well as the underlying components of language disturbance in aphasia. In the sections below, we review the current state of knowledge on the types of morphological difficulties that aphasic patients encounter and the manner in which those difficulties differ depending on the area of damage to the brain and the resulting aphasic syndrome. We also consider the ways in which morphological deficits vary depending on the language involved. Languages such as English, Chinese, Finnish, and Hebrew differ markedly in their morphological complexity as well as in the manner in which they form multimorphemic words from simpler units of meaning. We will also see that not all areas of morphology are equally affected. Inflectional morphology, the type of morphology that typically encodes the tense of a verb (e.g., *jump* → *jumped*) or the number of a noun (e.g., *tree* → *trees*), is usually more impaired in aphasia than derivational morphology, which creates words with new meanings and new grammatical categories (e.g., *teach* → *teacher*).

The diversity of morphological difficulties encountered by aphasic patients reveals to us the extraordinary complexity of this aspect of the language system. In the latter part of this article, we explore the ways in which knowledge acquired from the study of aphasic performance can help us to understand the consequences of this complexity for unimpaired lexical processing and how morphological ability may be instantiated in the human brain.

Types of Morphological Errors in Aphasia

Morphological errors, or morphological paraphasias, observed in the performances of individuals with aphasia are classically characterized in terms of omissions and substitutions of bound grammatical morphemes. Thus, inflectional suffixes such as the English tense marker *-ed* are reported as being omitted (e.g., *closed* → *close*) or substituted (e.g. *closed* → *closing*) in aphasic productions. Similarly, derivational affixes such as the prefix *un-* may give rise to omissions (e.g., *undo* → *do*) or substitutions (e.g., *undo* → *redo*).

Importantly, morphological paraphasias rarely violate the well-formedness principles of a language. Thus, erroneous productions are phonotactically legal, i.e., they result in phonological sequences that exist in the language. They also do not deviate from grammatical well-formedness. For example, an inflectional suffix will be replaced by another inflectional suffix (e.g., *he danced* → *he dances*), but not by a derivational suffix (*dancer*). Furthermore, as

this example illustrates, a verbal inflection will be exchanged with another verbal inflection. Substitutions are thus generally within category (here inflections) and within paradigm (here verbal suffixes). This clearly indicates that aphasic patients have not lost their linguistic knowledge. Rather, they are unable to select the required morpheme during language production.

With respect to inflectional morphology, it has been shown that nouns and verbs may be spared or impaired differentially. One patient may have greater difficulty with inflected forms of verbs than of nouns (e.g., Caramazza and Hillis, 1991; Tsapkini *et al.*, 2002; Shapiro and Caramazza, 2003a), while another may exhibit the opposite pattern (Shapiro *et al.*, 2000). However, selective difficulties with verb vs. noun processing may also derive from impaired semantic knowledge about actions (e.g., Pulvermüller, 1999; Tranel *et al.*, 2001).

While aphasic patients tend to omit or substitute lexical constituents in compound words (e.g., *horseshoe* → *horse* or *horse-iron*), as observed for English (Libben, 1993, 1998; Badecker, 2001), Italian (Delazer and Semenza, 1998), and Chinese (Packard, 1990), they can exhibit a dissociation in their ability to process closed-class morphology in compounds vs. noun phrases. Thus a study of Italian-speaking agrammatic aphasics has shown that whereas patients were impaired in their production of noun–adjective agreement in noun phrases (e.g., *febbre strana* 'strange fever'), their performance improved significantly on analogous compounded constructions (e.g., *febbre gialla* 'yellow fever') (Mondini *et al.*, 2002). This result indicates that inflectional morphology is more stable within lexicalized complex structures such as compounds than within a corresponding syntactic phrase and bears on the theoretical import of the dissociation observed between intact morphological performance on words produced in isolation vs. impaired morphological performance on words produced within a sentential context (Nespoulous *et al.*, 1988; Caramazza and Hillis, 1989; De Bleser *et al.*, 1996). Indeed, selectively impaired morphology in the production of sentences, but not in isolated words, points to an underlying deficit at the syntactic level of processing. However, the reported existence of impaired performance on words produced in isolation (e.g., Miceli and Caramazza, 1988) is not amenable to such an interpretation and casts doubt on a strictly syntactic account of impaired functional categories. Such an account is nevertheless attractive because it offers an explanation of why not all types of inflectional affixes are equally affected in aphasia. For example, in a series of recent studies investigating the performance of Hebrew- and Arabic-speaking agrammatic aphasic patients, tense was found to be impaired whereas (subject–verb) agreement was found to be spared (Freedman and Grodzinsky, 1997, 2000; Friedman, 2000, 2001). While tense has been shown to be more vulnerable than agreement across several languages (e.g., Goodglass, 1993 for English; Höhle, 1995 for German; Benedet *et al.*, 1998 for Spanish; Kolk, 2000 for Dutch), other studies did not replicate this finding (e.g., Stavrakaki and Kouvava, 2003 for Greek). These inconclusive results underscore the role of crosslinguistic variation in the study of morphological breakdown in aphasia.

Do Patterns of Morphological Impairment Differ across Languages?

Until the 1980s, our understanding of morphological impairments in aphasia, indeed of aphasic deficits in general, was largely based on investigations of English-speaking patients. Yet the English language features a relatively poor inflectional morphology and relies heavily on word order to assign argument structure (e.g., to assign the role of agent to a noun), in contrast to, for example, Turkish, a highly agglutinative language that relies mainly on case marking to assign sentence roles. The Cross-Language Aphasia Study by Menn and Obler (1990a) was the first systematic study that brought together narrative data across typologically differing languages, including Finnish, Hebrew, and Japanese. Parallel analyses of the 14 corpora of spontaneous speech presented in that study demonstrated the role of language variation in the manifestations of morphological impairments in agrammatism, a type of disorder commonly associated with Broca's aphasia.

Crosslinguistic differences have also been central to the account of aphasic deficits proposed by Bates and collaborators (for a review, see Bates *et al.*, 1991). Evidence from both research groups indicates that the degree and nature of morphological deficits vary considerably from one language to another. According to Bates *et al.*, error probability is directly related to the strength of a particular form in a language. Thus, in Hungarian and Turkish (MacWhinney *et al.*, 1991), case marking was found to be well preserved (a finding also reported by Niemi *et al.*, 1990 for Finnish). Furthermore, on the receptive side, grammatical redundancy (the presence of several different cues to sentence comprehension, including inflectional markers) was shown to augment comprehension performance to near-normal levels, leading the authors to conclude that the accessibility of morphological cues is reduced in aphasia. In sum, on that account morphology will be spared or impaired relative to the importance of a given marker

in the language and depending on the processing resources still available to the patient. These resources may be reduced due to perceptual, attentional, and/or mnemonic limitations. The interpretation put forth by Menn and Obler (1990b) was that agrammatic aphasic patients suffer from an impoverished capacity to integrate information required by complex syntactic computations, resulting in "degraded or blurred specifications of bound grammatical morphemes." Blurred specifications result in misselection errors and heavily degraded specifications result in the use of default forms.

Much debate has surrounded the issue of how omissions and substitutions pattern across languages in aphasia. It has been observed that in languages such as English, omissions of affixes tend to be more frequent than substitutions, while in languages such as Greek (Kehayia *et al.*, 1990), one only finds substitutions. This has led to the claim that problematic affixes are omitted only if the resulting form is a word in the language (e.g. *book* is still a word when omitting the plural marker *-s* in *books*), otherwise the affix is substituted. In Greek, for example, the form *anthrop-* resulting from the omission of the suffix *-os* in *anthropos* 'man' is not a word, as is the case with all unaffixed nominal stems, and would therefore never be produced by aphasic patients. Legally bare, or zero-inflected, forms have been claimed to represent the default form in aphasia (Grodzinsky, 1984); however, patients with a morphological deficit do not systematically revert to omissions when the resulting form is a word in the language. For example, a Polish-speaking aphasic patient having difficulties with the past tense form of verbs did not produce the bare form of the imperative, but rather misselected another inflected form of the verb (Jarema and Kadzielawa, 1990). This speaks against an account according to which patients systematically omit bound morphemes when the language allows bare forms and points toward an interaction with other factors, such as form frequency, but not affix frequency (Faroqi-Shah and Thompson, 2004; but for the opposite pattern, see Centeno *et al.*, 1996 for Spanish and Penke, 2003 for German) or distance from the target item, as measured by the number of features that separate the erroneous item from the target (Menn and Obler, 1990b).

What Do Morphological Deficits in Aphasia Tell Us about Normal Morphological Processing?

Without a doubt, most research on morphological processing in healthy adults has centered on the question of whether multimorphemic words are processed in terms of their constituent morphemes. Positions regarding this question have ranged from the view that all multimorphemic words are routinely and automatically decomposed into their constituents in word recognition (Taft, 2004) to the view that morphological decomposition is simply a backup procedure to be used when whole-word recognition fails (Butterworth, 1983). Over the past years, a number of intermediate positions have emerged. One position is that whole-word processing and morphological processing are carried out simultaneously (Schreuder and Baayen, 1995) as separate routes. For high frequency words, the whole-word route typically 'wins the race' whereas for less frequent words, particularly those with high frequency morphological constituents, the decomposition route has an advantage. This basic notion – that some types of word are decomposed but others are not – has been extended to a wide variety of morphological distinctions, including derivation vs. inflection, regularity vs. irregularity, and semantic transparency vs. semantic opacity.

Evidence from aphasia has a special role to play in our understanding of whether such distinctions do indeed play a role in determining whether words are processed as wholes or in terms of their constituent morphemes. The reason for this is that, in contrast to the apparently effortless and errorless manner in which multimorphemic words are processed by normal healthy adults, persons with aphasia often show selective difficulty on particular types of morphological constructions as well as error patterns that reveal underlying processes of morphological decomposition.

The performance dissociations seen in aphasia between derived words and inflected words serve as an excellent first example, although the exact characteristics that distinguish between inflectional morphology and derivational morphology are still a matter of debate (see Bybee, 1985). It seems that inflected words would be much more likely to be composed and decomposed on line than derived words. Inflectional morphology has been described (Anderson, 1982) as that aspect of morphology that is relevant to syntax and, as such, involves obligatory adjustments to a morphological stem so that it 'fits' into a sentence. Derivational morphology, on the other hand, is essentially a type of word formation process, resulting in either the creation of a word with a new meaning or of a new word having a different lexical category. These new words would seem much more likely to be represented in a manner that is distinct from their inflectional counterparts. The available data from aphasia seems to support such a view. There is evidence that derivational and inflectional morphology can, for example, be selectively impaired. Miceli and Caramazza (1988) reported the

case of F.S., an Italian-speaking patient who showed inflectional errors both in spontaneous speech and in repetition. F.S.'s performance on derived words, on the other hand, was unimpaired. Moreover, F.S. did not only show difficulty with inflected words. He also produced words that involved inappropriate combinations of morphological stems and affixes. The authors reasoned that such errors could only be possible if the multimorphemic inflected forms were composed on line.

In general, aphasic patients have much more difficulty with inflected words than with derived words, suggesting that the former are much more likely to be composed and decomposed on line. However, derived words can also be selectively impaired in aphasia. De Bleser and Bayer (1986) reported the case of a patient who showed difficulties with derived words but not inflected ones. Luzzatti and de Bleser (1996) reported a patient, M.G., who showed unimpaired lexical processing for inflected and derived words but very poor performance on compounds. Another patient in the same study, D.R., also showed difficulties with compounds, but in this case with impaired performance on inflected but not derived words. Two unusual cases of a selective deficit in derivational morphology were reported by Marangolo *et al.* (2003). The two patients presented in that study had similar right hemisphere lesions and showed intact linguistic abilities at all levels, including inflectional and derivational morphology, with the exception of a deficit in deriving nouns from verbs (but not nouns from adjectives, or verbs from nouns). Both patients substituted target deverbal nouns with participles. For example, for the verb *liberare* 'to free', they produced the participle *liberato* 'set free', instead of the noun *liberazione* 'liberation', but had no difficulty in producing the infinitive *liberare* when presented with *liberazione*. These results are interesting in several respects. First, they confirm previously reported dissociations between inflectional and derivational impairment; second, they bring to light the existence of highly selective deficits in the domain of morphology; and third, they reveal that a lesion in the right hemisphere **can** induce a morphological impairment and that the right hemisphere **does** contribute to morphological processing. Evidence from these studies thus suggests that the nature of morphological deficits in aphasia can be quite specific and correlate with the linguistic distinctions among the categories of inflection, derivation, and compounding.

Inflected words are the best candidates for obligatory morphological decomposition, particularly when they involve regular suffixation (Clahsen, 1999; Pinker, 1999). Studies have largely focused on past tense formation in regular verbs (e.g., *greet-greeted*) vs. irregular verbs (e.g., *teach-taught*). Patients are reported to have difficulties with regular verbs more than irregular ones, and vice versa (Ullman *et al.*, 1997; Marslen-Wilson and Tyler, 1997, 1998). The regular–irregular dissociation has also been reported to co-occur for both verbs and nouns (Miozzo, 2003). In that study, the patient produced regular forms such as *walked* and *gloves* accurately, but had difficulties with irregular forms such as *found* and *children*. These dissociations demonstrate that patients can be selectively impaired for either regular or irregular inflection.

The data from aphasia also offers evidence that derived words may be processed online in terms of their morphological constituents. Libben (1990) described an agrammatic patient, J.Z., who produced repetition errors with derived words such as *irregularity*, but had no difficulty with ones such as *unhappiness*. The crucial difference between these subtypes of derivation is that in the case of *irregularity* the addition of affixes to the root involves segmental and stress changes. In the case of words such as *unhappiness*, the derivational prefixes and suffixes are simply added to the root. The author concluded that J.Z.'s decreased performance on the former type of derived words resulted from the increased computational demand created by the nonneutral affixes in on-line composition. This conclusion was supported by the fact that J.Z. repeated words such as *irregularity* as 'un-regular-ity,' with unchanged stress and an unchanged prefix.

Studies of aphasic performance with compound words, as well, show evidence of automatic and obligatory morphological decomposition. Semenza *et al.* (1997) found that, in naming compound words, aphasic errors typically involve the erroneous production of another compound, rather than an inflected or derived word. This suggests that even though performance is impaired, aphasics have access to the morphological structure of compound targets. Badecker (2001) reported the case of an aphasic patient whose compound naming was characterized by the presence of reversal errors (e.g., *firewood* → *woodfire*). For such errors to occur, it was reasoned that the compound words would have to be represented and processed in terms of their constituent morphemes.

One category of compound word that might be particularly revealing of underlying processes involved in morphological computation is the category of semantically opaque compounds. Such compounds, e.g., *Sunday*, are those for which the whole word meaning is not obviously related to the meanings of both morphological constituents. Thus, an opaque compound such as *Sunday* may be contrasted

to a more semantically transparent compound such as *sunburn*. It has been claimed that only transparent compounds are automatically decomposed into their constituents. Some evidence from aphasia, however, suggests that, although there may be a fundamental difference between semantically transparent and opaque compounds, that difference may result from the fact that both are automatically and obligatorily decomposed in lexical processing. Indeed, Blanken (2000) found evidence of morphological composition for both types of compounds in German. A study by Libben (1998) reported a patient, R.S., who had particular difficulty processing opaque compounds. The paraphrase task revealed that her comprehension of opaque compounds such as *butterfly* involved the activation of both whole word and constituent meanings, so that she described it as "a pretty fly, it's yellow." The *yellow* descriptor was analyzed as being related to the constituent *butter*, whereas the descriptor *pretty* referred to the whole word meaning. A similar effect was reported by McEwen *et al.* (2001). They examined the deep dyslexic patient J.O., who also showed evidence of whole word and constituent blending in a reading task. Thus, in reading *pancake*, she produced 'cake, breakfast, syrup.' Both of these studies suggest that difficulties encountered in the processing of semantically opaque compounds may result from problems in 'turning morphemes off' rather than 'turning them on' (see Semenza and Mondini, forthcoming for a complete review of compound processing in aphasia).

Taken together, the studies we have reviewed point to the view that multimorphemic words are not processed as atomic units, but rather, their constituent subunits are routinely and automatically activated during word production and comprehension. This brings us to the question of why aphasic patients may have selective difficulties with inflected, derived, and compound words. We suggest the following possibility: in the case of inflected words, which are most often transparent in form and in meaning, the morphological deficit is likely to involve difficulties of morpheme access and combination. This can also be the case in derivation, particularly for low frequency words and those that involve phonological changes at the morpheme boundary. As we have suggested above, however, the evidence from semantic transparency effects in compounds suggests that a lexical processing impairment can result not only from difficulties in activating morphemes, but also from difficulties in deactivating them (Libben *et al.*, 2004). Thus, as we have noted above, automatic morphological processing ability can be considered to be a 'double-edged sword' for the language processing system, and a considerable challenge for persons with aphasia.

Do Patterns of Morphological Impairment Differ across Aphasic Syndromes?

Morphological deficits are found in two major aphasic syndromes: Broca's, or nonfluent, aphasia and Wernicke's, or fluent, aphasia. Morphological paraphasias are characteristic of sentence production and comprehension, as well as of single-word naming, reading, writing, and repetition. However, whereas morphological impairments are considered to be one of the defining feature of agrammatism in Broca's aphasia, this is not the case with paragrammatism in Wernicke's aphasia, a clinical disorder characterized by the massive production of paraphasias of all types (semantic, phonological, and morphological). This asymmetry is even more apparent in the case of jargonaphasia, a severe form of Wernicke's aphasia, in which patients produce affixed neologisms in which stems of words are abstruse but feature preserved (i.e., recoverable and contextually appropriate) inflections (e.g., Butterworth and Howard, 1987; Caplan *et al.*, 1972), as well as derivations (e.g., Semenza *et al.*, 1990). Affixes also appear to be preserved in the misspellings of patients suffering from an acquired dysgraphia. It was thus observed that word stems, but not affixes, are spelled erroneously (for a discussion, see Badecker and Caramazza, 1998). Probing Dutch- and English-speaking Broca's and Wernicke's aphasic patients, Bastiaanse and Edwards (2004) found that both groups of patients produce finite (inflected) verbs less accurately than infinitives. However, Broca's aphasics made more inflectional errors, while Wernicke's aphasics made more semantic errors.

In sum, morphological deficits do vary across clinically defined aphasic disorders, which leads to the question whether brain areas typically damaged in a given syndrome subserve morphological processing.

Is There a Morphology Center in the Brain?

Dissociations in the processing of multimorphemic words, brought to light by numerous behavioral studies over the past two decades, have spurred the question of whether different morphological operations involve different anatomical substrates. The classical lesion-based approach to the study of the relationship between language and the brain has proven problematic on several accounts. First, the same language disorder can be induced by varying lesion sites, and second, a

specific lesion can induce different aphasic profiles. Thus the type of deficit does not unequivocally predict the locus of the lesion, and vice versa.

The development of imaging techniques, such as fMRI (functional magnetic resonance imaging), has raised hopes about uncovering the neural correlates of language functions. Imaging studies probe the loci of cerebral activation *in vivo* while manipulating linguistic dimensions that yield differential performances and are associated with distinct neuropathologies. Two such dimensions have received much attention in both neurologically healthy and brain-damaged populations: grammatical category, more specifically the verb–noun contrast, and morphological regularity, more specifically the regular vs. irregular past tense contrast. However, due in part to the as yet unresolved shortcomings of imaging techniques (e.g., poor temporal resolution, limitations of the subtractive method in the case of fMRI; for a discussion see Démonet *et al.*, 1996), results from these studies remain inconclusive. Moreover, whether aphasic patients recruit the same neural substrate as non-brain-damaged individuals when processing multimorphemic words remains an open question. Overlap, albeit partial, between selective cortical activation in neurologically healthy individuals processing inflected verbs and lesions in patients with impaired verb morphology has been viewed as supporting the hypothesis that the same neural system is involved (Tyler *et al.*, 2004).

Several recent studies have attempted to address the issue of cerebral activation in aphasic performance. Laine *et al.* (1999), for example, demonstrated in a PET (positron emission tomography) study that decoding complex (regular case-inflected) words relative to simple words in Finnish increases activation in Broca's area, suggesting that the left anterior dominance reported for the production of regular morphology (Ullman *et al.*, 1997) also holds for comprehension, even though production and comprehension deficits can dissociate (Miceli, 1999). Ullman *et al.* (1997) reported a patient with an anterior aphasia showing more difficulties with the **regular** past tense, while patients with a posterior aphasia showed the opposite pattern, i.e., more impaired irregular forms. By contrast, Shapiro and Caramazza (2003b) described an agrammatic patient with a lesion primarily in the left frontal lobe who exhibited more difficulty in producing **irregular** forms of verbs, thus contradicting the hypothesis that anterior damage results in greater difficulty with regular forms.

In light of these and other conflicting results, it thus appears that linking fine-grained distinctions of morphological processing to specific brain regions may be premature. However, as we have seen throughout this discussion, disorders of morphology in aphasia show that aphasic syndromes map quite specifically onto distinctions in morphological structure. Our expectation is that, as brain-imaging techniques develop, we will find that the relation between morphology and the brain results primarily from the interaction of computational demands made by different aspects of morphological structure and the availability of those specific computational resources subsequent to brain damage.

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Disorders of Sign Language

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Sign Language Breaks Down by Linguistic Levels

Sign languages, like spoken languages, are not just collections of symbols but complex systems of communication in which smaller units of structure are organized on multiple levels. The units, and the principles of their combination, differ according to the level at which they operate: phonetics, phonology, morphology, syntax, semantics, or discourse. Sign language can be disrupted at one or more of these levels due to brain injury or disease.

Most data on disorders of sign language come from signers of American Sign Language. A number of signers with Parkinson's disease, left hemisphere brain damage, and right hemisphere brain damage have been studied. Rigorous clinical tests of their language skills as well as analysis of their spontaneous language use have revealed that even though sign language is quite unlike spoken language in its physical properties, it breaks down according to the same linguistic properties that spoken language does. Although signs are dependent on arm and hand movements, Parkinson's disease, a movement disorder, disrupts these movements only at the phonetic level. Although signing makes extensive use of visuospatial processing, a domain generally handled by the right hemisphere, it is left hemisphere damage that causes the most severe disruption to signing. Right hemisphere damage leaves grammar intact but disrupts language at the discourse level. For the most part, disorders of sign language and disorders of spoken language that arise from similar causes are manifested in similar ways. A description of the nature of language breakdown at each level follows.

Parkinson's Disease: Disruption of Phonetics

Parkinson's disease involves the degeneration of dopamine-producing cells in the brain, leading to problems with the control of movement. The dysfunction of motor processes supporting spoken language in people with Parkinson's results in errors at the level of articulation. This is also true for sign language. Timing, rhythm, volume, and melody in the execution of language may be disrupted, but deeper levels of linguistic structure are spared.

Signs are formed from sublexical contrastive specifications for handshape, movement, orientation, and location. Case studies of signers with Parkinson's have shown that these signers preserve the required phonemic contrasts in the sublexical parameters but alter other features of production. The overall effect of this alteration is that the signing space becomes smaller and movements are less pronounced. For example, the handshape of a sign may be produced in a lax manner, with fingers less tightly closed than they should be (see **Figure 1**), but it will not be replaced by another, phonologically distinct handshape. Another characteristic of Parkinsonian signing is the distalization of joint movement. In this case, a sign that normally moves outward with a motion of the elbow will be produced instead with an outward motion of the wrist. The proper, contrastive direction of movement is preserved, but in a way that demands less energy and coordination.

Disruptions to temporal aspects of signing are also observed in signers with Parkinson's disease, imparting a monotone quality. In normal signing, handshape changes that occur within signs (i.e., the change from an open to a closed hand in the sign MISS) are spread over the entire duration of the sign, while handshape changes that occur between signs (i.e., the change from an open hand in WILL to a closed hand in WORK) take a smaller proportion of the transition time. Signers with Parkinson's spread intersign handshape changes over the entire transition between signs, making them temporally indistinguishable from within-sign changes. Pauses between signs are also slowed, making them look more like phrase and utterance-final pauses. In signers without Parkinson's disease, the durations of these three types of pauses are much more distinct.

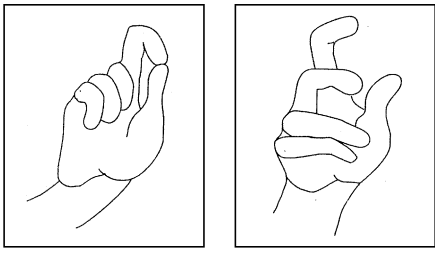

Good 'b0' handshape Lax 'b0' handshape

Figure 1 Well-articulated handshape and correct but poorly articulated handshape produced by signer with Parkinson's disease. On the left is a good 'b0' handshape, and on the right, a lax 'b0' handshape. Adapted from an article by Brentari D & Poizner H (1994). Published in *Language and Cognitive Processes 9*, by Psychology Press Ltd. (http://www.psypress.co.uk/journals.asp).

Aphasia: Disruption of Phonology, Morphology, Syntax, and Semantics

Damage to certain areas in the left hemisphere of the brain results in aphasia – a significant impairment in producing or understanding language. While aphasia can be accompanied by problems with perception, motor skills, or ability to use symbols, it can also occur independently of these problems. Aphasic behaviors display evidence of a language malfunction at the level of grammar.

Although aphasic syndromes do not conform to a one-to-one correspondence between location of brain injury and type of language deficit, they have been classified into two general categories: expressive and receptive. Expressive aphasia, also known as Broca's aphasia, is characterized by slow, effortful production and lack of closed-class words and grammatical markers, while comprehension is left relatively intact. Expressive aphasia occurs with damage to the inferior frontal lobe. In receptive aphasia, also known as Wernicke's aphasia, speech is fluent but peppered with odd word choices and grammatical mistakes. Comprehension of speech is also impaired. It is associated with damage to the posterior temporal lobe near the sylvian fissure.

Poizner *et al.* (1987) closely analyzed the language abilities of three signers with left hemisphere damage and three with right hemisphere damage. One of the left-brain-damaged signers, who had a large left frontal lesion, exhibited a classic case of expressive aphasia with severe dysfluency and complete lack of grammatical inflections in her signing. The others, whose lesions were more posterior, fit the profile of receptive aphasia. Since the Poizner *et al.* (1987) study, the number of brain-damaged signers studied linguistically has more than doubled.

Phonology

Phonological disorders affect the constrastive structure of signs rather than features of their execution. Unlike signers with Parkinson's disease, who modify sublexical components of signs without altering their distinctive features, aphasic signers make complete

substitutions in handshape, location, and movement. Such substitutions are referred to as phonemic paraphasias. The most common phonemic paraphasia involves a substitution in the handshape specification for a sign. Figure 2 shows one such error, in which the correct 'L' handshape in the sign SISTER was replaced by an 'F' handshape. In this error one distinctive feature has been replaced with another. By contrast, in the example from Parkinson's disease (see Figure 1), distinctive features are all preserved, although their articulation is distorted.

Morphology

In American Sign Language, multiple morphemes are pronounced simultaneously. For example, a plain lexical verb is inflected for object agreement by moving toward a location in space associated with the object. The grammatical function of aspect is indicated by combining a lexical verb with a specific movement pattern. Aphasic signers may fail to use agreement or aspect morphology at all, as in the case of the expressive aphasic, or they may use the morphological system incorrectly. One signer with posterior damage had signing that was full of morphological errors such as the inappropriate use of the morpheme for habitual aspect, resulting in the ungrammatical sign *BRILLIANT[habitual aspect], meaning something like 'always brillianting.'

Syntax

Sign language syntax involves two types of behavior that is known to be served by the right hemisphere: facial expressions and spatial cognition. In signers, damage to the left hemisphere does not affect these behaviors in general, but it does disrupt them when they are used for linguistic purposes. A limited set of facial expressions is used to indicate syntactic functions and relations between clauses. For example, a conditional clause is marked by an eyebrow raise that lasts the duration of the clause. Aphasic signers can fail to produce this type of facial expression but have no problem making facial expressions to show emotions and attitudes. Signers with right hemisphere damage, in contrast, lack affective facial expressions but use grammatical ones correctly.

Syntactic roles are set up at locations in the space in front of the signer. Signs for pronouns and verbs refer to these roles by pointing to those locations. While right hemisphere damage can cause severe problems with nonlinguistic visuospatial processing in signers, it is the left hemisphere damage of aphasia that disrupts the use of space in syntax. Aphasic signers may fail to point to the relevant locations at all, or they may point to the wrong locations (see Figure 3).

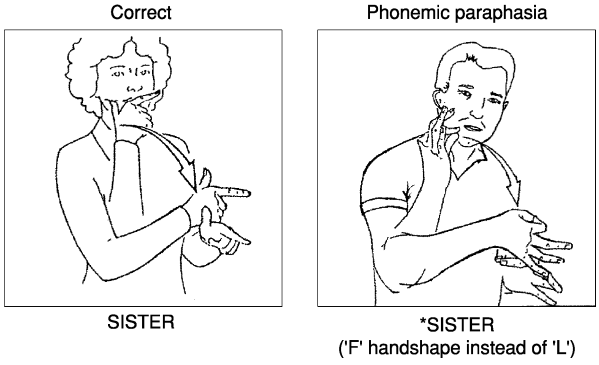

Figure 2 Phonemic paraphasia. The aphasic signer had replaced the correct 'L' handshape with an 'F' handshape. The picture on the left shows someone signing SISTER correctly; the picture on the right shows *SISTER signed by someone with phonemic paraphasia, who uses the 'F' handshape instead of 'L.' Reprinted with permission from Elsevier from Corina D P, Poizner H, Feinberg T *et al.* (1992). 'Dissociation between linguistic and non-linguistic gestural systems: a case for compositionality.' *Brain and Language 43*, 414–447.

Semantics

Left-hemisphere-damaged signers can also have deficits at the level of semantics. These deficits can take the form of semantic paraphasia, in which an intended sign is replaced by another sign related to it in meaning. For example, BED may be signed for CHAIR, or YEAR may be signed instead of HOUR. In these cases, the signs are correctly formed but miss the target meaning. In a different type of semantic error, one signer produced a semantic blend. He made the sign for TREE, but with the 'G' handshape from the sign GREEN instead of the proper, open handshape. In this case the form produced is not an actual sign but a blend of two signs with related meanings.

In general, aphasia in sign language is evidence of a dissociation of the linguistic facts of sign language from the physical facts. Left-hemisphere-damaged signers can often perform elaborate meaningful pantomime without any difficulty, but their signing comes out labored and full of errors. Aphasia affects the ability to communicate through signs only if those signs are part of a linguistic system. Further, it affects the system in specific ways, interpretable with respect to levels of structure.

Right Hemisphere Damage: Disruption of Discourse

For spoken language, right hemisphere damage is not associated with disruption of speech or grammar, but it can cause problems for linguistic communication at the level of discourse. People with this type

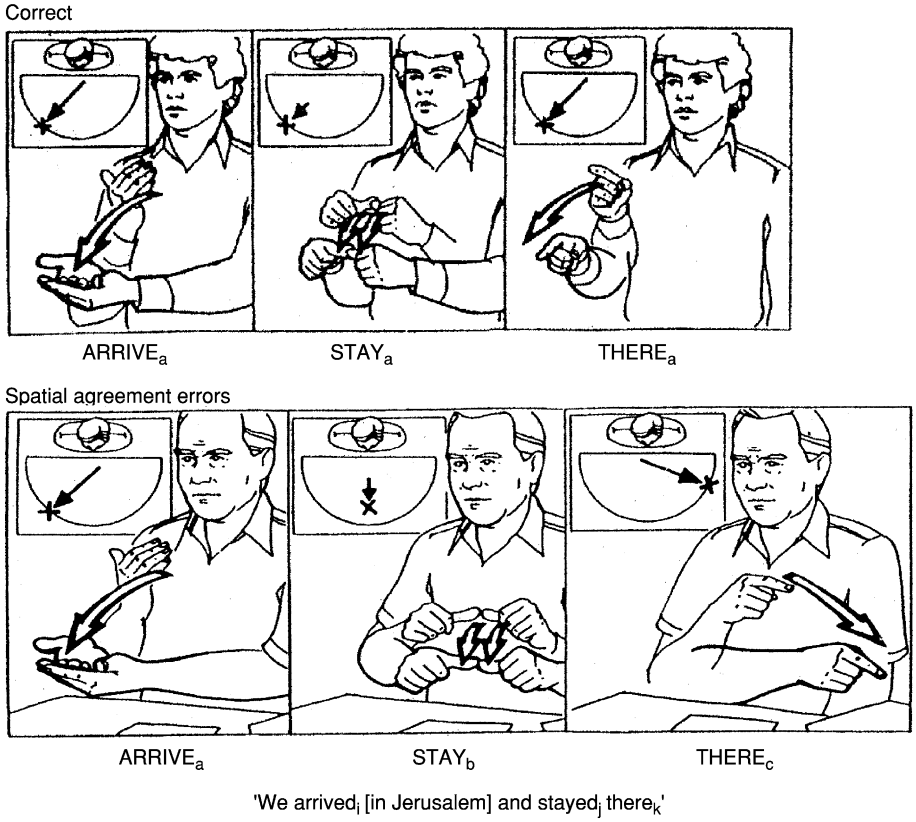

Figure 3 Incorrect use of spatial agreement as performed by aphasic signer. The correct use is shown in the upper strip: left pane: ARRIVE$_a$; center pane: STAY$_a$; right pane: THERE$_a$. Spatial agreement errors are shown in the lower strip: left pane: ARRIVE$_a$; center pane: STAY$_b$; right pane: THERE$_c$. The sentence being signed is 'We arrived$_i$ [in Jerusalem] and stayed$_j$ there$_k$.' Adapted from Poizner H, Klima E S & Bellugio U (1987). *What the hands reveal about the brain.* Published by the MIT Press.

of damage may be difficult to understand because they speak in a flat, affectless manner without appropriate prosody or facial expressions. They also often fail to make connections between topics, or they go into too much detail in their descriptions. Their visuospatial abilities are also often impaired, something that doesn't necessarily have an effect on spoken language but that has the potential to cause unique problems for a spatially dependent sign language.

As is the case for spoken language, the quality of sign language discourse is impaired with right hemisphere damage. Signers with right hemisphere damage perform normally on tests of phonological structure, and their spontaneous production is grammatical, but their narratives sometimes have a confusing, unnatural quality. They may include frequent off-topic comments and display unusual attention to detail. These narratives also seem flat, lacking in emotion and personal involvement, because, as mentioned above, affective facial expressions are absent.

Right hemisphere damage may also lead to a lack of cohesion in discourse because spatial reference is not maintained. The agreement of verbs with the spatial locations of their subjects and objects is a syntactic function operating at the level of the sentence. The consistency of those positions across sentences is a function of discourse. One signer with right hemisphere damage was reported to inflect verbs for agreement correctly within sentences, but she was unable to maintain locations for referents over the course of a narrative.

Sign Language and Spoken Language

The overall pattern of language disorder in sign language closely matches that of spoken language. The match is not perfect, however. The location of lesions resulting in receptive aphasia for sign language appears to be more posterior than for spoken language, and right hemisphere damage does sometimes result in comprehension deficits for spatialized syntax. There is evidence from studies of normal signers that some degree of neural reorganization of language takes place in people who acquire sign language early in life, so it is to be expected that brain damage will affect sign language differently in some cases.

However, similar types of brain damage overwhelmingly lead to similar outcomes. Parkinson's disease disrupts signing at the phonetic level, left hemisphere damage disrupts it at grammatical levels, and right hemisphere damage disrupts it at the discourse level.

See also: Aphasia Syndromes; Sign Language: Interpreting; Sign Language: Overview.

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Dissimilation

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Definition, Exemplification, and Terminology

The concept of dissimilation entered the study of grammar in the second half of the 19th century, probably from rhetoric, where it had been well established for the description of variation, i.e., the avoidance of repetition of the expression of grammatical form, the change of foot structure in the verse, etc.

The term 'dissimilation' was formed in opposition to its apparent counterpart 'assimilation' as a learned derivation. It refers to the change in which one of two phonological elements (phoneme, prosodic element) that are equal in at least one crucial feature and that are contained in a larger domain (word, stem, accent group) changes at least this one crucial feature under the influence of the second element in order to render the two elements unequal. A dissimilating feature must be contrastive in a given language (Grammont, 1895, 1933; Kiparsky, 2003).

A stock example comes from the Romance languages: Lat. *peregrinus* undergoes dissimilation of the two liquids, changing the first into a lateral in Fr. *pèlerin* and Ital. *pellegrino* (cf. also Engl. *pilgrim* and Ger. *Pilger*), but keeping the two rhotics in Span. *peregrino*. The well-known sound-law-like example for dissimilation is Grassmann's Law in Ancient Greek and Sanskrit where a word

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containing two aspirated consonants dissimilates the first of them to its unaspirated counterpart: cf. AGr. *thrík-s* 'hair, NomSg' vs. *trikh-ós* 'hair, GenSg.'

These two examples differ in some important respects: the Romance liquid dissimilation affects equal sounds and is sporadic and a diachronic change, whereas Grassmann's Law expresses a synchronic limitation, is regular and, moreover, affects different sounds and dissimilates them with respect to one apparently important characteristic, namely, aspiration.

Dissimilation is frequently opposed to assimilation, but as will be shown throughout the remainder of this article, these two phenomena differ in nearly all respects, and the only force keeping them together is the opposite directionality of the change.

Types of Dissimilation and Terminology

Dissimilation proper should be kept apart from dissimilatory forces in the broader sense, although the former may be the result of a more constrained application of the latter. In the phonological structuring of language, we find antagonistic structural principles at nearly all levels of analysis (consonant–vowel sequences, syllable structure, foot structure, etc.). They are paradigmatically the result of opposite tendencies, creating a dissimilate order with maximally alternating perceptual cues in the sequencing of elements. Most of the centrifugal changes strengthen the auditory differences between elements and are thus dissimilatory in a broad sense. But the term 'dissimilation' is better reserved for the systematic alternation type as described above.

Kiparsky (2003: 331) lists dissimilation among the minor sound changes. Like these, dissimilation (again in contrast to assimilation) is usually quantal (nongradual) and sporadic. The quantal character can be derived from the already mentioned phonemic change implied by the contrastiveness of the dissimilating features. It has sometimes been claimed that the sporadic character of dissimilations like the Romance r/l dissimilations goes back to older regularity, but there is no positive evidence for it, either in early Romance or in Latin. The frequently cited example *aulam extarem* (dissimilated from *extalem*) from Plautus is too isolated to serve as the basis for a different analysis. On the other hand, dissimilation can be regular when it responds to paradigmatic constraints (Grassmann's Law) but not necessarily so, cf. the irregularity governing the Latin *-alis/-aris* affixation (cf. Hurch, 1991). The sporadic character is also illustrated by isolated examples such as Lat. *quinque* 'five,' which loses the labialization of the first consonant in Proto-Romance (cf. Fr. *cinq,* It. *cinque,* Span. *cinco*, etc.) probably due to the presence of the second labiovelar.

So-called preventive dissimilation is more properly viewed as a morphophonemically governed selection device of competing allomorphs or morphemes in word formation, than as a change creating synchronic alternation. Under this heading, we have to subsume various types of alternating affixations ranging from the situation in which the selectable affixes differ only with respect to a dissimilating property and are otherwise equal, to the simple banning of specific affixes due to the clash of their sound structure in combination with a basis. The former has been postulated for Lat. *flore-alis* with a rhotic in the stem, selecting the lateral variant of the affix, and *sol-aris* with the lateral in the stem correspondingly selecting the rhotic variant of the affix (This constraint is far from holding without exceptions. There are counterexamples in both directions, as can also be testified by numerous examples in the Latinate lexicon of English (*lethal, legal*, *fluvial*, etc.), which question the strength of the dissimilatory force as a (morpho-)phonological factor). For the latter, see the Engl. derivative *-ish* for the formation of adjectives, which is banned from the combining with nouns ending in /ʃ/, e.g., *fish-ish. Bloomfield (1933: 390) also quotes a series of English words with uncertain internal structure, but which obviously avoid the combination of undissimilated liquids such as *crackle*, *rattle*, but *clatter*, *blubber*, etc.

A specific case of dissimilation is dissimilatory loss, i.e., the complete elimination of a segment as the consequence of identity: Lat. *clavicula* > Fr. *cheville*, It. *Federico* from Germanic initial *Fr-*, Lat. *proprius* ~ *propius* (vgl. Schopf, 1919: 149–166); cf. also the colloquial English forms such as *libary* and *Febuary* for *library* and *February* (G. Nathan, personal communication). Brugmann (1909: 147) proposes a wider concept of dissimilatory loss by including all those items where some element (feature) is deleted instead of positively being replaced by a dissimilated feature; so he calls into play examples such as the above-mentioned Lat. *quinque* where Romance languages lose the first labialization, i.e., labiovelars become plain velars. The concept of privative features had obviously been unknown in Brugmann's time. Haplology, another type of loss, namely, the eliminatory reduction of two identical sound sequences to one (e.g., Lat. *nutri-trix* > *nutrix* 'nurse'), is generally interpreted as syllabic dissimilation (Wurzel, 1976). It has sometimes been claimed that reduplication is a procedure opposed to haplology (Pott, 1833–1836).

The directionality of dissimilation is best captured by the traditional terms *regressive* and *progressive*. The former refers to the change $x_1 - x_2 > y - x_2$, the

latter to $x_1 - x_2 > x_1 - y$ (Schopf, 1919). The indices x_1 and x_2 only mean to indicate succession, not differentiation of x. In the traditional terminology, 'dissimilate' is a transitive verb and denotes the action x_2 exerts on x_1 in the former example so that $x_1 > y$. In other words: x_2 dissimilates x_1 to y.

We also find a type of preventive dissimilation in systems of reduplication with fixed segmentism, i.e., instances where the base itself begins with the regular fixed segment (Keane, 2005). Bengali *ʈak* 'bald,' *ʈak pʰak* 'bald etc.,' Hindi *viinaa* 'lute' *viinaa giinaa* 'lutes and such like.' The sound form of the *dissimilatum* stands in no (morpho-)phonologically comprehensible relation with the sound form of the *dissimilans* and thus deviates from the concept of dissimilation as presented above. Positively, the sequencing of *dissimilans* and *dissimilatum* is an indicator for the identification of the base and the reduplicant, thus they represent the directionality of reduplication. Brugmann quotes examples of dissimilatory loss in reduplication from Ancient Indian such as *pa-spaśé* 'see, 1,3SGMED,' *ta-stháu* 'stand, 1,3SG' where the sibilant of the reduplicant is claimed to be dissimilated in order to avoid two successive identical *sC*-syllable onsets; moreover the latter examples also show the application of Grassmann's Law. It seems more reasonable today to consider these apparent dissimilations in a different light: the specific reduplication type itself selects CV- from the base, initial clusters are reduced to a single consonant.

Properties and Preferences

Synchrony and Diachrony

Dissimilation proper is more easily encountered as a diachronic change than in synchronic alternation. As was already pointed out by Meringer (1897), dissimilation originates in contexts such as speech errors. This accounts for the sporadic character of the alternation and for the lack of a sound law-like behavior.

Locality

Posner (1961: 4) distinguishes dissimilation of consonants in contact (which she also calls differentiation) from dissimilation of consonants not in contact – Ferndissimilation, *dissimilation harmonique*. As opposed to assimilation, dissimilation proper works at a distance within a bigger, usually morphologically defined domain. Underspecification Theory in the late 1980s tried to define locality in terms of tiers, which means that segments separated by other segments must be adjacent on the tier of the relevant dissimilating features in order to develop their triggering force. Processes like diphthongization of long vowels, which are sometimes analyzed as a dissimilatory enhancement of differences between two subsequent morae within a single vowel, do not fall into the domain of dissimilation. Such processes, although having an output that is *prima facie* more dissimilar than the input, are better described as independently improving prosodic structure such as the syllable.

Directionality

Although we do find both regressive and progressive dissimilation, the regressive action seems to be the preferred option. Locality and directionality nicely demonstrate that dissimilation, in contrast to assimilation, is not the result of an immediate action of one sound upon another, but rather takes place at the level of cognitive planning of a word.

Quality and Quantity of Change

Whereas assimilatory processes, as lenitions in general, may be allophonic or phonemic, dissimilations are always phonemic. An explicit formulation of this observation dates as far back as the early days of phonology (Grammont, 1895). This corresponds to the centripetal character enhancing the perceptual reliability of the segmental structure. Moreover, it has always been assumed that whereas gradualness is a characteristic of assimilation, dissimilation is quantal. Assimilations usually are realized to a varying degree with a theoretical endpoint in fusion, whereas dissimilations work categorically. This probably depends on the fact that similarity is a matter of graduality; dissimilarity is not.

Affected Segments and Features

It has long been recognized that not all sounds and features are equally subject to dissimilatory tendencies. Schuchardt (1909: 474) objects to the interpretation of Ital.Dial. *u ppumento* as resulting through a dissimilation from *un momento* on the grounds that the dissimilatory result of *m* is *b*, but not *p*. The knowledge of phonological proximity dominates the selection devices for dissimilated consonants. The high number of liquid dissimilations has always suggested that this sound class is specifically subject to this type of change. The most detailed claim with respect to preferences of segments and/or features undergoing dissimilation is to be found in Ohala (2003).

Dissimilation should occur primarily on features whose acoustic-perceptual cues are known to spread over relatively long time intervals beyond the immediate hold of the segment they are distinctive on. This includes aspiration, glottalization, retroflexion,

palatalization, pharyngealization, labialization, etc. These are most likely to color adjacent segments and require the listener to undo their effects. When the same feature occurs distinctively on two sites within a word, their long-distance diffusion creates maximal ambiguity for the listener. Segments whose distinctive features do not migrate substantially in time should not be subject to dissimilation. This includes the features that cue stops, affricates, and voicing.

Contexts and Domains

An interesting restriction on dissimilation is that its context cannot sufficiently be specified in phonological or prosodic terms. Thus, not every two segments within a reasonable distance relation are able to develop a dissimilatory force, but only if they are contained within a specific domain, namely, the morphological word. Word boundaries do actively block dissimilations; morpheme boundaries, for example, do not.

Foundations

Most authors (Grammont, 1895; Passy, 1891) agree that the goal of dissimilation is to enhance a contrast by improving the auditory distance between the *dissimilans* and the *dissimilatum* and thus facilitate perception (Kiparsky, 2003). According to Grammont (1895), dissimilation is an expression of the *loi du plus fort*: the consonant in the accented syllable usually dissimilates the one either in unstressed or in the weaker syllabic position. Brugmann (1909) calls into play the *horror aequi* as the driving force of dissimilation. The main purpose for claiming this principle is that it aims at explaining those instances of preventive dissimilation, in which the equality exists in underlying representations only. In the same vein, but in modern terminology, Ohala (2003: 680) attributes dissimilation to what he calls parsing errors. Only very few scholars (Vendryès, 1921) advocate an articulatory teleology. Interaction and parallels with other types of sporadic changes (metathesis) still favor Meringer's (1908) hypothesis, which connects the origin of dissimilation to paradigmatic factors such as speech errors.

See also: Assimilation; Morphophonemics; Sound Laws.

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words in these varieties of American English like 't[j]oot,' 's[j]oon,' or 'sh[j]ut.'

The group of sounds that [j] cannot follow in American English are collectively known as the natural class of coronal consonants. The distinctive feature [coronal] characterizes sounds that are made with the front or central region of the tongue; as such, [coronal] generalizes over the more specific phonetic categories of *interdental* (pronounced with the tongue tip between teeth, as in 'thin' or 'though'), *alveolar* (pronounced with the front part of the tongue raised up toward the alveolar ridge, as in 'top' or 'sip'), and *palatal(-alveolar)*; pronounced with the central part of the tongue raised toward the roof of the mouth as in 'shoe' and 'judge'). The observation that distinctive features may draw broader distinctions than objectively exist in speech production or perception has been taken since at least the 1960s to provide evidence for their essentially cognitive status.

Phonetic Basis of Distinctive Features

It is generally assumed that the primary motivation for the existence of a feature comes from considerations of the patterning of sounds in language. However, since they were first introduced to linguistics, distinctive features have typically been defined in phonetic terms. Jakobson (1942) proposed that each feature exhibits one clear and easily identifiable acoustic feature for which there is a corresponding articulatory movement. Two examples from the feature theory of Jakobson *et al.* (1952) serve to illustrate this point. First, 'compact' sounds, such as [k g ʃ ŋ], have acoustic energy concentrated in a single compact frequency range and thus have greater measured 'phonetic power' than their counterparts among the 'diffuse' sounds [p t b d f s m n], the phonetic energy of which is distributed more evenly. Second, a 'grave' sound is defined as one in which the lower end of the frequency range predominates, as opposed to an 'acute' sound, in which the higher end of the frequency range predominates. Jakobson *et al.* (1952) proposed that these acoustic distinctions are measured in terms of the articulatory configurations related to them. For instance, grave sounds, such as [u o f x p k m], are produced with a larger and less compacted mouth cavity than their acute counterparts (i.e., [i e s ʃ t c n]). They also noted that the set of possible distinctive features is apparently limited only by the range of possible articulatory and acoustic configurations.

The features in Jakobson's theory are defined first and foremost in terms of the acoustic properties of sounds, based on instrumental measurements of these acoustic properties and the articulatory configurations required to produce them. Most early studies of sound systems emphasized speech articulation, presumably due to practical reasons: the linguist could observe the movements of the lips, jaw, and (at least parts of) the tongue. It was only after the development of the sound spectrograph that an attempt was made to develop an acoustically based theory of language sound structure. With Chomsky and Halle's (1968) influential work, *The sound pattern of English* (SPE), the field saw a return to an articulatory focus, as the SPE feature theory incorporated the view that sound patterns can be accounted for by a universal set of features, the definitions of which are primarily articulatory (though see the section on acoustic and auditory features).

Universality of Distinctive Features

In modern phonological theory, it is widely assumed that the set of distinctive features is innate and thus common to all speakers of all languages. This position was explicitly put forth in SPE, which can be viewed as an extension of Chomsky's theory of Universal Grammar developed to account for syntactic patterns. Many of the phonological features proposed in SPE can be traced to the earlier theory of Jakobson *et al.* (1952). For example, the feature [+/−coronal] is similar to the earlier feature grave/acute, yet with the focus on the articulatory property associated with the opposition: [+coronal] sounds are produced with the front of the tongue and tend to be acoustically acute, whereas [−coronal] sounds, not produced with the tongue front, tend to be acoustically grave. As noted above, this points to a major difference between the theories of Jakobson and that developed in SPE: in the latter, all features are defined articulatorily, rather than acoustically. Table 2 provides the feature specifications proposed by Chomsky and Halle (1968) for some vowels and consonants of English.

In this framework, the mental representation of a speech sound is assumed to be an unorganized set of feature values. A word is thus composed of (1) rows corresponding to members of the set of universal distinctive features and (2) columns corresponding to successive segments, as illustrated in Table 3 for the word 'feature.'

Speakers are free to choose the particular speech sounds used to express meaning in their language. However, given the assumption that the proposed set of features is universal and fixed, speakers are necessarily limited in the number and kind of meaningful sound distinctions that can be made. The fact that language is restricted in this manner is taken to

Table 2 Distinctive feature specification of some vowels and consonants of English

	i	*u*	*e*	*ʌ*	*o*	*æ*	*ɒ*	*j*	*w*	*r*	*l*	*p*	*b*	*f*	*v*	*m*	*t*	*d*	*θ*	*ð*	*n*	*s*	*z*	*ts*	*tʃ*	*dʒ*	*ʃ*	*ʒ*	*k*	*g*	*ŋ*
Syllabic	+	+	+	+	+	+	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Vocalic	+	+	+	+	+	+	+	−	−	+	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Consonantal	−	−	−	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
High	+	+	−	−	−	−	−	+	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	+	+	+	+	+
Back	−	+	−	+	+	−	+	−	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	+
Low	−	−	−	−	−	+	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Anterior	−	−	−	−	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	−	−	−
Coronal	−	−	−	−	−	−	−	−	−	+	+	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−
Round	−	+	−	−	+	−	+	−	+																				−	−	
Tense	−	−	−	−	−	−	−	−	−																						
Voice										+	+	−	+	−	+	+	−	+	−	+	+	−	+	−	−	+	−	+	−	+	+
Continuant										+	+	−	−	+	+	−	−	−	+	+	−	+	+	−	−	−	+	+	−	−	−
Nasal										−	−	−	−	−	−	+	−	−	−	−	+	−	−	−	−	−	−	−	−	−	+
Strident										−	−	−	−	+	+	−	−	−	−	−	−	+	+	+	+	+	+	+	−	−	−

Based on Chomsky and Halle (1968).

Table 3 Distinctive feature representation of 'feature'

f	*i*	*tʃ*	*r*
−syllabic	+syllabic	−syllabic	+syllabic
−vocalic	+vocalic	−vocalic	+vocalic
+consonantal	−consonantal	+consonantal	+consonantal
−high	+high	+high	−high
−back	−back	−back	−back
+ant	−ant	−ant	−ant
⋮	⋮	⋮	⋮

provide evidence for universal cognitive structures that the mind imposes on language.

Feature Geometry

In the earliest versions of distinctive feature theory, all features that comprise a speech sound are considered to have the same status; that is, no features are related more closely to each other than to any others. Since that time, however, a considerable amount of research has led to the conclusion that speech sounds have internal organization. The general name for this area of research and for models representing internal segment structure is 'Feature Geometry.'

The main proposal of Feature Geometry is that distinctive features form constituents, much as syntax assumes constituency and hierarchical phrase structure (Clements, 1985). Thus, rather than unorganized sets of features as in Table 2, segments are represented by hierarchically structured features, as illustrated in Figure 2. Each constituent is headed by a node – e.g., Laryngeal node, Manner node, Place node – that dominates all features belonging to that particular constituency. The traditional notion of 'segment' is largely redefined as all the feature values dominated by a single root node.

The observation that certain features commonly pattern together motivated the idea that there are 'natural groupings' of features that form higher-level functional units. For example, in many languages the features [labial], [coronal], and [dorsal] function together as a unit, thus motivating the Place constituent, as seen in Figure 2. In English, for instance, the nasal sound in a prefix such as 'en' typically takes on the place of articulation value of a following consonant, a process commonly referred to as 'place assimilation.' Thus, the nasal is pronounced as coronal [n] before coronal sounds (*encircle, endanger*), as labial [m] before labial sounds (*empower, embitter*), and as a dorsal nasal [ŋ] ('ng') before dorsal sounds (*encamp, encourage*). Notice that all three place features are involved and, furthermore, it is *only* the place of articulation value that is acquired from the following

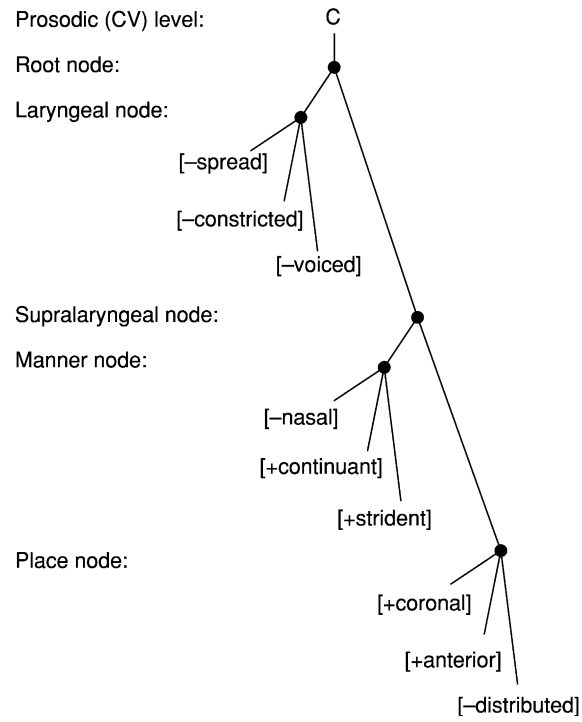

Figure 2 A partial feature geometric representation of [s]. Based on Clements (1985).

consonant. The three place features are thus assumed to be patterning together as a functional unit – in this case, in the process of assimilation – as expressed formally as in Figure 3. As shown, the Place node of /k/ extends its domain (referred to as 'spreading'), replacing the Place node of the consonant /n/, the target of assimilation. Features not dominated by the Place node, such as [+nasal], remain unchanged. The result of assimilation is two sounds sharing a single Place node that, in this case, dominates [+dorsal].

Feature Values and Relations among Features

A feature's ability to minimally contrast two sounds with each other is generally represented by listing that feature with either of two opposite values, indicated before a given feature by a plus or minus symbol. Such features are called 'binary.' The property of nasality that distinguishes, for example, [n] from [d] in English, can be represented by the feature values [+nasal] and [−nasal], respectively. The characterization of a sound as [+nasal] indicates that it is produced with air expelled through the nasal cavity, whereas the value [−nasal] defines sounds in which air is not expelled in this manner. Thus, it is possible to refer to natural classes defined by each of these two feature values.

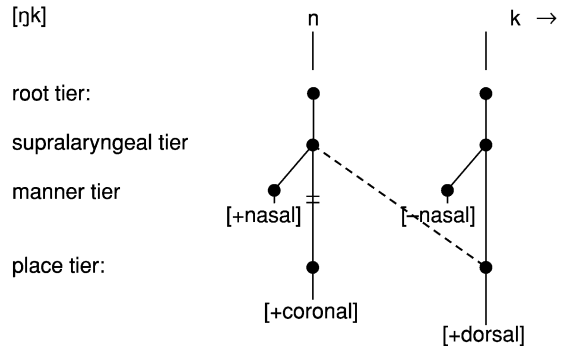

Figure 3 Assimilation in Feature Geometry.

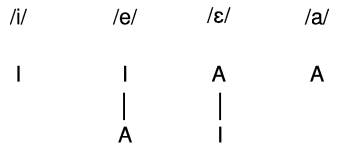

Figure 4 Vowel specification in Dependency and Government Phonology.

For some features, however, the negative value is not phonologically relevant; that is, it is never necessary to define a natural class of sounds. Features of this type are referred to as 'unary-valued' or 'privative.' Such features express contrast simply by their presence or absence in the representation of a sound. Thus, there is no negative feature value that can be referred to in the formal description of a sound system. Features characterizing place of articulation ([labial], [coronal], [dorsal]) are commonly assumed to be privative (Sagey, 1990). Because it is impossible to refer to sounds defined by the lack of a given property, this approach makes the strong claim that sounds defined by the absence of a given feature (e.g., noncoronal sounds) will not function as a natural class and thus not pattern together in any sound system.

Dependency and Government Phonology and Particle Phonology

Other theories of distinctive features, such as Dependency and Government Phonology (e.g., Anderson and Ewen, 1987; Harris, 1994) and Particle Phonology (Schane, 1995), allow features to be organized differently within the feature hierarchy in ways that are meaningful to the theory. In contrast to other approaches, all features are regarded as unary. The primitives of vowel feature organization (i.e., features) are hypothesized to be the elements A, I, and U, corresponding to aperture, palatality, and labiality, respectively.

A critical assumption of Dependency and Government Phonology is that the relations between features

[ɨ]/[ə]	[a]	[i]	[u]	[e]	[o]	[ü]	[ö]
—	A	I	U	A I	A U	I U	A I U

Figure 5 Feature specification of an eight-vowel system.

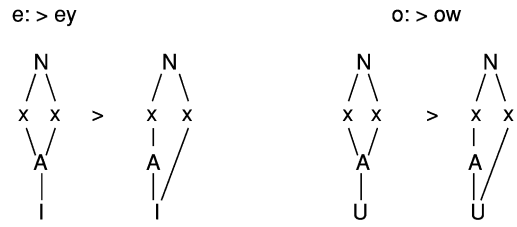

Figure 6 Diphthongization and monophthongization.

are variable and meaningful. For example, as shown in Figure 4, the height difference between mid vowels can be characterized by different dependency relations between A and I: In /e/, I dominates A, whereas in /ɛ/, A dominates I (Ewen, 1995). An eight-vowel system can be characterized by different combinations of the three particles, as illustrated in Figure 5.

Given the variability in relations among features, these theories are well equipped to account for such processes as diphthongization and monophthongization, as shown in Figure 6. Diphthongization is represented by splitting particle complexes into separate vowels (like splitting atoms), and monophthongization is the complementary process of combining two sets of vowel particles that were previously dominated by separate particle complexes (like fusing atomic nuclei; Schane, 1995): N represents a syllable nucleus; x represents one segment length.

Unified Feature Theory

Unified Feature Theory (UFT; Clements and Hume, 1995) proposes changes to the set of universal features and to feature organization. Most significantly, consonants and vowels are represented by the same set of place features, which include [labial], [coronal], and [dorsal]. Consistent with Jakobson *et al.* (1952), UFT incorporates the observation that vowels and consonants are produced within the same vocal tract, and consequently they are represented with the same set of features.

Evidence for this approach comes most notably from consonant-vowel interactions. For example, in the Dravidian language Tulu (Bright, 1972), the high unrounded central or back vowel [ɨ] is labialized if the preceding syllable contains either a labial consonant or a rounded vowel, as in Table 4. Labialization in Tulu can be treated as a unified process under the assumption that labiality in consonants and roundness in vowels are represented with the same feature, [labial]; they are thus members of the same natural

Table 4 Labialization in Tulu

naːɖɨː	'country'
kaʈɨː	'bond'
pudarɨː	'name'
ugarɨː	'brackish'
ari-n-ɨː	'rice' (acc.)
bolpu	'whiteness'
kappu	'blackness'
uccu	[kind of snake]
moroɖu	'empty'
uːru-n-u	'country village' (acc.)

class (Clements, 1991). Similar observations are made with regard to front vowels and coronal consonants (the class of [coronal] sounds), and back vowels and velar consonants (the class of [dorsal] sounds).

Acoustic and Auditory Features

As noted above, despite the early emphasis by Jakobson on acoustically based features, from the 1960s onward distinctive features have been widely assumed to be articulatorily defined. More recently, however, Flemming (2002) proposed an acoustic or auditory basis for some phonological features. This approach argues that many natural classes observed in sound patterns involve sounds that are acoustically similar, but do not share an articulatory property. These include, for example, the class of back and round vowels, both of which involve a low second resonance (F2). Similarly, labial and velar consonants often pattern together and are similar in that both have a resonance or noise that is relatively low in frequency. Jakobson's feature theory represents this with the feature [grave]. Flemming proposed the scalar auditory feature, Noise Frequency (NF), to express this property. As illustrated in Table 5, the class of labials and velars [x^w x f] is defined as [+lower NF].

Language-External Evidence

Although it is widely assumed that evidence for distinctive features comes primarily from the sound patterns themselves, experimental evidence has also been cited in support of features. However, the interpretation of this evidence as support for the existence and/or universality of distinctive features remains controversial.

For example, Stevens (1972) proposed that the sound inventories of languages are determined by the nonlinear mapping between articulatory and acoustic parameters; the attributes that occur within the regions where the mapping of articulatory properties onto acoustic properties is relatively stable are effectively the correlates of distinctive features. Others have suggested that these nonlinearities themselves may account for the nature of common sound patterns without being associated with abstract features (e.g., Beckman and Pierrehumbert, 2003).

Table 5 Scalar acoustic feature of Noise Frequency (NF)

	X^w	x	f	$ʃ^w$	$ʃ$	s^w	s
Lowest NF	+	−	−	−	−	−	−
Lowest NF	+	+	+	−	−	−	−
Low NF	+	+	+	+	−	−	−
High NF	−	−	−	−	−	+	+
Highest NF	−	−	−	−	−	−	+

Studdert-Kennedy *et al.* (1972), also presented findings that they interpreted as support for the notion of place of articulation features. They found that subjects in a dichotic listening experiment are better at identifying segments in both ears simultaneously when the segments share phonetic features. However, English-speaking subjects are no better at recognizing the place of articulation and voicing of stop consonants in both ears simultaneously when the following vowels are identical than when they are different. If acoustic similarity were the explanation for these findings, they argued, consonants with identical following vowels would be identified more accurately because the consonants in these contexts would be acoustically more similar than those in nonidentical contexts. The results are thus taken as support for the existence of abstract place features.

Support for distinctive features was also initially provided by infant speech perception experiments. The results of early experiments (e.g., Eimas *et al.*, 1971) suggested that the ability of infants to discriminate a wide range of phonetic contrasts is part of the innate human capacity for language and that neural atrophy during childhood is perhaps responsible for the diminished ability to distinguish non-native contrasts. Although this conclusion is compatible with the view of universal features proposed in SPE, later results have suggested alternative explanations. For example, Aslin and Pisoni (1980) noted Kuhl and Miller's (1975) finding that chinchillas are able to distinguish voiced and voiceless stop stimuli with a perceptual boundary very close to the boundary found for the voice-voiceless stop contrast in (presumably American) English adults. If chinchillas show human-like categorical perception, it seems less plausible that the same observations from infant speech perception can be attributed to innate processing abilities specific to human language. Rather, Aslin and Pisoni (1980) argued, based on their own

research findings, that the ability of infants to detect voice-onset time (VOT) contrasts (e.g., voicing) is the result of general constraints on the mammalian auditory system. These constraints cause detection of the onset of the first formant relative to higher formants to be easiest at ±20 ms, especially when the lower-frequency component begins first (positive VOT). This account can also be extended to explain the cross-linguistic preference for VOT contrasts with boundaries in the region of ±20 ms.

Challenges to the Assumption of Universality

The hypothesis that distinctive features are universal has been a standard assumption of phonological theory since the 1950s, though not in the early work of Trubetzkoy (1939) and Jakobson (e.g., 1942). There have been challenges to this view, however.

Ladefoged (1984) observed that many facts of language-specific phonetics are consistent within a given speech community, but are not explainable from universal principles of phonology or phonetics. For instance, Yoruba and Italian both have seven vowels that may be transcribed using the same symbols and characterized with the same distinctive features. However, lower mid vowels in Yoruba are much higher than lower mid vowels in Italian. Ladefoged argued that learners of these languages must simply learn these phonetic details in order to sound like a native speaker, and as a result, there is no need for innate distinctive features.

Mielke (2004) provided an additional challenge to the universality of distinctive features and, in particular, the view that a small set of features can describe all sound patterns in language. His survey of phonologically active classes of sounds in 561 languages found that about one-quarter of the observed classes cannot be defined by distinctive features proposed in any of the feature theories of Jakobson *et al.*, Chomsky and Halle, or Clements and Hume. Further, there is no objective way to partition classes into natural as opposed to idiosyncratic categories, and some of the most common 'undescribable' classes occur more frequently than so-called natural ones. These findings are in line with Ladefoged's conclusion, noted just above: categories of sounds that pattern together may be learned on a language-by-language basis, rather than be guided by a single set of innate features.

Distinctive Features in Signed Languages

Theories of distinctive features have generally been established on the basis of spoken language data.

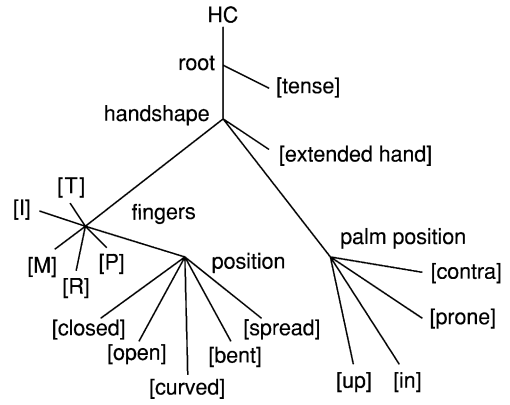

Figure 7 The Hand Configuration tree. From Sandler (1989).

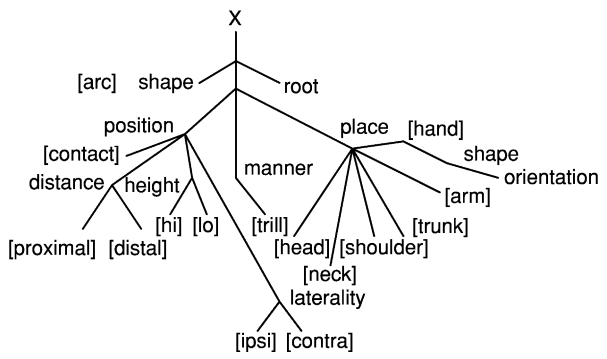

Figure 8 The Location tree. From Sandler (1989).

There has, however, been substantial work conducted in the area of sign language features and feature organization, and this research points to the importance of sign language phonology in the debate concerning the universality of features.

For all distinctive features to have emerged in the human genome, it is reasonable to assume that humans must have been exposed to contrasts motivating each of the features at some time before the life of a common ancestor of all modern humans. Under the assumption of universality, this would also be true of the distinctive features for sign languages. Yet, sign language systems seem to use different phonological features and feature organization than spoken systems, as outlined below. Given that deafness is generally not hereditary, this then raises the question as to how the two sets of features would have evolved separately.

Drawing on evidence from American Sign Language, Liddell (1984) reported that signed languages may have significantly larger numbers of contrastive segments than spoken languages, and many analyses are consistent with this view. For example, Stokoe (1960, *inter alia*) produced the first phonemic analysis of signed language, using 12 distinctive places of

articulation, 18 distinctive handshapes, and 24 distinctive aspects of movement. The Hold-Movement Model (Liddell and Johnson, 1989, *inter alia*), on the other hand, involved 299 distinctive features. Brentari (1990) reduced the number of features to 20, a total more comparable to that proposed for spoken languages, but not without assuming several multivalued features, which are generally not used in spoken language feature theory.

Sandler's (1989 *inter alia*) Hand Tier model was the first to incorporate a hierarchical organization of features. As shown in Figures 7 and 8, features referring to hand configuration and location are arrayed on separate trees that would seem to bear little resemblance to spoken language models of Feature Geometry. The extent to which the Feature Geometry models for spoken and signed language can or should be unified thus remains an open question.

Summary

The view that speech sounds are not indivisible units but rather are composed of smaller abstract categories called distinctive features is considered to be one of the most important advancements in phonological theory, if not in all of linguistics, of the 20th century. Features have allowed for the straightforward expression of contrast among speech sounds and the patterning of natural classes in phonological systems. At the same time, the theory of distinctive features makes strong predictions regarding the cognitive organization of language sound systems. Many questions still remain, however, regarding the nature of distinctive features, such as whether they are limited to a small innate set or, alternatively, are learned categories extracted from the sound patterns of each individual language.

See also: Abstraction; Autosegmental Phonology; Dependency Phonology; Evolution of Phonetics and Phonology; Experimental Phonology; Feature Organization; Generalization; Generative Phonology; Government Phonology; Information Theory; Jakobson, Roman: Theory of the Sign; Linguistic Universals, Chomskyan; Phoneme; Phonological Universals; Phonology: Overview; Phonology–Phonetics Interface; Sign Language: Phonology; Structuralist Phonology: Prague School.

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Distributed Cognition and Communication

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The distributed cognition approach was developed by Hutchins and his colleagues in the mid- to late 1980s as a new paradigm for conceptualizing cognition (Hutchins, 1995). Its theoretical and methodological bases are derived from the cognitive sciences, cognitive anthropology and the social sciences. The focus is on explicating *cognitive systems*, which are the interactions among people, artifacts, and both internal and external representations. Rather than focusing exclusively on an individual's internal cognitive processes, which traditional cognitive approaches do, it focuses on the processes that take place in an extended cognitive system. In so doing, it dissolves the traditional divisions between the inside/outside boundary of the individual and the culture/cognition distinction that anthropologists and cognitive scientists have historically created. One major benefit is the explication of the complex interdependencies among people, artifacts, and technological systems that often can be overlooked when using traditional theories of cognition.

Hutchins argues that what is problematic with the classical cognitive science approach is not its conceptual framework *per se,* but its frame of reference being only the mental processes that occur within an individual. He suggests that the same conceptual framework be applied to larger 'cognitive systems,' namely, those in which there are multiple people interacting with each other and a range of artifacts to perform an activity. Part of the rationale for this extension is that, first, Hutchins believes it is possible to determine the processes and properties of such cognitive systems more reliably – as they can be observed directly in ways not possible inside a person's head – and, second, they may actually be different and thus unable to be reduced to the cognitive properties of an individual.

Thus, distributed cognition continues to use concepts derived from traditional cognitive theories of the mind (i.e., representations, processes), but applies them to cognitive systems at large, notably, the interactions between people and the artifacts they use for a given activity. In addition, other concepts derived from the social sciences are utilized to account for the socially distributed cognitive phenomena. These include notions such as intersubjectivity, organizational learning, and the division of labor.

Cognitive systems that consist of more than one individual have properties that differ from the individuals that participate in them (Hutchins, 1995). For example, individuals working together on a collaborative task possess different kinds of knowledge and so will engage in interactions that will allow them to pool the various resources to accomplish their tasks. In addition, individuals in a cognitive system have overlapping and shared access to knowledge that enables them to be aware of what others are up to. This enables the coordination of expectations to emerge that in turn form the basis of coordinated action (e.g., glancing and nodding at someone to signal it is their turn to do something rather than explicitly asking or telling them).

To reveal the properties and processes of a particular cognitive system involves conducting an in-depth ethnographic study of a setting, paying close attention to the activities of people, their communications with each other and their interactions with different media. These are conceptualized in terms of 'the propagation of representational state across media.' The propagation of representational state refers to how information is transformed during the conduct

of an activity. The media refer to both internal (e.g., an individual's memory) and external representations (including both computer and paper-based displays). So, for example, the information displayed by a computer system transforms its state in response to an operator keying in a command. To analyze how the various representational states are propagated, attention is focused on the transformations of information between the different media. For example, consider the activity of flying to a higher altitude in a plane that takes place through the coordinated activity of an air traffic controller, a co-pilot, and a pilot. The air traffic controller tells the co-pilot over the radio when it is safe to fly to a higher altitude. This is an instance of a propagation of representational state, involving verbal communication. The co-pilot then alerts the pilot, who is flying the plane, by moving a knob on the instrument panels in front of them, indicating that it is now safe to climb. This is the next step of the propagation of representational state, but this time in terms of a physical change in the position of an instrument.

In addition to this level of analysis, the distributed cognition approach involves explicating:

- the distributed problem solving that takes place (including the way people work together to solve a problem)
- the role of verbal and non-verbal behavior (including what is said, what is implied by glances, winks, etc., and what is not said)
- the various coordinating mechanisms that are used (e.g., rules, procedures)
- the various ways communication takes place as the collaborative activity progresses
- how knowledge is shared and accessed

An important aspect is to identify the problems, breakdowns, and the concomitant problem-solving processes that emerge to deal with them. The analysis also can be used to predict what would happen to the way information is propagated through a cognitive system using a different arrangement of technologies and artifacts and what the consequences of this would be for the current work setting.

A much-quoted example of an extensive distributed cognition analysis is the navigation of a ship (Hutchins, 1995). Here, the focus is on the cognitive and communication processes that take place when steering a ship into harbor. Hutchins describes the detailed coordination of representational states across media that take place for the relatively simple but critical coordinating activity of plotting a fix. This involves several members of the navigation team taking and plotting bearings of the ship as it comes into the harbor at regular intervals of three minutes. It is a highly routinized activity, requiring the complex coordination of people and artifacts – all of which is crucial for ensuring the ship is on course. He also describes how these coordinated activities of plotting a fix provide a structured experience for the team members, enabling more generally, individual learning of procedures and the cultural practices of the navy. As noted by Hutchins (1995: 374):

> ... since most learning in this setting happens in the doing, the changes to internal media that permit them to be coordinated with external media happen in the same processes that bring the media into coordination with one another. The changes to the quartermasters' skills and the knowledge produced by this process are the mental residua of the process.

The distributed cognition approach has been used to analyze collaborative work practices for a number of different application areas, including cockpits (Hutchins and Klausen, 1996), call centers (Ackerman and Halverson, 1998), control centers (Garbis and Waern, 1999), software teams (Flor and Hutchins, 1992), and design and engineering teams (Perry, 1997; Rogers, 1992). More recently, Hutchins and his colleagues (Hollan *et al.*, 2000) have set an agenda explaining how distributed cognition can be applied to wider contexts. In particular, they maintain it is well suited both to understanding the complex networked world of information and computer-mediated interactions and to informing the design of digital work materials and collaborative workplaces. Others also have shown how the approach can be adapted for more applied concerns. Kirsh (2005) and Rogers and Brignull (2003), for example, have recently shown how ideas from distributed cognition can be used to inform the design of interactive multimedia applications and new physical workspaces. The distributed cognition approach has also been used as a basis for a user modeling technique, known as the 'resources model' (Wright *et al.*, 2000). It provides a method for analyzing and comparing how interfaces work through identifying the way different interaction strategies exploit different information structures as resources for action. It has been particularly useful for showing the limitations and problems of poorly designed dialogue-based interfaces that assume too much on behalf of the user as to know what to do next.

In sum, the distributed cognition approach seeks to explicate the complex interdependencies between people and artifacts in their work activities, of which an important part is identifying the problems, breakdowns, and the distributed problem-solving processes that emerge to deal with them. In so doing, it provides multilevel accounts, weaving together "the

data, the actions, the interpretations (from the analyst), and the ethnographic grounding as they are needed" (Hutchins and Klausen, 1996: 19).

See also: Computer-Mediated Communication: Cognitive Science Approach; Dialogue and Interaction; Language in the Workplace: Different Approaches.

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simplest view, following Embick (2000), is that the exponents of Root morphemes are inserted early, prior to or perhaps cyclically during syntax, while the exponents of other morphemes are supplied after syntax. In this respect Distributed Morphology shares the interpretive approach of other theories, such as the Extended Word and Paradigm model (Anderson, 1982) and Lexeme-Morpheme Base Morphology (Beard, 1995).

Underspecification prevents items of vocabulary from needing to be fully specified relative to their contexts of occurrence, ensuring simple treatments of default exponents. For example, the German adjectival suffix *-n* appears in a quite heterogeneous set of categories most simply described as the contexts where no other affix's more specific conditions for insertion are met. A general principle requiring that the most specific among competing exponents is inserted permits such default exponents to be minimally specified as 'elsewheres' (Lumsden, 1987; Halle, 2000).

An important consequence of late insertion is that features such as number or tense are supplied to the syntactic computation by abstract morphemes that are fully-specified for such features. In lexicalist approaches syntactic features must instead be supplied by words, which in turn obtain these features either by percolation from the specific exponents they contain, or by default rules filling in unmarked values. But because the distribution of default affixes entails that they must be left underspecified, it is predicted that default affixes should never need to supply marked values, i.e., values that cannot be provided by redundancy rules. This prediction is, however, quite problematic, as shown, for example, by the present-tense inflection of English verbs. The affix /-z/ appears only in the third-person singular, all other person and number combinations having a zero-suffix instead. Suppose then that the lexicon contains affixes roughly like the following:

(4) a. $\begin{bmatrix} \text{/z/} \\ \text{present} \\ 3 \\ \text{sg} \end{bmatrix}$

b. $\begin{bmatrix} \text{Ø} \\ \text{present} \end{bmatrix}$

The lexicon will now generate two present-tense verbs, one marked third-person singular and having the suffix *-z*, the other having no overt suffix and underspecified for person and number. As Noyer (2001) argues, the problem that emerges is, assuming that syntactic structures are projected from freely chosen combinations of lexical items, there is now no obvious way to prevent the verb form unmarked for number from composing with a third-person singular subject. In the derivation of such a sentence, the fact that the lexicon *can* generate a more specified verb form cannot be taken into consideration, since the derivation examines the compatibility of the lexical items that are chosen to project structure, not the range of all possible lexical items that *might have been* chosen to project structure (this set being, in fact, infinite).

To address this problem, lexicalist theories require that words generated by the lexicon do not in fact freely project syntactic structures, but instead must pass through a filtering mechanism that assembles words into paradigm groups, allowing only one word into each paradigm slot (Wunderlich, 1996). Distributed Morphology rejects such filters as redundant, given that the same space of featural possibilities will be generated in the syntax regardless.

Finally, hierarchical structure is assumed to exist at all levels of structural analysis; specifically, there are no 'process morphemes,' and a strict separation is maintained between morphophonological allomorphy rules, which may change the phonological properties of an exponent, and vocabulary insertion, which merely supplies exponents. For example, the derivation of *feet* involves the insertion of the vocabulary item /fʊt/ in a Root position in the context of a plural morpheme, insertion of a zero exponent into the plural morpheme, and finally, a morphophonological readjustment of the stem, changing its syllable nucleus to /ē/. On this view, then, it is incorrect to assert that either /fēt/ or the process of changing /ʊ/ to /ē/ actually spells out [+plural]. Properly speaking, /fēt/ is instead the stem allomorph of /fʊt/ which is generated in the plural environment. The 'piece-based' stance and rejection of processual rules of exponence aligns Distributed Morphology with certain lexicalist theories, most particularly that of Lieber (1981).

Operations after Syntax

Distributed Morphology predicts that in the default instance, the internal structure of words follows from syntactic operations, most particularly head movement (or X^0 Movement). Syntactic word/formation explains the 'mirroring' of syntactic derivational history and morpheme ordering noted by Baker (1985) without appeal to an extra-syntactic mirror principle. Nevertheless, much evidence suggests that in order to derive the full complexity of morpheme ordering the very general movement operations ordinarily imputed to syntax proper must be supplemented by several more specific post-syntactic mechanisms.

Morphological merger (Marantz, 1988) permits a morpheme to exchange a relation of linear adjacency

to another constituent (indicated by * below) for the relation of adjunction to the head of that constituent. In (5a), for example, the Latin second-position clitic *-que* 'and' is initially linearized left-adjacent to the constituent *bonī puerī* 'good boys':

(5) a.	[puellae *	[que *	[bonī *	puerī]]]
	girls	and	good	boys
b.	[puellae *	[[bonī+que *	puerī]]]	
	girls	good+and	boys	

In (5b), after Merger has applied, *-que* has traded its relation of left-adjacency to *bonī puerī* for a relation of (right-)adjunction to *bonī*, the peripheral morpheme of this constituent.

Embick and Noyer (2001) distinguish two varieties of merger: lowering and local dislocation. Lowering, such as T-to-v in English (6), is indifferent to linear ordering properties, and adjoins the merged morpheme to the syntactic head of a constituent; it applies prior to vocabulary insertion and is thus insensitive to the idiosyncrasies of specific exponents.

(6) Mary [$_{TP}$ t_i [$_{vP}$ loudly play-TENSE:PAST$_i$ the trumpet]]

Local Dislocation, such as the movement of Latin *-que*, on the other hand, applies after vocabulary insertion and linearization, and adjoins the merged morpheme to the peripheral morpheme of a neighboring constituent.

A second complication arises from affixes that do not plausibly spell out syntactic projections but rather appear to be inserted in specific morphosyntactic contexts. For example, morphological case marking is typically triggered by syntactic configurations and specific case-assigning verbs or prepositions, with no evidence of a syntactically active case morpheme *per se* (Marantz, 1992; McFadden, 2004); Embick (1997) makes similar claims for 'reflexive' verbal clitics such as *se, si* in the Romance languages. These dissociated morphemes are inessential to the operations of syntax, and, inasmuch as their conditions for insertion are already present in syntax, irrelevant to semantic interpretation. Instead, it is hypothesized that they are inserted after syntax by language-specific rules of ornamentation that account in large part for the wide range of morphological complexity observed in natural language.

Finally, impoverishment derives systematic category neutralizations by deleting certain morphosyntactic feature values prior to vocabulary insertion. For example, while classical Arabic lacks a first-person dual category, both in pronouns and in all types of verb agreement, related South Arabian languages Mehri and Soqotri do have this category:

(7) Prefix conjugation agreement

	Sing.	Dual	Plural	
Arabic	ʔ—-*u*	(= 1st plural)	*n*—-*u*	1st person
Mehri	ʔ—-Ø	ʔ—-*ō*	*n*—-Ø	
Arabic	*t*—-*u*	*t*—-*ā*	*t*—-*ūna*	2nd-person masculine
Mehri	*t*—-Ø	*t*—-*ō*	*t*—-*əm*	

In Mehri the 1st person dual is spelled with the first-person prefix /ʔ-/ and the dual suffix /-ō/, but the cognate form in Arabic with dual suffix /-ā/ is not well formed. Since this restriction has nothing to do with the exponents themselves, but rather with a general absence of category, a rule of impoverishment is invoked to delete the value [dual] from first-person arguments. As a result, the dual suffix /-ā/ will never be inserted in the first person.

(8) Arabic dual impoverishment

$$[\text{dual}] \rightarrow \emptyset / \begin{bmatrix} +1 \\ ___ \end{bmatrix}$$

Further Reading

More detailed overviews of Distributed Morphology can be found in Harley and Noyer (2003) and Embick and Noyer (forthcoming).

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R. M. W. (Bob) Dixon was born in Gloucester on January 25, 1939, and was brought up in Nottingham. After graduating with a degree in mathematics from Oxford University, he was in 1961 appointed Research Fellow in Statistical Linguistics at the University of Edinburgh. From reading the works of Boas and Sapir, Dixon realized that the only way he could master the principles of linguistics was to undertake study of a previously undescribed language. This led to 40 years of steady fieldwork, with 25 trips to the Cairns Rain Forest region of North Queensland, three to the Fijian island of Taveuni, and seven to the jungle village of Casa Nova, in Brazilian Amazonia (the trips varied in extent from 10 months to 2 weeks).

In addition to publishing shorter grammars of three Australian languages (Warrgamay, Nyawaygi, and Mbabaram) whose last one or two speakers he worked with, Dixon has published comprehensive grammars of two Australian languages – *The Dyirbal language of North Queensland* (1972) and *A grammar of Yidiny* (1977) – plus *A grammar of Boumaa Fijian* (1988) and *The Jarawara language of southern Amazonia* (2004). He has also published on Dyirbal songs and kinship, in addition to a thesaurus/dictionary plus texts volume on Yidiny (with similar volumes for Dyirbal in preparation).

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Dixon, Robert M. W. (b. 1939)

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adjectives gone?' (1977b) examined languages with a small adjective class and looked at the semantic rationale for their membership. In the introductory chapter of *Adjective classes: a cross-linguistic typology* (2004), he suggested that every language has an Adjective class (just as every language has Noun and Verb classes), but in some instances a degree of subtlety and insight is needed to discern it. His 80-page paper 'Ergativity' (1979), which was revised and enlarged as a monograph (1994), is regarded as the seminal work on this topic. He has also contributed to typological theory with papers on noun classes and classifiers, complementation, causatives, the unit 'word,' demonstratives, and copula clauses. Dixon's study of his native language, *A new approach to English grammar, on semantic principles* (1991a), has been thoroughly revised and enlarged and will be reissued (2005) as *A semantic approach to English grammar.*

In his comparative study of the approximately 250 indigenous languages of Australia, Dixon persistently drew attention to the difficulty of distinguishing similarities due to shared genetic inheritance and those resulting from borrowing. His essay 'The rise and fall of languages' (1997) put forward a 'punctuated equilibrium' model for the development of human languages over the past 100 000 or more years. Dixon's monograph *Australian languages: their nature and development* (2002a) provided a detailed study of and justification for regarding Australia as a very long term linguistic diffusion area.

After spending a somewhat frustrating period from 1964 (interrupted by a heady year at Harvard in 1968–1969) as a lecturer at University College London, Dixon was appointed Chair of Linguistics in the School of General Studies at the Australian National University and served as department head from July 1970 until December 1990. He developed a top-notch teaching and research milieu; 30 of the school's graduate students have gone on to academic positions across the newly formed linguistics departments in Australian universities and in overseas institutions.

The apogee of Dixon's career came in December 1996, when – jointly with Alexandra Aikhenvald – he founded the Research Centre for Linguistic Typology at the Australian National University. RCLT relocated to La Trobe University in Melbourne in January 2000. The center has about 20 members, recruited from across the world – doctoral students, postdoctoral fellows, and distinguished visiting fellows – every one of whom either is writing a comprehensive grammar of a previously undescribed language or has already done so. Each year, RCLT hosts an invitation-only international workshop; these have resulted in volumes on the distinction between areal diffusion and genetic inheritance, on derivations that change valency, on the unit 'word,' on evidentiality, on adjective classes, on serial verb constructions, and on complement clauses and complementation strategies. Dixon has a straightforward approach to academic administration, abhorring secrecy. He sets an example in probity and work ethic that is enthusiastically followed by members of RCLT.

Bob Dixon's activities range beyond linguistics. In the 1960s, he published a couple of science fiction short stories under the nom de plume of Simon Tully and, in the 1980s, two detective novels under the sobriquet Hosanna Brown. He has since 1955 been working on discography and is co-compiler of *Blues and gospel records, 1890–1943* (1997) and coauthor of *Recording the blues* (1970). His popular account of work in northern Australia, *Searching for Aboriginal languages: memoirs of a field worker*, was published in 1983 by the University of Queensland Press and was reissued in 1989 by the University of Chicago Press. We now await with eager anticipation Dixon's straight-talking autobiography, *I am a linguist*, scheduled for completion in 2005.

See also: Australia: Language Situation; Australian Languages; Causatives: Semantics; Classifiers and Noun Classes: Semantics; Gender, Grammatical.

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Djibouti: Language Situation

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There are four languages in use in the Republic of Djibouti, two indigenous and numerically predominant: Afar (Qafar) and Somali, and two introduced from outside: French and Arabic (Arabic, Ta'izzi-Adeni). According to 1996 figures, the proportion of speakers of Afar and Somali was roughly three to two, at 300 000 (55% of the total population at the time) and 182 000 (33%), respectively. The latter figure, however, is now certainly a gross underestimate, owing to the influx of Somalis from neighboring 'Somaliland' and Ethiopia. The estimated number of Somalis in Djibouti in 2004 stands at 60% of the population, which would mean around 280 000 speakers. French is the former colonial language and is maintained as one of the official languages of the country along with Arabic, which is spoken by a fraction of the population, chiefly by immigrants from Yemen, as well as a second language by sectors of the indigenous population. The majority of speakers of Afar (approximately 980 000 in total) lives outside Djibouti in neighboring Ethiopia and Eritrea, as of course is the case with Somali, which is also spoken in Somalia and 'Somaliland,' Ethiopia, and Kenya. The dialect of Somali spoken in Djibouti, Issa or Af Ciise, belongs to the Northern cluster on which Standard Somali is essentially based. Afar and Somali both belong to the Lowland branch of the East Cushitic family, the other languages of which are spoken in Ethiopia, Somalia, and Kenya.

Programs in both Afar and Somali are broadcast by Radio Djibouti and both have the status of written languages. Somali in Djibouti is written in the same Roman orthography adopted in Somalia since 1972, while since 1976 Afar has also employed the Roman script, but with certain differences in symbols for three non-European consonants. To add to the

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confusion, Afar in Ethiopia and Eritrea is now written in the same Roman orthography as Somali. The literacy rate in Djibouti was estimated at 68% in 2003, though earlier figures are much lower, 34% in 1996.

See also: Cushitic Languages; Eritrea: Language Situation; Ethiopia: Language Situation; Kenya: Language Situation; Somalia: Language Situation.

Language Maps (Appendix 1): Map 12.

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Ethnologue, Djibouti. http://www.ethnologue.com/show_country.asp?name=Djibouti.

Dobrovský, Josef (1753–1829)

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Josef Dobrovský was born on August 17, 1753 in Hungary, where his father was a soldier.

Although of Czech origin, he was brought up in the German language and learned Czech only when he was 10 years old, with his classmates at the Latin Augustinian school where he was educated from 1763 on. In 1768, he entered the Jesuit college of Klatow at the University of Prague. His capacities were noticed by the Jesuits, who made him attend the Jesuit Noviciate in 1772. In 1776, he started working as a preceptor for Count Nostic's children. There, where he worked for about 10 years, from 1776 to 1787, he got to know the upper crust of the Czech intelligentsia of the time. His works, first of an exegetical nature, became progressively more linguistic. A specialist in the Scriptures and Hebrew, he developed a passion for ancient languages. His personal evolution was linked to the Czech movement of national affirmation. For Dobrovský, however, Czech remained an object of study; he did not really believe in the literary potentialities of that language, and thus remained skeptical about its capacity to become a national language. So, even though he thoroughly studied ancient Czech literature – whose first systematic history he wrote in 1792 – he did it in German in the work entitled *Literarische Nachrichten von einer Reise nach Schweden und Russland*.

In the year 1792, he also carried out an exploratory mission on behalf of the Royal Czech Society to study history, literature, and the Slavic languages. He traveled through Germany and Sweden and visited Saint-Petersburg and Moscow, Warsaw, and Krakow. On that occasion, he became the foreign correspondent of the Russian Academy. The following year, he visited Hungary, Austria, and Northern Italy and made frequent trips to the Czech countries and Moravia. From those trips, he brought back many observations and impressions and set up a network of scientific correspondents interested in the Slavic studies. But it was through his teaching that he gave life to what would be called 'slavistics.'

In 1809 he published a Czech grammar, written in German. In 1822, he published in Latin his *Institutiones linguae slavicae dialecti veteris*, a book regarded not only as the first grammar of Old Slavonic but also – as it is to this day – as the founding act of scientific slavistics. Moreover, his linguistic works contain a Czech–German dictionary and two big miscellanies devoted to Slavic culture in all its diversity, with ethnographic, folkloric, mythological, historical, and linguistic studies: *Slavin* (1808) and *Slovanka* (1814–1815).

His ambition to write a Sorab dictionary (he had taught that language at the Prague Seminary) was finally ruined: Dobrovský, undermined by moral problems, went through long periods of doubt regarding the usefulness of his own work, the object of study he endeavored to constitute, and even the capacity of the Czech people to embrace their destiny. Partly because of his doubts, he became estranged from a new generation of scientists, who reproached him for his lack of faith and called him, as Josef Jungmann (1773–1847) put it, "a slavized German." He died on January 5, 1829.

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Dobson, Eric John (1913–1984)

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Eric John Dobson was a distinguished philologist of English, with a particular research interest in Middle English and early Modern English. He was born in Roseville, New South Wales, Australia, on August 16, 1913, and obtained a First Class degree in English at the University of Sydney in 1934. Further study at Merton College, Oxford, led to an additional First Class degree in English in 1937. He was appointed to a lectureship in English at the University of Reading in 1940, but spent part of the War years, from 1942 to 1945, in naval intelligence. In 1948, he moved back to Oxford. In 1954, he was made Reader in English Language, and in 1964 Professor of English Language. He died in Oxford on March 31, 1984.

In 1947, he published a preliminary but important study of the phonetic writings of Robert Robinson, the early 17th century phonetician, which was later revised for publication in book form (1957b). His doctorate (1951), supervised by Charles T. Onions, was on the pronunciation of English from 1500 to 1700 as revealed primarily in the works of the orthoepists. It quickly established itself as the standard work on the subject (1957a, 2nd edition 1968, Japanese translation 1962), and as such has not been bettered over the past 50 years. As part of his research into early Modern English phonology, Dobson also reedited *The hymn to the virgin* (1955), a 15th century poem, which was accompanied by a phonetic transcript by a Welsh speaker.

Dobson's work in Middle English textual criticism and literature focused mainly on the *Ancrene Riwle*.

A list of his publications is in Stanley and Gray (1983: 169–170).

See also: English, Early Modern; English, Middle English; Lexeme-Morpheme-Based Morphology; Phonetics: Overview.

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Doctors and Patients in Multilingual Settings

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Introduction

This paper opens with a broad review of what linguistics in its various guises has contributed to our understanding of doctor–patient communication. It will then look at the particular issues around the consultation in multilingual societies. Inevitably, by concentrating on doctor–patient communication, much of the talk of medical settings is hidden. This 'backstage' work – the talk between doctors and other health professionals – should not be underestimated. However, given that so much of the research has focused on the (usually) dyadic encounter between doctor and patient, this 'frontstage' work will be the focus here.

The studies of multilingualism and intercultural communication within the health setting share a context with the numerous studies of language and diversity in many other settings, most notably within education. Historically, these studies began to emerge in the 1960s and 1970s when most postcolonial industrial societies were transformed from either monolingual or stable bi- or trilingual societies into multilingual ones. The pressure to deliver services sensitive to emerging and changing multilingualism is charted in both the research literature and the policies and practices of these services. Many of the reforms to

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Eric John Dobson was a distinguished philologist of English, with a particular research interest in Middle English and early Modern English. He was born in Roseville, New South Wales, Australia, on August 16, 1913, and obtained a First Class degree in English at the University of Sydney in 1934. Further study at Merton College, Oxford, led to an additional First Class degree in English in 1937. He was appointed to a lectureship in English at the University of Reading in 1940, but spent part of the War years, from 1942 to 1945, in naval intelligence. In 1948, he moved back to Oxford. In 1954, he was made Reader in English Language, and in 1964 Professor of English Language. He died in Oxford on March 31, 1984.

In 1947, he published a preliminary but important study of the phonetic writings of Robert Robinson, the early 17th century phonetician, which was later revised for publication in book form (1957b). His doctorate (1951), supervised by Charles T. Onions, was on the pronunciation of English from 1500 to 1700 as revealed primarily in the works of the orthoepists. It quickly established itself as the standard work on the subject (1957a, 2nd edition 1968, Japanese translation 1962), and as such has not been bettered over the past 50 years. As part of his research into early Modern English phonology, Dobson also reedited *The hymn to the virgin* (1955), a 15th century poem, which was accompanied by a phonetic transcript by a Welsh speaker.

Dobson's work in Middle English textual criticism and literature focused mainly on the *Ancrene Riwle*.

A list of his publications is in Stanley and Gray (1983: 169–170).

See also: English, Early Modern; English, Middle English; Lexeme-Morpheme-Based Morphology; Phonetics: Overview.

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public services in health education, and doctor–patient communication specifically, which relate to linguistic diversity, reflect those developed within other public-sector sites. Research discussed below also shows that many of the strategies used are informal or 'coping' ones.

The Contribution of Linguistics to Research on Doctor–Patient Communication

It has been estimated that some 10 000 articles and books have been written about the doctor–patient consultation. The great majority of these have been written by medical practitioners, with the disciplines of psychology and communication studies well represented (Ong *et al.*, 1995). The contribution that linguistics has made is microscopic compared with this massive outpouring. And whereas there are well-established disciplines of medical sociology and medical anthropology, no such field exists for linguistics. Research on the interactional process of the consultation has been dominated recently by Conversation Analysis (CA).

One reason why medical linguistics is not a well-established field in doctor–patient communication studies may be that the research on medical interactions has been carried out by many different branches of linguistics. Furthermore, while some research draws on CA, medical linguistics/discourse lacks the overall coherence of CA studies (*see* **Conversation Analysis; Conversational Analytic Approaches to Culture**). However, a review of the contribution of linguistics to doctor–patient communication shows that some of the groundwork has been done and that this is a rich territory to mine, even though it is quite a problematic site to research (Candlin and Candlin, 2003). As well as the need for more medical linguistics, there is the tough job of making an impact on the health professions through medical journals and educational interventions.

One of the difficulties in assessing linguistic studies in the medical field is the perennial problem of establishing boundaries around the notion of language. This is particularly the case when looking at medical discourse. For this reason, readers will be referred to the CA and ethnographic literature from a sociological tradition, aspects of medical anthropology as well as the more mainstream work in sociolinguistics, linguistic discourse analysis, and corpus linguistics.

Sociological and Anthropological Approaches to Doctor–Patient Communication

These approaches have informed and used discourse analysis and are important influences for the linguist looking at doctor–patient communication. One of the first sociologists to look closely at doctor–patient communication, Aaron Cicourel, is concerned with how knowledge is mediated and interpreted in medical settings and uses discourse analysis and ethnography to examine participants' inferential processes. He examines the miscommunication that arises when doctor and patient have a different structure of belief about the cause of an illness (see also Tannen and Wallet, 1986). He argues that much of the misunderstanding that arises out of diagnostic reasoning stems from tacit clinical experience and from everyday understanding of social interaction, which is presumed to be shared knowledge (Cicourel, 1983). Other ethnographic studies, which take a closer look at the routines and patterns of medical discourse, include those of Atkinson (1995) and Silverman (1987). Drawing on seminal work on the ritual aspects of the consultation, both examine the powerful discourses that construct the patient as warranting particular types of treatment and show the gap between doctor and patient schemata. Whereas Silverman focuses on the consultation itself, Atkinson also goes 'backstage' to study the ways in which doctors organize narratives and descriptions of disease and patient history. This study, which takes a detailed discursive look at how clinical knowledge is reproduced, helps to account for the asymmetrical practices that the sociolinguistic literature has focused on.

The main section of this chapter will look at linguistic and cultural differences in the consultation. The impact of culturally different health beliefs has been a major concern of medical anthropology (*see* **Medical Discourse: Non-Western Cultures**). In contrast to the clinical view of disease defined by physical parameters and, largely, numerically, medical anthropology conceives of ill health as illness and looks at what illness means to the layperson. The significance for this approach in doctor–patient consultations lies in the potential for misunderstandings when different explanatory models of illness, which the patient brings to the encounter, clash with the diagnosis and explanation of the disease from the doctor's perspective. The interest in how patients organize their experience of illness has led to studies on the 'illness narrative' that have been taken up by discourse analysts (*see* **Medical Discourse: Illness Narratives**). Studies by medical

anthropologists have also discussed different ways in which patients from different cultural backgrounds may present their symptoms – different languages of distress – and the problems of medical terminology. The culturally-specific beliefs that patients bring to a consultation enter into the discourse of the encounter and cannot be ignored in a narrowly linguistic analysis. However, apart from the recent work on narrative, mentioned above, and the related interest in metaphor in making sense of illness, medical anthropology has not focused on the discursive and interactional aspects of the consultation.

The dominant approach to the interactions of doctor–patient consultations is through CA. By looking at relatively large numbers of a particular phase of the consultation, CA has shown the patterns of turn design and their consequences for doctors and their patients. The notion of turn design conflates both content and sequencing of turns so that, for example, the particular way in which a family doctor orientates to the patient in the opening sequence tends to determine how the patient will react. CA studies in the United States, Finland, and the United Kingdom, to name some of the main contributions to this tradition, have focused on particular phases such as openings, history taking, and making a diagnosis. They have been particularly concerned with how to deal with resistances from patients by, for example, online commentary while examining a patient, and designing the diagnostic conclusion to overcome possible disagreements and resistances (see Drew *et al.*, 2001 for an overview). The transcription and analysis of sequential organization that CA offers has been influential in medical discourse analysis as well as DA more generally. However, as is discussed in more detail below, CA, in pursuing the quest for general patterns, has not focused on diversity in communication and the unpredictable and less determinate qualities of consultations when patient and doctor do not share linguistic/cultural modes of acting. Nor does CA tend to look at the whole consultation in order to understand how the whole is managed and experienced.

Sociolinguistics and Discourse Analysis

Given that sociolinguistics is the study of language differences, variety, and change and what this tells us about society, it is not surprising that this field has given some attention to health professional–patient communication, where differences in modes of talking, values, and knowledge feed into institutional asymmetries. Early sociolinguistic studies focused on micro-level speech act strategies to work toward a model of discourse styles and rules of interpretation. The institutional context is only taken as a variable to explain stylistic differences. Other sociolinguistic studies of doctor–patient communication have paid more attention to the institutional context and have explored themes such as asymmetrical power relations (West, 1984), decision-making processes, and the discursive representation of health and illness (Fisher and Todd, 1983). The interest in asymmetry follows the studies in inequality in many expert–lay encounters (Freeman and Heller, 1987) and the framing of expert knowledge as opposed to lay experience (Tannen and Wallet, 1986).

Some studies examine the effect of a particular variable on the consultation. For example, West (1984) looks at gender as a factor in interruptions. Age and class have also been studied to ascertain the impact of these variables on access to appropriate medical treatment and advice. For example, studies show that patients from low socioeconomic backgrounds are more likely to be given drug prescriptions than psychotherapy. Corpus linguistic methodology has also been used to examine critically certain social phenomena in the consultation, such as use of jargon and the impact of the gender of the doctor on the consultation (Skelton and Hobbs, 1999).

For the purposes of this article, no strong distinction is made between interaction-based sociolinguistics and discourse analysis. A concern with social inequalities is reflected in both, particularly in the studies of how people are identified and categorized through talk and how talk is used to present or resist particular social identities. A seminal work here is Mishler's study of doctor–patient discourses (Mishler, 1984). The discourse, or what he calls 'voice' of medicine, is contrasted with the 'lifeworld' voice of the patient. The voice of the lifeworld refers to the reporting of everyday life, whereas the voice of medicine constructs a 'scientific attitude' through abstract rules that removes events from their immediate context (Mishler, 1984: 104). The voice of medicine distorts the lifeworld in order to dominate the patient. Mishler argues that doctors need to shift their discourses toward the voice of the lifeworld in order to respect patient identity and empower them. Mishler's discourse study has been taken up by medical sociologists and is part of the larger literature on the problems that patients have communicating with doctors. Recent studies such as Atkinson (1995) have argued that the distinction between these two voices is not so clear-cut. However, Mishler's work has been an important contribution to the theoretical backdrop on understanding misunderstandings, which is central to the research that is the focus of this article.

Studies in critical discourse analysis set the consultation within the wider bureaucratic context of the hospital or community practice. They examine the institutional structures of these settings that are constantly reproduced in the routine encounters between patients and health professionals. For example, Wodak (1997) discusses how the institutional order of the hospital bares down on the individual consultations. She shows how maintaining the institutional myths of the undisturbed, time-rich, harmonious process of seeing patients constructs patients as difficult, when these myths explode in the harsh reality of outpatient hospital life. Although much of the sociolinguistic literature on doctor–patient communication does not focus on specific aspects of medical care, such as types of disease or particular ethical considerations, there are exceptions such as the discourse analysis of genetic counseling. With the advent of a new journal *Communication and Medicine* (edited by Srikant Sarangi), more thematic discourse studies are likely to be produced.

Doctor–Patient Communication and Multilingualism

The institution of medicine faces many of the issues that education and other institutions in multilingual societies face. These are issues of access and potential inequality where a dominant language (shored up by language ideology) is inhospitable to or at least inattentive to minority languages. Speakers of these languages may find that there is no one in institutional authority that can speak to them in their first language and no provision for interpreting. And little or no attention, either practically or in the research literature, has been given to patients who can communicate in the dominant language but do not share the same communicative style as the doctors.

The literature on doctor–patient communication in multilingual, multicultural societies draws on most of the themes of the more general literature discussed above: asymmetry in encounters, misunderstandings and inferential processes, and some of the institutional systems and environments that affect the local outcomes of patient–doctor interactions.

The literature relating to multilingualism falls into two broad categories. There is an extensive literature on crosscultural (or transcultural) issues, drawing on medical anthropology and clinical studies. These studies identify cultural differences in health beliefs both in non-Western societies and, in comparative perspective, in multicultural societies in the West. Some of these studies are drawn on to develop educational and training programs in cultural sensitivity for medical students and trainee doctors in the West and in non-Western countries (Antia and Yassin, 2001).

The other area deals with issues of language in the consultation and this is the focus of the rest of this article. While some research plays down language problems, most emphasizes the concerns of practitioners and patients (Ahmad *et al.*, 1989). There is quite an extensive literature in interpreting in the doctor–patient consultation. There are also a few studies that look at how other strategies are used and at intercultural communication in the doctor–patient consultation. The literature on interpreting tends to either deal with policy issues around the need and type of provision (Jacobs *et al.*, 2001), or, more descriptively, with the nature of mediated consultations, or highlights some of the difficulties and drawbacks of dealing with interpreter-mediated triadic encounters. The next section will focus on the interpreter literature.

Interpreting in Doctor–Patient Encounters

The literature on interpreting in these encounters connects to the studies of mediating and advocacy more generally in medical encounters (where second or foreign languages are not barriers) and on the general literature on interpreting. In the former studies, it is usually a relative or friend who acts as a mediator or 'chauffeur' (Silverman, 1987: 161ff.). The chauffeuring image is one of the mediator 'steering' the patient through the consultation and this is particularly the case when members of the family are mediating for elderly parents in triadic encounters.

The general argument in the literature on linguistic interpreting is that only professional interpreters are able to do an adequate job of conveying the talk of the patient to the doctor and vice versa. Within this literature there is a tension between those who advocate an interpreter as a neutral tool and those who see the interpreter acting as an ambassador or advocate. The former assert the importance of the professional interpreter, the latter see advantages and disadvantages with professional interpreters and some see advantages in informal interpreters.

The literature on interpreting from within medicine tends to argue from two perspectives. The first is a policy one in which the issue is one of a shortage of professional interpreters. The second perspective is more of a grumble about providing care and establishing relationships with patients through an interpreter. In neither case is the quality of interpreting given much attention. However, linguistic and sociolinguistic studies take a more skeptical perspective on the 'perfect' medical interpreter. Far from being a neutral tool or 'walking bilingual dictionary' (Ebden

et al., 1988), the interpreter is a linguistic and social intermediary, dealing with discourse and social interaction and not just a narrow definition of language: interpreters do not merely convey messages; they shape, and in some very real sense, create those messages in the name of those for whom they speak (Davidson, 2000: 382).

Davidson's work also clearly shows that as well as managing the conversational flow of the consultation, interpreters also act as gatekeepers. They are aware of the institutional, and particularly, time constraints under which doctors work and, as employees of the hospital, often edit and even delete utterances of the patients for whom they are interpreting. To this extent, they are certainly not acting as advocates or ambassadors. Nor are they neutral since they act as social agents within the jointly constructed discourse. Rather they act as another level of institutional gatekeeping (Davidson, 2000). It is not surprising, therefore, that interpreter-mediated consultations are often less patient-centered than nonmediated ones (Rivadeneyra *et al.*, 2000).

In most medical settings, more informal interpreters are used than professional ones, including staff in the hospital or clinic and family and friends of the patients. Yet there is a dearth of literature in this area. One area where there are some studies is in the use of children as informal interpreters for their family. This research has focused on the views of health care professionals and has identified several problems including limited language skills and the difficulties of interpreting complicated and sensitive subjects (Cohen *et al.*, 1999). The term 'language brokering' is used, derived from the notion of cultural brokering, which suggests that a 'broker' is more independent than an interpreter in initiating action in an encounter. The term 'brokering' focuses on the consultation as an intercultural event and not just on narrow issues of linguistic translation. Although the role of children in these intercultural encounters can lead to the kind of problems mentioned above, research on children as brokers showed a more mixed picture (Free *et al.*, 2003). The child brokers often felt ignored and, contrary to good practice for professional interpreters, wanted to be treated as full participants in the consultation. But they also felt there were benefits to child brokering in terms of the responsibility it gave them and the help they could offer their families.

Although the lack of professional interpreters in the health service is a continuing problem, the interpreter-mediated consultation can produce its own misunderstandings and this may be in part due to the doctors' own competence in working with interpreters. Some patients prefer to communicate directly with their doctor and there is some evidence that patients are suspicious of cultural mediators who may talk *for* them. When no interpreter is available or wanted, doctor and patient face rather different problems. Consulting directly with patients with whom doctors do not share a first language and where the patient (or indeed the doctor) has only limited skills in a common language requires resourcefulness and communicative flexibility on both sides.

Other alternatives to the face-to-face interpreter-mediated consultation are the use of translated medical terms and phrases and the use of telephone interpreters. One ethnographic linguistic study of a local community clinic in Belgium (Blommaert *et al.*, in press) shows that there is considerable unease with all these different strategies among the staff of the clinic. A manual that consisted of key phrases, symptoms, and diseases was translated into those languages where there were few or no informal interpreters. However, this was found to be cumbersome and created its own linguistic and interactional problems. Doctors preferred direct and unmediated consultation where possible and this was also a finding from the UK-based telephone service: NHS Direct.

The studies mentioned above highlight two aspects: one involving language and culture and the other mediated or unmediated interpreting. The anthropological literature and the medical literature on multicultural matters tends to see the issues as cultural ones and aims to improve intercultural awareness The literature on interpreting, certainly until recently, has seen the issue as a language one (but see the sociolinguistic work on interpreting in the consultation referred to above). Rather than seeing these issues as either language issues or as cultural issues, recent studies take the view that language and culture are interconnected. The question of whether consultations are more effective if mediated through interpreters is not as straightforward as it appears. There is evidence that some doctors and some patients prefer to manage the consultation directly, despite the apparently obvious advantages of using interpreters. This leads to the research on unmediated encounters.

Intercultural Communication in Multilingual Settings

This section will look at intercultural communication where English is the language of the majority group. The issue of English language ability (and by implication the cultural knowledge associated with speaking English fluently) has been treated as an either/or matter in the medical literature: you either speak English or you do not. And this is part of a wider set of

linguistic ideologies in which clear boundaries are put around language and people's ability to speak them. Yet sociolinguistic studies show that patients who do not speak a local or standard variety of English may be anywhere on a continuum of ability in terms of their accuracy, fluency, structuring of explanations, and presentation of symptoms (Ali, 2003). Also, language limitations and differences are not just a matter of agreeing on shared information but can lead to negative judgments and stereotyping as GPs view patients (and sometimes those acting as interpreters) through the prism of language difference as 'difficult.' Problems with understanding, interpreting, and translating that relate to a particular language can slide into negative assumptions about the group that speaks this language (Blommaert *et al.*, in press).

In the past, there was a tendency to discuss 'culture' in terms of static, culturally specific health beliefs separate from language. This position is now widely critiqued in both the medical and the sociolinguistic literature. Despite some evidence of different health beliefs, research shows that Western models of medicine predominate. Rather than fixed health beliefs and the metaphors of illness of different cultural groups, it is the language and cultural issues concerned with relating to and representing illness to the GP that tend to cause misunderstandings (Anderson *et al.*, 1989).

Drawing on interactional sociolinguistics (Gumperz, 1999), recent studies have looked at the linguistic dimension of intercultural communication in doctor–patient communication. Ways of talking are not separated from cultural assumptions: for example, how direct to be, how much background detail to give before the main point, whether interrupting someone is rude or friendly or what topics can be discussed. These are matters of discourse or rhetoric that affect the whole climate of the consultation and are crucial to styles of self-presentation (Roberts *et al.*, 2004).

The problem of lack of mutual understanding is often highlighted in studies and medical textbooks on communication skills, as is the need for patient-centered consultations and the importance of shared decision making. Where there are language and cultural differences, these issues are likely to be more complex. The goal of shared decision making, for example, depends on negotiating shared meanings and the condition for creating such sharedness depends in turn on some level of agreement about how to interpret different communicative styles (Gumperz, 1999).

As the studies in CA referred to above have shown, much of this inferential process is displayed in the next turns at talk, and this is an important resource. However, studies in interactive sociolinguistics have argued that interpretive processes cannot be taken for granted. They may be hidden or indirect. This is particularly the case when neither participants nor analysts share the same communicative background. It is not, therefore, surprising that few CA studies are of intercultural consultations since a more ethnographic approach is needed to understand the range of different patient communicative styles that are typical of an average surgery or hospital clinic in multilingual urban settings.

Patients with Limited English and Doctors in General Practice

A recent study of linguistic minority patients using English in inner London family practice consultations charts the misunderstandings that occur when patients with limited English or a culturally specific communicative style have to use English with the family practitioner. The study also identifies ways in which doctors and patients attempt to prevent or repair misunderstandings (Roberts *et al.*, 2005). Using interactional sociolinguistic methods, combining video-recorded consultations with ethnographic feedback, this study showed that even quite limited speakers of English use it in the consultation. Misunderstandings were the result of both patients' and doctors' difficulties with linguistic features and different communicative styles. Paradoxically, doctors who used patient-centered techniques, such as asking patients what questions they wanted to ask, often created more misunderstandings. Patients' style of communicating caused problems for doctors, particularly in their rhetorical style of presenting their medical concerns. Both doctors and patients found ways of preventing and repairing misunderstandings. Patients used artifacts and worked from the 'here and now' details of their case. Doctors had found a series of strategies to make their utterances more expectable and more transparent through reformulations and found ways of recycling information over the whole consultation to tune into patient's local concerns and expectations. This study concluded that despite quite frequent and sometimes protracted misunderstandings, direct and unmediated consultations were accomplished successfully even though there were differences in language and cultural use and assumptions.

Doctors from Different Ethnolinguistic Backgrounds

Doctors whose first or dominant language(s) is not that of the majority community also face issues of intercultural communication. Doctors, like patients,

are evaluated and categorized. These include difficulties with and criticisms of their communicative style (Erickson and Rittenberg, 1987) and possible disadvantage or discrimination by the medical profession (McKenzie, 1995). This can also affect medical undergraduates, and both recently registered and established doctors, who are assessed on their performance in oral assessments and in simulated doctor–patient communication (Swadi, 1997).

There are also perceived advantages to employing doctors who share a common ethnolinguistic background with their patients. For example, Flores (2000) discusses achieving cultural competence with Hispanic doctors and patients, and in the United Kingdom patients' choice of doctor among the South Asian communities is frequently determined by language factors (Ahmad *et al.*, 1989). As different streams of migration change the linguistic composition of particular geographic areas and as institutional demands and pressures change, so the issue of shared language background changes. For example, a recent lack of family doctors in the United Kingdom has led to direct recruitment of trained doctors from Europe who bring with them a lingua franca that they can use with patients settled in the United Kingdom.

Conclusion

Many of the issues that discourse and conversation analysis have identified in the monolingual doctor–patient consultation resonate with those characterized by linguistic diversity. Misunderstandings between doctors and patients are commonplace. However, in multilingual settings these are more frequent and more likely to surface during the consultation. Similarly, the issues in interpreting more generally are relevant in the medical setting but again there are specific concerns highlighted by these settings such as the gatekeeping function of interpreters in hospital settings discussed above. The single most important development in researching and understanding doctor–patient communication in multilingual settings is to produce more collaborative work between those in mainstream medicine and discourse analysts and sociolinguists with expertise in linguistic and cultural diversity. Until this happens: "Our understanding of medical communication . . . is an understanding of a tiny proportion of doctors and patients throughout the world" (Skelton *et al.*, 2001).

See also: Conversation Analysis; Conversational Analytic Approaches to Culture; Medical Discourse: Illness Narratives; Medical Discourse: Non-Western Cultures.

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Document Retrieval, Automatic

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Document retrieval (more commonly referred to as 'information retrieval' by researchers in the field) is the computerized process of producing a list of documents that are relevant to an inquirer's request by comparing the user's request to an automatically produced index of the textual content of documents in the system. These documents can then be accessed for use within the same system. Nearly everyone today uses document retrieval systems, although they may not refer to them as such, but rather as Web-based search engines such as Google, Yahoo, and Alta Vista.

Document retrieval systems are based on different theoretical models that determine how matching and ranking are conducted. The most prevalent models are Boolean, vector space, probabilistic, and language modeling, each of which is explained later. Within the indexing aspect of each model, the system processes, represents, and weights the substantive content of documents and queries for matching. It is here in feature selection that one might expect to see linguistic theories and models used extensively. However, to date, most systems use only the morphological and lexical levels of language, with some notable exceptions where full natural language processing is used (Liddy, 1998; Strzalkowski *et al.*, 2002).

Following a brief history of the major mileposts and trends in the field of document retrieval, the basic components and processes of a generic document retrieval system are described in fairly nontechnical language in order to provide context for understanding later, more technical distinctions.

History of the Field

Document retrieval first emerged as a field of both inquiry and application in the late 1940s and early 1950s at a time when the amount of scientific literature being published was growing at such a tremendous rate that it raised concerns as to how scientists would be able to stay informed of new developments as they were being reported in the scientific literature. Researchers, mainly computer scientists and library scientists, began to consider how computers might be programmed to accomplish some of the laborious human tasks of representing and retrieving relevant sources that were previously considered within the purview of librarians and library science. Initially, document retrieval was actually citation retrieval,

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that is, a search against bibliographic fields such as title, author, source, and subject-based keywords that were humanly assigned to documents from a controlled vocabulary. The documents themselves were neither actually stored nor accessible by computer. The appropriate analogy is closer to an automated library card catalog search than a full-text search of the contents of actual documents. The results from a document retrieval search were simply citations that led the user to a hard-copy document, book, or report. Over time, advances in the theoretical models underpinning document retrieval and decreases in the cost of computer storage permitted the full text of documents to be ingested and searched, not just a limited set of manually assigned bibliographic access points.

While the increase in scientific literature may have been the practical motivator for the field of document retrieval, Vannevar Bush's article in the *Atlantic Monthly*, 'As we may think,' is considered by most historians of science as the intellectual forbearer of the field (Bush, 1945). In this piece Bush presaged much of what we today consider to be the crux of the field when he called for a solution for improved access to information that he referred to as "memex ... a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility ... an enlarged supplement to his memory."

As all other computer-automated applications at that time, document retrieval initially made use of punch cards that enabled the postcoordinate revolution – that is, rather than documents being assigned precoordinated descriptors, such as *automatic information retrieval* as would be typical in a card catalog or a printed index, postcoordinate indexing enabled single word descriptors to be assigned one to a card, such as *automatic* on one card describing the document, *information* on another, and *retrieval* on yet another card and then for the user to combine search terms as they best saw fit to describe their information need at search time.

The increasing availability of machine-readable texts led to rapid, widespread growth in the usage of document retrieval systems as the collection against which users could search increased dramatically. Not surprisingly, this also led to the flourishing of the early commercial document retrieval systems such as Dialog and LexisNexis. These systems were sufficiently complex and nonintuitive that end users needed to have trained search intermediaries do their searches, because these intermediaries could understand the intricacies of the data records in the document retrieval system and were well-trained in constructing queries in Boolean logic. These early systems were not based on free text searching, but rather required the intermediary to know the exact wording and syntax to use in searching, both for proper names and subject-based descriptions – referred to respectively as authority files and controlled vocabulary.

While the commercial realizations of document retrieval were seeing success in improved provision of citations or actual documents to researchers in the scientific disciplines, researchers in the growing field of information science were actively moving on to more complex models of retrieval and more natural representations of documents on which users themselves might search – namely the text as it occurred naturally in the documents. Of course, this then obviated the need for intermediaries, lowered the cost of entry to the field, and opened the modes of access. This was a trend that began in the early days of document retrieval, but which really only came to full fruition with the tremendous growth in open availability of information on the Web. Interestingly, the document retrieval systems, with full-text searching, relative weighting of terms, and ranking of results, which were being developed and tested with increasing rigor by academic researchers, were not adopted by commercial providers of document retrieval services, due to these organizations' sizeable investments in Boolean-based retrieval.

To the growing number of academic computer science departments and research labs that were becoming interested in document retrieval, the Cranfield experiments that ran from 1957 to 1967 (Cleverdon, 1967) were a major milestone as they established the basic evaluation paradigm, including metrics and experimental procedures that enabled true scientific experimentation to be conducted and the field to be recognized as a science. The test-collection paradigm of gathering a stable collection of documents of interest to an identifiable user group, as well as possible questions from these users that might be expected to be answerable by documents in that collection and relevance assessments on the retrieved documents (or the whole collection if possible), is still used today. The accepted metrics used in document retrieval experimentation and evaluation were also established, namely, *recall* – the percent of known relevant documents in the collection that are retrieved; and *precision* – the percent of retrieved documents that are relevant.

Based on the Cranfield test collections and the new evaluation metrics, an era of great research activity and development ensued. However, unlike Cranfield's work, which evaluated automatic searching of manually assigned index terms, the ensuing work used these same collections for experimentation on

automatic indexing of the natural language of document abstracts first, and later, of the full text of the documents. The various models of document retrieval that are so well-known and experimented with today were introduced, including the vector-space model of Salton and his group of researchers at Cornell (Salton, 1968); the probabilistic model (Robertson and Sparck Jones, 1976); and the inference model (Turtle and Croft, 1990). The most widely known and used of the experimental systems was SMART, developed by Salton (1971). It was used for extensive empirical runs that showed the value of the simple natural language processing techniques of stemming, deletion of stop words, and phrase-based indexing, as well as many experiments investigating the most appropriate term-weighting formula.

Document retrieval systems with empirically-tested ranking and weighting algorithms slowly spread into the operational world as increasing numbers of experimental results demonstrated that automatic indexing of the natural language of documents was as good as manually controlled vocabulary indexing. The range of retrieval models that were used commercially increased due to availability of increased computing power and lower cost of storage of indexes based on the full text of documents.

Large scale comparative testing of document retrieval systems began with the first of the Text REtrieval Conferences (TREC) at the National Institute of Standards and Technology in 1992 (Harman, 1993) (*see* **Text Retrieval Conference and Message Understanding Conference**) and has continued and expanded each year. The goal of these annual events is to bring together researchers from around the world to test their systems on a common test collection of queries and documents and then share the details of their systems with the other participants. Twenty-five research groups participated in the first evaluation using a large, new test collection, a set of questions generated by a likely group of users, and their relevance assessments on the documents retrieved by the participating systems. Most members of the document retrieval community believe that TREC has been one of the most positive influences on both scientific advances and expansion of interest in document retrieval.

However, most would also agree that it is the Web that has made the field as prominent and exciting as it is today. Web searching is now omnipresent in most individuals' lives and little thought is given to it as being the original document retrieval that began back in the 1940s. And while there are some real differences between earlier methods and practices of document retrieval from preestablished document collections as compared to the very dynamic and less controlled world of Web searching, the basics are the same, with the addition of link analysis, which uses a network structure of links among Web pages as an additional source of information (in addition to document content) in retrieving and ranking potentially relevant documents or pages (*see* **Web Searching**).

Walk-through of a Basic Document Retrieval System

In document retrieval, some processes take place dynamically when the user inputs their query, while other processes take place off-line in advance and in batch mode and do not involve individual users. These static processes are run on the documents that will be made available in the retrieval system. These will be explained first. Then, the two dynamic processes, Query Processing and Matching, will be presented. Figure 1 provides a simple but clear view of the relationship between these three processes.

Document Processing

The first two steps in the processing of documents are somewhat mundane, but necessary, and can be considered as batch preprocessing. These are:

1. Normalize document stream to a predefined format, whereby multiple external formats (e.g., news feeds, Web pages, word processed documents) are standardized into a single consistent format. This is an essential step (much akin to data cleanup in data mining), as all downstream processes rely on receiving a common format they can recognize and process. Preprocessing is particularly vital for systems with more complex processing than simple 'characters between white spaces' indexing.

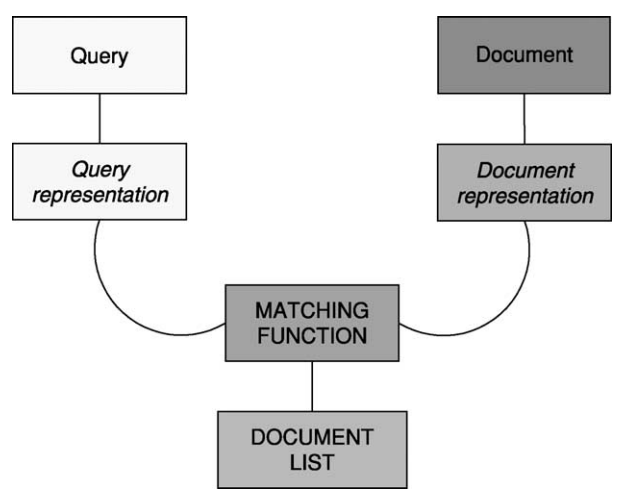

Figure 1 Basic components of a document retrieval system.

2. Break document stream into desired retrievable units, whether this is Web page, chapter, full document, paragraph, etc. The pointers stored in the inverted file are to whatever unit size has been predetermined. Therefore, document retrieval could in fact be paragraph retrieval, if the indexable unit was determined at this stage to be the paragraph.

From this step forward, the system is performing the heart of the document indexing process.

3. Identify potential indexable elements in documents. This is a key decision point that dramatically affects the nature and quality of the retrieval performance. First, the important definition needs to be made as to what is a term. Is it any string of alphanumeric characters between blank spaces or punctuation? If so, are noncompositional phrases or multiword proper names, or interword symbols such as hyphens or apostrophes, treated differently (e.g., are 'small business men' and 'small-business men' the same)? At this stage, the system requires a set of rules to be executed that control what actions are taken by the 'tokenizer' – the algorithm which recognizes 'indexable terms.' Information retrieval systems vary as to which of these processes they perform, but the most frequently used processes are these:
   a. Delete stop words with an algorithm that filters the document's potential indexable elements against a stop word list to eliminate terms that are deemed to be insignificant in determining a document's relevance to a user's request. The original objective in using stop words was to save system resources by eliminating those terms that have little value for retrieval performance. Although these terms may comprise up to 40% of the tokens in a document set, index size is of far less importance today due to cheap memory, but their omnipresence renders them of little value to retrieval. The typical word classes that are marked as stop words include the function word classes and a few more (i.e., articles, conjunctions, interjections, prepositions, pronouns, and 'to be' verb forms).
   b. Stem terms by removing suffixes. In this morphological step, some information retrieval systems do just inflectional ('weak') stemming, which only changes the subclass within a part-of-speech category, e.g., past tense to present tense, while others also do derivational ('strong') stemming which removes suffixes, sometimes recursively, that may actually change the part of speech of a word.

   The use of stemming will result in fewer entries in an index, each of which is likely to have higher frequency counts than if all morphological variants and their counts are used. The initial goal of stemming was to reduce the storage requirements of the inverted index file by reducing the number of unique words, but stemming has remained in use even today, when storage is not an issue, because it improves recall of relevant documents. For example, if a query includes *analyze*, the user may well want documents that contain *analysis*, *analyzing*, *analyzer*, or *analyzed*. In order for the system to match on all these variants, it must stem both the query and the document terms to *analy-*. Obviously, stemming may negatively impact precision (*see* **Stemming**).

4. Bracket noun phrases, usually by means of regular expressions which define the part-of-speech patterns that characterize a noun phrase (e.g., <ADJ NN> or <NN NN>). This is a step that can negatively affect recall of retrieval results by either excluding documents when the phrasal expression in the query is not exactly the same as the index entry of a document, or positively affect precision by retrieving only documents that include the terms in the desired phrasal expression.
5. Produce an inverted file containing a sorted array of all indexable terms (with *term* defined as referring to either a word or a phrase), along with the unique identification number of each document in the collection in which the term occurs, a link to each of these documents, weights for each term as determined by the IR model being implemented in the system (which will be described in the next section) and optionally, the within-document location of the term. More-sophisticated systems may include further information in the inverted file, such as named entity category for proper names (i.e., person, organization, geo-location, etc.) but the most common features are simply term, document ID, and weight.

Query Processing

The system's internal representation of the user's question/search terms is typically referred to as the query. Most of the same processes that are run on the documents are also run to produce the query, but there are some unique processes as well. As distinct from document processing, all of the query processing is done in real time, while the user awaits their documents. These are:

1. Recognize query terms vs. special operators, such as "*I need information about* …" that do not convey the topic of the user's information need and will not be included in the query representation.
2. Tokenize query terms, a process that requires similar decisions as were described on the document processing side – that is stop-word deletion, stemming, and phrase recognition.
3. Create a query representation, which typically follows stop-word removal and stemming, and which may also include insertion of logical operators between/amongst terms requiring cooccurrence or simple presence of only one of the arguments.
4. Expand query terms to include variant terms that refer to or relate to the same concept. These may be synonymous terms that are found in an electronic thesaurus such as WordNet (Fellbaum, 1998) or terms that are highly associated with the query term, based on cooccurrence statistics preferably computed on the same or a similar document collection as the one on which the search is being conducted. Query expansion relieves the user of needing to generate all conceptual variants of their search terms and is likely to improve recall, but may reduce precision when erroneous senses of the newly introduced terms retrieve irrelevant documents. The longer a query is, the less likelihood that erroneous senses of expanded terms will have a negative impact, but also the less likely that expansion will contribute much to the retrieval results.
5. Compute query term weights. This step is less commonly included in document retrieval systems, mainly because it is difficult both for users to know how to assign weights to query terms in a way that improves retrieval results, to perform automatic weighting, since queries are frequently so short as to give little evidence of the relative importance of individual query terms as most terms only occur once in a single query. Some NLP-based systems have positive results from automatic determination of the 'mandatory' concept in a query which is then assigned a greater weight (Liddy *et al.,* 1995).

Matching of Query to Documents

Once the query representation is produced, the matching process begins. The process description below may be easier to follow if you conceive of both the query and the documents as vectors of terms, with frequency information or weights for each term in the vector.

1. Search inverted file for documents that contain terms in the query. This is typically done with a standard binary search. Each document that contains any of the query terms becomes a candidate for retrieval.
2. Compute similarity score between query and each candidate document using the algorithm prescribed by one of the four document retrieval models being used. This score is referred to as the 'similarity coefficient.' The scoring mechanism for each of the major document retrieval models will be detailed in the next section.
3. Rank-order the documents in decreasing order based on the scores assigned to them by the scoring algorithm. This may be either straightforward ranking based on the similarity coefficient, or the system may use automatic relevance feedback whereby the system takes the top *N*-ranked terms from the top *N*-ranked documents as they are being shown to the user, adds these terms to the query representation, and reruns the search with the revised query to produce the continuation of the ranked list of relevant documents.
4. Provide list of perceived relevant documents to user ranked by similarity score between query and document. Systems that use other sources of evidence of value of a document to the query, such as number of links from the page/document to or from other pages/documents, would integrate this information and produce a potentially different ranked list.
5. Allow for query modification by the user if user-based relevance feedback is provided by the system. If so, typically, the user marks the documents they find relevant, either based on just the title and brief description shown in the initial list or by actually reviewing the full document, which they can link to from the results page.
6. Perform relevance feedback based on user's input. The algorithm for user-based relevance feedback is typically the same as that for automatic relevance feedback as described in Step 3 above. The system then reruns the search with the revised, and hopefully improved, query and produces a revised ranked list of documents. The relevance feedback loop is iterative and can be performed as many times as the user wants.

Theoretical Models

Over the years, a number of different theory-based models have provided the basis of implemented document retrieval systems. Four of the most influential models are briefly presented here – Boolean, vector

space, probabilistic, and language models – in the order in which they have come into use in the field. Mathematical details of the models as well as formulas for their implementation are beyond the scope of this piece, and can be found in information retrieval textbooks such as Baeza-Yates & Ribeiro-Neto (1999).

The Boolean model is the earliest and the easiest to understand of the four models. And, counter to the above description of the typical representation of documents in an inverted file, Boolean systems do not use either term frequencies or term weights. Terms are simply present or not in a document. As a result, the inverted file is smaller and easier to manage and update. The Boolean operators – AND, OR, and NOT – are used both for representing the user's need and in the internal matching of the query to the inverted file. For example, if a user is interested in 'the relative efficiency of oil vs. gas,' their Boolean query would be (*efficiency AND* (*oil OR gas*)), assuming that 'relative' is dropped from the query because it is on the stop-word list. Only documents that have either *oil* and *efficiency* or *gas* and *efficiency* would be retrieved. But, since the Boolean model does not use weights, the order in which the documents are presented to the user cannot be based on system-predicted degree of relevance. Therefore they are presented based on another dimension – typically date accessioned into the system.

While the Boolean model may appear crude as compared to more sophisticated models, it has the advantages of ease and efficiency of the implementation, simplicity of the inverted file structure, and clarity of the model. Disadvantages of the Boolean model are its inability to rank documents by relevance and the fact that users find Boolean queries difficult to produce, as the logical interpretations of the Boolean operators do not reflect their typical use in natural language. Attempts have been made to deal with both of these issues. The first, by the introduction of the extended Boolean model by Salton *et al.* (1983) relaxes the logical interpretation of the Boolean operators by using them as distances and thereby providing relevance-ranked lists of retrieved documents. The second acknowledgment of the disadvantages of the Boolean model has been addressed by the development of user interfaces that either clarify the Boolean logic or mask it from the user. The latter is done by allowing users to ask their questions in straightforward natural language, from which a natural language processing module in the system produces the Boolean-structured query automatically based on the natural logic embedded in a language's syntax and semantics.

The vector-space model (Salton, 1971) is the most commonly used model in document retrieval systems today due to its consistent, proven performance across multiple implementations on many collections. Conceptually, in the vector-space model, a document is represented by a vector of the terms in the document, and these vectors exist in term space, which is the size of all the unique terms in the collection. Each term represents a dimension in this term space and the similarity between a query and a document is measured by the closeness of the query vector and the document vector, where closeness is measured by the angle between the two vectors. Either cosine similarity or the inner/dot product is used to compute the angle between vectors.

However, to compute a similarity score between a query and documents in the collection and then rank-order the documents based on their likely relevance to the query, it is typical to use weighted vectors. The system needs a basis on which to assign weights to both query and document terms. While there are multiple ways to compute such weights, the nearly universal way to do this is what is known as $\mathrm{tf} \cdot \mathrm{idf}$ – that is, term frequency multiplied by inverse document frequency (or equivalently, divided by document frequency). By use of this weighting scheme, the vector-space model is saying that the best indexing terms are those that occur with high frequency in a document (*tf*) relative to their occurrence in other documents in the collection (*idf*). The *tf* metric is considered an indication of how well a term characterizes the content of a document. Of course, there are several arguments that might be made against this view, such as the linguistic phenomena of synonymy and anaphora – both of which can represent the same concept with different terms, thereby resulting in the candidate index term undercounting conceptual presence. The *idf*, in turn, reflects the number of documents in the collection in which the term occurs, irrespective of the number of times it occurs in those documents. Using these two metrics in combination, a query-to-document similarity score is computed between a query and each document in the collection. Based on these similarity scores, the model produces a ranked list of documents in terms of predicted relevance to the query.

Computing *tf* and *idf* requires first determining which features (e.g., words, phrases) will be used in representing documents and queries. It might be of interest to linguists that until recently, relatively little attention was paid to what these features were. While noun phrases were historically used as subject headings in library catalogs and controlled vocabularies, doing this automatically requires the ability to

distinguish noun phrase elements from other parts of speech, which was beyond the state of the art when document retrieval systems were first introduced. But the belief that some words provide a better representation of documents and queries led to the use of a stop-word list that excludes closed-class terms (e.g., prepositions, pronouns, determiners) from indexing, thereby leaving nouns, adjectives, verbs, and adverbs as the feature set.

Advantages of the vector-space model are that, distinct from the Boolean model, it allows partial matching of query and document, and the model's easy adaptability via adjustments to its parameters, including term-weighting schemes, which have been shown to have a major impact on the quality of retrieval results. As mentioned above, the vector-space model's performance is consistently good with general collections. The disadvantages of the vector-space model include its weighting schemes' reliance on information from across the document collection, and the need therefore for weights to be updated as the document collection changes. However, research has shown that less frequent updating of collection figures does not negatively impact performance significantly if the collection is large enough.

The probabilistic model, which was first introduced by Robertson and Sparck Jones (1976), is based on several assumptions, most significantly that terms occur independently of each other in the documents. Basically, using Bayes's theorem, a document retrieval system built on the probabilistic model assigns the odds of relevance for each term in a document based on that term's frequency in a set of known relevant documents. This appears to require the use of a set of known relevant and known nonrelevant documents in order to estimate the relevance probability for a new document. But, given that it is unlikely, without relevance feedback information being available, that relevance is known a priori, the odds that a term will appear in a relevant document is initially estimated by counting the documents in which the term appears and the documents in which it does not appear. This initial estimate is then adjusted based on information from the user, which results in a refinement of the estimate. This process of refinement can occur without input from the user, based on the distribution of the query term in the documents retrieved, which will be considered as relevant, while the documents that are not retrieved are considered nonrelevant.

Over the years, a number of weighting formulas have been developed and tested for use within the probabilistic model, starting with the Robertson–Sparck Jones BM1 version (1976) up to the weighting and document ranking function known as Okapi BM25 (Robertson *et al.,* 1998), which is used in many experimental text retrieval systems, with more tuning parameters.

The advantages of the probabilistic model are its solid theoretical foundation and the fact that the model performs well in general collection experiments. Also valued is its ability to rank documents in terms of their probability of relevance. Its disadvantages are its problematic assumption that probabilities are based on a binary condition of relevance, the assumption of term independence, which is not realistic, and the lack of actual relevance data in the system's initial assignments.

The last model, language modeling, was first introduced into document retrieval by Ponte and Croft in 1998 and has become an increasingly popular model in document retrieval research, based as it is on many years of research in statistical language modeling for successful applications such as speech recognition and spelling correction. Language modeling is a statistical method for ranking documents in a collection based on the probability that they might have generated the query (*see* **Language Processing: Statistical Methods**). An intuitive explanation of language modeling for IR is that each document has its own language model and queries are thought of as being generated by a document language model. So the operative question is: Which document(s) would produce this query? The documents in the collection are evaluated and ranked based on the probability of their language model generating that query. It is interesting to note that the system here is described as predicting probability of query production, not probability of relevance of the document, and has become known as the query-likelihood retrieval model.

The basic language model shares many of the same theoretical assumptions of other probabilistic models, and *n*-gram analysis and a hidden Markov model. To establish the word *n*-gram language model, probability estimates are derived from *n*-gram frequencies in the training data and then smoothing techniques are used to estimate frequencies for those words that do not actually occur in the training data. The language model has been extended in various ways by a number of research groups as discussed in detail in Liu and Croft (2004). It is also believed that the use of a more linguistically sophisticated document representation may even further improve the performance of the basic language model (Hiemstra, 2000).

See also: Language Processing: Statistical Methods; Stemming; Text Retrieval Conference and Message Understanding Conference; Web Searching.

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Documentary

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Documentary is a loose and often contested category of media work, applied chiefly to photography, film, and television. As a broad genre, its origins go back to the very first pioneering work in cinema, but during the 1920s and the 1930s a more self-conscious sense of a specific kind of project became established. This was particularly true in Britain, where John Grierson not only effectively coined the term 'documentary' itself (in 1926) but wrote extensively about documentary aesthetics and documentary purposes (see Hardy, 1979) Since then, documentary has developed internationally across a wide range of formats, including the use of dramatization, observational sequences (greatly aided by advances in lightweight recording technology), and various combinations of interview material with images that portray the real with different degrees of referentiality and aesthetic crafting. The last 15 years or so have seen the rapid growth of scholarly work in the area. Among the more important studies are Nichols (1991), Renov (1993), Winston (1995), Corner (1996), and the essays in Rosenthal and Corner (2005). Corner *et al*. (1989) paid particular attention to the organization of speech in a range of different documentary formats.

The term 'documentary language' can be used both figuratively and literally. Figuratively, it refers to the whole range of representational formats and devices which documentary makers use in constructing their accounts. Here, the scope of the visual language in use, drawing on previous photographic practice but also deeply linked to the conventions of fictional cinema, is an important element. More literally, the use of language in documentary has shown quite distinctive features of mediated speech, both in terms of the primary character of recorded utterance and the form of its combination with other elements.

In this short article, I shall concern myself primarily with the literal idea of documentary language, since this is more fitting for the encyclopedia. However, I shall often make reference to the broader

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In this short article, I shall concern myself primarily with the literal idea of documentary language, since this is more fitting for the encyclopedia. However, I shall often make reference to the broader

representational system in which speech is employed, since only by doing so is it possible to highlight the linguistic interest. First of all, I want to make some general observations.

Documentary Language Use

Generically, it is helpful to see the use of language in documentary as positioned between, on the one hand, specific developments in the speech forms of television news and, on the other, the forms of broadcast talk employed in a range of feature programming, including radio in the early days of documentary development, but most recently drawing from the varieties of the television talk show itself.

Like news, documentary often employs commentary speech, in which an unseen professional broadcaster offers an exposition across images. Like news, it also frequently uses the location interview, in which the accounts of nonprofessional participants are accessed, with the speaking interviewee often in shot and with variations in how the visual portrayal and speech of the interviewer are employed, if at all. Finally, like news, there are often sequences of location presentation, in which pieces to camera of various lengths occur within a spatial or temporal context of documentary significance itself (a place, an event relevant to the exposition).

The broader generic connections I have indicated follow from the way in which most documentaries offer a more expansive and narrativized form of portrayal than news accounts are able to do. In order to expand their exposition, they may wish to offer reconstructions, in which past action and dialogue are recreated in order to vivify the description and argument. Using observational approaches, they often seek to present the viewer with a sense of ongoing reality, made available for direct scrutiny in a mode of onlooking and overhearing. Such attempts to expand beyond the directly descriptive and prepositional, to engage the viewer with varieties of 'caught life,' inevitably encourage cross-generic influences. This is especially so since the requirement to fascinate and to entertain has become a commercial imperative in much documentary practice.

One final general point about documentary speech might be made here. In many cases of its use, its meaning and significance are interpreted alongside images, still or moving, concurrently before the viewer. Therefore, an analysis of documentary speech inevitably addresses those issues of image/word combination that have variously attracted academic attention, both in fine-arts criticism, for instance, and with more sociological intent in relation to photojournalism.

Six Modes of Documentary Speech

A brief account of the variety of documentary speech can usefully identify six principal modes, many of them already indicated in the general discussion above.

Commentary Speech

The offering of a spoken account, continuous or intermittent, across a sequence of images is the classic mode of speech in documentary film. It has been dubbed the "voice of God" (see Nichols, 1991), a phrase which attempts to characterize both its disembodied sourcing and its authority. Early documentaries relied extensively on this method for two reasons. First of all, many of them had a didactic, if not propagandistic, intent and a commentary account fitted this purpose well. Secondly, location interviews were technically difficult if not impossible because of the limitations of contemporary sound-recording equipment. However, it would be unfair to see all uses of commentary speech as following the examples of early didacticism. Depending on the particular project of the documentary, sustained description and explanation is only possible through speech of this kind, whatever the legacy of authoritarianism. The use of more colloquial and relaxed voicings of commentary quickly followed the arrival of television documentary. This reflected the move to more personalized, informal registers of speech across the medium as a whole, following from the domestic settings for reception and a need to establish a more intimate communicative bonding with the audience (as radio had already succeeded in doing).

Commentary speech regulates the viewer's interpretation of the image flow, a point that has received extensive analytic attention in terms of the 'truth' of documentary portrayal. Typically, it is the nominative work of the commentary which identifies what we are seeing, its relationship to other things or factors, and its general significance for the theme being pursued. Here, it is important to note the way in which documentary exposition varies in its degree of generality or particularity. A documentary about loneliness in the city works with a general topic, whatever particular examples it chooses to illustrate and evidence this. A documentary about the changing look of London's Piccadilly Circus works with a quite specific focus on the physical world. There are many examples in between, but whatever the level at which the engagement is made the filmed images can only be of particular things, while the commentary can refer both to particular detail and general circumstances. The terms of this play-off are often complex, particularly where

specific images are used to underpin broad, general claims to the 'truth' or the 'real' and where (as often is the case) there are shifts in the level of generality throughout a documentary, changing the kind of language work being done in the commentary.

Presenter Speech

Presenter speech involves the speaker not only in shot but also facing the camera and appearing directly to address the viewer. The implications of such direct address have been given extensive debate in media research (see, e.g., Fiske and Hartley, 1978). The gaze and demeanor of the presenter now become involved in the interpretation of the speech; the relationship is more strongly personalized than in commentary speech, with consequences for the kind of trust relationship established and the grounding of truth in the account. Delivered directly to the audience, the presenter's address is set within the broader communicative context of the shot and its development. The background will often be significant itself (what places can be seen, what action is occurring, perhaps partly off camera). During a presentation, the speaker (and the camera) may move to bring other sights into view and to meet people, possibly for interview. Set within a specific event world like this, the address clearly has a spatial and temporal relationship to the visual depiction that cannot occur in commentaries. Deictic constructions are common, making the most of this relationship and partially aligning the gaze of the presenter with that of the viewer in a manner often designed to encourage assent.

A recent example of presenter speech in cinema documentary is that provided by Michael Moore in his internationally acclaimed *Bowling for Columbine* (2002). Following the model that first came to prominence in his *Roger and Me* (1989), Moore works with a carefully judged 'amateur' persona and his presenter address, intercut with his commentary and his interviews, is a key element in the design of the film. This is carried through to even more devastating effect in *Fahrenheit 9/11* (2004), where critical commentary and presenter performance, framing several sections of interview (see below), sustain comic energy and a strongly critical account.

Interview Speech in Shot

Interview speech in shot is a central component of much documentary construction. As analysts of it point out, it is speech designed to be overheard, even though it purports to be dialogue. This play-off between its character as a form of public speaking and its adaptive use of the format of the private conversation is central to understanding its communicative power and its continuing controversiality. The degree of interactivity involved in its production and its level of continuity is variously revealed or hidden in the final, edited sequence as it appears on screen. Many documentarists prefer to remove the questions from the soundtrack and not to show the questioner at all, thus keeping the visual and aural focus firmly on the participants and effacing the explicit signs of directorship and authorship. In these circumstances, speech often has the character of voluntary testimony, with the face usually shot in a three-quarter profile that directs speech to the left corner of the frame (just off camera), but remaining sufficiently close to direct address to create something of that mode's effect. However, other directors use a full interactive presentation, with both questioner and interviewee in shot (either in a 'two-shot' or by intercutting) and the questions heard, so that the interviewee's speech is then clearly read as response rather than testimony.

Whatever the method used, interviews are invariably edited down from their original length, both to give optimum significance within the final design of the film and to manage overall duration within the limits. Given the economy of time and the requirement to sustain a good level of thematic focus and development, shifts in the order of answers may be introduced as well as internal editing within an utterance. The transformations away from the original speech event have often been the cause of dispute following the release of a final version, particularly in cases where the interviewee was speaking in an official capacity and therefore accountable for what they said. Interviews are inevitably prepared for and will vary considerably in their degree of apparent spontaneity and in their articulation. Fluency is not always sought, however, since hesitation can be a marker of authenticity, especially in relation to sensitive, personal themes.

Interview Speech as Voice-over

Where interview speech is used as voice-over it often links the interpretation of the image to a dimension of experience as well as of knowledge. The speech of a participant frequently frames what is shown within the terms of the personal and of memory. It may lack the direct informational authority claimed by a commentary or a presenter but it adds a distinctive dimension to portrayal, in part recruiting a 'firsthand' verification for the professional assembly of images over which the voice is heard.

Overheard Interchange

Overheard interchange is a key component of observational film making, in which the fiction that

participants are unaffected by the camera and the microphone, and indeed act as if they were unaware of their presence, is frequently maintained (hence the term 'fly on the wall'). With no direct connection to producer discourse (unlike interview answers), observed speech in documentary varies in its plausibility as natural. In general, it is more convincing when it occurs as part of an official task being performed (e.g., an airline check-in counter, police cautioning a motorist) then when it occurs simply as 'casual' (in domestic settings, for instance, or in workplace chat). However, in all cases the modifying effect of the documentary team upon what is said and how it is said remains an issue. In the forms of reality television, observed speech has often had a self-conscious and performative character, aligning it more with the display of the talk show than with the attempted naturalism of classic observational work. Shows such as *Big Brother* have clearly brought further complexities into the relationship of the natural to the artificial in what is 'overheard.'

Dramatic Dialogue

Dramatic dialogue is the scripted (or possibly improvised) dialogue occurring between actors in sequences of dramatized documentary. Although it shares features with overheard interchange as part of its desire to be naturalistic, it is usually carefully constructed to develop character, sustain narrative and reveal context and circumstances. Compared with most naturally recorded speech, its constructions will be more considered and coherent and the delivery more fluent, even allowing for the naturalism of hesitation and repetition. In drama-documentary, where there is often a requirement to use dialogue to convey information to the viewer that might otherwise have been conveyed by commentary, the conversational plausibility of the speech is sometimes in tension with its descriptive, explanatory functions. The further issue, of how far it might approximate to what was really said in the situation being reconstructed, is a long-standing point of contention in the discussion of films and programs using this approach.

It can be seen from this short review that documentary work employs quite distinctive variants of language use and holds rich interest for the growing number of linguists exploring how the media construct and organize speech.

See also: Media, Politics, and Discourse: Interactions; News Language; Radio: Language; Television: Language.

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Dogon

J Bendor-Samuel

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Dogon is spoken by about 500 000 people in northeast Mali, east of Mopti and the Niger river up to and astride the Burkina Faso border. In the past, within the Niger-Congo phyllum, Dogon has been regarded as belonging to the Gur subfamily, but since the lexical and grammatical evidence for this is weak, it is now treated as an isolate within Volta-Congo. Though the Dogon people recognize themselves as one ethnic group, there are six major dialects and several additional smaller ones. The major dialects are: Tɔmbo Sɔɔ, Dɔnnɔ Sɔɔ, Tɔrɔ Sɔɔ, Jamsay, Togo Kan and Tomɔ Kan (Bendor-Samuel *et al.*, 1989).

Dogon has a seven-vowel system and displays a limited vowel harmony system with only one vowel of the pairs e/ɛ and o/ɔ occurring in any stem. This contrast is neutralized in nasalized forms. Nasalized vowels always occur after a nasal consonant but may also occur after oral consonants and word-initially.

There is contrast between high and low tones, but this is probably best analyzed as tonal accent. Once

participants are unaffected by the camera and the microphone, and indeed act as if they were unaware of their presence, is frequently maintained (hence the term 'fly on the wall'). With no direct connection to producer discourse (unlike interview answers), observed speech in documentary varies in its plausibility as natural. In general, it is more convincing when it occurs as part of an official task being performed (e.g., an airline check-in counter, police cautioning a motorist) then when it occurs simply as 'casual' (in domestic settings, for instance, or in workplace chat). However, in all cases the modifying effect of the documentary team upon what is said and how it is said remains an issue. In the forms of reality television, observed speech has often had a self-conscious and performative character, aligning it more with the display of the talk show than with the attempted naturalism of classic observational work. Shows such as *Big Brother* have clearly brought further complexities into the relationship of the natural to the artificial in what is 'overheard.'

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There is contrast between high and low tones, but this is probably best analyzed as tonal accent. Once

the position of the accented syllable and its associated tone are known, the pitch of the other syllables is predictable.

Close kinship terms exhibit a very restricted vestigial noun class system. The verbal system distinguishes perfective and imperfective forms and utilizes six verbal extensions that focus on the time and kind of action. The pronominal system comprises one basic set (nominal) from which three other sets, possessive, accusative, and embedded/addressee, are derived.

The basic word order is S.O.V. Sentences frequently concatenate verbs in verb strings with subject-verb agreement marked on the sentence final verb form. Subordinating conjunctions occur clause final; other conjunctions are clause initial. Questions are marked sentence final.

There is a topic-comment construction in which the subject or object is forefronted and replaced by a pronoun in the comment. In general, a participant is introduced into a story indefinitely (a man) then definitely (the man) and then as a pronoun (he). After the first pronominal reference, there may be zero reference.

See also: Burkina Faso: Language Situation; Mali: Language Situation; Niger-Congo Languages.

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Doke, Clement Martyn (1893–1980)

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Clement Doke, missionary and linguist, was born in Bristol, England, the son of a Baptist minister who, in 1907, took up a post in Johannesburg, South Africa. Doke received his early education there and in Pretoria. In 1913 he accompanied his father on a missionary tour in central Africa that set the seal on his desire to devote his life to such work. This journey also led to his first contact with the Lamba people.

He spent the 1921–1922 academic session at London University, studying English, French and general phonetics with Daniel Jones and members of his staff at University College. He also took classes in Bantu linguistics at the School of Oriental Studies and in ethnology at the London School of Economics. This was his only formal linguistic training. In 1923 he accepted an appointment at the University of the Witwatersrand. He was promoted to Senior Lecturer in 1925 after completing his doctoral thesis on the phonetics of Zulu, and in 1931 to the chair of Bantu languages, retiring in 1953.

The Department of Bantu Studies at his university had social anthropology and native law and administration within its remit and extended its interests to other, non-Bantu, languages of southern Africa. Doke was a man well-fitted to head such a department, as his work among the Lamba had embraced the study of their folklore, social structures, customs and beliefs. He had, moreover, taken part in two expeditions to the Kalahari and produced papers on 'Bushman' languages.

Doke's phonetic work is of a high quality, though sometimes idiosyncratic. His work on Shona well illustrates his thorough and thoughtful approach, bringing together texts, photographs of informants and their homes, maps, and instrumental records to supplement his detailed phonetic analysis. His phonological ideas, on the other hand, were those of his time and of his training – not particularly insightful or suggestive.

In his middle years, Doke repudiated his early untutored linguistic work, which had analyzed Bantu languages by using the categories of European languages, and developed a model more suited to them. This also brought about a move from disjunctive to conjunctive orthography. He introduced the term 'ideophone' in 1935.

Doke's commitment to his faith and to mission work stood on an equal footing with his profession of linguistics. He was president of the South African Baptist Union of Churches in 1949–1950 and editor

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of *South African Baptist* for 25 years. He translated the Bible into Lamba.

See also: Bantu Languages; Ideophones; Jones, Daniel (1881–1967); Shona; Southern Bantu Languages; Zulu.

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Dolgan *See:* Turkic Languages.

Domari

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Definitions

Domari is the language of populations that were traditionally commercial nomads (metalworkers and entertainers) throughout the Middle East and neighboring regions. Fragmented documentation exists from Azerbaijan in the north, through to Sudan in the south. There are still Domari-speaking communities in Lebanon, Syria, and Jordan; the number of speakers is unknown. The only well-documented variety is that of Jerusalem, now spoken by only up to 100 elderly people. They refer to their language as Dōmari or Dōmi. Names in other regions include Domani and Qurbati.

History

Like Romani, Domari shares a number of ancient isoglosses with the Central branch of Indo-Aryan, most notably the realization of Old Indo-Aryan *ṛ̊* as *u* or *i* (Sanskrit *śṛ̊ṇ-*, Domari *sun-/sin-* 'to hear') and of *kṣ-* as *k(h)* (Sanskrit *akṣi*, Domari *aki* 'eye'). It also preserves a number of clusters that have been lost in the other Central languages (Sanskrit *drākṣa*, Domari *drak* 'grape'; Sanskrit *oṣṭha*, Domari *ošt* 'lip'; Sanskrit *hasta*, Domari *xast* 'hand'). It appears therefore that Domari, like Romani, emerged as one of the Central Indic languages, but migrated prior to the loss of these clusters to the northwest, where the clusters were generally retained. Both Romani and Domari also share the pattern of renewal of the past-tense conjugation (through affixation of oblique enclitic pronouns to the past participle) with northwestern Indian frontier languages such as Kashmiri and Shina. The morphology of the two languages is similar in other respects: both retain the old present conjugation in the verb (Domari *kar-ami* 'I do'), and consonantal endings of the oblique nominal case (Domari *mans-as* 'man.OBL', *mans-an* 'men.OBL'), and both show agglutination of secondary (Layer II) case endings (Domari *mans-as-ka* 'for the man').

It had therefore been assumed that Romani and Domari derived from the same ancestor idiom, and split only after leaving the Indian subcontinent. However, some isoglosses separating the two languages in phonology, morphology, and lexicon appear to be rather old, and point instead to a similar phenomenon of gradual northward and westward migrations, perhaps even to convergent development, rather than to a shared origin. Typical phonological developments that characterize Domari are loss of aspiration in *bh*, *dh*, *gh* to *b*, *d*, *g*; shift of medial *d*, *t* to *r*, of initial *v* to *w*, and of the retroflexes *ḍ*, *ṭ*, *ḍḍ*, *ṭṭ*, *ḍh*, etc., to *r*, *t*, and *d*.

of *South African Baptist* for 25 years. He translated the Bible into Lamba.

See also: Bantu Languages; Ideophones; Jones, Daniel (1881–1967); Shona; Southern Bantu Languages; Zulu.

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Dolgan *See:* Turkic Languages.

Domari

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Definitions

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The sound system

There is much volatility and variation in the Domari sound system. Consonants include the stops *b*, *d*, and *g*, and *p*, *t*, *k*, *q*, and *ʔ*, the fricatives *f*, *x*, *χ*, *ɣ*, and *h*, liquids *r* and *l* (and, marginally, a velarized *ɫ*), the glides *y* and *w* (alternating with *v*), and the sibilants *s*, *z*, and *š*. The affricates *dž* and *č* alternate with their sibilant counterparts *ž* and *š*. Pharyngealization of the dentals *d, t, s,* and *z* enters the language in Arabic loans, but is often imported into the pre-Arabic (Indic) lexicon as well (e.g. /wa:tˤ/ 'stone'). The pharyngeals *ħ* and *ʕ* appear only in Arabic loans. Consonant gemination is distinctive.

Domari vowel phonemes are *a, e, i, o, ɔ,* and *u*, each showing a number of allophonic variants. Vowel length is generally distinctive, though the duration of a vowel in a given word may vary considerably. Stress normally falls on the final inflectional segment of the word. Unstressed affixes are agglutinative (Layer II) case endings, external tense markers, and enclitic object pronouns.

Morphology

Nominal forms

The principal inflectional alternation in the noun is between two 'basic' or Layer I cases, nominative and oblique. Vocalic stems in the inherited (Indic) lexical component have the nominative endings *-a* (masculine) and *-i* (feminine). The most common oblique endings in the singular are *-as-* (*-s-* with vocalic stems) for masculines and *-ya-* (*-ē-* with vocalic stems) for feminines. Some consonantal stems, especially Arabic loans, take *-ī-* or *-ē-*. The oblique plural ending is generally *-(y)an-*. The oblique stem serves as the case of the direct object, and as the base for further (Layer II) agglutinative case formation, with the endings *-ta* (dative), *-ma* (locative), *-ka* (directive and benefactive), *-ki* (ablative and prepositional), and *-san(ni)* (instrumental and comitative).

Demonstratives and adjectives in attributive position agree with the head noun in gender, number, and case. Enclitic pronouns are used with nouns as possessive endings. They encode case and number (*putr-o-m* 'my son', *putr-i-m-ka* 'for my son', *putr-e-m* 'my sons'), as well as person (*putr-o-man* 'our son'). These enclitic pronouns also serve as object-concord markers with verbs, and as subject-concord markers with past-tense (perfective) verbs (*laked-om-ir* 'I saw you', *laked-or-im* 'you saw me'). The genitive-possessive construction marks the head with a possessive affix and the dependent in the ablative/prepositional case (*kury-os mans-as-ki* house-3SG man-OBL-ABL 'the man's house').

Verbs

Domari retains the Old Indo-Aryan intransitive (passive) derivation marker *-y-* (*ban-ari* 'shuts', *ban-y-ari* 'is being shut'). The transitive/causative marker *-naw-* is also productive (*q-ari* 'eats', *q-naw-ari* 'feeds'). The verb root with derivational augmentation constitutes the present or nonperfective stem. The perfective stem is formed by means of a perfective extension marker (*ban-ami* 'I close', *ban-d-om* 'I closed'). Arabic verb roots are integrated by means of the 'carrier' verbs *-k(ar)-* (transitive, from 'to do'), and *-h(r)-* (intransitive, from 'to become').

There are two sets of person markers. The present stem conjugation is (mostly) a direct continuation of the Old Indo-Aryan set of person markers (1SG *-m-*, 2SG *-k-*, 3SG *-r-*, 1PL *-n-*, 2PL *-s-*, 3PL *-n(d)-*). The perfective set derives partly from possessive markers in the singular, and from a combination of sources in the plural (1SG *-m-*, 2SG *-r-*, 3SG *-s-* [or M *-a*, F *-i*], 1PL *-n-*, 2PL *-s-*, 3PL *-e-*). The 3SG distinguishes between plain subjects, which show gender agreement (*kard-a* 'he did', *kard-i* 'she did'), and agentive subjects (*kard-os-is* 'he/she did it').

Tenses draw on the two stems, present and perfective, and the affixes *-i-* (progressive) and *-a-* (remote), which are external to the person affixes. The present stem followed by *-i-* constitutes the present/future tense (*laha-m-r-i* 'I see you'); followed by *-a-* it indicates the imperfect/habitual (*laha-m-r-a* 'I used to see you/was seeing you'). The perfective stem forms the basis for the simple past (*lake-d-om-ir* 'I saw you'), the perfect (*lake-d-om-r-i* 'I have seen you'), and the pluperfect/counterfactual (*lake-d-om-r-a* 'I had seen you/would have seen you').

The copula is enclitic. In the third person, predicate nouns and adjectives take a predicative suffix (M *-ēk*, F *-ik*, PL *-ēni*). Most of the modal verbs are borrowed from Arabic, and carry Arabic person and tense inflection.

Syntax

Domari shows syntactic convergence with Arabic. Word order is VO-based and flexible, and clauses are finite. All conjunctions and particles and most adverbs and numerals are borrowed from Arabic, as are most of the prepositions. While demonstratives precede the noun, there is a tendency to use adjectives mainly in predicative constructions, which agrees with the Arabic word order noun-adjective.

See also: Arabic; Indo–Aryan Languages; Jordan: Language Situation; Lebanon: Language Situation; Romani; Syria: Language Situation.

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Dominica: Language Situation

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See also: Arawak Languages; Pidgins and Creoles: Overview; St Lucia: Language Situation.

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Dominican Republic: Language Situation

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When referring to the Spanish spoken in the Dominican Republic, one must begin with Christopher Columbus's first encounter with the Americas on October 12, 1492. He landed in the island known to Taino inhabitants as Haiti, which he later renamed Hispaniola. With him arrived a contingent of conquerors and colonizers from the various provinces of Spain. The rising prestige of their speech found a home in Santo Domingo, from where they initiated the conquest of the New World. Of the different dialects the Spaniards brought along, the Andalucian prevailed, which explains the close identity of Dominican Spanish with the Spanish from southern Spain.

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creating its institutions of laws, religion, and learning. It was the establishment of viceroyalties, convents and a cathedral, two universities – the most notable being Santo Tomás de Aquino – and the flourishing of arts and literature during the 16th and early 17th century that earned Hispaniola the title of 'Athena of the New World.' The Spanish language permeated those institutions from which it spread, making Hispaniola the cradle of the Spanish spoken in the Americas.

Unlike the Spanish of Peru and Mexico, which co-existed with native Amerindian languages, Dominican Spanish received little influence from the decimated Tainos, whose Arawak-based language disappeared, leaving a few recognizable words, such as *maíz* 'maize' and *barbacoa* 'barbecue'. The 17th century saw the French challenge Spain's hegemony by occupying the western side of the island, which they called Saint Domingue and later became the Republic of Haiti. Spain continued ruling the eastern part under the name of Santo Domingo, changed subsequently to Dominican Republic by the independence movement, reserving Santo Domingo for the main city. Both powers were deeply engaged in the slave trade, which brought Spanish into contact with a variety of African languages. Dominican Spanish also inherited many words and a handful of phonetic and morphological traits that are attributable to African influence.

Like other dialects, Dominican Spanish transforms syllable-final /r/ and /l/ and word-final /n/ of *mar* 'sea', *falta* 'fault', and *sin* 'without' into [l], [r], and [ŋ] respectively, so that they are pronounced as *mal*, *far*, and *sing*. Typical to the northern Cibao region, and not found elsewhere in the Hispanic world, is the mutation of final /r/, /l/ into the [i] sound. *Mar* and *falta* are pronounced as *mai* and *faita*, both sounding like *my* and *fight*. Final /s/ also undergoes alterations ranging from the aspiration noticeable in *costa* 'coast', rendered as *cohta*, with a sound similar to the *h* in *hot*, to total elimination, producing in popular speech *cota*, for the word above. This loss has led many uneducated speakers to restructure their plural, so that instead of the expected *cotas* 'coasts', with *-s* denoting plurality, they have created a new plural with *-se*, as in *cótase*.

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Notwithstanding the numerous changes to its grammatical system, and the continuous contact with the English of a large immigrant population residing in the United States, Dominican Spanish has remained faithful to its Hispanic heritage. There exists a regulated normative linguistic system, taught in schools and reproduced by the mass media and literary works, that eight million speakers aspire to learn and imitate. Its mastery, along with its own Dominicanness, have engendered the likes of the humanist Pedro Henríquez Ureña, and the short-story writer Juan Bosch, who have come to occupy a place of distinction in Hispanic letters.

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Donkey Sentences

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The problem of 'donkey sentences' occupies a prominent place in the logical analysis of natural language sentences. The purpose of logical analysis of sentences is to assign them a structure suitable for logical calculus – that is, the formal derivation of entailments. Some variety of the language of predicate calculus (LPC) is normally used for logical translations.

In LPC, a term in a proposition that has a truth value must either be an expression referring to an individual (or a set of individuals) that actually exists

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In LPC, a term in a proposition that has a truth value must either be an expression referring to an individual (or a set of individuals) that actually exists

or be a bound variable. Modern predicate calculus is essentially extensional: truth values are computed on the presumption that term referents actually exist, so that it allows in all cases for substitution of coextensional constituents *salva veritate*. Intensional or virtual objects – objects that have merely been thought up but that lack actual existence – have no place in modern logic, just as they have no place in Quine's 'desert landscape' ontology, which has gained currency in large sections of Anglo-Saxon philosophy. That being so, modern logic has no choice but to posit that any argument term of a predicate in a proposition that has a truth value either refers to an actually existing object or is a bound variable ranging over such objects.

Since in natural language one often encounters expressions that have the appearance of being referring argument terms but in actual fact fail to refer – such as the famous sentence in Bertrand Russell's (1905) article *The present king of France is bald* – Quine (1960) started a "program of elimination of particulars" aimed at reformulating natural language sentences exclusively in terms of the quantificational language of modern predicate calculus, without any referring terms. Thus, for Quine and large sections of the logical community, LPC bans all definite terms and allows only for variables in argument positions.

This, however, will not do for natural language, which has sentences that express purely extensional propositions and yet contain terms that neither refer to an actually existing object nor allow for an analysis as bound variable. These are the so-called donkey sentences. The fact that natural language resists analysis in terms of LPC constitutes the problem posed by the donkey sentences.

The currency of the term 'donkey sentences' originates with the British philosopher Peter Geach, whose discussion of certain sentences, all about donkeys, awakened the interest of modern logicians (Geach, 1962). Geach did not mention – apart from a token reference (1962: 116) to "another sort of medieval example" – that he took his cue from Walter Burleigh (c.1275–after 1344), who introduced donkey sentences in the context of supposition theory, the medieval equivalent of reference theory. In Burleigh (1988: 92), written around 1328, one finds this example:

(1) Omnis homo habens asinum videt illum.
('Every man owning a donkey sees it.')

Burleigh's problem had nothing to do with LPC, which did not yet exist. His problem was of a different nature. Having noticed that there exist what we now call bound variable pronouns, as in (2), and having stated that these may never take as antecedent a constituent of the same clause ('*propositio categorica*'), he presented (1) as an apparent counterexample, since the pronoun *illum* takes as antecedent *asinum*, which stands under the same verb (*videt*) and is thus in the same clause.

(2) All boys expected that the dog would bite *them*.

His answer was that the antecedent of *illum*, i.e., *asinum*, is not a main constituent of the same clause but a constituent of a subordinate predication, i.e., *habens asinum* ('owning a donkey').

Geach (1962) discussed the same problem: how to account for the antecedent relation when the antecedent occurs in a relative clause contained in a complex predicate. It stands to reason, he said (1962: 117), to treat *man who owns a donkey* in the sentences (3a) and (3b), which he considered contradictories, as a complex predicate "replaceable by the single word 'donkey-owner'." But if we did that, (3a) and (3b) "become unintelligible . . . because 'it' is deprived of an antecedent":

(3a) Any man who owns a donkey beats it.
(3b) Some man who owns a donkey does not beat it.

A solution could conceivably be found in rewording these sentences as (4a) and (4b) (1962: 117):

(4a) Any man who owns a donkey, owns a donkey and beats it.
(4b) Some man who owns a donkey owns a donkey and does not beat it.

Yet, he says, whereas (3a) and (3b) are contradictories, at least according to native speakers' intuitions, (4a) and (4b) are not (1962: 118):

> [F]or both would be true if each donkey-owner had two donkeys and beat only one of them. Medieval logicians would apparently have accepted the alleged equivalences; for they argued that a pair such as [(3a)] and [(3b)] could both be true . . . and were therefore not contradictories. But plainly [(3a)] and [(3b)], as they would normally be understood, are in fact contradictories; in the case supposed, [(3b)] would be true and [(3a)] false.

The "medieval logicians" Geach argues against are in fact Walter Burleigh, who added the following comment to his discussion of (1), thereby denying that (3a) and (3b) are contradictories (1988: 92–93; translation mine):

> It follows that the following are compatible: 'Every man owning a donkey sees it' and 'Some man owning a donkey does not see it'. For assuming that every man owns two donkeys, one of which he sees and one of

which he does not see, then it is not only true to say 'Every man owning a donkey sees it', but also to say 'Some man owning a donkey does not see it'. In the same way, suppose that every man who has a son also has two sons, and that he loves the one but hates the other, then both the following are true: 'Every man who has a son loves him' and 'Some man who has a son does not love him'.

Geach's own solution was to analyze a relative clause within a predicate as an implication under universal, and a conjunction under existential quantification, as in (5).

(5a) Any man, if he owns a donkey, beats it.
(5b) Some man owns a donkey and he does not beat it.

This "is quite unforced and does give us a pair of contradictories, as it ought" (Geach, 1988: 92–93). Yet Geach apparently failed to realize that (5a) does not translate into modern predicate logic. Its translation would have to be something like (6), which contains the free variable *y* in Beat (x, y)

(6) $\forall x[\mathrm{Man}(x) \rightarrow [\exists y[\mathrm{Donkey}(y) \wedge \mathrm{Own}(x,y)] \rightarrow \mathrm{Beat}(x,y)]]$

Had he realized that, he would have hit on the donkey sentences problem as it lives in modern formal semantics.

Geach strengthened his putative solution by arguing (1972: 115–127) that a sentence like (7) should not be translated as a conjunction of two propositions – as $A \wedge B$ – but rather as a single quantified proposition with *it* translated as a bound variable, as in (8).

(7) Smith owns a donkey and he beats it.

(8) $\exists x[\mathrm{Donkey}(x) \wedge \mathrm{Own}(\mathrm{Smith},x) \wedge \mathrm{Beat}(\mathrm{Smith},x)]$

His argument amounts to saying that $A \wedge B$ and $A \wedge \neg B$ cannot be true at the same time, whereas (7) and (9) can. All it takes is for Smith to own two donkeys, only one of which he beats.

(9) Smith owns a donkey and he does not beat it.

Therefore, Geach argues, the logical translation (8) is correct, since it is compatible with (10), which simply posits a second ass, owned by Smith but not beaten by him

(10) $\exists x[\mathrm{Donkey}(x) \wedge \mathrm{Own}(\mathrm{Smith},x) \wedge \neg\mathrm{Beat}(\mathrm{Smith},x)]$

This analysis, however, cannot be correct, as pointed out in Seuren (2001: 316–318), since it lacks generality in view of cases like (11).

(11a) Smith must own a donkey, and he may beat it.
(11b) I believe that Smith owns a donkey, and I fear that he beats it.
(11c) This made Smith own a donkey and kept him from beating it.

No analysis of the type shown in (8) or (10) is applicable here, since they either require large scope for *a donkey*, which is contrary to what these sentences mean, or have to place the second operator (*may, fear, keep*) in the scope of the first (*must, believe, make*), which again is not what these sentences mean. Geach's analysis thus comes to nothing.

All this, however, is still beating about the bush. The real problem shows up in (12):

(12a) Every farmer who owns a donkey feeds *it*.
(12b) If Smith owns a donkey, he feeds it.
(12c) Either Smith does not own a donkey or he feeds it.

In the standard logical analysis of *if* and *or*, they come out as true if Smith owns no donkey. But then *it* cannot be translated as a referring expression (the donkey), as it lacks a referent. It should therefore be translatable as a bound variable. But that, too, turns out to be impossible. Universal quantification, proposed by Quine (1960: 139) and many others as a solution, again falls foul of possible intervening operators, as in (13) (see Seuren, 1998).

(13a) If Smith wants to own a donkey he must promise to feed it.
(13b) Either Smith no longer owns a donkey or he still feeds it.

There thus seems to be a hard core of sentences resisting translation into LPC. They contain definite expressions, preferably pronouns, that are neither referring expressions nor bound variables.

Also, these pronouns behave like referring expressions anaphorically linked to an antecedent, and not like bound variable pronouns. The former allow for substitution by a lexical noun phrase ('epithet anaphora'); the latter do not. Thus, *it* in (14a), (14b), and (14c) can be replaced by, for example, *the animal*, without much change in meaning, but *it* in (14d), which represents a bound variable, does not allow for such substitution.

(14a) Smith owns a donkey and he feeds it/the animal.
(14b) If Smith owns a donkey he feeds it/the animal.
(14c) Either Smith does not own a donkey or he feeds it/the animal.
(14d) Every donkey owned by Smith expects that he will feed it/*the animal.

Donkey pronouns, therefore, behave like referring expressions even though they are not allowed to do so under the statutes of current logic. Kamp and Reyle (1993) recognized the fundamental nature of this problem and proposed a radical departure from standard notions and techniques of semantic interpretation. They defended an analysis whereby the donkey pronouns and other definite expressions do not refer directly to entities in the world at hand but instead denote mental representations of possible real-world entities. In this theory, known as *Discourse Representation Theory*, the mechanism of reference is mediated by a cognitive system of mental representations whose relation to any actual world is a matter of independent concern. This halfway station of mental representations creates some extra room for a semantic account of donkey sentences. Even so, however, standard logical analyses are inadequate for natural language. What logic will do better justice to the facts of language is still an open question. Groenendijk and Stokhof (1991) was an attempt at answering that question.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Constants and Variables; Discourse Representation Theory; Dynamic Semantics; Propositional and Predicate Logic: Linguistic Aspects.

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Nancy Currier Dorian has been at the forefront of studies of language death and minority languages, authoring several books and over 50 articles on the topic since her seminal article, 'Grammatical change in a dying dialect,' was published in *Language* in 1973. Starting out with the study of phonology in the dialect, she has extended her study of language death to the full range of linguistic phenomena, including lexical, morphological, and syntactic aspects, and contributed importantly in the area of sociolinguistics. In addition to her articles in the journal *Language*, she has contributed to the journals *Word*, *The International Journal of Bilingualism*, *Language in Society*, *Applied Psycholinguistics*, *International Journal of the Sociology of Language*, and *Scottish Gaelic Studies*. A book, currently in preparation, expands on her 1994 *Language* article on personally patterned variation in East Sutherland Gaelic (Gaelic, Scots), demonstrating that the same phenomenon occurs in a variety of unstandardized minority language communities.

Dorian is Professor Emeritus of Linguistics in German and Anthropology at Bryn Mawr College, where she taught from 1965 to 1989, chairing the Department of German for three years between 1977 and 1983 and the Bi-College Department of German at Bryn Mawr and Haverford Colleges from 1986 to 1989.

Completing her undergraduate degree in German *summa cum laude* at Connecticut College for Women, she received a Fulbright Award to study linguistics and anthropology at the University of Bonn and the Free University of Berlin. She then studied linguistics at Yale and the University of Michigan, receiving her Ph.D. at the latter in 1965.

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Dorian is known, too, for her long-term friendships with students, colleagues, and fieldwork sources (across two and even three generations in this last case). One well-published ex-student, Suzanne Romaine, has written a biographical entry on Dorian in the *Concise encyclopedia of sociolinguistics* (R. Mesthrie, ed.). A second can be found in the *Encyclopedia of bilingualism and bilingual education* (C. Baker and S. Prys Jones, eds.).

Though obliged by health problems to withdraw mid-career from those aspects of academic life that require mobility, Dorian continues to be highly productive and well-recognized in the field for her convincing, detailed demonstrations that focusing on speakers who might be considered 'marginal' is crucial to a full understanding of human language.

See also: Romaine, Suzanne; Endangered Languages; Language Maintenance and Shift; Scots Gaelic.

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Down Syndrome

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Down syndrome (DS), a condition defined cytogenetically by trisomy 21, is the most common chromosomal disorder associated with mental retardation in developing countries, occurring in approximately 1/1000 live births (Hook, 1978). Language is one of the many spheres affected by this genetic abnormality and represents an area of specific additional difficulty for many individuals with DS.

Language Development

When studying the language acquisition of individuals with DS, a question often asked is whether language development in these children is typical but simply delayed or whether it is truly different from the usual acquisition patterns. Current findings generally differ on this matter since at a relatively superficial level, acquisition appears to proceed in a way that is generally comparable with the expected order. However, when more detailed observations are made, DS children form an usually distinct group from their nonretarded peers. Hence, in order to assess the effects of DS on speech and language, it is necessary to describe the acquisition process in a more systematic fashion. In what follows, studies published mainly over the past two decades will be briefly summarized according to five categories: Prelinguistic and early communicative skills, Phonetics and phonology, Lexicon, Morphosyntax, and Pragmatic language.

Prelinguistic and Early Communicative Skills

Following the work of Bates (1976), it has been recognized that some prelinguistic behaviors are prerequisites or facilitators of further linguistic development. Thus, most DS babies appear to have relatively good early nonverbal skills (Buckley, 1999), although they

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present with a retarded onset of abilities such as smiling, laughing, showing, and pointing (Rondal, 1987). They are also slower to explore the physical world and to participate in activities that require attention (Buckley, 1999). However, despite these delays, DS infants appear to produce as effective and frequent communicative signals as their normally developing peers (Chapman, 1995).

With respect to early vocal development, longitudinal studies of the emergence of babbling in DS babies have inconsistently revealed small delays relative to chronological age- (CA-) matched peers (Lynch *et al.*, 1991). Conversely, speech perception skills have been shown to be impaired relative to CA- and mental age- (MA-) matched groups (Lynch and Eilers, 1991). In addition, prolonged preference of DS infants for rhymes rather than spoken stimuli suggests a slower development of complex auditory representation (Glen and Cuningham, 1983). These two difficulties are believed to impact negatively for the later acquisition of a targeted lexicon.

Phonetics and Phonology

Phonetic development is generally slow and difficult in DS children but the overall sequence appears to parallel the expected pattern of acquisition (Menn, 1985). Vowels, semivowels, nasals, and stop consonants are produced first, whereas more difficult fricatives take much longer to be fully mastered – if they ever are (Rondal, 1988). That is, although retarded, the pattern of phonological errors seen in DS are of the same type as those observed in other children and include final consonant deletion, initial cluster reduction, substitution of glides for liquids, and stopping (Bleile and Schwartz, 1984). Furthermore, most of these processes persist in adolescence (Van Borsel, 1988) and this may account for the frequently reported low intelligibility of DS teenagers' speech (Rosin *et al.*, 1988).

Lexicon

Most children with DS are approximately 12 months delayed when they produce their first meaningful one-word utterances (Share, 1975). Although slower than their normally developing peers, DS children nevertheless demonstrate similar content and word-form categories in their first 50 spoken words (Gilham, 1990). Therefore, rate rather than content of production appears to be slower (Chapman, 1995). According to Miller *et al.* (1991), this finding of early delay would disappear if spoken vocabulary only were not the exclusive measure for lexical output. The vast majority of DS children also form signs to communicate and there is no gap when signed vocabulary is included in the lexical inventories.

In tasks of picture description, teenagers with DS present an increase in the use of verbs and a decrease in nouns, just as MA-matched controls do. Their ability to designate the function of concrete nouns (Cornwell, 1974), to define words, or to perform fast-mapping tasks also tends to increase with mental age (Chapman *et al.*, 1991). Despite these changes, their use of vocabulary (number and type of words) in narratives still remains significantly reduced compared to that of control groups (Chapman *et al.*, 1991).

In a study comparing verbal learning and memory, using the child version of the California Verbal Learning Test (CVLT-C; Delis *et al.*, 1994) in early brain injury and three developmental disorders (specific language impairment, Williams Syndrome, DS) the children with DS differed from controls on every CVLT-C variable. The results are consistent with the literature describing these children as having language deficits that are worse than their global delays (Nichols *et al.*, 2004). In that study, the children with DS were the only group that differed significantly from controls even on the first learning trial of the task. They were also particularly susceptible to interference from extra-list information.

Word comprehension appears to be an area of potential strength for individuals with DS. Their vocabulary is appropriate for mental age throughout childhood (Chapman *et al.*, 1991) and may exceed that of MA-matched controls at the time of adolescence (Rosin *et al.*, 1988).

Morphosyntax

Around 4 or 5 years of age, when DS children begin to utter two- and three-word sentences, they appear to appropriately produce and understand the same set of relational meanings (e.g., existence, possession, location, agent-action) as other normally developing children (Rondal, 1978). However, despite their semantic skills, DS children present with major impairments in the area of morphosyntactic skills. Rondal (1993) has observed that the spontaneous language of subjects with DS usually remains telegraphic with a highly reduced usage of function words. Moreover, in a variety of procedures used to assess morphosyntactic skills, DS children usually repeat a smaller number of phrases and make more mistakes than normal controls (Vicari *et al.*, 2000). It has also been reported that although shorter, the overall number of utterances produced by the DS children still remain comparable to those of normal controls, suggesting that they enjoy social interactions regardless of their linguistic deficiencies (Vicari *et al.*, 2000). In a study of

French-speaking DS children, Rondal (1987) found that they presented with difficulties with the use of grammatical morphemes such as verb inflexions for temporal and aspectual relationships, concordance between subjects and verbs, pronoun selection for gender and number, and determinant selection for definite/indefinite contrasts.

With respect to comprehension, Vicari *et al.* (2000) showed that children with DS had problems understanding simple structured phrases. This problem persists in adolescence and may be a cause of additional delays (Chapman *et al.*, 1993). Following Rondal's (e.g., 1978) studies with DS, Fowler (1990) has argued that there is a ceiling for syntax acquisition in this population. However, Chapman *et al.* (1998) refuted this hypothesis when they found a significant increase in the narratives of DS adolescents ages 16–20 years. Whatever the results of these studies, it is clear that there exists an important gap between lexical and morphosyntactic development in DS, which encompasses both production and comprehension.

Pragmatic Aspects

Although limited in form, the language of DS individuals nevertheless contains communicative value and coherence. Conversational topics are dealt with in a way that allows good continuity in the exchange between interlocutors and the major types of sentences (e.g., declarative, imperative, question) allowed by the grammar are used in DS (Rondal and Lambert, 1983; Rondal, 1988). In older DS children and adolescents, discourse aspects of pragmatic skill that are not dependent on linguistic skills—topic continuation, socially appropriate responding—appear to be properly used, whereas those dependent on linguistic skills, such as story retelling, seem limited (Jordan and Murdoch, 1987). Finally when DS individuals are tested for the appropriateness of their social response, they appear to give a significantly greater percentage of relevant suggestions and sympathetic comments than do high-functioning individuals with autism (Loveland and Tunali, 1991).

Adults and Aging DS Individuals

As a consequence of medical progress and social awareness of mentally challenged populations, the special needs and life expectancy of DS individuals have dramatically increased. Unfortunately, a limited set of observations concerning the linguistic abilities of older persons with DS is currently available. Nevertheless, it is possible to characterize the language of most DS adults as being deficient in the sphere of articulation and phonology (see Hamilton, 1993, for a review). Both adults and younger individuals with DS present the same speech characteristics, errors, problems, and reduced intelligibility. There is also a greater incidence of dysarthria and dyspraxia in older individuals with DS.

Morphosyntactically, the utterances of DS adults are short (MLU around 5), are monopropositional, and show limited and inconsistent use of grammatical morphology (Rondal, 1996). As opposed to their younger peers, linguistic comprehension appears to be considerably limited and the reliance on external cues, such as situational information, becomes essential (Rondal, 1996). Notwithstanding these shortcomings, the semantic structure and the content of utterances remain properly organized.

On a pragmatic level, the few existing studies report overall good abilities for DS adults. As proposed by Rondal (1987), it is important to differentiate between formal and informative aspects of language when describing the linguistic performance of adults with DS. Although several limitations with respect to form can be seen, the language of DS adults nonetheless comprises the functional and the informative cues required to communicate successfully in daily routines. For example, DS adults have difficulty linguistically encoding tense, but most of them are able to use adverbial expressions such as yesterday and tomorrow, which can disambiguate between past and future (Kernan and Sabsay, 1996).

Factors Suspected to Play a Role in DS Language Difficulties

A number of mechanical, cognitive, sensory, and environmental factors have been implicated in the language difficulties observed in DS individuals. Understanding how these influences act on language mechanisms is crucial to the development of efficient intervention strategies that will improve the speech and language skills of this population. The following factors are believed to be the most critical; although they are presented separately, there is little doubt that they interact in various ways and contribute to the overall syndrome profile.

Speech Motor Control

Speech production in most DS individuals is likely to be impaired by a number of speech motor difficulties originating from central muscle control deficits and resulting in problems with the selection, planning, and execution of the fine-motor movements required for proper articulation (Hamilton, 1993). These problems would also be caused by difficulties in

moving the orofacial muscles and tongue with precision due to a diversity of orofacial anomalies such as undersized mouth cavity, hypertrophy of the tongue, hypotony of the speech muscles, broad and irregular lips, excessive salivation, defective teeth, underdevelopment of sinuses and nasal passages, and frequent respiratory infections producing coughing, hoarseness, and reduced breathing capacity (Rondal, 1988). All of these abnormalities adversely affect the speech and intelligibility of DS individuals.

Cognition

It is quite likely that the limited mental capacity of DS individuals interferes with their ability to develop speech and language. With some exceptions, nearly all of them have moderate or severe mental retardation ($20 < IQ < 50$). Some authors (e.g., Rondal, 1988) have suggested that a mental age of 4 to 5 years would represent a realistic upper limit of mental growth for the majority of persons with DS. In addition to mental age, several other cognitive domains also appear impaired or deficient. They include short attention span, slow reaction time, deficiency in auditory-vocal processing, reduced perceptual discrimination, limited generalization capability, deficiency in symbolization (particularly nonconcrete symbols), difficulty with abstraction (Rondal, 1988), and finally reduced auditory short-term memory (ASTM).

Deficits in ASTM, considered to have the most deleterious effects with respect to language acquisition, are highly prevalent in children with DS (Hulme and Roodenrys, 1995). Regarding language development, a deficiency in ASTM would delay vocabulary learning, slow the acquisition of reading, and reduce comprehension abilities (Gathercole and Baddeley, 1993). More importantly, it would seriously hamper grammar acquisition since the ability to hold a whole phrase or sentence in short-term store to process it for meaning would be impaired (Buckley, 1999).

Sensory Deficits

There are consistent reports highlighting the high risk of mild to moderate hearing loss for children with DS (e.g., Davies, 1996). This is usually a conductive and intermittent loss due to otitis media or Eustachian tube malformation causing blockage of the external ear canal by cerumen. There is also a significant minority of individuals with permanent mild to moderate sensorineural deafness. Hearing loss and altered auditory perception are frequently associated with delayed language acquisition in normal children. However, hearing deficits are not the primary cause for the difficulties in language seen in DS, as such a deficit would predict underperformance in both language comprehension and production (Miller, 1988).

Ocular defects in DS have also been reported and include strabismus, myopia, nystagmus, cataracts, watering eyes, and frequent conjunctivitis, which appreciably reduce their visual efficiency skills (Rondal, 1988). Here again it is less likely that these deficits can adequately explain the delays seen in DS, considering the overall pattern of relative strengths in visual tasks in this disorder (Chapman, 1995; Jarrold *et al.*, 1999).

Environment

Environmental factors have been implicated in the language difficulties seen in DS input received by DS individuals. It has been proposed that the attention deficits in DS infants can significantly affect exposure to language input due to weakened mother–child interactions (Miller, 1988). Later, throughout childhood and adulthood, continuous reduced expectations regarding DS individuals' performance may generate learned incompetence as well as a lack of opportunities to learn and practice language and communication skills. However, given the dissociation between production and comprehension deficits, it would be less likely that these external factors represent a major cause of language delays seen in individuals with DS.

Conclusion

The general language profile in individuals with DS can be characterized by the following features:

1. The language of both children and adults is more impaired than one would expect given their level of cognitive development;
2. Production skills are limited;
3. Reduced phonological abilities contribute to poor speech intelligibility;
4. Major problems in morphosyntactic areas;
5. Lexical performance far surpasses other areas of language;
6. Good overall pragmatic and semantic skills that permit satisfying daily communication with both acquaintances and strangers.

However, it is important to keep in mind that this language profile for DS is not as homogenous as it appears and that there exist considerable interindividual variations in the expressive and receptive language abilities in DS. The cases of language-wise DS individuals who demonstrate perfectly normal linguistic performance (Rondal, 1998) suggest a far

more complex picture of the linguistic and cognitive abilities expressed in DS.

See also: Autism and Asperger Syndrome: A Spectrum of Disability; Williams Syndrome.

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Drama: Stylistic Aspects

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The Development of the Play-Text

The modern reader is likely to take some of the conventions of play-texts for granted, but a glance at play-texts from earlier periods will help to highlight some distinctive aspects. A rather basic assumption we may have is that the play exists from the outset as an entire visible entity, available to all readers. This used to be far from the case. In the Elizabethan period, for example, plays were primarily written for performance. Before the performance took place, typically two copies of the manuscript play were produced. One would constitute what we would call the 'promptbook'; the other, in order to save on further costs of copying, was cut up into individual character parts, the scraps of speech pasted into a roll of paper with short cues added. An actor's 'role' thus initially referred to the roll of paper containing his (Elizabethan actors were male) part, and not the part itself (something which came about later by metonymy). This process is likely to have had important implications for the way in which the dialogue was written, since an actor would only get to read his own part of the dialogue, hearing the rest of the dialogue at one of the few rehearsals. There were no lengthy 'stage directions' as in modern plays, particularly at the beginning. The actor had to glean information about 'character,' such as social status, from the language. This is, of course, long before the 'method' acting of Konstantin Stanislavski, which emphasized an individualized, psychological approach in which the actor would be as one with the part. Nevertheless, even Elizabethan actors would need to know what 'character' to present for the dialogue to be effective. Also, the language had to help with turn-taking. For example, if you cannot see the answer to a question, to whom would you address the question? An obvious linguistic mechanism of help here is the use of vocatives, which not only indicate who should be speaking to whom and when, but also can provide information about relative social status. Not

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surprisingly then, vocatives occur relatively frequently in older play-texts in comparison with other genres like prose fiction.

Play-texts have been affected by changes in the context of performance. Here, we will briefly note some effects of two types of context: the theater and the audience. The physical context constituted by the theater has changed significantly. Towards the end of Shakespeare's life, public open theaters like the Globe were becoming obsolete, giving way to new indoor theaters. The audience became more isolated from the performance as the stage ceased to jut out. Elizabethan plays had little by way of scenery and props, with the consequence that the dialogue had to undertake the informational function of indicating what was going on in the fictional situation of the play, as these examples illustrate: 'wee haue lost our way in the woodes,' 'Vpon these chalkie cliffs of *Albion* / We are ariued now,' 'Why dost thou gaze vpon these stately trees' (all from George Peele's *The Old Wiues Tale*, 1595). Such examples might be described as 'intradialogic stage directions' (see the section below, for more on stage directions). The dialogue of later plays in indoor theaters, with their greater potential for scenery and effects, was freer to focus on other functions of dialogue (e.g., expressive, interpersonal). Another physical change was the dramatic expansion of seating, especially in the mid-18th century. This meant bigger theaters with more physically distant audiences, and thus the actors were forced to speak louder and broaden gestures. As for audiences, today's convention of silence, such that the rustle of a crisp-packet attracts opprobrium, used not to apply. An Elizabethan audience member chatted to others, cracked nuts, and took other refreshments (or threw them at the cast if the play was rotten). Clearly, dramatic devices such as prologues, epilogues, and soliloquies helped the audiences follow the plot in circumstances where audience attention might be less than full.

Finally, we can note how conventions for presenting dialogue on paper have evolved. Of course, plays, particularly in earlier periods, did not just present dialogue, but would also include, for example, monologues, songs, and letters (to be read out). But dialogue was and is the central characteristic of play-texts. The convention for representing individual turns by giving a new speaker a new line must have been in place in early drama as a consequence of the fact that the script would be cut up into individual parts. However, this does not mean that when the play was published, each turn in the dialogue began with a new line. In fact, dialogue consumed a lot of space, and so sometimes printers might start a new speaker on the same line, as here:

> *Stult.* Conceit merrily: O that my love were any thing but woman. *Fub.* O that your love were any thing but Common: then might she be.-
> *Stu.* What might she be. *Fub.* Nay what you wil yfaith. ('The knave in grain,' 1649: 7)

Naturally occurring spoken dialogue is messy, full of overlaps and interruptions, sudden shifts in topic, false starts, 'needless' repetitions, pause fillers, 'natural' noises, and so on. Generally, play dialogues of all ages are considerably neater – closer to the norms of prose writing. This is an important point, because attempts at being 'natural' will be foregrounded. Consider Dorinda's 'throat clearing' in George Farquhar's 'The Beaux strategem':

> Mrs. *Sull.* The Physick works purely – How d'ye find your self now, my Dear?
> *Dor.* Hem! much better, my Dear [...] ('The beaux strategem,' 1707: 23).

In this period, 'hem' was a conventional way of presenting a particular speech disfluency, a slight cough or throat being cleared. 'Hem' is not like other words in the text; it lacks the semantic content we would expect of words that typically occur in a dictionary. It stands out against the other words in the play. But it cannot be dismissed as an unintentional cough, since we know that it was put there on purpose by the author (cf. the discussion of discourse structure in the section below). The author signals something about the character: Dorinda is embarrassed by Mrs Sullen's question, as she is secretly in love and thus in exceedingly good health.

There is no completely fixed and stable set of conventions for presenting natural features. For example, in the past, simultaneous speech has either not been presented or a clumsy device has been used: instead of the name of an individual character, the playwright uses 'all' or '*omnes*' to refer to a particular group who should speak together. Only in recent decades have playwrights attempted to develop decent systems of presentation. Caryl Churchill's plays are especially noteworthy in this respect. Consider this extract:

> NIJO The first half of my life was all sin and the second/ all repentance*
> MARLENE Oh what about starters?
> GRET Soup.
> JOAN *And which did you like best? ('Top girls,' 1990: 59).

The slash indicates when Marlene should start speaking, and the two asterisks indicate a topic continuity.

Some instances of simultaneous talk constitute interruptions, which today are typically represented with a dash, three dots, or nothing. The problem is

that these graphic features are (and were) not exclusively the preserve of interruptions. For example, all of them could also present a speaker 'trailing off.' Consider part of an interaction between Lord and Lady Touchwood in a play by William Congreve:

> Ldy *T.* Nay, but will you be calm – indeed it's nothing but-
> Ld. *T.* But what ?
> Ldy *T.* But will you promise me not to be angry – nay you must – not to be angry with *Mellefont* – I dare swear he's sorry – and were it to do again, would no –
> Ld. *T.* Sorry, for what? ('The double-dealer,' 1694: 27–28).

Dashes within turns seem to present the fragmentary quality of Lady Touchwood's talk (note also the needless repetition 'not to be angry'), whilst the first end-of-turn dash is probably a trailing off and the second probably an interruption. What a dash presents, whether in today's or yesterday's plays, is an interpretation made in context, not an automatic conclusion.

The Philological Tradition of Play-Text Study

Literary critics in the past have been loath to acknowledge the fact that plays are written in dialogue, and that that dialogue is – however imperfectly – modeled in some way on naturally occurring spoken interaction. Perhaps this is because spoken conversation has been often seen as a debased form of language; hence, critics attempt to rarify drama by considering it a 'dramatic poem.' However, this is not at all the case in the field of historical linguistics, particularly the philological tradition, where scholars have treated the language of drama as an opportunity to research the spoken language of the past. Vivian Salmon provided a justification for this use of drama: "The more skilful the dramatist the more skilful he will be, if presenting the normal life of his time, in authenticating the action by an acceptable version of contemporary speech" (1987: 265). The methodology in this area of research is to argue for a set of 'diagnostic items' linked to fundamental aspects of spoken conversation, and then search for those items in the play-texts. Thus, prototypically, spoken conversation is: (1) online and impromptu (diagnostics may include fluency features, such as needless repetitions, false starts, and hesitations), (2) interactive (diagnostics may include first and second person pronouns, and vocatives), (3) socially-situated (diagnostics may include 'ritual' formulae, such as greetings and partings), and (4) contextually-bound (diagnostics may include deictic elements). More recently, this kind of work has experienced a boost with the development of corpus linguistics, enabling the tracking of grammatical or lexical features across vast corpora containing texts of various genres and periods. Biber and Finegan (1992: 699ff.), considering dialogue in fiction and in drama over four centuries beginning with the 17th, pointed out that literary dialogue in all periods is unlike modern conversation with respect to its higher informational load, perhaps due to the need to advance the plot. Real spoken conversation has a relatively low informational load, because of the online processing pressures experienced by speakers. Such dialogue in drama would risk boring the audience (unless it were part of some dramatic purpose, as in some absurdist plays). The main finding of their 1992 paper was that all genres have 'drifted' over the four centuries towards a more 'oral' style (i.e., have become more involved and situated, but less abstract), except for some counter-developments towards more literate styles in the 18th century. As far as plays are concerned, this is consistent with changes in theatrical context noted in the first section. However, Biber and Finegan noted that plays bucked the general trend around the end of the 17th century and the beginning of the 18th century, perhaps because the 'polite' society of that period viewed spoken language as vulgar (1992: 700). This is an intriguing finding, but one that needs further investigation.

One problem with the diagnostics approach is that it is very difficult to know whether the diagnostic features selected had the same kind of discoursal value in earlier periods (e.g., interpersonal meanings, discoursal functions, degree of politeness); indeed, studies in historical pragmatics would suggest that they did not. Another problem is that it is difficult to know whether a particular feature had the same function in real conversation as it did in drama. One way forward would be to improve our sense of what forces shape the language of drama as a distinctive genre in its own right at different points in history. One way of doing this is to compare plays with other genres (see, for example, Culpeper and Kytö, 2000). Another problem with the diagnostics approach is that it relies heavily on a checklist of (usually) grammatical features. We need to move beyond this to consider pragmatic and discoursal aspects too.

Text and Performance

Up until the early 1980s, the analysis of play-texts had been largely neglected by stylisticians (Culpeper *et al.*, 1998: 3). Prior to then, in those instances where plays were the object of study, the kind of stylistic analysis performed was generally of the sort more commonly carried out in relation to poetry, with critics tending to concentrate on 'verse drama' (for

example, the plays of Shakespeare) and approaching such texts as if they were simply long poems. This was for the reason noted in the previous section, namely that 'drama as dialogue' has an uncomfortable resemblance to that perceived 'low' form of language, spoken conversation. Of course, this is not to say that the techniques used in the stylistic analysis of poetry have no place in the analysis of plays (for verse drama in particular they can, in fact, have special relevance), but simply that this type of analysis cannot explain the full range of effects created by play-texts. It was only with the advent of more appropriate tools from such areas of linguistics as pragmatics, conversation analysis, and discourse analysis that the stylistic study of plays was made fully possible (for examples of early work on the stylistics of drama utilizing these approaches, see Burton, 1980; Herman, 1991; Short, 1981; and Simpson, 1989).

A further obstruction to the linguistic study of play-texts was the long-held view that in the analysis of drama, performance was of greater significance than text. J. L. Styan, for example, writing in 1969, suggested that "a play is not an art of words, any more than a film is an art of pictures: it is the art of exercising them" (1969: 68). Likewise, Stanley Wells (1970: ix) asserted that "the reading of a play is a necessarily incomplete experience," a view still propagated by some critics today. However, there are several problems with studying performance as opposed to text, as Mick Short (1981, 1998) has pointed out. The most significant of these concerns the ontological status of dramatic performances. Short (1998: 8) explained that:

> In ontological terms, each production of a play would appear to be a play PLUS an interpretation of it, in that the director and actors have to decide which elements to focus on, emphasize in performance, etc.

The ramifications of this were made clear by Short when he said that:

> Both meanings and values will change not just from one production to another but also from one performance of a particular production to another. There then becomes no play to criticise [...] critical discussion becomes impossible unless the two critics concerned have both seen and are arguing about exactly the same performance. (Short, 1981: 181).

What this suggests for the stylistic analysis of drama is that the 'play-text' should be the object of study, rather than performance (hence, our frequent use of this term in this article, as opposed to 'drama,' which we reserve for reference to the genre itself). Indeed, a significant number of performance features can be inferred from careful analysis of the play-text, as, for example, Aston and Savona (1991) and Short (1998) have demonstrated. Consider, for example, the following extract from Gloucester's opening soliloquy in 'Richard III' (I.i.14–27):

> But I, that am not shaped for sportive tricks
> Nor made to court an amorous looking-glass;
> I, that am rudely stamped, and want love's majesty
> To strut before a wanton ambling nymph;
> I that am curtailed of this fair proportion,
> Cheated of feature by dissembling nature,
> Deformed, unfinished, sent before my time
> Into this breathing world, scarce half made up,
> And that so lamely and unfashionable
> That dogs bark at me as I halt by them;
> Why, I, in this weak piping time of peace,
> Have no delight to pass away the time,
> Unless to spy my shadow in the sun
> And descant on mine own deformity:

The extract above contains several clues as to how the character of Gloucester should look in a performance of the play. We can infer, for instance, that he should be ugly, since we know that he is not "made to court an amorous looking-glass" (I.i.14–27). More specifically we can infer that he must be deformed in some way ("Cheated of feature by dissembling nature/ Deformed, unfinished"), and that this deformity must be significant enough to be noticeable in Gloucester's shadow ("Unless to spy my shadow in the sun/And descant on mine on deformity") (I.i.14–27). It is arguably these implicit directions that have led to Gloucester often being portrayed as hunchbacked in productions of the play. (See the following section on stage directions for a more detailed look at Aston and Savona's work in this area). Nevertheless, performance is undoubtedly of relevance and remains an important matter in the analysis of drama, as Keir Elam (1980: 209) pointed out:

> [...] the written text/performance text relationship is not one of simple priority but a complex of reciprocal constraints constituting a powerful *intertextuality*.

Short (1998) himself did not argue against this position, but for the reasons described above, most modern stylisticians would restrict their comments about performance to those that can be inferred directly from the text itself.

Discourse Structure

One of the characteristics of plays that sets them apart from prose fiction is their different discourse structure. Short (1996) explained that the prototypical communicative event in ordinary discourse is one in which an addresser conveys a message to an addressee within a particular communicative context.

Plays, he argued, also have this underlying structure, but in play-texts it is complicated by the fact that there is an additional embedded level of discourse. Prototypically, play-texts have a two-tier 'discourse architecture' (Short, 1996) compared to the three-tier structure common to prose fiction. The topmost level of the discourse structure of a play consists of an 'addresser' (the playwright) giving a message to an 'addressee' (the reader/audience). Embedded within this is the second level, consisting of characters addressing each other within the fictional world of the play. With plays, the reader/audience is a sanctioned overhearer of the dialogue that all the characters engage in. In effect, the reader/audience 'looks in' on the story that is being enacted. Notice that when we read play-texts this act of 'looking in' is metaphorical, but when we watch a performance of a play the 'looking in' becomes a literal, nonmetaphorical act.

The two-tier discourse structure common to many play-texts can give rise to 'dramatic irony' in those instances where the reader/audience knows more about the happenings in the fictional world than the characters do themselves. Dramatic irony may be used as a device for the creation of humor, as in the British sitcom 'Fawlty Towers,' set in a seaside hotel, where much of the humor comes about as a result of the audience knowing more about the guests staying in the hotel than its hapless owner, Basil Fawlty. Alternatively dramatic irony may be used as a plot device, as in Shakespeare's 'Romeo and Juliet,' where the tragic denouement is heightened by the fact that the audience knows that Juliet is only sleeping whereas Romeo believes she has committed suicide by swallowing poison.

Of course, not all plays will have this discourse structure. Some plays, particularly those that include narrator personae, will have more discourse levels, as Short (1996) pointed out. Examples can be found in the Greek chorus plays and in much medieval drama, as well as in many of Shakespeare's plays. Contemporary play-texts that exhibit such discourse structures include Brecht's 'The Caucasian chalk circle' (see Short, 1996 for a discussion), Brian Friel's 'Dancing at Lughnasa' (1990) and Alan Bennett's 'The lady in the van' (see McIntyre, 2004a). In such plays, the discourse architecture includes a third discourse level (between the author and character levels) to mark the narrator and the narratee in the fiction. Such a structure is increasingly common in contemporary screen drama. Television examples include NBC's sitcom 'Scrubs,' as well as British serials such as 'Brideshead revisited,' 'The secret diary of Adrian Mole,' and 'Oranges are not the only fruit.' Examples of narration in the cinema include: Bob Kellet's 'Up Pompeii,' Richard O'Brien's 'The Rocky Horror picture show,' Rob Reiner's 'The princess bride,' Roberto Benigni's 'La vita è bella,' Richard Curtis's 'Notting Hill,' and Sharon McGuire's 'Bridget Jones' diary,' to name but a few. These more complex discourse architectures give rise to their own stylistic effects, amongst which is point of view, a phenomenon not traditionally thought to be associated with play-texts, but one which has recently received attention by stylisticians (see van Peer, 2001 and McIntyre, 2004a, 2004b). Essential to the creation of such an effect are the stage (or screen) directions of a dramatic text.

Stage Directions

Although an integral part of the play-text, stage directions have been relatively neglected in the study of plays, not only within stylistics, but also within literary criticism and even theater studies. Indeed, many critics have actively disregarded their importance. Thomas, for example, went so far as to say that stage directions "shouldn't be confused with the play itself" (1992: 12), suggesting by implication that only dialogue counts in the definition of a play-text. In stylistics, with the exception of Schotta's (1970) perfunctory attempt at a linguistic analysis of the stage directions in Shakespeare, stage directions were all but ignored until Wales' (1994) account. This reluctance among critics of plays to consider the interpretative value of analyzing stage directions appears to stem from an uncertainty as to their function within the text, which is something that Wales (1994) attempted to address. Latterly, Feng and Shen (2001) and McIntyre (2004a) have also addressed this issue by considering the stylistic effects of stage directions and their relationship to the dramatic dialogue of the text.

The first significant treatment of stage directions (albeit within theater studies as opposed to stylistics) was to be found in the work of Aston and Savona (1991). In their book, *Theatre as sign-system*, they argue that stage directions occur in two forms, 'intradialogic' and 'extradialogic.' Intradialogic stage directions are those that occur within the speech of particular characters, whilst the extradialogic variety are what we might refer to as prototypical stage directions; i.e., those that are separated graphologically from the characters' speech in some way, usually through the use of italicization or parentheses (Schotta (1970) referred to these stage directions as 'marginal'). Aston and Savona (1991: 75) noted that intradialogic stage directions are often found in

classical, medieval, and renaissance drama, and that their presence refutes commonly held critical views that such texts contain only minimal stage directions and are nonprescriptive as to how the text should be interpreted and/or performed. Such stage directions constitute the kind of 'implicit directions' discussed by Short (e.g., 1998). They allow the reader to infer aspects of characterization (e.g., the 'Richard III' soliloquy, as discussed in the previous section), location and other aspects of staging (e.g., the quotations from Peele's play in the first section), and aspects of performance (e.g., the accents in 'The Queen and I' or the nonfluency of Justice Shallow, as discussed in the next section).

Extradialogic stage directions, on the other hand, cannot be inferred from what the characters say, but are instead separated graphologically from the characters' speech, as in the following prototypical example:

> DEELEY stands, goes to cigarette box, picks it up, smiles at KATE. KATE looks at him, watches him light a cigarette, takes the box from him, crosses to ANNA, offers her a cigarette. ANNA takes one (Harold Pinter, 'Old times,' 1971: 35).

Extradialogic stage directions such as the Pinter example above are what Veltrusky (1977: 37) referred to as 'the author's notes,' pointing out that these constitute narrative elements in play-texts. Numerous critics have disagreed with this position, however, and are instead of the opinion that the narrative elements of a play-text come solely from the speech of the characters. Aston and Savona (1991: 72) summarized this position when they said that:

> [...] for critics whose orientation is narrowly literary, stage directions appear to do little more than impede the flow of the dramatic narrative.

Such a position appears to arise out of a misunderstanding of the function of extra-dialogic stage directions in play-texts. In her discussion of the 'Circe' episode of Joyce's *Ulysses*, Wales (1994) argued that the stage directions in the text collectively fulfil a narrative function. In demonstrating this she identified six different functions of stage directions, which we summarize here:

1. *Orientation*: such directions establish place and time within the fictional world, and commonly consist of noun phrases as opposed to complete sentences. Other common grammatical characteristics are present tense and adverbials of place as grammatical theme. The following example from Agatha Christie's play 'Appointment with death' (1994: 83) demonstrates the features of an orientating stage direction:

> *The lounge of the King Solomon Hotel, Jerusalem. Afternoon. Back centre are three open arches, the centre one giving access to a terrace with a balcony rail with a wide expanse of blue sky beyond.*

Wales also noted that this type of stage direction could be used to convey information about particular characters present within the scene, in which case the progressive aspect is commonly used, to convey a sense that the actions of the character in question are "happening simultaneously with the scene's opening" (Wales, 1994: 250). These directions often provide such background detail on the characters as their physical appearance, clothing, personality, etc.:

> *When Curtain rises,* ROGERS *is busy putting final touches to a room. He is setting out bottles down Right.* ROGERS *is a competent middle-aged manservant. Not a butler but a house-parlourman. Quick and deft. Just a trifle specious and shifty* (Agatha Christie, 'And then there were none,' 1994: 3).

2. *Narration of happenings in the fictional world*: Wales suggested this category as a particularly dominant type of stage direction, and one which essentially describes what happens on stage. This category covers the same kinds of phenomena as Short's (1996) NRA (Narrator's Report of Action) category in his cline of speech and thought presentation, and is illustrated by the example below:

> MICHAEL, KATE, GERRY *and* FATHER JACK *go off. The others busy themselves with their tasks. Maggie makes a mash for hens.* AGNES *knits gloves.* ROSE *carries a basket of turf into the kitchen and empties it into the large box beside the range.* CHRIS *irons at the kitchen table* (Brian Friel, 'Dancing at Lughnasa,' 1990: 2).

3. *Kinesis*: Directions in this category describe the body movements and often body language of characters. Wales noted that these types of directions are often distinguished structurally by occurring immediately after speech attributions rather than in a separate paragraph, as in the following examples:

> **Guildenstern** (*Flipping a coin*) There is an art to the building up of suspense (Tom Stoppard, 'Rosencrantz and Guildenstern are dead,' 1967: 9).

> **Lady Bracknell** (*frowning*) I hope not, Algernon. It would put my table completely out (Oscar Wilde, 'The importance of being earnest,' 1899).

4. *Facial expression*: These stage directions indicate, obviously enough, the expressions that characters display as they speak and interact in the fictional world, for example:

> **Mrs Erlynne** (*With an amused smile*) My dear Windermere, manners before morals! (Oscar Wilde, *Lady Windermere's Fan*, 1893).

Wales also included within this category the directions that specify how a character speaks, and that perform a similar function to reporting clauses in prose fiction:

> **Lane** (*gravely*) There were no cucumbers in the market this morning, sir. I went down twice (Oscar Wilde, 'The importance of being earnest,' 1899).

> **Lady Chiltern** (*coldly*) Oh, it has been no inconvenience. That will do, Mason. You can bring tea (Oscar Wilde, 'An ideal husband,' 1899).

In fact, in our view it would be preferable for this type of direction to be considered a category in its own right, and for directions indicating facial expression to be subsumed within the 'kinesis' category.

5. *Paralanguage*: Stage directions of this kind take the form of verbs and may indicate such actions as sighing, laughing, winking, crying, etc.

6. *Conversational strategy*: Wales' final category incorporated those stage directions that indicate conversational strategies such as pausing, staying silent, interrupting, etc.:

> **Anna** We weren't terribly elaborate in cooking, didn't have the time, but every so often dished up an incredibly enormous stew, guzzled the lot, and then more often than not sat up half the night reading Yeats.
> *Pause*
> (*To herself.*) Yes. Every so often. More often than not (Harold Pinter, 'Old times,' 1971: 22).

Wales' categories are useful (even if some are open to debate) as they highlight how narrative elements can arise from stage directions. However, narrative function is just one aspect; Zongxin Feng and Dan Shen (2001) argued that in order to appreciate the true complexities of stage directions it is necessary to address the complex issue of who they are intended to be read by. They suggested that in play-texts the concept of the 'reader' should be more explicitly spelled out, and that the addressee of the author's message should be seen as:

> . . . a collective concept covering various kinds of readers: the director, the editor, the stage producer, the setting designer, actors/actresses, etc., in theatrical situations and ordinary readers in their armchairs (Feng and Shen, 2001: 82).

They then went on to argue that the function of stage directions is different for each of these proposed addressees. For example, when a play-text is being treated purely as a text to be read (in much the same way as one might read a novel), then the stage directions take on a narrative function. The work of George Bernard Shaw is particularly pertinent here, containing, as it does, many lengthy stage directions. (The reason for their inclusion in Shaw's play-texts is perhaps linked to the playwright's politics. Shaw probably had a particular readership in mind when writing his plays, and this was likely to include people unable to afford to attend theatrical performances, and therefore only able to access his plays in their published form (in libraries, for example)). However, when a play-text is being used as a "recipe for performance" (Searle, 1975), then set, lighting, and costume designers may interpret stage directions as a series of instructions as to what a production of the play should look like.

Feng and Shen argued that playwrights use an assortment of pragmatic strategies to take into account the variety of potential readers of a play-text. Hedging (for example, by the use of modal verbs or sentence adverbs such as 'probably') may be used to tone down stage directions that may otherwise be interpreted by a director as too direct a command and thereby too artistically constraining. In addition, Feng and Shen noted that a major pragmatic strategy used by playwrights is that of the 'empathetic device.' They explain that empathetic devices are "those that a speaker uses in sharing someone else's feelings or experiences by imagining what it would be like to be in their situation" (2001: 87). A clear example of what Feng and Shen meant by this can be seen in the opening stage direction of Alan Bennett's 'The lady in the van':

> A front cloth with, inset, the bay window of an early–nineteenth century house [. . .] Alan Bennett 2 looks through the window briefly then disappears. The hymn is cut off abruptly and the front cloth rises to reveal Alan Bennett 2 sitting at his desk. He reads from what he has been writing (Alan Bennett, 'The lady in the van,' 2000: 5; our underlining).

The event-coding (see Short, 1996: 287) of the underlined parts of the above extract demonstrate how the playwright's perceptual point of view here reflects that of the intended reader/audience; i.e., when writing the play, Bennett the author clearly imagined how an audience would view the scene when the play was staged. This is apparent for several reasons, amongst which are the following:

1. Inset from the front cloth is the bay window of a house. Since the playwright describes this, the audience's perceptual point of view is that of someone positioned *outside* the house. The reference to Alan Bennett 2 (a narrator-character) looking through the window and then disappearing codes this occurrence from the perceptual point

of view of the audience. Obviously, Alan Bennett 2 does not disappear 'in a flash of smoke' – he simply disappears from the audience's angle of vision, due to the audience's perceptual viewpoint being restricted by the positioning of the flat on to which the bay window is painted.

2. As the front cloth rises to reveal the interior of the house, the audience's perceptual point of view changes from being outside the house to being inside it. In essence, the playwright creates the illusion for the audience of moving closer to the action, even though the audience remain in their seats at all times. The effect of this is similar to a camera closing in on the action in a film.

The structural properties and stylistic effects of stage and screen directions have still to be fully explored, and there is scope for much more work in this area.

Dramatic Dialogue and Characterization

In this section, we address two central issues: how the dialogue in play-texts works, and how the dialogue constructs characters. The two issues are linked in a fundamental way: dialogue is social interaction, and it is in social interaction that character is displayed and shaped. Most recent research has concentrated on characterization in prose fiction. This is surprising, since, typically, there is no narrator getting in the way of our perception of characters in plays (see the previous two sections for evidence of narratorial presence, and also 'authorial cues' in this section). We are exposed in a direct way to their words and actions, and, moreover, on stage we are exposed to their very physical presence. Of course, the two issues are separable: not every contribution to dialogue conveys an equal amount of character information. Of importance here is the 'discounting principle': character information will not, or at least logically should not, be inferred when a character is under external pressure to produce a particular behavior (see Culpeper, 2001: 116–117). For example, Regan and Goneril's protestations of love for King Lear can hardly be taken to represent their true state of feelings, given the presence of an enormous bribe (Lear will give the most generous portion of his kingdom to the one who loves him most).

In addressing the first issue, we will give the flavor of the main literature on the stylistics of drama (e.g., Culpeper *et al.*, 1998; Herman, 1995). This is largely made up of studies taking a pragmatic or discoursal framework developed for nonfictional spoken interaction and applying it to the dialogue of plays. In addressing the second issue, we shall largely draw upon Culpeper (2001). This work attempted to avoid a simple list of linguistic features that construct character in dialogue, not least of all for the reason that theoretically, any feature could be included. Instead, the emphasis was on features that 'real life' language attitudes research has suggested might be important, or that textual analyses of plays have shown to be important. The former alludes to the fact that we do not approach language with a blank sheet, but with the information we already have in our heads. We have knowledge about types of people (social schemata), and this knowledge will include how different types of people speak. For example, a 3-year-old child would be expected to have a relatively high pitch, reduced range of lexis, simple syntactic structures, and little pragmatic awareness. If these features were conveyed in play dialogue (high pitch could be signaled in a stage direction), we might infer that the character is young. Of course, we also deploy our knowledge of fictional character types (e.g., 'hero,' 'lover') and of how the specific language of drama works. Nevertheless, it is completely improbable that when we interpret fictional texts, we switch off the interpretative apparatus we employ for real-life discourses.

Following Pfister's work on drama (1988: 124–126), we make a distinction between (1) 'explicit' characterization cues, where we find characters explicitly making statements about themselves or others, and (2) 'implicit' characterization cues, where we have to infer (via schemata, for example) character information from linguistic behavior. We will also briefly note 'authorial' cues, where character information does not come from a character, as in the case of stage directions.

Explicit Cues One category of explicit cues is 'self-presentation.' For example, Shakespeare's Cleopatra boasts:

> Broad-fronted Caesar,
> When thou wast here above the ground, I was
> A morsel for a monarch;
> ('Antony and Cleopatra,' I.v.29–31)

But Cleopatra's statement about her sexiness cannot be taken at face value. The fact that her maids are present may have a discounting effect, since her statement can be seen as Cleopatra showing off. Discounting of this type does not apply in soliloquies. When Richard of Gloucester says that he will "seem a saint when most I play the devil" ('Richard III,' I.iii.336–338), we can take it at face value that this is what he plans to do (see the discussion of soliloquies in the next section).

The other category of explicit cues is 'other-presentation.' For example, Nell in 'A comedy of errors' (III.ii.71–153) is only spoken about and never seen or heard, yet the information we gain is remarkably detailed. We know her name, her job

('Kitchin wench') and thus her low social status. We are told about her unsalubrious physical appearance: the quality of her skin ('al grease'), her complexion ('swart'), and her shape ('sphericall'). We also learn about her disagreeable personality (she is "a very beastly creature," like a "beare"). However, discounting may also take place with this kind of cue. Consider, for example, Iago's presentation of Desdemona. The audience can discount it, but Othello fails to do so (see also the previous section on discourse structure and dramatic irony).

Implicit Cues The potential meaning of an utterance in a dialogue might be described in terms of five key components: formal, implied, illocutionary, interactional, and social. We shall discuss each of these in turn.

An 'utterance' presented in a written play-text involves a certain choice of lexis, grammar, and spellings. Regarding lexis, an interesting aspect relates to lexical richness. The main finding here in present-day language-attitudes research is that increased richness correlates with higher socioeconomic status and more education. This can be illustrated by type-token ratios (i.e., the number of different types of word divided by the total number of words) for characters in 'Romeo and Juliet.' For example, the Nurse has a low ratio of 0.293, suggesting her low socioeconomic status and lack of education, contrasting with Mercutio, who is of gentle status and presumably well-educated, and attains a ratio of 0.390. In fact, it also suggests the Nurse's rather emotional nature (repetitions, such as 'O woeful, woeful, woeful day!' (IV.v. 49), being one kind of emotional signal), contrasting with Mercutio, the playful word-smith. In addition to the issue of richness, lexical items might be associated with particular dialects or registers (e.g., 'nowt' as a marker of a northern English dialect), and we shall illustrate this further below. Regarding grammar, simple coordinated sentences versus complex embedded sentences can suggest different degrees of sophistication. Consider this sentence spoken by Lady Bracknell in Oscar Wilde's (1894) play 'The importance of being earnest':

> It is my last reception, and one wants something that will encourage conversation, particularly at the end of the season when everyone has practically said whatever they had to say, which, in most cases, was probably not much.

Even against the norms of writing, this is an unusual sentence: it has, for example, 38 words, whereas the average written sentence length in present-day English is 17 words. And, of course, it has multiple embedded clauses. All this contributes to making Lady Bracknell appear bizarrely aloof, especially in performance. Dialectal grammar is also used to suggest a character's social or geographical location, though, as with lexis, authors use markers to allude to particular dialects not to accurately and consistently represent them. Thus, for example, one frequent marker of the Norfolk dialect in Arnold Wesker's naturalistic 'kitchen sink' drama 'Roots' ([1959] 1960) is the absence of the third person singular <s> inflection, as in "She say some people get indigestion" (Wesker, [1959] 1960: 86). Clearly, in a play called 'Roots,' regional identity is important, and Wesker even included a note on the Norfolk dialect. As Wesker put it, "This is a play about Norfolk people . . . as it is about Norfolk people it is important that some attempt be made to find out how they talk" ([1959]1960: 83).

Regarding spellings, playwrights sometimes deploy them to suggest accents. A good illustration of this appears in: Sue Townsend's play 'The Queen and I' (1994: 7) (adapted from her novel of the same title). England has become a republic and the royal family are evicted to a council estate in the English Midlands. Finding their new house boarded up, the Queen approaches her next-door neighbor, Violet:

> Queen: Would you have an *axe* I could borrow?
> Violet: An *ix*?
> Queen: Yes, an *axe*.

Townsend uses 'ix' to suggest a vowel which is higher than the vowel of 'axe.' A raised vowel for 'axe' is associated with the stereotype of conservative Received Pronunciation (RP). In fact, 'ex' might have been a more accurate representation of what the real Queen actually does: 'ix' suggests a vowel that is rather too high, and recent research suggests that the Queen's pronunciation of this vowel has been lowering over the decades. But accuracy is not the issue. Townsend appeals to the stereotype for rapid character construction. Interestingly, note that the Queen is not given the nonstandard spelling, but her accent is conveyed by the nonstandard spelling of Violet's echo. Thus, visual 'nonstandardness' is consistently associated with the lower social groups. Elsewhere in the play, this even extends to spellings like 'an' for 'and' in contexts where all speakers would have elided the consonant. In such cases we have 'eye-dialect': a phenomenon which uses deviation from the norms of writing to suggest illiteracy and thereby imply social inferiority. In the play, Diana comes to the rescue:

> Diana: Does your husband have a *chopper*?
> Violet: He had one the last time I looked, yeah.
> Philip: We need an implement to gain access to our house.
> Violet: To your *arse*?

Diana, the 'People's Princess,' attempts to use the language of the people. Unfortunately, whilst 'chopper' is a slang term for an axe, it is also slang for a penis, hence Violet's confusion, and humor for the audience. Philip's contribution employs Latin- and French-derived lexis (e.g., 'implement,' 'access'), in contrast with Violet's wholly Germanic lexis, and this marks Philip out as from a different social world. As with the Queen, Townsend uses *arse* to appeal to the stereotype of a conservative RP accent, and does not attempt accurate representation. With words like 'hospital,' 'h-dropping' would be a characteristic of both high and low status social groups, but whether Philip would do so for 'house' is open to question. Similarly, the back vowel of 'arse' suggests an appeal to the elocution stereotype of 'how now brown cow,' but the reality is probably further to the front.

Except for the formal component, the meanings of an utterance in dialogue are not automatically deduced (i.e., a simple matter of decoding something) but are induced from the utterance in its context (a matter of inferring a conclusion from available evidence). Characters mean more than the words actually say. So, when, in 'Richard III,' Richard of Gloucester's mother says to him "Art thou my son?", this cannot be taken as a straightforward question about Richard's parentage. Instead, it implies that Richard has been acting in a way (i.e., murdering his relatives) that belies the fact that he is her son. Stylisticians have employed H. P. Grice's Cooperative Principle (1975) in the study of implied meanings in plays, good examples being Bennison (1993) and Cooper (1998). The Cooperative Principle comprises a set of maxims, quality, quantity, relation, and manner, which can be used to explain how meanings are implied. For example, the utterance above is less than cooperative (meaning cooperative in the exchange of information not socially cooperative) on the surface; Richard's mother flouts the maxim of quality ('try to tell the truth'), and thereby signals cooperation at a deeper level: she means more than she says – his behavior is not like that of a son. Generally, the Cooperative Principle can be used to describe characters' conversational behavior. Specifically with regard to characterization, the most important aspect of Grice's framework is that of an infringement. Rather than a maxim being obviously flouted, with the intention of conveying some implied meanings, an infringement refers to cases where the speaker breaks a maxim without knowing it. Real life examples might include children, or people who are drunk or have mental disorders. In fiction, a character may unintentionally betray a mental bias, of whatever kind, in their speech. An example is Shakespeare's Justice Shallow. Here, he is recruiting some law officers, and examines the roll call.

> Where's the role? Where's the role? Where's the role? Let me see, let me see, let me see. So, so, so, so, so – so, so – yea, marry, sir. Rafe Mouldy! Let them appear as I call; let them do so, let them do so. Let me see; where is Mouldy? ('Henry IV, Pt. II,' II.ii.96–100).

This, and similar examples elsewhere in the play, infringe the maxim of manner in that they are wordy and disordered. They betray the fact that Shallow is somewhat mentally shallow – he is going senile. Of course, this is only an infringement at the level of 'character to character' discourse. At the level of 'playwright to audience' discourse, it is a flout: the playwright is deliberately breaking the maxim in order to signal something about Shallow to the audience.

The philosophers Austin (1962) and Searle (1969, 1975) developed the notion that an utterance can be thought of as an attempt on the part of the speaker to 'do' something. An utterance (or series of utterances) may constitute a particular speech act, such as an assertion, command, promise, or curse. The 'illocutionary' meaning or force of a speech act is the speaker's intention in performing the act in a particular context. For a speech act to achieve success certain 'felicity conditions' (Austin, 1962: 12–45) need to be in place. Playwrights sometimes exploit these felicity conditions for dramatic effect. Lowe (1998), for example, showed how the speech act of 'confession' is exploited in Arthur Miller's play 'The crucible' ([1953] 1986), based on the Salem witchcraft event of the 17th century. Tituba, a black slave, is accused of witchcraft and subjected to a kind of interrogation. Given that she is under duress, that she does not use a form of words associated with 'confessions' (e.g., 'I confess,' 'I admit'), and that there is no evidence that Tituba has appropriate thoughts (e.g., she believes herself to be guilty), her eventual 'confession' is infelicitous (it must be discounted). However, it is nevertheless taken as a 'confession' by the characters in power – hence the drama of the moment.

Other stylisticians have looked how certain types of speech act and characters pattern (a good example is Hurst (1987), though the analysis focused on dialogue in prose fiction, not a play). Such patterns might constitute a foregrounded regularity (parallelism) or a foregrounded speech act irregularity (deviation), and this can occur at the level of individual speech act, as was the case with Tituba's 'deviant' 'confession,' or patterns of speech acts. Consider Jean meeting her grandfather at the beginning of John Osbourne's 'The entertainer' (1957: 14):

> *Jean* Hello, Grandad.
> *Billy* I wondered who the hell it was.
> *Jean* I'm sorry.
> *Billy* I thought it was some of that mad lot carrying on. Well, come in if you're coming, it's draughty standing about in the doorway. I've only just sat down.

This is part of the longer dialogue in which the speech act of complaint is repeated several times by Billy, and the speech act of apology several times by Jean. These speech acts coincide with perceptions of particular characteristics: 'grumpy' and 'irritable' for Billy, and 'polite' and 'patient' for Jean (for empirical evidence, see Culpeper, 2001). But note that deviation is also possible at the level of patterns of speech acts. Billy fails to return Jean's greeting and to accept the apology, with the interpretative consequence that he appears very rude. Not returning a greeting with another greeting is a 'dispreferred' second part of an adjacency pair; not accepting an apology is the 'dispreferred' part of an adjacency triple (i.e., complaint–apology–acceptance). Investigating patterns of speech acts in discourse is the business of discourse analysis, an area that overlaps with conversation analysis (cf. adjacency pairs), an area we will discuss below, but it is philosophically very different. Of particular note is Burton (1980), an exploration of the Sinclair and Coulthard (1975) model of discourse analysis in plays.

An utterance stands in certain structural relationship with the other utterances in a conversation, and it is that relationship which denotes interactional meaning. This area has been the focus of study for conversation analysis (e.g., Sacks *et al.*, 1974), and insights here have been usefully applied to drama, and succeeded in shedding light on character (e.g., Herman, 1991). Conversation analysis focuses in particular on (1) turn-taking (e.g., the distribution of talk, turn allocation, turn transition, interruptions, and topic control), (2) adjacency pairs (e.g., question–answer), and (3) the overall organization of conversation (e.g., openings and closings). Certain patterns in the structure of play dialogue invite certain inferences. The general finding for real talk in language-attitudes research is that speakers with more successful turns, more control over topic and more interruptions are likely to be perceived as more powerful. But power must be understood in all its complexity, not just as the power to coerce. For example, people may have the power to reward, or psychological power (e.g., confidence). Not surprisingly, in the famous first scene of 'King Lear' it is Lear, the absolute ruler, who attempts to control the discourse: he initiates the talk with the famous question "Which of you shall we say doth love us most?", he allocates turns (e.g., "Goneril, / Our eldest-born, speak first"), he attempts to control the topic (e.g., "Mend your speech a little, / Lest you may mar your fortunes") and to stifle interruptions (Kent: "Good my liege—" / Lear: "Peace, Kent!"). That he ultimately fails to control Cordelia (and Kent) sets the whole plot of the play in motion (see Herman, 1995: 107–110, for an analysis).

If an utterance is part of interaction, it carries social meaning. Analyzing how characters, or indeed people, perform their speech acts tells us much about their goals, how they perceive interpersonal relationships, and how they manage the social context. All this is very much the business of politeness. The main politeness theories are those of Brown and Levinson (1987) and Leech (1983), and these have been applied to play dialogue by, for example, Simpson (1989) and Leech (1992). In Leech's framework, the Politeness Principle accounts for *why* people convey indirect meanings. He demonstrates the value of politeness considerations for drama in his analysis of George Bernard Shaw's 'You never can tell' (1896). In this example, the waiter, as the most tactful communicator, has been chosen to convey some bad news to Crampton, namely, that he is Philip's father.

> Waiter: [smoothly melodious] Yes, sir. Great flow of spirits, sir. A vein of pleasantry, as you might say sir . . . The young gentleman's latest is that you're his father.
> Crampton: What!
> Waiter: Only his joke, sir, his favourite joke. Yesterday I was to be his father . . . ('You Never Can Tell,' II, 248).

The waiter hints that Crampton is Philip's father by pretending that the information is a joke. He upholds the maxim of Tact, but sacrifices Grice's maxim of Quality (he does not tell the truth, as it is not really a joke). Clearly, one way of describing characters' conversational behavior in plays is to note politeness patterns like that of the waiter, who gravitates towards tact. However, we should note that characters consistently employing politeness strategies to maintain social harmony do not make for a very exciting plot or dynamic characterization. Lack of politeness, or even impolite behavior, often appears as a symptom or a cause of social disharmony, and where there are tensions between characters we are more likely to see developments in character and plot. Culpeper (1998) applied his model of impoliteness to the dialogue of a film script, and showed how changes in (im)polite behavior correlate with changes in character.

Finally in this section, we briefly comment on 'authorial' cues. These are cues that do not arise from any character and are cues over which the character notionally has no power of choice. Consequently, we shall treat them as more closely associated with

the author (or editor). It should be noted, however, that some of these cues could be attributed to a kind of narratorial voice (see the previous section). There are two main types of authorial cue in plays: stage directions and names. We shall only comment on names, since stage directions are discussed at length in the previous section. Generally, proper names not only 'refer' to particular individuals, but also have some aspects of 'sense.' Most names are marked for gender, and research suggests that they also convey impressions of age, intellectual competence, race, ethnicity, and social class. Clearly, at different times different names have been fashionable, and different social groups have preferred particular names. A writer can exploit the meaning potential of names in constructing a character, and character names are a rather prominent feature of play-texts as they appear at the beginning of every character's new turn. In some cases, a name may trigger a relatively well-formed impression of a character before the play is seen or read. For instance, Richard III's supposed wickedness had made him a well-known figure well before Shakespeare put pen – or rather quill – to paper. The same also applies to Sue Townsend's royal family in 'The Queen and I' (1994). In that play, residents on the council estate have names like Trish, Leanne, Violet, and Spiggy, contrasting socially with Charles, Phillip, William, and so on. Interestingly, the Queen Mother's friend is called Philomena. We are not told her age, but the fact that she has an old-fashioned name suggests that she is fairly advanced in years. Besides this, playwrights can use names which are meaningful in themselves, not just through their associations: they have conceptual meaning. Shakespeare did this frequently, as did playwrights for the following two hundred years. For example, in 'Love's labour's lost,' Anthony Dull is very much a clod; in 'The two gentlemen of Verona,' Proteus is whimsical, fickle, and changeable; in 'Henry IV, Pt.2' and 'The merry wives of Windsor,' Shallow is shallow in nature; in 'Henry IV, Pt.2,' Silence is silent most of the time.

Monologic Discourse

As is the case with stage directions, monologic discourse in play-texts has received little attention within the stylistic study of plays. Among the small amount of published work on the topic is Lloyd Skiffington's (1985) monograph on the history of the English soliloquy, in which a soliloquy was defined as "a locution dominating the stage and the attention of the theatre audience, delivered by a speaker who is alone on the stage" (Skiffington, 1985: ix). Note, though, that Skiffington's definition related to drama in performance rather than to the play-text itself. The same is true of Wolfgang Clemen's (1964) work on Shakespeare's soliloquies. For a definition of a soliloquy that fits within the stylistic tradition of concentrating on text rather than performance, it is necessary to consider its function in the play. The main purpose of the soliloquy is to provide an outlet for self-expression on the part of the speaking character. This self-expression comes about partly because of the absence of other characters from the communicative act. The result of this is that characters are able to speak freely (without discounting effects), and this means that we can make a strong assumption that what characters say within a soliloquy is the truth as they believe it to be. In other words, most soliloquizers uphold Grice's (1975) maxim of quality. Of course, this is not to say that a character's self-conception is necessarily correct. It is limited by the character's self-awareness, and, presumably, how efficient they are in self-observation. We cannot, therefore, assume that Grice's other maxims – relation, quantity and manner – are also being upheld within the soliloquy. A clear example of this can be seen in an extract from Alan Bennett's 'The lady in the van.' The soliloquy comes from the main protagonist, Miss Shepherd, an old lady plagued by guilt over her involvement in a hit-and-run accident many years ago:

> **Miss Shepherd** The soul in question did not witness the incident, though there was hearing of it and seeing of the bodywork. The word accident was mentioned in a local newspaper, allegedly fatal, and a felony committed possibly [.] ('The lady in the van,' 2000: 31)

As the play progresses, it transpires that Miss Shepherd did witness the accident and, in fact, was instrumental in causing it. Notice, though, that she masks this by referring to herself in the third person ("The soul in question" [2000: 31]) and by using passive constructions and omitting the agent of these. In effect, she has convinced herself that she had nothing to do with the accident, and this factor contributes eventually to her mental decline. Miss Shepherd's other monologues in the play demonstrate further her mental frailty. Indeed, the cumulative effect of these speeches is to convey a unique 'mind style' (McIntyre (2005) discusses mind style in 'The lady in the van' in more detail).

Self-presentation is a key function in many of the soliloquies in Shakespeare's plays, and in his later work, Shakespeare developed the soliloquy into a powerful tool for thought presentation. In particular, the soliloquy was used as a vehicle for exploiting different aspects of character, such as the difference between the public self and the private self. The

extract from 'Richard III,' discussed in the previous section, aptly demonstrates this when, at the end of the soliloquy, Gloucester says "Dive, thoughts, down to my soul" (I.i.41). The self that Gloucester presents to the other characters in the play is very different from the self that he reveals privately in his soliloquies.

The soliloquy can also be used to articulate mental and emotional conflicts within a character. A good illustration of this particular usage occurs in another Shakespearean example. Consider the conflicts voiced by Julia in 'The two gentlemen of Verona,' when, disguised as a man, she is asked by her lover to woo her rival for him. These conflicts occur between the private self and the public self and arise from conflicting elements within one of those selves, or result from a clash between an aspect of the self and an action or event within the play. Such conflicts expressed in soliloquy imply self-awareness. Indeed, conflict would not be an issue if the character was not self-aware. The importance of these conflicts is that their resolution stimulates both character and plot development, two of the essential elements of drama.

See also: Accent; Conversation Analysis; Cooperative Principle; Corpora in Studies of Variation; Dialect Representations in Texts; Foregrounding; Irony: Stylistic Approaches; Irony; Mind Style; Narrative: Linguistic and Structural Theories; Narrativity and Voice; Personal Names; Poetry: Stylistic Aspects; Politeness; Sociolect/Social Class; Speech Acts; Speech and Thought: Representation of; Spoken Discourse: Diachronic Aspects; Stylistics: Corpus Approaches; Stylistics: Pragmatic Approaches.

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Dravidian Languages

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Languages and Subgroups

The Dravidian language family, first recognized as separate by Francis Whyte Ellis in 1816, is the fifth largest language family in the world. It consists of four widely spoken literary languages and approximately 20 minority languages (the number increases if some dialects are counted as separate languages). They are concentrated mainly in the four southern states (Tamilnadu, Kerala, Karnataka, and Andhra Pradesh) of India. Some other states, namely Maharashtra, Madhya Pradesh, Orissa, and Bihar, also have some of the tribal languages of the family, but most conspicuous is the presence of Brahui in Pakistan from ancient times. The languages are usually divided into three main groups—South Dravidian, Central Dravidian (with two subsubgroups, Telugu-Kuvi and Kolami-Parji), and North Dravidian—as shown in **Table 1** (some advocate a closer relationship of Telugu-Kuvi with South Dravidian rather than with Kolami-Parji). Of these, only four languages, Tamil, Malayalam, Kannaḍa, and Telugu, have their own scripts and literature from ancient times. The Sangam literature of Tamil, composed between the 2nd century B.C. and the 5th century A.D., and the pre-Christian-era grammar Tolkāppiyam of the same language are the oldest literary monuments for the entire family. The first inscription of Kannaḍa belongs to the 5th century A.D. and that of Telugu to the 6th century A.D.; the literature of these two languages starts in the 9th and the 11th centuries A.D., respectively. Malayalam evolved as a separate language from Old Tamil around the 9th century.

Phonology

Vowel System

Like Proto-Dravidian, most of the languages have a 10-vowel system with five short and five long ones (see **Table 2**) but Iruḷa, Toda, Kuṟumba, and Koḍagu have added centralized vowels to the inherited stock. Tuḷu developed a contrast between [e] (< [*-ēn]) and

Shakespeare
Soliloquy
Speech act
Spoken conversation
Stage directions
Theatrical performance

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Table 1 Dravidian language groups

Subgroup	*Language*	*Abbreviation*	*Locations*	*Number of speakers*
South Dravidian	Tamil	Ta.	Tamilnadu, Sri Lanka, South Africa, Malaysia, Singapore, Maritius, Fiji, Burma	58 million
	Malayalam	Ma.	Kerala	30 million
	Irula	Ir.	Tamilnadu	5200
	Kodagu	Kod.	Karnataka	93 000
	Kota	Ko.	Nilgiris, Tamilnadu	1400
	Toda	To.	Nilgiris, Tamilnadu	1600
	Kannada	Ka.	Karnataka, Badaga dialect in the Nilgiris, Tamilnadu	33 million
	Kuṟumba	Ku.	Nilgiris, Tamilnadu	5000
	Tuḷu	Tu.	Koraga dialect, Karnataka (Koraga dialect)	1.6 million
Central Dravidian: Telugu-Kuvi subsubgroup	Telugu	Te.	Andhra Pradesh	66 million
	Gondi	Go.	Maharashtra, Madhya Pradesh, Orissa, Andhra Pradesh; Koya dialect in Andhra Pradesh and Orissa	2.4 million
	Konda		Andhra Pradesh and Orissa	17 864
	Pengo	Pe.	Orissa	1300
	Manda		Orissa	Not known
	Kui		Orissa	641 662
	Kuvi		Orissa and Andhra Pradesh	246 513
Central Dravidian: Kolami-Parji subsubgroup	Kolami	Kol.	Maharashtra and Andhra Pradesh	99 281
	Naikri		Maharashtra	1500
	Naiki	Nk.	Maharashtra	54 000
	Gadaba	Ga.	Koṇdekor dialect [Andhra Pradesh], Ollari dialect [Orissa]	?18 000
	Parji	Pa.	Chattisghadh, Dhurwa	44 000
North Dravidian	Kurux	Kur.	Bihar	1.4 million
	Malto	Malt.	Rajmahal hills of Bihar	108 148
	Brahui	Br.	Baluchistan of Pakistan	1.7 million

Table 2 Vowels of Proto-Dravidian

	Front		*Central*		*Back*	
	Short	*Long*	*Short*	*Long*	*Short*	*Long*
High	i	ī			u	ū
Mid	e	ē			o	ō
Low			a	ā		

e in word-final position, for example, *kal-t-E* 'I learned' versus *kal-t-e* 'he learned'. In Modern Telugu [ɛ] (< [*iyā]), which is the past-tense suffix, appearing after most of the verb bases before personal suffixes other than 3rd nonmasculine, became a separate phoneme. Brahui lost short [e] and short [o] under the influence of neighboring Balochi. A long vowel of the root syllable undergoes shortening when the root is followed by a root extension that begins with a vowel; this alternation is regular in verb bases, less common in disyllabic nominal bases, and totally absent in trisyllabic nominal bases, for example, [*vīḷ-] ∼ [*viḷ-u-] 'to fall' (Burrow and Emeneau, 1984: 5430), [*nīḷ-al] ∼ [*niḷ-al] 'shade' (Burrow and Emeneau, 1984: 3679).

Consonant System

The consonant system as normally reconstructed is given in Table 3. The reconstruction of a laryngeal sound for Proto-Dravidian on the basis of the Old Tamil sound called *āytam*, preserved in a few words, involves speculation (Krishnamurti, 1997, 2003: 91). The most conspicuous features of the consonant system are:

1. The presence of retroflex consonants (stop, nasal, lateral, and approximant, the last one being the most peculiar feature of the entire phonological system), which are rare in the languages outside the Indian subcontinent (even the presence of these in Sanskrit and other Indo-Aryan languages is attributed to the influence of Dravidian).
2. The presence of six stops, the most peculiar of which is the alveolar (with the uncommon three-way contrast among the dental, retroflex, and alveolar ones still retained in Malayalam, Iruḷa, Kota, Toda, and Kuṟumba).
3. The absence of voiced stops and aspirated stops.

The initial stops in some words irregularly became voiced in all languages except Tamil-Malayalam and Toda; the voicing of single stops in medial position

Table 3 Consonants of Proto-Dravidian[a]

	L	*D*	*A*	*R*	*P*	*Vel*
Stop	p	t	t̲	ṭ	c	k
Nasal	m	n	n̲	ṇ	ñ	(ŋ)
Lateral			l̲	ḷ		
Trill			r			
Approximant				l̲		
Semivowel	v				y	

[a]Abbreviations: A, alveolar; D, dental; L, labial; P, palatal; R, retroflex; Vel, velar.

seems to have developed in the later stages of Proto-Dravidian itself. The apicals, that is, the alveolar and the retroflex consonants, do not occur at the beginning of a word; but this situation changed in Malayalam, Koḍagu, Tuḷu, and Telugu-Kuvi. Clusters involving two different stops do not occur within a morpheme. However, homorganic clusters of a nasal (N) and plosive (P) of the types NP, PP, and NPP can be reconstructed, for example, [*marunt(u)] 'medicine' (Burrow and Emeneau, 1984: 4719), [*cupp(u)] 'salt' (Burrow and Emeneau, 1984: 2674), [*kalaŋkkam] 'turbidity, confusion' (Burrow and Emeneau, 1984: 1303).

Syntax

Word Classes

The following word classes can be recognized for Dravidian: nouns (pronouns and numerals are subclasses of nouns because they are inflected for case and can occur as the head of a noun phrase like nouns), verbs, adjectives, adverbs (including expressives), particles, and interjections. The first two, which are the major classes, are dealt with in detail later; a few words on each of the other categories are in order here.

Adjectives occur before nouns, for example,

(1a) Ta.: nalla paiyan̲
(1b) Te.: manci abbāyi
'good boy'

Some nouns are converted into adjectives by the addition of the past adjectival participle of the verb [*āk(u)-] 'become', for example,

(2a) Ta.: al̲ak-āna peṇ
beauty-ADJ girl
(2b) Te.: andam-ayina pilla
beauty-ADJ girl
'beautiful girl'

Monomorphemic adverbs are few in number; most of them are formed from nouns or adjectives by the addition of the suffix, for example, Ta. *-āka*, Ma. *-āyi*, Ka. *-āgi*, Te. *-gā*:

(3a) Ta.: al̲ak-āka
beauty-ADV
(3b) Te.: andaŋ-gā
beauty-ADV
'beautifully'

The following are examples of expressives:

(4a) Ma.: avan **kar̲umur̲e** ti-nnu
he kar̲umur̲e eat-PAST
'he ate with a crunching sound'
(4b) Ka.: avanu **paṭapaṭane** hoḍe-d-a
he paṭapaṭa beat-PAST-3.SING
'he beat (someone) thoroughly'
(4c) Te.: vāḍu **karakarā** namil-Ē-ḍu
he karakara munch-PAST-3MASC.SING
'he munched with a crunching sound'

Particles are bound forms that can be added to a wide range of major sentence constituents. Examples are:

1. The interrogative particle, Ta. Ka. Te. *-ā*, Ma. *-ō*:

(5a) Ta.: avan̲ va-nt-ān̲-ā?
he come-PAST-3.MASC.SING-INT
(5b) Ma.: avan va-nn-ō?
he come-PAST–INT
'did he come?'

2. The particle of emphasis, Ta. *-tān̲*, Ma. *-tan̲ne*, Ka. Te. *-ē*:

(6a) Ta.: avan̲-tān̲
he-EMPH
(6b) Te.: vāḍ-ē
he-EMPH
'he himself'

3. The particle of coordination, added at the end of both (or all) the coordinated noun phrases, Ta. Ma. *-um*, Ka. *-ū*, Te. lengthening of the final vowel (but *-ū*/*-Ø* after nouns ending in [m]):

(7a) Ta.: pāl-um pal̲am-um
milk-COORD fruit-COORD
'milk and fruit'
(7b) Te.: moguḍū peḷḷām(-ū)
husband-COORD wife-COORD
'husband and wife'

Examples for interjections are: Ta. *ām* (spoken, [āmā]), Ma. *ate*, Ka. *haudu*, Te. *av(u)nu* 'yes'; Ta. Ma. Ka. Te. *ayyō*/*ayyayyō* expression of surprise, sympathy, pain, grief, or fear, *chī* expression of disgust.

Articles, conjunctions, and dummy subjects (as *it* in *it is raining*) are absent in Dravidian.

Word Order

The unmarked sentence structure is S(ubject) O(bject) V(erb). The head of the subject noun phrase is in the nominative case, whereas that of the object noun

phrase is in the accusative, the suffix for which can be unmarked in the case of inanimate nouns (see later discussion). Other noun phrases that can be in a sentence include those that indicate the indirect object and the person associated with the agent, time and place. Although the verb phrase normally occurs at the end of the sentence, the noun phrases can exchange their positions within the sentence with some freedom, as illustrated by the Telugu sentences in (8).

(8a) rāmuḍu sīta-ni ninna
Rama Sita-ACCUS yesterday
poddunna cūś-Ē-ḍu
morning see-PAST-3.MASC.SING
'Rama saw Sita yesterday morning.'

which can also appear as:

(8b) rāmuḍu ninna poddunna sīta-ni cūś-Ē-ḍu
(8c) sīta-ni rāmuḍu ninna poddunna cūś-Ē-ḍu
(8c) ninna poddunna rāmuḍu sīta-ni cūś-Ē-ḍu
(8d) ninna poddunna sīta-ni rāmuḍu cūś-Ē-ḍu

and so on.

Agreement

When used as the predicate, a noun shows agreement in gender and number with the subject 3rd-person pronoun and, when used as the subject, it shows agreement with the finite verb (for the latter, Malayalam is an exception). Therefore, nouns are classified on the basis of their gender and number, but there is no uniformity among the languages in this matter. Toda and Brahui have no gender distinction at all; original nonhuman forms have been generalized in these languages for all categories, for example, To. *aθ*, Br. *ōd* 'he, she, it'. The other languages can be classified into four groups on the basis of the gender-number distinctions they show. The South Dravidian languages show a five-way distinction, as in Table 4. Telugu and Kuṛux-Malto show a four-way distinction, as in Table 5. (Te. *āme/āviḍa* 'she (honorific)' has no verb form that exclusively corresponds to it and takes either the nonmasculine singular or the human plural form.) Pengo and Manḍa have a six-way contrast in the pronoun, as shown in Table 6, but the contrast between the feminine singular and the nonhuman singular is neutralized in the verb. The central languages other than Telugu, Pengo, and Manḍa have a symmetrical system with a four-way distinction, as shown in Table 7.

Equational Sentences without the Copula

A characteristic feature of the major Dravidian languages is the presence of equational sentences without the copular verb; however, Malayalam and many of the central and the northern languages have innovated by creating the copula under the influence of Indo-Aryan.

(9a) Ta.: en peyar kumār
my name Kumar
'my name is Kumar'

but:

(9b) Ma.: en-re pērð kumār enn(ð) āṇð
I-GEN name Kumar say-PAST COP
'my name is Kumar'

Dative-Subject Sentences

Although not exclusive to Dravidian, sentences with a dative subject are commonly used in these languages. In sentences of this type, the logical subject (i.e., the noun that denotes the person or animate being who has some feeling, such as anger, hunger, wanting, or liking, or has/acquires/needs something, abstract or concrete) appears in the dative case and the noun that denotes the feeling or the thing is in the nominative and serves as the surface subject.

(10a) Ta.: en-akku kōpam va-nt-atu
I-DAT anger come-PAST-3.N.SING
'I got angry'

(10b) Te.: vāḍ-i-ki ḍabbu kāvāli
he-OBL-DAT money is required
'he needs money'

Complex Sentences

The most notable among the complex sentences are those (1) with a past adverbial participle, (2) with noun phrases with a relative participle (also known as verbal adjective), and (3) with the quotative marker.

Table 4 Gender-number distinctions: Tamil

	Human		*Nonhuman*
	Masculine	*Feminine*	
Singular	avan 'he'	avaḷ 'she'	atu 'it'
Plural	avar(kaḷ) 'they (HUM)'		avai 'they (NONHUM)'

Table 5 Gender-number distinctions: Telugu

	Masculine	*Nonmasculine*
Singular	vāḍu 'he'	adi 'she/it'
	Human	*Nonhuman*
Plural	vāḷḷu 'they (HUM)'	avi 'they (NONHUM)'

A special feature of the Dravidian languages is the possibility of having more than one past participle in a sentence; this feature has spread from Dravidian to Sanskrit and modern Indo-Aryan. Examples are:

(11a) Ka.: vanaja mane-ge hōg-i snāna māḍ-i
Vanaja house-DAT go-PAST bath do-PAST
baṭṭe badalāyis-i ūṭa māḍ-id-aḷu
clothes change-PAST food do-PAST-3FEM.SING

(11b) Te.: vanaja iṇṭi-ki veḷḷ-i snānam cēs-i
Vanaja house-DAT go-PAST bath do-PAST
baṭṭa-lu mārcukun-i annam tin-di
cloth-PL change-PAST food eat-PAST.3.FEM.SING
'Vanaja went home, took a bath, changed her clothes and ate food'

The Dravidian languages do not have relative pronouns; their functions are carried out by the verbal adjectives, which are derived from verb bases and function as adjectives carrying tense distinction and even negation (see later discussion). A verbal adjective can occur before the head noun (which may be preceded by other types of adjectives).

(12) Te.: ninna poddunna meḍrāsu-niñci **occ-ina**
yesterday morning Madras-ABL come-PAST.RP
mā tammuḍu ikkaḍa unnāḍu
our (excl) younger brother here be-PRES-3.MASC.SING
'my younger brother who came from Madras yesterday morning is here'

A verbal adjective can qualify not only the agent of the source verb, as in (12), but also nouns denoting other relations, such as object (13a) and instrument (13b).

(13a) Ta.: kumār **ceyy-um** vēlai
Kumar do-NON-PAST.RP work
'the work that Kumar does'

(13b) Te.: kumār paṇḍu **kōs-ina** katti
Kumar fruit cut-PAST.RP knife
'the knife with which Kumar cut the fruit'

A quoted sentence precedes the matrix clause, which contains such verbs as 'tell', 'say', 'think', 'ask', hear', 'believe', and 'know'. The quotative marker (e.g., Ta. *enru*, Ma. *ennə*, Ka. *endu*, Te *ani* 'having said', past participles of the verb 'to say') occurs at the end of the quoted sentence.

(14) Te.: dēvuḍu unnāḍu **an-i**
god be-PRES-3MASC.SING say-PAST
cālā mandi nammu-tā-ru
many people believe-FUT-3.HUM.PL
'many people believe that there is god'

This Dravidian construction has influenced the quotative construction in Sanskrit as shown by the marker *iti*, which follows the quoted sentence.

Noun Morphology

Dravidian morphological structure is agglutinative. Nouns in Dravidian are mostly underived (e.g., Ta. Ma. Te. *puli* 'tiger'), but there are also nouns derived from verbs (e.g., Te. *pāṭa* 'song' from *pāḍu-* 'to sing') and from adjectives (e.g., Ta. *naḷḷa-tu* 'good thing' from *nalla* 'good'). A nominal stem may be followed, when plurality has to be expressed, by a plural suffix, which in turn may be followed by a case suffix or a (case suffix +) postposition (i.e., a separate word with case function), as in:

(15a) Ta.: kulantai-kaḷ-ukku
child-PL-DAT

(15b) Te.: pilla-la-ki
child-PL-DAT
'to the children'

Only a few of the nominal stems contain an overt marker for gender. For example, in Tamil, *aṇṇa-n* 'elder brother' has the masculine suffix but *tampi* 'younger brother' has no suffix.

Plural Suffixes

The plural suffix in most of the languages shows a distinction for human vs. nonhuman (or for masculine vs. nonmasculine in the Central group of languages other than Telugu) with some exceptions in which the nonhuman suffix occurs with human nouns, as in Kannaḍa:

Table 6 Gender-number distinctions: Pengo

	Human		*Nonhuman*
	Masculine	*Feminine*	
Singular	avan 'he'	adel 'she'	adi/adaŋ 'it'
Plural	avar 'those men/men and women'	avek 'those women'	avaŋ 'those (NONHUM)'

Table 7 Gender-number distinctions: Gondi

	Masculine	*Nonmasculine*
Singular	vōr 'he'	ad 'she, it'
Plural	vūr 'those men/men and women'	av 'those women/things'

(16a) huḍuga-ru
boy-PL.HUM
'boys'
(16b) mara-gaḷu
tree-PL.NHUM
'trees'

but:

(16c) mantri-gaḷu
mnister-PL.NHUM
'ministers'

There are also some languages in which the erstwhile nonhuman plural suffix is generalized to all nouns at the expense of the human plural suffix, as in Telugu:

(17a) akka-lu
'elder sisters'
(17b) nakka-lu
'jackals'

The Toda plural suffix *-ām* (optional), traceable to the postnominal modifier [*anayttum] 'all (NONH.)' illustrates the process of a separate word being reduced to the status of a suffix over course of time, as in To. *kas-ām* 'stones' (cf. Ta. *kall anaittum* 'all the stones'). The use of the plural suffix with nonhuman nouns is rare in the Southern and the Northern groups, whereas it is obligatory in the Central group, for example,

(18a) Ta.: iraṇṭu palam
'two fruit'

but:

(18b) Te.: reṇḍu paḷlu (< *paṇḍu-lu)
'two fruit'

([*reṇḍu paṇḍu] without the plural *-lu* is ungrammatical in Telugu.)

Case Suffixes

The nominative is unmarked in all the languages. Some of the nominal stems take an additional suffix, called the oblique suffix, when a case suffix other than the nominative or a postposition is added; the stem thus formed is called the oblique stem. For example, in Tamil, *vīṭu* 'house' and *maram* 'tree' have the oblique stems *vīṭ-ṭ-* (as in *vīṭ-ṭ-il* 'in the house') and *mara-tt-* (*mara-tt-il* 'in the tree'), respectively, but others, such as *ūr* 'village' (*ūr-il* 'in the village') and *pāl* 'milk' (*pāl-il* 'in the milk') do not have a separate oblique stem.

With regard to the accusative suffix, the languages are divided into two main groups with Tamil, Malayalam, Koḍagu, Iruḷa, Kurumba, and Brahui showing the reflexes of [*-ay], whereas all others show the reflexes of [*-n], often preceded or followed by a vowel.

(19a) Ta.: nāy-ai
dog-ACCUS
(19b) Ma.: paṭṭiy-e
dog-ACCUS
(19c) Ka.: nāy-annu
dog-ACCUS
(19d) Te.: kukka-ni
dog-ACCUS
'dog'

The two were probably dialectal variants in Proto-Dravidian. The accusative is generally unmarked with inanimate nouns in all the languages, for example,

(20a) Ta.: nān **pāl** kuṭi-tt-ēn
I milk drink-PAST-1.SING
(20b) Te.: nēnu **pālu** tāg-Ē-nu
I milk drink-PAST-1.SING
'I drank milk'

In Gonḍi (except the Koya dialect), Brahui, and some other non–South Dravidian languages, the dative case also assumes the functions of the accusative under the influence of Indo-Aryan:

(21) Go.: vōr nā-kūn sūṛ-t-ōr
he I-ACCUS/DAT see-PAST-3.MASC.SING
'he saw me.'

The instrumental case is also used in the sociative sense in many languages, such as Telugu:

(22a) nēnu **karra-tō** kukka-ni koṭṭ-Ē-nu
I stick-INSTR/SOC dog-ACC beat-PAST-3.1.SING
'I hit the dog with a stick'
(22b) nēnu **āyana-tō** māṭlāḍ-Ē-nu
I he-INSTR/SOC speak-PAST-1.SING
'I spoke with him'

But the two are distinguished in Tamil and some others:

(23a) Ta.: kaiy-āl
hand-INSTR
'with the hand'
(23b) Ta.: avan-ōṭu/-oṭu/-uṭan
he-SOC
'with him'

Of all the case suffixes, the dative case suffix is found with minimum variation in all the subgroups and is reconstructable as [*-kk(u)] for Proto-Dravidian.

Some languages have a genuine suffix for the ablative case, whereas others form it on the locative by the addition of a postposition, which originally was the past participle of the verb 'to be' (Ta. *iru-ntu*) or 'to stand' (Ma. *ninnð*). Both types are illustrated by Tamil. Although Old Tamil contains the suffix *-in*, Modern Tamil has locative *-il-iruntu*, as in

(24a) Old Ta.: malaiy-in
hill-ABL
'from the hill'

(24b) Mod. Ta.: malaiy-il-iruntu
hill-LOC-PO
'from the hill'

(24c) Ma.: vīṭ-ṭ-il-ninnð
house-OBL-LOC-PO
'from the house'

The sense of the genitive case can be expressed just by the juxtaposition of one noun (or its oblique base form, if there is one) and another noun (as in the Tamil and Telugu examples in (25a) and (25b)), but a suffix or postposition is also found (as in the Kannaḍa and Koḍagu examples (25c) and (25d)).

(25a) Ta.: tāy ccol
mother word
'mother's word'

(25b) Te.: amma māṭa
mother word
'mother's word'

(25c) Ka.: avar-a mane
they-GEN house
'their house'

(25d) Koḍ.: ayŋga-ḍa mane
they-GEN house
'their house'

What appear to be the suffixes of the locative case in the major languages are in reality postpositions (historically, in some cases). Thus, Ta. Ma. *-il* is from [*il] 'house' (Burrow and Emeneau, 1984: 494) and Ka. *-alli* is identical with *alli* 'there':

(26a) Ta.: vīṭ-ṭ-il
house-OBL-LOC

(26b) Ka.: maney-alli
house-LOC
'in the house'

Pronouns

The following peculiarities may be noted in the pronominal system of Dravidian:

1. The distinction between exclusive (i.e., excluding the hearer) and inclusive (i.e., including the hearer) in the first-person plural, as shown in Table 8. (Modern Kannaḍa lost this distinction and has *nāvu* in both the senses.)

Table 8 Exclusive and inclusive 'we'

Language	*Exclusive 'we'*	*Inclusive 'we'*
Ta.	nāŋkaḷ	nām
Ma.	ñaŋŋaḷ	nammaḷ/nām/nōm
Te.	mēm	manam

2. The marking of two degrees of proximity to the speaker in the third-person pronouns (e.g., Ta. *avan*, Te. *vāḍu* 'he (remote [formed on the root *a-*])' vs. Ta. *ivan*, Te. *vīḍu* 'he (proximate [formed on *i-*])'. (Old Tamil and Old Kannaḍa, Kuvi, Kuṛux, and Brahui show three degrees of proximity, the third one, intermediary, formed on [*u-], whereas Kui shows four degrees, the stems being *i-* [proximate], *e-* [intermediary], *a-* [remote], and *o-* [very remote].)
3. The two-way (in Tamil and Malayalam) or three-way distinction (in Telugu [only in the masculine] and Kannaḍa) based on politeness in the third-person singular pronouns, as shown in Table 9.
4. The use of reflexive pronouns [*tān] (SING) and [*tām] (PL) to refer to the third-person subject of the sentence, as in:

(27) Te.: kumār tana ḍabbu aḍig-Ē-ḍu
Kumar REFL-GEN money ask-PAST-3.MASC.SING
'Kumar asked for his (own) money'

Numerals

The cardinal numerals show a distinction between nonhuman and human at the morphological level. Only the South Dravidian languages (especially the three literary languages) and Telugu show a developed native numeral system in which the highest native numeral is Te. (Old) *vēyi*/(Mod) *veyyi* '1000' (PL *vē-lu*; also (Old) *vē-vuru* '1000 people') (Burrow and Emeneau, 1984: 5404); the words for 'hundred thousand' (Ta. *laṭcam*, Ma. *lakṣam*, Ka. Te. *lakṣa*) and for '10 million' (Ta.Ma.Ka.Te. *kōṭi*) are borrowed from Sanskrit and, in South Dravidian, even the

Table 9 Politeness in the third-person singular pronouns

Language	*Nonhonorific*		*Honorific*	
	Masculine	*Feminine*	*Masculine/feminine*	
Ta.	avan 'he (NHON)'	avaḷ 'she (NHON)'	avar(kaḷ) 'he/she (HON)'	
	Masculine	*Feminine*	*Masculine*	*Feminine*
Te.	vāḍu 'he (NHON)'	adi 'she (NHON)'	atanu 'he (HON 1st degree)' āyana/ (rarely) vāru 'he (HON 2nd degree)'	āme/āviḍa/ (rarely) vāru 'she (HON)'

word for '1000' is from that source through Prakrit (e.g., Ta. Ma. *āyiram*, Ka. *sāvira* < Skt. *sahasra-*). The languages of the Central (other than Telugu) and the Northern groups retain only a few of the basic Dravidian numerals and have borrowed the higher ones from the neighboring major languages. The basic nonhuman numerals that can be reconstructed for Proto-Dravidian are shown in Table 10. The human forms are derived from the nonhuman ones (or their variants, in some cases) by the addition of the suffix [*-var] ([*-van] also in the case of 'one'), for example, [*oru-van]/(honorific) [oru-var] 'one man' and [*iru-var] 'two persons'.

Modern Telugu and Modern Kannaḍa add a classifier (Te. *mandi*, Ka. *mandi/jana* 'people') to the basic numeral to form the human numeral, perhaps due to influence from the neighboring Indo-Aryan languages:

(28a) Ka.: mūru mandi/jana makkaḷu
three CLASS children
'three children'

(28b) Te.: enimidi mandi pillalu
three CLASS children
'eight children'

The languages of the Kolami-Parji group have created separate feminine forms for the numerals 'two' to 'five' by adding the feminine suffix [*-āḷ] to the root:

(29a) *īr-āḷ
two-FEM
'two women'

(29b) *muy-āḷ
three-FEM
'three women'

(29c) *nall-āḷ
four-FEM
'four women'

Table 10 Proto-Dravidian nonhuman numerals

Numeral	*Proto-Dravidian*	*Comment*
1	*ont(u)	
2	*iraṇt(u)	
3	*mūnt(u)	
4	*nāl	
5	*cay(-nt(u))	
6	*cāt(u)	
7	*ēl	
8	*eṇ	Identical with *eṇ 'number' (Burrow and Emeneau, 1984)
9	*toḷ	Preserved in Ta. Ma. toḷḷ-āyiram '900', etc.
10	*patt(u)	
100	*nūt(u)	

(29d) *ceyy-āḷ
five-FEM
'five women'

The multiples of 10 from '20' to '90' are formed by adding [*patt(u)] '10' to the adjectival or root form of the numerals 'two' onward: [*iru-patt(u)] '20 (lit., two tens)', and so on. The numerals '11' to '19' and numbers between multiples of 10 are formed by adding the basic numeral to '10' or its multiple, as in Ta. *pat-in-onru*, Te. *padakoṇḍu* '11'.

The ordinals are formed from the nonhuman cardinals by the addition of a suffix:

(30a) Ta.: iraṇṭ-ām/-āvatu
two-ORD

(30b) Ma.: raṇṭ-ām(atte)
two-ORD

(30c) Ka.: eraḍ-aneya/-anē
two-ORD

(30d) Old Te.: reṇḍ-agu/-ava
two-ORD

(30e) Mod. Te.: reṇḍ-ava/-ō
two-ORD
'second'

Verb Morphology

The most notable peculiarities of the Dravidian verb are (1) the presence of forms with a suffix for the negative, and (2) the verbal adjectives (or adjectival/relative participles). Verbs may be divided into two main categories: finite and nonfinite. The verb base (VB), which is the basis for verb inflection and derivation, has four types. The underlying verb base may be intransitive (e.g., Ta. *nil-* 'to stand') or inherently transitive (e.g., Ta. *cey-* 'to do'). An intransitive verb base may optionally be extended by a transitive suffix, resulting in a derived transitive. A transitive verb base of either type may be converted into a causative by the addition of a causative suffix. The Telugu verb bases *taḍiyu-* 'to become wet' (with no suffix), *taḍupu-* 'to make (something) wet' (with the transitive *-pu-*), *taḍi-p-iñcu-* 'cause (someone) to make wet' (with transitive *-pu-* and causative *-iñcu-*), and *cēy-iñcu* 'to cause to do' (with causative *-iñcu*) illustrate the four types of verb base.

Finite Verbs

The structure of a finite verb, which is sentence-final, may be symbolized as follows:

VB + Tense/Negative Suffix + Personal Suffix

There are three major exceptions to this statement:

1. Malayalam has lost the personal suffixes completely over course of time, although they were there in its earlier stage, for example,

(31) ñān/nī/avan va-nnu
come-PAST
'I/you (SING)/he came'

2. In the past negative morphological forms found in the Central languages other than Telugu and Gonḍi, the negative suffix and the past-tense suffix co-occur in that order:

(32) Kol.: siyy-ē-t-ēn
give-NEG-PAST-3.SING
'he did not give'

3. In Old Tamil, the additional past suffix *-an-* is often added after a regular past suffix other than *-in-*:

(33a) cey-t-ār
do-PAST-3.HUM.PL
(33b) cey-t-an-ar
do-PAST-PAST-3.HUM.PL
'they (HUM) did'

Tenses

All three tenses, past, present, and future, are found in most of the languages, as in Tamil:

(34a) cey-t-ēn
do-PAST-1.SING
'I did'
(34b) cey-kinr-ēn
do-PRES-1.SING
'I am doing'
(34c) cey-v-ēn
do-FUT-1.SING
'I (will) do'

But some languages have only two, past and nonpast, as in Kannaḍa:

(35a) ba-nd-e
come-PAST-1.SING
'I came'
(35b) baru-tt-ēne
come-PRES/FUT-1.SING
'I am coming/(will) come'

The present tense in many languages is periphrastic or is derived from a periphrastic construction. The future or nonpast tense also serves as the habitual.

Negative Finite Verbs

The negative finite verb, which normally denotes negation in the future or the habitual, contains the negative suffix (which may also be zero) between the verb base and the personal suffix (there is no tense marker in this construction):

(36a) Old Ta.: ceyy-Ø-ēn
do-NEG-1.SING
'I will/do not do'

(36b) Te.: cepp-a-nu
tell-NEG-1.SING
'I will/do not tell'

Negation in the past and the present is expressed by syntactic constructions involving the negative auxiliary verb.

- Past negative: VB + Infinitive + Negative Auxiliary

(37a) Ta.: coll-a(v) **illai**
tell-INF NEG.AUX
(37b) Te.: cepp-a **lēdu**
tell-INF NEG.AUX
'(one) did not tell'

- Present negative: Verbal Noun + Negative Auxiliary

(38a) Ta.: col-v-at(u) **illai**
tell-FUT-N.SING NEG.AUX
(38b) Te.: cepp-aḍam **lēdu**
tell-NOM NEG.AUX
'(one) is not telling'

Personal Suffixes

Personal suffixes distinguish number in the first and second persons but number and gender in the third person (see Table 11). Whereas Modern Malayalam has no personal suffixes at all, Toda and Koḍagu have no personal suffixes in the third person. Because of the presence of these suffixes in the verb, the subject pronoun or noun (the latter, if it can be retrieved from the context) can be freely omitted.

Table 11 Past tense paradigms of Ta. cey- and Te. ce:yu- 'to do'

Tamil	*Telugu*	*Gloss*
cey-t-ēn do-PAST-1.SING	cēś-Ē-nu do-PAST-1.SING	'I did'
cey-t-ōm do-PAST-1.PL	cēś-Ē-m do-PAST-1.PL	'we did'
cey-t-āy do-PAST-2.SING	cēś-Ē-vu do-PAST-2.SING	'you (sg.) did'
cey-t-īrkaḷ do-PAST-2.PL	cēś-Ē-ru do-PAST-2.PL	'you (pl.) did'
cey-t-ān do-PAST-3.MASC.SING	cēś-Ē-ḍu do-PAST-3.MASC.SING	'he did'
cey-t-āḷ do-PAST-3.FEM.SING	—	'she did'
cey-t-ārkaḷ do-PAST-3.HUM.PL	cēś-Ē-ru do-PAST-3.HUM.PL	'they (HUM) did'
cey-t-atu do-PAST-3.NONHUM.SING	cēs-in-di do-PAST-3.NONMASC.SING	(Ta.) 'it did' (Te.) 'she/it did'
cey-t-an-a do-PAST-3.NHUM.PL	cēś-Ē-yi do-PAST-3.NHUM.PL	'they (NEUT) did'

Table 12 Positive imperatives

Language	*Singular*	*Plural*	*Gloss*
Ta.	col	coll-uŋkaḷ tell-IMP.PL	'tell!'
Te.	ceppu	cepp-aṇḍi tell-IMP.PL	'tell!'

Table 13 Negative imperatives

Language	*Singular*	*Plural*	*Gloss*
Ta.	coll-āt-ē tell-NEG-IMP.SG	coll-āt-īrkaḷ tell-NEG-IMP.PL	'do not tell!'
Te.	cepp-aku tell-NEG	cepp-ak-aṇḍi tell-NEG-IMP.PL	'do not tell!'

Imperative

The verb base itself serves as the imperative form in the singular in most of the languages, but a special suffix is added to it in the plural, as in Table 12. The corresponding negative imperative has the negative suffix in between the verb base and the imperative suffix, as in Table 13.

Nonfinite Verbs

The nonfinite forms may be divided into verbal adjectives and other forms, most of which serve as heads of subordinate clauses. A verbal adjective is formed by adding to the VB the tense or the negative marker, followed by the adjective marker:

- Past verbal adjective: VB + Past + Adjective

  (39a) Ta.: cey-t-a
  do-PAST-ADJ
  (39b) Te.: cēs-in-a
  do-PAST-ADJ
  'that did'

- Present verbal adjective: VB + Present + Adjective

  (40a) Ta.: cey-kinr-a
  do-PRES-ADJ
  (40b) Te.: cēs-tōnn-a
  do-PRES-ADJ
  'that is doing'

- Future/habitual verbal adjective: VB + Fut/Hab + Adjective

  (41a) Ta.: ceyy-um
  do-FUT/HAB.ADJ
  (41b) Te.: cēs-ē
  do-FUT/HAB.ADJ
  'that (will) do(es)'

- Negative verbal adjective: VB + Negative + Adjective

  (42a) Ta.: ceyy-āt-a
  do-NEG-ADJ
  (42b) Te.: ceyy-ani
  do-NEG.ADJ
  'that will/do(es) not do'

- Past participle: VB + Past

  (43a) Ta.: va-ntu
  come-PAST
  (43b) Te.: occ-i
  come-PAST
  'having come'

- Present participle: VB + Present

  (44a) Ka.: bar-uttā
  come-PRES
  (44b) Te.: os-tū
  come-PRES
  'coming'

- Negative participle: VB + Negative

  (45a) Ta.: ceyy-āmal
  do-NEG
  (45b) Te.: ceyy-akuṇḍā
  do-NEG
  'without doing'

- Infinitive: VB + Infinitive

  (46a) Ta.: ceyy-a
  do-INF
  (46b) Ma.: ceyy-ān
  do-INF
  'to do'

- Conditional: VB + Past + Conditional

  (47a) Ta.: cey-t-āl
  do-PAST-COND
  (47b) Ka.: māḍ-id-ar-e
  do-PAST-COND-ADD
  'if (one) does'

- Concessive: Conditional + Coordinative particle

  (48a) Ta.: cey-t-āl-um
  do-PAST-COND-COORD
  (48b) Ka.: māḍ-id-ar-ū
  do-PAST-COND-COORD
  'even though one did/does'

- Verbal noun: (49a) VB + Future + *atu* 'it', (49b) VB + Nominalizer

  (49a) Ta.: cey-v-atu
  do-FUT-N.SING
  (49b) Te.: ceyy-aḍam/-aṭam
  do-NOM
  'doing'

Auxiliary Verbs

A modal (or passive) auxiliary follows the infinitive of the main verb, whereas other types of auxiliary verbs follow the past participle of the main verb. Tense and personal suffixes, when they can be added, are added only to the auxiliary. Examples for a modal auxiliary are:

(50a)	Ta.:	avan	var-a	**vēṇṭum**
		he	come-INF	MUST
		'he must come'		
(50b)	Te.:	vāḍu	tin-**āli**	
		he	eat-MUST	
		'he must eat'		

Ta. *viṭu-* and Te. *vēyu-* (with [v] > Ø), which literally mean 'leave' and 'throw', respectively, serve here as examples for a nonmodal auxiliary; when used as an auxiliary, they mean 'completion, quickness':

(51a)	Ta.:	avan	paṇam	koṭu-ttu	viṭu-v-ān
		he	money	give-PP	leave-FUT-3.MASC.SING
(51b)	Te.:	vāḍu	ḍabbu	icc-ēs-tā-ḍu	
		he	money	give-(PP)-throw-FUT-3.MASC.SING	
		'he will give the money completely/quickly'			

The passive voice, found only in the written (not in the spoken) varieties of the literary languages, is a syntactic construction with the auxiliary Ta. *paṭu-*, Ma. *peṭu-*, Te. *paḍu* (with the change [p] > [b] in the last language), which literally mean 'fall, suffer', following the infinitive of the main verb:

(52a)	Ta.:	ceyy-a	ppaṭ-ṭ-atu
		do-INF	PASSAUX-PAST-3.N.SING
(52b)	Te.:	ceyy-a	baḍ-in-di
		do-INF	PASSAUX-PAST-3.N.SING
		'it was done'	

Contact between Dravidian and Indo-Aryan

Dravidian and Sanskrit (and later Indo-Aryan) show mutual influence on a large scale, which justifies calling the Indian subcontinent a linguistic area (Emeneau, 1954, 1956, 1980). A few words and structural features of Dravidian origin that have been found in the *Ṛgveda* allow us to conclude that the Dravidian languages were spoken in the northwestern part of the subcontinent at that time. Two examples of Dravidian words in the *Ṛgveda* are *mayūra-* 'peacock' and *khála-* 'threshing floor, granary'. The most important structural features that spread from Dravidian to Indo-Aryan are retroflexes, the use of the past participle, the use of the Sanskrit quotative marker *iti,* the use of Sanskrit *api* in the meanings 'even, also, and, indefinite', and expressives. The Dravidian languages, in turn, have a large number of loanwords from Sanskrit.

See also: India: Language Situation; Indo–Aryan Languages; Kannada; Malayalam; Pakistan: Language Situation; Sanskrit; Sri Lanka: Language Situation; Tamil; Telugu; Toda.

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Dthat

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The expression *dthat* (pronounced as a single syllable) was introduced by David Kaplan (1978, 1989b) as a formal surrogate for the English demonstrative *that*. On Kaplan's theory of demonstratives, an utterance of the English demonstrative *that* is typically accompanied by a demonstrat**ion** that presents an object, namely the demonstrat**um** of the context. The demonstratum is the referent of the demonstrative in the context. The structure of dthat-terms reflects this theory of demonstratives. Each *dthat*-term has the form ***dthat[α]***, where α is a singular term. Such a term may be used to represent an English demonstrative *cum* demonstration. When so used, the expression *dthat* serves as a formal surrogate for the demonstrative, while α takes the form of a definite description that serves as a formal surrogate for the demonstration and fixes the reference of *dthat* in every context. In Kaplan's formal possible worlds semantics, the extension of a definite description α, with respect to a context, world, and time, is an individual. The extension of ***dthat[α]*** with respect to a context, world, and time is the extension of α with respect to the world and time of the context. Thus, dthat-terms are rigid designators with respect to a context: Given a context, the extension of a dthat-term is the same with respect to all worlds and times. In this respect, dthat-terms are like the indexical first-person pronoun *I*, whose extension, given a context, is the same individual (namely the agent of the context) with respect to all worlds and times.

Although Kaplan (1989b) presents his formal semantics in a possible worlds format, he prefers a semantics that uses Russellian structured propositions – propositions whose constituents include individuals, properties, and relations. On such a semantics, the Russellian content of a predicate, with respect to a context, is a property or relation; the content of *I*, with respect to a context, is the agent of the context; and the content of a definite description, with respect to a context, is a complex entity containing the content of the definite description's predicate and the higher-order property or relation expressed by 'the.' Kaplan's (1989b) informal remarks about *dthat* allow for two quite different interpretations of its Russellian semantics (as pointed out in Kaplan, 1989a). On the first interpretation, the Russellian content of a dthat-term, in a context, is an individual, namely the referent of α in that context. Kaplan (1989a) calls this the "demonstrative surrogate" interpretation of dthat-terms and says that, on this interpretation, the expression *dthat* standing alone is a singular term. But this semantics does not fit well with the syntax that Kaplan (1989b) ascribes to *dthat* in his formal system, where *dthat* appears to be an operator or functional expression. On the second interpretation, the content of a dthat-term is a complex entity that contains the content of the definite description α together with a higher-order content for *dthat*. On this interpretation, *dthat* is a functional expression that rigidifies the attached definite description; it is similar in some respects to the expression *actually* in ***the x: actually Fx***. Most theorists who use dthat-terms specify that a complete dthat-term, ***dthat[α]***, is a singular term whose content, in a context, is the referent of α in the context.

See also: Deixis and Anaphora: Pragmatic Approaches; Demonstratives; Descriptions, Definite and Indefinite: Philosophical Aspects; Indexicality: Philosophical Aspects; Possible Worlds: Philosophical Theories; Propositions; Rigid Designation; Russell, Bertrand (1872–1970).

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Du Cange, Charles du Fresne, Sieur (1610–1688)

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Sieur Charles du Fresne Du Cange was a scholar, historian and lexicographer, friend of Bernard de Montfaucon (1655–1741), the founder of scientific palaeography and codicology. Du Cange came from a wealthy family, which was for centuries in the service of the royal house of France. He was born in 1610 in Amiens and attended the Jesuit college in his hometown, studied law in Orleans, and finally became an advocate, a profession which he never practiced. In 1638, he married Catherine Dupos, daughter of the treasurer of Amiens; in 1645 he succeeded his father-in-law in this position, dying in 1688 in the same town.

The circumstances of Du Canges's life enabled him to devote himself to the study of history. His research involved both the regional and the general history of France, about which he produced numerous treatises. His scholarly activities extended also to the study of Byzantine history, resulting in the editing of original sources as well as personal works on the field. Especially noteworthy is his edition of the Byzantine historian Johannes Zonaras's *Annales ab exordio mundi ad mortem Alexii Comnenis graece et latine cum notis*, and his contribution in the 42-volumed *Corpus Parisinum* of Byzantine historians, a work commissioned by Louis XIV, alongside several other important scholars of his time. Du Canges's name, however, is mainly connected with his two dictionaries, one about medieval Latin (1678), the other about the Byzantine Greek language (1688). He compiled his lexica based on his own research of the various sources, which he drew directly from the original manuscripts and not from later, edited editions, which did not yet exist for these specific authors. Due to the peculiarity of his field of research, and to the fact that the medieval Latin and Byzantine lexicography attracted scholarly interest relatively late by comparison to the lexicography of the classical languages, his dictionaries remain an invaluable work of reference. Du Canges's studies go beyond the Greek and Latin languages, as was eloquently demonstrated by his posthumous work entitled *Illiricum vetus et novum* (ed. by Keglevick de Buzin, 1746), dealing with the Illyrian language.

See also: Lexicography: Overview.

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Dual-Mechanism Morphology

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Our understanding of how an adult native speaker/hearer processes inflected word forms in real time has increased considerably over the last decade. Experimental studies using a range of different psycholinguistic methods and techniques, e.g., lexical decision, priming, and event-related potentials (ERPs), have led to a number of consistent and replicable results such as frequency effects for inflected word forms in lexical decision tasks, priming effects for inflected word forms in different kinds of priming experiments, and left-anterior negativities for incorrectly inflected word forms in ERP violation studies;

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see Clahsen (1999) and Pinker (1999) for review. The theoretical interpretation of these and other results on morphological processing in adult native speakers is controversial; basically, three different approaches can be distinguished. On one side are different kinds of associative single-mechanism models claiming that all inflected words are stored and processed within a single associative system using distributed representations (see, e.g., Bybee, 1995; Sereno and Jongman, 1997, among others). The morphological structure of an inflected word is not explicitly represented in these models; instead, these models implement networks that represent the mapping relationship between different word forms through associatively linked orthographic, phonological and semantic codes. A radical alternative to these models are rule-based single-mechanism accounts in which all inflected words are formed by morphophonological rules, and memorization of inflected words is avoided as much as possible. Halle and Mohanan (1985) and related work in generative phonology in which minor rules are proposed (for example, *Lowering ablaut* deriving the past tense form *sang* from the stem *sing*) are representative of this approach; see Yang (2000) for a recent treatment of the English past tense in this framework. The third theoretical viewpoint is represented by a family of dual-mechanism models, which hold that morphologically complex word forms can be processed both associatively, i.e., through stored full-form representations and by rules that decompose or parse inflected word forms into morphological constituents (Chialant and Caramazza, 1995; Schreuder and Baayen, 1995; Clahsen, 1999; Pinker, 1999, among others). Here, we provide a brief overview of different variants of dual-mechanism models that are currently being discussed in the literature.

There is a class of dual-route models specifically concerned with the kinds of mental representation listeners consult in recognizing morphologically complex words. As is common in word-recognition research, modality-specific access representations are assumed to mediate the mapping from the orthographic or spoken input onto lexical representations in the central lexicon. Dual-route models posit that morphologically complex words can be recognized either via prelexical morphological parsing, which decomposes the orthographic or spoken input into its morphological components, or via a direct-access route, which is based on stored full-form representations for morphologically complex words. Different proposals have been made as to how these two access routes interact. For example, according to Caramazza and collaborators, full-form-based lexical access is preferred for all known words, and the parsing route is only employed for novel or extremely rare words that are morphologically regular (Chialant and Caramazza, 1995). In contrast, according to the morphological race model proposed by Baayen, Schreuder and collaborators, both the parsing route and the direct route operate in parallel. Which of these two routes turns out to be more efficient is claimed to depend on a number of factors, including the frequency of an inflected word and its constituents, the lexical neighborhood, the phonological and semantic transparency (vs. opaqueness) of a morphologically complex word, and the degree of homonymity of an affix (see, e.g., Baayen *et al.*, 2003; Bertram *et al.*, 2000). Much of the empirical evidence in the context of dual-route models comes from just one experimental task, namely so-called lexical decision, in which subjects have to discriminate between existing words (which have been encountered before) and nonce words (that have never been encountered before), e.g., *houses* vs. *nouses*. Lexical decision is a rather odd task, and it is hard to tell what response times to this task actually mean; see Balota (1994) and Deutsch and Müller (1999) for discussion. It seems clear, however, that given the task demands, lexical decision encourages subjects to strongly rely on memory, in order to determine whether or not they have encountered a stimulus word before. Thus, it could be that results from lexical decision have led us to overestimating the role of full-form access (as opposed to morphological parsing) in recognizing inflected and derived words.

Another variant of dual-mechanism morphology is the *words-and-rules* model of Pinker and collaborators (see, e.g., Pinker, 1999, Pinker and Ullman, 2002). The basic claim of the words-and-rules account is that two complementary systems coexist in how our mind/brain processes and learns language: a combinatorial (rule-based) system that generalizes over symbolic categories such as N(oun), V(erb), etc. and treats all members of a given category equally, and an associative system that extracts probabilistic contingencies such as frequency distributions, similarity clusters from the input data. These two systems can be implemented as neural circuits or subroutines that do not just underlie linguistic generalization, but are claimed to be used in other domains of cognition as well, for learning, and comparing in general. The key property of the combinatorial system is that it suppresses differences between individual examples and treats all members of a group or class equally. In contrast, the associative system generalizes on the basis of resemblance to stored examples. Extending Pinker's model, Ullman (2001) has argued that the distinction between words and rules can be linked to two different brain memory systems, according to which the associative system (words) depends upon

declarative memory and is rooted in temporal lobe structures of the brain, whereas the combinatorial system (rules) is rooted in frontal brain structures. However, the evidence currently available for such a strong localist interpretation of the words-and-rules distinction has not yet convinced everybody.

Much of the empirical research on the words-and-rules model comes from the study of a rather simple inflectional system, the English past tense. Pinker argues that the two different systems of his model directly correspond to the linguistic distinction between regular and irregular past tense formation. Regular *-ed* inflection is predictable in form, readily applies to novel items, and invokes a combinatory rule (add *-ed*) that may operate on the outputs of other morphological processes (derivation, compounding). On the other hand, irregular past tense inflection (e.g., *sing-sang*) is based on stored forms that cannot be perfectly predicted by the form of the stem or root, and only tentatively extends to new forms. There is indeed a considerable body of psycholinguistic evidence for the distinctions posited by the words-and-rules model from studies of the English past tense, investigating child language acquisition (Marcus *et al.*, 1992), adult language processing (Alegre and Gordon, 1999), brain-imaging and event-related potentials (Jaeger *et al.*, 1996; Münte *et al.*, 1999), and language disorders (Marslen-Wilson and Tyler, 1997; Clahsen *et al.*, 2004).

However, despite all the evidence that has been accumulated on the English past tense, there are many reasons to extend research on dual-mechanism morphology to a wider range of languages. Note, for example, that the English past tense has only one productive form (*-ed*) and that regularity is confounded with both the presence of an overt affix and with type frequency. Regular verbs in English are much more frequent (95%) than irregular ones (5%); see Marcus *et al.* (1995), and regular past tense forms contain a segmentable affix, whereas irregular forms typically do not have affixes. These two confounding features leave room for several alternative interpretations of the same set of facts. Potential differences, for example, between forms such as *walk-ed* and *came* in acquisition and processing could be effects of frequency differences and/or effects of the presence or absence of an overt affix, rather than the result of different mental representations.

To address these concerns, psycholinguistic studies have examined a range of typologically different languages from the perspective of dual-mechanism morphology: German: Clahsen (1999); Hebrew: Berent *et al.* (1999); Italian: Say and Clahsen (2002); Spanish: Clahsen *et al.* (2002a), Rodriguez-Fornells *et al.* (2002); Catalan: Rodriguez-Fornells *et al.* (2001). These studies focus on the question of whether and how the fundamental distinction between lexical storage and combinatory rules extends to linguistic systems other than the English past tense (see Pinker 1999, Chap. 8 for review). The results of these studies revealed contrasts that were similar to those obtained for regular and irregular inflection in English even though the vocabulary distribution, the surface morphology, and other properties of the language were different from those of English past tense formation. For example, psycholinguistic examination of the German noun plural system revealed that even though the *-s* plural is the least frequent plural allomorph in German, it exhibits the same experimental effects as the regular past tense *-ed* in English (Marcus *et al.*, 1995). The same is true for past participle formation in German although, unlike English, German has two segmentable participle endings, the regular *-t* and the irregular *-n*, and the vocabulary distribution for regulars and irregulars is different from that of the English past tense (Clahsen, 1999). Priming experiments revealed regular/irregular differences for German participles even though the phonological and orthographical distance between the participle forms and their corresponding stem forms tested was identical for both regular and irregular verbs (Sonnenstuhl *et al.*, 1999). For example, an irregular participle such as *geschlafen* 'slept' is as similar to its base form (*schlaf*) as a regular participle (e.g., *geöffnet* 'opened') is to its base stem (*öffn-*), and despite these formal similarities, the regular form produced full priming and the irregular one did not, exactly as in corresponding experiments on the English past tense (Stanners *et al.*, 1979). These results show not only that the words-and-rules model extends to morphological systems other than the English past tense, but also that alternative nonmorphological factors (e.g., the frequency distribution and the surface properties of inflected word forms) that may hold for the English past tense cannot explain the observed contrasts between lexically based (frozen) and rule-based (built) inflected word forms.

Dual-mechanism morphology can be implemented into an explicit linguistic theory in different ways. One direct implementation is Wunderlich and colleagues' morpheme-based model (Wunderlich, 1996) according to which irregularly inflected forms are lexically represented as subnodes of structured lexical entries, while regular inflection involves combinatorial rules that concatenate an affix with a lexical entry. An alternative implementation within realization-based models of morphology reconstructs this contrast in terms of the distinction between rules that contain variables and those that have a constant output; see, e.g., Blevins (2004). Irregular inflection,

for example, the form *is* of the verb *to be*, is encoded as a realization rule that has a constant formal spell-out (<[V, 3sg, pres, ind, BE], is>), whereas combinatorial (regular) inflection such as the regular 3sg present tense *-s* in English is based on a realization rule (<[V, 3sg, pres, ind], X + s>) that adds the exponent 's' to the base form represented by a variable (X) yielding inflected word forms for any verb that is not blocked by a more specific rule. Thus, although dual-mechanism morphology can be construed in terms of an opposition between rules and entries, the basic distinction between built and stored elements can also be expressed in alternative all-rules models of morphology.

From a linguistic perspective, dual-mechanism morphology and the accompanying empirical studies suggest that structural differences between built and frozen forms correspond to differences in the way they are mentally represented and processed by the speaker/hearer and acquired by children. This raises the question of whether there is any psycholinguistic evidence for more complex morphological concepts and operations that go beyond the simple opposition between built and frozen forms, a question that my colleagues and I have investigated in a number of recent studies using psycholinguistic experiments and other sources of evidence. We have studied, for example, the mental representation of stem allomorphy (Clahsen *et al.*, 2001a, 2002b), the role of inflectional paradigms in language processing and disorders (Clahsen *et al.*, 2001a, 2001b), and the effects of the split between derivation and inflection on morphological processing (Clahsen *et al.*, 2003). Even though further study is required to determine whether the results obtained generalize to other morphological systems, the findings from these studies suggest that morphological distinctions (beyond words-and-rules) do indeed play an important role in the organization of the mental lexicon and that morphological notions and concepts are not only useful descriptive tools for linguists, but also contribute to a better understanding of how the speaker/hearer processes morphologically complex words.

See also: Inflection and Derivation; Morphology in Parallel Distributed Processing; Psycholinguistic Research Methods; Psycholinguistics: Overview.

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Duan Yucai (1735–1815)

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Duan Yucai (also known as Duan Ruoying and Duan Maotang) is regarded as one of the most outstanding scholars in the study of Chinese philology in the Qing dynasty (1644–1911). He was a native of Jintan County in Jiangsu Province and grew up there. In 1763 he met the eminent scholar Dai Zhen (1725–1777) in Beijing and later became his disciple. Duan's development was deeply influenced by his teacher.

Duan's works on etymology and phonology have held dominant positions in their respective areas. His *Shuowen jiezi zhu* (*Annotation on the Shuowen jiezi*), a nearly thirty-year effort, inspired a golden era of study on the *Shuowen jiezi*. The *Shuowen jiezi*, compiled in the first century, is the earliest extant etymological dictionary of Chinese characters. While numerous attempts had been made before Duan to amend the *Shuowen jiezi*, it was not until Duan's work that the *Shuowen jiezi* really was thoroughly and systematically analyzed. His lengthy annotation covered many areas, with the following contributions particularly worth mentioning: (1) by using evidence from the dictionary itself and other classical documents, a large number of original annotations and even old writings of characters in the *Shuowen jiezi* were corrected; (2) the meanings of various technical terms employed in the *Shuowen jiezi* were explained in detail; (3) the format of the entries in the *Shuowen jiezi* was explicated, which in turn enabled Duan himself to correct and amend the dictionary; (4) the original meaning, the derived meanings, and any phonetic loan uses of each character were discussed, and their semantic changes were well illustrated with reference to classical documents; (5) sets of cognate words were identified, paving the way to the modern study of Chinese word families. One of the many reasons why Duan succeeded in the annotation is

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that he applied his phonological theories properly to tackle the puzzling problems in the dictionary. The preface of the annotation, written by Wang Niansun (1744–1832, *see* **Wang Nien-Sun (1744–1832)**), confirmed this point.

Duan's phonological theories can be found in his *Liushu yinyun biao* (*Phonological table of six character types*). He divided Old Chinese into seventeen rhyme categories, eight less than Dai Zhen. Another important theory put forward by Duan is "(characters with) the same phonetic element must be in the same rhyme category." This principle was thoroughly applied in the *Shuowen jiezi zhu*, where every word was assigned to one of his seventeen categories. His observations on intercategory rhyming practice and sound changes were also innovative.

It is not an exaggeration to say that Duan's work had turned the trends of the studies on Chinese philology. His followers inherited the method of linking etymology and phonology together, and applied it in the interpretation of various classical texts. Eventually fruitful results were achieved.

See also: Chinese; Wang Li (1900–1986); Wang Nien-Sun (1744–1832).

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Dubbing

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Dubbing is a type of Audiovisual Translation mainly used in Germany, Italy, France, Spain, Austria, Switzerland, Hungary, the Czech Republic, Slovakia, Turkey, Brazil, China, Japan, most Asian countries, and some North-African countries, consisting of a replacement of the original track of a film containing the source language dialogs, for another track on which translated dialogs in the target language are recorded. The remaining tracks are kept inviolable (the soundtrack – including music and special effects – and the track containing the images). Audiovisual Translation, a generic term equivalent to Screen Translation or Media Translation and opposed to written and oral translation, not only includes dubbing but also subtitling – the other major type of Audiovisual Translation – voice-over, narration, free commentary, and partial dubbing (Luyken *et al.*, 1991; Gambier, 2000; Díaz Cintas, 2003; Chaume, 2004a). The term *revoicing* also can be used as a synonym for dubbing, but it also includes the process of intralingual postsynchronization (when the original dialogs of a film are subsequently recorded in a studio). When revoicing is just used as a synonym for dubbing or interlingual postsynchronization, the term includes all dubbing types (dubbing properly, partial dubbing, narration, voice-over, etc.).

The Dubbing Process

The process of dubbing begins when a TV channel or a movie house decides to buy (the exhibition rights of) a foreign film in a foreign language in order to offer it in the local language. Then the TV channel or movie house commissions the translation and the dubbing process to a dubbing studio. In the studio, a dubbing director selects the voices (professional dubbing actors and actresses) that will give life to the translation, and stimulates and instructs the actors to put on the most adequate and accurate acting performances. At the same time, the studio commissions the translation to a professional translator. The translation brief usually consists of a literal translation that reflects all the idiosyncrasies of the source text and culture – the so-called rough translation. Then a dialog writer rewrites the translation (sometimes this is also done by the same translator), making it sound like natural speech and taking care of the three kinds of synchronization described below. This text is then passed on to the dubbing actors and actresses who, under the supervision of the dubbing director, will utter and fit all sentences into the mouth of the original source actors and actresses of the film. A sound technician or engineer will then record the target dialogs on a

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blank track of the original copy of the film, which will be ultimately mixed with the original tracks so that the film also can be exhibited and heard in the target language.

Synchronization

Synchronization (or lip-sync) is one of the key factors at stake in dubbing. It is commonly considered as the differentiating feature of dubbing, although, in fact, it only represents one important area, together with others such as the need to produce a translation reflecting oral unlabored dialog (a written text to be spoken as if not written), or the effect of the interaction between image and word on translation solutions. Synchronization undeniably has a direct impact on the translation process and product, and, as such, it should be given due consideration in the study of Audiovisual Translation. Synchronization obliges the translator to put into practice his or her creative skills and move away from literal conceptions in translation to focus on the function of the text and on the viewer, one of the essential features of Audiovisual Translation.

Although synchronization is both the professional and academic term for this technique (Fodor, 1976; Mayoral *et al.,* 1988; Whitman, 1992), other terms also may be found for the same technique, such as *adjustment* or *adaptation*. The following definition may be posited: Synchronization is one of the features of translation for dubbing, which consists of matching the target language translation and the articulatory and body movements of the screen actors and actresses, as well as matching the utterances and pauses in the translation and those of the source text.

The proposed definition establishes the following types of synchronization and rejects other typologies that have been included in the literature to date. The definition suggests three types of synchronization:

- phonetic or lip synchrony
- kinetic synchrony or body movement synchrony
- isochrony or synchrony between utterances and pauses

Lip or phonetic synchrony, referred to as *phonetic synchrony* by Fodor (1976), *lip-sync* by Luyken *et al.* (1991) and *lip synchrony* by Whitman (1992), consists of adapting the translation to the articulatory movements of the on-screen characters, especially in close-ups and big or extreme close-ups. The translation should particularly respect the open vowels and bilabial and labio-dental consonants pronounced on screen. Fodor's comprehensive study includes much more detailed observations for phonetic synchrony, but, except in the cases of close-ups, big or extreme close-ups or detailed lip shots, solutions provided in the professional contexts of the European countries with excellent dubbing reputations, are generally much more relaxed.

The synchronization of the translation with the actors' body movements is known as kinetic synchrony (Whitman, 1992: 33), originally referred to by Fodor (1976: 72) as *character synchrony*. The translation also must agree with the movements of the screen characters, i.e., a nodding head indicating affirmation cannot be accompanied by a negative 'no.'

The synchronization of the duration of the translation with the screen characters' utterances and pauses is known as isochrony (Whitman, 1992), i.e., the translated dialog must fit exactly in the time between the instant the screen actor opens his/her mouth – to utter the source text dialogs – and the instant in which he/she closes his/her mouth. Most criticisms of a badly dubbed film are grounded in deficiencies of isochrony, as it is here that the viewer is most likely to notice the fault.

Two further types of synchronization referred to in the literature do not strictly fall within synchronization: so-called *character synchrony* and *content synchrony*. The former (Whitman, 1992) covers the agreement between the *voices* of the dubbing actors and the expectations of the on-screen actor's voice: in general, a child on screen cannot be dubbed by an older male voice; a woman's voice must sound feminine, whereas the 'baddie' must sound deep and sinister. Apart from discussions of political correctness, this kind of 'synchrony' is definitely directly related to the dramatization of dubbing actors, rather than a type of synchronization. As such, it falls outside the range of synchronization to which the translator or dialog writer has access. The effects of dramatization are totally in the hands of the dubbing actors and the dubbing director.

Content synchrony (Mayoral *et al.,* 1988), or the semantic relation between the translation and what happens on screen (images and music), cannot be considered as a type of synchronization either. Here the term synchrony or synchronization is misleading, as it refers, rather than to synchrony, to the functional-systemic concept of *coherence*.

The degree of accurateness of synchronization depends on countries and traditions (norms). For some countries lip-sync is not that necessary, for others isochrony is not compulsory. The observation of the different kinds of synchrony depends on many factors, among them, the characteristics of the source text (films and cartoons are not equally synchronized), the languages and cultures in contact (the closeness of a language pair), the professional context

(the client's demands), the characteristics of synchronization itself, the characteristics of the viewer (child and adult audiences) and those of the target culture (Chaume, 2004b).

Research

Articles on aspects of dubbing were published in Europe as early as the 1960s and 1970s. Even so, it was the pioneering work of Fodor (1976) that opened the doors to research in this field, especially in the analysis of the process from a professional perspective and in the insistence on the adaptation of translation to the movements of the screen character's mouths. Years later, the detailed contribution made by Mayoral, Kelly, and Gallardo (1988) lays the foundations for investigation into dubbing and audiovisual translation. In the 1990s, Europe saw the publication of wide-reaching studies on dubbing (Luyken *et al.,* 1991; Whitman, 1992; Herbst, 1994; Agost, 1999; Chaves, 2000; Chaume, 2003, 2004a; among others), some pioneering articles (Hochel, 1986; Goris, 1993; Delabastita, 1989, 1990; Zabalbeascoa, 1996; among others), collective volumes (among them, those edited by Gambier, 1996, 1998, or Gambier and Gottlieb, 2001), and special issues of journals (the most recent being *The Translator, 9(2)* and *Meta, 49(1)*, both edited by Gambier). Karamitroglou's *Towards a methodology for the investigation of norms in audiovisual translation* (2000) explains the Greek landscape with a descriptive study of norms governing the choice of audiovisual modalities based upon the polysystem theory.

The lines of work in translation for dubbing are mainly focused in two different fields. First, there is the consideration of the *constraints* affecting the process of translation, mainly the simultaneous presence of images and dialogs, but also the observation of the different types of synchronization, or the elaboration of fresh, unlabored dialog, together with the strategies and techniques employed, etc. Second, there is the study of the translation itself: the *product*. In other words, the dubbed text is studied from linguistic-discursive, cinematographic, ideological, cultural and social perspectives. Translations are then seen as a system that influence and are influenced by other (literary) systems within the general polysystem of the target culture (the cultural impact of audiovisual texts, the generation of new types of texts in the receiving cultures and the necessary adaptations, etc.). Of special interest are the emerging studies on *norms* in dubbed texts, still vague and localized in case studies, but definitely promising, many of them based on corpus methodology. Academics also show interest in the description of the dubbing process, in the translation of idioms, politeness, humor, film titles, censorship, the construction of national identity, film language, etc.

Film language and translation is one of the promising areas of research at present. The audiovisual text is understood as a semiotic construct made up of different signifying codes the meaning of which interact with each other (linguistic, paralinguistic, musical, iconographic, photographic, etc.). The linguistic code, despite its predominant role, is but one more code at play in the construction and later transfer of meaning in audiovisual texts. For the translator, knowledge of all the signifying codes present in the audiovisual texts is extremely relevant. Apart from the descriptive analysis of these codes, the translator should be particularly interested in the effect of the different signifying codes upon the linguistic code, as this is the only one that can be manipulated at all (together with the soundtrack). A translation that does not take all the codes into account could then be seen only as a partial translation.

Quality Standards

In professional circles, there seems to be agreement with respect to three quality standards that any dubbed product should have:

- Observance of the three kinds of synchronization mentioned above, especially of isochrony. This should be taken into account by the translator, the dialog writer, and the dubbing director.
- Avoidance of overacting or underacting performances. Overdone, overdramatic performances, as well as flat and monotonous speech, do not contribute to the illusion of watching and living a true story. Actors and actresses and the dubbing director are responsible for this. Nevertheless, this norm depends on countries and traditions, for example, narration in Poland or Russia sounds flat and monotonous to people in Western European countries, whereas dubbing sounds phony, artificial, and false to people in some Eastern European countries.
- Elaboration of credible and natural dialogs, believable and convincing sentences, gestures and intonation that give the illusion of watching a 'real' story. This is one of the translator's major goals.

See also: Norms and Correctness; Subtitling; Voice-Over.

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Dubois, Jacques (Sylvius) (1489–1555)

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Jacques Dubois (1489–1555) is also known by the Latin form of his name, Sylvius Ambianus ('of Amiens'). He studied letters in Paris and medicine in Montpellier, receiving his degree in medicine in 1529. When refused a post at the University of Paris, he returned to his Humanistic studies and wrote the first grammar of French written in France, the *In linguam gallicam isagoge, una cum eiusdem Grammatica Latino–gallica, ex Hebraeis, Graecis, et Latinis authoribus* ('Introduction to the Gallic (French)

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The purpose of his grammar was 'to restore the ancient purity' of French by studying the changes in sound–letter correspondence between the ancient languages and the French of his day and to make French speakers conscious of their language, so that they would not be 'foreigners in their mother tongue.' At the same time, he wrote it in Latin so that people from other countries might be able to use it to understand French better.

The first part of the book, the *Isagoge*, has three sections. In the first section, he described the actual pronunciation of letters, their *potestas* 'power.' In the second, the longest part, he linked the letters of Latin and Greek words to the letters used in their French equivalents. It is a study of sound change, confused somewhat by the lack of distinction between sound and letter and by some forced etymologies. For instance, he did not know Frankish, so he often traced words of Germanic origin to an imagined Latin or Greek root, as when he links *blesser* to a Greek etymon, rather than to Germanic **blettjan*. The last section of the *Isagoge* is devoted to addition (e.g., prosthetic vowels), loss (e.g., apocope and syncope), or movement of sounds (e.g., metathesis) between the ancient languages and French.

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The impact of Dubois' grammar was limited by his acceptance of, and even preference for, Picardisms. Nonetheless, it remains a useful portrait of usage in early 16th century French, including aspects of social and regional variation.

See also: Etymology; French; Latin; Renaissance Linguistics: French Tradition.

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Ducrot, Oswald (b. 1930)

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Oswald Ducrot, French semanticist, has worked at the *École des Hautes Études en Sciences Sociales* in Paris since the 1960s. His effort has been directed to the production of a structuralist and enunciative-based, unverifiable semantics (argumentative semantics). In it, meaning is an intention that the enunciation represents. It does not seek to describe the speaker's intentions but to show that the language's forms in the enunciations signify certain intentions, whether the speaker wants them to or not. The intentions are, therefore, linguistic and not psychological. Within this perspective, he dedicates himself to the study of implicit meanings, distinguishing them as presupposed and implied (Ducrot, 1972).

His semantic linguistics (semantics of argumentation in language (Plantin, 1990)) is an 'integrated pragmatic.' The 'pragmatic' does not add itself to the language in the situation; it is part of the language itself. The argumentative orientation is an enunciative relation marked in the language (note the relation to Beneveniste). Argumentation is not a relationship of the language with the world; it is a relationship that leads from one meaning to another that is interpreted as a conclusion in a particular enunciation (Anscombre and Ducrot, 1983). The enunciations have the representation of their enunciation as their meaning and, in it, they represent the various figures of the subject (announcers, enunciators), constituting what

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he calls polyphony (a term utilized by Bakhtin). For Ducrot, and this has to do with his antipsychological effort, the speaker is not a linguistic category. The figures of the enunciation are the announcer (presented as responsible for the speech), the announcer-as-a-person (presented as the person referred to by an 'I'), and the enunciators (the perspectives by which the meanings are presented by the enunciation) (Ducrot, 1984).

Ducrot goes from a unitary conception of the enunciation to a polyphonic position, a change accompanied by the manner in which his concept of argumentative scale is modified (Ducrot, 1973, 1980), and by the latter inclusion of the notions of topos and topic form (Ducrot, 1990). In an enunciation, the topos is what sustains the passage from argument to conclusion. He has recently been working on a version of the theory of argumentation in the language that abdicates any relationship with its exterior. It abandons the topos notion and concentrates on what has been called the semantic block theory.

In the domain of general linguistics, his work on structuralism (Ducrot, 1968) and his decisive participation in the *Dictionnaire Encyclopédique des Sciences du Langage* (Ducrot and Todorov, 1972), recently redone (Ducrot and Scheffer, 1995) are of particular importance.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Benveniste, Emile (1902–1976).

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Konrad Duden, son of a railway employee, studied classical philology, philosophy, history and in-depth German and got his teaching degree in 1854. He interrupted his studies twice, as he had to work as a private teacher (Frankfurt, 1848, then Genoa). Back in Germany in 1859, he lived in Soest until 1869, teaching in a high school and becoming a vice-rector ('Prorektor'). He was the headmaster of a high school in Schleiz (Thuringia) until 1876, and the director of the Bad Hersfeld high school till 1905.

In his various positions, Duden became aware of the many local rules in spelling, differing from school to school and from place to place. German spelling had essentially developed without any particular administrative rules. The first rules came in 1855 (Hanover) and 1861 (Württemberg). There was a strong need for an orthographical standardization as the German *Länder* (countries) united in 1871 under the leadership of Bismark. This is when Duden first proposed simplifying spelling, summarized in 'Schreibe, wie Du sprichst (write as you talk),' to allow every citizen whatever his social origin and training, an easier access to writing. He published *Die Deutsche Rechtschreibung* (Duden, 1872) and was invited to participate in the Berlin Conference on spelling ('Herstellung größerer Einigung in der deutschen Rechtschreibung,' 1876). This program failed, and the *Länder* began to give separate rules for spelling, first the Bavarians then the Prussians. Duden wrote his *Vollständiges orthographisches Wörterbuch der deutschen Sprache* in 1880, abandoning some of his own propositions, and including Bavarian (southern) and Prussian (northern) spelling rules, in order to achieve a standardized spelling (completed in 1903 with the *Rechtschreibung der Buchdruckereien deutscher Sprache*). The dictionary became the reference in spelling for all the Germans. At the second 'spelling conference' (Second Orthographical Conference, Berlin, 1901), in which Duden participated, the delegates from Germany as well as those from Austria and Hungary decided to homogenize the spelling; from 1902 on, the 'Bundesrat' decided the Duden dictionary should be compulsory in all *Länder* as well as in Austria. Hungary and Switzerland decided

he calls polyphony (a term utilized by Bakhtin). For Ducrot, and this has to do with his antipsychological effort, the speaker is not a linguistic category. The figures of the enunciation are the announcer (presented as responsible for the speech), the announcer-as-a-person (presented as the person referred to by an 'I'), and the enunciators (the perspectives by which the meanings are presented by the enunciation) (Ducrot, 1984).

Ducrot goes from a unitary conception of the enunciation to a polyphonic position, a change accompanied by the manner in which his concept of argumentative scale is modified (Ducrot, 1973, 1980), and by the latter inclusion of the notions of topos and topic form (Ducrot, 1990). In an enunciation, the topos is what sustains the passage from argument to conclusion. He has recently been working on a version of the theory of argumentation in the language that abdicates any relationship with its exterior. It abandons the topos notion and concentrates on what has been called the semantic block theory.

In the domain of general linguistics, his work on structuralism (Ducrot, 1968) and his decisive participation in the *Dictionnaire Encyclopédique des Sciences du Langage* (Ducrot and Todorov, 1972), recently redone (Ducrot and Scheffer, 1995) are of particular importance.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Benveniste, Emile (1902–1976).

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Duden, Konrad (1829–1911)

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Michael Dummett is one of the principal contemporary philosophers in Britain. He was born in London in 1925, was educated at Sandroyd School, Wiltshire, and Winchester College, Hampshire, before he joined the army in 1943. In 1944 he converted to Catholicism, and has been a member of the Roman Catholic Church ever since. After leaving the army in 1947, he read philosophy at Christ Church, Oxford. Upon graduation in 1950, he became a fellow at All Souls College, which was the start of a long and successful academic career. Apart from a short stint at Birmingham in 1950–1951, and numerous visiting positions in Europe, the United States, and Africa, Dummett has always been based in Oxford. During the 1960s, he was active, together with his wife, Ann, in antiracism campaigns. He remained a fellow of All Souls until 1979. From 1962 to 1974, he was Reader in the Philosophy of Mathematics. He then became a Senior Research Fellow of All Souls, as well as Sub-Warden of the college. In 1979, he was elected Wykeham Professor of Logic, and joined New College. He retired in 1992. In 1999 he was awarded a knighthood, "for services to Philosophy and to Racial Justice." A prolific writer from the beginnings of his career, he continues to publish books and articles on a variety of subjects.

Dummett's main contributions to linguistic theory are connected with three interrelated themes. First, he is a leading commentator on the work of Gottlob Frege (1848–1925), whom Dummett considers to be the 'grandfather of analytical philosophy.' This is because, in Dummett's view, Frege was the first and most powerful originator of the 'linguistic turn' in philosophy, that is, the belief that an account of thought can be attained through an account of language, and that it can only be so attained.

Second, Dummett has argued influentially that logical analysis of linguistic practice may serve to resolve metaphysical disputes; in particular, debates over realism, that is, debates over the question whether objects or events of certain sorts exist independently of our knowledge or perception of them. Reformulating such debates in terms of what a proper representation of linguistic knowledge is will make it possible to decide, in some specific field, whether the case for realism or for 'antirealism' will be stronger.

Third, Dummett consequently has devoted much effort to determining what is required for a correct theory of meaning. On the one hand, an accurate account of what it is to understand a language must be closely connected with an account of truth. For to understand a sentence, or to grasp its sense, involves knowing its truth conditions, that is, knowing what is the case when it is true. On the other hand, a theory of meaning must do justice to the social character of language, and account for language use. For knowing what a sentence means also involves knowing how it

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In addition to his vast production on the philosophy of language, Dummett has written extensively on other philosophical subjects, notably the philosophy of mathematics, and on social and political issues, such as racism, immigration, and voting systems. Furthermore, he has published various books on card games and their history, in particular the Tarot.

See also: Frege, Gottlob (1848–1925); Logic and Language: Philosophical Aspects; Meaning: Overview of Philosophical Theories; Sense and Reference: Philosophical Aspects; Thought and Language: Philosophical Aspects.

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Duponceau, Pierre Étienne (1760–1844)

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Born on June 3, 1760 on the Ile de Ré (France), Pierre Étienne Duponceau had a special gift for languages; as a young man, he served as a secretary to the French scholar Court de Gébelin, the author of a voluminous work on the prehistory, history, and diversification of languages. Duponceau left France in 1777, accompanying the Prussian Baron Steuben to the United States, where the Baron had to take command over the Continental Army. Duponceau was a great admirer of the American Revolution and of its political and humanitarian ideals; after serving with Steuben, he established himself in Philadelphia, where he became a lawyer and a major figure in Pennsylvanian public life. Duponceau was known as a learned, cultivated, charitable, and honest man; he completely assimilated to American society, becoming a naturalized American citizen (Peter Stephen Du Ponceau). He died in Philadelphia on April 1, 1844.

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See also: Condillac, Etienne Bonnot de (1714–1780); Humboldt, Wilhelm von (1767–1835).

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Durkheim, Emile (1858–1917)

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Emile Durkheim (1858–1917) was a French sociologist and philosopher who was born on April 15, 1858 in Epinal, capital town of the department of Vosges, in Lorraine. His mother, Mélanie, was a merchant's daughter. He came from a long line of rabbinical parentage. His father, Moïse, was rabbi of Epinal and the Chief Rabbi of the Vosges and Haute-Marne, and his grandfather and great-grandfather had also been rabbis. Durkheim was a gifted student who received his early education from a rabbinical

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Durkheim, Emile (1858–1917)

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Emile Durkheim (1858–1917) was a French sociologist and philosopher who was born on April 15, 1858 in Epinal, capital town of the department of Vosges, in Lorraine. His mother, Mélanie, was a merchant's daughter. He came from a long line of rabbinical parentage. His father, Moïse, was rabbi of Epinal and the Chief Rabbi of the Vosges and Haute-Marne, and his grandfather and great-grandfather had also been rabbis. Durkheim was a gifted student who received his early education from a rabbinical

school. At Collège d'Epinal, he skipped two years, and received his *baccalauréats* in Letters (1874) and Sciences (1875). In his desire to become a teacher, he traveled to Paris to prepare for admission to *Ecole Normale Supérieure*. Though he failed his first two attempts at the entrance examination, he succeeded in his third in 1879. With his move to Paris, he abandoned his rabbinical interests and Judaism to follow a career in science, but he never denied his Jewish roots.

Durkheim's generation at the *Ecole* was notable for the number of intellectuals on its roster, among whom were the socialist Jean Jaurès (1859–1914), the philosophers Henri Bergson (1859–1941) and Maurice Blondel (1861–1949), the psychologist Pierre Janet (1859–1947), the historian Henri Berr (1863–1954), the geographer Lucien Gallois (1857–1941), and the linguist Ferdinand Brunot (1860–1938), who was involved in the reformation of education. Durkheim passed the *agrégation* and began teaching in 1882. Amidst the drive for a free, secular education, Durkheim was appointed in 1887 as 'Chargé d'un Cours de Science Sociale et de Pédagogie' at Bordeaux. Sociology was thus introduced into the French university system. He returned to Paris and was appointed professor of Science and Education at Sorbonne.

Durkheim was the author of many significant treatises on sociological issues that generated controversy as he struggled to define the methods of a new discipline. These include *The division of labor* (1893), *The rules of sociological method* (1895), *Suicide* (1897), *Elementary forms of the religious life* (1995), and the latest discoveries, Durkheim's Philosophy Lectures at the *Lycée de Sens*. In 1898, Durkheim founded the first social science journal in France, *L'Année Sociologique*, in which he published his own research and that of his students. Many linguists published in the journal, such as Antoine Meillet (1866–1936), a student of Saussure, Emile Benveniste (1902–1976), and Levi-Strauss (b. 1908). The saddest moment in his life came with the death of his young son André, confirmed dead at the Bulgarian front in 1916.

Durkheim wrote no treatise on language, but his work is considered relevant to linguistics, and the Saussurian notion of *la langue* has resonance with his notion of social fact, which is pivotal in connecting the work of Durkheim to that of Saussure. Social fact as defined "...consists of ways of acting, thinking and feeling, external to the individual, and endowed with power of coercion by reason of which they control him. These ways of thinking could not be confused with biological phenomena, since they consist of representations and actions; nor with psychological phenomena, which exist only in the individual consciousness and through it" (Durkheim, 1995: 3). This type of behavior is general throughout society. It exercises constraints on individuals, and though the constraints are unconscious, they are still coercive.

As Durkheim laid the foundation of the sociological method, so did Ferdinand de Saussure for linguistic studies. Saussure, born in Geneva (November 26, 1857–February 22, 1913), was a Swiss linguist, who in his *Cours de linguistique générale*, edited by Charles Bally and Albert Sechehaye (1916), based on lecture notes, laid the foundation for structural linguistics. The *Cours* establishes the synchronic method of doing linguistics as opposed to the diachronic method. Language is a system of simple signs that are two-faced and that associate the signifier with the signified. Language in its communicative functions may be viewed in a triple manner: (1) *la parole*, the individual manifestations of language, (2) *la langage*, the totality of such individual manifestations, and (3) *la langue*, the stable, immutable system that is beyond the vagaries of *la parole* and *la langage* and hence is an apt object of scientific study.

La langue of Saussure has parallels with the social fact of Durkheim: "Language (langue) is well-defined object in the heterogenous mass of speech facts (*langage*) ...it is the social side of speech, outside the individual who can never create nor modify it by himself" (Saussure, 1959: 14). *La langue*, like the social fact of Durkheim, is general through the speech community, is beyond the biological and the physical since it is a surrogate of such world realities, and is beyond the psychological since it does not exist in the individual consciousness but is made up of external constraints to the individuals' behavior, where it exercises its coercion.

Durkheim and Saussure were contemporaries and, as such, shared in the cultural and intellectual realities of the new sciences that brought them together in defining their respective fields of study, sociology and linguistics.

See also: Benveniste, Emile (1902–1976); Brunot, Ferdinand (1860–1938); Levi-Strauss, Claude (b. 1908); Meillit, Antoine (Paul Jules) (1866–1936); Saussure, Ferdinand (-Mongin) de (1857–1913).

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Dutch

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Dutch (Nederlands) is the official language of the Netherlands (with approximately 14 million speakers) and one of the official languages of Belgium (with approximately 6 million speakers). It is also the language of administration in Aruba, Netherlands Antilles, and Suriname. There are approximately 410 000 speakers of Dutch in the United States, 159 000 in Canada, 80 000 in France, and 47 000 in Australia. The name Flemish (Vlaams), formerly applied to all varieties of Dutch spoken in Belgium and France, is now properly used only of the dialects of the Belgian provinces of West and East Flanders (West- and Oost-Vlaanderen).

Genetic Relationship

Dutch (D), together with English (E) and Frisian, belongs to the Low German branch of the West Germanic languages. That it has not participated in the Second (or High German) Sound Shift is shown by such forms as *schaap*, *beter*, *boek* (= E *sheep*, *better*, *book*) compared to (High) German (G) *Schaf*, *besser*, *Buch*. Other features shared with English are the relative rarity of grammatical umlaut (D *boek*, *boeken*, E *book, books* vs. G *Buch*, *Bücher*) and the retention of the consonant clusters [sp] and [st] (D *spreken*, *stelen*, E *speak*, *steal*) vs. ([ʃp]) and ([ʃt]) (G *sprechen, stehlen*).

However, in other respects Dutch and German are similar: Prevocalic initial alveolar fricatives have become voiced (D *zeven*, G *sieben* ([z]) vs. E *seven*), and all word-final plosives are voiceless (D *brood* ([t]), G *Brot* vs. E *bread*).

Features peculiar to Dutch are the vocalization of preconsonantal [l] after a short vowel (D *koud* vs. E *cold*, G *kalt*), the change of initial Germanic [g] to [x] (D *geven* ([x]) vs. E *give*, G *geben*), the change of initial [sk] to [sx] rather than [ʃ] (D *schieten* [sx] vs. E *shoot*, G *schießen* ([ʃ]), the change of [-ft] to [-xt] (D *zacht* vs. E *soft*, G *sanft*), and the simplification of [-ks] to [-s] (D *vos* vs. E *fox*, G *Fuchs* [ks]).

History

Old Dutch or Old Low Franconian, conventionally dated from 700 C.E. to 1150 C.E., is attested only in a few, mainly fragmentary texts, but it already shows most of the previously mentioned typically Dutch features.

Thousands of texts date from the Middle Dutch period, c. 1150 C.E. to 1500 C.E., mainly produced in the provinces of Flanders, Brabant, and Holland and consisting of literary works and official documents. There was as yet no standardized language, and these texts are written in a variety of dialects belonging to five main groups. A case system of nominative, accusative, genitive, and dative is discernible in nouns, adjectives, articles, and pronouns, but in the course of the period this system was eroded and greater use came to be made of prepositions and of fixed word order. Nouns showed the three genders of masculine, feminine, and neuter.

Modern Dutch is reckoned to date from c. 1500 C.E. The 17th and 18th centuries were marked by continued literary production; by the increased use of Dutch in political and scientific domains; by the beginnings of the development of a standard language; by the writing of grammars and dictionaries; and by the magisterial Bible translation of 1637, the *Statenbijbel* (States Bible). The 19th century saw the production of prescriptive grammars, contributing to

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an acceptance of a standard language, and a series of *Nederlandsche Taal- en Letterkundig Congressen* (Dutch Language and Literary Congresses), beginning in 1849, at which writers and scholars from all parts of the language area could meet to discuss the shape of Dutch without regard to political boundaries. This particular activity finally culminated late in the 20th century with the publication of the authoritative *Algemene Nederlandse Spraakkunst* (General Dutch Grammar) of 1984 (second edition, 1997) and the vast *Woordenboek der Nederlandsche Taal* (Dictionary of the Dutch Language), completed (in pre-1947 orthography) in 1998.

Phonetics and Phonology

The consonantal phonemes of Standard Dutch in careful educated speech of the western Netherlands are /p b t d c k g ʔ f v s z ʃ ʒ x h m n ɲ ŋ r l ʋ j/. In this accent /p, t, k/ are unaspirated and voiceless; /b, d/ are fully voiced; /t, d, s, z, n, l/ are laminal alveolar consonants; /s, z/ have low-pitched friction; /x/ is [χ]; /h/ is [ɦ]; prevocalically /r/ is realized as an alveolar tap [ɾ] and postvocalically as an alveolar fricative [ɹ̝] (or approximant [ɹ]) or as a palatal fricative [j̞] (or approximant /j/); and /ʋ/ is realized prevocalically as a labiodental approximant [ʋ] and postvocalically as a bilabial approximant [β̞].

Dutch is characterized by assimilation and elision in connected speech. A voiceless plosive becomes voiced under the influence of an adjacent voiced one (*blijkbaar* /ˈblɛɪɡbaːr/ ‘evidently’); a voiced fricative becomes voiceless under the influence of an adjacent voiceless one (*laf zijn* /lɑf sɛɪn/ ‘to be a coward’); and, in sequences of plosive preceded or followed by a fricative, the plosive determines the voicing (*afbellen* /ˈɑvbɛlə/ ‘to ring off,’ *opvouwen* /ˈɔpfouʋə/ ‘to fold up’). Both regressive and progressive assimilation are therefore common. A sequence of two identical consonants is simplified to a single one (*doos zeep* /doːseːp/ ‘box of soap’).

Alveolar consonants may coalesce with a following /j/, resulting in postalveolar or (pre)palatal sounds (*katje* /ˈkɑcə/ ‘kitten,’ *oranje* /oˈrɑɲə/ ‘orange,’ *meisje* /ˈmɛɪʃə/ ‘girl’). Within words, a glottal stop /ʔ/ is inserted after /aː, ə/ before syllable-initial vowels (*beamen* /bəˈʔaːmə/ ‘to confirm’).

Because /c, ɡ, ʃ, ʒ, ɲ/ appear only as a result of assimilation and/or in words clearly felt to be foreign borrowings, such as *goal*, *chef,* and *jury*, some scholars prefer to deny them full phonemic status and treat them as marginal phonemes or as allophones of other phonemes. Similarly, the complete predictability of the appearance of /ʔ/ raises the question of whether it should be included in the list of phonemes.

The vocalic phonemes are /i ɪ y ʏ eː ɛ øː ə aː ɑ oː ɔ u ɛɪ œy ʌu/. /eː øː oː/ tend to be realized as closing diphthongs. Additional long vowels /iː yː ɛː œː ɔː uː ɛ̃ː ɑ̃ː ɔ̃ː/ appear only in recently borrowed foreign words, mainly from French, and are regarded as marginal phonemes in Dutch.

Morphology

The inflectional and derivational processes of Modern Dutch remain typically Germanic and are in principle little different from those of Modern English. Modern Dutch has lost most of the inflectional endings of the earlier stages of the language.

Nouns and articles show no case distinctions (apart from occasional relics of a genitive) and pronouns have only two, as in English. The majority of nouns form their plural by adding either *-s* or *-en* (*bakker/bakkers* ‘baker/bakers’, *boek/boeken* ‘book/books’). There remain only vestigial traces of the distinction between the indefinite and definite declension of adjectives (*een groot boek* ‘a big book,’ *het grote boek* ‘the big book’).

Apart from *hebben* ‘have’ and *zijn* ‘be,’ verbs show only three forms in the present and two in the past tense. In common with most other Germanic languages, there is a distinction between weak verbs (D *vissen*, *ik viste*, *ik heb gevist*; E *fish*, *I fished*, *I have fished*) and strong ones (D *kiezen, ik koos*, *ik heb gekozen*; E *choose*, *I chose*, *I have chosen*).

As in English and German, there are derivational prefixes and suffixes that indicate the relationship between countless sets of root-related lexemes, for example *meester* ‘master,’ *overmeesteren* ‘to overpower’; *hooren* ‘to hear,’ *gehoor* ‘audience’; *blind* ‘blind,’ *blindheid* ‘blindness’; and *ontplofen* ‘to explode,’ *ontplofbaar* ‘explosive.’ Compound nouns are common; they may look lengthy but the principle is no different from that of English (e.g., *postzegelverzameling* ‘postage-stamp collection’).

Syntax

Genders of inanimate objects have been reduced to two, common and neuter, revealed syntactically in the choice of definite article, *de* and *het,* respectively, and of pronominal reference, *hij/hem* and *het,* respectively; thus, *de stoel* (common) ‘the chair’ = *hij/hem* ‘he/him,’ *de tafel* (common) ‘the table’ = *hij/hem* ‘he/him,’ *het boek* (neuter) ‘the book’ = *het* ‘it’ (but see the section on Regional and Social Variation). The pronouns *hij/hem* and *zij/haar* are used to refer to males and females, respectively; *de man* ‘the man’ = *hij/hem, de vrouw* ‘the woman’ = *zij/haar* ‘she/her,’ *het meisje* ‘the girl’ = *zij/haar.* Moreover, in the

written language *zij/haar* and the possessive *haar* are used to refer to collective nouns denoting people (e.g., *de jeugd* 'youth' as in the sample sentence).

In declarative main clauses, the finite verb appears in second position and may be preceded by the subject or some other element, thus *ik zag hem gisteren* 'I saw him yesterday.' If the initial position is not occupied by the subject, the subject follows the verb, thus

gisteren	zag	ik	hem
yesterday	saw	I	him

'yesterday I saw him'

A past participle or infinitive appears at the end of the clause, thus

gisteren	heb	ik	hem	gezien
yesterday	have	I	him	seen

'yesterday I have seen him'

In subordinate clauses, the verb is in final position:

als	ik	hem	zie,	zal	ik	het	hem	zeggen
if	I	him	see,	will	I	it	him	tell

'if I see him, I will tell him'

Here there is obligatory inversion of subject and verb in the main clause because the subject does not begin the sentence.

In wh-questions, the wh-element occupies first position and the finite verb the second: *waar is het station?* 'where is the station?' In yes/no questions, the finite verb occupies first position and the subject the second:

heeft	de	vrouw	het	huis	gekocht?
has	the	lady	the	house	bought

'has the lady bought the house?'

Many verbs have a stressed prefix in the infinitive (e.g., *ondergaan* 'to set'). In the present and past tenses, this prefix **follows** the verb and appears at the end of main clauses:

de	zon	gaat	in	het	westen	onder
the	sun	V.PRES	in	the	west	PRT

'the sun sets in the west'

But in subordinate clauses it appears as a prefix: *als de zon ondergaat, wordt het donker* 'when the sun sets, it gets dark.'

Vocabulary

The vocabulary of Dutch is basically Germanic and has preserved hundreds of words that are not found in English (e.g., *gesprek* 'conversation'). Nevertheless, it has many Latin and Romance, mainly French, borrowings (e.g., *straat* 'street' and *horloge* /hɔr'loːʒə/ 'watch'). Since World War II, a large number of English borrowings have appeared (e.g., *management, website*), as well as loan translations (e.g., *diepvries* 'deep freeze').

Orthography

The present-day spelling system was basically established in the 19th century and a reformed version was made official in 1947. It is to a great extent phonemic, although not entirely so; thus, in *kat* 'cat,' *brood* 'bread,' and *wordt* 'becomes' the <t>, <d>, and <dt> all represent /t/. Furthermore, long and short vowels are distinguished in closed syllables by the use of two vowel letters versus one (*brood* /broːt/ 'bread' but *klok* /klɔk/ 'clock') and in open syllables by the use of one consonant letter versus two (*broden* /'broːdə/ 'loaves' but *klokken* /'klɔkə/ 'clocks'). The digraph <oe> is used for /u/ (*boek* /buk/) and <ui> for /œy/ (*huis* /hœys/), <w> represents /ʋ/ (*wind* /ʋɪnt/ 'wind'), and both <ch> and <g> represent /x/. Final <n> in place names and plurals of nouns and verbs is not pronounced in normal speech. The assimilation and elision typical of connected speech are not reflected in modern Dutch spelling.

Sample Sentence

This example is from Huizinga (1939, repr. 1950, 313).

de	meeste	bloeiende	culturen	hebben	wel
/də	meːstə	'blujəndə	kœl'tyrə	'hɛbə	ʋɛl
the	most	flourishing	cultures	have	admittedly

de	jeugd	liefgehad	en
də	'jøːxt	'lifxəhɑt	ən
the	youth	loved	and

vereerd,	maar	haar	niet	gecajoleerd	of gefêteerd,
və'reːrt	maːr	haːr	nit	xəkɑʒɔ'leːrt	ɔf xəfɛ'teːrt
honored	but	her	not	flattered	or fêted,

en	steeds	van	haar	geëist
ən	steːts	vɑn	haːr	xə'ʔɪst
and	always	from	her	demanded

gehoorzaamheid	en	eerbied	voor	de	ouderen
xə'hoːrzaːmhɛɪt	ən	'eːrbit	voːr	də	'ʌudərə/
obedience	and	respect	for	the	elderly

'while most flourishing cultures have loved and honored the young, they have not indulged or spoilt them, and always required from them obedience and respect for their elders'

Regional and Social Variation

The Dutch linguistic area includes not only the standard language but numerous regional variants; as

many as 28 dialects, falling into six main groups, have been recognized. These dialects are dying out, however, and are being replaced by regionally colored varieties of Standard Dutch.

There is much variation in the educated pronunciation of Standard Dutch; a particularly salient set of differences distinguishes pronunciations to the north of the Rivers Rhine, Meuse, and Waal from those to the south. In the south, an additional phoneme, a voiced velar fricative /ɣ/ (spelled <g>) appears, and the corresponding voiceless fricative /x/ (<ch>) is velar rather than uvular. In fact, in the north, /v/ may be replaced by /f/ and even /z/ by /s/. In the south, particularly Belgium, /eː øː oː/ are monophthongs rather than closing diphthongs, and /ʋ/ is [β̞] or (with palatalization) /ɥ/. /r/ appears in various realizations, usually alveolar in Belgium, Amsterdam, and the northeast Netherlands, but appears as uvular trills, fricatives, or approximants elsewhere.

In 1973 the official name of the language in Belgium became 'Dutch' rather than 'Flemish', the standard form being held to be that of the Netherlands, and in 1982 the Nederlandse Taalunie (Dutch Language Union), a joint Belgian-Netherlands venture, was set up with the aim of advancing Dutch language and literature throughout the Dutch-speaking area. Nevertheless, there are a few minor differences at the grammatical and lexical level between Standard Dutch in Belgium and in the Netherlands.

In Belgium, there are still three genders, revealed in pronominal reference as well as in the choice of article; thus *de stoel* (masculine) 'the chair' = *hij/hem* 'he/him,' *de tafel* (feminine) 'the table' = *zij/haar* 'she/her,' *het boek* (neuter) 'the book' = *het* 'it.' A further striking difference is that the informal pronoun of address in the Netherlands is *jij/je,* whereas in Belgium it is *gij/ge*, a form that in the Netherlands is now reserved for the Deity.

Lexical differences are found not only in administrative terms referring to the different political structures of Belgium and the Netherlands, but also in a long heterogeneous list of colloquial words; thus, Belgian *blokken* but Netherlands *studeren* 'to study,' Belgian *solden* but Netherlands *uitverkopen* 'bargains, the sales,' Belgian *gans proper* but Netherlands *helemaal schoon* 'very nice,' and so on.

Dutch is no different from other languages in possessing various sociolects (varieties of languages spoken by particular social classes or ethnic, age, employment, or religious groups) and in undergoing constant change. One innovation, noticed in the last quarter of the 20th century and termed Polder Dutch, is the change in the realization of the diphthongal phonemes /ɛɪ œy ʌu/ from [ɛɪ œy ʌu] to [aɪ ɔu ɑu]. This began among educated, upper-class women and rapidly spread to other groups, including men and children, and can now be found throughout the Netherlands.

Influence on Other Languages

Dutch was the official language of the colonial empire of the Netherlands and various local and creolized forms of the language sprang up in present-day Indonesia, the Caribbean, and South America. Most of these are now extinct, although Dutch had a considerable influence on the still-extant Spanish- and Portuguese-based Papiamentu and English-based Sranan. The Dutch spoken by colonists sent to the Cape by the Dutch East India Company in the 17th century evolved into Afrikaans, now one of the official languages of South Africa.

Within the Netherlands, Frisian is strongly influenced by Dutch, particularly in its vocabulary (for example *sleutel* 'key' instead of *kaai*); in Belgium, the conversational French of bilingual Dutch and French speakers may show Dutch influence (e.g., *s'il vous plaît!* instead of *voilà!* when giving someone something, on the model of *alstublieft!* 'please!').

In the late Middle Ages, trade between the British Isles and the Low Countries brought Dutch words into Scots (e.g., *pinkie* 'little finger') and English, especially nautical terms (e.g., *deck*, *smuggler*, and *yacht*). The 17th century saw the introduction of artistic terms (e.g., *easel*, *landscape*, and *sketch*). More modern borrowings include *boss*, *coleslaw*, and *cookie*.

See also: Afrikaans; English, Early Modern; English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); Germanic Languages; German; Netherlands: Language Situation; Papiamentu; Scots.

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Relevant Website

http://www.ned.univie.ac.at/publicaties/taalgeschiedenis – History of the Dutch Language. Department of Dutch Studies, University of Vienna.

Dutch and Flemish Lexicography

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History

The Middle Dutch Period

Lexicography of the Dutch language goes back to the 13th century. The earliest lexicographic products were 'glossaria,' primitive adaptations of Medieval Latin dictionaries to provide aids for the study of both Latin and the Bible, which were not intended to present a full inventory of the contemporary lexicon but rather to explain difficult words. These glossaria are alphabetically arranged according to the Latin lemmata and include explicatory glosses in a vernacular language. Examples in Dutch are the *Glossaria* of Bern (ms. 641, Bürgerbibliothek, ca. 1225), Haarlem (codex 183 D2 Stadsbibliotheek, ca. 1440), and Trier (ms. 1125, Stadtbibliothek, 14th century).

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The first dictionary in which Dutch preceded the foreign language was the Dutch-French *Naembouck* (Ghent, 1546) by Joos Lambrecht, possibly influenced by Robert Estienne (*see* **Stephanus, Robertus (ca. 1503–1559)**), who had compiled a new thesaurus of Latin, for which completeness was a goal in itself. This was no longer merely a bilingual or multilingual dictionary created for purposes of translation, but a collection of words and expressions of philological interest in their own right. Estienne had made a *Dictionaire francois latin* (1539) with emphasis on the French component, and through a series of expanded editions this dictionary had developed into a monolingual dictionary of French.

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Cornelis Kiliaan in the compilation of his *Dictionarium Teutonico-latinum* (1574), the third edition of which, entitled *Etymologicum teutonicae linguae* (1599), was for a long time the model for later dictionaries of Dutch.

By the 17th century, Latin had ceased to be either a source or a target language in the Low Countries. In addition, because of political events, the dominant position of the vernacular language of the southern Netherlands was gradually taken over by the Hollandic-Brabantish mixture that became the basis of the standard language in the northern Netherlands. Both were important in the development of lexicography in the Low Countries.

Most 17th- and 18th-century lexicographical products were bilingual dictionaries. They were either Dutch-Latin, such as S. Hannot's *Nieuw woordenboek* (1704, 1719, 1736) and the *Novum Dictionarium Belgico-Latinum* (1717), or Dutch with another language, among which French ranked first.

Kiliaan's *Etymologicum* was an important source for M. Sasbout's *Dictionaire Flameng-françois* (1582–1583) and his *Dictionaire François-Flameng* (1579). E. E. Mellema created an expanded version: *Dictionaire ou promptuaire Flameng-François and François-Flameng* (1587), which in its turn was the starting point of *Le grand dictionaire François-Flameng: Den schat der Duytscher tale* (1618). The 18th century was dominated by two lexicographers, who both created families of dictionaries. The first was P. Marin, who created *Dictionaire portatif Hollandois et François* (1696), from which were derived the *Nieuw Nederduits en Frans woordenboek* (1701) and *Dictionnaire complet François et Hollandois* (1710; 9th edn. 1786–1787). The second is F. Halma, who originated the *Dictionaire nouveau François et Flamand* (1686), which was followed by *Grand dictionaire François et Flamend* (1708; 6th printing, 1781) and the *Woordenboek der Nederduitsche en Fransche taalen* (1710).

In the first half of the 17th century, a number of Dutch-Spanish dictionaries were compiled, since the southern Netherlands were ruled from Madrid at that time. The *Vocabulaer* (1617; 4th edn. 1669) was a Spanish-Dutch dictionary by J.C. de Thovoyon. Iuan Francisco Rodriguez wrote the Dutch-Spanish *De nieuwen dictionaris* (1624, 1634) and the *Dictionaris Duytsch ende Spaensch* (1650, 1651), while A. de la Porte was the editor of *Den nieuwen dictionaris oft schadt der Duytsche ende Spaensche talen* (1659).

Henry Hexham, a former soldier in the service of the United Provinces, published *A copious English and Netherduytch dictionarie* (1647; reprinted 1669, 1675) and its counterpart *Het groot woordenboeck: gestelt in 't Nederduytsch, ende in 't Engelsch* (1648; reprinted 1658, 1672, 1678). The former was based on the word list of Francis Holyoke's *Dictionarium etymologicum Latinum* (1640), the latter on Mellema's Dutch-French *Dictionaire*.

Without doubt the most important dictionary of the 17th and 18th centuries was William Séwel's *Nieuw woordenboek* (1691), an English-Dutch/Dutch-English dictionary that was reprinted seven times within a century. From the second edition (1708) onward, Séwel indicated grammatical gender. He also introduced register labels, branding certain words as slang.

A dictionary derived from Séwel's was John Holtrop's *New English and Dutch Dictionary* (1789; a Dutch-English part was published in 1801). Additions by Holtrop were taken from the 1786 edition of Samuel Johnson's *Dictionary of the English language*.

The first Dutch-German dictionary came relatively late, with Matthias Kramer's *Koninglyk Neder-Hoog-Duitsch en Hoog-Neder-Duitsch dictionnaire* (1719; reprinted 1759, 1768, 1787).

In addition to the bilingual dictionaries, attempts were made as early as the middle of the 16th century to write monolingual Dutch dictionaries. The earliest efforts had a purist motivation, namely providing the user with good Dutch equivalents for the international vocabulary, based on Latin and French. Jan van den Werve's *Den schat der Duytsscher talen* (1559) is a good example of a lawyer listing for his colleagues the Dutch equivalents of their professional terminology. By the end of the 18th century this dictionary had appeared in 14 editions.

At the beginning of the 19th century, P. Weiland published an 11-volume *Nederduitsch taalkundig woordenboek* (Amsterdam, 1799–1811). This drew on earlier work by members of the Maatschappij der Nederlandsche Letterkunde (Society for Dutch Literature) of Leiden, who, in 1787, following a proposal of Josua van Iperen, had published an *Alphabetische woordenlijst,* based on citations from Dutch literature, which got as far as the letter H.

The Modern Period (1850 to the Present)

Over the course of the 19th century, the study of language changed dramatically through the introduction of scientific linguistics, resulting in a scientific approach to historical lexicography.

The Dutch-French dictionary by S. J. M. van Moock, based upon the work of Marin and Halma, was the starting point for the *Nieuw woordenboek der Nederlandsche taal* (1864) by the brothers I. and N. Calisch. In 1872 a second edition was published under the name of J. H. van Dale; each subsequent edition was expanded with new words and senses, as well as words from each successive section of the

Woordenboek der Nederlandsche taal (*WNT*). Van Dale is still the best-known concise dictionary of Dutch (13th edn. 1999; also available on CD-ROM).

Other concise dictionaries are Koenen's *Woordenboek Nederlands* (1897; 30th edn. 1999) and *Kramers woordenboek Nederlands* (22nd edn. 2000; also available on CD-ROM). A Flemish product is J. M. A. Verschueren's *Modern woordenboek* (1929–1930; 10th edn. 1996). This is a Dutch counterpart of the *Petit Larousse*, which provides a combination of lexical-semantic word descriptions and encyclopedic information.

Dictionaries Based on Historical Principles

The Dictionary of Old Dutch (ca. 475–1200)

Since 1999 an editorial team at the Instituut voor Nederlandse Lexicologie (INL) has been working on the creation of the *Oudnederlands woordenboek* (*ONW*). This dictionary will contain the lexical-semantic description of all known Dutch words dating before the year 1201, the oldest ones from runic inscriptions and place-names from the fifth century. In addition to surviving texts and glosses in Old Dutch, place-names and Old Dutch loanwords in French will be used to reconstruct the Old Dutch language as completely as possible. The approximately 4000 entries in the *ONW* will give a normalized headword together with spelling variants, inflectional variants, etymology, and as far as possible exactly dated and located quotations. The *ONW* is due to be completed in 2008.

The Dictionary of Early Middle Dutch (VMNW) (1201–1300)

Between 1977 and 1987 Maurits Gysseling compiled a 15-volume *Corpus van Middelnederlandse teksten*, in which he collected all known authentic documents in Dutch up to 1300. These texts, consisting of about 1.5 million words, are the basis of the *Vroegmiddelnederlands woordenboek* (*VMNW*), which was published in 2001. This dictionary, which is the first databased period dictionary in the Dutch language, contains some 26 000 entries, including personal names and place-names. The entries give normalized headwords together with spelling variants, inflectional variants, regional variants, etymology, morphology, and as far as possible exactly dated and localized quotations.

The Dictionary of Middle Dutch (MNW) (ca. 1250–ca. 1550)

The *Middelnederlandsch woordenboek* (1885–1941) has 11 volumes and contains approximately 80 000 entries. Entries in *MNW* have a normalized headword and contain spelling variants, grammatical information, etymology, and quotations. For each quotation the source is given, but they are usually neither located nor dated. The *MNW* represents the most complete collection of the Middle Dutch lexicon, but points of criticism include the limited reliability of its sources, the uneven representation of Middle Dutch dialects, and uncertainty about the extent to which the sources employed have actually been excerpted, whether completely, partly, or for a few words only. Since 1998 it has been available on CD-ROM.

In 1911 Verdam published a *Middelnederlandsch handwoordenboek*, of which a revised and updated version by C. H. Ebbinge Wubben appeared in 1932. A supplement to this *Handwoordenboek* by J. J. van der Voort van der Kleij appeared in 1983. It contains 14 000 entries and is based upon 25 000 located and dated quotations from 900 sources.

The Dictionary of the Dutch Language (WNT) (ca. 1550–1976)

In the second half of the 19th century many European nations began publishing national historical dictionaries, e.g., Grimm's *Deutsches Wörterbuch* (1852–1961) and the *New English dictionary on historical principles* (1878–1933), later known as *The Oxford English dictionary* (*OED*). Linguists from the Netherlands and Belgium initiated a national Dutch dictionary at a congress in Ghent in 1849 with Matthias de Vries as the first editor-in-chief. But unlike the dictionaries mentioned above, the Dutch *Woordenboek der Nederlandsche taal* (*WNT*) was to cover only the period from ca. 1550 onwards. The first installment appeared in 1864, and the dictionary was completed in 1998 (29 volumes). In 1976 the editorial board decided that for reasons of efficiency the *terminus post quem non* was to be 1921. In 2001 the dictionary was enlarged by 3 volumes of *Aanvullingen*, mainly to fill the gap between 1921 and 1976. Since 2003 the complete *WNT*, *Aanvullingen* included, has been available on CD-ROM.

The *WNT* is a monolingual, alphabetically arranged dictionary based on historical principles. This implies that data about spelling variants, semantic development, geographic range, etymology, and quotations from the entire period of the written language are taken into consideration. It includes, to a certain extent, dialect words, technical terms, and social variants. It lacks any indication of pronunciation. The original outline of the dictionary gradually changed, trying to keep in tune with the developments in linguistics and lexicology. However, mainly for practical purposes (alphabetic order and references), the spelling of 1864 has been maintained.

Dictionaries of Modern Dutch

Most concise modern dictionaries, e.g., Van Dale, Koenen, and Kramers, are derived from dictionaries that were first published in the 19th century.

A dictionary based on a completely new concept, will be the *Algemeen Nederlands woordenboek* (*ANW*). In this scientific electronic dictionary, the Dutch and Flemish vocabulary of the period between 1970 and 2020 will be described on the basis of both already existing and newly compiled large text corpora from this period. Special attention is to be paid to word combinations in common parlance; to syntactic, lexical, and semantic collocations; and to paradigmatic relations such as synonymy, antonymy, hyponomy, and hyperonomy. The *ANW* is a product of the INL and will be available on the Internet.

Dialect Dictionaries

Woordenboek van de Brabantse Dialecten (WBD)

The *WBD* was initiated in 1967 at the Catholic University of Nijmegen (KUN). In 1995 the compilation of the *WBD* became the shared responsibility of the Nijmeegse Centrale voor Dialect- en Naamkunde from the KUN and the Instituut voor Naamkunde en Dialektologie from the Catholic University of Leuven. The project covers the area of the former Duchy of Brabant. The *WBD* is organized as a thematic dictionary consisting of 3 main volumes: agricultural terminology, specific technical terminologies, and general terminology.

Woordenboek van de Vlaamse Dialecten (WVD)

In 1972, following the example and the approach of the *WBD*, the *WVD* was initiated at the University of Ghent. It covers the period from 1880 to the late 20th century. The *WVD* covers the former County of Flanders. All entries are thematically arranged and provided with English, French, and German translations.

Woordenboek van de Limburgse Dialecten (WLD)

The *WLD* first appeared in 1983 and is also a project of the KUN. It, too, is compiled on the same principles as the *WBD*. It covers the area of the former Duchy of Limburg. As in the *WVD*, the entries in the *WLD* are ideologically arranged and provided with English, French, and German translations.

Other Dialect Dictionaries

A very full review of Dutch dialect dictionaries written before 1981, by F. Claes, can be found in J. Molemans's *Mededelingen van de Vereniging voor Limburgse Dialect- en Naamkunde* 20 (1981).

Electronic Lexical Resources

In 1999 preparations began for the *Geïntegreerde taalbank 8ste – 21ste eeuws Nederlands* ('Integrated Dutch language bank from the 8th to the 21st century'). This INL product will be a database with flexible user options, including data on the Dutch language from earliest times to the present day. The Language bank will contain electronic versions of major dictionaries, including the *ONW*, the *VMNW*, the *MNW*, and the *WNT*, as well as large text corpora from all periods, enriched with linguistic information. The Language bank is intended to serve as a research tool for the study of all aspects of the Dutch language across time and will be consultable online via the Internet.

See also: Bilingual Lexicography; Corpus Lexicography; Dutch; Frisian Lexicography; Lexicography: Overview; Stephanus, Robertus (ca. 1503–1559).

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Relevant Website

http://www.inl.nl – Website of the Instituut voor Nederlandse Lexicologie.

Dyadic Constructions

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Initial Definition and Exemplification

Dyad constructions denote relationally linked groups of the type 'pair/group of brothers,' 'mother and child(ren),' 'teacher/student pair' (see Evans, 2003a for sources of all unreferenced data or terminology in this article). They may be formed by morphological derivation, as with Kayardild (Australian) *ngamathu-ngarrba* 'mother and child' < *ngamathu* 'mother,' or they may be unanalyzable lexical roots, such as Mianmin (Papuan) *lum* 'father and child' (Smith and Weston, 1974). Though they most commonly refer to pairs, as in the above examples, they may also refer to larger groups, e.g., Mianmin *lum-wal* 'father and children.' Though the above languages have dedicated dyad forms, it is more common for dyadic constructions to overlap formally with other categories, most commonly reciprocals, proprietive, or possessive constructions, or pair markers ('Related Categories'). Where a dual–plural contrast exists, the dual dyad is usually formally unmarked ('Dyads and Number'). Dyad constructions display a notably skewed geographical distribution, being concentrated in the language families of the Western Pacific, with only scattered occurrences elsewhere ('Formal Realizations and Polysemic Links').

Typically, languages with dyad constructions can form them both from symmetric (self-converse) terms like the English 'cousin' (X is Y's cousin ↔ Y is X's cousin) and from asymmetric terms like the English 'mother' (X is Y's mother <-/-> Y is X's mother), using the same constructional pattern. Kayardild *ngamathu-ngarrba* above has an asymmetric root; while *kularrin-ngarrba* 'brother and sister pair,' derives from the symmetric *kularrin-da* 'opposite sex sibling.' Although, crosslinguistically, there is some preference for the senior term to be employed, as with *ngamathu-ngarrba*, this is not always the case.

Though kin and other relational terms are most commonly nominals, in some languages they are expressed by verbs instead, so that some dyad constructions are verbs instead of nouns, e.g., |Gui (Khoesaan) ≠ *goaʔokuaha* 'be each other's cross-cousins; pair of crosscousins,' based on the symmetric kinship verb = *goaʔo* 'have as cross-cousin,' and |*koã*) kuaha 'be parent and child,' based on the -verb|*koã*) 'have as child' (Ono, in press) Regardless of whether they are nouns or verbs, it is commonest for dyad expressions to be used predicatively, as in 'they two sister-DYAD' for 'they two are sisters.' In many languages, dyad terms may take appropriate pronominal affixation, e.g., Bininj Gun-wok *guni-yau-go* [2du-child.of.female-DYAD] 'you two, mother and child' or *bani-bei-go* [3du-child.of.male-DYAD] 'they two, father and child.' Where this is obligatory, some grammars treat such dyad terms as kinship-sensitive pronouns rather than nouns affixed for pronominal information, as with Whitehead's (2004: 229) analysis of Menya (Angan, Papuan) *yä-mät-qiye* 'we two ((who) are) father and son,' *qe-mät-ažgi* 'you two ((who) are) father and son,' illustrating pronominal circumfixation around the dyad root *mät* 'father and son.' Though the Menya system could probably be analyzed either as dyad-sensitive pronouns or as pronominally circumfixed dyad nouns, once the dyad-denoting material becomes sufficiently reduced and/or formally divorced from meaningful kin roots, or the pronominal terms form a distinct class from nominal dyads, then only the former analysis is plausible: this is the case for Adnjamathanha (Australian; Hercus and White, 1973; Schebeck, 1973) where pronominal terms such as *žatlaka* 'we two (woman and child)' belong to distinct word classes to nominal dyad terms such as *žaminažka* 'mother (or mother's brother) and child.'

While the symmetric use aligns dyad expressions with reciprocals, asymmetric uses are much more widespread with dyad expressions than with canonical reciprocals, which are generally limited in their ability to be used in asymmetrical situations such as 'the plates were stacked on top of one another.' Descriptions of what are here considered dyad constructions frequently mention their seemingly anomalous use of reciprocal with asymmetric kin terms, e.g., in basing a dyad term for 'pair of brothers' on the term for 'older brother' in many languages of the world. Within the Oceanicist tradition, attempts to cover both symmetric and asymmetric situations have favored a monosemous analysis as 'plurality of relations' (Lichtenberk, 1999) instead of reciprocity, which subsumes both dyadic uses such as Fijian *vei-taci-ni* 'pair of same-sex siblings' (< *taci* 'younger sibling'), and other verbal uses such as Fijian *vei-'oti* 'be involved in activity of (hair cutting)' (without specifying who is cutting and who is being cut).

Nonetheless, there are some languages, such as Adyghe (N.W. Caucasian), which restrict dyad terms to nouns expressing symmetric relations, such as 'brother' or 'age-mate'; in such languages, dyads grade into referentialized reciprocals. There are also languages, such as Bininj Gun-work, which use different formatives according to whether the base relation

is symmetric or asymmetric: cf. *bei-go* 'father–child pair' (<√*bei* '(man's) child') shows the dyad use of *-go* on asymmetric terms, while *gakkak -migen* 'mother's mother/daughter's child pair,' shows the use of the distinct suffix *-migen* with the symmetric term *gakkak* 'uterine grandkin; mother's mother; (woman's) daughter's child.' These data necessitate a three-way classification of dyad constructions into symmetric, asymmetric, and unrestricted, definable as follows.

- symmetric dyad: 'two (people), such that **each** calls the other K'
- asymmetric dyad: 'two (people), such that **only one** calls the other K'
- unrestricted dyad: 'two (people), such that **at least one** calls the other K'

The unrestricted dyad is the most general, and can be used in either of the other two situations; unless otherwise mentioned below, all examples will involve unrestricted dyads. McGregor (1996) discusses more complex types in Gooniyandi, including terms which stipulate the relations of the two referents within the dyad to the speaker or hearer, e.g., 'husband/wife pair, such that the man is the speaker's brother, and the woman is his sister-in-law,' and 'multicentric ternary polyadic kin terms' such as 'group of mothers-in-law and fathers-in-law of various propositures.'

Drawing together examples we have already discussed, we can see that dyad terms are attested within three word classes crosslinguistically. Most commonly, they are nouns, as with the Kayardild and Mianmin examples above. Occasionally, they are verbs, as was exemplified for |Gui. Finally, they may be pronouns, as in most languages of the Angan family (Papuan) and in Adnjamathanha, reflecting a shift from nominal dyad terms prefixed for pronominal categories, to reanalysis as a primarily pronominal term. In some cases, these may then develop further into pronouns sensitive to more abstract kin-based categories such as generational harmonicity, patrilinearity, or matrilinearity (Evans, 2003b). Finally, dyad expressions may be multiword phrases, with a special word inducing the dyad reading, as in Pileni (Austronesian) *thau tungane* 'brother and sister' (*thau* 'dyad,' *tungane* 'opposite sex sibling'), further quantifiable with plural marker *nghi* to give *nghi thau tungane* 'brothers and sisters' (Næss, personal communication).

Terminology

Dyad constructions have only recently been recognized as a distinct, named category, probably reflecting the virtual absence of dyad terms in Indo–European and Semitic languages, with the exception of Icelandic terms like feðgar 'father and son,' feðgin 'father and daughter,' mæðgin 'mother and son,' mæðgur 'mother and daughter.'

The first defined use of the term, using the longer variant *dyadic*, was by Merlan and Heath (1982: 107), who apply it to "an expression of the type '(pair of) brothers' or 'father and child,' in which the kinship relationship is between the two referents internal to the kin expression"; they also introduce 'plural dyadic' for "the type '(three or more) brothers' or 'father(s) and children,' in which there are at least three designated referents but in which there are no additional complications in the kinship relationship specified in the corresponding dyadic term." To allow for the existence of nonkin dyads (e.g., teacher/pupil pair), 'kin' should really be replaced by 'relational.' Other terms for the same phenomenon have included 'kinship proprietive,' 'kinship duals,' 'reciprocal plurals,' 'collective nouns,' 'kin quantifiers' (Smith and Weston, 1974), 'group pronouns' (Oates and Oates, 1968), 'group genders' (Lloyd, 1970), or 'correlative kin terms' (Daniel, 2000). This huge terminological variation has retarded the crosslinguistic comparison of the phenomenon.

Related Categories

In many languages, dyad constructions overlap in meaning and form with various other categories – reciprocals, duals, associative dual/plural, family group classifiers, and additive cocompounds. To qualify as dyads, there must be tests that show them to be semantically or combinatorially distinct morphemes despite their etymological relationship – in Mangarayi, where *-yi* indicates both 'having' and the dyad relationship, the effects on number and word class are different: *žugu-yi* [water-having] is an adjective, inheriting the number of its head, whereas *baḍa-yi* [father-dyad] is a dual noun.

Their relation to reciprocals has already been mentioned; in contrast to reciprocals, though, dyads typically refer rather than predicate, and are used much more commonly in asymmetric situations.

Because dyads typically denote pairs, they partly overlap with duals, particularly with the 'oppositional paral' subtype. However, whereas duals of kin terms calculate the relationship 'outside' the pair, dyads calculate the relationship within it. English 'two cousins' is ambiguous: it includes the dual 'two (of my) cousins,' translatable into Kayardild by the dual *jambathu-yarrngka*, and the dyad 'two cousins (of each other),' translatable by the dyad *jambathu-ngarrba*.

Associative duals or plurals (Moravcsik, 2003), such as Japanese *Tanaka-tachi*, derive expressions meaning 'X and associates,' which in some contexts

(e.g., mother-ASSOC.PL) may allow readings such as 'mother and her children,' but this is only one of several available readings. A further difference from dyads is that associative duals or plurals can be based on proper names in addition to kin terms. Similar points differentiate dyads from 'elliptical duals' (food and [wine]) or certain sorts of pairing construction such as Vedic *mitr..váru.(u)* 'Mitra and Varuna,' which, unlike dyads, do not require any designated relationship to hold within the pair. Though it would be possible to subsume dyads under a broader label that includes these other pairings, this would miss the point that many languages have constructions specialized just for the dyad meaning, which thus requires a term and a systematization.

Family group classifiers (Bradley, 2001) combine numerals with a Family.Group.Classifier (FGC) to derive expressions meaning 'group of [Number] saliently including an elder relative who is K to someone else in the group.' Consider the Akha 'family group classifier' *ma*^{33} *za*^{21}, derivable from *a*^{21} *ma*^{33} 'mother' plus *za*^{21} 'child' (though not all FGCs are so transparently derivable). Combined with 'two,' this gives the meaning 'mother and child,' i.e., with cardinality two, these are identical to dyads. But once the group is larger, other nondyadic readings are allowed: *sm*^{21} *ma*^{33} *za*^{21} [three FGC.including.mother] could mean 'mother and two children,' but also 'mother, father and one child': only the first reading would be available with a true dyad construction. As a result, family group classifiers have a referential range identical to dyad expressions when they combine with the number 'two,' but only overlap partially when combined with larger numbers.

Additive cocompounds (Waelchli, 2003) compound two expressions referring (*inter alia*) to stereotypically conjoined entities (e.g., food–wine, father–son). They may include dyad combinations among their possibilities. In some languages, special cocompounding patterns are specialized for expressing dyad meanings. Wik-Mungkan (Kilham, 1974) forms dyads by combining the word *ma*' 'hand' with a cocompound, e.g., *ma*' *kaath puk* [hand mother child] 'mother and child,' while Cantonese (Mathews, personal communication) forms dyad cocompounds by joining clipped social relationship roots, which can then be combined with a numeral; distinctively from most nominals, no classifier is needed. Examples are *loeng5 mou5-leoi2* [two mother-daughter] 'mother and daughter (as a pair),' where *mou5* is clipped from *mou5-can1* 'mother' or *lou5-mou2* '(old) mum,' *saam1 hing1-dai6* [three older.brother-younger.brother] 'three brothers,' or, in a sentence:

(1) *loeng5* *si1-sang1* *ahi2dou6* *tou2leon6*
two teacher-student PROG discuss
'Teacher and student are discussing'

Dyad constructions, though overlapping in one way or another with each of the above, must therefore be regarded as distinct, even though these alternatives sometimes provide the closest translation equivalents. We can summarize the differences by saying that reciprocals normally predicate rather than refer, that (normal) duals are 'type duals' (i.e., the dualized elements are all equivalent), while associative duals, cocompounds, and family group classifiers are all 'group duals,' where grouped entities need not be equivalent, but simply happen to occur jointly in the world. Dyads have the special characteristic that the existence of one member, at least in the designated relation (e.g., father), logically entails the existence of the other (e.g., son), and vice versa.

Dyads and Number

Crosslinguistically, plural is generally considered unmarked with respect to dual, but this relationship is frequently reversed in the case of dyads, with plural dyads built up from dual dyads rather than the reverse. A Paiwan (Formosan) example, which first derives dual dyads by prefixation to the base noun, and then derives plural dyads by reduplication, is *ažak* 'child' > *małažak* 'parent and child' > *małažaažak* 'parent and children'. Several Australian languages, which form dual dyads by suffixation to a base kin term, then require further affixation to get plural dyads, e.g., Dhuwal *bäpa'* 'father,' *bäpa'-manyji* 'father and son pair,' *bäpa'-manyji-wurr* 'father(s) and children.'

In other languages, dyad forms are equally compatible with both dual and plural readings: Nêlêmwa (Bril, 2002: 368) derives dyads by circumfixation of *â-…-n* to a base kin term; they can then combine with either dual or plural pronouns, according to the number required: *hliibai â-vabuu-n* 'they two, grandfather and grandchild,' *hlaabai â-vabuu-n* 'they, grandfather and grandchildren.'

A tantalizing question is whether, through 'subset construal,' it is possible to use dyad terms for singular reference, by picking out one individual against the background of a dyadic relationship. A rare example, from the Australian language Mara (Merlan and Heath, 1982: 119), involves the combination of a dyad subject nominal with a verb with singular subject: thus literal 'we.two-younger.brother's.wife-DYAD she-went' is used for 'my younger brother's wife went,' lit. 'she, such that we are co-sisters-in-law,

went.' Like most aspects of dyad constructions, we need much more detailed data before we can fully peg out their typological possibilities.

Formal Realizations and Polysemic Links

It is rare for languages to have either a dedicated dyad affix, like the Kayardild *-ngarrba* suffix, or dedicated lexical roots referring to dyad pairs, like Mianmin *lum* 'father and child,' *hat* 'mother and child.' Dedicated dyad roots seem to be unique to Papuan languages. More commonly, forms have both dyad and some other function, but with enough distributional or semantic differences to warrant treating the two as distinct morphemes.

Dyads are frequently functional extensions of reciprocal morphemes, often marked by nonstandard semantics or combinatorics, or supplementary morphological material. The smallest deviation from basic reciprocal function is found where kinship terms are verbs, as with the |Gui examples above: here we are simply dealing with a regular use of the reciprocal, with expressions that happen to denote kin relationships, plus an irregular tolerance of the reciprocal with asymmetric kin relationships. The Cariban language Tiriyó illustrates a basically verbal reciprocal affix whose only occurrence with nouns is in dyad constructions; Ainu dyad terms share the prefix *u-* with reciprocal verbs but additionally use a 'having' suffix *-kor*, e.g., *u-po-kor* [RECIP-son-have] 'to be parent and son.' Northern Athapaskan languages make use of special reciprocal possessive affixes, as in Koyukon *neeɬ-to*' 'father and child,' literally 'each other's father' (cf. *neeɬ-ghaale*' 'each other's packs').

Two further extensions are from 'having' (comitative or proprietive) suffixes, and from 'possessed' suffixes. These extensions are bridged by contexts where the 'superset' – furnished by inclusory constructions like 'they.two$_{i,j}$ with.son$_j$' for 'they two, including (a) son' or 'they.two his.son' for 'they two$_{i,j}$, including his$_{i,k}$ son$_j$' – transfers its semantics to the noun plus affix combination, with comcomitant restriction on the possessor of the kin to the other member of the pair, i.e., 'they two, (a father)$_i$ with his$_i$ son$_j$'. In other words, the grammaticalization of these markers into dyads occurs when there is a restriction on the possessor such that it must be sought within the NP, or, put differently, within the pair. (Mosel, 1984: 40 distinguishes this dyad use of 3rd singular possessive *-na* in Tolai as 'derelational').

This is nicely illustrated by Mwotlap (François, 2002), where *yoge têta-yô* [Coll.dual diff.sex. sibling-3duPoss] means 'brothers of them two (two sisters)' or 'sisters of them two (two brothers),' with the possessor sought **outside** the denoted sibling set, whereas insertion of the dyad morpheme *matag* into this phrase, giving *yoge matag têta-yô*, forces the possessor to be sought **inside** the group, yielding the dyad reading 'brother-sister pair,' i.e., 'opposite siblings of each other.'

Diyari is an example of a language with a true dyad suffix, but also an instrumental (including proprietive use) on the way to grammaticalizing a dyad via an associative dual construction. The suffix *-mara* is only found in dyad expressions such as *kaku-mara* [elder.sister-DYAD] 'pair of sisters' or *nhuwa-mara* [spouse-DYAD] 'husband/wife pair,' while the instumental/ergative suffix allows either group-internal or group–external possessive readings when combined with a kin term and a pronoun for the superset. Thus, *pula kaku-yali* [they.two elder.sister-INSTR] is attested with the meaning 'pair of sisters,' while *pula ngapiri-yali* [they.two father-INSTR] is attested with the meaning 'they two, including his father' (i.e., they two, his father and another, e.g., his mother).' Dyads formally identical to 'having' constructions (associatives, comitatives, proprietives) are also found in Udihe (Tungusic) and Quechua.

The dyad suffix *-(u)ks(e)-* in Finnish, as in *velje-kse-t* [brother-DY-PL] 'brothers (with each other),' *sisar-ukset-t* [sister-DY-PL] 'sisters (of each other); also more generally siblings,' is identical to a denominal suffix 'material for NOUN', as in *aida-kse-t* 'objects (e.g., sticks) for building a fence (*aita*)'; suffixes with a similar functional range are found in Estonian and Sámi.

A further type of extension, is from a morpheme originally meaning 'pair' or 'one of a pair.' See Evans (2003a) for more on these semantic trajectories in Australian languages.

Geographical Distribution

Dyad constructions show a very skewed geographical patterning, concentrated in language families of the Western Pacific: Australian (>60 languages), Austronesian (>15 languages, from Taiwan to New Caledonia), Papuan (>10 languages), as well as parts of east and north Asia, including some Turkic and Uralic languages, and the isolates Ainu and Yukaghir. If one takes family group classifiers into account, there are also many Yi languages of South-East Asia with dyad-like phenomena.

Elsewhere, dyad constructions are sporadically attested in western North America (Koyukon and Carrier within Athabaskan; Pomo, Southern Paiute), Quechua and Cariban (Tiriyó) in South America, the

Caucasus (Adyghe) and southern Africa (|Gui and Kxoe within Khoisan).

It is too early to say whether this interesting geographical skewing is a genuine macroareal phenomenon, or merely results from the way the descriptive traditions for Western Pacific languages have encouraged linguists from that area to look out for dyad constructions. Given the lack of a systematic typology until now, though, it is likely that dyad constructions have lain undiscovered in many other languages of the world than have been discussed here.

See also: Fijian; Formosan Languages; Kayardild; Khoesaan Languages; Norse and Icelandic; Papuan Languages.

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Dynamic Semantics

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Information and Information Change

Dynamic semantics is a branch of formal semantics that uses dynamic logic. Dynamic logic was originally developed for the logical analysis of so-called declarative programming languages. The basic idea is that a program can be semantically interpreted as a transition relation between machine states. Two states s and t are related by a program π if, when π is executed in an input state s, t is a possible output state. For example, if the current value of x is 4, the effect of executing the assignment $x{:}=x{+}1$ will be that the new value of x is 5. A program is interpreted in terms of the change that it brings about. (Note that for a deterministic program, like the example just given, there is just one possible output state, for a given input state. But if the program threw a die, there would be several possible outputs.)

In standard logical semantics, (indicative) sentences are interpreted in terms of their truth conditions. And subsentential expressions are interpreted in terms of their contribution to the truth conditional

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In standard logical semantics, (indicative) sentences are interpreted in terms of their truth conditions. And subsentential expressions are interpreted in terms of their contribution to the truth conditional

content of the sentences in which they occur. The truth conditional content of a sentence corresponds to the information it provides about the world. Dynamic semantics takes a different view on meaning. The static notion of information content is replaced by a dynamic notion of information change. The meaning of a sentence is the change in information that it brings about: meaning is 'information change potential.'

Clearly, for a program, a static interpretation in terms of truth conditions makes little sense (as could be argued for imperative or interrogative sentences in natural language). But it is less obvious what the advantages of a dynamic semantics for indicative sentences would be. At first sight, it seems that a static semantics in terms of information content also already makes it possible to give a general characterization of information change potential: 'Add the information content of the sentence to the information about the world that is already available.'

One general type of argument in favor of a dynamic approach is that, even when we restrict ourselves to purely informative language use, there is more to meaning than can be captured in the notion of meaning as truth conditional content. A standard example (due to Barbara Partee) is the contrast between the following two sequences of sentences:

(1) I dropped ten marbles and found all of them, except for one. It is probably under the sofa.

(2) I dropped ten marbles and found only nine of them. ??It is probably under the sofa.

The first sentences in (1) and (2) are truth conditionally equivalent: they provide the same information about the world. Hence, if meaning is identified with truth conditional content, they have the same meaning. However, one may observe that whereas the continuation with the second sentence in (1) is completely unproblematic, the same continuation in (2) is not equally felicitous. The conclusion must be that the two opening sentences differ in meaning; hence, meaning cannot be equated with truth conditional content.

From the viewpoint of dynamic semantics, the two opening sentences in (1) and (2) differ in the way they change information, even though the information they provide about the world is the same. Unlike the opening sentence in (2), the opening sentence in (1) also creates an informational context that licenses the pronoun 'it' in the second sentence.

The notion of context is already important in standard semantics, in the sense that sentences are interpreted relative to a context of utterance, which may include several parameters, such as the time of utterance, etc. So, interpretation depends on context, or on the information available to the speech participants. What dynamic interpretation adds to this is the insight that the process of interpretation also brings about a change of the context, viz., in the information of the speech participants. Both context dependency and the creation of context in speech situations are taken into account.

One of the things this change of perspective brings is that attention shifts from isolated sentences to discourse, or text. It makes it possible to study and describe semantic phenomena that cross the border of a single sentence. As illustrated by the example given above, anaphoric relations across sentences are one such phenomenon.

Discourse Representation Theory and File Change Semantics

Dynamic semantics is not the only logical semantical theory that deals with the incremental interpretation of discourse, and it was not the first one, either. Whereas the logical roots of dynamic semantics lie in dynamic logic and the semantics of programming languages, its linguistic roots are discourse representation theory and file change semantics.

In discourse representation theory, the interpretation of a discourse – a sequence of sentences – takes the form of an incremental construction of a discourse representation structure. In file change semantics, it is not a single structure that is built, but a system of so-called file cards. The two main elements of discourse representation structures and file card systems are discourse referents and conditions. The discourse referents behave like logical variables, and the conditions are open formulae containing these variables, thereby putting constraints on the possible values of these variables. Discourse referents are introduced by certain noun phrases, in particular indefinites, and correspond to 'individuals talked about' by the discourse. In file change semantics the introduction of a new discourse referent means adding a file card to the system. The conditions are written on the file cards, and can contain information that is spread over several cards, thereby linking them to each other. In discourse representation theory the conditions can be atomic formulae, or more complex structures that include other discourse representation structures.

The discourse referents also function as possible referents for anaphoric expressions. Anaphoric expressions have to be linked to an accessible discourse referent in the discourse representation structure or file card system as it has been constructed at

that point. For example, in discourse (1) above, the phrase 'except for one' in the first sentence will have introduced a discourse referent to which the pronoun 'it' in the second sentence can be linked. In discourse (2) the first sentence does not introduce a suitable discourse referent to link 'it' to. So, discourse representation theory and file change semantics can account for the difference in acceptability of the two discourses.

The incremental construction of discourse representation structures is the first step in the interpretation process of a discourse. It clearly has a dynamic nature. Interpreting a sentence may depend on the nature of the structure created by previous sentences, and will result in a change of structure. The second step in the interpretation process of a discourse is more traditional. It consists in a semantic evaluation of the one resulting discourse representation structure relative to a standard logical model. A structure is true in a model if objects from the domain of the model can be assigned to the discourse referents in such a way that all the conditions in the structure are satisfied.

So, although the discourse representation structures are constructed dynamically, their semantic interpretation, and hence, indirectly, the semantic interpretation of the discourses they represent, are interpreted in terms of 'static' truth conditional content.

In our discussion of the discourses (1) and (2), we saw that the opening sentences have the same truth conditions. This will also hold for the discourse representation structures they give rise to. We concluded above that since the two discourses as a whole show different semantic behavior, the opening sentences must differ in meaning, and that hence the meaning of sentences cannot be equated with their truth conditions. Discourse representation theory accounts for the difference in meaning, but not in terms of a difference in information *content*, but in terms of a difference in the *representation* of information. The intermediate representation level thus becomes an essential ingredient of the theory of interpretation of natural language.

Dynamic semantics, in particular dynamic predicate logic, was invented to show that the linguistic phenomena that were dealt with in discourse representation theory can also be treated in such a way that the need to postulate an essential intermediate level of representation does not arise. Methodologically and philosophically, this is of importance, since postulating a representational level means to assume a language of thought as an intermediary between language and interpretation. It leads to a mentalistic theory of meaning, inheriting all the philosophical problems that come with such a view. All other things being equal, a theory that allows one to remain neutral on this issue is preferred.

Concerning interpretation, we concentrated on discourse representation theory. The interpretation procedure in file change semantics is different, and it is not so clear that the critique dynamic semantics puts forward against discourse representation theory applies in precisely the same way to file change semantics.

Dynamic Predicate Logic

The typical type of phenomena that discourse representation theory and file change semantics are designed to deal with are exemplified in the following two examples:

(3) A man is walking in the park. He whistles.

(4) Every farmer who owns a donkey beats it.

In standard predicate logic such (sequences of) sentences are a problem. Appropriate translations are as follows:

(5) $\exists x(\mathrm{man}(x) \wedge \mathrm{walk}(x) \wedge \mathrm{whistle}(x))$

(6) $\forall x \forall y((\mathrm{farmer}(x) \wedge \mathrm{donkey}(y) \wedge \mathrm{own}(x,y)) \rightarrow \mathrm{beat}(x,y))$

The problem with (5) as a translation of (3) is that the translation of the second sentence in (3) has to be brought under the scope of the existential quantifier in the translation of the indefinite in the first sentence. The problem with (6) as a translation of (4) is that the indefinite, which occurs in (4) inside the relative clause in the subject, turns up in (6) as a universal quantifier that scopes over the implication as a whole. Both facts are problematic from a compositional point of view: the logical formulae are composed at odds with the composition of the sentences. From a compositional point of view, we prefer the following formulae as translations:

(7) $\exists x(\mathrm{man}(x) \wedge \mathrm{walk}(x)) \wedge \mathrm{whistle}(x)$

(8) $\forall x((\mathrm{farmer}(x) \wedge \exists y(\mathrm{donkey}(y) \wedge \mathrm{own}(x,y))) \rightarrow \mathrm{beat}(x,y))$

But, under the standard interpretation of predicate logic, these formulae do not express what (3) and (4) express, because the last occurrence of the variable x in (7) and the last occurrence of y in (8) are free occurrences and are outside the scope of the existential quantifiers.

In a nutshell, what dynamic predicate logic achieves is that the translations in (7) and (8) are appropriate translations of (3) and (4), and, in fact, are logically equivalent with (5) and (6), respectively. It succeeds in this by giving a different, dynamic interpretation to the logical constants of the language of predicate logic. The basic feature of the dynamic existential quantifier is that it can bind variables outside its syntactic scope.

This is done by interpreting formulae as transition relations between assignments (of values to variables) much in the same way that programs can be viewed as transition relations between machine states (as seen above). That two assignments *a* and *b* are related means that when *a* is an input assignment, *b* is a possible output assignment. So formulae are interpreted as such input–output relations. Conjunction is interpreted as the composition of the transition relations of the left and the right conjunct. For example, the output of interpreting '$\exists x(man(x) \wedge walk(x))$' will consist of assignments that assign an object to *x* which is both a man and is walking. In interpreting (7) as a whole, these assignments are passed on as input to 'whistle(x)' and will remain as output for the whole sequence if the value assigned to *x* is also an object that whistles.

For (8) the story is slightly more complicated. Possible outputs for '$(farmer(x) \wedge \exists y(donkey(y) \wedge own(x,y)))$' are assignments that assign a particular farmer to *x* and donkey to *y* so that that farmer owns *y*. The effect of processing the implication '$(farmer(x) \wedge \exists y(donkey(y) \wedge own(x,y))) \rightarrow beat(x,y)$' is that it is checked to see whether every output of the antecedent still has an output after it has served as input for the consequent. In other words, it is checked whether the farmer in question beats all the donkeys that he owns. So, in effect, an existential quantifier inside the antecedent of a conditional amounts to universal quantification over the implication as a whole. Finally, the contribution of the universal quantification over farmers performs the check we just described for every farmer.

The empirical results that dynamic predicate logic obtains for these sentences are precisely the same as those of discourse representation theory and file change semantics, but the tools being used are much more orthodox. Dynamic predicate logic uses the familiar language of predicate logic, and the only difference in the interpretation of the language compared with the standard interpretation is that assignments of values to variables – which are the result of existential quantification – are remembered beyond the syntactic scope of such quantifiers.

Of course, even small changes can have rather big consequences. The logical properties of the system of dynamic predicate logic differ quite radically from those of standard predicate logic.

Update Semantics

Whereas the dynamic semantics of programs and predicate logic were originally formulated in terms of transition relations between states or assignments, update semantics gives a more simple and intuitive way of viewing the dynamics of interpretation. Statements are interpreted in terms of update functions on information states (or contexts, as they are sometimes called). Schematically, the interpretation of a sentence φ in an information state *s*, written as $s[\varphi]$, results in a new state *t*, which now incorporates the information provided by φ.

In the simplest case, information states are modeled as sets of possible worlds (as they are used in modal logic). Since our information about the world is usually partial, an information state leaves several possibilities for the way the world could be. If a world *w* is an element of a state *s*, this means that *w* is a way that the actual world could be, according to the information embodied by *s*. An update $s[\varphi]$ will in general lead to a state *t* such that $t \subseteq s$. Adding information eliminates possibilities. Growth of information makes the information state shrink.

Truth and falsity are not central notions in update semantics. Sentences are not statically evaluated with respect to the world but are interpreted in terms of their effects on information states. Two special cases of such effects are $s[\varphi] = \emptyset$ (the empty set), and $s[\varphi] = s$. The former means that updating *s* with φ leads to the *absurd state*, a state in which there are no possibilities left. This typically happens if φ is *inconsistent with* the information embodied in *s*. When $s[\varphi] = s$, this means that the update of *s* with φ has no effect. The sentence φ provides no new information relative to *s*. In such cases we say that *s supports* or *accepts* φ.

Now, clearly, update semantics gives us an alternative format to spell out the interpretation of a language, as compared to the standard truth conditional approach, but what are the advantages of this alternative view? One way to motivate update semantics is that there are types of sentences that do not obviously have truth conditional content, but that have meanings that can be described in terms of their effects on information states. Perhaps not the best, but certainly the simplest case to illustrate this with, is provided by epistemic modalities such as 'might.' Consider the following example:

(9) It might be raining outside . . . . It isn't raining outside.

The dots indicate that between the utterance of the two sentences some time passes during which, say, the speaker walks to the window to look outside. The point about the example is that this is a consistent, or coherent, piece of discourse. But at the same time, the following is not:

(10) It isn't raining outside . . . . It might be raining outside.

This would be hard to explain if both sentences were analyzed in terms of truth conditions (for example,

using standard modal logic for the analysis of the modality). Since they are composed of the same two sentences, how could the truth conditions of both sequences differ? From an informational dynamic semantic perspective, it is quite clear what makes the difference. Updating the first sentence of (10) leads to an information state in which there are no worlds left where it is raining at this moment. Such an information state would be inconsistent with the second sentence in (10). (The counterfactual 'It might have been raining' is all right, of course.) If things are presented in the opposite order, as in (9), we do not meet this problem. As long as our information state leaves open the possibility that it is raining outside, we can happily accept the first sentence in (9). And neither do we need to have a problem in accepting next the information that it isn't actually raining.

That order matters is a distinctive feature of update semantics, and of dynamic semantics and dynamic logic in general. Also, in the case of anaphoric relations, order is obviously important. The use of an anaphoric expression, such as a pronoun or anaphoric definite description, is only felicitous in case the preceding discourse has provided a suitable discourse referent to link it to.

Presuppositions

Dynamic semantics is not only suited to give an account of how the information or the context is changed – by eliminating possibilities and adding discourse referents – but also to formulate the conditions that the current information state or context should meet for a sentence to be acceptable at that point in the discourse. Updates in update semantics are typically partial in that they are only defined in states that meet certain requirements. If a sentence has certain presuppositions, it is required that these are already supported or accepted in the current state, and hence do not provide novel information.

Among the different dynamic frameworks, file change semantics most explicitly takes both anaphoric relations and presuppositions into account. Definites, in particular anaphoric definites, are associated with the property of *familiarity*. In terms of the file card metaphor, a definite requires the presence of a card that already carries the information presented in its descriptive content. In contrast, indefinites carry a *novelty* constraint, and should add a new file card to the stock.

The notion of presupposition has a long and complicated history in logical semantics. Without claiming that all puzzles have already been solved, it seems fair to say that the shift from truth conditions to information change and context change potentials has made a substantial contribution to the study of this phenomenon on the border of semantics and pragmatics.

Further Reading

A much more extensive introduction and overview of dynamic semantics and dynamic logic is Muskens, Van Benthem and Visser (1997). Chierchia (1995) provides an introduction in dynamic semantics with emphasis on linguistic motivation. Groenendijk and Stokhof (2000) gives an informal introduction of dynamic semantics, illustrating it with several different kinds of discourse phenomena.

Discourse representation theory was first presented in Kamp (1981). For an extensive overview, see Van Eijck and Kamp (1997); for a full textbook, see Kamp and Reyle (1993). The original sources for file change semantics are Heim (1983, 1989). An important source of inspiration, for dynamic semantics in general, and for Heim in particular, is Stalnaker (1974, 1979).

Dynamic predicate logic was first presented in Groenendijk and Stokhof (1991). A more detailed study of the dynamics of existential quantification can be found in Dekker (1993). A merge of dynamic predicate logic with Montague grammar is given in Groenendijk and Stokhof (1999). A similar merge with discourse representation theory is proposed in Muskens (1995).

The original source for update semantics is Veltman (1996). In Groenendijk, Stokhof and Veltman (1996), the combination of dynamic predicate logic and update semantics is discussed. An extensive overview of the study of presuppositions in dynamic semantics is given in Beaver (1997).

See also: Anaphora, Cataphora, Exophora, Logophoricity; Anaphora: Philosophical Aspects; Definite and Indefinite; Discourse Anaphora; Discourse Representation Theory; Donkey Sentences; Montague Semantics.

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Dynamic Syntax

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Dynamic Syntax (DS) is a procedural model of syntax, formalizing the idea that hearers build semantic representations from words in context on a left-to-right basis.

This idea developed out of work in semantics on the modelling of information update (DRT, Dynamic Semantics), on the role of context and the inferential task of the hearer in pragmatics (Relevance theory), and on work in logic on labelled deductive systems and logics of tree growth. The Dynamic Syntax model synthesized and developed results from these different research strands. The two main sources for Dynamic Syntax are Kempson *et al*. (2001) and Cann *et al*. (2005).

The main claim of Dynamic Syntax is that hearers build structured semantic representations from words encountered in context. These representations are modelled as possibly partial and underspecified trees, and the hearer's task in communication is to construct a complete, well-formed tree from lexical and contextual clues (which she can then take as an appropriate representation of the speaker's intended meaning). The role of syntax in this process is to provide licensed transitions from one partial tree to the other, interacting with lexical information, but there is no independent level of syntactic representation. Syntax is thus construed as exclusively procedural (or dynamic). This is reminiscent of parsing models, but the difference is that DS is modelled as a model of competence, and as such addresses many problems previously thought of as syntactic. Among specific empirical domains addressed within the theory are relative clause constructions, agreement and conjunction, several left- and right-periphery phenomena, word-order variation and head-final languages (in particular Japanese), topic and focus, and copula constructions. However, the empirical scope of the theory will have to be widened in the future so as to see whether the framework is equipped to provide analyses for different constructions from a wide variety of languages.

A number of interesting questions arise from the hearer-based perspective of the Dynamic Syntax model, among which, in particular, the questions of language generation/production, the role of context, and natural language dialogue have been addressed.

Historical Context

In the late 1980s, work in semantics addressed the problem of information update in context. In two

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influential models – Discourse Representation Theory (DRT) (Kamp and Reyle, 1993) and Dynamic Semantics (Groenendijk and Stokhof, 1991) – formal proposals were developed to explain the interpretation of pronouns such as *he* in the example below:

(1) A man came in. He sat down.

The point here is that 'he' (under the most likely interpretation) is not interpreted as 'a man,' but rather as 'the man who came in.' In other words, the antecedent for the pronoun is constructed from information previously introduced into the discourse and does not result from simple co-indexing. The answers to this problem proposed by DRT and Dynamic Semantics were essentially semantic – the introduction of so-called discourse referents (DRT), or of nonstandard, dynamic quantifiers with wider scope than traditional quantifiers (Dynamic Semantics) – but neither approach was concerned with the syntactic aspects (and parallels) of the interpretation of pronouns, a topic that was taken up in Dynamic Syntax.

While DRT and Dynamic Semantics were concerned with the semantic update of information, pragmatic theories, in particular Relevance Theory (Sperber and Wilson, 1995), offered cognitive models of communication, highlighting the role of inference in the construction of meaning as part of the hearer's task of utterance interpretation. Developing the Gricean notion of implicature (meaning construction over and above the 'literal meaning' of an utterance) (e.g., Grice, 1989), Relevance Theory introduced the notion of explicatures, that is, processes of inferential meaning construction relevant to the establishment of 'literal' meaning in the first place (Carston, 2002). Pragmatics, and with it notions of hearers, context, and inference, was suddenly no longer an add-on device for the study of literary and stylistic effects but became central for the understanding of any aspect of meaning in linguistic communication. From this, Dynamic Syntax took the further step to investigate the role of inference and context in the establishment of structured meanings, and argued that pragmatic reasoning is relevant not only to semantics (as argued by Carston) but also to syntax (Marten, 2002).

Finally, within logic, Gabbay (1996) and colleagues developed logic methodologies for defining a variety of labels to reflect step-by-step procedures of inference drawing, while Meyer-Viol (1995) worked on the representation of arbitrary names in natural deduction, and Blackburn and Meyer-Viol (1994) proposed a modal logic for trees, which became the logical backbone of the Dynamic Syntax framework, as it allowed the modelling of different notions of structural underspecification and update.

True to its historical antecedents, the Dynamic Syntax model provides a cognitive model of linguistic competence, focusing on the hearer, that centrally involves notions of underspecification and information update, not only in semantics but also in syntax, and that is modelled as an inferentially driven system of tree-growth.

The Formal Model

Dynamic Syntax models the process by which hearers establish structured logical representations from words in context as an incremental growth of binary semantic trees, corresponding to type-driven function application, where transitions from one partial (unfinished, incomplete) tree to another are achieved by transition rules, lexical actions, or pragmatic actions. Since the process is incremental, the linear order in which words are encountered in the utterance determines to a large extent the nature of the derivation.

The main formal tools of DS are the notions of tree growth, of requirement, and of underspecification. The starting point of a DS derivation is a minimal tree with only one node, at which a requirement to build a propositional formula (of type Ty(t)) holds (reflecting the Relevance-theoretic assumption that hearers expect to derive a propositional object from words encountered in communication):

(2) ?Ty(t)

Trees are developed by imposing modal requirements that induce tree growth, for example, in developing (2), by introducing the requirements $?\langle\downarrow_0\rangle Ty(e)$ and $?\langle\downarrow_1\rangle Ty(e \rightarrow t)$, i.e., the requirements to build a subject and a predicate node as daughters of the top-node. The entire process of building up interpretations is the progressive development of trees and the fulfilment of imposed requirements by lexical input. Every word provides lexical information as to how it is to be used in the establishment of the eventual semantic tree representation of the utterance (there is a pointer that keeps track of which node is currently under development). A nominal subject such as *Daudi* (of type Ty(e)), for example, may be associated at an initial node of a partial tree, leaving the requirement for a functor node (of type Ty(e → t)) yet to be developed:

(3)

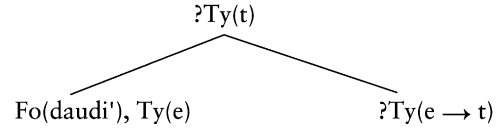

The partial tree in (3) results after 'Daudi' has been parsed as the first word in an utterance. The subject node has been filled with lexical information from 'Daudi,' including its type and its formula value (Fo), i.e., its lexical semantic meaning. Note that the order of the nodes in the DS tree is conventional (argument left, functor right), and does not reflect word order; the tree is a representation of semantic content, while word order is reflected only in the order of transitions licensed from one partial tree to another.

Lexical information interacts with this tree format, in that lexical entries for verbs, for example, may state that they can be introduced at a stage in the derivation where a requirement for a predicate holds. Lexical entries are formulated as IF–THEN statements such as the entry for 'love' below (the modal operators $<\downarrow_0>$ and $<\downarrow_1>$ indicate argument and functor daughters respectively):

(4) IF ?Ty(e → t)
THEN make($<\downarrow_1>$), go($<\downarrow_1>$), put(Fo(love′), Ty(e → (e → t))),
go($<\uparrow_1>$), make($<\downarrow_0>$), go($<\downarrow_0>$), put(?Ty(e))
ELSE abort

The condition in the IF clause specifies appropriate contexts for the introduction of 'love,' and the THEN statement specifies a set of actions to be performed if this context holds. The ELSE statement specifies actions (usually to abort the derivation) to be performed if the condition in the IF clause is not met. Actions under the THEN clause usually include the instruction to go to a node other than the current one ('go'), the annotation of existing nodes ('put'), and the building of new nodes ('make'). The specification of lexical content is thus explicitly procedural and contributes to the building up of the semantic tree, in addition to providing the concept that the word denotes. In the present example, a predicate node is built and annotated with the formula value of 'love,' and a new object node is built, reflecting the requirement of an object by transitive verbs:

(5)

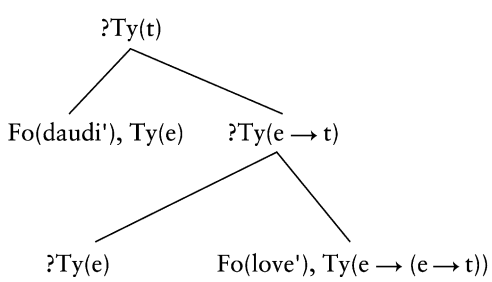

The outstanding requirement for an expression of Ty(e) at the object node can be fulfilled by lexical information from an NP such as 'Amina':

(6)

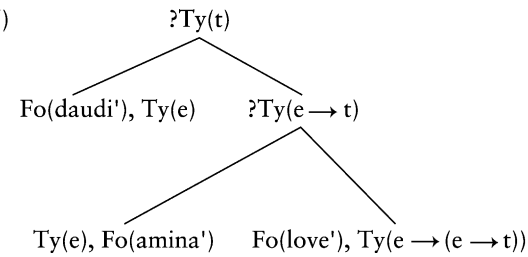

At this stage, all lexical input has been scanned and integrated into the tree. The final step in the derivation is to combine the accumulated information by applications of steps of modus ponens from bottom to top, so that a fully annotated tree results with no requirements outstanding. A typical DS derivation will thus involve the growth of a partial tree driven by lexical information, the introduction of requirements, and a final step during which accumulated information is gathered, starting from the bottom of the tree, and all remaining requirements are fulfilled. An unsuccessful derivation (corresponding to an attempt to parse an ungrammatical tree) is one where not all requirements can be fulfilled, and the information provided is not enough (or of the wrong type) to built and then evaluate a well-formed tree.

Another important DS concept is underspecification. While the model is monotonic in that information once established may not be removed, it allows for the introduction of partial information that can be updated at a later stage in the derivation. Examples of underspecification include pronominal elements, whose interpretation is fixed only with respect to some context provided (as proposed by DRT and Dynamic Semantics), as well as forms of **structural** underspecification, where for example the eventual tree position of some node is not known at the time it is introduced. This form of underspecification is exploited for the analysis of preposed question pronouns ('*wh*-words'), which are assigned an initially unfixed position in the overall tree, indicating only that the node is somewhere below the root node ('$<\uparrow^*>$?Ty(t)'), while its exact eventual position will be fixed at some later stage (the modal operator $<\uparrow^*>$ indicates a disjunction across all dominate relations between the introduced node and the top node):

(7)

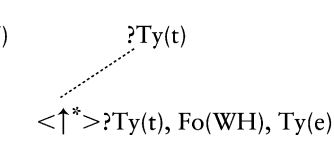

The unfixed node remains part of the tree until some appropriate situation arises at which the node is assigned its eventual fixed position. In, for example, 'What did Daudi see?,' this situation arises after the

verb has been scanned and an object node has been built, but where no further lexical input can fulfill its requirement for a Ty(e) expression:

(8)

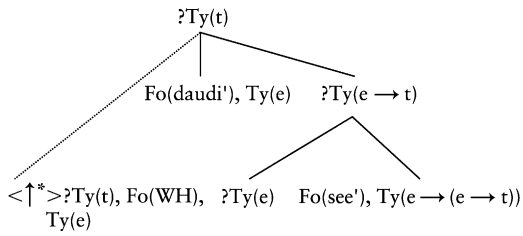

The unfixed node can be fixed at the object position and thus fulfills the type requirement holding there.

A final important extension of the DS system concerns a specific relation between (sub-)trees called LINK, which relates two nodes that do not stand in a daughter relation to each other (i.e., that are not related by function application) but still form part of one overall tree. A LINK relation may hold, for example, between the head of a relative clause and the relative clause itself, or between a left-dislocated topic and its matrix clause.

(9) Daudi, Amina likes him.

(10)

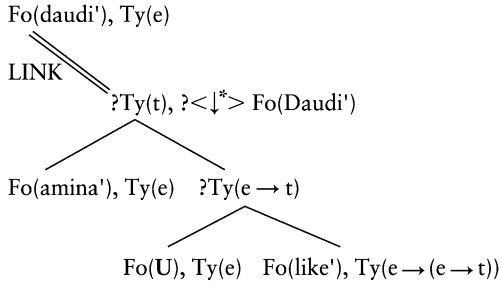

The tree in (10) shows the development of a tree across a LINK relation, after having parsed the verb 'like.' The initial constituent in (10) is related to the main tree across a LINK relation, which is developed as the first step. In a way, it provides (part of) the context in which the main assertion has to be parsed. Although the LINKed node is not related to the matrix tree by a function-argument relation (i.e., it is not a mother or a daughter node), it is part of the tree and imposes a requirement at the top node of the main tree that there be a copy of its formula value included (the requirement holds at the root node and specifies that Fo(daudi') be somewhere below (<↓*>) the root node, thus combining notions of requirement and structural underspecification). The requirement can be fulfilled by interpreting the pronominal meta-variable **U** (introduced by the pronoun 'him') at the object node as referring to Daudi.

Applications

Given the formal apparatus introduced above, what is the empirical scope of the theory? A particular strong point of the Dynamic Syntax approach is the modelling of the interaction between linear order and anaphoric relations, including the relation between agreement and pronouns with their antecedents. For example, there are well known cases of agreement 'mismatches' with conjoined subjects, as illustrated by the (somewhat simplified) Swahili facts below:

(11a) Haroub na Nayla wa-li-kuja
Haroub and Nayla 3pl-PAST-come
'Haroub and Nayla came'

(11b) *Haroub na Nayla a-li-kuja
Haroub and Nayla 3sg-PAST-come

(12a) wa-li-kuja Haroub na Nayla
3pl-PAST-come Haroub and Nayla
'Haroub and Nayla came'

(12b) a-li-kuja Haroub na Nayla
3sg-PAST-come Haroub and Nayla
'Haroub and Nayla came'

With a conjoined subject, only plural agreement is possible when the subject precedes the verb, but either plural or singular agreement is possible when the subject follows the verb. From a DS perspective, what is crucial about these examples is that in (11), the conjoined NP is built first and its value computed, so that the agreement – functioning just as pronouns in English – has to be plural to be able to refer back to the subject. On the other hand, in (12), the agreement merely introduces an expectation about what might follow in the subsequent parsing of the sentence. And because there is a stage in the derivation where only the verb and the first conjunct have been parsed, this first conjunct can fulfill the expectation created by the pronominal singular agreement (12b). Alternatively, the expectation for a plural NP is fulfilled once the full conjoined NP has been parsed and compiled (12a). The strength of the DS analysis here is that the role of word order is deeply embedded into the design of the model, so that word-order effects like the one in (11) and (12) can be stated quite easily.

A similar, if more complex, example is the analysis of relative clauses in DS. These are analysed as LINK structures, linking the tree-node built from the head of the relative clause with the relative clause:

(13) Daudi, who Amina likes . . .

(14)

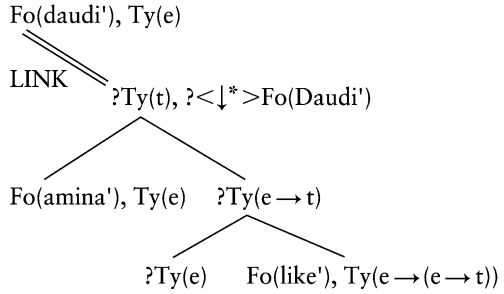

Different (lexical) triggers of the LINK relation induced after the parsing of the head may result in slightly different information holding at the outset of the relative clause: Is a copy of the formula value of the headnoun provided by the relativizer, or is the copy merely required (as in (14))? Must the requirement for the copy of the headnoun be fulfilled within the local clause (as in (14)), or within a wider domain? These parameters result in a typology of relative clauses with or without obligatory resumptive pronouns (e.g., English as opposed to Romanian), and with local (English and Romanian) vs. non-local requirements (Egyptian Arabic and Italian). The interaction of LINK structures, forms of structural underspecification, and anaphoric processes can be extended to a fuller typology of left- and right-periphery phenomena.

Another area where the use of structural underspecification proves to be fruitful is in the analysis of head-final languages like Japanese, where the order of NPs is comparatively free (the NPs in (15)–(16) can be in any order), but the verb or sequence of verbs has to be in final position:

(15) Hiroto-ga Akiko-ni ringo-o muita
Hiroto-NOM Akiko-DAT apple-ACC peeled
'Hiroto peeled an apple for Akiko'

(16) Hiroto-ga ringo-o tabeta to itta
Hiroto-NOM apple-ACC ate COMP said
'Hiroto said that he (or someone else) ate an apple'

These languages are problematic for many grammar formalisms, since the intraclausal structure seems flat and cross-clausal dependency relations often are apparently the inverse of other languages, with structure induced upwards and to the right, rather than top-down from the left (a paraphrase of (16) that reflects this dynamics more accurately would be 'Hiroto ate an apple, he said'). Furthermore, since parsers are standardly head-driven, the problem of parsing these languages seems radically different from other languages, and essentially nonincremental. However, by employing an underspecification analysis, the NPs in (15) and (16) can be characterized as introduced into the emergent structure initially unfixed while yet projecting constraints on their eventual position, and the verb then introduces the basic predicate-argument template against which the information accumulated from parsing the NPs is matched. This model, which induces structure locally and incrementally, matches the facts of Japanese over a broad range of otherwise puzzling structures (head-final and head-internal relatives, and long-distance scrambling; see Kempson *et al.*, 2003; Cann *et al.*, 2005), thus simultaneously reflecting structural patterns of verb-final languages and the empirical results that parsing of Japanese is no less incremental than the parsing of head-initial languages (Aouida *et al.*, 2004).

See also: Discourse Representation Theory; Dynamic Semantics; Grice, Herbert Paul (1913–1988); Relevance Theory.

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E

E-Language versus I-Language

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E-Language/I-Language Distinction

The purpose of this article is to clarify the various dimensions of Noam Chomsky's distinction between I- and E-language, with an aim to seeing what is fundamental to that distinction and to discussing some considerations that suggest one or the other conception of language to be correct. The main conclusions are that an E-language conception can and should absorb many of the insights of the I-language conception and that, so enriched, a genuine E-language conception can function foundationally in a theoretical understanding of language.

Some Preliminary Characterizations

Noam Chomsky (1986) introduces the distinction between I-language and E-language with subsequent writings revisiting and clarifying the distinction (e.g., in the papers collected together in Chomsky, 2000). The distinction concerns the metaphysical status of language, of what language **is**. I-language is internalized, individualistic, idiolectal, and intensional (Chomsky, 2000: 70–73). Each of these features will be discussed in turn, followed by a discussion of the contrasting features of E-language.

Linguistics is to be "conceived of as the study of I-language" and so "becomes part of psychology, ultimately biology" (Chomsky, 1986: 27). To say that a speaker knows a language is to say "the speaker knows an I-language as characterized by the linguist's grammar" (1986: 27; 40). I-language should be distinguished from Universal Grammar, which we might think of, roughly, as the innately given framework of any human language (*see* **Innate Knowledge**); I-language is not this initial state of the language faculty but rather "the system of knowledge attained" (1986: 26) at a state of linguistic maturation. I-language is not determined by how speakers use the language, although language use is evidentially relevant for determining the properties of the initial state and of I-language (cf. George, 1989: note 20). Chomsky also rejects the idea that the language that one speaks is determined by one's ability with the language (Chomsky, 1980: 51ff.; 1986: 9–21; 2000: 50–52). Rather the language a person speaks is determined by the person's psychology, in particular by the I-language that is the object of the person's knowledge. I-language is internalized in being a psychological property of speakers.

I-language is idiolectal in character. The identity conditions for I-languages make no mention of a shared socio-historical object, like English or French, of which speakers have only a partial knowledge. Chomsky (e.g., Chomsky, 2000: 72–73) also rejected Putnam's (1975) and Burge's (1979, 1982) antiindividualist ideas that meaning is partially determined by the social and physical environment (*see* **Externalism about Content**). More will be said about the issue of individualism and antiindividualism below.

Finally, I-language is intensional in the sense that the identity conditions of languages are determined by strong rather than weak equivalence of the grammars that generate them (Chomsky, 2000: 26). Roughly, grammars are weakly equivalent when they generate the same class of expressions as well formed; they are strongly equivalent when they generate the same class in the same way.

I-language is to be contrasted with E-language, which is external, sociolectal, antiindividualist, and extensional. It is external in that the object of E-language study is "a collection of actions, or utterances, or linguistic forms (words, sentences) paired with meanings, or as a system of linguistic forms or events," perhaps determined by convention (Chomsky, 1986: 19) (*see* **Conventions in Language**). It is sociolectal in making the primary object of study a social rather than individual-focused object. It is anti-individualist in that it takes the social environment and the physical environment to be relevant to the determination of meaning. And it is extensional in construing languages as identical if the grammar pairs the same sentences with the same meanings, no

matter how those sentences or meanings are generated (Quine, 1970).

Getting at What's Fundamental

In order to get at what is fundamental to the distinction between I- and E-language, this article will consider how much of the I-language perspective E-language theorists can accept without compromising their view. As it turns out, the E-language position can accommodate quite a lot. It is noteworthy that the E-language positions described here are either already prominent in the literature or involve natural extensions of the E-language outlook.

Consider first the intensionality of grammar. It is surely part of Chomsky's interest in advocating I-language to rid the study of language of the vestiges of behaviorism; but it is not clear that a quasi-behaviorist conception of language, in which semantic competence consists in dispositions to use sentences under certain conditions, cannot accommodate the intensionality of I-language. Behavioral patterns of semantic acquisition and decay can favor one grammar over some weakly equivalent alternative. If dispositions to use sentences are gained or lost in chunks, that can count in favor of grammars that construe those chunks as wholes grammatically structured in one way rather than another (cf. Evans, 1981 and Davies, 1981b). The same E-language conception shows that the idiolectal aspect of I-language can also be accommodated. The only relevant behavioral dispositions may be that of the individual at a given time. So, a grammar with one structure rather some other structure weakly equivalent to it can be determined as the grammar of a person at a time. If this is correct, then the intensionality and idiolectal character of language are consistent even with a quasi-behaviorist conception of language and are thus consistent with the overall E-language perspective.

What makes the quasibehaviorist view illegitimate from the I-language perspective? Here other features of I-language are relevant, in particular, the requirement that I-language be internalized. Suppose that the internalization requirement is construed in such a way that in contrast with the quasibehavioral view, that it demands a genuine mentalism; the quasibehaviorial conception of I-language is rejected because it fails to be genuinely psychologically realistic. But, again, it seems as though the E-language conception can accommodate I-language requirements. For example, in Lewis's account (1975), language is convention based, and the existence of convention is a psychological matter. Very roughly, in Lewis's account conventions are intentionally propagated regularities among the speech, beliefs, and intentions of speakers and hearers. The point is not the details but rather the fact that conventions are defined partly in terms of the psychological states of individuals. If convention-based conceptions of language are E-language conceptions, then E-language conceptions of language can accommodate the internalization requirement of I-language when that requirement is interpreted as a requirement to construe language psychologically.

But perhaps there is a stronger way to interpret the internalization requirement. The internalization requirement does not ask merely that language be psychological; it asks that language have a special cognitive home – that language be the object of a special, modularized, faculty of knowledge, the 'language faculty,' that is deployed in speakers' epistemic accomplishments of acquiring the capacity with language and with producing, and perceiving meaning. Language is what is mentally represented in our faculty of linguistic knowledge.

Two aspects of the language faculty should be distinguished. First, the states of the language faculty are tacit and thus differ substantially from ordinary cognitive and conative states such as belief and desire (*see* **Tacit Knowledge**). Convention-based views of language can accommodate this and perhaps should insist on it. There is at least some *prima facie* case for considering the complicated intentions involved in convention as of a psychologically different kind from the usual, garden-variety intention. Second, and more relevant here, the linguistic faculty is to be a faculty of knowledge of language and thus is a cognitive state directed toward the linguistic facts. Convention-based accounts of language deploy psychological states in the account of convention and may even deploy tacit states, but they do not deploy cognitive states that represent the linguistic facts. That is what the linguistic faculty does. So, the idea is, convention-based accounts of language cannot be I-language accounts because they reject the cognitivism fundamental to the internalization requirement of I-language.

So far we have seen that the intensional and idiolectal, requirements of I-language can be accommodated by E-language conceptions, as can the psychological and tacit aspects of the internalization requirement. But convention-based versions of E-language cannot accommodate the cognitivist aspect of internalization. Can any E-language conception? Again, the answer seems to be affirmative. Indeed, once we move to understanding the internalization requirement as a cognitivist requirement, the E-language conceptions seem to be in its element. States of the language faculty represent the linguistic – the phonological, syntactic, and semantic – facts. Plausibly these facts, like other facts, are facts independent of the thinker.

So there seems to be some clear sense in which there is something external about language.

All of this appears to be correct, and it clarifies the issues further. But it doesn't adjudicate the issue between E- and I-language. It fails to do so because the issue between I- and E-language concerns, not whether the language or the grammatical facts are represented by the language faculty, but rather why some language, rather than some other, is represented by the speaker. The central issue is about the metasemantics of the representations of the language faculty. So even if the facts are external, in the sense that any cognitivism demands, it might well be the case that a speaker stands in a particular representational relation to a language because of facts that are internal to the speaker. The actual language relation may be internally determined.

Individualism and Antiindividualism

This brings us to the final requirement of the I-language conception: that language is not only internal**ized**, but internal**ist**, or individualist, in character. Here we arrive at issues that are fundamental to the debate between I- and E-language. The I-language claim is that language is individualist in the sense that the facts that determine one's language supervene on internal bodily states; the metasemantics of the representation of language is individualist.

According to this kind of individualism, the role of representational content in the states of the language faculty is not questioned; however, it is demanded that the account of why the cognitive states of the language faculty represent what they do appeal only to internal facts. Facts about the language are not identified with facts in the head (for discussion see Rey, 2003a, 2003b) but rather are supervenient upon such facts. However, when this individualist view is applied to semantics, it seems to have the consequence that semantics cannot be referential or truth conditional (*see* **Truth Conditional Semantics and Meaning**). Representing the referential or truth conditional properties of expressions seems to require standing in some relation to external items of reference, where, in many cases, the external items are external items in the environment. But these relations to external items are not acceptable from an individualist point of view. So it seems that if individualism about semantic cognition is correct, theories of reference and truth can form no part of the content of semantic cognition.

One suggestion for a nontruth-conditional semantics, offered by Ray Jackendoff (1983, 1986), construes the central semantic notion not as truth but as truth-in-a-mental-projection, which is not a replacement for truth but a property that is contrasted with it. In this view, everyday speakers see, speak, and think only of a mentally projected world. This suggestion forces us to deny the instances of the platitudinous T-schema that Tarski (1944) used as a criterion of adequacy for a definition of truth:

(T) s is true-in-L iff p

where 's' is to be replaced by a structural description of a sentence of some language L, and 'p' is to be replaced by the very same sentence (type) in use, or a translation of that sentence. The schema is platitudinous insofar as its use as an adequacy condition is an expression of the platitudinous idea that a sentence is true if and only if things are as use of the sentence says they are. This idea constitutes our fundamental grip on the concept of truth, and it links the concept of truth to the concept of what a sentence says or means (cf. Rattan, 2004) (*see* **Truth: Theories of in Philosophy**). But in Jackendoff's view, a use of a sentence specifies only a truth-in-a-mental-projection condition, a notion that Jackendoff explicitly contrasts with truth. The view avoids truth conditionalism about meaning, but at too high a cost.

A better suggestion is offered in Pietroski (2003). Pietroski does not deny that language use connects up ultimately with truth (this is its difference from Jackendoff's view). But Pietroski exploits the ambiguity of 'says' in the platitude about truth to suggest that the platitude is a pragmatic, rather than a semantic, platitude. Indeed, a sentence is true iff things are as a use of the sentence says they are, but in this view, words don't say things, speakers do. Speakers exploit nontruth-conditional properties of expressions to say things, with certain communicative intentions, in certain contexts, that have truth conditions. And, consistently with individualism, the nontruth-conditional properties of expressions are determined by facts inside the head. I-language, including its semantics, is an elaborated, internally determined syntax.

Semantic Intuitions in Linguistics and General Epistemology

This view may ultimately be the most compelling. However, there are grounds for reservation. These grounds center on the role of intuitions in semantics and epistemology (*see* **Epistemology and Language**).

Intuitions have long been thought to play a fundamental role as data in linguistic theory. These intuitions concern matters of syntax (intuitive judgments of grammaticality or acceptability) and semantics (intuitive judgments of truth conditions). But once the link to truth conditions is broken, the connection between our intuitive judgments about what seems to

be a fundamental dimension of what expressions mean – their truth conditions – and semantic theory becomes much more tenuous and theory-involving. Now it may well be that the connection is tenuous and theory-involving, but it would be a mistake to think that this gap simply parallels matters in syntax. In the case of syntax, judgments of grammaticality are overturned based on considerations that have to do with psychological contingencies; for example, with parsing strategies ('garden-path' sentences) and interactions between memory and syntactic complexity (repeated center-embedding). But if semantics is not truth conditional, then intuitive judgments of truth conditions fail to engage the domain of semantics at all. The failure is not determined by psychological contingencies but rather is preordained by the framework of linguistic theorizing.

Semantic intuitions have another, related role to play in thought. One dimension of Quine's attack (1951) on the analytic/synthetic distinction is on the idea that there is a class of propositions whose truth is grounded in meaning, rather than, as with other true propositions, in worldly fact. Semantic intuitions must then play a dual role in telling us (indirectly) about the language, insofar as the intuitions derive from semantic competence, and also about the world, in being about the world. The second aspect of this dual role can be seen, for example, in the role that semantic intuitions play in correcting lexical explications (Burge, 1986). Considered explications of the meanings of lexical items might determine characteristics that are neither necessary nor sufficient for falling in the extension of, say, *chair*. One traditional, Platonic use of semantic intuitions deploys them to correct mistaken characterizations through the application of lexical items to examples. This deployment is epistemically valuable even when epistemically excessive features often associated with intuitions, like indefeasibility, are stripped away. The general role of semantic intuitions in correcting and being corrected makes sense only against the backdrop of a truth conditional conception of meaning – when there is something that the semantic intuitions intuit or fail to intuit. The epistemic role of semantic intuitions is another casualty of construing semantics in a nontruth-conditional manner.

See also: Abstraction; Conventions in Language; Epistemology and Language; Externalism about Content; History of Linguistics: Discipline of Linguistics; Idealization; Innate Knowledge; Tacit Knowledge; Truth Conditional Semantics and Meaning; Truth: Theories of in Philosophy.

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textbooks of 1756 and 1765 are valuable sources. He spoke, for instance, monophthongal [e:] and [o:], whereas Received Pronunciation today uses [e] and [ə], and he articulated non-prevocalic /r/ regularly. Elphinston's interest was focused on form. Spelling was his main concern, and he viewed both grammar and word formation from this standpoint.

His major work, *Propriety ascertained in her picture,* in which he improved his spelling system, dates from 1786–1787. Volume 2 of this work is particularly valuable. As early as 1760, Elphinston had collected, corrected, and enlarged older lists of Scotticisms, and in Volume 2 he also dealt with the peculiarities of the pronunciation and sentence structure of his native dialect. With this book Elphinston acquired a unique position among British writers on dialect.

In the 1790s he published *Forty* (later *Fifty*) *years' correspondence,* transcribed into his script. The following is a specimen from a letter to Samuel Johnson's biographer James Boswell: "Inglish Orthoggraphy waz no more known to' dheir Author, dhan to' moast ov my oddher Correspondents." As can be seen from this sample, one of Elphinston's ideas was to double consonants to mark stressed short vowels. In 1790, 1795, and 1797 he published popular versions of his simplified spelling scheme. There was, however, little interest in the aesthetic aspect of English at the time, but rather a demand for prescriptive grammars that Elphinston's work did not meet. Consequently, his reform proposal failed. Coming from a grammarian, Elphinston's observations on the problems of number in English are especially noteworthy. For him, the English grammar was the basis of a universal grammar.

See also: Bullokar, William (c. 1531–1609); Hart, John (?1501-1574); Mulcaster, Richard (1532–1611).

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E-mail, Internet, Chatroom Talk: Pragmatics

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Scope and Purpose

The notion of the Internet comprises several elements: the ensemble of technical possibilities resulting from computers being linked to each other in computer networks; the types of communicative situations and types of language used in those situations; the body total of its users; and the sum of all Net communities using language. All of these elements define situations of language use. In addition, the Internet comprises all websites, which may be linked to all kinds of use situations. This article will deal exclusively with uses that situations such as chats, e-mail, and lists have in common. All of these genres essentially involve the use of language in an interactive, human-to-human way.

The following discussion will only deal with interactive Internet genres. Just as in written and spoken language, there are great differences between these genres; the following discussion will try to identify aspects of language that apply to all such genres, even if to varying degrees, in the same way that we can make useful generalizing statements about written and spoken language as basic medial varieties. The following discussion will include technical details of the Internet only to the extent that such details are needed to account for specific uses of language on the Internet. The discussion presupposes a basic knowledge of the Internet and its resources.

Research Background

The rise of the Internet as a medium for communication has, next to its societal, economic, and political consequences, arguably had the most significant effect on language. Although the rise of the Internet has variously been compared, as to its nature and its effects, to the rise of mass literacy in the 'Gutenberg revolution,' the new cultural technology represented by Internet communication has received surprisingly little attention from linguistics. On the one hand, Crystal (2001: viii) points to the eminently "linguistic character" of the "Internet revolution," which he characterizes as a "linguistic revolution" (Crystal, 2001: viii); on the other hand, there is a remarkable reluctance on the part of linguists to engage in the subject to any major extent, when it comes to taking a perspective on the language of the Internet vis-à-vis the other medial varieties of language (such as has been done with respect to the differences between the spoken and written medial varieties of language). In fact, the common theme of all research on the subject is to point out how this lack of research interest is in stark contrast to the role of the Internet itself.

Several factors may be cited as possible motivation for this unexpected reticence on the part of the linguists. The use of language on the Internet occurs in the most technically-oriented among all of the media and, as such, is removed from what linguists tend to perceive as the domain of 'natural' language occurrence, given that the study of natural language is supposed to provide a window to humankind. The Internet's high degree of technological sophistication is felt as too much of an intervening, disturbing factor. Another factor may be the nature of the medium itself: given the fast technological development of the Internet, statements about communication on the Internet tend to become obsolete at a rate much faster than in any other field of language studies, in fact faster than in any other area of scientific investigation.

The relative volatility of the object of study is another reason why research on language in the Internet has been less well represented in traditional publication channels, which take a relatively long time for publication. This, in turn, has prevented the field from becoming an established and reputable field early on. It has also not been helpful that most of the research on computer-mediated communication (CMC) has occurred on the fringes of many other disciplinary traditions, often making it difficult to locate previous work on the topic. In addition, much, if not most, of the early work has seen the light of day in student papers and M.A. theses, available, befittingly, through the Internet. All this made for a distinct lack of genuine – and in fact embarrassing – linguistic interest in language on the Internet.

During the first stages of research on the Internet, there was a lot of speculative popular comment, practical interest in the technicalities of the Internet, and cultural criticism, most of which bordered on linguistics, and in fact pointed up the need for an empirically based linguistic study. Beginning from the earliest stages of the Internet, there continues to be a strong interest in practical etiquette, which includes matters linguistic, but is arguably just as interesting in its own right as a field for (socio-) linguistic research. While the social sciences showed an early strong interest (which also was of relevance to linguistics; cf. Wallace, 1999; Döring, 2003), the first major representatives of genuinely linguistic research are found in the studies by Herring (1996), Weingarten (1997) and Beißwenger (2000). The most recent – and in fact the first – monograph on linguistic aspects in the narrower sense is Crystal (2001). This work reflects the fast pace of the development of the Internet in that the research quoted is represented to a great extent by contributions to on-line journals (e-journals), which have a much faster rate of publication than do the traditional channels. The well-established *Journal of Computer-Mediated Communication* is supplemented by a website called *language@internet*, devoted specifically to research on language and language use on the Internet.

Finally and most significantly, empirical work on language in the Internet has up to now shown a severe bias towards a few world languages, with English and German the subjects of, by far, the most empirical studies. As this fact has definitely resulted in a skewed view of the subject, it should be clearly stated at the outset that whatever is said in the following reflects this present stage of scant empirical research – shortcomings of a kind and a degree that are unusual in other fields of linguistics. There is a very urgent need for studying other, typologically and culturally different, languages, as such languages are increasingly making an appearance on the Internet.

Languages on the Internet

Before discussing linguistic aspects of language on the Internet, it is in order to address the issue of languages on the Internet. While it is obviously very difficult, for a number of reasons, to give any figures even approaching reliability (language of home pages? language of chats, of newsgroups, listservs, e-mail? an average of all these? frequency of use?), it is generally agreed that at the moment of writing, English is (still)

the dominant language in the Internet, certainly as far as the language of homepages and the languages of browsers are concerned. There appears to be a consensus that, as of now, the figure for English stands at between 70 and 80%, with Spanish as the current runner-up. Even so, the rate of change in favor of other languages is enormous.

While English clearly has a major advantage as the language of the technology of the Internet – all terms for technology and communicational procedures being in English – there are countervailing tendencies. Above all, the number of Internet users whose first language is not English has risen dramatically; it is now estimated to be in the area of two-thirds of all Internet users. The issue here is to what extent these users are using which language in communicating with whom. Again, English is bound to have a major advantage for communicating with speakers of other non-English languages, both because the technology and terminology are English and because of the difficulties of introducing other writing systems. Still, there is a distinct and (even within the space of only a few years) fast increase in the number of other languages being used on the web, with Chinese as a potential frontrunner in the foreseeable future. Other factors that have to be taken into account are the global cultural and political reactions against English and English-speaking countries, along with the globalization process itself, inasmuch as English and the Internet represent important vehicles as well as symptoms of this process.

While further aspects of linguistic change will variously be taken up in the following sections, it is clear that on the level of language alone, the new medium is having a major impact on the ecology of language (*see* **Adaptability in Human-Computer Interaction**). The trend towards the use of English as a lingua franca on a hitherto unprecedented scale will be counterbalanced, with effects difficult to predict, by a slowing down, if not a reversal of the universal trend towards language loss, especially of minority languages (*see* **Minorities and Language**). What at the moment looks like a clear dominance of English on the Internet with the concomitant political, social, and cultural effects of language convergence will within a relatively short period transform into a major effect of preservation of language diversity, with the Internet offering a sanctuary for otherwise doomed languages and providing them with an important tool for the preservation of their identity, something no other medium could offer. It is difficult to predict, however, if all types of languages will be affected to the same extent and in the same way. Given the novelty of the situation and the fast rate of change of usage conditions, including the technical facilities, it is hard to predict if the effects will include a global diglossia, involving English or other world languages, or what the scenario of language distribution on the Internet and other linguistic media will be (*see* **Multilingualism: Pragmatic Aspects**).

Language in the Technical Medium

Of all three language media, the Internet is the one that is the most highly technically, nonnaturally constrained. It is therefore to be expected that to a considerable extent, the specific shape of language on the Internet will be a consequence of these constraints. While a radical technological determinism is not advocated by anyone, it is equally clear that the language of the Internet, for all its internal diversity, is shaped by the technological conditions in the same way that spoken and written language are. Here, it may be useful to work with a three-tiered layering of basic constraining factors: just as the differences in the physical, pragmatic, and communicative situation or setting of the two traditional language media make for differences in the social, psychological, and emotional conditions and perceptions of the situation, and, as a consequence, trigger different choices from the repertoire of structurally possible forms, so, too, the specific technical and physical conditions of Internet communication will result in specific constellations, comprising

- the physical setting
- the communicative situations and situations of use that are based on this setting, along with the situations as they are perceived psychologically, socially, and emotionally, and the concomitant pragmatic conditions
- the choices made from the repertoire of available linguistic forms, these choices in turn providing access to the perception of the communicative situations.

This three-tiered framework provides a broad grid for the new options and choices on all levels of linguistic analysis: from new genres to the systematic choice of the individual items.

Since every discussion of the place of language in the new medium makes reference, in a variety of ways, to the physical conditions and the communicative situation on the Internet as explanatory dimensions for the specifics of language use, it seems appropriate to briefly discuss these constraints first.

Next to the outstandingly 'technical' character of the medium itself, including its one-to-many and one-to-one, as well as all kinds of combined situations, the immense speed of communication and the sheer quantitative possibilities of data transfer, the most

important physical conditions determining the Internet setting are absence of physical copresence and various forms of shifted temporal copresence. Chat situations and instant messaging, as well as MUDs and MOOs (see below), come as close as possible to temporal copresence (either synchronous or asynchronous), whereas in other forms, such as e-mail, we have a presumption of temporal proximity (in replying and reacting) that varies to degrees; in contrast, listservs and newsgroups have a lesser expectation of their entries being followed up.

The lack of physical copresence has consequences of various kinds. Physical distance has been thought, on the one hand, to be prone to translate as emotional distance, making communication on the Internet appear less apt for subjective and personal communication. On the other hand, the intervening technology, together with, e.g., the option of assuming anonymous nicknames in chatrooms, provides a protective wall, allowing one to take more risks in communicating, at the same time that it reduces the need for strict self-control. This permissive character of the Internet in turn provides for more personal freedom than does spoken, face-to-face communication. These perceptions of the communicative situation have immediate consequences for the linguistic behavior of individuals, and are reflected by it.

This lack of control and monitoring has led to what, from a normative point of view, may appear as a relaxation of linguistic decorum and in general, more liberal attitudes towards norms, linguistic and social. In addition, the inability to control the other communicants provides more freedom and room for creativity, more room for playfulness, but also defines new constraints. It is not the case that there are no norms. Rather, Net communities on all levels develop norms that stand in a complex relationship of difference and distance to the norms in other social situations. The language used reflects this perception of the communicative situation as a virtual, shared communicative place (or even a 'stage') with newly evolving norms on several levels.

In fact, one of the major gratifications of Internet use, be it in chats or virtual play rooms such as MUDs (Multi-User Domains) and MOOs (Multi-Object-Oriented Multi-User Domains), is the sense of theatricality or even drama that is conveyed by the specific virtual universe of discourse and its complex relationship to the real world – not unlike, one might even argue, to what happens in literature. It is this theatrical character of the Internet that goes a long way towards accounting for the playfulness, the creativity of language, and in fact the humor typical of much Internet language, which is also the hotbed of the specific linguistic developments on the Internet. (Further, pragmatic implications of this characteristic with respect to speech acts will be discussed below).

Substituting Nonlinguistic Contextual Information

The linguistic issue that has figured most prominently in the discussions of language in the Internet is its character as a medium situated in between, and having affinities to, both spoken and written language. Already in the earliest linguistic analyses of Internet language, the issue most focused on was the presence of elements (especially in the language of chats) that are typical for spoken language. Such forms have to be seen under two angles: as elements conveying playfulness and creativity, and as elements substituting for the nonverbal context; at the same time, these elements carry the germs of potential linguistic changes. Among these elements are: ideograms (called 'emoticons'), expressing emotion in a way that is iconic for the respective facial expression; the liberal use of expressive abbreviations (such as 'rotfl,' 'rolling on the floor laughing'); and onomatopoetic expressions (or sound words) like 'ahhhhhhhhhhhhhhhh'. (*see* **Interjections**.) The list also includes all kinds of phonetic spellings (e.g., 'paske' for French 'parce que').

Orthography, too, may be an expressive vehicle; it is used in many ways, such as variation on capitalization (for emphasis) and use of lower case where (as for German substantives) upper case is standard. Punctuation and spelling deviations are also used in very creative ways.

Typical for chatrooms are, furthermore, activities termed 'emoting,' or action descriptions such as 'looks.' Typing '/me looks bewildered' will appear on the screen as 'X looks bewildered.'

The above list awaits further empirical study across typologically different languages, since different languages appear to make use of typologically different structures. A salient feature of German Internet language are the so-called 'roots,' 'action words,' or 'inflectives' as in *knuddel* ('cuddle'), which even can be intensified to *megazurueckknuddel* ('mega cuddle to you too'). These forms are formally infinitives and are therefore not inflected. This type of verbalization performs the respective motions (or emotions) and has to be seen in the context of the 'theatrical' character of the Internet universe of discourse.

Most of the forms quoted here have developed into markers of registers belonging to the Internet language of the languages under discussion (*see* **Register: Overview**). Their frequency of occurrence correlates with the perceived formality of the type of

interaction, even within subtypes of individual genres, such as different types of chat scenarios (e.g., moderated vs. nonmoderated). The use and mastery of these items have developed into indexes of speech community membership, with some Internet genres, like MOOs and chats, having developed very elaborate and strictly enforced social conventions. There is, on the Net, an acute perception of community membership as manifested by the correct use of these items.

Apart from their creativity in the specific communicative situation of the Internet, these novel items (especially the typically oral ones) have to be seen in the light of the language's particular character as medium. The most salient characteristic from the point of view of pragmatics and context is a property often referred to as 'lean': the Internet is characterized as a 'lean medium,' referring to the fact that in this medium, there is no 'rich' contextual information available of the extralinguistic kind. (The issue is similar to that discussed in earlier sociolinguistic debates under the label of 'deficit' vs. 'difference'.) Even so, the validity of the lean medium hypothesis has been questioned by people who claim that the screen provides a variety of graphic means to make up for the lack of extralinguistic contextual information; among these are the emoticons and other devices referred to above. Other ways to signal identity comprise (linguistic and other) features, such as personal formatting and the choice of nicknames, to compensate for the types of information not available in the Internet language, as compared to the spoken and written media.

The fact remains, however, that more attention is focused on the individual graphic and linguistic item chosen: the individual item and variant is perceived as carrying a higher functional and informational load. After all, with respect to perception and processing, the Internet language's visual input has a specific addressee and its shape cannot be changed at will: once received, it has much less of an ephemeral character than does the acoustic input of spoken language. In addition, it has been observed that the Internet medium, in comparison with the two traditional media, is much more conducive to metalinguistic comment and as such, much more self-reflexive; this observation holds both in terms of reflection on, and meta-discussion of, issues of language use proper, as well as for the pragmatic and social rules that govern language behavior (arguably another consequence of the medium's high technological sophistication). Thus, the technical nature of the medium changes the language itself, both as to content and use.

As for empirical research on the language of the Internet itself, one of the glaring deficits in this area concerns the lack of a cross-linguistic investigation of the features and forms discussed above. Even a superficial survey of extant work reveals that the forms used in a given language or culture are not only technically specified, but vary in accordance with typological conditions, with specific national cultural histories, and with the varying situations of contact. The use of uninflected forms in French appears to be very rare, whereas it is very frequent in German: in a strongly inflected language such as German, absence of inflection is marked and carries information. This condition would in turn explain the paucity of these forms in English, with empirically testable claims following from this hypothesis. As for the English of the Internet, this is characterized by its well-known proliferation of abbreviations, a phenomenon that fits in well with the language's established structural tendency of abbreviation and morphological reduction generally. It is instructive to observe the dominance of English as it appears even in the transfer of English-based abbreviations to other languages (among these not least German), as observed in the use of abbreviations and acronyms, such as 'rotfl'('rolling on the floor laughing') even in German chats, 'cu' (for 'see you') or in French chats; (cf. Haase, 2003; for work on Italian, cf. Orletti, 2004).

In cultural terms, the high frequency of acronyms in English may go back to the culture's long-established tradition of using shorthand in telecommunication. On the other hand, the typical German use of uninflected expression may well represent a borrowing from English-language cartoons and comic strips, whereas the French preference for the 'plus' and 'minus' signs ('+,' '−') may reflect the prestigious position of mathematics in the history and the educational system of that country. There is thus a wide-open field for the crosslinguistic study of technical-based universal, cultural, and typological factors determining the language-specific make-up of 'Netspeak' in Crystal's (2001) terms.

The Status of Internet Language as a Medium: Between Written and Oral, or How?

Apart from the forms directly supposed to act as substitutions for contextually given information in spoken language, there is another group of forms that are characterized by their preferred occurrence in spoken language. Here, we find all kinds of ellipses and deletions (both of subject and auxiliary, as in 'been here today?'), particles, deletions, and interjections as well as paratactic style and colloquialisms. Together with the first group of forms (treated above under the heading of 'lean' medium), they contribute

to what has been discussed as the typical 'oral' flavor of much of Internet language, especially as it is used in chat.

The two groups have given rise to a debate that basically replicates and extends the familiar issue of orality vs. literality. The discussion has increasingly focused on the question of whether the language of the Internet is a new variety of language medium in its own right, on a par with varieties such as the spoken and written medium, or whether it is simply an extension of written language, since it is typed on a keyboard, but of course including spoken elements to varying degrees. To deal properly with this matter, an essential distinction must be made between the medium of the physical input and output on the one hand, and on the other, the technicalities of the transmission process, which result in the properties discussed above. In particular, the way the language is dealt with through the media of writing and reading, in production and reception respectively, has led researchers to characterize Internet language as 'typewritten conversation': a language that is oral conceptually, but medially written. The notion of conceptual is taken here as referring to a prototypical association of the communicative situation and a set of perceptions of situation and register; the theoretical question of whether there are just two, or perhaps three conceptual language media, each prototypically associated with a language medium, will have to be decided empirically. To settle this issue, further empirical research on other languages, as well as on what does NOT occur in Internet language, will be needed.

Pragmatics

The issue of conceptually new media, broached in the previous section, is related to another issue, *viz.* the question to what extent the new Internet genres are simply medial translations of older genres belonging to the traditional language medium. Genres are conventionalized packages, containing as their ingredients communicative purpose, communicative situation, and language register; most of these are tied to one specific language medium (*see* **Genre and Genre Analysis; Register: Overview**). While it is clear that one significant aspect of language change affected by the Internet is the rise of new genres, this shift is more obvious in some cases than it is in others. MUDs and MOOs, new groups and listservs are clear cases of new genres in a new language medium; among the unclear cases, the most debated is that of chat.

At issue is the question to what extent spoken conversation is able to preserve its identity in the context of Internet chat. The most obvious common feature for both normal conversation and Internet chat is that of turn taking (*see* **Conversation Analysis**). Even so, we observe features of the chat that militate against a simple transposition of conversation from one medium to another: for instance, the notion of a turn is defined rather differently in the Internet medium, given its technical constraints on length, which has led to the invention of turn-splitting techniques. Also, the notion of the speaker itself is spread out over two contexts: the actual typing and editing context, and the context in which the message appears on the screen of the other communicant. Moreover, the mechanisms for next speaker selection are entirely different in the two media. Further important differences have to do with the notion of topicality, due to the nonadjacent character of corresponding moves, and in general with interactional coherence, which is a very different notion here than the one we are familiar with from spoken conversation with its narrow constraints. Thus, establishing coherence requires much more work on the Internet than it does in spoken conversation; an important aspect of that special effort is the need to furnish a lot of explicit communicative meta-information on the linguistic surface of the chat, making it in fact appear more autonomous, relying less on shared interactionally focused information than is the case for written language. Given these differences, it is an open question whether the media constraints of the Internet allow us to refer to the chat as typed conversation.

Parallel effects of the technical and communicative conditions on Internet language use can be observed on several other levels. An important consequence of the absence of direct monitoring is, in speech act terms, an increased uncertainty about the uptake of speech acts (*see* **Speech Acts**). On the one hand, this feature of the communicative situation tends to minimize the danger of loss of face (*see* **Face**), and thus helps explain the socially more forgiving character of the Internet. On the other hand, it also accounts for a higher degree of interactional uncertainty, especially when it comes to interactionally focused actions and referents. As a consequence, the usual conversational maxims are relaxed, or have to be adapted to the specific communicative situation; in particular, given the specific nature of turn-taking and topic management, the notions of relevance and quantity cannot be the same as in spoken conversation (*see* **Maxims and Flouting; Relevance Theory**).

Another consequence of the relative uncertainty of interactional focusing is the fact that much more referential effort has to be undertaken in terms of the intensional content of expressions; thus, there tends to be less pronominal reference and more reference by

full lexemes. This is particularly obvious when the referents are located in topically coherent, but spatially nonadjacent turns. We see the same phenomenon occurring in hypertext: hypertextual organization cannot rely on a sequential reading in any predetermined order. As a consequence, the modular character of hyper- (or in general: meta-) text enforces a much more explicit, self-contained, and autonomous reference, just as do the Internet genres themselves, and much as does written language. It is obvious that the essentially different social obligations incurred by Internet users have given rise to a substantial number of books on Internet 'netiquette,' testifying to the fact that notions of correctness and appropriateness, analogous to those familiar from written and spoken standard varieties and registers, are in the process of formation (*see* **Register: Overview**).

Varieties and Communities

Another issue on the borderline between linguistics and sociolinguistics that has surfaced in more recent studies on language on the Internet is the role of varieties. Early work was dominated by the idea that written English was to be the standard on the Internet; standard English operated as a vehicle of globalization, to the disadvantage of other languages, and contributed to an ever more progressive leveling of other languages and dialects. Studies of Internet language, apart from occasional references to nonstandard forms as marks of orality, were mainly focused on standard languages. While there is still little work being done on the systematic use of nonstandard varieties and dialects on the Internet, it is apparent that there are differences between languages, to the extent that some languages allow their users to exploit such varieties and dialects for purposes of maintaining a local identity; for instance, a language like German appears to be much better represented by its dialects on the web than are others, like French. There is, however, far too little data available on this question, and, as already pointed out, the situation is changing very fast, to the quantitative disadvantage of the world's languages.

Recent work (Androutsopoulos and Ziegler, 2003) has not only moved the discussion away from unreflected, folklore-linguistic doomsday predictions of further language decay on the Internet, to a serious analysis of nonstandard forms by studying actually occurring, nonstandard language, but it has also taken the debates a step further, in the direction of interpreting the changes in terms of code-switching, of interactional processes, and of language-community networks. As an instance, we may consider the situation on the Indian subcontinent, where core membership in an Internet network is associated with Hindi. In another context, chatters on a German local dialect channel select graphic representations of nonstandard spoken forms and nonstandard grammatical features to establish and confirm their respective membership on several levels of Internet communities.

While much research has been devoted to the nature and the internal structure of Net communities on the part of the social sciences, few studies have been done along the lines of a microlinguistic, interactionalist analysis, showing the micro-structure of the group symbolic use of linguistic forms and variants. Such work would describe local variants of global processes, in which ever larger networks of users develop shibboleths to manifest their status as network members, and ultimately as Internet users. In terms of language variety, what emerges here is a special, medially defined linguistic register. The specific varietal architecture of a language determines the extent to which varieties can assume these functions: nonobservance of spelling rules in a language like French, where the standard variety exerts very high normative pressure, carries much higher information value, and thus more symbolic force, than is, for instance, the case in German.

Language Change

Just as the advent of writing and mass literacy had a major impact on language and languages on several levels, new technical and communicational options are expected to evolve new genres, adapted to the new, sooner or later to be conventionalized communicative situations, with new rules for floor use and altered linguistic norms in terms of register and style. The development of such new genres, registers, and individual expressions, along with the attribution of additional functions to the old forms can generally be seen as an evolutionary process in which users adapt language to the new technical and communicative conditions and functions (*see* **Adaptability in Human-Computer Interaction**). As the network studies referred to above demonstrate, a core mechanism in this process is that of speakers negotiating, in a cooperative process, markers and symbols of language communities on several levels of networks; such markers and symbols then translate into register markers (*see* **Register: Overview**).

Above, I have discussed the impact of these processes on the ecology of language(s); in addition, there are several other important lines of research dealing with the effects of the Internet on language. Thus, one of the major future research questions will be to what extent the new registers, inasmuch as they

represent the new genres linguistically, will show a convergence of register features and markers. Given the advanced technological sophistication of the new language medium, it could be hypothesized that the registers would be more similar across languages than written registers traditionally have been, even taking into account the existence and influence of typological borders. It will also be interesting to see, given the great differences between cultures when it comes to notions of politeness, if any such convergence will extend to floor behavior in terms of pragmatic constraints and politeness rules, and in particular whether one may expect to see modifications of the cooperative principle. The more technical linguistic evidence regarding typological and cultural convergence vs. difference, to the scant extent that it exists at the time of writing, is inconclusive and does not offer support for either position, whether the discussions are couched in linguistic terms or in terms of cultural theory.

There can be no doubt that the Internet, its terminology, and at least some of its formal linguistic apparatus has, in addition to creating a certain spill-over effect onto the other language media, in particular furthered the influence of English. Technical terminology and the language used in communicative institutions such as 'chat' or 'e-mail' have entered the language at large: compare the use of the 'at' sign (@), domain names (.com, .gov., new lexical formations like 'dotcoms'), terms like 'flaming' or 'spam,' or the new word formations starting with 'e-,' such as 'e-mail,' 'e-government,' and so on. While these new forms certainly represent elements of language change, they are mostly confined to a rather local level, and do not change the overall, let alone the typological character of a language. But they do represent language change under another perspective: language contact. From this point of view, the Internet accelerates a trend that has long been observed for English in contact with other, local languages: the rise of contact varieties. It is to be expected that this tendency will pick up even more speed in the future. It will be interesting to see if the language contact mechanisms observed for spoken contact varieties apply in the same way in the communicative conditions of the Internet.

Since the Internet provides the fastest ever channel of social diffusion, and linguistic change on the broader, societal level is dependent on this kind of contact, the Internet may well accelerate other, ongoing changes on this more general level of societal change. In particular, with respect to the distribution of the language media over its various domains, the new language medium has effected something like a redistribution of the societal functions with respect to the language medium in which they are carried out. Not that written language is directly threatened as to its function and place of functioning: what has happened is that the spectrum of societal functions and types of communication is now being *shared* between three, rather than two, language media. In practical terms, this change means that there is an increase in genres and registers, amounting to an increase in internal differentiation of the repertoire to be learned and taught.

With regard to research on language change and its methodology, the Internet provides some unique opportunities. Thanks to its easy access to 'texts' (technically available as logs on the web), as elements of written-ness in a medium perceived as one of conceptual orality, the Internet provides a rare window of opportunity for monitoring the micro-mechanisms of this evolutionary process, including the social negotiation that takes place along with it, and traces the diffusion of that process through linguistic and social contexts until the language has changed.

See also: Adaptability in Human-Computer Interaction; Conversation Analysis; Genre and Genre Analysis; Interjections; Maxims and Flouting; Minorities and Language; Multilingualism: Pragmatic Aspects; Register: Overview; Relevance Theory; Speech Acts.

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Early Historical and Comparative Studies

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The origin of language studies and the search for linguistic affiliation have many roots. Languages were studied quite insightfully – with results thoroughly affecting linguistic thought even in the late 20th century – both in Greek and Roman antiquity, probably also long before that time in other cultures of which only limited information has survived. Scientific language study, on the other hand, is of a comparatively recent vintage. While a large number of sporadic attempts were made throughout the intervening centuries between classical antiquity and the beginning of the 18th century, the first decisive event of far-reaching consequences for the establishment of historical and comparative language studies was the proclamation of Sir William Jones (1746–1794), made in 1786 and published two years later. It swiftly captured the minds of scholars in many parts of Europe: a certain number of languages, later on to become known as Indo-European, are so similar in grammatical structure that they must be assumed to have descended from the same source language, a language that might no longer exist. Jones's hypothesis, for which neither he himself nor any of his contemporaries could provide much empirical linguistic evidence, set in motion an unprecedented number of activities, all geared to substantiate the correctness of what he had hypothesized, since there was little doubt as to the merit and the validity of his pronouncement. His stature – being one of the three Judges of the British Crown appointed to the Supreme Court of Justice in Calcutta, India, and at that an Orientalist in his own right – did ensure that his voice was widely heard. But it required Friedrich Schlegel, Franz Bopp, and others to ensure that the seeds planted by Jones could develop and bear rich fruit. Jones's observation, however, was not original with him; numerous endeavors made by others before his time led to statements similar to his without, however, having an impact on scholars even remotely comparable to that of Jones. Of the many earlier instances that could be cited as examples for still somewhat rudimentary historical or comparative language studies, only those representatives are mentioned below who were especially instrumental in determining the ensuing course of linguistics.

Full of interesting and important insights is a treatise by the Swiss theologian Theodorus Bibliander (ca. 1504–1564), *De ratione communi omnium linguarum & literarum commentarius* (*Commentary on the Reason Common to all Languages and Letters*), published in 1548 in Zurich. Its primary objective was a closer understanding between Christianity and Muslims. With this in mind he also edited the first Koran (Qur'an, from the Arabic stem Qara'a 'to read,' 'to recite') translation into Latin by Peter the Venerable (ca. 1092–1156), abbot of Cluny, which resulted in his immediate arrest. It took Martin Luther's personal intervention to set him free again. In comparing, for instance, Hebrew, Greek, and Latin, Bibliander showed (no matter how superficial and faulty some of his observations were) a surprising awareness of the factors that play a crucial role in the development of languages. Among the reasons languages have moved away from their original Babylonian uniformity he cites intermingling of languages and peoples, changes in governmental structure from domestic to foreign rulers, and modifications brought about by varying educational standards and by differences in vocational training. He also mentions factors tied to individual behavior in the handing over of languages from generation to generation, such as a tendency towards economizing the individual effort, through laziness and negligence, and a desire to exaggerate.

In 1555 the Swiss-German Conrad Gesner (1516–1565) published what was to become recognized as a first major attempt at scientific language comparison. In his book *Mithridates: de differentiis linguarum tum veterum tum quae hodie apud diversas nationes in toto orbe terrarum in usu sunt (Mithridates: on the differences of ancient languages as well as those that are in use today in the various countries of the entire world),* Gesner compared 22 languages by using the Lord's Prayer as his language sample, a procedure also employed, about two decades later, by his 18th-century successor Johann Christoph Adelung (1732–1806) and his collaborator Johann Severin Vater (1771–1826). Adelung managed to enlarge the number of languages from Gesner's 22 to approximately 500, but apart from the accumulation of a greater corpus of data the net gain was rather negligible. Jacob Grimm (1785–1863) expresses almost sarcastically his disappointment with what little had been achieved and what great opportunity in his opinion was passed up: "If Adelung and Vater would have had only a spark of such universal language talent [like Wilhelm von Humboldt], the Mithridates would have turned out to be something vastly different" (letter to Franz Bopp, quoted in Lefmann, 1891–1897: 179 [Anhang (Appendix)]). Even at the time when Adelung and Vater were at work on their

multivolume *opus magnum,* the expectations were rather high. But there were critical remarks as well, e.g., those of Wilhelm von Humboldt – more to the point than Grimm's mentioned above, even though he seemed most eager to contribute to that worthy cause: 'Das Vater unser enthält so einfache und kurze Sätze, dass kaum die Construction einer Sprache, viel weniger aber das, was den Stil in derselben bildet, darin sichtbar werden kann' ('The Our Father contains such simple and short sentences that it is hardly possible for the construction of a language, much less even for what forms the style in that language, to become visible in it' [= the Our Father]; Humboldt, 1817: 346).

Gesner was not a language specialist. His fields of interest were widespread and incorporated almost every branch of science practiced at his time. Hence, his qualifications for and experience in the area of language studies were rather general. In his collection of Slavic language data he mainly relied on the work of others, e.g., on the Latin travel report through Russia by Baron Sigmund von Herberstein (1486–1566), first published in Vienna in 1549, which, incidentally, is also an important source for Theodorus Bibliander, as Julia Verkholantsev asserts in a February 2001 conference presentation at the University of California, Los Angeles (see Verkholantsev, 2001). Gesner's work, however, is important in many respects, especially because of an idea he expressed in the introduction dedicated to the Englishman Johannes Balaeus. Languages, he says, are indeed very different in the way they express thought. That difference in grammatical structure indicates the extent to which languages are related. Precise knowledge of how different languages are is essential: "It is my conviction that it belongs to what an educated and philosophically-minded individual should study, namely, to come to know the variability of speech and of the languages." His remarks also throw light on possibly the strongest motivation even for scholars only marginally interested in language study to embark on the attempt to unravel the secrets of language: the desire to probe into the development of thought and its interdependent relationship to language. That same motivation was very forcefully expressed by Gottfried Wilhelm Leibniz (1646–1716). Statements like the following, contained in his *New essays concerning human understanding* (1704), characterize his general attitude in the matter:

> "I am truly convinced that languages are the best mirrors of the human mind, and that a precise analysis of the meaning of words better than anything else would show how the mind operates" (Gerhardt, 1875–1890, vol. 3: 313; my translation).

Leibniz, in keeping with this view, admonished his countrymen to improve thought by improving their native tongue. He furthermore set up strict guidelines for the work of the language investigator: "The study of languages must not be conducted according to any principles other than those of the exact sciences." He envisioned three stages in such a scientific procedure. The first stage, the only possible point of departure, would have to be the thorough study of "the modern languages which are within our reach." Once those have been sufficiently explored, they would have to be compared "with one another, to discover their differences and affinities." In the third and last stage, languages should be compared with "those which have preceded them in former ages, in order to show their filiation and their origin" (see Jankowsky, 1972: 21). While neither Leibniz nor anyone else at that time did advance to the implementation of those illuminating guidelines, his work, among that of numerous others, has provided a reliable framework for subsequent investigations, which eventually led to the achievements of the 19th-century linguists.

It is worth mentioning that Leibniz, apart from formulating guidelines for the meaningful study of languages, was also keenly interested in using his influence to arrange for language studies on a grand scale. Therefore he made an effort to prevail upon Peter the Great of Russia (1672–1725) to commission a survey of all languages in the territories under his rule, in Europe as well as in Asia. The idea caught on; it was, however, not Czar Peter who carried it out, but Czarina Catherine II (1729–1796) almost a century later, when she asked Peter Simon Pallas (1741–1811) to complete the task.

In 1686 the Swede Andreas Jäger (ca. 1660–1730) published a paper in Wittenberg entitled *De Lingua vetustissima Europae, Scytho-Celtica et Gothica (On the oldest language of Europe, Scytho-Celtic and Gothic).* It contained a number of surprisingly accurate observations on how languages are related. In describing this relationship he used terms like 'ancestral language,' 'mother language,' and 'daughter languages,' thus demonstrating that he had gained at least a general understanding of the notion of genetic relationship. Like August Schleicher (1821–1868) almost 200 years later, Jäger discussed the need to consider various stages of language development in terms of infancy, youth, manhood, and death. He used terms reminiscent of the family tree concept, speaking of dialects in terms of Latin *rami* (branches) with amazing consistency (see Metcalf, 1974: 236).

Jäger's paper suffered a curious fate. Since he was still a student in 1686, earning with his paper a

Magister's degree from the University of Wittenberg, the title page of the publication lists his academic moderator, Georg Caspar Kirchmayer (1635–1700) much more prominently than the author himself. This has two consequences: (1) For the subsequent 300 years he and his article are hardly referred to in the literature. (2) Not rarely, Kirchmayer is listed as the author. A prominent 20th-century example is *Sprachgeschichte: Ein Handbuch zur Geschichte der deutschen Sprache*, which lists under 'Quellen' (sources): '*Jäger, Andreas (Kirchmeier)*, De Lingua vetustissima Europae. Wittenberg 1686' (Besch, 1984–1985, vol. 2: 1607). The 'Verfasserregister' adds another element to the mix-up of names: 'Jäger, A. (= Kirchmeier) 1607.'

Justus Georg Schottelius (1612–1676), a lawyer by profession, fought valiantly to secure for his native German a place comparable to that traditionally accorded to the three 'sacred' languages, Hebrew, Greek and Latin. Already the Venerable Bede (672/73–735) had emphatically pronounced: 'Tres sunt autem linguae sacrae: Hebraea, Graeca, Latina, quae toto orbe maxime excellunt' ('There are indeed three sacred languages: Hebrew, Greek, Latin, which greatly excel in the whole earth') (quoted after Metcalf, 1974: 238). This pronouncement had lingered on as an almost dogmatic concept all through the Middle Ages until at least the beginning of the 18th century. The obstacles Schottelius had to overcome were formidable. Vernacular languages such as German were deemed unworthy to be the subject of any scholarly pursuit. Their status was vastly inferior to that of Hebrew, which continued to be widely regarded as the holiest and also the oldest language, from which all other languages were derived. While some quarters doubted the validity of that assumption, it was Leibniz who challenged effectively that cherished and hitherto largely uncontested belief, thus clearing the way for meaningful historical and comparative language studies. Schottelius excelled in amassing linguistic materials which many of his successors – including Leibniz, who frequently referred to him (see Schulenburg, 1973: 127) – found extremely useful. In the five books of his *Ausführliche Arbeit von der Deutschen Haupt-Sprache* (1663), one of his main objectives is to provide an investigation of the German language within a historical framework. He distinguishes five 'Denkzeiten' (periods of thought) as characteristic stages for the development of German: (1) The beginning formation of the German words; (2) the time of Charlemagne (742–814); (3) the reign of Rudolf von Habsburg (1273–1291); (4) the period starting with Martin Luther (1483–1546); and for (5), the last 'Denkzeit,' Schottelius wishes that it 'möchte auf die Jahre einfallen, darin das ausländische Lapp- und Flickwesen künte von der Teutschen Sprache abgekehret, und sie in ihrem reinlichen angebornen Schmukke und Keuschheit erhalten' ('should coincide with the years when the foreign rag- and patch-work could be removed from the German language and it could be retained in its pure innate decor and chastity') (1663: 49). Schottelius paid special attention to the analysis of words, what their component parts are, and how they combine to compounds. 'Stammwörter' (*literae radicales)* are for him the basic building blocks. They combine with 'Hauptendungen' (principal endings) or *terminatio derivandi*, to be distinguished from 'zufällige Endungen' (accidental endings) or *literae accidentales* (1663: 68–71). While he goes astray in many of his conjectures and definitions, especially when he ventures into the field of grouping languages as closely related, he deserves to be regarded as a crucial link in the advancement of historical language studies.

The German Orientalist Hiob Ludolf (1624–1704), upon whom Leibniz relied heavily in matters of the German language (as well as on a variety of 'exotic' languages), was another beneficiary of Schottelius's linguistic endeavors which had provided him with numerous useful points of departure. But both Leibniz and Ludolf outdistanced Schottelius considerably in the thoroughness of their linguistic acumen. Ludolf's ideas as to what language comparison entails are substantive and uncommonly precise:

> To establish [genealogical] relationship between two languages, it is necessary that they not only share some words, but also that their grammatical structure be identical to a substantial extent, as is known from the case of the Oriental languages. (Quoted after Jankowsky, 1972: 23–24)

No scholar before him had spelled out with greater precision the need for the language specialist to examine the grammatical structure of languages as the essential precondition for the determination of language relationships.

Ludolf, the founder of Ethiopian language study in Europe, practiced what he preached in numerous investigations involving Ethiopian, Amharic, Hebrew, also Latin (see Schulenburg, 1972 passim) and to some extent even the language of the Gypsies. But his guidelines, although they proved valuable for his own extensive research, did not become the 'tools of the trade,' neither among his contemporaries nor for the succeeding generations of language investigators during the next one hundred years.

Important insights regarding language affiliation were attained by Christian Jacob Kraus (1753–1807), of Königsberg, an economist by profession and a philosopher and linguist by avocation, who focused

his attention on the necessity of exploring the sound side of language in much greater detail than had been done before. He insisted, for instance, on the importance of determining the phonetic value of speech sounds (see Kaltz, 1985). But he also emphasized the need to analyze more thoroughly the grammatical structure and set up criteria for interpreting the similarity or identity of linguistic forms. His term '*philosophische Universal-Linguistik*' comes close to what 'comparative linguistics' stands for today. Kraus kept well informed about the results of language studies in his native Germany as well as in other countries. Thus he expressed high hopes that the exploration of the grammatical structure of Sanskrit by the 'learned society at Calcutta' would inspire other researchers to continue work along similar lines. He was a forerunner *par excellence* of comparative-historical linguistics.

Kraus was prompted to investigate the phonetic quality of language by carefully studying Peter Simon Pallas's *Vergleichendes Glossarium aller Sprachen und Mundarten* (Pallas, 1786–1787) and using it as a starting point for a review article (Kraus, 1787), in which he presents his own elaborate ideas on language history and language comparison: (1) He asks for valid reasons to study and compare languages the most obvious being to expand our knowledge of the nature of man. (2) Comparative studies have to include all components of language, its sounds as well as word meanings and grammatical structure. (3) How to go about determining what type of language to investigate? Kraus obviously was aware that the notion of language is far from being elaborately defined. Without using our modern terms, he alludes to the problems of idiolect, sociolect, and dialect in gaining insight into the nature of language. (4) The components of language, such as words and grammatical structure, need to be studied in their interrelationship as an indispensable precondition for the adequacy of language comparison. (5) Such a comparison requires well-designed methodologies to achieve solid results. Kraus understood that the envisioned research work is huge and enormously complex. It cannot be accomplished by the endeavors of a few single individuals but must become a collective effort by a large group of cooperating specialists.

The significance of Kraus for the development of historical and comparative linguistics has still not yet been exhaustively explored, even though several insightful studies have emerged during the last decades (see, e.g., apart from the earlier mentioned Kaltz, 1985, – Franke, 1979).

In Scandinavian countries, intensive historical language studies began approximately as early as in Germany. North Germanic philology was established and developed by a host of Danish, Icelandic, Swedish, and Norwegian scholars. As the most prominent and in all probability as the pioneers of North Germanic philology, the following scholars have to be mentioned: the Dane Stephanus Johannis Stephanius (1599–1650), famous for his edition of *Saxo Grammaticus: Gesta Danorum* (1644), gained recognition for his efforts to increase the precision of historical description. Ole Worm (1588–1654), another Dane, was noted for his several books on Old Germanic literature – for instance, *Runer seu Danica Literatura antiquissima* (1636); a booklet (1641) on the Golden Horn of Gallehus, discovered in 1639, containing the oldest extant Germanic alliterative verse (Ik Hlevagastir Holtingar horna tawido); and *Danicorum monumentorum libri VI* (1643), for a long time the most important book on the Germanic runes. Like Stephanius, Worm focused on the exploration of the riches of ancient Scandinavian literature.

The Icelander Runolfur Jonsson (died 1654), better known as Runolphus Jonas, is said to have written the first Icelandic grammar, *Recentissima antiquissimae linguae septentrionalis incunabula, id est grammaticae Islandicae rudimenta nunc primum . . . edita (The most recent incunabula of the most ancient Northern language, that is, an introduction to the Icelandic grammar, now for the first time . . . edited)* (1651). His intensive studies of the three 'holy languages,' as well as modern languages such as German, English, and the Romance languages, inspired him to apply the insights gained to his native tongue and for a historical treatment of the Scandinavian languages in general. Johannes Bureus (1568–1652), credited with having founded the study of Old Germanic archaeology in his native Sweden, wrote an evaluation based on his extensive collection of Runic inscriptions (on stone) and his meticulous description of his findings (1599). He furthered language studies significantly by being the first to describe an old Germanic language with primary emphasis on its grammar (1636).

Peder Hansen Resen, or Petrus Resenius (1625–1688), provided the first edition of Snorri Sturleson's (1179–1241) *Edda,* both of the *Poetic* or *Older Edda* and of the *Prosaic* or *Younger Edda* in 1665. The *Older Edda* contains approximately 30 songs dealing with stories about Germanic gods and heroes. It originated in Iceland between 800 and 1000 A.D. The *Younger Edda* dates from around 1220 and was written as a handbook for the younger *skalds* to gain experience in the use of *kenningars,* the metaphorical paraphrase of a concept by a composite expression, and also to learn about other essential aspects of poetic art. The edition, because of its comprehensiveness, proved to be a very important source material, not only for Scandinavian scholars but also for

scholars from all over Europe who were interested in Old Germanic studies. More than through his original research, Resenius exerted extraordinary influence by searching out segments of the ancient mythological writings discovered by other scholars, placing them into their appropriate context, and seeing to it that they were published. Another important contribution of his was the edition of the Icelandic dictionary (*Lexicon Islandicum, sive gothicae runae vel linguae septentrionalis dictionarium,* Havniae, 1683) which his countryman Gudmundur Andresson (ca. 1615–54) had compiled.

The Swedish captain Philipp Johann von Strahlenberg (1676–1747), prisoner of war for thirteen years in Siberia, had the good fortune of being able to utilize his time to collect materials on various languages he had encountered during his long years of imprisonment, especially on Altaic languages. He published his findings in a work entitled *Das nord- und östliche Theil von Europa und Asia* (1730). The treatise is remarkable because it is published as described in the subtitle, with 'einer noch niemahls ans Licht gegebenen Tabula polyglotta von zwey und dreyssigerley Arten tartarischer Völcker Sprachen und einem kalmuckischen Vocabulario' ('a Tabula polyglotta, never brought to light before, of 32 types of languages of the Tartar people and of a Kalmuck vocabulary').

For their efforts in exploring their native Danish language according to historical principles – at least to some extent – two additional scholars must be mentioned. The first is the Danish scholar Peder Syv (1631–1702). He gained importance by being one of the first to have written a Danish grammar (1663), reprinted by Henrik Bertelsen in *Danske Grammatikere I-VI* (Copenhagen 1915–1929). The second is Jens Pedersen Hoysgaard (1698–1773), whose work on *Accentuered og raisonnered grammatica* (1747) proved to be an essential link in the development of intensified historical studies. Hoysgaard's study provided most accurate information on the language of his time, especially on matters of accent and quantity.

Of extraordinary significance is the work of Franciscus Junius (1589–1677), born in Germany of a French father and a Dutch mother, who spent 30 years of his life in England and subsequently settled in Holland. He is rightly credited with having introduced Gothic into the Germanic family of languages by his edition of the *Codex Argenteus* (1665). He had received the texts from his brother-in-law Isaak Vossius (1618–1689), a great collector of manuscripts (a collection later purchased by Leiden University and known as *Codices Vossiani*). Comparative studies involving Gothic and other European languages followed at short intervals.

Andreas Jäger's *De Lingua vetustissima Europae, Scytho-Celtica et Gothica* (1686), mentioned above, was soon succeeded by numerous comparable publications. The Dutch scholar Lambert ten Kate (1674–1731; *Kate Hermansz, Lambert ten*) with his work on *Gemeenschap tussen de Gottische Spraeke en de Nederduytsche (The relationship between the Gothic and the Dutch Languages)* (1710), created a milestone in comparative studies. Among other discoveries, he found out that the stem vowels of the strong verbs are far from being entirely irregular, but follow, instead, regular patterns of deviation which are comparable in all Germanic languages. Another important contribution was made by the Swede Johannes Ihre (1707–1780) with his main work *Glossarium suiogothicum* (1769). He investigated comparatively the vocabularies of various Germanic languages and recognized their relationship with Mœsogothic, 'the mother of all the other [Germanic languages].' He was also aware that certain relationships exist between the Germanic languages and, for instance, Greek, Latin, and Persian. Ihre, furthermore, demonstrated familiarity with what later on were more comprehensively described as the laws of sound shifts.

The idea of studying language and languages as well as the historical development involved caught on in numerous other European countries. Even an approximately complete listing would require much more space than is available here. The motivation invariably was the desire to derive maximal benefits for certain scholarly disciplines through the investigation of selective language components. A prominent example from 17th-century France is the *Grammaire générale et raisonnée* of Port-Royal, with Claude Lancelot (1615–1695) and Antoine Arnauld (1612–1694) being its principal authors. Although numerous ingredients of this work had previously been discussed by a variety of scholars, the focus on exploring the interrelationship of grammar and mind, virtually equating mental processes and grammatical structures – which amounted to the identification of a solid foundation for a universal grammar – has exerted a profound influence throughout the succeeding centuries and made it 'one of the most important works on language ever written' (Tsiapera, 1993: 14). Noam Chomsky, in his *Cartesian Linguistics* (1966), restored life to the Port-Royal grammar in the 20th century, making it a cornerstone of his linguistic theory.

Reaching back to Dante Alighieri's (1265–1321) *De vulgari eloquentia,* written between 1304 and 1306, goes somewhat beyond the general time frame set for this survey. It is, however, significant to point out that here Dante argues – and he was the first ever

to make this argument – for the superiority of vernacular language over Latin, fortifying his views by providing a great number of good reasons. He also ventures interesting assumptions on the relationship of the successor languages to Latin as well as the spreading of languages from the Orient to European countries.

Giambattista Vico (1668–1744), professor of rhetoric at the University of Naples beginning in 1699, is generally credited with having been the first to develop a modern theory of historical research. He stressed the need for establishing 'a history of the ideas, the customs, the deeds of mankind.' Once this was achieved, we would gain insight into the common human nature and the genetic, universal characteristics shared by all people. Vico recognized that this common nature is accessible only through language. Hence he strongly encouraged the historical study of language as the indispensable means for the understanding of earlier human societies. Curiously, his ideas initially found little acceptance in his own country, whereas he was well known to and appreciated by German scholars such as Johann Georg Hamann (1730–1788), Johann Gottfried von Herder (1744–1803), and Friedrich August Wolf (1759–1824).

A place of great importance for initiating scientific historical and comparative linguistic research must be accorded to the Hungarian medical doctor and amateur philologist Samuel Gyarmathi (1751–1830). While being employed as a family physician by the Hungarian Count Gergely Bethlen, he spent three years in Germany, most of that time in Göttingen. There he wrote, between 1796 and 1798, a 400-page treatise establishing for the first time the genealogical relationship between languages through a comprehensive comparison of the inflectional forms of the Hungarian language with languages of Fennic origin. This pioneering work, written in Latin, was published in Göttingen in 1799 and immediately hailed as an extraordinary accomplishment. Two extensive reviews appeared the very same year (Hanzeli, in Gyarmathi, 1983: xxix), and prominent 19th-century linguists such as Rasmus Rask (1787–1832), Adelung, and August Schleicher expressed their admiration (Hanzeli, ibid.). However, amazingly, Gyarmathi's study never made it to the top of the ranking list and has remained, instead, largely relegated to the sidelines.

This survey has considered the achievements of linguists from a number of European countries. Of necessity completeness was not, and could not be, the primary objective. In the case of contributions made by Spanish and English linguists, we refer to two elaborate studies (Quilis, 1986; Salmon, 1988) rather than providing a more selective sample treatment.

The framework for comparative and historical linguistics created at the beginning of the 19th century by scholars like Franz Bopp, Rasmus Rask, and Jacob Grimm was, therefore, by no means without influential antecedents; on the contrary, there is sufficient evidence to prove that these linguists have greatly benefited from the labors – and the insights – of their numerous predecessors of the previous several centuries. The Indo-European hypothesis that unites most European languages with languages from as far away as India provided a focus that led to more and more precision in the description and analysis of languages and their history.

See also: Adelung, Johann Christoph (1732–1806); Arnauld, Antoine (1612–1694); Bopp, Franz (1791–1867); Chomsky, Noam (b. 1928); Grimm, Jacob Ludwig Carl (1785–1863); Gyarmathi, Samuel (1751–1830); Hamann, Johann Georg (1730–1788); Herder, Johann Gottfried (1744–1803); Humboldt, Wilhelm von (1767–1835); Jones, William, Sir (1746–1794); Junius (Francisci Filius), Franciscus (1591–1677); Leibniz, Gottfried Wilhelm (1646–1716); Luther, Martin (1483–1546); Pallas, Peter Simon (1741–1811); Rask, Rasmus Kristian (1787–1832); Schlegel, Friedrich von (1772–1829); Schleicher, August (1821–1868); Schottelius, Justus Georg (1612–1676); Vico, Giambattista (1668–1744); Wolf, Friedrich August (1759–1824).

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Early Irish Linguistics

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The linguistic interests and activities of medieval Irish scholars were resolutely conceptualized within the framework of *grammatica* (see, for example, Isidore *Etym*. I.v.) and its holistic provision of strategies for the interpretation and production of texts. Relevant texts include the exegetical grammars, in particular, a 9th-century group of Hiberno-Latin commentaries on Donatus' *Ars maior* (by Murethach and Sedulius Scottus and in the anonymous *Ars Laureshamensis* and *Ars Brugensis*, which arguably all depend on a lost common source written in Ireland) with its vernacular development *Auraicept na nÉces* 'The Scholars' Primer,' as well as various gloss-commentaries and glossaries, such as the ninth century glosses on Priscian's *Institutiones* in Sankt Gallen Stiftsbibliothek MS 904 and related manuscripts, which were important for the creation of linguistic terminology in Irish, the early eleventh commentary on the *Amra Choluimb Chille*, a difficult elegy for St Columba/Colum Cille probably written shortly after his death in 597, or *Sanas Cormaic* 'Cormac's Glossary.' *Auraicept na nÉces* is the title for the recensions and versions of a discussion of various linguistic topics, prominent among them the origin of the Irish language, the key categories of its analysis, and the presentation of some nominal paradigms. The origin myth of Irish propagated here explains it as the language constructed after the dispersion at the tower of Babel to preserve what was best in every language. This myth also indicates the Irish scholars' active pride in their own vernacular, which is further exemplified in their use of native terms for Irish, latinate terms for Latin, and an admittedly rather summary comparison of the semantic differentiation of the lexicon of Latin and Irish, to the advantage of the latter. The *Auraicept*'s vertical structure of base text and explicatory gloss-commentary places it formally into the tradition of the exegetical grammars; its very short canonical core has been tentatively dated to the late 7th century. Its use of Latin quotations and of concepts discussed in the Hiberno-Latin commentaries of the *Ars Maior* suggests the 9th and 10th centuries as the decisive phase of textual and intellectual development, while the end of its productive expansion has been placed around 1100. The earliest manuscripts now known are thought to date from the 14th century. The *Auraicept* was part of the linguistic training of poets; besides the jurists, the learned class arguably most important for an analytic interest in the vernacular. The poets' professional interest is further reflected in the four more specialized metrical tracts dating to the 10th and 11th centuries that basically survey current metrical forms. The final native development of medieval *grammatica* are the Early Modern Irish grammatical tracts of the 16th century. These tracts were instruments for the poets' codification of a standard form of Irish; they treated various aspects of orthography, syntax, and notably, morphology and the variants permitted for use in poetry. Grammaticographical codification of Irish in the 17th century was dominated by scholars associated with the Louvain school of Franciscans in whose work a formative influence of the new Renaissance models of grammar was combined with native bardic concepts.

See also: Priscianus Caesariensis (d. ca. 530).

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Early Socialization and Language

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The term 'socialization' refers to the process through which human beings learn how to be members of particular cultures. This process incorporates the transmission of both cultural knowledge and social skills and thus involves learning how to speak and behave within a given society. Early socialization is that which takes place during childhood, as a child discovers – in the contexts of family, community, and school – how to make sense of the world and respond to it appropriately.

'Language socialization' is generally understood to include both socialization through language and socialization to use language (Schiefflin and Ochs, 1986). In the course of early socialization, children also develop certain attitudes about language.

Socialization Through Language

During a child's acquisition of a first language, and once that acquisition is completed, much of his or her early socialization will take place through that language, both explicitly (in receiving cultural instruction) and implicitly (in the structures and patterns of linguistic communication). When we learn to speak, we learn not only the syntax, semantics, and phonology of a language but also its pragmatics. In doing so, we learn what constitutes appropriate behavior in a range of settings within our community and become better able to negotiate its cultural practices. Language is sensitive to activities and events, as well as playing a role in their construction, and when parents or other community members use language around children they provide information as to the purpose and structure of whatever event is taking place. As children develop their understanding of these linguistic cues (Gumperz, 1983), they also acquire an understanding of social organization and the competence to perform linguistically and socially in a range of situations.

In many cases, language is not simply a means of understanding sociocultural practices but itself comprises a social activity (Hymes, 1974), as with storytelling, arguing, teasing, or describing. Socialization in these cases is purely linguistic, as children learn how to create a particular context of behavior through their language use. Heath (1983) discussed the distinctive features of sociolinguistic activities like those within two communities in the American South, showing how the rituals involved in an exercise such as storytelling may differ from society to society. In the same communities, Heath (1983) explored the degree to which rituals of language use at home prepared children for linguistic rituals in the classroom in middle-class white families and working-class black families. In the former, she found that parents spent significant periods of time reading stories aloud to their children and discussing events in those stories with their children. Middle-class white children were therefore familiar with the patterns of questioning, revoicing, and discussion typical of the classroom. Working-class black parents, on the other hand, did not spend time reading stories to or with their children or engaging in one-on-one exchanges. They did, however, encourage their children to develop independence of thought and expression in both public and private settings. This form of linguistic preparation did not, Heath found, carry over well into the classroom, where linguistic rituals are based on the dominance and leadership of the teacher in discussions.

Socialization to Use Language

As has been noted, learning to use a language involves far more than becoming competent in syntax and pronunciation, although membership of a community is usually signaled at least partly by accent and dialect. The child in the process of socialization also has to learn to use a variety of 'registers.'

Registers are particular ways of using language associated with particular situations of use – for example, religious talk, teacher talk, or pillow talk. The relative subtlety of situation-appropriate speech means that children will often be able to communicate grammatically but without, or with limited, shifting of registers (Ochs, 1988). They may, for instance, display register variation by speaking differently to adults versus their peers. As with the acquisition of other aspects of language, children may be explicitly instructed in the use of features and constructions appropriate to different situations, but they will also learn simply by exposure to adult speakers in those situations.

Early socialization to use language in different registers is necessarily limited to those situations in which a child may be present. During later (or secondary) socialization, new social roles will necessitate the acquisition of new registers, such as student, parent, and professional of some kind. Cazden (1988) explores the register acquired and used by school students in their interactions with teachers and other students within the classroom. It is worth noting that

children have been shown in some cases to possess knowledge of registers that they have as yet had no cause themselves to use (Andersen, 1990).

Socialization about Language

As children develop their pragmatic and cultural understanding of language use, they also begin to acquire attitudes and expectations based on particular kinds of language use, both oral and written. The principal method of establishing what these attitudes and expectations may be is the technique termed 'matched guise,' in which the same speaker is recorded speaking different language varieties. Listeners, under the impression that they are hearing a number of different speakers, are then asked to evaluate each speaker. Areas of evaluation may include social status, personal integrity, and social attractiveness (Giles and Powesland, 1975).

Early socialization about language is also evident in the choices children make about how to speak themselves – whether effort is made to learn particular varieties or speech mannerisms, and decisions about when to use those varieties. These choices may be re-evaluated, and certainly they will be faced with new ones during secondary socialization.

The re-evaluation of early language attitudes that may occur, for example, at school, can lead to resistance by a child to his or her primary socialization. If the language or dialect dominant in the classroom is perceived as more prestigious or more useful by a child socialized in another tongue, then he or she may resist that initial socialization by choosing only to speak the new, dominant variety at home as well as in social and educational settings.

Environmental Influences on Early Language Socialization

Early socialization through and to use language occurs primarily through interactions between a child and his or her caregivers, as well as interactions between the child and other, more mature speakers, which may include their peers. Caregivers in particular are instrumental in the process of language acquisition and the socialization entailed in it, which is accomplished both through the immersion of the child in a linguistically active environment and also through explicit tuition on the part of other speakers (Schiefflin and Ochs, 1983). The most common example of the latter is the practice, common to many cultures, of a mother or other adult encouraging a child to imitate the pronunciation of a particular word or phrase (Ochs, 1990); others include the repetition, by a caregiver, of a child's utterance, in which the syntax and grammar are corrected (Schiefflin and Ochs, 1983).

Ochs (1988) highlighted the importance of cultural differences in child/adult interactions in examining early language socialization. Where much research in the field has been concentrated on middle-class Western family norms (e.g., Cross, 1977; Snow, 1972; Snow, 1977), Ochs investigated child-rearing customs in a Samoan village. In such societies, conversation between children and caregivers, and the interpretation of child communication by adults, is substantially different from that in Western society. The child's socialization, therefore, takes place along different lines, and he or she understands his or her cultural and social status in a manner unlike that of Anglo-American children. Ochs remarked on the problems that may arise in secondary socialization for children reared in households of a culture apart from the dominant national one – when, for example, they encounter educators who do not share their expectations as to the differing communicative roles of children and adults. In a country such as the United States, with its ethnically diverse composition, this is an especially prevalent problem. To date, it is unclear how secondary socialization, particularly in schools, might be aided, although researchers have given the problem some attention during the last few decades (e.g., Heath, 1983).

See also: Environment and Language; Identity and Language; Intercultural Pragmatics and Communication; Register: Overview; Variation in Child Language.

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Eblaite

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Eblaite, the Semitic language spoken by the people responsible for the urbanization of northern Syria and northern Mesopotamia in the early part of the third millennium B.C., is named after to the city of Ebla (c. 60 km south of Aleppo) because of its archives, which cover, however, only the second half of the 24th century B.C. Eblaite is a branch of Akkadian, which dates to the 26th century B.C., whereas the texts of the Dynasty of Akkad appeared a few decades after the documents of Ebla. Eblaite was not a written lingua franca used to communicate in a large area, because the material present in the various types of sources reflect a single language. Forms with the pattern *parrus*, *parrusum* are common to Eblaite and the Assyrian dialect, whereas Old Akkadian follows the *purrus*, *purrusum* pattern.

Sources

The archives of Ebla included originally about 3000 clay tablets in cuneiform writing. Most of the texts are administrative in character and relate to palace activity. They make large use of Sumerian logograms for substantives and verbs (according to the archaic use of cuneiform); therefore, the Semitic elements include a few names of objects, most of the prepositions, and personal names. Personal names are about 3000 and geographic names about 900. The chancery documents (approximately 60), which include letters, royal decrees, some political agreements, and diplomatic reports, are richer in Semitic elements. One of the several Sumerian lexical lists was provided for most of its 1200 words with an Eblaite translation; another list of 330 words was added to it. About 50 administrative documents of the same period come from Mari (Middle Euphrates); other 200 were found in Nabata (Tell Beydar) in northern Habur.

Grammar Features

Phonological and morphological interpretation is often hampered by the inaccuracy offered by syllabic orthography, notwithstanding the rules fixed in the 'syllabary.'

Personal Pronouns

1st sg. nom. *'anna* (Akkadian *anāku*; Ugaritic *'nk*); 2nd sg. m. *'anta*, gen.-acc. *kuwāti* (O. Ass. *ku(w)āti*), dat. *kuwāši*; 3rd sg. m. nom. *šū* / *šuwa*, gen.-acc. *šuwāti*, dat. *šuwāši*. *Personal pronoun suffixes*: 1st sg. com. *-ī* / *-ya*; 2nd sg. gen.-acc. m. *-ka*, f. *-ki*, 2nd sg. m. dat. *-kum*; 3rd sg. m. gen.-acc. *-šu*; 3rd sg. m. dat. *-šum*; 1st pl. gen. *-nā* / *-nū*; 3rd pl. m. gen.-acc. *-šunū*. *Relative pronouns*: sg. m. nom. *šu*, gen *ši*, acc. *ša*, fem. nom. *šātu*, gen. *šāti*; dual gen.-acc. *šā*; pl. gen.-acc. *šūti*, fem. *šāti*. *Interrogative pronoun*: animate nom. *mannu*, acc. *manna*; inanimate nom. *mīnu*, acc. *mīna*.

Nouns

Only Eblaite and Akkadian, among the Semitic languages, present the entire nominal inflexion of case, including the use of the dative and the locativ: sg. m. nom. *-um*, gen. *-im*, acc. *-am*, dat. *-iš*, loc. *-ūm*, fem. nom *-atum*, gen *-atim*; dual nom. *-ān*, gen.-acc. *-ayn*; pl. nom. m. *-ū*, gen.-acc. *-ī*.

Prepositions

in 'in,' *ana* 'to,' *ašta/i/u* 'from, with, by' constitute three important isoglosses with Akkadian. *sin* 'for, toward' might be found also in Sabaean. *al* 'on,' *min* 'in,' *minu* 'from,' *ade* 'instead of,' *qidimay* 'before,' *balu/i* 'without' are Common Semitic. The conjunction *šumma* 'if' is an isogloss with Akkadian and

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Eblaite

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Eblaite, the Semitic language spoken by the people responsible for the urbanization of northern Syria and northern Mesopotamia in the early part of the third millennium B.C., is named after to the city of Ebla (c. 60 km south of Aleppo) because of its archives, which cover, however, only the second half of the 24th century B.C. Eblaite is a branch of Akkadian, which dates to the 26th century B.C., whereas the texts of the Dynasty of Akkad appeared a few decades after the documents of Ebla. Eblaite was not a written lingua franca used to communicate in a large area, because the material present in the various types of sources reflect a single language. Forms with the pattern *parrus*, *parrusum* are common to Eblaite and the Assyrian dialect, whereas Old Akkadian follows the *purrus*, *purrusum* pattern.

Sources

The archives of Ebla included originally about 3000 clay tablets in cuneiform writing. Most of the texts are administrative in character and relate to palace activity. They make large use of Sumerian logograms for substantives and verbs (according to the archaic use of cuneiform); therefore, the Semitic elements include a few names of objects, most of the prepositions, and personal names. Personal names are about 3000 and geographic names about 900. The chancery documents (approximately 60), which include letters, royal decrees, some political agreements, and diplomatic reports, are richer in Semitic elements. One of the several Sumerian lexical lists was provided for most of its 1200 words with an Eblaite translation; another list of 330 words was added to it. About 50 administrative documents of the same period come from Mari (Middle Euphrates); other 200 were found in Nabata (Tell Beydar) in northern Habur.

Grammar Features

Phonological and morphological interpretation is often hampered by the inaccuracy offered by syllabic orthography, notwithstanding the rules fixed in the 'syllabary.'

Personal Pronouns

1st sg. nom. *ʾanna* (Akkadian *anāku*; Ugaritic *ʾnk*); 2nd sg. m. *ʾanta*, gen.-acc. *kuwāti* (O. Ass. *ku(w)āti*), dat. *kuwāši*; 3rd sg. m. nom. *šū* / *šuwa*, gen.-acc. *šuwāti*, dat. *šuwāši*. *Personal pronoun suffixes*: 1st sg. com. *-ī* / *-ya*; 2nd sg. gen.-acc. m. *-ka*, f. *-ki*, 2nd sg. m. dat. *-kum*; 3rd sg. m. gen.-acc. *-šu*; 3rd sg. m. dat. *-šum*; 1st pl. gen. *-nā* / *-nū*; 3rd pl. m. gen.-acc. *-šunū*. *Relative pronouns*: sg. m. nom. *šu*, gen *ši*, acc. *ša*, fem. nom. *šātu*, gen. *šāti*; dual gen.-acc. *šā*; pl. gen.-acc. *šūti*, fem. *šāti*. *Interrogative pronoun*: animate nom. *mannu*, acc. *manna*; inanimate nom. *mīnu*, acc. *mīna*.

Nouns

Only Eblaite and Akkadian, among the Semitic languages, present the entire nominal inflexion of case, including the use of the dative and the locativ: sg. m. nom. *-um*, gen. *-im*, acc. *-am*, dat. *-iš*, loc. *-ūm*, fem. nom *-atum*, gen *-atim*; dual nom. *-ān*, gen.-acc. *-ayn*; pl. nom. m. *-ū*, gen.-acc. *-ī*.

Prepositions

in 'in,' *ana* 'to,' *ašta/i/u* 'from, with, by' constitute three important isoglosses with Akkadian. *sin* 'for, toward' might be found also in Sabaean. *al* 'on,' *min* 'in,' *minu* 'from,' *ade* 'instead of,' *qidimay* 'before,' *balu/i* 'without' are Common Semitic. The conjunction *šumma* 'if' is an isogloss with Akkadian and

Arabic. *ap* 'further, rather' occur also in Ugaritic and Hebrew.

Verbs

There are three tenses: the imperfect with prefixes and some suffixes; the perfect with suffixes but no prefixes; the imperative. The roots can be modified in common with other Semitic languages. Eblaite has G, Gt, D, Dt, Š, Št (but no N) conjugations. The prefix vowel of the 3rd m. sg. is *i-*, as in Akkadian; some verbal forms in personal names present also *ya-*, as in West Semitic. The 3rd fm. sg. has not only *ta-* but also *ti-*.

See also: Akkadian; Sumerian; Ugaritic.

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Eco, Umberto (b. 1932)

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A semiologist, a philosopher of language, and one of the most celebrated novelists of our time, Eco is considered together with, but independently from, Roland Barthes the founder of 20th-century cultural semiology.

Born on January 1, 1932, in Alessandria, Eco studied philosophy at the University of Turin, graduating in 1954 with a thesis on Aquinas's aesthetical thought (Eco, 1982). After working for the Italian state television network, Eco held posts at the universities of Turin, Milan, and Florence. Since 1975 he has held the chair of semiotics at the University of Bologna, while keeping a number of visiting positions at American and Canadian universities.

In the presemiotic *Open work* of 1962 (Eco, 1989), Eco made it clear that modern works of art such as Joyce's *Finnegans wake*, Schönberg's twelve-tone music, or Calder's mobiles are open, insofar as they offer to the interpreter a spectrum of possibilities, which older works did not, because they were closed, e.g., medieval texts that were subject to the scheme of the fourfold sense. Eco's semiotic theory rests on the five fundamental concepts of sign and inference; dictionary versus encyclopedia; metaphor and semiosis; symbol; and code. Elaborating on the Peircean idea of unlimited interpretation and refusing to draw the conclusion that interpretation has no criteria, Eco saw the task of a general semiotics in tracing the unique formal structure that lies at the ground of all levels of coding and of production of signs, namely the inference that creates the interpretation (Eco, 1984). In the Tanner Lectures he gave at Clare Hall in Cambridge in 1990, Eco restated that a text is a device conceived in order to produce its model reader, whereby this reader is not necessarily the one that makes the only right conjecture. A text can foresee a model reader entitled to try infinite conjectures (Eco, 1992). In recent years Eco has been working on literary composition (Eco, 1994), lunatic linguistics, i.e., on serendipity (Eco, 1998), and on borderline instances that defy the relation between particular things and general categories (Eco, 1999).

Richard Rorty has seen Eco clinging to the notion that a text has a nature and that legitimate interpretation involves attempting in some way to illuminate that nature, whereas the true Perceian view urges us

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to think of the various descriptions that we find it useful, for our various purposes, to give (Rorty, 1992).

See also: Barthes, Roland (1915–1980); Dictionaries; Semiotics: History.

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Eco, Umberto: Theory of the Sign

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Umberto Eco's reflections on the category of sign has, since 1973, been continuous and systematic; he returned to this issue in 1975 in his *Trattato di semiotica generale* (*Theory of Semiotics*), in 1981 writing the headword, 'Sign,' for the Einaudi Encyclopaedia (now in Eco, 1984) and again in 1997, indirectly, in *Kant and the platypus*.

Throughout these four fundamental stages Eco confirms the centrality of such a category for semiotics (contrary to those who denounce its death and uselessness), stressing, however, the fact that the sign should be reconsidered independently from that limitative interpretation that linguistics gives it.

Eco starts by observing the different meanings of the term 'sign.' The dictionaries tell us that the sign is "a clue, a clear hint from which we can make deductions and glean knowledge; . . . a gesture, an act or a word that manifests a certain way of being; . . .... any graphic expression used to represent or express an entity, especially an abstract one; . . .. . . a visual communicative procedure; etc. . ...". Yet gestures, acts, and words are entities very different from one another – they are linguistic expressions and behavior, and they are actions that may or may not be intentional but that are likely to be used by others to express a certain intention. The word 'Italy' is a sign just as much as the drawing of Italy on a geographical map or the Italian flag or the soccer players' light blue shirts in the World Cup.

Faced with these multiple acceptations, in 1973 Eco first of all distinguished the theoretic questions that the issue of the sign makes it necessary to deal with:

- the relationship between the laws of the sign and the laws of thought;
- the relationship between signs and concepts;
- the relationship between enunciations and facts;
- the relationship between object and sign;
- the question of the denotation of the sign.

To deal with such issues, he proceeded by historically reexamining the problematics of the sign, rereading Plato, Aristotle, the Stoics, Augustine, the Medieval scholars, to name but a few. Through the 'archaeology' of the concept of sign, Eco outlines two great explicative paradigms of the sign: a dualistic model of linguistic origin and a triadic model whose origins date back to ancient Greece.

We can say that all Eco's semiotics is (also) an attempt to make these two models converge, relating the lesson of linguistics to the second paradigm, which is more strictly philosophical.

At the base of the sign's linguistic conception lies the category of meaning and value. The sign is seen as the minimum unit of sense, the correlation of two components: expression and content. Saussure was the first to define the linguistic sign as a two-sided entity – signifier and signified – and to clarify how the link uniting these two components of the sign is an arbitrary link. Language has no motivating relationship with reality, with the result that one same object (the material on which I am writing) can be called /paper/, /papier/ in French, /carta/ in Italian. The link that unites sound and meaning, signifier and signified, expression and content, is 'arbitrary.'

'Arbitrary' does not mean 'subjective,' because language is a social, not an individual, fact. It does however mean 'conventional': within a certain community, **at a certain moment** (that is, from a synchronic point of

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view) according to the conventions of that society and that language, the material on which I am writing is called /paper/.

The identity of the sign – its value – is, from this perspective, 'differential'; the sign 'paper' assumes a value based on the relationships it has with the surrounding elements.

Louis Hjelmslev takes up and develops these suppositions, not talking about the two sides of the sign (signifier and signified) but the two levels of language: expression and content.

These two levels are always concurrent (an expression is such only in relationship to a certain content, and likewise, a content is such only with respect to a certain expression); they subdivide the 'forms' of the meaning, cutting out the 'continuum' of the sense, thus categorizing the world and rendering it discrete.

Back in 1975, Eco had already realized the value of Hjelmslev's contribution, that 'de-materializes' the sign, transforming it into a 'function,' into a relation between two interchangeable functives.

Thanks to this contribution, he could move the emphasis onto the 'procedures' that produce the signs, the 'relationships' that bind a certain expression (be it a sequence of letters, a facial expression, a gesture, or the colors of a flag) to a certain content that makes up a sign. This latter appears as the outcome of a cultural and social 'process' that is semiotics' task to investigate. The relationship between the two levels of the sign's function is never given once and for all on the basis of a bond of logical implication (like 'if A, then B' or 'if smoke, then fire'), but is always to be defined or re-definable (depending on the culture, epoch, social context).

The code is what makes possible correlation of the two sides of the sign in different yet conventional ways:

> "When a code apportions the elements of a conveying system to the elements of a conveyed system, the former becomes the expression of the latter and the latter becomes the content of the former." (Eco, 1975 (tr): 48)

Eco (1975 (tr): 49) insists on the consequences of these assumptions:

a. A sign is not a physical entity, the physical entity being at most the concrete occurrence of the expressive pertinent element;
b. A sign is not a fixed semiotic entity but rather the meeting ground for independent elements (coming from two different systems of two different planes and meeting on the basis of a coding correlation).

The sign, therefore, can't be described as a simple relationship of bi-univocal association (*aliquid stat pro aliquo*, the correlation fixed between an expression and a content, always and only for that); it is not founded on the model of equivalence but rather on an inferential model whose form may be described so: 'If a certain term is in certain contexts, then it has the following interpretation.'

This scheme – particularly underlined by Eco in 1981 – is that of the Stoic semiotics, based on the implicative model ($p \supset q$), where the variables are not physical entities (expressions) or events but propositions that already imply a judgement: smoke is not a sign of fire unless an interpreter has first elaborated a hypothetical reasoning whereby 'if there's smoke, then there's fire', that is, unless an inferential 'rule' has already been defined.

Eco went on to develop these acquisitions through the lesson of Peirce, one of the theorists who contributed much to the development of the idea of 'sign as relationship.'

According to Peirce, all thought may be conceived as sign, because life **is** semiosis: an uninterrupted production of signs created on the basis of previous knowledge (in turn, made up of signs) and giving access to an unlimited chain of interpretations – interpretations that, at certain moments, in certain contexts, become established in interpretative habits, conventions, codes, and stereotypes that then reenter the circle of semiosis, remaining potentially open to new interpretations.

According to this conception, the sign is essentially a *renvoi* (a referral – 'of' something else and 'to' something else – and is defined every time as something which 'is in place of' something else, in some respects, or from some point of view, according to some pertinent choice. (The sign, in fact, can 'illuminate' what it stands for only selectively, selecting only some of the aspects of the object.)

The sign, therefore, is based on a triadic relationship: it stands 'in place of something, in some respect, for a thought that interprets it.'

In this perspective, everything can become the sign of something. The character of the sign is a function that, under certain conditions, can be assumed by anything.

The concept of 'freedom,' for example, can be considered as a sign, if, in my mind, it stands in place of a chain of thoughts in some respect – for instance, limited to a reflection on freedom by some prisoners of war. Or a piece of music can be a sign: Mameli's national anthem that, in respect to the issue of national identity, stands in place of 'Italian' for the spectators watching a soccer match. Words are obviously signs; the term 'semiotics,' for English-speaking peoples, stands, in respect to the problem of defining disciplines, in place of a certain knowledge that studies signs and the phenomena of significance. Certain forms of behavior can be signs; think of the range of gestures used for saying surprise, interrogatives, tiredness.

So, according to Peirce's conception taken up by Eco, signs do not have a definite matter or a fixed meaning but a procedural, contextual, and interpretative identity. They exist when an interpretant (that is, in turn, a sign, and can be an abstract rule that establishes a norm, or a diagram that visualizes a relationship, or a form of behavior that, even without having a direct connection with the sign from which it started, is nevertheless the consequence – the 'effect' – of it) establishes a correlation between an object and a sign – a 'representamen,' as Peirce called it. If we have a striped animal (object) and the word 'zebra' on the other side (representamen) and we don't speak English, we need an interpretant to establish for us that that five-letter word, 'zebra' stands for that strange animal with stripes. Only in this way does the word 'zebra' become a significant sign for us. Likewise, as Peirce explains, if we have a general who yells at his soldiers 'Down arms!' or 'At ease!' and they immediately carry out his command, the fact of standing at ease may be considered the interpretant of the representamen 'At ease!' and of the object 'the general's wish for the soldiers to stand at ease.' It is important to note that the soldiers' behavior, in this case, is not a pure 'reaction' (in the mechanical sense in which it is a reaction that, if I push a ball, it rolls) but the result of the comprehension, the 'mediation' and the 'interpretation,' of a sign (the general's injunction) and of the association of this to a determinate wish.

The interpretant, therefore, may be of various kinds: a dictionary (that for the word 'zebra' gives us a definition corresponding to the animal we are thinking of) or a drawing that associates the profile of our animal to that five-letter word that we didn't know. There is no limited or fixed number of interpretants. They are infinite. Each one selects a different aspect of the object and renders one of its qualities pertinent. If I explain what a zebra is with a dictionary definition I catch certain generic qualities; if I make use of a manual on zoology, I will have a much more refined definition (interpretant). If, instead, I'm speaking to a child, I will draw a picture showing its black and white stripes; if I then show him or her a soft toy, maybe (with respect to the drawing) I will have an interpretant that puts more emphasis on its likeness to a horse, say. The chain of interpretants is infinite because every interpretant is, in turn, a sign and may produce other signs (if I draw a picture to say what a zebra is, and then I have to explain it in words, then I'll make use of other signs to explain that sign); this is why, for Peirce, semiosis is 'limitless.'

In *Kant and the Platypus*, Eco delves further into Peirce's inferential interpretation of the sign, insisting on the 'contractual' nature of signs. The equivalences established by the codes are only sclerotizations of semiosis where the 'stands for' of an expression is negotiated every time through processes of trial and error and perceptive judgments that gradually adjust. For this purpose, Eco distinguishes three entities to describe the stages through which semiotics passes: the Cognitive Type, the Nuclear Content, and the Molar Content. While the Cognitive Type is the (private) scheme by which we 'recognize' something as the occurrence of a type (a photograph of a certain breed of dog as a 'case' for the species 'dog'), the Nuclear Content is the set of interpretants with which we intersubjectively clarify and describe a certain occurrence and re-define the Cognitive Type that we already had, while the Molar Content is the complex knowledge that we can have of a certain occurrence (much more knowledge than we need for recognition). As already claimed by Peirce, semiosis as inference and production of judgments (therefore interpretants, and therefore signs) begins with perception – the moment we have to recognize occurrences as cases of something, and thus to establish correlations. From this initial moment of recognition, semiosis proceeds by abduction, formulation of rules, associations, instructions, adjustments.

Man does not live within stable, reassuring associations of signs that are always fixed and already given, but, more adventurously, he negotiates from time to time the significances of the world and its expressions, between perception and intersubjectivity, in a continuous inferential activity.

See also: Inference: Abduction, Induction, Deduction; Interpretation: Theory; Saussure, Ferdinand (-Mongin) de (1857–1913); Sign Theories; Significs: Theory.

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Ecuador: Language Situation

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A pre-Columbian civilization, Spanish colonialism, global capitalism, labor migration, and even recent human smuggling have all contributed to the present language situation in the República de Ecuador, an essentially bilingual country of Spanish and Quechuan languages. Isolated rural populations speaking indigenous American languages and urban enclaves using Old World immigrant languages add some variety but do not significantly challenge the dominance of the national language, Spanish, in governmental, educational, and commercial discourse. The 1998 constitution proclaims Spanish the official language of Ecuador, but it also guarantees "Quichua, Shuar, and other ancestral languages" a secondary official status.

In Ecuador the Inca-heritage language is known as Quichua (Kichua, Quechua), which includes several varieties spoken in the highland areas west of the Cordillera Oriental and the Cordillera Real (comprising the Imbabura, Calderón, Chimborazo, Tungurahua, Cañar, and Loja dialects) and also varieties spoken in the eastern drainage of the Río Napo and the Río Pastaza (these lowland varieties being collectively known as Ingano). Despite a shared heritage, Quichua dialect variation ranges from minor lexical and phonetic differences to significant barriers impeding mutual comprehension. Among Quichua mother tongue speakers, there is a range of skill in Spanish, with highest competency among those living in Guayaquil and other urban areas outside their native highland Sierras. Although one-fifth of Ecuador's population is ethnically Quichua, only about half of them actually speak Quichua; locally, however, this proportion varies greatly, and many towns are completely Quichua speaking, with others using only Spanish. In traditionally non- Quichua areas, other indigenous people have become Quichua speakers. Merchants and other businessmen in Quichua-speaking areas have also learned to speak Quichua. A variety of Quichua that uses Spanish lexis, called Media Lengua, has also been reported.

Ecuador is also home to other autochthonous American languages. In the north of the country, in the Pacific Costa area, are spoken Awa (Ago; also Cuaiquer, Kwaiker), Chachi (Cayapa), and Colorado (Tsáchila), all Barbacoan languages, whose speakers number fewer than 10 000 in total. In the Oriente, Ecuador's Amazon drainage, live some speakers of the Chibchan language Cofán (Kofane; autonymically, A'ingae), the Tucanoan language Siona-Secoya (Secoya Angokera, Ecuadorian Siona), and the unclassified Huaorani (Waorani; pejoratively Auca). Also in the Oriente, mostly in the Río Zamora and Río Santiago drainage, live tens of thousands of speakers of Shuar (Jivaro, Xivaro) and Achuar (Achuar-Shiwiar), both Jivaroan languages. Since the uprising of 1990, and especially since the formation of CONAIE (Confederación de Nacionalidades Indígenas del Ecuador) and other new advocates for indigenous rights and culture, awareness of language endangerment in Ecuador has been increasing;

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however, language attrition and shift continue among these groups. There are additional Amerind language speakers east of the 1942 Rio de Janeiro Protocol border, in territory claimed by Ecuador, but that territory is currently under Peruvian control.

The preëminence of the old colonial language, Spanish, is guaranteed by the constitution of the republic. A very conservative form of highland American Spanish can be heard in certain families, especially in formal speech. A common division of colloquial Spanish dialects in Ecuador is that between Sierra Spanish, which is influenced by Quichua, and Costa Spanish. A third well-known dialect, spoken in the southern highlands near Loja, is strongly associated with a distinct cultural identity.

There are small populations of speakers of other immigrant European and Asian languages as well. English, the language of international business and tourism, is the most important of these, with a community of resident speakers numbering more than 50 000, supported by both U.S. and British schools in Quito and Guayaquil. There are also perhaps 15 000 German speakers, and two schools offer German mother tongue curricula. Historic enclaves of Chinese speakers have been refreshed by more recent transmigration involving the illegal travel and transport of Asian Chinese. There is a Norwegian mother tongue school in Cuenca. Small groups of Japanese, Arabic, and Italian speakers are also reported.

See also: Colombia: Language Situation; Peru: Language Situation; Quechua; Spanish.

Language Maps (Appendix 1): Map 58.

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Edgerton, Franklin (1885–1963)

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The American Indologist and linguist Franklin Edgerton was born in Le Mars, Iowa on July 24, 1885 and died in Laramie, Wyoming on December 7, 1963.

Edgerton was the son of a civil servant, Charles Eugene Edgerton and Annie Benedict White; his younger brothers were the lawyer Henry White Edgerton (1888–1970) and the Egyptologist William Franklin Edgerton (1893–1970). Though born in the West, the family was from New York and soon returned to the East. Edgerton was educated in Binghampton, Ithaca, and Washington, then at Cornell University (B.A. 1905). He pursued further studies in 1906–1907 in Munich (Indology under E. Kuhn and R. Simon) and Jena (Delbrück and Cappeller). In 1907–1909, he was a Fellow of Johns Hopkins University, and in 1909, received his Ph.D. there (under Bloomfield). In 1909–1913, he was Assistant, Instructor, and Johnston Scholar in Sanskrit and Comparative Philology at Johns Hopkins. In 1910, he spent several months in Russia learning the language. In 1914–1925, he was Assistant Professor and in 1925–1926, Professor of Sanskrit at University of Pennsylvania in Philadelphia, then moved to Yale, where he was Salisbury Professor of Sanskrit and Comparative Philology in 1926–1946 and Sterling Professor in 1946–1953 (Emeritus, 1953). He made visits to India throughout his lifetime: in 1926–1927, in 1938, in 1953–1954 (where he was Holkar Visiting Professor of Indology at Banaras Hindu University), and in 1956. After his retirement, he moved to Laramie, Wyoming.

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Education in a Former Colonial Language

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Colonization

Although notable colonizers have included the Arabs, the Chinese, and the Russians, the concept is primarily associated with Western European states in the 19th century, especially the English and French, although the Portuguese, Dutch, and Spanish were also deeply involved. English colonialism in particular has a long history (from the invasion of Wales in the 13th century to the takeover of Tanganyika in the 20th century), and was exceptionally extensive (including the Americas, Asia, Australasia, and Africa).

Colonization often was destructive to indigenous ethnic groups, and particularly so in the Americas, the Caribbean, Australia, and New Zealand, where, by the early 20th century, indigenous peoples had been wiped out or reduced to tiny minorities. The language of the colonizer thus became by default the language of education. In other colonized regions, however, notably Africa, the Far East, and the Indian subcontinent, indigenous populations survived colonization to achieve independence, especially following World War II.

Political Goals of Ex-colonies

Major concerns for newly independent governments were to secure the country's unity, to enhance development, and to promote national identity. The formal education system has been a key instrument for furthering these goals.

Unity

For newly independent countries that were multilingual, the colonial language was claimed to play a unifying role. Multilingual Zambia, for example, became independent in 1964, under the slogan 'One Zambia, one nation,' with the Minister of Education saying that "English – ironically a foreign language and also the language of our former colonial master – has definitely a unifying role in Zambia" (Mwanakatwe, 1968: 213).

Development

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Development

Newly independent countries that wished to gain access to technology, commerce, and international

diplomatic contacts felt a need to provide their citizens with access to an international language; the colonial languages were readily available candidates.

Identity

A stress on their unique identity enabled newly independent countries to distance themselves from the colonial regimes. The interplay of language, religion, and political ideology has been important here, with the colonial language sometimes seen as a threat to religious identity, or at variance with political ideology.

Prioritization of these three goals has varied across countries and over time; thus, some postindependence governments saw the colonial language as the language of oppression to be replaced as soon as convenient. However, more recent generations who did not experience colonization, have seen English in particular as the key to global participation, whether as agents of commercial development or as consumers of popular entertainment.

Colonization and Educational Language Policy

Africa

Following the 19th-century 'scramble for Africa,' borders to the European colonies were established through the General Act of Berlin in 1885. In almost every case the colonies thus created had multilingual populations. The preeminent colonial powers in Africa were Britain, France, and Portugal. Belgium occupied the Congo, whereas Germany, after World War I, lost present-day Namibia, Tanzania, and the Cameroons to France and Britain.

Given the multilingualism of most African countries, and the lack of any immediate realistic alternative, it is understandable that, at independence, many governments tended to downplay identity and designated the colonial language as the official language, giving it a significant role as a medium of instruction (MOI). Political views of English as unificatory were widespread. Furthermore, even countries whose populations share a common first language (e.g., Lesotho) still opted for English as a MOI, presumably for development purposes. Likewise, almost all ex-French or Belgian colonies retained French as the MOI in secondary and tertiary education (here we might note that French colonial policy in language and education was more assimilatory than British). In the ex-Portuguese colonies of Mozambique and Angola, Portuguese is the normal MOI, with English being increasingly taught as a subject, especially in Mozambique, which in 1995 joined the British Commonwealth. In the Republic of South Africa, primary education is in theory possible through any of the 11 official languages, including Afrikaans (the language of the early Dutch colonizers), although since the fall of apartheid English is the most frequent choice.

There are exceptions to the persisting dominance of colonial languages in Africa. Tanzania has long promoted Swahili as the MOI for reasons both of unity and identity (although this policy marginalizes local languages), whereas Muslim north Sudan uses Arabic. In North Africa, although French rather than Arabic is the MOI in about half of the secondary schools of Morocco, Arabic is nonetheless the predominant MOI in Algeria and Tunisia, except at tertiary level, where French is used. Islamic identity is certainly a factor in this postcolonial move to Arabic.

The Indian Subcontinent

At independence in 1947, British India was partitioned into India, West Pakistan, and East Pakistan (subsequently Pakistan and Bangla Desh respectively). Present-day India has 25 constituent states with 18 official state languages between them, although the country has some 800 languages in all. Attempts to select Hindi as the sole official language were resisted by non-Hindi speakers, and currently the MOI in government schools is the official language of that state, whereas English is widely used in the private sector, and in tertiary education. In multilingual Pakistan, although Urdu (the L1 of less than 10% of the population) is the official language, English is employed as a MOI in education, again especially in private schools, which some 20% of urban students attend. In Bangla Desh, Bengali is the L1 of 98% of the population, but English is a second official language, used together with Bengali as a MOI. In Sri Lanka, however, the government stressed Buddhist identity following independence, and Sinhala was made the sole official language and MOI, a move that provoked riots between the majority Buddhist Sinhalese and the Hindu Tamils. Nonetheless, English is employed for scientific study at tertiary level in the country.

East Asia

Independence in the ex-British colonies of east Asia (Malaysia, Singapore, and Hong Kong), led to a variety of educational roles for English. In Malaysia, English was gradually replaced as a MOI throughout the education system by Bahasa Malaysia (also called Bahasa Melayu), which not only empowered the ethnic Malays (some 50% of the population) but also

was intended to unify the three main ethnic groups (Malays, Chinese, and Indians). Ethnic Malays were Muslims, and relatively few Malays attended English medium schools for fear of Christianization. Singapore, however, with its majority Chinese population, seceded from the Malaysian federation in 1965 and accorded a dominant role to English in education; the results are said to be very positive, making Singapore an exception among countries that have maintained a colonial language as a MOI. Hong Kong reverted to China in 1997 after a century of British rule; since then, there have been moves to promote Mandarin Chinese (the L1 of about 1% of the population) in education, although English remains the MOI in much secondary and tertiary education.

Having been a Spanish colony for three centuries, the Philippines (with some 80 different languages) came under American rule from 1898 until 1946, a period that saw determined attempts to impose English in the education system. Although Filipino is now the national language, English remains the MOI in secondary education. Neighboring Indonesia, the most populous Muslim country in the world (and with over 600 languages), gained independence from Holland in 1955: Many children are educated initially through their L1, but Bahasa Indonesia becomes the universal MOI from year 4. Of the ex-French colonies in east Asia, Vietnam became independent in 1945, and Vietnamese, the L1 of about 90% of the population, replaced French as the MOI. In Cambodia (Kampuchea, independent in 1953), Khmer, again the L1 of 90% of the population, is now the sole official language. Laos, which gained independence from France in 1949, differs from Vietnam and Cambodia in having over 90 languages. French continued to be the MOI in tertiary education until the communist victory of 1975, when Lao (the L1 of just under half the population) became the exclusive MOI.

The general picture is that colonial languages have retained a prominent role as MOI in sub-Saharan Africa, and to a lesser extent in the Indian subcontinent, prime motivations being a concern for unity or for development, according to circumstance. Elsewhere, if colonial languages were perceived to be a threat to identity, whether cultural, or political, a national language generally became the MOI.

Individual Academic Effects

In focusing on political goals, however, governments have severely neglected the role of language in the academic development of the child. The educationist view is typified by UNESCO's dictum: "[W]e take it as axiomatic that the best medium for teaching is the mother tongue of the pupil" (1953: 6). Although 'mother tongue' is a problematic term, because one language label may encompass different varieties, evidence abounds that the dominance of colonial languages in ex-colonies has contributed to difficulties in the educational development of the individual.

The World Bank (1995), in a survey of bilingual programs in eight countries, concluded that "the first language is essential for the initial teaching of reading, and for comprehension of subject matter." Greaney (1996: 24) claims, "Research findings suggest that initial instruction should be offered in a child's first language." Elley (1994) reporting on 32 countries, found that pupils whose home language differed from the school language performed less well on reading tests than those who were tested in their home language.

In Africa especially, the use of colonial languages as a MOI is associated with negative academic achievement, and there is ample evidence that most primary school pupils are not able to read adequately in English: at year 6 this is the case with around three-quarters of children in Zambia, and around two-thirds in Zimbabwe. Similar problems obtain in Zanzibar, Mauritius, and Namibia according to a series of UNESCO reports (see Ross, 1998). Even in countries such as Kenya, Malawi, and Nigeria, where local languages are often the MOI in the first years, their role is transitional, with the switch to English generally occurring between years 3 and 5. Inadequate English proficiency at the point of change is a serious problem: there are particularly large discrepancies between the students' English vocabulary and the demands of English medium education. Weakness where the colonial language is an MOI is also widely reported outside Africa: examples include India and Pakistan (at tertiary level), the Philippines (secondary and tertiary), and Papua New Guinea (an ex-Australian colony where English is the universal MOI). Clearly, the students are not to be blamed for this: the majority get very little exposure to the colonial language outside school, particularly students in rural areas, and also girls, who may face domestic demands. Furthermore, in many countries, the rapid expansion of education following independence has meant that some teachers lack proficiency in the MOI.

Conversely, research suggests that using local languages as MOI enhances academic achievement: In the Nigerian Ife-Ife project, for example, Yoruba was used as an MOI for the first 6 years, with English as a subject, with positive results; in Tanzania, secondary school students taught in Swahili were said to have a cognitive advantage compared to those taught in English; in Mali, positive results are reported from mother tongue medium education rather than French (see Association for the Development of African Education, 1996). In Burundi, Eisemon *et al.* (1989)

found that scores on a range of academic tests were significantly higher for students tested in Kirundi rather than in French.

Conclusion

All the evidence is consistent with the commonsense view that learner proficiency in the MOI is an important factor – although not the only factor – in educational achievement. In those countries in which the colonial language has maintained a role as the MOI, the academic achievement of the majority of students has been adversely affected. The use of colonial languages at the primary level, which for many students is their only education, can be especially harmful. In effect, the colonial language is a barrier, rather than a bridge, to education. However, many families pay little heed to such realities, and see proficiency in colonial languages as the route to a salaried job. Such language ideologies coincide with government policies for unity and development through colonial languages; however, although using these languages has prevented national rifts based on language groups, it has exacerbated the divisions between those who have good access to colonial languages, typically the rich, and those who don't, typically the poor. Meanwhile, development, especially in terms of poverty alleviation, is hampered by a shortage of appropriately educated citizens for whom colonial languages have been an obstacle to learning.

Although the problems are obvious, the solutions are less so. Switching the MOI from colonial languages to local language involves the expense of producing materials in local languages, and of reskilling teachers. Against this, there is the considerable economic waste of running education systems that are, partly because of colonial languages, ineffective. Again, although it is important for a country's international relations and commerce to have some people competent in colonial languages, especially English, this could be achieved without using these languages as MOI for entire generations of students. Reducing the dominance of colonial languages, while simultaneously improving their teaching as subjects, offers a way forward for those countries that have yet to decolonize their education.

See also: Language Policy in Multilingual Educational Contexts; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language.

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Education in a Multilingual Society

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Introduction

Societal multilingualism can be conceptualized in relation to two broad dimensions:

- The proportion of citizens who are fluent in two or more languages
- The degree to which languages other than the dominant language are used for purposes of social interaction within the society.

Thus, the degree to which any society is multilingual varies in relation to how many of its citizens are fluent in multiple languages and use these languages for a variety of functions in a range of social contexts. By implication, few societies can be characterized as completely monolingual in the sense that virtually every society includes individuals who use their multiple language abilities in a variety of social contexts. There is no simple cut-off point above which a society can be characterized as 'multilingual' and below which it is 'monolingual'; rather, societal multilingualism represents a continuum that is, in principle, quantifiable according to the variables outlined above.

In an era of globalization with unprecedented human mobility and social exchange, processes of language learning (and language loss) are apparent in societies around the world. Government policies attempt to influence these processes by supporting the teaching of certain languages in schools and, in some cases, by actively discouraging the maintenance of other languages, usually the languages of subordinated groups within the society (Skutnabb-Kangas, 2000).

The complexity of global multilingualism, and the challenges of language planning, can be appreciated in relation to the fact that that there are an estimated 5000 languages spoken in the world's 200 or so sovereign states and about two-thirds of all children in the world grow up in a bilingual or multilingual environment (Crystal, 1997). To illustrate, approximately half of the school populations in the Canadian cities of Toronto and Vancouver come from non-English-speaking home backgrounds. Similar linguistic diversity as a result of immigration and population mobility characterize many cities in Europe, the United States, and Australia. Other countries around the world have always been highly multilingual since their inception as nation states (e.g., India, Singapore, South Africa, Switzerland, etc.).

In the following sections, categorizations of educational provision in multilingual societies are outlined, and some of the major sociopolitical and psychoeducational issues that characterize this provision are discussed.

Categorizing Education in Multilingual Societies

The most obvious initial categorization of education in multilingual societies is whether instruction is conducted through one language exclusively or through two or more languages. Although bilingual and trilingual programs have been increasing throughout the world, partly as a result of many positive evaluations of these programs (see below), the bulk of educational provision in multilingual societies is monolingual in nature. The relative merits of monolingual versus bilingual programs will be considered in relation to the research evidence after reviewing the many complex manifestations of bilingual and multilingual education.

A variety of typologies have been proposed for categorizing multilingual education. Perhaps the best

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A variety of typologies have been proposed for categorizing multilingual education. Perhaps the best

known of these is Mackey's (1970) typology that distinguishes 90 different potential varieties depending on the intersection of home language(s), curricular organization of languages, and language(s) of the community and country, as well as the regional and international status of the various languages.

A less complex categorization was proposed by Cummins and Corson (1997). They distinguished five broad types based on the sociolinguistic characteristics of the languages used in the program and the population groups the program is intended to serve. Four of these program types are intended primarily for minority or subordinated group students while the fifth is intended for majority or dominant group students. These categories are not rigid, and some programs can be located in more than one category as a result of the fact that the same program serves several different groups of students.

Type I programs involve the use of indigenous languages as media of instruction and are aimed primarily at helping students of indigenous heritage acquire or consolidate their knowledge of the language. Examples include Quecha/Spanish bilingual programs in South America (Hornberger, 1988), Maori bilingual and immersion programs in New Zealand (Bishop and Glynn, 1999) and the a variety of Native language bilingual programs in the United States (McCarty, 1997). The indigenous group has usually been conquered or colonized at some time in the past, and the bilingual programs are typically aimed at revitalization of languages whose survival is threatened.

Type II bilingual programs involve the use of a national language together with a higher status or more dominant language. The national languages involved in these programs typically have long-term status in the society and often some degree of official recognition. The primary target group of Type II programs are speakers of the national language, and the program goals typically include the development of bilingual and biliteracy skills among students and reinforcement of the status of the language in the society. Examples include programs that use various African languages together with English in several African countries (e.g., Nigeria and South Africa), Gaelic in Ireland and Scotland, Welsh in Wales, Basque and Catalan in Spain, and French outside of Quebec in Canada (Baker and Prys Jones, 1997).

Type III programs involve immigrant languages that are the languages of relatively recent immigrants to a host country. Many of the bilingual programs in countries such as the United States, The Netherlands, Australia, and Sweden fall into this category. Most of these are transitional programs designed to facilitate students' overall academic progress. In some situations, Type II and Type III programs merge into one another, as in the case of some Spanish-English bilingual programs in the United States that may serve both long-term Spanish-speaking groups as well as more recent immigrant groups.

Type IV programs use manual sign languages to serve children who are deaf or hard-of-hearing. Bilingual/bicultural programs for deaf children are a relatively recent phenomenon. Scandinavian countries pioneered bilingual/bicultural programs for deaf students (Mahshie, 1995) and North American programs involving American Sign Language (ASL) followed in the early 1990s (Gibson *et al.*, 1997).

Type V programs may involve either a national language or a language of wider communication and are intended for dominant or majority group students. The primary goal is to develop bilingual and biliteracy skills among these students. Examples of Type V programs include French immersion programs in Canada (Swain, 1997) and dual language programs in the United States (Thomas and Collier, 2002). Dual language programs in the United States also fall into the categories of Type II or Type III since they serve both linguistic minority students and English L1 students with the goal of promoting bilingualism and biliteracy for both groups. The European Schools model that involves instruction in up to four languages at various points in the students' school career also qualifies as Type V (Beardsmore, 1993). Many Type II programs involving instruction through a national language can also be classified as Type V because they serve students whose L1 is the majority or dominant language as well as native speakers of the national language.

Debates and Research on Bilingual Programs

Various rationales are typically offered for implementing monolingual education in multilingual contexts. These include justifications related to educational effectiveness, ideological imperatives, and administrative/financial expediency. For example, in Western countries with significant immigrant and/or minority populations (e.g., the United States) intense debates have raged with respect to the educational effectiveness of bilingual education. Those who champion monolingual education in the dominant language argue that maximum instructional exposure to that language will result in better overall school achievement. This argument is frequently paired with the ideological justification that education should actively promote the assimilation of minority students rather than encourage them to maintain their L1 and allegiance to their home cultures. Bilingual education

in these contexts is also frequently characterized as costly and administratively cumbersome.

Debates in post-colonial contexts have covered similar ground, albeit with some differences. The educational effectiveness argument for monolingual education in the higher status language of wider communication is frequently fueled by parents' perception that this is the language of power and upward mobility. Ideological considerations that lead some governments to support monolingual education include the fact that in highly multilingual countries the former colonial language is viewed as 'neutral' and thus no favoritism is shown to competing national languages. Finally, the cost and administrative burden of developing curricula and educating teachers to teach in multiple languages are frequently viewed as prohibitive for recently independent and often impoverished nations. As a consequence, it is often seen as more administratively feasible to teach through the colonial language than to explore multilingual instructional options.

Although the arguments for monolingual education have been persuasive to many policy-makers and parents in both developed and developing countries, accumulating research evidence paints a very different picture. Evaluations in many countries have demonstrated that well-implemented bilingual and trilingual programs succeed in developing fluency and literacy in a minority language at no cost to the development of academic skills in the majority or dominant language (Spolsky, 1986; Williams, 1996; Cenoz and Genesee, 1998; Cummins, 2000; Baker, 2001; Thomas and Collier, 2002). Furthermore, although there may be increased start-up costs involved in any new program, bilingual and trilingual programs are not intrinsically more costly to operate than monolingual programs. The fact that students in bilingual programs experience no adverse academic consequences despite less instructional time through the dominant language has been attributed to the demonstrated transfer of concepts and skills across languages (e.g., phonological awareness, concepts in content areas such as science and mathematics, reading and learning strategies, etc.) (see Baker, 2001 for a review).

In summary, considerable research supports the feasibility of bilingual and multilingual programs both from the perspective of cost and overall educational effectiveness. However, effective implementation is much more likely when the ideological conditions in the wider society are favorable. In the absence of such favorable ideological conditions, educators committed to the bilingual program must work collaboratively to create a microcosm within the school where students' bilingual and bicultural identities are affirmed (Freeman, 1998).

See also: Assessment of Second Language Proficiency; Bilingual Education; Bilingualism and Second Language Learning; Education in a Former Colonial Language; Immigrant Language Education; Language Education for Language Revival; Language Policies: Policies on Language in Europe; Languages of Wider Communication; Linguistic Decolonization; Minority Languages: Education; Minority Languages: Education; Minority Languages: Oppression; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Teaching of Minority Languages; Third Language Acquisition.

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Educational Failure

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Introduction

It is a commonplace in education that some pupils fare more poorly than others. Why should this be? Why do some children seem to be at a disadvantage from first school entry and why should they continue to achieve less than others, in some cases falling further and further behind and dropping out of school at the earliest opportunity? There is, of course, any number of reasons for individual underachievement, but group disadvantage is a different matter. Certain varieties of class, race, and ethnicity that differ from majority or mainstream society (of which the school is generally representative) seem, unfortunately, to be associated with a broad area of failure. In other words, group disadvantage seems to reside, most basically, in social difference. The important issues here relate to the nature of that difference and its ramifications, and it is no overstatement to suggest that the school, as a point of contact between groups, is an arena of the greatest social and academic importance.

While educational disadvantage should not simply be equated with material poverty, there is clearly a connection and, in some quarters, 'disadvantage' has often been a euphemism characterizing the poor. In 1970, Rainwater outlined the most important historical and contemporary perspectives on poverty, all of which continue in various guises. A moralizing view depicts the poor as strong but lacking in virtue, somehow deserving of their deprived state and requiring control. However, where the poor are seen as weak, a medical assessment may be made – what was once sin is now sickness and social remediation is at least theoretically possible. Poverty viewed as a combination of virtue and weakness forms the basis of a normalizing theory; the poor are morally similar to others, but lack the resources to cope effectively. Suggested solutions to poverty would then involve providing opportunities for self-betterment. Another perspective, reminiscent of Jean Jacques Rousseau's noble savage, holds that the poor are both strong and virtuous. In this apotheosizing picture, the poor are the basic, uncorrupted, and natural inheritors of the earth. Rainwater (1970) also supplied a different view, one which goes beyond descriptive value judgment and aims to explain poverty in objective ways: this naturalizing view stresses either some version of biological determinism or cultural differences that set the poor apart and explain their lifestyles and values. Unsurprisingly, it is within this last perspective that most social scientific attempts to come to grips with poverty and disadvantage are found.

The Nature of Group Difference

Biological determinism has historically been the most pervasive of 'scientific' accounts for group disadvantage, and the "benign totalitarianism" (to cite Rainwater again) often associated with it has had racist and eugenic aims (although it may be anachronistic simply to style Victorian scientists – Francis Galton, for example – as racist in the modern sense of the term). Strong connections were established between the widespread view that some groups were inherently less capable than others, and the intelligence-testing movement begun in the 19th century by Binet, Terman, and others. Assessment of ability in ways that are now seen as clearly ethnocentric and biased in favor of social mainstreams had unfortunate

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Educational Failure

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Introduction

It is a commonplace in education that some pupils fare more poorly than others. Why should this be? Why do some children seem to be at a disadvantage from first school entry and why should they continue to achieve less than others, in some cases falling further and further behind and dropping out of school at the earliest opportunity? There is, of course, any number of reasons for individual underachievement, but group disadvantage is a different matter. Certain varieties of class, race, and ethnicity that differ from majority or mainstream society (of which the school is generally representative) seem, unfortunately, to be associated with a broad area of failure. In other words, group disadvantage seems to reside, most basically, in social difference. The important issues here relate to the nature of that difference and its ramifications, and it is no overstatement to suggest that the school, as a point of contact between groups, is an arena of the greatest social and academic importance.

While educational disadvantage should not simply be equated with material poverty, there is clearly a connection and, in some quarters, 'disadvantage' has often been a euphemism characterizing the poor. In 1970, Rainwater outlined the most important historical and contemporary perspectives on poverty, all of which continue in various guises. A moralizing view depicts the poor as strong but lacking in virtue, somehow deserving of their deprived state and requiring control. However, where the poor are seen as weak, a medical assessment may be made – what was once sin is now sickness and social remediation is at least theoretically possible. Poverty viewed as a combination of virtue and weakness forms the basis of a normalizing theory; the poor are morally similar to others, but lack the resources to cope effectively. Suggested solutions to poverty would then involve providing opportunities for self-betterment. Another perspective, reminiscent of Jean Jacques Rousseau's noble savage, holds that the poor are both strong and virtuous. In this apotheosizing picture, the poor are the basic, uncorrupted, and natural inheritors of the earth. Rainwater (1970) also supplied a different view, one which goes beyond descriptive value judgment and aims to explain poverty in objective ways: this naturalizing view stresses either some version of biological determinism or cultural differences that set the poor apart and explain their lifestyles and values. Unsurprisingly, it is within this last perspective that most social scientific attempts to come to grips with poverty and disadvantage are found.

The Nature of Group Difference

Biological determinism has historically been the most pervasive of 'scientific' accounts for group disadvantage, and the "benign totalitarianism" (to cite Rainwater again) often associated with it has had racist and eugenic aims (although it may be anachronistic simply to style Victorian scientists – Francis Galton, for example – as racist in the modern sense of the term). Strong connections were established between the widespread view that some groups were inherently less capable than others, and the intelligence-testing movement begun in the 19th century by Binet, Terman, and others. Assessment of ability in ways that are now seen as clearly ethnocentric and biased in favor of social mainstreams had unfortunate

implications in eugenic practice and theory, in the passage of sterilization laws, and in immigration control, the last two being particularly important in the United States. It surely comes as no surprise to learn that assessment procedures found mental deficiency especially prevalent among the Black population, nor that many Italian, Polish, and Jewish immigrants were classified as feeble-minded compared with their British and northern European counterparts.

The ultimate excesses of the biological view were, of course, evident during World War II. The argument for innate genetic deficiency then languished until Jensen, beginning in 1969, proposed that American Blacks were indeed below the intelligence levels of normal Whites. While there was a simple and predictable charge of racism leveled against Jensen, his articles did prompt close analysis within the scientific community. Of greatest significance was the relationship between measured IQ and intelligence. Some tests are clearly biased toward particular groups: an instrument designed to measure knowledge associated with culture A would clearly be inappropriate for culture B, where intelligent behavior might take very different forms. Nevertheless, tests have been used in this inappropriate way, with predictable results. Aware of this, Jensen restricted himself to so-called culture-fair or culture-free tests, tests supposedly tapping more general ability. However, all tests, however abstract or nonverbal their form, are devised by someone at some time to measure something. A culture-free assessment is impossible. As well, some cultures are much more test-wise than others and this factor, along with elements of the context within which a test is administered, clearly influences outcomes. There is another practical point to be made here, too. Jensen found, on average, a 10–15 IQ-point difference between Black and White samples, and psychologists and educators have been virtually unanimous in saying that this difference is insufficient to warrant altered educational provision (Jensen himself had recommended different curricula for children with 'Level I' and 'Level II' ability).

Nonetheless, intelligence testing and its presumed implications for pronouncements about group heritability have continued. The studies of identical twins, which began in the 19th century (and which are virtually all flawed), were of great interest to Jensen. The now discredited work of Burt was apparently formative, and figuring in discussions by Eysenck, Kamin and others (see Edwards, 1989). The net result is that, while inheritance is clearly a factor in human life, the heritability of intelligence has not been shown to be significant for cross-group comparison – nor can it be so shown until that utopian day when differences attributable to environment and social prejudice have diminished. However, while wishing to discredit the genetic-deficiency argument, one has to warn that it is not a dead letter, either in the popular imagination or in academic circles. A psychologist in the Jensen mold emerged in the 1980s, for instance, when Rushton claimed Blacks to be inferior to Whites who, in turn, were inferior to Orientals.

Environmental deficiency has also been seen as the cause of group disadvantage, with children's poor scholastic performance attributed to inadequate and stunting physical, social, and psychological backgrounds. The patterns of socialization found among some groups have also been implicated in substantive deficit, hindering both in-school and after-school success. Thus, low socioeconomic status, large family size, absence of books in the home, disdain for the life of the mind, and, particularly, poor communication between parents and children might all contribute to disadvantage. The products of such homes have themselves been characterized as having poor language skills, poorly developed 'conscience' and academic motivation, and inability to see intellectually beyond the here-and-now and the concrete.

There are, again, real difficulties with this position. For example, the contexts that generated these observed deficits are suspect and, in any event, the latter are usually discussed in facile and overly general ways. Not enough is known about the links between early environment and these supposedly disadvantageous characteristics, nor about those between characteristics and school success or failure. How could the environmental-deficiency argument account, for example, for those many pupils who succeed despite having supposedly bad backgrounds?

The chief difficulty with the environmental position is that it is suffused with a middle-class bias. Many of the so-called deficits, for example, associated with disadvantaged children could be seen as strengths in the light of a sensitive awareness of their social situation. A poor conscience might be a sensible adaptation to dangerous and unpredictable surroundings; similarly, an inability to postpone rewards – as demonstrated in experiments in which lower-class children were much more likely than middle-class ones to take one bag of candy now rather than accept the offer of three bags in a week's time – makes good sense if previous experience suggests that promises are not always fulfilled. No one would deny that backgrounds and lifestyles differ; what is at issue here is whether or not it makes sense to translate difference into deficit.

If the environmental-deficit argument is weak, then it follows that educational innovation based upon it is flawed. This includes many varieties of compensatory education, head-start programs and

other well-meaning interventions (including proposals to completely resocialize children whose families are deemed inadequate). However, both inside and outside education, environmental deficiency continues to be seen as a strong argument in the explanation of disadvantage. Recent studies have shown that teachers – to cite one obviously important group – are still very prone to accept it (again, see Edwards, 1989 for a comprehensive review here).

If disadvantaged groups' difficulties do not spring from innate inferiorities or intellectually stunting environments, to what can be ascribed their very real educational problems? Logic and the process of elimination lead to the position that disadvantage resides in group differences, rather than in basic cognitive deficiency. Because of social comparison, and because it is clear which groups are relatively powerful and which subordinate, differences essentially become deficits. These are real enough, but it is important to realize that they are essentially **social** deficiencies. While the problems of the disadvantaged remain, their solution can now be seen to lie in the eradication of prejudice and ill-judged assessment. In some ways, this makes disadvantage even more disabling, since history suggests that problems whose existence rests upon social norms and values are among the most intractable. Even wide-ranging social revolutions and redistributions of power are unlikely to eliminate disadvantage; in the aftermath of such movements, new players may adopt new roles and the characteristics of disadvantage may alter, but the phenomenon itself seems endemic in stratified societies. This is not to say, however, that nothing can be done.

The Language Dimension

Language has a central and obvious position in social interaction and comparison. It is to be expected that 'different' language more accurately characterizes the disadvantaged than does 'deficient' language, and examining the linguistic dimension will flesh out the preceding generalities.

Sociologists and educators who studied class dialects in the early part of the 20th century generally held that lower-class speakers were both insufficiently exact and grammatically deficient, their speech being less complex in terms, for example, of phrase and clause usage. It is necessary to point out, however, that usage levels, or performance, need not relate to underlying competence (habitual performance is, of course, of some interest in its own right).

The work of the British sociologist, Bernstein (1959, 1960, 1971–1975), was significant in the analysis and explanation of lower-class language. In the 1950s, he introduced the terms 'public' and 'formal' language: the former, emphasizing emotion rather than logic, was the lower-class variant, while the latter, rich in sentence complexity, is that of the middle class (which also, however, has access to public forms). Public language is, above all, characterized by concrete and nonsymbolic expression, in which syntactic and lexical usage is restricted. Formal language, by contrast, has great symbolic and abstract expressivity. In later writings, Bernstein (1971–1975) referred to these varieties as restricted and elaborated codes.

While some of Bernstein's statements about the codes have a decidedly deficit ring to them (e.g., "the normal linguistic environment of the working class is one of relative deprivation"; Bernstein, 1960: 276), he did also note some strengths associated with public language ("simplicity and directness of expression, emotionally virile [sic], pithy and powerful"; Bernstein, 1959: 322). In the 1970s, Bernstein attempted to distance himself from any deficit interpretation and any group comparison at the level of competence, and he specifically rejected the prevailing sentiments behind compensatory education programs for the disadvantaged. Indeed, despite some of his own rather ambiguous statements, Bernstein should probably be placed within the difference camp. This does not alter the fact, however, that, whether correctly or wrongly interpreted, his work fueled the environmental-deficit argument on the linguistic contribution to educational underachievement.

The results of Bernstein's experimental studies certainly showed differences of habitual usage between groups (e.g., groups of working-class messenger boys compared with senior public-school pupils). The question, of course, is what to make of them. Many deficit theorists have had no difficulty here. The intra-family communication work done by Bernstein and his colleagues in Britain, work that reinforced the view that public-language restrictions develop from inadequate mother-child patterns, was taken up in the United States. Lower-class interactions were said to be of an imperative-normative kind, with direct and concrete language being used to maintain parental authority and control. Communication between middle-class mothers and children, however, was considered to be of a more rational and explanatory nature, setting the stage for such useful cognitive operations as generalization, logic, and planning. Indeed, in an elegant but vacuous phrase, one American research team noted that "the meaning of deprivation [is] deprivation of meaning" (Hess and Shipman, 1968: 103). All of this work is suspect. The effects of being interviewed and providing language data generally may themselves differentiate social groups; it is difficult to generalize from such data to real home interactions;

untested assumptions are made about links between variations in maternal behavior and children's developing cognitive abilities; and so on. Also, there is again in this work a strong and essentially unexamined belief in the correctness of middle-class standards and practices.

Verbal 'deprivation' was also, unsurprisingly, a powerful element in those programs of compensation underpinned by social-deficit theory. One of the most notable here began from the assumption that the lower-class (Black) child was generally retarded. Specifically, his or her language was 'immature' and 'rudimentary,' and, because of this, language was seen as 'dispensable': thus, "language for the disadvantaged child ... is not of vital importance" (Bereiter and Engelmann, 1966: 42). On this preposterous basis the authors – who had apparently never observed children from the orally rich Black culture at play – outlined a program to compensate youngsters for things they were not lacking in the first place.

None of these debatable observations about language was made by linguists, of whom virtually all have rejected the deficit philosophy from which they emerged. Many years ago, Sapir said that, "when it comes to linguistic form, Plato walks with the Macedonian swineherd, Confucius with the head-hunting savage of Assam" (Guy, 1988: 64) and, although we might not put things quite like that today, Sapir's thesis has proved convincing. Other linguists have rejected the idea of primitive mediums; while languages are not necessarily equivalent in all forms of expression, and while some may be more useful in some contexts, such dichotomies as better or worse, superior or inferior, are not applicable. More specifically, the same can be said for dialects and other varieties within a language. All forms are adequate for the needs of speakers within their own speech communities; issues of 'correctness' need to be considered with reference to each variety's own grammar, and problems generally arise only when different varieties come into contact.

In the 1960s and 1970s, this matter was thoroughly dealt with by Labov (1973) and his associates. Their test case was Black English (BE), a very good choice, since BE had long been widely perceived as a deficient and illogical approximation to proper English. The work had four important strands.

First, it was shown that the contexts in which verbal deprivation was diagnosed were generally threatening and hence inappropriate. A small Black child questioned by a large White adult typically produced "defensive, monosyllabic behavior" (Labov, 1973: 27). By simply relaxing somewhat, the formalities associated with speech elicitation, the child's performance improved dramatically, coming more to resemble that linguistic richness reflected and valued in the Black speech community.

Second, it proved possible to demonstrate that the 'restricted' speech of the lower class might well, if linguistic prejudices could be set aside, be viewed as more forceful and direct, and less redundant and verbose, than the 'elaborated' forms of the middle class. Concrete and highly charged language usage (showing, indeed, that 'pithy' quality noted by Bernstein) contrasts favorably with a more educated verbosity, which hedges basic ideas with a welter of qualification and hesitation. Of course, it can be reasonably argued that qualification and caution have a place, particularly in contexts in which difficult or abstract issues are under discussion; consequently, this second strand may be the weakest or the least completely developed. Nonetheless, it usefully challenges the received wisdom about the inevitable appropriateness of middle-class usage.

The third point of importance touched upon the competence-performance distinction. Black children were found to repeat standard English sentences in Black form. Given that the latter is a valid and rule-governed dialect (see below), and given that these repetitions exactly captured the original meaning, Labov (1973) argued that there was no evidence here at all for any inadequacy in pronunciation, grammar, or, indeed, basic cognitive ability. Children comprehend the meaning of what they hear, then (unsurprisingly) reproduce it in the form most familiar to them. The point was further reinforced by studies showing that White children repeating sentences phrased in BE typically employed standard forms.

The final, and most important, element in the overall argument dealt with specific aspects of BE grammar. The central and necessary point to be established here was that BE forms, though different (but not vastly different, incidentally) from standard ones, were adhered to as regularly as those of other varieties. Just two examples will suffice. One of the obvious features of BE is the deletion of the copula verb (in phrases like *He goin' to the store* or *We on tape*, where standard usage would produce *He is going to the store* and *We are on tape*). The copula verb **does** appear, however, in the past tense (*I was small then*). The regularity is that, in contexts where standard English permits contraction (*He is going* can become *He's going*), BE allows deletion (notice, by the way, that there is no loss in meaning, no ambiguity, in either case). Where standard usage prohibits contraction (for example, *He's as nice as he says he is* cannot become **He's as nice as he says he's*), so BE rules ban deletion. A final point here: the copula deletion traditionally condemned as inaccurate usage does, in fact,

exist in approved form in (informal) standard English too: *That your car?*, a strolling policeman might say to an illegally parked motorist.

A second example concerns such constructions as *She be standin' around* or *He be always foolin' about*, again, typically seen by White teachers and others as incorrect. Here, the *be* indicates habitual behavior and, were it absent, the BE speaker would be referring to a present action only.

These and other demonstrations convincingly make the case that BE (and, by extension, other English dialects) is a system within which grammatical rules are obeyed, not a haphazard assortment of utterances. Indeed, given what is known of human cognitive development, the rule-governed hypothesis intrinsically makes much more sense than the haphazard one, regardless of specific empirical observation, for what group, wherever and however it lived, could maintain itself adequately with a basically flawed communication system? Even so, a deficit conception of language continues in many quarters, and popular prejudices still exist toward disadvantaged forms, which are often seen as indicators of innate or acquired intellectual handicap. More worrying is that allegiance to a deficit philosophy is still evident in some academic circles.

One line of argument in such circles is that, while interventions based upon language-deficit models have been of only limited success, the models themselves are not without value. Another related suggestion is that deficit and difference theorists have typically attended to different aspects of language, with the former being mainly concerned with semantics, the latter with grammar. In either case, the linguistically overwhelming evidence against a deficit philosophy is quite incorrectly downplayed.

In 1983, Honey succeeded in muddying the waters with a monograph in which linguistic arguments supporting a difference viewpoint were rejected. Honey disagreed with the central thesis that all varieties are valid systems, claiming that this undermines attempts to reintroduce 'standards' at school and pushes disadvantaged speakers into a 'language trap.' What these persons really need, according to Honey, is assistance with standard English, but he complained that the contemporary linguistic stance, with its respect for all varieties, undercuts this and, in some cases, encourages the school to promote nonstandard forms. Detailed review of Honey's work is impossible here (though it has been undertaken by several prominent linguists, some of whom were attacked by name in the monograph), but the main points are easily summarized. First, the author has fallen prey to a confusion between concepts and the words to describe them: thus, so-called primitive groups may lack words or terms current in more 'advanced' societies, but this tells us about their physical and psychological lifestyle, not about the validity of their language (the question of why different groups develop in different ways is, of course, an interesting one, but it need have no relationship to matters of linguistic relativity). Second, in important ways Honey has misinterpreted the sort of evidence adduced by Labov (1973), which bears upon the linguistic validity of BE. Third, there is the failure to understand that language differences become deficits through the medium of popular convention and prejudice. Finally, Honey mistakenly imagined that a school policy that tolerates and does not stigmatize the use of nonstandard varieties must necessarily lead to an active fostering of these varieties (and a concomitant de-emphasis on standard forms).

Notwithstanding linguistic and other insights into the nature of language variation, it is important to remain vigilant and not to imagine that older and less informed views will simply vanish. Social psychology has long shown that the more mental energy we invest in a particular set of perceptions, the more unwilling we are to change them – even when faced with apparently unanswerable contradictions – preferring instead to engage in various forms of denial, distortion, and self-deception.

Language Attitudes

It is important to understand the evidence supporting a difference interpretation of language variety. However, it may change little in a practical sense, since it would be naive indeed to imagine that widespread diffusion of linguistic findings (assuming that were possible) would speedily eradicate incorrect perceptions. It is therefore necessary to consider in further detail those attitudes which translate language difference into language deficiency. These, it turns out, are matters with a long history; whether it is language, dialect, or accent that is discussed, preferences and prejudices tend to come to the fore. The 16th-century poet, Carew, felt that the Italian language was "pleasant, but without sinews," French "delicate," Spanish "majestical but fulsome," and Dutch "manlike, but withal very harsh." These judgments certainly reflected broad stereotypes of the day.

Dialect attitudes are most pertinent here, of course. When social comparison and inequalities of power make one dialect standard, it does not follow that others are linguistically or cognitively **sub**standard (although, if it can maintain nonpejorative status, the term 'nonstandard' is acceptable here) – a matter of *primus inter pares*, perhaps. However, works of reference have often unfortunately reinforced a

'substandard' interpretation. The Oxford English Dictionary (OED), for instance, has referred to dialect as a 'subordinate' form arising from 'local peculiarities' – a definition implicitly held by those for whom 'dialect' means some rustic or regional variety. Similarly, on accent, the OED notes 'peculiar' alterations of pitch, 'mispronunciation,' 'misplacing of stress,' and 'misinflection.' Little wonder, then, that it is still easy to find people who claim they have neither a dialect nor an accent, or to discover others eager to shed unwanted and socially stigmatized forms.

If dialects cannot be distinguished linguistically as better or worse, could it be that some are aesthetically more pleasing than others? This has certainly been a feature of much popular prejudice and, in *The Best English*, Wyld (1934) claimed that any unbiased listener would find RP (received pronunciation) the most pleasant, the most educated, and the variety best suited for formal purposes. He touched upon the heart of the matter with the word 'unbiased' – how does one obtain such a listener? Work by Giles and his colleagues attempted to illuminate this. They began by noting two basic possibilities: either some forms **are** intrinsically more pleasing than others (the 'inherent value' hypothesis) or aesthetic judgments proceed from assessments of the social standing of the speakers. To test this, judges unfamiliar with language varieties were asked to evaluate them on aesthetic grounds. In one study, Welsh adults with no knowledge of French were unable to differentiate among European French, educated Canadian French, and working-class Canadian French on this basis (even though different levels of pleasantness were found by judges drawn from **within** the French speech community). In a second experiment, English speakers knowing no Greek were asked to rate Athenian and Cretan varieties which, in the Greek context itself, are clearly marked as being of high and low status, respectively. Again, no inherent aesthetic superiority was detected. This leaves what Giles termed an 'imposed norm' explanation, one that rests upon the power of social convention and belief. The comedic effect of having a stage duchess with Cockney speech reflects ingrained and widely shared speech-community standards. A further demonstration of the purely arbitrary nature of status judgments was provided by Trudgill (1975). In England, speakers of the high-status RP do not pronounce the postvocalic *r* (in words like *cart* and *mar*), while in New York exactly the reverse holds: the higher a speaker's social standing, the more likely he or she is to sound the *r*.

More fine-grained analysis of language attitudes followed upon the introduction of the 'matched-guise' technique by Lambert and his colleagues. Here, judges evaluate recorded speakers' personality traits after hearing them read the same passage in each of two or more guises. Any rating differences can then be ascribed to language factors, since paralinguistic variables (pitch, tone of voice, etc.) are of course constant across samples. Two points are important here: first, judges must not realize that they are rating the same person using different dialects or accents (and typically they do not); second, the reasonable assumption is made that attitudes toward speech are, in fact, attitudes toward speakers: the speech acts as a trigger for a social stereotype, from which flow specific judgments, preferences, and prejudices.

Widespread use of this method in many different contexts has revealed that dialect evaluation generally involves three personality dimensions. Some dimensions of evaluation (including traits such as intelligence and industriousness) reflect a speaker's perceived competence; some (helpfulness, trustworthiness) reflect personal integrity; and some (friendliness, sense of humor) underlie social attractiveness. While, as might be expected, high-status dialects generally evoke high ratings of speaker competence, they do **not** always elicit strong perceptions of integrity and attractiveness: on the contrary, these last two (sometimes collectively seen as representing a larger, group-solidarity, dimension) are more associated with lower-class and lower-status varieties. Experimental results are, in fact, rather more involved than this summary suggests, but a reasonably fair gloss might be that higher-status speech forms are popularly associated (by both middle-class and lower-class judges, incidentally) with speaker intelligence, ambition, and drive, while the dialects of disadvantage connote trust, liking, and a general down-to-earth quality. The findings are not, then, entirely negative for the disadvantaged population by any means, but the great importance of personal competence (or the perception of it by others) remains central in educational and other settings.

Teachers' attitudes are of particular significance here since there is no reason to assume that they will diverge greatly from those of society at large, and because their perceptions may be especially salient in the definition and maintenance of disadvantage. There is a large literature on teacher expectations and the effects they have upon pupils' self-regard and scholastic progress; specifically, it has been shown that the formation of these expectations rests upon existing knowledge (and ignorance) and early assessment of children's characteristics. A child whose speech is perceived as substandard, and whose cognitive capabilities are, in turn, questioned, will be categorized and stereotyped in specific ways. There is, of course, nothing inherently wrong or unnatural with

teachers' expectations; they proceed from a universal tendency to simplify and understand a complex world which, without classification, threatens to overwhelm. But the familiar dangers of stereotyping and prejudice involve inaccurate, irrational, or incomplete categorization, often with harmful effects. Educational misperceptions based upon incorrect language assessment may create difficulties where none need exist. There is, perhaps, a special element of tragedy here inasmuch as the disadvantaged children likely to be inadequately understood in this way are exactly those children whose lives are already burdened with more tangible and inescapable weights. Experience suggests that the phenomenon of the 'nonverbal' child (to give but one example) may often be one created by teachers insensitive to cross-cultural (or cross-subcultural) differences in the domains of competition, response to authority figures, customary reaction to threat, and so on.

It is perhaps unnecessary to state that teachers are not simply and generally being accused of malice, racism, or 'classism' (although these qualities exist among them, as in the general population). Teachers are more concerned than most with the promotion of tolerance and increased social mobility. However, once installed in the classroom, there is evidence that teachers are quickly socialized into the traditional ways of the school, and this may mean a continuation of inaccurate views of disadvantage and, therefore, of disadvantage itself. Studies in the 1980s in North America and Europe have confirmed this, and have also confirmed that contemporary teachers, more tolerant of language variation than previously, still adhere in the main to a deficit view and still consider one of their major tasks to be the elimination of 'incorrect' speech patterns and the inculcation of 'proper' ones.

For example, in a study of primary and secondary teachers in Nova Scotia, Edwards and McKinnon (1987) found that disadvantage-as-deficit maintained its appeal; while teachers stressed the importance of home-background characteristics as contributors to disadvantage, they clearly viewed some environments as substantively deficient. With specific regard to language, teachers believed that disadvantaged children were incapable of properly articulating their thoughts, and generally placed little value on receptive and expressive skills (see Bereiter and Engelmann, 1966; Hess and Shipman, 1968). Minority-group children (in this study, Black and Acadian children) were particularly singled out, with Black pupils seen to have a "slang language all their own." A European review by Hagen (1987) has indicated that some countries such as France retain a centralist view of standard language, while others (the Netherlands, for example) have more liberal legislative perspectives on dialect variation, even if not always matched by school practice. Citing Dutch and Italian work, Hagen noted that nonstandard-speaking children's favorable attitudes to their own speech often decline dramatically as they grow up.

Educational Responses to Disadvantage

Language varieties associated with relatively subordinate groups are not inherently deficient, but they do possess negative connotations because of social stratification and comparisons that lead to denigration. Thus, social differences become deficits and nonstandard speech becomes substandard. While still waiting for an end to the unfair and inaccurate language perceptions that contribute to educational disadvantage and failure, it is not unreasonable to consider what schools might be doing.

First, of course, schools and teachers must become more aware of the relevant psychological and linguistic evidence bearing upon disadvantage. The wider society is generally ignorant here, so there is a real limitation on schools. On the one hand, schools tend to reflect mainstream society more than they lead it; on the other, even were schools to become centers of linguistic enlightenment, their students would still emerge into somewhat darker settings. Given these limitations, it is still quite possible for schools and teachers to be linguistically educated; the essentials of the difference-deficit argument, for example, are not difficult to grasp and do not require lengthy exposition or sophisticated prior knowledge.

Second, given the practicalities of social life, it should be assumed that a standard-language variety will continue to be important and particularly valued, and that increased mobility will be positively affected by facility with it. The recommendations made by some linguists that schools should actively encourage (in writing, as well as in speaking) nonstandard usage may seem somewhat naive. Indeed, a common accepted standard can be a leveling device rather than an exclusionary one, and a great asset in personal and group communicative efficiency. It would be a cruel irony if a rather innocent regard for all varieties resulted in a social babel where, it may be assumed, certain groups would again end up at the bottom of the heap.

Does this not bring us back to the rejected position associated with Honey? The difference is this: while it would be inappropriate and unjust for schools to neglect the standard (and while, incidentally, this would arouse great resentment on the part of disadvantaged groups themselves), a linguistically

enlightened policy demands tolerance at school for all forms. Furthermore, the best available evidence indicates that this tolerance should accompany very clear messages that mother-tongue varieties of every kind are both valid and valuable. The aim should be language-repertoire **addition**, not **replacement**: a policy of bidialectalism. Again, the evidence suggests that this is not at all an insuperable task to require of children (consider the development and maintenance of bilingual skills in suitable settings), nor need it be solely a school-based imposition. When discussing disadvantage, groups existing in the same large society are being treated; in terms of language, this means that disadvantaged groups typically have a considerable, if somewhat passive, exposure to standard forms, forms that are clearly associated with desired social contexts and rewards. The findings concerning sentence repetition indicate this latent standard facility; other evidence supports the fact that disadvantaged children, from an early age, can comprehend standard forms and, indeed, will use them themselves if they judge this appropriate. Schools, then, should activate this knowledge and make it clear to children that a broadening of their performance skills makes sense.

This is a matter of some delicacy, however, for children are being asked to accept two social facts that could easily be seen as contradictory. On the one hand, the message is that the mother-tongue variety is perfectly adequate within the home speech community, both for communicative purposes and as a vehicle of group solidarity. On the other, the child is to be made aware that a life beyond that community may require repertoire expansion. Transmission of these two messages requires tact and sensitivity based upon adequate knowledge of children's language and culture, but it will be assisted in many cases by a desire for mobility that is (unsurprisingly) strong in most disadvantaged communities. Indeed, one might note that the low regard for education supposedly characteristic of the lower class (in the deficit perspective) is much less common than a sometimes overoptimistic hope for mobility through education.

Experience, including that derived from deficit-inspired compensatory programs, suggests that formalized and drill-like language curricula make little sense. They run the risk, above all, of instilling a replacement perspective that is both uncalled-for linguistically and potentially damaging psychologically. A more laissez-faire policy seems appropriate, in which teachers act as standard-speaking models (most teachers are, in fact standard-variety speakers, either by upbringing or through their own professional socialization), and in which children's own good sense will lead to the desired expansion. Anything more formal will be counterproductive and will, at the least, contribute to an unnecessary rift between the child's school life and his or her unselfconscious participation in the community. Moreover, it should be noted again that this apparently laissez-faire policy is not simply some default option but, rather, a reasoned and aware reflection of all the evidence and insight presented here.

Recent developments in fine-grained analysis of classroom communication hold out the hopes of refining awareness and improving practices. For example, the traditional assertions that disadvantaged children's 'restricted' usage leads to difficulties with the 'elaborated' language of school are undercut by real classroom patterns, which are very often delimited exercises in control, both particularistic and concrete. Indeed, the view of schools as middle-class institutions has itself been challenged on these grounds. (While, in fact, this challenge cannot be sustained – schools **are** middle-class in the attitudes, skills, and values stressed there – there is clearly more work to be done in ascertaining classroom dynamics.)

Ethnographic analyses of classroom language have, for some time now, paid greater attention to such factors as the psychological context in which teacher-pupil interactions occur, a context in which postural configurations, direct and indirect verbal strategies, conversational rhythms, and prosody are important. These and other aspects clarify how impoverished traditional deficit-based and disembodied speech analyses are. Also central here is the interpretation of tacit school rules based upon teachers' needs for order. There is a more subtle treatment of the classroom as a speech domain in its own right, where a whole cultural code must be mastered for success. The implication is that disadvantage may be partly understood as an incomplete grasping of this code, which combines both knowledge and its appropriate display (for a seminal article here, see Mehan, 1984).

If traditional school practices required pupil adaptation in a sink-or-swim approach, while compensatory intervention programs were heavy-handed with insensitive alterations built upon insecure foundations, new approaches founded on subtle observation may help with both the school adaptation to classroom heterogeneity and a desired repertoire expansion on the part of children. Mehan's (1984) study demonstrated that detailed assessment of language styles between teachers and disadvantaged children allowed practical advice to be given to teachers about how best to adapt. This had the effect of lessening the passivity and 'nonverbality' of the pupils and, once greater participation was established, children were gradually and subtly introduced to school styles.

To reduce educational failure associated with group disadvantage, a combination of practical innovations and the transfer of existing psychological and linguistic information is needed. Ethnographic analysis of classroom discourse promises useful insights that can quickly be turned to the benefit of the disadvantaged (and their instructors). It is equally important, however, to provide teachers and others, such as speech therapists, with a much more detailed knowledge of language variation and its ramifications. While the mechanisms of disadvantage are outside the reach of school alone, there is no reason for classroom experiences to add unnecessarily to children's problems. A failure to try to ease these burdens is, in fact, a repudiation of the essence of education in a civilized society.

A Decade On

It has to be said that issues and problems have not changed greatly since this article first appeared a decade ago; the underpinnings of educational failure, in the sense discussed here, remain. The informed, academic support for the different-but-not-deficient interpretation of scholastic and linguistic disadvantage must still contend with broader and more popular views that either perceive disadvantage as substantive deficit (in more or less direct fashion) or else effectively translate difference into deficiency (through the operation of language attitudes and stereotypes, for example). Thus, the calls made above for greater general awareness of the nature of disadvantage, and for more sensitive treatment of language at school, in particular, must unfortunately be reiterated. Controversies surrounding Ebonics – as Black English has recently been styled in some quarters – provide a good example of the continuation of those heady intertwinings of knowledge and ignorance, prejudice and innocence, which we have so often seen before.

One or two of the major players mentioned above have re-entered the fray; the general impact, however, has been more to reinforce original positions than to advance understanding. Bernstein (1997: 47) has discussed the context within which his code theory was formulated and presented, and – rather disingenuously – observed that the difference/deficit debate was "of little theoretical significance" and "obscured more than it revealed." He also offers here an analysis of Labov's 1973 paper, but pays no attention to the grammatical aspects that were characterized (above) as the most important element in the overall argument. An interesting defense of Bernstein and his work has been mounted by Robinson (1998), who correctly points out that many of the views for which Bernstein was most vilified were not, in fact, his views at all. Robinson also maintains that academic criticism of Bernstein was essentially nonconstructive, not "Popperian-based", and often personalized. However, while such criticism certainly arose in some quarters, it would be a mistake to imagine that more measured treatments were absent (see Edwards, 1989). In a book published in 1997, Honey has re-emphasized his views (initially expressed in 1983) of standard and nonstandard language, views that have attracted considerable criticism for reasons already discussed here (see above). More recently, Honey (1998) suggested that academic criticism of his thesis is marred by false argument and innuendo.

In general, then, it is fair to say that the social conditions and the social prejudices that produce and maintain the educational failure associated with group disadvantage are still very much with us. It is also fair to say that much of the discussion of the issue – within and without the academic cloister – continues to generate more heat than light.

See also: Educational Failure; Language Attitudes; Language Policy in Multilingual Educational Contexts; Politics of Teaching; Social Class and Status; Teacher Preparation: Second Language.

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Educational Linguistics

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The Emergence of Educational Linguistics

By all accounts, educational linguistics as a defined area of study began in the 1970s with the work of Bernard Spolsky, who first put forth the term in a 1972 conference paper and later produced the seminal introductory monograph on the topic in 1978. He originally envisioned educational linguistics as a sub-field of linguistics, much like educational psychology and educational sociology are subfields of their disciplines proper, that would specifically address the broad range of issues related to language and education.

He positioned his educational linguistics in relation to applied linguistics, which, he noted, encompassed a broader territory of practical language issues. Educational linguistics has, indeed, continued to develop in tandem with applied linguistics, which has come a long way since the middle of the 20th century (Markee, 1990; van Lier, 1994). There is less than total agreement as to what the relationship between the two is, however. Some scholars, for example, identify themselves as linguists who are applied linguists who are educational linguists (e.g., van Lier 1997: 95), whereas others, pointing to its unique objectives and goals, distinguish educational linguistics as a field unto its own (e.g., Christie, 1994: 97; Hornberger, 2001: 5). What is clear, however, as Hornberger (2001: 19) points out, is that educational linguistics has developed a unique niche in that its "starting point is always the practice of education and the focus is squarely on (the role of) language (in) learning and teaching." It is in filling this niche that educational linguistics has found its place in a variety of contexts around the world.

Three Schools

Internationally, educational linguistics seems to have taken shape in three major ways, or in what might be considered loosely the British, the Australian, and the American schools. Each is distinctive in a number of ways.

The British School may be the most closely coupled with general linguistics as seen in the efforts to make linguistics a foundational area of teacher training (Brumfit, 1997; Stubbs, 1986), as well as attempts to create curricula based on linguistic principles (Carter, 1990, cited in Christie, 1994: 96). At the same time, British educational linguistics cannot be said simply to be the marriage of linguistics with education. On the one hand, there has not been universal agreement as to how linguistics should relate to education, leaving much to be done on this front by both linguists and educators (Hudson, 2004). On the other hand, following the lead of an applied linguistics that synthesizes multiple disciplinary approaches, British educational linguists also draw on a wide constellation of research tools beyond those offered by linguistics alone (Brumfit, 1996; see, for example, Creese, 2003).

Australian educational linguistics stands out for its clear connection to systemic functional linguistics, in particular. Here, systemic functional linguistics, in which language is viewed as a social semiotic that is part and parcel of creating and interpreting social context, is brought together with other social sciences

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in order to study language use in educational practice as a socially situated process (Christie, 1994; Martin, 1998). A central focus of the Australian School has been the teaching and learning of genre in literacy for professional and academic purposes (e.g., Christie and Martin, 1997). It also is worth pointing out the loose connection between the British and the Australian schools because of Halliday's influence on both the beginnings of British educational linguistics and the growth and development of educational linguistics in Australia (see Halliday *et al.*, 1964, for an early influential work; see also Hudson, 2002).

The American School is characterized by its diversity of topics and conceptual underpinnings. Aspects of general linguistics are brought together regularly with the research tools of other social sciences, most often anthropology, psychology, and sociology, to investigate the totality of issues related to language acquisition, language use, and sociolinguistic context in formal and informal education (Hornberger, 2001). In addition to Spolsky, Hymes has been an influential figure in American educational linguistics, especially in the early days, and his perspective on sociolinguistics (e.g., Hymes, 1974) has been drawn on in a great deal of research under the rubric of educational linguistics, especially in the United States.

It should be noted, of course, that the British, Australian, and U.S. contexts are not the only sites where educational linguistics has emerged. The principles of educational linguistics have been put to use in a variety of settings; for example, Pakir (1994) describes the use of educational linguistics to examine the role of multilingualism and cross-cultural communication for education in Singapore; and in Argentina, Suardiaz and Domínguez (1987) take an educational linguistics perspective in considering the role of the native language in elementary education, as both instrument and object of the educational process and as means of evaluating that process. The importance of educational linguistics for other contexts also can be seen in the establishment of training programs in various parts of the world, which will be discussed later.

Taking Stock of the Field

Despite the clearly identifiable (albeit nonexclusive) trends in what we call the three schools of educational linguistics, there is much common ground and activity. Educational linguistics is characterized by certain core features that, by and large, all approaches to educational linguistics share. In particular, we highlight the tendency toward transdisciplinarity that, although latent in Spolsky's formulation, is increasingly gaining prominence. We then pause to reflect on academic and professional developments including the establishment of degree programs and the publication of core texts.

Defining Characteristics

Fundamentally, as Hornberger (2001) shows, educational linguistics can be characterized as a field with a dynamic relationship to a range of disciplines which takes a problem-oriented approach to issues focused squarely on language in or around education, yielding analytical scope with depth on these issues. Accordingly, educational linguistics has a broad scope and a narrow focus.

The interface of linguistics with other disciplines has always been a core feature of educational linguistics. As Spolsky remarks, it "start[s] with a specific problem and then looks to linguistics and other relevant disciplines for their contribution to its solution" (1978: 2). Its scope, he continues, "is the intersection of linguistics and related language sciences with formal and informal education" (1978: 2). The potential set of problems to be examined is, of course, unquestionably vast, as are the possible combinations of research tools that could be used to investigate them. This does not mean, however, that educational linguistics is adrift in an ocean of research prospects. Rather, as a field, it is "pluri-centric, multi-method, and multi-level" (Kjolseth, 1978, in reference to Sociology of Language). That is to say, there are, as the entries in this section of the encyclopedia indicate, multiple core issues at the heart of educational linguistics, which demand different sets of research methods. Thus, a broad scope is achieved through the range of work done under the auspices of the field and depth is accomplished through intricate investigations by individuals with expertise in specific areas. Each educational linguist approaches research in different ways, some focusing on micro-level issues, some on macro-level issues, and others on the connections between them. The result is a holistic, or transdisciplinary, understanding of the interplay among individuals, language, society, and education.

From Interdisciplinary to Transdisciplinary

Educational linguistics came of age in a dynamic moment in intellectual activity, particularly in the area of language study which also saw the birth of Fishman's sociology of language (Fishman, 1968, 1972) and Hymes's ethnography of communication (Hymes, 1972; see Joseph, 2002, and Murray, 1998, for discussions on the history of [socio]linguistics). It is not surprising, then – given this climate that eschewed disciplinary boundaries in favor of the holistic study

of specific issues – that educational linguistics emerged as problem-oriented and interdisciplinary. Spolsky suggested that linguistics, although central to the study of language-related issues, must be synthesized in a complementary manner with the approaches of other disciplines in order to comprehend fully any specific problem (viz. issue or theme) related to language and education (1978: 2–3). It is here that the seeds of transdisciplinarity in educational linguistics were first planted.

Writing on the subject of applied linguistics more broadly, Halliday (2001: 176) stated:

> I say 'transdisciplinary' rather than 'inter-' or 'multidisciplinary' because the latter terms seem to me to imply that one still retains the disciplines as the locus of intellectual activity, while building bridges between them, or assembling them into a collection; whereas the real alternative is to supercede them, creating new forms of activity which are thematic rather than disciplinary in their orientation.

Halliday remarks that activities in applied linguistics "involve more than the content of any one discipline: at the very least, they involve psychology, sociology, and linguistics" (2001: 176) and he offers foreign language teaching as an example. In his call for a transdisciplinary applied linguistics, he notes that the aim should be not simply to create an amalgam of intellectual activity made up of a collection of features from a variety of disciplines but to go further and synthesize what each relevant discipline has to offer on a particular issue. By doing this, the focus becomes theme-based. A theme, he explains, "is defined not by content but by aspect, perspective or point of view" (Halliday, 2001: 176). In this way, Halliday suggests, the focus of intellectual activity would not be on building bridges across disciplinary content areas but, rather, on synthesizing specific research tools (which are often, although not always, disciplinary-based) to investigate a particular theme or issue. It is a fine distinction but an important one.

The starting point is at the core of the difference between inter-/multidisciplinarity and transdisciplinarity. In inter-/multidisciplinary inquiry, the research begins with what is knowable from the point of view of specific disciplines and how, by building bridges across them, a researcher can achieve a more vibrant picture than one would be able to view from the vantage point of a single discipline alone. In a transdisciplinary orientation, research begins with a theme – an aspect (a specific issue, concern, problem) of a specific situation – and then uses the resources at one's disposal to investigate that theme. This, to use Halliday's words, removes the locus of intellectual activity from the disciplines, thereby superseding them to place the locus of intellectual activity around the theme itself. The transdisciplinary researcher is like a painter who creates a multidimensional picture of a particular theme by using the spectrum of research tools on her or his palette.

Following Spolsky's characterization of educational linguistics as problem-oriented, it is easy to see how it is best considered transdisciplinary. Problem-oriented is similar in spirit to theme-based in Halliday's formulation of transdisciplinarity. In each case, the idea is that a researcher not simply take disciplinary knowledge and apply it to a situation. In educational linguistics, a researcher begins with a problem, issue or theme, related to language and education and then synthesizes the research tools in her/his intellectual repertoire to investigate or explore it. The work of educational linguistics, then, is carried out in and across a variety of academic departments (anthropology, area studies, education, English, foreign languages, linguistics, psychology, sociology, etc.) depending on the theme. This is, incidentally, how the pioneering anthropological linguist Edward Sapir envisioned that *all* research in linguistics should take place (Anderson, 1985: 219–221). In this way, educational linguistics follows in a tradition of linguistics broadly conceived. The Australian School has long taken this approach, characterizing educational linguistics as a transdiscipline (Martin, 1993: 141).

The theme-based nature of a transdisciplinary educational linguistics also serves to highlight another crucial element of this field – research/practice reflexivity. Research in educational linguistics is not done for the sake of knowledge alone but, rather, with the aim of addressing a particular aspect of a practical concern to formal and/or informal language education. Thus, the aim of research is to impact on practice. This is a two-way street, however. What is done in the practice of formal and/or informal education often serves as the impetus for research. In this way, themes to be investigated are not generated exclusively in the mind of a researcher but from the researcher's contact with practice. In educational linguistics research and practice feed off of as well as inform each other (Freeman, 1994; Myers, 1994; Pica, 1994).

From its beginnings, the field of educational linguistics has been concerned with the study of all the factors that influence language use as it relates to education. The objective has always been the creation of a thorough and articulated body of knowledge about these factors, and relationships among them, for the purpose of advancing educational issues ranging from language acquisition to language planning. Clearly, no single paradigm or discipline could suffice for such an endeavor and, consequently, educational

linguistics is likely to continue to evolve as a transdisciplinary field, bound not by a disciplinary base but by its single focus.

Professional Activities

Since the founding in the early 1970s of the first two doctoral programs in educational linguistics at the University of New Mexico, by Spolsky, and at the University of Pennsylvania, by Hymes and Wolfson (Hornberger 2001), a number of academic training programs specifically in educational linguistics have grown around the world. Doctoral programs with a concentration in educational linguistics have been established at Arizona State University, Stanford University, The University of Manchester, the University of Newcastle upon Tyne, and the University of Warwick. Master's level training in educational linguistics has been created at Lancaster University, Srinakharin Wirot University, and the University of Colorado, Boulder. Coursework in educational linguistics is offered at universities in Australia, Canada, New Zealand, Saudi Arabia, the United States, and probably elsewhere as well. In addition, the University of Groningen hosts the Educational Linguistics Research Group and the Monterey Institute of International Studies offers master's degrees in TESOL and TEFL through its Graduate School of Language and Educational Linguistics. Educational linguistics is clearly becoming firmly institutionalized (see Relevant websites).

Intellectual activity in educational linguistics also has been strong since the early 1970s. The first foundational book, alluded to earlier, was Spolsky's (1978) *Educational linguistics: an introduction* followed by Stubbs's (1986) *Educational linguistics*. Developments continued in the 1990s when educational linguistics was a featured topic of the Georgetown University Round Table on Languages and Linguistics (Alatis, 1994) as well as the subject of other conference presentations (e.g., Brumfit, 1996; van Lier, 1999). The *Concise encyclopedia of educational linguistics*, an impressive summary of work in the field, edited by Spolsky, was released in 1999. Most recently, Kluwer Academic Publishers inaugurated its *Educational linguistics* book series with van Lier as general editor. Although there is as yet no professional organization or peer-reviewed journal devoted to educational linguistics, the student-managed *Working Papers in Educational Linguistics* (www.wpel.net) has continuously published work since 1984. Individual educational linguists have published and presented their work in a variety of venues since the beginning and they continue to have a strong presence in linguistics and related social sciences.

Future Directions

Lamentably, as Gee reminds us, "linguistics has had much less impact on education, and teachers know much less about language and linguistics, than the current state of our knowledge about language in education, or the current dilemmas of our schools, would seem to merit" (2001: 647). After depicting how differing theories of language arising from functional and generativist linguistics, respectively, play a role in major educational debates (such as that around whole language vs. phonics instruction), Gee goes on to exemplify some of what we do know about language in education, including the role of overt focus on language in helping children acquire new forms of academic language, the need for teachers to understand the diverse linguistic and cultural resources children bring to their classrooms, and the ways in which language form and meaning are interactionally worked out in moment to moment classroom interaction. He argues, then, as other educational linguists have before him, that we need to do a better job of putting what we know in linguistics into practice in schools.

As pressure builds on the educational systems of the world to serve the needs of increasingly diverse multilingual populations and at a time when multilingualism and multiliteracy are clearly becoming socially and economically advantageous, the need to understand relationships between language and education is particularly acute. The more the complexity of the relationships between language and education is recognized, the more complex research must become, in turn. Transdisciplinary work is likely to be more important than ever before. Although educational linguistics as a field has tended in this direction since the beginning, there is much to be done to build a truly unified and coherent body of knowledge. Although all educational linguists seem to share the common goal of fostering education that is linguistically appropriate and socially responsible, there is little strategic dialogue on how to realize this goal on a grand scale. As a whole, then, educational linguistics seems to lack a clear course. If educational linguistics is to emerge as an articulated transdiscipline that encompasses all issues in language and education, it is time to seek out the connections and relationships among all the individual and societal topics that are studied at micro-, meso-, and macro-levels. Recent trends in ecological research are promising in this regard.

Although ecological approaches are not new to the social sciences, they have recently gained prominence in educational linguistics. Van Lier (1999), for example, emphasized the importance of integrated multidimensional inquiry over the decontextualized study

of discrete variables when trying to understand matters related to language and education, which are all socially situated. In this vein, an ecological approach is increasingly used in the study of all facets of educational linguistics, from individual-level language acquisition to classroom pedagogy to language policy. For instance, Leather and van Dam's (2003) *Ecology of language acquisition*, the first text released in Kluwer's *Educational linguistics* series, features a collection of articles that consider the complex contextual factors that influence language acquisition. In addition, Hornberger's (2003) *Continua of biliteracy: an ecological framework for educational policy, research, and practice in multilingual settings*, also an edited volume, highlights the value of synthesizing multiple levels of analysis in order to fathom the intricacies of constructing, implementing, and evaluating educational programs for bi-/multilingualism. Although these books reflect different perspectives on ecology, they share the understanding that the processes involved in any aspect of language and education cannot be effectively studied in isolation. It is in this sense that ecology is likely to play a central role in the future of educational linguistics.

Consistent with the early core characteristics of the field, these ecological approaches in educational linguistics are problem-oriented and interdisciplinary. At the same time, the theme-focused holism in these approaches moves the field more firmly toward transdisciplinarity, making a strength of drawing on multiple disciplines to create a holistic portrait of (the role of) language (in) teaching and learning. In all, educational linguistics, as it has done throughout its short history, is certain to remain grounded in its core principles while adapting to fit the needs of research and practice in an ever-changing multilingual world.

See also: Anthropological Linguistics: Overview; Fishman, Joshua A. (b. 1926); Halliday, Michael A. K. (b. 1925); Sapir, Edward (1884–1939).

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Efik

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Background

Efik is one of the better-known African languages and was at one time one of the best-described African languages. It is spoken today by perhaps 750 000 people as a first language in the southeastern corner of Nigeria, in and around the city of Calabar, its cultural center. Due to its location near the Atlantic coast, Calabar and the Efik were encountered early by European explorers, traders, and missionaries. Calabar was a major slave port during the era of the trans-Atlantic slave trade. As a result of its strategic location, Efik became the dominant language of the region, and for a considerable period was used inland along the Cross River as the local trade language. As a result of missionary activity in the mid- to late-1800s, Efik became one of the first languages of sub-Saharan Africa to be reduced to writing. A sketch grammar was published in 1857 (Goldie, 1857), followed by the first Efik-English dictionary in 1862 (Goldie, 1862). Insights from Efik data were important in the development of our current understanding of tone and its place in phonology (Ward, 1933; Welmers, 1959; Winston, 1960), leading to the notion of downstep and indirectly to the advent of autosegmental theory. In recent years Efik has been eclipsed in prestige locally, and it has given way to English and Nigerian Pidgin as lingua francas in Southeastern Nigeria. Despite its early development, only a small literature has accrued in the language; it is used to some extent on radio and television, but there is no Efik language newspaper. Goldie (1857) remains the only attempt at a grammar of the language, and except for the work of T. L. Cook (Cook, 1969, 1985, 1986, 2002), it has largely escaped the notice of contemporary linguists.

Classification

Efik is now recognized as part of Lower Cross, a subgroup of Cross River, which is in turn a branch

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Classification

Efik is now recognized as part of Lower Cross, a subgroup of Cross River, which is in turn a branch

of Benue-Congo and part of the Niger-Congo phylum (Connell, 1994). Linguists working on the classification of African languages have frequently noted similarities between Efik and Bantu, (e.g., Guthrie, 1967–1971; Greenberg, 1963; see also Winston, 1970), though without advancing the claim that Efik or its sister Lower Cross languages are themselves Bantu or Bantoid. Other members of the Lower Cross grouping include Ibibio and Anaang, which, despite interesting structural differences among the three, exhibit a fair degree of mutual intelligibility, Ekit, Oro, Obolo, Usaghade, and a number of other smaller languages. The variety of Efik spoken at Calabar is considered the standard form of the language; there are minor dialect variations, spoken at neighboring Creek Town and to the northwest of Calabar in the Odukpani area. The brief descriptive notes that follow are confined to remarks on certain interesting aspects of the Efik tone system.

Efik Tone

Efik is a classic example of a two-tone (high, low) terrace-level register tone language exhibiting both 'automatic' and 'nonautomatic' downstep. Thus, after H there exist only three possibilities: H, L or downstepped H ($^{\downarrow}$H), and after L only H is possible. H after L and $^{\downarrow}$H are both lowered relative to a preceding H (i.e. 'automatic' and 'nonautomatic' downstep, respectively) and no subsequent H within the same phonological phrase can rise above this new level, hence the terracing effect. H and L can combine within the same syllable to give surface contours, both rising (LH) and falling (HL). Lexical roots in Efik fall into one of three tone classes, those bearing H, L, or LH tone patterns.

Tone functions both lexically and grammatically in Efik. At the lexical level, there is an abundance of minimal pairs that establish this function. Grammatically, tone is used to mark a wide range of functions. In the noun phrase, associative and genitive constructions, whether adjective + noun or noun + noun, are indicated by means of a modification of the tone of the second element of the construction. In the verb phrase the positive imperative form of the verb is considered to bear the inherent tone; certain tenses, aspects, and moods, and focus and negation are indicated through tone modifications. Person (2SG vs. 3SG, 2PL vs. 3PL) is marked through a modification of the tone of a prefix. Together with tense and aspect, focus in Efik may be considered a basic category of the verb system. A very brief and partial sketch only of its operation is possible here; the interested reader is referred to Cook (1985, 2002) for further details.

Focus is marked by means of an inflectional affix, normally consisting of one or more tones, attached to the verb stem. On positive verbs, a three-way distinction is made, where focus is on the verb itself (verb phrase focus, VPF), on a word or words preceding the verb (PrVF), or on a word or words following the verb (PoVF). Thus, a verb with the same time and aspect reference will vary in its tone according to its focus condition. Verbs bearing inherent H become in the past, for 1SG, $^{\downarrow}$H (VPF), H (PrVF), and L (PoVF); verbs with inherent L remain L under these conditions. For negative verbs only a two-way distinction is realized, between PrVF on one hand and VPF and PoVF on the other.

This article has given only a brief insight into the complexity of one aspect of Efik, its tone system. Other aspects of Efik structure, both in the realm of phonology and in syntax, as well as elsewhere, are equally interesting. Renewed focus on this language would well repay linguists for their efforts.

See also: Benue-Congo Languages; Focus; Niger-Congo Languages; Nigeria: Language Situation; Tone: Phonology.

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Egypt: Language Situation

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Arabic in Egypt is the dominant language, and as in other Arab countries, diglossia is found in which 'higher' varieties such as Classical Arabic and Modern Standard Arabic exist alongside 'lower' colloquial varieties, which themselves are represented by local dialects. Other languages represented in Egypt, however, include Nubian, Kenuzi-Dongola, Domari, Berber, and Coptic. With a rapidly growing population of 76 million and a literacy rate of approximately 57%, Egypt continues to grapple with challenges concerning language preference and use.

Classical Arabic, the language of the Islamic tradition, is of course used in reciting the Koran, while Modern Standard Arabic is employed in religious sermons, contemporary literature, newspapers, news broadcasts, and academic writing. Modern Standard Arabic is learned at school and colloquial varieties are acquired at home. Although most educated Egyptians are able to comprehend Modern Standard Arabic in listening and reading, considerable variation exists in their ability to produce this form in speaking and writing.

Spoken Egyptian Arabic (Arabic, Egyptian Spoken), sharing features with Eastern Arabic spoken in the Levant and the Gulf is commonly used in everyday oral communication and is also the language of much film and television beamed throughout the Arab world. Varieties of Egyptian Arabic include the more prestigious urban dialect of Cairo, the dialect of Alexandria as well as rural dialects including Arabic spoken in the Delta, in the Oases and Sinai by Bedouins (known as Arabic, Eastern Egyptian Bedawi Spoken), and in Middle and Upper Egypt (known as Saidi Arabic).

Domari speakers represent the largest language minority group in Egypt, with over one million members. The Domari, referred to as Muslim Gypsies, trace their origins to India in the 18th century and are spread out in communities in North Africa and the Middle East. Both Nubian and Kenuzi-Dongola are spoken in Egypt as well as in Sudan and share lexical similarities. The Nubian language is spoken by approximately 200 000. With the construction of dams along the Nile, Nubians have either relocated to new villages or moved to larger cities. Kenuzi-Dongola speakers, many who also live in the Upper Nile Valley, are estimated to number approximately 100 000. Only about 5000 Berber speakers are found in the western desert of Egypt. Finally, Coptic, the original language of Egypt, is only used today in liturgies of the Coptic Christian Church. Although used almost exclusively for religious practices, a handful of Coptics have been involved in an attempt to revive the Coptic language.

Foreign languages commonly spoken in Egypt include English, French, and German. English, of course, is required in the curriculum from grade seven on through secondary school, and many private schools use English and to a lesser extent other modern European languages as one of the main languages of instruction.

As elsewhere in the Arab world, Egyptians continue to view mastery of Modern Standard Arabic as well as of English and other modern European languages as a means for socioeconomic mobility as well as a tool for modernization and privatization.

See also: Ancient Egyptian and Coptic; Arabic; Berber; Code Switching and Mixing; Sudan: Language Situation; Variation in Arabic Languages.

Language Maps (Appendix 1): Map 7.

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See also: Ancient Egyptian and Coptic; Arabic; Berber; Code Switching and Mixing; Sudan: Language Situation; Variation in Arabic Languages.

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Egypt: Scripts, Ancient

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Setting

Rising from obscure beginnings around 3000 B.C.E., ancient Egyptian civilization flourished in the Nile Valley for more than three millennia. In 332 B.C.E., Alexander the Great conquered Egypt. Greek writing, language, and culture became dominant among the upper classes concentrated in the cities. In 30 B.C.E., Rome annexed Egypt. The land lost its independence until modern times. The Pharaonic state ceased to exist. However, its distinctive culture endured for several hundred more years. It was the irrepressible expansion of Christianity, especially from the 4th century C.E. onward, that finally extinguished both Egyptian religion and hieroglyphic writing, which had become exclusively religious in purport, probably in the 6th or 7th century C.E. Pharaonic culture had by then retreated to remote holdouts in the deep south near Assuan. The advent of Islamic religion and Arabic language in the 7th century C.E. led to the extinction of the last stage of the Egyptian language, Coptic, some time between 1000 and 1500 C.E. Since the 3rd or 4th century C.E., literate Christians had begun writing the Coptic language with the Coptic script, which is the Greek alphabet supplemented by a few characters derived from hieroglyphic writing for sounds not expressed in Greek. Coptic survives to this day in the liturgy of the Christian–Egyptian, or Coptic, church. However, the language was hardly understood by many at the beginning of the modern age.

Ancient Egyptians used the hieroglyphic script to write their language. The script is pictorial. The unit is the hieroglyph. Hieroglyphs are stylized but fairly realistic pictures of divine and human beings and all sorts of objects. Earliest hieroglyphic writing, from approximately 3000 B.C.E., possibly earlier, consists of imperfect attempts that are often difficult to decipher. Full-fledged hieroglyphic writing emerges around 2500 B.C.E. In the 2nd century C.E., the hieroglyphic writing tradition began a steep decline, yielding to the Greek and Coptic scripts. The latest explicitly dated hieroglyphic texts belong to the 4th and 5th centuries C.E. The last scribes who could write hieroglyphs to any degree presumably died in the 6th or 7th century C.E., did we but know their names. The script therefore needed to be recovered from total oblivion. Jean François Champollion deciphered hieroglyphic writing in 1822. A key insight came to him on September 14, 1822. That day is widely regarded as the date of birth of Egyptology.

'Hieroglyphic' is a Greek term used by Clement of Alexandria (ca. 150–215 C.E.). It means 'pertaining to (*ic*) holy (*hiero*) carving (*glyph*).' Strictly speaking, the term denotes only the most conspicuous use of hieroglyphs, found in monumental texts incised on temple and tomb walls. Broadly speaking, hieroglyphic refers to all types of hieroglyphic writing, including some so cursivized that most signs are no longer recognizable as pictures.

Structure

Language and Writing: The Sign

Writing represents language. Describing a writing system therefore begins with the structure of language. Language consists entirely of signs – de Saussure's *signes linguistiques*. Signs have two sides, a signified and a signifier. An example of a signified is the image one has of a dog. An example of a signifier is the sound pattern consisting of the three sounds $d + o + g$ or, better, the code in the brain that can induce the speech organs to produce these sounds. The independent existence of signified and signifier is self-evident from comparing languages. Speakers of French possess the same signified. However, a different sound pattern serves as signifier, *chien*. The fact that in shifting from English to French, the image of a dog stays more or less the same whereas the sound pattern changes proves the distinction between signified and signifier. However, language is neither signifieds nor signifiers. It is the links between the two. Speakers consent, as it were, to link the image of a certain animal always to the same sound pattern, *dog*. Native speakers do so in childhood, and others do so when learning English as a second language. The electrochemical configurations in the brain of signifiers, signifieds, and links between them remain unknown. However, their existence seems certain by inference.

Hieroglyphs are pictures of people and things. How do pictures come to represent the language? Languages are made up of signs. Signs are two-sided. Symbols therefore represent signs in two ways. They refer either to signifieds or to signifiers. Hieroglyphic writing is one of a handful of scripts that exhibit both ways.

The Ideogram

A hieroglyph denoting a signified (i.e., the image one has of something) is an ideogram – that is, an 'idea' (*ideo*) 'character' (*gram*). Examples are the hieroglyph 𓁹 depicting a head in the word 𓁹𓏏 *tp* 'head,' 𓃭 depicting a lion in 𓃭𓅱 *rw* 'lion,' and 𓂋 depicting

a house in 𓉐 *pr* 'house'; the 'ideographic' stroke in these words marks hieroglyphs simultaneously as an ideogram and as sole symbol denoting a word. The relation between picture and person or object depicted differs from ideogram to ideogram.

The Phonogram

A hieroglyph denoting a signifier (i.e., one or more sounds linked to a signified) is a phonogram – that is, a 'sound' (*phono*) 'character' (*gram*). Examples are the hieroglyph 𓂋 depicting a mouth and denoting the sound *r*, 𓅓 depicting an owl and denoting the sound *m*, and 𓅱 depicting a swallow and denoting the two sounds *w* + *r*. Phonograms represent one, two, or three consonants and are hence called uniliteral, biliteral, and triliteral, respectively. Vowels are not written. Phonograms often serve as phonographic complements. For example, 𓂋 *r* is a complement in 𓅱 *wr* (*wr* + *r* = *wr*).

The Rebus Principle

How can pictures denote sound? Sounds are derived from pictures by means of the rebus principle. *Rebus* is Latin for '(to represent sounds) by (depicting) objects.' In English, one might playfully represent the pronoun 'I' by an eye (𓁹). In hieroglyphic writing, many phonograms are derived from pictures in this way. For example, *r* 'mouth' is written with the ideogram 𓂋 depicting a mouth. In rebus writing, 𓂋 turns into a phonogram representing the sound *r* in any word. Technically, the following happens: 𓂋 originally denotes the mouth as a signified. This signified is linked to the signifier, the sound *r*. Through the sign link, 𓂋 secondarily also denotes the sound *r*. In rebus derivation, a hieroglyph originally denoting a signified as an ideogram and therefore secondarily also the signifier attached to this signified is cut loose from the original signified and left to express only the signifier as a phonogram.

The 'Alphabet'

Like any language, Egyptian consists of a limited set of distinctive sounds, phonemes. Each consonant phoneme, 25 or so in number, can be represented by its own phonogram. The whole set is called the alphabet. Hieroglyphic writing is not purely alphabetic, however. Other signs are used alongside the alphabetic phonograms. Still, the alphabet accounts for approximately half of the signs in any text.

Asymmetry of Ideograms and Phonograms: The Logogram

Ideograms and phonograms exhibit a most characteristic asymmetry. Ideograms always denote sound in addition to meaning. Phonograms only sometimes denote meaning in addition to sound. Accordingly, ideograms are always logograms, whereas phonograms are only sometimes logograms. Because signified and signifier are linked in the sign, ideograms also denote sound. Thus, the ideogram 𓁷 in 𓁶 'head' conjures up not only the head as a signified but also the sounds *tp* as a signifier. In referring to both sides of a word, directly to its signified and indirectly to its signifier, ideograms are also always logograms, 'word' (*logo*) 'characters' (*gram*). On the other hand, only a full sound pattern as signifier is linked to a signified. Therefore, only phonograms denoting a full sound pattern are also logograms. For example, 𓅓 in *m* 'in, from' is both a phonogram and a logogram. It denotes every consonant of the word in question. However, the phonogram 𓅓 is not a logogram in 𓅓 *mr* 'director.' It denotes only one of the sound pattern's two consonants.

The Determinative

In addition to the ideogram and the phonogram, the determinative is a third type of hieroglyph. Determinatives appear at the ends of words and determine the meaning class to which a word belongs. Determinatives refer to a property of signifiers, namely their class appurtenance. Thus, words denoting human beings often end in 𓀀, a seated person. Words denoting time often end in 𓇳, the sun. Plurals mostly end in 𓏺, the so-called plural strokes.

Hieroglyphs often function in two or more capacities. 𓉐 functions as an ideogram in 𓉐 *pr* 'house,' as a phonogram in 𓉐𓄿 *pr*(*y*) 'go out' (𓄿 being a determinative in verbs denoting motion and *y* a 'weak' consonant mostly left unwritten), and as a determinative in many words denoting buildings. Ideogram, phonogram, and determinative are therefore types of hieroglyphic functions rather than types of hieroglyphs. Words are written in many various combinations of one or more of the three types (ideogram, phonogram, and determinative) and contain one to five or six hieroglyphs, sometimes more.

Types: Hieroglyphic Proper, Cursive Hieroglyphs, Hieratic and Demotic

Hieroglyphs normally exhibit their full pictorial quality only when chiseled or painted. This is hieroglyphic writing proper. When writing with a pen on papyrus, scribes used cursive variants. Pen-written hieroglyphs are called hieratic, which is Greek for 'priestly (script).' The distinction between 'hieroglyphic' and 'hieratic' appears first in Clement of Alexandria (200 C.E.). Hieratic was by then used mainly in papyri inscribed by priest-scribes with religious texts.

Earlier, however, in the 3rd and 2nd millennium B.C.E., hieratic was used for all pen-written texts composed in the first three stages of the language – Old, Middle, and Late Egyptian. 'Hieratic' in its modern use is therefore a misnomer. A type of writing less cursive than hieratic is cursive hieroglyphs, used typically in Book of the Dead papyri, whose earliest specimens date to approximately 1500 B.C.E.

From the 7th century B.C.E. onward, an extremely cursivized variant of hieroglyphic writing, called demotic, is attested for more than a millennium. It is used to write the fourth stage of the language, also called demotic. Demotic means '(script) of the people.' The name first appears in Herodotus (5th century B.C.E.). Hieroglyphic proper and hieratic had by then become limited mainly to monumental and religious texts. A most typical trait of demotic is that the hieroglyphs of a word often merge into a single composite sign that takes on a life of its own. Many demotic words are therefore written with their very own sign. Demotic consequently makes great demands on an ancient scribe's or modern scholar's paleographic memory.

Varia

There are additional distinctive properties of hieroglyphic writing worthy of note. First, hieroglyphic writing as a rule runs from right to left, with people and animals depicted in hieroglyphs facing right. Texts are mostly written in lines. However, columns were always common in monumental arrangements. They were also the norm early on in hieratic, in the 3rd millennium B.C.E.

Second, two types of restricted use are syllabic writing, used to write Semitic words in the New Kingdom (second half of the 2nd millennium B.C.E.), and Ptolemaic writing, which is attested mainly in temple inscriptions from approximately 300 B.C.E. onward and in which the conventions of writing are stretched to include many new signs and new values that are often cryptic or playful.

Third, in terms of number, A. H. Gardiner's sign list in *Egyptian Grammar*, still the most authoritative, contains fewer than 800 signs. However, the number of those used frequently is less. In Ptolemaic writing, the sign inventory runs into the thousands.

Fourth, late period pseudo-explanations indicate dwindling knowledge of hieroglyphic writing. In his book on hieroglyphs, Horapollo (5th century C.E.) knows that the hieroglyph 𓃹, a hare, is used to write the word meaning 'to open.' However, he falsely assumes that that is because hares always keep their eyes open. Rather, 𓃹 is a biliteral phonogram. It denotes the consonants $w + n$, as in *wn* 'to open.' It is a rebus derivation from the ideogram 𓃹 appearing in *wn* 'hare.'

See also: Aegean Scripts; Ancient Egyptian and Coptic; Champollion, Jean-Francois (1790–1832); Egypt: Language Situation; Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Semiotics: History; Sign Theories; Young, Thomas (1773–1829).

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Einstein, Albert (1879–1955)

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Albert Einstein was born on March 14, 1879, at Ulm, in Württemberg, Germany, and died April 18, 1955 in Princeton, New Jersey. After starting out at the Luitpold Gymnasium in Munich, he forfeited his German citizenship in 1896. In 1901, he graduated from the Swiss Federal Polytechnic School in Zurich and obtained Swiss citizenship. Unable to find a teaching post, he took a job at the Swiss patent office and continued his work in physics. In 1905, he earned a doctorate from the University of Zurich and by 1911 was full professor at the Karl-Ferdinand University in Prague. In 1912, he moved to a chair at the Zurich Eidgenössische Technische Hochschule. In 1921, he received the Nobel Prize for his paper on the photoelectric effect and also the Barnard Medal. That year he raised funds for the Hebrew University in Jerusalem. In 1925, he was awarded the Copley Medal of the Royal Society and in 1926 the Gold Medal of the Royal Astronomical Society. In 1932, he moved to Princeton University, and after the Nazis came to power never returned to Germany.

Einstein's special theory of relativity, pertaining to inertial motions, was linked to the surprising discovery that the speed of light is evidently invariant irrespective of the velocity of objects emitting it. His general theory of relativity, accounting also for acceleration, though still regarded as controversial remains the most unifying conception in physics. His search for a unified field theory, however, was unsuccessful. In addition to his work in physics, Einstein anticipated certain developments in modern linguistics and the philosophy of language, for which he has received little notice. For instance, in a 1941 radio talk entitled 'The common language of science,' he anticipated by more than two and a half decades Chomsky's (1965) observation that certain grammatical rules must be known by 'intuition' in order for languages to be acquired. Einstein wrote, "If language is to lead at all to understanding, there must be rules concerning the relations between the signs on the one hand and on the other hand there must be a stable correspondence between signs and impressions. In their childhood individuals connected by the same language grasp these rules and relations mainly by intuition" (Einstein, 1941/1956: 209). In fact, Einstein carried the conception of grammar all the way to its modern pragmatic phase.

Einstein capsulized P. F. Strawson's modification of the correspondence theory of truth and, independently, voiced much the same criticism of Bertrand Russell's thinking. In particular, Einstein insisted that "everything depends on the degree to which words and word-combinations correspond to the world of impression" (Einstein, 1941/1956: 110). He did not elevate raw facts, however, to the position of determining propositional syntax as the logical positivists were prone to do, nor did he commit the error of situational semantics where raw facts are accorded distinct identities without the assistance of propositions to single them out. Although it is doubtful that he ever met C. S. Peirce, it seems that Einstein was indirectly influenced by Peirce's followers, especially John Dewey, and possibly by Jean Piaget who held certain ideas in common with Dewey. Einstein was a rational empiricist, however. Although he accorded reality to observers, material objects, and events, he insisted that propositional representations must remain free of any deterministic control by the material world. Oddly, in his search for a unified field theory he had to suppose that the slightest motion of any material body (including living bodies) must be subject to strictly deterministic physical laws. Had his hope for such a theory panned out, it would have removed all stochastic processes and events. Einstein capsulized this expectation in a statement eagerly quoted by biographers: "I refuse to believe that God plays dice with the universe" (Clark, 1971: 742).

Nonetheless, with respect to language Einstein argued for free will and, anticipated arguments for Chomskyan linguistic creativity. This was made plain in Einstein's argument with Bertrand Russell where he insisted that "the concepts which arise in our thought and in our linguistic expressions are all – when viewed logically – the free creations of thought which cannot inductively be gained from sense experiences . . . . we do not become conscious of the gulf – logically unbridgeable – which separates the world of sensory experiences from the world of concepts and propositions" (Einstein, 1944: 297). Here, Einstein anticipated Chomsky's argument for the relative autonomy and freedom of grammar contra B. F. Skinner. However, Einstein reached further to argue for a conception of grammar that attaches bodily objects, persons, and real events to referring terms. It has become increasingly evident that this sort of pragmatic mapping is necessary if we are to explain child language acquisition and successful communications that depend on language (Oller *et al.*, 2005).

The following list includes the works cited here and a selection of Einstein's most relevant and accessible writings that deal directly or indirectly with language and linguistics.

See also: Chomsky, Noam (b. 1928); Peirce, Charles Sanders (1839–1914); Piaget, Jean (1896–1980); Reichenbach, Hans (1891–1953); Russell, Bertrand (1872–1970); Strawson, Peter Frederick (b. 1919).

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18th Century Linguistic Thought

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The 18th century has been characterized as a century of debate on language, leading to the formation of new conceptions in this field. The focus on language has also been supported by the role of public opinion and by profound changes in society. But the most important discussions were about the role of language in thought. In the field of language description, 18th-century authors followed for the most part traditional views and contributed to their further development.

Discussions on Language in the Early 18th Century

The inclusion of language in the philosophical systems of Rene Descartes (1596–1650), Antoine Arnauld (1612–1694), and Baruch de Spinoza (1632–1677) was based on the supposition that there was an analogy between the dualism of language and thought and that of body and mind. The basis of the doctrine, which supposed an incorporeal thinking no longer accessible to humans after original sin, had already been developed by St Augustine (354–430). From a historical perspective, thinking required signs to render collections of simple ideas, as well as memory, possible. Signs gave rise to the manipulation of ideas, and they did not depend on the presence of things or the enumeration of all the simple ideas included in them.

A main tenet of the Augustinian–rationalist doctrine was the merely spiritual nature of all notions and of the relations between them. The denotation of a term was regarded as a mental object that could only have a representational relation to the word and could not depend on linguistic signs and their corporeal nature. The form words obtained in different languages was regarded as arbitrary, whereas the composition of the concept was universal and did not depend on sensations. For the rationalist thinkers, the indispensability of language consisted only in communication between people when the transmission of pure incorporeal notions was impossible. But linguistic signs met the necessities of communication in a very insufficient way because intuitive conceptions overwhelmed the human mind while their linguistic signs distracted from their content and slowed down the process of thinking.

Descartes's vision of the relation between language and thought was a dualistic one, in that he did not attribute to linguistic signs any influence on ideas. He saw a confirmation of this opinion in the fact that animals with highly developed speech organs did not develop human thinking even if they were able to produce some speech sounds. This idea was further developed by Gerauld de Cordemoy (1626–1684), who claimed that the substantial difference between language and thought allowed the development of different languages with arbitrary sound patterns.

The authors of the Port-Royal Grammar (1660) and the Logic (1662) took up the distinction between language-independent thought, communicated thought, and language-dependent thinking, and they subordinated linguistic signs to conceptual notions. Had ideas depended on names, people would not have had the same ideas about even the simplest things

languages were equal in rank and could not be reduced to a universal grammar, Jenisch envisaged an impartial comparison of languages. But his idea of empiricism was merely hypothetical and based on literature.

So the prize-winning topic on the comparison of languages did not prepare or even open a new epoch of language studies but concluded the discussion on universals and the relativity of languages in the context of the Enlightenment debate. At the end of the 18th century, new kinds of empirical questions were emerging, but many authors still tried to address them through the old epistemological framework.

See also: Academies: Dictionaries and Standards; Adelung, Johann Christoph (1732–1806); Beattie, James (1735–1803); Beauzee, Nicolas (1717–1789); Brosses, Charles de (1709–1777); Burnett, James, Monboddo, Lord (1714–1799); Condillac, Etienne Bonnot de (1714–1780); Diderot, Denis (1713–1784); Early Historical and Comparative Studies; Hamann, Johann Georg (1730–1788); Harris, James (1709–1780); Jones, William, Sir (1746–1794); Language Teaching: History; Lomonosov, Mikhail Vasilyevich (1711–1765); Modern Linguistics: 1800 to the Present Day; Murray, Alexander (1775–1813); Origin of Language Debate; Rhetoric: History; Sign Language: History of Research; Sign Theories; Smith, Adam (1723–1790); Western Linguistic Thought Before 1800.

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El Salvador: Language Situation

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The República de El Salvador is linguistically more Spanish than Spain. Nine tenths of this Spanish-speaking Central American culture is ethnically mestizo (of mixed American and European heritage). Almost none of the resident Amerindians can speak anything but Spanish, which is also the dominant language of most of the European Salvadoreños. Other languages are spoken primarily as foreign languages of cultural and commercial interaction, with the possible exception of some Mayan-speaking immigrants from Guatemala. Spanish usage is so strong that, although knowledge of English is widespread in San Salvador business circles, even foreigners

in El Salvador tend to use Spanish, perhaps because there is a relatively small non-Hispanic foreign population.

Salvadoran Spanish resembles Honduran and Nicaraguan Spanish, yet it is in some ways closer to the general pan-American pattern, perhaps as a result of El Salvador's greater urbanization and high population density. The greatest differences can be seen among the farmers and the landed gentry, whereas the speech of the urban middle class is more similar to that of their counterparts in Honduras, Nicaragua, and even Guatemala. Vocabulary items typical of Salvadoran Spanish have been listed by the Real Academia de la Lengua Española. Widespread is the use of *pal* for *para* and the use of *chontoca* for *cabeza*. The Salvadoran scholar P. Geoffroy Rivas has suggested Amerindian language sources for much of the local vocabulary, and his book *La lengua salvadoreña* (1969) is the most widely cited authority; however, a truly thorough lexicography has yet to be written. Whatever the etymologies may be, young business professionals have been spreading their emblematic vocabulary, the 'salvadoreñismos,' throughout Central America and even beyond.

Despite their continued existence as identifiable ethnic groups, the Lenca and the Pipil have effectively ceased speaking their languages. Lenca has not been definitively classified, though a Macro-Chibchan affiliation is commonly assumed. The Pipil language, which is locally known as Náhuat (Nahuate, Naawat, Nawaa), is an Uto-Aztecan language. Although a government commission was formed in 1980 to save this language, Náhuat is now nearly extinct. It is possible that the archival speakers of these languages, preserved in audio and audiovisual recordings, may one day spark language revivals, although this seems highly unlikely for Lenca. Token speakers of Náhuat can be found in Sonsonate, Ahuachapán, La Libertad, and Santa Ana, and there are token speakers of Lenca in La Unión; however, neither Náhuat nor Lenca is a colloquial language of daily communication in El Salvador.

More than twelve thousand Q'eqchi' (Kekchí) speakers are widely reported to live in El Salvador, but this seems false, though the source of this error is unclear. Any Q'eqchi' living in El Salvador are certainly recent immigrants from Guatemala, and migration studies have identified no large population of Q'eqchi' in El Salvador, suggesting instead that there are actually many more Q'eqchi' speakers living in the United States. Occasional reports of Chortí speakers in El Salvador are also false, an error likely due to careless 'ruta Maya' tour promotion. Despite their historical presence, there is currently no Mayan speech community in El Salvador.

See also: Guatemala: Language Situation; Honduras: Language Situation; Nicaragua: Language Situation; Spanish.

Language Maps (Appendix 1): Map 59.

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Elamite

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Elamite was a language spoken on the Iranian plateau from at least the end of the fourth millennium B.C.E. until at least the end of the Persian Empire in the fourth century B.C.E. It is attested in thousands of cuneiform documents, the great majority of which come from the western and southwestern periphery of that area, in the modern provinces of Khuzestān and Fārs, especially from the sites of Susa, which was an important political and economic center during the whole period, and Persepolis, the dynastic center of the Achaemenid Empire. The Elamite texts are almost exclusively either monumental (e.g., building inscriptions) or administrative (e.g., accounts, rations) in character. Elamite was first identified by European scholarship early in the 19th century because of its inclusion in many of the Achaemenid bilingual and trilingual monumental inscriptions: Old Persian, written in a specially created alphabetic script, and Akkadian (Babylonian) and Elamite, both written in Mesopotamian cuneiform. This corpus

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provided the basis for the decipherment of Akkadian, and hence Elamite, cuneiform in the 1840s.

The earliest evidence of texts in the region was found on about 1500 clay tablets dating from about the end of the fourth and beginning of the third millennium B.C.E. They are written in a still undeciphered script termed, misleadingly, 'Proto-Elamite.' The language of these texts is presumed, but not proven, to be Elamite. The same can be said about another small corpus of about 20 texts from the end of the third millennium written in an indigenous but cuneiform-like script known as 'Linear Elamite.' Apart from these two very early corpora, Elamite texts are written in various local adaptations of Mesopotamian cuneiform, usually with a significant reduction in the number of syllabic and logographic values and the occasional creation of a new local value. This corpus of texts is unevenly distributed over the commonly recognized periods given in Table 1. Achaemenid Elamite is obviously the best attested and most studied of these corpora, but, in part because of the massive presence of Old Persian and other Iranian names and loanwords in this period and doubts about the extent of Iranian influence on the development of the Elamite language, Middle Elamite, where it differs from Achaemenid Elamite, tends to be taken as a kind of classical norm.

Elamite cannot with any certainty be related to any known language, although a geographically plausible relation to the Dravidian languages has been discussed almost since the beginning of modern scholarship in the language (see the synthesis of McAlpin, 1981). Partly because of the lack of a known cognate language and partly also because of the relatively limited and stereotyped nature of the contents of the corpus, the interpretation of many aspects of Elamite grammar remains uncertain and subject to a great deal of discussion in the literature.

Table 1 Periodization of Elamite

Period B.C.E.	*Designation*	*Texts*
c. 2600–1500	Old Elamite	Less than a dozen texts of varied content
c. 1500–1000	Middle Elamite	Almost 200 royal monumental inscriptions
c. 1000–550	Neo-Elamite	About 30 royal inscriptions and several hundred legal and administrative texts
550–330	Achaemenid Elamite	The several hundred royal inscriptions and several thousand administrative texts from the administrative centers of the Persian Empire

In terms of word-order typology, Elamite has predominantly subject-first, verb-last order, with a certain amount of variability. Adjectival, genetival, and relative modifiers normally follow the head noun; adverbial relations are rendered principally by postpositions, although there are also some prepositions. It is a subject of current debate whether Elamite displays features that might be termed 'ergative,' but in any case it is much less so than its contemporary neighbors Hurrian, Urartian, and Sumerian. Elamite morphology is almost exclusively suffixing. A central role in morphology and syntax is played by a classifier suffix/enclitic, NCLASS, marking person, number, and various classes of animacy and inanimacy. This formative plays the role of subject marker in two of the three verb conjugations, but it is also used in one of most characteristic features in the language: the delineating of a syntactic constituent N_{HEAD} adjunct by one or more occurrences of a NCLASS agreeing with the head. The adjunct can be an adjective or a possessor, as in:

(1) temti riša-r
lord.ANIM.SING great-NCLASS.ANIM.SING
'great lord'

(2) ulhi sunki-me
house.INAN.SING king-NCLASS.INAN.SING
'house of the king'

or in some more complex combination of the two:

(3) sian Nabu-me upat-hussi-p-me kuši-h
temple.INAN.SING Nabu-NCLASS.INAN.SING
brick.AN.PL-baked-NCLASS.AN.PL-NCLASS.INAN.SING
build-I
'I built a Nabu temple of baked brick'

The adjunct can also be used as relative (note the additional NCLASS formative after the negation marker before the relativized verb):

(4) sian in-me kuši-h-š-me-a
temple.INAN.SING not-NCLASS.INAN.SING build-PL-
3RD-NCLASS-COMP
'the temple which they did not build'

Finally, this marking can occur even in sequences which, for example, in English, would not normally be treated as a syntactic constituent (on this construction see Stolper, 2004: 85):

(5) peti-p pat-p u-p rabba-k-na
enemy.AN.PL-NCLASS[AN,PL] under-NCLASS.AN.PL me-
NCLASS.AN.PL bind-PERF-OPT
'may enemies be bound under me'

The last example illustrates that the NCLASS can also occur on the head noun, in this case explicitly marking it as plural.

See also: Classifiers and Noun Classes: Semantics; Dravidian Languages; Ergativity; Iranian Languages; Isolated Language Varieties; Sumerian.

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Electrical Stimulation of Cortex and Language

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Introduction

The use of the focal external electric stimulation technique intraoperatively is based on early observations of Fritsch and Hitzig (1870) and Bartholow (1874); they noted that an externally applied electric current to the exposed brain evokes sensorimotor experiences. Cushing (1909) was the first to use the focal external current to map out the somatosensory cortex in humans. With safety and reliability established over the past 50 years, this technique of stimulation has become a standard part of neurosurgical treatment for intractable epilepsy, tumour removal and for the management of the arteriovenous malformations. The goal of the stimulation technique is to determine the extent of tissue resection while preserving sensorimotor and critical cortical language and memory functions (Penfield and Roberts, 1959; Ojemann, 1983, 1993). In surgical management of seizure, the focal external current is used first to define the epileptogenetic region and second to map out the cortical sites serving memory and language functions. This functional mapping plays a crucial role in determining the extent of tissue resection, particularly from the left perisylvian region, since any tissue removal from the tempoparietal cortex can result in a permanent language deficit (Bhatnagar *et al*., 2000; Ojemann, 1983, 1993; Penfield and Roberts, 1959).

Focal Electric Brain Stimulation Technique

The intraoperative stimulation technique involves craniotomy and functional mapping of the exposed cortex. Since a patient's active participation is essential for any mapping of neurolinguistic functions, the intraoperative stimulation of the brain tissue is performed on patients who are awake. Minimal anesthesia is used with intravenous propofol and local anesthetics. Advances in technology have also allowed extraoperative stimulation mapping using subdurally implanted grids with multiple electrodes. The two issues closely related to stimulation mapping of the brain are stimulation parameters used for localizing functions and selection of linguistic tasks for measuring language. The electrophysiologic rule governing the parameters of stimulating current is that the selected current strength should be great enough to interfere with language processing, but it should be lower than the current trains that cause any after-discharges and/or trigger seizure activity. Therefore, the stimulation thresholds used for mapping an area are carefully selected to avoid after-discharges and are above the thresholds for sensorimotor responses. The external focal electric stimulation is applied using bipolar (sometimes unipolar) electrodes through a hand-held constant current generator, which generates a biphasic square waveform of pulse and ensures proper protection for the tissue. The electrodes are made of platinum or a combination of other materials to avoid polarization and vary in size from 0.5 to 3.00 mm in diameter with a center-to-center interelectrode distance of 0.5 to 2 mm. The stimulation involves a current strength ranging from 0.5 to 15 mA with

See also: Classifiers and Noun Classes: Semantics; Dravidian Languages; Ergativity; Iranian Languages; Isolated Language Varieties; Sumerian.

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biphasic square wave pulses, each of 0.3 to 1 ms at the rate of 50 to 60 Hz for a duration of 2 to 8 s. Functional disruptions in the brain by stimulation would have no value if the applied currents can trigger afterdischarges; this would not only negate the observed local functions but would also indicate a spread of the current volleys along the en-passage fibers. The stimulation serves as a reversible transient lesion and its effect rarely lasts longer than the stimulation duration. The stimulating current is applied at some point when the patient is performing a language task. This performance is called the stimulation (experimental) trial and it is mixed with nonstimulation (controlled) trials. The patient's performance is statistically examined to ensure that the stimulation-evoked positive responses of language errors are not random events. An interesting observation about the focal electric stimulation is that the current below threshold for seizure discharges evokes positive responses from the sensorimotor cortex. However, the application of this current, when applied to other brain areas, including the association cortex outside the sensorimotor region in awake patients, did not evoke any spontaneous verbal response. Penfield and Roberts (1959) noted that the application of the same current in some region of the association cortex can block an ongoing linguistic activity in an awake patient. This physiologic effect is based on the interference that the focal stimulation produces during the linguistic task. If stimulation at a cortical site disrupts (positive response) ongoing naming/speaking, the cortical area in question is considered to be functional for the task. If the stimulation does not block or alter the naming/speaking process, the stimulated area is not considered to be involved in language (see **Figure 1**).

The language task that has commonly been used to measure language during functional mapping of the brain is naming, which involves asking the subject to name pictured objects. The rationale for considering naming to reflect a measure of language during stimulation mapping has been the presence of the word-finding disorder in all types of aphasias in neurological patients.

As a technique, stimulation mapping has proven to have a significant advantage over lesion evidence since each subject serves as his or her own control. The patient's performance during nonstimulation trials serves as a controlled trial and it can be compared with the performance during stimulation to evaluate the reliability of evoked errors. Further, stimulation-induced interruptions provide precise details about functional localization, since the extent of the transient lesion can be only several millimeters in diameter, ranging from 0.5 to 3.00 mm. The stimulation is not known to leave any lingering effect and/or postoperative aphasia. Carefully controlled stimulation parameters pose no safety concern to patients, cause no injury to the examined brain tissue, and produce no evidence of acute inflammation to the mapped

Figure 1 An exposed human brain during electrocorticography prior to determining the extent of tissue removal. Numbered tickets mark sites that have been functionally mapped during intraoperative neurolinguistic testing. Many of the numbered sites were implicated in language and/or memory functions. Reprinted from Bhatnagar S C (2001). *Neuroscience for the study of communicative disorders* (2nd edn.). Baltimore: Lippincott Williams and Wilkins.

region of the brain (Ojemann, 1993). Furthermore, the effects of the stimulation on a particular site are repeatable but at times qualitatively different from other evoked changes from the same site as well as the sites in near proximity. Multiple samples of one or more linguistic behaviors from a single site allows us to evaluate the role that the tissue in question plays in language processing. Examination of the postoperative impact of tissue resection from the language-specific area has revealed that if the tissue resection site is 2 cm away from a cortical site implicated in language in the temporal lobe, no postoperative aphasia will be observed. On the other hand, a word-finding deficit has been noted to be present if the tissue removal comes within 2 cm from the site implicated in language (Ojemann, 1983; Ojemann and Dodrill, 1987).

A notable limitation of the focal cortical stimulation technique for functional mapping of the brain is the time constraint imposed by the surgery. This limitation, however, has been lessened because of technical advances involving the subdural implantation of a flexible grid with multiple electrodes on the cortical surface. The grids containing multiple electrodes can be left in the brain for varying time periods ranging from days to weeks after, thus allowing for neurolinguistic testing when the patient is rested, out of the surgery, and in a more natural environment (Uematsu *et al.*, 1992; Lesser *et al.*, 1981, 1984, 1994; Morris *et al.*, 1984).

Neurolinguistic Studies Using Stimulation Mapping

Over the past 50 years, focal cortical stimulation has been used for exploring neurolinguistic properties of the human brain. In light of the length limitations of this work, only a few significant neurolinguistic investigations will be discussed. The earliest series of investigations of cortical mapping of language function was undertaken at the Montreal Neurological Institute by Wilder Penfield and his colleagues (Penfield and Roberts, 1959; Penfield and Jasper, 1954), who functionally mapped the brains of approximately 110 neurosurgical, mostly epileptic, patients. Using naming and its evoked errors (misnaming and omission) as a measure of language, they reported approximately 132 aphasic-like errors, a very small number from a total of 110 patients (Ojemann and Whitaker, 1978). Penfield and his colleagues not only identified a large area essential for language in the left fronto–parieto–temporal cortex, but also explored the cortical regions that served motor speech, memory, and psychical (emotional) responses that consisted of hallucinations and interpretative illusions.

Using naming again as a measure of language, Fedio and Van Buren (1974) observed the evoked anomic errors from a large region of the fronto–parieto–temporal cortex; this area appeared to be larger than the area previously implicated in language. Searching for the correlates of verbal memory, Fedio and Van Buren noted that the stimulation of the posterior temporal–parietal cortex resulted in an impaired ability to recall stored verbal information, whereas the stimulation of the anterior temporal lobe interfered with the registration of new learning. In a series of neurolinguistic investigations using naming and a few other linguistic stimuli, Ojemann and colleagues noted a discrete localization of language in the human lateral cortex (Ojemann and Whitaker, 1978; Ojemann, 1983, 1993). Each of the mapped areas was found differentially committed to language in 50–80% of the patients sampled with the exception of a narrow region of the posterior–frontal lobe, which was implicated in all patients. This region appeared to be the most essential for language. Incidentally, this region of the posterior–frontal lobe is only a small part of the frontal language cortex.

Other significant neurolinguistic observations of stimulation mapping are as follows: (1) there was a differential organization of primary and secondary languages in the brains of bilingual subjects (Ojemann and Whitaker, 1978); (2) the cortical areas related and unrelated to language were separated by a boundary that was gradual (Whitaker and Ojemann, 1977); (3) cortical areas serving language, measured by object naming, were separate but were located adjacent to the areas that had been implicated in short-term verbal memory during stimulation (Ojemann, 1993); (4) cortical areas related to mimicry of sequential movements were also associated with phonemic identification (Ojemann and Mateer, 1979); and (5) many of the sites involved in object naming were implicated in syntactic errors in oral reading (Ojemann, 1983). This wealth of data supports an overlapping of cortical areas serving language, speech, verbal memory, and motor sequencing, which in turn contradicts the classical lesion-based application of discrete functional localization. Additional evidence exists to suggest that neurolinguistic representation of the human brain is possibly columnar or multilayered. Stimulation-based mapping of the brain examining semantic and syntactic tasks involved in the formulation of structurally intact sentences did not support the dichotomized discrete representation for syntax and semantics in the human brain (Bhatnagar *et al.*, 2000). The functional mapping of the brain confirmed that a large part of the fronto–parieto–temporal cortex in the left brain is involved in language as

measured by object naming only. A few of these sites throughout the entire fronto–parieto–temporal cortex were also implicated in syntactic morphology. However, only very few of the cortical sites from the inferior parietal region, or from the posterior and anterior temporal regions, participated in the semantic processes involved in sentence formation. This multitiered representation of language (naming, syntactic morphology, and semantic) functions implicating variable contributions of brain tissue to the overlapped – diffused and/or discrete – multiple functions supports a powerful and optimal model of the human brain, where language as a mental phenomenon evolves through qualitatively different forms within the same cortical tissues (Bhatnagar *et al.*, 2000). Emergence of different language errors from the same sites reveals a progressive unfolding of mental representation in logical time though not necessarily in the microseconds of real time and is reminiscent of the microgenesis model of Jason Brown (1988).

Neurolinguistic Studies Using Subdural Electrodes

A significant limitation of cortical mapping during craniotomy was the time that restricted language testing to less than 1 h (Lesser *et al.*, 1994; Umetsu *et al.*, 1992). A clinically driven need for better stimulation has led to the implantation of multiple electrodes using subdural grids and strips (see Figure 2). Common grid patterns that are used include arrays consisting of 8×8, 6×8, and 2×8 electrode arrangement and stripes containing 1×8 or 1×4 electrodes. They can be placed either under general or local anesthesia using standard neurosurgical procedures (Lesser, 1984). The stimulating current intensity using standard parameters is gradually increased until the current results in a functional interruption, or triggers after-discharges, or reaches the intensity limit of 15–17 mA (Gordon *et al.*, 1990; Lesser *et al.*, 1987). Other advantages of the subdural implantation include covering a better and larger area of the brain using multiple electrodes and far fewer artifacts to contaminate the results. The procedure involves using electrodes in a bipolar fashion incorporating two adjacent electrodes. If a pair of electrodes is found to be active, then one of the active electrodes is paired with other adjacent electrodes to determine whether one could localize the responsible electrode site with precision. An advantage of a subdural grid is that it allows for the localization of epileptogenetic areas and the identification of cortex involved in language, unhampered by the time restrictions in the intraoperative experimental procedural condition. This arrangement also permits an in-depth evaluation of language where the investigator can further question the patients about the awareness of the processes underlying the evoked linguistic errors. Neurolinguistic observations obtained from the patients

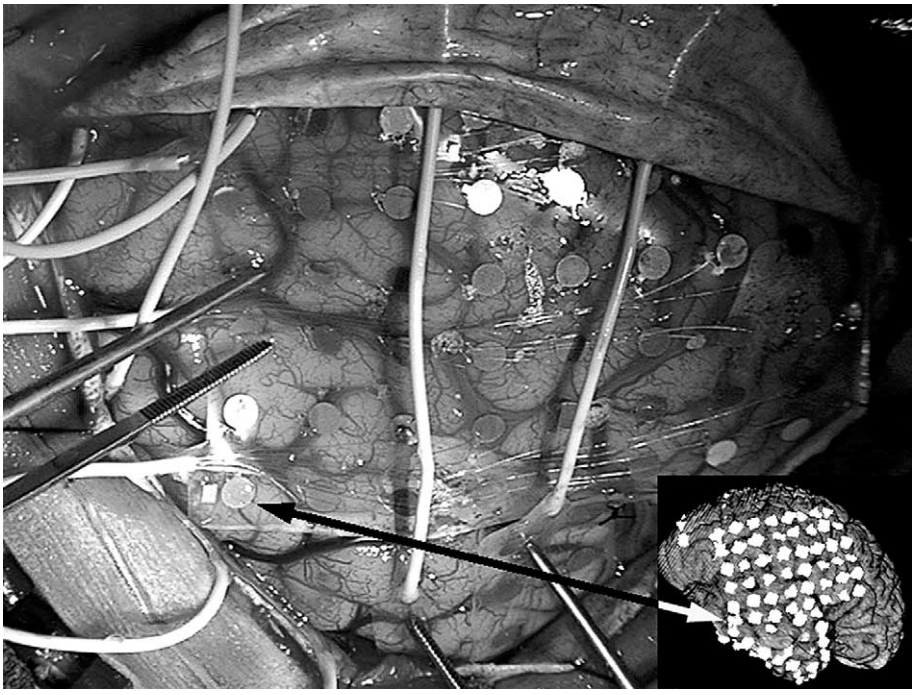

Figure 2 An exposed human brain during electrocorticography with an illustration of a subdural electrode grid placement in the management of seizure. Courtesy of Drs. Ronald P Lesser and Barry Gordon, Department of Neurology, The Johns Hopkins Medical Institutions.

with subdural grids of electrodes were similar to observations obtained from the stimulation using a hand-held stimulator. Other significant observations included the evoked dissociation of naming from reading (Lesser *et al.*, 1987) and the fractionation of the components of Gerstmann's syndrome from the stimulation of different sites within the angular gyrus (Morris *et al.*, 1984).

Stimulation of Subcortical Structures

Stereotaxic intervention, a precise method of identifying and targeting subcortical anatomic structures by use of three-dimensional coordinates for tissue destruction, has long been used in neurosurgery for treating movement disorders, postural abnormalities, and intractable pain. Clinical needs for safer and more effective treatment have replaced tissue destruction with stimulation using depth electrodes implanted stereotaxically in thalamic nuclei and basal ganglia structures (see Figure 3). Subcortical structures of the brain that have been targeted during neurosurgical procedures and examined for their role in higher mental function include the ventral lateral (VL) and centromedianum (CM), two most investigated nuclei of the thalamus and the basal ganglia structures of the posterior ventral pallidum (PVP) and subthalamic nucleus (STN). Other, though less frequently investigated structures include the cingulate, peri acqueductal gray, anterior and medial thalamus, and the subthalamic region.

Language generation in humans is a vastly complex event. It has been considered exclusively a cortical function implicating dominant temporal–parietal and frontal areas. However, the complexity of language and the cognitive processes underlying the use of language functions would strongly implicate much more than merely cortical structure. Surgically based neurocognitive studies have revealed that the generation of language also involves subcortical structures including the lateral basal ganglia, thalamus, and associated structures, creating a cortico–subcortical–cortical linguistic loop.

Role of Thalamus in Language Functions

Ventrolateral Nucleus Laterality of language extends even to the subcortical level. Notable differences in effect are seen when the dominant thalamus vs. the nondominant thalamus is stimulated. Aphasic manifestations have been documented after left thalamic involvement but are not seen after right thalamic perturbation. Originally, support for a thalamic role in the processing of language came from cases with hemorrhagic strokes or tumors involving the dominant VL nucleus, resulting in an array of disorders from motor speech (dysarthria) to language (anomia, paraphasia, and jargon verbal output). For example, subjects with left thalamic infarcts have been known to produce fluent verbal output characterized by jargon, anomia, and verbal paraphasia (Alexender and Lo Verme, 1980).

Further support of a thalamic role in language comes from stereotactic procedures, where selective therapeutic lesions placed in the left VL thalamus have resulted in linguistic impairments such as the following: reduced loudness, impaired motor quality of speech (dysarthria), anomia (Bell, 1968), arrests of speech (Guiot *et al.*, 1961), and word-finding errors (Ojemann, 1983; Selby, 1967; Vilkki and Laitinen, 1976; Fedio and Van Buren, 1975). Evoked errors in naming were also observed from stimulation of the

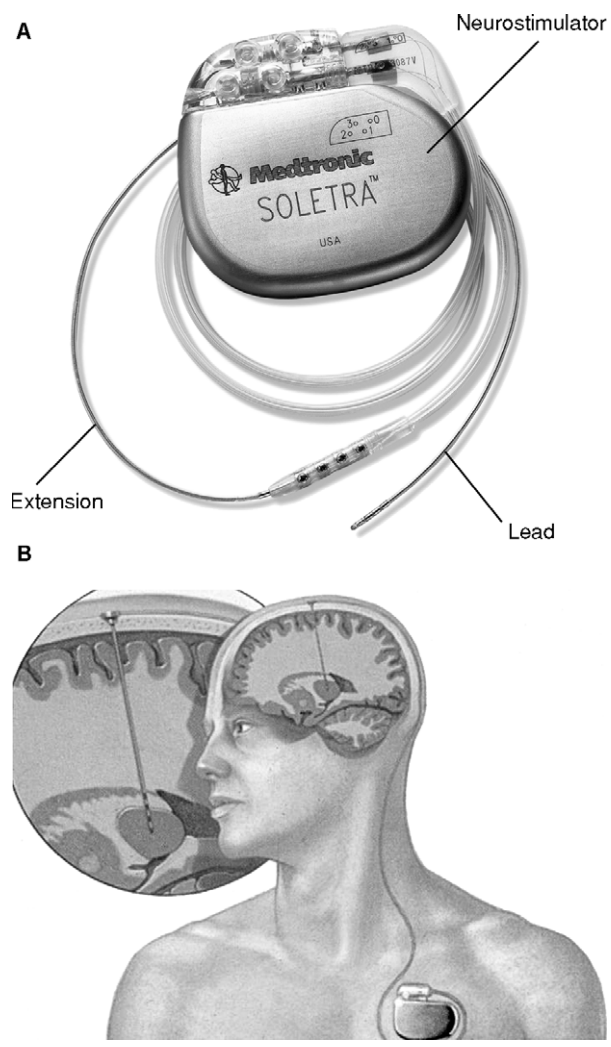

Figure 3 (A) Deep brain stimulator electrode unit (lead) and implantable programmable neurostimulator generator. (B) Diagrammatic representation of a deep brain stimulator implanted in the human brain. Courtesy of Medtronic Corp., Minneapolis, MN.

central medial part of the left VL nucleus and perseveration of the first syllable during left VL nucleus stimulation (Ojemann *et al.*, 1971).

The pulvinar has also been implicated in language functions, where its stimulation resulted in the impaired ability to name with preserved speaking ability (Ojemann *et al.*, 1968).

Neurosurgical investigations have also implicated the left thalamus with verbal memory; the electrical stimulation of the left VL nucleus produced a facilitatory impact on object naming and lexical memory, depending on the processing phase when the stimulation was delivered. This facilitatory effect has been referred to as the 'specific alerting response' (Ojemann, 1983). This alerting mechanism also rendered a facilitating impact on the processing of dichotically presented verbal stimuli. Dichotic listening is used to measure cerebral dominance; however, it has also been implicated in attentional processing (Ojemann, 1985; Bhatnagar *et al.*, 1989). Left thalamic stimulation has also been noted to facilitate calculation accuracy when subjects count backward by threes from a given double-digit number (Ojemann, 1983).

Centromedianum Nucleus Multiple sources of data obtained from the stimulation of the left centromedianum, a previously unexplored intralaminar thalamic nucleus, suggest the importance of the mesothalamic reticular formation in the processing of language. Many reports of stimulation in the left CM have shown that its stimulation results in a facilitatory influence on the processing of language functions, which were measured in terms of the correctness of responses, number of errors, patients' response latency, sentence comprehension, and nonverbal reasoning (Bhatnagar and Mandybur, 2005). In addition to a facilitatory effect on the processing of language, CM stimulation was also found to have facilitated calculation rate and accuracy if the patient was asked to count backward by threes from double- or triple-digit numbers (Bhatnagar and Mandybur, 2005). A positive effect of the CM stimulation was also noted on the auditory transmission of dichotically presented verbal stimuli even from the nondominant left ear, which only indirectly projects to the left dominant cortex (Bhatnagar *et al.*, 1990).

Furthermore, therapeutic mesothalamic stimulation used to relieve pain has also had an ameliorating effect on stuttering behavior (Andy and Bhatnagar, 1992). Elimination of stuttering-like behavior was attributed to an increased motor speech synchronization that was rendered by the stimulation of the left CM nucleus. These speech-fluency-related ameliorating effects lasted at least 2 to 3 years with chronic stimulation since the patients were last assessed. Microelectrode recording performed by Bechtereva *et al.* (1992) demonstrated that systems of thalamic neurons in the CM and VL thalamus respond selectively to word recognition. Further studying neuronal activity of subcortical (mainly striatal–pallidal and thalamic) neurons in lexical processing, Gogolitsin and Nechaev (1990) noted that the thalamic neurons fired in specific patterns in response to certain semantic categories.

Role of Basal Ganglia in Language Functions

In the clinical and scientific literature, most attention has been paid to the motor function of the basal ganglia nuclei. Consisting of a series of long and short loops and subloops, the basal ganglia nuclei have been known to process and refine the cortically generated input before channeling it back to the cortex through its output circuitry involving the internal globus pallidus, substantia nigra pars reticulata, and lateral thalamic nuclei. A few investigations, which focused on the behavioral dysfunctions in patients with basal ganglia lesions, have indicated that some of its neuronal circuitry is also involved in nonmotor functions (Brunner *et al.*, 1982). Investigations focusing on the retrograde transneural transport of the McIntyre-B strain of HSV1 have revealed that in addition to its output to motor and oculomotor areas, a substantial amount of basal ganglia output is to nonmotor areas that include the lateral prefrontal cortex (Brodmann areas 9, 12, and 46) and the inferiotemporal region (Middleton and Strick, 2000) (see Figure 4). The prefrontal cortex, as part of the executive brain, is involved in planning, learning, attention, problem solving, and other essential cognitive functions, and the ventrotemporal cortex is involved in memory. With efferents to and afferents from these regions, basal ganglia nuclei are anatomically situated to render a broader influence on cortically mediated functions.

Recognition for the potential contributions of the basal ganglia to higher mental function has emerged in the past 10–15 years. The clinically confirmed presence of the cognitive disorders, seen in virtually all patients with Huntington's chorea and in some patients with Parkinson's disease, has provided strong support for the cognitively relevant neural circuitry in the striatum and the reciprocally connected pars reticulata region of the substantia nigra (Middleton and Strick, 2000).

Posterior Ventral Pallidum

The appreciation of a cognitive role for the basal ganglia is coupled with the resurgence of interest in

	Cognitive			Sensory		Motor			Oculomotor
	Working memory: Planning	Working memory: Spatial	Working memory: Object	Recognition: Visual	*Function*	Movement parameters	Internally guided movements	Externally guided movements	Eye activity
	BA: 9	BA: 46	BA: 12	TE	*Cortical area*	M1	SMA	PM	FEF
	↑ VA	↑ VA MD	↑ VA MD	↑ VA	*Input nucleus of thalamus*	↑ VL	↑ VL	↑ VL	↑ VA MD
	↑ GPi SNpr	↑ GPi SNpr	↑ SNpr	↑ SNpr	*Output nucleus of basal ganglia*	↑ GPi	↑ GPi	↑ GPi	↑ SNpr

Figure 4 An illustration of basal ganglia circuitry serving motor and cognition functions. BA, Brodmann areas; GPi, globus pallidus, internal; MD, medial dorsal; SNpr, substantia nigra pars reticulata; VA, ventral anterior; VL, ventral lateral. Adapted from Middleton F A and Strick P L (2000). 'Basal ganglia output and cognition: Evidence from anatomical, behavioral, and clinical studies.' *Brain and Cognition 42,* 183–200, with permission.

surgical intervention for the remediation of motor disorders. The pallidal region of the basal ganglia became the primary target for the surgical treatment of medically intractable Parkinson's disease shortly after it was reconsidered on clinical and anatomical grounds by Laitinen *et al.* (1992). Only a few studies, though, actually categorized the influence of the globus pallidus on language function. Recording from single neuronal units has shown that only 19% of the recorded neurons in the globus pallidus interna were related to movement (Sterio *et al.*, 1993). Though it may actually have many heretofore uncharted functions, it does open the possibilities of many pallidal neurons participating in nonmotor functions such as language and cognition. Furthermore, chronic stimulation of the internal globus pallidus has resulted in a decline in verbal fluency and visuoconstructional skills, although no significant changes have been seen in overall levels of cognitive function (Troster *et al.*, 1997).

Subthalamic Nucleus

Within the complex neurocircuitry of the basal ganglia, the STN has been described as having a relatively central controlling relationship of basal ganglia output. With its strategic location adjacent to the inner basal ganglia loops, it is considered to be the preferred site for surgical interventions for medically intractable Parkinson's disease (Parent and Hazrati, 1995). A study involving bilateral subthalamic nucleus stimulator implantation showed prolonged postoperative semantic processing reaction times for a range of word types coded for meanings and meaning relatedness. Furthermore, the patients with the STN deep brain stimulators showed a significant improvement in postoperative lexical scores on the word test (revised) (TWT-R: a test of expressive vocabulary and semantics) but a decline in the accuracy of lexical decisions about words with multiple meanings (Whelan *et al.*, 2003). Additional studies involving the stimulation of the subthalamic nucleus have demonstrated a significant reduction in intraphrasal hesitation pauses, phonemic paraphasias, and morphosyntactic errors. Moreover, a clinically significant improvement was noted in lexical retrieval. There appears to be an implicit linguistic phenomenon, occurring mainly within the basal ganglia circuitry, which is benefited by stimulation-induced recovery of function within the basal nuclei and the overall relationship between the basal ganglia circuitry and the cerebral cortex (Zanini *et al.*, 2003).

Discussion

The full scope of the true nature of the brain's functional mechanism remains a mystery. Current knowledge of the brain and its function exists rather in bits and pieces, largely because the techniques (focal stimulation, positron–emission tomography, functional magnetic resonance imaging, and lesion evidence) have their inherent limitations and usually focus on a single functional property in any one study.

Considering the immense complexity of language, little is known about the precise ways in which the cortical and subcortical structures interact and participate to influence language acquisition and its ultimate formulation. Focal stimulation, which comes closest to focusing on the brain *in vivo*, is geared more for safety and side effect profiles with regard to neurosurgical interventions on these nuclear structures. In addition, confounding problems may accrue due to bilateral surgical intervention, in which the role of the dominant hemisphere cannot be independently measured. Comparisons of 'older' studies and more modern ones may also prove challenging because of changes in nuclear nomenclature as well as technological advances in surgery and imaging. With these issues in view and the limitations of techniques in mind, one can secure at least some partial understanding of the roles that cortical and subcortical structures play and of their interaction in the acquisition, regulation, and generation of speech, memory, and language functions.

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Elicitation Techniques for Spoken Discourse

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People who work with spoken discourse almost always have to face the problem of data collection. This is one of the most crucial phases of every research project insofar as the final results will be strongly dependent on the nature and the quality of the data gathered. For this reason, it is very important to choose the most appropriate technique, or a combination of techniques, in accordance with the specific purposes and the theoretical goals of the research. However, most important, it is essential to be aware of the intrinsic limits of each elicitation strategy.

The techniques used to elicit spoken discourse can be classified as methods based on observation and methods based on interview, depending on the approach of the researcher to the reality being investigated. During observation, the researcher observes and may participate in community life, trying to minimize the effects of his or her presence. On the other hand, interview methods influence the investigated community to a greater degree, creating a more unnatural situation, and consequently elicit less natural discourses.

Observation

Observation methods do not necessarily require the presence of the researcher in the community under investigation. Observation without participation implies that the interviewer remains outside the group and records it with candid instruments. An adequate unobtrusive data collection procedure is useful, for instance, in laboratory classrooms or in particularly delicate situations, but in general participant observation is preferred. In this case, the researcher participates in community life as an insider so that the individuals interact with him or her just as they would with anyone else. The prolonged presence in the field will provide the researcher with the chance to observe and collect (transcribing, recording, and videotaping) a large amount of linguistic and social data in almost natural settings and contexts.

Observation techniques developed by cultural anthropologists (Stocking, 1983) have been used in many different research fields: in ethnography of speaking by Blom and Gumperz (1972), in sociolinguistics (e.g., Labov (1972a) studied adolescent peer groups in south central Harlem using long-term participant observation), and in conversational studies (see, for example, Tannen (1981), who described the New York Jewish conversational style on a corpus of

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spoken language collected during everyday and ordinary conversation).

These techniques are very demanding in terms of tact, energy, time, empathy, and emotional involvement, but they create an intimate space in which the participants can share personal stories in a more natural discourse. The negative aspect of this approach is that a great amount of work may be wasted. In fact, the actual data analyzed from the recordings are minimal compared to the total amount of speech and number of speakers recorded. Sometimes, data are not suitable for analysis due to the low quality of the recordings. Furthermore, natural data have specific weak points which render them difficult to analyze. The effects of variables such as power, distance, status, gender and age gap between interlocutors become difficult to identify and take into account. These factors are crucial in pragmatic studies and therefore may interfere with the research results. Nevertheless, methods based on observations are a very valuable means of exploring the nature of communicative norms and cultural values of the groups studied, and this awareness is also a basic prerequisite when using interviews.

Interview

The interview involves at least two participants with clearly defined roles: the interviewer, who selects the topics and asks questions, and the respondent, who should answer the questions. The interaction between the two is a complex and multifaceted speech event, highly reflective of the relationship and the power relation established between the involved parties (Briggs, 1986: 18). These asymmetrical participant roles have major implications for discourse structure (for a critical discussion of the problem, see Milroy, 1987: 39–67). It is important to be conscious of the effects of some independent variables: Sex, age, race, personality, and the interactional style of the interviewer and of the interviewee can 'bias' the course of the interview (for the influence of race, see Edwards, 1986). The variety of the language used by the interviewer, as well as his or her way of dressing and general behavior, can potentially condition the interviewee and the language choices made during interaction.

There are many different interviewing strategies. Depending on the organization of questions and the formality of the interaction, interviews can be structured or spontaneous. In structured interviews, the informant can be asked to merely respond to some questions or to perform more elaborate tasks, such as retelling a short story or commenting on some pictures. In spontaneous interviews, the informant is encouraged to speak as naturally as possible. The length of the interviews can vary: There are anonymous and rapid surveys or long interviews. The interaction can be face-to-face or mediated, for instance, on the telephone. Interviews can be carried out outside or in private houses or laboratories. Depending on the number of participants, one-to-one or group interviews can be conducted.

In the following sections, some of these features are briefly described.

Structured Interview

Face-to-face interviews can be structured in various ways: The sequence and formulation of questions and responses may be more or less predetermined. In traditional dialectology, for instance, fixed questionnaires were used to obtain words or group of words (phrase or sentences) of the local dialects. The informant was asked to translate items or longer sequences of the standard language, often being influenced by the way in which the interviewer formulated the question. On the contrary, to elicit spoken discourse it is preferable to use more flexible questionnaires with a set of questions organized around specific topics. The sequence and formulation of questions may vary in each interaction. Standardization does not seem to be a requirement, even in survey interviews (Houtkoop-Steenstra, 2000: 180).

Specific Techniques Sometimes it is necessary to integrate interviews with specific techniques designed to elicit relevant data. Determined syntactic or morphological variables or discourse units, for instance, can occur only sporadically or by chance during verbal interactions.

In order to obtain a more structured and complex discourse, the informant can be asked to perform a role. This technique has been used to investigate second language acquisition by adult immigrants (Perdue, 1993). A typical example is the 'shrunken sweater' role play where the informant played the role of a customer who wanted to return a shrunken sweater to a shop. The customer wanted to obtain a refund because the sweater had shrunk even though it had been washed according to the label. The researcher performed the role of the shop assistant who dealt with customer complaints. The speech produced by the informant in this simulation offered valuable data for studying argumentative sequences as well as many other linguistic functions.

Another technique consists of showing people a film and asking them to talk about what happened

in it (see Chafe, 1980). This strategy allows the elicitation of spoken narrative style when people talk about things they have experienced. It has been employed to study a series of varied topics in different languages, such as the cultural differences in oral narrative strategies (Tannen, 1980) and the factors influencing lexical choice (Downing, 1980).

Other methods used to elicit spoken discourse employ a set of pictures showing different images. The informant has to comment on the images or use them as a guide to invent a story. Moreover, to study the phenomena of the syntactic level, it can be useful to ask the informant to retell a relatively complex story heard on audiotape or narrated by the interviewer.

Spontaneous Interview

The previously described techniques allow the elicitation of discourse in a restricted context. On the contrary, the aim of the so-called 'spontaneous interview' is to create a relaxed atmosphere in which the informant can talk 'spontaneously' and produce so-called 'casual speech' (Labov, 1972b).

Spontaneous interviews in relatively casual contexts are crucial for the analysis of sociolinguistic cues. Unfortunately, the very fact that a person is being interviewed is the main obstacle in obtaining casual speech – that is, the style in which a minimum amount of attention is given to the monitoring of language. This is the famous observer paradox (Labov, 1972c: 121). One of the techniques suggested by Labov to overcome this problem was to change the conversation to a topic that the interviewees felt very strongly about, such as the 'danger of death.' This had the effect of causing the speakers to focus on what they were saying rather than on how they were speaking. However, field experience has shown that questions concerning the danger of death are not always effective in obtaining a more natural speech (Milroy 1987: 40–1). It is much more important for the interviewer to understand what topics are of principal interest to the speaker and seek to steer the conversation in those directions all the while showing interest and empathy.

The distinction of categorical speech styles strictly associated with the formality of the context (Irvine, 1979) has been questioned (Eckert and Rickford, 2001). As Wolfson (1976) argued, Labov's categories of speech styles presuppose that there exists a precise entity of natural, casual speech. That entity does not exist *per se*, but the speech is natural when appropriate for a situation and a goal. The speech elicited during an interview is strictly dependent on the interview, and the problem of spontaneity should not be overemphasized because most important is the analytical study of all the factors that play a role during the interview.

In spontaneous interviews, it is useful to employ a variety of topics to initiate the conversation, according to the characteristics of the informants (age, sex, social status, interests, and country). Indeed, the informants may be surprised that a stranger, armed with a tape recorder, is so willing to engage in conversation even though there is nothing in particular to talk about (Wolfson, 1976). The interviewer can encourage the emotional involvement and the naturalness of interaction by speaking of his or her own personal experience. He/her can also take turns in conversation so as to make the interaction more natural, but should avoid frequent overlapping or interruption of the interviewee.

The spontaneous interview therefore demands strong social skills and communicative and empathic capabilities: "Flexibility in this regard is the earmark of the successful interviewer" (Labov, 1972b: 103). An overarching requirement for a good interviewer is an honest and frank interest in the subject matter of his or her research and for the people helping him or her collect material for the study (Wolfram and Fasold, 1974).

Rapid and Anonymous Surveys

Instead of complex and long interviews (regarding interview length, see Milroy, 1987: 39), it can sometimes be useful to use rapid surveys to elicit comparable sets of phrases in a natural context and with significant time savings. One famous research project conducted using this method is described by Labov (1972c) and is usually referred to as the 'fourth floor study.' In this study, data were collected from the shop assistants of three New York City department stores. The interviewer asked them for the location of an item he or she knew was located on the fourth floor. The response of the store assistant obviously contained common items, at least 'fourth floor'; in fact the linguistic feature investigated was the /r/ in preconsonantal and final position.

The same principle of rapid survey can be applied using other formulations, such as asking for directions (Dittmar and Schlobinski, 1988). These techniques require a well-planned study with a topic properly defined before interviewing. On the other hand, they fail to collect social characteristics from the informants and the linguistic data have a very narrow field of analysis (Milroy, 1987). In addition, the quality of the recording can sometimes be poor.

Rapid interviews have also been conducted using the telephone, which is an easy way to obtain a short interaction complete with all the rituals of

salutations. For instance, Schegloff (1968) studied the ritualized sequence of opening moves in telephone conversations.

It is also possible to analyze natural registered telephone calls. Scollon (1998) analyzed the social practices in the interactive construction of business telephone calls, and Zimmerman (1992) studied the interactional organization of the talk occurring in calls to the 911 emergency telephone number. The disadvantage of this type of interview is the lack of paralinguistic features such as gestures and eye gazing. Although telephone speech is acoustically limited, it can furnish good data for discourse analysis.

Group Interview

As opposed to the individual interview, occasionally the group interview turns out to be useful. Group interaction overcomes the restriction produced by the formal context of the one-to-one interview. It is also possible to interview one person in the presence of friends. This can make the context more realistic and familiar. Sometimes the people attending may exert enough pressure on the interviewee that he or she does not shift his or her way of speaking. Sometimes, however, the opposite happens and the people present, who question the way the informant should talk, oppress him or her. In group interviews, each speaker should be recorded on a single track in order to avoid the overlapping of voices.

Recording

As Vaux and Cooper (1999) suggested, it is important to record as much of a field session as possible. Videotaping and recording can help to make an analysis more fine-grained, giving the researcher the chance to hear or to see a tape repeatedly in order to notice things that happen rapidly or only once.

Sometimes being recorded can make people feel self-conscious or embarrassed, talk unnaturally, or, in extreme cases, stop talking altogether. Nevertheless, experience demonstrates that very often people ignore the microphone, either because of their familiarity with recording equipment or because they get used to the machine or even forget it is there. This is particularly true for elderly informants.

To facilitate this process during the interview, it is necessary to direct as little attention as possible to the recording process. For example it can be useful to place the recorder on a chair, easily accessed by the interviewer but hidden from the speaker. It is preferable to use an unobtrusive digital audio tape along with a good microphone.

Occasionally, it may be interesting to tape surreptitiously people who do not know they are being studied. This questionable practice gives rise to legal as well as ethical issues, and in any case it is necessary to ask for permission afterward. Speakers generally do not like to be recorded without their knowledge.

Ethics

Finally, the gathering of spoken data gives rise to ethical issues. It is fundamental to respect the interviewee's rights. For instance, occasionally it is necessary to interrupt the recording or even cancel part of it due to the explicit request of the informant. This happens when people realize they have given too much information about their personal and private affairs.

The researcher must observe participants' legal rights and should obtain informed written consent from them for their participation in the project and also for the use of the data they provide (for an overview, see Johnstone, 2000: 39–57). In addition, in order to preserve anonymity, it is good practice to use pseudonyms for personal and street names.

How much information concerning the research should be imparted to the interviewee presents another ethical dilemma.

It is important that a researcher face these issues conscientiously and choose the best way to deal with them before starting work in the field.

See also: Communicative Competence; Discourse Studies: Second Language; Language Surveys; Phonetics: Field Methods; Power and Pragmatics; Speech Acts; Speech Community; Style and Style Shifting.

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Ellipsis

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The term 'ellipsis' is derived from the Greek *élleipsis*, and in modern grammatical theory most generally refers to the omission of linguistic material, structure, and sound. In various theoretical frameworks, the phenomenon of ellipsis has been conceived of as a special case of anaphora because the silent string in an elliptical sentence is dependent for its interpretation on being associated with something else in the context, as is the case with anaphoric expressions (see Schwabe and Winkler, 2003 for an overview).

Some examples of different types of ellipses are given in (1). In each of the elliptical constructions in (1a) to (1f), linguistic material is omitted, deleted, or simply left unpronounced. Nevertheless, the silent string in the elliptical clause, here marked by an underscore, can be recovered from the italicized string in the previous conjunct.

(1a) Manny *plays* the piano and Anna _ the flute. (Gapping)
(1b) They *play the piano* but Anna doesn't _. (VP-Ellipsis)
(1c) They *play* the piano better than Anna does _ the flute. (Pseudogapping)
(1d) Manny *plays the piano* and Anna _, too. (Stripping)
(1e) Someone's *playing the piano* but I don't know who _. (Sluicing)
(1f) Manny played a solo with one *hand* and Anna with two _. (NP-Ellipsis)

In (1a), the second conjunct is interpreted as *and Anna plays the flute*. The verb *plays* is gapped, and therefore the elliptical construction is called 'gapping.' In (1b), the complete verb phrase after the auxiliary is absent, forming a case of 'VP-ellipsis' (VPE). Whereas (1c) is parallel to gapping, because the verb *play* is missing, it also bears some features of VPE because the missing sting occurs after an auxiliary and therefore it is called 'pseudogapping.' The phenomenon in (1d), where everything is elided except *Anna* and the focus particle *too*, is called 'stripping.' In (1e), the complete sentential complement to the interrogative wh-phrase *who* is missing and is recovered from the antecedent conjunct. The final example in (1f) combines 'NP-ellipsis' (NPE) after the numeral *two* with gapping of the string *played a solo*.

The constructions in (1) bear a set of similar features: they occur in coordinate structures; the second conjunct contains a gap or a silent site, and therefore Ø is referred to as the 'elliptical clause or phrase'; at the same time, the second conjunct contains a means

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The constructions in (1) bear a set of similar features: they occur in coordinate structures; the second conjunct contains a gap or a silent site, and therefore Ø is referred to as the 'elliptical clause or phrase'; at the same time, the second conjunct contains a means

of picking up the missing material from the first conjunct, often referred to as the 'antecedent clause;' the missing material or 'antecedent property' is interpreted in the elliptic site at the level of semantic interpretation; finally, the second conjunct contains elements that remain – so-called 'remnants.' The burning issue raised by the elliptical constructions in (1) for any theory of language is this: how is it possible that we understand more than we actually hear? The answer to this question lies in the most economic division of labor between the interfaces connecting form (syntactic structure), sound (PF)/(LF), and meaning as represented in the model of grammar (Chomsky, 1995).

Within the current theory of grammar, two prevailing research paradigms can be isolated: the deletion accounts and the nondeletion accounts (see Johnson, 2001 for details). Each of these approaches makes different predictions with respect to the three core questions relating to ellipsis: (i) how is ellipsis represented? (ii) how is ellipsis interpreted? (iii) how do information structure and focus contribute to the licensing and interpretation of ellipsis? These questions address the syntax, the semantics, and the information structure of ellipsis.

Syntax

By far the most widely studied types of ellipses are gapping and VPE, as given in (1a, 1b). The most basic observations about these two types of ellipses that any syntactic analysis must account for are the following: (i) VPEs target a phrase, whereas a gap need not be a phrase; (ii) VPEs can precede their antecedents, but a gap cannot; (iii) VPEs can occur in a subordinate clause, but a gap cannot; (iv) VPE is not subject to Ross's Complex NP-Constraint, but a gap is; (v) VPE can refer to an antecedent outside the clause, but a gap must find its antecedent within the first conjunct. These core differences are illustrated in (2) to (6), where the a-examples contain VPEs and the b-examples contain gaps.

(2a) Mr. Katzenstein certainly would have *learned something*, and it's even possible that Mr. Morita would have _ too. (Penn Treebank)
(2b) As a result consumer prices for the first 10 months of 1989 *surged* by 5% and wholesale prices _ by 1.3%. (Penn Treebank)

(3a) Although we think he shouldn't _ , Bush might *win the election*.
(3b) *Although we _ Bush shouldn't win the election, they *think* differently.

(4a) But like Mr. Egnuss few expect program trading to be *halted entirely* and a surprising number doubt that it should be _. (Penn Treebank).
(4b) . . .the Colombian minister of economic development said Brazil *would give up* 500 000 bags of its quota and (*then he announced that) Colombia _ 200 000 bags. (Penn Treebank)

(5a) John didn't *hit a home run*, but I know a woman who did_. (Sag, 1977)
(5b) *John didn't *hit* a home run, but I know a woman who _ a smash.

(6a) The thought came back, the one nagging at him these past four days. He tried to *stifle it*. But the words were forming. He knew he couldn't_. (Hardt, 1993);
(6b) [same context] *He knew he couldn't _ them.

VPE and gapping differ with respect to one further characteristic, usually referred to as the 'parallelism requirement.' Under this requirement, gapping must occur in coordinate structures and requires its remnants to occur in a contrastive relationship to their antecedents, as in (7). VPEs do not require parallel structures. The remnants are typically free to assume various discourse functions depending on the context, as in (8). Focused and accented elements are capitalized.

(7a) MANNY *plays* the PIANO and ANNA _ the FLUTE.
(7b) *MANNY *plays* the PIANO and ANNA _ the piano.
(7c) *MANNY *plays* the PIANO and Manny/he _ the FLUTE.

(8a) Manny *plays the piano* but ANNA DOESN'T _.
(8b) Manny *plays the piano* but he claims he DOESN'T _.

In current generative theory, the most influential account of ellipsis is the phonological deletion account assumed in Chomsky (1995) among many others. Historically, it is closely related to the syntactic deletion account, also called the 'strict transformational position,' as proposed by Ross (1967), which assumes that "all anaphoric processes are transformations that involve deletion" (Hankamer and Sag, 1976: 394). The basic idea of the PF-deletion account is that the computational system of human language hands on the fully derived sentence to the interfaces, PF and LF. At LF, the incoming sentence is interpreted. At PF, ellipsis is achieved by deletion of redundant material. PF-deletion accounts are based on the assumption that elided material has abstract features of phonetic and phonological representation, but that grammar contains a means of blocking its pronunciation. A

straightforward PF-deletion hypothesis is given in (9), as for example assumed by Kuno, 1976; Rooth, 1992; Merchant, 2001:

(9) Phonological Reduction Hypothesis:
Given material is deaccented or deleted at Phonological Form.

The term 'given material' in its original definition by Halliday (1967) refers to "recoverable information" in general. The hypothesis that explains the focus pattern of the remnants is given in (10), as for example assumed by Kuno, 1976; Rooth, 1992; Merchant, 2001:

(10) Contrastive Focus Hypothesis:
Given or redundant information licenses contrastive focus on the remnants.

The term 'contrastive focus' is informally defined as evoking a suitable set of alternatives from which a subset is chosen. The PF-deletion account predicts that an elliptical site is fully structurally represented, but not phonologically realized, as symbolized by the strike-through in (11).

(11) They *play the piano* but ANNA DOESN'T ~~play the piano~~.

The hypothesis (9) applied to the examples in (1a–f) correctly accounts for the elliptical sites, because in each case there is an antecedent in the coordinate conjunct that constitutes given material and thus can be elided in the second conjunct. Hypothesis (10) accounts for the ungrammaticality of (7b, c). Note, however, that neither of these hypotheses can adequately explain the difference in syntactic distribution of VPE and gapping illustrated in (2)–(6). Consider the alternative, or nondeletion account.

The nondeletion or proform accounts (a modern variant of the 'strict interpretive position') reject the claim that unpronounced material has syntactic representation. Instead they claim that "all anaphors (pronominal or null) are present in the underlying representation, and that no anaphors are derived transformationally" (Hankamer and Sag, 1976: 394). They propose that general mechanisms governing the recovery of meanings from context can be put to work to analyze elliptical constructions. One influential proposal was put forward by Lobeck (1995), building on much earlier work, in particular, Williams (1977) and Chao (1988). The main aim was to account for the distribution of ellipses by combining two assumptions: (i) ellipses are empty (non-nominal) proforms and are constrained in the same way as the empty nominal proform *pro*; (ii) ellipses must be analyzed as complements of a functional head. The result of applying (i) and (ii) to the elliptical constructions in (1) is that they account for VPE (1b), sluicing (1e) and NPE in (1f), but not to (1a, 1c, 1d). In VPE, sluicing and NPE, the complement of a functional head is empty (e), as illustrated in (12):

(12a) They *play the piano* but [$_{TP}$ Anna [$_{T'}$ doesn't [$_{VP}$ e]]].
(12b) Someone's *playing the piano* but I don't know [$_{CP}$ who [$_{C'}$ +wh [$_{TP}$ e]]].
(12c) Manny played a solo with one *hand* and Anna with [$_{DP}$ two [$_{N}$ e]].

This characterization fits in nicely with the claim that the set of elliptical constructions in (1) form two distinct natural classes, discourse-bound, as in (12) and sentence-bound as in (13), a distinction inspired by Williams' (1977) original differentiation between sentence grammar and discourse grammar (1977: 102) and further developed in Winkler (to appear). The examples in (13) comprise the sentence-bound ellipses, gapping and stripping, which are characterized by the absence of the phrasal head and other material in the elliptical clause.

(13a) Manny *plays* the piano and Anna [$_{VP}$ [$_{V}$ ~~plays~~] the flute].
(13b) Manny *plays the piano* and [$_{TP}$ Anna [$_{T'}$ ~~plays the piano~~]], too.

The distinction between sentence-bound and discourse-bound ellipses also provides an explanation for the data in (2) to (6). VPE is a discourse-bound ellipsis and can be accounted for by a proform analysis; gapping is a sentence-bound ellipsis and is more syntactically constrained, in a sense to be made more precise in the section on information structure.

Semantics

The question of how ellipsis is interpreted is closely connected to the nature of the identity that holds between the ellipsis and its antecedent. The PF-deletion account has the advantage that the syntactic structure in the elliptic site is strictly identical to its antecedent and is preserved for semantic interpretation at LF. However, it has the disadvantage that additional mechanisms must be assumed for cases where the strict syntactic identity between the ellipsis and its antecedent is not obeyed, as in (14):

(14) Speaker A: Do you think they will like me?
Speaker B: Yes, I'm sure they will _.

Example (14) is a case of VPE. It constitutes a problem for any theory that requires the ellipsis site and the antecedent site to be syntactically identical, because it can only be understood as *I'm sure they will* ***like you***. Instead of maintaining the referent of the antecedent VP (strict identity), the pronoun within the antecedent VP changed its referent in the

elliptic site, a phenomenon often referred to as 'sloppy identity.' However, the phenomenon of sloppy identity does not pose a problem for proform accounts that treat VPE on a par with other proforms, where the sloppy identity reading, as observed in (14), results from the fact that information retrieval operations are freely ordered.

There are three further syntactic effects on variables that are not respected under ellipsis and thus challenge the deletion account. First, it has been observed by Reinhart (1983) that for bound variables, like reflexives, the strict reading is systematically absent under VPE, as in (15a). Note, however, that the reflexive can acquire a strict interpretation when the coordinating conjunction *and* is replaced by the causal conjunction *because*, as in (15b) (from Hardt, 1993). Even context can trigger the strict reading, as in G. W. Bush's statement directed to Sadam Hussein (October 2002), given in (15c). The intended reading occurs in square brackets.

(15a) John voted for himself and his lawyer did _ too. [voted for himself]
(15b) John$_i$ defended himself$_i$, because his lawyer didn't_ [defend him]
(15c) "You disarm, or we will_[disarm you]." (G. W. Bush)

A second case in which syntactic constraints are not respected under ellipsis is illustrated in (16). Under the PF-deletion approach, (16) would be predicted to be ungrammatical due to the violation of Condition C of the Binding Theory. However, the Condition C effect is absent under VPE.

(16) I expected Jan$_i$ to win even when he$_i$ didn't_. [~~expect himself$_i$ to win~~].

A third case in point is the behavior of the polarity expression in (17). Under a PF-deletion account, (17) would be expected to be ungrammatical.

(17) Although Philip Morris typically tries to defend the rights of smokers with free-choice arguments, this has nothing to do with cigarettes, nor will it ever_. [have anything to do with it.] (Penn Treebank)

Note that a syntactically identical copy of the antecedent in the ellipsis site would result in ungrammaticality.

A further problem for the strict syntactic identity account stems from the observation that VPE can have split antecedents. As expected under the proform account, VPE patterns with regular pronouns with respect to split antecedents. A pronominal split antecedent example is given in (18a) and a case of VPE with a split antecedent is given in (18b):

(18a) Ben$_i$ told Jan$_j$ that they$_{i,j}$ will win the game.
(18b) Susan wanted to write a letter and John wanted to call her, but neither of them did. (Napoli, 1985)

The relevant observation with respect to example (18b) is that there are two possible antecedents for each of the VPEs. The interpretation of (18b) cannot be achieved by a deletion account that preserves syntactic identity. The required meaning cannot be derived from coordinating the respective verb phrases, because *write a letter and call her* does not provide the right meaning. We expect something like *but neither did Susan write a letter nor did John call her.* It seems that any account that is based on mere deletion of syntactically identical material will have problems accounting for these data.

The final point that challenges accounts that assume syntactic identity between the elliptic site and its antecedent is examples that show that VPE does not require parallel syntactic form between antecedent clause and elliptical site, as illustrated in (19a, b):

(19a) A lot of this material can be presented in a fairly informal and accessible fashion, and often I do_. (N. Chomsky, cited in Dalrymple *et al.*, 1991).
(19b) I haven't had a chance to talk, but I'm confident we'll get a bill that I can live with if we don't_. (G. W. Bush, Brussels, 2001).

Example (19a) shows that VPE in its active form can occur with a passivized antecedent verb phrase, and (19b) demonstrates that VPE can even find its antecedent in an embedded antecedent clause.

Information Structure

In recent publications on ellipsis and information structure, the PF-deletion account and the proform account make different predictions about how intonation and focus contribute to the licensing and interpretation of ellipsis. The claim is that the information-structural function of sentence-bound and discourse-bound ellipses differs and is signaled by different intonational features. Concentrate on two naturally occurring examples, one from each group: gapping, a sentence-bound ellipsis, is given in (20), and VPE, a discourse-bound ellipsis, in (21).

(20) It's probably true . . . that the system is so hierarchical
[that only the ASSISTANT manager can talk to the MANAGER
and the MANAGER to the GENERAL manager . . .] (Penn Treebank)

(21) Why does Betty think I was trying to kill myself? [On the principle that one swallow doesn't make a summer, but TWO probably DO], dear girl. (Walters (1996) *The Dark Room*. London: Pan Books, p. 42.)

The following pattern emerges. The sentence-bound and the discourse-bound ellipses have different information-structural functions, as stated in (22a, 22b).

(22a) Sentence-Bound Ellipsis:
The information-structural function of sentence-bound ellipsis is the isolation of contrastive foci or topics.

(22b) Discourse-Bound Ellipsis:
The information-structural function of discourse-bound . . . is marking the elliptical material as anaphoric or 'given.'

(22a) applied to the gapping construction in (20) predicts that the accented phrases represent contrasts. The first remnant of the elliptical clause *manager* is a contrastive topic; the second remnant *general manager* is a contrastive focus. (22b) must be applied to (21) and predicts that the elided material – here the NP *swallows* and the VP *make a summer* – marks given material. The fact that the functional elements immediately preceding the ellipsis sites are accented is due to a general rule of focus that regulates that the head of a phrase is accented if the argument cannot be (Selkirk, 1995).

Conclusion

Linguistic research over more than three decades has contributed significantly to our understanding of the different types of ellipses, the most prominent of which have been discussed here. The most comprehensive theories are those that recognize ellipsis as an interface phenomenon between syntax, semantics, and information structure. However, many aspects of how the different components work together still remain to be worked out.

See also: Coordination; Information Structure in Spoken Discourse; Island Constraints; Minimalism.

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Ellis, Alexander John (né Sharpe) (1814–1890)

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Ellis epitomized the life and career of the liberal-minded Victorian gentleman-scholar. Born into a comfortable middle-class family in Hoxton, London, on June 14, 1814, and supported financially for his entire life by a bequest, he was able to benefit from – and react to – the type of education provided by Shrewsbury, Eton, and Trinity College, Cambridge. His academic pursuits, mostly deriving from schoolboy interests and experiences, ranged over phonetics, music (especially singing), acoustics, mathematics (especially geometry), education, literature – and even horse taming.

He was drawn to phonetics by the mixed dialect areas in which he spent his early years: Hoxton, with its working-class Cockney speakers; Shrewsbury, with its mixture of Welsh and English accents; and Eton and Cambridge, with their aristocratic and upper middle-class speakers of RP. Contact with Isaac Pitman (*see* **Pitman, Isaac, Sir (1813–1897)**) led to joint developments in spelling reform (e.g., their 'Phonotypical Alphabet' of 1847) and shorthand. Publications on phonetics and spelling reform in the 1840s (1844, 1845, 1848) established Ellis as a major figure in these two fields. As a life-long advocate of the educational advantages of a reformed spelling of English, Ellis devised many systems, two of which, 'Palaeotype' and 'Glossic,' were to be utilized as phonetic notations (in the years before the development and near-universal acceptance of the IPA's alphabet).

The work for which Ellis deserves to be remembered is his *Early English pronunciation* (1869–1889), a five-volume description and discussion of the pronunciation of English from the Middle Ages to the late 19th century. Particular attention is paid to reconstructing the pronunciation of English during the Chaucerian and Shakespearian periods. For the 19th-century portion of the work, Ellis enlisted the help of hundreds of informants and a small group of phonetician–dialectologists. The result was the first major exposition of the dialect speech of the British Isles (together with some colonial and ex-colonial varieties); it was the precursor of the *Survey of English dialects* (*see* **Orton, Harold (1898–1975)**). His notations, although somewhat opaque to 21st-century users of IPA, reveal an astonishing array of detailed information about the allophony of 19th-century accents.

He graduated B.A. from Cambridge in 1837, was awarded the L.L.D. by Cambridge just months before his death, and was appointed F.R.S. in 1864. He died in West Kensington, London, on October 28, 1890.

See also: Dialect Atlases; Orton, Harold (1898–1975); Phonetic Transcription: History; Pitman, Isaac, Sir (1813–1897).

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Among British civil servants of the colonial period in India who performed services to linguistics, few names are more prominent than that of Francis Whyte Ellis. He sailed to India as a young man of no more than eighteen years and joined the Madras Civil Service. In the early 1800s he held various positions, becoming Collector of Madras in 1811. He died in 1819 while at that position. Accounts differ as to the cause of death, from swallowing a poisonous substance to cholera. By that time, he had planned various publications that can no longer be traced. One account has it that after his early death his cook was able to stoke the kitchen fires for a long time with manuscripts Ellis had left behind.

As a pioneering European scholar Ellis occupies a place in Dravidian studies analogous to that of Sir William Jones in Indo-European. "As early as 1816," says Bhadriraju Krishnamurti in his *The Dravidian languages,* "Ellis . . . in his *Dissertation on the Telugu Language,* asserted that 'the high and low Tamil; the Telugu, grammatical and vulgar; Carnataca or Cannadi, ancient or modern; Malayalma or Malayalam; and Tuluva,' are the members 'constituting a family of languages which may appropriately be called the dialects of South India;' . . . his purpose was to show that Tamil, Telugu and Kannada 'form a distinct family of languages' with which 'the Sanscrit has in later times, especially, intermixed, but with which it has no radical connection.'" Krishnamurti goes on to note that Ellis "presented considerable material, mainly lexical and some grammatical, from Telugu, Kannada and Tamil in support of his hypothesis."

Ellis's scholarly interests were wide-ranging. He was a good scholar of Sanskrit. His work on proprietary right to land in South India was highly regarded. So was his metrical translation of and commentary on the most famous of classical Tamil literary works, Valluvar's *Kural*. He did pioneering work collecting South Indian inscriptions.

Ellis decided to commit his life only to research until the age of 40, and only then to begin publishing. Unfortunately his life was cut short during a manuscript-collecting expedition when he had barely reached that age. Nevertheless, he had published a study marking the birth of comparative Dravidian linguistics, the somewhat obscurely entitled 'Note to the Introduction' to Campbell's *Grammar of . . . Teloogoo* (1816). On this firm foundation later scholars, such as Caldwell, Burrow, Emeneau, Krishnamurti, and others, were able to build so successfully.

See also: Burrow, Thomas (1909–1986); Caldwell, Robert (1814–1891); Dravidian Languages; Emeneau, Murray Barnson (b. 1904); Jones, William, Sir (1746–1794).

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Elphinston, James (1721–1809)

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The Scotsman James Elphinston was a latecomer to the spelling reformers. He was born in Edinburgh in 1721 and spent the first 32 years of his life in Scotland. Then he went to England, where he opened a school at Brompton, which he later moved to Kensington. For him teaching the mother tongue that he loved intensely had absolute priority, followed by French, which he had acquired in Paris and spoke fluently, and then the classical languages. It is not known why he gave up his educational activities in 1776.

Elphinston wanted to teach the pronunciation used in the London area, and for this his language

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Elphinston wanted to teach the pronunciation used in the London area, and for this his language

textbooks of 1756 and 1765 are valuable sources. He spoke, for instance, monophthongal [e:] and [o:], whereas Received Pronunciation today uses [e] and [ə], and he articulated non-prevocalic /r/ regularly. Elphinston's interest was focused on form. Spelling was his main concern, and he viewed both grammar and word formation from this standpoint.

His major work, *Propriety ascertained in her picture,* in which he improved his spelling system, dates from 1786–1787. Volume 2 of this work is particularly valuable. As early as 1760, Elphinston had collected, corrected, and enlarged older lists of Scotticisms, and in Volume 2 he also dealt with the peculiarities of the pronunciation and sentence structure of his native dialect. With this book Elphinston acquired a unique position among British writers on dialect.

In the 1790s he published *Forty* (later *Fifty*) *years' correspondence,* transcribed into his script. The following is a specimen from a letter to Samuel Johnson's biographer James Boswell: "Inglish Orthoggraphy waz no more known to' dheir Author, dhan to' moast ov my oddher Correspondents." As can be seen from this sample, one of Elphinston's ideas was to double consonants to mark stressed short vowels. In 1790, 1795, and 1797 he published popular versions of his simplified spelling scheme. There was, however, little interest in the aesthetic aspect of English at the time, but rather a demand for prescriptive grammars that Elphinston's work did not meet. Consequently, his reform proposal failed. Coming from a grammarian, Elphinston's observations on the problems of number in English are especially noteworthy. For him, the English grammar was the basis of a universal grammar.

See also: Bullokar, William (c. 1531–1609); Hart, John (?1501-1574); Mulcaster, Richard (1532–1611).

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E-mail, Internet, Chatroom Talk: Pragmatics

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Scope and Purpose

The notion of the Internet comprises several elements: the ensemble of technical possibilities resulting from computers being linked to each other in computer networks; the types of communicative situations and types of language used in those situations; the body total of its users; and the sum of all Net communities using language. All of these elements define situations of language use. In addition, the Internet comprises all websites, which may be linked to all kinds of use situations. This article will deal exclusively with uses that situations such as chats, e-mail, and lists have in common. All of these genres essentially involve the use of language in an interactive, human-to-human way.

The following discussion will only deal with interactive Internet genres. Just as in written and spoken language, there are great differences between these genres; the following discussion will try to identify aspects of language that apply to all such genres, even if to varying degrees, in the same way that we can make useful generalizing statements about written and spoken language as basic medial varieties. The following discussion will include technical details of the Internet only to the extent that such details are needed to account for specific uses of language on the Internet. The discussion presupposes a basic knowledge of the Internet and its resources.

Embera *See:* Choco Languages.

Emblems

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The term 'emblem' has multiple meanings or references. In its most general usage, it may refer to such artifacts as coats of arms, flags, heraldry, university seals, and religious icons (the crucifix). These emblems indicate membership and ownership.

A second usage is the emblem book, the origin of which is attributed to the Italian lawyer Andreas Alciatus, whose book *Emblematum liber* (1521) contained a series of emblems. This genre subsequently became enormously popular as Daly (1979) attests. In its printed format, the emblem itself consists of three parts, all with Latin designations, in the following sequence: an *inscriptio* (motto), a *pictura* (visual image), and a *subscriptio* (short text).

Modern nonliterary exemplars of the emblem appear in official governmental artifacts. The U.S. penny, with its depiction of the bust of Abraham Lincoln on the obverse and the Lincoln Memorial on the reverse, is typical. The obverse also has the texts 'In God We Trust,' 'Liberty,' and the year in Arabic numerals, whereas the reverse has the Latin motto 'E pluribus unum' ('one from many'), and the texts 'United States of America,' and 'One Cent.' In this sense, this unit of coinage, as is the case with most world currency or postage stamps, is a prototypical specimen of the emblem with its conventional tripartite configuration. Many corporations and organizations produce emblems to symbolize their product or service to the public.

The origin of the word *emblem* as a semiotic term derives from Efron (1941), who first used this expression to refer to a communicative culture-bound gesture. Efron (1941) used this term differently from Ekman and Friesen (1969: 63) because he meant it to be encoded arbitrarily, and not iconically. The emblem is now a part of the nonverbal repertoire of linguistic signs. In their now classic essay on nonverbal behavior, Ekman and Friesen (1969) use the term *emblem* as the first in a five-part categorization (emblem, illustrator, affect display, regulator, adaptors) of nonverbal expressions. They define (Ekman and Friesen, 1969: 63) emblem as "those nonverbal acts which have a direct verbal translation, or dictionary definition, usually consisting of a word or two, or perhaps a phrase." In this sense, an emblem usually consists of a gesture that corresponds to a single word in a language (e.g., the 'V,' or 'victory' sign signified by holding the index finger and the middle finger in the form of the letter 'V,' with the fingers that are clenched facing away from the body).

See also: Gesture and Communication; Gesture: Sociocultural Analysis; Iconicity: Sign Language; Kinesics.

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Born on February 28, 1904, in Lunenberg, Nova Scotia, Murray Barnson Emeneau grew up there studying French, German (German, Standard), Latin, and Greek (see Emeneau, 1991). Combining a background in the classics, general linguistics, and anthropology, he became one of the greatest linguistic Indologists of all time. A prolific author, no linguist interested in India can afford not to read him, while every general linguist will profit from his lucid prose, no matter what the field of specialization. Among his most noteworthy contributions are his work on the Indian *Sprachbund*, bilingualism and structural borrowing, linguistic prehistory, as well as Dravidian comparative linguistics and etymology.

Emeneau received his B.A. in 1923 from Dalhousie University and another B.A. and an M.A. from Oxford University in 1926 and 1935, respectively, where he was a Governor-General's Gold Medalist in 1923 and a Rhodes Scholar from 1923 to 1926. Among his other notable achievements are Guggenheim Fellowships in 1949–1950 and 1956–1957, Faculty Research Lecturer at the University of California, Berkeley during 1955–1956 (the highest honor awarded a Berkeley faculty member), and Wilbur Lucius Cross Medalist from the Yale University Graduate School in 1969. He was founder and first chairman of the Department of Linguistics at UC Berkeley in 1953, where he served on the faculty from 1940 to 1971. He holds honorary degrees from the University of Chicago, 1968; Dalhousie University, 1970; University of Hyderabad, 1987; and Vidyavachaspati K.S.D. Sanskrit University, 1999. He served as Linguistic Society of America President in 1949; Editor of the Journal of the American Oriental Society from 1941 to 1951; and President of the American Oriental Society in 1954–1955.

Emeneau's overall approach to linguistics was influenced by the Boasian and Sapirian traditions, which consider it a major branch of cultural anthropology. Since academic positions were hard to secure during the years of the Great Depression, he went off to British India on a fellowship from Yale, the American Council of Learned Societies, and the American Philosophical Society. There he did fieldwork from 1935 to 1938 in the Nilgiris on three little-known Dravidian languages: Toda, Kota, and Kodagu, as well as in central India, where he studied Kolami. This pioneering research resulted in numerous publications (e.g., Emeneau, 1944–1946, 1955, 1971, 1984; Burrow and Emeneau, 1984).

Thoroughly versed in Greek, Latin, Sanskrit, and comparative Indo-European, Emeneau brought with him a superb background for his (1931) Ph.D. dissertation, an edition of a Sanskrit folk tale text. His rigorous training under Franklin Edgerton and Edgar H. Sturtevant, together with his experience in linguistic fieldwork (see, e.g., Emeneau, 1951), led to his innovative research of the Indian linguistic area. Although the notion of the *Sprachbund* was known from the Caucasus, the Balkans, and the northwest coast of the United States, Emeneau's investigation of the Indian scene describes a situation in which "languages belonging to more than one family show traits in common which do not belong to the other members of (at least) one of the families" (Emeneau, 1980: 127). The relationship among the Indo-Aryan, Dravidian, and Munda families is a direct reflection of the linguistic history and prehistory of India, a field which he cultivated.

The genetic relationship among the Dravidian languages was of interest to him from the very beginning. Emeneau correctly theorized that the relationship among Latin, English, and Proto-Indo-European was mirrored by that of Kolami, Telugu, and Proto-Dravidian. In many ways, his *magum opus,* the co-authored *Dravidian etymological dictionary* (Burrow and Emeneau, 1984), capped a long and as yet unfinished distinguished career.

See also: Dravidian Languages; Indo–Aryan Languages; Munda Languages.

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Emotion: Stylistic Approaches

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The concept of emotion has always played a meaningful role in stylistics, whether it be in the context of production on the part of the writer, or reception on the part of the reader. The term 'emotive,' when employed in a stylistic framework, is often used interchangeably with the term 'affective.' This is in contrast to mainstream cognitive psychology, where 'emotion' usually refers to an intense, brief moment of felt experience, while 'affect' tends to be used as a more general term (see, e.g., Frijda, 1986). An example of this interchangeability in stylistics can be seen in the notions of 'affective meaning' and 'emotive meaning,' both of which refer to the effects that highly charged words – like 'home' and 'mother' – can evoke in a reader or listener.

The roots of stylistics-related affective criticism can be traced back to classical times. Aristotle's celebrated theory of catharsis, i.e., the purging or cleansing of emotion from the body, can be said to be one of the first physiological, reception-based accounts of literary emotion. The modern history of emotion in stylistics-oriented criticism began in the 1940s and 1950s. In this period, the New Critics opposed all subjective approaches to literary criticism. Wimsatt and Beardsley (1954), in particular, highlighted what they saw as the inappropriateness of attempting to evaluate literature by its emotive effect on readers with their theory of 'the affective fallacy.' The New Critics, therefore, essentially espoused an objective view toward literary interpretation and reception that by its very nature had to exclude emotion as a factor in receptive processes. Such antisubjective views are widely viewed these days as implausible, owing to what is now known about the crucial role that top-down processing also plays in reading procedures.

The text-based formalism set out in the work of the New Critics was continued in similar ways by Jakobson (1960). Jakobson's ideas relied on formal linguistic criteria in identifying stylistic patterns in texts. His famous 'speech event,' for example, included six categories, none of which concerned emotion. However, in addition to describing those six constituents of communication, he also identified six corresponding functions, one of which was 'the emotive function.' This emotive capacity, also often called 'the expressive function,' referred to the emotive role of language that communicates the addresser's emotions and attitudes. Jakobson, therefore, did not exclude emotion as a relevant factor in human communication. However, it is important to note that his account of emotive discourse communication was centrally concerned with production rather than reception.

This changed in the 1970s and early 1980s, when emotion became an important factor in stylistics-oriented criticism. This was especially the case in some of the reader-response theories of the time. The study of emotion in stylistics switched from that produced by writers to that experienced by readers, even if these readers initially were theoretically constructed ones rather than real readers. A main figure in this period was Fish (1980), who was not interested in just the physiological aspects of emotive response, such as those that classical catharsis professes, but also in the mental or cognitive aspects of such responses in stylistics. The main tenets of Fish's 'affective stylistics,' as it was called, involved a rejection of the pure Jakobsonian author-based textualism, in favor of reader involvement. This affective approach viewed stylistic effects as being in the reader rather than in the text. Fish's affective approach to stylistics, therefore, involved a theoretical account of interpretative processes, assumptions, and expectations on the part of the reader. However, for all the advantages of Fish's affective stylistics, it can be said that it was not primarily concerned with either real emotion or real affect. Rather, it was more focused on the role that context, in general, plays in the literary interpretative process.

For quite a while after Fish wrote about affective stylistics, emotion did not play a prominent role in stylistic analysis. This is surprising, given that the study of emotion and affective language was gaining popularity in the sister disciplines of functional linguistics and discourse analysis, two areas from which stylistics traditionally takes its cues. In Hallidayan systemic functional linguistics, for example, feeling played a role in the 'mental' category of Halliday's 'grammar of experience,' together with thinking and seeing (see Halliday, 1994: 108). Additionally, it also played a part in Halliday's ideational metafunction of language (see, e.g., Wales, 2001: 195).

Likewise, in discourse analysis, emotion was, and indeed still is, viewed as a key communicative concept. The expression of feeling and attitudes is deemed to be a significant component in both verbal and written communication, especially within a framework of subjectivity and interpersonal discourse functions. One such component is the phenomenon of 'intensity markers,' which can be

defined as affective linguistic devices. Quirk *et al.* (1985) listed these words in three groups in their chapter on adverbials. These groups are 'downtoners,' or 'hedges,' 'emphasizers,' and 'amplifiers.' Additionally, intensity markers can also include verbs, adjectives, and adverbials that encode the speaker's emotions, feelings, moods, and general dispositions (for an interesting discussion on this, see Georgakopoulou and Goutsos, 1997: 137–139). In addition to intensity markers, there is also the phenomenon of 'involvement strategies,' initially developed by Chafe (1982) in his work on discourse types. Chafe listed a number of categories that show how speakers can enthrall their readers and affect their inner states by means of language. This includes such notions as 'detail and imagery,' 'first and second person pronouns,' 'action and agents,' 'hedges,' 'direct speech,' and 'aggravated signals.' Chafe's emotive work has since been developed and expanded on by Tannen (1989).

In addition to intensity markers and involvement strategies, there is also the phenomenon of 'performance features' (Wolfson, 1982), which includes 'expressive sounds,' 'motions and gestures,' 'repetition,' 'direct speech,' 'the historic present,' and 'asides.' There are also Polanyi's 'evaluation devices,' which include 'negation,' 'repetition,' 'character speech,' and 'an account of the mental and emotive states of characters' (1985). Other important emotive issues in discourse analysis concern Caffi and Janney's more recent discussion on 'affective keys' (1994) and Biber and Finnegan's notion of 'affective stance' (1988). The latter concept refers to the use of both speech and language to convey all kinds of personal feelings and judgments with regard to the particular proposition being expressed at that moment.

These are just some of the many affective linguistic concepts that are currently helping to move emotion toward the center ground of discourse studies. All of these emotive theories, however, have yet to be picked up in any systematic way in stylistic scholarship. One exception is Watson's recent stylistic-emotive study on quantitative approaches to evidentiality and affect (1999), which took Biber and Finnegan's revised version of their basic model of stance and applied it to a corpus of prose fiction. Watson concluded that Biber and Finnegan's model was indeed useful for extracting broad stylistic trends of evidentiality and affect. Although the study was informative and thorough, one might question Watson's use of solely empirical methods to investigate such essentially subjective linguistic phenomena in stylistics.

In addition to functional and discourse approaches to language, emotion is also starting to play an increasingly important role in cognitive linguistics, which, like the above-mentioned sister fields, has had an influential effect on mainstream stylistics with regard to the application of frameworks and models. A general tenet in cognitive linguistics, set out in the work of cognitive grammarian Langacker, is that meaning is comparable to conceptualization and that both rely heavily on the immediately physical and cerebral context of human emotion (1991: 2–4). An interesting cognitive development that has breathed new impetus into the role that emotion plays in stylistics is 'schema theory.' This work has come not directly from cognitive linguistics but rather from relatively recent work done in cognitive psychology (see, e.g., Rumelhart, 1975), which was influenced by the early Gestalt psychology of the 1920s. It has also been reignited by research done in artificial intelligence (see, e.g., Schank and Abelson 1977). In light of these developments, it is logical that any meaningful discussion on cognition in the 1990s could not have ignored the increasing importance of the role that emotion must play in cognitive processes. It is in this way that emotion has found a new road into stylistic approaches. This has been shown, for example, in the stylistic schema theory work of Semino (1997). In that work, Semino took Schank's purely cognitive theory of Thematic Organization Points (TOPs) and incorporated into her analyses an additional category of 'emotional associations' (see Schank, 1982). This addition reflected the necessity of accounting for the affective components in the cognitive processing of text, literary text in particular. This is without doubt one of the most important emotive additions to cognitive stylistic approaches thus far.

Stylistic work done on schema theory also has links to the broader category of what might termed 'cognitive poetics,' in which emotion often also has a central function (see especially Tsur, 1978, 1992). Emotion is also taking on an increasingly important role in cognitive stylistics, a term frequently used synonymously with cognitive poetics. Some of these recent studies include work by Gibbs (2003) on prototypes and by Burke (2001) on iconicity. Emotion has also recently been prevalent in a number of other essentially stylistic approaches. These include narrative comprehension work conducted by Emmott, especially with regard to 'character empathy' (1997) and 'foregrounding' (2002), work done on 'feeling in reading' (Stockwell, 2002), the ongoing development of a 'poetic theory of emotion' (van Peer, 1997), and the study of 'emotional and aesthetic qualities' (Tsur, 2002). There have also been some more general stylistic works published on the subject of emotion. The most significant of these is Downes's emotional, evaluative, and intuitive account of the language of

felt experience (2000). This work also crucially considers both a cultural and a cognitive dimension to emotion in the study of stylistics.

In sum, it is clear that emotion has played a meaningful yet relatively limited function in stylistic approaches over the past 30 years. However, in view of the increasingly significant role that cognition is taking, in both stylistics and the study of literary reading processes in general, it is likely that this will lead to an increase in affective frameworks and methodologies being developed and applied in future stylistic approaches. Indeed, this is something that is already discernible in many contemporary stylistic studies, as can been seen from those sketched out in the previous paragraph.

See also: Foregrounding; Iconicity: Literary Texts; Literature and the Language of Literature; Literature: Empirical Studies; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Schema Theory: Stylistic Applications; Style; Stylistics; Stylistics, Cognitive.

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Empiricism

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The term 'empiricism' refers to a group of related philosophical doctrines, which place special emphasis on perception or experience. On one traditional formulation, empiricists hold that there is nothing in the intellect that is not first in the senses. This idea has roots in the texts of Aristotle and other ancient philosophers, but it was most influentially developed and defended by the British empiricists of the 17th and 18th centuries (see Locke, 1690; Hume, 1739). Empiricism took on new forms in the twentieth century. The history of Western philosophy can be usefully viewed as an extended debate between empiricists and rationalists.

Species of Empiricism

Empiricists say that experience is primary. But primary in what sense? There are several possible answers: primary as a source of knowledge; primary in the makeup of mental concepts; and primary in linguistic meaning. Each of these answers corresponds to a distinct species of empiricism. This article explains all three in turn.

In epistemology, empiricism is the doctrine that knowledge is based on experience (or '*a posteriori*'). Some epistemological empiricists claim that all knowledge is based on experience, some claim that most knowledge is, and some merely insist that the paradigm cases of knowledge are based on experience.

Historically, epistemological empiricism was contrasted with epistemological rationalism: the view that knowledge derives from intuition or pure reason. Rationalists claim that knowledge can be derived prior to experience (or '*a priori*'), and, to make good on this claim, they typically assume that we have an extensive stock of innate ideas. In ancient Greek philosophy, Aristotle and Plato inaugurated the debate between epistemological empiricists and rationalisms. Aristotle emphasized the role of observation in learning, whereas Plato emphasized innate knowledge that is acquired prior to birth and either triggered by experience (in the way that a memory might be triggered by seeing a related cue) or else revealed through philosophical reflection. In modern British philosophy, epistemological empiricism was resuscitated by Francis Bacon. Scientific method, he argued, depends on testing hypotheses against experience. Some empiricists have been willing to grant that certain domains are known *a priori*. John Locke holds this view of ethics and mathematics. Other empiricists have been more thoroughgoing. Moral sense theorists, such as Francis Hutchesen, postulate a special faculty that uses the passions – a kind of sense – to detect ethical truths. Empiricists about mathematics claim that we obtain mathematic knowledge by observation. It has been claimed that we can observe basic truths of geometry, arithmetic, and even set theory.

Epistemological empiricists typically endorse both a causal thesis and a normative thesis. According to the causal thesis, knowledge is causally obtained through experience. For example, Hume says that we obtain knowledge by association: We associate ideas of things that are experienced in spatial or temporal proximity. Associationism exerted an influence on behaviorism and connectionism. Behaviorists say we obtain knowledge by conditioning, which occurs when a stimulus or emitted behavior is accompanied by a behavioral reinforcer. Connectionists believe that knowledge acquisition involves the modulation of weighted connections between layered populations of neurons.

The normative thesis endorsed by epistemological empiricists says that experience is the primary source of epistemic justification. This thesis has often taken the form of epistemic foundationalism: the idea that knowledge must always be justified with reference to things that can be known directly. According to some foundationalists, the only things that we know directly are sense data: perceptual experiences given to us when our sense organs are stimulated (Ayer, 1936). Knowledge that goes beyond direct experience must be based on sense data. For example, Bertrand Russell (1912) argued that we obtain knowledge of the external world by inductive inference: We postulate a mind independent reality because it offers the best explanation of the fact that sense data seem to be outside our control. We might experience the shape of a cat, and then turn away, only to find that the shape remains when we return our gaze to the original position. The best explanation of this is that there is a cat in that location and it exists even when we are not viewing it. Some empiricists, who grant that all knowledge must be sense-based, find this argument unpersuasive; they are driven to skepticism about the external world or to the view that the external world is nothing but a collection of ideas (a view known as idealism or phenomenalism).

Epistemological empiricists need not be foundationalists. W. V. O. Quine (1951) claimed that theories must be confirmed against experience in entirety, rather than confirming a privileged class of

observational judgments and deriving the rest from those. Quine's alternative to foundationalism is called confirmation holism. On this approach, a judgment gains its epistemic warrant from experience along with its coherence with all the other judgments that have been supported by experience and pragmatic rules guiding theory revision. William James and John Dewey also defended versions of epistemological empiricism without foundationalism.

Epistemological empiricism can be distinguished from concept empiricism, the view that all of our concepts (or 'ideas') are derived from percepts (or 'impressions'). Ideas are encoded in the representational formats that are used by the senses. Aristotle said there is no idea without an image. John Locke and David Hume argued that ideas are abstracted or copied from impressions. This doctrine has had a recent revival in cognitive science (see Barsalou, 1999; Prinz, 2002). In addition to our external senses, concept empiricists admit that we can form ideas on the basis of 'reflection,' or inner experiences, such as the passions and sentiments. For example, Hume tried to explicate the concept of moral goodness by appeal to the sentiment of approbation.

Concept empiricists typically reject the rationalists' contention that many ideas are innate. Instead, ideas derive from 'impressions' (the mental states caused in our senses when we perceive the world). According to Locke, some ideas are simply stored copies of impressions, some are combinations of impressions, and some are derived from impressions through abstraction: a process (or set of processes) by which we extract general ideas from experiences of particulars.

In addition to epistemological and concept empiricism, there is an empiricist doctrine relating to meaning. Semantic empiricists contend that the meaning of every linguistic expression must be specifiable using expressions that ultimately get their meaning from experience. One version of this view is the principle of verifiability, which was defended by the logical positivists in the beginning of the twentieth century. According to this principle, a sentence is meaningful only if it can be confirmed or falsified by experience. All meaningful sentences use expressions that refer to things that can be directly observed (observation terms) or things that can be inferred from observable things (theoretical terms).

They allowed one kind of exception, however. The positivists drew a distinction between sentences that can be confirmed by experience (synthetic truths) and sentences that are true in virtue of the meanings of their terms (analytic truths). The sentence 'all mothers are female' is analytic, because 'mother' means female parent. The sentence 'Madonna is a mother' is synthetic. Analytic truths are, in a sense, knowable *a priori*, but they need not violate the spirit of epistemological empiricism. Analytic truths are based on relations between words that are stipulated by the authors of a language. To accept *a priori* knowledge of such truths is not a concession to the rationalists' claim that we have *a priori* access to substantive truths about the world. Nevertheless some epistemological empiricists reject analytic truths. Quine famously argued that no truth is immune from empirical refutation. New discoveries or events can lead us to revise apparent tautologies. If cross-dressing men began to adopt children and conform to prototypical maternal roles, then we might begin to refer to them as 'mothers.' Thus, 'all mothers are female' would be refuted.

These forms of empiricism often have been defended as a package, but they are independent. For example, an epistemological empiricist might reject concept empiricism and instead adopt the view that concepts are couched in a nonsensory language of thought. A concept empiricist might reject epistemological empiricism and argue for a coherentist theory of justification instead of foundationalism. Concept empiricists and epistemological empiricists might replace semantic empiricism with a causal theory of meaning, which would allow reference to unobservable entities.

Empiricism and Language

Each empiricist doctrine has implications for the study of language. This is most obvious in the case of semantic empiricism, which is a thesis about linguistic meaning. The link between epistemological empiricism and language is most remote, because theories of justification are usually held to be independent of theories of meaning. For verificationists, however, these two dimensions collapse, because meanings are equated with conditions for obtaining knowledge. Some verificationists were led by epistemological considerations (the impossibility of confirming entities hidden from view) to their thesis about meaning.

The connection between concept empiricism and language depends on the relationship between concepts and meanings. Some authors believe that concepts are private mental representations and that meanings are either mind-independent properties and propositions or public rules of linguistic behavior. Other authors believe that meanings are at least partially constituted by the concepts in our heads. Those in this latter camp would claim that an empiricist theory of concepts entails a form of empiricism about semantics. Concept empiricism would entail that meanings are at least partially constituted by perceptually derived mental representations.

Some cognitive scientists try to bridge concept empiricism and semantic empiricism by collecting evidence that people spontaneously use perceptual representations when understanding words and phrases (see, e.g., Barsalou, 1999). A related synthesis can be found in the work of some cognitive grammarians. They argue that some meanings are based on conceptual knowledge and that some concepts are partially constituted by image schemas. Image schemas are schematic (i.e., nonmetric) representations of spatial relations that are used in perceiving the world. George Lakoff (1987) has argued that highly abstract concepts, which are believed to pose a challenge for empiricists, are understood by means of metaphorical extension from perceivable spatial relations. The concept of ownership, for example, is understood with reference to the relation of spatial containment.

Some concept empiricists explain our mastery of abstract concepts in a different way. They argue that public language can be used as vehicles of thought. Sentences are observable. If concepts are stored records of experiences, they can be stored records of experiences with public linguistic items. To understand an abstract concept, on this approach, is to master a set of verbal entailments. Benjamin Whorf and Edward Sapir may have been led to their hypothesis of linguistic relativity in virtue of accepting a picture like this.

Another topic of concern to empiricists is language acquisition. Because empiricists traditionally reject innate ideas, some have argued that language can be acquired using general-purpose perceptual learning rules (such as pattern recognition, association, and conditioning). This view is highly controversial. Noam Chomsky and his followers have developed powerful arguments for the conclusion that language acquisition requires innate learning mechanisms that are specifically designed for language. Chomsky is a self-proclaimed rationalist, and some empiricists hope to prove that his arguments are mistaken.

In sum, empiricism is a family of doctrines united by the central role they afford to experience. These doctrines often have been defended by the same authors, but they are actually independent. Each has several forms, each faces different challenges, and each has implications for the nature of language.

See also: Associationism and Connectionism; Behaviorism: Varieties.

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Empty Names

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Most names refer. For example, the name 'Uma Thurman' refers to Uma Thurman. But some names don't refer. For example, suppose that Keanu Reeves introduces the name 'Sparkie' to refer to the lighter in his pocket, if there is one, and to nothing otherwise. If it turns out that Keanu's pockets are empty, then 'Sparkie' doesn't refer. In that case, 'Sparkie' is an *empty name*. Usually, an empty name is empty because there is no object for it to refer to. This is the case with 'Sparkie': 'Sparkie' is empty because Keanu's pockets are empty. But sometimes an empty name is empty not because there is no object for it to refer to but rather because of something else: the speaker's intentions, say. For example, some philosophers think that although fictional characters exist, names from fiction are empty when they are used with the intention of telling a story. On this view, there is a fictional character that ***we*** can use the name 'Sherlock Holmes' to refer to when we intend to talk about Sir Arthur Conan Doyle's work, but when ***Conan Doyle*** uses that name to tell a story, it's empty.

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In sum, empiricism is a family of doctrines united by the central role they afford to experience. These doctrines often have been defended by the same authors, but they are actually independent. Each has several forms, each faces different challenges, and each has implications for the nature of language.

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The term 'empty name' goes back at least to the German mathematician and philosopher Gottlob Frege (1848–1925), who called expressions that don't refer 'empty' (or, in German, '*leer*'). The problems that empty names pose go back much further, at least to the Greek philosopher Parmenides (5th century B.C.E.), who argued that you cannot say of what does not exist that it does not exist. Empty names have been giving philosophers headaches ever since.

The Problem of Negative Existentials

Consider a subject-predicate sentence of the form ⌜$\alpha\ \varphi$⌝, where α is the subject and φ is the predicate. ⌜$\alpha\ \varphi$⌝ says, of the object that α refers to, that it has the property that φ refers to. And ⌜$\alpha\ \varphi$⌝ is true if and only if what it says is the case: that is, if and only if that object has that property. For example, (1) says, of the object (or, in this case, person) that 'Uma' refers to, that it has the property that 'is a movie star' refers to.

(1) Uma is a movie star.

'Uma' refers to Uma, and 'is a movie star' refers to the property *being a movie star*. So (1) says, of Uma, that she has the property *being a movie star*. Since Uma has that property, (1) is true. Now consider (2), which says, of the object that 'Sparkie' refers to, that it has the property that 'doesn't exist' refers to.

(2) Sparkie doesn't exist.

The predicate 'doesn't exist' refers to the property *not existing* (or *being nonexistent*). (2) is a *negative existential*, since it appears to say of some object that it doesn't exist. The trouble with negative existentials is that some of them seem true; but it's hard to see how any of them could be. For example, (2) seems true. But since 'Sparkie' is empty, there is no object that it refers to; so there is no object for (2) to say, of it, that it has the property *not existing*. As a result, it is hard to see what, if anything, (2) says. And if (2) doesn't say anything, then it is hard to see how it could be true.

More generally, negative existentials are a problem for anyone who thinks that (a) the truth value of a sentence is determined, compositionally, on the basis of some semantic feature or features of its parts, and (b) the relevant semantic feature of a name is its referent. (And many philosophers share these assumptions: for example, Fregeans, Millians, and Davidsonians all can accept [a] and [b].) Since an empty name has no referent, it seems to follow that negative existentials that contain empty names have no truth value. This is a problem, because such negative existentials seem true.

Millianism

Empty names pose a number of problems in particular for Millianism. According to Millianism, sentences express *propositions*. These are abstract objects that are the primary bearers of truth values. They are also the objects of attitudes, such as believing and asserting. According to Millianism, propositions are *structured*. This means that the proposition expressed by (1), for example, can be represented as the ordered pair <U, *being a movie star*>, where U is something that corresponds to 'Uma.' (In what follows, complications about what goes in the non-U slot are glossed over; it is assumed that what goes in that slot is a property.) And, according to Millianism, sentences that contain names express ***singular*** propositions if they express any propositions at all. This means that, in the proposition expressed by (1), U is Uma herself. The proposition expressed by (1) can then be represented as <Uma, *being a movie star*>.

The source of the problems that empty names pose for Millianism is that it seems that Millianism entails that a sentence that contains an empty name doesn't express any proposition at all. According to Millianism, propositions are structured; so, if (2) expresses a proposition, then that proposition can be represented as <S, *not existing*>, where S is something that corresponds to 'Sparkie.' And, according to Millianism, sentences that contain names express singular propositions, if they express any propositions at all; so, if (2) expresses a proposition that can be represented as <S, *not existing*>, then S is the object that 'Sparkie' refers to. But, since 'Sparkie' is empty, there is no object that it refers to. So there is no object in the S slot in <S, *not existing*>. As a result, it seems that there is no singular proposition for (2) to express and hence that, according to Millianism, (2) doesn't express any proposition at all. The view that sentences that contain empty names don't express any proposition at all is called the *No Proposition View*.

The No Proposition View apparently has a number of consequences that are apparently counterintuitive. For example, you might think that a sentence is meaningful only if it expresses a proposition. If that's right, then the No Proposition View entails that (2), for example, is meaningless. But (2) doesn't seem meaningless. This problem is called the *Problem of Meaningfulness*. Or you might think that a sentence inherits its truth value from the proposition it expresses. If that's right, then the No Proposition View entails that, for example, (2) and (3) have no truth value.

(3) Keanu believes that Sparkie doesn't exist.

But (2) and (3) seem true. This problem is called the *Problem of Truth Value*. Or you might think that a person can sincerely and assertively utter a sentence only if she believes the proposition that it expresses. If that's right, then the No Proposition View entails that no one can sincerely and assertively utter (2), for example. But it seems that someone could sincerely and assertively utter (2). This problem is called the *Problem of Belief and Sincere Assertive Utterance*. Because of these problems (and others that have to do with the substitution of coreferential names in various linguistic contexts), many philosophers have concluded that Millianism should be rejected in favor of its rival, Fregeanism.

Fregeanism

Fregeanism can solve many of the problems that empty names pose for Millianism. Fregeanism agrees with Millianism that sentences express structured propositions. According to Fregeanism and Millianism alike, the proposition expressed by (1) can be represented as <U, *being a movie star*> (again, glossing over what goes in the non-U slot). But Fregeanism denies that sentences that contain names express singular propositions. According to Fregeanism, in the proposition expressed by (1), U is ***not*** Uma herself. Rather, U is a *mode of presentation* of Uma, $MP_{\text{'Uma'}}$, something that is a way of thinking about Uma or that captures an agent's perspective on Uma. Perhaps $MP_{\text{'Uma'}}$ is something that picks Uma out by describing her as having certain properties: *being the lead in Kill Bill Vol. 1*, say. Or perhaps $MP_{\text{'Uma'}}$ is some other kind of entity. Where Millians say that the proposition represented as <Uma, *being a movie star*> is true if and only if Uma has the property *being a movie star*, Fregeans say that the proposition represented as <$MP_{\text{'Uma'}}$, *being a movie star*> is true if and only if the object that $MP_{\text{'Uma'}}$ presents has the property *being a movie star*. Since $MP_{\text{'Uma'}}$ presents Uma, Fregeans agree with Millians that the proposition that (1) expresses is true if and only if Uma has the property *being a movie star*.

Fregeans can reject the No Proposition View. According to Fregeanism, the proposition expressed by (2) can be represented as <S, *not existing*>. But, according to Fregeanism, S isn't the object that 'Sparkie' refers to; rather, S is a mode of presentation, $MP_{\text{'Sparkie'}}$, that corresponds to 'Sparkie.' (If there is such a mode of presentation, then there can be empty modes of presentation: that is, modes of presentation that don't actually present anything. But *see* **Object-Dependent Thoughts**.) Perhaps $MP_{\text{'Sparkie'}}$ has something to do with the property *being a lighter in Keanu's pocket* and would pick out the unique object that has that property, if there were such an object. Or perhaps $MP_{\text{'Sparkie'}}$ is some other kind of entity.

Fregeans can solve the Problem of Meaningfulness: (2) is meaningful because it expresses the proposition represented as <$MP_{\text{'Sparkie'}}$, *not existing*>. Fregeans can also solve the Problem of Truth Value, at least for belief ascriptions like (3). (3) can be true because Keanu can believe the proposition represented as <$MP_{\text{'Sparkie'}}$, *not existing*>. (How the truth of [3] can be compatible with the assumptions [a] and [b] mentioned earlier is complicated. Perhaps in [3] 'Sparkie' isn't really empty: perhaps in [3] Sparkie refers to $MP_{\text{'Sparkie'}}$. Or perhaps in [3] 'that' refers to the proposition that [2] expresses.) And Fregeans can solve the Problem of Belief and Sincere Assertive Utterance: speakers can sincerely and assertively utter (2) because they can believe the proposition represented as <$MP_{\text{'Sparkie'}}$, not existing>.

But Fregeanism doesn't straightforwardly solve the Problem of Truth Value for sentences like (2). For (2) is true if and only if the proposition that it expresses, the proposition represented as <$MP_{\text{'Sparkie'}}$, *not existing*>, is true; and that proposition is true if and only if the object that $MP_{\text{'Sparkie'}}$ presents has the property *not existing*. But there is no object that $MP_{\text{'Sparkie'}}$ presents, and hence it is not the case that the object that $MP_{\text{'Sparkie'}}$ presents has the property *not existing*. So (2) isn't true. Still, many philosophers think that overall Fregeanism fares better than Millianism in handling the problems that empty names pose.

More Millianism: The Gappy Proposition View

Some Millians reject the No Proposition View in favor of the *Gappy Proposition View*, according to which (2) expresses a *gappy proposition* that can be represented as <____, *not existing*>. (That proposition is gappy because it is just like a singular proposition except that it contains no object where a singular proposition would.) The Gappy Proposition View can solve the Problem of Meaningfulness: (2) is meaningful because it expresses the gappy proposition represented as <____, *not existing*>. The Gappy Proposition View can also solve the Problem of Truth Value, at least for belief ascriptions like (3). (3) can be true because Keanu can believe the proposition represented as <____, *not existing*>. And the Gappy Proposition View can solve the Problem of Belief and Sincere Assertive Utterance: speakers can sincerely and assertively utter (2) because they can believe the proposition represented as <____, *not existing*>.

But the Gappy Proposition View can't solve the Problem of Truth Value in general. Suppose that Uma introduces 'Markie' to refer to the pen in her pocket, if there is one, and to nothing otherwise. If it turns out that Uma's pockets are empty, too, then 'Markie' doesn't refer either. On the Gappy Proposition View, (4) and (5) express the same gappy proposition, which is a conditional whose antecedent can be represented as <____, *existing*>.

(4) If Sparkie exists, then there is a lighter in Keanu's pocket.

(5) If Markie exists, then there is a lighter in Keanu's pocket.

But (4) and (5) seems to differ in truth value: (4) seems true, whereas (5) doesn't.

Millians could co-opt some of the resources of Fregeanism and say that agents believe propositions via modes of presentation. (4) and (5) express the same gappy proposition; but there are different modes of presentation associated with (4) and (5). The mode of presentation associated with (4) has something to do with $MP_{\text{'Sparkie'}}$, whereas the mode of presentation associated with (5) has something to do with $MP_{\text{'Markie'}}$. On this view, (4) seems true, because agents believe, via the mode of presentation associated with (4), the gappy proposition expressed by (4) and (5); but (5) doesn't seem true, because agents don't believe that proposition via the mode of presentation associated with (5). Let's call a Millian view that co-opts Fregean resources in some way *Neo-Millian*.

Still More Millianism: The Communicated Proposition View

Once Millians co-opt Fregean resources and become Neo-Millians, they no longer have to appeal to gappy propositions. Neo-Millians can say that ***sentences*** that contain empty names don't ***express*** propositions; but when they use those sentences, ***speakers*** can ***communicate*** propositions and in fact speakers can communicate the very propositions that Fregeans say are expressed by the sentences that speakers use. Let's call this view the *Communicated Proposition View*. The Communicated Proposition View can solve the Problem of Meaningfulness: (2) is meaningful because speakers can use it to communicate the proposition represented as <$MP_{\text{'Sparkie'}}$, *not existing*>. The Communicated Proposition View can also solve the Problem of Truth Value: (2) seems true because speakers use it to communicate the proposition represented as <$MP_{\text{'Sparkie'}}$, *not existing*>; and (3) seems true because speakers use it to communicate that Keanu believes that proposition. And the Communicated Proposition View can solve the Problem of Belief and Sincere Assertive Utterance: speakers can sincerely and assertively utter (2) because they can believe the proposition represented as <$MP_{\text{'Sparkie'}}$, *not existing*>.

The possibility of Neo-Millianism suggests that the debate between Millians (including Neo-Millians) and Fregeans should be understood not as a debate about ***whether*** there are modes of presentations like $MP_{\text{'Sparkie'}}$ but rather as a debate about ***where*** there are such modes of presentation. Fregeans says that such modes of presentation are constituents of the propositions expressed by sentences that contain names. Millians, by contrast, say that they're not, although they might mediate agents' cognitive relations to propositions (as on the Neo-Millian version of the Gappy Proposition View) or they might be constituents of propositions that speakers communicate (as on the Communicated Proposition View).

See also: Assertion; Causal Theories of Reference and Meaning; Communication, Understanding, and Interpretation: Philosophical Aspects; Compositionality: Philosophical Aspects; Direct Reference; Existence; Fictional Discourse: Philosophical Aspects; Object-Dependent Thoughts; Proper Names: Philosophical Aspects; Propositional Attitude Ascription: Philosophical Aspects; Propositions; Reference: Philosophical Theories; Rigid Designation; Semantic Value; Semantics–Pragmatics Boundary; Sense and Reference: Philosophical Aspects; Truth: Primary Bearers.

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Encyclopédie

N E Cronk

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This work of 20 million words is both the greaest summa of the French Enlightenment and its greatest manifesto. It symbolizes the 18th century's crusade against superstition, fanaticism, and tyranny, and its belief in human progress, happiness, and freedom. The articles and accompanying plates also constitute an unrivaled source of information about the scientific and technological knowledge of the period.

The History of the Work

An initial project to translate Chambers' two-volume *Cyclopaedia* (1728) grew into the much more ambitious *Encyclopédie ou Dictionnaire raisonné des Sciences, des Arts et des Mêtíers, par une société de gens de lettres*. The work appeared between 1751 and 1772, in 28 folio volumes, 17 of text and 11 of plates, during which time the two editors D'Alembert and Diderot (*see* **Diderot, Denis (1713–84)**) – Diderot alone, after the defection of D'Alembert in 1757 – endured continual struggles with the authorities. The 71 818 articles are written by more than 200 different authors, ranging from Voltaire and Rousseau to the unknown and the anonymous.

The work's influence was widespread and enduring. The first edition of 4225 copies quickly sold out, and several further editions followed, some published outside France, some in smaller formats. By the end of the 18th century there were some 24 000 copies of the *Encyclopédie* in circulation, over half of them outside France.

The Range of the Work

The sheer size of the *Encyclopédie* makes it difficult for the reader to form a balanced overall impression of the work. The selections of essays by which modern readers generally know the *Encyclopèdie* give a distorted view by concentrating on articles concerned with religion and politics. These were certainly among the most controversial contributions, but they are neither the most typical nor, necessarily, the most radical.

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Another important and highly original feature is the emphasis accorded to the image. The 2900 engraved plates, magnificent documents in their own right, are conceived as an essential complement to the articles. The plates accompanying the technological articles are also of linguistic importance, for they record, often for the first time, the terms employed by artisans to describe tools and machineparts.

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Endangered Languages

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Language Endangerment

Although it is somewhat difficult to count languages and to measure linguistic diversity with exact precision, there are an estimated 6800 languages spoken in the world today. While there is some question as to exactly how many languages will be lost over the course of this century – ranging from a low of 25% to a high of 90% – there is widespread agreement that language loss is occurring at an unprecedented rate. Most recent studies have concluded that at least 50% of the world's languages are losing speakers and that by the end of this century, a full 90% of the world's languages will disappear entirely, replaced by more widely used (national and/or global) languages. This situation is generally referred to as language endangerment, a term used broadly for languages which are threatened with absolute loss; a language is considered lost when it has no speakers. Language endangerment is sometimes called language attrition or language death, but 'death' is avoided out of sensitivity to the population whose language has been lost. Language attrition and moribundity – when children cease learning a language – are now taking place with exceptionally rapid speed. Hundreds of languages are currently endangered and there are few parts of the world where some form of language decline is not occurring. While language attrition is not in and of itself a new phenomenon, the rate of decline in linguistic diversity appears to be unique to this era, and

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is perhaps rivaled only by the kind of language loss which took place in conjunction with the agricultural revolution of approximately 10 000 years ago. One consequence is that a significant number of communities are facing the loss of a language which historically and traditionally has been foundational to their sense of identity. In some instances communities are reacting with efforts to revitalize the local language, while in others they lack the resources, time, or motivation to do so.

Linguists are particularly concerned with the loss of indigenous, or local, languages, as opposed to immigrant languages. For the latter, the language may give way in the new territory to an already established (national or dominant) language, but a robust speaker community continues/thrives in the homeland of the immigrants. (This is the situation of most immigrant languages in the United States, for example; for the most part, second-generation immigrants speak and use English in their daily lives, but their ancestral language is maintained in their original homeland. English, in contrast, is an immigrant language to North America; for a range of historical, socio-economic, and political reasons, it has largely ousted Native American local languages.) It is the loss of such local languages which is of concern to linguists, as their loss means an absolute kind of disappearance of the language. Thus, by and large, the term 'language endangerment' refers to the attrition and potential loss of local languages. A language is considered endangered when it is used by fewer speakers and when it is used in fewer situations or domains.

Language endangerment typically involves language contact situations, with two (or more) languages in use, where one language (Language A) replaces another (Language B). Prototypically, Language A is being adopted by speakers of Language B and so Language A replaces Language B in the sense that decreasing numbers of speakers of Language B use it, until ultimately there are no speakers of Language B at all. This is referred to as language shift, a term which refers specifically to such changes in patterns of language use, whereby speakers abandon the language of their parents in favor of another language. In the scenario outlined here, Language A can most neutrally be referred to as a language of wider communication; it tends to be a language which holds social prestige, serves official and governmental functions, and is used in education. It is often a regional or national lingua franca, i.e., the language which groups speaking different languages use to communicate with one another. It is also called, less neutrally, the dominant language, the majority language, or even the killer language. 'Dominant language' is to be avoided as it implies a deliberation on the part of the speakers of that language to dominate others; in some instances this is in fact the case, as when language policies intentionally restrict use of a local language. But in other situations the influence of the language of wider communication is more indirectly and subtly attained, through prestige and social pressures. Similarly, a number of labels are used to refer to Language B, such as minority language, indigenous language, mother tongue, or heritage language. The term 'local language' is more neutral and captures the fact that language use is tied to a particular geography, and that a speaker community generally sees the need or desire to use this language within a given region. The respective terms 'majority' and 'minority' for Languages A and B are not always accurate; speakers of Language B may be numerically greater but in a disadvantaged social or economic position which makes the use of the language of wider communication attractive. The term 'heritage language' can be confusing, as it is often used to refer to the language of one's ancestors, regardless of how many generations have passed since anyone spoke the language. It does not necessarily refer to a local or indigenous language, and can also refer to the ancestral languages of immigrants, even when they have not been spoken for generations.

Predications of language loss stem from several considerations, which center around a combination of critical factors in language vitality, including the number and generations of speakers, their geographic distribution and relative isolation, and recognition of ongoing rapid language shift. First, there is a very uneven distribution between languages and speakers, with just a handful of languages spoken by a very large percentage of the global population. According to current counts, approximately half the world's population speaks one of just 20 languages, and eight languages (Mandarin [Mandarin Chinese], Spanish, English, Bengali, Hindi, Portuguese, Russian, and Japanese) surpass all others with over 100 million speakers. Arabic could perhaps be added to this list: the sum total of all speakers of some form of Arabic makes it the fifth largest language, with over 200 million speakers. Not all varieties of Arabic are mutually intelligible, however, and so the differences between them are more language-like than dialect-like. Yet given the total number of people who speak some variety of Arabic, it should be included in the list of major world languages. The situation is markedly different for most of the world's languages. Some 96% of all languages are spoken by just 4% of the population, and one-fourth of the total number of languages have fewer than 1000 speakers. More than half of all languages have fewer than 10 000

speakers. Although the total number of speakers is not the sole indicator of language vitality, it is certainly a very important one. A very large majority of the world's population speaks just a very few languages. More to the point is the fact that we are witnessing rapid language shift, with a small set of major or global languages gaining in terms of numbers of speakers at the expense of a vast majority of the world's languages.

Finally, it is important to note that the geographic distribution of languages is also very uneven, with the largest numbers of languages spoken in Africa and Asia, and much smaller numbers elsewhere, such as in North and South America and the Pacific. Europe has a very few languages, both in terms of raw numbers and of percentage relative to the whole. This distribution is summarized in **Table 1**.

Distribution by continent or region is only part of the story. Language density, or the number of languages per unit area, varies greatly. Papua New Guinea stands out with 820 languages; with its relatively small territory, it has the highest language density of any country in the world. In all of North America, fewer than 200 indigenous languages remain, although there were certainly hundreds of distinct languages several centuries ago. Today, only a handful of these (such as Cree, Dakota, Ojibwa, Navajo) have a hope of survival, and even their longevity is doubtful. The case of Cree is illustrative. As of the 1998 Canadian census, there was a total of 87 555 speakers of all varieties of Cree. These speakers are not monolingual, however, and they show low literacy rates in Cree (only 5–10%) but high literacy rates in a second language, usually English (75–100%). Such figures are indicative of significant language shift. The figures for Dakota are even more alarming, with fewer than 27 000 speakers in North America as a whole, and only 31 monolingual speakers (as of 1990). Basic descriptions of Dakota speech patterns note that in some communities the children and young adults do not speak Dakota or at least prefer to speak English. Again, these are all signs of ongoing and advanced language shift, leading toward language extinction.

Table 1 Geographic distribution of languages

	Total living languages	*Percentage*
The Americas	1013	15%
Africa	2058	30%
Europe	230	3%
Asia	2197	32%
The Pacific	1311	19%
Total	6809	

Source: Grimes (2000).

As this may suggest, in only a very few cases is language loss due to the loss of the speaker population itself. Instead, the primary cause for language loss is language shift, when speakers cease to speak their own native tongue, the local language, in favor of the language of what is usually, politically and/or economically, the dominant culture. Such shift from the local to the language of wider communication can occur over several generations, or even as quickly as over the course of a single generation. In many cases the oldest generation – the grandparent group – speaks the local language as their first and primary language and has limited or nonfluent knowledge of the external language of communication; in some instances they may even have no knowledge at all of the language of wider communication. In contrast, the middle generation has some knowledge but primarily uses the language of wider communication, and the youngest generation has little to no knowledge of the local language, using at best a few words or phrases, such as greetings. In cases of rapid language shift, however, these changes occur across a single generation.

Levels of Language Endangerment

Implicit to the study of language endangerment is the notion that a relatively vital language can change to a state of endangerment at some point, usually when children cease learning the language. In studying language endangerment, it is important to assess degrees of vitality versus endangerment. That said, because a large number of factors enter into each situation, it can be difficult to rank levels of endangerment. Therefore, different linguists have proposed a variety of scales, with differing numbers of stages of endangerment and different labels for each level. There is, however, widespread agreement on the ends of the scale: safe languages and extinct languages. Generally, languages are categorized with respect to endangerment on a scale of six levels: safe, at risk, disappearing, moribund, nearly extinct and extinct.

Safe: A language is considered safe when all generations use the language in all or nearly all domains. It has a large speaker base relative to others spoken in the same region and, therefore, typically functions as the language of government, education, and commerce. Many safe languages enjoy official status within nation-states, and as such tend to be held in higher prestige than other languages.

At Risk: A language is at risk when it is vital (being learned and used by people of all different age groups)

without any observable pattern of a shrinking speaker base, but lacks some of the properties of a safe language: for example, it is spoken in a limited number of domains or has a smaller number of speakers than other languages in the same region.

Disappearing: A language is disappearing when there is an observable shift towards another language in the communities where it is spoken. With an overall decreasing proportion of intergenerational transfer, the speaker base shrinks because it is not being replenished. Disappearing languages are consequently used in a more restricted set of domains, and a language of wider communication begins to replace it in a greater percentage of homes.

Moribund: A moribund language is one that is not being transmitted to children.

Nearly Extinct: A language can be considered nearly extinct when only a handful of speakers of the oldest generation remain.

Extinct: An extinct language is one with no remaining speakers.

It should be noted that sometimes an intermediate stage between 'safe' and 'at risk' is recognized, 'safe but small,' determined by languages which are otherwise safe and stable but have a relatively small speaker base. The last three levels of language endangerment given here – moribund, nearly extinct, and extinct – are characterized by a lack of intergenerational transmission; disappearing languages are characterized by a downward trend.

Many linguists would argue that any language which is not at the safe level is endangered. Furthermore, there does not appear to be a direct correlation between the level of endangerment and the anticipated rate of language attrition: some communities shift language usage more slowly, and others more quickly. That said, language endangerment is currently a pressing concern for the linguistic community precisely because rapid attrition is occurring at a global level. In addition, the kinds of documentation and revitalization efforts needed are directly related to the level of endangerment. The closer a language is to extinction, the greater the urgency to act before fluent speakers are gone. Except in cases of sudden attrition (e.g., when a language is abruptly lost through natural catastrophe or warfare; see the next section), endangered language situations tend to be characterized by speakers of differing proficiency levels. Languages ranked at any level below safe tend to have communities which include individuals who are semispeakers, i.e., not fully fluent speakers, lacking native proficiency; the ratio of semispeakers to fluent speakers varies among communities and with endangerment levels. Such semispeakers show varying degrees of fluency, ranging from strong or nearly fluent speakers, through reasonably fluent semispeakers and weak semispeakers who are less fluent, to those with even more limited speaking competence. In assessing language vitality, it is thus important to take into consideration the proficiency and knowledge of the speakers of the language. Even in the case of extinct languages, there may be cause to move quickly, as there may still be 'rememberers' of the language who have some recollection of its use or may have some experience with it. Sometimes communities opt to resurrect (or 'resuscitate') extinct languages; rememberers can play a critical role in these efforts. Here too there is a range of proficiency: in some cases such rememberers have memorized entire texts without understanding their meaning, while the knowledge of others is restricted to only a few words or phrases. They can play an important role in language revitalization and documentation efforts, but they are static and do not represent living language.

What Is Lost?

There are a number of reasons to be concerned about language attrition. Language is a key part of each person's identity and is an essential component of a group's cultural and social heritage. Local communities who have lost their language speak about it as a deeply personal loss which is accompanied by a loss of a sense of self. Speakers whose languages are not endangered are also aware of the importance of language as a marker of identity and pay great attention to differences in dialects and speech patterns. Thus perhaps one of the most compelling reasons to be concerned about language endangerment is that the speakers who lost this part of their heritage deeply regret it and grieve over it. For this reason, so many different communities around the world are currently engaged in language revitalization efforts. Some of those groups whose languages are extinct are now attempting to resurrect them from whatever records have survived, including missionary descriptions, grammars, and sometimes oral recordings.

Loss of language also means a loss of intellectual wealth. From the linguistic standpoint, as we lose languages, we lose linguistic diversity. A great many of the world's broad array of endangered languages are understudied; what little knowledge we have indicates that many are structurally very different from the languages spoken by the majority of the global population (e.g., Mandarin, English, Spanish, and so on). The languages with the most speakers, cited in **Table 1**, represent a very small portion of the world's languages typologically and genetically.

Thus language loss means a decline in sources about the range of human language and its limitations. For the linguistic community, one of the challenges of language endangerment is to record and describe as many languages as possible while they are still spoken, so that we do not lose this wealth of human knowledge without record. Language loss should also be considered from the broader scientific perspective. Language encodes the range of human experience and knowledge; its disappearance entails the loss of the skills, information, beliefs, and ideas of a people. Often this involves specific knowledge about plants and their medicinal uses. It also includes historical knowledge; preliterate societies record their histories in their oral traditions, including stories, legends, and songs which tell the history of their people, settlements, battles, and so on. Language is more than a repository for religious and spiritual beliefs; in many societies the language itself is sacred and cannot be separated from religious beliefs and practices.

Taxonomy of Endangerment Situations

Language change and loss are naturally occurring processes which have been in place as long as language itself. Every language is constantly changing over time, and eventually evolves into one or more related but different languages; for example, the modern Romance languages (Spanish, Italian, French, and so on) are related to Latin, which is no longer used as a spoken language except for religious purposes. This kind of language 'loss' is a natural and ongoing process. Linguists are more concerned, however, with the absolute loss of language, which occurs when a language disappears entirely, without descendant languages. This kind of loss comes about in several different ways. Sometimes an entire speaker community passes away due to warfare, genocide, or disease. More frequently, however, language loss is the result of language shift, when speakers cease to speak their own native (local) tongue in favor of the language of what is usually the dominant culture, dominant politically and/or economically. The time frame for such shift varies across situations; it can take place over several generations, or much more quickly. One typical pattern is that the oldest generation, the grandparents, speaks the local language as their first and primary language, the middle generation has some knowledge but uses the dominant language primarily, and the youngest generation has little or no knowledge of the heritage language, and may at most know a few words or phrases. In cases of rapid language shift, however, these changes occur across a single generation, with the parent generation speaking the local language but their children, for whatever reasons, speaking a different one.

There are a number of ways to categorize language endangerment situations. One useful taxonomy takes into account the relative rate of attrition together with its causes. This taxonomy recognizes four different categories of attrition: sudden, radical, gradual, and top to bottom.

Sudden attrition refers to language loss which occurs abruptly because of the sudden loss of its speakers due to disease, war, natural disasters, and so on. Relatively few cases of sudden attrition have been documented, although it most probably occurred more frequently during periods of colonization, when certain indigenous groups are known to have been annihilated due to disease. In modern times, civil strife, ethnic and religious clashes, and the spread of some diseases, such as HIV, increase the chances of sudden attrition occurring in certain areas of the world.

Radical attrition is similar to sudden attrition in the sense that it comes about due to political circumstances which cause speakers to stop using their language. Such circumstances include repression and/or genocide, often occurring where groups are singled out for ethnic cleansing. (Under colonization and later, apartheid in South Africa, for example, Khoisan speakers abandoned their ethnic identity and so too their languages in order to avoid repressive measures which included genocide.) Such language shift is thus a means of self-defense or even self-preservation for speakers for whom identification with their ethnic group may lead to persecution. In these circumstances people are likely to cease speaking their heritage language abruptly.

Cases of gradual attrition are more prevalent in the world today. Gradual attrition is the relatively slow loss of a language due to language shift away from the local language to a language of wider communication. In some cases the language of wider communication is a regionally dominant language, and in others a national lingua franca. Gradual attrition often involves transitional bilingualism: as the speaker population is in the process of shift, certain groups primarily speak the local language and others the language of wider communication. Thus it is here that the clearest gradations in intergenerational transmission are to be found. Because this type of attrition is gradual, speaker communities may be unaware that it is in progress, until it is quite advanced and the local language is seriously endangered.

Bottom-to-top attrition refers to the loss of the local languages in most domains with the exception of religious and ritual practices. Languages at this

level are in an advanced stage of attrition. The local language is preserved only in those contexts where its use is seen to be the most critical. This tends to be those types of context where ritualized or sacred texts are critical, and the population may view the specific language of these as sacred in and of itself. Such ritualized or ceremonial texts are often memorized. Because these tend to be very prestigious but restricted domains for a community, it can be difficult to assess the actual vitality of the language in question. In less advanced instances of bottom-to-top attrition, the language is still used spontaneously in the settings to which it has been assigned by members of the local community. In extreme cases, the only remaining knowledge of a local language may be memorized portions of a ceremony. There are reports of communities which have retained the memorized rituals in the local language for many generations but have lost all comprehension of them.

Assessing Language Vitality

The factors involved in assessing language endangerment or vitality are complex. Language vitality is usually ranked in scalar terms on the basis of a combination of factors, in particular on numbers and generations of speakers. On one end of the scale are extinct languages which are no longer spoken at all, and on the other end are viable languages in no current threat of endangerment. In between these two extremes, a number of stages can be recognized. A healthy language with strong vitality is used with a variety of functions and in a range of settings, usually called domains. The most vital languages are used in all settings, formal and informal, official and in the home. In cases of language attrition, the local language is used in increasingly fewer domains with fewer functions as attrition progresses. Simply put, an important diagnostic in assessing vitality is the range of uses of a particular language.

Although it is often thought that the absolute number of speakers of a language is the key factor in language vitality, experts agree that in fact it is intergenerational transmission which is critical in determining it. In order for a language to be healthy, it needs to be used by future generations. When children cease learning and speaking a language, it is already endangered, even if there still exists a significant number of speakers. Intergenerational transmission does not in and of itself guarantee the safety of a language, however, as a complex set of factors are involved. These all pertain to questions of who uses the language, how, and when. In 2003 UNESCO's Ad Hoc Expert Group on Endangered Languages established a core set of nine criteria to be used in determining language endangerment:

1. Intergenerational transmission
2. Absolute number of speakers
3. Proportion of speakers within the total population
4. Trends in existing language domains
5. Response to new domains and media
6. Materials for language education and literacy
7. Governmental and institutional attitudes and policies, including official status and use
8. Community members' attitudes toward their own language
9. Amount and quality of documentation.

These nine factors are key in assessing language vitality. Variables (1)–(3) involve the distribution of speakers of the language, relative to the total number of the ethnic population as well as to generational stratification, and in absolute terms as well. Variables (4) and (5) are concerned with domains of language use; (7) and (8) with attitudes at the local and national level; and (6) and (9) are related to the kinds of material available for the language, including both pedagogical and reference materials as well as linguistic documentation. Strictly speaking, the level of linguistic documentation relates to language endangerment only insofar as ample documentation can aid language revitalization or resurrection efforts; the act of documenting a language does not directly affect its vitality.

Intergenerational Transmission

Intergenerational transmission is the single most important factor in determining a language's viability. In order for a language to remain healthy, it must be spoken by children, as they are the representatives and predecessors of future generations of speakers. For this reason, intergenerational transmission is the single most critical factor in a language's ongoing vitality. At the same time, rates of intergenerational transmission may vary between villages or speaker communities and it cannot be assumed to be uniform across a speaker population. There can be variation within a single village: it is often the case that in one family the children do not learn to speak the local language but in another they do. As this accurately suggests, overall language vitality may be uneven, higher in some communities and lower in others. A thorough analysis of language vitality requires attention to such regional variation in addition to the generational variation in transmission and use. A 10-way distinction in terms of transmission and use is proposed by Krauss (1997) to enable a more

detailed means of assessing variation in speaking patterns across generations:

a. The language is spoken by all generations, including all, or nearly all, of the children.
a-. The language is learned by all or most children.
b. The language is spoken by all adults, parental age and up, but learned by few or no children.
b-. The language is spoken by adults in their 30 s and older but not by younger parents.
c. The language is spoken only by middle-aged adults and older, in their 40 s and up.
c-. All speakers are in their 50 s and older.
-d. All speakers are in their 60 s and older.
d. All speakers are in their 70 s and older.
d-. All speakers are in their 70 s and older, and there are fewer than 10 of them.
e. The language is extinct, with no speakers.

As this scale suggests, it is important to make distinctions across age-groups within a single generation as well as across generations. Some might argue that a language is already in danger at stage (a-), when some of the children are not learning it. At stage (b), there is a greater level of danger, and so on; if the language is to survive at this stage, efforts need to be made at revitalization, or for reversing language shift. This scale may appear overly detailed; it is clear that a language is already on the way to extinction when it has reached stage (b). Yet at times it is needed. First, it can be quite useful in assessing the relative vitality not only of different languages, but at times more importantly, of various speaker communities. Inuktitut, for example, can be rated at level (a) in Greenland, where there are fluent speakers of all generations. (There are other factors which enter into its vitality in Greenland, such as official language status and use in education.) In some other Inuktitut-speaking communities, however, children are not learning the language and it is on the path to extinction. This is the case in specific communities in Canada and Alaska, although the children are acquiring it in other communities. This example further underscores the fact that evaluating the overall status of a language can be difficult, as it may vary from community to community. Second, if community members decide to revitalize their language, it is important to have an accurate understanding of the ages and numbers of fluent speakers who can assist in the revitalization effort.

Absolute Numbers of Speakers

Absolute population size alone is not a definitive indicator of language vitality. Each individual community is embedded in a set of circumstances that affect language use, so that even a small isolated rural community which has little contact with speakers of other languages and in which all members, of all generations, learn and use the local language, cannot reasonably be called endangered. That said, as a general rule, the more speakers, the more likely the community will be able to resist language shift. Put differently, small communities are at greater risk, because they can more easily disappear due to any one of a number of natural or man-made catastrophes. Furthermore, a small community can more easily be assimilated to a large community, and is likely to have fewer resources to resist external pressures. Yet small size alone does not condemn a language to extinction, because the nexus of relevant factors may actually favor language use. A case in point is Icelandic. It is spoken as the first language by a relatively small group of people (approximately 300 000), but it is the national language of the country of Iceland, has a long-standing literary history, and is a language of education. Icelanders have a strong sense of pride in their cultural and linguistic heritage and teach Icelandic to their children as their first language. It is hard to characterize it as being in any way endangered. By the same token, a relatively large speaker community does not guarantee language vitality. Navajo, an Athapascan language spoken in North America, provides an example. Although there are currently approximately 178 000 speakers (2000 census), there is ample evidence of advanced language shift. In 1968, a full 90% of first-grade children spoke Navajo as their first and primary language; by 1990 this figure had dropped to 30%. Despite the relatively large speaker base, it is doubtful that future generations will speak Navajo unless measures are undertaken to assure its continuance.

Proportion of Speakers within the Total Population

The ratio of speakers of the local language with respect to the total population of the local community is an important diagnostic in evaluating language vitality. For safe languages, all of the population speaks the language. In contrast, for extinct languages, none of the population does. In between these two extremes, languages can range from unsafe, with early language shift, where nearly all of the population still uses them, to severely endangered, where only a small percentage do. The larger the percentage speaking and using the language in an active way, on a daily basis, the more likely the language is to maintain its vitality.

In addition to the ratio of speakers of the local language to the number of people who would claim that local language as ancestral, it is useful to

compare how the local language speakers are embedded in a larger social and cultural context. Often local communities are in a minority position with regard to a national culture, represented by speakers of a language of wider communication. The narrower the gap, the stronger the position of the local language.

Trends in Existing Language Domains

A vital language continues to be used in existing domains, while in contrast an endangered language is used in fewer domains. The differences in usage can be placed on a continuum, with safe languages used in all domains for all purposes. Next are situations of what is called diglossia, or the use of different varieties in different contexts. Here a language of wider communication, usually a regional or national language, is the one used in official domains, such as government, education, and other public offices and institutions. The local language, in contrast, is also used in public domains, including not only traditional (local) places of worship or other religious institutions, but elsewhere as well. Typically, the local language is used in the home and informal domains, and the language of wider communication in official domains, and both can be used in public domains. Older members of the community may use only the local language. Next on the continuum is what the UNESCO Ad Hoc Group of Experts terms dwindling domains, when use of the language of wider communication spreads at the expense of the local language. The critical change here is that the local language is used less frequently in the home and is not transmitted to children. This state is further characterized by bilingualism in both the parent and grandparent generations; the children tend to be semispeakers but may be bilingual if the local language is spoken in the home. As this description suggests, at this point there is advanced language shift; the language is endangered and could be ranked as disappearing or even moribund. There are two final stages in this continuum which precede extinction: limited or formal domains is one, and highly limited domains the other. The former is characterized by use of the local language at festivals and ceremonies, in particular when the older generation is present (and therefore using the language). Often the use of the local language is itself tied to the rituals of these occasions and to an extent may be formulaic in usage. UNESCO also includes use of the language in the home in this category when such use is limited to the grandparent generation. The next stage, highly limited domains, represents even greater restriction in use of the local language. It is used only by a very small number of people on very particular occasions, and its use is often ceremonial.

As is clear from this description, the range of domains in which a language is used can be correlated to the generational distribution of speakers and their levels of proficiency. Use in all domains requires fluent speakers of all ages. Loss of intergenerational transmission, by its very definition, is indicative of a restriction in domains, as it signals that the language is not spoken in the home setting with children.

Response to New Domains and Media

Vital, safe languages are not only used in existing domains, but a measure of their strength is the extent to which their use is extended to new domains. These are created as society and conditions change, and an important measure of a language's vitality is the extent to which it evolves with the people who speak it. The general pattern, worldwide, is for the language of wider communication to be used in emerging domains, including formal education and media of all kinds. The question of language use in the media is critical. The media helps spread language use and fosters its growth and/or maintenance. Moreover, use of a language in media is an important indication of that language's prestige and the kind of support it receives from the larger (dominant) culture, the allocation of resources, and so on. Finally, the media represents prestige and affluence, and the language used in the media is associated with both of these.

Education is a key domain for language use. By its very nature, education promotes the language of instruction and fosters its use. Many local languages are not used in schools; in places where they are, they are more likely to be taught as a secondary subject and not used as languages of instruction. For a language to be truly vital, not only must it be taught in the schools, but it also must be used to teach other subjects.

Materials for Language Education and Literacy

Most linguists and local community members agree that education and literacy in the local language are necessary to maintain vitality, or to revitalize a language threatened with endangerment. Some local communities reject this notion, wanting to preserve their oral traditions and to rely solely on them. There is, however, a cost to this decision, as it limits the domains in which the language can be used. Regardless, most regard literacy as essential for local languages. Yet more than half of all languages have no written form, and so a writing system needs to be developed for them in order to use them in education

and literacy programs. Basic pedagogical and reference materials are needed, including textbooks, dictionaries and usable descriptive grammars. Such materials are readily available for languages of wider communication, but not for the majority of local languages. In addition, reading material is needed for literacy as well.

The existence and use of such materials is another diagnostic for assessing language vitality. UNESCO uses a scale of six levels in this assessment; each of these levels correlates with ever-decreasing vitality. At one end, safe and stable languages have an established orthography with a written tradition that includes a full range of written materials; the language is used in official domains such as government and education. At the next level, the materials exist and are used by children in the school, at least in terms of developing local language literacy, but the written language is not used in the government or administration. At the third level, children are exposed to written materials in the schools; they may play a role in education but print media, such as newspapers, journals, magazines, do not use the written form of the language. At the next level, although written materials exist, they are not used in education. Only some community members use them, while for others, their existence may have symbolic value. At the fifth level, the community has knowledge of a writing system and some written materials exist. Finally, at the other end of the community, there is no orthography and the language has no written form.

The singular importance of literacy, as presented by the UNESCO Ad Hoc Group of Experts, is not one which would be embraced by all linguists and by all community activists. It represents a practical view of the role of writing and literacy in the modern world in which local languages compete to survive.

Governmental and Institutional Attitudes and Policies

National and regional governmental policies, laws, and attitudes all play a critical role in the fate of local languages. Policies can be viewed as supportive, fostering the use and development of local languages. They can be benign, not explicitly supportive but also not disadvantageous to local languages. Governmental policies can also be explicitly hostile toward local languages and can actively discourage their use.

There is a direct relation between national-level policies and the attitudes of speakers of the language of wider communication. Positive policies at the national level tend to reflect the overall attitudes of the population toward local languages. One aspect of this is attitudes toward bi- or multilingualism. While some nation-states (such as Canada, Nigeria, or Switzerland) are multilingual, with multiple national and/or official languages, others (such as the United States) are unequivocally monolingual at a national level with regard to language and education policy, as such policies are intended to promote the use of one and only one official language (English, in this case). Because the use of local languages almost always entails at least bilingualism to some degree, so that community members can function at local, regional, and national levels, these languages suffer in countries which are dogmatically monolingual.

National-level attitudes can influence local attitudes. Language is closely associated with the people who speak it; negative attitudes toward a specific language translate into negative thoughts and beliefs about the speakers and their culture, social norms, and heritage. Such negative views can further influence the views community members have of their language. They may perceive it as backward, useless, underdeveloped, and so on, or they may see it as an impediment to advancement in a larger society which does not value their specific local language. Needless to say, such attitudes have an adverse effect on language use and foster language attrition. The role of community members' attitudes toward their own local language cannot be overstated. Where there is a strong sense of pride in the language, it is more likely to be used and less likely to move into an endangerment situation. In cases where language attrition has begun, the chances of reversing language shift are considerably greater if the people have positive attitudes toward the local language. In the absence of these, a revitalization program must begin by fostering community support.

Causes of Language Shift

The precise causes of language shift are specific to each individual endangerment situation, yet several key factors often come into play. These include urbanization, globalization, and what have been called social dislocation and cultural dislocation. Often the causes of language shift center around imbalances in prestige and power between the local language and culture on the one hand, and the language of wider communication and dominant culture(s) on the other. The imbalance, or unequal levels of power, often means that members of the local community are socially disadvantaged in a number of ways with respect to the majority population. In concrete terms, this frequently means that members of the local community are relatively powerless politically, and are less educated and less wealthy, in many cases living in poverty, and with less access to technology and

modern conveniences, than the majority population. One common result is that this socially disadvantaged position becomes associated with, or even equated with, the local language and culture, and so knowledge of the local language is seen as an impediment to social and economic advancement. Socio-economic improvement is thus perceived as tied to knowledge of the language of wider communication, as is renunciation of the local language and culture; for this reason, the situation has been called social dislocation. Social dislocation stemming from lack of prestige and power is one of the most powerful motivating factors in language shift.

Related to social dislocation is what has been called cultural dislocation, which comes about as a result of modernization and globalization. These two related forces bring people from different cultures, speaking different languages, together in a variety of settings, from informal to official, including religious and educational settings. This often results in the culture of the minority giving way to that of the majority. At an extreme, globalization is feared to lead to cultural homogenization. The loss of cultural distinctions supports a loss of linguistic distinctions, since the culture is embedded in the language.

Urbanization is another key cause of language shift and is itself related to cultural and social dislocation. Urbanization brings people from different regions and cultures into the same living and working spaces. They are necessarily required to communicate with one another and so turn to an established lingua franca or language of wider communication. It is not surprising that we find the highest levels of language retention in rural areas; in general, the more isolated a community, the more likely it is to maintain use of the local language. Urbanization has the opposite effect: by bringing people into contact, it facilitates language shift.

Globalization puts even greater pressure on local languages and can be a major factor in language shift. One of the results of globalization is the emergence of at least one global language of wider communication. A global language is a particular type of language of wider communication, and in some instances may supplant the national language in this role. The global nature of trade and commerce has in recent decades put increasing pressure on the need for an international lingua franca, a position currently held by English. Whereas historically it was important for key figures in world politics to be able to communicate, it is now critical that a large number of people in all walks of manufacturing and business communicate with one another, increasing the need for a global language. Some local communities thus see the knowledge of a global language as necessary for socio-economic advancement. In cases where knowledge of a national or regional language is also important, and in fact may be the only language of education, the need to know the global language can supplant the need or desire to know the local language.

Thus in the modern world, multilingualism generally involves knowledge of one or more national languages and, increasingly, of the global language. This represents a change in traditional patterns, when speakers knew a number of local languages. The shift stems from a combination of factors including education, social prestige, and socio-economics. One factor which has led to diminished local-level multilingualism is the current importance of the national language in terms of access to education, higher-paying jobs, the media, and social advancement. The national language provides a language of wider communication which makes knowledge of multiple local languages less necessary. A key characteristic of language endangerment is that use of the local language is limited, not only regionally but also functionally. In some cases, it is used only in the home, while in others, it is used in the village but not for communication with people living outside of the immediate community, and so on. Thus, the uses of the local language have become increasingly limited, with the net result that it is increasingly important for speakers to learn not only a language of wider communication but also, in many instances, a global language.

Strengthening Language Vitality

A number of steps can be taken to strengthen language vitality and reverse language shift. These require action and commitment on the part of community members and at the level of national government alike. Such steps include instituting educational programs which teach and promote use of the local language, and establishing national language policies which make these possible and which support linguistic diversity. An often critical part of such programs is the development of literacy in the local language. In most cases, pedagogical materials need to be developed and teachers need to be trained; in cases of advanced attrition, they will need to be taught the language itself, in addition to language pedagogy.

As this implies, levels of extinction and degrees of fluency (especially among semispeakers) are of great relevance to language revitalization efforts. Disappearing languages often have fluent speakers of many ages who can be enlisted in the work of revitalization. For moribund or nearly extinct languages, this is considerably less likely, and the importance of

semispeakers to the ultimate success of the process grows considerably. An extinct language may still have rememberers who, although they have no active speaking ability, may know individual words or phrases, such as greetings. So even in cases of extinction there may be a variety of levels of lingering knowledge.

See also: Ethnolinguistic Vitality; Identity and Language; Language Maintenance and Shift; Minorities and Language; Multilingualism: Pragmatic Aspects; Reversing Language Shift.

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semispeakers to the ultimate success of the process grows considerably. An extinct language may still have rememberers who, although they have no active speaking ability, may know individual words or phrases, such as greetings. So even in cases of extinction there may be a variety of levels of lingering knowledge.

See also: Ethnolinguistic Vitality; Identity and Language; Language Maintenance and Shift; Minorities and Language; Multilingualism: Pragmatic Aspects; Reversing Language Shift.

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Nora C. England (Ph.D. 1975, University of Florida) has worked on the description and documentation of Mayan languages for most of her career. She began working on Mayan languages in 1971, specializing in the description of Mam, then the second largest of the Mayan languages of Guatemala. She published a grammar of Mam in 1983 (England, 1983b) and edited a Mam-Spanish bilingual dictionary (Maldonado *et al.*, 1986). The grammar was at that time a model of descriptive grammar writing. She began working on Teko (Tectiteco) (also known as Tektiteko or Tectitico) in 1984 and on Mam dialectology in 1986. In 1988 and subsequent years she has

worked on at least 10 other Mayan languages of Guatemala.

Through her descriptive work she has contributed to a fuller understanding of the grammar of Mayan languages. Some of her contributions have included suggesting an analysis of directionals from a lexical perspective (England, 1983b), arguing for ergative syntactic rules in Mam (1983a), recognizing emphatic constructions other than Topic and Focus in some Mayan languages (1997), describing the syntax of dependent clauses in Mam that require split ergative marking (1983b), and advancing an understanding of Mayan comparative grammar (1989, 1991, 1992a, 2001).

A second aspect of England's work has involved the teaching of linguistics to native speakers of Mayan languages. She began this work in 1971, when she and Will Norman assisted Terrence Kaufman in the training of speakers in basic grammar and dictionary-making procedures at the Proyecto Lingüístico Francisco Marroquín (PLFM), Guatemala. In 1988 and 1989 she initiated two intensive courses in Mayan linguistics through the PLFM, and in 1990 she began to teach linguistics to Maya students in two Guatemalan universities (Universidad Rafael Landívar and Universidad Mariano Gálvez) and founded Oxlajuuj Keej Maya' Ajtz'iib' (OKMA), a Guatemalan institute for linguistic research, staffed by Maya linguists. She has been the advisor to OKMA ever since. In 1997 she provided intensive training in linguistics at OKMA for another group of 45 speakers of Mayan languages, and in 2003 initiated, along with OKMA linguists, a documentation project that involved training eight additional speakers in linguistics. England has been involved with the training of over 100 individuals through PLFM and OKMA, and 50 more in the Guatemalan universities. She currently has two Mayan students in graduate linguistics at the University of Texas. She has participated in the teaching of all of the Guatemalan Maya leaders in the linguistics of their own languages, and her work has provided a model for a productive relationship between Mayan speakers and outside linguists.

Part of her dedication to teaching linguistics to Mayas has led her to publish fairly extensively in Spanish, some of it for teaching purposes and all of it to enrich the literature available in Spanish about Mayan languages (see for example England, 1988, 1992a, 1997, 2000, 2001; England and Elliott, 1990). In addition, she has overseen the publication of more than 20 books written by Maya linguists about their own languages (a dictionary, reference grammars, pedagogical grammars, prescriptive grammars, dialect analyses, and a general book about the Mayan languages of Guatemala).

A third area in which England has worked is on language politics and linguistic identity. This work has depended greatly on her long-term involvement with speakers of Mayan languages and their concerns about language preservation and continuity. Publications in this area include England, 1992b, 1995, 1996, 1998, 2003a, and 2003b.

England was a Professor of Anthropology and Linguistics at the University of Iowa from 1977 until 2001. She was Chair of the Department of Linguistics from 1984 to 1987 and of the Department of Anthropology from 1993 to 1995. She was awarded a MacArthur Fellowship in 1993 and an Iowa Regents Award for Faculty Excellence in 1994. In 2001 she moved to the Department of Linguistics at the University of Texas at Austin as the founding director of the Center for Indigenous Languages of Latin America (CILLA). One of the main goals of the Center is to find ways for speakers of Latin American indigenous languages to study linguistics or linguistic anthropology at the graduate level at the University of Texas. There are currently (2004–2005) six such students at Texas. England's work at the University of Texas is thus directly connected with her interests in teaching linguistics to native speakers of indigenous languages.

See also: Mayan Languages.

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English in the Present Day (Since ca. 1900)

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Introduction

Despite the enormous range of 'Englishes,' there are few important differences between the principal national standards. The following description deals mainly with the common core. Some notes are also included on salient differences between two loosely defined representative varieties, 'general American' and 'standard southern British English.'

Orthography

Modern English spelling has inherited a mixture of Anglo-Saxon, Norman-French, and classical orthographic conventions, many of which were fixed with the invention of printing in the 15th century. Subsequent phonetic change has been considerable, so that sound–spelling correspondences are now poor. Written English, like French or Irish, is haunted by ghost letters standing for sounds that are no longer pronounced. The 40 or so phonemes of modern English are represented very unsystematically by the 26 letters of the Roman alphabet, singly or in combination. Many phonemes have various possible graphic representations; conversely, many graphemes can represent more than one sound. The situation is particularly chaotic with vowels, where six letters and their groupings serve to encode 17 or more phonemes. As in French, there is a directionality that favors readers over writers: one's chance of guessing how to pronounce a written word is considerably better than one's chance of guessing how to spell a spoken form. It is true that the extent of the orthographic irregularity can be exaggerated – a good deal of English spelling can be shown to be rule-bound. However, the rules are complex, and many of the most common words are highly irregular and have to be learnt by rote.

There are some superficial American–British differences resulting from Noah Webster's reforms in the early 19th century. They include:

- AmE *-or*, BrE *-our* (e.g., *color/colour*).
- AmE *-er*, BrE *-re* (e.g., *center/centre*).
- AmE *-og*, BrE *-ogue* (e.g., *catalog/catalogue*).
- AmE *-ize*, BrE *-ize* or *-ise* (e.g., *realize/realise*).
- Different spellings of some individual words. Examples are (AmE first): *aluminum/aluminium*, *analyze/analyse*, *check/cheque* (on a bank), *defense/defence*, *fulfill/fulfil*, *jewelry/jewellery*, *pajamas/pyjamas*, *skillful/skilful*, *tire/tyre* (on a wheel).

More recent moves for spelling reform have failed for predictable reasons: while the ultimate benefits would be substantial, reform would be extremely expensive and disruptive in the short term; and those who would benefit most – children and others who have yet to achieve literacy – are in no position to influence policy. Opponents of reform argue that a reformed orthography could in any case only encode the pronunciation of one variety of English, and would therefore be less than ideal for others; and that reform would obscure lexical relationships such as *photograph, photographer* or *sign, signature*. Chomsky and Halle (1968) went so far as to claim, indeed, that "Conventional orthography . . . is a near-optimal system for the lexical representation of English words," an assertion that might raise eyebrows in the average schoolroom.

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Table 1 English consonant phonemes

p	f	θ	t	s	ʃ	tʃ	k		m	n	ŋ	
b	v	ð	d	z	ʒ	dʒ	g		r	l	j	w h

Phonology

General

English has a moderately complex phonology: more elaborate than say, Spanish or Japanese, but less so than, for instance, Georgian. There are 24 consonant phonemes (Table 1).

Sixteen of these form voiced/voiceless pairs; though voicing may disappear in word-final position, a fortis/lenis distinction is preserved. Syllable structure permits clusters of up to three consonants (e.g., *strengths* /streŋθs/); clusters of four can occur postvocalically in inflected forms (e.g., *glimpsed* /glɪmpst/). /l/, /m/, and /n/, and (in AmE) /r/ can be syllabic.

The vowel inventory lists anything between 14 and 20 phonemes, depending both on the variety being analyzed and the descriptive approach adopted. Typical listings (for notes see 'American-British Differences' below) are shown in Table 2.

Vowels are generally oral; nasalization can occur, but is not phonemic. Vowel phonemes differ in intrinsic length, but length is not in itself distinctive.

Prominence, or stress, is realized as a combination of pitch, loudness, and lengthening. Word stress is lexically determined and is not generally predictable from the form of a word (compare *'promise*, *pro'mote*; *'photograph*, *pho'tographer*, *photo'graphic*); initial stress is most frequent. Two levels of stress (in addition to unstress) can be usefully identified (e.g., *ˌenter'tainment*). Some words and multiword items have contextually variable stress (compare *this after'noon*, *'afternoon nap*; *they broke 'up*, *she 'broke up the chair*). Stress is phonemic in a few pairs like *'extract/ex'tract*. Unstressed syllables most frequently have a reduced vowel, usually /ə/ (e.g., *malevolent* /məlevələnt/), sometimes /ɪ/ (e.g., *decide* /dɪsaɪd/). Many shorter function words such as articles, auxiliary verbs, prepositions, and pronouns undergo reduction to 'weak' forms with reduced vowels in most contexts: compare *I can* /kən/ *hear you* and *Yes, I can* /kæn/.

The rhythmic features of spoken English that distinguish it from, say, French or Spanish, arise from a combination of syllable structure, word stress, and vowel reduction; the traditional distinction between 'stress-timed' and 'syllable-timed' languages is no longer regarded as valid.

Intonation is multifunctional. Raised pitch contributes to the marking of stress. Tone groups mark off syntactic units such as phrases and clauses, with significant falls/rises at boundaries. Like many languages, English signals incompletion or uncertainty by rising tone movements, and closure or certainty by falling tones. Thus intonation serves not only to distinguish interrogation from assertion, but also to label information as 'given' or 'new' in discourse. Pitch also contributes to the expression of emotional attitudes.

Table 2 American and British vowel phonemes

Keyword	*AmE transcription*	*BrE transcription*
seat	sit	siːt
sit	sɪt	sɪt
set	sɛt	set
sat	sæt	sæt
calm, hard	kam, hard	kɑːm, hɑːd
cot, cough	(kat, kɔf)	kɔt, kɔf
bought, storm	bɔt, stɔrm	bɔːt, stɔːm
book	bʊk	bʊ̈k
too	tu	tuː
up	ʌp	ʌp
turn	(tʌrn)	tɜːn
ago	ə'go	ə'gəʊ̈
day	de	deɪ
my	may	maɪ
now	naw	naʊ
no	no	nəʊ̈
boy	bɔy	bɔɪ
here	(hɪr)	hɪə
there	(ðɛr)	ðeə
tour	(tur)	tʊ̈ə

American–British Differences

While some American and British dialects (e.g., Arkansas and Glasgow) are not mutually comprehensible, speakers of general American and standard southern British English have little difficulty in understanding each other. There are, however, many differences in pronunciation. They include the following:

- BrE has a distinct open back vowel phoneme that is absent in AmE. This is the rounded short /ɔ/ occurring in words like *cot*, *stop*, *on*, *cough*, *often*, *orange*. In AmE these words are pronounced either with /a/ (the same vowel as in *father*, *calm*, *car*) or with /ɔː/ (the same vowel as in *caught*, *storm*, *all*).
- Standard southern British English is nonrhotic: /r/ is only pronounced before a vowel sound. In general American (as in many other British varieties), /r/ is pronounced in final and preconsonantal positions.
- The disappearance of postvocalic /r/ in BrE has generated new diphthongs in some environments (e.g., *dear* /dɪə/, *hair* /heə/).

- The AmE intervocalic tapped allophone of /t/, in words like *writer*, does not occur in BrE.
- The glide vowels exemplified in *day*, *no* differ in quality; they are generally analyzed as monophthongs in American transcriptions (/e/, /o/) and as diphthongs in British transcriptions (/eɪ/, /əʊ/).
- The vowel sounds exemplified in *die, boy*, and *how* are generally analyzed as phoneme sequences in American transcriptions and as diphthongs in British transcriptions.
- Some words written with *a* + consonant (e.g., *fast*, *after*) have /æ/ in AmE and northern British varieties, and /ɑː/ in standard southern British English.
- Some words where /uː/ follows a dental or alveolar in AmE have /juː/ in British English (e.g., *duty*, *tune*, *new*).
- Some words ending in *-ary*, *-ery*, or *-ory* have one more syllable in AmE than in BrE (e.g., *station-(a)ry*).
- French borrowings (e.g. *paté*, *ballet*) tend to have end-stress in AmE and front stress in BrE.

Changes

The last half century has seen much faster changes in pronunciation norms in Britain than in the United States. Up to the 1960s, 'received pronunciation' (RP), a nonregional class-based accent used by a small minority of the British population, had the status of a standard. Its prestige, reinforced by its almost universal use in broadcasting, extended to other English speaking countries such as Australia and New Zealand. RP is now spoken by no more than 3% of the population, and to the extent that an influential pronunciation standard continues to exist in Britain, it is a variety closer to vernacular London speech ('Estuary English'). Vowel quality, in particular, is distinctly different from that of older RP. One consequence of this is that the accent of broadcasters from the 1940s and 1950s sounds decidedly amusing to modern British listeners.

Ongoing changes in pronunciation include the following:

- The use of an unvoiced /ʍ/ or /hw/ in words like *where*, *when* is becoming less common in AmE, and has virtually died out in standard BrE.
- Intrusive /r/ (as in 'Asiar and Africa') is on the increase in BrE.
- The change from /juː/ to /uː/ after dentals and alveolars is continuing, with words like *suit*, *illuminate*, and *enthusiastic* increasingly being pronounced in BrE without /j/, as in AmE.
- Glottalization of medial and final /t/, /p/, and /k/ is growing in BrE.

Lexis

English has an enormous vocabulary – exactly how large is a question to which no clear answer can be given. Well over 600 000 items are included in the *Oxford English Dictionary*, which, however, does not list specialist scientific and technical terminology. In any case, attempts to assess vocabulary size founder on problems of definition. As is becoming increasingly clear from research in phraseology, it is impossible to draw a principled line between orthographic words and other fixed lexical items: compare *cosmetic*, *make-up* (n), and *make up* (v), or *unemployed* and *out of work*.

The different sources of the English word stock are reflected both grammatically and stylistically in the modern language. According to studies cited by Algeo (1998), only 5.4% of the words listed in a dictionary originate from Old English, but these account for 74.5% of the words in newspaper running text. They include most of the highest-frequency vocabulary, and almost all function words such as determiners, auxiliaries, and prepositions. Most other older English words came into the language either from Norman French, or from Latin and Greek during the Renaissance. Besides providing English with much of its learned vocabulary, these later lexical injections have allowed the language to develop a wealth of variant forms for everyday concepts. Speakers and writers can frequently choose between down-to-earth forms (usually, though not always, the older words) and more formal or elevated alternatives (usually the later imports): for example *buy* or *purchase*; *try*, *attempt*, or *endeavor*; *start*, *begin*, or *commence*; *answer*, *reply*, or *respond*; *tell* or *inform*; *get off* or *alight*. For more literary purposes, the possibilities can be almost daunting. Words describing the reflection and transmission of light, for instance, include *shine*, *glitter*, *glisten*, *gleam*, *glow*, *sparkle*, *twinkle*, *glimmer*, *blaze*, and *coruscate*.

The paucity of inflections makes the language morphologically hospitable, and English continues to borrow freely from elsewhere. Algeo (1998) lists 20th-century borrowings from 56 languages, with by far the highest proportion coming from French. Most new English words, however, are home-grown, created either by shifting word class with no formal change (most high-frequency nouns have verbal homonyms, and vice versa), by compounding (e.g., *computer-literate*), or by affixation (e.g., *pro-life*). Over the last century, the latter process has been the major source of new vocabulary. Although English has few inflections, it has a good deal of derivational morphology, with well over 100 affixes in common use, many of them productive. These serve to modify

the meanings of words (e.g., *un-*, *counter-*, *re-*, *-ess*, *-hood*, *-ism*, *-ship*), and/or (especially in the case of suffixes) to change their word class (e.g., *en-*, *pro-*, *-age*, *-ance*, *-ful*, *-ly*, *-en*, *-ify*, *-ize*). Among the range of affixes there is a stock of naturalized morphological formative elements, originally borrowed mainly from Greek and Latin, which are particularly productive in present-day word-formation: for example, *auto-*, *eco-*, *cyber-*, *mono-*, *macro-*, *inter-*, *-ology*, *-cratic*, *-phile*, *-phobe*.

While the vast bulk of English vocabulary is common to AmE and BrE, there are a fair number of well-known differences. Many words in common use differ in their reference (e.g., *truck*, *mad*, *pavement*, *chip*); very frequently, different words are used for the same concept (e.g., *elevator/lift*, *faucet/tap*, *check/bill*). The independent development of industry in the two countries is strikingly reflected in, for instance, vocabulary relating to cars (*hood/bonnet*, *trunk/boot*, *fender/wing*, *gas pedal/accelerator*, *windshield/windscreen*, *gear shift/gear lever*).

Morphology and Syntax

General Characteristics

In traditional typological terms, modern English is situated toward the 'isolating' end of the spectrum. Little of the older inflectional morphology remains; what there is is largely redundant. Nine or so major word classes are commonly distinguished. Grammatical relationships are expressed primarily through word order (SVO) and the use of function words, particularly prepositions and auxiliary verbs. Case structure is nominative-accusative. Topic is not generally distinguished grammatically from subject. Word, phrase, and clause are relatively distinct categories, but there is considerable scope for phrasal and clausal embedding, exploited especially in the formal written language. Constituent order within phrases is mixed, with modifiers generally preceding heads and complements following.

Word Classes

- **Count and mass nouns** are distinguished syntactically; count nouns have an inflected plural form. Formally singular nouns referring to human groups may have partial plural agreement, especially in British English. An inflectional/clitic genitive exists, used preferentially with nouns that have human reference. English differs from most IE languages in having no grammatical gender.
- **Determiners** include a range of quantifiers, demonstratives expressing a two-term distal contrast, and a distributionally and semantically complex article system, similar in most respects to its counterparts in other Western European languages, but using zero article for generic reference (compare German *die Musik*, Italian *la musica*, French *la musique*, English *music*). There is some overlap between determiners and pronouns.
- **Adjectives**, as in most IE languages, form a large and semantically heterogeneous class. Most can function both attributively and predicatively; a few are limited to one or other position. There are semantically based ordering constraints. Comparison is inflectional (with shorter adjectives) or analytic. There is some overlap between the adjective and adverb classes.
- **Pronouns** are personal, reflexive/emphatic, reciprocal, relative, indefinite, possessive, demonstrative, and interrogative. Personal pronouns (first and third person) have distinct case forms; third-person singular forms encode natural gender. Relative and interrogative pronouns distinguish human from other referents (*who/which*; *who?/what?*), and retain a moribund case distinction (*who/whom*).
- **Lexical verbs** have a multifunctional base form that serves as a present tense (except in the third person singular), as an imperative, and as an infinitive (usually marked by a particle *to*). There is an inflected third-person singular present, and an inflected past tense. Morphologically marked nonfinites are a present participle or gerund, and a 'past participle' identical in regular verbs with the past tense. Irregular verbs form their past tenses and past participles in various ways, mostly involving a vowel change. Participles can combine verbal with adjectival or nominal functions.
- **Primary auxiliaries** are grammaticalized versions of *be* (used to construct passive and progressive verb forms), *have* (used in perfective verb forms), and *do* (used in some interrogative and negative structures).
- **Modal auxiliaries** (*will*, *shall*, *would*, *should*, *may*, *might*, *can*, *could*, *must*, and *ought*) and quasi-modals (e.g., *had better*) express varying degrees and nuances of epistemic, deontic, and dynamic modality, with a good deal of semantic overlap. Modals are invariable, lacking nonfinite and past forms.
- **Adverbs** are a heterogeneous class, including both clausal modifiers and items that modify particular clause elements. Adverb particles such as *back*, *away*, *on*, *off*, *in*, *out*, *over*, up form an important group, overlapping considerably with the preposition class; they combine extensively with verbs to form phrasal verbs.

- **Prepositions and conjunctions** constitute limited but not completely closed overlapping classes, with a growing number of multiword members.
- **Inserts** such as *Hi*, *Yeah*, *OK*, *Sorry*, *Look*, *Please*, *Damn!* form a distinct word class in conversational speech.

Noun Phrase Structure

Nouns can be premodified by determiners, adjectives, and noun modifiers, in that order. Complex hierarchical structuring is possible, facilitated by the freedom with which nouns can act as modifiers; this contributes to the dense and economical approach to information packaging found in some written registers. Some determiners show number agreement; premodifying nouns are generally unmarked for number.

Relative clauses postmodify, as do nonfinite clausal modifiers. Relativized NPs can function as subjects, direct or oblique objects, or possessives in relative clauses. Restrictive relative clauses have a hybrid character: they can be integrated into a preceding noun phrase by simple juxtaposition, by a relativizer (*that*), or by a relative pronoun (*who, whom, which*), which functions as an argument in the relative clause. The choice is subject to complex syntactic and stylistic constraints.

The Verb Group: Tense, Aspect, Modality, Mood, and Voice

English has a relatively rich and complex verbal system, especially in main clause use. The small inventory of morphological distinctions is supplemented by a range of periphrastic forms constructed with primary and modal auxiliaries. Tense, progressive and perfective aspect, mood, and voice can all be expressed separately or in combination though the verb group. Some key features:

- English perfective aspect encodes anteriority, often with continuing relevance.
  We couldn't get in because I had lost my key.
  I'm afraid Jane has had an accident.
- Future events arising out of present situations are generally referred to by present forms (especially the present progressive or *be going* + infinitive). Reference to future events viewed as detached from the present uses a bleached modal auxiliary *will*.
  We're meeting again tomorrow.
  Look out – we're going to crash!
  You will be paid at the end of the month.
- 'Irrealis' modality is expressed principally by the use of modal auxiliaries or, especially in subclauses, by past tenses; also (mainly in AmE) by subjunctives.
  It would be better if you came tomorrow.
  She must have forgotten.
  It's important that she be told. (AmE)
  It's important that she should be told. (BrE)
- English is unusual in that oblique arguments can act as subjects of passive verbs.
  I've been given one of those forms.
  She hates being shouted at.
- Reflexive and middle relations can be indicated by pronouns (e.g., *hurt oneself*), but are often unmarked (e.g., *shave*, *marry*).

Clause and Sentence Structure

Canonical SVO order is generally observed in written English; in informal speech, departures from the norm such as fronting and left-dislocation are more common. Nonprepositional indirect objects precede direct objects. Verb and object constitute a tight unit, not usually separated; otherwise, adverbial elements occupy a variety of positions. Relative and interrogative pronouns and adverbs are initial in clauses. Preposition-stranding is common. Interrogatives are formed by inversion of the subject and operator (the first of any primary or modal auxiliaries), negation by adding *not* to the operator. (Multiple negation is common in nonstandard dialects.) In the absence of an auxiliary, *do* is used as a dummy operator.

Nominative and accusative case are marked positionally, with redundant morphological marking in some pronouns. There is vestigial subject-verb number agreement in the present tense of lexical verbs and primary auxiliaries. Pronoun dropping is ungrammatical except in imperatives and certain elliptical structures.

Verbs have a wide range of possible complementation patterns; subcategorization rules of individual verbs are only partly predictable on semantic grounds.

Coordination and subordination operate as in most IE languages. Various types of subordinate clause with differing structural features can have nominal, adjectival, or adverbial functions in matrix clauses. Verbal structures in most subordinate clause types exhibit a more reduced range of tense/aspect expression than in main clauses. Embedding can in general be recursive up to the limits of processability. There are complex constraints on extraction from embedded clauses in interrogative and relative structures.

The sentence, as a unit, is essentially a feature of the written language. Conversational speech is not easily analyzed into sentences, and is perhaps better seen as constructed of 'clausal' and 'nonclausal' units (Biber *et al.*, 1999), which may be loosely linked into utterances in an add-on fashion rather than being organized into structural hierarchies.

Information Structure

English follows the quasi-universal tendency to put 'given' or background information before new. Formal written English has few topicalization devices; in order for given information to come first in an utterance without disrupting canonical word order, it therefore tends to be encoded as subject. The merging of topic and subject is facilitated in several ways. English allows an unusually wide variety of participant roles to be encoded as active subjects, including (depending on the verb) agent, patient, experiencer, benefactive, instrument, temporal, and locative. Indirect and prepositional objects can become passive subjects. The '*have*-passive' enables experiencer to be encoded as subject (e.g., *She had her roof blown off in a storm*). English is also rich in lexical alternatives with different argument selections (e.g., *admire/impress*, *frighten/fear*, *notice/strike*). In conversational speech, given-new relations are also indicated by fronting, left-dislocation, or phonological prominence.

Changes

Older changes that are still working their way through the language, and some newer developments, include:

- continuing spread of the *going-to* future
- increased use of the progressive with stative verbs (e.g., *I'm understanding German better now*)
- replacement of *shall* by *will*, and of *should* by *would* in some contexts
- spread of the *get*-passive
- decline in the use of the subjunctive, especially in BrE
- general reduction in the use of modals (see Leech, 2003)
- increased use of phrasal verbs
- spread of conditional structures with parallel verb forms in speech (e.g., *If you'd have asked me I'd have told you.*)
- increased use of noun + noun compounds
- disappearance of *whom*
- increased use and acceptability of noncanonical pronoun case in conjoined subjects and objects (e.g., *John and me went* . . . ; *between you and I*)
- grammaticalization of *you guys/folks* as new second-person plural pronoun
- increased use of singular indefinite *they*, partly as alternative to nonsexist *he or she*
- replacement of possessive determiner by object pronoun before *-ing* form (e.g., *This led to them being arrested.*)
- spread of analytic comparatives and superlatives (e.g., *commoner* > *more common*)
- dropping of complementizer/relative *that*
- increased use of preposition stranding.

For an excellent detailed discussion of ongoing syntactic changes, and further references, see Denison (1998).

American–British Differences

The grammatical systems of standard AmE and BrE are virtually identical. Minor differences, some of which are disappearing with the growing influence of AmE on BrE, include those exemplified below:

AmE	BrE
He just went home.	*He's just gone home.*
Do you have a problem?	*Have you (got) a problem?*
I've never really gotten to know her.	*I've never really got to know her.*
It's important that he be told.	*It's important that he should be told.*
Yes, I may.	*Yes, I may (do).*
The committee meets tomorrow.	*The committee meet/meets tomorrow.*
He probably has arrived by now.	*He has probably arrived by now.*
It looks like it's going to rain. (informal)	*It looks as if it's going to rain.*
He looked at me real strange. (informal)	*He looked at me really strangely.*

Standardization and Prescriptivism

Standardization continues in the English-speaking world, with regional dialects converging on standard varieties, and American English exercising increasing influence on usage in other countries. At the same time, however, increased democratization is reducing the social prestige of the standards, and there is somewhat more tolerance of variation, at least in speech, than, say, 50 years ago. The written–spoken divide is narrowing: with the continued growth of the spoken media, speech is no longer regarded as a poor relation of writing, and characteristically spoken lexical and grammatical elements are making their way into the standard written language. The recent explosion in electronic written correspondence has further reduced the gap, widening the use of relatively informal written registers at the expense of more traditional styles.

However, prescriptive attitudes to usage remain entrenched and powerful in both the United States and Britain. A command of the orthographic, grammatical, and rhetorical conventions of the standard written language is commonly equated with superior intelligence and educational achievement; failure to master these conventions can constitute a serious

obstacle to educational or professional advancement. 'Standard' is typically seen as being synonymous with 'correct,' and 'nonstandard' with 'incorrect'; regional or ethnic dialects such as cockney or Afro-American Vernacular English are widely believed to be grammatically deviant and ill-structured.

English is often perceived as being in a state of decay: threatened by variable and changing usage, the encroachment of nonstandard forms, a growing lack of respect for time-honored rules, and the failure of schools to provide adequate grammar teaching. Linguistic and moral decline may be seen as going hand in hand. The British politician Norman Tebbitt, echoing voices from the 18th and 19th centuries, famously declared in 1985 that "If you allow standards to slip to the stage where good English is no better than bad English, where people turn up filthy ... at school ... all those things tend to cause people to have no standards at all, and once you lose standards then there's no imperative to stay out of crime."

The feeling that the language is in danger generates a belief that grammarians, lexicographers, publishing houses, the media, and the educated community have a duty to defend it. In both the United States and Britain, radio and TV stations, magazines, and newspapers receive voluminous correspondence complaining about the 'mistakes' of journalists, broadcasters, and public figures (and, in Britain, condemnation of their 'Americanisms'). Many newspapers and magazines publish regular columns by language gurus on questions of usage. Prescriptive usage guides find a ready market among those who wish to see their prejudices reinforced or who have been made to feel insecure about their command of their own language. (A recurrent advertisement in the British press begins 'Shamed by your mistakes in English?') Such guides often continue to reproduce the 18th- and 19th-century proscriptions against preposition-stranding and split infinitives. Other current targets include novel part-of-speech shifts (e.g., *to task*, *to showcase*); the use of plural concord with group nouns (e.g., *the team are*, standard in BrE, but often condemned for being 'illogical'); 'misplaced' *only*; dangling participles; changes in the meanings of words (e.g., *anticipate*, *disinterested*, *enormity*) and in their grammatical scope (e.g., the use of *hopefully* and *thankfully* as disjuncts); singular indefinite *they* (centuries old); *less* before a plural noun (used by King Alfred); 'misuse' of *me* and *I* in conjoined subjects and objects (there are examples in Jane Austen and Shakespeare); and – perhaps most inflammatory of all – the illegitimate use or omission of the possessive apostrophe. (As Steven Pinker points out [1994], prescriptive rules are often so psychologically unnatural that only those with access to the right schooling can manage to abide by them; so they serve as shibboleths, differentiating the elite from the rabble.)

Despite the growing tolerance of regional pronunciation, elitist attitudes persist: a letter to the *Sunday Times* in March 1993 described speakers of 'Estuary English' as resembling "the dregs of humanity." Particular regionalisms are still widely proscribed or made fun of. British *h*-dropping in words like *horse*, *hurry*, *home*, common in Eastern England, is typically condemned as lazy, slovenly, or slipshod, generally by nonrhotic speakers who do not see their own *r*-dropping at all in the same light.

There have been quite strong counter-currents to prescriptive attitudes in educational and other circles at various times over the last century, but more liberal and relativistic views of linguistic authority and correctness have tended to meet considerable opposition. Finegan (2001) gives an interesting account of the outrage with which the publication of Webster's 'permissive' *Third New International Dictionary* was greeted in 1961. Jean Aitchison, a British linguist who gave the BBC Reith lecture series in 1996, received copious hate mail for questioning popular views of correctness.

The Future

As English increasingly takes on the role of a world lingua franca, it is certain to develop in interesting ways. One can imagine that a future international variety of English (or group of international varieties) might detach itself somewhat from the American–British standards; alternatively, it might pull them along with it. In either event, narrowly prescriptive attitudes of the kind described above are likely to appear increasingly parochial. While we have no way of knowing how an international English might evolve, we can speculate that it might simplify, regularize or dispense with some of the features that make the present-day language hard for non-native speakers to learn and use. Such changes might include the reduction of consonant clusters; the regularization of word stress and speech rhythm; the simplification of verb phrase grammar, perhaps accompanied by an increase in the range of grammatical particles; the reduction of the modal verb inventory; the regularization of verb complementation structures; and the disappearance of indefinite and perhaps definite articles. International English might also provide a more favorable environment for spelling reform.

See also: English, Later Modern (ca. 1700–1900); English Spelling: Rationale; English: World Englishes; Lingua Francas as Second Languages; Spelling Reform Proposals: English; Standardization.

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English Spelling: Rationale

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The Standard Orthography of English (SOE) is the most widely used writing system in the world, and an enormous educational effort goes into teaching it and, of course, learning it. Linguistics has not so far made the massive contribution to the efficacy of this effort that might have been expected: the study of graphology has lagged behind that of phonology, grammar, semantics, and other aspects of language, and applied linguistics has been more concerned with new orthographies than with old ones.

Writing System, Spelling, Orthography

The term 'writing system' has been used variously by linguists and has not always been distinguished from 'spelling system,' although it is clear that a writing system like SOE has components that lie outside the spelling system – most obviously, punctuation. In addition, there are writing systems that are not at all like SOE. Pitman's shorthand, for instance (or Gregg shorthand), looks quite different, and is quite different in its spelling system (e.g., no digraphs, homophones not distinguished) as well as in its script (the written shapes and the spatial disposition of its graphemes). This example points to another aspect of writing systems: namely, that there is more than one functional kind of writing system. Pitman's shorthand is a stenography, a special-purpose writing system. SOE, by contrast, is a general-purpose writing system, a class of writing system for which 'orthography' is an appropriate name.

The Basis of a Shared Rationale

Two Prongs of Spelling Analysis

A rationale of English spelling should enable teachers, learners, and people in the community (parents, for example) to give a rationale for the spelling of particular words – a 'spelling analysis'; yet good spellers, including good teachers, are rarely able to help weak spellers in this way.

The structure of the spelling system indicates two lines of attack – two prongs. Both of them derive from the grammar, or 'lexicogrammar,' of the standard form of the language – the first directly (see the section "Graphomorphemics") and the second (see the section "Graphophonemics") indirectly via the phonology (selecting a 'reference pronunciation' appropriate to the language community). Common to both is the mathematical concept of the one-member set, familiar already in the analysis of linguistic structure: in a scale, or rank-scale, of units, each unit (except the lowest) consists of one or more members of the next unit below. Take words and syllables: every word consists of 'one or more' syllables, and in English, words of one syllable, such as *aim* or *guess* are particularly common and are known as 'monosyllables.' This is a familiar example of 'one or more' constituency – though, as

nominative, and identified the subject wherever it was positioned, and the accusative form *þone cyning* signaled the object. Already in Old English, however, the order Subject-Object (as in the first of our examples) was much more frequent than Object-Subject. This order was the usual one even when case marking would have made the grammatical relations clear without the help of word order.

The position of the verb was also variable. Old English exhibits the preference for verb-second order in main clauses and verb-final order in subordinate clauses found in the other early Germanic dialects, but in Old English, verb-second position in main clauses was not as regular as it is in, for example, Modern Dutch, and only about 50% of subordinate clauses have verb-final order. Order within the noun phrase was also variable but far from free, with the prenominal order Determiner Adjective Noun familiar from Modern English already the unmarked pattern. The postnominal order found in *men þa leofestan* 'most beloved people' (lit. 'people the belovedest') was mostly limited to vocatives and poetry, and is presumably a relic of more widespread postnominal positioning of modifiers in Germanic. The scene was set for further dependence on word order in the Middle English period.

See also: English, Middle English; Germanic Languages; Gothic; Runes.

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English Lexicography

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Bilingual Beginnings

From earliest times, students have noted translations above words in foreign-language texts. Murray (1900) traces the origins of English lexicography to these notes, called 'interlinear glosses,' which are found in many Latin documents that survive from the Old English period. In some monasteries, interlinear glosses were collected into a document called a 'glossarium.' Such early glossaries originally listed the words in the order in which they were read in texts, but "as these manuscript lists came to be copied and re-copied, it was seen that their usefulness would be increased by putting the words and phrases into alphabetical order" (Murray, 1900). The development of these lists into more sophisticated language tools was given a great boost by the invention of printing, which enabled elaborate alphabetical lists of words, with explanations, to be reproduced in hundreds of copies. Lexicography has always been closely associated with printing and publishing. Johannes Gutenberg invented the printing press in Mainz, in about 1450, and by 1474, the new invention had been brought to England by William Caxton. In the century that followed, bilingual and multilingual compilations of technical terms in various domains, often with discursive and even anecdotal comments by the compiler, began to flourish. An example may be given from William Turner's *The Nature of herbes in Greke, Latin, Englishe, Duche & Frenche wyth the commune names that Herbaries and Apotecaries use*, published in 1548:

> **Anthenus.** *Anthenus* siue *Chamaemelon* is called in englishe *Cammomyle*, in duch *camillen*, in frenche *camomille*. Camomilla is deuided into three kyndes, the firste

kynde is called *leucanthemon* because it hath a whyte floure and of the commune herbaries Camomilla romana, and in englishe cammomyle, thys herbe groweth on Rychmund grene, and in Handsley heth in great plentie. The second is called in greke *chrysanthemon* because it hath a golden floure. I founde it once in a corne fielde betwene Basyle and Surike, and haue neuer sene it any where els in all my lyfe, it maye be called in englishe *yea lowe camomyle*. The thirde kynde is named in greeke *Eranthemon* because it groweth in the sprynge of the yere. I haue sene it in Englande but very rare, some call it *amariseam rubeam,* and they call it in Englishe *red mathes*, alij, *red mayde wed*, alij, *purple camomyle*. Camomyle is hote and drye in the fyrste degree.

Early dictionaries played a vital part in bringing the new learning and culture of the European Renaissance to England. As the cultural importance of vernacular languages grew, bilingual works were compiled, explaining the meaning of words in French, Italian, and Spanish literature for a sophisticated English-speaking audience and for travelers. Browsing these Tudor dictionaries (using Lancashire's (1999) *Early modern English dictionaries database, EMEDD*) gives a fascinating insight into the Renaissance mind set, and also the extent of Renaissance linguistic sophistication. French was the language of diplomacy as well as culture in Renaissance Europe, so it is not surprising that the earliest true dictionary published in England, in 1530, was *Lesclarcissement de la langue francoyse*, by John Palsgrave, tutor to Princess Mary (later Queen Mary I). This ambitious work contains 18 890 entries, together with a French grammar, being the first in a long tradition of dictionaries with supplements, bringing added value to the basic word list. As shown in *EMEDD*, it contains both simple glosses (example (1)) and guidance on phraseology (example (2)):

(1) **Alegyaunce,** uasselaige *s ma*.
Alley (to walke in), alee *s fe*.
Alfyn (a man of ye chesse borde), avlfin *s ma*.
Alyaunce, aliance *s fe*.
Alyen (straunger), alien *s ma*.
Alye or **alyaunce,** aliance *s fe*.
Alysandre (an herbe), alisandre *s fe*.
Alle (an instrument for souters), alaisne *s fe*.
Alsoulne day, le iovr des mors *ma*.
All maner wylde foule, uolaille *s fe*.
Alhalowentyde, la tous sainctz *fe*.
Alledgynge (of a matter), allegation *s fe*.
Almaygne (a man), alement *s ma*.
Almaygne (a countre), alemaigne *s fe*.
Almery (to put meate in), unes almoires *fe*.
Almysdede, avlmosne *s fe*.

(2) **Astore** . . . *This house is astored of all thinges plentuously:* Ceste mayson est foysonnée de toutes choses.
Brede . . . *I brede as many pygges aboute my house as two of my neyghbours:* Je nourrys *or* je eslieue autant de coychons autour de ma mayson come deux de mes voysyns.
Butt . . . *This house butteth vpon ye lordes landes:* Ceste mayson marche sur les terres du seignieur, *or* confine, *or* confronte.
Contayne . . . *This house is scarsely able to contayne his plate:* A payne peult ceste mayson contenir sa vaisselle.
Convaye . . . *Conuaye this man to my house tyll I come:* Menes cest homme a ma mayson tant que je viengne.

The most important of the early Latin–English dictionaries was Thomas Thomas's *Dictionarium linguae Latinae et Anglicanae* (1587), containing over 36 000 entries. It has a fairly sophisticated lexicographical apparatus, showing part-of-speech class, inflections, and derivation. Occasionally, brief references to authors are given, e.g., 'Plin.' for Pliny. Glosses are in both Latin and English. It was the standard work used by pupils and teachers in the newly founded 'grammar schools,' which taught Latin grammar (not English grammar), and 'public schools,' which are (or rather became) private schools. The following entries show how Thomas's *Dictionarium* was arranged (taken from *EMEDD*):

Alienatio, -onis, f.g. verb. Ab *alieno*. Alienation or altering, withdrawing of the minde from the friendship of anie man: deliuerance of possession of another. & **alienatio mentis,** Plin. The losse of ones witte: when one is bestraught.
Alienatus, -a, -um, part. p.b. Alienated, put awrie: altered: estranged, angrie: & **alienatus mente,** [Plin.] Troubled in his minde, out of his witte.
Alieno, -as, p.b. Plin. To alienate: estrange: to put awaie: to aliene or alter possession.
Alima, Medicines which either asswage hunger, or keepe a man from it.
Alimentum, -ti, n. g. verb. ab *alo*. L p.b. Sustinance, foode, nourishment, liuing.
Alioqui, siue **alioquin**, coniunctio, p.b. Otherwise: else: except that: if not.
Alipaenea, Caels. Medecines made without fatte.
Alipastos, Flesh that hath no fat.
Alipes, -edis, ex *ala* & *pes*, p. l. Ouid. Swift of foote.
Alipterium, p.b. Cael. A place in bathe or sloufs, where men were annointed.
Aliptes, -ae, m. g. p.b. The Master of the wrestlers, which with oyle did annoint them that should wrestle naked. Also a Chirurgion, which with oyle, & fatte mollifying emplasters laide to the outward parts, doth heale woundes and outward diseases.

In 1598 and 1599 respectively appeared the first major Italian–English dictionary and the first Spanish–English dictionary. John Florio's *A worlde of wordes* (1598; second edition, 1611, retitled *Queen*

Anna's new world of words), an Italian–English dictionary, offered translations of much contemporary vocabulary and even some slang. It contains over 50 000 translations. Florio was born in London in about 1553, the son of an Italian Protestant refugee. He studied at Oxford, and in 1604 he obtained a position at court. In addition to compiling a dictionary, he also published a very successful translation of the essays of Montaigne. The following entries are examples from Florio's dictionary, taken from *EMEDD*:

Alice, a little fish called a pilcher or a sprat, like a herring.
Alicorno, an vnicorne. Also an vnicornes horne.
Alida, alida carne, stale, tainted, mortified or flie-bitten meate.
Alidare, to mortifie, taint or make meate stale.
Alie, vsed for Ale: wings.
Alienare, to alienate or estrange.
Alienatione, an alienation or estranging.
Alieno, an alien, a stranger, a forraine, a frenne.
Alieta, a kinde of eagle which alone fixeth hir eies against the sunne.
Aliga, as Alga.
Aligare, to tie or binde togither.
Aligero, one bearing wings.
Alima, an herbe whereof eating a little one shall bee kept a long time from hunger.
Alimentore, to nourish, to feede, to sustaine.
Alimento, nourishment, sustenaunce, foode.
Alimo, a kinde of tree in India. Some take it for Licorice.
Aliossi, a play called Nine pins or keeles, or skailes.
Alipo, a weede growing vpon rocks by the sea side.
Aliso, a blew lillie flower.
Alisma, a kinde of weede growing in fens or marshes.

English political relations with Spain were troubled during the 16th and early 17th centuries, not only because the Spanish were among those attempting to reclaim Protestant England for the Roman Catholic Church, but also because of naval rivalry on the high seas, English military intervention in the Spanish Netherlands, and other points of tension. John Minsheu's *Dictionarie in Spanish and English* (1599), at least in part, was not only a work for literary scholars, travelers, and merchants, but also served a purpose similar to that of Russian–English dictionaries in America during the Cold War, namely, aiding understanding the language of the enemy.

The First Monolingual English Dictionaries

In Tudor times, pedagogical works were published vigorously, defending and promoting the use of English as a literary language. One of the best examples was the *Elementarie* (1582) by Richard Mulcaster, headmaster of Merchant Taylors' School, who stated, "I take this present period of our English tung to be the verie height thereof, bycause I find it so excellentlie well fined both for the bodie of the tung it self, and for the customarie writing thereof." He went on to propose, "It were a thing verie praiseworthie in my opinion, and no less profitable then praise worthie, if som one well learned and as laborious a man, wold gather all the words which we use in our English tung, whether naturall or incorporate, out of all professions, as well learned as not, into one dictionary." It would take 150 years for Mulcaster's dream of a dictionary listing all English words to be even approximately fulfilled.

The title of the earliest monolingual English dictionary, Robert Cawdrey's *Table alphabeticall … of hard usual English words, … gathered for the benefit & helpe of ladies, gentlewomen, or any other unskilfull persons* (1604), gives a clue to the motivation of its compiler, a motivation that was not very different from that of the compilers of bilingual dictionaries of the same period. Cawdrey's main sources were Thomas Thomas's Latin *Dictionarium* of 1587, mentioned previously, and a teaching manual of 1596 called *The English school-maister,* by Edmund Coote, which included a list of English 'hard words.' Cawdrey's purpose was to explain unfamiliar words, not to compile an inventory of all the words. This was particularly necessary at the start of the 17th century for two reasons. In the first place, a vast number of words of Latin origin had been introduced into English in the preceding century. These were known as 'inkhorn terms,' because they were associated mainly with learned writing, rather than with use in the vernacular speech of ordinary English people. At times, it seemed almost as if writers were vying with one another to introduce Latinate words into English, with results that did not contribute to conspicuous comprehensibility. Second, although a large number of English 'grammar schools' (teaching Latin grammar) were founded in the mid-16th century, these were open only to boys. Many aristocratic families engaged Latin tutors for their sons, but rarely for their daughters. This explains Cawdrey's reference to ladies and gentlewomen in the same clause as "other unskilfull persons." As a result, in some places women were probably unable to understand the words of their own language, as it was preached to them from the pulpit and used in other learned and official contexts. This continued to be reflected in the subtitles of English dictionaries throughout the 17th century, including the dictionaries of Cockeram ("for ladies and gentle women, …

clarkes, merchants, young schollers, strangers, travellers, and all such as desire to know the plenty of English") and Blount ("[for] the more-knowing women and the less-knowing men"). The following list is an example of entries from Cawdrey's 1604 dictionary (taken from *EMEDD*; see Lancashire, 1999):

alchimie, the art of turning other mettals into gold
alien, a stranger
alienate, to estrange, or with-drawe the mind, or to make a thing another mans
allegorie, similitude, a misticall speech, more then the bare letter
allegiance, obedience of a subiect
allusion, meaning and pointing to another matter then is spoken in words
allude, to speake one thing that hath resemblence and respect to another
altercation, debate, wrangling, or contention
altitude, height
amaritude, bitternesse
ambage, long circumstance of words

Cawdrey's little book, containing about 2500 entries, not only proved popular but also inspired numerous imitators and improvers, beginning the long accretive tradition of English lexicography, in which each new dictionary builds on the foundations laid by its predecessors. John Bullokar's *English expositor* (1616) doubled the size of Cawdrey's entry list to about 5000 entries and expanded some of the definitions, without much attention to method or principle. In particular, Bullokar introduced discursive comments on herbs and beasts. This was followed in 1623 by Henry Cockeram's *The English dictionarie: an interpreter of hard English words*. Cockeram was sensitive to distinctions of style and register and divided the vocabulary of English into two sections: "the choicest words now in use" and "the vulgar words." There is also a third section, an encyclopedic guide to mythological figures and literary allusions.

In 1656 appeared the *Glossographia* of Thomas Blount. Blount was a lawyer and, not surprisingly, the *Glossographia* includes many legal terms, as well as other technical words. It contains approximately 11 000 entries and was the first English dictionary to attempt to explain the etymologies of English words. Another important 17th-century contribution to English lexicography is *An English dictionary* by Elisha Coles (1676), which included cant words and dialect words as well as hard words.

In 1658, Edward Phillips published *The new world of English words*. This work borrowed heavily from Blount, though commenting disparagingly on him in the 'advertisement' at the front of the book. Blount hit back with a pamphlet entitled *A world of errors discovered in the new world of words*, in which he showed that Phillips had not only made errors of his own, but had even copied errors from the *Glossographia*. The effect of this spat seems to have been to improve sales, possibly of both books, but certainly of Phillips's, which continued in print, with occasional new editions, until the end of the century. In 1706, Phillips's work was revised and doubled in size (38 000 entries in a folio volume) by John Kersey, who in 1708 published an improved and abridged version (35 000 entries) in handy octavo format under the title *Dictionarium Anglo-Britannicum*. Kersey had already ventured into lexicography in 1702, with *A new English dictionary* – a list of 28 000 common words that had not previously been included in English dictionaries. In this work, the place of a definition is often taken by an example of use or context, thus:

Ake, as, my head akes
An ***Apron***, for a woman

Although it is by the same author, the *Dictionarium Anglo-Britannicum* is very different. There could be no better example of the fact that lexicography is accretive. Phillips improved Blount's definitions, and Kersey improved Phillips's before going on to improve his own work. He added technical terms from sources such as Harris's *Lexicon technicum* (1704) and rare words from Ray's *Collection of English words not generally used* (first published in 1674). Kersey's lexicography is remarkable for its clear, concise definitions and for the systematic identification of the source languages of words.

The 18th Century: Bailey, Martin, and Johnson

The most important English lexicographer before Johnson is Nathaniel Bailey, a schoolmaster whose *Universal etymological English dictionary,* containing approximately 40 000 entries, was published in 1721. Bailey was energetic in adding new words (including dialect words, taboo words, and phrases and idioms), borrowing entries from previous dictionaries (principally Kersey's), and systematically giving etymologies. When Bailey could not see a way of improving one of Kersey's definitions, he simply copied it. His etymologies are fuller than those of his predecessors, but reflect the limitations of historical linguistic knowledge of the time. Bailey was not an original scholar in etymology. Instead, he relied on

the work of others, in particular Stephen Skinner's *Etymologicon linguae Anglicanae* (1671), which had also been used in creating previous dictionaries. Bailey catered to the needs of readers of literature of the past by giving explanations of obsolete words used by Shakespeare, Spenser, and Chaucer. Bailey's work, advertised as being "as well for the Entertainment of the Curious as the Information of the Ignorant, and for the Benefit of young Students, Artificers, Tradesmen, and Foreigners," established itself as the standard English dictionary for the early 18th century and went through 30 editions, the latest being published in 1802.

In 1730, Bailey, aided by some collaborators, brought out an enlarged edition of his 1721 dictionary, a folio volume containing 48 000 entries, under the title *Dictionarium Britannicum*. Despite being larger than any of its predecessors, this work is remarkable not least for cutting out many of the fanciful and unused words that figure prominently in older dictionaries in the 'hard words' tradition. It represents a workmanlike attempt to provide a practical inventory of the lexicon of English. At last, lexicography was coming close to fulfilling Mulcaster's 1582 dream of gathering "all the words which we use in our English tung . . . into one dictionary." Another 150 years would pass before the theoretical problems confronting this ambition were addressed (by Murray in the introduction to the *Oxford English dictionary* (*OED*) and subsequently by corpus-based studies of the lexicon). The belief that the lexicon of a language is a finite set is very strong: the fuzziness of the boundaries of that set and the dynamic nature of the lexicon (with new coinages abounding in ordinary usage) have not always been recognized. The *Dictionarium Britannicum* contains many discursive remarks, some more relevant than others, and a list of proverbs. By creating two (actually, more than two) dictionaries at different price points, and thus effectively competing with himself, Bailey began a long tradition in dictionary publishing of adapting, expanding, and abbreviating basic lexicographical material in order to cater to the different needs of different user groups.

Samuel Johnson wrote his *Plan of a dictionary of the English language* in 1747, although the dictionary was not published until 1755. While it was in preparation, another new dictionary appeared, Benjamin Martin's *Linguae Britannica reformata* (1749). This work is important, representing the first attempt to order the senses of a word in a principled way, starting with the most basic sense and working systematically through figurative and derived senses. Martin also acknowledged the impossibility of 'fixing' the language: "The pretence of fixing a standard to the purity and perfection of any language . . . is utterly vain and impertinent, because no language as depending on arbitrary use and custom, can ever be permanently the same, but will always be in a mutable and fluctuating state."

Johnson's dictionary appeared in 1755. This magnificent work is remarkable on many grounds, not least its literary quality, the crisp and authoritative tone of its definitions, and its occasional flashes of idiosyncratic humor. The preface not only agrees that a living language cannot be fixed – in contrast to the intention stated in the 1747 plan – but also touches briefly on nearly all the major theoretical and practical issues of lexicography, such as defining techniques, light verbs and phrasal verbs, *-ing* forms, conventional metaphors, vagueness of word meaning in use, and others. Some of these issues were not seriously discussed again until the 20th century. Johnson wrote about the goal of 'fixing' the language: "When we see men grow old and die . . ., we laugh at the elixir that promises to prolong life to a thousand years, and with equal justice may the lexicographer be derided who . . . shall imagine that his dictionary shall embalm his language." Johnson, however, still saw it as a major part of the lexicographer's task to make value judgments, offering citations as authorities for good usage and selecting quotations from writers whom he regarded as "masters of elegance and style," although it was sometimes necessary to deviate from this principle: "Words must be sought where they are used."

Johnson conscientiously treated the scientific, medical, and technical vocabulary of his day. Many of these entries are largely incomprehensible to a modern reader without special training. It is remarkable how greatly the framework of scientific vocabulary changed between 1755 and 1878 (the year in which the first fascicle of the *OED* was published). The majority of Johnson's scientific definitions and citations represent an alien, vanished world, whereas the scientific entries in the *OED* are for the most part recognizably part of our familiar modern conceptual universe, even where the details have been refined and altered during a further century of scientific research. Johnson deliberately excluded vogue words, ephemeral slang, and the jargon of commerce and industry: "This fugitive cant, which is always in a state of increase or decay, cannot be regarded as any part of the durable materials of a language, and therefore must be suffered to perish with other things unworthy of preservation." Modern dictionary publishers take a different view, preferring to present fugitive cant as an index of the state of the language or of the world. The word 'alchymy' is defined in Johnson's 1755 *Dictionary* as follows:

ALCHYMY, The more sublime and occult part of chymystry, which proposes, for its object, the transmutation of metals, and other important operations.

There is nothing more dangerous than this licentious and deluding art, which changeth the meaning of words, as *alchymy* doth, or would do, the substance of metals, maketh of anything what it listeth, and bringeth, in the end, all truth to nothing. *Hooker*

O he sits high in all the people's hearts;
And that which would appear offence in us,
His countenance, like richest *alchymy*,
Will change to virtue, and to worthiness.
Shakesp. J. Caesar

Princes do but play us; compared to this,
All honours mimick, all wealth *alchymy.*
Donne

2. A kind of mixed metal used for spoons, and kitchen utensils.

The golden colour may be some mixture of orpiment, such as they use to brass in the yellow *alchymy.* *Bacon*

White alchymy is made of pan-brass one pound, and arsenicum three ounces; *or alchymy* is made of copper and auripigmentum.
Bacon's Physical remains

They bid cry,
With trumpets regal found, the great result:
Tow'rds the four winds, four speedy cherubim
Put to their mouth the sounding *alchymy*,
By herald's voice explained.
Milton's Paradise lost, book 2

The 19th Century: Walker, Richardson, Ogilvie, and Chambers

Toward the end of the 18th century, English lexicographers began to pay increasing attention to pronunciation. Building on foundations laid by Thomas Sheridan's two-volume *General dictionary of the English language* (1780), John Walker created a *Critical pronouncing dictionary and expositor of the English language* (1791), which was often bound together in one volume with Johnson's dictionary. In the 1820s and 1830s, the main activity in English-language lexicography took place in the United States, in particular with the ferocious 'dictionary war' fought out between the Anglophile Joseph Worcester and the Anglophobe Noah Webster (*see* **American Lexicography**).

The most important lexicographical work in England between Johnson and Murray was a *New dictionary of the English language* (1836–7) by Charles Richardson (1775–1865), which first appeared in installments as part of the *Encyclopaedia Metropolitana* from about 1818 onward. Richardson was a believer in the now-discredited theories of John Horne Tooke (1736–1812), who assigned a central role to nouns and verbs and believed that other parts of speech and indeed inflections are derived from either a noun or a verb. He also believed that longer words are derived from shorter ones beginning with the same letters, so that *barn, baron, barge, bargain, bark,* etc. are all derived from *bar* in the sense of 'a defense.' He reached these remarkable conclusions not by painstaking historical philological research, but by introspection. Tooke's more practical disciple Richardson believed that the meaning and use of a word should be conveyed through a selection of well-chosen citations rather than by definitions. Richardson's dictionary offers minimal definitions and few sense distinctions, but a wealth of citations for each word. His energy in collecting these citations was immense. If only for this reason, his work was highly valued by Murray, editor of *The Oxford English dictionary.*

The 19th century also saw the influence of American lexicography on British dictionaries, owing much to Webster. The best of these is the two-volume *Imperial dictionary: English, technical and scientific* (1850) by John Ogilvie (1797–1867). As its title suggests, it included technical and scientific vocabulary, including words that were to be left out of the *OED*, no doubt under the influence of Dean Trench, whose interests lay in the Reformation origins of the Anglican Church and contemporary antidisestablishmentarianism. A one-volume edition appeared in 1886, edited by Charles Annandale. Popularly known as Annandale's Ogilvie, its official title was *A concise dictionary of the English language*.

No survey of 19th-century English lexicography would be complete without mention of the five-volume *English dialect dictionary* (1898–1905) by Joseph Wright (1855–1930). This heroic work is based on Wright's own research and on materials collected by the English Dialect Society, collecting from every part of England vast numbers of traditional rural dialect terms, many of which have now vanished. Its evidence has been invoked to shed light on the origins of puzzling terms in other varieties of English – for example, American *bodacious* (Wright records *boldacious*) and Australian *fair dinkum* (which Wright found in Lincolnshire, meaning 'a fair share of the work').

The Oxford English Dictionary

In 1857, Dean Richard Chenevix Trench (1807–1886) read to the Philological Society in London a paper entitled 'On some deficiencies in our English

dictionaries.' Trench pointed out that many words used by Sir Thomas More and other Reformation writers had not yet found their way into any dictionary. To a modern reader, Trench's insistence that an English dictionary should include an exhaustive inventory of 16th-century ecclesiastical terminology, but exclude the new-fangled terminology of science and medicine, may seem rather odd, especially when we consider the advances in knowledge that had taken place in the first half of the 19th century, with accompanying changes in words and their meanings. Nevertheless, Trench's powerfully argued paper played a key role in persuading the Philological Society to give its backing to *A new English dictionary on historical principles*, as the project was called until it was rechristened *The Oxford English dictionary*, from 1895 unofficially, and officially in 1933. Trench took the view that the first duty of lexicographers is to compile an exhaustive historical inventory of all the words of the language. Definitions, etymologies, pronunciations, grammatical labels, citations, etc. play a secondary role. Distinguishing correct and incorrect usage and good words from bad, which Johnson saw as a central duty of lexicography, were no longer a major part of the task. The approach is robustly empirical and descriptive.

In the following year, 1858, the Philological Society appointed an editor for this proposed dictionary, Herbert Coleridge (1830–1861), and volunteers began to collect citations from literature. Tragically, Coleridge died of tuberculosis at the age of 30, less than 3 years after his appointment. He was succeeded by Frederick Furnivall (1825–1910), a man of many talents. Among other things, he founded the Early English Text Society, which brought out editions of previously unpublished medieval texts, without which the early histories of English words that are among *OED*'s distinctive features could not have been written.

In 1878, after 20 years of desultory citation collection, the dictionary project had fallen into desuetude. James Murray (1837–1915) was then appointed editor. Murray, a self-educated Scottish schoolmaster, was not only a fine scholar, but also a man of tremendous vigor and focus. He collected up the Society's citation slips, such as they were, found new readers (some of whom were to devote the rest of their lives to the dictionary), issued new instructions, and assembled a team of editors to work with him on sorting the slips and drafting definitions in a large shed in the back garden of his house in Oxford, which he christened 'the Scriptorium.' The first fascicle of the dictionary was published in 1884. Murray successfully resisted attempts by Professor Benjamin Jowett, Master of Balliol, to rewrite his Introduction, and he also resisted pressures from the publisher to cut corners and speed up the rate of production. The very thoroughness with which Murray worked threatened the project, however – there was no prospect of his completing the work in his lifetime. A solution was eventually found in the appointment of a second editorial team, led by Henry Bradley (1845–1823), and subsequently a third and fourth team, led by William Craigie (1867–1957) and C. T. Onions (1873–1965), respectively. Murray had instructed all of the principals of these teams and, although each team worked independently, there was constant correspondence between them and Murray. The other principals bowed to Murray's judgment on many but not all matters. This arrangement resulted in successful completion of the whole dictionary in 1928, despite the death of Murray in 1915, and it ensured remarkable homogeneity. In 1933, a supplement was published, containing new words and corrections, and the surviving lexicographers dispersed. Already while working on the last few letters of *OED*, Craigie had set up the *Dictionary of the older Scottish tongue* in Edinburgh in 1921 (*see* **Scots Lexicography**) and in 1925 had decamped to Chicago to take up a professorship in English literature and to edit the *Dictionary of American English* (*see* **American Lexicography**).

The first edition of *OED* is an exhaustive inventory of the words of English (over 600 000 entries, including even 'hapax legomena' from older literary texts), with a detailed historical record of the morphological and semantic development of each one. Its great strengths include its 1.8 million citations (no word is included without citation evidence), its etymologies (informed by the great advances in Indo-European scholarship of the 19th century and subsequent work in comparative lexicology), its magisterial definitions, and the skilful arrangement of senses on historical principles. It is not a dictionary that aims to give an account of the present-day conventions of word meaning. Instead, *sub specie aeternitatis,* it records the earliest meanings and subsequent development of each word. Among Murray's many achievements, mention should be made of his typography. The delight of consulting *OED* is enhanced by the judicious mix of fonts, weights and sizes of type, and the page layout, a beautiful balance between visual clarity and economy of space.

The 20th Century

In four volumes, between 1972 and 1986, a supplement to *OED* was published, edited by Robert Burchfield (1923–2004), adding new words and new senses to the historical record and making many further

corrections. The supplement and the original work, integrated as an electronic database, with support from International Business Machines Corp. (IBM) and from the University of Waterloo in Ontario, Canada, were published in 20 volumes as the *OED, 2nd edn.*, in 1989. The number of citations in this second edition rose from 1.8 million to over 2.4 million. A third edition of *OED*, taking full advantage of computer technology, is currently in preparation. This is a thoroughgoing recension of every aspect of the dictionary, under the editorship of John Simpson, with a large and distinguished team. It is expected to double the size of the second edition and is being published on line in quarterly installments. At the time of writing (2004), the online version of *OED* consists of the third edition for letters M, N, O, and part of P, and the second edition for the rest. New entries and new senses are added elsewhere in the alphabet as soon as they have been fully researched and edited.

In 1933, the two-volume *Shorter Oxford English dictionary,* edited by C. T. Onions and G. W. S. Friedrichsen, was published, an abridgement achieved largely by dramatically reducing the number of citations. In 1993, a completely new edition of the *Shorter* was published, edited by Lesley Brown. This was the first systematic recension of *OED*'s definitions. The vocabulary of the late 20th century was systematically redefined, many new words were added, and the Victorian and imperial biases of the original *OED* and the 1933 *Shorter* were corrected. The fifth edition was published in 2002, with the addition of around 3000 new words and senses and a new and innovative typographical design by Paul Luna.

Dictionary publishing in 20th-century Britain saw a profusion of practical one-volume dictionaries. Five main strands may be distinguished. The mainstream consists of monolingual dictionaries for adult native speakers, of which more later. Another major strand has consisted of dictionaries for non-native speakers of English (*see* **Learners' Dictionaries** and **Idiom Dictionaries**). A third strand consists of dictionaries for children – in particular, schoolchildren. Some English school dictionaries are no more than abbreviated or simplified versions of a mainstream dictionary, in some cases with added pedagogical features such as vocabulary-building exercises and expanded explanations of simple aspects of grammar such as the parts of speech. There could be no better example of 'cramming a quart into a pint pot' than a school dictionary. On the one hand, teachers argue that schoolchildren demand full coverage of vocabulary, with plenty of examples, and that they react negatively to any simplification that smacks of 'talking down'; on the other hand, a school dictionary should be light in weight and clear in layout, with plenty of white space on the page (extrapolation of points made in focus groups during the planning of *Collins school dictionary*, 1989). One of the most successful pedagogical English dictionaries is the *Heinemann English dictionary, 4th edn.* (1995), based on an Australian original compiled by English teachers. This work achieved wide vocabulary coverage in a lightweight volume, in part by the use of small-size type, presumably not a problem for sharp-eyed youngsters. The explanations are traditional, but in language judged suitable for children; it owes little to traditional lexicographese. A completely different approach was taken by *Collins school dictionary* (1989), which aimed in particular to offer help with language encoding, i.e., to help children to use newly learned words correctly, by putting the target word into context, thus: *If you* ***incite*** *someone to do something bad, you try to persuade them to do it.* This defining technique was inherited from the Cobuild dictionary project, also funded by Collins in the 1980s (*see* **Learners' Dictionaries; Definition**).

A fourth strand consists of dictionaries of slang, argot, cant, and informal English (*see* **Slang Dictionaries, English**), alongside which must be set the many more or less scholarly, more or less jocular representations of the vocabulary of particular localities. An example of the best of the latter, combining scholarship with light-hearted readability, is Michael Munro's *The complete patter* (2001), a collection of contemporary Glasgow words and phrases.

Finally, mention must be made of the hundreds of dictionaries of special subjects, ranging from medicine, science, and philosophy to chess, cricket, and baseball. Special-subject dictionaries differ from mainstream dictionaries in offering comparatively discursive explanations of terms and concepts, rather than focusing more strictly on the meaning and use of a word in the language. We conclude this section by discussing briefly other dictionaries that have shaped public awareness in Britain of the lexicon in the 20th century. For reasons of space, many important works – for example, the *Longman dictionary of the English language, the Reader's Digest dictionary,* and the *Encarta dictionary* (1998) – must be passed over in silence.

The Chambers brothers, William and Robert, founded their nonfiction publishing house in Edinburgh in 1819, issuing among other works a great encyclopedia, a series of practical information handbooks, and a weekly journal that achieved a circulation of 80 000. It was inevitable that sooner or later they would add a dictionary to their titles. The first edition of *Chambers' dictionary of the*

English language (1861), edited by A. J. Cooley, was the first in a long line of Chambers' dictionaries. Its successors, issued from 1901 onward for nearly 90 years under the title *Chambers' Twentieth Century dictionary* (Thomas Davidson, ed., 1901) and subsequently as *Chambers' English dictionary* and *The Chambers dictionary*, established the Chambers' dictionaries as an institution beloved of compilers and solvers of crossword puzzles and players of Scrabble, on account of the extraordinarily rich word list, gleaned not only from standard sources but also from Scottish dialects, archaisms, technical terms in obscure pastimes such as cribbage, and, of course, slang. *The Chambers dictionary* is still a wonderful ragbag of English word forms, mixed with a solid practical inventory of the language, in which definitions are pared to a minimum and little space is wasted on examples. Sadly, however, some of the rare and more unusual archaic and dialect words and senses have been removed in recent editions. Davidson's successors, the brothers William and Liddell Geddie, enlivened the pages of the dictionary with occasional dry witticisms, many of them cleverly encapsulating colloquial English usage. By the 1990s, pragmatism had prevailed, historical principles were abandoned (so that the first definition of ***camera*** is now 'the photographer's apparatus' rather than 'a small room' or 'the treasury of the papal curia'), and some of the more exuberant terms and definitions (for example, ***boy***, meaning 'champagne,' a term redolent of Oscar Wilde and his circle), along with many of the witticisms, were excised. In the 1998 edition, the tradition of very occasional elegant or sharp witticisms was revived, insofar as political correctness permits. The following list shows some characteristic entries in various editions of *Chambers' Twentieth Century dictionary*:

éclair, a cake long in shape but short in duration
jaywalker, a careless pedestrian whom motorists are expected to avoid running down
kazoo, a would-be musical instrument
middle-aged, between youth and old age, variously reckoned to suit the reckoner
noose, a snare or bond generally, especially hanging or marriage
sea-serpent, an enormous marine animal of serpent-like form, frequently seen and described by credulous sailors, imaginative landsmen and common liars
vamp, a featherless bird of prey

The most popular and widely used one-volume reference dictionary in Britain in the 20th century and today is undoubtedly the *Concise Oxford dictionary* (*COD*), the first edition of which (1911) drew on *OED* up to the alphabetical point where the editors, H. W. Fowler (1858–1933) and his brother Francis (1870–1918), overtook Murray and his colleagues. Despite its subtitle '*of current English*,' the definitions in the Fowlers' *COD* are mostly arranged in historical order, following *OED*, but otherwise its lexicographical organization and explanations are by no means slavishly derivative of *OED*. Fowler used sense numbers to lump together short definitions into major sense groups, rather than numbering each discrete and substitutable meaning statement separately, as is done in *OED* and many other dictionaries. This, coupled with exemplification by superordinates and other techniques, had the effect of representing the dynamic and variable nature of word meaning more accurately, albeit less crisply, than a discrete sense numbering system. Henry Fowler went on to compile *A dictionary of modern English usage* (1926), a widely cited and authoritative, though sometimes eccentric, reference book giving guidance on the usage of modern English. In 1996, R. W. Burchfield, having completed his work on editing the *OED new supplement*, published *The new Fowler's modern English usage,* which is much more than a new edition – it is a completely new guide to standards in English by an authoritative figure.

The *Concise Oxford dictionary* has remained a perennial bestseller, although subsequent editions range from minor updates to almost completely original works (in particular, the sixth edition of 1976, the eighth edition of 1990, and the tenth edition of 1999), in which only the title remains unchanged. The sixth edition completely updated the vocabulary coverage and for the first time paid serious attention to the language of science and technology. The eighth edition abandoned historical principles and put the modern meaning first. The tenth edition was a derivative of the 1998 *New Oxford dictionary of English* (see later).

The first edition of *Collins English dictionary* was published in 1979. The three principals were Patrick Hanks (who had previously edited *The Hamlyn encyclopedic World dictionary*, 1971, a Briticization of the *American College dictionary*), Laurence Urdang (an American lexicographer who had previously been managing editor of the *Random House dictionary*, 1966), and Alan Isaacs (editor of *The Penguin science dictionary*, 3rd edn., 1966, and subsequent editions). *Collins English dictionary* aimed to bring the best features of American 'college-size' dictionaries to the British and non-American world public. In this it was remarkably successful, establishing itself as a rival to the more literary *Chambers' Twentieth Century dictionary* and the smaller *Concise Oxford*

dictionary. The larger one-volume monolingual dictionaries in America are roughly equally divided between those compiled on historical principles (*Merriam Webster*, *New World Webster*) and those compiled on synchronic principles, i.e., they place the modern meaning first (*Funk and Wagnall*, *American College dictionary, Random House*, *American Heritage dictionary*). *Collins* placed itself firmly in the latter camp. Until 1979, all the leading British one-volume dictionaries (principally *Chambers'* and *Concise Oxford*) were compiled on historical principles. Now, the reverse is the case. Because word meaning is rather unstable, so that many English words have changed their main meaning, in some cases more than once, this simple reversal of the order of definition affects thousands of entries and makes dictionaries much less baffling to the general public. *Collins* also avoided the etymological nesting of defined entries (i.e., unlike the *Chambers'* and *Oxford* one-volume dictionaries of the time, it did not list ***carnation*** under ***carnal,*** even though both words are derived from Latin *carne* 'flesh'). It also avoided the forests of abbreviations that had become conventional, especially in etymologies. Like the *American College dictionary*, it took the view that a dictionary should be a kind of 'collective cultural index' and that names of famous people and places are part of the language, items of common knowledge that belong in a dictionary. Both *Oxford* and *Collins* created a family of smaller dictionaries at different price points, derived from their principal one-volume works. *Collins* had in fact established itself as a publisher of popular small dictionaries as early as 1902, with the *Collins English Gem*.

Until the advent of machine-readable corpora and electronic concordancing tools, lexicographers were starved of evidence as to how words are actually used. Even lexicographers working with large citation files found that citation readers tend to focus on rare and unusual words and senses, while ignoring examples of common, everyday usage. In the preface to the first edition of *Collins English dictionary* (1979), the editor (Hanks) argued that "the lexicographer . . . must have a deep understanding of the terms he is defining. A vast citation file is no substitute for the judgement of the trained lexicographer." The first of these points is uncontroversial: cricketing definitions written by noncricketing Americans, or baseball definitions written by non-ball-playing British lexicographers, bear out the fact that if you do not know how to play the game, you cannot define its terminology. However, subsequent events have shown that the second point was specious. Certainly, trained intuitions are needed for the interpretation of evidence, but the practice of using intuitions to invent evidence is a different matter. One of the main findings of corpus linguistics since the late 1980s has been that the regularities governing word use are more regular, and the irregularities more irregular, than predicted in the dictionaries and linguistic theories of the 1960s and 1970s. Invented examples all too often disregard the unspoken and unformulated conventions that govern normal usage; in other words they distort the regular usage of the very words that they are trying to explain. Capturing those regularities is still a major challenge for English lexicography, and American lexicography has yet to take the challenge seriously at all. This challenge was first met in the British dictionaries for foreign learners of English (*see* **Learners' Dictionaries**). *Collins Cobuild dictionary of the English language*, 1st edn. (1987) is corpus-driven and owes comparatively little to the accretive tradition of English lexicography. Subsequently, two pre-existing English learners' dictionaries (*Longman dictionary of contemporary English* and *Oxford advanced learners' dictionary*) were to be thoroughly revised to take account of corpus evidence, and new corpus-based learners' dictionaries were also published by Cambridge University Press and Macmillan.

Oxford University Press first responded in 1998 to the challenge of corpus evidence with *The New Oxford dictionary of English* (*NODE*); the second edition was published in 2003, retitled *The Oxford dictionary of English* (*ODE*). This work combines the evidence of the British National Corpus with citations for new words and senses collected by the Oxford Reading Program. The second edition drew on the newly created Oxford English Corpus. It also adopted a new organization of definitions, grouping related senses together rather than treating them as if they were independent, mutually exclusive semantic entities. It, too, eschewed historical principles and places the modern meaning first. Unlike *Collins English dictionary*, which makes a similar claim but is not corpus-based, *NODE*/*ODE* has evidence to support its claims about the modern meaning of each word. Reviving and expanding the Fowlers' organizing principle and applying it to the findings of corpus analysis, *NODE*/*ODE* identifies one or more 'core senses' of each word and then uses a system of subparagraphs and bullet points to show how conventional figurative, grammatical, and other exploitations are related to the core sense (see the following examples), drawing on the findings of modern research into prototype theory and stereotype theory. Definitions and examples are corpus based and focus on normal usage; this dictionary also pays more attention than do its rivals to local grammar

and lexical syntax. For example, it draws attention to important points of phraseology by highlighting them in examples, and it records the third valency of verbs (adverbials of direction, place, manner, etc.) insofar as this affects the meaning or normal usage of the word, so that, whereas standard American desk dictionaries record only that ***put*** is transitive (neglecting the obligatory adverbial), *NODE/ODE* says "with obj. and adverbial." Fuller information about the methodology of *NODE/ODE* is given in the introduction in each edition. Entries from *The (New) Oxford dictionary of English* (1998 and 2003) are treated as follows:

> **backbone**. . . **noun** the series of vertebrae in a person or animal, extending from the skull to the pelvis; the spine.
> ■ figurative the chief support of a system or organization; the mainstay: *these firms are the backbone of our industrial sector.* ■ [mass noun] figurative strength of character: *he has enough backbone to see us through this difficulty.*
> **bankrupt** . . . **adjective** (of a person or organization) declared in law unable to pay their debts.
> ■ figurative completely lacking in a particular good quality or value: *their cause is morally bankrupt.*
> **cocoon** . . . **noun** a silky case spun by the larvae of many insects for protection as pupae
> ■ a similar structure made by other animals
> ■ a covering that prevents the corrosion of metal equipment ■ something that envelops or surrounds, especially in a protective or comforting way: *a cocoon of bedclothes* figurative *a warm cocoon of love.*

See also: Academies: Dictionaries and Standards; American Lexicography; Australian Lexicography; Bilingual Lexicography; Bullokar, William (c. 1531–1609); Canadian Lexicography; Collocations; Computers in Lexicography; Concordances; Corpus Approaches to Idiom; Corpus Lexicography; Definition; Dictionaries and Encyclopedias: Relationship; English, Early Modern; English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); Etymology; Idiom Dictionaries; Johnson, Samuel (1709–1784); Learners' Dictionaries; Lexicology; Middle English Dictionaries; Mulcaster, Richard (1532–1611); Murray, James A. H. (1837–1915); New Zealand Lexicography; Old English Dictionaries; Personal Names; Phraseology; Proper Names: Linguistic Status; Register: Dictionaries; Scots Lexicography; Sinclair, John M. (b. 1933); Slang Dictionaries, English; South African Lexicography; Thesauruses; Tooke, John Horne (1736–1812); United Kingdom: Language Situation.

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See also: English, Later Modern (ca. 1700–1900); English Spelling: Rationale; English: World Englishes; Lingua Francas as Second Languages; Spelling Reform Proposals: English; Standardization.

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English Spelling: Rationale

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The Standard Orthography of English (SOE) is the most widely used writing system in the world, and an enormous educational effort goes into teaching it and, of course, learning it. Linguistics has not so far made the massive contribution to the efficacy of this effort that might have been expected: the study of graphology has lagged behind that of phonology, grammar, semantics, and other aspects of language, and applied linguistics has been more concerned with new orthographies than with old ones.

Writing System, Spelling, Orthography

The term 'writing system' has been used variously by linguists and has not always been distinguished from 'spelling system,' although it is clear that a writing system like SOE has components that lie outside the spelling system – most obviously, punctuation. In addition, there are writing systems that are not at all like SOE. Pitman's shorthand, for instance (or Gregg shorthand), looks quite different, and is quite different in its spelling system (e.g., no digraphs, homophones not distinguished) as well as in its script (the written shapes and the spatial disposition of its graphemes). This example points to another aspect of writing systems: namely, that there is more than one functional kind of writing system. Pitman's shorthand is a stenography, a special-purpose writing system. SOE, by contrast, is a general-purpose writing system, a class of writing system for which 'orthography' is an appropriate name.

The Basis of a Shared Rationale

Two Prongs of Spelling Analysis

A rationale of English spelling should enable teachers, learners, and people in the community (parents, for example) to give a rationale for the spelling of particular words – a 'spelling analysis'; yet good spellers, including good teachers, are rarely able to help weak spellers in this way.

The structure of the spelling system indicates two lines of attack – two prongs. Both of them derive from the grammar, or 'lexicogrammar,' of the standard form of the language – the first directly (see the section "Graphomorphemics") and the second (see the section "Graphophonemics") indirectly via the phonology (selecting a 'reference pronunciation' appropriate to the language community). Common to both is the mathematical concept of the one-member set, familiar already in the analysis of linguistic structure: in a scale, or rank-scale, of units, each unit (except the lowest) consists of one or more members of the next unit below. Take words and syllables: every word consists of 'one or more' syllables, and in English, words of one syllable, such as *aim* or *guess* are particularly common and are known as 'monosyllables.' This is a familiar example of 'one or more' constituency – though, as

it happens, the syllable, which is essentially a unit of rhythm in the pronunciation (phonology), does not play a leading role in spelling analysis. The unit that **does** play a leading role is not a phonological but a grammatical unit: it is, as the immediate constituent of the word, the lowest unit in the grammatical rank-scale, namely, the morpheme.

Graphomorphemic Segmentation (Morphemes)

In general, every orthographic word consists of a sequence of one or more 'morphemes,' and each morpheme can be said, for the moment, to be realized by a sequence of one or more letters. More often than not, the spelling of a word is the sum of its (grapho) morphemes, and this can be notated quite simply, e.g.:

$$^{o}\text{aim} + \text{ing} \rightarrow {}^{o}\text{aiming}$$
$$^{o}\text{guess} + \text{ed} \rightarrow {}^{o}\text{guessed}$$
$$^{o}\text{in} + \text{de} + \text{cipher} + \text{able} \rightarrow {}^{o}\text{indecipherable}$$

where ^{o} indicates letter(s)/spelling and + indicates a spelling junction with no change in the letters on either side, i.e., a 'plus-junction.'

Consider, however, ^{o}hope/hoping, ^{o}try/tried, and ^{o}hop/hopping: in the inflected forms, the nuclear morphemes; ^{o}hope, ^{o}try, & ^{o}hop, have undergone changes in their spelling, to ^{o}hop-, ^{o}tri-, and ^{o}hopp-, respectively. In each case the change affects the left-hand letter at the spelling junction, and such changes as these can be notated quite simply by a single sign (by × instead of +), since they are mutually exclusive:

$^{o}\text{hope} \times \text{ing}\ {}^{o}\text{hoping} \rightarrow$	by E-deletion (left-hand letter, terminal E, deleted)
$^{o}\text{try} \times \text{ed}\ {}^{o}\text{tried} \rightarrow$	by Y-replacement (left-hand letter, terminal Y, replaced by ^{o}i)
$^{o}\text{thin} \times \text{est}\ {}^{o}\text{thinnest} \rightarrow$	by Consonant-Doubling (left-hand letter, Terminal-Consonant, doubled)

These changes, which are not matched by changes in the phonology, are rule-governed: the incidence of plus-junctions and change-junctions is conditioned by the consonant and vowel categories of letters on either side of the junction.

Inflectional junctions provide a model for post-nuclear junctions in general. That is to say, most derivational junctions fall into the four 'core junction' cases: plus-junction (the most common) and the three kinds of change-junction, E-deletion, Y-replacement, and Consonant-Doubling (the least common). Consonant-doubling is less frequent than the other two changes because it is confined to nuclear morphemes, whereas E-deletion and Y-replacement, together with plus-junction, operate routinely all along post-nuclear strings. For instance:

$$^{o}\text{fate} \times \text{al} + \text{ity} \times \text{es} \rightarrow {}^{o}\text{fatalities}$$
$$^{o}\text{rig} + \text{id} + \text{ify} \times \text{ed} \rightarrow {}^{o}\text{rigidified}$$
$$^{o}\text{nat} + \text{ion} + \text{al} + \text{ize} \times \text{ate} \times \text{ion} + \text{s} \rightarrow {}^{o}\text{nationalizations}$$

It is useful to group all post-nuclear affixes together as 'postfixes' to balance pre-nuclear 'prefixes.' 'Postfix' provides a much-needed inclusive term subsuming both 'suffix' (i.e., 'derivational suffix') and 'inflection.' By no means all spelling phenomena at post-nuclear boundaries are accounted for by these core spelling junctions, but they provide a solid platform of regularity from which to address other cases.

As to pre-nuclear boundaries, plus-junctions predominate again, but the core change-junctions of postfix boundaries are replaced by Consonant-Assimilation change-junctions at prefix boundaries, once again affecting the left-hand letter at the junction: note the changes to the prefix ^{o}ad- in ^{o}affection, ^{o}aggregate, ^{o}annotate, ^{o}assume, ^{o}attract (before vowels, only the base form ^{o}ad- is found, e.g., ^{o}adopt, ^{o}adumbrate).

Graphophonemic Segmentation (Symbols)

Graphophonemic segmentation is not so much a splitting down as a grouping together of letters. It can therefore be fittingly shown by the simplest notation of all, underlining: ^{o}c a t, ^{o}ea ch, ^{o}sh ee t, ^{o}e ch o. The underlined groups of letters (including groups of one) correspond to phonemes in the pronunciation; they are 'graphophonemic symbols' or, less ponderously, 'symbols.' In general, it is not difficult to assign, in a principled way, every letter in the spelling of a word to a symbol (it just requires practice). The most frequent length of symbol is one letter, but as a class there are, of course, only 26 of these (the number of letters in the alphabet of SOE). The largest class of symbol is the two-letter class, embracing the familiar pedagogical consonant 'digraphs' like ^{o}ch, ^{o}sh, together with vowel symbols like ^{o}ea, ^{o}ai, consonant symbols like ^{o}kn, ^{o}mb, vowel symbols like ^{o}aw, ^{o}al, and double-letter symbols like ^{o}tt, ^{o}oo. These and other varieties of two-letter symbol are not always included under pre-theoretical 'digraph.' Three-letter symbols are mostly, and four-letter symbols are exclusively, vowel symbols like ^{o}catch; ^{o}beauty; ^{o}would; ^{o}high; ^{o}straight.

Symbol segmentation is not, however, a familiar exercise, either for the educated in general or even for educators. Two important reasons for this, inherent in the spelling system (rather than in the education system) are: (**a**) discontinuous symbols – the symbols

just illustrated are all continuous, but terminal-E' symbols, as in °take, °literate, °freeze, °sympathize, °house, °cute; introduce limited but textually frequent discontinuity, and (**b**) mixed symbols – while vowel letters barely have a role in consonant symbols (think of °guest, °guy), consonant letters have an evident role in vowel symbols (°would, °high, °straight). It can be seen, then, that symbols have structure in terms not only of letter places but also of letter categories.

One effect of concentrating on symbols and their structure is to shift the individual letters and their traditional 'sounds' from center stage as units of correspondence. The unit of phonemic correspondence in the spelling system of SOE is the graphophonemic symbol of one, two, three, or four letters, and the 26 letters are the irreducible combinatory elements out of which symbols are constructed. Each letter has a distinct pattern of behavior in terms of the symbols it enters into and the roles it plays in those symbols (consider, for example, the letters °h, °t, and °w in the symbols of °hat, °that, °what, °who, °watch, °wrath, °th aw). That behavior includes, in each case, acting as a one-letter symbol. Encouragingly, in ordinary texts, one-letter symbols predominate, by about four to one, over complex symbols. Looked at another way, one symbol in five is complex.

It is symbols, then, that enter into correspondence with phonemes: a 'graphophonemic correspondence' is a symbol matched to a phonemic value. For example: °b — /b/ is a primary correspondence, so is °ch — /ch/ ("symbol CH with the value [tš]") as in °church; °ch — /k/ as in °school is a secondary correspondence). With correspondences, two more inherent reasons emerge for literate people's reluctance to explore the spelling system. These are: (**c**) many symbols have more than one value, for example, °ch and most vowel symbols; and (**d**) many high-frequency words, including both 'function' words and 'content' words, contain not merely secondary but tertiary correspondences (e.g., °any, °busy, °come, °England, °friend, °great, °have, °of, °one, °said, °who), with limited or very limited distributions. As with letter structure, so with value range: compared to vowel symbols, consonant symbols are relatively straightforward.

Symbol segmentation can be viewed as one path toward phonemic analysis. Symbols can be segmented and categorized as vowel or consonant symbols before specific phonemic values are identified; and where standard word pronunciations differ, it is typically in the phonemic value to be attached to a single (simple or complex) symbol. Consonant/vowel category profiles of words provide another solid platform from which to address a familiar language awareness problem — phonemic identification. Without phonemic identification, any rationale of English spelling is incomplete.

Bringing the Two Prongs Together

A grammatical approach to the spelling system dispenses straightaway with the naïve view that letters (one or more) are the immediate constituents of words; it interposes the morpheme. But letters are not the immediate constituents of morphemes either: between morphemes and letters is interposed now the graphophonemic symbol as a unit in a four-rank constituency scale. The same one-or-more relationship holds in turn between words and morphemes, between morphemes and symbols, and between symbols and letters. At the same time, this approach provides a unit of correspondence with the phonemes of the spoken grammar, namely, the symbol, which does not, as the letter does quickly and repeatedly, break down in application. This enables the learner to advance beyond the naïve view that it is just letters that correspond to sounds (°cat, as we all know, is a 'one-to-one' word, but °chat, °cash, °Cath, °catch, °case, °cease, and °caught are not).

Beyond 'monosyllables' (and note that °guessed is a monosyllable homophonous with °guest) there are serious features of English structure to be confronted: two outstanding ones are 'lame' nuclears (like ° fess~ in °confessor, in contrast to °press in °compressor; recall °rigid and °nation, and compare °rigor and °native); and the minimal vowel (shwa twice in °compartment, twice in °depended). But the framework sketched here can be extended to cope with these to provide a rationale of the whole spelling system.

Conclusion

Much more needs to be said about morphemes in this rank-scale, including their stability (greater than in phonology) and their variability (both rule-governed and idiosyncratic). But enough has been said to indicate that there are two complementary, principled approaches to the highly accessible data of English spelling, which can be combined into a single framework. Their application is not unproblematic (nor are they exhaustive of the resources of the spelling system, which include, for instance, capitalization and apostrophes), but the principle that in turn governs them is that morphemes take precedence over symbols. Morphemes have meaning; symbols do not. Spelling analysis must be the servant of meaning.

This implies a change of paradigm, from the traditional 'words, letters, and sounds' paradigm to 'the spelling system as a whole' paradigm, with due attention to linguistic concepts and structures,

terminology, and notation. Educational effort might then pay off, undistracted by notions of absurdity or unanalyzability, obsolescence, spelling reform in the foreseeable future, or computers to the rescue (though computers have their place in developing understanding of the spelling system and how it works). There must be something about SOE – something internal, in addition to external circumstances – that makes it so successful as an orthographic writing system, and nine-tenths of a writing system is its spelling system.

See also: Spelling Reform Proposals: English.

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English, African-American Vernacular

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The term 'African-American English' (AAE) – formerly 'Negro' or 'Black English' or sometimes 'Ebonics' – denotes a range of ethnically distinctive varieties of North American English characteristically spoken by descendants of Africans brought to the Americas under slavery. This broad range includes regional and social dialects (rural Mississippi folk speech, African Nova Scotian English, Standard AAE); isolated contact and creole varieties (Gullah [Sea Island Creole English], Afro-Seminole Creole in Florida, Texas, and Mexico); distinctive oral discourse styles (preachers' rhetoric, political oratory, and slang associated with jazz, gospel, or hiphop); and their literary expressions.

The best known variety of AAE today is African-American vernacular English (AAVE), which is popularly associated with urban culture, working-class and younger speakers, and informal contexts. Contemporary AAVE originated via the Great Migration – the northern urbanization of rural Southern African-Americans that took place between World War I and World War II – and replaced older, post-Emancipation stereotypes of isolated rural dialect speakers, such as the Ex-Slave Elders (Bailey *et al.*, 1991). However, African-Americans collectively speak many varieties of English and other languages: not all use AAVE or participate in vernacular African-American culture (Baugh, 1991, which also surveys labels for the variety and speakers). Many African-American adults are skilled code-switchers; most have competence in standard AAE, which, although lacking nonstandard grammatical features, is yet distinctively and fluently African-American. Of the 36 million African-Americans in the United States (13% of the population), a large but unknown proportion speaks AAVE.

The distribution and functions of AAE are generally obscured by stigmatization and misrepresentations, principally: mistaking AAVE for all of AAE; the belief that AAVE is not a complete, systematic grammatical system (e.g., mistaking adolescent slang for all of AAVE); and the belief that vernacular use of AAVE is incompatible with literacy and mastery of standard American English (SAE). Linguistic

terminology, and notation. Educational effort might then pay off, undistracted by notions of absurdity or unanalyzability, obsolescence, spelling reform in the foreseeable future, or computers to the rescue (though computers have their place in developing understanding of the spelling system and how it works). There must be something about SOE – something internal, in addition to external circumstances – that makes it so successful as an orthographic writing system, and nine-tenths of a writing system is its spelling system.

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ideologies comprising such beliefs and attitudes have long obscured AAVE's structure and history and have been complicit in racist social structures. Descriptions of AAVE thus generally address not only synchronic structures but diachronic development, attitudes, and applied (especially educational) issues.

Lexicon

African-American speech diversity may be illustrated with the lexicon. Works on AAE list many thousands of items used almost exclusively or with distinctive meaning by African-Americans (Major, 1994; Smitherman, 1994; Cassidy and Hall, 1985). African-American English is a prolific source of slang and specific registers, from which items pass into general American use, if often late and with distortions. Stereotyping and stigmatization of urban slang by non–African-Americans has contributed to the general devaluation of AAVE as a linguistic system. While speaker competence varies along regional, generational, and social lines, knowledge of even widely shared lexical items (unknown in, or contrasting with, mainstream English) does not guarantee familiarity with grammatical properties of AAVE (Green, 2002). The AAE lexicon is a greater unifying force than AAVE grammar. The number of AAE lexical items with clearly identified African etymologies is significantly smaller than in Caribbean English creoles (CECs) – for example, Jamaican Creole English (Cassidy and Le Page, 1967) or Gullah (Turner, 1949), in which hundreds are attested.

Discourse

Uncensored speech (often judged profane or obscene) is subject to different norms in AAVE than in mainstream American English; items for which normalization, neutralization, and generalization have occurred may differ (Spears, 1998). The stereotypical prominence of uncensored speech, as perceived by non–African-Americans, reflects not only their contemporary social power to censor, but the obsolescence of earlier rules of respectful address and demeanor, enforced on black people by white people. This has resulted in more frequent direct speech (Spears, 2001), including 'dissing', 'reading', and others (Morgan, 1998).

Everywhere in the African diaspora, under slavery, such enforcement spurred development of characteristic modes of indirect speech, ambiguity and speaker agency ('counter-language', Morgan, 1993), e.g., 'signifying', 'marking', and 'loud-talking' (Mitchell-Kernan, 1971). Loud-talking involves direct address and manipulates volume to invoke an audience; marking characterizes targets through direct quotation, which may manipulate features of grammar, phonology, or pragmatics; while conversational signifying attributes "personal characteristics of the target to culturally marked signs" (Morgan, 1998, p. 275). Children and adolescents practice signifying in formalized routines of verbal play known as 'sounding', 'joning', 'snapping', and 'playing the dozens', wittily placing culturally significant emblems (e.g., *yo'mama*) in implausible contexts (Abrahams, 1962; Labov, 1972). African-American English speech events resemble Caribbean ones, like 'busing' (Guyana) or 'dropping remarks' (Barbados), or have pan–African diaspora distribution ('suckteeth', Patrick and Figueroa, 2002).

Syntax

Much early analysis of AAVE grammar contrasted it with both SAE and CECs; recent historical work compares it to Southern White vernacular English (SWVE). Much attention focuses on the AAVE verb phrase, and less on negation, nominal inflection, and pronoun selection (Green, 2002; Rickford, 1999). Major questions include (a) the degree of structural independence of AAVE from general English grammar, (b) evidence for AAVE's historical ancestry and development, and (c) the nature and significance of variation. Grammatical features are more often distinctive, while many phonological features occur in other vernacular English varieties, especially SWVE. Typically, nonstandard features occur more frequently in AAVE, in a wider range of linguistic contexts, while linguistic processes (e.g., rapid-speech reduction rules) are carried further. The nonstandard nature of AAVE is thus gradient, and often exacerbated by comparison to written standard norms.

The AAVE auxiliary system largely mirrors general American English (and so contrasts with CECs). However, main verbs and auxiliaries (*be*, *have, do*) have regular paradigms, without person/number agreement: third singular irregular forms are absent. For auxiliary *be*, the *is* form is generalized to all present persons and numbers (except first singular *am*), and *was* to all in the past. African-American vernacular English carries further a general American English tendency to regularize simple past and present perfect verb forms: they frequently merge in the simple past, although some participial forms are preferred. A few frequent strong verbs use stem forms with past meaning, but past-marking is overwhelming (again, unlike CECs). Future with modal *will* resembles general American English, although the normal phonological reduction to '*ll* is variably extended to complete vocalization and deletion. Question formation optionally involves inverting

auxiliaries and modals. Auxiliaries (only) may also fail to surface in questions, and may invert in embedded questions. The AAVE sentential negator *ain't* appears for standard *hasn't/haven't* or *isn't/aren't*, as elsewhere, but also for *doesn't/don't*. As in CECs, the sentential negator is tense-neutral, appearing for past meanings too.

Fundamental contrasts with other dialects occur for AAVE aspectual markers, which take forms deceptively similar to Vernacular American English auxiliaries (*be*, *been*, *done*, *had*). The complex aspectual system makes distinctions unfamiliar to other English dialects. The case of the habitual invariant *be*, widely taken as emblematic of AAVE, is typically misused or misunderstood by nonnative speakers. Other 'camouflaged' forms, often mistaken for their SAE equivalents, include *had* marking the simple past; the nondirectional *come* to express speaker indignation (Spears, 1982); and a stressed *been* for remote past. With stative verbs, *been* denotes continuity to the present moment; stativity constraints are typical of CECs, where *been* also marks remote past. Less familiar AAVE preverbal aspect markers include the immediate future *finna* (<SWVE *fixing to*), the completive *done*, the resultative *be done*, and *steady* marking an intensified continuative. Although several resemble CEC elements in functions, constraints, and even surface forms, few are patterned identically to any CEC, and some came into being or prominence during the last century: habitual *be* was rare "before World War II and . . . virtually non-existent . . . before 1900" (Bailey, 2001, p. 57).

Although negative concord and negative inversion resemble similar strategies elsewhere, AAVE seems unique among the varieties of American English in requiring concord with indefinite object noun phrases, a feature it shares with CECs. As with verbal *–s*, possessive and plural *–s* may both be absent in AAVE, though less often (respectively, 71% absence compared to 27% and 6% in vernacular Detroit speakers, Wolfram, 1969; absence is significantly greater in CECs). Associative plurals (*Doretha an' (th)em*) resemble CEC plurals with postposed *–dem*, but the AAVE structure (with its mandatory conjunction) occurs in SWVE. Descriptions of generational developments for these complex features are rare (Cukor-Avila, 2001). Pronominal features include pleonastic *it* and *they* in existential constructions. Invariant forms for plural possessives (*yall*, *they*), and occasional object forms for subjects (*us*), represent paradigm levelings that, taken together, are rare to nonexistent in other American English dialects but occur in CECs. The larger issue of modeling AAVE as a (sub-)system *vis-à-vis* general American English remains under-theorized (Labov, 1998).

Phonology

Bailey (2001) surveyed 45 phonological aspects discussed in the literature for either AAVE or SWVE: 19 were shared, 8 were common to AAVE but rare in SWVE (11 were vice-versa), and 6 were pan-English. Several of the oldest established shared features are receding for one or both groups: e.g., loss of intersyllabic /r/ (*hurry*), and long offglides after /a/ (*half* [hæif]). Features that are still vigorous in both varieties, such as glide reduction in /ai/ (*tie*) and /ɔi/ (*boil*), front-stressing (*po'lice*, *De'troit*), or the *pin/pen* merger in [ɛ] before nasals, developed in the late 19th century, when whites and African-Americans worked in contact as tenant farmers. Final consonant cluster reduction, a general English feature, is more frequent in AAVE, significantly before vowels (*firs' apple*).

Features particular to AAVE include shibboleths such as deletion of initial voiced stops /d, g/ in auxiliaries (*I'm (g)onna* /amənə/) and realization of syllable-initial /str/ as /[skr] before high front vowels (*street* [skrit]). Others involve final singleton consonants: reduction and loss of nasality in final nasals (*man* [mæ]) and deletion of word-final single consonants after a vowel (*cat* [kæ], *bad* [bæ:]). Final voiced stops are devoiced and sometimes glottalized (*bad* [bætʔ]).

In recent research on vowel subsystems, recordings of mid-19th century speakers show monophthongal /e/ and /o/ and fully back /u/ and /ʊ/, which contrasts with SWVE and American English generally but resembles CECs. Today AAVE possesses the same vowel phonemes as American English; its mergers and glide reductions all occur elsewhere in American English (Bailey and Thomas, 1998). But African-Americans as a group do not participate in systematic shifts of vowel position – the changes from below – that are characteristic of other dialects (Labov, 2001). Thus /æ/-raising, present in AAVE since the late 19th century, is not integrated into a pattern like the Northern Cities Shift. Several conditioned vowel mergers occur in AAVE and SWVE, but only SWVE reorganizes them into the Southern Shift.

History

The history of AAVE is controversial. Many dialectologists once held an 'Anglicist' position, arguing that AAE showed the same range of variation as comparable white speech (McDavid and McDavid, 1951). This was contested by the early creolist position, which held that a creole developed in colonial America (beyond the Gullah area) and subsequently decreolized, producing current forms of AAVE (Bailey, 1965; Stewart, 1968). Research on variable

realization of the *be* copula and auxiliary (Labov, 1969; Baugh, 1980) noted substantial similarities with CECs that were confirmed by later research using methodological refinements (Rickford *et al.*, 1991; Winford, 1992; Blake, 1997).

This line is opposed by a neo-Anglicist position (Poplack, 2000) drawing on data from Ex-Slave recordings and African American congeners (enclaves in Nova Scotia and Samaná), varieties united under the questionable label, 'Early AAE.' Poplack and Tagliamonte (2001) maintain that AAVE is directly descended from British dialects. Analyses of tense/aspect marking compare Early AAE with historical English dialects and CECs and conclude that nonstandard features of AAVE "were not created . . . but retained from an older variety of English" (Poplack and Tagliamonte, 2001, p. 251).

Such claims remain controversial among variationists and creolists, whose post-1990 research documents a more complex picture of CEC grammars, which neo-Anglicists largely ignore. The historical significance of enclave varieties rests on their conservative nature and representativeness of their ancestors. Singler's studies (e.g., 1998) of transplanted African-American settlers in Liberia constitute crucial evidence for AAVE; they represent many more speakers (16,000 emigrants) and are more typical of contemporary African-Americans. Singler's results, like Rickford's critiques, frequently conflict with neo-Anglicist positions and emphasize compatibility with recent research on CECs. Wolfram and Thomas (2002), in conducting an intergenerational analysis of an isolated Southern community, also reached different conclusions, arguing that the ethnolinguistic distinctiveness of AAE, although temporarily submerged by accommodation to regional dialect norms, still reflects a broader range of contact influences than British dialects, including African and CEC languages.

While early creolist positions have largely been abandoned in strong form, new research locates creole-like features in 'micro-switches' among indigenous early AAVE speakers far outside the Gullah area (Sutcliffe, 2001). Current creolist positions emphasize multiple causation and structural convergence between CEC and other inputs in a complex contact situation. Speakers from CEC-speaking territories predominated among early black arrivals in many American colonies, often predating direct African imports (Rickford, 1997). Through sustained contact with Gullah, African varieties, and British dialects, CEC speakers contributed substrate influences to AAVE grammar, without leading to acquisition of entire creole grammars (Winford, 1997; Wolfram and Thomas, 2002). Such generalized contact scenarios invoke interlanguage restructuring, for example, in the acquisition of syllable-coda consonant clusters (absent in West African inputs), leading to substantial prevocalic consonant cluster reduction. This produced similar results in both AAVE and CECs (but not SWVE) and thus convergent structures, which might have been reinforced by contact between them (Winford, 1997; Wolfram and Thomas, 2002).

Genesis issues are logically divorced from questions of current change, which focus on convergence or divergence with other American English dialects (Fasold, 1987; Bailey and Maynor, 1989). An expansion of data sources and the range of features studied led to findings of post-Emancipation innovations in AAVE phonology and syntax (examples cited previously). Taken alongside evidence of contemporaneous innovations in SWVE and the discovery of recent rapid diversification among mainstream American English dialects in major cities – in which younger African-Americans, who show surprising agreement on nationwide norms, are not participating (Labov, 2001; Thomas, 2001) – these developments demonstrate considerable divergence. However, convergence on other levels certainly continues (plural *–s* and past-marking, Rickford, 1987), while some features display both (present *–s*, Wolfram, 1987). Moreover, many linguists agree that the evidence is incomplete, the database can be improved, and the complexities of change and variation in AAVE, including its relationships to AAE and American English and the social consequences thereof, are far from satisfactorily understood.

See also: Copula Variation; Gullah; Jamaica: Language Situation; Media Panics; Mother Tongue Education: Nonstandard Language; Pidgins and Creoles: Overview; Variation in Pidgins and Creoles.

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Relevant Website

http://privatewww.essex.ac.uk/~patrickp/ – Includes a bibliography of more than 600 items about African-American English.

English, Early Modern

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Background

The early modern period (1500–1700) brought several significant changes in the lives of the English people. The most dramatic were perhaps the Reformation, the subsequent dissolution of the monasteries in the 16th century, and the devastating Civil War during the next. Less abrupt phenomena included population growth; changes in the social hierarchy, including greater social mobility; increasing economic activity; a widening world view; and growing national identity.

There were two developments that radically increased the number of written texts. The printing press was introduced into England in 1476, paving the way for subsequent genre diversification and popular writing. The expansion of educational opportunities promoted literacy, although still less than half the men and a third of the women could both read and write, even by 1700.

Good evidence that English had acquired its modern form is that the great literature of this period, such as Shakespeare's plays and the 1611 Bible translation known as the Authorized Version or King James Bible, can be understood by modern readers and listeners despite their archaic feel.

Linguistic Features

Phonology

Understanding Renaissance drama would be more difficult if it were performed using contemporaneous pronunciation, because many Early Modern English (EModE) words were not pronounced the same way as they are today. This divergence largely arises from shifts among the vowels, because changes in the consonant system have been limited.

The well-known series of changes known as the Great Vowel Shift affected long vowels. The origin and course of this development are still in debate, but it is clear that all Middle English (ME) long vowels changed at various times after 1400 (Table 1). The diphthongization of two ME long vowels, /iː/ and /uː/ into /ai/ and /au/, as in *write* and *house*, and the later merger of /eː/ and /ɛː/, as in *meet* and *meat*, left English with four long vowels, /iː, eː, oː, uː/. This inventory was supplemented by /ɒː/, which developed from the diphthong /au/, as in *cause*.

During the early modern period, the ME diphthongs, /iu, eu, au, ai, ou/, were monothongized, becoming /uː, uː, ɒː, eː, oː/, whereas /oi/ and /ui/ remained unchanged, as in *joy* and *boil*. A combination of these and new diphthongs that developed from long vowels resulted in three diphthong phonemes, /ai, au, ɔi/, at the end of the period. The impact of postvocalic /r/ which, among other things, often lowered preceding vowels, also created new diphthongs, when an epenthetic [ə] was inserted between a vowel and [r], as in *fire*. Although there may have been sporadic cases of the loss of postvocalic /r/ in the early modern period, its systematic deletion took place later.

The ME short vowels /i, e, a, o, u, ə/ remained mostly unchanged. A significant change was the southern split of /u/ into two phonemes, /u/ and /ʌ/, e.g., *put* and *cut*.

The consonant system lost the phoneme /x/, which was often spelled <gh>, with its two allophones [x, ç] Its realizations were replaced by vowel lengthening, e.g., *right* or by /f/, as in *enough*. Two new consonant phonemes, /ʒ, ŋ/, developed, and since that occurred, the inventory of English consonants has remained unchanged. The consonant /h/, was very weak and occasionally dropped, as contemporary spellings like <*elmett*> for *helmet* and the excrescent <*h*> in <*hevere*> for *every* show, but there is no evidence of its stigmatization.

Grammar

Many of the grammatical developments originating in the previous centuries continued in EModE, including morphological simplification and the stabilization of word order. On the whole, English acquired its present analytical structure during the early modern period. These developments are perceptible, for example, in the decline of inflectional endings, the

Table 1 Change in long vowels: schematic development

Middle English	*Early Modern English (1500–1700)*		*Present-day English*	
	Early	*Late*		
iː	əi	ai	ai	write
eː	iː	iː	iː	meet
ɛː	ɛː	eː	iː	meat
		iː		
aː	æː	eː	ei	make
uː	əu	au	au	house
oː	uː	uː	uː	food
ɔː	ɔː	oː	əu	boat

Sources: Görlach (1991: 70), Barber (1976: 294).

increasing use of auxiliaries, and the diminishment of inversion. Natural gender, in particular, the distinction between human and nonhuman reference, became an important factor among pronouns. The grammaticalization process created new closed-class elements in several areas of grammar.

Nominal inflection was mostly limited to the plural and genitive *-s* endings, except for some *-en* plurals, such as *brethren*. The case distinction between the nominative and accusative was only retained in the personal pronouns and the pronoun *who*. The personal pronoun paradigm is indeed a good example of an area that underwent significant changes in EModE (Table 2). First, the second-person plural forms *ye/you/your* came to be used in the singular. This process, which had begun in Middle English, gradually ousted the old *thou* paradigm from Standard English, but allowed subtle expression of power relations, politeness, and intimacy before it did. Second, the originally plural nominative *ye* was replaced by the accusative *you*. Moreover, the first- and second-person possessive determiners *mine* and *thine* lost their *-n* ending. The last environment where *-n* was used was the pre-vowel position; e.g., *thine eyes*.

Furthermore, the third-person neuter possessive determiner *its* was introduced into the language around 1600, replacing *his*, which had become affiliated with male human reference as a consequence of natural gender replacing grammatical gender. Human reference also began to constrain the choice of the relative pronoun, when *who/whom* was limited to personal reference and *which* to non-personal reference.

Verbal inflection was also simplified by reducing the present indicative suffixes to one, which in most varieties only encoded the third-person singular. The main suffix in the 16th century was *-th*, as in *he maketh*, which gave way to *-s* in the next century, as in *he makes*. These suffixes were also occasionally used in the plural. The second-person singular suffix *-st* appeared with *thou* but, as mentioned above, this pronoun became rare. The paradigms of strong and irregular verbs were stabilized to a large extent, and the number of verbs with weak conjugation grew.

Table 2 Early Modern English personal pronouns

	Nominative	*Accusative*	*Genitive (Possessive Determiner)*
Singular			
1st	I	me	my, **mine**
2nd	you, **ye**, *thou*	you, *thee*	your, *thy*, **thine**
3rd	he	him	his
	she	her	her
	it, **hit**	it, **hit**	ITS, **it, his**
Plural			
1st	we	us	our
2nd	you, **ye**	you	your
3rd	they	them, **hem**	their

Items in bold disappeared during the early modern period. Items in italics became rare during the early modern period. Item in small caps emerged during the early modern period.

An important phenomenon in the EModE verb phrase was the increasing use of periphrastic forms and auxiliaries at the expense of one-verb groups. Both *have* and *be* occurred in the (plu)perfect tense, but the use of *be* was limited to mutative intransitives, such as *a childe is come*. The aspectual marker, progressive *be* + *ing*, developed during the early modern era, which also witnessed the development of the auxiliary category, consisting of *can, could, may, might, must, shall, should*, *will,* and *would,* as these verbs lost their full-verb properties, such as non-finite forms and the ability to take non-verbal objects. These auxiliaries were employed to express many of the functions the subjunctive had had in earlier English, although the subjunctive did not entirely disappear.

Furthermore, during the 16th century the non-emphatic use of the auxiliary *do* grew rapidly in affirmative statements, but its popularity fell quickly in the 17th century. In contrast, the employment of *do* in interrogative, imperative, and negative declarative sentences found a firm footing in the language.

Alongside the use of *do* in negative declaratives *dos not hinder*, the old verb + *not* structure was common, in particular with the verbs *know*, and *doubt*, as in *I know not* and *I doubte not but*. Multiple negation was frequent until around 1600, as in *he helpes me nat with natheng*.

Although the regular word-order in affirmative statements was SVO, in the first decades of the 16th century it was not uncommon to invert the word order after adverbs such as *then, therefore, thus*, and *yet*. The present-day pattern of inversion after negative adverbs, such as *neither, nor*, and *never,* developed from the late 16th century onwards.

New function words were created through grammaticalization. For instance, new indefinite compound pronouns with personal reference developed, such as the forms in *-body*, e.g., *nobody,* from *no* + *body* 'person'. Similarly, complex prepositions such as *because of* from *by* + *cause* + *of* developed in EModE. Several connectives, for instance, *since, while*, and *because*, grammaticalized in earlier English, acquired new senses in the early modern period.

Lexis and Semantics

The early modern period witnessed large-scale lexical growth through extensive borrowing and expansion of word-formation patterns. The major source

language was Latin, but loans from other languages, in particular French, were also frequent. The extension of English into all areas of life, including science, and the broadening spectrum of genres, styles, and registers created a need for new and more varied vocabulary, which was satisfied with borrowings and native coinages.

This intake of Latinate vocabulary reduced the transparency of the English lexicon by adding a new layer to the already existing Germanic and Romance strata. On the other hand, it provided ample material for the creation of specialist technical terminologies. Not everybody was comfortable with the tremendous increase in Latinate words, as is testified to by the so-called Inkhorn Controversy in the late 16th century, when voices were raised against excessive use of learned borrowings. Dictionary evidence shows that many of these loanwords were short-lived, and it has been estimated that approximately a third of Shakespeare's numerous Latinate neologisms only occurred once.

Loanwords became integrated into the language to varying degrees. Writers occasionally used nearly synonymous word-pairs to make sure that the readers understood the borrowing, e.g., *wepyng and lamentyng*. Inflectional endings such as L *-atus* > E *-ate*, were modified as in *alternate*. Multiple borrowing occurred, and the spelling of older French loanwords could be Latinized, as illustrated by *dout* > *doubt*.

The existing word-formation patterns, affixation, compounding, and conversion, were expanded by borrowing. For instance, among the negative prefixes, the native *un-*, e.g., *unmeet*, encountered four competitors, *a-*, *in-*, *dis-*, and *non-*, e.g., *discontented*.

The biggest problems for understanding EModE texts arise from semantic changes, which range from radical changes in meaning to shifts in nuances. For example, *mete* means 'food' in general and not what we understand by *meat* today, and *an auncient and sad matron* in Sir Thomas Elyot's educational treatise is simply 'an old and trustworthy married woman'.

Linguistic Diversity

Although the presentation of early modern general features may give the impression of linguistic uniformity, we must not forget that there was substantial regional, social, individual, generic, and stylistic variation. Despite the lack of a codified model, the language underwent standardization in terms of focusing and option-cutting, with orthography leading the process. The spellings of early and later texts diverge in general, but barely literate people's private writings contain atypical spellings at all times.

Table 3 The Early Modern English genres in the *Helsinki Corpus of English texts*

Literate genres	Law
	Handbooks
	Science
	Educational treatises
	Philosophy
	Sermons
	History
	Travelogue
	Biography
	Letters non-private
	Bible
Oral genres	Trial proceedings
	Fiction
	Letters private
	Drama
	Diary
	Autobiography

There is no doubt that people spoke their local dialects, but dialectal texts are rare because of the low level of literacy. Drama can offer some information on dialectal usage, and private texts occasionally contain regional features.

As in any society, there were social differences in the language use in early modern England, which was markedly hierarchical. Research on the diffusion of morphosyntactic changes shows that several were introduced by the middling ranks and diffused from the London region to the rest of the country. Changes originating in the spoken language were usually led by women, but men were ahead of women in learned changes such as the loss of the multiple negation. The diversification of genres led to new genre conventions and stylistic variation. The 17 early modern genres included in the *Helsinki Corpus of English Texts* illustrate the broad spectrum of early modern writing (see Table 3). The most formal literate genres such as law, philosophy, and science stand out with Latinate diction and structural complexity both on the sentence and phrase level, whereas oral genres such as fiction and private correspondence often rely on Germanic words and simpler structures.

See also: English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); English, Middle English; English, Old English.

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English, Later Modern (ca. 1700–1900)

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Introduction

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(Sweet, 1873–1874: 620). His definition of Modern English was the period of lost inflections, i.e., from the 16th century to Sweet's own lifetime. It was not until the early 20th century that a subdivision of Modern English was called for by Wyld:

> We should further distinguish Early Modern, from 1400 or so to the middle of the 16th century; and after that it is convenient to distinguish late 16th-century, 17th-century, and 18th-century English and we may consider present-day English to begin toward the end of the 18th century (Wyld, 1936: 27).

Wyld thus recognized a distinction between Early Modern English and the later history of the language, but does not see this later period as a coherent entity worthy of a single label. As I have pointed out elsewhere (Beal, 1999, 2004), the study of Late, or Later Modern English, as it is sometimes termed, has been the 'Cinderella' of English historical linguistics: serious study of this period did not begin until the end of the 20th century, perhaps because it was not until the millennium was in sight that the Late Modern period could be seen in historical perspective. This is the explanation provided by Charles Jones:

> There has always been a suggestion . . . especially among those scholars writing in the first half of the twentieth century, that phonological and syntactic change is only properly observable at a great distance and that somehow the eighteenth, and especially the nineteenth centuries, are 'too close' chronologically for any meaningful observations concerning language change to be made (Jones, 1989: 279).

Jones has been a pioneer in the study of Late Modern English, organizing the first conference dedicated to this period in 2001, the proceedings of which have appeared as Dossena and Jones (eds.) (2003). Görlach has produced separate volumes dedicated to 18th and 19th century English, respectively (Görlach, 1999, 2001), and Bailey (1996) likewise deals with the 19th century separately, leaving Beal (2004) as the first book to cover the whole of this period in a single volume. Although the latter defines 'later' Modern English as covering the period 1700–1945, I will deal here with the period (roughly) from 1700 to 1900, leaving the 20th century to the article **English in the Present Day (since ca. 1900)**.

External History

Although the division between the Early and Late Modern periods is not defined by a single cataclysmic external event such as the Norman Conquest, there are several factors contributing to the view that a date around 1700 marks the beginning of a new era. Historians generally describe the 'long' 18th century as beginning with the Restoration of the monarchy in England (1660) and ending with the fall of Napoleon (1815), while the 'long' 19th century stretches from the start of the French Revolution (1789) to the end of World War I (1918). These overlapping 'long' centuries together provide a good working definition of the Late Modern period in English. 'Restoration' is perhaps a misnomer for the accession of Charles II, since, far from occupying the throne by Divine Right, he had been invited to do so by Parliament. The so-called Glorious Revolution of 1688 and the Bill of Rights (1689) further reduced the powers of the monarch, bringing in the constitutional system that still exists in Britain.

1660 is also the year when the Royal Society was founded, ushering in the Age of Reason. Both Porter (2000) and Lass (1999) cite the publication of Newton's *Principia* (1687) as the beginning of the English Enlightenment. Scientific progress from throughout the Late Modern period stimulated lexical innovation as new inventions, processes, and whole disciplines required names. The emphasis on 'reason' in the 18th century also contributed to the climate of opinion, described by Leonard (1929) as the Doctrine of Correctness, in which grammatical 'rules' such as the proscription on negative concord ('two negatives make a positive') were rationalized on mathematical models. The scientific discoveries of the late 17th and early 18th centuries led to the technological innovations that drove the Industrial Revolution of the late 18th and 19th centuries. As Britain became an industrial nation, workers moved from the countryside to the newly expanding towns and cities, especially in the English North and Midlands. In cities such as Manchester, Leeds, and Birmingham, new urban dialects evolved as the demand for labor brought in workers from various parts of Britain and beyond.

Dialect contact, and an awareness of the differences between dialects of English, was made possible by advances in transport and communications during the Late Modern period. In the course of the 18th century, the Turnpike Trusts funded a substantial number of new roads, cutting the journey from York to London from three days to one, thus making leisure travel a more pleasant and practical proposition. Travelogues such as Defoe's *A tour thro' the whole island of Great Britain* (1724–1727), Johnson's *Journey to the Western Isles of Scotland* (1755) and Cobbett's *Rural rides* (1830) describe journeys by carriage undertaken for curiosity. The 'outlandish' dialects of Northumberland and Cornwall (the areas of England most remote from London) are as much objects of curiosity for Defoe as the landscape and customs of other areas. In the course of the 19th

century, the development of the railway made affordable leisure travel possible for the lower and middle classes, at least in urban areas. Communication was further facilitated by the introduction of the Penny Post in 1840 and the electric telegraph in 1837, while the invention of the phonograph in 1877 made it possible to hear the disembodied voices of speakers from distant places. All these developments had the effect of increasing dialect contact between speakers of different British dialects and, eventually, between speakers (and writers) of British and American English.

The Late Modern period also marks the beginning of the 'great divide' between British and American English. Although the first English-speaking colonies in what is now the United States were founded in the early 17th century, the development of American English as a national variety with its own prescribed norms was precipitated by the American Revolution (1775–1783). In 1789, Webster asserted that 'customs, habit and *language*, as well as government, should be national. America should have her *own*, distinct from all the world.' (Webster, 1789: 179). His *American dictionary of the English Language* (1828) provided norms for spelling which were deliberately differentiated from those of British English, as well as legitimizing Americanisms. With the loss of America, British colonial expansion diverted to Australia (1788) and, in the 19th century, to South Africa and New Zealand. The development of distinct national varieties of English in these countries was perhaps more a phenomenon of the 20th century, but the expansion of British interests both in these colonies and the nations of Africa and Asia absorbed by the British Empire, brought into English loan words from a wide variety of languages, as flora, fauna, topographic features, and customs hitherto unknown to speakers of English required names. This, along with the scientific discoveries and inventions referred to above, accounts for the increase in lexical innovation during the 19th century.

Within Britain, increased social mobility brought about by the commercial opportunities of the Industrial Revolution and the expansion of educational provision in the course of the Late Modern period led to the emergence of an ambitious and influential middle class. Such 'social climbers' created a market for the normative texts for which this era is famous: alongside the 'triumvirate' of Johnson (1755), Lowth (1762), and Walker (1791), many other dictionaries, grammars, and pronouncing dictionaries were published to help those aspiring to linguistic correctness. Whether such normative works had any effect on the language, or whether they simply described linguistic practices already in use among the educated, is still a matter of debate (see, for instance, Beal, 2003), but it is certainly the case that the codification of Standard (British) English is one of the defining features of the Late Modern period. The following sections provide a brief account of the major changes that took place in the Late Modern English Period, but it is to be understood that this refers only to Standard English in England. For discussion of the history of other varieties of English, see Beal (2004: 190–220) and Watts and Trudgill (2002).

Morphology and Syntax

Morphology

We have seen above that Sweet defined the Modern English period as a whole as the period of lost inflections. However, this definition refers largely to the Early Modern period, as the only inflection to be lost after 1700 is the second person singular-*st* ending. This in turn depends on the loss, from Standard English, of the distinction between second person singular *thou, thee, thy, thine* and the formerly plural *ye, you, your, yours*. The singular forms had become marked in the Early Modern period, and by 1700 "survived only in dialects, among Quakers, in literary styles, as a device of heightening . . . and in its present religious function" (Strang, 1970: 140). Although some 18th-century authors, notably Sheridan and Richardson, put *thou* forms into the mouths of upper-class males, this usage was not universally accepted. McKnight (1928, reprinted 1968: 335) cites Greenwood (1711) as stating "it is counted ungentile and rude to say, *Thou dost so and so*." Of course, the loss of *thee/ thou* pronouns and the *-st* verb inflection (along with *art, wert* forms of *be*) meant that Standard English no longer marked the distinction between second person singular and plural. In the early 18th century, the distinction was maintained, at least with *be*, by using *you was* for the singular and *you were* for the plural. However, Lowth condemned this as an "enormous solecism" (Lowth, 1762: 48), and *you was* disappeared from Standard English, though it is still common in dialects. By the end of the 19th century, a new plural form *yous* was being used in Irish, American, and Australian English (Wright, 1898–1905), and this form has spread throughout Britain in the late 20th century (Cheshire *et al.*, 1993).

Syntax: Regulation of Early Modern Variants

Syntactic changes in the Late Modern period can be divided into two types: those that represent the final stages of processes begun in the Early Modern period, and those that are innovations of the 18th and 19th

centuries. The former type involve the regulation of variants, a process to some extent helped along by the prescriptive grammarians of the Late Modern Period. Changes in the auxiliary system led, in the Early Modern period, to variation between positive declarative causes with and without *do*. While the 16th-century grammarian Palsgrave was able to state: "*I do* is a verb moche comenly used in our tonge to be put before other verbs, as it is all one to say 'I do speake', and such lyke, and 'I speake'" (Palsgrave, 1530: 523), Johnson condemned this usage as "a vitious mode of speech" (Johnson, 1755: Sig. B2v). Ellegård (1953: 162) provides a graph demonstrating the decline of this construction through the Early Modern period, reaching close to zero by 1700. However, Tieken (1987) found that, in a corpus of 18th-century prose (948,700 words), the construction was still used, but it was rare, and 13 out of the 14 examples she found occurred before 1760. In poetry, the use of *do* before another verb persisted into the 19th century, presumably because the semantically empty auxiliary here provided an extra syllable when needed, and allows the citation form of the verb to be placed at the end of a line, thus facilitating rhymes. An example from Wordsworth (1827) is:

> The hapless creature which did dwell
> Erewhile within the dancing shell.
> (*The blind highland boy* 193–194)

However, it is certainly the case that this usage was extremely marked after the mid–18th century, at least in Standard English. Another, related, area in which Early Modern variants persist into the 18th century is negation: Ellegård (1953: 162) shows the use of *do* in negative declaratives in his corpus rising to 80% by 1700, with the steepest rise in this usage coming in the second half of the 17th century. Tieken (1987) found that an average of 76% of the negative declaratives in her 18th-century corpus involved the use of *do*, and that the decline of the *do*-less negative was gradual throughout the 18th century. She also found that the *do* + *not* + infinitive construction was more frequent in the usage of more educated authors, but that the *do*-less form was most frequent with the verbs *know* and *doubt*.

Another area in which regulation took place during the Late Modern period is relativization. The so-called *wh*-relatives *who, whom, whose*, and *which* had been introduced in the Early Modern period, but the options of using *that* with both human and nonhuman antecedents, and of using a zero, or contact relative in both subject and object positions, were still available. The 18th century saw grammarians expressing a preference for *who/ whom/ whose* with human antecedents and *which* with nonhuman antecedents, and condemning the zero relative. However, although Visser (1963–1973: 540) states that "a remarkable decline in the currency of the zero-construction becomes perceptible" in the 18th and 19th centuries and notes that Johnson called this "a colloquial barbarism," Raybould (1998) notes that Johnson uses this construction even in the nominative. It would appear that 18th-century authors saw this construction as informal or colloquial rather than strictly ungrammatical. The only substantive changes in relativization in Late Modern English are the restriction of *which* to use with inanimate antecedents, and the restriction of zero-relatives in the nominative to colloquial usage, and to existential constructions such as *there's a man out here wants to see you*.

Syntax: Innovations of the Late Modern Period

Perhaps the most fully researched feature of Late Modern syntax is what has been called the '*be* + *-ing*' construction, the 'progressive' and the 'expanded form,' as in *She is reading a book*. Although this construction had been used before 1700, its use in Early Modern English was optional in contexts where today it would be required. Thus in *Hamlet* II. 2. 190, Polonius asks Hamlet "What do you read my Lord?" Today this would be interpreted as an inquiry into Hamlet's reading habits, but Polonius was referring to the book that Hamlet had in his hands at the time. Today, the required construction in this pragmatic context would be *What are you reading, my Lord?*

Several studies (Dennis, 1940; Strang, 1982; Arnaud, 1983) have noted the increase in usage of the *be* + *-ing* construction throughout the Late Modern period, both in terms of the sheer numbers of such constructions, and the types of clause in which it can occur. Strang notes that before 1750 the construction is used mainly in subordinate clauses, but that, from the second half of the 18th century, the rise in the use of *be* + *-ing* constructions is proportionately greater in nonsubordinate clauses. Thus, the construction becomes fully grammaticalized in the course of the Late Modern period. Likewise, from the second half of the 18th century, there is a rise in the use of *be* + *-ing* with stative verbs such as *love, wish*, etc., with verbs denoting instant actions such as *explode, fall*, etc., and with nominal and adjectival complements (e.g., *You're being a fool/foolish*). The extension of *be* + *-ing* to the passive is likewise an innovation of the Late Modern period. As late as 1870, this construction was still being condemned by grammarians such as Marsh, who described it as "at war with the genius of the English Language" (Marsh, 1860: 465). The preferred form, for Marsh, was *the house is*

building. However, this had in turn been condemned by Johnson (1755) as an unacceptable innovation:

> The grammar is now printing, brass is forging … in my opinion a vitious expression probably corrupted from a phrase more pure but now somewhat obsolete: a printing, a forging.

While examples of the *a-printing* type are found in early 18th-century literature, by the 19th century they are being used (*sic.*) to represent nonstandard speech. In Richardson's *Pamela* (1740), the sentence "this girl is always a-scribbling" is given to an educated, upper-class man, but in George Eliot's *The mill on the floss* (1860), the same construction conveys uneducated, lower-class usage: "I hope, sir, you're not a-thinking as I bear you any ill-will … I'm not a-defending him." The first examples of the passive with *be* + *-ing* are found in late 18th-century letters, such as the following, cited in Denison (1998: 152):

> I have received the speech and address of the House of Lords; probably, that of the House of Commons was being debated when the post went out. (1772, Harris, *Letters*)

Letters are, of course, the most informal genre of writing: we have already seen that Marsh was reluctant to accept this construction a century later, and, even in the early 20th century Curme and Kurath seem to begrudge it:

> From 1825 on … the form with *being* + perfect participle began to lead all others in this competition, so that in spite of considerable opposition the clumsy *is being built* became more common than *is building* in the usual passive meaning, i.e. where it was desired to represent a person or thing as affected by an agent working under resistance vigorously and consciously to a definite end: 'The house *is being built*', 'My auto *is being repaired*' (Curme and Kurath, 1931: 444)

The extension of the use of the *be* + *-ing* construction to longer verb phrases involving perfective and modal verbs took longer. Marsh constructs such sentences as artificial examples of what he sees as the ludicrous consequences of allowing the passive with *be* + *-ing*:

> They must say therefore … the great Victoria bridge *has been being built* more than two years; when I reach London, the ship Leviathan *will be being* built; if my orders had been followed, the coat *would have been being made* yesterday; if the house had then *been being built*, the mortar would *have been being* mixed (Marsh, 1860: 654).

However, Marsh's ridicule was in vain, for, by the early 20th century, such constructions were in use: they were rare then as now, simply because the pragmatic circumstances in which they might be used are likewise rare. An early example is from Galsworthy: "She doesn't trust us: I shall always be being pushed away from him by her" (Galsworthy, 1915, *Freelands*, cited in Denison, 1998: 158).

The extension of the *be* + *-ing* form to the passive and to other paradigms is perhaps the most significant syntactic innovation of the Late Modern period. Other changes tend to involve, as Denison notes, "a given construction occurring throughout the period and either becoming more or less common generally or in particular registers" (Dension, 1998: 93). The role of prescriptive grammarians in relegating constructions such as the double negative to nonstandard usage in this period is a matter of debate. Greenwood's statement that "two *Negatives* or two *Adverbs of Denying,* do in *English* affirm" (Greenwood, 1711: 160) is often cited as an example of mathematical logic inappropriately applied to language. Yet Tieken (1982) and Austin (1984) note that, in the 18th century, multiple negation occurs in informal and lower-class writing, and in the portrayal of such usage by playwrights. Whether the grammarians created the stigma or merely reflected the sociolinguistic situation of their day is as difficult a question as that of prioritizing the chicken and the egg. What is certain is that multiple negation disappears from formal Standard English in the course of the Late Modern Period. Other constructions condemned by grammarians, such as preposition stranding and the split infinitive remain shibboleths to this day, and are perhaps more common in informal Standard English, but have by no means disappeared. In fact, Lowth, who is often cited as proscribing preposition stranding, merely states that this "is an idiom, **which our language is strongly inclined to**" and that this "prevails in common custom, and suits very well with the more familiar style in writing; but the placing of the Preposition before the Relative is more graceful … and agrees much better with the solemn and elevated style" (Lowth, 1762: 167–168, my emphasis). As Tieken (2000) points out, Lowth's use of the very construction he is supposedly condemning, is intended as a joke, and, far from proscribing preposition stranding, Lowth states that it is perfectly suitable for informal writing and, indeed, uses it in his own letters. His statement appears to be a description of 18th-century usage. The split infinitive was never mentioned by Lowth or any other 18th-century grammarian: it is first mentioned in 1834 in the *New England Magazine*, where it is represented as "not unfrequent among uneducated persons" (Lowth, 1834: 469, cited in Bailey, 1996: 248). If educated persons avoid the split infinitive in formal writing

today, this is largely because it has become such a shibboleth.

Phonology

The phonology of Late Modern English has, until very recently, had much less scholarly attention paid to it than that of earlier periods. This is probably because, as MacMahon suggests "superficially, the period under consideration might appear to contain little of phonetic and phonological interest, compared with, for example, earlier changes such as the transition from Old to Middle English, and the Great Vowel Shift" (MacMahon, 1998: 373). It is in the Late Modern period that, as Holmberg so neatly puts it, "the snob value of a good pronunciation began to be recognised" (Holmberg, 1964: 20), and elocutionists such as Thomas Sheridan and John Walker made good livings from providing lectures and pronouncing dictionaries (Sheridan, 1780; Walker, 1791) to the upwardly mobile. This is also the period in which Received Pronunciation emerged as the sociolect of the public-school-educated aristocracy and upper-middle class, eventually to become the reference variety of British English. When we discuss changes in English phonology and phonetics in this period, it has to be understood that we are comparing the reference varieties of the 18th and 19th centuries, as set out, for instance, in successive editions of Walker's *Critical pronouncing dictionary* from 1791 to 1904, with 20th-century RP as defined in those of Daniel Jones (first edition 1917). Other varieties of present-day English tend to retain variants 'left behind' by Late Modern English sound changes such that a passage transcribed according to Walker (1791) would sound regional and/or slightly archaic rather than obsolete or outlandish to a 21st-century British ear (see Beal, 2004: 134 for such a transcription). Although elocutionists such as Walker and Sheridan were undoubtedly normative, their detailed descriptions of sounds and transcriptions of every word in their dictionaries provide a great deal of evidence for the prestigious pronunciation of the period. A more detailed account can be found in Beal (1999 and 2004: 125–167): here, I will briefly describe the main changes in the pronunciation of received English between 1700 and 1900.

Consonants

Perhaps the most striking difference between the pronunciation set out in Walker (1791) and present-day RP is that the former is rhotic, with orthographic <r> pronounced in all positions. The loss of rhoticity is attested by Walker, who is one of the first sources of evidence for this change, but he considers this to be a marker of lower-class London usage:

> In England, and particularly in London, the r in *lard, bard, card, regard*, is pronounced so much in the throat, as to be little more than the middle or Italian a lengthened into *baa, baad, caad, regaad* (Walker, 1791: 50).

He goes on to describe the Irish pronunciation of /r/ as too harsh, but to say that the pronunciation at the beginning of a word should be more 'forcible' than at the end, so that '*Rome, river, rage*, may have the r as forcible as in Ireland, but *bar, bard, card, hard*, etc. must have it nearly as soft as in London (Walker, 1791: 50). This suggests that, even in the pronunciation recommended by Walker, /r/ was considerably weakened in final and preconsonantal positions. However, as Mugglestone (1995: 98–103) demonstrates, 'dropping' of <r> continued to be overtly stigmatized until the late 19th century. Loss of rhoticity in British, or, rather, English English, appears to have been a 'change from below,' first noticed in lower-class London English of the late 18th century and eventually to find its way into RP. In the 20th century, rhoticity became recessive even in regional dialects of England, remaining as a marker mainly of southwestern and some Lancashire dialects.

The other main consonantal changes in Late Modern English are not so much changes in the system, or even the distribution of phonemes, as the regulation of variants. Two of the greatest shibboleths of nonstandard pronunciation in the 20th and 21st centuries are popularly known as 'dropping' of <h> and <g>. In the latter case, the term 'dropping' is not at all accurate, since the stigmatized variant is /n/ as opposed to /ŋ/ in, for example, *hunting, shooting*, and *fishing*. In both cases, the stigmatized variants had been attested at least from the Early Modern period, but are not labeled as 'vulgar' or 'incorrect' before the 18th century. Sheridan was the first to comment on 'h-dropping':

> There is one defect which more generally prevails in the counties than any other, and indeed is gaining ground among the politer part of the world, I mean the omission of the aspirate in many words by some, and in most by others (Sheridan, 1762: 34).

Walker lists among the 'faults of the Cockneys' that of "not sounding *h* where it ought to be sounded, and inversely" "(Walker, 1791: xii–xiii). For both Walker and Sheridan, the dropping of /h/ from the /hw/ of *which, what*, etc. is as much a 'fault' as the omission of initial /h/ in *house*, etc. While h-dropping remains highly stigmatized in all but a handful of words of French origin (*hour, honour, herb* and derivatives), the initial /hw/ is now marked in RP as very

conservative. For a full account of the extent to which h-dropping became a shibboleth in the course of the Late Modern period, see Mugglestone (1995: 107–150). The stigmatization of the alveolar pronunciation of <ing> was equally strong by the late 20th century, but here the story is more complex, involving social stratification. Walker was aware of the distinction between /n/ and /ŋ/ and provides evidence that the use of /ɪn/ for the *-ing* morpheme was condemned by some teachers, but he states that "our best speakers do not invariably pronounce the participle *ing*, so as to rhyme with *sing, king* and *wing*" (Walker, 1791: lxxxviii). The alveolar pronunciation was a marker both of lower-class and upper-class usage throughout the Late Modern period. By the early 20th century, the upper-class use of the alveolar was becoming a target of humor, but it can still be heard in the speech of very elderly, very conservative RP speakers.

Vowels

Such vowel changes as occurred in the Late Modern period largely involve the continuation of processes begun in the 16th and 17th centuries. In all cases, the earlier variants are still found in English regional accents, with many of the innovations still confined to RP and southern varieties. One of the clearest and most persistent markers of the 'north–south divide' in English accents, the presence or absence of /ʌ/ in *blood, cup, put*, etc. had already been established by the mid-18th century, as Walker points out:

> If the short sound of the letter **u** in *trunk, sunk* etc., differ from the sound of this letter in the northern parts of England, where they sound it like the **u** in *bull* … it necessarily follows that every word where this letter occurs must by these provincials be mispronounced' (Walker, 1791: xiii).

What is new here is not the southern /ʌ/ so much as the attitude that the northerners' lack of this phoneme marks them out as provincial. That other marker of the north–south divide, the pronunciation of the vowel in *bath, laugh, grass*, etc., has a more complex history. Evidence of lengthening of /æ/ in certain environments, mainly before voiceless fricatives, preconsonantal (but not final) /r/, and /n/ followed by another consonant, as in *dance*, etc. occurs in the late 17th century, but, throughout the 18th and 19th centuries, the pronunciation with /ɑː/ was not universally accepted. Walker tells us that although 'Italian *a*' had previously been heard in words such as *glass, fast* "this pronunciation seems to have been for some years advancing to the short sound of this letter, as heard in *hand, land, grand* etc. and pronouncing the *a* in *after, answer, basket, plant, mast*, etc. as long as in *half, calf* etc. borders very closely on vulgarity" (Walker, 1791: 10). This change seems to have begun as a lengthened [æː] in the 17th century, and not to have become stigmatized until the lengthened vowel was retracted to [ɑː]. The latter pronunciation is described as 'drawling' throughout the 19th century, and there is evidence of a pronunciation with [æ] or even [ɛ] by young ladies wanting to avoid the 'vulgar' [ɑː]. Those who wished their pronunciation to be beyond reproach had to avoid both the 'drawling' [ɑː] and the 'mincing' [æ] at least until the beginning of the 20th century, when Daniel Jones's use of cardinal **ɑ** seems to have established this as the RP pronunciation. The lengthening of short *o* to /ɔː/ in *off, cloth, cross*, etc., likewise began in the late 17th century and was considered 'vulgar' through most of the Late Modern period. Walker explicitly draws a parallel between the two vowels:

> What was observed of the *a*, when followed by a liquid and a mute, may be observed of the *o* with equal justness. This letter, like *a*, has a tendency to lengthen when followed by a liquid and another consonant, or by *s, ss* or *s* and a mute. But this length of *o*, in this situation, seems every day growing more and more vulgar; and, as it would be gross, to a degree, to sound the *a* in *castle*, *mask* and *plant*, like the *a* in *palm, psalm,* &c. so it would be equally exceptionable to pronounce the *o* in *moss, dross* and *frost*, as if written *mawse, drawse,* and *frawst*. (Walker, 1791: xx)

As Mugglestone (1995: 231) points out, both [ɑː] in *bath*, etc., and [ɔː] in *off*, etc., were condemned as 'vulgar' throughout the 19th century, most probably because of their association with Cockney, and both became acceptable in 20th-century RP. However, while the former remains in present-day RP and southern accents of England, [ɔː] in *off* is now a stereotype of very conservative, very upper-class RP, such as that of older members of the Royal Family.

The other vowel changes to be considered here could be regarded as the tail-end of the Great Vowel Shift. In words such as *face* and *goat*, the ME vowels had been raised to /eː/, /oː/, respectively, and these are the pronunciations described by Walker, who writes of the 'long, slender' sound of <a> and the 'long, open' sound of <o>, respectively. While the exact quality of the vowels described by Walker is open to debate (MacMahon, 1998: 450; Beal, 2004: 136–138), the pronunciations described are monophthongal. However, the first evidence for diphthongal pronunciations of both these vowels comes very soon after Walker's first edition: MacMahon (1998: 459) points out that the first evidence for diphthongization of /oː/ comes from the Scottish orthoepist William

Smith in 1795 and it is generally accepted that the first attestation of a diphthongal pronunciation of /eː/ comes from Batchelor (1809). In both cases, the diphthongal pronunciations are widely accepted in the 19th century, and are still found in RP and many other accents of present-day English.

Lexical Innovation

Given the external factors referred to above, we would expect the Late Modern period to be a time of lexical expansion, as all the new inventions and discoveries of the scientific age would require names, and English speakers encountered a wide variety of languages as a result of trade, exploration, and colonization. **Figure 1** is based on information provided by the *Chronological English dictionary* (Finkenstaedt *et al.*, 1970), which, in turn, took its data from the *Shorter Oxford English dictionary*. Most recent accounts of lexical innovation in English, such as Bailey (1996) and Görlach (1999, 2000), take their information from this source, even though it has limitations. **Figure 1** shows a distinct downturn in lexical innovation in the mid-18th century, an increase in the 19th century, reaching a peak in the mid-19th century, and a tailing-off toward the 20th century. The apparent decline at the end of the 19th century can be dismissed as the information ultimately comes from the first edition of the *Oxford English dictionary*, which was being produced at the end of the 19th century and therefore did not tend to include innovations from this period. The *OED online* provides a more accurate picture: for instance, a search for the year 1890 under 'first citations' provides 1235 entries. The apparent trough in the 18th century can partly be explained by the relative neglect of 18th-century sources on the part of the original *OED* compilers, but it is also true that there was a tendency to resist innovation in this period. Authors such as Swift and Addison satirized the 'affectation' of slang words such as *mob* and *bamboozle* and the importation of French military terms such as *corps* and *c(h)arte blanche*. Objections to loanwords from French were voiced at various points in the 18th and early 19th centuries, when war between the two nations brought speakers of French and English into contact, and news of France's superior military engineering into the English papers. Several reviews in 18th-century periodicals comment adversely on the influx of French military terminology, but even in times of peace, the excessive use of French words is condemned as an affectation. In 1771, the *Monthly Review* criticizes those who use *rôle* for *part* or *penchant* instead of *the passion of love*, stating that "the offended ear of the unfrenchified reader sickens at the sound" of these words. Of course, both these words are now accepted in English, but, like many French loans of the Later Modern period, they have not been fully anglicized. Apart from French, the other major sources of loanwords in the 18th century were Latin and, to a lesser extent, Greek. Publications such as Chambers *Cyclopaedia* brought information on new scientific classifications, discoveries, and inventions to a wide readership, introducing words coined from classical roots. Examples from 1753 are *aeronautics, azalea*, and *caldarium* from Latin, and *aetiological, eczema*, and *splenitis* from Greek: all of these were first cited in the 1753 supplement to Chambers *Cyclopedia*. The number and the proportion of new words formed from classical roots was to increase substantially in the 19th century: figures from *CED* for 1835 show more than two-thirds of the words first cited in that year having Latin or Greek etymologies (Beal, 2004: 25). Some 19th-century authors objected to what they saw as an excessive dependency on these sources. Richard Grant White complained:

> In no way is our language more wronged than by a weak readiness with which many of those who, having neither a hearty love nor a ready mastery of it, or lacking both, fly readily to the Latin tongue or to the Greek for help in naming a new thought or thing or the partial concealment of an old one (1872, 22, cited in Bailey 1996: 141–142).

Despite such complaints, many of the scientific discoveries and inventions of the 19th century were given names coined from classical roots: examples

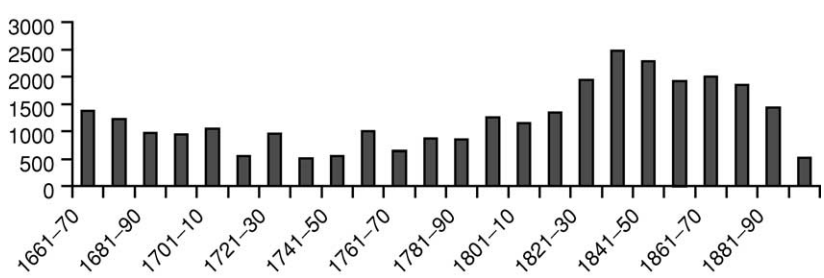

Figure 1 Numbers of first citations in the *Shorter Oxford English Dictionary* by decade 1661–1900.

from 1835 are *bifurcate, capilliform*, and *locomotory* from Latin and *creosote, phonograph*, and *silo* from Greek. The scientific discoveries of this century also led to a growth in the number of eponyms, as inventors or discoverers claimed a stake in posterity by having a new process or mineral named after them. The new science of geology provided many new words for minerals named after the geologist who first found them or the place they were found: examples first cited in 1835 include *bromlite, lanarkite, leadhillite, proustite, smithsonite, stromeyerite, troostite, uralite*, and *voltzite*. These are the major sources of lexical innovation in the 19th century, but what is also evident is that, as the Late Modern period progresses, words are imported into English from a wider variety of languages as exploration and colonization brought terms for the flora, fauna, and customs of the Americas, Asia, Africa and, last of all, Australasia. In 1835, for instance, the words *kiwi, rata*, and *tui* are first cited, all from Maori.

See also: English in the Present Day (since ca. 1900); English, Middle English; English, Old English.

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English, Middle English

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The English of the period between the Norman Conquest of 1066 A.D. and the arrival of printing in England in 1476 is generally referred to as Middle English, as opposed to Old English (before 1066) and New or Modern English (after c. 1500). This terminology was established by the late-19th-century scholars Henry Sweet and Julius Zupitza. The dates are, of course, only useful signposts because the transitions between the three periods were gradual.

External History

William of Normandy's victory over the Anglo-Saxons was followed relatively swiftly by the imposition of Norman political and cultural hegemony throughout the kingdom. By William's death in 1087, the first two classes (estates) of medieval society, the clergy and nobility, were dominated by Normans.

This major change in England's social structure had a profound effect on the status of the English language, which had hitherto occupied a position unparalleled among the western European vernaculars. When the Normans arrived, they found a sophisticated society that had developed a distinctive vernacular culture. Spoken Old English consisted of a range of different varieties, strongly affected – especially in the north and east of England – by the Norse dialects of Viking settlers. In the written mode, however, one Old English dialect, the Late West Saxon in southwest England, had achieved the prestige associated with standard languages (*see* **Standardization**) and was copied in various scriptoria, largely monastic, outside its area of origin. The Norman Conquest ended the prestige of Late West Saxon and, although texts continued to be copied in this standardized language for some time after 1066, dialectal variation and linguistic changes, hitherto not evidenced in written English, began to spread from the spoken to the written mode. The resulting language was Middle English, the earliest surviving example of which is probably the Final Continuation of the *Peterborough Chronicle* (see Clark, 1970).

Two languages replaced Late West Saxon in prestige: Latin and Norman French. The Conquest coincided with a revival of Latin learning in western Europe, and the Channel State of England and Normandy resulting from William's victory aided the transmission of this culture to Britain. Latin became the language of official record in England during the 12th and early 13th centuries, used for the *Domesday Book* (1086) and the Magna Carta (1215); it was also the literary language used by important 12th-century writers working in England, such as Geoffrey de Vinsauf, Alexander Neckham, and John of Salisbury.

Norman French, although the mother tongue of the invading elite, could not at first compete with Latin in all its functions. However, as Clanchy (1979: 168) pointed out, "contact with England, with its long tradition of non-Latin writing, may have helped to develop French as a written language"; and, from the 13th century onward, as Norman French developed

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in England into what modern scholars call Anglo-Norman, it began to be used for both official and literary purposes.

Throughout this period, English remained the primary language of the majority of the population of England, which peaked at just over 6 million in the middle of the 14th century. There is good evidence that the Norman aristocracy themselves had begun to speak English by the beginning of the 12th century, although French remained a necessary accomplishment for cultivated people; the change was encouraged by the loss of Normandy in 1204. English became increasingly widely used in the written mode as the Middle Ages progressed. However, its functions were parochial; it was used for local audiences and in the equivalent of primary education. The national functions of written language, until the very end of the period, were carried out by Latin and French; there was therefore no need of a national standard English. As a result, written English for much of the Middle English period manifested a high degree of variation of the kind now more generally associated with speech. There are, for instance, 143 distinct spellings for the item *such* recorded in the authoritative *Linguistic atlas of late mediaeval English* (McIntosh *et al.*, 1986), ranging from *schch* recorded in Norfolk to such forms as *swich*, *seche*, and *soche* to Kentish *zuyche* and Northern *swilk* and *slik*. It was only in the 15th century, with the rise of London English as a prestigious written language associated with the power and functions of the capital city, that a new standard written English emerged. Even then, extensive written variation remained into the 16th century, at which point the early printers began to provide authoritative norms for private use.

Internal History

Increased vernacular literacy from the 13th century onward means that, compared with Old English, a great deal of Middle English writing in contemporary manuscripts has survived. This material forms the primary evidence for Middle English.

Graphology

Given the variety of written Middle English, it is unsurprising that handwriting styles differed diachronically and diatopically and even in the work of single scribes. In general, the Old English insular script was replaced by continental styles; usages hitherto restricted to Latin texts began to be adopted when writing English. Cursive handwriting developed as a practical response to increasing literacy in both Latin and the vernaculars.

The Middle English alphabet was almost identical with that of present-day English. The Old English letters <æ> (ash), <ð> (edh), and <ƿ> (wynn) disappeared early in the Middle English period, being replaced by <a, e>, <th, þ>, and <w>, respectively. Old English runic <þ> (thorn) was retained alongside its ultimate replacement, <th>, for some time, although commonly realized as <y>, especially in northern varieties; when printing arrived, <þ> largely disappeared, but was retained (written <y>) in a few contexts where ambiguity did not arise, for example, <ye> 'the.' A modified form of the Old English insular g, <ȝ> (yogh), was retained by many scribes, commonly to represent [x, j]; the French habit of using <ȝ> to realize [z] was also adopted by many Middle English scribes, in addition to <z>, which was adopted from Latin usage. <g>, used in Anglo-Saxon times for copying Latin, was adopted to represent [g]. <c, k, q> developed their present-day usage during this period as a result of the adoption into English of practices used for writing French. <h> was used as a diacritic to indicate a modification of the letter it followed: hence, the development of <sh> (earlier <sch>) for Old English <sc>, <gh> for <ȝ> and <wh> for Old English <hw>. The letters <u, v> were used interchangeably to represent both vowel and consonant, with <v> generally being used initially and <u> elsewhere.

In Old English, <y> had represented [y], but that vowel was unrounded in many late Old English dialects, merging with Old English <i> [i] (In western dialects, the rounding was retained, but the vowel seems to have retracted to merge with <u> [u].) <y> then came to be used interchangeably with <i>, especially in environments where contemporary handwriting could be confusing (e.g., before or after <m, n, u>). <o> was used for <u> in similar circumstances.

The combinations <ou, ow> were adopted from French usage in place of <u> in words such as *how* and *brown* (cf. Old English *hu*, *brun*). Toward the end of the period, southern varieties frequently indicated vowel length by doubling the letters representing them (e.g., *good*, *feed*); however, in northern and Scottish varieties, long vowels were often indicated by the addition of <i> (e.g., *guid* 'good'). As inflexional-*e* fell out of use at the end of the period (see the section on Noun Phrases), it too became available as a diacritic mark to indicate a long vowel, as in *life* (cf. Old English *lif*).

Phonology

Knowledge of Middle English phonology derives from the analysis of rhyming verse, reconstruction

from later and earlier states of the language, and the interpretation of orthography. There is no thorough contemporary account of Middle English pronunciation comparable to the Old Icelandic *First grammatical treatise* (*see* **First Grammatical Treatise**), although there were scribes whose orthographic practices demonstrate considerable sophistication in handling the complexities of sound-symbol mapping (e.g., Orm, the author and scribe of *The ormulum*, c. 1200). The inventory of phonemes in Middle English varied diatopically and diachronically, so the following account is very general.

Consonants The phonemic consonants in Middle English were /p, b, t, d, k, g, tʃ, dʒ, f, v, θ, ð, s, z, ʃ, h, m, n, l, r, w, j/. The major structural difference between Old and Middle English was in the fricatives; voiced and voiceless fricatives were allophones in Old English, but were phonemicized in the Middle English period.

Vowels The Old English distinction between long and short stressed vowels remained important, but ceased to be phonemic as the Middle English period progressed; there is indirect evidence that the short vowels tended to have more open pronunciations than their long equivalents from the beginning of the 13th century onward. By the beginning of the 15th century, London English seems to have had the following inventory: /i, ɪ, e, ɛ, ɛː, aː, a, ɔ, ɔː, o, u, ʊ/; /i, e, o, u/ were long vowels where length had ceased to be phonemic. Quantitative changes, some already under way in the late Old English period, meant that short vowels tended to appear in closed syllables, whereas long vowels tended to appear in stressed open syllables; thus, contrastive distribution was lost.

The major difference between Old and Middle English vocalism was in diphthongs; the Old English diphthongs monophthongized, and new diphthongs arose from vocalizations of Old English [w, j, h]. French loanwords supplied the inventory with two new diphthongs, /ʊɪ, ɔɪ/.

In unstressed vowels, the Old English qualitative distinctions were already becoming obscured by the late Anglo-Saxon period. This process continued in Middle English; /ə/ was the most common vowel, although /ɪ/ spread from the north, and /ʊ/ (indicated by spellings such as <-us, -ud>) seems to have been characteristic of the west.

Grammar

Inflexion In Middle English, inflexions are not as functionally important as they were in Old English. Many roles played by inflexions in Old English were taken over by prepositions and a more fixed word order (see section on Word Order). There were, of course, dialectal differences. In general, innovations in morphology spread from the north of England to the south, so features found in late Northumbrian Old English (e.g., the 10th-century *Lindisfarne gospels gloss*) first appear in the south in Middle English texts.

Noun Phrase The masculine/feminine/neuter grammatical gender system of Old English disappeared in the Middle English period. Although inflexional distinctions remained in the personal pronouns of Middle English, these were assigned according to natural gender. This pattern was already becoming established in late Old English, when *wif* 'woman,' a neuter noun, was occasionally referred to by the pronoun *heo* 'she.' The case system had already been subject to syncretism in pre-Old English (as in all Germanic languages); it was during the Middle English period that it largely disappeared. Only inflexional markers of plurality and possession remained. Modifiers such as determiners and adjectives ceased to be marked for agreement with their head words.

In place of the four major and four minor noun declensions of Old English, Middle English had in general the modern pattern, that is, the simple addition of *-(e)s* to mark plurality or possession, although there were rather more relicts of the *mice/children*-type than there are in present-day English. The forms in *-s* derive from the Old English strong masculine paradigm.

Traces of the old adjectival strong/weak (indefinite/definite) distinction lasted until the late 14th century in southern England, indicated by the use of *-e* in some paradigms; thus the poet Geoffrey Chaucer (d. 1400) distinguished *the olde man* and *the man is old*. However, the system had died out everywhere by the beginning of the 15th century, and *-e* was subsequently used as a diacritic of length (see section on Graphology).

The Old English system of inflexionally differentiated determiners collapsed, and the present-day system (*the/this/that/these/those*) gradually emerged. An indefinite article *a(n)* appeared, derived from Old English *an* 'one.' Perhaps the most radical changes took place in the pronominals; the Old English dual pronouns disappeared, and a number of other forms (e.g., Old English *hie* 'they,' *heo* 'she'), which had ceased to be distinctive because of sound changes, were replaced by variants that were available in the lexicon through contact with Old Norse.

Verb Phrase The strong/weak/irregular paradigms of Old English remained, with numerous analogical reassignments. Verb inflexions, although reduced and reorganized, were retained to mark agreement between subject and predicator.

Complex verb phrases arose in place of some Old English simple verb phrases. Old English distinguished between *bundon* 'bound' (preterite plural indicative) and *bunden* 'may have bound' (preterite plural subjunctive); the obscuration of the inflexional distinction led to the replacement of the formal subjunctive by complex verb phrases with *may* and *might* (Old English *mæg*, *mihte*, etc., 'can, could'). *Shall* and *will* were increasingly used as auxiliary verbs indicating future time rather than as lexical verbs signaling obligation and volition, respectively. Toward the end of the Middle English period, a complex verb phrase with *do* emerged in affirmative declarative constructions (e.g., *she did eat*, *it doth illuminate*); this construction has not survived into present-day use.

Other characteristic Middle English innovations are the development of phrasal verbs, such as *put up* and *stand by*, and an extension of the use of impersonal verbs, such as *me thinketh* 'it seems to me.' The latter usage has disappeared from present-day use, but the former construction is still common, especially in informal styles.

Word Order In word order, there is a noticeable extension in Middle English of the subject-verb-object sequence from affirmative main clauses not beginning with an adverbial to main clauses beginning with an adverbial and to subordinate clauses, where the Old English orderings were prototypically adverbial-verb-subject-object and subject-object-verb, respectively (as in present-day German).

Lexicon

There are three main sources of loan words into English during this period: Norse, Latin, and French. (For useful lists, see Serjeantson, 1935.)

Norse Loans Many Norse words were actually taken into English in the late Anglo-Saxon period, but in general they are hidden by the standardized written mode. Most Norse loans express very common concepts (e.g., *bag, bull, egg, root, ugly, wing*), and it is notable that Norse has supplied such basic features as the third-person plural pronouns *they, their*, and *them* (cf. Old English *hie, hiera, him*).

Latin Loans A number of Latin words came directly into English during the Middle English period, largely as learned words carried over in the translation of Latin texts (e.g., *omnipotent* and *testament*). However, the great wave of Latin borrowings into English took place from the 15th century onward, with the rise of humanism, and this is therefore a feature of Early Modern English.

French Loans Up to the 13th century, recorded borrowings from French into English are few and were generally restricted to the registers of government (e.g., *justice, obedience, mastery, prison, service*). From the beginning of the 13th century to the end of the Middle English period, however, French words entered the English lexicon in large numbers. As contact with Normandy was lost, Central French, not Anglo-Norman, became the main source of these words. The range of domains covered by these words is vast (see Serjeantson, 1935: 12–156). This surge was socially driven; although the higher social classes did not speak French as their mother tongue by this time, French retained its social cachet, and the use of French expressions was an obvious way of signaling a higher social position. Even in present-day English, French-derived vocabulary is often stylistically marked as of a higher register; compare the difference in meaning between high-style *commence* and neutral *begin*.

French also affected word formation. On the one hand, compound forms, characteristic of Old English, were frequently replaced by simple borrowings (cf., *brecan* 'break,' *forbrecan* 'destroy'). On the other hand, French suffixes and prefixes were applied to native stems (e.g., *knowable*, *unspeakable*).

Typical Middle English

The heterogeneity of written Middle English means that a typical specimen of Middle English is not to be had. The following text from Scragg (1974: 31–32) is a version of the Lord's Prayer in a Central Midlands dialect of the 1380s (MS London, British Library, Royal 1.B.vi); it exemplifies some of the features previously discussed.

> Oure fadir, þat art in heuenys, halewid be þi name. þi kyngdom come. Be þi wille don as in heuene and in erþe. ȝiue to vs yis day oure breed ouer oþer substaunse. And forȝiue to vs oure dettes, as and we forȝiuen to oure dettouris. And leede vs not into temptacioun, but delyuere vs from yuel.

Modern Work on Middle English

The two most important recent single publications in Middle English studies are the *Middle English dictionary* (Kurath *et al.*, 1951–2001; also online), and *A linguistic atlas of late Mediaeval English* (LALME; McIntosh *et al.*, 1986). The former allows for a much more detailed investigation of the Middle English lexicon than has been possible hitherto. The parallel completion of the *Dictionary of the older Scottish tongue* (Craigie *et al.*, 1931–2002) means that the resources for the study of medieval lexicons

of Britain are now massively enhanced. In combination with the continued evolution of the *Oxford English dictionary*, and the imminent completion of the *Historical thesaurus of English*, these publications will allow a great leap forward in the diachronic study of vocabulary and its structure.

LALME has opened up a mass of unpublished evidence for investigation, and also, by localizing so many texts to particular places, means that a much greater range of dialectal grammars can be constructed than has yet been achieved. Follow-up projects on Early Middle English and Older Scots are currently under way.

The indispensable foundation, however, for the study of Middle English remains: the editing of texts. Some fashions in literary (as opposed to linguistic) study, however, militate against the usefulness of this enterprise; the modern practice: even in scholarly editions: is to make numerous silent decisions in editing Middle English texts. Such decisions disguise important linguistic features such as punctuation, marks of abbreviation, and even spelling.

Alongside these developments, theoretical work continues. Probably the most important descriptive milestones are the major histories, such as the second volume of the *Cambridge history of the English language* (Blake, 1992) and the single-volume *Oxford history of the English language* (Mugglestone, in press). Explanatory work is necessarily more controversial; probably the single most influential work on the historical study of English, with a special focus on Middle English, remains Samuels (1972).

See also: English, Early Modern; English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); English, Old English; First Grammatical Treatise; French; Germanic Languages; Latin; Norse and Icelandic; Standardization.

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English, Old English

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Old English is the development of the language which was introduced into Britain by Germanic invaders in the 5th century A.D. and became the dominant language of what is now England excluding Cornwall, and also southern Scotland. Old English evolved gradually into Modern English, and any date given to delineate the different stages of the language must be somewhat arbitrary. The period covered by Old English spans c. 425 to c. 1100, and the language underwent extensive changes in this period. The comments made below about the phonology and grammar of Old English must be understood to apply to some of this period, but not necessarily all. By 1100, the accumulation of changes had become so great that it is appropriate to speak of Middle English.

While we do not know what the earliest Germanic people coming to Britain called their language, we find it referred to as *englisc* c. 1000, and *Engla land* (land of the Angles) used for the area where it was spoken. It is impossible to estimate the number of speakers throughout the Old English period, but William the Conqueror's Domesday Survey (1086) suggests an Anglo-Saxon population of between one and two million.

It is customary to recognize four basic dialects of Old English, distinguished from each other most prominently by phonological features but also by morphological and lexical peculiarities: Northumbrian (northern), Mercian (midlands), Kentish, and West Saxon (southwestern). It is tempting to attribute the main dialect differences to the premigration period on the continent, following the tradition beginning with the famous description of the Germanic invaders in Bede's *Ecclesiastical history of the English people*. Bede, writing in Latin in 731, says that the invasion force consisted of three tribes – Angles, Saxons, and Jutes – who founded separate kingdoms. But majority opinion of modern scholars stresses the complexity of political and social factors that presumably contributed to the creation of regional dialects in addition to the variation that would have come with the earliest Germanic settlers.

Our knowledge of Old English dialects and how they developed is limited by the sparseness of records in English until the 9th century. Because this was a period of political hegemony by Wessex accompanied by a burst of literary activity associated with Alfred the Great (who reigned from 871 to 899), the majority of surviving Old English manuscripts were written in the West Saxon dialect, and West Saxon became a sort of standard for writing in most areas of the country. For this reason, West Saxon is what is normally taught as Old English. Standard Modern English is not in a straight line of descent from West Saxon, but derives mainly from southeastern Mercian varieties for which our information in the Old English period is scanty.

Genetic Relationships

Comparison of Old English with other languages shows that it belonged to the Germanic subgroup of the large Indo-European family, which includes Old Saxon, Old High German, Old Frisian, Gothic, and Old Norse. An example of a major phonological feature that sets the Germanic languages off from the other Indo-European languages is the Germanic shift of stress to the initial syllable of every word (excluding certain prefixes). Using the comparative method, we can reconstruct a good deal of the vocabulary and morphology of Germanic; for example, Old English, Old Saxon, and Old Frisian share the form *ūs* 'us', which can be shown to have descended from the same form **uns* in Germanic. The word shows up as *uns* in Gothic and Old High German and *oss* in Old Norse.

Such comparison indicates that Old English, Old Frisian, and Old Saxon shared some sound changes which differentiated them from the other Germanic languages. In the example just cited, the nasal *n* has been lost before the fricative *s,* with compensatory lengthening of the vowel, in these languages, and similarities of this sort have caused Germanic scholars to refer to these three languages as 'Ingvaeonic' or 'North Sea' Germanic. A smaller grouping of Anglo-Frisian can be made within the Ingvaeonic group. Old English and Old Frisian were the only Germanic languages that fronted the Indo-European back vowel *a* to front *æ*. The Ingvaeonic languages share with Old High German some consistent similarities that differentiate them from the Scandinavian languages such as Old Norse on the one hand (where assimilation of the nasal to the fricative gives *oss* from **uns*) and Gothic on the other, and so a tripartite division of the Germanic languages into West, North, and East is traditional. This picture is complicated by the fact that the speakers of the West and North Germanic languages maintained a reasonable degree of contact with each other. Even while their languages were undergoing separate development, they retained a certain amount of unity and shared innovations. The result is that Old English was more like Old Norse than it was like the East Germanic Gothic.

Written Records

We can never know for certain how Old English sounded or everything about the grammar of the language, but there is a lot we do know. We cannot know the exact quality of the vowel in what was written as *mus* ('mouse'), for example, but we can tell that it must have been a long, high, back vowel. For one thing, comparison of the sister Germanic languages and the further history of the word in English (which saw the vowel become a diphthong) makes this the only candidate. For another, the Old English scribes adapted the Latin alphabet to represent their language, and it would have been perverse to use a letter to represent a sound that was entirely divorced from the sound it was used to represent in Latin.

Old English written records do not start appearing until *c*. 700 in quantities useful for studying the language of the time and its previous development from common Germanic. Prior to this, there are some inscriptions in the runes that the Germanic tribes used before their conversion to Christianity, when the Latin alphabet was adopted (*see* **Runes**). The earliest of these dates to the 4th or early 5th century. However, runes were mostly used for inscriptions, not literary activity. The runic inscriptions found in Britain are also few in number, although they provide us with very important information (sometimes open to more than one interpretation). We also have a copy of the law code of Æthelberht of Kent (d. 616), but it is contained in a manuscript from a much later period. The fact that anyone thought it worthwhile to write these laws down in English sets Old English apart from most vernacular languages of such an early period, when Latin was the only language used for such subject matter in much of Europe.

The earliest writings in the Latin-based alphabet, adapted slightly to deal with the sounds of Old English, are mainly glosses of Latin. These are invaluable sources of information about the phonology and morphology of the earliest period of Old English, but they cannot teach us much about Old English syntax. It is only in the time of Alfred the Great that materials become abundant. We have more remains of Old English than any other Germanic language of such an early period, covering poetry, religious material, medicine books, a grammar of Latin for English speakers, the *Anglo-Saxon chronicle*, and more, amounting to approximately three million words. Scholars are well served with electronic corpora, of which the Helsinki Corpus (see Kahlas-Tarkka *et al*., 1993) was the first. Such corpora have become an invaluable tool in the study of Old English morphology and syntax in particular.

From Germanic to Old English: Phonology

One of the most striking features of Old English phonology is that assimilation is found in more than one guise. Assimilation is found in most Germanic languages to some extent, but Old English underwent its own special assimilatory processes. A process usually known as *i*-umlaut is one of the most important developments of the prehistoric Old English period when Old English had separated from its sister languages but was not yet written down. The essence of this process was that a high front vowel or palatal glide in one syllable caused a back vowel in the preceding syllable to become a front vowel, to oversimplify greatly. This is a type of anticipatory assimilation, in which the speaker anticipates the vowel of an upcoming syllable by moving the tongue into a front position too early. An assimilation of an even earlier period involved the palatalization of velar consonants that were adjacent to front vowels or a palatal glide in the same syllable. Palatal stops have a tendency to turn into affricates, and this is what happened in Old English, with the result that Germanic **dīk* has come down to us as *ditch*.

The importance of syllable structure in Old English is seen in a process that deleted a final vowel after 'heavy' syllables, which either contained a long vowel or ended in a consonant cluster. Thus, the nominative plural form was *scipu* for 'ship' because the base *scip-* had a short vowel and ended in a single consonant, while *word* was either nominative singular 'word' or plural 'words' because the consonant cluster *rd* caused deletion of the plural suffix *-u*.

One interesting difference between Old English and the language that descended from it is that voicing was not a distinctive feature for most fricatives. In Modern English, [f] and [v], written as *f* and *v,* are perceived as two distinct sounds, as the difference between *fat* and *vat* illustrates. But in Old English, they were perceived as variants of essentially the same sound or phoneme. The labiodental fricative was pronounced as voiced [v] when surrounded by voiced sounds (such as vowels), but pronounced as voiceless [f] otherwise; e.g., although *deofol* was written with an *f*, it was pronounced more like modern *devil* than the spelling suggests.

Effects of Language Contact

Some everyday words borrowed from Latin such as *cēse* 'cheese' (from Latin *cāseus*) bear evidence of early sound changes and are likely to have entered the language prior to the invasion of Britain. The conversion to Christianity brought writing in the Roman

alphabet to the Anglo-Saxons (with the help of Irish missionaries). However, Anglo-Saxon churchmen preferred to use native resources for translating ecclesiastical concepts, e.g., *halig gāst* 'holy ghost' as the translation of *spiritus sanctus*; *spirit* was not used until the Middle English period.

Since Britain was inhabited by Celts before the Germanic invasion, one might suppose that Old English would show a great deal of Celtic influence, but the number of Celtic words borrowed into Old English, other than place names such as *Temes* 'Thames,' is exceedingly small. This is a pattern typical of an invasion, c.f. the retention of aboriginal place names by English settlers in the United States and Australia. Expert opinion varies greatly as to the number of Germanic migrants and the displacement of the Celts, but whether it was a case of language shift by the Celtic population or the spread of the language by the spread of the Germanic population, there is no convincing evidence of substratum Celtic influence on Old English grammar or phonology.

In contrast, there can be no question of very intimate contact with Scandinavian speakers, particularly in the northeast of the country, due to the Scandinavian raids that began in the 8th century, which later became determined attempts at settlement and culminated in Danish rule of the entire country by Cnut (1017–1035). Such contact cannot fail to have linguistic consequences, although the nature of those consequences is a matter of debate. Our uncertainty is exacerbated by the paucity of written records from the areas where contact with Scandinavian speakers was the greatest in Old English. Many of the consequences in English do not appear in texts until the very late Old English or Middle English period. However, the inflectional system of the *Lindisfarne Gospels,* an interlinear gloss that was added to a Latin text of the gospels in the 10th century in an area that had been under Scandinavian domination for more than a century, exhibits considerable modification of the inflectional system presented below. Many of these changes, such as the generalization of *-es* as the genitive singular inflection to declensional classes where it historically does not belong, are harbingers of more general changes of the Middle English period. This suggests that contact with Scandinavian speakers played an important role in shaping the dialects where contact was the greatest, with ramifications for the later development of Standard English. However, it is likely that in many instances, the effect of contact was essentially to take the brakes off linguistic changes that were already in progress.

With such closely related languages, it can be difficult to tell whether a word that is only recorded in the late Old English period or later is of native origin or a Scandinavian borrowing, but it is certain that large numbers of everyday words such as *take* which replaced native *niman* are of Scandinavian origin.

French influence in English mostly dates from after the Norman Conquest of 1066 and so mostly lies outside the Old English period, but contact with French did not begin with the Conquest; especially notable is that there was a strong Norman presence at the court of Edward the Confessor (reigned 1042–1066). Several French loan words entered the language in the Old English period, including *prūd* 'proud', first attested c. 1000.

Grammatical Characteristics

Modern English still exhibits much of the lexicon and many of the Germanic structural characteristics of Old English, but Old English is so different from Modern English that it must be learned as a foreign language. One of the primary distinctions between Old English and later English lies in the more elaborated inflectional morphology of Old English. For example, nouns and their modifiers were inflected according to two numbers (singular and plural), three genders (feminine, masculine, and neuter) and four cases (nominative, accusative, genitive, and dative). The distinctions were mainly made by suffixation, but also by mutation of the stem vowel, as in feminine nominative/accusative singular *bōc* 'book' but dative singular *bēc*. An instrumental case was distinguished to a limited extent, but it had mostly merged with the dative case, and a prepositional phrase was more commonly employed than the instrumental case. Here, as in many other places, prepositional phrases were already being used to supplement case marking. Few forms were unambiguously markers of a single combination of grammatical features; most masculine nouns did not distinguish the nominative from the accusative in either the singular or the plural, while most feminine nouns made this distinction in the singular but made no distinction between the non-nominative cases. Modifiers of the nouns, especially determiners, distinguished grammatical features more consistently, e.g., the masculine 'the stone' is *se stān* (nominative), *þone stān* (accusative), *þæs stānes* (genitive) and *þām stāne* (dative). Fewer distinctions were made in the plural even with the demonstratives, e.g., *þā stānas* 'the stones' could be nominative or accusative.

The more elaborate case marking system of Old English made a freer order of constituents possible than is found in Modern or even Middle English. 'The man killed the king' could be expressed as either *se man acwealde þone cyning* or *þone cyning acwealde se man*, because *se man* was

nominative, and identified the subject wherever it was positioned, and the accusative form *þone cyning* signaled the object. Already in Old English, however, the order Subject-Object (as in the first of our examples) was much more frequent than Object-Subject. This order was the usual one even when case marking would have made the grammatical relations clear without the help of word order.

The position of the verb was also variable. Old English exhibits the preference for verb-second order in main clauses and verb-final order in subordinate clauses found in the other early Germanic dialects, but in Old English, verb-second position in main clauses was not as regular as it is in, for example, Modern Dutch, and only about 50% of subordinate clauses have verb-final order. Order within the noun phrase was also variable but far from free, with the prenominal order Determiner Adjective Noun familiar from Modern English already the unmarked pattern. The postnominal order found in *men þa leofestan* 'most beloved people' (lit. 'people the belovedest') was mostly limited to vocatives and poetry, and is presumably a relic of more widespread postnominal positioning of modifiers in Germanic. The scene was set for further dependence on word order in the Middle English period.

See also: English, Middle English; Germanic Languages; Gothic; Runes.

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English Lexicography

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Bilingual Beginnings

From earliest times, students have noted translations above words in foreign-language texts. Murray (1900) traces the origins of English lexicography to these notes, called 'interlinear glosses,' which are found in many Latin documents that survive from the Old English period. In some monasteries, interlinear glosses were collected into a document called a 'glossarium.' Such early glossaries originally listed the words in the order in which they were read in texts, but "as these manuscript lists came to be copied and re-copied, it was seen that their usefulness would be increased by putting the words and phrases into alphabetical order" (Murray, 1900). The development of these lists into more sophisticated language tools was given a great boost by the invention of printing, which enabled elaborate alphabetical lists of words, with explanations, to be reproduced in hundreds of copies. Lexicography has always been closely associated with printing and publishing. Johannes Gutenberg invented the printing press in Mainz, in about 1450, and by 1474, the new invention had been brought to England by William Caxton. In the century that followed, bilingual and multilingual compilations of technical terms in various domains, often with discursive and even anecdotal comments by the compiler, began to flourish. An example may be given from William Turner's *The Nature of herbes in Greke, Latin, Englishe, Duche & Frenche wyth the commune names that Herbaries and Apotecaries use*, published in 1548:

> **Anthenus.** *Anthenus* siue *Chamaemelon* is called in englishe *Cammomyle*, in duch *camillen*, in frenche *camomille*. Camomilla is deuided into three kyndes, the firste

English: World Englishes

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The conceptualization of the term 'world Englishes' is within a 'socially realistic' approach to language study (see, e.g., B. Kachru, 1981). The first linguist who, in a rather indirect way, provided such insight about what is now termed world Englishes was John Rupert Firth (1890–1960), the first holder of the chair of general linguistics at London University. In 1956, after his extensive experience in South Asia, Firth (1956: 97) observed:

> English is an international language in the Commonwealth, the Colonies and in America. International in the sense that English serves the American way of life and might be called American, it serves the Indian way of life and has recently been declared an Indian language within the framework of the federal constitution. In another sense, it is international not only in Europe but in Asia and Africa, and serves various African ways of life and is increasingly the all-Asian language of politics. Secondly, and I say 'secondly' advisedly, English is the key to what is described in a common cliché 'the British way of life.'

This observation, made over a half-century ago, exemplifies the linguistic pragmatism and social and functional realities of the English language in world context. Firth's earlier observations have been addressed in much more detail in the following years by a variety of theoretical and methodological frameworks (for a perceptive historical review, see Bolton, 2004).

Spread and Stratification

The cross-cultural and cross-linguistic diffusion of English may be viewed in terms of three phases. The first phase was initiated in the British Isles in 1535 when the Act of Union annexed Wales to England. The linguistic implications of this Act were far reaching, as outlined by Edwards (1993: 108):

> The most damaging section of the Act of Union, as far as the Welsh language was concerned and thus a significant element in its collective consciousness, was its emphasis on English as the language of preferment. English became essential for success. It specified "no personne or personnes that use the Welsshe speche or langage shall have or enjoy any manner of office or fees within the Realme of Onglonde Wales or other the Kinges dominions and exercise the speche or langage of Englische.

In 1603, Scotland also came under British rule, and with this territorial expansion, King James VI became King James I of England. The expansion continued, and in 1707 yet another non-English speaking region, Ireland and its indigenous languages of Celtic and Gaelic, were subsumed. This phase of expansion was notable for the consolidation of the dominance of English in the British Isles.

It was in the second phase of the diffusion that the diasporic varieties of English were transplanted across continents, notably to North America, Australia, Canada, and New Zealand. This phase involved a significant movement of native-English-speaking populations to new social, linguistic and cultural contexts. Although in total numbers this relocated population was limited, these groups, for example in Australia and New Zealand, developed influential and powerful English-using communities. As time passed, various strategies of educational planning, proselytization, and trading in the language were used to initiate – and increase – bilingualism in English.

The third phase of diasporic expansion introduced English into Asia and Africa. In contrast to the second phase, it brought English into contact with genetically and culturally unrelated languages in far-flung parts of the world. This diaspora provided a new ecology and, for the teaching of English, unprecedented challenges in terms of language contact, cultural contexts, norms, identities, and methodologies. Those challenges continue to confront the professionals in the new millennium.

This diasporic expansion laid the foundations for the use of the English language as cultural ammunition in all these territories and resulted in several indigenous varieties. The reactions to these transplanted varieties and their historical, social, educational, ideational, and cultural implications have ultimately resulted in the most articulate critical debates – both of agony and ecstasy (for further references, see B. Kachru, 1996).

The characterization of the stratification and functions of world Englishes within theoretical and pragmatic frameworks received a further stimulus in the 1970s. It was John Lyons (1978: xvi) who pointed out the parallels "between Labov's approach to linguistics and that of the 'British' school, which draws its inspiration from J. R. Firth." The 'socially realistic' paradigms – mixed with the activism of their proponents – resulted in consideration of linguistic diversity within Englishes as an integral part of social interaction and contextual realities (see B. Kachru, 1981).

Several schemas have been presented to characterize the diffusion of English and its global presence (see McArthur, 1993). One such model that has been

adopted in several studies since the 1980s, the Concentric Circles model (Figure 1), is discussed below in detail.

Concentric Circle Model

The concentric circles representation of the spread of English, proposed in 1985, is more than mere heuristic metaphor for schematizing the spread of English. This representation provides a schema for the contextualization of world varieties of English and their historical, political, sociolinguistic, and literary contexts. The characterization of world Englishes is primarily based on the following factors:

- the history of the types of spread and motivation for the location of the language
- patterns of acquisition
- societal depth of the language in terms of its users, and the range of functions that are assigned to the English medium at various levels in the language policies of a nation (e.g., in administration, education, and literacy)
- functional acculturation of the English language within the local culture and societies and its nativization in the society and its literary culture

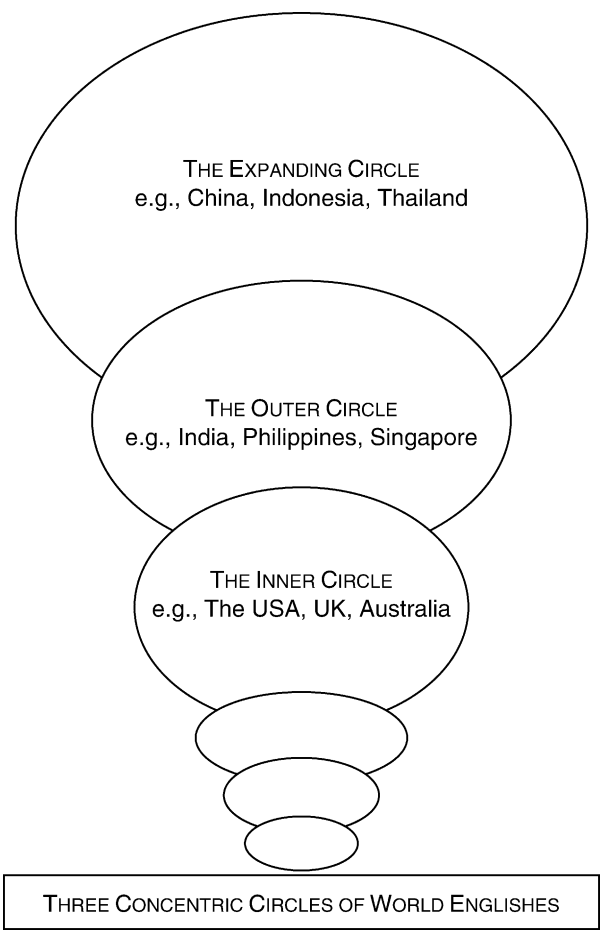

Figure 1 Three concentric circles of World Englishes.

The term 'nativization' refers to the formal and functional changes the language undergoes at various linguistic levels (e.g., phonetic, lexical, syntactic, discoursal, speech acts, literary creativity). In other words, the diffusion of English over centuries involves geographical expansion into regions of the world that had distinct physical realities and social, cultural and linguistic identities. It is in such contexts that the English language acquired 'functional nativeness.' It is the extent of functional nativeness in terms of the range and depth of English in a society that determines its impact. The more such functions of English increase in a speech community, the more local identities the variety acquires.

The three circles are not static, but dynamic and changing. The dynamics of the English language in terms of its status, functions, and attitudes toward it are well documented in the case studies of, for example, Bangladesh, Sri Lanka, Malaysia, Indonesia, and even in several Francophone countries.

In historical terms then, the Inner Circle primarily, but not exclusively, comprises the L1 speakers of varieties of English: It is this circle, (e.g., Britain, United States, Canada, Australia, and New Zealand), that provided the springboard for transplanting the language in other parts of the globe. The Outer Circle includes the major Anglophone countries of Africa and Asia, including India, Nigeria, the Philippines, Singapore, and South Africa. The Expanding Circle includes China, Taiwan, Korea, and Saudi Arabia (for the dynamic nature of this circle, see Berns, 2005).

The three circles model, as McArthur (1993: 334) suggested, represents "the democratization of attitudes to English everywhere in the globe." In his view,

> [T]his is a more dynamic model than the standard version, and allows for all manners of shadings and overlaps among the circles. Although 'inner' and 'outer' still suggest – inevitably – a historical priority and the attitudes that go with it, the metaphor of ripples in a pond suggests mobility and flux and implies that a history is in the making.

World Englishes Speech Communities

The earlier canonical definitions of the concept of 'speech communities' do not capture the pragmatic and functional global realities of the English language. Consider, for example, the restricted definition of the term provided by Bloomfield (1933: 42): "a group of people who interact by means of speech." On the other hand, in Hymes's view (1974: 47–51), a

speech community is "a social, rather than linguistic entity" that shares "knowledge of rules for the conduct and interpretation of speech." The views of Firth (1957: 191) contrasted with that of sociologists and anthropologists, when he wrote:

> The study of linguistic institutions is thus more specific and positive and on the whole less speculative than the sociological study of societies. Sociologists and social anthropologists are much bolder than linguists in what they find it possible to state in general human terms. To what lengths sociological abstractions can be extended is well-exemplified in Pareto's theory of residues and derivations.

However, Firth also emphasized that a monolithic description of language does not convey the socially and contextually insightful characteristics of language. In his provocative way, Firth (1957: 29) wrote that the "unity of language is the most fugitive of all unities whether it be historical, geographical, national, or personal. There is no such thing as *une langue une* and there has never been."

The English-using speech communities involve multiple – and often complex – historical, ideational, functional, and attitudinal contexts. In the global context, these fast-growing communities demonstrate varying degrees of competence in the language and its uses in terms of the range of functions and hybridization. These speech communities are primarily of the following types.

- Monolingual users of the language whose one and only language of communication is a variety of English; for example, a large portion of the inhabitants of the United Kingdom, United States, Australia, and Canada. In these countries, too, the number of bilingual users or non-English-using immigrant populations representing multiple languages from Asia, Africa, the Caribbean, Latin America, and Europe is fast increasing.
- Bilingual users of English who acquire English as an *additional* language for communication in those domains of function in which their L1 is not used or is not considered functionally appropriate to use.
- Multilingual users in whose verbal repertoire English is yet another code of communication, and language-shift and alternation are a normal communicative strategy. This phenomenon has been well documented with reference to multiple Anglophone English-using speech communities in Africa, Asia, Europe, and in the United States and United Kingdom.
- Bidialectal speakers and those whose L1 dialect has not attained functional and attitudinal recognition, as is the case of Ebonics (African-American English) or Spanglish in the United States.

One major factor that distinguishes the international profile of English from that of other languages of wider communication is that it has more users now who have acquired it as an L2, L3, or L4 in their language repertoire (see Table 1).

Process of Nativization and Englishization

The speech communities of English in the Outer Circle use institutionalized varieties of English, which have the following characteristics:

- recognition of English in the overall language policy of the English-using nation (e.g., India, Nigeria, Singapore)
- an extended tradition of contact literatures in English that are recognized as part of the national literatures.
- social penetration of the language that has resulted in several social, ethnic or functional subvarieties (e.g., Singlish, Basilect, Bazaar English, Tanglish)
- distinct linguistic exponents of the process of nativization at various levels

Table 1 The statistics of World Englishes

Society	*Approximate population (million)*	*Percentage of L1/ L2 English users*	*Approximate totals (million)*
INNER CIRCLE			
United States	293		
United Kingdom	59		
Canada	32		
Australia	20		
New Zealand	4		
OUTER CIRCLE			
India	1000	33	330
Philippines	86	56	48
Pakistan	159	11	17
Malaysia	24	32	8
Bangladesh	141	5	7
Hong Kong	7	35	2
Singapore	4	50	2
Sri Lanka	20	10	2
EXPANDING CIRCLE			
China	1300	18	234
Japan	127	33	42
Indonesia	238	5	12
Thailand	60	10	6
South Korea	49	9	4
Vietnam	83	5	4
Myanmar	43	5	2
Taiwan	22	10	2
Cambodia	13	5	0.6
Laos	6	5	0.3

The above figures are 'guesstimates' based on various published resources.

- an extended range of localized genres and registers
- Englishized varieties of local languages, some of which may have even acquired distinct names (e.g., *Hinglish* or *Hindlish* of India)
- acculturation of the English language for articulating local social, cultural, and religious identities.

The process of nativization is one major linguistic dimension of acculturation of world Englishes: this acculturation is evident in Anglophone Asian and African functionally localized contexts.

The two processes of nativization and Englishization are Janus-like, two faced. One face reflects the impact of contact and convergence with other languages – Asian and African – at various linguistic levels. The second face shows the impact that the English language and literature have on other languages and literatures of the world. Englishization is not restricted to phonology, grammar, and lexis, but can have a deep impact on discourse, registers, styles, and literary genres in contact literatures in Englishes (see, e.g., Thumboo, 1992; Dissanayake, 1997; Y. Kachru, 1997; B. Kachru, 2003; Y. Kachru, 2003; B. Kachru, 2005).

The process of Englishization is evident in three major geographical regions associated with the spread of English:

1. Traditional regions of cultural and literary contact in which a number of cognate languages of English are used (e.g., in Western Europe and parts of Eastern Europe)
2. Anglophone, geographically noncontiguous with English, regions of the Raj, which include the Outer Circle of English, and have, in a genetic sense, unrelated or not-closely related languages (e.g., parts of Africa and Asia)
3. Expanding Circle, which includes the rest of the world (e.g., Japan, China, the Middle East, and Latin America).

In defining the nativeness of varieties of Englishes, a distinction may be made between genetic and functional nativeness. Genetic nativeness refers to the historical relationship of the languages in contact, and functional nativeness to the domains of use of English, the range and depth in social penetration, and the resultant acculturation. A profile of the functional nativeness of a variety of English includes these factors:

- sociolinguistic status of a variety in its transplanted context
- range of functional domains in which a variety is used
- creative processes used to construct localized identities
- linguistic exponents of acculturation
- types of cross-over contributing to canons of creativity
- attitude-specifying labels used for the variety of English.

The second diaspora of English has raised a variety of questions that are unique to transplanted Englishes and continue to be debated in the literature (see, e.g., B. Kachru, 1988, 1996; Mufwene, 2001; B. Kachru, 2005).

Models of Description

The canonical models of English continue to be viewed in terms of privileged British and American varieties of the language. The theoretical, methodological, and ideational issues raised by such an attitude have been extensively – and passionately – articulated in the literature in recent years. This debate has acquired a prominent position in the conceptualization of world Englishes. There are essentially three types of speech fellowships of world Englishes: (1) those that are canonically considered privileged and norm-providing – the Inner Circle, (2) those that have functionally acquired the status of norms and are pragmatically relevant in their sociolinguistic context – the Outer Circle, and (3) those that in many respects continue to be attitudinally dependent on external norms, primarily from the Inner Circle – the Expanding Circle (see Berns, 2005).

Conceptual Myths

The articulation of the following six myths in the conceptualization, methodology, and pedagogy of world Englishes has resulted in the 'paradigms of marginalization.' These paradigms are essentially based on age-old following fallacies:

1. World Englishes in Anglophone Asia and Africa are acquired and used to interact with canonical 'native' speakers of English.
2. World Englishes are acquired to learn the Judeo-Christian traditions as articulated in American and British cultural and literary values and traditions.
3. The Inner Circle Englishes are primary and standard 'model providers' for teaching and acquiring communicative competence in the language.
4. Conceptually, all varieties of world Englishes in Outer Circle are essentially *deficit* or *interlanguage* varieties.
5. Historically it is the Inner Circle that has provided – or should provide – models and standards for ELT

pedagogy, creativity, and canonicity of Englishes across Anglophone regions and cultures.

6. The arms of codification of the English language, established – and imposed – by agencies of the Inner Circle, should ideally control the variation and diversity in world Englishes (see the Quirk-Kachru controversy, discussed in detail in Tickoo, 1991).

Constructing Identities of Englishes

The controversial modifiers of the term 'English' that are frequently used to characterize the post-colonial diffusion and stabilization of the English language across cultures and languages include 'new Englishes' and 'international,' 'global,' or 'world English.'

The term 'New Englishes' was primarily – though not exclusively – used for the institutionalized varieties in the Outer Circle. All the 'new' varieties are transplanted (diaspora) varieties that have a presence on almost every continent. However, the use of the modifier 'new' for such Englishes is a misnomer – historically, contextually, and in terms of their acquisition, as some of them pre-date some Inner Circle varieties.

The conceptualization of 'world Englishes' (and not 'world English'), in the sense in which it is used here, goes back to the 1960s. Its formal and functional implications were discussed in 1978 in two independently organized conferences in the United States: one at the East-West Center at Honolulu, (April 1–15) and the other at the University of Illinois at Urbana-Champaign (June 30–July 2). The Honolulu conference concluded with a statement and agenda for the future recognizing that "English used as an international and auxiliary language has led to the emergence of sharp and important distinction between the uses of English for international (i.e., external) and intranational (i.e., internal) purposes."

In addition to this distinction between the uses of English-using speech communities, the statement further distinguished between "those countries (e.g. Japan) whose requirements focus upon international comprehensibility and those countries (e.g. India) which in addition must take account of English as it is used for their own national purposes." The Honolulu conference also expressed concern that "[s]o far as we know, no organization exists that takes into account of any language in the light of this fundamental distinction."

The University of Illinois conference, in contrast, "broke the traditional pattern of such deliberations: no inconvenient question was swept under the rug. The professionals, both linguists and literary scholars, and native and non-native users of English, had frank and stimulating discussions" (Kachru, 1997: 210).

The scholars present, almost all from Anglophone countries – including, Africa and Asia, as equal partners – discussed with refreshingly fresh perspectives the sociolinguistic and linguistic profile of each English-using country in terms of the functional range of their varieties of Englishes and the social depth of the penetration of the language. What emerged were fascinating worldwide profiles of nativization and acculturation of world Englishes and construction of their identities, attitudes, and functions. It was through such discussions that a socially realistic and pragmatically appropriate preliminary framework developed.

This socially realistic framework represents the formal and functional variations, divergent sociolinguistic contexts, and histories of world Englishes. It is through such contextual insights that the bilinguals' creativity, at various levels, acquires a social and functional meaning. The concept underscores the 'WE-ness' of the medium, its distinct nativeness determined in cultural, linguistic, and ideological contexts of Anglophone communities. Such cross-cultural functions of the medium acquire their own semantic signals in which the traditional dichotomies and frameworks demand alternative approaches. There is recognition of the fact that different methodologies may be needed (e.g., literary, linguistic, and pedagogical) to capture and construct the altered identities represented in the medium in Englishes of the world. The pluralization of the canonical term 'English' does not suggest 'divisiveness' in the English-using speech communities, but rather the recognition of a unique functional reality of the language: the diversity of the medium and its assimilative qualities in multiple pluralistic, linguistic, and cultural contexts.

These functional, contextual, and ideational connotations – and realism – are absent, as mentioned above, in such terms as 'international English,' 'global English,' or 'world English.' The term 'international' is misleading in more than one sense: it signifies an international English in terms of acceptance, proficiency, function, norms, and intelligibility. These presuppositions are far from the real world of Englishes in the world contexts.

The other concept currently presented to represent the global – or some times a regional – medium is 'lingua franca English.' This term was originally restricted to the intermediary contact language (*Vermittlungssprach*) used by the Arabs and the Turks as a maritime jargon in the Levant. It primarily signifies a language of commerce (e.g., Italian around the Adriatic Sea). Each variety in the Outer Circle,

as in the Expanding Circle, has its subvarieties in terms of functional connotations, domains, and attitudes toward localized varieties of Englishes and their cross cultural and cross-linguistic communications. Yet, the Inner Circle has made no serious efforts – socially, methodologically, or pedagogically – to recognize their status and currency.

One often-quoted interpretation of the concept of world Englishes was provided by McArthur (1993: 334) when he referred to the logo-acronym of the journal *World Englishes* (which started in 1984), which "serves to indicate that there is a club of equals here." In this interpretation, the emphasis is on "the democratization of attitudes to English everywhere on the globe," and it, as McArthur perceptively pointed out, dissolves the trinity of ENL, ESL, and EFL nations.

The linguistic, cultural, canonical, and literary implications of the diffusion of English beyond the Inner Circle are discussed in, for example, Dissanayake (1997), Thumboo (1992), and B. Kachru (1988, 2005).

World Englishes and Conceptual Frameworks

The theoretical, methodological, and ideological questions related to world Englishes go beyond language pedagogy, which was the primary concern before the 1950s. In the post-1960s period, several sacred linguistic cows of theoretical and applied linguistics as applied to world Englishes have been under attack as a consequence of several developments: insights gained by critical sociolinguistic paradigms, the articulation of identities with the language, and altered dynamics of the functions of English in post-colonial linguistic and cultural contexts. One thinks of, for example, the earlier theoretical and methodological emphasis given to such concepts as interference, interlanguage, and fossilization in paradigms of language acquisition. There was very little – if any – awareness of the pluricentricity of Englishes in the Outer Circle or of developing literary and cultural canons and nativized registers and genres in world Englishes in Africa, Asia, and the diasporic writers in the Inner Circle. After the 1960s, a vibrant debate started about several pedagogical issues, such as idealized models for the codification of English, the cross-linguistic claims made for teaching methods and methodologies, and English-language teaching materials developed, published, and often exported by the English-language teaching 'experts.'

Two often-articulated descriptive and prescriptive questions – specifically about the Outer Circle varieties – are the following: what criteria may be used to determine a difference between an error (or mistake) and an innovation? And, what variables determine intelligibility for varieties of world Englishes across cultures and languages?

In his extensive empirical research on the latter topic, Smith (1992) viewed intelligibility in a pragmatic communicative context by making a distinction among intelligibility (word utterance recognition), comprehensibility (word utterance meaning [locutionary force]), and interpretability (meaning behind the word/utterance [illocutionary force]). Smith and Nelson (1985) have also discussed some issues that should be on the agenda of any researcher studying intelligibility.

Literary Creativity, Canonicity, and World Englishes

The creative linguistic processes that result in competence in two or more languages are termed 'contact' or 'interference' varieties. The underlying process in the construction of contact literary texts is that of hybridization, as reflected in bilinguals' (or multilinguals') creativity. Such texts are designed with a blend of linguistic features from two or more – related or unrelated – languages. The concept of 'contact literatures' thus brings to the English language the multilingual and multicultural contexts of, for example, Africa and Asia. These varieties of English have acquired stable characteristics in terms of pronunciation, grammar, lexis, discoursal, and stylistic strategies. These traditions are often blended with local subvarieties of English, (e.g., Nigerian Pidgin in Nigerian English, Singlish in Singapore English, Bazaar or Babu English in Indian English). In such contact situations, the English language is a medium that has been, pragmatically and contextually, localized to adapt to – and to represent, as elegantly claimed by such writers as Raja Rao and Salman Rushdie (India), Chinua Achebe and Wole Soyinka (Nigeria), Edwin Thumboo and Catherine Lim (Singapore), and F. Sionil Jose (the Philippines).

It is 'contact' at various levels (linguistic, social, and cultural) and the resultant nativization that contact literatures represent in literary and cultural canons that are distinct from the Judeo-Christian canons. These processes thus ultimately result in, say, the Africanization or Asianization of world Englishes.

The term 'interference varieties' – though attitudinally loaded – is yet another label to conceptualize the contact varieties of English and the bilinguals' creativity. The interference varieties, as Quirk *et al.* (1985: 27–28) recognized are

> so widespread in a community and of such long standing that they may be thought stable and adequate enough to be institutionalized and hence to be regarded as varieties of English in their own right rather than stages on the way to more native-like English.

All such varieties, as shown in numerous studies, have formal and functional identificational features that represent the linguistic processes at various levels: grammar, phonetics, lexis, discourse, speech acts, genres, and indeed literary creativity (see Smith and Forman, 1997; B. Kachru *et al.*, in press). These studies are of three types: variety-specific (e.g., Indian English, Singapore English, Nigerian English), area-specific (e.g., South Asian English, West African English, Southeast Asian English), or of larger geographical regions in terms of linguistic, literary, and sociolinguistic areas (Africanization or Asianization).

The study of bilinguals' creativity demands recognition that the institutionalized Englishes have an educated variety and a cline of subvarieties, that writers in contact literatures engage in 'lectal mixing,' and that in such texts there are style shifts related to the underlying context of situation. In contextual terms, style shifts result in the construction of altered discourse strategies, speech acts, and registers. In discussing such creativity in world Englishes, Thumboo (1992: 270) argued the following:

> This challenge confronts almost every bi-or multilingual writer. His bilingualism is one of three broad types – proficient, powerful, or limited; his position in this cline is not static, because quite often one language gains dominance. A bilingual person has at least two language universes, and each language works with its own linguistic circuits. How the two associate depends on whether the languages as neighbors inhabit the same space and time and can bend to serve creative purposes.

There is thus multicanonicity in world Englishes that blends two or more 'language universes' in their creativity; the interlocutors in Englishes have a variety of linguistic, cultural, social, and literary traditions – a speaker of a Bantu language interacting with a speaker of Japanese, a Taiwanese with an Indian, and so on. The traditional and much discussed and canonical 'native speaker' may rarely be part of such interactions in Englishes. The linguistic historical analogues that come to mind – though not necessarily parallel to world Englishes – are that of Latin in medieval Europe (Kahane and Kahane, 1979) and of Sanskrit in traditional South Asia and beyond.

The Pandora's Box and World Englishes

The shared strands of current debates on world Englishes include the following seven major contextually, attitudinally, pedagogically, and linguistically relevant issues:

1. The demythologization of conventional sacred cows model initiated and nurtured by the Inner Circle constructs of English (see B. Kachru, 1988; Quirk, 1988)
2. The ecologies of multilingual Englishes, specifically in the contexts of Africanization and Asianization of Englishes (see Mufwene, 2001; B. Kachru, 2005)
3. The increasing expression of bilinguals' creativity in the Outer Circle and its implications on traditional canons and canonicity
4. The theoretical, methodological, and pedagogical implications of the increasing depth and range of Englishes (B. Kachru, 2001)
5. The issues of intelligibility in cross-cultural and cross-linguistic communication
6. The evaluation of ethical practices related to forms, functions, and pedagogy (see, e.g., Baumgardner and Brown, 2003; Dhillon, 2003)
7. The motivation of power and politics and the role of initiators of arms of control (Phillipson, 1992).

See also: English, African American Vernacular; English in the Present Day (since ca. 1900); Lingua Francas as Second Languages.

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Environment and Language

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Introduction

The notion of environment, like that of language, is a complex one, and there are a number of views on the most appropriate approach to this topic. The title of this article suggests that they can be treated as independent entities and correlated to one another. Moreover, it suggests that language is central, and that the environment surrounds this center. This implies that that the principal task of the investigator is to look for significant correlations between the two. The correlational approach contrasts with the view that languages are integrated with their environment and that correlations therefore are not of central concern.

Whenever the coverage of a discipline such as linguistics is extended, problems of definition arise. I comment here on the notion of 'environment of language' first and turn to attempts to define 'language' in the next section.

Environment of language has been characterized differently by different writers. Sapir (1912: 227) distinguishes between physical and social environment but cautions that:

> The mere existence, for instance, of a certain type of animal in the physical environment of a people does not suffice to give rise to a linguistic symbol referring to it. It is necessary that the animal be known by the members of the group in common and that they have some interest, however slight, in it before the language of the community is called upon to make reference to this particular element of the physical environment. In other words, so far as language is concerned, all environmental influence reduces at last analysis to the influence of social environment.

One such social influence that has received much attention in recent years is how different social roles of men and women are reflected in gender-specific language and discriminatory language use. Similarly, a number of ecofeminists have argued that man-made language is a root cause not only of social discrimination but also of unhealthy environmental attitudes.

Perhaps the best-known characterization of the environment of language is given by Haugen (1972: 325), who pointed out that the search for an appropriate definition of 'environment' might lead one's thoughts first to the referential world to which language provides an index. However, this is the environment not of the language but of its lexicon and grammar. The true environment of a language is the society that uses it as one of its codes.

Haugen further limits his investigation to the linguistic environment of language (i.e., the users, the relation to other languages, and the agencies concerned with the form and use and attitudes, but not their relationship to the natural environment). Haugen's ideas reflect his experience of Norway, with its competition in colonial days between Danish and Norwegian, and in independent Norway between three competing proposals for a national language. He was furthermore influenced by his experience of migrant languages in the United States, and his observations of language in modern nation states are repeated in many of the pre-1990 writings on this topic (e.g., the contributors to Enninger and Haynes [1984]).

In more recent years, the notion of environment of language has been widened considerably. Fill (1993) includes parameters such as age and gender into the ecology of language and, in the wake of the growing awareness of a worldwide environmental crisis, the relationship between language and the natural environment has become a focus of research interest. The question of whether environmental problems are in part a consequence of a growing mismatch between the contours of language and the contours of the natural environment has been asked by Mühlhäusler (1983), Trampe (1990), Halliday (1992), and Fill (1993).

There are four logically possible relationships between languages and their environment, all of which have been the subject from time to time of different schools of linguistics: the independency hypothesis (Chomsky, cognitive linguistics), language is constructed by the world (Marr), the world is constructed by language (structuralism and poststructuralism), and language is interconnected with the world – it both constructs and is constructed by it (ecolinguistics).

In the emerging discipline of ecolinguistics (Fill, 1998; Mühlhäusler, 2003), all of these relationships are considered, though the importance of the independency view of language has been greatly reduced.

Linguists continue to differ on the kinds of relationships they regard as most important and on what aspects of the world are perceived as most influential. Regarding relationships, the majority of writers on language and environment continue to emphasize the central role of competition (Haugen, 1972; Mufwene, 2001). The experience of competition between the nation states of Europe seems to be the metaphorical basis for this emphasis, but in numerous

traditional societies, small languages have coexisted with larger ones without any danger of them being lost. Ecolinguists such as Fill (1993) note that competition is far less important in nature than commonly believed, and that more than 80 percent of all interactions between natural species are either beneficial or neutral.

The aspects of the world deemed most important by linguists are social factors – contact with other languages and varieties as well as the metalinguistic beliefs and practices prevailing in a language community. The interaction between languages and their natural correlates have remained subsidiary to this, partly because earlier attempts to explore the nature of language with reference to their environments have been fairly crude. The notion that language and environment adapt to one another is recent, and as yet not fully developed, but progress has been made in the study of the relationship between linguistic diversity and the diversity of natural life forms (Nettle, 1999), between conservation, biology and language conservation (Mühlhäusler, 2003; Harmon, 2002; Maffi, 2001), and between language development and environmental conditions (Mühlhäusler, 1996).

Metaphors and Definitions of Language

The primary purpose of definitions is to create a research tool. The question of a suitable definition of language needs to be distinguished from the question of its ontology – the actual nature of language. Haugen's notion of a 'language ecology,' in which languages interacted with other languages and their environment, was not conceived as a claim about the essential nature of language, and he made it clear that this was not a suggestion that languages are organisms. Language ecology for a long time remained a useful metaphor that helped answer questions such as the disappearance of minor European languages and the causes of language conflict.

Those who use the notion of language ecology metaphorically have held varying views on the nature of language, ranging from that a mental organ to that of a social semiotic. However, ecolinguists, similar to integrational linguists, question the independency view of language and claim that, as language is inextricably linked to wider ecology, its ontology is that of an ecological phenomenon (Finke, 2002; Mühlhäusler, 2003).

Themes in Language and Environment

There are numerous approaches to the relationship between language and environment (surveyed in Mühlhäusler, 2003). I restrict the discussion here to those that start at the linguistic end (i.e., studies focused on the properties of words, grammar, and discourse).

Properties of Words

A focus of many present-day writers is the proliferation of neologisms that have emerged in the wake of growing awareness of the global environmental crisis: Most of the new terms are the result of terminology planning rather than spontaneous innovation, an example being the INFOTERRA Thesaurus (1997). Most of the new terminology originates in English, is highly technical, and consequently abounds in abstract nouns, multiword formation, and words of Latin and Greek origin. The appropriateness of such formations in environmental discourse has been questioned by numerous writers (summarized in Harré *et al.*, 1999), who point out the dangers of substituting greenspeak for environmental action. They have also drawn attention to the trend to introduce deliberately misleading terms to deflect public attention of problematic practices. Examples of the latter category are 'land reclamation' for wetland drainage, 'sustainable agriculture' for agriculture aimed at sustainability, 'vegetation manipulation' for clear felling, and 'game management' for hunting of wild animals.

Critical ecolinguistics, pioneered by Halliday in 1992, exposes the growthism (portraying growth as semantically unmarked and positive: bigger is better), classism, and speciesism (privileging the human perspective: man is the master of creation) of Western languages, and there are now numerous studies on these trends (see Fill and Mühlhäusler, 2001). The dominance of inappropriate English expressions in the environmental domain is spread through translation. European Union legislation, for instance, requires intertranslatable environmental terminology, and the new member states model their terms on existing English expressions. The resulting process can be characterized as semantic colonization. Conversely, environmental concepts from traditional languages spoken in nonindustrial societies rarely find their way into the green terminology that has developed in English and other world languages over the last decades.

Properties of Grammatical Constructions

Studies beyond the level of green lexicon are rare. Halliday's (1992) suggestion that grammars are the fossilized memory of experience has prompted a number of writers to explore how radically different grammars (e.g., ergative vs. nominative-accusative) reflect fundamentally different attitudes to the relationship

between humans and nature. They point out, for instance, that ergative languages, or languages in which cause–effect relationships are difficult to encode, reduce the disposition of their speakers to change their environment. Noun classification systems differentially emphasize or deemphasize the solidarity of humans with other life-forms, as does the inclusion or exclusion of animals in the same gender class as humans.

An extensive list of environmentally problematic grammatical practices in modern European languages is given by Chawla (1991). These practices include passive constructions in environmental texts, which suppress the actor or human agency in environmental degradation, and nominalizations, which reduce processes to abstract objects, as in 'water condenses' becoming 'condensation occurs.'

Properties of Texts and Discourses

The Whorfian idea of linguistic determinism suggests that language structure predisposes language users to develop specific attitudes and actions. It fails to account for the observation that within one and the same language, very different discourses about environmental matters can be produced. For instance, different language is used by developers and environmentalists to describe the same landscape. These differences involve lexical choice as well as the differential use of pronouns. Thus, 'we' can refer to either 'humans and nature' or 'developers and clients.' Similar differences between conservationists' and seal hunters' discourses have been described by Martin (1986). When examining discourses from a narrative perspective, it is found that groups with opposing views on environmental issues typically use the same narrative structures, the difference being the choice of who are the heroes and who are the villains (see Harré *et al.*, 1999). Very different perceptions of the environment are created by the economic, moral, and scientific macro discourses. These discourses often raise conflicting perceptions, particularly on issues such as the need to reduce overpopulation of animals to prevent destruction of their habitat. Irving (2002) describes the cyclical discourses about the koalas of Kangaroo Island. These animals, which enjoy a charismatic status on the Australian mainland, were introduced to the island in the 1920s, where they multiplied to plague proportions. Scientific arguments for the cull or reduction of the koalas have been repeatedly put forward and rejected on moral and economic grounds, and the matter remains unresolved. Another domain in which scientific discourses clash with economic and moral discourses is ecotourism (Mühlhäusler and Peace, 2001).

Environmental Metaphor

Because environmental awareness is of recent origin in Western societies, environmentalist language not only developed numerous new terms but also developed a number of metaphors. Such metaphors have been the focus of several studies (Harré *et al.*, 1999; Döring, 2002; Mühlhäusler, 2003). Environmental metaphors can be analyzed as cultural core metaphors (e.g., our environment is the book written by God, a larder, or a machine), rhetorical devices that help reconcile conflicting discourses (one buys products that do not cost the earth), heuristic devices (the 'sink' metaphor has been employed to explore the possibility of reducing global warming through heat sinks and carbon sinks), and rhetorical devices to justify environmental policies such as population control (lifeboat earth, spaceship earth).

Those concerned with the effect of key metaphors on environmental perceptions and actions note that the different players in the environmental debate live by a range of different metaphors. This makes both local and global agreement on environmental action very difficult.

Critiquing environmental metaphors is a key concern of many ecolinguists. Ecofeminists have pointed out that the metaphors of male explorers such as 'virgin territory' or 'penetrating the interior' are essentially rape metaphors. Similarly, managerial, corporate metaphors such as 'environmental management system,' 'environmental auditing,' 'environmental performance evaluation,' or 'environmental objectives' have received much criticism, as has the metaphor of reification, the portrayal of situated processes as timeless, bounded objects.

Ongoing Dichotomies

In what has been said thus far, the notions of language and environment have been seen as distinct. This view contrasts with the ecological or biocultural approach (Maffi, 2001), which replaces the dualistic view of the relationship between language and the environment with a more complex holistic notion that nature and culture, language and environment are inextricably linked and that the diversity of linguistic and cultural perspectives is a key factor in biological diversity and environmental health. It has been proposed (Harré *et al.*, 1999; Maffi, 2001) that the fit between traditional languages and their natural environment was brought about by the necessity of languages to match the diverse environments in which they are spoken. This leads to the conclusion that the loss of linguistic diversity is a key factor in the loss of biological diversity.

Just as natural ecologies are seen as structures and are defined by functional interconnections between their inhabitants and their habitats, linguistic diversity is seen as similarly structured, with small languages being important for the viability of larger ones and vice versa. Haugen's metaphor of a competitive marketplace has been replaced by a metaphor of protective layers (Mühlhäusler, 1998). In a layered language ecology, the smallest local vernaculars are sheltered from neighboring vernaculars by intercommunity Pidgins, regional Pidgins, and larger lingua francas. The layer metaphor seeks to explain why small vernaculars have become very vulnerable when intercommunity languages are replaced by a single, large, national language.

Applications and Prospects

Any linguistics that increases the number of parameters it considers provides for a larger number of applications and explanations. The language and environment approach has begun to be applied to language planning, and Liddicoat and Bryant (2000: 305) suggest that "where planning does not consider ecology the result is typically environmental damage, in language as much as in other areas."

Increasingly, language planners consider the social and natural environments of their activities, and in particular the question of whether the introduction of new practices (e.g., literacy or Information Technology), into the environment of indigenous traditional languages might have an adverse effect on their viability. The suggestion that misleading labeling can lead to environmental degradation has been applied to environmental education and signage and has led, for instance, to the renaming of small Australian land animals (previously referred to as rats) with names that remove the perceived undesirability that 'rat' suggests. Examples include Djoorri for the common rock-rat, Palyoora for the plains rat, Tooaranna for the broad-toothed rat, and Rakali for the water-rat (Braithwaite *et al*., 1995).

Critical environmental linguists have proposed a number of changes in product labeling (e.g., more careful use of the descriptor 'natural' in the United Kingdom) and in the wording of environmental impact assessments. Interestingly, in Wales there is now a requirement of a linguistic impact statement. Critical reassessment of the term 'natural' is also encountered in the debate about causes of so-called natural disasters such as landslides, floods, or droughts, which often turn out to have been triggered by human activity. The idea of languages having an environment or being part of the ecology has produced significant development in the areas of literacy education (e.g., Barton, 1992) and L2 education. Language learning is now seen to take place in a classroom environment or wider social environments that affect its success.

As yet, most writings on language and education have been of a theoretical or critical nature rather than empirical, and the findings that have been made in recent years have been slow in reaching wider public awareness and policy making. Organizations such as Terralingua (http://www.terralingua.org), or events such as the 2004 World Expo of Language and Cultures in Barcelona, may help to popularize the ideas addressed here. The establishment of a new publication focused on an ecological approach to language planning (*Current Issues in Language Planning*) should promote new departures in language planning practices.

See also: Halliday, Michael A. K. (b. 1925); Haugen, Einar (1906–1994); Integrational Linguistics (IL); Language Families and Linguistic Diversity; Language Planning and Policy: Models; Mufwene, Salikoko (b. 1947); Sapir, Edward (1884–1939).

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Epistemology and Language

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There has always been a close relation between theories of language, mind, and knowledge, and over the past 80 years, the connection between epistemology and language has typically manifested itself in one of two ways.

First of all, reflection on language has been used to give an account of the meaning of epistemic terms like 'know,' 'rational,' and 'justified,' which have nontrivial, often antiskeptical, consequences. For instance, Strawson (1952) argued that using induction is an essential part of what we *mean* by having 'reasonable' or 'justified' beliefs about the world around us, and so it made no sense to worry about the 'rationality' or 'justification' of induction. More counterintuitively, Malcolm (1952) argued the there was a "strong" sense of "know" in which it was impossible for him to doubt that he knew that there was, say, a pen in his hand, since he would have counted *nothing* as evidence against this claim.

This sort of 'ordinary language' approach has generally (and justly) fallen out of favor, as its presuppositions about the meaning of epistemic terms are now viewed as implausible. However, a related strategy that drew from the same Wittgensteinian roots (Wittgenstein, 1969) has emerged in the form of contemporary 'contextualist' epistemologies. These argue that our use of 'know' and related terms is context sensitive in ways that allow the skeptic's claim that we know nothing about, say, the external world *and* our everyday claims to know commonplace facts about the world to *both* be true. It's just that the standards for applying the term 'knowledge' (like those for the application of terms like 'tall') shift from context to context (DeRose, 1995; Williams, 1991).

Such 'therapeutic' approaches do not so much solve traditional skeptical problems as show them to rely upon misunderstandings about how our epistemic terms operate. There is, however, a second way in which philosophical theories of language can be used to respond more 'directly' to traditional epistemological problems.

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Such 'therapeutic' approaches do not so much solve traditional skeptical problems as show them to rely upon misunderstandings about how our epistemic terms operate. There is, however, a second way in which philosophical theories of language can be used to respond more 'directly' to traditional epistemological problems.

The second approach focuses not upon the meaning of specific terms, such as 'know,' but rather upon our ability to derive epistemological conclusions from any *general* account of meaning that outlines the limits of our representational capacities. The limits of our representational capacities determine the extent to which certain sorts of skeptical doubts are legitimate and a general theory of language could thus be used as a weapon against skepticism.

To take an illustrative example, classical verificationism, which understood the meanings of our utterances in terms of the experiences taken to verify them, had clear antiskeptical consequences. If the meaning of a statement like 'there is a pen in front of me' were determined by the experiences standardly used to confirm it, and I could *know* that I'm having such experiences, then I could know that there is a pen in front of me. The verificationist theory of meaning thus blocked skepticism regarding the transition from knowledge of our experience to knowledge of the 'external' world (Ayer, 1936). Of course, it did this at the expense of making problematic our being able to talk or think about anything other than our own experiences.

This general pattern carries over to most other attempts to draw epistemic conclusions from a general theory of linguistic representation. Any substantial account of meaning that treats it as determined by some aspect of our *use* will give a certain amount of epistemic privilege to that meaning-determining aspect, and such privileging may undermine various local or global skeptical worries. However, the antiskeptical advantages that use-based accounts of meaning bring often come at the cost of having to endorse antirealism about facts that we intuitively take to be more 'objective.'

For instance, 'descriptive' theories of meaning took what we meant by (many of) our terms to be determined by (some of) the descriptions we associate with them. 'Pen,' say, gets its meaning by having a description like 'cylindrical handheld artifact used to write with ink' associated with it. However, if such descriptions determined the meaning of the terms involved, then they could be known to be true in virtue of those meanings, and thus a purely 'linguistic' explanation of the possibility of *a priori* knowledge becomes available. We could know *a priori* that all pens are artifacts, because this proposition followed from the meaning of 'pen.' *A priori* truths were so knowable because they were analytic, that is, true in virtue of their meaning (Ayer, 1936).

In addition to the general doubts about analyticity stemming from Quine's work (1951), the description theory suffered from the fact that many of the propositions that it suggested that we knew *a priori* seemed, on reflection, not to be so knowable. There are, as Putnam stressed, things that we *actually* apply the term 'pen' to, and if *they* turned out not to be artifacts (say, they were alien organisms that were born rather than manufactured), then we would conclude that pens were not artifacts, not that there were no pens (Putnam, 1975). The description theory showed how *a priori* knowledge would be possible, but doubts about such knowledge undermines the descriptive theory itself.

Descriptive theories made the mistake of tying what we mean exclusively to the general characterizations we associate with a term while ignoring what we have actually applied the term to (its 'putative extension'). This would suggest another approach to meaning, one that tied a term's meaning more closely to its putative extension. Such accounts can have antiskeptical consequences as well, but unlike descriptive theories, which seem better suited to underwrite *a priori* knowledge, such accounts underwrite perceptual knowledge.

Tying what a term means to its putative extension (or at least some privileged subset of it) is characteristic of the 'externalist' conceptions of meaning, which replaced the description theories in the 1970s (Kripke, 1972; Putnam, 1975). Such theories were often taken to rule out global skepticism about the external world, since if past usage determined what we meant by a term, then it made no sense to say that we might have always *mis*applied it. If, for instance, we were all brains in vats, and our 'perceptions' had always been determined by a supercomputer we were connected to, then our beliefs and assertions about the 'pens' around us would still be true, since by 'pen' we would mean the *virtual* pens that caused our pen utterances, not the 'real' pens that we hadn't had any contact with (Putnam, 1981). The externalist needn't rule out the kind of scenario that the skeptic traditionally relies on; she just denies that in such a scenario our beliefs would be false.

However, as an antidote to skepticism, such simple versions of externalism face two problems. First of all, even if externalism seems to secure the general veridicality of our beliefs, it does so at the expense of making our knowledge of our own thoughts problematic. After all, if the content of our beliefs is determined by such 'external' factors such as the nature of those items in our environment that we have *actually* applied it to in the past, and we don't have introspective access to such factors, then we may seem to lack introspective access to the content of our own beliefs (McKinsey, 1991; Falvey and Owens, 1994). We may have true beliefs, but our ignorance of their content prevents us from having knowledge. Second, it does seem possible that all of our applications of a term

could be misapplications. For instance, there have been many witch sightings throughout history, and since there are no witches, we can assume that all these perceptually based witch beliefs were false. Our general characterization of 'witch' was not satisfied by any of the people who were called 'witches.' The fact that the meanings of our terms could be affected by these general characterizations makes the transition from externalism to antiskepticism about perceptual judgments problematic. (The same problem emerged with the earlier 'paradigm case' arguments, which also made an attempt to equate a term's meaning with 'uncontroversial' cases of what we actually applied it to.)

The problems with these two sorts of account suggest that one's account of meaning should involve *both* a term's putative extension and the general characterizations associated with it. Something like this combination is found in Davidson's tying meaning to all of the sentences we take to be true, where this class includes both our general beliefs and our dispositions to apply terms to various objects in our actual environment. Davidson insists that on such a holistic account, we must treat a term's meaning as being that which would make *most* of the commitments associated with it true, so his view can still be understood as having antiskeptical consequences (Davidson, 2002). It might be that most of our beliefs about pens were false (because they weren't true of what we actually applied the term to), or it might be that most of the things we called 'pens' weren't pens (because they didn't satisfy most of our central 'pen beliefs'), but it couldn't be the case that *both* sorts of mistakes were the norm.

Still, even if most of our commitments turn out to be true on such an account, there will be no way to tell *a priori* which these will be. The holistic nature of the dynamic between our terms' putative extensions and general characterizations may insure that if our terms pick out anything at all, then the most deeply entrenched elements of our usage will turn out to be correct, but there is no guarantee that any *particular* aspect of a term's putative extension or general characterization will be among the set that ultimately reflects what we mean. Further, the fact that worries about our semantic self-knowledge remain on such an account, and that we can't be sure of the truth of any *particular* belief, suggests again that what the holistic theory gives us is a confidence that most of our beliefs must be true, not knowledge of any particular set of propositions.

It seems, then, that neither analyses of particular epistemic terms such as 'know' nor general semantic theories ruling out widespread misrepresentation can completely put skeptical worries to rest. This may be fortunate, since such strong antiskeptical consequences can be viewed as a sign that a semantic theory treats our representational capacities as *too* constrained and that a more expansive notion of what contributes to meaning is needed (Nagel, 1986).

See also: Analytic/Synthetic, Necessary/Contingent, and *a priori/a posteriori*; Causal Theories of Reference and Meaning; Contextualism in Epistemology; Davidson, Donald (1917–2003); Externalism about Content; Holism, Semantic and Epistemic; *A Priori* Knowledge: Linguistic Aspects; Kripke, Saul (b. 1940); Meaning: Overview of Philosophical Theories; Ordinary Language Philosophy; Putnam, Hilary (b. 1926); Quine, Willard van Orman (1908–2000); Radical Interpretation, Translation and Interpretationalism; Reference: Philosophical Theories; Strawson, Peter Frederick (b. 1919); Thought and Language: Philosophical Aspects; Truth Conditional Semantics and Meaning.

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Equatorial Guinea: Language Situation

Editorial Team

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Equatorial Guinea is one of the smaller African countries, with an area of about 28 000 sq km and a population of just under 0.5 million people. Its language situation, however, is comparatively complex, like that of many neighboring African countries. Geographically, Equatorial Guinea is divided into a mainland part (Riu Muni), bordering Cameroon in the north and Gabon in the east and south, and several islands, the most important of which is Bioko Island (formerly Fernando Po), on which the capital of Malabo is situated. Equatorial Guinea was a Spanish colony for almost 200 years, until independence in 1968. Although for a long time it was among the poorer countries of the world, Equatorial Guinea's economy has seen tremendous growth rates since the first revenues from the newly established oil industry in 1996. It remains to be seen if the increased income will benefit the country at large.

The main languages of Equatorial Guinea are the Bantu languages Fang, a major language of the mainland, and Bube, of Bioko Island. Smaller Bantu languages spoken mainly on the coastal strip of the mainland and adjacent islands include Batanga, Benga, Ngumba, Ngumbi, Seki, Yasa, and Gyele. Spanish, the official language, is an important language in government, administration, the media, and education. French and West African Pidgin English (also called Weskos) play an important role as lingua francas in urban areas, due to comparatively large communities from neighboring West African countries, especially Nigeria and Cameroon. Two creole languages are spoken in Equatorial Guinea; Fernando Po Creole English, an English-based creole, similar to Krio, which is found mainly in the northern part of Bioko Island near Malabo, and Fa D'Ambu (or Annobonese), a Portguese-based creole spoken on the southern island of Annobón and by the Annobonese community on the island of Bioko. Fa D'Ambu originated on the then Portuguese island of Annobón as a pidgin language of speakers from different parts of the Portuguese colonies Angola and São Tomé who had been brought to Annobón as part of the Portuguese slave trade. Fa D'Ambu enjoys comparatively high prestige amongs its speakers and is used in many communication domains.

Spanish is the dominant language used in administration, education, and media. There are some eight radio stations and one state-owned TV station that broadcast mainly in Spanish, with some programs in other languages. Education at the primary and secondary levels is provided in Spanish. The literacy rate is around 70%.

See also: Pidgins and Creoles: Overview.

Language Maps (Appendix 1): Map 14.

Ergativity

C D Manning, Stanford University, Stanford, CA, USA

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The term 'ergativity' is used to refer to phenomena in which the subject of an intransitive verb is treated the same as the object of a transitive verb, in situations where the subject of a transitive verb is treated differently. This contrasts with languages like English, in which the subject of an intransitive verb is treated the same as the subject of a transitive verb. The phenomenon of ergativity was first noted and is most common and clear when it appears in morphological marking, so let us begin with a morphological example. Contrast Latin morphology, in which the intransitive subject of (1a) has the same nominative case as the transitive subject of (1b), but the intransitive object is marked differently, in accusative case, with

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Inuit (Greenlandic Inuktitut) morphology, in which the intransitive subject of (2a) is marked in the same absolutive case as the object of the transitive sentence in (2b) and the transitive subject of (2a) is given a different, ergative case marking. One can also observe the Latin morphological pattern in English pronouns (*She comes/She hears him*), but in English, morphological marking is restricted to pronouns.

(1a) puella veni-t
girl.NOM *come*-PRES.IND.3SG
'the girl comes'

(1b) puer puella-m audi-t
boy.NOM *girl*-ACC *hear*-PRES.IND.3SG
'the boy hears the girl'

(2a) Oli sinip-poq
Oli.ABS *sleep*-IND.INTR.3SG
'Oli sleeps'

(2b) Oli-p neqi neri-vaa
Oli-ERG *meat*.ABS *eat*-INDIC.TRANS.3SG.3SG
'Oli eats meat'

Geographical and Linguistic Distribution of Ergative Languages

Ergative morphology at first seems rather strange and unnatural to those with a background in traditional grammar and the major European languages. However, it is not at all uncommon; around one-quarter to one-third of languages have ergativity (to varying extents). Ergativity is unevenly distributed geographically. It is particularly common among Australian, South American, Caucasian, Asian, and Pacific languages. In some sense, the best known ergative languages are perhaps Basque and Inuit. The ergative language with the most speakers is Hindi. Mayan languages are also mainly ergative. The uneven geographic distribution of ergative languages is to be expected, given that many languages are related as part of larger language families, which usually occur over a contiguous geographic area. However, it is important to note that many language families contain both ergative and accusative languages. The Indo-European language family includes many languages exhibiting ergativity in the Indo-Iranian part of the family tree. Conversely, Australian languages are mostly morphologically ergative, but there are some subgroups with accusative morphology, particularly the Mantharta subgroup from northwest Western Australia (Dench, 1982).

Ergative Argument Marking (Morphological Ergativity)

It makes good communicative sense that languages should have a basic coding method to differentiate the two arguments of a transitive verb. Although it is unnecessary for some verbs, such as with *The man cooked beans*, there are many predicates such as *The man saw the lion,* in which this disambiguation is important. Indeed, all languages do this, using three mechanisms: (1) changing the form of words of the dependent argument, that is, by case-marking morphology; (2) putting agreement markers on the head predicate; or (3) using the ordering of the arguments. This does not mean that the result is always unambiguous, though; there are some cases in which ambiguity remains because either case markers show syncretism across cases or agreement markers do not differentiate arguments of the same person, number, and gender. But in general these mechanisms allow us to distinguish the meanings of examples (1b) above versus (3).

(3) puer-um puella audi-t
boy-ACC *girl*.NOM *hear*-PRES.INDIC.3SG
'the girl hears the boy'

Use of standard grammatical terminology can become confusing or even misleading in the context of ergative languages because sometimes people use terms like 'subject' thinking of a subject's role as the main syntactic element in a clause and sometimes thinking from a more semantic vantage point, seeing the subject as indicating the most agentive argument. Here it is assumed that a predicate has an argument structure that gives the semantic roles of the predicate's arguments, and that these are divided into core arguments, which are normally mapped onto the surface subject and any objects (including possibly agentive complements in ergative languages), and oblique arguments, which are typically marked by oblique case markers or prepositions. This article will use the abbreviations A, S, and O to refer unambiguously to core arguments of a clause at the level of argument structure (following the notation of Dixon (1994), the standard reference text on ergativity). S is the single argument of an intransitive verb, and A and O are the two core arguments of a transitive verb. The more agent-like argument (or 'proto-agent,' in the terminology of Dowty, 1991) is denoted A, and the more 'undergoer'-like argument (or 'proto-patient') is denoted O. I will then use the term 'subject' exclusively to refer to the syntactically most prominent grammatical argument relation in a clause (Dixon, 1994, refers to this notion as the 'pivot').

Theories of case marking in turn standardly distinguish the main grammatical or structural cases, which mark the core arguments of intransitive and transitive verbs, regardless of their semantic role, from oblique cases, which are more semantically transparent in

meaning. The majority of languages with case marking have at least two structural cases, one used for the A and S arguments and the other for O arguments. These cases are termed 'nominative' and 'accusative.' Normally the accusative case is the marked case, as in the Latin examples 1a and 1b, and so we refer to such languages as accusative. By extension, any phenomenon that groups together S and A in opposition to O is also referred to as accusative. In the alternative organization, shown for Inuit in examples 2a and 2b, there are still two cases. Most linguists accept that they are still both structural cases (although some have argued for an analysis of ergativity whereby ergative languages have only one structural case and the ergative case is a semantic case). But in this case, the structural cases group S and O in opposition to A. This time, the case used to mark S and O is called 'absolutive,' and the case used to mark A is called ergative. As in the Inuit example, it is the ergative case that is the marked case, and so such languages are termed ergative, and by extension, any phenomenon that groups S and O in opposition to A is termed ergative.

Concerns of disambiguation motivate a system that differentiates A and O, but the remaining question is how to mark the single argument of an intransitive verb. One choice would be to mark it in a third way. There are occasional instances of such tripartite systems, but they are extremely rare and perhaps best thought of as a fairly unstable diachronic stage. A second choice would be to mark agent-like arguments of intransitive verbs like A arguments and patient-like arguments of intransitive verbs like S arguments. Such a 'split S,' or 'active-stative,' system is rather more common and occurs in various languages around the world, particularly North American and Caucasian languages – including some languages that are usually referred to as ergative (Mithun, 1991). For instance, it can be found in Basque (Hualde and Ortiz de Urbina, 2003):

(4a)	Jon	etorri	da
	Jon.ABS	*come:PTCP.PRF*	*is.3SG.INTR*
	'Jon came'		
(4b)	Jon-ek	saltatu	du
	Jon-ERG	*jump.PTCP.PRF*	*have.3SG.TR*
	'Jon jumped'		
(4c)	Jon-ek	ardo-a	ekarri
	Jon-ERG	*wine-DET.ABS*	*bring.PTCP.PRF*
	du		
	have.3SG.TR		
	'Jon brought the wine'		

Such active-stative marking may either be 'lexicalized,' whereby certain intransitive verbs select for a particular case, or it may be 'fluid,' with the choice of case marking indicating the perceived agentivity or volitionality of the action. It should be noted that for many languages with active-stative marking, either fluid marking or one choice of intransitive subject marker occurs only with a very restricted set of verbs, and so the languages have an overwhelmingly accusative or ergative character, and this restricted set of verbs might be considered exceptional. Such is the case for Basque.

The common situation across languages is that the S argument of intransitives is encoded uniformly like either the A or O argument of transitives, regardless of the verb's meaning, and this gives us the accusative and ergative case marking patterns with which we began in examples 1 and 2. These two case-marking choices can be illustrated graphically as follows:

(5)

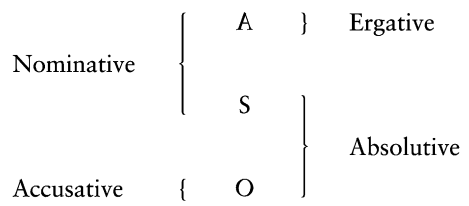

In this diagram, there is no particular reason to choose one system or the other. Using either is sometimes natural and sometimes does violence to the semantics because one is either using a basically agentive marker sometimes for undergoer S arguments or else sometimes using a marker usually used for undergoers for an agent-like S argument. Nevertheless, a desire for economy in surface forms of expression appears to lead most languages to use one or the other strategy. Moreover, while the above diagram makes the two methods of marking entirely symmetric, the discussion of split ergativity below shows that this apparently symmetrical picture is actually somewhat misleading.

Ergative case marking is by far the most common strategy for ergative core argument marking, and we have already illustrated it in example 2. In the vast majority of ergative languages, the absolutive case is a bare stem with no overt case marker, and the ergative case is an overt case marker. In other respects too, the absolutive appears to be unmarked, and the ergative is a marked case. A common analysis is thus to unify absolutive and nominative as a single unmarked nominative case and then to view accusative and ergative as marked case forms.

A more modest number of languages have an ergative verbal cross-referencing system. Sometimes there is something more like participial agreement information (number and gender) on the verb agreeing with the absolutive (as in Hindi), but for other languages, like the Papuan language Yimas (Foley,

1991) or Mayan languages, there is an ergative cross-referencing system (S and O are marked the same in an agreement slot that precedes the A agreement slot):

(6a) pu-tmuk-t
3PL-fall-PERF
'they fell down'

(6b) pu-ka-tay
3PL-1SG-see
'I saw them'

(6c) na-mpu-tay
3SG-3PL-see
'they saw him'

Finally, there is extremely little evidence of languages showing ergativity only by word order (unlike the case for accusative languages), but there are cases in which the word order is ergatively patterned in line with another marking system, for instance Päri (Andersen, 1988):

(7a) ùbúr á-túuk`
Ubur PERF-play
'Ubur played'

(7b) jòobì á-kèel ùbúrrì
buffalo.ABS PERF-shoot Ubur-ERG
'Ubur shot the buffalo'

Syntactic Ergativity

The different morphological marking of ergative languages might suggest a very different syntactic organization at work, and this was certainly assumed by many early grammarians encountering ergative languages. Anderson (1976) questioned this, suggesting that languages with ergative morphology actually have the same syntactic organization as languages with accusative morphology. As an example of this, the Basque examples below from Ortiz de Urbina (1989) show how an absolutive reciprocal can be bound by an ergative noun phrase (NP) (8a), while the reverse is impossible (8b). Reciprocals never appear in the A or S subject positions, but an S can also bind an oblique reciprocal (8c):

(8a) Gudari-ek elkar hiltzen zuten
soldiers-ERG RECIP.ABS kill AUX
'the soldiers$_i$ killed each other$_i$'

(8b) *Gudari-ak elkarr-ek hiltzen zituen/ zituzten
soldiers-ABS RECIP-ERG kill AUX
'theyselves$_i$ killed the soldiers$_i$'

(8c) Lagun-ak elkarr-ekin joan dira
friend-ABS RECIP-with go AUX
'the friends$_i$ have gone with each other$_i$ (i.e., together)'

This analysis indeed appears to be true for many languages with ergative morphology. However, it has now been comprehensively established that a subset of ergative languages show an ergative organization in their syntax (to varying extents) as well. The most famous examples are certain north-eastern Australian languages such as Dyirbal (Dixon, 1972). Among other evidence, we find that clause linking (processes of reduction in clause coordination) patterns ergatively. The two clauses have to share an S/O NP:

(9a) bayi yara baŋgul gubi-ŋgu
this.ABS man.ABS this.ERG gubi-ERG
munda-n baŋgun jugumbi-ru balga-n
bring-NFUT this.ERG woman-ERG hit-NFUT
'the gubi [shaman] brought the man here and the woman hit (him)'

(9b) bayi Burrbula baŋgul gubi-ŋgu
this.ABS Burrbula.ABS this.ERG gubi-ERG
bara-n baji-gu
punch-NFUT fall.down-PURP
'the gubi punched Burrbula$_i$ and [he$_i$] fell down'}

Many (although not all) syntactically accusative languages have a passive verb form, used to demote an agent to an oblique, a process that can then feed syntactic operations like clause chaining (as in *I came and was seen by Bill*). Conversely, a good number of ergative languages have an antipassive verb form, used to demote an absolutive to an oblique case, intransitivizing the verb. In the example below, the antipassive demotes the O argument of *see* to being a dative oblique so that clause chaining can occur between two intransitive clauses:

(10) ŋana banaga-ɲu bural-ŋa-ɲu
we.NOM return-NFUT see-ANTIPASS-PURP
ɲura-ŋgu
you-DAT
'we returned and saw you'

However, this is not the full story. Antipassives occur quite commonly in ergative languages regardless of whether they are only morphologically or syntactically ergative, and some ergative languages have both a passive and an antipassive. An example is Inuit, as in the examples below from Bittner (1994). Going in the opposite direction, there do not appear to be cases of a general antipassive construction in languages with accusative morphology and syntax, although there are occasional more limited processes with similar effect (such as *unspecified object deletion* in English, which gives *I ate* from the transitive verb *eat*).

(11a) Juuna-p miiqqa-t
Juuna-ERG children-PL.ABS
paar-ai
look.after-IND.TR.3SG.3PL
'Juuna is looking after the children'

(11b) miiqqa-t Juuna-mit
child-PL.ABS *Juuna*-ABL
paari-niqar-put
look.after-PASS-IND.INTR.3PL
'the children are looked after by Juuna'

(11c) Juuna miiqqa-nik
Junna.ABS *child*-PL.MOD
paari-si-vuq
look.after-ANTIPASS-IND.INTR.3SG
'Juuna is looking after children'

In almost all theories of syntax, there are notions corresponding to subject and object as surface grammatical relations, regardless of whether they are primitives of the theory or defined configurationally in terms of phrase structure positions. The question then is how to map syntactic ergativity onto surface grammatical relations. There are a number of conceivable answers to this conundrum, all of which have been proposed by some linguists. Possible approaches are given in (12).

(12)

a	Subject	A, S	Syntactic accusativity
	Object	O	
b	Oblique agent	A	Oblique ergative analysis
	Subject	S, O	
c	Subject	A	Absolutive-S as object
	Object	S, O	
d	Subject	A	Ergative Four relations analysis
	Object	S, O	Absolutive
e	Object	A	Inverse analysis
	Subject	S, O	

Approach 12a gives the language an analysis like an accusative language. This appears to be the right analysis for languages with only morphological ergativity, such as Warlpiri or Basque, but does not explain the appearance of ergative syntactic constructions of the sort we have just discussed. The approach shown in 12b treats the ergative as an oblique rather than a core argument of the sentence. This is also the claim of an ergative-as-passive analysis, which says that syntactic ergativity is the result of covert passivization. The two analyses differ only in terms of mechanism. Such an analysis says that syntactically ergative languages have only intransitive sentences and that ergative is an oblique case. This analysis does not appear to be correct. There are good arguments from languages that show syntactic ergativity, such as Dyirbal and Inuit, that clauses with an ergative NP are transitive (Manning, 1996). For instance, this seems the only way to understand valency-changing operations, such as the Dyirbal applicative, or the presence of nominative-accusative morphology on pronouns in the language. Approach 12c treats the absolutive S as an object, and so sentences with an S are in some sense intransitive but subjectless. This analysis has some appeal but fails to capture that the absolutive NPs in syntactically ergative languages have classic subject properties for phenomena like clause chaining, as we observed above. The four-relations analysis makes all four putative grammatical relations available in every language. It is harder to prove such an analysis wrong, but besides transgressing on the count of general permissiveness, it does not by itself predict the restrictive patterns of mixed syntactic behavior that are found in languages, which we turn to below. The inverse analysis treats the S and O as the grammatical subject in syntactically ergative languages, while the A is analyzed as an object (or an agentive complement, if one frowns on viewing a semantic agent as an object). This analysis naturally explains the surface syntactic patterning of ergative languages, such as the Dyirbal clause-chaining facts shown in example 10, and is the analysis adopted in Manning (1996). However, more needs to be said to explain the rather mixed character of many syntactically ergative languages, and this topic is taken up in the next section.

An alternative analysis is to suggest that, while there is an inversion whereby the absolutive argument has a certain sort of prominence in syntactically ergative languages, this does not happen at the level of grammatical relations (that is, an analysis of syntactic accusativity is assumed) but rather at the level of interclausal organization or discourse (Du Bois, 1987).

Split Ergativity

There is an asymmetry in linguistic systems in that while many languages appear to be entirely accusative in terms of their case marking, agreement, and

syntactic systems, there do not appear to be any languages that pattern entirely ergatively. Many languages have a largely ergative nature, but there always seem to be some traces of accusative organization, while yet other languages show quite a mix of ergative and accusative characteristics. The split between ergative and accusative patterning can be organized along a number of dimensions, and it can span both morphology and syntax.

Splits in Case Marking

Beginning first with morphology, in general languages with ergative case marking patterns are actually split between ergative and accusative. There is a continuum; some use nearly entirely ergative case marking, whereas in others ergativity is much more limited. A dimension of variation is what conditions the split. Various Indic languages, such as Hindi, are well known for having split ergative case marking in which ergativity appears only in the perfect aspect. A tense- or aspect-conditioned split is also found in some other languages, such as Burushaski. Some Urdu examples from Butt (1995) are shown here:

(13a) Naadyaa xat lik^{h}-tii
Nadya(FEM) *letter*(MASC) *write*-IMPF.F.SG
hai
be.PRES.3SG
'Nadya writes a letter'

(13b) Naadyaa-ne xat lik^{h}-aa
Nadya(FEM)-ERG *letter*(MASC) *write*-PERF.MASC.SG
hai.
be.PRES.3SG
'Nadya has written a letter'

(13c) Naadyaa-ne ciṭṭ^{h}ii lik^{h}-ii
Nadya(FEM)-ERG NOTE (FEM) *write*-PERF.FEM.SG
hai
be.PRES.3SG
'Nadya has written a note'

Note the change of verbal agreement as well as the case marking (in general, Hindi verbs agree only with nominative arguments).

Perhaps the most common, and certainly the most discussed, kind of split-ergative case marking occurs when some noun classes are marked ergatively and others accusatively. The splits that usually occur have an interesting patterning, which is captured in the Silverstein Hierarchy (Silverstein, 1976):

(14) The Silverstein Nominal Hierarchy
1st and 2nd person pronouns > 3rd person pronouns/demonstratives > Proper nouns > Animate nouns > Inanimate nouns

The general functional pressure underlying this hierarchy is that things at the left end of the hierarchy are more likely to be an actor that serves as the A role, while things at the right end are more likely to be acted on and fill the O role. To the extent that case marking serves to mark nonstandard configurations but an unmarked absolutive/nominative marks the default role of an NP, it makes sense to mark things at the right end, when they are serving as A, by an ergative case and things at the left end, when they are serving as O, by an accusative case. Many languages do this. For example, in Dyirbal, just first- and second-person pronouns have nominative/accusative marking; all other nominals are ergatively marked (Dixon, 1994):

(15a) ŋana banaga-ɲu
we.NOM *return*-NONFUT
'we returned'

(15b) ɲurra banaga-ɲu
you.PL.NOM *return*-NONFUT
'you all returned'

(15c) ɲurra ŋana-na bura-n
you.PL.NOM *we*-ACC *see*-NONFUT
'you all saw us'

(15d) ŋuma yabu-ŋgu bura-n
father.ABS *mother*-ERG *see*-NONFUT
'Mother saw Father'

Note that this morphological split does not have ramifications for the syntax of Dyirbal; phenomena like clause chaining behave the same regardless of the morphology, as was partially illustrated in (10) above. This independence of morphology and syntax appears to be the norm across ergative languages, regardless of whether they have ergative or accusative syntax.

Things do not always work out quite as simply as the Silverstein Hierarchy suggests. Sometimes the ranges of ergative and accusative marking overlap, and there is tripartite marking in the middle of the scale; sometimes the facts are complicated by certain case markings being present in particular noun classes at a more fine-grained level than the hierarchy above can capture. But the hierarchy is nevertheless a useful typological starting point.

Split between Case Marking and Agreement

Another very common form of split is between nominal case marking and verbal coreferencing. Here, the standard pattern is that nouns show ergative case marking, but the verbal coreferencing is accusative. This is illustrated by the Australian language Warlpiri in the examples below. Nouns (including pronouns) show ergative case marking, but verbal agreement on the auxiliary cross-references core arguments on an accusative pattern.

(16a) Ngaju ka-rna wangka-mi
I.ABS AUX.PRES-*1*SG *speak*-NONPAST
'I am speaking'

(16b) Ngajulu-rlu ka-rna-ngku nyuntu
I-ERG AUX.PRES-*1*SG-*2* *you*.ABS
nya-nyi
see-NONPAST
'I see you'

There do not appear to be languages that exhibit the opposite split of having uniform accusative morphology but ergative verbal agreement.

Splits in Syntactic Behavior

The traditional basis for identifying syntactic ergativity is to use phenomena that linguists have seen as associated with the subject of a sentence, then to see whether a phenomenon exists in a certain language, and then whether it applies to only S and A noun phrases or only S and O noun phrases. On this basis, Dyirbal has been the canonical case of a language with strongly ergative syntax. However, even in Dyirbal, it is not the case that all subject properties fall to the absolutive NP. For instance, the role of being the addressee of an imperative certainly groups S and A. Dyirbal perhaps only looks more ergative than some other languages because some other properties that typically behave syntactically accusatively in languages are not applicable tests in Dyirbal. For example, reflexive binding is done by a detransitivizing verb form. Although there are some analytically difficult cases, most languages with syntactic ergativity seem to show a fairly consistent split in terms of which syntactic tests show syntactic ergativity and which do not, as in Table 1.

For example, we can contrast in Inuit the fact that only S and O arguments can be relativized on in Inuit (participial) relatives, as in 17a through 17c, while only S and A arguments can control reflexives, as in 18a through 18c:

(17a) nanuq Piita-p tuqu-ta-a
polar.bear *Piita*-ERG *kill*-TR.PART-*3*SG
'a polar bear killed by Piita'

(17b) miiraq kamat-tu-q
child.ABS *angry*-REL.INTR-SG
'the child that is angry'

(17c) *angut aallaat tigu-sima-sa-a
man.ABS *gun*.ABS *take*-PRF-REL.TR-*3*SG.*3*SG
*'the man who took the gun'

(18a) ataata-ni Juuna-p tatig-aa
father-*4*SG.ABS *Juuna*-ERG *trust*-IND.TR.*3*SG.*3*SG
'Juuna$_i$ trusts his$_i$ father'

(18b) Aani illu-mi-nut ingerla-voq
Anne.ABS *house*-*4*SG-TERM *go*-IND.INTR.*3*SG
'Anne$_i$ is going to her$_i$ house'

(18c) *Anaana-mi Piita nagligi-jaŋa
mother-*4*SG.ERG *Piita*.ABS *love*-*3*SG.*3*SG
*'His$_i$ mother loves Piita$_i$'

Manning (1996) proposes that the way to explain this split is to argue that the S and O NPs fill the grammatical relation subject in syntactically ergative languages, but that the A and O arguments remain the most prominent argument at the level of argument structure, and then to adopt an analysis in which phenomena like control and reflexive binding are sensitive to argument structure rather than to surface syntax (Culicover and Jackendoff, 2005). An advantage of such an analysis is that it suggests a promising extension to the treatment of Philippine languages (and Austronesian languages more generally). Philippine languages have commonly been seen as a rather special third class of languages, fitting neither the syntactically ergative nor the accusative mold, and with a famous split in subject properties (Schachter, 1976). But, given that syntactically ergative languages exhibit much the same split of subject properties, the two classes can be folded together. Philippine languages are then special only in allowing a greater range of semantic roles to serve as syntactic subject than most languages, whereas other Austronesian languages, such as Balinese (Bali), have a more conventional syntactically ergative appearance (Wechsler and Arka, 1998).

Historical Change

Ergativity splits almost necessarily seem somewhat messy from the viewpoint of theoretical syntax, whereas a neater analysis would result from uniform behavior. But split behavior is well motivated functionally: both the A=S and O=S identification have a strong semantic basis, and it makes particular sense to make the former identification with prototypical agents (pronouns or all animate nouns) and the latter identification with prototypical undergoers (inanimate nouns). Split ergativity can also be viewed historically as an intermediate point in a historical evolution. Languages are not statically ergative or accusative. There are fairly well examined cases of languages changing their character from ergative to accusative and vice versa. There

Table 1 Syntactic phenomena typically showing ergative versus accusative behavior

Ergative S=O grouping	*Accusative S=A grouping*
Shared argument in coordination	Addressee of imperative
Obligatory element in clause	Binder of reflexive pronouns
Raised argument	Controlled argument in controlled clauses
Pivot for relativization	Used in switch-reference systems
Wide scope or definiteness needed	

is also a fairly intuitive account of how this can happen, dating to at least Kuryłowicz (1946). The basic observation is that if an accusative language has a passive (that allows expression of an oblique agent) and, for whatever reasons, prefers passive verb forms to the point that it stops using transitive verb forms (as seems to happen in various languages, such as the Polynesian language Maori), then the language has almost become ergative. This transition is complete when the previous marker of an oblique agent is reinterpreted as the marker of a core grammatical relation, and the old passive marker is reanalyzed (perhaps as a transitive marker). The same account can be told in reverse for an ergative language that prefers the antipassive, becoming accusative. From what we know from incomplete historical records, both of these pathways of change do seem to occur. But this is not the only means by which ergativity can arise or be lost. Another particularly common pathway for languages to become ergative is through reanalysis of nominalizations, frequently those involving passive participles. This pathway seems to be the historical basis in a number of language families (for example, Inuit, Mayan, and Austronesian languages) for using the same case form for both the genitive and the ergative case.

Final Remarks

Dixon (1994) is the first place that readers should look for a more comprehensive study of ergativity. Plank (1979) is an important earlier collection. There has been much theoretical literature on the treatment of ergative languages. For case marking, important recent approaches include Bittner and Hale (1996) and Woolford (1997), while for syntax, Bittner (1994) and Manning (1996) present detailed studies.

The term 'ergative' has also been used by some authors to refer to lexical semantic alternations in which a verb appears both transitively and intransitively, with the object of the transitive use having the same undergoer semantic role (theme/patient) as the subject of the intransitive use (such as for the verb *broke: The boy broke the mirror/the mirror broke*). Either the subject of the transitive may be referred to as ergative, or the intransitive form may be referred to as an ergative verb. These extensions of the term are generally seen as confusing by typological linguists; the intransitive form of such verbs is probably better referred to as 'unaccusative.'

See also: Active/Inactive Marking; Argument Structure; Case; Morphological Typology; Thematic Structure.

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Eritrea: Language Situation

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There are nine languages spoken in Eritrea in addition to English and Italian, the former colonial language. The major language of the country is Tigrinya, spoken by about 2 million people or 50% of the population as a first language. Tigrinya is also spoken in northern Ethiopia. The other Eritrean languages are Tigre, a sister Ethiopian Semitic language of Tigrinya, with 990 000 speakers (approximately 25% of the population), the Cushitic languages Afar (Qafar) with between 160 000 and 300 000 speakers, Saho with about 150 000, Beja (Bedawi) with between 80 000 and 120 000, Bilin with 70 000, and two Nilo-Saharan languages, Kunama with approximately 64 000 speakers and Nara with 48 000. In addition to these, a variety of Hijazi Arabic usually called Rashaida in the Eritrean context has also been spoken by a small population in Eritrea at least since the 19th century. A possible tenth indigenous language is Dahlik, with about 2000 speakers on the Dahlak islands, if this is not simply a divergent dialect of Tigre. The working languages within the country are Tigrinya and Arabic, which owes its particular status to the high percentage of Muslim Eritreans and to Eritrea's relations with neighboring Arabic-speaking states.

Aside from being the first language of about half the population of Eritrea, Tigrinya is also closely associated with the Christian religion and the Orthodox Church, where it has in some degree replaced Ge'ez as the liturgical language. English was the official language of the state, and it still remains the language of much international communication.

Since Eritrea gained full independence from Ethiopia in 1993, a concerted program of developing Eritrea's nine indigenous languages toward literacy and inclusion in education and the media has been pursued. Popular preference, however, has not always followed the same lines, as for instance with the Afar who have elected to have their children educated through the medium of Arabic. Aside from Arabic of course, only Tigrinya has any history of being a written language, with the first attestations right at the end of the 19th century. As part of the then Ethiopian kingdom, there had been a long tradition of literacy in Ge'ez (Classical Ethiopic) within the heritage and culture of the Ethiopian Orthodox Church. Tigrinya has always been written in a slightly expanded version of the Ethiopic syllabary, used for Ge'ez, and the same script is also being used for Tigre, Eritrea's other Semitic language, while Latin scripts have been developed for the non-Semitic languages, though the Ethiopic syllabary was also used for Bilin, especially among the expatriate community. However, there has been some preference for using the Arabic script by Muslim communities. Literacy is at present estimated at about 58%.

Eritrea's two Semitic languages, Tigrinya and Tigre, both belong to the northern branch of the Ethiopian Semitic group, as does the ancient Ge'ez language, now used only in liturgical contexts, especially in Ethiopia. Afar and Saho are closely related Lowland East Cushitic languages, of which they together form a single branch, while Beja, which also is spoken in the Sudan, itself forms a distinct branch of the Cushitic family, and Bilin belongs to the Central Cushitic or Agaw division of the family, the other members of which are all spoken in Ethiopia. The classification of the two Nilo-Saharan languages is somewhat more problematic, though it is generally agreed that Kunama itself forms a separate branch, while Nara is a member of the Eastern Sudanic group.

See also: Cushitic Languages; Ethiopia: Language Situation; Semitic Languages; Tigrinya.

Language Maps (Appendix 1): Map 12.

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Esalen *See:* Hokan Languages.

Eskimo–Aleut

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The Terms 'Eskimo' and 'Aleut'

The terms 'Eskimo' and 'Aleut' have unclear origins. 'Eskimo' is commonly believed to be derived from a derogatory Algonquian term meaning 'eaters of raw meat'; it has been replaced with Inuit, meaning 'people,' in most of Canada, and the language is referred to variously as Inuinnaqtun, Inuttun, Inuktitut, and by other names. The term 'Aleut,' confusingly, was bestowed on Aleut and Yupik people native to the Aleutian Islands and part of the southwestern Alaskan mainland, as well as on their languages, by Russians in the 18th century. The term in use in Alaska today for self-designation of the non-Yupik Aleut is Unangan or Unangas for the people and Unangam Tunuu for the language; however, the term 'Aleut' is preferred in Russia. Because there is still no other general term to describe all of the languages and dialects encompassed by the terms 'Eskimo' and 'Aleut,' and for reasons of linguistic tradition, they are still commonly used within the field of Eskimo–Aleut linguistics.

History and Genetic Relationships

The Eskimo–Aleut language family is spoken from the Siberian coast in the west to Greenland in the east. There are two major branches, Aleut and Eskimo, and Eskimo consists of at least two further subgroups, Yupik and Inuit. One recently extinct language, Sirenikski (Sirenik Yupik), may either have been a third branch of Eskimo or one of the Yupik languages.

The Eskimo and Aleut people are thought to have been part of the last large-scale migration from Asia across the Bering land bridge, between 4000 and 6000 years ago. Various attempts have been made to link Eskimo–Aleut with other language families on the Asian continent (e.g., Uhlenbeck, 1935, Swadesh, 1962). While there is little solid linguistic evidence of a genetic relationship between Eskimo–Aleut and other language families, there are strong suggestions of very early contact, particularly with Uralic (for a discussion of possible linguistic affinities and contact, see Fortescue, 1998). The development and differentiation of the Aleut and Eskimo languages and dialects probably took place in Alaska because of the linguistic diversity found on the Alaskan side.

From Alaska, there were several waves of migration down to the Aleutians, west again to Siberia, and eastward to Greenland. The earliest led to the linguistic split between Aleut and Eskimo, possibly around 4000 years ago, although there is archeological and skeletal evidence to suggest an earlier physical divergence (Laughlin, 1980). The earliest Aleut settlements appear to have been around the Island of Four Mountains, whence there were eastward and westward migrations. The Yupik and Inuit branches of Eskimo must have diverged about 2000 years ago. From their homeland around the Seward Peninsula, Yupik speakers occupied southwestern Alaska and, moving westward across the Bering Strait, reoccupied the Chukchi Peninsula in Siberia. If Sirenikski is a separate branch of Eskimo, then it may have split off about 2500 years ago and its origins may be on the Chukchi Peninsula as a result of an earlier back migration. It was gradually displaced by Central Siberian Yupik and neighboring Chukchi (Chukot). The ancestors of the Inuit spread northward and eastward in several waves. The latest migration began about 1000 years ago, and resulted in the rapid spread of the Inuit language, leaving few linguistic traces of previous Eskimo populations. The present dialect differentiation (see Figure 1) is possibly as recent as the past 500 years (see Dorais, 1996).

Historiography of Research

The first systematic linguistic studies of an Eskimo–Aleut language were made in Greenland, beginning in the 18th century. Outside of Greenland, most available materials on the Eskimo–Aleut languages consisted of word lists until well into the 19th century, and even into the 20th century for some of the western Inuit dialects (*see* **West Greenlandic** and **Inupiaq**). Nevertheless, the Danish scholar Rasmus Rask proposed a genetic relationship between Aleut and Eskimo languages as far back as 1819. His notes were published in 1916 (Thalbitzer, 1916), and his thesis was confirmed through Marsh and Swadesh (1951) and Bergsland (1951). More recently, comparative work has been done by Bergsland (1986, 1989) and Fortescue *et al*. (1994).

Linguistic Characteristics of Eskimo-Aleut

The following features are characteristic of the Eskimo-Aleut language family:

- There are three basic vowels (i, u, a), derived from an original four-vowel system (i, u, a, and schwa, represented by [e] in Yupik, which maintains the four-vowel distinction).

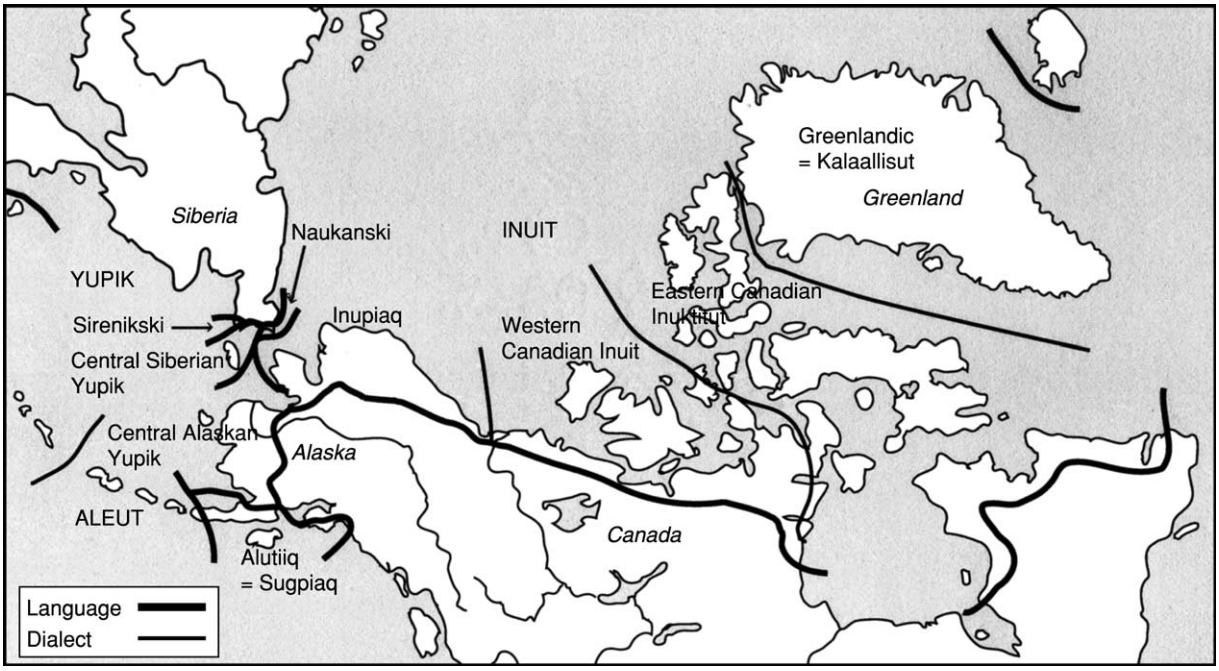

Figure 1 Eskimo-Aleut languages and major dialects. (Adapted from Map 1 in Fortescue *et al.* (1994)).

- Word building is almost exclusively through suffixation, the only exception being an anaphoric prefix *ta-* on demonstrative stems (e.g.,pan-Eskimo *una* (DEIC-PRX), *tauna* 'this one').
- To a greater or lesser degree within the language family, polysynthesis is the norm: very complex verb structures encode meanings for which other languages need whole sentences. This example is from Uummarmiut Eskimo (from Inuvik):

  kivgaluk-niaq-qati-gi-tqik-kuminait-kiga
  muskrat-hunt-partner-have.as-again-will.never-1SG.3SG.INDIC
  "I will never again have him as a partner to hunt muskrat" (Lowe, 1985: 18)

- Sentences typically consist of clause chains, in which a series of dependent clauses is headed by an independent clause. In the following simple example from West Greenlandic, there is one indicative clause and two subordinated participial clauses; clause chains can be quite extensive:

  irn-i qajartur-tuq
  son-his own be out in kayak-3SG.PART
  qinnguar-paa
  see through binoculars-3SG.3SG.INDIC
  natsirsu-up sursuk-kaa
  hooded seal attack-3sg.3sg.PART
  "he$_i$ saw his son$_j$ through his binoculars being attacked by a hooded seal while in his$_j$ kayak" (Fortescue, 1984: 39)

- Word order is typically SOV to a more or less fixed degree (Aleut has essentially fixed word order). In the previous example, the object clause *irni qajarturtuq* precedes the verb, and the subject of each of the subordinated clauses precedes its respective verb.
- Case marking follows the ergative-absolutive case-marking pattern (with extreme modifications in Aleut), where the subject of intransitive verbs receives the same marking as the object of transitive verbs, namely absolutive case, while the subject of transitive verbs receives a different marking, ergative case.

The Eskimo languages are much more closely related to each other than to Aleut. In addition to the common features listed for Eskimo–Aleut, they share

- certain restrictions on syllable and other phonological structures;
- up to six nongrammatical cases in addition to ergative and absolutive cases (locative, instrumental, ablative, allative, vialis, and equalis);
- transitive and antipassive structures, the choice of which appears to be partially determined by definiteness, as in the Central Alaskan Yup'ik (Central Yupik) examples below:

  angute-m neqa ner-aa
  man-ERG.SG fish-ABS.SG eat-3SG.3SG.INDIC
  'the man eats **the** fish'

  Angun neq-mek ner'-uq
  man-ABS.SG fish-INSTR.SG eat-3SG.INDIC
  'the man eats **a** fish'

Aleut

Aleut is a language with two major extant dialects, and at least two other dialects historically attested. Eastern Aleut is spoken east of Amukta Island to the Alaskan Peninsula, as well as on the Pribilof Islands. Atkan, also variously called Western or Central Aleut, is today spoken on Atka Island, and a version of it is spoken on Bering Island. A third dialect, Attuan, is essentially dead; a mixed language known as Copper Island Aleut (Mednyi Aleut), consisting of Attuan stems and Russian inflection, is still spoken on Bering Island. There is scant evidence in very early descriptions of a dialect spoken on the Rat Islands between Attu and Atka, suggesting a dialect continuum in the West.

Characteristic of Aleut are

- its lack of labial stops (although it appears that Copper Island Aleut has developed voiced labial stops), and its aspirated nasals;
- consonant clusters which differ from those in Eskimo in their distribution (e.g., they are permitted word initially, as in *qdinalix* 'to be slippery'), in the combinations of consonants possible (e.g., velar-uvular fricatives), and in their complexity (allowing up to three consonants, as in *chax̂sxix̂* 'reef');
- use of independent pronouns, as opposed to pronominal marking on verbs in Eskimo languages:

Aleut	txin	achix-ku-qing
	you	*teach*-PRES-1SG
		'I am teaching you'
Greenlandic		ilinniar-tip-pakkit
		learn-cause-1SG.2SG.INDIC
		'I am teaching you'

- its typologically unusual agreement system, in which ergative case marking is only used if a transitive object or an object of possession is not overtly expressed:

Piitra-x̂	tayaĝu-x̂	kidu-ku-x̂
Peter-ABS.SG	*man*-ABS.SG	*help*-PRES-3SG
'Peter is helping the man'		

Piitra-m	kidu-ku-u
Peter-ERG.SG	*help*-PRES-3SG.3SG
'Peter is helping him'	

Through contact with Russian traders and colonizers in the 18th and 19th centuries, modern Aleut has a large proportion of Russian loanwords. As a result of early decimation of the people and later suppression of the language in the schools, the language is severely endangered today, with at most 150 speakers in the Aleutian Islands, the Pribilof Islands, and Anchorage, and perhaps 10 on Bering Island. With the exception of Atkan, speakers are elderly.

Yupik

The Yupik languages include Naukanski (Naukan Yupik), spoken around East Cape on the Chukchi Peninsula; Central Siberian Yupik, spoken on the Chukchi Peninsula and on St Lawrence island; Central Alaskan Yup'ik, spoken from Norton Sound to Bristol Bay in Alaska; and Sugpiaq (Pacific Gulf Yupik), also known as Sugcestun or Alutiiq, spoken around Prince William Sound, the Alaskan Peninsula, Kodiak and Afognak Islands, and the tip of the Kenai Peninsula. Yupik languages are characterized by

- their retention of a fourth vowel that presumably stems from Proto-Eskimo (cf. Proto-Eskimo **neqe* became Central Alaskan Yup'ik *neqa* 'food,' Iñupiaq [North Alaskan Inupiatun] *niqi* 'food');
- more or less complex effects of intonational stress; in stressed syllables, for example, the vowel is often lengthened (for more on Yupik prosody, see Krauss, 1985).

There are some nonnegligible syntactic differences between the languages, although these have not yet been well described. Siberian Yupik languages have a number of English loan words, from contact with 19th-century whalers, and Alaskan Yupik languages have a large number of Russian loans from 18th- and 19th-century Russian colonization, as well as 20th-century English loans. Most Yupik languages are severely endangered today, with numbers of speakers ranging from 70 (Naukanski) to 1300 (Central Siberian Yupik). The notable exception is Central Alaskan Yup'ik, with about 10 000 speakers (and on the Kenai Peninsula these include children), and with immersion programs in the schools and active production of learning materials.

Sirenikski

Sirenikski is seen as an important link to Proto-Eskimo because of particularly conservative features, such as a retention of consonants between vowels, which were lost in all other Eskimo-Aleut languages (e.g., Proto-Eskimo **ataRuciR*, Sirenikski *ategesegh*, Central Alaskan Yup'ik *atauciq*, Iñupiaq *atausiq* 'one'). It has, however, undergone sound changes quite different from other Eskimo languages. For

example, in all nonstressed (essentially, noninitial) syllables (as in the example given above) the vowel changed to schwa. Unfortunately, it was first discovered and described at the end of the 19th century, when it was already highly moribund; the last speaker died in the year 2000.

Inuit

Inuit is generally described as a language with four distinct dialect groups, each of which have their own recognizable subdialects; these groups include Alaskan Iñupiaq, spoken from the Seward Peninsula and north; Western Canadian Inuit (Western Canadian Inuktitut), spoken over a vast area of Central Arctic Canada from MacKenzie Coast to Repulse Bay; Eastern Canadian Inuktitut, spoken in Baffin Island, Arctic Quebec, and Labrador; and Greenlandic Kalaallisut (Greenlandic Inuktitut), spoken in Greenland (there is also a sizable population of speakers in Denmark). Characteristic of Inuit are

- lack of intonational stress as compared with Yupik;
- loss of the fourth vowel, with various important phonological traces;
- various degrees of consonant and vowel cluster simplifications (cf. Iñupiaq *aglaun* 'pen,' Greenlandic *allaat* 'pen,' in which /gl/ became /ɬ/ and /au/ became /aa/);
- a tendency to merge parts of the mood system most important in narration, with most extensive merging in Alaska and least in Greenland.

All Inuit dialects have borrowed extensively from the respective languages of colonization. Most loans are from English in Alaska and Canada (although there are also French and German loans in eastern Canada, through the influence of missionaries) and from Danish in Greenland. The status and viability of the Inuit language is quite different in the different regions. In Alaska and western Canada, the language is severely endangered, with only about 3000 speakers, almost none of whom are children. In eastern Canada, there are about 20 000 speakers, but there is widespread bilingualism in almost all age groups and a growing tendency for English to replace Inuktitut. Active efforts are under way to reverse this process, including the encouragement of Inuktitut programs in schools. In Greenland, however, over 95% of the native population of some 50 000 are speakers of Kalaallisut, and the language is thriving.

See also: Canada: Language Situation; Greenland: Language Situation; Inupiaq; Polysynthetic Language: Central Siberian Yupik; Russian Federation: Language Situation; United States of America: Language Situation; West Greenlandic.

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Esperanto

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Esperanto is a constructed language intended for international use. Originating as an artificial language, it is unique in that it has enjoyed sufficient success to have acquired a speech community and even to have undergone a degree of creolization. Consequently, the epithet 'artificial' is arguably no longer applicable. Unlike computer languages and codes, Esperanto generally satisfies the criteria for recognition as a form of natural language. However, its proponents' hopes of its being generally adopted for international use have not been realized, and its future must be seen as uncertain.

Background

The creator of Esperanto was Ludovic Lazar Zamenhof, a Jewish oculist of Warsaw, who used the pseudonym Doktoro Esperanto, 'the one who hopes'. His *Lingvo internacia* was first published in 1887, in Russian. By the beginning of the 20th century, Esperanto, as the language itself quickly came to be known, had been taken up in France, Germany, and elsewhere; the London Esperanto Club (still in existence) was founded in 1903. The participants at the first International Esperanto Congress, held in 1905 in Boulogne-sur-Mer, proclaimed the essential linguistic basis (*Fundamento*) of the language as inviolable. Support has subsequently spread to most parts of the world, including Japan, China, and Brazil (although the movement remains very weak in most of the Third World). Both Stalin and Hitler saw the internationalist and idealist values of Esperanto as a threat and launched persecutions of its supporters (Lins, 1988). As of 2004, the number of speakers of Esperanto is unknown, but variously estimated as between one or two hundred thousand and several million. Universala Esperanto-Asocio, with headquarters in Rotterdam, has members in over 100 countries. Esperanto speakers in the news recently include 1994 Nobel laureate in economics Reinhard Selten, 1996 World Chess Champion Zsuzsa Polgar, and Tivadar Soros, father of financier George Soros.

The annual World Esperanto Congress – held entirely in Esperanto – regularly attracts participants in the thousands. The attached sound files are of speakers addressing this assembly, in 1964 and 1995 respectively: Ivo Lapenna (1911–1987), professor of international law at the London School of Economics, whose mother tongue was Croatian, and the author of this article, John Wells (1939–), whose mother tongue is English.

It must be emphasized that Esperanto is a real language, both spoken and written, successfully used as a means of communication between people who have no other common language. For the great majority of its users, of course, it is a second language, learned well after the acquisition of the L1, so that levels of competence vary widely. However, for some speakers, children of parents who use Esperanto as a family language, it is a native language or mother tongue, normally in a bilingual or trilingual relationship with the language of the local community or other parental language(s). There is no other case in linguistic history of something that started as an intellectual scheme, a project on paper, being transformed into a language with native speakers of the second and, indeed, the third generation.

The traditional aim of the Esperanto movement is the adoption of Esperanto as L2 for all mankind. The chief arguments for this can be summarized by saying that Esperanto is easy to learn and politically neutral.

- *Ease of learning* is a consequence of the complete regularity of the language: grammatical rules have no exceptions, and the agglutinative morphological structure (discussed in the morphology section) makes vocabulary acquisition much faster than for other languages. As a result, it is claimed, Esperanto can be learned three to ten times as fast as national or ethnic languages (although obviously the rate of progress depends, as always, on many factors, including the learner's L1).

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- *Political neutrality:* Esperanto belongs to no particular nation or ethnic group. This, it is claimed, makes it politically a better choice for an international common language than English (seen by many as irredeemably attached to parochial U.K. or U.S. values) or other national languages.

Opposition to Esperanto is often more emotional than rational. Serious critics, however, argue that Esperanto is a language without culture (although supporters of Esperanto would dispute this, pointing to over a hundred years' literary activity, including a substantial body of original poetry), and second, that it is too European (though all alternative solutions to the question of an international language are even more so). In any case, it is claimed, the economic, social, and political pressures in favor of the choice of English for international use are by now overwhelming.

In light of the perceived success of English in filling the role for which Esperanto was intended, one group (not the majority) within the Esperanto movement has redefined its aims as securing linguistic rights as a 'stateless diaspora linguistic collective.' It sees the speakers of Esperanto as being comparable to the speakers of other endangered or minority languages.

Pronunciation and Orthography

The phoneme system comprises 23 consonants and 5 vowels. The consonants are plosives /p b t d k g/, fricatives /f v s z ʃ ʒ x h/, affricates /ts tʃ dʒ/, nasals /m n/, liquids /l r/ and glides /j w/ (the latter only after a vowel). The vowels are /i, e, a, o, u/. Word stress is always penultimate. Orthography is strictly phonemic, using the Latin alphabet and including the following letters bearing diacritics: *ĉ* /tʃ/, *ĝ* /dʒ/, *ĥ* /x/, *ĵ* /ʒ/, *ŝ* /ʃ/, and *ŭ* /w/.

An international standard of 'good' pronunciation has by now evolved and includes the avoidance of marked interference from speakers' L1s. Intonation follows general, mainly European, models without parochialisms.

Morphology and Syntax

Esperanto syntax and morphology show strong Slavic influences. Its morphemes are invariant and can be almost indefinitely recombined into different words. The internal word structure has affinity with agglutinative languages in that all words (other than function words) consist of a stem plus a grammatical ending (*-o* for nouns, *-a* for adjectives, *-i* for infinitive verbs, etc.: *telefon-o* 'a telephone', *telefon-a* 'telephonic,' *telefon-i* 'to telephone'). The plural ending is *-j* (*telephonoj* 'telephones'). There is an accusative case *-n*, used for the direct object. Adjectives agree with nouns in number and case: *mi vidis grandan hundon* 'I saw a big dog,' *du grandaj hundoj atakis min* 'two big dogs attacked me.' There are three verb tenses, *-as* present, *-is* past, and *-os* future, plus *-us* conditional and *-u* interative/volitive. The definite article, invariant, is *la*; there is no indefinite article. The grammar is entirely regular and without exceptions.

The normal word order is SVO. Determiners and adjectives usually precede nouns, and the language is prepositional. However, the morphological marking of the accusative means that the order of constituents is flexible and can be rather freely scrambled. The last sentence quoted has emphatic or stylistic variants such as *atakis min du hundoj grandaj*.

The stem of a word may be a single root (base morpheme) or a combination of roots and/or affixes: for example,

(1) *parol-ant-o*
speak-pres.ppl-NOUN
'speaker'

(2) *parol-em-a*
speak-tending-ADJ
'talkative'

(3) *mar-bord-o*
sea-edge-NOUN
'seaside'

Each morpheme (root, affix, ending) is in principle unvarying in form and meaning; the meaning of a compound of affixed form is the sum of the meanings of its constituent elements. A 20th-century development is the increasing use of affixes as independent stems, for example, *em-o* 'inclination.'

Vocabulary

The lexical material was chosen by Zamenhof to be as international as possible. Some three-fourths of the basic roots are of Romance origin, with the remainder mostly Germanic or Slavic; often they are common to several source families (e.g., *dom-* 'house'). Classical and international roots are readily incorporated, though adapted to Esperanto phonology and morphology; thus since *teatr-o* is 'theater,' 'theatrical' must be *teatr-a*. Given *telefon-o* 'telephone,' *telefone* is automatically the adverb 'by telephone' and *telefoni* the verb 'to telephone.' The extensive use of affixes means that the vocabulary is highly structured and comparatively easy to learn. From *vidi* 'to see,' dozens of derivatives such as *videbla* 'visible,' *videbligi* 'to render visible,' and *nevidebleco* 'invisibility' can be regularly and predictably formed.

General

The language is monitored by an Academy (Akademio de Esperanto). This does not, however, inhibit individual speakers from constant linguistic creativity. Many Esperanto speakers enjoy debating linguistic issues and arguing about vocabulary innovations. It is only recently that computing terminology has settled down, with *komputilo* (regularly formed by the suffix *-il-* 'instrument,' cf. *hakilo* 'ax') as the term for 'computer' and technical expressions such as *elŝuti* 'to download.' Popular spoken Esperanto occasionally deviates from the written norm. For example, although the official form of the word for 'tax' is *imposto*, and this is the only form given in dictionaries, in spoken Esperanto the form *impoŝto* can be heard from time to time (because of contamination from *poŝto* 'post, mail'). The standard and written word for 'plastic' is *plasta*, but in conversation *plastika* is also heard. The existence of such 'incorrect' spoken forms can be interpreted as an indication that the language is truly socially embedded ('living').

With a speech community scattered around the world, but nevertheless commanding great feelings of loyalty from its speakers, Esperanto is indeed comparable in some ways to diaspora languages such as Romani, Yiddish, or Armenian. In its lack of official government status, it is like creoles and many ethnic minority languages. It remains to be seen whether in the last analysis it is a linguistic curiosity doomed to disappear or a brilliant idea whose moment has not yet come.

See also: Artificial Languages; Controlled Languages; Discrimination and Language; Language Planning and Policy: Models; Language Policies: Policies on Language in Europe; Languages of Wider Communication; Lingua Francas as Second Languages; Standardization.

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Essential Indexical

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Indexicals are linguistic expressions such as 'I', 'here', and 'now' whose reference varies depending upon the context in which they are used (*see* **Indexicality: Theory**). Many writers, including Castañeda (1966, 1967, 1968), Perry (1979), and Chisholm (1981), have argued that indexicals are irreducible to other modes of reference, such as names and definite descriptions. 'I' in my statement 'I am hungry,' e.g., cannot be replaced with the co-referring expression 'Komarine' without loss of cognitive impact, since I may believe that Komarine is hungry without realizing that Komarine is me. The same applies to uses of 'here' and 'now.' It is also claimed that the thoughts

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Indexicals are linguistic expressions such as 'I', 'here', and 'now' whose reference varies depending upon the context in which they are used (*see* **Indexicality: Theory**). Many writers, including Castañeda (1966, 1967, 1968), Perry (1979), and Chisholm (1981), have argued that indexicals are irreducible to other modes of reference, such as names and definite descriptions. 'I' in my statement 'I am hungry,' e.g., cannot be replaced with the co-referring expression 'Komarine' without loss of cognitive impact, since I may believe that Komarine is hungry without realizing that Komarine is me. The same applies to uses of 'here' and 'now.' It is also claimed that the thoughts

expressed using indexicals have a privileged role. The central insight is perhaps best appreciated if we consider Perry's claim that indexicals are essential for characterizing beliefs that motivate action (see also Castañeda, 1966, 1967, 1968). I may see myself in a mirror and notice that the person I see reflected has dirt on her face, but unless I believe that *I* have a dirty face I will not wipe it. I may believe that the meeting starts at noon but will not be moved to act unless I believe that the meeting starts *now*. I may believe that the treasure is buried outside the old church, but I will not start digging unless I believe that the treasure is buried *here*. To act requires me to have beliefs about my surrounding environment and how I am situated with respect to it. Indexical beliefs provide for this because their content is essentially perspectival. It is this egocentric dimension that is lost if the indexical is replaced with a non-indexical term, which is why indexical expressions cannot be reduced to other modes of reference.

Perry (1979) famously argued that indexicals pose a problem for the traditional Fregean account of belief. According to this theory, beliefs are relations between subjects and propositions. The belief report 'Komarine believes that Fido is a dog' states that an individual – Komarine – stands in the relation of believing to the proposition 'Fido is a dog.' The problem arises because the Fregean view implies (i) propositions are held to be true or false timelessly – not only true or false at a particular time, in a particular place, expressed by a particular person, and (ii) propositions are not individuated only by the ordinary objects that the proposition is about, but also by something like the conceptual components of the proposition that affect its cognitive impact. The propositions 'Hesperus is Venus' and 'Phosphorus is Venus' are about the same object, the planet Venus, but they are nevertheless different propositions since they are composed of different concepts. It is easy to see why indexicals pose a problem given the need to simultaneously satisfy (i) and (ii). A sentence such as 'I am hungry' does not pick out a proposition since its truth-value varies from context to context. To identify the proposition I believe when I utter 'I am hungry,' we need to specify some conceptual component associated with the term 'I.' To satisfy (i), the specification must yield a proposition that is timelessly true or false; to satisfy (ii), it must preserve the cognitive impact of 'I am hungry.' But as we saw above, there is no way of rendering 'I am hungry' as a proposition that is timelessly true or false without losing its cognitive impact. Various solutions to the problem have been proposed. Some attempt to refine the traditional account of belief (see, e.g., Evans, 1985), while others reject it in favor of a theory that can deal with the problem (see, e.g., Perry, 1986).

We sometimes attribute a use of an essential indexical to someone else. The usual way to do this is to use an *oratio obliqua* construction. I can, e.g., attribute the thought 'I am going to be late for work' to Sue by uttering, 'Sue thinks that she herself is going to be late for work.' Similarly, if Richard is in Malaga and thinks 'It is hot here,' I can attribute this thought to him by uttering 'Richard is in Malaga; he says it is hot there.' If Teresa thinks at 12 o'clock, 'It is now time to go to the meeting,' I can attribute this thought to her by uttering, 'Teresa thought at 12 o'clock that it was then time to go to the meeting.' (The alternative is to employ an *oratio recta* construction, e.g., 'Sue thinks: I am going to be late for work.') Castañeda (1966, 1967, 1968) labels expressions that attribute a use of an essential indexical to someone else in *oratio obliqua* constructions 'quasi-indicators.' Like essential indexicals, quasi-indicators cannot be replaced with co-referring expressions without loss of cognitive impact. 'Sue thinks that Sue is going to be late for work' and 'Sue thinks that she herself is going to be late for work' attribute different thoughts to Sue, since she may have amnesia and forget that she is called 'Sue.' Thus, quasi-indicators raise the same kind of issues as essential indexicals. There are further problems associated with their use. Essential indexicals create difficulties for the traditional Fregean account of belief because the beliefs they express are essentially tied to the perspective of the believer. It is puzzling, therefore, how a listener can grasp the content of another's indexical utterances, and further, convey that content to someone else. Again, there is disagreement concerning how the content of quasi-indexical attitudes – those expressed using quasi-indicators – should be understood.

See also: Indexicality: Theory.

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Estonia: Language Situation

A Verschik, Tallinn, Estonia

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According to the census of 2000, 142 different ethnicities live in Estonia. The total population amounts to 1 370 053. The largest ethnic groups are Estonians (67.9%, or 930 219) and Russians (25.6%, or 351 178). As a result of the Soviet (1940–1941, 1944–1991) and Nazi occupations (1941–1944), the demographic situation changed drastically, due to emigration (Baltic Germans), plight (Swedes, Estonians), deportations (mainly Estonians), or virtual extinction of indigenous minorities (Jews, Roma). In addition, the number of ethnic Estonians decreased (from 88.2% in 1934 to 61.5% in 1989) on account of the increasing number of Russians and Russian speakers. The latter were encouraged by Moscow to settle in Estonia and other non-Russian countries incorporated into the USSR. Due to higher living standards and a more European-like culture, the three Baltic republics (Estonia, Latvia, and Lithuania) had acquired a reputation of 'the Soviet West.' Russian speakers from the USSR settled in urban and industrial areas and now constitute a majority in northeastern Estonia.

The attempts of overt and covert Russification failed, due largely to the high prestige of Estonian among its speakers. Despite Russification efforts, the network of schools and universities functioning in Estonian was maintained throughout the Soviet occupation. Ethnic Russians and ethnic Estonians formed two separate communities with little or no interaction. Estonians working in the public sphere had a working command of Russian, but very few Russians learned any Estonian.

The so-called third ethnicities (neither Russians nor Estonians) had to choose between schools with Russian and with Estonian as the language of instruction for their children. As opposed to the remaining members of indigenous minorities with the roots in pre-1940 Estonia, the non-Russian newcomers had little knowledge of and little interest in the Estonian culture and language and, usually, had already acquired a certain command of Russian. The choice of Russian-language education for their children appeared logical, but on the other hand, it contributed to the further Russification of these ethnicities.

Since 1989, Estonian has been the official language. After the regaining of independence in 1991, Estonian became a compulsory subject in schools with a non-Estonian language of instruction, and jobs in the public sector require proficiency in Estonian. The knowledge of the language among non-Estonians has increased. In the last Soviet census (1989), 15% of Russians claimed to know Estonian, whereas by 2000 this figure had reached 44%. Nevertheless, language loyalty is high in the two largest ethnic groups. By the law, at least two foreign languages must be taught in every school. Primary education in one's mother tongue is guaranteed by the state; in addition, there exist Estonian immersion schools and Russian-Estonian bilingual schools. The knowledge of English is becoming common. In the capital, Tallinn, many people understand and can speak Finnish. The cultural life and activities of the minorities are being promoted in the spirit of the prewar tradition of cultural autonomy. In 2004 the Estonian Bureau for the Lesser Used Languages (EstBLUL) was established, representing speakers of Tatar, Russian, Yiddish, Romani, German (Standard German), Finnish, and Võru-Setu (a newly created regional standard based on Võru and Setu dialects of Southern Estonia).

See also: Estonian; Latvia: Language Situation; Lithuania: Language Situation; Uralic Languages.

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Estonian

R T Harms

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Estonian, a Baltic–Finnic language within the Uralic family, is represented by over a million speakers, as the official language of Estonia as well as actively maintained by émigrés in Sweden, Canada, and elsewhere. The diverse Estonian dialects may be divided into a northern group and a southern group, with Tallinn and Tartu as their respective cultural centers. Standard Estonian, in large part based on the northern dialects, underwent significant adjustment at the hands of language planners during the twentieth century to provide a compromise literary medium suitable for all areas. In contrast with nationalist movements in other countries, foreign loanwords have been tolerated, in part motivated by a desire to facilitate access to Western European culture. The resulting standardization, however, has commonly forced Estonians to consult an extensive orthographic manual for spelling and morphological norms.

The history of Estonian must be projected from reconstruction, as apart from fragments dating from ca. 1220, the first written texts appeared in the sixteenth century, beginning with the Kullamaa prayers in the 1520s. In its development the interaction of inherited features with those of contact languages (including governing superstrata, especially German) has played a major role in shaping its unique structure.

Estonian phonology is characterized by an abundance of vowels (/i ü u e ö o ä a/ plus a midcentral unrounded /õ/), few consonants (/p t k s h m n l r y v/ plus palatalized /t^y s^y n^y l^y/—and /f š/ in loans), and a richness of stressed syllable structures resulting from contrastive vowel length (*a* versus long *aa*) tautosyllabic vowel clusters (e.g., *ea*, *eo*, *õa*), and geminate consonants (*ala* versus *alla*). The writing system is based on the Latin alphabet, augmented by diacritics (*ü*, *õ*), but palatalization is not represented. Initial stress is the rule, but loans often preserve noninitial stress (*hotell*), and multiple word stresses may result from morphology (*tulemata*) < /tule + ma + tta/—with a second stress, often stronger, on the third syllable).

Typologically the most salient feature of Estonian is its extrasegmental quantitative prosody, by which stressed heavy syllables contrast in two types of quantity and tonal contour; for example, segmental /saata/ *saada* together with prosodic quantity may yield [sa:ta] 'send!' (long *a*) or [sa::ta] 'to become' (overlong *a*); *linna*, [linna] 'city (gen.)' or [lin:na] 'into city'; *osta*, [osta] 'buy!' or [os:ta] 'to buy' (contrast here /sata/ *sada* 'hundred,' *lina* 'linen,' with light first syllables). The first syllable of a form such as /saatta/ *saata* 'to send' may occur with the overlong prosodic quantity without requiring individual component segments (/aa/ or /tt/) to be overlong. Prosodic quantity is noted in spelling only for intervocalic *p*, *t*, *k*; e.g., [ata] as *ada*, [atta] as *ata*, and [at:ta] as *atta*.

The palatalized coronal consonants /t^y s^y n^y l^y/ are of special interest, since these reflect an earlier Umlaut-like process (contrasting typologically with their Slavic counterparts in the absence of a prominent offset transition). This palatalization produces a *y*-like onset transition from a preceding stressed vowel (triggered by an [earlier] *i* in the following syllable); e.g., /kas^{y}k/ *kask* = [ka^{y}sk] <*kaski 'birch' (contrast the absence of palatalization in *kaks* < *kaksi 'two').

See also: Estonia: Language Situation; Uralic Languages.

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Estonian Lexicography

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Antecedents: German-Influenced Bilingual Dictionaries

The history of Estonian lexicography dates back to the early 17th century, when Germans hardly fluent in Estonian wrote Estonian grammars for German-speaking Lutheran pastors, adding small bilingual German–Estonian glossaries as supplements. German remained the focus of almost all lexicographic work done in Estonia for about two centuries.

Estonian first became the source language of bilingual German dictionaries in the 18th century Vestring (1720?), its printed version (Helle, 1732), and Hupel (1780) are accepted as the best lexicographic sources of that period.

The late 19th century brought a change: the previous North- and South-Estonian standards both provided for a unified national standard, while Estonian excited a growing linguistic interest. The lexicographic masterpiece of the period is the scholarly *Ehstnisch-deutsches Wörterbuch* by F. J. Wiedemann (1869) providing abundant linguistic information on 50 000 Estonian words and covering all regional variations (largely due to the author's extensive fieldwork).

1900–1980s: From the First Monolingual Dictionaries to the Computer Era

In the early decades of the 20th century the development of standard Estonian was accelerated. The principles of language planning were worked out, and the language was modernized and standardized. In the Republic of Estonia, born in 1918, the literary standard was based on the first normative orthological dictionary of Estonian (ORTH, 1918), introducing a long tradition of dictionaries of this special type (without definitions). The first (ORTH, 1918) was followed by Veski and Muuk (1925–1937), Muuk (1933), Nurm, Raiet, and Kindlam (1960), Raiet and Kull (1976), and Erelt (1999) with many reprints. The language of science was shaped by numerous terminological dictionaries, while several excellent bilingual dictionaries were also published, particularly for English (Silvet, 1939–1940) and Finnish (Mägiste, 1931).

The years of Soviet occupation (1940–1991) disrupted the previous linguistic life and split Estonian lexicography in two. In exile, two voluminous dictionaries were published: the thesaurus by Saareste (1958–1963) and the Estonian–English dictionary by Saagpakk (1955). Dictionaries published in Estonia in the 1960s reveal a strong Russian impact, both linguistic and ideological; later, this pressure was alleviated. Nevertheless, language remained one of the most powerful tokens of Estonian identity. In the 1960s, compilation of the first comprehensive dictionary of Estonian (EKSS) was started – roughly 200–300 years later than those of French, English, or German and 100 years later than in the Nordic countries – while the first fascicle appeared in 1988. The first fascicle of the dictionary of Estonian dialects (EMS) was published in 1994, also originating from the1960s.

The history of computational lexicography begins in the late 1970s when the revised electronic version (1980) of the orthological dictionary (Raiet and Kull, 1976) was completed. From this time onward, all dictionaries – including the first comprehensive monolingual Estonian dictionary (EKSS) – have been digitized, using a descriptive and, later, SGML markup.

Current Developments

In 1989 the Law on Language declared Estonian the sole state language of Estonia. The restoration of Estonian independence in 1991 has conditioned massive changes in Estonian society, including linguistic life (expansion of researcher contacts), as well as in the language (influx of new borrowings). Today there are two main lexicological centres in Estonia – Institute of the Estonian Language (Tallinn) and the University of Tartu. Long-term scholarly dictionaries are financed by national programs.

Language technology (corpora, electronic dictionaries, automatic morphology, software localization, etc.) is particularly advanced. Several printed dictionaries, both monolingual and bilingual, also exist in machine-readable form; a lexico-grammatical database of Estonian is in progress. Several dictionaries are available via the Internet or on CD. Corpora are acquiring an increasing role in Estonian linguistics, including lexicography. The Corpus of Standard Estonian (CSE), modeled on the classical Brown corpus, currently (2005) contains about 6 million words; the eventual aim is 100 million words. The Corpus of Early Written Estonian (CEWE) exists, as well as the Corpus of Estonian Speech (CES). The compilation of the Estonian WordNet (EstWN) – as part of the EuroWordNet – is also in progress.

Estonian dictionaries have a long tradition of presenting morphological information, as Estonian is characterized by a great number of inflected forms and extensive variation of morphological units. A special morphological dictionary (Viks, 1992) has contributed to three systems of automatic morphology. The morphology modules have been successfully used in lexicography for generating the grammar component in dictionary entries.

The most recent orthological dictionary (Erelt, 1999) represents a more lenient trend in language cultivation, providing recommendations rather than strict norms.

The comprehensive dictionary of Estonian (EKSS) is to be completed in 2007, thus taking nearly 50 years to produce – a time period common to many other countries. Work continues on the big dialect dictionary (EMS). Although lexicographers still face the challenge of filling in some gaps in Estonian lexicography, they are now in a good position to take advantage of new ideas.

See also: Bilingual Lexicography; Computational Lexicons and Dictionaries; Computers in Lexicography; Corpora; Dictionaries and Inflectional Morphology; Estonian; Finnish Lexicography; German Lexicography; Latvian Lexicography; Lithuanian Lexicography; WordNet(s).

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Ethiopia as a Linguistic Area

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Introduction

The Ethiopian linguistic area is probably the most famous linguistic area in Africa. It is often the only African linguistic area discussed to any extent in general works dealing with language contact and areal linguistics (Masica, 1976; Thomason and Kaufman, 1988; Thomason, 2001). Most scholars refer to this area as the Ethiopian language area (Ferguson, 1976; Sasse, 1986; Hayward, 1991; Zaborski, 1991, 2003; Tosco, 1994; Crass, 2002). This term, however, is problematic in several respects. First, the English translation of the German term *Sprachbund* is linguistic area, convergence area, or diffusion area (Campbell, 1994: 1471). Second, the area includes Eritrea, which was a province of Ethiopia until it became an independent state in 1993. Third, a certain number of features are found beyond Ethiopia and Eritrea in languages spoken in neighboring countries, such as Djibouti, Somalia, and Sudan, and even beyond. Some scholars have taken these facts into account, at least to some extent. Hayward (2000: 623) uses the term Ethio-Eritrean Sprachbund; Zaborski (2003: 62) proposes North East African Language Macro-Area. Bender (2003a: 4) argues that the terms Northeast Africa area, Horn of Africa Language Area, and Erythraean Area "all have their plusses and minuses" and stresses that "now we must modify it to Ethiopia-Eritrean Area." In the present article, the term Ethiopian linguistic area (ELA) is used in order because (1) language area is not the correct term in areal linguistics and (2) the core of the area is Ethiopia.

Most of the approximately 80 languages spoken in Ethiopia and Eritrea belong to three language families of the Afroasiatic phylum: Semitic, Cushitic, and Omotic. A number of languages in the west and in the southwest belong to various families of the Nilo-Saharan phylum.

According to a widely accepted view, Semitic-speaking peoples arrived in the Horn of Africa at the end of the first millennium B.C. by crossing the Red Sea after having left their home on the Arabian Peninsula. They migrated into the area of today's Ethiopia and Eritrea and underwent extensive linguistic and extra-linguistic influence due to contact with Cushitic-speaking peoples (Ullendorff, 1955). A contradictory view considers Ethiopia and Eritrea to be the original homeland of Semitic-speaking people (Murtonen, 1967; Hudson, 1977). This view is based on the observation that the linguistic diversity among Semitic languages in Ethiopia and Eritrea is much greater than elsewhere.

The proposed features defining the ELA differ considerably from author to author, and the validity of these features has been discussed by the authors previously mentioned.. Recently, even the existence of an ELA was rejected by Tosco (2000).

Research History

Leslau (1945) and Moreno (1948) are two early attempts to describe the influence of Cushitic languages on Ethiopian Semitic languages. The first to claim the existence of a linguistic area in "Ethiopia and the various Somalilands" was Greenberg (1959: 24). He argues that this area is marked by "relatively complex consonantal systems, including glottalized sounds, absence of tone, word order of determined followed by determiner [*sic*], closed syllables, and some characteristic idioms." According to Heine (1975: 41ff.), who deals with word order, Ethiopia is part of "probably the largest convergence area in Africa, stretching in a broad belt from the Lake Chad region in the west to the Red Sea and the Indian Ocean in the east."

Ferguson (1970, 1976) was the first to describe the ELA in more detail. The second of these articles, with an extended database and improvements and corrections, is still the reference work for all scholars. Therefore, Ferguson (1976) is the starting point when in the following discussion of phonological and grammatical features. Ferguson discusses eight phonological and eighteen grammatical areal features for 18 languages, including Arabic and English. He is of the opinion that the "languages of Ethiopia constitute a linguistic area in the sense that they tend to share a number of features which, taken together, distinguish them from any other geographically defined group of languages in the world" (Ferguson, 1976: 63f.). He stresses that "some of these shared features are due to genetic relationship [...], while others result from the process of reciprocal diffusion among languages which have been in contact for many centuries" (Ferguson, 1976: 64).

Zaborski (1991: 124) criticizes Ferguson's selection of languages and features. He is of the opinion that the languages were "rather random[ly] selected" and that "most of the alleged areal features are not really areal but of common genetic origin." Hayward (2000: 623) argues that a number of Ferguson's features are "characteristic of most languages of this region"; five of these features he considers to

be "very widespread." Some articles deal with only one areal feature: Appleyard (1989) discusses relative verbs in focus constructions, Tosco (1994) deals with case marking, and Tosco (1996) deals with extended verb paradigms in the Gurage-Sidamo subarea.

Tosco (2000) is a controversial paper. In it, he denies the existence of an ELA because of the genetic relatedness of Ethiopian Semitic and Cushitic languages, the unilateral diffusion from Cushitic to Ethiopian Semitic, and the occurrence of features in related languages that do not belong to the ELA. Four recent papers, Bender (2003b), Crass (2002), Crass and Bisang (2004), and Zaborski (2003: 62f), favor the existence of a linguistic area. Bender (2003b) argues against the conclusions in Tosco (2000) and tries to extend the ELA by testing a number of Nilo-Saharan languages using a selection of Ferguson's features. Crass (2002) discusses two phonological features in detail; in Crass and Bisang (2004), the discussion is extended to features such as word order, converbs, and ideophones verbalized by the verb 'to say'. Zaborski (2003) presents the most extensive list, including 28 features that he considers to be valid for a macroarea that includes Ethiopia, Eritrea, Djibouti, Somalia, and parts of Sudan, Kenya, and even Tanzania and Uganda. Finally, Hayward (1991) deals with patterns of lexicalization shared by the three Ethiopian languages, Amharic (Semitic), West-Central Oromo (Cushitic), and Gamo (Gamo-Gofa-Dawro; Omotic). According to Hayward (1991: 140), these lexicalizations reinforce "the very real cultural unity of Ethiopia." This topic is reopened in Hayward (2000).

The ELA is considered to be composed of several subareas. Leslau (1952, 1959) describes change in Ethiopian Semitic languages induced by contact with neighboring Highland East Cushitic languages. Sasse (1986) deals with the Sagan area in southwest Ethiopia, and Zaborski (1991: 125) gives a list of seven subareas that are composed of "smaller contact and interference units," which he extends to nine by adding a Kenyan and an Tanzanian subarea (Zaborski 2003: 64).

Phonological Features

The eight phonological features listed by Ferguson (1976: 65ff.) are

P1: /f/ replacing /p/ as the counterpart of /b/
P2: palatalization of dental consonants as a common grammatical process in at least one major word class
P3: the occurrence of ejectives (in Ferguson's terminology, glottalic consonants)
P4: the occurrence of an implosive /ɗ/
P5: the occurrence of pharyngeal fricatives
P6: the occurrence of consonant germination
P7: the occurrence of central vowels
P8: the occurrence of an epenthetic vowel

Ferguson's list has since been criticized by several scholars. Zaborski (1991: 114 fn. 3) considers only P3 and "with reservations" P2 to be "really areal." In his more recent paper, Zaborski (2003: 62) lists only four phonological features for ELA. In addition to P3 and P6, he argues that "labialized consonants are frequent [and that] some palatalized consonants are innovations." Tosco (2000: 341), in contrast, is of the opinion that P1, P2, P3, and P5 are genetically inherited within the Afroasiatic phylum; that P4, P7, and P8 are restricted to one or two language families; and that P6 is widespread in both the Afroasiatic and the Nilo-Saharan phyla. But according to Bender (2003a: 3, 2003b: 32), P2 and P6 are typological features, P5 is too limited, and P8 "is vacuous because consonant clusters are rare" (Bender, 2003a: 3). P1, P3, P4, and P7, however, are "fairly idiosyncratic and easy to check" (Bender, 2003b: 32). Hayward (2000: 623) explicitly mentions only P6, which he considers to be areal. Crass (2002) discusses the ejectives and pharyngeal fricatives (P3 and P5) in detail. Because both features are genetically inherited within the Afroasiatic phylum, Crass argues that their occurrence (in the case of ejectives) and nonoccurrence (in the case of pharyngeal fricatives) can be considered areal features. Reconstructions of different stages of proto-languages of Afroasiatic show that ejectives were lost over the course of time (for details, see Crass, 2002: 1683); in recent times, however, ejectives were reimported into most of the languages via contact. In Proto-Highland East Cushitic, for example, only one ejective is attested, the velar ejective. In most of the modern Highland East Cushitic languages, however, four ejectives occur as phonemes: the dental, the postalveolar affricate, the velar, and to a lesser extent the labial ejective (Hudson, 1989: 11). In the Agaw languages (Central Cushitic), ejectives occur predominantly in loan words from Amharic and Tigrinya (Tigrigna) and their phonemic status is problematic (cf. Appleyard, 1984: 34).

The reasons for the nonoccurrence of pharyngeal fricatives in most of the languages of central Ethiopia are unclear. The nonoccurrence may be due to language contact or due to language-internal change. Tosco (2000: 343) supports Crass's idea in arguing that the nonoccurrence of pharyngeal fricatives "could identify a smaller 'central Ethiopian area' . . .

in which pharyngeal consonants are either dropped or reduced."

Grammatical Features

Ferguson's (1976: 69ff.) grammatical features are

G1: SOV word order
G2: subordinate clauses precede main clauses
G3: converb
G4: postpositions
G5: quotation marked by the verb 'to say' (in Ferguson's terminology, quoting clauses)
G6: "compound verbs ... consisting of a noun-like or interjection-like 'preverb' plus a semantically colourless auxiliary, commonly the verb 'to say'" (Ferguson, 1976: 71f.)
G7: negative copula
G8: singular used with numbers
G9: possessive suffixes identical or nearly identical with object suffixes added to the verb
G10: masculine/feminine gender distinction in the second- and third-person singular of pronouns and verbs
G11: identical subject prefixes for the second-person masculine singular and the third-person feminine singular marking a certain tense that contrast with subject suffixes forming other tenses
G12: for many words, a consonantal skeleton carrying the lexical meaning and a pattern of vowels carrying the grammatical meaning
G13: reduplication for forming intensive verbs and plurals of adjectives
G14: plural formation by change of the pattern (e.g., ablaut, called broken plurals)
G15: an independent and a subordinate form of the imperfective
G16: plural nouns agree with a feminine singular adjective, verb, or pronoun
G17: the imperative of the verb 'to come' is formed either from "a totally different stem [...] or with an exceptional formation" (Ferguson, 1976: 74)
G18: the unmarked form of a noun is not singular in number but plural or collective (Ferguson, 1976: 74)

Zaborski (1991: 124) considers G1 to G6 to be areal features and G7 to G18 to be due to genetic origin. Furthermore, he adds two features that he considers areal: (1) adjectives precede substantives and (2) main verbs precede auxiliaries. Hayward (2000: 623) is of the opinion that G1, G3, G6, and G15 are "very widespread." According to Bender (2003a: 3, 2003b: 32), G2, G3, G4, and G9 "are implicational consequences of SOV order," G13 and G18 are "too typological," and G10 to G12, G14, and G16 are Afroasiatic, "especially Semitic idiosyncrasies." In addition, G7 "looks like a good choice but turns out [...] to be inadequately defined." Bender seems to consider the features G1, G5, G6, G8, G15, and G17 to be good candidates for areal features.

Hayward (1991) and Tosco (2000) correctly stress that G2 and G4 have a relation to G1 and therefore cannot count as individual features. Within this context, Campbell (1994: 1471) raises the question of the weight of "a trait so central to the grammar" when it is counted only as a single feature. Also, G3, contrary to Bender's opinion, is not related to G1 (cf. Bisang, 2001) and is found in an area exceeding the ELA. Tosco (2000) considers G3 to have spread into Semitic languages due to Cushitic influence. According to Tosco, this holds true also for G5, G6, G8, G13, and G15. The features G11, G12, and G14 are strongly "Semitic-biased," and G17 and G18 are Afroasiatic features.

The huge list of areal features presented by Zaborski (2003: 62f.) contains features of differing quality. Unfortunately, in most cases Zaborski simply names the features without any discussion. A number of features relate to the basic SOV word order; examples are (1) dependent clauses precede main clauses, (2) main verbs precede auxiliary ones, (3) adjectives precede nouns that they define and (4) possessor (genitive) precedes the possessed. Other features are trivial or represent frequent grammaticalizations, such as (1) relative clauses are frequent, (2) cleft sentences are frequent, (3) subject is in the oblique case, and (4) postpositions start functioning as new case endings. However, there are a few interesting features that need further study, such as (1) quoting clauses and a lack (or at least limited use) of indirect speech and (2) a considerable number of different 'to be' auxiliary verbs.

Lexical Features

Hayward (1991) distinguishes three categories of lexicalizations, which he exemplifies with data from Amharic, Oromo, and Gamo. These categories are (1) single-sense lexicalizations, (2) lexicalizations with two or more distinct senses, and (3) lexicalizations involving similar derivations. The first category comprises "single-sense lexicalizations of typically indigenous concepts" (Hayward 1991: 145), the second category lexicalizations "showing inter-linguistic matching across the three languages" (Hayward 1991: 148), and the third category lexicalizations with a "similar (parallel) 'derivational pathway'" (Hayward 1991: 150). To the first category belong mainly nouns, such as lexical items for seasons of

the year, categories of terrain, categories of dung/excrement, supercategories for birds, types of borrowing, and the skin-color classification of people of the region. Furthermore, this category includes the suppletive imperative of the verb 'to come' (Ferguson's feature G17) and particles with the meaning 'take this!', which have no obvious etymological relationship to a verb. The second category, lexicalizations with two or more distinct senses, predominantly comprises verbs and some nouns; examples are the verb that has the basic meaning 'hold, catch' and the secondary meaning 'start, begin' and the verb that has the basic meaning 'play' and the secondary meaning 'chat'. The third category includes verbal derivations, compound verbs (Ferguson's feature G6), possessive constructions including two NPs, and idiomatic expressions. Examples of verbal derivations are the causative of the verb 'want', which has the meaning 'need'; the causative of the verb 'enter', which has the meaning 'marry'; and the causative of the verb 'pass the night', which has the meaning 'administer'. Examples of compound verbs are 'become silent', 'hurry up', and 'jump up suddenly'. Possessive constructions that include two NPs have a word-by-word meaning and a metaphorical meaning. Examples are 'son of man/people', with the metaphorical meaning 'mankind, human being', and 'land of man/people', with the metaphorical meaning 'foreign country'. Examples of idiomatic expressions are 'regain/recover control, take courage', which is composed of the noun 'heart' and the verb 'return (INTRANS)', and 'catch cold', in which the noun 'cold' is the subject and the experiencer is the object of the verb 'catch'.

Summary

The ELA is characterized by phonological, grammatical, and lexical features. Their areal status is not accepted by all scholars; furthermore, the existence of the ELA itself is not generally accepted. Most of the features are found in languages spoken in the highlands of Ethiopia. The more distant a given language is from this core area, the fewer features it has. However, because only a relatively small number of languages have been adequately described, these findings must be considered preliminary.

See also: Africa as a Linguistic Area; Amharic; Areal Linguistics; Contact-Induced Convergence: Typology and Areality; Converbs; Cushitic Languages; Ge'ez; Highland East Cushitic Languages; Omotic Languages; Oromo; Somali; Tigrinya; Wolaitta.

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Ethiopia: Language Situation

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Like many African countries, Ethiopia, which covers an area of 1 000 000 km^2, is linguistically and ethnically a very heterogeneous country. There are over 80 languages and approximately the same number of ethnic groups within a population officially reckoned to be about 54–63 million people, although unofficial estimates are between 68 and 70 million. Of the 80 or so languages, three major languages, Amharic, Oromo, and Tigrigna, comprise 70% of the total population (CSA, 1998). The language question is of paramount significance in the sociopolitical life of Ethiopians. The present government and its political ideology, for example, is based on 'ethnic federalism.' The constitution of 1995 also confers rights, including regional autonomy, to population groups on the basis of their ethnolinguistic character. Ethiopia's present geopolitical structure is thus primarily defined by language and ethnicity.

Language Families

The majority of the languages of Ethiopia belong to the Afro-Asiatic phylum and are classified under Semitic, Cushitic, and Omotic families. Others belong to the Koman and Chari-Nile subfamilies of the Nilo-Saharan phylum. The majority of the modern Semitic languages, most of the Cushitic, and all of the Omotic languages are strongly represented in Ethiopia. Over a dozen Nilo-Saharan languages are spoken at the periphery of the country bordering Sudan and Kenya. These are the least studied languages of Ethiopia.

There has always been uncertainty about the internal genetic classification of Ethiopian language groups (Bender *et al.*, 1976). There are also some unclassified languages: Ongota (Birale) and Shabo, spoken by very small communities in the southwestern corners of the country. Ethiopia has been considered as a 'language area' from a typological perspective and this was first suggested by Ferguson (1976). However, this view has been controversial among linguists and was opposed, for example, by Tosco (2003).

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Table 1 Endangered and/or extinct languages of Ethiopia

Languages	*Language family*	*Approximate number of speakers**
Ongota (Birale)	Unclassified	<10
Shabo	Unclassified	<200
Koegu (Kwegu)	Surmic, Nilo-Saharan	450
Opo (Opuuo)	Koman, Nilo-Saharan	<280
North Mao	Koman, Nilo-Saharan	<500
Argobba	Semitic, Afro-Asiatic	<1000
Zay	Semitic, Afro-Asiatic	<6000
Haro	Omotic, Afro-Asiatic	200
Kara (Karo)	Omotic, Afro-Asiatic	1000
Kimant	Cushitic, Afro-Asiatic	300
Anfillo	Omotic, Afro-Asiatic	Nearly extinct
Omo Murle (Murle)	Surmic, Nilo-Saharan	Extinct
Gafat	Semitic, Afro-Asiatic	Extinct
Geez	Semitic, Afro-Asiatic	Extinct

*The figures are estimates of the author based on personal experience and may not agree with official figures given in the past.

Language Policy and Education

Since 1991 Ethiopia has undergone dramatic socio-political changes, particularly in the education sector. One of these changes is the extension of the role of a number of languages for the purpose of primary education, which reflects a fundamental shift from bilingual to multilingual approaches to education. There are now about 21 vernaculars introduced into the Ethiopian school system as media of instruction and/or as subjects to be taught in primary schools, as well as being used for regional governmental and administrative activities.

Orthographies and Scripts

There are three scripts in use throughout the country: Ethiopic (Geez), Latin based and Arabic. Ethiopic is largely used for the Semitic languages such as Amharic, Tigrigna, Harari, and Gurage while many Cushitic and Omotic languages such as Oromo, Somali, Afar, Wolaytta, etc. have adopted the Latin alphabet. In areas where Arabic has a role as a language of literacy and religious study, the Arabic script is in use. Ethiopia is thus both a multilingual and a multiscriptual nation.

Multilingualism and Patterns of Language Use

Because of the changes noted above, the pattern of language use in Ethiopia has been influenced in a significant way. One of these changes concerns the status of Amharic. It was the official and national language of the country during the two previous governments, Haile Selassie's imperial government (1941–1974) and the Socialist Derg (1974–1991). Its status has now been reduced to (a) a school subject from grade 3 to grade 10, in regions where it is not used as a medium of instruction, (b) the working language of the federal government, and (c) the working language of some regions where two or more competing languages exist, such as Benishangul Gumuz and Gambella. In higher institutions Amharic continues to enjoy its status as a field of study at diploma, B.A. and M.A. levels. Recently, some major languages such as Oromo and Tigrigna have also been introduced in various colleges and universities as minor and major subjects of study for first degrees.

Languages with Special Status

There are also some languages with special status: Geez, Arabic, and English. Geez is an extinct language but has been in use as a liturgical language in the Ethiopian Orthodox Church for centuries. Classical Arabic has also been in use as a language of literacy and religious study since the 13th century. Ethiopia therefore possesses a wealth of manuscripts in Geez and classical Arabic that focuses on both religious and secular themes. English is the language of secondary and tertiary education and plays a role in modernization, business, and technology.

Language Maintenance and Shift

Ethiopia is one of the countries designated as being within a 'crisis area' in a report posted on the UNESCO website (2002), because it has the most moribund and seriously endangered languages in Africa. These include: Ongota (Birale), Shabo, Koegu (Kwegu), Opo (Opuuo), North Mao, Argobba, Zay, Haro, Kara (Karo), Kimant, Anfillo, Omo Murle (Murle), Gafat, and Geez (see Table 1).

Although Amharic is used as a *lingua franca*, it does not mean that the speakers of these endangered languages are shifting towards Amharic. Only speakers of some languages, for example, Geez (partly), Gafat, Argobba (partly), and Kimant, have shifted or are shifting toward Amharic. In some cases, the language shift is taking place towards other major languages such as Oromo (e.g., Anfillo). The language shift patterns vary and depend on various socioeconomic and demographic factors.

See also: Amharic; Ethiopian Semitic Languages; Language Education Policies in Africa; Oromo; Tigrinya.

Language Maps (Appendix 1): Maps 12, 13.

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Relevant Website

http://www.unesco.org.

Ethiopian Semitic Languages

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The Ethiopian Semitic (ES) languages form a subdivision of the Semitic language family that is a branch of the Afroasiatic superfamily. This subfamily comprises about 23 languages. Two languages (Tigre and Dahlik) are spoken only in Eritrea. Tigrinya (Tigrigna) is spoken in Eritrea and Ethiopia and all the others are in Ethiopia. (Unless otherwise specified, figures of speakers cited in this article are taken from the Ethnologue website.)

Classification and Demography

The still widely accepted classification of ES is based on shared "innovations due to internal reasons" (Hetzron, 1972: 13) and has two main divisions, a northern (NES) and a southern branch (SES). The northern group is formed by only four languages: the ancient Ge'ez (now extinct), Tigrinya (1 900 000 in Eritrea and 3 225 000 in Ethiopia), Tigre (800 000), and the recently identified Dahlik (1000) by Simeon-Senelle (2000). The southern branch, in contrast, comprises most of the languages and has a more complex composition, with several subgroups. This branch, according to Hetzron (1972), is classified into Transversal and Outer South ES. The languages forming the Transversal South ES are spoken in the central and center-eastern parts of Ethiopia and is subdivided into Central Transversal, consisting of Amharic (spoken as a first and second language by 80% of the 70 million total population of Ethiopia; cf. Meyer and Richter, 2003) and Argobba (10 000), and Eastern Transversal, consisting of the Eastern Gurage languages, i.e., Silt'e, Zay, and Wolane (together 900 000) and Harari (22 000), spoken in the city of Harar. The second subgroup, Outer South ES, contains all other languages that are divided into a 'n-group,' which consists of Gafat, a non-Gurage language that is extinct, and the North Gurage languages that comprise Goggot, Soddo (Gurage, Soddo), and, according to Leslau (1969) and Demeke (2001), Mäsqan, (together around 300 000) and a 'tt-group,' which comprises about nine different languages (Muher, Ezha, Chaha, Gumär, Gura, Gyeto, Ennemor, Endegen, and Endär, together 800 000). These languages are spoken in a comparatively small area south of Addis Ababa. The term Gurage therefore refers to a group of peoples with a common cultural and historical background who speak different South Ethiosemitic languages

Although Amharic is used as a *lingua franca*, it does not mean that the speakers of these endangered languages are shifting towards Amharic. Only speakers of some languages, for example, Geez (partly), Gafat, Argobba (partly), and Kimant, have shifted or are shifting toward Amharic. In some cases, the language shift is taking place towards other major languages such as Oromo (e.g., Anfillo). The language shift patterns vary and depend on various socioeconomic and demographic factors.

See also: Amharic; Ethiopian Semitic Languages; Language Education Policies in Africa; Oromo; Tigrinya.

Language Maps (Appendix 1): Maps 12, 13.

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that do not necessarily constitute a single genetic group.

The geographical origin of the ES languages is controversial. The traditional hypothesis proposes an origin in the Near East: Semitic-speaking settlers from Southern Arabia crossed the Red Sea and introduced the ancestor of modern ES languages in Northeast Africa around 1000 B.C. (cf. Ullendorff, 1955). In contrast, there is a more convincing hypothesis that sets the emergence of Semitic languages in the context of the Afroasiatic language family and proposes an origin in Ethiopia proper (cf. Murtonen, 1967; Drewes, 1958; Hudson, 1977, among others).

Phonology

Ejective consonants (p', t', s', c', and k') are widespread in all ES languages and seem to represent an earlier stage of Semitic emphatic consonants. Pharyngeal consonants are retained in NES, Argobba, and Harari but are lost in the remaining languages. Labialization, especially of velars, is common. Quite complex palatalization and labialization processes appear in several Gurage languages. Vowel length is attested only in Ge'ez and Eastgurage. The central vowel ɨ acts as an epenthetic vowel in many SES languages. Gemination of consonants is distinctive.

Morphology

The verbs are categorized in different types depending on the gemination of the penultimate consonant and the vowel quality in different conjugational paradigms. The different behavior of gemination in type A verbs is one of the distinguishing features between NES and SES languages. The former geminates in the perfective whereas the latter does so in the imperfective.

Verbal negation is marked by prefixed morphemes, which may differ for different aspects. In addition to the two main aspect forms, perfective and imperfective, there are a number of compound tense constructions formed with auxiliaries (build with the verb of existence √*hlw*). A special form of verbs are the so-called compound verbs. Their composition has the form ideophone + conjugated form of the verb 'to say'; the first carrying the semantic content and the latter the grammatical functions such as person or aspect.

The use of converbs for verbal subordination (expression of sequence or adverbial concept) is common. They appear generally in two different forms: In NES languages and Amharic/Argobba gerundive forms are used, whereas in the remaining SES languages there are a number of different suffixes attached to different verb forms such as perfective and imperfective.

The relative is marked with a morpheme that is prefixed to a verb that by itself precedes the head noun of the relative clause. Verbal derivation is achieved by prefixes and internal extension of the stem. Derivational prefixes are a- and as- for causative and t- for passive or middle voice.

Nominal morphology is characterized by the broken plural in NES languages and the use of suffixed plural markers in SES languages. In some languages this plural suffix marks the transnumeralis. An article derived historically from possessive marker can be observed in some languages. Marked cases are accusative, which is marked either by a pre- or by a suffix, and genitive, which is marked by position or with a prefix at the possessor that precedes the possessed.

Syntax

The most striking feature of ES language syntax is the word order, SOV, which stands in an obvious contrast to VSO in the Asian Semitic languages. This change of word order leads to a somehow mixed typological situation, i.e., the verb is in the sentence-final position and the subordinated clause precedes the main predication.

(1) lɛgan azzɛnnɛwga mɛt'ɨllɛw (Argobba)
tomorrow NEG.it-rained.if I-come
'If it doesn't rain I will come'

In addition to postpositions, which are typical for SOV, prepositions are widely used. Most of them are also used as conjunctions that are usually cliticized to the following constituent (t- and b- are more frequent; k-, s-, and l- are seldom used). The suffixed pronominal features for the direct object often have the form of affix, unlike those in Asian Semitic languages, which are clitics. The present tense copula is formed in many languages by the root nɛ- plus a person-marking suffix. Tigre and Ge'ez express present tense equative clauses without a copula or with a pronoun copula, as in most Asian Semitic languages (Crass *et al.*, 2004). The past tense copula in most ES languages is nɛb(b)ɛr. *Wh*-items are *in situ* types and question words may be used in yes–no interrogatives and usually have postverbal position. Relative forms of verbs are frequently used in nominal function.

On the discursive level, cleft sentences play a major role, especially for focusing of certain parts of a sentence.

(2a) tɛlantɛna nɛw sɛwɨyyɛw yɛmɛtt'aw (Amharic)
yesterday COP man-the REL.he-came
'It was yesterday that the man came'

(2b) sɛwɨyyɛw nɛw tɛlantɛna yɛmɛtt'aw
man-the COP yesterday REL.he-came
'It was the man that came yesterday'

Most of the morpho-syntactic differences between Ethiosemitic and Asian Semitic languages are assumed to be the result of language contact on the Ethiopian side, but there are not enough data to support this claim. Documentary works still need to be conducted on many of these languages.

See also: Afroasiatic Languages; Eritrea: Language Situation; Ethiopia as a Linguistic Area; Ethiopia: Language Situation; Ge'ez; Semitic Languages.

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Ethnicity

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This article has two main objectives. First, it describes the various ways in which ethnicity has been analyzed and the insights it sheds into an understanding of social and political processes. Second, and relying on data from Africa and the experiences of immigrant communities in Western countries, we analyze the relationship between ethnicity and language variation to explore the nature of the possible insights we might develop into ethnicity by studying ethnicity within Africa as well as in European and North American immigrant communities. The key contribution of this article is the way in which it illustrates how the relationship between ethnicity and language variation is more fruitfully understood not only when it is analyzed contextually, but also and more importantly when the analysis is embedded within the *longue durée* (Wallerstein, 2000). Wallerstein uses the French term *longue durée* to describe changes, social and political, which take place over a long historical period. This article will also examine how ethnic identities shift due to migration. Examining ethnicity within migration is necessary because of the massive voluntary and involuntary migration both within and from Africa to Europe and the United States. Our goal is to determine what it is about ethnicity which renders it susceptible to shift and manipulation.

While definitional details of ethnicity may vary from one discipline to another, the central tendency of ethnicity is how people define themselves *vis-à-vis* others, how distinctions are made between 'we' and 'they' (Newman, 1978: 105) or between 'us' and 'them.' Ethnicity is dynamic rather than enduring, fixed or unchanging. It is, as Jenkins (1997: 13) notes pointedly, collective and individual, externalized in social interaction and internalized in personal self-identification; it is situationally defined and is

(2b) sɛwɨyyɛw nɛw tɛlantɛna yɛmɛtt'aw
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produced (endlessly anew) in the course of social transactions that occur at or across (and in the process help to constitute) the boundary between ethnic collectivities (Jenkins, 1997: 52, 1994: 63, 198). Put differently, ethnicity is context-dependent; that is, it is 'brought about' rather than 'brought along' in an interaction and is activated in different ways in different contexts (Hinnekamp, 1982, quoted in Makoni, 1996: 268–269). At its core, says Fishman (1977: 17), "ethnicity is experienced as coming 'with the blood if not through it'; as an inherited constellation acquired from one's parents as they acquired it from theirs, and so on back further and further, *ad infinitum*." For some, to be without ethnicity is 'to be faced with one's death' (de Vos and Rmanucci-Ross, quoted in Fishman, 1977: 19). It is perhaps because individuals and groups feel so strongly about ethnicity that Fishman (1977: 18) warns that when we deal with ethnicity, "we may be dealing with some of the strongest assumptions and some of the most powerful investments in which social man is involved." Because of the wide range of disciplines studying ethnicity, as pointed out below, its meanings are generally ambiguous and multiple. Accordingly, we will be using the term ethnicity in a broader sense than that of Bourhis and Marhall (1999), who use it interchangeably with 'minorities' or ethnic people in America.

As already observed, ethnicity is currently being studied in a wide range of disciplines, prominent among them being political science, sociology, sociolinguistics, and more recently cognitive anthropology. It must be pointed out, however, that research into ethnicity is a recent 'vintage' (Brutt-Griffler and Davies, 2005). In academia there was a general tendency to shy away from studying ethnicity, particularly in Africa, since it was seen as a retrogressive and shameful topic that would not necessarily promote national interests and aspirations for integration. Against this background, the new nation-states in Africa sought to achieve national integration through 'erasing' (Irvine and Gal, 2000) ethnic identities (Kashoki, 2003). The quest for national integration, which was to prove illusory in Africa, was sought politically through a one-party state, and linguistically in language planning policies predicated upon a one nation = one language policy or what Bambgose (1991) calls a preoccupation with 'one.' In South Africa, for instance, ethnicity was construed as a false and divisive creation of the architects of apartheid. The idea of distinct ethnic groups with distinct languages formed the basis of the apartheid's homeland policy, or policy of separate development (Herbert, 1992), a policy that led to the creation of separate homelands for the various black ethnic groups. There was, for instance, a Zulu ethnic homeland for Zulu-speakers, a Xhosa homeland for Xhosa-speakers, a Ndebele homeland for Ndebele-speakers, a Swazi homeland for Swati-speakers, to name a few (Kamwangamalu, 2000) and despite the fact that the languages that these groups spoke were mutually intelligible varieties of the Nguni language. The idea of ethnicity as inextricably linked to language, indeed the idea of ethnicity as language, is a product of German Intellectual Romanticism (Cook, 2004). It is interesting to observe that although the idea of language as ethnicity was a product of early colonial period, most contemporary South Africans, for instance, associate standard Zulu with Zulu ethnicity, se Tswana language with seTswana ethnicity, isiXhosa with Xhosa ethnicity. The former homeland regimes of the apartheid era, which used the idea of language as ethnicity as one of their operational principles, overlooked the fact that the notion of language had longer roots traceable to early colonial thinking.

The earliest use of the term ethnicity as a way of framing research into social relations can be traced to Wallerstein's 1960 seminal article, 'Ethnicity and national integration in West Africa' (reprinted in Wallerstein, 2000: 3). In the article Wallerstein distinguishes ethnicity from tribalism. For him, ethnicity was largely an urban phenomenon arising in contexts in which there is an interplay between the ways in which individuals define themselves and how they are defined by others, much as we have pointed out earlier with respect to definitional details of ethnicity. Wallerstein argues that the new social relationships are more appropriately described not by the term ethnicity but by the French term *association d'originaires* (Wallerstein, 2000: 4). The French term did not, however, gain much currency in studies into ethnicity. Social relationships in tribes as opposed to ethnic groups were construed as heavily dependent upon a sense of loyalty to chiefs. Linguistically, social relations within an ethnic group are reinforced through the use of kinship idioms drawn from tribal relations: old ways of encoding new social relationships, so to speak. The distinction between tribalism and ethnicity that forms the basis of Wallstertein's early thinking about ethnicity is no longer necessary because the term tribalism has fallen into disrepute and has largely been superseded by ethnicity in most academic discussions. But has it entirely? Although the term tribalism has fallen into disrepute, it has not been completely excluded in serious discussions about ethnicity and identity and may be making a subtle comeback, as can be inferred from Joseph's (2004) concept of 'tribal language' and Mey and Modood's (2001) 'new tribalism,' a term akin to ethnic labels (see below) and one that Western

discourses use to describe the alleged socially disruptive effects of immigration by non-Westerners to Western countries.

Ethnicity and Ethnic Labels

Ethnic labels typically exist in a "context of oppositions and relativities" as when groups encounter other groups (Comaroff and Comaroff, 1996). For example, the ethnic label Shona was first used not by the Shona to describe themselves but by the Nguni-speaking Ndebele to refer to the Rozwi people they met after entering the Changamire state in the 1830 in southern Africa. If the Shona were being defined ethnically by the Nguni, they were defining themselves not linguistically, culturally, or ethnically, but politically – as "subjects of a particular chief" (Ranger, 1985). In the mid-20th century identities among the "Shona expanded beyond historical political units to be thought of as a matter of language, culture, and ethnicity" (Ranger, 1985), thus reflecting the point, made in Ross (1979: 9–10), that "language is probably the most powerful (though not necessarily the only one) symbol of ethnicity because it serves as a shorthand for all that makes a group special and unique."

Despite this, in the context of the Shona of Zimbabwe it was not always the case that there was a connection between ethnicity and language. The relationship between ethnicity and language is further complicated by the fact that although currently the Shona may define themselves linguistically as Shona, it does not follow that everyone who so identifies themselves does, *ipso facto*, consider themselves as Shona ethnically. For example, the Mozambicans who live in the Ndau region in southern Zimbabwe do not see themselves as Shona although they speak Ndau, a dialect which linguists would refer to as Shona (MacGonagle, 2002). Historically, the ancestors of Ndau speakers would not have identified themselves either as Ndau or Shona ethnically. They would rather have identified themselves politically as either subjects of Sanga or Teve (Beach, 1994) or some other local chief. Eldredge (1993) in a study of 19th century Lesotho provides another example that illustrates how ethnicity evolves over the *longue durée* (see also Atkinson, 1989 for an analysis of the evolution of ethnicity among the Acoli in Uganda). Eldredge describes how the emergence of Sotho ethnicity was a product of the amalgamation of southern African chiefdoms. These identities, which were clearly a product of a specific historical epoch, tend to be treated by the speakers as natural, essential, and primordial. For example, Yoruba-Ibo rivalry has played a key role in Nigerian politics, although the use of the term Yoruba itself to refer to western Nigeria was initially used by Anglican missionaries, and standard Yoruba was created to unify the diverse groups in western Nigeria (Wallerstein, 2000: 5).

There are two questions that arise when we focus on how ethnicity evolves historically. First, how do these identities emerge? Second, what is it about ethnicity that renders it so susceptible to manipulation? Common ethnic identities emerge when people perceive themselves as occupying a common cultural space, have a real or imagined common descent, or regulate their lives in comparable ways (Weber, 1978). As Le Page and Tabouret-Keller (1985) would put it, a common ethnic identity presupposes, for those who lay claim to it, shared culture and/or language, measure of consensus of the evaluation of others, active self-identification with the in-group, ascription to it by outsiders, and/or some idea of biological kinship and inheritances (see also Paden, 1970: 245).

Ethnicity and History

Historians have argued that the emergence of ethnicity as a form of identity was a product of colonialism. Tribalism in this line of reasoning, best illustrated by Vail (1989), was invented by colonialism. Colonialism fixed identities that were fluid in pre-colonial eras. Whether or not all ethnicity is a product of colonialism is increasingly being challenged. For example, Zulu ethnicity in South Africa may be more usefully traced back to Chaka even though it crystallized during the colonial era (Makoni and Meinhof, 2003).

Discussions on whether ethnicity can be traced to epochs other than the colonial era miss the point. The important issue that Vail's model of ethnic construction demonstrates is that ethnicity, even if it is subsequently treated as primordial, can be constructed and manipulated for political purposes by rulers irrespective of whether they are pre-colonial, colonial, or contemporary African rulers or elites. For instance, the colonial rulers in the former Belgian Congo, now the Democratic Republic of Congo, manipulated ethnicity to divide Ciluba-speakers into what came to be known as Bena-Lulua and ba-Luba, a division that led the country into a civil war in the early 1960s. Likewise, during his 32-year-rule over the Democratic Republic of Congo, a country he renamed Zaire, the late dictator Mobutu Sese Seko played one ethnic group against the others to maintain hs power.

This phenomenon of ethnicity manipulation can be observed in several other African states. In South Africa the apartheid regime played the ethnic card to divide the black population, and particularly to create tensions between the Inkatha Freedom Party, whose members are mostly Zulus, and the African

National Congress (ANC), which tends to be identified with the Xhosas. The ongoing political conflicts in Ivory Coast and the Sudan, for instance, have their roots in ethnicity, and so do the conflicts in Rwanda and Burundi, where the Tutsis and the Hutus have been at loggerheads with each other for generations. Listing these cases of ethnicity manipulation is not to say that ethnic constructions are monopolized by rulers and elites with the disadvantaged passively acquiescing. The disadvantaged and non-elites also at times challenge their social definitions as the other and outsiders (MacGonagle, 2002). Greene (1996) demonstrates how Anlo women in West Africa since the 17th century have exploited and shifted ethnic boundaries within the lineages of Anlo society in southeastern Ghana. Herbert (2002) reports on the linguistic behaviors of Mozambique Thonga men and women who migrated to South Africa generations ago. He shows how Thonga women, unlike Thonga men, resist abandoning their Thonga ethnicity for a Zulu ethnicity, despite the prestige that is associated with the latter. It is observed that while Thonga men universally speak Zulu and make a conscious effort to pass themselves as Zulu to improve their social and economic mobility, Thonga women do the opposite: they display their Thonga identity by speaking 'bad Zulu,' that is, Zulu replete with Thonga lexical residue as well as phonological and morphosyntactic influences (Herbert, 2002: 327). Herbert explains that Thonga women traditionally enjoy more status, privileges, and power than Zulu women. Accordingly, for Thonga women to embrace Zulu ethnicity as their men do would involve a marked diminution of their status and power (2002: 331). Eldredge (1994) documents how through marriage alliances women facilitated the spread of a common culture and language over a wide geographical area.

The observations by Greene and Eldredge (1994) are crucial. They foreground the importance not only of studying ethnicity and language historically, but of stressing the intersection between language, ethnicity, and gender relationships, which become clearer when studied over the *longue durée*. Epistemologically, studying the intersection between ethnicity and gender and language is an important departure, because gender and ethnicity have tended to be treated as separate fields in Western linguistics (Cameron, 1993). It is doubtful whether the separation is a viable way of proceeding when studying ethnicity in colonial and post-colonial contexts.

Ethnicity and Migration

Migration is increasingly playing an important role in shaping the nature of the relationship between ethnicity and language variation in contemporary Africa. An important post-independent trend in Africa is the massive migration of Africans from different ethnic groups to urban centers. Because of economic stagnation there are large numbers of unemployed youths as well as of people from different ethnic backgrounds living in close proximity. Therefore, investigating the potential effects of ethnicity on language variation becomes crucial. For example, in Bukavu the dominant center of the Kivu province situated at the southern tip of Lake Kivu in the Democratic Republic of the Congo, Goyvaerts (1996) reports that there are between 40 and 50 different languages in a population of about 240 000 people. In these contexts new forms of language emerge to express the new identities that are meant to mask previous ethnicities. The new language varieties tend to be hybrid languages and are generally used to neutralize the potentially negative effects of ethnicity (Goyvaerts, 1996). It is not clear whether these new forms of expression are best described as hybrid languages, registers, anti-languages, or stylistic inventories.

The crucial issue, however, is that these new forms of expressions draw from the social and linguistic landscape, in ways that complement existing languages. The ways in which the new expressions draw from the social and linguistic landscape may vary from one setting to another. In the Ivory Coast the linguistic expressions may draw liberally from French and other African languages. In urban South Africa the new urban expressions may draw from Afrikaans, English, and other local languages. For instance, in a study of the linguistic makeup of identity in an urban community in post-apartheid South Africa, Finlayson and Slabbert (2000) show that the free movement of communities coupled with the competitive forces of supply and demand has resulted in a hybrid form of identity, an identity that distinguishes urban people from their rural counterparts. This identity, the authors propose, is hybrid because it simultaneously embraces those features that are marked as 'modern' and 'Western' and those that are marked as 'traditional' and 'African' (Finlayson and Slabbert, 2000: 122). Although the new forms of expression of this hybrid identity may mask ethnic origin they tend to be gendered. For example, girls include more English in their speech while boys are likely to draw more liberally from Afrikaans, Tsotsitaal, and other local languages.

The new expressions in urban areas demonstrate that it is indeed possible for people to shift from one ethnic identity and appropriate a new form of urban identity. Current urban migrations in the Democratic Republic of Congo provide an excellent example of

the phenomenon of identity shift under discussion. With the collapse of the economy in the Democratic Republic of Congo the elites in non-industrial cities have migrated to industrial ones in search of job opportunities. The change of location has forced the migrants to effect a change in their ethnic identity by adjusting their speech to reflect that of their new environment. For instance, Ciluba speakers who migrate from Western Kasai to Eastern Kasai to work for MIBA, a major diamond company in the region, tend to adopt the local variety of Ciluba, one that is different from their native variety. Though both varieties are mutually intelligible, there are marked phonological differences in that where Western Kasai Ciluba, for instance, uses [p] as in *Mulopo* 'God', *kupesha* 'to give', *bupole* 'peace', Eastern Kasai Ciluba uses [h] so that it renders the above words as '*Muloho*', *kuhesha*, and *buhole*, respectively. For the migrants, the shift from Western Kasai Ciluba to Eastern Kasai Ciluba, and with it the shift of ethnic identity, is a strategic one aimed at facilitating access to whatever resources are available in the new environment.

Looking outside African culture for a moment, a further example of strategic shift in ethnicity comes from the naming practices by the Tuvans, an indigenous Turkic people of south central Siberia in the former Soviet Union. According to Harrison (1999: 69), the Tuvans maintain a tenuous identity, pummeled by forces of linguistic and cultural assimilation to the Russian culture on the one hand, and empowered by a discourse of self-determination on the other. Rather than assimilate completely to the Russian culture, the Tuvans adopted a symbiosis of Russian and Tuvan naming systems, a strategy that sought to restore the equilibrium by preserving the old (that is Tuvan) system (through retention of Tuvan kinship terms and nicknames) while accommodating the new one, that is the Russian naming system, which was imposed on them. Harrison explains that the Tuvans adopted the noted symbiosis because, on the one hand, the use of the Russian language and names provided access to cultural capital and advancement and, on the other hand, the mixture of the Russian naming protocols with the Tuvan ones (e.g., use of Tuvan nicknames and kinship terms) ensured that the adoption of the Russian naming system did not bring about the demise of the Tuvan culture and identity.

All the above examples attest to the point, made in several studies (Fishman, 1977; Okamura, 1981; Courteau, 1991; Jenkins, 1994), that language is generally seen as the most powerful symbol of ethnicity. The studies also note, however, that language is not always the sole medium through which ethnicity is expressed. A wide range of other media also serve as symbols of ethnicity, among them ethnic dress, dance, foods, and physical features, to list a few. For example, in Ghana 'original Accra' residents tend to refer to all merchants from the north as Hausa on the basis of geographical origin and professional status or what may be termed industrial ethnicity. Social geographers are increasingly beginning to demonstrate how space is used to imagine and construct ethnicity (Seirlis, 2004). In Abidjan, however, the same people may be referred to as Diola. In Zimbabwe, all people from Malawi irrespective of ethnic background are classified by Shona speakers as Chewa. Although these ethnic designations may have arisen in error, the Hausa/Diola/Chewa may take advantage of these new designations to merge into their new groups. In Accra the 'new' Hausa may end up living in Sobon Congo. In West Africa to facilitate their integration into the Hausa some of the migrants may convert to Islam, but not necessarily learn to speak Hausa as an additional language. Apparently, the conversion is a temporary one because upon return to the rural area they shift back to their previous religion (Wallerstein, 2000).

The pressures to shift away from an ethnicity-bound self construction and adopt another identity also takes place among Africans in the new diaspora in North America. Ibrahim (2003) describes how black Sudanese, when migrating from Sudan to North America, have to learn to imagine themselves as black within the North American space. In the North American context, as part of the process of learning to be black, they learn Black English Vernacular as an additional language. Black English Vernacular becomes a crucial marker of their new found black identity. The shift in this case is from an ethnic based identity to a racial one. This is achieved by learning Black English Vernacular, (*Whassup homeboy*) as expressed felicitously by Brutt-Griffler and Davies (2005) when she describes it as a shift from being American African to African Americans.

Census, Language, and Ethnicity

An important strand in ethnic and identity formation has relied on censuses. Inspired by the work of Bourdieu, this literature has sought to examine how censuses tend to create people by "nominating into existence" new categories (Brubaker *et al.*, 2004). An analysis of the categories used in the censuses is important in so far as it sheds insight into the categories being used by government. For example: an analysis of the census categories used by the Southern Rhodesian government in 1926 and the Zimbabwean

Government in 1982 and in 1992 provides empirical evidence on how colonial and postcolonial governments understood the nature of the relationship between ethnicity and language.

> 1926
> Form for the use of EUROPEANS or WHITE PERSONS only
> A separate form must be filled in for each Family or Household. If one form is insufficient, please ask for Additional Forms. All Europeans or White Persons, including visitors, lodgers and white servants, whether in the main building or outside rooms, to be entered hereunder. Particulars about Asiatic, Coloured, or native Servants or Employees residing in this Dwelling or on the Premises must be given on the separate forms provided for those persons.

In the 1926 census there was no distinction made between the different European groups. It was insignificant how the colonial state imagined Europeans, whether they were Dutch, Portuguese, Greek, or English. Similarly, no distinctions were made within the Asian group. Both Europeans and Asians were distinguished from 'Coloured' and native Servants (Africans). Africans were largely seen in terms of employees. African employees had to be distinguished from white employees on the basis of race. There was no explicit mention of ethnicity.

In the 1982 census, which was the first census Zimbabwe conducted after it attained independence in 1980, the labels or categories used to identify the different population groups changed. The concept of ethnicity emerges:

> ETHNIC GROUP and CITIZENSHIP
> Is this person a Zimbabwean? Zimbabwean Africans state father's dialect.
> Other Zimbabweans state ethnic group. Others state citizenship and ethnic group.

The categories in the 1982 census differ radically from the 1926 one. In the 1982 census the distinction is now made between Zimbabwean Africans and other Zimbabweans. The other Zimbabweans are likely to be Europeans, 'Coloured,' and Asians if we are to use the categories in the 1926 census. Ethnicity only needs to be stated for non-Zimbabweans but not for Zimbabweans. Ethnicity for Zimbabwean Africans is only assessed by proxy via the 'father's dialect.' Asking about the father's dialect was therefore a euphemistic way of enquiring about the nature of the relationship between ethnicity and language. It is instructive that the form asked for the father's dialect and not the mother's.

In the 1992 census a new set of questions were asked.

> What is the name's ethnic origin?
> 1. African
> 2. European
> 3. Asiatic
> 4. Mixed race

In the 1992 census yet other categories emerge. The differences between Zimbabwean Africans and other non-African Zimbabweans are now expressed in terms of a distinction between African and European. The distinction made in the 1982 census between Zimbabwean Africans and other Africans has disappeared. Both groups are now replaced by a simple category, namely, Africans. It's important to observe that from the 1926 census through to the 1992 census the category that has been retained continuously through the different censuses is that of Asiatic and 'Coloured,' with 'Coloured' at times being used instead of 'mixed race.' An analysis of these categories is important because they may have profound consequences on how individuals understand themselves. Further studies are required into how popular understandings relate to the official accounts of ethnic categories.

Conclusion

In this article we have analyzed the nature of the relationship between ethnicity and language, with a focus especially on Africa. We have tried to illustrate the various ways in which ethnicity might be conceptualized, and the social and political roles it might play in shaping individual and collective identities. We have argued that at least in Africa and perhaps among ethnic minorities in the United States and Europe, it might be prudent to adopt a long term perspective on the nature of the relationship between ethnicity and language. It might also be necessary to conflate distinctions between ethnicity and gender rather than studying them as separate areas, as has traditionally been the case.

See also: Africa as a Linguistic Area; African Linguistics: History; Afroasiatic Languages; Applied Linguistics in Africa; Critical Applied Linguistics; Ethnolinguistic Vitality; Identity in Sociocultural Anthropology and Language; Language Planning and Policy: Models; Linguistic Ethnonationalism; Migration and Language; Missionary Linguistics; Prestige, Overt and Covert.

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Ethnolinguistic Vitality

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Objective Group Vitality

Linguists and sociolinguists concerned with issues of language contact, multilingual communication, language attitudes, bilingualism, language shift, and language loss must inevitably deal will the relative strength and weaknesses of the language communities they are investigating. Sociostructural and sociopolitical factors can fundamentally affect the nature and quality of 'intergroup' contact between speakers of contrasting ethnolinguistic groups (Bourhis, 2001a). The concept of 'ethnolinguistic vitality' emerged out of the critical need for situating the sociolinguistic and social psychological processes underlying language behaviors within their proper sociostructural contexts (Johnson *et al.*, 1983).

The notion of ethnolinguistic vitality provides a conceptual tool to analyze the sociostructural variables affecting the strength of language communities within multilingual settings. The vitality of an ethnolinguistic group is defined as "that which makes a group likely to behave as a distinctive and collective entity within the intergroup setting" (Giles *et al.*, 1977: 308). The more vitality an ethnolinguistic group has, the more likely it is that it will survive and thrive as a collective entity in the intergroup context. Conversely, ethnolinguistic groups that have little or no vitality are more likely to eventually cease to exist as distinctive language groups within the intergroup setting.

Three broad dimensions of sociostructural variables influence the vitality of ethnolinguistic groups: demography, institutional support, and status. Demographic variables are those related to the absolute number of members composing the language group and their distribution throughout the urban, regional, or national territory. Number factors refer to the language community's absolute group numbers, their birth rate, mortality rate, age pyramid, endogamy/exogamy, and their patterns of immigration and emigration in and out of the ancestral territory. Distribution factors refer to the numeric concentration of speakers in various parts of the territory, their proportion relative to 'outgroup' speakers, and whether or not the language community still occupies its ancestral territory. These demographic factors can be based on one or a combination of the following linguistic indicators: L1 as mother tongue, knowledge of a first (L1) or second (L2) language, L1 and/or L2 language use at home. Taken together, these indicators can be used to monitor demolinguistic trends such as language maintenance, language shift, language loss and inter-generational transmission of the L1 mother tongue. Within democracies, demographic factors constitute a fundamental asset for ethnolinguistic groups, as 'strength in numbers' can be used as a legitimizing tool to grant language communities with the institutional control they need to ensure their inter-generational continuity within multilingual societies.

Institutional control is defined as the degree of control one group has over its own fate and that of outgroups, and can be seen as the degree of social power enjoyed by one language group relative to salient outgroups (Sachdev and Bourhis, 2001). Institutional control is the dimension of vitality par excellence, needed by language groups to maintain and assert their ascendancy relative to competing language groups. Conversely, subordinated language groups need to achieve and maintain a favorable position on the institutional control front if they wish to survive as distinctive collective entities within multilingual states (Fishman, 2001). The extent to which a language group has gained formal and informal representation in the institutions of a community, region, state, or nation constitutes its institutional support. Informal support refers to the degree to which a language community has organized itself as a pressure group to represent and safeguard its own language interests in various state and private domains. Formal support refers to the degree to which members of a language group have gained positions of control at decision-making levels of the government apparatus, in education, in health care, in the army, in business, industry, the mass media and within cultural, sport and religious institutions.

Status language planning adopted by regional or national governments can also contribute to the institutional support of language communities by legislating the use of competing languages in the government administration, in education, in the mass-media and as the language of work. The presence and quality of leaders who can head the formal and informal institutions representing language groups also contributes to the institutional control of language communities. Gains in institutional control often depend on the emergence of activists and leaders who succeed in mobilizing language groups to struggle for greater institutional control within multilingual states. The absence of quality leadership can undermine gains achieved by previous generations of group members on the institutional control front and can mortgage

future gains needed for the language survival of the next generation of group members. Taken together, language groups which have gained strong institutional control within state and private institutions are in a better position to safeguard and enhance their collective language and cultural capital than language communities who lack institutional control in these domains.

Language groups that have gained ascendancy on institutional support factors are also likely to benefit from considerable social status relative to less dominant groups within multilingual states. The status variables are those related to a language community's social prestige, its sociohistorical status within the state, and the prestige of its language and culture locally, nationally, and internationally. The more status a language community is ascribed to have, the more vitality it is likely to possess as a collectivity. Social psychological evidence shows that speakers of high-status groups enjoy a more positive social identity and can more readily mobilize to maintain or improve their vitality position within the state (Giles and Johnson, 1987). Conversely, being a member of a disparaged low-status linguistic group can sap the collective will of minorities to maintain themselves as distinctive language communities leading to linguistic assimilation. The experience of belonging to a high- vs. low-status language community is more vivid to the degree that status differentials between ethnolinguistic groups are perpetuated through language stereotypes (Ryan *et al.*, 1982) and/or are enshrined through the adoption of language laws that legislate the relative status of language communities within multilingual states (Bourhis, 1984, 1994).

The above three dimensions combine to affect in one direction or the other the overall strength or vitality of ethnolinguistic groups (Giles *et al.*, 1977). A language group may be weak on demographic variables but strong on institutional support and status factors, resulting in a medium vitality position relative to a language minority weak on all three vitality dimensions. Language communities whose overall vitality is strong are more likely to survive as distinctive collective entities than groups whose vitality is weak within the multilingual setting. Demolinguistic and sociographic data based on the census and other sources are used to assess the relative vitality of ethnolinguistic groups within a particular multilingual setting. Such objective assessments of vitality do serve the descriptive and analytic functions needed to more rigorously compare and contrast the ethnolinguistic groups one is dealing with in linguistic and sociolinguistic research. The objective vitality framework was used to describe the relative position of language groups in numerous bilingual and multilingual settings such as: the French and the English of Quebec (Bourhis, 2001b), the Cajuns in Louisiana (Landry *et al.*, 1996), Hispanics in the United States (Barker *et al.*, 2001), the Catalan in Spain (Atkinson, 2000; Ytsma *et al.*, 1994), and ethnolinguistic groups in Nigeria (Mann, 2000).

Subjective Perceptions of Group Vitality

How speakers perceive the vitality of their own language community relative to salient linguistic outgroups may be as important as objective assessments of group vitality based on demolinguistic and census data. The subjective vitality questionnaire (SVQ) was designed to measure group members' assessments of 'ingroup'/outgroup vitality on each of the items constituting the demographic, institutional support, and status dimensions of the objective vitality framework (Bourhis *et al.*, 1981). A review of the vitality research using the SVQ showed that that overall, group members are realistic in perceiving their vitality position along the lines suggested by objective assessments of ethnolinguistic vitality (Harwood *et al.*, 1994). However, studies have also shown that ethnolinguistic group members can be biased in their assessments of 'owngroup' and outgroup vitalities. Such biases do not emerge on obvious differentials between ingroup/outgroup vitality, but are documented on objectively minor vitality differences between contrasting language communities.

Three basic types of subjective vitality biases were identified based on our review of the literature (Harwood *et al.*, 1994). Perceptual distortions in favor of ingroup vitality occur when language groups exaggerate the strength of their owngroup vitality while underestimating the vitality of the outgroup. Perceptual distortions in favor of outgroup vitality involve language groups who underestimate the vitality of their owngroup while exaggerating the vitality of the outgroup. Nonconsensual vitality perceptions occur when language groups disagree not only on the degree of difference between groups, but also on the direction of such difference. Both motivational (ingroup bias) and cognitive factors (availability and vividness heuristics) help account for these perceptual distortions of group vitality (Sachdev and Bourhis, 1993).

Empirical studies have also show that the vitality items listed within each dimension of the objective vitality framework are not necessarily perceived as falling within the demographic, institutional, and status dimensions of the model. Vitality items are perceived as belonging to configurations of dimensions that reflect current harmonious or problematic relations between language communities within

specific cultural settings. Noting such trends, Giles pointed out that "vitality is not a static given but, rather, a malleable social construction depending on social group membership and fluctuating socio-political circumstances" (2001: 473). Overall, studies show that perceivers are quite sensitive to the relative position of their own language group relative to outgroups on each vitality element making up the three dimensions of objective and subjective vitality.

Subjective Vitality as a Predictor of Language Attitudes and Behaviors

A basic premise of the subjective vitality framework is that group members' subjective assessment of ingroup/outgroup vitality may be as important in determining language attitudes and behaviors as the group's objective vitality (Bourhis *et al.*, 1981). A combination of both objective and subjective vitality information constitutes a more sensitive method of predicting the language behavior of group members than simply relying on objective assessments of group vitality (Giles and Johnson, 1987). Studies combining features of objective and subjective vitality have shown that ethnolinguistic vitality is related to a broad range of language attitudes and language behaviors. For instance, studies have shown that ethnolinguistic vitality was related to: self-reports of French language use in everyday activities by Acadians in New Brunswick (Landry and Allard, 1994), self-reported Turkish usage among immigrants from Turkey in France (Yagmur and Akinci, 2003), self-reported use of Bengali and attitudes to English use by Sylheti-Bangladeshi pupils in London (Lawson and Sachdev, 2004), evaluative reactions to language switching in Montreal and Quebec City (Genesee and Bourhis, 1988), positive/negative attitudes towards outgroups among blacks and Afrikaans-speaking whites in South Africa (Bornman and Appelgryn, 1997), Anglo-American support for the English only movement in the United States (Barker and Giles, 2004), ingroup favoritism attitudes by Castillians and members of the bilingual communities of Spain (Ros *et al.*, 1994), Francophone and Anglophone language competence in L2, willingness to communicate, and linguistic identity in Ontario (Clément *et al.*, 2003; Noels and Clément, 1996), and presence of French linguistic landscape perceived by Francophones across Anglo-Canada (Landry and Bourhis, 1997).

While the SVQ monitors general beliefs about the perceived vitality of ingroup/outgroup language communities (Bourhis *et al.*, 1981), the Beliefs on Ethnolinguistic Vitality Questionnaire (BEVQ) monitors egocentric beliefs, made-up of self-beliefs and goal beliefs concerning ingroup/outgroup vitality (Allard and Landry, 1986). While group members may perceive that their language community is weak on most vitality factors as per SVQ ratings, BEVQ ratings may show that most group members may do little personally to assert their own group vitality (self-beliefs) and may have no intention to act in favor of improving their owngroup vitality (goal beliefs). In contrast, other group members may also perceive that their owngroup vitality is weak but may endorse self- and goal beliefs in favor of bolstering their owngroup vitality on strategic institutional, demographic, and status factors. Thus a combination of general beliefs (SVQ) and egocentric beliefs (BEVQ) may better predict language attitudes and behaviors in multilingual settings. Allard and Landry (1994) compared the predictive value of their BEVQ with the SVQ, which they had administered to a large sample of Francophone minorities across Canada. Though their results showed that the BEVQ was the more powerful predictor of French language behavior, strong support in favor of the SVQ as a predictive measure was also obtained.

The concept of ethnolinguistic vitality has provoked debates, some of which have been addressed conceptually and empirically in the literature (Hamers and Blanc, 2000; Husband and Khan, 1982; Johnson *et al.*, 1983). To the degree that ethnolinguistic group members accurately perceive the vitality of their own group and that of salient outgroups, the SVQ can be used as a descriptive measure that can help validate the choice of ethnolinguistic groups used by researchers to conduct their sociolinguistic and social psychological studies. Combining objective and subjective vitality can be used as a tool of social analysis for addressing a broad range of empirical and theoretical issues related to language behaviors within both the linguistic, sociolinguistic and intergroup literature.

See also: Endangered Languages; Identity and Language; Interactional Sociolinguistics; Language Attitudes; Language Maintenance and Shift; Language Planning and Policy: Models; Migration and Language Planning; Minorities and Language; Multiculturalism and Language.

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Ethnologue

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Ethnologue: Languages of the World is a reference work cataloging all known languages of the present-day world. Now in its 15th edition (2005), the *Ethnologue* identifies 6912 living languages, both spoken and signed. These are distinct languages that have living mother tongue speakers. A few hundred recently extinct languages are documented as well.

For over 50 years, the *Ethnologue* has been compiled and published by SIL International, a nonprofit, nongovernmental organization that studies, documents, and assists in developing the world's lesser-known languages. Information comes from a variety of sources including reliable published sources, a network of field correspondents, and numerous personal communications that are confirmed by consulting published sources or the network of correspondents. The editorial staff processes approximately 10 000 updates to the database every year.

History of the *Ethnologue*

The *Ethnologue* was founded by Richard S. Pittman, who was motivated by the desire to share information on language development needs around the world with his colleagues in SIL International as well as with other language researchers. The first edition in 1951 was 10 mimeographed pages and included information on 46 languages or groups of languages. Maps were first included in the 4th edition (1953). The publication transitioned from mimeographed pages to a printed book in the 5th edition (1958). Dr. Pittman continued to expand his research through the 7th edition (1969), which listed 4493 languages.

In 1971, Barbara F. Grimes became editor. She had assisted with the *Ethnologue* since 1953 (4th edition) and took on the role of research editor in 1967 for the 7th edition (1969). She continued as editor through the 14th edition (2000). In 1971, information was expanded from primarily minority languages to encompass all known living languages of the world. Between 1967 and 1973, Ms Grimes completed an in-depth revision of the information on Africa, the Americas, the Pacific, and a few countries of Asia. During her years as editor, the number of identified languages grew from 4493 to 6809, and the information recorded on each expanded so that the published work more than tripled in size.

The 15th edition (2005) was edited by Raymond G. Gordon, Jr. It reflects an increase of 103 languages over the previous edition. Most of these are not newly discovered languages, but are ones that had been previously considered dialects of another language.

The Problem of Language Identification

Given the nature of language and the various perspectives brought to its study, it is not surprising that a number of issues prove controversial. Of preeminence in this regard is the definition of 'language' itself. Since languages do not have self-identifying features, what actually constitutes a language must be operationally defined. That is, the definition of language one chooses depends on the purpose one has in identifying a language. Some base their definition on purely linguistic grounds. Others recognize that social, cultural, or political factors must also be taken into account.

Every language is characterized by variation within the speech community that uses it. The resulting speech varieties are more or less divergent from one another. These divergent varieties are often referred to as dialects. They may be distinct enough to be considered separate languages or sufficiently similar as to be considered merely characteristic of a particular geographic region or social grouping within the speech community. Scholars do not all share the same criteria for what constitutes a 'language' and what features define a 'dialect.' The *Ethnologue* applies the following basic criteria:

- Two related varieties are normally considered varieties of the same language if speakers of each variety have inherent understanding of the other variety at a functional level (that is, can understand based on knowledge of their own variety without needing to learn the other variety).
- Where spoken intelligibility between two varieties is marginal, the existence of a common literature or of a common ethnolinguistic identity with a central variety that both understand can be a strong indicator that they should nevertheless be considered varieties of the same language.
- Even where there is enough intelligibility between varieties to enable communication, the existence of well-established distinct ethnolinguistic identities can be a strong indicator that they should nevertheless be considered to be different languages.

Increasingly, scholars are recognizing that languages are not always easily treated as discrete isolatable units with clearly defined boundaries between them. Rather, languages are more often continua of features that extend across both geographic and social space. The *Ethnologue* approach to listing

and counting languages as though they were discrete, countable units does not mean to preclude a more dynamic understanding of the linguistic makeup of the countries of the world. In fact, particular language entries in the *Ethnologue* list known dialects and often comment on the similarity and intelligibility relationships among them. In the final analysis, however, the *Ethnologue* lists and counts languages as distinguished by the criteria named above because it serves as a baseline for those who are developing language policy and making plans for language development. It is also foundational for those, such as librarians and archivists, who would classify written and spoken materials with respect to the languages they are in, or would organize pieces of language-related information with respect to the languages they are about.

Three-Letter Language Identifiers

A distinctive feature of the *Ethnologue* over the years has been its use of three-letter codes to uniquely identify the languages of the world. Any enterprise that would categorize language-related resources so that others might effectively retrieve those resources depends on the uniform identification of the languages to which they pertain. Simply using language names for this purpose is not adequate since the same language is typically known by many names and those names change over time. Furthermore, different languages may be known by the same name. Thus, the most effective approach is to use standardized language identifiers.

Standardized language identifiers were introduced into the *Ethnologue* in 1971 by then consulting editor, Joseph E. Grimes, when he transformed the typesetting tapes for the 7th edition (1969) into a computerized database on languages of the world. The work was done at the University of Oklahoma under a grant from the National Science Foundation. In 1974, the database was moved to a computer at Cornell University where Dr Grimes was professor of linguistics; it was moved to a personal computer in 1979. Since 2000, it has been housed at the headquarters of SIL International in Dallas, Texas.

One feature of the database since its inception has been a system of three-letter language identifiers. Grimes explained this feature as follows in the 1974 final report for the grant: "Each language is given a three-letter code on the order of international airport codes. This aids in equating languages across national boundaries, where the same language may be called by different names, and in distinguishing different languages called by the same name." While the codes were used behind the scenes in the database that generated the 8th and 9th editions, it was not until the 10th edition (1984) that they appeared in the publication itself.

The 15th edition (2005) marked an important milestone in the development of the language identifiers, namely, their emergence as a draft international standard. In 1998, the International Organization for Standardization adopted ISO 639-2, its standard for three-letter language identifiers. That was based on a convergence of ISO 639-1 (its earlier standard for two-letter language identifiers adopted in 1988) and of ANSI Z39.53 (also known as the MARC language codes, a set of three-letter identifiers developed within the library community and adopted as an American National Standard in 1987). The current standard, ISO 639-2, has proven insufficient for many purposes since it has identifiers for fewer than 400 individual languages. Thus, in 2002, ISO TC37/SC2 invited SIL International to participate in the development of a new standard based on the language identifiers in the *Ethnologue*. The new standard was to be a superset of ISO 639-2 that would provide identifiers for all known languages. Consequently, hundreds of the *Ethnologue* language identifiers were changed in order to achieve alignment with ISO 639-2. In 2004, the proposed new standard, ISO 639-3, passed the first round of balloting by national standards bodies to attain the status of Draft International Standard. The three-letter language identifiers in the 15th edition of the *Ethnologue* are thus the codes of ISO/DIS 639-3.

Endangered Languages

Language endangerment is a serious concern to which linguists and language planners have turned their attention in the last decade. For a variety of reasons, speakers of some languages are motivated to stop using their language and to use another. Parents may begin to use only that second language with their children. Eventually there may be no speakers who use the language as their first or primary language and frequently the language ceases to be used altogether and the language becomes extinct – existing, perhaps, only in recordings or written records and transcriptions. The concern about language endangerment is centered, first and foremost, around the factors that motivate speakers to abandon their language and the consequences of language death for the community of (former) speakers of that language. Since language is closely linked to culture, loss of language almost always is accompanied by social and cultural disruptions as well. Secondarily, those concerned about language endangerment recognize the implications of the loss of linguistic diversity,

both for the linguistic and social environment generally and for the academic community, which is devoted to the study of language more specifically.

There are two dimensions to the evaluation and characterization of endangerment: the number of speakers of the language and the number and nature of the domains in which the language is used. A language may be endangered because there are fewer and fewer people who speak that language. It may also, or alternatively, be endangered because it is being used for fewer and fewer functions. The *Ethnologue* attempts to provide data on both of these dimensions whenever it is available.

Language endangerment is a matter of degree. At one end of the scale are languages that are vigorous and perhaps are even expanding in numbers of speakers or functional areas of use. At the other end are languages that are on the verge of extinction. In between are many degrees of greater or lesser endangerment. The *Ethnologue* does not attempt to identify the level of endangerment of each language listed but does specifically identify those languages at the far end of the scale by indicating 'nearly extinct' at the end of the language entry. A language is listed as nearly extinct when the speaker population is fewer than 50 or when the number of speakers is a very small fraction of the ethnic group. In the 15th edition, 497 languages are so designated.

How to identify the level of endangerment of the remaining languages that are not designated as nearly extinct is not necessarily clear. Linguists seek to identify trends in language use, such as a decrease in the number of speakers or a decrease in the use of the language in certain domains or functions. An increase in bilingualism, both in the number of bilinguals and in their proficiency levels, is often associated with these trends. When data are available, the following factors that may contribute to endangerment are reported in the language entries: small population size, bilingualism, urbanization, modernization, migration, industrialization, the function of each language within a society, and whether or not children are learning it. Such factors interact within a society in dynamic ways that are not necessarily predictable. As a scholarly consensus forms that can be applied worldwide, a scale of endangerment is becoming increasingly possible. In the meantime, only brief statements about the above factors are given for each language as data becomes available.

Overview of Contents

The *Ethnologue* begins with an 'Introduction' and 'Statistical Summaries.' The latter give a summary view of the world language situation in terms of numerical tabulations of living languages and number of speakers by world area, by language size, by language family, and by country. Then follows the main body of the work in 'Part 1: Languages of the World.' This section provides detailed information on all known living languages of the world organized by area and by country. An extensive bibliography is located at the end of this section. 'Part 2: Language Maps' provides 208 color maps locating the languages in most countries of the world. Finally, 'Part 3: Indexes' consists of three indexes: a language name index listing all of the 39 491 distinct names that are associated with the languages described in Part 1, a language code index listing all of the three-letter language identification codes that are used in Part 1, and a country index listing the pages on which the section for that country begins in Part 1 and Part 2.

In Part 1, languages are listed by country under the five major geographic areas of Africa, the Americas, Asia, Europe, and the Pacific. The entry for a country begins with a header giving summary information about the country including official name, total population, a listing of national or official languages, a listing of recent immigrant languages, country literacy rates, and a count of languages indigenous to the country. This header is followed by an entry for each language of the country that is not a recent immigrant.

Entries are alphabetized by the primary name of the language. This is followed by all known alternate names and the three-letter identification code. An estimate of the speaker population is then given; there may also be an estimate of monolingual speakers, or of the size of the ethnic group (including those who no longer speak the language). Next, the location of the language group within the country is described, followed by the genetic classification of the language. Where dialects are known to exist, these are listed along with alternate names. Comments on intelligibility and similarity relationships among dialects or with neighboring languages may follow. Next are notes on language use, including functions of the language (such as official language or language of wider communication), viability, domains of use, age range of speakers, attitudes toward the language, and bilingual proficiency in other languages. These are followed by notes on the status of language development, including literacy rates, use in elementary or secondary schools, scripts used for writing, existence of published literature, and use in media. The entry closes with information in miscellaneous categories including general

remarks, linguistic typology, geological and ecological environment, subsistence type of the speakers, and religions.

See also: Endangered Languages; Language and Dialect: Linguistic Varieties; Summer Institute of Linguistics.

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Ethnomethodology

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Ethnomethodology represents a new dimension, perspective, and approach in the social sciences and undertakes to study the everyday world as an achieved social reality. Its position is that all human action is irremediably indexical and reflexively related to the occasions and settings within which it occurs. Members are continually engaged in making sense, achieving intelligibility, and providing, for themselves and others, accounts of the self-same actions and utterances that, in turn, constitute the social situation in which they find themselves. Ethnomethodology proposes that the serious study of how members produce, sustain, achieve, and maintain 'the social world' requires close attention to the methods (i.e., members' methods, or ethno-methods) of that production, achievement, and maintenance, and these methods include all manner of practical reasoning and practical actions. The discovery, description, and analysis of such methods constitute ethnomethodology's main tasks.

Major Figures and Contributors

Harold Garfinkel, the founding father of ethnomethodology (who received his Ph.D. from Harvard in 1952), was concerned with the problem of social order. His position can be considered a radical counterposition to that of Talcott Parsons, a major theorist in American mid-20th-century sociology and an advocate of positivist, structural functional analysis and abstract theorizing as set forth in his book *The social system* (1950), with its pattern variables, and in his general theory of social action.

Garfinkel was influenced by his readings of the German phenomenologist philosopher Edmund Husserl and the sociologist and phenomenological philosopher Alfred Schutz, as well as by Aaron Gurwitsch, phenomenologist and psychologist, and by the French phenomenological psychologist and philosopher Maurice Merleau-Ponty.

Garfinkel worked most closely over a period of more than 12 years with Harvey Sacks. Their collaboration was extensive and one of mutual influence. Sacks (who died in 1975) went on to develop, with Emanuel Schegloff and Gail Jefferson, what has come to be known as conversation analysis, now considered to be one of the important offshoots of ethnomethodology. This field continues to be developed by Emanuel Schegloff, at the University of California, Los Angeles, Gail Jefferson, now in the Netherlands, and many other researchers in the United States and throughout the world.

Other contributors in America include E. Bittner, D. Bjelic, D. Boden, D. Bogen, S. Clayman, J. Coulter, C. and M. H. Goodwin, J. Heap, J. Heritage, S. Jacoby, P. Jalbert, G. Lerner, K. Liberman, M. Lynch, D. Macbeth, D. Maynard, M. Pollner, A. Pomerantz, G. Psathas, A. B. Robillard, A. Rawls, J. Schenkein, J. Streeke, L. Suchman, D. Sudnow, D. L. Wieder, T. Wilson, and D. Zimmerman.

Ethnomethodology spread to the United Kingdom, in part influenced by the visits of Garfinkel to Manchester, Aaron Cicourel to the University of London and Manchester in the early 1970s, Jefferson to Manchester (1979–1981) and York (1982–1985), and Anita Pomerantz to Oxford (1981–1984). British sociologists who have been most active have been R. J. Anderson, J. M. Atkinson, G. Button, R. Dingwall, P. Drew, D. Francis, C. Heath, S. Hester, J. Hughes, I. Hutchby, W. W. Sharrock, and D. R. Watson.

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and P. tenHave in the Netherlands; E. Gonzalez Martinez and J. Widmer in Switzerland; N. Ikeya and A. Nishizaka in Japan; A. Firth and J. Wagner in Denmark; I. Arminen, A. Hakulinen, A. Peräkylä, and M. Sorjonen in Finland; G. Fele, I. Paoletti, and L. Zapulli in Italy; and others around the world.

The Name 'Ethnomethodology'

The ethnomethodological approach studies the methods actually used by members of society for doing whatever it is they are doing, including their ways of talking about their activities.

A serious and careful study of the methods used by members for accomplishing practical actions in the world of everyday life would result in descriptions and analyses of the methodology of everyday life or of the ethno (the group's) methodology, or members' methods.

When Garfinkel first developed the term, he was studying how the members of a jury performed the task of jurying. But rather than refer to members' methods for doing jury work as ethno-jurying or ethno-law, which would provide subdivisions of members' methods according to the (substantive) topics with which their activities were concerned, he took a broader perspective.

Perhaps ethnosociology or 'members' ways of doing sociology' would have been alternative terms. But actually these terms would not be consistent with Garfinkel's intended topic of study, which is how members accomplish social order, not how members describe or analyze their society.

For example, in anthropology there had developed a perspective called ethnoscience, which aimed to discover the ways that members of a particular culture name and classify objects and products, that is, ethnobotany, ethnomusicology, ethnohistory, and so on, or in other words, the particular classification systems of particular cultures at particular times and places.

As Garfinkel stated (1967: 8), his concern was

> the *how* it [society] gets put together; the how it is getting done; the how to do it; the social structures of everyday activities.... studying how persons, as parties to ordinary arrangements, use the features of the arrangement to make for members the visibly organized characteristics happen.

Another way of saying this is that he was concerned with 'everyday praxis.'

The 'methodology' part of the term ethnomethodology is to be understood as referring to the 'how,' the actual situated practices, the methods by which everyday activities are accomplished.

However, members of society cannot simply be asked how they accomplish their everyday activities and their answers then used as propositional knowledge. The reasons offered are, firstly, that members are essentially not interested in analyzing how they do things; they are only interested in doing them.

Secondly, members are not aware, in any explicit sense, of how they do things. Therefore, even if asked to try to explicate, or analyze, what they do, their analyses are inadequate.

For members of society, the effective test of whether they know how to do something is whether they can actually do it, whether it be to have a conversation, draw a map, give directions, diagnose a disease, or give a lecture. Members operate with certain assumptions, take matters for granted, know how to do things without ever analyzing the 'how' of what they know, i.e., without ever having propositional knowledge.

For the ethnomethodologist, the methods that members actually use to accomplish whatever it is they are doing are an 'awesome mystery' (Garfinkel, 1967: 35). The discovery and explication of these methods are tasks for someone with a special interest, whose focus of attention will be on such matters directly.

If the social scientist is to analyze commonsense understandings, simply using the same commonsense understandings that members use will not achieve the desired result. Instead, the commonsense understandings must themselves be analyzed and made into topics of study, not simply used as resources for producing descriptions.

Ethnomethodology proposes to analyze commonsense knowledge and to discover how commonsense knowledge comes to be constituted; what produces, for members, the sense that it is knowledge; and how this knowledge is used. For Garfinkel, knowledge is not in the head but consists of the doing; i.e., knowledge is not a mentalistic phenomenon but praxis. (A knowledge claim is a claim; knowing how to do something is demonstrable only in the doing itself.)

However, social scientists cannot escape using commonsense knowledge (and understandings) in their own work. After all, they live in the world of everyday life, and they talk, write, and communicate using the same language and linguistic practices as members do.

Their own use of talk (language) can also be examined to discover the methods whereby talk makes 'visible' the matters talked about. Such methods as 'citation of typical cases,' 'referencing behavior to rules,' 'glossing,' and 'making arguments as to reasonableness,' among others, may be used by members and social scientists alike.

Such methods, because they are used by social scientists, are not somehow transformed into better or different methods or into scientific methods. Rather, these methods can be subject to ethnomethodological inquiry also. (Refer to studies of the work of scientists by Lynch, 1985.)

The result is that ethnomethodology produces a view of all activities within the world of everyday life, even those of social or other scientists, as first and foremost practical activities subject to ethnomethodological analysis. This view does not result in ethnomethodology's becoming a sociology of science or a sociology of sociology, however. Rather the methods of sociology and of all the sciences are revealed to be practical accomplishments in their own right.

So ethnomethodology represents the search to discover members' methods of accomplishing the complex tasks of everyday life, including methods of reasoning, methods of interpretation, methods of communicating, methods of interacting, methods of doing conversation, methods of doing whatever. This means that ethnomethodology is a perspective that has relevance for all the sciences, political science, economics, biology, and so on, because studies can be done of practical political, economic, or biological reasoning and of the actualities of their research practices.

And since many of these practices are repeated and patterned, their methodical character, their orderliness, i.e., their organization, can be discovered.

Ethnomethodology is oriented to the discovery and analysis of such orderliness. It is not interested in explanation or the analysis of originary or causal relations.

Indexicality and Reflexivity

Two of the major concepts of ethnomethodology are indexicality and reflexivity. Indexicality refers to the fact that, for members, the meaning of what they say and do is dependent on the context in which their doing and saying occurs. Members are able to understand an action or utterance because they also know something about the time and place of occurrence, who the parties were, what had occurred previously, the relationship between the parties, what occurred next, and so forth.

Members are interested in the particularities of actions and utterances and not in standardized or idealized meanings. In achieving understanding, members take notice of and utilize all that is available to them in the context. Such details Garfinkel has called indexical particulars. Indexicality is thus part and parcel of every ordinary situation of action and talk and cannot be remedied by developing standardized or idealized concepts or terms. Members do and must use indexical particulars in making sense of their circumstances; it is an essential property of the way they make interpretations and arrive at sense, decision, action, etc.

Reflexivity refers to the fact that, for members, "the features of the real society are produced by persons' motivated compliance with these background expectancies" (Garfinkel, 1967); that is, commonsense knowledge provides members with knowledge of the features of society, and these same features are then complied with. There is thus a reflexive relation between the 'facts' about society and the ways that members use practical reasoning and commonsense knowledge to depict society. Accounts are reflexively tied to those matters and circumstances that are being accounted for.

Garfinkel (1967) stated this as follows: "members' accounts are reflexively and essentially tied for their rational features to the socially organized occasion of their use, for they are *features* of the socially organized occasions of their use" (p. 4).

Accounts reveal features of the setting, as Leiter (1980) put it,

> which, in turn, depend on the setting for their specific sense. The features of a setting that are revealed by descriptive accounts and behavior do not just explicate the setting; they, in turn, are explicated by the setting.... [B]ecause accounts consist of indexical expressions they depend on the setting for their meaning. At the same time, a feature of any setting is the production of accounts. The setting gives meaning to talk and behavior within it, while at the same time, it exists in and through that very talk and behavior. (p. 139)

The Ethnomethodological Attitude

The natural attitude, as Husserl and Schutz showed, is the attitude of the person living in the world of everyday life. In that attitude persons accept things as they are, as they appear to be, without question. Social reality is regarded as simply there, as a world existing independent of perception. For persons who operate within the natural attitude, these 'facts' are accepted and are not subjected to further study. That is, how members have achieved this sense or interpretation of what the world is, how members actually experience and describe the social world as 'factual,' how members achieve, for themselves and for others, this sense of the massive, external, 'objective' quality of the social world, is not studied.

But it is precisely this that ethnomethodology wishes to study. Therefore, these methods for achieving a 'sense of the social world' as 'factual,' as 'out there,' as external, must be studied directly.

The ethnomethodologist does not say that the social world is this way or that but instead brackets, or sets aside, all such ideas and beliefs and does not consider them true or false. Instead the focus is on how persons make the social world factual, observable, and real for themselves. This would include, of course, how they talk about it.

So, rather than taking a position that one version of the world or the other is correct, the ethnomethodologist would ask instead how members go about deciding matters of correctness (or truth), what interpretations they engage in, how they talk about such matters, and how they achieve what they would recognize as and call correct.

Society is not denied, nor does it disappear, as some critics have claimed. For members, society is always there, but for the ethnomethodologist, that which members consider to be society is capable of study only in and through members' practices. These practices include their completed (past) activities as well as their present, still on-going activities, including speaking and acting. Past activities are available for study through recall, written materials, and in whatever ways these are referred to and oriented to by members.

Ethnomethodology Is Not Ethnography

Ethnomethodology represents a 'methodography,' i.e., a search for the practices or methods by which the "substantive features of the setting are made observable" (Zimmerman and Pollner, 1970). It is therefore not the same as ethnography.

Rather than focusing on what members do, in terms of such substantive headings as, for example, marriage, divorce, kinship, and property in family sociology (which are concerns of conventional ethnography), an ethnomethodological approach would focus on members' methods for making visible, demonstrable, and accountable the particular settings' features, e.g., how members recognize, describe, and make accountable, for themselves, such matters as 'family,' 'marriage,' 'kinship,' etc. The result would be discoveries with regard to a set of members' practices for accounting for such matters, i.e., what and how categorization devices are used, how persons are 'counted' ('traced,' 'located') or not counted; how persons are 'classified' and 'unclassified,' 'collected' and 'separated' for particular purposes, and in what ways matters such as these are 'decided and done' on various types of occasions and for various purposes.

Ethnomethodological studies may discover categorization practices that underlie family or kinship terminological assignments and, as a collection of practices, members' categorization practices (or, as Sacks, 1992, called them, membership categorization devices, or MCDs), may be found to display general (or invariant) features or structures that hold across particular occasions, particular speakers, etc.

The discovery and analysis of methods of categorization may lead more deeply into kinship terminologies or away from kinship to everyday practices in other areas, e.g., racial, class, personality, or pronoun references. The phenomenon of 'members' methods of categorization,' as a members' method, is not limited by virtue of any prior preconceptions to such conventional topics as kinship. In fact, ethnomethodology is indifferent to all alternative theorizings and conceptualizings.

Ethnomethodological studies may be said to be, in part, critical of conventional work in the social sciences. The criticism is this: that conventional studies do not seek to study the phenomenon as a members' phenomenon and as an ongoing socially produced phenomenon, in all its details, following it wherever it may lead but instead, try to specify in advance, even before the research has begun, what the topic is exactly, how the topic is to be studied, and what form the results of the inquiry should take; for example, that variables must be defined, that measurement is necessary, that statistical or quantitative analysis is essential, that empirical generalizations must be proposed, that interpretation of findings in relation to prevailing general theories (as found in the sociological literature) is necessary, and that, preferably, a causal theory is to be developed.

It is not difficult to understand why social scientists who accept such a model of what research should look like are skeptical and critical of ethnomethodological studies, which do not appear in this form at all.

As another example, ethnographers may be interested in such matters as beliefs and the content of beliefs, i.e., what beliefs are about. The ethnographer may then describe what persons believe, what they tell each other to believe, to whom they tell certain beliefs, and how they separate their beliefs into such groupings as religion, tradition, economics, or politics. The emphasis in such research is on systematically collecting and studying such beliefs.

In contrast, instead of being concerned primarily with the contents of beliefs, the ethnomethodologist would consider beliefs as members' ways of accounting to themselves for certain matters.

Beliefs, and their expression, would be studied to see how they are used and what work they actually do for members, i.e., what they accomplish. One discovery may be that 'beliefs' serve to explain action; for example, it may be said that a person watered crops because that person believed that water helped crops grow. Such words as 'believe' may be used by

members to interpret, or make sense of, peoples' actions (Coulter, 1979b). If such words and ideas as 'belief' or 'motive' are used by them, then how these are used and what their use accomplishes would be subjected to study.

Such studies would reveal what commonsense knowledge and understandings in their everyday meanings (uses) are for members by making commonsense knowledge and understandings the topic of study.

Further, ethnographic and conventional social science approaches generally try to describe the everyday practices of members of society by using conceptual constructions to make events observable and understandable, i.e., by 'constructing' everyday reality. That is, formal analytic constructs used by the social sciences would be considered by ethnomethodology to be a set of accounts that hide or make unavailable the concrete, specific particulars that are involved in members' practices. Ethnomethodology claims to be indifferent to such analytic accounts and instead provides an asymmetrically alternate form of social analysis by focusing on the achievement of every form of social order as practical action (Garfinkel and Wieder, 1992).

Later Work

In his later work, Garfinkel (1986, 2002) and his colleagues developed what is referred to as the 'studies of work' program, in which a more radical ethnomethodology seeks to respecify the phenomena of order as 'achieved phenomena of order,' whose organization and methods of achievement are to be discovered through direct, lived experience, examined, and described in and as of particular concrete situations. The 'haecceities,' or the 'just thisness,' of orderly phenomena require a focus on particularities and even efforts to achieve competence in the production of the phenomena under study. Thus, one version of 'unique adequacy' for the study of such phenomena requires a 'vulgar competence' by the ethnomethodologist, as for example demonstrated in Sudnow's study (1978) of the accomplishment of improvisational jazz at the piano, wherein he studied his own performance and described the phenomena of order he discovered. The methods used in the research are already possessed by the competent performer who knows and is competent in their use since he can produce a competent performance. This also includes competence in recognizing, identifying, and displaying the orderly phenomenon, i.e., playing improvisational jazz. Similarly, Livingston (1986), by learning how to do a mathematician's work, was able not only to display his competence to perform mathematical proofs but also to identify, recognize, and describe the methods by which such proofs were accomplished.

In another sense of unique adequacy, the phenomena of order can be said to "already possess whatever as methods methods could be of [finding them]" (Garfinkel and Wieder, 1992: 182). That is, the methods for observing, examining, counting, collecting, and describing the phenomena are already contained or incorporated within the phenomena as a lived local production. The methods for studying the phenomena of order are those that are uniquely suited to it, and no prescribed research methodologies are to be selected in advance. Whether the findings from such studies can or ought to be generalized or offered as revealing general rather than particularistic discoveries is a point of argument because some critics (Wilson, 2003; Lynch, 1993) contend that such studies result in ethnomethodology's becoming "an 'experiential practice,' the purpose of which is to encounter directly and unmediatedly the lived ordinariness of concrete situations" (Wilson, 2003).

As ethnomethodology continues to develop and is taken up by researchers in various fields, including anthropology, communication studies, education, sociology, information technology, interaction analysis, social studies of science, and so on, it provides a "multi-faceted focus on the local social orders" that are enacted in various situations, particularly "embodied, endogenous, witnessed practices" (Rawls in Garfinkel, 2002) and thereby a rich alternative perspective in the social sciences.

Ethnomethodology is, therefore, a genuine, reflexive social science. As such, it offers to contribute to all studies of the world of everyday life, including studies of the work of the sciences themselves.

See also: Husserl, Edmund (1859–1938); Sacks, Harvey (1935–1975).

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Ethnoscience

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theoretical framework. Conklin (1980) provides an exhaustive bibliography of such studies through 1971.

Given the historical grounding of anthropological fieldwork at some remove from modern urban, 'Western' societies, ethnoscientific studies have largely focused on peasant, tribal, or band societies more or less tenuously linked to global markets. Older authors might have characterized their work as the study of 'primitive medicine' or 'plant use by primitive peoples' (Castetter, 1944). Nevertheless, to speak of ethnoscience implies a radical notion, to wit, that **science** is not just a product of Renaissance genius and modernist dedication, but rather an impulse common to all humanity. In this sense, ethnoscience mandates a comparative analysis of the various historic forms of scientific investigation.

Ethnoscientific studies are of particular interest for linguists in that each such science is grounded in a technical vocabulary. Comparative ethnosemantic analyses of these vocabularies may define both cognitive universals and the range of conceptual realities possible within each domain. Beyond this semantic base ethnoscientific studies may address questions of worldview, cultural and ecological adaptation, and prehistory beyond the scope of this article.

For example, Mayan astronomy employed but a small vocabulary for celestial features but developed a system of precise calculations capable of predicting lunar and solar eclipses and planetary movements, these interpreted as cosmic guides to human fate (Aveni, 2001). Ethnomedicine involves the causal association of several hundred plant names and an ethno-anatomical nomenclature with perhaps a hundred terms for disease symptoms and syndromes. These associations motivate hundreds of specific treatment recipes, many of which can be shown to be effective within the conceptual frame of a specific culture (Ortiz de Montellano, 1990). Ethnogeographies involve toponymic inventories of approximately 500 terms for each face-to-face community (Hunn, 1994). These may be analyzed in terms of their descriptive semantics, their spatial and ecological patterning, and their moral power (Basso, 1996; Hunn, 1996).

Ethnobiology integrates a diversity of disciplines, not all clearly relevant to the study of language, yet, as with modern systematic biology, all ethnobiological knowledge systems studied to date involve an extensive and systematic nomenclature and classification of living entities. Every language names several hundred basic categories of plants and a similar number of animals and recognizes patterns of similarity or 'kinship' among them that we may represent as a taxonomic hierarchy (see Figure 1), closely comparable to the Linnaean taxonomy we now interpret as representing evolutionary history (Berlin, 1992).

The term 'ethnoscience' has also been used to refer to a particular school of ethnographic theory and practice which achieved a certain prominence, particularly in the United States, during the 1960s. Sturtevant (1964) took stock of this emerging theoretical challenge. As he noted, ethnoscience might be understood as in our prior characterization, but might also refer to a methodological program to develop scientific ethnography, that is, ethnography less dependent on subjective impressions, less subject to the biases of the ethnographer, and one which by

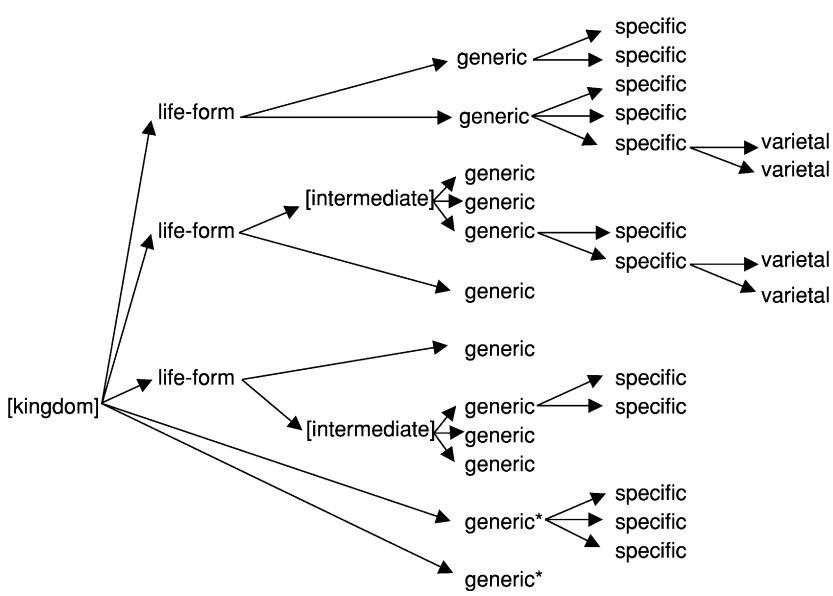

Figure 1 Ethnobiological taxonomic structure, after Berlin (1992). (* indicates an 'unaffiliated generic').

means of systematic elicitation procedures, modeled on those then favored by structural linguists, might produce replicable cultural descriptions. Ethnoscience as ethnographic critique was indebted in many ways to linguistic theory: to structural linguistics for the emphasis on 'scientific' discovery procedures (Frake, 1962; Metzger and Williams, 1966), but also to the newly prominent Chomskyan perspective, in which grammars are sets of abstract cognitive 'rules' for generating appropriate (i.e., grammatical) sentences or, more generally, 'rules' that generate appropriate behavior within specifiable social and cultural contexts (Goodenough, 1957).

Ethnoscience in this latter sense died with the 1960s (Murray, 1998), but lives on in contemporary cognitive anthropology and in ethnoscientific studies in the first sense noted. Both subscribe to the notion that a basic goal of ethnography is to faithfully translate from the vernacular local understandings of the natural and social worlds, and to seek to appreciate how these understandings reflect our common humanity.

See also: Anatomical Nomenclature: History; Cognitive Anthropology; Color Terms; Lexical Conceptual Structure; Semantics: Field Work Methods.

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Etymology

P Durkin, Oxford English Dictionary, Oxon, UK

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The Historical Background: Pre-modern Etymology

The etymology of the word *etymology* (ultimately from Greek *etumon* 'true meaning or form', in turn from *etumos* 'true') is a perfect illustration of the 'etymological fallacy', the view that the earliest meaning of a word is truer or more correct than subsequent meanings. This approach, running counter to the modern stress on the arbitrariness of the linguistic sign, vitiates much pre-modern etymological work, as does the lack of any systematic methodology, lending some truth to the famous remark attributed to Voltaire that "in etymology, consonants signify little and vowels nothing at all" (and variants thereof). Nonetheless, the insights, intuitions, and traditions of earlier commentators can sometimes provide useful stimuli for etymological research. For instance, where a Latin or Greek word is of unknown etymology, it can be useful to know that it was regarded as a loanword in antiquity, even if no likely etymon is identifiable. Furthermore, the intuitions of contemporaries can have interesting analogies with the

means of systematic elicitation procedures, modeled on those then favored by structural linguists, might produce replicable cultural descriptions. Ethnoscience as ethnographic critique was indebted in many ways to linguistic theory: to structural linguistics for the emphasis on 'scientific' discovery procedures (Frake, 1962; Metzger and Williams, 1966), but also to the newly prominent Chomskyan perspective, in which grammars are sets of abstract cognitive 'rules' for generating appropriate (i.e., grammatical) sentences or, more generally, 'rules' that generate appropriate behavior within specifiable social and cultural contexts (Goodenough, 1957).

Ethnoscience in this latter sense died with the 1960s (Murray, 1998), but lives on in contemporary cognitive anthropology and in ethnoscientific studies in the first sense noted. Both subscribe to the notion that a basic goal of ethnography is to faithfully translate from the vernacular local understandings of the natural and social worlds, and to seek to appreciate how these understandings reflect our common humanity.

See also: Anatomical Nomenclature: History; Cognitive Anthropology; Color Terms; Lexical Conceptual Structure; Semantics: Field Work Methods.

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process of historical change known as folk etymology, and hence can suggest explanations for formal and semantic change (*see* **Folk Etymology; Historiography of Linguistics**).

The Place of Etymology in Modern Linguistics

Modern etymological work is an essential component of, and is in an inextricable symbiotic relationship with, the comparative method and the great 19th-century advances in the methodology of historical linguistics.

In the broadest use of the term, etymology is in fact little more than a variety of 'applied historical linguistics', and its methodology is the same as that of historical linguistics more broadly. What this article will not attempt to do is to give an over-brief summary of this basic methodology, which is dealt with in full elsewhere in the encyclopedia (*see* **Historical and Comparative Linguistics in the 19th Century**). Instead, what follows is a survey of the different areas of linguistics where etymology plays a role, and of how different contexts influence methodology. In particular, I will look at the tradition of etymology in lexicography, and at related stand-alone studies of single lexical items in the scholarly literature.

Looking more closely at the term *etymology* itself, several distinct, albeit overlapping, uses of the word are identifiable in modern scholarship:

1. The methodology by which the history and/or prehistory of the lexis of a language may be traced, and/or its affiliations in other languages. (Thus conceived, etymology comprises all applications of the methodology of historical and comparative linguistics as manifested at the level of the lexeme, and it cannot usefully be separated from a general account of the methodology of the discipline.)
2. An account of the history of a word, including all major developments in meaning and form, so far as these can be traced in historical documents or reconstructed from the available evidence, together with an account where appropriate of the word's affiliations in other languages, or, in the case of a loanword, a similar account of the relevant facts in the word's history within the donor language(s), and sometimes also the ulterior history of the word within the donor language or beyond. This will often be abbreviated, by restriction to a particular historical period, or by selective presentation of the most significant data. Where there is doubt or uncertainty, rival explanations will normally be summarized and appraised (although this will seldom constitute a full summary of earlier suggestions). This is what is normally represented by an entry in an etymological dictionary, or by the etymological component of a general dictionary (in an historical dictionary, various components of the dictionary entry when taken together will provide this information). There is also a corresponding non-countable use to denote the researching and provision of this sort of information.
3. More narrowly defined, any of various subcomponents. In the case of a word that is taken to form part of the inherited wordstock of a language, this may be a listing of the word's immediate or remoter cognates (the similarly descended forms in related languages), with or without a reconstructed proto-form. In the case of a loanword, this may amount to no more than the immediate donor form, or even just an indication of the language from which it is borrowed.
4. Any of the competing explanations of a word's origin or development (e.g., an article in a journal might have the title 'A new etymology of English *boy*'). Sometimes more specifically, a suggestion that a word may originate in a particular language or group of languages (e.g., "In place of the Germanic etymology traditionally posited for this word, some scholars have instead suggested a Celtic etymology.").

The second of these definitions will be most central in the remainder of this article, although it is as well to bear in mind that all of these uses of the word are current, and that the dividing lines between them are not always clear-cut in practice.

Etymology and Historical and Comparative Grammars

Comparative etymologies (i.e., the establishment of cognates and proto-forms) and comparative grammars are in a completely symbiotic, and even somewhat circular, relationship: the correspondences established between the sounds and forms in two or more languages depend fundamentally on a group of firmly established etymologies (ideally with cognates in all of the languages concerned), and conversely the individual etymologies are given their strength by the regular correspondences identified in the comparative grammar. Nonetheless, it is worth bearing in mind that these sorts of secure etymologies are normally not numerous. This is not necessarily a problem for the historical grammar, but the etymologist should be wary that these few secure etymologies do not exercise a "gravitational pull" that attracts other, weaker etymologies. However good a formal "fit" is found,

and however many other words show the same formal correspondence, an etymology that is supported by only a single probable cognate with a poor semantic correspondence remains weak. Perhaps the best illustration of this is provided by browsing through the Indo-European etymologies in Pokorny (1959–1969) (or if one does not have a reading knowledge of German, the etymologies in Mallory and Adams (1997) and the further literature cited there): the reader can easily work through, separating those etymologies with ample support from those where only a small number of forms in widely separated languages are adduced, or separating those where both the formal and the semantic correspondence are exact from those where formal difficulties are flagged or where the semantic correspondence is tenuous.

Cognates can be established wherever a relationship between two languages is established (the two go hand in hand), and such etymologies will therefore be found for a great many of the world's languages, and not just in the familiar territory of Indo-European etymology. However, when they are not supported by a good deal of historical documentation for the languages concerned, it is likely that the semantic component in such etymologies will be minimal, and all that can be constructed are proto-forms for certain shared lexemes of common descent, with a semantic label attached which is little more than the aggregate of the modern meanings of the words. This is also the area of etymological work where theories of areal diffusion may sometimes present serious challenges to more traditional analyses of common descent (*see* **Areal Linguistics**). In some languages (for instance, Tahitian or Tuamotuan among Polynesian languages), extensive replacement of lexis as a result of taboo may make even this sort of etymological work difficult, and it is of course impossible for languages that are true isolates (e.g., Basque).

The rest of this article will be concerned chiefly with languages where there is more historical data and where more detailed etymologies can therefore be prepared. Such etymologies are of vital importance to historical (as opposed to comparative) grammar, as it is essential that form and meaning can be traced through the history of a language if detailed conclusions are to be drawn about the internal development of sounds and morphology. They also provide an essential point of reference for work in areas where information is more limited.

Etymology and Dictionaries

Just as a symbiotic relationship exists between etymology and comparative grammars, so it does also between etymology and dictionaries. To take each of the major types in turn:

General Dictionaries

In some smaller dictionaries, particularly the desktop synchronic ready-reference dictionary, the etymological section of each entry is in a sense detachable: whatever the other arguments for or against its inclusion, little emendation would be needed to make the remainder of the dictionary comprehensible were it removed. Conversely, the etymologies would still make reasonable sense if divorced from the rest of the dictionary, so long as some brief identifier of the core meaning of each word were retained to tell apart homographs.

Historical Dictionaries

The same is not true of an historical dictionary, where the detailed account of historical forms and meanings has innumerable points of intersection with the etymology section proper (normally contained within square brackets, or otherwise marked off from the rest of the text). The etymology (in the sense of #2 above) is one of the main principles determining the division of the material into separate entries: all of the material which is developed from a single origin and which has the same form in the modern language will be kept together in a single entry. Taking the *Oxford English Dictionary* as the typical example of such a dictionary, homonyms such as *mean* 'common' (of Germanic origin) and *mean* 'average' (of Romance origin) are divided on the basis of their distinct origins, even though the subsequent semantic development brings some senses of each word so close together that it becomes almost arbitrary to assign them to one entry or the other. Affixes will often be included in the dictionary's headword list, for convenience as much as anything in the presentation of etymologies within the work, even though this means that what is strictly a part of the grammar of the language is presented for pragmatic reasons as a part of the lexis.

Etymological Dictionaries

Some varieties of comprehensive etymological dictionary differ from the historical dictionary only in that the focus is more restrictively on those facts which are most important in understanding the historical development of the word. Comprehensive illustration of continuing use in a given sense will not normally be found: see for example Corominas (1980–1991), which gives detailed etymological discussion and supporting documentation on early use, but does not illustrate subsequent use except where this is

necessary for the discussion of major developments in form or meaning.

The *Französisches Etymologisches Wörterbuch*, perhaps the greatest example of an etymological dictionary of a modern language, differs also in that the organizational principle is the etymon (e.g., a Latin word which has reflexes in French, or a reconstructed Frankish form borrowed into Old French) and not the modern word forms. A base word and its derivatives will be found under a single headword, as will etymological doublets which differ greatly in modern form. So, under Latin *mĭttĕre* one finds *message* and *messager* alongside *mettre*, *mise*, *entremettre*, *démettre*, *émettre*, etc., while under Latin *ŏpĕrari* one finds *ouvrer* alongside *opération*, *opérateur*, *opérer*, etc. It is also notable for its comprehensive listing of regional forms (on the structure of *FEW,* see Büchi (1996)).

Single-volume etymological dictionaries of a major language are sometimes modeled directly on a larger parent work, such as the *Oxford Dictionary of English Etymology,* which is based on the materials of the *OED* although supplementing it in some respects. Sometimes they stand alone, such as the venerable Kluge (2002) or the younger Pfeifer (1992), both of which draw on the tradition of historical dictionaries of German in adducing early forms and meanings, but in both of which the internal history may often seem underplayed somewhat in comparison with the etymological discussions in *FEW* or *OED*.

A particularly clear model for the structure of an etymological dictionary (well characterized by its subtitle *histoire des mots*) is presented by Ernout-Meillet (1932), where the history of each word and its derivatives within Latin are presented in a succinct summary, followed by the etymology, in which succinctness is again the key in both the presentation of cognates and the selective discussion of rival hypotheses.

The Article and Monograph Literature

Separate monograph- or article-length studies of the etymology of individual words or of groups of words (e.g., Schuchardt (1903–1904) or Ross (1952)) belong in the same tradition as the etymological or historical dictionary, and the two are fundamentally interdependent. Without parallels (preferably close in date and cultural context), any discrepancy in the semantic or formal data will give cause for concern, no matter how ingenious an *ad hoc* explanation is hit upon to explain it. The etymologies proposed for a particular language therefore form a closely related set, whether they are presented together in a dictionary or separately in individual studies.

Major Categories of Etymology

It can be useful to classify etymologies in three broad groupings.

Internal Formations

An interesting group is formed by onomatopoeic and other expressive formations (including formations showing phonesthemes whose gradual convergence and productivity can often be traced, for instance, English *flip*, *flop*, *flounder* all developing as additions to the existing group shown by *fling*, *flounce*, etc. (*see*), along with practically arbitrary neologisms (for example modern proprietary names such as *Kodak*). However, far more numerous in most languages are formations showing various derivational processes such as compounding, affixation, or conversion (*see* **Word Formation**). Here the role of the etymologist is normally quite simple: one must ensure that the formation conforms to the established patterns of word formation in the language in question, and, also, for historically well-documented languages, that the respective dates of attestation of the proposed parent and child do not contradict the supposed etymology. Where difficulties do arise (for instance, where a noun-forming suffix apparently forms an adjective, or a compound occurs earlier than the corresponding simplex), one must ensure that there are not alternative, more likely explanations, and if there are not, the difficulty must be flagged for the historical grammar (in the case of unusual word formation) or for the history of the lexicon (where the dating of a particular lexical item is at issue). The study of internal formations is thus uncontroversially a part of the study of the internal history of the lexis of a language.

Loanwords

The available data is the factor determining what sort of etymology work can be attempted for a loanword. A classic illustration of this is provided by Ross (1952), where the word *ginger* is traced back from early modern documentation in European languages, through Arabic, to various languages of South Asia; at each stage in the etymology, the procedure is subtly different, reflecting the different nature and extent of the available historical data.

Similarly, the differing information available for donor language and recipient can often result in an asymmetry in etymologies: an obvious case is borrowing into European languages directly from more "exotic" languages as a result of contact through trade, exploration, or colonization. Taking as an example Tupi loans in Portuguese, one can trace back the earliest forms in Portuguese and look at their contexts and what these say about the likely date and

circumstances of the borrowing, but for the Tupi side of the equation this information is normally absent. For examples, see the excellent coverage in Cunha (1978). What one can do for both languages is to apply the basic methodology of checking whether: (a) the thing denoted is native to the region where the language is spoken; (b) the word shows semantic or morphological complexity; (c) it has an unusual phonological or morphological shape for either language; (d) there are related lexical items in the language. But without supporting historical data, there will be no certainty that changes have not been masked by accommodation to either language, folk etymological alteration, etc.

Sometimes, the overwhelming amount of historical data available can pose a problem, if it has not been covered adequately by historical lexicography. German was in the late 19th century a (if not the) predominant language of scientific research, but the coverage of scientific vocabulary in dictionaries of German is poor (for various, interesting, cultural-historical reasons), and the researcher wanting to explore the etymologies of scientific words in other European languages in that period is often only able to put together a partial impression of a word's history within German through tracking bibliographical leads through the technical literature (or in other words, by becoming temporarily an historian of science).

Ross (1952) is also a good example of the importance of external history, *realia*, and textual criticism (indeed of old-style philology) in this sort of work – which is perhaps one of the reasons for the limited appeal of etymology in comparison with 'purer' areas of linguistics.

Inherited Words

Reconstruction at great historical depth has already been touched on, but ideally this will dovetail with the historical data (where it is available). For example, modern English *mare* 'female horse' can be shown (on the basis of comparative reconstruction across the Germanic languages) to be the formal reflex of a Germanic word for 'male horse' but to have the sense of its corresponding feminine derivative. However, it is only through careful combing of the recorded attestations in Old and Middle English that the complicated process by which this came about can be traced.

Historically well-documented periods and the well-trodden ground of major world languages are in many ways ideal training grounds for any etymological research and provide an important test for the universality of explanations proposed for less well-documented areas (that whatever is hypothesized should have parallels in the recorded history of languages). However, it is also necessary to bear in mind the atypicality of historically documented languages with regard to the literary transmission of words, senses, and forms, the influence of written language on formal development, etc.

Names

In most traditions, proper names constitute a separate branch of etymological work, although a vital one. Here the semantic component is stripped bare, but paradoxically the tracing of historical forms is vital, because names (having reference but no denotation) are so prone to alteration. For a model example of this sort of work, see the publications of the English Place-Name Society, in which specialist documentation on individual place names is found side by side with lexicographical analysis examining the relationship between place name elements and the general lexis (*see* further **Place Names**; **Personal Names**; **Nicknames**).

Issues of Words, Word Forms, Polysemy, and Dictionary Entries

The problem of what constitutes a lexical 'word' has many implications for etymological work. Various processes can have radical implications for the coherence of a lexical item, such as:

- multiple inputs, e.g., where a word shows a blend of two input words, or where it has been borrowed from one language in part via another
- reborrowing, e.g., where a word is borrowed first in one sense, only to show subsequent semantic influence from the donor language over a period amounting perhaps to several centuries
- mergers and splits (or more commonly gradual divergences)
- polysemy
- variation in form

This is often explicit in dictionaries (especially historical dictionaries where the historical data is presented up front), but it is potentially more dangerous when etymologies are discussed or adduced in other contexts. In many cases, there will be doubt whether one is dealing with one or more lexical items, and consequently whether a single etymology can apply. What appears to be a seamless history in terms of formal and semantic coherence may start to fall apart if one looks more closely at the individual examples of early use, and it may be that a number of slightly different etymologies have come together in a single lexical item. (For an interesting experiment in this area, at least with regard to diversity of form, see Roger Lass's

work on the *Linguistic Atlas of Early Middle English* (Lass), where a separate etymology will be provided for each form-type in a database.)

Issues of Semantics

Semantic transfers in historically documented periods often focus on particular attributes to the neglect of others. To take a notorious example, the British bird name *robin* has in North America been transferred to a much larger bird which does, however, also have a distinctive red breast, while in Australia and New Zealand it denotes any of various small flycatchers with brightly colored breasts. Similarly, the British bird name *magpie* has in Australia been transferred to a bird which is also black and white, but, while the European bird has a raucous cry, the Australian bird is famous for its beautiful song, so much so that the soprano Joan Sutherland has been referred to as an 'Australian magpie.'

An artifact or piece of technology and its name are not necessarily borrowed together (for instance, Basque *golde* 'plough' is a borrowing from Latin *culter*, but the artifact was probably in use among Basque speakers long before the word was borrowed from Latin). Similarly, core vocabulary items are frequently borrowed in language contact situations. English has borrowed from French or from Scandinavian languages such basic words as *face* or the pronoun *they*, or (all from the Swedesh list of basic vocabulary items) *person*, *mountain*, *skin*, *grease*, *egg* (albeit in the last instance displacing a native cognate word). The words for 'head' in modern French and German show striking parallels: in both languages the inherited Indo-European word shows metaphorization (German *haupt* 'main, chief', French *chef* 'leader, boss') and has been displaced in its core meaning by words which in turn show metaphorization of words for vessels (German *Kopf* 'head', originally 'bowl', French *tête* 'head', originally 'pot'). Avoidance of obscenity, blasphemy, or other culturally marked connotations can lead to alteration of form (e.g., English *heck* for *hell*), replacement by a near homophone (e.g., English *ruddy* for *bloody*), or substitution of a different lexical item (e.g., in Japanese substitution in many contexts of *yon* for *shi* 'four', a homophone of *shi* 'death').

Even more important, the mechanisms for semantic change have as yet not shown themselves to be reducible to system in the same way as phonological or morphological change. Such familiar processes as broadening, narrowing, pejoration, amelioration, hyperbole, litotes, metaphor, and metonymy are all too apt to sound like special pleading in support of a favored etymology, especially one that provides an enticingly exact formal 'fit'. The pages of etymological dictionaries are all too full of such comments as "but this suggestion seems unconvincing from a semantic point of view," bringing to prominence what can seem an uncomfortably subjective element in etymological work. In the absence of a deeper understanding of the processes of semantic change, the assessment of the intrinsic semantic plausibility of etymological suggestions remains difficult, and it is not surprising that opinions frequently differ.

Manuals and Textbooks

Some earlier manuals attempt to embrace all of the material covered by the first definition above, at least insofar as this touches on an individual language. Thus, at the end of the 19th century, Walter Skeat made various attempts at a comprehensive primer of English etymology, to provide all the necessary historical and comparative grammar to enable the budding scholar to trace English etymologies through Germanic and beyond to Indo-European, as well as to provide the most essential data on the internal and external history of the major donor languages such as Old Norse and French. Most later attempts are unsurprisingly much less adventurous, although there are exceptions such as (for English again) Bammesberger (1984) or Lockwood (1995), which attempt to give students the basic framework and a taste of what etymology has to offer, or Ross (1958), which attempts to give a basic introduction to methodology and an interesting guide to using some of the major etymological dictionaries. Crucially, all such manuals are conceived as supplements and adjuncts to the principal historical grammars, and can only be used as such. For guidance through the basic tools of the trade, the modern equivalent of the user envisaged by Skeat should turn to the many excellent introductions to historical linguistics and its various branches, of which etymology can properly be regarded as a type of 'applied' manifestation.

Another strand is represented by studies of the methodology and achievements of etymological work (as it were, the 'meta etymology manual'). Outstanding in this field is the work of Yakov Malkiel.

Languages of Etymological Scholarship

Etymological scholarship is increasingly often written either in English or in the language being studied, in common with most other areas of linguistics. However, as will have been evident from the rest of this article, much of the most important existing literature is in German or French. This is in part a result of the particular longevity of etymological scholarship, and

also of its propensity to cross the barriers of national schools of linguistic study.

Some Possibilities for Future Work in Etymology, Especially for the Individual Scholar

Undertaking new etymological research, especially when not a component of an attempt to establish or build on the comparative grammar of a group of languages, can seem an unattractive prospect, especially for the individual scholar. For many languages, the existing body of literature is large and extremely technical, embracing components of a number of different core areas of historical linguistics. Where a promising amount of historical data is available, it is probably already well worked over in dictionaries and in individual studies, and is liable to be worked over again periodically by specialist teams (for instance on a dictionary project) who will be able to take advantage of leads that emerge during the course of reviewing the available records without the pressure constantly to be making new 'discoveries'. However, if the work of an individual scholar is well targeted, it can often present fresh insights and discoveries that can greatly enrich understanding of the history of a particular language or group of languages, as well as having more general theoretical implications. Some particular possibilities present themselves:

- All etymological or historical dictionaries list large numbers of words as being "of unknown origin" or "of uncertain origin" (or various other formulas to the same effect). Approached unwarily, such items can be a form of etymological quicksand, causing the newcomer to expend enormous energy in doing little more than reinvestigating well-known blind alleys. However, with a suitably focused method, such items can prove fertile ground for future work. Notable in this respect have been attempts to focus on such items for possible evidence of layers of loanwords, which the external history of a language would give grounds for expecting but which have only been identified in small numbers. For instance, Theo Vennemann has highlighted the possibilities for research on the large numbers of English words that have no secure etymology, or of the similarly large numbers of words with no secure etymology beyond the Germanic languages; of course, it must be acknowledged that findings of this sort will often be tentative and controversial, as is so often the case with any more adventurous work in etymology. Taking a different approach with the same body of material, Anatoly Liberman is engaged on an ambitious project surveying and reviewing previous attempts at etymologizing just such difficult words (often extending his gaze to suggestions made long before the development of modern comparative methodology) to see whether a grain or two of truth can be found among the chaff of previous attempts in the form of a promising idea that can be worked up further in the light of modern methods.
- Alongside words of unknown or uncertain etymology, etymological dictionaries are full of cases where two words or groups of words show puzzling similarities of form and meaning that etymologists have been loath to attribute to coincidence, but where it has nonetheless proved impossible hitherto to establish a completely satisfactory explanation of an etymological relationship. Careful targeted examination of such cases, so long as it observes the methodology of historical and comparative linguistics, might well yield more satisfying solutions, and perhaps even some fresh insights into the historical or comparative grammar of the language in question, or into the mechanisms of semantic change.
- As noted above, the mechanisms of semantic change are not nearly so well investigated as those of phonological and morphological change. Careful work on semantic development in historically documented periods, and on the semantics of loanwords (both oral and literary) where historical documentation is available for both donor language and recipient, could yield valuable insights for periods for which such documentation is lacking, as well as having implications for general understanding of processes of semantic change. Several new areas of research in historical semantics (for instance work in cognitive semantics such as that by Eve Sweetser, or the still expanding field of grammaticalization) have clear implications for work on etymology in remote or poorly documented periods.

See also: Areal Linguistics; Folk Etymology; Historical and Comparative Linguistics in the 19th Century; Historiography of Linguistics; Lexicography: Overview; Nicknames; Personal Names; Place Names; Word Formation.

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Europe Alphabets, Ancient Classical

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The transmission of the Levantine linear alphabet to Greece, Anatolia, and Italy is an event of great importance, if only because these words you are now reading could not have been written (or would have been written entirely differently) had it not been for that event. It is no wonder that it has been the subject of much study and controversy.

In the present state of our knowledge, we can say that the alphabet, in its Phoenician form, reached Greece first, no earlier and not much later than the 9th century B.C.E., and subsequently spread from Greece to Anatolia and Italy. This is not to say that there are no other theories, involving, among others, an Aramaic origin, or a transmission through Anatolia to Greece, or a much earlier date. We will nevertheless start our discussion with the transmission of the Phoenician alphabet to Greece, and then move on to the early alphabetical writing systems of Anatolia and Italy.

Greece

At the end of the Mycenaean age (ca. 1100 B.C.E.), literacy was lost in Crete and other parts of the Greek-speaking world. Only in Cyprus was a modified form of the Aegean syllabary maintained to write the Greek language, and it remained in local use until Hellenistic times (*see* **Aegean Scripts**). Elsewhere in the Aegean, there was a lapse in literacy (the so-called 'Dark Ages'), which only came to an end with the adoption and adaptation by the Greeks of the Phoenician variety of the Canaanite linear *abjad*. The exact place and date of transmission are not known exactly and will always remain subject to revision from new archaeological finds. Much of the evidence has been irretrievably lost, because most writing was done on perishable materials such as wood, bark, and leather, and only occasionally on the more durable stone, metal, or pottery.

The Phoenician origin of the Greek alphabet, however, is not in any serious doubt, and is supported by several lines of evidence:

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The Phoenician origin of the Greek alphabet, however, is not in any serious doubt, and is supported by several lines of evidence:

- the shapes of the letters;
- the names of the letters;
- the order of the letters;
- the direction of writing (originally right to left in single-line inscriptions);
- the Greek tradition of referring to the letters as *φοινική γράμματα* (p^{h}oinikéː grámmata) 'Phoenician letters', transmitted to the Greeks by a legendary Phoenician ruler Kadmos.

Without meaning to demerit the Greek tradition, we will focus on the linguistic and paleographic aspects of the question.

The Shapes of the Letters

The majority of the early Greek letter shapes are nearly identical to their Phoenician prototypes (𐤂 g, 𐤃 d, 𐤄 h, 𐤆 z, 𐤈 ṭ, 𐤊 k, 𐤍 n, 𐤎 s, 𐤏 ʕ, 𐤐 p, 𐤓 r), especially if we take the archaic Cretan forms into account (𐤁 b, 𐤇 h, 𐤌 m, 𐤒 q) (see Table 1). The remaining differences mostly involve simple rotations and reflections (𐤋 > 𐤀, 𐤉 > 𐤉, 𐤔 > 𐤌/𐤎, 𐤕 > 𐤕).

The most interesting deviations are those of Phoenician 𐤅𐤅/w/. This regularly gives Greek υ, ϝ/u/, but as a consonant (/w/), it appears as ϝ, ϝ in archaic Cretan, and later, influenced by neighboring 𐤇, as ϝ. This also brought about the loss of the horizontal sidebar of Phoenician 𐤉 /j/, which turned into Cretan ϊ, ι /i/. The differentiation of vowel ϝ (placed at the end of the alphabet) and consonant ϝ looks like a deliberate attempt to create a doublet, by rotating the 'cup' of 𐤅 by 45 degrees. The lack of an unambiguous Greek equivalent to Phoenician 𐤑 /ṣ/ is also worth noting.

Three shapes are important for dating the transmission of the Phoenician alphabet to Greece. A *terminus post quem* is provided by Greek κ and μ, which come from the Phoenician 𐤊 and 𐤌, forms that only appear ca. 850 B.C.E., replacing earlier 𐤊 and 𐤌. Similarly, a *terminus ante quem* is provided by Greek Δ, which comes from Phoenician 𐤃, which after around 850 B.C.E. acquired a tail (𐤃). This would fix the time of transmission at approximately 850 B.C.E., even though the first actual evidence for the Greek alphabet is from about a century later.

The Names and Sound Values of the Letters

While the letter shapes do not exclude a non-Phoenician Northwest Semitic origin (the Aramaic and Hebrew alphabets were borrowed from the Phoenician one, and the shapes did not start to diverge until some time later), the names of the letters may provide us with some clues. Even though the Phoenician names of the letters have not been preserved, it seems clear that Hebrew and Aramaic borrowed some of the letter names from Phoenician (e.g., yôd instead of yād or yad 'hand' and mēm instead of mayim, maym 'water'), while other names were nativized (e.g., zayin, zayn 'weapon' and rēš 'head'). The Greek letter names, however, are all consistent with the likely Phoenician forms, including ξεῖ /kseː/ from *šeːn 'tooth,' and ῥῶ/r^{h}ôː/, from *rɔːš 'head.' Ζῆτα /dzêta/ looks as if derived from a Phoenician *dzɛːt 'olive,' but perhaps it simply derives from *dzɛːn 'weapon' > *ζῆ, and further > ζῆτα under the influence of neighboring ἦτα /hêta/ and θῆτα /t^{h}êta/.

Another argument for a very early or Aramaic origin of the Greek letter names is the final *-a* which appears on most letters. If the names had been borrowed very early, this *-a* might reflect the Proto-Semitic case ending *-a* (originally accusative, but marking the absolute state in North West Semitic). This, however, is inconsistent with the Greek name ἰῶτα /iôːta/, which clearly comes from Phoenician *yɔːd "hand," not from Proto-North-West Semitic *yada. Another theory is that Greek *-a* comes from the Aramaic emphatic definite article *-aː(ʔ)*. Again this is contradicted by ἰῶτα, and by the fact that the emphatic article is not added to letter names in Aramaic itself. A simple explanation is available in Greek itself, which did not allow final stops (*bɛːt, *ṭɛːt, (*dzɛːt), *yɔːd, *qɔːp) or consonant clusters (*ʔalp, *gaml, *dalt, *kapp, *labd, *samk).

Finally, it has also been suggested that the Greek treatment of the s(h)ibilant letters points to an Aramaic rather than a Phoenician transmission source. This is based on the fact that letter 𐤎 is sounded as an affricate /ks/ in Greek, while 𐤔 is sounded /s/, which is reminiscent of the Proto-Semitic values (respectively, the affricate /ts/ for 𐤎 and the sibilant /s/ for 𐤔). However, as can be seen in **Table 2**, there is no North-West Semitic dialect that preserved both those sound values.

On the subject of s(h)ibilants, even if Phoenician had reduced the Proto-Semitic s(h)ibilant inventory from nine to four, Greek only had use for two or three of them: plain /s/, the voiced affricate /dz/ (later metathesized into /zd/), and, in some dialects, also a voiceless affricate /ts/ or /tʃ/ (in most dialects reduced to /s/, /t/, /ss/ or /tt/). In particular, Greek had no phoneme /ʃ/, the most common s(h)ibilant in Phoenician. The Phoenician letter **name** *šeːn was adopted as Greek *ξει* /kseː/, with the foreign phoneme /ʃ/ apparently replaced by Greek /ks/. The **shape** of the letter (rotated to 𐤌 or 𐤎), however, was used to render Greek plain /s/.

Phoenician /s/, written 𐤎, gave Greek Ξ, but the name (*samk > *γ* /síŋma/ or *ν* /sán/) was transferred to the letter denoting plain /s/. Phoenician /dz/ 𐤆 gave

Table 1 From Phoenician to Early Greek

	Phoenician	*Early Greek*	*Greek*	*Roman*
1	𐤀	Α Α	Α	A
	*ʔalpʰ ''OX''	*ἄλφα* /álpʰa/		a
	/ʔ/	/a/	/a/	/a/
2	𐤁	Β Β	Β	B
	*bɛːt ''house''	*βῆτα* /bêːta/		be
	/b/	/b/	/b/	/b/
3	𐤂	Γ Ꞓ	Γ	C
	*gaml ''throwing-stick''	*γάμμα* /gámma/, *γέμμα* /gémma/		ce
	/g/	/g/	/g/	/k/
4	𐤃	Δ	Δ	D
	*dalt ''door''	*δέλτα* /délta/		de
	/d/	/d/	/d/	/d/
5	𐤄	Ε Ꞓ	Ε	E
	*heː ''hey!''	εἶ /eː/	*ἒ Ψιλόν*	e
	/h/	/e/	/e/	/e/
6	𐤅	Ϝ Ꞓ		F
	*waw ''hook''	Ϝαῦ /waû/		ef
	/w/	/w/		/f/
7	𐤆	Ι	Ζ	(G)
	*dzɛːn ''weapon'', *dzɛːt ''olive'' (?)	*ζῆτα* /dz êːta/		(ge)
	/dz/	/dz/	/zd/	(/g/)
8	𐤇	Η Ꞓ	Η	H
	*ħɛːt ''?''	*ἦτα* /h êːta/	*ἦ*Τα / ɛːta/	ha
	/ħ/	/h/	/ɛː/	/h/
9	𐤈	Θ	*Θ*	
	*ṭɛːt ''?''	*θῆτα* /tʰ êːta/		
	/tʼ/	/tʰ/	/tʰ/	
10	𐤉	Ϛ ϛ	iω	ı
	*yɔːd ''hand''	*ἰῶτα* /iɔ̂ːta/		i
	/j/	/i/	/i/	/i/
11	𐤊	Κ ϰ	Κ	K
	*kapp ''palm''	*κάππα* /káppa/		ka
	/k/	/k/	/k/	/k/
12	𐤋	Ι ϟ	Λ	L
	*lamd ''staff''	*λάβδα* /lábda/, *λάμβδα* /lámbda/		el
	/l/	/l/	/l/	/l/
13	𐤌	Μ Ϻ	Μ	M
	*mɛːm ''water''	*μῦ*/mûː/, *μῶ* /mɔ̂ː/		em
	/m/	/m/	/m/	/m/
14	𐤍	Ν Ϻ	Ν	N
	*nuːn ''fish''	*νῦ*/nûː/, *νῶ* /nɔ̂ː/		en
	/n/	/n/	/n/	/n/
15	𐤎	Ξ	Ξ	
	*samk ''support''	*ξεῖ* /kseː/	*ξῖ*	
	/s/	/ks/	/ks/	
16	𐤏	Ο	Ο	O
	*ʕɛːn ''eye''	*οὖ* /oː/	*ὂ μικρόν*	o
	/ʕ/	/o/	/o/	/o/
17	𐤐	Π Ϻ	Π	P
	*peː ''mouth''	*πεῖ* /peː/	*πῖ*	pe
	/p/	/p/	/p/	/p/
18	𐤑			
	*tsʼadɛː ''locust'' (?)			
	/tsʼ/	(/s/)		
19	𐤒	Ϙ		Q
	*qɔːpʰ ''monkey''	*Ϙόππα* /qóppa/		qu
	/q/	/k/ (/kʷ/?)		/k/
20	𐤓	Ρ ϱ	Ρ	R
	*rɔːš ''head''	*ρῶ* /rʰɔ̂ː/		er
	/r/	/r/	/r/	/r/

Continued

Table 1 Continued

	Phoenician	*Early Greek*	*Greek*	*Roman*
21	W *še:n ''tooth'' /ʃ/	M ξ ʒ *σίγμα* /sígma/; *σάν* /sán/ /s/	Σ /s/	S es /s/
22	+ *taw ''mark'' /t/	T *ταῦ* /taû/ /t/	T /t/	T te /t/
23	Y *waw /w/	ϒ ϒ ῦ /hû:/ /u/	Y ὐ *Ψιλόν* /y/	V u /u/, /w/
24		ϕ *φεῖ* /p^{h}e:/ /p^h/	*Φ* *φεῖ* /p^h/	
25		ϰ χ Χεῖ/k^{h}e:/ /k^h/ or /ks/	X Χῖ /k^h/	X eks, iks /ks/
26		ϰ Ψ ↓ *Ψεῖ*/pse:/ /k^h/, /ks/ or /ps/	Ψ ψῖ /ps/	
27		⊚ Ω *ὦ*/ɔ:/ /ɔ:/	Ω *ὦ μέγα* /ɔ:/	
28		M ? /ts/		

Table 2 Semitic S(h)ibilants

P.S.	*Akk.*	*Ugar.*	*Phoe.*	*Hebr.*	*Aram.*	*Arab.*	*E.S.A.*	*Egypt. transl.*
*s	š /ʃ/, s /s/	š /ʃ/	š /ʃ/	š /ʃ/	š /ʃ/	s /s/	s_1 /s/	š /ʃ/, s /s/
*ts	s /ts/ > /s/	s /ts/	s /s/	s /s/	s /ts/ > /s/	s /s/	s_3 /ts/	ṯ /tʃ/
*ts'	ṣ /ts'/	ṣ /ts'/	ṣ /ts'/	ṣ /ts(')/	ṣ /ts'/	ṣ /sˤ/	ṣ /ts'/	ḏ /tʃ'/
*dz	z /dz/ > /z/	z /dz/	z /dz/	z /dz/ > /z/	z /dz/ > /z/	z /z/	z /dz/	ḏ /tʃ'/
*tʃ>*θ	š /ʃ/	ṯ /θ/	š /ʃ/	š /ʃ/	ṯ /θ/ > t /t/	ṯ /θ/	ṯ /θ/	s /s/, š /ʃ/
*tʃ'> *θ'	ṣ /ts'/	ṯ /θ'/	ṣ /ts'/	ṣ /ts(')/	ṯ > ṯ /t'/	ẓ /θˤ/ ∼ /ðˤ/	ṯ /θˤ/	ḏ /tʃ'/, ṯ /tʃ'/
*dʒ > *ð	z /dz/ > /z/	ḏ /ð/	z /dz/	z /dz/ > /z/	ḏ /ð/ > d /d/	ḏ /ð/	ḏ /ð/	ṯ /tʃ/, ḏ /tʃ/
*ɬ	š /ʃ/	š /ʃ/	š /ʃ/	ś /ɬ/ > /s/	ś /ɬ/ > s /s/	š/ʃ/	s_2 /ɬ/	s /s/, š /ʃ/
*tɬ'	ṣ /ts'/	ṣ /ts'/, ṯ /θ'/	ṣ /ts'/	ṣ /ts(')/	q /q/ > ´ /ʕ/	ḍ /dˤ/	ḉ /tɬ'/	ḏ /tʃ'/
*ʃ	š /ʃ/	h /h/	h /h/	h /h/	h /h/	h /h/	h /h/	
*tɬ	š /ʃ/	š /ʃ/	š /ʃ/	ś /ɬ/	ś /ɬ/ > s /s/	š /ʃ/	ć /tɬ/ > ś /ɬ/	

Greek I, also pronounced /dz/ at the time (later /zd/), while Phoenician ϟ /ts'/ was lost in the transition. The adopting Greek dialect apparently did not have a need for a voiceless affricate.

Besides the s(h)ibilants, there were other changes between Phoenician and Greek in the assignment of sound values to the letter shapes. The most important change is the creation of the Greek vowel letters.

The Greeks correctly assumed that the Phoenician letters were acrophonic: the first sound of the name provided the sound value of the letter. In the case of the very first Phoenician letter, called *ʔalp 'ox,' this led the Greeks, who lacked a phoneme /ʔ/, to assume that the sound value of the letter was /a/. Greek also did not have a phoneme /j/ ([j] was merely an allophone of /i/), so the letter *yɔ:d 'hand' was taken as acrophonic for /i/. The vowel /u/ was provided by Phoenician *waw 'hook' (although a doublet letter had to be created for the Greek phoneme /w/). Of the two Phoenician h-like sounds, Greek chose the more marked one (*ħ ɛ:t) to stand for the Greek rough breathing, which made Phoenician *he: 'hey!' (= Greek ἦ /ɛ́:/ 'hey!') available for the vowel /e/. For the final vowel, /o/, no obvious Phoenician model was available, and the Greeks adopted the remaining letter that to them sounded as if it was vowel-initial, ʕɛ:n 'eye,' perhaps by default, perhaps because the Greek word for 'eye' (ὀφθαλμός /op^{h}t^{h}almós/) starts with an o-.

Semitic has a category of **emphatic** consonants, pronounced glottalized in early Semitic, later in some languages velarized or pharyngealized. Of the original Proto-Afroasiatic/Proto-Semitic inventory,

/t'/, /ts'/, and /q/ (< /k'/) had survived into Phoenician. Greek had no emphatic consonants, but it had another marked category, that of aspirated stops (/p^h/, /t^h/, and /k^h/). Although aspiration is a (secondary) feature of the **non**emphatic consonants in Semitic, the Greeks did adopt Semitic *tɛːt to stand for Greek /t^h/, one marked consonant for another. The same was not done in the case of /q/, perhaps because in Semitic it no longer rated as a marked, emphatic consonant, perhaps because Greek at the time had not yet completely lost its labio-velar consonants k^w, g^w, and k^{hw} (still present in the Mycenean texts), and the back velar /q/ was first adopted to stand for /k^w/ where it remained (usually before /u/, as in *k^wek^wlos > ϙύκλος /kúklos/ 'circle'). This then led to the practice of using ϙόππα for back allophones of /k/ in general (i.e., before the vowels /u/ and /o/).

With the creation of vowel signs, and the reassignment of the s(h)ibilants and emphatics, most Greek sounds could now be rendered using the 'Phoenician letters.' Only the aspirates /p^h/, /k^h/, and, in some dialects, the voiceless affricate /ts/, still needed to be assigned a letter value. Furthermore, no distinction was yet made between short and long vowel phonemes, or between open and closed varieties of /e/ ~ /ɛ/ and /o/ ~ /ɔ/.

The Order of the Letters

In the North-West Semitic alphabet, the letters had a specific order. The Phoenician alphabet eliminated certain letters from the original model (*see* **Ugaritic**), but the basic order was otherwise left intact (see Table 3). Greek follows the Phoenician order with little or no change. In the earliest Euboian abecedaria (found in Italy, and to become the model for the Etruscan alphabet), the two sibilants Ξ (written ⊞) and sán (M), which were not used in Euboian writing itself, are included in the spots for Phoenician *samk and *ts'adɛː. This has understandably led to the supposition that the letter sán somehow continues

Table 3 Semitic and Greek alphabetical order and numerical values

Ugaritic		*Phoenician*			*Corinth*		*Euboia*		*Ionia*		#
1	ʔa	1	ʔ	𐤀	a	Α	a	Α	a	Α	1
2	b	2	b	𐤁	b	Ϝ	b	Β	b	Β	2
3	g	3	g	𐤂	g	Γ	g	Ϲ	g	Γ	3
4	x										
5	d	4	d	𐤃	d	Δ	d	Ɗ	d	Δ	4
6	h	5	h	𐤄	ε	Ε	e	Ε	e	Ε	5
7	w	6	w	𐤅	w	Ϝ	w	Ϝ		(Ϝ)	6
8	dz	7	dz	𐤆	dz	Ι	dz	Ι	zd	Ι	7
9	ħ	8	ħ	𐤇	h	Η	h	Η	ɛː	Η	8
10	t'	9	t'	𐤈	t^h	Θ	t^h	Θ	t^h	Θ	9
20	j	10	j	𐤉	i	Ϛ	i	Ι	i	Ι	10
30	k	20	k	𐤊	k	Κ	k	Κ	k	Κ	20
40	ʃ										
50	l	30	l	𐤋	l	Λ	l	Ι	l	Λ	30
60	m	40	m	𐤌	m	Μ	m	Μ	m	Μ	40
70	ð										
80	n	50	n	𐤍	n	Ν	n	Ν	n	Ν	50
90	θ'										
100	ts	60	s	𐤎				(⊞)	ks	Ξ	60
200	ʕ	70	ʕ	𐤏	o	Ο	o	Ο	o	Ο	70
300	p	80	p	𐤐	p	Π	p	Π	p	Π	80
400	ts'	90	ts'	𐤑	ks	Ξ		(M)			
500	q	100	q	𐤒	k	Ϙ	k	Ϙ		(Ϙ)	90
600	r	200	r	𐤓	r	Ρ	r	Ρ	r	Ρ	100
700	θ	300	ʃ	𐤔	s	Μ	s	Ϛ	s	Ϛ	200
800	Y										
900	t	400	t	𐤕	t	Τ	t	Τ	t	Τ	300
	ʔi										
	ʔu										
	ṡ										
					(u	Ϝ)	u	Υ	y	Υ	400
					(p^h	Φ)	ks	Χ	p^h	Φ	500
					(k^h	Χ)	p^h	Φ	k^h	Χ	600
					(ps	Ψ)	k^h	↓	ps	Ψ	700
					(eː	Β)			ɔː	Ω	800
									ts	Ϡ	900

Semitic ts'adê. However, neither the shape (rotated *šeːn), nor the sound-value (/s/), nor the name of sán (most likely from *samk) gives any support to this thesis. Neither does the spot that sán occupies in the Corinthian alphabet, where it is in the place for sígma, as expected. It is therefore more likely that the Euboian and Corinthian abecedaria simply reflect that the existence of letters at places 15 and/or 18 in the Phoenician model was known to the Greeks, but that the actual names, sound-values, and shapes were confused in different ways. The Euboians borrowed the Corinthian shape of sígma (= sán) to fill one of the slots, the Corinthians filled the hole left by *ts'adɛː with the shape of *samk (pronounced like *šeːn). The Ionians simply forgot about the shape, sound-value, and alphabetical slot of *ts'adɛː altogether, and when a letter with a similar sound-value /ts/ was adopted at Miletos, sámpi was appended at the end of the alphabet (and, indeed, sámpi has no relationship to *ts'adɛː).

Appending new letters at the end of the alphabet, leaving the previous ordering intact, was standard procedure. We can, therefore, use the alphabetical order as an indication of the order in which supplemental letters were added. This confirms what is already clear from the distribution of the signs: the letter Y /u/, used in every variant of the Greek alphabet, was the first addition. The letters Φ and X/Ψ (used everywhere but Crete, Thera, and Melos) come next, but sometimes the order is XΦ, sometimes the order is ΦX. We can deduce that both signs were added simultaneously. Next, if applicable, comes the second variant of X/Ψ, which means of course that the letter was split into two entities at a later time. Ionia added further letters after that: first omega, then sampi. Other additional letters elsewhere may also have been appended at the end (e.g., Corinthian ϡ = /ɛ(ː)/), but we have no evidence.

J. Naveh interprets these striking paleographic differences as evidence that the Greek alphabet was borrowed from Phoenician at a time (12th or 11th centuries B.C.E.) when Phoenician writing also exhibited most of these characteristics.

Naveh's argument has been used as supportive evidence in the 'New Chronology' debate (e.g., by James, 1991). However, as we have seen, the Greek shape of the letters káppa, mûː, and délta all point towards a transmission around the year 850 B.C.E., and Naveh has to admit as much at least for káppa, which, in his view, was reborrowed from Phoenician in the 9th century B.C.E. (while the old shape hung on as Greek ↓ /k^h/). Similarly, Naveh suggests that *waw was borrowed first as the shape that was eventually transformed into Greek ϝ, and that ϝ was reborrowed in the 9th century.

But those are unnecessary complications. There is nothing in the Greek script as we find it in the 8th century that is inconsistent with 9th-century Phoenician writing. The difference in style is merely a consequence of the novelty of alphabetic writing in Greece: shapes, names, and sound values were distorted in the process of adaptation from Phoenician to Greek, and further, in the island-hopping from one Greek epichoric variant to another. The Greeks seem to have understood well enough that writing ran from right to left in single-line inscriptions, but either their Phoenician teachers never got to the point of explaining what to do in multiline inscriptions, or their Greek pupils forgot about that lesson. Less lapidary and more cursive writing, as well as standardization of the shapes, were still centuries away in Greece, as they had been in Phoenician writing itself a couple of centuries before. In the end, Greek writing, unlike the Phoenician and the Phoenician-derived scripts (and also unlike Greek-derived Lydian and Etruscan), settled on left to right directionality.

The Direction of Writing

By the 9th century B.C.E., the Phoenician alphabet had reached a certain level of stability and standardization: there were few regional and/or personal variations anymore in the shape of the letters, and the script was uniformly written from right to left. The style was becoming more and more fluid and cursive. By contrast, Greek writing in the 8th and subsequent centuries, until the standardization of the Ionian script in the 4th century, had very different characteristics: regional and personal variations in the shape and orientation of the letters abound, the inscriptions run from right to left, or from left to right, or in *boustrophedon* fashion ('as the ox plows,' i.e., right to left in one line, left to right in the next, etc.).

The Greek Epichoric Alphabets

The Greek regional (epichoric) alphabetic variants are subclassified according to a colorful naming scheme that derives from a map in Kirchhoff's 1863 work on the Greek alphabet (see **Figure 1**). The 'primitive' alphabets of Crete, Thera, and Melos are called 'green,' the 'Western' alphabets of, for example, Euboia and Lakonia, are called 'red,' and the 'Eastern' alphabets of Ionia, but also of Corinth and neighboring city states, are called 'blue.'

In the following, green is used to stand for certain primitive characteristics (found in Crete, Thera, or Melos, but not only there), red and blue for the typical Western (X=/ks/, Ψ=/k^h/) and Eastern (X=/k^h/, Ψ=/ps/) varieties, respectively, and the term 'white' for variants that are intermediate between red and blue.

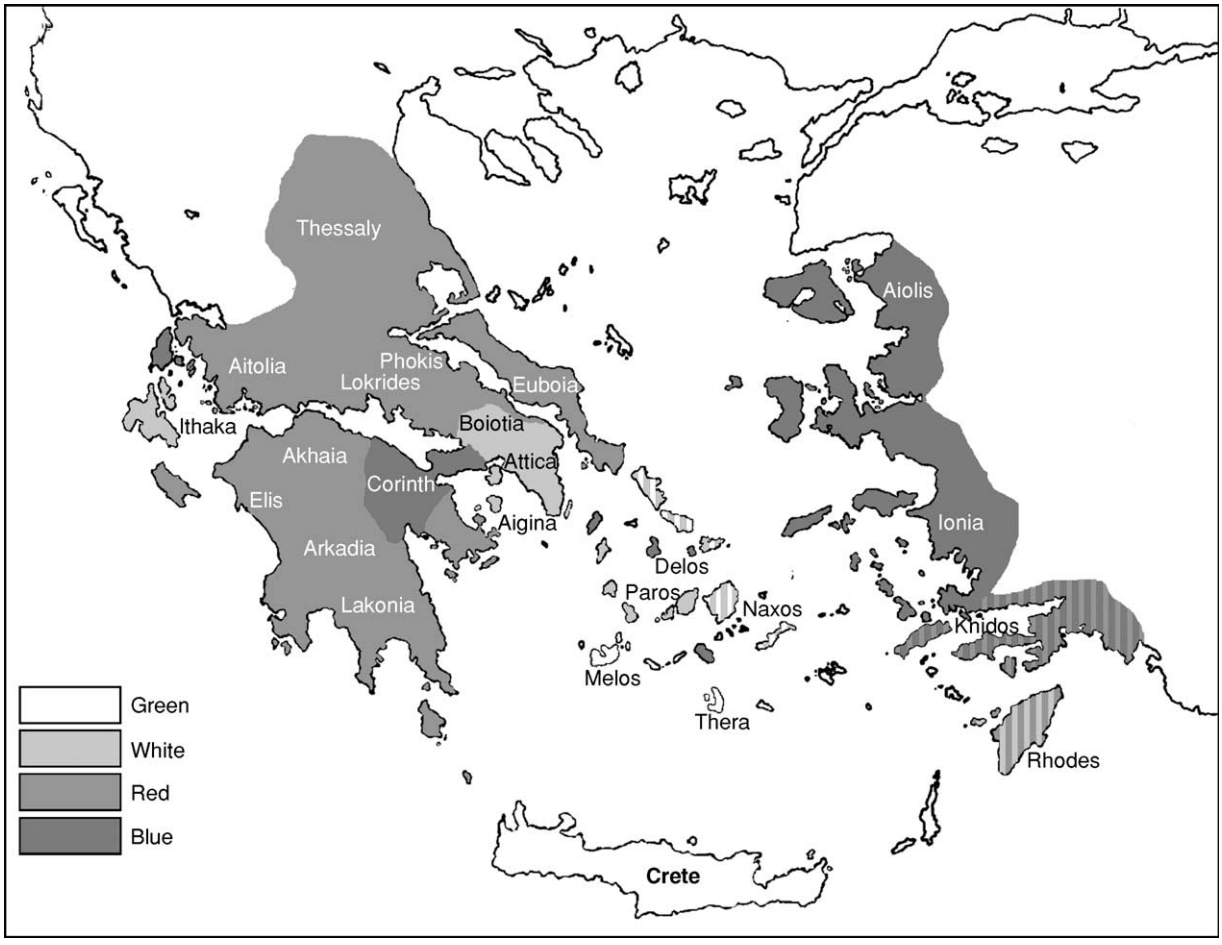

Figure 1 Greek epichoric alphabets.

The main characteristics of the green variants are:

- 'crooked' iota ϛ, ꞃ, and san ϻ (Crete, Thera, Melos; Corinth/Isthmus; Akhaia, Aitolia, Ithaka);
- archaic varieties of B, such as ß, ᛋ, ᛒ, and ᚹ (Crete, Thera, Melos; Cyclades; Corinth/Isthmus);
- five-stroke ϻ ᛗ (Crete, Melos; Euboia);
- archaic varieties of F ᚠ, H ᚼ, and Q ᚩ (Crete);
- absence of supplemental letters after Y (Crete, Thera, Melos).

It should be noted that such **non**primitive shapes as ß, ᛗ, ᚠ, ⊟, and ᚩ are also found in Crete.

The red variants typically have:

- 'Latin-like' Γ (C), Δ (D), Ρ (R), Υ (V);
- Absence of Ξ;
- X =/ks/, Ψ = /k^h/.

The blue variants tend to have:

- Turned lambda (ᛦ);
- X = /kh/, Ψ = /ps/;
- (Ionia) additional letter Ω.

The shapes of Γ/Λ, Δ/Ρ, and Y are not fundamental for the division of the Greek epichoric alphabets into red and blue varieties (although they are relevant for Latin C/L, D/R and V, derived from a red Euboian model). The fundamental difference between the variants is the spelling of the sounds /p^h/, /k^h/, and of the clusters /ps/, /ks/ (see Figure 1).

Many things have been said about the origin of the supplementals X, Φ, Ψ, and about the origin of the red and blue variants. Wilamowitz's ingenious explanation is that Φ and X are both derived from the one aspirate ⊕ /t^h/ that already had a symbol adapted from the Phoenician: Φ by eliminating the horizontal bar, X by eliminating the surrounding circle. Ψ, however, is weakly explained as adapted from Y /u/. The variant ↓ has been explained as deriving from early Phoenician ↓/k/. At the risk of adding one more item to the long list of explanations, I would like to suggest the following, strangely overlooked possibility: it stands to reason that a letter for denoting the phoneme /p^h/ would have involved the existing letter /p/, and that a

letter for denoting the phoneme /k^h/ would have involved /k/. Rather than inventing a whole new symbol, the preferred method for fixing defective writing systems is to modify an existing symbol (e.g., Latin C > G) or to use a digraph (Medieval Latin V V > W). Now double-P would have given a symbol looking approximately like ⊤ or φ (qóppa then becoming φ), double-K would have given ⋔, subsequently simplified to ⋔ or to ⋔ / ⋔.

In any case, there can be little doubt that ⋔, ⋔, ⋔, ⋔, + are all variants of a single sign originally denoting the velar aspirate /k^h/. Except in the green area, and on Naxos, the clusters /ks/ and /ps/ (phonetically perhaps [k^hs] and [p^hs]) started to be written using the new signs as ⋔⋔/⋔⋔ and φ⋔. This is what I call the white system. However, /ks/ could in some parts at least also be written using the Phoenician sign ⋔. The emergence of the red and blue systems is a matter of simplification and removal of digraphs: in the red zone, the system was simplified by abbreviating ⋔⋔ to ⋔, and reserving the variants ⋔ and ⋔ for the aspirate /k^h/. In the blue zone, ⋔ replaced ⋔⋔ (or perhaps an already simplified spelling ⋔), and the symbol ⋔ was assigned a whole new value /ps/, replacing the original digraph spelling φ⋔. The latter development (elimination of all digraphs) also occurred in part of the red area, with /ps/ being spelt ⋔ (Lokrides, Arkadia, Akhaia) instead of φ⋔. Schematically:

	1.	2.	3.	4.	5.	6.	7.	8.	9.
/kh/	⋔	⋔	⋔	⋔⋔	⋔	⋔	⋔	⋔	⋔
/ks/	⋔	⋔	⋔⋔	⋔	⋔⋔	⋔	⋔	⋔	⋔
/ph/	⋔	φ	φ	φ	φ	φ	φ	φ	φ
/ps/	⋔	⋔		φ⋔		φ⋔	⋔		⋔

1 = Crete, Thera, Melos (green).
2 = Naxos (transitional green-white)
3 = Ithaka (white A)
4 = Attica, Aigina, Boiotia, Paros (white B)
5 = Rhodos (transitional white-red)
6 = Euboia, Thessaly, Aitolia, Lakonia, etc. (red A)
7 = (Thessaly), Lokrides, Arkadia, Akhaia (red B)
8 = Knidos (red or blue, depending on the origin of the sign ⋔)
9 = Ionia, Delos, Corinth/Isthmus (blue)

The Ionian dialect had no /w/ and no /h/, and this led to the elimination of waû (except as a number) and to the letter H /h/ becoming /ɛː/ by renewed application of the acrophonic principle (hɛːta > ɛːta). For symmetry, this led to the creation of Ω to denote the vowel /ɔː/. Ionian, like most other variants, also dropped the letter qóppa, and thus we arrive at the Classical Greek inventory of 24 letters (for the further development of the Greek alphabet, *see* **Greek, Ancient**).

Table 4 The Phrygian, Lycian, and Lydian alphabets

Phrygian		*Lydian*		*Lycian*	
A	a	A	a	A	a
B 8	b	8	p	B b	b /β/
Γ	g	⅃	g (?)	Γ ⅄	g /γ/
Δ	d	⅄	d /δ/	Δ	d /δ/
E	e	⅃	e	E	i
F	w	⅁	v	F	w
Ŧ	(zd ?)	I ⋔	s /ʃ/	I	z /ts/
				+	h
				X	θ
I	i	I	i	I	j
⅃ ⅃ X	j	⅁	y /i/		
K	k	⋊	k	K	k /ki/
Γ	l	⅃	l	Λ	l
M	m	⅃	m	M	m
N	n	⅄	n	N	n
O	o	O	o	O	u
Γ	p			Γ	p
φ	(k ?)	+	q /k^w/	◇	κ /k/, /h(e)/
P	r	φ	r	P	r
⋔ ⋔	s	⋔ ⋔	ś /s/	S	s
T	t	T	t	T	t
Y	u	⅄	u		
↑ T φ	tʃ (?)	↑	c /tʃ/ (?)		
Y T	ks				
				⋀	e
		M	ã /ãː/	⋔ ⋔ ⋔ ⋔ ⋔ ⋔	ã
		Y	ẽ /ã/	⋔ ⋔ ⋔ ⋔ ⋔	ẽ
		T	λ /ʎ/		
				X	m̃ /m¬/
		⋔	v /n¬/ (?)	Ξ	ñ /n¬/
		8	f		
		Ξ	τ /ts/	W	τ /t^w/ (?)
				⋔	q /k/
				N	K /k/
				W Y	χ /q/

Anatolia

The first alphabetic scripts of Ancient Anatolia can be classified into two groups. The first consists of clearly Greek-derived alphabets, such as Phrygian, Lycian (usually written left to right), and Lydian (right to left). Besides the Greek-derived signs, Lycian and Lydian also possess a number of supplemental letters to denote native sounds absent from Greek phonology

(see Table 4). The later Pisidian and Pamphylian alphabets lack such supplemental letters, and can be considered merely Greek alphabetic variants used to write local Anatolian languages.

The second group (Sidetic, Carian) is more difficult to classify. The Carian alphabet contains many shapes that are similar or identical to Greek letter shapes, but the pronunciation of most of them bears no relationship to the Greek pronunciation.

Early decipherers were misled by this characteristic of the Carian script: the Greek-looking letters were read with their Greek sound-values, while the non-Greek letters were variously interpreted as syllabic (due to their rather elevated number and vague similarities to the Aegean linear scripts or the Anatolian hieroglyphic script, *see* **Aegean Scripts**) or as supplemental letters in Lycian/Lydian fashion. Neither approach led to much progress in the decipherment of the Carian language. It was only with the work of Kowalski (1975) and especially Ray (1982) that the decisive first step towards decipherment was taken, by focusing on the Carian-Egyptian bilinguals (especially the onomastic elements therein, cf., the decipherment of Egyptian itself by Champollion) and deriving the Carian sound-values (at first) solely from that evidence, without preconceptions about the sound-values of the letters. Ray's early work was extended further by Adiego (1993), Schürr (1992), and Ray himself (1990), resulting in the identification of all the more common Carian signs, as outlined in Table 5.

The new sound-values of Carian suggest an interesting question: can the Carian alphabet be called Greek-derived, or is the relation more like that between the Latin alphabet and Sequoyah's Cherokee script (see)? Of the five clear shape–sound correspondences between Carian and Greek, the vowels A, O, and Y are strongly suggestive of Greek origin (this also invalidates the possibility of a direct Phoenician-Carian link). Moreover, the Cherokee script is a syllabary, while Carian is alphabetic, arguing against a 'naive' origin of Carian writing. It seems preferable to think (Adiego, 1993) that the shapes derive from a Greek model after all, having passed through a process of cursivization and remonumentalization (e.g., Greek T > Carian ⲧ), although the exact details would need to be worked out further.

Table 5 The Carian and Sidetic alphabets

Number (Masson)	*Carian Shape*	*Sound Value (Adiego, 2003)*	*Sidetic*	*Sound Value*
1	A	a	ϟ ϟ	a
2	B	= 24 (/p/)	P	b (?)
3	C	d (/ð/)	И	g
4	Δ	l	ᘏ	d
5	E	y	ϵ	e
6	F	r	X	w
7	I	λ	N	ś
8	H	= 26 (/i/)	O	θ
9	⊕	q	ϟ	i
10	Λ	b (/β/)	ϟ ε	j
11	N	m	>	k
12	O	o	K	l
13	Γ	--	C <	m
14	ⲧ	t	ϑ	n
15	ⲧ	š /ʃ/	ϕ	o
16	R	--	ϩ	p
17	M	s	Λ	r
18	T	?	I	s
19	V	u	⊤	t
20	Φ	ñ	Y	u (?)
21	X	χ	Ψ	χ (?)
22	↓	n	↑	ⲧ (?)
23	Ω	= 40 (/ts/)	ʒ	?
24	⌓	p		
25	Ⓓ	ś		
26	⊖	i		
27	D	e		
28	⊽	ý (/ɥ/)		
29, 30	▽ ⊽	k		
31	⌃	δ (/d/)		
32	m	ú (/w/)		
33, 34	⧖ ⧖	γ		
35, 36	ⲭ ⲥ	ζ		
37	⚒	?		
38	Ⲏ	í (/j/)		
39	ⲣ	?		
40	↑	ⲧ (/ts/)		
41	ⲩ	= 5 (/y/)		
42	ϭ	ŕ		
43,44,45	ν ⌃ ϟ	β (/b/)		
46	μ	?		

Italy

With the exception of the Messapic alphabet, written from left to right and based on a Greek (Lakonian) model from Taranto, all other early Italian alphabets

Table 6 The Italic alphabets

	Etruscan	*Latin*	*Venetic*	*Oscan*	*Umbrian*	*Messapic*
/a/	A A	A A	N A	N A	A	A A
/b/	B	B		B	B	B
/k/	>	C	>	> /g/		Γ /g/
/d/	D	D		Я Я		D Δ
/e/	∃	E	∃	∃	∃	E
/w/	∃	F /f/	∃	⅃	⅃	F
/ts/	I ‡	(I) G /g/	‡ /d/	I	‡	I /dz/
/h/	B B	B H	B	B	⦸	B H
/tʰ/	⊕ ⊙		⊙		⊙	⊕ ⊙
/i/	I	I	I	I	I	I
/k/	K	K	K	K	K	K
/l/	⅃	L	⅃	⅃	⅃	Λ
/m/	M M	M M	M M	M	M	M M
/n/	M N	M N	M N	N	N	M N
/s/	⊞					
/o/	O	O	◊			O
/p/	⅂ ⅂	⅂ ⅂ P	⅂ ⅂	⅂	⅂	Γ
/ʃ/	M ⋈ /s/, /ʃ/		M ⋈		M	
/k/	Q	Q Q Q				Q
/r/	⅃ ⅃ D	P R	⅃	⅃	D	R P
/s/	⅃ ⅃ /ʃ/, /s/	S S	⅃ ⅃	⅃	⅃ ⅃	S ⅃
/t/	T T	T	T X	T	T	T T
/u/	Y V	Y V	V	V	V	
/ks/	X /s/	X				X +
/pʰ/	φ Φ		Φ /b/			
/kʰ/	Ψ Ψ		Ψ /g/			Ψ ↑
/f/	8 8	(F)	(B ∃)	8	8	
<í>				·H		
<ú>				V		
<ř>					⅃	
<ç>					d	
/tʃ/ ?						Ψ

(see Table 6) are derived from the Etruscan, which was in turn adapted from an Euboian Greek model (through the Euboian/Chalkidian colony at Kyme).

Etruscan had no voiced stops, just voiceless and aspirated ones. The letters /b/ and /d/ were retained in abecedaria, but not used for writing Etruscan. The letter > came to be used to write the front allophones of /k/, just as Ϙ, following the Greek model, was used to write the back allophones of /k/. Since Etruscan also lacked the vowel /o/ (likewise retained only in the abecedaria), this resulted in the spellings KA, CE, CI, QU, which are also found in early Latin (which added CO, and later settled on CA instead of KA).

Etruscan had the fricatives /f/, /ts/, /s/, /ʃ/, and /h/ (/x/). The first was written as <wh>, 𐌅𐌗 later with a special sign 𐌆 or 𐌇 which Etruscan, remarkably, shares with Lydian. For voiceless /ts/, Greek 𐌶 was used. To distinguish the two sibilants /s/ and /ʃ/, the letters sígma and sán (rarely kseî) were used, as inherited from the Euboian abecedaria. Southern Etruscan used 𐌢 for /ʃ/, 𐌣 for /s/; Northern Etruscan adopted the opposite convention.

The Oscan script shows its Etruscan roots by being written right to left, having no O (the sign 𐌥 <ú>, a modified /u/, is used instead), the sound-value /ts/ for 𐌶, and /f/ written 8. Besides 𐌥, Oscan also uses 𐌹·(𐌷) or ·𐌹 (𐌻) <í> to denote the closed vowel /e/ (besides open /ɛ/ written 𐌴 𐌺).

Umbrian, known principally from a single inscription, the Iguvine tables, is similar to Oscan. It is written right to left, has no O (V or sometimes 𐌰 is written instead). 𐌶 (Z) and 8 are pronounced as in Oscan (and Etruscan). Additionally, Umbrian does not use the letters C and D (although the symbol 𐌿 ř, from etymological */d/, possibly derives from D). Umbrian also writes the shibilant /ʃ/ as 𐌢, like (Southern) Etruscan. Besides 𐌿 ř, Umbrian also has the additional letter 𐌼 ç (etymologically from palatalized */k/).

Other scripts from Central and Southern Italy (Northern and Southern Picene, Middle Adriatic) largely follow the Oscan and Umbrian model, with some minor graphic variations (e.g., the dotted forms 𐌰 = A, · = O, 𐌹 = T, and : = 𐌇, and the variants 𐌥 ú, 𐌹 í).

The Northern scripts (Venetic, Lepontic, Gallic, and Rhaetic) also show Etruscan influence: they are mostly written right to left, lack B and D, use C for /k/ and 𐌢 for /ʃ/. The vowel O is present, however. Venetic uses WH to denote /f/, and the voiced stops /b/, /d/, and /g/ are written 𐌑 ⟨p^h⟩, 𐌶 ⟨z⟩, 𐌺 ⟨k^h⟩. This Northern Etruscan alphabet spread beyond the Alps, and became one of the influences on the Germanic *futhark* (*see* **Runes**).

The Latin (Roman) alphabet shows Etruscan influence in its use of C for /k/, and in the early spelling FH for /f/ (this has in fact become unattested, with the exposure of the Praenestine fibula as a fake). Early inscriptions were written right to left, but Latin soon standardized on left to right directionality. The letters B, D, and O were recovered with their Greek values from the Etruscan abecedaria, but the phoneme /g/ was not distinguished from C /k/ until 234 B.C.E., when the modified form G was adopted to denote the voiced stop. This new letter took the place of Z (/ts/) in the abecedarium, for which the Latin language did not have much use. A further Roman innovation was the simplification of the digraph FH /f/ to F, which meant that the vowel /u/ and the semivowel /w/ both came to be written V (in itself an arrangement no different than the writing I for both vowel /i/ and semivowel /j/, as inherited from Etruscan and, ultimately, Greek).

The letters Y and Z were introduced in the early Imperial period, to transcribe the sounds /y/ and /zd/ (or /z/) in Greek borrowings. The Emperor Claudius further introduced the signs ↃΨ /ps/, Ⅎ /w/ or /v/, and ├ for a vowel intermediate between /i/ and /u/ (*maximus* ~ *maxumus*), perhaps simply /ə/, but these were quickly abandoned after his death.

The names of the letters did not make the transition from Greece to Italy. We do not know what the Etruscans called their letters, but it seems likely that the Roman naming system was taken over from them. This system makes a distinction between letters that cannot be pronounced in isolation (the stops) and the other letters. The stops are named by adding the vowel /e/ to the consonant (BE, CE, DE, GE, PE, TE), except allophonic KA and QU, which add the vowel with which they were always associated in Etruscan usage. Vowels are named after themselves (A, E, I, O, U), while sonorants and fricatives originally were too (/ff/, /ll/, /mm/, /nn/, /rr/, /ss/, /kss/), as witnessed by the fact that the early Roman letter names, being asyllabic, could not be mentioned in poetry. Later, /e/ was preposed, and sometimes /e/ appended, resulting in the names ef(fe), el(le), em(me), en(ne), er(re), es(se), ex(e), the latter later also pronounced /iks/. Only /h/ could not be pronounced in isolation (/hh/ was impossible in Latin, unlike perhaps in Etruscan, where the sound may have been /x/ or /χ/), so it acquired the name /ha/ (and later *hac* to distinguish it from the vowel /a/, after the loss of Latin /h/). The Greek letters Y and Z were borrowed with their Greek names as ypsilon (or *i graeca*) and *zeta* (or *zet*). (For the further development of the Roman script, *see* **Latin**.)

See also: Aegean Scripts; Greek, Ancient; Latin; Paleography, Greek and Latin; Runes; Ugaritic.

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Europe as a Linguistic Area

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Historical Overview

Areal linguistics of Europe is currently experiencing a period of intensive empirical research and methodological discussion, as the impressive series of eight volumes resulting from the EUROTYP project (Bossong and Comrie, 1998–2003) and other publications either directly (Bernini and Ramat, 1992) or indirectly (Mayerthaler *et al*., 1993) related to it amply document. Among their early predecessors in the 19th century, we find the German Indo-Europeanists Schleicher (1850) and Pott (1868; 1887), whose interest in the linguistics of Europe, however, was not primarily guided by purely geolinguistic hypotheses but rather by the prominence given to questions of language genealogy induced by the *Zeitgeist* of their epoch. Therefore, their studies highlighted diversity rather than convergence – an attitude that continued to dominate well into the 1960s among scholars studying the European linguistic landscape. In the mid-20th century, Lewy ([1942] 1964), most probably inspired by the 'discovery' of the Balkan *Sprachbund* by Sandfeld (1930) and the large phonological areas proposed by prominent members of the Prague Linguistic Circle in the 1930s (Jakobson, [1931] 1971), looked at the areal makeup of Europe, mostly in the realm of morphology and morphosyntax. Lewy's fundamental ideas are also at the heart of the contributions by Becker (1948), Wagner (1959; 1964) and Décsy ([1973] 2000), who, in a manner of speaking, are the representatives of a still somewhat speculative and impressionistic approach with strong affinities to *Völkerpsychologie*, the formerly widespread branch of cultural anthropology that, anticipating Whorf ([1941] 1956) in a way, postulated a high degree of cognitive relativism supposedly determined by and

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identifiable on the basis of linguistic structure. Becker (1948) turned his attention to the overall convergence of European languages, while Décsy ([1973] 2000) tried to combine the identification of distinct subareas (= diversity) with the deduction of pan-Europeanisms (= convergence), cf. below.

The three booklets by Haarmann (1976a; 1976b; 1977) mark the transition from heavy speculation to a more rigorous methodology mostly rooted in quantitative typology, whereas Bechert ([1981] 1998), evidently impressed by the progress areal linguistics had been making in the description of the linguistic geography of regions outside of Europe, instigated an entire research program for the investigation of Europe as a linguistic area, thus preparing the ground for EUROTYP (König and Haspelmath 1999). More recently, a new approach, meant as a kind of transnational philology, has been developing. It goes by the name of *Eurolinguistik,* and, apart from the clearly cultural–political mission the major representatives have formulated, adopts a pan-European vantage point and attempts to identify those linguistic phenomena that attest to a kind of common Europeanness of the languages and speech communities involved. A recent example is Hinrichs's (2004) collection of articles that address the issue of whether the languages of Europe are currently shifting from the synthetic morphological type to the analytic type. For other linguistic endeavors with a continent-wide orientation, the reader is referred to the survey in Ureland (2004).

There is thus, an abundance of studies dedicated to the description and evaluation of the geolinguistic situation in Europe. Indeed, these studies all contribute to our knowledge of the areal linguistics of the continent. However, they stem from a variety of schools of thought with at times widely diverging theoretical axioms. This diversity on the theoretical side, of course, has methodological consequences that, in turn, also determine which picture of areality results from the interpretation of the empirical facts.

Approaches

In addition to the commented inventories of European languages without explicit or dominant areal-linguistic goals (Nocentini, 2002; Banfi and Grandi, 2003), there are several approaches to the languages of Europe that all have been adopted at least once in the history of areal linguistics of Europe. The egalitarian approach, the segregating approach, and the center vs. periphery approach are each discussed separately, with these terms being coined here as handy labels for the present occasion. Before we proceed to this survey, some remarks of a methodological nature are in order that affect not just European areal linguistics specifically but areal linguistics in general (including subareas, etc.). For a more detailed discussion of these and similar problems, see the contributions in Matras *et al.* (2005).

With a view to establishing whether or not the distribution of linguistic phenomena over languages has or needs an areal explanation, it is absolutely necessary to clarify in advance a number of difficult issues. First of all, one has to start from somewhere, that is, one has to decide whether the area-to-be has a geographic, political, historical, cultural, or other foundation. Talking about Europe as a linguistic area presupposes an idea of some kind of what is meant by 'Europe.' If the starting point is geography, problems arise, as Europe is notoriously difficult when it comes to determining, for instance, where it ends and Asia begins and vice versa. A frequent victim of these uncertainties about the borders separating the two continents is the Caucasian region, which is often totally or partially (= Trans-Caucasus) ignored (Décsy, [1973] 2000), whereas languages such as Georgian, (Eastern) Armenian, Azeri (South Azerbaijani), and so on are classified as 'European' in other publications (Siewierska, 1998). A perhaps rhetorical question: If the Caucasus and/or Ural mountain ranges are considered topographic obstacles that supposedly render communication across the line difficult, why should this be different in the case of the Alps? As a matter of fact, individual researchers arbitrarily stipulate certain relatively time-stable landmarks as outer boundaries of the continent, even if one and the same language is spoken on both sides of the landmark. One example is the Bosporus, which cuts the Turkish territory into two parts of very different size, the smaller one belonging to Europe, while the larger one forms part of Asia. Does it make sense at all for areal linguistics to follow the lead of geography, especially if the solutions of the latter are inconclusive or variable? These varying solutions do not only have implications for the sample size but also for the general inventory of possible structural properties of European languages and the quantity and quality of potential subareas.

Similarly, taking political boundaries as a yardstick creates more problems than it solves, although it must be acknowledged that they may become relatively strong secondary factors in the reshaping of linguistic boundaries, especially dialect boundaries (Auer, 2004). Since state boundaries do not automatically map onto topographic landmarks of the above-mentioned kind, a political definition of 'Europe' yields a result markedly different from a geographic definition. Under the premise that the notion of 'Europe' is not reduced to the present member states

of the European Union, Turkey may again serve as an example of the potential problems a policy-based definition is bound to create: If the entire territory of the Turkish state has to be taken into account, this also means that those languages that are coterritorial with Turkish, such as Kurdish, become European languages. Varieties of Kurdish, however, are also spoken in the adjacent countries of the Middle East – a fact that makes them Asian languages – and thus the political boundary induces the linguist to investigate only part of the territory occupied by a given speech community.

What is more, political boundaries are of course subject to minor and major adjustments according to the momentary balance of power among competing political entities. In other words, the supposed European linguistic area based on political boundaries is prone to metamorphosis in time, as its political basis is in no way immutable. Thus, if we go back a couple of centuries and look at the political boundaries of the *de jure* predecessor of contemporary Turkey, the Ottoman Empire, the option of including or excluding it from the study of Europe as a linguistic area in say, the 17th century, is tantamount to deciding whether to have a sizable part of the Middle East and North Africa in or out of the sample. If the answer is to exclude, then the entire Balkans and other regions and their languages have to be excluded as well because they were under Ottoman rule at that time – a solution that leaves room only for a rather small-sized Europe.

Equally unhandy is the requirement of a common cultural background of those speech communities whose languages belong to one and the same linguistic area (Décsy, [1973] 2000). One would have to define a culture area beforehand and thus work on the hypothesis that culture areas and linguistic areas are largely coextensive with each other (Lewy, [1942] 1964; Becker, 1948). Haarmann (1976b: 71–76) demonstrates that the culture-first approach rests on the erroneous assumption that cultural convergence and linguistic convergence are two sides of the same coin, which is evidently much too strong a hypothesis. Apart from the fact that it would surely cause problems to depict Europe sweepingly as culturally homogeneous, it must be stated that cultural traits and linguistic traits may diffuse over geographic boundaries, but not necessarily in a parallel fashion. On the other hand, neither of the two kinds of traits automatically covers a geographically defined region in its entirety. Thus, instead of starting from mostly elusive or controversial nonlinguistic criteria, the more promising approach to linguistic areality is the one suggested by Bechert ([1981] 1998), according to which the diffusion patterns of the individual linguistic phenomena, independent of geographic, cultural, and political assumptions, should guide the linguist. This is what generations of dialectologists have successfully been doing when they identify isoglosses and define dialects as those varieties that share a certain set of isoglosses (or isopleths, i.e., clusters of isoglosses) (van der Auwera, 1998).

Equally important for the outcome of one's research is the status of the sample languages. The exclusive comparison of written varieties of normative standard languages will inevitably yield results different than an approach that takes nonstandard varieties (regional languages, dialects, etc.) into account (Haarmann, 1986). Recent research emphasizes the fact that we need to pay more attention to substandard varieties in order to better understand – among other things – the areality of linguistic phenomena (Kortmann, 2004). With these provisos in mind, we are now in a position to tackle the issue of the coexistence of various approaches.

The Egalitarian Approach

The egalitarian approach presupposes that all languages that qualify as European share certain features and thus display a sufficient degree of similarity, such that the entire geographic space occupied by these languages can be considered a linguistic area. Therefore, this approach adopts *per se* a continent-wide perspective. The most radical version of the egalitarian approach can be found in Becker (1948), who treats the languages of Europe as a solid homogeneous block. The evidence for this is, however, rather poor and consists mainly of idiomatic or phraseological parallels with a more or less obvious origin in Christian religious discourse practices. Décsy ([1973] 2000) is slightly more cautious, as he also recognizes that Europe is fragmented into several subareas and thus that there is a potentially rather high degree of heterogeneity of the continent. This acknowledged internal diversity notwithstanding, Décsy ([1973] 2000) searches for pan-European commonalities that he terms 'Europemes.' Among these Europemes, we encounter, for instance, a kind of common core phonological system with five vowels (= /a/, /e/, /o/, /i/, /u/) and 10 consonants (/p/, /t/, /k/, /s/, /v/, /m/, /n/, /l/, /r/, /j/) that are said to be present in each and every phonological system in Europe – a somewhat dubious assumption. For reasons of space, the tenability of Décsy's hypotheses is not reviewed here (but see Stolz, 2002). Since the identification of full-blown Europemes (in the sense of exceptionless substantial areal traits) on all linguistic levels is, for various reasons, next to impossible, Décsy ([1973] 2000: 341) resorts to a solution reminiscent of Lewy ([1942] 1964: 103–108) and Becker (1948) when he says:

> [t]he genuine resemblance [of the languages of Europe] lies however in the way of thinking [...]. [T]he great majority of Europeans hold the same mind-set, which arose from a Graeco–Latin cultural tradition in a two-thousand year development, connecting the regions between Iceland and the Urals, between the North Cape and Palermo, between Dublin and Istanbul to a unity in historical proportion.

This is equivalent to a declaration of defeat in linguistic terms because it admits that one cannot find sufficient tangible proof of a pan-European linguistic structure.

Haarmann (1976a: 105–106) adopts the notion of Europeme but defines it more rigorously in analogy to the well-established Greenbergian probabilistic universals. Haarmann (1976a: 107–108) goes on to sketch the methodological and empirical requirements necessary for a wholesale comparison of the languages of Europe. On a still provisional basis of selected aspects of 65 sample languages excluding the Caucasian region (the ultimate goal being the large-scale comparison of entire grammatical systems), Haarmann (1976a: 108–116) puts forward 16 Europemes for which he feels to have sufficient evidence (the following Europemes implicitly contain the common introductory phrase 'In all European languages,' or a suitable variation thereof; where the Europemes come in the shape of an implication, it is always meant to be unilateral):

- Europeme 1: The number of simple phonemes ranges between 10 and 110.
- Europeme 2: Consonants outnumber vowels.
- Europeme 3: Only one-third of the potential phonotactic combinations is actually made use of.
- Europeme 4: The basic syllable structure is (C)V(C)(C).
- Europeme 5: The basic morphotactic structure is

  [radical](-[derivation]) (-[inflection])

- Europeme 6: Singular and plural are distinguished formally.
- Europeme 7: Nouns and verbs are distinguished formally.
- Europeme 8: Present and past tense are distinguished formally.
- Europeme 9: Morphological case distinctions range from zero to 30.
- Europeme 10: Indicative, imperative, and conditional are distinguished formally.
- Europeme 11: Multifunctional derivational affixes are ubiquitous and outnumber monofunctional ones.
- Europeme 12: Synthetic and analytic encoding strategies are compatible with each other.
- Europeme 13: Changes from synthetic to analytic structures do not necessarily embrace the whole grammatical system.
- Europeme 14: The order S > O is basic (V may occupy various positions).
- Europeme 15: VSO languages employ the category of verbal nouns.
- Europeme 16: Intonation contours in questions are different from the ones used in declarative sentences.

Some of the above generalizations are almost trivial because they meet universal expectations. Others are not particularly distinctive, and still others remain somewhat vague as they circumscribe the range of variation between a minimum and a maximum number of entities. Already Europeme 1 is problematic, as the upper limit is imposed by Kildin Saami, with whose large phoneme inventory of over 100 none of the other European languages can compete (there is a gap of over 40 units between Kildin–Saami and the second best, Lithuanian). At the same time, it remains opaque which of the languages of Haarmann's sample comes close to the minimal size of phoneme inventories, as Haarmann (1976a: 113) himself states that European languages generally do not display significantly small inventories. Similarly, the rich morphological case-systems suggested by Europeme 9 boil down to Hungarian, which, according to the maximalist count, displays 28 cases and thus exceeds the paradigms of its competitors (Finnish, Basque) by about a dozen units. Instead of working with the statistical extremes, it would probably have made more sense to go by the statistical mean or any other mathematical procedure on which predictions about the expected average system can be formulated. The Europemes allowing for quantitative variation therefore can be considered to be merely observations of structural facts that cannot claim to identify a certain quality that characterizes the languages of Europe. In addition, Europeme 13 is odd in the sense that it is the only diachronic generalization in a list of otherwise strictly synchronic observations, and Europeme 15 has a genetic bias as it only applies to members of the Celtic phylum.

No matter how accurately the Europemes capture the linguistic facts, Haarmann's (1976a) approach works in such a way that the languages of his sample are automatically treated as similar in one way or another (which is a pitfall of the geography-first approach criticized by Haarmann (1976b) himself). This is for methodological reasons: The researcher focuses on the common denominators alone without specifying whether or not the findings have to be explained by diffusion. Any two languages of the

world, past and present, can be compared in order to determine what they have in common. Whether the shared properties call for a genetic, typological, areal, or other explanation, if at all, is a completely different matter. Thus, the above Europemes gain significance for areal linguistics if and only if it can be demonstrated that they result from diffusion (either way, i.e., receding or expanding) and/or that their combination is characteristic of the area under scrutiny such that it can be kept apart from other areas.

The Segregating Approach

The segregating approach starts from a different premise, according to which not all European languages resemble each other to the same extent; the degree of similarity may be significantly stronger in certain smaller subareas of the continent that, in turn, deserve the designation of distinct linguistic areas of their own. Thus, this approach favors research on individual regions, not necessarily with an orientation toward comparing the findings with those of other potential subareas. Haarmann (1976b), and to a lesser extent Décsy ([1973] 2000), are exceptions as they, in principle, combine the segregating and the egalitarian approaches.

On the basis of a sample of 18 languages, Lewy ([1942] 1964) distinguishes five subareas in Europe. The languages discussed are to be understood as representatives of larger groups forming geographic neighborhoods:

- Atlantic area (Celtic, Romance [without Rumanian (**Romanian**)], East and West Scandinavian, English)
- Central area (German, Hungarian)
- Balkan area (Albanian, Rumanian, Greek)
- Eastern area (Baltic, East Slavic, Finnish, Mari, Mordvin (Erzya))
- Arctic area (Yurak)

With the notable exception of the Balkan area, Lewy's proposals have experienced major alterations in the subsequent years. The changes are partly occasioned by the fact that the number of sample languages increased considerably from 65 in Décsy's and Haarmann's publications in the 1970s to 140 or more for EUROTYP and related projects. The more important factor, however, is the introduction on the list of items to be compared of further categories and phenomena on all linguistic levels. Presently, 12 potential subareas (often called *Sprachbünde* or the like) are discussed with varying intensity in the pertinent literature, even though most of them are still largely controversial and some – like the Littoral *Sprachbund* – are unlikely to pass the test at all. In the following list, the languages that count as members of a given subarea are the ones explicitly mentioned by the first source quoted; in the literature, different sets of languages may occur under the same heading, whereas different labels may be used for the same set of languages. This variation reflects the fact that the shape of a linguistic area is directly dependent on the quality and quantity of the features one scrutinizes (Haspelmath, 2001: 1505).

- Standard Average European (SAE) languages (= Albanian, Dutch, French, German, Italian, Portuguese, Sardinian, Spanish) (Haspelmath, 2001) including the *Charlemagne-Sprachbund* (van der Auwera, 1998: 824); cf. below.
- Viking *Bund* (Décsy, [1973] 2000)/northwest linguistic area (Wagner, 1964) (= insular and mainland North Germanic, Celtic, Saami, Finnish, Veps, and the Anglo-Saxon component in modern English)
- British (Isles) areal type (= Celtic, English) (Wagner, 1959), the relic of an erstwhile more extended area to which also Basque and Berber belonged
- Littoral *Bund* (= Basque, Dutch, Frisian, Maltese, Portuguese, Spanish) (Décsy, [1973] 2000), based on the idea that the speech communities involved represent renowned seafaring nations
- Mediterranean linguistic area (= Romance, Maltese, North African Arabic, Hebrew, Turkish, Balkan *Sprachbund*, Serbian, Croatian, Slovenian) (Ramat and Stolz, 2002)
- Rokytno *Bund* (= Bielarusian (**Belarusan**), Kashubian, Lithuanian, Polish, Ukrainian) (Décsy, [1973] 2000)
- (Circum-)Baltic super-position zone (Koptjevskaja-Tamm and Wälchli, 2001)/ Peipus *Bund* (Décsy, [1973] 2000) (= Balto–Finnic, Danish, Estonian, Latvian, Lithuanian, Low German (**Low Saxon**), Saami, Swedish)
- Karelian *Sprachbund* (Sarhimaa, 1991) (= Russian, Balto–Finnic)
- Eurasian *Sprachbund* (East Slavic, conservative Polish and Sorbian, Rumanian, Lithuanian, Altaic languages of the former Soviet Union) (Stadnik, 2002)
- Danube *Sprachbund* (= Czech, German, Hungarian, Slovak) (Skalička, 1968)
- Volga–Kama *Sprachbund* (= Bashkir, Chuvash, Kalmyk (Kalmyk-Oirat), Mari, Mordvin, Tatar, Votyak (Udmurt), Yurak (Nenets), **Komi–Zyrian**) (Wintschalek, 1993)
- Caucasian *Sprachbund* (= all Caucasian phyla) (Haarmann, 1977)

Décsy ([1973] 2000) does not tolerate a single European language to remain outside a *Bund,* and thus he postulates a number of so-called groups of languages (viz., Isolates [in the sense of 'not belonging to any other *Bund*'] and Diaspora languages) that have no areal raison d'être but are said to be based on social and/or historical criteria. Haarmann (1976b) rightly observes that this *horror vacui* of Décsy's renders the whole areal undertaking dubious since the classificatory criteria are not kept constant, which is characteristic of Décsy's handling of the problems posed by European areal linguistics (Russian, for instance, counts as an SAE language just because it happens to have more than 50 million speakers; thus, demographic criteria may oust structural ones for Décsy). Moreover, languages do not have to converge even though they happen to be neighbors. The fact that the territories of two speech communities adjoin surely facilitates convergence but does not necessarily trigger it. Irrespective of these additional methodological problems, the many and sometimes competing suggestions of subareas within and beyond Europe are indicative of a certain linguistic heterogeneity of the continent. This heterogeneity on the meso level and micro level raises the question of whether it makes sense at all to talk about Europe as a linguistic area on the macro level.

Center vs. Periphery Approach

The center vs. periphery approach is not so much a compromise between the two previous ones (which operate on the basis of predetermined areas with more or less fixed sets of member languages) as it takes a dialectology-minded stance. It assumes that individual linguistic phenomena diffuse geographically in such a way that it becomes difficult to determine clear-cut boundaries between those languages that form part of a given linguistic area and those that remain outsiders. Membership in a linguistic area is thus a matter of degree, a gradient property of the languages compared (Haspelmath, 2001). The approach is feature based with a continent-wide perspective (or more precisely, with a potentially unlimited perspective, as no boundaries are defined beforehand). This approach plays an important role in the recent discussion about the notion of SAE languages.

Haspelmath (2001: 1493–1501) presents a list of 12 properties that he classifies as major SAE features, all of which belong to the realm of morphosyntax in the widest sense of the term. In the subsequent list of features, the abbreviation 'SAE' stands for varying sets of languages that nevertheless overlap in such a way that some languages partake in (almost) every SAE-isogloss (namely French and German, the two pillars of the *Charlemagne Sprachbund*):

- presence vs. absence of definite and indefinite articles: SAE languages have both types of articles, whereas languages on the fringes of and beyond the SAE area either lack one or both.
- relative pronoun strategy in relativization: SAE languages employ relative pronouns, i.e., relativizers that contain grammatical information about the syntactic function of the relativized head in the relative clause, whereas outside the SAE area, languages opt for invariable relative particles or other strategies.
- 'have'-perfect: In SAE languages, an auxiliary with the (erstwhile) lexical meaning of 'have' serves the purpose of encoding perfect (sometimes in complementary distribution with 'be'-perfects); non-SAE languages prefer 'be'-perfects or other strategies.
- agent-like experiencers: SAE languages tend to encode experiencers as subjects and thus treat them on a par with agents, whereas languages in the European east and also in the extreme northwestern regions have a predilection for keeping agents and experiencers formally apart; this difference in semanto–syntactic behavior is, however, a matter of degree, as both agent-experiencer 'syncretism' and agent-experiencer 'differentiation' can be encountered on both sides of the dividing line.
- participial passive: SAE languages have a passive construction made up of an auxiliary and a passive participle of the lexical verb, a construction type that is absent from the languages spoken in the eastern part of the continent and in the westernmost languages.
- anticausative–prominence: Inchoative–causative alternations are expressed predominantly by anticausatives in SAE languages, whereas causatives are preferred by languages outside this area; as with agent-experiencer encoding, we are dealing with a preference for anticausatives and not with a 100% solution.
- dative external possessors: SAE languages typically have external possessors and encode them as datives, which contrasts with external possessors of the locative type found in North Germanic and with languages that lack external possessors altogether.
- negative pronouns/lack of verbal negation: SAE languages normally combine a verb unmarked for polarity with a negative indefinite pronoun, while outside this area, i.e., on the western and eastern rims of the continent, negative pronouns go along with negated verb forms.

- particle comparatives: SAE languages overwhelmingly employ particle comparatives, i.e., the standard of a comparative construction is introduced by a conjunction-like element; in other European languages, the locative strategy of marking the standard is more frequent.
- equative constructions based on the relative clause: Equally in the realm of comparison, equative constructions reveal that SAE languages resort to a kind of adverbial relative clause that contains the standard of comparison; this strategy is unknown in the languages spoken in the west, north, and east of Europe, where special equative markers or other means are employed.
- strict agreement markers: SAE languages inflect their verbs for subject person even though an overt subject NP is always copresent (= 'non-prodrop'), whereas the vast majority of European languages are of the referential-agreement type (= 'prodrop').
- intensifier-reflexive differentiation: SAE languages distinguish intensifiers (= words that mark the referent of an NP as central) from reflexives, whereas nondifferentiation of the two categories is widespread among non-SAE languages.

These findings stem from a variety of studies, the empirical basis of which differs widely because of different sample size and so forth. Some of the features have a wider distribution that embraces the bulk of the languages of Europe, whereas others are attested only in a relatively small number of languages. Some are characteristic of European languages in general and let them stand out as 'exotic' (Dahl, 1990), whereas others are preponderantly Indo-European or characterize only a subset of the languages of Europe. Independent of these differences in their distribution in space, the phenomena have one crucial element in common, viz., they all involve larger or smaller geographically contiguous areas. In other words, they do not occur sporadically on the map but cover entire regions (with the occasional isolate or secondary accumulation outside the more extended area). More often than not, the isoglosses cut across major (= macrophyla such as Indo-European and Uralic, etc.) or minor (= phyla and subphyla such as Germanic and Romance, North Germanic and West Germanic, etc.) genetic groups. This is of course indicative of a possible origin in diffusion via language contact.

The various isoglosses overlap, which allows us to identify a core area with a particularly high number of shared features, as opposed to a periphery in which languages only participate in a smaller number of isoglosses. Ideally, the following generalization holds: The further away one gets from the core, the smaller the number of shared features. In a manner of speaking, a given language may be more or less SAE according to the number of isoglosses in which it partakes. Being an SAE language is thus again a matter of degree. However, this observation cannot solve all the problems acknowledged by Haspelmath (2001: 1504–1506). Apart from the fact that the complete absence of shared features may be taken as evidence of a language's areal outsider status, it is the linguists' choice of features that has a bearing on the identification of areas. A different catalogue of properties might yield a completely different geolinguistic map of the same group of languages. Moreover, there remains a certain element of arbitrariness when it comes to deciding what the numbers of attested isoglosses tell the observer. As a matter of fact, it is up to the individual linguist to decide how many features are required for a language to be a member of the core or the periphery – and, on top of that, whether the number of shared features is in any way significant. For the solution of the latter problem, comparative studies of linguistic areas worldwide are called for.

Nevertheless, the validity of the SAE area is well documented and based on empirically solid foundations. In addition to the above major features, Haspelmath (2001: 1501–1504) mentions many further candidates for the status of SAE isogloss; however, their exact geolinguistic distribution has not been established yet. Some of these additional features provide evidence *ex negativo,* as they state the absence of a given feature in SAE languages (lack of grammatically relevant alienability correlations in adnominal possession; lack of formal inclusive–exclusive distinction on pronouns; lack of (partially) reduplicating constructions). Three of these supposedly minor features are discussed below, based on research carried out by the present author. While one may agree with Haspelmath that negative evidence has to be taken into account when it comes to identifying linguistic areas, it is necessary to also accept the methodological consequences. If the absence of certain features is characteristic of SAE languages and is thus counted as an isogloss defining a linguistic area, then the absence of typical SAE features in languages outside the SAE area may likewise be considered evidence *ex negativo* in favor of a linguistic area (especially if the features in question are in a binary nongradient relation). Thus, a strong competitor of the SAE *Sprachbund* is created as an epiphenomenon of our search for isoglosses supporting the SAE hypothesis. It would certainly be unfortunate to baptize this additional area the 'non-SAE area' (not simply because it might ultimately turn out to comprise the majority of the languages of Europe). If one wants to deny those

languages that lie outside the SAE *Sprachbund* the status of an area of their own, it is a necessity to find strong counterarguments, among which only internal heterogeneity seems to be convincing.

The center vs. periphery approach reveals certain important facts. In addition to the idea that membership in a linguistic area is a gradient property, Haspelmath's findings also suggest that one and the same language may belong to several different linguistic areas at the same time (for example, a marginal member of the SAE *Sprachbund* might be a marginal or central member of the still nameless non-SAE competitor). Given that the linguist's choice of features has a considerable influence on what a linguistic area might look like, there is at least theoretically the possibility that the prominence given to SAE languages in the extant literature does not adequately reflect the areal composition of the continent. Chances are that the members of the SAE *Sprachbund* identified so far behave differently as soon as we take other linguistic phenomena into consideration, thus relativizing the current emphasis on the SAE *Sprachbund* by showing that there are potentially other areas in Europe that could pass as serious competitors. Haspelmath (2001: 1505–1506) acknowledges these possibilities, though with certain reservations. In the next section, with a view to elaborating on these issues, a few phenomena are scrutinized that either have been ignored completely or mentioned only in passing in the recent discussion within European areal linguistics.

More Isoglosses

The evidence adduced by Haspelmath is exclusively morphosyntactic; below, there is a variety of phonological issues that also display a clear geographical distribution. For the sake of brevity, another good candidate for areality in the realm of phonology, i.e., Sandhi, cannot be discussed here (Andersen, 1985). In addition, areal phenomena in Europe are approached from the perspective of grammaticalization theory by Heine and Kuteva (2005). The phonological sketches are complemented by others that focus on morphology. The list of features is again random, apart from the fact that they are not discussed in detail in Haspelmath (2001). When reference is made to more or less central languages or 'layers' of SAE, these judgements are based on Haspelmath's (2001: 1505) cluster map meant to represent the degrees of membership in the supposed linguistic area. The following (convenience) sample comprises 51 languages of all macrophyla represented in Europe (= Indo-European, Uralic, Altaic, Caucasian, Afroasiatic [= Maltese] and the isolate Basque). For the sake of simplicity, exclusively data from standard varieties are compared (occasionally allowing for a comparison of competing standards). In the east, the dividing line between Europe and Asia is assumed to run from the Arctic Sea southward along the Ural mountains to the Caspian Sea, then westward along the southern borders of Azerbaijan, Armenia, and Georgia to the Black Sea, where it follows the Turkish state boundary to the Mediterranean; in other words, the entire Trans-Caucasus and Anatolia are treated as integral parts of Europe. For the northern, western, and southern limits of Europe, a conventional solution has been taken.

Phonology

Rounded front vowels The first feature to be scrutinized is the presence or absence of vowel phonemes with the feature triple [¬low] + [front] + [round] =/y/, /Y/, /ø/, /œ/ as in French *culture*[kyltyʀ] 'culture' and *sœur* [sœʀ] 'sister.' The areal distribution of rounded front vowels is also partly discussed in Chambers and Trudgill (1980). Eighteen languages of the sample used here have two rounded front vowels, and one rounded front vowel is attested in two further languages, leaving a solid majority of 31 languages that lack vowel phonemes of this kind. Figure 1 reveals that there are two hotbeds in Europe where rounded front vowels occur.

These hotbeds are at a considerable distance from each other and are separated by a solid block of languages that do not have these vowels on their phoneme charts. Those languages that have rounded front vowels in the east belong to the Altaic macrophylum (more precisely, to the Turkic phylum), and thus this feature most probably has a genetic explanation. In the other hotbed, however, Indo–European languages of three different phyla (Germanic, Romance, and Celtic) and Uralic languages share the feature. However, not all members of the various phyla partake in this isogloss. French and the Puter (Lower Engadine) variety of Rhaeto–Romance are the only Romance languages to display rounded front vowels; the same holds for Breton among the Celtic languages. English, however, does not follow its Germanic relatives, all of which have rounded front vowels. Likewise, Saami and Mordvin, both lacking these phonemes, do not go along with their Uralic relatives. The group of languages that make do without rounded front vowels is genetically heterogeneous, too. Note, however, that the entire Slavic and Baltic branches are immune against rounded front vowels in a manner of speaking. Nevertheless, the isogloss cuts across genetic boundaries. The languages that share the feature are geographical neighbors: Those that have rounded front vowels are

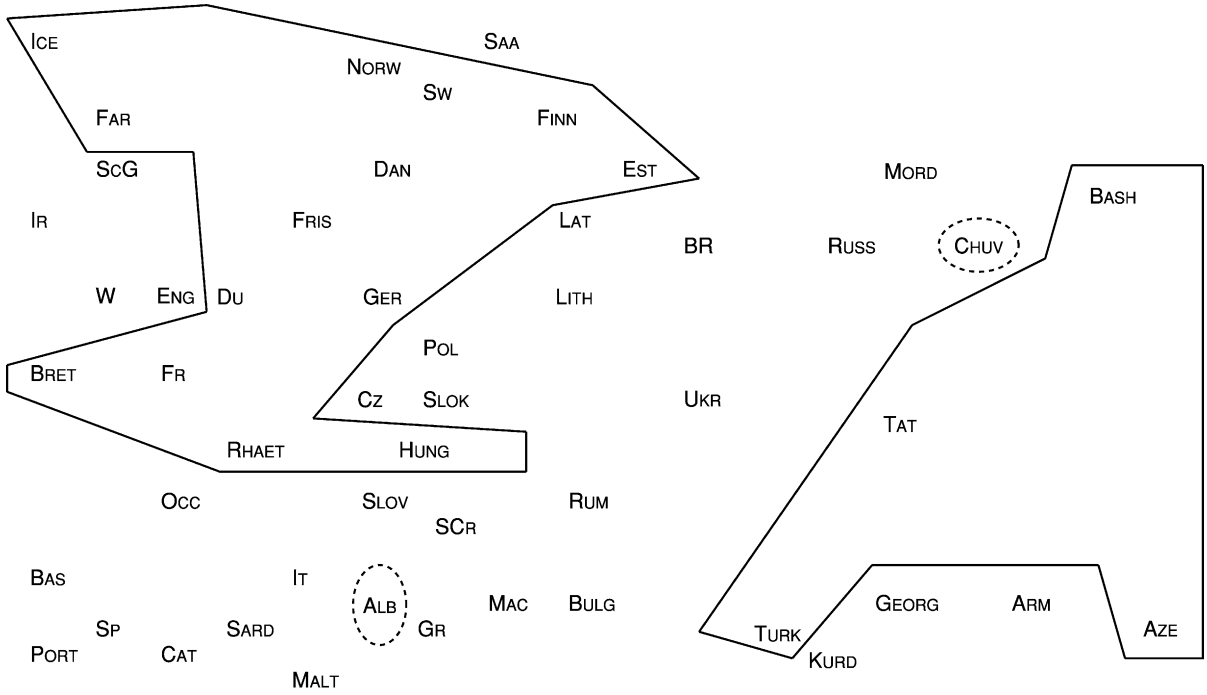

Figure 1 Rounded front vowels [solid line = both /œ/ ∼ /ø/ and /ʏ/ ∼ /y/; dotted line = only /ʏ/ ∼ /y/]. ALB = Albanian, ARM = Armenian, ART = article, AZE = Azeri, BAS = Basque, BASH = Bashkir, BR = Bielarusian, BRET = Breton, BULG = Bulgarian, CAT = Catalan, CHUV = Chuvash, CZ = Czech, DAN = Danish, DU = Dutch, ENG = English, EST = Estonian, FAR = Faroese, FINN = Finnish, FR = French, FRIS = Frisian, GEN = genitive, GEORG = Georgian, GER = German, GR = Greek, HUNG = Hungarian, ICE = Icelandic, IR = Irish, IT = Italian, KURD = Kurdish, LAT = Latvian, LITH = Lithuanian, MAC = Macedonian, MALT = Maltese, MORD = Mordvin, NORW = Norwegian, OCC = Occitan, PERF = perfective, PL = plural, POL = Polish, PORT = Portuguese, RHAET = Rhaeto–Romance, RUM = Rumanian, RUSS = Russian, SAA = Saami, SAE = Standard Average European, SARD = Sardinian, SCG = Scots–Gaelic, SCR = Serbo–Croatian, SLOK = Slovak, SLOV = Slove-Slovenian, SP = Spanish, SW = Swedish, TAT = Tatar, TURK = Turkish, UKR = Ukrainian, W = Welsh.

spoken next to each other, and those that do not employ rounded front vowels are also in a neighborhood relation among each other. We do not encounter islands of either type interspersed among languages of the opposite type. However, there are two special cases, Albanian and Chuvash, which have /y/ as a phoneme but lack mid-high rounded front vowels and thus fail to partake in the larger isoglosses. Chuvash is renowned for its at times idiosyncratic behavior, as opposed to other members of the Turkic phylum. In the present case, Chuvash seems to mark the transition from the Turkic solution with two rounded front vowel phonemes to the situation found in the surrounding non-Turkic languages (Mordvin, Russian, etc.) where this class of phonemes is lacking, i.e., the absence of /ø/ is likely to be a product of language contact between Chuvash and its genetically unrelated neighbors. The complete absence of rounded front vowels in Mordvin has perhaps a similar explanation. Still, Chuvash is located next to the hotbed of rounded front vowels in the east containing the sister languages of Chuvash. Albanian, on the other hand, is cut off from the hotbed in the west by members of the Slavic phylum that do not allow for rounded front vowels at all. In all likelihood, Albanian is the remnant of an erstwhile more extended subarea to which, on earlier stages, Greek also belonged. Similarly, English and Welsh have lost rounded front vowels in the course of their history. For Breton, French, and Rhaeto–Romance, the feature is certainly a relatively late contact-induced acquisition: The two Romance languages have copied the feature from Germanic, and Breton developed it under French pressure. It is noteworthy that the *Charlemagne Sprachbund* is again involved, while other more central SAE languages are somewhat underepresented.

Quantity This section is concerned with the distribution of phonemic length in vowels (= /V:/), as in German *Hasen* [haːzən] 'hares' vs. *hassen* [ha(s)sən] 'to hate,' and consonants (= geminates /K_iK_i/), as in Italian *sanno* [sannɔ] 'they know' vs. *sano* [sa(ˑ)nɔ] 'healthy.' Ternes (1998) has studied both phenomena in a survey of the phonology of European languages that tacitly corrects a number of hypotheses put forward by Haarmann (1976a). Owing to the fact that, in a variety of languages, quantitative differences

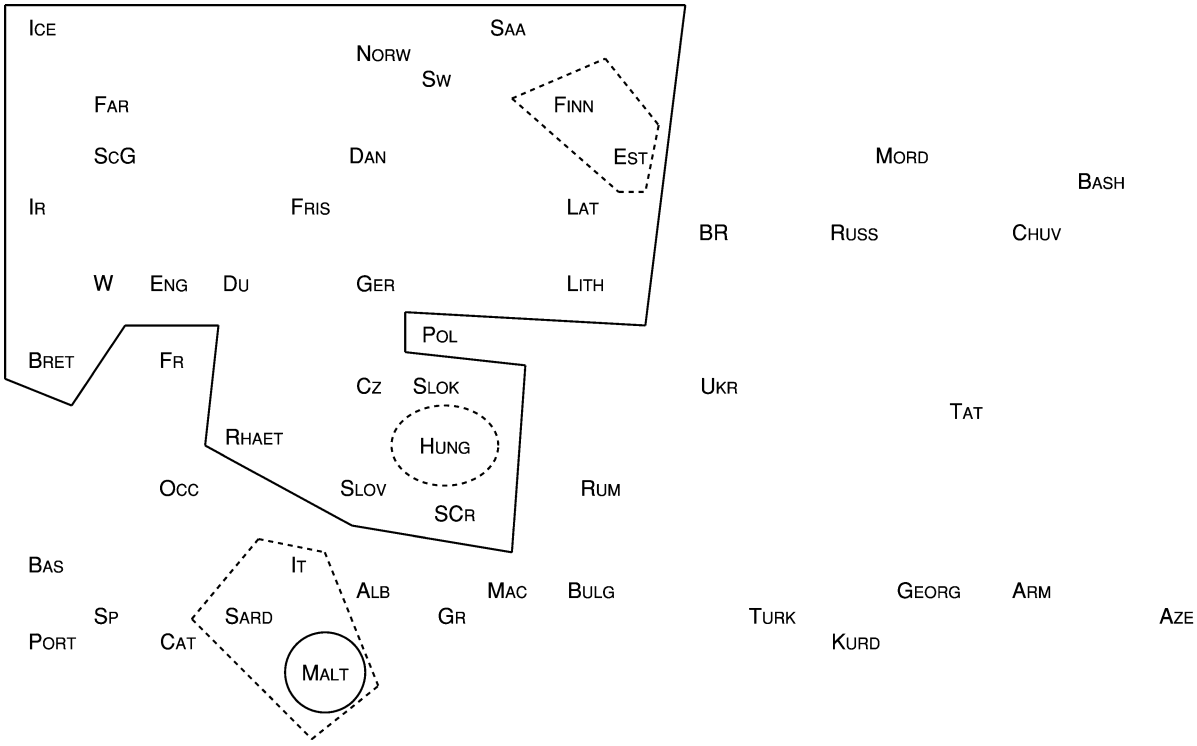

Figure 2 Quantity correlation [solid line = phonemic V:; dotted line = phonemic K:].

epiphenomenally go along with more or less significant qualitative differences and are sometimes determined by the moraic prerequisites of the canonic syllable structure of a given language, it becomes difficult to decide whether length itself is the phonemically relevant factor. This and other aspects pose serious problems *inter alia* for the analysis of English and French. In the latter language, vowel length is marginally phonemic only in careful educated speech. In order to keep the discussion within reasonable limits, things are simplified by leaving problems of vowel quality and moraic templates aside. Moreover, cases like the French one are treated as instances of absence of a vowel quantity correlation.

Figure 2 surveys the presence and absence of phonemic long quantity for both vowels and consonants in Europe. Twenty-five sample languages (= slightly less than 50%) have distinctive vowel length, whereas only six display a quantity correlation for consonants. Four of these latter five distinguish quantities for both vowels and consonants. Were it not for Italian and Sardinian, one could be tempted to formulate an implication according to which phonemic quantity of consonants implies phonemic quantity of vowels. Long consonant phonemes are clearly a minority solution.

Independent of the fact that vowel length is distinctive in almost half of the present sample languages, the languages where this feature is attested display a clear areal bias. Discounting the isolated instance of distinctive vowel length in Maltese, one immediately notices that phonemic long vowels are a matter of a large area comprising the European northwest, Scandinavia, the Baltic region, and central and part of southwest Europe. Three Indo–European phyla in their entirety partake in the isogloss: all Celtic, Germanic, and Baltic languages distinguish short vowels from long vowels. This distinction is also found in varieties of Rhaeto–Romance and some members of the South Slavic and West Slavic subphyla, all of which border the territory occupied by Germanic languages. Of the Uralic languages, those that are spoken in the vicinity of Germanic, Baltic, or Slavic languages with length distinctions for vowels have the same feature, whereas Mordvin seems to lack it. Again, the feature cuts across major and minor genetic boundaries. The same is true of the group of languages that do not allow for phonemic quantity.

The areality of the phenomena under scrutiny cannot be denied. In contradistinction to the foregoing one, where it is possible to identify waves of spread and recession, much seems to speak in favor of a slow but continuous shrinking of the area characterized by phonemic length. Given the fact that, historically, all Indo-European languages employed distinctive vowel quantity, the present situation is suggestive of a large-scale loss of the feature in the successor languages of Latin, Ancient Greek, Old Church Slavonic, and so

on. Thus, the area from which phonemic length is absent has been expanding to the detriment of the hotbed of distinctive quantities. Interestingly, the two members of the *Charlemagne Sprachbund* are this time located on different sides of the dividing line: German is an uncontroversial case of a language with phonemic vowel length, and French does not form part of the isogloss (but see above). With the exception of Dutch, vowel length distinctions are not typical of other more central SAE languages.

Morphology

Morphological case distinctions European languages come in two varieties. One group has case inflections on nouns independent of the exact size of the paradigm (Finnish *talo* {house} 'house' vs. *talo-n* {house}-{GEN} 'of a/the house'), whereas the other group does not mark case on nouns by morphological means (cf. the Welsh 'construct state' *tŷ y dyn* {house} {ART} {man} 'the man's house'). For the present purpose, neither the genitive clitic of English and the mainland Scandinavian languages nor the facultative *s*-genitive on proper nouns in Dutch and Frisian are counted as instances of bound case morphology. The present sample languages distribute over the two possible types as follows: a minority of 20 languages lack nominal case inflections, as opposed to a majority of 31 languages that employ more or less sizable inventories of morphological cases on nouns. Figure 3 captures the areal pattern.

Nominal case morphology is largely a trait of languages located in the east and in the far west of the continent. A small strip extending from Norwegian in the north via French in the middle down to Maltese in the south is characterized by absence of morphological case distinctions on nouns. Outside this area, this feature is also shared by Kurdish in the southeasternmost corner of the map and the two Balkan Slavic languages Macedonian and Bulgarian, which are surrounded by full-blown case languages. Basque is the only case-inflecting island in largely caseless surroundings. As is the situation with the previous isoglosses, phyla are cut across. There are case-inflecting Celtic languages and caseless ones; the same applies to the Germanic phylum, where German and the insular North Germanic languages stand out as representatives of the case-inflecting type, whereas the remaining Germanic languages have lost the ability to inflect nouns for case. Rumanian is the only Romance language with nominal case-inflection, while Bulgarian and Macedonian are dropouts from the Slavic phylum, as they have given up their erstwhile fully functional case system. All Uralic and Altaic languages are case-inflecting, as are the Baltic languages, Armenian, Greek, Albanian, and the bulk of the Slavic phylum. Maltese is the only non-Indo-European language without nominal case inflection. The primary stronghold of case inflection is clearly the eastern part of the continent. In the northwest the feature seems to be on the decline in

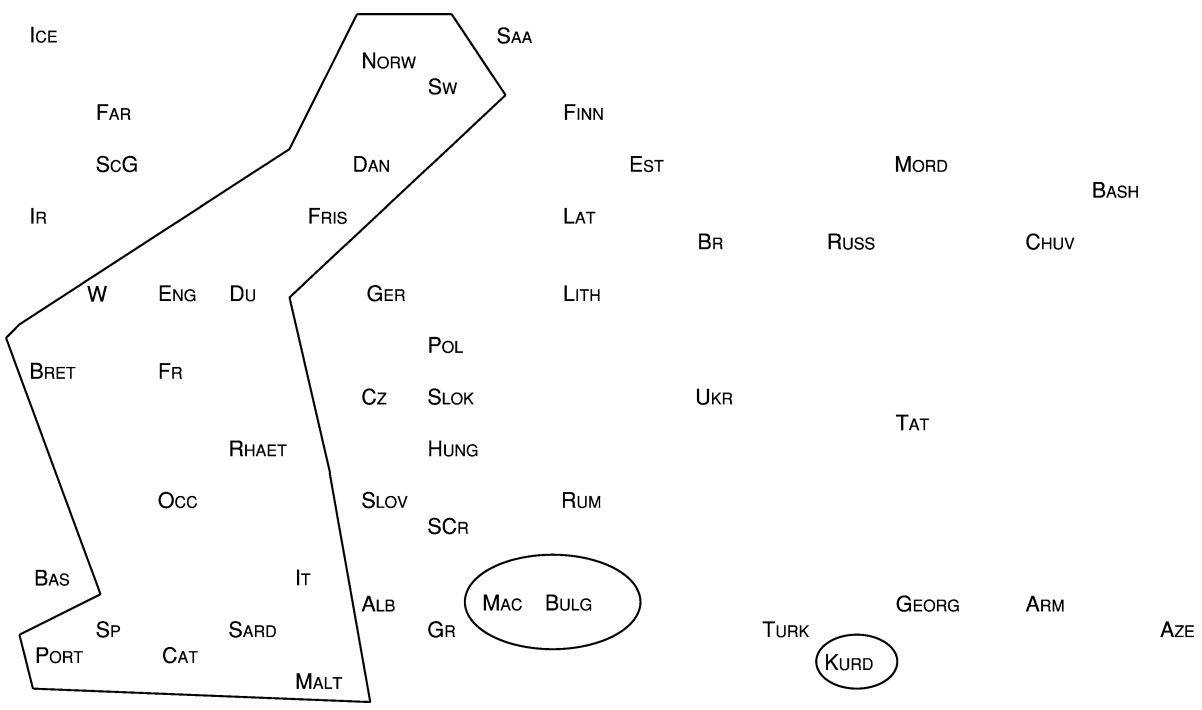

Figure 3 Morphological case on nouns [solid line = languages without case inflection].

the Celtic languages, less so in Faroese and probably not yet in Icelandic.

In their older stages, the Indo-European languages (Old Irish, Old English, Latin, Old Church Slavonic, Old Persian, etc.) were all endowed with a nominal case paradigm that in its most conservative shape resembled closely the one of present-day Lithuanian. Therefore, the absence of nominal cases in many Romance, Celtic, Germanic, and some Slavic languages (and Kurdish, for that matter) is an innovation. Much the same can be said of Maltese in comparison to Classical Arabic. In the languages that currently inflect their nouns for case, this feature can be classified as a retention, a conservatism. Old French is reported to have employed a minimal bipartite case system during the earliest stages of documentation, while the nominal case system had already disintegrated in most of its sister languages outside the Balkans. The chronology of the disintegration of nominal case systems is suggestive of a spread of caselessness from the south northward, eventually cutting the formerly continuous area of case languages into two subareas. Presently, the isogloss separates the two members of the *Charlemagne Sprachbund* that again happen to be situated on different sides of the line. The absence of case inflection, however, unites many of the more central SAE languages (Dutch, Spanish, Portuguese, Sardinian, Italian).

Comitative-instrumental syncretism The next feature also belongs to the realm of case distinctions, although it is not restricted to bound morphology. The focus is on the grammaticalized expressions of comitative and instrumental relations independent of the morpheme status of their markers. The presentation is based on the findings of a long-term crosslinguistic research on the two categories, some of which are discussed in Stolz *et al.* (2003), Haspelmath (2001), and Heine and Kuteva (2005). Languages may belong to one of three classes: They use two distinct markers to encode comitative and instrumental separately (= asyncretic); they do not distinguish formally between the two categories (= syncretic); or they employ two markers, of which one exclusively encodes either comitative or instrumental and the other one covers both functions (= mixed). Europe stands out from the rest of the world, as it is the only continent where the syncretic type is statistically the strongest (everywhere else the asyncretic type dominates by far). Thirty-five of the European sample languages (= 69%) are syncretic, 11 are asyncretic, and five are mixed. Figure 4 suggests that the types are not randomly distributed over the continent but that there is a clear areal pattern.

The territory occupied by syncretic languages is divided into two subareas. The larger one covers most of the European north, west, and south. The smaller one is located in the extreme east; thus, the major homestead of the asyncretic type finds itself sandwiched between syncretic languages. What strikes the eye most is the fact that representatives of the mixed type never cluster anywhere. Where

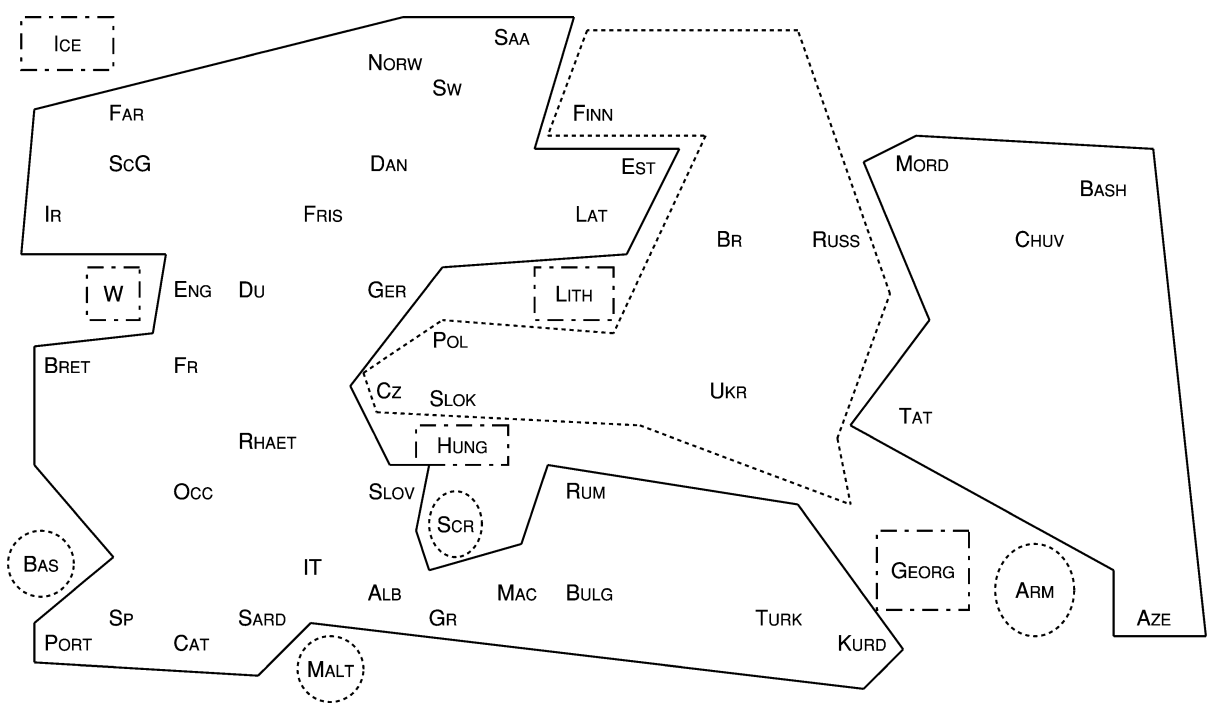

Figure 4 Comitative–instrumental syncretism [solid line = syncretic; dotted line = asyncretic; dashed/dotted line = mixed].

they occur they are situated on the margins of the syncretic territory, often trapped between syncretic and asyncretic languages. This is indicative of a transition from one major type to the other. Not surprisingly, the isoglosses do not respect genetic principles. The Uralic macrophylum contains syncretic, asyncretic, and mixed languages. Slavic, Celtic, Baltic, and Germanic languages are distributed over two different types. These differences in class membership are not random but rather are areally motivated. Those languages that fail to behave like their next of kin converge with their next-door neighbors, either fully or partially.

Diachronically, the properties of the syncretic type seem to be innovations, at least in a number of the languages involved. It can be shown that the feature spread from Germanic to the Baltic languages and Estonian in the early days of their documented history and triggered their typological change from asyncretic to syncretic via mixed – which is the stage reached by contemporary Lithuanian. Germanic and Italo–Romance can also be held responsible for the present syncretic status of Slovenian, whereas Macedonian and Bulgarian conform to the general Balkanic picture that favors the syncretic type. A similar contact-based explanation is perhaps also possible for the mixed status of Hungarian (supported by German and Rumanian influence). In the east, syncretic properties have a genetic foundation, as all members of the Altaic phylum display the feature. Mordvin is again likely to have been influenced by the neighboring Turkic languages. Asyncretic languages are thus on the retreat.

Syncretism of comitative and instrumental is indeed a trait shared not only by the two members of the Charlemagne Sprachbund but also by those languages that belong to the more central 'layers' of SAE, including a variety of languages that do not partake regularly in isoglosses of the SAE languages.

Cardinal-based derivation of ordinals In Stolz and Veselinova (forthcoming), the relationship between ordinal numerals and cardinal numerals in terms of derivation is studied in a crosslinguistic perspective. There are various types, the major ones being:

1. no formal distinction (= unattested in Europe)
2. ordinals are regularly derived from cardinals, as in Tatar *běr* 'one' → *běr-ěncě* 'first,' *ikě* 'two' → *ikě-ncě* 'second,' etc.
3. FIRST is not based on ONE, all other ordinals follow pattern (b), as in Georgian *erti* 'one' vs. *p'irveli* 'first' as opposed to *ori* 'two' → *me-or-e* 'second,' *sami* 'three' → *me-sam-e* 'third,' etc.
4. FIRST and SECOND are not derived from ONE and TWO, respectively, all other ordinals follow pattern (b), cf. Swedish *en* 'one' vs. *första* 'first,' *två* 'two' vs. *andra* 'second' as opposed to *tre* 'three' → *tre-dja* 'third', *fyra* 'four' → *fjär-de* 'fourth,' etc.

On the basis of the data in Stolz (2001), Haspelmath (2001) considers the suppletive second ordinal, i.e., type (d) a potential SAE feature. Figure 5 reveals that this type is indeed the majority solution for the sample languages: 36 languages belong to type (d), 10 to type (c), and the remaining five are type (b) languages.

Type (d) occupies the large middle section on the map stretching from Saami in the north via Czech down to Sardinian in the south. The easternmost representative of this type is Mordvin, which, for once, does not show affinities to its Turkic neighbors. Irish marks the westernmost outpost of type (d) languages. The only region of Europe from which type (d) is completely missing is the southeast, where type (b) and type (c) dominate. Type (b) has a strong genetic foundation, as it is attested in all Altaic languages of the sample. The distribution of type (c) is less coherent because there are isolates and small subareas on the margins of the territories of the other two types. The largest of these comprises three West Germanic languages and Scots–Gaelic. Owing to the fact that other Celtic and Germanic languages are bona fide (d) type languages, it is clear that the isoglosses follow the familiar pattern or running criss-cross over genetic boundaries. Rumanian is the only representative of (c) type in the otherwise predominantly (d) type–oriented Romance phylum. Indo-European and non-Indo-European languages may form subareas together, as is the case for the (c) type languages Albanian and Maltese in the south and Armenian and Georgian in the southeast. The entire Uralic macrophylum partakes in the (d) type isogloss, together with the bulk of the Indo-European languages.

A word of caution is in order: There are areas of transition between the major and the minor types. Depending upon which variety of Frisian and Kurdish one chooses, the isoglosses may change direction: West Frisian follows Dutch and German (= [c] type), whereas North Frisian goes along with neighboring Danish (= [d] type). Zazaki Kurdish (Dimli) behaves like Georgian and Armenian (= [c] type), whereas other varieties of Kurdish join Turkish in the (d) type. In addition, French, with its contrast of *second* vs. *deuxième* 'second,' combines properties of both (c) type and (d) type and thus shares features not only with the bulk of typical SAE-languages that tend to belong to the (d) type but also with its partner in the *Charlemagne Sprachbund*, the (c) type language German. Turkish, Azeri, and Kurdish also allow for

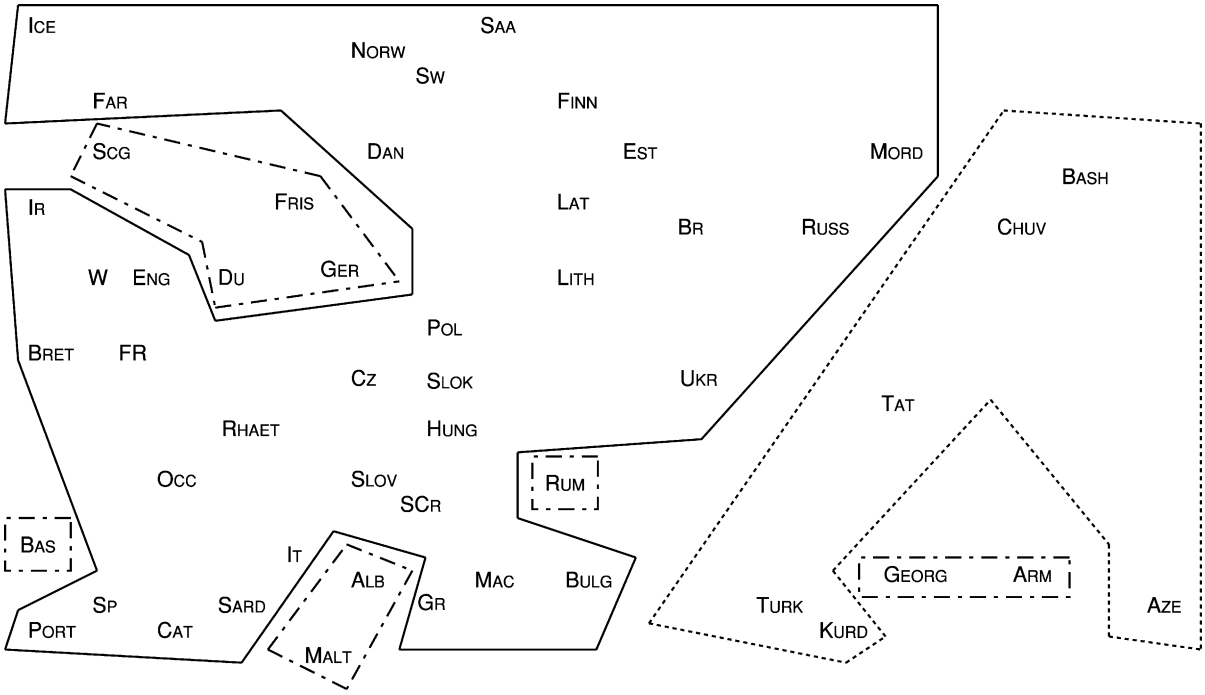

Figure 5 Suppletive ordinals [dotted line = type (b); dashed/dotted line = type (c); solid line = type (d)].

two allmorphs of FIRST, one of that is suppletive (Turkish *bir* 'one' → *biri-nci* 'first' vs. *ilk* 'first'). These cases add to the areality of the phenomena under scrutiny, as they clearly demonstrate that neighborhood relations are crucial. The diachrony of the geolinguistic distribution patterns of the suppletive second ordinal still needs to be investigated more thoroughly. The most one can say for now is that German, Dutch, and Rumanian seem to have lost their erstwhile (d) type properties in the course of their history (for Rumanian, (d) type features may be found in certain stylistically marked registers).

Total reduplication Haspelmath (2001: 1503) observes that reduplication is practically unknown in contemporary European languages. This observation is correct as far as partial reduplication goes. The picture changes dramatically when we look at total reduplication, as studied in Stolz (2003). Total reduplication is firmly established as a morphological means in 25 of the sample languages, such as Maltese *ġew tnejn tnejn* {come.PERF.3PL} {two} {two} 'they came in pairs of two,' whereas the other 26 languages do not employ total reduplication in any systematic way. For a number of languages, the situation is difficult to assess. Figure 6 identifies the areal hotbeds of these types.

In Ibero–Romance languages, total reduplication is largely discouraged by normative grammar, although some patterns recur in the written register. This suggests that we are dealing again with an areal phenomenon. Those languages that disfavor total reduplication are located in the center of the map, almost completely surrounded by languages that have a predilection for total reduplication. Total reduplication is especially strong in the south and east as well as in the western rim of the continent.

As to genetic affiliation, a high percentage of languages where total reduplication is systematically employed belong to non-Indo-European macrophyla (12 out of 25 = 48% of the type). No non-Indo-European language is a bona fide case of a non-reduplicating language. Romance and Slavic phyla are divided into two, each with a substantial minority of the languages allowing for total reduplication. The entire Celtic phylum is reduplicating, whereas total reduplication is foreign to the Baltic and the Germanic phyla. Irrespective of these genetic preferences, Figure 6 shows that neighborhood relations are again decisive: Those Romance and Slavic languages that have total reduplication share this feature with their unrelated or only distantly related neighbors. In terms of the SAE *Sprachbund*, the southern half of it is cut off from the rest by this isogloss because Italian, Sardinian, and Albanian are reduplicating but French, German, and Dutch are not.

The isogloss of total reduplication continues far beyond the limits of Europe into Siberia, the Middle East, India and South Asia, and Africa. Those languages that do not participate in this isogloss, therefore, represent the marked case. As yet, nothing definitive can be said about the history of the

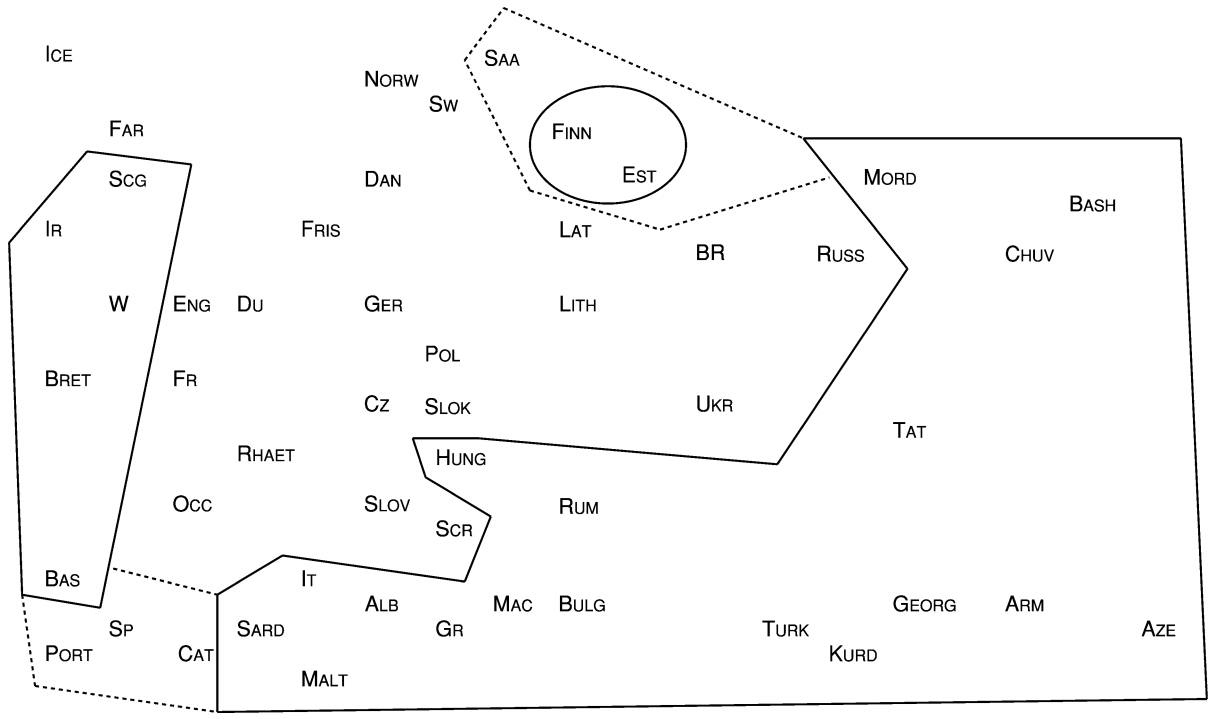

Figure 6 Total reduplication [solid line = reduplicating languages; dotted line = controversial cases].

isglosses. There is evidence for diffusion of total reduplication from the Levant westward in the Mediterranean. At the same time, avoidance of total reduplication seems to spread from central Europe to the southwest. The latter processes may be supported by normative grammarians, which leaves open the question of whether total reduplication is employed by native speakers in actual discourse.

Quintessence

Summing up what Figures 1 to 6 tell us, we observe that the distribution of the phenomena is not identical for any two isoglosses – in other words, isoglosses behave like individuals. This is of course the expected outcome. The individuality of the isoglosses notwithstanding, it is nevertheless possible to map the isoglosses onto each other to produce isopleths. Figure 7 depicts the clustering of isoglosses from the perspective of Russian as a kind of check for the SAE-centered approach of earlier contributions of the areal linguistics of Europe. Note that every sample language shares at least one feature with Russian.

Superficially, this cluster map suggests that, with the necessary changes, it is also possible to paint a picture of the geolinguistics of Europe with a language in the center of attention that is not a prime candidate for the status of SAE language. However, there is a relatively strong genetic component that determines similarity relations. Russian and its east Slavic sisters and neighbors, Bielarusian and Ukranian, share all six features. The next layer, with five shared features, is also exclusively Slavic, namely the west Slavic phylum plus Serbo–Croatian. Only on the third layer does genetic diversification set in: Here we find, in addition to Slovenian, the Baltic subphylum, Armenian, Greek, all varieties of Occitan, Basque, and Mordvin. The smaller the number of shared features, the higher the genetic heterogeneity of the layer. Interestingly, the languages with the minimal number of one single shared feature, Dutch, Frisian, and Breton, are all spoken in the west at a distance from Russian. Mainland Scandinavian languages and central Europe are likewise less prone to associate with Russian in isoglosses. Nevertheless, there seems to be a somewhat stronger westward orientation of the assumed area based on Russian, as the members of the Turkic phylum in the east display unexpectedly low degrees of similarity to Russian. Discounting the fact that the very first layers (with five or six shared features) on the cluster map are clearly grounded in the Slavic phylum, it is nevertheless possible to postulate an areal structure with decreasing numbers of shared features from center to periphery. Thus, this still very superficial look at Europe from the eastern vantage point supports the idea that there is a counterpoint to SAE. This view is in line with Lewy's ([1942] 1964) observation that there is an east–west asymmetry in Europe. As Haspelmath (2001: 1505) observes, the coexisting areas collide

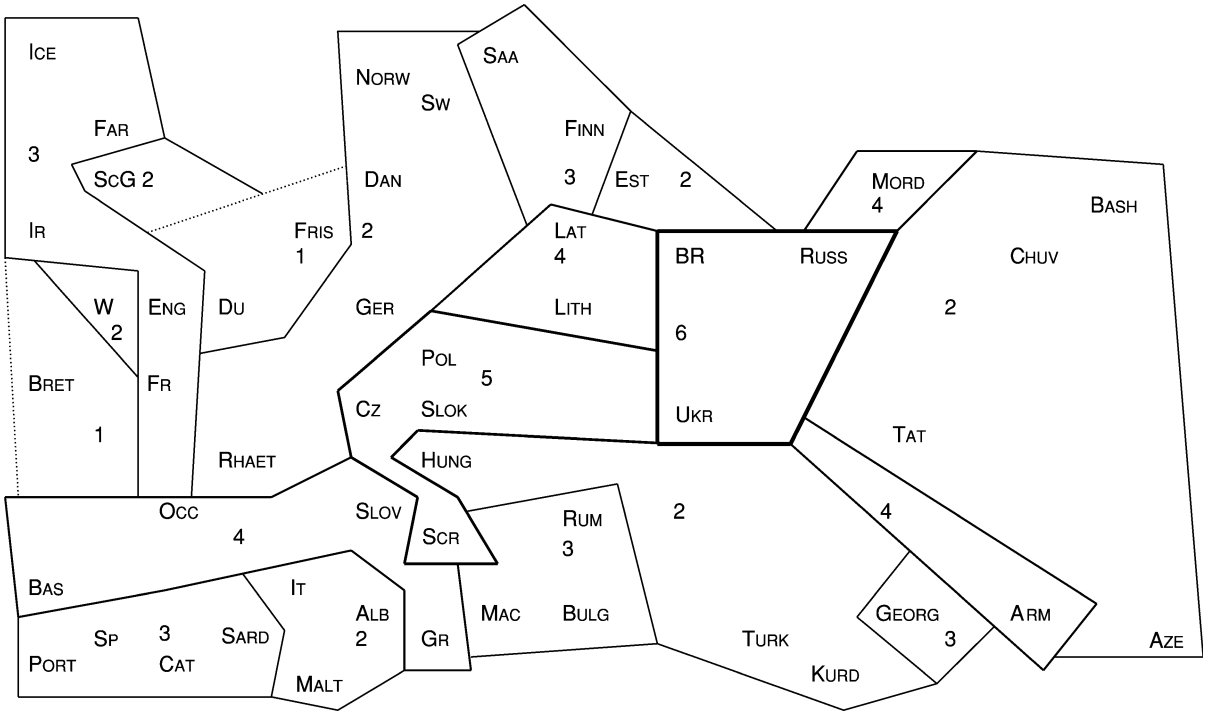

Figure 7 Cluster map.

and overlap (most probably on the Balkans) and thus contribute to the geolinguistic diversity of Europe.

Europe as a Contact-Superposition Zone

From the above we learn that one and the same language may be part of residual and expansive areas, depending on the feature under review. What the data seem to suggest is the frequent diffusion of features originating on the (south)western mainland of the continent to the north and east. With a view to determining the balance or imbalance of SAE-based innovations and non-SAE-based ones, a much more detailed in-depth study of the geolinguistics of Europe is called for.

In the absence of such a study, one can tentatively conclude that:

- Europe is not a homogeneous linguistic area on a par with, say, the Balkan *Sprachbund*.
- The areal linguistics of Europe cannot be reduced to the identification of SAE features because:
- many languages of the continent are never or hardly ever included in the relevant isoglosses;
- many important features have not yet been checked for their areal distribution within the confines of Europe;
- the languages that fail to qualify as more central SAE languages (including those that do not share a single of the features characteristic of SAE) are likely candidates for at least one non-SAE linguistic area.
- The feature/isogloss-based approach to areal linguistics is methodologically superior to others, as it is based on proper linguistic criteria without the necessity of recourse to nonlinguistic ones.
- The feature/isogloss-orientation also gives us the opportunity to look beyond the geographic boundaries of Europe in order to establish whether the languages involved form part of a much larger macro area (Kuteva, 1998).

Given that isoglosses overlap and relatively seldom come in bundles, and given too that features may originate in different places, it is probably more accurate to speak of Europe as a contact-superposition zone (Koptjevskaja-Tamm and Wälchli, 2001) in lieu of using the suggestive label *Sprachbund* or even the somewhat less restrictive term 'linguistic area.' The present distribution of features on the European map is the product of a variety of processes that happened at different epochs. Not all of the phenomena can be attributed to the time of the Great Migrations or to any one major historical event of the

distant past (Haspelmath, 1998; Haspelmath, 2001: 1506–1507). Some innovations spread at a higher speed than others, some are attractive and are copied in language contact, others fail to meet this criterion and thus never extend beyond a certain region. One can therefore agree with Haspelmath (2001: 1507) when he concludes that the distribution of different features is 'due to different historical circumstances, and the correct picture is likely to be much more complicated than we can imagine at the moment.'

With a view to coming closer to the correct picture, future investigations on the basis of a much larger sample of languages will have to integrate both evidence from substandard varieties and diachronic data.

See also: Africa as a Linguistic Area; Balkans as a Linguistic Area; Circum–Baltic Area; Contact-Induced Convergence: Typology and Areality; Ethiopia as a Linguistic Area; South Asia as a Linguistic Area; Southeast Asia as a Linguistic Area.

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Europe, Christian: Alphabets

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Writing as a Semiotic System

The alphabets of the Christian Orient that emerged from the Greek alphabet, like all writing systems, are to be conceptualized as semiotic systems – sets of interrelated signs of a special nature, forming a single integrated structure. As such, they consist of signs characterized by (a) expression, i.e., their shape, and (b) content, in this case an individual speech sound. Additionally, Saussure's notion of paradigmatics and syntagmatics should be transferred from the study of language to the study of writing. The paradigmatics of an alphabet refers to the standard order of its letters; the syntagmatics, to their sequence in a text.

To account for the origin and typology of alphabetic writing, represented by Classical Greek, one must refer to an analysis of Old Semitic (*see* **Asia, Ancient Southwest: Scripts, Epigraphic West Semitic**).

Old Semitic writing should be described as a consonantal–syllabic system of writing (rather than consonantal only, cf. Driver, 1948: 130, or syllabic only, cf. Gelb, 1963: 148ff.). The reason for this is that Old Semitic writing appears simultaneously as consonantal (paradigmatically, i.e., within the system) and as syllabic (syntagmatically, i.e., in the text). Typologically, this is a dual system, intermediate between consistently syllabic writing, i.e., syllabic both in paradigmatics and syntagmatics (e.g., Linear B, cf. **Aegean Scripts**), and alphabetic proper systems of writing (e.g., Classical Greek, cf. **Europe Alphabets, Ancient Classical**).

Origin of the Alphabetic Scripts of the Christian Orient

The Classical Greek writing system (**Table 1**) served as a prototype script, a writing model, for a group of Christian alphabets, namely Coptic, Gothic, Classical Armenian, Old Georgian, Caucasian Albanian, and Old Slavonic (as well as the Latin).

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Table 1 Greek alphabetic writing

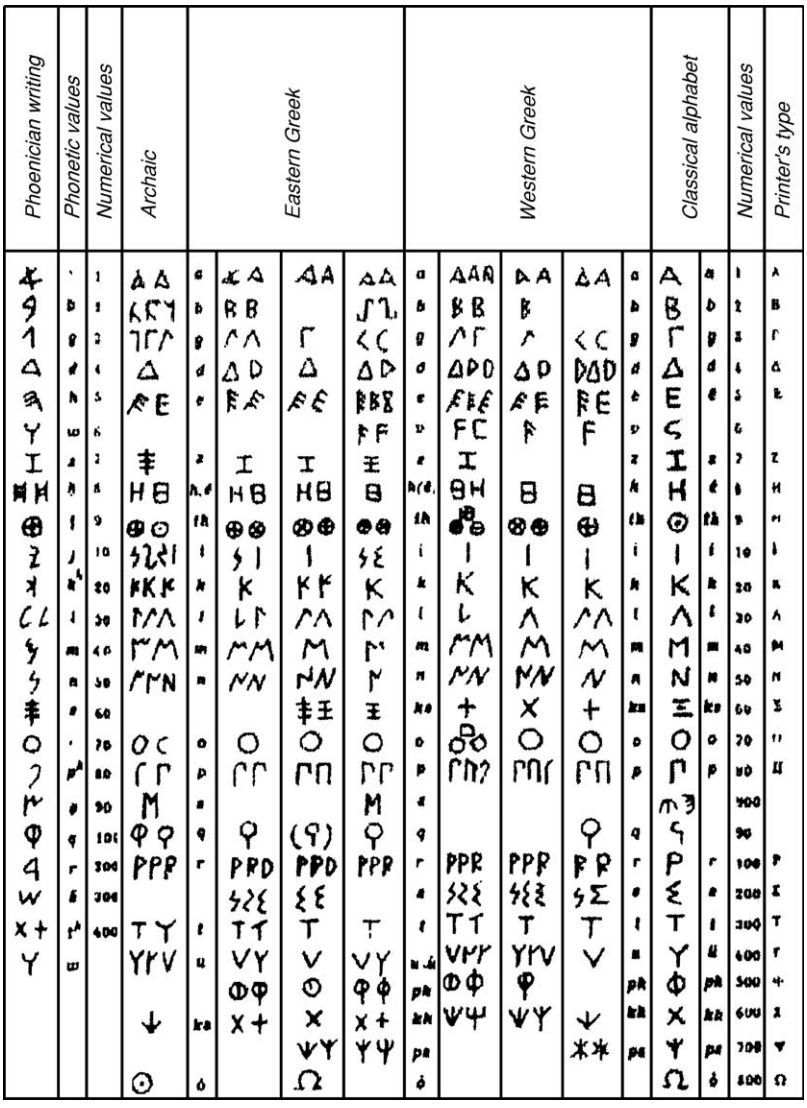

Coptic Alphabetic Writing

With the proclamation of Christianity as the national religion of Egypt, New Egyptian (Coptic) began to revive as the official state language, which since the time of Alexander the Great had been Greek. Christian culture in Egypt now began to develop on the basis of the local/national Coptic language, changing from the complex Demotic Egyptian script to a new writing system based on the Greek alphabet.

Coptic writing originated from a variant of Greek uncial writing that appeared in the first century B.C.E. The shapes of Coptic letters are essentially the same as the corresponding graphic symbols of Greek uncial writing. The earliest Coptic written documents are dated to the 2nd and 3rd centuries B.C.E.

To render corresponding Coptic sounds, 25 letters were borrowed from the Greek alphabet in the established sequence (Table 2). One of these, sixth in the sequence, is employed in Coptic only for its numerical value, reflecting the peculiarity of the Greek alphabet of a particular period when the Greek letter *stígma*, stemming from the archaic graphic symbol ϝ *dígamma*, was devoid of phonetic value, carrying only the numerical value of 6.

In the Coptic alphabet, the place of Greek ϙ *kóppa* is taken by the letter ϥ *fāj*, with the phonetic value [f] – specific to the later language. The letter preserves

Table 2 Coptic writing

Numerical values	*Phonetic values*	*Names*	*Coptic letters*	*Greek initial letters*
1	a	alfa	ⲁ	Α
2	b,v	véda	ⲃ	Β
3	g	gamma	ⲅ	Γ
4	d	dalda	ⲇ	Δ
5	ē	ēje	ⲉ	Ε
6	–	nou	ⲋ	Ϛ
7	z	zāda	ⲍ	Ζ
8	e	hāda	ⲏ	Η
9	l·ħ	tidte	ⲑ	Θ
10	j, i	joda	ⲓ	Ι
20	k	kabba	ⲕ	Κ
30	l	jola	ⲗ	Λ
40	m	mēj	ⲙ	Μ
50	n	ni	ⲛ	Ν
60	ka	ekai	ⲝ	Ξ
70	ō	ou	ⲟ	Ο
80	p	bej	ⲡ	Π
100	r	rou	ⲣ	Ρ
200	s	samma	ⲥ	C
300	t	daa	ⲧ	Τ
400	i	he	ⲩ	Υ
500	p.h	fij	ⲫ	Φ
600	k.h	kij	ⲭ	Χ
700	ps	ebsi	ⲯ	Ψ
800	ō	ō	ⲱ	Ω
900	–	–	ϣϣ	

Table 3

Numerical values	*Phonetic values*	*Designations*	*Coptic letters*	*Demotic letters*	*Hieroglyphics*
–	š	šdj	ϣ	𐲝	𓈖
90	f	fāj	ϥ	𐲟	𓄡
–	ŋ	adj	ϧ	𐲢	𓄿
–	h	hŏri	ϩ	𐲤	𓎛
–	ğ	ğanğa	ϫ	𐲥	𓄡
–	(g. č) š)	šima	ϭ	𐲧	𓋴
–	tt	dīj	ϯ	𐲩	𓏏

the alphabetic sequence of the corresponding Greek prototype and has the numerical value 90.

The Coptic letter corresponding to the last symbol ϡ *sámpi* in the Greek alphabet is employed similarly to its Greek prototype, with its numerical value 900.

Table 3 presents the seven graphic symbols that complete the Coptic alphabetic sequence. The symbols are traceable to their corresponding demotic prototypes, expressing specifically Coptic sounds that have no phonetic equivalents in Greek. The names of the letters of the Coptic alphabet essentially reflect their corresponding Greek designations. In the properly Coptic part, the names of the letters are based on corresponding demotic designations.

The Coptic alphabetic sequence thus consists of two parts: a 'principal' part, corresponding to the Greek alphabetic sequence and repeating the phonetic and numerical values of Greek paradigmatics, and an 'additional' part, attached to Greek paradigmatics, with graphic symbols expressing specific Coptic sounds that have no phonetic equivalents in Greek. Thus, Greek paradigmatics – the phonetic and numerical values of corresponding graphic symbols – is fully preserved in that part of the Coptic alphabet that corresponds to the Greek alphabetic sequence.

Gothic Alphabetic Writing

The Gothic alphabet, created at approximately the same time, is similar (Table 4). In this case as well, the creation of a new alphabet was connected with the adoption of Christianity. In order to translate the Bible into Gothic, the bishop of the West Goths, Ulfilas (318–388 C.E.), rejected the ancient monumental Runic writing, linked to pagan beliefs, and invented a writing of a new type.

Greek uncial writing served as the model for the newly created Gothic alphabet, which is incontestably manifested in the shape of Gothic letters and essentially Greek alphabetic order, reflected in the paradigmatics of the Gothic alphabet.

In the Gothic alphabet, the paradigmatics of the Greek prototype is preserved by referring specifically Gothic phonetic units to those letters of the Greek phonetic series that have no sound value in Greek, or express sounds alien to the Gothic language. This prevents the violation of the paradigmatics of the prototype system. For example, the sixth place in the Gothic alphabetic series, with the numerical value 6, is held by the symbol 𐌠 with the phonetic value [q^w].

Eighth in the Gothic alphabet, instead of H *êta* we find a letter for /h/ (long vowels are alien to Gothic). Following it, with the numerical value 9 and replacing the aspirated stop Θ *thêta*, stands the letter 𐌸 designating the interdental spirant /θ/. Graphically, this letter is traceable to the Greek ψ *psî*, while the place corresponding to the Greek *psî* is occupied by the letter 𐌨 [h^w], numerical value 700 (the archaic Greek 𐌨 *thêta* served as the graphic prototype of this Gothic letter).

The place corresponding to the Greek Ξ *xî* in the Gothic alphabetic series is held by the letter 𐌾 with the phonetic value [j] (numerical value 60), believed to be a borrowing from the Latin.

The next letter Π in the Gothic alphabetic sequence, with the numerical value 70 (in place of the Greek O *ò mikrón*), expresses the phoneme /u/,

Table 4 Gothic writing

Numerical values	*Phonetic values*	*Gothic writing*	*Uncial Greek writing*	*Origin*
1	a	𐌰	Α	
2	b	𐌱	Β	
3	g	𐌲	Γ	
4	d	𐌳	Δ	
5	e	𐌴	Ε	
6	q	𐌵	Ϙ	Lat.
7	z	𐌶	Ζ	
8	h	𐌷	Η	
9	*þ*	𐌸	Ψ	
10	i	𐌹	Ι	
20	k	𐌺	Κ	
30	l	𐌻	Λ	
40	m	𐌼	Μ	
50	n	𐌽	Ν	
60	j	𐌾	Ϛ	Lat.
70	u	𐌿	Ο	Run.
80	p	𐍀	Π	
90	–	𐍁	Ϟ	
100	r	𐍂	Ρ	Lat.
200	s	𐍃	Σ	Lat.
300	t	𐍄	Τ	
400	w	𐍅	Υ	
500	f	𐍆	Φ	Lat.
600	χ	𐍇	Χ	
700	*hw*	𐍈	Θ	
800	*ō*	𐍉	Ω	Run.
900	–	𐍊	Ϡ	

traceable to a corresponding letter of Runic writing. To designate the value /u/, Ulfilas did not take the graphic equivalent of the Greek digraph OY but borrowed a letter from Runic writing. He did the same in designating the vowel /o/ by the letter 𐍉 that in the Gothic alphabetic series occupies the place of the Greek Ω *ô méga* (numerical value 800).

In the Gothic alphabet, the letter 𐍆 with the numerical value 90 derived from the Greek Ϙ *kóppa* is likewise here devoid of phonetic value.

Thus, in using the Greek alphabet as a prototype for the creation of Gothic writing, Ulfilas did not omit letters expressing specific Greek sounds from the alphabetic sequence but replaced them with letters with specific Gothic phonetic values. Thereby the paradigmatics of the Greek prototype system is reflected in Gothic, with the preservation of the numerical values of the respective letters in the Greek and Gothic systems.

The Greek and Gothic systems fully coincide. Unlike Coptic, the Gothic alphabet has no additional letters in comparison with the Greek alphabet.

Like Greek, the Coptic and Gothic alphabets contains 27 (i.e., 9 × 3) letters in all; of these, the first nine express integers, the following nine, tens, and the final nine, hundreds. The 27th Gothic letter – used only for the numerical value 900 – reflects the Greek episemon Ϡ *sámpi*, with the numerical value 900. The absence in Gothic of additional letters is accounted for by the fact that specific Gothic sounds were fitted into the framework of Greek paradigmatics.

Table 5 Armenian writing. Armenian paradigmatics in juxtaposition with Greek

1.	Ա	1.	Α	*a*	19.	Ձ ձ			
2.	Բ	2.	Β	*b*	20.	Ղ	12.	Μ	*m*
3.	Գ	3.	Γ	*g*	21.	Ճ յ			
4.	Դ	4.	Δ	*d*	22.	Մ	13.	Ν	*n*
5.	Ե	5.	Ε	*e*	23.	Շ շ			
6.	Զ	6.	Ζ	*z*	24.	Ն	14.	Ο	*o*
7.	Է	7.	Η	*ē*	25.	Ջ ջ			
8.	Ը ə				26.	Պ	15.	Π	*p*
9.	Թ	8.	Θ	*ē*	27.	Ռ ǰ			
10.	Ժ ž				28.	Ր	16.	Ρ	*r*
11.	Ի	9.	Ι	*i*	29.	Ս	17.	Σ	*s*
12.	Լ l				30.	Վ			
13.	Խ x				31.	Տ	18.	Τ	*t*
14.	Ծ c				32.	Ր			
15.	Կ	10.	Κ	*k*	33.	Ց ց			
16.	Հ h				34.	Ւ	19.	γ	*ü, w*
17.	Ձ j				35.	Փ	20.	φ	p^h
18.	Ղ	11.	Λ	*l*	36.	Ք	21.	Χ	k^h

Armenian Alphabetic Writing, *Erkat'agir*

Armenian historical tradition links the creation of the Armenian alphabet *Erkat'agir* or 'Iron writing' with the enlightened work of the first teacher of the Armenians, Mesrop Mashtots (d. 440).

The Greek basis of Classical Armenian writing (Table 5) is manifested primarily in the agreement of the alphabetic sequence with Greek paradigmatics, when letters expressing specifically Armenian sounds unknown to Greek are omitted. Some letters with specifically Greek phonetic values were omitted.

To create a new script, the compiler of the Armenian alphabet took the Greek writing system as a model. Each new letter was correlated with a Greek letter that expressed a corresponding sound in Armenian.

Classical Armenian, like Coptic, had more consonant phonemes than Greek. But the creator of Armenian writing had recourse to a different procedure from that used for Coptic. The additional letters of the Armenian alphabet were not placed at the end of the alphabetic sequence, but inserted at different places in the Greek paradigmatic sequence. This primary core of the Armenian alphabet, built on the basis of the Greek paradigmatics, commenced with the letter Ա *a* and ended with the symbol Ք *k'*.

Such a distribution of the additional letters of the Armenian alphabet among the letters of its primary core led to a total disruption of the system of numerical values characteristic of the Greek prototype. Agreement of numerical values in the Greek and Armenian systems is observable only between the first seven letters of the alphabet. Beginning with the eighth letter, the symbols of the Armenian system indicate different numerical values.

Since the Armenian system has a greater number of letters than the Greek prototype, it appeared practicable to create a fuller system of expressing numerical values in Armenian. By means of the $9 \times 4 = 36$ letters of Armenian writing, it proved feasible, with the aid of individual written symbols, to express thousands as well.

Moreover, Armenian breaks all graphic links with the letters of the Greek writing system. The Armenian letters that express sounds phonetically equivalent to Greek have nothing in common graphically with corresponding letters of Greek writing. This graphic peculiarity of *Erkat'agir* has provided ground for hypotheses on the origin of Classical Armenian writing from the most diverse written sources. The derivation of an entire writing system from a particular written source on the basis of similarities and differences in the shapes of individual letters, i.e., on the basis of a graphic analysis of the plane of expression is not methodologically justified. Graphic resemblance of individual letters in various writing systems is not sufficient for asserting their origin from one or another writing source. Such assertions require consideration of more substantive inner systemic characteristics of writing.

The paradigmatics of a writing system constitutes one such inner systemic characteristic of writing. In this respect, Armenian writing reveals an indubitable relationship with the Greek writing system. But the creator of Armenian writing consciously severed all external relations with the graphic symbols of the Greek prototype system, freely inventing the graphic form of corresponding letters according to a definite principle. In the course of such graphic creativity, Mesrop Mashtots could naturally consult the available graphic specimens from the most diverse writing systems, such as Aramaic–Pahlavi, Syriac, Ethiopic, Greek, etc., scripts whose writing displays some likeness to the graphic symbols of Armenian writing.

Armenian writing is the product of the ingenious creativity of its author rather than the result of the historical transformation or graphic reproduction of a definite writing. This accounts for the graphic links of Armenian writing with various systems. Such free creation of the graphic symbols of Armenian must have been motivated by a desire to conceal the dependence of the newly created writing on the Greek model. In this way, an apparently original national writing was created – seemingly independent of any external influences or links. The distribution of the additional letters of the Armenian alphabet among the symbols of the principal part, corresponding to Greek paradigmatics, can be explained by the same considerations. The sequence of symbols inherited from the Greek system was thereby violated, and a correspondingly new system of numerical values came into being.

In all probability, this was a manifestation of the tendencies in the eastern Christian cultural world of the period, dictated by specific religious and political considerations, toward concealing all links and dependence of the local Christian culture on Greek culture. (Similar tendencies were manifested in the creation of other scripts of the Christian period, particularly Old Georgian and Old Slavonic writing.)

Old Georgian '*Asomtavruli*' Writing

The derivation of the Old Georgian alphabet (early 5th century) from the Greek alphabet can be established on the basis of a number of inner structural indices of the Old Georgian writing system.

A noteworthy characteristic of the Georgian language throughout its history is the astonishing phonetic conservatism of the system. The phonetic structure of the Georgian language of the earliest period is preserved to the present day without significant phonetic changes. This largely accounts for the fact that Georgian writing fully preserves one-to-one correspondence between the phonetic units of the language and the graphic symbols of writing both in paradigmatics and syntagmatics (Table 6).

What writing system served as a model for the creator of the Old Georgian alphabet? There are two possibilities: Old Semitic writing or the Greek alphabet (or other alphabets deriving from it). In either case, one thing is clear in advance: a comparison of these systems with the sound units of the Georgian language shows that in Georgian a whole group of consonants would be identified, without phonetic equivalents in the systems juxtaposed. Thus, there were two groups of sounds in Georgian: the 'principal' sounds corresponding to sounds represented in the source script, and the 'additional' ones.

Clearly, the adoption of the Greek or Semitic writing system as the prototype would shape the principal and additional parts of the newly created

Table 6 Old Georgian writing

Asomtavruli	Modern print form	Phonetic value	Designation	Asomtavruli	Modern print form	Phonetic value	Designation
I	!	a	an	Y	1	r	rae
J	"	b	ban	Z	2	s	san
K	#	g	gan	[	3	t'	t'ar
$	$	d	don	ⴕ	ⴗ	wi	wie
M	%	e	en	ⴖ	5	p^h	p^har
N	&	v	vin	ⴔ	6	k^h	k^han
ⴖ	I	z	zen	7	7	r	ran
ⴓ	B	ej	he	8	8	q'	q'ar
ⴒ	(	t^h	t^han	9	9	š	šin
Q	)	i	in	b	:	č	čin
R	*	k'	k'an	c	;	c	can
S	+	l	las	d	<	z	zil
T	,	m	man	ⴑ	=	c'	c'il
U	-	n	nar	ⴐ	>	č'	č'ar
C	s	j	je	ⴏ	?	x	xan
V	.	o	on	ⴎ	ⴓ	q^h	q^har
W	/	p'	p'ar	ⴍ	ⴒ	ž	žan
X	0	ž	žan	i	A	h	hae

writing differently. Comparison from this point of view of the Semitic and Greek systems of writing with Georgian writing brings out a genetic relationship of the latter only with the Greek system and rules out its derivation from the Semitic writing system. The assumption of the Greek system as the prototype in the creation of the Old Georgian alphabet renders quite understandable the structure and character of the principal and additional parts of the Old Georgian alphabetic sequence. Only those sounds of Georgian that have no phonetic correspondence in Greek are found in the additional part.

Graphic analysis and comparison of Old Georgian letters with the corresponding Greek letters show their utter graphic incongruity and incompatibility. In the creation of Old Georgian writing, the Greek writing system was evidently taken as a model for identifying and distributing Georgian sound units, which were subsequently expressed by special graphic symbols. However, the graphic symbols of the Old Georgian alphabet do not repeat the Greek shapes, as in the Coptic or Gothic alphabets, or the Slavonic Cyrillic. On the other hand, a number of characters of Old Georgian writing manifest some graphic features that bring them close to the shapes of Classical Greek letters (and overlap with the shapes of Phoenician scripts). The Old Georgian characters ⴑ *ban* (cf. archaic Greek Β *bêta*), ⴒ *gan* (cf. archaic Greek Γ *gámma*), ⴓ *en* (cf. archaic Greek Ϝ *é psilón*), ⴔ *vin* (cf. archaic Greek Ϝ *dígamma*), etc. – all facing left – are the Old Georgian letters that come close to the archaic outlines of corresponding Greek letters. However, the majority of Old Georgian letters show no resemblance to the corresponding Greek letters. (The currently used shapes of Georgian letters, *Mxedruli*, represent centuries of paleographic development.)

How should one account for the graphic difference between the majority of Old Georgian letters and the paradigmatically corresponding characters of Greek writing, given the resemblance of some characters to their archaic Greek counterparts? Is this difference the result of natural development and graphic evolution of the Old Georgian system, during which it must have diverged considerably from the shapes of the characters of the archaic Greek prototype system that served as the basis of Georgian writing?

This assumption requires dating the formation of the Old Georgian alphabet on the Greek pattern to a very early period, when the archaic Greek writing system prevailed – directed from right to left, with letters slanting leftward, and with a number of archaic graphic and phonetic peculiarities. Even setting aside the difficulties on the cultural–historical plane that arise with such an assumption, the fact that a number of graphic and phonetic characteristics that emerged in Greek much later are reflected in the Old Georgian writing system renders such an assumption unlikely.

It should thus be assumed that the archaic Greek alphabet was used as the model for the Old Georgian, taking into account the graphic and phonetic changes that subsequently arose in the Greek system. The Old Georgian alphabet was therefore likely an artificial creation, the result of conscious archaizing and graphic stylization of the Classical Greek alphabet.

It appears feasible to analyze the graphemes of the Old Georgian monumental *Asomtavruli* writing as formed of a limited number of original graphic elements, the *straight line* and the *semicircle*. All the

Table 7 Albanian writing

	'Albanian' characters	*Names*		*'Albanian' characters*	*Names*
1		alt	27		či
2		odet	28		čaj
3		zim	29		mak
4		gat	30		kar
5		ēb	31		novc
6		zarl	32		ʒaj
7		en	33		šak
8		žil	34		ʒajn
9		taz	35		ovn
10		ča	36		taj
11		jovd	37		xam
12		ža	38		ʒaj
13		irb	39		at
14		ša	40		pen
15		lan	41		phēs
16		ina	42		kat
17		xēn	43		sēk
18		dan	44		wēz
19		čar	45		tivr
20		zox	46		soj
21		kar	47		ion
22		lit	48		cav
23		hēt	49		çajn
24		haj	50		jojd
25		ar	51		phivr
26		çoj	52		kiv

graphic symbols of the Old Georgian *Asomtavruli* may be drawn by means of various combinations of such a straight line and a semicircle within a square – described by definite rules of combination.

The Caucasian Albanian writing

To the group of scripts of the Christian Orient should be added the still undeciphered writing of the Caucasian 'Albanians.'

The paradigmatics of the 'Albanian' writing counting 52 units is attested in an old Armenian manuscript, with the names of the signs rendered in Armenian letters (given in Table 7 in transliteration), which reflect the approximate phonetic values of the respective Albanian characters.

The paradigmatics of the Albanian script bears a certain resemblance to the Old Armenian, although we cannot make any conclusive judgment on the structure and provenience of the writing system in view of the absence of concrete texts in Albanian. A small number of inscriptions with Albanian characters awaits a definitive decipherment. Recent news of the recovery of long Christian Albanian texts on old Georgian palimpsests (which are as yet unpublished) makes us hope that the ultimate decipherment of Caucasian Albanian is a matter of time. According to preliminary reports, Caucasian Albanian is a language whose contemporary descendant should be seen in the North East Caucasian Udi language.

The Old Slavic Writing

Beginning in the 9th century A.D., fully developed original alphabets, based on the Greek alphabet, came into being in the Slavic cultural world. The Slavonic writing systems, called Glagolitic and Cyrillic, were invented for recording texts in the Old Church Slavonic language, in which divine worship began in the Slavic Christian world and the Slavic Christian literature was first written. Historical tradition ascribes this to the enlightenment activities of the Christian missionaries – the first teachers of the Slavs – the brothers Constantine, later surnamed Cyril (827–869) and Methodius (d. 885).

To all appearances, Glagolitic arose from 9th-century Greek minuscule writing. This manifests itself in the Greek arrangement of the Glagolitic alphabet – the paradigmatics of the letters essentially reflects the Greek sequence, broken only by the insertion of a number of letters expressing specifically Slavonic sounds.

This in turn caused some shift of the numerical values expressed by the letters. The number of Old Slavonic phonemes considerably exceeded the number of Greek phonemes, so it was necessary to create a whole group of additional characters for them. The number of letters in the newly developed writing, which was intended to simultaneously express the system of numerical values as well, could not be less than $9 \times 4 = 36$ (for the expression of integers, tens, hundreds, and thousands by individual letters). And indeed, the Old Slavonic Glagolitic originally contained $9 \times 4 = 36$ graphic symbols (Table 8).

The graphic individuality of Glagolitic writing stems from the fact that the letters of the Greek minuscule cursive are represented here in syntagmatics as isolated graphic symbols, but the symbols of the Glagolitic bear the imprint of their creator's graphic modification, formally distancing them from their Greek graphic prototypes. The ductus of the exceedingly complex and intricate letters of Glagolitic, with numerous flourishes and loops, is so peculiar that some researchers believe it to have been the result of Constantine-Cyril's independent original creativity.

There can be no doubt that the creator of Glagolitic deliberately modified and stylized the original Greek letters – perhaps with a view to concealing the dependence of the newly created writing on its Greek counterpart and to creating the impression of complete independence and originality.

Table 8 The Glagolitic alphabet

1	ⰰ	*a*	100	ⰿ	*r*
2	ⰱ	*b*	200	ⰾ	*s*
3	ⰲ	*v*	300	ⰿ	*t*
4	ⰳ	*g*	400	ⰿ	*ül*$_2$
5	ⰴ	*d*	500	ⰿ	*f*
6	ⰵ	*e*	600	ⰿ	*x*$_2$
7	ⰶ	*ž*	700	ⰿ	*o*$_t$
8	ⰷ	*ʒ*	800	ⰿ	*ψ*
9	ⰸ	*z*	900	ⰿ	*ʒ*
10	ⰹ ⰺ	*i*$_1$	1000	ⰿ	*č*
20	ⰻ	*i*$_2$	2000	ⰿ	*š*
30	ⰼ	*h*	3000	ⰿ	*ə*
40	ⰽ	*k*	4000	ⰿ	*ȣ*
50	ⰾ	*l*	5000	ⰿ	*ä* (*ѣ*)
60	ⰿ	*m*	6000	ⰿ	*x*$_1$
70	ⱀ	*n*	7000	ⰿ	*ö*
80	ⱁ	*o*$_1$	8000	ⰿ	*ü*$_1$
90	ⱂ	*p*	9000	ⰿ	*N*

For a number of Glagolitic letters belonging to the additional part of the alphabetic series and lacking Greek graphic prototypes, the influence of some other, chiefly Oriental, sources may be hypothesized. Thus, for example, the Coptic characters ϣ *šāj*, ϫ *ǧanǧa*, and ϧ *ḫāj* may have served as prototypes of the Glagolitic letters ⰾⰾ *š*, ⰶ *ž*, and ⰽ *x*$_1$, and the Hebrew צ *ṣādē* for the Glagolitic ⱌ *c*, and so on.

The names of the letters of the Glagolitic alphabet were selected from Slavic words on the acrophonic principle, i.e., words whose initial phoneme coincided with the phonetic units expressed by the corresponding letters: *az*, *buki*, *glagol*, *dobro*, etc. Such assignment of letter names coincides with the naming pattern of Germanic runes and Gothic writing.

The second variety of Old Slavonic writing, known as Cyrillic, is clearer with respect to the source of the shapes (Table 9). Of the 43 letters of this alphabet, 24 repeat the graphic symbols of 9th–10th century Greek writing, with their respective phonetic values. Conforming with the Greek prototype, the combination of the letters OY served as the symbol for the vowel *u*. In comparison with the Greek prototype, the ligatures $i+a=$[ja], $i+e=$[je], and $i+o=$[ju] constitute graphic innovations.

Several letters designating specifically Old Slavonic sounds, i.e., *ž, c, č, š, št*, etc., appear to be borrowings with simplification from Glagolitic.

What is the relationship between the two varieties of Old Slavonic writing? According to the most widespread view, Constantine-Cyril must have invented the Glagolitic alphabet as an absolutely original Slavic writing, on the basis of the Greek prototype, borrowing at the same time a number of letters from various Oriental scripts. The extensive philological education and linguistic erudition of Constantine-Cyril – a philosopher and first teacher of the Slavs – render understandable the links displayed by Glagolitic with Greek and a number of oriental scripts.

Table 9 The old Slavic scripts

Glagolitic	Numerical values	Cyrillic	Numerical values	Phonetic values
ⰰ	1	а	1	*a*
ⰱ	2	б	—	*b*
ⰲ	3	в	2	*v*
ⰳ	4	г	3	*g*
ⰴ	5	д	4	*d*
ⰵ	6	є	5	*e*
ⰶ	7	ж	—	*ž*
ⰷ	8	ѕ	—	*dz*
ⰸ	9	з, ʒ	7	*z*
ⰹ, ⰺ	10	і	10	*i*
ⰻ	20	и	8	*i*
ⰼ	30	—	—	*γ*
ⰽ	40	к	20	*k*
ⰾ	50	л	30	*l*
ⰿ	60	м	40	*m*
ⱀ	70	н	50	*n*
ⱁ	80	о	70	*o*
ⱂ	90	п	80	*p*
ⱃ	100	р	100	*r*
ⱄ	200	с	200	*s*
ⱅ	300	т	300	*t*
ⱆ	400	ѹ, ꙋ	400	*u*
ⱇ, ⱈ	500	ф	500	*f*
ⱉ	—	ѳ	9	*ϑ*
ⱊ	600	х	600	*x*
ⱋ	700	ѡ	800	*ω*
ⱌ	800?	ѿ	—	*št*
ⱍ	900	ц	900	*c*
ⱎ	1000	ч	—	*č*
ⱏ	—	ш	—	*š*
ⱐ	—	ъ	—	*ъ*
ⱑ	—	ы	—	*y*
ⱒ	—	ь	—	*ь*
ⱓ	800?	ѣ	—	*ě*
ⱔ	—	ю	—	*ju*
—	—	ꙗ	—	*ja*
—	—	ѥ	—	*je*
ⱕ	—	ѧ	900	*ę*
ⱖ	—	ѫ	—	*ǫ*
ⱗ	—	ѩ	—	*ję*
ⱘ	—	ѭ	—	*jǫ*
—	—	ѯ	60	*ξ*
—	—	ѱ	700	*ψ*
ⱙ		ѵ	400	*υ*

The graphically complex and intricate Glagolitic writing, invented by Constantine-Cyril, is second to

the graphically more perfect variety of Old Slavonic writing – the so-called Cyrillic – with its geometrically simple form of letters based on Greek uncial writing. This second variety of Old Slavonic writing, with certain systems and graphic modifications, is represented in particular by the modern Russian alphabet. This emerged after simplifications in 1708–1710 under Tsar Peter the Great, which eliminated ѡ ѧ ѧ ѱ ѯ, and after the Revolution in 1917, which eliminated ѕ ѕ і ѯ ѳ ѹ Ѹ ѵ ѣ.

A Typology of Invention of Ancient Alphabetic Writing Systems

A comparative study of various ancient alphabets reconstructs the typology of writing, yielding a general picture of the invention of alphabetic scripts based on a sample writing system that served as a model for the newly created systems.

The first and principal stage of this process is the breakdown of the phonetic side of a language into separate phonetic units to be expressed in writing by special graphic symbols, in essence the creation of the 'plane of content' of the writing system. This basic stage of the creation of writing essentially constitutes a phonetic–phonemic analysis of language for which a writing is being created. This is conducted on the basis of a comparison of the phonetic aspect of the language with the sound units represented in a definite sequence in the writing system it takes as a model.

The isolation and ordering of the phonetic units of a language for which a script is being created presupposes the simultaneous invention of specific graphic symbols by means of which these sounds will be expressed. Essentially this is the creation of the 'plane of expression' of the writing system. These two processes – the isolation and arrangement of the phonetic units of a language in a definite sequence and the invention of graphic symbols to express them – are interrelated procedures, presupposing each other. The shaping of both the plane of content and the plane of expression of a writing system is a single creative process of the inventor.

Exact reproduction of the outlines of corresponding graphic symbols of the prototype system, arranged in a definite sequence, would be the simplest and most natural way of shaping the plane of expression of the newly created writing system. Additional letters, expressing sounds specific to the given language, might be borrowed from other writing systems possessing similar sounds, or be created by modifying letters of the given system.

From the viewpoint of the plane of expression of a system, the Coptic, Gothic, and Old Slavonic (Cyrillic) alphabets are of similar character, all being based on Greek writing, not only with respect to the inner structure, but also to the shape of the corresponding Greek uncials.

A completely different way of shaping the plane of expression of a script is presented when the graphic symbols of the prototype system are transferred to the newly created system not in the same graphic form but with certain (possibly considerable) graphic modifications. This method alters – often beyond recognition – the original shape of the initial letters of the system (cf. the shapes of the Glagolitic letters in juxtaposition with Greek minuscule writing). Such graphic modification of the model may have been effected consciously, in order to conceal the dependence and connections of the newly created script with the system of the prototype writing.

Armenian *Erkat'agir* represents an extreme expression of this tendency, for the plane of expression of the Greek prototype is fully replaced. The graphic symbols of *Erkat'agir* were largely invented independently of Greek writing as the result of the creativity of its inventor, making use of various non-Greek graphic specimens.

In this respect, Armenian writing is typologically opposed to Coptic, Gothic, and Cyrillic; they represent extreme poles. Between them may perhaps be placed Glagolitic. It does not graphically break completely with the Greek system, but its letters are highly modified and graphically stylized. Old Georgian *Asomtavruli* belongs to the same typological group deriving from the Greek prototype.

The entire paradigmatic series of the Greek system is fully reflected in the Old Georgian alphabet, as well as in Coptic and Gothic; all $9 \times 3 = 27$ letters of the Greek prototype have been taken over into these alphabets in the same sequence, with corresponding phonetic and numerical values. Greek 'episemons' are transferred in the same function (i.e., only as symbols expressing definite numerical values; cf. the Coptic letters with the values 6 and 900, and the Gothic letters with the numerical values 90 and 900), or they acquire in the new systems specific phonetic values characteristic of the given language.

The paradigmatics of the initial writing system is essentially preserved through phonetic substitution and retention at relevant places in the alphabetic series of the newly created writing of all the graphic symbols of the prototype system. The paradigmatics of the prototype system is thereby mapped, as it were, onto the alphabetic series of the newly developed writing.

In Gothic, such mapping of the paradigmatics of the Greek prototype system onto the alphabetic series was effected without the addition of any characters

with specifically Gothic phonetic values; these values are fully accommodated in the paradigmatics of the Greek prototype. In Coptic and Old Georgian, there remained a certain number of sound units that had to be expressed in writing. These specific sounds and the graphic symbols designating them were added to the principal part of the alphabetic series by way of completing it, reflecting the paradigmatics of the initial prototype system with $9 \times 3 = 27$ graphic symbols. Such additional characters permitted the expression of numerical values of thousands in the Old Georgian alphabet as well.

The Armenian alphabet is based on an essentially different paradigmatic principle, typologically opposing it to the Coptic, Gothic, and Old Georgian writing systems. In drawing up the Armenian alphabet, all the episemons were removed, as well as all the letters designating sounds specific to Greek but not characteristic of Armenian. It appears that drawing up the Armenian alphabet did not involve substitution of Armenian sounds for the Greek phonetic values, but a reduction of the Greek alphabetic series to a sequence containing only correlates of Armenian sound units that had to be expressed by special letters. The Greek paradigmatic sequence originating in this way served as the initial nucleus of phonetic values on the basis of which the entire system of the Armenian alphabet was shaped by adding specifically Armenian sounds via specific letters.

However, these specifically Armenian values do not constitute a continuation in the alphabetic series of the principal part, but the symbols of the additional part are inserted at various places between the graphic symbols of the principal part, thus upsetting the original paradigmatics motivated by the Greek prototype, and accordingly the system of numerical values characteristic of the initial Greek model.

Old Georgian and Glagolitic share the principle of distancing the graphics of the new alphabet from that of the prototype system. This was done to characterize the emergent system as an independent national writing with no outward resemblance to other contemporary writing systems.

Classical Armenian writing, with its graphics totally differing from the Greek prototype, created by Mesrop Mashtots, proved an extreme manifestation of this principle. Fully basing himself on the Greek alphabet in inventing the Armenian alphabet, Mashtots totally changed the graphics of the prototype system. In this way, all external links with the Greek prototype are severed and a semblance of the complete independence and originality of the newly created writing is created.

The inventor of the Old Georgian alphabet deliberately modifies the Greek prototype system, for the same purpose. In the new system, the inventor does not break totally with the Greek graphics, but transforms it by a deliberate archaization of certain signs of the prototype system. In the newly created system, the inventor does not break totally with the Greek graphics, but transforms it by a deliberate archaization of certain signs of the prototype system and by graphic modification of corresponding characters. In this way, the creator of the Old Georgian alphabet achieves essentially the same result in inventing an original national writing.

Such tendencies in the Eastern Christian Cultural World – dictated by political and religious considerations – led to the creation of several outwardly differing writing systems, resting on Greek writing but exhibiting outward graphic independence with respect to the Greek prototype system.

In many originally alphabetic writing systems, created for the exact expression of the phonetic side of a language, the spelling of words may no longer fully reflect their actual pronunciation, owing to more or less significant transformations of the phonetic system. The sound syntagmatics of the language may become ever more removed from the graphic syntagmatics that reflected the phonetic make-up of respective words at the time of the creation of the alphabet and at early stages of its development.

In such later alphabetic systems, the graphic structure of individual words essentially represents a conventional sign for expressing their phonetic side. In such systems, individual graphic symbols may emerge, in syntagmatics, not as representatives of separate sounds and phonemes, but as graphic elements of a certain syntagmatic aggregate expressing the phonetic aspect of a whole word (cf., for instance, the spellings of individual words in modern English or French).

A logical sequel to such a disparity in the development of the phonetic aspect of a language and the ancient syntagmatics of writing may be the transformation of a writing of alphabetic origin into a quasilogographic system with individual letters or syntagmatic groups of letters expressing whole words (at a total disparity between the phonetic values of these letters and sounds that form these words). The writing breaks, as it were, all links with the phonetic side of the language, turning into a system independent of language, with a definite number of graphic symbols and special rules reflecting the ancient phonetic syntagmatics. It is only in this sense that one can speak of the 'autonomic' character of writing.

See also: Aegean Scripts; Asia, Ancient Southwest: Scripts, Epigraphic West Semitic; Europe Alphabets, Ancient Classical.

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Evaluation in Text

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Evaluation in Context

Evaluation is one approach to an area of interest in the analysis of discourse that focuses on attitudes of speakers or writers toward what they are saying or toward their interactants. Other approaches to the same broad area of interest include stance, appraisal, modality, and metadiscourse. This diversity of terminology reflects not so much defined theoretical oppositions as the outcome of attempts to map a complex area from different starting points.

In fact, the term evaluation is commonly used to refer to four related but distinct concepts: (1) a set of language resources (often, refer to as evaluative language), (2) a set of meanings realized through language, (3) the function of part of a text, and (4) an activity carried out by the writer or speaker through language. Similarly, stance is sometimes used to refer to a set of resources (e.g., stance adverbials) or a set of meanings (e.g., stance-taking when used for writer/speaker activity). The terms appraisal and modality refer to systems of meanings. Metadiscourse is used to refer to a subset of the language items usually identified as evaluative.

The concepts of evaluation as a set of meanings and as a set of resources are very closely related; a meaning is identified through the language resources used, and those language resources are said to be evaluative because of their meaning. Which meanings can be categorized as evaluative is a further area of debate. Common definitions focus on the notion of valuation – 'good' versus 'bad' – and of subjectivity or intersubjectivity. Some terms, such as appraisal and metadiscourse, are restricted to some of those meanings only; others, such as stance, tend to be more inclusive. At the most explicit end of the valuation cline, language items such as *excellent* or *disaster* realize and identify meanings of 'good' and 'bad.' The expression of 'good' and 'bad' may be less overt than in these items, however. Phrases such as *par for the course* (Channell, 2000) or *in the middle of* (Stubbs, 2004) can be shown to be intertextually evaluative, in the sense that there is evidence that their typical use is in the context of negative evaluation. (*Par for the course* usually indicates that an undesirable event is typical, as in *Sloppy research is par for the course in this [TV] series*. Even less intuitively obvious is *in the middle of*, whose most typical context is in phrases such as *in the middle of the night*, which usually indicate an undesirable event, as in *Once he had to call out a doctor in the middle of the night*.) Louw (1993, 1997) notes that such implicit meaning can be indicative of an unstated ideology and that the effect of some literary texts can be explained in terms of the highly covert presence of such meanings. In addition, evaluation can be expressed through the grounds or evidence for evaluation (evoked appraisal as opposed to inscribed appraisal in the terms used in Martin, 2000), as with a

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comment such as *It rained all day*, which might be evidence for positive evaluation (farmers in a dry country) or negative (holiday-makers in a typically damp one). Some comparative language items, such as *only* or *nearly*, frequently indicate the most likely interpretation of evoked evaluation; compare *It took us under three hours* (good) and *It took us nearly three hours* (bad). Defining evaluation as subjectivity allows other assessments, such as likelihood or importance, to be included in the concept, whereas defining it as intersubjectivity suggests that items appealing to the interaction between the speaker/writer and hearer/reader should also be included.

Similarly related are the concepts of evaluation as a set of resources or meanings and evaluation as the function of a specific part of a discourse; the function is often recognized by the presence of particular items. Labov (1972) and more recent writers (e.g., Eggins and Slade, 1997) propose that evaluation is one element in narrative structure, with the function both of delaying the action and so creating suspense and of indicating to the hearer what the point of the narrative is. Winter (1982: 9) suggests that one of the most basic relationships between clauses in a discourse is that of situation-evaluation; in other words, a text producer first gives information and then assesses it. Hoey (1983, 2001) elaborates this as a basis for exploring the organization of text. He describes a number of culturally popular text patterns (such as Situation-Problem-Response; or Situation-Goal-Response), each of which ends with an evaluation element that indicates the writer's assessment of the success of the enterprise described in the preceding text. The Evaluation section is marked either by evaluative lexis (such as *success*) or simply by the position of the section and its relation to the information in the rest of the text. In fact, however, Hoey emphasizes that, although the term evaluation may be used to label one part of the pattern, every element of the pattern relies on evaluation (the Problem is 'that aspect of the situation that is evaluated as problematic' and so on). In other words, the writer's attitude toward the material is what structures the text as a whole. The self-reflective and interactive nature of the Evaluation segment is emphasized by Sinclair (1988), who proposes that any written text is composed of a hierarchy of moves, the final one at each level being interpretable as a reflection on the previous ones, similar to the follow-up element in spoken exchanges that confirms the satisfactory completion of the exchange.

Finally, the notion of evaluation as a function or activity is articulated by Hunston (1989, 1994), who proposes a model of evaluation that reacts to a number of elements in Winter's, Hoey's, and Sinclair's work. First, there is a clear interdependence between Situation and Evaluation, that is, between **what** is evaluated and **how** it is evaluated. In other words, the writer's assessment or point of view is visible in the articulation of both these elements. More exactly, the distinction is not between a thing and the evaluation of the thing but between a thing evaluated as a particular kind of entity and a quality ascribed to that entity. In Hunston's work, these are described as the status and value functions of evaluation. Second, evaluation, particularly in its value function, is not necessarily realized as a set of discrete items but is pervasive, cumulative, and perhaps implicit. Third, evaluation as an element in text structure has an organizing function. Although evaluation may not be restricted to the third move in a sequence, that move does have a self-reflective function, labeled relevance by Hunston.

Researchers into the broad area covered by evaluation face two main problems – the first practical, the second theoretical. The first is that evaluation, whether it is conceptualized as a set of meanings or as a set of functions, is recognized by language items (words, phrases, and so on) that are identified as evaluative. The identification of such items is essential if a reading of the evaluative meanings of a text is not to be subjective to the point of idiosyncrasy. Yet evaluative items are not a closed set; evaluation, as previously noted, may be implicit (evoked) or cumulative; and there is no one-to-one relation between an item and its evaluative meaning in all contexts (Silver, 2003). The quantification of apparently evaluative items (e.g., Hyland, 1998; Conrad and Biber, 2000) is necessary when comparing large amounts of text, but such approaches sit uneasily with the highly interpretative analysis of a single text. The problem of reconciling large-scale and small-scale methods of analysis has not yet been solved.

The theoretical question is where to locate evaluation within a theory of language. Put simply: What kind of thing is evaluation (a meaning, a function, a set of items)?; what is nonevaluation and how is it recognized?; and how should the various aspects of evaluation (good-bad, certainty, interactivity, and so on) be seen to relate to one another? Martin (2000) and White (2002), working within the systemic-functional tradition, provide the clearest answers to these questions, identifying evaluation or stance as belonging to the interpersonal metafunction, thereby opposing it to the ideational and textual metafunctions, and proposing a set of systems to account for the various types of meaning. Similarly, reserving the term evaluation for part of a text allows it to be differentiated clearly from other parts. Other writers avoid the problem either by limiting the scope of the

phenomena they work on (e.g., Conrad and Biber's study of stance adverbials) or by focusing on the multifunctionality of evaluation or stance or of metadiscourse itself (e.g., Hunston and Hyland) and ignoring what lies outside.

The Polypragmatic Nature of Evaluation

One interpretation of the functionality of evaluation has already been mentioned. Thompson and Hunston (2000) further interpret the functions of evaluation as (1) to construe cultural values and the relationship between the entities in the text and those values, (2) to construe a relationship between writer and reader, and (3) to organize the text. Any piece of evaluative language is polypragmatic in that it may perform two or three of these functions simultaneously. As an illustration, here are extracts from an opinion article discussing the electoral prospects of the right-wing UK party the British National Party (BNP) (Hugh Muir, 'We can halt the far right's rise in London and the north,' *The Guardian* 14 May 2004). We have numbered the sentences for ease of discussion and underlined the instances of evaluation that are discussed.

> (1) <u>It is not hard to see</u> why the <u>racist</u> party <u>craves</u> a London assembly seat. (2) Unlike local councillors, assembly members elected from party lists have the right to claim a mandate from the whole of London. (3) They have the benefits of office, the resources, the staffing and the media recognition. (4) Mr Douglas and his party—which in its senior ranks includes <u>convicted thugs, football hooligans, vandals, police bashers, gay bashers and fraudsters</u>—will be in a position to influence key committees. (5) He could use his own experience to help the Metropolitan police authority, with football hooligan convictions going back 14 years. . . .
>
> (6) Searchlight, the anti-fascist organisation, has a national Stop The BNP campaign. . . . (7) But what is also needed to stop a national <u>disaster</u> in London is a <u>determined push</u> by all the mainstream parties. . . . (8) <u>It could be argued that</u> the BNP would never win a seat if the main parties spent less time <u>plotting</u> and writing <u>platitudes</u> to local papers, and more working the streets and getting core supporters into the polling booths. (9) Today in London, Labour begins a leafleting campaign and Mr Livingstone will be visiting mosques. (10) <u>It is a start.</u>
>
> (11) That said, the parties cannot do it all. (12) If we vote for anyone but the BNP, it will increase the turnout and <u>make it far more difficult</u> for the <u>racists</u> to reach the required threshold. (13) Minority communities are entitled to look to the mainstream parties to stop the BNP. (14) But until there is some indication that these parties care about this as much as we do, <u>we may be advised</u> to look to ourselves.

The first function of the evaluation in this text is to tell the reader the writer's opinion about how entities expressed in the text, such as the BNP, relate to a given system of cultural values. In doing so, it both reflects and construes those values. In the text, members of the BNP are described as *racists* (1, 12) and as *thugs*, *hooligans*, *vandals*, and *fraudsters* (4). The verb *crave*, indicating a desire that is irrational and out of control, is used to describe the BNP's ambitions (1). The possible success of the party in elections is referred to as a *disaster* (7), which should be countered by a *determined push* – a phrase that is used almost exclusively in the context of positive evaluation of the goal of the pushing. The other, mainstream parties are criticized more mildly, with their activities described as *plotting* and *platitudes* (8) and as detracting from the more important goal of preventing the BNP from obtaining seats. These evaluative items, and others, which propagate (Lemke, 1998) through the text, indicate that the writer strongly disapproves of the BNP and, moreover, that the writer presupposes that his readers will share this disapproval.

The second function of evaluation, to construe a relationship between the writer and reader of the text, is achieved partly by the assumed sharing of values – the reader is in a sense complimented by the assumption that dislike of the BNP is shared. In addition, phrases that indicate a shared experience, such as *it is not hard to see* (1), or shared ambition, such as *make it far more difficult* (12), construe solidarity and consensus. Furthermore, what is sometimes referred to as hedging in phrases such as *it could be argued that* (8) and *we may be advised to* (14) mitigates assertions and directives for which common ground is not assumed and thus construes a deference toward and respect of the reader's views.

Finally, evaluation serves to organize the text. Arguably, this extract is composed of three sections, each a paragraph. They may be described as (1) Statement of Problem, (2) Recommended Response A (action by political parties), and (3) Recommended Response B (action by individuals). Thus, the text as a whole is designed to present an evaluation and a reaction to that evaluation. In addition, each of the three units has what might be called an evaluative structure. Unit 1 (1–5) begins with a statement of opinion (*it is not hard to see why*) that prospects (the term used by Sinclair, 1993) the rest of the paragraph as providing supporting evidence. Less directly, the rest of the paragraph can be seen as partly serving to justify the negative evaluations in *racist* and *craves*. Unit 2 (6–10) consists of a concession (Searchlight is carrying out some positive actions) followed by a counterassertion (political parties also need to be involved). It is concluded by an assessment that summarizes and evaluates what has gone before (*it is a start*, 10) and so completes the unit. The final unit

(11–14) begins with an encapsulation (the term used by Sinclair, 1993) of the preceding unit (*that said*) and a prospection (*the parties cannot do it all*) predicting further recommendations. A specific recommendation follows – *vote for anyone but the BNP* – together with an explanation of why this is a good idea, culminating in the general exhortation to *look to ourselves*.

Value, Assessment, and Appraisal

Of the three main functions of evaluation previously mentioned, it is the first that has traditionally received most attention within linguistics: the expression of the speaker's attitude toward entities and propositions. The majority of earlier studies worked with the fundamental but relatively nondelicate distinction between positive and negative evaluation. The focus was frequently on lexical items, and a central issue was the identification of precise nuances of connotative meaning of individual items (see e.g., Cruse, 1986). Different scales of values were referred to (good/bad, desirable/undesirable, important/unimportant, etc.) but typically in a nonsystematized way. However, over the past 20 years, there has been an increasingly sophisticated attempt to describe the range of values that are drawn on in the process of evaluation, to relate these to the kinds of entities that are evaluated, and to apply the resulting description in the analysis of evaluation in discourse.

One area in which these issues first came to the fore was the analysis of academic writing. Hunston (1989, 1994) explores the ways in which research is evaluated, focusing primarily on the notions of goal-achievement and of fit. Research methods and results are evaluated positively by being shown as achieving the researcher's, or the research community's, goals. Research results and interpretations are evaluated positively by being shown to fit into a network of knowledge, theories, and hypotheses. For example, in the next extract (from Pubmedcentral), the data mentioned in sentences (2) and (3), and by implication the whole experimental process, are given positive value because they successfully achieve the aim stated in sentence (1): *to test whether the . . . cells . . . are actually contributing*. However, the hypothesis contained in sentence (1) (*genetically modified cells in the GM-CFU population contribute to the posttransplant repopulation of peripheral book and marrow hematopoietic cells*) is given a negative value in sentence (3) because there is no positive fit between the hypothesis and the experimental results.

> (1) To resolve this question, we decided to analyze the data derived from an ongoing MDR-1 chemoprotection trial for advanced breast and ovarian cancer patients to test whether the genetically modified cells in the GM-CFU population are actually contributing to the post-transplant repopulation of peripheral blood and marrow hematopoietic cells. . . . (2) The data from this study showed that the frequency of transduction (as measured by a GM-CFU plating assay in taxol) immediately post-transduction was the same in the suspension and stromal transduction protocols. . . . (3) These data suggest that the GM-CFU cells from the suspension method are not contributing to the hematopoietic recovery immediately posttransplantation. . . .

Thetela (1997) further discriminates within the values identified by Hunston, arguing that they can be grouped into a four-cell grid, as in Table 1. The grid represents the intersections of the evaluated entities (columns) and the value ascribed to the entities (rows).

In the Pubmedcentral extract, the negative evaluation of the hypothesis contained in sentence (1) falls into the category significance. There are several indications of degrees of certainty: *show* (2) evaluates the findings of the data as certain and *suggest* (3) lowers the degree of certainty with which the interpretation of the findings is advanced (for an alternative approach to handling these values see later discussion). The overall aim of the article is to contribute to usefulness by establishing the effectiveness of certain methodological procedures (the final sentence of the extract explicitly evaluates the study as useful for other researchers).

The most fully developed current model of values in discourse is Appraisal theory, developed by Martin and his associates within a Systemic Functional Linguistics framework (see Martin, 2000; Martin and Rose, 2003; White, 2002; Macken-Horarik and Martin, 2003; cf. Lemke, 1998, for an alternative account of evaluation within the same framework). The Appraisal model was originally developed to handle the analysis of evaluative meanings in textbooks, but it has been expanded to become a tool for mapping the values through which a culture makes sense of its experiences. The three major categories established in the model can be illustrated by the following short extract from an advertisement for an American beach resort (from Brignatinebeachnj.com).

Table 1 Parameters of evaluation in research articles

	Process/methods	Product/ findings/ knowledge
Worthiness (validity)	Usefulness	Significance
Fixedness (reliability)	Control	Certainty

Source: Adapted from Thetela (1997: 114, Table 4). Reprinted with permission from Elsevier.

(1) Brigantine Beach … an island you'll love for life! (2) South Jersey's best kept secret—Brigantine Beach—is a beautiful, pristine hideaway for families seeking a safe, peaceful haven. (3) Our community is naturally friendly. (4) Cultural events and recreational activities provide the opportunity to enjoy quality time with family friends and visitors. (5) If it's night life that interests you, Brigantine Beach is just minutes away from Atlantic City's endless casino excitement and world famous boardwalk.

The core resource for the realization of appraisal is Affect, as exemplified in (1): *you'll love [Brigantine Beach] for life*. Affect is the most congruent expression of appraisal because it construes evaluation in terms of the appraiser experiencing a reaction (in this case, love) directed toward, or stimulated by, the appraised entity. Affect can be seen as 'institutionalized' (in Martin's phrase) into two other major categories, in which the affectual reaction is, as it were, externalized and construed as a quality of the appraised entity. Whereas Affect may be directed toward any kind of entity, the two other categories are distinguished according to the kind of entity appraised and the kind of values drawn on. Appreciation involves aesthetic assessments of 'products, performances and naturally occurring phenomena' (Martin, 2000: 159). A typical example occurs in (2), where Appreciation is drawn on in describing the beach as a *beautiful, pristine hideaway*. Judgment, on the other hand, has to do with ethical assessments of human behavior; sentence (3) expresses a judgment of the community as *naturally friendly*. This two-way division is justified not only on the grounds that, as humans, we naturally feel more directly implicated in assessments of human behavior, but that human vs. nonhuman (or more precisely conscious vs. nonconscious) is a major motif in what Whorf terms the cryptogrammar of language.

Each of the three main categories is subdivided at increasingly delicate levels. For example, Affect may be *realis* (I like/hate it) or *irrealis* (I want/fear it); Judgment may involve social esteem (she is clever/stupid) or social sanction (she is honest/a fake); and Appreciation includes subcategories such as reaction (it is interesting/tedious) and composition (it is harmonious/a mess). Martin points out that Appreciation is the category most affected by field or subject area: whereas the judgments of humans fall into generally applicable groupings (we normally have a high degree of agreement on how people should and should not behave), the values at stake in, say, advertising a holiday resort are rather different from those in academic research. Nevertheless, it is argued that valid subcategories can be set up that hold over the wide diversity of linguistic realizations, and that the distinctions reflect culturally specific sets of values.

As previously noted, evaluation need not be explicit; and Appraisal theory builds in a distinction between inscribed and evoked appraisal. In (5), the inscribed appraisal relates to Atlantic City (*endless … excitement, world famous*), but the main purpose in mentioning this is that the proximity of Atlantic City is clearly intended as a token of appraisal to evoke positive Appreciation of the beach. Inscription and evocation of appraisal are not seen as distinct categories but as points on a cline; in the intermediate area, appraisal may be provoked by signals which are not in themselves evaluative but which indicate that evaluation is going on. In fact, (5) is an example of provoked Appreciation – the phrase *just minutes away* (more generally the frame *just [small measurement term] away*) is typically used in contexts that are evaluative rather than neutral statements of distance. A paraphrase of (5) that took away the provoking signals would still be read in context as an appreciation of the beach, but more implicitly evoked: *Brigantine Beach is close to Atlantic City's casinos and boardwalk*. As this version makes clear, evoked appraisal relies even more strongly than inscribed does on shared values; the reader is expected to collaborate in constructing the evaluation that makes this statement appear coherent in context. This serves to reinforce existing sets of values (casinos and boardwalks are attractive; proximity to them is a bonus), and it may also, of course, be used for manipulative purposes by not spelling out the values that the addressees are being projected as already sharing.

Evaluative Voices

If we turn now to the role of evaluation in construing the relationship between writer and reader, this involves moving a step beyond the typical lay view of evaluation as purely I-oriented, the self-justifying broadcasting of inner feelings. Evaluation should be seen rather as an essentially interactive resource, deployed in order to elicit a response, preferably of acceptance, from the addressee. To evaluate means to enter into a complex negotiation of values because any assessment inherently implies the possibility of a different assessment. That alternative assessment may be one that is already present in some sense – the writer may be reacting to assessments that have previously been spoken or written or that are represented as accepted truths; and/or it may be an assessment that the writer foresees as a potential response to his or her own assessment. The result can be a multilayering of evaluative voices, as in the following extract (from Trevor Phillips, 'Multiculturalism's legacy

is "have a nice day" racism,' *The Guardian*, 28 May 2004).

> (1) This was a debate waiting to happen. (2) Some on the left had been worrying aloud for months that 'immigrants' are doomed to become ghetto-bound minorities, a divisive presence threatening Britain's underlying social fabric. (3) They need to relax. (4) All but the racist fundamentalists of the far right accept that Britain's economic and social vigour has always been renewed from the wellspring of immigration. (5) Scotland's first minister, Jack McConnell, sensibly wants new migrants to revive Scotland's relatively elderly population. (6) Even Norman Tebbit recently stunned a BBC audience with a warm and unqualified welcome to migrants from eastern Europe. (7) The real argument is how we manage the process of integrating migrants.

Some of the statements here are the writer's: *This was a debate waiting to happen* (1), *They need to relax* (3), and so on. Other statements are attributed (Sinclair, 1982, 1988; Tadros, 1993; Hunston, 2000) to other speakers: *some on the left* (2), *all but the racist fundamentalists of the far right* (4), *Scotland's first minister, Jack McConnell* (5), and *Norman Tebbit* (6). There is a far from simple distinction, however, between the I voice and the other voices in the extract. For example, the statement *Britain's economic and social vigour has always been renewed from the wellspring of immigration* (4) is attributed to a vaguely constituted group consisting of *all but the racist fundamentalists*, but the I voice of the extract clearly aligns himself with the statement, partly by constituting such a commonsense group and partly by choosing *accept* as the report verb. There is no such alignment with the group designated as *some on the left* (2). The I voice, then, is in consensus with the *all* voice but not with the *left* voice. The extract also construes conflict between the consensual group and the *racist fundamentalists*, whose implied voice is construed as saying that *Britain's economic and social vigour has not been renewed from the wellspring of immigration*.

White's theory of engagement addresses the question of how writers reflect their awareness of possible conflict and consensus or attempt to preempt the emergence of alternative assessments. A range of linguistic phenomena, including modality, polarity, and evidentiality, are seen as resources by which the writer may contract or expand the dialogic interaction. Contraction in White's model means closing down alternatives, presenting the evaluation as not open to negotiation, whereas expansion means opening up the dialog to alternative possibilities. The next two extracts (from *The Guardian Weekend* magazine, 22 May 2004) illustrate the difference. The first is an attack on aspects of political correctness and the second is a restaurant review.

> This is <u>surely</u> an example of excessive squeamishness. <u>I don't see how</u> press hysteria about 'bogus' asylum seekers can be allowed to discredit the phrase asylum seeker any more than indolence and scrounging among 'job-seekers' should discredit that expression.

> My lack of excitement stemmed not from any disappointment in the standard of the dim sum themselves. . . . The trouble was, I felt I'd come across it all before at Hakkasan. <u>Perhaps</u> this is an unsportsmanlike criticism to make. . . .

The underlined phrases in the first extract represent the evaluation as a matter of common agreement (*surely*) and the opposing view as patently wrong (*I don't see how*). In the second extract, on the other hand, the writer uses modality (*perhaps*) to signal that he is introducing a counterview that other people, including some readers, might advance, thus opening the discourse to alternatives. In both extracts, the negotiation is dialogic in that the views of others are explicitly acknowledged and engaged with.

More generally, the role of evaluation in construing negotiation raises the issue of which evaluation is mainly at stake at any point in the discourse; that is, what it is that the writer is negotiating. Evaluation can often be layered in complex ways, with one evaluative expression functioning as the stimulus for, or a token of, a different kind. This phenomenon, which might be called the Chinese box (or Russian doll) syndrome, appears to be an inherent feature of evaluation. If we go back to the Brigantine Beach extract, the text as a whole clearly functions as an appraisal of the beach, and in this context it can be argued that the judgment of *our community* as *friendly* is primarily a token of Appreciation – it provides grounds for appraising the resort positively. It is therefore similar to the appreciation of Atlantic City's *casino excitement* and *world famous boardwalk*, which in this text serves the same purpose. But should we stop there? The headline construes the appraisal in terms of Affect; so it would be equally valid to argue that the Appreciation (into which the Judgment feeds) functions primarily as grounds to justify the positive Affect that frames the text. The insight that evaluation is frequently nested in this way is a powerful one – but it can lead to a situation in which the analyst is uncertain how far to track the nesting or how to represent nested evaluation (as previously noted, this is especially pertinent in studies that take a quantitative approach).

Evaluation and Epistemic Knowledge

One of the difficulties in referring to evaluation as participating only in the interpersonal metafunction, as argued by Martin and White, is that it makes it appear additional to the information-giving function of a text. In fact, and especially in academic discourse, evaluation plays a central role in the construction of epistemic knowledge.

As previously mentioned, academic texts often express values of 'good' and 'bad' only very implicitly. Hunston (1989, 1994) points out that in most academic texts the success of an experiment or the failure of a rival researcher to take an essential factor into account is indicated through the grounds for assessing quality rather than through the assessment itself (in Martin's terms, it is evoked rather than inscribed). On the other hand, academic texts consistently present an assessment of the statements they consist of in terms of the relationship between the word and the world. Hunston refers to this as evaluation of status; the status of a proposition is the averred (not actual) alignment between it and the world outside the text. Because propositions have status, they construe the epistemological world as viewed by the writer.

Here is an illustrative extract, with sentences numbered and key phrases underlined as before (from Allaboutcircuits).

> (1) When Benjamin Franklin made his conjecture regarding the direction of charge flow (from the smooth wax to the rough wool), he set a precedent for electrical notation that exists to this day, despite the fact that we know electrons are the constituent units of charge, and that they are displaced from the wool to the wax— not from the wax to the wool—when those two substances are rubbed together. (2) This is why electrons are said to have a *negative* charge: because Franklin assumed electric charge moved in the opposite direction that it actually does, and so objects he called 'negative' (representing a deficiency of charge) actually have a surplus of electrons.

In this paragraph, the writer evaluates the status of a number of propositions, evaluating some as being Franklin's wrong ideas and others as today's knowledge. In other words, Franklin's ideas are assessed as aligning with a counterfactual world, whereas the contrasting ideas align with a factual one. The convention that electrons have a negative charge is neither factual nor counterfactual but might be called afactual. The status of each proposition is indicated by a noun (e.g., *conjecture*, 1), a verb (e.g., *know*, 1), or an adverb (e.g., *actually*, 2). The propositions and their statuses can be set out as in Table 2.

Status is clearly associated with evaluation of certainty – Franklin's conjecture is less certain than today's knowledge – but it is essentially about averred alignment rather than about certainty. The textual function of status evaluation is to reify propositions so that they can be further evaluated. In the Allaboutcircuits extract, Franklin's conjecture is evaluated as untrue not by being evaluated as a conjecture but by being asserted to be inconsistent with more recent, detailed knowledge. In academic discourse, the entity being evaluated is very commonly a proposition such as this rather than a physical object or a person.

In other types of discourse, evaluated entities are likely to be things (objects, organizations, people, and so on) rather than propositions. In the BNP *Guardian* extract, the BNP has the status of a political party. This is the kind of thing that it is, and it is evaluated in the terms appropriate to a party, notably the reasonableness of its policies and the respectability of its members. Other criteria for judging political parties include something that might be called gravitas; in (8) the mainstream parties are criticized for not achieving that. However, that text also puts forward propositions with an epistemic status, which are open to further evaluation. For example, the statement

Table 2 Evaluation of status

Aligned with a counterfactual world	Aligned with a factual world	Aligned with an afactual world	Status indicator
Electrical charge flows from smooth wax to rough wool			*conjecture*
	Electrons are the constituent units of charge. Electrons flow from wool to wax		*we know*
		Electrons have a negative charge	*are said*
Electrical charge moves in one direction			*assumed*
	Electrical charge moves in the other direction		*actually*
Objects are negative			*he called*
	These objects have a surplus of electrons		*actually*

But what is also needed to stop a national disaster in London is a determined push by all the mainstream parties (7) is a recommendation, for which further evidence is then given. The averred alignment between the proposition and the world is not factual, as in the Allaboutcircuits extract. Instead, the status is one of opinion: The statement is averred to be an interpretation of the world rather than a representation of it.

Analyzing Evaluation in Text

Evaluation, then, is a complex phenomenon that resists easy categorization. It demands objective recognition, yet time and again the interpretation of a phrase as evaluative is subjective and dependent on textual, situational, and cultural context. It demands systematicity, but systems that depend on generalization tend to oversimplify. It demands quantification, but also a response to the detail of individual discourses. It is, however, an essential object of study in any functional approach to language if linguists are to obtain a rounded picture of how discourse functions.

See also: Mood and Modality in Grammar; Problem-Solution Patterns; Text and Text Analysis.

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Evans, Gareth (1946–1980)

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Gareth Evans was a philosopher of language and mind at Oxford University during the 1970s. From 1973 on Evans published important articles that dealt with such themes as the philosophy of language, logico-semantics, espistemology, and metaphysics. His unfinished main work, *The Varieties of Reference,* in which 'the Generality Constraint' as well as the notion of 'nonconceptual content' were introduced, was published posthumously by John McDowell in 1982. Influenced by Strawson and Davidson in the 1960s and 1970s, Evans developed theories for formal semantics for natural languages. Davidson's views on theory of meaning, i.e., theory of truth conditions and Dummett's interpretation of the German philosopher Frege had a special influence on the theoretical development of Evans's thought. He coedited *Truth and meaning* with John McDowell and published several variously influential articles in the areas of the philosophy of language and the philosophy of mind.

It is maintained that Evans belongs to the neo-Fregean position in the philosophy of language in the sense that he attempted to clarify the concepts and terms of Frege. The new theory of causal reference by Kripke and the theories of Direct Reference by Kaplan and Perry assume that the meaning of proper names and indexical and demonstrative expressions cannot be equated with a denoting description, since these expressions are restricted to their causally or contextually determined reference. Therefore, Frege's concept of 'sense' (*Sinn*) is claimed to be irrelevant for all these expressions. On the contrary, Evans observes that this way of criticizing Frege is based on the misunderstanding of Frege's theory and his concept of *Sinn*. According to Evans, Frege himself represents the position that the aforementioned expressions in question are directly referential.

The central thesis of *Varieties of Reference* has to do with Evans setting out Russell's principle as a starting modus operandi of what thinking about an object requires. "[Russell's] principle is that a subject cannot make a judgment about something unless he knows which object his judgment is about. ... In order to make Russell's Principle a substantial principle, I shall suppose that the knowledge which it requires is what might be called discriminating knowledge: the subject must have a capacity to distinguish the object of his judgment from all other things" (Evans, 1982: 89). Evans justifies this principle by means of a salient attribute of thinking which he took over from his teacher Strawson. He names this attribute 'generality constraint.' Evans prefers to explain "the sense in which thoughts are structured ... in terms of their being a complex of the exercise of several distinct conceptual abilities." This constraint postulates that "if a subject can be credited with the thought that *a* is F, then he must have the conceptual resources for entertaining the thought that *a* is G, for every property of being G of which he has a conception" (Evans, 1982: 100–104). In order to think of *a*, one must have an association of *a*, and this association can also come to the surface in other thoughts.

Evans is also well known for introducing a fourth pronoun category – the E-type – which is distinguished from the traditional tripartite classification of pronouns. Pronouns of this fourth category represent the antecedent quantifier phrase but are not bound by it. This contribution has to do with analyzing the environments in which there are good pragmatic reasons (not syntactic reasons) to avoid bound anaphora while still intending coreference. In this finding, the semantics of bound pronouns is studied and their place in the pragmatic theory of coreference is clarified.

See also: Frege, Gottlob (1848–1925); Kripke, Saul (b. 1940); Pronouns; Russell, Bertrand (1872–1970).

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Evenki

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Evenki belongs to the Tungusic family, widely considered to form a branch of the Altaic languages. Tungusic family comprises three subgroups, the Northern (or Siberian), the Southern (or Amur), and the Manchu. (There is another classification in which two subgroups are distinguished, the Northern group and the Southern group including Manchu.) The number of native speakers of Evenki in Russia does not exceed 30 000. Evenks live on vast territories in Siberia, far east of Russia, and in the north of China and Mongolia (where they are called Oroqs or Orochons; about 12 000). The Evenki Autonomous Region comprises about 768 000 square kilometres; its population is about 30 000 and only about 5000 of them are Evenks. If we sum up all the territories of Siberia and the far east of Russia inhabited by the Evenks, the total will equal the territory of at least one-third of Russia. There is hardly another people in the world as small as the Evenks that is aboriginal to such a vast area, as they were a nomadic people.

Evenki is also remarkable for its number of dialects and subdialects, about 50 in all. They are subdivided into three groups, Northern, Southern, and Eastern. The Northern dialects of Evenki are spoken in the northern part of the Krasnojarsk and Irkutsk regions, and the Southern dialects around Lake Baikal and in Buryatia. The Eastern dialects are spoken in the Republic of Sakha-Yakutia, in the Amur and Khabarovsk regions and on the Island of Sakhalin. The Evenki language acquired its writing system in the early 1920s. It was based on the Latin alphabet but later (in the early 1930s) it was replaced by the Cyrillic alphabet. Nowadays, books and newspapers are published in Evenki.

General Characteristics: Sentence Structure and Morphonology

Evenki is an agglutinating (suffixal) language with no prefixes. It has nonrigid SOV word order, rich verbal morphology, and predominantly participial and converbal syntax. Adjectives, demonstrative, and possessive pronouns, and numerals always precede the head noun.

Case, Number, and Possessivity

The Evenki noun has 13 cases (plus the comitative, which can also be viewed as a special noncase form). Nominative: zero marker (marks the subject); Accusative 1: *-va* (marks the definite direct object); Accusative 2: *-a/-ya* (marks the indefinite direct object; can also express the partitive meaning and, with markers of personal or reflexive possession, the benefactive meaning of the direct object); Dative: *-du/-tu* (marks locative and temporal adverbials and also addressee and beneficiary); Allative 1-*dula/-tula/-la;* Allative 2: *-tki;* Allative-Prolative: *-kli;* Locative-Allative:*-kla;* Instrumental: *-t/-di;* Ablative 1: *-duk/-tuk;* Ablative 2: *-git;* Prolative: *-duli/-li;* Comitative: *-nun*.

Accusative 2 (traditionally termed indefinite accusative) is used either for indefinite nonreferential objects or for a partitive meaning, and it generally occurs either with the future tense or with the imperative; e.g.,:

(1) *Ukumni-ye* *min-du* *bu:-kel*
milk-ACC2 I-DAT give-IMPERATIVE:2SG
'Give me some milk'

Accusative 2 with the markers of personal possession codes object-oriented benefactive forms, while the same case with reflexive-possessive markers codes subject-oriented benefactive forms, e.g.,: dy*av-ya-v* 'a boat for me', dy*av-ya-s* 'a boat for you'(SG); *dyaw-ya-vi* 'a boat for oneself (myself/yourself/himself/herself)'; dy*av-ya-var* 'a boat for ourselves/yourselves/themselves.' The plural marker is the suffix *-l* on the absolute majority of nominal stems; on nouns with the stem-final *-n*, the plural marker is *-r*, which ousts *-n*, e.g., *oron* 'reindeer.SG' → *oro -r* 'reindeer-PL'. The personal-possessive affixes are: dy*u-v* 'my house', dy*u-vun* 'our (EXCL) house'; dy*u-t* 'our (INCL) house', dy*u-s* 'your (SG) house', dy*u-sun* 'your (PL) house', dy*u-n* 'his/her house', dy*u-tyn* 'their house.' Reflexive-possessive affixes are *-vi/-mi* for a singular possessor: depending on the person of the subject it may mean 'my', 'your (SG), 'his/her'; and *-var/-mar* for a plural possessor: depending on the person of the subject it may mean 'our', 'your (PL)', or 'their'. Morphemic ordering in nouns is the following: noun stem - plural - case - possession, e.g.,: dyu-l-dula-tyn 'to their houses/tents'.

Tense/Aspect System and Agreement

There are eight tenses; the markers are: *-ra*: non-future tense; *-dyara*: present tense; *-cha:* past tense; *-dyacha:* imperfect; *-ngki:* iterative past; *-dya:* future 1; *-dyanga:* future 2; *-dyalla:* future 3. There are about 10 aspectual markers: imperfective *-dya*; inchoative *-l*; semelfactive *-sin/-sn/-s;* distributive *-kta;* durative *-t/ -chi;* habitual *-ngna;* iterative *-van/-vat;* resultative *-cha;* quick action *-malcha*.

Table 1 Agreement markers

	Nominal type		*Verbal type*	
	SG	*PL*	*SG*	*PL*
1st p.	*-v*	*-vun/-t*	*-m*	*-v/-p*
2nd p.	*-s*	*-sun*	*-nni*	*-s*
3rd p.	*-n*	*-tyn*	*-n*	*-ϕ*

There are two types of agreement. The first one coincides with the personal possession nominal markers and is used with tense forms that go back to (and coincide with) participles. The second type is the system of verbal agreement markers proper. Agreement markers of the finite verb forms are the following (see **Table 1**).

Non-finite Verb Forms

There are about 15 converbs and 10 participles. The most common participles are the habitual (marker-*wki*), the simultaneous (*-dyari*), the anterior (*-cha*), the posterior (*-dyanga*). The most common converbs are those of anteriority (marked by *-ksa/kanim*) and temporal-conditional converbs in *-mi (same-subject)* and *-raki (different-subject)*.

Voice System, Means of Valency Change, and Their Combinability

There are four productive means of changing the valency and/or the number of participants, traditionally regarded as voices: causative (marker *-vkan*), passive/decausative *(-v/-p/-mu*), reciprocal (*-mat/-mach*), and sociative. The sociative marker *-ldy* does not change syntactic valency of the base verb, but it changes the number of participants. Reflexivity is expressed pronominally. In this respect, Evenki, like other Tungusic languages, differs from the neighboring Turkic languages and reveals similarity to the neighboring Mongolian languages.

Causative derivation increases the valency of the base verb by one. Causatives are freely derived from all pure transitive and intransitive stems (i.e., stems with no other voice/valency suffixes) and also from sociatives and a few reciprocals, e.g.,: *iche-* 'to see sth' → *iche-vken-* 'to show sth to sb' → *iche-vken-met-* 'to show sth to each other'; *archa-* 'to meet sb' → *archa-mat-* 'to meet each other' → *archa-machi-vkan-*'to cause/let/make sb (to) meet each other'.

Sociative derivation is possible from all pure verb stems and also from causatives, but not from reciprocals and passives:

(2) *Asa-l* *dyu-va*
woman-PL house-ACC
iche-vke-ldy-re-0
see-CAUS-SOC-NFUT-3PL
'The women showed the house [to someone else] together'

Passive derivation (suffix *-v*) is possible from all transitive stems including causatives (thus resulting in either personal or impersonal passive constructions), almost all intransitives (resulting in impersonal passive constructions only) and seven intransitive 'weather' verbs (resulting in personal adversative passives). The marker *-v* homonymous with the passive suffix can function as a nonproductive causative suffix. Passives are not derived from reciprocals and sociative stems.

(3a) *Asi* *dyu-va* *o:-ra-n*
woman house-ACC make-NFUT-3SG
'The woman put up a tent'

(3b) Dy*u* *o:-v-ra-n*
tent make-PASS-NFUT-3SG
'The tent was put up'/'The house was built'

Reciprocal derivation is impossible from passive and sociative stems (the suffix *-ldy-met* is not a reciprocal derivation from sociative but a complex reciprocal suffix). It is possible from causative stems:

(4a) *Asa-l* *dyu-l-var*
woman-PL house-PL-their
iche-vken-met-te-0
see-CAUS-REC-NFUT-3PL
'The women showed their houses to each other'

(4b) *Nungartyn* *eme-vken-met-chere-0*
they come-CAUS-REC-PRES-3PL
'They cause each other to come'

Anticausatives from verbs denoting destruction or change of state are formed by means of the suffix *-rga/-rge*. From a small group of verbs, anticausatives are formed by means of the suffix *-v/-p/-mu*, and it also functions as a passive marker (note that this very suffix is also used to derive causatives from about 50 intransitive and 20 transitive verbs):

(5a) *kapu-* 'to break' (vt) → *kapu-rga* 'to break' (vi)
ety 'to tear' (vt) → *ety-rge* 'to tear' (vi)

(5b) *das*- 'to close' (vt) → *dasi-v*- 'to close' (vi)
sukcha 'to break' (vt) → *sukcha-v*- 'to break' (vi)

Negation, Modality Markers, and Morphemic Ordening

There are two major ways of expressing negation in Evenki: (a) by means of the conjugated negative auxiliary verb e -'not to . . .', and (b) with the negative noun *achin* 'no'.

The modality markers include: *-mu* ('want'), *-ssa* ('try'), and *-na* ('go'), e.g., Nungan homoty-va (ACC1) va: -na-ssa-mu-dyere-n lit. 'He wants to try to go and kill the bear'.

Morphemic ordening in verbs is the following: verb stem - causative - sociative - reciprocal - aspect - passive - modality - evaluation - aktionsarten - tense or non-indicative moods or nonfinite markers - subject agreement (in person/number).

See also: Altaic Languages; Russian; Tungusic Languages.

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Event-Based Semantics

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The notion of *events* may be used in semantic theory in a wide variety of ways, but the term *event-based semantics* normally refers to semantic analyses that incorporate or adapt the proposal of Davidson (1967) that certain predicates take an implicit variable over events as an argument. In Davidson's original proposal, this event argument is accommodated by analyzing the predicate as having one more argument place than is assumed in more traditional analyses. The event variable is existentially quantified, with the result that Sentence (1)a is assigned a logical structure like (1)b, rather than the more traditional (1)c:

(1) a. Jones buttered the toast.
b. $\exists e$ butter(Jones, the toast, e)
c. butter(Jones, the toast)

Thus, *butter* is analyzed as expressing a three-place relation between an individual who butters, an object that gets buttered, and a buttering event; and the sentence is analyzed as asserting that such an event exists.

The initial motivation for this proposal is that it provides a way to analyze adjuncts such as locative, temporal, and instrumental adverbial phrases. These are also treated as predicates of events – or more specifically as predicates of the same event as the verb. Each adjunct gives rise to its own clause in logical structure, and these are combined with the clause corresponding to the verb and its arguments by ordinary propositional conjunction. The existential quantifier binding the event variable takes scope over the whole structure, so that Sentence (2)a is assigned a logical structure like (2)b, for example:

(2) a. Jones buttered the toast with a knife in the bathroom at midnight.
b. $\exists e$[butter(Jones, the toast, e) & with(e, a knife) & in(e, the bathroom) & at(e, midnight)]

This approach has an advantage over one in which the adverbials are treated as arguments of the verb, so that *butter* expresses a five-place relation as in (3):

(3) butter(Jones, the toast, a knife, the bathroom, midnight)

If we adopt a formula like (3), but continue to represent *Jones buttered the toast* as in (1)c, with a two-place relation, we would seem to deny that *butter* expresses the same meaning in both sentences and claim instead that it is ambiguous. Nor is this a simple two-way ambiguity; *butter* will have to express different relations in each of the sentences in (4)

(5b) *das*- 'to close' (vt) → *dasi-v*- 'to close' (vi)
sukcha 'to break' (vt) → *sukcha-v*- 'to break' (vi)

Negation, Modality Markers, and Morphemic Ordening

There are two major ways of expressing negation in Evenki: (a) by means of the conjugated negative auxiliary verb e -'not to . . .', and (b) with the negative noun *achin* 'no'.

The modality markers include: *-mu* ('want'), *-ssa* ('try'), and *-na* ('go'), e.g., Nungan homoty-va (ACC1) va: -na-ssa-mu-dyere-n lit. 'He wants to try to go and kill the bear'.

Morphemic ordening in verbs is the following: verb stem - causative - sociative - reciprocal - aspect - passive - modality - evaluation - aktionsarten - tense or non-indicative moods or nonfinite markers - subject agreement (in person/number).

See also: Altaic Languages; Russian; Tungusic Languages.

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Event-Based Semantics

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The notion of *events* may be used in semantic theory in a wide variety of ways, but the term *event-based semantics* normally refers to semantic analyses that incorporate or adapt the proposal of Davidson (1967) that certain predicates take an implicit variable over events as an argument. In Davidson's original proposal, this event argument is accommodated by analyzing the predicate as having one more argument place than is assumed in more traditional analyses. The event variable is existentially quantified, with the result that Sentence (1)a is assigned a logical structure like (1)b, rather than the more traditional (1)c:

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Thus, *butter* is analyzed as expressing a three-place relation between an individual who butters, an object that gets buttered, and a buttering event; and the sentence is analyzed as asserting that such an event exists.

The initial motivation for this proposal is that it provides a way to analyze adjuncts such as locative, temporal, and instrumental adverbial phrases. These are also treated as predicates of events – or more specifically as predicates of the same event as the verb. Each adjunct gives rise to its own clause in logical structure, and these are combined with the clause corresponding to the verb and its arguments by ordinary propositional conjunction. The existential quantifier binding the event variable takes scope over the whole structure, so that Sentence (2)a is assigned a logical structure like (2)b, for example:

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This approach has an advantage over one in which the adverbials are treated as arguments of the verb, so that *butter* expresses a five-place relation as in (3):

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If we adopt a formula like (3), but continue to represent *Jones buttered the toast* as in (1)c, with a two-place relation, we would seem to deny that *butter* expresses the same meaning in both sentences and claim instead that it is ambiguous. Nor is this a simple two-way ambiguity; *butter* will have to express different relations in each of the sentences in (4)

(4) a. Jones buttered the toast with a knife.
b. Jones buttered the toast in the bathroom.
c. Jones buttered the toast at midnight.
d. Jones buttered the toast with a knife at midnight.
e. Jones buttered the toast with a knife in the bathroom.
f. Jones buttered the toast at midnight in the bathroom.

This massive ambiguity is undesirable.

We might try to avoid the ambiguity by claiming that *butter* always expresses a five-place predicate, and that in examples in which fewer than five arguments appear overtly, the missing argument places are filled by implicit existentially bound variables. However, this strategy ignores the fact that additional adverbials can always be added, with no limit on the number; as long as adverbials are analyzed as arguments, one cannot specify a fixed number of argument places for the verb, even if one allows for implicit arguments.

These problems are avoided completely under Davidson's proposal; *butter* is consistently analyzed as a three-place predicate. An unlimited number of adverbials may be added because these combine with the verb by ordinary conjunction, and not by filling argument places.

A second advantage to this analysis is that it correctly captures the fact that Sentence (2)a entails all the examples in (4) as well as (1)a, that (4)d entails (4)a, (4)c, and (1)a, and so on. Without some extra stipulation, these entailment relations do not fall out of an analysis in which adverbials are arguments to the verb. Extra stipulations are also required to capture these entailment relations in other alternative approaches to the semantics of adverbials, such as an approach in which they are treated as higher-order predicates taking verb intensions as arguments, as in (5):

(5) [at-midnight(^in-the-bathroom(^with-a-knife(^butter)))](Jones, the toast)

Davidson limited his original proposal to 'action sentences' and was explicit that it should not be applied to sentences such as $2 + 3 = 5$. Nonetheless, it is sometimes assumed that a similar analysis should be extended to some or all stative sentences (see especially Parsons, (1987/1988, 1990). In analyses employing both states and events, the term *eventuality* (introduced by Bach, 1986) is often used for the general category covering both.

The issue of which predicates have a hidden argument place for an eventuality, and which do not, is addressed in a well-known proposal by Kratzer (1995); see also Higginbotham (1983) and Fernald (2000). Kratzer suggests that *individual-level* predicates do not have such an argument place, and that *stage-level* predicates do. This position is supported by the following pattern of acceptability:

(6) a. When Mary speaks French, she speaks it well.
b. *When Mary knows French, she knows it well.
c. When a Moroccan speaks French, she speaks it well.
d. When a Moroccan knows French, she knows it well.

Assuming that indefinites contribute free variables to semantic representation (as in File Change Semantics or **Discourse Representation Theory**) and that *when*-clauses serve to restrict the domain of an implicit generic quantifier that can bind these variables, the acceptability of (6)c–d is expected. The unacceptability of (6)b follows from a simple prohibition on vacuous quantification: The *when*-clause contains no free variables for the generic quantifier to bind. Why, then, is (6)a acceptable, as it does not contain any indefinite noun phrases either? Kratzer suggests it is because the stage-level predicate *speak* contributes a free Davidsonian event variable, whereas the individual-level predicate *know* does not.

Another area in which event variables have proven useful is in the semantics of perception reports (Higginbotham, 1983; Vlach, 1983; Parsons, 1990). Sentences like (7)a have been cited in support of thoroughgoing revisions to semantic theory of the kind adopted in **Situation Semantics**; but if we analyze this sentence as meaning that there is an event e of Mary's leaving, and an event e' of John's seeing e, we may assign it the logical structure in (7)b and obtain a reasonable analysis without using resources beyond those of ordinary first-order logic:

(7) a. John sees Mary leave.
b. $\exists e[\text{leave}(\text{Mary}, e)\ \&\ \exists e'\ \text{see}(\text{John}, e, e')]$

Davidson's technique of representing adjunct phrases as expressing separate logical clauses raises the possibility that major arguments of the verb such as the subject, direct object, and so on, might be treated in the same way. Davidson himself rejected this sort of extension, but a variant of it has been very popular in later work. Often termed the *Neo-Davidsonian* approach, this style of analysis treats the verb as a one-place predicate of eventualities; the subject, direct object, and so on do not serve directly as arguments to the verb, but instead stand in thematic relations to an event that fills the verb's sole argument place. A sentence such as (8)a thus receives a logical structure like that in (8)b:

(8) a. Brutus stabbed Caesar.
b. $\exists e$[stab(e) & agent(e, Brutus) & patient(e, Caesar)]

This approach to thematic relations appears first to have been proposed by Parsons (1980, 1985, 1990); see also Carlson (1984) and Krifka (1989, 1992). Note that this style of analysis requires an eventuality argument for all predicates that assign thematic roles, not just action predicates or stage-level predicates – at least on the assumption that thematic roles are represented in a uniform fashion for all predicates that assign them.

One advantage of this approach is that it allows a nice analysis of 'semantically optional' arguments: The direct object of *stab* may be omitted, as in (9)a; to give a logical form, we simply omit the clause for the corresponding thematic relation, as in (9)b:

(9) a. Brutus stabbed.
b. $\exists e$[stab(e) & agent(e, Brutus)]

In a more conventional analysis, we might represent this sentence as in (10)a:

(10) a. $\exists x$ stab(Brutus, x)
b. stab(Brutus)

But as Parsons points out, this entails that Brutus stabbed something, whereas (9)a does not: Brutus could have stabbed and missed. If we try to avoid this entailment by representing (9)a as (10)b, we treat *stab* as ambiguous, expressing a different meaning in (9)a than it does in (8)a; but this is avoided in the Neo-Davidsonian analysis.

The idea that verbs are predicates of events has also been exploited in the analysis of certain types of nominalization (Higginbotham, 1985; Parsons, 1990). Combining the Neo-Davidsonian analysis with an assumption that nominals may express the same predicate of events as the verbs they derive from makes it possible to account for the validity of the argument in (11)a in a very straightforward fashion. This argument is represented as in (11)b, which is licensed by standard principles of first-order logic:

(11) a. In every burning, oxygen is consumed.
Agatha burned the wood.
Therefore, oxygen was consumed.
b. $\forall e$[burn (e) $\rightarrow \exists e'$ [consume(e') & theme (e', oxygen) & in(e, e')]]
$\exists e$[burn(e) & agent(e, Agatha) & patient (e, the wood)]
$\exists e'$[consume(e') & theme(e', oxygen)]

Event arguments have also been used extensively in the analysis of Aktionsart. One line of research in this area, exemplified by Pustejovsky (1991, 1995) and Grimshaw (1990), represents events of certain complex types as structurally composed of events of simpler types. For example, an accomplishment predicate such as *build* may be associated with events of the structure illustrated in (12):

(12)
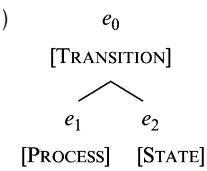

Here e_1 represents the building process itself, whereas e_2 represents the resultant state of something having been built. As a telic predicate, *build* involves reference not just to the building process, but also to its culmination in the transition to a result state, represented by e_0.

A rather different approach to the event-theoretic representation of Aktionsart was developed by Krifka (1989, 1992). Here, a 'sum' operation is assumed on events, so that for any two events e_1, e_2, a complex event $e_1 \sqcup e_2$ consisting of them is assumed to exist. A part/whole relation is definable in terms of the sum operation: $e_1 \sqsubseteq e_2$ ('e_1 is a part of e_2') iff $e_2 = e_1 \sqcup e_2$. Predicates are assumed to denote sets of events, allowing aspectual classes to be defined in terms of closure conditions on these sets. Cumulative predicates are those denoting sets that are closed under the sum operation:

(13) $\mathrm{CUM(P)} \leftrightarrow \forall x, y\ [[\mathrm{P}(x)\ \&\ \mathrm{P}(y)] \rightarrow \mathrm{P}(x \sqcup y)]$

For example, if x is a walking event, and y is a walking event, their combination is also a walking event. In contrast, quantized predicates denote sets from which proper parts of their members are excluded:

(14) $\mathrm{QUA(P)} \leftrightarrow \forall x, y\ [[\mathrm{P}(x)\ \&\ \mathrm{P}(y)] \rightarrow x \not\sqsubset y]$

For example, if x is an event of drinking a glass of wine, and y is also an event of drinking a glass of wine, x cannot be a proper part of y. Cumulative and quantized predicates of events correspond roughly to the familiar categories of atelic and telic predicates, respectively. However, by assuming a sum operation and corresponding part/whole relation on individuals, and not just events, it is possible to apply these concepts to predicates of individuals as well. For example, if x is wine and y is wine, their sum must also be wine, establishing *wine* as a cumulative predicate; if x is a glass of wine and y is a glass of wine, x may not be a proper part of y, establishing *glass of wine* as a quantized predicate. The status of a verb's arguments as cumulative or quantized often affects the aspectual category of the verb phrase or sentence; hence (15)a is cumulative whereas (15)b is quantized:

(15) a. John drank wine.
b. John drank a glass of wine.

Assuming a Neo-Davidsonian representation of thematic relations, Krifka explored the mathematical properties such relations must have to give this effect.

A related application of part/whole structures for events was developed by Lasersohn (1990, 1995) for the semantics of plurality (see also Schein, 1993). Distributive readings of predicates with plural subjects are analyzed as representing events that divide into smaller events corresponding to the individual members of the group denoted by the subject. For example, an event of John and Mary sitting divides into a smaller event of John sitting and one of Mary sitting. Collective readings correspond to events that cannot be divided in this way; an event of John and Mary being a happy couple does not divide into an event of John being a happy couple and an event of Mary being a happy couple. Representing the collective/distributive distinction in terms of event structure in this way makes possible an extensional analysis of adverbials like *together*, which imposes a collective reading on the predicates it modifies.

Event-based semantics has also been fruitfully applied to a wide variety of other problems, of which space limitations prevent a discussion here: plurality (Lasersohn, 1990, 1995; Schein, 1993; Landman, 2000), temporal anaphora and narrative progression (Hinrichs, 1986; Partee, 1984), cognate objects (Mittwoch, 1998), adjectives (Larson, 1998), and many others. There is also a large philosophical literature on events, much of which relates directly to Davidsonian-style event-based semantics; see Davidson (1980), LePore and McLaughlin (1985), Higginbotham *et al*. (2000), and the references cited therein.

See also: Adverbs; Aspect and Aktionsart; Discourse Representation Theory; Nominalization; Plurality; Situation Semantics; Thematics.

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Evidentiality in Grammar

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Evidentiality is a grammatical category that has source of information as its primary meaning – whether the narrator actually saw what is being described, or made inferences about it based on some evidence, or was told about it, etc. Languages vary in how many information sources have to be marked. Many just mark information reported by someone else; others distinguish firsthand and nonfirsthand information sources. In rarer instances, visually obtained data are contrasted with data obtained through hearing and smelling, and through various kinds of inference.

As Boas (1938: 133) put it, "while for us definiteness, number, and time are obligatory aspects, we find in another language location near the speaker or somewhere else, source of information – whether seen, heard, or inferred – as obligatory aspects." The terms 'verificational' and 'validational' are sometimes used in place of 'evidential.' French linguists employ the term 'mediative' (Guentchéva, 1996). The term 'evidential' was first introduced by Jakobson (1957). A summary of work on recognizing this category, and naming it, is in Jacobsen (1986) and Aikhenvald (2004).

Evidentiality is a verbal grammatical category in its own right, and it does not bear any straightforward relationship to truth, the validity of a statement, or the speaker's responsibility. Neither is evidentiality a subcategory of epistemic or any other modality (pace Palmer 1986: 51): in numerous languages irrealis and other modalities can occur together with evidentials (also see discussion in De Haan, 1999; Lazard, 1999, 2001; and DeLancey, 2001).

In Tariana, an Arawak language spoken in the multilingual area of the Vaupés in northwest Amazonia, speakers have to specify whether they saw the event happen, or heard it, or know about it because somebody else told them, etc. Omitting an evidential typically results in an ungrammatical and highly unnatural sentence (see details in Aikhenvald, 2004).

If one saw José play football, (1) would be appropriate:

(1) Juse irida di-manika-**ka**
José football 3person.masculine.singular-play-RECENT.PAST.VISUAL
'José played football (we saw it)'

If one just heard the noise of a football game but could not see what was happening, (2) is the thing to say:

(2) Juse irida di-manika-**mahka**
José football 3person.masculine.singular-play-RECENT.PAST.NONVISUAL
'José played football (we heard it)'

If one sees that the football is not in its normal place in the house, José and his football boots are gone, with crowds of people coming from the football ground, these details are enough for us to infer that José is playing football:

(3) Juse irida di-manika-**nihka**
José football 3person.masculine.singular-play-RECENT.PAST.INFERRED
'José played football (we infer it from visual evidence)'

If José is not at home on a Sunday afternoon, we can safely say (4). Our inference is based on general knowledge about José's habits: he usually plays football on Sunday afternoon.

(4) Juse irida di-manika-**sika**
José football 3person.masculine.singular-play-RECENT.PAST.ASSUMED
'José played football (we infer it from general knowledge)'

If one learnt the information from someone else, then (5) – with a reported evidential – is the only correct option:

(5) Juse irida di-manika-**pidaka**
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'José played football (we were told)'

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Languages that have 'evidentiality' as a grammatical category vary in how many types of evidence they

mark. Some distinguish just two terms (eyewitness and noneyewitness, or reported and everything else), while others six or more terms.

Every language has some lexical way of referring to information source, e.g., English *reportedly* or *allegedly*. Such lexical expressions may become grammaticalized as evidential markers. Nonevidential categories may acquire a secondary meaning relating to information source. Conditionals and other nondeclarative moods may acquire overtones of uncertain information obtained from some other source, for which the speaker does not take any responsibility; the best known example is the French conditional (Dendale, 1993). Past tense and perfects acquire overtones of nonfirsthand information in many Iranian and Turkic languages, and resultative nominalizations and passives (also with a resultative meaning) can express similar meanings. In other languages, the choice of a complementizer or a type of complement clause may serve to express meanings related to how one knows a particular fact. In English, different complement clauses distinguish an auditory and a hearsay meaning of the verb *hear*: saying *I heard Brazil beating France* implies actual hearing, while *I heard that Brazil beat France* implies a verbal report of the result. These evidential-like extensions are known as 'evidentiality strategies' (Aikhenvald, 2003a). Historically, they may give rise to grammatical evidentials.

Languages with evidentials fall into a number of subtypes, depending on how many information sources acquire distinct grammatical marking. Small systems with just two choices cover:

A1. Firsthand vs. nonfirsthand. The firsthand term typically refers to information acquired through vision (or hearing, or other senses), and the nonfirsthand covers all other sources, including information acquired by senses other than seeing, by inference and by verbal report. A useful overview of such systems, especially in Turkic and Iranian languages, is in Johanson and Utas (2000). In (6), from Jarawara, an Arawá language from Brazil (Dixon, 2003), a firsthand evidential marks what the speaker could see, and the nonfirsthand refers to what he could not see

(6) Wero kisa-me-**no**,
name get.down-BACK-IMMEDIATE.PAST.NONFIRSTHAND.masculine
ka-me-**hiri**-ka
be.in.motion-BACK-RECENT.PAST.FIRSTHAND.masculine-DECLARATIVE.masculine
'Wero got down from his hammock (which I didn't see), and went out (which I did see)'

A2. Nonfirsthand and everything else. The nonfirsthand evidential covers a large domain of information acquired through senses other than seeing, and through hearsay and inference of all sorts, as in many Caucasian languages, and also in Turkic and Finno-Ugric languages (Johanson, 2003; Aikhenvald, 2003a). Forms unmarked for evidentiality are evidentially neutral (they do not have any reference to information source). The nonfirsthand evidential in Abkhaz, a Northwest Caucasian language (Chirikba, 2003), can describe inference, as in (7): that the woman was crying is inferred from the fact that her eyes are red. The same form is used for reported information.

(7) jə-q'a-n d'ᵒəwa-**zaarən**
it-be-PAST (s)he+cry-NONFIRSTHAND
'(when she came up to the light, to the fire, her eyes were very red) Apparently, she had been crying' (speaker's inference)

A3. Reported (or 'hearsay') and everything else. Systems of this sort with one, reported, evidential, which covers information acquired through someone else's narration, are widespread all over the world (see, for instance, Silver and Miller (1997: 38) on North American Indian languages). (8) comes from Estonian:

(8) Ta **olevat**
he be.REPORTED
arsti-teaduskonna
doctor-faculty.GENITIVE.SINGULAR
lõpeta-nud
finish-PAST.PARTICIPLE
'He is said to have completed his studies of medicine (but I wouldn't vouch for it)'

A4. Sensory evidence and reported. The sensory evidential refers to something one has seen, heard, smelt, or felt (by touch); the other evidential refers to verbal report, as in the Australian languages Ngiyambaa (Wangaaybuwan-Ngiyambaa) and Diyari (Dieri).

Of these, A1 and A4 are clear-cut two-term systems, while A2 and A3 include an 'everything else,' or evidentially neutral, term.

Systems with three choices are:

B1. Direct (or visual), Inferred, and Reported. Depending on the system, the first term can refer to visually acquired information, as in Qiang, a Tibeto-Burman language from China; or to information based on sensory evidence, which covers seeing, hearing, smelling and touching something, as in Mosetén, an isolate from Bolivia, the Jaqi, or Aymara languages

from Bolivia (Hardman, 1986), and Shilluk (a Western Nilotic language from Sudan). Quechua languages have three evidentiality specifications: direct evidence (*-mi*), conjectural (*-chi*, *-chr(a)*) and reported (*-shi*) (see Floyd, 1999, on Wanka Quechua:

(9) trabaja-aña-**m** li-ku-n
work-PURPOSE. MOTION-now-DIRECT. EVIDENTIAL go-REFLEXIVE-3person
'He's gone to work' (I saw him go)

(10) chay lika-a-nii
that see-NOMINALISER-1person
juk-ta-**chra**-a lika-la
other-ACCUSATIVE-CONJECTURAL. EVIDENTIAL-TOPIC see-PAST
'The witness ('my seer') must have seen someone else' (her house was robbed; she saw someone next to her house, it was not me, I infer it was (*-chr*) someone else)

(11) Ancha-p-**shi**
too.much-GENITIVE-REPORTED.EVIDENTIAL
wa'a-chi-nki
cry-CAUSATIVE-2person
wamla-a-ta
girl-1person-ACCUSATIVE
'You make my daughter cry too much' (they tell me)

B2. Visual, Nonvisual sensory, Inferred are found in Washo, from the California-Nevada border and in Siona, a West Tucanoan language from Ecuador.

B3. Visual, Nonvisual sensory, Reported are found in Oksapmin (isolate from Papua New Guinea), Maricopa, a Yuman language from Arizona, and Dulong, a Tibeto-Burman language from Burma.

B4. Nonvisual sensory, Inferred, Reported are found in the Samoyedic languages Nganasan and Enets.

B5. Reported, Quotative and everything else. Only reported and quoted information requires a special marker in a few North American Indian languages, e.g., Comanche, a Uto-Aztecan language from Oklahoma.

These systems include at least one sensory specification. The nonvisual sensory evidential in B2, B3, and B4 systems typically covers information acquired by hearing, smelling, and touching, and feeling. The inferred evidential refers to inference based on visible traces and assumption, while the reported evidential describes any kind of verbal report. If a language has an evidentially unmarked form, its evidentiality value is typically recoverable from the context.

Four-term systems cover:

C1. Visual, Nonvisual sensory, Inferred, Reported, as in numerous East Tucanoan languages spoken in northwest Amazonia, and in Eastern Pomo, a Pomoan language from California.

C2. Visual or direct evidence, Inferred, Assumed, REPORTED, as in Shipibo-Konibo, a Panoan language from Peru. The sensory evidential in a C2 system can refer to firsthand knowledge acquired through any physical sense, be it vision, hearing, smell, taste, or touch, as in Shipibo-Konibo; or it may refer just to information acquired by seeing, as in Tsafiki, a Barbacoan language from Ecuador (Dickinson, 2000). The visual evidential is formally unmarked; there is one suffix marking information inferred from direct physical evidence, another for inference from general knowledge, and an additional one for reported, or hearsay.

(12) Manuel ano fi-e
Manuel food eat-DECLARATIVE
'Manuel ate' (the speaker saw him)

(13) Manuel ano fi-nu-e
Manuel food eat-INFERRED-DECLARATIVE
'Manuel ate' (the speaker sees the dirty dishes)

(14) Manuel ano fi-n-ki-e
Manuel food eat-NOMINALISER-VERB.CLASS:do-DECLARATIVE
'Manuel ate' (He always eats at 8:00 and it's now 9:00)

C3. Direct (or visual) Inferred, Reported, Quotative are found in Cora, a Uto-Aztecan language from Mexico.

Four-term systems involve at least one sensory specification. If there is just one sensory evidential, additional complexity arises within inferred evidentials (as in C2: one evidential then refers to inference based on visible results, and the other one to inference based on reasoning and assumption). Additional choices between reported evidentials involve distinguishing reported and quoted information (C3).

The only type of multiterm system found in more than one language involves:

D1. Visual, Nonvisual sensory, Inferred, Assumed, and Reported. This system was exemplified in (1)–(5) above and is also found in Tucanoan languages in Brazil and Colombia, such as Tuyuca and Desano (Barnes, 1984).

Systems with more than five terms have just two sensory evidentials, and a number of evidentials based on inference and assumption of different kinds, as in the Nambiquara languages from Brazil, and Foe and Fasu, of the Kutubuan family spoken in the Southern Highlands of Papua New Guinea. In some languages, a wide variety of evidential meanings may be expressed in different slots of the verbal word or within a clause. Different evidentiality specifications are 'scattered' throughout the grammar, and by no means form a unitary category, as in Makah, a Wakashan language from Washington State (Jacobsen, 1986), in Eskimo languages and in Western Apache, an Athabaskan language from Arizona (de Reuse, 2003: 97).

Evidentials can be expressed with a wide array of morphological mechanisms and processes. There is no correlation between the existence of evidentials and language type. Even pidgins and creoles are known to have had evidentials (as did Chinese Pidgin Russian). Examples of a truly functionally unmarked form in an evidentiality system are rare. The firsthand, visual, or a combined visual and sensory, evidential tends to be less formally marked than any other term. This term is formally unmarked in some languages, as we saw in (12), from Tsafiki. Evidentiality neutral terms are a property of a few systems where an evidential is opposed to 'everything else' (these are A2, A3, A5, and B5). This is quite different from omitting an evidential, which can happen either if the information source is clear from the context, or if evidentials are mutually exclusive with some other morpheme, e.g., mood, as in Samoyedic languages.

Cooccurrence of different evidentials in one clause – and the different morphological statuses of evidentials – provides a tool for distinguishing evidentiality subsystems within one language. If a language has several distinct evidentiality subsystems, the reported specification is most likely to be set apart from others.

Evidentials differ from other grammatical categories in a number of ways. The information source can be marked more than once in a clause. Two sources can be different, but somehow linked together, as in Tsafiki (Dickinson, 2000: 408):

(15) Manuel ano **fi-nu-ti-e**
Manuel food eat-INFERENCE.PHYSICAL.EVIDENCE-REPORTED-DECLARATIVE
'He said/they say Manuel has eaten' (they didn't see him, but they have direct physical evidence)

In Eastern Pomo, the two sources can be fully distinct: describing information source of a blind man, one uses a nonvisual evidential, while the story is told in reported evidential because the narrator heard it from someone else. These features make evidentiality similar to a predication in its own right. Further arguments to the same effect include:

- An evidential may be within the scope of negation, as in Akha, a Tibeto-Burman language (Hansson, 2003). In (16), the visual experience and not the verb itself is being negated:

(16) àjɔq áŋ dì
he NOUN.PARTICLE beat
ɔ àshú yà mà ŋá
VERBAL.PARTICLE who not VISUAL
'I do not know/can't see who is beating him'

- An evidential can be questioned, as in Wanka Quechua (Floyd, 1999: 132).
- The 'truth value' of an evidential may be different from that of the verb in its clause. Evidentials can be manipulated to tell a lie. One can give a correct information source and wrong information, as in saying 'He is dead-REPORTED,' when you were told that he is alive, or correct information and wrong information source, as in saying 'He is alive-VISUAL,' when in fact you were told that he is alive, and did not see him die.
- And finally, an evidential can have its own time reference, distinct from the time reference of the event talked about (see Aikhenvald, 2003b, for Tariana).

Evidentials vary in their semantic extensions, depending on the system and its structure. The firsthand term in two term-systems typically refers to visual and often other sensory information, and can be extended to denote the direct participation, control, and volitionality of the speaker. The sensory evidential in A4 systems refers to sensory perception of any kind, without any epistemic or other overtones. The nonfirsthand term in A1 and A2 systems means the opposite of firsthand. The nonfirsthand often implies lack of participation, lack of control, nonspecific evidence (or no evidence at all), inference, and hearsay. An extension to hearsay is sometimes found but is not universal.

There are hardly any epistemic extensions in A1 evidentiality systems with two choices. Languages tend to have other ways of expressing probability and possibility.

In systems with three or more terms, the visual or the direct evidential usually covers information acquired through seeing, and also generally known and observable facts. It may be extended to indicate certainty. The nonvisual sensory evidential in B2, B3, and B4 systems refers to information acquired by

hearing, smell, touch, or feeling (such as an injection), and has no epistemic extensions. No language has a special evidential to cover smell but not auditory information. The inferred evidential typically covers inference based on visual evidence, on nonvisual sensory evidence, on reasoning or on assumption. It is also used to refer to someone else's 'internal states' – feelings, knowledge, and the like. It may acquire an epistemic extension of 'conjecture,' uncertainty, and lack of control.

The reported evidential is semantically uniform in systems of all types. Its core meaning is to mark that information comes from someone else's report. A reported evidential can be used as a quotative, to indicate the exact authorship of the information, or to introduce a direct quote. It can be used for a secondhand or thirdhand report. A reported evidential may develop an epistemic extension of unreliable information, as a means of 'shifting' responsibility for the information to some other source one does not vouch for, as in Estonian: example (8) has overtones of 'I don't vouch for this information.' Such extensions are not universal. As Valenzuela (2003: 57) remarks for Shipibo-Konibo, the selection of reported evidential over the direct evidential "does not indicate uncertainty or a lesser degree of reliability but simply reported information."

Languages with multiterm evidentials generally tend to have a multiplicity of other verbal categories, especially ones that relate to modalities. The larger the evidential system, the less likely it is that the evidential terms will develop epistemic extensions.

A nonfirsthand term in a two-term system, or an inferred term in a three-term system, tend to subsume all sorts of information acquired indirectly. These evidentials may then evolve mirative extensions (to do with unexpected information, the 'unprepared mind' of the speaker, and speaker's surprise: DeLancey, 1997, 2001).

When used with a first person subject, the nonfirsthand evidentials in A1 and A2 systems, nonvisual evidentials in larger systems, and reported in systems of varied types may acquire additional meanings of lack of intention, control, awareness, and volition on the part of the speaker. Verbs covering internal states may require obligatory evidential choice depending on person. As a result of these correlations evidentials acquire the implicit value of person markers.

Evidentials interrelate with clause types and other grammatical categories in the following ways:

1. The maximum number of evidential specifications tends to be distinguished in declarative main clauses.
2. The most frequent evidential in commands is reported ('do what someone else told you to'). The choice of an evidential in questions may contain reference to the source of information available to the speaker, to the addressee or to both.
3. Fewer evidentials may be used in negative clauses than in positive.
4. Nonindicative modalities (conditional, dubitative and so on) may allow fewer evidential specifications than the indicative. In many languages, evidentials may not be used in future which is, by its nature, a kind of modality.
5. The maximum number of evidential specifications is expected in past tenses. In some languages, as in Jarawara (Dixon, 2003), firsthand and nonfirsthand evidentials are distinguished only in the past. The source of information for an event is often based on its result, hence the link between firsthand/nonfirsthand, on the one hand, and past, perfect, perfective, and resultative on the other.

Evidentials often come from grammaticalized verbs. The verb of 'saying' is a frequent source for reported and quotative evidentials, and the verb 'feel, think, hear' can give rise to a nonvisual evidential in large systems. Closed word classes – deictics and locatives – may give rise to evidentials, both in small and in large systems.

Evidentiality strategies involving past tenses and perfects, and nominalizations, can develop into small evidentiality systems (A1 and A2). The creation of a reported evidential may involve reanalysis of subordinate clauses (typically, complement clauses of verbs of speech) as main clauses (as in Estonian). Nonindicative moods and modalities may give rise to a term in a large evidentiality system; however, there are no examples of a modal system developing into a system of evidentials. This lack of evidence confirms the separate status of evidentiality and modality. Large evidential systems tend to be heterogenous in origin.

Evidentiality is a property of a significant number of linguistic areas, including the Balkans, the Baltic area, India, and a variety of locations in Amazonia (Aikhenvald and Dixon, 1998). Evidentials may make their way into contact languages, such as Andean Spanish (see papers in Hardman, 1981).

If several information sources are available – for instance, I both saw and heard a dog barking and later someone told me about it – any one of three evidentials can potentially be used: visual, nonvisual, and reported. In this situation, the visual evidential tends to be preferred. The genre of a text may determine the choice of an evidential. Traditional stories are typically cast in reported evidential. Evidentials

can be manipulated in discourse as a stylistic device. Switching from a reported to a direct (or visual) evidential creates the effect of the speaker's participation and confidence. Switching to a nonfirsthand evidential often implies a backgrounded aside. Evidentiality is interlinked with conventionalized attitudes to information and precision in stating the source of information (Hardman, 1981, 1986).

See also: Arawak Languages; Epistemology and Language; Inference: Abduction, Induction, Deduction; Mood and Modality in Grammar; Reported Speech: Pragmatic Aspects; Tense, Mood, Aspect: Overview.

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Evoked Potentials

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Introduction

An event related potential (ERP) is a transient fluctuation in the brain's electrical field generated by neural activity and induced, in language studies, by the presentation of a visual or auditory language stimulus. ERPs are the oldest noninvasive technique for imaging the activity and location of brain systems during language processing. ERPs complement and extend the imaging power of other prominent imaging technologies, which include magnetoencephalography (MEG), positron emission tomography (PET), and most recently, functional magnetic resonance imaging (fMRI). Each technique has its advantages and disadvantages, but all remain vital emerging technologies for understanding the functional organization of language in the human brain.

The major goals of ERP language imaging research are to understand how the human language faculty is anatomically and functionally organized in the brain, how it maps spoken, signed, or written language onto mental structural representations and meaning, how it interacts with other cognitive brain systems, how it breaks down or reorganizes due to trauma or developmental factors, and how innate neurodevelopmental constraints and specific language experiences interact to determine its neurobiological organization.

Linguistic and psycholinguistic theory have played prominent roles in guiding ERP research toward these goals. For example, one dominant theme of linguistic theory has been the division of the human language faculty into modular subtheories that function independently to generate phonology, syntax, and semantics. Debates about the psychological reality of modular subtheories have produced competing psycholinguistic proposals to explain how processing mechanisms may proceed either modularly or interactively, in sequence or in parallel, to build coherent linguistic representations in the brain during sentence comprehension. Contemporary ERP research provides a powerful methodology for testing competing processing theories.

As recording technology and analysis methods have become more sophisticated, ERP studies have yielded new and unprecedented detail about the cerebral locations, time-courses, and functional interactions of different domains of language processes. ERPs have helped to provide answers to major questions about the stages of sentence processing from perception to comprehension, the nature of semantic processing, the timing of syntactic operations, the distinct roles of each hemisphere in language processing, the neurobiology of developmental language disabilities, and the neurobiology of language-specific versus language-universal processes. This article illustrates the importance of ERP imaging to our rapidly growing understanding of the neurobiology of human language by presenting contemporary highlights of these contributions.

What is an ERP?

An ERP, in the context of typical language studies, is a short-lived (approximately 1–2 seconds) fluctuating electrical response produced by the brain, and recorded from electrodes resting on the scalp. It reflects neural activity associated with the sudden appearance and processing of a language stimulus. Typical stimuli may include language elements such as spoken or printed syllables, letters, words, or lexical signs from a visual-spatial language such as American Sign Language (ASL). The ERP provides moment-by-moment information about how the brain identifies and interprets the linguistic features of those language elements. When those elements are presented as parts of a sentence, the ERP reflects information about the roles those elements play in the structural and semantic mental representations of the entire sentence.

When ERPs are sampled from different places on the scalp, they can provide information about where the brain systems that build mental language representations are located. Historically, cost and time considerations have restricted most laboratories to the use of a few sparsely distributed electrodes to sample ERPs at different places on the scalp. Therefore, localizing language systems based on ERP data has tended to be a crude or sometimes misleading process. However, the advent of sophisticated microcomputers and advanced electrode system design during the last two decades have made affordable 'dense-array' scalp recording technology available, in which dozens or hundreds of electrodes can be quickly situated on a person's scalp. Dense-array recordings provide unprecedented spatial detail of the brain's surface electrical fields during language processing, and permit anatomically plausible localization of the neural mechanisms underlying a particular language process within the 3-dimensional geometry of the brain.

Figure 1A shows a human volunteer wearing a state-of-the-art 128-sensor dense-array electrode net

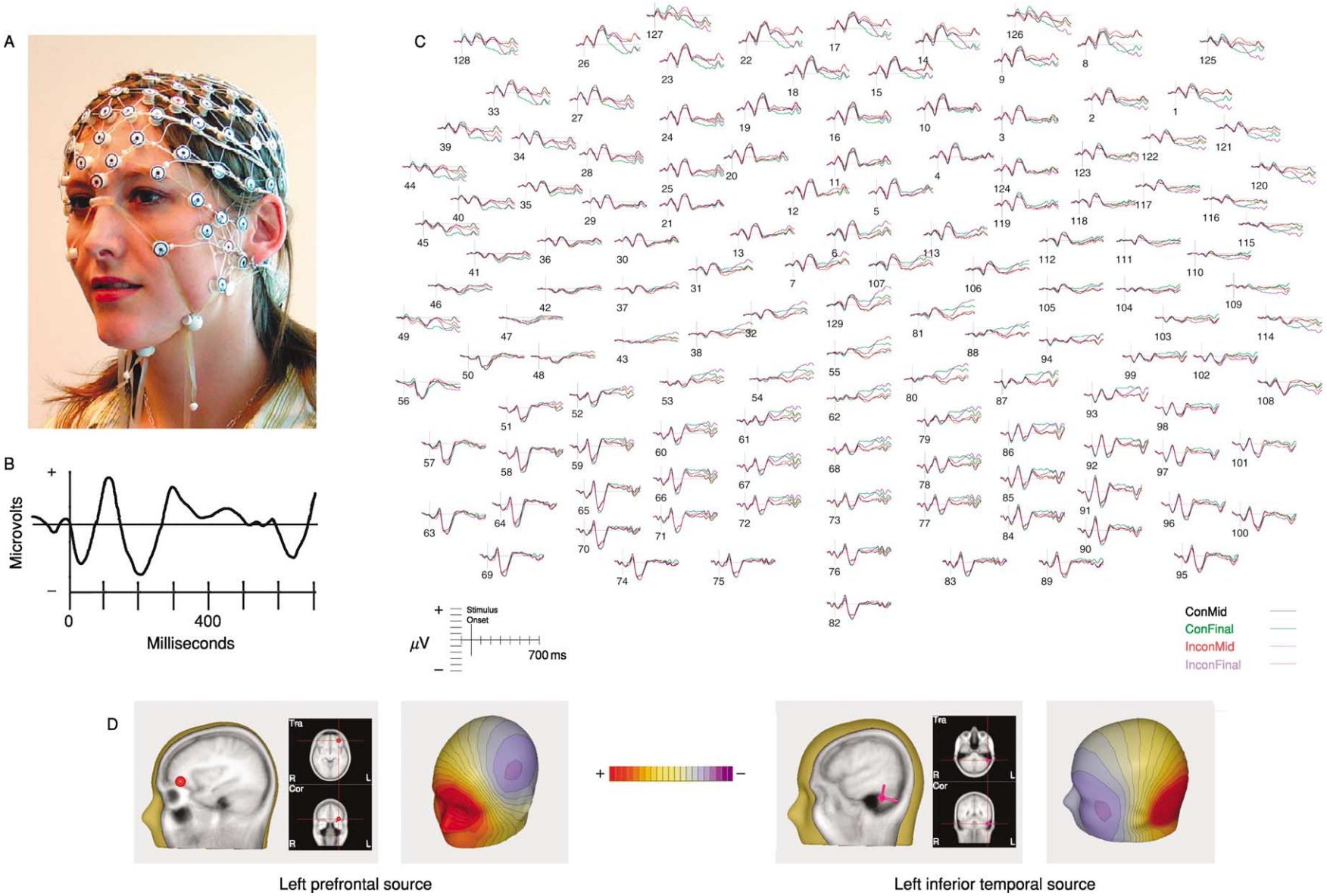

Figure 1 (A) 128-sensor HydroCel Geodesic Sensor Net (reproduced by permission of Electrical Geodesics, Inc.) (B) Example of an ERP to a visually presented word. (C) A 128-channel dense-array ERP data set showing superimposed ERPs to visually presented words at each electrode site from different conditions in a semantic sentence processing study (based on Frishkoff *et al.*, 2004; supplied by and printed with permission of the authors). (D) Graphic representation of the 3-D location and projection scalp electrical fields of 2 of 10 ERP sources recovered from the topographic pattern of the data set represented in **Figure 1C**. (Adapted from Figure 6 of Frishkoff *et al.*, 2004; reprinted with permission of the authors.)

manufactured by Electrical Geodesics, Incorporated (Tucker, 1993). Each of the 128 electrodes can record a single ERP, such as that shown in Figure 1B, in response to a language stimulus. Because the voltage amplitude of an ERP to a single stimulus is tiny compared with the simultaneously occurring EEG, the same type of language stimulus must be presented several times, a second or two of brain activity must be sampled each time, and the samples must be averaged together to cancel out the random background EEG fluctuations. When this is done, stable microvolt-scale negative and positive peaks appear that comprise the ERP.

The ERP peaks are produced by the electrical fluctuations contributed to the scalp electrical field by many separate neural networks, or sources, located throughout the brain and functioning during different, often overlapping time periods after the stimulus. Many of these networks of neurons comprise the neural substrates of specific language subsystems. They are activated or inhibited in real time by the sequence of processing demands of the language stimulus and the performance requirements of the language task. Some ERP peaks will therefore appear, disappear, or change in amplitude or latency as a function of the occurrence of different specific language processes in different experimental processing tasks, providing a direct real-time measure of the activity of those processes.

Figure 1C displays a full set of ERPs recorded from 128 sites on the scalp during a recent semantic sentence processing study by Frishkoff *et al.* (2004). At each scalp location, the ERPs from four different experimental types of language stimuli within sentences are overlapped for comparison. At some locations the four stimulus types produced almost identical ERPs, while at other locations the four ERPs had very different patterns. The timing and distribution, or topography, of such language-related waveform differences over the scalp provide the basic information necessary for imaging the underlying language systems producing them. By applying mathematically sophisticated tools for component analysis, topographic animation, and electrical source analysis to densely sampled waveform sets, the location of the multiple sources that generate the scalp potentials can be inferred and their separate influences on the surface electrical fields at each moment in time can be observed (Tucker *et al.*, 1994; Scherg, 1990). Figure 1D shows the 3-D locations (left) and the individual scalp electrical field projections (right) of two examples of the 10 sources identified by Frishkoff *et al.* (2004) that combined to produce the language-related waveform differences in the ERPs in Figure 1C.

Advantages of ERPs

Excellent Temporal Imaging

Although the term *imaging* typically connotes spatial or spatiotemporal representations of functional brain systems, ERPs are often selected for language studies because they provide excellent *temporal* imaging of language processes at their natural rate of progression, on the order of tens or hundreds of milliseconds. Temporal imaging simply means the detailed millisecond-by-millisecond resolution of the complex time-courses of language processes by the ERP waveform and its components, regardless of the number of electrodes placed on the scalp. Indeed, many studies are less concerned with identifying the neural source locations and cortical topographies of a language process than with imaging the basic time-course of that process in relation to other language processes in order to test specific processing theories. Many aspects of perceptual, attentional, phonological, syntactic, and semantic processing occur within a few hundred milliseconds after the stimulus. ERPs from only a few optimally chosen recording sites are often sufficient to accurately track the relative amplitudes and latencies of different ERP components associated with those processes. fMRI and PET techniques cannot resolve the time courses of those processes since they typically have time resolutions on the order of seconds.

Good Spatial Resolution

The ability of ERPs to adequately image the distribution of electrical fields over the surface of the scalp and to reveal anatomically plausible localizations of language systems depends directly on how densely electrodes are placed over the whole scalp. Dense sampling with an array of 128 electrodes typically resolves the useful range of ERP spatial frequencies and avoids significant technical reference problems that produce misleading localization of electrical sources (Srinivasan *et al.*, 1998; Tucker *et al.*, 1994).

Because many different source configurations can produce the same distribution of electrical fields over the scalp, accurately localizing neural sources of language-related ERP components typically requires constraints based on prior knowledge of additional localizing data from fMRI or PET activation patterns observed during similar language processing tasks (Scherg and Berg, 1991). The recent development of advanced methods for recording truly concurrent ERP and fMRI data promises to substantially improve the spatiotemporal imaging power of ERP data by providing direct activation maps of ERP component sources during language processing (Goldman *et al.*, 2000).

Selectivity of Components for Specific Representational Levels of Language Processes

In certain experimental paradigms, some ERP components are sensitive to specific representational levels of language processing and are produced by different sources in the brain (Friederici and Kotz, 2003; Martin-Loeches *et al.*, 2001; Neville *et al.*, 1992; Nevins *et al.*, 2004; Osterhout and Holcomb, 1992). The following components have become central to ERP language studies.

The N400 component (Kutas and Hillyard, 1980) is a broad negative deflection that arises between 300 and 500 ms after the presentation of a word in a sentence that is semantically incongruous with the rest of the sentence (e.g., 'The boy ate cookies and bicycles') compared with a semantically congruous word (e.g., 'The boy ate cookies and milk'). Figure 2 illustrates the N400. Because its amplitude varies as a function of manipulations that produce semantic priming and sentence-level semantic constraints (Kutas and Van Petten, 1994), the N400 has become a mainstay ERP tool for studying semantic integration in sentence processing and its interaction with other levels of linguistic representation, such as syntactic and lexical processes.

The early left anterior negativity (ELAN) arises about 150 to 200 ms poststimulus in response to phrase structure violations (e.g., when a verb appears in a sentence position where the preceding syntactic frame requires a noun). A somewhat later left anterior negativity (LAN), occurring around 350 to 500 ms, appears to reflect violations of agreement, case marking, and thematic role assignment (Coulson *et al.*, 1998; Friederici and Kotz, 2003).

The P600 component arises between 400 and 800 ms after a stimulus word that violates the syntactic constraints of its sentence context or that triggers a syntactic reanalysis to repair a misparsing of a grammatically correct but ambiguous sentence frame (Friederici *et al.*, 1993; Osterhout and Holcomb, 1992). The P600 is responsive to a wide range of syntactic violations (Hagoort, 2003). The P600 may reflect general syntactic integration processes that compare the ongoing language input with the syntactic predictions established by previous sentence structure (Kaan *et al.*, 2000). It may also reflect the effort required to attempt syntactic reanalysis to make sense of implausible thematic role assignments in syntactically correct sentences (Hoeks *et al.*, 2004).

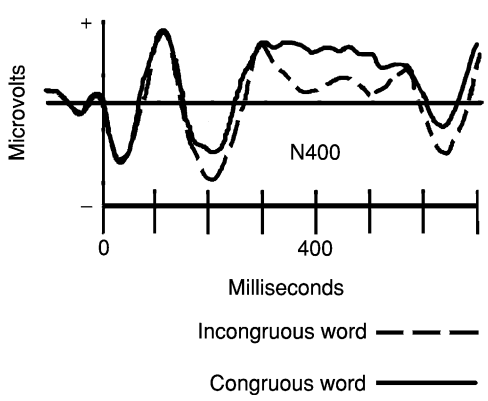

Figure 2 The N400 component is a negative deflection produced by lexical items that are semantically incongruous with their sentence context (e.g., 'The boy ate cookies and bicycles.') compared with lexical items that are semantically congruous (e.g., 'The boy ate cookies and milk.')

The recognition potential (RP) is an ERP component peaking at about 250 ms that indexes the function of neural networks concerned with the initial processing of individual words, especially lexical semantic processing, and is functionally distinct from the N400 (Martin-Loeches *et al.*, 2001).

By using linguistically sophisticated materials based on coherent psycholinguistic models to elicit these and other classic ERP components, researchers have begun to address core issues regarding lexical processing and sentence processing theory and have had some success at modeling the associated underlying brain systems, as illustrated below.

Lexical Access

Lexical access refers to the retrieval of the orthographic, phonological, syntactic, and semantic features of individual words during language processing. Previous ERP studies of semantic or syntactic category distinctions between words generally indicate that lexical access occurs by about 250 ms after word presentation (Abdullaev and Posner, 1998; Dahaene, 1995; Pulvermuller *et al.*, 1999; Samar and Berent, 1986; Martin-Loeches *et al.*, 1999).

The neurobiological substrates of lexical access are as yet unclear. Several ERP studies indicate that the lexical category distinction between closed class items (e.g., articles, conjunctions, etc.) and open class items (e.g., nouns, verbs, etc. having specific semantic content) is available between 200 and 350 ms poststimulus, with left anterior systems involved in processing closed class items and posterior systems involved in processing open class items (King and Kutas, 1998; Neville *et al.*, 1997). However, it is unclear whether these effects reflect the earliest stage of syntactic and semantic lexical access, respectively (Keurs *et al.*, 1999). Recent ERP studies suggest that semantic lexical access involves early activation of the left cingulate area and left anterior frontal areas (Abdullaev and Posner, 1998; Ruz *et al.*, 2003), which may trigger activation of category-specific Hebbian

cell assemblies widely distributed throughout both anterior and posterior cortex (Pulvermuller *et al.*, 1999). Recent ERP dense-array source localization of the RP indicates that the lingual gyri, located within the extrastriate cortex at the base of the posterior temporal lobes, are involved in lexical semantic categorization (Martin-Loeches *et al.*, 2001).

Semantic Processing

Lexical, syntactic, and semantic ambiguities in sentences often complicate the construction of meaning during sentence processing. A classic psycholinguistic issue has therefore been how the appropriate meaning of ambiguous words is determined. The multiple meanings of ambiguous words in sentences (e.g., 'bank') are all activated in memory at once early in processing (e.g., Tanenhaus *et al.*, 1979). Therefore, the selection of appropriate word meaning and its integration into the larger meaning of the sentence must involve inhibition of the context-inappropriate alternative meanings of words after their retrieval from the lexicon. N400 priming effects confirm that, following lexical access of the multiple meanings of a word, the semantic context provided by the preceding words produces a powerful postlexical inhibition of the irrelevant alternative meanings (Chwilla and Kolk, 2003).

A recent dense-array ERP imaging study of the N400 illustrates in unprecedented detail how multiple brain networks coordinate their processing over time during semantic comprehension of phrases and sentences. Frishkoff *et al.* (2004) asked participants to read sentences containing phrases that were semantically well formed (congruous with the predicative selectional restrictions of verbs or adjectives, e.g., '... drink some coffee'), or semantically ill formed (incongruous with predicative selectional restrictions, e.g., '... drink some sky').

Figure 3 is a sequence of topographic 'snapshot' maps of the brain activity, reproduced from Frishkoff *et al.* (2004), which display the scalp electrical fields produced every 16 ms by congruous and incongruous words at the ends of sentences over the N400 time epoch from approximately 250 to 550 ms poststimulus. The middle row shows the location of the N400 response (blue shading), based on the difference of the congruous and incongruous word topographies, as it develops and migrates over the cortical surface in time. The N400 response originates early in semantic

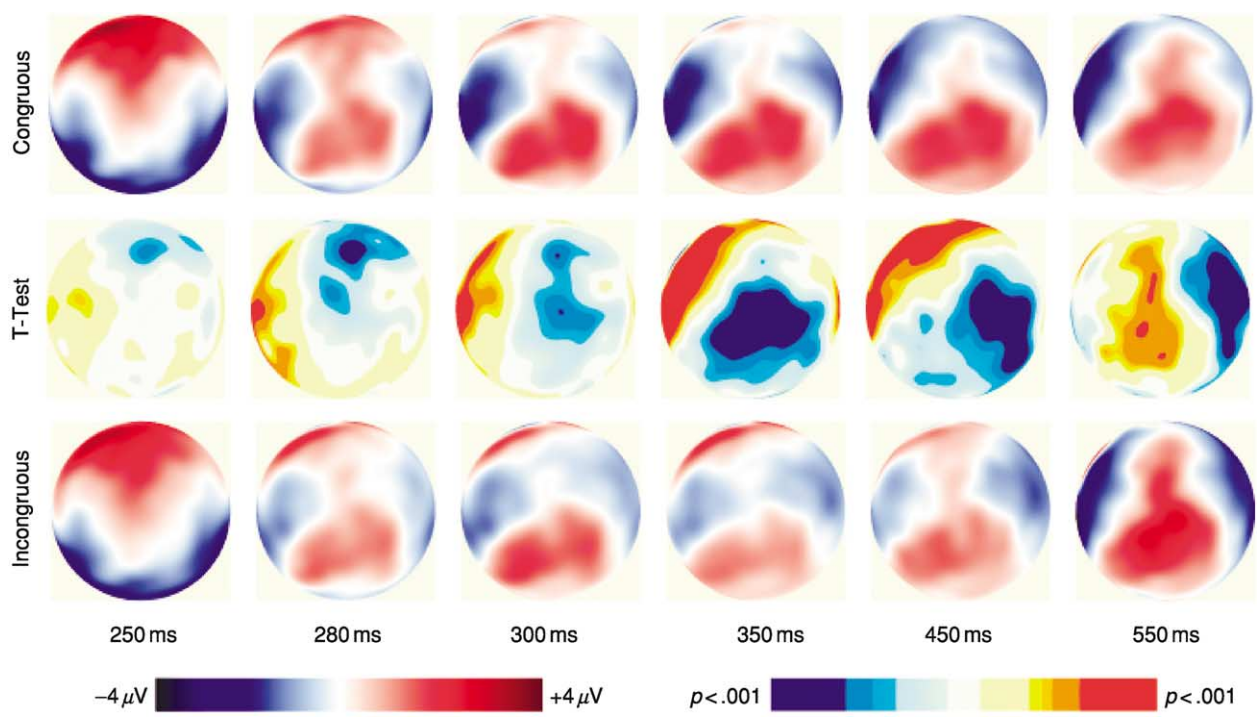

Figure 3 Topographic scalp maps from the study of Frishkoff *et al.* (2004), reproduced with permission from the authors. These maps represent sequential time samples of the millisecond-by-millisecond changes in the topographic distribution of the scalp electrical fields for final words in sentences that were semantically congruous with the sentence context (top row) or semantically incongruous with the sentence context (bottom row). The middle row displays the orderly topographic changes in the electrical field pattern at the scalp specifically related to neural sources that processed the semantic difference between the congruous and incongruous words. These topographic changes reflect the sum of the individual projected field patterns of 10 separate neural sources, each following its own schedule of activation, as they contribute to the semantic analysis of the congruity of individual words in their semantic context.

processing near the medial frontal cortex around 250 ms, presumably after lexical access has already occurred. As semantic integration of the word meaning into the sentence context progresses, the N400 response migrates toward posterior cortex and becomes lateralized over the right hemisphere.

Source localization revealed that the earliest source sensitive to semantic congruity was localized to the left anterior cingulated cortex. Subsequently, left inferior prefrontal sources became activated, followed a few milliseconds later by right inferior prefrontal sources, and remained active for a sustained period of time between 250 and 800 ms. Sources in the mid-posterior cingulate and inferior temporal cortex became active for a more transient period between 350 and 450 ms. During this peak, the right inferior temporal sources became predominantly sensitive to semantic incongruity when it occurred at the end of the stimulus sentence but not in the middle of the stimulus sentence.

This dynamic pattern of overlapping source activations agrees with earlier studies suggesting that ventral frontal regions of the left hemisphere are engaged in the early stages of lexical semantic comprehension, including semantic selection and maintenance in working memory. Subsequently, postlexical predicative semantic integration occurs within classical temporal language cortex such as Wernicke's area and the paralimbic cortex. The sustained prefrontal source activations suggest that the lateral prefrontal cortex is involved in concept maintenance in working memory and in top-down regulation of ongoing semantic integration processes in the posterior association cortex, mediated by corticothalamic pathways and corticolimbic mechanisms.

The N400 word incongruity effects at the ends of sentences reflect both predicative violations (due to lexical selectional restrictions) and pragmatic violations (due to general conceptual discrepancies), whereas word incongruity effects in the middle of sentences primarily reflect predicative violations. The N400 lateralization facts suggest that right hemisphere processes are recruited only as a last resort to specifically provide potentially coherent nonliteral semantic (pragmatic) interpretations of strict predicative violations, based on the general conceptual content of the sentence (Frishkoff *et al.*, 2004).

The N400 to a final word incongruence produced by either a sentence or a discourse context shows qualitatively similar behavior and topography (Salman and Pratt, 2002; Van Berkum *et al.*, 1999), suggesting no neurobiological distinction between sentence and discourse level boundaries during context buildup. Intrasententially, however, the results of Frishkoff *et al.* (2004) suggest that N400 is multiply determined by different sources that have neurobiologically distinct roles for logical (predicative) versus pragmatic processing. Future dense-array studies that explore the equivalence of N400 source models for sentence-level versus discourse-level semantic processing when both logical and pragmatic violations are systematically manipulated at each level will help clarify the neurobiology of context buildup across sentence boundaries.

Syntactic Processing

A central concern of psycholinguistic models of sentence comprehension is whether the syntactic component of the mental grammar functions as a modular (autonomous) processor without regard for semantic and lexical processes or, instead, is interactively influenced by the activity of those processes. Modular, structure-first models postulate that word category information (e.g., verb, noun, etc.) is used to build an initial phrase structure before integrating the specific argument structure of individual verbs and semantic information into the sentential representation. Constraint-satisfaction models assume parallel real-time interactions among lexical, syntactic, and semantic processes in building an integrated mental representation (McElree and Griffith, 1995).

Recent ERP data support the position that phrase structure is built by an autonomous processor prior to the application of verb argument information. Verbs in correct phrase structures that fail to assign a required thematic role to an NP argument elicit a N400 but no ELAN, reflecting the semantic consequences of an absent thematic role. A phrase structure violation alone or a combined phrase-structure/argument-structure violation elicits an ELAN but no N400, indicating that argument structure cannot be assigned without first building a correct phrase structure (Frisch *et al.*, 2004). While these findings appear to support the modularity of phrase-structure building mechanisms, later syntactic processes may still interact with semantic processes to achieve an integrated mental representation (Friederici, 2002; Hagoort, 2003).

Based on convergent imaging data from ERP and other techniques, Friederici and Kotz (2003) proposed a comprehensive neurocognitive model linking the primary syntactic and semantic ERP components to brain regions. In their model, early and late syntactic processes are associated with separable brain systems lateralized to the left hemisphere. Early syntactic structure building processes reflected in the ELAN are subserved by a temporal-frontal network involving the inferior portion of Broadman area 44 in the inferior frontal gyrus (IFG) and the anterior portion of the

superior temporal gyrus (STG). Late syntactic integration and reanalysis/repair processes are subserved by the basal ganglia and the posterior portion of the STG. Lexical semantic processes associated with the LAN and N400 are subserved by a separate temporal-frontal network involving portions of the STG and IFG. In general, this model entails a functional neuroanatomy of left hemisphere syntactic and semantic processing systems that is substantially domain specific, and is likely to motivate significant future imaging research.

Hagoort (2003) recently proposed an alternative lexicalist account of sentence parsing that challenges the modular structure-first assumption of this model, while still respecting its general domain specificity. Hagoort suggests that syntactic frames associated with each word of the language are stored in the STG and retrieved during on-line sentence processing. IFG mechanisms are responsible for binding these individual frames together in way that respects agreement and subcategorization features.

Reading

Reading is a late-acquired neural process. It recruits posterior visual system mechanisms early in the process to identify printed or written words as abstract visual word forms, that is, as ordered strings of graphemes independent of their physical properties, such as font, size, and location. Restricted areas of the left temporo-occipital cortex provide the initial abstract visual word form used by later word recognition processes to retrieve a word's syntactic, semantic, and phonological features. Recent ERP imaging, coupled with fMRI imaging, have provided concurrent, high-resolution spatial and temporal localization of the visual word form system to the left medial fusiform gyrus, in the time interval of approximately 180 to 200 ms after word presentation (Cohen *et al.*, 2000). The fusiform gyrus is located on the underside of the posterior temporal lobe and is part of the brain's visual object recognition system in the ventral stream.

ERP latency data suggest that lexical access and retrieval of phonological, syntactic, and semantic category information occur subsequent to word-form identification (Dehaene, 1995; Proverbio *et al.*, 2004; Samar and Berent, 1986). ERP studies of the grapheme-to-phoneme conversion processes during reading indicate that the left IFG is strongly activated by orthographically legal pseudowords, whereas the bilateral temporal-occipital and left posterior middle temporal cortex are strongly activated by real words and illegal letter strings (Proverbio and Zani, 2003; Proverbio *et al.*, 2004). This topographic dissociation for different classes of letter strings is consistent with well-known dual route models of reading (Coltheart *et al.*, 1993), which propose that pseudoword reading engages a phonological pathway to assemble a phonological representation based on spelling-sound correspondences and that real word reading engages a lexical-semantic pathway to extract stored phonological representations. Distinct anterior and posterior topographies and separable developmental trends for phonology-sensitive ERP components supports the existence of multiple neural subsystems for different aspects of phonological processing during reading (Grossi *et al.*, 2001).

Little is known about how the initial processing of written words is influenced by different linguistic levels of representation and different writing systems. Limited ERP evidence suggests that prior phonological, lexico-semantic, and sentence-level meaning influence the processing of incoming words during reading (Hoeks *et al.*, 2004; Perfetti *et al.*, 2002). Future dense-array ERP imaging studies will provide rich detail about the neurocognitive architecture underlying both universal and language-specific neural reading mechanisms (Perfetti *et al.*, 2002).

Developmental Language Disorders

Children and adults with developmental language disorders such as specific language impairment and dyslexia display various ERP anomalies (Guttorn *et al.*, 2001; Ors *et al.*, 2002). Generally, ERP studies have helped to confirm that dyslexia, the most common developmental language disorder, is a phenotypically complex impairment of phonological processing, related language processes, rapid auditory temporal processing mechanisms, and transient visual system mechanisms involving wide-ranging brain systems (Stein, 2001). Developmental dyslexics show delayed ERP components for stimuli containing rapid acoustic transitions (Been and Zwarts, 2003; Hugdahl *et al.*, 1998; Ors *et al.*, 2002), show ERP evidence of delayed lexical access (Csepe *et al.*, 2003), and display ERP responses to visual motion stimuli associated with deficits of the dorsal stream, especially of extrastriate visual motion area MT (Schulte-Korne *et al.*, 2004).

Recent studies suggest that ERPs may be useful for the detection of dyslexia in young children and in certain special populations such as the deaf population. Infants with familial risk of dyslexia and infants diagnosed as dyslexic years later display abnormal ERPs to speech stimuli at birth (Molfese, 2000; Guttorn *et al.*, 2001). ERP and psychophysical evidence of dorsal stream dysfunction in deaf adults with exceptionally poor reading skill suggest that ERP imaging may provide a diagnostic marker for hidden

dyslexia in the deaf population that avoids the confounding developmental effects of deafness on reading and English language development (Samar *et al.*, 2002; Samar and Parasnis, in press).

Plasticity of Neural Language Systems

Human language development is a universal cognitive trait whose neurobiology is determined both by innate neurodevelopmental biases and by specific sensory and language experience. ERP studies of healthy and brain-damaged populations exposed to different language forms and language modalities and with different ages of acquisition have helped to identify universal neurobiological systems responsible for higher-order language processing and to determine how specific experiences constrain and optimize the final organization of those systems (Neville and Bavelier, 1998).

ERP studies of deaf and hearing ASL signers and nonsigners have been particularly influential in separating the effects of general sensory experience, language-specific perceptual constraints, and universal linguistic constraints on neural organization. Early ERP components for English words and ASL signs in sentences obtained from native language users show differential topographic patterns for closed class lexical items, which help determine initial syntactic structure during sentence processing, versus open class lexical items, which hold specific semantic content. The ERP patterns implicate anterior brain systems in processing closed class items and posterior brain systems in processing open class items, regardless of language modality (Neville *et al.*, 1997). Hence, the specialization of anterior and posterior systems for grammatical and semantic processing, respectively, appears to be a universal organizational constraint of formal languages. Differential effects on open and closed class words as a function of the age of acquisition of language indicated further that the neural organization of aspects of grammatical and semantic processing may be differentially vulnerable to language delay.

Neville *et al.* (1997) also noted an ERP pattern of more bilateral activation of closed and open class processing systems for ASL signs than for English words, possibly reflecting recruitment of specialized right hemisphere mechanisms for processing language-relevant shape, motion, and location information in ASL, a position supported by recent fMRI data (Newman *et al.*, 2001). Other studies, however, suggest that early signers, but not nonsigners, display a left hemisphere advantage for global motion processing by dorsal stream mechanisms, suggesting that acquisition of ASL may also sometimes drive a left hemisphere lateralization for specialized processing of certain grammatical features of ASL signs (Bavelier *et al.* 2001; Bosworth and Dobkins, 2002; Samar and Parasnis, in press). It is possible that specific grammatical ASL features depend differentially on ventral versus dorsal stream mechanisms or on lower-order versus higher-order visual feature analysis networks within the visual streams, and that the recruitment of these distinct brain systems for language processing requires correspondingly distinct lateralization biases. Future ERP imaging studies of lexical feature processing in ASL may elucidate the specific processing and neural system constraints that drive altered lateralization patterns in the service of sign languages.

Conclusion

Dense-array ERP imaging technology is poised to play an increasingly prominent role, alongside other emerging high-resolution imaging techniques, in comprehensive research programs aimed at understanding the neural organization of language processing systems and the way in which their development is constrained by both genetic endowment and language experience. By extending this technology to various clinical populations, dense-array ERP imaging also has potential as an affordable, noninvasive tool to aid early diagnosis and evaluation of language disorders.

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Evolution of Phonetics and Phonology

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Human speech – the acoustic signal used for language – differs from the sounds produced by our nearest relatives, the great apes. Like apes, humans have a system to convey information about emotional state, using signals such as crying, laughter, and cries of pain or joy. However, humans also use speech to convey complex information. There are two fundamental differences between the primate system and speech. Speech is under voluntary control, whereas the primate system is involuntary. Secondly, the primate system is holistic, whereas speech is combinatorial. A combinatorial system has a small number of basic elements that can be combined into many different sequences. For speech, the basic elements are phonemes or syllables, and these are combined into words and phrases. Holistic utterances do not consist of smaller elements. They cannot be recombined, although they might have some parameters that can be varied, such as pitch and loudness.

Humans have several adaptations to speech. Humans have extraordinarily good control over breathing. Also, the human vocal tract can produce a large number of distinct sounds. In contrast with other mammals, whose vocal tracts are a single tube, the human vocal tract consists of two linked tubes. These are the pharyngeal cavity and the oral cavity, divided by the tongue. This allows a much larger repertoire of possible sounds. As the tongue is important in articulation, and as it needs to move rapidly, it is small compared with those of other primates, and well innervated.

Human hearing is also adapted to speech. Humans are very sensitive to sounds between 1 kHz and 4 kHz. This is approximately the range of the resonance frequencies of the human vocal tract that determine the timbre of speech sounds.

Humans also have neurological adaptations to speech. They are good at performing rapid controlled and coordinated movements with both their

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Evolution of Phonetics and Phonology

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Human speech – the acoustic signal used for language – differs from the sounds produced by our nearest relatives, the great apes. Like apes, humans have a system to convey information about emotional state, using signals such as crying, laughter, and cries of pain or joy. However, humans also use speech to convey complex information. There are two fundamental differences between the primate system and speech. Speech is under voluntary control, whereas the primate system is involuntary. Secondly, the primate system is holistic, whereas speech is combinatorial. A combinatorial system has a small number of basic elements that can be combined into many different sequences. For speech, the basic elements are phonemes or syllables, and these are combined into words and phrases. Holistic utterances do not consist of smaller elements. They cannot be recombined, although they might have some parameters that can be varied, such as pitch and loudness.

Humans have several adaptations to speech. Humans have extraordinarily good control over breathing. Also, the human vocal tract can produce a large number of distinct sounds. In contrast with other mammals, whose vocal tracts are a single tube, the human vocal tract consists of two linked tubes. These are the pharyngeal cavity and the oral cavity, divided by the tongue. This allows a much larger repertoire of possible sounds. As the tongue is important in articulation, and as it needs to move rapidly, it is small compared with those of other primates, and well innervated.

Human hearing is also adapted to speech. Humans are very sensitive to sounds between 1 kHz and 4 kHz. This is approximately the range of the resonance frequencies of the human vocal tract that determine the timbre of speech sounds.

Humans also have neurological adaptations to speech. They are good at performing rapid controlled and coordinated movements with both their

hands and their articulatory organs. Humans are much better at this than other primates. Interestingly, rapid hand movements are also used in human sign language.

All these properties must be explained by evolution. The next sections provide background information on the evidence for the evolution of speech, and a sample evolutionary scenario.

Fossil Evidence

The shape of the human vocal tract must have changed during evolution. Unfortunately, because it is determined mostly by soft tissue, scientists have been unable to reconstruct its evolution from the fossils that have been found so far. However, better control of breathing and tongue movement are also adaptations to speech. As larger nerves are needed for better control, researchers have investigated the holes in the skull and vertebrae through which these nerves pass.

Kay *et al.* (1998) investigated the size of the hypoglossal canal, through which the main nerve of the tongue passes. They determined that it is relatively larger in humans than in chimpanzees and gorillas. When comparing different fossils, they found that the canals in modern and early *Homo sapiens* and in Neanderthals were similar in size to the human canal, while those in *Australopithecines* and *Homo habilis* were chimpanzee-like. They concluded that 'human vocal abilities' existed 400 000 years ago.

MacLarnon and Hewitt (1999) studied the thoracic vertebral canal, through which the nerve controlling the diaphragm, and therefore breathing, passes. They found that it is significantly larger in humans than in apes and that Neanderthals and early *Homo sapiens* fell in the modern human range, while *Homo ergaster* and the Australopithecines did not. They estimated that increased breathing control emerged between 1.6 million and 100 000 years ago.

With regard to the perception of speech, Martínez and colleagues (2004) calculated the frequency sensitivity of *Homo heidelbergensis*, whose fossils are about 350 000 years old. They found that the frequency sensitivity in the range of speech was like that of humans. This contrasts with chimpanzees, which have quite different frequency sensitivity.

This evidence suggests that adaptations for speech first appeared in the common ancestor of *Homo sapiens* and *Homo neanderthalensis*. Early work by Lieberman and Crelin (1971), however, suggested that the Neanderthal vocal tract was not a two-tube system. This used to be interpreted as an argument against Neanderthal speech, but more recently Lieberman has accepted the possibility of speech in Neanderthals.

Parallels in Other Animals

To know the starting point of the evolution of speech, it is necessary to investigate primate vocal abilities. There are animals other than primates that use complex vocal communication that is combinatorial and learned. Examples of these are songbirds and humpback whales. As these species are quite distant evolutionary, this must be parallel evolution. It is interesting, however, to compare these animals with related species with fewer vocal abilities. Fitch (2000) reviewed animal vocalizations in the context of evolution of speech.

Primates do use vocal communication extensively, but their vocalizations are like human emotional utterances. Research cited by Hauser (1997) indicated that primate vocalizations are mostly innate but that details might be learned. He also indicated that "no convincing demonstration" of vocal imitation existed, except in captive chimpanzees and orangutans. Attempts to teach orangutans or chimpanzees to speak have failed, in contrast with attempts to teach apes sign language. This is understandable, as apes have different vocal tracts and less accurate motor control. However, the attempts do show that these animals have some voluntary control over vocalization. As for perception, apes can understand speech to some degree, and therefore must be able to perceive some of the acoustic distinctions of speech.

Little is known about the structure of ape calls and its relation to human phonology. The long calls of gibbon species are perhaps best studied; these have compositional structure, in that smaller units are recombined into novel utterances (Mitani and Marler, 1989). Among the apes, gibbons are most distantly related to humans. All other apes have simpler calls; therefore, gibbon calls cannot be direct precursors of speech. Nevertheless, they show that apes can handle the complexity of producing and processing combinatorial calls.

There is considerable anatomical overlap between brain organization of vocalizations in primates and speech humans. According to Ploog (2002), two pathways exist in both humans and other primates: the 'cingulate vocalization pathway' for the emotional content of speech, and the 'neocortical vocal pathway' for fine motor control. The latter is more developed in species closer to humans.

Mechanisms

The observations mentioned thus far in this article show that (proto-) humans had adaptations for

modern speech at least 400 000 years ago, while the last common ancestor of chimpanzees and humans had preadaptations for speech. It had fewer articulatory possibilities, and insufficient control of articulation and breathing. It probably also could only imitate and learn utterances on a very limited scale. This was the starting point of the evolution of speech.

Modern speech gives an idea of what abilities have evolved. Maddieson (1984) and Ladefoged and Maddieson (1996) gave an overview of the possible speech sounds (and syllables). These can be extremely complex, but it is also useful to know that there are languages with very simple sound systems. The simplest one is Piraha, which uses only 11 phonemes, while Hawaiian is one of the languages with the smallest number of syllables: 162 (Maddieson, 1984). It is also sometimes said that modern language is impossible without the vowels /i/, /a/, and /u/. However, there are languages with vertical vowel systems that do not have /i/ and /u/. Hugely complex speech is unnecessary for modern language.

For a theory about evolution of speech, several mechanisms must be considered. Speech is a learned system in a population, and therefore cultural evolution is important. Genetic changes that allow an individual to use signals that cannot be used by other individuals are useless. Therefore, cultural evolution must drive genetic evolution. Innovations in speech spread culturally, after which genetic adaptation to these innovations becomes useful. This is the so-called Baldwin effect.

The physical nature of speech also causes functional pressures to play a role in its evolution. Not all properties of speech need to be explained as the result of adaptations of the brain. Several researchers have proposed functional pressures to explain properties of speech (for an overview, see Chap. 2 of de Boer, 2001). These are acoustic distinctiveness, articulatory ease, and articulatory stability, among others. Through self-organization in a population, functional pressures can determine what sounds will be used in speech.

Another mechanism is exaptation. Evolution tends to adapt existing systems for new functions. Anatomical parallels between primates and humans show that many parts of the primate brain associated with vocalization and motor control and with acoustic perception have been exapted for speech. But behaviors can be exapted as well. MacNeilage and Davis (2000) proposed that oscillatory jaw movements, such as chewing, form the basis of the syllable structure of speech.

The theory that speech evolved from sign language is also an example of exaptation. Although it is remarkable that language can be expressed with both gestures and sounds, the theory does not explain how and why sign language has evolved into spoken language.

A Possible Scenario

So far, facts have been presented here that are pertinent to the evolution of speech: fossil evidence, knowledge about our evolutionary relatives, and knowledge of the evolutionary process. Any attempt to build a scenario of the evolution of speech must, however, be speculative. Such a scenario is nevertheless useful to illustrate how different pieces of evidence can fit together, but it must be seen as just a possibility. Researchers do not agree on a definitive scenario.

Evolution of speech must have started with the ability to learn novel utterances, allowing a culturally transmitted sound repertoire to emerge. This ability could have been exapted from tool use. The repertoire could initially also have contained gestures. As primates prefer vocal communication, the burden in a hybrid system would have shifted to vocal communication. Having to learn new utterances made it necessary for the utterances to be more distinctive, thus putting pressure on breathing control, motor control, and vocal tract shape. At this point, anatomical adaptations would have appeared. As the repertoire expanded, it became more difficult to learn all utterances; hence, combinatorial structure would have become advantageous. Adaptations facilitating the use of this structure would have been an advantage, although at first the utterances could still have been learned without them. Later, both cognitive abilities and linguistic complexity would have increased, until being able to handle combinatorial structure became essential. Speech at this stage had all the essential characteristics of modern speech, although the repertoire of speech sounds was probably much smaller.

Through functional pressure and self-organization, sound systems would have acquired certain universal characteristics. Some sounds and combinations of sounds would have occurred more often than others. Neural adaptations to these universals probably occurred. As a result, early combinatorial speech evolved into complex modern speech, with all its phonological rules.

Fossil evidence shows that early *Homo sapiens* must have used complex articulations, whereas *Homo erectus* probably did not. Whether these articulations were combinatorial remains an open question, but as gibbons (with much smaller brains) use combinatorial calls, it is likely that early *Homo sapiens* also used combinatorial speech. The repertoires of sounds might not have been very complex. However, given

that there exist modern languages with simple sound systems, the evolution of speech provides no reason that early *Homo sapiens* did not have complex communication.

See also: Cultural Evolution of Language; Evolution of Pragmatics; Evolution of Syntax; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Origin and Evolution of Language.

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Evolution of Pragmatics

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Introduction

Imagine you are walking through a forest. You approach a clearing in the middle of which you notice three tall sticks standing in the ground. Are they young saplings? No, as you get closer you notice that each stick has been stripped of its bark, that one end of each has been sharpened, and that all three have been forcibly embedded into the ground. This is no natural occurrence; someone has put the sticks there deliberately. You begin to wonder. The sticks are arranged in a straight line each about a meter apart, but the two outer ones are angled inwards, so it's unlikely they're intended as a fence. They are not hidden, so it is unlikely that someone has left them there to collect later. Since they have been put there deliberately, however, they must have been put there for a reason: why?

This is the kind of question we humans ask a lot. We strive to interpret the actions or behavior of others in terms of the reasons or intentions that might have led them to act or behave in the way they did. In the above scenario, our natural disposition is to try and work out (infer) the intentions behind the action of placing the sticks where they were. Despite the absence of the person who placed the sticks in the ground, you can't help wondering what he or she might have meant by putting them there.

Pragmatists have noticed that this disposition also comes into play when the behavior in question is linguistic. After all, there is much more to understanding the full message that a speaker is trying to convey than simply knowing the meaning of the words themselves. Consider example (1) below:

(1) Jack: Are you going to Bill's party?
Lily: Bill doesn't like linguists.

The words Lily utters in response to Jack's question have stable, context-independent meaning: linguistic meaning. Jack knows the linguistic meaning of Lily's utterance because he can speak English. The study of this level of meaning is linguistic semantics. But what about the full message Lily intends to convey with her reply – her 'speaker meaning'? This message need not be closely tied to the words she utters at all; it is context-dependent as opposed to context-independent. If I tell you that Lily is a linguist, and that Jack knows this, then the message she intends to convey might be that she will not be going to Bill's party. This level of meaning – what speakers, as opposed to words mean – is the domain of pragmatics.

Of course, pragmatics is many things to many people: there are over 100 entries in the 'pragmatics' section of this encyclopedia and a quick flick through

that there exist modern languages with simple sound systems, the evolution of speech provides no reason that early *Homo sapiens* did not have complex communication.

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Of course, pragmatics is many things to many people: there are over 100 entries in the 'pragmatics' section of this encyclopedia and a quick flick through

them reveals modern pragmatics to be made up of a wide range of subdisciplines. There's conversational analysis, the pragmatics of gesture and gender, literary pragmatics and historical pragmatics to name only a few. Indeed, one way of looking at the evolution of pragmatics would be to interpret it as concerning the development of the discipline of pragmatics and to trace its historical development from the writings of Charles Morris and, in the case of English pragmatics, the literature in ordinary language philosophy at Oxford in the 1940s and 1950s (Austin, 1962; Grice, 1989).

The sense of the word 'evolution' used in the title of this essay, however, is the biological one. So for talk of the evolution of pragmatics to make any sense at all, we need to adopt a view of pragmatics that somehow ties it in with biology, and more generally with the 'natural' world. One way to do so is to adopt a cognitive viewpoint and regard pragmatics as – ultimately at least – a branch of cognitive science or psychology. Such a view owes a lot to the work of Noam Chomsky (2000), who advocates a similar, 'naturalistic' view of language (*see* **Naturalism**). Construed in this way, pragmatics is not just an academic enterprise, it is:

> a capacity of mind . . . a system for interpreting a particular phenomenon in the world, namely human ostensive communicative behavior. (Carston, 2002: 4)

This essay, then, concerns itself with how the capacity of mind that is pragmatics evolved. It is not an essay about the evolution of language (*see* **Origin and Evolution of Language**). The human pragmatic capacity is implicated in the interpretation of all kinds of human communicative behavior: true, that behavior may well – and perhaps most often does – consist in uttering a string of words (accompanied perhaps by a nonverbal behavior such as a gesture or a facial expression), but it could just as easily consist in planting some sticks deliberately into the ground.

The section 'The Pragmatic Capacity' looks briefly at how human communication works, and articulates what the human pragmatic capacity is. This section involves an exploration of what identifies human behavior as 'ostensive' and 'communicative' (the kind of behavior the capacity has evolved to interpret). It also looks at the foundational cognitive machinery the capacity appears to be built upon. The section 'Metarepresentation and Evolution' examines some of the broader questions an evolutionary account needs to address. To what extent is the evolution of this foundational machinery bound up with the evolution of communication? What circumstances might have led to the evolution of such mechanisms, and how did they become a specialized pragmatic capacity? Bearing the answers to these questions in mind, the section 'The Evolution of Pragmatics' presents one version – in the form of a step-by-step account – of the evolution of pragmatics. This progression is based on a 'myth' originally offered in Grice (1982) but in what follows is independently endorsed by research into the evolution of human cognition.

The Pragmatic Capacity

Ostensive Behavior

Whichever of the subdisciplines of pragmatics you choose to focus on, there is a good chance it will owe at least something to the work of H. Paul Grice. Grice (1989) was a philosopher who wrote some highly influential papers and delivered the William James Lectures – called 'Logic and Conversation' – in 1967, out of which modern pragmatics developed.

Part of Grice's legacy is that our view of how humans communicate has changed completely. According to the traditional 'code model' of communication – which dates back to Aristotle – a communicator's thoughts are translated into a signal by the use of a code (in this case, language), and translated back from the signal by an audience into the original message. Post Grice, human communication has come to be regarded as an intelligent, intention-driven, inferential activity (*see* **Inference: Abduction, Induction, Deduction**). Rather than simply being a process of coding and decoding, human communication is achieved by a speaker giving evidence of an intention to inform the hearer of something, and the hearer inferring a conclusion from this evidence.

Consider the following example. If a colleague catches your eye at a meeting and looks in a deliberate manner towards the door (perhaps accompanied by a mimed yawn), then you might infer that your colleague is bored and wants to leave. But this communication is not achieved by coding and decoding. Rather, what the behavior made clear was the fact that your colleague had an intention to inform you of something: communication was achieved by your inferring what this was, rather than decoding your colleague's actions.

Of course, to adopt this view of communication is not to deny the role of coding and decoding in the special case of linguistic communication. In order for Jack to derive Lily's intended meaning in (1), he does indeed need to know the linguistic meaning of the sentence that Lily utters. Crucially, however, he only needs to know it because it provides him with a clue to the speaker meaning that she intends to convey. Her utterance makes clear that she intends to

communicate something to him, and he has to infer what the content of this intention is.

There have been various proposals as to how this inference is made. A common story (initially proposed by Grice) has it that Jack begins from the presumption that Lily is being cooperative in her response (perhaps by following a 'cooperative principle' and 'maxims'), or 'relevant' in some sense of the word (*see* **Relevance Theory** – Sperber and Wilson, 1986/1995). Jack uses this presumption to construct the best available hypotheses about Lily's intended meaning. Since Jack has asked her a question, he obviously expects an answer, and Lily would be being neither cooperative nor relevant if her only intention was to communicate to Jack that Bill doesn't like linguists. Jack knows, however, that Lily is a linguist, and based on the presumption that Lily is cooperating (or that she believes it is relevant to tell him that Bill doesn't like linguists), Jack can infer that Lily's intention is to communicate that she will not be going to Bill's party. Whatever story you decide to tell, as well as possessing the requisite semantic competence, in order to interpret speaker meaning, hearers must possess something more, and use this information to work out what was meant.

This 'something more' involves a range of factors. Since it involves inferring the intentions of others, it presupposes an awareness that other people have intentions in the first place. This observation is not a trivial one: other people's intentions and mental states generally are not objects to be perceived in the world in the same way as are their faces or bodies; they are 'out there,' but they are invisible. Equally, it presupposes the existence of mechanisms by which these hypotheses about the intentions of others can be represented: a 'framework,' if you like, on which representations of the thoughts and intentions of others can be hung. Finally, it presupposes the existence of standards or expectations about proper communicative behavior according to which hearers form the best hypothesis about a speaker's intended meaning.

On the last of these points, I will have little to say; not because the existence of such standards or expectations is not linked to the evolution of pragmatics, but because the attempt here is to tell a much more general story. Suffice to say, humans are rational beings, and successful communication (in general) proceeds along rational lines according to such standards or expectations. In what follows, I will be interested in the extent to which human communication involves the expression and attribution of intentions (and what kinds of intentions are expressed and attributed), and the mechanisms that underlie our ability to do this.

So, what kinds of intentions are involved? A first suggestion might be that all that is required for an act to be 'ostensive' or 'communicative' is that the agent of the act has an intention to impart some information to an audience. A moment's reflection, however, reveals that having this intention is not enough. If I intend to inform you that I want a particular book for my birthday, I might decide to leave a magazine casually open at the page where I have ringed a review of the book in question with a pen. Notice that in this scenario, I don't want you to know that leaving the magazine for you is my intention: I leave the magazine looking as if it has fallen open at this page naturally.

Many people (including Grice) see a sense in which this kind of example is problematic; those who do see the problem as residing in the fact that there is something covert about the way I have behaved. Indeed, there is a sense in which the kind of transfer of information in this example doesn't even count as 'communication,' which – after all – we feel to be a joint activity. In any case, even if we do regard this situation as an instance of communication, it is certainly not the kind of communication that is reliant in any way on the expression and attribution of intentions. It can't be, since you are unaware I have an intention to inform you of anything. In this example, my behavior is not 'ostensive.'

For an act or behavior to count as ostensive, we need another intention. This one is the 'higher-order' intention that the intention to impart some information be revealed. So in the above example, I would not only need to intend to inform you that I would like the book for my birthday, but also intend you to **realize** that this is my intention. I could achieve this higher-order intention in a variety of different ways. One way would be to make it obvious to you that I have left the magazine open deliberately: I might leave it out in a highly prominent position – perhaps open on your desk; another would be to write 'Birthday present please!' next to the circle I have drawn around the review; still another would be to point out to you the fact that I have circled the review as you enter the room. In keeping with the terminology adopted by Carston in the above quote, I call behavior with this kind of higher-level intention 'ostensive communicative behavior.'

Returning to the example in my opening paragraph, one reason that the three sticks deliberately stuck in the ground attract your attention so is that they may be evidence to you that someone has the higher-order intention that you realize that they have a basic intention to impart some information to you. Having recognized the higher-level intention, you are

naturally predisposed to try and infer what this basic intention is.

Theory of Mind

The capacity to infer this kind of complex intention is closely related to – perhaps even a part of – the human ability to attribute mental states in general, including beliefs, intentions, and desires: the ability widely known as 'mind-reading' or 'theory of mind' (Baron-Cohen, 1995). Imagine two people running past you quickly down a road, one behind the other: A, the person behind, is gesticulating angrily; B, the person in front, is looking over his shoulder with a certain expression of fear. Rather than viewing their motion as you might view the random motion of two billiard balls – one apparently 'following' the other around a billiard table – it is an automatic response to interpret their behavior in terms of the mental states that underlie it. At a basic level, you would perceive their actions in terms of their goals and desires; in terms of the person behind – A – wanting to catch the second – B, or B's desire to escape.

However, as well as these basic concepts, you would also attribute to A and B more complex mental states (Leslie, 1994). So, for example, it might be clear to you that A **believes** that B has done something wrong (the complex mental state underlying A's goal), and that B believes that A **intends** to catch him (the complex mental state underlying B's desire to get away). Notice that the kind of beliefs you attribute may well be incompatible with the beliefs you yourself hold: you have no problem attributing to A the belief that B has stolen his wallet, even though you know that B has not (because, for example, you have A's wallet in your pocket).

Since the ability underlying theory of mind is recursive, our own and others' mental states can be represented in a multilayered way, to a number of different levels. Watching the chase, you have no problem entertaining the thought that B believes that A believes that he has done something wrong, or even that A believes that B believes that A believes that he has done something wrong (or even, for that matter, that B believes that A believes that B believes that A believes that he has done something wrong, etc.). The mind-reading ability – and, therefore, the pragmatic capacity – is underpinned by a more general ability that humans have to represent other representations, or, to use another current piece of terminology, to 'metarepresent.' The pragmatic capacity is built upon this ability.

The kind of representations humans might metarepresent can be either public ones – such as the linguistic utterance in example (2), or mental – such as the thought in example (3). The pragmatic capacity must at the very least involve the ability to entertain and manipulate metarepresentations as complex as the one(s) in (3) (where the metarepresentation is the emboldened part):

(2) Lily said **that Bill doesn't like linguists.**

(3) Lily intends **me to realize that she intends to inform me that she isn't going to Bill's party.**

Developmental psychologists have designed experiments to discover at what age this ability emerges in humans (by about four years old), and have shown that it is subject to pathological breakdown. Autistic individuals, for example, typically fail tests in which they have to explicitly attribute to others beliefs incompatible with their own, and this inability is generally taken to be evidence that they lack full-blown theory of mind (Leslie and Happé, 1989; Happé, 1994; *see* **Autism and Asperger Syndrome: A Spectrum of Disability**). While some autistic individuals acquire language, the condition is typified by an inability to communicate anywhere near 'normally': those who **do** understand words find it hugely problematic, sometimes impossible, to understand what speakers mean by them.

Metarepresentation and Evolution

Over recent years, there has been a tremendous amount of research into the human mind and the evolution of human cognition. In particular, people have questioned the long-held view that humans are endowed with general, all-purpose cognitive abilities, which they bring to bear on any cognitive task set before them. Philosophers of mind (Fodor, 1983) have argued that the mind (or part of it) is modular: that it is an organized system of individual, highly specialized mechanisms (*see* **Modularity of Mind and Language**). The existence of conditions such as autism lends support to this proposal. Cognitive scientists and evolutionary psychologists argue that these domain-specific mechanisms have evolved as adaptations to deal with specific challenges in the ancestral hominid environment (Hirschfeld and Gelman, 1994). The mind, viewed in this way, is an 'adaptive toolbox.'

We are now in a position to begin asking evolutionary questions, such as those I posed in the introduction. Indeed, since the pragmatic capacity is some kind of specialized metarepresentational ability, we can be more specific in the kind of questions we ask. Before we look at possible scenarios in the evolution of the pragmatic capacity, we need to look at the evolution of the metarepresentational ability.

All nonhuman animals with cognitive capacities possess the ability to represent, but the ability to

entertain representations of representations – and representations of representations of representations, etc., – appears to be as unique to humans as the ability to use echolocation is unique to bats (Sperber, 2000b: 117). Indeed it has even been suggested that the sophistication of the human metarepresentational ability underlies our ability to be aware of our own thoughts, and is therefore implicated in one of the biggest mysteries of all: human consciousness.

A striking feature of much of this work is that while there is disagreement on the factors that may have led to the evolution of such an ability, there is broad agreement at least that it could have evolved – or at least begun to evolve – independently of communication. One view (Cosmides and Tooby, 2000) proposes that the ability to 'detach' ourselves – mentally, at least – from the here-and-now, and entertain a representation of a situation as something other than a true belief about the world, would have improved our adeptness in reacting and responding to local aspects of the environment. This ability would have enabled humans to adapt to the environment spontaneously – for example, by making plans – rather than having to adapt (as does the rest of the animal kingdom) on an evolutionary time-scale. Such improvisational skills would have proved highly adaptive.

Another view – The Machiavellian Intelligence Hypothesis (Byrne and Whiten, 1988) – suggests that as well as the task of interacting with the natural environment, a particular challenge for humans (and, indeed, primates generally) was the task of dealing with the complexity of social interaction. In the human case, it is proposed that this challenge led to a kind of 'Cognitive Arms Race,' within which human cognitive abilities spiraled – mainly in order to help individuals compete with their conspecifics and perhaps outmaneuver them. The ability to interpret behavior in terms of the motives behind it would have given an individual strong predictive powers, and it would have been adaptive to become more and more adept at working out the thoughts and feelings of others (Humphrey, 1984).

A recent paper (Tomasello *et al.*, in press), points out that as well as evolving the ability to compete and deceive, humans also evolved the ability to collaborate and cooperate. This unique human disposition to share intentions – in which a metarepresentational ability is also implicated – may form the foundations upon which much human interaction (and possibly human culture) is built.

Of course, sensing how someone else is feeling does not necessarily require complex metarepresentational abilities. Well before full-blown human theory of mind develops, a young infant can sense the emotional state of its carer. Indeed, a great deal of the way humans sense the emotional states of others is done in other – nonintentional – ways. Consider the automatic way in which we interpret facial expressions, or the way panic spreads through a crowd. The cries that alert others to danger in this situation may not be uttered with intentions, and are on the whole not understood by attributing intentions. Presumably at some early stage in our evolution, this was how we were able to sense whether or not people were friendly or a threat, or whether a situation was safe or dangerous.

Before the evolution of metarepresentation, our ancestors were 'ignorant of an inner explanation for their own behavior' (Humphrey, 1984: 49). But once they were selected, rudimentary metarepresentational abilities could have spiraled and spiraled until they eventually led to the evolution of the kind of complex mechanisms that underlie full-blown theory of mind. Tooby and Cosmides (1995: xvii) put it like this:

> Unobservable entities . . . are 'visible' to natural selection . . . Over innumerable generations, the evolutionary process selected for modules . . . that could successfully isolate, out of the welter of observable phenomena, exactly those outward and visible signs in behavior that reliably signaled inward and invisible mental states.

At a crucial evolutionary stage, then, humans somehow became aware that they were living not just in a world populated by other faces and instinctive cries, but a world populated by other minds.

There is little evidence so far that nonhuman animals possess mind-reading abilities to anything like the degree of sophistication found in humans (Premack and Premack, 1983; Hauser, 1996) and hence recognize that their signals **mean** anything. In many ways, this lack of evidence could be seen as presenting problems for an evolutionary account of, for example, theory of mind (Plotkin, 1997). Our common ancestor with the chimpanzee (who lived about 7 million years ago) may have possessed imitative capacities, and these may have been refined into metarepresentational abilities along the hominid line since then, but there is scant evidence among modern-day chimpanzees that they possess anything other than the most rudimentary metarepresentational abilities. The communicative skills of chimps are very basic; indeed, even the more sophisticated nonhuman animal communication systems work along entirely different lines to human communication.

Consider vervet monkeys: when a vervet sees a predator, it emits a specific alarm call (*see* **Alarm Calls**) that alerts other monkeys in the group: a loud barking call for leopards; a short, double-syllable cough for eagles; and a 'chutter' sound for snakes (Cheney and Seyfarth, 1981). However, on hearing a

vervet monkey produce an alarm call, a vervet need not presume that the calling vervet is being cooperative or relevant in order to work out precisely what it means. Vervet monkeys don't mislead, and they don't answer questions indirectly. Communication is achieved without either the sending or receiving animal consciously recognizing that the signal means anything. Indeed, studies suggest that the vervet has very little control over the production of the call itself; it is more as if vervets exploit a reliable correlation between hearing an alarm call and there being a predator in the vicinity rather than that there is any 'meeting-of-minds.' What we need to show is why, and how, human communication evolved along such radically different lines.

The Evolution of Pragmatics

To recap: the human pragmatic capacity is "a system for interpreting ... human ostensive communicative behavior." Ostensive behavior is behavior that reveals a certain complex type of intention, and so the pragmatic capacity is a system that makes the recognition and attribution of such intentions possible. In other words, it is a specialized version of the human ability to attribute mental states.

To what extent would it need to be a specialized version of this ability? There are a number of issues to bear in mind. First, the types of 'meaning' that a speaker can convey by producing an utterance are generally much more complex than the types of intention normally attributed to someone in order to explain their observed behavior. Second (and related to the first), we often attribute intentions to others by observing the effects of their actions, deciding which of those effects they might have desired, and attributing to them the intention to achieve those desired effects: the 'chase' between A and B is a good example. However, a speaker will achieve very few effects by producing an utterance unless she is first understood, so the normal procedures for recognizing the intentions behind ordinary noncommunicative actions won't work: the hearer can't first observe the effect of an utterance and then infer what it meant.

Thirdly, in order to understand intentional communication – as opposed to ordinary noncommunicative behavior – it is necessary to be able to attribute several layers of metarepresentations; yet young children below the age of four – the same children who (as do autistic subjects) fail standard theory of mind tests – master verbal communication quickly and effortlessly well before this age. Based on these and other arguments, Sperber and Wilson (2002) propose that the theory of mind inferences central to the interpretive process are performed by a domain-specific 'comprehension' mechanism or module. This comprehension module is an evolved submodule of the theory of mind module: another part of the human 'adaptive toolbox.'

Consider the following scenarios, which are intended to be seen as taking place over many, many generations. Imagine a tribe of our hominid ancestors. When these ancestors are tired, they involuntarily yawn. To other hominids, a yawn reliably correlates with tiredness in the same way that, say, black clouds correlate with rain (or – though there are differences – the vervet alarm call correlates with the presence of a predator). Crucially, though, a metarepresentational ability is already evolving along the hominid line: perhaps to help better exploit the environment; perhaps to facilitate more complex social interaction. Our ancestors already have rudimentary metarepresentational abilities, and the evolution of the pragmatic capacity should be seen against the backdrop of this independently-evolving metarepresentational prowess.

In the first scenario, one member of the tribe – call him Jack – is able to fake a yawn. Another member – call her Lily – recognizes the voluntary, unspontaneous nature of Jack's yawn. At this stage, the fact that Lily recognizes that Jack has faked the behavior may lead her to come to the conclusion that he is not tired. Jack is producing a normally involuntary behavior voluntarily and could, after all, be trying to deceive her.

Now, let's move to scenario two. In this scenario, we imagine that not only does Lily recognize that Jack has faked a yawn, but also that Jack intends Lily to recognize his behavior as such. Jack and Lily can already metarepresent in a rudimentary way: the metarepresentational ability, recall, is evolving independently. He is 'aware' of his intention, and is metarepresenting its content – as in (4) – and she is entertaining the metarepresentation in (5) below:

(4) I intend **that Lily recognizes my intention to fake this yawn.**

(5) Jack intends **that I recognize that he intends to fake a yawn.**

The possibility of deception – a plausible interpretation in the previous stage – is no longer the only possibility. Of course, Lily is still likely to be in something of a quandary. Jack is not only apparently faking a yawn, but also doing so overtly. It does not seem unreasonable to suggest that one way Lily might proceed is to presume that Jack is pretending or being playful. By the time such a conclusion is arrived at by Lily, we have reached a third scenario.

Consider now a fourth scenario. Lily has come to suppose not that Jack is playing a game, but rather that Jack is trying to get Lily to believe (or at least accept) that he is, in fact, tired. That is, that Jack's intention in producing the normally involuntary behavior voluntarily is to communicate the very same thing the involuntary behavior normally conveys. By this stage, of course, Lily may wonder precisely why Jack should choose to use a faked yawn to communicate tiredness as opposed to an involuntary one. There may be various reasons; one reason may be that Jack's voluntary production might only be intended to indicate some, as opposed to all, of the features associated with an involuntary yawn. Perhaps Jack is tired, but not so tired as to yawn involuntarily; perhaps he is feeling drowsy because he feels unwell. Recall the example described in the section 'The Pragmatic Capacity,' where a faked yawn is used to communicate boredom. Whatever he intends to inform Lily, he is – at this stage – entertaining the metarepresentation in (6):

(6) I intend **Lily to realize that I intend to inform her that** . . .

And Lily, if she recognizes his intention, is entertaining the metarepresentation in (7):

(7) Jack intends **that I realize that he intends to inform me that** . . .

By the time we have reached this scenario, Jack's behavior is 'ostensive' in the sense defined earlier, and Lily has engaged in the kind of pragmatic inference modern-day humans employ. If such a system of communication can be shown to have been advantageous, we can imagine that the cognitive abilities necessary to engage in such communication would have been selected for.

What might the advantages be? Why should already-evolving metarepresentational abilities be recruited – or 'exapted' (Gould, 1980) – for use in communication? The main advantage is that it is the intention behind the behavior, rather than the behavior itself, which plays the main role in Lily's successful understanding of Jack. Communicators have reached a stage where the ostensive behavior need have nothing more than a very tenuous connection with the message a communicator intends to convey, so long as the communicator thinks the audience can infer it. In short, hominids have gone from only being able to communicate by exploiting 'natural' correlations and being able to communicate only a limited number of things, to also being able to communicate non-naturally (*see* **Natural versus Non-natural Meaning**), employing systems of representations, and being able to communicate virtually anything at all.

Of course, communication along these lines would at first have been slow and effort-consuming. The limitless possibilities such a system would have opened up, though, would have given humans an enormous advantage that presumably came to outweigh the costs. If we imagine scenarios such as these taking place generation after generation, and consider them against the back-drop of the developing metarepresentational ability, we have a plausible account of how ostensive communicative behavior and – moreover – the specialized cognitive mechanisms required to interpret such behavior could have evolved. Over evolutionary time, slow, conscious reasoning processes would have come to be replaced by 'fast and frugal heuristics' (Gigerenzer and Todd, 1999) which made this kind of pragmatic inference automatic. In modern humans, they are carried out by a dedicated submodule of theory of mind: the pragmatic capacity.

Now Jack is walking through a forest. As he approaches a clearing, he hears an animal cry. In the middle of the clearing, he sees a large rodent disappearing slowly into a wide pool of quicksand. He becomes tense. His tribe uses this route frequently, and even if he shouts at the top of his voice, he knows they will not be able to hear him from here. He thinks. He has to go on, but he must warn his people. If he places a log in front of the quicksand, there is a chance that some people will walk around the log and hence successfully avoid the quicksand. Many, however, will simply presume that the log has fallen naturally and step straight over it into danger. He thinks again. He walks over to a small tree and cuts off three long, thin branches. He strips off the bark and starts to sharpen them.

See also: Alarm Calls; Autism and Asperger Syndrome: A Spectrum of Disability; Inference: Abduction, Induction, Deduction; Modularity of Mind and Language; Natural versus Non-natural Meaning; Naturalism; Origin and Evolution of Language; Relevance Theory.

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Evolution of Semantics

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One of the most important functions of language is to facilitate the 'transmission' of thought from one language user to another. A number of scholars, including Sperber and Wilson (1995), and Tomasello (1999, 2003), have observed that verbal communication requires both a code – which is to say a language-system involving conventional symbols, pairings of form and meaning – and intentional mechanisms such as inference-reading abilities. While both these aspects are essential for verbal communication, communication can, in principle, occur in the absence of a code. Indeed, as we shall see, intentionality and the ability to recognize communicative intentions are likely to have been necessary prerequisites for the evolution of symbolic representation in language.

To function as a means of communication, an important prerequisite of a code, which is to say a language-system, is to be able to encode and externalize humanly-relevant concepts and combinations of concepts. Semantic knowledge, therefore, concerns the range and nature of humanly relevant concepts that can be expressed in language, and the way language serves to combine concepts in order to convey complex ideas. In this article, we explore (i) possible cognitive preadaptations for the development of semantic knowledge, and (ii) the range and nature of conceptual structure as encoded in language, and suggestions as to the way that this structure may have evolved.

Unlike some other aspects of language, there is scant evidence we can draw on in attempting to reconstruct the evolution of semantic knowledge. After all, we are, in essence, attempting to reconstruct the evolution of human cognition. To do this, we are

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Unlike some other aspects of language, there is scant evidence we can draw on in attempting to reconstruct the evolution of semantic knowledge. After all, we are, in essence, attempting to reconstruct the evolution of human cognition. To do this, we are

relying on indirect evidence drawn from primatology and comparative psychology, paleontology, evolutionary anthropology, and evolutionary psychology. Nevertheless, in view of some recent developments in linguistics, both in terms of uncovering and better understanding semantic phenomena, and recent theory-construction, we can now construct some plausible paths of semantic evolution that will at least facilitate further inquiry.

Cognitive Preadaptations for Semantic Knowledge

Language is characterized by being representational or 'symbolic.' That is, a language consists of a structured set of 'symbolic units' consisting of form and meaning components. While this definition represents the received view for lexical items, a growing body of scholarship argues that grammatical patterns can also be thought of as being inherently symbolic in nature (Langacker, 1987). Symbolic units consist of two further units: a phonological unit and a semantic or conceptual unit. The semantic unit, which is what we are concerned with here, has been variously termed a 'lemma' (Levelt, 1989) or a 'lexical concept' (Evans, 2004). In this section, we approach the evolution of semantic knowledge in a general way by considering the cognitive preadaptations that may have paved the way for the emergence of semantic knowledge.

The Importance of Motor Evolution

Donald (1991, 1999) has argued that there were two essential prerequisites for the evolution of symbolic units. One defining characteristic of language is that it can represent a particular idea or entity in the absence of a concrete cue: the design feature of language known as 'displacement.' For this representation to occur, hominids had to gain conscious access to their own memories (Donald, 1999). A second and crucial preadaptation for the emergence of language was the development of voluntary motor control. That is, hominids must have developed the ability to attend to their own action patterns, and to select, trigger, and 'edit' action pattern sequences. According to Donald, this development gave rise to 'mimesis,' a form of nonlinguistic representation. Mimetic action is representational in that it relies on perceptual resemblance to represent itself. For instance, hominid tool use, which can be traced back 1.5 million years, may have employed mimetic representation not only for showing and learning how to employ a tool, but through 'editing' motor routines through rehearsal, to improve the way in which the tool was used. Forms of representation such as mime, dance, ritual acts, and some kinds of music are also mimetic, serving as a form of communication that is nonlinguistic in nature. According to Donald, mimetic action was the earliest form of communication, upon which the later development of language may have been built.

While voluntary control of the musculature must have been important in the rise of this early and basic form of communication, and presumably also facilitated the later development of phonetic abilities and phonological systems, for Donald, linguistic representation is of a different kind from mimetic representation. While mimetic representation is holistic, a key characteristic of semantic knowledge, as represented by the inventory of lexical concepts available in the languages of the world, is that symbolic units serve to 'parse' sensory or perceptual experience into component parts, e.g., tree versus rock versus mountain, and even to encode a particular perspective with respect to which a component is viewed. For, instance, 'shore' and 'coast' both encode the same strip of land at the edge of the sea, but do so from different perspectives. Thus, for Donald, the importance of mimetic representation was that it created an appropriate cultural context, what he terms 'mimetic culture,' in which communication took place, and more precise disambiguation could occur with the advent of linguistic representation.

The Importance of Intention-Reading Skills

Another important preadaptation for the development of semantic knowledge is likely to have been the emergence of the ability to read intentions. According to Tomasello (1999), this sort of ability was the crucial preadaptation required for the evolution of symbolic abilities such as language more generally. Research in developmental psychology reveals that during early ontogeny, shortly before a year old, human infants begin to experience themselves as 'intentional agents.' That is, they perceive themselves as beings whose attentional and behavioral strategies are goal-directed. Accordingly, human infants also come to see others with whom they identify, conspecifics, as intentional agents. Crucially, it is shortly after this ontogenetic 'breakthrough' that language begins to emerge (Tomasello, 2003). Later, from around the age of three, human infants begin to develop the notion of themselves and conspecifics as 'mental agents.' This development constitutes the emergence of the 'theory-of-mind,' in which children develop the ability to conceive that others can hold different views from their own.

The importance of viewing oneself and conspecifics as intentional agents is far-reaching. From this view, it follows that others are intentional agents who possess

mental states that can be directly influenced and manipulated. For instance, pointing at an object can cause one intentional agent – who recognizes the person doing the pointing as an intentional agent attempting to direct attention – to follow the direction of pointing and thus share a 'joint attentional frame' (Tomasello, 1999, 2003). Thus, from this perspective, the importance of a lexical concept being associated with a particular linguistic form is in the utility of the symbolic unit in affecting the mental state of another in some way, such as by coordinating behavior. In other words, language, and the lexical concepts encoded by language, require intention-reading skills, which derive from the awareness that conspecifics represent intentional agents whose mental states can be influenced and manipulated by language.

A number of scholars view intention-reading abilities as an outcome of earlier evolutionary developments. For instance, Whiten (1999) argued that intention-reading skills constitute the outcome of the emergence of what he termed 'deep social mind.' This result can be characterized by cooperative behaviors including the sharing of food, monogamous reproduction – which has been claimed to be the ancestral pattern for humans – and behavior such as communal hunting. Indeed, Whiten argued that intention-reading abilities would have been essential for coordinating activities such as hunting, success at which requires being able to read the intentions of cohunters, and possibly also the prey.

Intention-reading skills most likely evolved by reading observables, such as direction of gaze, direction of motion, and so on. Thus, intention-reading skills are likely to have emerged from behavior-reading skills. On some accounts, chimpanzees are capable of rudimentary intention-reading abilities. Thus, intention-reading might be more than 6 million years old (Byrne, 1999), the time when hominids and chimpanzees separated.

Some scholars have argued that intention-reading in hominids can be viewed as a consequence of a long chain of evolutionary development. For instance, Savage-Rumbaugh (1994) suggested that bipedalism may have set in chain a series of evolutionary developments that gave rise to the cognitive ability to take the perspective of others (intention-reading). For instance, while chimpanzees and gorillas are distinguished from orangutans by a kind of quadrupedal locomotion termed 'knuckle-walking,' early hominids, the australopithecines, who emerged sometime between 4 and 5 million years ago, were distinguished by bipedalism. According to Savage-Rumbaugh, knuckle-walking and bipedalism were distinct and independent solutions to traversing open terrain and transporting infants. However, a consequence of bipedalism, but not knuckle-walking, is that the parent would have had to pay more attention to the infant, which is carried in the arms. In particular, the parent must remember to pick the child up after it has been put down. This consequence may have led to the later evolution of being able to take the perspective of others.

Table 1 Human intention reading abilities

Human intention reading abilities include . . .
The ability to coordinate or share attention, as when an infant and adult both attend to the same object
The ability to follow attention and gesturing, as when an infant follows an adult's pointing or gaze, in order to attend to an object
The ability to actively direct attention of others, such as drawing attention to a particular object or event, for instance, through pointing
The ability of culturally (imitatively) learning the intentional actions of others, such as imitating verbal cues in order to perform intentional actions such as declarative, interrogative or imperative speech functions

Similarly, Byrne (1999) argued that there may be more remote evolutionary antecedents for intention-reading abilities. One hypothesis is that our relatively large brachiating ancestors, for whom a fall would have been deadly, may have accomplished arboreal locomotion by advance planning. The mental representation of self as an entity moving through space would have prefigured representational abilities in general, and would have facilitated planning a trajectory of motion. Self-representation, and the ability to consciously plan one's movements are cognitive achievements that imply intentionality, and the later evolution of intention-reading skills. The suite of intention-reading skills evident in modern humans is summarized in Table 1.

The Importance of Personality Types

This issue concerns the idea that the earliest lexical concepts may have related to personality traits (King *et al.*, 1999). Recent research suggests that personality traits are stable across time and between contexts, correlate with verbal and nonverbal behaviors, and can be reliably judged by human observers. Moreover, King *et al.* (1999) argued that such behaviorally-signaled personality traits as reliability, dominance, and trustworthiness are directly relevant to complex social interactions involving competition, cooperation, sharing, sexual selection, and so on. King *et al.* (1999) suggested that it is the context-independent nature of such complex personality traits, and their importance for hominids that suggests such traits may have been encoded as the earliest lexical concepts.

For instance, studies that have sought to teach chimpanzees to manipulate symbolic units have found

that for symbol use to succeed, meaning must be decontextualized. Consider the example of an apple. If a symbol is applied to this referent, it is not clear which properties of the scene the symbolic form relates to. For instance, it could refer to the apple's color, shape, or that it is an item of food. Until the referent has been experienced in a number of contexts, it is not clear which aspect of the referent is being indexed, and thus what the lexical concept is that is being associated with the form. As personality traits are context-independent and readily identifiable by observers, then an early linguistic form that indexed a particular personality trait might have served as an early lexical concept. That is, personality traits achieve the displacement aspect of lexical concepts by virtue of being inherently context-independent. For this reason, symbolic representation in language may have taken personality traits as the first lexical concepts.

The Nature and Evolution of Semantic Knowledge

In this section, we examine the nature of semantic knowledge in more detail. That is, we examine how humans organize the world and their experience of the world into concepts. We also speculate on possible evolutionary bases of semantic knowledge of this kind and the cognitive mechanisms underlying this knowledge.

Concept Formation

'Semantic structure' constitutes the meaning system directly expressed by and encoded in language. In other words, semantic structure is the form that conceptual structure takes for expression in language. Thus, in order to get a sense of the nature of semantic knowledge, for instance, the nature and range of lexical concepts, we must begin by examining the nature of conceptual structure. In this section, then, we consider the basic units of concept structure, 'concepts.' We consider the following question: Where do concepts come from?

For psychologists, concepts are the basic units of knowledge and are essential both for 'categorization' – the ability to identify individuals, entities, and instances – and 'conceptualization' – the ability to construct alternative perspectives (Barsalou, 1992). To illustrate the notion of conceptualization, consider the sentences in (1) and (2). Each provides a different conceptualization of the concept Book:

(1) That book is heavy.

(2) That book is boring.

While the example in (1) relates to the book 'as tome,' the example in (2) relates to book 'as text.'

Since the work of the French philosopher René Descartes in the 17th century, who developed the principle of Mind/Body dualism, there has been a common assumption within philosophy and, more recently, the other cognitive sciences, that conceptual structure can be studied without recourse to the body, and hence without recourse to 'embodiment.' In modern linguistics, this 'objectivist approach' has been most evident in the approach to meaning known as 'Formal Semantics.' Proponents of this approach assume that it is possible to study meaning as a formal or computational system without taking into account the nature of human bodies or human experience. This position is problematic from an evolutionary perspective as it entails that a new discontinuous cognitive adaptation was required for conceptual structure. Conceptual structure, on this account, is assumed to employ what has been termed an 'amodal' (nonperceptual) form of representation. Amodal representation is distinct from the 'modal' or perceptual forms of representation that presumably had to exist prior to the emergence of conceptual structure, in order to represent 'percepts' (Barsalou, 1999).

The last two decades or so have seen a shift from modeling conceptual representation in terms of amodal systems, towards a more perceptual-based or 'embodied perspective.' An embodied perspective takes the view that concepts derive from percepts, and thus, conceptual structure is fundamentally perceptual in nature. Within linguistics, this general perspective has been advocated most notably by Lakoff and Johnson (1980, 1999; Lakoff, 1987), and also by Jackendoff (1983, 1992, 2002).

In general terms, the idea is that concepts have an embodied character. This idea constitutes the thesis of embodied cognition (see Ziemke, 2003 for discussion).

The idea that concepts are embodied assumes that we have a species-specific view of the world, due to the nature of our physical bodies.

One obvious way in which our embodiment affects the nature of experience is in the realm of color. While the human visual system has three kinds of photoreceptors or color channels, other organisms often have a different number. For instance, the visual system of squirrels, rabbits, and possibly cats, makes use of two color channels, while other organisms, for instance, goldfish and pigeons, have four color channels (Varela *et al.*, 1991). Having a different range of color channels radically alters how the world of color is perceived. This difference affects our experience of color in terms of the range of colors accessible to us along the color spectrum. Moreover, while some

organisms can see in the infrared range, humans are unable to see in this range (Jackendoff, 1992). It's clear, then, that the nature of our visual apparatus – an aspect of our physical embodiment – determines the nature and range of our visual experience. The position that different organisms have different kinds of experiences due to the nature of their embodiment is known as 'variable embodiment.'

The position that our experience is embodied – that is, structured in part by the nature of the kinds of bodies/neuro-anatomical structure we have – has consequences for conceptual structure. This corollary follows because the concepts we have access to, and the nature of the 'reality' we think and talk about, is a function of our embodiment. In other words, we can only talk about what we can perceive and think about, and the things that we can perceive and think about derive from embodied experience. Hence, the human mind must bear the imprint of embodied experience.

Some psychologists have made specific proposals as to how embodied experience gives rise to concepts. For instance, the developmental psychologist Jean Mandler (2004) suggested that through a process of 'perceptual meaning analysis,' percepts come to be recoded as concepts. Mandler argued that this process occurs alongside percept formation and begins virtually from birth. However, she viewed percepts and concepts as wholly distinct forms of representation. Another view has been proposed by Barsalou (1999). He argued that a concept is akin to a remembered perceptual state, which he termed a 'perceptual symbol.'

From an evolutionary perspective, if it is correct that concepts are fundamentally perceptual in nature, then by virtue of early hominids gaining conscious access to the contents of their own memories, little additional complexity in terms of cognitive development is required for a rudimentary conceptual system to have emerged. This corollary follows as concepts, on this account, are something akin to 'remembered percepts.'

The Nature of Lexical Concepts: The Natural Partitions Hypothesis

Having examined conceptual structure, we now turn to semantic structure.

Linguists have traditionally classified lexical concepts into those that are encoded by 'open' versus 'closed class forms.' Open class forms include, for English, nouns, verbs and adjectives, while closed class forms include determiners, prepositions, conjunctions, and so on. The basic insight is that it is much harder to add new members to the closed class set than to the open class set. A related insight is that open class forms tend to have much richer denotational meaning, while closed class forms are associated with lexical concepts that have more schematic or relational meaning. That is, they provide connections to other lexical concepts that have a more referential meaning.

However, since at least the early 1980s, the strict separation between closed and open class concepts has been called into question. This query stems from the observation that the division between open and closed class concepts constitutes more of a continuum rather than a strict bifurcation. For instance, Gentner (1981) pointed out that verbs, which are normally thought of as being open class, are highly relational in nature, a feature associated with closed class elements.

More recently, Gentner and Boroditsky (2001) have elaborated on this view, suggesting that open class lexical concepts exhibit 'cognitive dominance.' This contrasts with closed class concepts that exhibit 'linguistic dominance.' These notions relate to the similar idea expressed by Langacker (1987), who used the terms 'conceptually autonomous' versus 'conceptually dependent.' The basic idea is that lexical concepts associated with prototypical open class (autonomous) forms obtain their reference independently of language, which is to say from the world, while prototypical lexical concepts associated with closed class or relational forms obtain their reference from language. Moreover, whether a form is cognitively dominant (or autonomous) or linguistically dominant (or dependent) is a matter of degree. A proposed continuum is given in Figure 1.

In order to account for the cognitive dominance of prototypical open class lexical concepts (i.e., nouns), Gentner (1981) proposed the Natural Partitions Hypothesis. This idea holds that concepts that are encoded as prototypical open class elements such as

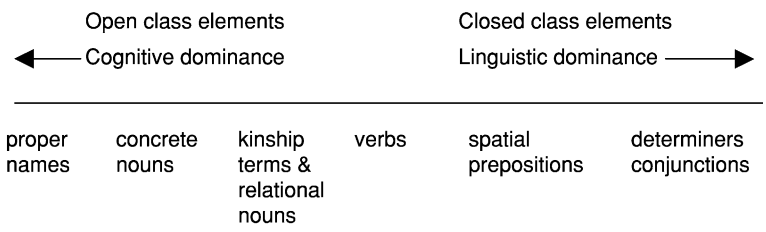

Figure 1 Division of dominance among form classes of lexical concepts. (Adapted from Gentner and Boroditsky, 2001: 216.)

individuals and objects are 'individuated.' That is, entities of this kind constitute densely bundled collections of percepts. Thus, an entity such as a rock or a tree 'stands out.' In Gestalt Psychology terms, a rock constitutes the figure in the figure-ground organization of a given scene. The Natural Partitions Hypothesis states that certain aspects of the world are given by the world. These entities are typically encoded crosslinguistically by nouns, and are acquired first by children. On this account then, bundles of percepts are 'given' by the world, and are simply labeled by language.

The Natural Partitions Hypothesis offers an intriguing insight into a possible order of evolution among lexical concepts – which is to say concepts encoded by language. That is, we might speculate, based on this, that the very first lexical concepts were those for individuals, including animals (and possibly classes of animals) and objects. Concepts of this kind have the most cognitive dominance. That is, they have highest conceptual autonomy. Other lexical concepts may have evolved later.

Further, there is a correlation between the position of a lexical concept on the continuum of dominance (see Figure 1) and the form class associated with the lexical concept. Although this correlation is not exact, for instance, 'destruction' and 'destroy' encode a similar concept employing different lexical classes (noun versus verb), it is plausible that the evolution of lexical classes (or 'parts of speech') emerged due to distinctions in the relative dominance or autonomy being further, later, encoded by morphosyntactic properties of language.

Lexical Concepts and Concept-Combination

From an evolutionary perspective, being able to form concepts and express them via language, while a remarkable achievement, doesn't begin to approach the range and complexity of the semantic structure available to modern Homo Sapiens. Lexical concepts are only a subset of our semantic knowledge. Another important aspect of semantic knowledge concerns our ability to combine lexical concepts in order to give rise to new and different kinds of conceptual structure. Moreover, it is a striking fact that concept combination produces complex concepts that are not simply the sum of the individual parts that comprise the derived concept. For instance, the complex concept Petfish is not simply the intersection of the concepts Pet and Fish. Rather, the concept Petfish has its own concept-internal structure, known as 'category structure.'

For instance, while most people would rank mackerel, which is silver in color, as a good example of the Fish category, a cat or a dog would be rated as a good example of the Pet category. Yet, a good example of a Petfish is a goldfish. Not only is a goldfish not silver, it is not soft and cuddly either. An important task in developing an evolutionary perspective on semantic knowledge is to account not only for the way in which lexical concepts are formed, but also for the mechanisms responsible for concept combination.

A recent approach to concept combination of this kind argued that complex concepts result from a process of 'conceptual integration' (Fauconnier and Turner, 2002; Turner and Fauconnier, 1995). This process involves what is termed 'selective projection' of content from each of the concepts that give rise to the complex concept, as well as additional material derived from background knowledge, such as knowledge that the kinds of fish we keep in fishbowls are typically goldfish. This process is termed 'completion.' Thus, the complex concept, known as a 'conceptual blend,' has structure associated with it that is found in neither of the 'input' concepts that give rise to it. This structure is diagrammed in Figure 2.

Clearly, some form of conceptual integration allows humans to combine and manipulate concepts in order to produce more complex ideas. Fauconnier and Turner argued that the emergence of cognitively modern human beings, during the upper paleolithic era, somewhere in the region of 50 000 years ago, points to the development of a new cognitive ability: our ability to perform conceptual integration. While anatomically modern humans appear to have existed from at least 100 000 years ago, the upper paleolithic stands out. This period witnessed the emergence of new social and technological breakthroughs, including the development of projectile points made from bony material for use in hunting, the manufacture of personal adornments, the development of sophisticated art, evidence of belief systems such as religion and magic, plus manmade shelters were built for the first time, sewn clothing was worn, and sculptures were produced. Fauconnier and Turner argued that what made advances such as these possible, was that humans had evolved the ability to perform complex conceptual integrations. This process, then, may have facilitated composing and elaborating concepts to produce new and more elaborate conceptual structures.

Polysemy

Another striking aspect of semantic knowledge is the phenomenon of 'polysemy.' This aspect constitutes the way in which a range of related lexical concepts can be expressed using a single form. For instance, the English preposition 'over' has a number of distinct but related lexical concepts associated with it.

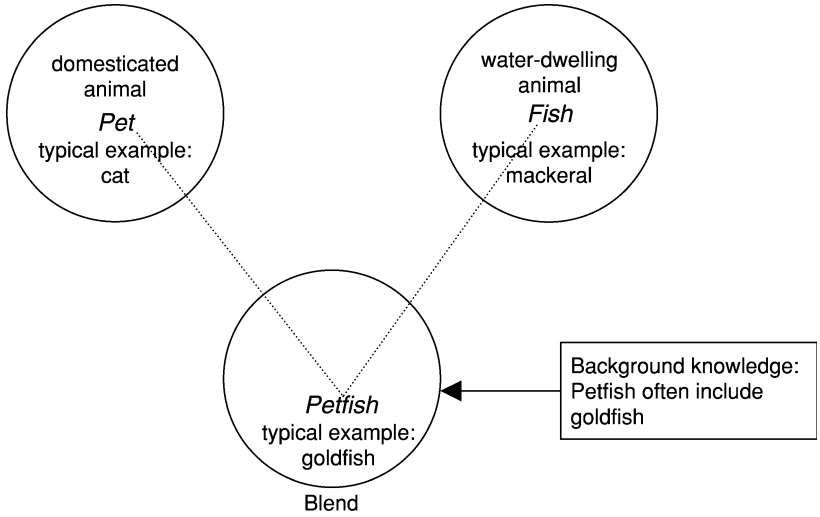

Figure 2 Conceptual integration for the composite concept *goldfish*.

Consider some of the distinct lexical concepts proposed by Tyler and Evans (2003):

(3a) The picture is over the sofa ['above']
(3b) The picture is over the hole ['covering']
(3c) The ball is over the wall ['on-the-other-side-of']
(3d) She has a strange power over him ['control']
(3e) The government handed over power ['transfer']
(3f) She prefers wine over beer ['preference']
(3g) The relationship is over ['completion']
(3h) The relationship evolved over the years ['temporal']
(3i) The fence fell over ['reflexive']
(3j) They started the race over ['repetition']

Recent research has argued that polysemy, far from being merely a 'surface' phenomenon, is in fact conceptually real. That is, polysemy patterns reflect distinct lexical concepts, stored as different senses in the mental lexicon (Evans, 2004; Lakoff, 1987; Tyler and Evans, 2003). Accordingly, from an evolutionary perspective, the challenge is to explain how the proliferation of lexical concepts, i.e., polysemy, arises.

A recent perspective is that polysemy emerges from the interaction between language use and contexts of use, due to the conventionalization of situated (or invited) inferences (Traugott and Dasher, 2002; Tyler and Evans, 2003; Evans, 2004). For instance, the 'covering' meaning associated with 'over' may have derived from contexts of use in which, in a given spatial scene, an element placed above another entity thereby covered it. Through a process of decontextualization, the 'covering' meaning was reanalyzed as being a distinct meaning component. Once this reanalysis occurred, it could be used in novel ways unsupported by the original spatial scene that gave rise to the inference in the first place (Tyler and Evans, 2003).

From an evolutionary perspective, the importance of polysemy and meaning-extension is that it illustrates how language, in conjunction with human experience, can give rise to new lexical concepts. Moreover, this particular phenomenon of meaning-extension illustrates how language can flexibly increase its repertoire of lexical concepts without increasing the number of linguistic forms.

Abstract Concepts

Another important aspect of semantic structure relates to so-called abstract concepts. These include lexical concepts such as Truth, Justice, or Theory. Concepts of these kinds are abstract in the sense that they cannot be straightforwardly accounted for in terms of perceptual recording, precisely because it's not clear what their perceptual basis is, and even whether they have one. Indeed, abstract concepts provide a significant challenge if we are to attempt to provide an evolutionary account maintaining the thesis of embodied cognition.

An influential framework that provides an account that is based in perceptual or embodied experience is the 'conceptual metaphor theory' of Lakoff and Johnson (1980, 1999). Lakoff and Johnson argued that abstract concepts are grounded in embodied experience, and thus our perception of the world, even if the grounding is not direct. This grounding is achieved by virtue of 'conceptual metaphors,' which are long-term conceptual mappings that serve to project structure from a 'source concept,' which relates to perceptual experience onto the abstract concept, the 'target concept.' For instance, we commonly understand the abstract concept of Quantity in terms of the more perceptually concrete concept of Verticality, as evidenced by examples such as the following:

(4a) The price of stocks has **gone up**.
(4b) Her score is **higher** than mine.

In both these examples, an abstract notion of Quantity is understood in terms of physical position or motion on the vertical axis. This understanding is licensed by the conceptual metaphor Quantity Is Vertical Elevation.

The most recent version of conceptual metaphor theory recognizes two distinct kinds of conceptual metaphors: 'primary metaphors,' which are directly grounded in experience and constitute 'primitive' conceptual mappings, and more complex 'compound metaphors,' which are constructed out of the more experientially basic primary metaphors (Grady, 1997; Lakoff and Johnson, 1999).

For instance, when we understand Theories in terms of Physical Structures, as evidenced by the following examples:

(5a) Is that the **foundation** for your theory?
(5b) The argument is **shaky**.

Grady argues that the motivation for linguistic examples such as these is in fact two primary metaphors, Persisting Is Remaining Erect and Organization Is Physical Structure. These unify to give the compound metaphor An Abstract Organized Entity [such as a theory] Is An Erect Physical Object (Grady, 1997).

Thus, it is only primary metaphors that are grounded in perceptual experience. The motivation for the conceptual associations captured by primary metaphors is due to a tight and ubiquitous correlation in experience. For instance, there is a tight and recurring correlation in experience between quantity and height. When we fill a glass with water, an increase in quantity correlates with an increase in height. Thus, primary metaphors are motivated by 'experiential correlation.'

From an evolutionary perspective, the phenomenon of 'metaphoric' mappings holding between concepts from different parts of 'conceptual space,' known as 'domains,' allows us to account for how perceptual information can be recruited in order to construct more abstract concepts, such as Quantity and Theories. This phenomenon suggests that, in addition to being able to recode percepts as concepts and combine concepts, the conceptual system must have additionally developed a mechanism for projecting structure from one conceptual domain to another in order to create more abstract concepts.

Cultural Evolution

The final issue we examine is that of cultural evolution. Lexical concepts are culturally embedded, and thus, we must briefly look at the role of cultural evolution in providing the conceptual backdrop for the emergence of semantic knowledge.

Consider the evolution of the concept of Money. This concept is one that has been evolving for over 3000 years. Weatherford (1998) identified a number of key mutations in the development of how we conceptualize Money. The first was the invention of coins in Anatolia over 3000 years ago. This development gave rise to the monetary economies that underpinned the classical Greek and Roman civilizations. The second was the development of family-owned credit banks in Renaissance Italy. This development gave rise to capitalist market economies that replaced earlier feudal societies throughout Europe, and the period in which European countries expanded to became global economic powers. The process whereby cultural artifacts or cultural practice undergoes cumulative evolution, resulting in modification or improvement has been dubbed the 'ratchet effect' (Tomasello, 1999). Thus, an important aspect of the evolution of semantic knowledge involves the development and evolution of cultural knowledge.

See also: Cultural Evolution of Language; Descartes, René (1596–1650); Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Origin and Evolution of Language.

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Evolution of Syntax

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After more than a century of more or less avoiding the subject, linguists have become much more interested in questions about evolution in recent years. Arguably, this interest was kick-started by an important paper by Steven Pinker and Paul Bloom (Pinker and Bloom, 1990). The number of articles in this encyclopedia that are concerned with matters of evolution can be seen as evidence of this increased interest (see cross-references below). Jackendoff (2002: 231–232) suggests two reasons for the increased interest. One is that we now understand much more about evolutionary principles in general and about human origins in particular than we did a century ago. The other is that increased interest in evolution in general inevitably leads to increased interest in the evolution of language in particular and, as Bickerton suggests (Calvin and Bickerton, 2000), it is important for linguists to be involved in this discussion. At the same time, there is some ambivalence about this topic. Linguists are wary of debates on topics where the data is so limited and the discussion therefore has to be quite speculative. Despite this, there have been a number of interesting discussions in recent years and significant progress has been made in this area. There has also been a significant increase in work that considers how syntax in particular might have evolved. This essay begins by considering some general questions about the nature and evolution of language before considering questions about the evolution of syntax, and some of the answers that have been proposed. The two sets of questions are closely linked in ways that echo the connections between studies of language in general and studies of syntax in general.

Language

Before working out how a particular trait evolved, we first need to know what that trait is. There has been considerable disagreement about what 'language' is in the past and there are currently several different views (*see* the articles in this encyclopedia on **Linguistics: Approaches** and **Approaches to Translation, Linguistic**). Language can be viewed as a social or a cultural phenomenon as well as a psychological one.

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After more than a century of more or less avoiding the subject, linguists have become much more interested in questions about evolution in recent years. Arguably, this interest was kick-started by an important paper by Steven Pinker and Paul Bloom (Pinker and Bloom, 1990). The number of articles in this encyclopedia that are concerned with matters of evolution can be seen as evidence of this increased interest (see cross-references below). Jackendoff (2002: 231–232) suggests two reasons for the increased interest. One is that we now understand much more about evolutionary principles in general and about human origins in particular than we did a century ago. The other is that increased interest in evolution in general inevitably leads to increased interest in the evolution of language in particular and, as Bickerton suggests (Calvin and Bickerton, 2000), it is important for linguists to be involved in this discussion. At the same time, there is some ambivalence about this topic. Linguists are wary of debates on topics where the data is so limited and the discussion therefore has to be quite speculative. Despite this, there have been a number of interesting discussions in recent years and significant progress has been made in this area. There has also been a significant increase in work that considers how syntax in particular might have evolved. This essay begins by considering some general questions about the nature and evolution of language before considering questions about the evolution of syntax, and some of the answers that have been proposed. The two sets of questions are closely linked in ways that echo the connections between studies of language in general and studies of syntax in general.

Language

Before working out how a particular trait evolved, we first need to know what that trait is. There has been considerable disagreement about what 'language' is in the past and there are currently several different views (*see* the articles in this encyclopedia on **Linguistics: Approaches** and **Approaches to Translation, Linguistic**). Language can be viewed as a social or a cultural phenomenon as well as a psychological one.

But any social or cultural phenomenon must be represented mentally, and psychological systems and processes must be involved at some stage in the spread of any phenomenon through a culture.

Even when seen as a psychological phenomenon, there is disagreement about what kind of thing language is, and different assumptions about this will have implications for theories of language evolution. To take one example, Hauser *et al.* (2002) claim that recursion is the one key feature of language seen as a mental faculty, while Pinker and Jackendoff (2005) see recursion as just one of several important properties of language. At a more general level, there is the question of how components of the language system such as phonology (the system of sounds), syntax (structure), and semantics (representations of meaning) are related. Could phonology exist independently of syntax? Could syntax exist independently of phonology? Could the use of symbols exist without the existence of structural representations? Even more generally, there is the question of how language relates to other parts of the mind. Fodor's 'language of thought' hypothesis (Fodor, 1975) suggests that our system of mental representations is both representational (has a kind of semantics) and computational (has a kind of syntax). If this is so, then we need to explore how the language of thought relates to our knowledge of natural languages, including the relationship between the syntax of the language of thought (which most theorists would assume to be universal) and the syntax of particular languages.

Evolution of Language

One of the most frequently discussed questions about the evolution of language concerns the speed at which it occurred. Was it a slow, incremental process where each stage developed independently after the previous one? Or did language emerge suddenly as something dramatically different from what had gone before? Another question concerns the nature of the evolutionary process. Pinker and Bloom (1990) suggest that language is a complex biological adaptation that evolved by natural selection, while other researchers have considered evolution as a cultural phenomenon rather than a biological one. Pinker and Bloom's work is partly motivated as a response to Chomsky's (1975) skepticism about an evolutionary account of language based on natural selection. While many researchers agree that a number of preadaptations made the development of language possible, there is disagreement on whether language emerged as an adaptation (so that language is now being used for the purpose for which it evolved) or, following Gould's (1991) terminology, an exaptation (where a trait that evolved for one purpose is then co-opted for another purpose). An exaptation can be either an adaptation that has been co-opted for a purpose different from that for which it originally evolved (such as feathers, which originally evolved because they helped keep birds warm but later turned out to be useful for flight) or side effects of adaptations, which then turn out to be useful in a different way. The latter are referred to as 'spandrels,' a term taken from architecture where it describes the spaces created as a side effect of putting two arches next to each other. Gould suggests that language could be a spandrel in the sense that it is a by-product of increased brain size that was beneficial for independent reasons. This view seems to be supported by Chomsky in one of his most well-known comments on evolution:

> We know very little about what happens when 10^{10} neurons are crammed into something the size of a basketball, with further conditions imposed by the specific manner in which this system developed over time. It would be a serious error to suppose that all properties, or the interesting properties of the structures that evolved, can be 'explained' in terms of natural selection. (Chomsky, 1975: 59)

Another general question concerns the relationship between the different features that together constitute human language. One important problem in developing an account of the evolution of language has to do with the perceived complexity of language and the large number of separate phenomena that together are involved in linguistic behavior: at least phonology, syntax, and semantics for the system itself, and at least intentionality and metarepresentational ability for the ability to communicate with it. While it is easy to see that full human language is likely to deliver an evolutionary advantage and so be favored by natural selection when it happens to emerge, it is not so obvious that any of these phenomena alone would deliver an evolutionary advantage. So it seems unlikely that a situation could arise where what we know as language could emerge and then be selected. This may be one reason for Chomsky's reluctance to entertain the possibility of an account of language evolution based on natural selection.

Partly despite and partly in response to this problem, discussion has focused on particular components of language and there has been ongoing discussion of the likelihood of various orders of emergence. Lieberman (1984, 1991, 1998), for example, has suggested that the ability to speak preceded the development of full language. He suggests that we first evolved all of the physiological resources to make speech possible and that this then made possible the development of full language. Corballis (2002), in

contrast, suggests that fully syntactic messages were conveyed by hand gestures along the lines of modern signed languages long before speech developed. Bickerton (2003) rejects Corballis's view, following Burling (2000) and Sperber and Origgi (2000) in assuming that prehumans had to be attempting some form of intention-recognition before any of the components of language could exist. While he suggests that symbolism might have preceded structure by "as much as two million years" (Bickerton, 2003: 81), he also suggests that syntax is central to language and that this was the crucial development which made language possible. Okanoya (2002) suggests that syntax might have developed before words so that semantic relationships emerged after syntactic structure. This is based on evidence from the study of finch song, where it seems that a rudimentary syntax evolved independently of meaning. Okanoya further suggests that there are links between syntactic abilities and sexual selection.

An account of the evolution of syntax will be located within this debate and will have to address the question of how syntax and its evolution relate to other components of language and their evolution.

One major issue for all work on evolution is the nature of the evidence. In work on the evolution of language, there is a wide range of approaches from a wide range of disciplines using a wide range of evidence types. Areas that provide, or could conceivably provide, evidence include animal communication, anthropology, archeology, artificial intelligence, cognitive neuroscience, comparative neuroanatomy, computer modeling, ethology, formal language theory, language acquisition, language disorders, mathematics and mathematical modeling, philosophy, psychological experiments, as well as more familiar linguistic and conceptual evidence. But of course since language itself leaves no fossils, all evidence is indirect.

Syntax

As suggested above, we cannot but assume that syntax is part of language seen as a psychological phenomenon (even if syntax-like combinatorial structure is also involved in thought and other aspects of the mind). So an account of the evolution of syntax must be part of an account of the evolution of language seen as a psychological phenomenon. As well as answering questions about the relationship between syntax and other components of language, any account of how syntax evolved will need to make assumptions about the nature of syntax itself and how it is related to other parts of the mind. Different answers to these questions lead to quite different accounts of the evolution of syntax. At one extreme, we might suggest that syntactic structure (in the sense of NPs and VPs) is necessary for combinatorial thought, and therefore that syntax is a necessary precursor to the development of full human language. At another extreme, we might suggest that syntactic structure emerges after the development of other phenomena such as the ability to speak and the ability to understand noises or gestures as representing particular meanings. To some extent, this is a question of the development and status of combinatoriality. Combinatoriality is a property of phonological and semantic knowledge, as well as of syntax. This raises the question of whether it arose in one of these areas first before developing in the other areas.

Chomsky has suggested that the properties of phonological structure and of semantic representations each depend on properties of syntax but not *vice versa*. In his view, syntax is fundamental to our linguistic knowledge. Jackendoff (2002) terms this 'syntactocentrism' and argues that it should be rejected. He proposes that language can be understood in terms of a 'parallel architecture' where phonology, syntax, and semantics are separate, equally generative, components that communicate with each other through 'interface' components. This question concerns us here because of the implications for an account of the evolution of syntax. Can we treat the evolution of syntax as separate from the evolution of phonology and semantics or do they depend on each other, mutually or in an ordered way (where the evolution of one preceded the evolution of the other)?

Recursion is a fundamental property of syntax, and an important part of an evolutionary account will concern how knowledge of recursive structures such as (1) evolved (*see* **Recursion**):

(1) Keith said that Billy thought that this was the book that annoyed the linguist who surprised the psychologist when he said that recursion was the most important defining property of human language.

What makes this recursive is the fact that it contains constituents that dominate other instances of the same syntactic category (for example, the sentence beginning *Keith said that…* dominates the sentence beginning *Billy thought that…*)

It is not only linguistic expressions that demonstrate recursion. Our thoughts too are recursive, in that we can embed thoughts within other thoughts, entertaining propositions such as that expressed by (2):

(2) Tom thinks that Mary said that Dan was wondering whether Frieda knew about the party.

It seems that we are the only creatures who have this ability to such an extent. Other primates can entertain thoughts about thoughts but only to a limited extent (see Tomasello and Hare, 2003), e.g., a chimp might be able to think that if he defends an empty container, another creature will think it is full; or recursive thoughts might be involved in a chimp working out a plan of action. This is, though, about as complex as such thoughts can get for chimps. Humans can entertain recursive thoughts quite easily and can also produce and understand linguistic expressions that are complicated in the same way. This leads to speculation that the evolution of syntax may have made possible both metarepresentation and also human language.

Evolution of Syntax

There has been a considerable amount of significant work on the evolution of syntax in recent years (a large amount of this work can be found in the collections edited by Christiansen and Kirby, 2003; Hurford *et al.*, 1998; Knight *et al.*, 2000; Wray, 2002). While no general consensus or dominant approach has yet emerged, we can identify a number of questions and themes that researchers have addressed. As mentioned above, many of these concerns overlap or mirror questions about the evolution of language as a whole. It is not possible here to do justice to the range of positions and themes that have been explored so far, but we run through a number to give a flavor of the kinds of issues currently being explored. At the end of this section, we give a more detailed sketch of Jackendoff's (2002) sketch of a possible series of stages in the evolution of (syntax and) language.

Is Syntax Adaptive?

As with other components of language, there are different views about whether syntax is adapative or not, and therefore whether it can be explained in terms of natural selection or not. Pinker (2003; Pinker and Bloom, 1990) and Bickerton (1981, 1990, 1998, 2002, 2003), among others, suggest that language and syntax are adaptive and so amenable to an account in terms of natural selection. Lightfoot (1991, 2000), in contrast, suggests that some properties of syntax are not adaptive and so they have evolved despite being dysfunctional. Part of the evidence is that individuals violate some of the constraints imposed by the syntactic system. Lightfoot argues that certain conditions are "dysfunctional, blocking expressions which are needed" (Lightfoot, 2000: 244). This means that they are spandrels and so could not have been selected for. He concludes that this is true of at least some syntactic conditions but does not rule out the possibility that the whole language system is a spandrel. Overall, a number of distinct positions have been taken with regard to the question of whether syntax, or language, is adaptive. The notion that syntax is adaptive is often linked to the observation that combinatoriality is a property not only of syntax but also of semantics, phonology, and thought.

Exaptation

Assuming a biological approach, one suggestion that has a significant number of supporters is that syntax is an exaptation from nonsyntactic structure. One possible line on this is that the mental representations involved in thought developed combinatorial structure and this was then taken over by the linguistic system. Alternatively, combinatoriality might have originated in phonology or in speech (Carstairs-McCarthy, 1999).

Biological or Nonbiological Evolution

Related to this is the question of whether explanations are proposed in terms of biology, of culture, or as developments within the language system itself. As we have seen, Bickerton and Pinker propose a biological account. Tomasello (2003) shares one part of Bickerton's view, namely that it is the separate evolution of symbols and grammar that distinguishes human communication from that of other primates. But he rejects Pinker's and Bickerton's view that it is specifically language that is adaptive. He suggests instead that language emerged as one part of the larger process of the evolution of human culture. In his view, the emergence of a broader kind of social cognition enabled human culture, and human symbolic communication should be seen as a special case of that. Worden (2000) proposes a model with a constant biological endowment which, together with specific learning mechanisms, enables the **cultural** evolution of languages. Hurford (2003) proposes a combination of biological preadaptations and learning-based linguistic adaptations. Jackendoff (2002) leaves open the question of how much is biological and how much cultural.

The 'Big Picture' and Details of Syntax

Hurford (2000: 222–224) raises the interesting issue of the relationship between programmatic, 'big-picture' statements and "the degree of detailed knowledge that has now been accumulated about the syntax of languages." He points out, for example,

the striking contrast between the simple syntaxes of the emergent languages in computer models and the complexity of real languages, which is familiar to linguists. He suggests that the value of programmatic proposals follows from the fragmented and rapidly changing nature of contemporary syntactic theorizing. The 'turmoil' of the field, he suggests, means that syntactic theorizing "needs to start looking beyond its traditional horizons for explanatory principles of kinds that it has not previously considered" (Hurford, 2000: 223).

A related contrast is between programmatic proposals and more specific suggestions. One of the boldest specific suggestions so far has been Newmeyer's (2000) suggestion, based on evidence from typology as well other work on language evolution, that the earliest forms of human language had rigid SOV word order.

Effects of Particular Developments Within Theories of Syntax

It is also interesting to consider how particular developments in syntactic theorizing relate to theories of the evolution of syntax. The Minimalist Program, for example, has been seen by some theorists (e.g., Berwick, 1998) as making evolutionary accounts more plausible, while others, including Chomsky himself (1991a, 1991b) have suggested that language is 'dysfunctional' with regard to processing and so makes an evolutionary account less likely. These conclusions rest, of course, on assumptions about how particular syntactic theories interact with other domains, such as theories of processing.

When Did Syntax Emerge?

Many researchers suggest that syntax emerged relatively late (around 40 000–150 000 years ago) and relatively quickly, but Burling (2002) suggests that it may have been a more gradual process starting much earlier. His evidence for this comes from looking at early and late stages of child language acquisition. He suggests that the acquisition of syntax spans a relatively long time in the development of an individual child and that this weakens arguments based on analogy with child language acquisition that the evolutionary development of syntax was abrupt.

How Many Stages?

Related to this is the question of the stages involved in evolution. Bickerton (1990, 1998, 2002, 2003; Calvin and Bickerton, 2000; see also Bickerton's article **Protolanguage** in this encyclopedia) has proposed that language evolved in two stages. The second step is the development of language as we know it now. The first step is the development of protolanguage. Protolanguage is a simpler system of communication than full human language where certain actions (sounds or gestures) represent certain meanings but without the full complexity that arises with the development of syntax. So protolanguage can be thought of as 'modern language without syntax.'

There are two particularly interesting things about this proposal. First, it suggests a way around the logical problem caused by thinking of human language as one entity and so suggests how we can develop an incremental account of language evolution. Protolanguage would bring advantages and therefore 'be worth selecting for its own sake.' Second, Bickerton suggests that protolanguage is still present in the human brain and can be seen in a number of situations where language is disrupted or not developed. Cases of disruption include the development of pidgin languages when distinct language groups are thrown together and need to find a way to communicate without a full shared language (Bickerton, 1981), cases such as that of 'Genie' (Curtiss, 1977), where an individual is denied the necessary environmental triggers until it is too late for her to acquire full language, and possibly cases of agrammatic aphasia, language disorders that affect syntactic processing. Cases where language has not developed include early child language and communication systems developed by apes when humans attempt to teach them language (Linden, 1974; Savage-Rumbaugh *et al.*, 1998). The suggestion is that protolanguage emerged, was useful and favored by natural selection and that this made possible the subsequent development of human language with complex syntax.

A Series of Stages

Bickerton (1990) initially saw the development from protolanguage to modern language as one great leap, but has since (Calvin and Bickerton, 2000) developed a more gradualist position. Jackendoff (2002) proposes a much more incremental story. He suggests that it is possible to reconstruct from modern human language a sequence of distinct innovations from primate calls, each of which is an improvement in communicative expressiveness and precision. He suggests, furthermore, not only that the earlier stages are present in the brain but also that their 'fossils' are present in the grammar itself, and so are available as evidence. A summary of the steps proposed is shown in Figure 1.

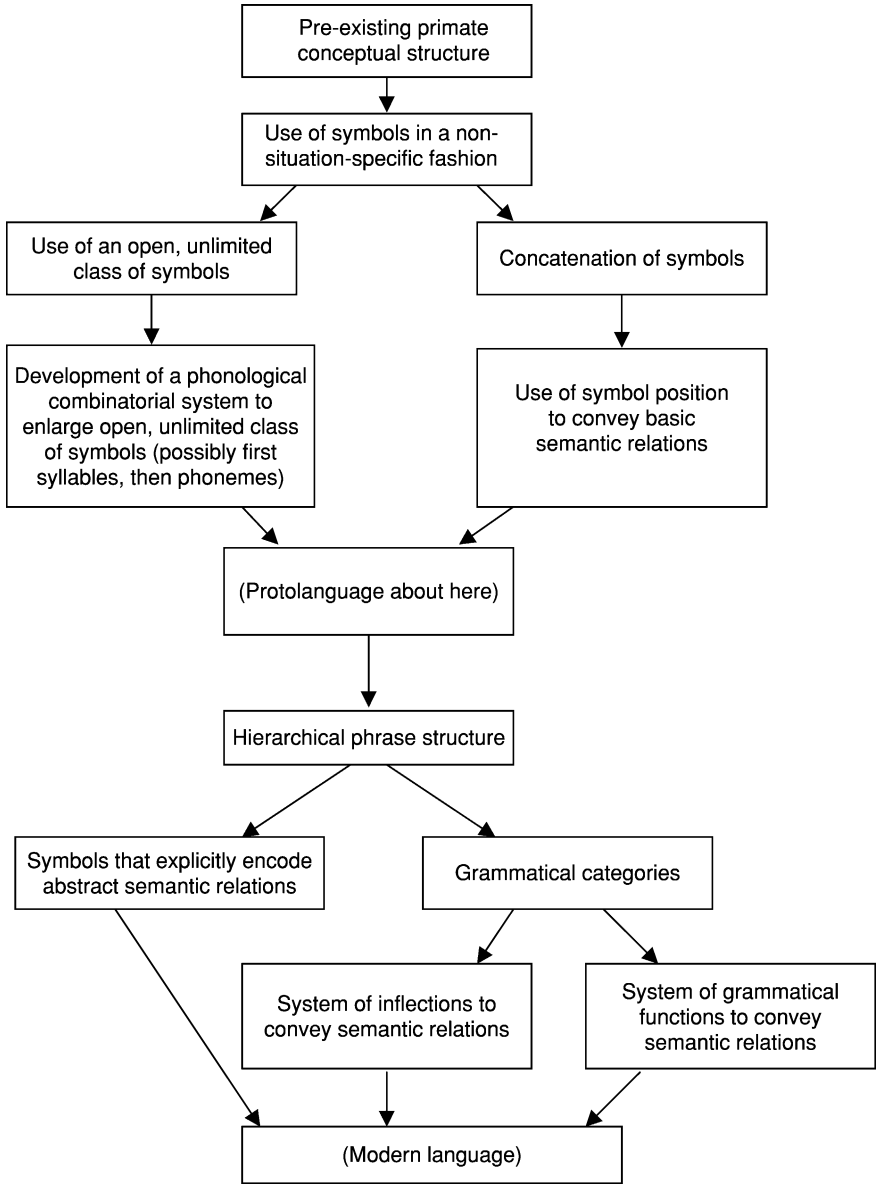

Figure 1 Summary of incremental evolutionary steps (from Jackendoff 2002: 238).

Working downward through Figure 1, the first step and the two steps on the left of the figure (use of symbols, open class of symbols, phonological combinatorial system) take us beyond primate call systems but do not come close to full modern language. The development of a phonological combinatorial system is an important step here. As the number of symbols becomes larger, it becomes harder to make them all memorable and discriminable. If the symbols were holistic, it would not be possible to keep even a thousand of them distinct in perception and memory. This problem is solved in modern language by building words up combinatorially from a few dozen smaller meaningless speech sounds, the phonemes.

The first step toward modern syntax is to concatenate more than one symbol into a single utterance, with the connection between them determined purely by context. Concatenating more than two symbols multiplies the number of possible meanings, though much depends on exactly which symbols are used. This is different from the combination of sounds just mentioned, in that meaningful symbols are combined to form larger utterances whose meanings are a function of the meanings of the symbols used. In 'protophonology,' in contrast, meaningless symbols are combined to form meaningful ones.

Concatenating symbols opens up many opportunities for enhancing expressive power and precision.

Two important classes of innovations are orthogonal: using the linear order of concatenated symbols to express relations between them, and introducing new sorts of vocabulary item that convey relations explicitly. On this view, the former is a stage on the way to Bickerton's protolanguage, while the latter (discussed below) is a stage later than protolanguage on the way to modern language.

With just symbol concatenation, interpreting particular utterances depends very much on contextual inference. Pinker and Bloom (1990) suggest that this means that using principles of word order would be communicatively adaptive. Some principles of word order will narrow down the range of possibilities and lead to a system roughly equivalent to Bickerton's protolanguage.

An important step in moving from protolanguage to modern language is to develop the means to represent relations not just between words but also between phrases. In a sentence such as *the careless boy lost his brother's apple,* it is the entire phrase *the careless boy* that enters into a semantic relation with the verb *lost*. This collection of words functions as an elaborated version of the single word *boy*, the head of the phrase. More generally, a noun phrase is an elaborated version of a noun, an adjective phrase is an elaboration of an adjective and so on.

When headed phrases appear, then principles of word order can be elaborated into principles of phrase order. This means that the messages that can be conveyed are much more complex: not just *dog chase mouse*, for example, but also *[big dog with floppy ears and long scraggly tail] chase [little frightened mouse]*. It also makes possible hierarchical embedding such as *[the dog [that bit the cat [that chased the rat]]]*. This hierarchical embedding is one of the hallmarks of modern language but it is neither simple nor inevitable, even in a generative representation. It does not occur so relentlessly in phonological structure, for example.

This potential complexity raises new problems of communicability. With only three words in a sentence, the relations among them can be conveyed by simple word order plus pragmatics. But when sentences are longer and grouped into phrases, it becomes much more important to make phrase boundaries and the semantic relations among words explicit to the hearer. Language needs further devices than linear order and intonation in order to make semantic relations explicit.

One way to encode semantic relations among words and phrases is to invent words that express them. Relational words are pointless at the one-word stage but are useful once we have multiple-symbol utterances. The next step is the development of grammatical categories, and Jackendoff makes some suggestions about how the distinction between nouns and verbs might have arisen.

Two more changes are needed to move from this point to modern language: the development of morphology and the remaining aspects of syntax. Bickerton and many other linguists treat these as an integrated whole at the core of grammar, but Jackendoff suggests that we might see phrasal syntax and morphosyntax as independently evolved systems, each built on top of the system of protolanguage, each refining communication through its own expressive techniques.

On this speculative picture, then, modern language evolved from primate calls in a number of stages, each step having its own advantages over the step before. This suggests not only that the evolution of language can be seen as happening in a number of discrete steps but also that the syntactic component itself can be further broken down and that syntax itself may have developed in a series of discrete steps. This leaves open the important question of which of these steps require biological evolution and which could be the consequence of cultural innovation.

Conclusion

Some linguists are reluctant to discuss a topic where the data is so remote. But the data of 'everyday' linguistics is also remote in that it is buried in the minds of language users at a level not accessible to consciousness. Recent work means that we now have a fuller understanding of evolution in general and linguists have been working on formulating and testing clearly stated hypotheses on the evolution of language, including the evolution of syntax. Continuing developments in the study of language and syntax have also helped linguists make significant progress in our attempt to understand the nature of syntax and language and how they evolved. While there is as yet no general consensus, there is a clear sense of an emerging interdisciplinary research program concerned with the evolution of language in general and with the evolution of syntax in particular.

See also: Approaches to Translation, Linguistic; Cultural Evolution of Language; Evolution of Pragmatics; Evolution of Semantics; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; History of Linguistics: Discipline of Linguistics; Language of Thought; Linguistics: Approaches; Origin and Evolution of Language; Protolanguage; Recursion.

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Evolutionary Theories of Language: Current Theories

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Research into language evolution is alive and well, as evidenced by a healthy mixture of agreement and disagreement among its participants.

Is Language Evolution Research Worthwhile?

Before we discuss current issues within the field of language evolution, it is worth mentioning a basic disagreement between researchers in this field and other language researchers outside it. This most fundamental issue is whether anything at all sensible can be said about the evolution of language. A body of researchers from a wide variety of disciplines, including archaeology, anthropology, artificial intelligence, cognitive science, ethology, genetics, linguistics, mathematics, philosophy, and psychology, are clearly of the opinion that something sensible can be said, and a growing number of books, journal articles, and conferences attest to this commitment. However, it is noticeable that relatively few linguists participate in these activities, and many linguists either believe that nothing solid can be said on the subject or that questions of evolution are peripheral to the main study of language. These differences are rooted in the history and sociology of the various academic disciplines.

Much mainstream theorizing about the nature of language from within the field of linguistics is solidly within a structuralist mould and tends to take into account a quite narrow range of data, centered mostly on judgments about particular examples. The explanatory principles typically postulated by linguists are specific to language (i.e., not applicable to facts outside language) and are quite abstract. The general aim is like that of physics, to arrive at a parsimonious set of axioms from which the facts (in this case, facts of language) can be derived. Within mainstream linguistics, it is usually assumed that such axioms will be specific to language. To outsiders (e.g., anthropologists or biologists), such concentration on the structure of particular sets of linguistic examples, and the concomitant language-specific theory-building, is something of a mystery, or at least an esoteric avenue unlikely to be conclusive on its own. It is natural that anthropologists should believe that at least some properties of language are the result of its use in societies, that animal behavior researchers should look for parallels between animal communication and cognition and human language, and that computational and mathematical modelers of language evolution should appeal to principles of self-organization found in other complex dynamic systems.

What unites the nonlinguist researchers in language evolution is a belief that evolutionary processes in themselves can help to explain how language came to be as it is. They subscribe to Dobzhansky's (1973: 125) slogan, "Nothing in biology makes sense except in the light of evolution." Linguists, however, have largely been trained in a tradition that pays little or no attention to evolutionary processes, even while the core of the mainstream position on language is that language is a biological phenomenon. Dobzhansky's focus on 'making sense' in his famous quotation points to the central motivation of language evolution research; namely, to see language in such a light that it makes sense. Thus, the goal of language evolution research is much less the answering of (apparently) factual questions like, 'What was the first human language like?' 'To what extent was language developed in *Homo erectus*?' and 'When did recursive syntax first appear?' than establishing connections between the findings of all the disciplines concerned with human behavior in such a way that the facts of language, as described in detail by linguists, make sense. 'Making sense' is, of course, a quite vague phrase that needs to be nailed down more precisely. Here we are at the mercy of the extreme complexity of our subject matter. A human language is the outcome of the interplay of many factors – both biological and social – all subject to noise and random accident. Nevertheless, language evolution researchers share the belief that taking evolutionary processes, broadly conceived, into account helps us to achieve some understanding of why language is the way it is.

How Much About Language Is Special?

This question is often called the 'question of domain-specificity.' Humans are the only species with language. This could be because humans have greater general cognitive capacity than other species, and each element of our linguistic prowess has a counterpart in some nonlinguistic domain of human behavior. For instance, it has been argued by Christiansen and Ellefson (2002) that the preferences seen across languages for certain orderings of heads and modifiers arise from the fact that such orderings are easier to learn by a neural net, that is a general-purpose learning device, rather than a learning device specifically devoted to language. Another example of a suggestion that an ability deployed for use with language is not an adaptation specifically for language is implicit in the finding by Kuhl and Miller (1978) that chinchillas are sensitive to exactly the same auditory

distinction between voiced and voiceless sounds as humans; this aspect of human hearing, it can be concluded, is not specific to the human language capacity, because we share it with chinchillas, who do not have any language capacity. An extreme position on this question would claim that there is no aspect of human linguistic behavior special to language. In fact, such an extreme view would mean that there is no specifically linguistic faculty.

Linguistic theory from the 1950s to the 1990s was dominated by a view that humans are endowed with a specifically linguistic faculty that is richly structured. In other words, there is a lot of information in the language faculty that cannot be found in any domain outside language. It was the goal of linguistic theory to spell out the complex nature of this faculty, variously referred to as UG (universal grammar) and the LAD (language acquisition device). See Chomsky (1965, 1975, 1981) for successive articulations of this research program. This represents a position at the other end of the spectrum from the 'no specific language capacity' position. This 'rich language faculty' position is coupled with a strongly nativist position, claiming that the rich details of this faculty are encoded in the genes and transmitted via DNA.

More recent theorizing has reversed the direction of the previous four decades, and the 'Minimalist Program' (Chomsky, 1995) claims that the human language faculty is in fact not very richly structured at all. A stimulating paper by Hauser *et al.* (2002) suggests that the human language faculty may consist of nothing more than the capacity for recursive computation, with even a hint that if recursion can be found in the cognitive capacities of nonhuman animals, the specifically linguistic faculty of humans may be zero (i.e., it may not exist). The paper by Hauser *et al.* makes the useful distinction between FLN (faculty of language in the narrow sense) and FLB (faculty of language in the broad sense). FLB includes capacities that support language but that also (arguably) support other nonlinguistic abilities – capacities such as normal hearing, control of breathing, short-term memory, and logical inference. The discussion above concerns FLN. A more conservative view, reflecting preminimalist theorizing, and claiming that the language faculty is indeed special in many more ways than just involving recursion, is expressed by Pinker and Jackendoff (2005). Jackendoff (2002) has related such arguments to evolutionary issues, postulating eight discrete stages toward the evolution of modern language.

How Much of Language Is Adaptive?

The question of how much of language is special (or how much is in FLN) has direct implications for language evolution. If the innate language faculty is rich in detail, these details must have arisen through biological evolution, and most researchers envisage that natural selection must have played a major role in this evolution. Natural selection, the argument goes, produces structures that are adapted to those functions that help an organism survive and reproduce. Before the rise of the Minimalist Program, while linguistic theorists (at least within the generative tradition) mostly still subscribed to the view that the language faculty is rich in information, there was disagreement about how much of this rich detail had been selected by natural selection. Theorists who all agreed that the language faculty is a rich complex of separate specifically linguistic principles disagreed on how it had come to be that way. A highly influential paper by Pinker and Bloom (1990) argued strongly that the most obvious and least controversial explanation for the innate principles of language was natural selection. They compared the evolution of the language faculty with the evolution of the mammalian eye; both were gradual, with the language faculty evolving gradually by small increments, one grammatical principle at a time. (Pinker and Bloom further assumed that the principal function served by language is "the communication of propositional structures over a serial channel." (p. 713). We return to the issue of what function language serves in the next section.)

Pinker and Bloom's argument about the evolution through natural selection of innate features of language stayed at a quite general level, but other linguists got down to specific details. For several decades, one of the most widely discussed examples of an innate, specifically linguistic principle was the Subjacency Principle. This accounts for the fact that movement of certain linguistic constituents is allowed under some structural conditions but not permitted under other conditions. For instance, fronting of the question word 'who' gives a perfectly grammatical result when applied to the rhetorically incredulous 'Bill believes Mary saw who?' giving 'Who does Bill believe Mary saw?' One might expect that this rule of 'wh-' fronting could apply generally, but if one tries to apply it to the slightly more complex 'Bill believes the claim that Mary saw who?' (a source that is grammatically OK), the result is the ungrammatical '*Who does Bill believe the claim that Mary saw?' Thus this movement rule is restricted in its application to certain structures specified in detail by the Subjacency Principle; this principle handles a range of phenomena other than *wh*-movement. Newmeyer (1991) argued that the Subjacency Principle is adaptive, making language easier to process. Lightfoot, in contrast, argued against the adaptiveness of any innate

principles such as subjacency on the grounds that obeying the subjacency constraint in one's utterances was hardly likely to make any difference in attracting a mate. Lightfoot's position on the evolution of language was in line with the more general views on evolution of S. J. Gould, who stressed the accidental nature of much biological evolution, correspondingly downgrading the systematic role of natural selection. Gould adapted the term 'spandrel' from art history to describe a feature of an organism that is not adapted to any particular function but is merely an accident or a side-effect of some other (possibly adaptive) feature. In Lightfoot's view, innate features of the language faculty are spandrels. In the early 1990s, the debate involved figures such as Pinker and Bloom on the adaptationist side and Chomsky, Lightfoot, and Gould on the nonadaptationist side. The adaptationist side of the argument is in line with the prominent movement called Evolutionary Psychology (Barkow *et al.*, 1992), which holds that much in human psychology is an evolutionary adaptation. Two computer models of this period (Hurford, 1989, 1991) also assumed that certain very basic aspects of language, the arbitrary bidirectional Saussurean sign and the critical period for language acquisition, were the outcome of natural selection and simulated the relevant mechanisms.

During the period in which the innate language faculty was held to be rich in information (i.e., before the Minimalist Program), much skepticism was voiced over whether so much innate information could plausibly have evolved during the relatively brief lifetime of *Homo sapiens sapiens*. Worden (1995), among others, argued that there could not have been enough time for a very rich language acquisition device to have evolved biologically. Nativist linguists were accused of believing in biologically implausible 'macromutations' or of having a saltationist view of evolution. The move to the view that there is in fact much less to the innate language faculty than was previously thought receives a much more sympathetic hearing from biologists. Linguists who are closely familiar with the enormous complexity of real languages, and who believe that it cannot be reduced to minimal principles, face a dilemma: either implausibly attribute all the complexity to biological (possibly adaptive) evolution or find some nonbiological mechanism accounting for the complexity.

The issues of how much of the innate language faculty is special and how much of it is biologically adaptive are intertwined, and positions have shifted in the past decade. **Table 1** outlines the possible positions and names representatives of these positions.

Table 1 Adaptiveness and richness of language structure: theoretical positions

	UG is rich	*UG is minimal*
UG is an adaptive product of natural selection	Pinker & Bloom	
UG is a spandrel, not adaptive	Chomsky before Minimalism, Lightfoot	Chomsky after Minimalism

Adaptation and Function: What Is Language Good For?

Theorists such as Lightfoot and Chomsky, who deny any role for natural selection in the evolution of the special innate structural properties of language, do not deny that language is enormously useful. Once we had got it, it turned out to be useful. We had inherited a fortune, in terms of power to alter the world. This position has sometimes been construed as anti-Darwinian, but in fact, accounting for the particular structures of language in Darwinian terms is by no means a straightforward matter. We survey some prominent ideas below.

A group of ideas about the adaptive function of language can be classified as 'Social.' Dunbar's (1998) theory is based on a correlation between cortex size and social group size and on claims that language first evolved as a form of social grooming. As social groups got larger, there was not enough time for animals to spend time in one-to-one grooming episodes and maintain social bonds with the whole group. A form of language, which allows a speaker to address many hearers at a time, stepped in. Locke (1998) argues that early forms of language were adaptive for purposes of social bonding. Another social theory is that runaway sexual selection helped the evolution of language (Miller, 2000): elaborate linguistic performances attracted mates. None of these theories, as their authors admit, explain the particular complex grammatical and phonological details characteristic of language. Perhaps, however, they can help to explain the very early stages in the evolution of communication.

Another group of theories, which holds more promise for getting to grips with the detailed structure of languages, can be labeled 'Cognitive/Communicative' theories. It seems obvious to most people that the primary function of language is communication. There is a serious problem with accepting the simple view that language evolved for the purpose of communicating complex messages, however. This is the problem of altruism. Information is a valuable resource. How can it benefit an

individual to share information with another? Why, for example, should one animal risk drawing the attention of a predator by issuing an alarm call? Why should one animal tell another where to find food, especially if food is scarce? In most scenarios that one can imagine, no advantage accrues to an individual giving away information for free. (It costs virtually nothing to talk.) The accepted wisdom in biology is that natural selection works at the level of the individual or the gene, but not at the level of the social group. So an argument that language evolved because it benefited groups that possessed it will run afoul of objections from biologists. However, recently Sober and Wilson (1999) have advanced arguments that group selection may after all be a biologically viable mechanism. This opens up the possibility for an evolutionary explanation for language as an instrument of communication.

Chomsky has often argued that the primary function of language is not communication but, rather, internal mental representation (thought). Notice how a view that language is used for communication of facts to other individuals in fact requires the existence in speakers of preexisting internal mental representations. Communication is usually pictured as the transmission of ideas from one head to another, and this presupposes that the ideas must be in the first head to start with. However, although communication requires preexisting internal mental representation, it also imposes further requirements (see Hurford, 2002). There are many features of language (all of phonetics and phonology for a start) that are not required for purposes of thought. We do not think in a particular regional accent. Our thoughts do not exhibit such grammatical features as subject–verb agreement. It seems reasonable that some, but not necessarily all, features of language evolved to suit the purposes of communication.

The suitability of a language to its function can be a result either of the biological adaptation of humans, allowing them to acquire such useful systems, or of the cultural adaptation of the language by humans, tailoring it to suit their communicative purposes. The two options are not mutually exclusive; in fact, both biological and cultural adaptation probably have a role. It need not be supposed that the cultural tailoring of language is in any way intentional or conscious. When it happens, it is as a result of an 'invisible hand' mechanism of the sort proposed by Adam Smith (1776) for economics.

There are several possible pressures that can impinge on the cultural evolution of languages, which one can classify under the headings of the roles people take in relation to language. People are speakers, hearers, and learners. From the selfish point of view of a speaker, economy of effort is important, so there is motivation to slur pronunciation, to truncate sentences, and to use easily retrievable words. This does not help the hearer. From the point of view of the hearer, a message should be clear: its constituent words should be distinctly articulated, its structure should not be ambiguous, and it should not be too cryptically short (nor too long to handle). The pressures on a speaker and a hearer are opposed, and it seems that the behavior of speakers typically ends up as a compromise between these rival pressures.

The behavior of typical speakers is what confronts a newborn child, but the child has an additional problem; namely, learning the particular grammar and lexicon of the language. For language to be learnable, there has to be a way into it that the child can pick up from whatever innate dispositions it is born with. For instance, once a child has learned a small basic vocabulary, it can pick up a lot more by inferring the meanings and grammatical functions (e.g., noun, verb, etc.) of new words from their context. However, if the sentences of a language were structured in such a way that knowledge of the meanings and functions of every word in a sentence was essential to understanding it, then the child could never get a toehold. Such a language would be unlearnable. Clearly, languages have evolved to be learnable.

The view that languages have evolved to be learnable is actually very close to the Chomskyan idea of language universals being attributable to the innate properties of the language learner. No learning is unbiased – there is never any pure *tabula rasa* on which experience stamps an impression – so when we speak of languages evolving to be learnable, we must be thinking in terms of learners with some preexisting bias. Given a strong enough set of initial biases in the language learner, the resulting grammatical systems that can be internalized by the learner are severely constrained. This is another way of saying that languages are selected for learnability. In the Chomskyan version of this story, the adaptation of the language to the learner takes place in a single generation and takes place every generation. But learnability is a matter of degree: some systems are more easily learnable than others. Thus, it is reasonable to envisage a slower process of adaptation to the biases of learners, occurring over many generations. Over the course of history, a language will get to be more learnable, barring invasions from other languages.

In summary, research into the evolution of language is now possible and worthwhile. Evolutionary considerations can help us to make sense of language structure. That being accepted, many of the central

issues in language evolution are also central in (non-evolutionary) linguistic theorizing. For example, how much about language is special? The argument rages, with prominent theorists on both sides. For example, Chomsky entertains the radical idea that the only trait special to human language is recursion, and Jackendoff and Pinker, more traditionally, claim that linguistic behavior is special in many other ways. A closely related question is whether whatever is special to language is adaptive – the outcome of natural selection. Again, argument rages. It is hard to find adaptive evolutionary explanations for many of the more intricate aspects of syntax. A promising alternative to biological selection is cultural selection by successive generations of language learners and language producers of more and more elaborate ('grammaticalized') structures.

See also: Evolution of Pragmatics; Evolutionary Theories of Language: Previous Theories; Grammaticalization.

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Evolutionary Theories of Language: Previous Theories

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Ancient and Early Modern Theories

This article will take 'evolutionary' to include any enquiry into the origin of language that assumes it appeared not fully blown, but in some rudimentary form that then developed toward the kind of language we know today. Many of the world's cultures are like that of the Hebrews, in having a nonevolutionary account of language as a divine endowment that separates humans from other animals. Less common is the sort of tradition recorded by Plato in the *Cratylus*, which imagines a purely conventional origin for language as the creation of one or more individuals.

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In the first squarely evolutionary theory of language, Epicurus (*Letter to Herodotus*) held that languages originate directly from the body and in a subsequent evolution are refined by social convention. In Epicurus's first stage, the nature of the particular ethnos, itself shaped by race and environment, determines an initial 'rough' language for that people. Although spoken not by reasoning but by natural constraint, this language provides a basis upon which rational thought and social agreement can henceforth be constructed. People can then become aware of the flaws in the language, such as ambiguity or lack of conciseness, and introduce improvements by 'common consent' within the ethnos.

Epicurus's view of language evolution as rooted in ethnic difference stands in stark contrast to the earlier teachings of Aristotle, who took the feelings and impressions experienced by human beings to be universal, "the same for all" (*On interpretation*). But Aristotle could offer no explanation for why different languages should exist. For later Epicureans like Lucretius (*De rerum natura*), the great advantage of Epicurus's theory was its avoidance of what they saw as the absurdity of a conventionalist account of the origin of language, imagining as it does that people could have reached agreement about the meaning of words without already having a language in which to discuss and reach agreement (see further Joseph, 2000: Chapter 4).

The philosophical discourse within which Epicureanism was framed would fall silent in Europe under the dominance of Christian teaching, in which language was not merely created by God but actually one with God Himself (John 1:1). The existence of different languages was explained by the story of Babel, and although there was intellectual space open for inquiring into why different languages might have developed as they did, scholars showed little interest in the differences among languages during the first 1300 years of Christianity.

However, interest in language reemerged with the Renaissance, beginning with the new attention given to the work first of Aristotle, then Plato, then Epicurus, who was made into the precursor of a 'modern' view of language and mind as formed through sensory experience rather than innate endowment. The Epicurean concept of different sounds emitted by animals, according to whether they are experiencing fear, pain, or happiness, would now be designated 'natural signs' and would be the bedrock of modern evolutionary theories of language, offering continuity with other species as well as an explanation of why languages share common features.

Francis Bacon was among the first modern Europeans to take seriously the notion that Chinese character writing represented – or could be adapted to represent – natural signs and physical objects, rather than conventionalized, language-specific signs and concepts, and thereby formed a truly universal language. In the 17th century, various schemes for a 'real character' were launched, notably those by Comenius, Wilkins, and Dalgarno (see Cram and Maat, 2001: 1–74). The spirit of all these schemes – a 'return' to the natural and original language of humans, which had been obfuscated by conventional languages – was implicitly consonant with both the Epicurean and the biblical worldviews. As such, it both supported and received support from a Protestant ideology that wanted to clear the decks of religious worship from conventional accretions piled on by a Rome that, as it happened, had spent the last five centuries in the intellectual thrall of Aristotle.

The 18th Century

The 'long 18th century' in the discussion of linguistic evolution started with the publication in 1690 of Locke's *Essay on human understanding*. Locke broke understanding down into elemental 'ideas' that joined in various ways to form more complex ones, and held that, because these ideas were transmitted to us and retained by us via words, the regulation of language was the key to improving human understanding. The first decades of the 18th century saw numerous attempts to link Locke's analysis to the development of language, for example by Vico and Warburton. But it was a French cleric, the Abbot of Condillac, who turned Locke's scheme into the most influential of early modern evolutionary theories of language. His 1746 *Essai sur l'origine des connaissances humaines* asserted that language originated with simple signs in the form of 'natural' cries and bodily signals. The crucial change occurred when this 'language of action,' atemporal and synthetic, evolved into conventional language, which was successive, signifying in bits spread across time: The sounds made up the word, the words made up the sentence, and the sentences made up the discourse. Both in the species and in the individual, it was the acquisition of conventional language that made thought itself temporal and analytical.

Reactions to Condillac were quick and widespread. Adam Smith contested the possibility that change in a language represented any kind of progress for those who spoke it. Rather, language evolution enacted a different kind of structural economy, where a shift from simplicity toward compoundedness followed necessarily from the movement of populations and provoked an equal and opposite shift within another area of language structure. Also in 1761, Rousseau completed his remarkable *Essai sur l'origine des*

langues (not published until 1781). Contrary to Condillac, he insisted that although "needs dictated the first gestures, [. . .] the passions drew out the first words," which in fact must have been sung, since accents, tones, and rhythm were the features of language that issued naturally from the throats of infants. These features continued to predominate in the 'southern' language type, represented by Chinese and Arabic, which were also more natural in the prominence they give to vowels. Consonants – an intrusion of the analytical – had spread with phonetic writing, first in the northern languages and only latterly to the southern. Moreover, the original language consisted entirely of tropes, images, and other forms of figurative speech, with the force of onomatopoeia felt continually. Again, wrote Rousseau, these continued to be more characteristic of the southern language type than the northern.

The *Abhandlung über den Ursprung der Sprache* by Herder won the Berlin Academy Prize in 1770 and was much more widely read than Rousseau's *Essai*. Herder positioned himself in opposition to both Condillac and Rousseau by asserting that "the former turned animals into men and the latter men into animals." He rejected any attempt to draw an analogy from the 'naturalness' of animal language to human language. Human language was invented once man was "placed in the state of reflection which is peculiar to him" and when the mind in this state of reflection was "for the first time given full freedom of action." Neither this reflection nor this freedom was shared by animals, whereas for humans they were "essential to his species; and so is language."

The 18th century was the great age of evolutionary theories of language, producing them in too great an abundance to be covered adequately here; a somewhat fuller summary can be found in Rée (1999: Chapter 12).

The 19th Century

As the 19th century progressed, academic attention focused ever more closely on details of linguistic form and their history relative to one another, rather than the construction of grand narratives of origins. Two main impulses emerged, one of which was to classify all the languages of the world in a way that would help identify the essential type that each represented, and how the types fundamentally differed from one another. This impulse was memorably developed by Humboldt, who in a treatise published posthumously in 1836, insisted that the intellectual power of a language was determined more by its purity within its type (isolating, agglutinating, or inflectional) than by the type itself. Like Herder, Humboldt started from the Romantic assumption that the whole history of a language is already contained in germ in its origin – its evolution is actually just the unfolding of these preordained developments.

The other impulse was to understand the historical affiliations of the classical languages to one another and to those other highly inflected European and Southwest Asian languages with which they were plausibly related within a relatively shallow time depth. Bopp (1857–61) took the Indo–European proto-language to have a relatively simple structure that became more complex with subsequent evolution. But by the time of Schleicher (1869), the ideology had become one in which every structural feature of every Indo–European language had to be explicable by features already present in the proto-language. The result was that the individual languages no longer appeared as more complex versions of that original state but simplifications from it, implying a very different evolutionary process indeed.

Schleicher is also remembered for his insistence that language was an organism – his introduction of the 'family tree' schema for linguistic evolution was not originally metaphorical in intent, because he really conceived of the growth of languages and of trees as two instances of the same process – for his insistence that in historical times, languages were necessarily in decay, characterizing contemporary languages as 'senile relics' of their glorious forebears (a view that would be forcefully contested by Jespersen, 1894); and for the influence of his writings on Haeckel, who sent a copy of Schleicher's 1863 book (translated into English in 1869) to Huxley, a disciple of Darwin. Darwin was critical of historical linguists who worked with a model of slow, gradual evolution that was naturalistic in the sense of being wholly internally determined; biological evolution, as he saw it, demanded sharper, environmentally sensitive changes. Alter (1999) provided a rich account of the interchanges among these figures, as well as the bitter debate between, on one side, Max Müller, and on the other, Darwin and Whitney (see also Koerner, 1983).

One other position on the evolution of language that rose to prominence in the latter part of the 19th century, harked back to the 17th and early 18th centuries. This was the view that the natural signs with which language originated could be observed in the present in the manual sign languages of deaf-mutes and certain 'primitive' peoples. The person chiefly responsible for thrusting this idea back into the limelight was E. B. Tylor, the first professor of anthropology at Oxford. Tylor made much of the research on American Indian sign languages conducted by Mallery, and in turn Mallery and J. W. Powell wrote extensively in support of Tylor's theory

(see Rée, 1999: Chapter 24). It helped promote the general view that continued to inform anthropology at least into the 1920s, that observing primitive peoples and their languages offered a look into earlier phases of human evolution.

The 20th Century

As with the 18th century, a slightly 'long' 20th century of linguistic evolutionary theory can be dated from just before the turn of the century, with the publication of Jespersen (1894) and Baldwin (1896). Baldwin argued that an evolutionarily advantageous factor need not arise by chance mutation but could be produced by deliberate invention and cultural propagation, after which the advantage it conferred might henceforth become a part of genetic human evolution. The Baldwin factor liberated evolutionary accounts of language from bondage to naturalistic origin theories. Yet linguists had by this time so focused their attention onto details of sound change that it was only in Baldwin's own field of psychology that the full impact of his proposal was realized (although since the late 1980s, when linguists rediscovered language evolution as a topic of inquiry, the 'Baldwin effect' has been at the center of the discourse).

Otherwise, the first half of the 20th century was a decadent period for evolutionary theories of language. The rise of structuralism and behaviorism meant a shift away from historical inquiry and onto a specific focus on how language systems worked or how speakers performed linguistically. Jespersen continued to put forward his strong modernist view that language change represented a form of evolutionary progress, a sentiment shared by most linguists. However, there were occasional bursts of new, or at least seminovel, evolutionary theories, the most spectacular of which was the 'Japhetic' theory of Marr, which became the official Soviet theory of language in the 1930s. Marr believed in an original cultural and linguistic unity spanning most of the world and introduced a 'paleontological analysis' that reduced all the words of all languages to four basic elements – *sal, ber, yon,* and *rosh* – occurring singly or in combination. He analyzed their subsequent history according to his theory of 'stadialism,' which held that economic revolution must produce linguistic evolution. Outside the Soviet Union, and eventually inside as well, Marr's theories were dismissed as methodologically unsound and ideologically driven.

Paget (1930) put forward an account of the evolution of language, starting from 'mouth-gestures' that he had analyzed in Polynesian languages. Rudolf Steiner developed a similar tongue–gesture theory, without the empirical support but with a spiritual dimension that had great appeal for the semimystical Nazi philosophy that was taking root in the 1920s and 1930s. This philosophy became bound up with a belief in Aryan origins that historical linguistic research appeared to support (see Hutton, 1999). The eugenic and genocidal horrors that ensued were sufficient (along with the methodological shifts already described) to quell interest in evolutionary theories of language after World War II. The forms such theories took following the eventual resurrection of interest in the topic are described in a separate article (*see* **Evolutionary Theories of Language: Current Theories**).

See also: Bacon, Francis, Lord Verulam (1561–1626); Bopp, Franz (1791–1867); Condillac, Etienne Bonnot de (1714–1780); Dalgarno, George (ca. 1619–1687); Evolutionary Theories of Language: Current Theories; Herder, Johann Gottfried (1744–1803); Humboldt, Wilhelm von (1767–1835); Jespersen, Otto (1860–1943); Locke, John (1632–1704); Müller, Friedrich Max (1823–1900); Myths about Language; Origin and Evolution of Language; Paget, Richard Arthur Surtees (Bart.), Sir (1869–1955); Plato's Cratylus and Its Legacy; Rousseau, Jean-Jacques (1712–1778); Schleicher, August (1821–1868); Sign Language: History of Research; Smith, Adam (1723–1790); Whitney, William Dwight (1827–1894); Wilkins, John (1614–1672).

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Ewe

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Also written Eʋe, and pronounced /əβə/, Ewe designates a dialect cluster that is spoken mainly in Southeastern Ghana, but also in the southern part of Togo and across the Togo-Benin border. Its dialects include Kpele and Notsie, spoken in Togo, Waci, spoken in Benin, and Aŋlɔ, Tɔŋu, Ho, Kpedze, Anfoe, and Kpandu, all spoken in Ghana. The dialects in Ghana are grouped into Coastal (e.g., Aŋlɔ, Tɔŋu), Central (e.g., Ho, Kpedze), and Northern (e.g., Anfoe, Kpando). The Central and Northern dialects are also grouped together as Inland dialects. Ewe is part of the Gbe language cluster (cf. Capo, 1991), which belongs to the Kwa family.

History and Sociolinguistics

The origin of the Gbe-speaking people has been traced to Ketu, a Yoruba town in the present-day Benin. From there they moved southward, with some founding a settlement at Tado, while others settled at Adele and others went to Notsie. The Ewes are among those who settled in Notsie. They say that their forefathers fled the tyranny of a ruler of Notsie called Agorkoli, and dispersed to their present-day locations.

Ewe is spoken by approximately 3–5 million speakers. It is taught as a subject from elementary school to the university level and is one of the seven national languages in the media in Ghana, and one of two in Togo. A clear dialectal difference can be established between the Coastal and Inland dialects, e.g., 'ash' is *afi* in the Coastal dialects, and *dzowɔ* in the Inland. The former also have a habitual suffix *-na*, which is represented in the other dialects as -V, the resultant realization being determined by the preceding vowel. Hence *zɔna* 'walks' is *zɔɔ* in the Inland while *fena* 'plays' is *feɛ*.

In addition, the initiator of greetings at the Coast exhausts all his or her questions before the interlocutor begins. By contrast, in the inland, both speakers take turns in asking how-are-you questions. Left-hand use is prohibited in social interaction, giving rise to interesting modes of pointing.

Phonology

Ewe has 29 consonants and seven oral vowels with nasalized counterparts. Notable among the consonants are labiovelar stops, bilabial fricatives, and a velar approximant. Both /l/ and /r/ occur in complementary distribution: /r/ occurs before laminodentals, alveolars, and palatals, while /l/ occurs elsewhere, including in word-initial position. Also, /w/ occurs before rounded vowels while /ɣ/ occurs before unrounded vowels (*wɔ* 'do' vs. *ɣi* 'white'). Although most of the dialects have all the nasalized vowels, a few, including Peki, do not have /õ/. Thus instead of *lõ* 'take off fire,' they say *lɔ̃*.

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Ewe is a tone language. Phonetically, all the dialects have high, mid, and low tones, which also combine to yield six contour tones. Phonologically, it has a high and nonhigh tone, both of which are dependent on the environment. Thus nonhigh tone is realized as mid in a root noun that has a voiceless obstruent or sonorant, and low before a voiced obstruent. High tone is realized as high before a voiceless obstruent and mid before a voiced obstruent. Aŋlɔ also has a phonologically conditioned extrahigh tone, while Adangbe has an extralow tone that occurs on the utterance-final interrogative particle.

The syllable structure is mainly open, although a few words end with nasals, e.g., *kpam* 'sound of slap.' While it is possible to have a maximum of two syllable-initial consonants, the second has to be a liquid or approximant. The nucleus can be a vowel or a nasal.

Morphology

Ewe has been characterized as an isolating language with agglutinating features (Ameka, 1991). Thus, many words look like a concatenation of individual morphemes:

nyɔnu-vi-wo
woman-little-PL
'girls'

It has only one inflectional affix, i.e., the habitual suffix *-na*. However, it has derivational processes, which include reduplication, triplication, and compounding. It also has derivational affixes such as the agentive *la*:

nu-fia-la
[thing-teach-AG]
teacher

Syntax

Syntactically, Ewe is an SVO language, with alternative OSV order being determined by semantic and pragmatic factors such as topicalization and focusing. Within the noun phrase, modifiers follow the head noun (*ɖevi nyui la* 'child good the'). The plural morpheme *wo* is related to the third person plural pronoun *wo* and is not required when the NP has a numeral (*ɖeviwo* 'children' vs. *ɖevi eve* 'two children'). It is, however, obligatory after a determiner (*ɖevi eve ma-*(wo)* 'child two that-PL'). There is a logophoric pronoun (*ye*) that occurs in a subordinate clause introduced by *be(na)* 'that' (cf. Clements, 1979; Essegbey, 1994).

Ewe is a tenseless language. An active verb in the aorist receives past tense interpretation, (*e-ɖu nu* 'he ate'), while a stative or inchoative verb receives present tense interpretation (*e-ku* 'it is dead'). A potential morpheme gives rise to future interpretation. It has a serial verb construction (SVC) in which the two or more verbs in a clause share the same TMA value. Negation in the clause is a discontinuous morpheme *me . . . o*: *me* precedes the first verb and *o* occurs at the end of the clause. Ewe has obligatory complement verbs (OCVs): verbs with fully specified meaning have to take a generic-meaning complement (*ɖu nu* 'eat thing'), while others with less determined meanings have their meaning further specified by the complement. These are known as inherent complement verbs (ICVs), (*fu tsi* 'move_limb water = swim').

There are two types of double object constructions: Theme-Goal (*bia nya Kofi*, literally 'ask word Kofi') and Goal-Theme (*na Kofi ga* 'give Kofi'). *Na* 'give' and *fia* 'teach' occur in both constructions. Finally, Ewe has ideophones, some of which code manner of motion concepts, e.g., *dziadzia* 'energetic walking.'

See also: Ghana: Language Situation; Kwa Languages; Niger-Congo Languages; Togo: Language Situation.

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Existence

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What Existence Is

Existence is the property that is attributed to Uma Thurman in

(1) Uma Thurman exists.

Perhaps existence is also attributed to some object in

(2) There is an even prime.

There is a connection between existence and (objectual) quantification: what exists is exactly what our quantifiers quantify over, when our quantifiers are unrestricted. Sometimes our quantifiers are restricted so that they quantify over only some of the things that exist. For example, in

(3) All the bottles of beer are in the fridge.

the quantifier "all the bottles of beer" is naturally interpreted so that it doesn't quantify over **all** of the bottles of beer in existence. But what exists is not limited to what our quantifiers quantify over when they are restricted in one way or another. (In various free logics, variables need not be interpreted so as to have as values objects that exist. Sometimes a special predicate is introduced for 'exists' in these logics. Existence is not tied to quantification in these logics, although it might be tied to the special predicate.)

It seems that existence is a property that everything has: namely, the property *existing* or *being existent*. But various philosophers deny this for various reasons: some deny that existence is a property; others accept that existence is a property but deny that any objects have it (because only properties do); and still others accept that existence is a property but deny that all objects have it (because only some do).

The Hume-Kant View

The Scottish philosopher David Hume (1711–1776) and the German philosopher Immanuel Kant (1724–1804) denied that existence is a property. (It is often said that existence is not a predicate. This is at best a confused way of denying that existence is a property.) Let us call the view that existence is not a property the *Hume-Kant view*. One reason for holding the Hume-Kant view is that existence is supposedly not a property but rather a precondition for having properties. After all, how could something have any properties if it did not exist? But it is hard to see what a precondition is if it is not a property. For example, being human might be a precondition for being a movie star; and *being human* is a property.

Another reason for holding the Hume-Kant view is that to say that something has a property **F** and exists is supposedly not to say anything more than that something has **F**. For example,

(4) Uma is a movie star and exists.

supposedly doesn't say anything more than

(5) Uma is a movie star.

But if this is a good reason to deny that existence is a property, then it is also a good reason to deny that *being self-identical* or *being either round or not round* is a property. For if (4) doesn't say anything more than (5), then

(6) Uma is a movie star and is self-identical.

and

(7) Uma is a movie star and is either round or not round.

don't say anything more than (5) either. But it seems that *being self-identical* and *being either round or not round* are perfectly respectable properties. For example, *being round* is a perfectly respectable property. And if negations and disjunctions of perfectly respectable properties are themselves perfectly respectable properties, then *being either round or not round* is also a perfectly respectable property.

The Frege-Russell View

Some philosophers who accept that existence is a property deny that everything has it, because they think that no ***objects*** have it; rather, they think that only *properties* have it. On this view, *existence is* not a (first-level) property of objects; rather, it is a (higher-level) property of properties. In particular, it is the property *being instantiated*. This is a view that was held by the German mathematician and philosopher Gottlob Frege (1848–1925) and, at least at one time, by the British philosopher Bertrand Russell (1872–1970). Let's call this view the *Frege-Russell view*.

One reason for holding the Frege-Russell view is that if existence were a property of objects, then it would not be possible to be mistaken in ascribing that property to an object. (By contrast, one can attribute the property *being instantiated* to the property *being a golden mountain*, say, even if that property is

not instantiated.) But if this is a good reason to deny that existence is a property of objects, then it is also a good reason to deny that *being self-identical* or *being either round or not round* is a property of objects. For it is not possible to be mistaken in ascribing those properties to an object either. And yet they are perfectly respectable properties of objects.

Another reason for holding the Frege-Russell view comes from the problem of negative existentials. A *negative existential* is a sentence like

(8) The golden mountain doesn't exist.

which seems to say of some object that it doesn't exist. For example, (8) seems to say, of the object that "the golden mountain" refers to, that it doesn't exist. Either "the golden mountain" refers to something or it doesn't. On the one hand, if "the golden mountain" doesn't refer to anything, then it seems that (8) doesn't say anything about anything. On the other hand, if "the golden mountain" does refer to something, then it seems that it must refer to something that exists, in which case (8) says, of something that does exist, that it doesn't exist. Either way, it seems that (8) can't be true. But (8) seems true; hence the problem.

The Frege-Russell view offers a straightforward solution to the problem of negative existentials. On the Frege-Russell view, (8) says, of the property *being the golden mountain*, that it does not have the property *being instantiated*. And it is true that the property *being the golden mountain* does not have the property *being instantiated*. So, on the Frege-Russell view, (8) is true, as desired. (Russell's treatment of definite descriptions like "the golden mountain" is actually more complicated. (*see* **Descriptions, Definite and Indefinite: Philosophical Aspects**). One might worry that even if Russell's treatment solved the problem of negative existentials for sentences like (8), it wouldn't solve the problem of negative existentials for sentences like

(9) Santa Claus doesn't exist.

which contain names rather than definite descriptions (*see* **Proper Names: Philosophical Aspects**).

One problem with the Frege-Russell view is that (8) doesn't seem to say the same thing as

(10) The property *being the golden mountain* doesn't have the property *being instantiated*.

Similarly,

(11) If the golden mountain were to exist and if cows were to fly, then just as they would have the property *being able to fly*, it would have the property *being golden*.

seems true, and it doesn't seem to say the same thing as

(12) If the property *being the golden mountain* were to have the property *being instantiated* and if cows were to fly, then just as they would have the property *being able to fly*, it would be instantiated by something that has the property *being golden*.

Another problem with the Frege-Russell view is that the property *being instantiated* doesn't seem to be fundamental in the right sort of way. It seems that facts about which properties have the property *being instantiated* depend on quantificational facts. For example, it seems that the property *being a movie star* has the property *being instantiated* only because some object (Uma, say) instantiates the property *being a movie star*. But it seems that objects (Uma, say) can instantiate properties (*being a movie star*, say) only if they exist. So if it is to be instantiated, then the property *being instantiated* seems to require that some objects exist and hence that, contrary to the Frege-Russell view, existence be a property that at least some objects have.

The Meinong-Russell View

Some philosophers who accept that existence is a property deny that everything has it, because they think that some, but not all, objects have it. At one time, Russell thought that there is a broad ontological property that everything has; but he thought that this property is *being* (or *subsisting*), not *existing*. On this view, the golden mountain, the round square, numbers, sets, tables, and chairs have being; but only tables and chairs (and other objects that are located in space and time) exist. The Austrian philosopher Alexius Meinong (1853–1920) held a similar view. He thought that there is a broad ontological property that everything has; but he thought that this property is *being an object*, not *being* or *existing*. On this view, the golden mountain, the round square, numbers, sets, tables, and chairs are objects; but of these, only numbers, sets, tables, and chairs have being. (And only tables, chairs, and other objects that are located in space and time exist.) Let's call this – the view that although there is a broad ontological property that everything has, only some objects exist – the *Meinong-Russell view*.

One reason for holding the Meinong-Russell view is that it offers a straightforward solution to the problem of negative existentials. On the Meinong-Russell view, (8) says, of the object "the golden mountain" refers to, that it doesn't exist, and "the golden mountain" refers to an object that doesn't exist. So, on the Meinong-Russell view, (8) is true, as desired.

But the Meinong-Russell view doesn't solve parallel problems. A *negative subsistential* is a sentence like

(13) The golden mountain has no being.

that seems to say of some object that it has no being. Those who distinguish being and existence sometimes say that "there is" has to do with being, not existence. On this view,

(14) There is no golden mountain.

is also a negative subsistential. And a *negative objectual* is a sentence like

(15) The golden mountain isn't an object.

or

(16) No object is the golden mountain.

that seems to say of some object that it isn't an object. Speakers who have the intuition that (8) is true might also have the intuition that (13)–(16) are true. And if a solution to the problem of negative existentials should respect speakers' intuition that (8) is true, then one might think that a solution to the problem of negative subsistentials or negative objectuals should similarly respect speakers' intuition about (13)–(16). But on the Meinong-Russell view, (13) and (14) or at least (15) and (16) are false, because "the golden mountain" refers to an object that has being or at least is an object. (This argument might work best against those who say that (8) is false but (14) is true.) Solving the problem of negative existentials only at the cost of not solving the problem of negative subsistentials or the problem of negative objectuals doesn't seem like much of a benefit. In addition, many dislike the Meinong-Russell view because, by saying that existence is what Russell (1903) once called "the prerogative of some only amongst beings," the view offends what Russell (1919) later described as "a robust sense of reality."

If one rejects the Hume-Kant view, the Frege-Russell view, and the Meinong-Russell view, one is left with the view that existence is a property that everything has. Although there is much to commend this view, those who hold it still have to solve the problem of negative existentials. This suggests that a solution to that problem will not come from views about existence. And once one had a solution to the problem of negative existentials (whatever that solution is and wherever it comes from), it seems that there would be little to prevent one from holding the view that existence is a property that everything has.

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Empty Names; Fictional Discourse: Philosophical Aspects; Negation: Philosophical Aspects; Nominalism; Objects, Properties, and Functions; Proper Names: Philosophical Aspects.

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Experimental and Instrumental Phonetics: History

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In the middle of the 19th century in Europe, Ernst von Brücke in Austria (*see* **Brücke, Ernst (1819–1891)**) and Alexander Melville Bell in England (*see* **Bell, Alexander Melville (1819–1905)**) published their proposals for a systematic description of speech sounds on the basis of a new physiology of speech ('sound physiology'). Brücke's (1849, 1856) and Bell's discoveries (1863, 1867) formed part of the development of a new, scientifically based discipline for the investigation of spoken language. This had more than one reason, as will become apparent below. One of these reasons needs to be mentioned immediately, however, since it also gave rise to the academic name of the new discipline.

The word 'phonetic' seems to have been used for the first time in the modern sense in 1797 by the Danish Egyptologist George Zoega. In his dissertation *De origine et usu obeliscorum* published in Rome, he used the adjective *phoneticus* in connection with the question as to what sound forms in ancient Egypt the hieroglyphic signs on the obelisks stood for. The term was established in Europe 25 years later when Champollion (*see* **Champollion, Jean-Francois (1790–1832)**) succeeded in deciphering the hieroglyphic writing system. His solution concerning *l'alphabet des hiéroglyphes phonétiques employés par les Égyptiens* was a sensation, and more and more authors in Europe who dealt with the spoken form of languages and at the same time wanted to stress the specific differences between the spoken and written forms of languages decided to use the adjective 'phonetic' in the new sense.

Early modern speech science had four important sources: the academic development of historical linguistics and comparative philology, both themselves embedded in the evolution of modern sciences, especially the natural sciences; a new public interest in the distinction between written and spoken language, which was motivated in particular by the increasing attention given to the learning and teaching of foreign languages; the cultural need for orthographic reform and standardization of writing, especially true at that time of German and English; and finally the politically and economically inspired interest in developing orthographies for still unwritten languages in the new colonies (*see* **Phonetic Transcription: History**).

Early Discoveries, Assumptions, and New Questions

The rise of modern phonetics as an academic discipline is closely associated with publications by Brücke and Alexander Melville Bell (*see* **Brücke, Ernst (1819–1891), Bell, Alexander Melville (1819–1905)**) confirming what many earlier writers had suggested, (though without the same background of knowledge of the physiology of speech), namely that the alphabetic units of writing could be related in a very systematic way to certain observable properties of the articulatory production of speech. Speech science started as sound physiology and was based on a method called 'direct observation.' It was assumed that the phonetic value of any given alphabetic unit could be unambiguously determined by looking at the articulatory speech organs during the pronunciation of these units. Moreover, 'direct observation' was not restricted to single speech sounds but also meant the visual, auditory, and tactile inspection of whole running speech acts.

Sound Physiology and Articulatory Phonetics

Observable Alphabetic Units: Letters and Sounds Before precise phonetic terms and concepts had become established, such a simple distinction as that between letters and sounds was not at all a trivial one, even for professional linguists. Jacob Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**), for instance, entitled the first chapter of his famous German Grammar (1822) *Die Lehre von den Buchstaben* (theory of letters), and here the term *letter* meant both the printable form of a letter and also the sound it stands for when used in a text. It should be mentioned that Grimm changed the title of the first chapter for the third edition, 1840, into 'Lautlehre' (theory of sounds). (For an account of early uses of the term 'letter' in English and in other languages, see Abercrombie, 1965.)

Letters were generally understood as names of speech sounds. However, the sounds of fluent speech in running speech acts disappear again at the very moment that they are created by the speaker. Thus the text of an utterance which could be written down from left to right in the form of a linear sequence of alphabetic units seemed to early phoneticians to be the only durable object of observation for scientific investigation. Thus they never called into question the existence of alphabetic units as such.

Naive Assumptions About Letters and Sounds: A Basic Postulate and Two Presuppositions The

theoretical argumentation in Brücke (1856) is very explicit on this point. All letters of a good orthography that is in agreement with pronunciation should be signs that represent real sounds. Sounds constitute the values of an alphabetic sign just as numbers are the value of figures. Brücke was able to propose a new method for characterizing the sound value of given speech sounds. "The time has come," he writes, "to present the 'natural value' of speech sounds and to explain the 'natural connection' between the sounds and their signs. The value of a given sound is determined by its properties which are called 'attributes'." Here it is of interest to note that Brücke distinguishes two different ways of finding the attributes of given sounds: one possibility is to look at the sounds (represented by letters) to see "how they affect their neighboring sounds, and how they are themselves affected by these," and one can also "follow the changes they suffer during the course of time and through their going over from one language into another [...]. This is the way of the linguist" (1856: 1). A different possibility is given by the method of direct observation which "is the way of the physiologist": direct inspection of the production of speech sounds and experiments concerning "the manner and condition of their formation" lead to the desired attributes.

Here the first fundamental postulate of early speech science can be stated. It consisted in the naive assumption that single speech sounds do exist in reality, as alphabetical elements. The nature of this reality was not questioned, simply because it was taken for granted that any given speech sound could be represented by a proper alphabetic symbol. Speech research was mainly devoted to the single aim of determining the relevant attributes, such that alphabetical elements with identical attributes could be represented by just one proper symbol.

This postulate had two presuppositions. It was assumed, first, that speech could be exhaustively investigated as a purely mechanical process, and secondly that the listener could be replaced by a deaf observer. Both these presuppositions can be clearly confirmed in the works of Brücke and Bell.

A Purely Mechanistic Approach Brücke developed his theory of sound physiology with explicit references to earlier pioneers of speech research, two of whom must be mentioned here: Wolfgang von Kempelen (*see* **Kempelen, Wolfgang von (1734–1804)**) with respect to the production of consonants, and Robert Willis with respect to the formation of vowels. After many years of work, von Kempelen was the first to succeed in constructing a mechanical system for synthesizing artificial speech. A native speaker of Hungarian, he worked at the court in Vienna where in 1791 he published his famous book about the mechanism of human language including the description of his speaking machine. Brücke admired this marvelous work (facsimile reprinted in Kempelen, 1970) and prized it as "one of the best physiological books" he knew, and he recommended that all those linguists should read it who "want to make themselves thoroughly acquainted with the purely mechanical part of sound theory" (Willis, 1830: 6). Whereas linguists at that time still tended to use more or less metaphorical expressions in their characterizations of speech sounds (Grimm, for instance, called consonants the "bones and skeleton" and vowels the "blood of the organism" of a language), Brücke insisted on reducing the "wondrous mechanism outpouring the stream of speech" to the physical laws which determine the mechanical structure and function of the human speech organs. He probably saw and heard a model of von Kempelen's speaking machine, which many years later was moved from Vienna to Munich, where it can still be found in the archives of the German Museum.

How von Kempelen succeeded in the acoustic modeling of human sound production has been described in Dudley and Tarnoczy (1950). From a purely mechanical point of view, his speaking machine is a simplified copy of the human speech organs in the form of an instrument that can be manipulated by two hands and the right forearm. As shown in Figure 1, it consists of bellows and a box containing the speech sound articulating system.

The box has two circular windows for inserting the right and left hands (Figure 2). Those who only know the speaking machine from the drawings (as, for instance, in Dudley and Tarnoczy, 1950) will be surprised how small the speech sound articulation system actually is. It has the dimensions of the

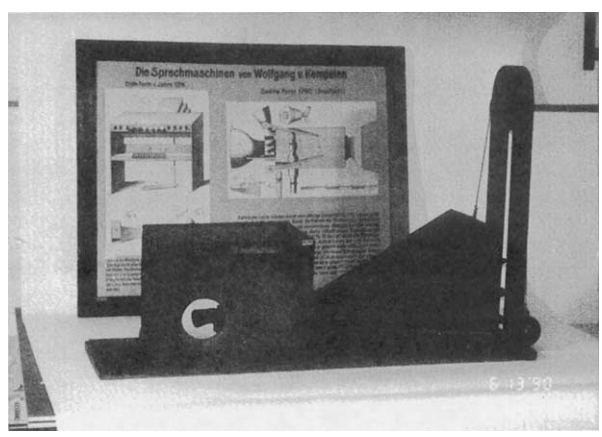

Figure 1 "For a speaking machine no more is required," thought von Kempelen (1791: 398), "than a lung, a glottis, and a mouth."

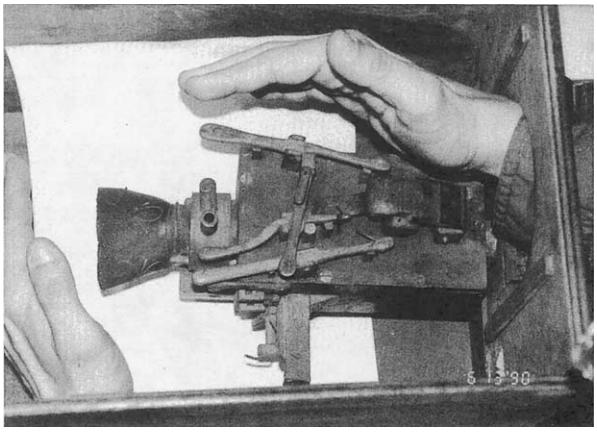

Figure 2 ''Speech or articulation is nothing more than the passage of voice through various openings'' (von Kempelen, p. 397).

human vocal tract. As soon as the right forearm pushes the bellows, which are pulled up by the weight of an iron ball, a rather high, croaky (female) phonation sound is heard. The left hand can be used to open and close the artificial mouth or to perform different degrees of mouth opening for the production of different vowel-like sounds. As Brücke pointed out, the resulting vowels were not very convincing, mainly because the principles discovered by Willis (1830) were not yet known to von Kempelen (cf. 'Acoustic Nature of Speech Sounds' below). With the fingers of the right hand, one could push different levers to produce audible fricatives within the artificial mouth. Two small artificial nostrils could be opened or closed to produce nasal or oral sounds. von Kempelen himself was sufficiently trained to be able to play his instrument in such a way that listeners could recognize single Hungarian and German words.

That von Kempelen, who traveled through Europe to present his sensational speaking machine to paying audiences, was obviously so successful in producing audible events that his listeners could perceive as spoken words simply because he always told his audiences in advance which words they were going to hear next. So von Kempelen not only invented a mechanical speech synthesis system but also what could be called the Von-Kempelen-Principle, which says that any speech synthesis system works much better as soon as top-down processes become dominant as opposed to a situation where speech recognition is restricted to bottom up processes only.

There exists now a complete reconstruction of this mechanical speaking machine (in the F. Kempelen Speech Research Laboratory of the Research Institute for Linguistics in Budapest). This replication is described in Nikléczy and Olaszy (2002). Today there is a new interest in von-Kempelen-type speaking machines in robotics (Gósy, in press). Such a purely mechanical speech production system, which creates the air needed for voice generation by a small pump, imitates the human vocal tract and controls its cross-sectional area function by stepper motors has been developed recently in Japan (Department of Intelligent Mechanical Systems Engineering, KAGAWA University).

The general conclusion that was drawn from the possibility, in principle, of constructing an artificial speaking machine was that human speech could be explained and also wholly described as a purely mechanical process. This is the first presupposition, referred to earlier, underlying the postulate of the direct observability of given speech sounds, and this was also the central theoretical assumption made by Carl Merkel (1812–1876) when he systematically collated current anatomical and physiological knowledge about the "human voice and speech organs" in his *Anthropophonik* (Merkel, 1857).

Speech Sounds as Visible Units The second presupposition of the postulate had to do with the observation that all the different, individual speech articulating systems could be reduced to one generalized abstract mechanical system consisting of certain parts in a particular configuration. Each individual speaker must make use of his lips, his tongue, his velum, etc. in a certain way in order to produce a certain speech sound, and conversely each given speech sound can be analyzed into certain individual actions of certain parts of the generalized system. For the early sound physiologists, it was a very surprising discovery that all possible speech sounds could be compared with each other in relation to such a generalized system and thereby exhaustively analyzed into a set of identical or different articulatory components. The nasals [m, n, ŋ], for instance, share with the stop consonants [b, d, g] their respective place of articulation as well as their articulatory organ, but these two sets of sounds are distinguished from one another by their respective manner of articulation: [m, n, ŋ] are produced with closed mouth passage and open nasal passage (lowered velum), while for [b, d, g], in addition to the mouth closure, the velum is raised to close the nasal passage, which is a necessary condition for the articulation of any plosive (including, of course, the corresponding voiceless ones: [p, t, k]).

It must be emphasized that this possibility of analyzing articulated speech sounds was known over 2000 years earlier to the ancient Indian phoneticians, and to many later investigators of speech in the West. Brücke himself was familiar with the Spanish tradition of language teaching to the deaf, dating back to the 16th century, and mentions Pietro Ponce, a

Benedictine monk who died in 1584. In the Vienna court library, Brücke had discovered a work of a successor of Ponce, Bonet (1620), "the oldest work on teaching the deaf we have" (Brücke, 1856: 15). He also knew the *Tractatus grammatico-physicus de loquela* (1653) of John Wallis (*see* **Wallis, John (1616–1703)**) who began to teach two deaf pupils in England 100 years after the Spanish pioneers. So the original contribution of the sound physiologists to speech science was not that they discovered articulatory phonetics, but rather that they drew systematic conclusions from the earlier discoveries. Their discovery, one may say, was that speech sounds generally can be described from the viewpoint of a deaf observer. Bell clearly indicated in 1867 that this discovery was a central issue for the early speech scientists, when he gave to what can be described as the second standard work of the new speech science the title *Visible speech: universal alphabetics or self-interpreting letters for the writing of all languages in one alphabet*.

The Successful Articulatory Description of Single Speech Sounds Looking back on the early development of speech science it must be recognized that the great successes of articulatory phonetics were mainly restricted to the description of isolated speech sounds. The first sound physiologists did not really look at running speech acts, nor did they investigate concrete, physiological data. They spent most of their time sitting at their desks and observing themselves while repeating the pronunciation of isolated words with a very careful articulation. Thus they discovered very fine distinctions between the different sounds of different languages and gave very reliable articulatory descriptions of possible differences between alphabetically isolatable speech sounds. Tactile perceptions were translated into the visualized model of the articulatory organs.

What the eye could not see directly was, as far as possible, made visible by auxiliary means. As far back as 1803, Erasmus Darwin, grandfather of Charles Darwin, devised a method for investigating the formation of vowel sounds by inserting into the mouth cylinders made of tinfoil which received different impressions according to which vowel was spoken (see Darwin, 1803: 120). Grützner (1879) was the first to experiment with painting the tongue before producing a certain sound in order to look at the colored parts of the hard palate, with the aim of specifying the areas of contact. Oakley Coles (1872), Kingsley (1880, 1887), and Lenz (1888) refined the method of inspecting directly or indirectly produced palatograms to determine the tongue palate contacts of certain sounds. This kind of method is still in use within fieldwork today. Other methods had to be introduced to get a clearer picture of those speech sounds that do not have palatographically illustratable places of articulation. Grandgent (1890, 1892) tried to determine the distance between the tongue and the hard palate. Only a few years later, Atkinson (1899) invented a very delicate instrument for obtaining real mouth-mappings. His method of creating so-called longitudinal stomatograms made use of a thin wire that could be moved within a fixed guiding construction to the point of 'touch-sensation of the tongue' which could then be translated into the drawn picture showing tongue distances from the palate.

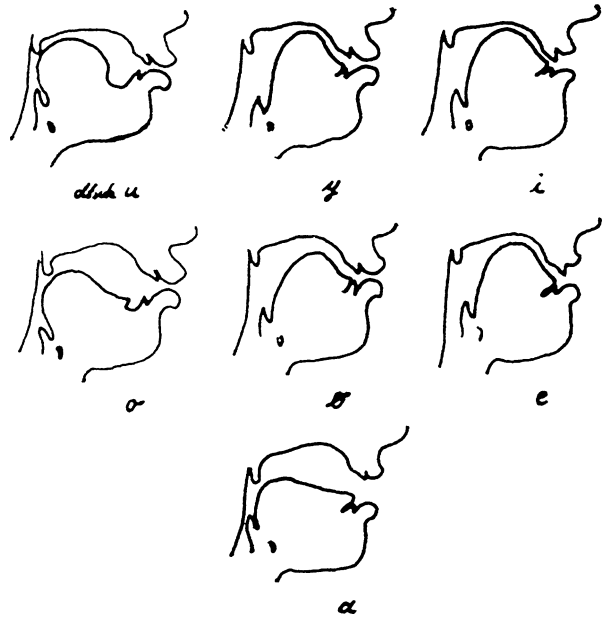

Figure 3 "My observations regarding the growth of my hair made it appear prudent to restrict the X-ray recordings to not more than two per week" (Meyer, 1907: 233).

Pictures of the tongue and the hard and soft palate were of special interest in cases where authorities on descriptive phonetics adopted a divergent or even contradictory view about a certain detail. Thus, for instance, Sievers (*see* **Viëtor, Wilhelm (1850–1918)**), Viëtor (*see* **Sweet, Henry (1845–1912)**), and also Sweet agreed in believing that the high front unrounded and rounded German vowels [i] and [y], [e] and [ø] also differ in their tongue height, whereas Jespersen assumed (more from a theoretical point of view) that the only linguistically relevant articulatory difference between these pairs of vowels consisted in their lip position. Here E. A. Meyer – only 10 years after the discovery of the X-rays by Röntgen – was the first to produce very clear radiographic pictures of German vowels and consonants (cf. Figure 3). After having put small leaden plates on the tongue and palate, Meyer exposed himself to X-ray photography.

The exposure time for one single speech sound was about 1 minute (see the quotation in the caption of Figure 3). During this time, the depicted vowel or consonant was reproduced in a fixed steady state, with a duration of about 8 seconds and was repeated between six and eight times. (Meyer was much too optimistic about the safety of X-ray photography – he thought that if the hair of the subject was protected by tinfoil folded many times and if the two sides of the head were each alternately exposed only once a week "any detrimental effect to the body of the subject could be ruled out" (Meyer, 1907: 233).) In his famous contribution to Viëtor's Festschrift, Meyer (1910) proposed another noninvasive method for getting good pictures of the form of the tongue and its distance from the palate: he fixed little threads of nonelastic tinfoil along the midline of an artificial palate and constructed a mechanism for transducing the received tongue impressions into drawn contours.

With these two techniques, Meyer was able to demonstrate that a speaker of northern German did indeed show small but systematic differences in the tongue height during the production of high front rounded and unrounded vowels. As can be gathered from Figure 3, the raising of the tongue during the production of [y] was clearly less than for [i] and nearly as low as for [e]; and the vowel [ø] clearly had a lower tongue position than was found for [e] (cf. (Hoole, 1999)).

The articulatory description of isolated speech sounds is undoubtedly very helpful in the context of teaching the pronunciation of a given language. Anyone who knows how to produce the alphabetic units of a given language in isolation is also in a good starting position for incorporating them in the reproduction of whole words, especially in the clear speech of citation forms. On the other hand, it must be said that the sound physiologists and descriptive phoneticians were never troubled by the fact that alphabetically represented sound structures as found in the citation form of isolated words are subject to more and more reduction in colloquial speech. The reductions and elisions of fluent speech are inconspicuous to the naive observer simply because it is much too complex and runs much too fast for direct observation of it in all its detail. Thus the success of early sound physiology and articulatory phonetics was restricted to the description of more or less careful speech, and especially of the citation forms of isolated words and of single speech sounds uttered in isolation.

An Early Experiment with Isolated Speech Sounds

In 1871, the medical doctor and ear specialist Oskar Wolf published a book entitled *Sprache und Ohr*. He had observed that patients with different degrees and different kinds of hearing losses had different problems in the perception of different speech sounds, and he wanted to know how a normal listener was able to perceive the set of speech sounds he used in testing the hearing abilities of his patients. Thus he was probably the first to conduct an articulation index experiment.

Wolf decided to determine the auditory perceptibility of 18 speech sounds presented partly in isolation, partly in a consonant–vowel context. The alphabetically specified categories of these sounds were taken for granted; they constituted the independently given variable. To obtain a dependently variable measure of auditory perceptibility Wolf conducted the experiment he describes on page 59 of his book (Wolf, 1871: 59). He asked a trained professional speaker and two professional musicians to take part in the test. The professional speaker took up his position at the end of a long avenue of trees, in calm conditions, and was instructed to produce each of the test stimuli with equal effort. One of the two musicians stood beside him and was instructed to monitor the realized effort of the stimulus production. The other musician served as test subject. He had to take steps forward and backward along the avenue in order to determine the step distance where the test items could still be clearly identified. The resulting step distances can be seen in Figure 4 in the (reprinted) original form.

Wolf's experiment had a very strong influence on the further theoretical development of phonetics as an experimental discipline. Despite certain methodological deficiencies, it showed that in principle it was

Schematische Darstellung des Tonstärkeverhältnisses der Sprachlaute

Sprachlaut*	Wird noch deutlich unterschieden in einer Entfernung von Schritten	Bemerkungen
A	360	* Im Freien in einer Allée zur Nachmittagszeit gemessen.
O	350	
Ei**	340	** Klingt meist wie Ai.
E	330	
I	300	
Eu	290	
Au	285	
U	280	
Sch	200	
M und N***	180	*** In Verbindung mit dem Vocale A.
S	175	
F	67	
K und T	63	
R****	41	**** Das Zungenspitsen-R für sich
B	18	
H*****	18	***** Für sich als verstarkter Hauch.

* measured in open air in an avenue in the afternoon.

Figure 4 Wolf's original sonority scale of 18 German speech sounds.

possible to characterize the speech sounds under examination by means of independent measures.

Eduard Sievers (1876), and later Otto Jespersen (1904), used the sonority scale invented and experimentally determined by Oskar Wolf to formulate their phonetic syllable theories. They assumed that the syllabic prosody of speech could be understood as a function of the degrees of sonority in pronounced sound sequences, with the vowels forming the sonority peak in the center of the syllable and the marginal consonants creating troughs of sonority between the peaks.

Segmental States and Fast Intersegmental Transitions

Phonetics as established during the second half of the 19th century, as a branch of linguistics, had two main orientations: a theoretical one and a more practical one. The success of the latter mainly consisted in the practical application of the new articulatory categories to produce reliable phonetic transcriptions. The French phonetician Paul Passy (*see* **Passy, Paul Edouard (1859–1940)**) was one of the initiators of the famous Association Phonétique Internationale (API)/International Phonetic Association (IPA)/Weltlautschriftverein (WLV), founded in 1886 (*see* **Phonetic Transcription: History**). One year later, in Marburg, Wilhelm Viëtor (*see* **Viëtor, Wilhelm (1850–1918)**) started the first important, international journal of the new discipline, entitled *Phonetische Studien. Zeitschrift für wissenschaftliche und praktische Phonetik mit besonderer Rücksicht auf den Unterricht in der Aussprache*. Both orientations are specified in the subtitle of the journal, and the practical aspect of teaching pronunciation is also particularly mentioned. The number of the cooperating persons whose names were printed on the cover increased within 2 years from over 50 to nearly 90. This 'editorial board' contained the names of practically all the leading phoneticians of the time including Bell, Brücke, Ellis, Jespersen, Lloyd, Lundell, Noreen, Passy, Storm, Sweet, Techmer, and Winteler.

The theoretically oriented scientific branch of phonetics developed in close relation with the continuing rise of the natural sciences, but was at the same time strongly influenced by new programmatic concepts of linguistic theories. The more the new phonetic knowledge became available to linguists, the greater was its role in helping them to comprehend and explain the processes of sound change in the evolution and branching of documented historical languages. With the neogrammarian school of comparative philology (*see*), the new insights provided by sound physiology and the articulatory description of speech sounds became an integral part of linguistics, and phonetics gained basic concepts from the theories of historical linguistics for its further scientific development.

Eduard Sievers (1850–1932) can be regarded as the phonetician of the neogrammarian school of comparative historical linguistics. His book on the principles of sound physiology was written as an introduction to the study of the sound theory (*Lautlehre*) of the Indogermanic languages. First published in 1876 (in later editions the term *Lautphysiologie* in the title of the book was replaced by *Phonetik*), it had a strong influence in two directions: first on the further development of theoretical linguistics, and second, regarding a new theoretical foundation for phonetics as a linguistic discipline. At the same time, Sievers, like Techmer (see below), anticipated the creation of instrumental and experimental phonetics in a programmatic way.

Analysis Versus Synthesis An important new issue in the development of speech science was the theoretical distinction between speech analysis and speech synthesis. Alphabetically representable speech sounds were no longer understood as directly observable, but rather as the elementary results of an abstracting analysis. As soon as these elementary units of speech description were used for the representation of real speech, it became clear that additional phonetic properties of speech had to be specified. One of the questions typically asked in this connection was, for instance, how the uniform elementary units of a sound alphabet could be used to generate such differently sounding utterances as those of English, French, or German. (One of the answers given to this interesting question consisted in simply assuming a different language-specific general setting of the articulatory organs, the so-called basis of articulation, *Artikulationsbasis*.)

Speech synthesis not only meant putting together alphabetic units into real syllables, words, and sentences, but also the description of the different prosodic and rhythmic organization of speech utterances. In particular, the assumed fast transitions between the assumed steady sound segments were thought to play an important role in historical sound changes. In this respect, assimilations and dissimilations in the phonetic formation of individual words gained special interest, of course.

Sievers – and later Jespersen – understood the distinction between analysis and synthesis not only as a fruitful heuristic program, but also as absolutely necessary for understanding and describing the physical reality of speech. In 1884, Friedrich Techmer (1843–1891) attempted to formulate a complete theory of phonetic speech communication. His 'scientific analysis and synthesis of audible language' is still very modern ('scientific' is meant in the sense of natural sciences:

Naturwissenschaftliche Analyse und Synthese der hörbaren Sprache). Techmer distinguishes seven stages involved in the "cycle of audible language" on its "way from inside to outside" and "on the way from outside to inside." He gives a detailed description of these stages taking into account all knowledge available to him at that time. At the respective stages 1/7, 2/6, 3/5, he describes the psychic, psychophysical, and physiological activities within the communicating organisms and at stage 4 the physical processes outside of them. A central role in the generative process of speech synthesis is played by the syllable. Accordingly, speech sounds are characterized by means of a threefold dichotomy. Each speech sound is physiologically either *Mundöffner* (mouth opener) or *Mundschließer* (mouth closer), physically either *Klang* (complex tone) or noise, and perceptually either *Phon* or *Symphon*. All vowels are 'mouth openers,' *Klang*, and *Phon*. Techmer's important work served as a model 20 years later when Scripture wrote his standard work on experimental phonetics, which also contained a complete theory of speech communication.

Theoretical Assumptions Leading to Early Instrumental Phonetics When Sievers (1893), in the preface to the fourth edition of the *Grundzüge*, showed himself not to be too enthusiastic about the "new experimental phonetics of recent years" he did not seem to realize that the turn in this direction was also a consequence of certain basic theoretical assumptions about speech science that he and his linguistic colleagues had introduced and advocated in their publications in the years before, especially in connection with the explanation of sound change.

First the typical view of speech perception as subjective as opposed to speech production as objective will be mentioned. According to this – almost behaviorist – view, a listener was often considered as only 'believing that he heard something,' – something that in reality was not objectively present. Sievers observed that naive listeners, in particular, were normally systematically misled into hearing the sounds of their own dialects, and he therefore very insistently argued that linguists should train their ears as much as possible in order to learn to hear the relevant articulations. Techmer points out that thanks to the new instruments "we now are able . . . to control the ear through the eye." Speech perception was not an interesting problem in its own right, its only task was to transport the speech sounds "on their way from outside to inside."

The second assumption is the most important in the context of this article. It is concerned with the concept of infinitely fine sound varieties in the transitions between steady state sound segments. Sievers (1876) argued that given a sound sequence such as [la] or [al] it is

> intuitively obvious that during this transitional movement neither the pure a-sound nor the pure l-sound can exist, but that rather between the pure a produced at the beginning and the 1 at the end a continuous series of transitional sounds must be interposed (Sievers, 1876: 85).

Because these transitional sounds (*übergangslaute*) were assumed to be much too short for them to be heard, the only conclusion to be drawn was that one should use instruments for getting a description of all the postulated relevant variants.

A third very general – and, from the point of view of today's theory of science, also very naive – assumption was that there exists just one, objectively given, reality of speech acts, a 'real reality' in the physical world, which at the same time constitutes the contents of subjective (and imperfect) perception and of objective scientific description. A peculiar consequence of describing a physically given world with normal words was that the continuous and transitory process of speech articulation was automatically segmented according to previously given categories, such as places of articulation at which an articulatory organ produces just one of the given possible manners of articulation. When this epistemological paradox became clear to Otto Jespersen he invented a new system of phonetic description (1889) that worked without 'semantically segmenting' categories such as manners and single places of articulation (for this analphabetic notation **Phonetic Transcription: History**). In an analphabetic representation of speech, the whole configuration of the articulatory speech production system from the lungs to the lips is given, either as fixed within a time segment or as a transition from one configuration to another.

It was precisely the naive identification of two realities, one of them being measurable by means of instruments in the physical world, and the other being what linguists described phonetically as observable speech sounds, that provoked the emergence of instrumental phonetics. Some 30 years after Jespersen's use of the analphabetic notation to represent the articulatory synthesis of speech, one of the leading Dutch speech scientists, Zwaardemaker (1927), tried to realize a complex kymographic system for graphically producing a directly measurable analog of this analphabetic notation.

Early Instrumental and Experimental Work

After the very successful eras of sound physiology and articulatory phonetics, a new generation of speech

scientists showed a growing distrust of the methods of direct observation and direct transcription. Shortly before the last decade of the 19th century, they had begun to use new types of instruments to measure speech data. In most cases, they recorded time functions representing either the movement of certain articulatory organs, or the acoustic speech output, resulting in an oscillogram of the speech wave in a somewhat restricted and not yet analyzed form.

The method of direct observation was replaced by the method of indirect measurement. At the beginning of the 20th century, the mainstream of speech science had definitely left the domain of comparative philology and linguistics and was moving into the domain of the natural sciences. Within a short period of time, several new laboratories for experimental phonetics were established at different universities in Europe and the United States. The new approach of experimental phonetics was to study speech sounds exclusively in the form of the graphically presented speech curves that could be produced by equipment specially developed for the purposes of instrumental phonetics. The possibility of transforming transient speech into the graphic curves of measured speech data that remained stable for closer inspection introduced a new kind of experimental work into the mainstream of speech science, work that in principle was based on arbitrarily reproducible observations made under controlled repeatable conditions with systematic variation.

Measurable Speech Movements and Readable Speech Curves

Ten years after Marey had published his *Méthode graphique dans les sciences expérimentales* (1878) in Paris and Leipzig, two young linguists, independently of each other, were the first to try to make use of the proposed method in speech science: they used it to transform transient speech utterances into persisting graphic registrations, and they were both interested in getting as precise a description as possible of a particular dialect; Wagner (1891) of a dialect in South Germany, Rousselot (1891a) of his own Gallo–Roman dialect (*see* **Rousselot, Pierre Jean, Abbé (1846–1924)**). Wagner tried to measure certain sound durations in order to determine the quantity relations in the sound system of his dialect. E. A. Meyer (1898) reanalyzed his data and also improved the instruments used by Wagner in order to get more reliable measurements.

In the first chapter of his dissertation, Rousselot produced a great variety of graphic speech curves for detailed inspection and description. He certainly believed that speech utterances could be reliably and authentically replaced by these rather poor graphic registrations and he obviously liked the art of reading these curves, *la lecture des tracés*; a great part of his later work consisted simply in presenting, and using his skill in 'reading,' speech curves. One may say that he invented a new kind of 'speech curve philology.' Thus his publications were full of phonetically interesting individual observations. Scripture (1902), in his broad, systematic attempt to present the new discipline of experimental phonetics as a central part of experimental psychology in the tradition of Wilhelm Wundt (*see* **Wundt, Wilhelm (1832–1920)**), quotes no less than 30 of these observations.

There is yet another reason why Abbé Rousselot was so successful in directing the main stream of speech science into experimental phonetics. The interest in reading speech curves constituted a new scientific program. The aim of Rousselot was not to find the invariant common features of a given sound in different realizations, but on the contrary to discover differences in the realizations of a given sound in the pronunciation of a given word. Most of his material consisted of lists of words or short word sequences. This new program was already clearly expressed in 1891 in the title of his dissertation, *Les modifications phonétiques du language* (1891a), and in another contribution from the same year, entitled *La méthode graphique appliquée à la recherche des transformations inconscientes du langage* (1891b), Rousselot presented his arguments for this new kind of speech curve philology. All sound changes in the histories of all languages, he maintained, are caused by phonetic modifications unintentionally produced by the speakers, and the resulting 'subliminal transformations' in the phonetic form of the utterances can only be studied after they have been made visible in the registrations produced by the new graphic method.

The Kymograph The registrations of speech curves were produced by an instrument called the kymograph. In the development of instrumental phonetics it played a role similar in its importance to that played 50 years later by the sonagraph. It could be used for the registering of rather slow air pressure variations up to about 500 Hz. It consisted of a drum that was covered with smoked paper and was kept in constant revolution by means of clockwork during registration. So-called Marey tambours, flat circular metallic boxes with a rubber top and a side tube, were used to receive and transduce the air pressure variations. A light lever, usually of straw, was fixed to the rubber membrane at the top of the tambour to follow its movements, which were simultaneously inscribed onto the revolving smoked paper by means of a light quill at the end of the lever. The membrane of the tambour reacted to the air pressure either directly or indirectly. The first case is shown in Figure 5 where

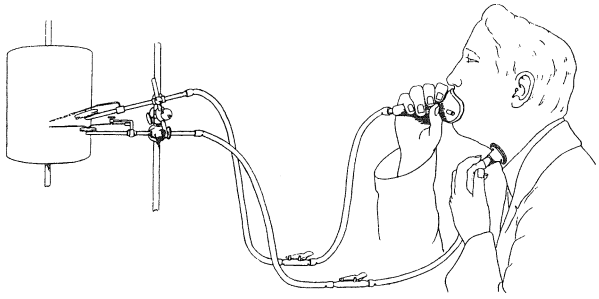

Figure 5 Kymographic recording of mouth airstream and glottal vibration (from Panconcelli-Calzia 1924: 14, © De Gruyter, Berlin. Reproduced with permission).

the speaker presses a funnel around his mouth in such a way that the resulting air stream from the mouth is conducted directly through a rubber tube into the tambour. In the picture shown, the glottal vibrations are indirectly transmitted to a second tambour.

For recordings of the movements of the lips or the jaw, direct and indirect methods could be used. In the latter case, levers fixed to the articulatory organs had first to transmit their upward and downward movements to the membrane of a receiver tambour. The resulting air pressure variation was then transmitted through a rubber tube into a second recording tambour at the site of the kymograph. The indirect method could also easily be used for the registration of the vibrations of the larynx during the production of voiced speech sounds. In this case, the membrane of the receiver tambour could be applied directly to the neck, as shown in Figure 5.

Whereas Rousselot and most of his colleagues and followers were quite confident of the reliability of the resulting kymograms as measurements of the articulatory speech processes under investigation, Meyer (1898–1899) rigorously analyzed the problematic time constants of the system and showed how limited the use of the kymograph actually was for a precise measurement of the underlying time functions. He took the limitations of the kymographic system into serious consideration when he used it for determining the perceptual centerpoint of syllables in rhythmic speech production by simultaneously recording kymograms of the mouth airstream and of hand tapping. Meyer argued that in reality the production of words and sentences involves movements of the articulatory speech system far more complex and complicated than can be seen even from a large set of simultaneously taken kymographic recordings.

Simultaneous and Successive Speech Movements It is impossible to sum up all the individual observations and speech measurements that were made by use of the kymograph during the first 40 years of the 20th century. One could easily fill a database with the published results, even though in many cases it would then be less easy to classify these results according to the concepts and categories of today's speech science, which were not available to the early instrumental phoneticians. In other cases, the results of kymographic investigations have led directly to, or have at least strongly influenced, the development of certain modern concepts. Details of measurements of the specific velocity of different articulatory organs such as the upper and lower lip, the tip and the body of the tongue, the velum, and many other very interesting data, collected by Louise Kaiser from a large population of Dutch students may be found in Kaiser (1934, 1943).

There is one more general aspect of kymographic work that needs to be mentioned and exemplified. Typically more than one time function was recorded at the same time. Rousselot argued that only the comparative inspection of several simultaneously taken speech curves could help to reveal what he called a 'registration error' (*erreur d'inscription*). For him and his closer colleagues, the speech curves had to be interpreted in relation to the underlying articulatory processes, and only if this interpretation led to a clear picture would the kymograms be regarded as usable. This was especially true when the curve reader had to draw segment boundaries between the individual speech sounds. In this case, only the comparative inspection of several simultaneously recorded curves was accepted as giving the relevant hints. If a segment boundary could not be determined unambiguously the kymograph was said to have failed, and the faulty kymogram was replaced by a new and better one. This highly questionable methodology had to be adopted by all those who wanted to measure sound or syllable durations and the like. Those who decided for methodological reasons that the instrument used could not make mistakes had to draw the conclusion that the phonetic form of speech is itself nothing other than a continuous movement.

Different Voice Onset and Voice Offset Times Comparing a French and a German speaker articulating simple CV-sequences such as [ba] and [pa], with a voiced or voiceless stop followed by a vowel, Rousselot (1897–1908: 454–456) discovered that they showed a typically different voicing behavior in the production of the stops. He compared kymograms containing the airstream curve of the mouth and the vibration curve of the larynx. With modern knowledge about the distinctive function of the onset of laryngeal phonation relative to the point of stop release in the mouth, Rousselot can be said to have

discovered that the French speaker produced the voiced stop with negative voice onset time (VOT) and the voiceless one with zero VOT, whereas the German had zero VOT in the case of the voiced stop and a clear positive VOT in the case of the voiceless stop. But it must also be recognized that Rousselot did not look at these differences from a functional point of view. His conclusion was that such theoretical distinctions as the one between voiced and voiceless stop consonants can be realized by quite different phonetic forms in different languages or dialects. That the phonemic principle (**Phoneme**), according to which a distinctive opposition is created between minimal pairs of words, did not play any role for Rousselot can be inferred from the fact that he discovered and described different voice onset and offset times in those situations also where they did not have any contrastive function. His final conclusion was that in addition to the voiced and voiceless consonants, intermediate sound variants must be introduced. In French he called them *demi-sourdes* and *demi-sonores*.

That the linguistic function of the observed voice onset and offset times was not really a central issue for the early instrumental phoneticians can also be inferred from Panconcelli-Calzia (1919). He argued that the use of words such as 'semivoiced' or 'semivoiceless' is too vague to describe all the possibly occurring situations in a precise way. He proposed to characterize both the degree and the place of voicing by means of two measures, *pi* and *tau*. The measurement of the voicing degree, *pi*, was also explicitly called *Phonoposotometrie*, whereas *tau* was the value of the so-called *Phonotopometrie* chosen to determine the local stretch of voicing within a given segment. To get normalized values, the length of any given segment under consideration was divided into 10 equal parts. Thus the normalized degree *pi* of voicing could vary in steps from 0 to 10. The *tau* value then, of course, is of interest only if the *pi* value differs from 0 or 10; $pi = 0$ indicates no voicing at all and $pi = 10$ indicates voicing throughout the whole segment. The topometric *tau* value determined the beginning and length of the voicing stretch, again in steps of 10% of the segment duration. In Figure 6 (reproduced from Panconcelli-Calzia, 1924), a dozen pairs of speech curves illustrating different voicing situations can be seen. The upper curve of these pairs always shows the airstream time function from mouth or nose, the lower one is always the larynx curve showing or not showing glottal vibrations. Only curves #1 and #11 demonstrate a completely voiceless and a fully voiced sound segment. Examples #3, #7, and #12 are voiced only in the initial part of the segment, examples #2, #5, and #9 show voicing only in their final part, curves #4, and #10 depict segments with a devoiced central part of the segment, whereas curve pair #8 has voicing vibrations only within its central part.

Panconcelli-Calzia knew that from a linguistic point of view the importance of his absolute *pi* and *tau* measurements was only of a

> relative nature. Because in a language where certain sounds show voicing with a degree of pi = 10, sounds having pi = 5 [...] must be considered as voiceless, while in another language, where pi in optimal cases is equal to 5, all sounds with pi-values of 4 or 3.5 must be considered as voiced (Panconcelli-Calzia, 1924: 45)

This quotation shows that the linguistic function of VOT, while not playing a central role, was not totally neglected.

Measured Durations of Sounds, Syllables, and Words

As soon as segment boundaries were drawn across the speech curves of a kymogram, the duration of the resulting sound segments could be very easily determined. In fact, this type of quantitative speech data gave rise to a large number of investigations which produced many interesting results. Only a few of them can be briefly mentioned here.

The first surprising fact that could be directly observed in the measured data itself was the great amount of variation in segmented durations. Variation as such was of interest for the reasons already mentioned, especially for those concerning the possibility of explaining sound change. But there was also the question of whether one could discover the systematic factors behind the observed variation.

Rousselot (1891a) was the first to try to answer this question in an experimental way. He chose nonsense words as test items and systematically varied their phonetic structure. In VCVCV test items with the vowel [a] in the V-position and one of the consonants [p, f, t, s, k, ʃ] in the C-position, he found that the stops were slightly shorter than the fricatives. In VCV items with the nasalized vowel [õ] and one voiced or voiceless consonant such as [v, f, d, t] in the intervocalic position, the voiced consonants were a little shorter than the voiceless ones. In CVC, CVCVC, and CVCVCVC sequences, the duration of the sound segments decreased as a function of the number of syllables. Rousselot could also show that a stressed syllable had longer segments than the same syllable without stress. And he also discovered that the last consonant in a word uttered in isolation is generally lengthened. This corresponds to the well-known fact that the duration of sound segments is normally increased at the end of an utterance, a fact that has been described in more detail by Binet *et al.*

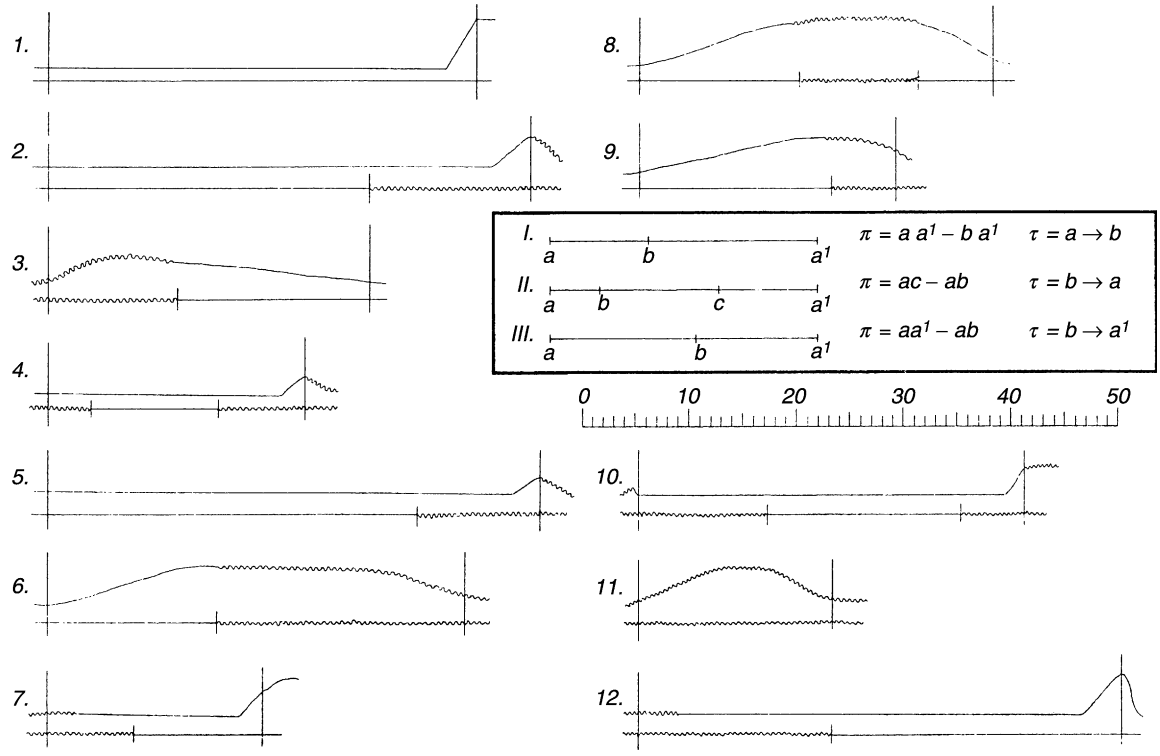

Figure 6 Phonoposoto- and phonotopometries (from Panconcelli-Calzia 1924: 42, © De Gruyter, Berlin. Reproduced with permission).

(1894). Many of Rousselot's early observations have been confirmed and partly refined by later investigators.

Grégoire's investigation *Variations de durée de la syllable française*, published in 1899, was the pioneering work for all following kymographic studies of duration. In his kymograms, he recorded both the airstream from the mouth and glottal vibrations from the larynx. His test items consisted of sequences of real French words such as *pâte:pâteuse:pâte* or *pâteuse:pâte:pâteuse* where the voiceless stop consonants facilitated the segmentation of the speech curves. Grégoire pointed to the fact that the intervocalic stops caused a silent interval between the vowels that was often nearly as long as the preceding vowel, and it should be mentioned that he tried to explain why this silent pause within the word is not actually noticed as an interruption of the word. Instead of formulating the rule, well known in modern speech science, that short silent intervals of this sort are perceived as stop consonants, he argued that the motor activity of the speech organs goes on just as vigorously during the silent occlusion as before and after it, and thus unifies the auditory parts in the hearer by way of association. In addition, Grégoire again observed the lengthening of the final syllable of a word before a pause. In accordance with the CVC, CVCVC, and CVCVCVC observations of Rousselot mentioned above, Grégoire also discovered that the long syllable of a monosyllabic word becomes shorter and shorter when further syllables are added, as could be shown in the kymograms of the French words *pont, pontife, pontificat*, and *pontificalement*.

Grégoire's findings stimulated many other investigations concerning the law-governed variation of the duration of kymographic segments of sounds, syllables, and words. In particular, languages having phonological quantity contrasts attracted many investigators. Figure 7 gives an example from Panconcelli-Calzia (1924: 115) who used this kymogram of mouth airstream curves to demonstrate the quantity differences in the Italian minimal word pair *topo/toppo*. The time reference at the bottom of Figure 7 is a 100 Hz oscillation. The closure duration of the geminate p-stop in *toppo* is nearly 380 ms and is more than twice as long as the short stop in the contrasting word. But in the word *topo* the duration of the preceding vowel is much longer than in *toppo* as can be easily seen in the upper mouth airstream curve of Figure 7.

E. A. Meyer devoted several extensive and carefully conducted studies to the duration of vowels and consonants in English (1903), German (1904), and Hungarian (1909). Besides many language-specific regularities that he was able to describe, he also discovered the so-called general law of vowel quantity,

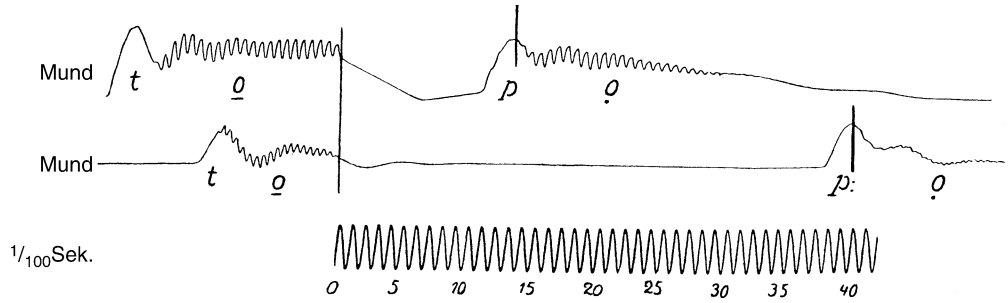

Figure 7 Kymograms of the mouth airstream curves of the Italian minimal pair *topo/toppo* (from Panconcelli-Calzia 1924: 115, © De Gruyter, Berlin. Reproduced with permission).

which states that the duration of a vowel is correlated with its tongue height. This *Eigendauer* of vowels (intrinsic vowel duration, increasing from [i] and [u] to [a]), cannot be explained – as Jespersen had tried to propose – by the longer distance the tongue has to travel from the consonantal place of articulation to the vowel target. As Meyer could show, the characteristic intrinsic values of vowel duration do not disappear if the vowel is embedded between labial consonants. The same is true for vowels in word final position.

In another famous investigation, Menzerath and de Oleza (1928) drew and measured more than 7800 sound segments in the kymographic recording of Spanish words read in citation form. The word material was organized first of all according to the number of syllables, words of 'Typ I' having one, of 'Typ VII' having seven syllables. The second criterion was the position of the stressed syllable, counted from left to right: thus a word of 'Sub-Typ V 3' consisted of five syllables and had lexical stress on its third syllable. The third criterion was the number of sounds in the word of a given subtype. The analysis of the detailed results, presented in 29 tables and 11 diagrams, led to the formulation of no less than 12 general and 50 specific laws of quantity. The systematic behavior of syllable durations can be seen from one of the original figures reproduced in Figure 8. Here the mean duration of the syllables of the subtypes is represented by the diameter of a small circle, the circle of the stressed syllable being given a special mark. Stressed syllables always have a longer duration. Prepausal lengthening is clearly present in all 23 polysyllabic subtypes of words. The marked circles in the first column show the mean durations of all syllables in the given type of word. The duration of the syllables of a word decreases with the increase of the type number, as can be seen from Figure 9 where the mean syllable duration of a word is presented as a function of Types I to VII.

In 1931, Weitkus published a similar extensive investigation based on the kymographic measurement of the duration of sounds and syllables in German sentences. He also considered the effects of different speaking rates. His final results are given in a concentrated list of 70 individual items. His work can be understood as a first step in the direction of the new 'phonometry' proposed by the Zwirners (see 'Acoustic Nature of Speech Sounds' below).

The First Crisis in Experimental Speech Research: Segmentation Problems and the Discovery of Coarticulation

Not all speech researchers analyzing kymograms were convinced that the given speech curves could be unambiguously segmented into single alphabetic units, according to the prevailing theoretical assumption that the utterances of speech acts consist of stable and steady segmental states and short and fast intersegmental transitions. A few critical researchers had decided to believe only in what a kymogram really showed itself, and ignored the interpretations of the skilled reader. Scripture (1902), for instance, was clearly convinced that the most important result of experimental phonetics was the discovery that phonetic utterances had the form of the measured speech curves – thus for him all vowels were in reality 'more or less' of the nature of diphthongs, and alphabetically represented speech sounds existed only as a product of perception.

Another prominent researcher, Panconcelli-Calzia, argued that sound segments or syllables had no phonetic reality at all. He called such units a pure fiction, an invention of linguists. He tried to prove this (Panconcelli-Calzia 1924: 23) by showing a pair of speech curves taken from the chest of a subject uttering the German word *Lokomotive*, first of all in a scanned version putting heavy stress on each individual syllable, and then in normal pronunciation: "the syllable is only there if it is intentionally produced, i.e., by means of extra chest pulses (see Figure 10).

When in 1930, Gutzmann, at a meeting of the International Society of Experimental Phonetics in

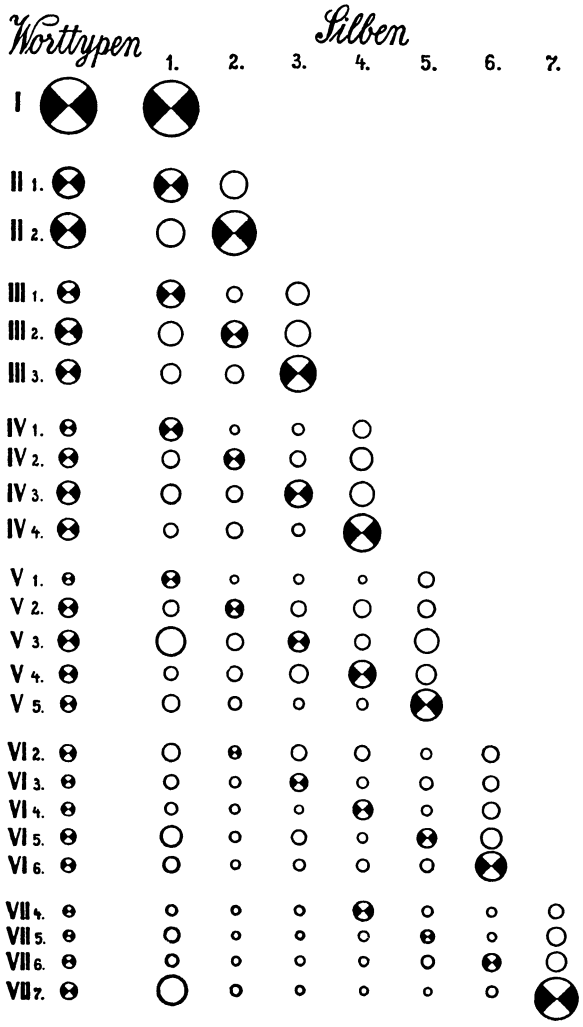

Figure 8 Syllable durations in Spanish words (from Menzerath and de Oleza 1928, Appendix Fig. V, © De Gruyter, Berlin. Reproduced with permission).

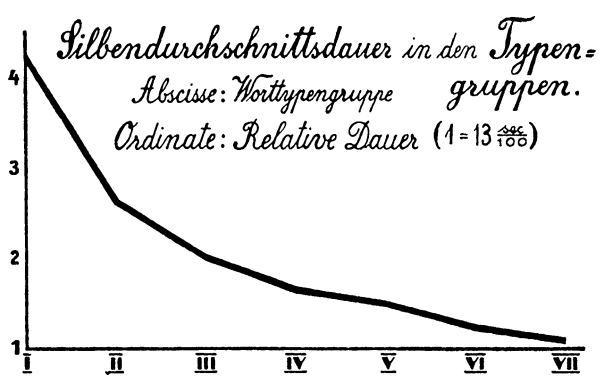

Figure 9 Mean duration of syllables in Spanish words as a function of numbers of syllables (from Menzerath and de Oleza 1928, Appendix Fig. VI, © De Gruyter, Berlin. Reproduced with permission).

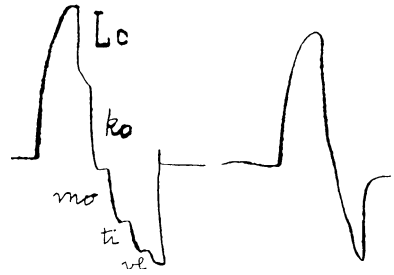

Figure 10 Chest kymograms of the German word 'Lokomotive' uttered in a scanned and a normal version (from Panconcelli-Calzia 1924: 23, © De Gruyter, Berlin. Reproduced with permission).

Bonn, showed the first cineradiographic film of running speech, the audience was shocked, as Scripture reports:

> The impression of such a film is overwhelming. The organs of speech do not remain still for an instant, every speech act is the combination of the movements of all organs of the mouth, the throat, the larynx etc., and this combination is deployed over time. Sound positions simply do not exist. One understands at once that the sound physiology up to now has been based on an illusion and one awaits new explanations (Scripture 1932: 173)

Here the crisis of modern speech research – the impossibility of mechanically identifying the sound units of an alphabetic speech transcription – became evident for the first time. The paradoxical situation was that instruments had been introduced to replace subjective hearing by objective measurements, but the resulting picture did not show what was originally looked for: visible speech sounds. These had disappeared and had to be reinvented by the new phonologists (*see* **Prague School**).

A phonetic way out of the dilemma was proposed in 1933 by Menzerath and de Lacerda in their study *Koartikulation, Steuerung und Lautabgrenzung*. They used the kymographic method to show that speech sounds at the beginning of a syllable are coarticulated, i.e., produced at the same time, and that the vowel in a syllable rhyme is stopped ('controlled') by the following consonant if there is one. Menzerath and de Lacerda observed various coarticulatory phenomena; however, in modern terms, *Koartikulation* for them mainly seems to refer to the anticipation of consonantal and vocalic features in syllable initial position, whereas carry-over effects cannot easily be related to their concept of *Steuerung*. They formulated the theory that the complex combination of all simultaneous movements of the speech organs, which they called 'Synkinese,' existed only for the purpose of producing 'acoustically' a sequence of clearly sepa-

rated and directly segmentable sound units. But in their new theory, they failed to make any distinctions between purely acoustic sound segments in the physical world and the auditorily perceived sounds, which again were taken as a common reality, an assumption that would later lead to a repetition of the first crisis.

Acoustic Nature of Speech Sounds

Before the mainstream of speech science, after the invention of a new kind of visible speech in the 1940s (*see* **Speech Synthesis**), moved on to an extensive acoustic analysis of speech as well as to the early experiments concerning auditory speech perception (*see* **Speech Perception**), there already existed a solid foundation of phonetic knowledge about the acoustic nature of speech sounds.

Brücke (1856) already had a good knowledge of the intrinsic pitch of vowels, and he clearly distinguished between the respective contributions of the vocal tract and the larynx to the acoustic formation of speech sounds. He repeated some of Willis's experiments (*see*) to demonstrate the separate effects of glottal phonation and the resonances in the vocal tract. Thus he could explain the audible effects when a female singer produces an [u]-vowel with a very high pitch. He also observed, by touching the Adam's apple with the tips of his fingers, that the length of the vocal tract varies with the tongue height of vowels.

The first person to look at specific pitch movements within the vowels of spoken and sung single words on the basis of measured fundamental frequency (F_o) values was Meyer (1897). He also described F_o-perturbations caused by the consonantal environment. Many detailed descriptions of variations in the F_o-contours can be found in the periodical *Vox* edited by Panconcelli-Calzia, especially in the years between 1911 and 1930. These include the influence of a prevocalic breathy onset or of a glottal stop onset on the measured F_o-frequency; the syllabic F_o-contours of the tones of West African tone languages; the international F_o-contours of questions, commands, exclamations, requests, or neutral statements.

In his *Lehre von den Tonempfindungen*, first published in 1863, Helmholtz had introduced Fourier's harmonic analysis to explain vowel sounds in terms of complex tones. In 1861, Scott had invented the 'phonautograph' to register the vibration of a membrane in the form of an oscillogram. He referred to this as a direct way for the 'writing of sounds.' Paul Wendeler (1887) was one of the first to publish a comprehensive selection of speech oscillograms in his *Versuch, die Schallbewegung einiger Consonanten und anderer Geräusche mit dem Hensen'schen Sprachzeichner graphisch darzustellen*. Pipping (1890) improved Hensen's recording method, and presented the first manual computation of complete phase and amplitude spectra of sung vowels. In 1894, Hermann discovered the nonharmonic formant frequency that led to the long dispute between the Helmholtz/Stumpf and the Hermann/Scripture supporters, a conflict that was totally superfluous and unnecessary, as became known later. In the Z-transform X(z) of a digital speech signal x(n), the nonharmonic formant frequencies correspond to poles within the unit circle of the plane of the complex variable z, whereas harmonic components result, if the Z-transform is evaluated at integer multiples of the respective roots of unity directly on the unit circle itself. Stumpf published the results of his 'experimental phonetic investigations' in a book of more than 400 pages (Stumpf, 1926). Most other pioneers of acoustic phonetics had analyzed recordings of a speaker who was asked to produce a certain speech sound. Stumpf conducted perception experiments and introduced his own 'analysis by synthesis' method to determine the acoustic properties of voiced and whispered vowels and consonants.

The relation between acoustic and articulatory speech data was discussed and analyzed very early by Lloyd (1890–1899) in a series of articles entitled *Speech Sounds*: *Their Nature and Causation*. He criticized the fact that phoneticians either "investigate speech on the side of sound" or "on that of articulation" and argued "that each is necessary to the other's completeness" (Lloyd, 1890: 251). One of his aims was to explain "why certain dissimilar articulations are found to produce very similar sounds, or why, conversely, certain small changes in articulation have a great effect upon the quality of sound" (Lloyd, 1890: 252). Lloyd's questions are still of great interest.

On the basis of a statistical analysis of acoustically segmented and linguistically labeled speech data, the method of phonometry was proposed by E. and K. Zwirner (1936), as another way out of the lost speech sound dilemma described above. They believed in the binomial distribution of the acoustic properties of sound segments, and assumed that the mean value of acoustically segmented and auditorily labeled parameters could represent the relevant norm historically given in a speech community (according to the theory of Hermann Paul concerning use and norms.)

Conclusion

The historical fact that the early inspection of speech sounds through direct perception, whether visual or aural or even tactile, was replaced by the inspection of

graphically given speech curves led to a paradoxical situation. On the one hand, it is true that more and more new properties of speech sounds were discovered, but on the other hand the linguist has to admit that certain fundamental theoretical concepts concerning the general nature of speech sounds, as well as the possibility of developing a systematic theory of speech sounds, had finally been lost. The ensuing bifurcation of the mainstream of classical speech science into instrumental and experimental phonetics on the natural science side, and phonology and theories of sound systems of individual languages on the linguistic side, as well as the eventual reunification of the two separated streams into the speech science of the late 20th century is outside the scope of this article.

See also: Bell, Alexander Melville (1819–1905); Brücke, Ernst (1819–1891); Champollion, Jean-Francois (1790–1832); Grimm, Jacob Ludwig Carl (1785–1863); Kempelen, Wolfgang von (1734–1804); Passy, Paul Edouard (1859–1940); Phoneme; Phonetic Transcription: History; Prague School; Rousselot, Pierre Jean, Abbé (1846–1924); Speech Perception; Speech Synthesis; Sweet, Henry (1845–1912); Viëtor, Wilhelm (1850–1918); Wallis, John (1616–1703); Wundt, Wilhelm (1832–1920).

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Experimental Methods for Study of Variation

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Introduction

Sociolinguists are continually grappling with the trade-off between conducting research under good scientific conditions and conducting research that examines the way people naturally talk – the focus of our field. Therefore, our research practices consist of various combinations of efforts to record naturally occurring speech and efforts to control the context of speech production as much as possible. **Figure 1** lists different types of data collection methods that are frequently used by sociolinguists: (1) from easiest to collect and analyze to hardest to collect and analyze, and (2) from least representative of natural speech to most representative of natural speech.

This chapter focuses on the experimental methods, or controlled conditions, aspects of our research methodology (those items toward the bottom of **Figure 1**), leaving aside the discussion of 'naturalistic speech,' as collected via the main portion of the traditional sociolinguistic interview. The traditional battery of field experimental techniques implemented by Labov (subjective reaction test, minimal pair test, commutation task, self-report, and the linguistic security test) are well described in Labov (1984). I therefore focus on more recent innovations.

To motivate the need for more experimental techniques, even though they diverge farther from naturalistic speech, I begin with one example to illustrate that even a method like eliciting a translation may not provide sufficiently controlled speech samples. I was eliciting imperative and interrogative forms from a speaker of Faitare by providing phrases in Italian that he was to translate. After several successful iterations, we had the following exchange:

1. NN: Diamo il libro al ragazzo.
   Let's give the book to the boy.
2. M81: Denà lu lìvere a lu quattrà.
   Give the book to the boy.
3. NN: Hai datto il libro alla mama?
   Did you give the book to the mother?
4. M81: Gloje. *Yes.*

Lines 1 and 2 show a successful translation of an imperative. However, lines 3 and 4 show a failure at the translation of an interrogative. In this case, it was immediately apparent that line 4 was not a translation of line 3, but such transparency doesn't always exist when a fieldworker works in an unfamiliar speech variety (Nagy, 2000). The more the linguistic content can be controlled, the more the linguist knows what she is analyzing, but the less she is analyzing naturalistic speech. A variety of methods must be used because each has its shortcomings.

This principle has been applied since the earliest American sociolinguistic studies. Labov's (1963) study of Martha's Vineyard consisted of speakers reading brief passages, word lists, and minimal pair lists in order to efficiently elicit the same sounds in the same (phonological and stylistic) contexts from a variety of speakers, in addition to recorded conversations. In his New York City studies (Labov, 1966), the Rapid and Anonymous technique was added, in which efficiency and naturalistic speech production were combined. The fieldworker asked each subject one question designed to elicit the same phrase (the now widely cited 'fourth floor') and then asked for one repetition, as if he hadn't heard. All the subjects (department store employees) had to do was answer. In this way, data on the production of /r/ was collected from a large number of speakers from different demographic categories. In all likelihood, these speakers did not know they were participating in a linguistic experiment.

In recent years, there have been three main developments, all of which had their roots in Labov's earliest work. The first is the rise of improved recording techniques allowing for the combination of acoustic analysis and variability studies (giving rise to a field called 'sociophonetics'). The second is perception studies that examine how listeners evaluate certain speech patterns. The third is an increase in the number of studies that combine real-time and apparent-time techniques.

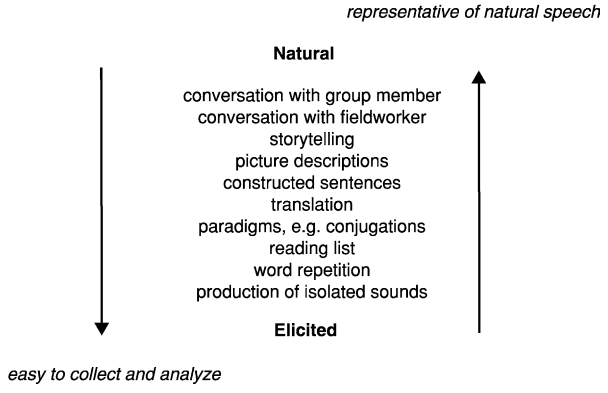

Figure 1 Continuum of sociolinguistic research techniques.

Recording Issues

Because sociophonetic analysis depends on high-quality recordings of speech, I first mention some relevant technological developments. The type of microphone, recorder, recording medium, hardware, and software used makes a big difference in the measurements achieved. A series of presentations by Plichta and his colleagues (cf. Plichta and Mendoza-Denton, 2001; Plichta Website) have been useful in bringing the field up to date on some important mechanical issues. For example, Plichta (2004: 38, Fig. 16) clearly shows the effect of the choice of microphone on how vowel formants are analyzed. Plichta (2004: Chapter 2) explains the utility of aerodynamic measurements of oral and nasal airflow for greater accuracy of formant recognition and provides a dynamic and highly automated method for acoustic analysis.

Plichta (2004: 100) presents a method of presenting speech cues on a laptop computer, which allows for greater mobility. By making it possible to bring the lab to the speakers, rather than vice versa, we make a step in overcoming the Observer's Paradox – speakers are a little bit closer to their natural (unobserved) habitat. On the flip side, Plichta (2004: Chapter 2) makes a strong case for the use of fairly invasive microphones and nasometers to achieve more accurate acoustic measurements. This illustrates that experimental techniques may reside at either end of the continuum represented in **Figure 1** – naturalistic but complicated, or non-naturalistic but simple.

Perception Studies

Two types of perception studies exist. In one, listeners are asked to make judgments about what is said. In the other, they are asked to make judgments about the speaker(s). An example of the first type is Labov and Ash (1997, cited in Fridland and Bartlett, 2004: 5), which examined how well listeners identified Southern vowels. An example of the second type is Wolfram *et al.* (1999, cited in Fridland and Bartlett, 2004: 4), which examined how various productions of open-o words influenced judges' (the research subjects, or listeners) ratings of the Northerness or Southerness of the speaker.

However, these two types are not as distinct as one might first imagine. Their interconnection is illustrated in the following studies. Niedzielski (1999) conducted a clever perception study in which judges from Michigan, all of whom heard the same voices, were led to believe that they were listening to either Canadian or Michigander voices. She illustrated that who they thought they were hearing significantly influenced how they heard certain vowels (as raised or nonraised variants of /aw/). Similarly, Strand (1999, cited in Plichta and Preston (2005: 25) shows that judges' expectations of typical male versus female identity affect their perceptions of sibilant consonants. Atagi (2004) shows the extreme effects that can occur in studies where judges are asked to make linguistic judgments but are clearly influenced by their social judgments. Judges all listened to the same speaker, but the speaker was labeled as either a native speaker of English or a non-native speaker, and labeled with an ethnicity differing to various degrees from that of the judges. These labels strongly influenced the judgments of fluency and nativeness made by the research subjects (university students who thought they were judging the comprehensibility of native and non-native teaching assistants). In a further step, Atagi showed that, in a post-test, the judges were able to recall more content presented by the voices labeled as native speakers.

Studies of the perception of speech are not new; some early perception work by Lambert and colleagues (e.g., Lambert *et al.*, 1975: 129) provided information about how speakers of particular Canadian varieties were perceived. Lambert *et al.* introduced an experimental technique known as the 'matched guise test' in which bilingual speakers were recorded speaking each of their languages. Judges listened to a series of voice recordings without knowing that pairs of passages in different languages were produced by the same speaker. The judges were asked to rate the speakers on a variety of personality and demographic characteristics. The speech variety used had a strong effect on how the speaker was judged.

While utilizing natural speech and having judges engage in typical behaviors (judging people by how they talk), these early matched guise techniques did not allow the researcher to determine which aspect of the speech variety the listener was reacting to, nor even if it was anything in the speech at all, as opposed to general notions about the community being represented by a certain speaker. More recent studies overcome this shortcoming by controlling many linguistic features in order to isolate what triggers the judges' responses.

In a study of perceptual awareness and social evaluation, Fridland and Bartlett (2004) carefully controlled the content to which the judges responded. They used acoustically manipulated speech samples, producing artificial guises of Northern and Southern form, in which everything but the formant values was held constant. Judges were asked to rate each speech sample for how Southern it sounded. The judges' accuracy was correlated to whether the manipulated

variant resembled that present in their own speech community or not, and they showed an ability to respond to slight differences in formant structure.

Another approach was used by Clopper and Pisoni (2004). They played speech samples from different regions for judges who were asked to identify the region of each speaker. Clopper and Pisoni then acoustically measured some of the variants (in the samples) that are typically associated with either the North or the South. Correlational statistics were produced, "suggesting that those variants are most responsible for triggering regional association" (Fridland and Bartlett, 2004: 5).

Fast (2002) conducted a set of production, perception, and evaluation studies with a group of Quebec French speakers. In Fast's version of the Subjective Reaction test, "the informant was asked to listen to and evaluate a series of stimulus sentences. [...] for each variable, one of the sentences was read with a 100% non-standard realization of the variable, and one with a 100% standard realization" (Fast, 2002: 33). All other variables were produced with the standard variant, and all sentences were read by a single speaker (Fast, 2002: 33–4). While the production and perception techniques (subjective reaction, matched guise) she used were not innovative, she gained greatly by interweaving her interpretations of the two together. Among other benefits, "this allows an evaluation of the subjects' linguistic insecurity, and the extent to which they are motivated by overt or covert norms about language" (Fast, 2002: 22).

Preston (1989) played speech samples from a selection of geographically distributed sites. Judges were asked to identify which site each sample was from. Building on this method to further study the perception of /ay/, but avoiding effects of extraneous speaker differences (e.g., voice quality), Plichta and Preston (2005) presented to judges a variety of synthesized versions of /ay/ ranging from fully diphthongal to fully monophthongal. The judges had to indicate on a map which location they thought the speaker was from; on the map, a narrow band containing nine different sites stretched from the north to the south of the U.S. These judges performed better than they themselves thought possible, indicating a level of subconscious awareness tapped by this method.

Plichta (2004: Chapter 3) made some important points about perception studies. He pointed out that the typical two-way forced choice methods of judgments, where all variables but one are held constant, make experimental conditions less like real-life language use than necessary. He proposed an alternative approach in which many combinations of different variants are presented to judges and then multivariate statistics are used to tease apart the effects (Plichta, 2004: 98–9). He has also presented advances in automated methods of data collection and analysis to make such an approach less unwieldy (Plichta, 2004: 102–3, Plichta Website).

Grammaticality Judgments

The notion of a 'grammatical utterance' is still commonly based upon the non-experimental basis of gathering data through introspection (the linguist's own judgments). Labov (1975), however, demonstrated that speakers' judgments of their own competence are unreliable. One step toward a more experimental approach is to ask others (rather than just ourselves) to say whether something is grammatical or not. A more nuanced approached is to ask whether they think they themselves might say it, or if 'someone' (either from their own group or another) might say such a thing. Moving away from such explicit questions, Karins and Nagy (1993) developed an experimental method to test the status of WH-traces in GB theory (whether or not such traces block contraction). This approach involves subjects' interpretation of a sentence that is ambiguous only if, in their grammar, WH-traces do not block contraction. This allows us to understand whether a certain sentence interpretation is grammatical for a certain speaker without asking directly.

Surveys

Milroy and Gordon (2003: Section 3.2) provided a thorough overview of survey methods: mail, Internet, and face to face.

Combining Real and Apparent Time Methods

I conclude with a recent trend in the field that falls between experimental and natural: the use of a combination of Apparent and Real Time studies. This method (first introduced by Bailey *et al.* (1991) and revisited in Bailey (2002)) allows for further testing of the Apparent Time Construct, which claims that by contrasting the speech patterns of speakers of different ages, we can get a good sense of how the community's language is changing over the course of time. This approach requires concomitant examination of other demographic factors (e.g., sex and socioeconomic status) in order to distinguish stable age-graded variation from ongoing changes. This is an experimental approach in that there are efforts to control for a number of variables by collecting data in the same community at different points in time.

Labov included in his 1963 study a comparison with earlier reports of Martha's Vineyard speech, and a comparison of speakers of different ages, but this technique has been much expanded in recent years. For example, both Pope and Josey returned to Martha's Vineyard to see what had happened with the language in the last 40 years (Pope, 2003; Josey, 2004). They each replicated Labov's methodology in order to see how the speech patterns had changed over time, attempting to control for all other factors.

In Montreal, recordings of French speakers made in 1971 (Sankoff and Sankoff, 1973), 1984 (Thibault and Vincent, 1990), and 1995 (Vincent *et al.*, 1995) have allowed for both panel studies (studies of the same speakers over a period of time) and trend studies (re-study of the same community, but not the same speakers). See Sankoff and Blondeau's (2002) report on both trend and panel studies of the changes in /r/ in Montreal. Schilling-Estes (2003) compared data from 1983 and 1991 to examine real-time change in Smith Island, MD. Naro and Scherre (2003) presented a trend study comparing data from the 1980s and from 1999–2000 showing changes in number agreement in Brazilian Portuguese. Other Real Time studies, all cited in Sankoff (in press), include the restudy of Rio de Janeiro (Callou *et al.*, 1998); Cedergren's (1987) restudy of Panama City; Hansen's (2001) trend study of Parisian nasal vowels; Paunonen's (1996) restudy of the 1971 Helsinki survey; and Trudgill's (1988) restudy of Norwich.

See also: Phonetics, Acoustic; Phonetics, Articulatory; Experimental and Instrumental Phonetics: History; Dialect Atlases; Folk Linguistics; Labov, William (b. 1927); Panel Studies and Language Variation; Sociophonetics; Speech Synthesis; Statistical Testing of Variation.

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Experimental Phonology

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As its name implies, *experimental phonology* can best be described as the application of the scientific method, and therefore the experimental method, to the study of the phonologies of spoken and signed languages. While it has seen a recent increase in popularity, the application of the experimental method to study of phonological phenomena began a little more than a century ago. Künhart and Nolan (1999) describe Scripture's (1902) and others' articulatory experiments in the late 1800s and early 1900s that challenged then widely held views about phonological structure. At the time, Bell's (1867) and Sievers's (1876) introspective studies had led the linguistic community to posit discrete and invariant speech segments (more or less equivalent to phonemes) with brief contextual transitions (the proverbial 'beads on a string'). Scripture, citing evidence of long-distance coarticulation, challenged the division of speech into sequential units such as segments and syllables and instead proposed a simultaneous articulatory plan with continuously varying movements. While methodologies became more sophisticated over time and results more reliable, Scripture's hypothesis foreshadowed the work of Stetson (1951) and aspects of Browman and Goldstein's (1989) articulatory phonology. Nevertheless, while the experimental method has seen continuous application in phonetic and psycholinguistic research into phonological phenomena, it was not widely used by mainstream phonologists until recently.

In its current form, experimental phonology has its origins in the mid–1970s to mid-1980s with the work of Ohala (e.g., 1974, 1986), Jaeger (e.g., 1980), Treiman (e.g., 1983), Beckman and Pierrehumbert

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(1986), and others working at the intersection between phonology and phonetics or phonology and psycholinguistics. The 'Laboratory phonology' series provides an excellent collection of work in this area (Kingston and Beckman, 1990; Docherty and Ladd, 1992; Keating, 1994; Connell and Arvaniti, 1995; Broe and Pierrehumbert, 2000; Gussenhoven and Warner, 2002; Local *et al.*, 2004). A common thread that runs through research in experimental phonology in the belief that evidence is only valid if it is testable, falsifiable, and replicable. An equally important research principle is using methods that minimize experimenter bias.

While it is not diametrically opposed to traditional generative phonology, and certainly not to phonological theory *per se*, experimental phonology does not recognize as **evidence** many of the phonological observations that have been made in the past 40 years. Observations based on introspection are of particular concern because they can neither be controlled nor replicated. Since no other linguist can replicate the conditions existing in another's mind, and since thinking about something necessarily involves bias, introspection will never be a methodological tool in experimental phonology, not even mass introspection, in which a group of linguists all believe that they have the same feelings about a particular phenomenon. This is in contrast to well-designed studies in which the tasks, the stimuli, the subject populations, and so on are controlled to minimize a variety of biases and the experimenter is not a participant in the study itself.

The Scientific Roots of Experimental Phonology

At the scientific method's core are the philosophical underpinnings of skepticism and falsifiability. Skepticism comes from the recognition that all observers are biased in their observations of the world due to their own experiences and beliefs and larger cultural beliefs and norms. Thus, any belief about the world is only as reliable as it is testable. When developing theories, it is therefore necessary to minimize inherent bias through adherence to standard procedures and controlled observation. Any two scientists independently applying the scientific method to the study of phonology and using the same set of measures ideally should replicate each other's experimental results, regardless of their personal beliefs, cultural milieu, or experience with language.

The scientific method's inherent skepticism also means that we, as scientists, cannot know the truth. This means that we cannot prove our hypotheses about language to be true; we can only test them. We accept that a hypothesis is valid only if we have failed to disprove it, but we also recognize that a future linguist may have a competing hypothesis that better accounts for the phonological phenomenon under study. However, a negative result, in other words, a disproved hypothesis, does not imply that some other hypothesis has been validated, only that the tested hypothesis has failed the test and that the result is null. This is because when we test a hypothesis, or even a set of hypotheses, we are by necessity **not** testing the myriad of competing factors that may have resulted in the failure of our test. In any experiment there is always the null assumption that the tested hypothesis has no reliable effect, that is, that there is no useful evidence for any theory or hypothesis.

Observation, Hypothesis Formation, Hypothesis Testing

Pick up any textbook that covers the scientific method and you will see that there are three steps involved in experimental design: careful observation, hypothesis formation, and hypothesis testing. At both the observational and the hypothesis testing stages, the observed data must be quantifiable and statistically reliable. As Ohala (1995) notes, this separates experimental work from other necessary aspects of linguistic science such as description and classification. However, experimental phonologists believe that to be able to form a coherent and rational phonological theory, we must ultimately be able to test the theory's predictions about language in a rigorous and scientific way.

Even at the observational stage, the scientist uses tools that are as objective and controlled as possible. At this point, it is important to understand the limitations of the tools and observational methods. It is equally important to utilize methods that adhere to a set of standards. The same rigor and understanding of the methodological limitations must be applied in the hypothesis testing stage. For example, when even standard transcriptional methods are employed in the absence of acoustic tools, observations are coarse and are affected by perceptual bias on the part of the transcriber. Likewise, in the absence of articulatory tools, when acoustic tools are used to measure how speech articulations occur, they may miss movements that leave no articulatory trace or are obscured or distorted in the acoustic signal. On the other hand, when articulations are measured in the absence of acoustic data, certain aspects of cause-and-effect relationships between the articulations and speech

signal remain obscure. Finally, any claim about an articulatory or acoustic measure and phonological contrasts, phonological units, constraints, processes, and so forth should be tested at some point using a perceptual measure. None of these methodologies are invalid, but it is important to keep in mind that the graininess of the observation determines the degree of resolution in the hypothesis formation and testing stages. Moreover, the hypothesis determines the experimental design, which in turn determines the appropriate methods and appropriate type of data.

A good example of externally imposed limitations in our ability to observe comes in studying infant language acquisition; observation of spontaneous babbling in infants is necessarily limited primarily to audio and video recordings. Therefore we are limited in our observations to transcriptions, simple perceptual tasks, acoustic measures, and what articulatory information may be gleaned by visual observation. As a result, the degree of resolution at the hypothesis formation or testing stage is more limited than that seen in work on adult speech, where more invasive articulatory measures are possible or where task complexity is less of a limiting factor. Fieldwork observation has also been limited to transcription, perceptual tasks, acoustic measures, and visual inspection of articulations (with the exception of static palatography) because most articulatory methodologies have traditionally been limited to the laboratory. Recent advances in noninvasive technologies for articulatory observation, such as ultrasound, may do away with many limitations in articulatory observations of infants or in linguistic fieldwork (e.g., Green *et al.,* 2003 for child language; Gick, 2002 for field methods).

Most phonological language descriptions traditionally were based on speech sounds that had been impressionistically transcribed by a single researcher, were based on a single speaker, and collected under uncontrolled conditions. This is becoming much less common. In this day of affordable and portable digital recorders and computers, there is little excuse for using this kind of data unless the language of interest is no longer spoken. In the event that there are no more speakers of the language left and the researcher must resort to data collected in the past under less than ideal circumstances, the data must be used with caution and given less weight than data collected using more sophisticated methodologies or data that can be verified by the phonologist with speakers of a language.

In the past, similar data collection techniques had been employed in infant studies (e.g., Jakobson, [1941]1968), and in speech error studies (e.g., Fromkin, 1971). The uncontrolled and often anecdotal observational techniques employed in these early studies result in only the coarsest sort of data and should be taken only as a starting point for more controlled observations involving multiple transcribers and a reasonable population sample (e.g., Stemberger, 1991 for speech errors; de Boysson-Bardies *et al.,* 1992 for child language) and usually acoustic measures (e.g., Frisch and Wright, 2002 for speech errors; Buder and Stoel-Gammon, 2002 for child language). Moreover, if the observer wishes to make observations involving speech articulators, then articulatory measures ultimately should be employed (e.g., Mowrey and MacKay, 1990; Pouplier, 2003 for speech errors; Tiede, 1996 for the feature ATR in vowel contrasts).

Selected Examples of Work

The various methodologies and findings in the experimental phonology literature are too numerous and complex to summarize sufficiently in a document of this type. Rather, the work cited here represents a sample that touches on several core areas of phonological theory or on important methodological issues. Ohala (1995) summarizes several areas in which experimental phonology has made a lasting contribution to phonological theory. The field includes experiments on voicing and other laryngeal contrasts (e.g., Lisker and Abramson, 1964; Raphael, 1972; Jager, 1980), assimilation (e.g., Fujimura *et al.,* 1978; Ohala, 1990), sound change (e.g., Ohala, 1974, 1993), and syllable structure (e.g., Treiman, 1983; Cutler *et al.,* 1986).

A recent study by Pouplier and Goldstein (in press) on perceptual bias in speech error observation highlights the danger to phonology of limiting observations to the coarsest level, in this case transcription. Transcriptional data in speech error corpora have led researchers to conclude that, in phonological encoding, speech errors originate from a categorical shift of a segment (or feature) to an erroneous position within a prosodic structure (such as a syllable or word). The reported errors typically have an asymmetric distribution, favoring syllable and word onsets and favoring certain segments over others. However, acoustic and articulatory studies of errors indicate a wide variety of errors that had not been reported in the traditional literature. Pouplier and Goldstein presented listeners with a stimuli containing known articulatory errors. Their results indicate that biases in the perception of errors appear to be the source of asymmetries in error distributions as they have been observed in speech error corpora, particularly those patterns that are used to support coronal underspecification. Moreover, recent research by Stemberger

(2004) using a tongue twister paradigm indicates that speech errors are also sensitive to certain types of lexical effects that are not predicted by traditional phonological theory. For example, phonological similarity (neighborhood) is shown to have faciliatory effects: Fewer errors occur for words with large numbers of neighbors that share the characteristic that is being primed for error, while words do not share the target characteristic have little effect on error rates.

Phonotactic constraints such as the sonority sequencing principle or restrictions on codas have traditionally been regarded as part of the underlying grammar. However, many phonologists have recognized that there appears to be a role for perception in such constraints. One recent study (Wright, 2002) attempted to investigate the potential role of perception in restrictions on codas. He found that place of articulation in coda consonants was perceived with a much lower accuracy than their onset counterparts in noise lending evidence to a perceptual motivation for constraints against codas in general. He also found that certain manners of articulation were affected much more by noise than others when isolated from vowels: In nasals, place was perceived poorly in the absence of vocalic transitions but was rarely lost altogether in noise; stops were often lost completely in noise even though their place was recovered reliably in the absence of noise; and fricatives' place was identified accurately in the clear and in noise. The last finding has a bearing on why sibilant fricatives such as /s/ are frequently found to violate sonority-based constraints.

The role of lexical frequency in phonology, phonological processes, and phonological constraints has remained controversial. Traditionally, most phonological processes or constraints (such as assimilation, vowel harmony, or OCP effects) are regarded as being discrete and not affected by lexical factors such as word frequency or transitional probabilities across words in the lexicon. However, there is evidence from a variety of sources that this view is an oversimplification due in part to lack of controls in observation or hypothesis testing. For example, Coleman and Pierrehumbert (1997) found that wellformedness judgments on neologisms were correlated with the log likelihood of segmental combinations across the lexicon. In a follow-up experiment that was aimed at examining the gradiency of a well-known phonological process, nasal place assimilation, Hay *et al.* (2004) investigated the psychological reality of nasal place assimilation while also exploring the effect lexical frequencies had on the judgments. In a series of three experiments, they presented the subjects with edited stimuli that contained sequences of nasal+ obstruent that either agreed or disagreed in place of articulation and also varied in the log likelihood of occurrence in the lexicon. They found that nasal homorganicity is both psychologically real and gradient in its effect on judgments. Importantly, the patterns that they observed in their data were related to lexical frequency, rather than being an all-or-nothing restriction that must apply equally across all words in the lexicon. This finding is supported by patterns of speech errors in which lexical factors played a role in the probability and types of errors that occurred (e.g., Frisch and Wright, 2002) and by research on language acquisition that finds that the transitional probabilities of segment strings are used by infants in segmenting prosodic structures such as words from running speech (Saffran *et al.*, 1996).

The last three studies are cited because each tests specific predictions that phonological theory makes about how speakers should behave in a given phonological task and because each challenges commonly held views in more traditional areas of phonology. Together with previous experimental research, they raise three important questions for phonologists: What constitutes evidence? How precise do we need to be in our observations of language? Is our theory of grammar based on our biases or on actual patterns in language?

See also: Experimental and Instrumental Phonetics: History; Generative Phonology; Natural Phonology; Phonetics, Articulatory; Phonetics: Overview; Phonological Typology; Phonological Universals; Phonology: Optimality Theory; Phonology: Overview; Phonology–Phonetics Interface; Speech Development; Speech Errors as Evidence in Phonology; Speech Perception.

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Expletives and Dummies

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Problems of Terminology

Preliminary Considerations

The term 'expletive' covers a wide range of disparate phenomena, whose treatment as one unified group still lacks theoretical basis. Studies in this area are often limited to descriptions and exemplifications of structures that are considered together under the more general label of sentence 'fillers' without clearly definable semantic value. Although in modern linguistics the term 'expletive' has been used since the 19th century in various fields (by the Neogrammarians, by Bréal and Saussure, and by idealist linguists), in contemporary linguistics it is most commonly used with the meaning assigned to it in generative grammar: a "place holder which stands for the subject of the predication when the latter is in postverbal position" (Moro, 1997: 4; cf. also Haegeman, 1991: 53). The role of this type of element is thus defined on a purely structural basis (see the below section 'Expletives and Dummies in Generative Grammar'). 'Pleonasm' and 'dummy' are synonymous terms, often used more or less interchangeably with 'expletive' in the literature of various theoretical and methodological approaches. The latter has a specific meaning in generative grammar (see below).

Two basic issues are of particular interest: (1) How to determine the function(s) fulfilled by expletive units; and (2) how to account for their distribution according to style and register, as in many languages they are characteristic of more informal and spontaneous styles of speech. Both problems have a descriptive and also theoretical dimension. With regard to function, once the types of expletive structure have been identified and their formal properties established, we must examine the specific nature of their meanings and consider whether we can really postulate linguistic forms whose meaning representation is empty. This question raises two important theoretical issues that cannot be avoided. One issue is the status of these structures with respect to the relationship between form and function and to that between function and meaning (see the following paragraphs). The question of stylistic distribution must be addressed by reconsidering traditional explanations based on redundancy and *abundantia*, which are held to be characteristic of spontaneous spoken discourse as opposed to planned written text. These two problems perhaps constitute distinct but complementary aspects of the challenge that spoken discourse and spoken language phenomena pose for current theoretical models. Although expletive units occupy a marginal role in modern linguistic thought, they are of significant potential interest in the development of new models of language and speech, as well as for new linguistic models in general.

History of the Concepts and Problems in Their Definition

The definition of expletive/pleonasm as an empty filler element has its roots in classical rhetoric. The Greek term *πλεονασμός* is present in Dionysius of Halicarnassus and Apollonius Dyscolus with the meaning 'use of redundant words' and 'lengthening of clause,' 'repetition' (cf. Liddell and Scott, 1996: 1416). The Latin adjective *expletivus* appears in the works of Latin grammarians (Servius, Pomponius, Donatus, Priscianus, Charisius), particularly with reference to conjunctions, meaning a part of speech that without altering the sense, "explendi et ornandi causa quasi abundanter additur," 'is added almost abundantly to fill up and embellish' (*Thesaurus Linguae Latinae*, V, 2: 1721, 80ff.). Quintilian considers *πλεονασμός* to be a vice (*soloecismus*) of addition (*adiectionis vitium)* (Quintilian, *Institutio Oratoria*. 1, 5: 40), similar to others such as macrology, perissology, and tautology (cf. Lausberg, 1960, vol. 1: § 502) and distinct from the vice of subtraction (ellipsis) and from that of inversion (anastrophe) (cf. Lausberg, 1960, vol. 1: § 501). Pleonasm occurs when a phrase is overloaded with entirely superfluous words (Quintilian, *Institutio Oratoria* 8, 3: 53; cf. also Lausberg, 1960, 1: § 502). The expression *ego oculis meis vidi* 'I saw it with my own eyes' shows in comparison to the alternative *vidi* '[I] saw [it]' (cf. Quintilian, *Institutio Oratoria* 8, 3: 53) several elements that are unnecessary, in that they are already expressed explicitly or implicitly in the expression constituted solely by the verb form. The pronominal form *ego* could be considered a repetition of the inflectional bound morpheme *-i,* which in the perfect tense is a marker of the first person, and the phrase *oculis meis* expresses explicitly two components of the semantic content of the verb *video*. One is evident in the very definition of 'to perceive with one's eyes'; the other can be extracted through an inference, which is relevant to all verbs that are compatible with an Agent or Experiencer Subject: that the action or the perception expressed is realized through a part of the body of the Agent or Experiencer.

Pleonastic alterations were considered vices of 'diction' (*elocutio*) if they lacked intentional motivation,

but Quintilian notes that they can also be related to emphasis or assertion (*adfirmationis gratia*), as in Virgil's *Aeneid,* Book 4, line 359: *vocemque his auribus hausi* 'and [I] heard his voice with my [own] ears.' This testifies to a basic problem that has affected linguistic thought for centuries, namely, how to define the criteria on the basis of which certain elements of a structure must be considered excessive or redundant. In Quintilian's example, *Institutio Oratoria* 8, 3: 53 as cited above, the verb form *vidi* is considered a semantically compact and omnicomprehensive nucleus, with forms such as the personal pronouns or the peripheral phrase *oculis meis* mere repetitions. In fact, this analysis is only possible if a phrase/utterance is reduced to a minimal structure whose content is expressed by constituent parts necessarily and sufficiently with respect to the referential function. It implies a transformation that takes as its principle the ideal of *brevitas* ('brevity'), considered a stylistic virtue (cf. Quintilian, *Institutio Oratoria* 8, 3: 82). There has been an implicit and straightforward assumption of this operation and the principles behind it in modern studies of phrase structure, in particular in studies of the relationship between the structure of the verb phrase and that of the subject noun phrase (see the below section 'Expletives and Syntax'), and more generally in the definition of a pleonastic/expletive unit. The procedure implies several relevant theoretical assumptions:

1. that for every utterance structure there exists a corresponding structure derived by minimal (i.e., most economical) paraphrase;
2. that this derived structure is the base on which the logicosemantic and syntactic relationships of all expanded paraphrases can be studied;
3. that the informative–referential function should be a priority for structural analysis;
4. that the relationship between function and form should be biunique (one and only form should correspond to each function).

Assumptions (3) and (4) seem particularly open to criticism. As far as (3) is concerned, the importance assigned to the informative–referential function, already questionable under a theory of language functioning, means that all deviations from the minimal structure taken as a standard of comparison may be considered 'emphatic.' It is clear that the logic of the whole theory does not take into account the characteristic properties of linguistic planning, particularly of spoken discourse planning. These may be relevant to understanding not just language functioning but also grammatical structures.

In modern linguistics we must take note of some attempts to replace the concept of expletive/pleonasm with models of various types, the ultimate justification for which would have to be found in psychological phenomena. Paul (1920: § 121) considered pleonasms in negation and other syntactic phenomena involving apparent superfluity to be the effect of "contamination." Schwyzer (1941) suggested a wider model of "hypercharacterization" (*Hypercharakterisierung*), providing a rich range of possible applications for phenomena found in genetically and typologically different languages. According to Schwyzer, the hypercharacterization model should not be defined exclusively on the basis of stylistic phenomena, but should take account of grammatical, morphological, and syntactic factors of varying regularity, such as the structures with reduplication found in several Indo–European languages, or those with subject pronouns adjacent (and in some languages cliticized) to verb forms that are inflected for person. He maintains that the explanation should in general be attributed to the "feeling of insufficient characterization" on the part of the speakers, an idea that had previously been endorsed by Brugmann (cf. Schwyzer, 1941: 27 fn. 3). Although Schwyzer's attempt is certainly interesting, it still relies on the mere idea of repetition of form and/or function, the basis of which is somewhat unsatisfactory.

Types of Phenomena

The phenomena traditionally defined as 'expletive/pleonasm' constitute a wide and varied set. Their examination shows the hybrid nature of the range and the impossibility of identifying a single source factor. In many cases, the terms in question seem to be used simply for want of better descriptions. Heterogeneity already emerges at the simple descriptive level, and it is even more clearly evident if we look for reasons behind the phenomena investigated. A swift analysis of the main types of phenomena grouped together under this label is thus appropriate. These will be divided into three different groups on the basis of the nature of the process that determines them: Expletives/Pleonasms due to:

1. processes of desemanticization (bleaching) typical of grammaticalization paths. These are particularly evident in phenomena that involve constructions with modal or aspectual value;
2. factors more **specifically** connected to planning strategies characteristic of spoken discourse. These are particularly evident in phenomena of pronominal deixis and in their syntactic linearization;
3. metrical and prosodic factors.

This classification should not however be taken as absolute. Indeed, in some phenomena it is possible to

recognize an action connected to two or more causes. For example, the phenomenon of expletive subject pronouns could be considered a result of the grammaticalization of typical strategies of spoken discourse (see below discussion).

It is also possible to categorize different phenomena along the *langue/parole* axis or, to use a different model, according to the level of grammaticalization (*see* **Grammaticalization**). Some phenomena can typically be grouped together at the *parole* level and are thus not grammaticalized, but are of a stylistic nature, even if they conform to more or less frequently occurring schemata. Phrases that constitute etymological figures, such as the often-studied examples in Latin prose (cf. *pulchram pulchritudinem*, 'beautiful beauty,' *incipit initium* 'beginning begins,' *saepe solere* 'to be often accustomed to') (Leumann *et al.,* 1965–1977, 2: 792, 793, 797), are found in casual registers of various languages, whether spoken or written. Other phenomena have a more obviously grammatical dimension, such as the types described here in the following sections. Among the phenomena with a greater level of grammaticalization, one particular case is constituted by *expressions figées*: Think, for example, of pairs of synonyms such as Italian *sano e salvo*, English *safe and sound* (the adjectival pairing is attested in the Latin of Plautus) (cf. Leumann *et al.,* 1965–1977, 3: 786), often with alliteration or rhyme, where a possible original meaning with elative or intensifying value has eventually faded. Between the two extremes of stylistic singularity and grammaticalized constructions there exists a wide range of phenomena in the process of grammaticization. In many cases it can be difficult to establish whether these are stylistic or grammatical. We can consider forms typical of New Testament Greek with duplication of the verb 'to say' *ἔφη λέγων,* lit. 'he spoke, saying' and *ἀπεκρίθη καὶ εἶπεν* 'he replied and said' (cf. Blass and Debrunner, 1976: 349; Kieckers, 1912: 154; Kieckers, 1915: 34ff.), which are also found in medieval Greek and have been retained as calque-expression in Latin translations of the Bible (cf. *sic ait dicens*, *respondit et dixit ei*) and in various modern European languages. As with other verbal periphrases, the wide diffusion of these constructions poses difficulties in outlining their history, especially in identifying the factors that determined their development and spread (cf. 'Auxiliation and Expletivity' below; the coordinating type is present in many Romance dialects and colloquial varieties today). An uncertain level of grammaticalization also seems to be that of another type with wide areal distribution, where the verb 'to say' appears as a parenthesis before or within a reported speech (cf. Latin *inquit* (Petersmann, 1977: 48ff.), Italian *dice* 'she/he says,' dialectal German *segg ik* 'I say' (Havers, 1931: 170); cf. also Schwyzer, 1929: 244). This type seems to be limited to spoken registers.

Sometimes also defined as expletives/pleonasms are constituents whose function is of doubtful theoretical status, such as the so-called 'personal dative' pronouns. In this construction, a personal pronoun coreferential with the subject noun phrase appears, often adjacent or cliticized to the verb, that expresses the meaning 'in the interest of, to the advantage of' or the involvement of the subject in a given action/state: cf. regional Italian of Southern areas *che mi mangio oggi?* 'what do [I] eat for myself today?' (instead of *che mangio oggi?*). This construction is present in a number of Indo–European languages (cf. Havers, 1931: 134), at different levels of grammaticalization. In Slavic languages and in a few Romance varieties, such as colloquial Spanish (cf. Schuchardt, [1884] 1971: 127ff.), the southern dialects of Italy, and Italian spoken in the south (cf. Sornicola, 1997a), this is an entirely regular construction, especially with certain classes of verbs. This type was frequent in spoken Latin (cf. Petersmann, 1977: 83–85 for the language of the *Satyricon*), and in a few epigraphic texts from the Imperial Age it shows a state of incipient crystallization with the 3rd-person reflexive pronoun (cf. Cennamo, 1991). It is also found in some dialectal varieties of American English, such as the Appalachian dialects (cf. *we had us a cabin, built us a log cabin back over there*) (Christian, 1991). The theoretical representation of this type is problematic. Although this form does have some affinities with the indirect object, it cannot be represented with this type of function, since it exhibits specific grammatical properties (for English, cf. Matthews, 1981: 130; Christian, 1991). Furthermore, it is not clear whether or not it can be considered an argument of the verb. It is possible that structures of this kind are considered expletives simply because in linguistic theories there are no models that can be used for their classification.

Effects of Grammaticalization Processes

A considerable number of processes traditionally defined as expletivization can be attributed to processes of grammaticalization. But grammaticalization raises other problems. The first involves the nature of the relationship between expletivization and grammaticalization, and in the end, the very definition of expletive. The simple passage of an element from a semantic to a grammatical function does not necessarily have to involve a process of expletivization, as a function of the unit is in any case preserved. On the other hand, it is doubtful whether elements can be

bleached of meaning to such an extent that they have not functions. Yet in studies of grammaticalization the use of the term 'expletive' or 'expletivization' is not uncommon with reference to developments of a main verb into an auxiliary or 'converb.'

The second problem regards the extreme delicacy of the semantic analyses that are necessary to determine desemanticization and the extent to which it is present. We will discuss these issues in the following sections.

Interjections and Modal Particles

Where modality is concerned, we can observe many phenomena whose properties are the result of processes of desemanticization or other changes in semantic value. In such cases the original etymological meaning has been obscured and the element is close to becoming an expletive/pleonasm. This is typical of modal particles, some of which are developments from early interjections. The resulting structural unit often combines with others of similar meaning, giving rise to an aggregate form in which each of the components conveys an illocutive potential (*see* **Speech Acts**) reinforced by the other, without it being possible to determine which is the specific value of each of the two parts. One example of this phenomenon is offered by the Latin *pol* (< Pollux, Polluces), *edepol* (cf. Ernout and Meillet, 1959–1960: 190b), whose original exclamative value 'by Pollux!' has weakened and become a generic asseverative expression 'indeed! truly!' that often occurs straight after an adverb of equal modal value, such as *certe* 'certainly,' or *sane* 'indeed, by all means': *certe pol (edepol), sane pol* 'indeed, truly.' A similar process is that of the type *Hercle* 'by Hercules!,' which has passed to a purely assertive value and is also found in combination with the modal adverb *vero* 'indeed, truly.' These types of developments are also present in modern European languages. The Italian curse *Diavolo!* 'by the devil!,' may also be found in conjunction with the affirmative adverb *sì*, as a reinforcing form with the value 'certainly yes,' and even alone as an affirmative response: *Sei contento?* 'Are you happy?' *Diavolo!* 'Yes, of course.' A curse may be inserted in a larger enunciative structure as an inert constituent. For example, Italian *Che diavolo vuoi?* and English *What the devil (the hell) do you want?* display a *Wh-* question with a phrase juxtaposed to that of the complementizer, whose semantic value consists purely of an illocutive force of irritation or annoyance.

Auxiliation and Expletivity

Processes of desemanticization that lead to loss of lexical value and in some cases also grammatical function of the constituent involved are characteristic of periphrastic constructions with verbs of movement, verbs in the semantic fields of 'to take' and 'to do.' They are found in many languages of different families (cf. Havers, 1927), in some appearing typically in substandard or dialectal spoken registers (cf. Coseriu, 1966: 16–26). Cross-linguistic comparison presents opportunities for interesting analyses but also poses the risk of grouping certain phenomena together that in fact require different classifications. So, for example, as regards periphrases with verbs of movement, the paratactic type:

> I go/come and X
> (where X is a variable denoting a verb form that assumes the same inflectional person and tense markers of the verb of movement)

is present in various European languages, but with different characteristics with regard to the type of syntactic and semantic relationship between the verb of movement and X. The spectrum of variation includes at one extreme constructions in which each of the two verbs retains a certain level of syntactic and semantic independence with respect to the other (cf. English *I went and said*, Italian *andai e (gli) dissi*). At the other extreme are constructions in which the verb of movement is downgraded to the status of a quasiauxiliary. Such a quasiauxiliary has lost its full capacity not only of semantic but also of syntactic functioning (it cannot undertake any grammatical relation, e.g., it cannot assume an object) and is restricted to expressing an illocutive force of shock, marvel, and/or regret. The phenomenon shows notable similarities with that of converbs. This is exemplified by types such as spoken Spanish *fué y lo hizo*, lit. '[s/he] went/ came and did it,' *va y me dice*, lit. '[s/he] goes and tells me' (cf. Keniston, 1936, particularly 166; Coseriu, 1966: 30), dialectal Italian *vado a ffaccio*, lit. '[I] go and do' (cf. Sornicola, 1976, particularly 71), modern Greek *ἔρχουμι κὶ κάσουμι* (= *ἔρχομαι καὶ κάθομαι*), lit. '[I] come and sit' (Thumb, 1910: 10.2; Seiler, 1952: 159; Coseriu, 1966: 23).

It is doubtful whether the verb reduced to auxiliary or quasiauxiliary status can really be considered an expletive. Of this opinion is Wagner (1956), while Keniston (1936: 166) sees in the first verbal element of the Spanish construction "an intensive used in popular speech, originally with affective values of surprise or irritation." There are good reasons for maintaining that in contemporary Romance and Modern Greek varieties the process of expletivization is by no means complete. This conclusion seems plausible, particularly since within the same variety one specific periphrastic type may, depending on the context, assume different values, some

of which preserve to varying extents traces of the meaning of movement of the quasiauxiliary verb. An interpretation in terms of inchoative/ingressive aspectual value has been proposed by Rohlfs (1949–1954, vol. 3: § 740) and Wagner (1956) (analysis criticized by Coseriu, 1966: 43; Sornicola, 1976: 71), while Keniston (1936: 167) maintains that a possible original inchoative value has been lost and that the verb now has a solely intensifying function.

Similar considerations are relevant to paratactic periphrases with verbs of the lexical class of 'to take' (cf. Coseriu, 1966), exemplified in constructions such as English *she took and died*, Spanish *tomo y me voy*, Italian *prendo/piglio e me ne vado*, lit. '[I] take and go away' (Coseriu, 1966: 17, 21, 23), Modern Greek *πιάνει καὶ χτίζ'ἕνα σπίτι*, lit. '[he] takes and builds a house' (cf. Seiler, 1952: 159; Coseriu, 1966: 23). The desemanticized verb is restricted to expressing the idea of "sudden resolve, schneller Vollzug," or an aspect of "plötzliche oder unerwartete Handlung" (Coseriu, 1966: 42). These functions fade into one another and are difficult to define. Furthermore, it is not clear whether verbs that have lost their lexical value may be defined as quasiexpletives. Such a conclusion seems plausible, however, when the verb has reached complete desemanticization, with loss of inflection and fossilization, such as the construction in Italian dialect of Otranto *sta bbegnu*, lit. 'be.PRES. [I] come,' = 'I come.' In this type an invariable form of 'to be' (*stare*) precedes all conjugated forms of the full verb, and the whole construction alternates with the simple full verb with no difference in meaning (cf. Meyer-Lübke, [1890–1906] 1974, vol. 3: 591–592).

A development toward the fossilization of the verb 'to do' in a periphrasis:

to do + X
(where X is a variable that denotes a infinitival verb form)

into a simple grammatical marker can be found in English in the diachronic development of *do* (cf. Traugott, 1972: 138–142; Stein, 1990; Nurmi, 1999; and the extensive bibliographies cited in these works). Such a grammatical marker is present today in interrogative, negative, and contrastive-emphatic declarative structures (cf. Quirk *et al.,* 1985: 2.49–51, 3.36–37; the development is already outlined in early Modern English: cf. Traugott, 1972: 138; Stein, 1990: 11–13).

Examination of these developments over a long period offers interesting points for consideration. Two functions of *do* – the causative function and that which is "periphrastic and devoid of meaning" (the terminology is from Traugott, 1972: 199) – seem to have coexisted in Middle English (cf. Denison, 1985: 46–48; Stein, 1990: 11ff.; Nurmi, 1999: 22). According to Traugott, values of *do* that can be expressed as 'truly, indeed' and the optional tense marking' function belong in this category. But problems arise from this description. Stein (1990: 11) maintains that functions devoid of meaning should not be hypothesized here, and proposes that the periphrases of Middle English should be interpreted with a semantic value similar or close to a causative. The difficulties in determining exact function are largely outlined in the bibliography (cf. Ellegård, 1953: 29; Denison, 1985: 46; Engblom, 1938; Stein, 1990: 11ff.; Nurmi, 1999: 18). No less significant problems emerge in ascertaining emphatic value (cf. Tieken, 1987: 118; Stein, 1990: 272), which can be identified with reasonable level of certainty only from early Modern English onwards (cf. Traugott, 1972: 199; Stein, 1990: 273).

The occurrence of this type in many languages, particularly in substandard and/or dialectal registers and in periods in history when the rules of the written language were still weakly codified, leads us to believe once again that this may be a natural syntactic change, typical of spoken registers. The type is present in other Germanic languages; German *tun* + infinitive appears at the substandard and dialectal level and in noncontemporary literary texts (cf. Behaghel, 1923–1924, vol. 2: § 746; Russ, 1999: 116, 495) and is also attested in non–Indo-European languages (cf. Havers, 1927). However, while there exists a broad consensus on the origin of periphrastic *do* in spoken registers (cf. Rissanen, 1991: 321; Stein, 1990: 91), it is not clear how the natural syntactic character of these constructions has interacted with other structural and social factors in grammaticalization/grammaticization of modern forms (cf. Stein, 1990: 316–318, 324–328).

Particularly interesting in this respect is the problem of the relationship between the periphrases of Middle English, with semantically weakened *do*, the contrastive-emphatic types of early Modern English, and the modern forms with grammaticalization/grammaticization of *do* in interrogative, negative, and emphatic-contrastive structures. One factor of natural development could have been the affinity or contiguity of emphatic, interrogative, or negative function, which can be seen in the paths of grammaticalization in many languages (cf. Stein, 1990: 275–276; Nurmi, 1999: 29). The association of these functions would therefore have followed the well-known path of demarking of emphasis or contrastivity, leaving *do* behind as a mere 'dummy.' It would, however, be preferable to consider such an element as a hypercharacterization of those functions.

The more controversial issue, however, is the relationship between the early periphrases, with apparently

meaningless *do*, and the more modern declarative types, emphatic or otherwise. Stein (1990: 11) maintains that "although there appears to be an unbroken syntactic continuity, there is semantically a watershed between the earlier 'meaningless periphrastic' and the later use in declarative sentences in Standard English." In this respect analytical difficulties are presented by the modern situation, which is far from uniform, just as they are by earlier phases in the development of the language. In present-day spoken language the emphatic value occurs four times more frequently than it does in the written language (cf. Nevalainen and Rissanen, 1985). The use of *do* in constructions in religious or legal contexts (such as *I do solemnly declare*, or *we, the undersigned, being of sound mind, do this day hereby bequeath*: cf. Quirk *et al.,* 1985: 3.37) is an archaism, which may be attributed to an obvious process of freezing of emphasis as a result of ritualization (cf. Stein, 1990: 272). The periphrastic value "equivalent to the simple tense" (*Oxford English Dictionary,* 1989, vol. 4: 905c) appears only at the substandard and dialectal level (in dialects of southwest England): cf. Ihalainen (1991). This situation is reminiscent of the well-known continuous diachronic development, whereby a stigmatized construction has disappeared from the written language but remains in spoken registers. However, as with periphrastic constructions with verbs of movement and of the semantic area of 'taking,' it is doubtful whether *do* can today be considered a dummy. Although the dialectal forms have been described as interchangeable with the simple verb forms, more accurate analyses indicate that we do not in fact find free variation. These forms instead express habitual or 'generic' aspect (cf. Ihalainen, 1991: 154, 156–159), with similar or contiguous aspectual values to those found in periphrases with *tun* in some German dialects (cf. Stein, 1990: 138; Russ, 1999: 116).

Negation

A different range of grammaticalization processes that are the source of units considered expletives can be found in negation and its determinants. Double negation (reinforced negation) is a phenomenon of natural syntax (cf. Horn, 1989), with typical broad diffusion across genetically and typologically different languages (for Bantu languages, cf. Nurse and Philippson, 2003; for Semitic languages, cf. Brockelmann, 1908–1913, vol. 2; Leslau, 1995). As with periphrastic forms, in languages that are sensitive to difference between spoken and written norms, double negation surfaces especially in spoken substandard and dialectal registers, and tends to be stigmatized in written ones: cf. substandard English *I don't see nothing* 'I do not see anything,' colloquial and dialectal German *Er tut niemand nichts* 'he does not make anything for anybody' (cf. Jespersen, 1917; Milroy and Milroy, 1993; Behaghel, 1923–1924, vol. 2; Wackernagel, 1920–1924, vol. 2). In Italian, as in other Romance languages, double negation is a regular construction in standard spoken registers: cf. *non vedo niente* 'I do not see anything,' while the types without double negation, such as *non vedo alcunché/alcuna cosa*, are typical of the written language.

The diffusion of this phenomenon also in older diachronic phases of modern and classical languages (cf. Plautus: Men. 1027: *nec meus servus numquam tale fecit*) is further evidence of it being the reflex of a very general factor. Yet the nature of this factor needs further elucidation. Whether it is related to the greater difficulty in understanding the more marked negative constructions (cf. Horn, 1989: 154–203) or to a process of emphasis freezing is not clear. Jespersen (1917: 71) maintains that "double negation arises because under influence of a strong feeling the two tendencies . . . one to attract the negative to the verb as a nexal negative, and the other to prefix it to some other word capable of receiving this element, may be both gratified in the same sentence." As to the latter hypothesis, however, it can be observed that the tendency towards syntagmatic expansion for operators of negation is not necessarily connected to emphatic processes. Wackernagel (1920–1924, vol. 2: 299) attributes the doubling of negation to the "need of spreading negation over the whole sentence" (cf. also Jespersen, 1917: 71), a description that suggests automatic structural mechanisms in speakers, but seems weakened by an element of circularity.

Some phenomena pose interesting semantic problems of relationship between negation and certain lexical verb classes. In ancient and modern Indo-European languages, the use of an expletive operator of negation is indeed widespread in complex sentences whose main clause exhibits a verb such as 'to fear' 'to prohibit,' 'to deny.' A well-known example is the Latin type *timeo ne veniat* 'I fear that [s/he] comes,' grammaticalized in the classical period (cf. Leumann *et al.,* 1965–1977, vol. 2: 534). The negative feature inherent in the complementizer *ne* is obviously at odds with the affirmative meaning of the subordinate construction it introduces. The traditional explanation is that this is due to contamination and integration into one sentence of two structures originally linked by parataxis, such as *timeo* '[I] fear' and *ne veniat!* 'may [s/he] not come!' This implies a reanalysis of the negating particle *ne* from a constituent belonging to the clause with the ottative modality into a complementizer governed by the main verb. In the same way, the later type *timeo ne non veniat!* 'I fear that [s/he] does not come,' with an apparent overabundance of negating constituents, would be

due to the integration of two structures, the grammaticalized *timeo ne* 'I fear that' and *non veniat* 'I wish [s/he] does not come' (cf. Wackernagel, 1923–1924: 277ff.; Schwyzer, 1941: 11). The presence of similar phenomena with the same classes of verbs in other modern European languages could be due to Latin influence in learned registers: cf. French *je crains que tu ne sois malade* 'I fear that you are ill' (lit. 'that you are not ill'). Although such construction is not common in German, a few examples can be found, probably due to a calque: *ich fürchte, dass nicht . . . eure Sinne verrückt werden* 'I fear that . . . your senses go mad,' lit. 'that your senses do not go mad' (Luther 2, Cor. 11: 3; cf. Wackernagel, 1923–1924, vol. 2: 278). For negation with verbs of prohibition or impediment (cf. Behaghel, 1923–1924, vol. 2: 87–88).

Comparative structures also often feature negations that have been considered expletives, in both spoken and written registers: cf. German. *ich bin kränker, als du nicht denkst* 'I am more ill than you think,' lit. 'than you do not think' (cf. Behaghel, 1923–1924, Vol. 2: 89), Italian *ti vuole più bene di quanto tu non creda* '[s/he] loves you more than you think,' lit. 'more than you do not think,' French *il est plus riche qu'il ne semble* 'he is richer than he seems,' lit. 'than he does not seem' (cf. Lerch, 1925, vol. 1: 77). Cf. further Havers (1931: 134). Wackernagel (1923–1924, vol. 2: 307) maintains that "to negate what has been backgrounded with a comparative clause is a spontaneous process which recurs at various times." A similar justification could be extended to negation in affirmative temporal subordinates, such as Italian *bisogna aspettare finché non viene* 'one needs to wait until [s/he] comes,' lit. 'until [s/he] does not come' (Rohlfs, 1949–1954, vol. 3: § 970) and in German (cf. Behaghel, 1923–1924, vol. 2: 89–92). But the general factor at work here seems to require further clarification.

An interesting case is that whereby originally reinforcing elements, which in various languages have eventually become grammaticalized as constituents of the negation phrase, lose their etymological value. These are often discontinuous constituents with respect to negation proper, as in Romance examples such as French *je ne mange pas* 'I do not eat,' *il ne vient mie* 'he does not come,' Italian *non costa mica tanto* 'it does not cost so much,' (Tuscan) *non dubito punto* 'I do not doubt a bit' (cf. Meyer-Lübke, [1890–1906] 1974, vol. 3: 774–775; Grevisse, 1975: 946–947; Gadet, 1992: 77–79) or English examples as *I don't like it a bit*. Such constructions show the development of a noun phrase, which originally had the function of an internal object or of a circumstantial element expressing a quantity, into hypercharacterizing negative expressions. These then often fossilize as the normal determiners of negation. The nominal elements involved in this development all share the semantic property of denoting a small quantity. This path is most evident when we look at the Latin origins of the Romance types: French *mie,* Italian *mica* < Latin MICA, 'crumb' (Italian *brisa*, often found as a negative intensifier in Northern Italian dialects, has the same meaning), French *pas* < Latin PASSUS 'a step,' or more specifically 'a measure of length, consisting of five Roman feet,' Italian *punto* < Latin PUNCTUM, 'a point, a small spot' or more specifically 'a small part of any thing divided or measured off; a small weight, a small liquid measure; a small portion of time, an instant, a moment' (Lewis and Short, 1987: 1491–1492). These developments can be seen as the reanalysis of objects or measure adverbials; from being arguments or circumstantials in verb phrases, they become mere determiners of negation inside negation phrases. Sometimes, as in French or in northern Italian dialects, they undergo further developments whereby they can be analyzed as the head of the negation phrase. This change is concomitant with the disappearance of negation itself, as in spoken French *je mange pas*, spoken northern Italian *mangio mica* 'I do not eat.' For a crosslinguistic study of the problem, see Bernini and Ramat (1996).

Expletives and Syntax

Expletives and Dummies in Generative Grammar

In the last 20 years, particular attention has been paid to the syntactic dimension of expletivity, particularly in generative grammar. In this field, the issues of main concern have been the positions occupied by elements considered dummies (i.e., "semantically empty" and "mere slot fillers" (Haegeman, 1991: 53)) in certain syntactic configurations, their relationship with the INFL phrase and its head, their argumental and functional status (for recent perspectives, see the papers in Svenonius, 2002). Particularly under examination have been:

- pronouns in structures with extra-posed sentences (such as English *it is appropriate that he goes*);
- pronouns that precede the verb phrase as substitutes for the subject noun phrase in postverbal position (such as French *il sont venus trois garçons*);
- pronouns in existential-locative structures (such as French *il y a trois garçons*);
- subject pronouns in constructions with meteorological verbs (such as English *it's raining,* French *il pleut*, German *es regnet*).

These pronouns, entirely devoid of referential features, are considered nonarguments, as they behave as substitutes for a constituent endowed with grammatical function, which should be found in that position and therefore simply occupy space in the sentence structure. One should note that the dummy substitute of a subject NP does not necessarily have to be a nominal proform. In existential–locative constructions in English (*there are two cats in the garden*) or Italian (*ci sono tre gatti nel giardino*), the substitute is an adverbial pro-form defined as a subject (cf. Haegemann, 1991: 54–55; Svenonius, 2002: 5).

In generative theory expletive subjects are considered characteristic of non–prodrop languages (such as English, German, and other Germanic languages) in which the position of the preverbal subject must obligatorily be occupied by a constituent, while in prodrop languages (such as Italian and Spanish), it does not necessarily have to be filled (cf. Chomsky, 1981; Cardinaletti, 1994). The dichotomy between prodrop and non–prodrop has been widely employed in typology, in correlation with other parameters (for example the absence or presence of morphologically realized verbal inflection for person). But this purely taxonomic model cannot account for the synchronic and diachronic dynamics whereby some languages reach the state of grammaticalizing/grammaticizing subject pronouns while others do not (cf. Sornicola, 1997b).

Subject Pronouns, Spoken Discourse Strategies, and Processes of Grammaticalization

The spoken registers of languages that are traditionally considered prodrop are rich in various types of constructions with subject pronouns (henceforward SP). This is also true in languages, such as the Romance and Slavonic ones, that have a rich inflectional morphology (a factor often believed associated to optionality of SPs). Constructions of the type SPs + verb with morphological inflection (cf. It. *io dico* 'I say,' *tu dici* 'you say') are highly frequent in the spoken language, under various structural and textual conditions (for Italian and Spanish cf. Sornicola, 1996; for Russian, cf. Fougeron, 2003). In particular, 1st- and 2nd-person SPs have the highest recurrence. Although these forms have been variously described as emphatic or related to switch reference strategies (cf. Hofmann, 1951: § 95, Pinkster, 1987 for Latin), such accounts can represent only a part of the cases that appear in text corpora. In many tokens the SPs may be considered units on the way to becoming grammaticalized, since they have neither emphatic nor switch-reference function (cf. Sornicola, 1994 for Italian; Sornicola, 2002 for Latin and late Latin). Clearly, however, they cannot be represented as grammatical inflection markers, as in French.

Like other phenomena of so-called expletivity, these cases are not easily accommodated in traditional frames, in which all doublings of a given category are considered pleonasms, since they repeat information already contained in that category. But how is the main category chosen? The general frame has a long history behind it, since it was already present in classical rhetoric (see the previous discussion) and taken up again in various forms by the comparative linguistics of the 19th century (cf. Delbrück 1893–1900, vol. 3: 461), by structuralism (cf. Bally, 1932: 153–156), and ultimately by generative grammar, where the relationship between SP, verb phrase and INFL phrase has given rise to wide debate (cf. Safir, 1985; Cardinaletti, 1994; Svenonius, 2002). In these discussions it has been assumed that there is only one head that carries INFL and that possible coreferential units are in various ways treatable as bound elements of an anaphoric chain (cf. Safir, 1985). But the extent to which these models could satisfactorily represent the wide range of structures with SPs is debatable. For example, it is not clear what dependency relationships should be postulated between verbal inflection and pronouns in the Romance and Slavic constructions described above. A more general problem concerns the condition of unique assignment of θ-roles (see Haegeman, 1991 *passim* for an overview and 52–53 in particular for its application to expletive subjects). Whatever its theoretical elegance and even necessity, it is not certain whether it could be stretched to cover the whole area of existing pronominal structures.

Some of these structures, in fact, can be attributed to the general tendency in the spoken registers of various languages towards referential hyperdetermination, which presents itself in the form of propagation of deictic features (cf. Sornicola, 1996). Although needing theoretical refinement, the notion of hypercharacterization (see discussion above) could be perhaps a point of departure for the analysis of the structures under discussion.

Phenomena Due to Prosodic Factors

Also defined as expletives/pleonasms are a few phenomena whose nature is clearly prosodic. These are total or partial reduplications of stems, or insertions of paragogic elements. Such cases presumably have an ultimate phonostylistic origin. Indeed, they often appear as allomorphs or lexical forms that are stylistically and/or sociolinguistically marked. However, they often give rise to fully grammaticalized structures. Although different processes may be at work behind the various phenomena of this range, they

can be considered effects of a general and integrated tendency toward the expansion of word structure, in connection with lexical prosodic (in particular accentual and metrical) factors, and/or syntactic and prosodic environmental conditions. Monosyllabic words such as pronominal forms and conjunctions, or oxytonic words, are often involved. Furthermore, in many languages the final position of intonational block and, to an even greater extent, that of the utterance constitute typical contexts for the phenomena under examination. The accentual conditions are also crucial: In some contexts, among which are those already mentioned, the accent-bearing syllables tend to acquire 'volume' or weight via reduplication or coalescence of another element, like particles desemanticized to a greater or lesser extent.

Latin has a few pronominal forms with stem reduplication, which have been associated with emphasis: cf. *tute* 'you' < *tu* + *te* (Hofmann, 1951: § 95), *mēmē* 'me' < *me*, *tētē* 'you.OBL' < *te*, *sēsē* 'himself' < *se* (cf. *Thesaurus Linguae Latinae*, V, 256: 1721, 75ff. s.v. *ego*; Leumann *et al.*, 1965–1977, vol. 1: 464, vol. 2: 174). The tendency for monosyllabic elements to accumulate in pronominal forms can also be observed in forms such as *egomet, nosmet, illemet*, characteristic of early comedies and of texts where vulgarisms and colloquialisms are frequent, such as the *Satyricon* (Stefenelli, 1962: 123) (on the whole issue, cf. Wackernagel, 1953; Havers, 1931: 179). The predilection for longer pronominal forms (reduplicated or with the addition of a paragogic element) is found, for example, in many varieties of old and modern Romance languages, especially dialectal. Here are a few examples from the Italian area: Apulian *jojə* 'I,' < *jo* 'I'+ *je*; the forms of central and southern Italian dialects *mene* 'I.OBL' (< *me* + *ne*), *tene* 'you.OBL' (< *te* + *ne*); the old Italian and now dialectal form *ene* 'is' (< *è* 'is' + *ne*); monosyllabic forms of adverbial particles of affirmation and negation, like *sine* (sì, 'yes' + *ne*), *none* (*no* + *ne*); infinitives like *amanə*, 'amare,' *avenə*, 'avere,' with the coalescence of a particle onto originally oxytonic forms (*amà*, *avé*); the interrogative adverb *pəkkenə* 'because/why,' derived from truncated forms *pəkké* + *nə* (cf. Rohlfs, 1949–1954, vol. 3: § 336).

It is possible to consider these phenomena similar to vocalic or consonantal lengthening in a stressed environment. Like the latter, these can be explained by the interaction of prosodic and segmental structures: Both the geminate and the agglutinated elements can be considered expansions determined by the prosodic skeleton of the word (cf. Kager *et al.*, 1999).

A specific issue concerns the utterance (or sentence) initial position. In various languages this tends to be reinforced by the combination (and in some cases agglutination) of conjunctions or particles to a pronominal element, even when the conjunction does not seem semantically required, as in late Latin types *atque ego*, *et ego* (cf. Havers, 1931: 9). Other structures that at least in part may be determined by the prosodic and syntactic environment are main declarative clauses with a complementiser in 1st position, as in Romance types with initial *che, que*: cf. Abruzzese *ca mo ve* 'now [s/he] comes,' lit. 'that [s/he] now comes' (Rohlfs, 1949–1954, vol. 3: § 794), Gascon *qu'a yelàt* ' it's freezing,' lit. 'that [it] has frozen,' *que-t dechàm soul* '[we] leave you alone,' lit. 'that [we] leave you alone' (cf. Rohlfs, 1970: 205). In Standard Italian, *che* appears after adverbs of affirmation or negation, as in *sí che l'ho visto, no, che non l'ho visto*, with a reinforcing value (cf. Rohlfs, 1949–1954, vol. 3: 794).

Presumably multiple factors cause conjunctions to accumulate at the beginning of utterances, a phenomenon that can be observed in many languages. The need to fill the first position with constituents with prosodic weight may be in part responsible for various syntagmatic combinations of light adverbs or particles, as in the Latin types *nam et, sed et*. It may also cause conjunctions to be strengthened by coalescing with other particles (cf. Meillet, 1921–1928, vol. 1: 164–165, 171). On the other hand, semantic factors such as intensive redetermination can also play a role. This often leads to the joint use of two adverbs with the same meaning, such as in the (non-classical) Latin types *sed autem,* Italian (substandard) *ma invece* 'but.'

Conclusions

This examination of structures traditionally considered expletive/pleonastic may have demonstrated the extent to which phenomena with different properties and explanations have been grouped together under this label. Behind the apparently unitary tendency toward structural hypercharacterization (i.e., multiple determination of form and function), we have tried to discern heterogeneous processes. Their scrutiny brings to light different properties with respect to the time factor. Some in fact have a dimension that is principally panchronic (that is, they are connected to factors that act independently in many periods and many places), others diachronic, still others synchronic. In the first group we may place the spread of negation in the utterance, subject pronouns with verbs inflected for person, and the increase in the prosodic weight of a word. In the second group, we may place the bleaching of meaning typical of grammaticalization (as in auxiliaries in periphrasis) and, more generally, the survival of archaisms or fossilized

relics in constructions to which speakers are no longer able to assign meaning, and that are sometimes redetermined (such as in Spanish *conmigo* 'with me,' *contigo* 'with you,' etymologically related to late Latin types CUM MECUM, CUM TECUM). Other factors that may lead to phenomena considered expletives have a clearly synchronic origin in processes of contamination and more generally in associative processes (cf. Havers, 1931: 174; Paul, 1920: § 121).

The existence of several structural and historical reasons for phenomena considered expletives allows us to abandon the traditional perspective according to which they are no more than 'illogical' manifestations (thus Wackernagel, 1920–1924, vol. 2: 306). One obvious property of form appears in all structural cases discussed in the third through fifth sections above. It is the expansion or propagation of form within a given phrase and even beyond, in the sentence/utterance. This constitutes a link across different types of phenomena. Yet the implications for theories of sentence/utterance structure are not as obvious.

A few problems of a theoretical nature seem particularly interesting that are related to the concept of function and to the very legitimacy of the notion of expletive/pleonasm. With regard to the first problem, two conclusions may be suggested:

1. It is appropriate to distinguish between semantic function and functioning in discourse. Units exist that do not have semantic function but that do have a functioning power in the utterance, such as those determined by prosodic factors (cf. "Phenomena Due to Prosodic Factors," above). Other units may have both functioning power and semantic function, such as subject pronouns with verbs inflected for person, or the constituents of double negation in nongrammaticalized types. These may be properly defined as hypercharacterized structures.
2. The relationship between function and form on the syntagmatic level must be conceived as plurivocal (more than one form can correspond to each function). This may run contrary to principles or conditions long established in theories, but seems an option that cannot be ruled out.

Some conclusions may also be drawn regarding the legitimacy of the concept of expletive/pleonasm. As we have observed, hypercharacterization is simply the effect of synchronic (or panchronic) processes typical of discourse structuring, which can become grammaticalized or otherwise, or it may be the result of diachronic processes of desemanticization, fossilization, often (although not exclusively) connected to the previous ones. Fossilization with total loss of meaning is difficult to ascertain in many cases. One therefore can have good reasons to think that the concept of expletive has a weak empirical and theoretical basis. A more radical and perhaps paradoxical conclusion would be that expletives (empty elements, or as they have sometimes been called, 'junks') exist neither at the discourse level nor at the *langue* level. But the phenomena that the term has traditionally come to define are notable both at the empirical and the theoretical level.

One final problem concerns the sociolinguistic dimension. It has been widely noted in the literature of various orientations that expletives and pleonasms are typical of the language or style of less educated people. This empirical observation still lacks articulate and stringent justification, but for the moment it is sufficient to maintain that speakers with minimal or no education provide evidence of dynamics of functioning in discourse that cannot be neglected by general linguistic theories.

See also: Grammaticalization; Lexicon, Generative; Mood and Modality in Grammar; Negation; Phonology: Optimality Theory; Pronouns; Prosodic Morphology; Speech Acts.

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Expression Meaning versus Utterance/Speaker Meaning

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When Mrs. Malaprop in Richard Sheridan's play *The Rivals* says to her niece Lydia Languish "don't attempt to extirpate yourself from the matter," she means to say that her niece should not attempt to *extricate* herself from the matter. But that is not what 'extirpate' means in English (at least, it is not a meaning one would find listed under 'extirpate' in a good dictionary of English usage). Malapropisms of this sort are one way in which expression meaning (i.e., word or sentence meaning) can come apart from speaker meaning. Mrs. Malaprop has a mistaken belief about what the words she is using mean in the language she is using. Slips of the tongue (e.g., saying 'pig vat' instead of 'big fat') represent another way in which expression and speaker meaning can come apart.

Gricean conversational implicatures represent another, much larger, class of cases in which these two kinds of meaning come apart. These are cases in which the speaker engages in some form of indirection, where, typically, the main conversational point is something implicitly communicated rather than explicitly expressed. In such cases, the speaker's words mean one thing, but the speaker is trying to convey another meaning, either in addition to the literal expression meaning or in place of it. An example of the former sort is when Mary replies to Peter's offer to take her to the movies that evening that she will be studying for an exam then. Mary has explicitly said that she will be studying, but has implicitly communicated that she is refusing Peter's invitation. Here both the explicit statement and the implicit refusal are intentionally communicated. The

Abstract:

Under the term 'expletive,' phenomena with different properties and explanations traditionally have been grouped together. Three main sources of expletives have been identified here: (1) processes of desemanticization typical of grammaticalization paths; (2) factors more specifically connected to planning strategies characteristic of spoken discourse; and (3) metrical and prosodic factors. In some phenomena it is possible to recognize an interplay of these factors. Among the phenomena related to source (1), the loss of full meaning of one of the verbs of a verbal periphrasis is especially conspicuous. Phenomena like double negation and so-called 'expletive subject pronouns' originate in source (2), although they are often also involved in grammaticalization processes leading to them being fixed as normal structures in the linguistic system. Stem reduplication and other kinds of extensions of morphological units are related to metrical and prosodic factors. It is claimed that these disparate phenomena also have various properties with respect to the time factor (i.e., some are mainly diachronic, others synchronic, still others panchronic). They also pose interesting theoretical problems for the form–function relationship. A notion that seems useful at the descriptive level and seems to have potential implications for the theory is hypercharacterization (i.e., multiple determination) of form and function. Two conclusions may be suggested. The first is that it is appropriate to distinguish between semantic function and functioning in discourse. Units exist that do not have semantic function but do have a functioning power in the utterance; other units may have both functioning power and semantic function. These may be properly defined as hypercharacterized structures. The second conclusion is that, contrary to principles or conditions long established in theories, the relationship between function and form on the syntagmatic level must be conceived as plurivocal (more than one form can correspond to each function).

Biography:

Rosanna Sornicola is Professor of General Linguistics at the Department of Modern Philology of the University of Naples Federico II, where she is also the Director of the European Master's Degree in Linguistics. She graduated in Linguistics and Modern Philology at the University of Naples in 1975. She was Visiting Fellow at Wolfson College (Cambridge) in 1983 and Visiting Scholar in 1997, Visiting Researcher at the Department of Linguistics of the University of California (at Berkeley) (1985), and Visiting Researcher at the Department of Italian of the University of California (at Los Angeles) (1988). She is a senior member of Wolfson College of the University of Cambridge. She was Visiting Professor at the University of California at Los Angeles (1990), Manchester University (1990), Girona (1996), and Gand (1999), and has lectured in many other European universities.

She has worked for several international research projects (the EUROTYP project of the European Science Foundation, 1990–1996; the project on Diachronie, diatopie, diastratie, diaphasie des langues romanes directed by Eugenio Coseriu and Rika Van Deyck, 1993–2001) and is currently involved in various research projects on Italian sociolinguistics and dialectology in cooperation with the Department of Linguistics of the University of Turin and the Romanisches Seminar of the University of Heidelberg.

She is member of the scientific board of the reviews *Cahiers de linguistique romane, Lingue e Linguaggi,* and *Revue de linguistique romane*, and is co-editor of the journal *Bollettino Linguistico Campano*. She has been member of the Executive Committee of the International Society for Historical Linguistics, of the Scientific Bureau of the Societé internationale de linguistique et philologie romanes, and from 1999 until 2003 served as President of the Società di Linguistica Italiana.

Her research interests concern phonetic, phonology, syntax, and pragmatics of spoken language, the relationship between spoken and written discourse, Italian and Romance sociolinguistics and dialectology, synchronic and diachronic typology, and history of linguistics (especially the history of European functionalism).

Her publications include the following books: *La competenza multipla* (Napoli, Liguori 1977), *Sul parlato* (Bologna, Il Mulino 1981), *Il campo di tensione. La sintassi della Scuola di Praga* (coeditor with Aleš Svoboda, Napoli, Liguori 1992), *The virtues of language: history in language, text and literature* (co-editor with Dieter Stein, Amsterdam, Benjamins 1998), *Stability, variation and change of word order patterns over time* (editor with Erich Poppe and Ariel Shisha Ha-Levy, Amsterdam, Benjamins 2000), *Langue écrite, langue parlée dans le passé et dans le present* (co-editor with Rika van Deyck and Johannes Kabatek, Gand, Communication and Cognition, 2005). She is also author of many articles published in books and journals.

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Expression Meaning versus Utterance/Speaker Meaning

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When Mrs. Malaprop in Richard Sheridan's play *The Rivals* says to her niece Lydia Languish "don't attempt to extirpate yourself from the matter," she means to say that her niece should not attempt to *extricate* herself from the matter. But that is not what 'extirpate' means in English (at least, it is not a meaning one would find listed under 'extirpate' in a good dictionary of English usage). Malapropisms of this sort are one way in which expression meaning (i.e., word or sentence meaning) can come apart from speaker meaning. Mrs. Malaprop has a mistaken belief about what the words she is using mean in the language she is using. Slips of the tongue (e.g., saying 'pig vat' instead of 'big fat') represent another way in which expression and speaker meaning can come apart.

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statement is intended to give Mary's reason for her refusal. An example of the latter sort is when Mary responds to Peter's refusal to help her when she is in need by saying 'You're a fine friend!' Here she is implicitly communicating that Peter is *not* a good friend. Her words 'fine friend' are being used sarcastically, and she does not intend to communicate what her words literally mean.

It should be mentioned that there are philosophers who think that even what is explicitly said (as opposed to implicitly communicated) can come apart from literal sentence meaning. These are cases where literal expression meaning must be pragmatically narrowed or broadened in order to arrive at what is explicitly communicated. Thus, when Mary says to the waiter at the restaurant that he should take her steak back because it is raw, she doesn't mean to say the steak is literally uncooked, but that it is too undercooked for her taste – a case of pragmatic broadening. Or when Mary tells her son that he is not going to die when he comes crying to her with a cut on his finger, she means to say that he is not going to die from that cut, not that he is never going to die – a case of pragmatic narrowing (*see* **Pragmatic Determinants of What Is Said**).

For some, utterance meaning is just a variety of speaker meaning. It is the meaning an expression has as used by a speaker in some conversational context. The hearer arrives at an understanding of utterance meaning by combining literal expression meaning with other contextually available information, including information about the speaker's communicative intentions. However, at least some philosophers of language and linguists wish to draw a contrast between utterance and speaker meaning. Levinson (1987, 1995, 2000) has argued for three levels of meaning. There is expression meaning, utterance meaning, and speaker meaning. Utterance meanings belong to a system of default meanings associated with certain expression types. These default meanings are distinct from literally encoded expression meanings. However, when a speaker utters an expression of this type in a normal context, she will have conveyed the default meaning, unless she either explicitly or implicitly cancels this meaning. Levinson identifies these default meanings with the class of conversational implicatures that Grice called generalized conversational implicatures. For instance, when Peter accuses Mary of having eaten all the cookies and Mary replies that she has eaten some of the cookies, she explicitly says that she has eaten some and possibly all of the cookies, she implicates in a generalized way that she has not eaten all of the cookies, and she implicates in a particularized way that she is not the guilty party. These three meanings correspond to Levinson's three levels of sentence, utterance, and speaker meaning, respectively.

The distinction between expression and speaker meaning has been invoked in many philosophical debates as a way of avoiding the postulation of multiple meanings for a single expression type. One well-known instance is Kripke's (1977) appeal to a distinction between speaker's reference and semantic reference of definite descriptions. Kripke appealed to this distinction in order to deny the semantic significance of what Donnellan (1966) called the referential use of such descriptions. Suppose Mary uses the description 'the man in the corner drinking a Martini,' intending to refer to Peter, but in fact Peter is drinking water, not Martini. Kripke argues that the so-called referential use of the description can be accounted for by appeal to what Mary meant to convey by the use of that expression, whereas what she actually said is determined by giving a Russellian analysis of the description. Since there is no unique Martini drinker in the corner (since, let us suppose, there is no Martini drinker there), what Mary has said is false, although what she meant to convey (her speaker meaning) may very well have been true.

There are differing views as to the relative priority of expression and speaker meaning. Some philosophers, such as Strawson (1950), have argued that it is not words and sentences by themselves that refer or express propositions. Rather, it is speakers who refer or express propositions by their uses of words and sentences, respectively. Salmon (2004) calls this the speech-act-centered conception of semantics and contrasts it with the view he favors, namely the expression-centered conception. According to the latter conception, words and sentences have their semantic properties intrinsically, in the sense that one can talk about the referential and truth-conditional content of expressions without any knowledge of or appeal to the communicative intentions of users of those expressions.

Although defenders of the speech-act-centered conception are committed to denying that expressions have referential or truth-conditional content independently of speakers' communicative intentions, their view is compatible with the claim that expression types have aspects of meaning that are context invariant. These would correspond to Fregean 'senses' or 'modes-of-presentation' or (for demonstratives and indexicals) to Kaplanian 'characters.' Such nonreferential or nontruth-conditional aspects of meaning may be intrinsic in Salmon's sense. In other words, such meaning would be a property of expression types, independently of the intentions of the users of those expression types.

Some philosophers of language have denied the idea of intrinsic expression meaning independent of speaker meaning. For instance, Grice (1957) argued that expression meaning is reducible to speaker meaning. Grice was interested in nonnatural meaning ($\text{Meaning}_{\text{NN}}$), as opposed to the sort of natural meaning that a sign may have in virtue of naturally signaling or indicating some state of affairs. He argued that an utterance's nonnaturally meaning that *p* is simply a matter of a speaker's uttering an expression with a certain communicative intention. This would be a sort of 'one-off' meaning for that expression. However, that speaker may be disposed to utter an expression of this type whenever he wishes to convey a certain meaning. Thus, he might develop a habit of using that expression type that way. If this usage were then to spread to other members of his community, it would become a standardized usage, and that expression type would come to have a stable meaning independent of the intentions of any one speaker. But such a meaning would not be independent of the linguistic activities of the users of the expression type in general.

Another way that defenders of a speech-act-centered conception have challenged the idea of intrinsic expression meaning is to argue with Searle (1983) that all meaning is relative to a nonintentional Background. A sentence only has truth-conditions relative to some assumed Background. This Background can never be made fully explicit, because at bottom it consists in a set of abilities, practices, and ways of acting that are nonintentional. Although Searle, unlike Grice, is not suggesting that expression meaning depends ultimately on the communicative intentions of speakers, he is arguing that expression meaning depends on a certain sort of human activity, and so this conception is antithetical to the idea of intrinsic expression meaning.

See also: Character versus Content; Context Principle; Conventions in Language; Descriptions, Definite and Indefinite: Philosophical Aspects; Intention and Semantics; Natural versus Non-natural Meaning; Pragmatic Determinants of What Is Said; Referential versus Attributive; Semantics/Paragmatics boundary, The; Sense and Reference: Philosophical Aspects; Speech Acts; Truth Conditional Semantics and Meaning.

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Expressive Power of Language

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The expressive power of a language is its ability to convey meanings of various kinds. Most often, the term is used in comparative or contrastive contexts, for example, to claim that one language is of greater expressive power than another in a certain semantic domain.

At one time, it was believed that the classical languages of Western civilization enjoyed much greater expressive power than the so-called primitive languages of Africa, Asia, Oceania, and the Americas. However, when linguists began familiarizing themselves with more distant and exotic languages, it became clear that they were anything but impoverished in their expressive power. Today, it is generally accepted that all languages are endowed with expressive power of similar order of magnitude.

Nevertheless, within particular domains, languages may still vary substantially with respect to their expressive power. Perhaps the most celebrated example of crosslinguistic variation in expressive power, the Eskimos' purported plethora of 'snow words,' has

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At one time, it was believed that the classical languages of Western civilization enjoyed much greater expressive power than the so-called primitive languages of Africa, Asia, Oceania, and the Americas. However, when linguists began familiarizing themselves with more distant and exotic languages, it became clear that they were anything but impoverished in their expressive power. Today, it is generally accepted that all languages are endowed with expressive power of similar order of magnitude.

Nevertheless, within particular domains, languages may still vary substantially with respect to their expressive power. Perhaps the most celebrated example of crosslinguistic variation in expressive power, the Eskimos' purported plethora of 'snow words,' has

recently been called into question; however, numerous other examples are empirically well-supported. In order to compare the expressive power of languages, it is necessary to consider the forms that may bear meanings, the meanings that may be borne by those forms, and the nature of the form-meaning relationship.

The forms that may bear meanings are linguistic units of various size: morphemes, words, phrases, clauses, sentences, and texts. Alongside these, intonation contours may also be associated with meanings. In addition, smaller, phonological units may bear meanings in what is known as sound-symbolism.

The meanings that are borne by linguistic forms may be broadly characterized as either conceptual or affective. Conceptual meanings are based on the traditional notions of semantics, such as propositional content, modality, and reference, and may be further classified into various semantic domains, including thematic roles, tense/aspect, quantification, kinship terms, color terms, weather terms, and so forth. In contrast, affective meanings involve states such as tension, happiness, arousal, and their like.

The form-meaning relationship, that is to say the association of linguistic forms with their particular meanings, is the basis of the expressive power of language. For any given meaning M, the following three cases may, potentially, be distinguished: (a) M is expressible in all languages; (b) M is expressible in no languages; and (c) M is expressible in some but not all languages. However, the above taxonomy faces a number of serious problems.

One difficulty is empirical: without access to each and every one of the world's thousands of languages, it is an extremely risky proposition to make any universal generalizations to the effect that a certain meaning may be expressible in all languages, or in none. In lieu of a much larger data base than is currently available, all such claims must therefore be treated as conjectures of various degrees of plausibility.

Another issue pertains specifically to the meanings purportedly expressible in no languages. Some scholars view language as system of societal conventions, and meanings, in particular, as essentially public entities: for such scholars, the concept of an unexpressible meaning is therefore an oxymoron. More generally, by their very definition, meanings expressible in no language can never be referred to, even indirectly, as in expressions such as *the meaning of Mona Lisa's smile*: the very notion of unexpressible meaning is thus paradoxical.

Nevertheless, prophets, poets, and others have reported undergoing mystical experiences beyond the realm of linguistic expression; similar claims are also made by persons who have entered altered states of consciousness, for example, with hallucinogenic drugs. Indeed, the logical positivists maintained that natural languages are incapable of expressing scientific concepts with sufficient precision; this postulate was their motivation for proposing an 'artificial language of science.' More far reachingly, cognitive scientists have suggested that the human mind is innately incapable of grasping certain kinds of knowledge; such knowledge would, *a fortiori*, be unexpressible in any language. In view of such claims, it would therefore seem advisable to at least entertain the possibility that there may exist meanings expressible in no languages, in spite of the problems inherent therein.

A further, much-debated issue is that of crosslinguistic synonymy. Some linguists question whether linguistic forms in different languages are ever capable of bearing the exact same meaning. Each and every linguistic form is part of a language system; hence, it is argued, linguistic forms belonging to different language systems can never be equivalent. The issue of crosslinguistic synonymy is of course crucial to the process of translation: if complete crosslinguistic synonymy is not attainable, neither is the 'perfect translation.' Nevertheless, for many purposes, it would seem advantageous to abstract away from such subtleties, in order to posit crosslinguistic synonymy, when equivalence of meaning, up to a certain point, can be seen to obtain.

A particular problem arises when supposed crosslinguistic synonyms are constructed from linguistic forms of different types, or 'sizes.' Consider, for example, the English expression *boy* and its nearest equivalents in Hebrew, *yeled*, and in Tagalog, *batang lalaki*. Whereas English has a monomorphemic word, Hebrew possesses a bimorphemic word consisting of root *y-l-d* 'child' plus masculine singular inflection *-e-e-*, while Tagalog makes use of two words, *batang* 'child' plus a grammatical linker, and *lalaki* 'male.' It is at least plausible to suggest that the meanings associated with *boy*, *yeled*, and *batang lalaki* reflect their different structures. Specifically, whereas a semantic representation of *boy* might involve a primitive concept Boy, that of *yeled* might be obtained by application of a masculine feature to Child, while that of *batang lalaki* might be constructed compositionally, by modifying Child with Male.

It would therefore seem crucial to distinguish between the different types of linguistic forms that may bear meanings: segments, morphemes, words, phrases, clauses, sentences, texts, intonation contours, and so forth. Specifically, for any meaning M, and any type of linguistic form T, the following three cases may be distinguished: (a) M is expressible by a

form of type T in all languages; (b) M is expressible by a form of type T in no languages; and (c) M is expressible by a form of type T in some but not all languages. Following are some examples of each of these three cases.

Taking T to be morpheme, and examining the semantic domain of cardinal numerals, One is possibly expressible by a single morpheme in all languages, whereas One Hundred And Twenty Three is almost certainly expressible by a single morpheme in no languages. In between these two extremes, Eleven is expressible by a single morpheme in English *eleven*, but not in Malay, where *seblas* consists of *se-* 'one' plus *-blas* 'over ten'; while One Hundred Thousand is expressible by a single morpheme in Hindi *laakh*, but not in English.

Letting T stand for word and generalizing the semantic domain to that of quantification, One is possibly expressible by a single word in all languages, whereas At Most Four Or More Than Seven is almost certainly expressible by a single word in no languages. In between, the quantifier No is expressible by a single word in English *no* (as in *no languages*), but not in Hebrew, where it would be paraphrased with a negative polarity marker *af* preceding the noun plus a negation *lo* in construction with the verb; while Only One is expressible by a single word in Tagalog *iisa,* but not in English.

Taking T to denote clause, simple propositions such as John Came are perhaps expressible by a single clause in all languages, whereas a conditional linking two events such as If John Comes, Bill Will Go most probably cannot be expressed monoclausally in any language. However, propositions involving conjoined participants such as John And Bill Came can be expressed by a single clause in English, *John and Bill came*, but not in the Amerindian Yuman language Maricopa, where its nearest equivalent, *John-ʃ Bill uðaavk vʔaawk*, contains an embedded clause *John-ʃ Bill uðaavk* 'John accompanied Bill.' Conversely, propositions involving indirect causation such as John Caused Bill To Write A Letter can be expressed monoclausally in Hindi, as in *John-ne Bill-se khat likhwaayaa*, making use of a single verb *likhwaayaa* 'write' inflected for indirect causation, but not in English, where, in the nearest equivalent, *John caused Bill to write a letter*, two verbs, *caused* and *write,* head two different clauses.

Letting T represent intonation contour, emphasis is probably expressible via intonation in all languages, while a cardinal numeral such as Seven is almost certainly expressible through intonation in no languages. However, yes/no questions can be formed with intonation in English, but not, allegedly, in Thai, whereas 'a variety of exclamation colorings,' including 'the lack of concern on the part of the speaker for the outcome of his utterance' can be expressed intonationally in Vietnamese, but not in English.

Finally, taking T to denote phonological feature, harshness and aggression are possibly expressible, through sound symbolism, by the feature [obstruent] in all languages, while a cardinal numeral such as Seven is almost certainly expressible with a phonological feature in no languages. However, since the association of phonological features with meanings is based on universal cognitive principles, falling outside the domain of conventionalized and possibly language-specific grammatical rules, there are probably no cases of meanings expressible by phonological features in some but not all languages.

In those cases where a meaning M is expressible by a form of type T in some but not all languages, the availability of M as a meaning of a Type T form may be correlated with various other linguistic properties. Such correlations can be represented as implicational universals of the following form: (a) For any language L, if M is available as a meaning of a Type T form in L, then L has property P; and (b) For any language L, if L has property P, then M is available as a meaning of a Type T form in L. At present, however, not enough is known about patterns of crosslinguistic variation in expressive power to conclusively support a significant body of such universals. Nevertheless, some work in linguistic typology has pointed towards possible correlations between expressive power and various other linguistic properties.

For example, in phonological typology, it has been suggested that intonation is associated with less expressive power in tonal languages than in their nontonal counterparts. Similarly, in morphological typology, the word is generally endowed with less expressive power in isolating languages than in synthetic ones, and less expressive power in synthetic languages than in polysynthetic ones, such as the Australian language Mayali, in which a single word *gayauganjngunihmiwage* can mean 'the child crawls along eating meat.' Analogously, in syntactic typology, the sentence is generally equipped with less expressive power in English and other European languages than in several Papuan languages of the so-called clause chaining type, in which a single sentence can narrate a series of events that, in most other languages, would require a lengthy sequence of sentences.

While some facts and generalizations about the expressive power of language can be accounted for terms of linguistic typology, others would seem to result from extralinguistic factors, while yet others would appear to be immune to either kind

of explanation, instead reflecting the arbitrariness of language and linguistic structure.

See also: Grammatical Meaning; Relativism; Semantic Primitives; Sound Symbolism; Translation Universals; Translational Equivalence.

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Extensionality and Intensionality

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A sentence is extensional if its expressions can be substituted with expressions that have the same denotation (reference) without altering the truth value of the sentence. A sentence that is not extensional is intensional. A language is extensional if every sentence of it is extensional. Otherwise, the language is intensional.

The following sentence is then intensional:

George IV wished to know whether Scott was the author of *Waverly*.

As Scott was in fact the author of *Waverly*, 'Scott' and 'the author of *Waverly*' are co-denotational. However, if we substitute one for the other, we get

George IV wished to know whether Scott was Scott,

which, unlike the former, can hardly be taken as true. Because natural language contains intensional sentences, natural language is intensional.

A context in which co-denotational expressions cannot be substituted is known as an indirect context (or oblique, opaque or intensional context), and a context of extensional expressions is a direct context. Sentences involving propositional attitudes, intentions, quotations, temporal designation, and modalities give rise to indirect contexts. Another example of intensionality:

Nine necessarily exceeds seven.
Nine is the number of the planets.
The number of the planets necessarily exceeds seven.

Although the first two sentences are true, the third is not because it is only a contingent astronomical fact and not a necessary truth that the number of planets exceeds seven – it is possible that there were only seven planets.

Semantical Aspects of Extensionality and Intensionality

Issues concerned with extensionality and intensionality have been cardinal motivations behind the development of important semantical theories. Reducing extensionality and intensionality to technical conditions regarding substitutivity of expressions is accordingly a crude simplification.

Though extensionality and intensionality can be traced as far back as ancient Greek philosophy, the first major contribution to the subject was Gottlob Frege's *Über Sinn und Bedeutung* (Frege, 1892). Note, there are different translations of the title words of this work: *Sinn* is translated as 'sense' but *Bedeutung* is translated as either 'denotation', 'reference', or 'nominatum' ('meaning' has actually been used for both *Sinn* and *Bedeutung*). Following Bertrand Russell and Alonzo Church, *Bedeutung* will be identified with 'denotation'.

Although Frege does not spell it out in detail, he maintains that semantics is compositional, such that the semantics of a sentence is determined by the semantics of its parts. To illustrate his theory, assume, to begin with, that semantics is purely referential, that is, assume that the semantics of an expression is what

of explanation, instead reflecting the arbitrariness of language and linguistic structure.

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the expression denotes. This seems plausible; for example,

Paris is beautiful

asserts that what 'Paris' denotes, i.e., the actual capital of France, has the property of being beautiful. It is not the string of symbols 'Paris' or one's idea of Paris, whatever that may be, which is beautiful.

However, things are more complicated than this. There are aspects of natural language semantics that cannot be explained by resorting to the notion of denotation, Frege argues. He illustrates this by the following puzzle. Suppose a and b are names for some objects and that

$$a = b$$

is true, hence the expressions 'a' and 'b' have the same denotation.

Frege then recognizes a difference between this identity and an identity such as $a = a$. The latter is trivially true (analytically true), whereas the former may contain useful information. For instance, in a criminal investigation a discovery such as "the burglar is the suspect" could be decisive, whereas "the burglar is the burglar" is useless. The important question is then: What is the source of the difference between $a = a$ and $a = b$? As semantics is compositional, the difference must be due to a difference between the semantics of the expressions 'a' and 'b'. But by assumption, 'a' and 'b' have the same semantics because they have the same denotation. In other words, referential semantics must be rejected because it cannot explain the difference between the identities.

Frege's famous solution is to acknowledge that 'a' and 'b' refer to their denotation in different ways. Consider, for example, the expressions 'morning star' and 'evening star.' Both denote the planet Venus, so *morning star = evening star* is true, but they refer to Venus in different ways: One refers to a heavenly object seen in the morning, the other to a heavenly object seen in the evening. Frege says 'morning star' and 'evening star' have different senses. The puzzle about identity can now be solved by noting that $a = a$ and $a = b$ express different senses. Frege was inspired by mathematics when he developed this theory. Consider the two expressions '$1 + 3$' and '$2 * 2$'. Both are equal to, i.e., denote, the number 4, however, their way of referring to four differs because the calculations for obtaining the result differ. Hence, the expressions have different senses.

To solve the puzzle, Frege accordingly introduces two semantical concepts, denotation and sense. Each expression – including proper names and sentences – is then assumed to have both a denotation as well as a sense, although he recognizes that exceptions may occur. Frege never precisely described what senses are, but he explained that the sense of an expression contains its mode of presentation (its way of referring), that expressions express their senses, and senses are something we grasp. Moreover, senses are distinguished from ideas (subjective thinking), meaning they are objective. The notion of sense may appear unfamiliar and it may not be clear why it is seminal. However, expressions such as 'morning star' or 'Paris' are signs, and signs are characterized by their ability to refer to something. Sense addresses this fundamental feature – the referential capacity of expressions. So, it is natural to discern between expressions that refer to the same thing.

There is a close relationship between Frege's theory and the earlier definition of extensionality and intensionality. Frege can now provide an explanation for failure of substitutivity in indirect contexts. In indirect contexts we are talking about the senses of the expressions occurring therein. When we say

John believes that the morning star is the evening star

we are not talking about Venus, Frege argues, but about different senses that determine Venus. In indirect contexts the semantics become the sense. Thus, when we substitute two co-denotational expressions that have different senses in indirect contexts, we obtain different propositions that may have different truth values.

Frege's theory has been challenged by, among others, Bertrand Russell (Russell, 1905). Russell notes that in Frege's theory, a phrase such as "the present Queen of England" denotes an actual woman. It would seem, by parity of form, that a phrase like "the present King of France" also is about, i.e., denotes, an actual individual. However, as an actual King of France does not exist, this sentence does not denote – it merely expresses a sense. Only when sentences are false or nonsense, do we talk about senses, it seems. Russell then presents a rival theory of denotation which, by means of a clever paraphrasing technique, does not resort to Fregean senses. However, it faces other difficulties. For instance, Russell would have to accept that

Ponce de Leon sought the fountain of youth

is either false or nonsense because there did not exist an actual fountain of youth.

There are other semantical theories and notions similar to Frege's. The notion of connotation is similar to sense. Rudolf Carnap (Carnap, 1947) has presented a semantical method in which he distinguishes the notions extension and intension. These are closely

related to Frege's notions, in fact, in direct contexts extension and denotation are the same, and so are intension and sense; only in indirect contexts does Carnap distinguish his notions from Frege's. Common to these theories is the distinction between two semantical notions, one more general than the other.

Extensionality and Intensionality in Formal Settings

So far, the investigations have been restricted to natural language; in the following they will be generalized to logic. The underlying idea is to formalize the condition for extensionality (substitutivity of co-denotational expressions). This will allow us to determine whether a logic is extensional or intensional.

In propositional logic, the formula

(1) $(P \leftrightarrow Q) \rightarrow (R \leftrightarrow R[Q/P])$

is valid (logically true) for all formulas P, Q, and R, where R[Q/P] is the result of substituting zero or more occurrences of P with Q in R. This result says that equivalent (co-denotational) formulas can be substituted with preservation of truth, hence, that propositional logic is extensional.

In contrast, modal logic is intensional because (1) is not valid in modal logic. We have the following counterexample comprising the necessity operator:

$$(p \leftrightarrow q) \rightarrow (\Box\, p \leftrightarrow \Box\, p[q/p]),$$

that is,

$$(p \leftrightarrow q) \rightarrow (\Box\, p \leftrightarrow \Box\, q)$$

is not valid, where p and q are atomic propositions. Thus, in modal logic we cannot substitute equivalent formulas, but this is precisely what we want because modal logic formalizes the intensional notion of modality. The example shows that $\Box$ creates an indirect context.

Presenting a general, formal definition of when a logic is extensional is no trivial task. One reason is that the notion of logic is general indeed, meaning there are several, non-equivalent formalizations of the condition for extensionality. Consider first-order predicate logic, which is commonly said to be extensional. If we accept open formulas (formulas in which variable occurrences are not bound, such as $F(x)$), formula (1) is not valid. But this means that we would have to say that predicate logic is intensional. However, (1) is not the only formalization of the condition for extensionality for predicate logic. As an alternative formalization, we have:

(2) If $P \leftrightarrow Q$ is valid then $R \leftrightarrow R[Q/P]$ is valid.

The difference between this formalization and (1) is that (2) is formulated in metalanguage. As (2) holds, it says that predicate logic is extensional in terms of metalogical formalization. Unfortunately, we cannot adopt (2) as a general formalization of extensionality because modal logic also satisfies (2), meaning it would become extensional too. A possible solution is to discard open formulas in predicate logic and accept (1) as a formalization of extensionality. However, other solutions might be preferred. It has been suggested, e.g., by Ruth Barcan Marcus (Marcus, 1960), that there are several principles (definitions) of extensionality, and hence also several principles of intensionality. This reveals subtleties in the distinction between extensionality and intensionality.

Because of their imprecise nature, intensional notions such as sense have been deemed opaque. However, the last 50 years of developments in non-classical logic, in particular the development of possible-world semantics by such people as Saul Kripke and Richard Montague (1970), have shown that a significant part of intensional notions can be formulated in precise (mathematical) settings. See Gamut (Gamut, 1991) for an introduction and Fitting and Mendelsohn (Fitting and Mendelsohn, 1998) for newer developments in possible-world semantics.

See also: Connotation; Modal Logic; Montague Semantics; Propositional Attitudes; Sense and Reference: Philosophical Aspects.

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Externalism about Content

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The Thesis of Externalism

Externalism is a thesis in the philosophy of mind about thought content, i.e., what is believed, desired, hoped, feared, etc. We can distinguish externalism and its opposite, internalism, by contrasting relational properties such as the property of being taller than the Eiffel Tower, and intrinsic properties, such as the property of being made of iron. Externalism treats the property of having a certain thought content as a relational property, whereas internalism treats it as an intrinsic property.

As an example, let Oscar and Twin Oscar share all their intrinsic properties: they are molecule-for-molecule physical duplicates; they share all the same dispositions to behave, where behavior is construed as bodily movement non-intentionally described; and they share all the same 'narrow' functional properties, i.e., functional properties defined in terms of causal relations within the body. Externalism claims that Oscar and Twin Oscar may have different thought contents if they are in different environments. Internalism claims that Oscar and Twin Oscar have the same thought contents. Thus we may understand the dispute between externalism and internalism in terms of supervenience. Internalism claims, while externalism denies, that thought content supervenes on the properties that duplicates like Oscar and Twin Oscar share.

Externalism has important consequences for the philosophical debate about the relation of mind and body. Externalism is incompatible with the behaviorist claim that talk of mental states can be reduced to talk of dispositions to behave, where behavior is construed as bodily movement non-intentionally described. Further, externalism is incompatible with the reduction of types of mental state either to types of brain state, or to narrow functional types. Externalism rejects the Cartesian supposition that a normally embodied person and an always envatted brain (i.e., one not connected to a real body in a real world) could have all the same mental states while being in radically different environments. (Notice that externalism and internalism should not be understood as disputing the uncontroversial truth that a subject's environment causally affects what she thinks. For instance, an internalist who claims that types of mental state are identical to types of brain state may agree that a subject's environment causally affects what types of brain state he is in, and so what types of mental state he is in.)

Arguments for and against Externalism

Natural Kind Terms

Putnam's classic twin earth argument for externalism asks us to imagine that there is a far away planet, Twin Earth, that is a physical duplicate of Earth and that contains duplicates of all Earthians. The only difference between the planets is that whereas, on Earth, the stuff that flows in rivers and falls as rain has chemical composition H_2O, on Twin Earth, the stuff that flows in rivers and falls as rain is an identical seeming stuff that has a different chemical composition, abbreviated XYZ. Consider an Earthian, Oscar, in 1750 when the chemical composition of water was not yet known. Putnam claims that when Oscar sincerely says, "Water is wet," the term 'water' and the concept it expresses refers to all and only H_2O, so that the truth value of Oscar's utterance and thought turns on the properties of H_2O. By contrast, Putnam claims that when Oscar's Twin Earthian twin, Twin Oscar, makes the same utterance, the term 'water' and the concept it expresses refers to all and only XYZ, so that the truth value of Twin Oscar's utterance and thought turns on the properties of XYZ. Given that it's an assumption of the thought experiment that Oscar and Twin Oscar are physical duplicates, the fact that their utterances and thoughts are about different substances and have different truth conditions seems to support the externalist claim that a subject's thought contents are partly individuated by the sorts of substances present in his environment.

As initially set-up, the thought experiment suffers from the fact that since humans are largely made out of water, Oscar and Twin Oscar cannot be physical duplicates. However, the thought experiment can easily be reformulated to overcome this objection, by using a term for a 'natural kind' that is not part of the physical constitution of humans. The thought experiment exploits the idea that we intend some of our terms to refer to natural kinds that are naturally demarcated by their fundamental properties, and it is the job of science to discover those properties. On this view, an item could appear superficially just like instances of a certain natural kind and yet not be of that natural kind if it lacks the relevant fundamental properties (e.g., fool's gold). Further, an item could be of a certain natural kind even without possessing its characteristic appearance if it has the fundamental

properties definitive of that kind (e.g., an albino tiger). If we intend 'water' to refer to such a natural kind, then XYZ is not included in the reference of our term for, although it looks and behaves like H_2O, XYZ is stipulated to differ in its fundamental chemistry.

One could object to Putnam's Twin Earth argument by rejecting some of the assumptions on which it lies: for example, that there are natural kinds, that some of our non-technical terms aim to refer to such kinds, and that if a substance like XYZ were discovered it would be incorrect to regard it as of the same natural kind as H_2O. Even if all these assumptions are granted, one could further object to the argument that one can accommodate the idea that Oscar's and Twin Oscar's thoughts refer to different substances without granting the externalist claim that their thought contents are partly individuated by the substances in their respective environments. Suppose that each would explicate the meaning of 'water' as "the watery stuff around here." On this explication, since the watery stuff in Oscar's environment is H_2O, in his mouth, 'water' would refer to H_2O. By contrast, since the watery stuff in Twin Oscar's environment is XYZ, 'water' in Twin Oscar's mouth would refer to XYZ. In this way, someone could hope to explain how Oscar's and Twin Oscar's utterances and thoughts refer to different substances within a view that treats their reference as being determined by a common rule, or 'character' in Kaplan's sense. Such a 'two-dimensionalist' view could arguably be used to support an internalist account of Putnam's Twin Earth story.

Indexicals

A second argument for externalism concerns reference to particular objects, rather than natural kinds. Suppose that a subject sees a blue lamp and says, "That lamp is broken." His utterance and the thought it expresses refer to the lamp he sees, and their truth value turns on the properties of that object. An internalist could suggest that the content of the demonstrative expression and the corresponding thought constituent is given by a certain condition such that the demonstrative expression and thought constituent refer to an object if and only if it meets that condition, say the condition of being the unique blue lamp (on some interpretations, this condition is an example of a Fregean 'sense'). On this view, in a counterfactual condition in which the subject is in the same intrinsic state but looking at a duplicate lamp he would have the same thought content. However, there are a number of objections to the suggested internalist understanding of demonstrative reference. First, it is hard to specify a condition that both uniquely picks out the intuitive referent and that is plausibly available to any subject capable of making or understanding demonstrative reference. Second, understanding the demonstrative expression arguably only requires latching onto the right object, regardless of how one conceives of it. As a result of these difficulties, externalists suggest that the object referred to partly specifies the content of the demonstrative expression and thought constituent, so that if the subject had instead been looking at a duplicate lamp the content of his thought and utterance would have been different. This alternative view supports the externalist claim that a subject's thoughts are partly individuated by the objects in his environment. An internalist could try to avoid this conclusion by exploiting a two-dimensionalist framework in a way analogous to the potential two-dimensionalist reply to Putnam's argument.

Burge and Linguistic Practice

A third argument for externalism, forwarded by Burge, aims to show that a subject's thought contents are partly individuated by the linguistic practices of his community. Burge's argument concerns a subject, Alf, an ordinary member of the English-speaking community and arthritis sufferer who complains to his doctor, "I fear my arthritis has spread to my thigh." This attitude indicates that Alf incompletely understands arthritis for, by definition, 'arthritis' applies only to problems of the joints. Despite this, Burge argues that Alf has the concept arthritis and that, by his utterance, he expresses the fear that his arthritis has spread to his thigh. Burge supports this interpretation by saying that it would be natural to report Alf's thoughts in this way, despite his incomplete understanding.

Now consider a duplicate of Alf, Twin Alf, who has been brought up in a counterfactual linguistic community in which 'arthritis' is instead defined to apply to rheumatoid ailments of the joints and thighs. In the counterfactual situation, the term 'arthritis' does not express the English concept arthritis. Like Alf, Twin Alf complains to his doctor, "I fear that my arthritis has spread to my thigh." Burge argues that, in the counterfactual situation, Twin Alf lacks the concept arthritis and thus expresses a different thought by his utterance than Alf does. This claim is supported both by the way Twin Alf would explicate 'arthritis' and by how experts in his community would explicate the term. Unlike Putnam's Twin Earth argument, Burge's argument can use a variety of terms and needn't use natural kind terms.

Burge's argument relies on the idea that one may have a concept that one incompletely understands. So, an internalist might object to Burge's argument by rejecting this assumption. In reply, an externalist

may point out that the notion that a subject may incompletely understand a concept she possesses is supported by our ordinary practice of attitude ascription in which we routinely ascribe concepts to subjects even despite their incomplete understanding of the relevant term, and regard them as sharing beliefs with others who fully understand the term. Further, it seems supported by Alf's own understanding of the situation. Suppose that the doctor reassures Alf, saying that, by definition, arthritis cannot occur in thighs. It seems likely that Alf would defer to the doctor about the application of 'arthritis,' and regard his earlier fear as false. But, this response suggests that it is the public concept arthritis that figures in his belief, not some idiosyncratic concept defined by his own views.

Accounts of Content

As well as the particular arguments for externalism detailed above, a more general motivation arises from "naturalistic accounts of content." Such accounts start from the thought that content is not a fundamental feature of the world but can be accounted for in terms of other non-intentional features of the world. On the "causal account," what it is for a state of a system to have a certain content is for it to bear certain kinds of causal relations to other items. On the "teleofunctional account," a state of a system has a certain content if and only if it has a certain evolutionary history. On both of these leading naturalistic accounts, what it is for a state of a system to have a certain content involves its relational properties to items outside that system.

Externalism's Consequences

In addition to its consequences for the mind-body debate (detailed above), externalism has been claimed to have controversial consequences in epistemology and philosophy of mind, in particular for knowledge of one's own mind, knowledge of the world, and the explanation of action. If one's thoughts are partly individuated by the environment, it seems hard for one to know what one thinks just by introspection and without first investigating the environment. Further, if what one thinks depends on the kind of environment one is in, then it may seem that were one to know what one thinks introspectively one could use that knowledge to gain knowledge of the environment without first investigating it! Externalism may also seem to conflict with the plausible intuition that what one thinks causally explains one's actions, given the metaphysical assumption that causal powers depend on intrinsic and not relational properties.

See also: Natural Kind Terms; Two-Dimensional Semantics.

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F

Face

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Background

A search for 'face' in the on-line *Oxford English dictionary* (OED) yields pages on this polysemic entry. It also illuminates the cultural and psychological dimensions of the construct that lies at the heart of a well-known model of linguistic politeness expounded by Brown and Levinson in their seminal work *Politeness: some universals in language usage* (1978, 1987) (*see* **Politeness**). The Western character of their (positive and negative) face derives from an Anglo-Saxon understanding of the rational individual who seeks to protect himself or herself, and others, from Face-Threatening Acts (FTAs). In spite of its claim to universality, the politeness model that stems from this characterization of face is also, inevitably, culture-biased (*see* **Intercultural Pragmatics and Communication**).

In reaction to this, a critical reappraisal of Brown and Levinson's notion of face has engaged scholars beyond the Anglophone world, who have brought to their analyses insights from psychology, philosophy, and anthropology. In particular, critique from Asian linguists has now grown into a consistent contrastive body of research, which has expanded to include perspectives from Southern Europe (e.g., Turkey, Greece, Spain, Italy), South America (e.g., Ecuador, Argentina), and South Africa, thus widening considerably the cultural spread of the debate.

If it is thanks to two British anthropologists (Brown and Levinson) that linguistic politeness rose to become the subject of ongoing scholarly debate, it is too easily forgotten that it was an American sociologist who gave us the powerful account of 'face' that stands at the heart of it. Not a universal account, however; in fact, Erving Goffman's 'face' is American in many of its facets, and yet an original contribution to the modern study of the social and psychological relevance of this arguably universal construct to politeness research and human interaction (*see* **Goffman, Erving (1922–1982)**).

Face as a philosophical construct boasts a history that dates to ancient civilizations. For example, the Náhuatl people who inhabited Central America would use the expression 'face-heart' (Spanish *rostro-corazón*) to define personhood. In their understanding, "face seems to refer to the physiognomy of the self while the heart is the dynamic aspect of self" (Jiménez Cataño, 1993: 72) (my translation). In modern times, among the more defining influences on Goffman's early work and his conceptualization of face are Chinese and American Indian sources and the work of the French sociologist Émile Durkheim (*see* **Durkheim, Emile (1858–1917)**).

'Face' According to Goffman

Even though Goffman was primarily concerned with uncovering the rules governing social interaction, his treatment of 'face' leads the reader to believe that he saw it as the hub of interpersonal dynamics; in fact, for Goffman 'face-saving' was shorthand for 'the traffic rules of social interactions' (1967:12). His concept of face, unlike Brown and Levinson's later understanding of it, seeks to accommodate both strategic and social indexing behaviors and is best apprehended in the context of social order as ritual. Equilibrium is maintained by interactants making choices informed by moral rules. In turn, the social morality underpinning Goffman's order consists of values such as pride, honor, dignity, consideration, tact and poise, perceptiveness and feelings, all of which the self expresses through face. Within the wider social order, face maintenance is a condition rather than the objective of interaction.

Émile Durkheim, the French thinker, saw social action as symbolic ritual enacted through positive and negative rites, hence Goffman's definition of the person as a "ritual object," a "deity," and "his own priest" (1967: 55). However, Durkheim also envisaged solidarity as the glue of the social order. Solidarity between actors would aim for the

fulfillment of obligations toward others as a condition for the maintenance of equilibrium. Goffman's interactant is certainly more individualistic, but avoids the egocentrism of Brown and Levinson's idealized agent. Ultimately, for Goffman as for Durkheim, organizational order comes before the safeguard of the individual self, which can be asked to sacrifice his or her face (with the ensuing embarrassment) for the gain of society (1967: 112).

In 1944, the *American Anthropologist* published Hsien Chin Hu's seminal account of the Chinese concept of 'face.' A decade later, Goffman acknowledged his debt to Hu in his discussion of a Western version of 'face.' Goffman's social psychological definition of face is that of 'the positive social value a person effectively claims for himself by the line others assume he has taken during a particular contact' where a "line" is the interactants' self and others' evaluation (1967: 23). Self-respect and considerateness are safeguards for one's own and others' face in social encounters. These social values underline the interdependent character of Goffman's actor whose face he considers sacred (1967: 19). Face maintenance requires a ritual order, that is 'acts through whose symbolic component the actor shows how worthy he is of respect or how worthy he feels others are of it' (Goffman, 1967: 19). For Goffman, the contemporary and still enduring Anglo-Saxon values of independence and privacy have swung the balance from a Durkheimian collective self to a self-aware, more individualistic self.

Goffman's 'face-work' consists of defensive (saving one's own face) and protective (saving others' face) practices exercised simultaneously, another indication of the social value that he attached to face. "Avoidance" rituals, "corrective" processes, and the "aggressive use of face-work" are also discussed by Goffman in some detail alongside the tacit cooperation that makes face-work possible. Brown and Levinson's model seems to have given preeminence to the first three practices, thus emphasizing the self-defensive, negative posture of their ideal agent.

For Goffman, "tact," "reciprocal self-denial," and "negative bargaining" (favoring one's counterpart) signal the degree of social awareness and concern for others, possibly motivated by self-preservation, which interactants would display as a "ritually delicate object" (1967: 31). In spite of later developments in politeness research that somewhat obscured the originality of Goffman's face, his notion remains a primary object of interest for scholars engaged in the situated study of interpersonal behavior in general and of 'polite behavior' in particular.

Brown and Levinson's 'Face' and Its Critics

Brown and Levinson's positive and negative face is a cognitive, abstract, culture-dependent construct attributable to a rational agent; it makes extensive use of Durkheim's negative (avoidance) rituals. The dualistic notion of face and the emphasis on negative face and the notion of 'imposition' have attracted extensive criticism in subsequent Chinese and Japanese studies of politeness, as well as among other non Anglo-American scholars. Although Brown and Levinson acknowledge Durkheim as their source for negative and positive rites, their understanding of the sociologist's original concepts is substantively altered in their model; their ideal rational actor is busy protecting own and others' face, rather than giving, enhancing, or maintaining face. Emotions, when accounted for, are also means of face-protection.

Such a reductionist perspective has progressively laid bare the need for a sociopsychological and affective construct of face that resonates again with Goffman's original motivation for the study of interaction as being "not about the individual and his psychology, but rather the syntactical relations among the acts of *different persons mutually present to one another*" (1967: 2) (italics added).

It is Brown and Levinson's negative face (and negative politeness) that have been singled out for intensive scrutiny on grounds of cultural relativity. Further, their outline of positive and negative face as mutually exclusive in interaction has been challenged by empirical research that indicates, instead, the coexistence of many face wants calling on simultaneous positive and negative face-work. Similarly, the assumptions that only one type of face can be threatened at any given time and that Face Threatening Acts (FTAs) can be analyzed out of context are highly problematic.

The crosscultural validity of Brown and Levinson's model has buckled under the criticism of suffering from British 'cultural bias' (Baxter, 1984). Research in linguistic politeness in the 1990s indicated a split between cultures where face is a key explanatory construct in interpersonal behavior and those where other values such as discernment, deference, and respect play a more important role. Face and face-work will operate differently in socially stratified cultures (e.g. Japan and Mexico, where normative politeness is dominant) compared to status-based cultures (such as China and Korea), where normative and strategic (volitional) politeness coexist. Where status is allegedly less marked in interpersonal interaction and normative politeness is less in evidence (e.g., Northern

Europe and North America), the concern for face remains nevertheless relevant, even if expressed in a more understated way.

The consolidation of psychology research on the social self and social identity has opened up new contexts of relevance for the dynamics of face and face-work, calling on a modified model of face and politeness that breaks free from the straitjacket of cognitivist psychology. Another exciting development is the emergence of indigenous psychologies from Asia and Africa which, instead of testing Western formulations, may develop their own analytical models and constructs to make true crosscultural comparison possible.

Future of Face Research

For all the criticism of ethnocentrism that their model has generated, Brown and Levinson's work can boast an unmatched and continuing level of interest within the field of linguistic politeness research. Twenty years on, new insights from social and cultural psychology point in the direction of a culture-situated, dynamic understanding of face that gives consideration to other factors such as personal values, one's own self-concept, self-identity in various groupings, role expectations, and normative constraints (Earley, 1997: 95–97). After years of established disciplinary research in politeness, especially in anthropology and linguistics, face is becoming a privileged topic for interdisciplinary research. In addition, its cultural sensitivity calls for more international collaborative research if its sociocultural and philosophical roots are to be uncovered for further comparative analysis.

On a more abstract level, one could imagine face as a bridging concept between interpersonal interaction and social order in the sense that face, at the micro-level of verbal and nonverbal behavior, encapsulates and dynamically displays the manifestations of (macro-level) cultural values. Situated discourse would thus become the epistemological locus where observation and interpretation of face and face-work take place as within their most expressive environment. Alongside psychologists, anthropologists, and sociologists, in future social theorists may be called upon to explore a powerful construct that thus far has occupied but not yet exhausted the endeavors of most politeness scholars.

See also: Durkheim, Emile (1858–1917); Goffman, Erving (1922–1982); Intercultural Pragmatics and Communication; Politeness.

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Factivity

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Factivity is a semantic property of certain predicates, factive predicates, which take an embedded S-structure, preferably a *that* clause, as subject or object. The *that* clause of a factive predicate P is presupposed to be true when P is the main lexical predicate of a main clause (directly under a speech act of assertion, question, wish, command, etc.). Examples of factive predicates with factive object clauses are *know*, *realize*, and *have forgotten*. Usually the so-called affective factives are included, such as *regret*, *deplore*, and *be delighted*. (*Un*)*forgivable*, *pity*, and *regrettable* are predicates with factive subject clauses. Thus, *What a pity that she has left* presupposes that she has left. And *He hasn't forgotten that Jack played a trick on him* (with presupposition-preserving *not*) presupposes that Jack played a trick on him.

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Sometimes a predicate may take a sentential subject as well as a sentential object clause. Such double-complementation predicates are invariably factive with respect to their subject clause. For example, a sentence such as *That the butler had blood on his shirt suggested that he was the murderer* presupposes that the butler had blood on his shirt. This is a general, and so far unexplained, property of verbs that take double complementation.

Factive verbs are intensional in that they block *substitution salva veritate* of coreferential terms: *Luke realizes that the Morning Star is uninhabited* does not have the same truth conditions as *Luke realizes that the Evening Star is uninhabited*.

Some predicates are 'antifactive,' in that they induce a presupposition of the **falsity** of the embedded *that* clause. For example, *be under the illusion* is an antifactive predicate (likewise for the German *wähnen*, used by Frege (1892: 47) in the first modern observation of factivity).

In modern times, factivity was brought to the attention of the linguistic world by Kiparsky and Kiparsky (1971), who pointed out that factivity is not only a semantic but also a syntactic property, as factive predicates share a number of syntactic properties, in particular the impossibility of Subject Raising from the embedded clause, and the possibility of replacing *that* with the complex NP *the fact that*. The only exception is the prototypical factive verb *know*, which behaves syntactically as a nonfactive verb. This problem may be solved by assuming that *know* has lexically incorporated the NP *the fact* as part of its object clause, reducing the complex NP *the fact that* to the simple complementizer *that*.

See also: Extensionality and Intensionality; Lexical Conditions; Presupposition.

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Falc'hun, François (1909–1991)

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Canon Falc'hun was born in 1909 into a peasant family of North Finistère so he was a native speaker of Breton. He went to Lesneven College (or '*petit-séminaire*') and prepared for priesthood in the Grand-Séminaire of Quimper. Soon after his ordination, he asked his bishop for authorization to go to Paris to study phonetics and Celtic studies. A researcher in the Centre National de la Recherche Scientifique from 1939 on, he became a lecturer (1944) and Professor of Celtic (1952) in the Arts Faculty of Rennes. When Brest University was founded, he transferred there, which was near his own birthplace. From the age of 20 he suffered from tuberculosis, which obliged him to interrupt his work for long periods several times. He died in January 1991.

During his stay in Paris, Falc'hun recorded his own Breton language and studied its sounds with various instruments. He became particularly interested in 'initial mutations' in Breton, together with the exact pronunciation of consonant groups. His phonetic observations were also interpreted phonologically under the influence of M.-L. Sjoestedt-Jonval (Professor of Irish in the Ecole Pratique des Hautes Etudes), who had written a thesis on the phonology of Kerry Irish. According to Falc'hun, Breton consonants are divided into strong (*fortes*) and soft (*douces*, *lenes*), in 12 pairs. In a stressed syllable (that is, in the penultimate for most of the dialects), a strong consonant always follows a short vowel, and a soft consonant follows a long vowel. The initial mutation, called 'lenition' (voicing of voiceless stops, spirantization of voiced stops, etc.), is based on the opposition between strong and soft consonants: in the case of resonants, the strong variants are softened by the 'lenition.' This mutation occurs in every context where the word would have been originally preceded by a word with a vocalic ending: the following initial consonant has been assimilated to the vowel,

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As a consequence of these observations, in the years 1954–1955 Canon Falc'hun planned a reform of Breton orthography. This was later called the 'University spelling.' He felt the need for two different spellings for the velar spirants (the voiced and the voiceless). As the final stops of Breton do not have a voice opposition, he proposed to distribute the corresponding letters (-t/-d, c/-g) according to morphological classes.

His main thesis was devoted to 'linguistic geography': he maintained that the analysis of dialect maps on its own can enable us to understand the history of a language. Basing his study on the *Atlas Linguistique de la Basse-Bretagne*, by Pierre Le Roux (*see* **Le Roux, Pierre (1874–1975)**), he drew the different isoglosses, trying to establish the main frontiers between the dialects. Though his historical conclusions were fairly rational (as, for example, an innovating center in Carhaix, and archaizing zones in NW and SE), they sometimes suggested erroneous assumptions about what was archaic and what was not: Jackson (*see* **Jackson, Kenneth Hurlstone (1909–1991)**) later proved that the analysis of isoglosses on its own cannot lead one to differentiate archaisms and innovations.

Toward the end of his career, Canon Falc'hun wrote many articles and books on more popular subjects, most of which are condemned to oblivion. He was unfortunately unable to meet the scientific requirements of linguistic history and comparative grammar. His fantastic etymologies, his idea of a direct filiation between Gaulish and Breton, and his supposed 'Gaulish article' are all to be rejected.

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Falkland Islands: Language Situation

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The Falkland Islands comprise two large islands (East and West Falkland) and more than 300 smaller islands covering an area slightly larger than Jamaica. They are situated in the South Atlantic 12 800 km south of the United Kingdom and 480 km east of South America. Approximately 2500 people reside in the islands, with three-quarters living in Stanley, the capital and the only town located on the east of East Falkland, and the remainder living around the islands in settlements ranging in size from three to more than 30 people. (An additional 2000 to 3000 military and military-associated personnel are based in the islands at any one time.) All settlements outside Stanley and the land itself are collectively known as Camp, derived from the Spanish word *campo*, meaning 'countryside'. The islands have been English speaking since the 1830s, when a permanent British settlement was established on the previously uninhabited islands. This makes the English spoken in the Falkland Islands one of the youngest native Englishes in the world.

Regional Variation

The geographical isolation and small population of many of the Camp settlements has led to the assumption that different dialects emerged in different Camp settlements and closely resembled the English of the original settlers. In Stanley, by contrast, a new, southern-hemisphere dialect of English has emerged (Trudgill, 1986). This report is very likely to have been accurate in the early to mid 20th century and probably before the 1982 conflict between the United Kingdom and Argentina over sovereignty of the islands. However, in recent decades the increase in United Kingdom immigration to the islands and improved transport and communication links within the islands and to the outside world have resulted

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in such regional differences becoming less marked and a more homogenized variety of Falkland Islands English developing.

Social Variation

There is little in the way of variation along a socially-stratified continuum in Falkland Islands English, presumably as a result of the very small population and consequent lack of social class boundaries. However, in early Falklands history a small number of landowning settlers was sent to the United Kingdom for education, which resulted in a small group of near-received-pronunciation speakers.

Phonology/Phonetics

Phonemically Falkland Islands English is a Southern British variety sharing the phonemic system of Southern Britain and the other southern hemisphere Englishes. Phonetically, however, there are a number of differences between Falkland Islands English and the other southern hemisphere Englishes (New Zealand English, Australian English, and South African English), and there is also a high level of both inter- and intraspeaker variability. Key phonetic features of Falkland Islands English include the following:

- Nonraising of the front short vowels in TRAP, DRESS, and KIT, by contrast with the other southern hemisphere Englishes
- Weak allophonic distribution of the MOUTH and PRICE diphthongs, according to the pattern of Canadian Raising (Chambers, 1973)
- Tendency toward a long front realization of BATH/START/PALM lexical sets
- Gradual focusing on schwa in unstressed syllables

In terms of intonation, Falkland Islands English shares high raising terminals at the end of statements with the other southern hemisphere Englishes.

Syntax

Falkland Islands English has few grammatical features that distinguish it from Southern British English.

Lexicon

There is a small amount of island-specific vocabulary in Falkland Islands English, particularly in comparison with other southern hemisphere Englishes. The majority of local lexical items derive from Spanish and are connected with horse-riding gear and place names, most likely a legacy of 19th century South American gauchos who worked transiently in the islands. Such loanwords have been 'Falklandized' and have distinctive Falkland Islands English pronunciations, almost unrecognizable from the Spanish. Examples include the place name *Tranquilidad*, pronounced [triŋkəli:da:], and *rebenque* 'whip', which is pronounced [rəvɪnki:].

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False Friends

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The term 'false friends' (*faux amis*, in French) was coined by M. Koessler and J. Derocquigny (1928) in their classical, seminal work on this topic. From a synchronic point of view, the linguistic phenomenon of false friends can be defined as the fact that two given words are similar or equivalent graphically or phonetically in two or more given languages but have different meanings. In other words, false friends share their signifiers, but they do not share their meanings. For that reason, false friends are extremely insidious traps for translators. To illustrate just how problematic false friends can become, take the Spanish term for them, *falsos amigos* – now widely used in linguistics and translation studies; it results from inadequate translation of French *faux amis*. In Spanish, a treacherous, disloyal, or unfaithful friend is not properly called *un falso amigo*, but *un mal amigo*, literally 'a

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bad friend.' Although 'false friends' is the most common term applied to the phenomenon under discussion, other names, such as *false equivalents* and *false cognates,* also have been used (Buncic, 2000). Nevertheless, it should be stressed that the concepts of false friends and false cognates (from Latin *cognatus*, 'relative') are quite different because all false cognates are false friends but not all false friends are false cognates. For instance, Italian *burro* 'butter' and Spanish *burro* 'ass, donkey' are false cognates and false friends. By contrast, French *personne* 'nobody' and English *person* are false friends but, given that they are etymologically related, they aren't false cognates. In other words, the set of false friends includes the set of false cognates but not vice versa.

False friends can be classified in two groups: **chance false friends** and **semantic false friends**.

Chance false friends are those words that are similar or equivalent in two or more given languages but without any semantic or etymological reason for this overlap. The English noun *coin* and the French noun *coin* 'corner' have exactly the same graphic shape because of a fortuitous diachronic process. Similarly, the Portuguese word *chumbo* 'lead' and the Spanish noun *chumbo* 'Indian fig, prickly pear' are not etymologically related at all. In fact, chance false friends could be considered as the equivalents, in two or more given languages, of homonymic words in a single natural language. Such false friends also are false cognates.

Semantic false friends are those words that are similar or equivalent in two or more languages because they are etymologically related. That is, semantic false friends have the same etymological origin but have developed different meanings in each language. For that reason, semantic false friends could be considered the equivalents, in two or more given languages, of polysemous words in a single natural language. Semantic false friends can in turn be divided into two groups: (1) full false friends, which are those words that have completely different meanings; and (2) partial false friends, which are those words that have several senses, some of which coincide in both languages whereas others do not. The Spanish word *bigote* 'moustache,' English *bigot,* and French *bigot/bigote* are cases of full false friends because there is no possible context in which the Spanish word can be (correctly) translated into the English or French words. By contrast, Spanish *actual*, French *actuel/actuelle* and German *aktuell* are only partial false friends with regards to English *actual* because, although all three usually mean in ordinary language 'up-to-date' or 'current,' they also can mean *actual* 'real, existing in fact' in philosophical jargon. The English noun *injury* is another perfect example of a partial false friend with regard to Spanish *injuria*, Portuguese *injúria*, and French *injure*. *Injury*, *injuria*, *injúria*, and *injure* are rooted in Latin *injuria* 'offence, injustice.' Spanish, Portuguese, and French have more or less kept the original Latin meaning of that word. As a consequence, the Spanish, Portuguese, and French terms are not false friends with regard to the English one, in which *injury* is a synonym for 'insult,' 'offence,' or 'injustice.' But the English term is also used metaphorically and/or euphemistically to mean 'wound'. So that when *injury* is a synonym for 'wound' we are dealing with a false friend with regard to *injuria*, *injúria*, and *injure*. This means that certain word plays and double entendres that are possible in English are impossible in Spanish, Portuguese, or French: for instance, the play on words in *The resulting lawsuit injured her more than the actual automobile accident had done*.

The study and knowledge of semantic false friends is especially interesting and beneficial for translators. When false friends are etymologically related, speakers may fail to recognize that their meanings are quite different. Usually the hearer or reader of a translation can detect erroneously translated false friends by means of a pragmatic strategy when detecting an inconsistency in the text. Nevertheless, there are also cases in which the translated text or utterance may make sense, but what the hearer/reader understands may be quite different from what the speaker or writer was trying to say (Chamizo-Domínguez and Nerlich, 2002).

As words change their meanings inside a single language, false friends develop by one or or more well-known mechanisms; namely, metaphor, amplification or restriction of meaning, amelioration or pejoration, metonymy, borrowings, euphemism or dysphemism, irony, and so on (Chamizo-Domínguez and Nerlich, 2002).

Let us consider some examples.

1. Metaphor. In addition to its literal meaning, the Spanish noun *canguro* 'kangaroo' has developed the metaphorical meaning (now lexicalized and widely used) of 'babysitter,' whereas the English word has not developed any such metaphorical meaning, except perhaps in the collocation 'kangaroo court', i.e., 'illegal court.'

2. Amplification of meaning. The Spanish adjective *inexcusable* shares the meaning of 'indefensible, unjustifiable, unpardonable' with its English cognate, but the Spanish word, in addition, has amplified this shared meaning and also means 'unavoidable.'

3. Amelioration/pejoration. The English noun *topic* and the Spanish counterpart *tópico* 'commonplace' are perfect examples of semantic false friends. It should be stressed, however, that both words are related to the Greek word *topos* 'place, site' and have

emerged from an allusion to Aristotle's work *Topics*. *Topic* has become a synonym for 'subject of a text or discourse' in English because of a process of amelioration through which the standard meaning of the Greek term changed its meaning. By contrast, the standard meaning of the Spanish word *tópico* is the outcome of a process of pejoration, a process which sent the word in the opposite direction semantically. So when an English lecturer teaches *a topic* she/he can be regarded as an excellent teacher, whereas a Spanish one who teaches *un tópico* can be regarded as a terrible teacher. By contrast, the French cognate *topique* (mainly used in medical jargon) has kept a meaning very close to the usual meaning of Greek *topos*.

4. Metonymy. Take the case of the Spanish word *baño* and the French word *bagne*. Both derive from Latin *balneum* 'bath, bath house,' but *baño* means 'bath' or 'bath house,' whereas *bagne* has the standard meanings of 'prison,' 'dungeon,' and 'hard labor,' as well as the slang or familiar meaning of 'work' or 'the site where a person works.' But in the past the Spanish word *baño* also meant 'prison' or 'dungeon', as illustrated by the title of the well-known work by Miguel de Cervantes, *Los baños de Argel* 'The dungeons of Algiers.' It has to be said, however, that few Spaniards (and that includes most scholars) know this old-fashioned meaning of *baño*. The meaning of 'prison' for *baño* and *bagne* originated in a metonymy based on the fact that the Turks used to imprison their captives inside Constantinople bath houses. From these initial conditions the following metonymic chain of semantic changes arose: (1) French has lexicalized the meaning of 'prison' for *bagne*; (2) by means of a second metonymy the meaning 'hard work' has become lexicalized in *bagne*; and (3) by means of a third (and perhaps humorous/ironic) metonymy the meaning of 'work' has been added. As a result of this diverging chain of metonymies the words *baño* and *bagne* have now become false friends, because, whereas French *bagne* is synonymous with *pénitencier*, *galères*, *enfer*, *préside*, or *travaux forcés*, current Spanish *baño* is not. Both words are false friends with regard to the English word *bagnio* that was borrowed from Italian *bagno* 'bath, bathing house' with the euphemistic meaning of 'brothel,' which was in use in English from the 17th to the 19th century and probably beyond.

5. Borrowings. Given that most words are polysemous, when a concrete term is borrowed it usually becomes a (partial) false friend by means of a restriction in meaning. English *check* has been borrowed by lots of languages but is restricted to the field of banking. Similarly, German has borrowed English adjective *soft* in the collocation *soft Eis*, but what Germans call *soft Eis* is what English speakers call *ice cream*.

6. Euphemism/dysphemism. Although the Latin word *latrina* (related to *lavare*, 'to wash') was coined as a euphemism for *cloaca*, it has acquired a dysphemistic flavor in most European language (e.g., English *latrine*, Spanish *letrina*, French *latrine*, or German *Latrine*), because it is used in barrack room contexts. As a result of this, English *latrine* and Latin *latrina* have become false friends because, if they are used in the same context, a different register is evoked and different implicatures arise.

7. Irony. Spanish *bárbaro/bárbara* has developed, in addition to the meanings of 'brute,' 'cruel,' 'inhuman,' or 'ferocious,' which are shared with English *barbaric/barbarous*, the ironic meaning (now widely lexicalized) of 'fantastic,' 'terrific,' 'great,' or 'super' (cf. colloquial English *wicked*).

When one of these kinds of semantic change takes place in a given language false friends are likely to arise. And this happens not only with common nouns, adjectives, and verbs but also with proper names. For instance, the Spanish toponym *Cabo de Hornos* 'Cape Furnaces' originated in the erroneous translation of English *Cape Horn* and/or Dutch *Kaap Hoorn* because of the graphic similarity between Spanish *horno* 'furnace' and the English or Dutch word. And, as a result of this erroneous translation, *Cabo de Hornos* and *Cape Horn/Kaap Hoorn* have become false friends.

Although false friends are usually analyzed as words in isolation, many terms only become false friends in the context in which they are used. In fact, there are numerous words that are not false friends at all when they are considered in isolation but that become false friends when they are part of an idiom. It should be stressed that most idioms can be understood both according to the literal meaning of their component words and according to any figurative interpretation. This figurative meaning becomes the most salient one when idioms are fully lexicalized. The literal translation of *French letter* (euphemism for 'condom') into French *lettre française* has only the literal meaning, 'letter in French.'

See also: Idioms; Irony; Metaphor and Conceptual Blending; Metaphor: Philosophical Theories; Metaphor: Psychological Aspects; Metonymy; Polysemy and Homonymy; Taboo, Euphemism, and Political Correctness; Translational Equivalence.

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Family Speak

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To work on family speak is to be interested in language as it is used in the private space. Family interactions have special features that make them a particularly revealing object of research. As in any interaction, power relationships exist, especially between parents and children (*see* **Power and Pragmatics**) But the intimacy that prevails in a family setting is unique: no other context presents so great a degree of proximity between participants or so great a volume of shared references owing to a common past (*see* **Shared Knowledge**). The intimacy of the family context affects discourse in three ways: (1) informality, since family speak is the most informal discourse there is, (2) the major role played by implicit understanding due to shared references, and (3) the particularly high number of metapragmatic or metadiscursive comments (especially in exchanges with children), since the home is a privileged venue for pragmatic learning (*see* **Language Socialization; Metapragmatics**).

Work on family discourse allows us to reconsider some important issues in pragmatics, namely:

1. The socialization of children. The family is the matrix of socialization and of the constitution of identity. As a result, family interactions offer an ideal means for observing processes involved in the acquisition of pragmatic competencies and the transmission of social and cultural values. Various strategies related to these processes have been studied, notably the use of control acts (particularly well documented), topic management, and metapragmatic comments. Narrative and explanatory talk have also been the object of interesting studies (*see* **Narrativity and Voice**). Several of the works listed were conducted from a cross-cultural perspective and highlight the differences observed from one linguistic community to another (*see* **Scaffolding in Classroom Discourse; Pragmatics: Overview**).
2. Politeness. In canonical models of politeness (notably Brown and Levinson, 1987), face-threatening acts (FTAs) are classified based on how directly or indirectly they are carried out, and the greatest politeness is associated with the greatest degree of indirection. It appears, however, that nagging, insults, complaints, and other FTAs occur frequently in family conversations, often in a direct form, without causing a deterioration in the family climate. These acts are not perceived as crude. In family speak, therefore, the direct nature of the act does not indicate impoliteness, and facework is done differently. By documenting how FTAs occur in the context of intimacy, works on family speak therefore help relativize the scope of norms that some consider universal in terms of politeness (*see* **Politeness; Face**).

See also: Face; Language Socialization; Metapragmatics; Narrativity and Voice; Politeness; Power and Pragmatics; Pragmatics: Overview; Scaffolding in Classroom Discourse; Shared Knowledge.

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Fanagalo

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Fanakalo (also spelled Fanagalo) is a southern African pidgin language that continues to be used two centuries after its inception. It is used in parts of South Africa, Zimbabwe (where it is usually known as Chilapalapa), Mozambique, Malawi, Zambia, and Namibia where it has been carried by migrant workers in the South African mines. Within South Africa it is spoken mainly in the provinces of KwaZulu-Natal and Gauteng (the mining area).

Fanakalo can be described as a 'crystallized' pidgin in terms of its fairly stable structure and circumscribed contexts of use. It is a contact language used prototypically in work situations: on farms, in the mines of the Witwatersrand that draw a multilingual workforce from all over southern Africa, in other urban labor situations, and in domestic employment (between employers and maids, cooks, gardeners). One can hear it in situations of sustained labor contacts, as well as in 'transactional' communications as in gas stations, shops, markets, and the like. In South Africa in provinces other than KwaZulu Natal and Gauteng, Fanakalo is less well known, as the rival urban lingua franca in the domain of labor is Afrikaans. In rural areas, population demographics often dictate that white farmers and their families acquire the local Bantu language, especially Tswana in the Free State, Xhosa in the eastern Cape, and Zulu in KwaZulu-Natal. In former times, Fanakalo was also used in nonlabor contexts when Europeans and/or Indians had no other means of communication with each other. Thus, it was used sporadically "by white men amongst themselves when no other means of communication are available" (Mayne, 1947: ii) and when North Indians had no other means of communication with South Indians (Mesthrie, 1989).

Fanakalo use is receding slightly as English spreads as a lingua franca among younger people, even on farms. In addition, its use is no longer officially sanctioned in the mines of post-apartheid South Africa because of its long-standing association with cheap labor and racism. However, there are still ample situations in which it is used, including some nonlabor contexts (Adendorff, 1995). Two such uses are a kind of expatriate solidarity or nostalgia for things South African expressed by some expatriates in light-hearted communications with family in South Africa or as a secret language for Zimbabwean or KwaZulu-Natal tourists abroad, especially for those who do not speak a Bantu language or Afrikaans. Fanakalo is sometimes used by Zulu speakers as a playful form of code divergence that signifies harsher relations with interlocutors than is possible using Zulu (Adendorff, 1995).

Origins

The first sustained contacts between Europeans and indigenous peoples in South Africa took place in the western Cape in the 17th century, where Afrikaans arose as a lingua franca out of the experience of colonization and slavery. When Afrikaners moved into the eastern Cape from about 1770 onward, Afrikaans was no longer a viable means of communication with the Xhosa people, and several strategies of communication arose: by signs, by simplified Xhosa, by simplified Afrikaans, or by a mixture of these methods (Mesthrie, 1998). With the arrival of the first batch of settlers from England, English was added to the frontier in 1820.

Fanakalo probably came into existence amid these diffuse communicational circumstances in the eastern Cape in the early 1800s. Mesthrie (1998: 13) gave the earliest recorded sentence in the pidgin as *Wena tandaza O Taay* 'You (must) worship God' (uttered by the missionary John Reid, Kat River 1816, who thought he was speaking Xhosa). Fanakalo does not seem to have been widespread in this period: It is but one of several communication strategies that appear in the archival and travel literature of the times, and judging from the sources it was used not very frequently.

Among the many diffuse strategies of communication on the eastern Cape frontier, the one that won out later in the new colony of Natal (established in 1843 further north along the coast) was the Fanakalo option. The pidgin, which was initially known as 'Kitchen Kaffir' in this colony, was likely brought over by people with experience of the frontier: Afrikaners away from the British in the Cape Colony, their 'colored' servants, English adventurers, and possibly some officials. No concrete evidence of this link exists, however, and the brief accounts of Fanakalo give a picture of a pidgin being invented anew from contacts between British settlers and the Zulus who outnumbered them. Two major crystallizing events for Fanakalo took place in this period: (1) the arrival of indentured Indians in large numbers in the coastal province of Natal (starting in 1860); and (2) the discovery of diamonds and gold in the interior (starting in 1867).

Structure

Although Fanakalo has none of the inflexional/agglutinative richness of Zulu (see Cole, 1953), it is not as impoverished as one might expect of a pidgin. It has four tense markers used with verbs, which are all derived from Zulu (or Nguni languages generally): *-a* (for infinitive, imperative, and present tense verbs); *-ile* (past tense); *zo* (future); and *gate* (anterior). The first two tense markers are suffixes, whereas the future marker *zo* occurs either as a free form that precedes the verb or as [z] cliticized to the subject pronoun. The fourth tense marker, *gate* (phonetically [gate] < Zulu *kade* 'long ago') is in the process of being grammaticalized for pluperfect and habitual past.

Other verb inflections, which are all taken from Zulu/Nguni, are the following:

-isa (causative), e.g., *theng-a* 'buy' versus *theng-isa* 'cause to buy, sell'
-wa (present passive), e.g., *phek-a* 'cook'; *phek-wa* 'is cooked'
-we (past passive), e.g., *phek-a* 'cook'; *phek-iwe* 'was cooked.'
-ela (benefactive), e.g., *theng-a* 'buy'; *theng-ela* 'buy for'-'Buy (a shirt) for (me)'

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Phonetically, Fanakalo is subject to wide variation depending on the L1 of the speaker. The common core tends to use a five-vowel system (like Zulu) with two diphthongs, [ai] and [au], and to replace the clicks by velar /k/.

See also: Bantu Languages; Interactional Sociolinguistics; Lingua Francas as Second Languages; Malawi: Language Situation; Mozambique: Language Situation; Namibia: Language Situation; Pidgins and Creoles: Overview; South Africa: Language Situation; Xhosa; Zambia: Language Situation; Zimbabwe: Language Situation; Zulu.

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Gunnar Fant was born on October 8, 1919. He obtained an electrical engineering degree in 1945 and Doctor of Science in 1958, from the Kungliga Tekniska Högskolan (Royal Institute of Technology, KTH) in Stockholm. After working at Ericsson Telephone Company and then spending two years at the Acoustics Laboratory and Physics Department of the Massachusetts Institute of Technology, he returned to KTH and headed its Speech Transmission Laboratory from 1951 to 1966. From 1966 to 1987, he was a professor at KTH, in charge of its newly founded Department of Speech Communications and Music Acoustics. He is currently Professor Emeritus and Senior Research Fellow at KTH.

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Structure

Although Fanakalo has none of the inflexional/agglutinative richness of Zulu (see Cole, 1953), it is not as impoverished as one might expect of a pidgin. It has four tense markers used with verbs, which are all derived from Zulu (or Nguni languages generally): *-a* (for infinitive, imperative, and present tense verbs); *-ile* (past tense); *zo* (future); and *gate* (anterior). The first two tense markers are suffixes, whereas the future marker *zo* occurs either as a free form that precedes the verb or as [z] cliticized to the subject pronoun. The fourth tense marker, *gate* (phonetically [gate] < Zulu *kade* 'long ago') is in the process of being grammaticalized for pluperfect and habitual past.

Other verb inflections, which are all taken from Zulu/Nguni, are the following:

-isa (causative), e.g., *theng-a* 'buy' versus *theng-isa* 'cause to buy, sell'
-wa (present passive), e.g., *phek-a* 'cook'; *phek-wa* 'is cooked'
-we (past passive), e.g., *phek-a* 'cook'; *phek-iwe* 'was cooked.'
-ela (benefactive), e.g., *theng-a* 'buy'; *theng-ela* 'buy for'-'Buy (a shirt) for (me)'

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theory. Most current work in speech technology is based on this theory of vowels and consonants, as discussed in his monograph, *Acoustic theory of speech production* (1960). Based on this new theory, he created a speech synthesizer, implemented as an electrical circuit, resonant frequencies of which were controlled by moving a handle on a plane (OVE I). The quality of the artificially produced speech signals using this principle (series formant synthesis scheme with added circuits and an improved controlled scheme, OVE II) has not been surpassed, even by the most modern computer-based speech synthesis work. It provided solid experimental evidence for the accuracy of his approximation theory. Currently, he works on prosodic characteristics of speech signals, research well beyond the scope of his previous seminal work on segmental phonetics, in collaboration with Dr. Anita Kruckenberg.

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Professor Fant is a member of the Royal Swedish Academy of Engineering Sciences (Gold Medal, 1959), the Royal Swedish Academy of Science (Large Gold Medal, 1998), the American Academy of Arts and Sciences, and the U.S. National Academy of Engineering, and is a Fellow of the Acoustical Society of America (Silver Medal, 1980) and of the European Speech Communication Association (Gold Medal, 1989).

Faroe Islands: Language Situation

M P Barnes, University College London, London, UK

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The Faroes were settled by Scandinavians about AD 800. There was no indigenous population, so the language of the islands came to be based entirely on the speech of the settlers, most of whom seem to have hailed either directly or indirectly from western Norway. By the time of the Reformation, the Faroes, together with Norway, were ruled from Denmark. Danish became the language of public discourse in the islands, and the sole written medium. Although all the Scandinavian tongues have a common origin, 16th-century Faroese and Danish were almost certainly no longer mutually comprehensible, so the natives were compelled to learn a modicum of the rulers' language in order to deal with authority and participate in church services. The degree to which the Faroese mastered the new tongue doubtless varied, but by the latter half of the 18th century Danish influence on the native idiom was so strong that one influential writer proposed abandoning Faroese altogether.

The advent of National Romanticism in the 19th century saw the development of an etymologically based (effectively Icelandic) orthography for Faroese, and the publication of a grammar of the language. Although subject to criticism for being too far removed from spoken forms, the new orthography was adopted by almost all who began to write and print in Faroese, and is still in use today. The last 150 years have seen the status of Faroese grow to the point where it is now the principal language of the islands, used in administration, church, education and the media. Nevertheless, Danish remains an official language, which all inhabitants of the Faroes are required to learn thoroughly. Even though granted home rule in 1948, the islands are still part of the Danish realm. And with the estimated number of Faroese speakers put at around 60 000 (of whom some 44 000 are resident in the islands, together with perhaps 1000 Danish speakers), linguistic self-sufficiency is hard to achieve. There is a lack of textbooks in Faroese in

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some subjects, especially at higher levels; magazines and trivial literature tend to be in Danish, as do many television programs (when not American); and most forms of higher education have to be pursued in Denmark or elsewhere abroad.

Spoken Faroese is still strongly influenced by Danish, especially the lexicon. In the light of the political and social history of the islands, this encroachment has led to the adoption of a purist policy for the written language and for public discourse. It is argued that unless a clear line of demarcation is drawn, Faroese could yet become so inextricably mixed with Danish it would effectively cease to have an independent existence. Dictionaries have reflected this policy by excluding hundreds of words in everyday spoken use on the grounds that they are Danish, while listing many Faroese neologisms created to replace Danish or international terms (e.g., *telda* 'computer,' derived from *telja* '[to] count,' *ferðaseðil* 'ticket,' literally 'journey paper,' for which the spoken language uses *bilett* from Danish/French *billet*). Recently the purist line has been attacked by some, who see written Faroese as artificial and too far removed from the spoken idiom. With increasing internationalization, linguistic attitudes may well change.

See also: Danish; Language Education for Language Revival; Minorities and Language.

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Feature Organization

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Early Views

What are speech sounds composed of? An early answer to this question was that speech sounds are definable as 'bundles' of simultaneous features having no internal organization (Bloomfield, 1933). However, a number of observations beginning in the mid 20th century called this view into question. A first discovery, stemming from such work as Hockett (1942), Harris (1944), Firth (1957), and others, was that features may have different scope across the segments of which a word or phrase is composed. A 'long component' (Harris) or 'prosody' (Firth), such as emphasis in Arabic or vowel harmony in Turkish, typically extends over many segments. Even more strikingly, perhaps, the study of the tone languages of Africa and elsewhere has shown that tones are typically asynchronic with segments, in the sense that several tones can be sequenced on a single syllable, giving rise to contour tones, while single tones can extend across several syllables. Some morphemes have been found to consist of tones alone, and most spectacularly, tones can 'float,' exerting a decisive influence on the tone contour of an utterance despite having no segmental realization themselves (for reviews of these and other 'nonlinear' properties of tone systems, see Goldsmith, 1990; Yip, 2002). Work in autosegmental phonology and related frameworks has brought to light many analogues to these properties among segmental features.

If features are not organized into unstructured 'bundles,' what is their organization? Earlier work in phonology gave scant attention to this question, though there were suggestions, from time to time,

that features could be classified into related classes or families and that such families could behave as units in regard to phonological processes (see, e.g., Trubetzkoy, 1969; Lass, 1975). The view that has gained most currency in recent work, from Clements (1985) to Padgett (2002), is that features are structured into *feature classes*, which combine in various ways to form higher-level units – notably the familiar consonant and vowel segments, but also incompletely specified subsegments. If features play a role in modern phonological theory similar to that of the atom in physics, feature classes play a role similar to that of the molecule: thus, segments are assigned a quasimolecular structure in which each 'molecule' corresponds to an independent articulator of the vocal tract (the tongue, the lips, the velum, the glottis, etc.). A further level of organization groups these smaller classes into larger classes corresponding to composite articulatory structures such as the oral cavity or the larynx. The resulting structure forms a comprehensive hierarchy of features.

Feature Geometry

This conception can be formalized in different ways. One well-known approach is that called *feature geometry*. This approach proposes to characterize feature structure within the general framework of autosegmental phonology. It addresses questions such as the following:

- What is the internal structure of speech sounds?
- How do speech sounds interact in phonological systems?
- What are possible and impossible phonological processes?

In its earliest and simplest form (Clements, 1985, drawing upon earlier suggestions by Mascaró and Mohanan), the basic premises of feature geometry are the following:

(1) a. Features may be grouped into feature classes.
b. Classes form a strict hierarchy that can be represented as a rooted tree.
c. This hierarchy is universal (identical in all languages).
d. Each feature and feature class is represented as a node on a separate autosegmental tier.
e. Each such node links to elements of just one higher-level tier.

This conception of feature organization can be illustrated by the tree structure in Figure 1, which shows the (highly simplified) representation of the doubly articulated labial velar stop [kp], found in many African languages. (The English speaker can approximate this sound by attempting to pronounce the word *backpack* without the initial *ba*.)

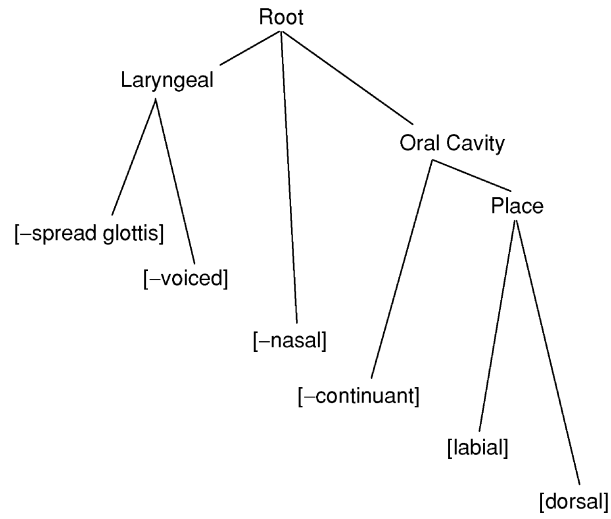

Figure 1 Organization of features in the sound [kp].

In this diagram, the Root node dominates all features. The Laryngeal, Oral Cavity, and Place nodes are intermediate class nodes, and [−spread glottis], [−voiced], etc., are the features themselves, constituting terminal nodes of the tree. Each node (including the features) is placed on a separate line representing an independent autosegmental tier. Note that features on different tiers are not ordered with respect to one another; for instance, [labial] neither 'precedes' nor 'follows' [dorsal]. Figure 1 illustrates the various properties in (1): (1a) features are grouped into classes, (1b) classes form a strict heirarchy, (1c) the hierarchy is universal by hypothesis, (1d) each feature and class is represented as a separate node on a separate tier, and (1e) each node links to the elements of just one higher-level tier. It follows from the latter assumption that features belong to (at most) one immediately superior class; thus, for example, no feature can link to both the Laryngeal node and the Place node.

How is the membership of feature classes determined? In feature geometry, classes are determined *functionally* rather than phonetically. A set of features forms a class if it behaves as a cohesive unit with regard to phonological statements and processes. As an example, let us consider NC (nasal + consonant) clusters in Spanish. The phoneme /n/ of the article *un* has several realizations, depending on the sound that follows. Examples are shown in Table 1.

If the following sound is a vowel or glide, as in the last example in Table 1, /n/ is realized as a dental sound. But if the following sound is a consonant, /n/ acquires its place of articulation, being realized as labial before the /p/ of *pulpo*, velar before the /g/ of

Table 1 Place assimilation across word boundaries in Spanish

u[m] pato	'a duck'	(labial)
u[ŋ] gato	'a cat'	(velar)
u[n] topo	'a mole'	(dental)
u[n̠] choco	'a cuttlefish'	(post-alveolar)
u[n] oso	'a bear'	(dental)

Table 2 Word-internal place assimilation in Spanish

ca[m]po	'field'	(labial)
ca[n]to	'chant'	(dental)
ca[n̠]cho	'rock'	(postalveolar)
ca[ŋ]co	'flower pot'	(velar)

gato, and so forth. The same preconsonantal distribution is found within words, as shown by the examples in Table 2.

These examples show that the various features that define the property 'place of articulation' behave as a single unit in Spanish. Rather than the assimilation rule's being stated in terms of each individual place feature ("/n/ is realized as [labial] before labial sounds, [dorsal] before dorsal sounds," etc.), it may be stated once and for all by making reference to the Place node, which groups all oral cavity place features together: "Nasal consonants share the Place node with a following consonant." The NC cluster is accordingly treated as a linked sequence comprising internally sequenced manner features ([+nasal] followed by [−nasal], etc.) but a single Place specification, as shown by the representation of relevant features of *ninfa* [nimfa] 'nymph' in Figure 2.

Each segment is said to be 'characterized' by the features it dominates in the tree. Thus [m] is characterized as [labial], [+nasal], and [−continuant], while [f] is characterized as [labial], [−nasal] and [+continuant]. The fact that the nasal acquires a labiodental rather than a bilabial realization can be explained on the assumption that the Place node receives a uniform articulatory interpretation at the phonetic level.

As this example illustrates, the Place node has been determined on purely phonological grounds, following the observation that in Spanish, as in many other languages, all place features constitute a functional unit. As place features tend to behave as a single group across languages, they are gathered into a single Place class. Though phonetic considerations were not used as a criterion in setting up this class, it is not a phonetically arbitrary one, but comprises the set of features that define the location of the primary constriction of a segment in the oral cavity. In this case (and others), the feature classes brought to light by the study of phonological patterns prove to have certain phonetic properties in common. This is surely not an accident, but shows that the feature hierarchy has its phonetic basis in speech articulation. The complete feature hierarchy resembles a simplified image of the vocal tract, in which each class represents a functionally independent articulator or articulator set.

Given these various observations, we may formulate the following claim:

(2) Phonological statements (rules, constraints) take single nodes as arguments.

This means that phonological statements may operate only on single nodes in the tree. Place of articulation assimilation in Spanish provides a good illustration; this rule targets a single node (the Place node), requiring that nasal consonants must share this node with the following consonant in the word or phrase. The empirical interest of (2) in cross-linguistic perspective is that it heavily constrains the set of imaginable phonological rules, dividing them into two classes: 1) possible rules, 2) impossible rules. Spanish nasal assimilation is a possible rule, as it conforms to (2); but a similar rule requiring a nasal consonant to assimilate to a following consonant in terms of an arbitrary set of features, such as [labial], [voiced], and [lateral], would not meet this criterion, as no single node groups just these features and no others. A great deal of research has tended to corroborate this claim, at least for the better-understood features; for example, the arbitrary rule just stated is unattested across languages, as far as we know. One of the major results of work in feature geometry has been its ability to provide a much narrower characterization of the notion 'possible rule,' and hence 'possible process,' than has been achieved in other approaches.

Later Developments of Feature Geometry

The rather simple conception outlined above has been modified and elaborated in later work. A first development came from the work of McCarthy (1988). McCarthy reviewed the various properties that have traditionally been seen as diagnostics of autosegmental representation, including the following:

(3) a. Assimilation
b. Dissimilation
c. Floating features
d. Contour features
e. Single-feature morphemes

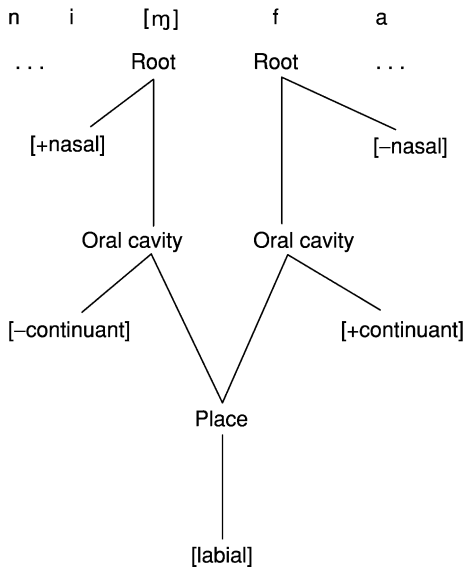

Figure 2 One place node characterizes two sounds in the Spanish word *ninfa*.

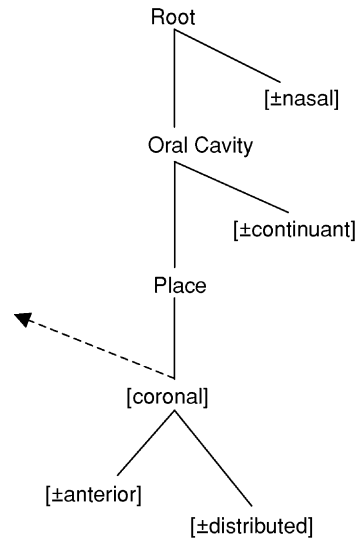

Figure 3 The spread of [coronal] entails spread of its dependent features.

He pointed out that while some features (e.g., those characterizing tone, place of articulation, voicing) satisfy some or all of these diagnostics across languages, at least two apparently do not: the major class features [±sonorant] and [±consonantal]. If we place these features on separate autosegmental tiers, we will incorrectly predict that they will exhibit some or all of the properties listed in (3). In order to exclude this possibility, McCarthy proposed that [±sonorant] and [±obstruent] should be features of the root node, rather than autonomous features in the autosegmental sense. While this proposal has been contested (for discussion of [±consonantal], see especially Kaisse, 1992), counterexamples have proven scarce, and it has tended to be widely accepted. However, this result requires a modification of statement (1d), restricting it only to those features that exhibit autosegmental properties such as those listed in (3).

A second important development comes from articulator theory, as developed by Sagey (1990) and Halle (1995). Halle noted that autosegmentally represented features can be divided into two types: those that depend for their execution on one or another of the articulators ([labial] = lips; [coronal] = tongue front; [dorsal] = tongue body, etc.), which they term *articulator dependent*, and those that are not, which they term *articulator free*. Examples of articulator-dependent features are [±anterior] and [±distributed], which are executed exclusively by the tongue-front articulator [coronal], and examples of articulator-free features include [±continuant] and [±consonantal], which can be executed by any of several articulators. Regarding the first, Sagey observed that whenever one segment assimilates to another in coronality, its dependent features of [±anterior] and [±distributed] always spread along with it. For example, if a labial sound such as *m* assimilates to a nonanterior coronal sound such as [tʃ], it will become not only coronal (for this, a shift to [n] would suffice) but also nonanterior (postalveolar). This regularity can be expressed by placing [±anterior] and [±distributed] under [coronal] as *dependents*, as shown in Figure 3.

Given this representation, the spread of [coronal] to a preceding segment, as indicated by the dashed line, will entail the spread of its dependent features as well. In contrast, the higher-level features [±continuant] and [±nasal] are unaffected. In general, as this example illustrates, higher-level structure tends to remain stable under processes that affect lower-level structure – another strong and apparently correct claim of feature geometry.

A further innovation in Sagey's work is the classification of speech sounds into three types: *complex segments*, containing two unordered place specifications; *contour segments*, containing two internally sequenced features; and *simple segments* comprising all others. Complex segments include the labial-velar stops *kp* and *gb* of many sub-Saharan African languages (as shown in Figure 1) or the clicks of many South African languages, both of which combine a velar closure with another closure located further forward in the mouth, as well as consonants with minor (or secondary) articulations, such as labialized k^w. Contour segments include affricates, such as t^s, containing successive [−continuant] and [+continuant] components, and prenasalized stops,

Table 3 A single set of place features for consonants and vowels

Feature	*In consonants*	*In vowels*
[labial]	labials, labialized consonants	rounded vowels
[coronal]	coronals, palatalized consonants	front and retroflex vowels
[dorsal]	velar and uvular consonants, velarized and emphatic consonants	back vowels
[pharyngeal]	uvular and pharyngeal consonants, pharyngealized and emphatic consonants	pharyngealized vowels

such as ^{n}d, containing successive [+nasal] and [−nasal] components. The recognition of contour segments greatly extends the expressive power of the theory, and for this reason they have come under close scrutiny; it now appears, for example, that affricates can be reanalyzed as simple stops with no [+continuant] component (see Kehrein, 2002, and references therein).

A third development in feature geometry is unified place theory, as summarized in Hume (1994), Clements and Hume (1995), and references therein. The basic innovation of this approach is its use of a single set of articulator features to express related places of articulation in vowels and consonants, as shown in Table 3.

(Note that uvulars are characterized as both [dorsal] and [pharyngeal].) This approach captures the close phonological relationship between homorganic consonants and vowels by assigning them the same features. Thus, rounded vowels share the feature [labial] with labial consonants; front vowels share the features [coronal] and [−anterior] with palatal consonants; back vowels share [dorsal] with velar and uvular consonants; and so forth. This analysis allows common processes of consonant/vowel place assimilation to be expressed as the spreading of Place features. For example, the shift of /pi/ to [pu] is characterized as the spread of [labial] from the consonant to the vowel, while velar palatalizations such as /ki/ > [ci] are characterized as the spread of [coronal, −anterior] from the vowel to the consonant. A formal consequence of this approach with respect to earlier work is that features such as [labial] and [coronal] must be allowed to link to two different tiers of structure (C-place in the case of consonants and V-place in the case of vowels and secondary articulations), requiring a weakening of principle (1e). This innovation is needed to express the transparency of consonants to many types of vowel spreading; for example, rounding harmony in Turkish vowels is not blocked by labial consonants like *p*, as would be predicted under the no-line-crossing constraint of autosegmental phonology if [labial] were linked to the same tier in consonants and vowels.

Table 4 Relationships between different types of consonants

Consonants	*Tones*	*Halle/Stevens features*
Voiced obstruents	Low (or extra-low) tones	[+slack vocal cords]
Voiceless obstruents	High tones	[+stiff vocal cords]

Two attempts have been made to express the consonant/vowel relations in Table 3 while maintaining principle (1e) as well as the traditional vowel features [±back, ±round]. In the model proposed by Ní Chiosáin and Padgett (1993), consonant place features are represented twice: once on a consonantal tier of structure, where they constitute primary place features, and again on a vocalic tier, where they act as "virtual" secondary place features. A basic claim of this model is that only the latter interact directly with vowels; thus, the shift of /pi/ to [pu] represents the spread of the secondary labial feature [+round] from the consonant to the vowel. Velar palatalizations, such as /ki/ > [ci], are handled by a separate mechanism of restructuring. In a proposal by Halle *et al.* (2000), developing earlier work by Halle (1995), the shift of /pi/ to [pu] involves the spread of the terminal feature [labial], as in the Clements/Hume model, but the output is subjected to restructuring by a set of equivalency relations so that the resulting [u] bears the feature [+round] instead of [labial]. Palatalizations are handled analogously. As the restructuring conventions required in both models carry out rather substantial surgery on feature trees, both require at least a limited violation of the constraint in (2).

A closely related and equally controversial question in feature organization concerns the correct expression of the close relations between certain consonant types and tones. Observations from a number of tone languages in Asia and Africa have brought to light the common (though not universal) relationships between consonants and tones shown in the first two columns in Table 4.

For example, in many tone languages, voiced obstruents are found to trigger low tones on following vowels or to block the spread of high tones across them (just as they would do if they bore low tones).

For example, in the African language Ewe, high tones are realized as rising after noun-initial voiced obstruents: /vǐ/ > [vǐ] 'child'. To express such facts, Halle and Stevens (2002), drawing on their own earlier research as well as work summarized in Bao (1999), propose a feature-geometrical account in which consonants and tones share the features in the third column in Table 4. In this model, the feature [+slack vocal cords] is interpreted phonetically as voicing in obstruents and low tone in vowels, while [+stiff vocal cords] is interpreted as voicelessness in obstruents and high tone in vowels. Halle and Stevens propose that both of these features link directly to the Glottal tier (analogous to the Laryngeal tier in Figure 1), in conformity with (1e).

However, many linguists have noted that not all tone languages exhibit the relations in Table 4. Not only are these relations sometimes broken by historical change, but many, perhaps most, tone languages do not exhibit any phonological consonant/tone interactions at all. For example, in many tone languages, such as Mende or Kikuyu (Gikuyu), high tones spread freely across all obstruents, both voiceless and voiced. It appears that in order to render the Halle/Stevens model compatible with such facts, a feature-geometric model must be enriched in one of at least two ways. One solution would allow tonal geometry to be parameterized across languages, requiring a relaxation of (1c). In this approach, tone features would dock to the Glottal node in languages that, like Ewe, exhibit the consonant/tone interactions in Table 4, while in languages lacking such interactions, such as Mende and Kikuyu, tone features would dock to a higher-level node, such as the Syllable or Mora. Another solution would maintain a universal tonal geometry but would allow tone features in consonants to dock to a different node from tone features in vowels. In this approach, Ewe, Mende, and Kikuyu would all have the same representations, and what would differ would be the level of structure accessed by the tone rules. This solution, like the Clements/Hume proposal for place features, would require a weakening of principle (1e). At the present time both of these approaches, and variants of them, are undergoing active research (for related discussion and further references, see Yip, 2002: 56–61).

One more recent proposal may be noted. In early work on feature geometry, Hayes (1986) suggested that feature classes are built up derivationally, introduced only when they are triggered by rules. Developing this suggestion within a constraint-based framework, Clements (2001) proposes that though the feature hierarchy is universal (cf. [1c]), not all languages make use of all structure. Rather, structure is present just to the extent that it is activated in a particular language. For example, French, with no place assimilation, does not activate the Place node. In the limit case, a language with no phonology whatsoever – that is, one in which underlying and surface representations are identical – would have no tier structure at all. Clements shows that this approach can provide a solution to several traditional problems involving long-distance harmony and assimilation.

Phonetic Extensions of Feature Geometry

Feature geometry drew much attention in the late 1980s and 1990s, leading to the development of many further proposals within the general framework of autosegmental phonology. Related models have been developed in other nonlinear phonological frameworks, such as dependency phonology (e.g., Smith, 1989; van der Hulst, 1989) and government phonology (e.g., Harris, 1994; Scheer, 1998). Given limits of space, we discuss just one other important development here, involving the extension of feature-geometrical approaches to phonetics. This development aims to achieve a full integration, as opposed to *ad hoc* 'interface,' of phonetics and phonology. Three proposals are reviewed here.

First, from the point of view of precedence and influence, the framework of articulatory phonology as developed by Browman and Goldstein (1989, 1992, etc.) deserves special attention. The hypothesis underlying this framework is that the basic principles underlying spoken language are best understood when viewed as patterns of coordinated articulatory gestures. Articulatory phonology proposes to model phonetic and phonological patterns in terms of 'articulatory scores,' that is, formal representations consisting of abstract gestures and their patterns of coordination. Given that feature-geometrical representations have already brought to light structures that resemble abstract 'maps' of the vocal tract, it is not surprising to find that there is a close resemblance between gestural scores and feature-geometrical representations. Gestures are defined in terms of articulator sets whose content is similar to that of the Oral Cavity node in some feature geometry models (Clements and Hume, 1995) or to the Place node in others (Padgett, 1995). Each articulator set includes specifications for constriction degree, constriction location, constriction shape, and stiffness for a particular articulator (Lips, Tongue Tip, Tongue Body, etc.). These components closely parallel the features of feature geometry, as shown in Table 5.

Nevertheless, articulatory phonology differs from feature geometry in several important respects. First, gestures have temporal duration, while features

Table 5 Gestural components compared to features

Articulatory phonology	*Feature geometry*
LIPS	[labial]
Tongue Tip (TT)	[coronal]
Tongue body (TB)	[dorsal]
Closed	[−continuant]
Critical	[+continuant] in [−sonorant]
Dental	[+distributed]
etc.	

do not. Second, while features are categorical (typically one valued or at most two valued), the components of gestures are quantitatively specified. Third, while features are defined in terms of quantal articulatory-acoustic relationships (Stevens, 1989), gestures are defined in terms of an articulatory task-dynamic model (Salzman and Kelso, 1987). Again, while most features are represented on separate tiers in feature-geometrical representations, the components of gestures (constriction location, constriction degree, etc.) are bundled together with an articulator on the same 'tier' of the gestural score. Still another difference is that while feature geometry places class nodes directly in the feature representation, articulatory phonology locates them outside the articulatory score.

All these differences make precise predictions that help to distinguish the relative sphere of application of each theory. It does not appear at present that either theory fully covers the empirical domain of the other; thus, feature geometry is too coarse grained to capture a great many articulatory regularities at the phonetic level, as Browman and Goldstein have amply shown, while articulatory phonology is too fine grained to capture important generalizations at the phonological level, such as feature economy (Clements, 2003). It may be that in spite of their close resemblance, the two theories must still be viewed as interfaced, rather than truly fused (Zsiga, 1997). Nevertheless, articulatory phonology has taken a major step toward bringing phonology and phonetics closer together.

Two other approaches have attempted to achieve similar goals. Keyser and Stevens (1994) propose a theory of feature geometry based largely on phonetic criteria. Drawing almost exclusively on articulatory and acoustic considerations, they attempt to bring the phonological tree into closer agreement with known facts about the control of articulatory processes and their corresponding acoustic correlates. In another direction of research, Clements and Hertz (1996) propose an integrated representational system (IRS) for expressing phonology-acoustic relations, providing a formal theory of acoustic scores comparable to the articulatory scores of Browman and Goldstein. Their approach, like that of Browman and Goldstein, must be considered an interface model, in the sense that phonological structure and acoustic scores constitute separate but related planes within a complex representational space.

Current Trends and Perspectives

This article reviews a number of proposals to explain the behavior of speech sounds in terms of models of segment-internal feature structure. These proposals have been developed within the broader framework of nonlinear phonology. An underlying assumption has been that well-elaborated models of representation can go a long way toward constraining phonological structure, allowing the expressive power of rules to be severely limited. As McCarthy has put it (1988: 84), "[I]f representations are right, the rules will follow."

Two newer developments in the past decade have placed research on feature organization in a new light. The first is optimality theory, with its emphasis on ranked constraints, as opposed to rules and representations. Linguists working within this framework have taken a new look at many classic problems that were earlier dealt with in representational terms, such as vowel and consonant harmony, and have proposed new explanations in which constraints rather than multitiered representations play a leading role. The second is the increasing reconciliation of phonetics and phonology, already mentioned, in which the explanation of cross-linguistic trends in phonological patterning is sought more often in constraints on articulation, audition, and perception than in linguistic formalisms.

In formulating strict, testable predictions about a wide range of phonological processes, feature geometry and related approaches have provided a powerful engine for research and have brought to light a great many discoveries that would hardly have been conceivable in their absence. They continue to raise substantive questions concerning segmental interactions, several of which, as noted in this article, remain essentially unsolved at the present time. Multitiered feature representations are compatible in principle with constraint-based approaches (e.g., Zoll, 1998) and can be defined in terms of constraints on feature configurations (e.g., Uffmann, 2005). Perhaps most importantly, by invoking the abstract, higher-level cognitive organization of speech, feature representations provide a necessary counterpart to phonetically driven approaches, offering explanation in areas where phonetics does not reach (Clements, in press).

The study of feature organization can be expected to continue to play a central role in future work, though perhaps in a somewhat different form.

See also: Autosegmental Phonology; Distinctive Features; Phonology: Overview.

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Ferguson, Charles A. (1921–1998)

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One of America's leading linguists, with an unusually broad range of well-developed interests and a highly significant number of organizational accomplishments, Charles A. Ferguson was born on July 6, 1921, in the Germantown section of Philadelphia, Pennsylvania, the city in which he also grew up and received his elementary, secondary, and higher education: University of Pennsylvania, A.B., 1942 (Philosophy); A.M., 1943; and Ph.D., 1945 (Oriental Studies). Having specialized in Arabic (his M.A. thesis was on the Moroccan Arabic verb) and Bengali (his doctoral dissertation was on standard colloquial Bengali), Ferguson was initially employed as a linguist for Near Eastern languages by the Foreign Service Institute of the U.S. Department of State, from 1946 to 1955. During this time, he established the Foreign Service Institute and Language School, attached to the American Embassy in Beirut. Thereafter, he taught briefly at the Institute of Languages and Linguistics at Georgetown University and Deccan College in India; he then joined the Center for Middle Eastern Studies at Harvard University as a lecturer in linguistics and in Arabic, remaining there until 1959. In 1959, Ferguson became the founding director of the Center for Applied Linguistics in Washington, D.C., a position that he maintained until 1966. Under Ferguson's leadership, the center developed from initially being under the auspices of the Modern Language Association of America into an independent institution with a staff of approximately 100 and recognized international stature in most areas of applied linguistics. In time, the field of applied linguistics became firmly placed on the agenda of linguistics throughout the world, its high stature to this very day deriving from the combined efforts and expertise of both Ferguson and the center. He also led the center in its focus upon language teaching, literacy, and language planning, interests that he actively pursued for the rest of his life.

While directing the center, Ferguson also served as a member of the Committee on Linguistics and Psychology of the Social Science Research Council (1959–1961) and later became a founding member and chair of the council's Committee on Sociolinguistics (1964–1970). Over the course of half a dozen years, Ferguson's leadership enabled the latter committee to establish this new area of specialization as a recognized field of linguistic research and instruction, both in the United States and throughout much of the world, with a wide array of courses, journals, conferences, and research projects quickly being devoted to it. Ferguson's continued identification with sociolinguistics is evidenced by the very large number of articles and books that he authored, coauthored, edited, and coedited in this field. In addition to sociolinguistics ('language use in society') Ferguson also made pioneering contributions to the study of language universals, first- and second-language development, and language change.

In 1967, Ferguson became Professor of Linguistics and the founding chairperson of the Committee on (later: Department of) Linguistics at Stanford University (California). From the very outset after Ferguson's arrival, linguistics at Stanford was characterized by a strong interest in many of Ferguson's areas of specialization, including not only those already mentioned in this article but also child language, language and religion (particularly non-Western religions and also the study of saints' lives), and, of course, all of the standard areas of general linguistics.

Among Ferguson's seminal sociolinguistic publications was his relatively brief paper 'Diglossia' (1959), which dealt with languages and language varieties in long-term, widely accepted, and functionally complementary operation within the same speech community (classical and vernacular Arabic, High German and Swiss German, Katharevousa and demotic Greek, Classical and vernacular Tamil, Haitian Creole and French, etc.). This article stimulated literally hundreds of conference papers, symposia, and journal articles and many books and, indeed, continues to do so to this very day (e.g., Hudson and Fishman, 2002; Belnap and Fishman, 2003) among a very diverse group of colleagues, students, and researchers internationally and in such distinct fields as sociolinguistics, language planning, bidialectalism, and bilingualism.

Ferguson, a person of great faith, modesty, and patience, was often honored by the language studies professions, among these honors being the publication of a collection of his selected papers (Dil, 1971) as well as a two-volume Festschrift in honor of his 65th birthday (Fishman *et al.*, 1986a, 1986b). The latter contains a full bibliography of his published works (books, articles, and reviews) until 1985 that is supplemented in Huebner (1986).

Upon his retirement from Stanford (1986), Ferguson became Professor Emeritus but continued to live near Stanford University (in Palo Alto, California) and to work in many of the areas of interest that he had pioneered and fostered throughout his exceptionally

productive and stimulating career. During this period, he completed a new collection of his sociolinguistic papers (Huebner [ed.], 1996), as well as a collection of his papers related to Arabic (1996). Several memorial volumes in his honor have also appeared (e.g., Hudson, 1996; Belnap and Fishman, 2003).

See also: Bilingualism.

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Fick, August Konrad Friedrich (1833–1916)

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August Fick, born on May 5, 1833, in Petershagen (near Minden), Germany, did philological studies in Göttingen (comparative grammar [with Theodor Benfey] and classical and Oriental languages) and then taught there for many years at a grammar school. In 1876, when his most important books had been published, he was appointed to a newly founded extraordinary professorship of Indo-European studies at the University of Göttingen. In 1888, he moved to Breslau, where he had been offered the chair of comparative linguistics. For reasons of health, he became professor emeritus in 1891, but by living mostly in places with a healthy climate, he was able to continue working until he died on March 24, 1916, in Hildesheim.

Like August Friedrich Pott, Fick, owing to his strength of imagination and his power of reasoning, discovered great quantities of plausible etymologies in the field of the Indo-European languages. He became the first to compile a comparative dictionary of the Indo-European languages (1868), thereby reconstructing the lexical stock of the proto-language. In a second stage, he tried to refine this work and to combine it with August Schleicher's family-tree theory by drawing up the lexical stock of several prehistoric subgroups. In any case, those investigations shedding light on the prehistory of the individual Indo-European languages, particularly those of Old Europe (1873), had a strong effect on the consolidation of Indo-European comparative linguistics.

However, most of Fick's publications dealt with questions of the Greek language and specifically with Greek anthroponyms. One of his great achievements was describing, for the first time, the entire system of Indo-European personal names and the structure underlying it. In 1874, he proposed that the compound two-stem names, as well as the shortened names based on them (and including the hypocoristics), were formed in the same manner among most of the Indo-European peoples.

In later years, he turned to studies on the pre-Greek geographical names (1905) and uncovered a prehistoric layer of toponyms common to ancient Greece and Asia Minor. However, those works seem to lack the strong methodological principles followed elsewhere, as well as a sufficient backup in the material discussed, so experts have regarded them with suspicion. The same applies to Fick's work on the Homeric epics and Hesiod's poems. Convinced that they had not been originally written in the Ionic dialect, he attempted to reconstruct their initial Aeolic text in an entirely one-sided manner of reasoning and without regard to the particular character of the early Greek poetic language and to the history and prehistory of the Homeric epic poems in general.

See also: Benfey, Theodor (1809–1881); Pott, August Friedrich (1802–1887); Schleicher, August (1821–1868).

productive and stimulating career. During this period, he completed a new collection of his sociolinguistic papers (Huebner [ed.], 1996), as well as a collection of his papers related to Arabic (1996). Several memorial volumes in his honor have also appeared (e.g., Hudson, 1996; Belnap and Fishman, 2003).

See also: Bilingualism.

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August Fick, born on May 5, 1833, in Petershagen (near Minden), Germany, did philological studies in Göttingen (comparative grammar [with Theodor Benfey] and classical and Oriental languages) and then taught there for many years at a grammar school. In 1876, when his most important books had been published, he was appointed to a newly founded extraordinary professorship of Indo-European studies at the University of Göttingen. In 1888, he moved to Breslau, where he had been offered the chair of comparative linguistics. For reasons of health, he became professor emeritus in 1891, but by living mostly in places with a healthy climate, he was able to continue working until he died on March 24, 1916, in Hildesheim.

Like August Friedrich Pott, Fick, owing to his strength of imagination and his power of reasoning, discovered great quantities of plausible etymologies in the field of the Indo-European languages. He became the first to compile a comparative dictionary of the Indo-European languages (1868), thereby reconstructing the lexical stock of the proto-language. In a second stage, he tried to refine this work and to combine it with August Schleicher's family-tree theory by drawing up the lexical stock of several prehistoric subgroups. In any case, those investigations shedding light on the prehistory of the individual Indo-European languages, particularly those of Old Europe (1873), had a strong effect on the consolidation of Indo-European comparative linguistics.

However, most of Fick's publications dealt with questions of the Greek language and specifically with Greek anthroponyms. One of his great achievements was describing, for the first time, the entire system of Indo-European personal names and the structure underlying it. In 1874, he proposed that the compound two-stem names, as well as the shortened names based on them (and including the hypocoristics), were formed in the same manner among most of the Indo-European peoples.

In later years, he turned to studies on the pre-Greek geographical names (1905) and uncovered a prehistoric layer of toponyms common to ancient Greece and Asia Minor. However, those works seem to lack the strong methodological principles followed elsewhere, as well as a sufficient backup in the material discussed, so experts have regarded them with suspicion. The same applies to Fick's work on the Homeric epics and Hesiod's poems. Convinced that they had not been originally written in the Ionic dialect, he attempted to reconstruct their initial Aeolic text in an entirely one-sided manner of reasoning and without regard to the particular character of the early Greek poetic language and to the history and prehistory of the Homeric epic poems in general.

See also: Benfey, Theodor (1809–1881); Pott, August Friedrich (1802–1887); Schleicher, August (1821–1868).

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Fictional Discourse: Philosophical Aspects

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Fictional discourse is among the most superficially unproblematic yet philosophically puzzling of linguistic phenomena. We usually have little difficulty distinguishing fictional from nonfictional writings. We easily make sense of what is set out within the pages of fictions, and readily agree that Pegasus is a winged horse and not a one-legged donkey. Nor are we unreflectively perplexed by the feelings aroused in us by fictions. But each of these issues – the nature of fictional discourse, its meaningfulness, our ability to determine what is true in a fiction, and our capacity to be moved by it – has engendered heated philosophical debate that shows no sign of abating. While some of these issues concern only philosophers of art and literature, others bear on wider issues in ontology and the philosophy of language.

The Nature of Fictional Discourse

As will become apparent, a number of significantly different linguistic phenomena might be classified as forms of fictional discourse, but the core phenomenon is the use of language in fictional narratives such as the Sherlock Holmes stories. The fictionality of such narratives cannot be simply a matter of whether they portray actual happenings and actual agents, for works of fiction seem to contain numerous truths about the real world – e.g., true statements about the geography of Victorian London in Dickens's *Bleak house*. Furthermore, some paradigmatic works of nonfiction, such as medieval texts on alchemy, are largely false. Nor can the style of narration or the use of 'literary' techniques serve as a criterion of fictionality; there are non-fictional works that make free use of the narrative structures and stylistic devices typical of fiction (e.g. Mailer's *The executioner's song*), and celebrated works of fiction that adopt the style of nonfictional genres of writing (e.g. the 'academic' style of Nabokov's *Pale fire*).

The fictionality of a narrative may therefore depend upon **how it functions**, or **how it was designed to function** – either the function conferred upon it by its users (e.g., Walton, 1990), or its author's intention that it function, or be used, in a certain way. Philosophers attracted by the latter analysis have drawn upon the more general notion of a speech act, that is, an action performed by using language (verbal or nonverbal) in a certain way (Searle, 1975). The paradigm speech act is assertion, and Searle has maintained that fiction results when an agent **pretends** to assert what is stated by the sentences that make up a narrative. Given that there seem to be pretended assertions that do not result in fictions – e.g. a satirist's mimicking of a politician, Currie (1990) proposed that fiction results from the genuine performance of a speech act, but one that differs from assertion in that, whereas the latter requires that the speaker intend her audience to **believe** what she states, the author of a fictive utterance intends that her audience **make believe** what is narrated (see also Lamarque, 1996). To understand a work of fiction, then, is to grasp what it is that, as reader, one is intended to make believe.

Truth in a Fiction

If this is on the right track, what reading strategies should one adopt to determine what one **is** required to make believe to count as understanding what is

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Truth in a Fiction

If this is on the right track, what reading strategies should one adopt to determine what one **is** required to make believe to count as understanding what is

'true in a story'? Not everything explicitly affirmed by the narrator of a story can be true in the story, for there are deceived, or deceiving, or ironic narrators. Nor should we restrict what is true in a story to what is explicitly affirmed by a trusted narrator, for sometimes, as in ordinary discourse, we take a narrator to be communicating more by her words than is strictly stated. We also assume, in our reading, that many things are true in a story although they are neither explicit nor implicit in the trustworthy affirmations of the narrator. We must therefore explain how we determine the unspecified background of general propositions that are nonexplicitly true in a given story. One strategy, here, appeals to what philosophers term "possible worlds" – roughly speaking, alternative ways the actual world might have been (Lewis, 1983): what is true in a (fictional) story N is decided by reference to possible worlds in which those things that are explicitly or implicitly true in the text of N are actually true. The task, then, is to pick out a particular group of such possible worlds as the ones that determine what else is true in the story.

A general problem for any such account of fictional truth, however, is that it cannot deal with stories in which **inconsistent** truths obtain – for example, certain sorts of time-travel stories – since possible worlds must themselves be **consistent** in order to be possible. To resolve this problem, Currie has proposed an analysis not in terms of possible worlds in which a given set of beliefs is true, but, rather, in terms of belief-sets themselves. He maintained that, in reading fictional narratives, we make believe that we are being informed about the events in the story by a reliable source, the so-called fictional author of the story. It is by reference to the beliefs attributable to the fictional author (the f.a.) – a completely reliable source of information about the narrated events – that the reader determines what is true in the story. The reader is supposedly guided here by the text itself, which provides evidence as to the f.a.'s character and psychological idiosyncracies, and by background assumptions – based on knowledge of the real author – as to the historical situatedness of the f.a. But it is open to question whether these resources are adequate to the task (see Davies, 1996).

Semantics of Fictional Discourse

The suggested strategies are supposed to explain how, given an instance of fictional discourse, we can understand what is true in the narrative presented through that discourse. Even if the author does not assert the sentences in such a discourse, it is assumed that the sentences themselves provide us with the content for our acts of make-believe. The use of language in fictional discourse is thus assumed to differ pragmatically rather than semantically from its use in nonfictional discourse (Gale, 1971). This is unproblematic when fictional discourse predicates nonactual properties of actual things – when, for example, Chancery is represented by Dickens as being shrouded in an impenetrable fog. But problems arise when a sentence S in fictional discourse contains what appears to be a proper name N (e.g. 'John Jarndyce,' as it occurs in *Bleak house*), which is not plausibly taken as denoting an actual person, place, or event. Suppose 'fictional names,' as Currie terms them, are genuine proper names, and that the same semantic principles apply to fictive and nonfictive discourse. Then, given the widely accepted 'direct reference' theory of proper names (Kripke, 1972), where a proper name contributes to the meaning of a sentence only the individual it denotes, S is meaningful only if N is a genuinely denoting term. If, by definition, no actual person, place, or event exists that is denoted by a fictional name – if such names are empty – how can we explain our seeming ability to understand sentences containing fictional names, and to hold some of them expressive of what is 'true in the story'?

Something, it seems, has to give. That is:

a. fictional names do genuinely denote, or
b. S's logical form is not as it appears to be, and fictional names do not function as proper names, or
c. our ability to make sense of S is compatible with S's being meaningless.

Option (a) is most famously associated with Meinong (1960), who held that there are nonexistent objects corresponding to unactualised sets of properties. Contemporary Meinongians, such as Parsons (1980) and Zalta (1983), have asserted that fictional characters are nonexistent objects of this kind, and that fictional names denote fictional characters so construed. An alternative strategy is to take fictional names to denote nonactual but possible objects that exist in other possible worlds (Plantinga, 1974; Lewis, 1983). Less ontologically profligate is the contention that fictional characters exist as 'abstract artifacts' (Thomasson, 1999) or as theoretical entities required to make sense of our critical practice (Van Inwagen, 1977), where such entities depend for their being on the activities of authors or critics. Those who choose option (a) must explain how fictional names are able to refer to fictional objects, as abstract entities, if names secure their reference through some kind of causal/historical link with their denotata, and how fictional characters are individuated. Arguably, Meinongians are able neither to meet these challenges nor to validate our intuition that authors create

the characters in their works (Thomasson, 1999), whereas, so it is claimed, these difficulties can be surmounted if fictional characters are taken to be abstract artifacts.

Option (b) requires that sentences containing fictional names be paraphrased such that they no longer contain such denoting expressions but are meaningful and possess appropriate truth values. Russell (1990), for example, analyzed sentences such as 'Pegasus flies' as quantified sentences affirming the existence of something that is a winged horse and flies: fictional names, like all standard names for Russell, are disguised definite descriptions. But this strategy makes sentences containing fictional names come out false unless by chance there is an existent fitting the relevant description. One response, here, is to take sentences occurring in fictional discourse to have a suppressed 'in the story' operator, while retaining the idea that fictional names, in such contexts, are disguised descriptions (Currie, 1990).

Option (c) grants that fictional names are genuine names and that they are empty, and therefore that sentences containing fictional names are meaningless. We are, however, able to understand fictions and determine what is true in a story, since, in engaging with a fiction, we make believe that the contained sentences are meaningful and that they have the relevant truth values (Walton, 1990).

A problem that is especially acute for those who choose option (b) is accounting for occurrences of fictional names in other kinds of linguistic contexts where it is difficult to deny our commitment to the reality of fictional characters. Discourse **about** fiction includes such utterances as 'N is a fictional character,' 'Tolstoy created N,' and 'N is a better detective than M.' Paraphrases of such sentences offered by proponents of both (b) and (c) seem implausible. However, Meinongians also have to tell a different story about the occurrence of fictional names in such contexts. Zalta (1983), for example, who has held that fictional characters, as nonexistent objects, 'encode' but do not exemplify the properties ascribed to them in the story, maintained that, in discourse about fiction, the characters do exemplify the predicated properties. Van Inwagen (1977) and Thomasson (1999) preserved the surface grammar of such occurrences of fictional names, but at the price of denying that fictional characters literally possess any of the properties predicated of them in the story: for Van Inwagen, such properties are ascribed but not possessed.

Responding to Fictions

Philosophers have also puzzled over the capacity of fictions to elicit fear or other emotions in readers. The puzzle is especially acute given the recent rise to dominance of cognitivist theories of the emotions. According to the latter, my being in an emotional state like fear requires more than that I have a certain feeling or am in a certain affective state. My fearing *x* also requires that I believe that *x* endangers me or someone close to me. Given these requirements, it seems impossible for me to experience genuine fear (or, *mutatis mutandis*, pity) concerning what is narrated in what I take to be a fiction, because I do not believe that anyone is really in danger when I imaginatively engage with such a fiction.

One strategy here is to argue that our affective responses to fictions do have the cognitive foundations required if they are to be genuine emotions. Perhaps, for example, we believe that real people are endangered or suffering **in the same way** that the fictional characters are represented as doing, and this leads us to feel genuine emotions for these real people. More plausible are analyses that take as central the belief that it is **make-believe**, in the fiction, that I stand in the relation to the fictional characters or situations required if I am to feel genuine emotions for them. According to Walton, such beliefs about the story elicit in us quasi-emotions, which resemble genuine emotions in their physiological and psychological features and which enter into our imaginative engagement with the fiction by encouraging us to **make believe** that we feel the corresponding real emotions (see also Currie, 1990, chapter 5). Neill (1993), however, contended that affective responses elicited in us through our beliefs as to what is fictionally true are often instances of genuine emotions. A third alternative is the so-called 'thought theory,' which holds that such responses (whether or not they are genuine emotions) are engendered not by beliefs about what is the case, actually or fictionally, but by thoughts (Carroll, 1990; Lamarque, 1996) or imaginings (Novitz, 1987) as to what might be the case. (See Hjort and Laver, 1997, for further articles.)

See also: Assertion; Direct Reference; Empty Names; Possible Worlds: Philosophical Theories; Proper Names: Philosophical Aspects.

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Figurative Language: Semiotics

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Introduction

The term 'figurative language' can be misleading because it has at least two meanings. For many years, texts on literary criticism have used this expression to mean a literary adornment or a stylistic device (Wellek and Warren, 1956: 23, 157). Lakoff and Johnson (1980: 3) noted this conventional usage in their influential work on metaphor. In general, the expression 'figurative language' was restricted to special usage in poetry or rhetorical language. Traditional scholars maintain a strict dichotomy between figurative language and ordinary or literal language. This conventional aesthetic sense of figurative language no longer reflects current usage. Today, the term 'metaphor' has replaced 'figurative language' with the special sense of a cognitive device used to explain how people categorize reality and store abstractions of that physical existence in their brain.

In this article, we will discuss the following issues:

1. Theories of metaphor
2. A selected overview of theoreticians of metaphor and their theories
3. The literal-figurative dichotomy
4. The role of metaphor as a cognitive mechanism
5. The use of metaphor as a knowledge generator.

The literature about metaphor is voluminous, as exemplified selectively in three extensive bibliographies on this topic (Noppen and Hols, 1990; Noppen *et al.*, 1985; Shibles, 1971). Moreover, important journals devoted to metaphor, such as *Metaphor and Symbol* (formerly, *Metaphor and Symbolic Activity*), *Poetics*, and *Cognitive Linguistics* reflect this burgeoning interest.

The explosion of literature on metaphor reflects some basic shifts in linguistic theory during the 20th century. In particular, there have been three philosophical revolutions in linguistic theory. In the first part of the 20th century, the North American linguist Leonard Bloomfield (1887–1949) espoused what he called a mentalist approach to the study of language in his book *Introduction to the study of language* (1914). Subsequently, Bloomfield would undergo a philosophical transformation while at Ohio State University under the influence of the behavioral psychologist Albert Weiss (1879–1931). This theoretical conversion appeared in Bloomfield's classic volume *Language* (1933). This behaviorist, or empiricist, view of language received its maximum articulation in B. F. Skinner's (1904–1990) *Verbal behavior* (1957). Its stunning repudiation by Noam Chomsky (b. 1928) in his review in the journal *Language* in the same year represents the beginning of the Cartesian, or rationalist, approach to linguistic theory that continues to be vital today. Neo-empiricism, however, reasserted itself in the influential book *Metaphors we live by* (1980) by George Lakoff (b. 1941) and Mark Johnson (b. 1949).

Traditional discussion of figurative language features a detailed typology of figures of speech. It was a standard practice for those who studied Greek and Latin to receive training in the tropes (derived from Greek for 'manner') of literary language. These include metaphor, simile, personification, and others.

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This classical view of figurative language as the adornment of a basic literal language influenced literary research and analysis. Wellek and Warren's *Theory of literature* (1956) embodied this approach, and it was highly influential in university literature departments.

Conventional courses in literature often have a component on rhetorical or figurative language. These discussions view such language as stylistic in nature and designed to arouse the reader's interest through these embellishments. The following is a selected enumeration of some conventional tropes (cf. Danesi and Perron, 1999: 162–164 for a more extensive list).

Theories of Metaphor

Most theories of metaphor can be reduced to two basic ones with some variation. In this section, we will examine these theories and some of their most prominent proponents. First, there is the comparison theory, which may be traced back to the Greek philosopher Aristotle (384–322 B.C.). In this model, metaphor has the form *A is B*, and it suggests an analogy between two items or notions. In this view, a metaphor is a compressed simile. This is the traditional approach, and it includes the resemblance of objects or notions; its usage involves style or economy of statement. A variant of the comparison theory is the substitution theory. The substitution theory means that an inappropriate (figurative) term stands for a proper (literal) one. In this approach, the speaker uses an expression that means, or refers to, something else, thereby requiring the listener to decode the statement. An example is *Martin Luther King is a lion*. *Lion* thus substitutes for the meaning that Martin Luther King is brave and fearless. The essence of the comparison model or the substitution version is based on the premise that there is a basic literal language that is precise and neutral. This language stands in stark contrast to the poetic language generally associated with literature and rhetorical flourishes.

The second major theory is the interactionist theory, which, with its various manifestations and modifications in the 20th century, is the prevailing one today. It contrasts with the comparison view of metaphor. In this approach, there is an interaction of concepts at sentence-level and not word-level, i.e., there is a conceptual association of the elements that constitute a metaphor, and this association gives rise to new meaning as we shall see.

Selected Review of Theories of Metaphor

In this section, we will examine selectively prominent theoreticians of metaphor. These include Aristotle, Giambattista Vico, Groupe μ, I. A. Richards, Max Black, Paul Ricoeur, George Lakoff, and Mark Johnson.

Aristotle (384–322 B.C.)

Aristotle is credited with introducing the word 'metaphor' in two of his major treatises (*Rhetoric* and *Poetics* [1997]). The etymology of the word metaphor is from the Greek 'to carry beyond' or 'to transfer.' This meaning refers to an implied comparison or transference of meaning between two objects formulated as 'A is B' or 'A implies B.'

Aristotle's view of metaphor is a literalist one, i.e., metaphors stand in contrast to ordinary language. Moreover, his view of metaphor is now known as the comparison theory of metaphor, i.e., 'A is B' or 'A implies B.' Aristotle's influential statements about language and rhetoric in *Rhetoric* and *Poetics* continue to be cited after more than two millennia.

Table 1 Some examples of traditional figurative language

Type of figurative language:	*Definition:*
Conceit	An analogy between two completely distinct notions, e.g., *war is peace*.
Euphemism	Use of a pleasant word for one that is vulgar or obscene, e.g., *powder room for toilet*.
Hyperbole	Extreme exaggeration, e.g., *he ate half a side of beef*.
Irony	Sarcastic wit to mean the opposite of what is meant, e.g., *I love that dress!* (meaning, *I hate that dress!*).
Litotes	Understatement to magnify the significance of a statement, e.g., *Verdi was not an unimportant composer*.
Metonym	A common feature is used to designate the whole entity, e.g., *the pen is mightier than the sword*.
Onomatopoeia	The use of words to describe the sounds that they refer to, e.g., *the clanging of the bells*.
Oxymoron	An observation that is apparently contradictory, e.g., *he is a wise fool*.
Paradox	An apparently contradictory statement, e.g., *dumb as a fox*.
Personification	The representation of a concept or an object as living entities, e.g., *Death came through the door*.
Rhetorical question	A question that is not intended to be answered, e.g., *do you understand me?*
Simile	An overt comparison with words such as *like* or *as*, e.g., *he floats like a butterfly*.
Synecdoche	The part stands for the whole, e.g., *the law* (= *the police*) *broke down the door*.

The Greek philosopher, and student of Plato (ca. 428–347 B.C.), considered metaphor in *Poetics* (Aristotle, 1997: 150–156). In a general discussion of grammar and etymology, Aristotle provided selected observations on metaphor. In particular, Aristotle stated that "metaphor is the transference of a word of another significance either from genus to species, or from species to genus, or from species to species or by analogy or proportion" (Aristotle, 1997: 150). Aristotle (1997: 151) stated that there are four types of metaphor. His consideration of the first three was terse, while his commentary on the fourth was a bit more expansive.

Aristotle's first type, that of genus to species, is the expression "my ship stands there" (Aristotle, 1997: 151). In this type of metaphor, which is, in fact, a synecdoche, 'stand' is the genus and 'lying at anchor' is the species.

The second type (species to genus) offered by Aristotle (1997: 151) is "verily ten thousand noble deeds hath Odysseus wrought," in which case 'ten thousand' signifies 'many.' Again, this is a synecdoche, and some critics have labeled it 'clumsy' because the choice of 'ten thousand' to mean 'many,' even though it may have been a commonly accepted expression in Aristotle's time, is definitely not novel.

The third metaphor type, and the exemplar for species to species is "with the blade of bronze drawing out the life" (1997: 151) and "cutting with the unwearied bronze" (1997: 151). In these cases, 'drawing out' means 'cutting.' while 'cutting' means 'removing something.' Both mean to 'take away.' Umberto Eco (b. 1932) argued that this third type of metaphor was the quintessential one on which subsequent theories base their own views of the nature of metaphor (1984: 92). Aristotle's third type of metaphoric exemplar perhaps best illustrates 20th-century views of metaphor as a tripartite concept, e.g., I. A. Richards's (about whom more will be said below) notion of a metaphor as consisting of a tenor (the metaphorized term), a vehicle (the metaphorizing term), and a ground (the meaning created by the interaction of the tenor and the vehicle. This type of metaphor has the form (A (B) C), i.e., A is the tenor, C is the vehicle and B is the ground or the intermediary term which provides the meaning of the metaphor supplied by the interpretant, or the person who seeks to make meaning of the comparison. The tenor (often called the topic now) is the A-referent (what is talked about in the metaphor). The vehicle is the C-referent (something concrete or familiar) and the ground is the meaning of the comparison, or the B-referent. In the sentence, *Mary is a witch*, 'witch' is the vehicle, 'Mary' is the tenor or topic, and the meaning created by the connection of these two terms is the ground. Cultural context will assign a specific meaning to the vehicle of a metaphor.

The fourth and last type of metaphor, with Aristotle's overt statement that it is by analogy or proportion, involves a formula with four elements. Aristotle offered two examples. The first is the analogy of the "shield of Dionysus" and the "cup of Ares" (Aristotle, 1997: 151). In this four-part proportional metaphor, the four terms may be delineated in the following way as a subject/instrument relationship: Dionysus : cup :: Ares : shield. This is to say that 'shield of Dionysus' is a metaphor for 'cup,' and 'cup of Ares' is a metaphor for 'shield.' Thus, the cup is to Dionysus as the shield is to Ares. Eco (1984: 95) pointed out that there are similarities and differences in this metaphor. Dionysus and Ares are both gods (the former of joy and peaceful rites, the latter of war and death). The cup and shield are alike due to their roundness. The hearer must pick out the similarities and discard the differences. If there are too many differences, the metaphor is unsuccessful.

In Aristotle's second example (Aristotle, 1997: 151), "old age [is] . . . the sunset of life," attributed to Empedocles (5th century, B.C.), there is a proportion or analogy that consists of four terms, namely, A : B :: C : D, i.e., old age : life :: sunset : day. This proportion is different from the above metaphor because it involves the proportion A : B :: C : D. In this metaphor, the proportion may be stated in the following way: A = old age, B = life, C = evening, D = day. In this sense, A is to B as C is to D. Hence this proportional analogy is a comparison of the life cycle to the diurnal cycle.

Thus, in a succinct narration, Aristotle provided us with our initial knowledge of the metaphor, and one to which all future scholars would refer over the millennia. Aristotle's views on metaphor contain three basic notions: (1) there is an exchange of properties between two entities to increase understanding; (2) there is a cognitive dimension to metaphor, albeit suggested rather than overtly stated, and Aristotle does not explain this; and (3) the pair metaphor/metonymy represents the essence of semiosis and human thought.

It is also clear that Aristotle left a legacy that includes a doctrine of signs, when he observed that words are tripartite objects which consist of a form (pronunciation), a referent (what the word alludes to), and a meaning. In one of his statements on metaphor, Aristotle (1997: 153) stated that ". . . making good metaphors requires the ability to grasp resemblances." In effect, this observation is a comparison model of metaphor. Aristotle's comparison theory has met with criticism over the centuries, though its basic premise remains intact.

It should be noted that the Roman rhetorician Quintilian (ca. 35–100 A.D.) espoused Aristotle's comparison view of metaphor and claimed that it was a substitutive process. This substitution theory argued that in the metaphor 'John is a rat,' the use of 'rat' for 'man' (in the sense of a vile and loathsome creature) was simply a deviation from a pristine literal language. Neither Aristotle nor Quintilian offered a psychological explanation for the pervasive use of metaphor in world languages. That would not take place in any systematic way until the 20th century.

Giambattista Vico (1668–1744)

The Neapolitan empiricist philosopher had many interesting things to say about metaphor, and his observations presage important work in the 20th century, and it is for this reason that we discuss his work here. In his treatise *The new science* (1968), Vico spoke about figurative language, in particular, metaphor. Reawakened interest in Vico in the 20th century corresponds to a renewed interest in metaphor research and the way in which Vico conceptualized it. Vico differs from his rationalist counterpart, the French philosopher René Descartes (1596–1660), whose views on language are quite distinct. Descartes was a rationalist who believed that people possess an innate linguistic faculty rather than an acquired one.

Vico's views on language consist of a series of basic epistemological principles that propose how we acquire knowledge about the world and how language develops. His stance on language in general, and metaphor in particular, may be stated as axioms about the origination of language and thought. We will now discuss this set of stages or steps in the development of thought and language, and, ultimately, metaphor.

First, thought is corporeal. We acquire our knowledge of the external world through our senses. In this regard, Vico espouses his empiricist view of epistemology by arguing that our knowledge has a sensory basis, i.e., we learn about the world by experiencing it first and foremost through vision, as well hearing, touch, smell, and taste. We then use this information to categorize this knowledge in a systematic way through our contact with the external world. Second, thought is representational. This means that it is imaginative or image-creating. These visual, culturally-determined patterns allow us to access information retained in our memory iconically. The linguist Ann Viberg noted that in the languages of the world, most of the predicates that are synonymous with the verbs of knowing and understanding relate to visual intake. In fact, prior to the development of a systematic language system with a phonology, morphology, syntax, semantics, and lexicon, it is likely that prelinguistic peoples utilized visual signals and signs including primitive pictures for communication as evidenced by the drawings and paintings at various archaeological sites worldwide, e.g., the cave paintings of Altamira, Spain. Third, thought has gestalt (German for configuration)-like properties, i.e., it consists of segments or parts that have a greater significance than its individual constituents. This axiom means that we configure thought through a series of components that build from the concrete to the abstract. Fourth, thought has an ecological basis. For Vico, human language evolved through a series of stages that included gestures that stood for a single article (tool) or concept (fire), and these symbolic gestures developed over time into complex verbal systems. Finally, thought and its verbal manifestation speech is, in fact, metaphorical in nature. For Vico, the process by which thought and language developed means that language is metaphorical, because we express ourselves through categories based on real-world experience, which we internalize in our brain in meaningful components.

The essence of Vico's cognitive scientific views of metaphor appears in the following citation "...in all languages the greater part of the expressions relating to inanimate things are formed by metaphor from the human body and its parts and from the human senses and passions. Thus, the head for top or beginning; the brow and shoulders of a hill..." (Vico, 1968: 129). This association of external reality with the bodily experiences of that reality is the essence of the new empiricist linguistics which was encapsulated in Lakoff and Johnson's (1980: 59) observation that "...we typically conceptualize the nonphysical *in terms of* the physical...." i.e., the unknown in terms of the known.

I. A. Richards (1893–1979)

Richards introduced some basic notions on the structure of metaphor in his classic treatise *The philosophy of rhetoric* (1936). In the fifth and sixth lectures ('Metaphor' and 'The command of metaphor') of the Mary Flexner Lectures series at Bryn Mawr University, he discussed metaphor in revolutionary terms. In his fifth lecture, Richards (1936: 90) noted that metaphor has traditionally meant "...a grace or ornament or *added* power of language, not its constitutive form." In this groundbreaking paper, Richards would go on to espouse his interactionist theory of metaphor. He argued, in fact, that metaphor is ubiquitous in language, and, by implication there is no literal-figurative speech dichotomy. Richards then introduced new expressions for the three parts of a metaphor, namely, 'tenor,' 'vehicle,' and 'ground.' In a prototypical metaphor, the tenor is the topic or the unknown part in Richard's triadic configuration.

The vehicle is the part that comments on the topic, and the ground is the actual meaning created by the interaction of the tenor and the vehicle.

In this theoretical model, Richards builds upon Aristotle's claim that metaphor is the comparison of two apparently dissimilar items (*A is B*) or the substitution of one item for another (*A stands for B*). In Richards' model, however, there is an interaction, i.e., parts of the two entities remain separate and distinct but there is a domain of shared properties in which a new meaning is created. This area of shared properties may be configured as (A(X) B). In this model, A is the tenor (topic) or the unknown aspect of the metaphor. B is the vehicle that is a familiar object or concept. X in the equation just given is the ground or meaning produced by the association of the tenor (A) and the vehicle (B). Thus, the previously mentioned statement *John is a rat* causes the hearer to think or experience one thing in terms of another. In this case, we are invited to draw comparisons between the behavior and traits of a person (*John*) and those of an animal (*rat*). Clearly, a human and a rat are distinct, yet they may share certain traits, e.g., animate, furtive, sneaky, filthy, to name but a few domains of similarity. It is in these areas that new meanings are created. In this specific case, the prototype metaphor or conceptual metaphor (see Lakoff and Johnson below) is PEOPLE ARE ANIMALS (conceptual metaphors are presented in upper case letters by convention and we will follow this format throughout). The specific case here causes the hearer or reader to draw inferences about the shared properties of *John* and a *rat*. To be sure, the similarities in this instance are not pleasant ones. We can thus state that *John* is the tenor or topic, *rat* is the vehicle, and the ground is the meaning of this metaphor, i.e., the conceptualization of John as a vile person. The juxtaposition of the A component (tenor/topic) and the B component (vehicle) is thus responsible for an interaction that provides a new meaning that had not previously existed. Although Richards uses the term 'interaction' in his writing on metaphor, this expression would be most closely associated with Max Black (see below) who gave it currency.

As we shall demonstrate, scientific discovery relies heavily on the use of metaphor to create new knowledge about the world by this interactionist strategy. Many scientific breakthroughs have occurred by using this epistemological strategy, e.g., William Harvey's (1578–1657) use of the machine metaphor to describe the physiological phenomenon of the movement of the valves of the heart.

Richards (1936: 92, 93) also points out that metaphor is "omnipresent" in speech. He notes that even in scientific and technical language, metaphors are ubiquitous. Although Richards did not carry out an empirical analysis of this assertion, Pollio and his associates (1977) did just this, and they discovered that novel and dead metaphoric language permeated speech. Richards thus takes the position that there is no literal-figurative dichotomy, i.e., the claim that there is a basic 'ordinary' language that is embellished by the use of colorful figurative language.

In yet another way, Richards is a precursor of the theoretical metaphorology espoused by George Lakoff and his advocates. He states that thought is metaphoric. By this, he means that metaphor constitutes the essence of epistemology. We acquire knowledge about our world and ourselves by converting concrete experience into abstract manipulable units of that experience that allow us to categorize it and refer to it.

Max Black (1909–1988)

Max Black provides another perspective of the interactionist view of metaphor. In his illuminating discussion on the form of metaphor (Black, 1981 [1955]: 77–78), Black enumerated seven basic points about the interaction model of metaphor. First, a metaphor consists of two topics, a primary and a secondary one. Next, these topics are not monolithic entities, but rather they are complex, well-organized groupings of properties. Third, the metaphor affixes to the primary topic a complex of analogous insinuations attributable to the secondary topic. Fourth, in general, these inferences involve commonalities, though, occasionally, there are startling associations. Fifth, metaphors are selective in their implications, i.e., they choose only certain aspects of the secondary topic that apply to the primary one. Sixth, transformations in the lexical meaning belonging to the same family may be metaphoric transfers. Finally, no simple rule for shifts in meaning exists, nor is there a good explanation for why some metaphors are accepted and others are not.

Schroots (1991: 222) best captured the essence of Black's interactionist view of metaphor in the following observations:

1. Metaphors are concerned with systems of ideas;
2. Such systems are specially constructed;
3. Metaphors are projective in that they allow one field of thought (subject) to organize another, whether by selection, filtering, focusing, or other means; and
4. Models are extended and systematic metaphors.

The celebrated semiotician Charles Peirce (1839–1914) espoused the concept of 'abduction.' Simply

stated, this is an educated guess. With regard to metaphor, abduction allows the hearer to make a meaningful association between the tenor (now generally called the topic) and the vehicle, i.e., the A and the B components of a metaphor. Abduction would thus allow the hearer to engage in meaningful hypotheses about what the associations between the tenor and the vehicle might be. As noted above, if the associations are tenuous or oblique, then the metaphor will be unsuccessful.

Groupe μ

Groupe μ consists of a cadre of scholars at the University of Liège in Brussels who published *A general rhetoric* (1981) that dealt with figurative language. It predated Lakoff and Johnson's groundbreaking work on metaphor but offered an excellent overview of a structuralist approach to metaphor research. This group represents the ideology of Ferdinand de Saussure (1857–1913), Louis Hjelmslev (1899–1965), Emile Benveniste (1902–1976), Algirdas Julien Greimas (1917–1992), Roman Jakobson (1896–1982), and others of the Structuralist school (see more about this linguistic school below).

Paul Ricoeur (1913–2005)

Paul Ricoeur's study (1977) of metaphor is considered to be one of the major statement on metaphor. In this important volume, Ricoeur authored eight essays on metaphor. Ricoeur appropriately began with a consideration of Aristotle's views as the prime mover in metaphor research for more than two millennia. Next, he reviewed the French writer Pierre Fontanier, whose taxonomic approach was inadequate to explain metaphor. In his third study, the author examined metaphor as a sentence-level or a word-level device. In his fourth and fifth studies, Ricoeur investigated structuralist views of metaphor. The sixth study moved to the discourse-level of metaphoric analysis. The seventh paper discussed reference, and the final one dealt with the philosophical underpinnings of metaphor research. What makes this volume valuable is the author's ability to analyze the multiple approaches to metaphor in an objective fashion. Ricoeur brought to our attention that the study of metaphor means coming to grips with the essential nature of language – meaning and semantic deviation.

George Lakoff (b. 1941) and Mark Johnson (b. 1949)

Lakoff and Johnson articulated an elaborate theory of metaphor as a cognitive construct. Their collaborative and individual work has done much to advance metaphor research in the past quarter century. In this section, we shall devote an extended discussion to their contributions to metaphorology.

In *Metaphors we live by* (1980), Lakoff and Johnson discussed the notion of the conceptual metaphor. Their approach to the study of metaphor is now known as Conceptual Metaphor Theory. Thus metaphors such as the previously stated example *John is a rat* (discussed previously) is part of the general conceptual metaphor which equates qualities of people with qualities of animals. Sometimes, these are positive (*Mary is a bunny rabbit*), and in other instances they are negative (*John is a warthog*). The preceding three examples belong to the conceptual metaphor PEOPLE ARE ANIMALS.

Conceptual Metaphor The conceptual metaphor PEOPLE ARE ANIMALS is relatively common. In recent times, the generic term predator, those animals that live by preying on other, weaker animals for sustenance, has come into frequent use. Predatory animals include, but are not limited to, lions, tigers, and pumas. When people are labeled as predators, this is a subcategory of the PEOPLE ARE ANIMALS conceptual metaphor. This type of metaphor is common in the media, especially when referring to certain types of heinous crimes. This metaphor involves those people who prey upon people who are weaker, e.g., children, older adults, or people with disabilities. The following sentences illustrate this usage.

1. The man *stalked* his victim for days.
2. The outlaws *hunted* their prey surreptitiously.
3. The criminal *pursued* his quarry relentlessly.

The sense of this subcategory of PEOPLE ARE ANIMALS is decidedly negative, because it evokes powerful negative emotions due to its unpleasant associations. Conceptual metaphors thus consist of two parts that are called domains. The first is a source domain (vehicle, or the known, sometimes labeled the B-referent) and a target domain (tenor or topic, or the abstract element, sometimes called the A-referent). In the PEOPLE ARE PREDATORS conceptual metaphor, *people* is the target domain, or the topic itself, while *predator* is the source domain, or the vehicle that delivers the metaphor to the hearer. A metaphor is thus the mapping of one domain into another.

In the Lakoff and Johnson model, metaphor is not a mere deviation from an underlying literal language that functions as a linguistic ornament. Rather, metaphor is now viewed as a cognitive process that allows the mapping of a source to a target domain to enhance comprehension of the unknown in terms of the known. Thus, for Lakoff and Johnson (1980: 5, emphasis in original) "the essence of metaphor is

understanding and experiencing one kind of thing in terms of another."

Other examples of conceptual metaphors include the ARGUMENT IS WAR metaphor, exemplified by such common examples as the following sentences.

ARGUMENT IS WAR

1. They *fought* my claims constantly.
2. I *won* that point.
3. They *beat* us in court.

An additional illustration of conceptual metaphors follows. It should be noted that many of these are rooted in the proverbial language of a culture. In English, 'time is money' is simultaneously a proverb and a conceptual metaphor.

TIME IS MONEY

1. We will *buy back* your time with release time.
2. *Budget* your time for each section of the test.
3. *Donate* some of your free time to this cause.

The number of conceptual metaphors in a language is potentially unlimited. Different cultures, however, will focus on and highlight different aspects of these metaphors.

Metonymy A subcategory of metaphor is metonymy. Metonymy refers to the use of one element to refer to another that is closely related. The following examples illustrate this cognitive mechanism.

1. He loves *Cervantes*. (Cervantes = the writings of Cervantes)
2. She's in *opera*. (opera = the profession of operatic performance)
3. *New hair* made John very happy. (new hair = surgical procedure to implant hair).

Synecdoche Synecdoche is a subtype of metonym. It is the conceptual process by which the part stands for the whole, i.e., a segment of an object stands for the entire object. The following examples depict this cognitive device.

1. The *SUV* is destroying the environment. (= the overuse of the this type of vehicle is destroying our limited natural resources)
2. A few good *arms* will help us win this baseball game. (= good pitchers will help the team to win the baseball game)
3. The *brains* in that university are world-class. (= the intelligent people on the faculty).

Marcel Danesi (1946–) and Paul Perron (1940–) introduced the expression 'conceptual metonym' as a parallel to conceptual metaphor as a way to organize reality in different cultures (1999: 176). Conceptual metonyms are another meaning-making tool at our disposal. Among the categories they suggest are the following ones.

PRODUCER FOR THE PRODUCT

1. Give me a *Perrier*®.
2. I just bought a *Ferrari*®.
3. I own a *Miró*.

THE PLACE FOR THE INSTITUTION

1. The *White House* just denied complicity.
2. *Fleet Street* is predicting a recession.
3. *Vatican City* issued a papal decree.

During the decade of the 1980s, Lakoff and Johnson presented a persuasive model of metaphor to explain how we convert concrete experience into abstract concepts and store the information gleaned from those experiences in our brains. In the next section, we shall discuss how Lakoff and Johnson described this process.

The Image-Schema The image schema is a key element in the theoretical construct of Lakoff and Johnson's conceptual metaphor. Johnson (1987: 29) pointed out that an image schema "...operates at a level of mental organization that falls between abstract and propositional structures ... and particular concrete images...." Johnson argued that in order for us to provide structure to our experience and to be able to recall it, there has to be a pattern and order in our perceptions, actions, and conceptualizations. This arrangement occurs through image schemas that consist of shapes, patterns, and images that provide regularity to our experience. Schemas allow us to categorize and catalogue our experienced reality by associating the unknown with the known and allowing us to decide where the new information belongs. The experimental psychologist, Eleanor Rosch (1973), showed that people do this on a regular basis. In this way, conceptual metaphor, and its related forms conceptual metonymy and conceptual synecdoche, represent this cognitive process.

Johnson pointed out that the image schema is not a photographic reproduction of experienced reality; rather, it is a mental icon that is malleable in its format, i.e., is not a fixed form. It allows us to fit new experiences into a somewhat amorphous pattern or shape and give it meaning. Image schemas may represent any of the five senses (sight, hearing,

touch, taste, smell). Selected linguistic analogues include the following expressions:

1. A sight to behold (sight)
2. The roar of the crowd (sound)
3. A clammy feeling (touch)
4. A sweet flavor (taste)
5. The smell of greasepaint (smell).

Because image schemas are such an ingrained part of language, we often do not recognize them.

Lakoff's (1987: 122–124, 138–142) work on fuzzy grammar pointed out systematic grammatical reflexes of what would come to be called image schemas. Lakoff showed that English utilizes certain phrases and expressions to express membership in prototypical categories. Thus, there are certain objects that clearly belong to a specific category, e.g., birds (winged, feathers, ability to fly) such as cardinals and bluejays. Other animals either do or do not belong to this category or belong only marginally. In these cases, expressions such as *a kind of*, *sort of*, *essentially*, and many more are employed to situate these objects at the periphery of this category. Thus, the sentence *a penguin is a kind of a bird* indicates our placement of this animal at the border of this image-schematic classification. Ronald Langacker would develop this notion to a far greater extent in his 'cognitive grammar' model of linguistic theory (see below).

Lakoff and Johnson's innovative research thus represents a continuum in the analysis of metaphor dating back to Aristotle. They utilize pre-existing scholarship as the basis for their conceptual metaphor theory. At the beginning of the 20th century, researchers such as Karl Bühler (1879–1963) initiated experimental research in the paraphrasing of metaphor-rich proverbial language. By the middle of the 20th century, psychologists including Charles Osgood (1916–1991), B. F. Skinner (1904–1990) and Solomon Asch (1907–1996) began to examine metaphor. It was I. A. Richards and Max Black, however, who most influenced Lakoff and Johnson's research with their interactionist view of metaphor.

Ronald W. Langacker (b. 1942)

The theoretical linguist, Ronald W. Langacker, articulates Lakoff and Johnson's views on conceptual metaphor in his cognitive grammar. Langacker notes that the Lakoff and Johnson view of metaphor is one in which metaphor is basic to epistemology. As stated previously, metaphor involves mapping a source domain (vehicle = the known) and a target domain (topic or tenor = the unknown). In this approach, the projection of a source field onto a target field is a metaphoric process. In this sense, as Danesi and Perron (1999: 175) noted that metaphor is "...the ability of the human brain to convert experience into abstraction via the mapping of some source domain onto a target domain to produce an abstract concept." In his extensive research, Langacker provides specific examples from various languages to illustrate how his version of cognitive grammar works. What Langacker does is connect the conceptual metaphors to grammar. Specifically, he relates grammatical categorization and concept formation. The following example illustrates Langacker's line of argumentation.

Lakoff demonstrates that certain aspects of English grammar reflect the image schema, the essential basis for Lakoff and Johnson's notion of the conceptual metaphor. Langacker (2002: 1–32) showed a relationship between grammar and concept formation. In cognitive grammar, a metaphorical theory of grammar, we receive input from the external world. This input is processed at the experiential level, i.e., through our senses. Next, this information is converted into image schemas such as shapes and so forth. Third, the image schemas are transformed into conceptual metaphors/metonyms/synecdoches. Finally, this totality of information is transformed into the linguistic categories of grammaticalized or lexicalized forms.

A succinct, albeit simplified restatement of one example, of the many presented by Langacker (2002: 149–163) suffices here. The verb *go* exemplifies the grammaticization, or the projection of certain basic concepts into the grammar of a language. The verb *go* has the meaning of motion and, subsequently, it evolves into a future meaning. This occurs because the original meaning of 'movement from the speaker,' a spatial concept, is transferred to a temporal domain. On the one hand, this verb means to move from point A to point B, e.g., A → B. On the other hand, it signals a more abstract movement through time, i.e., an activity that will be carried out at a future time. In this sense, English and many other languages of the world combine spatial and temporal movement into a single verb. To be sure, this explanation is a bare-bones discussion of the complexities involved this semantic shift from space to time, but it serves to show that conceptual frameworks may be grammaticized or shifted from experience to an abstract grammatical notion of movement.

Literal Versus Figurative Language

The assertion that figurative language derives from a basic literal language has been a matter of discussion

for some time. This underlying assumption thus separates language into two distinct categories – one primary, the other secondary. For nearly 25 centuries, since Aristotle's commentary, the assumption of the literal-figurative language dichotomy has gone virtually unchallenged, albeit certain philosophers such as Vico have indeed insinuated that all language is metaphorical. As noted above, Aristotle's significant statements about metaphor held sway, with certain precursory and insinuative statements to the contrary, until the 20th century.

The essence of the literal-figurative debate revolves around whether or not metaphor is a deviation from some pristine ordinary language or whether it is a basic form of linguistic expression. The essential question relates to whether or not metaphor is derivative or basic. To respond to this question, it is necessary to consider briefly some hypotheses about the origin of language. In this regard, Danesi (1993: 1–29) discussed in some detail the likely, lengthy progression of the process of linguistic evolution. Danesi's response was Vichian in that he subscribed to Vico's empiricist view that language originates through gestures that signified basic concepts. Subsequently, these isolated gesticulations and primitive interjections became codified into an ever-increasing abstract set of oral symbols that we call language. This process involves an abstraction or a metaphoricization of these primitive experiences that evolved from gesture to symbolic utterance to a fully developed linguistic syntax. Many of these primal metaphors become unrecognizable and they now appear to be literal linguistic expressions. Because these basic metaphors have become so commonplace and are now unrecognizable, we assume that they are literal.

In the literalist camp, Mac Cormac (1985: 73) defined literal language as "the use of language to express concrete objects and events. When we employ ordinary words in their ordinary dictionary senses to describe events or situations that are publicly perceptible, we are speaking literally." Even though Mac Cormac is an ardent literalist who believes that there is a distinction between these two forms of language, he conceded that as a literal language apologist, he (Mac Cormac, 1985: 78) must admit that his explication of literal language presupposed an elementary metaphor, namely, that the world consists of natural categories.

In his 1936 discussion of metaphor, Richards was among the first to break with tradition and state that metaphor is essentially omnipresent in language. By making this bold statement, he revolutionized prevailing wisdom about metaphor. It is no longer deviation from standard or literal language, it is, in fact, the essence of language. Richards noted that the boundary between literal and figurative language was not fixed or constant.

Empirical research carried out by Pollio *et al.* (1977), for example, provided persuasive evidence for what Richards called the omnipresent nature of metaphor in ordinary language. Specifically, their research showed that individual speakers uttered approximately 3000 new metaphors per week, as well as 7000 idioms that are frozen metaphors.

Lakoff disputed the literal-figurative dichotomy. In an important article on this aspect of language, Lakoff (1986: 292) pointed out various distinct meanings of literal language. It is possible to state Lakoff's views of the misconceptions of the word 'literal' in this debate in at least four different ways. First, literal language diverges from special uses of language such as literary language. Second, there is a language for a particular subject matter. Third, there is a language that has no secondary meaning. Finally, there is a logical language that may be true or false. Lakoff points out that these four basic assumptions of a literal-figurative dichotomy are not tenable. In fact, the four meanings of 'literal' converge.

Semiosis and the Signifying Order

The signifying order is the means by which a society or a culture codifies meaning. It is a tripartite process, as Danesi and Perron (1999: 70) pointed out. It consists of semiosis (the capacity to comprehend and create signs), representation (the process of using signs to refer to objects and concepts), and the signifying order (the cultural complex employed by a given culture to impose representation and order in that society).

Sebeok (1920–2001) developed a modeling system to describe this process of the comprehension and production of signs (Sebeok, 1994: 116–127). The primary modeling system is the mental system that receives input from the external world. This system is the one that underpins the representational operations of replication, simulation, imitation, and indication. Next, the secondary modeling system is that mental system that produces projections of primary or concrete models into abstractions. In this sense, language exemplifies this modeling system because it utilizes primary signs to create linguistic signs. The tertiary modeling system extends primary and secondary modeling systems into an elaborate schema of cultural signs (literature, the performing and representational arts) to its most abstract and significant levels. The combination of these three systems, and most especially the tertiary modeling system is metaphorical, in nature because the cultural signs stand for different aspects of the culture, e.g., an Italian opera

is a higher order system of signs (verbal, musical, artistic) that incorporates many essential aspects of the Italian culture.

Metaphor production is a special example of this process that involves, as Danesi and Perron (1999: 69) discussed, a series of stages that includes environmental input into the bodily senses through a process of semiosis. This input is then represented in the mind and ultimately displayed in the culture through the signifying order. In language and in art, this signifying order manifests itself through metaphoric concepts. The actual activity of sign-making is re-presentation, i.e., the presentation knowledge and information again in some new symbolic format, e.g., writing, painting, sculpture, architecture, and so forth. There is an ordered process for semiosis, namely, external input (through the senses) → re-presentation (the use of signs to refer to these external stimuli) → culture (the culture in which person lives gives meaning to the signs of that culture). One of the roles of educating a child is to teach it the salient signs of a culture. Parents engage in this activity with their children from infancy on. The signs of a specific culture are both verbal (language) and nonverbal (kinesics, paralanguage, proxemics). Cultural signs are transmitted from one generation to another via literature, and the plastic and representational arts. Oral societies use memorized and recollected narratives, a kind of auditory cultural history to transmit their cultural signs from one generation to another. These codified signs must be learned by members of other cultures. In the deaf community often via various forms of translation, these signs take the form of meaningful systematic visual gestures.

The essence of semiotics, as Sebeok (1994: 11) pointed out, is the relationship expressed in the medieval Latin expression *aliquid stat pro quo,* i.e., 'something stands for something else.'

Charles Sanders Peirce would expand this bipartite definition (object-sign) of the sign to a tripartite one, in which interpretation becomes the third element (object-sign-interpretant). In essence, a sign is generally considered to consist of three components: (1) the sign or representation (something employed to stand for something else); (2) the object or referent (what is referred to by the sign); and (3) the interpretant (a person's understanding of the sign-object relationship, determined by culture). Medical analysis, one of the oldest recorded professional practices, provides a good example of this triadic system of meaning. In classical medicine, the four signs of illness were *fervor* 'fever,' *dolor* 'pain,' *rubor* 'redness,' and *tumor* 'swelling.' These signs or symptoms, alone or in combination, stand for various physical maladies to be interpreted by the physician. Over the years, symptomatology has become quite sophisticated, in part, aided by new knowledge and sophisticated technology. A good example of the medical sign is the aggregation of symptoms that stand for a stroke, namely, sudden numbness or weakness of the face or limbs, especially on one side, confusion, vision problems, and so forth. All of the medical signs converge to form a systematic pattern of a particular medical problem. The correct interpretation of this cluster of meaningful signs results in a diagnosis. The grouping of physical signs stands for specific illness or syndromes as interpreted by a trained physician.

The Uses of Metaphor

Metaphors may generate new knowledge. As noted above, this is often the case in science. The ability to explain the unknown in terms of the known, the abstract in terms of the concrete, make them ideal vehicles to expand knowledge and to enhance comprehension.

In any discussion of metaphor as a knowledge creator, especially in science, it is necessary to discuss three basic notions: (1) analogy, (2) model, and (3) metaphor. It is not uncommon to find these terms used interchangeably, though, in fact, they are distinct. Analogy, a term used by Aristotle in the definition of his fourth type of metaphor, has at least two meanings. First, it may mean similarities in two objects that are otherwise distinct. Secondly, it is a kind of inference by which it may be deduced that objects that bear some similarity may also be comparable in other ways. A model in the scientific sense does not refer to a scale model, but rather to an analogy. A metaphor in science is again a comparison of the unknown in terms of the known. Thus, a miniature planetary system stands for the Bohr-Rutherford atom, a container of billiard balls in motion for the kinetic movement of gases, the computer for the brain, and so forth.

A model may be an object, often of reduced scale, that stands for the actual object. In architecture, scale models of buildings are commonplace. A second meaning is a tentative theoretical construct intended to function as a testing device. In her discussion of 'model,' Mary Hesse (b. 1924) uses the example of the dynamic model of gases, in which gases are seen as an assortment of billiard balls in random motion. In this model, motion and impact are the shared features, while color, hardness and shininess are irrelevant (Hesse, 1966: 7–11). The shared elements are a positive analogy; those that are not significant constitute a negative analogy. Other factors that play no role in the analogy are neutral. In this view of a 'model,' the primary model ($model_1$) alludes to the

imperfect copy (billiard balls) minus the negative analogy. The second use of the term 'model' ($model_2$) is the second copy with its positive, negative, and neutral analogies.

A few examples of a model are in order. The Bohr-Rutherford conceptualization of the atom is explained in terms of the planetary system, i.e., the different parts of the atom with its component electrons and protons which function much as the planets that revolve around a central solar system. In this case, the planetary system is $model_1$ and the Bohr-Rutherford atom is $model_2$. Additional examples of this use of modeling include comparisons of the human or animal body to a machine, or the brain to a computer.

We shall now discuss a number of specific examples of how science and education use metaphors and models as a way to advance knowledge. It must be noted that a model is an actual object (planetary system, billiard balls, computers) already known to the audience. The theory used to explicate the scientific innovation uses the model metaphorically, once again, to describe the unknown in terms of the known.

Theory-Constitutive Metaphors

Scientists use metaphors to explicate their theories in a way that will make them comprehensible to their intended audience. This public, however, is often limited to fellow scientists. Successful metaphors, i.e., those that introduce a novel perspective in a branch of science, tend to capture the imagination of an entire generation of scholars who embrace its basic meaning and apply its newly created insights to previously unresolved problems. This notion of theory-constitutive metaphor merits review at this juncture.

Thomas S. Kuhn's (1922–1996) book *The structure of scientific revolutions* (1970) argued that there are periods of normal science when scientists work within a single paradigm or model commonly accepted by the practitioners of a particular science until there is what many call a 'breakthrough.' In his discussion of paradigm, Percival (1976: 286–287) noted that scientific paradigms consist of symbolic generalizations, such as Einstein's $e = mc^2$, which are elegant, yet simple explanations for previously unexplained phenomena. Paradigms also consist of models or conceptual analogies that offer members of a given scientific community an ontological framework. Members of these groups share theoretical values to evaluate competing theories within their framework. Finally, they use exemplars to show how their theory resolves complex problems that earlier theories could not. Periodically, this normal science is rejected, most often by a single scientific genius who provides answers to residual problems in the prior theory as well as making significant new strides in the field of inquiry. What we shall see is that scientific revolutions are often founded on novel metaphors that reject those of the theory they have supplanted.

Linguistics 20th-century linguistic theory provides an excellent example of the use of metaphor to change theory. During the last century, two major theoretical paradigms in linguistics emerged. The first was exemplified by Leonard Bloomfield's *Language* (1933), with its empiricist view of language. In this book, linguistic knowledge derives from external sensorial experience. In *Verbal behavior* (1957), B. F. Skinner, the U.S. psychologist, elaborated these empiricist views on language through his stimulus-response approach, one that greatly influenced second-language education in the 1960s. A second theoretical approach to linguistic analysis emerged with Noam Chomsky's *Syntactic structures* (1957) and *Aspects of theory of syntax* (1965), and its clearest exposition in Chomsky's *Cartesian linguistics* (1966), with its rationalistic approach to language acquisition, i.e., humans are born with an inherent language acquisition device.

Both of these linguistic theories employ distinct metaphors. In brief, the Bloomfield model, or American Structural Linguistics, language may be viewed as a stack of boxes that represent levels of analysis (phonology, morphology, syntax). The linguist begins with the lowest box, or level, and then, presumably utilizes a series of analytical tools (item and arrangement analysis, item and substitution analysis) until the highest level (syntax) is attained. It utilizes a down-up metaphor. This approach utilizes the empiricist notion that language is accessible and analyzable through the senses. Structuralism likewise introduces language as a physical, biological, organic entity. Hence, phonemes functions as atoms, syllables as molecules, and words as cells, though it was rare that structural analysis went beyond these linguistic units to higher order linguistic units such as sentences and discourse. Again, analysis starts with the phoneme, or basic unit of sound in a language, since its metaphoric model were those sciences which progressed from the smallest unit to the largest one. The conceptual metaphors that guided structural linguistic analysis, as we shall see, are very different from that those organized transformational-generative linguistic theory.

One of the problems with the structuralist model, and one that the next generation of linguists would address in a comprehensive fashion, is its failure to provide an analysis of syntax. In the succeeding generation, the transformational-generative model of

language, Noam Chomsky viewed language as an abstract system genetically embedded in the brain. In this model, syntax is central, while phonology and morphology are lower-level, somewhat superficial manifestations of the abstract syntactic level. In this theoretical model, the brain functions as a computer, and it generates an infinite number of grammatical sentences via a limited set of simple rules. This model employs a left-right metaphor for analysis (rewrite rules). Transformational grammar also uses the metaphor of a tree structure with terminology such as branching, pruning, chopping, and nesting to describe its processes. Finally, geometrical and mathematical metaphors predominate, e.g., mapping, transforming, and propositional calculus. It is this use of mathematical metaphors that caused some to believe that the transformational-generative model of linguistic theory was a branch of mathematics. In the transformational model, ideas are often described as 'parallel,' 'diametrically opposed,' and 'central.' The fact that Western culture has a predisposition to accept mathematical and scientific models of the world as objective and authentic is another reason for the switch from structuralism to a generative-transformational model of language.

An essential element of Chomsky's theory of language involves the computer metaphor. Several scholars observed that the computer metaphor is one that prevails when speaking of the mind or brain. Boyd (1979) examined this usage in his analysis of cognitive psychology. Boyd (1979: 360–361) made several equations including the following: (1) thought = information processing; (2) brain language = computations; (3) memory = data storage capacity; and (4) consciousness = feedback. Many of these same analogies exist implicitly in Chomsky's early work such as *Syntactic structures* (1957) and explicitly in his later work *The minimalist program* (1995) where, in fact, his language comes directly from computational jargon. It must also be noted that there are significant differences between the human brain and a computer as well as limitations on both.

Linguistics utilizes theory-constitutive metaphors to elucidate its basic principles. When there are significant changes in these metaphors, there is a paradigm change in the way linguistic theory examines its basic topic of study – language.

Physics Physics uses metaphor to explain and illustrate theories that would otherwise be difficult to comprehend. In his discussion of the metaphoric notion *boojum* (Mermin, 1990), N. David Mermin (b. 1935) points out that this expression derives from Lewis Carroll's (pseudonym of Charles Lutwidge Dodgson, 1832–1898) nonsense poem 'The hunting of the snark.' What Mermin wanted to do was describe the physical properties of a certain type of liquid at very low temperatures. At these low temperatures, the expected patterns could not be maintained, and as was the case with the snark, the physical behavior "softly and suddenly vanished away" (Carroll, 1939: 778). The neologism and the concept are now an established part of physics, as evidenced by its appearance as an entry in *Webster's new international dictionary*. Mermin's use this metaphor captures the essence of the physical properties of this phenomenon.

Anatomy Sir William Harvey (1578–1657), whose anatomical research revealed the circulation of blood throughout the body, employed a mechanistic metaphor to illustrate his findings. In his description of the auricles and ventricles of the heart, Harvey likened them to the firing of a projectile from a firearm. To be sure, his description is incomplete but compelling.

Second Language Pedagogy Second language pedagogy is replete with metaphoric constructs, many of them implicit. For Herron (1982), second language methodology consisted of a series of shifting metaphoric models. The grammar-translation model, for example, employs the MIND-BODY metaphor, by which second language acquisition entailed a sort of mental exercise akin to bodybuilding. A second metaphorical model, THE PRODUCTION METAPHOR, was characteristic of audiolingualism. In this approach, the process of imparting a second language to a student is similar to a factory in which a supervisor (instructor) molds the products (students) through their blueprints (textbooks). The basic purpose of this approach was a utilitarian one, in which use of the fundamental language skills (speaking, writing, comprehension, and reading) were the primary goals. The production metaphoric model still lingers in career-oriented classes, i.e., language for specific purposes (medicine, law, social work, and so forth). Herron also noted that a new metaphoric model has emerged; namely, that second language acquisition is the same as first language acquisition. One effect of this metaphor is to make the teacher a parent in the classroom, and this frequently results in a teacher-dominated classroom environment. Metaphoric models, especially unrecognized ones, may have a negative effect on second language instruction because they bear assumptions that may be counterintuitive to the results sought. Danahy (1986) concurred in this assertion and categorized metaphoric models for second language instruction and student-teacher interaction using major divisions – human-non-human metaphors and human-human ones. In the former case, the

culinary metaphor entails that an instructor is the actor and the students are the patients. In this active/passive model, students are the recipients of a prepared meal that will enrich and enhance them. In the latter model, the family metaphor is one that assumes that students are child-like individuals incapable of doing anything on their own. This parent-child metaphor is a powerful that prevents students from becoming independent and self-sufficient. Recognition of the metaphoric models that pervade a discipline is essential to an understanding of what we do. Identification of negative or inappropriate conceptual metaphors in any profession is a first step to remedying deficiencies.

Concluding Remarks

In this overview of figurative language, we have seen that there are two basic theories of metaphor: the comparison theory that dates back to Aristotle, and its subsidiary version, the substitution model. In the 20th century, the interactionist theory, originally articulated by I. A. Richards and Max Black, but perhaps most completely developed and elaborated by George Lakoff and Mark Johnson, provides us with a cognitive-conceptual model of metaphor and its corollaries metonymy and synecdoche to form a novel epistemological model.

See also: Abduction; Aristotle and Linguistics; Aristotle and the Stoics on Language; Classical Antiquity: Language Study; Classroom Talk; Cognitive Grammar; Cognitive Linguistics; Eco, Umberto: Theory of the Sign; Empiricism; Human Reasoning and Language Interpretation; Interpretation: Theory; Language as an Object of Study; Language Politics; Metaphor and Conceptual Blending; Metaphor: Philosophical Theories; Metaphor: Stylistic Approaches; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Metonymy; Modern Linguistics: 1800 to the Present Day; Nicknames; Philosophy of Linguistics; Port-Royal Tradition of Grammar; Post-Bloomfieldians; Prototype Semantics; Rhetoric: Semiotic Approaches; Second and Foreign Language Learning and Teaching; Semiosis; Texts: Semiotic Theory.

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Figures of Speech

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A 'figure of speech,' sometimes termed a 'rhetorical figure' or 'trope,' is a word or group of words used in some deviation from the strict literal sense of the word(s), or from the more commonly used form of word order or sentence construction. Although traditional rhetoric distinguishes between 'figures of speech' and 'figures of thought,' it has been often difficult, in the absence of any universally accepted criteria, to differentiate between the two in any consistently accepted manner. It has been claimed, by Quintilian among others, that figures of speech are, by nature, grammatical or rhetorical (e.g., antithesis, anaphora) and as such can retain their original sense even when subject to change. This is not true with figures of thought, which, it has been argued, are expressions that have *a priori* strayed from their intrinsic, literal sense (e.g., metaphor, irony, and synecdoche).

Another oft-made distinction underlines the differences between 'schemes' and 'tropes.' Simply put, schemes are abnormal arrangements that allow ideas to be presented forcefully, while tropes are devices that alter the conventional meaning of the expression. The former includes, for example, alliteration and chiasmus, while the latter encompasses metaphors, irony, and synecdoche.

Scope and Functions

Figurative language is central to both poetic and nonpoetic discourse. Throughout the ages, figurative expressions have been featured extensively in the works of both orators and writers alike, who used them to embellish their style, to clarify or illuminate meaning in an efficient, compact manner, or as a particularly effective persuasive device.

Over the years, the study of figures of speech moved from the sphere of traditional rhetoric to that of poetics, and, more recently, to the cognitive sciences, specifically cognitive linguistics and cognitive psychology. This latter development was triggered by a growing awareness that the scope and functions of figures of speech extend well beyond the realm of traditional rhetoric or poetics. However, this view is not an entirely new perception, with scholars dating back to the classical era (for example, Quintilian, and later Alexander Gottlieb Baumgarten and Giambattista Vico) sensible to the fact that figurative modes and models lie at the heart of human consciousness and thus underlie the process of conceptualizing experience. These figurative modes include, in addition to metaphors, metonymy, synecdoche, and irony.

Studies conducted over the last 50 to 60 years have revealed that those figurative modes play an important part not just in everyday thought and language, but in the evolution of most intellectual disciplines, whether in the arts or sciences, as well (Burke, 1945; White, 1978). While traditional rhetoric assumed tropes to be exclusively verbal expressions, recent studies in the field of visual rhetoric and visual literacy have uncovered the existence of a visual equivalent to the verbal trope; hence, the concept of 'visual tropes,' which have pushed the conceptual and so functional boundaries of tropes forward to a considerable degree (Kennedy, 1982). Literary scholars (notably, the Russian formalists and New Critics) have regarded figurative language as a basic stylistic property, key to the unique nature of all poetic discourse. (e.g., Shklovsky, 1965; Mukařovský, 1970; van Peer, 1986). Students of cognitive linguistics (e.g., Lakoff and Johnson, 1980; Gibbs, 1994), claiming that figuration belongs to the realm of thought rather than language, insist that – as suggested by Gibbs in his *The Poetics of Mind* – figurative modes of thinking help to structure and mold human cognition. Accordingly, figurative modes, far from being mere verbal

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constructs, are primarily conceptual by nature and as such play a key role in various cognitive domains, including categorization, problem solving, inferences, and memory.

Figures of Speech in the Cognitive Era

The impact of the 'cognitive revolution' on the study of figurative language was considerable. It precipitated numerous studies (as surveyed in Gibbs, 1994) suggesting that figurative modes, notably metaphor and metonymy, play a central role in structuring and shaping human cognition. Drawing on developments in the field of cognitive sciences, it encouraged students of cognitive linguistics, psycholinguistics, cognitive psychology, and others to explore in great detail and depth all manner of figurative types.

While the emphasis in classic rhetoric was on the classification (taxonomy) of tropes, the cognitive revolution encouraged scholars to delve into such questions as how figurative types work and how they are understood. This produced ever more comprehensive, yet detailed studies of the major figurative types. It led to the introduction of novel issues as well as the development of new methodologies, which, in turn, broadened the range of questions studied even further. Finally, as noted, the cognitive revolution uncovered new, previously unimagined trope-linked functions. Thanks to these developments, issues such as the employment, comprehension, and appreciation of tropes could now be explored in greater depth.

In this context two key and oft-examined questions merit particular attention: (a) how does the processing of literal language differ from processing figurative language? and (b) what is the directionality of mapping?

The Processing of Literal as Opposed to Figurative Types

In this context the key question is whether nonliteral language – metaphors, irony, metonymy, etc. – calls for forms of processing that are distinct from those used to process literal language. The standard view, rooted in philosophy of language theories and pragmatic theory (see Gibbs, 1994) – notably Searle's speech act theory and Grice's theory of conversational implicatures – is that figurative language, being an intentional violation of specific pragmatic and/or communicative norms, obliges the addressees to abide by certain procedures if they are to unearth the figurative expression's meaning. From this it follows that, prior to decoding a figure of speech's figurative meaning, its literal meaning must first be understood. In other words, the former cognitive activity is optional and pursued only after it is clear that the expression's literal meaning is in some way defective.

However, there is psycholinguistic evidence suggesting that if tropes – that is metaphors, metonymy, idioms, as well as indirect speech – are set in a likely and/or plausible context, it is possible to grasp their figurative thrust without having to first analyze and then reject their literal meaning. These experimental findings, which apply to all figurative types, including irony (see, Gibbs, 1993), do more than simply blur the distinction between the way in which literal and figurative language are processed. They suggest that, at least during the initial stages of the cognitive process, the psychological mechanisms used to decipher both literal and figurative speech are the same.

Directionality of Mapping

The question of the directionality of the conceptual mapping process from source to target domains is another key issue in the study of metaphorical and metonymic types. Figurative expressions, it is claimed, follow well-defined structural (directional) patterns. These will be described in greater detail in the following section, which discusses the major figurative types, namely the four types of metaphor (simile, oxymoron, synesthetic metaphors, and zeugma), plus metonymy and irony. This discussion will also examine the question of processing and other related topics.

There are clear qualitative differences between the four aforementioned metaphorical figures. Similes feature an explicit comparison connector. An oxymoron is comprised of two terms between which lies a vast, ostensibly unbridgeable, conceptual gulf. Synesthetic metaphors are a unique metaphorical type involving cross-sensory modality mapping. A zeugma turns on the order in which the terms within the metaphor appear.

Similes A 'simile' is based upon an explicit comparison between two terms, for example, *Rage is like a volcano*. Traditional literary and philosophical theories of simile (see, e.g., Black, 1962; Beardsley, 1958) focused principally on issues such as the difference between a metaphor and a simile, or how the comparison marker *like* serves to elucidate the simile's meaning. It was cognitive studies of similes (that is, metaphorical comparisons), notably that of Ortony (1979), that first raised the question of directionality. Were metaphorical comparisons inherently asymmetrical (that is, unidirectional), and if so, was the asymmetry characteristic of metaphorical comparisons higher than that of literal comparisons? For example, the sentence *Billboards are like placards* is

a literal comparison, since billboards and placards fall into the same category and so share a considerable number of highly salient attributes. On the other hand, the statement, *Billboards are like warts* is a metaphorical comparison, or simile, since some of the highly salient properties of *wart* match a number of the less salient attributes of *billboard*: both are ugly, protuberant, and a blight on the surroundings. This high-low salience relationship underlies all similes. Hence, Ortony contended (supported experimentally) that, in terms of similarity, the degree of asymmetry found in metaphorical comparisons was higher than that found in literal or anomalous comparisons.

Synesthetic Metaphors 'Synesthesia' (Greek, *syn* 'together' + *aesthesis* 'perception') is a remarkable psychological and linguistic phenomenon that has long fascinated scholars from a variety of fields (for a review, see Dann, 1999). In psycho-perceptual terms, synesthesia refers to the involuntary physical reaction produced by crossmodal association, such as seeing a certain color each time a particular sound is heard. 'Synesthetic metaphors,' by contrast, are a verbal phenomenon in which a concept belonging to one sensory domain is referred to in terms taken from another sensory domain. Thus, Keats' 'heard melodies are sweet' evokes a clearly auditory concept *(heard melodies*) in terms belonging to the realm of taste (*sweetness*). The expression *a cold light* is another example of a synesthetic metaphor. In this case, *light,* which is linked to the visual domain, is defined in terms of coldness, which belongs to the tactile domain. In technical terms, the synesthesia sweet melodies reflects a mapping process in which the source domain taste is mapped onto the target domain of sound, while the synesthesia *cold light* represents a mapping process whereby a word belonging to the tactile (source) domain is mapped onto a word belonging to the (target) visual domain.

One of the central issues in the study of synesthesia concerns the directionality of mapping in synesthetic metaphors employed in poetic discourse. Namely, are some modalities more likely to be mapped onto others, or are all modalities equally liable to mapping, irrespectively? Ullmann (1945) (see also Tsur, 1992) proposed a graduated scale of modalities ranging from sight – the 'highest' modality – followed by (in order of importance) sound, smell, taste and, finally, touch – the 'lowest' sense. Based on this hierarchy of senses, synesthetic metaphors embrace either a low-to-high mapping process, as in Keats's 'sweet melody,' in which the mapping progresses from the lower sensory modality of taste to the higher auditory domain, or a high-to-low directionality, as in the expression *melodious sweetness,* in which mapping proceeds from the higher auditory to the lower taste domain.

Studies of assorted poetic and prose corpora (e.g., Ullmann, 1945; Shen, 1997) – in English, French, Russian, Arabic, Hebrew, Chinese, and Japanese – revealed a marked preference for low-to-high as opposed to high-to-low directionality, with a single exception: synesthetic metaphors involving the two highest modalities, sight and sound. These findings are supported by empirical research, which has shown that it is both easier to recall, as well as to assign meaning to, low-to-high mapping constructs, which are also, as rule, regarded as more natural.

According to Shen (1997) the low-to-high pattern that is typical of synesthetic metaphors is a specific case of a more general metaphorical mapping principle, according to which mapping from more accessible to less accessible domains is generally favored over mapping from less accessible to more accessible domains (Lakoff and Johnson, 1980). In the context of synesthetic metaphors, this general cognitive principle stipulates that concepts such as touch and taste, associated with the lower senses, are more easily accessible than those related to the higher senses, for example, sound and sight. The reason that lower sensory concepts such as coldness or sweetness are more accessible is that they are generally experienced directly, unlike most higher sensory concepts, which are, as a rule, experienced at several removes. In sum, synesthesia's marked predilection toward low-to-high mapping, stemming, as it does, from the above general cognitive principle, imposes severe constraints upon the use of synesthetic metaphors in natural discourse.

Oxymoron An oxymoron (ancient Greek, *oxus* 'sharp' + *moros* 'dull' = a sharp dullness) is a figure of speech containing two contradictory concepts, as in the phrase *sweet sorrow.* The former example, like the expression *serious vanity,* contains two clearly antonymic terms, thus producing, as do all oxymora, an utterly incongruous statement.

Oxymora are ubiquitous and appear in all types of discourse. Shakespeare had a marked penchant for oxymora: "O heavy lightness serious vanity!/ Mis-shapen chaos of well-seeming forms!/Feather of lead, bright smore, cold fire, sick health!" (*Romeo and Juliet,* Act 1, Scene 1); as did Milton, for example, with his "darkness visible."

There are two types of oxymora (Shen, 1987): 'direct' and 'indirect.' The first involves 'direct' antonyms (e.g., *silent sound*), while the second involves 'indirect' antonyms (e.g., *sweet sorrow* or *cold fire*). While both semantic structures are oxymora, in the case of indirect oxymora the terms involved are

contradictory only by association (see Shen, 1987). Poetic and nonpoetic discourse in most languages has, over the ages, inclined toward the indirect rather than direct oxymora, perhaps because indirect oxymora are easier to digest than direct ones (Gibbs and Kearney, 1994).

Zeugma A 'zeugma' is a figure of speech in which one syntactic category, typically a verb or an adjective, governs a catalog of at least two other syntactic categories (normally nouns); however, it does so literally in one case and metaphorically in the other. For example: *She caught an airplane and a husband* or "Her beauty pierced mine eye, her speech my woeful breast/Her presence all the powers of my discourse" (Cuddon, 1977). As can be seen in both cases, one term (*caught* and *pierced*) stands in the same syntactical relation to two or three other terms (*airplane* and *husband* in the first instance and *eye, breast,* and *discourse* in the second), yet, in each case, it assumes a different meaning. One of the key questions relating to zeugmas, which touches, albeit indirectly, upon the subject directionality, concerns the order in which the zeugma's components are arranged. Studies (Shen, 1997) have shown there to be a marked bias, in both poetic and nonpoetic discourse, toward placing the literal component before the metaphorical one, as in *He packed his shirt and sadness*. This 'literal first' structure is, as has been observed (Shen, 1997), a cognitively simpler and more easily comprehended configuration. Certainly most people would blink twice at the construct *He packed his sadness and his shirt*.

While in metaphorical figures, the relationship between the target and source domains revolves around the highly complex notion of similarity, underpinning the two remaining figurative types of metonymy and irony is the difference between what is said and what is meant.

Metonymy Traditional rhetoric defines 'metonymy' (Greek, 'change of name' or 'misnomer') as a figure of speech in which one word is substituted for another word with which it has some kind of contiguous relationship, for example, the relationship between a container and what it contains, exemplified by the sentence *the kettle is boiling,* in which *the kettle* signifies the water it contains. In the sentence *Napoleon invaded Russia*, the word *Napoleon* stands for the *French Army*, a substitution made possible by the existence of a contiguous relationship between a leader and his army or nation.

There are several theories (Jakobson, 1971; Burke, 1945) underlining the differences between metaphors and metonymy. All essentially argue that while metaphors hinge on similarity, metonymic expressions are based on the existence of a contiguous relationship between the metonymic phrase (Gibbs, 1993) and its intended meaning. Examples of such a contiguous relationship include the relationship between the part and the whole or between cause and effect (sometimes termed 'synecdoche').

It has been suggested (Gibbs, 1993) that one reason metonymic statements are easily understood is because our conceptual system contains several metonymic models that underpin and shape most metonymic expressions. Hence, the conceptual principle in which the object replaces the user produces such metonymic sentences as *the sax* (read: saxophonist) *has flu today,* while the conceptual habit of substituting place for event results in the sentence *Watergate* (read: the bugging of the Democratic Convention by the Republicans and the subsequent White House cover-up) *changed our politics*.

Metonymy displays certain biases in terms of directionality. Thus, while authors' names are often cited in lieu of the title(s) of their book(s), for example, *Have you read Tolstoy?* there are some things that cannot be expressed in terms of the person or persons who made them: one can hardly say *Mary was tasty* with *Mary* representing the cake she baked.

Clearly there are some elements within the perceptual or conceptual domain that are more susceptible to metonymic substitution than others. Whether or not a term will lend itself to metonymic use depends on its perceptual and conceptual salience (Radden and Kövecses, 1999). Salient concepts include concepts of an immediate and direct nature, big concepts, and noticeably gestalt-like concepts. This perceptual-conceptual distinction between salient and nonsalient terms affects the metonymy's directionality, there being a marked preference for the use of immediate stimuli in lieu of nonimmediate stimuli, as in the expression *I'll answer the phone,* which actually means *I'll answer the person speaking at the other end of the line*. There is also a tendency to favor dominant over less dominant terms. Hence, metonymic expressions will name the biggest and most powerful country in the system or the principal part of the country in lieu of the larger geopolitical unit: England for Great Britain or Russia for the former Soviet Union. This principle may also explain why generic terms such as *mankind* or *postman* are traditionally masculine in form.

Irony In 'irony' (Greek, *eironeia* 'dissimulation,' principally by understatement) the relationship between what is said and what is meant is utterly

at odds. This gives the speaker the freedom to exaggerate or understate matters and to be sarcastic, sardonic, or cynical at will. For example, when people respond to a particularly stupid action by saying *That was very clever,* the positive turn of phrase is in direct contradistinction to the obviously negative reaction to the affair. It is this discrepancy between what is said and what is meant that makes irony a nonliteral or a figurative type. The expressed meaning and the intended meaning of ironic statements are not simply different but diametrically opposed, which distinguishes irony from all other figurative types.

The use to which irony is put also differentiates it from its fellow figurative types. Rather than purporting to express the nature of something, irony is primary intended to express the speaker's attitude (typically negative or critical) toward that something (Gibbs, 1993). It differs from plainly literal critical attitudes in that it is indirect – therefore, less confrontational. Irony also serves to 'echo' expectations or offer an alternative view of a given situation. For example, the expression *It's a lovely day,* when said in the middle of a downpour, is a way of acknowledging, indeed underlining, the utter discrepancy between the expectation that it would be a nice day and the inclement reality. The notion of 'echoing' spawned the 'Echoic mention theory' (Sperber and Wilson, 1981), according to which some statements have no nonliteral meaning but are intended simply to trigger in the listener the memory (echo) of some familiar propositions (whose truth value is irrelevant) and/or reflect the speaker's attitude toward these.

As can be seen from the above examples, in the case of irony the literal utterance is always more positive than the underlying true meaning. This pattern of directionality, which hinges on the speaker's attitude toward the subject at hand, is typical of most ironic statements (Gibbs, 1993). Recent studies on the way in which irony is understood have suggested that it takes no longer to decode an ironic remark, such as *He is a fine friend,* than it does to grasp the same sentence in a literal context, or comprehend its straightforward (un-ironic) equivalent (*He is a bad friend*) (Gibbs, 1993).

In conclusion, the poetic and ordinary use of figures of speech illustrates the two-sided nature of linguistic creativity in general. Their use represent in many cases some deviation from their nonfigurative counterparts; however, this deviation is itself highly constrained by certain (cognitive) principles. This adherence to (cognitive) constraints guarantees the interpretability and communicability of these figurative types.

See also: Irony: Stylistic Approaches; Literary Theory and Stylistics; Literature: Empirical Studies; Metaphor: Stylistic Approaches; Poetry: Stylistic Aspects; Rhetorical Structure Theory; Speech and Thought: Representation of; Style; Stylistics; Stylistics, Cognitive.

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Fiji: Language Situation

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Fiji is a multilingual country in which about 95% of the population are members of either the Fijian or the 'Indian' ethnic group. Before the constitutional changes of 1987 the Indian ethnic group was slightly the larger. A number of varieties of Fijian and a number of languages/language varieties of Indian (both Indic – especially Eastern Hindi and Bhojpuri – and Dravidian) provenance are found in Fiji. In addition to these, Rotuman, a language closely related to Fijian, is spoken on Rotuma (a small island about 300 miles to the north of Viti Levu) as well as in Fiji proper, by a total of about 10 000 people. Fijian and Rotuman belong to the Oceanic branch of the Austronesian language family. Small numbers of speakers of other Oceanic languages (principally Ikiribati, or Gilbertese) and Tongan are also to be found in Fiji.

Vernacular Fijian varieties are classifiable as either Western Fijian or Eastern Fijian. Western Fijian is spoken in the western half of the major island of Viti Levu and on neighboring smaller islands while Eastern varieties are spoken in the eastern half of Viti Levu, on the other major island of Vanua Levu, and on the many small islands to the south of Vanua Levu. Standard Fijian, based on a form of Eastern Fijian, is the lingua franca of members of the Fijian ethnic group. Pidgin Fijian, a simplified form, may be used as a means of communication between Fijians and Indians, as may Pidgin Hindustani/Fiji Bāt, a simplified contact language that developed, like Pidgin Fijian, on the sugar plantations.

The principal first language of the Indian ethnic group(s) is Fiji Hindi/Fiji Hindustani. A high proportion of Fiji Indians and Fijians have a knowledge of English. A declining proportion of the Indians maintain their traditional languages (mainly Indic languages of North India). The major written language of the Indian ethnic group is Hindi/Urdu with Hindi predominating (since about four-fifths of Fiji Indians are Hindus).

English, the language of the administrators of the colonial period (1874–1970), has official status and is now the principal inter-ethnic lingua franca; it is now the first language of some city dwellers of non-European origin as well as that of most of the roughly 20 000 citizens of 'European' and 'part-European' ethnic origin. Several varieties of Chinese are maintained among the few thousand people of Chinese ethnic origin.

In the first few years of education, teaching is in a form of Fijian or Hindi/Urdu, depending on the locality, after which English is used. In the mass media, English, Fijian, and Hindi/Hindustani are the main languages used, both in broadcasting and in newspaper publication.

See also: Amman, Johann Conrad (1669–1730); Fijian.

Language Maps (Appendix 1): Map 148.

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See also: Amman, Johann Conrad (1669–1730); Fijian.

Language Maps (Appendix 1): Map 148.

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Fijian

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Fiji is situated in the Southwest Pacific, between the Solomon Islands and Vanuatu in the west and Tonga and Samoa in the east, but closer to the latter. There are approximately 100 inhabited islands, with a population of 800 000.

Two hundred years ago, the vast majority of the inhabitants spoke Fijian. Today, Fijian is spoken as a first language by the indigenous population of 400 000 and by maybe 10 000 people of mixed ancestry and descendants of Solomon Islanders and other immigrants. Fijian is also spoken in migrant communities in New Zealand, Australia, United States, and Canada.

Fijian is a continuum of some 300 distinct but related 'communalects' divided into two major subgroups, the Western in western Vitilevu (the main island) and adjoining islands, and the Eastern elsewhere. Communalects from different subgroups are not mutually intelligible, and even within each subgroup, geographical distance presents difficulties. However, the term 'Fijian' usually refers to Standard Fijian (popularly called 'Bauan'). Fijian belongs to the Central Pacific subgroup, which also includes Rotuman and all Polynesian languages. Central Pacific is a subgroup under Eastern Oceanic and then Oceanic in the Austronesian language family.

Fijian was not traditionally written and was first recorded by European visitors in the early nineteenth century. A Roman-based alphabet was devised by Methodist missionaries around 1840 and has remained in use relatively unchanged.

Although English is the main language of education, government, and commerce, Standard Fijian has a literary tradition going back over 150 years and is used to some extent in education and in the media (three radio stations and two weekly newspapers, but minimal television programming). Although Fijian speakers are mostly literate, they use their literacy very little, with literacy in English being emphasized in schools. The 1997 constitution declared Fijian one of the official languages, along with English and Hindi.

The phoneme inventory consists of 20 consonants (b [^{m}b], c [ð], d [^{n}d], dr [^{n}r], f, g [ŋ], j [ʧ], k, l, m, n, p, q [^{ŋ}g], r, s, t, v [*β*], w, y, z [^{n}dZ]) and 10 vowels (a, e, i, o, u, ā, ē, ī, ō, ū). There are no consonant clusters, and syllables are open (except in some recent loans). In writing, vowel length is not usually marked, but most modern reference works use a macron.

Grammatical functions are typically performed by affixes or pre- and postposed particles. Pronouns distinguish four persons (including first-person inclusive and exclusive) and four numbers (singular, dual, paucal, plural). Some nouns (mostly denoting body parts and kin) are suffix possessed; others suffix a possessive pronoun to a preposed marker indicating whether the possessor eats, drinks, owns, does, or is affected by the head noun. The attribute follows the noun.

There is obligatory pronominal SVO marking of subject and object within the verb phrase. It is unusual for both subject and object noun phrases to occur outside the verb phrase, but when this happens, SVO, VSO, and VOS are equally common:

era boro-ya na cauravou na no-dra vale
they paint-it the young-men the poss-their house
'The young men are painting their house'

The popular myth among linguists that 'Fijian is a VOS language' seems to have its origin in an editorial decision made by the translator of the Bible (who was not a native speaker).

See also: Austronesian Languages: Overview; Fiji: Language Situation.

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Charles J. Fillmore received his Ph.D. in Linguistics at the University of Michigan in 1961. After spending ten years at Ohio State and one year at the Center for Advanced Study in the Behavioral Sciences at Stanford, he transferred to the Linguistics Department at Berkeley. He was elected Fellow of the American Association of Arts and Sciences in 1984 and was President of the Linguistic Society of America in 1990.

Fillmore's work centers around interconnected foci of research. The major focus is the interface of syntax and semantics, concentrated on the analysis of English and Japanese with an emphasis on the semantics, in the broadest sense, of individual expressions. Fillmore has successfully applied this type of analysis to several types of discourse, focusing especially upon the deictic potential of individual expressions; for example, he has made use of literary discourse as a means of explaining the perspective exploited especially by modern literary discourse, such as indirect free style. His analysis of semantics and syntax was later elaborated upon in a systematic way in the form of 'construction grammar,' the integrated description of the semantics and syntax of subsentential units.

Fillmore's work has had a major impact on semantic and syntactic analysis by arguing for a separate level of analysis for 'case roles' such as agent, patient, and locative, in an effort to account for the semantics of sentences and the semantic interdependencies, manifested syntactically, between constituents, much in the vein of valency theory. Although there are regular correspondences with syntactic functions of phrases like subjects and objects, such as that between syntactic subjects and agents, these case roles have to be set up as a logically separate layer of semantic intuition and, consequently, of linguistic description, since in other cases, and in variant typological scenarios, the only argument for the association of case roles with syntactic function is based upon statistical tendencies of various strengths.

Fillmore's work constitutes a significant contribution not only in terms of linguistic theory, but also to the linguistic description of English and Japanese. The application to a major corpus of English (based on the British National Corpus, amongst other materials) of his descriptive approach is at the center of a major corpus-based lexicographic project ('Frame Net') with the aim of a semantic-syntactic description of the lexical units of English. These lexical units are conceived of as triple layers of information: a semantic case (such as agent), a grammatical function (such as subject), and a phrase type (such as NP). The semantics of a lexical unit, in particular each individual sense of a polysemous unit, is conceived of as based on a semantic frame with a script-like inferential structure associated with types of situations, objects, or events. Any target so characterized is also characterized by dependents that are part of this frame. The core elements of a particular frame uniquely specify the particular sense of a lexical unit. Meaning differences between different senses of polysemous items are reflected in different kinds of syntactic realizations of the elements of the frame defining the whole lexical unit. The aim is to ultimately provide an on-line-accessible database that contains all the semantic-syntactic information a native speaker possesses of a lexical unit.

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Finck, Franz Nikolaus (1867–1910)

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Franz Nikolaus Finck had a comparatively short, but richly productive, academic career. The best overview of the outward trajectory of his career is given by his one-time student John P. Harrington in his 1910 *American Anthropologist* obituary. Finck "was born at Krefeld in 1867. He studied at the universities of Munich, Paris, and Marburg, receiving his doctor's degree at Marburg in 1896. He was docent in comparative philology at Marburg University from 1897 until 1901. His connection with Berlin University began in 1903; at that institution he was first docent and later professor of General Linguistics. From 1907 he was also in charge of the department of Oceanic languages in the Oriental Seminary at Berlin" (Harrington, p. 724). He had five years of military service prior to commencing his university studies, and published three small volumes of poetry during that time.

During the last year of his formal studies at Marburg, Finck "[tore] himself free from the restraints and artificialities of university life," in Harrington's words (Harrington, p. 725). He spent that year living on the Aran Islands (Ireland), conducting field work on the local Gaelic dialect, a sojourn that resulted in publication of a grammar and a lexicon. While a docent at Marburg, Finck immersed himself in the study of a great variety of languages, including non-Indo-European ones, preferring lesser-known idioms and remote dialects. Following Gaelic, he studied Gypsy (Romani), Armenian, and several Caucasian languages. He was not content to merely pursue languages in a philological mode, but employed on-site field technique (the value of which was enhanced by the recent introduction of the International Phonetic Alphabet) and made extended visits to the native regions of the speakers of languages that drew his interest. As Harrington recounted, "... during this Marburg period Finck lived among the gypsies, learning their language and customs" (Harrington, p. 725). Each of these field interludes resulted in publications. He also published articles on Polynesian and Bantu languages.

Finck is widely, if not frequently, recognized as an early influence on studies of language typology. Among his most important works are *Der Deutsche Sprachbau als Ausdruck deutscher Weltanschauung* (1899), *Die Klassifikation der Sprachen* (1901), *Die Sprachstämme des Erdkreises* (1909), and *Die Haupttypen des Sprachbaues* (1910). Not only was his scholarship informed by knowledge of a broad reach of languages; there is evidence that his thought was developing all the time. Petr Sgall noted that between 1899 and 1910, "F. N. Finck changed his attitude" regarding whether language types were rigidly fixed or not.

Despite his untimely death (due to heart disease) in 1910 during what Harrington called "the period of his most fruitful activity" (Harrington, p. 274), he left a rich record of his wide-ranging interests and insightful attention to linguistic detail. A complete bibliography can be found in Harrington (1910).

See also: Sgall Petr (b. 1926).

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Fingerspelling

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The Relationship between Fingerspelling and Sign Languages

Manual alphabets consist of a series of handshape arrangements corresponding to the letters of a written alphabet. Using these manual letters, a signer may spell out a representation of any written word. Fingerspelling is thus the manual representation of the orthography of a word. It was originally devised by hearing people who, for various reasons (such as secrecy or vows of silence), needed an alternative to speech. However, it has been used by Deaf people for centuries. When used by Deaf signers, it is one of several ways in which sign languages may borrow forms from spoken languages in order to realize them in a visual modality. Some fingerspelled forms have become established loans in sign languages, but fingerspelling is only one resource available to sign languages, and most signs in most sign languages are created through visual motivation and are entirely independent of spoken languages. While fingerspelling is always derived from the written mode of a spoken language, the phonological patterning of sign languages may affect the ultimate form of a fingerspelled word.

Manual alphabets and fingerspelling are used only in sign language communities whose members have some degree of literacy in a spoken language, so there is a close relationship between fingerspelling and education. Since the 16th century, educators of Deaf children have used fingerspelling as a way of representing spoken languages visually (Bonet, 1620; Holder, 1669) and providing a link between signed and spoken languages (Figure 1). It has been used to support teaching methods that make no use of visually motivated signs (which may be termed 'Oral'). In some cases it was used to supplement speech and lipreading, while in others it has been the sole method of communication. Even the great 18th-century Oralist educator, Samuel Heinicke, at the Leipzig school, made use of fingerspelling (Buxton, 1886; Arnold, 1888). It has also been used to supplement teaching that uses sign languages (which may be termed 'manual') and is used in bilingual education for Deaf children. In some sign languages that use a one-handed manual alphabet, educators have used manual letters to manipulate the language, creating 'initialized signs' (see the section 'Established Lexical Items Originating from the Manual Alphabet').

Manual Alphabets

One-handed manual alphabets are the most commonly used in the world's sign languages today. In these alphabets, letters are made with one hand, in a range of different handshapes, with varying palm and finger orientations and movements. One-handed alphabets were certainly in use in Europe in religious communities in the 15th century, and a version of one of these came to be used by Spanish teachers with Deaf pupils. It was taken up (with modifications) by the French educators in the mid 18th century, and spread with the French education methods across Europe and to the Americas and, from there, across Africa, Asia, and Australasia. The International manual alphabet (selected by the World Federation of the Deaf for use in international situations) is based on these one-handed manual alphabets.

Despite the present-day dominance of one-handed manual alphabets, there are also many documented two-handed manual alphabets, in which the two hands are configured together to create manual letters. The origins of the two-handed alphabets are unknown, but examples have been documented in the former Yugoslavia, Indonesia, Grand Cayman, Germany, Norway, the USA, and the British Isles.

One-handed manual letters require many different handshapes in order to create 26 distinct configurations. Consequently, several of the handshapes are highly marked (and do not occur in non-fingerspelled signs) and motorically complex, requiring fine movements of the fingers. The small changes in finger position between letters require the fingers to be in the center of the observer's visual field. The observer's focus is on the signer's face, so fingerspelling is made

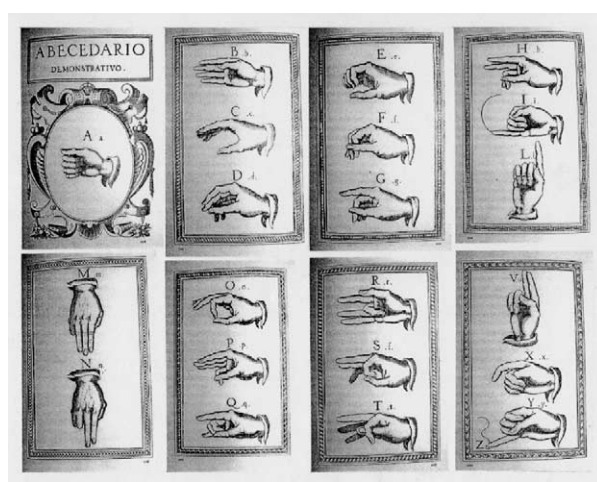

Figure 1 Juan Pablo Bonet (1620): extract from *Reducción de las letras y arte para enseñar á hablar los mudos.*

close to the body, at shoulder height. Two-handed manual letters require far fewer handshapes, because the use of the second hand permits several configurations of the same handshapes (so all handshapes in the British manual alphabet, for example, also occur in non-fingerspelled signs). As the handshape differences are less fine and the movements are larger, signs may be seen in peripheral vision, so two-handed fingerspelling is located at the waist.

Historical Changes in Manual Alphabets

The manual alphabets used in Britain have been of two basic types. Prior to 1698, most were 'arthrological,' based on methods of allocating letters to joints of the fingers or areas of the hands and pointing these out in succession (although for a few letters in some manual alphabets, a letter was represented by a given hand arrangement). In the later, 'dactylological' systems, the letters were distinguished by different handshapes, often reflecting the shapes of the written letters, as they are today.

John Wilkins's book on cryptography (1641:116) mentioned fingerspelling as one method of "secret discoursing, by signes and gestures." In one passage, he described an arthrological system, including the five vowels exactly as the vowels are made in the modern British manual alphabet (Figure 2). The alphabet presented by George Dalgarno (1680) used the same technique (Figure 3). The most substantial shift from arthrology to dactylology occurred in 1698, with the anonymous publication of *Digiti Lingua*, which presented the first manual alphabets with most letters represented by distinctive hand arrangements (Figure 4). The vowels, however, remained at the tips of the fingers, as with previous alphabets. The author recommended the use of the manual alphabet for anyone incapable of speech but made no explicit reference to its use by Deaf people. This alphabet was made within the prevailing tradition of cryptography

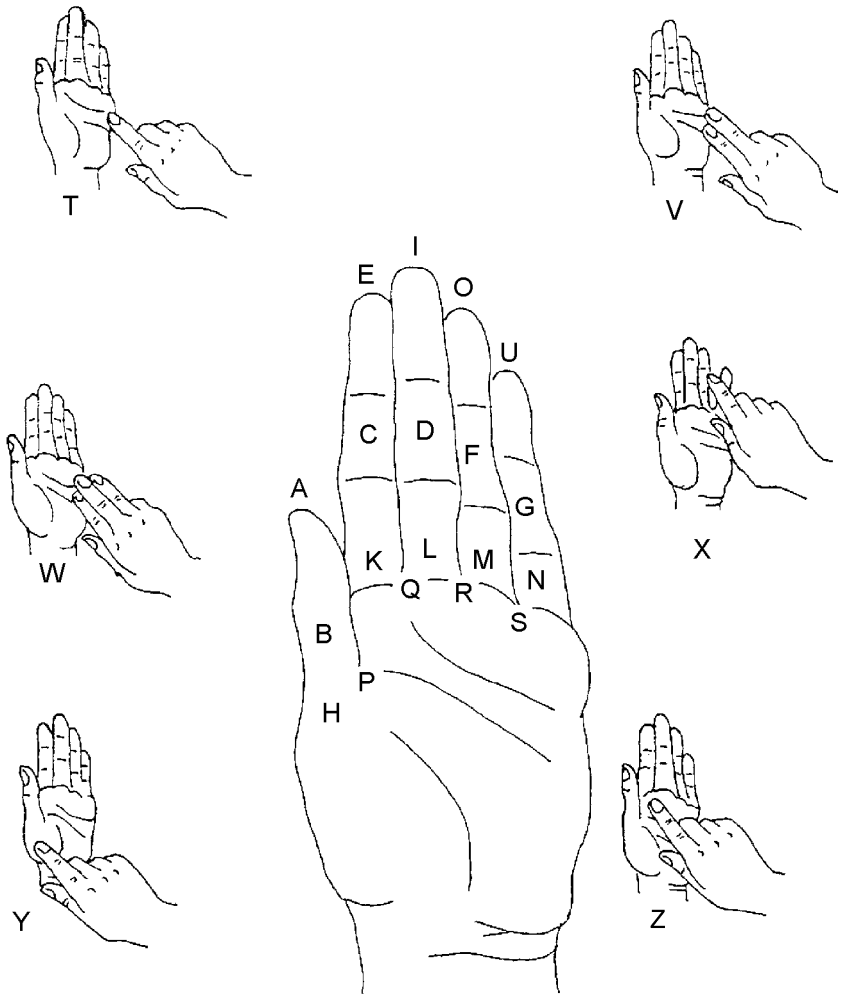

Figure 2 John Wilkins (1641): Mercury: the Secret and Swift Messenger (reconstructed from his description).

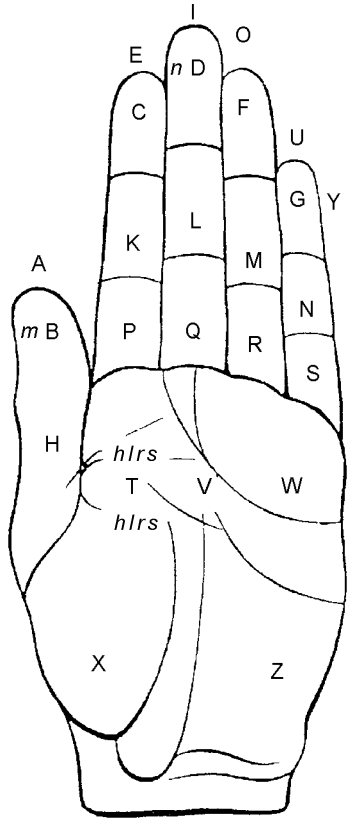

Figure 3 George Dalgarno (1680) Didascolocophus.

and the political turmoil in England at the time, which increased the need for covert activity. In the name of secrecy, the author offered two sets of 26 hand arrangements arranged into alphabets, with the recommendation that the reader should allocate different letters to the different handshapes, or even make up new ones.

In 1720 Daniel Defoe published *The life and adventures of Mr. Duncan Campbell*, which contained a plate showing an alphabet that is very similar to the modern alphabet (although J was missing), with only four other letters different from those used today (Figure 5). Thus, somewhere between 1698 and 1720, the British manual alphabet became fixed in roughly the form we know it.

The British two-handed manual alphabet spread to many parts of the world with the British Empire. Today some educated urban Deaf people in India who know English use the British system when fingerspelling, although the vowels are unlike the British ones. Carmel (1981) reported that South Africa and countries of the British Commonwealth used the British fingerspelling. Uganda, for example, uses the British manual alphabet, although American-initiated education programs have increased the influence of the one-handed alphabet (*Manual of Ugandan signs*, undated). In Australia, the British two-handed alphabet has been used in all states (except Western Australia, which at one time used the one-handed alphabet but later changed over to create unity in the country). Irish priests and nuns opened schools for the Deaf in New South Wales, bringing with them the one-handed Irish alphabet and creating a situation in which Catholic Deaf used one-handed fingerspelling and Protestant Deaf used two-handed (Carmel, 1981). Most of Canada uses the American one-handed alphabet, but British two-handed fingerspelling is still used in some parts of eastern Canada, and many older signers in the United States are familiar with the two-handed alphabet (Loew *et al.*, 2000).

The Function of Fingerspelling

Fingerspelling permits signers to borrow from spoken languages, and code-mix and code-switch between the signed and spoken languages, as it allows them to represent the spoken language vocabulary and morphology manually. As almost all Deaf signers who fingerspell are bilingual to some extent, it is not possible to test for distinctions between loans and code mixing (or nonce and established loans), on the grounds that loans are used only by monolinguals. It is often difficult to know when a form from English is an established loan and when it is an instance of code mixing or a nonce loan. However, some loans must be considered established loans, purely on the grounds of their widespread use within the sign language.

Fingerspelling violates essential rules of sign language phonology, primarily because natural signs rarely use more than two handshapes, whereas a fingerspelled sign may be made up of several different handshapes (representing each letter of the word). In order to more closely approximate the patterns of the recipient language, loan fingerspellings are usually abbreviated to two (or three) letters. Short words particularly (e.g., j-a-m, s-o-n, or m-a-y) may become established loans through fingerspelling. Patterns of abbreviation vary, but common processes in British Sign Language allow selection of first and last letters (e.g., b-l from *Bristol*), first and second letters (e.g., a-b from *Aberdeen*), and first letters from each morpheme (or perceived morpheme) of the loanword (e.g., m-c from *Manchester*). The selection of letters is also influenced by the form of the manual letters – at least in two-handed alphabets – so that symmetrical letters and those with a larger area of contact between the hands are more likely to be retained. Vowels are most frequently omitted, unless they are word-initial (Sutton-Spence, 1994).

Fingerspelling may be of entire content words, especially of proper nouns and of nouns referring to new

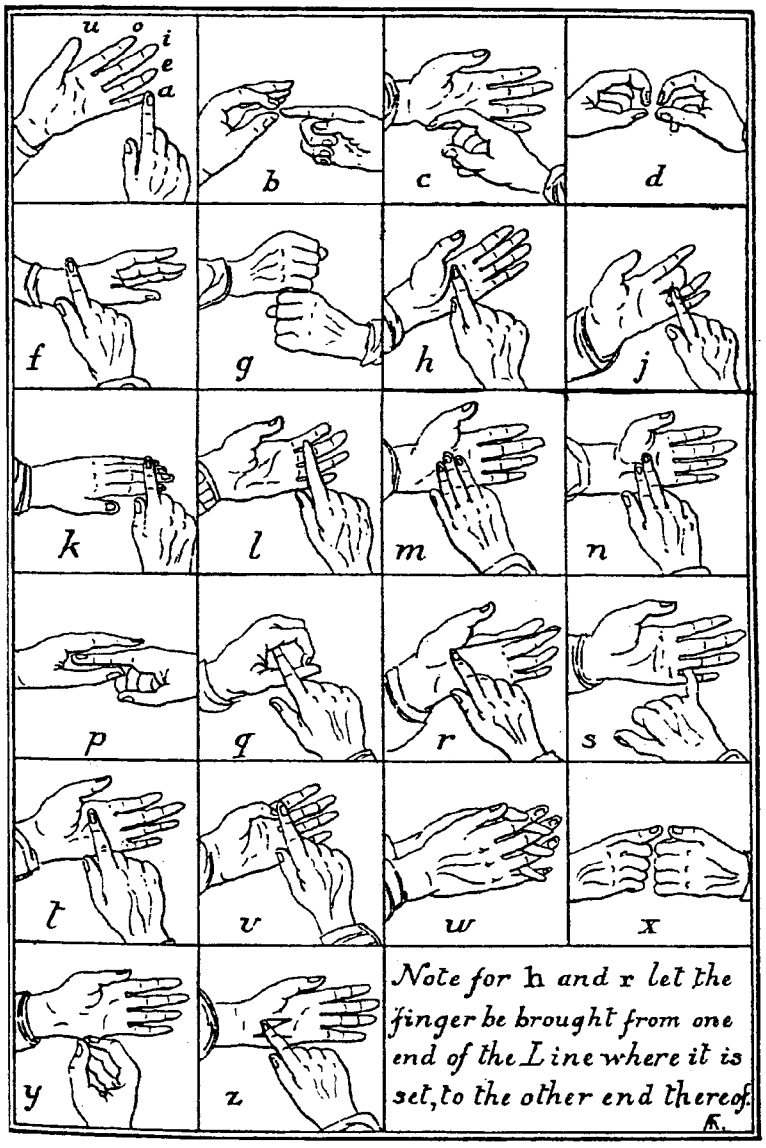

Figure 4 Anonymous (1698) *Digiti Lingua.*

concepts. Signers working with a spoken language interpreter may sometimes fingerspell a word to ensure that the interpreter produces the English word that the signer has in mind. Function words may also be fingerspelled. As most sign languages express grammatical relations through space rather than lexically, these function words are often noticeable as loan items, but their short length makes them formationally easy to assimilate to the sign language phonology.

Established Lexical Items Originating from the Manual Alphabet

Initialized signs are signs that are usually visually motivated in the location and movement path of the hands, but the handshape of the manual letter corresponding to the initial letter of the spoken language equivalent is imposed upon the sign. For example, in American Sign Language, a sign with a visually motivated location and movement path symbolizing a 'pathway' may be made with different handshapes from the manual alphabet, using a 'W' handshape to mean *way*, a 'P' handshape for *path*, 'R' for *road*, 'S' for *street*, 'A' for *avenue*, and so on.

The nature of two-handed manual letters prevents their widespread use in initialized signs (with the exception being the letter C, which is made with one hand and which does lead to initialized signs). Instead, in British Sign Language, single manual letter signs may be made by using a simple repetition of the first letter of the corresponding English word. Thus,

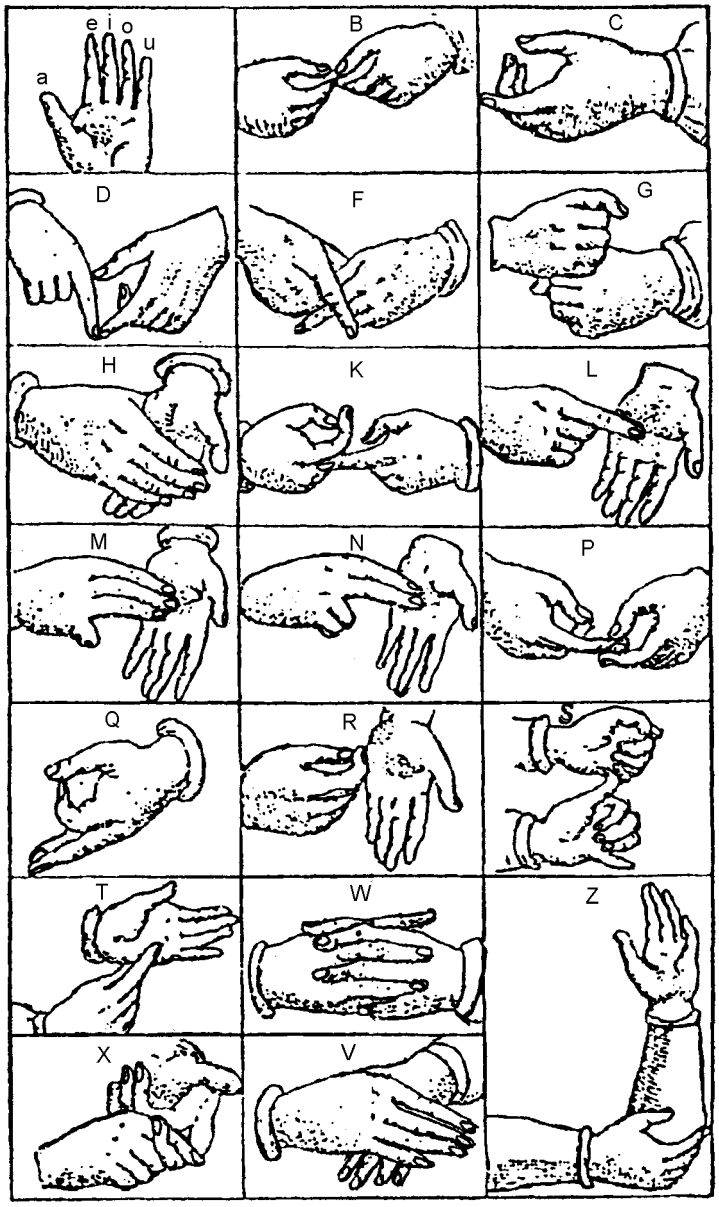

Figure 5 Attributed to Wallis (mid to late 17th Century) by Jussen (1973). From Defoe (1720) *The life and adventures of Mr. Duncan Campbell.*

signs meaning *mother*, *Monday*, *member*, *minute*, and *month* may be made with a repeated letter M, and *George*, *ginger*, *government*, *garage*, and *Gloucester* may all be made with a repeated letter G. Context and an accompanying mouth pattern derived from the spoken English word serves to specify the meaning of the sign.

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Finland: Language Situation

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Finland lies at the northeastern extremity of Europe, a linguistic and political boundary zone that has shaped the language situation of the country. Two languages have official status, Finnish and Swedish. Archaeological evidence shows continuous settlement in Finland for at least 8000 years, but linguistic data for these very early populations is scarce.

Until the 17th century, indigenous Saami speakers, traditionally engaged in reindeer-herding, hunting, and fishing, inhabited roughly the northern two-thirds of Finland. Since then, the Saami have been gradually displaced northward and have undergone cultural and linguistic assimilation. At present, Saami speakers make up about 0.03% of the population and include about 2000 North Saami speakers, 300 Skolt speakers (originally resettled from Russia after 1944), and 250 Inari speakers (Ethnologue 2000). All Saami speakers in Finland are bilingual and relatively few speakers are children, but some revitalization programs are in place. The 1992 Saami Language Act was passed to protect the rights of the linguistic minority in the Saami homelands.

Finnish-speaking Finno-Ugric tribes inhabited southern and western Finland by the early Middle Ages. Politically, Finland was part of Sweden from the 12th century until 1809. During this time, Swedish was the language of the nobility, officialdom, and education, with Finnish the spoken language of the majority. With annexation by Russia in 1809 and the publication of the epic *Kalevala* in 1835, Finnish nationalist sentiment grew, along with a drive for greater official equality between the two languages. Finland declared its independence from Russia in 1917. A 1922 language act provided the legal framework for equality between Finnish and Swedish, which remains more or less intact today. Finnish speakers currently make up 93.5% of the population, about 4.7 million people (Ethnologue 2000); another few hundred thousand speakers live in the diaspora, particularly in Europe, North America, and Australia. Finnish dialects include Savo, Southeastern, Häme, Southwestern, Ostrobothnian, and Finnish Lapland varieties. Finnish is an official language of the European Union.

Swedish-speaking settlers arrived centuries ago in the south and west but have always been in the minority in Finland. Currently Swedish speakers number about 300 000, roughly 6% of the population. They have a higher rate of bilingualism than Finnish speakers and their numbers have been in decline since the late 19th century. The semiautonomous Swedish-speaking Åland archipelago is an exception, and remains essentially monolingual. Swedish language programming makes up about 15% of television broadcasts in Finland; there is one national Swedish-language newspaper and one national radio station.

Other minority languages spoken include Kalo (or Kaale) Romani, the language of the 8–10 000 Romanies of Finland. Finnish Sign Language users number about 5000. Finno-Ugric minority languages spoken in Finland are Tornedalen Finnish (30 000 speakers, mainly along the Swedish border), Karelian (10 000), Estonian (6000), and a scattered population of Livvi (Olonets) speakers. Finland also hosts small populations of speakers of English, Russian, German, Romanian, Somali, Spanish, Tatar, Turkish, Vietnamese, Arabic, and Chinese speakers (Ethnologue 2000).

See also: Finnish; Saami; Swedish.

Language Maps (Appendix 1): Map 136.

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Relevant Website

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See also: Finnish; Saami; Swedish.

Language Maps (Appendix 1): Map 136.

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Finnish

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Background

Finnish belongs to the (Baltic-)Finnic subbranch of the Finno-Ugric languages. The closest relatives are Karelian and Estonian. The Finno-Ugric and Samoyed languages form the Uralic language family.

In 2003, the number of Finnish speakers in Finland was 4.8 million, 92% of the population. Abroad, more than 1 million people speak Finnish (or are descendants of Finnish immigrants), especially in Sweden (300 000), the United States (600 000), Canada, and Australia. Finnish is one of the two national languages of Finland (the other is Swedish). Finnish obtained its position as national language in 1863 and ultimately 1902. Finnish has been used in writing since the appearance of the first parts of the Bible translation in the 1540s.

Phonology

Finnish has 8 vowel and 13 consonant phonemes, /i e æ y ø u o a/ and /p t k d s h v j l r m n ŋ/. /b g/ occur only in recent borrowings. /d/ is marginal because it occurs only as a product of morphophonological processes (consonant gradation).

Finnish stress is fixed on the first syllable. The quantity distinction is effectively phonemic. Both vowels and consonants can be phonemically short and long, and they combine with one another with few restrictions in both stressed and unstressed syllables, for example, *tuli* 'fire', *tuuli* 'wind', *tulli* 'customs', *tule* 'come!', *tulee* 'comes', *tuulee* '(the wind) blows'.

There are 16 diphthongs such as /ai æi ei oi ui ou æy ey ie uo yø/. The canonical structure of words is bisyllabic; the monosyllables can be counted in the tens.

Vowel harmony is a constraint on stems and suffixes. The vowels form three groups, the harmony vowels /y ö ä/ (front) and /u o a/ (back) plus the neutral vowels /i e/. The three vowel pairs from the harmony sets are often denoted by morphophonemic symbols /U, O, A/. Vowels from the front and back harmony sets cannot co-occur in native words whose vowels are drawn either from /i e ä y ö/ or /i e u o a/. Suffixes with harmony vowels have one front and one back variant occurring after front and back stems, respectively. Stems with neutral vowels count only as front. Thus (INE = inessive case):

talo-ssa
house-SING.INE
'in (a/the) house'

kylä-ssä
village-SING.INE
'in village'

venee-ssä
boat-SING.INE
'in boat'

Finnish orthography is often commended for being among the most efficient in the world, in the sense that it is almost perfectly phonemic. Each phoneme has its own unique letter, with the sole exception of /ŋ/ for which /ŋŋ/ is written <ng>. The phonemic perfection of Finnish orthography is true with respect to the careful normative pronunciation of the standard language. However, present-day colloquial Finnish has strayed from this ideal due to many contractions and elisions.

Morphology

Finnish is a suffixing language with an elaborate morphology. Nominals (nouns, adjectives, pronouns, and numerals) are inflected for number, case, and possessive. There are two numbers, fourteen cases, and five possessive morphemes, occurring as classes in this morphotactic order. Here are some examples of inflected Finnish nouns.

talo
house.SING.NOM
'house'

talo-t
house-PL.NOM
'houses'

talo-ssa
house-SING.INE
'in (a/the) house'

talo-i-sta-ni
house-PL-EL-POSS.1.SING
'out of my houses'

talo-o-nne
house-SING.ILL-POSS.2.PL
'into your house'

Finite verb forms are inflected for indefinite (called passive in traditional Finnish grammar), tense and mood (belonging to the same morphotactic position because tenses and moods are mutually exclusive), and person. There are two simple tenses, present and past, and two composite ones, perfect and pluperfect. There are four moods: indicative, conditional,

potential, and imperative. There are three grammatical persons in the singular and the plural, plus a fourth-person linking up with the indefinite.

sano-n
say-PRES.INDIC.1.SING
'I say'

sano-i-n
say-PAST-1.SING
'I said'

sano-isi-mme
say-COND.1.SING
'we would say'

sano
say.IMP.2.SING
'say!'

sano-kaa-mme
say-IMP-1.PL
'let us say!'

sano-ta-an
say-INDEF.PRES-4
'one says, people say'

Nonfinite verb forms (i.e., infinitives and participles) are inflected for indefinite, nonfiniteness, number, case, and possessive (INE = inessive case):

sano-a
say-INF.NOM
'to say' (infinitive I in traditional Finnish grammar)

sano-e-ssa-nne
say-INF-INE-POSS.2.PL
'when you are saying' (infinitive II)

sano-v-i-ssa
say-PRES.PART-PL-INE
'in the saying (ones)' (present participle)

sano-tta-e-ssa
say-INDEF-INF-INE
'when one says'

Almost every word form in Finnish, inflected or not, can be cliticized with an element from a set of five clitics with pragmatic functions. The most important one is the question morpheme /-kO/. For example:

talo-ssa-si-ko
house-SING.INE-POSS.2.SING-Q
'in your house?'

Finnish lexicography as manifested in *Nykysuomen sanakirja* (Dictionary of modern Finnish, 1951–1961) postulates 82 inflectional classes for nominals and 45 for verbs; at the other extreme, a generative description might operate with none but with a wealth of ordered (morpho)phonological rules. A surface-oriented morphological approach would recognize at least 10 nominal inflectional classes and six verbal ones.

Finnish word structure is characterized by considerable allomorphy both in stems and suffixes and therefore Finnish is not a typical agglutinative language. There are tens of more or less morphologically conditioned alternations. The most profound one is consonant gradation, which concerns both nominals and verbs. The long voiceless stops /pp, tt, kk/ are shortened to [p, t, k], and the short voiceless stops /p, t, k/ are weakened in various ways: /p/ → [m] (after /m/), /p/ → [v] (between vowels), /t/ → [d] (between vowels), /t/ → [l, r, n] (after an identical consonant), /k/ → [ŋ] (after /ŋ/), and /k/ → Ø (between vowels). These alternations are triggered by suffixation processes.

Syntax

Case marking has an important role in Finnish syntax in marking the arguments of the verb (nominative, genitive, partitive, accusative for grammatical subjects, objects, and predicate complements; and an assortment of local cases for adverbials). Due to extensive case marking, Finnish word order is free and used especially to indicate information structure, for example, subject-last for introducing new referents and leftward topicalization for linking to previous context. There are many highly productive nonfinite constructions. Premodifers in NPs agree with the head in number and gender; the finite verb agrees with the person and number of the grammatical subject.

See also: Finland: Language Situation; Finnish as an Agglutinating Language; Finnish Lexicography; Phonology: Overview; Syntax of Words; Uralic Languages.

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Finnish as an Agglutinating Language

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A theoretically ideal agglutinative language would satisfy five criteria: there are no inflectional classes and all words of the same part of speech are inflected in the same way; there are several morphotactic positions for affixes of composite word forms, especially those of nouns and verbs; every morphological element (stem or affix) is clearly segmentable; the affixes convey one rather than several grammatical meanings; there are no morphophonological alternations in any element due to morphological processes such as affixation. As a corollary, every element has exactly one phonological shape (disregarding low-level phonetic processes) and no fusion of several meaning elements into one unsegmentable whole.

Morphotactic Structure

Finnish is a suffixing language with a 14-member case system. As for basic inflectional and cliticized morphotactic positions, the surface structures of Finnish nominal (nouns, adjectives, pronouns, and numerals), finite, and nonfinite verb forms are as follows (INE = inessive case, INS = instructive case, COND = conditional mood) (see Table 1, Table 2, and Table 3).

Inflectional Classes of Nominals

There is no consensus on how many inflectional classes there are for nominals and verbs. Traditional Finnish lexicography as manifested in *Nykysuomen sanakirja* (Dictionary of modern Finnish, 1951–1961) postulates 82 inflectional classes for nominals, whereas, at the other extreme, a generative description such as Wiik (1967) operates with none but a wealth of ordered (morpho)phonological rules. A surface-oriented morphological approach would recognize at least 10 nominal inflectional classes. The most important ones are those ending in B*i*, B*e*, and B*s* in the nominative singular. Four case forms (nominative, genitive, and partitive singular, partitive plural) unfold the allomorphic variation in the stems of each class, closely linked to the selection of particular ending allomorphs (NZ = nominalizer) (Table 4).

Class 1 is the largest and most productive one with the least amount of stem allomorphy, minimally only the stem vowel B*i* alternates with B*e* before the plural B*i*. At least 10 000 nominals are inflected according to class 1 and this is the pattern of most borrowings and other neologisms.

Classes 2 and 3 are closed: class 2 has some 220 words and class 3 around 40. Class 2 is more complex than class 1 as the stem vowel alternates also in the singular, and on top of that class 3 is more complex than class 2 by further eliding the stem vowel in SG.PART and also having alternations in the medial stem consonant. Many of the words in classes 2 and 3 are high-frequency words, for class 3, for example, *kuusi* '6,' *uusi* 'new,' *vesi* 'water,' *viisi* '5.'

For nominals in B*e*, class 5 is in principle closed (disregarding certain derivatives) even if it has more than 1000 members. Class 4 is small in contemporary Finnish, with less than 100 items, but this class is productive. Comparison of classes 1–3 and 4–5 discloses, not surprisingly, that the productive inflectional classes are those that have a minimal amount of stem allomorphy.

For nominals in B*s*, class 6 (>4000 items) is simpler and more productive than class 7 (some 800 items). Class 8 covers a common type of derivatives.

Inflectional Classes of Verbs

Nykysuomen sanakirja postulates 45 inflectional classes for verbs. A more generalizing approach would do with six classes, here presented by way of four central inflectional forms, the endingless (NOM) infinitive, the first person singular present tense indicative form, the third person singular past tense form, and the past tense participle in the nominative singular form (Table 5).

Table 1 Nominals

Stem	*Number*	*Case*	*Possessive*	*Clitic*
talo		ssa		
house		*INE*		
'in (a/the) house'				
talo		ssa	ni	kin
house		*INE*	*POSS.1.SG*	*also*
'also in my house'				
talo	i	sta	si	ko
house	*PL*	*EL*	*POSS.2.SG*	Q
'from your houses?'				

Table 2 Finite verb forms

Stem	*Indefinite*	*Tense/mood*	*Person*	*Clitic*
sano			n	
say			*PERS.1.SG*	
'I say'				
sano		i	t	ko
say		*PAST*	*PERS.2.SG*	*Q*
'did you say?'				
sano	tta	isi	in	pa
say	*INDEF*	*COND*	*PERS.4*	*even*
'even if one would say'				

Class 1 is by far the largest class with some 10 000 members. Around 2000 verbs belong to class 2, but this is presently the most productive verb class, obviously because overall there is less stem allomorphy in class 2 than in class 1; cf. especially the indefinite forms (called passives in traditional Finnish grammar) where the last morpheme is a personal ending for the indefinite 'fourth' person.

Class 4 is also a strong class with 4000 verbs. Class 3 has fewer than 20 monosyllabic verbs but around 1000 polysyllabic ones.

Morphophonological Alternations in Stems

As demonstrated by the example words of the nominal and verbal inflectional classes, Finnish word structure is characterized by considerable allomorphy, both in stems and suffixes, which detracts from the theoretical agglutinative ideal. Part of the allomorphy is most conveniently described in terms of item-and-arrangement morphophonological alternations, partly in terms of item-and-process directional rules.

Vowel harmony is an overriding constraint on stems and suffixes. The Finnish vowels form three groups, the harmony vowels /y ö ä/ (front) and /u o a/ (back) plus the neutral vowels /i e/. The three vowel pairs from the harmony sets are often denoted by morphophonemic symbols: U, O, A. Vowels from the front and back harmony sets cannot co-occur in native words whose vowels are drawn either from /i e ä y ö/ or /i e u o a/. Suffixes with harmony vowels have one front and one back variant occurring after front and back stems, respectively. Stems with neutral vowels only count as front. Thus:

talo-ssa
house-SG.INE
'in (a/the) house'
kylä-ssä
village-SG.INE
'in village'
venee-ssä
boat-SG.INE
'in boat'
auto-lla
car-SG.ADESS
'by car'
pyörä-llä
bike-SG.ADESS
'by bike'
veitse-llä
knife-SG.ADESS
'with knife'
tule-vat
come-PRES.INDIC.3.PL
'(they) come'
määrää-vät
decide-PRES.INDIC.3.PL
'(they) decide'
mene-vät
go-PRES.INDIC.3.PL
'(they) go'
anne-ta-an
give-INDEF-4
hala-ta-an
embrace-INDEF-4

Table 3 Nonfinite verb forms

Stem	*Indef*	*Nonfinite*	*Number*	*Case*	*Possessive*	*Clitic*
sano		a				
say		*INF*				
'to say'						
sano		a		kse	ni	
say		*INF*		*TRANSLV*	*POSS.1.SG*	
'in order for me to say'						
sano		e		ssa	si	ko
say		*INF*		*INE*	*POSS.2.SG*	*Q*
'when you are saying?'						
sano	tta	e		ssa		kin
say	*INDEF*	*INF*		*INE*		*also*
'also when one is saying'						
sano		va				
say		*PART.PRES*				
'saying'						
sano		nee	t			
say		*PART.PAST*	*PL*			
'said (pl.)'						
sano		v	i	en		
say		*PART.PRES*	*PL*	*GEN*		
'of the saying (ones)'						

Table 4 Inflectional classes of nouns

Class	*SG*	*SG.GEN*	*SG.PART*	*PL-PART*
(1)	lasi *glass*	lasi-n	lasi-a	lase-j-a
(2)	ovi *door*	ove-n	ove-a	ov-i-a
(3)	käsi *hand*	käde-n	kät-tä	käs-i-ä
(4)	nalle *bear*	nalle-n	nalle-a	nalle-j-a
(5)	vaje *lack*	vajee-n	vaje-tta	vaje-i-ta
(6)	varis *crow*	varikse-n	varis-ta	variks-i-a
(7)	vieras *guest*	vieraa-n	vieras-ta	viera-i-ta
(8)	rakka-us *love*-NZ	rakka-ude-n	rakka-ut-ta	rakka-uks-i-a

Vowel harmony is basically a phonological phenomenon. There are tens of other, more strongly morphologically conditioned alternations. The most profound one is consonant gradation, which concerns both nominals and verbs. Under complicated phonological and (partly opaque) morphological conditions, the long voiceless stops *pp*, *tt*, *kk* (which constitute two-phoneme combinations) are shortened to *p*, *t*, *k*, and the short voiceless stops *p*, *t*, *k* are weakened in various ways, e.g., *p* → *m* (after *m*), *p* → *v* (between vowels), *t* → *d* (between vowels), *t* → *l*, *r*, *n* (after an identical consonant), *k* → *ŋ* (after *ŋ*), *k* → zero (between vowels). The weak grade is triggered by suffixation processes, in particular the occurrence of a suffix closing the syllable in the beginning of which the strong grade occurs (Table 6).

However, the weak grade also occurs in many purely morphological contexts without suffixes closing the stem syllable, e.g., in certain imperative and indefinite verb forms and in the base forms (nominative singulars) of nouns belonging to inflectional class 5: *ker.ro* tell.IMP.2.SG, *ker.ro-.ta-an* tell-INDEF-4, *sa.de* rain.SG.NOM, *sa.tee-n* rain-SG.GEN.

About 20% of the Finnish vocabulary is subject to consonant gradation: 8000 nouns, 1000 adjectives, and 6000 verbs. Of the 1000 most frequent words, 30% participate in consonant gradation. This is a profound characteristic of Finnish.

Another set of typical morphophonological alternations are the vowel mutations in front of certain suffixes starting with B*i*. Long stem vowels are shortened, stem diphthongs are simplified, stem-final short B*i* changes to B*e*, stem-final short B*a* might change to B*o*, etc.:

maa
country.SG.NOM
ma-i-ssa
country-PL-INE
'in (the) countries'
tie
road.SG.NOM,
te-i-llä
road-PL-ADESS
'on (the) roads'
lasi
glass.SG.NOM
lase-i-ssa
glass-PL-INE
'in (the) glasses'
pila
joke.SG.NOM
pilo-i-ssa
joke-PL-INE
'in (the) jokes'

Many word forms simultaneously display several alternations, e.g., *virka* job.SG.NOM, *viro-i-ssa* job-PL-INE 'in (the) jobs' (gradation and mutation). The nominal inflectional class 3 is particularly complex. On top of gradation and mutation (deletion of B*e*) there is assibilation of stem-internal B*t*B in SG.NOM and deletion of B*e* also in SG.PART: *käsi* hand.SG.-NOM, *käte-en* hand-SG.ILL 'into (a/the) hand', *käde-llä* hand-SG.ADESS 'with (a/the) hand', *kät-tä* hand-SG.PART 'hand' (e.g., as direct object in negated clauses), *käs-i-ä* hand-PL-PART '(some indefinite) hands'.

Morphophonological Alternations in Suffixes

Suffixes might lose their final consonant in front of a consonant starting the next ending, or assimilate their first consonant to the last consonant of the preceding stem. Consonants are deleted in front of possessive suffixes: *maa-han* country-SG.ILL 'into (a/the) country', *maa-ha-mme* country-SG.ILL-POSS.1.PL 'into our country', *talo-n* house-SG.GEN, *talo-t* house-PL.NOM, *talo-mme* house-SG.NOM.POSS.1.PL ∼ *house*-SG.GEN.POSS.1.PL ∼ house-PL.NOM.POSS.1.PL. Note the three-way ambiguity arising due to consonant deletion in a form like *talo-mme* expressing nominative singular, genitive singular, and nominative plural.

The illative case has an extreme number of allomorphs. It has four basic suppletively related allomorphs, 'quasimorphemes,' occurring in different phonologically determined contexts: B*VVn*, B*hVVn*, B*seen*, B*siin*. The morphophoneme *V* is realized by reduplication as a copy of the preceding vowel. In

Table 5 Inflectional classes of verbs

Class	*INF.NOM*	*PRES.INDIC.1.SG*	*PAST.3.SG*	*PAST.PART.SG.NOM*
(1)	sano-a *say*	sano-n	sano-i	sano-nut
	anta-a *give*	anna-n	anto-i	anta-nut
(2)	hala-ta *embrace*	halaa-n	hala-si	halan-nut
	kara-ta *escape*	karkaa-n	karka-si	karan-nut
(3)	saa-da *get*	saa-n	sa-i	saa-nut
	haravoi-da *harvest*	haravoi-n	haravo-i	haravoi-nut
(4)	nous-ta *rise*	nouse-n	nous-i	nous-sut
(5)	lämme-tä *warm up*	lämpene-n	lämpen-i	lämmen-nyt

Table 6 Consonant gradation

kaup.pa	kau.pa-n	kau.pa-s.sa	*kauppa-a*
shop.SG.NOM	*shop-SG.GEN*	*shop-SG.INE*	*shop-SG.PART*
sil.ta	sil.la-n	sil.la-l.la	sil.ta-an
bridge.SG.NOM	*ridge-SG.GEN*	*ge-SG.ADESS*	*ge-SG.ILL*
ker.to-o	ker.ro-n	ker.ro-i-m.me	ker.to-.vat
tell-PRES.INDIC.3.SG	*tell-PRES.INDIC.1.SG*	*tell-PAST-1.PL*	*tell-PRES.INDIC.3.PL*

Syllable boundaries are indicated by periods.

addition, the final consonant may be deleted before possessives. Therefore the illative has no fewer than 36 allomorphs:

talo-on
house-SG.ILL
'into (a/the) house'
talo-o-mme
house-SG.ILL-POSS.1.PL
lasi-in
glass-SG.ILL
lasi-i-mme
glass-SG.ILL-POSS.1.PL
maa-han
country-SG.ILL
maa-ha-mme
country-SG.ILL-POSS.1.PL
puu-hun
tree-SG.ILL
puu-hu-mme
tree-SG.ILL-POSS.1.PL, etc.

Many suffixes have several allomorphs, each linked to specific stem selection criteria and/or inflectional classes. For example, the partitive allomorph B*ttA* only goes with nominal inflection class 5, B*tA* with classes 3, 6, 7, 8, and B*A* with classes 1, 2, and 4.

Fusion and Polyfunctional Suffixes

There are several polyfunctional suffixes where the grammatical functions cannot be segmented, e.g., B*t* (nominative plural), B*ten* (genitive plural, the segmentable genitive plural has the plural marker B*i*), B*ine* (comitative singular or plural), -*ttU* (indefinite fourth person perfect participle), B*kAA* (imperative 2.PL).

In colloquial Finnish, there is a tendency to drop B*i* in unstressed diphthongs. When this B*i* is the past tense marker, the mutated stem vowel becomes the only marker of the past tense function: *anta-a* give-PRES.INDIC.3.SG, *anto-i* give-PAST.3.SG, (colloquial) *anto* give-PAST.3.SG.

Conclusion

Karlsson (1983) distinguished 45 different morphophonological alternations. They create massive

allomorphy in both stems and endings. A two-way dependency exists between many stems and endings: certain stems take certain endings only, and certain endings go only with certain stems. This mutual boundedness implies that Finnish word forms are highly cohesive, a property that is amplified by vowel harmony stretching over the whole (uncompounded) word, and further amplified also by the fixed initial stress.

Thus, Finnish departs from the theoretically ideal agglutinative type in some respects, as regards the occurrence of nominal and verbal inflectional classes, allomorphy among the affixes, morphophonological alternations, endings expressing composite grammatical functions, and fusion of certain grammatical elements.

See also: Arabic as an Introflecting Language; Chinese as an Isolating Language; Finnish; Morphological Typology.

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Finnish Lexicography

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Finnish lexicography can be discussed both as a language policy issue and as a commercial enterprise. The Research Institute for the Languages of Finland, KOTUS, is the national organization responsible for the languages spoken in Finland: Finnish, Swedish, and Saami. Five million people speak Finnish, 300 000 speak Swedish, and about 5000 speak Saami. Finnish belongs to the family of Finno-Ugric languages, of which Estonian is a closely related language and Hungarian, with about 15 million speakers, the biggest.

The dictionary projects undertaken by KOTUS can be described as academic projects of linguistic and cultural importance. Modern monolingual and bilingual dictionaries of Finnish naturally also have commercial value and are produced jointly with commercial partners. Recent achievements include the *Basic dictionary of the Finnish language* (BDFL) in three volumes (from 1994). The production and maintenance methods of this dictionary are traditional. Its predecessor, the comprehensive *Dictionary of modern Finnish*, was published in the years 1951–1961.

An updated version of the BDFL was converted in 1997 to an electronic format. This dictionary has about 100 000 entries. The latest electronic CD-ROM, Internet, and intranet edition of the BDFL was published in 2005 by Kielikone Oy, the major publisher of electronic dictionaries in Finland. No print updates are planned for the time being. Kielikone publications also include the electronic MOT dictionary library, which consists of a number of monolingual and bilingual dictionaries, with and without Finnish. The rights for the electronic versions have been purchased from various European print dictionary publishers.

The recent academically oriented products of KOTUS include the dictionaries of *Finnish dialects* (seven volumes, A to K, published), *Swedish dialects in Finland* (three volumes, A–K, published), *Old literary Finnish* (two volumes, A–K, published), and dictionaries of Karelian, Vogul (Mansi), and Cheremis (Mari). New dictionaries with more appeal to the general public include the *Finnish-Swedish general dictionary*, the *Basic dictionary of the Finnish Sign Language*, the *Finno-Swedish dictionary* (describing the Swedish spoken in Finland), and a Finnish-Estonian dictionary in two parts. This modern dictionary has more than 90 000 entry words and was compiled and published in 2003 in cooperation with the Institute of the Estonian Language in Tallinn.

Commercial lexicography in Finland is practiced in a challenging environment. Print dictionaries are expensive, because the potential market is small and basically restricted to Finnish-speaking audiences. Two major publishers, WSOY and Gummerus Oy, have accepted the challenge and produce a majority of the dictionaries on the market. WSOY has over the years published a number of large bilingual dictionaries between Finnish and English, Swedish, German, Spanish, and Russian. The update intervals tend to be long and vary from one language pair to another. In

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recent years, the demand has been highest for English and Swedish. Less expensive student and pocket versions are also available.

Gummerus has concentrated on the production of middle-range and smaller dictionaries. Its new English-Finnish dictionary (2005) has been compiled in the context of an EU-funded dictionary project, which has Finnish and British academic and commercial partners, and aims at a distinctly user-oriented approach in the dictionary entry structures.

Corpus lexicographical principles have so far been applied only sporadically in Finnish lexicography, usually in the context of international cooperation. However, extensive electronic text material in Finnish is publicly available for research purposes at the CSC, the Finnish IT Center for Science, governed by the Ministry of Education. The linguistic material is available as the Language Bank of Finland, an electronic text archive of Finnish and Finno-Swedish books, newspapers, and magazines. The archive consists of more than 200 million words. A 22-million-word Finnish subcorpus of newspaper texts (the 1995 issues of Helsingin Sanomat, the largest Finnish daily newspaper) has been analyzed with Kielikone's Textmorfo parser. The language bank now also includes a speech corpus – an annotated radio and TV corpus of approximately 17 hours of recordings in 2003 from the Finnish Broadcasting Company, YLE.

See also: Estonian; Finland: Language Situation; Finnish; Saami; Swedish.

Relevant Websites

http://www.csc.fi/kielipankki/.
http://www.gummerus.fi.
http://www.kielikone.fi.
http://www.kotus.fi.
http://www.wsoy.fi.

Finno-Ugric Languages *See:* Uralic Languages.

First Grammatical Treatise

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First grammatical treatise (*FGT*) is a modern title for a 12th-century text. In the Icelandic manuscript *Codex Wormianus* (AM 242 fol.), probably written about 1360, four treatises on native phonetics/phonology, orthography, style, and poetics are appended to a redaction of Snorri Sturluson's prose *Edda* (a textbook of Norse poetics). The *FGT*, which has no heading, is the oldest of these and precedes the others in the manuscript. Whether the scribe who compiled *Codex Wormianus* had access to the original text of the *Treatise* or was copying from a copy cannot be determined.

Chiefly on the basis of the Icelandic sound system described, but also because of the occurrence of certain archaic phonological and morphological forms and a rather rambling style associated with early attempts to write the vernacular, the *FGT* has been dated to the 12th century, and by some scholars to the narrower period 1120–1150. The identity of the author is unknown; as is where he wrote his work. His aim, which arose from dissatisfaction with existing scribal practices, was to create an orthography for Icelandic that would eradicate all ambiguity. His solution was to use a unique written character for each sound that could 'change the meaning' (*máli skipta*) of a word. The distinctive vowel sounds are established by the use of minimal pairs. By contrasting, for example, *sár* 'wound' with *sǫ́r* 'wounds,' the First Grammarian (FG), as the author is commonly known, shows that the sequence [sa:r] gives a different meaning from [sɔ:r], necessitating the use of two distinct vowel symbols if ambiguity is to be avoided. The vowel system arrived at contains 36 distinctions: 9 qualitatively different vowels, each of which can be either oral or nasal, long or short. Not all of these can in fact have been distinctive. The short nasals in

recent years, the demand has been highest for English and Swedish. Less expensive student and pocket versions are also available.

Gummerus has concentrated on the production of middle-range and smaller dictionaries. Its new English-Finnish dictionary (2005) has been compiled in the context of an EU-funded dictionary project, which has Finnish and British academic and commercial partners, and aims at a distinctly user-oriented approach in the dictionary entry structures.

Corpus lexicographical principles have so far been applied only sporadically in Finnish lexicography, usually in the context of international cooperation. However, extensive electronic text material in Finnish is publicly available for research purposes at the CSC, the Finnish IT Center for Science, governed by the Ministry of Education. The linguistic material is available as the Language Bank of Finland, an electronic text archive of Finnish and Finno-Swedish books, newspapers, and magazines. The archive consists of more than 200 million words. A 22-million-word Finnish subcorpus of newspaper texts (the 1995 issues of Helsingin Sanomat, the largest Finnish daily newspaper) has been analyzed with Kielikone's Textmorfo parser. The language bank now also includes a speech corpus – an annotated radio and TV corpus of approximately 17 hours of recordings in 2003 from the Finnish Broadcasting Company, YLE.

See also: Estonian; Finland: Language Situation; Finnish; Saami; Swedish.

Relevant Websites

http://www.csc.fi/kielipankki/.
http://www.gummerus.fi.
http://www.kielikone.fi.
http://www.kotus.fi.
http://www.wsoy.fi.

Finno-Ugric Languages *See:* Uralic Languages.

First Grammatical Treatise

M P Barnes, University College London, London, UK

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particular must be discounted since they are in each case preceded or followed by a nasal consonant. The FG's analysis of Icelandic consonants tells us something about their distribution, but his main aim is to show that for most of them length is distinctive, which he once again demonstrates with minimal pairs (e.g., *vinna* '[to] work' *v. vina* 'of friends [gen. pl.]'). Instead of gemination, he recommends the use of small capital letters to denote long consonants for the sake of speed and to save parchment. Allophonic variation is ignored: thus [θ] and [ð], for example, which are positional variants of /θ/, are both to be written 'þ.'

The *FGT* is a highly important work. Apart from giving us an account of the sound system of 12th-century Icelandic, it shows more clearly than other medieval treatises on language the problems involved in adapting the roman alphabet to a vernacular and offers a coherent and systematic solution. In addition, it provides insights into the pronunciation of Medieval Latin. The use of minimal pairs anticipates by some 800 years the main tool of phonemic analysis. The FG's description of Icelandic phonology tallies wherever it can be checked with the results of historical linguistics (each of the nine long nasal vowels identified, for example, can be shown at one time to have been followed by a nasal consonant). This, together with the conservatism of Icelandic, has led many scholars to posit a system much like the one the FG describes for Viking-Age Scandinavian in general. Important as the *FGT* seems to the modern linguist, it was clearly not highly prized in the author's day. It exists only in the copy made by the *Codex Wormianus* scribe, and there is no compelling evidence that any of the FG's recommendations were ever adopted.

See also: Iceland: Language Situation; Norse and Icelandic.

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Firth and the London School

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The British linguist J. R. Firth (1890–1960) had an indisputable influence on the development of general linguistics in Britain both as an academic discipline and as a field of study. His influence until the 1960s within Britain is easily recognized (see, among others, Palmer, 1994; Brown and Law, 2002; Rebori, 2002). The assessment of his posthumous influence is nevertheless difficult.

Some key terms are valuable tools for a summary approach to the problem. Thus, 'London School of Linguistics,' 'Firthianism,' and 'Neo-Firthianism' convey the reference to sets of notions drawn from Firth's theories and shared by a group of linguists.

The term 'London School' was initially used by Firth in his *Papers in Linguistics 1934–1951* in two contexts: first, to refer to the tradition of studies in phonetics centered in London and led by Daniel Jones (1881–1967) (Firth, 1957: 110), and second to refer to the school of linguistics that was starting to develop during the 1930s at the School of Oriental and African Studies (SOAS) in London (Firth, 1957: 141, 145). Firth worked at SOAS from 1938 until his retirement in 1956.

From the 1940s onward SOAS radiated Firth's linguistic ideas and philosophy out to the rest of Britain. Firth's was the only indigenous theory of general linguistics at a moment when general linguistics was just preparing for its institutional birth in Britain (Robins, 1969). These historical facts together with Firth's well-known dominating personality allow the

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conclusion that there was a school centered on him and located mainly at SOAS during his lifetime. The main topics developed by Firth and put into practice together with the London school were, briefly:

- importance of theory over procedures or methods;
- meaning stated at any linguistic level;
- context of situation;
- collocation;
- colligation;
- system and structure;
- restricted languages;
- prosodic analysis;
- renewal of connection.

The publication of *Studies in Linguistic Analysis* in 1957, a collection of papers by Firth and his pupils, is the last body of work written under his personal influence. It symbolizes the dividing line between the London school centered on him and 'Firthian' linguistics – the latter being the work inspired by Firth's ideas and carried out by the first generation of British linguists who now spread into the newly founded linguistics departments in Britain.

With Firth's death in 1960, a debate which continued into the 1970s took place (Langendoen, 1964; Langendoen, 1968; Monaghan, 1979). The parties to the debate were the 'Firthians' and the 'Neo-Firthians.' Although the use of labels to identify a body of work with any school or group was rejected, especially by the Neo-Firthians (Halliday, 1966), in the context of the debate both expressions refer to Firth's pupils, who were at the time divided according to their affinities either with the linguistics practiced by the members of the SOAS department previously headed by Firth (Firthians) or with the work done by and under the leadership of M A K Halliday (Neo-Firthians).

The main topics under debate were:

- the study of linguistic patterns with reference to how, when, and where;
- the independence of semantics from grammar;
- the existence of central language cores;
- the use of statistical procedures in lexical analysis;
- notions of 'restricted language' and 'register';
- change in form and change in register;
- monosystemic vs. polysystemic categorization;
- the phoneme concept.

(see Mitchell, 1975; Palmer, 1968).

The debate between the Firthians and the Neo-Firthians faded with the dispersion of its figures and the growth of other approaches in the British linguistics scene, which imprinted a more eclectic and international profile. But Firth's influence can still be traced in 21st-century linguistics, in prosodic phonology, corpus linguistics, pragmatics, sociolinguistics, and systemic functional grammar (see Butt, 2001).

See also: Collocations; Firth, John Rupert (1890–1960); Halliday, Michael A. K. (b. 1925); Henderson, Eugénie J. A. (1914–1989); Register: Overview; Robins, Robert Henry (1921–2000); Systemic Theory.

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Firth, John Rupert (1890–1960)

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John Rupert Firth is the founder of the London School and one of the leaders of 'systemic linguistics.' He was born on June 17, 1890, and graduated in history at Leeds University in 1911. After World War I, which took him to Afghanistan, Africa, and India, he was Professor of English in the University of the Punjab at Lahore. In 1928, he took up the post of Senior Lecturer of Phonetics at University College (under the phonetician Daniel Jones), and, in 1938, after 15 months in India where he worked on the Gujarati and Telugu languages, he became Senior Lecturer of Linguistics and Indian Phonetics under Lloyd James, whom he succeeded as head of the department in 1941. From 1944 until his retirement in 1956, he became the first occupant of the Chair of General Linguistics at the University of London and was very active to develop general linguistics and phonetics in Great Britain. In addition, being an orientalist, he contributed to the beginnings of language study in India.

As he was very busy in teaching and creating chairs of linguistics in British universities and because his flow of publications was interrupted by World War II, John Rupert Firth published no major theoretical books, and his descriptive works are often considered programmatic. He wrote only two short books, early in his career: *Speech* in 1930 and *The tongues of men* in 1937. His papers were collected in two volumes: he published the first one, *Papers in linguistics (1934–1951),* in 1957; the second one, *Selected papers of J. R. Firth (1952–1959),* was edited posthumously in 1968 by one of his pupils, F. R. Palmer.

Firth's attention was essentially focused on phonology, semantics, and history of linguistics, and his main contributions to linguistics are prosodic analysis in phonology, following the tradition of Henry Sweet and Daniel Jones, and the contextual theory of meaning inspired by Malinovsky's use of context of situation and by Wittgenstein's conception of word meaning. His view on meaning and his refusal to separate phonology and suprasegmentals, caused Firth to be radically opposed to American structuralists. He promoted a 'polysystemic' conception of language, in opposition to Saussurian structuralism. The task of the linguist describing a particular language is to distinguish the different component levels, phonetic, phonological, grammatical, lexical, and semantic. The meaning of an utterance is its acceptability at all levels. He particularly focused on the phonological and the lexical levels, and some of his main achievements are the notions of context of situation and meaning by collocation. His programmatic views have since been concretized by his pupils under the name of the London School of Linguistics; among the most prestigious are M. A. K Halliday and J. M. Sinclair, John Lyons, Randolph Quirk in lexicology and systemics, and R. H. Robins in history of linguistics. Firth's original conception of lexis and meaning by collocation is now reinvested in corpus linguistics.

See also: Collocations; Empiricism; Firth and the London School; Firthian Phonology; Halliday, Michael A. K. (b. 1925).

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Firthian Phonology

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Introduction

Firthian Phonology, better known as (Firthian) Prosodic Analysis (FPA), is a technique of phonological analysis associated with J. R. Firth and his colleagues and students at the School of Oriental and African Studies (SOAS) at the University of London. The historical and theoretical background of FPA is well documented by Anderson (1985). What is known about FPA comes mostly from analyses published in the 1950s; major papers appear in Palmer (1970), the Philological Society's *Studies in Linguistic Analysis* (1957), and in collections of Firth's writings (Firth, 1957; Palmer, 1968), which contain work spanning Firth's career as a linguist.

FPA is not a very accessible linguistic theory because the Firthians wrote no clear, definitive statement of their linguistic thought, seeing their work as experimental and ongoing. They experimented freely with notation; their analyses (often of unfamiliar languages) tended not to be published in major international journals, were deliberately *ad hoc*, and did not make claims to universality. They published no major work on a European language (although they did conduct such work; see Ogden and Kelly, 2003). All these things contributed to FPA remaining a relatively parochial phenomenon, although many of its most radical ideas resurface in later phonological theories.

The influence of FPA runs deep in British linguistics, since many of the linguists employed in new linguistics departments in Britain in the 1960s were trained at SOAS. This means that another useful source of information on Prosodic Analysis is notes taken from the lectures of J. R. Firth, Eugénie Henderson, and Eileen Whitley, who developed a prosodic analysis of English but published very little. Significant collections of such unpublished material are held at SOAS and the University of York.

Important characteristics of FPA include the following: it is primarily a theory of representations (Anderson, 1985); it treats language as a complex set of interacting systems, each with its own characteristic properties (i.e., FPA is **polysystemic**); it foregrounds grammatical relations in establishing phonological systems; and it is rooted in phonetic analysis, yet it makes a strict separation between different types of linguistic information.

Main Concepts

In order to illustrate some of the main concepts of Prosodic Analysis, let us look at a piece of analysis by Eileen Whitley. The example is taken from notes on lectures she gave in the 1950s, and is based on Irish consonant mutation.

In the left-hand column of Table 1, the case and number of the noun is given. The center column contains a 'reading transcription': this is a systematic phonetic transcription that has no phonological status. Its function is to represent in a systematic way the 'phonic material.' For Firth, linguistic phonetics was a level of abstraction over individual occurrences of spoken material. The third column contains 'phonological formulae.' The formulae capture the analysis of the data into phonological units of two main types, 'prosodies' and 'phonematic units.' Note that this analysis, like most others in the canon of Prosodic Analysis, is partial: it handles a limited number of phonological patterns rather than providing a complete account of the phonological structure of Irish words.

Let us consider the construction of the analysis. Firstly, the material it is based on. In this case, a 'grammatical,' or morphological, paradigm (Determiner + Adjective + Noun) provides the framework for the analysis. This is a common starting point in much work in FPA. No one form of any of the lexical

Table 1 The Irish Nominal Piece; Determiner + Noun + Adjective

Case/ number		*Reading transcription*	*Phonological formula*
Masculine nouns			
	the small head		
(1)	NOM SG	ən kʲaun bjog	ə̃$^{-P-}$ yhP—N^{w} $^{-P-}$ yP—P^{w}
(2)	GEN SG	ən xʲiːŋʲ vʲigʲ	ə̃$^{-H-}$ yhP—N^{y} $^{-P-}$ yP—P^{y}
(3)	NOM PL	nə kʲiːŋʲ vʲog	nə$^{-P-}$ yhP—N^{y} $^{-H-}$ yP—P^{w}
(4)	GEN PL	nə gʲaun mʲog	nə$^{-N-}$ yhP—N^{w} $^{-N-}$ yP—P^{w}
	the white boat		
(5)	NOM SG	ən baːd baːn	ə̃$^{-P-}$ wP—P^{w} $^{-P-}$ wP—N^{w}
(6)	GEN SG	ən vaːdʲ vaːnʲ	ə̃$^{-H-}$ wP—P^{y} $^{-H-}$ wP—N^{y}
(7)	NOM PL	nə baːdʲ vaːnə	nə$^{-P-}$ wP—P^{y} $^{-H-}$ wP—N^{w}ə
(8)	GEN PL	nə maːd maːn	nə$^{-N-}$ wP—P^{w} $^{-N-}$ wP—N^{w}
Feminine nouns			
	the white shoe		
(9)	NOM SG	ən vroːg vaːn	ə̃$^{-H-}$ wP—P^{w} $^{-H-}$ wP—N^{w}
(10)	GEN SG	nə broːgʲə baːnʲə	nə$^{-P-}$ wP—P^{y}ə$^{-P-}$ wP—N^{y}ə
(11)	NOM PL	nə broːgə baːnə	nə$^{-P-}$ wP—P^{w}ə$^{-P-}$ wP—N^{w}ə
(12)	GEN PL	nə mroːg maːn	nə$^{-N-}$ wP—P^{w} $^{-N-}$ wP—N^{w}

(Whitley, unpublished manuscript.)

items is given primacy: neither the 'citation form' nor a particular grammatical case (such as an unmarked form) or number is chosen as the basic form from which others are derived. Instead, each grammatical form has associated with it a particular phonological form. In this sense, FPA is representational and not derivational, because it does not see some forms as derived from, or based on, others.

'Meaning' in its broadest sense has a central position in Firthian linguistics. By placing words in a grammatical frame like this, phonological variation which relates to morphological categories is foregrounded: this relates to what Firth called the 'major function' of phonological categories as conveying grammatical contrast, as opposed to the 'minor function' of conveying lexical contrast. Another effect of starting out with data this way is that the **syntagmatic** relations between items – that is, the ways in which units such as words and syllables are joined – are given prominence. This is a very different approach from that of the contemporaneous phonemic analysis, which was based on minimal pairs of contrasting lexical items. Robins (1957) comments that phonemic analysis, in contrast with FPA, highlights **paradigmatic** relations. In FPA, both syntagmatic and paradigmatic relations are important, but analysis starts from the syntagmatic ones.

The phonological formula contains essentially two kinds of unit, **prosodies** and **phonematic units**. Robins (1957) suggests there are two kinds of prosody: **demarcative** and **extensional**. Demarcative prosodies delimit particular structures. This means that properties that are a feature of a particular structure are handled as prosodies. Examples include glottal stops in German (German, Standard) V-initial words or laterals in Thai, which are limited to syllable onset position. Extensional prosodies capture phonological properties which hold over longer stretches of material, such as nasalization in Terêna, which marks third person singular. Henderson (1978, reported in Roberts, 1979) points out that this distinction is not made by Firth, but is an attempt to explain his thinking.

In the Irish example shown in Table 1, the small capital letters N, H, and P written in superscript represent phonological properties which belong to joins between words. In other words, word-initial plosivity in (1) ən k^{j}aun bjog and friction in (2) ən x^{j}iːŋ^{j} v^{j}ig^{j} are treated as prosodies of word-junction; and in the same examples, velarization ([un] and [og]) and palatalization ([iːŋ^{j}] and [ig^{j}]) at the word ends are treated as prosodies of the word-ending; these are notated as *w* and *y*, again written in superscript. Word-final *w* and *y* thus have characteristics of both extensional and demarcative prosodies.

It should be clear from the data that the word-junction prosodies {P H N} and the word-final prosodies {*w y*} have variable phonetic exponents (see below) according to the number, gender, and case of the grammatical piece. Thus, a link is established between morphology, lexis, and phonology. This analysis of data at **congruent levels** is one of the distinguishing features of FPA. Word-initial palatalization/velarization (*y w*) and aspiration (*h*) and its absence in this data have 'minor function' in that they are lexical properties, and not variable according to grammatical structure. These prosodies are written on the line.

Phonematic units are written in this analysis (as in most others) as capital letters that sit on the line. They are basic units of structure and are established on the basis of paradigmatic contrast: their closest equivalent in other theories is perhaps Trubetzkoy's underspecified 'archiphoneme' (Trubetzkoy, 1939). In this analysis, the phonematic units are not stated in full, but are left unspecified and general, as P and N, to stand for places in structure at which there are systems of contrast involving plosivity and nasality, respectively.

Two other concepts important in FPA should now be fairly clear. These are **system** and **structure**. Structure relates to syntagmatic relations, i.e., relations between units in a series. Syllables are one kind of structure; words are another. In Whitley's Irish analysis, πC—C$^{\pi}$ is a partial structure that describes nominal and adjectival lexical items, where π stands for a prosodic system. Another structure implicit in this analysis is the **piece**, a combination of words of a particular lexical class (here, Determiner, Noun, Adjective). A system is a restricted set of choices available at a given place in phonological structure: in the structure just described, the possible terms are {*w y h*} for the first π, {P} for the first C, {P N} for the second C, and {*w y*} for the second π. Note that the analysis is underspecified: for example, there are presumably more possible C-terms for the word endings.

Finally, the unit ə needs comment. In places where no system of contrast can be established for either vowels or consonants, FPA does not posit phonematic C or V terms, since these stand for phonematic units which are established on the basis of contrast. Thus, the smallest system contains two terms. A common device to handle this kind of case is the **syllabic**, such as ə to handle vowels whose quality is completely predictable. For consonants whose identity is

similarly syntagmatically or structurally predictable, a term written *c* or sometimes *r* ('reduplication') for consonants (e.g., Carnochan, 1957) is sometimes used rather than a capital letter such as *C*. Notice that nasality that is timed concurrent with or after syllabicity is written as a tilde, while syllable-initial nasality is written as *n* on the line.

Prosodic analysis is, distinctively, **polysystemic**. This means that one of its fundamental tenets is that at different places in structure, different phonological relations hold. Although *w* and *y* occur both word-finally and word-initially in this analysis, they are treated as different units because (1) they stand in different systems of contrast, with the possibility of *h* initially, but not finally, and (2) they have different functions, carrying lexical contrast initially, but handling morphological contrast finally.

A final aspect of FPA to observe is its separation of linguistic levels, especially phonetics and phonology. For the Firthians, phonology and phonetics describe different things and are different (but related) levels of abstraction with their own formal languages. Levels of linguistics statement are connected by statements of **exponency**. For instance, in the Irish example, the **exponents** of word-final *w* include velarization of the latter part of the syllable, while the exponents of word-final *y* include palatalization of the latter part of the syllable. Statements of exponency are sensitive to system and structure, so that the exponents of *y* and *w* in word-initial and final positions may be different. This is how FPA handles 'allophony' declaratively, without structure-changing or loss of information.

Prosodic Analysis and Modern Phonology

In 1970, a volume of collected papers was published (Palmer, 1970), an occasion that in some ways marks an ending of Prosodic Analysis. However, FPA has continued to be influential in a number of ways. There are obvious parallels between some of the ideas of FPA and autosegmental phonology (most notably the similarity between autosegmental 'spreading' and 'extensional' prosodies), although neo-Firthians have argued that these similarities are more superficial than real (Ogden and Local, 1994). More interestingly, the Firthian concepts of exponency, polysystemic analysis, and the insistence on phonological analysis as part of the wider social process of language have grown in influence, and have been incorporated into a variety of kinds of work. These are primarily centered around the significance of 'phonetic detail,' the constrainedness of FPA as a declarative theory, and a broad view of 'meaning' which goes beyond mere lexical meaning and takes serious account of context.

Some speech synthesis systems have formally modeled aspects of FPA. YorkTalk, IPOX, and ProSynth all use a combination of polysystemic analysis and phonetic exponency to model details of natural speech. Much recent work on the phonetic analysis of conversation draws on Firth's foregrounding of syntagmatic relations, and combines polysystemic linguistic analysis with a polysystemic sequential analysis. Finally, the Firthian insight that phonetic detail is sensitive to place in system and structure has been taken up in a theory of speech perception (e.g., Hawkins, 2003).

See also: Autosegmental Phonology; Declarative Approaches to Phonology; Firth, John Rupert (1890–1960); Henderson, Eugénie J. A. (1914–1989); Phoneme.

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Eli Fischer-Jørgensen was born February 11, 1911, in Nakskov, Denmark; she is a prominent Danish phonologist and phonetician.

Fischer-Jørgensen took a major in German and a minor in French at the University of Copenhagen in 1936. Her M.A. thesis on dialect geography and the understanding of sound change was published in 1934. As a postgraduate student, she studied phonology with Martinet and experimental phonetics with Fouché and Durand (1938) and later E. Zwirner (1939). From 1939 until her retirement in 1981, she was affiliated with the University of Copenhagen; in 1966, she became the first professor of phonetics. In 1968, she was also the first woman to be elected to the Royal Danish Academy of Sciences. Eli Fischer-Jørgensen holds honorary doctorates from the universities of Aarhus and Lund (1978), as well as Copenhagen (1993) and Bayreuth (2003).

Influenced by the somewhat older Louis Hjelmslev, she became an important figure in the Linguistic Circle of Copenhagen in its first fruitful years (1931–1956) when the Copenhageners hoped to found a new structural linguistics. Fischer-Jørgensen's role was that of the phonetician and she throughout stressed the importance of taking phonetic substance and phonetic results into consideration when forging a structural phonology. In particular, this was a critique of Hjelmslev's attempt to create a purely formal theory without reference to phonetic substance. Fischer-Jørgensen's most important papers from this period are 'Remarques sur les principes de l'analyse phonémique' (1949), 'On the definition of phoneme categories on a distributional basis' (1952), and the classic 'Form and substance in glossematics' (1966).

Whereas Eli Fischer-Jørgensen's career includes both theoretical and historical works and a wide-ranging experimental *oeuvre*, her experimental treatises are always theoretically informed and reflect her complete mastery of the research history of the subjects and her theoretical works constantly refer to experimental results. This is nowhere demonstrated more convincingly than in her majestic *Trends in phonological theory* (1995), a thorough and critical discussion of all the major theoretical schools of thought based on her first-hand knowledge of both the theories and their spokesmen. Her most important experimental treatise deals with the Danish stød, a slight glottal stop that is central to Danish phonology and phonetics, though it is not present in all dialects of Danish. At the age of 90, she published a book on stress in older Danish (2001).

Fischer-Jørgensen has been active for an unusually long period as a teacher and as the head of the Institute of Phonetics and has thus taught and supervised several generations of linguists and phoneticians. All of them have been influenced by her high standards and her searching spirit, never settling for an easy solution.

Dr. Fischer-Jørgensen has always been actively interested in politics. During the German occupation of Denmark (1940–1945), she worked as an assistant to Professor C. Høeg, who directed the secret gathering of intelligence information on Danes cooperating with the German occupation forces. Fischer-Jørgensen has published her memoirs from this period (2005). In the years after her retirement, she has intensified her painting and has taught Danish to refugees and other immigrants to Denmark, with particular emphasis on pronunciation.

See also: Brøndal, Rasmus Viggo (1887–1942); Glossematics; Hjelmslev, Louis Trolle (1899–1965); Uldall, Hans-Jørgen (1907–1957).

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with a 300 Hz fundamental frequency is produced by muscles contracting 300 times per second. The rate of muscle contraction is affected by temperature, so as the water temperature increases, the fundamental frequency of the call increases.

Midshipman (*Porichthys* spp.) spawn in rocky tide pools in the eastern Pacific. Their calls are somewhat unique among fishes in that these fish will produce continuous sounds that last for several minutes up to an hour. Like other toadfishes, the males guard a nesting area and produce tonal sounds to attract females. Their mating system is interesting in that an alternative reproductive strategy to establishing a territory and calling to attract females has been adopted by sneaker males. These males are smaller and similar in size to females, and their sonic musculature is not as well developed as that found in calling males. Their strategy is to sit by and wait for a spawning event to begin and then sneak in and release sperm during the spawning event.

Toadfishes are one of the few fishes in which acoustic interactions have been identified between neighboring males. In the midshipman, since males produce long calls, the sounds of adjacent males often overlap. This results in an acoustic beating phenomenon where the interference patterns produce beats at the difference frequency between the adjacent males. These beats are detectable by the fish and could be used by females to discriminate sounds from concurrently calling males. Whether this is intentional on the part of the fishes, or just a byproduct of individuals being located close to one another, is not known.

In the gulf toadfish (*Opsanus beta*), males will often produce a grunting call that overlaps with their neighbor's boatwhistle. This has been dubbed 'tagging' behavior and may be related to dominance hierarchies between males or may be involved in maintaining the timing of calling between individuals. This, along with the acoustic beats, is one of the few examples of acoustic interactions between fishes.

Damselfishes

Damselfishes (Family: Pomacentridae) are found commonly on coral reefs throughout the world. Males guard a territory in which they prepare a nest in which females lay eggs. To attract females, they produce a pulsed sound while performing a behavior known as the signal jump. They repeatedly perform this courtship ritual up to several hundred times a day. Studies of closely related species (*Stegastes* spp.) have shown that each species produces a unique sound and that they can discriminate conspecifics from heterospecifics. There is also evidence for individual recognition of these courtship sounds.

The calling rates of individual males are highly variable; they cycle through bouts of high calling rates interspersed with periods of low calling rates. Sound production in the domino damselfish (*D. albisella*) peaks at dawn, much like the dawn chorus of birds. The level of sound production is tightly linked to the timing of spawning, which is locally synchronized in this species. Thus, on the day before and the day of spawning, calling activity reaches its highest levels.

The dominant frequency of the sound is inversely proportional to male size, so larger males make lower frequency sounds (see **Figure 3**). In many fishes, females choose to mate with the largest males. In some damselfishes, such as the bicolor damselfish, it appears that females choose mates with the lower dominant frequency. In other damselfishes, it appears that females choose to mate more often with males that call more frequently. The pairing of sound production with a visual display is unique to the damselfishes. Since it has been argued that fishes may have difficulty localizing sound underwater, the pairing of the visual display with the acoustic signal may help females find the calling male. Because the male will defend the eggs from predators, it would be advantageous for a female to choose a mate with greater energy reserves. Though the energetic costs of sound production are not known, they are likely less than those of the swimming motion that accompanies sound production. This coupling of signals may create a more honest signal of a male's energy reserves.

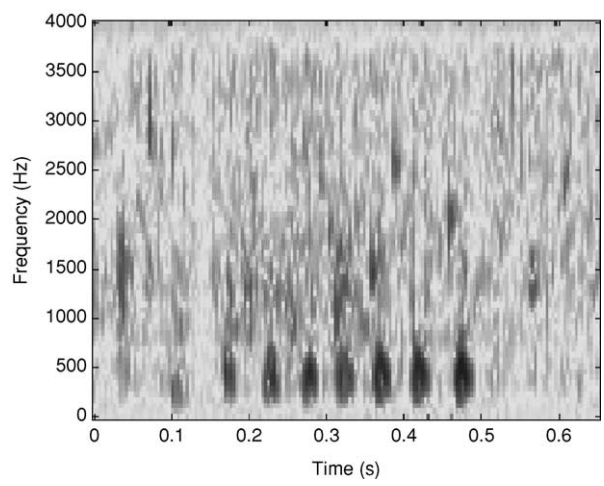

Figure 3 Spectrogram of courtship sound produced by the domino damselfish, *Dascyllus albisella*. This sound consists of seven pulses that range in frequency from approximately 200 to 600 Hz.

Damselfishes also produce sounds in other behavioral contexts, such as aggression and mating. All of these sounds are pulsed and similar to the courtship sound, but they vary in the number of pulses and loudness. For example, sounds produced during spawning typically have fewer pulses than courtship sounds and are much quieter. Aggressive sounds are louder, have longer pulse durations, and a faster pulse rate than courtship sounds. Interestingly, domino damselfish typically produce a single-pulse 'pop' sound when directing aggression against other species, rather than the multiple-pulse aggressive sound. This popping sound has energy over a broader frequency band than the aggressive sound and may be more detectable by a broad range of fishes that may vary in their hearing sensitivity.

Croakers and Drums

Croakers and drums (Family: Sciaenidae) are named for the sounds that they produce. Males have drumming muscles located on the body wall that are used to drum the swimbladder. In some species, females also possess sonic musculature, but it is not known how they use sounds in communication. The size of the drumming muscle increases during the breeding season and then regresses after the breeding season. Unlike the toadfishes and damselfishes, croakers and drums join choruses of calling males where sound levels can become so loud that they are audible above water.

Like the damselfishes and toadfishes, each species has a unique sound, which varies in its spectral and temporal characteristics (Figure 4). Even though these sounds are very common in coastal waters throughout the world, very little is known about the behavioral importance of these sounds to females and their role in mate choice.

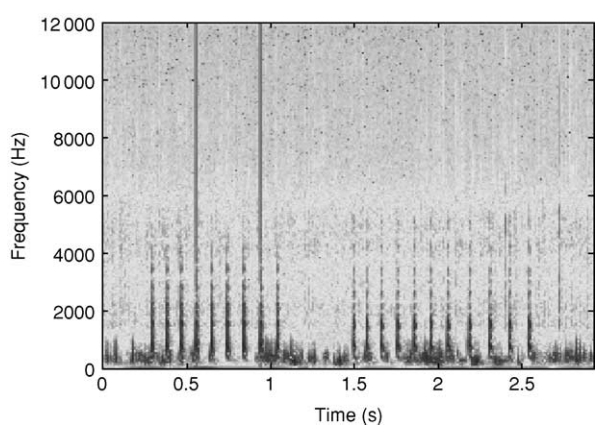

Figure 4 Silver perch and spotted seatrout sounds. Note that the silver perch sounds are higher in frequency (500–5000 Hz) and are repeated at a consistent pulse rate. Spotted seatrout sounds have most of their energy in the range 200–400 Hz.

These choruses tend to take place at dusk and at night (Figure 5). Because of this and the fact that the estuaries in which these species are found have limited visibility, little is known about the behavior that accompanies sound production and spawning. The chorusing of spotted seatrout has been referred to as lekking, because the aggregations occur at specific spawning locations, such as passes, where the fish might not otherwise be found. These fishes often attract feeding dolphins, and it has been hypothesized that dolphins may passively listen for sound- producing prey. Stomach contents data on bottlenose dolphins indicate that sound-producing fishes, including toadfish and croakers, constitute a major part of the prey base of dolphins in Florida.

Conclusions

Acoustic communication in fishes has been studied for over 50 years, but much remains to be learned. Fish sounds tend to be species-specific and stereotypical. In this sense, they are similar to the calls produced by insects and frogs. There appears to be little geographic variability within a species in the sounds they produce, except for indirect effects, such as the effect of temperature on the fundamental frequency of toadfish calls.

The diversity in life histories of fishes provides a strong base from which comparative studies of the evolution of acoustic communication can be performed. These three examples of sound production by toadfish, damselfish, and croakers show that fish vary greatly in the types of sounds they produce and in the temporal aspect of calling behavior. In species with fixed territories, such as the toadfish and damselfish, there are acoustic interactions between neighbors. In chorusing species, such as the croakers, it is not clear whether there are acoustic interactions between individuals. Future work with hydrophone arrays and advanced sonar systems will allow these questions to be answered.

It is important to remember that many different types of signals are often combined, such as sound production with a visual display, despite the fact that we often treat them separately. Future studies will examine the integration of these signals to more completely elucidate communication in fishes.

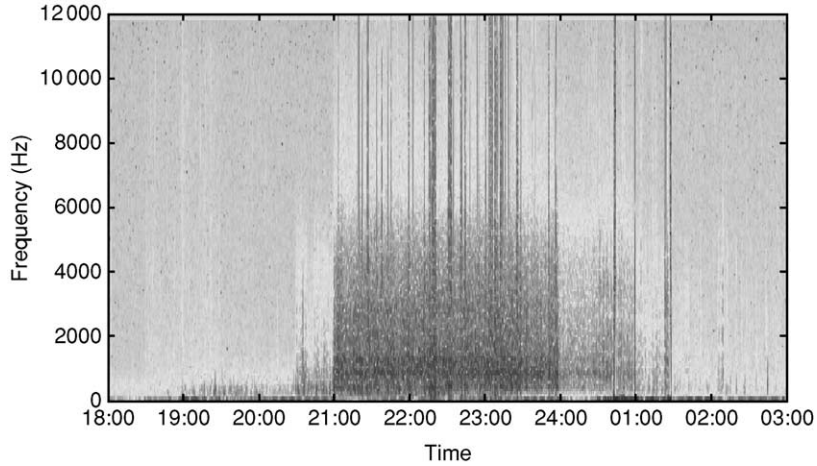

Figure 5 Composite spectrogram showing one night of a chorus of silver perch in Charlotte Harbor, Florida. Sounds were recorded 10 s every 10 min. Sand seatrout begin calling approximately 19:00 h. Silver perch chorusing begins somewhat abruptly at 21:00 h. Strong vertical bars are due to clipping in the recording system when sound levels exceeded 144 dB re: 1 μPa.

See also: Animal Communication: Deception and Honest Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Signal Detection; Birdsong; Communication in Marine Mammals; Frog and Toad Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Traditions in Animals.

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Relevant Website

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Fishman, Joshua A. (b. 1926)

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Joshua Fishman is a pioneer in the field of sociolinguistics, particularly in minority languages. Born on July 18, 1926 in Philadelphia to a Yiddish-speaking family, Fishman was aware from a very early age of the difficulties involved in maintaining a language that is different from that of the majority, especially when, like with Yiddish, the future of that language is uncertain. His interest and passion for issues of multiculturalism began when he was a child studying history and collecting foreign stamps. He put this interest into practice from an early age, founding and writing for the Yiddish youth magazine *Yugntruf*. Today, he is an outspoken supporter of bilingual education and heritage language programs in the United States and abroad.

Fishman studied at the University of Pennsylvania, receiving his combined Bachelor's and Master's degrees in 1948. Originally studying to be a dentist like his father, he soon became a history major with a minor in Spanish, with plans for graduate study in New York. During his studies he established a friendship with Max Weinreich, the co-founder of the YIVO Institute for Jewish Research and one of the preeminent scholars of Yiddish at the time. In 1948, he entered Columbia University to study psychology on the advice of his mentor, completing his doctorate in 1953 with a dissertation on the attitudes of Jewish youth regarding mainstream America.

Fishman's training in psychology and quantitative analysis gave him a perspective quite different from that of most linguists at the time and a sense of the importance of experimental research in the field. Fishman quickly became interested in integrating his interest in language with the field of social psychology, and from 1955 to 1958 he taught social psychology at City College of New York, incorporating sociolinguistic materials. In 1958, Fishman returned to the University of Pennsylvania, this time as Associate Professor of Psychology and Human Relations, but he would leave in 1960 to become Professor of Psychology and Sociology at Yeshiva University in New York. There, he achieved the title of Distinguished University Research Professor in 1966 and Emeritus Professor in 1988.

The field of sociolinguistics has been profoundly influenced, and indeed, defined by Joshua Fishman's work. Not restricted to Yiddish, his works, such as *Language loyalty in the United States* and *bilingualism in the barrio*, concern other immigrant languages, particularly Spanish. In these and other works Fishman addressed the issue of language maintenance and shift from a multidisciplinary perspective, taking into account aspects of history, culture, political organization, and economics that are related to language practice. By expanding his research beyond the United States, Fishman was able to study cases of language loss and revival (both successful and unsuccessful) worldwide, enabling other scholars and language advocates to draw meaningful conclusions about the methods that might apply in their own communities. At a time when over half of the world's languages are threatened with extinction, Joshua Fishman's combination of passion and scholarship continues to empower and inspire those who would protect this piece of their heritage.

See also: Language Education for Endangered Languages; Language Education for Language Revival;

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See also: Language Education for Endangered Languages; Language Education for Language Revival;

Linguistic Anthropology; Minorities and Language; Social Psychology and Language; Yiddish.

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Fleuriot, Léon (1923–1987)

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Born in Morlaix (Finistère) in 1923, Léon Fleuriot studied history at the Sorbonne and became an 'agrégé' teacher of history in 1950. Trained in the study of Celtic by Édouard Bachellery in the École Pratique des Hautes Études (Sorbonne, Paris), he began to gather the earliest evidence of the Breton language and, in 1958, he was admitted to the French National Research Foundation (CNRS) to write a thesis on this subject. This work was completed in 1963, and published in 1964. Soon after he received a professorship in Celtic Studies at Rennes University (1966) and later on succeeded É. Bachellery as Directeur d'Études in the École Pratique des Hautes Études. He was acting as director of the research team of Celtic Studies in the CNRS, and as chairman of the editorial committee of the CNRS journal *Etudes Celtiques*, until his sudden death, on March 15, 1987. His impassioned interest in the history of Breton was coupled with a great concern for the specific features of Breton culture: he never tried to sever his theoretical research from the general problems of modern Brittany and particularly from the problem of its language survival.

His scientific work developed along the lines traced years ago by Joseph Loth (*see* **Loth, Joseph (1847–1934)**): Old Breton and Gaulish were his two main interests. Eager to extend knowledge of Old Breton, Fleuriot had been scanning many manuscripts of the 9th century in his search for new glosses. His painstaking labor was rewarded with important discoveries, particularly the glosses on Bede's scientific works (ms. 477, Angers, Bibl. Municipale) and on Priscian's grammar. Fleuriot doubled the number of Old Breton glosses; he published this enlarged corpus in the form of a dictionary, probably under the influence of Loth's *Vocabulaire Vieux-Breton*. He was also asked to write a grammar of Old Breton.

His other interest was Gaulish and Continental Celtic. Convinced as he was of the similarity of Gaulish to ancient British (or Brittonic), he was prepared to recognize what the facts later proved to be right. In his general approach to ancient Celtic, Fleuriot revealed his profound knowledge of the older states of Brittonic, but he was also prone to rely on intuition, and to underestimate the importance of other Indo-European evidence. Thanks to his tenacity, however, it can be considered proven that among Continental Celtic languages, Gaulish was the nearest to the ancestor of Brittonic languages; this link helps to fill the gap between Continental Celtic and insular (medieval) Celtic.

Later works of Fleuriot were inspired by his passionate interest for the early history of Brittany. As a young man, he conducted archaeological explorations at the estuary of Rieux (at 'Coz-Yaudet,' Ploulec'h, dép. – Côtes-d'Armor). Reacting against the 'hyper-criticism' of Ferdinand Lot and others, the historian wanted to reconsider the evidence of some legendary sources, such as the histories written by 'Nennius' and Geoffrey of Monmouth. To realize this aim, he used what he himself called 'linguistic proof,' such as toponyms and anthroponyms. His book, *Les origines de la Bretagne*, however, did not meet with real success among historians.

See also: Loth, Joseph (1847–1934).

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Linguistic Anthropology; Minorities and Language; Social Psychology and Language; Yiddish.

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Flores Languages

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The Austronesian languages of Flores, in southern Indonesia, all belong to the Central Malayo-Polynesian grouping, and can be divided internally into three groups, roughly western, central, and eastern. There are 11 western languages, prominent among them Manggarai and Ngad'a, which are more closely related to Bima than to the languages of the rest of Flores. The three eastern languages, Sika, Lamaholot, and Lewotobi, are related to the languages of the Solor archipelago as far as Alor. The five central Flores languages, most prominently Ende and Li'o, are the most isolating and show a chaining relationship, with the southwestern languages changing incrementally into the northeastern varieties. The languages of Flores typically employ prenasalized and imploded/preglottalized consonants, sometimes in contrast to voiced stops. Most commonly, the languages have a five vowel system with epenthetic schwas separating illicit consonant clusters. Because these epenthetic vowels do not receive stress, the epenthesis results in apparent exceptions to the penultimate stress rule. In Palu'e ['lama] 'rice' appears to contrast in terms of stress placement with [lɐ'ma] 'tongue,' but the difference is better analysed as an underlying difference between /lama/ and /lma/.

The languages of Flores lack extensive verbal morphology to mark voice. This is part of the general isolating tendency, although the eastern languages have verbal agreement, and most languages show varying degrees of cliticization, which show degrees of development toward agreement and case marking. The eastern language Sika, for instance, shows a full set of agreement prefixes on verbs, whereas Palu'e in the center has only one proclitic, *ak* = '1sg.subj'. The recent grammaticalization of this clitic is attested in the inability of an independent pronoun to occur in the same clause as the clitic, and the optionality of the clitic: *Aku ka lama* 'I eat rice,' or *Ak=ka lama*, but not **Aku ak=ka lama*. There are no other subject clitics in Palu'e, but there are four genitive enclitics that are used in nominalized clause: *ka=gu lama* 'my eating of the rice.' The central and western languages show voice alternations. Manggarai shows an alternation in voice that is morphologically marked in word order and the choice of VP-final subject clitic. Palu'e has an active/passive alternation with only AVP and PAV word orders marking the difference, but a variety of morphosyntactic tests showing the changed status of the A and the P. Thus, the AVP sentence *Kita ka lama wa'a* 'We ate that rice,' contrasts with PAV in *Lama wa'a kita ka* 'That rice was eaten by us.' Tests for subject, such as modification by floating quantifiers, makes this unambiguous: the clause-final quantifier *teti'ón* 'all' in *Kita ka lama wa'a teti'ón* can only modify the subject: 'We all ate that rice,' whereas in *Lama wa'a kita ka teti'ón* can only be interpreted as 'We ate all of that rice.' Other tests support this analysis of the A in a PAV construction as oblique, and the P as subject.

Symbolism and metaphor are present in both ritual and everyday speech. This is licensed by an unusually large number of homophones, partly because of constrained phonotactic possibilities. For instance, in Palu'e the fortuitous coming-together of PAN *bənua > *nua* 'house' and *nuSa > *nua* 'island' is used to enforce the sense of belonging to their island home. Another factor is the extensive precategoriality of lexical roots, such as *kti*, which has the referential sense 'knife,' the predicative sense 'cut off,' and the modificational sense 'severed, loose.'

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Malayo-Polynesian Languages.

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fMRI Studies of Language

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Introduction

Functional neuroimaging has fundamentally changed the types of information that can be acquired about the relationships between neural structures and behavior, and this has been particularly important in the study of human language. Reviews of language/brain relationships are typically organized around hypothetical linguistic processes and the brain regions where they occur. From such a perspective, research questions might include the functional localization of processes related to discourse coherence, past tense affixation, phonology, pragmatics, production, prosody, reading, semantics, sentences, syntax, and words.

However, it is unlikely that the brain makes these distinctions as clearly as we linguists and psychologists do. In the current review, we turn this approach inside out, so to speak, and focus on the variety of different linguistic tasks that produce neuronal activity in a given location. This approach does not make assumptions about what is 'done' in an area and allows a picture to emerge of the mechanisms underlying language function throughout the brain, as opposed to trying strictly to localize it. From this point of view, we discuss not only traditional auditory linguistic perceptual tasks but also nontraditional but more ecologically valid tasks (e.g., audiovisual speech perception). Furthermore, we view language production and perception not as functionally separable processes but instead as lying on a continuum. Thus, tasks involved in language production are discussed with the understanding, as illustrated by work in the visual system (see, e.g., Jeannerod, 1997), that in order to understand the mechanisms of perception, we must simultaneously understand the mechanisms of production. Finally, we identify and describe a number of nonlinguistic tasks that produce reliable neuronal activity in some of the same regions that process linguistic material.

This approach serves to highlight new findings that have emerged from the neuroimaging literature. The emerging model differs somewhat from the standard view, that left Wernicke's area performs receptive functions and left Broca's area performs expressive functions (e.g., Geschwind, 1965b). Neuroimaging studies have demonstrated that in addition to these 'classical' areas, other more distributed bilateral brain areas play a role in language processing. It seems that each of the regions implicated in language processing plays a role in other, nonlinguistic processing as well, making it more likely that language emerged phylogenetically from existing processing mechanisms, rather than formed *de novo* to create a dedicated language mechanism in these 'classical areas.' Certainly understanding these mechanisms will help us understand language function. Finally, neuroimaging studies suggest that language processing is 'embodied'; aspects of processing both 'lower-level' speech sounds and 'higher-level' word meanings appear to involve brain areas that would be used both to perceive and to produce those sounds or meanings. As described, the intent is to illustrate these points by brain region. First, however, we

provide a brief overview of fMRI, as this is the principal method used in the surveyed studies (for a more detailed explanation of fMRI, see Cohen *et al.*, 1993). We do not, however, hesitate to draw on existing PET studies for historical reasons or for support.

fMRI: Basic Principles

Magnetic resonance imaging (MRI) is a noninvasive method of imaging the brain with high spatial resolution. fMRI is a way of using MRI to highlight regional differences in blood flow that occur during human cognitive or motor performance. fMRI requires neither injection of contrast agents nor radiation exposure, allows for fast and randomized 'single trial' stimulus presentation, and has comparatively high spatial resolution. This has led fMRI to become the image acquisition method of choice in establishing brain/behavior relationships in cognitive neuroscience, supplanting positron emission tomography (PET) for this purpose. Unfortunately, fMRI acquisition is very loud, requiring caution both in the care of research subjects (protecting hearing) and, important for the present review, in the design and interpretation of imaging studies involving auditory language (though 'silent' fMRI is possible, e.g., Engelien *et al.*, 2002). Another disadvantage of fMRI is a loss of signal in regions of the brain close to bone or air-filled sinuses, such as the medial temporal and orbitofrontal regions (see, e.g., Schacter and Wagner, 1999).

MRI works by altering the spins of protons aligned along the longitudinal axis of an imposed magnetic field. After application of a radiofrequency pulse to the brain, the proton spins are tipped away from the longitudinal axis. As the spins recover to their original state, they produce a measurable signal, which forms the basis of the MR image. Contrast between different tissue types (e.g., white matter, gray matter) can be achieved by exploiting the fact that the mechanism for the proton's recovery depends on its local tissue environment.

The most commonly used form of fMRI uses the blood oxygen level dependent (BOLD) contrast method (Ogawa *et al.*, 1992) and measures a molecule that is correlated with blood flow, and its changes during task performance. This in turn is a surrogate marker of neuronal activity. The temporal resolution of blood flow is slow: the vascular response begins about 2 seconds after the onset of neural activity, reaches a peak around 5–7 seconds, and declines for several seconds thereafter (Cohen, 1997). Despite this sluggishness, fMRI has been creatively adapted to the detection of stimuli as brief as 34 milliseconds (Savoy *et al.*, 1995). fMRI does not measure blood flow directly, as in PET, but rather measures relative changes in blood oxygenation. When neural activity occurs, blood flow in that area increases above the actual oxygen demand (Raichle, 1989), increasing the concentration of hemoglobin in that area. Although there is an increase in both oxygenated and deoxygenated hemoglobin, it is the increase in (paramagnetic) deoxyhemoglobin at the venous side of the capillary bed that results in the signal detected with fMRI.

Functional MRI requires a 'subtractive' task design. That is, the BOLD signals produced during one condition at each location in the brain must be compared with those during another condition at the same location. Those areas with a higher signal in one condition than another, thresholded by some statistical procedure, are usually referred to as 'activation.' Tasks of interest can be compared with a 'resting' baseline or with a simple perceptual control task or even with complex tasks that are tightly matched on psychological grounds. In the first case caution is required, as activation associated with 'rest' may be influenced by the participant's spontaneous thoughts or thoughts about the tasks given to them or by nonfocused attentional processes (Binder *et al.*, 1999; Raichle *et al.*, 2001). Regarding using another task as control (called a cognitive subtraction), caution is necessary, as very subtle differences in the tasks may result in activation that differs in intensity, spatial extent, and location (Jennings *et al.*, 1997; Raichle *et al.*, 1994). However, designs have emerged that are not as contingent on the assumption of pure insertion. These include a number of specialized design approaches, each with a suggestive name, such as 'cognitive conjunction' (i.e., determining the overlap among two or more tasks sharing a common processing component), 'common baseline' designs (i.e., comparing all tasks with one baseline), parametric designs (i.e., varying a level, e.g., frequency of word presentation, of a dimension, or of a task), and 'selective attention' designs (i.e., stimuli do not change between tasks; rather, participants are required to attend to different aspects of the stimuli, e.g., syntax or semantics).

During fMRI scanning, stimuli are presented either in 'blocks' or in a single-trial or event-related design. In a block design, participants perform multiple trials of a particular task repeatedly before performing another task. In event-related designs, stimuli are presented one at a time and randomly. Event-related designs have an advantage in that they are relatively resistant to habituation, boredom, expectation, and adoption of a fixed strategy.

We start our linguistic discussion with tasks that are associated with the activation of auditory cortex, an early step in the cerebral cortical processing of

1. Transverse temporal gyrus (buried) and sulcus

Dorsal Pathway (white numbers)

2. Angular gyrus
3. Pars opercularis of the inferior frontal gyrus
4. Planum temporale (buried)
5. Posterior superior temporal gyrus and sulcus
6. Premotor cortex (motor cortex in sulcus)
7. Supramarginal gyrus of the inferior parietal lobule

Ventral Pathway (black numbers)

8. Anterior superior temporal gyrus and sulcus
9. Middle temporal gyrus
10. Pars orbitalis of the inferior frontal gyrus
11. Pars triangularis of the inferior frontal gyrus
12. Planum polare (buried)

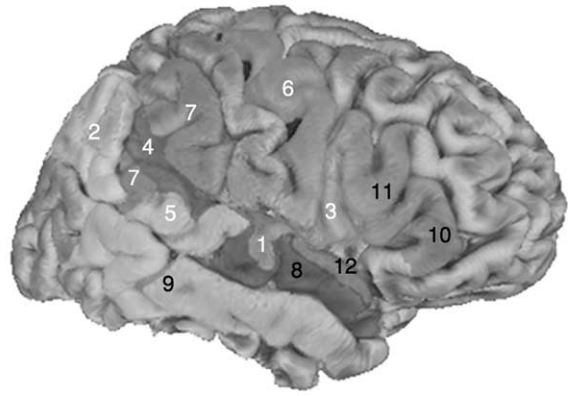

Figure 1 Key to regions discussed in the text. Regions with white numbers roughly correspond to the dorsal pathway, whereas regions with black numbers roughly correspond to the ventral pathway. 'Buried' indicates that regions are internal to the surface and are exaggerated on the image so that they can be more easily visualized.

spoken language. Figure 1 shows the location of this and other regions discussed below.

The Transverse Temporal Gyrus

The Transverse Temporal Gyrus (TTG), or Heschl's gyrus, is a large bump or bumps on the lower bank of the Sylvian (or lateral) fissure, the most posterior-medial half of which is primary auditory cortex (Liegeois-Chauvel *et al.*, 1991). Language competence is generally thought to develop from and rely upon auditory decoding of stimuli; thus, understanding the auditory bases of speech requires understanding the kinds of information processing that occur in the TTG.

fMRI studies have supported the view that the medial half of the TTG contains a tonotopic gradient in which more medial aspects process high frequency, while more lateral aspects process low-frequency sound information (Bilecen *et al.*, 1998; Wessinger *et al.*, 1997). In addition, some studies have shown that a more lateral aspect of the TTG has a mirroring tonotopic organization (Engelien *et al.*, 2002; Talavage *et al.*, 2000). Besides frequency information, the TTG is sensitive to the duration (Binder *et al.*, 1994; Jancke *et al.*, 1999; Engelien *et al.*, 2002) and intensity (Bilecen, 2002; Jancke *et al.*, 1998) of auditory stimuli.

These properties suggest that the TTG plays an important role in *early* processing related to speech understanding. That is, frequency discrimination is important in decoding phonetic differences, and certain phonetic boundaries are defined by durations of specific portions of vocalizations. Furthermore, sensitivity to prosodic information requires sensitivity to small differences in frequency and temporal duration.

However, the TTG is not simply at the bottom of a hierarchical language system. The TTG is subject to top-down influences of attention (Jancke *et al.*, 1998). Furthermore, activation of the TTG is subject to influence from other modalities: seeing moving faces producing speech without the accompanying auditory speech activates the lateral aspects of the TTG in normal hearing individuals (Calvert *et al.*, 1997; Calvert and Campbell, 2003) and in deaf individuals (MacSweeney *et al.*, 2002a). Furthermore, the TTG is activated by signed language in both populations (MacSweeney *et al.*, 2002b). In addition, speech production alters activity in the TTG (Houde *et al.*, 2002; Numminen *et al.*, 1999), and evidence from nonhuman primates has suggested that this consists of inhibitory responses preceding and excitatory responses following vocalization (Eliades and Wang, 2003).

These results bring into question the strict conceptualization of the TTG as a primary area. Rather, feedback to and plasticity at the level of the TTG are probably important components for shaping our auditory experience during language tasks. That is, language competence is not simply a process of decoding auditory stimuli, but rather, our auditory experience is shaped by attentional factors, other cues in the environment, and our own experience in producing speech sounds. It is important that processing in other brain areas (e.g., areas important in attention or face processing) can influence processing in TTG, since this accentuates the distributed nature of language function in the brain, as opposed to strictly modular and hierarchical conceptualizations.

Processing Pathways

Despite this general fact, processing occurs in a *somewhat* hierarchical manner in primate auditory cortices. These cortices are organized into a core with surrounding lateral belt areas (for review, see Kaas and Hackett, 2000; Rauschecker and Tian, 2000). The core in human (i.e., the TTG) has been shown to be sensitive to all types of sounds, while surrounding belt areas are sensitive primarily to complex sounds (Binder *et al.*, 2000; Hall *et al.*, 2002; Wessinger *et al.*, 2001), with speech (i.e., very complex sounds, like words and sentences) producing the greatest lateral spread of activation in superior temporal (ST) cortices *both* anterior and posterior to the TTG (Binder *et al.*, 2000).

Auditory processing in the monkey is thought to proceed in multiple functionally distinct pathways with a ventral (i.e., toward the bottom of the brain) pathway that is more sensitive to *What* (i.e., identification of auditory stimuli) and a dorsal (i.e., toward the top of the brain) pathway more sensitive to *Where* (i.e., localization of auditory stimuli, Rauschecker and Tian, 2000). This physiological distinction has been variously adopted with regard to the human brain based on neuroimaging results (e.g., see Belin and Zatorre, 2000; Hickok and Poeppel, 2000, 2004; Scott and Johnsrude, 2003; Wise *et al.*, 2001), with the suggestion that there is a ventral pathway involved in the transformation of sound into meaning and a dorsal pathway involved in the transformation of sound to motor-based representations (for a detailed explication, see Hickok and Poeppel, 2004). That is, as described in this article, the ventral pathway is involved in semantic aspects of language function – for example, understanding the meaning of words and sentences. In contrast, the dorsal pathway is more closely involved in motor aspects of language function, like auditory motion perception, speech production, verbal working memory, and/or phonology or segmentation. The dorsal pathway is thus related to the action perception–production continuum.

These two pathways have different reciprocal connectivity with frontal regions (Hackett *et al.*, 1999; Romanski *et al.*, 1999). Here we follow a simplified version of these pathways with the reality that there are probably many such pathways. First, we survey tasks that activate the ventral pathway. This pathway involves cortices anterior to the TTG connected, most likely via the uncinate fasciculus, to more anterior and ventral frontal cortices. Second, we examine tasks that activate the dorsal pathway, i.e., the cortices posterior to the TTG that are connected to more posterior frontal cortices, possibly via the arcuate fasciculus.

The Ventral Pathway: Temporal

The cortices of the ventral pathway in the temporal lobe are primarily in the ST regions anterior to the TTG and variously consist of the planum polare, the superior temporal gyrus (STG), and the upper bank of the superior temporal sulcus (STS). Also discussed are the temporal poles and the inferior and middle temporal gyri and the angular gyrus. As a general rule, the complexity of the stimuli that activate the anterior ST region increases as a function of the distance from the TTG: sounds, speech, words, sentences, and discourse produce increasingly anterior activity patterns respectively. This activity in the ventral pathway is unified functionally, in that it is associated mostly with semantic and grammatical aspects of language function.

Immediately anterior and lateral to TTG, bilateral ST cortices are active during tasks involving complex spectrotemporal structure, including both speech and nonspeech sounds (Belin *et al.*, 2000, 2002; Binder *et al.*, 2000; Davis and Johnsrude, 2003; Hall *et al.*, 2002; Scott *et al.*, 2000; Warren *et al.*, 2003). Intelligible speech seems to be confined to more anterior portions of the STG and especially the STS (with a leftward asymmetry, Scott *et al.*, 2000; Specht and Reul, 2003). Words tend to activate a more anterior extent of the ST region than sound alone (Mummery *et al.*, 1999; Specht and Reul, 2003) and connected speech, e.g., sentences, even more so (Friederici *et al.*, 2000a; Humphries *et al.*, 2001; Stowe *et al.*, 1998). Activation associated with discourse (i.e., relative to sentences) seems to extend into the temporal poles (Fletcher *et al.*, 1995; Robertson *et al.*, 2000; Tzourio *et al.*, 1998b). Collectively, it is these more anterior structures that are sensitive to semantic manipulations and grammatical structure (e.g., see Bavelier *et al.*, 1997; Chee *et al.*, 1999; Mazoyer *et al.*, 1993; Mummery *et al.*, 1999; Nobre *et al.*, 1994; St George *et al.*, 1999; Stowe *et al.*, 1998).

Whereas there is a small leftward asymmetry for intelligible stimuli, the right hemisphere is active for both intelligible and unintelligible stimuli, with a special preference for pitch variations and melodies (Belin *et al.*, 2002; Kotz *et al.*, 2003; Liebenthal *et al.*, 2003; Meyer *et al.*, 2002; Meyer *et al.*, 2004; Patterson *et al.*, 2002; Scott *et al.*, 2000; Specht and Reul, 2003; Zatorre, 2001; Zatorre *et al.*, 1992). For example, right anterior ST cortices have been shown to be more active while discriminating words based on emotional prosody than while performing a phoneme identification task (Buchanan *et al.*, 2000). Because of these hemispheric differences, it has been proposed that the left hemisphere is more involved in fine-grained temporal resolution, whereas

the right hemisphere is more involved in the frequency domain (Poeppel, 2003; Tallal *et al*., 1993; Zatorre *et al*., 2002).

In addition to anterior ST structures, posterior inferior STS has been implicated in the retrieval of words from memory based on semantic cues (Wise *et al*., 2001). Also, the middle temporal gyrus and angular gyrus (active in many of the cited studies) is thought to support semantic processing (Demonet *et al*., 1992; Vandenberghe *et al*., 1996). Similarly, reading words activates posterior middle temporal and anterior inferior temporal cortices in association with semantic aspects of processing (Fiez and Petersen, 1998; Hagoort *et al*., 1999; Herbster *et al*., 1997; Kuo *et al*., 2003; Price *et al*., 1997), and the medial and inferior temporal lobes are thought to support semantic verbal memory and retrieval (Bartha *et al*., 2003; Pihlajamaki *et al*., 2000).

In sum, activity in the ST region seems to course anteriorly as the complexity of stimuli increases from sound-based, intelligible speech, words, sentences, and discourse respectively. Furthermore, tasks yielding activity in the ST region and more inferior aspects of the temporal lobe are associated with semantic and grammatical aspects of language function. Together, those results support the contention that these aspects of the ventral pathway are involved in mapping sound-based representations to meaning (Hickok and Poeppel, 2004).

The Ventral Pathway: Frontal

Temporal lobe structures of the ventral pathway are connected via the uncinate fasciculus with more anterior and ventral aspects of the frontal lobe. These frontal structures include orbital, medial, and ventrolateral frontal cortices (cytoarchitectonic areas 10, 45, 46, 47/12). Neuroimaging studies have indicated that there are functional homologies between cortices of the temporal ventral pathway and these frontal areas. That is, the anterior aspects of the inferior frontal gyrus (IFG) – specifically the pars triangularis (cytoarchitectonic area 45) and pars orbitalis (cytoarchitectonic area 47/12) regions – are activated by tasks intended to assess higher-level linguistic processing related to semantic manipulations and grammatical structure.

These regions have been shown to be involved in strategic, controlled, or executive aspects of processing semantic information in words or sentences (Baumgaertner *et al*., 2002; Buckner *et al*., 1995; Dapretto and Bookheimer, 1999; Devlin *et al*., 2003; Fiez, 1997; Friederici *et al*., 2000b; Gabrieli *et al*., 1998; Gold and Buckner, 2002; Kapur *et al*., 1994; Petersen *et al*., 1989; Poldrack *et al*., 1999) and show reductions of activation during semantic priming (Demb *et al*., 1995; Wagner *et al*., 2000). These regions have also been reported to be involved in strategic, controlled, or executive aspects of processing syntactic information (Caplan *et al*., 1998, 2000; Embick *et al*., 2000; Fiebach *et al*., 2001; Inui *et al*., 1998; Just *et al*., 1996; Roder *et al*., 2002; Stromswold *et al*., 1996).

Activity in orbitofrontal regions and cytoarchitectonic areas 45 and 47, however, has been directly implicated in the perception and production of affective states, often regardless of the linguistic nature of the context (for a comprehensive review, see Phillips *et al*., 2003). It is no accident that areas of the brain implicated in emotional processing are also involved in semantic processes related to language, given that semantic qualities of words and sentences are imbued with affective qualities. Indeed, anterior and ventral frontal cortices are involved in processing emotional prosody in linguistic contexts (Buchanan *et al*., 2000; George *et al*., 1996; Kotz *et al*., 2003).

The Dorsal Pathway: Temporal–Parietal

The cortices of the dorsal pathway in the temporal lobe are primarily in the ST regions posterior to the TTG and variously consist of the planum temporale, the STG, the upper bank of the STS, and the supramarginal gyrus of the inferior parietal lobule. In various studies some combination of these regions is referred to as Wernicke's area.

As a general rule, the dorsal pathway is involved in mapping sound to motor-based representations (Hickok and Poeppel, 2004). Consistent with this view, as in the monkey, posterior ST cortices are involved in auditory motion perception in humans (Alain *et al*, 2001; Baumgart *et al*., 1999; Bushara *et al*., 1999; Pavani *et al*., 2002; Warren *et al*., 2002). This is an important aspect of language behavior (e.g., locating a friend based on his or her voice in a crowded room) and requires an orienting response with the head and/or body and thus a motor-based representation.

The dorsal pathway may also have a relationship with motor-based representations associated with the actual production of language. It has been stipulated that humans' ability to acquire and understand language requires a close connection between speech perception and stored speech sounds and motor areas involved in speech production (e.g., Liberman and Mattingly, 1985). Clearly, posterior ST and inferior parietal regions play a specific role in acoustic and phonological analyses and the storage and manipulation of speech stimuli (Belin *et al*., 1998, 2000; Benson *et al*., 2001; Binder *et al*., 1996, 1997, 2000; Burton

et al., 2000; Celsis *et al.*, 1999; Davachi *et al.*, 2001; Demonet *et al.*, 1992; Fiez *et al.*, 1995, 1996; Gelfand and Bookheimer, 2003; Hashimoto *et al.*, 2000; Hugdahl *et al.*, 2000; Jancke *et al.*, 2002; Jonides *et al.*, 1998; Kansaku *et al.*, 2000; Mazoyer *et al.*, 1993; Petersen *et al.*, 1988; Smith and Jonides, 1999; Tervaniemi *et al.*, 2000; Tzourio *et al.*, 1997, 1998a,b; Wise *et al.*, 2001; Zatorre *et al.*, 1992, 1996). Unlike anterior ST and inferior temporal cortices, which are also involved in acoustic and phonological analysis of stimuli, the posterior ST and inferior parietal cortices are involved in both overt and covert articulation, reading, and naming (Anderson *et al.*, 1999; Bookheimer *et al.*, 1995; Paus *et al.*, 1996; Price *et al.*, 1996; Wise *et al.*, 2001). That is, the perception of speech sounds overlaps the production of the same sounds in these regions (Buchsbaum *et al.*, 2001; Hickok *et al.*, 2000; Papathanassiou *et al.*, 2000).

The dorsal pathway is also involved in reading, another language task that may be tied to language production. fMRI studies have demonstrated a crucial role of the supramarginal gyrus in converting orthographic to phonologic encodings during reading. First, activity in this area is sensitive to the phonological demands of the reading tasks given to participants (Paulesu e*t al.*, 1993b; Price *et al.*, 1997). Second, studies have shown that the supramarginal gyrus is more active for reading relative to object naming (Moore and Price, 1999b) and for reading pseudowords relative to real words (Price, Wise, and Frackowiak, 1996; Rumsey *et al.*, 1997). This role of the supramarginal gyrus in converting orthography to phonology might relate to its anatomical location, facilitating interaction with frontal systems involved in motor output as would be required for reading (i.e., because of actual production requirements or the rehearsal aspects of verbal working memory; see Clark and Wagner, 2003; Davachi *et al.*, 2001; Jonides *et al.*, 1998a; Paulesu *et al.*, 1993). Indeed, it has been shown that the supramarginal gyrus is more active during overt relative to covert reading (Bookheimer *et al.*, 1995).

Posterior ST and inferior parietal regions, besides being involved in acoustic and phonological analysis and reading, are involved in other types of non-auditory-based linguistic processing. These regions are involved in the perception of sign language (Bavelier *et al.*, 1998; Braun *et al.*, 2001; Corina *et al.*, 1999; MacSweeney *et al.*, 2002b) and linguistically meaningful (and meaningless) facial movements (e.g., Campbell *et al.*, 2001) and are activated to a greater extent by many audiovisual language tasks that contain faces than auditory tasks alone (Jones and Callan, 2003; Mottonen *et al.*, 2002; Olson *et al.*, 2002; Wright *et al.*, 2003). Furthermore, the posterior ST regions are activated by the observation of nonlinguistic but biologically relevant movements and by implied movements of the eyes, mouth, and hands (for a review, see Allison *et al.*, 2000).

Thus, it seems that these posterior ST and inferior parietal regions are implicated not only in auditory aspects of perception and their coupling with motor output (as in auditory motion perception) but in all types of biological motion perception and their integration with other sensory modalities (e.g., see Calvert *et al.*, 2000; Sams *et al.*, 1991) and action performance.

The Dorsal Pathway: Frontal

Temporal lobe structures of the dorsal pathway are connected via the arcuate fasciculus with more posterior and ventral aspects of frontal cortices than the ventral pathway. These frontal structures include the pars opercularis of the inferior frontal gyrus (IFG; cytoarchitectonic area 44) and premotor cortex (cytoarchitectonic area 6). The latter structure connects directly to primary motor cortex (cytoarchitectonic area 4). Supporting the hypothesis that the dorsal pathway is involved in mapping between sensory- and action- or motor-based representations are the data that these areas are directly involved in the preparation for and the production of language (among other movements). Furthermore, like the temporal–parietal aspects of the dorsal pathway, posterior frontal cortices are involved in tasks intended to assess phonological processing.

Specifically, Broca's area of the IFG, comprised of the pars opercularis (roughly cytoarchitectonic area 44) and the pars triangularis (roughly cytoarchitectonic area 45), has long been viewed as supporting the mechanism by which auditory forms are coded into articulatory forms in service of language production (Geschwind, 1965). This characterization, however, is not completely accurate. Although Broca's area is activated during overt and covert articulation (Friederici *et al.*, 2000b; Grafton *et al.*, 1997; Huang *et al.*, 2001), this area is not itself involved in controlling articulation *per se* (Bookheimer *et al.*, 1995; Huang *et al.*, 2001; Papathanassiou *et al.*, 2000), but it may be a 'prearticulatory' region (Wise *et al.*, 1999). Indeed, other regions have been shown to be more consistently active than Broca's area during overt production (e.g., premotor cortices, Blank *et al.*, 2002; Wise *et al.*, 1999).

Further supporting the notion that Broca's area is not involved in controlling articulation *per se* is that activation in this area is not specific to oral speech. For example, Broca's area is activated during

production of American Sign Language (Corina *et al.*, 1999; Huang *et al.*, 2001) and is activated by the *observation* and imitation of nonlinguistic but meaningful goal-directed movements (Binkofski *et al.*, 2000; Ehrsson *et al.*, 2000; Grezes *et al.*, 1999; Hermsdorfer *et al.*, 2001; Iacoboni *et al.*, 1999; Koski *et al.*, 2002).

One suggestion regarding the function of Broca's area is that it is involved in tasks (both productive and perceptive, whether related to speech or not) that require segmentation (Burton *et al.*, 2000). Furthermore, tasks involving segmentation tend to activate more posterior aspects of Broca's area (i.e., the pars opercularis), whereas, as discussed in the section on frontal lobe characteristics of the ventral pathway, more anterior aspects of the IFG (i.e., the pars triangularis and orbitalis) tend to be activated by tasks that are semantic or grammatical in nature. One set of tasks requiring segmentation that consistently activates the pars opercularis are those intended to assess phonology (Buckner *et al.*, 2000; Burton *et al.*, 2000; Demonet *et al.*, 1992, 1994; Fiez *et al.*, 1995; Heim *et al.*, 2003; Muller *et al.*, 2001; Paulesu *et al.*, 1993a; Poldrack *et al.*, 1999; Zatorre *et al.*, 1992, 1996). Furthermore, tasks intended to assess verbal working memory – i.e., those thought to require active maintenance of phonological or segmental information (Baddeley and Logie, 1999) – also activate the pars opercularis of the IFG, in addition to premotor cortices (Awh *et al.*, 1995; Braver *et al.*, 1997; Cohen *et al.*, 1994, 1997; Jonides *et al.*, 1998; Paulesu *et al.*, 1993b; Schumacher *et al.*, 1996).

Premotor cortices are active when tasks require that a participant generate an articulatory/phonetic plan and are active to a greater extent than is Broca's area. In particular, studies of language production demonstrate (ventral) premotor and insula activity, but not necessarily IFG activity (Chao and Martin, 2000; Grabowski *et al.*, 1998; Grafton *et al.*, 1997; Heim *et al.*, 2002; Martin *et al.*, 1996; Riecker *et al.*, 2000; Wildgruber *et al.*, 1996, 2001; Wise *et al.*, 1999). In addition, speech perception overlaps speech production of the same speech sounds in premotor cortex (Wilson *et al.*, 2004). Furthermore, in contexts where a speaker's face is observable, audiovisual language comprehension activates the pars opercularis, premotor cortex, and primary motor cortex to an even greater extent than with auditory comprehension alone (Skipper *et al.*, 2002, 2004, 2005). The latter suggests that observable characteristics of facial movements might be understood and utilized in language comprehension through knowledge of how to produce the observed movements (Binkofski *et al.*, 2000; Kohler *et al.*, 2002; Rizzolatti and Arbib, 1998; Umilta *et al.*, 2001).

In sum, the tasks that activate frontal cortices of the dorsal pathway (i.e., speech production, verbal working memory, and perception of speech sounds) are functionally continuous with those that activate the temporal–parietal aspects of the dorsal pathway, though they are more closely associated with production. This supports the contention that this pathway subserves mapping between sensory- and motor-based representations (Hickok and Poeppel, 2004). Furthermore, it adds support to the hypothesis that under some conditions, language (or at least speech) is understood through the utilization of knowledge about speech production (e.g., Liberman and Mattingly, 1985).

There is, however, a very different manner in which these frontal cortices, especially premotor cortices, are involved in language understanding that does not fit with a clear dissociation between the dorsal and ventral pathways. Thus far, the distinction between the dorsal and ventral pathways has been that frontal areas associated with the dorsal pathway are involved in sensorimotor integration with regard to segmental aspects of speech perception/production, whereas the ventral route is involved in semantic operations. However, there is at least one way in which sensorimotor integration may play a role in semantic aspects of language processing, as suggested by lesion and neuroimaging studies of category effects in word processing. That is, temporal lobe lesions result in naming deficits for concrete entities, but not for actions, and prefrontal lesions show the opposite effect (Tranel, 2001; Tranel *et al.*, 1997a,b, 2003). Similar results have been found in non-brain-injured participants; this shows that tool naming selectively activates premotor regions relative to naming objects that are not manipulable (Chao and Martin, 2000; Grafton *et al.*, 1997; Martin *et al.*, 1996). Similarly, premotor cortex is more active during categorization of graspable objects (e.g., fruits, vegetables, and clothing) relative to animals and nonmanipulable man-made objects (Gerlach *et al.*, 2002).

Taken together, these results suggest that the semantic properties of words might encode features of their categories. Thus, the activation of tools might activate premotor regions because of the association between tools and reaching (Martin *et al.*, 1996). Indeed, some evidence suggests that action words (e.g., *run* vs. *type* vs. *smile*) activate motor cortices in a somatotopic manner (Pulvermuller *et al.*, 2000, 2001). Indeed, though the discussion at this point is centered on inferior frontal and premotor cortex, the principle that features of words are encoded or retrieved with word perception and production is a general one. For example, there is more processing

in visual areas for animals relative to tools (Martin *et al.*, 1996; Moore and Price, 1999a; Mummery *et al.*, 1998; Perani *et al.*, 1999), perhaps because we encode the latter more in terms of their visual properties and the former more in terms of their sensorimotor properties. It has been shown, for example, that color words activate visual areas involved in color processing (Martin *et al.*, 1995).

In summary, the dorsal pathway may encode action knowledge not only in relation to speech sounds (i.e., how to produce them) but also in relation to the semantic characteristics of word meaning (the word 'hammer' encodes knowledge about how to use a hammer). These two aspects of the action perception–production continuum with relation to language function are very different and probably rely on very different neural networks and probably represent an overlap between the dorsal and ventral pathways, as discussed here. This urges caution in strictly accepting the dorsal/ventral pathways distinction and suggests, rather, that such distinctions be utilized for heuristic purposes only, with the reality that things are much more complicated.

Occipital Cortices

Neglected thus far, among many brain structures, are occipital regions generally thought to support vision. Visual cortices clearly play an important role in the recognition of objects as an initial stage in object naming. The regions involved in processing object properties might also be involved in word processing (irrespective of the presence of an object) to the extent that words encode visual features as semantic content (e.g., color words activate visual areas involved in processing colors).

Of course, there is an entire system of visual language processing that overlaps with portions of the auditory language system but also includes a number of different pathways. Bilateral extrastriate cortex is likely involved in the early analysis of complex visual features associated with reading (Petersen *et al.*, 1990; Tagamets *et al.*, 2000). Aspects of the fusiform gyrus (i.e., the left ventral occipitotemporal sulcus) are especially responsive to written words (Cohen and Dehaene, 2004; Cohen *et al.*, 2000, 2002). Because of this, this region is often referred to as the 'visual word form area' and has been suggested to be somewhat modular and specialized, though it is more likely that this area in involved in other forms of (task-dependent) processing (Jobard *et al.*, 2003; Price and Devlin, 2003).

Interestingly, the hypothesis that action perception cannot be detached from action performance and vice versa seems to apply also to reading and writing. That is, writing modulates activity in the 'visual word retrieval system' (Nakamura *et al.*, 2002), and viewing letters activates premotor regions used in the act of writing (Longcamp *et al.*, 2003).

Conclusions

This review, rather than showing where specific kinds of linguistic processing occur (e.g., syntax), illustrates the various tasks that activate given regions. Brain activity resulting from these tasks show that 'classical' language areas are involved in language processing, but not necessarily in the ways originally prescribed, and that language processing in cortical areas extends beyond those originally thought to be involved in language function. Furthermore, the clear division of expressive and receptive functions is called into question with aspects of the perception of speech sounds and semantics involving a motor component. This review also highlights the functional similarities of connected regions loosely organized into distinct pathways. There seem to be pathways involved in sensory-meaning and sensorimotor translations related to language perception and production (Hickok and Poeppel, 2004). Such findings highlight the need to move away from strict localizationism (i.e., identifying brain regions responsible for a proposed cognitive function) and toward methods intended to discover the functional relationships between regions. Though such methods exist (e.g., McIntosh, 1999; McIntosh and Gonzalez-Lima, 1994) and have been applied to auditory (Gonzalez-Lima and McIntosh, 1994; McIntosh and Gonzalez-Lima, 1995), visual (McIntosh *et al.*, 1994), and motor tasks (Solodkin *et al.*, 2004), little work has been done to characterize the relationships among regions during language processing (Horwitz *et al.*, 1998; Krause *et al.*, 1999). Understanding these networks for language function clearly represents the next step of this exciting area of research.

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Focus

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'Focus,' like many technical terms in linguistics, has various uses. Fortunately, they share a major property: They all have to do with highlighting constituents, making them stand out from the surrounding constituents in a clause or sentence. Speakers focus on constituents to highlight the information they carry, to contrast one piece of information with another, to introduce new information, to reintroduce information that has already been mentioned but dropped, to shift the listener's attention to another entity or topic of conversation, or to emphasize a piece of information. Focusing/highlighting cannot be examined in isolation; linguistic properties are interconnected and focusing has its converse, defocusing or making constituents less prominent, usually because they convey information that is treated by the speaker as familiar to the listener(s).

Different Concepts of Focus

Halliday

Halliday (1967) provided the first systematic discussion of focus. His account was very apt because it dealt with the use of pitch and stress to signal focus. Halliday posited information units that are realized as tone groups. A tone group contains one obligatory component, namely a segment carrying stress (a tonic segment), which may be a whole word or part of a word; it contains at least one optional component, the pretonic segment. One information unit is realized as one tone group, and the number and size of the information units in a given utterance reflect how the speaker has divided the message into blocks of information. Within each information unit the speaker selects a certain element or elements as points of prominence within the message. For example, (1) can be realized as (2a) or (2b), where the double obliques indicate tone group boundaries and capitals indicate the position of the tonic segment. (Current literature refers to the focal segment, which carries the focal accent.)

(1) John visited Susan yesterday

(2a) John visited SUSAN yesterday
(2b) JOHN visited Susan yesterday

The constituent carrying the focal accent is flagged as carrying information that the speaker treats as new – that is, as not available to the listener either by inference or because it has already been mentioned. Halliday emphasizes that 'new' means 'what the speaker chooses to present as new.' New information may simply be added to the available information or may contrast with it. (See Halliday, 1987: 277.)

(2a) is appropriate as a response to the question, 'Who did John visit yesterday?' whereas (2b) is a possible response to 'Who visited Susan yesterday?' To put it another way, the speaker who utters (2a) presupposes that John visited someone and specifies the someone. The speaker who utters (2b) presupposes that someone visited Susan and specifies that someone. As Lambrecht (1994: 210) stated, the information conveyed by (2b) is that "the person who visited Susan yesterday is John." The constituent carrying the focal accent provides a value for *x* in the proposition *x visited Susan yesterday.*

Contrastiveness: Chafe, Lambrecht, and Dik

Chafe (1976) asked what contrastiveness is. With respect to the example, *Ronald made the hamburgers*, Chafe spells out the factors involved: (1) background knowledge that a set of hamburgers was prepared, (2) a set of possible candidates for the cook, and (3) assertion of which candidate is the correct one. Contrastiveness is manifested principally by the placement of higher pitch and stronger stress on the focus of contrast, although IT clefts are an alternative device. Like Halliday, Chafe regarded the pitch phenomena as of primary importance and the use of syntactic constructions as secondary, but

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unlike Halliday he limited focus to contrast. Halliday regarded contrastiveness as only one property of focus – focused, new information can be cumulative to existing information or in contrast with it.

Lambrecht (1994: 290) proposed that the placement of focal accent is not to be explained in terms of contrastiveness. He treated contrastiveness as a gradient property that may be zero in a given context and related it to the inferences drawn by listeners in particular conversational contexts. With respect to *Who made the hamburgers*, he proposed that no limited set of candidates is implied.

Dik (1980: 210–229) classified different types of focus. He drew a distinction between shared and nonshared, or new, information; as in Halliday's account, it is the speaker who decides the status of a piece of information. Like Halliday, Dik treated focus as usually marking information as nonshared. Nonshared information is made salient, either by intonation or by constituent order or by focus markers such as particles and special focus constructions, or indeed by a combination. Dik provided a hierarchy of different types of focus; the examples are from Mackenzie and Keizer (1990). All the examples have in common that the speaker uses the focal accent to make information salient, presenting it as unshared or new.

Examples of the different types of focus are given in (3). Obviously, the placement of the focal accent is relevant only to speech. Spoken and written language share the syntax of the different types of focus, but in speech the syntax might well be reduced; for instance, in (3c) a possible spoken retort is simply *coffee*, with the appropriate pitch pattern and an appropriate voice quality.

(3a) Completive focus
Where is John going?
He's going to the market / to the market

(3b) Parallel focus
John and Bill came to see me. John was nice but Bill was boring

(3c) Replacing focus
John bought rice
No, he bought coffee

(3d) Restricting focus
John bought coffee and rice
No, he only bought coffee

(3e) Expanding focus
John bought coffee
Yes, but he also bought rice

(3f) Selecting focus
Would you like coffee or tea?
Coffee, please

Dik took Halliday's distinction between cumulative and contrastive focus, drew out the various reasons why a speaker might wish to highlight a constituent, and extended the range of devices to be recognized as highlighting. That is, the general concept of contrastive focus is all very well, but spontaneous spoken discourse yields a range of subtypes, some of which can be signaled in more than one way. For example, in addition to the responses given previously, (3c) can be responded to by *it was coffee* or *it was coffee he bought*.

Vallduví: Heads and Tails

Vallduví (1994) incorporated focus-as-new into an explicit information-handling model. Consider (4).

(4a) What did Sally give Andrew for his birthday?
(4b) She gave him a CD of Jean-Michel Jarre

Sentences encode a logico-semantic proposition and an information-packaging instruction. The proposition in (4) is GIVE (SALLY, SOMETHING, ANDREW). The information-packaging instruction indicates what part of a given sentence carries information and where and how that information fits into the hearer's information store. (Strictly speaking, it indicates where and how the speaker thinks the information fits in.) In (4b), the sequence *She gave him* is taken to be the ground, that which is already established in the speaker's information model. The 'established' entities are Sally and Andrew, and for both of these file cards have been opened. *A CD of Jean-Michel Jarre* is the focus, that is, information to be added to the hearer's information model by adding information to a file card – here the card for the entity given to Andrew. If necessary, the hearer opens a new file card.

The ground consists of a link element and a tail element. The link points to a specific file card in the hearer's knowledge store; in (4b) *she* and *him* point to the cards for Sally and Andrew. Link elements are typically pronominal and in speech carry low pitch and amplitude. In spoken English, the answer to (4a) would typically be *a CD of Jean-Michel Jarre*, with a zero link element. Tail elements are ground elements that are not links.

Transitions

The core concept of contrastive focus as employed by Halliday and Chafe turns out to have much in common with the concept of focus as used by Dik, and even with two apparently very different concepts – that of Grosz and Sidner (1990), which has to do with referential status, and that of Vallduví (1994), which has to do with the transmission of information. In order to accommodate the various concepts in one framework, we add the notion of communicative goal as deployed by Levy (1979) and bring in the further

concepts of macrofocus, relating to high-level, major transitions in a text, and microfocus, relating to low-level, minor transitions. The important notion here is 'transition,' which is also at the heart of Grosz and Sidner's work.

The concept of focus is invoked in accounts of how a given speaker and listener shift attention from one entity to another in a given context, thereby shifting the reference of pronouns, as described in the classic paper on centering by Grosz (1981) and in Grosz and Sidner (1990). The latter paper appeals not just to linguistic structure but also to the notions of intentional and attentional structure. The former has to do with the intentions of the speaker in producing a particular discourse or discourse segment and the latter with the salience of entities, properties, relations, and discourse purposes and intentions. We are concerned here with attentional structure since it, like focus, has to do with salience.

The important concepts are focus space and transition rule. A focus space is associated with each discourse segment and in it are representations of entities salient in that discourse segment – that is, entities that are mentioned explicitly or become salient as speaker and hearer work to produce and interpret utterances. Within focus spaces all Dik's different types of focus are relevant, as are the devices for introducing new entities and new propositions into focus spaces. Of course, speakers can choose one of these devices or simply use a neutral syntactic construction, as in much of the dialogue analyzed by Grosz and Sidner.

As a discourse is built up, speakers pass from one focus space to another and it is here that the concept of transition rule becomes relevant; speakers and writers may choose to make a given transition salient, and the text schema in (5), taken from Levy (1979), shows how they can do this.

(5) A text schema
(5a) I had a lousy day at work
(5b) i. Monday is a horrid day anyway.
ii. When I arrived . . .
iii. At the second year lecture . . .
iv. Right in the middle of my afternoon nap . . .
v. Just as I was leaving . . .
(5c) i. At the second year lecture
ii. the first thing was that the overhead projector was playing up
iii. then the students hadn't done any reading
(5d) iv. but what bugged me most was . . .

Essentially a time or place phrase is put into first position in a clause and these phrases connect and contrast with the previous text. (The phrases in first position in clauses are known as themes; in (5), *I*, *Monday*, *When*, *At the second year lecture*, *Right in the middle of my afternoon nap* are themes.) The text schema in (5) shows that there are major and minor transitions; the transition from the previous topic of conversation to the lousy day at work is very large and (5bi) could be preceded by *Can I tell you about my day? Talking about having a bad day*, *I'm glad someone had a good day*, and so on. The transition from topic set (5b) to topic set (5c) is less important, and the transitions within sets (5b) and (5c) are relatively minor. Nonetheless, they are signaled by the time progression from event to event conveyed by the theme phrases listed previously.

Transitions in texts are beyond the scope of this article but are relevant for typology. Transitions in a spontaneous Russian text are discussed in detail in Miller and Weinert (1998: 203–209); they invoked the concept of macrofocus for the major transitions and microfocus for the minor transitions. The transitions involve contrast but also cohesion, and they are rendered salient by various syntactic and lexical devices, such as *moreover*, *in addition*, *conversely*, *We turn now to a different but related topic*, and so on.

Focus Particles

The final use of focus has to do with words such as *even*, *only*, and *just*. These words are called 'discourse markers' or 'discourse particles.' They contribute to the complete interpretation of utterances: *Even Angus has heard of Bach* has the interpretation 'Contrary to your expectations (given what you know about Angus), Angus has heard of Bach'; *The dog only chewed the table this time* has the interpretation 'This time the dog chewed the table and nothing else' and invites the inference 'on some other occasion the dog chewed a lot more'; *Just open the window a bit* has the interpretation 'Open the window, but not very much, and I'm asking you politely.' In addition, *even*, *only*, and *just* give salience to *open a bit*, *the table*, and *Angus*.

All the uses of the term focus mentioned previously have to do with making constituents salient, but for different reasons: because they carry new information, because they signal a change of attention, because they signal a transition in a text (conversation, narrative, or serious discussion), or because the salience helps to signal some other important meaning, such as attitude.

Focal Accent and Syntactic Structure

New information has to do with whole propositions (and the clauses that convey them), predicates (as conveyed by verbs), or arguments of predicates

(as conveyed by noun or prepositional phrases). Lambrecht (1994: 223–228) demonstrated that the introduction of these different types of new information correlates with different syntactic structures and with the focal accent falling in different places. Where a whole proposition is new, the focal accent in English falls on the subject noun phrase (with an intransitive verb, at least); where a predicate is new, the focal accent falls on the verb and the subject noun phrase is typically a pronoun. Consider (6a), which is a possible answer to the question *What happened?* and compare it with (6b), a possible answer to the question *What happened to your car?*

(6a) Sentence focus (whole propositions)
My CAR broke down
(6b) Predicate focus
It broke DOWN
(6c) Argument focus
My CAR broke down

Where the whole proposition is new, the focal accent falls on *car*, but also where *car* is the argument that is new. Where the question being answered is *What happened to your car?* the focal accent is on *down* and the subject noun phrase is *it* since speakers do not repeat full noun phrases such as *your car* but use pronouns to refer to entities that have just been mentioned.

Corresponding to (6a)–(6c), French has three different structures, as in (7a)–(7c).

(7a) Sentence focus

J'ai	ma	VOITURE	qui
I have	*my*	*car*	*which*
est	en	PANNE	
is	*in*	*breakdown*	

'My car has broken down'

(7b) Predicate focus

(Ma voiture)	elle	est	en	PANNE
(My car)	*it*	*is*	*in*	*breakdown*

'My car/it is broken down'

(7c) Argument focus

C'est	ma	VOITURE	qui
It is	*my*	*car*	*that*
est	en	panne	
is	*in*	*breakdown*	

'It's my car that's broken down'

Reduction in Salience

Speakers and writers can treat information as available to listeners and readers. Such information is said to be given. Since it is treated as recoverable, and contrasts with information that is new and not recoverable, the constituents conveying it are not highlighted but reduced. Major phrasal categories are reduced to pro-elements or zero, as exemplified in (8).

(8a) The students went into the examination hall. They wrote their names on the script books and began to read the questions.
(8b) Bethan went to the exhibition. Catriona couldn't.
(8c) I was ill yesterday. So was my wife.

In (8a), *the students* is replaced by *they* in the second sentence and reduced to zero in the second clause of that sentence, [ ] *began to read the questions*. In (8b), *went to the exhibition* is replaced by *couldn't* [ ]; the negative *n't* adds new information. In (64c), *ill* is replaced by *so*.

Speakers referring to entities that are very salient in a given situation typically do not even use proforms. This phenomenon is known as situational ellipsis; the examples in (9) are from Quirk *et al.* (1985) with the ellipted items in bold inside square brackets.

(9a) [**I**] told you so
(9b) [**do you**] want a drink?
(9c) [**it/the restaurant/the train**] seems full

The ellipsis of constituents carrying given information can extend over various turns in a conversation. (10a) is an excerpt from real conversation with the ellipted constituents in bold. The boy mentioned in M59 is one Richard, who has been under discussion.

(10) **M1** what's he going to do, that boy, anyway?
L1 [**that boy is going to**] play golf
A1 [**that boy is going to**] be a professional golfer
M2 is he [**going to be a professional golfer**]
L2 he would [**be a professional golfer**] if he could [**be a professional golfer**] I think he's applied for a scholarship

In some languages constituents are made less salient by being moved to the right, out of the core of the clause. Vallduví (1994) gives the following examples from Catalan:

(11a)

El	Luc	[s'estima	el	GOS]
The	*Luke*	*loves*	*the*	*DOG*

'Luke loves his dog'

(11b)

El	Lluc	[se	l'ESTIMA],	el	gos
The	*Luke*	*self*	*it-LOVES*	*the*	*dog*

'Luke LOVES his dog'

(11a), with the focal accent on the rightmost constituent *gos*, is neutral. (11b) has the verb *estima* as the focal constituent. The focal accent falls on the rightmost constituent; it can fall on the verb only if the verb is rightmost. This is brought about by *el gos* being

moved rightwards out of the core clause into a position where it is clearly signaled as background, given material. Luke and the dog are given; the relationship between them is presented as new via the verb.

(12), also from Vallduví (1994), shows a real example in context. *Treballs* occurs in A's contribution and is repeated, in the NP *els treballs*, in B's, in which it is moved to the right, out of the core clause, in order to allow *macro* to be the rightmost constituent and to carry the focal accent. In English, B might have said *I thought it was the mainframe you did the papers on*.

(12a)	tinc	un	ordinador	que	va	molt
	I-have	*a*	*computer*	*that*	*works*	*really*
	bé	té,	mira	aquest	treball	
	well	*here*	*look-at*	*this*	*paper*	

(12b)	em	pensava	que	els
	I	*thought*	*that*	*them*
	feies	al macro,	els treballs	
	you-did on-the	*mainframe*	*the papers*	

Note that in B's contribution the mainframe and the papers are treated as given; they are referred to by means of definite noun phrases. What is treated as new is not *al macro*, 'on-the mainframe,' but the production of the papers on the mainframe; as Lambrecht noted, a value is assigned to *x* in the proposition *prepare papers on x*.

Introducing New Entities

Completely new entities can be introduced by the classic existential construction in (13a), in which they are highlighted by the use of a special construction and by being in final or near-final position. The possessive *have (got)* construction can be used too, as in (13b). In special circumstances, such as when two people are cooperating in a task, new entities may be introduced and made salient by the use of an interrogative possessive construction, as in (13c).

(13a) There's a Phillips screwdriver in the left-hand drawer
(13b) We have an old Volvo. It keeps going but it drinks petrol
(13c) Have you got a smithy on your map?

(13c) comes from dialogs produced by pairs of subjects carrying out a task in which one person explains to another person how to draw a route on a map. Neither person can see the map being used by the other. Entities are regularly introduced (i.e. treated as new) by means of constructions with *see*: *Can you see allotments? Can you see a windmill?* One participant injects a note of certainty by using the formula *you'll see a diamond mine on your map*, *you'll see a graveyard*. French has a similar construction, as in (14).

(14)	J'ai	mon	enfant	qui	est	malade
	I-have	*my*	*child*	*who*	*is*	*ill*

'My child is ill'

Speakers have various constructions for highlighting new propositions, which may also signal a new topic of conversation. The examples in (15) are more typical of writing but are a good starting point.

(15a) X has one interesting/obvious/relevant/important property, namely . . .
(15b) Another property of X that must be taken into account is . . .
(15c) We turn now to a less/more attractive property of X
(15d) It is worthwhile remarking at this point that . . .
(15e) Consider for a moment the fact that . . .

Other constructions are more typical of spontaneous speech. Very common is *the thing is* as in (16). (Note the use of *What about X?* to signal a change of topic, a change of what is centered).

(16a) What about Edinburgh? Do the people go up there?
(16b) oh yeah a lot
(16c) oh yes especially at night. They go to the pictures. **But the thing** is if you go to the pictures if you go to the late show you've to run for buses

The thing is is regularly reduced to *thing is*; the loss of *the* indicates that the phrase may come to be a single item no longer perceived as two words. (17) shows a common variation on *the thing is*.

(17) **the only thing with Beth** Beth'll not spend money. She's mean. She's really mean. She wouldn't give you two halfs for a one

Speakers also use free relative clauses, such as *what surprises you* in (18). *What* points forward to an upcoming explanation.

(18) **I tell you what surprises you em**//as I say . . . it's marvelous how many people stayed in such a really small area

The previous constructions are ways of highlighting new information. Speakers regularly have to highlight information (people, things, and propositions) that are given, in the sense that they have been mentioned but not recently, or are obvious in the immediate context. *You see* and *you know* are frequently used for this purpose, as in (19).

(19a) **you see Mr Y** he's got rid of whatsername the old secretary
(19b) **you see** the houses on the other side of the square?
(19c) **you know** where it says 'secret valley'?

In some varieties of English in the United Kingdom (e.g., Scottish English), *see* alone is used. Whether with *you see* or *see*, the intonation marks the construction as a question, as does the fact that listeners often respond with *yes* or *no*. Other constructions are *as for X* and *as far as X is concerned*: *As for the other candidates, they're simply not up to the job*, *As far as funding is concerned, you just leave that to the fund-raising team*.

English has two constructions that highlight old information. They are illustrated in (20) and (21).

(20) Left dislocation
(20a) what are the people like to work with the drivers
(20b) **the driver** he's really friendly and **the guy that's** full time he gives you a lot of laughs

(21) Right dislocation
(21a) they're still here, **the people from next door**
(21b) it's a dangerous pastime, **reviewing**

Ward *et al*. (2002: 1410–1411) describe left dislocation as a construction that simplifies the speaker's task of producing complex information and the listener's task of interpreting it. A point to be emphasized is that left dislocation is not a construction essentially associated with breakdown of syntax or difficulties in syntax planning. (20), from real conversation, shows no hesitations or stumbling. It allows the speaker to introduce an entity, possibly requiring a complex description, in one chunk of syntax (e.g., *the driver*) and then to provide information about that entity in another chunk (e.g., *he's really friendly*). Left dislocation is 'designed' for the production of language in real time. Of course, because the noun phrase *the driver* comes first in (20) and is outside the clause *he's really friendly*, it is highlighted. (An important fact is that left dislocation is not just typical of spoken English but is typical in the spoken Russian examined by Zemskaja (1973), the spoken French explored in Blanche-Benveniste (1991), and many other languages. It is not just an idiosyncrasy of speakers of English but seems to be a 'design feature' of spoken language in general.)

Ward *et al*. describe right dislocation as clarifying the reference of a pronoun. The right-dislocated phrases in (21), *the people from next door* and *reviewing*, are unlikely to carry the focal accent; however, where a pronoun is used to introduce a completely new entity the phrase can carry the focal accent, as in *parked right outside our door it was, a huge TRUCK*.

Cleft Constructions

English has two major constructions that serve to highlight words and phrases and the information they carry. The constructions, known as clefts, are exemplified in (22).

(22a) It's **that side** you should be on (IT cleft)
(22b) What you want to do is **curve round that wood** (WH cleft)

IT clefts can be contrastive or noncontrastive (see the previous discussion of Chafe and Lambrecht). An overtly contrastive example is in (23). The focal accent falls on the item that is being contrasted, *syntax*.

(23) we're after everything I mean not the phonetics because that's fairly well known anyway it's **the** SYNTAX we're after

(24) is a noncontrastive IT cleft.

(24) I'm supposed to have it [costume for a play] toady and I forgot all about it so I'm not very popular I don't know I think it's one of **the** TEACHERS is taking photographs but I hate having my picture taken

In spoken English speakers regularly produce a construction that has the same function as the IT clefts in (23) and (24) but is not a complete IT cleft.

(25a) when do they start again?
(25b) it's the middle of the month

The complete cleft would be *It's the middle of the month they start again* but the clause *they start again* is ellipted, for the same reason as words and phrases are ellipted in (8) and (10): in speech old information is left out, or rather the words and phrases carrying old information are left out.

The WH cleft in (22b) consists of *what you want to do* and the phrase *curve round that wood*. Two bits of syntax are connected by *is*. In spontaneous spoken English WH clefts typically consist of the WH part followed directly by a complete clause: *what you want to do-you curve round that wood*. The WH word points forward in the discourse and WH clefts can be used either to introduce a narrative or talk, as in (26), or to draw a line under a discussion and point forward to the next stage in the dialogue, as in (27).

(26a) what happened was when the school was opened the priests of the other church were chosen to be chaplains [speaker continues the tale]

(27a1) I've got a gold mine, a totem pole and then a great rock, a really good bit down
(27b1) right
(27a2) and then bandit territory right at the bottom
(27b2) right what you're trying to do is avoid the totem pole

Most of the previous examples are from English, but the Catalan examples in (11) and (12) demonstrate that the signaling of focus and the handling of old information are done differently depending on the syntactic and phonological patterns of particular languages. The functions of word order also vary from language to language, quite apart from the fact that the basic neutral word order also varies. In the examples of right dislocation in (21), the rightmost phrase typically does not carry a focal accent. In Italian, however, with more flexible word order, the rightmost phrase is typically focal. *Io pago* 'I am-paying' is a neutral reply to *What are you doing?*. *Pago io* is equivalent to *It's me that's paying (and not anyone else)*. Consider (28), in which the final word *Gino* is in contrastive focus.

(28) Non trovi anche tu che
Not find also you that
Mario è bello?
Mario is handsome
'Don't you too think that Mario is handsome?'

Non lo trovo tanto bello-
Not him I-find so handsome
è più bello Gino
is more handsome Gino
'I don't find him so handsome. Gino's more handsome'

Clefts, Word Order, and Particles

Cleft constructions are available and readily used by speakers of certain languages on the western seaboard of Europe. The availability and use of clefts declines across Europe from west to east, and the spoken language data on which this article is based indicate that nonneutral word orders are often (perhaps even typically) accompanied by particles. Speakers of English, French, and Swedish, for example, use clefts regularly. In theory, German has cleft constructions, but in the route-drawing task mentioned in connection with (13c) German participants rarely used clefts. (On the other hand, clefts do occur in German conversation.) The availability and use of clefts declines across Europe from west to east but there is an increase in the use of nonneutral word orders, often (perhaps even typically) accompanied by discourse particles or markers. (See Fraser, 1998.) (29) is a German example with the particle *eigentlich* where English-speaking participants could use a WH cleft. (For a fuller discussion, see Miller and Weinert, 1998: 297–300.)

(29) und jetzt muß du eigentlich
and now must you really
parallel zu der Linie wieder
parallel to the line again
zurückgehen
back-go
'what you have to do is go back parallel to the line . . .'

German speakers typically highlight words and phrases by means of particles such as *noch*, *sonst noch*, and *zusätzlich*. The rare WH clefts typically contain one of these particles, as in (30).

(30) was ich noch sagen wollte ich
what I still to-say wanted I
hab dir das Geld da hingelegt
have to-you the money there put
'What I wanted to say is that I've put the money there for you'

Where English uses clefts, other languages have special highlighting positions. In Finnish clauses, any item at the beginning of the clause other than the subject is highlighted. (31a) is neutral, but in (31b) the verb is highlighted and in (31c) the direct object. The appropriate English translation is by means of a discourse particle for (31b) and by an IT cleft for (31c). (32), which is the same construction in Finnish, is in context appropriately translated by a reverse cleft.

(31a) Marja tapasi Jussin Lontoossa
Mary-NOM met Jussi-ACC London-LOC
'Mary met Jussi in London'
(31b) TAPASI Marja Jussin Lontoossa
met Mary-NOM Jussi-ACC London-LOC
'Mary did indeed meet Jussi in London'
(31c) MARJA Jussin Lontoossa tapasi
Mary-NOM Jussi-ACC London-LOC met
'It was Mary who met Jussi in London'

(32) siellä sinun pitäisi olla
Where/there you-GEN should be
'That's where you should be'

Conclusion

This article began with the original concept of focus as new information signaled by a focal accent. It discussed focus and centering, focus and transition from one section of text to another, and contrastive

and noncontrastive focus. It also considered how phrases and the information they carry can be reduced in status. The second half of the article dealt with how speakers can make information salient, using different devices depending on the language. English has different constructions, such as the IT cleft and WH cleft, but also discourse particles. Other languages use word order and discourse particles. Whether speakers are introducing new entities, changing topic, emphasizing information, or contrasting one thing with another, they present the information as new and make it salient.

See also: Anaphora Resolution: Centering Theory Approach; Clefting in Spoken Discourse; Discourse Markers; Interjections; Nonverbal Communication; Spoken Discourse: Word Order; Word Order and Linearization.

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Focus Particles

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Focus particles are invariant scope-bearing elements that interact with the focus–background structure of a sentence. They express quantification over the set of alternative values contrasting with the denotation of a focus, in relation to the information given in the background of a sentence. Typical instances of focus particles are English *only*, *also*, and *even*. For example, *only* in *Only* $[Fred]_F$ *snores* expresses that the property of snoring (background) can be attributed to no one other than Fred (focus).

The meaning of focus particles can be described with reference to two major parameters. First, there are two basic types of quantification: While *only* conveys negated existential quantification over the domain of alternative values and is, in that sense, 'exclusive,' *alo* and *even* express existential quantification and are therefore 'additive' or 'inclusive.' Second, some focus particles interact with unstructured sets of alternative values (nonscalar particles, e.g., *too*), whereas others make reference to ordered sets of alternatives (scalar particles, e.g., *even*). For example, *Peter snores, too* merely presupposes that there is someone other than Peter who snores, while *Even Peter snores* additionally suggests that Peter is particularly unlikely to snore.

Focus particles may stand in various structural relationships to the corresponding foci. There are three major types of configurations: (i) the particles

and noncontrastive focus. It also considered how phrases and the information they carry can be reduced in status. The second half of the article dealt with how speakers can make information salient, using different devices depending on the language. English has different constructions, such as the IT cleft and WH cleft, but also discourse particles. Other languages use word order and discourse particles. Whether speakers are introducing new entities, changing topic, emphasizing information, or contrasting one thing with another, they present the information as new and make it salient.

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Focus particles may stand in various structural relationships to the corresponding foci. There are three major types of configurations: (i) the particles

exhibit a considerable degree of positional variability but must c-command the focus (e.g., English *only*); (ii) the particles are adjacent to the focus (e.g., Turkish *de* 'too'); or (iii) the particles occupy a fixed position in the clause (e.g., the preverbal position in Mandarin Chinese). A tendency has been observed for exclusive particles to precede the focus, whereas inclusive particles often follow it (König, 1991).

Some focus particles exhibit specific compatibility requirements on their environment, for example, insofar as they interact only with foci of specific syntactic categories (e.g., Standard German *selbst* 'even' co-occurs only with clausal and nominal foci). Moreover, additive focus particles are sometimes sensitive to the polarity of a sentence (e.g., English *too* vs. *either*; Spanish *tambien* 'too' vs. *tampoco* 'either').

The historical sources of focus particles cover a wide range of expressions. Exclusive particles typically develop from elements meaning 'one' or 'alone' (e.g., English *only* < ME *oon-li* 'one-ADV'; French *seule-ment* 'alone-ADV') or 'not more/in addition/except' (e.g., Modern Breton *hepken* < *hep ken* 'without more'; Danish *kun* < *ikke uden* 'not except'). Adjectival sources with a 'privative' meaning are also widespread (e.g., Swedish *bara* < *ber-* 'bare'; German *bloß* 'bare'), whereas verbal source lexemes are relatively rare (e.g., German *nur* < MHG *ne wære* 'not was.CONJ'). Additive focus particles are often diachronically related to meanings such as 'and (so)' (e.g., Danish *og-så* 'and-so') or to expressions indicating 'increase' (e.g., English *too* < OE *tō* 'in addition'). Among the most typical source lexemes giving rise to scalar additive focus particles are 'until' (e.g., Spanish *hasta*; Hausa *har*), intensifiers (e.g., French *même*; Finnish *itse*), and meta-linguistic expressions such as 'really,' 'truly' or 'clearly' (e.g., Romanian *chiar* < *clarus/a* 'clear').

See also: Adverbs; Focus; Intensifiers; Quantifiers: Semantics; Scope and Binding: Semantic Aspects.

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Jerry Alan Fodor (born in 1935) is the State of New Jersey Professor of Philosophy at Rutgers University. He earned his Ph.D. in Philosophy from Princeton University in 1960. He previously held professorships at the departments of philosophy and psychology at MIT and at the CUNY Graduate Center.

Fodor's work focuses on the philosophical problems about psychology, philosophy of mind, philosophy of language, theories of cognitive architecture (modularity, interactionism, etc.), psycholinguistics (especially parsing), and child's theory of mind. His experimental work especially emphasizes the last two topics.

Fodor has busied himself with the problem of how mental representation can be accounted for within a physicalist framework. His theory is sometimes labeled as 'Computational Representation Theory of Mind.' He is known for his thesis of 'radical concept nativism,' which posits that virtually all lexical concepts are innate. In one of his representative works, *The mind doesn't work that way: the scope and limits of computational psychology* (Fodor, 2000), he examines the relationships among the computational and modular theories of mind, nativism, and evolutionary psychology.

Fodor takes the view that "computational theory of mind (CTM)" supported by Steven Pinker (1997) does not suffice to explain the nature of human thought, even though the theory turns out to be the best theory of cognition at hand. CTM maintains that the mind is a system of organs of computation and that the mental processes of human beliefs and desires are mechanical computations and function like syntactic operations of algorithmic structures. According to Fodor, however, problems crop up when it comes to cases where the mental process must be dependent on factors outside the syntactic domain of the mental representation in question. As the main alternative to the CTM, connectionism is also critically evaluated by Fodor; according to him, it fails to explain abductive reasoning. In Chapter 5 of *The mind doesn't work that way*, Fodor also argues that evolutionary psychologists, such as Steven Pinker, are misguided in their thinking that human minds are adaptations or products of natural selection, since it is likely that human minds evolved quickly as saltations rather than gradually as the product of mutations of small and incremental effect. Fodor believes that gradualism is a requirement of natural selection, while

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saltationism is opposed to small, incremental variations of fitness.

Jerry Fodor is also known as one of the leading adherents of naturalized semantics, or informational semantics. This has to do with interpreting the connection between meanings and representations. A meaning of a sentence is represented in some sort of internal code or 'language of thought.' Semantically equivalent expressions must denote the same entities, so concepts that carry identical information should be interpreted as coextensive, otherwise the theory of content cannot be purely informational. According to informational semantics, "a predicate's content consists of the information it carries, which in turn consists of the property whose instantiation would, under standard conditions, lawfully covary with the occurrence of the predicate" (Wakefield, 2003: 525).

See also: Philosophy of Mind; Psycholinguistic Research Methods; Psycholinguistics: History; Psycholinguistics: Overview.

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Folk Etymology

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'Folk etymology' or 'popular etymology' is the name given to a process of reanalysis. Speakers of a language, expecting their words to be partly motivated, find in them elements which they perceive as motivating the word, even where these elements have no historical presence. It is called 'folk' or 'popular' because it pays no attention to the knowledge of the erudite. It is called 'etymology' because it appears to invent a new origin for a word, an origin which is contrary to fact. A better label would be 'morphological reanalysis.'

A set of words particularly susceptible to folk etymology is loan words. Very often these obtain forms in the borrowing language which show something of the way they have been perceived, but owe little to the structure of the language from which the word is borrowed, except some superficial phonetic resemblance. Examples include English *woodchuck* from Ojibwa *otchig*, with nothing to do with either wood or throwing; Danish dialect *kamelte* (literally 'camel tea') from *kamillete* ('chamomile tea'); German (Standard German) *Hängematte* (literally 'hanging mat') originally from Taino *hamaca* 'hammock.'

The source word need not, however, be a foreign word; it can be native. Consider English *titmouse*, a kind of bird, from an earlier *titmāse*, with no link to mice, or German (Standard German) *Maulwurf* 'mole' (literally 'mouth throw') from an earlier *moltwerf* 'earth thrower' (compare English dialect *mouldywarp*). The same word turns up in one attested (but not established) instance in Danish as *muldhvalp* (literally 'earth puppy'). Note also that folk etymology frequently leaves part of the original

saltationism is opposed to small, incremental variations of fitness.

Jerry Fodor is also known as one of the leading adherents of naturalized semantics, or informational semantics. This has to do with interpreting the connection between meanings and representations. A meaning of a sentence is represented in some sort of internal code or 'language of thought.' Semantically equivalent expressions must denote the same entities, so concepts that carry identical information should be interpreted as coextensive, otherwise the theory of content cannot be purely informational. According to informational semantics, "a predicate's content consists of the information it carries, which in turn consists of the property whose instantiation would, under standard conditions, lawfully covary with the occurrence of the predicate" (Wakefield, 2003: 525).

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Folk Etymology

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'Folk etymology' or 'popular etymology' is the name given to a process of reanalysis. Speakers of a language, expecting their words to be partly motivated, find in them elements which they perceive as motivating the word, even where these elements have no historical presence. It is called 'folk' or 'popular' because it pays no attention to the knowledge of the erudite. It is called 'etymology' because it appears to invent a new origin for a word, an origin which is contrary to fact. A better label would be 'morphological reanalysis.'

A set of words particularly susceptible to folk etymology is loan words. Very often these obtain forms in the borrowing language which show something of the way they have been perceived, but owe little to the structure of the language from which the word is borrowed, except some superficial phonetic resemblance. Examples include English *woodchuck* from Ojibwa *otchig*, with nothing to do with either wood or throwing; Danish dialect *kamelte* (literally 'camel tea') from *kamillete* ('chamomile tea'); German (Standard German) *Hängematte* (literally 'hanging mat') originally from Taino *hamaca* 'hammock.'

The source word need not, however, be a foreign word; it can be native. Consider English *titmouse*, a kind of bird, from an earlier *titmāse*, with no link to mice, or German (Standard German) *Maulwurf* 'mole' (literally 'mouth throw') from an earlier *moltwerf* 'earth thrower' (compare English dialect *mouldywarp*). The same word turns up in one attested (but not established) instance in Danish as *muldhvalp* (literally 'earth puppy'). Note also that folk etymology frequently leaves part of the original

word unanalyzed: *belfry*, from an earlier *berfry*, analyzes the first element as related to *bell*, but leaves the *-fry* element meaningless.

The line between an instance of folk etymology and a malapropism is sometimes a thin one, but in principle a malapropism confuses two similar-sounding words (e.g., in an example from Sheridan's character Mrs. Malaprop, *contiguous* and *contagious*) while folk etymology is an error based on the supposed meaning of elements within the word (even if those elements are clearly absurd, like the *mouse* in *titmouse*) which spreads beyond the individual to a whole community. Both are often occasioned by the attempt to use exotic or difficult vocabulary whose form is not entirely accurately perceived.

See also: Etymology.

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Folk Linguistics

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In the world outside linguistics, people who are not professional students of language nevertheless talk about it. Such overt knowledge of and comment about language by nonlinguists is the subject matter of folk linguistics. Although study of folk linguistics is older, interest was reawakened at the 1964 University of California, Los Angeles, Sociolinguistics Conference:

> We should be interested not only in (*a*) what goes on (language), but also in (*b*) how people react to what goes on (they are persuaded, they are put off, etc.) and in (*c*) what people say goes on (talk concerning language). It will not do to dismiss these secondary and tertiary modes of conduct merely as sources of error. (Hoenigswald, 1966: 20)

Hoenigswald's plan for the study of folk linguistics (*c* above) included collections of folk expressions for speech acts and even of folk terminology for and definitions of such grammatical categories as 'word' and 'sentence.' He proposed uncovering folk accounts of homonymy and synonymy, regionalism and language variety, and social structure (e.g., age and sex). He suggested that particular attention be paid to folk accounts of the correcting of linguistic behavior, especially in the context of first language acquisition and in relation to ideas of correctness and acceptability. He recommended asking what sorts of language and speech styles are admired and what sorts have special status as taboo. He urged researchers to seek folk linguistic accounts of both language history and deficit (e.g., stuttering and muteness).

Here 'folk' refers to those who are not trained professionals in the area under investigation. It does not refer to rustic, ignorant, uneducated, backward, so-called primitive, minority, isolated, marginalized, or lower-status groups or individuals. Included in the research on folk linguistic belief in the United States speech community most often cited in this entry, for example, are respondents who know the names of Noam Chomsky, Dell Hymes, and William Labov. To do otherwise would be to assume that folklore and cultural anthropology are not doable in some societies. Another important importation from modern folklore into folk linguistic research is the notion that folk belief is simply belief, its folk character being no indication of its truth or falsity.

Hoenigswald's suggestions have been taken up recently, and the discrediting of folk belief has been rejected, but even those who would agree that folk belief is worthy of investigation have raised objections – one that suggests that folk linguistics is impoverished, particularly in the English-speaking world, and another that suggests it is largely inaccessible.

The impoverishment issue was raised by William Labov, immediately following Hoenigswald's 1964 presentation:

> The overt responses in American and English society generally are quite poor as far as vocabulary is concerned. 'Poverty-stricken' would be the best term for this vocabulary. The inadequacy of people's overt remarks about their own language is directly reflected in the fact that there are only a few words that they use to convey the subjective response that they feel . . . . But some of the references made here today show that there are highly institutionalized folk attitudes toward language which are much richer than those which we

> are accustomed to meeting in the U.S. and England. (discussion by Labov in Hoenigswald, 1966: 23)

If one could show a strong pattern of "subjective response" that the folk were interested in talking about but were incapable of talking about due to vocabulary deficiency, then one might say that a language (or variety) was inadequate, but Labov himself singles out linguistic features for which the folk have such labels and makes the point that they are linguistic stereotypes, items that are the subject matter of overt comment (e.g., Labov, 1972: 248). When the folk are vague, confused, or simply wrong about linguistic phenomena, it is often in their responses to linguists, which may prove only that linguists either ask about objects of no interest to the folk or fail to account for the adequacy of the folk notion.

One appropriate treatment of folk responses tries to set them in a dynamic context of use, not in a static one of folk knowledge. This allows one to find a detailed folk linguistics, one operating at many levels of linguistic structure and in many areas of concern. Joel Sherzer reflects this attitude in his comment on folk names for ways of speaking:

> Terms for talk ... are communicative resources which vary from person to person and from context to context and are used strategically in the course of speaking. In addition, there are significant features of ... language and speech that are not labeled, and there are labels that are ambiguous without reference to contextualization in concrete instances of usage. (Sherzer, 1983: 16)

The second impediment to folk linguistic research is the inaccessibility to folk consciousness of linguistically interesting matters. Michael Silverstein (1981) attempts to describe the sorts of language features that are available to folk awareness and suggests five conditions: (a) unavoidable referentiality, (b) continuous segmentability, (c) relative presuppositionality, (d) decontextualized deducibility, and (e) metapragmatic transparency.

Silverstein illustrates 'unavoidable referentiality' with the deference-to-hearer versus solidarity-with-hearer pragmatic system, realized as a second or third person plural (deferential) versus a second person singular (solidary) – e.g., German (German, Standard) *Sie* versus *du*; French *vous* versus *tu*. The opposition is unavoidably referential, for the pronoun forms that carry the pragmatic system are the same ones that refer to individuals (Silverstein, 1981: 5). In contrast, although a speaker's selection of a certain phonetic variant in a given performance might symbolize greater deference to a hearer (as a result of the greater formality associated with that variant), such variants are not themselves referential; therefore, although formality versus informality is a pragmatic opposition, its realization in the use of a particular phonetic variant is not unavoidably referential and less open to folk awareness.

The second of Silverstein's requirements is 'continuous segmentability.' Some linguistic units are not interrupted by other material. In *I am going to town*, the entire sentence, each word, phrases such as *to town*, and even morphemes such as *-ing* are all continuously segmentable. The form that refers to the progressive aspect, however, is *am -ing* and displays discontinuity, making it less open to awareness (Silverstein, 1981: 6). However, in a lengthy discussion of the passive, an equally discontinuous phenomenon, several U.S. English-speaking respondents provided evidence for considerable awareness of the-construction (Niedzielski and Preston, 2003). Subject–verb agreement, multiple negation, and so-called split infinitives, all discontinuous or potentially so, are also frequently discussed phenomena in English, suggesting that some other factors may overcome Silverstein's purely linguistic categorizations.

'Relative presuppositionality' is Silverstein's term for the degree to which a pragmatic function depends on contextual factors to realize its meaning. At one end of this scale are such items as *this* and *that*, which successfully function only if there is a physical reality to which they can be linked, a relative physical (or mental) distance that supports the choice between them, or a prior mention of some entity (Silverstein, 1981: 7). Such presuppositionally dependent items do very little creative work and, according to Silverstein, are readily available to the folk as linguistic objects. At the other end of the scale are items that are context creating. For example, Duranti (1984) notes that third person subject pronoun occurrence in Italian (a pro-drop language) signals a "main character" and usually one toward whom the speaker displays "positive affect." This function of such pronoun appearance in Italian is hidden to folk speakers.

Silverstein's 'decontextualized deducibility' says more about how linguistic facts are accounted for by the folk than about their general availability. Silverstein claims that one common path taken by folk commenters on linguistic objects is that of specifying the 'deducible entailed presuppositions,' a characterization that, he says, is the equivalent of stating the meaning. In other words, providing the contexts in which the form in question fits or is true is a common folk activity (Silverstein, 1981: 13–14).

The fit between increasingly specified contexts and a word's appropriate use is explicitly remarked on by D, a folk respondent, in the following:

((In a discussion of Christmas customs, H (the fieldworker) has asked if there is any difference between *gift* and *present*. D has said earlier that there is not, but he returns to the question.)) [In this and following quotations of respondent discourse, the transcription conventions follow those devised by Gail Jefferson (Niedzielski and Preston, 2000).]

D: Oftentimes a gift is something like you you go to a Tupperware party and they're going to give you a gift, it's- I think it's more=

[
H: Uh huh.
D: =impersonal, - than a present.
[
G: No, there's no difference.
[
D: No? There's real – yeah there's really no difference. That's true. Maybe the way we use it is though.
[
G: There is no difference.
U: Maybe we could look it up and see what 'gift' means.
[
D: I mean technically there's no difference.
((They look up *gift* and *present* in the dictionary.))

D's distinction between 'technical' meaning and 'use' points in the direction of 'decontextualized deducibility'; that is, although D feels the words mean the same at a level open to expert knowledge, the fit of the words into different contexts reveals distinctions. After some time, he comes up with an appropriate frame:

D: In advertising sometimes they'll say: you know, 'We have a gift for you.' Or- or something.
H: Yes, yes. But they don't use 'present.'
D: Um : – I don't think as much.

D goes on to say that his bank offers a *gift* if one opens an account and that *present* would be unlikely in that context. This finely tuned characterization of meaning is determined through the folk activity of matching the item to those contexts that meet the required characteristics.

Finally, Silverstein's 'metapragmatic transparency.' When the folk characterize what went on, they are more likely to mimic what was actually said if the performance is 'metapragmatically transparent.' Suppose that Wanda is cold and that Karla is near the thermostat. Wanda has a number of options:

Brrrrrrrrr!
I'm freezing.
Aren't you cold?
I wonder if the furnace is broken?
Would you mind if we had a little more heat in here?
Turn up the heat.

'Turn up the heat' obviously has the greatest metapragmatic transparency, and folk accounts of the interaction between Wanda and Karla are more likely to result in an observation that *Wanda asked Karla to turn up the heat* than in an embedding of any of the other request forms. *Wanda said "Aren't you cold," and by that meant for Karla to turn up the heat* would be a strange report (except for a linguist or a philosopher).

Silverstein's account of the potential for folk awareness of linguistic structure does not, however, address the types of awareness evidenced in actual reports (or failures to report). In an effort to so classify actual occurrences, Preston (1996a) proposed the following modes of awareness:

(a) *Availability*: As already suggested, not all facets of language (whether of performance, ability, or reaction) have equal availability to the folk. They may be ranked as follows:
   (i) *Unavailable*; the folk not only do not but will not comment on such topics (e.g., specific phonological features of some so-called accents).
   (ii) *Available*; the folk will discuss some matters carefully described by a fieldworker (e.g., deviant sentences), but they do not normally do so.
   (iii) *Suggestible*; although seldom initiated in ordinary conversation, the folk will comment on topics if they arise, and they do not require elaborate description from a fieldworker.
   (iv) *Common*; topics of usual folk linguistic discussion.

(b) *Accuracy*: Although it has no bearing on the value of the data, folk descriptions of every aspect of language may be inaccurate or accurate.

(c) *Detail*: A linguistic object may be characterized with great specificity or none.
   (i) *Global*; in a) i) above, for example, the phonological detail of an accent might be unavailable, but that does not limit comment on the accent.
   (ii) *Specific*; in some cases, linguistic characterization is detailed (e.g., accounts of speakers who are said to drop their g's in *-ing* forms).

(d) *Control*: In both account and performance, folk linguists may or may not control the variety

> (or any aspect of it) under consideration. This cuts across the first three considerations in unexpected ways. A speaker who reports on only the global aspects of an accent might nevertheless give a detailed imitation of it (which might be in part accurate, in part inaccurate, e.g., white imitations of African-American English and African-American imitations of white English, Preston, 1992) (41–42).

A further word about 'available' is in order, for some may wonder how the folk can have a folk linguistics about matters they are led into. Folk belief is, in fact, not only a static set of wisdoms trotted out at opportune or culturally caricaturistic moments; it is also the dynamic process that allows nonspecialists to provide an account of the environment, some parts of which have been so frequently focused on in traditional reasoning that the results have come down neatly prepackaged. These should not be ignored, but respondents should also be presented with problems and areas that expose the processes of their thinking about language, even taking them down paths they have not trod. This is a productive way to discover folk concepts, for it is more like the real world of problem solving. Toelken states this notion clearly for folk studies in general:

> We might characterize or describe the materials of folklore as "tradition-based communication units exchanged in dynamic variation through space and time." *Tradition* is here understood to mean not some static immutable force from the past, but those pre-existing culture-specific materials and options that bear upon the performer more heavily than do his or her own personal tastes and talents. We recognize in the use of *tradition* that such matters as content and style have been for the most part passed on but not invented by the performer. *Dynamic* recognizes, on the other hand, that in the processing of these contents and styles in performance, the artist's own unique talents of inventiveness *within* the tradition are highly valued and are expected to operate strongly . . .. Folklore is made up of informal expressions passed around long enough to have become recurrent in form and content, but changeable in performance. (Toelken, 1979: 32)

The accuracy of folk linguistic report, however, may be a more interesting consideration than it is in the study of many other forms of folk behavior, for the path from linguistic facts to comments about them is a rocky one, impeded by the nature of communication itself as well as by social factors that accompany every linguistic act.

First, it seems clear that the structural elements of the language are subservient to communicative function so far as the folk are concerned. Even discourse analysts, who are very sensitive to minor variation, make numerous transcription mistakes, for it is difficult to turn off one's attention to communication and listen only to the form of a message. If one reports that a speaker uttered *he decided that he would go* when what he or she actually said was *he decided to go*, there is nothing lost to communication, and such 'mishearings' are very common.

Second, even if communicative function has not hidden the linguistic form, the interference of social factors may. There is no more telling example of the massive influence of stereotype than that reported in an experiment conducted by Frederic Williams and his associates (1971). The voice of a standard-English-speaking Anglo child was played while the side view (to prevent lipreading) of an Anglo, an African-American, or a Mexican-American child was shown. The respondents (teacher education majors) rated the standard speech as significantly less standard when it was accompanied by the visual image of a minority child. In fact, when the minority children's images were shown with accompanying nonstandard performances, there was no significant decrease in the teachers' ratings of their standardness.

In short, the communicative function of language is so strong that it overcomes the ability to give an accurate report of performance, whether of self or of others and whether of general or restricted phenomena. In addition, the inaccuracy of self and other report when stereotypes are engaged is also very powerful.

It is possible, however, to go further in characterizing why the folk perceive what they do. Nonlinguists, at least as seen in work done in the United States, use **pre**scription (at nearly every linguistic level) in **de**scription; linguists, on the other hand, find the sources for prescription outside language itself – in power, esteem, tradition, and the like. To be sure, the folk associate language facts and social groups, but they reject the cause and effect relationship: good language is not standard because it is used by stereotypically good people. Standard language for the folk is good because it is logical, clear, continuous (in an etymological sense), and so on. For the folk this notion of the standard extends itself even to the boundaries of what a language is. What is not a part of that logical, continuous entity is not really language at all, and appeals to dictionaries and grammars are, therefore, not appeals to trusted authorities on usage; they are appeals to pundits and sages who have some insight into an abstraction that is the only authentic language for the folk. If these guardians of the public linguistic trust fail in their responsibility to provide an accurate account of the abstraction, they may be open

to public outcry. The vehemence with which some receive news of language specialists' abrogation of their responsibility to describe the abstraction is best exemplified in the flurry of emotion that accompanied the publication of the partly usage-based *Webster's third new international dictionary, unabridged*. There is a good account and analysis of these reactions in Finegan (1980: 116–129). The majority of contributions to Greenbaum (1985) discuss such matters, and the 'Introduction' to Ferguson and Heath (1981) reviews several "American myths about language."

Recall that D (cited above) contrasts "the way we use it" with "technically" in determining the difference between *gift* and *present*. Many linguists will find this naive, for "the way we use it" is the determiner of the sense. D, like other folk linguists, however, believes that there is some sort of abstract reality to the language itself, in which, apparently, these two words mean the same thing.

In addition, what many have to say about the facts of language will appear to professional linguists to be filtered through reactive, attitudinal factors. Folk observations, however, may often reflect only the difference between a belief in a technical abstraction (the language itself) and what is actually done, but this philosophical (or Platonic) prescriptivism is not the outpouring of an overactive linguistic insecurity. An area in the upper Midwest of the United States, where a great deal of folk linguistic research has been done, has no such self-image, yet this belief in the abstraction is very common.

Figure 1 contrasts a folk versus a linguistic taxonomy. Linguists agree that there is considerable variation among individuals and types of individuals, but THE LANGUAGE in the linguistic taxonomy is a convenient fiction for certain sorts of research.

> Of course, it is understood that speech communities in the Bloomfieldian sense – that is, collections of individuals with the same speech behavior – do not exist in the real world. Each individual has acquired a language in the course of complex social interactions with people who vary in the ways in which they speak and interpret what they hear and in the internal representations that underlie their use of language . . . . We abstract from these facts . . . , considering only the case of a person presented with uniform experience in an ideal Bloomfieldian speech community with no dialect diversity and no variation among speakers. (Chomsky, 1986: 16–17)

At the level of THE LANGUAGE in the 'Linguistic' Theory, therefore, dialectal, stylistic, and even individual diversity is edited out, so this abstraction does not represent a cognitive, internal reality of an individual speaker but has been treated as one for research purposes.

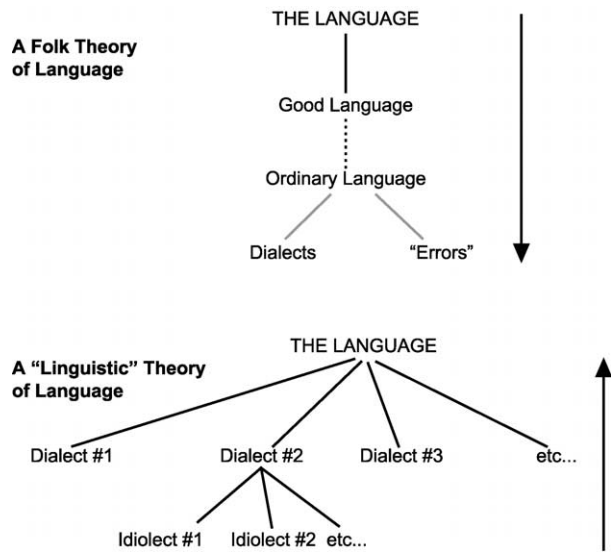

Figure 1 Folk and linguistic taxonomies (partial) of competence and performance.

Figure 1 shows the radical difference between the folk and linguistic taxonomies. Linguists have created an agreed-on but fictitious abstraction (THE LANGUAGE) by pretending that there is a group of error-free, monodialectal, monostylistic speakers. The upward-pointing arrow shows that linguists know that the real basis of language, however, is embedded in the brains of individual speakers. The folk, in contrast, appear to believe in their abstraction (also called THE LANGUAGE), but the downward-pointing arrow shows that, since they take it to be real, they also believe that individual language competencies somehow derive from it.

Linguists know, however, that varieties (in fact, idiolects themselves) are the only authentic cognitive examples of THE LANGUAGE, and a linguist is just as happy to write the mid-level rules of Swiss German or Schwabian as he or she is to write the rules of so-called Standard German, or Hochdeutsch. Any of these specific varieties is equally part of the basis for the abstraction "German"; for the folk, however, such varieties deviate from the single abstraction, an idealized but nevertheless real element for them.

Teachers of introductory linguistics will recognize another outcome of this folk belief: it is only the abstraction that is rule governed; the deviations are not. The linguist's rules of African-American English or lower-class New York City English are nonsense for the folk. What rules could there be when the forms under discussion are simply failures to observe the rules of THE LANGUAGE?

The folk interpretation of the nature of language, or theory of language, has been dwelt on at length, for it is a common theme in much of what the folk say about language, and no matter what the search for underlying folk theories turns up, a responsible investigation will seek just such levels, ones of the sort suggested in recent studies of 'cultural models.'

> A cultural model is a cognitive schema that is intersubjectively shared by a social group .... One result of intersubjective sharing is that interpretations made about the world on the basis of the folk model are treated as if they were obvious facts of the world .... A second consequence of the intersubjective nature of folk models is that a great deal of information related to the folk model need not be made explicit. (D'Andrade, 1987: 112–113)

The considerations so far would suggest that the contrast between conscious and unconscious behavior characterizes the distinctness of folk linguistics from the covert structural knowledge of language (competence) and from some, perhaps many, attitudinal responses, but this contrast is perhaps better seen as a continuum than as a sharp break. Figure 2 shows that the largely unconscious sorts of reactions tapped in traditional language attitude studies may be placed in one corner of a triangle of linguistic concerns (the bn corner), and the conscious sorts of expressions of folk linguistics in the b1 corner. In both cases, a connection is made to the underlying beliefs (b′) that stand in the same relation to folk linguistic comment and attitudinal reactions as the cognitive underpinnings of language (a′) do to language production (a).

The two corners (b1 and bn) are extremes of a continuum that reaches from the most conscious, deliberate statements about language all the way to the most automatic, least-controlled attitudinal reactions to it.

The leftmost (b1) corner of this triangle is the territory most characteristic of folk linguistics, but it would be foolish to say that folk linguistics stops precisely at b23 (or b48, or any other point along the continuum) and that everything to the right of it belongs to the social psychology of language, language attitude study, or some other approach.

From this point of view, in folk linguistics, it is important to keep in mind the diversity of the objects of research (i.e., the data from a and a′), the levels of awareness (i.e., the b continuum), and the means of data collection and analysis. For example, one may investigate folk linguistics based on (1) any aspect of a or a′ (from phonetics through pragmatics and interaction, including all cognitive or psycholinguistic aspects of the storage, acquisition, and implementation of all structural levels of language), (2) the most

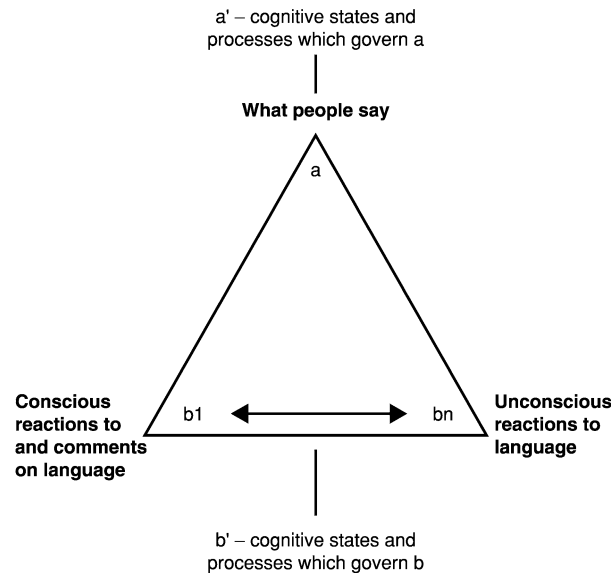

Figure 2 A triangle of concerns in the study of language (Niedzielski and Preston, 2003).

overtly conscious commentary about language (b1) to the most deeply subconscious reaction to a language fact (bn), and (3) methodological perspectives ranging from the carefully controlled experimental presentation of data to freewheeling conversations.

This diversity of data types, levels of awareness, and methodologies suggests that even those data that come from the conscious end of the continuum are open to investigation that may reveal the b′ features lying behind them, and this is a primary reason for the investigation of the discoursal side of folk linguistics. The following illustrations of folk linguistic research begin, therefore, on the far left side of the triangle – data acquired from the respondent when he or she is fully aware that the focus of the investigator is on the topic of language and he or she responds discursively.

In an investigation of Japanese attitudes toward English and Japanese, Imai (in Niedzielski and Preston, 2003) shows how an analysis of discoursal structure helps in understanding speaker beliefs about and attitudes toward language. She triggered the conversation by asking simply, "What do you think about the differences and similarities between Japanese and English?" She analyzed a portion of the conversation between two respondents as an 'argument' (following Preston, 1993, 1994), a discourse genre that consists, essentially, of positions, disputes, and supports.

One important part of Imai's investigation lies in her discovery that a young female respondent, Y, based her comments on a theory of what might be called the social use of language; for example, she did not regard aspects of a language to be viable parts of

it unless they were used in ordinary conversation. Evidence for this folk theory came mostly from the respondent's support moves rather than from any positions she took in the argument. Her interlocutor, for example, asserted that English has more words than Japanese, but Y disputed that position and supported her dispute with the claim that "Americans don't use difficult words." When her interlocutor asked if it weren't the case that books can be linguistically difficult, Y noted that she was concerned only with conversation. Later she also noted that she did not consider phone calls from salespersons to be authentic language either, since scripted calls were also filled with difficult and incomprehensible language, the sort she had not encountered face to face.

Imai suggested that Y's continuing support for the notion that authentic language is based on conversational usage led her to be critical of what she saw as an American insensitivity to demands for flexibility in language use.

> Y: This is not about the words and probably it is because of the national traits, but, well, I don't know how to say this, but sometimes if I said something and they didn't understand, they say they don't understand, right? And if they say 'say it again,' a Japanese would change the words or make it simpler=
> S: ((laughter))
> Y: =We try to make it simpler and explain, don't we? Americans repeat exactly the same thing.
> All: ((laughter))
> Y: They are not very flexible, you know?
> (Niedzielski and Preston, 2003: viii–ix)

Y's theory of good language included sensitivity to the needs of the interlocutor, and she clearly found Americans lacking in this respect. In contrast, the major folk notion attached to language among U.S. respondents reported above nearly always hinged on prescription. Y's comments suggested that the Japanese may base evaluative notions of language more on the area of speaker and hearer rights and responsibilities. If that is so, it may even prove to be the case that the underlying representation of language itself for Japanese speakers is not the idealized, cognitively external code held to be the essence of language by U.S. respondents.

Here is another discoursal candidate for analysis, quoted from a southeastern Michigan middle-aged, middle-class, female European-American respondent.

> M: Yeah, ah see that – that's what upsets me. You can see a really – an educated Black person, I mean I- you know I don't care what color a person is. It doesn't matter to me. – And you can underSTAND them and you can TALK to them and – Look at on the news, all the news broadcasters and everything. They're not talking ((lowered pitch)) 'Hey man, ((imitating African-American speech)) hybyayhubyhuby.' You can't understand what they're saying. And – I just don't think there's any excuse for it. It's laziness and probably – maybe it is you know, because they are low class and they don't know how to bring themselves up or they just don't want to.

This is very clearly a discourse that has language (the unintelligibility of African American Vernacular English (AAVE) and the irresponsibility of those who speak it) as its topic. M's notice of AAVE is motivated by two conditions common in folk linguistics: first, AAVE is different from her own variety (a linguistically internal reason), and second, it is clearly not a prized or correct variety (a linguistically, or structurally, external reason). M also employs a performance to focus the listener's attention on the fact that AAVE is indeed unintelligible by providing a string of nonsense syllables, presumably an imitation of the acoustic affect AAVE has on M, but surely one she expects will ring true to her listener.

Just as the investigation of the Japanese folk theory reported on above used conversational support, another rich territory to mine for folk belief about language may be the presuppositions that lie behind folk comment – the variety of unasserted folk beliefs that members of speech communities share. Linguists and philosophers alike agree that presuppositions form the backbone of mutual understanding among conversational participants.

> Presuppositions are what is taken by the speaker to be the *common ground* of the participants in the conversation, which is treated as their *common knowledge* or *mutual knowledge*. (Stalnaker, 1978: 320, emphasis in the original)

It should go without saying that the deeper the sense of community or shared culture among participants, the more likely that enormous amounts of presupposed (and therefore usually unstated) beliefs will play an important role.

With this understanding in mind, let us return to M, who states very directly why some African-Americans speak a variety that she cannot understand – they are lazy. M may feel this is a little too blunt, for she goes on to excuse this behavior by noting that such speakers are low class and don't know how to escape that situation, although she is also quick to add that it may be that "they just don't want to."

M further notes that "an educated Black person" can be understood and can be talked to (after the disclaimer that she does not care what color a person is), but she says she cannot understand other African-Americans (and she gives a little imitation of how

they talk, which, except for "Hey, man," does not even consist of words).

Her first important folk claim is, therefore, that she cannot understand some varieties of African-American speech, but isn't this because M and speakers of AAVE do not, as suggested earlier, share rule systems? Remember, M claims that she can't understand speakers of AAVE because they are 'lazy.' For her, the proof of this lies in the fact that many of them have not made any effort to learn her variety. She says, "I just don't think there's any excuse for it." What is 'it'? Of course, 'it' can only be the use of a variety that M cannot understand (at least within a social setting in which she believes she has the right to understand) or the failure to have learned her variety. It might appear at first that she simply believes that speakers cannot be excused for using their native-language rule-system when there is another one around preferred by some.

How can M justify her belief that those who do not acquire another rule system are 'lazy'? Isn't such acquisition difficult? In fact, we have already seen one reason many nonlinguists believe that standard English might be almost effortlessly acquired. As Figure 1 suggests, many find the standard variety to be the only embodiment of rule-governed behavior. The idea that nonstandard varieties are also rule governed is a very strange notion to the folk since nonstandard varieties are most often described by the folk as lacking rules. The relative ease with which speakers who have no rules should catch on to a rule-governed system (i.e., a grammar) appears to be obvious to speakers like M.

It would be inaccurate, therefore, to suggest that M's underlying belief was that people with different rule systems ought to acquire hers. In fact, her belief is that people who behave in non-rule-governed ways should make the minimal effort to acquire an orderly way of behaving.

This is, of course, a most serious linguistic misunderstanding. No matter what language system another person in the world shows up with, it is a system. And, equally important, for those who know its rule system, it is just as efficient a device for communication and/or the organization of thought as any other language system, as William Labov has shown so convincingly in 'The logic of nonstandard English' (1969). M's presupposition that nonstandard varieties have no rules, a fact clearly related to the predominant folk theory of language, at least in the United States, is the basis for much of her diatribe against speakers of African-American English.

There is, in addition, an alternative view of minority speakers that may cause even greater disparagement of such speakers than the 'lazy' accusation we have just seen. In this view, they are simply recalcitrant because they already know good English but just refuse to use it:

> J: And I used to teach Black children. And I had a difficult time understanding what they were saying. And I found out later though that they were – it was intentional, because they could speak – like we speak. And they wer- because: I – was having difficulty with this o(h)ne little bo(h) (h)y. He was twe(h)lve. (.hhh) And – I – was supposed to test him, for uh reading problems. And I couldn't understand what he was saying. And so I called uh the teacher next to me was Black. ( ) next to me. (.hhh) So I did go over and get her, and I asked if she would help me. (.hhh) And she came in and she- – just- said to him, she said 'You straighten up and talk – the right way. She's trying to help you.' (laughs)

M would be even angrier if she thought that all those people who were saying "Hey man, hybyayhuby-huby" could speak better but just refused to do so, but this is clearly what J has learned from her experience with a stubborn elementary school pupil (and she has been aided in this interpretation by a Black teacher, whom she regards as authoritative on the matter).

G, another schoolteacher, also voices the opinion that (apparently) all speakers know (somehow) the rules of standard English.

> G: The children themselves – all of us at time may say the improper endings. We may say it. (.hhh) But we recognize it is somebody says to us 'Is it correct,' you say 'No,' you know, 'This is the correct way (to) speak.' (.hhh) But- to sit and TEACH it incorrectly I don't think is right. Cause you DO say 'I have gone,' You do not say 'I have went.'

G seems to believe that nonstandard usage is somehow recognized by its speakers. Of course, to the extent that such speakers have been instructed in the details of the contrast between nonstandard and standard grammar or to the extent that they have constructed a contrastive grammatical analysis of their own on the basis of their exposure to both varieties, G may be in some small part right. But he appears to mean more than that. He appears to believe that there is some sort of innate recognition that nonstandard constructions are not right. Except for slips, then, which he recognizes, "there is no excuse" for the use of nonstandard varieties because we all know better.

Of course, that is not so. We do not know the rules of a variety we do not know. If you are a speaker of some standard variety of U.S. English, for example, try to imagine a situation in which everything you say or write will be judged and graded by how accurately it conforms to the rules of AAVE. After all, you have surely had a lot of exposure to it – from movies,

television programs, books, and even interpersonal communication. Most of us, however, would not fare very well. Among those who would get failing grades are those syndicated columnists in the United States (both Black and white, by the way) who wrote about the 1996–1997 Ebonics controversy, attempting to include examples of the variety. In fact, they performed miserably in AAVE. Most of their sentences would fall into the category 'not valid examples of the variety in question.' Their pathetic attempts were perfect illustrations of the pervasive folk belief that AAVE (or any nonstandard variety) consists merely of breaking the rules of standard English (any of its rules, any way one chooses to break them). (Admittedly, they seemed to use some silly strategy such as "sprinkle uninflected *be* widely throughout the discourse," but that is simply further proof that nonstandard varieties in the minds of the folk are not really rule governed.)

Whatever the viable folk linguistic notions turn out to be, such discourse research is fruitful in folk linguistics because it relies on established analytic procedures, in these cases on an analysis of the argument structure, one which outlined each position, support, and dispute as it arose, and on an analysis of presuppositions embedded in various discourses. These analyses allow situationally and culturally sensitive interpretations of the beliefs behind conversational content to be made. Folk linguistic investigations surely ought to involve further detailed analyses of talk about language, making use of the entire arsenal of discourse and conversation analytic tools now available to us.

Although perhaps most valuable in uncovering the dynamic instantiation of underlying folk belief about language, ethnographic observation and the analysis of folk discourses about language have not been the only methodologies employed. In the area of folk linguistics known as perceptual dialectology, for example, a number of quantitatively oriented collection methods have been employed. Respondents have drawn and labeled maps of regional speech, rated regions for such characteristics as correct and pleasant speech, identified the regional or other social (e.g., ethnic) provenience of speech samples, characterized the degree of difference between one speech region (usually their own) and others, and responded to experimental settings in which individual linguistic units have been manipulated (e.g., acoustically) to determine the degree of salience of specific features in triggering folk linguistic responses. Since the respondents in such research programs are fully aware of the linguistic nature of the tasks set before them (i.e., the identification or evaluation of speech regions or other groupings), this research for the most part seems to occupy the leftmost (b1) side of Figure 2. Further details of the program of research known as perceptual dialectology are provided in a separate entry (*see* **Perceptual Dialectology**), but much of that work illustrates the fact that quantitative as well as qualitative work has gone on in the folk linguistic research area.

Folk linguistic work has also been closely allied with the growing research program of sociophonetics. To take only one example, work in the perception of language increasingly focuses more specifically on the exact linguistic elements that give rise to perception rather than on the global presentation of varieties (or variety or area labels) in eliciting responses. Eliciting folk imitations is one way of approaching this problem (e.g., Evans, 2002; Preston, 1992, 1996a). The presentation of specific elements (by name, by actual sample, or by computer-modified samples) for identification, placement, and evaluation by respondents is perhaps an even better way to grasp greater details of the triggering mechanisms of language regard among the folk as well as the potential influence of such regard on the more general processes of variation and change. The lack of overt awareness by the respondents of the elements being manipulated in such research, however, brings us away from the b1 corner.

For example, when Graff, Labov, and Harris (1986) instrumentally manipulated the onset of the /aw/ diphthong of an African-American speaker from Philadelphia (in which the /a/ portion was synthetically fronted to a position nearer /æ/), they succeeded in showing that this fronting alone (with no other alteration of the speaker's performance) was enough to signal white ethnicity to both African- and European-American local respondents. They suggested that such acoustic modification and presentation was a new tool for sociolinguistic research. If ethnic identification by language cues alone is a folk ability, then such research as this surely qualifies as folk linguistics.

Folk linguistics may also work hand in hand with investigations of much finer details, perhaps even those approaching the bn corner. For example, Niedzielski (1999) studied the local Detroit awareness of 'Canadian raising,' in which the onsets of the /aw/ ('house') and /ay/ ('night') diphthongs are raised before voiceless consonants. She played a Detroit female speaker's pronunciation of the word 'house' in which the onset of /aw/ was considerably raised. Although Detroiters associate this pronunciation with Canadians, they quite regularly perform it themselves. She asked Detroit respondents to match this vowel with one of three others (synthesized tokens), which they had heard several times. The first (#2 in Table 1) is called 'ultra-low' since it represented an

Table 1 Influence of nationality labels on token selection (for 'house')[a]

Token label	*#2*	*#3 Canonical /a/*	*#4 Actual token*	*Total*
CANADIAN	15%	25%	60%	
	n = 6	10	24	40
MICHIGAN	38%	51%	11%	
	n = 15	20	4	39

[a]Chi-square = 23.48; $p < .001$; Source: Niedzielski, 1999.

onset considerably below the norm (for F1) for /a/ in local speech. The second is called 'canonical' /a/ and represented the height of /a/ as given in Peterson and Barney (1952), an acoustic study of so-called General American vowels. The third token to which the sample was to be matched is called 'actual' and was the same token used in the sample itself, one in which the onset was considerably raised. Respondents heard these tokens mixed with others, but the presentation was significantly different for two groups; one received an answer sheet which had the word 'CANADIAN' prominently printed at the top of the page; the second received an answer sheet with the word 'MICHIGAN' at the top. Any difference in token matching by the two groups, therefore, can be attributed to that apparent regional identification.

As Table 1 shows, labeling had a strong effect. Sixty percent of the 40 respondents who had the word 'CANADIAN' printed on their response sheets matched the token presented with the 'actual' one (i.e., accurately), in contrast to only 11% of the 39 who had sheets with 'MICHIGAN' written on them. Fully 51% of the respondents with the 'MICHIGAN' written cue heard the token as 'canonical /a/,' and 38% even heard it as 'ultra-low.' It is obvious that the identification of the home site of the sample voice exerted an enormous effect on the sound that was heard by the respondents.

How do the results of this experiment fit requirements for folk linguistic investigation, presumably ones nearer the b1 corner of Figure 2? First, although Detroit-area respondents are fully aware of Canadian Raising (an a-corner fact), they do not imitate it correctly (they say [hus] instead of [hʌws]). So they have a b1-corner consciousness of an 'a' phenomenon, but an inaccurate one, and folk facts are already at work. Second, they apparently unconsciously (somewhere closer to bn) bring the regional information supplied to them on their answer sheets to bear on an 'a' fact – the similarity of two vowel sounds. Recall that the voice they hear is identified as being from Michigan or from Canada, when it is in fact always the same voice. Finally, and most interestingly, how does the awareness of region b1 cause such inaccuracy in characterizing 'a'? The b′ information is not hard to locate in this case.

A dominating concern among U.S. folk respondents is with prescription, and Michiganders regard themselves as the best speakers in the United States (e.g., Preston, 1996b), residents of the mythic heartland, where no dialect is spoken. The folk imposition on vowel perception is, therefore, easy to understand. If Michiganders are speakers of standard English, then the most standard-like vowel is the one the Michigan speaker pronounced, regardless of acoustic reality. The deeper folk theory (b′) of the standard language and the shallower b′ belief that Michigan speakers lie very close to that standard triggers an automatic classification of likely behavior (bn) when Michigan respondents are asked to carry out a vowel-matching task based on regional identity (b1).

The empowering folk beliefs of b′, the ultimate goal in the quest for an understanding of folk linguistics, not only influence the conscious and unconscious reflections on and reactions to language that are a part of the continuum at the base of the triangle but also interact with the perception of language data itself, the very stuff of 'a.' This suggests that any linguistics without folk linguistics does not explore the breadth and depth of language in communities – the regard in which it is held and even the ways in which it is processed and eventually modified in the progress of language change.

In conclusion, the study of folk beliefs about language may be recommended for at least four reasons:

First, it is simply one of the ethnographies that one might choose to do of a culture. In ethnobotany one wants to learn (at least) a culture's beliefs about the naming of, relationships among, and uses for plants. Ethnolinguistics should do the same for language, but the contrast between a folk and a scientific linguistics will be more complex than that between many other ethnosciences and their academic partners, particularly in a nonhomogeneous, late-modern society.

The role of language and its attendant beliefs ought to be set in the larger framework of the culture under investigation, for ethnolinguistics may not be just more complex than ethnobotany or ethnogeology but more complex in subtle ways. If it is believed (and reported) that a certain plant is good for settling the stomach, it would be odd to find it seldom used for that purpose (unless some taboo restricted its use). A contrast between belief and use in language, however, is not at all an uncommon state of affairs ("I know what's right, but I don't talk that way"); this apparent mismatch requires greater subtlety in combining ethnolinguistics with a study of language

in use. All the work done in the area of folk linguistic enquiry contributes to this goal of the larger understanding of language as a cultural tool.

Second, for those who want to employ solutions that linguistics may offer to real-world problems, there is surely no more important information the applied linguist can have than that of the authentic folk belief about language held by those with whom he or she would work. Imagine a rural doctor who did not know that 'the sugar' was the local term for diabetes! Here is a concrete folk linguistic example. In work on the contrast between language teacher and language student beliefs about language acquisition, Peacock (1998) showed that error correction by the teacher was valued very highly by the pupils and hardly at all by the teacher. One can imagine that an underlying folk theory held by the learners is that uncorrected errors lead to bad habits, a position not likely to be held by the teachers, particularly those who have been trained by modern linguists, who reject a theory of habit-formation, and modern language teacher trainers, who favor a so-called communicative approach. The latter is particularly tolerant of student errors, especially during activities in which students are supposed to gain communicative control of the language and for which self-assurance is seen as beneficial. In short, a modern communicatively oriented language teaching program would surely rub the folk in such a community the wrong way, and not to know that in advance would preclude any preparatory work that administrators, curriculum designers, textbook writers, and teachers might do.

Third, since the folk are in constant contact with language and varieties, might it be the case that they can provide clues to interesting linguistic features that have not been focused on by linguists? In a recent investigation of the vowels involved in a dramatic change in the urban north of the United States, Plichta (2004) discovered that several of these vowels have added a strong nasal component, even when there is no nasal consonant present. This is certainly not an odd finding; nasal vowels outside of nasal environments are common, but this discovery is perhaps many years late due to the ignoring of folk linguistic evidence. For some time it has been known that upper Midwestern speakers of U.S. English have been regarded as nasal by speakers from other areas. This had been universally disregarded by dialectologists and sociolinguists, who assumed that the folk simply associated certain vowel changes with a nasal vocal quality that was not there. Labov, in his comments on Hoenigswald's 1964 presentation on folk linguistics, noted that nasalization was one of the facts that folk observers had no accurate perception of at all, for they reported that both nasalized and denasalized speech examples are nasal. Plichta's work showed, however, that speakers of the dialect in question were, in fact, nasalizing certain segments, and the folk perception of that fact had been available to researchers for some time.

Fourth, and perhaps most important (at least so far as linguists are concerned), folk linguistic beliefs may help determine the shape of a language itself. It would be unusual to discover that what nonlinguists believe about language has nothing to do with the strengthening or weakening of targets in linguistic change. It is obvious, for example, that the underlying ideology of correctness or a folk belief in language standards influences grammatical selection and, therefore, the establishment of constructions. In Albanyan and Preston (1998), for example, it was shown that undergraduate students at a large U.S. Midwestern university were worried that the prescriptively sanctioned *they gave the bill to Carol and me* might be wrong. They were worried, of course, because they had doubtless been criticized by teachers, parents, and others for using such expressions in subject position (e.g., *Carol and me wanted the bill*) and had now extended their fear to other cases. Almost 10% of the students surveyed said that they would prefer *they gave the bill to Carol and myself* on all occasions, and 21% said they liked that construction best for formal writing and speech. Another 20% said they preferred *they gave the bill to Carol and I* for all occasions. It is clear that a concern for language correctness has, at least in part, disrupted the historical distribution of nominative, oblique, and reflexive pronouns in U.S. English. Doubtless many other winners and losers in the ebb and flow of language can be best accounted for with reference to linguistic folk belief.

Even if these relations of folk linguistics to central concerns in language description and change do not obtain, the first two goals would be sufficient, at least within a linguistics broadly conceived, to earn folk linguistics an important place.

Finally, it is helpful to recall that the study of folk behavior should be done with regard to its dynamic as well as static nature. In a modern folk linguistics, it will be important to observe the routes folk follow in thinking through problems about language as well as their prepackaged items and conventional structures of belief, whatever role these latter may play in more active processes. For example, it is important to know that in English, *still waters run deep* is a folk saying that suggests that those who don't speak much may be wise, but a more thorough investigation of folk linguistics in its dynamic sense would seek out its actual deployment, not just cite the fact that it is a fixed folk linguistic phrase.

In addition, like other studies in the ethnography of speaking, a responsible folk linguistics should seek the organizing principles behind belief, and some parts of this brief account have illustrated such attempts. Folk linguistics is, however, not the only rubric under which such investigations have been carried out. Linguistic anthropologists have, for some time, been concerned with the investigation of cultural behaviors and the models that underlie them; such behaviors clearly include language. Recent work on language ideology would seem to come most directly from this tradition (e.g., Woolard and Schieffelin, 1994), and a facile division of labor might suggest that folk linguistics is concerned with the leftmost side of Figure 2 (b1), language attitudes with the rightmost side (bn), and language ideology with underlying principles, theories, and beliefs about language and those related areas that influence beliefs about language (b′). That is a tempting subdivision of labor, but it would leave the areas of language attitude study (perhaps the entire social psychology of language) and folk linguistics as purely descriptive modes of research, never reaching to the explanatory level. At the present time, it seems premature to suggest any definitive description of these subdisciplinary boundaries.

The intellectual debt in both the folk linguistic and language ideology enterprises, however, is surely greatest to those ethnographers of speaking whose work with a variety of data from a variety of contexts leads to an enriched understanding of language. Hymes puts it simply and directly:

> If the community's own theory of linguistic repertoire and speech is considered (as it must be in any serious ethnographic account), matters become all the more complex and interesting. (Hymes, 1972: 39)

If we allow a space in linguistics for a development of the understanding of ordinary speakers' metalinguistics (as well as their competence, performance, and reaction), we will surely come even closer to realizing the full account of language we seek. By doing so we may also succeed, in one more way, in making our science relevant to the human needs around us.

See also: Anthropological Linguistics: Overview; Cognitive Anthropology; Consciousness, Thought and Language; Conversational Analytic Approaches to Culture; Idealization; Language Attitudes; Language Education: Correctness and Purism; Language Ideology; Language Teaching Traditions: Second Language; Metasemiosis and Metapragmatics; Prestige, Overt and Covert; Presupposition; Reflexivity in Sociolinguistics; Relativism; Social Psychology and Language; Society and Language: Overview; Sociophonetics; Speech Community; Speech Technologies: Language Variation; United States of America: Language Situation.

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Food: Semiotics

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Introduction

In cultural settings, different types of food, culinary preparations, eating events and rituals, and food-celebrating occasions are signs and texts that are part of a culture's overarching network of meanings. The eating of meat, for example, is dependent upon the specific connotations that a certain animal has in that network. In Western society, eating beef is a common occurrence, no matter what form its preparation takes (steak, hamburger, etc.), because cattle meat is perceived as an edible food, whereas the eating of rabbit or cat meat is not, for the reason that the animals in this case are defined culturally as domestic companions. As this simple illustration indicates, meat is a sign that derives its meanings from the network of culture-specific meanings that animals possess. In most meat-eating societies, certain animals are identified as sources of food, others are not, rendering them 'uneatable.'

Food is clearly much more than substance for nourishment and sustenance. It is part of a sign system imbued with culture-specific connotations. As such, it is studied by both anthropologists (e.g., Goody, 1982; Goode, 1992; Mintz, 1996; Schlosser, 2000) and semioticians, starting with Claude Lévi-Strauss's brilliant 1964 essay on the semiotic difference between 'raw' and 'cooked' food, in which he argued that cooked meals were the foundation of various religious and social practices. Many Christians, for instance, say grace before starting a meal together; Jews say special prayers before partaking of wine and bread. At a formal meal, the order in which dishes are presented, what combinations can be served in tandem, how the foods are to be placed on the table, who has preference in being served, who must show deference, who does the speaking and who the listening, who sits where, and what topics of conversation are appropriate are all based on traditions derived from cooking food. All cultures, moreover, have a discrete set of table rituals and manners accompanying the cooking of food that are inculcated into the members of the culture from birth. If one does not know the table-manner code, then he or she will have

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Food: Semiotics

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Introduction

In cultural settings, different types of food, culinary preparations, eating events and rituals, and food-celebrating occasions are signs and texts that are part of a culture's overarching network of meanings. The eating of meat, for example, is dependent upon the specific connotations that a certain animal has in that network. In Western society, eating beef is a common occurrence, no matter what form its preparation takes (steak, hamburger, etc.), because cattle meat is perceived as an edible food, whereas the eating of rabbit or cat meat is not, for the reason that the animals in this case are defined culturally as domestic companions. As this simple illustration indicates, meat is a sign that derives its meanings from the network of culture-specific meanings that animals possess. In most meat-eating societies, certain animals are identified as sources of food, others are not, rendering them 'uneatable.'

Food is clearly much more than substance for nourishment and sustenance. It is part of a sign system imbued with culture-specific connotations. As such, it is studied by both anthropologists (e.g., Goody, 1982; Goode, 1992; Mintz, 1996; Schlosser, 2000) and semioticians, starting with Claude Lévi-Strauss's brilliant 1964 essay on the semiotic difference between 'raw' and 'cooked' food, in which he argued that cooked meals were the foundation of various religious and social practices. Many Christians, for instance, say grace before starting a meal together; Jews say special prayers before partaking of wine and bread. At a formal meal, the order in which dishes are presented, what combinations can be served in tandem, how the foods are to be placed on the table, who has preference in being served, who must show deference, who does the speaking and who the listening, who sits where, and what topics of conversation are appropriate are all based on traditions derived from cooking food. All cultures, moreover, have a discrete set of table rituals and manners accompanying the cooking of food that are inculcated into the members of the culture from birth. If one does not know the table-manner code, then he or she will have

to learn it in order to continue living in the culture without censure and disapprobation.

The social importance of food was noted first in writing by the Greek historian Herodotus (c. 484–425 BCE), who spent a large part of his life traveling through Asia, Babylon, Egypt, and Greece, noting and recording for posterity the differences he perceived (with respect to Athenian culture) in the language, dress, food, etiquette, legends, and rituals of the different people he came across. The annotations he made constitute the first significant accounts of the cultures of virtually the entire ancient Middle East, including those of the Scythians, Medes, Persians, Assyrians, and Egyptians. Inspired by Herodotus, other ancient historians also made it a point to describe systematically and comparatively the languages, character, manners, and geographical distribution of the peoples they visited. As these ancient 'anthropologists' discovered, in a social ambiance food takes on significance that transcends its basic survival function, affecting perceptions of its edibility. Food mirrors social organization, religious beliefs, and other aspects of communal life. It is, in other words, an important element for understanding the overall 'code' of a culture.

Systems of 'etiquette,' incidentally, existed even in early tribal settings. As prehistoric people began to interact with one another, they learned to behave in ways that made life easier and more pleasant. For example, as people learned to plant crops and farm, the ability to store food led to communal eating. Rituals developed for the preparation and sharing of meals which, over time, evolved into the table manners of today. Then, early civilizations, such as those of ancient Greece and Rome, developed rules for proper social conduct. Such rules became more formal during the Middle Ages, during which boys training to become knights learned a code of conduct called 'chivalry.' According to this code, a knight was devoted to the Christian church and his country and treated women with great respect. Some aspects of chivalry, particularly the special treatment of women, became a traditional part of manners.

Much of today's formal etiquette originated in the French royal courts during the 1600s and 1700s. King Louis XIV drew up a daily list of events, giving time, place, and proper dress. It was posted in his palace at Versailles as an etiquette, a French word meaning ticket, to help the nobles know what to do. It brought order to court society, and other monarchs adopted the code of behavior for their own courts. In time, upper classes throughout the Western world adopted the code.

Food vs. Cuisine

Of course, survival without food is impossible. So, denotatively, food can be defined as 'survival substance.' But, in a social ambiance, food and eating involve the enactment of culture-specific connotations. The term that is often used to designate the system of connotations that food evokes is 'cuisine.' Cuisine informs us not only as to what certain people eat, but also how they make it, and ultimately what it reveals about them.

The earliest people probably ate whatever plant food they could find, including fruits, mushrooms, nuts, roots, and seeds. They also caught fish and small land animals, and ate the meat of the dead animals they found. In time, they developed weapons to hunt large animals, and probably spent much time searching for them. If the food supply in an area ran out, they apparently moved on. They roasted some of their food over burning wood from fires that started naturally. After they discovered how to make fire, they started roasting food more often. After they learned how to make pots, they began boiling and stewing food.

By about 8000 BCE, people began raising plants and animals for food – hence the rise of farming as a communal activity, assuring people of a steadier food supply. It also meant settling in one area instead of traveling about in search of food. Grains were especially important crops for the early farming communities. So was the raising of cattle, goats, sheep, and other animals for meat and milk. Some groups of prehistoric people were nomadic. They traveled across the countryside in patterns, raising such animals as camels, goats, and sheep. Between 3500 and 1500 BCE, the first great civilizations developed in river valleys, such as the Nile Valley in Egypt, the Tigris-Euphrates Valley in what is now Iraq, the Indus Valley in what are now Pakistan and northwestern India, and the Huang He Valley in China. All these valleys had fertile soil and a favorable climate, which enabled farmers to produce abundant yields. In ancient Egypt, for example, farmers along the Nile could raise two or three crops a year on the same fields. They grew barley and wheat and such vegetables as beans, lettuce, and peas. The Egyptians also cultivated such fruits as grapes and melons. Their livestock also included cattle, goats, and sheep.

At first, the ancient Greek and Roman societies could not produce enough food for their growing populations. They thus had to import large quantities of food from other countries. This may be the reason why both civilizations took the decision to conquer

and colonize lands that had plentiful food supplies. By the 3rd century AD, the Roman Empire covered much of Europe, most of the Middle East, and the Mediterranean coast of Africa. Most of the empire's large farms specialized in raising wheat, which formed the basis of the Roman diet.

The origin of true culture is, arguably, the result of efforts to secure a source of food and to invent a technology to make the provision of food abundant and stable. As mentioned, the anthropologist Claude Lévi-Strauss (1964) argued that the origin of culture can, in fact, be traced to the advent of 'cooking technology.' Lévi-Strauss claimed that this transformation was accomplished by two processes – roasting and boiling – both of which were among the first significant technological advances made by humanity. Roasting is more primitive than boiling because it implies a direct contact between the food and a fire. But boiling reveals an advanced form of technology, because the process in this case is mediated by a pot. Boiling was the event that led to the institution of true culture – which implies the sharing of food in the community of others. At that point, food took on symbolic meanings.

To grasp how this may have come about, it is useful to imagine being in a 'Robinson Crusoe' situation – Robinson Crusoe being the protagonist in Daniel Defoe's (1660?–1731) famous novel, *The life and adventures of Robinson Crusoe*, which appeared in 1719. Although the novel is the fictional tale of a shipwrecked sailor, it is nonetheless based on the real adventures of a seaman, Alexander Selkirk (1676–1721), who had been marooned on an island off the coast of Chile. The novel chronicles Crusoe's ingenious attempts to overcome the hardships he faces on the island. Like Robinson Crusoe, one can imagine being abandoned on an isolated island in the middle of nowhere. Without the support and security of a social ambiance, our first instincts are to survive in any way that we can. In such a situation, the need for food and water takes precedence over all else. One would hardly tend to be fussy about what to eat. In effect, we would eat whatever we find.

Now, suppose that after living alone on the island for a few years we discover other similarly abandoned individuals, each one on some remote part of the island, all of whom speak the same language. Since there is strength in numbers, the decision is made by all concerned to become a group, in which specific roles are assigned to each person for the procurement, storage, and preparation of food. This division of labor constitutes an emergent 'social contract.' As time passes, other 'social contracts' are made, all designed to ensure survival. The food eaten and its method of preparation will start at that point in time to take on meanings that transcend survival. The group may want, for instance, to reserve a day of the week to eat a special type of food, cooked in a special way, to symbolize the gratitude each one feels (for having survived). From this a rudimentary religious tradition can be established. Other traditions can also be similarly instituted.

This vignette suggests that food cooked for a community of eaters is bound to take on significance beyond that of 'survival substance.' When especially abundant food sources became available, early humans settled in permanent, year-round communities, learning to domesticate plants and animals for food, transportation, clothing, and other uses. With greater population concentrations and permanent living sites, social contracts evolved into cultural institutions complemented by religious ceremonies and ritualistic food events (such as communal meals and feasts). These early hunting-gathering societies soon developed complex belief systems with regard to the supernatural world, and the behaviors of spirits and gods. Food became a part of ritual and communal meaning-sharing, often offered to the deities in return for specific favors. To this day, food is perceived invariably as a primary constituent of all kinds of ceremonies and rituals, from feasts (weddings, Bar Mitzvahs, etc.) to simple social gatherings. We schedule 'breakfast,' 'lunch,' and 'dinner' events on a daily basis. Indeed, we plan our days around meals. Even going out on a common romantic date would be virtually unthinkable without some eating component associated with this courtship ritual (ranging from the popcorn eaten at movie theaters to the elaborate meals consumed at trendy restaurants).

Food as Symbolism

As part of rituals, food items take on symbolic meanings. Take, for example, bread. We talk of the 'bread of life,' of 'earning one's bread,' and so on because, as in many other cultures, bread is a symbol for life. The word 'companion', incidentally, comes from Latin and means literally the person 'with whom we share bread'. As Margaret Visser (1991: 2–3) aptly pointed out:

> This is true even in our own day, when people eat far less bread than they used to, and when bread comes to us from a factory, bleached, squishy, ready-cut (so much for 'breaking bread'), wrapped in plastic or cellophane. Yet we still expect to have bread on hand at every meal, as background, as completion, as dependable comforter and

> recompense for any stress or disappointment the rest of the meal might occasion. Bread is for us a kind of successor to the motherly breast, and it has been over the centuries responsible for billions of sighs of satisfaction.

The probable reason for the association of bread with life may be the fact that it is one of the oldest foods eaten and prepared by humans. Prehistoric people made flat bread by mixing grain meal with water and baking the resulting dough on rocks that they had heated. Historians believe the Egyptians learned to make yeast bread around 2600 B.C. The ancient Greeks learned bread-making from the Egyptians and later taught the Romans how to do it. By the 1st century A.D., the Romans passed this knowledge on to the people in the many parts of Europe they had conquered.

Many of the symbolic meanings of food derive from accounts of human origins. The story of Adam and Eve in the Western Bible, for instance, revolves around the eating of a forbidden fruit. The representation of this fruit as an apple came in medieval pictorial representations of the Eden scene. Since then, the Biblical symbolism of the apple as 'forbidden knowledge' continues to resonate across many societies. This is why the apple tree symbolizes the 'tree of knowledge;' why the 'Apple' computer company has probably chosen this fruit for its company name and logo, and so on. The discovery and cultivation of the apple dates back to 6500 B.C. in Asia Minor. Ramses II of Egypt cultivated apples in orchards along the Nile in the 13th century B.C. The Ancient Greeks also grew apple trees from the 7th century B.C. onward. They designated the apple 'the golden fruit,' since in Greek mythology the apple was given to Hera from the Garden of the Hesperides as a wedding present when she married Zeus.

As another example of food symbolism, consider lamb meat. This is a particularly important Easter food in central and eastern European countries. It is eaten at this time period of the liturgical year because it represents Jesus and relates His death to that of the lamb sacrificed on the first Passover. This is why Christians traditionally refer to Jesus as 'the Lamb of God.' In many homes, a lamb-shaped cake also decorates the table at Easter. Many Eastern Orthodox Christians even hang pictures of the Easter lamb in their homes.

Similar accounts as those above can be sketched for virtually any of the traditional foods we continue to eat today. Symbolism is also the reason why the meat of certain animals is not eaten by certain people. And it is also the reason for fasting. Fasting is one of a number of rites in which physical activities are reduced or suspended, resulting in a state of quiescence symbolically comparable to death, or to the state preceding birth. Fasts have been part of fertility rites since pre-historic times.

In addition to fasting so as to induce fertility, there are fasts intended to avert catastrophe or to serve as penance for sin. The ancient Assyrians and the Babylonians observed fasts as a form of penance. Among Jews, too, fasting has always signified penitence and purification. This is why fasting is observed annually on the Day of Atonement, Yom Kippur. The fast observed by Muslims during the month of Ramadan is another expression of atonement. Although most Protestant churches retained fasting after the Reformation in the 16th century, stricter Protestants such as the Puritans condemned traditional fasts. The Orthodox Church, on the other hand, continues to observe fasts rigorously. Native North Americans hold tribal fasts to avert impending disasters. Political fasting, known as 'hunger striking' has also been employed as a political weapon ever since Mohandas Gandhi, leader of the struggle for India's freedom, used it effectively in the early and mid-1900s.

The counterpart to fasting is overeating. One tradition based on culinary indulgence is 'carnival,' which in Christian cultures consists of feasting and merrymaking just before Lent. The Mardi Gras in New Orleans is a famous American carnival. From this religious tradition the modern concept of a carnival as a form of outdoor amusement that consists of exhibits, games, rides, shows, and all kinds of tempting foods gradually developed.

The Edible and the Non-edible

Eating foods constitutes an act of 'sign-eating.' This can be seen when someone is asked to eat something perceived semiotically as inedible. In Anglo-American culture that is the case of rabbits, which are defined as 'household companions' rather than as sources of food. The same culture also does not classify foxes or dogs as edible food items; but the former is reckoned a delicacy in Russia, and the latter a delicacy in China. On the other hand, bovine meat (beef steaks, hamburgers, etc.), lamb meat, and poultry meat are eaten routinely in Anglo-American and European culture, with few negative perceptions and gustatory reactions. In India, on the other hand, a cow is considered by religious tradition to be sacred and, therefore, beef is perceived to be inedible.

It is interesting to note that, historically, the ancient Romans were the ones who had domesticated the rabbit, which flourished throughout their empire as a source of food. In 16th-century England, rabbits were prized instead for their fur. For this reason,

they were bred selectively in order to enhance their rich coats. In the 19th century, England passed strict game laws prohibiting rabbit hunting. In the remainder of the previous Roman empire, however, they continued to be perceived as food sources. By the turn of the 20th century, rabbits were redefined in Anglo-American culture as household animals. The reinforcement of the anthropomorphic connotations that the rabbit has since taken on can be seen in the popularity of fictional rabbit characters ('Bugs Bunny,' the 'Easter Bunny,' 'Benjamin Bunny') that have become a part of childhood.

Edibility is, in sum, more a product of Culture than of Nature. Outside of those that have a demonstrably harmful effect on the human organism, the species of flora and fauna that are considered to be edible or inedible are very much the result of history and tradition. We cannot get nourishment from eating tree bark, grass, or straw. But we certainly could get it from eating frogs, ants, earthworms, silkworms, lizards, and snails. Most people in Anglo-American culture would, however, respond with disgust at the thought of eating such potential food items. However, there are cultures where they are not only eaten for nourishment, but also as part of symbolic traditions. The expression 'to develop a taste' for some 'foreign' food reveals how closely tied edibility is to cultural perception. Left alone on that hypothetical Robinson Crusoe island described above, the question would certainly not be one of 'taste,' but of 'survival' at any taste.

So close is the association between food and culture that it is used commonly and stereotypically as a template for evaluating other people and their cultures. People perceive gustatory differences in cuisine as fundamental differences in worldview and lifestyle – as differences between 'us' and 'them.' It is relevant to note that when people come to accept the cuisine of others as not only tasty but as a delicacy, the culture of the food-makers concomitantly is perceived much more positively.

Food Codes

Food codes, like all other kinds of social codes, are regulatory systems – they control what kinds of food are eaten, when they are eaten, who is allowed to eat them, and so on and so forth. Predictably, these vary considerably from culture to culture, having an effect on how certain foods are perceived, on how they are prepared, on who has priority in eating them, and so on (Goode, 1992: 236–245). Here are a few examples:

1. The adult !Kung Bushmen of the Kalahari Desert in southern Africa never eat the scavenged contents of a bird's nest, but will use it to make soup for their children.
2. In traditional Chinese households, the eldest eats first, followed by the next generation, on down to the youngest.
3. At certain intervals, the richest members of the Kwakiutl society of the Pacific Northwest put on a lavish feast during which they give away material gifts as a sign of bonding with all the members of the society.
4. At matrimonial ceremonies throughout the world, specific kinds of codes may dictate the organization of parts of the ceremony (e.g., the wedding party normally sits apart from the invited guests).

Above all else, food codes dictate how eating events are organized, including: the order in which dishes are presented; what combinations can be served in tandem; how the foods are to be placed on the table; who has preference in being served; who must show deference; who does the speaking and who the listening; who sits where; what topics of conversation are appropriate. As Visser (1991: 107) remarked, "dinner invitations can be fraught with hope and danger, and dinner parties are dramatic events at which decisions can be made and important relationships initiated, tested, or broken."

Eating events are so crucial to the establishment and maintenance of social relations and harmony that there exists virtually no culture that does not assign an area of the domestic abode to eating functions and ceremonies. All cultures, moreover, have a discrete set of table rituals and manners that are inculcated into the members of the culture from birth. If you do not know the table-manner code of a certain culture, then you will have to learn it in order to continue living in that culture without reproach and disapproval. Consider a concrete example. If you have never eaten spaghetti before, then you will have to learn that the 'correct' way is to eat it with a fork if you find yourself in Italy. In 19th-century Naples, where the modern-day version of this dish comes from, people ate spaghetti with their hands by raising each string of pasta in the hand, throwing back the head, and lowering the string into the mouth without slurping. Today, the correct manner of eating spaghetti is to twirl it around the fork, in small doses, and then to insert the fork into the mouth as one does with any other fork-based intake of food. Eating spaghetti in any other way would be perceived as a breach of the relevant table-manner code.

Table-manner codes often involve the use of flatware. Knives, spoons, forks, and other specialized implements for eating and serving food have until recent times been the privilege of the aristocracy. In Egypt, Greece, and Rome knives and spoons of the aristocracy were made of precious materials, including silver and gold, and were sometimes decorated. The Romans also possessed skewers. These were forerunners of forks. From the Middle Ages until the Renaissance, the knife remained the principal table utensil. Forks came into common table use in Italy in the 1500s. At the same time, spoons made the transition from kitchen utensils to table flatware. From that time onward, flatware came to be used by all peoples of all classes. During the 19th century, numerous other items of flatware were created, such as teaspoons, butter knives, and salad forks.

Semioticians typically view food codes as prototypical social codes (Parmentier, 1994; Gottdiener, 1995). The signs that we use to make messages are not randomly chosen structures. When we enter into an eating event, for example, we will be able to participate successfully in it only if we know the appropriate food code. This provides information about specifics of how to eat food, when to speak during eating, and so on. Food codes tend to be more or less stable and fixed, varying very little over time, if at all. But they are adaptive nonetheless. And, like all codes, they are sensitive to context. Eating a wiener with the hands would be inappropriate in a high-class restaurant, but it would be one of the ways to eat it at an open-air meal among friends at a barbecue where cutlery may not be available. Clearly, the physical context of occurrence and social frame of reference will determine how a food item is eaten. The restaurant is, itself, a social code. This is why we interpret anything that is eaten there differently than if it is eaten somewhere else.

The network of interconnected meanings that constitute a culture is configured with such social codes. These can be characterized as 'organizational grids' within the network. Utilization of these codes for various interactive reasons will, of course, vary, but the basic structure of the codes will remain intact and recognizable.

Conclusion

The semiotic investigation of food illustrates how Nature and Culture intersect constantly in human life. At a denotative level, food means exactly what Nature has decreed it to mean – survival substance. However, in cultural settings, food items become signs that assume specific kinds of meanings. And these cohere into codes that govern how they are evaluated and eaten. Cultures vary widely as to the types and the degree of meaning they assign to food and eating. But throughout the world, food is viewed to be as much symbolic substance as it is survival substance.

See also: Denotation versus Connotation.

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Foot

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The Foot as a Metrical Unit

The foot is the basic unit of word stress assignment in many contemporary linguistic theories. Theories making use of the concept of foot thus maintain that word stress is a property not of single segments or syllables but of groups of syllables, i.e., feet (see Kenstowicz, 1994; Hayes, 1995; Kager, 1995, for an overview on the role of the foot in metrical theory).

It is generally assumed that in the prosodic hierarchy (Selkirk, 1980) the foot occupies the position above the level of the syllable and below the prosodic word level. One or more syllables form a foot, and one or more feet, in turn, the prosodic word:

```
(1)    ... Prosodic word ...
                  |
             ... Foot ...
                / \
     ... Syllable    Syllable ...
```

Analysts diverge as to whether they assume that syllables have to be parsed exhaustively into feet (e.g., Halle and Vergnaud, 1987) or whether they maintain that natural language allows syllables to remain unfooted (Prince, 1983; McCarthy and Prince, 1993; Hayes, 1995, among others).

Metrical units have been used under various names for the description of stress patterns at least since Scott (1948), Miyaoka (1971), Lehiste (1965), Allen (1973) (see Hayes, 1995, for an overview). In generative grammar, Liberman (1975) introduced the idea of metrical constituents and Prince (1976a, 1976b) first proposed stress assignment as the direct construction of constituents. The name 'foot,' borrowed from poetic meter, has established itself through the work by Selkirk (1980).

The foot has since been employed first of all to describe the rhythmic structure of words and phenomena determined by it, such as main stress and rhythmical secondary stress. Take, for instance, Seminole/Creek (McCarthy, 1979; Hayes, 1995; data from Haas, 1977, and Tyhurst, 1987). In a string of light syllables (heavy syllables are abstracted away from, here), a high tone falls either on the penult or on the final syllable of the word, whichever is preceded by an odd number of syllables. If we employ the concept of foot, we can simplify this description and say that in Seminole/Creek iambic (i.e., right-headed) feet are parsed beginning at the left edge of the word, grouping always two light syllables into a foot. A high pitch accent is then assigned to the head of the last foot generated by this parsing, as we can see in (2). In the examples, foot boundaries are indicated with round brackets; L stands for a light syllable, H for a heavy syllable, and *σ* for a syllable in general, in languages in which syllable weight does not play any role in stress assignment (see the discussion of quantity-sensitive and quantity-insensitive systems). An acute accent [´] generally indicates main stress (in the Seminole/Creek examples below it indicates high tone) and grave accent [`] secondary stress.

(2) a.	cokó (LĹ)	'house'
b.	osána (LĹ)L	'otter'
c.	apataká (LL) (LĹ)	'pancake'
d.	anokicíta (LL) (LĹ)L	'to love'
e.	isimahicitá (LL) (LL) (LĹ)	'one to sight at one'
f.	itiwanayipíta (LL) (LL) (LĹ)L	'to tie each other'

Wargamay (Dixon, 1981; Hayes, 1995) is a language with the opposite directionality in metrical parsing. In strings of light syllables, main stress is assigned to the first syllable in even-numbered strings and to the second syllable in odd-numbered strings. If we describe the pattern making use of the concept of foot, it becomes clear why the even or odd number of syllables should make a difference: trochaic (i.e., left-headed) feet are parsed from right to left and main stress is assigned to the leftmost foot generated by this parsing.

(3)	báda (*σ́σ*)	'dog'
	gagára *σ*(*σ́σ*)	'dilly bag'
	gíɲawùlu (*σ́σ*)(*σ̀σ*)	'freshwater jewfish'
	ɲuɽágay- mìri *σ*(*σ́σ*)(*σ̀σ*)	'Niagara-Vale-FROM'

Thus, in metrical theories, directionality of secondary stress is traditionally expressed indicating the direction of parsing of secondary stress feet: feet are parsed either starting from the left edge of the word proceding to the right, as in Seminole/Creek, or starting at the right edge proceeding leftward, as in Wargamay.

Since McCarthy and Prince (1993a), the directionality of secondary stress feet is also described as alignment of feet to the left or the right edge of the prosodic word. Seminole/Creek aligns feet as

much as possible to the left edge of the word, whereas Wargamay aligns them as much as possible to the right.

In the next section, the state of the art regarding the shapes that feet can take will be summarized. In the final section of the article, the most important arguments that have been brought forward for the existence of the category foot will be discussed.

Parameters Determining the Shape of Feet

For various theories on the parameters determining metrical patterns and hence also foot-shape, see Liberman and Prince (1977), Halle and Vergnaud (1978, 1987), Hayes (1981, 1995), Prince (1983, 1990), Idsardi (1992), McCarthy and Prince (1993), Prince and Smolensky (1993), Kager (1993a, 1995), Halle and Idsardi (1995), and Hyde (2002).

Quantity-sensitive and Quantity-Insensitive Feet

So-called quantity-sensitive languages distinguish between heavy and light syllables, whereas in quantity-insensitive languages for the purpose of stress assignment all syllables count as light (see Kager, 1992, 1993a, 1993b, for the distinction between *trivially* and *truly* quantity-insensitive systems, i.e., systems that do not have any weight-contrast between syllables in general and systems that do have a contrast but where weight does not influence stress placement). In quantity-sensitive languages, syllables containing long vowels or diphthongs, and, in many languages, also syllables closed in a consonant, count as heavy. The difference between heavy and light syllables is often represented by assigning to the rhyme of heavy syllables two 'weight-units,' called moras (μ), and to light syllables only one. The moras are assigned to the rhyme of the syllable, because only the rhyme determines weight; onsets typically do not contribute to syllable quantity:

```
(4) ... σ ...
      / \
     μ   μ
C   V   V    -->   heavy syllable with long vowel
C   V   C    -->   heavy syllable closed in a consonant
    ... σ ...
       |
       μ
  C   V      -->   light syllable
```

Bimoraic syllables typically attract stress and thus influence the stress pattern of a quantity-sensitive language.

Many languages have a requirement that their feet be no smaller in size than two moras (see below). Thus, in quantity-sensitive languages, in which certain syllables count as bimoraic, a quantity-sensitive foot (Ḣ) consisting of a single heavy syllable can b parsed. This foot is impossible in quantity-insensitive languages, in which all syllables count as light, for the purpose of stress assignment. As an example, take again the metrical structure of Seminole/Creek, this time considering a string containing a heavy syllable:

(5) iŋkosapitá 'one to implore'
(H)(LL)(LĹ)

Compare this example to (2d) above. Both examples are five syllables long, but because in this example the first syllable is heavy, it can form a foot of its own and parsing will resume right after it. Thus, the pitch accent falls on the final syllable, instead of the penultimate syllable, as in (2d).

Foot-size: Binary, Degenerate, Ternary, Unbounded

The maximal and minimal possible shape of feet is still a question open for debate. Feet typically have a binary structure, i.e., they consist of either two syllables or two moras. It might be necessary to admit the existence of smaller feet, though. So-called degenerate feet are feet consisting of a single light syllable. Monomoraic feet have been claimed to exist in languages such as Passamaquoddy (LeSourd, 1993):

(6) wìcohkémal 'he helps the other'
(*ò*σ)(*ó*σ)
wìcòhkekémo 'he helps out'
(*ò*)(*ò*σ)(*ó*σ)

Passamaquoddy parses quantity-insensitive, left-aligning trochaic feet. Stress on the first two syllables of odd-numbered strings, as in the second example, makes it necessary to analyze the structure as displaying two feet in initial position, the first one of which is degenerate. Even in languages in which normally feet are binary there are words in which degenerate feet seem to be parsed. This is the case for English *(é) (ssày)* or exceptional final stress in Italian (*cittá*, 'city').

It is less clear whether feet larger than binary are part of the inventory of possible feet across the world's languages. In fact, although morphological templates offer evidence for various types of binary feet (see later), no ternary or larger constituents have

been found so far in prosodic morphology (see Itô and Mester, 1992, for discussion of seemingly ternary templates in Japanese clippings). In the metrical literature, however, two types of larger feet, ternary amphibrachs and unbounded feet, have been proposed (see Kenstowicz, 1993, for evidence from tone shift for the existence of unbounded feet).

Take, for instance, languages with a ternary rhythm, such as Cayuvava (Key, 1961, 1967):

(7) ǰihiraríama 'I must do'
(σ̀σ)σ(σ́σ)<σ>
maràhahaéiki 'their blankets'
σ(σ̀σ)σ(σ́σ)<σ>
ikitàparerépeha 'the water is clean'
σσ(σ̀σ)σ(σ́σ)<σ>
čàadiròboβurúruče 'ninety-nine'
(σ̀σ)σ(σ̀σ)σ(σ́σ)<σ>

In Cayuvava, every third syllable counting from the right is stressed. This pattern can be analyzed as above as a structure where the final syllable is extrametrical (i.e., is excluded from the domain of stress assignment) and binary trochees are parsed from right to left with one syllable left unparsed between feet (Kager, 1993a; Hayes, 1995; Elenbaas and Kager, 1999). However, it also has been analyzed employing ternary feet. Thus, Halle and Vergnaud (1987) propose an analysis for Cayuvava where ternary amphibrachs (i.e., constituents whose head is not terminal) are parsed from right to left:

(8) maràhahaéiki 'their blankets'
(σσ̀σ)(σσ́σ)<σ>
čàadiròboβurúruče 'ninety-nine'
(σ̀σ)(σσ̀σ)(σσ́σ)<σ>

Feet unbounded in size have been proposed for languages without iterative stress. For instance, Koya (Tyler, 1969) is a language in which stress falls on every heavy syllable and on the initial syllable. Main stress is initial. Halle and Vergnaud (1987) analyze this pattern as a structure with unbounded feet where a foot starts at each heavy syllable and at the initial syllable:

(9) (ĹL)(ȊLLL)(ȊLL)

An analysis in these terms presupposes that feet are parsed exhaustively, i.e., all syllables are part of a foot. An analysis based on binary feet, by contrast, would maintain that some syllables of the word are left unparsed:

(10) (ĹL)(Ȋ)LLL(Ȋ)LL

The issue of exhaustive parsing, mentioned earlier, is thus closely connected to the question of binarity: theories maintaining that syllables are parsed exhaustively into feet must allow for feet that are larger than binary, whereas theories claiming that feet are necessarily binary have to dismiss exhaustive parsing.

Headedness: Iambs and Trochees

Feet can be divided into two groups with respect to the position of the head, i.e., the stressed element, inside the foot. Iambs are feet whose final syllable is stressed (the foot is right-headed) whereas trochees are feet whose initial syllable is stressed (the foot is left-headed). It has been observed that besides the position of the head there are other properties distinguishing iambic and trochaic systems. Iambic systems are typically quantity-sensitive, while we know both of quantity-insensitive and quantity-sensitive trochaic systems (Hayes, 1995). Moreover, as Hayes (1995) observes, iambic feet tend to enhance the quantity-contrast between the first and the second element of the foot, i.e., the unmarked iambic foot (LḾH) consists of an initial light and a following heavy syllable. The unmarked trochee, by contrast, consists of two elements that are equal in quantity. These observations have lead Hayes (1995) to propose the *Iambic/Trochaic Law* (see Kager, 1993a, for a proposal to derive the Iambic/Trochaic Law from independent principles of rhythmic organization such as constraints against stress lapses and stress clashes):

(11) Iambic / Trochaic Law (Hayes, 1995: 80)
a. Elements contrasting in intensity naturally form groupings with initial prominence.
b. Elements contrasting in duration naturally form groupings with final prominence.

Iambic and trochaic systems also differ with respect to the parameter of directionality. It has been claimed (Kager, 1993a; Hayes, 1995; Hyde, 2002; Alber, 2005) that although we find both right- and left-aligning trochaic systems, iambic systems are always of the left-aligning type.

Markedness Scale of Feet and Foot Inventories

Taking into account the Iambic / Trochaic law as well as the observation that heavy syllables attract stress and that feet are usually binary, Prince (1990) proposes to create a markedness scale for iambic and trochaic feet ("≻" means "is better than"):

(12) Iambic: (LḾ) ≻ (LĹ), (Ḿ) ≻ (Ĺ)
Trochaic: (ĹL), (Ḿ) ≻ (ḾL) ≻ (Ĺ)

The most unmarked iambic foot would thus be an (LḾ) foot, as this structure enhances the internal

quantity-contrast between the two syllables of the foot respecting at the same time the principle that heavy syllables should be stressed and the principle that feet should be binary. Iambic feet of the type (LÍ), (Ḿ) are binary as well and don't have any unstressed heavy syllables, but they don't respect the Iambic/Trochaic law. In fact, in (LÍ) and (Ḿ) feet the two elements of the foot – two syllables in the former, two moras in the latter – are of equal duration. Finally, the degenerate (Í) foot is the most marked foot, because it violates the principle of binarity. As for trochees, here the most unmarked feet are those in which both elements are equal in duration, whereas the uneven (ḾL) trochee is only second best (but see Mellander 2003 for (ḾL) forming processes).

This markedness scale coincides with the empirical findings of Hayes (1995), who observes that the foot-internal quantity-contrast in iambic systems is often enhanced by lengthening the second syllable of the foot, that trochaic systems avoid parsing an uneven (ḾL) trochee and that degenerate feet are strongly restricted in their occurrence. Hayes therefore proposes the following universal foot inventory that is asymmetric, reflecting the differences between trochaic and iambic systems:

(13) a. Syllabic Trochee (*σ́σ*)
b. Moraic Trochee (ÍL) or (Ḿ)
c. Iamb: (LḾ), (LÍ) if possible; otherwise form (Ḿ)

According to this universal foot inventory we will find both quantity-insensitive and quantity-sensitive trochaic systems (a and b), whereas iambic systems are usually quantity-sensitive (c). Moreover, the moraic trochee of quantity-sensitive systems is always even, (ḾL) trochees are not allowed in this inventory. Finally, iambs, differently from trochees, can be uneven, as the presence of the (LḾ) foot demonstrates (but see Kager, 1992, 1993b), who questions the existence of truly quantity-insensitive systems and Kager (1993a), who proposes to eliminate the (LḾ) iamb from the inventory of parsing feet. For an earlier proposal of foot typology, cf. Hayes (1980). For a foot inventory in terms of restrictions on heads and nonheads, see Hammond (1986). See Dresher and Lahiri (1991), who propose to add to Hayes's inventory the *resolved trochee* (Ḿ), (Í*σ*), i.e., a heavy syllable or a light syllable followed by a syllable regardless of weight, for which they find evidence in Old English and early Germanic in general).

Constraints on Feet

In Optimality Theory (Prince and Smolensky, 1993), the principles determining foot-structure are taken to be violable constraints. In fact, it has been observed that languages are not always consistent in their choice of a certain parameter determining foot shape. For instance, Prince and Smolensky (1993) observe that Southern Paiute (Sapir, 1930; Hayes, 1995), an otherwise iambic language, parses a final trochee in strings with an even number of syllables:

(14) pumpúŋkuŋwɨtàŋwa 'our (incl.) horses owned severally'
(*σσ́*)(*σσ̀*)(*σ̀σ*)

In terms of violable constraints, Southern Paiute can be analyzed as a language where a universal constraint requiring feet to be right-headed (RHTYPE = IAMBIC) dominates the constraint requiring feet to be left-headed (RHTYPE = TROCHAIC). Thus, generally, Southern Paiute will parse iambs, rather than trochees. In one special context, though – precisely, in word-final feet – the constraint RHTYPE = IAMBIC is itself violated. Prince and Smolensky (1993) propose that in this context we see the effect of the constraint NONFINALITY, a constraint militating against final stress and thus responsible for extrametricality effects. Because in this language NONFINALITY dominates RHTYPE = IAMBIC, the latter constraint is violated in order to satisfy the former. Table 1 illustrates this.

The competition between candidate a. and b. shows us that in strings with an odd number of syllables Southern Paiute behaves like a normal iambic language: since the constraint RHTYPE = IAMBIC is ranked above RHTYPE = TROCHAIC, the iambic parse in a. wins over the trochaic parse in b. In even-numbered strings, on the other hand, a final iamb would lead to a violation of the top-ranked constraint NONFINALITY (candidate b′.). Therefore, the final two syllables are parsed into a trochee, violating RHTYPE = IAMBIC, but satisfying NONFINALITY (candidate a′.).

The principles determining metrical structure thus are not simply on or off in a certain language but, rather, are the result of violable constraints interacting with each other (see also Alber, 1997, for quantity-sensitivity as the result of constraint

Table 1 Change of foot-type due to NONFINALITY

	NONFINALITY	*RHTYPE = I*	*RHTYPE = T*
☞ (a) (*σσ́*)(*σσ̀*)*σ*			**
(b) (*σ́σ*)(*σ̀σ*)*σ*		**!	
☞ (a′) (*σσ́*)(*σσ̀*)(*σ̀σ*)		*	**
(b′) (*σσ́*)(*σσ̀*)(*σσ̀*)	*!		***

interaction; Rosenthall and van der Hulst, 1999, for context-sensitive syllable weight; and Pater, 2000, for nonuniformity in English secondary stress assignment).

Two other constraints have been widely used to determine the shape of feet in optimality-theoretic analyses: the weight-to-stress principle (WSP) (Prince, 1990), responsible for generating quantity-sensitive systems and FT-BIN (Prince, 1980), favoring binary feet consisting of either two syllables or two moras:

(15) WSP: heavy syllables are prominent in foot structure and on the grid
Ft-Bin: Feet are binary at some level of analysis (μ, σ)
(Prince and Smolensky, 1993; see Kager, 1999, for a detailed overview on metrical constraints in general)

Evidence for the Foot as a Metrical Constituent

Evidence for the foot as a constituent comes from prosodic morphology, stress assignment, and foot-related phonological processes (for a detailed overview on evidence for the category foot, see Kenstowicz, 1993; for stress shift depending on metrical structure as evidence for the foot see Prince, 1975; Kenstowicz, 1994, and Kager, 1995).

The prosodic morphology hypothesis, as stated in McCarthy and Prince (1986/1996, 1990, 1993b, 1995), maintains that the templates found in the morphology of the world's languages are defined in terms of the units of prosody such as the mora, the syllable, and the foot. Work on reduplication, truncation, and word minimality restrictions has shown that we do find templatic morphemes that are bigger in size than a syllable but smaller than a prosodic word. Morphemes of this type should thus be evidence for the existence of the foot as a constituent.

One well-studied case in which templatic morphemes emerge is reduplication. For instance, in Manam, the reduplicative morpheme is a quantity-sensitive bimoraic foot. Exactly the two final moras, either in the form of two light syllables or one heavy syllable, are reduplicated:

(16) Manam reduplication (Lichtenberk, 1983; McCarthy and Prince, 1986/1996, 1993b, 1995):

salaga	salaga-laga	'long'
laʔo	laʔo-laʔo	'go'
malaboŋ	malabom-boŋ	'flying fox'
ʔulan	ʔulan-laŋ	'desire'

The analysis of the reduplicative morpheme as a bimoraic foot receives support from the stress-pattern of the language: main stress in Manam is assigned to a rightmost quantity-sensitive trochee, where syllables closed in a consonant count as heavy (long vowels do not occur):

(17)

siŋába	'bush'
L(ÍL)	
lúnta	'moss'
(Ḿ)L	
malabóŋ	'flying fox'
LL(ḿ)	

Note that without the concept of 'foot' as a prosodic constituent, the choice of two instead of three or four moras for the reduplicative morpheme would be completely arbitrary.

A bimoraic template is also found in the templates emerging in certain morphological processes of truncation. Consider Japanese, a pitch-accent language not making use of metrical feet as far as the stress pattern is concerned. Nevertheless, the foot plays an important role in its templatic morphology (Poser, 1984, 1990; Itô and Mester, 1992). Thus, in the formation of a particular type of hypocoristics, so-called 'rustic girl's names,' the first two moras of the name are used for the truncated form (Mester 1990; *o-* is a honorific prefix):

(18)

a.	Yuuko	–>	o-Yuu
			(H)
b.	Ranko	–>	o-Ran
			(H)
c.	Yukiko	–>	o-Yuki
			(LL)

Again, the choice of two moras instead of one, or three, is not accidental: the minimal quantity sensitive foot consists of exactly two moras, i.e., it consists of either one heavy or two light syllables. Thus, by using the category 'foot,' this type of hypocoristic formation can be described in a very simple way: the output of the morphological process must be a minimal foot, filled with the first two moras of the base name.

In many languages, there are requirements on the minimal length that a word must have. Typically, words must be at least bimoraic, i.e., consist of a heavy syllable (in quantity-sensitive languages) or of two syllables regardless of weight (in quantity-insensitive languages). Prince and Smolensky (1993) analyze such word-minimality effects as the result of a constraint LexWd ≈ PrWd (see also Prince, 1980), requiring every lexical word to correspond to a prosodic word, hence, to consist of at least one foot. One of the cases they present is Lardil (data originally from Hale, 1973), a language in which words must be at least two syllables long and in which this requirement is satisfied by blocking vowel apocope or by triggering augmentation:

(19)	Underlying stem	Nominative	Nonfut. Acc.	Gloss
	Apocope			
	a. yiliyili	yiliyil	yiliyili-n	'oyster sp.'
	b. mayařa	mayař	mayařa-n	'rainbow'
	No change			
	c. wiṭe	wiṭe	wiṭe-n	'inside'
	d. mẻla	mẻla	mẻla-n	'sea'
	Augmentation			
	e. yak	yak**a**	yak-in	'fish'
	f. maṛ	maṛ**ta**	maṛ-in	'hand'

In Lardil, final vowels are deleted in the nominative (examples a and b). Apocope is blocked, though, when deletion would generate a subminimal form, i.e., when the stem corresponds to the minimal word, which in Lardil is disyllabic (examples c and d). When the underlying stem is already subminimal (examples e and f), it is augmented in the nominative, in order to obtain a minimal disyllabic word (the nonfuture accusative suffix is *-in*; the vowel of the affix is deleted when it is attached to vowel-final stems. Augmentation takes two forms: the stem is augmented with a vowel, if the stem-final consonant is an illicit coda in Lardil, it is augmented with a consonant and a vowel, if the final consonant is possible in the coda; see Prince and Smolensky, 1993, for details). We see that Lardil employs various strategies to obtain the disyllabic template when words risk subminimality. Again, there is a reason for disyllabicity: a unit of two syllables forms a typical quantity-insensitive foot.

Yet another argument for the existence of the foot as a prosodic category comes from the typology of stress patterns. We know that certain types of stress patterns are more marked than others. As Hayes (1995: 47) notes, this fact can be best expressed by using a foot-based theory to classify them. Thus, it has been claimed that right-aligning iambic systems do not exist (see, e.g., Kager, 1993a; Hayes, 1995; Hyde, 2002; Alber, 2005). In foot-based theories, we can single out the right-aligning iamb as a marked structure, whereas without the iambic foot as a category we would have to describe this observation as "systems with stress on odd-numbered syllables counting from the right do not exist." Without the concept of foot, it would be a mystery why these systems should be absent from the typology whereas, for example, "systems with stress on odd-numbered syllables counting from the left" are attested (see also Kenstowicz, 1993, for quantity-sensitive iambic grouping vs. quantity-insensitive trochaic grouping as evidence for foot-structure).

Evidence for the category foot also comes from foot-related phonological processes. Iambic lengthening and trochaic shortening are both processes that target the foot as a domain and thus bear witness to its existence. It is one of the important findings of Hayes (1985, 1995) that iambic feet are typically uneven in length (see earlier), thus taking an (LH́) shape. In many languages, this shape is obtained by a process, iambic lengthening, which lengthens every even-numbered syllable in a string of light syllables. The typical trochee, by contrast, is even in length, i.e., it consists of either a single heavy syllable (H́) or two light syllables (ĹL). Hence, in trochaic languages we do find processes of shortening by which an HL sequence is transformed into an LL seLquence, which then can be parsed into an even (ĹL) trochee (Prince, 1990; Mester, 1994; Kager, 1993a). An example of this process is English Trisyllabic Shortening, a process by which the antepenultimate vowel of the word is shortened (Prince, 1990):

(20)			
	a.	ó:men	óminous
		(H́)<σ>	(ĹL)<σ>
	b.	sá:ne	sánity
		(H́)	(ĹL)<σ>

Assuming that the final syllable is extrametrical, English Trisyllabic Shortening thus is a process by which an HL sequence arising through suffixation (ó:men+ous) is transformed into an LL sequence, which then can be parsed into a canonical trochee. Prince points out that strikingly the element to be shortened here is the stressed syllable, contrary to the widespread believe that stressed syllables are always lengthened and unstressed syllables shortened. Trochaic shortening thus is not a process linked directly to stress but to the more abstract properties of foot structure.

Finally, there are phonological processes whose environment of application has been claimed to be the foot. An example for such a process is aspiration in English. Voiceless plosives are aspirated when foot-initial, but not when foot-medial: e.g., *a(tʰómic)* vs. (*átom)*. Glottal stop epenthesis in German also can be interpreted as being, at least in part, foot-related (Wiese, 1996). Thus, morpheme-internally glottal stops are inserted before vowel-initial syllables, when these syllables bear main stress (e.g., *chaʔótisch* 'chaotic' vs. *Cháos* 'chaos') and, for some speakers, also when they bear secondary stress (*Mícha*ʔ*èl*, 'proper name'). Note, that it could be argued that the concept of *stressed* syllable is sufficient for describing the context of application of these rules, we don't have to resort to the category foot. There are,

however, processes where referring to the stressed syllable is not enough. For instance, in Pacific Yupik, a language with iambic rhythm, foot-initial consonants undergo fortition (Leer, 1985a, 1985b). Thus in the following example, the first [k] is not realized as fortis, because it is foot-medial, whereas the foot-initial [t] undergoes fortition:

(21) akutamɔ́k '(kind of food) (abl.sg.)'
(LĹ) (L̲H́)

Note that differently from processes such as aspiration in English and glottal stop epenthesis in German fortition in Pacific Yupik cannot be interpreted as a simply being a correlate of the *stressed* syllable. Fortition in fact targets the unstressed – but foot-initial – syllable.

See also: Creek; Generative Grammar; Generative Phonology; German; Japanese; Metrical Phonology; Phonological Words; Phonology: Optimality Theory; Prosodic Morphology; Quantity; Rhythm; Rhythmic Alternations; Syllabic Constituents; Syllable: Typology; Template Morphology; Word Stress.

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Foregrounding

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What literature is, how it works, and why it exists at all are some of the fascinating questions that the theory of foregrounding tries to answer. The term 'foregrounding' refers to specific linguistic devices, i.e., deviation and parallelism, that are used in literary texts in a functional and condensed way. These devices enhance the meaning potential of the text, while also providing the reader with the possibility of aesthetic experience. According to the theory of foregrounding, literature – by employing unusual forms of language – breaks up the reader's routine behavior: commonplace views and perspectives are replaced by new and surprising insights and sensations. In this way, literature sustains or creates individual self-awareness of automatized actions and preconceptions. It thus contributes to general

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creativity and development in societies. The theory of foregrounding is one of the few literary theories that has been tested empirically for its validity.

Foregrounding: The Term

The term 'foregrounding' may be used in a purely linguistic sense. In sentence structure, it then refers to new information, in contrast to elements in the sentence that form the background against which new elements are to be understood by the listener or reader. From this point of view, foregrounding bears resemblance to other (paired) linguistic concepts, such as theme/rheme, given/new, frame/insert, and subject/predicate. In the following discussions, the term will *not* be used in this narrow linguistic sense, but rather will be viewed as situated in the wider area of stylistics, text linguistics, and literary studies. There the term originates with Garvin (1964), who introduced it as a translation of the Czech *aktualisace,* a term common with the Prague Structuralists, especially Jan Mukařovský, who employs it in the sense of the English 'actualization.' This suggests a temporal category, i.e., to make something actual (rather than virtual). Garvin's translation has rendered this temporal metaphor into a spatial one, that of a foreground and a background. This allows the term to be related to issues in perception psychology, such as figure/ground constellations. It remains uncertain, however, whether this corresponds to what the Prague scholars had in mind.

In English, the term 'foregrounding' has come to mean several things at once. First of all, it is used to indicate the (psycholinguistic) processes by which – during the reading act – something may be given special prominence. Second, it may refer to specific devices (as produced by the author) located in the text itself. It is also employed to indicate the specific poetic effect on the reader. Furthermore, it may be used as an analytic category in order to evaluate literary texts, or to situate them historically, or to explain their importance and cultural significance. Finally, it is also employed in order to differentiate literature from other varieties of language use, such as everyday conversations or scientific reports. Thus the term covers a wide area of meaning. This may have its advantages, but may also be problematic: which of the above meanings is intended must often be deduced from the context in which the term is used.

Devices of Foregrounding

Outside literature, so the assumption goes, language tends to be automatized; its structures and meanings are used routinely. Within literature, however, this is opposed by devices that thwart the automatism with which language is read, processed, or understood. Generally, two such devices may be distinguished, those of deviation and those of parallelism. Deviation corresponds to the traditional idea of poetic license: the writer of literature is allowed, in contrast to the everyday speaker, to deviate from rules, maxims, or conventions. These may involve the language as well as literary traditions or expectations set up by the text. The result is some degree of surprise in the reader, and his/her attention is thereby drawn to the form of the text, rather than to its content. Cases of neologism, live metaphor, or ungrammatical sentences, as well as archaisms, paradox, and oxymoron (the traditional tropes), are clear examples of deviation.

Devices of parallelism are characterized by repetitive structures: (part of) a verbal configuration is repeated (or contrasted), thereby being promoted into the foreground of the reader's perception. Traditional handbooks of poetics and rhetoric have surveyed and described (under the category of 'figures of speech') a wide variety of such forms of parallelism, e.g., rhyme, assonance, alliteration, meter, semantic symmetry, and antistrophe.

Historical Background

It should be noted that, although formulated by the Prague Structuralists, the concept of foregrounding is not their own invention. In fact, foregrounding was a further historical development of ideas generated by the Russian Formalists, most notably those connected with the device of estrangement (Russian *priëm ostranenije*), as proposed by Viktor Shklovsky (*see* **Shklovsky, Viktor Borisovich (1893–1984)**). According to Shklovsky, the purpose of art is to make objects unfamiliar, so that a renewed perception of them creates a fresh awareness in the beholder, beyond the stale routines of automatized schemes. (Note, how also here, the perceptual metaphor plays an important role.) Thus, for Shklovsky (and his fellow Formalists), the devices used by writers are not merely there for ornamental reasons – they serve specific functions. Hence, the concept of foregrounding is also a theoretical one, which was later exported to the West by scholars such as Roman Jakobson, Felix Vodicka, and Rene Wellek. The theory was further refined in British stylistics, most notably by Geoffrey Leech (1969). (On the continuity between Formalism and Structuralism, see especially Erlich (1965) and Fokkema (1976); *see also* **Russian Formalism**).

Although in its present form the theory of foregrounding has been put forward most clearly in the

20th century, its roots can be traced back to Aristotle's *Poetics* (~335 B.C.E.). Time and again, Aristotle emphasized the fact that the literary text is made according to specific rules, and in this process, devices of deviation and parallelism play an important role. In *Poetics*, chapter 22, for instance, Aristotle stated that the diction of the literary work must be 'distinguished,' and that this effect is arrived at through the use of unfamiliar terms, metaphors, strange words, or lengthened forms. Through the influence of Aristotle's work from the Renaissance onward, this view of literature has gained a wide dissemination in Western culture. The theory of foregrounding can be seen as a more precise and more systematic elaboration of these ideas.

Descriptive Power of the Theory

The question should be asked whether foregrounding devices are universal. Few authors are explicit on this point, though in general the assumption seems to be that the answer should be positive. The presumed ubiquitous nature of foregrounding devices should not be taken in the sense that they all occur in literature all the time, but rather that various forms of parallelism and/or deviation do seem to form an integral part of the literatures of all known languages, cultures, and historical periods. If that is so, then the concept is a useful tool for analyzing and studying literature, both in the case of individual texts and in general.

This raises the issue of whether it is only a tool in the hands of the analyst, or whether processes of foregrounding also play a role in the mind of the reader. On the basis of empirical tests, it has been shown that the latter is the case. In a series of reading experiments, it proved to be possible, on the basis of the theory of foregrounding, to predict responses of readers to a number of texts. This was the case regardless of the readers' background or training. Research confirmed that a reader's attention is drawn by deviations, that these deviations cause the reader to process the text more slowly, that they cause an increase in affective responses to the text, and that they enhance aesthetic appreciation and change the reader's perception of the world outside the literary text (Van Peer, 1986; Miall and Kuiken, 1994; Hakemulder, 2004).

There are still several questions that remain to be answered. For example, when readers focus on the way a text is written rather than on its content, would this be a matter of convention or purely an effect that can be attributed to text properties? In other words, do readers process more carefully because they think literary texts are supposed to be read more carefully, or are they somehow forced by the text? Some research shows the influence of convention (Zwaan, 1993). Others studies, however, reveal that it is indeed foregrounding that causes such effects (Miall and Kuiken, 1994, 2001). Miall (1995) discussed how some research results in neuropsychology can be interpreted as support for the foregrounding theory. Hoorn (2001) conducted studies using electroencephalograms, revealing the cognitive-energetic surprise effect of literary metaphor processing. From his findings it can be concluded that semantic incongruency (foregrounding) causes a shock of surprise. Similar results have been found in experimental aesthetics (*see* **Literature: Empirical Studies**); complex and novel stimuli, including those in language, cause more arousal and hedonic pleasure than do common stimuli.

Not all of the research supports the hypotheses of foregrounding theory. Gibbs *et al.* (2002) examined emotional responses to literal statements, conventional metaphors, and novel metaphors. It was found that metaphors, compared to literal expressions, were rated as reflecting more intense speaker emotions, but contrary to what foregrounding theory would predict, no significant differences in responses to conventional and novel metaphors were found. However, on the whole, the results of reader response research reveal a clear tendency that favors foregrounding theory. (For text-oriented studies of foregrounding and how it may affect readers' aesthetic evaluation, as well as their interpretation of literary character and themes, see Simonton (1990), Culpeper (1996), Emmott (2002), and Van Peer (2002)).

Problems

The notion of foregrounding is not without problems. First of all, the relation between foregrounding and the evaluation of texts remains unclear. Does the presence of foregrounding devices increase a reader's sense of value of the text? There is only partial evidence for the existence of a relationship here. A more serious problem is the lack of a systematic inventory of devices and their relative importance. There is also terminological vagueness: are different terms, such as 'estrangement,' 'defamiliarization,' 'deautomatization,' 'foregrounding,' etc., synonyms, or do they correspond to slightly different psychological processes? In this respect, the similarities and differences with the more general (philosophical) notion of alienation through literature also should be clarified. A more precise description of the way in which the theory of foregrounding differs from other but similar theoretical constructs would also be welcome, e.g., Bertolt Brecht's theory of *Verfremdung* and similar notions in Surrealism, the Theater of the Absurd, and existential literature (the notion of aesthetic distance).

The Problem of Literariness

The presence of foregrounding devices in a text has often been used to determine the demarcation line between literary and nonliterary language. As has been observed by several linguists, however, foregrounding devices are also encountered in everyday language, e.g., in jokes, political slogans, nursery rhymes, and advertising texts. This has led most scholars to abandon the search for essentials of literariness, and to take a relativist stand, by concentrating on the conventional nature of what is called literature (*see* **Literature and the Language of Literature**). However, there may still be ways in which to solve the problem. To begin with, it is possible to distinguish between functional and nonfunctional cases of foregrounding. Perhaps only the former should be considered as literary. When someone accidentally produces an iambic pentameter in a scientific report, the formal structure does not in itself render it a case of foregrounding. Here Mukařovský's distinction between artifact and aesthetic object is useful. Second, we should not lose sight of the fact that some text genres (such as jokes, nursery rhymes, and advertisements) do display characteristics typical of literature, in form, function, and effect. The apparent problems of the concept of foregrounding in this respect are thus caused by the fact that the academic study of literature neglects a number of text genres (*see* **Genre and Genre Analysis; Text and Text Analysis**), such as oral texts, which are in no way categorically different from the texts traditionally studied in literature departments. If this is so, then the problem resides with the refusal of literary scholars to employ the term 'literature' in a descriptive, nonevaluative sense (*see* **Literature and the Language of Literature**). Finally, the problem may also be solved by pointing to the coherence and density of foregrounding, i.e., the degree to which the foregrounded elements can be integrated into the structure and interpretation of the work as a whole, or to the more systematic and consistent nature with which it is used in literary works (*see* **Cohesion and Coherence: Linguistic Approaches**).

A similar problem has arisen with respect to the device of parallelism. It has been demonstrated that patternings of the kind proposed by foregrounding theory may also be detected in scholarly articles, or in newspaper articles from *The Sunday Times*. In a sense, this is to be expected: because the repertoire of elements in a language (for instance, the number of phonemes) is finite, repetition is bound to occur. What has been overlooked in this matter, however, is the fact that the presence of patterns in nonliterary texts does not necessarily lead to new and/or interesting interpretations of those texts, nor do these patterns as a rule have a poetic effect on their readers. Presumably, parallelism in literary texts is distributed according to principles other than those of probability (as is the case in nonliterary texts). What is perhaps lacking most from the theory is a criterion for selecting those elements that are crucial to the literary functioning of the text.

Foregrounding and Literary History

The concept of foregrounding has been made use of most in textual analysis. It is a useful tool to describe particular characteristics of the text, or to explain its specific poetic effects on the reader. It may also fruitfully be employed to establish a link between a purely linguistic description and the functioning of literary texts in a culture at large. There is more to the concept of foregrounding than analyses of individual literary texts, though, and its importance should certainly not be reduced to this contribution.

Foregrounding has also been a useful concept in the study of visual arts and spectator responses (e.g., Krampen, 1996; Hakemulder, 2005). In this regard, it has played an important role in the Russian Formalists' approaches to film (Eagle, 1981). Their interest was partly inspired by the ideas and films of Sergei Eisenstein (e.g., *Battleship Potemkin*, 1925). Later, defamiliarization techniques were put to work by Bertolt Brecht, not only in his theater productions but also in films (*Kuhle Wampe*, 1931, and *Hangmen Also Die*, 1943). In general, in the visual arts, foregrounding refers to drawing spectators' attention to some element in a film by means of unusual filmic devices. Wollen (1982) refers to foregrounding to define counter-cinema (opposing mainstream cinema); for him it describes the spectators' focus on processes of construction of meaning. Examples would be fixed positioning of the camera, and the deformation of familiar objects through filters, mirrors, and extreme close-ups. Of immense impact on film studies is the work by Bordwell (1985), who was also influenced by the ideas of Russian Formalists, and for whom deautomatization is a central concept in the study of film. In his terminology, foregrounding is a deviation from intrinsic norms.

Foregrounding theory can help in conceptualizing literary history. By inspecting the way in which foregrounding operates in the literary system at large, its importance for the historical study of literature may transpire. It is conceivable that foregrounding devices may, because of their very use, lose their defamiliarizing potential, and thus they stand in need of constant replacement. In this way, history can be

viewed as a continuous wavelike substitution and renewal of the devices and processes by which foregrounding operates. The individual work of literature exists in an unavoidable tension between its conformity to tradition and the pressure it is under to add some innovative aspect to this tradition. Literary history, then, is the never-ending relief of new ways in which foregrounding is brought about and experienced (see Martindale, 1990).

See also: Cohesion and Coherence: Linguistic Approaches; Genre and Genre Analysis; Literature and the Language of Literature; Literature: Empirical Studies; Russian Formalism; Shklovsky, Viktor Borisovich (1893–1984); Text and Text Analysis.

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Abstract:

What literature is, how it works, and why it exists at all are some of the fascinating questions that the theory of foregrounding tries to answer. The term 'foregrounding' refers to specific linguistic devices, i.e., deviation and parallelism, that are used in literary texts in a functional and condensed way. These devices enhance the meaning potential of the text, while also providing the reader with the possibility of aesthetic experience. According to the theory of foregrounding, literature – by employing unusual forms of language – breaks up the reader's routine behavior: commonplace views and perspectives are replaced by new and surprising insights and sensations. In this way, literature sustains or creates individual self-awareness of automatized actions and preconceptions. It thus contributes to general creativity and development in societies. The theory of foregrounding is one of the few literary theories that has been tested empirically for its validity.

Biography:

Jèmeljan Hakemulder's background is in literary theory and comparative literature. He conducted his Ph.D.-research (1998) at the department of Literary Studies at Utrecht University and the Department of Psychology at the University of Illinois (Urbana-Champaign). He specialized in the psychology of literature, focusing on the effects of reading literary texts on attitudes. On this subject he published several books and articles, among which *The moral laboratory. Experiments examining the effects of reading literature on social perception and moral self-concept* (Amsterdam: Benjamins, 2000), and in 2004 "Foregrounding and its effects on readers' perception" (*Discourse Processes, 38,* 193–218). From 1998 to 2001 he conducted his (post-doc) research at the Free University of Amsterdam, looking at aspects of literary communication that may be responsible for the effects of reading on intergroup attitudes. Since 2001 he is an assistant professor at the Institute for Media and Representation (Utrecht University), and conducts studies concerning the reception of film.

Biography:

Willie Van Peer studied linguistics, literature, and philology. He received his Ph.D. in 1980 from the Department of Linguistics of Lancaster University (UK). After teaching jobs in Belgium and Algeria, he worked in text linguistics at the University of Tilburg and in theory of literature at Utrecht University, both in the Netherlands. He was appointed to the professorship of Intercultural Hermeneutics in the Department of Languages and Communication at the University of Munich in 1997. His main areas of research are the theory of literature, stylistics, intercultural studies, and the empirical study of literature. He is the author of *Stylistics and Psychology: Investigations of Foregrounding* (London: Croom Helm, 1986) and editor of *The Taming of the Text. Explorations in Language, Literature, and Culture* (London/NewYork: Routledge, 1988). Together with Seymour Chatman he edited *New Perspectives on Narrative Perspective* (Albany, NY: SUNY Press, 2001); with Max Louwerse he edited the interdisciplinary volume *Thematics. Interdisciplinary Studies* (Amsterdam/Philadelphia: John Benjamins, 2002).

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Foreign Language Teaching Policy

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Defining Foreign Languages

As used here, the term 'foreign language teaching' refers to two phenomena: (a) the provision in one country of instruction in a language whose home base is another country, and (b) instruction in a transnational language such as English or Arabic whose identification with a particular country is minimal. Policies with respect to both of these phenomena will be referred to as foreign language policies. In most countries, the second type of foreign language is becoming more important than the first in foreign language teaching policy.

It is also important to note that in many countries the division between domestic and foreign languages is imprecise. In Canada, French is a regional language, serving as the official language of Quebec, and it is the first non-mother-tongue language taught to children in the non-Francophone portions of Canada, and it is also taught as a foreign language. Tamil is both a domestic and a foreign language in Sri Lanka. Turkish and Arabic are both foreign and immigrant languages in many of the cities of Europe. Spanish was at first an immigrant language in the United States. It has become a strong regional language in California, Florida, and the American southwest, and it is the foreign language with the largest enrollment in schools and colleges throughout the United States. Modern Standard Arabic is taught in countries in the Maghreb and the Middle East, where it is often used in official and educational venues, but it is somewhat different from the spoken vernaculars in those countries.

Foreign Language Policy Decisions

With respect to the teaching of foreign languages, there are a number of interconnected policy decisions that administrators and educators must make. First, they must decide the relative emphasis to give to foreign languages in both educational and public affairs. In addition to this general decision, there are a series of more specific architectural decisions about the organization of foreign language teaching in the formal education system that have to be made: (a) when to start foreign language instruction; (b) what proportion and what kinds of students will receive foreign language teaching as a mandatory or as an optional subject; (c) in what grades and for how many hours or years should foreign languages be taught; (d) should the foreign languages be taught as subjects to be studied or as media of instruction in teaching other subjects; (e) how many and which languages should be taught; (f) how should standards of achievement be set and assessed, and (g) how to recruit and train teachers. With a few exceptions, in most countries the precise form of foreign language pedagogy to be used is not the subject of official policy, leaving the choice to individual teachers and textbook publishers.

Categories of Countries by Linguistic Context

While most scholarly attention to foreign language policy has concentrated on Europe, it is instructive to examine it more broadly throughout the world. In doing so, it is useful to divide countries into a number of categories according to differences in the linguistic contexts in which they teach foreign languages. Each of the linguistic contexts makes a difference in both the emphasis given to foreign language education and how the system is structured. The classification of countries used here is (1) mosaic countries with a large number of important domestic languages; (2) monolingual countries where languages other than English are the primary mother tongue; (3) English-mother-tongue countries, (4) Continental Europe. The rank order of these categories roughly parallels differences in the relative importance of foreign language teaching, ranging from little to highly important.

Mosaic Countries with Numerous Important Domestic Languages

The majority of countries in the world have five or more important indigenous languages. In many such countries, the overwhelming language policy issues are concerned with the development and relative standing of multiple national languages, and the languages of major important regional minorities, autochthonous peoples, and immigrant groups. Foreign language instruction tends to be given limited importance. This situation is characteristic of many of the countries of Africa where the official status of the many indigenous languages is under negotiation,

and where corpus language policy issues such as the determination of standard versions of indigenous languages, the development of scripts, the promotion of literacy, and the management of the transition from vernaculars used in the home to standardized school languages are still major tasks for language policy makers. Where foreign language instruction is developed in mosaic countries, the language studied tends to be English as a world language, and to a lesser extent French, in former French colonies. In many of the latter countries, the proportion of students enrolled in the study of English as opposed to French is rising. In Cambodia, for instance, when students are given a choice, they choose English over French by a two-to-one margin. In Vietnam, another former French colony, about 90% of the schools teach English as the first foreign language.

Where colonial or foreign languages are taught in mosaic countries, the teaching tends to be in private schools, or, when in public schools, at the secondary and tertiary levels, often on an optional basis. Knowledge of the colonial language serves as a screening device for upward mobility and entrance into the cosmopolitan environment. Only rarely is more than one foreign language offered or taken in mosaic societies.

Non-European Linguistically Homogeneous Countries

In countries outside of Europe where a single domestic language predominates, foreign language instruction tends to concentrate almost exclusively on English. In Japan, for instance, the teaching of English has been a focus of language policy since the Meiji restoration, although only recently for the general populace. Although the study of English is not a compulsory subject, 90% of Japanese students receive English instruction. Other foreign languages are given much less emphasis. When taught, non-English foreign languages tend to be in private schools, in universities that specialize in the teaching of foreign languages, and in schools that prepare business people for foreign assignments.

The teaching of English presents special problems for countries such as Japan, whose home languages belong to unrelated language families. For one thing, students take considerably longer to master the language. Second, it is difficult to train teachers so that they can approximate native speakers and can employ teaching strategies different from those they are accustomed to in learning or teaching their own language. The Japanese solution to these problems is to import British and American students to serve on a temporary basis as native speaker assistants in Japan and to send Japanese teachers into classrooms in the United States in which Japanese is taught to perform similar functions and to observe American language teaching styles. Other countries use study abroad for raising the command of English among their teachers, and the development of country-specific varieties of English enable countries to train their teachers at home.

A similar emphasis on the teaching of English is found in most Southeast Asian countries—Brunei, Burma, Hong Kong, Indonesia, Laos, Malaysia, Philippines, Singapore, and Thailand—and in the countries of Central and South America. China, while a mosaic country with extensive internal linguistic variety, with respect to the teaching of foreign languages it acts like a monolingual society, promoting the overarching *lingua franca* Putonghua, and it teaches English as the primary foreign language. English is taught selectively in some secondary schools, and China is experimenting with requiring it at the college level.

Israel has a large (18%) Arabic-speaking minority which by and large resides in a separate sector of the country. In the Jewish sector, 60% of the population was born outside of the country and speaks a wide variety of languages. The official government statement on foreign language teaching, *1996 Policy for Language Education in Israel*, makes provision for language maintenance of immigrant languages. However, in language policy, it tends to act like a non-English speaking monolingual or bilingual country. The official language of Israel is Modern Hebrew, but in the Palestinian portion of Israel, Modern Standard Arabic is taught. In the two linguistic sectors, the teaching of each other's language is required. Foreign language instruction is by and large confined to English, which all students are required to study at the elementary and secondary levels.

English-Mother-Tongue Countries

In all of these countries, the presence of English, the world language—one that is predominant in international discourse, in science, business, and in a large sector of the popular entertainment culture—lowers the motivation for governments and educational institutions to teach other languages and, most important, for students to study them. The more general humanistic motivations for studying a foreign language—personal enrichment and multicultural understanding—are less persuasive to both students and educational administrators.

Furthermore, in each of the English-mother-tongue countries, policy toward domestic languages demands a substantial amount of attention. In New Zealand,

the primary issue is the maintenance of Maori. In the UK, it is the support of regional minority languages: Welsh and Gaelic. In Ireland it is the rejuvenation of Irish. In Australia it is the maintenance of the aboriginal languages, and support for immigrant languages, there called 'community languages.' In the UK, it is problems with the languages of the South Asian immigrant communities. In the US, it is the provision of early education in the home language for immigrant children legally designated as having Limited English Proficiency (LEP), some 3 million students, or about 6.7% of all students. Three-quarters of LEP students are Hispanic.

The countries where English is the mother tongue may in turn be divided into two categories: (a) those located in continents far from Europe such as Canada, Australia, and the US; and (b) the UK and Ireland in which the foreign language teaching system is a more limited version of mainland Europe.

Category (a) English-Mother-Tongue Countries Distant from Europe The major countries in category (a)—Canada, Australia, and the United States—have extensive foreign language teaching systems, but in scale and reach they are considerably more limited than in those in Continental Europe. They tend to start later, reach a smaller per cent of educational institutions, are less mandatory, and have sharp drops in enrollment and major pedagogical gaps across educational levels.

Foreign language policy making in each of these countries is largely decentralized, the responsibility of provincial, state, or local governments, or, in the United States, of individual school districts, schools, and teachers. Accordingly, the language educational systems vary significantly from one section of the country to another, with some sections relatively strong in foreign language teaching and other sections weak. Australia has had a number of attempts at centralized policy making for foreign language teaching systems (Lo Bianco, 1987), and for several decades the study of foreign languages has been actively promoted both by government and by university-based centers established for this purpose. However, support by the Commonwealth government has waxed and waned over the years. The United States has no mechanism for national foreign language planning, nor has there been any sustained national advocacy for the expansion of the foreign language teaching system. Moreover, all policy, where there is one, is made at the level of the state, the school district, and the individual teacher.

In one respect, category (a) English-mother-tongue countries distant from Europe have more fully developed foreign language educational systems than the UK and Europe. Because they do not need to teach English as a foreign language, and because the expectation is somewhat less that their citizens will come to actively use their foreign language competencies as adults, particularly with respect to European languages, the choice of which languages to teach is somewhat freer. Accordingly, each country has dedicated a portion of its system to expanding the geographic coverage of the languages taught. In the western part of Canada, the substantial immigration from Asia has increased the number of students who elect to study Asian languages. Australia has provided substantial Commonwealth government support to an initiative called National Asian Languages and Studies in Australian Schools (NALSAS). Its goal was to expand the coverage of Asian languages. As a result, in 2000 some 23.4% of Australian students, about 750 000 of all students, were studying an Asian language.

In the United States, which languages are taught is heavily influenced by the preferences of students, and they have drifted away from traditional European languages. Before World War I, most students who studied a foreign language in school were enrolled in Latin and Greek. In the early decades of the twentieth century, language choice followed the British and European pattern of emphasizing German and French. In recent years, enrollments in the United States have shifted overwhelmingly to Spanish, not as a European language but as a language of the Americas. In addition, U.S. governmental policy has fostered the growth of instruction in a great many of the non-Western languages of East Asia, Eastern Europe, and the Middle East. They were introduced first in the universities but are now spreading into colleges and secondary schools. Even primary schools have seen an increase in the study of non-Western languages. While they represent only 2% of enrollments in secondary schools, led by Chinese and Japanese, their enrollments have been increasing. At the collegiate and university level, 21% of the students enrolled in foreign language classes are studying a non-Western European language. It takes longer for English speakers to master these languages. According to the Defense Language Institute in the United States, which teaches many languages, it takes about five times longer for an English speaker to learn Japanese or Chinese than to learn French or German. As a consequence, a number of architectural challenges arise for foreign language teaching systems: a shortage of qualified teachers; low enrollment classes, particularly at the advanced level; and special problems of using immigrant native speakers as

instructors who are untrained in foreign language pedagogy and have a limited knowledge of the language of the students they are teaching.

The individual countries in category (a) differ considerably in the architecture of their foreign language teaching systems. Canada is a prime example of a linguistically binary country (Lambert, 1999), that is, a country in which two sections of the country have different mother-tongues—in this case English and French. The rationale for Canada's bilingual education program is primarily domestic, the promotion of a single national identity in a culturally divided country. It is not the promotion of foreign language skills. If the teaching of French in the Anglophone sections and the teaching of English in Quebec were considered foreign language instruction, Canada's foreign language education system would be among the most extensive in the world. Indeed, its innovations in second-language teaching have introduced a variety of new pedagogical practices, particularly in the development of immersion language instruction, which have influenced foreign language instruction throughout the world. In the full-immersion system, children start to study the second language in early primary school years, and throughout their schooling a variety of subject matter courses is taught in the second language. Second-language instruction can require up to 5000 hours of instruction time in the primary and secondary school years, although most students receive a lesser amount of language education.

In Australia, most states and territories require students to take at least 3 years of a foreign language. Language education generally starts in primary school, but in the early years it is primarily aimed at cultural awareness rather than skill acquisition. In many states, language study is mandatory from mid-primary school through grade 8 when compulsory language instruction stops. This results in a huge drop in enrollments in school years 9 and 10, when fewer than 50% of students study languages other than English. By year 12, the per cent has dropped even further to only 13.2%. One survey noted: "The general level of language study in Australia has fallen dramatically in the past twenty-five years. In the 1960s, about 40% of final year school students studied a language other than English. Today fewer than 1% of all higher education students complete a language unit at any stage in their course" (Erebus Consulting Partners, 2002: Chap. 2, p. 11).

In the US, only about one-third (31%) of elementary schools offers foreign language instruction, but only about 15% of all students receive it. Moreover, in elementary school at least half of the courses tend to be pointed toward general language familiarization rather than the attainment of proficiency. As in Australia, most of them provide less than two hours per week of language instruction. While 86% of U.S. secondary schools provide foreign language instruction, usually for five hours per week, enrollment is generally optional, and 40% of secondary school students receive no foreign language instruction at all. Moreover, the duration of language study tends to be limited—80% of enrollees receive two years or less of language study. Only about 50% of the students enrolled in any one year of language study continue to the next level. In the year 2000, only 13.2% of all students at grade level 12 were enrolled in foreign language courses (Lambert, 2000), and only about half of secondary school students receive any foreign language instruction at all. A substantial portion of students who study a foreign language begin that study at the college level. Half of these post-secondary institutions require that by the time their students graduate from college they have had some foreign language study at some point in their education, sometimes just a year. However, only 10% of all college students study any foreign language while they are in college.

Although the United States has no mechanism or tradition of centralized language planning, there has been one major governmental initiative born in its diplomatic and military training programs that has had a major effect on foreign language teaching policy throughout the country. Those government schools and training programs developed a system of oral interviews and a laddered scale of descriptors to measure the level of language proficiency. This technology was adopted by one of the major foreign language teachers' organizations, the American Council on the Teaching of Foreign Languages (ACTFL), which diffused it widely throughout the field. The ACTFL scale together with the development of a related set of language-specific standards, effectively promoted the shift from the grammar-translation pedagogical style to the more interactive, oral, less grammar-oriented pedagogical style.

Category (b) English-Mother-Tongue Countries in Europe In those English-speaking countries neighboring continental Europe—the UK and Ireland—the scale of their foreign language teaching systems falls midway between the more fully developed systems in Europe and the other, distant from Europe, English-mother-tongue countries. Like the other English-speaking countries, the UK accommodates several regionally distinct languages—Welsh and Gaelic—but the domain of those languages remains almost

entirely within the UK, in Wales and Scotland, on home territory.

With respect to the study of foreign languages, the UK remains behind its European partners in total modern foreign language education. In continental Europe, pupils start earlier and continue longer.

In the UK in general, the National Curriculum for Modern Foreign Languages requires by statute the study of a foreign language in secondary schools where the average amount of time is 140 minutes per week or about 10% of classroom time. Achievement levels also are nationally specified. The intention is to have all students from ages 11 to 16 study a foreign language for about 120 minutes per week. Students can opt to study a second language in secondary school, but only 5% of the students do so, down from 10% five years earlier. The government has made the study of any foreign language optional for all 14- to 19-year-olds and limited statutory requirements to 3 years, resulting in a 50% drop in instruction in state schools. This would be offset by the provision of an entitlement program making foreign language instruction available at the primary level. The study of a foreign language in upper secondary school is optional, and only about 10% of the students study one. It is predicted that this will result in the wholesale dropping of language study by vocationally oriented students.

Throughout the school system, instruction in modern foreign language is heavily concentrated on the Western European languages: 62% in French and 25% in German, although the number of students sitting for A-level exams in Urdu, Russian, and Japanese has increased. As in the United States, England has a substantial amount of foreign language education in higher education. It may be taught in a language or discipline department or in a school of foreign languages that serves both majors and students training to be specialists in other disciplines. Languages may be taught *ab initio* for beginning students or advanced for those who have taken A level exams in a language prior to admission. At the university level, 34% of the courses given are in French and 32% in German. The rest of the courses are primarily in Italian or Spanish.

England has played a central role in the development of pan-European language policy in the Council of Europe and in such collective foreign language advocacy efforts as Europe's Year of Language. It has had major continuing foreign language advocacy centers such as The Centre for Information on Language Teaching and Research (CILT) and the Nuffield Foundation.

Ireland's foreign language educational system resembles that of the UK but on a somewhat smaller scale. It does not make the study of foreign languages a compulsory subject. Rather the emphasis is on the teaching of Irish, the historic language of the country. However, in practice most students do study a foreign language. For instance, students in the 12- to 14-year-old age group spend about 140 minutes per week in the study of foreign languages. As in the UK, the languages most frequently studied are French and German.

Continental Europe

In many respects, the home of foreign language instruction lies in Europe. In terms of the policy decisions that must be made, most of these countries start foreign language instruction earlier, promote it more aggressively, make it more compulsory, continue it longer, require or recommend that each student study a larger number of languages, assess it more deliberately and consistently, are more likely to use it as a medium of instruction, are more likely to establish a centralized assessment system, and are more systematic in developing explicit national policies than the countries in the other three linguistic categories of nations.

The enhanced scale and strength of European foreign language teaching systems rest in part on the fact that a majority of the population—53% according to a Eurobarometer survey of residents more than 15 years of age (European Commission, 2003)—reports the capacity to carry on a conversation in a foreign language, and the proportion is even higher for younger age groups. Moreover, 93% of those surveyed believe it is important that their children learn other European languages. There is some variation among European countries in the extent of adult multilingualism. The Luxembourgers, Netherlanders, and Danes do best, while Russians, Spaniards, and Poles report less competency. The French come somewhere in the middle. The level of adult support for multilingualism is both cause and effect in determining the scale of foreign language teaching systems.

There is a considerable difference among countries in the architecture of foreign language teaching. A number of comparative inventories are available that compare different systems (Bergentoft, 1994; Dickson and Cumming, 1996; Eurydice, 2000). John Trim describes some of the major determinants of the scale of development of foreign language teaching within European countries. He reports that "a country is more likely to value L2 proficiency if (1) it is internally multilingual (established territorial minorities); (2) it is a small country, but not

geographically or politically isolated; (3) its neighbors speak a different language; (4) its own language is not widely spoken and not used as a vehicle for international communication; (5) its export/import trade is a higher percentage of GDP; and (6) its travel trade is a higher proportion of foreign trade and GDP." (Trim, 1994: 12).

In addition to differences in overall scale, individual countries within Europe make different choices in the various features of their language policy. Traditionally, the study of a foreign language was a requirement for the academically oriented. Now almost all European countries by law require the study of at least one foreign language for all students. In many countries, the study of two foreign languages is required—for instance, in Belgium, Denmark, Finland, Greece, The Netherlands, and Sweden—and in the others the study of a second foreign language, while provided, is voluntary, with schools and students given varying degrees of choice. There is more variation in upper secondary education, where some academic specialties such as classics, humanities, economics, and the social sciences emphasize foreign language learning, and other academic specialties do not. In many of these countries, there are schools specializing in foreign languages.

One of the indicators of the degree of a country's commitment to foreign language study is the age at which the first foreign language appears on the compulsory curriculum. In most European countries students must start learning a foreign language between the ages of 8 and 12. In Austria, Italy, Luxembourg, and Norway, they start at age 6 or 7. Most students continue language study for about 10 years, receiving from 135 to 180 minutes per week in language classes. Most countries only teach foreign languages as subjects, using them as media of instruction in limited subject matter areas such as science or special, vocationally oriented courses such as travel and trade. Luxembourg, however, maintains a full-immersion system with all subject matter courses taught in French or German throughout the educational system, as well as Letzeburgisch, the local language. Their students tend to go to France or Germany for advanced education.

One of the most important language policy issues that tend to be determined at the national level is which foreign languages to teach and in what order. While the international goal is the creation of a pluralistic Europe in which all citizens learn the languages of one or a number of other countries of the region, in almost every country in Western Europe the first foreign language taught and taken by most students is English. In the binary and triad countries such as Belgium and Switzerland, the predominant languages taught—French, German, or Italian—are those of both an internal linguistic region and of a neighboring country. In the countries of Eastern Europe that were formerly under Russian hegemony, German is often substituted for the formerly compulsory Russian, but the teaching of English is spreading.

Almost all European countries have explicit, comprehensive foreign language plans. Sometimes they result from private surveys exploring existing strengths, needs, and weakness, such as the The Netherlands's *Horizon Taal* (van Els, 1990) or the Nuffield Foundation surveys (Moys, 1998). More often, these plans comprise the organization and specific goals of foreign language study (e.g., Sweden's National Agency for Education, 2001). One of the most remarkable aspects of European language policy is the influential role of international organizations—in particular, the Council of Europe and the European Union—in advancing foreign language teaching policy across Europe.

Since the adoption of the European Cultural Convention in 1954, the Council of Europe has been engaged in creating a transnational consensus on foreign language teaching policy. Its varied activities have had an immense impact on member countries' own policies. The Council assisted in countries' assessments of their language needs. It was central to the transformation of language pedagogy from a grammar-translation format to one emphasizing communicative language competence. It developed manuals setting learning objectives and goals for several levels of foreign language proficiency. The first manual, published as *Threshold Level 1990* (van Ek and Trim, 1998) changed the focus of language teaching from what the learner needs to know to what he or she must be able to do to function adequately in a foreign language. The first and most general model, the Threshold Level, has been formally adopted throughout Europe to cover 20 languages. Using a similar approach, a Waystage model was also developed for a more elementary level of competence, and later, a model for more advanced learners called Vantage Level. The Council (Council of Europe, 2001) issued a more comprehensive Common European Framework of Reference for Languages: Learning, Teaching, Assessment. It covers more generally a wide variety of policy issues in language learning. It also establishes a hierarchy of levels of language proficiency that can be used across languages and countries in Europe. This skill hierarchy differentiates

proficient, independent, and basic language users, and provides specific skill level descriptors for listening, speaking, and writing. This general scaling of language competencies as expressed in the Common European Framework is intended to be applicable across languages and countries (Language Policy Division, 2003). A number of countries, e.g., The Netherlands and England, have already begun to calibrate their own systems of ranking language skill with those of the Common Framework, and more countries are working toward that end. Moreover, these internationally agreed upon scales of competency are also intended to be used by individual learners in making up a language portfolio to provide evidence of their language skills for use in education, transnational employment, or international travel.

In the other major European international organization, the European Union (EU), during the early years, in matters relating to foreign language policy attention was concentrated primarily on matters of economic or vocational relevance. The European Commission has adopted a much wider perspective on the promotion of foreign language learning throughout Europe (European Commision, 1997). Specific EU funding programs have been especially productive in enhancing the foreign language education system. The LINGUA program within SOCRATES supported training opportunities for language teachers to study abroad. The LEONARDO DA VINCI program supported the development of language skills for international business. A new program, COMENIUS, is primarily concerned with language education in schools.

Future Developments

It is difficult to predict the future of foreign language teaching policy. How long the seemingly universal trend of teaching English as the first foreign language will continue is unclear. There are some who hope its role will diminish (Phillipson, 2003) and others who predict its hybridization and possible loss of supremacy (Graddol, 1997, 2004). Were English to cease being the first foreign language to be taught around the world, it is difficult to predict what would succeed it. The perennial drive to spread the use of Esperanto as a common world language has had only modest success (Corsetti, 2003). And whether Europe will complement its inward-looking policy and adopt a broader range of foreign languages to teach is problematic. However, the teaching and learning of foreign languages will remain high on the world's agenda.

See also: English: World Englishes; Language of Tertiary Education; Language Planning and Policy: Models; Language Policy in Multilingual Educational Contexts; Languages of Wider Communication.

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Formal Models and Language Acquisition

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The project of understanding how children acquire language faces enormous empirical challenges in characterizing the development of children's linguistic knowledge, understanding how that knowledge arises (given innate constraints and linguistic and non-linguistic input to the child) and specifying the neural, cognitive, and social processes in which language acquisition is rooted. But an equally substantial challenge concerns the theoretical problem of language acquisition. How, in principle, is it possible to derive the spectacular richness and complexity of adult linguistic performance from the apparently unsystematic and impoverished input available to the child?

Formal models of language acquisition attempt to address this question: to explain how language acquisition is possible at all. The strategy of formal models is abstraction. Rather than attempt to incorporate the detailed knowledge that has been obtained through empirical research, formal models typically focus on a highly schematic and idealized picture. This high level of abstraction in inevitable, if a mathematical analysis of the acquisition problem is to be viable. Just as in any area of natural or social science, extreme simplification is a precondition for mathematical analysis. It is also, arguably, desirable in any case, because simplifications allow a clarification of core theoretical and empirical issues, which might otherwise be buried in endless details. Nonetheless, idealization has its perils. We shall see below that the particular idealization adopted of different aspects of the learning problem can often be of great theoretical significance.

The rather abstract character of formal models of language acquisition has a very different flavor from the much more concrete and descriptive character of most psychological and linguistic research into how children learn language. Formal models frequently abstract away from details that much of the rest of the field of language acquisition research is concerned to characterize.

Ultimately, though, empirical and formal approaches to language acquisition are unavoidably intertwined. Attempts to develop broad theoretical arguments concerning how children learn language, which are crucial to organize and understand the wealth of empirical data, inevitably involve radical abstraction and idealization. For example, arguments for innateness based on the poverty of the stimulus (and counter-arguments against this position) are pitched at just the high level of abstraction that demands, and has received, formal attention. More broadly, just as in other areas of science, it is reasonable to demand that informal theoretical claims can be made formally rigorous, at least in certain idealized settings. Yet just as the empirical study of language acquisition needs formal models, so equally do formal models rely on the results of empirical research to set out the key phenomena that a theory of language acquisition must capture.

In the rest of this article, we introduce the problem of language acquisition in general terms, as a problem of inductive learning, and outline certain general puzzles concerning how learning of this type is possible. We then consider a range of specific formal analyses of aspects of the learning problem and we shall see that different idealizations appear to support very different qualitative conclusions about the nature of language acquisition. We shall, moreover, attempt to connect the discussion of formal modeling work with empirical constraints, qualitative theoretical analysis and computational modeling, emphasizing that formal models of language acquisition should be integrated with the wider scientific problem of understanding how children acquire language.

Language Acquisition as Induction

It has become standard to view the problem facing the child in the following terms. Language is governed by a highly complex set of regularities; the child is exposed to a finite set of examples of linguistic stimuli

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that conform to these regularities; the goal of the child is to infer the regularities; these regularities then underpin the successful learner's generation of language in conformity with these regularities, so that the output of the successful learner can serve as input to future learners. In this way, language can be propagated from generation to generation.

This perspective sees the child's objective as, in part, theoretical: a key goal of the child is to infer the regularities of natural language from their instances. This view is an instance of the more general problem of theory-induction. Given data of whatever kind, whether linguistic, astronomical, or chemical, the task is to infer a theory of the domain in question, from observations of data from that domain. This general problem of theory induction thus immediately invites formal analysis, independent of the specifics of language acquisition.

A well-known result in the philosophy of science and statistics seems to yield a disconcertingly negative conclusion. The result is that theories are underdetermined by any finite quantity of data: that is, for any finite body of data, there will be infinitely many theories that are compatible with that data but that diverge arbitrarily when applied to non-observed data. How then, can a language learner pin down the correct regularities from a finite sample of language, so that the learner can generalize freely and creatively in generating new language? There is a range of possible responses to this query, focusing on, among other things, the available linguistic input, innate constraints, or the criterion of successful learning.

Regarding available linguistic input, perhaps the child has access to additional sources of empirical information that help pin down the correct regularities in the language. For example, perhaps the child receives and is able to use so-called 'negative evidence' – invalid linguistic inputs, somehow signaled as such (Brown and Hanlon, 1970). Or, somewhat implausibly, perhaps the child somehow has access to explicitly stated rules of linguistic correctness, as is typical in the instruction of second language learners. Or alternatively, it may be suggested that the connection between the structure of linguistic inputs and their meanings provides a rich set of additional constraints, and so on.

Regarding innate constraints, perhaps the child does not learn certain aspects of language from experience at all, but has an innate preference ordering over possible grammars of the language, and that it chooses the most preferred of these that is compatible with the current linguistic data (Chomsky, 1965). Or perhaps certain universal principles of grammar are innately fixed, and hence will be evident in all human languages, and the child merely needs to throw a number of switches during the acquisition process in order to choose the correct grammar (Chomsky, 1981).

Finally, regarding the criterion of successful learning, we might ask whether learners really do agree on the regularities in the language at all; or whether they may have different characterizations of these regularities, which merely happen to agree (mostly) in practice.

For each of these proposals, we can usefully ask complementary empirical and formal questions: What is the empirical evidence that this sort of information, constraint, or learning criterion is applicable to the child? And how would any such proposal modify the formal learning problem? We shall consider a selection of issues concerning the formal learning problem, below.

Do Learners Really Converge on the Same Regularities?

A slightly stronger result than the under-determination result mentioned above is that, even if we fix the complete (typically infinite) set of data over which our theory is to operate, there will be infinitely many ways of capturing the regularities in that domain (clearly the precise statement of this kind of result depends on how we use 'regularity'). For example, consider the infinite set of sentences generated by a phrase structure grammar. There will be infinitely many other phrase structure grammars that generate precisely the same sentences (just observe the indefinite number of ways in which rules and categories can be pointlessly duplicated; there are also much less trivial cases). It may turn out to be important that language learners can pick out some 'generatively equivalent' grammars rather than others. For example, some grammars may relate more transparently with semantics, or be easier to process. But the field of formal of language acquisition typically ignores the question of choosing between equivalent grammars.

Let us focus instead on the question of whether learners agree on overt linguistic data. An immediate issue concerns the nature of the linguistic data on which we evaluate any such agreement. One viewpoint, which can be traced to pre-Chomskyan linguistics, is that learners agree behaviorally – i.e., they treat linguistic inputs in the same way and tend to produce linguistic outputs with the same regularities. An aspect of this viewpoint is that the sentences that matter are those that are actually encountered. It seems natural, accordingly, to view language acquisition as a statistical problem, in which the learner must

agree on new cases after exposure to a sample from a statistical distribution. We shall see that formal methods from statistics can, indeed, be recruited to analyze this idealization of the language acquisition problem and that this viewpoint connects to recent work in corpus linguistics, computational linguistics, and psycholinguistics (Bod, 2003).

Since Chomsky (1965), however, there has been a considerable move away from this statistical perspective. The primary data for grounding linguistics theory has been presumed to be grammaticality (and other acceptability) judgments – and these judgments appear to be reliable far outside the realm of actually produced sentences. For example, outside linguistic discussion, the probability of encountering "Colorless green ideas sleep furiously" is infinitesimal; but arguably people agree that it is grammatically acceptable. Conversely, there are many things that people say, due to production errors, that the learner must reject, despite their statistical prevalence.

The language acquisition problem looks alarmingly difficult from this point of view, because the sample of sentences to which the child is exposed may differ considerably from that over which adult linguistic knowledge (as evidenced in grammaticality judgments) appears to reign. Moreover, the learner cannot, it appears, with any certainty, rely on helpful statistical regularities in the input, as these may reflect accidental and linguistically irrelevant features of the input. This perspective on the learning problem can be addressed using methods, not from statistics, but from a formal theory of identification in the limit (Gold, 1967).

Language Learning in the Limit

Consider the goal of learning which sentences are acceptable in a language, and which are not. Suppose that sentences (positive evidence) and non-sentences (negative evidence) are presented in an indefinitely long input corpus. Suppose that, after each successive sentence, the learner makes a 'current best guess' concerning the difference between sentences and non-sentences of the language. Under what conditions is it possible for the learner to find, eventually, a correct characterization of difference between sentences and non-sentences (to 'identify') the language, and to stick with this characterization however much further corpus of the language is encountered? This type of question is addressed by the theory of learning in the limit, invented by Gold (1967), and developed in a rich subsequent literature (Jain *et al.*, 1999; Osherson *et al.*, 1985).

Note that learnability in the limit does not require that the learner can announce when learning has succeeded, only that it *should* ultimately succeed. That is, the learner will get 'stuck' eventually, when it knows the language, but it may not know that it *has* got stuck. To see why this matters, consider the problem of learning one of the set of finite languages, for a corpus of positive data only, with the guarantee that every sentence will appear eventually (although arbitrarily late in the corpus). If the learner simply numerates sentences as it encounters them, then it will identify the language, once all sentences have been encountered, but it will not be possible to announce success, because the learner has no way of knowing that a further sentence may appear later on.

What conclusion can be derived from analysis of this kind? This is not a straightforward question to answer, because of the vast range of specific problems that can be studied (concerning properties of the corpus, the class of languages from which the learner selects, whether identification needs to be exact or approximate, and so on). Nonetheless, one conclusion from this work has entered linguistic and psychological folklore – that identifying infinite languages from positive linguistic data alone is problematic. As we have mentioned, there are many specific assumptions that can be used in studying language identification in the limit; here we sketch an informal argument that applies in a wide range of settings.

Before getting to the negative result, let us start with a positive case. Suppose that the set of 'possible' languages contains all and only finite languages (i.e., finite sets of sentences, however large, composed of some basic symbolic elements, e.g., phonemes or words). And that every corpus of a language will contain every sentence in that language eventually, and that there are no other constraints on what a corpus may look like (i.e., it can be as 'perverse' as you like). Consider the following, trivial, learning method, that we have mentioned already: at each point in the corpus, guess that the language consists of all and only those sentences you have heard so far. Thus, every time a new sentences arises, we add it to our current hypothesis; otherwise, we leave the hypothesis as it is. This method will learn any finite language 'in the limit' – by hypothesis, every sentence in the target language turns up eventually; once they have all occurred, the correct hypothesis is stated, never to be retracted. The learner never knows that learning has succeeded – because another sentence could occur at any point; but nonetheless, after a certain point in the corpus, the language will be correctly, and permanently, identified.

Now suppose that we add a single infinite language, I, to the picture. The previous learning method will never identify this language, as it will only

postulate (increasingly large) finite languages. But it turns out that **no** learning method will reliably identify the set of all finite languages, together with *I* (at least, with no further assumptions). Let's sketch a proof by *reductio ad absurdum*. Suppose that this set of languages *is* identifiable by a learner.

Consider a finite 'prefix' of our potentially infinite corpus (i.e., some finite initial chunk), which leads the learner to hypothesize the infinite language, *I*. This corpus is finite, and hence is compatible with all finite languages containing the finite set of items in the corpus, including finite subsets of *I*. It **could** turn out that the target language is one of these subsets. If so, by assumption, the learner will be able to identify it – hence, there will be continuations of that corpus (indeed, infinitely many) that will lead the learner to reject *I* and hypothesize this finite language. So, whenever the learner is fixated on an infinite language, the corpus may always continue so as to 'bounce' it back to postulating a finite language, which is a subset of *I*.

Conversely, consider any finite prefix of a corpus that leads the learner to postulate a finite language that is a subset of *I*. It is of course possible that the true language is *I*, and that as the corpus continues, the learner will realize this truth (by assumption, the learner identifies all languages), and postulate *I*. So, whenever the learner is fixated on a finite language, the corpus may always continue so as to 'bounce' it back to postulating the infinite language, *I*.

Combining these two observations, we can see that it is possible to construct a corpus that will make any learning method bounce infinitely often between *I* and (different) finite subsets of *I*, and never settle. This corpus will, as it happens, only be compatible with *I* (every finite subset of *I* will be rejected); but the learner will never identify *I*, but will vacillate endlessly between finite languages and the infinite language, *I*.

The details of arguments like this, even when described intuitively, are not easy to follow, as the reader may attest (and the conditions of validity of this argument depends on our specific formal assumptions, which have been neglected here). But there is a general moral that is more intuitive: learning infinite languages from positive evidence is difficult. Making any jump from a finite corpus to an infinite corpus is risky, because if the correct language is smaller, it will be difficult to realize this (the mere non-occurrence of a sentence is no evidence that it does not exist; after all, in an infinite language, the overwhelming majority of sentences do not occur, in any finite section of a corpus). So this caution might suggest a conservative approach, of choosing the smallest language set that fits the prefix of the corpus that has been seen so far. But this limitation will never work for learning infinite languages, because (a) the smallest such language fitting the corpus is always finite; (b) even if we disallow finite languages, for any infinite language containing some set of sentences, there will be a smaller infinite language that also contains that set – and hence there is no smallest such infinite set on which we may alight (except given rather strict assumptions about the class of allowable languages).

How Is Language Acquisition Possible?

Negative Evidence

A natural conclusion to draw from this line of argument is that, under reasonable conditions, infinite languages cannot be learned from positive data – and hence that natural language cannot be learned from positive data alone. With only positive data, there seems to be no way to eliminate over-general grammars that postulate that the language contains more sentences than it does.

To prune back over-general grammars would, though, be greatly assisted by the presence of negative data, i.e., non-sentences, labeled as such. Mathematical analysis does, indeed, show that an appropriately comprehensive stream of negative data can allow infinite languages to be identified in a broad range of cases where positive data alone is insufficient. It seems prima facie plausible that negative evidence might be available and used: for example, one can imagine that a child with an over-general grammar will thereby produce anomalous sentences, leading to correction by parents; incomprehension, rephrasing, puzzlement, or some other indication that the sentence is not correct. The theoretical significance of negative evidence has focused considerable attention on the empirical question of how far children have access to, and can use, such evidence – the majority view appears to be that language acquisition can occur normally where no such evidence is available.

A Finite Set of Languages

If negative evidence does not explain how infinite natural languages can be learned, a natural alternative is to suggest that there are only a finite number of possible natural languages – so that, as we saw above – the correct language can be identified, given positive data alone. This viewpoint has been dominant in linguistics since the 1980s. Chomsky's principles and parameters program proposes that natural languages differ only on a finite number of parameters, each of which has a finite set of discrete values – thus, superficial lexical variation aside, there are essentially a

finite number of possible languages, and the principles that are universal to all natural languages are not learned at all, but are innately specified.

Learning to set parameters is particularly straightforward if there are triggers in the linguistic input that can be detected independently for each parameter. In practice, however, this awareness may not always be straightforward, because linguistic input can only be viewed as evidence for a particular parameter value (e.g., that the language allows subject pronouns to be omitted), given a particular *interpretation* of the linguistic input. An uninterpreted stream of sounds cannot, for example, provide evidence about whether a language does, or does not, allow subject pronouns to be omitted. The problem of learning from triggers has been the subject of sophisticated analysis (Gibson and Wexler, 1994; Berwick and Niyogi, 1996), but it is clear that the problem of learning parameters from corpora of real linguistic data, by finding triggers or by other means, is extremely challenging.

A related line of formal research has concerned the degree to which languages can be acquired from exposure to a specific subset of the language. Natural languages allow clauses to be recursively embedded within each other arbitrarily often – yet such embeddings are rather rare in the child's input. Wexler and Culicover (1980), working in a transformational framework, proved that, under certain assumptions, a child exposed to base- and surface-structure pairs for sentences of the language with up to two embeddings (e.g., John believed [that Bill thought {the cat had been fed}]) could learn the entire language. This concept was known as degree-2 learnability. Using a different formal setting, Morgan (1986) showed that, again under specific assumptions, one level of embedding was sufficient: degree-1 learnability. Lightfoot (1991) has argued for degree-0 learnability, essentially on the grounds that main clauses, with no embeddings, are sufficient to set the finite number of parameters required to identify each natural language successfully.

Stronger Assumptions about Positive Data

A very different way in which language acquisition can be recast to appear more tractable is by making stronger restrictions on the corpora that children receive. We have so far assumed only that the corpus for a language eventually includes any sentence of the language, and no non-sentences. But very much stronger assumptions may be realistic. Indeed, an early result by Horning (1969) showed that languages generated by a probabilistic context-free phrase structure grammar could, with high probability, be identified to an arbitrarily good approximation given sufficient positive data. The critical assumption Horning makes is that sentences are chosen by sampling independently from a probability distribution, so that each sentence has the same probability of being sampled at any time. This means that, with high probability, a corpus with a large sample of sentences will be a reasonably reliable indication of the properties of the rest of the same. In particular, this assumption allows the learner to prune over-general grammars, even in the absence of negative evidence. To take an extreme example, a grammar that ignored agreement between noun and verb might imply, say, that there are roughly twice as many sentences in English than there really are. For example, for each sentence such as *John runs*, according to this over-general grammar, there is an equally viable sentence *John run*. Thus, according to this over-generality, the probability that a sentence happens, by chance, to exhibit 'correct' agreement (*John runs*) is about one-half. But these odds mean that the probability that a corpus of, say 100 English sentences, would happen to contain just sentences with 'correct' agreement would be the infinitesimally tiny 2^{-100}. Hence this over-general grammar can be decisively rejected. Similar assumptions can be used to reject grammars that are much less over-general – although, of course, more data is required to eliminate these with a reasonably high level of confidence.

It turns out, intriguingly, that it is possible to prove similar results with much more modest assumptions about the language that learners encounter. Perhaps the most surprising results of this kind stem from a remarkable theorem, due to Solomonoff (1978), in the context of the general problem of inductive inference. Solomonoff considered the question of predicting the next item in a sequence that can be determined by any computation whatever, mixed with any amount of random noise. At each point, the learner's goal is to provide a probability distribution over possible next items in the sequence; this predicted distribution is then compared with the true distribution (as defined by the process actually producing the sequence). Solomonoff considered an 'ideal' learner, that finds the shortest computer program. This learner starts by generating the current sequence and predicts according to the next item produced by the program (more precisely, the ideal learner considers a weighted sum of predictions of such programs, where the shortest are weighted most heavily). This approach corresponds to learning using a principle of simplicity, of a kind reminiscent of, though not identical to, simplicity measures over grammars considered in early views of language acquisition with the

framework of generative grammar (Chomsky, 1975). The key result is that the sum-squared error between the predicted and true probability distributions, summed up over the entire infinite sequence, has a finite sum – proportional to the complexity of the process of generating the language. This means that, even with these minimal computational restrictions on the nature of the corpus (and no additional restrictions on the form of the grammar whatever), predictions become arbitrarily good, with enough corpus (strictly, this result holds only with overwhelming probability, rather than with complete certainty).

This and related results about prediction can be adapted to more directly interesting linguistic ends. It can be shown that an ideal learner can, under these conditions, learn to make arbitrarily good grammaticality judgments, produce language, and even to learn the mapping between form and meaning given an unlimited sample of form-meaning pairs (Chater and Vitányi, 2004).

From Learnability to Theories of Language Acquisition

Theorems about learnability typically make rather abstract assumptions about the problem of language acquisition. This level of abstraction makes the mathematics tractable; it makes it possible to place bounds (typically upper bounds) on what can be learned, given certain assumptions – and these bounds must be respected if those assumptions are supplemented with greater detail. The approach also has the advantage of crystallizing otherwise informal debates concerning learning, concerning, for example, how far language can be learned from positive data, or the extent to which learning must be guided by innate constraints. There are, moreover, many further issues, that we have not touched on in this brief article, that learnability results can address, including how the non-grammatical utterances, which are widespread in the child's input, affect learning; how much linguistic material is required to learn different aspects of language; whether there are advantages for the learner in receiving simplified linguistic input.

These abstract analyses are complementary to detailed research on how children's language develops, the input available to the child and the aspects of that input the child is able to exploit, and possible mechanisms by which language acquisition may occur. Building a theory of how children acquire language requires providing a highly specific model of the computational learning mechanisms available to the child, and showing how it produces the pattern of observed linguistic development, given the linguistic, and non-linguistic, inputs available to children. But achieving such a synthesis is far beyond the scope of present research, except for extremely restricted aspects of language (e.g., learning specific aspects of phonology, morphology, or learning crude syntactic categories). Learnability results, by abstracting from such details, allow some insights into what is required for the language as a whole to be learned, and allow progress to be made, even in the absence of detailed empirical constraint. Yet the very abstraction that makes learnability theory tractable also implies that its results should be treated with caution, when applied to theories of language acquisition. The results of learnability may be too weak (because the child has recourse to much richer linguistic or non-linguistic input, or due to innate constraints), or too strong (because the child does not exploit information that is potentially available). It may be hoped, however, that mathematical results on learnability, and increasingly detailed empirical work, may eventually converge to provide richer and more realistic theoretical models of how children acquire language.

See also: Chart Parsing and Well-Formed Substring Tables; Formalism/Formalist Linguistics; Idealization; Language: Mathematical Complexity.

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Formal Semantics

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Introduction

Semantics, in its most general form, is the study of how a system of signs or symbols (i.e., a language of some sort) carries information about the world. One can think of a language as constituted by a lexicon (an inventory of morphemes or words) and a combinatorial apparatus according to which complex expressions, including, in particular, sentences, can be built up. Semantics deals with the procedures that enable users of a language to attach an interpretation to its arrays of symbols. Formal semantics studies such procedures through formally explicit mathematical means.

The history of semantics is nearly as long and complex as the history of human thought; witness, e.g., the early debates on the natural vs. conventional character of language among the pre-Socratic philosophers. The history of formal semantics is nearly as daunting as it is intertwined with the development of logic. In its modern incarnation, it is customary to locate its inception in the work of logicians such as Frege, Russell, and Tarski. A particularly important and relatively recent turning point is constituted by the encounter of this logico-philosophical tradition with structural and generative approaches to the study of human languages, especially (though by no means exclusively) those influenced by N. Chomsky. The merger of these two lines of research (one brewing within logic, the other within linguistics), has led formal semantics to become a central protagonist in the empirical study of natural language. The research paradigm that has emerged has proven to be quite fruitful, both in terms of breadth and depth of results and in terms of the role it is playing in the investigation of human cognition. The present work reviews some of the basic assumptions of modern formal semantics of natural language and illustrates its workings through a couple of examples, with no pretence of completeness.

Semantics vs. Lexicography

One of the traditional ideas about semantics is that it deals with the meaning of words. The main task of semantics is perceived as the compilation of dictionaries (semantics as lexicography). To this, people often add the task of investigating the history of words. Such a history can teach us about cultural development. One might even hope to arrive at the true meaning of a word through its history. Compiling dictionaries or reconstructing how particular words have changed over time are worthy tasks; but they are not what formal semantics is about. Lexicography, philology, and related disciplines vs. semantics as conceived here constitute complementary enterprises. They all, of course, deal with language. But the main goal of semantics is to investigate how we can effortlessly understand a potential infinity of expressions (words, phrases, sentences). To do that, we have to go beyond the level of single words.

It may be of use to point to the kind of considerations that have led semantics to move the main focus of investigation away from single word meanings and their development. For one thing, it can be doubted that word histories shed light on how words are synchronically (i.e., at a given point in time) understood and used. People use words effectively in total ignorance of their history (a point forcefully made by one of the founding fathers of modern linguistics, namely F. de Saussure). To make this point more vividly, take the word *money.* An important word indeed; where does it come from? What does its history reveal about the true meaning of money? It comes from Latin *moneta*, the past participle feminine of the verb *moneo* 'to warn/to advise.' *Moneta* was one of the canonical attributes of the Roman goddess Juno; *Juno moneta* is 'the one who advises.' What has Juno to do with money? Is it perhaps that her capacity to advise extends to finances? No. It so happens that in ancient Rome, the mint was right

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next to the temple of Juno. So people metonymically transferred Juno's attribute to what was coming out of the mint. A fascinating historical fact that tells us something as to how word meanings may evolve; but it reveals no deep link between money and the capacity to advise. This example is not meant to downplay the interest of historical investigations on word meanings; it is just an illustration of how linguistic history affects only marginally the way in which a community actually understands its lexicon.

There is a second kind of consideration suggesting that the scope of semantics cannot be confined to the study of word meanings. Do words in isolation have clearly identifiable meanings? Take any simple word, say the concrete, singular, common noun *dog*. What does it mean? Some possible candidates are: the dog-kind, the concept of dog, the class of individual dogs. . . . And the list can go on. How do we choose among these possibilities? Note, moreover, that all these hypotheses attempt to analyze the meaning of the word *dog* by tacking onto it notions (kind, concept, class . . .) that are in and of themselves in need of explication. If we left it at that, we wouldn't go far. Looking at dictionary definitions is no big help either. If we look up the entry for *dog*, typically we will find something like:

(1) A highly variable carnivorous domesticated mammal (Canis familiaris) prob. descended from the common wolf.

Indeed, if someone doesn't know the meaning of the word *dog* and knows what *carnivorous* and *mammal* mean, then (1) may be of some practical help. But clearly to understand (1), we must rely on our understanding of whole phrases and the words occurring in them. Words which, in turn, need a definition to be understood. And so on, in a loop. This problem is sometimes called the problem of the circularity of the lexicon. To put it differently, (1) is of help only if the capacity to use and interpret language is already taken for granted. But it is precisely such capacity that we want to study.

The limitation of a purely word-based perspective on the investigation of meaning is now widely recognized. Frege summarized it in a nice motto: "only in the context of a sentence do words have meaning." His insight is that complete sentences are linguistic units that can sort of stand on their own (more so than any other linguistic units). They can, as it were, express self-contained thoughts. We are more likely, therefore, to arrive at the meaning of single words (and of phrases in between words and complete sentences) via a process of abstraction from the contribution that words make to sentence meaning, rather than the other way around. This is so because sentence meaning is somehow more readily accessible (being, as it were, more complete) than the meaning of words in isolation.

These are some reasons, then, why the perspective of modern semantics is so different from and complementary to lexicography and philology; such perspective is much more directly tied to the investigation of the universal laws of language (language universals) and of the psychological mechanisms underlying such laws. Understanding the function, use, etc., of a single word presupposes a whole, complex cognitive apparatus. It is, therefore, an arrival point more than a starting point. It seems thus reasonable to start by asking what it is to understand a sentence.

The main thesis we wish to put forth is that to understand a sentence involves understanding its relations to the other sentences of the language. Each sentence carries information. Such information will be related to that of other sentences while being unrelated to that of yet others. In communicating, we rely on our spontaneous (and unconscious) knowledge of these relations.

The Notion of Synonymy and Its Problems

Imagine watching a Batman movie in which the caped hero fights the Riddler, one of his eternal foes. The Riddler has scattered around five riddles with clues to his evil plans. Batman has managed to find and solve four of them. We could report this situation in any of the following ways:

(2a) Batman has found all of the five clues but one.
(2b) Batman has found four out of the five clues.
(2c) Four of the five clues have been found by Batman.

These sentences are good paraphrases of each other. One might say that they have roughly the same information content; or that they describe the same state of affairs; or that they are (nearly) synonymous. (I will be using these modes of speaking interchangeably.) To put it differently, English speakers know that there is a tight connection between what the sentences in (2a), (2b), and (2c) mean. This is a kind of knowledge they have *a priori,* i.e., regardless of what actually goes on. Just by looking at (2a) vs., say, (2b) and grasping what they convey, we immediately see that they have roughly the same informational content.

This is what we mean when we say that understanding a sentence involves understanding which other sentences count as good paraphrases and which don't. Thus, knowing a language is to know which sentences in that language count as synonymous. Semantics is (among other things) the study of synonymy. Two synonymous sentences (and, more generally, two synonymous expressions) can always

be used interchangeably. This last informal characterization can be turned into a precise definition along the following lines.

(3a) Suppose one utters any complex expression α containing a subexpression A. If one can replace in A α with a different expression β, without changing the overall communicative import of A, then α and β are synonymous.

(3b) α is synonymous with β = in the utterance of any expression A containing α, α can be replaced with β without changing the communicative import of the utterance (*salva significatione*).

For example, in uttering (2a) (our A), we can replace the subcomponent that comes after *Batman has found__* namely *all of the five clues but one* (our α) with *four out of the five clues* (our β) and convey exactly the same information. Hence, these two expressions must be synonymous (and, in fact, so are the whole sentences).

This looks promising. It paves the way for the following setup for semantics. Speakers have intuitions of whether two expressions can be replaced with each other while keeping information content unchanged. For any two sentences α and β, they spontaneously know whether they can be substituted for each other (i.e., whether β can be used to paraphrase α). Because the sentences of a language are potentially infinite, it is impossible for speakers to memorize synonymous sentences one by one (for that clearly exceeds what our memory can do). Hence, they must recognize synonymy by rule, by following an algorithm of some sort. The task of semantics, then, becomes characterizing such an algorithm.

There is a problem, however. Sameness of communicative import is a more or less thing, much like translation. In many contexts, even sentences as close as those in (3a) and (3b) could not be replaced felicitously with each other. Here is a simple example. The discourse in (4a) is natural and coherent. The one in (4b) much less so:

(4a) Batman has found all of the five clues but one, which is pinned on his back.

(4b) ?? Batman has found four out of the five clues, which is pinned on his back.

(modeled after a famous example by B. Partee)

Clearly in (4a) we cannot replace *Batman has found all of the five clues but one* with *Batman has found four out of the five clues* while keeping unaltered the overall communicative effect. This means that if we define synonymy as in (3a) and (3b), then (2a) and (2b) cannot be regarded as synonymous after all. Yet they clearly share a significant part of their informational content. What *is* it that they share?

In fact, it has been argued that if (3a) and (3b) are how we define synonymy, then there simply are no two sentences that qualify as such. Here is a classical argument that purports to show this (based on Mates (1950)). Take the following two sentences:

(5a) Billy has a dog.

(5b) Billy has a highly variable carnivorous domesticated mammal prob. descended from the common wolf.

Are these two sentences synonymous? Hardly. They are clearly semantically related. But they surely do not have the same communicative import. Nor can one replace the other in every context. For example, (5a) could describe a true state of affairs, while (5b) might not:

(6a) Molly believes that Billy has a dog.

(6b) Molly believes that Billy has a highly variable carnivorous domesticated mammal prob. descended from the common wolf.

This shows that in contexts like *Molly believes that __* we cannot simply replace a word with its dictionary definition. And if dictionary definitions don't license synonymy, then what does?

The problem can be couched in the following terms. Any normal speaker of English perceives a strong semantic connection among the sentences in (2a), (2b), and (2c), or (4a) and (4b). So strong that one might feel tempted to talk about synonymy. Yet when we try to make the notion of synonymy precise, we run into serious problems. Such a notion appears to be elusive and graded (a more or less thing); so much so that people have been skeptical about the possibility of investigating synonymy through precise, formal means.

A fundamental breakthrough has been identifying relatively precise criteria for assessing semantic relations. The point is that perfect synonymy simply does not exist. No two sentences can be always replaced with each other. The notion of synonymy has to be deconstructed into a series of more basic semantic relations. We need to find a reliable source for classifying such relations, and, we will argue, such a source lies in the notions of truth and reference. Consider the sentences in (2a), (2b), and (2c) again. Assume that the noun phrase *the five clues* in (2a) and (2b) refer to the *same* clues (i.e., we are talking about a particular episode in a particular story). Then, could it possibly happen that say (2a) is true and (2b) false? Evidently not: no one in his right mind could assert (2a) while simultaneously contending that (2b) is false. If (2a) is true, (2b) also must be true. And, in fact, vice versa: if (2b) is true, then (2a) also must be. When this

happens, i.e., when two sentences are true in the same set of circumstances, we say that they have the same truth conditions.

Notice that sameness of truth conditions does not coincide with or somehow require sameness of communicative import (too elusive a notion), nor substitutivity in any context whatsoever (a condition too difficult to attain). Our proposal is to replace such exceedingly demanding notions with a series of truth-based notions, while keeping the same general setup we sketched in connection with synonymy: for any pair of sentences, speakers have intuition about whether they are true under the same conditions or not. They can judge whether they are true in the same (real or hypothetical) circumstances or not. Because the sentences of our language are infinite, this capacity must be somehow based on a computational resource. Speakers must be able to compare the truth-conditions associated with sentences via an algorithm of some sort. The task of semantics is to characterize such an algorithm. The basic notion changes (synonymy is replaced with sameness of truth conditions), but the setup of the problem stays the same.

Truth and Semantic Competence

Let us elaborate on the proposal sketched at the end of the previous section. Information is transmitted from one agent to another (the 'illocutionary agents') in concrete communicative situations ('speech acts'). No two such situations are alike. And consequently, no two pieces of information that are transmitted through them are alike. In *Groundhog Day,* a movie with the actor Bill Murray, the protagonist gets trapped into going through the same day over and over. He wakes up and his day starts out in the same way (with the alarm clock ringing at 7 a.m. on groundhog day); as he walks outside, he meets the same waitress who greets him in the same way ("weather so-so, today"). Yet this sentence, though being the same day after day, and being uttered in circumstances as identical as they can conceivably be, clearly conveys a different sense or information unit on each occasion of its use (the hearer going from noticing that something is fishy about this verbatim repetition, to the painful discovery of the condemnation to live through groundhog day for eternity).

Ultimately, we want to understand how communication takes place. But we cannot nail down every aspect of a speech act, just as we cannot know (not even in principle, I believe) every aspect of the physical or mental life of a particular human being. At the same time, while speech acts are unique events, there is much that is regular and invariant about them; that is what can be fruitfully investigated. One family of such invariants concerns form: similar sound patterns may be used in different speech acts. Another family of invariants concerns content: similar states of affairs may be described through a variety of expressions. The notion of truth is useful in describing the latter phenomenon. A pair of sentences may be judged as being necessarily true in the same circumstances. This is so, for example, for (5a) vs. (5b). Yet, such sentences clearly differ in many other respects. One is much more long-winded than the other; it uses rarer words, which are typical of high, formal registers. So in spite of having the same truth conditions, such sentences may well be used in different ways. Having the same truth condition is generally regarded as a semantic fact; being able to be used in different ways is often regarded as a pragmatic fact. While this gives us a clue as to the role of these two disciplines (both of which deal with meaning broadly construed), the exact division of labor between semantics and pragmatics remains the object of controversy.

Truth conditions are a tool for describing semantic invariants, structural regularities across communicative situations. Whenever I utter a declarative sentence, I typically do so with the intention to communicate that its truth conditions are satisfied (which of course raises the question of nondeclaratives, emotive expressions, and the like; see for example textbooks such as Chierchia and McConnell-Ginet (2000) or Heim and Kratzer (1998); cf. also Kratzer (1999) for a discussion of relevant issues). Truth conditions depend on the reference (or denotation) of words and the way they are put together, i.e., they are compositionally projected via the reference of words (or morphemes). If I say to you, as we are watching a movie, "Batman has found all of the five clues but one," you understand me because you sort of know (or guess) who Batman is, what sort of things clues are, what finding something is, what number the word *five* refers to; you also understand the "all … but …" construction. The reference/denotation of words is set (and is modified, as words may change their denotation in time) through use, in complex ways we cannot get into within the limits of the present work. The denotation of complex expressions (e.g., of a verb phrase such as [$_{VP}$*found five clues*] and truth conditions of sentences) are set by rule (the semantic component of grammar). Semantic rules presumably work like syntactic rules: they display variation as well as a common core, constitutive of universal grammar. Insofar as semantics is concerned, what is important for our purposes is that truth conditions can be compositionally specified. This paves the way for an algorithmic approach to meaning. We already remarked that sentences are formed by

composing morphemes together via a limited number of syntactic operations. So to arrive at the truth condition of an arbitrary sentence, we can start by the contribution of the words (their reference). Then, for each way of putting words together, there will be a way of forming the reference of complex expressions, and so on until we arrive at the truth condition of the target sentence.

So far, we have discussed sentences that have the same truth conditions (such as those in (2a), (2b), and (2c)); but this is not the only semantic relation that can be characterized in terms of the notion of truth. Consider the following examples.

(7a) Every Italian voted for B — a'. Most Italians voted for B.
(7b) Leo voted for B — b'. Leo voted for B.

Sentence (7a) is related to (7b) in a way that differs from the relation between (7a') vs. (7b'). Here is the difference. If (7a) is true, and Leo is Italian, then (7b) has to be true, too; this is clearly not so for (7a') vs. (7b'): (7a') may be true without (7b') being true. If whenever A is true, B also must be, we say that A *entails* B (B's meaning is part of of A's meaning). Two sentences with the same truth conditions entail each other (i.e., they hold a symmetric relation); when entailment goes only one way (as from (6a) to (6b)), we have an asymmetric relation.

Entailment is pervasive. Virtually all semantic intuitions are related to it. As an illustration, consider the pair of sentences in (8a) and (8b).

(8a) John promised Bill to take him to the station.
(8b) John ordered Bill to take him to the station.

Pronouns, like *him* in (8a) and (8b), take their denotation from the context; they can take it from the extra linguistic context (a person salient in the visual environment, a person the speaker points at, etc.) or from the linguistic context (e.g., from NPs that occur in the same discourse; *John* or *Bill* in (8a) and (8b)); one widespread terminology is to speak of *indexical* uses in the first case and of *anaphoric* uses in the second. We can conceptualize this state of affairs by viewing pronouns as context-dependent items, incomplete without pointers of some sort. Now we shall focus on the anaphoric interpretation of (8a) vs. (8b).

(9a) John promised Bill that John would take Bill to the station.
(9b) John ordered Bill that Bill should take John to the station.

These appear to be the only options. That is to say, sentence (8a) cannot convey something like 'John promised Bill that Bill should take John to the station.' The point of this example is that we have intuitions that govern how the denotation of a pronoun is to be reconstructed out of contextual clues; such intuitions tell us that (8a) and (8b), though structurally so similar, allow for a distinct range of interpretive options. At the basis of intuitions of this sort, we again see entailment at work: on its anaphoric construal, (8a) entails (9a).

Another important set of truth-based semantic relations are presuppositions. Consider the contrast between the sentences in (10a) and (10b).

(10a) Fred stole the cookies.
(10b) It was Fred who stole the cookies.

There is a noticeable semantic contrast between (10a) and (10b). How can we characterize it? Clearly the two sentences are true in the same circumstances (they entail each other). Yet they differ semantically. Such a difference can be perhaps caught by looking at what happens by embedding (10a) and (10b) in a negative context.

(11) So, what happened this morning?
(11a) Everything went well. Fred didn't steal the cookies; he played with his toys.
(11b) ?? Everything went well. It wasn't Fred who stole the cookies.

The answer in (11a) is natural. The one in sentence (11b) would sound more natural as an answer to

(12a) Who stole the cookies?
(12b) It wasn't Fred.

The difference between the question in (11) and the one in (12a) is that the latter (but not the former) tends to presuppose that cookies where stolen. In other terms, the situation seems to be the following. Both sentences in (10a) and (10b) entail:

(13) Someone stole the cookies.

If either (11a) or (11b) are true, then (13) must also be true. Furthermore, sentence (13) must be true for (10b) to be *denied* felicitously. The illocutionary agents must take for granted the truth of (13) to assert, deny, or otherwise use sentence (10b), as the naturalness of the following continuations for (13) illustrate:

(14) Someone stole the cookies . . .
(14a) It was Fred.
(14b) It wasn't Fred.
(14c) Was it Fred?
(14d) If it was Fred, he is going to get it . . .

This brings us to the identification of presupposing as a distinctive semantic relation: a sentence A presupposes B if the truth of B must be taken for granted

in order to felicitously assert, deny, etc., A. Presuppositions are quite important in language. So much so that there are distinctive syntactic constructions (such as those in (10b), known as cleft sentences) specifically keyed to them.

Let me illustrate the wealth of semantic relations and their systematic character by means of another example, which will bring us to the interface between semantics and pragmatics. Consider:

(15a) Who stole the cookies?
(15b) Fred looks mischievous.
(15c) Fred stole the cookies.

If to a question such as (15a), I reply with (15b), I do suggest/convey something like (15c). Sentence (15c) clearly is not part of the literal meaning of (15b) (however hard defining such a notion might be). Yet, in the context of the dialogue in (15a), (15b), and (15c), speakers will converge in seeing that (15c) is strongly suggested by (15b). Here, too, we have, thus, a systematic semantic intuition. The suggestion in (15c) can be retracted; that is, one can continue (15b) with '... but I know he didn't do it'. However, in the absence of such an explicit correction, illocutionary agents upon hearing (15b) will tend to infer (15c). This phenomenon has been studied by H. P. Grice (1989), who dubbed it implicature. His proposal is that it arises through interaction of the core meaning assigned to sentences by rule with principles that govern conversational exchanges. The basic idea is that for conversational exchanges to be successful they have to be basically cooperative acts; cooperating means that one sticks to relevant topics, one only gives information believed to be truthful, one gives no more and no less than what is relevant, etc. Applying this to the case at hand, in a situation in which question (15a) is topical, answering (15b) would seem to be blatantly irrelevant; the hearer, however, tends to interpret it as relevant and sets in motion an inferential process that tends to link it to some piece of information that does address the topical question; such a link is to be found with the help of the information available in the context to the illocutionary agents (e.g., in the common knowledge that if people commit a mischief, such as stealing cookies, they may well look mischievous, etc.). Thus, this type of semantic judgment (the implicature) appears to be best accounted for in terms of the interaction between grammar and general conditions on reasonable language use (that fall under the scope of pragmatics).

Sometimes it is not immediately clear whether something is a matter of conventionalized meaning or pragmatics. To illustrate, consider the oscillation in meaning of a word like *or*. It can be illustrated with the following examples. Consider first (16a):

(16a) If I got it right, either John or Mary will be hired.
(16b) If I got it right, either John or Mary but not both will be hired.

Normally, one tends to interpret (16a) as truth conditionally equivalent to (16b); i.e., the disjunction in (16a) is interpreted exclusively (as incompatible with the simultaneous truth of each disjunct). However, this is not always so. Contrast (16a) with (17a).

(17a) If either John or Mary are hired, we'll celebrate.
(17b) (?) If John or Mary (but not both) are hired, we'll celebrate.
(17c) If John or Mary or possibly both are hired, we'll celebrate.

The most natural interpretation of (17a) is not the exclusive one (namely (17b), which is somewhat odd pragmatically); rather it is the inclusive one, made explicit in (17c). (Notice that the emphatic word *either* is present both in (16a) and (17a); in spite of this, the interpretation of *or* shifts.) We might see in these phenomena a lexical ambiguity of disjunction. Words expressing disjunction, we may feel inclined to conclude, have a varying interpretation, as it happens with words such as *bank* or *lap* ('sit on my lap' vs. 'he swam three laps'). We may assume that such interpretations are always in principle available, but then we select the most suitable to the context of the speech act. While this seems *prima facie* possible, there are reasons to doubt it. In particular, true lexical ambiguities are resolved across languages (in Italian, there are two different words for the two senses of *lap*). Ambiguities are never universal. The meaning shift of *or*, *per contra*, seems to be universal: in every language disjunction appears to have a similar oscillation in meaning. A convincing case for two lexically distinct disjunctions, one exclusive, the other exclusive, has not been made (sometimes it has been proposed that Latin *vel* vs. *autem* is just that; for arguments against this, cf., e.g., Jennings (1994)). Moreover, other areas of the lexicon have been found that display a similar behavior (e.g., the number words). This strongly suggests that a different explanation for such behavior should be found. Grice himself has proposed that the phenomenon under discussion is to be accounted for in terms of the interaction between semantics and pragmatics. The idea is that the basic meaning of *or* is the inclusive one, as it is the most liberal interpretation; the exclusive construal arises as an implicature, i.e., a

pragmatic enrichment, albeit a generalized one. The advantage of this move is that it would explain the oscillation in meaning of disjunction without positing a covert ambiguity. We will come back to how the generalized implicature associated with *or* might come about in the later section "The Semantics/Pragmatics Interface".

Wrapping up, the picture that emerges is roughly the following. In using language, speakers display complex forms of spontaneous knowledge. They put together words in certain ways and not others. This is how knowledge of syntax manifests itself. They also accept certain paraphrases and not others, draw certain inferences and not others, etc. It turns out to be possible/useful to categorize the latter in three major families of semantic relations.

(18a) Entailment-based (entailment, mutual entailment, contradictoriness, analyticity, etc.)
(18b) Presupposition-based (presupposition, question/answer pairs, etc.)
(18c) Implicature-based (generalized implicature, particularized implicature, etc.)

All of them can be readily defined in terms of the notion of truth:

(19a) A entails B = for any conceivable situation s, if A is true in s, B is also true in s.
(19b) A presupposes B = to use A appropriately in a situation s, the truth of B must be taken for granted by the illocutionary agents in s.
(19c) A implicates B = use of A in a situation s suggests, everything else being equal, that B is true in s.

The definitions in (19a), (19b), and (19c) can be readily associated with "operational" tests that enable speakers to assess whether a given relation obtains or not. For example, to check whether (20a) entails (20b), you might check whether you could sincerely assert (20a) while denying (20b), viz. whether you could sincerely and felicitously utter something like (20c):

(20a) It is indeed odd that Mary is home.
(20b) Mary is home.
(20c) It is indeed odd that Mary is home, even if she in fact isn't.

To the extent that you can't really say something like (20c), you are entitled to conclude that (20a) entails (20b). It is useful, in these cases, to use contrast sets such as (21a) and (21b).

(21a) It is indeed conceivable that Mary is at home.
(21b) It is indeed conceivable that Mary is home, even if she in fact isn't.

The semantic relations in (18a), (18b), and (18c) can be viewed as intuitions of semantic relatedness speakers have about sentences of their own language, as judgments that may be elicited, and the like. By analogy with well-formedness judgments, there are some cases in which things are not so clear and we may not be sure whether, say, a certain entailment holds or not. In such a case, more complex arguments, indirect evidence of various sorts, or psycholinguistic experimentation may be called for (see, e.g., Crain and Thornton (1998) on experimental methodologies for truth-based semantic judgments). But in indefinitely many cases, simple introspection yields relatively straightforward judgments. The capacity for making such judgments is constitutive of our semantic competence. Such a competence cannot be simply a thesaurus, a store of pairs of sentences, with the relative judgment tacked on, for the number of judgments speakers can make on the fly is potentially infinite. Semantic competence must be a computational device of some sort. Such a device given an arbitrary pair of sentences <A, B> must be able to determine in principle whether A entails B, presupposes it, etc. The task of semantics is to characterize the general architecture of such a computational device. While there are many foundational controversies that permeate the field, there is a broad convergence that this is roughly the form that the problem of meaning takes within modern formal semantics.

Semantic Modeling

In the present section I will sketch how a (necessarily, much simplified) calculus of semantic relations may look. Suppose you have a lexicon of the following form:

(22a) N: John, Bill, dog, cat, table, ...
(22b) V: runs, smokes, drinks, . . .
(22c) DET: the, a, some, every, no . . . .

Think of syntax as a device that combines lexical entries by merging them in complex phrases and assigning them a syntactic analysis that can be represented by tree diagrams or labeled bracketings of the following form:

(23a) $[_{VP}$ John smokes]
(23b) $[_{DP}$ every boy]
(23c) $[_{VP}$ $[_{DP}$ every boy] smokes]

I assume, without being able to justify it, that lexical items have phrasal projections. In particular, VP is the phrasal projection of V and constitutes a clausal nucleus composed of the verb and its arguments linked in a predicative structure. Such a nucleus forms the

innermost skeleton of the sentence (I will have to ignore matters pertaining to inflection, agreement, tense, and the like). The lexical features of verbs are crucial in determining the characteristics of clausal nuclei. DP is the phrasal projection of D, and it is constituted by a determiner and a (common) noun. Clausal nuclei can be formed by merging a verb with a (proper) name or a DP, as indicated. In the spirit of the discussion in the section on **Truth and Semantic Competence**, semantics assigns recursive truth conditions to sentences in terms of the reference assigned to lexical entries. There are several ways to do this. Ultimately, the choice one makes on the exact format of interpretive rules has far-reaching consequences for our understanding of grammar. However, our choices here are only in small part dictated by our current understanding of semantics in universal grammar; for the major part, they result from considerations such as ease of exposition, keeping prerequisites at a minimum, and the like. To get started, we should assign a reference (or denotation, terms we will use interchangeably) to lexical entries. To do so, we assume we have a certain domain $D_s = \{a, b, c, \ldots\}$ at each given discourse situation s that constitutes our universe of discourse. A discourse situation can be thought of as the time at which the utterance takes place. A domain is just a set of individuals, pragmatically selected (e.g., those salient to the illocutionary agents). Interpretations are relative to an utterance situation s and the corresponding domain of discourse D_s. Reference of proper nouns, for example, is suitably chosen from the domain of discourse. Suppose, for example, that a and b are salient humans in our universe of discourse, then we might have:

(24) For any conceivably relevant utterance situation s, the name *John* denotes a in s; the name *Bill* denotes b in s . . .

It doesn't matter how a or b are characterized (via a description, an act of indication, etc.) to the extent that one successfully succeeds in linking the noun to its bearer. Also, it is useful to have a uniform category-neutral notation for semantic values; we will use for this the double bar notation $\| \ \|$; accordingly, for any expression α, $\|\alpha\|^s$ will be the semantic value of α in situation s. Thus, (24) can be abbreviated as:

(25) $\|\text{John}\|^s = a$ (where $a \in D_s$, the domain of discourse at s)

(Technically, $\| \ \|$ can be viewed as a function from expressions and situations into denotations; so sometimes we will speak of the interpretation function.) The denotation of a simple (intransitive) verb such as those in (22b) can be thought of as a function that for each (appropriate) individual in the domain discourse tells us whether that individual performs a certain action or not. Here is an example:

(26) *smokes* in a situation s denotes a function $\mathbf{smoke}_s$ that applies to animate individuals and returns truth values. If a is such an individual, then $\mathbf{smoke}_s(a)$ returns 'true' (which we represent as the number 1) if that individual performs the action of smoking in s (where smoking involves . . . .); otherwise $\mathbf{smoke}_s$ (a) returns 0 (i.e., 'false').

If a is not animate (e.g., if a is a stone and s is a 'normal' situation), then $\mathbf{smoke}_s$ (a) is not defined (lacks a value). The final part in definition (26) reflects the fact that sentences like (27a) and (27b), out of the blue, are (equally) strange: smoking normally requires its subject argument to be animate.

(27a) That stone smokes.
(27b) That stone doesn't smoke.

The deviance of sentences like (27a) and (27b) has been variously characterized as a violation of selectional restrictions or as sortal deviance. Here we are couching the relevant phenomenon in presuppositional terms (to illustrate a further application of such a concept). The fact that sentences of this sort remain deviant across negation may be taken as evidence that the verb *smoke* imposes an animacy presupposition on its arguments (see e.g., Chierchia and McConnell-Ginet (2000) for more discussion). A definition like (26) can be stated more compactly:

(28) $\|\text{smokes}\|^s = \mathbf{smoke}_s$,
where for each a in D_s, $\mathbf{smoke}_s(a)$ is defined iff a is animate in s; if defined, $\text{smoke}_s(a) = 1$ if a smokes in s (where smoking involves . . .); $\mathbf{smoke}_s$ (a) = 0, otherwise.

The definition of (or constraints on) smoking (i.e., the dots in (28)) can be elaborated further in several ways by refining our lexical analysis of the verb *smoke*. Although much progress has been made on this score, many important issues remain open (including, e.g., whether a presuppositional treatment of selectional restrictions is ultimately viable). What is important, from the point of view of compositional semantics, is the *logical type* or *semantic category* of the denotation of a verb like *smoke*. Such verbs are treated here as functions from individuals into truth values. These are called *characteristic functions*; they divide the (relevant portion of) the domain of discourse of the utterance situation in two: the things that satisfy the verb from those that don't. Characteristic functions correspond to sets (which might be called the *extension* of the function), as the following example illustrates:

(29) Let universe of discourse be {a, b, c, d}; let a, b, and c be people. Of these, let a and b smoke in s while b but not a also smokes in a different situation s'. We can represent all this as follows:

$$\textbf{smoke}_s = \begin{array}{l} a \rightarrow 1 \\ b \rightarrow 1 \\ c \rightarrow 0 \end{array} \text{ corresponding extension: } \{a,b\}$$

$$\textbf{smoke}_{s'} = \begin{array}{l} a \rightarrow 1 \\ b \rightarrow 0 \\ c \rightarrow 0 \end{array} \text{ corresponding extension: } \{a\}$$

As is evident from the example, sets and characteristic functions are structurally isomorphic (encode the same information). In what follows it will be useful on occasion to switch back and forth between these two concepts. Use of characteristic functions as a formal rendering of verb meanings is useful in giving truth conditions for simple subject predicate sentences:

(30a) A sentence of the form $[_{VP}$ N V] is true in s iff $||V||^s (||N||^s) = 1$

Example:

(30b) $[_{VP}$ Bill drinks] is true in s iff $||\text{drinks}||^s (||\text{Bill}||^s) = 1$

The truth conditions of any sentence with the syntactic structure specified in (30a) boil down to applying a characteristic function to an individual (and thereby ascertaining whether that individual belongs to the set that constitutes the extension). To find out whether Bill in fact smokes in s, we need factual information about the situation obtaining in s. To understand the sentence, we don't. We merely need to know its truth conditions, which in the case of simple subject–predicate sentences are an instruction to check the value of a characteristic function for the argument specified by the subject. The rules in (30a) and (30b) can be reformulated more compactly as in (31):

(31) $||\,[_{VP}\ N\ V\ ]\,||^s = ||V||^s (||N||^s)$

This can be viewed as the kernel of a predication rule (that tells us how subject and predicates combine semantically).

Everything so far looks like a formally explicit (and perhaps somewhat pedantic) way of sketching a denotational, information-oriented semantics, and the reader may get the feeling of not yet finding striking insights on what meaning is. In order to grasp the potential of this method, one needs to look at a little more of its computational apparatus. So let us turn now to DPs. Things here are definitely more challenging. DPs are constituents formed by a determiner plus a common noun. Common nouns can be given, at least in first approximation, the same analysis as (intransitive) verbs, i.e., the meaning of, say, *cat* can be thought of as a characteristic function that selects those entities that are cats out of the universe of discourse (or, equivalently, we can say that *cat* identifies a class/set across situations). But what about things like *no cat* or *every cat*, which are the typical constituents one finds in, e.g., subject position and the like? What does *no cat* denote? And, even worse, what do *no* or *every* or *some* denote? Our program is to assign a denotation to lexical entries and then to define in terms of it truth conditions for sentences. So we must find suitable denotations of Ds and DPs.

To address questions of this sort, we apply a heuristic that goes naturally with our general setup: whenever the denotation of an expression is not directly accessible to your intuition, look at what that expression contributes to the truth conditions of the sentences it occurs in (the epistemological primacy of sentences, again). So, consider for example:

(32) No boy smokes.

We know/assume/conjecture that *boy* and *smoke* denote characteristic functions and that sentences contribute truth values (i.e., they are true or false, as the case may be, in different situations). We may think of *no* as a function, too. As is evident from (32), such a function combines first with a characteristic function/set (corresponding to the noun); then the result combines with a second characteristic function (corresponding to the verb) to yield a truth value. Schematically, here is what we have:

(33) $\textbf{no}(\textbf{boy}_s)\ (\textbf{smoke}_s) = 1 \text{ or } 0$

Now we can look at our intuitions. When is (32) true? The answer is pretty clear. When among the boys, nobody smokes. Or, equivalently, when the class of boys (i.e., the extension of $\textbf{boy}_s$) has no member in common with the smokers (i.e., the extension of $\textbf{smoke}_s$), (32) is true. In set talk, the intersection between the boys and the smokers must be empty:

(34) $\text{no}(\textbf{boy}_s)\ (\textbf{smoke}_s) = 1 \text{ iff } \text{BOY}_s \cap \text{SMOKE}_s = \varnothing$

(where BOY_s, SMOKE_s are the extensions corresponding to $\textbf{boy}_s$, $\textbf{smoke}_s$, respectively) This is perfectly general. Replace boy/smokes with any other noun/verb. The contribution of *no* stays constant: no(N) (V) is true just in case no member of the extension of N is in V. We thus discover that *no* has a perfectly sensible (if abstract) denotation: a function that encodes a relation between sets. Our contention here is that speakers behave as if they had such a function in mind (or something similar to it) in using *no*.

The next step is to see that *all* determiners express relations among sets (characteristic functions), just like *no* does. Here are a few examples, along with some comments.

(35a) *Some*
(35a.i) Example: some boy smokes
(35a.ii) Truth conditions: **some**(**boy**$_s$) (**smoke**$_s$) = 1 iff $BOY_s \cap SMOKE_s \neq \emptyset$
(35a.iii) Comment: *some* is the contrary of *no*; *some boy smokes* is true just in case you can find someone among the boys who is also among the smokers; i.e., the intersection between the class of boys and the class of smokers must be non empty. The indefinite article *a* can be analyzed along similar lines.
(35b) *Every*
(35b.i) Example: every boy smokes
(35b.ii) Truth conditions: **every**(**boy**$_s$) (**smoke**$_s$) = 1 iff $BOY_s \subseteq SMOKE_s$
(35b.iii) Comment: *every* expresses the subset relation: *every boy smokes* is true just in case all the members of the class of boys also belongs to the class of smokers
(35c) *Most*
(35c.i) Example: Most boys smoke
(35c.ii) **most**(**boy**$_s$) (**smoke**$_s$) = 1 iff the number of member of $BOY_s \cap SMOKE_s$ is bigger than half the number of members of BOY_s.
(35c.iii) Comment: *most* involves actual counting. *Most boys smoke* is true just in case the number of boys who smoke (i.e., the intersection of the boys with the smokers) is greater than half the number of boys (i.e., more than half of the boys are smokers).
(35d) *The*
(35d.i) Example: The blond boy smokes.
(35d.ii) Truth conditions: **the** (**blond boy**$_s$) (**smoke**$_s$) is defined only if there is exactly one blond boy in s. Whenever defined, **the** (**boy**$_s$) (**smoke**$_s$) = **every** (**boy**$_s$) (**smoke**$_s$).
(35d.iii) Comment: this reflects the fact that *the blond boy smokes* is only interpretable in situations in which the universe of discourse contains just one blond boy. If there is more than one blond boy or if there is no blond boy, we wouldn't really know what to make of the sentence. So *the* is a presuppositional determiner; it presupposes the existence and uniqueness of the common noun extension. (This analysis of *the* goes back to Frege.)

In spite of the sketchiness of these remarks (that neglect important details of particular determiners), it should be evident that the present line of analysis is potentially quite effective. A class of words and phrases important and tendentially stable across many languages falls into place: determiners ultimately express natural relations between sets (the set associated with the common noun and the set associated with the verb phrase). Our denotational perspective seems to meet rather well the challenge that seemingly denotationless items pose. It is useful to see what becomes of our rule of predication (viz. (31) above). Evidently such a rule needs to be split into two (main) subcases, depending on whether the subject is a simple N (a proper name) or a complex DP. Here is an exemplification of the two cases:

(36a) Mary smokes.
(36b) No boy smokes.

In case (36a), we have semantically two pieces: an individual (whomever *Mary* denotes) and a characteristic function (**smoke**$_s$); so the latter applies to the former. In case (36b) the two pieces are: a complex function (namely **no** (**boy**$_s$)) that looks for a characteristic function to yield a truth value, and, as before, the characteristic function **smoke**$_s$; in this case the former applies to the latter. In either case, the end result is a truth value. So our predication rule becomes:

(37a) $\| [_{VP}\ N\ V\ ] \|^s = \|V\|^s (\|N\|^s)$
(37b) $\| [_{VP}\ DP\ V\ ] \|^s = \|DP\|^s (\|V\|^s)$

This suggests that the core rule of semantic composition is functional application. Consider for example an ungrammatical sentence of the form:

(38) * $[_{VP}$ boy smokes]

Such a sentence, as things stand, would be generated by our (rudimentary) syntax. However, when we try to interpret it, we find two characteristic functions of individuals, neither of which can apply to the other. Hence, the sentence is uninterpretable, which explains its ungrammaticality. There are languages like, for example, Russian or Hindi where singular common nouns without a determiner can occur in subject position:

(39a) Russian: mal'cik kurit boy smokes 'the boy smokes'_
(39b) Hindi: kamre meN cuuha ghuum rahaa hai (from Dayal 2004) room in mouse moving is 'a mouse is moving in the room'

Notice that (39a) is the verbatim translation of (38) and is grammatical in Russian. The line we are taking suggests that in such languages it must be possible to turn some covert forms of common nouns into

argumental DPs, i.e., things that can semantically combine with predicates; for example it is conceivable that in a language without articles, like Russian, the semantic functions associated with the articles can be applied covertly (as part of the interpretive procedure), so as to rescue the semantic mismatch that would otherwise ensue. This may, in turn, involve the presence of a phonologically null determiner (for alternative developments of this line of analysis, as well as details concerning the available interpretations, see, e.g., Chierchia (1998), Longobardi (2001), and Dayal (2004)).

The picture that emerges is the following. The basic mode of syntactic composition is *merge*, or some analogously simple operation that puts together two constituents (subject to parametrization pertaining to, e.g., word order, case, etc.). The basic mode of semantic composition is *apply*: constituents are compositionally analyzed as functions (of more or less complex semantic type) and arguments (individuals or other functions); so whenever we find a function and an argument of the appropriate sort, we simply apply the former to the latter. If things go wrong at any level, the derivation crashes and the result is ungrammatical. The semantic side of this process has come to be known as 'type driven interpretation,' the main idea being that the semantic categories of functions and arguments drive the interpretation process.

The present approach directly yields a computationally tractable theory of entailment and presupposition. We have defined entailment roughly as follows: a sentence S entails a sentence S' iff whenever S is true, S' is also true. The apparatus we have developed allows us to prove whether a certain entailment holds or not. Let me show, as an illustration, that (40a) entails (40b) but not vice versa.

(40a) Every scientist smokes.
(40b) Every mathematician smokes.

To show this we need to assume that if one is a mathematician, one is a scientist; i.e.,

(41) For every individual a,
(41a) if $\mathbf{mathematician}_s$ (a) = 1, then $\mathbf{scientist}_s$ (a) = 1 or, equivalently:
(41b) $\text{MATHEMATICIAN}_s \subseteq \text{SCIENTIST}_s$

Consider now the semantics of (40a), according to our analysis. It is the following:

(42) $\mathbf{every}(\mathbf{scientist}_s)\ (\ \mathbf{smoke}_s)$

In virtue of (35b), this is tantamount to

(43) $\text{SCIENTIST}_s \subseteq \text{SMOKE}_s$

This being so, every subset of the set of scientists must also be included among the smokers (by elementary set theoretic considerations). Since, in particular, mathematicians are scientists, it follows that

(44) $\text{MATHEMATICIAN}_s \subseteq \text{SMOKE}_s$

But this is just the semantics of (40b). So, if (40a) is true in s, then (40b) must also be true in s. Evidently, this reasoning goes through no matter which situation we are in. Hence, (40a) does entail (40b). On the other hand, it is easy to conceive of a situation in which (44), and hence (40b), hold, but say some economist doesn't smoke; in such a situation, (43) would fail to obtain. Hence, (40b) does not entail (40a).

A fully parallel way of reasoning can be put forth for presuppositions. We said that S presupposes S' iff S' must be taken for granted in every situation in which S is asserted, denied, etc. This can be cashed in as follows. We can say that for S to be true or false (i.e., to have a semantic value that makes it suitable for assertion or denial), S' must be known to be true in the utterance situations by the illocutionary agents, i.e., S can be true or false in s iff S' is true in s. Using this definition (known as the 'semantic' definition of presupposition), we can formally prove (though we will not do so here) that, for example, (45a) presupposes (45b):

(45a) The blond boy smokes.
(45b) There is exactly one blond boy around.

The general point of these examples is the following. Intuitions about entailment and the like are *a priori*; speakers have them just by inspecting the meaning of the relevant sentences. In the present setup, this central fact is captured as follows. Semantics can be viewed as a set of axioms that (a) determines the interpretation of lexical entries and (b) assigns truth conditions to sentences. Such apparatus yields a calculus of entailment (and other semantic relations) that reemerge as theorems of semantics. We have not formalized each single step of the derivation (relying on the readers' patience and understanding of elementary set theory); but such a formalization is, evidently, feasible. We not only thereby gain in clarity. We also obtain a device that constitutes a reasonable (and falsifiable) model of speakers' linguistic abilities. The claim is not that the specific rules we have given are actually implemented in the speakers' mind. The claim is that speakers, to the extent that they can be said to compute entailments must be endowed with computational facilities that bear a structural resemblance to the ones sketched here. This, in turn, paves the way for inspecting the architecture of our linguistic abilities

ever more closely. Without excessive optimism and in full awareness of the controversies that permeate the field, this seems to constitute a step in the right direction.

One further remark on the general picture that emerges from the sketch above cannot be avoided. Our approach to meaning is denotational: we assign a denotation to words and morphemes and (in terms of such denotations) truth conditions to sentences. This can be understood in several ways, of which I will present two much simplified extremes. We can take truth condition assignment as a way of exposing the link between language and the world, which is, arguably, the ultimate goal of semantics. Words/morphemes are actually mapped into aspects of the world (e.g., names are mapped into actual individuals); sentences are symbolic structures that code through their fine structure how things may be arranged in the world. However, it is also possible to view things somewhat differently. What really matters, it can be argued, is not the actual mapping between words and aspects of reality and between sentences and the conditions under which they, in fact, are true. What we do is give a form or recipe or potential for actual truth conditions; we merely constrain the form that truth conditions may take. What we get out of this is what really matters: a calculus of semantic relations (entailment, presupposition, etc.). Unlike what happens in, say, pure logic, such a calculus is not a normative characterization of sound reasoning; it is an empirically falsifiable characterization of semantic competence (i.e., of what speakers take to follow from what, when). Under the latter view, truth conditions (or truth condition potentials, or whatever it is that we map sentences on) are a ladder we climb on to understand the working of semantic relations, i.e., relations that concern the information content of linguistic expressions.

It is evident that we are not going to settle these issues here. As a small consolation (but also, if you wish, as evidence of the maturity of the field), I hope to have given the reader reasons to believe that progress is possible even if such foundational issues remain open.

We haven't discussed implicatures and other pragmatically driven intuitions about meaning. To understand the full scope of the present proposal, it is important to do so. This requires extending a bit what we have done so far.

The Semantics/Pragmatics Interface

In the section **Truth and Semantic Competence**, we mentioned implicatures, a broad and varied type of meaning relations. We will elaborate by looking more closely at the oscillation in the meaning of *or*. The purpose is to illustrate how generalized implicatures come about and how this bears on the view of semantics sketched in the preceeding section on **Semantic Modeling**.

The first step is to attempt a semantic analysis of *or*. To this we now turn. Imagine we extend our grammar by introducing coordination and negation along the following lines:

(46a.i) [$_{VP}$ John doesn't smoke]
(46a.ii) [$_{VP}$ NEG VP]
(46b.i) [[$_{VP}$ John smokes] and/or [$_{VP}$ Bill smokes]]
(46b.ii) [VP and/or VP]

The syntax of negation and coordination poses many thorny questions we simply cannot address here. Although for our purposes any number of assumptions concerning syntax might do, let us maintain, again without much justification, that a negative sentence like (46a.i) has the structure in (46a.ii) out of which the observed word order is derived by moving the subject left from the inner VP. Furthermore, we will assume that coordinated sentences, whether disjunctive or conjunctive, such as (46b.i), are obtained through schemas such as (46b.ii). Insofar as semantics is concerned, the introduction of negation, conjunction, disjunction, etc., poses problems similar to that of determiners. The relevant expressions are function words, and it is not obvious how to analyze them in denotational terms. This question, however, can be addressed in much the same way as we have done with the determiners: by looking at what the relevant elements contribute to the truth conditions of the sentences they occur in. For sentential operators, we can draw on a rich logical tradition. In the attempt to characterize the notion of valid inference, logicians have discussed extensively propositional connectives (like *not*, *and*, *or*), and the outcome is an analysis of such elements as truth functions or, equivalently, in terms of 'truth tables.' For example, the contribution of negation to meaning can be spelled out in terms of conditions of the following sort:

(47a) *John doesn't smoke* is true in s iff *John smoke* is false in s
(47b) $\| \text{NEG VP} \|^s = 1$ iff $\| \text{VP} \|^s = 0$
(47c)

VP	NEG VP
1	0
0	1

In (47c) we display in the form of a truth table the semantics given in (47b). Essentially, this says that in uttering a negation like (47a), the speaker intends to convey the falsity of the corresponding positive sentence. By the same token, conjunctions can be

analyzed as in (48a), (48b), and (48c), and disjunction as in (49a), (49b), and (49c):

(48a) *John smokes and Bill smokes* is true if both *John smokes* and *Bill smokes* are.

(48b) $\| [VP_1 \text{ and } VP_2] \|^s = 1$ iff $\| VP_1 \|^s = \| VP_2 \|^s = 1$

	VP_1	VP_2	$[VP_1 \text{ and } VP_2]$
(48c.i)	1	1	1
(48c.ii)	1	0	0
(48c.iii)	0	1	0
(48c.iv)	0	0	0

(49a) *John smokes or Bill smokes* is true if either *John smokes* or *Bill smokes* or both are true.

(49b) $\| [VP_1 \text{ and } VP_2] \|^s = 1$ iff either $\| VP_1 \|^s = 1$ or $\| VP_2 \|^s = 1$ or both

	VP_1	VP_2	$[VP_1 \text{ or } VP_2]$
(49c.i)	1	1	1
(49c.ii)	1	0	1
(49c.iii)	0	1	1
(49c.iv)	0	0	0

This is the way in which such connectives are analyzed in classical (Boolean) logic. Such an analysis has proven extremely fruitful for many purposes. Moreover, there is little doubt that the analysis in question is ultimately rooted in the way in which negation, etc., works in natural language; such an analysis indeed captures at least certain natural uses of the relevant words. What is unclear and much debated is whether such an analysis stands a chance as a full-fledged (or nearly so) analysis of the semantics of the corresponding English words. There are plenty of cases where this seems *prima facie* unlikely. This is so much so that many people have concluded that while Boolean operators may be distilled out of language via a process of abstraction, they actually reflect normative principles of good reasoning more than the actual semantics of the corresponding natural language constructions. Of the many ways in which this problem might illustrated, I will choose the debate on the interpretation of *or*.

The interpretation of *or* provided in (49a), (49b), and (49c) is the inclusive one: in case both disjuncts turn out to be true, the disjunction as a whole is considered true. As we saw, this seems adequate for certain uses but not for others. The exclusive *or* can be analyzed along the following lines:

(50) Exclusive *or*

	VP_1	VP_2	$[VP_1 \text{ or } VP_2]$
(50.i)	1	1	0
(50.ii)	1	0	1
(50.iii)	0	1	1
(50.iv)	0	0	0

As the readers can verify by comparing (49a), (49b), and (49c) with (50), the two interpretations of *or* differ only in case (i); if both disjuncts are true, the whole disjunction is true on the inclusive interpretation and false on the exclusive one.

So, the thesis that *or* is ambiguous can be given a precise form. There are two homophonous *or*s in English. One is interpreted as in (48a), (48b), and (48c), the other as in (50). Illocutionary agents choose among these options on pragmatic grounds. They go for the interpretation that is best suited to the context. Determining which one that is will involve knowing things like the topic of the conversation (e.g., are we talking about a single job or more than one), the purpose of the conversational exchange, the intentions of the speaker, etc.

We mentioned that Grice proposed an alternative view, however. We are now in position to spell it out more clearly. If you look closely at the two truth tables in (49a), (49b), and (49c) vs. (50), you'll notice that in all the cases in which the exclusive *or* comes out true (namely case (ii) and case (iii)), the inclusive one does, too, i.e., in our terms, [p $\text{or}_{\text{exclusive}}$ q] entails [p $\text{or}_{\text{inclusive}}$ q]. The former is, thus, stronger, more informative than the latter in the following precise sense: it rules out more cases. If you get the information that [p $\text{or}_{\text{exclusive}}$ q] holds, you know that case (ii) or case (iii) may obtain, but case (i) and case (iv) are ruled out. If you know instead that [p $\text{or}_{\text{inclusive}}$ q] obtains, you know that you might be in case (i), (ii), or (iii); only case (iv) is ruled out. Your degree of uncertainty is higher. So $\text{or}_{\text{exclusive}}$ is more restrictive; $\text{or}_{\text{inclusive}}$ is more general (more liberal we said). Things being so, suppose for a moment that *or* in English is unambiguously inclusive (i.e., its interpretation is the most general, less restrictive of the two); this does not rule out at all the possibility that we are in case (ii) or case (iii). The exclusive construal, in other words, might arise as a special case of pragmatic strengthening. It is as if we silently add to, say, (51a) something like (51b).

(51a) John or Mary will be hired.
(51b) (... but not both)

The silent addition of (51b) to (51a) might be justified through a reasoning of the following sort:

(52) The speaker said (51a); let us assume she is being cooperative and not hiding on purpose any relevant information. This entails that she has no evidence that both John and Mary have been hired, for otherwise she would have said so. Assuming, moreover, that she is well-informed about the facts, this furthermore entails that she thinks that in fact (51b) holds.

So in this view, the base interpretation (viz. (51a)) is enriched through an inferential process that draws on principles of rational conversational exchanges and on factual knowledge about the context. The relation between (51a) and (51b) can thus be analyzed as a case of implicature (cf. on this, e.g., Horn (1989), Levinson (2000), and references therein).

The debate on how the two interpretations of *or* come about is important and shows different ways in which semantics is taken to interact with broader considerations pertaining to communication. Whether the two interpretations of *or* are a matter of ambiguity or arise as an implicature, I want to point out a generalization concerning their distribution, which I think shows something important concerning how language works. I will argue that the cases in which *or* is construed preferentially inclusively are (1) predictable, and (2) determined by structure. Then, I will put forth a hypothesis as to why this is so.

We have seen that a sentence like (16a), repeated here as (57a), is interpreted as in (57b), namely exclusively:

(53a) If I got it right, either John or Mary will be hired.
(53b) If I got it right, either John or Mary but not both will be hired.

Now take the consequent (i.e., the main clause) in the conditional in (53a) and move it to the antecedent, and the interpretation tends to shift:

(54a) If either John or Mary are hired, we'll celebrate.
(54b) If John or Mary or both are hired, we'll celebrate.

So, moving a disjunction from the consequent to the antecedent seems to have a systematic effect on the interpretation of *or*. The same holds for the pair in (55a) and (55b):

(55a) Every student will either take an exam or write a paper.
(55b) Every student who either takes an exam or writes a paper will satisfy the requirements.

In (55a), *or* is within the VP, which corresponds to the second argument of *every*, according to the analysis sketched in the section **Semantic Modeling**. Its preferred interpretation is exclusive. In (55b), *every* is in a relative clause which is part of the subject NP (namely, the first argument of *every* according to the analysis in **Semantic Modeling**). Its preferred interpretation is clearly inclusive.

A further class of contexts that displays a similar effect are negation and negative verbs. Compare (56a) and (56b):

(56a) I believe that either John or Mary will be hired.
(56b) I really doubt that either John or Mary will be hired.

Sentence (56a) is likely to get the interpretation 'I believe that either John or Mary but not both will be hired.' Sentence (56b), on the other hand does not have a parallel reading. It rather means 'I really disbelieve that John and Mary stand a chance.'

The list could go on. But these examples should suffice to instill in the reader the idea that there is a systematic effect of structure on the interpretation of *or*. A doubt might linger, though, as to whether it is really in the nature of structure to have this impact. Take, for example, the pair in (55a) and (55b). Is it the position of disjunction that makes a difference? Or is it rather our knowledge of how classes normally work?

This is a legitimate question. Noveck *et al.* (2002) address it experimentally. They designed a reasoning task, in which logically naïve subjects are asked to judge whether a certain inference is sound or not. For example, subjects were asked to judge whether one can infer (57c) from (57a) and (57b):

(57a) If there is an A, then there is a B or a C.
(57b) There is an A.
therefore:
(57c) There aren't both a B and a C.

Subjects were told that this was about inferences that could be drawn (on the basis of the given premises) concerning letters written on the back of a certain blackboard. What would your answer be? The experimental subjects overwhelmingly accepted the inference in (57a) and (57b). What is interesting is that in terms of classical Boolean logic (which takes *or* to be inclusive) this inference is invalid. It is only valid if *or* in (57a) is interpreted exclusively. At the same time, subjects rejected inferences of the following form:

(58a) If there is an A, then there is a B and a C.
(58b) There is an A.
therefore:
(58c) There is a B or a C.

Again, this seems to make sense only if *or* in (58c) is interpreted exclusively. Things change dramatically if *or* is embedded in the antecedent of a conditional:

(59a) If there is an A or a B, then there is a C.
(59b) There is an A; there is also a B.
therefore:
(59c) There is a C.

Subjects overwhelmingly accepted this inference as valid. But this is only possible if *or* in (59a) is

construed inclusively. Our raw intuition thus finds experimental confirmation, one that passes all due controls (the inferences were mixed with others containing other connectives and quantifiers, so that subjects were not conditioned to devise an answering strategy, and the order of presentation was duly varied, etc.). What is interesting is that these experiments only involved meaningless letters A, B, C . . . so scripts, contextual clues, knowledge of the world can hardly be imputed any role in the outcome. If there is a systematic effect on the interpretation of *or*, this must be due to the meaning of conditionals, of disjunction, and to the positioning of the latter. Nothing else is at play.

The reader may wonder how one manages to find out which structures affect the interpretation of *or*. The answer is that such structures were familiar from another phenomenon: the licensing of Negative Polarity Items (NPIs). NPIs are lexical items like *any* or *ever* that seem to require the presence of a negative element:

(60a) * There is any cake left
(60b) There isn't any cake left.

NPIs are acceptable in the contexts that favor the inclusive interpretation of *or* over the exclusive one:

(61a) * If we are in luck, there are any cookies left
(61b) If there are any cookies left, we are in luck.

(62a) * Everyone had any cookies left
(62b) Everyone who had any cookies left shared them.

This correlation is striking, for the two phenomena (the distribution of *any* and of inclusive vs. exclusive *or*) seem to have little in common.

The next question is whether the relevant contexts have some common property. The answer seems to be positive and, surprisingly, points in the direction of a rather abstract, entailment-based property. Positive contexts typically license inferences that go from sets to supersets. For example, (63a) entails (63b) and not vice versa.

(63a) There are Marlboros.
(63b) There are cigarettes.

The set of cigarettes is a superset of the set of Marlboros; so the entailment goes from a set to its supersets. Negation reverses this pattern: (64b) entails (64a) and not vice versa:

(64a) There aren't any Marlboros.
(64b) There aren't any cigarettes.

Now the VP portion of a sentence with *every* (i.e., its second argument) patterns with (63a) and (63b):

(65a) Everyone had Marlboros.
(65b) Everyone had cigarettes.

Sentence (65a) entails sentence (65b) and not vice versa. So does the consequent of a conditional

(66a) If you open the drawer, you'll find Marlboros.
(66b) If you open the drawer, you'll find cigarettes.

But the NP argument of *every* (its first argument) inverts this pattern just like negation, as we saw in the **Semantic Modeling** section:

(67a) Everyone who had Marlboros shared them.
(67b) Everyone who had cigarettes shared them.

Here it is (67b) that entails (67a) and not vice versa. The same applies to the antecedent of conditionals:

(68a) If you smoke Marlboros, you'll be fined.
(68b) If you smoke cigarettes, you'll be fined.

Sentence (68b) entails (68a); on the other hand (68a) could be true without (68b) necessarily being true (in a town in which Marlboros but no other brand is banned).

In conclusion, the contexts that favor the inclusive interpretation of *or* share a semantic property that has to do with entailment patterns: they all license entailments from sets to their subsets. Such a property has come to be seen as the property of being *downward entailing* (where *down* refers to the directionality of the entailment from sets to smaller ones). If this characterization is correct, this means that speakers to the extent that they interpret *or* as shown, must differentiate such contexts, and hence must be able to compute the entailments associated with the relevant structure.

The next question is why *or* tends to be interpreted inclusively in downward entailing structures. I will only hint at what strikes me as a highly plausible answer. As we saw above, in plain unembedded contexts, exclusive *or* is stronger (i.e., asymmetrically entails) than inclusive *or*. The set of cases in which exclusive *or* is true is a subset of the set of cases in which the inclusive one is true. We evidently prefer, everything else being equal, to go for the strongest of two available interpretations. Now, negation and, in fact, all downward entailing structures, as we just saw, reverse this pattern. Under negation, first becomes last; i.e., strongest becomes weakest. In the case of disjunction, the negation of inclusive *or* is stronger (i.e., entails) the negation of exclusive *or*. I'll leave it to the readers to persuade themselves that this is so. Now why is this observation relevant? Suppose we go for the strongest of two alternatives (i.e., we maximize informativeness, everything else being equal); for disjunction, in downward-entailing

contexts inclusive *or* is the strongest interpretation; in nondownward-entailing contexts exclusive *or* is the strongest. This explains the observed behavior in terms of a rather simple principle that optimizes information content on the basis of the available expressive resources.

So pragmatic strengthening (via a generalized implicature) correlates harmoniously with the entailment properties of various elements.

Conclusions

We have sketched a view of semantic competence as the implicit knowledge a speaker has of how the information content of various expressions is related. We have proposed to classify the hosts of semantic relations in three major families: entailment-based, presupposition-based, and implicature-based. Given two sentences, speakers can judge whether they entail each other or not, whether they presuppose each other or not, and so on; and they can do so with finite cognitive resources. We have sketched a denotational semantics that accounts for such a competence (i.e., provides a model for it). Our semantics takes the form of a calculus in which entailments, presuppositions, and even (certain) implicatures re-emerge as theorems. Such a model is formal in the sense of being explicit (building on the tradition of logic and model theory). It is, however, also substantive, in that it models a human cognitive capacity (i.e., the ability to semantically relate sentences to each other). We have seen two simple applications of this approach, to the analysis of determiners and connectives. We have also discussed a case of pragmatic enrichment. What we found is that the interpretation of *or* as exclusive or inclusive follows a pattern sensitive to downward entailingness (much like what happens with negative polarity items). If this is so, then entailment patterns are not simply an invention of logicians or linguists. They must be constitutive, in an unconscious form, of the spontaneous knowledge that endows speakers with their linguistic abilities.

See also: Boole and Algebraic Semantics; Compositionality: Semantic Aspects; Implicature; Monotonicity and Generalized Quantifiers; Presupposition; Propositional and Predicate Logic: Linguistic Aspects; Quantifiers: Semantics.

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often contradicting the theory under consideration, so that the cycle can start again. Progress in science is the incorporation of more and more data in the explanatory scope of the theory. This model is still adopted, usually implicitly, by many researchers working in empirical science.

Logically, the empirical cycle is not sufficiently explicit to guide scientific research. At every stage, too many alternative possibilities would have to be considered. In the transition from generalizations to theories, for instance, a sufficiently imaginative researcher could come up with more theories than they could test in their lifetime. In scientific practice, however, such problems do not arise. In the perception of most researchers, it is difficult enough to come up with a single theory that fits the data. The discrepancy between the logical plethora of theories and their scarcity in scientific practice can be explained by assuming a research program. A research program is the set of assumptions guiding the researcher toward sensible decisions at any step in the empirical cycle. These assumptions need not be conscious to the researcher and are often not formulated explicitly. In the same way as a good chess player does not see all logical possible moves but only the sensible ones, a scientist working in a research program automatically constrains the possible theories to be considered.

Chomskyan linguistics is a research program in linguistics. As such, it should be distinguished from Chomsky's linguistic theory. While both were conceived by Noam Chomsky in the late 1950s, their aims and later development are strikingly different. Chomsky's linguistic theory went through a number of stages in its development, including standard theory (ST) in the 1960s, government and binding theory in the 1980s, and the minimalist program in the 1990s. In each of these stages, tree-structure representations of sentences played a role, although the constraints on the production and manipulation of these tree structures varied. Chomskyan linguistics, by contrast, remained stable during this period. It does not refer to tree structures but specifies what a linguistic theory should explain and how such a theory should be evaluated.

Chomskyan linguistics defines the object of study as the knowledge of language a speaker has. This knowledge is called the linguistic competence or internalized language (I-language). It is not open to conscious, direct introspection, but a wide range of its manifestations can be observed and used as data for the study of language.

Competence is opposed to performance. Performance includes various types of language use; for instance, a collection of utterances, a corpus of texts, a set of grammaticality judgments, and a set of results of psycholinguistic experiments. They can be used as data in linguistic research, but in every case the relationship they have to competence should be kept in mind in their use. Naturalistic data (utterances, texts) reflect the interaction of competence with a number of other factors. Examples of such factors are knowledge of the situation in which the utterance was made, intention on behalf of the speaker, memory limitations, and degree of fatigue. Because the role of many of these factors is poorly understood, it is often difficult to use naturalistic data as evidence for the nature of competence. Experimental data also reflect competence in interaction with other factors, but in setting up the experiment, an attempt is made to control the non-competence factors. The most frequently used type of experiment is the grammaticality judgment. There is no principled reason for treating it in a special way, but because grammaticality judgments are both highly informative and easy to obtain, they have always been widely used in Chomskyan linguistics.

A grammar is a theory about the competence of an individual speaker. It describes the competence as the system underlying the observed data. As such, the grammar explains the data. The term grammar is sometimes also used to refer to competence, but this use is potentially confusing. In early stages of Chomskyan linguistics, including Standard Theory as outlined by Chomsky (1965), grammars were described in terms of rewrite rules and transformations. At this stage of the theory, rewrite rules of the type S → NP VP generated tree structures and transformations that operated on these tree structures to account for phenomena such as subject-verb agreement, passive constructions, and question formation.

The research program as described so far encounters a serious epistemological problem. If we assume a set of grammaticality judgments as our data there are infinitely many grammars (sets of rewrite rules and transformations) consistent with our data. This is a result obtained in mathematical linguistics, the theory of formal grammars. Because the aim of linguistics is to identify the grammar describing the actual competence, we need a method to distinguish this grammar from the other ones compatible with our data. Adding more data of the same type will exclude some grammars but not reduce the problem in a principled way. At any point in time, our set of data will be finite, and for any finite set of data there are indefinitely many different grammars.

As a solution to this problem, Chomskyan linguistics adopts a cross-linguistic perspective, focusing on language acquisition. In other theoretical frameworks, different languages have been compared to

reconstruct a common parent language (historical-comparative linguistics) or to find universals (typology). In Chomskyan linguistics it is assumed that certain genetically determined properties of the human mind are necessary for language acquisition. These properties are therefore reflected in one way or another in any language. By comparing different languages, linguists working in the Chomskyan framework try to find evidence of properties of the language faculty that make the acquisition of these languages possible. These properties have little in common with superficial inductive generalizations. Biologically, they are supposed to be encoded genetically in the same way as, for instance, the property that the human hand has four fingers and an opposed thumb, but they are more difficult to detect because individual languages may reflect them in different ways.

Various indications make the choice of language acquisition as the source of universals plausible. Acquisition of a language is necessary for its existence. Data from child language acquisition show that for many features of syntax, the child does not learn by repetition and resists correction. Moreover, the discrepancy between competence and performance leads to many ungrammatical and incomplete sentences in the input that children receive. The resulting I-language acquired by the child, however, is much more similar to the competence of the people in his or her environment than is a grammar that allows the sentences in the performance the child receives as input. While such considerations make a language faculty as a genetic component of the human mind plausible, conclusive empirical evidence for or against such an assumption is hard to imagine and probably impossible in principle.

In the research program of Chomskyan linguistics, the language faculty is described by a universal grammar (UG). Sometimes the language faculty is also called the language acquisition device or UG, but these names are less appropriate, because the former conflates the knowledge incorporated in the language faculty with its use and the latter conflates it with its description. The interaction of UG and grammars of individual I-languages is an essential factor in the epistemological validity of the Chomskyan research program. Since the purpose is to describe on the one hand all I-languages and on the other the language faculty that makes their acquisition possible, a proper balance has to be struck between what is genetically determined and what is acquired. If UG is too restrictive, it will not be possible to come up with grammars for all I-languages. If UG is not restrictive enough, it will not be possible to explain the learnability of the I-languages.

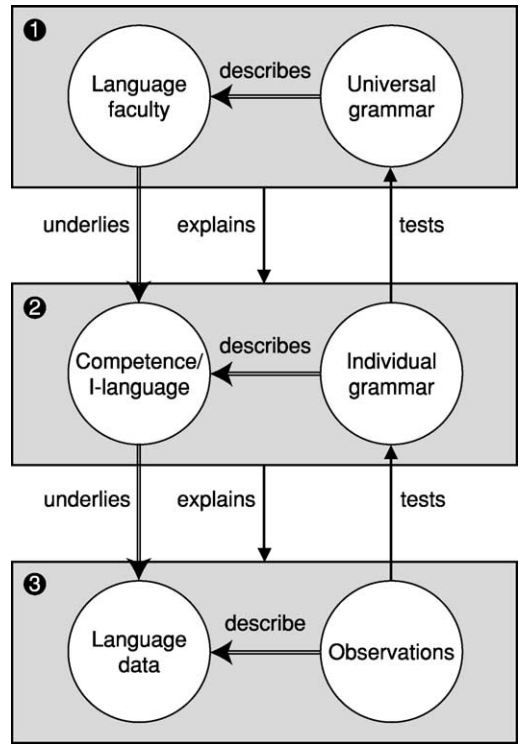

Figure 1 The research program of Chomskyan linguistics.

The interaction of the main components of Chomskyan linguistics can be represented as shown in Figure 1. Language is studied at the universal level (1), at the individual level (2), and at the level of data (3). These levels are represented as the three numbered boxes. On the left we find the real-world entities at each level: the language faculty, the individual competence, and the performance data. On the right we find the constructs of linguistics: UG, individual grammars, and observations about performance. At each level, the linguist's construct describes the real-world entity. In interpreting the relationships between the different levels, it should be kept in mind that there are many instances of the lower level corresponding to a single instance of the higher level. For example, by describing an I-language, a grammar can explain (aspects of) a large set of performance data. Conversely, these data can be used as a test for the grammar. At the higher level, UG describes the language faculty and explains thereby (aspects of) a large set of I-languages. Again, conversely, I-languages can be used as a test for UG, because UG has to allow for a descriptively adequate grammar that is in addition learnable.

While Chomsky (1965) recognized the epistemological need for UG, he also observed that ST did not incorporate the mechanisms for formulating it. By progressive generalization and cross-linguistic

comparison, a model of the language faculty emerged, which was formulated as the Government and Binding Theory (GB theory) by Chomsky (1981). In this model, UG consisted of a number of principles, which were universal. Differences between I-languages were accounted for by including parameters in the principles. A parameter specified a number of options, typically two. In language acquisition, parameters were set by selecting one of these options. The grammar of an I-language was thus determined by the parameter settings selected. The Minimalist Program (MP) outlined by Chomsky (1995) changed many of the theoretical assumptions of GB theory but continued to adhere to the principles and parameters model. An example of a difference between GB theory and the MP is the way movement was constrained. In GB theory, the individual transformation rules of ST were replaced by a single, general rule move α. This meant that anything could move anywhere unless a constraint prohibited it. In the MP, the perspective was reversed: every movement had to be motivated.

A noteworthy consequence of Chomskyan linguistics is that language can be studied at the level of individual I-languages or of the universal language faculty, but not at the level of major languages or dialects. There is no sense of **language** in Chomskyan linguistics, such that, for instance, David Beckham and Paul McCartney share the same language. Since they have different minds, they cannot share a mental component. The similarity of their I-languages, which by no means amounts to identity, can be explained as a consequence of the limited choice permitted by parameter settings, combined with a large overlap in vocabulary.

Other Mentalist Approaches

Adoption of a formalist approach to linguistics and acceptance that language is a knowledge component in the mind of the speaker by no means implies adherence to the research program of Chomskyan linguistics. There are many different ways of elaborating these two basic assumptions into a research program. Although the research program of Chomskyan linguistics has been debated more intensively and developed in more detail, this does not mean that the others are less valid in any sense. In this section, two approaches will be presented that have been developed over the past decades and continue to attract a significant group of researchers: Lexical-Functional Grammar (LFG) and Head-driven Phrase Structure Grammar (HPSG).

Lexical-functional grammar emerged in the late 1970s as a reaction against certain aspects of Chomskyan linguistics. However, the main focus of debate at the time was not the research program of Chomskyan linguistics, as described in the previous section, but the interpretation of a number of individual theoretical results. An example of a prominent issue was the so-called psychological reality of grammars for individual languages. In any stage of Chomskyan linguistics, a sentence is represented as a tree structure generated by rewrite rules and subsequently affected by transformations that move elements of the tree to other positions. The principles and parameters of GB theory are constraints on rewrite rules and movement. Some researchers argued that if such a grammar is a psychologically real description of the speaker's competence, a sentence that requires more movement operations or more complex ones should take longer to process than one with fewer or simpler movement operations. They devised psycholinguistic tests to evaluate this hypothesis and found that processing times were not affected in the expected way. Cognitive complexity could not be related to the complexity of syntactic derivations in a transparent way. This stimulated the development of grammar formalisms in which the role of transformations was reduced or eliminated. Lexical-functional grammar is one of the most successful of them.

As the contributions to Bresnan (1982) indicated, LFG was devised mainly by Joan Bresnan. Instead of tree structures and transformations, LFG has a tree structure and a functional structure for each sentence. The functional structure represents grammatical functions, such as subject and predicate, in a feature structure. The tree structure and the functional structure are linked by a unification-based procedure. In this way, transformations are no longer required, so the problem they pose for the psychological reality of grammars no longer arises.

At first sight, the research program of LFG was not fundamentally different from that of Chomskyan linguistics. Superficially, the main difference seems to be the nature of the grammar formalisms. A grammar in LFG also intends to describe the competence of a speaker. When we consider the universal level, however, a more principled difference can be observed. Lexical-functional grammar assumes that the formal mapping procedure between the tree structure and the functional structure is universal. This assumption constrains the formulation of grammars in a way parallel to the function of UG in Chomskyan linguistics. This means that the language faculty in LFG is interpreted not as the knowledge needed for language acquisition but as a mechanism for language processing. Therefore, the research program of LFG can also be represented as in Figure 1, but rather than UG, a

universal mechanism for processing language, i.e., mapping between form and meaning, describes the language faculty.

Another influential framework is HPSG, which emerged in the 1980s. Originally, as represented in Pollard and Sag (1987), it was strongly influenced by logical approaches to syntax (generalized phrase structure grammar; see the following section) and semantics (situation semantics). In more recent representations of the framework, Pollard and Sag (1994) and Sag and Wasow (1999) adopted a mentalist position. However, work in HPSG is more concerned with developing grammars than with discussing their status. In HPSG formalism, tree structures have been replaced entirely by feature structures. Rather than different levels of representation that are related to each other by transformations or other operations, HPSG adopts a single level. All information about what is called a sign (lexical item, phrase, sentence, etc.) is combined into a single structure. This includes phonology, syntax, semantics, and pragmatics. Relationships between components of the structure are indicated by co-indexation. This applies to both, for instance, a pronoun and its syntactic antecedent and to syntactic, semantic, and pragmatic representations of the same item. The grammar formalism in HPSG seems to be understood as a universal mechanism with language-specific parameters for building up feature structures, which suggests a research program similar to the one for LFG. The HPSG literature is in general more interested in describing individual languages than in the nature and status of universals.

Purely Formalist Approaches

Formalist approaches to grammar are often labeled as generative grammar. The term 'generative' stems from the theory of formal languages. A formal grammar is a set of rewrite rules that generates a set of sentences. The set of sentences is called a language.

In early Chomskyan linguistics, the mechanism of rewrite rules played an important role as a theoretical device. The role of the formulation of individual rewrite rules has declined in the transition to the principles and parameters model in GB theory. The conception of a language as a set of sentences goes counter to the definition of the research topic in any stage of Chomskyan linguistics. Chomsky (1986) called it an E-language (*E* for externalized), as opposed to the I-language he wanted to study.

Other linguists and philosophers pursued the idea that natural language should be studied as a set of grammatical sentences. Quine (1972) summarized the epistemological implications of this assumption. In his view, a language like English is ultimately a set of grammatical sentences. Although this set is infinite, it can still be determined for each sentence whether it is grammatical or not. For any set of sentences, there are infinitely many possible grammars. Rather than finding the correct one among them, this approach considers all of them as equally valid. It is not the knowledge of individual people that is interesting but only the language as an abstract object. English is an abstract object, of which individual speakers have imperfect knowledge, encoded in potentially quite different, more or less imperfect grammars. This position was elaborated by Katz and Postal (1991).

In the domain of semantics, this view of language has a long tradition in the philosophical study of truth and reference. In formal logic, models were developed for calculating whether a particular logical formula is true or false, given a specific assignment of truth values to primitive statements. It was Richard Montague who extended the use of these mechanisms to complex phenomena in natural language, such as quantification. Compared to Chomskyan linguistics, Montague grammar reversed the relative importance of syntax and semantics. Whereas in Chomskyan linguistics, syntax is the central area of linguistics, Montague found syntax not interesting by itself but only as a contribution to calculating the semantics of sentences. He used categorial grammar instead of rewrite rules to represent syntax. In this formalism, constituents are characterized in terms of their relationship to referring expressions and truth values. His model-theoretic semantics was meant to characterize formally the set of possible worlds corresponding to the truth of a sentence. After Montague's death, a large number of followers continued to pursue this idea.

In the domain of syntax, the progressive formulation of principles generalizing over individual rules in Chomskyan linguistics gave rise to the objection that the grammars were no longer generative because they were not formalized in enough detail to determine whether a particular sentence would be generated or not. Many researchers who had been attracted by Chomsky's (1965) ST because of its formality did not accept this development. The introduction of these principles was motivated at least in part by the problems caused by the excessive mathematical power of transformations. Therefore, Gerald Gazdar developed a formalism that approached this problem in an alternative way and dispensed with transformations altogether. In Generalized Phrase Structure Grammar (GPSG), even long-distance dependencies are expressed in terms of a purely 'context-free grammar' (CFG). A CFG consists only of rewrite rules of

the type A → α, where A stands for a single symbol and α for a string of symbols. An example of a long-distance dependency is found in the following: *Who did John think Mary loves?* Here, *who* is interpreted as the object of *loves*. In Chomskyan linguistics, the usual way of expressing this is to say that *who* originates to the right of *loves* but is moved to the start of the sentence by a sequence of transformations. Gazdar demonstrated that a CFG can account for this as well as for many other relationships traditionally described with transformations. To achieve this, he decomposed syntactic categories into feature structures and formulated so-called meta-rules. A meta-rule is a rule that takes a CFG rule as input and produces another CFG rule. Meta-rules have access to individual features inside the syntactic categories.

One of the main advantages of CFGs is their easy implementation on a computer. However, Barton *et al.* (1987) demonstrated that the system of meta-rules adopted in GPSG made grammars computationally intractable. Although GPSG has lost much of its attraction and is no longer pursued as a major grammar formalism, it contributed significantly to the theory of feature structures and was at the basis of the HPSG formalism.

Formalist approaches in the narrow sense do not have a research program parallel to the ones discussed in earlier sections of this article. They do not investigate language as an empirical entity, represented in the speaker's mind but only as an abstract object. As a consequence, their research is not guided by the empirical cycle. It is more similar to formal logic or mathematics, in which theorems are derived from axioms. The axioms correspond to the grammar and the theorems to the sentences. Contrary to common practice in logic and mathematics, formal linguistics starts with a set of theorems (grammatical sentences) and non-theorems (ungrammatical sentences) and searches for a set of axioms that generates all theorems and none of the non-theorems.

Aspects of Language Use

In all formalist approaches to linguistics, the theory of the language system is intended to be part of a general, empirical account of language-related phenomena. The hypothesis that language can be described as an autonomous system, whether realized as a component of the mind/brain or as an abstract system, implies that the interaction between this system and other factors can be invoked to account for phenomena related to language use.

The use of language in communication is one of the most prominent phenomena that have to be covered in this context. Yet it should be emphasized that language and communication are independent. This contrasts with the view adopted in functionalist approaches, where communication is invoked to explain language. In formalist approaches, language is not considered as a tool for communication (although it can be used for communication) and communication is not seen as dependent on language (although it often involves language). By recognizing this mutual independence, relevance theory, as developed by Sperber and Wilson (1986), is compatible with formalist approaches to the description of language. In HPSG, the information pertaining to language use can be encoded directly in the feature structures representing signs. In Chomskyan linguistics, it has been suggested that there is a mental component of pragmatic competence interacting with grammatical competence. Kasher (1991) elaborated this idea.

Since the 1980s, a number of other phenomena based on language use have gained a prominent position on the research agenda of Chomskyan linguistics. They include first and second language acquisition and language change. The reason for their prominence is that they can be used as a source of data about the principles and parameters involved in language.

Whereas the logical problem of language acquisition is at the basis of the language faculty hypothesis discussed in the section on Chomskyan linguistics, the practical problem of first language acquisition is analyzed in the principles and parameters model as the process of parameter setting by the child on the basis of performance data provided by people in the child's environment. The main question here is how the language faculty interacts with general cognitive development. Wexler (1999) advocated the hypothesis that the language faculty matures in the process of language acquisition. Lust (1999) proposed instead that the language faculty remains stable and that the first language competence is a distinct component from the language faculty.

Second language acquisition leads to a state of competence that is usually less than the one achieved for the first language. It is often called interlanguage. In Chomskyan linguistics, an interlanguage is an I-language. The question is what roles are played by such factors as the learner's cognitive development, the type of access to the language faculty, and the first language competence in the emergence of interlanguage competence. Gregg (1996) gave an overview of some of the main positions.

Language change is the historical development of languages such as English. In Chomskyan linguistics, English is considered an epiphenomenon. Its change means that different generations of speakers have systematic differences in language competence. Lightfoot (1999) presented a model in which it is assumed that parameter settings determining a speaker's grammar do not change in their lifetime but their use of the grammar does. The use of certain constructions may drop below a threshold necessary for a new generation of speakers to set the parameters in the same way as their parents. When this happens, the language is perceived as having changed.

In this section, various fields have been touched upon that crucially involve language use. The role that these fields play in approaches to linguistics that assume an autonomous system of language demonstrates that this assumption does not prevent the study of language use. Instead, it guides this study in a fruitful and constructive direction. The principles and parameters model adopted in Chomskyan linguistics stimulates this type of research in particular, because it provides external evidence about the nature of principles and parameters.

See also: Autonomy; Chomsky, Noam (b. 1928); E-Language versus I-Language; Functionalist Theories of Language; Grammar; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Linguistic Paradigms; Linguistic Universals, Chomskyan; Minimalism; Montague, Richard (1931–1971); Politeness; Pragmatics: Overview; Principles and Parameters Framework of Generative Grammar; Second Language Acquisition: Phonology, Morphology, Syntax.

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primary subgroup of Austronesian. There is a 10th group, Malayo-Polynesian, which includes all the other 1100 or so Austronesian languages spoken outside Taiwan (Yami of Orchid Island, politically part of Taiwan, is a Malayo-Polynesian language). If one accepts Blust's hypothesis, then the Formosan languages of Taiwan comprise 9 out of the 10 subgroups of Austronesian.

Blust's grouping is questionable in the view of some scholars because phonological innovations may diffuse across linguistic boundaries. A more conventional grouping is shown in Tsuchida's (1983) map. It has just three groups: Atayalic, Northwest Formosan (comprising Taokas-Babuza, Saisiyat, and Pazeh) and Southern Formosan, which includes three smaller groups, Tsouic, Rukai, and Paiwanic (comprising Amis, Bunun, Puyuma, and Paiwan). Other Formosan languages are ungrouped. This grouping and variations on it are open to the criticism that they are based on shared similarities, not on shared innovations, and are therefore not subgroups in the standard sense of the linguistic comparative method.

It is possible that there will never be a full agreed subgrouping of Formosan languages. Speakers of Proto-Austronesian probably arrived in Taiwan from mainland Asia some 5000 years ago, and it is a reasonable inference that as their descendants populated Taiwan the language diversified first into a dialect network, then into individual languages. Contact between speakers of different languages would have continued, with concomitant mutual influence (and different patterns of contact at different times), leaving complex patterns of shared phonological features, lexicon, and grammatical constructions, the historical significance of which it is difficult to disentangle. Perhaps half the Formosan languages have disappeared since the early 17th century, hampering the task of historical reconstruction yet further.

There is, however, agreement among a number of scholars that Taiwan is the Austronesian 'homeland.' The reason why all Austronesian languages outside Taiwan belong to a single subgroup is that they are descended from a single language whose speakers appear, on current archaeological evidence, to have migrated southward from Taiwan to the Philippines about 4000 years ago.

The History of Formosan Language Studies

The first outsiders to study Formosan languages were probably Dutch missionaries in the early 17th century. Our knowledge of the extinct Siraya language, for example, comes from a New Testament translation and other documents printed by the Dutch (Adelaar, 2004). There is evidence that some Dutch observers recognized similarities between Formosan and Malay vocabulary, but the first explicit statement that Formosan languages belong to what we now call the Austronesian family is found in Klaproth (1824). The first modern examination of the historical position of the Formosan languages was Dyen (1963), and Dahl (1973) was the first major work on the reconstruction of Proto-Austronesian to incorporate Formosan material.

Japanese linguists and anthropologists made quite extensive studies of Formosan speakers and their languages, resulting in the publication of Ogawa and Asai (1935). The first 20th-century description of a Formosan language to appear in a Western language was Asai's (1934) account of Seediq. The first description to be published after World War II was Tung (1964) on Tsou and two articles by Egerod (1965, 1966) that provided a sketch of Atayal grammar. This trickle has grown to a flow since the early 1970s, with grammars, dictionaries, text collections, as well as journal articles and Taiwanese M.A. theses, which mostly deal with one aspect of one language. Several single-language dialect comparisons were published by Paul Li and his colleagues at the Academia Sinica in the 1970s and 1980s. However, considerations of space allow only a restricted literature survey, and (with a few exceptions) only published book-length works in Western languages dealing with living Formosan languages are mentioned.

Languages are discussed in a roughly north-to-south order. The Atayalic languages are among the best described Formosan languages. As well as Egerod's work, there are short grammars of two Atayal dialects (Huang, 1992, 1995) as well as an important article on verbal morphemes (Huang, 2000). Egerod (1999) provided a substantial dictionary. Asai (1934), Holmer (1996), and Tsukida (2004) each sketch the grammars of Seediq dialects.

There are as yet no readily accessible descriptions of Saisiyat or Kavalan (but see Chang, 2000). However, Li and Tsuchida (2001) and Blust (2003) have provided thorough documentation of two languages on the verge of extinction, Pazeh and Thao. Ironically, for Amis, the Formosan language with the most speakers, there is only a partial description in a rather opaque framework (Chen, 1987). There is also a dictionary by Fey (1986). Bunun, another language with quite a large population of speakers, has received little attention since Jeng (1977).

Tsuchida (1976) provided sketches of the three Tsouic languages in the course of reconstructing Proto-Tsouic. Tsou had already been described by Tung (1964) and it has received continuing attention

(see Zeitoun, 2004), but Kanakanavu and Saaroa are in danger of becoming extinct before being further described. Rukai was documented and described by Li (1973) and its dialects have been described in articles by Zeitoun (1997).

The grammar of one Puyuma dialect is described in Japanese with English glosses by Tsuchida (1980). Cauquelin (1991a, 1991b) provides a grammar sketch and a dictionary of another dialect. Paiwan competes with Atayal for the privilege of being the best described Formosan language, with two dictionaries (Ferrell, 1982; Egli, 2002), a grammar (Egli, 1990), and a collection of texts, some of them from Japanese work in the 1930s (Early and Whitehorn, 2003).

The documentation of Formosan languages is thus patchy, with significant gaps when it comes to comprehensive language descriptions and dictionaries. Recently a series of short reference grammars in Chinese, of which Chang's work (2000) is an example, has been published.

The Structure of Formosan Languages

The Paiwan examples below are typical of those used to illustrate the basic structural features of Formosan clauses. Each NP is marked, either by a pronominal form or by a morpheme preceding the NP, as absolutive, genitive, or oblique (a locative marker *i* precedes or replaces the oblique in certain contexts). The verb has an affix that assigns one of four broad semantic roles to the absolutive (the 'nominative' in Formosanist parlance). This affixation is the most salient feature of Formosan languages, also shared by many Philippine languages.

q<m>ałup = aken tua vavuy i (tua) gadu
<ACTOR>hunt = ABS:1SG OBL pig LOC (OBL) mountain
'We hunt boar on the mountain.'

qałup-en nua tsautsau a vavuy i (tua) gadu tua vuluq
hunt-PATIENT GEN man ABS pig LOC (OBL) mountain OBL spear
'The man hunts the pigs in the mountains with a spear.'

ku = qałup-an a gadu tua vavuy
GEN:1SG = hunt-LOCATION ABS mountain OBL pig
'We hunt boar on the mountain.'

ku = si-qałup a vuluq tua vavuy
GEN:1SG = INSTRUMENT-hunt ABS spear OBL pig
'We hunt boar with a spear.'

Morphologically this is an absolutive–ergative system. The verb with ACTOR marking is intransitive, i.e., anti-passive-like, while the verb in each other example is transitive, with two core arguments: a genitive-marked actor ('genitive' because it may also serve as possessor within a NP) and an absolutive-marked NP whose role is indicated by the verbal affix.

By Formosanist convention, the verbal affix is a 'focus affix.' It would be more appropriate, however, to call it an applicative. Applicatives usually occur in nominative-accusative languages, where they change the role of the object. Here, with absolutive–ergative alignment, they change the role of the absolutive. The conventional idea that the 'focus affix' marks the semantic role of the absolutive is also suspect. On other verbs, the affixes marked as LOCATION and INSTRUMENT mark other semantic roles. The common feature is that they progressively reduce the affectedness of the absolutive NP.

Analyzing the non-actor markers as applicatives allows us to regard the construction in which they occur as a single, 'Undergoer' voice, in opposition to the anti-passive or Actor voice. All Formosan languages except Rukai have a voice system similar to Paiwan (with some morphological differences), but its use in discourse varies from language to language (Huang, 2002). In Tsou and Puyuma, the Undergoer voice is the default in narrative discourse, and the oblique-marked Undergoer in an Actor-voice independent clause is always indefinite and often nonspecific. In Paiwan and Seediq, the indefiniteness rule does not apply, and the Actor Voice behaves as an alternative default. How the speaker selects voice is not well understood.

See also: Austronesian Languages: Overview; Taiwan: Language Situation.

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Formulaic Language

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Introduction

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Formulaic Language and Novel Language

It is universally recognized by linguists that human language is unique in its expressive potential because it enables us to produce and comprehend utterances that we have never encountered before. Most research into linguistic form has therefore tended to focus on the mechanisms by which that flexibility operates. However, evidence from psycho- and sociolinguistics, and in recent years also from corpus linguistics, indicates that there is a mismatch between the potential that human language has for novelty and the much smaller set of patterns that are actually found in our

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everyday linguistic behavior. As Pawley and Syder (1983) point out, there are things that the theoretical models indicate we **can** do, but which don't seem to be done as often as they might be.

Of course, it is no surprise that languages make possible the expression of ideas that no one has ever yet needed to express. The cutting edge of human creativity is the capacity to capture a new idea and convey it to others, and unless language can facilitate that, cultural, technological and philosophical development will be greatly hampered. What is less clear is why messages that **are** often needed should also eschew the full creative potential of language. For although language makes it possible for us to express an idea in many different ways, native speakers of any given language know that there are certain preferred formulations of it. Pawley & Syder (1983) point out, for instance, that in English we say that the time is 'six forty' or 'twenty to (or before) seven,' not 'a third to (or before) seven' or 'seven minus twenty.' This is a matter of convention, not any grammatical or semantic restriction, and languages vary in their practices. In French, 'six forty' is expressed as *sept heures moins vingt* ('seven o'clock minus twenty'), while in German, *halb sieben* ('half seven') means 'half past six,' that is, half an hour before seven.

A Preliminary Definition of Formulaic Language

As with many complex phenomena, a complete definition of formulaic language is difficult to capture until a great deal is understood about it. A fuller exploration of the definition and identification of formulaic language is provided later. For now, it will suffice to say that, for most researchers, the term 'formulaic language' refers to two or more words which may or may not be adjacent and which have a particular mutual affinity that gives them a joint grammatical, semantic, pragmatic, or textual effect greater than the sum of the parts. For instance, the word string *in order to* conveys a relationship between two actions without it being clear how the three constituent words contribute to expressing that relationship. The word string *get away with you* means 'don't be ridiculous,' which is not a literal interpretation of the words. The word string *happy birthday* is a strongly favored routine for expressing good wishes, even though, by analogy with Christmas greetings, *merry birthday* ought also to be possible.

Even these few examples already highlight a number of issues that must be continually addressed when researching formulaic language. Firstly, it is clear to even a casual observer that most, if not all, formulaic word strings derive from novel constructions. This raises the question of how we are to decide precisely when a configuration should be considered formulaic rather than novel. Is *have a nice day* a formula or not? It certainly seems to have pragmatic connotations over and above its composite parts, yet if someone were to create, as novel, a grammatical sentence to wish someone a pleasant time from now until nightfall, it could well come out in precisely these words. A second, related issue is how much linguistic knowledge we should attribute to users. In the expression *if I were you*, the verb form is a subjunctive. Many people now do not use the subjunctive after *if*, but still use this expression. Are they exceptionally applying knowledge that they do in fact have, or do they have a way of producing the expression without needing to understand why – or indeed perhaps without even noticing that – the verb takes a form they could not generate using their own linguistic system? Thirdly, what is the relationship between units of processing and words on the page? The vagaries of English writing are legion: we write *into* as one word but *out of* as two, for instance. Is *in order to* really *inorderto?* What would the implications be for viewing *take heed* as *takeheed*, since we can say *due heed was taken* and *took heed* as well? The point is not whether answers can be proffered, for they certainly can, but that any given answer reflects certain assumptions and priorities in linguistic modeling. When the questions are asked, it is these assumptions and priorities that are under examination.

The Focus of Research into Formulaic Language

Researchers of formulaic language are interested in questions such as: Why do conventionalized forms exist and persist? What determines which forms become conventionalized? What prevents or permits the replacement of one conventionalized form by another? How does the deliberate choice of a less conventionalized formulation impact on the way the message is perceived? How do children balance learning to be idiomatic with learning the underlying linguistic system that predicts so many under-used alternatives? Why do post-childhood foreign-language learners find it so difficult to identify the conventionalized nativelike form from among the many equally grammatical alternatives? What is it about common conventional word strings that makes them peculiarly resistant to the effects of aphasia?

As answers to these questions have emerged, it has become clear that the relationship between formulaic language and the language system as a whole has the potential to inform many applied linguistic endeavors, including language teaching, machine translation,

author identification and profiling, artificial speech aids, linguistic rehabilitation, and perhaps even the early diagnosis of degenerative brain conditions.

Why Formulaic Language Exists

Processing Shortcuts

Psycholinguistic evidence strongly suggests that we operate under tight processing restrictions when handling linguistic material. If this is so, then our tendency to use formulaic language might be the result of expediency – that is, it makes processing shortcuts possible. Conceptualizing a 'processing shortcut' is highly contingent on how one models psycholinguistic knowledge. However, most psycholinguists would agree that the pressure point relates to assembly rather than storage. In other words, the brain seems very able to accommodate as many lexical units as we want to store, but we are very easily thrown off course when formulating an utterance, if we try to do too many things at once.

Quite why humans should experience difficulties in composing language online is unclear, but it is probably linked to our limited working-memory capacity. In one approach to psycholinguistic modeling, formulaic language is conceived of as a solution to this constraint. It bundles a grammatical configuration of several words into a single lexical unit that can be understood or retrieved without any grammatical processing. In fact, this proposal is seriously compromised, in its extreme form, by the fact that virtually no word strings are immune from some sort of grammatical fine-tuning. In its weak form, however, the model proposes that grammatical interventions are kept to a minimum, to the benefit of processing parsimony. That is, even if it is necessary to insert the subject, verb ending, and object into *do* SOMEONE *a favor,* a saving is still made over having to retrieve each word and ending separately and combining them from scratch.

Not all psycholinguistic models, however, easily accommodate the notions of 'units' and 'assembly.' Neurologically inspired models aim to identify the processes by which pathways of neural activity are established, maintained, and used. In such models it makes no sense to speak of a word string being 'stored.' Rather, a formulaic word string is conceptualized in terms of a fast processing pathway. Just as a pianist who practices a difficult sequence of notes will, by virtue of that repetition, find it easier to play in future, so it is reasoned that if you become used to producing the articulatory movements that result in a particular routine expression, then this pathway will be strengthened, until it becomes not only fast and reliable but also rather difficult to interrupt, modify or, if it should go wrong, put back on track without starting from the beginning again. Different approaches to psycholinguistic modeling make different predictions, and so are a useful focus for investigations. By testing the predictions of each model, their relative plausibility can be evaluated.

What Formulaic Language Is Used For

Promotion of Self

There are as many different proposals about the purpose of formulaic language as there are domains in which it is found. Under one or another name, it has been independently described across a wide range of areas of linguistic research, beginning, many centuries ago, with observations in the clinical domain, and most recently blossoming as a major focus of attention in second language acquisition and teaching. In between, attention has been paid to it by researchers working on child language acquisition, sociolinguistics, literary style, phraseology, grammar, discourse, and psycholinguistics. Yet in each domain the purpose of formulaic language is differently conceived, so that a somewhat confusing picture emerges. Wray (2002) proposes that the explanation for the differences is that formulaic language is a generic strategic solution to a recurrent challenge for us as humans: how to promote our own interests.

The rationale for this proposal resides in the way that humans use language to manipulate others. Manipulation entails persuading another person to think, feel, or act in some way that you desire. Selecting linguistic material that enables you as a speaker to fluently express your message and enables your hearer(s) to easily decode it supports this self-promotional goal. For instance, commands in the army are given in a consistent, prespecified form, not only so that they will be instantly recognized, but also so that they will be acted upon as a reflex, rather than queried or challenged.

It is important to note that, in this context, it is not just the local meaning of utterances that the speaker wants the hearer to understand with ease, but also their meaning within the surrounding discourse and the pragmatic, social, and cultural context. Also, the speaker's intentions may be altruistic at one level, such as when a teacher formulates the explanation of a concept in a way that will help the students understand it. But at a deeper level even such altruism is driven by the speaker's desire to create a particular kind of outcome that is beneficial for him or herself.

Teachers want to be good at their jobs and want to avoid having to explain the same things many times. The workman who shouts a warning to a passing pedestrian certainly wants to save him or her from danger but also does not want to be responsible for injuring someone.

The following sections examine some of the various functions of formulaic language that have been chronicled in the research literature. The proposed underlying agenda of self-promotion is just a hypothesis, and it is for future researchers to establish whether it stands up to scrutiny in each of the contexts in which formulaic language is believed to operate.

A Badge of Identity

Most native speakers can think of expressions that they have picked up from someone else. Sociolinguists have long recognized that humans use language as a tool for expressing their identity relative to other speakers. When we speak, we select particular turns of phrase that we perceive to be associated with certain values, styles, and groups. We are sensitive, too, to the choices that others make. Our linguistic choices can be both conscious and subconscious and are part of a more general desire to behave like those with whom we most closely identify, or who embody our aspirations.

Social Bonding

Closely allied with the expression of identity is the selection of particular turns of phrase to achieve specific purposes in a (micro-)culturally acceptable way. For instance, in some kinds of Christian discourse, expressions like *praise the Lord* are used simultaneously as disjuncts conveying the speaker's stance towards the associated proposition(s) and as strong markers of the perceived shared values of hearer and speaker. At the macro-cultural level, native speakers within their broad speech community share certain knowledge about nativelike ways of expressing ideas – knowledge that nonnative speakers may not be party to. Becoming accepted into an adoptive speech community entails demonstrating this insider knowledge, though various dynamics relating to both the infiltrator and the host community may place obstacles in the way of a full match with native speaker knowledge.

Other kinds of social bonding also use formulaic language. For example, in Britain elaborate exchanges often take place during a simple sales transaction, with every stage accompanied by routine, largely unconscious, expressions of gratitude. Such behavior is evidently necessary to create and maintain the locally desired level of social ambience, for its absence can be interpreted as rudeness.

Memorization as an Aide-Memoire

One subtype of formulaic language consists of deliberately or inadvertently memorized material, including rhymes, prayers, speeches, songs, and so on. The deliberate memorization of texts is often associated with the need to recall the fine detail of the text correctly, not just its message or general form. It would be inappropriate, for instance, to remember only the gist of a Keats poem, so that one had to paraphrase it rather than recite it, for poetry is defined as much by the precise configuration of the form as by the meaning. Some texts, such as liturgical and legal rituals, have a performative status that can be nullified if the form is altered. Other texts must be recalled correctly because they are the key to other information. For example, it is important not to confuse which months have which numbers of days in the chant *Thirty days hath September* and not to reverse the order of the words in *Richard of York gave battle in vain* (used for remembering the colors of the rainbow), otherwise the very purpose of learning the text is defeated. The mnemonic function of formulaic language matches well the psycholinguistic notion that a formulaic word string is retrieved as a single unit, or in some automatic way. The less processing that goes on, the lower the chances of making alternative choices that undermine the integrity of the whole.

But formulaicity really comes into its own where a balance is sustained between prefabricated text and creativity. This is in evidence in oral literary traditions, where the recitation of lengthy epic poems is achieved by the strategic use of repeated text patterns to express recurrent ideas. These provide a reliable structure for a unique performance event, in which the detail of the formulation is a one-off creative variation on a traditional oral text. Key research into formulaicity in oral performance was carried out by Parry (e.g., 1930) and Lord (1960) who compared traditional Slavic poetry performances to Homer's epics. But it has also been identified in many other cultures including Anglo-Saxon, Maori, and Tibetan. Closer to home, parents retelling well-known fairy stories display something similar. Each extemporization is unique, yet fully recognizable as a version of the original. Its form is constrained both by the plot itself and by traditional, thus more or less compulsory, turns of phrase (e.g., *I'll huff and I'll puff and I'll blow your house down; Mirror, mirror on the wall, who is the fairest of them all?; Who's been sleeping in my bed?*).

Fluency Under Pressure

Public extemporization, described in the last section, must count as a high-stakes activity that can put the

performer under a lot of pressure. It seems entirely plausible that one function of repeated material in traditional narratives, as also the chorus in folk songs, is to provide the performer with processing space to remember and formulate the next part of the text. Formulaic patterns also support other kinds of fluent performance, such as auctions and sports commentaries (Kuiper, 1996). Here, as in epic poetry, familiar words and grammatical patterns aid not only the performer but also the audience. The performer can use well-rehearsed strings to relieve the pressure on productive fluency, confident that this material will come out effortlessly and without thought. Meanwhile, the audience, recognizing that a formulaic string has begun, can bypass full decoding and use the recurrent material as a means of locating and isolating what is new.

Support for First Language Acquisition

The relationship between formulaicity and language learning is complex. In first language acquisition children are known to use memorized expressions, containing grammatical constructions that are precocious relative to their current level of linguistic knowledge. However, commentators often downplay this practice relative to the acquisition of single words and grammatical rules. The reason is that while formulaic language certainly plays a social and interactional role for most children, it is unclear to what extent the early holistic learning of word strings makes any contribution to the slower, more methodical learning of the language as a system of rule-governed unit combinations. Memorized strings do seem to be broken down and reused to some extent. However, the fact that children often 'unlearn' memorized irregular forms like *went* – only to have to relearn them later – has led many researchers to regard the breaking down of formulaic material as too patchy to be a major feature of language acquisition, leaving the role of the formulas something of a puzzle.

On the other hand, since a common feature of formulaic material, both in adult and child usage, is irregularity, it is somewhat to the child's advantage **not** to be too precipitous about harvesting from a useful whole what might turn out to be rather less useful parts. In line with Peters' (1983) notion of 'segmentation,' Wray (2002) has proposed that children and adults alike take a parsimonious approach to breaking down memorized word strings. This **needs only analysis** (Wray, 2002: 130–132) enables word strings to be associated with their holistic meaning until there is direct evidence for the possibility of variation in a particular locus, when the string will be loosened in just that place, to accommodate the variation. In this way, the idiom *by and large*, which never changes, is never broken down, because there is never any input that challenges its immutable form-meaning association. As a result, neither children nor adults inform their knowledge of the word *large* by referring to its occurrence in that idiom, any more than the meaning of *king* would be informed by its apparent occurrence in *barking*. In contrast, a word string such as *pull* SOMEONE'S *leg*, which displays limited variation, will establish a balance of fixedness to flexibility that accommodates the novel subject and possessor, along with appropriate verb morphology, but retains as fixed the occurrence of *pull* and *leg*. Needs only analysis, Wray argues, accounts for the conservation of irregularity in idioms and other formulaic word strings, and, being motivated predominantly by evidence in input rather than logical potential, also explains the relative rarity of many grammatically acceptable formulations for which another formulation already exists with the same meaning.

Help and Hindrance in Second Language Acquisition

In second language acquisition, new parameters result in new patterns (see Wray, 2002: Chaps. 9–11 for a detailed review). While young children seem to acquire a second language in a manner somewhat similar to their first (and with similar success), even at kindergarten age any differences in the uses to which the language is put (and in how the child perceives it as a communicative tool) seem to affect the pattern of acquisition. As children grow older, new psychological and social constraints appear to precipitate variations in learning style and outcome, as Wong Fillmore (1979) notably found in her study of five Hispanic children in California.

By adulthood, two broad tendencies can be observed. Naturalistic learners favor approximations of large chunks gleaned from input, which may remain permanently inaccurate in form, especially if they are effective in communication. Taught learners appear to undervalue phrasal input, focusing on smaller units in order to gain a sense of control in their expression and comprehension. By the time such learners are of higher intermediate level, they characteristically display grammatically logical but often nonnativelike choices. That is, they have missed out on the acquisition of 'idiomaticity.' The challenge of how to improve nativelike idiomaticity in intermediate and advanced learners is a focus of considerable research, but no easy answers have yet materialized. An irony of attempts to promote idiomaticity through the teaching of common nativelike

expressions is that an excessive use of them can render a learner's output a somewhat meaningless concatenation of phrases, disguising other aspects of his or her linguistic knowledge. As a result, the puzzle of how to teach nativelike language is matched by the puzzle of how to test it in relation to other abilities.

A Residual Lifeline

It has been known for centuries that certain kinds of common expressions, such as greetings and curses, along with memorized rhymes, prayers, and songs, often survive when a stroke or other injury disrupts a person's linguistic abilities. In addition, individuals may produce one or more recurrent phrases peculiar to them and/or repetitive phonological strings with no apparent meaning. Psycholinguists are interested in establishing the properties shared by these resilient items, in order to shed light on linguistic processing in general. Meanwhile, clinicians and speech therapists focus on how someone with command of such a limited inventory of expressions can often succeed in conveying a great many messages, using intonation, tone of voice, and voice quality to modify or cancel the customary meaning.

Recognizing Formulaic Language

Researchers of formulaic language are currently challenged by two major practical difficulties: how to define it and how to identify it in spoken and written text. These are inevitably intertwined, for you cannot find something that remains undefined, nor define it without having examples of it. Wray (2002: Chaps. 2 and 3) explores the issues in detail, showing that many definitions confuse form, function, and meaning, while others are too exclusive or inclusive to be useful.

Frequency

One approach is to define formulaicity as a function of frequency. In this view, word strings that are often heard and said gain processing privileges born of the repetition. The increasing ease of processing reinforces their preferential selection from among the options for expressing that message. Meanwhile, their frequency is what makes them sound familiar and nativelike, so that our desire to sound like those around us encourages us to continue selecting them for social reasons. The advantage for researchers of a definition based on frequency is that it facilitates reliable identification. One can set the parameters of an automatic corpus search and extract as formulaic all the material that reaches that threshold.

There are difficulties with this approach, however. Firstly with a very few exceptions – mostly idiom adverbials and adjectives like *by and large, spick and span,* and *lock, stock, and barrel* – formulae are not invariable in form and are often not contiguous either. This complicates the searching, and while wild cards can assist in the accommodation of certain kinds of variation, the setting of the search parameters remains a significant determinant of what is included and excluded in the output and how much manual sorting is subsequently required. A second problem is where to draw the line between two formulas and two variations of one. For instance, what is the relationship between *thank you*, *thank you very much,* and *thank you very much indeed*? In practice a contingency decision is taken. But by the time readers survey the results of a study, such decisions are often long forgotten, risking the proliferation of beliefs about absolute answers rather than definition-dependent ones.

A third problem is that frequency is not determined from a consistent baseline, but rather as a function of how often a message needs to be conveyed. When we find that *good morning* is more frequent in a corpus than *long live the King* this does not tell us that the former is 'more' formulaic, only that people more often wish each other good morning than they wish the king a long life. Frequency searches therefore need to be able to measure how often a particular formulation is used to express its message. The formulaicity of *good morning* arguably owes more to its preferential use over alternatives like *good day* and *how do you do* than to its absolute frequency. Indeed, it might well be found that, opportunity for opportunity, *long live the King* is more predictable than *good morning*.

Form

Aligning formulaicity with grammatical irregularity offers an easy but rather narrow route to definition and identification. In more inclusive approaches, the cline of fixedness makes form-based definitions difficult to pin down. One strategy has been to make a feature of the variability itself, and place linguistic configurations along a continuum from fully immutable to fully flexible. Although many have favored this approach, it is difficult to avoid a descriptive taxonomy with no explanatory or predictive powers. Since there is evidently a dynamism about form, including the diachronic shift from flexible to inflexible

(fossilized), this seems a pity. Nevertheless, it is clear that form cannot be ignored. Capturing the nature and extent of the variability has also been attempted, and entails the recognition of 'frames' composed partly of lexical material and partly of abstract categories representing closed or open class choices, e.g., *NP_1 take + TENSE NP_2 to task*. Many frames become predominantly abstract, once the potential for adjectives, intensifiers, and so on is allowed for, raising new theoretical questions about just how different such frames are from traditional linguistic descriptions.

Phonological form has attracted some attention, since fluency is associated with elision, weak forms, etc., and phrases with nonliteral meanings can be expressed within a single tone unit more easily than can their literal equivalents. However, it has proved difficult to find a resilient correspondence between pronunciation and formulaicity.

Finally, in form-based accounts, the status of standard collocations remains unclear. A word may preferentially combine with particular partners without being prohibited from pairing with others. The customary pairings are unquestionably idiomatic, but often do not have other features of formulaicity.

Meaning

Some linguists regard as formulaic only expressions with a holistic meaning that cannot be derived from the individual words. A useful test of this is to swap an individual word with a near synonym, to see if this destroys some feature of the meaning. The results can be very informative: the *large intestine* is not the same as the *big intestine* nor the *big toe* as the *large toe*. However, it is easy to cross into instances where the alternative is not really a synonym. In *by and large* the word *large* does not, and never did, relate to size, and this is why **by and big* sounds impossible.

Holistic-level semantics is, however, not a sufficiently broad definer of formulaicity. Even if the definition is extended to cover the pragmatics of the whole, as with expressions like *have a nice day*, difficulties arise. The expression *great to see you again* will, for example, fall outside of the definition, being neither opaque nor endued with a strong pragmatic tone. A second difficulty is that there is no cleardividing line between what is and is not opaque. Several dynamics interact here, including the survival in a formula of an outmoded word (e.g., *curry favor*) and the use of metaphor (e.g., *straight from the horse's mouth*). Just as with morphology and etymology in word formation, what is opaque for one person may be transparent for another. It follows that any attempt to define formulaic language in relation to meaning cannot ignore the knowledge of the individual. Yet drawing on the individual's intuition and judgment as the basis for defining and identifying formulaic language runs into its own serious problems.

All in all, it remains difficult to characterise formulaic language in purely semantic terms, and, again, it is part of the researcher's job to formulate theory that can explain why this should be so.

Future Directions

Research into formulaic language draws together the theoretical and the practical. In applied spheres it is possible to by-pass theory, but understanding how formulaic language fits into the bigger picture remains important. So far, the modeling of formulaic language has been psycholinguistically inspired, but the role of psycholinguistic models in informing linguistic theory has always been debated. The point of contact must be the definition of the lexical unit, on the one hand, and of the word and morpheme, on the other. Cross-linguistic research already questions the viability of the 'word' as a linguistic category (e.g., Dixon and Aikhenvald, 2002), and research on formulaic language suggests that words are not the largest units being manipulated by the grammar. While some theoretical linguists maintain that idiomaticity falls outside the domain of formal linguistic description, there is undoubtedly scope for theory to address more directly the question of what formulaic language is and how it arises.

See also: Construction Grammar; Corpus Linguistics; Corpus Lexicography; Discourse Processing; Formulaic Speech; Idioms; Sentence Processing.

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Formulaic Speech

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Introduction

Formulaic speech is simply speech that utilizes formulae. Formulae are phrasal lexical items that are indexed for their role in social interaction or, more narrowly, indexed for specific use in discourse varieties, registers, and genres. (This sense of the word formula should be distinguished from the more general sense of the word to denote mathematical or logical expressions.) As for speech, it is to be distinguished from language in the sense that speaking is a variety of linguistic performance, what humans do with language, not language itself, which is a knowledge system. Knowledge systems contain both declarative and procedural knowledge. Declarative knowledge is knowledge about 'what' – for example, the fact that all lower-body garments that have two pipes, such as *trousers* and *knickerbockers*, are plural in English. This fact can be regarded as as part of a native speaker's declarative knowledge of English. Linguistic competence is mostly of this kind. Procedural knowledge is knowledge about 'how to': for example, how to behave verbally at dinner parties and in church is partly based on procedural knowledge. Formulae are part of the declarative knowledge of a language that speakers have, and speakers also have procedural knowledge about how they are used.

The Phrasal Lexicon

All linguistic performance draws on the lexicon. Formulaic speech draws on the phrasal lexicon. For example, the performative sentence *I name this ship the… God bless her and all who sail in her* is a formula in that those who know it know the conditions under which it may be appropriately uttered (Austin, 1976). Some single-word lexical items also have such usage properties (Wray, 2002: 264). One-word curses, for example, have specific contexts of use. They are used to express one's adverse reaction to entities or events. They are to be used in some social domains and not others. Polite curses such as *Darn!* are used in contexts where *Shit!* might be inappropriate. Some linguists would include such one-word items within the definition of formulae, but usually formulae are regarded as being phrasal.

A number of formulaic performatives, such as the ship-launching-and-naming formula, have been thoroughly analyzed. Those who know such a formula not only know it as a form of words, i.e., as a lexicalized phrase, but also know that it is associated with a matrix of social conditions that must be fulfilled for it to function in its socially prescribed manner (Coulmas, 1979). The speaker must be the person designated, by those in authority over the launching, to be the person to speak these words. The person must speak the formula at the time and place designated for the naming and launching ceremony. She must also break a bottle of champagne over the bow of the ship, and so forth. If there is a mismatch between what native speakers know to be the prescribed conditions of use for the formula and the context in which a speaker is using the formula, various effects may occur. For example, uttering the launching formulae the day before the official launch when one is not the person designated to perform the launch does not count as a ship launching and can create effects such as eliciting laughter if there are others present. In other contexts, using formulae inappropriately can have more serious consequences, such being committed to a psychiatric institution or to prison for uttering obscene curses at police officers without any cause (and sometimes even when one does have cause).

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Classic Formulaic Speech

As an object of a research program, formulaic speech came into its own with the publication of Albert Bates Lord's book *The singer of tales* (Lord, 1960). Lord's approach also provided many of the leading ideas that have borne fruit in subsequent work. Lord's book was the culmination of years of fieldwork, in what was then Yugoslavia, investigating how the oral heroic South Slavic epics were being performed. The aim was to come to an understanding of how the poems attributed to Homer might have come into being. Lord and his senior partner, Milman Parry, were the first to record oral traditional poets, which they did with primitive wire recording equipment.

The performance of South Slavic epic occurs in particular places and at particular times, notably in coffeehouses during Ramadan. Bards perform under contract to the owner of the *kafana*, and the best can provide a new epic for each of the 30 nights of Ramadan. The defining characteristic of the performances of such bards is of composition in performance. The epic is composed anew each time it is performed and is therefore never exactly the same each time it is performed. To put it differently, bards do not recall epics verbatim but compose them from elements that are common in the tradition to which they are heir. The traditional elements are of three kinds.

The first element is a set of plots, broad outlines of stories. Klaeber (1950) proposed that the basic plot of *Beowulf*, itself an oral heroic poem, consists of two sections: Beowulf's early heroic actions and then his last actions. In the first, Beowulf fights and defeats Grendel and then fights and defeats Grendel's mother. In the second, Beowulf fights the dragon, kills it, and is himself mortally wounded in the attempt. Each of these in turn has substructure, but the plot is basically a serial structure with some additional embedded material. It can, however, be amplified in performance and expanded. Episodes can be added from a store of episodes the bard knows. Episodes can also be deleted if an audience proves unsympathetic.

The second element of a composition in performance are the episodes themselves, of which there are also a finite number. In the *Iliad*, warriors arm themselves before battle. This small episode is conventionally ordered, and the events it consists of are normally given in the same order. In South Slavic epics, the meeting of the council always introduces the actors in the same order. Heroes leave for battle and their leave-taking has a similar episodic character each time it is related.

The final elements are the formulae out of which the oral text is ultimately composed. Formulae in oral epic traditions are forms of words that conform to the metrical tradition within which the performer is brought up. In the case of Homer, formulae must fit the hexameter template of the Homeric tradition. In the case of the Old English tradition, they must conform to the pattern of half-lines that have two stressed syllables and that alliterate. As forms of words, some formulae are wholly fixed, but others allow for a small amount of internal variation in that there might be two or three words that can occupy a particular position in the phrase.

These traditional resources are part of an oral tradition. They are the linguistic knowledge that underlies the performances of bards who sing in a tradition. There are other requirements, such as the capacity to perform fluently, to sing or chant in the traditional way, to be responsive to an audience, and to fill the time available by adjusting the length of the performance. The totality of these capacities might be termed the generalized communicative competence of the tradition.

How do bards acquire this kind of communicative competence? According to Lord, the process is a three-stage one, beginning with an apprenticeship where a novice attaches himself to a master or masters and spends as much time as possible listening to them. Then follows a period as journeyman, where a singer can produce a series of songs but relatively stereotypically and without great flexibility. Finally, and not for all performers, there is a period of mastery where the performer can learn new songs quickly, adapt himself to local conditions, and create new formulae by adapting the old. The result is that masters are acknowledged by all as such and are much sought after as performers. In the case of Old English heroic poetry, one feels that the bard who composed the fragment of the *Fight at Finnsburg* would have had particular narrative strengths as a performer. There is a qualitative dimension, then, to performance in an oral-formulaic tradition.

Two sets of determinants lead to the creation of oral-formulaic traditions. The first set is social. Formulaic traditions exist in particular speech communities and serve particular functions. Germanic bards performed in the mead halls before warrior bands and their chiefs, not in coffeehouses to people who were fasting for Ramadan. Germanic traditions dealt with Germanic heroes from the past and within a heroic code different in its details from the heroic code of the South Slavic epics. The exploration of these traditions has been the subject of ongoing

research since the publication of *The singer of tales* (Foley, 1990).

The second set of determinants is psycholinguistic. Live performance requires memory and processing resources. The three sets of linguistic resources Lord proposes for oral traditional performance all serve the function of cutting down the amount of information a speaker has to keep in memory and to process while performing. Since all formulae are indexed for the task they perform in the discourse – such as announcing the entrance of the cupbearer at a council meeting – when a performer must relate the entrance of the cupbearer, the formulae for saying that are in memory and do not need to be constructed *ab novo*. The plots are already known, as are the episodes from which the performances are constructed. The performer still has to keep track of where the story is currently located in the plot as a whole, but once he or she has embarked on an episode such as a Homeric battle, its progress is controlled partly by the required sequence of such episodes and partly by the formulae themselves, since they have rich associative networks with those in their conventional proximity.

Since these resources are in many traditions carried down the generations entirely by oral means, the relative stability of the traditions over time is perhaps surprising. Most forms of words are not long remembered. Humans are good at recalling the gist of what they have heard, but not the form of words within which it was couched. However, Rubin (1995) showed just how durable oral traditions can be and why. Formulae contain a large number of mnemonic 'hooks,' which allow them to be recalled accurately over very long periods. There is also a considerable social investment in having these traditions presented in a consistent way over time. Oral cultures are like that. So are the oral cultures within literate cultures. The formulae used by the speaker of a parliament are invested with the power of the office, and a speaker must use his or her formulae, which are also the formulae of the office, with panache to control members and the proceedings of a house of parliament.

Classic formulaic speech does not require accurate verbatim recall. Variation is possible, and innovation within a tradition can be valued. Fry (1975) showed how Caedmon used the pagan formulaic tradition of Old English heroic poetry to create a hymn of praise to the Christian God with a minimum of adaptation. However, the adaptation was significant. There are, on the other hand, cultures where accurate verbatim recall is also important. The laws of preliterate Iceland rested on the capacity to plead a case with totally accurate recall. If that was not done, the case failed.

Formulae in Other Forms of Speech

Classic oral formulaic speech of the kind documented by Lord for the performance of South Slavic epics, and now found to be at the core of many other oral literary traditions, is not limited to such traditions but may also be found in a large range of vernacular traditions (Edwards and Sienkewicz, 1990). These range from single performative formulae, such as *I now declare you man and wife*, through dyadic formulaic pairs such as *How are you? – Fine, thanks*, to traditions that are not as clearly governed by discourse structure rules and where not every sentence is a formula. For example, Pawley (1991) showed that at cricket's most ritual moment, the bowling of the ball and its immediate aftermath, cricket commentators are highly formulaic. However, at other times, they converse relatively less formulaically about the weather, the spectators, and even seagulls. At this point, formulaic speech shades off into speech that may contain phrasal lexical items of various sorts but that are not necessarily indexed for their social or discourse role. Intermediate situations include formulae used as discourse markers or politeness signals in otherwise nonformulaic speech (Aijmer, 1996; Ferguson, 1976; Keller, 1981).

When we look at such 'in-between' uses of formulae, the weight of two sets of factors, social and psycholinguistic, is in many cases hard to assess. The psycholinguistic factors have been investigated in the cases of auctioneers and sports commentators (Kuiper, 1996). These performers operate within their own oral traditions, and they produce performances that have many of the characteristics of those of Lord's bards. However, the conditions under which they do so vary. Slow auctions do not place great pressure on the auctioneer, while fast ones do. Slow sports allow a lot of time for constructing speech, whereas fast ones do not. It seems that classic formulaic speech – that is, speech with a fixed discourse structure, high frequency of formulae, and unusual fluency – is most in evidence where performers are subject to high memory and processing pressure but where it cannot take place unless the performances are ritualized to some extent, that is, they have a continuity over time and are socially embedded in some way. Traditional Maori *marae* ritual is of this kind (Salmond, 1977). Recent research into psycholinguistic aspects of formulaic speech can be found in Schmitt (2004).

It may be that the social embeddedness of formulaic speech allows one to analyze further the social context in terms of the function of the rituals that formulaic speech can enact. But that need not inevitably yield interesting ethnographic

interpretations. Many social practices exist because they are traditional rather than because they have clear sociocultural functions. Some communities of practice shake hands; some press noses. That humans greet one another is common to the human condition, but one need not and sometimes cannot read major symbolic significance into how that is done. On the other hand, routine human behavior that involves formulaic talk is frequently tuned in to particular sociocultural norms and therefore can yield worthwhile ethnographic interpretations. There are cultural practices of significance that are implemented in whole or part through formulaic speech. This has been known since Malinowski's ethnographies in Melanesia (Malinowski, 1922). Much of what Malinowski observed could be understood only through an understanding of the formulaic performances surrounding it. Rites of passage, for example, are normally accompanied by formulaic speech. The cultural import of the ritual can be understood better if the speech and its formulae are understood in their context. With weddings, for example, the traditional formulaic vows declare publicly, whatever the participants' private intentions, that their future relationship will be monogamous and lifelong. That is the tacit Judeo-Christian assumption behind these vows. Ritual insult can be similarly analyzed for what it has to say about male bonding (Dundes *et al.*, 1972; Kuiper, 1990; Labov, 1972). Proverbs that qualify as formulae on the grounds of their use in particular social contexts were revealingly analyzed as political tools by Mieder (1997) and Ji (2004). Essays exploring the relationships between formulaic speech and its cultural context can be found in Skandera (in press).

Formulae as PLIs

Phrasal lexical items (PLIs) have linguistic properties besides, in some instances, having associated conditions of use (Burger, 2003: 11–123). They can, for example, be classified as idioms. For instance, the auctioneer's formula *going once, going twice* does not actually mean literally that the lot is being sold one, twice, or three times. It is being sold only once. In this way the presale formula is like *tug at NP's heartstrings* or *make heavy weather of NP*, which are generally taken to be semantically noncompositional phrasal lexical items. Formulae might also be classified as restricted collocations in having arbitrary restrictions on which words pattern with which. For example, the auctioning formulae *last call* cannot have any word other than *call* used in second position. Auctioneers do not say *last shout* or *last invitation* to indicate that they are about to close the bidding. In this way, many formulae are like prepositional usage in English, which frequently involves collocational restrictions. One takes notice *of* something; one takes an interest *in* something. One does not take notice *in* something or an interest *of* something. These other properties have no bearing on whether or not a phrasal lexical item is a formula, but they clearly cross-classify with the property of being a formula. The general area of phraseology was surveyed from a variety of perspectives in Everaert *et al.* (1995), Cowie (1998), and Burger *et al.* (in press).

The Size of the Formulaic Vocabulary

Since formulae are PLIs, it is an interesting question how many items a native speaker knows. This question has not been answered with any degree of specificity. Estimates as to the size of the phrasal lexicon in general range from its being of the same order of magnitude as the single-word lexicon (Becker, 1975: 29; Jackendoff, 1995: 137) to an order of magnitude larger (Mel'čuk, 1995: 169). Often those making such estimates do not indicate whether the numbers are those of PLIs in a language or in the lexicon of an individual speaker or both. How many of these items are formulae in either case is not normally estimated. However, the task, in the case of classical formulaic speech, is certainly a possible one. By collecting sufficient recordings, one can isolate the formulae of the tradition and their variant forms. In rich traditions, the formulaic vocabulary of a mature performer would certainly run into hundreds and thousands of items. Sports commentators are heirs to such rich traditions, as, clearly, are the performers of heroic epics. This suggests that the most productive approach is to see speakers as heteroglossic in the Bakhtinian sense (Bakhtin, 1981). The crucial factor is not how many formulae a speaker knows but the traditions in which the speaker is fluent. Each of these traditions will have its own formulae. A speaker's communicative competence is thus the repertoire of speaker roles in which he or she is communicatively competent. The formulaic vocabulary known in each of these roles then becomes a manifestation of this kind of competence.

Formulaic Speech and Linguistic Variation

Formulaic speech is not in general a case of dialectal variation, since mature native speakers may switch into and out of formulaic speech varieties. It is, rather, a manifestation of register or genre variation. Exactly what the parameters of situational constraint are can be examined only on a case-by-case basis.

Figure 1 Wrightson livestock auctioneer in action, Oxford ewe fair. (Photo by Koenraad Kuiper, 1998.)

The situation of supermarket checkout operators surely has little socially in common with that of Old English bards. Yet both produce formulaic speech. This suggests that careful ethnographic description is needed of each social situation in which a formulaic tradition is found.

Within each tradition there may be variation. Different geographic areas can develop local variants of a tradition. In the case of auctions, different livestock saleyards have their own local variants of the linguistic features of the variety, including the discourse structure rules, formulae, and prosodics (Figure 1). American tobacco auctioneers chant with Black musical ornamentation, and their formulaic inventory includes formulae such as *Dance with me darlin's*. Auctioneers at Sotheby's do not chant their auctions with Black musical ornamentation and do not use the formula *Dance with me darlin's* (Kuiper and Tillis, 1986). Different commodity markets have theirs. The formula *Farm x is a footrot-free property* belongs to livestock auctions where sheep are sold in New Zealand and not to auctions of houses. There is, therefore, dialect variation within a tradition. All performers change their performances over time and develop their own idiosyncrasies. Variation within formulaic traditions thus also has both a diachronic and an idiolectal dimension. Again, the nature of this variation can be uncovered only by looking in detail at each tradition.

Formulaic and Other Speech

The observation that much of naturally occurring speech is formulaic to a degree is sometimes taken as evidence against the Chomskian position that human linguistic capacity is creative. That does not follow. Human linguistic potential is fully as Chomsky regards it. That this potential is not fully or partially brought into play in some varieties of speech is not counterevidence to this position. It is counterevidence to the position that every sentence humans utter is a novel creation (Becker, 1975). The interesting question that remains is how much of human linguistic potential rests on recall and how much on the processing of novel utterances. This is likely to be contextually determined, and the two factors that govern formulaic speech – namely, psycholinguistic factors to do with memory and processing pressures and sociocultural factors such as the degree to which the situation in which the speaker is speaking is routine – are likely to be the major determinants. In ritual contexts and under pressure, such as when composing prayers of intercession, speakers are likely to be able to draw on formulaic resources. Where there is time, and novelty is required, such as in the writing of poems, formulaic speech is less likely.

See also: Collocations; Compositionality: Semantic Aspects; Construction Grammar; Formulaic Language; Genre and Genre Analysis; Idiom Dictionaries; Idioms; Jargon; Language Development: Overview; Language Socialization; Learners' Dictionaries; Lexicalization; Oral Traditions and Spoken Discourse; Orality; Performance Factors in Spoken Discourse; Performance in Culture; Phraseology; Register: Overview; Sentence Processing; Situation Semantics; Slang, Argot and Ingroup Codes; Speech Acts; Speech Genres in Cultural Practice; Sports Broadcasting.

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Michel Foucault (true name Paul, born on October 15, 1926, in Poitiers, France) was a French philosopher, psychologist, and psychopathologist. He graduated from the École Normale Supérieure de Paris in 1952. From 1954 to 1958 he taught French at the University of Uppsala in Sweden, and from 1958–1959 at the University of Warsaw, Poland, where he established the Center of French Culture. Foucault spent the following year in Hamburg, returned to France in 1960, and became the head of the Department of Philosophy at the University of Clermont-Ferrard. In 1969, he was given a professor title and was promoted to the head of the History of Systems of Thought at the College de France. Foucault died of AIDS on June 25, 1984.

Foucault's ideas developed in three periods marked by the issue of his major books.

The first period, represented by *Madness and civilization* (Foucault's doctoral dissertation) is inspired by the fact that madness, though originally inspired divinely, was considered a mental illness and thus simultaneously repressed in the Western societies. He also claimed that madness contrasted to sanity, and the repercussion caused by this distinction is a troublesome and scalding conception dating back to the Age of Reason.

In the second period of his development, Foucault issued *L'Ordre du discours*, which is a seminal study of the natural sciences, linguistics, economics, and social thought of the 18th and 19th centuries. Greatly

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inspired by Nietzsche's claim about the death of God, Foucault declares the death of Man – a discursive formation of the advances in sciences in the last 150 years.

During the last period (from 1975), Foucault examined the effects of power on the individuals and society, and demonstrated how historical inquiry are combined with philosophical questions about subjectivity, knowledge, and power. He showed how sexuality can be put into discourse and argued that simple liberation from power is impossible. Subjectivity, he claims, can be viewed through one's sexuality. In the immense three-volume study entitled *Histoire de la sexualite* (the first two volumes were issued during his lifetime; the third one is unfinished) he gives an insight into the understanding of sexuality through centuries, and how Western Societies perceived themselves as sexual beings.

Foucault juxtaposes the 'history of ideas' with the 'archeology of science.' In the 'speaking' of language, he sees the replication of discourses of power; what constitutes us as human speakers is social power, hegemony, and ideology. He claims that the history of thought, of knowledge, of philosophy, of literature seems to be seeking and discovering discontinuities. Foucault considers all knowledge arbitrary, including notions of truth, in order to keep power structures relevant and functioning. In this view, he rejects the linear model of history and suggests analyses of discourse, its relative rules in various moments of history, and sees any form of writing or expressing oneself as the way of abandoning of disruptions in favor of stable structures. Moreover, he sees discourse not as a document, but as a monument.

Foucault was not only philosopher, lecturer, and writer, but also participated in the political actions; he actively helped the Solidarność [Solidarity] party in Poland in 1980 and engaged in the movements against discrimination of the disabled, homosexual, and marginal social groups. His thoughts, taken over in the 1990s by the queer theory, became the source of the revival of the feminist, gay, and lesbian studies.

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Fowler, Henry Watson (1858–1933)

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Fowler is the name by which most people refer to H. W. Fowler's (1858–1933) landmark book, *A Dictionary of modern English usage* (*MEU,* first edition, 1926). Oxford University Press sensibly rejected Fowler's suggestion that the book be called '*Oxford Pedantics*.'

Fowler was born in Kent, England and attended Rugby School and Balliol College in Oxford. After leaving Oxford, he worked as a schoolteacher, first in Scotland (1881–1882), and then in Yorkshire from 1882–1899. He then moved to London to work as a journalist, living mainly on his inheritance from his father. H. W. Fowler was a shy and reserved man who took great pleasure in daily exercise, especially cold-water swimming.

In 1903, Fowler moved to the parish of St Peter-in-the-Wood, Guernsey, to join his brother, Francis George (Frank) Fowler. They lived in side-by-side granite cottages, and worked together translating the works of the Greek writer Lucian of Samosata for the Clarendon Press, which published them in four volumes in 1905. *The King's English* (1906), which Fowler described as "a sort of English composition manual, from the negative point of view, for journalists and amateur writers," was published with only their initials, but its authorship was soon

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The brothers then turned to *The concise Oxford dictionary of current English (COD)*. Completed in 1911, the dictionary was very successful, both in the UK and overseas, despite Fowler's lack of experience in lexicography. As Fowler put it in the preface to the second edition of *COD*, they had been "plunging into the sea of lexicography without having been first taught to swim." They clashed more than occasionally with Oxford editors on matters of spelling, pronunciation, and definition, but not about payment – Fowler and his brother received only lump sums for their work for Oxford, not royalties, and Fowler several times said that he believed that he was being overpaid for his efforts.

Tired of lexicography, Fowler returned to a project he had suggested to OUP years before, an 'idiom dictionary,' that would only deal with words for which there were difficulties of usage. This was the project that became *MEU*. Work on *MEU* was interrupted by World War I, when Fowler at age 56, and his brother at age 45, enlisted. Put in support positions, neither brother saw much action, and they were invalided out of the army. Frank died of tuberculosis in 1918, and Fowler carried on alone, working on the *Pocket Oxford dictionary* (1924) and a second edition of *The concise Oxford dictionary of current English (COD,* 1929).

Fowler, although a gifted classical scholar, was not a linguist, and his pronouncements in *MEU* are those of a prescriptive (albeit very entertaining) schoolteacher. His goal was to be "more courageous" than lexicographers in declaring what was and what was not idiomatic British English, to be a guide for the "half-educated Englishman" who needed to know "Can I say so-and-so"?

See also: Critical Applied Linguistics; Lexicography: Overview.

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Roger Fowler was born on August 23, 1938, in humble circumstances in Worcestershire, England. He was educated first at Tewkesbury Grammar School and then at University College London, from which he received his M.A. in English in 1962. He lectured first at the University of Hull, 1960–1964, moving to the newly founded University of East Anglia (UEA), Norwich, where he remained – except for sabbaticals to Berkeley and Brown – until his sudden untimely death on June 20, 1999.

Having read the English 'language syllabus' in London, Fowler began as a mediaevalist. His 1962 M.A. thesis, an annotated edition of Wulfstan's *Canons of Edgar*, was published in 1972. However, by the mid-1960s he had become a key advocate of the new relation between modern linguistics and literature in English Studies. He preferred the term 'linguistic criticism' to 'stylistics,' which he used in a restricted technical sense. From the mid-1970s, he became known as one of the founders of an overtly political and controversial 'critical linguistics,' an extension of these methods to the revelatory critique of ideology in language use. Writing or editing more than 20 books, his thinking was influential for many practitioners of both literary and critical linguistics, inventively showing what was possible in both these areas.

Stimulated on the one hand by the attention to the language of literature in New and Practical Criticism – he admired Nowottny's 1962 *The language poet's use* – and on the other hand by the possibilities of linguistics as a precise and objective tool, Fowler early argued that literary criticism and education needed linguistics to address language in a rigorous, rather than an impressionistic way, and to make serious advances in some technical areas, such as metrics. His sustained thinking about this relationship can be traced from the 1966 volume he edited, through the seminal collections of his articles in *The languages of*

guessed. Some reviewers took issue with a few of their pronouncements, especially their condemning as 'superstition' the stricture against ending a clause or sentence with a preposition.

The brothers then turned to *The concise Oxford dictionary of current English (COD)*. Completed in 1911, the dictionary was very successful, both in the UK and overseas, despite Fowler's lack of experience in lexicography. As Fowler put it in the preface to the second edition of *COD*, they had been "plunging into the sea of lexicography without having been first taught to swim." They clashed more than occasionally with Oxford editors on matters of spelling, pronunciation, and definition, but not about payment – Fowler and his brother received only lump sums for their work for Oxford, not royalties, and Fowler several times said that he believed that he was being overpaid for his efforts.

Tired of lexicography, Fowler returned to a project he had suggested to OUP years before, an 'idiom dictionary,' that would only deal with words for which there were difficulties of usage. This was the project that became *MEU*. Work on *MEU* was interrupted by World War I, when Fowler at age 56, and his brother at age 45, enlisted. Put in support positions, neither brother saw much action, and they were invalided out of the army. Frank died of tuberculosis in 1918, and Fowler carried on alone, working on the *Pocket Oxford dictionary* (1924) and a second edition of *The concise Oxford dictionary of current English (COD,* 1929).

Fowler, although a gifted classical scholar, was not a linguist, and his pronouncements in *MEU* are those of a prescriptive (albeit very entertaining) schoolteacher. His goal was to be "more courageous" than lexicographers in declaring what was and what was not idiomatic British English, to be a guide for the "half-educated Englishman" who needed to know "Can I say so-and-so"?

See also: Critical Applied Linguistics; Lexicography: Overview.

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Fowler, Roger (b. 1938)

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Roger Fowler was born on August 23, 1938, in humble circumstances in Worcestershire, England. He was educated first at Tewkesbury Grammar School and then at University College London, from which he received his M.A. in English in 1962. He lectured first at the University of Hull, 1960–1964, moving to the newly founded University of East Anglia (UEA), Norwich, where he remained – except for sabbaticals to Berkeley and Brown – until his sudden untimely death on June 20, 1999.

Having read the English 'language syllabus' in London, Fowler began as a mediaevalist. His 1962 M.A. thesis, an annotated edition of Wulfstan's *Canons of Edgar*, was published in 1972. However, by the mid-1960s he had become a key advocate of the new relation between modern linguistics and literature in English Studies. He preferred the term 'linguistic criticism' to 'stylistics,' which he used in a restricted technical sense. From the mid-1970s, he became known as one of the founders of an overtly political and controversial 'critical linguistics,' an extension of these methods to the revelatory critique of ideology in language use. Writing or editing more than 20 books, his thinking was influential for many practitioners of both literary and critical linguistics, inventively showing what was possible in both these areas.

Stimulated on the one hand by the attention to the language of literature in New and Practical Criticism – he admired Nowottny's 1962 *The language poet's use* – and on the other hand by the possibilities of linguistics as a precise and objective tool, Fowler early argued that literary criticism and education needed linguistics to address language in a rigorous, rather than an impressionistic way, and to make serious advances in some technical areas, such as metrics. His sustained thinking about this relationship can be traced from the 1966 volume he edited, through the seminal collections of his articles in *The languages of*

literature (1971) and *Literature as social discourse* (1981) to the second edition of *Linguistic criticism* (1996a), a book designed to make his method widely accessible. In *Linguistics and the novel* (1971), which introduced the concept of 'mind style,' Fowler was influential in developing the linguistic criticism of this genre. He confronted head-on the conflict between the literary and language/linguistic sides of English Studies and the abiding hostility of some to the methodological claims of linguistics in the humanities. (He himself was transferred out of UEA's School of English in 1996 and the linguistics degree he founded was abolished in 2004.) In the 1971 volume, this issue is aired in a debate with the critic F. W. Bateson. Fowler expressed exasperation at the reciprocal ignorance and acrimony of this 'schism within English Studies.' His own approach as an 'interdisciplinary linguist' was flexible and open-minded, rejecting both exaggerated claims for linguistics – as well as being eclectic/pragmatic as to what linguistics to deploy – and what he viewed as elitist obscurantism or inaccuracy about language in much literary criticism.

Early on, Fowler distinguishes between brute linguistic description of texts – of limited interest to criticism – and higher 'levels of achievement.' These involve the interpretation of described patterns. A second level is 'stylistics,' the isolation of stable linguistic patterns characteristic of periods or authors. The critical use of linguistics is different again. At this third level, the linguist acts as critic, forming interpretative hypotheses as part of the intuitive literary activity of criticism, approaching texts with literary hunches. This is 'linguistic criticism.' And it emphatically provides no mechanical method or discovery procedure for reading. Instead, it allows for rigor and objectivity in the formulation of and argument for or against literarily informed readings.

From the mid-1970s, Fowler's linguistics becomes less formal and, influenced by both M. A. K. Halliday and developments in sociolinguistics and pragmatics, more social, contextual, and functional (Fowler, 1981, 1986, 1990). He is instrumental in promoting the theories of M. Bakhtin and V. N. Voloshinov (e.g., Fowler, 1983) and employing Halliday's notion of 'anti-language' (e.g., Fowler, 1979a). He poses the question: What motivates the stylistic choices that constitute the linguistic pattern of the text? The answer is the way the text constitutes and reproduces the social context of its production and consumption within the wider society. Linguistic criticism is an interpretative procedure that demonstrates this process for all to see; and such criticism is itself defamiliarizing.

This sociolinguistic turn has consequences for his literary theory. In the 1982 volume, Fowler asserts – against Jakobson's poetics – that there is no essentialist answer to the question, What is literature? Instead, as he says in his 1975–1976 Royal Institute of Philosophy lecture, "What literature is, can be stated empirically, within the realm of sociolinguistic fact. It is an open set of texts, of great formal diversity, recognized by a culture as possessing certain institutional values and performing certain functions" (reprinted in Fowler, 1982: 81). The values derive from the function of such texts in society. In this respect, literary texts are not in principle different from other text types. Therefore, linguistic criticism as a method equally applies to texts of all kinds. All texts are both products of and processes within social practice and are equally subject to a critique that reveals this. (The anti-esthetic point that there is no qualitative distinctiveness in literature was made as early as 1971. See Fowler, 1971: 16.)

This move reflects the fact that Fowler and his associates, Gunther Kress, Robert Hodge, Tony Trew, and others, had been employing linguistic methods in a radical social critique of institutional and media texts; see the collective 1979 volume *Language and control*. (For criticism of this approach see Pateman, 1981.) In this politically committed 'Critical Linguistics,' Fowler *et al.* (1979) show how stylistic patterns are motivated ideologically. (He refers to Althusser, 1971 as a source for his notions of ideology and legitimation.) But for Fowler, 'ideology' simply means that the language used in social practices necessarily reflects tacit beliefs that, although contingent expressions of social structure and its processes of power, present themselves as natural, as unchallengeable common sense. The critic's job is to 'see through' this ideological 'representedness' by displaying how it is linguistically achieved. In Fowler's version of 'weak Whorfianism' – largely derived from Berger and Luckmann (1976) – the critic penetrates the artificiality of representation, not to reveal some absolute truth, but to show that other ways of seeing are also possible. In this way, the given distribution of power is displayed, challenged; its grip is loosened. The method is illustrated in Fowler's *Language in the news* (1991), in his 1979 UEA Inaugural Lecture 'Linguistic criticism' (in Fowler, 1981), in Fowler and Marshall (1985), and discussed in Fowler (1996b), and with respect to power in Fowler (1985). It is revealing that his last book, his study of *The language of George Orwell* (1995), was the one he believed was his best. Like Orwell, Fowler combined a love for and social perspective on literature with a political attack on

linguistic manipulation in "a society of verbal violence – advertising, abuse, rant . . . "

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Bateson, Gregory (1904–1980); Halliday, Michael A. K. (b. 1925); Jakobson, Roman (1896–1982); Mind Style; Stylistics; Voloshinov, V. N. (ca. 1884/5–1936).

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Frajzyngier, Zygmunt (b. 1938)

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Frajzyngier was born April 3, 1938, in Radom, Poland. In 1939 his family fled to the Soviet Union, where Frajzyngier acquired both Russian and Polish as first languages. He later returned to Poland and entered the Institute for Oriental Studies (University of Warsaw), where he studied Ge'ez (Geez; Classical Ethiopian), Amharic, Hausa and Swahili. He earned a Master's degree in Oriental Languages from Warsaw in 1963 and a second Master's, in African Linguistics, from the University of Ghana in 1965. He returned to Warsaw for a Ph.D. (1968) under renowned Ethiopist Stefan Strelcyn; other committee members were Dymitr Olderogge and renowned Indo-Europeanist Jerzy Kurylowicz.

Frajzyngier's first academic appointment was as assistant professor in Semitic and African Languages, University of Warsaw. He lost this job when he applied to the Polish Communist government for permission to emigrate. To obtain an exit visa, he was forced also to give up Polish citizenship. He took refuge in Rome, where he applied to other universities for a position in linguistics. The Linguistics Department at the University of Colorado, then chaired by Luigi Romeo, offered Frajzyngier the professorship he still holds.

Frajzyngier has published more than 100 professional papers and has written or edited more than 15 books. Early publications focused on Hausa and

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Frajzyngier was a 2002 recipient of the Humboldt Research Award and has held academic appointments at the Research Centre for Linguistic Typology (La Trobe University); the Centre National de la Recherche Scientifique (University of Nice); the Max Planck Institute for Evolutionary Anthropology (Leipzig); and Abdullahi Bayero College (now Abdulahi Bayero University; Kano, Nigeria).

See also: Afroasiatic Languages; Chadic Languages; Kuryowicz, Jerzy (1895–1978).

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Frame Analysis

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Through a systematic examination of texts, the methodology of frame analysis provides a content analysis of political documents that systematically analyzes their ideational contents and relational aspects. It aims to document features such as exchanges between political actors, their communication strategies, and changes over time. The use of the concepts of 'frame' and 'framing' clearly indicates a lineage with the work of Erving Goffman, who with this term referred to the textual conjunct function of concentrating attention on some aspects while excluding others. This emphasis on inclusion and exclusion mechanisms, on social controversies and the associated actors and processes, is widely utilized in political research – a scan of a database of political journal articles would for instance bring out well over a thousand references in recent years which use the framing metaphor. However, the framing analytical tradition in social movement research is the approach that since the early 1980s has most consistently attempted to systematize this approach. It has steadily grown in relevance as a useful tool for analyzing political texts and has expanded to other fields such as policy analysis, media studies and more generally various subfields in political sociology and political science.

The interest of social movement scholars in framing processes begins with the consideration that in order to achieve successful mobilization a set of cultural processes of definitions of the situation in terms that are conducive to political engagement and activation of a protest repertoire have to occur. In a society that is increasingly dependent on publicly mediated processes of formation, diffusion, and negotiation of cultural contents, the role of debating arenas becomes crucial. This refers to sectoral social and political arenas such as social movements, political parties, workplaces, and churches, but more importantly one has to emphasize the role of the general media as a debating space in which social issues are framed. Framing theorists concentrate on the operating mechanisms of these arenas and examine topics such as the formation of mobilizing ideas, the responses of opponents, and the processes of redefinition that mobilizing ideas undergo under

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the influence of movement allies and institutional environments. The concept of frame refers, then, to a central organizing idea that defines for an audience what is important in a debate. Frames also generally specify the causes of a problematic situation and indicate solutions, and movement frames stress the importance of active individual engagement. They often also posit the existence of an injustice that needs to be remedied. Concepts frequently employed in this context are that of the 'master frame,' which refers to a global frame encompassing an entire cycle of protest, and of 'frame packages,' which refers to sets of ideas related to a movement frame but more limited and less stable over time, embodying the discursive strategic activities of organizational leaders dynamically reacting to social controversies.

The production of social meaning, and specifically the production of ideological and policy alternatives to tackle contested social issues, is seen as a process in which a set of actors engage strategically in a societal contest, arguing their points and redefining their position in response to changing events. Social movements face problems of access to debating arenas, problems of formation, unification, and mobilization of consensus within their ranks, and problems of presentation of their perspectives to outside audiences. Their goal is the formation of concerted alternatives to dominant positions on contested issues; that is, the formation of collective action frames. In addition, to achieve widespread social relevance, they have to align their message to aspects of the dominant perspectives, which are known by the public and approved by social institutions. These goals and the methods movements adopt to achieve them were discussed in some key articles by David Snow and Robert Benford in the mid- and late 1980s (Snow *et al.*, 1986; Snow and Benford, 1988). Also influential for this perspective was the early work on the media of William Gamson and his collaborators and the work of Bert Klandermans on the mechanisms that mediate the transformation of a sympathetic attitude towards movements' perspectives into a willingness to engage in political struggle. Klandermans also focused on the difference between unplanned emergence of discourse, which joins the views of relevant social actors, and the planned and strategically orientated formation and diffusion of perspectives, intended to facilitate movements' goals (Klandermans, 1984; Gamson and Modigliani, 1988; Klandermans, 1988; Gamson and Wolfsfeld, 1993).

Whilst there is obviously diversity within this tradition on how exactly to define frames and their mechanisms of operation, and on the important issues to be put on the research agenda, there is sufficient consensus on reasserting the role of culture and communication in social movement research, on stressing social-psychological and cognitive elements in the genesis of social movements and their impact, and in rejecting more comprehensive conceptions of ideology in favor of an approach more conducive to an empirical treatment – a tendency that has recently been criticized (Oliver and Johnston, 2000).

A central assumption of this literature is that social movements do not merely passively present their ideas to the public and their own activists. They are engaged in processes of cultural construction of grievances, and in shaping public opinion, which are in turn influential on participant mobilization. This approach, which stresses the cognitive aspect of frame formation, was innovative when it emerged in social movement theory. The then dominant approaches to the study of social movements – the resource mobilization approach and the new social movements approach – either had little consideration for cultural factors or did not study them systematically, and did not have a methodology to specifically look at the impact of the media. Resource mobilization scholars had argued that grievances are pervasive in modern society. The analytical focus was on how they are adopted by social movements, and on the influential role attributed to political entrepreneurs in gathering and using resources. Conversely, new social movements scholars had related the emergence of social movements to the influence of specific grievances that are linked to various social, economic, and cultural changes, such as the generalized emergence of 'postindustrial' values. Neither of these approaches focused on the 'constructed' character of grievances. An alternative approach, which frame analysts have adopted, was to consider grievances as cultural constructs, and to examine the process of the emergence and construction of issues. As Gamson (1988: 219) noted, this process is highly controversial. Thus, collective action is first of all a search for a definition of the situation. Gamson notes that "for every challenge there is a relevant discourse, particular sets of ideas and symbols that are used in the process of constructing meanings relevant to the struggle." (Gamson, 1998: 223).

At the core of each definition there is a central organizing idea, or frame. To achieve generalized support, movements have to rearrange conventional prevailing frames on the topics of contention and stimulate a new consensus on the necessity of certain policy changes and the appropriateness of mobilization. For instance, in the study of the relation between movements and media Gamson and Wolfsfeld (1993)

showed the power and dependency aspects of the relationship and at the same time the subtle contest over meaning that permeates the interaction between the two parties.

The modification of frames that movements undergo, either intentionally or as a result of broader cultural processes, has been described in terms of the concept of 'frame alignment.' This refers to mechanisms that connect a social movement frame to another societal frame. This connection can take the form of 'frame bridging' when two previously unconnected frames come to be discursively connected. 'Frame amplification' takes place when existing but underspecified frames are articulated and the favorable implications for a movement are emphasized. 'Frame extension' takes place when movements attempt to modify a frame in a direction that is congruent with their views and 'frame transformation' when only a radical realignment of messages can connect a movement frame with public opinion. Through these categories it is possible to accomplish a set of theoretical objectives such as the integration of micro and macro variables and of cultural and structural variables. For instance, Zuo Jiping and Robert D. Benford connect broad cultural patterns to mobilization dynamics (Zuo and Benford, 1995). In their examination of the 1989 Chinese prodemocracy movement they focused on the relation between the ideas prevalent in the population and the attempt by movement activists to present their goals as congruent with these ideas. With reference to activists' discourse, they note:

> Their frame alignment strategies and non-violent direct action tactics tended to resonate with ordinary people's observations and experiences as well as with traditional Chinese narratives of Confucianism, nationalism, and communism. State reactions and counter-framings, on the other hand, failed to sway the masses.

They then proceed to show that framing strategies were related to, though only a part of, a wider set of structural strategies that included the mobilization of preexisting student networks, the impact of economic reforms, regime crises, delayed repression, and the presence of foreign journalists.

In studying the relationship between framing processes and public opinion, special attention has been devoted to the role of the media. For instance, Gamson in *Talking Politics* examined the role of the media in shaping perceptions of certain key social controversies and in the same context investigated the role of social movements (Gamson, 1992).

Whilst much work on frame analysis such as this one has focused on the relationship between movement framing activities and public opinion, studies of the relationship between the themes stressed by movements and specific institutional environments have also appeared. This is particularly the case with policy environments, initially studied by Donald Schön and Martin Rain, who pointed to the socially constructed character of policy making – the fact that policy solutions emerge out of deliberative practices in which actors pursue their goals strategically utilizing the same mechanisms illustrated by social movement researchers (Schön and Rein, 1994). Policy specialists have pointed to the role of paradigmatic crises in specific policy sectors that often spur a global rethinking and the utilization of the radical remedies advocated by social movements. For instance, in this perspective, Carlo Ruzza has studied the diffusion in European Union conventional political environments of the policy frames of a set of movements (Ruzza, 2004).

In terms of methodology, this approach includes informed discussions of methodological aspects (Donati, 1992) and ranges from the most frequent qualitative analyses using excerpts to support the researchers' arguments, to quantitative content analysis, such as in Gamson (1992), and quantitative approaches applied at the micro level (Johnston, 1995).

Recent assessments of this research tradition by some of its original proponents have documented its versatility and some of its substantive outcomes for both descriptive and analytical purposes and have also provided a frank discussion of the main criticisms it has received (Benford, 1997; Benford and Snow, 2000). Among the criticisms one has to list a neglect of systematic empirical studies – researchers prefer to engage in conceptual development – and reliance on limited case studies. There is also a descriptive bias in much of the work on framing which typically seeks to describe types of frames, such as injustice frames, arms control frames, or environmental justice frames, but does not lend itself to new analytical findings. Furthermore, the dynamic element of framing processes is often ignored in favor of a static description of frames that does not take into account their changing nature over time.

See also: Frame Problem; Goffman, Erving (1922–1982); Media and Language: Overview; Metaphors in Political Discourse; Politics and Language: Overview.

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Frame Problem

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Origins of the Problem

The frame problem, first explicitly identified by John McCarthy and Patrick Hayes (1969), arises in the attempt to design artificially intelligent machines. Intelligent reasoning includes temporal reasoning, such as planning actions or explaining a causal sequence of events. Correct temporal reasoning requires knowing the effects that actions will have in the situations in which they are performed, both the changes and the nonchanges. The frame problem, in its original formulation, is the problem for designers of artificially intelligent systems of how to represent nonchanges, such as when a cup is moved yet its color does not change. For humans such inferences are trivial, just common sense. However, designing systems with common sense has proved to be an extremely difficult problem for artificial intelligence (AI) researchers, making the frame problem of much wider interest than a technical design problem, as it touches on age-old philosophical questions about understanding intelligence – not least as it is manifest in human conversation. In the hands of philosophers, the frame problem has come to refer to a cluster of issues concerning the relevance of the content and speed of human thinking.

McCarthy and Hayes were working within the tradition of using formal logic to design intelligent systems. To handle temporal reasoning, McCarthy had developed the situation calculus, an instance of first-order predicate logic. The formalism indexes time discretely. It includes rules that allow a system to deduce the results of an action, given a description of some situation, i.e., it can produce a description of the situation that results from the action. They applied the formalism to very simple 'toy worlds,' such as a block world consisting of only a small number of blocks on a table and a few simple actions, such as moving or stacking, that could be performed on the blocks. What McCarthy and Hayes realized was that the rules specifying the explicit effects of some action were not sufficient for the system to completely describe the situation resulting from that action. For example, if in situation S1, block A is on block B, and blocks C and D are on the table, the formalism does not allow the system to deduce that in S2, the situation resulting from moving block C onto block D, block A remains on block B. An additional rule specifying that block A remains on block B when block C is moved is required for that inference. The rules specifying the nonchanges during an action are

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called frame axioms, because they specify the stable frame of reference in which the action occurs.

Frame Axioms Result in Computational Overload

The difficulty with using frame axioms is not that the correct inferences cannot be drawn; it is, rather, that a very large number of frame axioms are required even in simple worlds. For example, adding a painting action to the block world requires distinct rules specifying that each block remains the same color when any block is moved or stacked or when any other block is painted. As worlds become more complex, the number of frame axioms comes to overwhelm the system. Most of the system's computations are irrelevant deductions about what has not changed, making the system very slow and thus unable to function in real time. Also, the formalism is very brittle. Most frame axioms will be false in at least some situations when concurrent actions are possible, leading to false conclusions of the sort that humans rarely endorse. Given the complexity of our environment, it is extremely implausible that we reason using frame axioms. Thus, insofar as it is a goal of AI research to help us understand intelligent behavior, the use of frame axioms is unsatisfactory. The problem, then, is how to represent nonchanges without using a large number of frame axioms.

The Sleeping Dog Strategy and Nonmonotonic Logics

A main strategy for solving the frame problem within AI is called the sleeping dog strategy. The idea is 'to let sleeping dogs lie,' which in the context of the frame problem is to make the assumption that things remain just as they are when an action is performed unless there is some explicit indication of a change. This method uses databases containing statements describing situations. When an action is performed, its effects are computed. Statements that cease to hold are deleted, and statements describing changes are added. All other statements correspond to the nonchanges, so they are included in the database for the resulting situation; the nonchanges are stored in memory, rather than computed.

A difficulty for using the sleeping dog strategy as a solution to the frame problem is that there are often exceptional effects of actions. For example, moving a block does not ordinarily change its color, but it does in the exceptional case that the block is moved under a spray painter. Intuitively, what is required to handle exceptional cases is the ability to draw a new conclusion upon learning new information. Formally what is required is that by adding a premise, the deduction of one conclusion can be transformed into the deduction of a different, contradictory conclusion such that the original conclusion no longer follows – on pain of inconsistency. The difficulty is that classical logics do not have this property. They are monotonic, which is to say that any conclusion that follows from a set of premises also follows if further premises are added. In response, AI researchers have developed a number of nonmonotonic logics in which adding new premises blocks the derivation of the original conclusion. Using nonmonotonic logics makes it possible to derive new, contradictory conclusions when exceptional circumstances formalized as additional premises are added to a derivation. This often involves adding a premise indicating that the action is abnormal in the given situation, so that the usual conclusion ceases to follow.

The Yale Shooting Problem

Even when nonmonotonic logics are used, there are still problems in trying to use the sleeping dog strategy. The most famous such problem is known as the Yale Shooting Problem, introduced by Hanks and McDermott (1986). The scenario in the Yale Shooting Problem is that a gun is loaded at some time t. For a number of discrete time units following t, the action taken is to wait. Then the gun is fired at Fred. The intuitively correct outcome is that in the next time unit, Fred is dead. The formalism predicts this by taking the gun's being loaded as the sleeping dog that persists. Though being alive is a state that usually persists, being shot by a loaded gun is abnormal with respect to being alive, so Fred must be dead. The formalism also predicts that Fred is alive, however, by treating the state of being alive as the sleeping dog. The reasoning in this case is that since Fred is alive, the gun must have become unloaded during the waiting, treating the action of waiting as being abnormal with respect to the gun's being loaded. The formalism cannot determine which sleeping dog, Fred's being alive or the gun's remaining loaded, should be left to rest in the given situation, so it cannot predict whether Fred is alive or dead. The problem comes about because in nonmonotonic logics the addition of a premise – the gun is shot – can undermine support for some conclusion. When more than one conclusion can become unsupported – Fred is alive, the gun is loaded – the formalism has no way to decide which one to keep, leading to contradictory predictions about the new situation. In some cases the conflict is a virtue, because it models our own uncertainty of the

outcome, but even when the outcome is obvious to us, the formalism is stymied.

Holism Presents a Problem for the Sleeping Dog Strategy

A more general philosophical concern with the sleeping dog strategy results from the holistic nature of commonsense inferences. In the right situation, virtually anything we know might be relevant for successfully predicting the outcome of an action. A dropped paper clip will fall to the ground, unless it is in a magnet field. My love of pizza could even affect the New York Stock Exchange if I order the last slice of pepperoni ahead of a multibillionaire who then invests irrationally after lunch. There is no principled way that anyone yet knows of for determining which sleeping dogs need to be woken in a particular situation. (This reading of the frame problem as a problem of accessing relevant information is of interest to linguists and philosophers of language attempting to understand what is said in making an utterance over and above its literal meaning. Research here is being conducted at the interface of pragmatics and semantics.)

AI researchers such as McDermott (1987) and Hayes (1987) criticized the broad philosophical interpretation on the grounds that it is not the real frame problem. Instead, philosophers are focused on problems of relevance and prediction, which are related to, but distinct from, the frame problem. Distinguishing these problems is more than mere pedantry; it stems from a general optimism that progress is possible following a divide-and-conquer strategy that is often successful in science. Clear distinctions also further understanding. Philosophers such as Fodor (1987, 2000) are much more pessimistic, since they see the problem as generalizing. Defining the frame problem so narrowly that it is solvable leaves the much wider problem of relevance untouched. Insofar as it is the aim of AI research to design intelligent machines, progress will be impeded until holistic reasoning can be modeled. For example, abductive reasoning, such as judging which of two hypotheses is simpler, faces the same problem of computational overload that we see in the traditional frame problem, and for the same reason, according to Fodor (2000). Whether or not some hypothesis is simple depends on the theory and background assumptions into which it is embedded. As a result, computing simplicity seems to require computing over an entire theory; yet we make simplicity judgments in real time, leaving us with the problem as to how a computational model can account for abductive inferences.

Concluding Remarks

Since the formulation of the frame problem, attempts to solve it have led to many advancements in logic and computer science that are significant in their own right, much as work on Fermat's last theorem developed mathematics. Though researchers do not agree on just what the problem is or the progress that has been made, most agree that progress on the frame problem is central to the development of cognitive science.

See also: Holism, Semantic and Epistemic; Pragmatics: Overview; Relevance Theory; Semantics–Pragmatics Boundary; Speech Acts and Artificial Intelligence Planning Theory.

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Frame Semantics

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Introduction

Frame semantics is first of all an approach to describing the meanings of independent linguistic entities (words, lexicalized phrases, and a number of special grammatical constructions) by appealing to the kinds of conceptual structures that underlie their meanings and that motivate their use. These conceptual structures, called frames, can be schematizations of particular situation types and their components such as the events or states expressed by simple verbs or adjectives, e.g., *lift* or *similar*; large-scale institutional scenarios such as commercial transactions or judicial process; patterns of contrast such as that between winning and losing; networks of relationships such as what is found in kinship terminology; and a great many others. The words or other linguistic entities in a text or discourse **evoke** or **project** their frames in the minds of the language user and figure in the cognitive process of language interpretation.

In 1983, Victor Raskin convened a Congress Workshop at the 13th International Congress of Linguists in Tokyo under the title 'Round Table Discussion on Frame/Script Semantics.' A 1985 volume of papers (Raskin, 1985), including many from researchers who did not participate in the Tokyo Round Table, became the first general collection on this broad topic, characterized mostly as work that accepted cognitive structures with names such as *frame*, *schema*, *script*, and *scenario*, that led one away from prevailing views of semantics within the Katz and Fodor (1963) tradition in generative grammar. In 2003, at the 17th Congress of the same organization, in Prague, a second Frame Semantics workshop was held, and the range of approaches was again quite broad. Collections of papers from that workshop are said to be forthcoming.

The kinds of phenomena dealt with in frame-semantic analysis can be illustrated with a few examples.

Oppositions

If we read of kestrels that they 'sometimes nest *on the ground*,' our picture of kestrel nesting behavior has us imagining that these birds otherwise build their nests in trees, or perhaps under the eaves of buildings or in bird houses. But if we read of auks that they 'build their nests *on land*,' this matches or perhaps induces our understanding that these birds otherwise spend most or all of their time in or above water. This is because there are conventional pairings between the words *ground* and *air*, as between *land* and *sea*, matched by phrasal contrasts between *on the ground* and *in the air* on the one hand, or *on land* and *at sea* on the other hand. Each member of such contrast sets evokes an understanding of the contrast as a whole.

We hear that someone named Jim "spent two hours *on land* today," and we conclude easily that this is an interruption of a sea voyage; or we hear that he "spent two hours *on the ground* today," and we see it as an interruption of a period of air travel. There is yet another such contrast, using the word *earth*, as can be recognized in the report that Jim "spent only a few years *on this earth*": we assume this time that we are being told that he is now in heaven – or possibly that he has returned to outer space.

It is important to realize that these conclusions are based, not on **information** about where these nests or people are located, but on the **words** used to express that information, words that evoke the frames against which the fuller understanding is structured. We could, in fact, have a single snapshot image of Jim doing something somewhere on the earth's surface that fits any of the three framings.

Word Choice

Sometimes we are surprised by the use of a word in a particular context, and inquiry leads to an explanation involving the 'framing' role of words. If we were to buy some herbal medicine at an American health-food store and wished to find out how much we should ingest in order to treat our problem, we might be surprised to read on the product label that one *serving* is two capsules. We expect the language on the package to match our framing of the product as a medicine, but the word *serving* surprises us. We would have expected something like *dose* or *dosage*.

Officially, the product we bought is neither a food nor a medicine: it is a dietary supplement, more or less limited to botanics, vitamins and minerals. The U.S. Food and Drug Administration has premarketing regulatory authority over food and medicine, but it has only postmarketing monitoring authority over dietary supplements. This means that if any such product is described on labels or packaging as effective for specific medical conditions, or is directly or indirectly presented to customers as a medicine, it can be taken off the market. Since the words *dose* and *dosage* would surely evoke the medicine frame, marketers of dietary supplements refrain from using it. It is not, strictly speaking, a food either, but the term *serving*, while seeming out of place, is presumably safer.

Beyond Literal Meaning

It is common to believe that a sentence can have a *literal meaning*, namely that part of the meaning that determines its truth conditions, and that the more elaborated in-context meaning is attained by fitting that literal meaning into an awareness of the context of communication and assumed answers to questions about why it was said, when it was said, and the like. Presumably in the literal meaning of

Reviewers praised the cellist.

any truthful utterance of the sentence has to refer to a group of people who happen to be reviewers, and a person who happens to be the in-context designated cellist. If the people identified as reviewers said something positive about the person called the cellist, then the sentence is literally true, even if they met in a bar and what they said was something like *Nice haircut!* That same literal meaning would have been achieved (on this narrow view) if the reviewers had been identified by a list of names and if the cellist had been identified by a pronoun.

We need more than context and literal meaning to explain the most natural out-of-context interpretation of that sentence, however, since the words themselves evoke situations whose details need to get filled in in the cognitively most straightforward way. The meaning of *reviewer* that makes most sense in this context is a person who writes reviews of artistic performances; the *praising* in this case would be understood as expressed in the text of such reviews; and the *cellist* would have been praised for his or her performance on a cello as part of the event about which the reviews were written.

In all of the above examples, it seems clear that what is needed for understanding the meanings of particular linguistic signs is a two-fold structure, separating an institutional or experiential background from what is profiled or foregrounded within that background. That is, we need both the words and the frames.

Frames and Framing

Two separate traditions, one inside linguistics and one outside, have come together in motivating both the activity referred to as frame semantics (FS) and, coincidentally, the use of the word *frame* within that activity. In the examples just examined, the word 'frame' has been used very broadly, but we see in each case that the frame that participates in the interpretation is associated with a particular lexical or grammatical fact. Since frame semanticists are frequently asked about the relationships between different uses of the same term of art, some clarification seems appropriate.

Cognitive Frames

There is a common nonlinguistic use of this word where it refers not to what a piece of language evokes in the mind of an interpreter, but what kinds of conceptual structures an interpreter invokes to make sense of some experience.

This nonlinguistic use of the concept has a long history (Bartlett, 1932; Piaget, 1971; Mill, 1846; see Fillmore, 1985), but it flourished in the cognitive and social sciences in the 1970s. The idea behind this work is that people understand what they are observing by calling on memories of past experiences, or by construing what is observed as instances of or variations from structures of belief and experience that could be used to make sense of what they have heard or observed. These structures in the mind are called frames, and these are not necessarily connected in specific ways with language (*see* **Frame Analysis**).

Minsky Frames To Marvin Minsky (1981, 1985), the mind is equipped with a vast repertory of such ready-made (i.e., from past experiences) frames, and people are capable of bringing these to bear, with

remarkable ease and speed, to make sense of their perceptual and other everyday experiences, such as recognizing familiar objects on limited visual evidence, or assigning one or another interpretation to ambiguous line figures.

A well-known example of Minsky's that involves a response to language centers around the Birthday Party frame. Consider what's involved in making sense of the following two-sentence text,

> *Mary was invited to Jack's party. She wondered if he would like a kite.*

There is nothing in the text that directly evokes the idea of a birthday party, but a typical interpreter quickly and easily invokes just that frame in order to make the text cohere. The kind of event that fits a child's birthday party frame in this culture contains 'slots' for certain expected participants, props, and subevents. We expect such an event to have a celebrant, a host, a number of partygoers, and gifts, and other items such as balloons, cakes, candles, and the birthday song. The interpreter makes the parts of the text cohere by the cognitive process of filling in as many of the slots as possible on the basis of what he has just learned – here with Mary as a partygoer, Jack as the celebrant, and the kite as Mary's potential gift for Jack – and populates the other slots with default values that characterize the typical child's birthday party. (World knowledge invited us to assume that this is a child's birthday party, but if the potential gift had been identified as a box of cigars rather than a kite, that would have been different.)

Again, there is nothing in the text itself that invites the Birthday Party frame: that is the interpreter's contribution. The language conveys certain information, without directly providing the framework, and the interpreter makes it cohere.

Goffman Frames Important in the work of Erving Goffman (1974) is the notion of mistaken framings and their possible consequences. Take a variant of a Goffman example: an instance of roughhousing on the street between young boys could be construed by an outside observer as either Combat or Play. An adult observer might 'misframe' a playing event as combat, and believing that the person who has the upper hand is likely to do serious harm to his coparticipant, might inappropriately intervene – and might discover his mistake when both boys attack him.

Frame semantics, in contrast, is concerned with how situation types are evoked specifically by linguistic entities: if Minsky's example had included either of the phrases *birthday party*, *birthday cake* or *birthday present*, that could have evoked the frame; if the boys in the Goffman example had declared, "We're just *playing*, Mister," that would have provided a linguistic encoding of the frame, i.e., would have instructed the observer on the proper frame to invoke (*see* **Goffman, Erving (1922–1982)**).

The Word 'Frame' in Linguistics

The nonlinguistic strand, which has figured in sociology, cognitive science (including artificial intelligence and cognitive psychology), and theories of narrative, and has used the words 'frame' and 'schema' in essentially the same way, has to do with the structures of knowledge that enabled people to interpret (or misinterpret) the things they experienced.

Frame semantics in its current form was influenced by this nonlinguistic strand, but also arose as part of a continued exploration of what was called case grammar (Fillmore, 1968, 1977). Within this linguistic strand, in its earliest history, the word 'frame' had nothing to do with cognitive acts of construal, but instead organized fairly mundane matters of grammar and semantics. 'Syntactic frames' were proposed as slot-defining contexts that provided criteria for membership in particular word classes. For example, the frame [the very ___ thing] could represent a context for prenominal adjectives. In generative grammar (Chomsky, 1965), 'subcategorization frames' defined slots for the various kinds of English verbs, i.e., according to whether they required direct or prepositional objects, directional or manner adverbs, etc. This narrowly syntactic sense of 'frame' was expanded in case grammar.

Case Frames In the early work of Charles Fillmore and his colleagues (Fillmore, 1968, 1978), the term 'case frame' was introduced to describe the semantic 'valence' of verbs (mostly). Early treatments of valence, tabulating the combinatory properties of predicating words, were more or less limited to (1) specifying the number of arguments a verb could take (intransitive verbs take one argument, transitive verbs take two arguments, a smaller class of verbs take three or more arguments), and (2) specifying information about the grammatical requirements on the dependents that a predicating word could 'take' – in traditional Latin grammars, this could include the grammatical cases (nominative, accusative, dative, etc.) of accompanying nominals and the ways in which prepositional phrases could introduce less central meanings. Discussion of the semantic aspects of verb valence was more or less limited to information about very general semantic properties of argument nominals (human, inanimate, abstract, etc.), summary descriptions of the uses of the cases and

prepositions (as in traditional Latin grammars), and classifications of the kinds of verbs that were likely to occur in one or another of these patterns.

Fillmore's (1968) proposal was that the 'semantic valence' of a verb could be identified independently of the manner of grammatical realization of the verb's arguments, in terms of semantic role notions (called deep cases) that classified such participant types as the perpetrator of an action (Agent), an entity that moves or is capable of moving (Theme), the destination of a movement (Goal), the starting point of a movement (Source), and several others. A combination of deep cases that together expressed the semantic part of a verb's combinatorial requirements was referred to as its case frame.

The sets of deep cases that could occur with verbs of one sort of meaning (e.g., Placing) could frequently be seen as characterizing all of the verbs with similar meanings (*set*, *place*, *put*, *stand*, *insert*). The case frames therefore naturally came to be thought of as characterizing particular event types, and this classification could be importantly different from classifications based on grammatical context differences. Thus the combination {Agent, Theme, Goal} could serve as role names for the participants in Placing events, independently of how the these participants were actually expressed in the grammar of a sentence.

Case grammar was designed to show both how the various cases combined to classify verbs and other predicates, and how the grammar of the language allowed these to be matched with surface grammatical structures. However, it eventually became possible to think of these classifications – these frames – as the primary concepts, identifying situation types on their own, and the semantic role names as identifying the participants in such situations – somewhat analogously to the gift, cake, and celebrant in a birthday party, with the difference that case frames were tied to the grammar of particular lexical items.

The case frames started out as clusters of participant roles using, initially, names from an assumed universally valid finite inventory of such roles and it was thought that any verbal meaning could be seen as using some collection of these. The frames of current frame semantics, in contrast, are described in terms of characteristics of the situation types themselves, including whatever could be said about the background and other associations of such situations. Moreover, the goal of limiting the number of semantic roles to a roster of reusable universal role names lost its importance, and the effort to force any frame-specific semantic role into the members of such a list could be abandoned in good conscience.

Merging the Two Research Strands

In merging these two strands of talk about frames, a frame semantics that goes beyond verb valence now includes within its scope fairly large and multilayered structures, like baseball or commerce or movie production, which incorporate complex connected patterns of knowledge and terminology.

Frame semantics continues to be closely tied to linguistic form, but in recent work (i.e., in FrameNet; see 'Frames and Lexicon' below) it has proved useful to distinguish 'small frames' associated with individual predicates from 'big frames,' i.e., the institutional concepts that were themselves identifiable by names (birthday, but also commerce, computation, criminal process, etc.). In the current framework, the differently motivated needs for a frame concept unite. This joining supports semantic analysis that accommodates the richness of the cognitive work that goes into linguistic interpretation and expression. It also allows us to investigate more precisely and powerfully the linkages between grammar, lexicon, and the contents of experience.

Frames and the Lexicon

Sponsored by the National Science Foundation and housed at the International Computer Science Institute in Berkeley, California, the FrameNet project is building a frame-based lexicon for English; in collaboration with researchers in Europe and Asia, the extent to which semantically valid lexica can be built for other languages using the same principles is being investigated. The project takes a lexicon to be a vast inventory of the words, multiword phrases, and grammatical constructions that speakers of a language have to know outright, as contrasted with those abilities speakers have for generating or interpreting language by building on the things they already know. A frame-based lexicon associates each lexical unit that it evokes, together with the patterns by which the grammar of the language provides information about the frame in words and phrases which are in construction with the LU.

The ongoing work of the FrameNet project (Fontenelle, 2003) differs from that of ordinary lexicography in an important way: instead of working with a single word and exploring all of its meanings, it takes a single frame and examines all of the LUs that evoke that frame. In practice, of course, such work begins by considering a word in one of its senses and exploring the frame that goes with just that sense. To illustrate, the verb *cure* in its medical care sense

(as in to *cure a disease*) is one LU; the same verb in its food preservation sense (as in to *cure ham*) is another LU and calls for a separate frame. Instead of depending on dictionaries or native-speaker intuition to summarize what can be known about the LU, FrameNet, taking advantage of the power of computers, the easy availability of vast text resources and tools for managing and manipulating these, bases its findings on corpus evidence. Currently our corpus base includes one hundred million running words in the British National Corpus plus two hundred million words of U.S. newswire text.

FrameNet entries are built up in the following way. A group of LUs is chosen as representative of a single frame; taking one LU at a time; example sentences containing it are extracted from the corpus and sorted by syntactic context; representative samples are selected that clearly illustrate the sense in question; and the selected sentences are annotated according to the frame the LU evokes. Before the annotation begins, labels are chosen to represent the semantic roles or frame elements (FEs) that the LU has in respect to the given frame, for example, Buyer, Seller, Goods, Money, etc., for the various frames connected with Commerce. Sentence constituents that are grammatically linked to the LU in question are assigned appropriate FE labels, and the constituents thus labeled are also provided with information about their grammatical function (GF) – Subject, Object, etc. – and their phrase type (PT), e.g., finite *that*-clause, marked infinitive VP, NP, etc.

Important steps in these processes are carried out automatically and several are computer-assisted, but an indispensable core is handled manually by trained native-speaker annotators who have to read and understand the sentences and make judgments about the fit of each usage with the frame currently being studied.

An Example: The Revenge Frame

The analysis process can be exemplified by considering the Revenge frame. Any situation that can be thought of in terms of a revenge concept has an associated scenario or history. Within that history, one person has done something to offend another person (the FE names for these individuals are the Offender and the Injured Party, respectively, and the offending act is referred to as the Injury), and one person, called the Avenger, who may be but need not be identical to the Injured Party, undertakes to harm the Offender, in response to the Injury, with an avenging act called the Punishment. The roster of core FEs, those FEs that are criterial for the frame, then includes Avenger, Offender, Injured Party, Injury, and Punishment. The project in its current work also annotates peripheral FEs, those that can accompany expressions within the frame, indicating such matters as Time, Place, Manner for events, Purpose, and a few others for events that are also acts, and so on. In general practice, the core FEs are given frame-specific FE names, whereas the peripheral FEs are given 'reusable' names that do not require frame-by-frame definitions.

The words that evoke the Revenge frame include simple verbs such as *avenge*, *revenge*, *retaliate*; phrasal verbs such as *get back*, *get even*; nouns such as *vengeance*, *revenge*, *retaliation*, *retribution*; adjectives that characterize the punishment such as *retaliatory*, *retributive*, *vindictive*; adjectives that describe the intensity of feeling of the person carrying out the revenge such as *vengeful*, *vindictive*; and support verb constructions such as *take revenge*, *wreak vengeance*, and *exact retribution*.

Examples of annotations in the Revenge frame are offered in **Figure 1**.

As can be seen in **Figure 1**, the linking of FEs to their grammatical realization is variable, though the Avenger is uniformly linked to the subject position of an active verb. The Offender is introduced by a variety of prepositions: *on*, *with*, *at*, and *against*, the Injury can be a direct object or an object of the preposition *for*, and so on. Several features not discussed so far are indicated in the annotations. At the end of each sentence there are representations of null instantiation: these notations have symbols such as DNI and INI in place of lexical material, and they indicate that the missing FE is either understood in the context (DNI = definite null instantiation), or are simply unspecified (INI = indefinite null instantiation). The last few sentences are examples of support constructions, where the verbal meaning is expressed by a combination of a support verb and a Revenge noun: *have vengeance* (11), *exact vengeance* (12), *take vengeance* (13), *wreak vengeance* (14), and *visit retribution* (15). The subject arguments are sometimes attributed to a verbal frame if the phrases that express them are arguments of control verbs, as with the subjects of *wish to avenge* (1), *determined to avenge* (2), *proceed to wreak vengeance* (14).

Polysemy

The words in the Revenge frame have mostly a single meaning, but many of the words examined in FrameNet have multiple senses, which almost always means that they belong to different frames. We decide that a word belongs to different frames (i.e., that it formally supports different LUs) on the basis of such criteria as its relationship with other frames, the permitted

1. [^{Avenger}The Trojans] wish to AVENGE^{Target} [^{Injury}the death of Hector]. [^{Offender}DNI] [^{Punishment}INI]
2. [^{Avenger}America's top two golfers] are determined to AVENGE^{Target} [^{Injury}their recent defeat in the Dunhill Cup at St Andrews]. [^{Offender}DNI] [^{Punishment}INI]
3. Ravana captured Hanuman and set fire to his tail, but [^{Avenger}the monkey] AVENGED^{Target} [^{Injured_Party}himself] [^{Punishment}by growing to the size of a giant and setting fire to the city]. [^{Offender}DNI]
4. Oneday [^{Avenger}she] would GET EVEN^{Target} [^{Offender}with Donna] [^{Injury}for this]. [^{Punishment}INI]
5. [^{Avenger}I] 'll GET EVEN^{Target} [^{Offender}with you] [^{Injury}for this]. [^{Punishment}INI]
6. [^{Avenger}The USA] RETALIATED^{Target} [^{Injury}against the harassment of its diplomats] [^{Punishment}by expelling 36 staff from the Iraqi embassy in Washington – including seven accredited diplomats – on Aug. 27, and imposing restrictions on the 19 who remained]. [^{Offender}DNI]
7. [^{Avenger}Groups of Muslim demonstrators] RETALIATED^{Target} [^{Punishment}by attacking the nearby Holiday Inn with small arms and grenades]. [^{Injury}DNI] [^{Offender}DNI]
8. [^{Avenger}Iraq] also RETALIATED^{Target} [^{Punishment}by launching Scud missiles against Saudi Arabia and Israel]. [^{Injury}DNI] [^{Offender}DNI]
9. [^{Avenger}A neighbor] RETALIATED^{Target} [^{Injured_Party}on behalf of his fallen friend]. [^{Offender}DNI] [^{Punishment}INI]
10. Have [^{Avenger}you] come to REVENGE^{Target} [^{Injured_Party}yourself] [^{Offender}on me] [^{Injury}for failing you]? [^{Punishment}INI]
11. My God, [^{Avenger}she] would [have]^{Supp} VENGEANCE^{Target} [^{Injury}for this]! [^{Offender}DNI]
12. [^{Avenger} The Turks] [exacted]^{Supp} a [^{Manner}terrible] VENGEANCE^{Target} [^{Offender}on the helpless Serbs]. [^{Injury}DNI]
13. The old forests burned as [^{Avenger}the Dark Elves] [took]^{Supp} VENGEANCE^{Target} [^{Injury}for their long exile]. [^{Offender}DNI]
14. The king was taken to Renilworth Castle while [^{Avenger}Isabella and Mortimer] proceeded to [wreak]^{Supp} [^{Avenger}their] VENGEANCE^{Target} [^{Offender}on his supporters]. [^{Injury}DNI]
15. One function is to [visit]^{Supp} RETRIBUTION^{Target} [^{Offender}upon people who have broken the law].

Figure 1 Annotations from the Revenge frame.

inferences associated with given FEs, synonyms and antonyms, and the grammatical patterns in which they are expressed. For example, the word *remember* needs to be assigned to different frames as shown in the examples in Table 1. (The use found in *Remember me to your parents* has not been included.)

The FrameNet Database

The FrameNet database has four main components: descriptions of frames and frame elements; the body of annotated sentences; lexical entries that show for each LU the variety of ways in which the FEs are grammatically signaled; and information about how the frames are related to each other.

The Basic Data Proceeding by frames rather than words means that members of a single frame can include words from all major parts of speech. As seen in the annotations in Figure 1, the data collected involves more than verbs and their expressed arguments. Verb-headed and adjectival expressions that make use of the frame-bearing functions of various kinds of nouns occur with the help of support constructions of various kinds. We saw expressions such as *take revenge*, *wreak vengeance*, and *exact retribution* in the Revenge annotations, where the syntactic head and the semantic head are discrepant: to the extent that the verbs make their own semantic contribution, they are made to fit into the frame structure

Table 1 Polysemy of *Remember*

Frame name	**Remembering_experience**
Interpretation	recall of personal experiences, episodic memory
Examples	*I remember as a child falling down the steps in my grandmother's house.*
	I remember something touching me in the dark.
	I remember you as much taller.
Synonyms and paraphrases	*Recall, recollect, have a memory of;* associated with count-noun *memory*
Complement types	VP-gerunds, S-gerunds, NP + Predicate
Relationships	Not paired with *forget* or *know*
Frame name	**Remembering_information**
Interpretation	Keeping knowledge, continuing to know
Examples	*I didn't remember that the meeting was today.*
	Do you remember what she said?
	I hope they remember my phone number.
Complement types	S-that, S-wh, VP-wh, 'concealed question' NP
Relationships	Paired with frames led by *forget* and *know*
Frame name	**Remembering_to_do**
Interpretation	Thinking of some preknown task or intention at the appropriate time
Examples	*Did you remember to feed the cat?*
	I hope she remembered her umbrella.
Complement types	VP-inv, NP with *coerced* verb
Relationships	Paired with *forget*, not with *know*

evoked by the object noun. And nouns can be 'supported' to create adjectival expressions with the help of prepositions, as in *at risk*, *in danger*, *on fire*, and scores of others. The FrameNet database allows the recovery of such information through associated browsing software.

A commitment to account for all frame elements that are conceptually necessary for a given frame-bearing word has required the development of annotations for missing but understood elements, through a variety of indications of null instantiation. The concept **d**efinite null instantiation (DNI) is associated with a given FE in a given sentence as a signal of zero anaphora: some value to the FE thus tagged must be available in the shared context of speaker and hearer, and this is a property associated with particular LUs or the words in particular frames. The destination of verbs of Arriving can be omitted under anaphoric conditions if they would otherwise be expressed prepositionally; the speaker who says *She's arrived!* assumes that the addressee already knows the intended destination. The destination of *reach* cannot be left unexpressed: *She's reached *(home)*.

The Frame-to-Frame Relations FrameNet captures linguistic generalizations in a number of ways. The 'Net' part of the name refers to the frame-to-frame relations in addition to LU membership in individual frames, both of which are potential sources of generalization. The fact that the frame-specific FE Avenger has a preferred subject-linking preference should be represented in some way that recognizes the 'agency' associated with this FE; although there are good reasons for not wishing to be limited to the familiar thematic roles from the linguistic literature, it is nevertheless possible to see a great many verbal frames as instances of more abstract frames of action, change, motion, experience, causation, etc. Providing a systematic display of the full network of *inheritance* relations between frames is an ongoing area of development.

Some frames represent complex events that are made up of component events, and these contained events can have frame structure as well. A structure of 'subframe' relations is created to show the role of Money_transfer in Commerce, the role of Ratifying_treaty in a larger Diplomacy scenario, and so on. In many cases, a subordinate frame presents a perspectivization on the larger frame. For example, a broadly conceived frame of Employment lays out a large set of situations and changes, within which there are perspective-taking frames of Hiring, Employing, Firing, Taking_a_job, Working, Quitting, and several others. A major frame of Criminal_justice_procedures contains components of Arresting, Arraigning, Trying, Adjudicating, and Sentencing, as well as a number of alternate routes through that chain. Relations such as those of inheritance and subframe are needed for deriving inferences from frame-based assertions, and this must include FE-to-FE binding

between lower and higher frames, and transitively between the elements of lower frames where appropriate. The individual who undergoes Arrest and then Arraignment in two successive phases of a complex criminal_procedure scenario is the same as the Defendant in the (later) Trial and Adjudication scenarios, and so on. For a well-designed system to carry out inference on frame-annotated texts, such bindings have to be made formally explicit, and the work to make this possible is under way.

Applications and Extensions

Frame semantics has in a sense two subfields, and these can be thought of as the drudgery part and the fun part. The drudgery, or painstaking foundation part, is the work of actually building a frame-based lexicon and integrating it into a particular kind of grammar of the language. The fun part is that of analyzing how the actual choice of a lexical item evokes a frame, and what follows from that evocation. Here are just two classes of such consequences.

One type of consequence concerns aesthetic and persuasive effects: frame semantics may be able to provide a precise basis for the analysis of the effects stemming from word choice in poetry and prose as well as texts of a more propagandistic sort. Current political discourse in the United States makes a great deal of use of 'reframing' (Lakoff, 2004) in political discourse to associate personal values with the propagandist's political positions: when talk of *tax reductions* is rephrased as *tax relief*, the image of someone who has been suffering is highlighted; when *estate tax* is spoken of as *death tax*, the unwelcome image of being punished for dying comes to the fore; if in the debates about the morality of abortion, a week-old fetus is referred to as *the little baby*, then the association is created of a small and helpless human being needing adult protection (*see* **Politics and Language: Overview**).

Second, there are potentially powerful uses of frame-semantic notions within the fields of Natural Language Processing. As of this writing, several projects are under way to show the relevance of frame-semantic representation in such tasks as automatic sense resolution, semantic tagging, question answering, and machine translation. More far-reaching uses for work in NLP lie ahead (*see* **Natural Language Processing: Overview** and **Machine Translation: Overview**).

See also: Frame Analysis; Goffman, Erving (1922–1982); Machine Translation: Overview; Natural Language Processing: Overview; Politics and Language: Overview.

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France: Language Situation

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Metropolitan France (population 59.9 million) is a liberal constitutional republic in Western Europe and a member of the European Union. While French is used by the vast majority of the population (82% are native speakers), and is the only official language of government and administration, and the dominant language of culture, journalism, and broadcasting, various other languages are used, often in situations of diglossia. Indeed, although the fact has long effectively been ignored, France is one of the most linguistically diverse countries of Europe, even though the 75 languages catalogued by Cerquiglini (Cerquiglini, 1999) include those spoken in French overseas departments and territories, and the vast majority of the 400 identified by the national institute of statistics (INSEE) (INSEE, 2002) have very small numbers of isolated speakers.

The other languages of France are both regional heritage languages (*les langues régionales*), with histories at least as long as that of French, and the more recently introduced migrant languages (*les langues immigrées*). French itself developed out of Francien, one of a number of varieties jointly labeled Langue d'Oïl and historically spoken across the northern two-thirds of the country. A few other Langue d'Oïl varieties (Poitevin-Saintongeais, Gallo, Normand, Picard, Champenois, and Morvandiau) survive away from the Île-de-France. In the extreme West, two major dialects of Breton, France's only remaining Celtic language, are spoken by 240 000–370 000 of a population of 1.5 million. Near the western Belgian border in the north, 20 000–40 000 people in Westhoek (pop. 300 000) around Dunkirk in an area covering one quarter of a single department (Nord) have some knowledge of West Flemish, France's smallest regional heritage language. In the northeastern Alsace-Lorraine, Alsatian has about 1 million speakers, approximately half the population of Alsace, while Lorrain (or Moselle Franconian) has 78 000 speakers. In a fairly large triangle in the east are spoken a number of varieties of Francoprovençal, a diffuse transition area between the Langue d'Oïl and southern Langue d'Oc area. Estimates of the number of speakers are in the order of 1% of the population, that is, about 60 000. On the Mediterranean island of Corsica (apart from the town of Bonifacio, where 300 to 400 people speak Ligurian), a number of local varieties of the Italo-Romance Tuscan, known together as Corsican, are spoken by less than half of the 280 000-strong population, and understood by probably a further 20%. Corsican is unique among France's regional heritage languages in having a legal status, which is linked to recent political/administrative devolution on the island. Extending across most of the southern third of France, speakers of half a dozen mutually comprehensible varieties of Occitan number 2 million to 3 million. At the eastern end of the Pyrenees, about 126 000 people in Pyrénées-Orientales (pop. 370 000) speak Catalan. At the western end of the Pyrenees, three varieties (Labourdin, Low Navarrese, and Souletin) of Basque, Europe's oldest and France's only non-Indo-European regional heritage language, are spoken by some 40 000 people in the Pays Basque Nord (pop. 260 000), and understood by perhaps a further 12 000.

Of the increasingly diverse (that is, non-European) foreign and migrant population, the largest groups are from France's former North African colonies and speak Maghrebian Arabic (1.37 million) and Kabyle or Tamazight Berber (687 000). Then comes Italian (1 million speakers), Spanish (260 000), Portuguese (150 000), French Creole (from Réunion, Martinique, Guadeloupe, and Guyana) (150 000), Turkish (135 000), Western Armenian (70 000), Farsi (40 000), Khmer (50 000), Wolof (35 000) and Vietnamese (10 000). Fewer numbers of people speak Yiddish and Romani.

The future health of these minority languages varies widely, but is generally questionable. The relevant factor, however, is not absolute number of current speakers, alone, although it is true that Breton and Flemish are spoken in increasingly shrinking peripheral areas. More significant is speaker profile and language competence, itself related to strength of sense of united community and cultural identity. There are no longer any monolingual speakers of regional heritage languages, and their use is increasingly the reserve of older generations in lower socioeconomic groups in rural areas. Thus, while these low-prestige varieties continue to be spoken among adults, they are not passed on to younger generations, who see little practical value in them. The most robust regional heritage languages, in relative terms, include Alsatian, Basque, Catalan, and Corsican. But even in Alsace-Lorraine, only between one-half and one-third of children under 15 speak Alsatian and Lorrain, despite the fact that in 1994 two-thirds of Alsatians were in favor of bilingual education from primary school upward. With both Catalan and Basque, the lifeblood is in Spain (for example, about 90% of Catalan speakers live in Spain, with better age profile and transmission rates), and the communities in

France are very much of secondary importance. Particularly vulnerable are the varieties of Langue d'Oïl, Francoprovençal, Breton, Flemish, and Occitan. Francoprovençal has much dialectal variation and no unifying popular identity, literature, or urban center; it is moribund in France (and in neighboring Switzerland, too, although it is apparently holding up better in the Val d'Aosta, Italy). While some regional heritage languages have large numbers of speakers, it is the migrant languages that, in terms of age profile and language competence of current speakers, as well as transmission rates to younger generations, are doing best. INSEE surveyed the all-important early-childhood linguistic behavior among a sample of 380 000 people (0.63% of the metropolitan population). It showed that French is making steady progress, but at the expense of regional heritage languages rather than of migrant languages. Yet, even among the most sturdy migrant languages (Maghrebian Arabic and Kabyle Berber) what *in relative terms* are impressive transmission rates – (70%–80% of Parisian children of two migrant-language-speaking parents say they can speak the language well or very well), as well as the phenomena of migrant-language-speaking parents being replied to in French by their children – ultimately point to ongoing decline which, at best, can be decelerated, but certainly not halted.

In legal terms, the linguistic situation in France is far from straightforward. Because of the fundamental French republican values of indivisibility, oneness, and equality (there is a single French people; demographic minorities defined in terms of distinctions along ethnic, cultural, or linguistic lines are not recognized; one subgroup cannot be treated differently from any other), the situation of languages other than French is in many ways unclear. They do not enjoy official recognition, they are widely stigmatized, and little in the way of reliable statistics is available about the extent of their use. (The figures reported above are perhaps on the conservative side.) Thus, along with no questions about religion and ethnicity, census surveys omit questions of language use, and those studies that have been conducted do not reliably question informants about their level of competence. Similarly, no questions about linguistic background are asked of people seeking to immigrate or be naturalized.

Official intervention in matters of language use has sought to protect French from various perceived threats and goes back to the 1539 edicts of Villers-Cotterêts, which – at a time when barely anyone spoke it – imposed French (instead of Latin) as the language to be used in all administrative and legal contexts, orally and in writing. Political intervention – this time against France's regional heritage languages – continued in revolutionary France with a systematic policy of linguistic unification. With a view to protecting consumers from a potential invasion by English, the 1975 *Loi Bas-Lauriol* imposed the use of French in all public signage and any documentation relating to services or goods, including written and spoken advertising. In 1989, the government created the *Délégation générale à la langue française* (DGLF), tasked with engaging relevant authorities in the promotion of the French language nationally and internationally, while respecting linguistic and cultural diversity and plurilingualism. Its creation was followed by a 1992 amendment to Article 2 of the 1957 constitution, which made French the sole official language – once again a preemptive strike to protect French against progress by English, this time within international bodies – and the 1994 *Loi Toubon*, which updated the *Loi Bas-Lauriol* and extended it to cover official government documents, the media, and education. However, such protectionism toward French in the face of a perceived threat from English has been interpreted as clearly anti-plurilingual. Nevertheless, in 2001 the DGLF was renamed the *Délégation générale à la langue française et aux langues de France*. Now, rather than merely respecting plurilingualism, the organization is to develop it in the name of cultural diversity.

Within the context of the European Union, the European Charter for Regional or Minority Languages was adopted – against the wishes of France – by the Council of Ministers in 1992. It was not until 1999, though, that France signed up to 39 of the Charter's 98 measures, considerably fewer than her neighbors. Specifically, France shied away from recognizing, protecting, or conferring rights on any linguistic minority group. Later, the Constitutional Council prevented the Charter from being ratified by ruling that the Preamble and Article 7 ran counter to the Constitution in that they conferred specific rights to speakers of regional or minority languages. (President Jacques Chirac caused a minor political storm when he rejected a suggestion from Prime Minister Lionel Jospin to amend the Constitution to avoid the problem.) While at least 35 of the Charter's measures were deemed uncontentious, the Council of State further suggested that ratification would have little impact because the measures largely coincided with existing domestic law. Indeed, within the media, legislation passed in 1982 and updated in 2000 obliges public-service broadcasters to promote regional language and culture, and provision by Radio France (radio) and France 3 (television) is

variable in both quantity and quality. Within the independent-radio sector, in contrast, a number of specialized minority-language stations have been set up. The post office even agreed to deliver mail addressed in Breton, Basque, and Occitan, and some road signs are now bilingual!

Much of the battle between monolingualists and plurilingualists has been fought in education. Given that revolutionary France used schools as the tool for imposing French on the entire population, this was understandably the area in which the minority-language campaigners, who began to organize themselves in the 19th century, chose to fight for their cause. Exactly a century after an 1851 circular relating to the *Loi Falloux* ruled that French was the sole language to be used in schools, the first sign of flexibility with respect to the use of heritage languages as a symbol of regionalism came with the rather restrictive 1951 *Loi Deixonne*, which allows primary and secondary schoolteachers to apply for permission to offer optional classes, initially in Breton, Basque, Catalan, and Occitan, later in Corsican, Alsatian, and Gallo. The 1975 *Loi Haby* extends the provision in allowing regional languages to be taught to schoolchildren of all ages, and requires curricula and timetables to be revised as well as teachers to be trained. The 1995 circular 95–086 recommends a wider awareness of regional languages and cultures within schools, and even allows for up to three hours of classes per week through the medium of the regional language, as a way of addressing the need to preserve national cultural heritage. The 2001 decree 2001–733 envisages a consultative regional-language council with the task not only of promoting regional languages and ensuring that their status is not undermined but also of collaborating with regional education authorities in formulating regional-language policy and monitoring how policy is implemented. Things have not always run smoothly: a 2002 order from the department of education establishing bilingual immersion teaching was rescinded by the Council of State on the grounds that because immersion was not *necessary* for teaching regional languages, the general rule that French be used as the *medium* of instruction should be upheld. And, of course, not everyone in regional-language-speaking areas supports the cause, and many doubt the practical value of regional languages. For example, unionists argue that the dialectal variation within Corsican means that the language does not lend itself to use in public examinations. Corsican language teaching regionally has been compulsory at secondary school since 1999: one longitudinal study suggests that support for the initiative actually fell sharply during the first year of implementation!

Estimates of the number of pupils learning regional heritage languages at school range from 110 000 to 335 000. A government report from 2002 suggests that some 225 000 pupils in metropolitan France were taught regional heritage languages in 2001–2002, up 50% from the previous year, but still only about 2% of the total school population. What is clear is that, while the take-up of regional heritage languages (except Gallo) within schools is increasing (especially Basque, Catalan, and Corsican), it is nowhere near as widespread as modern foreign languages such as English and Spanish, or indeed Hebrew and Chinese. In Alsace, rather than promoting Alsatian, the newly enlightened language-teaching policy within primary schools is actually benefiting standard German! It is only in Corsica that regional-language teaching is anything like fully embedded within the curriculum, with 83% of primary schoolchildren exposed to the language and as many as 20% of teenagers including Corsican in their *baccalauréat* diet. Elsewhere, even the rosier pictures are not good for regional language survival: in the Basque country, 80% of schoolchildren are not taught Basque.

See also: Arabic; Armenian; Basque; Berber; Bilingual Education; Breton; Catalan; Celtic; Dutch; Endangered Languages; English in the Present Day (since ca. 1900); French; German; Italian; Language Education Policy in Europe; Language Planning and Policy: Models; Language Policies: Policies on Language in Europe; Latin; Minorities and Language; Portuguese; Romance Languages; Romani; Spanish; Turkish; Wolof; Yiddish.

Language Maps (Appendix 1): Map 137.

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Franglais

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Franglais is primarily a lexical innovation: new lexis has been absorbed and existing lexis is being used differently. Francophones have enriched their lexis by (a) adopting English word forms, especially from commerce (*le shopping*, *le business*, *le discount*, *le leasing*, *le sponsor*); (b) adapting English lexis (*le self* 'self-service cafeteria', *le parking* 'parking lot', *le dressing* 'dressing room', *le loft* 'loft apartment'); and (c) innovating pseudo-English lexis (*le starter* 'choke', *le footing* 'jogging', *le baby-foot* 'table football', *le pressing* 'dry cleaner's' *le lifting* 'face-lift', *le brushing* 'blow-dry', *le planning* 'schedule', *le recordman* 'record holder', *le rugbyman* 'rugby player', *le scratch* 'Velcro').

In addition to embracing English word forms, Francophones have changed the way they use French forms, apparently under the influence of English, either as a faux ami (*un ordre* for *une commande* 'an order', *une opportunité* for *une occasion* 'an opportunity', *du matériel* for *du tissu* 'fabric') or by calquing the syntax of English expressions (*nourrir le chat* 'to feed the cat' for *donner à manger au chat*, *rejoindre l'armée* 'to join the army' for *s'inscrire à l'armée*, *parler sur le téléphone* 'to speak on the telephone' for *parler au téléphone*). According to Duneton (1999: 121), this usage would have shocked just a few decades ago but is now banal.

However, Franglais is alleged to have had influence beyond lexis, too, for example, in the use of unnecessary determiners in appositive contexts (*Berlin, la capitale de l'Allemagne*); prenominal adjectives (*la composition scientifique* > *la scientifique composition*); adjectives as adverbs (*écrire économiquement* > *écrire économique* 'to write economically'). Increased use of passives has also been blamed on English influence. Finally, although Franglais lexis often submits to French stress patterns (breath-group final rather than lexical or foot-based) and orthography (*bouledozère* 'bulldozer', *boum* 'boom', *cédérom* 'CD-ROM'), Franglais has had a minor impact on the phonology and orthography of the language, with increased occurrence of the phones [ʔ] and [ʤ] (otherwise found in borrowings, only) and the graphemes *k*, *y,* and *w.* (Arguably, though, a much more apparent, economy-driven impact on French orthography is being caused by SMS messaging, with unpronounced graphemes dropped (*tabac* > *taba*, *comme* > *kom*), the representation of vowels and consonants simplified (*beau* > *bo*, *qui* > *ki*), and single graphemes used to represent whole words (*c'est/ces/ses* > *c*).

Étiemble's thesis is that, because of its scale, rather than being part of a natural process of dynamic development, the one-way influence of English on French taking place from the mid-20th century onward is, instead, doing unwelcome and irreparable damage to the core of the French language, culturally if not purely linguistically. Duneton (1999) has reached the same conclusion. Whether or not Étiemble is right depends on one's perspective. If one sees language as a mere vehicle for communication, then openness on the part of one linguistic community to the lexical resources of the language of another can only increase expressive power. Contact and mutual influence between Francophones and Anglophones have a history going back a millennium, and the languages are widely believed to be all the richer as a result. More recent longitudinal work by Shana Poplack on the effect of English–French contact on the French language spoken around Ottawa and Hull (Canada) suggests that French has been enriched by the contact, rather than impoverished. If, in contrast, like Étiemble, one sees language as having a role to play in articulating a speech community's social and cultural identity, then excessive influence of English on French arguably undermines French (or at least Francophone) identity. Distinguishing French lexical influence on English from English lexical influence on French, for example, Duneton (1999: 115ff) reported the view that the former reflects middle-class snobbery, the latter, working-class ignorance. The desire to combat this perceived ignorance underlies much of the corpus planning pursued in France in recent decades, with official dictionaries cataloguing approved French alternatives to anglicisms and legislation guaranteeing the use of the French language in a number of contexts.

There are various reasons to believe that the stance adopted by Étiemble is more emotional than rational and similarly Duneton, one of whose grounds for concluding that the heart of the French language is under threat is the observation that Francophones now say *Oops!* – apparently unheard of in 1979 – rather than *Hou là là!* when they drop something! It is likely, for example, that Étiemble overestimated the scale of lexical Franglais. Leeman-Bouix (1994: 29–30) cites a 1965 study that counted 694 English-origin words in the 100 000 lexemes of French (0.7%). Similarly, Étiemble was wrong to claim that Franglais lexis was unwarranted due to the availability of French synonyms. For example, although *faire du shopping* may be as perfect a synonym of *faire des courses* as it is possible to get, Leeman-Bouix (1994: 137–138) justified the use of *challenger* over *adversaire* 'opponent' in TV game shows precisely because it includes the notion of challenge, absent from *adversaire*, and the use of *casting* instead of *distribution* because of the ambiguity of the latter term in the cinema context. Finally, Étiemble was in fact mistaken in some of the claims of English influence he made, for example, *examen-fenêtre* 'the act of examining an

object by the window', blamed by Étiemble (1973: 195) on unwelcome English influence, despite the absence of any evidence to support such an accusation (Goosse, 2000: 131). It is thus difficult to disagree with Hagège (1987: 52) that "English has not impacted upon the hard core of the French language" and Goosse (2000: 141) that the unmarked variety, or varieties, of French is following its course.

A more plausible take on the underlying concerns of Étiemble and other purists hangs on yet another role of language, namely, its at times near-isomorphic relationship with, and reflection of, the status of a nation. There is no need to rehearse here the geopolitics of the 20th century and the way the role of France on the international stage diminished after World War I and particularly World War II. In such a context, Étiemble's talk of an attack by Anglo-American cultural imperialism and Duneton's discourse of an infestation of teeming ants is hardly surprising. Franglais is a rude reminder of the loss of French prestige on the world stage. Thus, the concerns expressed by Étiemble, as well as the status-planning policies embraced by successive French governments since the mid 1960s, not to mention virulent anti-Americanism, can be seen as "a massive overreaction at a time when France's political identity was being redefined" (Battye *et al.*, 2000: 44). Significant in this respect is a contrast between the level of negative reaction to Franglais in France and its broad acceptance in Quebec, for example, where, if anything, the influence of English is even greater.

See also: Code Switching; France: Language Situation; French.

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Frege, Gottlob (1848–1925)

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Frege was born on November 8, 1848, in Wismar, Germany. He studied mathematics at Jena, then at Göttingen, where he obtained his doctoral degree in 1873. He became Privatdozent at the University of Jena, where he taught mathematics. In 1879 he became extraordinary professor and in 1896 honorary professor. He stayed in Jena until he retired in 1918. He died on July 26, 1925, in Bad Kleinen. Frege's main field of research was mathematics and the philosophy of mathematics, but his lasting contributions are in the field of formal logic and philosophy of language. During his lifetime Frege, who was an introvert and had a very small audience, exerted little influence, but his ideas were diffused by Rudolf Carnap, Bertrand Russell, and Ludwig Wittgenstein. Because of the development of semantic theory and the growing impact of formal logic on linguistic theorizing, his work occupies a central position within contemporary semantic and linguistic theory, epistemology, and philosophical logic.

Frege's work can be seen as the (unfulfilled) realization of his logicist program, which consisted in reducing arithmetic to logic, i.e., in defining arithmetical concepts in terms of logical concepts and in developing a strictly formalist-logical system for arithmetic statements and procedures. His *Begriffsschrift* (1879) was the first important step in the realization of the program. Frege modernized propositional and predicate logic, and provided a notational system for

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Frege was born on November 8, 1848, in Wismar, Germany. He studied mathematics at Jena, then at Göttingen, where he obtained his doctoral degree in 1873. He became Privatdozent at the University of Jena, where he taught mathematics. In 1879 he became extraordinary professor and in 1896 honorary professor. He stayed in Jena until he retired in 1918. He died on July 26, 1925, in Bad Kleinen. Frege's main field of research was mathematics and the philosophy of mathematics, but his lasting contributions are in the field of formal logic and philosophy of language. During his lifetime Frege, who was an introvert and had a very small audience, exerted little influence, but his ideas were diffused by Rudolf Carnap, Bertrand Russell, and Ludwig Wittgenstein. Because of the development of semantic theory and the growing impact of formal logic on linguistic theorizing, his work occupies a central position within contemporary semantic and linguistic theory, epistemology, and philosophical logic.

Frege's work can be seen as the (unfulfilled) realization of his logicist program, which consisted in reducing arithmetic to logic, i.e., in defining arithmetical concepts in terms of logical concepts and in developing a strictly formalist-logical system for arithmetic statements and procedures. His *Begriffsschrift* (1879) was the first important step in the realization of the program. Frege modernized propositional and predicate logic, and provided a notational system for

expressing all types of relationships between propositions, and offered a formalization of first order predicate calculus. In his following book, *Die Grundlagen der Arithmetik* (1884), Frege provided a not-yet formalized elaboration of logicism. The main idea developed in this work is that numbers can be defined as classes of equivalent classes (hence the *a priori* truth of '$2 + 3 = 5$'). Frege then embarked upon the exhaustive formalization of his program, trying to reduce arithmetic to logic within an axiomatic system. This was the ultimate goal of his *Grundgesetze der Arithmetik*, the first volume of which appeared in 1893 and the second in 1903. But at the time the second volume was published, Frege had already been faced with a paradox in his logical system (the paradox was pointed out to him by Russell), and in spite of his efforts, Frege eventually had to recognize the unrealizability of his reductionist program.

In the process of working out his program, Frege had felt the need to explicate the underlying philosophical views. This required a systematic reflection on notions such as truth, meaning, thought, concept, object, identity, function, and argument. Whereas the 'semantic theory' contained in Frege's *Begriffsschrift* was a poor one, he succeeded in articulating a comprehensive theory of meaning and reference in three articles published in the early 1890s: 'Funktion und Begriff' (1891), 'Über Begriff und Gegenstand' (1892), and 'Über Sinn und Bedeutung' (1892). Although the three articles were, in Frege's view, an informal study (oriented toward aspects of linguistic expression) meant to clarify the aims of logic (the study of laws and properties of thought), they belong to the foundations of modern philosophical logic. Frege himself continued to refer to these articles when, later in his life, he wrote three studies on thought and thought operations ('Der Gedanke,' 'Die Verneinung,' and 'Gedankengefüge,' published between 1918 and 1923). It is important to stress that Frege never referred to his logico-semantic views as constituting a 'philosophy of language' (in fact, as a logician he had a deep mistrust of natural language): whatever he wrote on meaning, reference, assertion, and on linguistic aspects of concepts and judgments was intended to be a less technical exposition of his work in the philosophy of mathematics and in formal logic.

Frege's theory of meaning (and reference) is basically the outgrowth of his reflections on the construction of a notational system for expressing relationships between objects and properties (for Frege's reductionist and very Platonicist ontology only objects and concepts are needed). Objects are expressed by names; as objects, Frege recognizes individuals, classes and truth values. Properties correspond to concepts, expressed by predicative words (*Begriffswörter*, or short: predicates). Predicates are instantiated by individuals (when these are subsumed under a predicate: *Socrates is human*), or are included in a more general predicate (subordination of a predicate under another predicate: *Humans are mortal*). Thoughts (*Gedanken*) are the result of a combination of (object-)names and predicates; they are expressed in sentences, which have a truth value. Predicates are treated as functions to which arguments are linked: a predicative 'function' leaves open one or more places that can be taken in by 'arguments', the variable semantic and syntactic terms filling in the open spots: *speaking* (x), *murdering* (x, y) as semantico-syntactic frames for propositions such as *Brutus is speaking* and *Brutus murdered Caesar*. So Frege treats basic propositional structure in terms of function and argument(s); he was very critical of the traditional analysis into subject and predicate, as it makes no distinction between subsumption and subordination. For the description of the structure of propositions involving operations on the basic function-argument frame, still other expressions are needed, such as 'propositional connectives' and 'quantifiers' (also dealt with by Frege). Frege was aware that apart from assertive propositions or statements there are other types of sentences: commands, wishes, exclamations, etc. He excluded these from his logical investigations, and in fact seems not to have taken much interest in what he called the *Kraft* ('force') of linguistic expressions.

As a logician, Frege stuck to the principle of the part-whole correlation, applying it to the analysis of propositions (in direct relation to their truth value); later, this principle was called the 'compositionality' principle. The principle is used to account for the fact (1) that the truth value of a proposition results from what its component parts stand for; (2) that the (semantic) content of a proposition results from the combined contents of its component parts; (3) that we can construct new propositions out of (significant) parts of formerly uttered propositions.

The crown jewel of Frege's 'philosophy of language' (essentially a logical semantic theory, with a syntactic component later developed by Carnap as 'logical syntax') is his theory of *Sinn* and *Bedeutung*. The terms have been most often translated into English as 'meaning' resp. 'reference' (but also as 'sense' resp. 'meaning'); however, *Sinn* is not strictly (lexical) 'meaning' and *Bedeutung* is not only 'reference' (i.e., a relation) but also 'referent' (i.e., an object: the *Bedeutung* of a proper name is, in Frege's view, the object denotated, and the *Bedeutung* of a proposition

is its truth value) and even 'importance' (Frege's semantic theory has an axiological ring to it, since he also speaks about 'value'). The distinction – which Frege applied to proper names, to (uniquely referring) descriptions, and to (simple/complex) sentences (conditional sentences; indirect speech) – serves to set off (a) the objective idea corresponding to the way an object is presented to us [= *Sinn*] as distinct from all kinds of subjective representations [= *Vorstellungen*] that we can associate with an object; and (b) the object (a referent, class of referents, a truth value) in which the reference achieves its realization [= *Bedeutung*]. Identity statements (such as *The morning star is the evening star*) precisely are cognitively (scientifically) important, because through them we learn that two expressions giving a different presentation of an object refer to the same thing (in this case, the two expressions or names *the morning star* and *the evening star* 'coincide' in the same object, namely, the planet Venus). Of the same object various ways of presentation can be given (like 'Marcus Tullius' and 'Cicero' or of Napoleon: 'the winner of the battle at Austerlitz' and 'the emporer defeated at Waterloo'); the same *Sinn* or way of presentation can, at different moments, correspond to different objects ('the president of the United States'). Although problems remain with the distinction (e.g., what is the *Sinn* of a proper name? How can one make a clear-cut distinction between objective ideas and subjective representations about objects?), Frege's theory of *Sinn* and *Bedeutung* has been of crucial importance for the later study of meaning and reference (specifically for the analysis of proper names and descriptions) and for the logical analysis of sentences. Frege's logic (and reductionist ontology) also inspired later work in logical syntax and semantics as applied to the analysis of truth and to the construction of an ontology.

See also: Propositions; Russell, Bertrand (1872–1970); Wittgenstein, Ludwig Josef Johann (1889–1951).

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Freire, Paulo (1921–1997)

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One of the most influential educational thinkers of the 20th century, Paulo Freire became a powerful symbol of the relationship between education and social change, particularly in the Third World. Freire was born on September 19, 1921, in the city of Recife in northeast Brazil, where he grew up in poverty. He succeeded in entering a private high school with a scholarship and became sensitive at an early age of the discrepancies in power and wealth between Brazil's social classes.

Freire entered the University of Recife Law School in 1943 but decided that he should devote himself to education instead. He became the director of education at SESI (Social Service of Industry), a government agency responsible for improving the living standards of workers. He received his Ph.D. in 1959 from the University of Recife with the dissertation 'Present day education in Brazil.' During the 1960s, he became involved in movements for popular education, focusing on adult literacy in rural communities and, in 1963, became the director of the National Literacy Program.

Since at the time literacy was a prerequisite for voter registration, Freire's activities were considered overtly political and, by many in the ruling elite,

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subversive. In 1964, a military coup ousted President Goulart, and Freire was arrested and held for 70 days on charges of treason. What followed were 16 years of exile. During that time, Freire worked at the Chilean Institute for Agrarian Reform until he took a post at Harvard for a year (1969–1970) and then moved on to Geneva, where he became the educational director of the World Congress of Churches, traveling the world to promote literacy programs and develop further his ideas on education and literacy that he had described in his *Pedagogy of the oppressed* (1972).

A passionate Christian and a Marxist, Freire saw education both as a tool by which ruling classes subdue the masses and as a way of resisting that very oppression. Freire attacked the 'banking' system of education, where the student is viewed as an empty receptacle to be filled with facts, and instead advocated a dialogic or problem-posing approach to teaching, where education is made meaningful because it is related to the real lives and experiences of the learners. The purpose of this style of teaching and learning is to empower learners by making them aware of their own capacity to transform the world. This process, known as conscientization, has been associated with Freire's philosophy of education, although he himself thought the term was often misused.

In 1980, Freire returned to Brazil and began teaching at the Catholic University of São Paulo and the State University of Campinas. He also continued to be involved in adult and mass education programs. In 1986 Freire received the UNESCO Prize for Peace Education, and in 1988 he was appointed minister of education for the city of São Paulo. Paulo Freire died on May 2, 1997, at the age of 75. His work continues to exert a profound influence on educational thought and practice to this day.

See also: Brazil: Language Situation; Language Education Policy in Latin America.

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French

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French is a member of the Romance group of Indo-European languages. It forms part of the Gallo-Romance sub-group, along with Occitan and the transitional varieties labeled Franco-Provençal. Modern French can ultimately be traced back to the Latin of northern Gaul, a Latin that was significantly modified by contact with the language of the pre-Roman Celtic inhabitants of the area and the language of the Germanic invaders who occupied the region after the fall of the Roman Empire. Its more immediate ancestor is the medieval dialect of Paris (labeled *francien* by 19th-century scholars), which, as the speech of the major economic and cultural center first of the Île de France and then of a progressively larger administrative unit created by conquest and royal marriages, enjoyed particular prestige; however, in the course of becoming a national standard, this variety was additionally subjected to complex processes of leveling and koineization resulting from large-scale migration to the capital.

Number of Speakers and Geographical Distribution

French is currently spoken (as a first or near-native second language) by approximately 100 000 000 people. In Europe it is the official language of France (population approximately 60 000 000), and is also spoken in the contiguous areas of southern Belgium (roughly 5 000 000 speakers), Luxembourg (500 000), western Switzerland (1 500 000), and the Val d'Aosta region of Italy (35 000). It is one of the two national languages of Canada, where it is the native tongue of almost 7 000 000 people, or between one-fifth and one-quarter of the population – at the provincial level, it is the official language of Québec and has co-official status with English in New Brunswick; smaller numbers of speakers are

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found elsewhere in the maritime provinces, and in Ontario, Manitoba, and Saskatchewan. French is the official language of the French Overseas Territories (most of which are situated in the Caribbean or in the Indian or Pacific Oceans). It is also the official language of several former French colonies, especially in West, North, and Central Africa, although many inhabitants of these countries do not in fact speak French, and, for the majority of those who do, it has the status of a second language. French dialects that differ significantly from the standard language survive in northern France (Picard) and southern Belgium (Walloon), as well as in Normandy. A Norman French dialect is also found in the Channel Islands of Guernsey and Jersey, although the numbers of speakers are fast declining. For two hundred years, from the early 18th century to the early 20th, French was the unrivaled language of international (and especially diplomatic) communication. It also played a crucial role in the establishment and subsequent functioning of the institutions from which the European Union was to emerge. In addition, it has been the vehicle of one of the world's major literatures for over a thousand years. For all of these reasons, French has assumed an importance that transcends the number of its native speakers.

Phonetics and Phonology

A maximal phonemic inventory of contemporary standard European French would include the following: 16 vowels (a front unrounded series /a ɛ e i/; a front rounded series /œ ø y/; a back series consisting of unrounded /ɑ/ and rounded /ɔ o u/; four nasal vowels /ɑ̃ ɔ̃ ɛ̃ œ̃/; and the unspecified vowel schwa /ə/); three glides /j ɥ w/; two liquids /l r/, the former a voiced lateral, the latter usually realized as a voiced uvular fricative [ʁ] or trill [ʀ]; and 16 consonants (bilabial, dental, and velar plosives, voiced and voiceless /p b t d k g/; labio-dental, alveolar, and palatal fricatives, voiced and voiceless /f v s z ʃ ʒ/; and four nasals /m n ɲ ŋ/ – the last found only in some speakers' pronunciation of English loan-words such as *parking*). However, this inventory represents an idealization, and few, if any, speakers exemplify the full system. In particular, a number of vocalic distinctions (especially amongst mid-vowels) have, for many speakers in many contexts, been either obliterated or reduced to phonetically predictable oppositions. While present phonetically, vowel length has ceased to be phonologically significant for virtually all speakers.

The phonetics and phonology of Canadian French differ in significant ways from those of the European language, especially as regards vowels. Vowel length is more salient, and has phonemic value in some contexts (compare *mettre* [mɛtʀ] 'put' vs. *maître* [mɛ:tʀ 'master'); long vowels may become diphthongs. Nasal vowels are less nasal, and have chain-shifted. Short high vowels in closed syllables become lax. Unstressed high vowels in medial syllables may be devoiced or disappear completely.

A strong (although not absolute) phonotactic principle precludes sequences of more than two consecutive consonants (or, utterance-initially, more than a single consonant), excluding syllable-initial [s] and liquids following an obstruent at the end of a cluster. This principle correlates with the presence or absence of schwa in many contexts; in informal speech, schwas will be deleted unless or until such deletion would give rise to an unacceptable sequence of consonants.

The most important and characteristic French sandhi phenomenon is liaison, in which a consonant that is not usually present on the surface in other contexts intervenes between two vowels at a word boundary and blocks hiatus. Historically, liaison arises from the differential disappearance of word-final consonants, which were retained longer before a following vowel than in other contexts. However, a synchronic treatment of the phenomenon must take account of frequent hypercorrections, which suggest that the liaison consonant is no longer underlying, but rather inserted epenthetically. In addition, liaison takes place with only a subset of consonants, and many (though not all) liaisons are highly variable and socially marked. In another sandhi phenomenon, misleadingly termed 'aspirate h' (it does not involve aspiration and may not even involve <h>), expected hiatus-blocking processes, such as elision and liaison, are themselves blocked (compare *l'héritier* [leʁitje] 'the heir' vs. *le hérisson* [ləeʁisɔ̃] 'the hedgehog', but also *le onze* [ləɔ̃z] 'the number eleven').

A strong preference for open syllables means that word boundaries do not always coincide with syllable boundaries. Prosodically, French is characterized by syllable-timing and by an absence of word stress, with tonic stress falling rather on the final syllable of the phonological phrase. Non-final syllables may occasionally bear stress for affective emphasis; otherwise secondary stress is assigned to them according to eurythmic principles. There is a tendency in Canadian French for some phrase-penultimate long syllables to receive stress.

Orthography

The French spelling system is far from phonographic. The 26 letters of the Roman alphabet are insufficient in themselves to represent all the phonemes of the language, and so the inventory of symbols has been augmented by digraphs and diacritics (the acute <´>

and grave <`> accents, which originally distinguished closed and open e, respectively, from schwa, and are occasionally used to distinguish between what would otherwise be homographs, e.g., *la* 'the (fem.)', *là* 'there', *ou* 'or', *où* 'where'; the circumflex <ˆ>, originally placed over a vowel to indicate the omission of a letter that was no longer pronounced, with concomitant lengthening of the vowel; the cedilla <ç>, indicating that <c> is pronounced as [s] before <a>, <o>, or <u>; the tréma <¨>, which, when placed over the second vowel in a sequence, prevents the sequence from being interpreted as a digraph). However, their usage, even in institutionalized normative orthography, is inconsistent. The influence of a late-medieval Latinizing tendency (which, moreover, was often ignorant of the true Latin etyma of French words) is still felt in forms such as *temps* [tɑ̃] (< Latin TEMPVS, compare Old French <tens>) 'time' and *poids* [pwa] (< Late Latin PENSVM, mistakenly traced to Classical Latin PONDVS) 'weight'.

Morphology and Syntax

French is a fusional language. It has three grammatical persons, singular and plural number, and two genders, masculine and feminine. (Nominal case survived into Old French, but was then lost.) The second-person plural forms are also used to encode respect toward a single addressee. Synthetic tenses of the verb (here exemplified by *faire* 'do') are the present (*fais*), future (*ferai*), and past. A morphological distinction of aspect exists only in the past, where a perfective simple past (*fis*) contrasts with an imperfect (*faisais*). The subjunctive, perhaps best described as a 'non-assertive' mood, has a synthetic present (*fasse*) and imperfect (*fisse*). Other indicative tenses, such as the present perfect (*ai fait*), pluperfect (*avais fait*) and future perfect (*aurai fait*), as well as the perfect subjunctive (*aie fait*) and pluperfect subjunctive (*eusse fait*), are realized by combining an auxiliary (usually *avoir* 'have', although *être* 'be' is found with a subset of intransitive verbs) with the past participle. The imperfect and pluperfect subjunctives have disappeared from all but the most formal written registers of the language. A 'future in the past' (*ferais*, *aurais fait*), used in reported speech, doubles as a conditional mood, found in the apodosis of irrealis conditional sentences. This form also conveys attenuative values, such as politeness and evidentiality, and is coming to rival the subjunctive as an exponent of non-assertive modality.

French generally exhibits more analytic exponence than other Romance languages. Unlike Italian, Spanish, and Portuguese, it has lost productive diminutive, augmentative, and superlative morphology. In everyday spoken language, the simple past tense (*fis*) has been ousted by the present perfect (*ai fait*), and there is evidence that a similar process is affecting the future, with the synthetic form (*ferai*) yielding to an analytic 'go to do' construction (*vais faire*). Save in exceptional cases, the singular/plural distinction in nouns and adjectives has become inaudible, with the loss of final [s], (although it continues to appear in writing) and the number of a noun is effectively indicated by some other item, usually a determiner.

Both determiners and adjectives agree with the noun. Determiners precede the noun, and attributive adjectives usually follow it, although they may also precede, especially when they have an affective nuance or a metaphorical interpretation. At sentence level, the basic word order of formal written French is SVO, but the frequent dislocations and topicalizations found in speech and in the informal written language suggest that French may be moving away from a word-order determined by grammatical functions, such as subject and object, toward one that reflects discourse-prominence.

Unlike most Romance varieties, French is not a pro-drop language, and an explicit subject is required in almost all non-imperative sentences. Subject-marking often involves a pre-verbal clitic pronoun; other clitics may mark the direct object, the indirect object, and some types of adjunct. The exact status of these clitics is the topic of much debate, with some scholars seeing them as developing into verbal affixes.

In more formal styles, interrogation is conveyed by inversion of the verb with a subject-clitic. Everyday language uses the interrogative particle *est-ce que* or declarative word-order with rising intonation. Very colloquial varieties, especially in Canada, may use a postverbal interrogative particle *-ti* or *-tu*.

In earlier stages of the language, negation was indicated by the preverbal negative marker *ne*. This marker could be reinforced by a positive-polarity item (thus *personne* 'person' > 'no one', *rien* 'thing' > 'nothing'), including *pas* 'step', which came to be a default filler of this slot and was semantically bleached. Nowadays, *ne* is generally absent from everyday spoken language, leaving the original reinforcing element as the sole marker of negation.

Vocabulary

Significant external influences on the vocabulary of French have included Frankish (during the early Middle Ages), medieval Latin, Italian (especially during the 16th century), and, latterly, English (giving rise to the hotly debated phenomenon of *franglais*). Colonial contact led to the absorption of several words from North African Arabic. Internal

derivational processes include affixation, conversion, and back-formation. Two phonological processes that have proved lexically significant are clipping (e.g., *prof* < *professeur* 'teacher') and *verlan* (inversion of the order of syllables – the name, from *l'envers* 'the reverse', exemplifies the process). The latter phenomenon, which originated in low-socioeconomic-status immigrant areas in the northern suburbs of Paris, but which spread beyond these confines to become widespread in the speech of young people, and which has even penetrated the standard language, is a significant sociolinguistic development, while the outcome of some inversions has contributed to our understanding of French syllable structure.

See also: Affixation; Algeria: Language Situation; Back-Formation; Belgium: Language Situation; Benin: Language Situation; Burkina Faso: Language Situation; Burundi: Language Situation; Cameroon: Language Situation; Canada: Language Situation; Central African Republic: Language Situation; Chad: Language Situation; Channel Islands: Language Situation; Clitics; Congo, Democratic Republic of: Language Situation; Congo, Republic of: Language Situation; Conversion; Diacritics; Djibouti: Language Situation; Education in a Former Colonial Language; Evidentiality in Grammar; France: Language Situation; Franglais; French Guiana: Language Situation; French Lexicography; French Polynesia: Language Situation; French Southern Antarctic Lands: Language Situation; Gabon: Language Situation; Germanic Languages; Guadeloupe: Language Situation; Haiti: Language Situation; Israel: Language Situation; Italian as a Fusional Language; Italian; Ivory Coast: Language Situation; Language Education Policies in Africa; Latin; Luxembourg: Language Situation; Mali: Language Situation; Martinique: Language Situation; Mauritania: Language Situation; Mauritius: Language Situation; Mayotte: Language Situation; Morocco: Language Situation; Niger: Language Situation; Occitan; Politeness; Portuguese; Réunion: Language Situation; Romance Languages; Rwanda: Language Situation; Senegal: Language Situation; Seychelles: Language Situation; Spanish; St Pierre and Miquelon: Language Situation; Switzerland: Language Situation; Variation in French; Wallis and Futuna: Language Situation.

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French Guiana: Language Situation

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Characterized by a situation of plurilingualism with over 20 languages in use, French Guiana includes, among its population, Amerindians, Antilleans, Asians, Creoles, Bushinengues, French, and Hmong, as well as more recent immigrants, all of whom contribute to this overseas department of France's linguistic and cultural diversity. Several of these languages have only recently been introduced, such as Hmong (Yao-Miao family), established in the 1970s.

French, the official language, is used mainly in the government and the schools; however, knowledge of French is not necessary for everyday communication. Although most of the members of the younger generation of all minority groups speak French today, the great majority of children do not have French as their first language, which creates learning difficulties. As a result, the Council of National Education, in partnership with the French Centre of Research in Indigenous Languages of America (CELIA-CNRS/IRD), has implemented a training program with 'bilingual mediators' from six regional languages, aiming to help children learn the official teaching language.

In the media broadcasts, the only regional language which is used is Guianese Creole, although a year ago there were still broadcasts in Kali'na (Carib), Palikur and Ndyuka.

Regional Languages

According to the European Charter for Regional or Minority Languages, the French State lists ten regional languages for French Guiana: three Creole languages, six Amerindian languages, and Hmong (see Figure 1). Work on descriptive linguistics is in progress on most Amerindian and Bushinengue languages. The sociolinguistic situation and the future of these languages are critical, because several are endangered: The number of speakers is low, and there are no policies to increase their status as part of French Guiana's linguistic and cultural heritage.

Creole Languages

Three of the Creole languages spoken in French Guiana are considered regional languages: Guianese Creole, Saramaccan, and Aluku-Ndyuka-Paramaccan. The three languages that make up Aluku-Ndyuka-Paramaccan are very similar to each other and so must be regarded as varieties of only one language.

Guianese Creole Guianese Creole (or Kreol Gwiyanè) is spoken by about 50 000 speakers in French Guiana and another 3000 speakers in Brazil, where it is also referred to as Patwua, Crioulo, or Caripuna. It is spoken in the coastal area and in the area of Lower Oyapock, as well as in Brazil's Uaça area. There are slight dialectal distinctions between Western (surrounding Saint-Laurent) and Eastern French Creole. It has an important tradition and literature.

Guianese Creole is a French-based creole, relatively close to Antillean Creole, and is widely spoken by Amerindians, Bushinengues, Chinese, Brazilians, and Haitian Creoles as a lingua franca. However, in the western area of French Guiana, Guianese Creole can no longer be considered the most widespread language of communication; Bushinengue languages, especially Sranan tongo, are now used most widely there. Recently, a strong revitalization movement in the schools with 'mediators' trained in regional languages and cultures has been supporting the use of Guianese Creole, but its sociolinguistic situation has not been well studied yet. The first study on Guianese Creole linguistics dates to 1872.

In the Brazilian area of Uaça, Guianese Creole is the Caripuna group's mother tongue and is also used by other Amerindians living in this area.

Saramaccan and Aluku-Ndyuka-Paramaccan Originating in Suriname, Black Maroons or Bushinengue languages spoken in French Guiana – Aluku-Ndyuka-Paramaccan and Saramaccan – are called *nenge(e) tongo*. They are characterized by two subgroups of creole: one English-based and the other English relexified toward Portuguese. The Maroon communities remain mainly on the French Guiana and Suriname border. On the coast live 29 800 speakers, with an additional 7400 speakers in the interior. At least 8% of Maroons live in the Netherlands: 100 Aluku, 400 Paramaka, 4500 Ndyuka, and 4000 Saramaka. The term 'taki-taki,' used for all these languages, has a degrading meaning.

Aluku (or Boni) is spoken by 5900 speakers in French Guiana. It is a communication language on the Middle Maroni River area (Maripasoula, Apatou, Papaïchton). Some Aluku live in Cayenne and Kourou. Paramaccan is spoken by 2800 Pamaka speakers in French Guiana and by 2800 in Suriname. They live on the Middle and Lower Maroni River bank. Ndyuka (or Aukan, Okanisi) is spoken by 14 000 speakers in French Guiana and 32 000 in Suriname, who live among the Paramaka. Ndyuka is also spoken by the Aluku and Pamaka people.

Saramaccan (or Samaka) is the most distinct of the Bushinengue languages; 37% of its lexicon is relexified toward Portuguese. It is spoken by 14 500 speakers in French Guiana and 32 000 speakers in Suriname who live in the coastal area and also in the interior.

Amerindian Languages

Amerindian languages are part of three linguistic families in French Guiana (Table 1). All Amerindian groups can communicate in the official language of the country where they live, as well as in the Amerindian and Creole languages with which they are in contact. In French Guiana, descriptive linguistics studies of most of these languages are in progress.

Arawak Family Only 10% of the Arawakan population speaks this language. It is spoken mainly by old people and by very rare young over 35 years old. In French Guiana, less than 20 people still speak it, although some degree of revitalization has been observed. There is great need for a Linguistic survey (descriptive and documentation) of this language. The Arawak language spoken in French Guiana and the Guajiro and the Paraujano languages spoken on

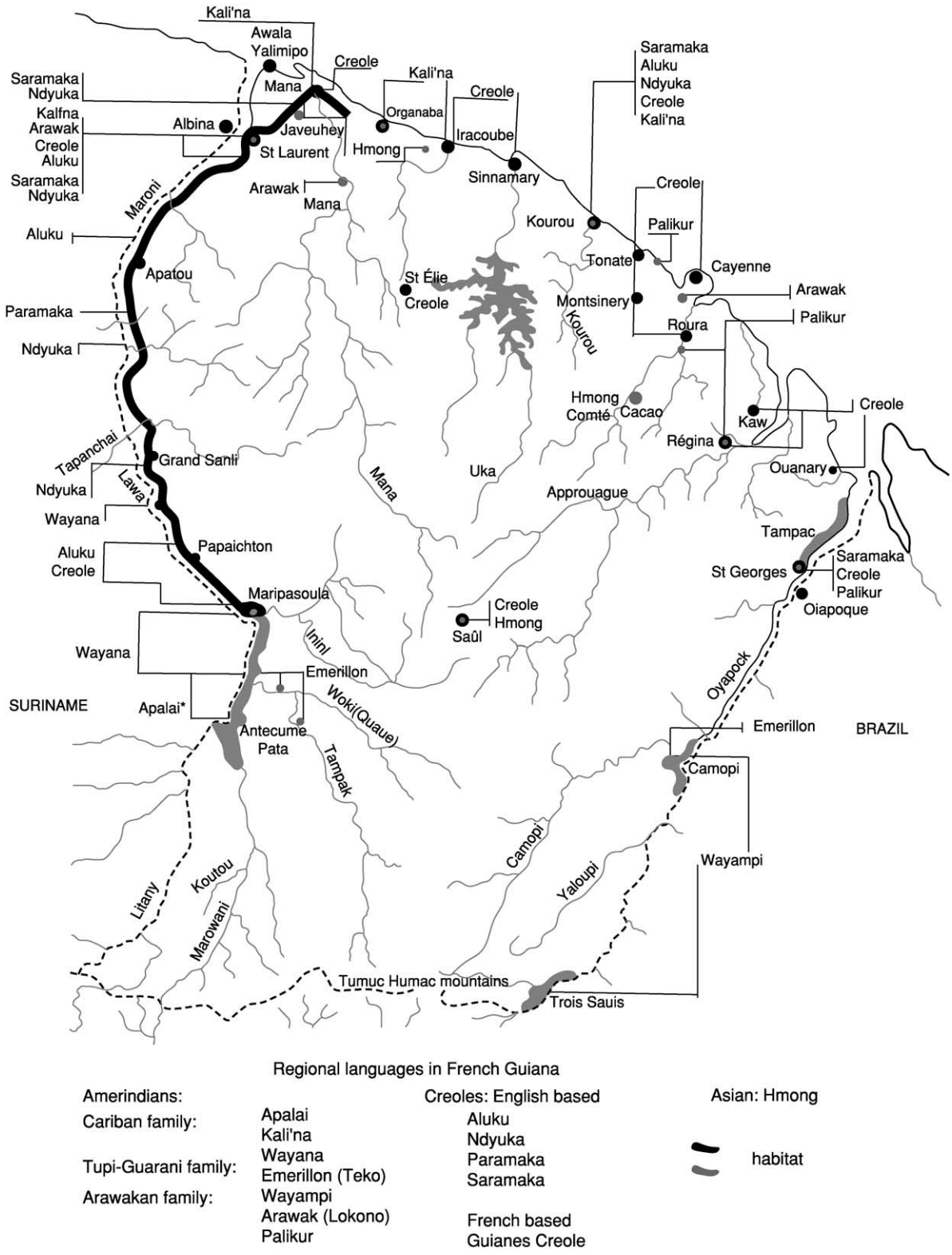

Figure 1 Regional languages in French Guiana. From Goury (2001).

Table 1 Linguistic families in the Amerindian languages

Linguistic family	*Language name*	*Other names*	*Location and population*
Arawak	Arawak	Lokono	600 people in French Guiana, 700 in Suriname, 5000 in Guyana (the most outnumbered group), and a few persons in Venezuela
	Palikur	Parikwaki, Ulukwa	1100 people in French Guiana and 1200 in Brazil
Cariban	Apalai	—	Less than 30 speakers in French Guiana and less than 200 in Brazil
	Kali'na	Caribe, Galibi, Karib	2700 speakers in French Guiana, 3000 in Suriname, 480 or more in Guyana, 12 000 in Venezuela, and 30 in Brazil
	Wayana	Formerly Roucouyen, Urukuyana	800 speakers in French Guiana, 200 in Brazil, and 500 in Suriname
Tupi-guarani	Emerillon	Teko	400 speakers in French Guiana
	Wayampi	—	1270 speakers in French Guiana (510 at Trois Saut and 770 at Camopi) and 686 scattered in 40 villages in Brazil

the Caribbean West Coast present many affinities and can be considered to be a homogeneous dialectal unity.

Palikur speakers refer to this language as Aukwayene, Pa'ikwene, or Parikwene. It originated from the Uaça area in Brazil and differs by only 100 words from kiaptunka, an extinct ceremonial language.

Cariban Family A few Apalaí families moved from Brazil to French Guiana in the late 1960s and again in the early 1990s and intermarried with the Wayana and Trió. The Apalaí language (Apalai: French/English writing, Aparai: Brazilian writing) contains important loanwords from Tupi-Guarani languages. It is not included in the official inventory of regional languages and is considered an endangered language. A Linguistic survey (descriptive and documentation) is needed.

The Kali'na group's name has been at the origin of the name of its linguistic family, Cariban. There is a dialect spoken on the Lower Maroni called Tilewuyu. There are several works on Kali'na sociolinguistics, and there is a Kali'na oral literature as well.

Wayana originated from Brazil. Its speakers have intermarried with other Cariban groups (Apalaí, Trió), as well as Tupi-Guarani ones (Emerillon, Wayampi). On the Brazilian side, a significant number of loanwords are taken from the Apalaí language.

Tupi-Guarani Family Emerillon is the only Amerindian language spoken exclusively in French territory and among the Wayampi (on the Camopi area) and Wayana (on the Maroni and Tampoc rivers). There are quite a few bilingual speakers of Wayana-Emerillon. Wayampi, Aluku, and French are also spoken in this area. Emerillon is an endangered language, and a survey of it is in progress.

Wayampi originated from the Xingu river (Amazon right bank) and was established on the Amapari, Araguari (Upper Ipitinga), and Upper Jari/Cuc rivers in the 18th century. Between 1967 and 1981, the speakers living near the Upper Jari/Cuc rivers scattered among other Wayampi and Wayana villages in Brazil, and in Oyapock in French Guiana. Intermariage occurred with speakers of Wayana and Emerillon. There are dialectal variants and various loanwords from Wayana, French (Creole), and Brazilian Portuguese.

The Hmong

The Hmong, living in French Guiana, established communities mainly in Cacao (1975) and in Javouhey (1977), where there are literacy classes in Hmong. White Hmong is the dominant dialect spoken in French Guiana. Originally from Laos, Hmong speakers lack a knowledge of French, which holds back their progress in school. A strong Laotian cultural heritage remains among the old people. Some Hmong speak Vietnamese.

Other Languages

Other Creole, Indo-European, and Sino-Tibetan languages are spoken in French Guiana, although the vehicular language of these communities remains Guianese Creole. Brazilian, Portuguese, and Haitian Creole are the immigrant languages most spoken. Most people living in French Guiana are bilingual.

Sranan Tongo language is a koïne language of Surinam spoken mainly as a lingua franca by the population on the French Guiana and Suriname border made up of Bushinengue, Indian, Creole, Javanese, and Chinese people. This English-based Creole has a significant Dutch lexicon, which had

been partially relexified toward Portuguese. Sranan is mutually intelligible with Ndyuka, but mutually unintelligible with Saramaccan.

There are a large number of speakers of French-based Creole in French Guiana. Antillean Creole is spoken by 7000 speakers from Antilles (Guadeloupe, Martinica) who live on the coastal areas around the main cities. It has an important literary tradition, and there are literature and linguistics written in Guadeloupean and Martiniccan. Haitian Creole is spoken by 30 000 Haitian emigrants who now live mainly in Cayenne neighborhoods. This French-based Creole is characterized by a merger of French structural and West African languages features. English Creole from Guyana and Creole from the island of St Lucia and from Reunion are also spoken.

Among Indo-European languages, Portuguese and Spanish are the most widely spoken in French Guiana. Officially, Portuguese is spoken by 15 000 Brazilians, but there may be as many as 30 000 speakers. Since 2002, Spanish has been spoken by the increasing number of South American immigrants, mainly Peruvians and Dominicans.

Asian languages are represented by Chinese, which is spoken by 3000 speakers in French Guiana and 6000 in Suriname. The community arrived at the end of the 19th century and beginning of the 20th century from southeastern and eastern China and was established in the main cities (coastal and countryside areas). Lao is spoken by 150 to 200 people living at Roura commune and in Kourou. Hmongs, emigrants from Laos, also speak Lao. Javanese and Vietnamese are also spoken.

Hindustani, Lebanese, and Dutch English are also spoken in French Guiana.

See also: Arawak Languages; Cariban Languages; Endangered Languages; Multilingualism: Pragmatic Aspects; Pidgins and Creoles: Overview; Tupian Languages.

Language Maps (Appendix 1): Map 60.

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French Polynesia: Language Situation

D T Tryon

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French Polynesia lies between 7° and 28° S latitude and 131° and 156° W. longitude. Its constituent parts are five archipelagos, namely, the Society Islands, the Tuamotus, the Marquesas, the Gambiers, and the Australs. It has a total population of 188 814 according to the 1988 census, the most recent (1992) complete census available for the archipelago. Within French Polynesia there are five indigenous Polynesia languages spoken, in addition to French, several Chinese dialects, predominantly Hakka, and to a lesser extent English.

The Polynesian languages spoken are Tahitian, Tuamotuan, Marquesan, Mangarevan (Mangareva), and Rapan (Rapa). Tahitian is the principal language of the region. It is spoken by 115 000 speakers, or almost 70% of the population, and is widely used and understood throughout French Polynesia. Tahitian is spoken principally in the Society Islands, with only minor dialect differences between the Windward and Leeward Islands. It is also spoken in the Austral Islands. Tuamotuan is spoken in most of the islands of the Tuamotu archipelago, a series of coral atolls to the northeast of the Society Islands. There are eight dialects of Tuamotuan, with some notable differences in vocabulary between distant atolls, for example, Napuka and Anaa. Tuamotuan has approximately 10 000 speakers. Marquesan is spoken in the Marquesas Islands, situated about 1200 km northeast of Tahiti, by some 7500 resident speakers in two rather marked dialects, one centered around Nuku Hiva in the northwest and the other around Hiva'Oa in the southeast. Mangarevan is spoken by no more than 620 Polynesians in the Gambier group of islands far to the southeast. Rapan is spoken on Rapa (pop. 480), some 1500 km south of Tahiti. There Tahitian has made considerable inroads, with few Rapan speakers remaining in the 1990s whose language is not heavily Tahitianized.

The official languages are French and Tahitian. Literacy is estimated at 95%. The languages of government/administration are French and Tahitian, as they are for broadcasting and television. The medium of education is mainly French, although Tahitian is also used in some schools at primary level. Marquesan is also taught in the Marquesas group. The main foreign language, apart from French, is English.

See also: French; Tahitian.

Language Maps (Appendix 1): Map 149.

French Southern Antarctic Lands: Language Situation

Editorial Team

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Situated in the southern sector of the Indian Ocean, the Southern Lands comprise two archipelagos, Iles Crozet and Iles Kerguelen, as well as two volcanic islands, Ile Amsterdam and Ile Saint-Paul. There is no indigenous population nor are there permanent settlements in the Southern Lands, which are used only for research concerned principally with meteorology and the local fauna. The Antarctic lands correspond to the Adelie Land, a thin strip of about 500 000 sq km in the Antarctic continent discovered and claimed

by the French in 1840. This last claim is, however, neither recognized nor denied by the Antarctic Treaty, which governs the whole of Antarctica. The French Southern and Antarctic Lands are an overseas territory of France and are administered from Paris. The approximately 150–200 researchers – the numbers vary between summer and winter – present in the Lands are mainly French speakers from France and Reunion Island. Vacant positions are advertised in French and research papers are also primarily published in French.

See also: Antarctica: Language Situation.

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French Lexicography

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The Beginnings

As in other European countries, French lexicography was at first bilingual. The first publication that can be considered a dictionary appeared in 1531 under the title *Dictionarium seu Latinae linguae Thesaurus . . . cum Gallica fere interpretatione* (i.e., an inventory of the Latin language with translations into French). Its author, the humanist Robert Estienne (otherwise known as Robertus Stephanus) (*see* **Stephanus, Robertus (ca. 1503–1559)**), was to reedit and expand his dictionary several times. In 1539 Estienne published an inversion of his dictionary under the title *Dictionaire françois-latin contenant les motz et les manieres de parler françois tournez en latin*. This French–Latin dictionary went through several editions, which, with the help of collaborators and later successors, were enlarged with more and more technical terms, regional vocabulary, and words used by great contemporary writers such as Du Bellay and Ronsard. Other items, such as definitions and etymologies, were added over the years. Whereas the fourth edition (1573) was still called *Dictionaire françois-latin*, the fifth edition (1606), compiled by Jean Nicot, was presented under the title *Thresor de la langue françoyse* and included some 18 000 entries. This dictionary constitutes the first description of the French lexicon. It was not a monolingual dictionary, however, as all comments were given in Latin. This type of dictionary is sometimes called 'faux bilingue.'

In the meantime other bilingual, and often multilingual, dictionaries had appeared. A. Calepino or Calepinus had published a dictionary with five languages in 1545 and one with ten languages (Latin, Greek, Hebrew, Italian, French, Spanish, German, English, Polish, and Hungarian) in 1585. The first bilingual dictionary with a 'modern' vernacular as target language was the *Dictionaire françois-flamand*, published in 1562 by G. Meurier. There were other bilingual dictionaries to follow for English (1567) by L. Harryson and Spanish (1575) by C. Oudin. A more complete French–English dictionary was compiled by R. Cotgrave on the basis of a recent edition of Nicot's *Thresor*. It appeared in 1611 under the title *A dictionarie of the French and English tongues* and covered about 40 000 items.

In 1635 Richelieu, cardinal and statesman under Louis XIII, founded the Académie Française, which had as its primary remit to work out 'des règles certaines à notre langue' (sure rules for our language). The list of works to be undertaken included, after a grammar, a rhetorics, and a poetics, a dictionary of the French language. This dictionary was to be published at the end of the century (1694). As the need for a good monolingual dictionary was felt by many, P. Richelet published his *Dictionnaire français* in 1680, while A. Furetière, member of the Académie but not satisfied with the work of his fellow Academicians, published his *Dictionnaire universel* in 1690. As the Académie Française had the monopoly of the first monolingual dictionary of French, both Richelet's and Furetière's dictionaries had to appear outside the country (in Switzerland and Holland, respectively).

Richelet's dictionary contained most of the characteristics of a modern monolingual dictionary: definitions, usage labels, examples, and quotations, and it described several registers, such as colloquial and vulgar, technical and regional terms, archaisms and neologisms. Like Furetière's dictionary, which was more extensive and contained encyclopedic elements, Richelet's dictionary was organized as an alphabetical list. The *Dictionnaire de l'Académie Françoise*, on the other hand, continued the older tradition of the Latin glossaries, which had an organization that was

essentially based on roots and necessitated many cross-references. This arrangement, which was much criticized, did not reappear in later editions. The lack of technical terms in the dictionary of the Academy was compensated for by the *Dictionnaire des arts et des sciences* published by another Academician, Th. Corneille, in 1694.

During the 18th century, the dictionary by Furetière, along with the *Dictionnaire de Trévoux* (1704), a new version of Furetière's dictionary compiled by the Jesuits of that town, was reedited several times, as was the case with a number of other dictionaries that had been compiled during the preceding century. The main new event of the 18th century was the publication, from 1751 to 1780, of the *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers* (35 vols) (*see* **Encyclopédie**). This major work by D. Diderot and J. Le Rond d'Alembert included almost 72 000 entries and comprised eleven volumes with thousands of illustrations. It firmly established one of the characteristics of French lexicography: the encyclopedic dictionary. One other dictionary should be mentioned, the *Dictionnaire critique de la langue française* (1787) of J.-F. Féraud, which constitutes one of the best and most systematic inventories of the language of the 18th century.

Maturity: Littré, Larousse, Robert

In the first half of the 19th century there was a tendency toward collection of the maximum number of entries, for example in the dictionary by P.-C. Boiste (first edition 1800, 14th edition 1857) or the *Dictionnaire national* by L.-N. Bescherelle (1843). Dictionaries of this type tend to include ever more words, including neologisms and archaisms (and even nonexistent words), as well as many appendices with lists of synonyms, homonyms, rhymes, and essays on versification or pronunciation. On the other hand there are abridged editions of existing dictionaries in which one finds large word lists with little information on the words presented. Both types of dictionaries can be seen as affected by the growing numbers of children attending school. Besides, there were dictionaries that foreshadowed the innovations that were to take place later in the history of French lexicography: Laveaux (1820) and Poitevin (1856) were firmly based on literary examples, Dochez (1859) presented etymologies and usage in a systematic way, and Lafaye (1858) and Boissière (1862) were the first dictionaries that enabled users not only to find the meaning of words but also to search for words for objects or concepts.

Real innovations were introduced by the three lexicographers mentioned in the heading of this section. Emile Littré and Pierre Larousse were contemporaries, but their dictionaries illustrate two fundamentally different directions in French lexicography.

Littré, who published his *Dictionnaire de la langue française* from 1863 to 1873 (4 vols), presented his description of the French language with some 250 000 quotations, mainly taken from the classical writers of the 17th century and with a marked neglect of more contemporary sources. He also took into account the growing body of knowledge about etymology and the history of the French language. Littré's dictionary is an excellent example of philological and historical lexicography. Because of the importance given to the use of the words, it is essentially a 'dictionnaire de langue'. As to the philological tradition, one should mention also the dictionary of Darmesteter and Hatzfeld (1890–1900), which goes systematically from the 'etymological or primitive sense' to the present-day meaning.

Pierre Larousse, who began his career as a schoolteacher, was much more interested in the modern use of the language. In his *Grand dictionnaire universel du XIXe siècle*, published from 1865 to 1890 (15 vols plus two supplements), he took advantage of the language of contemporary writers such as Victor Hugo or Emile Zola. But there is also a wealth of encyclopedic information: every entry has two sections, one devoted to the language and the other, which is often very long, to descriptions of the outside world. Larousse's dictionary exemplifies the other type of French lexical reference work called a 'dictionnaire de choses,' or encyclopedic dictionary.

About a century later, Paul Robert managed to create a new blend of a number of these characteristics. His *Dictionnaire alphabétique et analogique de la langue française* (1953–1964, 6 vols) is a 'dictionnaire de langue,' based as it is on an enormous collection of quotations, taken this time from a variety of contemporary sources, journalistic as well as literary, and from modern writers as well as classics. At the same time, as is announced in its title, it is an onomasiological dictionary that leads the user from known to unknown elements, thanks to a system of analogical cross-references. It was the first general dictionary to introduce such a system.

After the publication of the Robert, the focus on the language itself, which had been somewhat neglected since Littré (finished in 1873 and never updated), was taken up by others. The *Grand Larousse de la langue française* (1971–1978, 7 vols) should be mentioned in this context, as well as two dictionaries by the linguist Jean Dubois: the *Dictionnaire du français contemporain* (1966) and the *Lexis* (1975), which presented different uses of the same

form as homonyms and grouped derivatives under a single base form. A project that was financed by the French government and managed by Paul Imbs and Bernard Quemada was the *Trésor de la langue française* or TLF (1971–1994, 16 vols). For this project, which was the first to use new technologies on a large scale, extensive literary sources, from the Revolution until about 1960, as well as a minority of technical and scientific texts, were perused.

This survey would not be complete without mentioning the *Dictionnaire explicatif et combinatoire* or DEC (1984–2000) by I. Mel'čuk and his collaborators in Montréal, Canada. Up to now four volumes with several hundred lexical items have been published. This project introduced a system of explicit definitions, exhaustive syntactic descriptions of every individual 'lexème', and a limited list of 'lexical functions', such as *Magn* for the class of intensifiers or *Incep* for expressions that indicate the beginning of a process.

The State of the Art

At the beginning of the 21st century, the lexicographic landscape for French is rich and varied, although there are also gaps and deficiencies. For instance, there is no dictionary describing the collocations of French, and for synonyms there are only dictionaries presenting lists of forms, no commented inventories of words having similar meanings, with the recent exception of the *Dictionnaire des synonymes* of Larousse (1992, 2003).

The market for general one-volume dictionaries is dominated by the *Petit Larousse* (first edition, 2005), a 'dictionnaire de choses', and the *Petit Robert* (first edition, 1967), a 'dictionnaire de langue.' Both are issued annually in an updated version, the *Petit Larousse* for more than a century now. Next to the *Petit Robert*, there is the *Petit Robert des noms propres* or PR2 (first edition, 1974), which treats one type of encyclopedic information. The *Dictionnaire Hachette* contains every year a list of neologisms awaiting definitive integration in the dictionary.

Although most dictionaries belong to the didactic type of texts, some are explicitly meant for special groups of speakers. Features such as defining style, the use of illustrations, and the choice of words to be treated bring the *Robert junior* (1993), the *Dictionnaire Hachette Benjamin* (1996), the *Larousse du collège* (1995) and other dictionaries published by Nathan more into the reach of young speakers of French.

In the field of dictionaries for native speakers of other languages, the *Dictionnaire du français. Référence. Apprentissage* (1999), for a number of reasons, does not meet the needs of potential users nor the standards set by the learners' dictionaries for English. The same goes for the *Dictionnaire du français usuel* (2002), which was compiled for use by native speakers of French as well as for nonnative speakers. On the other hand, the *Robert & Collins junior bilingue* (2002) by M. Back is an excellent though limited dictionary for young French learners of English at the elementary stage. The *Dictionnaire d'apprentissage du français des affaires* (2000), by a group of Belgian teachers, is very interesting and innovative in the use of a sound corpus, the introduction of an explicit defining style inspired by the Dictionnaire explicatif et combinatoire, and the systematic treatment of collocations.

As for French outside France, it has been studied in recent decades and turns up more and more frequently in general dictionaries, especially in the *Robert*. But dictionaries devoted to these varieties have been published also: French in North America (among others Bergeron, 1980; Auger *et al.,* 1988; Boulanger, 1992; Meney, 1999), in Africa (AUPELF, 1981, 1995, 1998), or in Europe (Knecht, 1997, 2000 for Switzerland), as well as a dictionary of regionalisms (Rézeau, 2001).

For the history of the French lexicon there is always the monumental *Französisch etymologisches Wörterbuch* (1921, 25 vols) by W. von Wartburg. As a complement to this exhaustive dictionary, one can find a lively description of the evolution of French words in A. Rey's *Dictionnaire historique de la langue française* (1992, 2 vols).

Popular varieties of French are described in the *Dictionnaire du français non conventionnel* by J. Cellard and A. Rey, and an inventory of recent words can be found in the *Dictionnaire des mots contemporains* by P. Gilbert. Both date from 1980 and have not had any successors since then, although *Le dico du sport* and *Le dico de la violence* by A. Doillon (2002) partially fill this gap.

Bilingual dictionaries with French as one of the languages exist for all more important languages as well as for many lesser-known languages. The best ones seem to be those that are compiled in collaboration with publishing houses in other countries, such as the *Robert & Collins* and the *Oxford Hachette* series of English–French French–English dictionaries. Unfortunately, the vast majority of these dictionaries, even those for the biggest market (English and French) are bidirectional, trying to serve in a single volume native speakers of both languages. There exist some specialized bilingual dictionaries such as the *Robert & Collins du management* (1992).

Most general monolingual and bilingual dictionaries are now available in electronic form, in most cases as CD-ROMs or DVD-ROMs. These are all conversions of existing paper dictionaries. A growing

number of important dictionaries are available online. This is, for instance, the case for the TLF and the *Dictionnaire de Trévoux*. Other historical dictionaries, such as Nicot's *Thresor*, the 18th-century *Encyclopédie*, the *Dictionnaire de l'Académie*, or the *Grand dictionnaire universel* of Pierre Larousse, are published as CD-ROMs by the publishers Redon and H. Champion. The only corpus of texts that is available for research or for other purposes is Frantext, the somewhat outdated and mainly literary corpus that has been compiled in the context of the TLF.

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French Polynesia: Language Situation

D T Tryon

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French Polynesia lies between 7° and 28° S latitude and 131° and 156° W. longitude. Its constituent parts are five archipelagos, namely, the Society Islands, the Tuamotus, the Marquesas, the Gambiers, and the Australs. It has a total population of 188 814 according to the 1988 census, the most recent (1992) complete census available for the archipelago. Within French Polynesia there are five indigenous Polynesia languages spoken, in addition to French, several Chinese dialects, predominantly Hakka, and to a lesser extent English.

The Polynesian languages spoken are Tahitian, Tuamotuan, Marquesan, Mangarevan (Mangareva), and Rapan (Rapa). Tahitian is the principal language of the region. It is spoken by 115 000 speakers, or almost 70% of the population, and is widely used and understood throughout French Polynesia. Tahitian is spoken principally in the Society Islands, with only minor dialect differences between the Windward and Leeward Islands. It is also spoken in the Austral Islands. Tuamotuan is spoken in most of the islands of the Tuamotu archipelago, a series of coral atolls to the northeast of the Society Islands. There are eight dialects of Tuamotuan, with some notable differences in vocabulary between distant atolls, for example, Napuka and Anaa. Tuamotuan has approximately 10 000 speakers. Marquesan is spoken in the Marquesas Islands, situated about 1200 km northeast of Tahiti, by some 7500 resident speakers in two rather marked dialects, one centered around Nuku Hiva in the northwest and the other around Hiva'Oa in the southeast. Mangarevan is spoken by no more than 620 Polynesians in the Gambier group of islands far to the southeast. Rapan is spoken on Rapa (pop. 480), some 1500 km south of Tahiti. There Tahitian has made considerable inroads, with few Rapan speakers remaining in the 1990s whose language is not heavily Tahitianized.

The official languages are French and Tahitian. Literacy is estimated at 95%. The languages of government/administration are French and Tahitian, as they are for broadcasting and television. The medium of education is mainly French, although Tahitian is also used in some schools at primary level. Marquesan is also taught in the Marquesas group. The main foreign language, apart from French, is English.

See also: French; Tahitian.

Language Maps (Appendix 1): Map 149.

French Southern Antarctic Lands: Language Situation

Editorial Team

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Situated in the southern sector of the Indian Ocean, the Southern Lands comprise two archipelagos, Iles Crozet and Iles Kerguelen, as well as two volcanic islands, Ile Amsterdam and Ile Saint-Paul. There is no indigenous population nor are there permanent settlements in the Southern Lands, which are used only for research concerned principally with meteorology and the local fauna. The Antarctic lands correspond to the Adelie Land, a thin strip of about 500 000 sq km in the Antarctic continent discovered and claimed

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by the French in 1840. This last claim is, however, neither recognized nor denied by the Antarctic Treaty, which governs the whole of Antarctica. The French Southern and Antarctic Lands are an overseas territory of France and are administered from Paris. The approximately 150–200 researchers – the numbers vary between summer and winter – present in the Lands are mainly French speakers from France and Reunion Island. Vacant positions are advertised in French and research papers are also primarily published in French.

See also: Antarctica: Language Situation.

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French Lexicography

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The Beginnings

As in other European countries, French lexicography was at first bilingual. The first publication that can be considered a dictionary appeared in 1531 under the title *Dictionarium seu Latinae linguae Thesaurus . . . cum Gallica fere interpretatione* (i.e., an inventory of the Latin language with translations into French). Its author, the humanist Robert Estienne (otherwise known as Robertus Stephanus) (*see* **Stephanus, Robertus (ca. 1503–1559)**), was to reedit and expand his dictionary several times. In 1539 Estienne published an inversion of his dictionary under the title *Dictionaire françois-latin contenant les motz et les manieres de parler françois tournez en latin*. This French–Latin dictionary went through several editions, which, with the help of collaborators and later successors, were enlarged with more and more technical terms, regional vocabulary, and words used by great contemporary writers such as Du Bellay and Ronsard. Other items, such as definitions and etymologies, were added over the years. Whereas the fourth edition (1573) was still called *Dictionaire françois-latin*, the fifth edition (1606), compiled by Jean Nicot, was presented under the title *Thresor de la langue françoyse* and included some 18 000 entries. This dictionary constitutes the first description of the French lexicon. It was not a monolingual dictionary, however, as all comments were given in Latin. This type of dictionary is sometimes called 'faux bilingue.'

In the meantime other bilingual, and often multilingual, dictionaries had appeared. A. Calepino or Calepinus had published a dictionary with five languages in 1545 and one with ten languages (Latin, Greek, Hebrew, Italian, French, Spanish, German, English, Polish, and Hungarian) in 1585. The first bilingual dictionary with a 'modern' vernacular as target language was the *Dictionaire françois-flamand*, published in 1562 by G. Meurier. There were other bilingual dictionaries to follow for English (1567) by L. Harryson and Spanish (1575) by C. Oudin. A more complete French–English dictionary was compiled by R. Cotgrave on the basis of a recent edition of Nicot's *Thresor*. It appeared in 1611 under the title *A dictionarie of the French and English tongues* and covered about 40 000 items.

In 1635 Richelieu, cardinal and statesman under Louis XIII, founded the Académie Française, which had as its primary remit to work out 'des règles certaines à notre langue' (sure rules for our language). The list of works to be undertaken included, after a grammar, a rhetorics, and a poetics, a dictionary of the French language. This dictionary was to be published at the end of the century (1694). As the need for a good monolingual dictionary was felt by many, P. Richelet published his *Dictionnaire français* in 1680, while A. Furetière, member of the Académie but not satisfied with the work of his fellow Academicians, published his *Dictionnaire universel* in 1690. As the Académie Française had the monopoly of the first monolingual dictionary of French, both Richelet's and Furetière's dictionaries had to appear outside the country (in Switzerland and Holland, respectively).

Richelet's dictionary contained most of the characteristics of a modern monolingual dictionary: definitions, usage labels, examples, and quotations, and it described several registers, such as colloquial and vulgar, technical and regional terms, archaisms and neologisms. Like Furetière's dictionary, which was more extensive and contained encyclopedic elements, Richelet's dictionary was organized as an alphabetical list. The *Dictionnaire de l'Académie Françoise*, on the other hand, continued the older tradition of the Latin glossaries, which had an organization that was

number of important dictionaries are available online. This is, for instance, the case for the TLF and the *Dictionnaire de Trévoux*. Other historical dictionaries, such as Nicot's *Thresor*, the 18th-century *Encyclopédie*, the *Dictionnaire de l'Académie,* or the *Grand dictionnaire universel* of Pierre Larousse, are published as CD-ROMs by the publishers Redon and H. Champion. The only corpus of texts that is available for research or for other purposes is Frantext, the somewhat outdated and mainly literary corpus that has been compiled in the context of the TLF.

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the emergence of the unconscious in conscious life. The forgetting of names, *parapraxias* such as slips of the tongue, mistakes in reading and writing, omitted acts, and other forms of resurgence into social reality of what has been suppressed do not happen by chance; they are strictly determined by psychical forces (Timpanaro, 1976). *Jokes and their relation to the unconscious*, written in 1905 (Freud, 1953–1974, vol. 8) made it clear that most creations of our mind are nothing but psychology that is projected outside, and it is the task of psychoanalysis to retranslate imaginary constructs into metapsychology.

Freud's discoveries not only provided an extension of the uses to which the various languages might be put; they also suggested a range and a new reordering of symbolism that could be applied in various ways to literature. *The relation of the poet to day-dreaming*, written in 1908 (Freud, 1953–1974, vol. 4) made the point that the unconscious, which is the underworld into which rejected wishes and thoughts are cast, surrounds the conscious life of man and apparently influences and colors it at every point. The artist's creations, works of art, were the imaginary gratifications of unconscious wishes, just as dreams are, and like them they were in the nature of compromises, since they too were forced to avoid any open conflict with the forces of repression.

The question of the logical status of psychoanalytic theories has dominated philosophical debates about Freud (Levy, 1996). Freud recognized the distinction between the verbal claim that the terms 'mental' and 'conscious' are interchangeable and the factual claim that mental phenomena are in every instance conscious. However, his denial that there are mental occurrences from which the unconscious is absent seems indeed to cut off any theoretical falsification. Wittgenstein made the point that psychoanalysis imposes interpretations, rather than unfolding them as it claims. For him, psychoanalytic interpretation involves a predetermined explanation imposed on a mental state that reduces it to something familiar and common where, nevertheless, the assent or non-assent of the patient is supposed to be normative. Psychoanalysis becomes then a kind of religion, one that does not even realize that that is what it is (Wittgenstein, 1966). On Freud's behalf, one can note, however, that not even an empty wrangle over words is empty of unconscious motivation that needs to be brought to life. To agree with the stipulation that 'mental life' must not be stretched beyond the range of application of the word 'conscious' means to silence psychoanalysis (Lazerowitz, 1977).

See also: Psychoanalysis and Language; Wittgenstein, Ludwig Josef Johann (1889–1951).

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Fries, Charles Carpenter (1887–1967)

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Fries was born in Reading, Pennsylvania. He received an A.B. from Bucknell University in 1909, briefly attended the Divinity School at the University of Chicago, and then returned to Bucknell, where he received an M.A in Classics. He taught there until 1920. He then obtained a Ph.D. from the University of Michigan in 1922, and taught there until his retirement in 1958.

Teaching English, both to native and to non-native speakers, was central to his life's work. In addition to addressing English teaching directly (1927, 1945) and attempting to interpret linguistics for English teachers (1955, 1961), he produced not one but two descriptive treatments of informal American usage, each based on a large corpus of data. The first (1940) used letters sent to a U.S. government agency; the second (1952) used a large number of recorded telephone calls. In the best tradition of American descriptive linguistics, he chose to gather data from popular rather than elite usage. In his analysis, he

the emergence of the unconscious in conscious life. The forgetting of names, *parapraxias* such as slips of the tongue, mistakes in reading and writing, omitted acts, and other forms of resurgence into social reality of what has been suppressed do not happen by chance; they are strictly determined by psychical forces (Timpanaro, 1976). *Jokes and their relation to the unconscious*, written in 1905 (Freud, 1953–1974, vol. 8) made it clear that most creations of our mind are nothing but psychology that is projected outside, and it is the task of psychoanalysis to retranslate imaginary constructs into metapsychology.

Freud's discoveries not only provided an extension of the uses to which the various languages might be put; they also suggested a range and a new reordering of symbolism that could be applied in various ways to literature. *The relation of the poet to day-dreaming*, written in 1908 (Freud, 1953–1974, vol. 4) made the point that the unconscious, which is the underworld into which rejected wishes and thoughts are cast, surrounds the conscious life of man and apparently influences and colors it at every point. The artist's creations, works of art, were the imaginary gratifications of unconscious wishes, just as dreams are, and like them they were in the nature of compromises, since they too were forced to avoid any open conflict with the forces of repression.

The question of the logical status of psychoanalytic theories has dominated philosophical debates about Freud (Levy, 1996). Freud recognized the distinction between the verbal claim that the terms 'mental' and 'conscious' are interchangeable and the factual claim that mental phenomena are in every instance conscious. However, his denial that there are mental occurrences from which the unconscious is absent seems indeed to cut off any theoretical falsification. Wittgenstein made the point that psychoanalysis imposes interpretations, rather than unfolding them as it claims. For him, psychoanalytic interpretation involves a predetermined explanation imposed on a mental state that reduces it to something familiar and common where, nevertheless, the assent or non-assent of the patient is supposed to be normative. Psychoanalysis becomes then a kind of religion, one that does not even realize that that is what it is (Wittgenstein, 1966). On Freud's behalf, one can note, however, that not even an empty wrangle over words is empty of unconscious motivation that needs to be brought to life. To agree with the stipulation that 'mental life' must not be stretched beyond the range of application of the word 'conscious' means to silence psychoanalysis (Lazerowitz, 1977).

See also: Psychoanalysis and Language; Wittgenstein, Ludwig Josef Johann (1889–1951).

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To some linguists, his theoretical position and linguistic target seemed loosely defined. He was primarily interested not in formal analysis aimed at other linguists, but rather in speakers' reactions to what they heard, in each hearer's understanding of the verbal signal – results that would be helpful in teaching English. His research showed that indeterminacy and imperfect communication were normal phenomena; however, academic linguistics was not ready to digest the implications of such findings. Similarly, to many in the literary arm of the English professoriat, such a theory and such data must have seemed wrongly conceived: vernacular English presented in nontraditional terms and categories was of no interest in literary studies. Consequently, Fries was inaccurately branded. Some theory-oriented linguists saw him as too involved in applied work; the literary English faculty viewed him, as they did many other linguists, as a 'behaviorist,' a tag that was even less appropriate for him than for many others. However, ESL teachers all over the world have appreciated and honored him for decades.

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Theodor Frings was born in Dülken, a small town of the lower Rhine area near Mönchen-Gladbach, as the son of a bookbinder. He studied 'Germanistics' and 'Romanistics' in Marburg, a combination decisive for his further fundamental research. He received his doctor's degree from the University of Marburg in 1911; his thesis dealt with the lower Rhine dialects. In Bonn, he qualified as a university lecturer ('Habilitation') with a book on the Rhenish accent, in 1915. First, he was associate professor of Dutch and Low German language and literature at the University of Bonn, then, at the same university, full professor of German philology with respect to the Dutch, Low German, and Rhenish languages. In the years 1927–1957, he was full professor of German language and literature at the University of Leipzig.

The dynamics of language in history was the major field of interest to Theodor Frings. In teaching and studying, this was his practice. German as a language had to be contrasted with neighboring languages, in the West with Dutch (e.g., Frings, 1944, 1948, 1956) and French (e.g., Frings, 1932, 1939, 1956), and in the East with Slavic languages (e.g., Frings, 1936 and many doctoral theses initiated by Frings, among them those on East German onomastics). The idea to have all East German dialect areas described led to a great number of monographs coming from his students.

In the Rhineland, the territories of the late Middle Ages were responsible for dialect boundaries. This was 'history' as a factor. That the state frontiers were barriers of communication was not further discussed. Frings accumulated examples of a transfer of the vocabulary from Romance languages into German; he even managed to show the 'streets' that the loanwords took to intrude into German, e.g., of *Presse* 'winepress'. But to characterize these events, a precise terminology was lacking if compared with Hugo Schuchardt or, later on, Uriel Weinreich.

To Frings, the explanation of language change was the 'external' history. Sound changes (e.g., Frings, 1939) and loan words (e.g., Frings, 1932, 1956) were explained this way. The basis of the (later on) standard German language as described by Frings was scientifically well accepted: the regional basis is east Germany (Thuringia, Saxony, Silesia). Also, the external history there was the reason for the linguistic results: settlers from three German dialect areas came to the east; by dialect mixture, they ended up

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Frisian: Etymology

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Akademy, founded in 1938, set as its main goal the compilation of a large-scale dictionary after the model of the *Woordenboek der Nederlandsche Taal* (*WNT*). The first volume of the *Wurdboek fan de Fryske Taal* (*WFT*) appeared in 1984. 19 out of 26 planned volumes have followed, and completion is scheduled for 2008. Its scope is more modest than the *WNT*. The *WFT* describes the vocabulary between 1800 and 1975, definitions are in Dutch, pronunciation is given in a slightly adapted IPA, important dialect variants are signaled, and ample citations with sources are provided for each entry. However, the *WFT* gives little etymological information. Other Akademy products are two good concise dictionaries: Frisian–Dutch (Zantema, 1984) and Dutch–Frisian (Visser, 1985). All lexicographical work at the Fryske Akademy has been computerized. A spin-off of Zantema (1984) is a word index in reverse order by Dykstra *et al*. (1992). Jørgensen and Hoekema (1968) is a West Frisian–Danish / Danish–West Frisian pocket dictionary. Dykstra (2000) is a fairly comprehensive West Frisian–English dictionary, also providing a concise English–Frisian word list and grammar of Frisian in English. Fort (1980) is a dictionary with grammar of Saterlandic in German (without pronunciation). Kramer (1992–) is compiling a large-scale trilingual East Frisian dictionary (definitions in West Frisian, English, and German) with pictures (and pronunciation in IPA). The center for the lexicography of North Frisian is the Nordfriesische Wörterbuchstelle at the University of Kiel. The great diversity of the North Frisian dialects together with the relatively few speakers of each dialect has seriously impeded lexicographical work. Yet most dialects have received dictionaries since the late 19th century. Some recent dictionaries include Sjölin (1994), for the Wiedingeharde dialect, and Sjölin *et al*. (2002), for the Mooring dialect, both Mainland); *Fering-Öömrang Wurdenbuk/ Wörterbuch der friesischen Mundart von Föhr und Amrum* (Anon. 2002) is a good concise tool for the insular dialects of Föhr and Amrum. Although for many years a comprehensive dictionary for all the North Frisian dialects has been in preparation, it seems unlikely that such a work will be completed in the foreseeable future.

Despite the advances in the various branches of Frisian studies, the situation is still far from ideal, which also unfortunately mars our understanding of, for instance, the word geography and etymology of (West) Germanic, to which Frisian has much to contribute because of its relatively isolated position and linguistic conservatism.

See also: Frisian: Etymology; Netherlands: Language Situation.

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The above survey discusses only the most important and the most recent works. For more detailed information on minor dictionaries, glossaries, and secondary literature, see Claes *et al*. on all (1984), Bremmer on Old Frisian (1992: Sect. 5.1; 2001), Wilts on North Frisian (2001), and Dykstra on West Frisian (2001). For Frisian studies in general, see Munske (2001).

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http://www.fa.knaw.nl – Fryske Akademy, lemmatized database of Middle Frisian texts.

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New philological interest in Frisian came with the Romantic movement. Rasmus Rask (*see* **Rask, Rasmus Kristian (1787–1832)**) and Jacob Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**) gave full recognition to Frisian in their explorations of Germanic. Joseph Bosworth, author of the *Dictionary of the Anglo-Saxon language* (1838) exerted himself to get as much Frisian in it as possible (Stanley, 1990). Karl von Richthofen's dictionary of 1840, through its inclusion of Germanic cognates, was a major step toward the etymology of the earliest phases of Frisian. Ferdinand Holthausen's *Altfriesisches Wörterbuch* (1925) consistently provided etymological information by including cognates for each entry, occasionally adding bibliographical information. Unfortunately, Hofmann's revision of this dictionary did not extend to updating the etymological component. Exceptional are the concordantial glossaries compiled by Buma (1949) for his editions in the series *Oudfries(ch)e taal- en rechtsbronnen*, notably *Die brokmer rechtshandschriften*, which he provided with extensive etymologies. Ahlsson (1960) presented a full survey of the abstract nouns with their derivations. Lendinara (1999) did much to make good the neglect of Old Frisian in 20th-century lexicographic works, such as J. Pokorny's *Indogermanisches etymologisches Wörterbuch* (1959) and W. Lehmann's *Gothic etymological dictionary* (1986). Faltings (1996) compensated somewhat for the relative neglect of Frisian in Heidermann's etymological dictionary of Germanic primary adjectives. For his Old Frisian data, Orel (2003) relied on the Holthausen dictionary, thus partly recycling wrong or outdated information (see Bremmer, 2005). A recent online etymological dictionary, based on the First Riustring Manuscript only, is Boutkan (2004–).

The etymology of Middle Frisian (1550–1800) fares even worse, mainly because it has not yet been described lexicographically. Good explorations are Brandsma (1936), an exhaustive study of the verbs in the works of the Renaissance poet Gysbert Japix (1603–1666), providing etymologies for each verb, and Van der Kuip (2003), for a study of the lexicon of the *Burmania proverbs* (ca. 1610). Many obscure words from this period have been etymologized by Buma in a series of word studies called 'Wurdsneuperijen,' most of them published in *Us Wurk*.

For Modern Frisian the situation is far from ideal. Buma (1969) announced an etymological dictionary, and included as a sample the entries for 'A'. The *Wurdboek fan de Fryske Taal* (Van der Veen, 1984–), whenever possible, refers to the Dutch cognate, enabling the reader to find the etymology in Dutch dictionaries. For words lacking such cognates, reference is given to relevant studies, if any. The only fully etymologized dialect of Western Frisian is that of the island of Schiermonnikoog (Frisian Skiermûntseach) (Spenter, 1968). Hoekema (1979) is a Frisian word index on Spenter's work, thus supplying a key to the etymology of numerous Standard Frisian words. Van der Veen (1993) surveyed the many steps to be taken before an adequate etymological dictionary of Western Frisian can be written.

For Eastern Frisian and Northern Frisian there are no etymological dictionaries. Useful information can be found in the studies of Löfstedt (e.g., 1963–1969), Faltings (1993), and Århammar (e.g., 1988).

The relative importance of Frisian in a wider Indo-European context was pointed out by Århammar (1972–1973). Bremmer (1988, 1992) showed the significance of Frisian for the etymology of English and Dutch, respectively. Wollmann (1990) and Dekker (2000) demonstrated the relevance of Frisian for the recovery of the early Latin loans into Germanic and rebuked the arbitrariness with which etymologists of the major Germanic languages have hitherto treated Frisian.

See also: Frisian Lexicography; Grimm, Jacob Ludwig Carl (1785–1863); Junius (Francisci Filius), Franciscus (1591–1677); Kiel/Kiliaan, Cornelis van (1530–1607); Rask, Rasmus Kristian (1787–1832).

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Frisian Lexicography

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In modern times Frisian never attained the status of a national language. On the contrary, for centuries it has been a minority language in the Netherlands, Germany, and, until the 1860s, Denmark. The social status of Frisian is reflected in the still inadequate state of its lexicography.

Frisian is divided into West Frisian, spoken in the Dutch province of Fryslân (ca. 470 000 speakers), East Frisian, spoken only in Saterland, Niedersachsen (*ca.* 1500 speakers), and North Frisian – both Insular and mainland – spoken in Schleswig-Holstein (*ca.* 10 000 speakers). West Frisian is the most fully developed branch, while the other two are restricted to mainly agrarian communities. The traditional periodization, especially for West Frisian, is Old (1200–1550), Middle (1550–1800), and Modern (1800–).

Old Frisian

The lexicography of Frisian began with its historical stages. In 1786, Tileman Wiarda (1746–1826), a lawyer, published a dictionary of Old Frisian, based on a limited number of texts. Far more exhaustive, and still useful today, was Karl von Richthofen's *Altfriesisches Wörterbuch* (1840), based on his *Friesische Rechtsquellen* (1840), an edition of practically all then known Old Frisian texts. Von Richthofen (1811–1888), a legal historian and pupil of Jacob Grimm (see Grimm, Jacob Ludwig Carl (1785–1863)), arranged his dictionary alphabetically, entering compounds under the simple form. Through the contextual illustration of words, dictionaries of comparable languages such as J. Bosworth's *Dictionary of the Anglo-Saxon Language* (1838) and E. G. Graff's *Althochdeutscher Sprachschatz* (1834–1846) excelled in clarity of presentation. Willem L. van Helten (1907) supplied important corrections and additions to von Richthofen's work. These were incorporated in the work of Ferdinand Holthausen (1925), a glossary rather than a dictionary, and corrected and improved by Dietrich Hofmann (1985). At his death (1998), Hofmann left behind an almost complete new concise dictionary of Old Frisian, which is now being prepared for publication at the University of Kiel. The Fryske Akademy, in cooperation with the Frisian Institute (University of Groningen), is working on a large-scale comprehensive Old Frisian dictionary, completion of which is scheduled for ca. 2015. An important tool for Old West Frisian is Buma's (1996) concordance-based dictionary.

Middle Frisian

Middle West Frisian, above all influenced by the Renaissance poet Gysbert Japix (1603–1666), was first surveyed (in Dutch) by Ecco Epkema (1754–1832), a classical philologist, in 1824. Although individual glossaries have appeared since then, most recently Van der Kuip (2003), a comprehensive dictionary is still wanting. However, all known texts have been stored in a database and lemmatized. This material is accessible at the Fryske Akademy and is being used for a hardcopy dictionary, to appear ca. 2008. The scanty remains of Middle East Frisian have not been assembled yet, but can be found for the greater part in König (1911), Möllencamp (1968), and Remmers (1993). Written tradition started only in the 19th century for the North Frisian dialects, with a few exceptions. Holthausen (1921) edited one of the extant 18th-century handwritten glossaries.

Modern Frisian

A milestone in the emancipation and standardization of Modern West Frisian was reached with Waling Dijkstra, whose dictionary (1896–1914) gave an adequate inventory of the Frisian vocabulary, with definitions in Dutch and frequent illustrations and citations. Dijkstra (1821–1914), a bookseller and prolific popular writer, was able to incorporate into his dictionary both the published and unpublished lexicographical work of the great philologist Joost Hiddes Halbertsma (1789–1869). The Fryske

species, the male first changes some characteristics of its advertisement call before switching to a second kind of vocalization, the aggressive call or encounter call (Wells, 1977). In comparison to advertisement calls, aggressive calls are much less stereotyped, and variation in such properties as call duration and rate of calling may even be correlated with the probability that the encounter will escalate to a physical fight (Figure 2; Grafe, 1995). Males of some species produce complex calls that have two or more distinct elements. Experiments show that one part is directed toward females and the other toward potential rivals. Because females of most species that have been tested strongly prefer advertisement calls to aggressive calls (see the review in Gerhardt and Huber, 2002), these compound calls have the advantage of retaining their attractiveness to females while providing what is perhaps a stronger warning to rivals than the advertisement call alone.

After physical contact, the identification of gender and sexual receptivity is mediated by release calls. Males are notoriously indiscriminate in trying to clasp and mate with other frogs of comparable size that move near them in a breeding aggregation. Males that are clasped produce release calls, which often have an acoustic structure similar to that of aggressive calls. Unreceptive females – those that are not yet ready to lay eggs or that have already mated – also give release calls, which have a structure similar to that of male release calls. Distress calls may also be produced by individuals of both genders when they are captured by a predator. Unlike all other signals in the repertoire, these calls are made with the mouth open. Distress calls may startle the predator and allow the frog to escape.

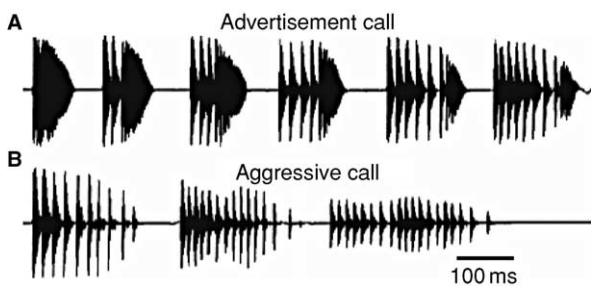

Figure 2 Oscillograms of a graded series of calls produced by an African tree frog (*Hyperolius marmoratus*). The first call in the series (left, A) is produced when males are calling in relative isolation and would be considered the advertisement call. In vocal interactions, males add increasing numbers of cycles of modulation (pulsing) and increase call duration as the level of aggression escalates. The last two or three calls could be considered aggressive calls (B), which might be produced as an immediate response to a strong threat. Reproduced with permission from Gerhardt and Huber (their Figure 9.3A), originally adapted from Grafe (1995, Figure 4).

Mechanisms of Call Production

Most species of frogs and toads use pressurized air from the lungs to excite vibration of the vocal cords, which are situated in the larynx. These vibrations are then radiated from specialized vocal sacs, which inflate during each call and which in a few species may serve as secondary visual cues. The vocal sac does not add energy to the sound but acts as an impedance-matching device that increases the efficiency of radiation. That is, sound – and especially low frequencies with long wavelengths – radiates more effectively from the large surface of the vocal sac than from the relatively tiny membranes that constitute the vocal cords. Species without vocal sacs can nevertheless produce reasonably loud calls. Species with long-duration calls can shuttle air back and forth from the lungs to the vocal sac without having to inhale again. In a few species, sound is produced during inspiration, and there is strong evidence that in the bullfrog (*Rana catesbeiana*), sound is efficiently radiated by the large external eardrums of the male (Purge, 1997). Specialized mechanisms of calling have also been described in highly aquatic species such as pipids and South African clawed frogs, which call while submerged.

The frequency content of the call is determined mainly by the physical properties (size, stiffness, tension, mode of vibration) of the vocal cords. In signals with a broadband spectrum (e.g., Figure 1B, 1D) the vocal cords can selectively resonate and hence 'color' the frequency content of the final output. The temporal properties of the call are shaped by active or passive modulation. In active modulation, one sound is produced for each contraction of the body wall musculature that forces air from the lungs. In passive modulation, the airflow from the lungs is continuous, but the airstream is pulsed, because the larynx acts as a pressure-sensitive relaxation oscillator. That is, the larynx is held closed by muscle tension, but air forces it open periodically, at which time the vocal cords are excited in vibration. In some species, calls are produced by both active and passive modulation. The temporal properties of the calls of these heterothermic animals are almost always temperature dependent, and female preferences are affected by temperature in a parallel fashion – a phenomenon termed *temperature coupling* (Gerhardt, 1978b).

Vocal Development and Learning

In most frogs and toads, there is no parental care. Moreover, young frogs typically metamorphose from tadpoles after males of their own species are no longer present or calling. Thus, a juvenile frog is more likely to hear the calls of other species than calls of its own

species. For this reason, the current dogma is that the vocalizations of frogs and toads are unlearned, as are the selective responses of females to these signals. A few experiments in which frogs were raised from tadpoles in acoustic isolation and even in environments where they were exposed to the calls of other species have supported this hypothesis. The calls produced by these experimental subjects were typical of conspecific males that are recorded in nature (e.g., Doherty and Gerhardt, 1984). However, such experiments have not been conducted with species with very long breeding seasons or in which tadpoles overwinter. Here young frogs would have ample opportunities to associate with and hear the calls of conspecific adults. There is also no evidence that young anurans learn to respond or discriminate among different sound patterns during development to sexual maturity. However, adult male bullfrogs habituate (a form of learning) to the calls of their territorial neighbors, so frogs at least have the ability to learn to recognize sounds that differ in relatively subtle ways.

Recognition of Advertisement Calls: Behavior and Function

Advertisement calls potentially convey information about the caller to receivers of the same and the opposite gender. Although a few studies have been concerned with distinguishing these kinds of calls from others in the repertoire, such as aggressive calls (Gerhardt, 1978a), most work has focused on the acoustic properties that allow females to recognize conspecific calls and perhaps to choose a particular male from among nearby callers. More recently, studies of male bullfrogs have identified properties of advertisement calls that underlie the discrimination of the calls of familiar neighbors and strange males (Bee and Gerhardt, 2001a, 2001b). The functional aspects of these behavioral studies have been complemented by statistical analyses that (1) quantified the pattern of variation in acoustic properties within and between biological classes of concern (species, populations, individuals, types of signals), and (2) correlated variation in acoustic properties with attributes of the caller that might constitute biologically important information for decision making by the receiver (Gerhardt, 1991). For example, if the mostly strongly emphasized (dominant) frequencies of the calls of one species broadly overlap those of the calls of another species in the same environment, then this property is unlikely to be useful for females of either species to distinguish between conspecific and heterospecific calls. If variation in dominant frequency is correlated with body size, then this property could be reliable for discriminating among individuals in the context of mate choice or territorial defense – a form of honest advertisement.

Relevant and Irrelevant Properties

Frogs and toads are superb subjects for testing ideas about the function and discriminability of the signal properties that might convey biologically important information. Gravid females reliably show positive phonotaxis (movement toward a sound source) to speakers playing back attractive sounds and indicate their preferences among two or more different sounds emitted by separate speakers by hopping on or near one speaker. Male frogs respond to playbacks by altering the timing and rate of calling or by switching to another type of call. Whereas most preference tests on females are conducted in arenas, in which gravid females are placed after capture, most playbacks to males take place in a field, where a speaker can be placed close to a calling male without disturbing it.

As in the earliest experiments by ethologists, playbacks using synthetic advertisement calls have usually shown that some highly invariant, species-typical properties of conspecific calls are actually not used by receivers to select among signals. For example, in some species the dominant frequency is frequency modulated (changes from beginning to end), but females are just as attracted by synthetic calls lacking such modulation as by synthetic calls with modulation (**Figure 3**; Gerhardt, 1978b). Furthermore, many comparative studies have shown that a property may be relevant for one species but not for a closely related species (for review, see Gerhardt, 2001b). Such species differences are useful for comparative studies that aim to uncover general patterns of coevolution of signal production and recognition.

Patterns of Preference

In general, the preferred values of the relevant properties of advertisement calls may correspond well with the values typical of conspecific calls, or there may be a significant mismatch. In the first case, evolutionary biologists would characterize this pattern as a form of stabilizing selection. That is, males with calls having average values are more likely to attract mates than males with calls having values significantly below or above the average (**Figure 4A**). Stabilizing patterns of preference are often exerted on properties of the calls that are relatively invariant within and between males and that may contribute to species recognition (Gerhardt, 1991). Strong evidence that stabilizing patterns evolved to function in species isolation, however, requires showing differences in selectivity depending on whether other species with similar

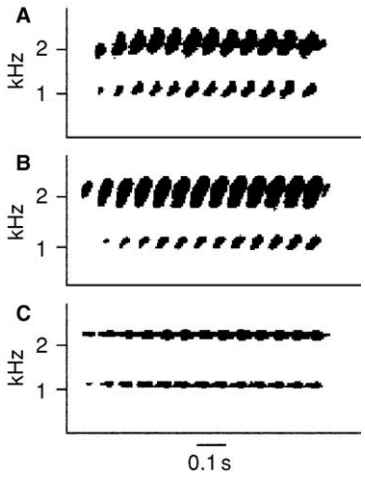

Figure 3 Sonograms of a recorded and two synthetic calls of the gray tree frog, *Hyla versicolor*. The natural call (A) and one of the synthetic calls (B) have pulses that increase in frequency from beginning to end; the other synthetic call (C) has pulses of constant frequency. Females did not show a preference for natural or synthetic calls with frequency-modulated pulses to synthetic calls without modulation. Modified with permision from Gerhardt (1978b).

calls are present (e.g., Gerhardt, 1994; Höbel and Gerhardt, 2003). In the second case, the pattern would constitute directional selection. Females are likely to mate with males whose calls have properties higher or lower than the mean (Figure 4B). These patterns of preference indicate how values of the property are likely to change in the future unless there are other, negative consequences for a male producing calls with these attractive values. In the gray treefrog (*H. versicolor*), females prefer long-duration calls to short-duration calls, and females choosing to mate with long-calling males are likely to have offspring that grow faster and to a larger size than do females choosing to mate with short-calling males (Welch *et al.*, 1998). Call duration is also a reliable indicator of the metabolic costs of calling by males and hence may indicate a male's physical or genetic fitness (Wells and Taigen, 1986). In túngara frogs (*Physalaemus pustulosus*), calls that are attractive to females might also be especially detectable to predators (Ryan, 1985). In reality, frogs base mating and other decisions on variation in more than one acoustic property, and one study of the gray tree frog (*H. chrysoscelis*) showed that females weighed pulse rate (stabilizing preference function) more heavily than call duration (directional preference function) in areas where mating mistakes with a similar species were possible than in areas where such a species was absent (Gerhardt, 1994).

Neurobiologists have often studied mechanisms that lead to stabilizing selection and consider such processes to be some form of matched filtering (Capranica, 1965). As discussed later in this article, auditory organs are often tuned to the frequencies that are emphasized in conspecific calls, and neurons in higher auditory centers often respond best to sounds with temporal properties having values typical of conspecific calls. In contrast, little work has been done with mechanisms that might underlie directional selection, other than a few studies showing that the frequency tuning of the auditory organs or system as a whole does not exactly match the average frequency in male calls and a recent study, discussed later in this article, of 'counting' neurons.

Individual Recognition

Male bullfrogs (*R. catesbeiana*) defend territories for weeks or months; females usually lay their eggs in the territory of a male that they have chosen on the basis of his calls, his territory quality, or both. Fighting between males is intense in the early part of the breeding season, when territories are being staked out, but aggression between individual territorial neighbors soon wanes. Playback experiments have shown that males learn to recognize the calls of territorial neighbors and will habituate to the playback of a synthetic advertisement call. Playing back the calls of an unfamiliar male or a synthetic call with different properties than the habituating stimulus results in renewed aggression. This phenomenon has been termed the 'dear-enemy effect' and presumably has the benefit of allowing established rivals to save time and energy that might otherwise be used for unnecessary aggression. Playback experiments have also shown that males use spectral (frequency) properties of the call for neighbor–stranger discrimination and that this discrimination persists even when the playback is conducted at a different place around the perimeter of the male's territory, where aggressive responses to both sounds are elevated (Bee and Gerhardt, 2002). Statistical analyses have indicated that the minimal difference in spectral properties that result in elevated aggression are just above the usual within-male variation in these properties. Moreover, these properties vary sufficiently among males to allow for the discrimination of many pairs of neighbors and strangers.

Recognition of Acoustic Signals: Mechanisms

Auditory System

As in other animals, auditory receptors are hair cells. They are located in two distinct inner ear organs, the basilar papilla and the amphibian papilla, neither of

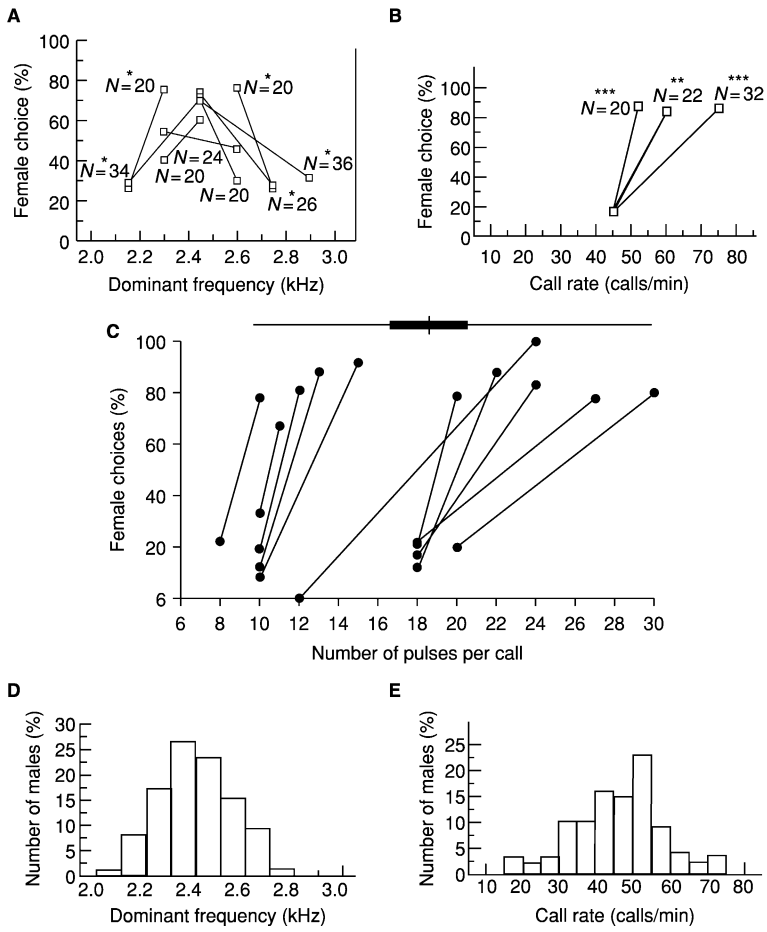

Figure 4 Preference functions based on variation in a single acoustic property. (A) A stabilizing function in which female reed frogs (*Hyperolius marmoratus*) preferred synthetic calls with dominant frequencies close to the mean in conspecific calls; the distribution of dominant frequency in a sample of males is shown in (C). (B) A directional function in which female reed frogs showed preferences for calls of high rate to calls of low rate. The distribution of call rate in a sample of males is shown in (D). Each line in (A) and (B) connects points showing the percentages of females choosing each of the two alternatives in a two-speaker choice test. Asterisks indicate statistically significant preferences (* < 0.05; ** < 0.01; *** < 0.001). Reproduced with permission from Gerhardt (2001a) in Dugatkin (ed.).

which is an obvious homologue of inner ear organs in higher vertebrates (Lewis and Narins, 1999). The amphibian papilla is the more complex of the two organs. It not only contains more hair cells but also shows some tonotopic organization, whereby hair cell receptors with similar tuning properties are located in close spatial proximity. The tuning of hair cells in the amphibian papilla is probably mediated by both mechanical and electrical processes; the latter are inferred from the fact that tuning is affected by anoxia and temperature. Finally, tone-on-tone inhibition occurs in the amphibian papilla, indicating a nonlinear interaction between receptors. This phenomenon involves the inhibition of a receptor's response to an excitatory tone by the addition of a second tone, usually of higher frequency. By comparison, the basilar papilla has fewer hair cells; these are tuned to a relatively narrow, though higher, range of frequencies than those that most effectively excite hair cells in the amphibian papilla. There is no evidence in this organ for tonotopy, temperature effects on tuning, or tone-on-tone inhibition. In most species of frogs and toads, the emphasized frequencies in advertisement calls match the sensitivity of one or the other or both of the inner ear organs (Figure 5; Gerhardt and Schwartz, 2001).

Auditory nerve fibers project from the inner ear organs to the dorsolateral nucleus, the first station in the ascending auditory pathway. At this level, there is already some convergence of neurons innervating the two papillae, but some separation of these low- and high-frequency channels is maintained at least to the level of the main midbrain auditory center, the torus semicircularis, which is a

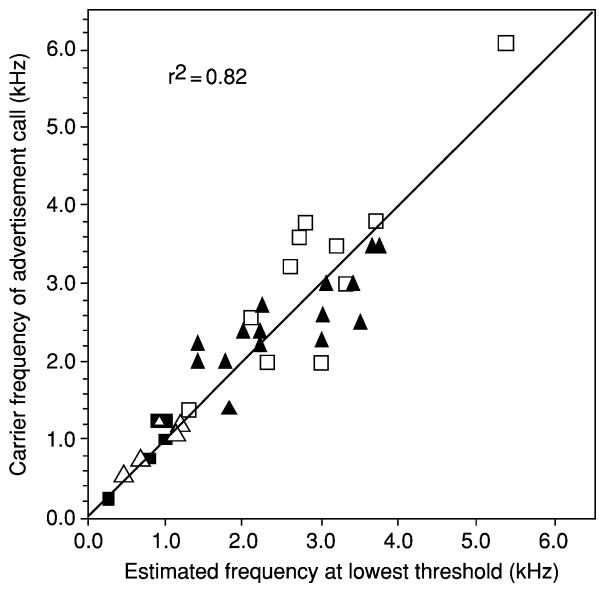

Figure 5 Matched filtering in frogs and toads. The diagram shows the correlation between the sound frequency to which a species was most sensitive (lowest threshold) and the frequency or frequencies having the greatest relative amplitude in the conspecific advertisement call. Solid symbols = closed-field acoustic stimulation. Open symbols = free-field acoustic stimulation. Squares = low-frequency sensitivity of amphibian papilla. Triangles = high-frequency sensitivity of basilar papilla. The complete documentation of this figure (a key to the frog species from the data were plotted) is in Gerhardt and Schwartz (2001, Figure 1).

homologue of the inferior colliculus of higher vertebrates. There is at this level, however, little evidence for fine-scale tonotopy, such as that observed within the amphibian papilla. The torus semicircularis has several subnuclei and appears to be the main processing center for auditory information. Although the torus projects to higher-order cells in the thalamus and telencephalon, these brain areas do not appear to be necessary for either phonotaxis or selective responsiveness to biologically significant signals (Endepols *et al.*, 2003).

Some auditory nerve fibers and neurons in the ascending pathway synchronize fairly well to specific cycles of amplitude modulation in standard auditory stimuli (= amplitude-modulated sine waves or trains of short pulses) or in natural signals with a pulsatile structure. Synchronization for patterns typical of conspecific signals is not superior to that for patterns typical of heterospecific signals, provided repetition rates are below about 400 Hz. Selectivity for fine-scale patterns occurs in the torus semicircularis, where neurons with various filter properties have been described. Substantial proportions of one class of such neurons – bandpass – are best excited by repetition rates typical of conspecific calls in some, but not all, species of anurans that have been studied. A subset of bandpass neurons in leopard frogs and Pacific tree frogs has been found to respond only when a minimum number of pulses with the correct pulse rate occur (Alder and Rose, 1998).

Sound Localization

Higher vertebrates compare the magnitude of differences in time of arrival or intensity at the two ears in order to localize a sound source. The ears of most anurans are, however, too close together for such external differences to be usable. Most researchers think that instead, anurans use some form of pressure-difference mechanism, which has been well established for insects such as crickets and grasshoppers (see a review in Gerhardt and Huber, 2002). In such a system, the movement of the eardrum depends not only on its displacement from a sound wave arriving at its external surface but also on its displacement by sound waves arriving at its inner surface from internal pathways. The net displacement of the eardrum depends on the phase (timing) relationship of the two waves, which in turn depends on where the sound source is located. The nature of the pathways to the internal side of the eardrum and just how the inputs to its internal and external surfaces can generate directional cues in each eardrum are still unknown.

Reduction of Masking

Masking occurs when the signals of different individuals overlap in time, thus obscuring their detection and the resolution of temporal and spectral properties that are used for recognition. Frogs and toads that call in noisy choruses where masking is a severe problem probably use several mechanisms to compensate. First, the peripheral tuning of the auditory system to frequencies in conspecific calls can enhance detection of those calls, which will more effectively stimulate the auditory system than the calls of other species, which have different frequencies. Second, directional hearing results in the more efficient detection of sounds arriving from widely spaced sources than sounds arriving from sources situated adjacent to one another. This phenomenon contributes to the 'cocktail party effect,' whereby sound localization aids humans in eavesdropping on conversations in

different parts of a crowded, noisy space. Thus, males of the same species tend to maintain some minimal spacing even if they are not defending territories. Third, neighboring males of many species tend to time their calls so that they do not overlap those of their neighbors. If they do overlap, males compete to place their calls in a leading or lagging position, which makes them more detectable to females (see review in Gerhardt and Huber, 2002).

See also: Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Birdsong; Communication in Marine Mammals; Fish Communication; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication.

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Fry, Dennis Butler (1907–1983)

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Dennis Fry was the leading British experimental phonetician of the third quarter of the 20th century. In 1934, after an early career as a teacher of modern languages, he was appointed Assistant Lecturer in the Phonetics Department of University College London (UCL), then the only university phonetics department in the UK and headed by Daniel Jones. Apart from the war years, which he spent in the acoustics laboratory of the RAF Central Medical Establishment, he remained at UCL throughout his career. He became Superintendent of its Phonetics Laboratory at the age of 30, and in 1949 succeeded Daniel Jones as Head of Department. He was appointed Professor of Experimental Phonetics in 1958. He gave up the headship of the department in 1971 and retired in 1975.

Despite some early work of a type more readily associated with the Daniel Jones school (Fry and Kostić, 1939), Fry's principal interest was experimental phonetics. His scientific career started in an era when the equipment of a modern phonetics laboratory included sensitive flames and mechanical kymographs. It culminated in the era of the minicomputer.

The 1940s and 1950s had seen the birth of information theory and of important developments in electronics, including the earliest electronic computers. Together with new signaling processing techniques such as the Vocoder, this led to a growth of interest in experimental phonetics. For the first time automatic recognition and synthesis of speech began to seem feasible. Fry, with a wide interdisciplinary knowledge and an awareness of linguistic aspects of speech not always shared by those educated solely in the scientific tradition, saw that an understanding of the speech process would involve not only acoustic aspects but also psychological, perceptual, and linguistic analysis.

He was the first to experiment with automatic speech recognizers using not only acoustic but also linguistic cues. To linguistic phoneticians, who tended to be naïve about the physical aspects of speech, Fry demonstrated the importance of laboratory experimentation. One of his best-known achievements was to demonstrate that stress in English words is perceived not mainly as a consequence of loudness (as American structuralists assumed) but of spectral (pitch) and temporal (duration) characteristics. To the experimentalists he insisted that – given the robustness of human speech perception under extremes of distortion and noise – communication could not be dependent solely on acoustic cues.

In 1958 he founded the scholarly journal *Language and Speech*, of which the Oct–Dec 1978 issue comprises essays in his honor and includes a list of his publications. From 1971 on he was President of the Permanent Council responsible for organizing the International Congresses of Phonetic Sciences.

Fry was an excellent singer and was involved in semi-professional singing throughout his life. In 1966 he became a governor of the Sadlers Wells Foundation.

One practical application of Fry's work was in relation to the hearing-impaired: his book *The deaf child* (with E. Whetnall), first published in 1964, is still in print.

Formal retirement did not mean that Fry stopped working. To the contrary, the books for which his name is most widely known were written after his retirement: *Homo loquens* (1977) and *The physics of speech* (1979).

See also: Experimental and Instrumental Phonetics: History; Jones, Daniel (1881–1967).

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Katsuji Fujioka was born in Kyoto, Japan, on August 12, 1872. He graduated from the Department of Hakugengaku (*Sprachenkunde*), College of Letters, Tokyo Imperial University, in 1897 and was admitted to further study in the graduate school. In 1901, he was ordered by the Japanese government, as was usual in those days, to study linguistics in Germany for three years. There he studied Indo-European linguistics and the history of linguistics, among other subjects. Upon his return from Germany, he was appointed Assistant Professor of Linguistics at Tokyo Imperial University in 1905 and Professor in 1910. He retired in 1933, and died on February 28, 1935, in Tokyo.

Fujioka's major field of interest spanned Europe and Asia. As a pioneer scholar in the development of linguistics in Japan, he lectured on such various themes as the outline of linguistics, general phonetics, Brugmann's *Kurze vergleichende Grammatik der indogermanischen Sprachen,* Streitberg's *Stand und Aufgaben der Sprachwissenschaft*, Paul's *Prinzipien der Sprachgeschichte*, Turkish–Mongolian–Chinese exercises, the historical grammar of Germanic languages, Ural–Altaic linguistics, Greek and Latin philology, and French and Romance linguistics. Among his pupils were such influential scholars in Japanese and other fields of linguistics as Shinkichi Hashimoto (Old Japanese and Japanese grammar), Shinpei Ogura (Korean linguistics and dialectology), Kyosuke Kindaichi (*see* **Kindaichi, Kyosuke (1882–1971)**), Kaku Jimbo (phonetics and theoretical linguistics), Sanki Ichikawa (English philology), and Shiro Hattori (*see* **Hattori, Shiro (1908–1995)**).

Fujioka's theory on the structural similarities among Uralic, Altaic, and Japanese languages has exerted considerable influence on the genealogical study of Japanese in Japan. He did not, however, believe in the genealogical relationship between Altaic and Japanese.

Among his scholarly works is an important Japanese translation of *Manbun roto* (*Man wen lao dang*, literally 'Manchurian-written old document'), its first translation into another language. This translation was published posthumously by Shiro Hattori (Fujioka, 1939). He published many translations of influential books, probably as preparation for his lectures, such as Bloomfield's *Introduction to the study of language,* Whitney's *The life and growth of language,* Saussure's *Cours de linguistique générale,* Gabelentz's *Die Sprachwissenschaft*, Paul's *Prinzipien der Sprachgeschichte*, and Meillet's *Introduction à l'étude comparative des langues indo-européennes*. A beautiful account of him as a scholar is to be found in Hattori's *Beginnings of linguistics* (privately printed, in Japanese).

See also: Altaic Languages; Bloomfield, Leonard (1887–1949); Brugmann, Karl (1849–1919); Gabelentz, H. Georg Conon von der (1840–1893); Hattori, Shiro (1908–1995); Japanese; Kindaichi, Kyosuke (1882–1971); Meillit, Antoine (Paul Jules) (1866–1936); Paul, Hermann (1846–1921); Saussure, Ferdinand (-Mongin) de (1857–1913); Uralic Languages; Whitney, William Dwight (1827–1894).

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Fujitani was born as the second son of Syundoo Minagawa, who was a doctor in Kyoto. Fujitani's brother, Kien Minagawa, was also a scholar, engaging in philology of Chinese classics. Fujitani succeeded to his father's property at the age of 19. He died young, at the age of 42, before his research came to be appreciated. Due to their high originality, Fujitani's works are now acknowledged as one of the leading contributions to the foundation of the study of Japanese grammar. In particular, Fujitani is regarded as one of the first traditional Japanese grammarians to propose a systematic classification of grammatical categories. Along with Norinaga Motoori, Fujitani is also considered as one of the founders of the modern study of *te-ni-o-ha* (noninflecting Case particles and postpositions) and verbal conjugation in Japanese. Around the time when Fujitani and Motoori actively engaged in research, the target of the study shifted to the *waka* poetry from the *Tyuuko* period (794–1185). This shift enabled the traditional linguists at the time to investigate a wider range of data, which brought a major change in the object of the study as well. Rather than focusing on *man'yoo gana* and glossaries of the *Zyoodai* period (710–794), concord, agreement, and contexts became the main research topics of the researchers. Fujitani's major works are '*Kazasi syoo*' (1767), 'Explaining *kazasi*,' '*Ayui syoo*' (1778), 'Explaining *ayui*,' and '*Yosoi-Zu*,' which is a draft of the chart of the verbal conjugation of Japanese.

In *Kazasi syoo* (1767), Fujitani proposed a classification of syntactic categories into the following three subclasses: (i) *kazasi* (literally 'accessories for hair and caps'), which includes heterogeneous pronominal elements, adverbial elements, conjunctive particles, emotive expressions, and prefixes, (ii) *yosoi* (literally 'costumes'), referring to predicates, and (iii) *ayui* (literally 'shoe strings'), covering Case particles, postpositions, auxiliary verbs, and suffixes. In *Ayui syoo* (1778), Fujitani further elaborated his three-way classification by including *na* ('name'; names and nominal elements) and expanding it into a four-class categorization. He then divided up *ayui* into two groups; the one that subcategorizes for nominal elements, and the other that subcategorizes for non-nominals.

The expanded four-way classification of Fujitani's is considered as having two origins; one is the classical study of *te-ni-o-ha* from the Tyuusei period (Middle Japanese; 1182–1603) and the other is his elder brother Kien Minagawa. In particular, the influence of his sibling is explicitly observed in Fujitani's analytical method and his emphasis on combinations (or subcategorization/selectional relations) of syntactic constituents. This contrasts Fujitani with two of his contemporary fellow Japanese grammarians, Motoori and Akira Suzuki (a disciple of Motoori's), who put more emphasis on concord and agreement relations among the syntactic constituents.

Due to being too innovative at the time, there was no successor to Fujitani's grammatical theory until the Meiji era (1868–1925), when Yoshio Yamada (1873–1958) took over Fujitani's research endeavor.

See also: Motoori Norinaga (1730–1801); Suzuki Akira (1764–1837).

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The Language Name

Most Fulbe call their language Fulfulde. Other names currently used for the language are *Ful*, *Fula*, *Fulani*, *Peul,* and *Pulaar.* Fulfulde is in fact one large dialect continuum in Africa stretching over thousands of kilometers from Mauritania, Senegal, and Guinea in the west to as far as Sudan and Ethiopia in the east, and to Cameroon, the Central African Republic, and Congo in the south. The Fulbe call their own language *Pulaar* or *Pular* in the dialect areas of Fuuta Tooro (Senegal, Mauritania) and Fuuta Jaloo (Guinea, Sierra Leone) and *Fulfulde* in all the other dialect areas, such as Maasina (Mali), Liptaako (Burkina Faso), Gombe (Nigeria), and Aadamaawa (Cameroon). In English literature, *Fulani* is a name frequently used for both the people and their language; it is an English loanword from Hausa (spoken in Nigeria). In French literature, the people and the language are called *Peul,* which is a French loanword from Wolof (spoken in Senegal). In American literature, the name *Fula* is often used and is the name chosen for the language of the Fulbe by D.W. Arnott, who wrote an important reference book on this language. He argued that the term Fula "seems more appropriate as well as more euphonious than the plain stem *Ful*" (Arnott, 1970:1–2). The name *Ful* is often used in German; this name is based on the root, which is common to the name of the people (sing. *Pullo*, pl. *Fulɓe*) and the different authochtonous language names (*pular, pulaar, fulaare, fulfulde*).

The Language and Its Speakers

Fulfulde is an Atlantic language, its closest relatives are Wolof and Sereer (Serer). Atlantic is a subbranch of the Niger-Congo language family.

The number of Fulfulde speakers is unknown, because for good reasons population counts usually do not determine the different ethnic backgrounds of people in various countries. In addition, numerous people in several areas of West Africa speak Fula as a second language. In the *Ethnologue* (Grimes, 2003), the number of speakers is estimated to be between 13 and 17 million.

The Fulbe are known especially for two features: in West Africa, they are almost the only group that has specialized in cattle herding (cf. Blench, 1999), and they have played an important role in the spread of Islam in this part of the world (cf. Last, 1987). The importance of cattle for the Fulbe is reflected in the existence of a noun class NGE, which classifies all cow names and, depending on dialect, some other terms related to cows: These nouns are all pronominalized by the same pronoun *nge* (Breedveld, 1995a, 1995b). The involvement of the Fulbe with Islam is reflected in the language by numerous religious and other loanwords from Arabic (Labatut, 1984). In most areas, the class of learned Qur'anic teachers have their own sociolect that has incorporated a number of Arabic sounds (e.g., the velar fricative [x]).

Several Fulfulde key cultural words, such as *pulaaku* and *semteende,* have received a lot of attention in studies on Fulbe culture (cf. Stenning, 1959; Dupire, 1970; Riesman, 1977; Breedveld and De Bruijn, 1996). Often, these words are associated with a code of behavior. However, prescribed conduct in the Fulbe societies differs according to social class, and most descriptions take the highest social class – the *rimɓe* or so-called noblemen – as the standard for the whole society, thus over-generalizing rules of behavior in certain contexts to the whole Fulbe society. In Mali, certain terms describing behavior seen as typical for the Fulbe are loanwords from neighboring languages (e.g., *yaage* 'respect, restraint, avoidance behavior' is a loanword from Soninke). This borrowing indicates that some component of these ideas is defined regionally and not ethnically.

Orthography

The Fulfulde language is written in both Arabic and Latin script. In both scripts, special conventions exist for writing lengths of vowels and consonants and for writing the prenasalized and laryngealized consonants (Ladefoged, 1964; Breedveld, 1995a). There is disagreement on the phonetic nature of the latter; some claim that these consonants are implosive (Sylla, 1982; Lex, 1987) or pre-glottalized (Klingenheben, 1963; Swift *et al.,* 1965). In 1966, experts attending a UNESCO meeting for the 'Unification of Alphabets of the National Languages' recommended a unified orthography for the Fulfulde language as shown in Tables 1 and 2 (Arnott, 1970).

Table 1 Orthography of Fulfulde vowels (short/long)

	Front	*Back*
High	i/ii	u/uu
Mid	e/ee	o/oo
Low		a/aa

Recommended by UNESCO, 1966.

Different authors and ministries of education in different West African countries use the Fulfulde alphabet in different ways. For example in Senegal the symbol [ñ] is used instead of the digraph [ny] (e.g., Fagerberg-Diallo, 1983). Arnott (1970) has used the digraph [sh] for the phonetic symbol [ʃ] because that sound has replaced [c] in the Gombe dialect. Many authors describing the eastern Fulfulde dialect also use the letter [v] for a labiodental fricative that occurs in these dialects (Labatut, 1982; Mohamadou, 1991).

Noun Class System

All the nouns in Fulfulde are divided into groups with different grammatical markings. These groups are called 'noun classes,' and the number of noun classes varies according to dialect. For example, the Aadamaawa dialect spoken in eastern Nigeria and Cameroon has 25 classes, whereas the Maasina dialect spoken in Mali has 22. The noun classes group nouns according to semantic and formal grounds. Most nouns end in the suffix form of the noun class to which they belong. The reference marker or concord that is basically the same for all nouns of the same noun class occurs in all pronominalized forms of the noun (pronouns) and in all words that modify the noun (e.g., adjectives, demonstratives). In the following example from the Maasina dialect, Tioulenta (1986:6), writing a prize-winning novel about a young man leaving the village for the big city, used in one sentence repeatedly the concord KOY, which marks the plural diminutive. The concords reoccur with the forms *-oy*, *-woy*, and *-koy* in several pronominal and modifying words that refer to the nouns in the KOY-class.

Yogaaɓe	*mbittan*	*njoppa*	*ndew-oy*
some	will leave	leave behind	little women-KOY
naye-woy	*ngarbintoo-koy*		
old-KOY	begging-KOY		

Some will leave behind little old women begging

e	*ngor-oy*	*maw-koy*	*koy*	*mbaaworaa.*
and	little men-KOY	old-KOY	who	are powerless

and little old men who are powerless.

The allomorphy of the suffix forms (e.g., that which determines whether the form of the class suffix is *-oy*, *-woy*, or *-koy*) is still the subject of debate in Fulfulde studies (Klingenheben, 1941; Mohamadou, 1991; Paradis, 1992; Breedveld, 1995a; Gottschligg, 1997). The question of the semantic basis of the noun class system in Fulfulde has also recently received new attention (Mohamadou, 1991; Breedveld, 1995b). However, consensus has not been reached on these subjects.

Consonant Alternation

A large number of consonants in Fulfulde are subject to alternation in certain contexts. In most dialects, the verbal system shows a change in the initial consonant of the verb stem, depending on plural or singular number of the subject, and also when the pronominal pronoun follows rather than precedes the verb stem.

mi ***w****ar-ii*
I come-COMPLETIVE
I have come

ɓe ***ng****ar-ii*
I come-COMPLETIVE
I have come

mande ***ng****ar-ɗaa*
when come-you sg. COMPLETIVE
When have you come?

In nominal stems, the initial consonant can alternate among three categories: a basic (continuant or fricative) consonant (F), a plosive consonant (P), and a pre-nasalized consonant (N). Table 3 shows the consonants that alternate in nominal stems.

Table 2 Orthography of Fulfulde consonants (short/long)

	Labial	*Alveolar*	*Palatal*	*Velar*	*Glottal*
Plosive					
Voiceless	p/pp	t/tt	c/cc	k/kk	'/''
Voiced	b/bb	d/dd	j	g	
Laryngealized	ɓ/ɓɓ	ɗ/ɗɗ	y/yy		
Prenasalized	mb/mmb	nd/nnd	nj/nnj	ng/nng	
Nasal	m/mm	n/nn	ny/nny	ŋ/ŋŋ	
Continuant					
Fricative	f	s			h
Glide	w/ww		y/yy		
Rolled		r/rr			
Lateral		l/ll			

Recommended by UNESCO, 1966.

Table 3 Consonant alternation in Fulfulde

Basic (F)	*w*	*r*	*y*	*y*	*w*	*b*	*d*	*j*	*g*	*f*	*s*	*h*
Plosive (P)	b	d	j	g	g	b	d	j	g	p	t	k
Prenasalized (N)	mb	nd	nj	ng	ng	mb	nd	nj	ng	p	t	k

Basically, the articulatory nature of the first consonant of a nominal depends on the noun class suffix. This distribution is shown in the following nominal paradigms derived from the verb stem *yim-* 'to sing, recite':

- *yim-re* poem (NDE class suffix: F initial consonant)
- *jim-e* poems ('DE class suffix: P initial consonant)
- *jim-ol* (long) song (NGOL class suffix: P initial consonant)
- *jim-i* (long) songs ('DI class suffix: P initial consonant)
- *jim-el* small song, poem (NGEL class suffix: P initial consonant)
- ***nj**im-oy* small songs, poems (KOY class suffix: N initial consonant)
- *jim-al* big song, poem (NGAL class suffix: P initial consonant)
- *jim-eele* big songs, poems (DE class suffix: P initial consonant).

That the form of the initial consonant of nouns is determined by the class is a possible remnant of the fact that the classes that are now marked by suffixes were once prefixes (De Wolf, 1985).

There are dialect variations in the system of consonant alternations. For example, there is no initial consonant alternation in the verbal system in the dialects of Fuuta Jaloo. Additional consonants alternate in the nominal systems; for example, the dialect of Fuuta Tooro (Senegal) has an additional set '-g-ng, and in Aadamaawa (Nigeria, Cameroon), the additional consonant alternation set v-b-mb occurs.

Focus as a Salient Feature of Fulfulde Syntax and Verbal Morphology

Most literature devoted to Fulfulde syntax also deals with its complicated verbal morphology, because both the form of the verbal conjugation and word order are determined by focus (Labatut, 1982; McIntosh, 1984). For example, in a sentence without any of the constituents in focus, the marker of the incompletive verbal conjugation is *-an*. As soon as one of the constituents is in focus, the focused constituent is placed in the first position of the sentence and the so-called relative form of the incompletive *-ata* is then used to conjugate the verb.

Baaba *sood-**an*** *kaddule.*
father buy-INCOMPLETIVE clothes
Father will buy clothes.

Kaddule *baaba* *sood-**ata**.*
clothes father buy-RELATIVE.INCOMPLETIVE
CLOTHES father will buy.

There are three voices – active, middle, and passive – marked in the Fulfulde verb, which have ramifications for the verbal morphology and constituent order. The following three sentences show combinations of the verb stem *yeggit-* 'forget' and the negative incompletive conjugation in the three voices.

Mo *yeggit-**ataa*** *ndee innde.*
he forget-NEGATIVE INCOMPLETIVE that name
He will not forget that name.

Ndee *innde* *yeggit-**ataako**.*
that name forget-NEGATIVE INCOMPLETIVE MIDDLE VOICE
That name cannot be forgotten.

Ndee *innde* *yeggit-**ataake**.*
that name forget-NEGATIVE INCOMPLETIVE PASSIVE VOICE
That name will not be forgotten.

Sentences in the passive and middle voice usually have one constituent less than sentences in the active voice. There are three paradigms of conjugational verb suffixes: each voice had its own set.

Linguistic Taboos

Part of what Fulbe consider to be proper behavior is not to say what should not be said. Certain words are taboo for all speakers, and certain names and terms of address are taboo in particular (kinship) relations.

The taboo on body part nouns has led to much dialect variation in Fulfulde. In Malim, the euphemism for the back is *caggal*, and *ɓaawo* is considered rude. Conversely, *ɓaawo* is the proper word in Cameroon. Because prepositions are grammaticalized from some body part terms, the same dialectal variation is

replicated. In Mali, the preposition *nder* 'in' is not used, possibly because it is derived from the noun *reedu* 'belly', which is considered rude. In certain dialects, the noun class concord *ngu* is taboo because it is associated with the female genitals.

There are many taboos on names (Ameka and Breedveld, 2004). There is a general tendency to use clan names, rather than more personal first names. In certain specific kinship relations, names are replaced by other words (e.g., a child named after his or her grandmother is called *innere* 'little mother-thing').

Although many studies have been written on the Fulfulde language (cf. Seydou, 1977), descriptions of many dialects are lacking. The study of dialect comparison remains an important goal for further research.

See also: Ethiopia: Language Situation; Mali: Language Situation; Mauritius: Language Situation; Niger: Language Situation; Niger-Congo Languages; Nigeria: Language Situation; Senegal: Language Situation; Sierra Leone: Language Situation; Sudan: Language Situation.

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Functional and Skopos Oriented Approaches to Translation

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Functional translation theories are gaining ground in many parts of the world, especially where translation needs are pressing and equivalence theories are out of the question because of (1) different stages of (lexicological, terminological etc.) development in source and target languages, (2) discrepant levels of knowledge and experience in source and target audiences, or (3) large gaps between source and target cultures, value systems, perspectives, world views, and so on.

Nevertheless, criticisms have been leveled at the theoretical foundations and applicability of functionalist approaches in general and of skopos theory in particular. Although, as Toury pointed out with reference to both skopos theory and his own target-oriented approach, "target-orientedness as such no longer arouses the same antagonism it used to less than 20 years ago" (Toury, 1995: 25), quite a number of criticisms are still, explicitly or implicitly, present in debates on translation theory today. Some scholars keep maintaining the view that equivalence is the only valid yardstick of translation quality, as well as being a constitutive characteristic of translation proper (cf. Koller, 1995).

Is equivalence a safeguard against manipulation? Post-colonial translation studies show that the (theoretical) notion of equivalence has never stopped any translator (or commissioner of translations) from manipulating source texts consciously or unconsciously. A corrective is needed for both equivalence-based and function-oriented translation theories. For this purpose, I have suggested the concept of 'loyalty' (cf. Nord, 1997a) to account for the culture-specificity of translation concepts, setting an ethical limitation on the otherwise unlimited range of possible skopoi for the translation of one particular source text.

Historical Overview

Functional approaches to translation developed in Germany in the beginning of the 1980s. At that time, university programs for translation and interpreting could look back on quite a long tradition, since the first interpreter training had been established at Humboldt University in Berlin as early as 1894. During and shortly after World War II, translator training departments were founded at several universities in both East and West Germany to meet the increasing demand for well-trained translators and interpreters.

The training was mainly practical; theoretical foundations were borrowed from linguistics. Equivalence between source and target language was the quality yardstick that was never questioned, although the definitions of the concept were far from satisfactory. The material used in the classroom comprised mostly essays or literary texts used to train the students' linguistic and stylistic proficiency in both the source and the target language. Trainers were often language teachers with little or no experience in professional translation.

Employers, however, kept complaining about the poor competence of graduated translators with regard to the variety of text genres and tasks that had to be tackled in professional practice, where 'equivalence' of whatever kind is often neither possible nor desirable. For example, resumé translations need not give more than the gist of the source-text information, specialist research reports sometimes must be translated for a broader nonspecialist audience, and poorly written operating instructions have to be adapted to the needs of a target culture where technical or cultural conditions are completely different from those of the source culture. Teachers needed a new yardstick to explain why different contexts call for different translation solutions, and the pragmatic turn in linguistics seemed to point in the right direction.

The publication of Hans J. Vermeer's 'Framework for a general translation theory' (1978) seemed to offer a theoretical foundation for translator training. The theory was later explained in more detail in a book co-authored with Katharina Reiss, who had prepared the ground for a functional approach in her work on translation criticism as early as 1971 (cf. Reiss, 1971; Reiss & Vermeer, 1984). Using the Greek word *skopos*, meaning 'purpose' or 'aim', Vermeer called his theory skopos theory because he considered translation to be a type of human action. 'Action,' in turn, was defined as a behavior intended to change a state of affairs. In accordance with action theory (for example, von Wright, 1968), Vermeer defined translation as a purposeful behavior that takes place in a given situation; it is part of the situation at the same time as it modifies the situation. Further, because situations are embedded in cultures, any evaluation of a particular situation, of its verbalized and nonverbalized elements, depends on the status it has in a particular culture system (cf. Vermeer, 1989).

According to this line of thought, translation cannot be considered a one-to-one transfer between languages, and a translation theory cannot draw on a linguistic theory alone, however complex it may be.

Skopos theory is, therefore, a culture-oriented approach. One of the most important factors determining the purpose of a translation is the intended audience of the target text, specifically its culture-specific world knowledge, expectations, and communicative needs. Every translation is directed at an intended audience, because to translate means "to produce a text in a target setting for a target purpose and target addressees in target circumstances" (Vermeer, 1987: 29).

In the phrase just cited, the source text is not even mentioned. Its status is clearly much lower in skopos theory than in equivalence-based theories. Vermeer regarded a text as an 'offer of information,' from which any receiver picks precisely the items he or she wants, and is able, to process. Therefore, a translation is an offer of information produced in the target language and culture for target-culture addressees about another offer of information that was produced in a source language and culture for source-culture addressees. This means that, in the translation process, the translator's decisions are no longer guided by the linguistic and stylistic characteristics of the source text but by the constellation of participants and conditions of the communicative situation for which it is produced. Instead of equivalence between source and target texts, the aim is adequacy for the translation purpose.

Right from the outset, skopos theory had a considerable impact on the methodology of translator training. Hans G. Hönig and Paul Kußmaul (1982), both engaged in translator training, gave the starting signal with their book on translation strategy. They showed how functional strategies lead to appropriate solutions to translation problems. Although their examples are taken from German-English translating, the problems they discussed are clearly not language-specific, but may occur, with slight variations caused by language structures and culture conventions, in any translation situation. Other scholars followed suit, developing models for a functional approach to translation error analysis (Kupsch-Losereit, 1985), functional text analysis (Nord, 1988), functional text typology (Göpferich, 1995), translator training (Kußmaul, 1995), a functional typology of translations (Nord, 1997b), and a functional redefinition of the translation unit (Nord, 1997c). Applications of functionalist methodology dealt with the descriptions of nonverbal behaviour in the *Odyssey* (Vermeer, 1992), titles and headings (Nord, 1993, 1995), culture-references in literary texts (Nord, 1994), the cultural transfer in simultaneous interpreting (Pöchhacker, 1995), text-type conventions (Kußmaul, 1997), and the translation of paralanguage in literary texts (Nord, 1997a), to name only a few contributions available in English.

It is a feature common to the functionalist scholars engaged in translator training that they try to focus on the language-independent pragmatic and cultural aspects of translation, emphasizing the specific nature of translation competence, rather than language proficiency. Obviously, they want to distance themselves from the first phase of German translator training, which evolved from the philologies and from language teaching.

Fundamental Principles of Functional Translation

The main hypotheses of a functional approach to translation may be summarized in the following principles:

- The purpose of the translation determines the choice of translation method and strategy. This means that any choice among two or more available solutions to a translation problem must be guided by an intersubjective criterion that, in the functionalist framework, is provided by the communicative function or functions for which the target text is needed.
- The purpose is defined, either explicitly or implicitly, in the translation brief provided by the client or commissioner. The translator interprets the translation brief in order to find out what kind of translation is needed and which translation strategy to choose.
- A translation may be called functional if it 'works' for its receivers in a particular communicative situation precisely in the way the client wants it to work. The translator has, therefore, to evaluate the audience's capacities for comprehension and cooperation, especially with regard to previous knowledge about the topic, and anticipate the possible effects that certain forms of expression may have on the readership.
- Function is not an inherent quality of a text. It is attributed to the text by the receiver, at the moment of reception. It is the receiver who decides whether (and how) a text 'functions' (for him or her, in a specific situation). If, as we know, the same receiver at different moments of his or her life may react in different ways to the 'same' text (e.g., to Shakespeare's *Romeo and Juliet*), it is most improbable that different readers, at different moments, will react to the same text in the same way, let alone readers belonging to different cultural environments.
- Yet, if this is true, how can we be sure that a text achieves the function we want it to achieve? We cannot. Usually, we rely on the audience's

willingness to cooperate in a given situation; otherwise, communication would be impossible. Any text producer, therefore, consciously or unconsciously uses some kind of verbal and/or nonverbal 'function markers,' which indicate the intended communicative function(s). Thus, printing the text in tiny letters on a slip of paper that comes with a box of pills indicates patient information; imposing a title, such as 'Instructions for use,' is a most explicit function marker. Other types of markers might be a particular text format or layout, such as a newspaper headline; certain sentence structures, such as imperatives in a recipe; a particular register, like that of an editorial; certain forms of address for the readership, for example in a student's manual, and the like. If the receivers recognize the function markers, they may accept the text as serving the intended function. However, markers can only be interpreted correctly by a receiver who is familiar with the marker code used.

- Basically, the function (or set of functions) intended for, and/or achieved by, the target text may be different from that intended for, and/or achieved by, the source text.

Functionality and Loyalty

Looking at the basic principles presented above, we may wonder why there is no mention of such equivalence-based criteria as 'faithfulness' or 'fidelity' to the source text. This is the reason why some critics reproach functionalism for producing "mercenary experts, able to fight under the flag of any purpose able to pay them" (Pym, 1996: 338). This criticism refers to an ethical quality related to the status of the source text. If the linguistic and stylistic features of the source are no longer regarded as the yardstick for translation quality, does this mean that the translator is entitled to do whatever he or she likes?

Indeed, the first basic principle of functionalism could be paraphrased as 'the translation purpose justifies the translation procedures,' and this statement could easily be interpreted as 'the end justifies the means.' In this case, there would be no restrictions to the range of possible ends: The source text could be manipulated, as clients (or translators) saw fit. In a general theory, this doctrine might be acceptable enough, since one could always argue that general theories do not have to be directly applicable. Yet, translation practice does not take place in a void. It takes place in specific situations set in specific cultures, so any application of the general theory, either to practice or to training, has to take account of the specific cultural conditions under which a text is translated.

At different times and in different parts of the world, people have had and still have different concepts of the relationship that should hold between an original and the text that is called its translation. According to the prevailing concept of translation, readers might expect, for example, that the target text gives exactly the author's words; other cultures might want it to express the author's intention, even though this would mean changing the words. Still others could praise archaizing translations or ones that are comprehensible, readable texts. Taking account of all these different expectations, which may vary according to the text type in question or depend on the self-esteem of the receiving culture with regard to the source culture, the translator acts as a responsible mediator in the cooperation developing among the client, the target audience, and the source-text author. This does not mean that translators always have to do what the others expect – doing so may even be impossible if the three parties expect different translational behaviours. It just means that the translator has to anticipate any misunderstanding or communicative conflict that may occur due to discrepant translational concepts and has to find a way to avoid them.

This responsibility that translators have toward their partners can be called 'loyalty.' Loyalty is not the old fidelity in new clothes, because fidelity usually refers to an inter*textual* relationship holding between the source and the target texts as linguistic entities. However, loyalty is an inter*personal* category referring to a social relationship between individuals. In a general model, loyalty would be an empty slot that, in a specific translation task, is filled by the demands of the translation concepts of the cultures in question, especially when the source-text author and the target-text audience hold discrepant views of what a translator should or should not do. It is the translator's task to mediate between the two cultures, and mediation cannot mean the imposition of the concept of one culture on members of another.

The loyalty principle thus adds two important qualities to the functional approach. Because it obliges the translator to take account of the difference between culture-specific concepts of translation prevailing in the two cultures involved in the translation process, it turns skopos theory into an anti-universalist model, and because it induces the translator to respect the sender's individual communicative intentions, as far as they can be elicited, it reduces the prescriptiveness of 'radical' functionalism.

The first basic principle of functional translation theory mentioned above should, therefore, be complemented by the following limitation: The acceptability of translation purposes is limited by the translator's

responsibility with regard to her or his partners in the cooperative activity of translation. Loyalty may oblige translators to lay open their translation purposes and justify their translational decisions.

As the only one in the communicative 'game' of translation who knows both the source and the target cultures, the translator plays a powerful role. She could easily deceive her partners without anybody noticing – sometimes even just by 'faithfully' translating 'what the source text says.' Seen in this way, loyalty may be a corrective in the power play among client, author, target receivers, and the translator.

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Functional Categories

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In the generative framework (particularly in the principles and parameters framework, Chomsky, 1981) a distinction is drawn between substantive or lexical categories, such as N(oun), V(erb), A(djective), and P(reposition), on the one hand, and nonsubstantive or functional categories, such as C(omplementizer), T(ense), or D(eterminer), on the other. The distinction roughly corresponds to the traditional one between content and function words.

The contribution of lexical categories (e.g., 'tree', 'walk') is that of conveying substantive content. Functional categories, on the other hand, take on the task of conveying grammatical information about sentence type, finiteness, definiteness, among others. We can think of verbs as an example of a lexical category ('walk') and AGR(eement) or T(ense) as an example of functional categories ('has walked', 'walked').

Basic examples of functional categories are I(nflection), the locus of finiteness in the clause, with specifications for agreement and tense (see examples [1] and [2]) and C(omplementizer), which encodes information about discourse connections and the illocutionary force of the clause (± interrogative, see examples [3] and [4]). In a parallel way Abney (1987) first proposed D(eterminer) as a functional category in the nominal. In English this category would encode information about definiteness and be instantiated by articles, demonstratives, and other determiners (see [5]).

(1) Kim **has** bought apples
I [+AGR], [+TNS]

(2) Kim has promised **to** buy apples
I [–AGR], [-TNS]

(3) you know **that** Kim likes apples
C [−wh]

(4) **what** does Kim like?
C [+wh]

(5) **the/** some/ these apples
D

Given the differences between lexical and, functional categories, there is a division of labor between them. Lexical categories play a role in the interpretation of linguistic expressions, in conceptual aspects. Functional categories' main role, on the other hand, lies in computational aspects of linguistic structures.

Since Chomsky (1970), lexical categories and, later functional categories have been assumed to be feature complexes. Their feature specification differs in accordance with their role in linguistic expressions. Theta features are specific of lexical categories. A lexical category such as the verb *buy* selects a certain set of theta roles, namely an agent and a patient. On the other hand, a functional category such as T(ense), realized for example as the auxiliary *has*, subcategorizes for a certain syntactic category, namely a verb phrase (but not for any specific theta role). Functional categories at the I-level are carriers of information about person, number, tense, etc., known as phi features.

Increasing emphasis has been put on the importance of features in the phrase structure. The division of labor between lexical and functional categories and their respective feature specification is reflected in the way they project: lexical categories must discharge all the theta roles they assign. Functional categories, on the other hand, discharge their subcategorization feature on their complement, a maximal projection. They then take a further maximal projection for the purpose of agreement.

Some functional heads have agreement features and attract a maximal projection to their specifier position for the latter to have their agreement features licensed and, thus, become 'visible.' This is the case for the head I attracting a subject D(eterminer) P(hrase) to the specifier of the I(nflectional) P(hrase). In this sense, then, functional categories are triggers for syntactic movement, depending on their feature strength.

Feature Strength

The features of functional categories are assumed to be valued as either weak or strong. Feature strength is responsible for movement and has a correlate on distributional facts.

Consider, for example, the distribution of the finite verb with respect to the negation in examples (6) and (7) from English and French, respectively, or that of the verbs in the interrogative sentences in (8) from English and (9) from German.

(6a) Kim did not buy many apples
(6b) *Kim buys not apples

(7a) Kim n' a pas acheté
Kim NEG *-have.3*SING NEG *buy.*PART
beaucoup de pommes
*a lot of apple-*PL
'Kim did not buy many apples'

(7b) Kim n' achète pas de pommes
Kim NEG- *buy.3*SING NEG *of apple-*PL
'Kim does not buy apples'

In French, all finite verbs, i.e., both auxiliaries and main verbs, appear to the left of the negative element

pas; in English, on the other hand, main verbs cannot appear to the left of *not*, only modals, auxiliaries and *do* can. Similarly, only modals, auxiliaries, and *do* can appear to the left of the subject in so-called subject–auxiliary inversion. In German, on the other hand, both main verbs and auxiliaries appear to the left of the subject in interrogatives.

(8a) *buys Kim apples?
(8b) does Kim buy apples?
(8c) has Kim bought apples?

(9a) kauf-t Kim Äpfel?
buy-3SING.PRES Kim apple.PL
'does Kim buy apples?'
(9b) hat Kim Äpfel ge-kauf-t?
has Kim apple.PL buy-PART
'has Kim bought apples?'

These differences are explained as differences in structural movement triggered in turn by properties of functional categories, more specifically by their feature value. It is assumed that the value of I is strong in French, but weak in English. Strong I attracts all verbs, weak I only a subset of them. In the case of interrogatives, it is assumed that the C head is strong in German and weak in English. The effects on movement are parallel to those in the IP.

The difference between English and French in one case and between English and German in the other is reduced to the strong/weak contrast in feature value. Although the analysis captures the facts, it might look like a superfluous stipulation if all one wants to say is that main verbs in English do not precede either the negation in a negative clause or the subject in an interrogative clauses and that this is different in French or German. However, the strong/weak contrast accounts for the facts in other domains and in other languages, and thus achieves a higher generalization power.

Functional Categories and Parametrization

The idea of functional categories allowed a new perspective on crosslinguistic variation, restricted to the domain of functional categories in the lexicon.

Chomsky (1995) assumed for each language a computational system and a lexicon. In the principles and parameters framework, universal principles account for those aspects which apply to all languages. Language-specific choices are formulated in terms of parameters, a finite set of options as to how the principles apply. The next question, then, is what these options are and in which language component they are to be found. Following Jespersen's intuition about the syntax–morphology divide, Chomsky assumed that parameters are limited to the lexicon and, within it, to functional categories. This limited lexical variation is of a morphological nature (see Chomsky, 1995: Introduction).

The examples above illustrate parametrization of the functional categories I and C, on the verbal and clausal level respectively.

Functional Categories and Learning

Language-specific choices are formulated in terms of parameters, which account for learnability. Given that functional categories are the locus of parametrization and of the syntactic organization of the clause, they play a central role in theories of both L1 and L2 acquisition.

Early child utterances display obvious differences with adult language. It has been observed (Radford, 1990, among many others) that these differences are related to properties of functional categories, such as omission of complementizers, of finiteness markers, or of determiners. Consider the examples under (10)–(14).

(10) Papa have it (Eve, 18 months) (Guasti, 2003: 106)

(11) Eve gone (has) (Eve, 18 months) (Guasti, 2003: 106)

(12) dog barking (Bethan, 21 months) (Radford, 1990: 84)

(13) Wayne in garden (Daniel, 23 months) (Radford, 1990: 84)

(14) Daddy go? (Daniel, 23 months) (Radford, 1990: 123)

The verb in (10) is not marked for agreement with the subject. Those in (11) and (12), the only verbs in the utterance, are nonfinite forms. Finite verbs or auxiliaries are missing in (11), (12), (13), and (14). Determiners are missing in (12) ('dog') and (13) ('in garden'). The question in (14) lacks a wh-word: the assumed adult utterance would be 'where does Daddy go?' In other words, all these peculiarities can be analyzed as problems with the functional categories C, I, and D.

Debate on this problem, starting in the late 1980s, focused on the question whether the observed differences between initial acquisitional stages and adult grammar were due to the unavailability of functional categories (Radford, 1990) or to their underspecification (Hyams, 1992, 1996; Wexler, 1994), which would explain the nonobligatoriness of tense in matrix clauses.

Bilingual situations, especially early bilingual children, offer an opportunity of observing – and directly comparing – the emergence of different parametric settings and with them language-specific differences (see e.g., Meisel, 1990, 1994) Research from the late 1990s has focused on the optionality observed both in first and second language acquisition. This

optionality has been attributed to the developmental process from underspecified to fully specified functional categories in first language acquisition. In the case of second language acquisition, the discussion centers on the problems encountered by learners when faced with a language whose feature specification is different from their first language, or one in which a certain functional category is not instantiated. An example for the first case could be that of a speaker of French, a language with strong I, learning English, a language with weak I. An example for the second case could be that of a speaker of Chinese or Japanese, languages without articles and which have been assumed not to have the category D, learning English, which does have articles (see e.g., White, 2003).

See also: Formal Models and Language Acquisition; Minimalism; Noun Phrases; Principles and Parameters Framework of Generative Grammar; Syntactic Development; Syntactic Features and Feature Structures; X-Bar Theory.

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Functional Discourse Grammar

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Functional Discourse Grammar is a functional-typological approach to language that (a) has a top-down organization; (b) takes acts in discourse rather than sentences as the basic units of analysis; (c) analyzes discourse acts in terms of independent pragmatic, semantic, morphosyntactic, and phonological modules, which interact to produce the appropriate linguistic forms; and (d) is systematically linked to a conceptual, a contextual, and an output component. A summary of the various properties of this model can be found in Hengeveld (in press); a full presentation of the model is given in Hengeveld and Mackenzie (in press).

A Functional-Typological Approach to Language

Functional Discourse Grammar (FDG) is the successor to Functional Grammar (FG; Dik, 1997a, 1997b), a theory of the organization of natural languages developed by Simon C. Dik and his colleagues since the late 1970s. FDG retains the strengths of FG, in particular by combining typological neutrality with formal rigor; at the same time FDG expands the scope

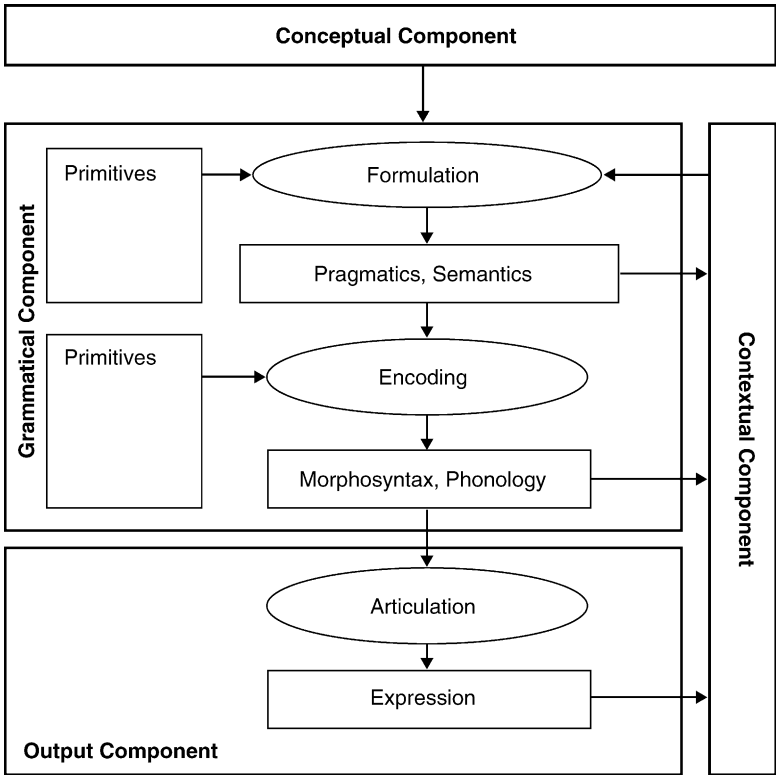

Figure 1 General layout of FDG.

of FG by taking the pragmatic and psychological adequacy of the theory very seriously, adopting as its starting point the communicator's intention to influence his or her interlocutor through the use of linguistic discourse. These notions impose extralinguistic explanatory constraints on the theory: an FDG will succeed to the extent that it clarifies the relation between the instrumentality of the language system in creating and maintaining communicative relationships (pragmatic adequacy) and to the extent that it obeys general cognitive restrictions on the production and interpretation of discourse (psychological adequacy). FDG occupies a position halfway between radically functional and radically formal approaches to grammar. In Butler's (2003) terms, it is a structural-functional grammar.

Linguistic typology, the study of the principles underlying formal variation across the languages of the world, is an essential source of inspiration for FDG, since the theory aims at developing a framework for the systematic description of all possible human languages. At the same time, FDG offers a coherent theoretical framework for typological work that goes beyond the 'basic linguistic theory' to which many typologists ascribe (Dryer, in press). Most importantly, the distinction between the different components of FDG forces the typologist to study the pragmatic and semantic typology of languages systematically, and not merely their syntactic and morphological typology.

Despite the centrality of discourse notions, FDG is not a discourse-analytical but a grammatical model: it captures the formal properties of linguistic units in terms of the world these properties are used to describe and the communicative intentions with which they are produced. This is precisely why FDG can be called a functional model of language.

General Overview

FDG is the grammatical component of a wider theory of verbal interaction. Where linguistic structure is determined by verbal interaction, this is captured as interaction between the grammatical component and a conceptual, a contextual, and an output component (see Figure 1). Within the grammatical component itself, ovals contain operations, boxes contain primitives (the basic building blocks used in operations), and rectangles contain the levels of representation produced by operations. In line with the top-down organization of FDG, we start our discussion of Figure 1 at the top.

At the prelinguistic conceptual level, a communicative intention (e.g., issuing a warning) and the corresponding mental representation (e.g., of the event causing danger) are relevant. The operation

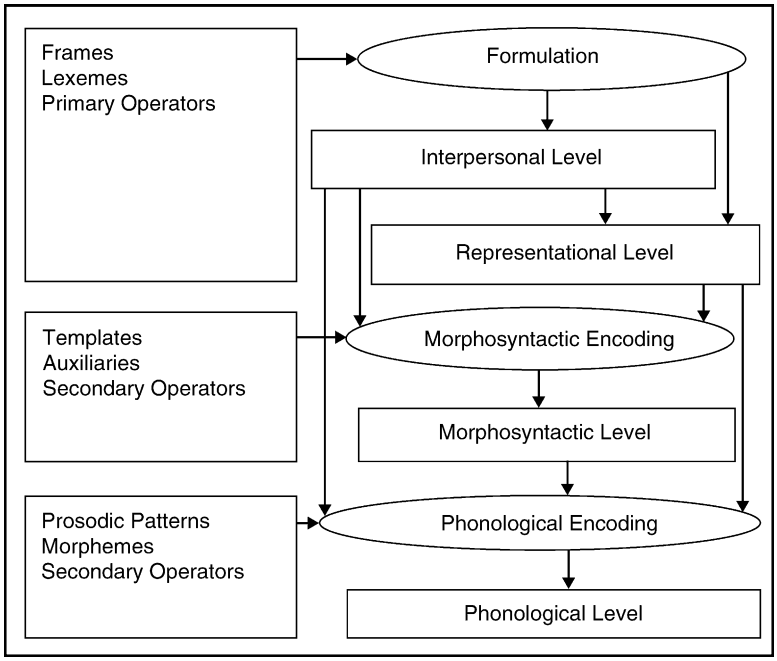

Figure 2 The grammatical component of FDG.

of formulation converts these into interpersonal (pragmatic) and representational (semantic) representations. These in turn are translated into morphosyntactic and phonological representations through the operation of encoding. Just like the rules used in encoding, those used in formulation are language-specific, i.e., FDG does not presuppose the existence of any universal pragmatic or semantic notions. As a result, similar conceptual representations may receive different interpersonal and representational representations across languages, e.g., warnings are in some languages formulated as a distinct type of speech act, whereas in others they receive the same treatment as orders (see 'The Representational Level' below).

The output of the grammar is input to the operation of articulation, which, in the case of an acoustic output, contains the phonological rules necessary for an adequate phonetic utterance. Each level of representation within the grammar furthermore feeds into the contextual component, enabling subsequent reference to the various kinds of entity relevant at each level as soon as they are introduced into the discourse. The formulator draws on this component, so that the availability of antecedents and visible referents may influence the composition of (subsequent) discourse acts.

Figure 2 gives a more elaborate representation of the grammatical component as such. It shows the presence of four different levels of linguistic organization: the interpersonal, the representational, the morphosyntactic, and the phonological, which will be discussed one by one in the following sections. It also specifies the various sets of primitives feeding the operations of formulation and of morphosyntactic and phonological encoding, which we will discuss here.

The set of primitives relevant for formulation consists, firstly, of frames which define the possible combinations of elements at the interpersonal and representational levels for a certain language. Secondly, this set of primitives contains lexemes. In the implementation of the grammar, frames are selected first, and then lexemes are inserted into these. This reflects the options available to the speaker to describe one and the same entity through a variety of lexemes with different connotations and/or denotations. Thirdly, this set of primitives contains primary operators, which symbolize those pragmatic and semantic distinctions grammaticalized in the language under description (e.g., identifiability or evidentiality).

Morphosyntactic encoding makes use, first of all, of a set of templates for words, phrases, clauses, and sentences, and possibly larger units such as paragraphs. The primitives available for this operation also include all free grammatical morphemes. These have to be introduced at the structural level, since they occupy slots in the syntactic configuration, which is determined at this level. The third set of primitives relevant at the morphosyntactic level

consists of (morphosyntactic) secondary operators. These anticipate morphological means of expression, the form of which will eventually be selected at the phonological level.

The primitives used in phonological encoding consist, firstly, of a set of prosodic patterns, which organize the linguistic information coming in from higher levels into coherent blocks. The second set of primitives consists of bound grammatical morphemes that correspond to the primary or secondary operators specified at the higher levels of organization. Bound grammatical morphemes are introduced at the phonological level since in many languages the form of grammatical morphemes may be affected by the syntactic configuration in which they occur. A third set of primitives potentially relevant at the phonological level consists of (phonological) secondary operators. These anticipate acoustic (signed, orthographic) means of expression that are not a direct reflection of a primary operator, as when phonological phrasing is sensitive to the syntactic organization of a linguistic unit.

There are systematic correspondences across the three sets of primitives. Within each set there is a subset of units with a structuring function: the frames used in formulation, the templates in morphosyntactic encoding, and the prosodic patterns used in phonological encoding all serve the purpose of providing an overall structure for their respective levels. Within each set there is, furthermore, a subset of units in phonemic form: the lexemes used in formulation, the free grammatical morphemes used in morphosyntactic encoding, and the bound grammatical morphemes used in phonological encoding all contribute to the cumulative segmental specification of the underlying representations. Finally, within each set of primitives there is a subset of operators: primary operators are relevant to the operation of formulation, secondary operators to the operation of encoding.

The various levels of linguistic organization are all hierarchical in nature and are displayed as a layered structure. In its maximal form, the general structure of layers within levels is as follows:

(1) $(\pi\ \alpha_1\text{: [(complex) head]}\ (\alpha_1)\text{: } \sigma\ (\alpha_1))_\varphi$

Here α_1 represents the variable of the relevant layers, which is restricted by a possibly complex head and further restricted by one or more optional modifiers σ and/or is further specified by an operator π and/or a function φ. Modifiers represent lexical strategies, operators and functions grammatical strategies. The difference between the latter two is that functions are relational while operators are not.

The Interpersonal Level

The interpersonal level accounts for all the formal aspects of a linguistic unit that reflect its role in the interaction between speaker and addressee. The purposiveness of interaction entails that each speaker will employ a strategy, more or less consciously, to attain his or her communicative aims. The formulator employs the interpersonal level to indicate how this strategy is realized, with regard to both the speaker's purposes and to the addressee's likely current state of mind. The units of discourse through which the interpersonal level operates are organized hierarchically, in keeping with the global architecture of FDG, as follows (for ease of reading, the hierarchical structure has been indicated by indentation):

(2) $(\Pi\ M_1\text{: [}$	Move
$(\Pi\ A_1\text{: [}$	Act
$(\Pi\ F_1\text{: ILL } (F_1)\text{: } \Sigma\ (F_1))_\Phi$	Speech occurrence
$(\Pi\ P_1\text{: } \ldots\ (P_1)\text{: } \Sigma\ (P_1))_\Phi$	Speaker
$(\Pi\ P_2\text{: } \ldots\ (P_2)\text{: } \Sigma\ (P_2))_\Phi$	Addressee
$(\Pi\ C_1\text{: [}$	Communicated Content
$(\Pi\ T_I\ [\ldots]\ (T_I)\text{: } \Sigma\ (T_I))_\Phi$	Subact of Ascription
$(\Pi\ R_I\ [\ldots]\ (R_I)\text{: } \Sigma\ (R_I))_\Phi$	Subact of Reference
$\text{] } (C_1)\text{: } \Sigma\ (C_1))_\Phi$	Communicated Content
$\text{] } (A_1)\text{: } \Sigma\ (A_1))_\Phi$	Act
$\text{] } (M_1)\text{: } \Sigma\ (M_1))_\Phi$	Move

The highest layer in this hierarchy, the Move, describes the entire segment of discourse under analysis, with the various lower layers containing components of that segment. The hierarchy also represents the sequencing of linguistic actions: a Move may consist of several temporally ordered Acts; an Act may contain several temporally ordered Communicated Contents, and they in turn may contain multiple Subacts of Ascription and or Reference. To give a simple example, the positioning of an Act before or after a strategically more central Act determines whether it is understood as an Orientation – as in the first element of (3a) – or as an Afterthought – as in the last element of (3b):

(3a) Football, I don't really like it.
(3b) I don't really like it, football.

In conversations, Moves are contributions that either call for a reaction from the addressee or are themselves a reaction. The Move does not correspond exactly to any grammatically identifiable unit of discourse, but its status as Initiation or Reaction does impinge upon its form (e.g., its intonational contour). Moves are composed of one or more Acts of discourse (A_1, A_2, ...), which make up the Head of the Move. An example of a Move containing two Acts is (4):

(4) Watch out, because there may be trick questions in the exam.

The first Act issues a warning through an Imperative Illocution; the second, subsidiary Act provides a Motivation for the warning (signaled by the subordinator *because*).

FDG takes the Act rather than the clause to be the basic unit of analysis in grammatical theory. This is because there is at best a default correlation between Acts and clauses. A speaker will generally not express more of his or her communicative intention than is required to understand it; correspondingly, the analysis of a particular Act in FDG will show only those components that have actually been deployed by the speaker, reflecting the actional nature of this level. In this way, it can be explained, for example, why the Turkish interrogative particle *mI* (which displays vowel harmony) can be attached to structural units of any type: a clause, as in (5a); an NP, as in (5b); or an interjection, as in (5c):

(5a) Ahmet sinema-ya git-ti mi?
Ahmet cinema-DAT go-PAST INTER
'Did Ahmet go to the movies?' (Kornfilt, 1997: 5)

(5b) Bugün mü?
today INTER
'Today?' (Lewis, 1967: 105)

(5c) Tamam mi?
OK INTER
'OK?'

In the construction of an Act, the formulator chooses from three possible frames:

(6a) $(A_1\text{: } [(F_1)\ (P_1)_S\ (P_2)_A\ (C_1)]\ (A_1))_\Phi$ (Illocutives)
(6b) $(A_1\text{: } [(F_1)\ (P_1)_S\ (P_2)_A]\ (A_1))_\Phi$ (Interpellatives, Interactives)
(6c) $(A_1\text{: } [(F_1)\ (P_1)_S]\ (A_1))_\Phi$ (Expressives)

Where a Communicated Content ($\mathbf{C_1}$) is present, the Act belongs to the class of Illocutives. The familiar distinction between explicit and implicit performatives is reflected in the formulator's choice between assigning a lexical or an abstract predicate to the Head of the Speech occurrence ($\mathbf{F_1}$). Thus in (7a), the Head is the verb *promise* but in (7b) the abstract predicate DECL, as shown in the representations in (8):

(7a) I promise to do the washing-up.
(7b) I will do the washing-up.

(8a) $(A_I\text{: } [(F_I\text{: promise}_V\ (F_I))\ (P_I)_S\ (P_J)_A\ (C_I)]\ (A_I))_\Phi$
(8b) $(A_I\text{: } [(F_I\text{: DECL}\ (F_I))\ (P_I)_S\ (P_J)_A\ (C_I)]\ (A_I))_\Phi$

In keeping with the principles of FDG, no more abstract illocutionary primitives will be posited for each language than are justified by the grammatical distinctions present in that language. The primitives from which the world's languages make a selection appear to contain at least those in Table 1.

Table 1 Illocutionary primitives

DECLarative
INTERrogative
IMPERative
PROHibitive
OPTATive
HORTative
IMPRecative
ADMOnitive
CAUTionary
COMMissive

An illocutionary predicate, be it lexical (9a) or abstract (9b), can be specified by a Modifier $\mathbf{\Sigma^F}$ ($\mathbf{F_1}$), such as the adverb *sincerely*:

(9a) Sincerely, this is not a trick.
(9b) I promise you sincerely that this is not a trick.

(10a) $(A_I\text{: } [(F_I\text{: DECL}\ (F_I)\text{: sincerely}_{Adv}\ (F_I))\ (P_I)_S\ (P_J)_A\ (C_I)]\ (A_I))$
(10b) $(A_I\text{: } [(F_I\text{: promise}_V\ (F_I)\text{: sincerely}_{Adv}\ (F_I))\ (P_I)_S\ (P_J)_A\ (C_I)]\ (A_I))$

Where the specification of the illocutionary predicate is grammatical rather than lexical, it is analyzed in FDG as an operator $\mathbf{\Pi^F}$. These operators account for grammatical reinforcement and mitigation of the illocution. Modifiers and operators have been identified for all the units recognized within the interpersonal level.

The Communicated Content ($\mathbf{C_1}$) contains everything the Speaker wishes to evoke in his or her communication with the Addressee. Each Communicated Content contains one or more Subacts, so-called because they are forms of communicative action hierarchically subordinate to Acts. Subacts come in exactly two types. A Subact of Ascription ($\mathbf{T_1}$) reflects an attempt by the Speaker to evoke a property, while a Subact of Reference ($\mathbf{R_1}$) is an attempt by the Speaker to evoke a referent, i.e., a null, singleton, or multiple set of entities or qualities. Evocation is thus a cover term for the actions of reference and ascription.

It is to these Subacts that pragmatic functions such as Topic and Focus are assigned. Every Communicated Content, no matter how brief, will have a Focused Subact, i.e., one that is communicatively salient. The Focus status will be reflected in the encoding of the Subact at the morphosyntactic and/or phonological levels. Communicative salience can be attributed to three different factors: the speaker's strategic selection of new information (New Focus); the speaker's desire that the addressee should attend particularly to a Subact (Emphatic Focus); the speaker's desire to bring out the particular differences and

Table 2 Semantic categories

Semantic category	*Variable*	*Examples*
Individual	X	chair, brother_of
State-of-affairs	e	meeting, cause_of
Propositional content	p	idea, belief_in
Property/relation	f	color, fond_of
Location	l	garden, top_of
Time	T	week, end_of

Table 3 Word formation strategies and semantic categories

Semantic category	*Examples*
f	mean-**ness**, kind-**ness**, false-**ness**
x	writ-**er**, employ-**er**, sing-**er**
e	explora-**tion**, deci-**sion**, deple-**tion**
p	hope-**Ø**, wish-**Ø**, belief-**Ø**
l	brew-**ery**, bak-**ery**
t	summer-**time**, day-**time**

similarities between two or more Communicated Contents (Contrastive Focus). Not all Communicated Contents will have a Topic, however: in minimal or holophrastic utterances, for example, the one Subact will necessarily bear Focus.

A final example will give an impression of the operation of the interpersonal level. The Move (11) will be analyzed as (12), in which an Interpellative Act is followed by an Illocutive Act:

(11) Hey, you dropped your wallet!

(12) $(M_I\text{: } [$
$\quad (A_I\text{: } [(F_I\text{: hey } (F_I))\ (P_I)_S\ (P_J)_A]\ (A_I))$
$\quad (A_J\text{: } [(F_J\text{: DECL } (F_J))\ (P_I)_S\ (P_J)_A\ (C_I\text{: } [(R_I)$
$\qquad (T_I)\ (R_J)]\ (C_I))]\ (A_J)$
$] \ (M_I))$

The Representational Level

The representational level accounts for all the formal aspects of a linguistic unit that reflect its role in establishing a relationship with the real or imagined world it describes, i.e., it concerns designation rather than evocation, the latter being the job of the interpersonal level. The representational level thus takes care of the semantics of a linguistic unit. The semantic units through which the representational level operates are organized hierarchically, in keeping with the global architecture of FDG, as follows:

(13) $(\pi\ p_1\text{: } [$ — propositional content
$\quad (\pi\ e_1\text{: } [$ — state-of-affairs
$\qquad (\pi\ f_1\text{: } \ldots (f_1)\text{: } \sigma\ (f_1))_\varphi$ — property
$\qquad (\pi\ x_1\text{: } \ldots (x_1)\text{: } \sigma\ (x_1))_\varphi$ — individual
$\qquad (\pi\ l_2\text{: } \ldots (p_2)\text{: } \sigma\ (p_2))_\varphi$ — location
$\qquad (\pi\ t_1\text{: } \ldots (t_i)\text{: } \sigma\ (t_i))_\varphi$ — time
$\quad] \ (e_1)\text{: } \sigma\ (e_1))_\varphi$ — state-of-affairs
$] \ (p_1)\text{: } \sigma\ (p_1))_\varphi$ — propositional content

The differences between units at this level may be made in terms of the ontological category designated. To the extent that ontological categories are reflected in the language system, they have the status of semantic categories, each of which is provided with its own variable.

The most frequently encountered semantic categories can be defined taking Lyons (1977: 442–447) as the starting point. Using a terminology different from Lyons's, three semantic categories can be distinguished: individuals, states-of-affairs, and propositional contents. An individual can be located in space and can be evaluated in terms of its existence. A state-of-affairs can be located in space and time and can be evaluated in terms of its reality. A propositional content, being an exclusively mental construct, can be located in neither space nor time. It can be evaluated in terms of its truth.

To these three basic semantic categories three others may be added: properties, locations, and times. Properties (see Hengeveld, 1992; Keizer, 1992) have no independent existence and can only be evaluated in terms of their applicability, either to members of other semantic categories or to the state-of-affairs they describe in general. Thus, the property 'green' applies to individuals, the property 'recent' to states-of-affairs, and the property 'undeniable' to propositional contents. Similarly, the concepts of space and time cannot be reduced to any of the primary semantic categories, but rather specify dimensions of members of those semantic categories and therefore constitute independent semantic categories themselves. This point has been argued in Mackenzie (1992) for location and Olbertz (1998) for time. The various semantic categories are listed and illustrated in Table 2.

Various phenomena in the grammars of individual languages can be understood in terms of the semantic categories designated. Consider the examples in Table 3 of word-formation strategies in English. These examples show that, although there are exceptions, there is a clear relation between the form of this process on the one hand, and the semantic category designated on the other.

The description of an entity type α_1 may take various forms. It may be described through a construction with a lexical head (14) or through a construction with a complex head, consisting of a combination of (other) semantic categories (15).

(14) $(\pi\ \alpha_1\text{: } (f_1\text{: Lex } (f_1)_\varphi)\ (\alpha_1)_\varphi)$

(15) $(\pi\ \alpha_1\text{: } [(\alpha_2)_\varphi \ldots (\alpha_n)_\varphi]\ (\alpha_1)_\varphi)$

Some specific instantiations of these general schemas are given in (16) and (17):

(16) $(1\ x_i\text{: } (f_i\text{: } boy_N\ (f_i)_\varphi)\ (x_i)_\varphi)$
'a boy'

(17) $(\text{Past } e_i\text{: } [(f_i\text{: } read_V\ (f_i))\ (1\ x_i\text{: } boy_N\ (x_i))_{Ag}$
$(1\ x_j\text{: } book_n\ (x_j))_{Pat}]\ (e_i))$
'The boy read the book.'

In (16), a noun, itself designating a property (f_i), gives a simple lexical description of an individual (x_i). In (17), a combination of semantic categories, between brackets, gives a compositional description of a state-of-affairs. The combinations of semantic categories allowed in a language, both in quantitative and in qualitative terms, are specified in terms of representational frames, which form part of the set of primitives that feeds the formulator.

Quantitative restrictions on representational frames in languages may determine the minimum number of arguments required or the maximum number of arguments allowed. Thus, in some languages, such as Turkish, zero-place predicates do not exist, i.e., the minimum valency is one, whereas in other languages, such as Negerhollands, the maximum valency is two and alternative strategies have to be invoked to introduce additional participants, such as serialization. Qualitative restrictions on representational frames concern first of all the semantic categories of the component units, as when a language does not allow a propositional content to occur as an argument of a matrix verb, but requires a paratactic strategy instead. A second type of qualitative restriction concerns the way the relations between the component units of a frame are expressed, in terms of their semantic functions.

Here we will only illustrate the latter type of restriction. In English, a distinction is made between the locative relations *at*, *to*, and *from*, expressing Stative Location, Direction, and Source, respectively. In Tariana (Aikhenvald, 2003: 148), all three relations are expressed by the same case-suffix *-se*. These different ways of dividing the locative domain are captured through differences in the predication frames available for these languages. In Tariana, predication frames contain the general semantic function Location, as illustrated in (18):

(18) $(\pi\ e_1\text{: } [(f_1)\ (x_1)_{Ag}\ (l_1)_{Loc}]\ (e_1))$

English predication frames contain the more specific functions Stative Location, Direction, and Source:

(19a) $(\pi\ e_1\text{: } [(f_1)\ (x_1)_{Ag}\ (l_1)_{StLoc}]\ (e_1))$
(19b) $(\pi\ e_1\text{: } [(f_1)\ (x_1)_{Ag}\ (l_1)_{Dir}]\ (e_1))$
(19c) $(\pi\ e_1\text{: } [(f_1)\ (x_1)_{Ag}\ (l_1)_{So}]\ (e_1))$

Although predication frames are language-specific, the expectation is that important typological generalizations can be made in the form of implicational statements.

The nature of an entity type and the way its description is built up are not indicative of how the linguistic unit representing that entity is used within a discourse act. Entity types are categories, not functions. The functional analysis is given at the interpersonal level. Thus, the same property (f) may be either ascribed (T) to an entity, or it may be referred to (R). The following examples illustrate this point:

(20a) The teacher is **tall**.
(Ascription of zero-order entity: T/f)
(20b) **Tallness** impresses the teacher.
(Reference to zero-order entity: R/f)

(21a) Sheila is **a friend of mine**.
(Ascription of first-order entity: T/x)
(21b) **A friend of mine** visited me last night.
(Reference to first-order entity: R/x)

A more elaborate representation of (20) is given in (22):

(22a) $(C_I\text{: } [\ T_I \quad R_I \quad]\ (C_I))$
$(p_i\text{: } (e_i\text{: } [\ (f_i\text{: } \mathbf{tall}_A\ (f_i)) \quad (x_i\text{: } teacher_N\ (x_i))_\varnothing \quad]\ (ei))\ (p_i))$
(22b) $(C_I\text{: } [\ T_I \quad R_I\ R_I \quad]\ (C_I))$
$(p_i\text{: } (e_i\text{: } [\ (f_i\text{: } impress_V\ (f_i)) \quad (f_i\text{: } \mathbf{tall}_A\ (f_i))_{Ag} \quad]\ (e_i))\ (p_i))$
$(x_i\text{: } teacher_N\ (x_i))_{Exp}$

Examples such as these show that, though there are regular correspondences between the interpersonal and the representational levels, the two are basically independent of each other, allowing for a wide variety of interactions between them.

The Morphosyntactic Level

The morphosyntactic level accounts for all the linear properties of a linguistic unit, both with respect to the structure of sentences, clauses, and phrases, and with respect to the internal structure of complex words. The set of primitives used in morphosyntactic encoding provides the appropriate templates on the basis of which the morphosyntactic level is structured. Like other levels, the syntactic level and the templates it uses are hierarchically organized. It uses bracketed structures and category labels to capture the relevant formal properties of linguistic units within the language concerned, as in the following example:

(23) The girl danced beautifully.

$[$	Sentence
$[$	Clause
$[\text{the}_{Art}\ \text{girl}_N\text{-SG}]_{NPi}$	Noun Phrase
$[\text{dance}_V\text{-PAST}\ [\text{beautifully}_{Adv}]_{AdvP1}]_{VPi}$	Verb Phrase
$]_{CLi}$	Clause
$]_{Si}$	Sentence

As this example shows, the morphosyntactic representation captures the constituent structure of the

sentence as well as the internal ordering of elements within words. Thus, there are secondary operators serving as place-holders for the expression of singularity (SG) and past tense (PAST), which will receive their final phonemic expression at the phonological level.

Given the functional orientation of FDG, the expectation is that often the ordering properties of languages can be explained in terms of the meaning and use of linguistic units. The fact, however, that many other ordering properties are governed by independent principles warrants the postulation of a separate morphosyntactic level within the grammar, rather than as the output of the grammar as in FG. Further motivation for the presence of this level within the grammar is the fact that anaphoric reference can be made to morphosyntactic units, as in the following reaction to (23):

(24) **That**'s not what I would call **it**.

In this example *that* refers to the morphosyntactic syntactic unit selected for description (here $AdvP_i$), whereas *it* refers to the property described by that syntactic unit, which is represented at the representational level by means of an f-variable. By providing morphosyntactic constituents with an index, anaphoric reference can be established with each of them.

The existence of independent interpersonal, representational, and morphosyntactic levels within FDG is particularly useful when there is a discrepancy between them, i.e., in those cases in which morphosyntax does not mirror the semantic representation directly. A case in point is the phenomenon known as 'raising,' as in the following examples:

(25a) It seems that Sheila has arrived.
(25b) Sheila seems to have arrived.

'Raising' is functionally motivated, since the information structure of the discourse act as represented at the interpersonal level is decisive: in (25a) the constituent Sheila is part of the new information, in (25b) it is not. This factor is used in FDG to trigger the selection of the appropriate syntactic template, in which the Subject of the embedded clause in (25a) is treated as the Subject of the main clause in (25b) when provided with the pragmatic function Topic at the interpersonal level. At the same time, the semantic units underlying the embedded clause in (25a) has to be broken up, in the sense that elements logically belonging together end up in different places in order to meet the requirements of the interpersonal level. This is indicated in (26a) and (26b), which show the correspondences of the syntactic units involved in (24a) and (24b) with interpersonal and representational units.

(26a) $(C_I$: [(T_I) $(R_I$: [$(R_J)_{FOC}$ $(T_J)_{FOC}$] $(R_I))$] $(C_I))$
$(p_i$: [(f_i) $(p_j$: [(x_i) (f_j)] $(p_j))$] $(p_i))$
$[[\text{It}]_{NPiSubj}$ $[\text{seems}]_{VPi}$ [[that] $[\text{Sheila}]_{NPjSubj}$
[has arrived]$_{VPj}$ $]_{CLi}$ $]_{Si}$

(26b) $(C_I$: [$(R_J)_{TOP}$ (T_I) $(T_J)_{FOC}$] $(C_I))$
$(p_i$: [(x_j) (f_i) (f_j)] $(p_i))$
[$[\text{Sheila}]_{NPiSubj}$ $[\text{seems}]_{VPi}$ [to [have arrived]$_{VPj}$ $]_{CLi}$ $]_{Si}$

In this way, syntactic configurations can be seen as the outcome of an interplay between interpersonal and representational considerations.

The Phonological Level

The phonological level accepts input from the Interpersonal and Morphosyntactic levels and provides input for the extragrammatical processes of articulation. In a complete FDG, the phonological level will be supplemented by a graphological and a gestural level, for written and signed communication, respectively.

FDG concentrates on those aspects of phonology that reflect the functioning of language in communication. Aspects directly influenced by the interpersonal level include the phonological reflection of the division of Moves into Acts. FDG distinguishes, in terms that anticipate the actional, temporally sequenced nature of phonetic activity, phonological Moves and phonological Acts, which in general correspond one to one with their congeners at the interpersonal level.

Within the phonological Act, the choice of Illocution type in many languages impacts upon the intonation: in languages such as Spanish, DECL and INTER Illocutions are rendered as distinct intonation contours, whereas in others (e.g., Japanese), this distinction is handled morphosyntactically, with little or no effect on the phonology. Similarly, the selection of the operator EXCLamative may bring about the selection of a marked word order template (for example), but is frequently encoded at the phonological level by relatively wide-ranging pitch movement; similarly, languages may make systematic use of phonological means to indicate an ironic intention.

Within the Act, such interpersonal functions as Topic and Focus, especially in languages where these have no morphosyntactic repercussions, must be indicated by relative accentual prominence. Distinctions between New, Contrastive, and Emphatic Focus may all be handled phonologically, as in English, cf. (1), where capitalization indicates the strongest accent:

(27a) She bought this beautiful DRESS. (New Focus)
(27b) She bought this BEAUTIFUL dress.
(Emphatic Focus)
(27c) SHE bought this beautiful dress.
(Contrastive Focus)

In other languages, these Focus contrasts may be reflected in morphosyntactic constructions or even lexically (i.e., via a Modifier).

The linear sequence emerging from the morphosyntactic template may be differently partitioned at the phonological level. Thus the template for Dutch subordinate clauses will place the complementizer *dat* in clause-initial P1 position and a 3rd person masculine pronominal subject in the following S position, as independent constituents; the phonological level will merge them into one phonological word:

(28)	MsL:	Ik	wou	dat	hij	kwam
		1ps	*want*.PAST	COMP	*3ps*	*come*.PAST
				P1	S	Vfin
		'I wish he would come.'				
	PhL:	/[kʋau]		[dɑti]		[kʋɑm]/

It is at the phonological level that segmental information about bound inflectional morphemes becomes available on the basis of paradigmatic knowledge. In Latin, for instance, the abstract suffix [–ACC.SING] will be placed at the morphosyntactic level but only at the phonological level will receive its form, e.g., */-am/* in the context of */femin-/* 'woman' and */-um/* in the context of */uir-/* 'man.'

Conclusion

Functional Discourse Grammar is a functional-typological theory of language that strives for psychological and pragmatic adequacy. This is reflected in its top-down organization, and in the fact that it takes discourse acts rather than sentences as the basic units of analysis. Within the underlying structure of utterances, four levels of analysis are distinguished. The form of utterances is accounted for as the outcome of the interaction between these levels. FDG has been developed on the basis of typological work, but at the same time offers important tools not only for typologists interested in syntactic and morphological typology, but also for those interested in pragmatic and semantic typology.

See also: Functional Grammar: Martinet; Functionalist Theories of Language; Halliday, Michael A. K. (b. 1925); Systemic Theory.

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Functional Grammar: Martinet

A Martinet

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Functional Linguistics: A Short Historical Survey

In the course of the 20th century, the term 'functional' has been applied, on several occasions, to different types of linguistic practice. First of all, by members of the Prague Linguistic Circle, from the late 1920s onward, with a value close to the one that will be retained here. Later on, by Louis Hjelmslev with a sense reminiscent of its mathematical use and akin to that found in 'grammatical functions,' i.e., pointing to relations between items. More recently, it has been used by some followers of the transformational and generative trends, or by people initially influenced by, but departing from, them. As this article shows, the functional linguistics recommended employ 'functional' in its most usual meaning of 'adapted to achieve some end.' This use has been adopted, to some extent at least, by the members of the International Society for Functional Linguistics (= SILF, standing for the French Société internationale de linguistique fonctionnelle).

The first linguists who pointed to the necessity of a conscious functional approach were the Prague phonologists. In the wake of Karl Bühler (1931), they operated with the principle of abstractive relevance, according to which any scientific approach chooses a viewpoint that determines what observable facts shall be retained and what shall be disregarded as irrelevant for a given research. Experience has shown that the functioning and evolution of languages depends first and foremost on their use as communicative mediums. Therefore, communicative relevance is the first, if not the sole, relevance to be reckoned with.

In the same way as glossematics took shape as a reaction to Prague teachings, functional linguistics, stemming from the same Saussurian stock, has in many respects developed in contrast to glossematic positions (Martinet, 1977). The main features that characterize glossematics are (a) the constant parallelism between the two faces of the sign presented as expression and content, (b) the rejection of phonic and semantic substances in favor of pure relations, this leading to (c) the disregard of changes affecting substance, resulting in a tendency to equate the successive stages of a language and thereby leading to a purely static approach.

On these three points, functionalism is in total disagreement: (a) the asymmetrical pattern of double articulation into phonemes and monemes contrasts with Hjelmslev's isomorphic approach; (b) relevant substance is retained in order to qualify relations; and (c) changes in substance are found to pave the way toward a reshuffling of the relational network.

Operating with relevant substance leads to positing a functional linguistic reality. Linguistic structures are thus deemed to be facts with a real existence in human behavior and by no means, as widely assumed, mere contrivances of the descriptivists.

Contrasting with the enrichment derived from the permanent, even if antithetic, contacts between glossematicians and functionalists, the reaction of the latter to generativism has always been totally negative (Martinet, 1975: 82–88). The assumption of an innate language organization distinct from the various mental equipments of man was rejected from the start as gratuitous. The arbitrary and conflicting statements regarding a so-called deep structure were denounced as entirely subjective (Martinet, 1975: 231–32). The transformative operation was described as an unnecessary departure from an observation and comparison of real utterances leading to the establishment of syncretisms.

Functionalism was introduced into the UK by Jan Mulder, and later developed at St. Andrews University by Mulder and Sándor Hervey (1980). Its basically axiomatic basis has been emphasized and a logical apparatus devised that anticipates a confrontation with a large variety of linguistic facts, a procedure that contrasts with the more pragmatic, step-by-step 'continental' approach.

An Empirico-Deductive Approach

The obvious fact that languages differ through space and time is indicative of the nature of human language. It points to its constant adaptation to the varying needs of human communities. Contacts will breed linguistic convergence, with concomitant divergence among those who do not participate in the same contacts. This amounts to saying that communicating with language may be conducive to linguistic changes and, in short, that languages change because they function. Those who describe languages should take this into consideration and, by comparing the usages of coexisting generations, try to determine the direction and rhythm of their evolution.

The observation of natural languages has shown that they have a number of features in common – first of all, their communicative function. No one would

deny their fundamental contribution to the ordering of human experience. But this results from the analysis of that experience made necessary by the need to communicate it from person to person.

The next common feature is their use of vocal utterances. This is often forgotten – nay, intentionally omitted – by those who want to operate with relations rather than substance or do not feel at ease in phonic matters. The argument that some languages practically exist only in a written form is invalidated by the fact that they originated as spoken mediums and are organized accordingly. The linearity of speech could, in Saussurian terms, be considered irrelevant for 'language' proper, the occasional use of respective position in the spoken chain for indicating relations being bypassed as belonging to substance and not to the relational pattern. But it should be clear that if mankind had resorted to visual signs for interhuman communication, the analysis of experience, prior to its transmission, would have been of a totally different nature. Functionalists (Martinet, 1975: 26–29) do away with linearity in their two-dimensional visualizations. But they do not mean thereby that the auditory nature of linguistic exchanges that imposes that linearity has no bearing upon the way man perceives the world.

A third common feature is the double articulation of utterances into significant units whose perceptible form is, in its turn, articulated into distinctive units. Many linguists, even among functionalists, are tempted to argue that one could distinguish between more than two articulations, such as that of significant units into semantic features and that of distinctive units into distinctive features, which no one denies. But what is essential is the distinction between what is significant and what is just distinctive. Here again, those who refuse to consider the written form of a language as an additional code could argue that ideographic writing systems do not go beyond a first articulation. But they would thereby forget that all ideographic systems must at some point have recourse to phonic, i.e., distinctive nonsignificant, features.

By stipulation, we shall call 'a language' any form of human behavior that shares the above-mentioned three features. Arguing that the validity of our assertion has not been checked for all the past, present, and future 'languages' of the world does not make sense, because by means of our stipulation, we actually redefine the term 'language' and decide that it shall not be used in reference to any object that would not conform to our definition. All scientific terms should, of course, be carefully redefined.

Some linguists take exception to our stipulation by arguing that it leaves out some features that are obviously present in what all would agree to call a language, as, for instance, 'intonation,' or more generally prosodic or suprasegmental traits. The answer is that 'vocal,' in reference to linguistic utterances, implies 'voice,' which in its turn implies 'melodic curve,' which takes care of 'intonation.' Intensity and duration are similarly implied. For what purposes individual languages make use of the ingredients is not of concern here.

Our stipulatory, or should we say 'axiomatic,' approach takes care of what it has been fashionable to refer to as 'universals.' It would defeat our purposes to posit universals that are not implied in our formulation. Whatever does not conflict with it cannot be excluded from a language, be it positive or negative. For instance, the assumption that the distinction between noun and verb is universal cannot be made, because it is not implied by our definition. It should go without saying that being rendered in English by means of a verb or a noun does not make a foreign significant unit a verb or a noun. In other words, what is relevant in language A does not make it relevant in language B.

Functional Grammar

Functional grammar is concerned with the identification, classification, and functioning of significant units. It presupposes a phonology whose main task is the identification of distinctive units. It precedes a study of the lexicon, i.e., an examination of each significant unit, not taken care of in the grammar, in its relations to the analysis of man's experience.

The minimal linguistic unit combining an acoustically perceptible form and a reference to some aspect of experience is called a 'moneme.' Utterances are analyzed into monemes by means of the commutation test, which consists in looking for and comparing utterances that differ only on account of one minimal meaningful segment. A meaningful element is said to be minimal if it cannot be further analyzed into such segments. Many linguists refer to minimal significant units as 'morphemes.' But it is preferable to avoid this term, which suggests form rather than meaning. Once form has played its identifying role, only meaning should count, as implied by the term 'significant.' The linguistic ideal would seem to require that each meaning should always correspond to one and the same form and that one and the same form should always correspond to the same meaning. Actually, it frequently happens that the same meaning assumes different forms in different contexts as, e.g., *-s* in *cows* and *-en* in *oxen* with the same meaning 'plural,' and the same form assumes different meanings, as in *last* $\neq$ *first* and *last* = *to endure*. Here, *-s* and *-en* stand for the same moneme, $last^1$ and $last^2$ for different ones.

Among monemes identified by means of the commutation test, a first distinction is to be made between joint and free monemes: *farm* is free in *the farm was sold*, but joint in *farmer, farmyard*, and *farmhand*. A free moneme refers to a definite element of experience; a joint moneme, as such, does not. A combination of joint monemes is called a 'syntheme.' Free monemes and synthemes may receive determinations: *a big farm, a large farmyard, a strong farmhand*; joint monemes cannot. Synthemes commute with free monemes and maintain the same relations within the utterance. Therefore, what is said henceforth about monemes applies to free monemes and to synthemes as well. Complex monemes, such as participles, that share the compatibilities of different classes or present their own set of compatibilities are said to be 'parasynthemes.' Since individual speakers are free to make new synthemes according to certain patterns, 'synthematics,' which partially coincides with traditional 'word building,' belongs to grammar as an aspect of the functioning of significant units.

Speakers are not free to combine monemes at will if they want to be understood. The appearance of some type is often dependent on the presence of some other type. In such a case, the monemes of the former type are said to be 'subordinated' to those of the latter. Where no such restrictions exist, the monemes that are found to maintain the same relations to the context are said to be 'coordinated.'

Utterances consisting of several monemes are normally found to center around one of them or around two or more coordinated ones, which can be designated as the nucleus, the rest being its satellites. In *I worked on my father's farm*, the nucleus is *work-*; *I* enjoys a special status because its elimination would destroy the utterance. It is traditionally interpreted as what is talked about and accordingly called the 'subject.' Both *-ed*, as the form of the preterite moneme, and what follows are dispensable satellites. In *my father's farm, farm* acts as the nucleus of its satellite *my father's*. A specific designation was needed for the nucleus of the complete utterance. The term 'predicate' was chosen for that purpose, although it originally covered not only the nucleus but all its satellites except the subject.

What is called a 'verb' is a moneme that is used only as a predicate (or a predicatoid, i.e., the nucleus of a subordinate clause or, in other words, a full statement functioning as the satellite of another). Predicates are not necessarily verbs: in Russian *dom nov* 'the house is new', the predicate is *nov* 'new', but *nov* can function as a satellite in *nov-yj dom* 'new house'.

Some monemes never act as nuclei but always as satellites. They are called 'modalities' or 'modifiers.' They often appear as grammatical endings, such as the *-ed* of *worked*. But *my*, in *my father's*, is also a modality. A modality requires, of course, the presence of a nucleus.

A 'relator' (or 'functional') is a moneme that connects two monemes or moneme clusters, either coordinated or subordinated. Traditionally, coordinators such as *and, or, but* are called conjunctions; subordinators are conjunctions when they connect two clauses. They are prepositions, postpositions, or case endings elsewhere. A relator obviously requires the presence of two or more than two monemes or moneme clusters.

Another way of expressing the relation between nuclei and satellites is the use of 'determine' or its derivatives: the nucleus is said to be determined by its satellites, and the satellites are the determinants of the nucleus.

Monemes are said to be compatible with one another if they can meaningfully combine in an utterance. This does not necessarily imply contiguity: *farm* is found to be compatible with the article *the* in *the rich and big farm*.

Moneme classes are established on the basis of their mutual compatibilities. They are found to differ from one language to another. This was not generally assumed for the traditional parts of speech. Describers should not be led astray by the translations into their own language of the utterances they are analyzing. What appears as an adjective in a translation may well be a verb or a noun in the original. If, as has just been done here, the terms 'adjective,' 'verb,' and 'noun' are retained in reference to the moneme classes of a new language, they should be carefully redefined after a complete survey of the compatibilities of each class. It should not be assumed that all languages distinguish between adjective, verb, and noun classes.

Monemes belonging to a class are apt to be transferred to other classes: by dropping the moneme that a relator connects with the rest of the utterance, the relator ceases to be one and becomes the determinant of what precedes, as in *go through, stand for; blind* remains an adjective when it designates those who cannot see, but it is transferred to the noun class in *the blinds of the windows*. Cardinals, in French, which are constantly transferred from one class to another, may as well be considered as forming a class of their own.

Beginners should be warned against assuming the existence of a moneme when a formal distinction does not contribute any new information. This is the case of gender in a language like French. Except in some derivatives, the feminine gender in that language is manifested not in the noun itself but in its

determinants, articles, or adjectives. The word *classe* 'class' happens to 'be' feminine. All French speakers know that accordingly it requires feminine concord, which means that the use of the article *la* instead of *le* contributes no information whatsoever. Therefore, the feminine gender is not a moneme. In the same language, there is a female sex moneme that appears as *-esse* in *poétesse* 'female poet' or as *-ière* in *épicière* 'female grocer', as opposed to *épicier*, her male equivalent. But since the gender mark in the adjective *entière* 'entire' versus *entier* is homonymous, traditional grammarians are apt to confuse feminine gender, a morphological accident, and female sex, a full moneme.

In the same vein, no moneme should be posited for a gap in a grammatical paradigm. With a language with a past tense moneme and a future tense moneme, one is tempted to assume the existence of a present tense moneme. But in such languages, it is frequent that what is called the 'present' is formally identical with the bare stem of the verb, i.e., the verbal moneme itself. Should that form be restricted to the expression of events taking place precisely when the speech is being delivered, one would have to posit a present moneme with the positive meaning 'present' even if its form is zero. But as a rule, the bare stem is also found in reference to past and future events (cf. *call me before you come*) and generally when no definite time period is implied. In French, for instance, where personal endings are added to the bare stem in the so-called present tense, no present tense moneme should be identified. In English, where the present tense is positively characterized by third person singular *-s*, the existence of a present tense moneme could be argued.

The same remark applies to the singular number in languages where the bare stem is used for the species as well as for a unit, e.g., *man, the lion*. The same could be said about the indicative mood, which, again, normally coincides with the bare stem and just points to the existence of an event. But a zero form does not necessarily coincide with the absence of information: in Russian, the endingless *ryb*, among full forms such as *ryba*, *ryby*, harbors three distinct monemes with the meanings of 'fish,' 'plural,' and 'genitive.' Here again, what counts, when dealing with significant units, is meaning.

Generally speaking, concord amounts to repeating the same information in different places in the utterance, as, e.g., in Latin *bonorum vinorum* 'of good wines' where 'plural' and 'genitive' appear twice but are meant once. In the case of French gender, the *-a* of the article *la* is properly a part of the 'feminine' moneme *classe*. It is precisely what distinguishes *la voile* 'the sail' from *le voile* 'the veil.' In such cases, one operates with the discontinuous form of a moneme or, for short, a discontinuous moneme.

It is quite frequent that the commutation test confirms the presence of a moneme, but in such conditions one is not in a position to ascribe to it a definite segment of the utterance. This applies to Latin *vinorum*, where it cannot be discerned which parts of the total should be ascribed to 'wine,' 'genitive' or 'plural' respectively. In such cases, the forms of the monemes are said to be 'amalgamated.'

These various accidents should not prevent us from operating with monemes and incite us to resort to the traditional notion of 'word.' Even if it may prove useful in the description of a language like Latin, it cannot be accurately defined in general linguistics except in reference to the written forms of languages that make use of an alphabet. The closest one can get to pinning down the 'word' in the basic spoken form of language is by starting from the grammatical phrase, or syntagm. This consists in a nucleus with its various determinants and, as the case may be, a relator connecting it to the rest of the utterance. The largest grammatical phrase is the sentence, where whatever sounds as a relator (e.g., *but*) is actually transferred to some adverbial class, i.e., used as a determinant of the predicate. As an illustration of a full grammatical phrase, with all its ingredients, one can choose *of the large gardens* where *garden-* is the nucleus, *large* is a determinable determinant (as in *very large*), *the* and *-s* are modifiers, and *of* is the relator. The term 'syllemma' has been proposed for a grammatical phrase limited to its nucleus, its modifiers, and its relator. If the determinable determinant *large* is removed, the grammatical phrase is reduced to the syllemma *of the gardens*. Now, if in a syllemma the modifiers and the relator come before the nucleus, they are likely to be words in their own rights, as is the case here with *the* and *of*. If they come after, they will probably constitute a single word with the nucleus, as in *garden-s*. In *havernes*, the Danish equivalent of our syllemma, both the modifiers, *-er-* 'plural' and *-ne-* definite article, and the relator *-s* follow the nucleus, and the syllemma corresponds to what is called a 'word.' The reason for this difference of treatment is clear: significant segments are normally identified in speech before their final phonemes are uttered. It is therefore essential to preserve the identity of the initial part of each of them by avoiding amalgamation with what precedes, whereas that of the final part is less important and offers less resistance to blurring. One could be tempted to define the word as a syllemma where determinants and relator follow the nucleus. But there are exceptions, like Greek *elabon*

'I took', written as a single word in spite of the initial position of the modifier *e-*, a past tense moneme. Besides, such 'words' as *of* or *the*, being modifiers, cannot be identified as the nuclei of syllemmas. It should be clear that a functional grammarian is under no obligation ever to operate with the notion of syllemma.

Syntax is often conceived as dealing with the combinations of significant units (usually conceived as 'words') in utterances. Functionally, it is best understood as the study of how the hearer can manage to derive a meaning from a succession of significant units or, in other terms, to reconstruct, beyond the articuli of speech, the experience the speaker wants to communicate. It is, from the start, clear that relators like *-s* in *man's speech* or *of* in *the speech of man* should play a great role in such matters. But plain contiguity is often resorted to. The identification of a moneme as belonging to a certain class may suffice to indicate the nature of its relations to its neighbors: *good*, as an adjective, is known to qualify a following noun; *-ed* is known as a modifier of the verb to which it is tagged, and so forth. In other words, the first chapter of syntax will consist in the inventory of moneme classes, including, of course, all the compatibilities of each class.

This will suffice in a number of cases. But stating that in English verbs and nouns are compatible, the former as a nucleus, the latter as a satellite, does not give all the required information, because the mutual relations between verb and noun vary from one utterance to another and within the same utterance: the noun may act as a subject, an object, a beneficiary, an indication of time, space, or manner, and so on. These different functions may be indicated by means of the respective positions of verb and noun, e.g., the noun in subject function appearing before and that in object function after the verb. But this will have to be eked out by means of some relators, also referred to as 'functional indicators.' Another possibility is to coordinate several verbs, each one requiring its own determinants, as when *I write a letter to my son* becomes *I letter write give my son*. But of course *give*, in such a case, may be interpreted as resulting from a transfer from the verb class to that of subordinating relators.

Within a class, the nature of possible relations varies from one moneme to another. This is illustrated by the traditional distinction established between transitive and intransitive verbs. But in order to be exhaustive, one shall have to tell which verbs can combine with a beneficiary (e.g., *to give*), which verbs do not need a real subject (e.g., *to snow*) because the action referred to is conceived as self-sufficient, which verbs cannot appear without an object (e.g., *to put*), and so forth. In short, each moneme likely to act as a nucleus can be expected to maintain different relations with its satellites. The listing of all of these is best left to the lexicon, the grammarian, as such, being satisfied with the identification of the different types of relations for each moneme class.

As pointed out earlier in this article, the form of a moneme may vary from one context to another: *keep* appears as *kep-* before the preterite moneme /-t/, *have* is reduced to *ha-* before the /-d/ variant of the same modifier; *go* + the preterite appears amalgamated as *went*; the genitive moneme of Latin presents 10 different avatars. Concord is widely responsible for the formal variations of monemes. As suggested earlier, the material changes determined by concord should be ascribed to the moneme whose choice caused them. This rule, if strictly applied, would not only ascribe the *-a* of the definite article to the feminine noun that it accompanies but also every additional element that the choice of such a noun entails in the determining adjectives: if the French moneme for 'chair' is supposed to assume the form /-aʃɛz/ in *la chaise*, it will become /-a . . . -dʃɛz/ in *la grande chaise*, since no to /d/ is sounded in the masculine *grand*. Of course, once such variations have been identified as zero for the communication of information, one may be allowed to list the ones implied by the feminine gender of nouns in *see* **Adjectives**. In a similar way, using declensional patterns is probably the most sensible approach to the presentation of the forms of Latin cases. But one should not forget that the *-ibus* of *civibus* and the *-is* of *dominis* are linguistically identical, viz. datives and ablatives.

All of this belongs in the section on morphology in this encyclopedia. The unfortunately widespread opinion that morphology involves, and even consists in, the study of the relations between the components of the 'word,' just like syntax takes care of the relations between 'words,' should by all means be denounced as a misinterpretation of the contents of classical grammars.

Morphology, or accidence, is nothing but the presentation of the formal accidents that may complicate the task of youthful or adult learners, but do not have the least bearing upon the information utterances are meant to convey. Formal accidents may, of course, be prosodic as well as phonematic and also include deviations in the respective positions of monemes.

The insistence on a strict distinction between morphology and syntax as respectively negative and positive from the point of view of the success of communication and ease in the handling of the linguistic tool does not entail that each should be dealt with in two different articles. The presentation of each class should include a thorough survey of the

various accidents every one of the monemes involved may incur. But this should by no means exclude the possibility of dealing with some morphological facts prior to the listing of the classes. Such features as German umlaut, which affects the morphology of several moneme classes, are best presented in an introductory part of the grammar and referred to later when dealing with specific problems, such as plural of nouns, personal inflection of verbs, and so on. This means that the way morphology will be introduced in the grammar will depend on the nature of the formal accidents in the language at issue.

Grammar dealing with significant units, it is to be expected that semantics will not be absent from it. The problem is how much of it will be handled here and how much will be left for the lexicon. Spelling plays a role in this connection, because written 'words' will be included in the lexicon, but endings will be left out. This conflicts with the functional approach, which implies that modifiers and relators be handled together irrespective of whether they appear as 'words' or as parts of 'words.' Linguistic reality, as distinct from its formal vagaries, demands that, e.g., relators should be handled together and confronted, whatever form they may assume: endings, prepositions, or respective position. With this reservation, there is no reason to depart from the habit of dealing, in the grammar, with the semantic values of the units belonging to classes where they can be exhaustively listed and leaving those of others to the dictionary. In the same way that linguists distinguish in phonic matters between phonetics dealing with objective reality irrespective of its function, and phonology where matters are handled in reference to communicative relevance, it is recommended that a distinction be made between semantics proper, where differences of meaning are considered irrespective of whether they correspond to some formal difference, and axiology, where only relevant significant features are retained, namely those that are orally perceptible.

The describers of a language cannot hope to give an exhaustive presentation of all its varieties. Whether they should concentrate on an idiolect or a sociolect or try to cover a number of different usages depends on what their aims are. They might choose to concentrate on the spoken practice or cover the written form as well, and the problem arises of whether the two aspects should be dealt with separately, particularly in the case of an ideographic writing system. But even with an alphabetically written language, it may be advisable to present two different analyses, at least for some of the moneme classes. In standard written French, personal endings may differ from one verb to another. For present indicative first, second, and third singular, there is for *dorer* 'to gild', *-e*, *-es*, *-e*, in *je dores, tu dores, il dore*, but for *dormir* 'to sleep', *-s*, *-s*, *-t* in *je dors, tu dors, il dort*. In daily oral practice, all these endings are silent and all the forms sound /dɔr/ (note, with linking, the same pronunciation /dɔrtil/ for *dore-t-il?* 'does he gild?' and *dort-il?* 'does he sleep?'). This means that one has to operate in one case and with two different conjugations and first, second, and third singular, in another with verbs with the same radical throughout versus verbs with varying radicals: cf., e.g., *nous dorons* 'we gild' /dɔr-/ versus *nous dormons* 'we sleep' /dɔrm-/. Here is a situation where the distinction between spoken and written coincides with two different levels, one more solemn and one more spontaneous. But these are not necessarily confused: to familiar and slangy forms normally correspond written renderings, and rhetoric and ritual usages often present some specific oral features. All of this goes beyond grammar, involving as it does phonetics, phonology, and vocabulary, but it includes it.

See also: Adjectives; Functionalist Theories of Language.

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hearer have something in common. Or, similarly, that a killer, a sender, and a dancer have something in common. Though it is true that a killer and a sender are not the same thing, they both instigate an event or action, usually volitionally. Therefore, they are purposefully instigating some event. Similarly, with the hearer and the believer, both are having some sort of internal experience, one perceptual and one cognitive. No event or action is being instigated in either case, nor is the experience normally volitional. Thus, they do have something in common. The generality problem can be formulated as follows. Given relations that are similar (for example, hearer, see-er, smeller, and taster can be classed together as perceivers; and believer, thinker, and knower can be classed together as cognizers), is it appropriate to postulate 'perceiver' and 'cognizer' as distinct thematic relations? Or is it appropriate to establish a more general role of 'experiencer' and then set up 'cognizer' and 'perceiver' as allorelations of that one more general relation?

These questions cannot be answered purely semantically, because both possibilities can be justified in semantic terms. The answer must, therefore, come from grammatical facts. This should not be surprising, since thematic relations are part of a general theory of grammar. It is necessary, then, to look and see if languages systematically treat perceivers and cognizers as different grammatically, or if they tend to treat them alike. It is generally the case that they do tend to be lumped together, receiving the same morphosyntactic treatment. But, on the other hand, many languages systematically treat experiencers differently from killers, senders, and dancers. In other words, an experiencer, which undergoes an internal state, is treated very differently in the grammar from purposeful instigators. In many languages, for example, subjects that are experiencers appear in the dative case, whereas those that are willful instigators appear in the nominative or ergative case. An example of this can be found in many Indo–European languages, e.g., Russian, Standard German (German), and Italian, in which some verbs of internal state use the so-called 'inverse construction': the experiencer is in the dative and the thing being experienced is in the nominative, e.g., German *das gefällt mir* (that[NOM] pleases me[DAT]) 'I like that.' This is opposed to *kill*, *send*, and *dance*, where the entities killing, sending, and dancing are in the nominative. Underlying the common treatment of experiencers is a neutralization of otherwise valid semantic contrasts within the grammar. It would be hard to argue, on any kind of reasonable 'grammatical' grounds, that believers ought to be separated from knowers, thinkers, expecters, and assumers. Since it would be hard to justify this, they are all grouped together as cognizers. Similarly, it would be hard to justify see-ers, feelers, hearers, touchers, smellers, and tasters as all being different; hence, they are all grouped together as perceivers. Clause-internal phenomena like case marking tend to treat them alike, and on these grounds they are often classed together under the general label of experiencer.

The fundamental issue here is to justify these distinctions on grammatical grounds, because ultimately, thematic relations act as an interface between lexical semantics and syntax. In other words, they do double duty. On the one hand, they are semantic in nature and related to the lexical semantic representation of the verb, because they are a function of the meaning of the verb. And the richer and more detailed the representation of the meaning of the verb, the more distinctions can be made. For example, a richer representation would permit the representation of the nuances that separate a believer from a knower. This is ultimately a part of a speaker's linguistic competence. But this distinction does not appear to be necessary for the grammar. On the one hand, these roles are a part of the lexical semantic representations of verbs, and on the other hand, they have grammatical implications. The thematic relations posited must be faithful to their semantic basis, but they also must be sensitive to the demands of grammar.

The solution to the problem of the correct inventory of thematic relations is ultimately a theory-internal issue; different theories and approaches have proposed inventories ranging from three to several dozen thematic relations. Since, as argued above, thematic relations must be justified grammatically as well as semantically, the grammatical justifications would be couched in terms of particular grammatical theories. Moreover, the size of the inventory depends crucially on the task(s) that thematic relations are assigned. There are two basic functions they can serve: (a) they can be part of the system of lexical representation, wherein they represent aspects of the verb's meaning (as in, e.g., Fillmore, 1968); and (b) they can play a role in the statement of grammatical rules, principles, or constraints. It is the first function that has led to large inventories of thematic relations: if they are used to capture meaning contrasts among verbs, then a large number will be needed to express the great variety of verbal semantic contrasts. If, on the other hand, their function is limited to the second one, then only as many will be needed as the syntax requires, and this is a much smaller number than that required for a lexical representation function.

Table 1

Agent: A willful, purposeful instigator of an action or event, such as in *John broke the glass*.

Experiencer: Things that experience internal states, such as perceivers and emoters (subjects of verbs like *think*, *believe*, *love*, and *hate*), as in *John thought about the question*.

Instrument: Usually inanimate things that are manipulated by an agent in the carrying out of an action, as in *John broke the window with the rock* or *The rock broke the window*. In both cases, *rock* is the instrument of an agent, whether the agent is specified or not.

Force: Involuntary causal participant that, unlike an instrument, cannot be manipulated. They can include things like *tornados, storms*, and *acts of God*, as in *The flood washed away the village*.

Patient: Things that are in a state or condition, or undergo a change of state or condition as in *John is tall, John is sick, The window broke*, and *John died*.

Theme: Things that are located or are undergoing a change of location (motion), as in *The book is on the table* or *John put the book on the table*.

Recipient: Someone who gets something (recipients are almost always animate), as in *He sent the book to John* or *He sent John the book*.

Goal: Destination, which is similar to recipient, except that it is inanimate, as in *He sent the book to Philadelphia*.

Source: The origin of an event or action. It is used in a variety of situations, which can conflate the ambiguity between recipient and goal:

	transfer	recipient
source x−y	⟶ z	
	motion	goal

(x = initial position, y = object, and z = final position)
If there is a transfer of *y*, then *z* is a recipient. If *y* is in motion, then *z* is a goal. In either case, *x* is the source, and *y* is the theme. No distinction is usually made between source of motion and source of transference, even though there is a distinction between recipient and goal.

Locative: A location. Path, source, and goal can be viewed as elaborations of different aspects of locatives. Locatives contrast with the others by referring to a situated location, such as in *The book is on the table*.

Path: A route, as in *He ran from the house, along the creek to the park*.

Though it would be quite impossible to review all of the inventories proposed by different theories, it is possible to construct a list of thematic relations that are standardly referred to in most accounts. This is given in Table 1.

One solution to the inventory problem suggested in Foley and Van Valin (1984) and elaborated in Van Valin (1993) is not to propose an absolute universal list of roles but rather to posit a universal semantic continuum in terms of which languages may make a varying number of distinctions. In this continuum of thematic relations, agent defines one end and patient the other; all of the other thematic relations

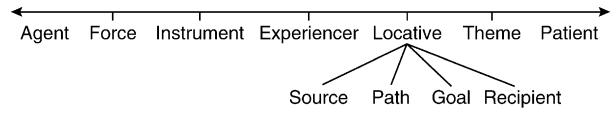

Figure 1

represent points along the continuum, and there is no absolute number of distinctions that every language must make, although there is strong evidence that certain of these distinctions are universal. The continuum may be represented as in Figure 1. The anchor points of the thematic relations continuum are agent (the willful, volitional, instigating participant) at one end and patient (the nonwillful, noninstigating, maximally affected participant) at the other. In between the polar entities, there is a continuum of semantic relations of more agent-like and patient-like roles. This continuum is flexible, for languages divide it up in different ways. There are, however, certain restrictions on the ways that it can be divided up.

Furthermore, the divisions are not random, for there are common divisions across languages. Languages distinguish entities that are affected in terms of their state or condition from those that are affected in terms of location. Therefore, they differentiate patients from things that are clearly at the right end of the scale but are less patient-like, namely themes. Themes are not affected in the same way and to the same degree, because they do not get crushed and chopped, but they do get moved around. Therefore, themes are clearly at the right end of the continuum and are not agent-like. On the other hand, there are things on the left side of this continuum that can be causal, but not instigating or controlling. Examples of this include instruments and forces. Further to the right, toward the center of the continuum, is the experiencer, which is the locus of an internal event, but is certainly not willful, volitional, and instigating. Many perceptual events are not volitionally instigated. The difference between verbs like *look at* and *see* is that the subject of *look at* is an experiencer that is also an agent, whereas the subject of *see* is simply an experiencer. In the middle of the continuum, there are all of the various types of locatives. In fact, many more can be found in the world's languages than are represented in Figure 1. Typically, things like recipient, source, goal, and path do not interact with one another, but rather with the theme. Figure 1 represents a continuum of distinctions, and languages may make more or fewer of them than what is listed above. This seems to be the semantic range that needs to be expressed in all languages. There appear to be as many

roles as can be motivated, as long as they fall on the continuum in Figure 1. And, in fact, the same distinctions recur across languages; the same contrasts between experiencer and agent, instrument and agent, theme and locative, and so on, are found in language after language.

Jackendoff (1987) took a somewhat different approach to specific thematic relations. He posited several tiers of thematic relations: an action tier and a temporal tier in addition to the basic level of the thematic tier. The thematic tier deals with motion and location, the action tier deals with attributions of responsibility and affectedness, and the temporal tier deals with aspectual properties of events. The thematic tier is primarily concerned with the roles of theme, goal, and source, whereas agent and patient appear only on the action tier. This is exemplified in (1), with examples from Jackendoff (1987).

(1) (a) The car [Theme_{TH}] hit the tree [Goal_{TH}; Patient_{AC}].
(b) Pete [Source_{TH}; Agent_{AC}] threw the ball [Theme_{TH}; Patient_{AC}].
(c) Bill [Theme_{TH}; Agent_{AC}] entered the room [Goal_{TH}].

('TH' denotes a role from the thematic tier; 'AC' denotes one from the action tier.)

In this scheme, an argument may bear multiple specific thematic relations, each reflecting one facet of its interpretation.

Generalized Thematic Relations

It has been proposed that a second, more general type of semantic relation must be posited: 'semantic macroroles' or 'semantic proto-roles.' Originally proposed in Van Valin (1977) and further developed in Foley and Van Valin (1984) and subsequent work, semantic macroroles are generalized semantic relations that subsume groups of specific thematic relations. There are two macroroles, 'actor' and 'undergoer.' They are the two primary arguments of a transitive predication, corresponding to the general senses of 'agent' and 'patient' discussed above, either one of which may be the single argument of an intransitive verb. They correspond to what is pretheoretically commonly called 'logical subject' and 'logical object.' Macroroles are motivated by the fact that in grammatical constructions groups of thematic relations are treated alike. This is illustrated in (2)–(4).

(2)	(a) *Fred* broke the window.	Agent
	(b) *The bomb* destroyed the car.	Instrument
	(c) *Mary* received a parking ticket.	Recipient
	(d) *The farm animals* sensed the earthquake.	Experiencer
	(e) *Stars* emit light.	Source
(3)	(a) Max tossed *the book* to the teacher.	Theme
	(b) The tidal wave destroyed *the harbor.*	Patient
	(c) The rock hit *the wall.*	Locative
	(d) The mugger robbed *Tom* of $45.00.	Source
	(e) Will presented *Sheila* with a bouquet.	Recipient

(4)	(a) The window was broken by *Fred*.	Agent
	(b) The car was destroyed by *the bomb*.	Instrument
	(c) The earthquake was sensed by *the farm animals*.	Experiencer
	(d) *The book* was tossed to the teacher by Max.	Theme
	(e) *The harbor* was destroyed by the tidal wave.	Patient
	(f) *The wall* was hit by the rock.	Locative

In (2), agent, instrument, recipient, experiencer, and source are all treated as the actor and subject of a transitive verb, whereas in (3), theme, patient, locative, source, and recipient are treated alike as the undergoer and object of a transitive verb. These groupings are not equivalent to (surface) grammatical relations like subject and direct object, for they hold in passive constructions as well, as illustrated in (4); here the undergoer is the subject and the actor the object of *by*. If this alternation were to be stated in terms of specific thematic relations, then long disjunctive lists of thematic relations would be required: in an active clause, the agent, instrument, recipient, experiencer, or source is the subject and the theme, patient, locative, source, or recipient is the object, whereas in a passive clause the theme, patient, locative, source, or recipient is the subject and the agent, instrument, recipient, experiencer or source is the object of *by*. This is an undesirable analysis, as it clearly does not capture what is going on. Alternatively, a formulation in terms of macroroles is much simpler: in an active clause, the actor is the subject and the undergoer is the direct object, whereas in a passive clause the undergoer is the subject and the actor is the object of *by*.

With intransitive verbs, similar generalizations hold. Some intransitive verbs take an actor as their single argument, and others take an undergoer. This is illustrated in (5)–(6).

(5)	(a) *David* sang loudly.	Agent
	(b) *The ball* flew over the fence.	Theme
	(c) *The motor* is running well.	Instrument
(6)	(a) *The dog* was sitting on the table.	Theme
	(b) *Larry* got fat.	Patient
	(c) *Marge* felt sick.	Experiencer

The subjects in (5) are all actors, despite the range of thematic variation, and those in (6) are undergoers.

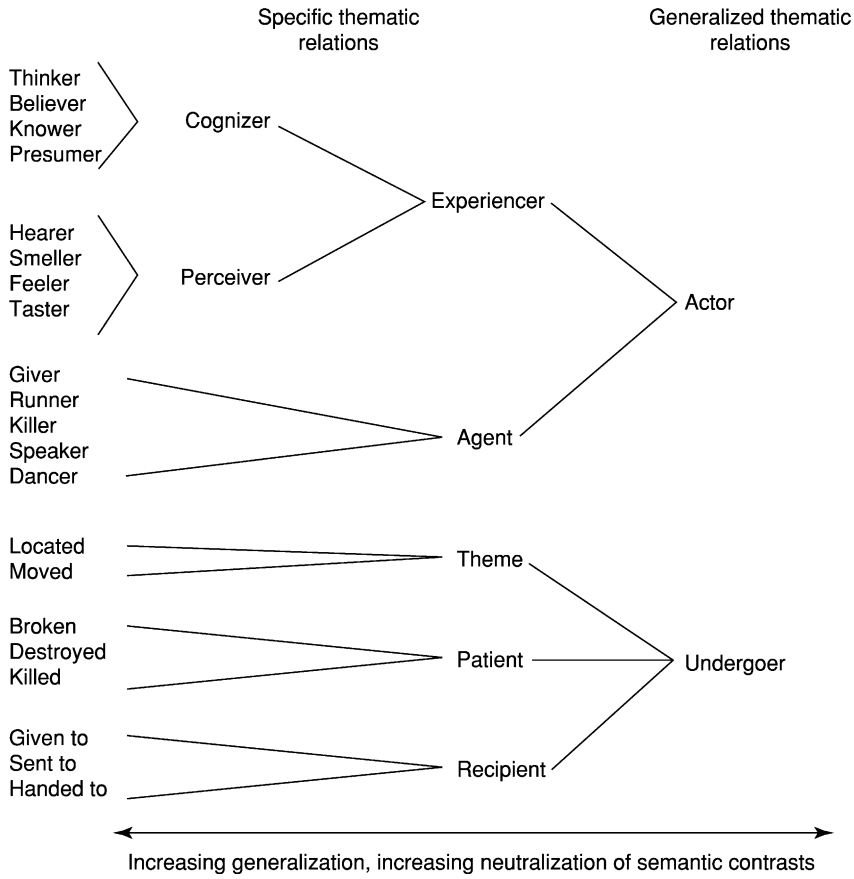

Figure 2

As with transitive verbs, each macrorole subsumes a number of specific thematic relations.

Dowty (1991) proposed two generalized thematic relations, which he called 'proto-roles'; they are 'proto-agent' and 'proto-patient.' They are similar in certain respects to actor and undergoer, but they are embedded within a very different theoretical outlook: Dowty claimed that proto-roles are the only valid thematic relations, and he denied the validity of specific thematic relations like agent, theme, and patient. Proto-roles are constellations of features that define a prototype; they are not generalizations of specific thematic relations, unlike macroroles.

The relationship between specific and generalized thematic relations is captured in Figure 2, which represents the increasing generalization and neutralization of semantic distinctions involved in them. (Not all specific thematic relations and not all groupings of specific thematic relations into generalized relations are illustrated).

Role of Semantic Relations in Syntactic Theories

Most syntactic theories employ semantic relations in some way; Generalized Phrase Structure Grammar (GPSG) (Gazdar *et al.*, 1985) and Montague Grammar (MG) (e.g., Dowty, 1979) are the major exceptions (*see also* **Montague Semantics**). Specific thematic relations are a central feature of lexical entries for verbs in both Government-Binding Theory (GB) (Chomsky, 1981) and Lexical Functional Grammar (LFG) (Bresnan, 1982); they are assumed to be part of the lexical entries for verbs in work in Relational Grammar (RelG) (Perlmutter, 1982), but there is no explicit discussion of either thematic relations or lexical entries within RelG (*see also* **Word Order and Linearization**).

Thematic relations function differently in GB and LFG. The list of (specific) thematic relations associated with a verb, its *θ-grid*, plays a central role in the GB system; syntactic subcategorization information is deduced from it, and this in turn underlies the constraints imposed by the Projection Principle. D-structure is assumed to be a *pure* syntactic representation of the argument structure of a verb, which is represented by the θ-grid. Moreover, θ-role assignment is an important part of the derivation of a sentence, and the principle that governs it, the θ-criterion, is one of the major constraints in the GB

system. In LFG, on the other hand, θ-roles are associated with grammatical relations (called grammatical functions' in LFG) in the lexical entries of verbs, and lexical rules operate to change the linkings between thematic relations and grammatical functions, e.g., passive relinks the agent from subject to oblique and the theme from object to subject. In both theories, θ-roles serve as the primary means for representing the *meaning* of a verb, but neither theory assumes an explicit theory of lexical semantics or proposes any independently motivated principles that govern the assignment of specific θ-roles to particular verbs. This is more of a problem for LFG than GB; in GB nothing depends on which θ-role an argument receives, as long as it receives one (and only one), whereas in LFG the validity of the syntactic analysis depends crucially in many instances on the identity of the θ-role assigned, e.g., the analysis of locative inversion in Chichewa in Bresnan and Kanerva (1989). Hence, without independent criteria for determining which θ-role an argument is linked to, the validity of such analyses is open to serious question. Thus, though thematic relations are an important feature of the GB and LFG systems of lexical representation for verbs, their respective functions within the overall theory are very different in the two frameworks.

The only theory that makes use of both specific and generalized thematic relations is Role and Reference Grammar (RRG) (Foley and Van Valin, 1984; Van Valin, 1993; *see* **Role and Reference Grammar**). RRG posits only one level of syntactic representation, unlike GB and RelG, and θ-roles, especially macroroles (generalized thematic relations), serve a crucial function in the linking of semantic and syntactic representations. Some of the generalizations captured by macroroles (see (2)–(6) above) are handled in other theories by D-structure (GB)/initial stratum (RelG) grammatical relations, but macroroles are not equivalent to underlying grammatical relations (see Van Valin, 1990). Unlike GB and LFG, θ-roles are not part of the scheme for lexical representation of verbs; this is accomplished by a modified version of the system of lexical decomposition proposed in Dowty (1979). Moreover, there are independent principles governing the association of specific θ-roles with particular verbs, and therefore RRG is the only theory in which the assignment of thematic relations to verbs is independently motivated.

Pragmatic Functional Relations

Pragmatic functional relations are concerned with the distribution of information in utterances, in particular with respect to what is assumed by the speaker to be known to interlocutors and what is presented as new and informative. Research on this type of functional relation goes back at least to the Prague School linguists (*see* **Prague School**) of the 1920s, e.g., Mathesius (see **Mathesius, Vilém (1882–1945)**), and has continued in modern work, e.g., Firbas (1966). Pragmatic relations have played a role in contemporary linguistic theory and description in the work of Halliday (1967, 1985), Jackendoff (1972), and Kuno (1972a,b; 1975), among others.

There is a fundamental distinction in information structure that all of these different approaches seek to capture, namely that between the material in an utterance that is presented by the speaker as assumed to be known, accessible, or recoverable from context by interlocutors and that which is presented by the speaker as unknown, inaccessible, and not recoverable, hence as new and informative. Different approaches vary with respect to both how this contrast is labeled and exactly how the opposition is defined, but this basic distinction underlies all of them. In Prague School work, for example, 'theme' (known, given) is distinguished from 'rheme' (unknown, new), whereas in most contemporary work the terms 'topic,' 'focus,' and 'presupposition' are employed. They may be characterized as follows, following Lambrecht (1986, 1987, 1988).

> *Pragmatic presupposition*: 'The proposition or set of propositions which the speaker assumes the hearer considers true (believes, knows) and is aware of at the time of the utterance and which is relevant in the context of utterance.' (Lambrecht 1988: 1)

> *Topic*: 'What must be presupposed in the case of a topic is not the topic itself, nor its referent, but the status of the topic reference as a possible center of interest or matter of concern in the conversation. . .[T]he topic reference is *active* or *accessible* in the discourse. . .[T]he topic is contained in the pragmatic presupposition or is an element of the pragmatic presupposition.' (Lambrecht, 1986: 102)

> *Focus*: The focus of an utterance is the non-presupposed part of the utterance; it is the part that is asserted in a declarative utterance and questioned in an interrogative utterance. In English and many other languages, it is indicated by prosodic prominence.

These notions are derivable from Kempson's (1975) reformulation of Grice's (1975) maxim of quantity (see Van Valin, 1991). They are universal, as they follow from the essential communicative function of language.

Lambrecht proposed a typology of information structure patterns with different topic–focus arrangements. The least marked one distributionally involves a topical subject and a focal predicate and

corresponds to the traditional 'topic–comment' bifurcation of clauses; he labeled it a 'predicate focus construction.' Presentational sentences like *There arose a great storm* lack a topical lexical subject NP and contain virtually all focal material; these are termed 'sentence focus constructions' by Lambrecht and 'neutral description utterances' by Kuno (1972a,b). Finally, utterances in which the focus is restricted to a single constituent, e.g., the answer to a wh-question, are called 'narrow focus constructions.' These constructions are found in all languages, and a variety of means are employed to signal them. English distinguishes them primarily by means of prosody and clefting. Japanese uses particles: unstressed *wa* marks the topic(s) in a predicate focus construction, stressed *wa* and stressed *ga* ('exhaustive listing *ga*' in Kuno) mark narrow focus constructions, and unstressed *ga* indicates sentence focus constructions. Italian employs word order, prosody, and clefting: predicate focus involves (S)VO order, sentence focus VS order, and narrow focus a cleft in which the focus NP appears postverbally in the matrix clause (see Lambrecht, 1986, 1987, 1993, for detailed discussion).

It has long been noticed that there appear to be correlations between information structure and grammatical structure. Given that in the vast majority of languages topical, presupposed material tends strongly to precede focal, non-presupposed material in utterances, constructions that involve displacement of elements from their default position to the left toward the onset of the utterance could be analyzed as having a topicalizing function, whereas those that entail the displacement of elements to the right toward the end of the utterance could be analyzed as having a focalizing function. Subject inversion in Romance languages like Italian and Spanish, for example, can be viewed as motivated by the need to place the subject in the immediately postverbal focus position in these languages in a sentence focus or narrow focus construction. Similarly, passivization can be interpreted as a construction in which the undergoer, which would normally appear in the pre (OV)-/post(VO)-verbal focus position, occurs instead in the normally topical subject position, as a reflection of its topical status in the discourse context, while the actor, the topical subject in the default case, appears in the normally focal portion of the utterance (if it appears at all). The occurrence of normally clause-internal material in utterance-initial position, as in topicalization and left-dislocation constructions, is another example of pragmatically motivated syntax (see, e.g., Prince 1981a,b; Horn, 1986).

Most syntactic theories simply ignore pragmatic functions. To the extent that the correlations noted above between syntactic structures and pragmatic functions are acknowledged, it is nevertheless considered to fall outside of the realm of grammar. Only two of the theories mentioned above make any systematic use of these functions, namely, LFG and RRG. Both theories recognize all three types of functional relation, but they are treated differently in them. LFG views them as autonomous, and an argument can be described in terms of all three independently; that is, a subject can be an agent or a theme and a topic or a focus, for example. In RRG, on the other hand, syntactic (grammatical) relations are analyzed as being grammaticalizations of semantic and pragmatic relations, as is discussed in the next section. Hence, they are not an autonomous type of relation as in LFG.

Syntactic Functional Relations

Syntactic functional relations, or grammatical relations, are the focus of considerable controversy within syntactic theory. Some theories, e.g., RelG and LFG, consider them to be a fundamental and indispensable component of linguistic theory and analysis. Others, e.g., GB and RRG, treat them as derivative of other, putatively more basic concepts, and GPSG ignores them altogether. GB derives grammatical relations from phrase-structure configurations: subject is the NP immediately dominated by S (Chomsky, 1965), or, more recently, SPEC(ifier) of IP (=INFL″ =S) (Chomsky, 1986), and object is the NP immediately dominated by VP (Chomsky, 1965) or V′ (Chomsky, 1986). The RRG theory of grammatical relations differs markedly from all generative accounts, and it discussed below.

Grammatical Relations

Since both LFG and RelG claim to be theories of universal grammar, their postulation of grammatical relations as fundamental components of linguistic theory raises the vital issue of their universality. If valid cross-linguistic universals are to be stated in terms of them, then they must themselves be universally valid constructs. The first step in ascertaining their validity as primitive (nonderived) theoretical constructs is characterizing them in such a way that their existence in a grammatical system can be demonstrated.

A grammatical relation exists when there is a restricted neutralization of semantic roles for syntactic purposes. Grammatical relations result from the extension of the pattern of neutralization represented in Figure 2 to the neutralization of all semantic role contrasts. Consider the following examples from English (7):

(7) (a) Henry seems to be singing in the shower.
(b) Henry seems to be elated.
(c) Henry seems to be listening to a new CD.
(d) *Henry$_i$ seems Louise to have embarrassed_____$_i$.
(e) Henry seems to have been embarrassed by Louise.

In (7) an argument of the dependent clause appears in the matrix clause. In (7a), the 'raised' argument is the actor of the intransitive verb *sing*, and in (b) it is the undergoer of the intransitive predicate *be elated*. The verbs in the remaining examples are transitive; the raised argument in (c) is the actor of *listen to*, and in (d) and (e) it is the undergoer of *embarrass*. It is clear that the restriction on which argument can be raised cannot be stated in semantic role terms: it can be either an actor or an undergoer, and the crucial contrast between (d) and (e) cannot be explained in purely semantic terms. Rather, it must be accounted for syntactically: the argument that can be raised is the one that bears a particularly syntactic relation in the dependent clause, and it bears this relation in the passivized dependent clause in (e) but not in the active clause in (d) in which it has a different syntactic function. Hence, there is a restricted neutralization of semantic roles with regard to which argument of the dependent clause can appear in the matrix clause, and the relation that this neutralization defines is the traditional notion of 'subject' for English. The same argument can be made with respect to the relation that triggers finite verb agreement in (7); it cannot be characterized semantically, because all semantic role possibilities are represented in (7a, b, c, e). (Note that it makes no difference for this argument whether specific or generalized thematic relations are assumed.) Here again, a restricted neutralization defines the same syntactic relation as in the raising construction.

Grammatical relations are defined only by restricted neutralizations of semantic roles; neither unrestricted neutralizations nor restrictions without neutralization define a syntactic relation. An example of an unrestricted neutralization is relativization with a wh-relative pronoun in English. This clearly involves a neutralization of semantic roles, as the relativized NP can bear virtually any thematic relation, specific or general, to the predicate in the relative clause. This is illustrated in (8).

(8) Mary talked to the man
(a) who [actor, agent] bought the house down the street.
(b) who [undergoer, patient] the dog bit.
(c) to whom [recipient] Bill showed the house.
Mary looked at the box
(d) in which [locative] the jewelry was kept.
(e) out of which [source] the jewelry had been taken.

There appear to be no semantic restrictions of the relevant type on the relativization strategy in English, and therefore this is an example of a neutralization of semantic roles for syntactic purposes. However, this construction does not define a grammatical relation in English, unlike raising and finite verb agreement, because it is not restricted. The converse, a restriction without neutralization, can be found in possessor ascension in Aceh (Acehnese), an Austronesian language spoken in Sumatra. The basic facts are presented in (9), from Durie (1987).

(9) (a) Seunang até lôn.
happy liver 1SG
'I am happy.' (lit: 'My liver is happy.')
(b) Lôn seunang-até.
1SG happy-liver
'I am happy.'
(c) Ka lôn-tët rumoh gopnyan.
IN 1SGA-burn house 3SG
'I burned her house.'
(d) Gopnyan ka lôn-tët-rumoh.
3SG IN 1SGA-burn-house
'I burned her house,' or 'She had her house burned by me.'
(e) *Gopnyan ka aneuk-woe.
3SG IN child-return
'His/her child returned.'

Possessor ascension is possible only if the possessed argument functions as an undergoer in the clause; the transitivity of the verb is irrelevant. In (9a), the single argument of *seunang* 'be happy' is *até lôn* 'my liver,' which is the undergoer of the stative predicate. In (9b), *lôn* 'I' functions as subject and *até* is compounded with *seunang*. In (9c), the undergoer of the transitive verb *tët* 'burn' is *rumoh gopnyan* 'his/her house,' whereas in (9d), the possessor *gopnyan* 'he/she' appears as an independent argument and *rumoh* 'house' is incorporated into the predicate. This is impossible with the possessor of an actor argument, as (9e) shows. Thus possessor ascension in Acehnese involves a definite restriction, i.e., the possessed NP must be an undergoer argument, but there is no neutralization of semantic roles; consequently, the relation specified is not a syntactic (grammatical) relation but rather a semantic one. It is only when there is both a restriction and a neutralization that a grammatical relation is involved.

If one were to investigate every major syntactic construction in English, it would be seen that the results were either like that in (7), in which a particular

restricted neutralization is found, or like that in (8), in which there is a neutralization without a restriction. The pattern of restricted neutralizations across constructions is very consistent in English, and it is this pattern that constitutes and defines the grammatical relation 'subject' in English. Grammatical relations are consistent patterns of restricted neutralizations in a language.

Universal Grammatical Relations

There are two senses in which grammatical relations could be considered universal, a strong one and a weaker one. The strong sense is that there are grammatical relations in every human language. That is, in the grammar of every human language there is at least one construction in which there is a restricted neutralization of semantic roles for syntactic purposes. If it can be demonstrated that there is at least one language in which this is not the case, then grammatical relations are not universal in the strong sense. The weaker sense of universality is that in all of the languages that have grammatical relations, they play the same role in every language. This is based on the Saussurean notion of linguistic 'value': two linguistic entities are the same if they have the same value; i.e., they enter into the same relations of co-occurrence and contrast within the linguistic system (*see* **Saussurean Tradition in 20th-Century Linguistics; Saussure, Ferdinand (-Mongin) de (1857–1913)**). This weaker sense of universality is, then, the claim that grammatical relations in different languages have the same value in each linguistic system. In this domain, value is determined by the restricted neutralizations defining the relations: two systems of grammatical relations are the same if they are defined by the same (or comparable) restricted neutralizations.

As noted above, grammatical relations are not universal in the strong sense if there is a single language that exhibits no restricted neutralizations in its grammar. Acehnese is such a language, as argued in Durie (1987): there are restrictions without neutralizations, as in (9), and neutralizations without restrictions, as in (8), but there are no restricted neutralizations of semantic roles for syntactic purposes in the language. The full range of Acehnese data cannot be presented here, but three representative sets can be given. Grammatical constructions fall into three groups in this language: those in which only actor arguments may be involved, those in which only undergoer arguments may be involved, and those in which any argument of the verb may be involved. The second type has already been exemplified in (9). Before presenting the other two, it is necessary to give a brief introduction to verb classes and agreement in Acehnese. All examples are from Durie (1987).

Acehnese transitive may carry agreement clitics cross-referencing both primary arguments, the actor and the undergoer. This is illustrated in (10).

(10) (a) Gopnyan geu-mat lôn./geu-mat-lôn.
3SG 3A-hold 1SG/3A-hold-1SGU
'(S)He holds me.'
(b) (Lôn) lôn-mat gopnyan.
1SG 1SGA-hold 3SG
'I told him/her.'

The clitics for actor and undergoer have the same basic form; they are distinguished by position, with actor signaled by a proclitic and undergoer by an optional enclitic. Thus *geu-* cross-references the actor and *-lôn* the undergoer in (10a), whereas *lôn-* cross-references the actor in (10b). Intransitive verbs fall into two general classes in terms of which agreement they take: some take only actor proclitics, e.g., *jak* 'go,' and the others take only the undergoer enclitics, e.g., *rhët* 'fall.' This is exemplified in (11).

(11) (a) (Gopnyan) geu-jak. /*gopnyan jak(-geuh).
3SG 3A-go go(3-U)
'(S)He goes.'
(b) (Lôn) lôn-jak./*lôn jak(-lôn)
1SG 1SGA-go go(-1SGU)
'I go.'
(c) Gopnyan rhët(-geuh)./*gopnyan geu-rhët
3SG fall(-3U) 3_A-fall
'(S)He falls.'
(d) Lôn rhët(-lôn)/*lôn lôn-rhët
1SG fall(-1SGU) 1SGA-fall
'I fall.'

Constructions involving the verb *tém* 'what' can only have complements in which the verb takes an actor argument, and the cross-reference clitic for the actor is obligatorily omitted; intransitive verbs that take only an undergoer argument are impossible in this construction, and with a transitive verb the omitted argument must always be the actor, never the undergoer. This is illustrated in (12).

(12) (a) Gopnyan geu-tém [(*geu-)jak].
3SG 3_A-want go
'(S)he wants to go.'
(b) Geu-tém [(*geu-)taguen bu].
3-want cook rice
'She wants to cook rice.'
(c) *Gopnyan geu-tém [rhët].
3SG 3_A-want fall
'(S)he wants to fall.'

(d) *Aneuk agam nyan ji-tém
child male that 3_A-want
[geu-peuréksa lé dokto].
3_A-examine by doctor
'That child wants to be examined by the doctor.'

(The Acehnese construction in (12d) is not a passive; see Durie (1988) for detailed arguments. *Geu-* and *ji-* are both third person but differ in the social status they code; *geu-* cross-references the higher status doctor, whereas *ji-* agrees with the lower status child.) Both *jak* 'go' and *taguen* 'cook' take actor arguments, and the actor clitic is obligatorily omitted in the dependent clause in (12a, b). *Rhët* 'fall,' on the other hand, takes only an undergoer argument, and it is impossible in this construction, as (12c) shows. In (12d), the omitted argument in the complement clause must be interpreted as the undergoer, and the result is ungrammatical. Thus, this construction is restricted to verbs that take an actor argument, and the actor argument must be omitted; this is an example of a restriction without a neutralization. The difference between this construction and the one in (9) is that possessor ascension is restricted to undergoer arguments only, whereas this one is restricted to actor arguments only. These two constructions are representative of the majority of syntactic constructions in Acehnese.

There are, however, constructions that involve an unrestricted neutralization, e.g., raising. This is exemplified in (13).

(13) (a) Gopnyan teuntèe [geu-woe].
3SG certain 3A-return
'(S)he is certain to return.'

(b) Gopnyan teuntèe [meungang-geuh].
3SG certain win-3U
'(S)he is certain to win.'

(c) Gopnyan teuntèe [geu-beuet hikayat prang sabi].
3SG certain 3A-recite epic
'He is certain to recite the Prang Sabi epic.'

(d) Hikayat prang sabi teuntèe [geu-beuet].
epic certain 3A-recite
'The Prang Sabi epic is certain to be recited by him.'

(e) Gopnyan lôn-anggap [na neu-bi pèng baroe].
3SG 1SG-consider be 2A-give money yesterday
'I believe him to have been given money by you yesterday.'
(lit.: 'I consider him_i [you gave money [to]$______i$ yesterday].')

The raised argument is an actor in (13a, c), an undergoer in (b, d), and a recipient argument in (e); Durie stated that any core argument of the verb can be raised in this construction. Hence in this construction, unlike the others, there is a neutralization of semantic roles for syntactic purposes, but it is not restricted. Therefore, it does not define a grammatical relation. Neither actor nor undergoer nor 'any argument of the verb' constitutes a grammatical relation.

Acehnese thus presents an example of a language that exhibits no restricted neutralizations of semantic roles in its syntax and therefore lacks grammatical relations as defined above. Another example of such a language is Mandarin Chinese; Li and Thompson (1976) argued that pragmatic functional relations are the relevant relations in Mandarin grammar, and LaPolla (1990) showed that there is no evidence to support the positing of purely syntactic relations in Mandarin syntax. Consequently, the strong sense of universality cannot be maintained. The validity of the weaker sense can be tested by contrasting English with Warlpiri (Andrews, 1985), a language of Central Australia. The construction to be examined involves omission of an argument in a dependent clause; it is illustrated in (14).

(14) Ngaju-rlu Ø-rna yankirri pantu-rnu,
I-ERG AUX-I emu (ABS) spear-PAST
ngapa nga-rninyja-kurra
water (ABS) drink-INF-while
'I speared the emu while it (not I) was drinking water.'

Andrews stated that the missing argument in the *-kurra* construction is always the subject of the nonfinite clause. In semantic role terms, the omitted argument is the actor of *nga-* 'drink.' The actor argument of an intransitive verb can also be omitted, and in the sentences in (15) the omitted argument in each is the undergoer of an intransitive verb.

(15) (a) Ngaju ka-rna-ngku mari-jarri-mi
I(ABS) PRES-I-you grief-being-NONPAST
nyuntu-ku, murumuru nguna-nyja-kurra-(ku)
you-DAT sick lie-INF-while-(DAT)
'I feel sorry for you while you are lying sick.'

(b) karli Ø-rna nya-ngu
boomerang(ABS) AUX-I see-PAST
pirli-ngirli wanti-nyja-kurra
stone-ELATIVE fall-INF-while
'I saw the boomerang fall from the stone.'

In (15a), the verb is *nguna* 'lie' as part of the expression 'lie sick,' which can plausibly be assumed to be nonvolitional since people do not volitionally lie sick, and in (15b) it is *wanti* 'fall.' These two verbs do not take actors as their single argument, and yet it is possible for it to be omitted in this construction. This shows that the restriction on which argument is omitted in the dependent clause cannot be stated in purely semantic role terms. Therefore, with

Table 2 Restricted neutralization of semantic roles

	Intransitive Vs	*Transitive Vs*	*Grammatical relations*
Acehnese	No	No	No
English	Yes	Yes	Yes
Warlpiri	Yes	No	Yes

intransitives, there is an example of a restricted neutralization of semantic roles for syntactic purposes in Warlpiri, and this shows that the language has grammatical relations.

Is there an analogous neutralization in sentences with transitive verbs? The restricted neutralization in (14) and (15) parallels that in English in (7a, b) with intransitive verbs and (7c) with an active voice transitive verb. In English, there is a restricted neutralization with transitive verbs, as shown in (7c, d, e); the relevant Warlpiri example is given in (16).

(16) *Yankirri Ø-rna nya-ngu
emu(ABS) AUX-1SG see-PAST
ngarka-ngku pantu-nyja-kurra.
man-ERG spear-INF-while
'I saw the emu$_1$ while the man speared___$_1$'.

It is impossible for the omitted argument in the dependent clause to be interpreted as the undergoer, in sharp contrast to (7e) in English, and therefore the restricted neutralization in Warlpiri is limited to intransitive verbs. The facts in (14)–(16) are representative for the language as a whole. The situation in Acehnese, English, and Warlpiri is summarized in Table 2. Even though grammatical relations can be motivated in both English and Warlpiri, the restricted neutralizations defining them are not the same: in English, the neutralization applies to the arguments of both transitive and intransitive verbs, whereas in Warlpiri, it is only with intransitive verbs. Thus, subject in Warlpiri cannot be considered to be exactly the same as subject in English, and therefore the weaker sense of universality is also insupportable. It must be emphasized that the reason for this contrast is not due to the fact that Warlpiri has ergative morphology and English accusative; Dyirbal, another Australian language (Dixon, 1972), has both ergative morphology and syntax, and yet with respect to these criteria, it patterns like English, not Warlpiri, in that it exhibits restricted neutralizations with both intransitive and transitive verbs. Though this discussion has focused on just these three languages, many examples of English-type and Warlpiri-type languages could be adduced (see Foley and Van Valin, 1985; Van Valin, 1993). It appears, then, that grammatical relations are not universal in either sense.

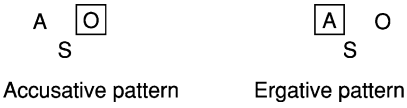

Figure 3

Types of Systems of Grammatical Relations

Systems of syntactic relations vary along three primary dimensions: the pattern of the relations, the factors affecting the relations, and the consistency of the relations. Each of these is discussed below.

The pattern of grammatical relations refers to the contrast between languages with accusative syntax and those with ergative syntax. In characterizing ergativity, it is useful to distinguish what Andrews (1985) called 'grammatical functions' from grammatical relations. Dixon (1972) proposed that there are three grammatical functions: 'S,' the single argument of an intransitive verb; 'A,' the actor of a transitive verb; and 'O,' the object of a transitive verb. Grammatical relations are constituted of combinations of the functions. In English, the grammatical relation 'subject' includes both S and A, whereas the 'direct object' encompasses only O. This is clear from the facts in (7): S and A are treated alike, as in (7a, b, c), whereas O is excluded from the construction, as (7d) shows. In order for an undergoer of a transitive verb (which is normally realized as the O) to be raised in this construction, it must function as the derived intransitive subject of a passive verb; this grammatical function will be labeled 'd-S.' This pattern (subject = [S, A, d-S], object = [O]) defines an 'accusative' pattern. The name comes from the case marking pattern in languages like German in which S and A receive nominative (unmarked) case and O receives accusative (marked) case. In an ergative language, the grouping of functions is different, at least for some grammatical phenomena. With respect to case marking, S and O are assigned absolutive (unmarked) case, and A receives ergative (marked) case. There are also syntactic phenomena in some ergative languages, e.g., Dyirbal (Dixon, 1972), Sama (Walton, 1986), and (Jacaltec) (Craig, 1977), which treat S, O, and d-S the same and exclude A, e.g., relativization. Thus, in a morphologically ergative language, case marking groups S and O together and treats A differently, and in a syntactically ergative language, the restricted neutralizations treat S, O, and d-S the same and A differently. These two patterns can be represented as in Figure 3.

This difference in patterns of grammatical relations is relevant to the issue of universality. If [S, A, d-S] defines the traditional notion of subject found in English and many other languages, what is the grammatical relation defined by [S, O, d-S]? If [O] is the

traditional notion of direct object, what grammatical relation is [A]? The decomposition of grammatical relations into grammatical functions also permits a restatement of the contrast presented in Table 2, as in (17).

(17) (a) English subject [S, A, d-S]
(b) Warlpiri subject [S, A]
(c) Dyirbal 'subject' [S, O, d-S]

Both English and Dyirbal have restricted neutralizations with both intransitive and transitive verbs, hence the d-S component of subject, which Warlpiri lacks. Thus, even though the syntactic pattern in English and Warlpiri is accusative, the notion of subject is not the same in the two languages. And even though Dyirbal and Warlpiri are both morphologically ergative, they differ syntactically in terms of both pattern and types of restricted neutralizations. There are, therefore, three distinct notions of syntactic subject operative in the grammatical systems of these three languages.

The second parameter of variation among grammatical systems is the factors affecting the relations. By this is meant the factors, syntactic, semantic, or pragmatic, that affect the determination of which argument of a verb will bear which grammatical relation. That is, given the set of thematic relations associated with a multiple-argument verb, there is, in some languages, more than one possible morphosyntactic realization of these arguments. With a transitive verb in Warlpiri and the North American Siouan language Lakota (Lakhota) (Van Valin, 1977), for example, there is no variation as to which argument will be the subject and which will be the object: the actor is always the subject, and the undergoer is always the object. In these languages, the lexical semantic properties of the verb determine how the arguments will be realized; there is no variation. With a transitive verb in English and Dyirbal, on the other hand, either the actor or the undergoer may function as the subject; what conditions this choice? The fact that both roles are possible shows that the choice is not strictly semantically conditioned, as in Warlpiri and Lakhota. A major factor affecting the selection of the argument to function as subject is the pragmatic status of the argument in the discourse. It has long been noted that there is a correlation between subjecthood and topichood, and in some languages, the relative topicality of arguments affects subject choice: the most topical argument will be realized as subject, *ceteris paribus*. An analysis of subject selection in texts provides strong evidence of discourse influences on subject selection (see Van Valin, 1993). Thus, pragmatic relations of the kind discussed above play a significant role in the grammar of some languages, and in these languages, subject can be viewed as a grammaticalization of the discourse relation of topic within the clause. It is important to emphasize that although subjects appear to be highly topical in all languages that have grammatical relations, pragmatic factors influence subject selection in only some languages, e.g., English and Dyirbal. Hence, in some languages, grammatical relations represent an interaction between all three types of functional relations, and in these languages, grammatical relations cannot be considered purely syntactic.

Table 3

Construction	*Pattern*
1. 'Subject'[S, A]-triggered equi-NP-deletion	[S] only
2. 'Object'[O]-triggered equi-NP-deletion	[S, d-S(passive)] only
3. Promotion ('subject' copying with verbs like *begin*)	Dialect 1: [S] only Dialect 2: [S, d-S(both)] only
4. Relativization	[S, O, d-S(antipassive)]
5. Wh-question formation	[S, O, d-S(antipassive)]
6. Clefting	[S, O, d-S(antipassive)]
7. Cross-clause coreference (preferred)	[S, A, d-S(passive)]

The final dimension of variation is the consistency of the relations defined by restricted neutralizations. In all of the languages discussed to this point, the major constructions in the language all involve basically the same restricted neutralization. When one talks about the notion of subject in English, what is meant is that the restricted neutralization found in (7) is found in all of the major constructions in the language. Grammatical relations are thus generalizations across the consistent restricted neutralizations found in a language, and therefore consistency is a crucial feature of these relations. Not all languages have consistent systems of grammatical relations. A very extreme example of an inconsistent or split system can be found in Jacaltec, a Mayan language (Craig, 1977). Table 3, taken from Van Valin (1981), summarizes the pattern of neutralizations in seven major grammatical constructions. The inconsistency here is indeed striking: there are *five* distinct patterns in only seven constructions. It is not at all clear what 'subject in Jacaltec' in the traditional sense could mean, other than S, the only common denominator in all seven constructions. Thus, although most languages are like English, Dyirbal, and Warlpiri in having a relatively consistent system of grammatical relations, there are languages such as Jacaltec in which

there does not appear to be a set of syntactic relations that applies consistently through their grammar.

Implications for Syntactic Theories

As noted above, grammatical relations are treated differently in different syntactic theories. They play only an indirect role in GB; although reference is often made to the subject, it is always interpreted in a strictly structural way, i.e., as the NP, which is SPEC of IP or the 'external argument' of the verb. This approach crucially assumes that subject can be given the same structural definition in every language, and this is problematic. It would be possible to claim that in a syntactically ergative language like Dyirbal or Sama S and O are the external argument and A is the VP-internal argument, but phenomena like those in Jacaltec potentially pose a serious problem, since in some constructions S and O would be the external argument, in others the S alone would be external, and in yet others S and A would appear to be the external argument.

Theories like LFG and RelG, which take traditional English-like grammatical relations as basic, run into greater difficulties. The nonuniversality of grammatical relations in both senses is a significant problem. The existence of languages like Acehnese, which lack grammatical relations, is an obvious difficulty; this would appear to pose a severe challenge to the descriptive adequacy of the theories. RelG nevertheless proposes grammatical-relations-based analyses of the language (e.g., Perlmutter, 1982), though no analysis of these phenomena has yet been proposed in LFG. The variation in grammatical relations across languages is also problematic. In RelG, this has been dealt with in terms of grammatical relations at different strata in a derivation, e.g., initial versus final grammatical relations, and combinations thereof, e.g., 'working 1' = an argument that is a subject (1) in the initial stratum and a term in the final stratum (Perlmutter, 1982). Researchers in LFG have not addressed this issue, either; there are no accounts of syntactic ergativity in LFG, for example. Finally, both theories assume consistent systems of relations, and split systems like Jacaltec present another challenge. RelG approaches split systems the same way that they deal with cross-linguistic variation, namely, with formulations based on grammatical relations at different levels in a derivation and combinations thereof. An LFG account of these phenomena remains to be developed.

RRG takes a radically different approach to these problems: it rejects traditional grammatical relations as theoretical constructs and instead proposes only a single syntactic relation, which it terms 'the syntactic pivot of a construction.' Syntactic pivot is a construction-specific notion, and a pivot is defined by a restricted neutralization of the type discussed above. Thus, RRG views grammatical relations systems as being composed of syntactic pivots; languages that have the same pivot for all or most major grammatical constructions have what appears to be the traditional system of grammatical relations, but this is a derived rather than basic concept. Languages with ergative or split syntactic systems pose no particular challenge, because there is no assumption that the [S, A, d-S] accusative pivot of English is in any way the unmarked pivot universally or that a language must have the same pivot for every construction. Languages like Acehnese simply lack syntactic pivots, and grammatical constructions are characterized directly in terms of semantic functional relations. RRG integrates pragmatic relations in such a way that in languages like English and Dyirbal their influence on the determination of the pivot in a construction can be captured.

See also: Mathesius, Vilém (1882–1945); Montague Semantics; Prague School; Role and Reference Grammar; Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics; Word Order and Linearization; X-Bar Theory.

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Functionalist Theories of Language

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Functionalism within the Gamut of Linguistic Theories

Functionalist theories of language have most often been contrasted with formalist theories, particularly those developed by Chomsky during the past half century. This comparison is useful and will indeed form the starting point for the discussion in this article. However, like many dichotomies in linguistics, this one conceals a much more complex reality. A more realistic way of looking at things would be to posit a linear sequence of approaches, with strongly formalist theories such as Chomsky's at one end and the more radically functional approaches at the other. Even this, though, is still something of an oversimplification: what we really need is a multidimensional model in which the whole space occupied by linguistic theories is populated by groups of theories that form tighter or looser clusters according to their degree of similarity on a wide range of features. In what follows, we examine a number of features that are

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characteristic of functionalist theories. Much more detailed discussion of many of these points can be found in Butler (2003a: Chapter 1).

A further complication that should be borne in mind as we survey the range of functionalist approaches is the distinction between European and North American functionalism. Important theories initially developed in Europe include Functional Grammar (FG: Dik, 1997a, 1997b) and Systemic Functional Grammar (SFG: Halliday, 1994; Halliday and Matthiessen, 1999, 2004). In the United States, there are two rather distinct kinds of approach: on the one hand, Role and Reference Grammar (RRG: Van Valin, 2005; Van Valin and LaPolla, 1997) belongs to the rather more formal subgroup of functionalist theories; on the other hand, there is a set of approaches, more radically functionalist in nature, that have developed out of the 'West Coast' functionalism of scholars such as Givón, Haiman, Bybee, Hopper, Thompson, DuBois, Noonan, and Goldberg and that are often included, together with Langacker's cognitive grammar, under the label of 'usage-based' models. It is important to be aware that often, in the writing of American functionalists, the labels 'functionalist' and 'functionalism' are used primarily in relation to this last group of models, often with little reference to European ideas.

The Basic Tenets of Functionalism

The three most basic principles of functionalist approaches are that

- they regard communication as the primary function of language, which shapes the forms languages take
- they attribute great importance to external (cognitive and sociocultural) factors in explaining linguistic phenomena
- they reject the claim that syntax is autonomous from semantics and pragmatics.

The most basic tenet of all, from which all others derive to some degree, is that the primary purpose of language is human communication, and that this fact is crucial in explaining why languages take the form they do. This view contrasts somewhat starkly with that of Chomsky, for whom language is essentially a vehicle for expressing thought, with interhuman communication being just one of the uses to which it can be put, and not to be prioritized over other possible functions. Chomsky (1980: 229–230) defends his position by reference to what he regards as noncommunicative uses of language, such as resolving a problem or engaging in what has been called 'phatic communion' in order simply to oil the social wheels. For the functionalist, many such situations would still be communicative, though what is communicated may be largely social or interpersonal in nature rather than purely representational. Furthermore, even if some types of language use are noncommunicative, they are, the functionalist will claim, merely parasitic upon the central communicative use.

If we are to study language as communication, then we will need to take into account the properties both of human communicators and of the situations in which linguistic communication occurs. Indeed, a further important claim of functionalism is that language systems are not self-contained with respect to such factors, and therefore autonomous from them, but rather are shaped by them and so cannot be properly explained except by reference to them. Linguists who make this claim belong to the group that Croft (1995) calls 'integrative functionalists,' and they undoubtedly form the largest and most influential group of functional theorists. The main language-external motivating factors are of two kinds: the biological endowment of human beings, including cognition and the functioning of language processing mechanisms, and the sociocultural contexts in which communication is deeply embedded. We might also expect that a functionalist approach would pay serious attention to the interaction between these factors and the ways in which languages change over time, although in practice this varies considerably from one model to another.

The question of motivation for linguistic systems is, of course, not a simple one. Much of the formalist criticism of functionalist positions has assumed a rather naïve view of functional motivation, in which some linguistic phenomenon is explicable in terms of a single factor. Functionalists, however, have never seen things this way, but rather accept that there may be competing motivations, pulling in different directions and often leading to compromise solutions.

It is important to note that formalists are not necessarily totally opposed to the claim that language is functionally motivated, although this is something that is not often discussed in the formalist literature. Newmeyer (2003a), for example, claims that even hard-line formalists would accept this claim, and that Chomsky has never denied it. The question, for Newmeyer, is how much functional motivation there is, where it is located in the system, and to what extent it should form part of the research program. In particular, Newmeyer claims that functionalists and practitioners of cognitive linguistics have

posited a tighter iconic form–function fit than is justifiable and is skeptical of the concept of competing motivations, on the grounds that anything can be explained away by some combination of such antagonistic forces (Newmeyer, 1998: 137–153, 2003b). The solution, of course, is to demonstrate such competing motivations and their antagonistic effects clearly so that functional 'explanation' does not become vacuous, a problem that is discussed in Butler (2003a: 19–25).

The great majority of functionalists also believe that within the nonautonomous linguistic system as a whole, that part of it which deals with the forms of language, and which we may call morphosyntax, is also not autonomous but is intimately bound up with the kinds of meaning that it serves to express, divided by many linguists into the semantic and the pragmatic. In other words, functionalists claim that the morphosyntax of languages is motivated by the meanings that it conveys, although we shall see that the various theories differ with regard to the strength with which they hold this position. Indeed, there are some scholars, such as Prince and Kuno, whom Croft (1995) calls 'autonomist functionalists' precisely because they do accept the autonomy hypothesis, but it can be argued that these approaches are peripheral to the mainstream of functionalism (Butler, 2003a: Chapter 1). Most functionalists would accept that there is some degree of (at least apparent) arbitrariness in the morphosyntax of any language, but many would again attempt to link this to the concept of competing motivations. The functionalist position again contrasts with the formalist one, which maintains that the morphosyntax forms a system that can be described and explained independently of meaning.

Summing up the basic characteristics of functionalist theories, we may say that the core of the functionalist position is that language systems and their components are so inextricably linked with the social, cognitive, and historical contexts of language use, and with the meanings that language is used to convey, that it is futile to attempt to describe and explain them except through reference to such factors.

Further Features

There are a number of further features that, although ultimately derivable from the basic tenets, show considerable variability across functionalist theories:

- The attempt to account for the full range of linguistic phenomena rather than merely a 'core grammar'
- The use of authentic linguistic productions as data
- Recognition and modeling of the flexibility of language in use
- Attention to discourse as well as to the sentence
- A concern with typological variation in language
- An approach to language acquisition in which the child constructs his or her language from the information available in the linguistic environment, given inherent general cognitive capacities and learning abilities

In the following sections, these points are explored in more detail.

Inclusive Rather Than Core Grammars

A truly functional approach, aiming to understand and account for language as communication, cannot restrict its scope to some kind of core grammar, as with Chomskyan theories, but must, in principle, take on the full complexity of languages and our use of them, provided, of course, that the phenomena under study are systematic.

The Use of Authentic Textual Data

If, as functionalists claim, they are interested in studying language as communication, then it is logical to assume that one of the main sources of data for their descriptions and theorizing will be samples of actual communication, in their contexts of use. In other words, we would expect functionalists to make extensive use of authentic language data in their work, particularly those large bodies of material that have been collected in the form of computer-readable corpora.

Flexibility of Meaning and Structure

If we are truly to study language in its communicative role, we must come to terms with the fact that what we say, and the way we say it, responds flexibly to the demands made by the communicative context. There are various aspects to this flexibility: the context-dependent meaning of words; the fact, clear from corpus linguistics, that a good deal of what we say is made up of reusable 'chunks' of language rather than generated or analyzed afresh every time we need to express a particular concept (*see* **Formulaic Language**); the fuzzy nature of linguistic categories, which has been modeled through recourse to the specification of prototypes; the fact that structures in actual communication are often much less rigid than the textbook grammars would allow; the emergence of grammatical categories from the requirements of

discourse; and the 'leaky' nature of the grammars we write to describe languages (Givón, 1995: 9).

A Discourse Grammar, Not Just a Sentence Grammar

Communication normally involves not just single, isolated sentences but also larger stretches of multi-propositional discourse. It follows that a truly functional theory should reflect this fact by containing not just a sentence grammar but also a model of discourse structure and of how the two interact.

Typological Orientation

Functionalists are interested not only in individual languages but also in 'language' as a whole. Since crucial motivating factors such as the human biological endowment and the overall requirements of communication are universal, we may expect that they will be reflected in linguistic universals, although it is also important to realize that because competition among motivations can be resolved in many ways, and because there are considerable differences in the sociocultural conditions under which languages are used, there are also pressures leading to diversity among languages. These concerns are manifested in the interest shown by most functionalists in linguistic typology. As pointed out by Croft (2003: 2), the label functional–typological approach is often given to an approach that seeks to motivate similarities and differences between languages in functional terms rather than in terms of the 'formal' explanations sought by Chomskyan linguists. Nevertheless, as Croft (2003: 5–6) also observes, the functionalist and formalist approaches share several fundamental characteristics, although with different emphases: both begin by analyzing language structures (functionalists in terms of function and Chomskyans in terms of formal properties), both are concerned with the central question of what constitutes a possible human language and posit universal constraints, both abstract patterns from the data (the functionalist across languages and the formalist within languages), and both explain universals in terms of universal human abilities (the functional typologist in terms of general cognitive and sociocultural abilities and the formalist in terms of innate principles specific to language).

A Constructivist Account of Acquisition

Functionalist theories, with their communication-in-context view of language, understandably tend to favor a constructivist view of language acquisition, according to which enough information is available in the linguistic environment for the child to be able to construct a grammar, with the help of more general cognitive factors and learning capacities. This is not to say that functionalists totally reject the possibility of innate characteristics: what is at issue is rather the nature of this endowment. For the functionalist, it is more likely that what is innate will be a set of general cognitive principles and predispositions to learn rather than some concrete set of linguistic rules and principles.

Important Functional Theories

This section examines briefly the European and American functionalist approaches mentioned at the beginning of this article, with particular reference to the features of functionalism discussed previously.

Functional Grammar

Functional Grammar was developed by the Dutch linguist Simon Dik and his colleagues from the late 1970s onwards. Dik made a strong commitment to the centrality, in the formulation of a grammar, of the concept of communicative function:

> The primary aim of natural languages is the establishment of interhuman communication; other aims are either secondary or derived. (Dik, 1986: 21)
>
> In the functional paradigm, . . . a language is in the first place conceptualized as an instrument for social interaction among human beings, used with the intention of establishing communicative relationships. Within this paradigm one attempts to reveal the instrumentality of language with respect to what people do and achieve with it in social interaction. (Dik, 1997a: 3)

Dik (1986) discussed in detail the kinds of external motivation that we need to appeal to in explaining why languages are as they are, also bringing in the concept of competing motivations.

Dik (1997a: 8) also rejects the thesis that syntax is autonomous from semantics and pragmatics:

> Semantics is regarded as instrumental with respect to pragmatics, and syntax as instrumental with respect to semantics. In this view there is no room for something like an 'autonomous' syntax. On the contrary, to the extent that a clear division can be made between syntax and semantics at all, syntax is there for people to be able to form complex expressions for conveying complex meanings, and such meanings are there for people to be able to communicate in subtle and differentiated ways.

He does, however, accept that grammar is a structural system, governed by a set of rules and principles, which should nevertheless be explained, wherever possible, in terms of the functioning of language as a communicative device. For example, Dik (1986: 27–28, 43) points out that expression types used to express politeness, deference, and social distance are

typically longer and more complex than less polite counterparts, and that this reflects two types of iconic principle: that of diminution vs. augmentation (important = high, big; unimportant = low, small) and the avoidance of directness (see also Haiman, 1983).

The previous quotation suggests that pragmatics, as the driver of semantics, which in turn is the driving force behind the syntax, should play an important part in FG, and Dik does indeed set up a criterion of pragmatic adequacy for his grammar. He also makes a commitment to a criterion of psychological adequacy, according to which the grammar should at least be compatible with what we know of the storage and processing of language. It has been argued, however, that Dik's work failed to live up to both of these standards of adequacy. A number of new models have been put forward under the general umbrella of FG, one of whose aims is to increase the level of pragmatic and (particularly) psychological adequacy. Particularly important among these new developments are the Functional Procedural Grammar (FPG) of Nuyts, the Functional Discourse Grammar (FDG) of Hengeveld, and the Incremental Functional Grammar (IFG) proposed by Mackenzie. Mention should also be made of the Functional Lexematic Model of Mairal Usón and colleagues, which is derived from FG and Coseriu's theory of lexematics. This model pays considerable attention to cognitive aspects of lexical structuring. Brief introductions to all these models can be found in Butler (2003a, 2003b), together with evaluations of the extent to which they, as well as the parent theory of FG, attain the standards of adequacy they aspire to.

FG and its variants are committed to providing an account of the full range of phenomena found in the world's languages rather than of some restricted core grammar. In Dik's work, most examples used to illustrate the grammar were constructed, but proponents of FG and its variants are beginning to take more seriously the need to work with authentic productions, and the use of computer-assisted corpus analysis is increasing. FG has not been among the theories that have foregrounded the flexibility of language, although there is some work on prototypes.

Dik's early model was purely a sentence grammar, although he did present a programmatic model of discourse structure in his later work (Dik, 1997b: Chapter 18). However, there have always been groups of classicists and anglicists in The Netherlands interested in the textual dimension of FG, and this interest has recently increased, with a proliferation of discourse models beginning in the 1990s. Particularly important in this connection are FDG and IFG, which aim to model discourse as well as the sentence grammar.

From its inception, FG has always had a strongly typological orientation. Dik (1997a: 14) states of FG that it should

> be *typologically adequate*, i.e., that it should be capable of providing grammars for languages of any type, while at the same time accounting in a systematic way for the similarities and differences between these languages.

This orientation is very clearly reflected in the work of Dik and other FG linguists, and it persists in recent models such as FDG and IFG.

On language acquisition, Dik (1997a: 7) states the following:

> From a functional point of view, . . . it is certainly more attractive to study the acquisition of language as it develops in communicative interaction between the maturing child and its environment, and to attribute to genetic factors only those underlying principles which cannot be explained as acquired in this interaction.

However, only a limited amount of work on acquisition has been done so far.

Role and Reference Grammar

RRG makes a strong commitment to the study of language as communication, as shown by the following quotation from an early work in which the initial basis of the theory was developed (Foley & Van Valin, 1984: 7):

> The theme underlying the various functional approaches is the belief that language must be studied in relation to its role in human communication. Language is thus viewed as a system of human communication, rather than as an infinite set of structural descriptions of sentences.

The last sentence is clearly intended to contrast the perspective taken in RRG with that of Chomskyan linguistics. With this orientation goes a concern for the functional motivation of the grammar: "RRG takes language to be a system of communicative social action, and accordingly, analyzing the communicative functions of grammatical structures plays a vital role in grammatical description and theory from this perspective" (Van Valin, 1993: 2). In practice, RRG prioritizes cognitive over sociocultural explanation, adopting what Van Valin and LaPolla (1997: 15) refer to as a 'communication-and-cognition perspective' and leaving out of account, for now, the ways in which language is used in different social situations (Van Valin and LaPolla, 1997: 3, 15).

The autonomy of syntax is firmly rejected (Van Valin, 1993: 2):

> Syntax is not autonomous. In terms of the abstract paradigmatic and syntagmatic relations that define a structural system, RRG is concerned not only with relations of co-occurrence and combination in strictly formal terms but also with semantic and pragmatic co-occurrence and combinatory relations.

In other words, RRG postulates that semantic, pragmatic, and syntactic aspects of language, and their combinations, are all crucial in explaining the observed properties of language. Syntax, however, is only relatively motivated by semantics, pragmatics, and cognitive concerns; that is, syntactic phenomena cannot just be reduced to matters of semantics and pragmatics, and there remains some arbitrariness in the formal system.

RRG aims, in principle, to provide an account of all the grammatical phenomena attested in any language. To date, it has not made extensive use of authentic data. Like FG, it does not prioritize the concept of flexibility in its account of languages. It does, however, make use of the concept of prototype, especially in its use of hierarchies of argument types to predict more and less typical choices in two areas: (1) the 'macroroles' of Actor and Undergoer in the clause, which are generalizations over more specific thematic relations, and (2) syntactic relations, which RRG conceptualizes not in terms of the usual functions of Subject and Object but, rather, in terms of the notion of the 'privileged syntactic argument' of a construction. Although RRG does offer a detailed account of a number of discourse pragmatic areas, such as information distribution (in terms of topic and focus) and switch reference, it has not developed its own model of discourse structure and is still essentially a sentence grammar.

Like FG, RRG is very much concerned with typological matters: "The theory is greatly concerned with typological issues. In particular, it seeks to uncover those facets of clause structure which are found in all human languages" (Van Valin, 1993: 4). Indeed, Van Valin says that the theory arose out of the question of what linguistic theory might look like if, rather than being centered on English, it were based on languages such as Dyirbal, Lakhota, or Tagalog.

RRG takes a constructivist line on language acquisition (Van Valin, 1993: 2):

> The RRG approach to language acquisition ... rejects the position that grammar is radically arbitrary and hence unlearnable, and maintains that it is relatively motivated (in Saussure's sense) semantically and pragmatically. Accordingly, there is sufficient information available to the child in the speech to which it is exposed to enable it to construct a grammar, and therefore the kinds of autonomous linguistic structures posited by Chomsky are unnecessary.

There have been a number of studies using RRG as a basis for accounting for observed patterns in the acquisition of morphosyntax in a variety of languages (for a summary, together with a discussion of the relationship between acquisition studies and the linguistic theory, see Butler, 2003b: 402–413).

Systemic Functional Grammar

SFG, as developed by Halliday, has its roots in the work of the British linguist J. R. Firth, with influence also from Hjelmslev, the anthropologist Malinowski, and the Prague School. Halliday makes it clear that his aim is to give an account of linguistic communication, or 'language in use,' and that languages are as they are because of the functions they have evolved to serve:

> Language has evolved to satisfy human needs; and the way it is organized is functional with respect to these needs – it is not arbitrary. A functional grammar is essentially a 'natural' grammar, in the sense that everything in it can be explained, ultimately, by reference to how language is used. (Halliday, 1994: xiii)
>
> Both the general kinds of grammatical pattern that have evolved in language, and the specific manifestations of each kind, bear a natural relation to the meanings they have evolved to express. (Halliday, 1994: xviii)

Note that Halliday takes a very strong stand on functional motivation: in principle, everything in the grammar can be motivated through function – a position that some other functionalists would regard as rather extreme. As might be expected from the antecedents of SFG in the work of Firth and Malinowski, Halliday has always been concerned more with social and cultural motivations than with those related to psychological/cognitive processes: indeed, the social dimension is more strongly developed in SFG than in any other functional theory. This is particularly apparent in the theory of social context developed by Halliday and colleagues in the 1960s and since developed not only by Halliday but also by Hasan, Martin, and others. SFG distinguishes between dialectal and diatypic (or 'register') variation in language, and within the latter between the variables of field (concerned with the nature of the social action), tenor (involving the relationships between interactants in communication), and mode (the medium of communication and its role in the linguistic event). SFG has also developed accounts of genres, seen as ways of getting things done linguistically.

SFG totally rejects the concept of an autonomous syntax. The theory is firmly centered on meaning, with syntactic patterns being seen as one mechanism for realizing meanings, a means to an end. Indeed, Halliday prefers to avoid the term 'syntax' altogether

in order to distance himself from the view that syntax can be opposed to semantics and pragmatics. Instead, he uses the term 'lexicogrammar,' chosen to emphasize the claim that grammar and lexis are not totally different kinds of patterning but are part of the same level, different in degree rather than in kind. Both act, together with intonation, to give shape to the meanings we wish to convey. Furthermore, the division between lexicogrammar and semantics is itself not a clear one: "There is no clear line between semantics and grammar, and a functional grammar is one that is pushed in the direction of the semantics" (Halliday, 1994: xix). SFG has not, historically, given high priority to typological matters, and this is reflected in the fact that the most comprehensive accounts of this theory (Halliday, 1994, 2004; Halliday and Matthiessen, 1999) are centered very firmly on English. However, currently there are signs of greater interest in typological matters (Caffarel *et al.*, 2004). The approach to typology in SFG differs sharply from that in FG and RRG in that the emphasis is on the detailed description of particular languages, followed by generalization where possible, rather than on using data from a wide range of languages in order to formulate the theory in the first place.

SFG takes a strongly constructivist line on language acquisition, and there have been longitudinal studies of three individual English-speaking children (for summaries, discussion, and references, see Butler, 2003b: 413–424).

We should note here the existence of a second version of SFG, developed by Fawcett and colleagues. This model takes Halliday's work as its starting point but modifies it in a number of important ways, one of which is to propose clearly separate levels of semantics and syntax (Fawcett, 2000). However, this version still treats the semantics as the underlying driving force at the center of the model, with syntax as one means (together with lexical items and intonation) for the realization of meaning.

West Coast Functionalism

So-called West Coast functional grammar was never a single, unified model but, rather, a fairly loose collection of individual approaches. We cannot, therefore, survey the whole area here but will concentrate on one important exemplar, the work of Givón.

Givón subscribes fully to the central tenets of functionalism discussed previously. He (1995: xv) holds that "language (and grammar) can be neither described nor explained adequately as an autonomous system," but that in order to understand why language is as it is, we must make reference to "the natural parameters that shape language and grammar: cognition and communication, the brain and language processing, social interaction and culture, change and variation, acquisition and evolution." It is, however, possible for competing motivations to lead to a situation in which grammar "assumes its own reality" (Givón, 1995: 11). The central part played by semantics, pragmatics, and discourse within Givón's approach to language is abundantly clear in all his work. Furthermore, relationships between linguistic usage, synchronic variation, and language change are discussed in terms of the grammaticalization of originally lexical elements.

Givón rejects Chomsky's sanitization of the data for linguistic theory building, through the prioritization of competence over performance. He thus takes an inclusive stance on the range of phenomena for linguistic study, and makes frequent use of attested linguistic data, especially in his studies of the frequency distribution of features in different languages and their varieties. Although Givón does not offer a model of discourse structure as such, his work is very much involved with the relationship between grammar and discourse, and context is a key concept in his work. The flexibility of language is an important theme in Givón's writing, and the concept of prototype is central.

Givón's work is strongly typological in nature, striking a balance between what is common across languages and their individual characteristics. He (1995: 17) comments that "[w]hile recognizing cross-language typological diversity, most functionalists remain committed to the existence of language universals, presumably both of meaning/function and grammatical structure."

Finally, Givón takes an explicitly constructivist position on language acquisition, claiming that what the child initially acquires is not syntax, in the Chomskyan sense, but rather a more rudimentary communicative system, which only later becomes modified toward syntax. He castigates Chomsky for his rejection of communicative function, general cognitive capacities, and sociocultural effects as important factors in acquisition.

Usage-Based Functionalist–Cognitive Models

The label usage-based is used for a group of models that claim that "the speaker's linguistic system is fundamentally grounded in 'usage events': instances of a speaker's producing and understanding language" (Kemmer and Barlow, 2000: viii). This label brings together models derived from earlier work in West Coast functionalism with approaches such as Langacker's cognitive grammar and some variants of construction grammar, such as Goldberg's model. Here,

we concentrate on those approaches that derive from the earlier work of West Coast functionalists.

One important strand of usage-based functional linguistics is Hopper's Emergent Grammar, which takes a very radically functionalist stand in claiming that "[g]rammar . . . is not the source of understanding and communication, but a by-product of it. Grammar is, in other words, epiphenomenal" (Hopper, 1998: 156). Thus, a grammar is seen not as a unified, relatively stable system but, rather, as "an open-ended collection of forms that are constantly being restructured and resemanticized during actual use" (Hopper, 1998: 159). This model is thus firmly rooted in the communicative functions of language and in the cognitive and social contexts of language use. It also pays great attention to relationships between usage, synchronic variation, and diachronic change, through the study of grammaticalization.

Closely related to emergentism is work by Thompson, Hopper, Bybee, and others, which prioritizes the study of authentic conversational data, and in which the concept of broad syntactic templates is replaced by local, lexically bound schemas or collocations, often formulaic in nature, which are specific to the language concerned. These reusable fragments, often with slots for variable items, are seen as empirically verifiable instantiations of the concept of construction, seen as a pairing of form and meaning/function, which is central to construction grammar models. For instance, Thompson (2002) presents evidence that in conversational English what are traditionally analyzed as complement-taking predicates (e.g., *think* + complement clause) are better seen in terms of the combination of (1) a fragment, often formulaic in nature, with epistemic, evidential, or evaluative function, such as *I think/I don't think/I thought/ I didn't think/I guess/I remember*, etc., and (ii) a declarative or interrogative clause that carries the main representational content.

Clearly, these usage-based approaches adopt a very inclusive stance on the range of phenomena that are to be accounted for, since the basic aim is to provide an explanatory treatment of the rich diversity to be found in authentic interaction. These models are very much concerned with the flexible responses of language to the contexts in which it is used: they are rooted in the discourse and the ways in which it conditions the choice of what is said and how it is expressed. Considerable weight is given to the frequency of particular items and combinations in language use, on the grounds that frequency demonstrably affects a range of phenomena, including phonological reduction, constituent structure, and the retaining of irregular or even archaic patterns (Bybee and Hopper, 2001). Typological data are also crucial and are taken to support the paramount importance given to discourse motivations for grammatical structuring. Finally, a clearly constructivist line is taken with respect to language acquisition (Tomasello, 2003).

Conclusions

Functionalism, like other terms for 'schools' of linguistics, is a convenient label for a complex, varied set of approaches to linguistic theory and description. We have seen, however, that these approaches are united by rejection of the claim that the linguistic system should be studied independently of the cognitive, sociocultural, and temporal factors that at least partially motivate it and also by rejection of the claim that syntax is autonomous from semantics and pragmatics. Functional models regard language as primarily a means for human communication in context and attempt to explain as much as possible in terms of functional motivations, which may compete to give the appearance of arbitrariness in the system. Many also exhibit a number of derived characteristics, although these are much more variable across models: They are not confined to a core grammar but, rather, attempt to take on board the full range of systematic linguistic phenomena; they often use authentic linguistic productions as part of their database; they attempt to model the flexibility and 'fuzziness' of language; they are concerned with discourse as well as the sentence grammar; they study typological variation in language; and they adopt a constructivist approach to the acquisition of language by the child.

Finally, it is important to note that there are important similarities between functional models, as defined here, and explicitly cognitively oriented approaches such as Cognitive Grammar and the various models of Construction Grammar. This is reflected, for example, in the fact that recent usage-based models embrace both functional and cognitive orientations (see also Horie and Comrie, 2000).

See also: Cognitive Grammar; Construction Grammar; Formulaic Language; Functional Discourse Grammar; Functional Grammar: Martinet; Minimalism; Principles and Parameters Framework of Generative Grammar; Role and Reference Grammar; Systemic Theory.

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Future Tense and Future Time Reference

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It is tempting to think of time simply as a line extending in both directions from the point at which we happen to be located. However, in constructing a theory of temporal semantics, we have to acknowledge that what is ahead of us – the future – is epistemologically radically different from both what is behind us – the past – and what is taking place at this moment – the present. Future states of affairs cannot be perceived or remembered, although they can be the subject of our hopes, plans, conjectures, and predictions. Philosophers such as Aristotle have claimed that the future has a special nature not only epistemologically but also ontologically: statements about the future do not yet have a determinate truth value. In a possible worlds framework, the 'branching futures model' can be seen as an expression of a similar idea: time looks like a tree rather than a line, and at any point in the tree there is only one way back into the past, but many branches lead into the future.

Against this background, it is perhaps not so strange that there tend to be asymmetries in the ways in which temporal reference is structured in

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It is tempting to think of time simply as a line extending in both directions from the point at which we happen to be located. However, in constructing a theory of temporal semantics, we have to acknowledge that what is ahead of us – the future – is epistemologically radically different from both what is behind us – the past – and what is taking place at this moment – the present. Future states of affairs cannot be perceived or remembered, although they can be the subject of our hopes, plans, conjectures, and predictions. Philosophers such as Aristotle have claimed that the future has a special nature not only epistemologically but also ontologically: statements about the future do not yet have a determinate truth value. In a possible worlds framework, the 'branching futures model' can be seen as an expression of a similar idea: time looks like a tree rather than a line, and at any point in the tree there is only one way back into the past, but many branches lead into the future.

Against this background, it is perhaps not so strange that there tend to be asymmetries in the ways in which temporal reference is structured in

languages, and that in particular the grammatical category of tense often blurs into modality and evidentiality in the area of the future. Whether for instance the English auxiliaries *shall* and *will* should be seen as markers of future tense or rather as ordinary modal verbs is a much-debated issue, the importance of which depends on the stand one takes on another, equally contentious, issue: how essential it is to uphold the discreteness of grammatical categories. If it is acknowledged that it is normal for the semantics of grammatical items to combine temporal elements with components of a modal, evidential, or aspectual character, it may become more important to study how the weight of these different factors shift over time, in the process of grammaticalization. From this perspective, it is notable that the diachronic sources of what grammars refer to as future tenses typically have exclusively nontemporal meanings, and the temporal meaning elements tend to grow stronger during the course of grammaticalization ('temporalization,' in the term of Fleischman, 1983), as future markers gradually obtain an obligatory status. English is a language that has advanced relatively far along the road towards obligatory marking of future time reference. In this regard, it is instructive to compare English to a language such as Finnish, in which there is hardly any grammaticalization of future time reference. In English, the sentence *It is cold tomorrow*, with the present tense of the copula *is*, sounds rather strange: it is more natural to say *it will (it'll) be cold tomorrow* or *it is going to be cold tomorrow.* In Finnish, on the other hand, we may replace the adverb *tänään* 'today' in the sentence *Tänään on kylmää* 'Today is cold' with *huomenna* 'tomorrow,' yielding *Huomenna on kylmää* '(lit.) Tomorrow is cold,' without any further changes in the sentence. Thus, Finnish weather forecasts are typically formulated in the present tense, which is hardly possible in English.

The English examples, however, also illustrate two other important points. First, the obligatoriness of future marking in English is not independent of the epistemological status of the statement. If it concerns an event that is fixed by some kind of schedule, English tends to use the present tense, although the time referred to is in the future, as in *The train leaves at noon.* Second, future marking is an area where we often find competition between two or more grammatical devices. For English, *will* and *be going to* have already been mentioned, but there are in fact several additional ways of referring to the future, such as by the present progressive (*We are leaving at four*) or by a combination of *will* and the progressive (*The shop will be closing in five minutes*), neither of which have a progressive meaning in the examples cited. Other languages are similar: Bybee *et al.* (1994) found at least two futures in 70% of the languages in their sample and at least three in close to 25%. As the word 'competition' suggests, the choice between the alternative ways of marking future is usually not reducible to any simple semantic or pragmatic distinction: rather, a number of different factors are at play: thus, *will* and *be going to* differ both semantically and stylistically. In many cases, differences between future-marking devices are attributable to what point they have reached in the grammaticalization process; in others, the differences reflect the original meanings of the diachronic sources of the items in question.

Future-marking devices derive historically from a number of sources. Among the most common are auxiliary constructions expressing obligation ('must'), e.g., English *shall*; volition/intention ('want'), e.g., English *will*; and motion ('go' and 'come'), e.g., English *be going to*. However, a future tense may develop out of an earlier nonpast or imperfective as an indirect effect, for example of the expansion of an earlier progressive – the future uses are what is left of the old category after that expansion (possible examples mentioned by Bybee *et al.* (1994) are Margi, Tigre, Pangasinan, and Kui).

In the development of futures, several things happen. To start with, there is normally an initial change of meaning that may involve both what has been called 'pragmatic strengthening' and 'semantic bleaching.' Thus, a verb of volition, such as *want*, does not normally imply that the willed action is performed; to interpret something like *She wants to leave* as 'She will leave,' the meaning of the volitional verb has to be strengthened. But when extended to cases of 'pure prediction' such as *It will rain,* the volitional element has to be bleached altogether. Furthermore, the item gradually comes to be used in contexts where it is communicatively redundant, which leads to it being reduced phonetically (e.g., *is going to* > *is gonna*). Eventually, the grammaticalizing item may fuse with the main verb and become affixed to it. A famous example is the French inflectional future as in *il chantera* 'he will sing,' which derives from a construction involving the Latin verb *habere* 'have' in an obligative meaning. English *shall/will* have not become inflections, although they are usually cliticized to the preceding word in the reduced form *'ll*.

Being usually more advanced on the grammaticalization path, inflectional futures tend to have a wider range of uses than periphrastic ones. Normally, future-marking devices start out in main clauses, which are bearers of the illocutionary force of an utterance. English is an example of a language in

which no future time marking is normally found in some types of subordinate clauses, such as conditionals and temporal clauses – for example, *If it rains, you'll get wet*, where only the main clause is marked for future time reference. As it turns out, future marking in such clauses tends to be restricted to languages with inflectional futures (Bybee and Dahl, 1989).

It was said above that future states of affairs are the subjects of our hopes, plans, conjectures, and predictions. The latter notions also represent what we can call different epistemological bases for statements about the future, and, as was also mentioned above, the way in which such statements are expressed in a language can depend on which kind of epistemological base it has. A major distinction may be drawn between **intention-based** and **prediction-based** future time reference. Particularly in everyday conversation, a large part of what is said about the future refers to plans and intentions of the participants. I announce what I intend to do, or ask you what you intend to do. This is clearly different from discussing what the weather will be like tomorrow. A straightforward grammatical opposition based on the distinction between intention-based and prediction-based future time reference is less common than one would perhaps think, in view of the apparent cognitive salience of that distinction. Its importance lies rather in the observation that markers that are originally restricted to intention-based future time reference tend to develop into general future markers, which include prediction-based future time reference as central cases but can in the normal case still be used for intention-based future time reference.

Another major parameter is the temporal distance between the speech act and the future time point in the future. Immediacy is often cited as a condition on the use of certain future-marking devices, such as the English *be going to* or the French *aller* + infinitive construction. At a closer look, it often turns out that immediacy is a contributing factor but hardly the only one, as we shall illustrate below. It does happen, however, that more precise restrictions on temporal distance develop, although this is much less common for the future than for the past. Bybee *et al.* (1994) cite Mwera (1994; original source Harries, 1950) as an example of a language that has three different future auxiliaries, *ci* for reference to the same day (hodiernal future), *cika* for the following day (crastinal future), and *jiya*, which they interpret as a general future.

Typological surveys (Dahl, 1985; Bybee, 1994) have shown approximately equal numbers of inflectional and periphrastically expressed futures. In the sample in Dahl and Velupillai (2005), North America, Australia, central New Guinea, the Caucasus, and South Asia come out as areas where languages with inflectional futures are in a clear majority. Among areas where inflectional futures tend to be absent are Southeast Asia (where most languages are isolating) and northern Europe.

See also: Evidentiality in Grammar; Modal Logic; Mood and Modality in Grammar; Temporal Logic; Tense and Time: Philosophical Aspects; Tense, Mood, Aspect: Overview; Tense.

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Fuzhou *See:* Chinese.

G

Gabelentz, H. Georg Conon von der (1840–1893)

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Hans Georg Conon von der Gabelentz, born March 16, 1840, in Poschwitz, Germany, studied law, Asian languages, and comparative linguistics at the universities of Jena and Leipzig. After graduation in 1863, he served for 12 years as an employee of the Royal Saxonian government in Dresden, Leipzig, and Strassburg. In 1876, immediately upon earning a doctorate from Leipzig University with a thesis on the Chinese philosopher Zhou Dunyi, he applied for a professorship of Chinese, Japanese, and Manchurian. With a great deal of good luck and the strong support of the well-established Sinologist Wilhelm Schott (1807–1889), Gabelentz was appointed Professor Extra-ordinarius for East Asian languages in 1878 and 4 years later, in Leipzig, became the occupant of the first Chair at a German University in East Asian Studies. The last 4 years of his life, he taught at Berlin University as Ordinarius für Sinologie und allgemeine Sprachwissenschaft.

During the last two decades of the 19th century, Leipzig University enjoyed an unprecedented reputation as the center of the new historical linguistic studies, with the Neogrammarians, a group of young and highly productive Germanists and Indo-Europeanists, being the undisputable leaders in the field. From the very beginning, Gabelentz found himself in a difficult position. In comparison to Indo-European languages, his specialty was rather marginal, with only a very small number of students attending his lectures. More importantly, his approach to language study was on at least two counts markedly different from that of the Neogrammarians. Taking his lead from Wilhelm von Humboldt's linguistic philosophy, Gabelentz saw language as a system where inner and outer forms exist in a relationship of mutual interdependence. He therefore moved away from the Neogrammarians' almost exclusive emphasis on outer form and at the same time focused on synchronic rather than diachronic language study. He studiously avoided controversy, yet this only made it easier for 'mainstream linguistics' to treat him with disregard. Hermann Paul (e.g., 1920: 125) mentioned him repeatedly and approvingly, but there was no other substantive reaction to his work from the Neogrammarian group. Outside Germany, on the other hand, Gabelentz's ideas caught on much earlier than in his native country. The Czech linguist Vilém Mathesius (1882–1945), as well as the Danish linguists Otto Jespersen (1860–1943) and Louis Hjelmslev (1899–1965), acknowledged their indebtedness to various aspects of Gabelentz's approach. In Germany, it was Eugenio Coseriu (1921–2002) who in 1969 led the way to a comprehensive recognition of what Gabelentz had contributed to the development of general linguistics (cf. Gabelentz, 1891). Through Coseriu's elaborate investigation, it became apparent that Gabelentz had developed, and worked with, numerous ideas of groundbreaking importance for linguistic science, e.g., the differentiation between language use (*Rede*) and language system (*Sprache*), a distinction crucial for Saussure and, subsequently, for 20th-century structuralism.

Gabelentz was primarily interested in East Asian languages. His "great grammar [1881] is even today indispensable for the study of the Chinese written language" (Richter, 1979: 30). In the preface to the 1960 edition, Eduard Erkes stressed that "it is undoubtedly quite unusual for a scholarly work to experience a new unchanged edition after 70 years" (vii). Among the 105 books and articles and more than 200 reviews listed in Richter (1979) are numerous other publications dealing with East Asian languages and culture (e.g., 1882, 1888a, 1888b). But Gabelentz had a much wider range of interest and expertise, encompassing, e.g., the analysis of Basque and certain North African languages (1893, 1894) and even venturing into exploring the area of native American languages (see Richter, 1979: 34).

His early death (December 11, 1893, Berlin) cut short a life still full of now irretrievable promise.

See also: Coseriu, Eugenio (1921–2002); Humboldt, Wilhelm von (1767–1835); Jespersen, Otto (1860–1943); Mathesius, Vilém (1882–1945); Neogrammarians; Paul, Hermann (1846–1921); Saussure, Ferdinand (-Mongin) de (1857–1913).

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Gabon: Language Situation

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Since its adoption as official language by the Republic of Gabon in 1960, French has been used for education and official written communication, economic and financial activities, and politics and administration. It is now rapidly expanding among younger generations to other domains of social exchange as everyday communication, especially in urban contexts. Perceived as synonymous with access to employment, welfare, and the outer world, it is presently used by 70 to 75% of Gabon's inhabitants. According to the latest Ethnologue report, French literacy rate amounts to approximately 75%. The total number of Francophones is steadily growing and the quality of mastery is globally improving.

French is becoming the first acquired language for an increasing number of children. However, due to social, educational, and geographical differences, there is some disparity in the degree of mastery and actual practice. French is only occasionally used, for instance, in less developed rural non-institutional environments, where the vernacular languages still play a significant role. A decreasing number of Gabonese, generally older generations who learned French in non-institutional contexts, speak local varieties of French, mainly characterized by lexical traits. (Boucher and Lafage (2001).)

Recent attempts made by the Raponda-Walker Foundation to introduce vernacular languages into the educational system have not been very successful due to organizational, scientific, and political reasons. Gabon's complex ethnic situation is a potential source of conflict. In response to this, the official language policy is to reinforce the use of French, as it constitutes a unifying factor in a multilingual space, and to improve or replace the often out-of-date methods used for teaching French.

Multilingualism is omnipresent. Most Gabonese speak one or more local languages besides French, including their mother tongue. Code-switching is a well-attested phenomenon, especially among young people: lexical and grammatical French items appear within local language utterances in a more or less principled manner.

French is gradually replacing the vernacular languages, which are increasingly exclusive to in-group communication. Massive borrowing from French is current; its generalized use constitutes a serious threat to the vernacular minority languages.

In close collaboration with linguists from the MRAC (Tervuren, Belgium) and the Omar Bongo University (Libreville), a team of Bantuists of the Lyon 2 university have substantially contributed over the last 25 years to the understanding of the

overall linguistic situation of Gabon and the description of the individual local languages. Extensive on-site sociolinguistic inquiries and surveys have nourished synchronic and diachronic descriptions, and generated numerous scholarly publications. Today the overall linguistic situation is much clearer than two decades ago, though more in-depth investigation is needed.

Inventory of Language Varieties

Table 1 presents a detailed inventory of the Bantu and Pygmy language varieties of Gabon. Some of these vernacular languages, e.g., Fang, may be used for communication between members of different ethnic groups, especially in non-urban environments. The language references used in Table 1 are from Maho, 2003, based on those elaborated by Malcolm Guthrie. The precise status of some newly added varieties remains to be determined. The sources of the date appear after each estimated number of speakers. Demographic data have been taken either from Ethnologue (abbreviated in the table as Ethn.) or the official 1993 census of the Gabonese population (abbreviated OC93). Minor language varieties are often not visible in the census, because they are included, sometimes in a somewhat arbitrary way, in one of the major ethnolinguistic groups. No separate estimations (abbreviated NSE) are available for most of these languages. Ethnologue language names are included parenthetically if they are different from the names used here. An asterisk indicates that a language is absent from the Ethnologue database.

Localization of Language Varieties

The speakers of the varieties listed in Table 1 are distributed all over the country; for locations, see the map in Figure 1. Most of the local ethnolinguistic communities are represented in Libreville. Members of these groups generally live together in separate districts of the capital (see Kwenzi-Mikala, 1992). Other urban centers also attest to a great variety of local populations.

The map indicates the geographic locations of most of the language varieties listed in Table 1. Its scale, however, does not allow much accuracy as to their precise locations; moreover, we have no location information for some minor language varieties. Most villages are situated along the main communication axes; villages and people often move along these roads and rivers. Several regions, mostly heavily forested, are uninhabited.

Small Pygmy settlements are found in all provinces, nearly always at the fringes of the forest, in the vicinity of their Bantu neighbors with whom the Pygmies frequently interact. Their genetic affiliation is uncertain. The Pygmies are generally considered to have been in place before the arrival of Bantu-speaking groups. Formerly hunter-gatherers, today they have a semi-nomadic lifestyle, partially due to government policy. The Baka(o) live in the extreme north, the Koya in the northeast, the Bongo in the more central and southern regions, and Okoa in the estuary. The Rimba and Gama live in the southwestern part of Gabon. According to Mayer (1987), basically three types of situations exist; the first of these is by far the most common:

1. Pygmies who speak the same language variety as their Bantu neighbors, with no traces of some original language (e.g., the Koya in the Mekambo region);
2. Pygmies who speak some mixed Bantu language resulting from extensive but eclectic borrowings not matching any specific Bantu variety (e.g., the Bongo near Mbigou);
3. Pygmies who speak a non-Bantu language in a Bantu environment, but who are completely bilingual (e.g., the Baka speak an Ubangian language as their mother tongue in a Fang environment, but use Fang for everyday communication).

Most language varieties spoken by the Pygmies are not mutually intelligible.

Issues Related to Classification

The Bantu varieties of Gabon can be grouped into a dozen clusters (Table 1) belonging to three different but contiguous geolinguistic zones (A, B, and H). Table 2 presents classification issues and some specific linguistic traits.

The Bantu languages of Gabon belong to what is now called Forest Bantu, which is a part of Western Bantu, as opposed to West-central Bantu and Eastern Bantu (Nurse and Philippson, 2003). For Bastin *et al.* (1999), zone A languages constitute, together with B10–B20–B30, Northwestern Bantu opposed to the rest of the western languages. This implies the presence of a linguistic barrier within Gabon, and especially within zone B (see Figure 1).

On the basis of several structural innovations, at least four higher-level clusters may be established: A (including *A75*), *B10–30*, *B50?–60–70*, parts of B80–H24, *H10*–30, H42, *B40*–parts of B85 (groups attested in Gabon are in italics.) The precise articulations between these higher-level clusters are still being examined.

Table 1 Inventory of vernacular languages spoken in Gabon

Language variety and groups	*Reference (Maho, 2003)*	*Source of data and estimated number of speakers*	*Linguistic status*
Bube-Benga	A30		
Benga	A34	OC93:[a] included in Myene group (NSE)[b]	
Yaunde-Fang	A70		
Fang	A75	OC93: 258 601 in Gabon	
Atsi (*)[c]	–		A75 variety
Meke (Make)	–		A75 variety
Mvai(*)	–		A75 variety
Ntumu (Ntum)	–		A75 variety
Nzamane (*)	–		A75 variety
Okak (*)	–		A75 variety
Makaa-Njem	A80		
Shiwa (*)	–	OC93: included in Fang group (NSE)	A83 dialect
Bekwil (Bekwel)	A85b	OC93: included in Fang group (NSE)	
Myene	B10	OC93: 48 767 total	
Mpongwe	B11a	Ethn[c]: 1000–4000	
Rungu (Orungu)	B11b	Ethn.: 10 000	
Galwa	B11c	Ethn.: 2000–11 000	
Dyumba (Ajumba)	B11d	Ethn.: 1000–2000	
Nkomi	B11e	Ethn.: 20 000	
Enenga	B11f	Ethn.: 1000–5000	
Kele	B20	OC93: 71 351 total	
Sekyani (Seki)	B21	Ethn.: 1000–4000	
West Kele (Kili)	B22a	(NSE)	
Ngom	B22b	(NSE)	
Mbangwe	B23	(NSE)	
Wumbvu	B24	(NSE)	
Kota	B25	(NSE)	
Shake (Sake)	B251	(NSE)	B25 dialect
Mahongwe	B252	(NSE)	B25 dialect
Ndasa	B201	(NSE)	B20 variety
Si(si)gu (Sighu)	B202	Ethn.: 1000	B20 variety
Samaye (*)	B203	(NSE)	B20 variety
Ndambomo (*)	B204	(NSE)	B20 variety
Tombolo (*)	B205	(NSE)	B20 variety
Mwesa (*)	–	(NSE)	B20 variety
Tombidi (*)	–	(NSE)	B20 variety
Tsogo	B30	OC936: 32 793 total	
Tsogo	B31	Ethn.: 31 000	
Kande	B32	Ethn.: fewer than 1000	
Viya (Eviia)	B301	50–100? (NSE)	B30 variety Different from B305
Himba (Simba)	B302	Ethn.: 3000	B32 dialect
Bongwe (*)	B303	(NSE)	B31 dialect (Pygmies)
Pinzi (Pinji)	B304	Ethn.: 5000	B32 dialect
Vove (Bubi)	B305 (= *B22c*)	Ethn.: 4000	B30 variety
Shira	B40	OC93: total 241 954	
Shira (Sira)	B41	Ethn.: 17 000–50 000	
Sangu	B42	Ethn.: 10 000–30 000	
Punu	B43	(NSE)	
Lumbu	B44	(NSE)	
Bwisi	B401	(NSE)	B40 variety
Varama (Barama)	B402	(NSE)	B40 variety
Vungu (Vumbu)	B403	(NSE)	B40 variety
Ngubi (*)	B404	(NSE)	B40 variety

Continued

Table 1 Continued

Language variety and groups	*Reference (Maho, 2003)*	*Source of data and estimated number of speakers*	*Linguistic status*
NJABI	B50	OC93: total 113 656	
Duma (Aduma)	B51	Ethn.: 7000–10 000	
Nzebi (Njebi)	B52	(NSE)	
Tsaangi	B53	(NSE)	
Wandji	B501	Ethn.: 6000–14 000	B51 dialect
Mwele (*)	B502	(NSE)	B50 variety
Vili (*)	B503	(NSE)	B50 variety Different from H12a
MBETE	B60	Ethn.: 110 000; see Teke	
Mbete (Mbere)	B61	(NSE)	B62 dialect
Mbaama (Mbama)	B62	(NSE)	
Mpini (*)	B601	(NSE)	B62 dialect
Ndumu	B63	(NSE)	
Epigi (*)	–	(NSE)	B63 dialect
Kanandjogo (*)	–	(NSE)	B63 dialect
Kuya (*)	–	(NSE)	B63 dialect
Nyani (*)	–	(NSE)	B63 dialect
Kaningi	B602	Ethn.: 6000	
TEKE	B70	OC93: 82 890 (= MBETE-TEKE)	
Tege-Kali (N. Teke)	B71a	Ethn.: 10 000–20 000 in Gabon	
Tsaayi (W. Teke)	B73a	Ethn.: 32 000 in Gabon	Extinct in Gabon?
Tsitsege	B700	(NSE)	
KONGO	H10		
Vili	H12(a)	OC93: included in SHIRA? (NSE)	Different from B503
UBANGI (. . .)			
Baka	Non-Bantu	Ethn.: 3200 (overestimated) OC93: 3534 Total of Pygmies	

[a]OC93 is the official 1993 Gabon census.
[b]NSE means no separate estimate.
[c]Languages marked with are asterisk are not listed in the database at www.ethnologue.com (abbreviated in the table as Ethn.)

Present and Future Status

The vernacular languages, none of which has received any official status, play an important role in the perpetuation of traditional practices and beliefs. They may be freely used for these purposes. However, many of these varieties are seriously threatened by extinction within two or three generations. Several languages are in the course of being abandoned. The impact of French reinforces this demise, as does the rural exodus.

As a consequence of multilingualism and convergence, several languages present clear signs of admixture. Viya's affiliation with B30, for instance, is beyond doubt, but subdomains of its lexicon reveal signs of extensive borrowing from neighboring Shira (B41). The Makina people speak Shiwa (A83), but their language and culture is today yielding to the fast-growing influence of Fang (A75). Shiwa speakers now generally speak Fang and are abandoning their language.

The conservation of the linguistic and cultural heritage of Gabon is a matter of utmost emergency. Special, though insufficient, efforts are being made in order to save as much of the linguistic patrimony (i.e., the remaining languages) as possible. Linguists from Libreville and Lyon are preparing a detailed atlas of the languages and ethnic groups of Gabon. Recently, two scientific dictionaries have become available: Van der Veen and Bodinga-bwa-Bodinga (2002) concerning Viya, and Mickala-Manfoumbi (2004) on Vove.

Peopling of the Gabon Area

On the basis of the available linguistic data, historical inferences can be made about the peopling of the Ogooué-Ivindo-Ngounié area by Bantu-speaking populations. Successive waves moved away from a major western Bantu expansion, which originated in northwestern Cameroon and spread southward. Some linguistic groups of Gabon migrated from more northern regions (Myene-Tsogo, and much later, Fang),

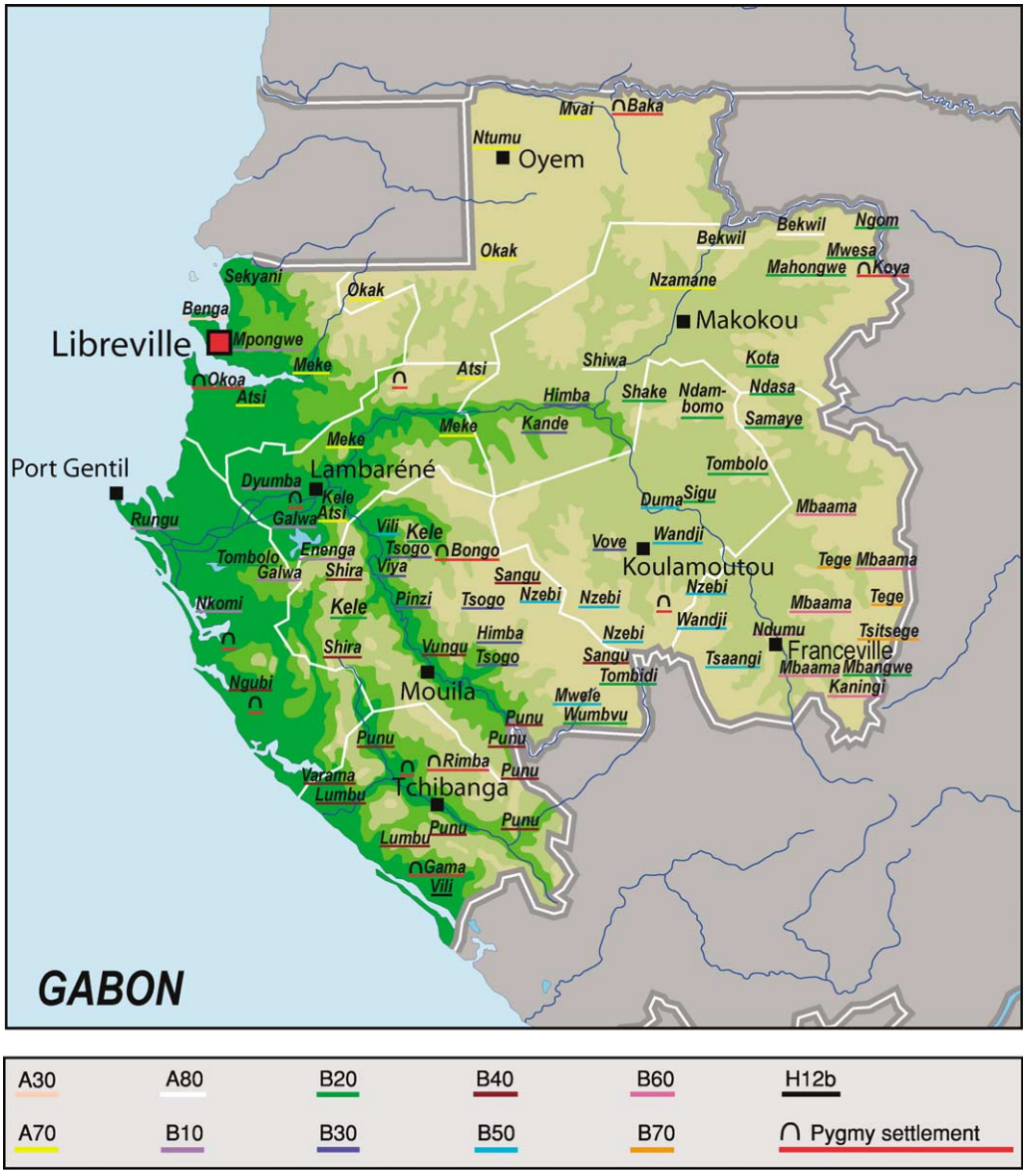

Figure 1 Localization of vernacular languages in space. Pygmy settlements according to Mayer (1987).

others from southern regions (Shira-Vili), and others from regions located to the east (Njabi-Mbaama-Teke) (see Figure 2).

The chronology can only be very approximate; linguistic data roughly matches the available archaeological data. The first Bantu-speaking populations must have arrived around 1000 B.C. or earlier (with the spread of agriculture), whereas the Fang migration did not occur until the 17th through 20th centuries A.D.

Comparative studies suggest an ancient affiliation between the Myene and Tsogo groups, but there must have been a convergence between B10 and part of B30 at a later stage, after their initial separation. At an even higher level, B10–B30 clusters with zone A languages, as an ancient branch of Western Bantu (Bastin *et al.*, 1999; Mouguiama-Daouda and Van der Veen, forthcoming, due in 2005). B20's precise affiliation is still a matter of debate, but there is evidence of an ancient genetic relationship between this group and A34. Some uncertainty also exists concerning the genetic affiliation of all or part of B50. Oral tradition claims the Njabi speakers migrated from Democratic Republic of Congo. B50 is generally considered related to B60–B70–B80 (the latter in DRC), but the observed clustering may also be the result of a prolonged hybridization. Some scholars suggest an ancient affiliation with B20. Vili speakers (H12a) claim a southern origin, as do most of the B40 speakers. Linguistic data corroborates this claim. A preliminary study of Baka lexicon suggests several

Table 2 Classification issues and specific linguistic traits

Group	*Classification issues*	*Specific traits*
Benga	Ancient affiliation with B20?	7V system. Glottal fricative. No spirantization.
Fang	Northern and southern subgroup; varieties attesting traits from both	Frequent loss of final vowels with consequences for syllable structure, vowels, and tone. 8V. Diphthongs. Labiovelars. Signs of spirantization and merger of high and mid-high vowels in southern dialects. Synopsis: Medjo Mvé, 1997; Mba-Nkoghe, 2001
Bekwil	Dialect cluster (Gabon, Congo-Brazzaville, Cameroon)	7V. Closed next to open syllables. Distinctive vowel length. Diphthongs. Very close mid-high vowels. Labiovelars. Outline: Bouka, 1995
Myene	Closely related varieties Relatively recent linguistic diversification?	Consonantal alternations in base-initial position. 7V. Traces of fossilized augments and of Meinhof's rule. Profoundly altered tone systems. Def. vs. Indef. contrast expressed by tone. Nasalized labial approximant in B11a. Synopsis: Mouguiama-Daouda & Van der Veen (forthcoming, due in 2005)
Kele	Geographically (see map) and linguistically, most divergent group. Ancient diversification? Floating group in most recent classifications (cf. Bastin *et al.* 1999). Clusters with A + B10 – B30 or with other, more southern groups. Two major subgroups: Kota cluster and Kele cluster. B22c (''Bubi'') affiliates with B30 (Jacquot, 1983 and Van der Veen, 2003	Under examination. 7V. Weakening or loss of final vowels in several varieties, e.g., B22a Nasalization of vowels due to loss of nasals. Glottal fricative in several varieties, e.g., B252 Frequently -ak- suffix in infinitives Spirantization emerging in several languages: B203, B204, B22a, B25, B251
Tsogo	Dialects Kande, Pinzi, Himba form northern subgroup (with considerable influence from B10). Other varieties: separate, though related languages. Increasing pressure on Viya and Vove from surrounding non-B30 languages	7V. FUT: -nga-. Absence of noun class 15 and traces of 10. 19/13 pairing Vove: very close mid-high vowels Synopsis: Van der Veen, 2003
Shira	Rather homogeneous group, several varieties are dialects. Morphology, tonology, and lexicon suggest clear genetic relationship between B40 and part of H10	5V. Distinctive vowel length. Spirantization. Tone cases: Blanchon, 1999. Overview B40–H10: Blanchon, 2000; Idiata-Mayombo, 1998
Njabi	Closely related varieties	Nzebi, Wandji, and other varieties have 7 (phonemic) vowels in C_1 (though not directly related to the 7V of proto-Bantu) and 5V in C_2. Spirantization. More detailed studies: Hombert & Mouele, 1988; Marchal-Nasse 1989; Blanchon, 1987
Mbaama	Three major varieties: Mbaama (7V), Kaningi (7V + phonemic length) and Ndumu (5V) Mbete (B61): dialect of Mbaama. Ndumu: four dialects (see **Table 1**). Members of B60 undergo pressure from B50 and B70	Spirantization: pf and bv. Flap
Teke	Represented in Gabon by two varieties (acc. to Jacquot (1978)). Most of Tege is spoken in DRC and Congo Tsaayi: extinct in Gabon at present?	5V. Distinctive vowel length. Nasalized vowels in some dialects due to the loss of nasal consonants (Hombert, 1986). Spirantization (Fontaney, 1984)
Kongo	Represented in Gabon by Vili. Other varieties spoken in Congo-Brazzaville	H12a and B40 share structural features: 5V, tone cases, spirantization, etc. Overview of B40–H40: Blanchon, 2000
Baka-Gundi	Baka: Ubangian language variety. Probably related to language spoken by Baka populations in Cameroon and DRC	No noun classes 7V. Complex tone system Sound inventory similar to nearby Bantu. Recent and ancient loanwords from several contiguous and noncontiguous Bantu languages (mainly A75, B10, B20, B30

periods of contact with Bantu speakers at different stages of time and place. This ongoing study may provide further indications as to the expansion patterns of languages such as Myene, Kele, and Tsogo.

Several of the above-mentioned hypotheses have recently been submitted to geneticists for examination. Blood samples have been collected from some 950 individuals belonging to 21 ethnolinguistic groups. Will population genetics corroborate the linguistically based inferences? Issues such as affiliation, homoplasy (convergence due to contact), geographic origin (e.g., Fang), expansion routes, and impact of

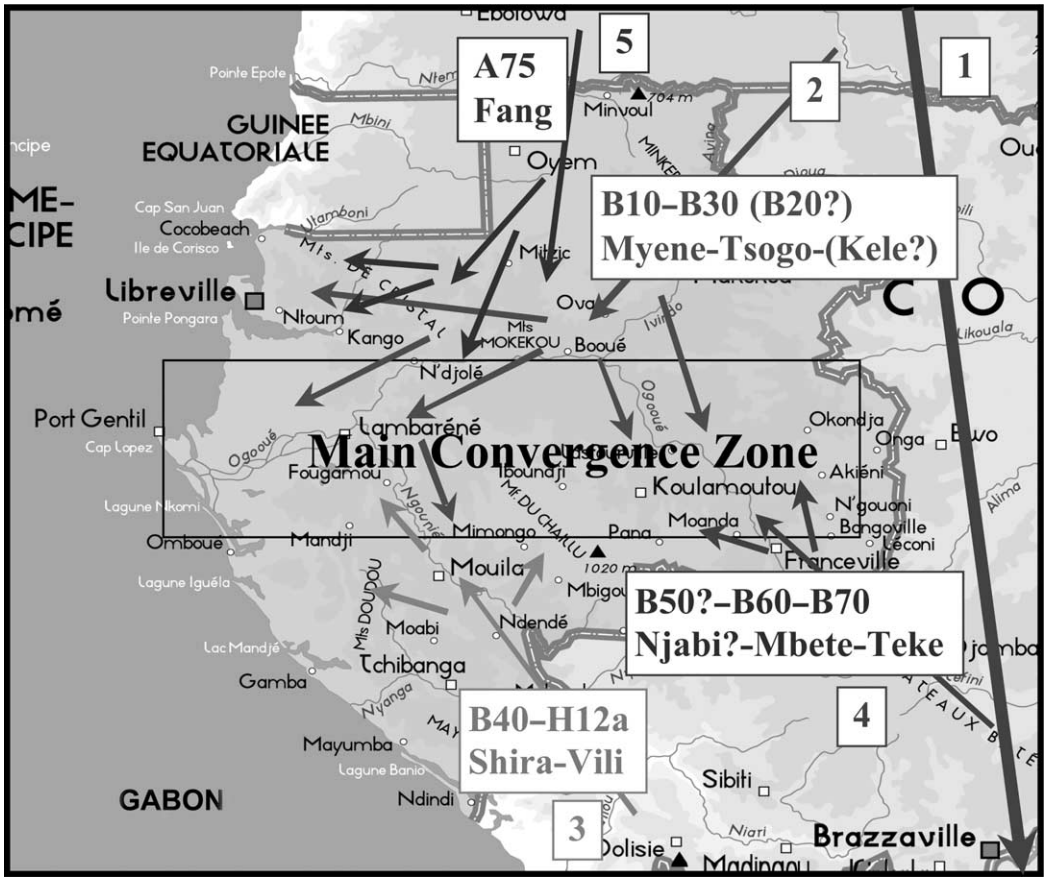

Figure 2 Major Bantu expansion routes in the Gabon area. The routes have been inferred from diachronic language studies; successive waves move away from the main western expansion at different stages in time: (1) Western Bantu expansion originated in northwestern Cameroon (approx. 5000 B.P.). (2) Myene-Tsogo branch, perhaps with Kele. (3) Shira-Vili split off. (4) Njabi(?)-Mbete-Teke branch. (5) Fang expansion (started in 16th century A.D.). Reference numbers taken from Maho, 2003.

mating patterns are being studied carefully. This multidisciplinary approach, which also brings in cultural anthropology and archaeology, offers new perspectives. Results regarding mitochondrial DNA and Y-chromosome variation will become available in 2005, when it will be examined by specialists from all involved disciplines. For a detailed presentation of this project, see Van der Veen *et al.* (forthcoming, due in 2005).

See also: Bantu Languages; Multilingualism: Pragmatic Aspects.

Language Maps (Appendix 1): Map 14.

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Gadamer, Hans-Georg (1900–2002)

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In 1979, while reflecting upon the philosophical relationship that for decades had united Hans-Georg Gadamer and Martin Heidegger, J. Habermas used an interesting expression. He remarked that Gadamer "had urbanized Heidegger's provinces." Gadamer studied under Heidegger (see Heidegger, Martin [1889–1976]) in Marburg, a German university town where Heidegger, 11 years his senior, taught for a short time (it was the 1920s, a difficult time for the German economy). During this brief period, the young Gadamer experienced a life-altering crisis that would transform the course of his existence (as well as that of other future important German philosophers).

Gadamer's notion of *Wirkungsgeschichte,* or "effective history," which the philosopher often referred to in his writings, represents the principle of 'urbanization.' As particularly evident in his most important work, *Wahrheit und Methode* (1960), this notion has been successful in drawing closer together those authors and philosophical schools of thought about whom Heidegger had spoken in radical and inflexible terms, for example, Plato, Hegel, and the humanists in general. Heidegger had, in fact, come to reject the very connotation of 'tradition,' regarded in its highest terms, to which Gadamer, in contract, paid the utmost attention. Gadamer succeeded in leading

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Heidegger away from the 'provinces' in which he had confined his thought and toward the vastness of the 'philosophical metropolis' and a constant discourse with tradition. The theory of philosophical hermeneutics, which emerged as a result, tries to weave the threads of human knowledge, a knowledge of which philosophy is the depositary, although not the sole one, in spite of the real and dramatic historical 'cuts' that have occurred.

Gadamer therefore distanced himself from Dilthey's belief in a distinction between natural sciences and human sciences; this eventually led him to confine their historical comprehension to an almost museum-like dimension. Gadamer's theory of understanding (*Verstehen*) is the reaffirmation of how vitally important it is for the human being to be involved with the object of his studies, also scientific.

Philosophical hermeneutics (see Habermas, Jürgen [b. 1929]) does not seek to assume a sort of epistemological role somehow superior to the theories subtending scientific knowledge. It is, rather, the close examination of the 'preunderstanding' horizon common to every human cultural event or action (hence, Gadamer's discussion of 'prejudice'). Consequently, Gadamer's *Verstehen* characterizes the relationships among human beings that existed prior to the onset of any scientific knowledge, revealing itself as a sort of existential substratum for man. By virtue of this substratum, understanding can effectively be regarded as value, that is, also as a result of 'effects.' This value uses language as its own preferred and indispensable *medium*, to the point of binding permanently together, according to Gadamer, understanding and interpretation as linguistic events. His concept of 'reason' is aimed at recovering the omnicomprehensive dimension that in the Platonic era had never been considered in abstract terms, as if disconnected from the realm of human action. According to Gadamer, reason must always be ruled by reasonability and wisdom. This is the *Phronesis*. Human language, handed down to us from history, is the medium that enables us to hold together both past and future dimensions in a present that is "reasonable and active."

Poetry holds a special place in Gadamer's thought, as in Heidegger's, by virtue of his firm belief in the privileged relationship that links it with the phenomenon of language. In addition to German classical poets such as Hölderlin, Goethe, and Schiller, he dedicated an important volume to the analysis and interpretation of Paul Celan's cycle of poems *Atemkristall*, as if he were trying to enter into a discourse with the poet that Heidegger had failed to establish.

See also: Habermas, Jürgen (b. 1929); Heidegger, Martin (1889–1976).

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Galician

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Language Classification

Galician is a Romance language derived from Vulgar Latin, belonging to the family of Ibero-Romance language varieties, and specifically, to the Galaico/Galician-Portuguese linguistic area. Termed *Galiza* by pro-Portuguese groups; in Galician, the language is *galego*.

Historical Overview

Galicia is the northwest region of Spain. One of three self-governing regions, the indigenous language of over 3 million people shares coofficial status with Castilian but linguistic origins with Portuguese, whose independence initiated diversification of Galician-Portuguese linguistic systems. By the 17th century, Galician varieties had lost prestige functions to Castilian, solely retained for oral intra-group purposes. However, by the 1980s a regional constitution and a written standard, the *Normas Ortográficas da Lingua Galega* (RAG & ILGA, 1995), were endorsed.

The long-standing diglossic situation with Castilian has led to lexical interference, although the phonological system also exhibits some structural borrowing: unlike Portuguese, *b* and *v* are homogeneous phonetically, there are no phonological nasal vowels or distinctive voiced sibilants, and the *ceta* [θ] is present.

Two major differences between Galician/Portuguese and Castilian:

(1) Lat. Ĕ > Port./Gal. terra
Cast. tierra
'land'
Lat. Ŏ > Port./Gal. porta
Cast. puerta
'door'

(2) Castilian monophthongization:
Port./Gal. madeira
Cast. madera
'wood'
Port./Gal. pouco
Cast. poco
'little'

Phonological System

The three dialectal zones based on derivations of Latin -ANUM by García de Diego (1909)

(3) eastern -ao
western -an
central -ano

may be maintained, but like the *seseo* pronunciation of *c*, the *gheada*, the (variable) voiceless continuant pronunciation of *g* in certain western dialects, confirms Zamora Vicente's (1953) two linguistic zone thesis; *galego iriense* (west) and *galego lucense* (east) (Fernández Rei, 1990):

(4) Gal. amigo > ami[h]o
'friend' > ami[x]o
> ami[x^h]o

However, the *Atlas Lingüístico de Galego* (ILGA, 1990, 1995, 1999) highlight the continued presence of more diverse dialectal variation. For example, whereas Portuguese acquired V̂ or retained V[m] of word-final VN sequences, and Castilian retains V[n], Galician generally adopts a V[ŋ] resolution, but the following can also occur:

(5) Lat. GERMANU > Port. irmão [ãw̃]
'brother' > Gal. irmao [aw]
(center, east)
> irmán [aŋ] (west)
> irmá [a] (northwest)
> Cast. hermano [an]

The *Normas* also require [ŋ] for intervocalic *nh*:

(6) Gal. unha
'one' (fem. sing.)

Controversy surrounding the phonemic status of [ŋ] is based upon its syllable position (Veiga Arias, 1976; González González and González González, 1994; Beswick, 1999).

See Table 1 for a more complete display of the Galician Phonological System.

Morphology

The tense range is similar to Portuguese: no compound tense forms, but a personal infinitive:

(7) comeran cando eu os chamei
'they had eaten when I called them'

(8) para faceres iso, precisas axuda
'in order to do that, you'll need help'

Verbal periphrases express aspectual, modal, or temporal meanings:

(9) o neno está a chorar/ o neno está chorando
'the boy is crying'

Table 1 Galician phonological system

Oral Vowels

	Tonic		*Non-final atonic*		*Final atonic*	
a	[a]	*cama* 'bed'	[a]	*palabra* 'word'	[a]	*casa* 'house'
e	[e]	*cera* 'wax'	[e]	*escrito* 'written'	[e]	*lume* 'light'
	[ɛ]	*letra* 'letter'				
i	[i]	*clima* 'climate'	[i]	*último* 'last'		
o	[o]	*son* 'sound'	[o]	*época* 'era, period'	[o]	*novo* 'new'
	[ɔ]	*forma* 'shape'				
u	[u]	*grupo* 'group'	[u]	*portugués* 'Portuguese'		

Diphthongs

Falling			*Rising*		
ai	[aj]	*pai* 'father'	ia	[ja]	*copia* 'copy'
au	[aw]	*auga* 'water'	ie	[iɛ]	*ciencia* 'science'
ei	[ej]	*maneira* 'manner'	io	[jo]	*milenio* 'millenium'
eu	[ew]	*meu* 'my'	iu	[ju]	*diurno* 'daily'
iu	[iw]	*partiu* 'he, she breaks'	ua	[wa]	*igual* 'same'
oi	[oj]	*biscoito* 'biscuit'	ue	[wɛ]	*frecuencia* 'frequency'
ou	[ow]	*doutor* 'doctor'	ui	[wi]	*lingüista* 'linguist'
ui	[uj]	*puiden* 'I was able to'	uo	[wo]	*residuo* 'residue'

Consonants

Orthographic symbol		
b intervocalically	[β]	*beber* 'to drink'
b elsewhere	[b]	
c + e, I	[θ] or [s]	*cedo* 'early'
c + a, o, u	[k]	*carta* 'letter'
ch	[tʃ]	*chiste* 'joke'
d intervocalically	[ð]	*dedo* 'finger'
d elsewhere	[d]	
f	[f]	*feo* 'ugly'
g	[g] or [h]	*garfo* 'fork'
gu + e, i	[g]	*guerra* 'war'
l	[l]	*lei* 'law'
ll	[ʎ] or [j]	*allo* 'garlic'
m	[m]	*mesa* 'table'
n	[n]	*nó* 'knot'
ñ	[ɲ]	*viño* 'wine'
nh	[ŋ]	*unha* 'one'
p	[p]	*persoa* 'person'
q	[k]	*quente* 'hot'
r intervocalically, word finally r elsewhere	[ɾ]	*ira* 'anger'; *ser* 'to be'
r elsewhere	[r]	*rede* 'net'; *tenro* 'tender'
rr	[r]	*carro* 'cart'
s	[s]	*sabor* 'taste'
t	[t]	*tema* 'theme'
v intervocalically	[β]	*vivir* 'to live'
v elsewhere	[b]	
x	[ʃ]	*xente* 'people'
z	[θ] or [s]	*zapato* 'shoe'

(10) teño traballado moito cando era xoven
'I used to work very hard when I was young'

(11) o can foi atropelado polo coche
'the dog was run over by the car'

Words in *-n* and polysyllabic words in *-l* are variable in the plural according to the linguistic zone:

(12) o can 'dog' > os cans (west/standard)
> os cas (center)
> os cais (east)

(13) o animal > os animás (sporadic)
'animal' > os animales (west/center: castilianism)
> os animais (east/standard)

The second person dative pronoun *che* is syntactically optional as a solidarity dative:

(14) dóecheme a perna
'my leg aches'

Object pronouns have a fixed order, as in Portuguese; contraction is common:

(15) déullelo
deu + *lles* + *o*
'he gave it to them'

Third person accusative pronoun allomorphs are phonologically conditioned by final phonemes of preceding words:

(16) o/a/os/as - default
comen o pan
'they eat the bread'
cómeno
'they eat it'

Here, *n* may be a positional allophone: velar word-finally before the article but morphologically connected to the pronoun, syllable-initial, and hence, alveolar.

(17) lo/la/los/las - following -r/-s, leading to their loss:

vou beber + a
vou bebela
'I am going to drink it'

(18) no/na/nos/nas - following a diphthong. A widespread innovative trait:

farei o xantar
'I will make dinner'
fareino
'I will make it'

The definite article comprises two allomorphs:

(19) o/a/os/as - default

(20) lo/la/los/las - following -r/-s:
todolos dias
todos + os
'everyday'

Article/preposition contractions are common:

(21) ós luns
a + os
'on Mondays'

(22) dunha amiga
de + unha
'of a friend'

Syntax

Pronoun order is similar to Portuguese. Simple declaratives and interrogatives:

(23) A miña irmá tróuxome unha flor
'My sister brought me a flower'

(24) Falaronlle da festa?
'Did they talk to him about the party?'

Negative, subordinate, complex interrogatives:

(25) A muller non che deu as notícias
'The woman didn't give you the news'

(26) Sabes canto me custou a casa
'You know how much the house cost me'

(27) ¿Quen lle deu o libro?
'Who gave him the book?'

See also: Generics, Habituals and Iteratives; Portuguese; Romance Languages; Spain: Language Situation.

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Gambia: Language Situation

Editorial Team

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Gambia is one of the smallest countries of Africa, with an area of around 11 300 sq km. It extends along the river Gambia from the Atlantic coast some 350 km inward and is, apart from the coastline, completely surrounded by Senegal. Gambia's population is about 1.5 million (2004 estimate). The majority of Gambian languages are Niger-Congo languages, belonging either to the Western Mande or the Atlantic group. Gambian Mande languages include Mandinka, Soninke (or Serehulle), and Jahanka (closely related to Mandinka and Western Maninka). Atlantic languages spoken in Gambia include Fula (or Pulaar), Wolof, Jola-Fogny, Serer, Balanta-Kentohe, and Mandjak. In addition, English, the official language, and the English-based Creole Aku are spoken, as well as languages of a number of immigrant communities, for example, Lebanese Arabic. Linguistically and culturally, the Gambia shares many traits with neighboring Senegal. Apart from the different official languages – English in the Gambia, French in Senegal, reflecting different colonial histories – most Gambian languages are also spoken in Senegal, and some have an even wider West African distribution.

The languages with the highest numbers of speakers in the Gambia are Mandinka (402 500 speakers), Fula (233 300), and Wolof (146 650). The principal languages of wider communication are, apart from English, Mandinka, mostly spoken in the rural areas, and Wolof, mainly spoken in the urban areas of the coast. Fula is spoken mainly in the interior, with the up-river towns of Basang and Basse being about one half Fula and the other half Mandinka. Most of the population of these areas is bilingual in Fula and Mandinka, which are considered rural languages of the interior, even though Mandinka is also spoken in most costal towns. Wolof carries a certain social prestige and is associated with urban sophistication. It is the main language of Banjul, the capital. The only rural Gambian Wolof live on the north of bank of the Gambia river, around Farafenni and Kauur. Except where Wolof is a lingua franca, it is not found south of the Gambia river. Jola is the fourth most widely spoken language in the Gambia, found mainly in Fogny. The Jola are almost invariably bilingual, also speaking Mandinka. Many urban Jola adapt to other cultures, especially Wolof and Mandinka, and cease to use their own language. There is some suggestion that with increasing urbanization, Jola may gradually disappear. Balanta and Manjak speakers, many of whom are recent immigrants from Guinea Bissau, constitute only a small percentage of the population, living mostly in Fogny. Aku is an English-based Creole originating from the community of freed slaves that settled in the capital Banjul in the early 19th century. Unlike other West African Creoles, such as Krio in Sierra Leone, Aku is not used as a lingua franca, but is spoken by a small, but economically important group of Aku speakers living mainly in Banjul.

The language of formal education is predominantly English, which is used at all levels of state education, and is also being introduced as a subject in Arabic-speaking madrassas. Mandinka, Wolof, and Fula are used to some extent in education, as well as in adult literacy programs, but often the unavailability of suitable teaching materials and textbooks is a problem. Literacy in Roman letters, as well as in Arabic script, which is often used for writing the three main Gambian languages Mandinka, Wolof, and Fula, is comparatively low (in 2002 estimate), with a significant difference between males (45%) and females (31%).

See also: Fulfulde; Multilingualism: Pragmatic Aspects; Niger-Congo Languages; Pidgins and Creoles: Overview; Senegal: Language Situation; Wolof.

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Game-Theoretical Semantics

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The leading ideas of game-theoretical semantics (GTS) can be seen by considering the truth condition of a sentence S of an interpreted first-order language. Now, S is true in an obvious pretheoretical sense iff there exist suitable witness individuals testifying to its truth. Thus, $(\exists x)F[x]$ is true iff there exists an individual b such that $F[b]$, $(\forall x)\ (\exists y)F[x,y]$ is true iff for each a there exists an individual b such that $F[a,b]$, and so on. As such examples show, one witness individual can depend on others. Hence, the existence of suitable witness individuals for S means the existence of a full array of Skolem functions for S, such as the function f in the sentence $(\exists f)\ (\forall x)\ F[x,f(x)]$, which is equivalent to $(\forall x)\ (\exists y)\ F[x,y]$. Such arrays of Skolem functions can be seen to codify a winning strategy in a simple game (semantical game) between a 'verifier' V and a 'falsifier' F. The game G(S) associated with S is played on some domain in which the nonlogical constants of S have been interpreted. G(S) begins with S, but at each move the sentence that the players are considering changes. When a move is made, V chooses disjuncts and values of existential quantifiers, whereas F chooses conjuncts and values of universal quantifiers, proceeding from outside in. For G(∼S) a game rule tells V and F to exchange roles and continue as for G(S). If a play of G(S) ends with a true negated or unnegated atomic sentence or identity, V wins and F loses; if it ends with a false one, vice versa. S is true iff there exists a winning strategy for V and false iff there exists one for F. GTS amounts to the systematic use of such truth conditions.

Game-theoretical ideas thus enter into GTS as highlighting the role of Skolem functions in logical theory. For this purpose, the whole generality of game theory is usually not needed. For instance, the only failure of perfect information that needs to be considered is a player's ignorance of earlier moves because only the individuals chosen at such moves can be arguments of Skolem functions.

So far, GTS for quantified sentences merely spells out our ordinary concept of truth. In traditional first-order languages, truth in the sense of GTS coincides with truth according to a Tarski-type definition (assuming the Axiom of Choice). But the GTS treatment can be extended and varied in several ways not available otherwise.

1. By allowing informational independence in the sense of game theory, we obtain a more expressive logic called independence-friendly (IF) logic (cf. Hintikka and Sandu, 1989). The greater expressive power is due to the semantic job of quantifiers as expressing dependence relations between actual variables by means of their formal dependence on one another. In the received first-order logic, only some patterns of such dependence could be formulated because the dependence-indicating scope relation is nested and hence incapable of expressing other dependence patterns. This defect is eliminated in IF logic. The role of Skolem functions in GTS is illustrated by the fact that each IF first-order sentence has a sigma-one-one second-order translation, namely, the sentence that asserts the existence of its Skolem functions. Conversely, each sigma-one-one sentence can be translated into the corresponding IF first-order language.

2. The independence of a quantifier (Q_2y) from another quantifier (Q_1x) within whose syntactical scope it occurs can be expressed by writing it (Q_2y/Q_1x). Often it is convenient to restrict this notation to quantifiers of the form $(\exists y/\forall x)$ and to assume that existential quantifiers are independent of one another, as are universal ones. (This simplification is used in this article.) As this slash notation suggests, the semantics of unextended first-order IF languages is not compositional. The limits of compositional methods in the semantics of IF logics have been investigated intensively (Hodges, 1997), and the impossibility of compositional semantics for IF logic normally interpreted has been shown (Cameron and Hodges, 2001; Sandu and Hintikka, 2001). The strength and naturalness of IF logic thus throws serious doubts on compositionality as a desideratum in semantic

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theorizing in general. In any case, many noncompositional languages can be treated semantically by means of GTS.

3. GTS can be extended to natural languages by allowing the substitution of names for entire quantifier phrases, as in Hintikka and Kulas (1983, 1985). Then the meaning of this phrase has to be taken into account by suitable additions to the output sentence. For instance, a game step (amounting to existential instantiation) might take the players from a singular sentence of the form

(1) X — some Y who Z — W

to a sentence of the form

(2) X — *b* — W, *b* is a Y and *b* Zs

Perhaps the greatest difference between natural language games and formal ones is that in the former the order of the application of game rules can be indicated by means other than scopes (labeled tree structures), for instance by the lexical items in question. This shows the limitations of the notion of scope, as argued in Hintikka (1997). At the very least, the two functions of scope (parentheses) have to be distinguished from one another as indicating the limits of binding (binding scope) and as indicating logical priority (priority scope). This distinction helps, among other things, to solve the problem of donkey sentences.

4. GTS can accommodate any concept, logical or nonlogical, whose meaning can be captured by a rule or rules in a semantical game. Cases in point are anaphoric pronouns, epistemic notions, genitives, *only*, and so on (cf. Hintikka and Sandu, 1991). For instance, the semantics of anaphoric pronouns can be captured by construing them, in effect, as existential quantifiers ranging over the individuals hitherto selected by V and F in a play of a semantical game. This extendability of GTS to nonlogical concepts throws into doubt the possibility of any sharp distinction between logical and nonlogical concepts.

By means of IF logic, several mathematical concepts can be expressed on the first-order level that could not be captured in ordinary first-order logic, including equicardinality, infinity, (topological) continuity, and König's lemma. In general, IF logic extends greatly the scope of what can be done in mathematics on the first-order level (cf. Hintikka, 1996).

5. The notion of informational independence plays an especially important role in epistemic logic, including the logic of questions and answers. Their logic depends essentially on the logical properties of the desideratum of a question. Such a desideratum is of the form $K_I S$ where K_I means *I know that*. It expresses the epistemic state that an answer to the question is calculated to bring about. The question ingredient is now of the form $(\exists x/K_I)$ for wh-questions and $(\vee/K_I)$ for propositional questions. All the most important notions related to questions and answers can be defined by means of the slash notation.

6. The law of the excluded middle amounts to the requirement of determinacy in semantical games and, hence, is not always satisfied. Determinacy fails, in fact, in IF logic, where the negation $\sim$ is used but not the contradictory $\neg$ negation. The latter can be introduced by a fiat, but within the GTS framework this can be done only when it occurs sentence-initially. When both negations are present, we obtain a logic whose algebraic structure is that of a Boolean algebra with an operator in Tarski's sense. In that logic, we can define generalizations of such notions as orthogonality and dimension.

7. The failure of *tertium non datur* shows that IF logic is closely related to intuitionistic logic. In a sense, IF logic is in fact more elementary than ordinary first-order logic. For instance, an application of the GTS truth definition to a sentence does not involve infinite closed totalities of individuals even when the domain is infinite. If such totalities are relied on, we can give truth conditions also for sentences in which $\neg$ occurs internally. The resulting logic is as strong as the entire second-order logic (with the standard interpretation), even though it is first-order logic in the sense that all quantifiers range over individuals.

In general, GTS shows that our concept of negation is irreducibly ambiguous between the strong (dual) negation $\sim$ and the contradictory negation $\neg$. This fact explains a number of features of the behavior of negation in natural language (cf. Hintikka, 2002a).

8. The simplest type of IF sentence that is not translatable into ordinary quantificational notation is of the following form, known as a Henkin quantifier sentence:

(3) $(\forall x)\,(\forall y)\,(\exists z/\forall y)\,(\exists u/\forall x)\mathrm{F}[x, y, z, u]$

The negation $\sim$S of an IF sentence S can be formed in the same way as in ordinary logic. For instance, the negation of (3) is (4)

(4) $(\exists x)\,(\exists y)\,(\forall z/\exists y)\,(\forall u/\exists x) \sim\mathrm{F}[x, y, z, u]$

The 'independence-free' meaning of (4) is brought out by its equivalence with (5)

(5) $(\exists f)\,(\exists g)\,(\exists x)\,(\exists y)\,(\forall z)\,(\forall u)$
$((z = f(x)\ \&\ u = g(y)) \supset \sim\mathrm{F}[x, y, z, u]$

9. IF logic is misnamed in that it allows for the representation of more dependencies (not just more independencies) than ordinary logic. A case in point is constituted by irreducibly mutually dependent variables. In order to express them, we have to generalize the notion of function and to take seriously the idea that a functional identity $y = f(x)$ expresses a dependence relation (cf. Hintikka, 2002b). This can be taken to mean that if such an identity fails to have a truth value for some x_o, $f(x_o)$ has to be taken to represent a probability distribution. Such distributions must then be able to be reified so as to act as argument values, too. With this understanding, the mutual dependence of x and y satisfying the condition F[x,y] can be expressed by

(6) $(\exists f)\ (\exists g)\ (\forall x)\ (\forall y)\ (x = f(y)\ \&\ y = g(x)\ \&\ \mathrm{F}[x,y])$

which is obviously equivalent to

(7) $(\forall x)\ (\forall y)\ (\exists z/\forall x)\ (\exists u/\forall y)\ (x = z\ \&\ y = u\ \&\ \mathrm{F}[x,y])$

10. The GTS approach can be varied in other ways, for instance, by restricting V's strategies to recursive or otherwise constructive ones as discussed in Hintikka (1996). In a different direction, a semantic game can be divided into subgames with specific rules for the transfer of information from one subgame to another one. Such subgames can be used for the interpretation of conditional sentences (cf. Hintikka and Sandu, 1991).

11. The notion of truth is put into a new light by IF logic. Tarski's well-known result shows that truth cannot be defined in an ordinary first-order language L for L itself, even when the syntax of L can be represented in L, for instance by means of Gödel numbering. The reason is that quantifiers ranging over numbers as numbers and quantifiers ranging over numbers as codifying numerical expressions must be informationally independent of one another. This requirement cannot be implemented in the received first-order logic. Because such independencies can be expressed in IF logic, a first-order IF language allows the formulation of a truth predicate for itself. Because Tarski's theorem is thus due to the expressive poverty of traditional logic (rather than its excessive deductive strength, as usually thought), definability problems are no obstacles to the explicit use of the notion of truth also in natural languages (cf. Hintikka, 1996; Sandu, 1998). Because much of the recent philosophical discussion of the notion of truth has in effect been prompted by Tarski's undefinability theorem, most of this discussion has to be reconsidered.

12. GTS, in the sense used here, is characterized by the definition of truth of S as the existence of a winning strategy for V in a semantical game G(S) associated with S. This meaning of GTS has to be distinguished from other uses of games and game theory in logic and linguistics, such as dialogical games (including questioning games), games of formal proof, games of communication, and so on. There are interesting connections between these different kinds of games. For instance, games of formal proof can be considered as mapping the different courses that a play of a semantical game can take. Again, the strategies of deductive games are closely related to the strategies of the corresponding questioning games when all answers are known *a priori* to be true (i.e., games of pure discovery).

13. Historically, GTS was inspired by Ludwig Wittgenstein's notion of language game. Philosophically, these two share the idea that language-world relations are constituted by certain rule-governed human activities. This implies that intentional relations are dispensable in semantics. In neither kind of game are the moves normally made by speech acts or other language acts. Both games are objective in that their theory depends only on their rules.

In sum, GTS is not merely one branch of formal semantics among others. It is an approach to all semantics, based on the possibility of considering the language-world links as being mediated by games in the abstract sense of the mathematical theory of games.

See also: Boole and Algebraic Semantics; Compositionality: Philosophical Aspects; Donkey Sentences; Multivalued Logics; Negation: Philosophical Aspects; Negation: Semantic Aspects; Truth Conditional Semantics and Meaning; Truth: Theories of in Philosophy.

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Gamilaraay

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Introduction

Gamilaraay (Kamilaroi) is an Australian Aboriginal language that was traditionally spoken over a large area in the northwest of New South Wales, from the Great Diving Range, near Tamworth, north and west to the Darling and Barwon rivers. There was a range of dialect variation within this region, mostly marked by vocabulary differences, with all the local groups identified as *gamil* 'no' *-araay* 'having'. The sociolinguistic history of Gamilaraay is typical of many southeastern Australian languages.

The first recording of Gamilaraay is a short word list collected in 1832 by Major Thomas Mitchell (1839), and there is quite an amount of vocabulary material collected by local landowners in the late 19th century. The missionary William Ridley (Ridley, 1856, 1875) lived among the Gamilaraay in the 1850s and studied the language, collecting vocabulary and making simple primers and Bible translations. In 1903 the surveyor R. H. Mathews published grammatical notes and a short word list; however, the first professional recordings of the language date from 1930, when the anthropologist Norman Tindale took down words in phonetic notation and collected a short traditional narrative text (Austin and Tindale, 1986). By that time, local Aboriginal social and cultural transmission had been so disturbed by the impact of European settlement (*see* **Australia: Language Situation**) that the two old men Tindale interviewed had difficulty recalling the story. In 1955, S. A. Wurm carried out extensive fieldwork in eastern New South Wales and at Boggabilla interviewed Peter Lang, who seems to have been the last fluent native speaker of the language. He died the following year. Wurm's materials included field notes and a 13-minute tape recording. In 1972–1974, Austin interviewed a large number of semispeakers who could recall up to 200 lexical items and fixed phrases from their youth, though none could produce sentences in the language. Using all the existing modern and 19th-century materials, together with comparative data from neighboring languages, one can obtain a fair but incomplete idea of the language and its structure.

From the 1940s onward, Gamilaraay ceased to be used as the main means of communication, although knowledge of words and expressions (such as plant, animal, and food names) continues until today. Since the 1990s, there has been intense local interest in the language, and strong support for its documentation and reintroduction. Austin (1992) is a bilingual dictionary that has been widely distributed; a hypertext version created by Austin and Nathan (1995) was the first fully hypertext bilingual dictionary on the World Wide Web.

As a result of local initiatives and with support from the New South Wales government, Gamilaraay is currently undergoing a language revival and is being taught both in adult education and primary school classes. A range of materials are now available on the language and its neighbor Yuwaalaraay, including a reference dictionary (Giacon *et al*., 2001), language lessons (Giacon, 1999), and a wordbook with accompanying music CD.

Language Relationships

Gamilaraay is closely related to its immediate western neighbors, Yuwaalaraay and Yuwaaliyaay. The languages share about 70% common vocabulary with Gamilaraay, and a similar grammatical system. Fortunately, Corinne Williams was able to study with the

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last two fluent speakers of these languages in 1975 and compiled a basic reference grammar and vocabulary list (Williams, 1980). There is also a large amount of tape-recorded material, collected in the 1970s by amateur linguist Janet Mathews (a relative of R. H. Mathews), that is being mined for other data.

These languages are quite clearly related to Wiradjuri (Wiradhuri), spoken over a large area of central New South Wales, and Ngiyampaa and Wayilwan, spoken along the Lachlan River (Donaldson, 1980; Austin *et al.*, 1980), and are members of a single linguistic subgroup (see Austin, 1997). This subgroup belongs to the widespread Pama-Nyungan family, which covers the southern two-thirds of Australia (*see* **Australia: Language Situation**).

Linguistic Characteristics

Phonology

The phonological system of Gamilaraay is typical of languages of eastern Australia, with contrastive stops at five points of articulation, a nasal for each stop position, a single lateral, a flap, a semiretroflex continuant, and two glides. Table 1 gives the relevant consonants in their practical orthographic form. There are just three vowels: high front *i*, high back *u*, and low *a*, with a phonemic length contrast found in all syllables of words.

The general structure of Gamilaraay roots is CV(C)CV(C). Every word must begin with a consonant and end in a vowel, or *n, l*, or *y*. Word-initially, only nonapical stops and nasals and the two glides are found. Word-medially, there are limited consonant clusters, primarily homorganic nasal plus stop, and apical nasal or lateral plus peripheral stop (*b* and *g*). Vowel clusters are not found. Words borrowed from English are generally restructured to meet these phonotactic constraints, e.g., *wajiin* 'white woman' (from 'white gin'), *ganjibal* 'policeman' (from 'constable'). Word stress is entirely predictable from the phonological shape of words: primary stress falls on long vowels or on the first syllable of a word that does not contain a long vowel. Secondary stress is on each even-numbered syllable to the left or right of the primary stress (except that final short syllables are not stressed). Examples are *gamilaraay* [gʌˌmilʌˈɽɑːy] 'Gamilaraay', *bandaar* [bʌnˈdɑːr] 'kangaroo', *thinawan* [ˈt̪inʌˌwʌn] 'emu'.

Table 1 Consonants

	Bilabial	*Lamino-Dental*	*Palatal*	*Apico-Alveolar*	*Dorsovelar*
Stop	*b*	*dh*	*j*	*d*	*g*
Nasal	*m*	*nh*	*ny*	*n*	*ng*
Lateral				*l*	
Flap				*rr*	
Continuant				*r*	
Glide	*w*		*y*		

Morphology

Gamilaraay, like other languages of the Pama-Nyungan group, is entirely suffixing in its morphology. There are two major word classes: nominals and verbs, with nominals showing a rich system of case marking and verbs marking tense/aspect/mood and dependent clause categories. Nominals can be subdivided into substantives (which cover both noun and adjective concepts in a language like English), pronouns, and demonstratives. Minor word classes include adverbs, particles, and interjections.

Nominals in Gamilaraay inflect for case, with the syntactic functions of intransitive subject (S), transitive subject (A), and transitive object (P) showing a split-ergative pattern of syncretism in the case forms determined by animacy:

- For the first and second person pronouns, S and A fall together as a single (unmarked) form with P different, making nominative-accusative case marking.
- For third person pronouns and all other nominals, S and P fall together as a single (unmarked) form with A different, making ergative-absolutive case marking.

In addition to the three main cases (*nominative* for S, *ergative* for A, *accusative* for P), there are also the following case forms:

- *dative* marking alienable possession, and direction toward a place
- *locative* coding location in a place
- *ablative* coding direction from a place, and cause

The actual forms of the cases are affected by the phonological shape of the root, e.g., whether it ends in a vowel or not and what kind of vowel or consonant is root-final.

Gamilaraay has a well-developed system of nominal word-building morphology that involves suffixation between the root and case inflection. Categories encoded in word-building morphology include number (plural), having (e.g., *bagaay-baraay* 'Boggabri' (literally 'creek-having')), lacking (e.g., *yuul-ngin* 'hungry' (literally 'food-lacking')).

Pronouns in Gamilaraay distinguish three persons and singular, dual, and plural number; in the first person nonsingular, there is no inclusive-exclusive contrast (unlike other Australian languages). Table 2

Table 2 Pronouns

	A/S	*P*	*Dative*	*Locative*
1sg	*ngaya*	*nganha*	*ngay*	*nganunda*
1dl	*ngali*	*ngalinya*	*ngalingu*	*ngalingunda*
1pl	*ngiyani*	*ngiyaninya*	*ngiyaningu*	*ngiyaningunda*
2sg	*nginda*	*nginunha*	*nginu*	*nginunda*
2dl	*ngindaali*	*ngindaalinya*	*ngindaalingu*	*ngindaalingunda*
2pl	*ngindaay*	*ngindaaynya*	*ngindaayngu*	*ngindaayngunda*

sets out the basic pronoun forms. There are also bound pronouns for second person reference only; these are reduced forms of the free pronouns and are suffixed to sentence initial negative and interrogative particles only. Examples are the following:

(1) *Yaama-nda* *ngalingu* *wuu-rri* *dhinggaa*
Q-2sg 1dl.dat give-fut meat
'Will you give us meat?'

(2) *Gariya-ndaali* *dhinggaa* *nhama* *dha-la*
not-2pl meat this eat-imper
'Don't you two eat this meat!'

Verbs morphologically distinguish between main verb and dependent verb inflections. Main verbs encode tense and mood categories, distinguishing future, nonfuture (covering past and present time reference), and imperative. Dependent verbs occur in hypotactically linked clauses and mark relative present tense (giving background information about the main clause event) and relative future tense (typically expressing purpose). The relative future is formally future plus dative case. There are four morphologically determined verb conjugations: conjugation 1 is primarily transitive, conjugation 2 is primarily intransitive, and conjugations 3 and 4 are much smaller and have mixed transitivity. There are monosyllabic verb roots that occur in all conjugations. Table 3 sets out the verb conjugation endings.

Verbs show productive word-building morphology, including affixes that indicate the temporal reference of an event within the tense frame of the inflected verb, e.g., *-ngayi-* indicates 'event in the morning', *-mayaa-* 'event in the evening', and aspectual, e.g., *-waaba-* 'completive', or directional meanings, e.g., *-uwi-* 'back'. There are also transitivizing and detransitivizing affixes, which shift conjugation and transitivity, e.g., *-ala-* 'reciprocal', *-ngiili-* 'reflexive'. There are also limited category-changing processes with only nominalization marked by addition of a conjugation marker to the verb, e.g., *giili-y* 'urine' being productive.

The minor categories of adverb, particle, and interjection show no morphological variation.

Syntax

Like other Australian languages (*see* **Jiwarli**), Gamilaraay has relatively free word order and shows all possible orders of Subject, Object, and Verb, although there is a preference for A P V order; (Williams, 1980: 93) said this is found in 65% of examples. It also allows nouns and adjectives to be separated in the clause, with case agreement indicating which elements are constituents. Williams (1980: 96) gave the Yuwaalaraay sentence showing this:

(3) *Buma-ay* *dhayin-du* *buyabuya* *dhayin*
hit-nonfut man-erg thin man
wamu-bidi-ju
fat-big-erg
'The fat man hit the thin man'

When the adjective precedes the noun, no case marker needs to be attached to the adjective. Similarly, possessors (in dative case) may precede or follow the alienable possessed noun.

Gamilaraay interclausal syntax is relatively simple compared with some other Australian languages. Dependent clauses occur hypotactically, located on the margins of main clauses, and distinguish only between relative future tense (purposive) or relative present tense (with adverbial or adnominal interpretations, depending on context). There are no cross-clausal coreference restrictions (such as switch reference or syntactic ergativity). Examples from Yuwaalaraay (Williams, 1980: 117–122) are shown in (4), (5), and (6).

(4) *Girr* *ngaya* *nhama* *baa-nhi*
affirm 1sgnom that jump-past
nhaadhiyaan-di, *nginda* *garra-ldaay*
log-ablat 2sgnom cut-relpres
'I jumped off the log that you cut'

(5) *Nginda* *ngaaluurr* *burrulaa* *bayama-ndaay,*
2sgnom fish many catch-relpres
ngay *bulaarr* *wuu-na*
1sgdat two give-imper
'If you catch many fish give me two'

(6) *Ngaya* *yana-y* *walaay-gu,*
1sgnom go-nonfut camp-dat
dhinggaa *dha-ligu*
meat eat-relfut
'I am going to camp to eat meat'

Particles in Gamilaraay have scope over the whole clause and encode such semantic concepts as polar question, as in (1); affirmation, as in (4); and negation. There are different particles for negative imperative, as in (2), and negative statement, as in (7).

Table 3 Verb conjugations

	Conjugation 1	*Conjugation 2*	*Conjugation 3*	*Conjugation 4*
Future	*-li*	*-y*	*-gi*	*-rri*
Non-future	*-(a)y*	*-nhi*	*-nhi*	*-nhi*
Imperative	*-la*	*-ya*	*-nga*	*-na*
Relative present	*-ldaay* ~ *-ndaay*	*-ngindaay*	*-ngindaay*	*-ndaay*
Relative future	*-ligu*	*-ygu*	*-gigu*	*-rrigu*

(7) *Gamil* *ngaya* *gamilaraay* *guwaa-li*
not 1sgnom Gamilaraay speak-fut
'I will not speak Gamilaraay'

See also: Australia: Language Situation; Jiwarli.

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Relevant Website

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Gardiner, Alan, Sir (1879–1963)

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Alan Henderson Gardiner was born on March 29, 1879 in Eltham, England. After attending Charterhouse School, he spent a year in Paris before first studying classics and then Hebrew and Arabic at Oxford. He next worked in Berlin for 10 years on Erman and Grapow's *Wörterbuch der ägyptischen Sprache*. From 1912–1914, Gardiner worked at Manchester University and then took up the life of a gentleman scholar, not unlike Charles Darwin. He died in Oxford on December 19, 1963.

Gardiner's main work was done in Egyptian philology and general linguistics. He made contributions in the former to both the major areas of philology, hermeneutics and textual criticism. The questions Gardiner set himself to answer in the latter were: What is 'language'? How does speech work? These questions, he believed, could only be properly approached within a comprehensive theory of speech. Important concepts in this theory were 'sentence' (revealing an intelligible purpose), 'language' (a "universally possessed science" (Gardiner,

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1932: 62), and 'speech' ("universally exerted activity" [*ibid.*]). 'Language' comprised a list of words, along with syntactic rules and intonation patterns. The basic unit of language was thus the word, and the sentence was the basic unit of speech.

Gardiner's aim was to analyze a single "act of speech" (Gardiner, 1932: vii, 6). He interpreted 'the act of speech' less abstractly than those who came after him, as "a particular transient occurrence involving definite individuals and tied down to a special time and place . . . " (Gardiner, 1932: 71). For his analysis, Gardiner isolated four factors: the speaker, the listener, the thing-spoken-about, and the words used. Of these, linguists had conventionally concentrated too much on the last, and within this, on statements: "'questions' and 'requests' used barely to be considered sentences at all" (Gardiner, 1932: 209). Gardiner further established as attributes of the 'utterance' sentence **quality,** sentence **function,** and sentence **form,** the latter comprising both 'locutional form' (the right words in the right order) and 'elocutional form' (intonation).

Gardiner stands in a line of development leading from Wegener and de Saussure to Austin, Searle, and beyond. Not content to confine his attention to the sentence, he broke new ground, but found few disciples. Although many of his seminal ideas anticipated elements of Speech Act theory, Harris's 'integrationist' linguistics, and Relevance Theory, he wrote in a context poorly equipped to assimilate his ideas. Avowedly mentalist at a time when Bloomfield's brand of linguistics appeared to be "gaining ever new ground in [North] America," Gardiner wrote, "I . . . cannot believe . . . that the method of introspection is completely defunct" (Gardiner, [1932]1951: 344).

Gardiner's is a persuasive example of philological work interacting with general linguistics to enrich both disciplines.

See also: Approaches to Translation: Relevance Theory; Austin, John Langshaw (1911–1960); Bloomfield, Leonard (1887–1949); Hermeneutics; Saussure, Ferdinand (-Mongin) de (1857–1913); Speech; Speech Acts: Definition and Classification; Wegener, Philipp (1848–1916).

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Gauchat, Louis (1866–1942)

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Born on January 12, 1866 in Les Brenets (near Neuchâtel), Louis Gauchat studied Romance philology in Bern and Zurich, and later in Paris and Rome. In 1890, he obtained his Ph.D. with a thesis on the Francoprovençal dialect of Dompierre. After a short period during which he was a school teacher, Gauchat was appointed Privatdozent first in Bern (1893–1897), and then in Zurich (1897–1902); in 1902 he became professor of Romance philology in Bern, from where he moved again to Zurich in 1907, where he stayed until the end of his career. In 1926–1928, he was Rector of the University of Zurich. He died on August 22, 1942 in Lenzerheide.

Gauchat represents the typically Swiss blend of the German Neogrammarian type of Romance linguistics with French linguistic geography, lexicography, and medieval philology. He was instrumental in transmitting this fruitful conjunction of two national traditions of research to later generations of Swiss Romanists (among others J. Jud, K. Jaberg, W. von Wartburg).

Gauchat was a specialist in the Gallo-Romance family, especially of its eastern branch, now called Francoprovençal. He laid the foundations of dialectological research in the Francoprovençal dialects spoken in Switzerland (the so-called *patois de la Suisse romande*) through the publication of phonetic

1932: 62), and 'speech' ("universally exerted activity" [*ibid.*]). 'Language' comprised a list of words, along with syntactic rules and intonation patterns. The basic unit of language was thus the word, and the sentence was the basic unit of speech.

Gardiner's aim was to analyze a single "act of speech" (Gardiner, 1932: vii, 6). He interpreted 'the act of speech' less abstractly than those who came after him, as "a particular transient occurrence involving definite individuals and tied down to a special time and place . . . " (Gardiner, 1932: 71). For his analysis, Gardiner isolated four factors: the speaker, the listener, the thing-spoken-about, and the words used. Of these, linguists had conventionally concentrated too much on the last, and within this, on statements: "'questions' and 'requests' used barely to be considered sentences at all" (Gardiner, 1932: 209). Gardiner further established as attributes of the 'utterance' sentence **quality,** sentence **function,** and sentence **form,** the latter comprising both 'locutional form' (the right words in the right order) and 'elocutional form' (intonation).

Gardiner stands in a line of development leading from Wegener and de Saussure to Austin, Searle, and beyond. Not content to confine his attention to the sentence, he broke new ground, but found few disciples. Although many of his seminal ideas anticipated elements of Speech Act theory, Harris's 'integrationist' linguistics, and Relevance Theory, he wrote in a context poorly equipped to assimilate his ideas. Avowedly mentalist at a time when Bloomfield's brand of linguistics appeared to be "gaining ever new ground in [North] America," Gardiner wrote, "I . . . cannot believe . . . that the method of introspection is completely defunct" (Gardiner, [1932]1951: 344).

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tables, a systematic bibliography, and the collection of lexicographical and ethnographical data. This led to the impressive *Glossaire des patois de la Suisse romande*, the publication of which still continues, and he also contributed to the diachronic study of these dialects. But Gauchat was also a theoretician, whose work anticipated variational studies and (historical) sociolinguistics. Whereas in his 1890 dissertation he had accepted the idea of well-established dialect boundaries, he later rejected this Neogrammarian principle (1903, 1905), and replaced it with a diasystemic view of *patois*, seen as the dynamic product of demographical, cultural, socioeconomical, and political variables, and developing through mutual contact and under the influence of standard languages (1905, 1906, 1908, 1909). Gauchat, whose dialectological work was characterized by an anthropological dimension (1910), was also interested in the function of language as a guide to sociocultural reality and as the symbolic expression of a world view (1914).

See also: Jaberg, Karl (1877–1959); Jud, Jakob (1882–1952); Wartburg, Walther von (1888–1971).

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Geach, Peter Thomas (b. 1916)

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Peter Geach was born in London in 1916. His mother was the daughter of Polish emigrants, and at the time of Peter's birth, his father was a professor of philosophy at Lahore, India. In the first years of his life he stayed with his mother and grandparents, but at the age of 4 he was separated from them and made the ward of a guardian. When he was 8 years old, he was sent to Llandaff Cathedral School. Shortly afterward, his father returned to England and started teaching him logic and philosophy. He thus became familiar with Russell and Whitehead's *Principia Mathematica* in his school days, before he went to Oxford to read philosophy at Balliol. In 1938 he converted to Catholicism. Upon graduation in the same year, he won a Gladstone Research Studentship and went to St Deiniol's Library, Hawarden, to do further research on the philosophy of McTaggart, whom he had admired since his father introduced him to his work. While still in Oxford, Geach met Elizabeth Anscombe, a recent convert like himself. They married in 1941. The marriage lasted more than 60 years, until Elizabeth Anscombe died in 2003. They had seven children. During the 1940s the family lived in Cambridge, where they were friends with Wittgenstein, who supported Geach's attempts to acquire a teaching post. In 1951 Geach became Assistant Lecturer in Logic at Birmingham University. He remained there consecutively as a Lecturer, Senior Lecturer, and Reader in Logic until 1966, when he was appointed to the Chair of Logic at Leeds University. He retired in

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1981. In 1985 he was a visiting professor at the University of Warsaw.

Geach has written influentially on many topics in the history and philosophy of logic. He did much to show that the problems regarding the meaning of linguistic expressions that have exercised medieval logicians are the same as the problems addressed by modern ones. He also argued that several central elements of the pre-Fregean logical tradition, in particular the theory of the distribution of terms, are ill-conceived and unsound. Geach strongly opposed the dominant trend in British philosophy during the 1950s and 1960s known as 'ordinary language philosophy,' especially the then popular view that ordinary language has nothing to do with formal logic. His *Reference and generality* (1962) was meant as an extended proof to the contrary, containing as it does numerous applications of logical techniques to the analysis of English sentences. Geach's observations and theses in this area have greatly stimulated research in formal semantics. The most famous example of this is his discussion of the nature of reference involved in the sentence 'Any man who owns a donkey beats it' (1962: 117), which has engendered a widespread concern with so-called 'donkey sentences' and with the semantics of anaphoric pronouns in general.

Geach has also applied methods of logical analysis to the philosophy of mind (*Mental Acts*, 1957) and to the philosophy of religion (*God and the Soul*, 1969). In ethics (*The Virtues*, 1977), he has sought to revive an Aristotelian type of doctrine of the virtues.

See also: Anaphora: Philosophical Aspects; Donkey Sentences; Frege, Gottlob (1848–1925); Logic and Language: Philosophical Aspects; Ordinary Language Philosophy; Russell, Bertrand (1872–1970); Wittgenstein, Ludwig Josef Johann (1889–1951).

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Gedeo *See:* Highland East Cushitic Languages.

Gəʿəz

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Gəʿəz (Gəʿəz, Classical Ethiopic, Old Ethiopic) is the classical language of Ethiopia. Gəʿəz belongs to the Northern branch of Ethio-Semitic, which is part of South Semitic, a subgroup of the Semitic languages. The earliest extant texts are inscriptions from the 3rd century found in Northern Ethiopia, especially in the city of Aksum. From this time, Gəʿəz maintained its exclusive status as a medium of formal communication, until the 19th century, when it gave way to Amharic. Within the Ethiopian Orthodox Church it still holds a position comparable to the status of Latin in Catholicism. Gəʿəz was also the liturgical language of the Jewish community of Ethiopia, the Betä ʾƎsraʾel.

Gəʿəz is written in a quasi-syllabic script, developed on the basis of the Sabaean alphabet. Each sign represents either a combination of a consonant and a vowel or a simple consonant, e.g., አቡነ፡ ዘበሰማያት፡, representing the sequence *ʾa-bu-nä zä-bä-sä-ma-ya-t*, pronounced *ʾabunä zäbäsämayat* (‘Our father who art in heaven’). In its classical form, Gəʿəz phonology comprises 26 consonants plus a set of four labialized velar obstruents and seven vowels. Noteworthy are sets of lateral, pharyngeal, and laryngeal obstruents as well as a set of ejectives. In the traditional pronunciation as practiced by learned Ethiopians, many consonantal distinctions are lost under the influence of modern Ethio-Semitic languages.

Gəʿəz has a rich morphology based on the common Semitic system of three or four consonantal roots and vocalic patterns, with prefixes and suffixes used both in derivation and inflection, as in *ṣäḥafä* ‘he wrote’, *ṣäḥafku* ‘I wrote’, *nṣḥf* ‘we shall write’, *ṣäḥafi* ‘scribe’, and *mäṣḥaf* ‘book’. Grammatical categories of the noun are gender (male/female), number (singular/plural), and case (nominative-genitive/accusative). The verb has five tense–aspect–mood (TAM) categories (perfect, imperfect, jussive, imperative, and converb). Other categories of the verb are person, number (singular/plural), and gender (male/female, also for second person!). The syntax is based on a rather loose verb-subject-object word order, and agreement is not strict.

The vocabulary of Gəʿəz is to a large degree common Semitic. However, loanwords from Cushitic languages, especially Central Cushitic languages, form a sizable part of the Gəʿəz lexicon. Contacts with the Church of Alexandria paved the way during late antiquity for many Greek and, during the Middle Ages, Arabic loanwords. On the one hand, Gəʿəz shares many typological features with the Asian Semitic languages, such as Arabic or Hebrew. On the other hand, it shows features known from the modern Ethio- Semitic languages, which belong to the Ethiopian language area, also shared by the Cushitic languages, with their subject-object-verb syntax. The converb, already present in Gəʿəz, is typical for this area.

See also: Amharic; Ethiopia as a Linguistic Area; Semitic Languages.

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Coming from a strong philological background, Gelb developed an ever greater interest in theory, which he felt would help him better understand the data. This was within the atmosphere of great intellectual ferment that characterized the University of Chicago in the formative period of Gelb’s intellectual career, i.e., from the 1940s to the 1960s (and that, linguistically, can be characterized as Bloomfieldian structuralism). Within the Oriental Institute itself, other great Assyriologists were developing analogous interests, in particular Thorkild Jacobsen and Erica Reiner. This developing interest in theory took him in two major directions: the social sciences and linguistics. As a result, he did seminal work in both areas within the field of Assyriology, pioneering especially the application of a coherent methodology to explain structural relationships within the data. Besides linguistics, he contributed immensely to the study of socioeconomic structures in ancient Syro-Mesopotamia. His philological control of the data remained unparalleled throughout his career, lending an even greater credibility to his efforts.

He was born October 14, 1907, in Tarnow, Poland. He left when he was 18 to study first in Florence, Italy, and then in Rome, where he studied Semitic philology, and became particularly close to Giorgio Levi della Vida; he concluded his studies with a doctorate (laurea) from the University of Rome in 1929. He then went to the Oriental Institute of the University of Chicago, where he remained for the rest of his life. As a traveling fellow and research Associate from

1929 to 1941, he did fieldwork at archaeological sites in the Near East and was appointed assistant professor in 1941. Naturalized as a U.S. citizen in 1939, he volunteered for and was drafted by the U.S. Army in 1943. He served most of the war in England, France, and Germany, working on military intelligence for the Office of Strategic Services. He finished his tour working at the Trials at Nuremberg. He became a Distinguished Service Professor in 1965, a position he held until his retirement in 1978. He served as editor in charge of *The Chicago Assyrian Dictionary* from 1947 to 1955; the dictionary project had started in 1921, and Gelb's years served as the transition from a two-decade gestation period to the actual beginning of the publication.

Within the field of linguistics, two major types of contribution can be distinguished. In one particular area, the history of writing, he produced works of general theory while otherwise concentrating on the application of theoretical principles to specific bodies of data. *A study of writing* (1952c) is the most complete presentation of his theoretical approach to a theme of linguistic import. Interestingly, the book introduced the term 'grammatology,' which was acknowledged in an obscure footnote by J. Derrida in his book *Of grammatology* (1976: 83 and 323) – however far this book in fact is from the spirit and the intent of Gelb's work, for, as one might expect, Gelb's grammatology is rooted in history rather than in philosophy. From a linguistic point of view, Gelb's main contribution was in providing a rigorous framework for an understanding of writing as a structural system, whatever its historical idiosyncrasies and whatever the language it aims to express. He also made an important contribution toward a clarification of the concept of graphemics as an area distinct from paleography. He gave a major empirical application of his principles in the volume on *Old Akkadian writing and grammar* (1952b), published the same year as *A study of writing*. In earlier years (i.e., before he had defined the basic presuppositions of method but was in fact already applying them to the data), he had published *Hittite hieroglyphic monuments* (1939), a landmark study of a body of texts written in a distinctive writing system.

In a similar vein, Gelb's second major area of interest was devoted to the application of linguistic principles to the grammar and the lexicon of the two oldest attested Semitic languages, Akkadian and Amorite. The closest he came to writing a comprehensive theoretical statement on the matter was his *Sequential reconstruction of Proto-Akkadian* (1969). 'Sequential' refers to the way in which elements of external inflection fall into slots whose sequence is controlled by rigorous rules. These rules are shown to apply not only synchronically but also across time, allowing him to project the archaic shape of morphological forms into a phase immediately preceding the oldest one as historically attested. What is significant in this approach from a theoretical point of view is that (a) the diachronic reconstruction is based essentially on the coherence of the system, which is projected (with plausible arguments) into the earlier phase of the language, and (b) the description of the segmental nature of inflection has considerable impact on the synchronic understanding as well. His other works on Akkadian deal not so much with theory but with the application of more rigorous linguistic criteria to data that had been treated until then in an *ad hoc*, philological manner. Besides his *Old Akkadian writing and grammar* (1952b), his 'Notes on Von Soden's grammar of Akkadian' (1955) are particularly notable in this respect.

Another major aspect of his contributions to linguistics is in the field of onomastics. His keen interest in the field was occasioned by the fact that personal names are the major sources for three languages with which he had become involved – Old Akkadian, Amorite, and Hurrian. After earlier major publications, especially *Nuzi personal names* (1943) and *Glossary of Old Akkadian* (1973), his towering work in this area was his 'Computer-aided analysis of Amorite' (1980), in which he applied fully the theoretical principles stated in his *Sequential reconstruction* (1969) and showed, *inter alia*, how his method was particularly suited for a digital analysis of the data (this being the first major publication in the discipline to apply electronic data processing to a vast corpus).

See also: Bloomfield, Leonard (1887–1949); Reiner, Erica (b. 1926).

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Gender

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What Is Gender and Why Do Linguists Study It?

The term *gender* will be used in this article to refer to the social condition of being a woman or a man. *Gender* in this sense is distinguished from *sex*, meaning biological femaleness or maleness. Sex is potentially relevant for areas of linguistic inquiry where biological mechanisms are at issue (e.g., neurolinguistics), but in most research on language what is relevant is the *social* differentiation of men and women in particular communities. Generally speaking, gender-linked patterns of language-use arise not because men and women are naturally different, but because of the way that difference is made significant in the organization of social life and social relations. The forms and precise social significance of gender can vary considerably across cultures and through time.

Gender in its 'men and women' sense is also distinct from the use of the term in linguistics to denote a grammatical category (*see* **Gender, Grammatical**). The relationship between linguistic and social gender has been of interest to researchers who study the linguistic representation of men and women, but it will not be considered here. Rather I will concentrate on empirical research investigating patterns of language-use linked to the gender of the language-user. This kind of research may be done within a number of academic disciplines and paradigms, but here I will be mainly concerned with research that adopts a broadly sociolinguistic approach.

Why is gender an important concern in sociolinguistics? First, because the social fact of gender differentiation is consequential for processes of general interest to sociolinguists, such as language variation, change, and shift. Gender must therefore be considered in any satisfactory account of those linguistic processes. But the influence does not run in one direction only. Just as gender influences the workings of certain linguistic processes, so language-using is part of the process whereby gender is produced and reproduced as a salient feature of the social landscape. Language can be seen as one resource used by social actors to construct various kinds of masculinity and femininity, aligning themselves with some gender positions and differentiating themselves from others. The study of language and gender, then, aims to illuminate both linguistic and social processes. For many researchers its goals are also political: gender is seen from a feminist perspective not as a neutral *difference* but as a socially constructed *inequality*.

Theorizing Gender: From Difference to Diversity

Both expert and popular discussions of gender and language-use have traditionally revolved around the question of what differentiates women as a group from men as a group. It should be said immediately that virtually none of the putative differences are categorical: statements about men's and women's

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linguistic behavior are almost invariably probabilistic, asserting that the analysis of a particular data sample has shown a statistically significant tendency for women to use feature X more than men, or *vice versa*. Well-known generalizations of this form include "women use more tag questions than men," "women's speech is closer to the prestige standard than men's," and "women are more polite than men." In each of these cases, the generalization has been contested because the evidence is not clear-cut: different studies have yielded conflicting results, and even researchers who accept the generalization would acknowledge that exceptions to it exist.

It is not coincidental that all the claims just cited covertly treat men as the norm and women as the gender whose behavior requires explanation. Explanations have had a tendency to psychologize, treating women's linguistic behavior as an expression of the personality traits they are thought to develop as a consequence of their distinctive social roles. For instance, the "women are more standard" generalization has been explained as a consequence of women's "status-consciousness," a psychological disposition which has been related in turn to women's own alleged social insecurity (since their status depends on that of the male head of household) and/or their desire to secure social advantages for their children, among other things by providing them with models of 'correct' speech. Even in the 1970s there was dissatisfaction with accounts like these, which relied on stereotypical and increasingly outdated understandings of women's social position. But more radically, since the early 1990s, the idea of gender as a simple binary difference – however conceptualized – has been subjected to intense critical scrutiny.

A particular problem critics have pointed to in the binary framework is its tendency to flatten out the internal diversity that exists within each gender category: the differences *among* women, or men, may be as great as or greater than the differences between the two genders. People are after all never *just* men and women, but are always men and women of particular ages, classes, ethnic and geographical origins, occupations, social roles and statuses, and religious and political beliefs. The form gendered behavior takes is inflected by these other dimensions of identity and experience. Older and younger women, or working-class and middle-class women, may be as different from one another as they are from their male peers; each of these groups may define its femininity more by contrast with the femininity of some other group of women than in opposition to masculinity. That is still a question of gender, but it is not simply about differences between men and women.

With broader definitions in mind, many researchers today have rejected the old assumption that an inquiry into gendered linguistic behavior is essentially a search for large-scale generalizations about the language used by women and men. The traditional preoccupation with gender *differences* has increasingly given way to a concern with gender *diversity* – in other words, with the use of linguistic variability as a resource for producing a range of masculine and feminine styles in different communities or contexts. Researchers follow the injunction to 'look locally' at the form gender identities and relations take in specific communities, on the grounds that gender-linked patterns of language-use will emerge from the localized social practices in which women and men are engaged. How our understanding of language and gender has been changed by this move from difference to diversity, and from a global to a more localized perspective, will be explored in the following sections.

Language and Gender in the Variationist Paradigm

The 'variationist paradigm' in sociolinguistics uses quantitative methods to investigate linguistic variation and change. In its classic form, pioneered by William Labov (*see* **Labov, William (b. 1927)**) and others in the 1960s, variationist research focused on two issues particularly: the distribution of linguistic variables (in most cases, phonological ones) across major demographic categories in a speech community (e.g., social class, ethnicity, sex), and the motivations and mechanisms of linguistic change. These issues are interrelated, since linguistic change does not usually involve a sudden break, but rather a gradual shift in the balance between already-existing variant realizations of a particular variable. The motivation for change is typically related to the social meaning of the variants involved, which is linked in turn to their demographic distribution.

Early in his career Labov studied the variable (r) – that is, the pronunciation or non-pronunciation of /r/ after vowels, as in *car, farm* – in the English of New York City. New York was historically non-rhotic (not /r/-pronouncing), but Labov found evidence that the incidence of rhoticity was rising. This change reflected speakers' desire to avoid the stigma attached to non-rhotic pronunciations, used most frequently by lower-class speakers as part of a generally low-status New York urban dialect. Women were more advanced than men in the shift. In an earlier study conducted on the island of Martha's Vineyard off the coast of Massachusetts, Labov had found that a centralized pronunciation of the diphthongs (ay) – as in

white – and (aw) – as in *out* – was gaining ground from the non-centralized pronunciation. Centralized diphthongs were associated with local island tradition rather than with external measures of status (e.g., wealth, power, education); the motivation for adopting them was a desire to assert a 'real islander' identity in opposition to the incomers and tourists who increasingly dominated the island economy. This change was led by men.

These findings, and analogous ones from other speech communities, suggested that women and men were instrumental in different kinds of changes. Women led in "change from above" (the adoption of prestige pronunciations for variables whose social meaning people are consciously aware of, like (r) in New York City), and men in "change from below" (the adoption of particular non-prestige pronunciations as an expression of identity, which takes place below the level of conscious awareness, as with (ay) and (aw) on Martha's Vineyard).

The idea that men and women play different roles in language change was not new. Eighteenth-century enthusiasts for 'fixing' language, who saw change as undesirable, frequently attributed innovations to women's fickleness; but later commentators who saw language change as 'natural' or progressive more often held some variant of the view cited by Otto Jespersen (1922): "Women do nothing more than keep to the traditional language which they have learnt from their parents and hand on to their children, while innovations are due to the initiative of men."

The advent of variationist studies, which offered solid statistical evidence for the involvement of both genders in change, should arguably have put an end to the myth of female conservatism, but in fact that myth seems to have influenced the way at least some early variationists interpreted their findings. Two senses of conservative were sometimes confusingly conflated: the sense in which it means "resistant to any change," and the political sense in which it connotes allegiance to the values of a dominant class. The women who were leading the shift towards /r/-pronouncing in New York City were clearly being innovative rather than conservative in the first sense; but the fact that women typically led in changes towards a prestige norm was often taken to evidence conservatism in the second sense – women's alleged status-consciousness made them susceptible to the influence of middle-class prescriptions for 'correct' usage. Meanwhile, 'real' innovation occurred in local vernacular speech by way of change from below, which was then thought to be initiated most often by men. Probably the most familiar of all variationist claims about gender – that the speech of women in all classes tends to be closer than men's to the prestige standard – avoids the issue of conservatism/innovation, and is to that extent less confusing, but essentially it makes the same point and reflects the same understanding of femininity and masculinity.

It should be noted, however, that this familiar claim no longer accurately represents the orthodox variationist position. In 1990, after reviewing the accumulated evidence, Labov formulated some general principles that can be summarized as follows:

- Where sociolinguistic variables are stable, men use higher frequencies of nonstandard variants than women.
- Where there is change from above, women lead in the adoption of the incoming prestige variant.
- Where there is change from below, women are more advanced than men in their use of the innovative variant.

The big change here is that women are now considered prototypical leaders in *both* the major types of linguistic change. There is, then, no overall tendency for women to favor more standard and men more vernacular pronunciations, or for women to be (socially or linguistically) conservative. The neat gender-complementarity of the older model has broken down, producing what Labov dubs a "gender paradox": women "conform more closely than men to sociolinguistic norms that are overtly prescribed, but conform less than men when they are not' (Labov, 2001: 293). And this paradox is not amenable to explanations in terms of women's distinctive social roles or psychological dispositions, since a major part of what now needs to be explained is, precisely, the non-uniform behavior of women as a group.

At this point it becomes relevant to return to the theoretical development mentioned above, namely the shift from gender *difference* to gender *diversity*. In a diversity framework it is not assumed that all women's or all men's linguistic behavior will be uniform. If we accept that women and men are internally diverse groups, the fact that some women do one thing while others do the opposite need not be considered a paradox at all.

In research conducted in the1970s in coastal South Carolina, Patricia Nichols (1998) observed younger black island women shifting more markedly than men of the same generations from the Creole variety Gullah towards Standard English (SE). Older black women on the other hand were more conservative than their male peers. Nichols's account relates the women's behavior to local labor market conditions. Historically, islanders had lived by farming, but economic change had propelled them into waged labor on the mainland. Their opportunities, however, were

circumscribed by gender. Whereas black men could find well-paid jobs in construction, the best-paid positions available to black women were mainly clerical, demanding standard language and literacy skills. Hence black families had increasingly invested in educating girls, with the result that younger women made more use of SE than either men or older women who had not had the same economic opportunities. White mainland women (who did not speak Gullah but rather Appalachian English) were a different case again: where their husbands, more advantaged in the labor market than either women or black men, earned enough to support dependents, they did not have the same need as black women to work outside the home and had neither opportunity nor incentive to adopt a more standard speech.

This study provides an early illustration of the benefits of 'looking locally.' Nichols showed that people's linguistic behavior was not simply a consequence of their membership of particular social categories – the fact that they were men or women, black or white – but rather emerged from their attempts to negotiate local arrangements involving those categories (e.g., a labor market segregated by gender and race). Looking locally suggests that conflicting tendencies in women's sociolinguistic behavior may reflect the different choices, opportunities, and risks that different groups of women are faced with. Even if it is found (as in some studies it has been) that the *same* women's behavior instantiates both elements of Labov's paradox (each in relation to a different set of linguistic variables), we may be able to explain this conflict by looking carefully at the social conditions these women inhabit.

Why, though, is it specifically women whose behavior exhibits the paradox? Merely invoking the diversity of women cannot provide an answer, since men are no less diverse. If Labov's principles have any validity or value, do they not point to some global, or at least supra-local, phenomenon requiring an explanation?

Penelope Eckert is among those variationist researchers who believe that looking locally can and should be combined with 'thinking globally' about gender. Making use of the concept of the community of practice (CoP), a group defined by the engagement of its members in some joint endeavor (examples might include a workplace team or sports team, a church congregation or a teenage gang), Eckert points out that language-using is shaped by the activities and practices in which it is embedded; and that in most societies, gender exerts an influence on the activities people habitually engage in. If men and women differ in the range of CoPs they belong to and/or the terms on which they participate in joint endeavors, those differences can be expected to have linguistic consequences – and perhaps not only local ones, though since CoPs are local entities, investigation must begin at the local level.

Eckert carried out research in a suburban high school near Detroit, where identity and social practice were organized around the contrast between 'jocks' (who embrace the official definition of school success, e.g., participating actively in both academic and extra-curricular pursuits) and 'burnouts' (who reject the school's values and resist active participation in its official culture). Affiliation to these groups was marked linguistically as well as in other ways: several phonological variables that are currently undergoing a change known as the Northern Cities Vowel Shift were appropriated differentially to signify either jock or burnout identity. In both groups, however, young women were more advanced than young men in their use of the variants that marked group membership: linguistically, women were the 'jockiest' jocks and the most 'burned-out' burnouts. So although the jock and burnout women were less similar to one another in terms of actual linguistic behavior than any other pair of subgroups in Eckert's sample, at a more abstract level they had something in common – a tendency to be extreme in their linguistic marking of group membership.

Eckert's account of this tendency could be seen as a reworking of the old idea about women's status-consciousness – except that status is reinterpreted in terms of participants' local values. She suggests that women use language to claim status as 'good' jocks or 'good' burnouts, and gives reasons why this strategy is especially favored by women. The reasons have to do with the different terms on which women and men participate in the jock and burnout CoPs. Men can gain status by displaying ability (e.g., in sports or fighting), but even if women possess the same skills, they are not rewarded in the same way. A woman's status has more to do with her appearance and personal style: her capital as a jock or a burnout is, in other words, largely symbolic. Consequently, women work harder to assert in-group status through symbolic details like the styling of their jeans and the pronunciation of their vowels. Eckert has suggested that this pattern is not confined to adolescent subcultures. Women, as the subordinate gender, may perceive their status and legitimacy to be in question in all kinds of CoPs; making a symbolic display of in-group credentials – pointedly presenting oneself as, say, a 'real' lawyer/athlete/truck driver, using resources such as language that are accessible to women as well as men – is one way to deal with this marginal social positioning. If so, it is evident that inequality, rather than just difference, shapes the relationship of language to gender; and there are

patterns of gender inequality which are not just operative at local level.

These observations may bear on Labov's gender paradox: the combination of conformist and non-conformist behavior identified with women in his principles could be produced by women asserting their status in both global terms (by adopting variants that carry supra-local prestige) and local settings (by adopting variants that can be used to assert one's credentials as a member of a particular community). If both kinds of status are relevant to an individual, as will commonly be the case in societies where people have some range of identities and roles, then there is no contradiction in seeking to maximize both; and as Eckert points out, there are reasons why women might be particularly active in this regard.

Eckert has described her approach as part of a third wave in variationist studies. In the first wave, researchers used survey techniques to reveal large-scale patterns of variation and change: Labov's research in New York City is an example. A second wave employed ethnographic methods to study the workings of variation and change in particular local communities, relating linguistic variables to the social categories and divisions that were meaningful for community-members themselves. The third wave is similar to the second in that research is ethnographic and locally-based, but the focus of interest shifts from simply correlating linguistic and demographic variables to investigating the social meaning of linguistic variables and their clustering into styles. It is these styles rather than individual variables that are linked to membership of local social categories (for instance, jock and burnout). Eckert comments: "Since [the third wave] takes social meaning as primary, it examines not just variables that are of prior interest to linguists (e.g., changes in progress) but any linguistic material that serves a social/stylistic purpose. And in shifting the focus from dialects to styles, it shifts the focus from speaker categories to the construction of personae." These preoccupations give the new wave of variationist research a good deal in common with another major current of language and gender research, which is the subject of the next section.

Gendered Discourse Styles

Variationist investigations of gendered linguistic behavior were motivated in the first instance by a desire to understand the workings of variation and change as general linguistic processes. Other researchers, however, were motivated to investigate gendered linguistic behavior primarily by an interest in what language might contribute to the social processes whereby gender is reproduced. These researchers often sought to identify what I am calling 'gendered discourse styles,' in other words, ways of speaking that signal masculinity or (more commonly) femininity by deploying characteristic combinations of linguistic features. Whereas variationists took the link between gender and particular realizations of phonological variables to be arbitrary in linguistic terms, researchers of discourse style often supposed that the linguistic markers of men's style and women's style would be functionally linked to the traits and roles of men and women.

One early attempt to delineate a gendered discourse style in English (though on the basis of the analyst's own intuitions rather than empirical investigation) was Robin Lakoff's account of women's language (WL), first proposed in 1973. The characteristic features of WL included a preference for milder over more strongly tabooed expletives, exaggerated politeness, an elaborate color vocabulary, use of empty adjectives ('lovely,' 'divine') and intensifiers ('*so* nice'), hedging to reduce the force of an utterance and/or the speaker's degree of commitment to it, and phrasing statements as questions, using rising intonation and/or end-of-sentence question tags. This formally, rather ill-assorted cluster of features is made coherent by attending to their functions in discourse. Many of them, Lakoff argued, communicate insecurity: a lack of confidence in one's own opinion, a desire to avoid giving offence and a need to seek approval from others. Lakoff saw these as traits women were socialized to develop in order to conform to mainstream notions of femininity, and she linked this insecurity to women's subordinate status. WL, from her perspective, was a display of women's culturally-imposed powerlessness in a male-dominated and sexist society.

This line of argument places Lakoff among the many 1970s feminists who adopted what has been called the 'dominance' approach to language and gender – in other words, they sought to explain gendered linguistic behavior in terms of men's power and women's subordination. But since Lakoff clearly regarded WL as inferior, for many purposes, to the alternative (which she labeled 'neutral language' rather than 'men's language' – Lakoff understood femininity to be not parallel to masculinity but marked with respect to it), her work has frequently been cited as an example of the 'deficit' approach, in which women's behavior is judged negatively against an explicitly or implicitly male norm. (In my own view Lakoff's work has elements of both deficit and dominance, and if anything, the dominance view is stronger.)

In the 1980s both the abovementioned approaches were challenged by the advent of a '[cultural] difference' approach to the question of gendered discourse styles. Difference researchers (the best-known of whom is the interactional sociolinguist Deborah Tannen – *see* **Tannen, Deborah (b. 1945)**) argued that women and men, like members of different ethnic or national groups, behaved differently because they had unconsciously internalized contrasting norms for the performance of communicative acts. These norms, in turn could be related to the gender-differentiated organization of children's peer groups, which both reflected and reproduced quasi-cultural differences in men's and women's general orientation to the world. Proponents of this argument have frequently suggested, for instance, that women typically orient to people and relationships while men are more oriented to objects and information. Such a difference in orientation might be expected to affect many aspects of discourse performance: what topics men and women prefer to talk about, how they address others, how they manage the floor, how much and what kind of politeness they use, the frequency of questions and minimal responses, the form of directives, the use of deixis, even the structure of nominals referring to objects.

Research along the lines suggested by the difference approach continues. One notable development is the use of corpus methods to search for statistical evidence of the predicted gender-linked patterns in multi-million word collections of texts. The computing scientist Shlomo Argamon and his associates, for instance, have recently developed an algorithm for which they claim 80% success in deciding whether a formal written text was composed by a man or a woman. The criteria used, which were originally selected using purely statistical methods, include the frequency of determiners and quantifiers (high frequency is a good predictor of male authorship) and that of personal pronouns, especially *I, you, she* and their variants (high frequencies are associated with female authorship). The researchers suggest that these correlations arise because of men's greater concern with specifying the properties of objects and women's greater concern to specify relations between persons addressed or mentioned in the text. A simplified version of their algorithm, known as the Gender Genie, has been made available on a website, inviting visitors to measure their own or others' writing against the Genie's templates for male and female style.

But this quest for gendered discourse styles, whether couched in terms of deficit, dominance, or difference, is vulnerable to the same criticism as early variationist work: that it is a global approach, predicated on a binary model of gender, and taking insufficient account of intra-gender diversity. Many researchers on gender and discourse have taken Penelope Eckert's point that new understandings of gender not only require us to look locally (the community of practice framework is influential in discourse studies, too), more radically they "shift the focus from speaker categories to the construction of personae."

In discourse studies as in third wave variationist research, the emphasis is now on mapping the way social actors use what Eckert calls "linguistic material that serves a social/stylistic purpose" (which in this current of work may be anything from a single vowel segment to an entire code) to construct gendered personae. Some researchers are influenced by Judith Butler's notion of gender as 'performative,' that is, not given in advance but brought into being when people act (or in this case, speak) in ways that are culturally coded as masculine or feminine. It follows that social actors may construct a range of gendered personae (not just one each), and that their performances may include unusual, artificial, or deviant ones. There has been considerable interest recently in researching the linguistic performance of gender by non-mainstream sexual subjects in a variety of cultures and contexts – gay men, lesbians, transgendered individuals, sex workers, drag artists, and teenage nerds who remain marginal to peer-cultures organized around heterosexual activity. In more mainstream cases, too, the diversity of gendered performances and personae is emphasized, with many studies setting out to show that particular CoPs perform gender linguistically in particular ways, and that even a single small group of women, or men, will often make use of stylistic resources to shift between different kinds of femininity or masculinity.

Conclusion

This article has focused on the nature, results, and implications of the recent shift from difference to diversity as a framework for studying the relationship of language and gender. It should be noted that this shift, though unquestionably important, is not by any means total. Third wave variationist research coexists with older approaches in which the mechanisms of variation and change and their relationship to demographic categories continue to be explored. The quest for general accounts of men's and women's discourse styles continues to flourish alongside studies that 'look locally.'

But to the extent that language and gender researchers' approaches have shifted, the resulting research is now beginning to prompt its own questions, and in some cases criticisms. Perhaps the most significant of

these is whether the new emphasis on looking locally, stressing the diversity of gendered behavior, is resulting in a reluctance to 'think globally' about gender. For some commentators, this caution about treating gender as an overarching social category risks losing sight of the political dimension of language and gender research. It may also distort the overall picture by over-emphasizing the agency of subjects in constructing gendered personae, while downplaying the structural and institutional factors that in reality constrain their performances. The anthropologist Susan Phillips, for instance, has observed that the way gender is enacted locally by the members of an adolescent peer-group or the inhabitants of a village is not unaffected by what happens above the local level, in state and other public institutions (and in contemporary conditions, one might add, in transnational institutions like global communications media). The challenge, then, is to articulate the analysis of local and diverse social practices with an analysis of larger social and political structures.

See also: Communities of Practice; Gender and Language; Gender, Grammatical; Gender, Sexuality and Language; Labov, William (b. 1927); Language Education and Gender; Queer Talk; Sexist Language; Tannen, Deborah (b. 1945).

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Gender and Language

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The field of language and gender is multidisciplinary in scope. Practitioners can be found not only in linguistics and gender studies but right across the humanities and social sciences, including in anthropology, cultural studies, education, literary studies, social psychology, and sociology. The point of contact is feminist interest in language and, in that sense, there is always some form of political agenda and engagement. After thirty years, the accumulated research is now wide-ranging. Explicitly feminist in focus are explorations of gender positioning, in representations in media broadcasting and print, and in interaction in the media and other institutions. To give an indication of the range of coverage, a few examples are: examinations of the dynamics of classrooms privileging boys (e.g., Swann, 1992); case studies of women in public life (e.g., Walsh, 2001); the wisdom and efficacy, or otherwise, of institutional guidelines on non-sexist language use (Cameron, 1998a); sexism in press coverage, e.g., victim-blaming in rape reporting (Clark, 1998), and the reinforcement of normative gender positions in reporting on a sexual harassment conviction (Talbot, 1997); the rhetoric of physically abusive husbands and the disenfranchisement of their wives (Adams *et al.,* 1995). Less explicitly feminist, but nevertheless coming from a feminist standpoint are studies of the minutiae of conversational interaction between close friends in same-sex groups (e.g., Coates, 1996), a study of bilingual youth culture (Pujolar, 2000), and many and varied storytelling analyses: of accounts of pregnancy (Freed, 1996), socialization of children at family dinnertables (e.g., Ochs and Taylor, 1992), lesbian coming-out stories (Wood, 1999), among many others. *The handbook of language and gender* is a detailed overview of the field, providing a full and indicative representation of its diversity and depth (Holmes and Meyerhoff, 2003).

Since the early 1990s, two prominent issues in language and gender have been: a sustained critique of 'gender differences' as the research agenda and a need for firmer theoretical grounding. The sections that follow address both of them in turn.

Querying the 'Gender Differences' Agenda

There is a well-known claim that men and women use interactional styles associated with power and solidarity, respectively (*see* **Power and Pragmatics**). The existence of distinct female and male interactional styles has now gained widespread acceptance, to the extent that they have entered popular 'common sense' (cf., e.g., Talbot, 2003). There is a considerable weight of evidence to support this view, including research on politeness (e.g., Holmes, 1995) and on physical alignment and eye contact in conversations (e.g., Tannen, 1990). In a detailed study of compliments and compliment responses, for example, Janet Holmes has found New Zealand women using compliments a great deal more than men do, with compliments between women being used to consolidate solidarity between the giver of the compliment and the recipient. Holmes found that men, on the other hand, tend to find compliments threatening and may use mock insults and sparring to cement friendships instead. The overall picture is one of polarization; of men's talk as power based and competitive, women's talk as solidarity-based and cooperative.

According to the 'difference' framework, gendered language patterns are a consequence of distinct female and male subcultures. In this view, women and men behave differently because they are segregated in childhood. Boys, who tend to play in large groups with hierarchical social structure, learn to value status and become power-focused; whereas girls, who tend to play in small groups of 'best friends,' learn to value intimacy and become solidarity-focused. In the process, children acquire different gender-appropriate behavior. They enter adult heterosexual relationships with differing expectations about friendly interaction and consequently encounter problems of miscommunication (e.g., Tannen, 1991). These miscommunication problems have been presented as analogous to cross-cultural miscommunication.

There are many detailed critiques of the 'difference' framework (e.g., Cameron, 1995; Crawford, 1995; Freed, 1992; Talbot, 1998; Troemel-Ploetz, 1991; Uchida, 1992). The foremost concerns are the erasure of power and a tendency to overgeneralize, brought about by disregard for contextual considerations other than gender. Sex segregration in childhood is greatly exaggerated (Thorne, 1993). Claims about miscommunication among adults disregard issues of conflict over rights and obligations in times of social change (Cameron, 1998b). 'Gender differences'-based research on language depends on untenable dichotomies; critics have argued for far more nuanced understandings of power and solidarity, and indeed gender, and query the continued usefulness of the whole line of inquiry. The question: 'how does the language of women and men differ?' is no longer

considered an appropriate starting point for research into gendered patterns of behavior seeking to further a feminist understanding of patriarchal social relations and sexual inequality. It is a question that assumes its answer lies with, precisely, differences. In short, the search for 'gender differences' has become an impoverished framework that flattens out the enormous range, variation, and richness of interaction between women and men, boys and girls.

Beyond 'Difference': The Poststructuralist Turn

In an article reflecting on the history of the field, Barrie Thorne points to a skewed emphasis on the micropolitics of face-to-face interaction – at the expense of the social structures and processes in which all face-to-face interaction is embedded – and accounts for it in terms of a 'strategy of deliberate one-sidedness' advocated by Erving Goffman (1983) (*see* **Goffman, Erving (1922–1982)**). This analytic move generated a rich body of work on gender in everyday interaction but also, Thorne argues, generated a rift between theory and analysis (Thorne, 2001). Since the early 1990s, attempts to resolve this rift have drawn on critical theory, particularly poststructuralist theories of discourse and identity (*see* **Poststructuralism and Deconstruction**). A conceptualization of identity as flux is notable in recent research, strongly influenced by poststructuralism and paralleling developments in related fields (e.g., *see* **Critical Discourse Analysis**).

A poststructuralist position on discourse and identity provides an alternative to the polarized conceptualization of gender identity. While the 'gender difference' approach operates with a static conception of distinct male and female identities, developed and fixed in childhood, in a poststructuralist account identity is much more fluid. Feminist criticism from this perspective takes language as the site of the cultural production of gender (e.g., Weedon, 1997). In this view, gender identities are not pre-given, but constructed in discourse; individuals take up positions in their enactments of discourse practices. This view serves to caution against making *a priori* assumptions about gender identity, such as by implicitly setting up a masculine-feminine dichotomy as the starting point (by determining to look for 'differences' in the behavior of women and men). It also serves as a corrective to assumptions of homogeneity in the social identities and relationships of women and men. Research influenced by poststructuralism examines not gender difference but the construction of gender identities. This approach to language and gender is grounded in the assumption that subjectivity is constituted in discourse. In discourse, individuals are positioned as social subjects who are gendered in specific ways.

Careful avoidance of bipolar categories of gender, and the comparative approach that goes with them, is a characteristic of recent research. Some analysts are explicit in their grounding in feminist theory (e.g., contributors to Hall and Bucholtz, 1995; Bucholtz *et al.*, 1999) and directly or indirectly interrogate categories such as masculine, feminine, heterosexual, white, middle-class, etc. 'Exceptional speakers' (the title of Kira Hall's contribution to the *Handbook of language and gender*) are increasingly studied on their own terms, rather than as exceptions to an over-rigid model that is unable to accommodate them. Such cases of 'footnote deviance' (Holmes and Meyerhoff, 2003: 354) include the 'tomboys' and 'sissies' that a 'two-cultures' account cannot accommodate adequately, and the African-American women whose verbal behavior awkwardly refuses to fit the pattern for a 'feminine' interactional style based on middle-class white Americans. This attention to liminal users of language has produced new areas of interest within the field of language and gender, e.g., an emerging field centering on 'the sexual and gender deviance of previous generations' (ibid.), which its practitioners have given the name 'queer linguistics' (*see* **Queer Talk**). A related point is that there are parallels between developments in the study of gender and of ethnicity, where the converse is taking place. A shift in focus to gendered subjectivity has generated increasing attention to masculinities. Just as whiteness is receiving critical attention, rather than occupying an invisible position as the 'non-ethnic' norm, so masculinities are being examined as constructed identities. Language and gender has seen significant expansion to encompass sexual orientation, ethnicity, and multilingualism, and, to some extent, class, involving analyses of spoken, written, and signed gendered identities (*see* **Intercultural Pragmatics and Communication; Multilingualism: Pragmatic Aspects**).

See also: Critical Discourse Analysis; Gender and Language; Gender, Sexuality and Language; Intercultural Pragmatics and Communication; Multilingualism: Pragmatic Aspects; Poststructuralism and Deconstruction; Power and Pragmatics; Queer Talk; Sociolinguistics and Political Economy.

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Gender and Political Discourse

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Little research has been done on the topic of gender and political discourse, although this issue may show us the extent to which a gendered division of power holds worldwide. (The recent work done by Walsh 2001 is noteworthy in this field.) While highly revealing of the key role that language and other styles of communication play in the political arena, investigations of gender and politics also shows how social closure occurs, hindering access and skewing the representation of certain genders, classes, and social groups in this area.

This article will deal primarily with issues of institutional politics, particularly parliamentary, legislative, and government politics, and not with issues of everyday politics. The very lack of women in government and parliaments explains in part the lack of research done on gender and political discourse

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(in Peterson and Sisson Runyan, 1993, conclusive figures from all continents around the world can be found. Also see Wodak, 2003). In fact, most countries that acknowledge the objective of promoting equality between women and men do not have parity governments, and only in a very few exceptional cases do women even comprise 40% of parliament. The fact that women's social position is not as strong as men's, despite progress made in certain areas of the world, has been linked to masculinist hegemony, which in turn is connected to social class and ethnic differences in different ways in different places. Masculinist hegemony is diffuse since, as Walsh (2001: 17) indicates "it is embedded in impersonal discursive practices and institutional structures that are historically associated with men." Indeed, when statistics are broken down by gender in the areas of education, health, economic participation, or wages, women as a group are still at a disadvantage. The fact that women's social position remains weak, although to varying degrees in different countries around the world, explains why women encounter resistance and difficulties in joining the political sphere and other prestigious areas of society such as business or academia. In the legitimization of this social weakness, several factors seem to play a significant role, like religion (Balaghi, 1994), culture (Graumann-Ubale, 1996), or historical reasons (Dudink, 2004).

Because our societies perceive a process of evolution and modernization leading women's presence to increase daily throughout the world, their greater presence in the Western sphere, considered to be more 'evolved' ('civilized'), is considered a given. Nevertheless, these assumptions are not always justified and mask some important aspects of the issue. For instance, while the female participation rate in northern European countries stands out as an exception (Gomard, 2001), other countries considered to be less Western or civilized, such as Costa Rica and Rwanda, apply the quota system.

Seemingly, only where strong women's movements conjugate certain political clout with the defence of women's social position and interests can political change increase women's numbers in politics. Thus, the political earthquake hitting Rwanda or Northern Ireland has uniquely placed women's movements actively participating in the peace negotiations and making noteworthy contributions to national reconciliation. These women have subsequently stood for public office in elections in order to change policies. Analogously, the processes of political decentralization in Spain and recently also in the United Kingdom, have enabled the conditioning of women politicians in regional parliaments and governments, and in regional governments (thereby enabling the recent constitution of a parity national government in Spain with women who have demonstrable experience in government).

Such examples seem to indicate that barriers encountered by women are so frequent and substantial that the process is sometimes not gradual (as it seems to have been in Scandinavia). At times, the political rules are modified, opening the way for women only after deep change altering the political equilibrium, or even only after strong social upheavals. But the figures are overwhelming and leave little room for optimism. The results of deep changes in the political rules, if they do suffice, are not always positive. Developments in the so-called Eastern European countries illustrate how political change can lead to lower female participation (Hungry, Poland, Rumania, and Russia are clear examples. See Peterson and Sisson Runyan, 1993: 54ff.; see also Matland, 2003). Seemingly therefore, only where strong women's movements conjugate certain political clout with the defense of women's social position and interests can political change increase women's numbers in politics.

This article reveals how language barriers (i.e., difficulty in attaining an education and socialization generating an acceptable communicative style for intervening in the social arena), and cultural barriers (i.e., difficulty in fully participating in traditionally male-oriented fraternal networks within political organizations), are rooted, but also reinforce structural barriers (particularly, the unequal distribution of women and men in the public sphere of politics; differences in women's socialization that do not prepare them to overcome cultural and linguistic barriers, etc.).

In order to show these links, the first section of this article analyses the issue of gendered communicative styles, the difficulties they present for women, and what women contribute by modifying traditional patterns. Section two demonstrates how perceptions of gendered communicative styles affect the way women involved in politics are represented and evaluated. Finally, section three examines the role played by the current discursive order in reproducing gender inequality and how language barriers are linked to other cultural and structural barriers.

The Discursive Order: Is There a Feminine Style in the Political Arena?

Several of the authors who have worked on this issue have used 'communities of practice' as their starting point to suggest that the political domain constitutes a discursive order characterized by certain ways of speaking and evaluations about their appropriacy

that are traditionally associated with males. That is, professional politicians are seen as an "aggregate of people who, united by a common enterprise, develop and share ways of doing things, ways of talking, beliefs, and values, -in short practices" (Eckert and McConnell-Ginet, 1999: 186). The fact that this community of practice has traditionally been made up of males explains why such ways of speaking and values have taken shape as dominant and why everything departing from this practice and these values is appraised as unsuitable or unacceptable. While no specific communicational style is demanded of men in the political arena, women do not seem to have an appropriate one available. This inequality in demands leads to a process of exclusion, making it difficult for women to gain access to important resources and positions in the organization. This situation is an example of social closure (social domination).

This exclusion may, in turn, give rise to a situation in which access to these high-level resources and positions is achieved by means of adaptation to the dominant styles and forms. Within research on language and gender, certain linguistic choices have been identified as masculine in style: being more assertive in one's expression and exercising of power (which includes highlighting rather than concealing responsibility for decisions or actions), and being direct and confrontational with adversaries in political debates. These traits, which are not necessarily found among all males, appear most clearly in two specific spheres in the political arena: in parliamentary debates and in the creation and maintaining of fraternal or peer networks, both within political organizations (parties and unions), and in informal interaction between members of the same or of different parties. Ties are made and negotiations take place outside a formal context through these networks, making them as important in politics as they are in other areas.

These masculine stereotyped forms are increasingly rejected by women. Thus, within the British Labour Party, for instance, Harriet Harman has criticized what she terms the "militaristic" and "macho" language of the laddish coterie who surround Blair, claiming that talk of "big guns," "big hitters," and "big beasts" is not how women refer to one another (the Guardian, 9 March 1999; also see Walsh's analyses, 2001: 100ff.). However, these discursive practices are highly effective in building fraternal networks in political parties.

Researchers have also attempted to define the traits characterizing a feminine style. Authors such as Blankenship and Robson (1995), using a study of a corpus of political discourse in the United States between 1990 and 1994, have identified the following five traits: basing political judgments on concrete, lived experience; valuing inclusivity and relational nature of being; conceptualizing the power of public office as a capacity 'to get things done' and to empower others; approaching policy formation holistically; moving women's issues to the forefront of the public arena.

At least the first three of these five traits have been considered paradigmatic examples of how women tend to tackle communication in other public spaces, such as business. However, as with all characterizations of feminine styles, we can never be sure whether these styles actually appear in women's discourse or whether they are rather a perception or a representation of women in social positions of responsibility, based on and shaped by gender stereotypes (Martín Rojo and Gómez Esteban, 2002, 2004).

Lastly, we cannot overlook the different ways in which women devoted to politics act. In fact, Walsh (2001: 11) identified three models explaining these differences. First is the accommodation model, required by a male-oriented cultural context, in which women adapt to dominant practices both in their management of conflict and in their expression of authority. Nevertheless, adapting to molds and forms traditionally considered typical of male politicians often leads women politicians to be seen as strange specimens, behaving as would be expected of a leader, but not of a woman (Margaret Thatcher is a paradigmatic example). The fact that women to whom this categorization is attributed are seen as exceptions does not contribute to promoting the feminization of the political sphere.

The second model is what Walsh terms the critical difference model, which could be characterized as the search for cooperation instead of adopting an aggressive, confrontational style. Here, there is a risk of being perceived as weak and ineffectual, or to put it bluntly, as poor professionals having arrived where they are thanks to the paternalism of males who have given them an undeserved place due to quota policies (this phenomenon could be seen as similar to what occurs in leadership positions in the sphere of labor, cited by authors such as Holmes, 1995; Tannen, 1996; Martín Rojo and Gómez Esteban, 2002, 2004). As indicated by Deborah Cameron (1992: 76), regardless of how this style is judged, adopting it contributes to rectifying the traditional dichotomy between private and public spheres and the unequal distribution of women and men in these spheres. It could be expected, however, that with the gradual feminizing of the public sphere, adopting this style would contribute to transforming the rules and values that govern it.

The third model is what Walsh calls the performative model and consists of women switching between

the other two models depending on the communicative situation and other factors. Although this model is perhaps the most widely followed (see Romaniuk, 2004 for similar conclusions), it remains invisible. As stated in Fairclough's (1989: 182ff.) analysis, although Margaret Thatcher herself used a hybrid style, carefully conjugating selected features associated with middle-class femininity and 'authoritative expressive elements' used by men politicians, the masculine model was insistently attributed to her (she was described as 'the best man in the cabinet'). Her model was even resorted to in order to masculinize and discredit the work of other women (Walsh cites the case of Margaret Beckett when competing for Labour leadership in 1994 (Walsh, 2001: 72–73).

This frequent alternating of styles does not depend so much on a rational choice made by these women but is rather a reflection of the tension they experience, leading them to use different options. Examples such as the new President of the Parliament of Andalusia, who declared her will to exercise her power "not to follow in the footsteps of men, but to open new paths on which womens' footsteps may be seen . . ." are still few and far between. In addition, as Wodak (2003) points out, female MPs in EU parliament display a wide range of identity constructions, and gender can be overridden through national and ideological affiliation.

Furthermore, while serving as an avenue for women to develop their own style of leadership, stressing the differences between the masculine and feminine forms of exercising power also involves risks. Emphasizing some aspects of what has been defined as specifically feminine leadership, or defending its virtues, may in fact serve only to further stereotype and marginalize women in leadership and politics. It is also paradoxical that this marginalization comes at a time when certain cracks can already be seen in the towering edifice of the two-sex and two-gender system. (Given that people are now more aware of the fact that gender differences are socially constructed, distinctions between the genders have weakened and a host of different ways to be a women or a man are expressed more freely.) (Freed, 2003). And what is even more highly suspicious is the vulgarized version of the positive view of differences in academic circles that is so prevalently found in the media, the self-help industry, and books on popular psychology. *Cosmopolitan* has made en effort to tie these different ways of speaking with the presence of certain hormones or the different constitution of our brains. Through dichotomies and oversimplification, these media relentlessly stress that women and men shop, think, speak and behave differently.

Beyond any doubt, in the current discursive order of politics, we find that the requirements are somewhat flexible and open for men (if male politicians adopt a nonconfrontational style, this behavior would not be necessarily interpreted as a sign of weakness), but restrictive for women who are also harshly criticized and often excluded from a sphere where dominant practices have been imposed throughout history. We therefore find ourselves up against an example of domination and exclusion that is reproduced and bolstered by discursive practices. From this perspective, at least three areas stand out for their importance: parliamentary debate, government tasks, and peer relations in nonformal contexts. The first area is linked to the adversarial style, the second to how power is expressed and managed, and the third to building one's own identity and one's own group identity.

As indicated by other authors (Puwar, 1997; Sreberny-Mohamadi and Ross, 1996; Walsh, 2001), women find a confrontational style, ranging beyond parliamentary debate, to be alienating and inhibiting. As Sedgemore (1995: 54) indicated, in parliament, when differences are small, they must be magnified and when they do not exist at all, they must be fabricated.

However, cultural differences can be observed in how this confrontation is managed. In the British parliament, for instance, both the parliamentary procedure and the physical layout itself stimulate confrontation (Sedgemore, 1995: 54). Legal interventions are allowed in debate where one speaker gives way to another so that he or she can make remarks that tie in with the line of argument. These legal interventions are not permitted in other parliaments. But illegal interventions, highly effective in increasing the aggressive tone of the debate, are found in all parliaments. When made on a group basis, these interventions consist of interjections, stomping, noise, and all types of comments demonstrating support or disapproval of the speaker, while on an individual basis, illegal interventions usually consist of comments such as 'that's a lie' or 'resign.' In this light, Shaw's figures (2000) illustrate that legal or illegal interruptions in parliamentary debates are often made by men. By not availing themselves of these interventions, women therefore limit their access to the floor and thus relinquish their power in the debates.

In the second area, government tasks, the way is gradually being paved for new styles of leadership incorporating more cooperative and less assertive traits that afford greater scope for interpersonal relationships. Yet these innovations come up against

resistance even when advocated by men. (As compared with his predecessor's brusque, pushy, severe style, Spanish prime minister Rodríguez Zapatero has been dubbed 'Bambi' by the opposition for his conciliatory style). This resistance is even greater when it comes to women, since their practices, based on an ideology that understands power as a resource to transform society and not to dominate others, are not considered to be chosen rationally but rather considered to be a sign of inherent weakness. In her campaign within the British Labour party, Beckett's reluctance, for instance, to speculate on potential situations in which she would push the nuclear button were not understood as a political position in itself, i.e., the rejection of a populist discourse on security, or support for nuclear disarmament. Instead, they were understood as a sign of weakness invalidating her as a candidate.

Lastly, in the third area, peer relations, the role played by practices traditionally associated with masculine forms is interesting to observe. Especially interesting is the role they play in informal contexts (coffee breaks, mealtimes, parties, Christmas dinners, nights out), where relationships become less formal, power relationships are less manifest, and more stable networks emerge. Organizations and political parities are built on these types of relationships. Paradoxically, obstacles are also presented for women in participating in this type of situation, especially in highly masculinized sectors. It is important to draw attention to the social implications of this marginalization of women in male peer networks, since at the higher levels of organizations real power resides in these groups. Because networks like these are the basis for choosing the candidates called upon to represent the people in elections, these relationships play a key role in either promoting or thwarting women's inclusion.

Reducing political relationships to 'gentlemen's clubs,' 'big guns,' or 'political babes' excludes those who explore new, more democratic types of political systems. Therefore, analyzing the barriers to women in politics better enables us to show the potential results of women's equalitarian participation in politics that could, in turn, open up the possibility of new ideological positions. It has, for instance, been noted that women's role in peace negotiations after various conflicts in Northern Ireland, Rwanda, or Israel-Palestine has opened up forms of reconciliation that are not based on excluding any of the parties. Also, the awareness of being in a position of weakness in politics can lead to a less assertive style and the seeking of consensus in decision-making and exercising power. Moreover, women's involvement in grassroots movements is bringing about new brands of politics that are closer to people's everyday life experience and needs. This less elitist style, more adapted to voters' specific situations, means that politics becomes much more democratic. Romaniuk (2004) also shows the emergence of a new communication ideology that values private forms of communication in the public sphere. It has also been indicated that women are less susceptible to corruption (according to Johon Mathiason, former Director of the UN Division for the Advancement of Women), perhaps because of their exclusion from the fraternal networks where so many things are negotiated outside the regulatory sphere of the political arena. Lastly, women's role in changing the political agenda seems noticeable, although it is done from NGOs, since in certain countries, consensus has been reached between women of different political parties to address issues such as abuse of women, or to respond to some of the claims of the women's movement's.

The Social Representation of Female Politicians

What we have seen thus far shows how the style adopted by women in positions of power in government or parliament is sometimes not as important as how these styles are perceived and represented. Several authors have studied how representations reproduce gender stereotypes and traditional dichotomies separating the public and private spheres.

The media play an important role in reproducing and disseminating dominant representations of women involved in politics (Ross and Sreby-Mohammadi, 1997). One of the main reasons, in addition to the deep rooting of traditional visions indicated by Walsh, is that most of those who own or control the media are men who assume that the ideal reader will also be male.

Due to the strong impact of gender inequalities in the distribution of social spaces, women's presence in the public sphere is still viewed as exceptional. Thus, as Fowler (1991) indicated, male presence undoubtedly overshadows female presence in the British press, which reaffirms women's underrepresentation in the public sphere (King, 1992: 133), feeding the lack of female models. The few articles which are devoted to women reproduce traditional stereotypes, that is, these articles include references to women's family ties (husbands, fathers, children, etc.) or provide information on their marital status, thereby reaffirming their image as dependent (on the will or actions of others). These articles often also include observations and value judgments regarding their physical aspect (for instance in the campaign for Labour

Party leadership "where Blair was a youthful 40-something, Beckett was post-menopausal" (*Daily Express*, 24 June 1994). Adjectives used to describe women usually place the emphasis on their physical and emotional qualities and nearly never on their professional or moral worth. And when the adjectives do evaluate their moral worth, they usually refer to traditionally imposed traits (fidelity, resignation, care for others) or traditionally disdained traits (domineering, masculine in style, wielding of 'female weapons'). (Mcdonald, 1995: 50, points to double moral standards in social spaces.)

Therefore, when women's action as high-level politicians is represented in the media, we find they are considered tokens, that is, as symbols of their gender rather than as individuals. For example, when a minister is criticized for her actions, her entire gender's suitability for government is called into question, while a man's incompetence only calls into question his own incapacity and never that of his entire gender.

Thus, as Kanter points out, when women are seen as token they are subject to three perceptual tendencies: greater visibility, contrast or comparison, and assimilation (1977: 130ff.). Greater visibility, contrast, and comparison can be observed in the scrutinizing and criticism of women's action in government. Walsh (2001) has studied how women's actions within the Labour Party, the Blair government ('Blair's babes'), and the Welsh and Scottish parliaments are continuously compared and benchmarked against male ways of speaking and values. Women in government are the marked gender (Tannen, 1996). As a result, their behavior is observed and judged for its suitability. If their performance is judged to be negative, then the whole gender is discredited. Suffice it to cite how Welsh Agriculture Secretary Christine Gwyther was treated in the media for being vegetarian.

This discredit leads on to the third tendency – assimilation. Women in the public sphere are seen as more masculine than in the domestic sphere. Thus, those women who do not convey an empty image of power are perceived as macho. This is not a positive representation, however, since they are seen not as women, but as rejected specimens. They are the iron ladies, the women who wear the trousers, pseudo-men (for research on virilization and exclusion suffered by these women in the public sphere see Martín Rojo and Gómez Estaban, 2002).

The observation of these perceptual tendencies leads us to reason that the women who do not take part in this dichotomized distribution of public and private spheres are the ones who pose the greatest contradictions and tensions in the media. Page's analysis (2003) of the representation of leading barrister and wife of the current British prime minister Cherie Booth Blair in the British press shows these contradictions. The stereotypically passive representation of Cherie Blair might be seen as securing her husband's political status against the potentially destabilizing influence of her representation as a powerful professional in the public domain, thereby reinforcing gendered norms (Page, 2003: 570). What has yet to be studied is the impact of her representation as a professional on other working women. Here, Page's analysis seems to show that while her professional worth is not questioned, she is considered to be an exception.

Barriers Constituting a Glass Ceiling and Potential Action

Language barriers hamper women's access to politics both on an institutional and an everyday level in both parties and organizations. We must not overlook female illiteracy rates, higher than those of men throughout the world. While women have not yet been socialized to compete in the political arena, what is relevant is how in the current order of discourse the dominant practices and values deprive them of the tools they need to make a way for themselves.

We have already seen the dilemmas faced by women in politics as well as the dominant social representations in the media. While no specific communicational style is demanded of men in institutional politics (except some stylistic preferences for expressing conflict and opposition in debates and for exercising power), women politicians do not seem to have an appropriate style available to them. This inequality in requirements gives rise to a situation where both maintaining their traditional features and assuming traditional masculine traits leave women looking out of place in politics. As a result, men's prevalent position in organizations is not threatened, but rather effectively reproduced and therefore bolstered.

In addition, while stressing the differences between the masculine and feminine forms of exercising power provides an avenue for women to develop their own style of leadership, it also conceals other restrictions they face at entry and the thwarting of new ideological positions and ways of doing politics.

Changing this situation requires changing discourse's social order so that it is open to other types of participation. Carbó (2003) studies one outstanding example of the changes required, the Zapatist commander Esther's intervention in the Mexican

Parliament, the first by a nonparliamentarian, indigenous woman. Yet, we know that the order of discourse cannot be modified unless other orders are. In fact, it is no coincidence that women have attained socialization in less competitive areas, like politics in regional parliaments and local institutions, because less power is wielded there (i.e., the autonomous governments in Spain and the United Kingdom) or in situations where overcoming crises has required innovative solutions.

Language barriers are inextricably tied to other barriers, particularly cultural ones, favoring particular practices and ways of doing politics. This link explains why women MPs in Britain were not even able to change the evening sessions in the British Parliament to make their work and home lives compatible. Their attempt was seen as a break with tradition, and the same holds true for their rejection of the dominant aggressive, masculine style.

Both cultural and language barriers invariably lead us to structural barriers, to the unequal distribution of social spheres, and to the relegating of women outside the most prized public sphere. Social changes are threatening this order but have not yet changed it. More deeply rooted and seemingly more difficult to change is the strong link traditionally established between power and masculinity. Gender stereotypes are still shaping role stereotypes in the political arena. As a result of the association of power and masculinity, when women reach high positions, they can be regarded as deviant examples or virilized women (Golda Meyer and Margaret Thatcher are outstanding examples). This association between genders and roles promotes essentialist discourses attributing specific worth and possibilities. As a result, we see that the political arena is a gendered social space.

As long as women's numbers in politics are low, it will be difficult to see that the problems we face as women (abuse, less research on diseases affecting women, lower salaries, difficulties in attending to both work and children, etc.) are problems of society as a whole. In democracy, justice must be for the entire population. Women's greater presence in politics would help to bring these issues to the fore and would encourage solutions attenuating social exclusion and injustice.

See also: Language Education and Gender.

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Gender, Grammatical

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Gender is a feature of special interest because it provides a dramatic demonstration of just how different languages can be. For many of the Indo-European languages it is an important feature that is realized in a high proportion of utterances. In most Daghestanian languages, such as Tsakhur, it is still more salient: it suffuses the syntax and morphology, appearing on some unlikely agreement targets. In almost all the languages of the Austronesian family, it is simply missing. This article first examines the definitions of gender to ensure that we are comparing like with like. There has been careful research to do this, and it will become clear that within the languages that do have gender there is a considerable variety of possible gender systems. This is particularly apparent in the ways in which speakers assign nouns to genders. Gender systems may have sex as a component, as in languages with masculine and feminine genders; but, equally, sex may be irrelevant, as in the Algonquian languages, where the distinction is between animate and inanimate. This article outlines the distribution of gender in the world's languages, and finally considers prospects for investigating the feature further.

Terms

The word 'gender' derives from Latin *genus* via Old French *gendre,* originally meaning 'kind' or 'sort'. There are many kinds of noun: those with four syllables, those denoting agents, and so on. But 'gender' is normally reserved for kinds or classes of noun that are, as Hockett (1958: 231) put it, "reflected in the behavior of associated words." To make valid comparisons, it is important to have this externally motivated classification. The relevant reflection in the behavior of associated words is 'agreement' (including for some linguists antecedent-anaphor relations). The noun inventory is divided into different kinds, or genders, according to the different agreements they take. When this is done, we find that in the more familiar languages, the different kinds or genders have a semantic core based on sex (thus, Russian nouns divide into three kinds; nouns denoting males, though not only these, group together, and those denoting females also group in another gender). In other languages the structures may be very similar, but the semantic core may not based not on sex; for instance, it may be based on human versus nonhuman or animate versus inanimate. Thus a language has a gender system only if noun phrases headed by nouns of different types control different agreements. No amount of marking on a noun can prove that it has gender; the evidence that nouns have gender in a given language lies in the agreement targets that show gender. An illustration of this from the Nakh-Daghestanian language Bagvalal (Kibrik, 2001: 64–65) will show this. Each noun in these examples is representative of many more:

(1) w-eša-w waša
MASC.SING-plump-MASC.SING boy
'a plump boy'

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(1) w-eša-w waša
MASC.SING-plump-MASC.SING boy
'a plump boy'

(2) j-eša-j jaš
FEM.SING-plump-FEM.SING girl
'a plump girl'

(3) b-eša-b ʕama
NEUT.SING-plump-NEUT.SING donkey
'a plump donkey'

Attributive modifiers show that the nouns of Bagvalal divide into three agreement classes. In the plural, examples like (1) and (2) fall together, and so the plural does not yield additional agreement classes. No more does changing the case. Let us try changing the type of target, by looking at a verbal predicate:

(4) waša w-iRi
boy MASC.SING-stop
'the boy stopped'

(5) jaš j-iRi
girl FEM.SING-stop
'the girl stopped'

(6) ʕama b-iRi
donkey NEUT.SING-stop
'the donkey stopped'

Although the morphological realization is somewhat different (prefixal only instead of being prefixal and suffixal), the verbal predicate does not provide further agreement classes. Bagvalal has three agreement classes, and each should be recognized as a gender.

For languages in the Nakh-Daghestanian family, like Bagvalal, the term used is often 'noun classes.' But there is no substantive difference between 'genders' and 'noun classes'; the different terms arise in different linguistic traditions. For instance, Kannada (a Dravidian language) has three genders, to which nouns are assigned by rules similar to those of Bagvalal. By tradition, Kannada is said to have three genders, and Bagvalal three noun classes. We shall use the term 'gender' for both.

The Number of Genders

The approach to gender sketched in the first section of this article is based on the notion of 'agreement class' (Zaliznjak, 1964). For two nouns to be in the same agreement class, they must take the same agreements under all conditions – that is, if we hold constant other features such as case and number. (The agreements and their domains can be extremely varied; Corbett, forthcoming.) If two nouns differ in their agreements when factors such as case and number are held constant, then they belong to two different agreement classes and normally they will belong to two different genders. To take another example, in Russian, in environments where nominative singular forms are syntactically appropriate, nouns like *otec* 'father' and *stol* 'table' take the possessive adjective *moj* 'my' (*moj otec* 'my father'). Since this gender includes many nouns denoting males, it is conventionally labeled 'masculine,' even though the majority of nouns it includes, like *stol*, do not denote males. A second agreement class consists of nouns like *mat'* 'mother' and *kniga* 'book', which take *moja*, and make up the feminine gender. Finally, there are nouns like *pis'mo* 'letter', which take *moe*, and comprise the neuter gender.

For many languages there is no dispute as to the number of genders, but there are others where the question is complex. For instance, Romanian gender has provoked a lengthy debate. The analytical problem of determining the number of genders and the tests for deciding the gender of a given noun depend on separating out the sets into which nouns are divided (the 'controller genders') from the number of different genders marked on agreement targets (the 'target genders'). Frequently the two match up, as in French or German, but in several languages they do not. A full treatment of the subject is not possible here; for a detailed account and extensive references see Corbett (1991).

Gender Assignment

Given that there are the analytic means to establish the genders of a language and to determine which nouns belong in which gender, we now approach the question from the opposite perspective, and ask how nouns are allotted to the genders of a given language. In other words, how does a native speaker 'know' what gender a noun belongs to? Models of the mechanisms by which nouns are allotted to genders are called 'assignment systems.' Assignment may involve two sorts of information about the noun: its meaning and its form. To illustrate these, we will take some well-established clear examples. There are others that involve more complex combinations of systems.

Strict Semantic Assignment Systems

A strict semantic assignment system is found in Bagvalal (Kibrik, 2001: 64–66), as illustrated in the earlier examples. Nouns denoting male humans (and only those) are masculine, while those denoting female humans are feminine. All remaining nouns are neuter. Thus, *waša* 'boy' is masculine, *jaš* 'girl' is feminine, and *ʕama* 'donkey' is neuter. The meaning is sufficient, and no information about the form of a noun is needed to determine its gender. Kala Lagaw Ya, spoken on the Western Torres Straits Islands, has

a two-gender system, also with strict semantic assignment: nouns denoting males (and the moon, to which we return below) are masculine, and all others belong in the feminine gender (Bani, 1987). In Diyari (Dieri), a language of South Australia, we find the converse: there is a gender for nouns with female referents (such as women, girls, doe kangaroos), and the other gender is for all remaining nouns (Austin, 1981). Strict semantic systems are found in various parts of the world and are particularly prevalent in the Dravidian family, where there are three-gender systems (as in Kannada and Tamil) and two-gender systems (as in the Parji-Gadaba languages).

Predominantly Semantic Assignment Systems

Many languages have semantic assignment rules that are, however, less comprehensive than those of Bagvalal. Predominantly semantic assignment is found in Tsakhur, which like Bagvalal is a Nakh-Daghestanian language. Its four genders are shown in Table 1.

Assignment to genders I and II is straightforward: I is for male humans (also gods, angels, and so on), while II is for female humans (and female mythical beings). Most remaining animates are assigned to gender III, although a few belong to gender IV, along with some mythical beings. Inanimates are found in genders III and IV, and it is hard to discern a pattern (Mel'nikov and Kurbanov, 1964; Ibragimov, 1990: 54–56 and references there; Kibrik, 1999: 48–49).

Languages of this general type are widespread. For some of them, researchers have proposed that abstract semantic criteria partly miss the point, and that if we can gain a better grasp of the worldview of the speakers, we can then understand the assignment system more fully. The most discussed case is that of Dyirbal, North Queensland (Dixon, 1972), which has four genders, primarily for male humans and non-human animates (I), female humans (II), non-flesh food (III), and the residue (IV). There are various nouns for which additional principles are required. For example, the moon is in the first (masculine) gender and the sun is in the second (feminine) gender. This recalls Kala Lagaw Ya. In Dyirbal mythology, as indeed in much of Australia, the moon is the husband of the sun. For such instances, the mythological significance of referents can determine gender assignment. Dixon's data and analysis continue to provoke debate, and there is similar debate about the role of worldview in the gender assignment system of Ojibwa (and of other Algonquian languages of North America).

In all the languages discussed so far, the meaning of the noun determines gender. In the strict assignment systems, the rules are transparent; in the predominantly semantic systems, there are exceptions, although in some cases these may be explicable once the cultural setting is taken into account. If we ask which are the semantic criteria on which semantic systems can be based, we see recurring patterns. Quite often we find animate/inanimate, human/non-human, and male/female. Sometimes there is a gender for diminutives, as in various Bantu languages. There are also less usual genders, such as that for non–flesh food (Dyirbal) and the gender for insects (found in the Rikvani dialect of the Nakh-Daghestanian language Andi). A criterion that is sufficient to define a gender in one language may be just one factor in the assignment of gender in another. Thus the Bantu language Chichewa (a dialect of Nyanja) has a gender for diminutives, while in the Omotic language Dizi, diminutives together with nouns denoting females form a gender.

Table 1 Gender assignment in Tsakhur

Criterion	*Gender*	*Examples*	*Glosses*
Male rational	I (masculine)	*baba*	grandfather
		dak$_j$	father
Female rational	II (feminine)	*jed*$_j$	mother
		jiš	daughter
Animate (also some inanimates)	III (animate)	*aɪmale*	donkey
		balkan (*dama*) (*lat*)	horse (river) (trough)
Other (including a few animates)	IV (neuter)	*kalle*	head
		sen (*kabaj*)	year (butterfly)

Formal Assignment Systems

In many languages, the semantic rules assign many nouns to the appropriate gender, but they also simply fail to apply to many others. In Russian and in many other Indo-European languages, for sex-differentiables (those where sex is salient or of importance to humans), nouns denoting males are masculine and those denoting female are feminine. But these rules have nothing to say about the majority of the noun inventory. While in languages like Bagvalal, the nouns not assigned by the semantic rules (the 'remainder' or 'semantic residue') all belong to a single gender, in many languages they are found in more than one gender, even in all the genders (as in Russian). Here there are additional rules for assigning nouns to genders, but according to their form. Languages may use semantic rules, or semantic **and** formal rules, but not only formal assignment rules. In no language are

nouns assigned to genders, as defined earlier, by purely formal rules. An example would be a language in which there were two agreement classes, and the nouns in the first all ended in a consonant cluster, and those in the second did not, and there was no semantic regularity for the distribution of nouns. I claim that this hypothetical type does not exist. Formal assignment rules may appeal to two types of information: phonological and morphological.

Phonological The clearest example of assignment depending on phonological information yet found is provided by Qafar (Afar), an East Cushitic language spoken in northeastern Ethiopia and in Djibouti (data from Parker and Hayward, 1985). Qafar has rather standard semantic assignment rules, namely, that for sex-differentiable nouns, those denoting males are masculine and those denoting females are feminine. It is the nouns that fall outside these rules – the residue – that are of interest. For them the phonological rules apply: nouns whose citation form ends in an accented vowel are feminine (for example, *catò* 'help'), while all others are masculine (for example, *gilàl* 'winter', which does not end in a vowel, and *tàmu* 'taste', which ends in an unaccented vowel). These rules operate with few exceptions. There is an interesting twist here: nouns denoting males and females typically fit with the phonological assignment rules, too (for example, *bàqla* 'husband' and *barrà* 'woman, wife'). Given the data presented so far, we might try to dispense with semantic rules for Qafar and treat it as being of a quite different type. However, there are crucial examples like *abbà* 'father', which is masculine, even though it ends in an accented vowel. Similarly, *gabbixeèra* 'slender-waisted female' is feminine, even though the accent is not final. Qafar has straightforward phonological assignment rules. When the semantic and phonological rules are both applicable, they almost always give the same result in Qafar. However, in cases of conflict, the semantic rules take precedence, as is the normal situation in gender assignment systems. There are many more example of phonological assignment, although few if any are as clear as those of Qafar. At the other extreme we find French, often claimed to have no system to its gender assignment. Yet French has a phonological assignment system. For example, of 938 nouns ending in /ɛ̃/, 99 percent are masculine (*le pain* [pɛ̃] 'the bread') (for details see Tucker *et al.*, 1977; Hardison, 1992).

Morphological The morphological assignment system that has received the most attention is probably that of Russian. Earlier it was noted that in Russian, as in many other Indo-European languages, for sex-differentiables, nouns denoting males are masculine and those denoting females are feminine. But unlike the situation in languages like Bagvalal, the nouns not covered by these rules – the semantic residue – are not simply assigned to the neuter gender. Rather, in Russian, the residue is shared between the three genders, with the neuter gender not even receiving the majority. It seems unlikely that we are failing to spot additional semantic criteria; see (Table 2).

Table 2 Russian nouns belonging to the semantic residue

Masculine	*Feminine*	*Neuter*
dub 'oak'	***sosna*** 'pine'	*derevo* 'tree'
stvol '(tree) trunk'	*doska* 'plank'	***brevno*** 'log'
čaj 'tea'	*voda* 'water'	*moloko* 'milk'
ogon' 'fire'	*peč'* 'stove'	*plamja* 'flame'
okean 'ocean'	*reka* 'river'	*more* 'sea'
avtomobil' 'car'	*mašina* 'car'	*taksi* 'taxi'
den' 'day'	***noč'*** 'night'	*utro* 'morning'
čas 'hour'	*minuta* 'minute'	*vremja* 'time'
nerv 'nerve'	*kost'* 'bone'	*serdce* 'heart'
glaz 'eye'	*brov'* 'eyebrow'	*yeko* 'eyelid'
lokot' 'elbow'	*lodyžka* 'ankle'	*zapjast'e* 'wrist'
flag 'flag'	*èmblema* 'emblem'	*znamja* 'banner'

Nouns in bold are inflected in Table 3.

If the morphology of the nouns is examined instead, then progress can be made. There are arguably four main inflectional classes in Russian, each with several thousands of nouns. There are six cases and two numbers (although no paradigm has 12 distinct forms because of various syncretisms). Table 3 provides the singular forms.

Of course, a speaker needs to know the inflectional behavior of a noun. On the basis of that information, the assignment rules are straightforward. Nouns in inflection class I are masculine, those in classes II and III are feminine, and those in IV are neuter. As with Qafar, we might wonder whether the semantic assignment rules are superfluous, since *otec* 'father' is in class I, while *sestra* 'sister' is in class II, and *mat'* 'mother' is in class III, and therefore many sex-differentiable nouns would be assigned correctly by the morphological assignment rules. But there are also instances where this is not so. Thus, *deduška* 'grandfather' denotes a male but is in class II, whose nouns are typically feminine; it is masculine. Nouns like this show, once again, that we do not find languages where formal assignment rules are sufficient. Further rules are required in Russian for indeclinable nouns (like *taksi* 'taxi', which is indeclinable and neuter). Morphological assignment systems are found in various other Indo-European languages. Looking further afield, in Arabic, too, gender is assignable in the main according to morphology (Cowell, 1964:

Table 3 Inflectional classes in Russian

	I	*II*	*III*	*IV*
Nominative	*dub*	*sosna*	*noč'*	*brevno*
Accusative	*dub*	*sosnu*	*noč'*	*brevno*
Genitive	*duba*	*sosny*	*noči*	*brevna*
Dative	*dubu*	*sosne*	*noči*	*brevnu*
Instrumental	*dubom*	*sosnoj*	*noč'ju*	*brevnom*
Locative	*dube*	*sosne*	*noči*	*brevne*
Gloss	'oak'	'pine'	'night'	'log'

372–375). In Kuot, a language isolate of New Ireland, Lindström (2002: 147–164, 176–194) suggested that there were 11 inflectional classes for nouns, and the assignment of nouns to the two genders could be predicted to a significant extent on the basis of the inflectional class (in addition to a semantic rule based on sex).

The clearest examples have been chosen here for illustration. In some languages, the different types of assignment criteria overlap and interact in complex ways. Sometimes there are small clusters of nouns subject to semantic criteria (apart from those covered by the main semantic rules), even within systems where formal rules have a major role (as shown for German by Zubin and Köpcke, 1986; Köpcke and Zubin, 1996). Even in these complex cases, whenever gender languages are analyzed in sufficient detail, the gender of the vast majority of nouns turns out to be predictable.

Distribution

Given this typology of gender systems, we can now ask how they are distributed over the world's languages. In a sample of 256 languages (Corbett, 2005), somewhat over half (144) were found to have no gender system. A gender system with at least two genders (and two-gender systems are common) existed in 50 examples in this sample. Three genders was about half as common (26 examples), and four genders was about half as common again (12 examples). Larger systems, with five or more genders, represented a substantial minority (24 languages in the sample). Fula (a Niger-Congo language) has around 20 genders, depending on the dialect. Of the languages with a gender system, the majority had an assignment system based on sex (84 examples), but 28 languages of the sample, notably in the Niger-Congo and Algonquian families, had systems based on animacy. And as for the type of assignment system, strict semantic and predominantly assignment systems together were found in just under half the languages (53 examples), while a slight majority (59 examples) had semantic and formal assignment.

Prospects

Studies on grammatical gender continue to appear regularly. There are four areas in which we can hope for progress.

Data

Studies of previously unresearched or little-researched languages continue to extend our knowledge of gender systems. For example, in Ngan 'gityemerri a Daly language spoken in northern Australia) there is a development from generic classifiers into genders (Reid, 1997); a comparable situation, but with a very large system, is found in Miraña (Boa), a Witotoan language spoken in Colombia, as described by Seifart (2004). It is possible to have gender and classifier systems co-existing, as in Tariana (Aikhenvald, 2003). Among the better known languages, some studies of gender are based on a few convenient parts, while fuller studies of the whole morphosyntax, to the extent that it is relevant to gender, and of a substantial portion of the lexicon, can contribute significantly to our understanding of gender. The incorporation of loanwords can be seen as a continuously running experiment on an assignment system, offering the possibilities for statistical analysis, as in Kilarski's (2003) account of English borrowings into Danish, Norwegian, and Swedish.

Lexicology

Gender is a key feature for lexicology, since it is crucial for understanding the nature of lexical entries. In a gendered language, the gender of a noun must be available. Yet as we have seen, it does not normally need to be specified, since the information can be derived, by assignment rules, from other information that must be stored. We still do not know the full range of information that may be relevant (for instance, the possible semantic features that may determine gender assignment). There are further surprises: it is possible for certain nouns to be of different genders according to the sex of the speaker; this is found in Garífuna, a member of the Arawak language family spoken in Belize, Honduras, Nicaragua, and Guatemala (Taylor, 1977: 60; Munro, 1998). These two points raise interesting questions as to the shape of lexical entries.

Psycholinguistics

The issues specified for lexicologists are also increasingly of concern to psycholinguists (see, for instance, van Berkum, 1996). Gender provides a feature that is moderately well described, typically has few values, and yet is pervasive in one language and absent in

another, thus providing helpful control conditions. Psycholinguists are also interested in apparently non-linguist effects of grammatical gender, as in judgments of picture similarity (see Boroditsky *et al.*, 2003). There has been some interesting work on how children acquire gender systems by Mills (1986) and Müller (2000), among others. Such studies may also help us to see how such systems change over time, as shown by the work of Polinsky and Jackson (1999) on Tsez (Dido); see also Comrie and Polinsky (1998). For further work on modeling of change in assignment systems see Polinsky and Everbroeck (2003). An account of the history of gender in Indo-European is provided by Matasović (2004).

Modeling

Modeling is being used in various ways. First, it is used to verify particular analyses. Some types of assignment system are so transparent that alternative analyses are hard to imagine. However, with morphological assignment systems, particularly when the number of genders and the number of inflectional classes are close in a given language, there are other possible analyses. Arguments in favor of the morphological approach include the following: the main claim is that in languages like Russian, the internal evidence shows that we can assign gender from inflectional class (but the inflectional class cannot be predicted from gender); second, there is the typological claim that one of the possible types of assignment system (or some combination) will always guarantee that gender is predictable for the vast majority of nouns, and so treating the Russian type system differently would create an anomaly. However, modeling allows us to take a further step. Fraser and Corbett (1995) employed the Network Morphology framework to give an account of the Russian gender and inflectional class relations. Since the analysis was implemented in the lexical knowledge representation language DATR (Evans and Gazdar, 1996), the analyses can be verified computationally. It can be demonstrated that, starting from minimal lexical entries for a wide range of nouns, this account did indeed predict the right genders.

A more complex situation is found in languages where gender is assigned according to morphological class, but where the morphological class is itself predictable. A well-studied case is Bumbita Arapesh, a language of the Toricelli family spoken on the north coast of New Guinea (Fortune, 1942; Aronoff, 1992; 1994: 89–114). In addition to semantic assignment rules based on sex, there are morphological assignment rules that determine 13 genders on the basis of 22 morphological classes, and the latter are largely predictable from phonological information. It has been demonstrated how this system can be analyzed within the Network Morphology framework, and an implementation has been provided to demonstrate that these claims are indeed valid (Fraser and Corbett, 1997). There is also a complex interaction of assignment to gender and to morphological class in Bininj Gun-Wok (previously Mayali), a non-Pama-Nyungan language of northern Australia, which has four genders and five morphological classes for nouns. This too has been successfully implemented; for details of a formal model of this system see Evans *et al.* (2002). Modeling has tended to concentrate on synchronic assignment systems. However, there is also interesting work on modeling the development of assignment systems over time, as in Polinsky and Everbroeck (2003), as noted earlier.

Conclusion

We have seen why gender continues to evoke such interest: it is a core feature in some languages, while in many others it is absent. We have the analytic tools for investigating gender systems, and new and intriguingly complex systems are still coming to light. In terms of gender assignment, the rules vary from being fully transparent, as in Bagvalal, to complex, as in French and German. It is a research area in which various different types of expertise are leading to gradual progress.

Acknowledgments

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See also: Number; Phonology: Overview.

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Gender, Sexuality and Language

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Gender initially became a focus of linguistic interest in the first half of the 20th century when field linguists discovered what they perceived as stark differences between European languages and the indigenous languages they had begun to document in the Americas and elsewhere. Of particular interest was the finding that a number of these languages differentiated between women's and men's speech on the basis of grammar, phonology, and lexicon. These so-called 'women's languages' and 'men's languages' were characterized as vastly different and mutually exclusive, and were often held up as evidence for the rigidity of gender roles in traditional societies in contrast to the enlightened gender liberalism of Western modernity. In addition to the problematic exoticism of native languages and cultures that informs this view, such a dichotomy between traditional and modern structures of gender is empirically untenable. It has recently been shown, for instance, that it was only under the conditions of modernization that gender differentiation through the creation of 'women's language' emerged in Japan.

In these early texts, sexuality was not theoretically distinguished from gender; researchers assumed a direct mapping from one to the other and of both onto language. Thus a speaker's departure from normative speech patterns was interpreted as gender deviance as well as sexual deviance, with 'effeminate' and 'bisexual' speakers occupying the margins as linguistic exceptions to an otherwise unyielding gender dichotomy. What was missing from such a perspective was the concept of 'indexicality,' the process whereby language 'points to' the social and discursive context of its own production. Seen in this way, many instances of perceived cross-gender language use might more accurately be understood as indexing interactional stances such as affect or force/mitigation, not gender identities.

Despite its flaws, the early anthropological research on women's and men's languages did call attention to the important relationship between gender and sexuality. However, this connection was not developed theoretically until the 1990s, in spite of the small but steady stream of linguistic publications on sexuality. In the 1970s, a number of ethnographically oriented researchers published a flurry of studies on sexualized insults and banter, focusing primarily on male speakers. Although the intention of such work was to bring underinvestigated communities and genres into linguistic scholarship, many of these studies unwittingly worked to reinscribe stereotypes of the licentious and hypersexed Other.

As linguistic anthropologists began to turn their attention to at least some aspects of sexuality, gender was gaining a more central role in linguistic scholarship due to the influence of second-wave feminism, especially in sociolinguistic research on Western languages. One of the earliest and most important contributions to this new line of feminist scholarship offered a different conceptualization of 'women's language' as primarily pragmatic rather than structural and suggested that women's speech both produced and reflected real-world powerlessness. This view was complicated by contemporary anthropological research, however, which revealed that women's speech in other cultures could be forceful and assertive, though still devalued.

Recognizing the widespread deprecation of social practices associated with women, by the 1980s many feminist social scientists, including linguistic anthropologists, were seeking to validate women as competent cultural members in their own right. Meanwhile, the concept of 'culture' was adopted by some researchers of American society to account for what were still seen as vast differences between women and men. Though inspired by anthropological work on cross-cultural communication, this body of work overlooked widespread efforts to rethink the concept of culture within anthropology in this period.

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A more complex understanding of culture emerged in language and gender research in the next decade, accompanied by more explicit theorizing of the concept of gender.

Much research on gender and language from the 1990s to the present has been greatly enriched by attention to the ideological symbolic aspects of talk as produced within particular communities of practice. In language and gender research, these insights led scholars to set aside a monolithic model of women's gender identity in favor of an examination of diverse versions of femininity even within a single 'culture' such as the United States.

Developments in poststructuralist gender theory and queer theory have further contributed to this shift. Drawing on and revising the poststructuralist feminist concept of performativity, which borrows heavily from the concept of the performative in the philosophy of language, linguistic anthropologists have documented the linguistic practices of gender-transgressive and sexually marginalized social groups around the world. Some of this research has been positioned within the theoretical perspective now known as 'queer linguistics,' which focuses on how sexuality is regulated by hegemonic heterosexuality and how nonnormative sexualities are negotiated in relation to such regulatory structures. Recent scholarship has considered how such groups use language to index varying stances of modernity and tradition in the context of postcolonialism and globalization.

In addition to the new focus on such groups, many of which have been understudied due to their social marginalization, linguists have also turned to those aspects of gender and sexuality that have gone uninvestigated due to their unmarked and hegemonic status, namely, masculinity and heterosexuality. The ethnographic study of desire has likewise received more attention in linguistic anthropology, as scholars have begun to consider the ways in which romance and eroticism are both produced and constrained socioculturally. Newer research on sexual joking shares this ethnographic focus, analyzing linguistic humor as a product of localized understandings of power, marginality, and socioeconomic class.

There has recently been a vociferous call to reframe the field of language and sexuality more narrowly in terms of psychoanalytically construed desire rather than sexual identity. The recent explosion of scholarship on a variety of compelling topics, however, including a more richly theorized concept of identity, suggests that the field's boundaries will continue to expand rather than contract. The intersection of sexuality with phenomena such as globalization, life stage, asexuality, health, and bilingualism, for instance, has only recently begun to receive linguistic attention. Currently, language, gender, and sexuality is a vibrant and dynamic area of research that is increasingly shedding its formerly marginal status to become a central empirical and theoretical contributor to the field of linguistic anthropology.

See also: Critical Discourse Analysis; Gender; Gender and Political Discourse; Indexicality: Theory; Sexist Language; Speech Acts.

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General semantics "tells you *what to do* and *what to observe* in order to bring the thing defined or its effects within the range of one's experience" (Hayakawa, 1972: 157). More precisely, the literal meaning of a statement expressed by sentence Σ is given by defining the method for observationally verifying the conditions under which Σ is properly used. There are several problems with this method. First, as Ayer (Ayer, 1946: 12) admits, there is no upper limit on the number of conditions on Σ's use. Second, verificationism interprets "conditions under which Σ is properly used" as "conditions under which the truth of the statement expressed by Σ is true"; consequently, values other than truth must be found for types of illocutionary acts such as requestives, directives, expressives, permissives, and declarations. Third, Hayakawa (Hayakawa, 1972: 54) contrasts the simplicity of using a tapemeasure to verify the truth of *This room is fifteen feet long* with the impossibility of operationally verifying to everyone's satisfaction *Angels watch over my bed at night* or *Ed thinks he dreamt he was in bed with Marilyn Monroe*. Such sentences are judged meaningless and therefore synonymous with one another – which they are not. Fourth, operational semantics affords no account of the compositionality of meaning. Fifth, general semantics has little or nothing to say about semantic relationships within a language.

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See also: Psychotherapy and Counselling; Taboo, Euphemism, and Political Correctness; Use Theories of Meaning.

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Note: The following references illustrate the points made in this article. The list is not intended to be a comprehensive bibliography of current scholarship on the topic of language, gender, and sexuality across cultures.

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Generalization

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Linguists make generalizations: that is what they do for a living. To make a generalization means having a look at a set of phenomena, for example a set of sentences, a set of sounds, and seeing what they have in common. First, one needs to describe and analyze data accurately, and then one needs to generalize over those data. Concentrating on word order and the status of 'subject,' consider the Old French (OF) example in (1) as a way of illustration.

(1) et li baron regardent les letres.
and the barons look at the letters
'The barons look at the inscription.' (*La Queste del Saint-Graal*, 5, 22)

In (1), we note that the order is Subject-Verb-Object (subject = *li baron*; verb = *regardent*; object = *les letres*). This is the first observation we make about OF word order. In (2), we see, however, that the situation is slightly more complicated.

(2) ceste costume ai je toz jors tenues.
this habit have I all days held
'I have always held this habit.' (*La Queste del Saint Graal*, 5, 7)

In this example, the subject (*je*) is postverbal while the object (ceste costume) is preverbal. The question that arises is thus: is French an SVO language (i.e., with Subject-Verb-Object order) or an OVS language (i.e., with Object-Verb-Subject order)? If we were to look at a corpus of OF texts, we would note that there are no attested cases where the subject is postverbal without the presence of an element in the preverbal zone. All sorts of elements can appear in that position always forcing the verb to be in the second position, hence the term used for such configurations: **V2** (most commonly associated with languages like German).

Thus, our first generalization is the following: in OF the subject is preverbal, except in cases where the preverbal position is occupied by something else.

Now, let us consider a second generalization in connection with the first. In OF, referential and non-referential subjects were possible, but a special environment was necessary for them to be licensed. Whereas Spanish and Italian allow a null subject in contexts such as (3), OF does not. (3) is an example from Spanish.

(3) habla español.
speak-3SG.PRES Spanish
'He/she speaks Spanish.'

Traditionally, the fact that languages like Spanish and Italian allow null subjects is explained by the fact that rich inflection is present on the verb (this inflection has a pronominal property and can 'stand for' the nominal). OF did not have uniform (i.e., for all persons across tenses) rich agreement (cf. Roberts,

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1993), which might explain why null subjects were not possible in environments such as (3).

However, if we look at a series of texts in OF we note that there are plenty of attested examples with null subjects.

(4) lors vienen a un huis barré.
then came to a gate
'Then they came to a gate (a postern).' (*Le Chevalier à la Charrette* 2368)

The question is now: how are these null subjects licensed? Looking closely at the data, we note that the structure is a V2 configuration (there is an element appearing before the verb). Thus, the generalization must be that null subjects in OF are possible provided non-subject material appears in the preverbal position and that the verb is in second place.

In order to go beyond simple description of the data, the next step after a generalization is to make a hypothesis that will make predictions. We know from numerous sources that OF was a so-called asymmetric V2 language, i.e., allowed V2 only in main clauses (some languages, such as Yiddish or Icelandic, are symmetric V2 languages). Since we have established that null subjects in OF were licensed in/by a V2 environment, we predict, that is, make the hypothesis, that null subjects are not possible in OF embedded clauses. This is generally believed to be the case. We thus find some confirmation for our hypothesis.

However, a hypothesis is a hypothesis is a hypothesis. It has been argued that some embedded environments allowed null subjects in OF. There are cases of null referential subjects in interrogative and adverbial embedded clauses in a range of 12th-century prose and verse texts, as well as in some 13th-century verse texts (Hirschbühler, 1990). Consider the following two examples where __ indicates a subject gap.

(5) a. por l'esperance qu'an
for the-hope which-in
lui __ ont, . . .
him have.3PL.PRES . . .
'For the hope which they have in him, . . .'
b. et si ne sait
and so not knows.3SG.PRES
que faire __ puisse.
what do-INF can.3SG.SUBJ
'And so he doesn't know what he can do.'

When making a generalization, however, one should be careful. Although (5a) and (5b) appear to involve V2 at first (*an lui* appears before the verb in the first example while *faire* appears before the verb in the second), it has been argued that in fact they do not. Such cases are not cases of topicalization, that is, V2, but of so-called 'stylistic fronting' (Cardinaletti and Roberts, 1991/2002). There are clear differences between topicalization of the V2 kind and stylistic fronting (see Maling, 1980 and also Holmberg, 2000 for details).

The idea that we are not dealing with topicalization is strengthened by the fact that null subjects are possible in non-interrogative embedded clauses without inversion of the verb as shown, for example, by Adams (1987a, 1987b), Dupuis (1988, 1989), Hirschbühler and Junker (1988), Vance (1988) and Hirschbühler (1990).

(6) a. je suis le sire a cui __
I am the lord to whom (you)
volez parler.
wish-2PL.PRES speak-INF
'I am the lord to whom you wish to speak.'
(*Aymeri de Narbonne* 4041, in Hirschbühler, 1990: 36)
b. l'espee dont __ s'estoist
the-sword by-which self-was.3SG.PAST
ocis
killed
'The sword with which he killed himself.'
(*Chastelaine de Vergi* 913, in Hirschbühler, 1990: 36)
c. ainz que __ m'en aille
thus that myself-pro go.1SG.SUBJ
en France
in France
'Thus that I go to France.'
(*Aymeri de Narbonne* 204, in Hirschbühler, 1990: 36)
d. quant__ vit le roi
when saw.3SG.PAST the king
'When he saw the king.'
(*Aymeri de Narbonne* 702, in Hirschbühler, 1990: 36)

These examples show that at some point French seemed to be developing a system according to which null subjects no longer require V2 to be licensed. However, it is unlikely that French developed a system resembling that of Spanish and Italian. This is because the inflections on the verb did not suddenly become (uniformly) rich. Therefore, the licensing of null subjects in environments such as (6) still remains something of a mystery.

In conclusion, a generalization is always very fragile in that counterexamples are often easy to find. The important point is that in order to make progress in the search for patterns, one should not be afraid of

dropping previous generalizations in order to make new ones.

See also: Abstraction; Data and Evidence; French; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Subjects and the Extended Projection Principle; Word Order and Linearization.

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Generating Referring Expressions

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Introduction: An Informal Characterization of the Problem

The generation of referring expressions is a key component task in many studies of natural language generation, and one that has attracted a significant amount of attention over the past 15–20 years. Every natural language generation system has to talk about things, and in order to do so it has to determine how to refer to the things it wants to talk about. This may seem relatively straightforward when the entities to be talked about have names or possess other unique identifiers – so-called **rigid designators** (Kripke, 1980) – as is the case for people and certain other special types of entities, such as cities, newspapers, or ships. In such cases, we can usually assume that the use of the name or identifier will be enough to pick out the entity in question. However, most entities in the world do not have unique names; in the absence of a unique name, in order to refer to such an entity, the generator is faced with the task of constructing a description that allows the hearer to identify the intended referent. The process is necessarily a constructive one, or at least one of choice among a number of possibilities, since what counts as an appropriate form of reference will depend on contextual factors. Determining what description to use is the problem of referring expression generation.

As human users of a natural language, we are faced with this task countless times every day. Suppose, for example, we are in a meeting, and I am drawing a diagram on a whiteboard. While carrying out this exercise, I discover that I need to use a different color to highlight some aspect of my diagram, and so I decide to ask you to pass me a particular whiteboard pen that is out of my reach on the other side of the table. If there are a number of other whiteboard pens on the table, and other ones scattered around the room in other locations, a bare request of the form *Could you pass me the whiteboard pen?* is unlikely to do the job. I need to identify for you the particular pen I want you to pass to me, and to do so, in the

dropping previous generalizations in order to make new ones.

See also: Abstraction; Data and Evidence; French; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Subjects and the Extended Projection Principle; Word Order and Linearization.

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As human users of a natural language, we are faced with this task countless times every day. Suppose, for example, we are in a meeting, and I am drawing a diagram on a whiteboard. While carrying out this exercise, I discover that I need to use a different color to highlight some aspect of my diagram, and so I decide to ask you to pass me a particular whiteboard pen that is out of my reach on the other side of the table. If there are a number of other whiteboard pens on the table, and other ones scattered around the room in other locations, a bare request of the form *Could you pass me the whiteboard pen?* is unlikely to do the job. I need to identify for you the particular pen I want you to pass to me, and to do so, in the

absence of an associated pointing gesture – suppose both my hands are occupied – I need to formulate a verbal description of this pen that allows you to determine which pen I have in mind. The pen has many properties that I could use in such a description, including some that are intrinsic to the pen (the fact that it is red, that it is of a particular brand, and so on), and some that it possesses by virtue of its relationship to other entities (the fact that it is nearer to you than it is to another colleague, the fact that it is on the table rather than on the floor, and so on). Which of these properties it is most appropriate to use in my description will depend on a range of contextual factors, including what other entities are in the environment, and what knowledge I might believe you to have of the entity in question. For example, I might say *Could you pass me the pen that Bill brought yesterday?* but this is appropriate only if I have reason to believe that you are aware of the provenance of the pen. Of course, as humans, we are normally able to carry out the task of producing an appropriate and effective identifying description with apparent effortlessness. The goal of researchers interested in natural language generation is to design algorithms that can achieve the same end results.

A More Formal Characterization of the Problem

From the point of view of computational implementation, natural language generation (NLG) is generally conceived of as a process that involves many subtasks, including **content determination**, **text planning**, **sentence planning**, **lexicalization**, and **grammatical realization**. Yorick Wilks is credited with the observation that, if natural language understanding is like counting from one to infinity, then natural language generation is like counting from infinity to one: in every one of the subtasks that make up NLG, a key problem that presents itself is the question of what kind of input to take as a starting point. For each subtask, the lack of an agreed consensus on the answer to this question is a major stumbling block to the consolidation of research results from different perspectives. For example, it is difficult to compare the merits of two components that carry out grammatical realization – the process of producing a syntactic structure, given some input semantic structure that contains the content to be conveyed – if the two components embody different views as to what a semantic structure should contain. The task of referring expression generation stands out from among these other subtasks in that there is a widely agreed starting point. It is probably this fact more than any other that has contributed to the level of interest in addressing this particular research problem.

The bulk of research in the generation of referring expressions takes as given the following assumptions:

- We have a domain that consists of a collection of entities, identified by symbolic identifiers, such as e_1 through e_n.
- The entities in the domain are characterized in terms of a set of attributes and the values that the entities have for these attributes; so, for example, our knowledge base might represent the fact that entity e_1 has the value pen for the attribute type, and the value red for the attribute color, where the symbols used to designate attribute values correspond to conceptual or semantic elements rather than to surface lexical items. We will use the notation ⟨*attribute*, *value*⟩ for attribute–value pairs; for example, ⟨color, red⟩ indicates the attribute of color with the value red.
- In a typical context, when we want to refer to some e_1, which we call the intended referent, there will be other entities from which the **intended referent** must be distinguished; these are generally referred to as **potential distractors**.

The goal of referring expression generation is therefore to find some collection of attributes and their values that distinguish the intended referent from all of the potential distractors in the context. If such a collection of attributes and their values can be found, then it serves as a **distinguishing description**. Formally, we can characterize this as follows:

> Let r be the intended referent, and C be the set of distractors; then, a set L of attribute–value pairs will represent a distinguishing description if the following two conditions hold:
> - C1: Every attribute–value pair in L applies to r: that is, every element of L specifies an attribute–value that r possesses.
> - C2: For every member c of C, there is at least one element l of L that does not apply to c: that is, there is an l in L that specifies an attribute value that c does not possess; l is said to *rule out* c.

We can think of the generation of referring expressions as being governed by three principles, referred to by Dale (1992) as the principles of **adequacy**, **efficiency**, and **sensitivity**; these are Gricean-like conversational maxims (Grice, 1975) framed from the point of view of the specific task of generating referring expressions. The first two of these principles are primarily concerned with saying neither too much nor too little: the principle of adequacy requires that a

referring expression should contain enough information to allow the hearer to identify the referent, and the principle of efficiency requires that the referring expression should not contain unnecessary information. The principle of sensitivity, however, has a different concern: it specifies that the referring expression constructed should be sensitive to the needs and abilities of the hearer or reader. Accordingly, the definition of a distinguishing description specified here should really include a third component:

- C3: The hearer knows or can easily perceive that conditions C1 and C2 hold.

In other words, the hearer must realize that the distinguishing description matches the intended referent and none of the potential distractors, and ideally this realization should not require a large perceptual or cognitive effort on the hearer's part.

In broad terms, the task of referring expression generation is assumed to fall within the overall architecture of a natural language generation system in the following manner. We generally assume that some prior stage of processing has determined what speech acts and embedded propositions should be expressed in the surface form output, whether written or spoken. For example, the referring expression generator might be invoked when we have an input structure corresponding to something like request(h, pass(h, s, e_1)), where h is the hearer, s is the speaker, and e_1 is some entity: in other words, the speaker has determined that it wants to produce an utterance that requests the hearer to pass the speaker the entity in question. An appropriate utterance corresponding to this structure might begin *Please pass me* . . . . The provenance of the input structure is not considered to be of relevance to the task of referring expression generation, but typically is the responsibility of the sentence-planning component, and linguistic realization will be responsible for fleshing out the embedded proposition in an appropriate syntactic form, such as the request described here. The task of referring expression generation is to decide how to refer to the entities in the proposition. Note that, strictly speaking, this includes determining how to refer to both the hearer and the speaker. The chosen syntactic form in this case rules out the need for an explicit reference to the hearer, and we will assume that the choice of the third-person singular personal pronoun to refer to the speaker is straightforward; in reality, however, things may not always be so simple.

If we leave aside those cases in which the intended referent has a unique name, the task can be thought of, in Fregean terms, as mapping from a referent to something like a sense (Frege, 1892). Generally speaking, the output of the process is seen as being a fragment of semantic content, rather than as a collection of lexical elements; the lexicalization of the chosen semantic material is considered to be a separate and subsequent task. This allows the later process to make further and more surface-oriented choices; for example, once the content of a description has been chosen, surface realization might then still have the option of realizing that description as either *the red pen* or *the pen that is red*. This view makes the referring expression generation task one of content determination, and raises some questions as to where this process is best located within the natural language generation task as a whole: generally, we think of content determination as having taken place before (for example, sentence planning). This question and its ramifications merit further exploration, but this is beyond the scope of this article.

Approaches to the Problem

Early Work

As noted previously, the generation of referring expressions is a component task in almost all NLG systems. Discussion of issues that arise in the broader context of NLG system construction can be found in the seminal early works of Davey (1979), McDonald (1980), and McKeown (1985). However, in each of these cases, the generation of referring expressions was only one of many tasks the authors tried to address, and so the problem was necessarily only touched on, and not given an extensive treatment. The first major work to look specifically at the problem of referring expression generation was that of Appelt (1985). This work contained many insights into the range of problems that a thoroughgoing solution to the problem needs to consider, placing the task firmly within the framework of speech acts (Searle, 1969). Following other work that has attempted to model speech acts by means of artificial intelligence (AI)-style planning operators, Appelt developed a plan-based approach to constructing references, whereby the speaker reasons about the effects on the hearer by using particular elements of content in a referring expression.

Producing Minimal Distinguishing Descriptions

The early works of Davey, McDonald, McKeown, and Appelt clearly established the need to view the generation of referring expressions as a specific task

to be addressed within a generation system. However, none of these works provided a formally well-specified algorithm for carrying out the task. The principle of efficiency outlined previously suggests that, other things being equal, we desire an algorithm that will deliver a referring expression that mentions as few attributes as possible: a minimal distinguishing description. From the point of view of computational complexity, the problem of constructing a **minimal distinguishing description** is equivalent to finding the minimal size set cover. In computational complexity theory, this problem is known to be NP-hard (Garey and Johnson, 1979), and any such algorithm is probably computationally impractical when entities have any more than a small number of properties that might be used in descriptions. Much of the work in providing algorithms for referring expression generation has therefore been concerned with finding heuristic workarounds that avoid these computational complexity issues.

There is insufficient space here to consider each of the algorithms in the literature in detail; however, to provide a flavor of what such algorithms contain, we show here the first of the fully specified algorithms to appear, as published in Dale (1992); this has served as a starting point for many of the subsequently proposed algorithms. The algorithm, which is essentially a variant of Johnson's greedy heuristic for minimal set cover (Johnson, 1974), is as follows:

Let L be the set of properties to be realized in our description; let P be the set of properties known to be true of our intended referent r, where a property is a combination of an attribute and a value for that attribute; and let C be the set of potential distractors as defined earlier. The initial conditions are thus as follows:
$C = \{\langle \text{all distractors} \rangle\}$;
$P = \{\langle \text{all properties true of } r \rangle\}$;
$L = \{\}$.

In order to describe the intended referent r with respect to the set C, we do the following:

1. Check Success:
   if $|C| = 0$ then return L as a distinguishing description
   elseif $P = \emptyset$ then **fail**
   else goto Step 2.
2. Choose Property:
   for each $p_i \in P$ do: $C_i \leftarrow C \cap \{x | p_i(x)\}$
   Chosen property is p_j, where C_j is the smallest set.
   goto Step 3.
3. Extend Description (with respect to the chosen p_j):
   $L \leftarrow L \cup \{p_j\}$; $C \leftarrow C_j$; $P \leftarrow P - \{p_j\}$
   goto Step 1.

To see how this works, suppose we have a context that contains the following entities with the properties indicated, and that the intended referent is e_1:

e_1: ⟨type, pen⟩, ⟨color, red⟩, ⟨brand, Staedtler⟩, ⟨size, large⟩
e_2: ⟨type, pen⟩, ⟨color, blue⟩, ⟨brand, Staedtler⟩, ⟨size, small⟩
e_3: ⟨type, pen⟩, ⟨color, red⟩, ⟨brand, Stabilo⟩, ⟨size, large⟩
e_4: ⟨type, pen⟩, ⟨color, green⟩, ⟨brand, Staedtler⟩, ⟨size, large⟩

Here, the property of being red rules out more distractors than does any other property possessed by e_1: it rules out both e_2 and e_4, whereas the brand and size attributes only rule out one distractor each, and the type attribute has no impact at all. We still then have to add additional information to rule out e_3: here, size does not help, but adding the brand does what is needed. On the other hand, if the intended referent was e_2, the color or size alone would be sufficient, and if the intended referent was e_3, the brand alone would be sufficient. Verifying that the algorithm does indeed provide these results is left as an exercise for the reader. In reality, since noun phrases always (or almost always) contain head nouns, the head noun indicating type is also incorporated into the resulting description, and for completeness the algorithm given here would have to be augmented to ensure this.

The algorithm here is intended to be quite general and domain independent; wherever we can characterize the problem in terms of the basic assumptions laid out earlier, this algorithm can be used to determine the content of context-dependent referring expressions. However, the algorithm also suffers from some limitations:

- As stated, it may satisfy the principles of adequacy and efficiency, but it does not pay heed to the principle of sensitivity: there is no guarantee that the properties selected will even be perceptible to the hearer. In the preceding scenario, for example, if the labels that indicate the brands of the pens are face down on the table, and the pens have no other brand-distinguishing characteristics, then the brand information is of no real value for the hearer.
- The algorithm only makes use of one-place predicates (such as the fact that our whiteboard pen is red), but as already noted, we can also make use of relational properties (such as the fact that the pen is on the table rather than on the floor) when describing entities.

Since this early algorithm was developed, a wide range of alternatives have been proposed, either to address these particular problems or to extend the coverage of the algorithms in other ways.

More Efficient Algorithms

Although the algorithm described here avoids the computational complexity of a literal interpretation of the principle of efficiency, it is still a relatively expensive way of computing a description. A second algorithm for referring expression generation that has had widespread influence is Dale and Reiter's (1995) incremental algorithm. This algorithm has three distinctive properties. First, the algorithm sacrifices the goal of finding a minimal distinguishing description in the interests of efficiency and tractability. It does this by considering the attributes that might be used in a description in a predefined order. This means that on occasion it may include a property with a discriminatory power that is made redundant by some subsequently incorporated property; however, Dale and Reiter argued that this is not necessarily a bad thing, since human-generated referring expressions also often contain informational redundancy (see, for example, Pechmann (1989)). It remains to be seen whether the algorithm provided by Dale and Reiter provides the same *kinds* of redundancies as those produced by humans.

Second, although the incremental algorithm contains a domain-independent, and therefore quite generally applicable, algorithm for building up the content of a referring expression, it does so by reference to a predefined list of properties, the content of which is dependent on the domain. This provides a convenient balance between generality and domain specificity. Third, when the algorithm considers whether a given property would be useful to include in a description, it carries out a check to determine whether the property in question is one that the hearer would be able to make use of in identifying the referent. In so doing, it also explicitly aims to address the principle of sensitivity. The incremental algorithm has served as the basis for a number of other algorithms in the literature.

Referring to Entities Using Relations

Another deficiency (noted previously) with respect to the greedy heuristic algorithm was that it could only make use of one-place predicates in determining which attributes of an entity to use in its description. The reason for this limitation is to avoid adding significant complexity to the algorithm: if we want to build referring expressions of the form *the red pen next to the coffee cup*, note that the entity to which we are relating the intended referent (in this example *the coffee cup*) is itself an entity for which we have to construct a referring expression. Once the generator decides that some other entity has to be introduced in order to identify the intended referent, a recursive call to the process of referring expression generation is required. There is clearly the scope here for an infinite regress, as in *the red pen next to the coffee cup next to the red pen next to the coffee cup next to* . . . . In informal terms, it would appear to be straight forward to deal with such cases appropriately, but capturing the required behavior algorithmically is a little more difficult.

As a solution, Dale and Haddock (1991) proposed an algorithm based on constraint satisfaction. This effectively builds up collections of properties for each of the entities to be described in parallel, and determines when the properties (or more precisely, the relations) used to describe one entity also support the identification of another entity. Krahmer *et al.* (2003) have proposed a solution based on viewing the domain of entities, properties, and relations as a labeled graph, with the problem of referring expression generation then being one of constructing an appropriate subgraph. This provides a very elegant solution to the problem, with well-understood mathematical properties.

Logical Extensions: Sets, Booleans, and Quantifiers

So far, we have pointed to algorithms that permit the use of both one-place predicates and relations in the construction of referring expressions. Although this provides for a wide range of possibilities, it still does not encompass all of the devices that humans use in constructing referring expressions. Notably, the algorithms discussed so far assume that the intended referent is a singular individual, and that it is to be picked out by the logical conjunction of the properties in the description. There are, of course, other possibilities here. We may sometimes need to refer to sets of entities (*Please pass me all the pens*), and it may sometimes be convenient to refer to entities not just in terms of conjunctions of properties, but also via other Boolean possibilities, such as the use of negation and disjunction. To return to our earlier example, it might in some circumstances be most appropriate for me to say *Please pass me the red pen that hasn't run out of ink*; and in cases in which we want to refer to a set of entities, there may be no property that is shared by all the intended referents, requiring an expression such

as *the red pen and the blue pen*. These ideas are explored in detail in van Deemter (2002), who presented generalizations and extensions of the incremental algorithm that cater to these possibilities. Creaney (2002) offered an algorithm that allows the incorporation of logical quantifiers, such as *all* and *some*, into descriptions.

Broader Issues and Outstanding Problems

In the foregoing discussions we have surveyed, albeit very briefly, the major aspects of referring expression generation that have been the focus of attention in the development of algorithms over the past 15 years. There are many other algorithms in the literature beyond those presented here, but the problems addressed are essentially the same. In this final section, we turn to aspects of the problem that have not yet received the same level of detailed exploration.

Other Forms of Anaphoric Reference

We have focused here on the construction of definite descriptions: references to entities that are in the common ground, either by virtue of their presence in the environment or because they have already been introduced into the discourse. Definite descriptions are not the only form of anaphoric reference: we can, of course, also use pronouns such as *it* and *one*-anaphoric expressions such as *the red one* to identify intended referents. Although the literature does contain some work on generating these forms of reference, they have not received the degree of attention that has been lavished on definite descriptions, and in particular there has been little work that has seriously attempted to integrate the various forms of reference in a unified algorithmic framework. Other forms of definite reference have also been neglected: in particular, there is no substantive work that explores the generation of associative anaphoric expressions, such as the use of a reference like *the cap* in a context in which the hearer can infer that this must be a first mention of the cap of a particular pen that is already salient in the discourse.

Initial Reference

An even more striking gap in the literature is any serious treatment of initial reference, as opposed to subsequent or anaphoric reference. Subsequent references to entities have a tendency to reuse information used in earlier references; so, for example, I might introduce an entity as *that Stabilo pen on the table* and subsequently refer to it as *the Stabilo pen*. The generation literature not only tends to ignore this influence of the initial form of reference on subsequent referring expressions, but is in general quite silent on the problem of how initial references can be constructed. There are a great many ways in which I might refer to a specific entity when introducing it into the discourse, and when we move beyond simple examples of collections of similar objects, as are often used in the literature, it becomes clear that the form of initial reference used has a lot to do with the purpose of the discourse and other aspects of the discourse context. Thus, my decision as to whether to introduce someone into the discourse as *a man I met at the bus stop*, or *a mountain climber I met last night*, or *an interesting guy I met*, will depend on what I have planned in terms of content for the rest of the discourse. The complexities of planning and reasoning required to explain how this selection process works are far beyond our current understanding.

The Pragmatics of Reference

Following on from the previous point, relatively little work has looked at the broader context of reference, and in particular the fact that, when we construct a referring expression, we may be doing many things simultaneously and attempting to achieve a variety of purposes. Building on the earlier explorations of Appelt (1985), the work of Kronfeld (1990) is a notable exception here, but we lack a worked-out computational theory of how reference functions within the wider context of language use, and, in particular, we have no formally well-specified explanations of the variety of purposes of reference. The bulk of the work in the field has focused on referring expressions as linguistic devices to distinguish intended referents from other entities in a given context, but this is a rather narrow and low-level view. We also use reference to maintain topic, to shift topic, to introduce contrasting entities, and to navigate a hearer's focus of attention in various ways, among a range of other higher level purposes. These are all relatively unanalyzed notions from a formal perspective, and the relationships between them need to be worked out more clearly before we can say that we have a proper computational theory of the use of reference and the part it plays in language. As is often the case, approaching this problem from the perspective of natural language generation may provide insights

that can also enrich our understanding of natural language analysis.

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Generative Grammar

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Like many linguistic terms, the phrase 'generative grammar' means different things to different practitioners of linguistics. The term 'grammar' itself can be loosely defined as the set of rules that accurately describe the combination of elements in a language. A properly 'generative' grammar is, roughly speaking, a grammar whose rules generate (i.e., produce) all and only the correct combinations of elements in a language. This definition corresponds to the use of generative grammar as a common noun. However, the term 'generative grammar' gradually received a much broader meaning as a proper noun, referring to the specific research program that is associated with the mentalist approach to language launched and developed by Noam Chomsky. In this article, the basic characteristics of both meanings of generative grammar are sketched, and the relationship between them is elucidated.

The narrower, common noun meaning of the term 'generative grammar' originates in mathematical recursive function theory and is also used in computer science. A generative grammar, then, is one of two types of formal grammars, generative and analytic. Such a formal grammar comprises a set of rules, which in turn define a possibly infinite set of finite strings composed of a set of fixed elements. These elements need not be words of natural language; they may be any kind of symbol.

A classical generative grammar contains four components: (1) a finite set of nonterminal symbols, (2) a start symbol contained in the set of nonterminal symbols, (3) a finite set of terminal symbols, and (4) a finite set of production rules that rewrite a (string containing at least one) nonterminal symbol into a string of terminal and/or nonterminal symbols. Rules

that can also enrich our understanding of natural language analysis.

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Generative Grammar

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Like many linguistic terms, the phrase 'generative grammar' means different things to different practitioners of linguistics. The term 'grammar' itself can be loosely defined as the set of rules that accurately describe the combination of elements in a language. A properly 'generative' grammar is, roughly speaking, a grammar whose rules generate (i.e., produce) all and only the correct combinations of elements in a language. This definition corresponds to the use of generative grammar as a common noun. However, the term 'generative grammar' gradually received a much broader meaning as a proper noun, referring to the specific research program that is associated with the mentalist approach to language launched and developed by Noam Chomsky. In this article, the basic characteristics of both meanings of generative grammar are sketched, and the relationship between them is elucidated.

The narrower, common noun meaning of the term 'generative grammar' originates in mathematical recursive function theory and is also used in computer science. A generative grammar, then, is one of two types of formal grammars, generative and analytic. Such a formal grammar comprises a set of rules, which in turn define a possibly infinite set of finite strings composed of a set of fixed elements. These elements need not be words of natural language; they may be any kind of symbol.

A classical generative grammar contains four components: (1) a finite set of nonterminal symbols, (2) a start symbol contained in the set of nonterminal symbols, (3) a finite set of terminal symbols, and (4) a finite set of production rules that rewrite a (string containing at least one) nonterminal symbol into a string of terminal and/or nonterminal symbols. Rules

apply in any order and any number of times until all nonterminal symbols are rewritten as strings of terminal symbols. The set of strings with terminal symbols that can be generated this way is called the 'language' generated by the grammar. Generative grammars can be classified into four types conforming to the so-called Chomsky hierarchy. These types differ by an increasingly stricter format for production rules and concomitantly fewer formal languages. In this formal sense, the term 'grammar' is therefore used only by analogy with the term 'grammar' in natural languages.

Take a generative grammar that consists of the set of nonterminal symbols {X,Y} with X the start symbol, the set of terminal symbols {a,b}, and the rules X → aYb, Y → Xb, and Y → ba. The arrow inside the rules carries the instruction 'is rewritten as.' Applying X → aYb, followed by an application of Y → Xb yields the intermediate string a**Xb**b. This string still contains a nonterminal symbol. Therefore, it requires reapplication of the rule X → aYb (yielding a**aYb**bb) and subsequently the rule Y → ba to yield a string that consists solely of terminal symbols, in this case aa**ba**bbb. This grammar also generates other strings (infinitely many, in fact), which together constitute the language of this particular generative grammar.

This formal apparatus provides a powerful tool for analyzing natural language. The set of terminal symbols, then, contains the vocabulary of a natural language, say, English. The set of nonterminal symbols contains word class labels (noun, verb, etc.), as well as larger syntactic units, such as noun phrases and sentences. The largest syntactic unit, the sentence, can be taken as the nonterminal start symbol. The production rules of a descriptively adequate grammar generate the set of sentences that an English speaker would understand as uniquely English, and they fail to generate sentences and phrases that are not judged to be proper English by such a speaker. An English speaker will readily accept *the red book* as a grammatical unit, but not **the book red*. A more traditional description would then state that in English, adjectives end up in front of nouns and do not appear after them. In a generative grammar of English, this descriptive fact is a result of the order specified in the rewriting rule. In this rule, a noun phrase (NP) is rewritten as a string in which the Determiner (Det) is followed by the adjectival phrase (AP) and the noun (N) in that order: NP → Det AP N. Replacing the nonterminal symbols Det, AP, and N by *the*, *red*, and *book* respectively yields *the red book*. By contrast, the rewriting rule that makes adjectives end up after nouns (NP → Det N AP) is not part of the generative grammar of English. The grammar thus provides a fully explicit syntax of English, rather than the informal or implicit characterization often found in traditional grammars. English speakers have rules that allow them to generate an infinite number of new sentences by using a finite vocabulary, and to interpret entirely new combinations of words. A generative grammar can be recursive: the output of one application of a rewrite rule can serve as the input for a later application of the same rule. This mechanism of recursion is also active in natural language; it is responsible for such sequences as *the sister of the brother of the grandfather of the niece of an acquaintance of my aunt*, which can in principle be infinitely extended by recursion, limited only by performance factors.

Applying this line of thinking in a mentalist context, Noam Chomsky in the late 1950s revolutionized the way of looking at natural language. The study of language could reveal "abstract principles that govern its structure and use, principles that are universal by biological necessity and not mere historical accident, that derive from the mental characteristics of the species" (Chomsky, 1975: 3). The computationally 'generative' properties of the grammars of natural languages, and more in particular the property of recursion, is one instance of such abstract, universal, biologically necessary characteristics of the grammars developed by the human species. It should be noted, however, that it is perfectly possible to study properties of formal generative grammars outside of the mentalist context, i.e., generative grammars can be part of nonmentalist approaches to grammar.

Nevertheless, the school of thought on the mentalist nature of language developed by Chomsky and his followers came to be known – rather misleadingly and somewhat erroneously – under the popular name 'generative grammar' or 'generative linguistics,' this time used as a proper noun. In this much broader meaning, the name should be taken as no more than an expedient, historically motivated *pars pro toto*, encompassing not only syntax but a mentalist model of grammar also comprising phonology, morphology, and semantics. Accordingly, this school of thought is not limited to finding the generative grammar generating all and only the grammatical sentences of a language in the formal sense defined earlier in this article. Perhaps even more surprisingly, however, the model of generative grammar (as a proper noun) developed in the Minimalist program does not even contain a generative grammar in the common noun sense. Rewriting rules have been entirely dispensed

with in favor of more elementary, structure-building operations. Thus, the proper noun meaning of 'generative grammar' has entirely outgrown the common noun meaning. Understandably, then, Chomsky himself opposes the use of 'generative grammar' to describe his approach to language, preferring terms such as the rather laborious 'principles and parameters framework' or the succinctly elegant 'biolinguistics.' Despite such opposition, the term is in widespread use as representing the scientific paradigm that has dominated theoretical linguistics for the past 50 years. The remainder of this article is therefore devoted to characterizing generative grammar as a proper noun in the sense already defined.

The approach to language initiated by Chomsky is radically *internalist*. Language is viewed as a species-specific property, part of the mind/brain. The object of study of linguistics as a part of cognitive science is this mental faculty for language. Chomsky radically equates linguistic theory with the study of *I(nternal)-language,* language as an internal cognitive structure. A theory of grammar is a model of the speaker's linguistic competence, part of the internal structure of his mind. A speaker of a language has internalized a system of rules relating sound to meaning in a particular way. The task of the theoretical linguist is to describe and explain the linguistic competence of a native speaker, the linguistic knowledge of language present in the minds of individuals. A linguist construes hypotheses concerning this internalized system. *E(xternal)-language* is not part of the theory of language and comprises sundry approaches to language as it is used in society, literature, or communication.

The fact that any child can acquire any of the 6000 or so languages in the world in a relatively short period of time and under imperfect input conditions gives rise to the *Innateness Hypothesis*. This hypothesis encapsulates the claim that some set of fundamental characteristics of all human languages must be the same, and part of the *Language Faculty.* The faculty of language is part of the human biological endowment. Children are born with a faculty of language in its Initial State, i.e., the state of the faculty of language before it is exposed to the input of a particular language. This innate knowledge is sometimes called *Universal Grammar.* Language acquisition requires interaction with the environment, in the same way birds need interaction with the environment to 'learn' how to fly or sing. It is assumed that particular properties of Universal Grammar are parametrized, hence the term Principles and Parameters framework. Particular choices for each parameter of UG lead to specific grammars of individual languages. The Initial State is therefore progressively replaced during acquisition with grammars that come to resemble the Steady State, i.e., the internalized grammar of the language of a given adult speaker.

See also: Chomsky, Noam (b. 1928); Cognitive Science: Overview; Communicative Competence; Performance Factors in Spoken Discourse; Principles and Parameters Framework of Generative Grammar; Recursion.

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phonetic distance and allow a formal study of natural classes in which the plausibility of a rule is reflected in the relative simplicity of its statement. Concern for simplicity and formal statement became a cornerstone of the generative approach.

Chomsky and Halle's landmark study *Sound Pattern of English* (1968) (SPE) is the first systematic exposition of generative phonology. A key feature was to take seriously the notation in terms of which sounds are represented and rules are formulated. SPE's analysis of the English Vowel Shift and Velar Softening illustrate these points well. Alternations among [aj] ≈ [i] (*divine*, *divin-ity*), [ij] ≈ [e] (*serene*, *seren-ity*), and [ej] ≈ [æ] (*profane*, *profan-ity*) pervade English vocabulary. Because the short vowels of *rig**i**d*, *perpet**u**-al*, and *fin**a**l* (cf. *rigid-ity*, *perpetuity*, *final-ity*) are stable, the long vowel must underlie the [aj] ≈ [i], [ij] ≈ [e], [ej] ≈ [æ] alternations. But the underlying quality of the vowel is reflected in the short variant. Hence, SPE posits underlying /i:/, /e:/, and /æ:/ and two ordered rules. The first rule shortens the vowel before certain suffixes. Any remaining long vowels are diphthongized and then rotate their nuclei by two rules: the first interchanges high and mid /i/ and /e/ by changing [αhigh] to [−αhigh]; the second interchanges mid (derived from high by the first change) and low vowels by changing [αlow] to [−αlow]. Thus, in the derivation of *divine* the high vowel switches places with the mid vowel of *serene* and then with the low vowel of *profane* (**Figure 2**).

This vowel interchange defined a new category of sound change, and SPE devoted a chapter to its documentation in the historical development of English. Although stunning in itself, the analysis of the Vowel Shift allowed linguists to make sense of a variety of consonantal changes as well. For example, /k/ is replaced by /s/ before suffixes beginning with /i/: *critic*, *critic-ism*; *medic*, *medic-ine*. But the trigger in *critic-ise* is a back vowel [aj] at the phonetic surface. However, if Velar Softening applies before Vowel Shift (to /kritik-i:z/), then the latter is not exceptional at all. On the strength of such analytic insights resting on a formally explicit methodology, SPE was universally regarded as a tremendous theoretical and descriptive advance.

/devi:n/	/sere:n/	/profæ:n/	Phonological representation
ij	ej	æj	Diphthongization
ej	ij	—	[αhigh] → [-αhigh]
æj	—	ej	[αlow] → [-αlow]

Figure 2 Derivations of *divine*, *serene*, and *profane*.

The generative methodology in which systematic alternations are derived from a common underlying form by an ordered set of rules was successfully applied to such well-known languages as Russian, Japanese, French, and Spanish by Chomsky and Halle's first generation of graduate students. A critical mass of detailed analyses from the generative perspective accumulated that uncovered numerous problems and research questions – many of them still unresolved. We mention four here.

Paul Kiparsky (1968, 1971) pointed to the excessive abstractness of many analyses adhering to the generative method, raising the question of how a learner could arrive at such rules and representations in the absence of knowledge of their historical antecedents. He suggested that abstract representations are motivated by alternations and that grammars change to states in which the underlying representations can be induced by rules that state generalizations over the surface phonetic representation.

Charles Kisseberth (1970) called attention to various rules in the phonology of Yawelmani that conspire to ensure that the output does not contain three successive consonants. The language lacks roots of this structure; and when stems and suffixes are combined to create CC + C or C + CC sequences, various rules come into play that either delete one of the consonants or insert a vowel. Moreover, another rule elides a vowel in the context VC__CV; it can be understood as a more general V → Ø process that is blocked just in case its output would violate *CCC. With its emphasis on formal connections among rules, the SPE model was unable to express the functional unity among these diverse processes. More generally, it was unclear how to formalize the notion of rules applying or blocking to satisfy a constraint.

David Stampe (1979) emphasized the importance of substantive rather than formal considerations in shaping phonological structure. He tried to make sense of two puzzles in acquisition. Languages such as Catalan, Russian, and German have a process devoicing word-final obstruents. Acquisition studies fail to detect a stage in which the child pronounces final [b, d, g], reflecting incomplete mastery of the rule. Rather, child speech conforms to the process from the outset. More significantly, child language is rife with sound changes that lack any precedent in the mature grammar. The sound substitutions of child phonology are thus hard to understand as immature versions of the rules of adult grammar. According to Stampe, they reflect a set of innate processes that are curtailed in the process of language acquisition so that the child's output matches the ambient language. Stampe also drew a sharp distinction between such natural processes and more phonetically arbitrary

rules such as SPE's Vowel Shift and Velar Softening that state generalizations over limited sets of lexically related words. In his view, phonological processes are what the child brings to the language, whereas phonological rules are what the language's vocabulary brings to the child.

Finally, with its emphasis on rules of sound change, the SPE model has little to say about phonotactics – static constraints on word shape that are unsuited to rules of sound change and seem best treated as conditions on representation that outputs must respect. Kenstowicz and Kisseberth (1976) called attention to the problem that constraints on lexical shape are often duplicated by rules of sound change that can be thought of as bringing the representation in line with the constraint. This point of view was explored by Sommerstein (1974).

Enriched Representations: 1975–1990

The SPE model has a simple representational format: An utterance is a string of feature matrixes punctuated by boundary symbols of various kinds to indicate stem, morpheme, word, and phrase junctures. Rules changing feature structure in a local context are ill suited to the phonology of tone, stress, and length. These suprasegmentals became the object of intensive scrutiny that had a profound effect on how all sounds are represented and manipulated by the rules of grammar.

The tonal languages of Africa proved particularly perplexing. Although phonetically expressed as a vocalic feature, a tone's phonological behavior is largely autonomous from the segmental string. For example, in Mende lexical items belong to a limited number of tonal melodies such as high (*kɔ́* 'war,' *pélé* 'house,' *háwámá* 'waist') or falling (*mbû* 'owl,' *ngílà* 'dog,' *félàmà* 'junction'). The problem is to express the generalization that the falling tone is restricted to monosyllables and breaks into H + L under suffixation (cf. *mbú-mà* 'on owl'). If tone is a segmental feature analogous to [labial] or [nasal], then complicated rules are required to transform [+fall] to [+hi] followed by [−hi]. Also, in tonal languages, when a vowel elides the associated tone typically shifts to an adjacent syllable (cf. Margi (Marghi Central) *kúm-árì* 'meat (DEF)' and *wù* 'tree,' *wǎ̀rì* 'tree (DEF)' from /wù-árì/.

Building on the work of Wil Leben, Edwin Williams, and others, John Goldsmith (1976) made a significant breakthrough on this problem by proposing that tonal features be represented on a separate level (tier) associated with, but autonomous from, the segmental tier. Conditions governing a well-formed association of tones and vowels such as one-to-one, left-to-right mapping and no unassociated tones or vowels derive the surface patterns via simple rules operating in local environments (Figure 3A–B). And if tones are autonomous then vowels can delete while a tone persists on its own tier and maps to an adjacent syllable to ensure maximal association (Figure 3C).

Stress poses similar locality questions. For example, English words with final primary stress such as *T'enness'ee* invert their Weak-Strong contour when followed by a stronger stress: *T'ennessˈee W''altz*. If stress is represented as a feature, the final syllable must be demoted in value ([1stress] → [2stress]), while the first is raised ([2stress] → [1stress]). One never finds [nasal] or [back] exhibiting such long-distance complementary changes. Mark Liberman (1975) and Liberman and Prince (1977) made another conceptual advance by seeing stress as the reflection of an abstract property of prominence formalized in terms of a metrical grid in which each syllable is associated with a column of marks indicating its relative prominence in the word or phrase. With this notation, the inversion can be described by a simple rule that slides the top element of the weaker of the two clashing stresses to the next available landing site – the first syllable – to create a rhythmically more balanced contour in which two stronger stresses are separated by a weaker one (Figure 4).

Finally, although the 'syllable' was mentioned throughout the analysis of English in SPE, the notion had no formal status in the theory. Various researchers proposed that syllables could be represented by boundary symbols analogous to word junctures in

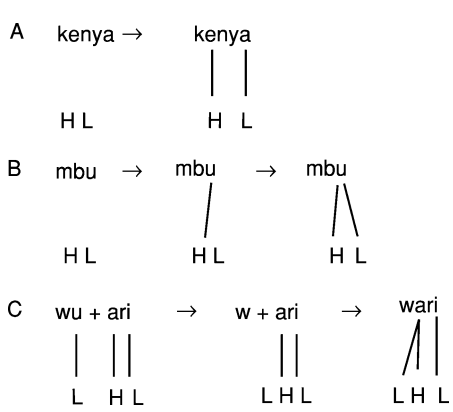

Figure 3 Autosegmental mapping of tones.

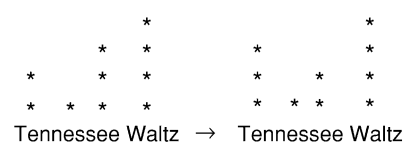

Figure 4 Grid notation for stress inversion.

Table 1 Arabic morphology

/d-r-s/		/ħ–m-l/	
daras-a	'he studied'	ħamal-a	'he carried'
dars-un	'a lesson'	ħiml-un	'a load, cargo'
darraas-un	'student'	ħammaal-un	'porter'
daaris	'studying'	ħaamil	'carrying'

Table 2 Turkish data

Accusative	*Nominative*	*Ablative*	*Gloss*
zamaan-ɨ	zaman	zaman-dan	'time'
hiss-i	his	his-ten	'feeling'
devr-i	devir	devir-den	'transfer'

order to express the frequent conjunction of preconsonantal and word-final position. Adapting insights of Kenneth Pike and Jerzy Kuryłowicz, Elizabeth Selkirk (1982) proposed that the syllable is a constituent with internal structure of onset and rhyme that organizes the individual phonemes. With the syllable given official grammatical status, rules of vocalic epenthesis (Selkirk, 1981) and consonantal deletion (Steriade, 1982) can be formalized as methods to achieve a parsing of segments in accord with limitations on syllable shape, such as the traditional sonority hierarchy.

The ideas that features appear on autosegmental tiers and that an invisible hierarchical structure underlies words and phrases proved especially fruitful. Much of the generative research of the next 15 years involved extending and exploring the consequences of these proposals. We mention a few highlights.

Bruce Hayes (1980, 1985) analyzed the stress contours from a variety of languages with rules that group syllables into iambic (weak-strong) and trochaic (strong-weak) metrical feet in a left-to-right or right-to-left sweep of the word. Metrical stress research suggested that for restricted areas of phonology Chomsky's Principles and Parameters methodology was appropriate. Other influential studies of metrical stress include Prince (1983), Halle and Vergnaud (1987), and Dresher and Kaye (1990).

The notion of phonological features on separate tiers was extended to a variety of problems. John McCarthy (1979) suggested that the notorious root and pattern morphology of Semitic languages such as Arabic could be formalized analogous to the behavior of tones. As illustrated in Table 1, derivational relations among words are marked by changes in syllabic structure rather than overt affixation: perfects have the shape CVCVC, nominals CVCC, and agentives CVCCVVC. If the radical consonants [drs] 'study' and [ħml] 'carry' are represented on an autosegmental tier, then the same principles that control tonal structure (left-to-right association and multiple linking) can describe the structure of these words. Biradicals such as [md] 'stretch' seem to spread their second consonants to fill out a CVCVC template (cf. *madadna* 'we stretched') comparable to the extension of the L tone in the HL melody of Mende *félàmà*.

Clements and Keyser (1983) proposed extending the CV representation to all languages so that a greater variety of phonological processes could be expressed in autosegmental terms. For example, long consonants and vowels can be represented as one feature matrix associated with two adjacent CV positions. With this notation, changes in quantity involve the addition or deletion of CV slots. Their study demonstrated how the disparate changes of vowel shortening, consonant degemination, and vowel epenthesis illustrated by the Turkish data in Table 2 can be formalized as by-products of the organization of segments into CVC syllables (Figure 5).

The CV tier and, in particular, the possibility of empty skeletal positions intervening between phonetically adjacent segments was investigated in considerable detail by researchers working under the banner of Government Phonology (see Kaye *et al.*, 1990). For example, whereas the SPE model would posit a rule deleting the medial schwa to account for the V ≈ Ø alternation in French *revenir* [rɛvnir] 'to come back' (cf. *revienne* 3 SG. PRES. SUBJUNCTIVE), Government Phonology postulates an empty nucleus [revønir] (Charette, 1990). This approach minimizes the role of rules in favor of constraints on representations – in particular, the distribution of empty elements. The problem was conceived of as parallel to the distribution of empty syntactic elements (traces) in which Chomsky's (1981) notion of proper government was adapted to phonology. More generally, phonological expressions are viewed as sequences of C and V elements organized by syntactic principles based on the concept of government couched within an overarching Principles and Parameters methodology.

Building on observations by Joan Mascaró and K. P. Mohanan, George N. Clements (1985) proposed that features are organized into a hierarchical tree structure, such as in Figure 6. This notation allows formal expression of the observation that certain features introduce subdistinctions within the class of other features rather than partitioning the entire set of speech sounds into two groups of comparable status such as [±consonantal]. For example, the feature [anterior] is only relevant for coronal consonants. More important, the feature tree allows one to formalize the observation of recurrent feature sets

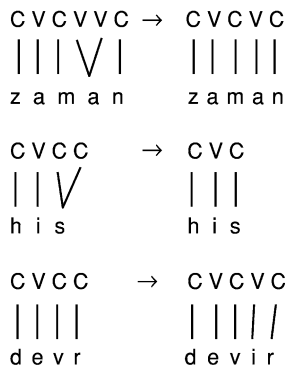

Figure 5 Autosegmental mapping of Turkish data.

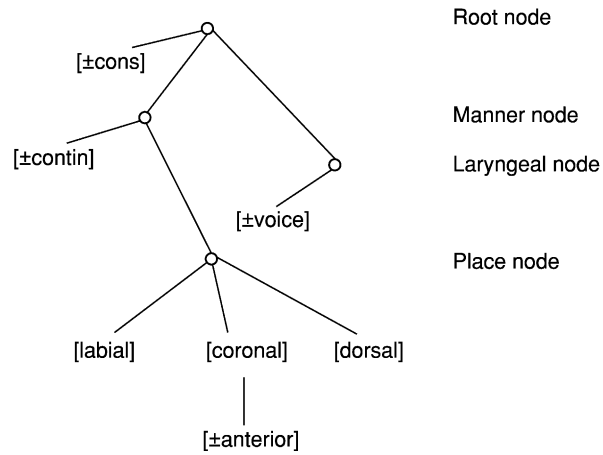

Figure 6 Hierarchical tree structure for features.

in assimilation rules in which, typically, all the subsidiary place features are spread as well.

Also, some sound changes can be treated as deletion and insertion of nodes in the feature tree, for example, debuccalization of $s \rightarrow h$ as the removal of the supraglottal place node, leaving the laryngeal articulator to implement [continuant].

Several other lines of research were inspired by autosegmental-metrical structure. Pierrehumbert (1980) demonstrated that the intonation contours of English can be analyzed as sequences of tones analogous to the melodies found in African languages such as Mende. For example, the rising interrogative contour is composed of a L* pitch accent on the major stressed syllable and a H% boundary tone realized at the end of the intonational phrase. Selkirk (1980, 1986) extended the prosodic hierarchy to include phonological words and phrases so that the domains of sentence-level phonological processes could be defined and studied. McCarthy and Prince (1986/1996) opened up the study of truncatory phenomena such as hypocoristics and reduplication to formal scrutiny. Their Prosodic Morphology hypothesis stated that the templates underlying such structures are not arbitrary sequences of CV slots but rather prosodic categories such as light and heavy syllables and metrical feet whose precise characterization should correspond to how these units function elsewhere in the language. For example, the truncation *Elizabeth* → *Liz* minimizes the base while respecting the requirements on a freestanding English word – a bimoraic foot. Mokilese prefixal reduplication, seen in *pok-poki* 'beat,' *paa-pa* 'weave,' and *koo-kookɔ* 'grind coconut,' converges on a heavy syllable (CVC, CVV), whereas in Diyari (Dieri) the CV(C)CV reduplication template underlying *kanku-kanku* 'boy' and *kulku-kulkuŋa* 'jump,' *tjilpa-tjilparku* 'bird (species)' consists of a disyllabic trochaic foot.

Starting with Baudouin de Courtenay in the 19th century, linguists had the impression that phonological rules fall into two broad classes that are exemplified by the English Velar Softening of *electric* ≈ *electric-ity* vs. the flapping of *write* ≈ *wri-writer*. Rules of the first type have exceptions, substitute contrastive segments, and typically apply at the juncture between morphemes. Rules such as flapping tend to be automatic, may introduce allophones, and may apply morpheme internally (cf. *a*[ɾ]*om* vs. *a*[t^{h}]*omic*). In a pair of influential papers, Paul Kiparsky (1982, 1985) developed a Lexical Phonology model of the grammar that formalized this intuition in an especially perspicuous way. Rules of the first type (lexical rules) are placed inside the lexicon and integrated with the morphology to apply after each rule of affixation. As such, lexical rules are inherently cyclic. Adapting Chomsky's notion of the 'strict cycle,' Kiparsky offered an explanation for why lexical rules normally fail to apply morpheme internally in contrast to postlexical rules, which typically introduce allophones regardless of context. Although this approach was initially attractive, problems arose in extending this model to other languages, necessitating complex distinctions among affixes (level-1 vs. level-2). Also the tight connection between morphological and phonological domains on which the model is based is challenged by bracketing mismatches, such as *ungrammaticality* in which the morphology demands the parse [*un*+*grammatical*] + *ity* but the phonology requires *un*+[*grammatical* + *ity*].

Constraint-Based Models: 1990–2005

As more languages were analyzed from the autosegmental and metrical perspectives, recurrent cross-linguistic patterns were discovered, suggesting that a higher level of explanatory adequacy was within reach. The tension between descriptive coverage and theoretical economy came to a head with some

linguists defending the latter at the cost of more elaborate representations and derivations (Jonathan Kaye's 1990 Government Phonology) and others looking to connectionist-inspired modeling of 'soft' universals (John Goldsmith's 1993 Harmonic Phonology) or competing principles that evaluate representations (Luigi Burzio's 1994 analysis of English metrical structure).

Prince and Smolensky (1993) addressed these concerns as well as the unresolved problems from the 1970s with a new model of phonological derivation (Optimality Theory, OT) in which rules are abandoned and the explanatory burden is placed entirely on universal grammar (UG) constraints. Plausible descriptive coverage is ensured by the idea that constraints conflict (echoing Stampe) and that the conflict can be resolved by a strict ranking or prioritization. OT makes it possible to formally express Kisseberth's intuition that inputs are mapped to outputs in order to satisfy a particular objective. And with its basic distinction between faithfulness and markedness constraints, OT formalizes Stampe's intuition that the radical simplifications of child speech reflect innate phonetic biases that must be overcome so that the resultant adult grammar is the residue of these biases. Finally, given that OT constraints shape the output rather than the input, Kenstowicz and Kisseberth's duplication problem is resolved. Most important, the OT model passes the basic test of pairing input with output in an explicit and workable fashion. For these reasons, OT quickly captured the attention of the generative school whose research agenda largely focused on an exploration of its implications for analysis and theory.

The OT model consists of two basic functions. GEN constructs a large (possibly infinite) pool of candidate outputs for any given input, which are then EVALuated by a fixed UG set of conflicting constraints (CON) that sift through the pool of candidates to eliminate all but the correct output. Grammars differ in the ranking of the constraints, which is the major learning task in acquisition. We illustrate with the crosslinguistic treatment of word-final rising sonority clusters, for example, in the stem of *theatr-ic*. English *théa*[tər] inserts a schwa, Canadian French *théâ*[t] deletes the liquid, while European French *théâ*[tr] remains faithful to the input. The relevant constraints appear in (1) and their evaluation of these candidates appears in Table 3.

(1) Max-C: Do not delete a consonant.
Dep-V: Do not insert a vowel.
Sonority Sequencing (Son Seq): A sonority peak is a syllable peak.

The grammar of English imposes the ranking Son Seq, Max-C >> Dep-V so that the faithful candidate *thea*[tr] and the truncating *thea*[t] are penalized in comparison to the winning candidate with epenthesis *thea*[tər]. These evaluations are summarized in Table 4. Canadian French (*théâ*[t]) demotes the ban on truncation (Son Seq, Dep-V >> Max-C), whereas European French (*théâ*[tr]) demotes the ban on nonsyllabic sonority peaks (Dep-V, Max-C >> Son Seq).

During its initial phase, OT concentrated on recasting the basic insights of prosodic and autosegmental phonology. This research also uncovered cases of top-down and other remote effects (Berber syllabification, Hindi stress, and Malay reduplication), which are handled effortlessly by OT constraints defined over fully formed output structures but which require phonological rules to look ahead of themselves (a formal impossibility in the serial model of SPE). Other achievements include a much more nuanced and elaborated understanding of markedness (structural complexity) that has resulted in typologies with rich implicational hierarchies. The OT model also provides a useful framework for studying phonological development from an initial state in which markedness constraints dominate faithfulness constraints and has fostered the study of learning algorithms (Tesar and Smolensky, 1998).

Because the OT architecture involves a one-step mapping from input to output, it is immediately confronted by the pervasive serialism (e.g., *writer vs. rider or writer-rider*) on which the original SPE model is predicated. OT has chipped away at this problem. Some cases have been attributed to faithfulness to other members of a stem's paradigm. Other researchers have proposed intermediate stages in the input–output mapping that mirror Lexical Phonology's stem and word levels. However, a nagging and

Table 3 Word-Final rising sonority clusters in Optimality Theory

	thea/tr/	*Max-C*	*Dep-V*	*Sonority Sequencing*
English	thea[tər]		*	
Canadian French	thea[t]	*		
Standard French	thea[tr]			*

Table 4 English ranking of word-final rising sonority clusters constraints

thea/tr/	*Max-C*	*Sonority Sequencing*	*Dep-V*
>thea[tər]			*
thea[t]	*!		
thea[tr]		*!	

sizable residue of examples, such as Canadian English *title* [tʰʌjɹəl] (cf. *tidal* [tʰaːjɹəl]), persists as an outstanding problem (Idsardi, 1998).

Current Trends

Constraint-based formalisms have opened up a wider range of factors that can be taken into account to model recurrent sound patterns. A lively debate has arisen over the phonetic grounding of phonological structure and, more generally, the relation between phonetics and phonology. Traditionally, phonology is held to deal with categorical (symbolic) distinctions and phonetics with continuous movements of articulators and associated acoustic effects. But research in the 1980s revealed systematic gradient differences among languages that provoke the question whether phonology should expand to encompass the gradient or whether the grammar includes a distinct phonetic component.

Another trend extends the data and methods for studying phonological competence. Traditionally, phonologists have concentrated on the study of systematic generalizations in a language's inherited lexical stock with an occasional bow to supporting evidence from language games, loanwords, and speech errors. Under the banner of Laboratory Phonology (Pierrehumbert *et al.*, 1996), linguists are adopting more experimental approaches in which subjects are tasked with learning artificial languages, judging similarity between carefully controlled stimuli, and producing tongue twisters. Computer-accessible databases have made it possible to study a language's lexicon in an efficient and accurate manner. Generative phonologists are turning their attention to topics that were understudied or ignored in the classical period. We mention three here.

With its concentration on rules, generative phonology abstracted away from questions of frequency – as long as an alternation or phonotactic restriction was regular it was assumed to be part of the speaker's competence. Recent research suggests that speakers have knowledge of frequency patterns in the lexicon. For example, Dutch has final devoicing. Ernestus and Baayen (2003) showed that there are significant differences in the number of voiced versus voiceless obstruents that underlie the alternation (e.g., final [p] derives from underlying /p/ for 97% of the lexicon and from /b/ for just 3%; final [x] derives from underlying /x/ for 19% of the lexicon and from voiced /ɣ/ for 81%. When Dutch subjects were asked to supply the inflected form of a pseudo stem, their responses mirrored the lexical frequencies.

Anttila (2002) studied the competition between Finnish rules that shift stem-final [a] to [o] before the suffix [i] (/kana-i-ssa/ > *kanoissa* 'hen') versus deletion in the same context (/muna-i-ssa/-> *munissa* 'egg.' Although neither rule applies categorically, there are clear statistical differences as a function of the preceding consonant and stem vowel. The change to [o] is preferred to deletion according to the following hierarchies: stem vowel /i/ > /a, e, u/ > /o/, preceding consonant velar > dental > labial. Anttila modeled this orderly variability with competing OT grammars that differ in the ranking of constraints penalizing sequences of similar sounds.

The notion of contrast has been resuscitated and addressed directly in several lines of research. Flemming (2005) argued that the relative markedness of a phoneme can only be judged in relation to other segments in the system. For example, he observed that, in languages contrasting front and back vowels, front rounded /y/ and back unrounded /ɯ/ are only added to the phonemic inventory after the more peripheral vowels /i/ and /u/ are chosen. But in vertical vowel systems that do not contrast front and back, the central vowel /ɨ/ is the optimal high vowel. Recasting some of Bjorn Lindblom's ideas on vowel dispersion, Flemming modeled a vowel inventory in terms of competing constraints that balance articulatory effort with maximizing the number of contrasts along a phonetic dimension and maintaining sufficient phonetic distance between pairs of elements. Thus, if a language makes no contrast in the F2 dimension, then minimizing articulatory effort will favor the central vowel /ɨ/. But if a contrast is introduced, then the peripheral vowels /i/ and /u/ will be chosen first on the grounds of phonetic distance. More vowels such as /y/ or /ɯ/ are added at the cost of decreasing the phonetic difference between contrasting pairs.

Padgett (2003) discussed the role of contrast in motivating and restricting the scope of a Russian sound change that fronts unrounded /ɯ/ to /i/ after velars. The *ɯ* → *i* change did not occur after labials or dentals because these consonants are palatalized before /i/; fronting after /p/ would replace a more widely spaced /pʲi/ versus /pɯ/ contrast with the auditorially less optimal /pʲi/ versus /pi/. The fronting of /ɯ/ occurs after velars because an earlier sound change shifted /ki/ to /tʃi/ and so the hard-soft consonantal contrast is realized as a more perceptible dorsal-coronal one.

Based on a typological survey of contrasts in aspiration, Steriade (to appear) discerned an implicational hierarchy of contexts in which a /t/ versus /tʰ/ opposition is neutralized: preobstruent > word-final > presonorant > prevocalic. The hierarchy does not align with syllable onset versus coda position but rather with the contexts in which the principal acoustic cue (voice onset timing, VOT) to aspiration is

optimally realized. A general Licensing by Cue format is envisioned in which phonetic perceptibility scales project corresponding ranked constraints into the OT grammar.

Blevins (2004) defended a more traditional view that synchronic grammars compute over representations in which phonetics is only reflected obliquely via distinctive features in their classificatory function. The rich phonetic grounding uncovered by studies such as Steriade's is attributed to asymmetries in actual speech samples that form the basis for the induction of the grammar by the child, who may misinterpret *anpa* as *ampa*, rephonologize a speaker's [ʔa] < /a/ as /ʔa/, or ground a phonological analysis in a different exemplar in a phoneme's range of permissible variants. This point of view places the study of sound change on an equal footing with synchronic structure and seriously implicates language acquisition as well. It encourages generative phonologists to adopt a new, more integrative approach in their research program. But, despite changes in emphasis and technique, generative phonology remains committed to an explicit modeling of linguistic competence.

See also: Chomsky, Noam (b. 1928); Distinctive Features; Feature Organization; Halle, Morris (b. 1923); Linguistic Features; Phonemic Analysis; Phonology: Optimality Theory; Rule Ordering and Derivation in Phonology.

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Generative Semantics

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Each of the four main figures McCawley associates with generative semantics – George Lakoff (b. 1941), John Robert (Háj) Ross (b. 1938), Paul Postal (b. 1936), and himself – contributed very substantial elements to its identity, but McCawley embodied the approach, from his feet to his very lively eyebrows, and especially above. He was, in all senses of the phrase, its presiding genius. He helped bring it to life in lengthy, rollicking, mid-1960s telephone calls with Lakoff between Cambridge, Massachusetts, and Chicago. He supplied what many regarded as its strongest arguments and its most compelling analyses, some of which brought Postal into the program. He spent his entire career in the movement's epicenter, the University of Chicago. He continued to publish comprehensive works in the generative semantics spirit long after the label had fallen into disrepute, especially *Syntactic Phenomena* (1993a) and *Everything That Linguists Have Always Wanted to Know about Logic* (1993b). He believed in generative semantics to the very end, not in all of its specific proposals (relentlessly honest, he cheerfully and publicly dropped analyses that no longer fit his evolving views and cheerfully welcomed views that did, no matter what their origin), and certainly not in the label itself (indeed, he renounced all theoretical labels), but in its substance.

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Generative Semantics (by James D McCawley)

The term 'generative semantics' (GS) is an informal designation for the school of syntactic and semantic research that was prominent from the late 1960s through the mid-1970s and whose best-known practitioners were George Lakoff, James D. McCawley, Paul M. Postal, and John Robert Ross.

GS Positions on Controversial Issues

The name GS gives undue prominence to one of many issues on which GS-ists took positions that conflicted with those of more orthodox generative grammarians, an issue that in hindsight seems arcane because it is intelligible only against the background of the once widely accepted assumption (shared then by GS-ists and their adversaries) that there must be a single level of linguistic structure for which it is appropriate to give a system of 'generative rules' (i.e., rules giving a complete specification of what structures are well-formed on that level) and to which all other levels of structure are related by 'interpretive rules.' The issue commemorated in the name GS was that of whether the privileged level was semantic structure (the GS position) or was a level of syntactic structure as distinct from semantic structure (the position of Chomsky and other 'interpretive semanticists'). The prominence that has been given to that arcane issue should not obscure the fact that GS-ists disagreed with other generative grammarians on many far more substantial issues, such as the following:

a. Whether sentences were 'grammatical' or 'ungrammatical' in themselves rather than relative to (linguistic and extralinguistic) contexts and to possible interpretations. GS-ists rejected the then popular idea that a language can be identified with a set of sentences and took syntactic derivations as implying that the surface form in question was grammatical not absolutely but only relative to the meaning represented in its deep structure and to any contextual factors to which steps in the derivation are sensitive.
b. The nature of semantic structure. GS-ists held that semantic structures have the same formal nature as syntactic structures, except for having semantic rather than morphological entities as their ultimate constituents, while interpretive semanticists either were reluctant to make any concrete claims about the nature of semantic structure (e.g., Chomsky, 1972: 137) or adopted a conception of semantic structure that differed considerably in formal nature from syntactic structure (e.g., Jackendoff, 1972).
c. The nature of syntactic categories. Much work in GS attempted to reduce syntactic category distinctions to distinctions of logical category, supplemented by lexical 'exception features' (e.g., verbs and adjectives would both belong to the category 'predicate,' usually confusingly called 'V' by GS-ists, with adjectives differing from verbs in bearing a feature licensing the application of a transformation that inserts a copula), while other generative grammarians took syntactic categories to have at most a tangential relation to semantic categories.
d. The linguistic level or levels relevant to the choice of the lexical material of a sentence. One who holds that there is no level of syntactic deep structure as distinct from semantic structure is forced to recognize syntactic structures whose ultimate units are semantic rather than morphological in nature, such as a syntactic structure [Brutus DO SOMETHING$_x$ (X CAUSE (BECOME (NOT (Caesar ALIVE))))] underlying *Brutus killed Caesar.* (Here and below, capitalization is used as an informal way of representing semantic units corresponding roughly to the words in question.) GS-ists accordingly proposed transformations that combined semantic units into complexes that could potentially underlie lexical items, e.g., 'predicate-raising' (proposed in McCawley, 1968) adjoined a predicate to the immediately superordinate predicate, thus allowing the derivation of such complexes as NOT-ALIVE, BECOME-NOT-ALIVE (= *die*), BECOME-NOT (= *cease*), and CAUSE-BECOME-NOT-ALIVE or CAUSE-*die* (= *kill*). Intermediate derivational stages involving both lexical and semantic units (such as CAUSE-*die*) needed to be recognized in order to account for, e.g., the parallelism between idiomatic combinations with *come* (*come about, around, to* . . .) and their counterparts with *bring*: as Binnick (1971) noted, *bring* corresponded not to CAUSE plus some determinate complex of semantic material but to CAUSE plus *come*, irrespective of whether *come* was used as an independent lexical unit or as part of such combinations as *come about*. Consequently, lexical insertion could not be restricted to a single linguistic level: applications of certain transformations had to be interspersed between lexical insertions. The combinations that could be derived through the application of predicate-raising and other 'prelexical' transformation were supposed to underlie 'possible lexical items.' Since there are infinitely many such combinations but only finitely many actual

lexical items in any given language, most correspond to no actual lexical item of the language and were supposed to reflect accidental gaps in the lexicon of the language.

Lexical decomposition analyses were criticized in such works as Fodor (1970), where it was argued that the simple and complex surface forms that supposedly corresponded to the same deep structure (e.g., *Brutus killed Caesar* and *Brutus caused Caesar to die*) did not in fact have the same meanings. It was noted subsequently (McCawley, 1978) that such discrepancies in interpretation can be explained by a version of Grice's (1967/1989) maxim of manner according to which a simple surface form is preferred to a more complex alternative except when the referent is a peripheral instance of the category defined by the given semantic structure, e.g., using indirect means to cause someone to die would be a peripheral instance of the category defined by 'cause to cease to be alive' and thus would not be in the part of that category where *kill* would preempt the use of *cause to die*. (Syntactic analyses involving lexical decomposition also figured prominently in Gruber, 1965, a work that early GS-ists found congenial despite some important differences between its framework and theirs.)

GS Policies on the Conduct of Research

Of equal importance to these points of theory in their influence on the directions that GS research took and the reception that GS work received were several policies about the conduct of linguistic research, of which the following deserve mention here:

a. A lack of concern about the compartmentalization of the parts of a linguistic analysis or of a linguistic theory, as contrasted with the concern among Chomskyan generative grammarians with the drawing of boundaries among, e.g., syntax, semantics, and pragmatics. One important facet of this lack of concern was an egalitarian position regarding the different kinds of data that had a bearing on a linguistic analysis: whereas most generative grammarians held that syntactic analyses needed to be supported by arguments in which only syntactic facts figured, GS-ists held that facts about truth conditions, possible denotations, etc., were as relevant as any other kind of facts to evaluating analyses that purported to specify how meanings corresponded to surface forms in the given language, and that supposed syntactic facts were usually at least partly semantic in nature, in that what a speaker of a language judges acceptable is not a sentence in itself but that sentence relative to an assumed understanding of it. Another facet of this policy was GS-ists' insistence that all parts of a linguistic analysis were subject to the same standards of explicitness, simplicity, and factual accuracy, irrespective of how one might wish to demarcate syntax and semantics; by contrast, interpretive semantics has come only gradually and often grudgingly to subject the semantic parts of analyses to the same standards of appraisal as the syntactic parts.
b. Rejection of the dogma of generative grammar that a fixed notational system is essential to a linguistic theory and that precision can be achieved only by formulating one's analyses in the privileged notational system.
c. Adoption of a 'static' conception of linguistic rules: rules were thought of not in terms of the popular metaphor of assembling linguistic structures and converting structures on one level into corresponding structures on another, but as 'derivational constraints,' that is, as specifications of what a structure may or may not contain and of how a structure on one level may not contain and of how a structure on one level may or must differ from the corresponding structure on another level. This difference in the conception of rules resulted in difference with regard to what theoretical notions posed 'conceptual problems' (Laudan, 1976) for each approach; thus GS-ists readily accepted rules that specified relations among nonadjacent levels of structure (what Lakoff, 1970b dubbed 'global rules'), a notion that was unproblematic from their conceptual vantage point but outlandish from the vantage point of the 'operation' metaphor for rules, while rejecting the idea of ordering among rules, a notion that was unproblematic for those who accepted the 'operation' metaphor but was difficult to make coherent with the GS conception of rules as derivational constraints.
d. Disdain for those concerns of Chomskyan generative grammarians that had little connection with linguistic facts or with detailed linguistic description, such as mathematical models and speculation about the extent to which linguistic structure is biologically determined. While GS-ists were receptive to the idea that linguistic structure is profoundly influenced by neuroanatomy, they demanded (e.g., Lakoff, 1974: 171) that claims to that effect be backed up with solid linguistic and solid biology rather than with what they dismissed as arguments from ignorance (i.e., hasty leaps from one's failure to see how some characteristic of languages could be learned to the conclusion that it must be innate).
e. Eagerness to put in practice in their professional lives many of the ideas of the 1960s counterculture,

such as policies of antiauthoritarianism, antielitism, and demystification of science and scholarship, and a belief that one's work should be pleasurable. One of many facets of the GS ethos that these policies helped to shape is what Newmeyer (1986: 133) has disparaged as 'data-fetishism': joy in the unearthing of novel and intriguing facts for which one is not yet in a position to provide a satisfactory analysis; GS-ists, by contrast, regarded Chomskyan generative grammarians as 'scientific Calvinists' (McCawley, 1980: 918).

Prominent and Influential Analyses Proposed within the GS Approach

Kuhn (1970) notes that one major component of the paradigm of a scientific community is a set of 'exemplars': prestigious solutions to problems, presented to neophytes in the field as paragons of good science, and serving as models for solutions to new problems. (For discussion of the history of generative grammarians' analyses of English auxiliary verbs in terms of Kuhnian notions such as 'paradigm' and 'exemplar,' see McCawley, 1985.) The exemplars for the GS community included a number of analyses that bore an intimate relation to central tenets of GS, for example, lexical decomposition analyses such as were discussed in, First section of this article, and analyses of quantified expressions as being external to their host sentences in deep structure (e.g., *John has read many books* = *many books* + *John has read x*) and as being moved into their surface positions by a transformation of Quantifier-Lowering (QL). (The term QL was in fact applied indiscriminately to a variety of transformations that differed according to the specific deep structure that was assumed; proposals differed with regard to whether just a quantifier or a whole quantified expression was external to the host S, what filled the deep structure position into which the quantified expression was to be moved, and where the quantifier or quantified expression was in relation to the host S.) The best-known arguments given for a QL analysis consisted in demonstrations that the many syntactic rules that were problematic when applied to structures that contained quantified elements became unproblematic if the deep structure position of a quantified expression was external to its host sentence and consequently (in virtue of the principle of the cycle) the rule had as its domain of application a structure that does not contain the quantified expression; for example, this view of the interaction between QL and the transformation of 'Reflexivization' explained why such pairs of sentences as *Every philosopher admires himself* and *Every philosopher admires every philosopher* differed in meaning in the way in which they did, and why reflexivization was applicable only in the derivation of the former. A thorough survey of arguments for a QL analysis is given in McCawley (1988: Ch. 18).

Several other GS exemplars were in fact as consistent with the substantive claims of interpretivist transformational grammar as with those of GS, but were embraced by GS-ists and rejected by interpretive semanticists as much because of policies on the conduct of research (see previous section) as because of any points of linguistic theory, or simply because of the historical quirk that a particular idea occurred to a member of the one camp before it occurred to any of his counterparts in the other camp. One such exemplar is the analysis of English auxiliary verbs as being verbs that take nonfinite sentential complements in the manner of such verbs as *seem* (Ross, 1969; McCawley, 1971), which Pullum and Wilson (1977) subsequently argued for from within an interpretive semantic framework. (A similar treatment of auxiliary verbs is found in Jespersen, 1937: 92). A second was the proposal (McCawley, 1970, subsequently disavowed by the author) that English had underlying verb–subject–object (SVO) word order, a hypothesis that is, if anything, harder to reconcile with the assumptions of GS than with those of interpretive semantics in view of the dubious nature of the assumption that the order of elements is significant in semantic structure; by contrast, there is no general policy in interpretive semantic versions of generative grammar against discrepancies between deep and surface constituent order, and indeed languages with surface VSO word order are commonly analyzed by interpretive semanticists as having deep VSO word order. Another such exemplar is the 'performative analysis' (Ross, 1970), in which sentences are assigned underlying structures in which a 'hypersentence' (Sadock, 1969, 1974) specifies the illocutionary force of the sentence, e.g., *Birds fly* would have an underlying structure of the form [*I tell you* [*birds fly*]].

The History of GS

The term 'generative semantics' first appears in Lakoff (1963/1976), a work that antedates the development of the Katz–Postal–*Aspects* approach to syntax and prefigures some of Lakoff's subsequent GS work. GS originated in attempts by Postal and Lakoff to exploit novel possibilities that were opened up by the revisions of the transformational syntactic framework proposed in Katz and Postal (1964) and Chomsky (1965) and to fill gaps in the evolving framework. For example, Lakoff's Ph.D. thesis (Lakoff, 1965/1970) originated as an attempt to develop a precise and coherent account of the way in

which a lexical item could affect the applicability of transformations to structures containing the given item, and thereby to put on a solider footing those analyses in Chomsky (1965) in which the choice of lexical items affected the possibilities for derivations. In the course of providing such a theory of 'rule model theory.) Coincidentally, the radical revisions that interpretive semanticists were making in their versions of generative syntactic theory included the adoption of the 'X-bar' conception of syntactic categories (see *X-Bar* Theory (*see* **X-Bar Theory**), which identified two of the factors that affect the syntactic behavior of a linguistic unit, namely, the difference between a word unit and a phrasal unit, and the part of speech of the unit or of its head. Once a descriptive framework was available that allowed linguistic generalizations to be stated in terms of those factors, considerable progress was made in the analysis of the many syntactic phenomena in which those factors play a role.

No important tenets of GS rule out the adoption of a conception of syntactic categories as defined by these factors *in addition to* logical categories, and indeed a conception of syntactic categories as reducible to those and other factors (with logical category being merely one of several factors that influence a unit's syntactic behavior) is adopted in McCawley, 1977/1982 and subsequent works. However, in the 1960s and early 1970s, an assumption shared by GS-ists and interpretive semanticists impeded GS-ists from adopting such a conception of categories, namely the assumption that syntactic categories must remain constant throughout derivations: a word (with a determinate part of speech) that replaced a complex of semantic material (thus, a unit not having a part of speech) could not differ in category from the replaced unit and thus parts of speech could not be part of the category system. (The widespread misconception that GS analyses allowed linguistic units to change category in the course of derivations in their analysis of, for example, nominalizations overlooks the fact that, according to GS-ists' assumptions, verbs and their nominalizations belonged to the same category. Anyway, analyses of any kind in which the verb *invent* is a constituent of the noun *invention* are not committed to any assumption that the former changes its category in the derivation of the latter: it is whatever it is, regardless of what it is contained in.) Since interpretive semanticists did not require that deep structures match semantic structures (and indeed took delight in arguing that they did not match), there was no obstacle to their having the same categories in deep as in surface structures while drawing the full range of category distinctions provided for by X-bar syntax. The interpretive semantic research program was thus able to become 'progressive' in the sense of Lakatos (1978) because of something extraneous to the issues that were the loci of the substantive disputes between GS and interpretive semantics.

See also: McCawley, James (1938–1999); X-Bar Theory.

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Generic Reference

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Forms of Generic Reference

Generic reference is the term commonly used to describe noun-phrase reference in sentences that express generalizations (*see* **Generics, Habituals and Iteratives**). Some common examples are found in (1)–(3):

(1) *Potatoes* are native to South America.

(2) *The lion* is a fearsome beast.

(3) *A pencil* is used for writing.

Generic reference is usually understood as making reference to kinds of things (*see also* **Natural Kind Terms**). When we speak of 'kinds,' we intend a classification system that is based on the denotations of nominal expressions, or sortals, of the language (for one view, see Gupta, 1980).

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Generic reference is usually understood as making reference to kinds of things (*see also* **Natural Kind Terms**). When we speak of 'kinds,' we intend a classification system that is based on the denotations of nominal expressions, or sortals, of the language (for one view, see Gupta, 1980).

It is now commonly accepted that reference is not only limited to individuals or pluralities of individuals, but also to kinds or types of things as well. This is most evident in noun phrases of the type "this kind of animal," which evidences an overt postdeterminer of the class of 'kind,' 'type,' 'sort,' 'species,' and so on.

(4) *This kind of animal* hibernates in the winter.

These kind-referring phrases can appear in quantified contexts as well. The analysis then is that the quantifier ranges over kinds of things, just as it ranges over individuals in the more usual instances.

(5) *Three kinds of swallows* are found in the northeastern United States.

(6) *Every type of tree* exchanges carbon dioxide for oxygen.

When the postdeterminer element is removed, there remains the possibility of interpreting the noun phrase as referring to or quantifying over kinds. This normally results in a type/token ambiguity. For instance, in (7) one could be talking about individual flowers in a given context or kinds of flowers; similarly for (8). This reading is called a *taxonomic reading* in Krifka *et al.* (1995).

(7) Sharon photographed *every flower.*

(8) *Several penguins* inhabit this frozen wilderness.

Examples such as (7) and (8) are ambiguous between a 'kind' reading and the more common individual reading. On the taxonomic reading, the denotation of the head noun is partitioned into subkinds, though this is done contextually since there are multiple ways to naturally partition any domain. For instance, automobiles can be partitioned according to body style (sedan, sports car, station wagon, etc.) or by manufacturer (BMW, Mazda, Volvo, etc.), among other ways. It is commonly noted that if one takes a mass term and syntactically treats it as a count term, by pluralizing it or pairing it with a determiner that selects for singular count nouns only, a taxonomic reading may emerge. Thus, in (9) we are speaking of kinds of wine, and in (10) of kinds of metal:

(9) *Three wines* are stored in the cellar.

(10) *Every metal* conducts electricity to some degree.

Another means by which kinds are referred to in natural language is by definite singular noun phrases. In English, this has a stylistically technical tone, but this is not a general feature of other languages. Three possible examples are:

(11) *The computer* has changed society in many ways.

(12) Scientists have now documented the entire life cycle of *the three-toed sloth*.

(13) *The self-cleaning plow* was invented by John Deere.

These exemplify the definite generic on the most natural readings of the noun phrases in these examples. This reading appears in addition to the much more frequent individual-denoting use of the definite article, and often results in ambiguity. Generally unambiguous is the use of the definite article with only an adjective (e.g., "*The rich* are often oppressors of *the poor*"). Other types of definite kind reference include uses of the proximal and distal demonstratives (*this, that*) in the plural. The demonstrative is not, on one interpretation, an actual indexical; instead, it colloquially conveys an emotional attitude toward the kind (Bowdle and Ward, 1995). It appears to be the same use of the demonstrative as when it accompanies a proper name (e.g., "*That Roberto* has done it again").

(14) *Those spotted owls* (i.e., the kind spotted owl) are constantly being talked about by environmentalists.

(15) Who invented *these computers*, anyway?

In addition, there are noun phrases that employ adjectives like 'typical,' 'average,' or 'normal,' which have a kind-reference reading, as in "*Your typical businessperson* takes eight plane trips per year." Supplementing definite generics are the consciously introduced Latinate natural kind names, lacking a definite article, which always have an elevated scientific tone no matter the language. This includes examples like *'felis domesticus'* (cat) or *'acer saccharum'* (sugar maple tree). These are unambiguous and always denote kinds. Though not of consciously Latinate origin, the use of 'man' in English as a generic functions in much the same way.

Beyond these are additional means of kind reference in natural language. Bare plurals – that is, plural noun phrases lacking a determiner or quantifier element, at least on one reading – may refer to kinds. The following are three examples:

(16) *Airplanes* have made intercontinental travel a common event.

(17) *Lions* once ranged from the tip of Africa to eastern Siberia.

(18) *Hunting dogs* are most closely related to *wolves*.

Functioning much the same as bare plurals are undetermined mass expressions (in French, the definite article must be employed), which allow for generic reference to unindivuated domains.

(19) *Water* is a liquid. (cf. Fr. "*L'eau est un liquide.*")

(20) *Hydrogen* is the most common element in the universe.

Finally, the singular indefinite article allows for a generic usage, as in the following:

(21) *A triangle* has three sides.

(22) *A potato* contains vitamin C.

The bare plural and the indefinite singular are commonly distinguished from the definite singular in English in that the former two usually allow for additional descriptive material in the form of modification, whereas the noun phrases in the definite generic instance are much more limited.

(23) *A cake without baking powder/Cakes without baking powder/??The cake without baking powder* fails to rise properly in the oven.

Unlike the bare plurals or indefinite singulars, the definite singular is basically limited to expression of well-established kinds, those taken to be already familiar from one's background knowledge. Furthermore, as Vendler (1971) notes, it does not appear they can be 'too general.' Thus, alongside 'the parabola' and 'the circle,' one does not find generic reference to 'the curve.' Currently, a full account of these facts is lacking.

Cross-linguistically, generic reference is carried out by noun phrases with definite and indefinite articles and with determinerless expressions quite generally. In languages without articles, the determinerless form typically has a generic interpretation in at least some sentence positions. While in English the plural form of the definite has generic reference only marginally at best, in German, which is closely related to English, the plural definite may take generic reference quite easily (Delfitto, 1998). If there are languages with articles or other determiners specific to generic reference, they have yet to be brought to general attention, or they may not exist at all.

It is important to distinguish generic reference from the type of sentence in which the expression appears. While generic reference takes place most commonly within the context of a generic or habitual sentence, not all generic or habitual sentences have a noun phrase with generic reference, and generic reference may take place within sentences that are episodic or that make reference to specific events. The clearest examples of this are sentences with the definite singular generic exhibiting the *avant-garde* reading (Krifka *et al.*, 1995). Consider the following example:

(24) *The horse* arrived in the New World around 1500.

This means that some horses were introduced about that time, but implies that the event was the first time any modern horses had been in that area. To observe a shipment of horses arriving in the western hemisphere in 1980 and use (24) modified by "in 1980" to describe that event would be inappropriate. Other instances where there is kind-reference in episodic sentences, on at least one reading, include the following three examples:

(25) Today, Professor James lectured to us on the history of *dinosaurs*.

(26) Marconi invented *the radio*.

(27) *Monkeys* evolved from *lemurs*.

Theory of Generic Reference

While most semanticists agree that at least certain noun phrases refer to (or quantify over) kinds of things, there is a tradition in which apparent kind reference is treated in terms of quantification over individuals. Stebbings (1930), for instance, suggests that the sentence "The whale is a mammal" expresses a universal proposition (similar to "All whales are mammals"), as does "Frenchmen are Europeans." Russell comments that the sentence "Trespassers will be prosecuted" "means merely that, if one trespasses, he will be prosecuted" (1959: 102), which reduces the analysis of the apparent kind reference (*trespassers*) to an indefinite in a conditional. However, Moore (1944), in response to Russell's theory of descriptions, cites examples like "The triangle is a figure to which Euclid devoted a great deal of attention" and "The lion is the king of beasts," both of which convincingly resist implicit quantificational or conditional analyses.

The most convincing evidence for kind reference in the semantics stems from predicate positions that select for something other than individuals and pluralities of individuals and that readily accept the types of noun phrases reviewed earlier. These are called kind-level predicates. Examples (26) and (27) contain kind-level predicates. While an individual might invent something, the direct object must express a kind of thing and not a particular individual or set of individuals. The verb 'evolve' relates species and other levels of biological classes to other such classes,

but not individuals to individuals. The following are other examples of kind-level predicates:

(28) Dogs are *common/widespread/rare*.

(29) Insects are *numerous*.

(30) The elm is *a type/kind of tree*.

(31) The gorilla is *indigenous to* Africa.

(32) The Chevrolet Impala *comes in* 19 different colors.

Kind-level predicates are relatively infrequent in any language. Most predicates fall into the classes of either individual level or stage level. Roughly speaking, stage-level predicates speak of highly temporary events and states, such as running across a lawn, eating a sandwich, or being asleep. Individual-level predicates, on the other hand, speak of more permanent states of affairs, such as knowing French, liking the opera, or being intelligent. Typically, the predicates of a habitual or generic sentence ("x cooks wonderfully") are individual level. These are discussed in more detail in Carlson (1980), Kratzer (1995), Fernald (2000), and by others. Both stage-level and individual-level predicates select for noun phrases that denote individuals and pluralities of individuals. However, kind-denoting expressions appear with these predicates naturally as well. With both stage-level and individual-level predicates, a quantificational analysis of kind-denoting phrases (quantifying over individuals of that kind) becomes easily possible.

The kind-level predicates do not typically allow for the use of the indefinite singular. An example like (33) is generally deemed not very acceptable:

(33) ?*A lion* is a species of animal. (cf. *the lion, lions*)

A continuing controversy centers on the analysis of the English bare plural construction, which has an unlimited distribution in comparison to bare plurals in other languages with articles, such as Spanish or Italian (e.g., Laca, 1990). English bare plurals appear to have different interpretations in different contexts. With individual-level predicates, they have a general interpretation, one that is quantificationally similar to 'all' or 'most.'

(34) Cats (roughly, all or most cats) sleep a lot.

(35) Hammers (roughly, all or most hammers) are used for driving nails.

On the other hand, bare plurals also have an existential interpretation in other contexts that is similar to "some" in force.

(36) *Priceless works of art* (i.e., some works) were delivered to the museum yesterday.

(37) The rioters threw *stones* through *shop windows*, shattering them.

The primary question is whether in these instances, as well, the bare plural construction is kind-denoting, as most believe it is with kind-level predicates. Carlson (1980) and Chierchia (1998) argue that such a unified analysis is not only possible but also desirable, and both present analyses showing how it can be accomplished. However, others argue that more adequate insight can be gained through an analysis that differentiates true instances of kind reference from those instances where bare plurals appear with individual-level and stage-level predicates and that a quantification over individuals approach is better taken (see Wilkinson, 1991; Diesing, 1992; Krifka *et al.*, 1995).

See also: Aspect and Aktionsart; Generics, Habituals and Iteratives; Natural Kind Terms.

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Generics, Habituals and Iteratives

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Sentences may express information about particular events, such as:

(1) Mary ate oatmeal for breakfast this morning

But sentences can also express regularities about the world that constitute generalizations over events and activities:

(2) Mary eats oatmeal for breakfast

Unlike (1), the truth of (2) does not depend on Mary eating oatmeal for breakfast at any particular time and place, but instead it is the regularity of occurrence that is asserted, and the truth conditions of the sentence are tied to that regularity.

Sentences of the sort exemplified in (1) are sometimes called 'episodic' sentences. The class of episodic sentences also includes examples where a plurality of individuals or events occurs. The examples (3–5) exemplify sentences that are episodic but whose truth values depend on multiple occurrences of particular events:

(3) Mary and George ate oatmeal for breakfast
(4) Each student in the class handed in a completed assignment
(5) Every day last week, Mary ate lunch at a restaurant

Such examples are episodic. In contrast, examples such as (1) are often called 'habitual' or 'generic' sentences. In some instances, habituals are termed 'iteratives,' but insofar as the terminology indicates that iteratives and habituals are the same thing, it can be misleading (see Comrie (1976: 27) for extended comments on the use of the term in Slavonic linguistics). Iteratives are a subclass of aspectual operators and do not produce generic or habitual sentences but rather are episodic in nature. Payne describes iteratives in the following way: "Iterative aspect is when a punctual event takes place several times in succession" (1997: 39). That is, what is produced is a series of events of the same type, which occur in a sequence (i.e., not simultaneously) and are intuitively connected with one another in time (i.e., not spaced 'too far' apart). Such iterative interpretations are especially common for semelfactive verbs such as *cough* or *flap* (*a wing*). In English, *John coughed* can be understood as saying that he coughed once, or in a series, repetitively. In some languages, iteratives are marked morphologically, typically by an inflectional affix on the verb though commonly in other ways such as by reduplication, as in Quileute (Greenberg *et al.*, 1978). Iteratives, when specifically marked, also lend themselves to additional implications, especially those of intensity and/or prolongation. In English, *John coughed and coughed* is iterative in interpretation, like one understanding of the simple *John coughed*, but in addition implies that he coughed each time with intensity and/or that he coughed for a prolonged period. Often there are implications that the intensity or prolongation is inappropriate or a sign that something is wrong. These implications, however, are not a part of iterativity *per se*, but an additional, associated meaning above and beyond.

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It is also commonly noted that progressive or continuous aspectual constructions often imply iteration. In *The bird is flapping its wings* the most natural interpretation is that there is a series of wing flappings (though an extended single flap might also be described in this way). But again iteratives are not the same as progressive and continuous constructions, having different and distinguishable semantic contents.

Unlike iteratives, habituals and generics do not denote a connected series of events, even though there is the root intuition that repetitiveness is involved. Terminology is not entirely standardized; one also finds the terms 'customary,' 'usitative,' 'gnomic,' and 'frequentative' applied to generics and habituals, though occasionally with more specialized meanings. The term generic predominates in the formal semantics literature and habitual appears most dominant in the more descriptive literature. Some reserve the term generic for habitual sentences with subject noun phrases that have generic rather than specific reference (*see* **Generic Reference**), though this is not standard practice. The term habitual itself is potentially misleading. Lyons notes that, "The term 'habitual' is hallowed by usage; but it is something of a misnomer in that much of what linguists bring within its scope would not generally be thought of as being a matter of habit" (1977: 716). The following examples would also qualify as habituals according to the general pattern of usage:

(6) Glass breaks easily (a disposition)
(7) Bishops move diagonally (a rule of a game)
(8) Robert works for the government (an occupation)
(9) Soap is used to remove dirt (a function)
(10) A wise man listens more than he speaks (a moral injunction)

Like iteratives, generics and habituals may be morphologically marked, normally by an inflectional affix or a free form in the verb's 'auxiliary' complex, though also through a wide variety of other formal means. Habitual markers are typically classified as a member of the aspectual system, though this morphological marking is in addition to the variety of means lexically available (e.g., 'tends to,' 'has a habit of') and is a component of meaning of most frequency adverbs such as *usually*, *often*, or *always*. Payne (1997) cites the example of Ewe:

(11) É-du-a mɔli
3sg-eat.HAB rice
'S/he eats rice'

Dahl (1985) in a cross-linguistic survey notes similar marking in Guarani (Paraguayan Guaraní), Georgian, Kammu (Khmu), Czech, Akan, Wolof, and other languages. Similar markers can be found in a wide variety of other languages, noted in specific studies (e.g., Swahili, Guyanese English, Tamazight, Awa, Zapotec (Istmo Zapateco), Navajo). These co-occur with predicates classified as events and processes, but not, in general, with stative predicates. Most commonly, though, in languages that have specific morphological expression of habituality, one can also express habituality via a regular (usually tensed) form, often in the imperfective if the language makes an imperfective/perfective distinction, though also very commonly in the maximally unmarked tensed forms of the language (Dahl, 1995). Semantic differences are occasionally noted in languages that have a marked and an unmarked expression of habituality, but little research has been conducted on this question. One particular form appears with considerable regularity. This is a specialized remote past tense form, functioning like English *used to*. Further, formal distinctions not associated with the auxiliary and inflectional system of the verb also may be reflective of a habitual/episodic distinction, as in the *wa/ga* distinction in Japanese, the *når/da* 'when' distinction in Norwegian, or the *ser/estar* distinction in Spanish. Though on occasion iterative forms and habitual forms are identical, this is not indicative of any special semantic connection as more commonly languages use syncretic future forms, progressives, and imperfectives to express habituality, among a wide variety of other possibilities.

Whereas generics and habituals appear to make reference to a multiplicity of events, reminiscent of the episodic examples in (3–6) or iteratives, generics and habituals are quite different in character. For one, the resultant sentence is aspectually stative (though derived from a nonstative) or at least shares major properties with other statives. For instance, in a narrative discourse a generic sentence does not 'move' the time forward, as do events and processes, but rather, like other instances of statives, appears to provide background or setting information. Like statives, generics and habituals also observe the subinterval property (Dowty, 1979). That is, if a habitual is true for a period of time, it is also true for any smaller interval within that same period of time, no matter how short.

Generics and habituals also have, as pointed out by Dahl (1975), an intensional component of meaning lacking in episodics. This intensionality may be observed, in part, in the 'nonaccidental' understanding of generics and habituals. This is the notion that the varying events generalized over are a part of a larger generalization, and not some happenstance (Schubert and Pelletier, 1987). For example, imagine you

encounter some very, very small town in which all residents, entirely unbeknownst to one another, chew (only) sugarless gum. It could be sheer happenstance, but if one accepts the following as true:

(12) Residents of this town chew sugarless gum

one commits to the notion that this is not sheer happenstance, but that there is some underlying cause or causes of this particular behavior (e.g., the town dentist instructs people to avoid sugared gum; it is the only brand the local store carries). The particular cause or causes need not be specifically identified, but it does give rise to the counterfactual implication that if a person were to become a town resident, he or she too would likely chew sugarless gum, as a result of becoming a town resident, even if they had not done so before.

Being generalizations, generics and habituals also have the property of tolerating exceptions. The initial instinct is to treat generics and habituals as universally quantified sentences. However, if you learn that Elena eats oatmeal for breakfast, she need not eat oatmeal at every breakfast. Or, the commonly found example *Birds fly* is tolerant of exceptional penguins, ostriches, and other flightless birds. The limits of this exceptionality has proven extremely difficult to quantify—how long must Elena go without eating oatmeal for breakfast before the generalization no longer holds? How many flightless birds need there be in order for *Birds fly* no longer to be thought true? While some quantitative understanding of exceptionality plays a role, most researchers agree that generics and habituals require an additional component of meaning, or a different arrangement of meaning altogether, to give an account of exceptionality.

The most commonly assumed semantic analysis of habituals and generics is outlined in Krifka *et al.* (1995). This is a fundamentally quantificational analysis of habitual sentences. It posits an operator, which is often implicit in the linguistic form, which is a dyadic relation between the interpretations of two constituents partitioned from the sentence it is operating on, a 'restrictor' and a 'matrix' or 'nuclear scope,' in keeping with the most commonly accepted semantic analysis of quantification. As this dyadic operator is focus-sensitive, generic sentences can be ambiguous, according to which constituent meaning is assigned to the restrictor and matrix. For example, Milsark (1974) notes the ambiguity of the sentence *Typhoons arise in this part of the Pacific*. As discussed in Carlson (1989), if the subject noun phrase *typhoons* is understood as the restrictor, and the predicate of the sentence is understood as the matrix, then the interpretation assigned is akin to asserting that generally speaking, if something is a typhoon, it then arises in this part of the Pacific ocean (and not elsewhere). If, on the other hand, *in this part of the Pacific* is assigned to the restrictor, then the resulting interpretation is that, in this part of the Pacific, there arise typhoons (from time to time), and perhaps elsewhere as well. Word order in English and other languages can affect how the sentence is partitioned by this and other focus-sensitive operators (Diesing (1992) discusses German (Standard German) at some length). For instance, the English sentence *In this part of the Pacific arise typhoons* has only the latter of the two readings.

Krifka *et al.* (1995) describe the generic operator as a "default quantifier" in order to account for exceptionality and intensionality. Other researchers take a different approach, such as modifying possible worlds to enrich the interpretive structure with a notion of 'normality' or 'prototypicality' (e.g., Eckhardt, 2000; Heyer, 1987). The basic idea here is that one can reduce the generic operator to a universal statement relativized only to the most typical or normal individuals of the domain, or to "normal worlds." Cohen (1999) suggests that the generic operator is a quantificational operator similar in contents to 'most,' though relativized to a partition of individuals and situations that is pragmatically driven, and not determined by the focus structure of the sentence. For instance, in asserting that mammals bear live young, one is partitioning the set of mammals by gender and age, as only mature (fertile) females have such capability. Meanings of habituals and generics are often expressed in Artificial Intelligence and Computer Science by way of default reasoning systems and non-monotonic logics. Such systems are designed to draw logical conclusions in the face of absence of information. According to this understanding then, a generic or habitual is information assumed to hold for any given relevant instance, unless specific information is given otherwise.

See also: Aspect and Aktionsart; Event-Based Semantics; Extensionality and Intensionality; Generic Reference; Quantifiers: Semantics.

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Genetics and Language

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The Genetic Underpinnings of Language

Many modern linguistic theories assume that at least some aspects of our linguistic behavior are genetically determined: Chomsky's early arguments from the poverty of the stimulus (for example, Chomsky 1988) set out the position that children could not learn any language as quickly and completely as they do, with so many shared intuitions, and on the basis of such relatively partial and degenerate data, in the absence of some innate, prespecified assistance. The precise configuration of this innate component, which is often called Universal Grammar or the language faculty, has been much debated; for a recent, much-discussed contribution to this literature, see Hauser, Chomsky, and Fitch (2003).

However, the advent of molecular genetic technology and the human genome project have made it possible to ask a more direct question: what exactly are the genes that underlie language and make humans linguistic animals? As often in the history of science, the main attempts to address this question have involved studying systems where things have gone wrong.

It is well known that certain individuals have significant difficulties in acquiring and using language. Such difficulties may or may not be correlated with other developmental disorders: in Williams Syndrome, for example, there are other nonlinguistic deficits, while in so-called SLI, Specific Language Impairment, nonlinguistic aspects of development are frequently within the normal range. This feature makes SLI a good candidate for identification of a gene or genes associated with language development as opposed to general cognitive capacities, if and only if SLI or similar conditions can also be shown to be inherited and therefore likely to be at least partially genetically determined.

The key to the story of one particular candidate gene is the so-called KE family, whose case is discussed in Fisher *et al.* (1998) and elsewhere. About half the members of this family, over three generations, have suffered from a range of speech and language problems, including severe difficulties with articulation, and with the use of affixes to signal grammatical information including tense and agreement (Gopnik, 1999). Because this syndrome of deficits, referred to as developmental verbal dyspraxia, is inherited in a dominant fashion (meaning that each affected individual has one affected parent), it was relatively straightforward to identify the gene involved. The first step was to track this gene to

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Genetics and Language

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The Genetic Underpinnings of Language

Many modern linguistic theories assume that at least some aspects of our linguistic behavior are genetically determined: Chomsky's early arguments from the poverty of the stimulus (for example, Chomsky 1988) set out the position that children could not learn any language as quickly and completely as they do, with so many shared intuitions, and on the basis of such relatively partial and degenerate data, in the absence of some innate, prespecified assistance. The precise configuration of this innate component, which is often called Universal Grammar or the language faculty, has been much debated; for a recent, much-discussed contribution to this literature, see Hauser, Chomsky, and Fitch (2003).

However, the advent of molecular genetic technology and the human genome project have made it possible to ask a more direct question: what exactly are the genes that underlie language and make humans linguistic animals? As often in the history of science, the main attempts to address this question have involved studying systems where things have gone wrong.

It is well known that certain individuals have significant difficulties in acquiring and using language. Such difficulties may or may not be correlated with other developmental disorders: in Williams Syndrome, for example, there are other nonlinguistic deficits, while in so-called SLI, Specific Language Impairment, nonlinguistic aspects of development are frequently within the normal range. This feature makes SLI a good candidate for identification of a gene or genes associated with language development as opposed to general cognitive capacities, if and only if SLI or similar conditions can also be shown to be inherited and therefore likely to be at least partially genetically determined.

The key to the story of one particular candidate gene is the so-called KE family, whose case is discussed in Fisher *et al.* (1998) and elsewhere. About half the members of this family, over three generations, have suffered from a range of speech and language problems, including severe difficulties with articulation, and with the use of affixes to signal grammatical information including tense and agreement (Gopnik, 1999). Because this syndrome of deficits, referred to as developmental verbal dyspraxia, is inherited in a dominant fashion (meaning that each affected individual has one affected parent), it was relatively straightforward to identify the gene involved. The first step was to track this gene to

a small region on the long arm of chromosome 7 (Fisher *et al.,* 1998); mutations in this region were identified in affected family members in a gene now named FOXP2, and details were published in Lai *et al.* (2001). FOXP2 appears more generally to be involved in the development of the brain, and has been shown, as is the case with many important genes, to be highly conserved in evolutionary terms. Enard *et al.* (2002) have established that FOXP2 is almost identical between mice and primates, with only one amino acid substitution; but there are two more changes between humans on the one hand, and other primates on the other. This difference means that mice and primates are separated by at least 130 million years and one genetic change, while humans and chimps, separated by just 5 million years, have two further changes (Chen and Li, 2001). It has therefore been argued that FOXP2 is highly likely to be implicated in the development of some system that differs substantially between humans and other primates; clearly, language is one such system.

This theory is a wonderful piece of scientific detective work, but there have been, as is often the case, overenthusiastic interpretations of the results, especially in the media, to the effect that **the** gene for speech and language has now been discovered. There are both specific and general objections to this line of argument. First, there are complex possibilities of cause and effect (Bishop, 2002). Might the apparent grammatical difficulties of members of the KE family be a consequence of their speech impairment? Are cognitive abilities in affected individuals really normal, or are they typically lowered, meaning that the supposedly isolated speech and language deficits might not be so isolated after all? The same complexities apply when we turn to the evolutionary relevance of FOXP2: is the gene implicated in the origins of language, or in the improvement of vocal communication for an elementary system that had already developed? Even if we accept that FOXP2 is the only gene involved in this deficit for this family, there are certainly individuals with SLI who do not show any defect in FOXP2, though some other possible candidate regions on chromosomes 16 and 19 are emerging (SLI Consortium, 2002).

More generally, it is highly unlikely that any complex system like language will involve only a single gene; many systems, both physical and neurological, are implicated in our linguistic abilities and behavior, and each may be controlled by the interaction of many genes. At least 20 genes are involved in the formation of blood clots, a relatively straightforward physical process: leaving aside the additional genes responsible for regulating the expression levels of these core 20, we should anticipate greater complexity in a complex, multisystem trait like language. Further implicated genes will certainly be found as more families are studied, and these will contribute to fuller understanding of the genetic underpinnings of the physical and neurological aspects of language; but the story will not be simple, and it is going to take a great deal of piecing together.

One thing linguists must remember, however, is that if we implicate genes and identify or theorize about some genetically specified language faculty, we are necessarily making evolutionary assumptions. Anything in our genes must have got there somehow in evolutionary time, either as a new structure, or more likely, as a development of an existing, older structure that may have had a tangentially related or altogether different function. The advent of genetic linguistics in this sense should make linguists consider carefully whether they wish to use terms like 'innate'; we should do so only if we are content for the gene hunters to look for the genetic structures behind them, and if we are confident that a truly universal, evolutionary explanation is plausible and necessary.

Genes and Languages in Populations

Modern genetics is divided into molecular and population subdisciplines. The former focuses on analysis of individual genomes, though the conclusions may be extrapolated to the species level; and the linguistic relevance of molecular studies was dealt with in the last section. At the population level, geneticists are not so much concerned with localizing and tracking individual mutations, but with the distribution of resulting variants within and between human (or other) groups. There will rarely if ever be a single mutation that uniquely characterizes all, or even most members of a population, since 84% of human genetic variations are found in all human groups (Barbujani, 1997); but by considering a whole range of genetic variants and calculating their frequencies, it is possible to produce a profile for each population and to work out how close this group is to others. Using the more quickly mutating mitochondrial or Y-chromosome DNA can also allow individual mutations to be tracked back to common ancestors, allowing the histories of populations and their interrelationships to be established.

For historical linguists, the important point is that the distribution of genes and languages may correlate across populations. This point straightforwardly reflects the fact that humans both carry genes and speak languages, and will therefore take both with them when they migrate, and potentially contribute elements of both when they interbreed with members of other populations. Because human histories are

complex and involve decisions about allegiance and group membership rather than simply stochastic processes, genetic and linguistic signals will not always match: in some situations, genetic signals may indicate earlier mixing of two populations, but the language of one original group may have been lost entirely, for instance. As contact between populations becomes more common over longer distances, the correlations between genes and languages are also likely to break down progressively, as indeed are boundaries between traditional groups in many parts of the world. However, it has been demonstrated that correlations between genetic and linguistic characteristics of populations can be found and explored (Poloni *et al.,* 1997; Gray and Jordan, 2000; Rosser *et al.,* 2000; McMahon, 2004; McMahon and McMahon, forthcoming). As one might expect, these hold best for populations separated by considerable distances or natural geographical barriers, and are more elusive for adjacent populations with a history of contact. Even here, however, comparisons of genetic and linguistic characteristics can be used productively as part of the 'new synthesis' (Sims-Williams, 1998; Renfrew, 1999; Cavalli-Sforza, 2000), for instance, in seeking to explain discrepancies by invoking particular patterns of contact or influence.

Work of this kind is interesting, not only or even principally because of the establishment of correlations, but because our insights into early history and prehistory from any individual discipline can be limited and hazy. If related historical disciplines, like population genetics, archaeology, and comparative linguistics, can cooperate and share results and interpretations, we are likely to achieve greater understanding of population histories. This research is aided by the recent and ongoing development of quantitative historical linguistics (Embleton, 1986; Ringe *et al.,* 2002; Gray and Atkinson, 2003; McMahon and McMahon, 2003, forthcoming), where computer simulations, and tree-drawing and simulation programs often developed initially in biology are applied to linguistic data to form, test, and validate hypotheses about relatedness and contact between languages. The development of programs that generate either trees or more complex networks depending on the signal pattern at issue (Bandelt *et al.,* 1999; Bryant and Moulton, 2004; Bryant *et al.*, forthcoming), and which therefore do not force a tree on nontreelike data, are particularly valuable and promising in allowing borrowing and common ancestry to be explored and represented as equally likely and important.

See also: Evolutionary Theories of Language: Current Theories; Origin and Evolution of Language.

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Geneva School of Linguistics after Saussure

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After Saussure's death, the approach he founded developed into several competing versions of structuralism. The Geneva School of linguistics (a term first used during a gathering in 1908), being the depositary of the original Saussurean documents, and having edited and published the *Cours de linguistique générale*, focused on two main directions of research. First, scholars were concerned with interpreting and reconstructing Saussure's original thought, which remained unclear on several important points. Second, they launched and developed new research projects in areas that Saussure envisaged but did not pursue, such as linguistics of *parole* (related to pragmatics) as opposed to *langue* (related to the linguistic system).

The major figure within this trend is Charles Bally (1865–1947, co-editor of the periodical *Cours* with Albert Sechehaye), one of Saussure's disciples. Although he was deeply attached to the idea of a *langue* that needed to be studied from a static point of view, his research was pragmatic before its time. He was soon concerned with problems of *parole* (language-in-use), in particular in everyday spontaneous speech, a project he presented in his 1913 inaugural lecture. In Bally's three main publications, *Traité de stylistique française* (1909), *Le langage et la vie* (1913b), and *Linguistique générale et linguistique française* (1932), he focused on nonpropositional issues such as affective aspects of communication. In particular, he differentiates between the dictum (the content) and the modus (how this content is presented). Differences in the modus are differences about the attitude the speaker adopts toward the proposition conveyed, an idea which is to be related to his technical notion of *style*.

Bally's concept of style is understood as the mark of a subjectivity expressed through the packaging of the informational content. His idea was that content can be conveyed according to various *modalities*. Well before Bakhtin's work became popular in pragmatics, Bally posited not only that an utterance bears the trace of viewpoints, but also that, generally speaking, utterances are echoing other utterances and mixing viewpoints from several real or imaginary speaking instances. This idea converged with notions further developed in pragmatics and discourse analysis such as polyphony and heterogeneity of discourse. His theoretical work goes hand-in-hand with a reflection on Saussurean notions such as *value* and *signification*, about which he developed original thoughts (in particular, he suggests a dichotomy between *actual* concept in *parole* and *virtual* concept in *langue* in a 1940 paper). Charles Bally was also concerned with the didactics of first language, and gave a series of lectures at the University of Geneva on that topic in 1930, where he adopts, as a follower of Saussure, a moderate anti-normative position and pleads for a more synchronic point of view (reprint Bally, 2004).

Albert Sechehaye's (1870–1946) main theoretical work, illustrated with French data, was to suggest a renewal of the theory of grammar by means of a constructive method, considering that complex syntactic forms can be reduced to basic syntactic forms (Sechehaye, 1926).

The other scholars of the Geneva School are Robert Godel, who focused on the edition of Saussurean archives and discussed, in light of them, key Saussurean concepts; Serge Karcevski, who exported the ideas of the Geneva School to the Moscow School; Henri Frei, who worked on Asian languages and on a theory of mistakes in communication (Frei, 1929); Luis Prieto, who, following a first move toward social psychology, understood semiology in relation with social practices (Prieto, 1975); André Burger, who studied romance languages; and René Amacker, who established close links with the Italian school of linguistics

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and provided a treatise on Saussurean linguistics. The Geneva School has turned to discourse analysis with Eddy Roulet and is no longer directly connected with the works of Saussure and his followers. Nonetheless, research on the Saussurean heritage is still pursued in Geneva with publications including the periodical *Cahiers Ferdinand de Saussure* and the related series of volumes of the Ferdinand de Saussure Circle.

The Swiss scholar Rudolf Engler, who spent most of his career in Berne, is also associated with the Geneva School of linguistics. Although he wrote a valuable study on the arbitrariness of the sign, he is mostly well-known for his expert work and edition of Saussurean manuscripts. Having traced and examined the original sources available in the archives of Geneva, he established the classical synoptical edition of the *Cours* in the late 1960s. He died in 2003 after publishing newly found manuscripts with the French semiologist Simon Bouquet (Saussure, 2002).

It is worth noticing that the ideas developed in the Geneva School of linguistics were not grounded in the radical anti-realism developed in France and which later turned into the postmodern movement. Some French scholars radically interpreted Saussure's ideas on the rejection of reference (linguistic theory is not about reference) and assumed that there is no such thing as reference or objective knowledge. These ideas converged with increasingly popular ideas on radical anti-realism, nominalism, and solipsism supported by postmodern philosophers. Although Saussurean structuralism was understood by the Geneva scholars as founded on the relative and differential notion of *value*, they remained reluctant in adopting a radical view on these issues, probably because they were, as Saussure himself was, much concerned with empirical and descriptive adequacy.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); De Mauro, Tullio (b. 1932); Dialogism, Bakhtinian; Expressive Power of Language; Language as an Object of Study; Literary Theory and Stylistics; Personality Factors in Spoken Discourse; Poetry: Stylistic Aspects; Realism and Antirealism; Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Structuralism; Stylistics: Pragmatic Approaches; Text and Text Analysis; Topic and Comment.

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Genre and Genre Analysis

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Genre in Literary Studies

When, in the 18th century, English commentators wished to follow their classical predecessors, Plato and Aristotle, in distinguishing among types of artistic production, they borrowed the word *genre*, 'kind,' from French. The term was initially applied to literary texts, which had also been the concern of the classical commentators. All literary genres were considered to be recognizable by their adherence to conventions of form, content, and use of language. For example, Aristotle, in Chapter 6 of the *Poetics*, defined and described epic, lyrical, and dramatic poetry by identifying their constituent parts. Of tragic drama, he wrote (quoted in Dorsch, 1965: 39):

> Necessarily . . . every tragedy has six constituents, which will determine its quality. They are plot, character, diction, thought, spectacle, and song. Of these, two represent the media in which the action is represented, one involves the manner of representation, and three are connected with the objects of the representation; beyond them nothing further is required.

In a similar vein, but over 2000 years later, the Romantic essayist William Hazlitt began his *Lectures on the English Poets* (1818 [1910]: 1) by focusing on the content, form, and phonological features of poetry:

> In treating of poetry, I shall speak first of the subject-matter of it, next the forms of expression to which it gives birth, and afterwards of its connection with harmony and sound.

According to classical Greek literary theory, the distinction among lyric, epic, and dramatic poetry was found in their different use of narrative voice: In lyric poetry, only the narrator's voice was heard; in epic, the narrator spoke alongside the characters; and in dramatic poetry, only the characters' voices were heard. Despite a longstanding tendency among neoclassical commentators to treat genres as discrete and stable, writers inevitably mixed them; for instance, Shakespeare mixed prosaic comedy and tragic verse by following the murder of Duncan with the comic porter's scene in *Macbeth*, and in *Hamlet* (Act II, Scene ii), he parodied the critics of his time through Polonius's pedantic distinctions among the genres of 'tragedy, comedy, history, pastoral, pastoral-comical, historical-pastoral, tragical-historical, tragical-comical-historical-pastoral' and so on.

By Hazlitt's time, the proliferation of new genres, such as the novel, and the Romantic critic's preference for the unique and original over the generic and conventional led to the gradual decline of the importance of the concept of genre in literary studies. As a result, in literary studies and in other esthetic fields, such as art and film criticism, to describe something as a 'genre piece' was to stigmatize it, a process some writers and critics have been at pains to challenge (e.g., Braudy, 1985):

> No part of the film experience has been cited more consistently as a barrier to serious critical interest than the existence of forms and conventions, whether in such details as the stereotyped character, the familiar setting, and the happy ending, or in those films that share common characteristics – Westerns, musicals, detective films, horror films, escape films, spy films – in short, what have been called *genre* films. Genre films especially are criticized because they seem to appeal to a preexisting audience, whereas the film 'classic' creates its own special audience through the unique power of the film-making artist's personal creative sensibility.

In the 20th century, certain critics began to rehabilitate the concept of genre in literary studies. Rather than conceiving of genre as a fixed, absolute set of conventions, however, modern critics see genre as a dynamic set of conventions that are related to changing social institutions and purposes. Structuralist critics redefine genre as a set of expectations that a reader acquires from his or her reading. These expectations may be fulfilled or frustrated in any further act of reading, each one of which reshapes one's generic expectations. The literary critic's role, therefore, is not to state the formulas to which literary texts must adhere, but, at least in part, to expose the expectations that account for particular esthetic responses. The structuralist critic also tends to favor those works of literature that set out to challenge prevailing expectations through parody or denial, as Eichenbaum (1925; cited in Scholes, 1974: 88) noted:

> In the evolution of each genre there are times when its use for entirely serious or elevated objectives degenerates and produces a comic or parodic form. The same phenomenon has happened to the epic poem, the adventure novel, the biographical novel, etc.

Eichenbaum argued that the genre is 'regenerated' through the playful subversion of conventions that enable the creation of new forms.

Genre in Language Studies

Structuralist critics view literature as a self-contained system with its own codes and conventions. In contrast, another major figure, Mikhail Bakhtin, related literary language to the wider and hitherto neglected

system of codes and expectations governing discourse in general. In 'The Problem of Speech Genres,' Bakhtin (1952–1953 [1986]: 60) wrote:

> Each separate utterance is individual, of course, but each sphere in which language is used develops its own *relatively stable types* of these utterances. These we may call *speech genres* . . . Special emphasis should be put on the extreme *heterogeneity* of speech genres (oral and written). In fact, the category of speech genres should include short rejoinders of daily dialogue (and these are extremely varied depending on the subject matter, situation, and participants), everyday narration, writing (in all its various forms), the brief standard military command, the elaborate and detailed order, the fairly variegated repertoire of business documents (for the most part standard), and the diverse world of commentary (in the broad sense of the word: social, political). [italics in original].

In language studies, in the decades following Bakhtin, the term 'genre' has been appropriated by linguists who wish to explore nonliterary spoken and written discourse in which expectations of conventional use of text structure, lexis, and syntax are likely to be satisfied; for example, academic research articles, letters of application for employment, recipes, and so-called 'service encounters' in which customers interact with shopkeepers in order to purchase goods. Despite common interests, there is considerable divergence in why and how these linguists use the term 'genre' and undertake genre analysis.

Genre in Systemic-Functional Linguistics

Systemic-functional linguists employ genre as part of their project to relate language use to its social context, in particular, 'the context of culture.' Interest in genre arose out of a growing sense of the inadequacy of the concept of 'register' to account for the contextual aspects of text. Register analysis assumes that textual features can be predicted because texts vary conventionally in relation to three 'situational variables'; namely, 'field' (subject matter), 'tenor' (relationship between participants in the interaction), and 'mode' (whether the text is written or spoken). These situational variables did not deal with *why* the text might have been written or spoken. The realization that a text might be shaped and so categorized in relation to its communicative purpose led to a resurgence of interest in a text's genre; that is, how a text relates systematically to its context of culture.

For example, the register of entries in travel guidebooks might vary according to the writer's relationship with the intended readership (a formal relationship with erudite connoisseurs of, say, art history and architecture, or an informal relationship with student backpackers); the subject matter covered by the entries (fields such as food, wine, history, architecture, beaches, night clubs, and various types of accommodation); and the mode (usually written but possibly with some appeal to spoken discourse in the less formal realizations). None of these situational variables takes into consideration *why* tourist guidebooks come to be written; in other words, their context of culture. Analysis of the genre of travel guidebooks would consider the cultural phenomenon of tourism: the fact that different types of people choose to travel as a leisure pursuit in which they gaze at certain things (landscape, certain buildings), eat certain kinds of food, and indulge in particular leisure pursuits (swimming, clubbing, visiting galleries, shopping for souvenirs) before moving on. A consideration of the genre of a text helps account for its content, as well as its form: A generic text is one in which conventional characteristics have developed out of an evolving set of cultural imperatives.

Systemic-functional linguists begin to analyze the genre of a text by assuming that its overall purpose is met through a sequence of stages, each of which achieves an intermediate purpose. The analyst seeks, through observation of a number of related communicative events, first to identify these stages and then to decide which are optional and which are obligatory, as well as their possible chronological order. Ideally, the analyst then arrives at the "generic structure potential" (Halliday and Hasan, 1989: 63–69) of a set of communicative events. Hasan recorded a number of 'service encounters' at a grocery, which yielded several apparently obligatory elements that she termed sale request, sale compliance, sale purchase, and purchase closure. These obligatory moves were sometimes combined with several optional elements. Hasan's notion of generic structure potential involved a considerable level of detail. The elements were not only shown to be compulsory or optional but they were also put in predictable sequences and recursive elements were identified.

Though fewer of her successors dared to be quite so detailed in their formulation of generic structure potential, Hasan's work was followed, for example, by Ventola's (1987) crosscultural comparison of Finnish and Australian English talk in a post office and gift shop and by McCarthy's (2000) discussion of talk in a hairdresser's salon and during driving lessons. McCarthy's study was particularly concerned with the interplay between the relatively predictable 'transactional talk' (which, in a hairdresser's salon, included 'arrival and checking in for appointment.' 'discussion of how the client's hair is to be cut,' and 'payment/closure at desk') and the less predictable 'interactional talk,' such as evaluative comments on the smell of the shampoo, the shape of the protective

gown, or casual conversation about the hairdresser's life and recent experiences. McCarthy argued that, though it is less predictable, the interactional talk is as important as the transactional, because it is the former type of talk that manages the client–customer relationship.

Unpredictability is an issue for genre analysis, and it is fair to say that much genre analysis favors conventional situations. Kress (1985: 19) went so far as to argue that most situations are conventional and, therefore, produce texts that can be characterized as 'generic':

> The social occasions of which texts are a part have a fundamentally important effect on texts. The characteristic features and structures of those situations, the purposes of the participants, the goals of the participants all have their effects on the form of the texts which are constructed in those situations. The situations are always conventional. That is, the occasions on which we interact, the social relations which we contract, are conventionalized and structured, more or less thoroughly, depending on the kind of situation it is. They range from entirely formulaic and ritualized occasions, such as royal weddings, sporting encounters, committee meetings, to family rituals such as breakfast or barbecues or fights over who is to do the dishes. Other, probably fewer occasions are less ritualized, less formulaic; casual conversations may be an example.

Despite Kress's skepticism about casual conversation, McCarthy's (2000) discussion of interactional talk and Eggins and Slade's (1997) exploration of casual conversation suggested that casual talk is at least partly amenable to genre analysis. Eggins and Slade (1997: 229) identified, for example, different types of narrative that populate everyday talk, and they proposed a generic structure for gossip. They made the following observation:

> Storytelling is very common in casual conversation. It provides conversationalists with a resource for assessing and confirming affiliations with others.

Like McCarthy, Eggins and Slade viewed interactional speech genres as crucial in establishing, negotiating, and maintaining group identity. Through stories that illustrate and dramatize cultural values, conversational participants manage in-group membership.

Ultimately, what distinguishes the systemic-functional genre analyst is his or her focus on the text (spoken or written) as the source of evidence for generic classifications. The procedure is an iterative one: The analyst gathers together examples of the genre, looks at their structure, and breaks each example down into purpose-driven stages. Because each stage has a different purpose, the assumption is that each stage will be differently realized linguistically. The analyst, therefore, seeks to describe the 'realization patterns' of each stage of the generic text. The presence of distinctive patterns reinforces or challenges the analyst's intuition that the texts are generically related. Critics argue that the procedure is circular: If the analyst finds an example that does challenge his or her intuition, the model is simply adapted to accommodate the awkward text. Thus, the model is never 'proven wrong.' However, advocates of this type of genre analysis would counter that the circularity of the process is inevitable; describing the potential structure of a genre entails an ongoing series of refinements, because the nature of a genre changes as society's demands evolve (e.g., Halliday and Martin, 1993). The way that society shapes genres is the focus of the approach taken by North American school of analysts known as the 'New Rhetoricians.'

Genre in 'the New Rhetoric'

The evolving nature of genres is a preoccupation for at least some of the American genre analysts known as the 'New Rhetoricians' (cf., Freedman and Medway, 1994). The focus of the New Rhetoric is "centered not on the substance or the form of discourse but on the action it is used to accomplish" (Miller, 1984: 151). This school of genre analysts, therefore, situates genres in a thick ethnographic description of the communities that give rise to them, whether these communities are tax accounting firms (Devitt, 1991), bank offices (Smart, 1993), or scientific researchers (Bazerman, 1988; Myers, 1990).

For example, Bazerman (1988) looked at the gradual evolution of the experimental article in science and accounted for its changing form and structure in the evolving character and activities of the academic communities that have increasingly come to communicate through research papers. Thus, the experimental article grew out of the broadening of the scientific community in the age of Newton and of the substitution of the replicable experiment for the public demonstration. As experiments became more sophisticated and costly, replicability in principle replaced replication in practice; meanwhile, the success of the physical sciences gave their preferred forms of communication a prestige that was borrowed by other disciplines such as psychology and the social sciences. In those disciplines that are less obviously amenable to empirical research, the formal elements of the research article have a persuasive as much as a practical function. The moral of the New Rhetoricians' work on genre is that it is a negotiable 'social fact,' rather

than an invariable set of conventions, as for example, in Bazerman (1988: 8):

> Formal definitions, expected features, institutional force, impact, and understandings of the genre vary through time, place, and situation. That variation is an important part of the story. Each new text produced within a genre reinforces or remolds some aspect of the genre; each reading of a text reshapes the social understanding. The genre does not exist apart from its history, and that history continues with each new text invoking the genre.

Although New Rhetoricians are concerned that students understand the history and changing nature of genres, they are less inclined to offer formulaic descriptors of specific generic texts. In this, they differ both from the systemic functionalists and from those who come to genre analysis from applied linguistics, and specifically English for Specific Purposes (ESP).

Genre in Applied Linguistics

Applied linguists' analyses of genre share something of the approaches of both the systemic-functionalist school and the New Rhetoricians. Like the latter, they favor ethnographic descriptions of the 'discourse communities' who use genres to achieve social actions (cf., the notion of a 'rhetorical community' proposed by Miller, 1994). It is the needs of the discourse communities that are linked to the formal qualities of generic texts, usually described as a sequence of 'moves' that recall the generic structure potential of the systemic functionalists.

One of the best-known accounts of genre in this tradition is Swales' (1981, 1990) account of research article introductions in the sciences and social sciences. He refined his model into a three-move sequence, the overall function of which within the academic community is to 'create a research space.' This goal is accomplished by 'establishing a territory' (for example, by making a topic generalization and surveying the literature); 'establishing a niche' (for example, by questioning past research or adding to its scope); and 'occupying the niche' (for example, by previewing one's own research). Within the research community, the research article introduction is used rhetorically to align oneself with or against a research tradition and to frame stronger and weaker claims to knowledge. Further work along these lines has been published on business correspondence (Bhatia, 1993), quantity surveying reports (Marshall, 1987), and economics discourse (Dudley-Evans and Henderson, 1990).

Where systemic functionalists rely initially on the genre analyst's intuitions to break down a text into purposive stages, focusing mainly on multiple examples of the text type and looking for realizational patterns that justify the intuitive categorizations, the applied linguist checks his or her stages or moves against evidence garnered from the discourse community, through observation and interview.

Changing Conceptions of the Discourse Community

The 'discourse community' concept was based on the sociolinguistic notion of the speech community, whereby similarities in speech could be accounted for by the speakers' living in a community defined by geographical space, social class, gender, ethnicity, and so on. In a discourse community, the members may be dispersed widely and of different social classes, genders, and ethnicities, but they are linked by a common set of communicative purposes; for example, they might need to write research articles for international refereed journals, or they might need to write business letters, such as letters of application for a job. For Swales (1990), discourse communities have six identifying characteristics:

1. A discourse community has a broadly agreed set of common public goals.
2. A discourse community has mechanisms of intercommunication among its members.
3. A discourse community uses its participatory mechanisms primarily to provide information and feedback.
4. A discourse community uses and hence possesses one or more genres in the communicative furtherance of its aims.
5. In addition to owning genres, a discourse community has acquired some specific lexis.
6. A discourse community has a threshold level of members with a suitable degree of relevant content and discoursal expertise.

The influence on Swales' work of academic genres is clearly discernible here. A group of physicists or biologists, say, would have a set of research goals, journals, and conferences with which to give information and feedback. The group would have several genres at its disposal (research articles, reports to funding agencies, conference papers, popularizations), and its members would have relevant expertise (they would all likely be educated to degree level and beyond). However, more recent work has addressed the restrictive and static nature of this tentative description of the discourse community. It is difficult to fit diffuse discourse communities into Swales's model: What is the discourse community that produces and reads, say, a tabloid newspaper, or even a popular science article in a magazine like *New Scientist?* In those examples, writers and readers

seem to have different levels of expertise. Junk mail seems to be a genre, but it is difficult to characterize the discourse community that produces or consumes it. Several attempts have been made to redefine the discourse community. Consider Barton's (1994: 57) definition:

> A discourse community is a group of people who have texts and practices in common, whether it is a group of academics or the readers of teenage magazines. In fact, discourse community can refer to several overlapping groups of people: It can refer to the people a text is aimed at; it can be the people who read a text; or it can refer to the people who participate in a set of discourse practices both by reading and writing.

In this definition, Barton brought out the different orientations each individual has to the discourse community to which he or she belongs. We can imagine a novice language teacher joining a teachers association and attending conferences and receiving its newsletter. After a while she might lose interest, stop attending conferences, and throw out the newsletter when it comes through her letterbox. Later, however, she might begin to undertake a further educational qualification. She might start attending conferences again, read the newsletter, and even contribute some articles based on her further study. She might then be invited to serve on a committee of the association and contribute to the making of policy and the organization of association events. In short, over time, the individual's status in the community shifts – it may be marginal or it may be central. A central member will have more say over the ethos of the community and will have more resources at his or her disposal for communication than a marginal member. If we suppose that this fictional teacher is typical of members of a discourse community, then we can begin to rethink discourse communities as large, fuzzy, porous, dynamic groupings, rather than as a static set of qualified individuals. Presumably, too, our imaginary teacher has other interests, domestic and public, that simultaneously involve her in different discourse communities to different degrees.

In addition, Barton pointed out that not all discourse communities have the participatory structure of, say, a teachers association. Magazines geared to teenagers will have a less participatory structure than newsletters produced by teachers' associations. Few of the readers will ever become writers for the magazine, and the readership will by its nature be transient and renewed, as people get older and move on. Even so, publications like this usually have a participatory mechanism, such as a letters page, where at least some of the readers can articulate their opinions or share their problems and thus constitute a visible community of which the reader is invited to feel part.

Bex (1996) adopted and adapted another concept from sociolinguistics in his redefinition of discourse communities: that of loosely knit and closely knit social networks (cf., Milroy, 1987). In her work on dialect preservation and change, Milroy observed that, when members of a speech community interact with each other regularly in their public and private lives (i.e., if they work and socialize together), then the community can be characterized as 'close-knit' and dialect is maintained. When people commute to work, interact with different people when they socialize, and have a number of links with 'outsiders,' then they are loosely tied to their speech community, and so dialect tends not to be preserved. Bex argued that this process has a parallel in discourse communities. The teacher who is an active member of an association, both reading and writing articles for the association newsletter and regularly attending conferences and leading workshops, will be closely tied to this discourse community and will have internalized more fully its generic codes and conventions than a loosely tied teacher who sometimes reads the newsletter. Readers of a magazine for teenagers would generally not move much beyond a loose affiliation with a fairly disparate community. The nature of the discourse community and the nature of the individual's involvement with it, then, are both variable. Bex (1996: 66–67) emphasized the dynamic nature of discourse communities:

> What I am proposing then is a complex interrelationship between social discourses, discourse communities, text production, and text reception. The model I have in mind is entirely dynamic. Individuals either produce, or produce interpretations of, texts according to the norms of the discourse community and the functions which the text is intended to serve within that discourse community. These are then verified by the group as meaningful, or challenged and refined. Such groups may develop highly characteristic modes of expression that remain internal to the group. However, these modes of expression are always situated historically, in that they develop from earlier 'ways of saying,' and socially, in that they interact with and take on (some) of the meanings of the larger social groups of which they are part.

Bex used this dynamic model of the discourse community to account for the generic conventions of a variety of texts, from academic texts to advertising to junk mail to literature. Such a dynamic model of the discourse community allows genre analysts to move away from the notion of genre as being confined to ritualistic sequences of speech or writing uttered to

perform predictable actions by a specific group of qualified people.

More recent work on genre in applied linguistics continues to address the concept of the discourse community in academia and highlights the danger of thinking of even close-knit discourse communities, such as those of academic disciplines, as being homogeneous, harmonious groupings of individuals. Hyland (2000: 11) observed the following:

> Communities are frequently pluralities of practices and beliefs which accommodate disagreement and allow subgroups and individuals to innovate within the margins of its practices in ways that do not weaken its ability to engage in common actions. Seeing disciplines as cultures helps to account for what and how issues can be discussed and for the understandings which are the basis for cooperative action and knowledge-creation.

Given the social nature of academic discourse, it is possible to look at some of its features in terms of how the social relations within the academic communities are negotiated. Myers (1989), for example, showed how pragmatic conventions of politeness are negotiated, even within scientific writing.

Summary

As the above discussion shows, conceptions of genre – literary and nonliterary – vary according to the interests of the analysts. Literary theorists are concerned with the categorization of literary texts and how their conventions are elegantly maintained or wittily subverted. Linguists are concerned with the relation of texts to context and focus in particular on the predictability or unpredictability of elements of the text. As a result, some analysts have focused on the descriptions of highly predictable, ritual, transactional texts, many of which seem banal in nature, such as recipes (Eggins, 1994) or reprint requests (Swales, 1990). More recently, there has been a greater attempt to identify generic patterns in less predictable interactional texts, such as casual conversation (Coupland, 2000; Eggins and Slade, 1997). In the systemic- functionalist tradition (e.g., Halliday and Hasan, 1989), the analyst collects comparable texts and attempts to find in them predictable, goal-oriented elements that are characterized by similar realizational patterns. The New Rhetoricians collect comparable texts and set them in a rich ethnographic context that attempts to account for the engagement of the individual text with the dynamic history of the genre to which it belongs. The applied linguists, whose concern is less to explain and more to teach generic conventions to novices, take from both of the other approaches and identify predictable 'moves' in generic texts while explaining their function with reference to the communicative purposes of the discourse community.

The concept of the community and its communicative needs has been central to recent conceptions of genre in linguistics. Even here, the notion of the discourse community has rapidly evolved from that of a static group of experts with clearly defined goals. The discourse community is now perceived as a diffuse group of individuals with different levels of expertise and changing social relations, whose communicative needs more or less coincide at different points of time. The logical extension of this line of thought is to consider how individuals understand genres. Chilton and Schäffner (2002: 20) wrote

> Participants in a linguistic interaction conceive of the interaction as being of a certain kind, as proceeding according to certain patterns of linguistic interaction that they have conceptualized in memory, and in which they may be more or less skilled. The conceptualization and its deployment in the ongoing activity define that activity: There is no genre form independent of the participants' conceptions and preconceptions.

There is truth in this assertion, or systemic functionalists, New Rhetoricians, and applied linguists could not begin to group together those texts that they believe belong to the same genre and begin their analysis. However, genre analysis can be conducted with reference to the individual's knowledge and expectations, the structure of the discourse communities in which he or she is situated, and the more-or-less conventional texts produced to serve those communities' communicative purposes.

See also: Halliday, Michael A. K. (b. 1925); Popularizations; Prague School; Speech Genres in Cultural Practice; Swales, John (b. 1938); Text and Text Analysis.

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Genres in Political Discourse

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A 'genre' is a more or less stabilized and habitual linguistic way of acting and interacting, characterized by a distinctive linguistic form or structure, associated with specific communicative purposes, and with particular social or institutional contexts (Swales, 1990; Bhatia, 1993). For instance, giving a speech, conducting an interview, and having a debate are all types of political genre. The category of 'genre' is related to what some scholars call 'text type' (de Beaugrande and Dressler, 1981), and to 'activity type' (Levinson, 1979). Analysis of the linguistic forms of genres sometimes focuses on 'generic structures' (Halliday and Hasan, 1989), the overall organizational pattern that distinguishes one genre from another, seen in terms of particular elements (or 'stages') occurring in a particular order – for instance, news reports in the press characteristically consist of a headline, plus a lead paragraph that summarizes the story, plus a variable number of 'satellite' paragraphs that fill out details. Bell and van Leeuwen (1994: 124–177) analyze "adverserial political interviews" in this way. Other more cognitively oriented research analyzes the characteristic topical structures of genres in terms of macrostructures and macrotopics (van Dijk, 1980). Genres also have distinctive features of linguistic form at other levels of analysis. For instance, the organization of 'turn-taking' (the distribution of turns at talking between participants) in political interviews is different from that in doctor-patient consultations (Heritage and Greatbatch,

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A 'genre' is a more or less stabilized and habitual linguistic way of acting and interacting, characterized by a distinctive linguistic form or structure, associated with specific communicative purposes, and with particular social or institutional contexts (Swales, 1990; Bhatia, 1993). For instance, giving a speech, conducting an interview, and having a debate are all types of political genre. The category of 'genre' is related to what some scholars call 'text type' (de Beaugrande and Dressler, 1981), and to 'activity type' (Levinson, 1979). Analysis of the linguistic forms of genres sometimes focuses on 'generic structures' (Halliday and Hasan, 1989), the overall organizational pattern that distinguishes one genre from another, seen in terms of particular elements (or 'stages') occurring in a particular order – for instance, news reports in the press characteristically consist of a headline, plus a lead paragraph that summarizes the story, plus a variable number of 'satellite' paragraphs that fill out details. Bell and van Leeuwen (1994: 124–177) analyze "adverserial political interviews" in this way. Other more cognitively oriented research analyzes the characteristic topical structures of genres in terms of macrostructures and macrotopics (van Dijk, 1980). Genres also have distinctive features of linguistic form at other levels of analysis. For instance, the organization of 'turn-taking' (the distribution of turns at talking between participants) in political interviews is different from that in doctor-patient consultations (Heritage and Greatbatch,

1991). And there are genre differences in intertextuality – the way one text is connected with others – for example, scientific articles and political reports in newspapers represent the words of others in different ways (de Beaugrande and Dressler, 1981).

Pragmatic research on genre focuses on the importance of contextual cues in the way people interpret texts. One approach is in terms of prototype theory (Rosch, 1973), which helps to explain why texts that differ in their linguistic structure from central instances of a particular genre may nevertheless be interpreted as instances of that genre on the basis of contextual cues – for instance, an article written by a scientist on the basis of scientific research in a scientific journal is likely to be interpreted as a scientific report, even if it differs linguistically quite markedly from most scientific reports (Paltridge, 1995).

Genre can be seen as one of three main analytical categories in discourse analysis: a genre is a way of (inter)acting, a 'discourse' is a way of representing particular aspects of the world (e.g., there are liberal, conservative, and social democratic discourses in the field of politics, which represent matters such as social welfare differently), and a 'style' is a way of being, an identity (e.g., there are different leadership styles in politics, such as the styles of British Prime Ministers Winston Churchill, Margaret Thatcher, and Tony Blair). Genres are best distinguished at the level of social practices that are relatively stable and durable over time, and particular concrete events, such as an actual political speech or interview, can be analyzed in terms of which genres and combinations of genres they draw upon. Much actual political text and talk is hybrid with respect to genres, i.e., combines different genres together (Fairclough, 1995a,b; Lauerbach, forthcoming).

An account of specifically political genres faces the difficulty that the field of politics is not unambiguously delimited but is socially constructed, and open to different competing constructions. The feminist slogan of the 1960s and 1970s, 'the personal is political,' is one indication of the difficulties here. Are we to assume a clear separation between the personal and domestic as elements of 'private' life, on the one hand, and politics as an element of 'public' life, on the other? Are gender relations in the household a form of political relation, or do political relations only obtain between the parties and factions of parliamentary politics? What about extraparliamentary movements and campaigns, such as those of environmental groups or protests against the policies of the World Trade Organization – are they a part of politics? Is there a clear distinction between politics and government, or politics and media, given that government is so much the target and focus of politics, and that so much of even parliamentary politics is now mediated through the press, television, and even the Internet? And are we to regard talk of the politics of organizations (such as businesses and universities) as merely a metaphorical appropriation of the term, or see the field of politics as including the many different types of organization as well as 'national' politics? What about local politics, international politics, and what is increasingly referred to as 'global' politics? How one defines and delimits politics is itself a political choice, and it determines how one delimits the genres of politics.

Here is a relatively broad view of politics, one that focuses on the political sphere as a distinct and partially institutionalized area of social life, and therefore excludes household politics and the politics of particular organizations, such as schools or workplaces. The political sphere, for purposes of this article, is that dimension of social life in which different social groups act in pursuance of their particular interests, needs, aspirations, and values. Political interaction between different social groups has both a cooperative character in that there is a search for a *modus vivendi* and a conflictual character in that there is a struggle for power (Chilton and Schäffner, 2002). They may do so at different scales (locally, regionally, nationally, and internationally), although it is the national scale that has received most attention in political theory and analysis, problematically, given the current growth of international political entities. Politics in this sense includes the political system (parliament, political parties, elections, structures of political communication, etc.), but also includes 'grassroots' or 'social movement' politics, and the 'mediatized politics' of the printed and broadcast media (Fairclough, 1995a). These are analytically distinguishable but overlap considerably in concrete events. The political sphere can be seen as the sphere that connects the state and the lifeworld (or 'civil society'), and one dimension of its internal heterogeneity is that it ranges from stabilized and institutionalized structures to unstable, fluctuating, emergent political tendencies and initiatives. Settled practices and vested interests precariously coexist with movements in and pressures from the lifeworld, and what counts as political (open to action in pursuance of alternative policies) shifts as areas of social life are politicized and depoliticized, brought into and taken out of the sphere of politics (Muntigl, 2002).

In accordance with this view of politics, political genres will be taken to include genres associated with the political system (e.g., parliamentary debate, political manifestos and programs, parliamentary or party conference speeches by political leaders, policy documents), mediatized political genres (e.g.,

political news reports, political interviews, political 'chat shows,' party political broadcasts, political advertising in the press and on billboards), the political public sphere (e.g., public meetings, campaign literature of social movements, political forums, and focus groups). The range of genres is thus extensive, and this list of examples is by no means exhaustive. Most of the literature has tended to focus on particular genres (political interviews and parliamentary debates have, for instance, received considerable attention), but there are arguments for also attending, particularly in the case of more institutionalized areas of politics, to 'chains' or 'networks' of genres that constitute the discourse dimension of political systems, the discourse 'technologies' so to speak of institutionalized politics. Thus, in the area of political communication there are systematic connections between, for instance, policy documents or major political speeches, press releases and news conferences, and reports in the media, and there are regular and predictable transformations in language as material is moved along such a chain of genres (Fairclough, 2003).

This article focuses on linguistic research on political genres (including linguistic, pragmatic, sociolinguistic, discourse, and conversation analysis), but it is important to acknowledge that various disciplines contribute to analysis of political genres, including political science and media studies. Very limited reference is made here to this broader body of research (Dryzek, 1990; Corner, 1995; Livingstone and Lunt, 1994), but research on political discourse in general and political genres in particular is most productively conceived as interdisciplinary analysis in which language and discourse analysts can make a specific contribution to political, cultural, and media research, while at the same time enriching themselves theoretically and methodologically through dialogue with other disciplines (Fairclough, 2000).

This articles focuses on four genres associated with the political system, mediatized politics, and the political public sphere: political interviews, political speeches, policy documents, and public sphere dialogues.

Political Interviews

Political interviews have attracted considerable research interest as the genre that has been most potent in the way television has transformed the character of politics in the past 50 years. The history of broadcast interview (Bell and van Leeuwen, 1994) shows a shift from deferential journalists putting tentative questions to distant and sometimes impatient politicians, to a situation in which journalists confidently and sometimes aggressively quiz or try to corner politicians, on behalf of the public as they commonly claim, while politicians have become accomplished television performers and even media personalities. The boundary between politics and media has radically shifted, and politics now has a thoroughly mediatized character.

One body of research on political interviews has adopted the method of 'conversation analysis' (Heritage and Greatbach, 1991; Clayman and Heritage, 2002). Conversation analysis focused initially on everyday conversation but increasingly has turned its attention to institutional talk in, for instance, doctor-patient interactions and news interviews, treating these as adaptations of everyday conversation to fit specific institutional purposes that reduce the diversity of features characteristic of the latter, and develop the normal conversational activities that are retained in specialized ways. For instance, features of 'turn-taking' (organizing the distribution and alternation of participants' turns at talking), which are a pervasive characteristic of conversation, are retained but in a distinctive form. Types of turn are distributed according to the institutional role of participants, most obviously in that it is only interviewers (IR) that ask questions, and interviewees (IE) that provide answers. IR questions are commonly preceded by statements that are standardly treated by IE as 'prefaces' to questions in that they do not respond to such statements but wait for a question before responding. There are features of the design of news interview talk which (a) achieve the 'task' that participants have to produce talk for an 'overhearing' news audience, talk that is addressed to an audience rather than addressed by IR and IE to each other (which would position the audience as 'eavesdroppers' on a conversation), and (b) meet the constraint that interviewers should "maintain a stance of formal neutrality towards interviewee statements and positions" (Heritage and Greatbatch, 1991: 106). For instance, 'response tokens' (such as 'yes,' 'oh,' 'really,' 'mm hm'), which are regularly produced in everyday conversation by co-participants in the course of an extended turn by one participant, are not produced by IR in the course of extended answers by IE, and, in withholding them, IR 'declines' the role of primary addressee in favor of the news audience. And IR questions that might be taken to be 'hostile' and therefore in breach of IR neutrality are generally not treated as expressing IR's opinion but are merely designed to solicit IE's viewpoint. Participants in news interviews overwhelmingly comply with such interactional norms.

Although conversation analysts emphasize that the norms of political interview are socially constructed and subject to social change, they have tended to

understate the diversity and variability of contemporary forms of political interview. I see this as a problem of levels, as I indicated earlier. Conversation analysts have described a genre of political interview that has been perhaps the dominant genre, one with a normative power in terms of what interviewers and interviewees tend to recognize as what they should do, one that has achieved a certain stability and durability at the level of the social practices of politics, which can constitute a powerful point of reference in actual political interviews but is not instantiated in any simple way within them. Actual events, actual text, and talk are more diverse and hybrid with respect to genres. One response to this is to distinguish different types and styles of political interview (Bell and van Leeuwen, 1994), but clear-cut typologies are difficult to arrive at. Another approach is to recognize that although there is a measure of stabilization of types and styles (including the personal styles of leading broadcast journalists), political interviews as events are performances that variably, and more or less innovatively, draw upon and combine genres which have a certain stability and uniformity at the level of social practices (Fairclough, 1995a,b; Lauerbach, forthcoming).

Bell and van Leeuwen (1994) analyze one particular type of political interview, the 'adverserial' political interview, in terms of its generic structure, seeing it as made up of the following 'stages': (a) greeting, (b) soliciting opinion, (c) checking, (d) challenging, (e) entrapment, and (f) release. The interview begins on a cooperative note, with the interviewer as host greeting the interviewee as guest. The interviewer then asks an 'open' question giving the interviewee the chance to state his views in the way that he wants to ('soliciting opinion'). The shift from cooperation to contest begins with 'checking,' in which the interviewer prepares the ground for challenges by checking facts and figures. The interviewer then moves onto the offensive by confronting the interviewee with statements that contradict or weaken the latter's position ('challenging'). 'Entrapment' is a sort of verbal checkmate, a statement with which an interviewee can neither agree nor disagree without damaging his or her position. The final stage is 'release,' a return to cooperation, in which the interviewer asks a question (often dealing with future prospects or aims) that the interviewee is allowed to answer without challenge. Some of these stages may be absent from adversarial interviews – the interviewer may move straight into challenges after the greeting – and the central stages occur recursively (e.g., there may be several sequences of challenge and entrapment). Although the whole of such an interview consists of a series of questions and answers, the interviewer's questions vary in their linguistic form and in their illocutionary force in different stages of the interview. Their analysis thus moves toward forms of pragmatic analysis, which are more fully developed in other research (e.g., Fetzer, in Chilton and Schäffner, 2002), in which the focus is on the relationship between what is said and what is meant, and on such specific issues as directness and indirectness, politeness and impoliteness, and presupposition.

Fairclough (1995b) is an analysis of a political panel interview in the course of an election campaign between a television journalist and representatives of the three main British political parties. The focus is on genre hybridity, on the slippage between conventional political interview of the type described by Heritage and Greatbatch (1991), everyday conversation, and an entertainment genre that at points approximates a comedy routine. Such genre hybrids are a general characteristic of mass media and a specific characteristic of mediatized political genres. They are a facet of the fluid and shifting character of the political sphere, that is, of its shifting relations with other spheres, including those of the media and of everyday life (the 'lifeworld'). Another example is political 'chat shows,' in which politicians engage in 'chat,' – conversational language specialized for purposes of entertainment – rather as film stars or pop idols do (Livingstone and Lunt, 1994; Fairclough, 1995a).

Political Speeches

I referred at the beginning of this article to the common view of the 'generic structure' of genres – particular elements occurring in a particular order. I also defined a 'genre' as a more or less stabilized and habitual linguistic way of acting and interacting. These 'elements' are characteristically themselves actions – so that a genre is a way of (inter)acting, which is composed of constituent actions. However, the assumption that these constituent actions are necessarily strictly ordered is not sustainable. They are in highly ritualized genres (e.g., the official opening of a new parliamentary session), but this is not a defining feature of genres as such. For instance, Graham, Keenan, and Dowd (2004) analyze historical continuities in 'call to arms' speeches from Pope Urban II (1095) to George Bush (2001). They identify four 'generic features' of such speeches: (1) an appeal to a legitimate power source that is external to the orator, and which is presented as inherently good (e.g., God, or the nation), (2) an appeal to the historical importance of the culture in which the discourse is situated, (3) the construction of a thoroughly evil Other (e.g., terrorism), and (4) an appeal for unification behind the legitimating external power source.

The authors analyzed some 120 of such speeches, and the particular realization, including the particular ordering of these generic elements, is predictably variable.

A different approach to analysis of political speeches is based on 'functional pragmatics,' which aims at reconstructing the 'deep' actional structure of texts through analysis of their textual 'surface.' Sauer (2002) analyzes one of a series of commemorative speeches (British Prime Minister John Major's speech) given by senior politicians on the 50th anniversary of the allied victory in World War II. One focus of his analysis is the 'importation' of textual elements into this primarily epideictic address (eulogy), which gives it a heterogeneous character, including a mixture of genres. Specifically, these are elements of Conservative Party neoliberal ideology that introduce the genre of party political speech. Sauer (p. 131) also notes a 'populist' element that enters through "the classical rhetorical technique of contrasting sublimity with popular expressions" (e.g., "We are, as it were, still rubbing our eyes after 1989 wondering if it can be real"), a characteristic I also identified in Tony Blair's speech on the occasion of Princess Diana's death (Fairclough, 2000). Such 'conversationalization' of political language is pervasive in contemporary politics.

Muntigl (2002) focuses on the innovative political work that is done in major political speeches, specifically the 'politicization' of certain issues in the sense of constituting them as issues for political debate, and the 'depoliticization' of others. He analyzes a speech by the European Commissioner responsible for employment, industrial relations, and social affairs, Commissioner Flynn, in which employment policy at a European Union (EU) level is opened up as a political issue (politicized), but, at the same time, is depoliticized by projecting the particular policies adopted by the EU as the only possible ones, ruling out alternatives. Muntigl's analysis includes the generic structure of the speech, and semantic and grammatical analysis of how particular social groups and their policy positions are positioned in relation to each other. I adopted a similar approach to a major policy speech of Tony Blair on the "new international community" at the time of the Kosovo war (Fairclough, 2000), showing how the speech constituted 'the international community' as a new and only apparently inclusive actor in international affairs and especially military interventions in the affairs of sovereign states, which could be interpreted in Muntigl's terms as the simultaneous politicization of interventions on claimed 'humanitarian' grounds and their depoliticization through excluding alternatives to the particular policies proposed. In both cases, one can see an important element of the action of such policy speeches in terms of space: 'carving' out a new EU space for employment policy interventions, and a new 'global' space for military interventions on the part of a largely self-appointed 'international community' (in effect, the United States and its allies). In discourse analytical terms, this political genre contributes to the emergence and hegemony of new discourses.

Policy Documents

Discussed here briefly is work on the genesis of policy documents within the EU (Wodak, 2000), which draws attention to a complex collective and negotiated process of production associated with this genre (as also with other political genres, such as political news reports). Successive drafts of the policy document were debated and altered in the EU Competitiveness Advisory group, which consists of representatives of the employers and the trade unions, as well as some politicians and bureaucrats. This analysis locates this one genre as an element in a chain or network of genres (including committee meetings, expert opinions, documents of the EU Commission) and points to relations of recontextualization between such genres, and to the characteristic transformations that take place as elements are moved from one genre (e.g., committee discussion) to another (e.g., the policy document). One aspect of these relations of recontextualization is their 'filtering' effect: things that can be said in a meeting cannot be directly recontextualized in a policy document.

Public Sphere Dialogues

My fourth example illustrates most clearly the potential of interdisciplinary research on political genres. The foundational work of the social theorists Jürgen Habermas and Hannah Arendt on the public sphere has made it clear that the question of the public sphere is centrally the question of what forms of dialogue are available for public deliberation. Their work has been developed by Dryzek's studies of 'deliberative democracy'; the final chapter of Dryzek (2000) can be interpreted as a normative discussion of the genre of public sphere deliberation or dialogue. None of these theorists is a linguist, so what they say about public sphere dialogue is merely schematic from a linguistic point of view. However, their work can be 'operationalized' in the analysis of actual dialogues in a way that fruitfully combines social theory and analysis of discourse and genre.

The 'critical' analysis of discourse has often focused on negative critique – a critique of the dominant forms (including genres) of discourse. However, part of the objective of critical analysis is also 'positive'

critique – the normative specification of alternatives, not in a purely hypothetical way, but on the basis of forms that actually exist, if often in a marginalized way. In the case of public sphere dialogue, one can specify normative generic conditions on the basis of (to give the familiar term an ironic twist) 'best practice,' and evaluate actual dialogues in terms of these normative conditions (Fairclough, 1999). On the basis of the theoretical work on the public sphere discussed earlier, the following characteristics of good public sphere dialogue can be specified:

- Regulation: maximally open to diverse discourses and voices, interaction jointly managed by all participants
- Emergence: new individual, collective (as members of groups) and universal (as citizens, and human beings) identities can emerge
- Action: as Arendt (1998: 200) puts it, "power is actualised where word and deed have not parted company" – good public sphere dialogue leads to action, has effects on the world

Although these characteristics are formulated in an abstract way, their presence or absence in dialogue can be measured in more precise analytical terms – for instance, with respect to the first characteristic, the form of management of interaction can be specified in terms of features of turn-taking. The third characteristic points to the question of how public sphere dialogue is positioned in genre chains or networks, and it indicates that particular institutionalized regimes of governance have a partly discourse character – specifically, in this case, the existence (or nonexistence) of systematic procedures for feeding public dialogue and deliberation into policy-making processes can be seen as partly a matter of the existence of established relations of recontextualization between the genre of public sphere dialogue and the genres of policy making.

Conclusion

A vast amount has been written on political genres, including traditional and more modern forms of rhetorical analysis of especially political speeches. This article has drawn selectively from more recent research. I highlight two characteristics of political genres that have been relatively neglected but are crucial if genre and discourse analysts are to make an effective contribution to political research.

The first is the fluid and shifting character of political genres, their hybrid character, and their openness to new forms of hybridity. Politics is in a sense a 'space between,' a social sphere that, on the one hand merges into the structures of the state and the market, and, on the other, connects with the more open and diverse sphere of the 'lifeworld,' everyday life. Relations between politics and business, media, leisure, and so forth fluctuate as part of processes of social change. For instance, there is a common view that the 'official' politics of the political system has become moribund as states have begun to function more as facilitators for the emergent 'global' form of 'hypercapitalism' – real policy options have ceased to exist, old differences in political ideologies have become meaningless – and one can see the increasingly mediatized character of politics, its increasing focus on leaders who are effective television personalities, its preoccupation with image at the expense of political 'message,' as discourse facets of what are arguably structural changes.

The second is the interconnection of political genres, the relations that are contracted between them in genre chains or networks, the relations of recontextualization that obtain between them, and the linguistic transformations entailed when, for example, material from committee meetings is recontextualized in policy documents. This focus accords with the partly institutionalized character of politics as political system, including pressures to incorporate the public sphere (e.g., the contemporary integration of 'focus groups' into the political apparatus) and 'lifeworld' politics (e.g., various originally activist NGOs, which have become institutionalized). The political sphere is germane to the constitution of 'regimes of governance' on different scales ('global,' macroregional, e.g., the EU, national, and local), which regulate (with varying degrees of success) social interactions, relations, and identities. And such regimes of government have a partly discourse character, which is best captured by seeing them as distinctive networks of genres. Especially in the context of increasing 'globalization,' in which such regulation operates with extreme rapidity across vast distances of social space and across scales, networks of political genres are an inherent part of regimes of government.

See also: Activity Theory; Conversation Analysis; Critical Discourse Analysis; Discourse Semantics; Genre and Genre Analysis; Media, Politics, and Discourse: Interactions; Political Speeches and Persuasive Argumentation.

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Georgia: Language Situation

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Georgia (capital Tbilisi) officially occupies 69 500 square kilometers in northwest Transcaucasia. It lies between longitudes 40°05′ and 46°44′ east, and latitudes 41°07′ and 43°35′ north, bordering the Russian Federation, Azerbaijan, Armenia, Turkey, and the Black Sea. The last census covering this entire territory took place during the final years of Soviet rule in 1989. The main figures are presented in **Table 1**.

But two areas have been *de facto* independent of the central government for most of the period since the collapse of the USSR (1991): the former Autonomous Republic of Abkhazia (capital Sukhum) in the northwestern triangle of Transcaucasia, and the former Autonomous Region of South Ossetia (capital Tskhinval), to the south of Russia's North Ossetian republic across the main chain of the Caucasus mountains. Georgia's population (as of 2004) is lower than the 1989 figure partly because of post-1991 emigration (non-Georgians leaving largely because of ethnic

Table 1 Main population of Georgia (1989)

Ethnic group	*Population (no.)*	*Population (%)*
Whole Population	5 400 841	100
'Georgians'	3 787 393	70.1
Armenians	437 211	8.1
Russians	341 172	6.3
Azerbaijanis	307 556	5.7
Ossetians	164 055	3.0
Greeks	100 324	1.8
Abkhazians	95 853	1.8

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Table 1 Main population of Georgia (1989)

Ethnic group	*Population (no.)*	*Population (%)*
Whole Population	5 400 841	100
'Georgians'	3 787 393	70.1
Armenians	437 211	8.1
Russians	341 172	6.3
Azerbaijanis	307 556	5.7
Ossetians	164 055	3.0
Greeks	100 324	1.8
Abkhazians	95 853	1.8

tensions; Georgians themselves abandoning the homeland for economic betterment), and partly because of the loss of the afore-mentioned territories, whose own populations are reduced as a result of the respective wars with Georgia in the early 1990s (1990–1992 for South Ossetia; 1992–1993 for Abkhazia). The draft of a Georgian Language Law, which was published in 1988, with its requirement that all entrants to higher education in the republic be able to pass a test in Georgian language and literature, was a contributory factor to the ethnic strife that began to scar the body politic in the last years of Soviet communism. Many members of certain ethnic minorities, generally living compactly around Georgia's borders, tended to have little or no knowledge of Georgian.

The 1989 figures for both the basic number of Georgians and the almost 100 percent registering fluency in the mother tongue are vitiated, because since 1930, the term 'Georgian' has been used to include all of the Kartvelian peoples. The groups that fall under that title are Georgians proper (in Georgian *kartvel-eb-i*), the related Mingrelians (in Mingrelian *margal-ep-i*), the Svans (in Svan *shwan-är*), and the relatively few coastal Laz (in Laz *laz-epe/ch'an-epe*) residing here (the bulk of the Laz live along the northeast Turkish littoral). The Georgian language lacks a superordinate term for these four peoples, while 'Kartvelian' is the natural choice in English, given the expression "Kartvelian languages" (in Georgian *kartvel-ur-i en-eb-i*) as a synonym for "South Caucasian languages." The entire North Central Caucasian Bats (Ts'ova-Tush) community of ca. 5000, concentrated in the east Georgian village of Zemo Alvani, are also so categorized.

All of the Svans (circa 55 000, centered in the high valleys along the Ingur and Tskhenis-ts'q'ali rivers in western Georgia) and most of the Mingrelian-speaking Mingrelians (about half a million, in the western Georgian lowlands) have Georgian as their second (literary) language through receiving their education in Georgian-language schools. No widespread knowledge of Georgian among Svans or Mingrelians should be assumed for pre-Soviet times, despite Georgian's role as the language of worship in the Georgian Orthodox Church. Only between Mingrelian and Laz is there any degree of mutual intelligibility within the Kartvelian family; native scholars treat them as co-dialects of the so-called Zan language.

Though they never gained the status of permanent literary languages during the Soviet period, a number of books, journals, and newspapers were produced in Mingrelian from the late 1920s to 1938 (Enwall, 1992), and a language-primer was even published in Sukhum for the few Soviet Laz residents in 1935 (Feurstein, 1992). Otherwise, the only publications in these languages (and Svan) were designed for linguists and/or folklorists, rather than the native speakers themselves, who were obliged to view themselves as Georgians (hence the post-1930 census-classification). During Soviet times all Svans and most (Laz-)Mingrelians were educated in Georgian-language schools, where instruction was in Georgian and their true mother tongues were not taught; in such schools Russian was also taught from the first grade.

Russian was likewise taught *ab initio* in Armenian-, Azeri-, Ossetian- and Abkhaz-language schools (these being the other literary languages found in Georgia, in addition to Russian), while in Russian-language schools tuition was in Russian, with Georgian introduced from grade 3 (though Abkhaz became the optional second language in such schools from 1981–1982; see Hewitt, 1989). No Chechen-language schools seem ever to have been established to cater for the Chechen-speaking Kist' population of the P'ank'isi Gorge in eastern Georgia.

Georgia's independence, combined with Georgians' well-known antipathy towards Russia, has meant a drastic diminution in the teaching of Russian within Georgia proper, such that knowledge of it can no longer be taken for granted among the post-Soviet generation. According to the latest information available (2004), there were 86 Russian, 127 Armenian, 117 Azeri, and 73 mixed schools subordinate to the Ministry of Education (plus 2023 Georgian schools), and in all of them Georgian is taught from grade 1. Within South Ossetia and Abkhazia it is essentially the Soviet system that still applies, though the Abkhazian authorities do not sanction the teaching of or in the Georgian language, as reportedly desired by the republic's Kartvelian (mostly Mingrelian) residents, concentrated in the southeasternmost Gal District; Abkhazia's main *lingua franca* is Russian.

With the post-independence rise of private publishing, a number of Mingrelian publications have appeared for popular consumption. Within Abkhazia a trilingual (Russian, Mingrelian, Abkhaz) newspaper (*Gal*) has been established, and one periodically hears calls for the establishment of full literary status for this language, a move that is strenuously discouraged in Tbilisi because of the perceived threat of the political separatism that might follow.

Georgia also has small communities of speakers of Greek, Assyrian, and some Daghestanian languages (e.g., Udi). Whilst Bats is actually moribund, Udi, Svan, Laz (even in Turkey), and Abkhaz are endangered (as Mingrelian will be in the longer term, since it has been losing ground from the east to

Georgian since the 19th century), unless appropriate measures are taken.

See also: Abkhaz; Caucasian Languages; Georgian; Language Education Policy in Soviet Successor States; Russian.

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Georgian

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Georgian is spoken in the Republic of Georgia, the Zakatala district of Azerbaijan, the historical Georgian regions of northeastern Turkey, by descendants of Georgians transplanted to Fereydan in Iran by Shah Abbas (17th century) and by émigré communities established in such countries as France following sovietization but growing in Russia and beyond since the collapse of the USSR in 1991.

The Georgian language (*kartuli ena*) belongs to the Kartvelian (South Caucasian) family (*see* **Caucasian Languages**). Georgian possesses a number of dialects, which can differ sharply from both one another (e.g., western Gurian versus northeastern Khevsurian) and the literary standard. The latter is in some respects still in the process of regularization but is based on the central Kartlian dialect, in which region lies the capital, Tbilisi (formerly T'pilisi).

The language is customarily periodized as Old Georgian (5th–11th centuries) → Mediæval (12th–18th centuries) → Modern (post-1800). Iranian, more recently Russian, and now English lexical influences are marked; Greek, Armenian, Arabic, and Turkish loans have also penetrated.

The oldest inscription dates from circa 430 AD at a site near Bethlehem. Within Georgia, the church at Bolnisi boasts an inscription dated to 494. Iak'ob Tsurt'aveli's "Martyrdom of Shushanik," apparently composed between 476 and 483, represents the first work of native literature, while the oldest dated manuscript (the Sinai Polycephalon) hails from 864. The earliest survivals exhibit peculiarities in the marking of the third person indirect object/second person subject, from which they are styled *xanmet'i* 'with extra *x*' or *haemet'i* 'with extra *h*'; the nature of this distinction (diachronic versus dialectal) has been hotly debated. Little seems to have been written during the centuries of Mongol and Tatar depredations.

Georgian is written in a unique, wholly phonemic alphabet with 33 characters from left to right without any upper- versus lower-case distinction. The modern script *mxedruli* 'military; secular' evolved in the 11th century from its precursor *k'utxovani* 'angular.' This in turn developed in the 9th century from the oldest variant *mrg(v)lovani* 'rounded,' which was probably devised in the 4th century AD on the model of Greek to facilitate the spread of Christianity, adopted as the official religion by King Mirian of Kartli during the 330s. Even after the 11th century, religious texts continued to be written in a combination of the two earliest scripts, called *xutsuri* 'ecclesiastical,' such that the oldest served as the majuscule (*asomtavruli*) to the minuscule (*nusxuri*) of its successor.

Modern Georgian has 28 consonants plus five vowels (**Tables 1** and **2**).

Old Georgian additionally had the voiceless uvular plosive /q/, which in standard Georgian has merged with the voiceless back fricative, plus the palatal glide /j/, sounds retained in Svan. Circumfixes abound.

Table 1 Consonantal system

b	p	p'						m	
						v [v/f/w]			
d	t	t'						n	
			d͡z	t͡s	t͡s'	z	s	l	r
			d͡ʒ	t͡ʃ	t͡ʃ'	ʒ	ʃ		
g	k	k'							
		q'				ʁ	χ		
							h		

Table 2 Vowel system

i				u
	ɛ		ɔ	
		ɑ		

Georgian since the 19th century), unless appropriate measures are taken.

See also: Abkhaz; Caucasian Languages; Georgian; Language Education Policy in Soviet Successor States; Russian.

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g	k	k'							
		q'				ʁ	χ		
							h		

Table 2 Vowel system

i				u
	ɛ		ɔ	
		ɑ		

Table 3 Patterns of case marking and verb agreement

Grammatical role	*A/S*	*O(/P)*	*IO*
Pattern α	ERG_A	NOM_B	DAT_B
Pattern β	NOM_A	DAT_B	DAT_B
Pattern γ	DAT_B	NOM_A	GEN + /-tvis/ 'for'

Table 4 Correlation of agreement pattern, verb type, and verb series

	Series I	*Series II*	*Series III*
Type I	β	α	γ
Type II	β	β	β

Verbs divide into transitives, intransitives, 'medials,' indirects (with logical subject in the dative), and a small stative class; 'medials' often appear intransitive but largely behave morphosyntactically like transitives because the relevant forms are borrowed from corresponding transitive paradigms. Georgian (with Svan) preserves the feature, assumed to have characterized Proto-Kartvelian, whereby a transitive verb's arguments are case-marked in one of three ways determined by which of three tense-mood-aspect (or *screeve*) series the given form displays. Verbs can agree with up to three arguments by virtue of the presence of two sets (A and B) of pronominal agreement affixes. The patterns of morphosyntactic behavior (with subscripts indicating affixal agreement) are (Table 3) distributed as follows (where the transitives and 'medials' are combined as Type I verbs, while intransitives, indirects, and statives are subsumed under Type II) (Table 4).

The examples below demonstrate that, while case marking in Series II follows ergative alignment, affixal agreement is accusative, creating a split-ergative configuration. Although the Series III pattern might appear to be a better candidate for illustrating ergativity, this inverted construction developed relatively late across Kartvelian out of a past (essentially intransitive) resultative. No unique Ergative morph can be reconstructed for proto-Kartvelian. The system is illustrated by the transitive 'The shepherd (a) will toss$_\beta$, (b) tossed$_\alpha$, (c) (has) apparently tossed$_\gamma$ food down for his flock' versus the intransitive 'The priest (d) will drown$_\beta$, (e) drowned$_\beta$, (f) (has) apparently drowned$_{\beta'}$, where (a/d) represent Series I, (b/e) Series II, (c/f) Series III:

(a) mʃs'q'ɛ ms-i sɑ.mʃs'q's.ɔ-s sɑ.ʃ'm. ɛl-s
shepherd-Nom$_A$ *flock-Dat$_B$* *food-Dat$_B$*

dɑ-ø-ø-u-q'r-i-s
Prev-it$_B$-it$_B$-OV-toss-TS-he.Fut$_A$

(b) mʃs'q'ɛms-mɑ sɑ.mʃs'q's.ɔ-s sɑ.ʃ'm.ɛl-i
shepherd-Erg$_A$ *flock-Dat$_B$* *food-Nom$_B$*

dɑ-ø-ø-u-q'ar-a
Prev-it$_B$-it$_B$-OV-toss-he.Aor$_A$

(c) mʃs'q'ɛ ms-s sɑ.mʃs'q's.ɔ-s-tvis
shepherd-Dat$_B$ *flock-Gen-for*

sɑ.ʃ'm.ɛl-i dɑ-ø-u-q'r-i-ɑ
food-Nom$_A$ *Prev-he$_B$-OV-toss-Perf-it$_A$*

(d) m.ʁvd.ɛl-i dɑ-i-χrʃ-ɔb-ɑ
priest-Nom$_A$ *Prev-Pref-drown-TS-he.Fut$_A$*

(e) m.ʁvd.ɛl-i dɑ-i-χrʃ-ɔ
priest-Nom$_A$ *Prev-Pref-drown-he.Aor$_A$*

(f) m.ʁvd.ɛl-i dɑ-m-χrʃv-ɑl-ɑ
priest-Nom$_A$ *Prev-Pref-drown-Suff-he.Perf$_A$*

The languages to have undergone most Georgian influence are naturally its congeners, Mingrelian and Svan, plus other Transcaucasian neighbors, notably Bats, Iranian Ossetic, Indo-European Armenian, and Northwest Caucasian Abkhaz. As a feudal power throughout the Caucasus and source for the spread of Christianity to the north Caucasus before the coming of Islam, Georgian has left some lexical traces here, too.

See also: Abkhaz; Caucasian Languages; Georgia: Language Situation.

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Georgiev, Vladimir Ivanov (1908–1986)

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Georgiev was born on February 16, 1908. He went to school in Varna and then studied classics at Sofia University. Between 1933 and 1948 he had various study periods in universities outside Bulgaria: Vienna (1933–1934) where he studied the ancient languages of Asia Minor under Kretschmer; Florence and Berlin (1939–1940); Paris after World War II (1947). In 1948 he was appointed professor in Sofia, under Mladenov. He was very early on interested in Indo–European (I–E) and Proto-I–E (Pelasgian, Etruscan, Mycenean, Thracian, Hittite, Luvian) and in Balkan toponymy. He frequently challenged accepted views and put forward controversial theories, especially in relation to the Balkans. He worked intermittently for nearly 30 years on Etruscan, and published a summary of his findings in two volumes (Georgiev, 1970–1971), in which he maintained that there was a clear connection between Etruscan and Hittite (the question is still open). The Thracian presence in the Balkans – its effect on later Slavonic, especially as spoken by the Bulgarian population (e.g., an important dialect difference between Western and Eastern Bulgarian, the treatment of Common Slavonic *jat*' as *e* or *e/ja*, respectively, follows approximately the line of the Moesian–Thracian frontier), as well as the Thracian origin of much of the Balkan toponymy – was another of Georgiev's abiding interests, and culminated in his 1977 publication *Trakite i tekhnijăt ezik* (*The Thracians and their language*). On the question of the division of the I–E languages he argued that the traditional *centum/satəm* was irrelevant, and that six main divisions should be recognized: (a) Northern – Germanic, Balto–Slavonic, Tocharian; (b) Western – Celtic, Italic, Venetic, Illyrian, Messapic, Lepontic, Ligurian, Rhetic; (c) Central – Greek, Macedonian Phrygian, Armenian; (d) Eastern – Daco–Moesian, Albanian, Indo-Iranian; (e) Southern – Thracian, Pelasgian, Termilian (Lycian); (f) Hittite, Luwian, Lydian, Etruscan, Carian, Eteocretan (Linear A). As with many I–E questions relating to very early times and dependent on very scanty evidence, theories abound and provide a happy hunting-ground for hypotheses. Georgiev was far from having resolved all the problems he surveyed, but his learning was solid and his provocative stances gave a special zest to I–E studies.

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German

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In terms of speaker numbers, German is the most important language in western and central Europe. With English, Dutch, and Frisian (Western Frisian; Northern Frisian), it belongs to the western group of the Germanic languages. In its standardized form, however, it is linguistically more conservative, having retained more of the synthetic morphology of the common ancestor. Its dialects exhibit immense variation, with a low degree of mutual intelligibility, and the standard form emerged relatively late as a consequence of the political fragmentation of central Europe.

The Speakers of German

With approximately 100 million speakers, German ranks 10th among the languages of the world, and it is the most widely spoken language in the European Union in terms of first-language speakers. Within Europe, it is exceptional in terms of the number of countries in which it is spoken. The largest proportion is in the Federal Republic of Germany (80 million), followed by Austria (7.5 million), German-speaking Switzerland with Liechtenstein (4.5 million), and Luxembourg (350 000). German also has some official status as a regional language in Belgium, Denmark, Hungary, Italy, and Romania, and there are significant German-speaking minorities in the Czech Republic, France, Poland, Slovakia, and a number of the successor countries to

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the Soviet Union, notably Kazakhstan. However, where German-speaking minorities lack official status, the number of speakers is generally in decline.

Outside Europe, there are over a million active users of German in the United States and significant numbers in Argentina, Australia, Brazil, Canada, Namibia, South Africa, and a few other South and Central American countries. These numbers are now declining quite rapidly as German speakers assimilate to the majority linguistic community.

German has a few significant offshoots. The only example of a German-based creole was in Rabaul (Unserdeutsch, spoken in New Britain), but this is now vestigial. Pennsylvania Dutch (Pennsylvanish), deriving from Palatinate dialects, is spoken in parts of Pennsylvania, Ohio, and Ontario, although it is in decline outside closed religious communities such as the Amish. Since the Second World War, the local dialects of Luxembourg have no longer come to be perceived by their speakers as forms of German, and a standard Luxembourgish (Luxembourgeois) is becoming established. The most important language to have developed from German, though, is Yiddish, whose origin was the medieval German spoken in Jewish communities in central and southern Germany but that has subsequently developed into a distinct language, with a syntax and vocabulary unlike that of any variety of German.

The History of German

Modern Standard German (customarily referred to as *Hochdeutsch*, or High German) arose from the West Germanic dialects spoken by a number of peoples (Franks, Alemannians, and Bavarians) who settled between the north German plains and the Alps in the first centuries A.D. These dialects came to differ from other forms of West Germanic, and especially from the Low German dialects of the northern plains, through the consonant changes that are known collectively as the Second (or High German) Sound Shift. Because of this change, inherited voiceless plosives became affricates or fricatives (depending on whether they were word-initial or not), as illustrated by the pairs of cognates from English (which retained the original West Germanic consonants) and modern German in Table 1.

Table 1 Second sound shift: English and German cognates

English	*German*
pepper	Pfeffer
tin	Zinn (<z> = [ts])
water	Wasser
book	Buch (<ch> = [x])

There are continuous written records in varieties of High German from the second half of the 8th century, and the history of the German language is usually divided into four major periods. Relatively few texts, mainly of a religious character, have survived from the first period (750–1050), known as Old High German, because Latin was the dominant language of literacy. The Middle High German period (1050–1350) saw some development of secular writing, notably in the form of chivalric verse on French models. The linguistic territory was extended during this period as High German settlers moved east across the Elbe.

The third period, Early New High German (1350–1650), saw the beginnings of a slow process of standardization. Up to this time, numerous regional varieties had been used in writing, but, with the invention of printing, certain variants started to be used more widely than in their region of origin. This development was aided by the Reformation and the prestige of Luther's writings, especially his Bible translation, which often proved decisive in the preference for a particular variant over competing forms. In this way, the process of selection, as the first stage in the process of standardization, had been largely completed by the mid-17th century, and a relatively uniform High German was being used for writing in central Germany and, significantly, also in the north, where it supplanted the native Low German.

The process continued into the fourth, New High German period (1650 on) as this written variety was codified in terms of grammar, orthography, and lexis. Crucially, in the course of the 18th century, this variety gained acceptance in Catholic south Germany, Switzerland, and Austria, which had resisted a variety associated with Lutheranism and retained regionally based norms. Nevertheless, *Hochdeutsch* long remained a primarily written variety, with local dialect being the norm in speech. By the middle of the 19th century, however, a prestige pronunciation had arisen based on the north German tradition of speaking written High German precisely as it was spelled. This was formally codified for use on the stage in 1898, and it has subsequently been adopted by a majority of speakers as a spoken supraregional norm.

The Structure of Modern Standard German

Sounds and Spelling

Among the noteworthy features of German phonology is the existence of a set of affricates, specifically a labial /pf/ and dental /ts/, which have (controversially)

been analyzed as single phonological units. There is also a set of front rounded vowels, as in *fühlen* [fyːlən] 'feel,' *böse* [bøːzə] 'evil.' The opposition of voicing in obstruents is neutralized in syllable-final position, as in *ich sage* [zaːgə] 'I say' but *ich sagte* [zaːktə] 'I said.'

A striking feature of German orthography is the capitalization of nouns. Otherwise, it is broadly phonemic, if not precisely so. In particular, the tense/lax distinction in vowels is not marked in a uniform way, and there is a general principle that root morphemes retain a consistent spelling wherever possible. The Latin alphabet is used, with some modifications, specifically the symbol <ß>, used for /s/ in some words, and the umlaut symbol, which assists in maintaining the consistent orthographic shape of roots. The spelling of German was reformed in 1996 (after the initial codification in 1902) with the aim of eliminating inconsistencies. This reform has generated considerable controversy that is still ongoing, but the changes are relatively slight and chiefly affect the use of the symbol <ß> and punctuation.

Morphology

German is the only West Germanic language to retain extensive inflectional marking of grammatical categories, although the nature of this marking has often changed. The four noun cases, for example, are now marked primarily through the inflection of the determiner and/or the adjective, as in *der Mann* 'the man':

NOM: der Mann

ACC: den Mann

GEN: des Mannes

DAT: dem Mann

The three genders of the noun can only be identified through agreement and do not correlate consistently with any phonological or semantic features of the noun itself, for example, *der Band* 'the volume' (masculine), *die Hand* 'the hand' (feminine), *das Land* 'the country' (neuter).

German makes extensive use of vowel changes in inflection. Ablaut in the strong verbs (e.g., *singen* 'sing,' past *sang*. past participle *gesungen*) is found in other Germanic languages, but German has also morphologized the vowel fronting alternations known as umlaut in several functions, for example, in noun plurals (*der Bruder* 'the brother,' *die Brüder* 'the brothers'), the subjunctive (past indicative *ich war* 'I was,' past subjunctive *ich wäre*), and adjective comparison (*groß* 'big,' *größer* 'bigger').

Syntax

A striking aspect of German syntax is the position of the finite verb. In main clause statements it is the second constituent, but in questions it occurs first and in subordinate clauses it occurs finally. In verb-second and verb-initial clause types, any non-finite components of the verb phrase are placed finally, forming what German linguists term a 'bracket construction' enclosing the other constituents:

deinen	Bruder	**habe**	ich	zufällig
your	*brother*	*have*	*I*	*by chance*

gestern	in	der	Stadt	**gesehen**
yesterday	*in*	*the*	*city*	*seen*

'I have by chance seen your brother in the city yesterday'

The preverbal position constitutes a topic slot that can be filled by any appropriate constituent. The position of other clause-level constituents depends on communicative criteria. The syntax of German has thus often been considered to be characteristically flat (Kathol, 2001), although a more conventional view is that it is an underlyingly SOV language, with the finite verb being moved into second position.

Regional and Social Variation in German

The German speech area exhibits much geographical variation, with significant linguistic differences among distant regional dialects. The area can be seen as a dialect continuum from the Alps to the coast, with the most important division being between the High German dialects of the center and south, which participated in the Second Sound Shift, and the Low German dialects of the north, which did not. The Low German dialects are closer to standard Dutch than standard German, but these areas adopted standard (High) German as their language of literacy in the 17th century. The major dialect groups within High German are West Central German (in the Rhinelands and Hesse), East Central German (in Thuringia and Saxony), Bavarian (including most of Austria), and Alemannic (in the southwest, including German-speaking Switzerland).

These dialects are very diverse, and the degree of mutual comprehensibility between even geographically quite close dialects can be remarkably low. Not all Swiss Germans, who are all competent in their local dialect, can understand the dialects of the remoter Alpine valleys. Few linguistic criteria, with the possible exception of the verb-second constraint, link all the speech varieties within this continuum exclusively, and only the long-established notion

that these are all, in some way, forms of German provides a connection, as does the use of the common standard, which is important for supraregional communication and as a unifying symbol of ethnic identity. The significance of the latter has become clear again following reunification in 1990. Nevertheless, there is significant variation in the codification of the standard between the various German-speaking countries, and some regional diversity is accepted in the standard even within Germany, particularly at the level of lexis (e.g., northern *Sonnabend* and southern *Samstag* 'Saturday').

Remarkable, too, is the sociolinguistic diversity of the German speech area in the variety of the relationships between standard German, the dialects, and other languages. German-speaking Switzerland is a classic instance of diglossia, although the nature of this diglossia is changing rapidly. South Tyrol and eastern Belgium exhibit relatively stable – and nowadays institutionalized – bilingualism, whereas in Alsace-Lorraine the centuries-old French–German bilingualism is breaking down with the rapid decline of the local dialects and the decoupling of the link between them and standard German. Within Germany and Austria the relationship between *Hochdeutsch* and the dialects varies markedly over the whole area, with the relative prestige and use of dialect increasing the further south one travels. A common pattern in central and southern Germany is the existence of a continuum of variants between near-dialect and near-standard, with speakers employing two focused varieties along this continuum that they perceive as (and label) *Hochdeutsch* and dialect. These are then used in accordance with the perceived formality of a given speech situation.

See also: Europe as a Linguistic Area; German Lexicography; Germanic Languages; Germany: Language Situation; Language and Dialect: Linguistic Varieties; Luther, Martin (1483–1546); Luxembourgish; Spelling Reform; Variation in German.

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German Lexicography

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From the Beginnings up to the 17th Century

The beginnings of German lexicography can be found in medieval glossaries. Latin-Old High German glossaries such as *Abrogans* (ca. 765, Freising), named for its first entry, and specialist glossaries such as the widely copied *Summarium Heinrici* from the 11th century, were used in language teaching and education and to help travelers with communication. Numerous similar vocabulary collections appeared up to the 14th century, arranged alphabetically or thematically (for an overview, cf. Grubmüller (1990)). In one of these, the *Engelhus* glossary (ca. 1400), a German headword is explained in German for the first time: *Segel* ('sail'). *Vocabularius ex quo* (1410) shaped the 15th century lexicographical landscape. This major thesaurus of Early New German is unrivalled: wherever German was written, copies could be found, in more than 270 manuscripts. It was first printed in 1467, and by 1505 46 reprints had appeared.

The first printed German-Latin glossary was the *Teuthonista vulgariter dicendo Duytschlender* (Gherard van der Schueren, 1477), which was based on an older German-Latin word list, *Vocabularius theutonicus* (ca. 1400). In the Humanist period, the German language competed successfully with Latin. Humanist onomastica – e.g., Hadrianus Junius: *Nomenclator omnium rerum* (Antwerp, 1567, reprinted 1976), Theophilus Golius: *Onomasticon*

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latinogermanicum (Strassburg, 1597, reprinted 1972), and Nathan Chytreaus: *Nomenclator Latinosaxonicus* (Rostock, 1582, reprinted 1974) – are important milestones in the lexicography of German. The most important alphabetical dictionaries in the transition to humanistic lexicography were Petrus Dasypodius' *Dictionarium latinogermanicum Et vice versa Germanicolatinum* (Strassburg, 1535–1536, reprinted 1974) and *Die Teütsch spraach: Dictionarium Germanicolatinum novum* by Josua Maaler [Pictorius] (Zurich, 1561, reprinted 1971).

The German Dictionary Scene between the 17th and 20th Centuries

The 17th Century

The 17th century can be seen both as a critical and an innovative phase in the history of German lexicography: discussions which continue right down to the present day began in this period concerning the lexicographical codification of German. The roots of a flourishing dictionary scene can be traced to this period.

In 1616, in Augsburg, the first volume (A–G) of Georg Henisch's dictionary *Teütsche Sprach vnd Weissheit: Thesaurus lingvae et sapientiae Germanicae* (reprinted 1973) was published. Henisch was the first German lexicographer to base his dictionary on citations, which he collected himself, and to provide sources. He listed the (High) German vocabulary of his period, including many idiomatic phrases and proverbs, mostly without Latin definitions. The dictionary, which did not develop beyond a fragment, followed the principle of lexical roots, and was motivated by cultural patriotism. It was intended to illustrate the dignity, utility, and richness of the German language. This aim made Henisch a precursor of the lexicographical debates that took place in the 17th century. These debates were conducted under the auspices of learned societies, of which the most influential was the *Fruchtbringende Gesellschaft* ('*Fructifying Society*'), which linked support for a comprehensive dictionary to the question of the status of the German language. They called for a collection of lexical roots that would illustrate the wealth of the German language and support its claim to a status equal to that of the classical languages. They also called for a thorough compilation of German vocabulary, and, given the increasing variety in linguistic standards, they wanted to codify the language, using exemplary authors. However, these discussions did not result in the creation of such a dictionary. The list of approximately 5000 lexical roots provided by Justus Georg Schottel in his *Ausführliche Arbeit Von der Teutschen HaubtSprache* (Braunschweig, 1663, reprinted 1967) can only be seen as a 'framework' for a dictionary. Kaspar Stieler's *Der Teutschen Sprache Stammbaum und Fortwachs oder Teutscher Sprachschatz* (Nürnberg, 1691, reprinted 1968) came closest to fulfilling the visions of the 'Fructifying Society.' Stieler listed about 400 to 600 lexical roots, which he explained in Latin. This dictionary is extensive in comparison with its predecessors, containing about 65 000 words. Stieler codified the contemporary everyday vocabulary, but also included poetic expressions, as well as colloquial and popular expressions.

The 18th Century

Attempts to establish a German dictionary were finally realized by Matthias Kramer with *Das herrlich Grosse Teutsch-Italiänische Dictionarium oder Wort-und Red-Arten-Schatz* (Nürnberg, 2nd edn., 1700/1701, reprinted 1982). This was a bilingual dictionary for foreign language teaching and was oriented strictly toward contemporary language usage. This practical orientation was accompanied by a high esteem for the German language. Kramer's *Dictionarium* is the most thorough representative of late 17th century German lexicography. Christoph Ernst Steinbach's bilingual *Vollständiges Deutsches Wörter-Buch* (Breslau, 1734, reprinted 1973) is also part of the tradition of dictionaries of lexical roots. It contains extensive citations, and, for the first time, a system of diacritical labels, which indicate, for example, regionalisms or obsolete words.

At the beginning of the 18th century, the so-called second lexicographical planning discussion took place, mainly at the *Societät der Wissenschaften* in Berlin, with contributions from scholars such as Bödiker, Leibniz, Jablonski, and Frisch. This focused on plans for a comprehensive monolingual dictionary dealing with the whole language system, which Leibniz (1697) sketched in *Unvorgreiffliche Gedancken betreffend die Ausübung und Verbesserung der Teutschen Sprache*. This conceptualization of a dictionary was refined by Johann Leonhard Frisch and realized in his *Teutsch-Lateinisches Wörter-Buch* (Berlin, 1741, reprinted 1977). Frisch's dictionary is more comprehensive than its predecessors, containing about 60 000 lemmata, for which examples and citations were provided. The articles contain semantic, grammatical, etymological, sociolinguistic, and phraseological information. Alongside Latin glosses, German is used as the language for definitions. Dictionary entries composed entirely in German can be found alongside 'bilingual' entries. This lexicographical practice makes the *Teutsch-Lateinisches Wörter-Buch* a link

between translation and comprehensive dictionaries. The work's conception, orientated toward a descriptive compilation of the entire language, and its inventory of words from trade and special languages taken from 15th to 17th century sources, make it an important precursor of later general monolingual dictionaries and a reliable reference work. Even today it is valued as a source for Early New High German.

Johann Christoph Adelung compiled the first comprehensive general monolingual dictionary of the German language, *Versuch eines vollständigen Grammatisch-kritischen Wörterbuchs der Hochdeutschen Mundart mit beständiger Vergleichung der übrigen Mundarten, besonders aber der oberdeutschen* (5 vols., Leipzig, 1774–1786). He began refining it directly after publication, and an improved edition of the work appeared as *Grammatisch-kritisches Wörterbuch der Hochdeutschen Mundart mit beständiger Vergleichung der übrigen Mundarten, besonders aber der oberdeutschen* (4 vols., Leipzig, 1793–1801, reprinted 1970, CD-ROM, 2000; Adelung, 1811). Adelung's decision to base his dictionary on the regional dialect of Upper Saxony and especially the usage of the Meissen 'upper classes' was criticized. However, a glance at the dictionary illustrates that there is no absolute regional limitation. The dictionary is conceptualized semasiologically. The more than 55 000 entries are ordered strictly alphabetically – a novelty in German lexicography. The vocabulary is described from a synchronic perspective. The articles contain information about grammar, orthography, pronunciation, inflectional morphology, word construction, semantics, etymology, and paradigmatics, along with examples and literary citations. Adelung tried in particular to describe words comprehensively: he regarded it as his duty "to match the terms and definitions of every word as closely as possible." For this, he used exclusively German paraphrases. The most outstanding aspect of Adelung's dictionary is the thorough explanation of the meanings of words. Pragmatics, explaining how a word can be used appropriately, are also stated in great detail and variety. These include a wealth of explanatory notes about register and a five-level system of register for evaluating the 'dignity' of words and phrases.

The *Grammatisch-kritisches Wörterbuch* was highly valued for its user-friendliness and its practical usability. It can be seen as a milestone in German lexicography, and, through its widespread distribution and documented usage, it contributed significantly to the establishment and expansion of the German standard language.

The *Wörterbuch der Deutschen Sprache* (5 vols., Braunschweig, 1807–11, reprinted 1969) by Joachim Heinrich Campe was published as a critical response to Adelung, avoiding his focus on the Meissen dialect and concentrating on the literary language of the period. Competitive and ambitious, Campe also aimed to exceed the number of entries in Adelung. He achieved this aim mainly through the inclusion of compounds and derivatives, and, not least, through coining Germanisms, including new words created by Campe himself. Other collections, such as D. W. Soltau's *Beyträge zur Berichtigung des Adelungschen grammatisch-kritischen Wörterbuchs* (1806), were also incorporated, along with numerous additions from contemporary and specialist literature. Campe did not include etymologies, and he employed a space-saving system of 14 abbreviations to denote words that were obsolete, regional, 'low', poetic, or newly created. Puristic considerations led Campe to list foreign words separately in a work entitled *Wörterbuch zur Erklärung und Verdeutschung der unserer Sprache aufgedrungenen fremden Ausdrücke: ein Ergänzungsband zu Adelungs Wörterbuche* (Braunschweig, 1801). Three years later, this was superseded by an improved edition, with the subtitle *Ein Ergänzungsband zu Adelung's und Campe's Wörterbüchern* (1813, reprinted 1969). Campe's dictionary is not particularly innovative: it is based on Adelung's in practically all aspects, and it made considerable use of the *Grammatisch-kritisches Wörterbuch*. Even a superficial comparison indicates that many articles were adopted without alteration or contained only minor modifications.

The 19th Century

In 1852, a chapter in German lexicography opens in which the historical treatment of German vocabulary is a dominant focus, with the publication of the first part of the *Deutsches Wörterbuch* (*DWB*). The *DWB* was planned and begun in the late 1830s by Jacob and Wilhelm Grimm. They saw it as a privately initiated publication of six to seven volumes, which they would work on for approximately 10 years. In the event, the work was completed only after more than 100 years of work, as an academic enterprise, with a total of 32 volumes, plus a volume of sources (Leipzig, 1854–1960/1971; CD-ROM, 2004; DWB). In the *DWB,* the Grimm brothers followed nationalistic pedagogical and political ambitions: it aimed to be a reference work for use in equal measure both by scholars and by the public interested in language, showing the Germans the wealth of their mother tongue, and it aimed to have a positive effect on German unification, which was still awaited at that time. The Grimms conceived the work as a descriptive dictionary. In 1846, Wilhelm Grimm said: "We

want to present the language in the way that it has presented itself over the past three centuries . . . . Our work will . . . contain a natural history of words." Work on the articles themselves began in 1849. Jacob worked on letters *A, B, C, E,* and *F* (up to *Frucht*) until his death (1863). To a large degree, his work determined the style of the dictionary. Shortly before his death (1859), Wilhelm completed letter *D*. Their most important successors, who shaped the *DWB* in their own ways, were Karl Weigand, Rudolf Hildebrand, Moritz Heyne, and Matthias Lexer. From 1880 onward, there were attempts to anchor the *DWB* in an institution. In 1908, the *Preussische Akademie der Wissenschaften* took it over, and the *DWB* gained the status of a national dictionary. In Göttingen, a central collecting office was established for quotations and references, which were then excerpted according to agreed criteria. In 1930, the *DWB* was domiciled in Berlin, with the establishment of an editorial department and, 78 years after the appearance of the first fascicle, the formulation of binding guidelines for the lexicographical task. After World War II, and the division of Germany, work continued in the Academies of Sciences in Berlin (GDR) and Göttingen (FRG) and was completed in 1960.

The *DWB* contains the vocabulary of written New High German, in alphabetical order, from the mid 15th century to the present. It centers on the description and analysis of meanings and different descriptions of how the words can be used. The dictionary documents chronologically the emergence, alteration, and nuancing of word meanings from their first appearance to their most recent documentation, and is substantiated with citations from sources. The etymology, cognate words, and older forms are described, along with their geographical prevalence within the German language area.

The dictionary includes vernacular, colloquial, and also 'lewd' words, along with the word stock from the older German professional jargons of hunters, miners, fishermen, etc. One peculiarity in the recording of words in the *DWB* is the generous recognition of interjections, expressions, and onomatopoeia. There is only a limited inclusion of Low German, foreign words, and proper names (particularly personal names). Despite some gaps, no other German dictionary contains and comments on the development of word usage in German texts from the Middle Ages up to the present as thoroughly as the *DWB*. The long period of development, the absence of guidelines, successive editors who lacked any form of guidance other than their own practice, the alternation between linguistic and lexicographic principles, and not least, Germany's changing political circumstances, make the *DWB* an extraordinarily heterogeneous work. Its total of 67 744 printed columns (with ca. 350 000 headwords) contain clearly differing dictionary styles, with variations ranging from the composition of items and the explanations of meaning to the presentation of the quotations and the selection of sources. However, despite some deficits, the *DWB* is **the** material documentation of the German language, and as a fundamental work of the history of words it is indispensable for linguistic and cultural historical research.

In the 1950s, under the leadership of Theodor Frings, preparation began for the reworking of the *DWB*. This has been in progress since 1957 at the academies in Berlin (*A* to *C*) and Göttingen (*D* to *F*). The first fascicle (*A – Abenteuer*) appeared in 1965, and by 2003, publication had reached the words *aufsuchen* (Berlin) and *flieszen* (Göttingen). The reworking is not a supplement to the first edition, but a completely new dictionary. Like the original Grimm, the new version will also eventually be available online.

At the end of the 19th century, the majority of dictionaries either followed the historical principles of *DWB* or aimed to fill its specific gaps. Some examples worth mentioning are the *Deutsches Rechtswörterbuch* (Weimar, 1896/1897–), which contains the vocabulary of legal texts from the beginning of written records in the 5th century up to the time of Goethe; and the *Deutsches Fremdwörterbuch* (Strassburg, 1913–1983, reworked since 1990), which describes the historical development of loan words.

An extraordinarily successful 19th century work was the one-volume *Deutsches Wörterbuch* by Hermann Paul (Halle, 1897), a conceptual alternative to Grimm. This is a historical dictionary with a focus on sources. The dictionary is in its tenth edition, after being reworked and expanded (Tübingen, 2002; CD-ROM 1992).

The most productive German lexicographer of the 19th century was Daniel Sanders, author of the *Wörterbuch der deutschen Sprache, mit Belegen von Luther bis auf die Gegenwart.* (Leipzig, 1869–1865/1871, 2nd edn., 1876, reprinted 1969). This arose from critical engagement with the Grimms' project, which Sanders considered to be mistaken. His dictionary focuses on the usage of educated German speakers of the 19th century, although it also has a historical dimension. Together with the *Ergänzungs-Wörterbuch,* which appeared in 1871, Sanders is a systematic and reliable source for the standard German used in the second half of the 19th century. Unfortunately, the words are often hard to look up, as Sanders did not order headwords strictly alphabetically, but instead nested compounds and derivates

under their basic word, for example *einschalten* under *schalten*, *empfinden* under *finden,* and the headword *Gebirge* is between *Bir* and *Birgel* under *B*.

The 20th Century

The lexicographical scene in Germany in the first half of the 20th century was largely shaped by the *DWB* and German language studies, with a predominantly historical focus and no major lexicographical innovations. An authoritative monolingual dictionary of contemporary German did not exist. A new benchmark for a monolingual dictionary of the present-day German language was set at the Akademie der Wissenschaften in Berlin (GDR), where work started in 1952 on the *Wörterbuch der deutschen Gegenwartssprache* (*WDG*, ed. by Ruth Klappenbach and Wolfgang Steinitz). This work was published between 1961 and 1977 in 57 parts, in a total of six volumes (followed by several new editions until 1982). Even during its publication, it was recognized (not only in East Germany) as a pioneering development in German lexicography, because of its form, its elegance, and its philological meticulousness. *WDG* is a dictionary whose stock of words was not merely copied from other dictionaries, but was systematically collected from primary sources and verified. Its sources include most of the important contemporary authors in the German-speaking lands up to the 1970s, and numerous older texts by German authors since Lessing and Kant. Thus the dictionary contains primarily the general vocabulary of the 20th century, together with a substantial part of the literary vocabulary of the 18th and 19th centuries, for which the archive of the *DWB* was used. In the preface, the authors describe their aim of collecting the current German language of the educated classes in its oral and written form. The entries were influenced primarily by this focus, although in some cases also by an ideologically determined description of the sociopolitical vocabulary of the time. Seen from the perspective of the 21st century, the proportion of entries noticeably influenced by East German (GDR) political ideology is comparatively slight. The *WDG*'s entries are clearly structured and systematic. The meanings are recorded and explained succinctly. The articles contain grammatical details. However, there is comparatively little etymological information and little guidance on pronunciation. Phraseology is emphasized with illustrative and literary examples. Two innovative aspects are the systematic labeling of register, for example *umg*. (umgangssprachlich: 'colloquial'), *geh*. (gehoben: 'elevated'), *abwertend* ('pejorative'), *verhüllend* ('euphemistic'), etc., and the treatment of compounds, in which the headword is the final component. In addition, neologisms are marked as *Neuwörter* ('new words'), *Neuprägungen* ('new creations'), or *Neubedeutungen* ('new meanings'). The *WDG* recognizes many foreign words, but specialist and vernacular words are given more restricted coverage.

After the *WDG*, in the Federal Republic, two six-volume dictionaries of the German contemporary language were published which do not qualitatively supersede their East German precursor. Günther Drosdowski's *Duden: das grosse Wörterbuch der deutschen Sprache in sechs Bänden* (Mannheim, 1976–1981) differs from the *WDG* in the number of headwords and the corpus of sources and its coverage of specialist vocabulary. The *Brockhaus-Wahrig: deutsches Wörterbuch in sechs Bänden* (Wiesbaden, Stuttgart, 1980–1984) is not based on primary sources, but copied from other dictionaries. In contrast to *WDG* and *Duden,* the *Brockhaus-Wahrig* records proper names, especially first names.

There are three compact dictionaries that are conceptually comparable to the multivolume dictionaries. Gerhard Wahrig's *Deutsches Wörterbuch* (Gütersloh, 1966, 7th edn., 2002; CD-ROM by Wahrig), recently reworked and published by Renate Wahrig-Burfeind, is a lexicographical bestseller. It contains not only the German basic vocabulary, but also numerous technical words from specialist fields and neologisms. This dictionary's greatest strengths lie in the integration of grammar and lexis; there are, however, weaknesses in the explanations of meaning and examples. The *Duden: deutsches Universalwörterbuch* (Mannheim, 1983, 5th edn., 2003; CD-ROM) is established as **the** one-volume standard dictionary for the contemporary German language and an example of continuous dictionary maintenance.

The *Handwörterbuch der deutschen Gegenwartssprache*, produced under the direction of Günther Kempcke (Berlin [GDR] 1984) is based on the *WDG*. The *Handwörterbuch* develops new ground: it is the only general monolingual dictionary of German contemporary standard speech that deals appropriately with idioms.

The Duden publishing house issued *Duden: das grosse Wörterbuch der deutschen Sprache in zehn Bänden* (*GWDS*) in 1999. This is currently the most comprehensive documentation of the German language and it is based on authentic sources. In comparison to its predecessors (Mannheim, 6 vols., 1976–1981; 8 vols., 1993–1995), it is based on a significantly expanded corpus, including publications up to and including 1999. It also records numerous words from the historical vocabulary of the 18th and 19th centuries. *GWDS* uses the new German spelling rules (1998) throughout, in the citations and

examples as well as in the definitions. Another noteworthy innovation is the abandonment of the customary nested ordering of headwords. Each entry in *GWDS* has headword status.

The dissolution of the nests has some negative consequences: when searching for elements of extensive word families, with numerous compounds and derivatives, the user needs some persistence. Compounds with *Ehe-*, for example, extend over eight columns. Furthermore, details relevant to the headword are lost, regarding pronunciation or register labels which formerly applied to the entire nest. These no longer appear, as would be required, near words with separate lemmata. In such cases, a meticulous user, or one insecure about words, would first have to look up the 'main' headword for orientation. *GWDS* reflects current developments in the German language and German society and includes new words such as *Altersteilzeit* (part-time work for a retired person), *Bleiberecht* (right to remain a resident in a country), *Euroland* (country that uses or all countries that collectively use the Euro as its currency), *Suchmaschine* ('search engine', e.g., Google), *Reformstau* (reform backlog), alongside the many Anglicisms, for example: *Late-Night-Show, Offroader, Touchscreen, User.*

German Period Dictionaries

The publication of period dictionaries of the German language started in the late 18th century and reflects the tremendous advances in historical linguistic scholarship over two centuries. The most important German period dictionaries were reworked or reprinted or can be accessed on-line. For Old High German, these include: *Althochdeutsches Wörterbuch* (Berlin, 1968 –, ed. Elisabeth Karg-Gasterstädt and Theodor Frings, continued after vol. 2 by Rudolf Grosse, and since 2001 by Gotthard Lerchner), *Althochdeutsches Wörterbuch*, 2 vols (Berlin/New York, 1993, ed. Jochen Splett), *Althochdeutsches Glossenwörterbuch* (Heidelberg, 1971–1984, ed. Taylor Stark and J. C. Wells), and *Althochdeutsches Wörterbuch* (Tübingen, 5th edn., 1995, ed. Rudolf Schützeichel).

For Middle High German, the main reference work is *Mittelhochdeutsches Wörterbuch*, 5 vols (ed. Georg F. Benecke, Wilhelm Müller, and Friedrich Zarncke, Leipzig 1854–1866; reprinted Stuttgart, 1990; MWV). This is accompanied by a supplement and alphabetical index: *Mittelhochdeutsches Handwörterbuch*, 3 vols (Leipzig, 1872–1878, ed. Matthias Lexer; reprinted Stuttgart, 1992, MWV). An extraordinarily successful compact dictionary is the *Mittelhochdeutsches Taschenwörterbuch* (ed. Matthias Lexer, with supplements by Ulrich Pretzel, 38th edn., Stuttgart, 1992). Eberhard Nellmann provides an annotated index to Benecke, Müller, Zarncke, and Lexer: *Quellenverzeichnis zu den mittelhochdeutschen Wörterbüchern* (Stuttgart/Leipzig, 1997, MWV). Also worthy of mention are Kurt Gärtner *et al.*, *Findebuch zum mittelhochdeutschen Wortschatz* (Stuttgart, 1992, MWV), Erwin Koller, Werner Wegstein, and Norbert R. Wolf, *Neuhochdeutscher Index zum mittelhochdeutschen Wortschatz* (Stuttgart, 1990), *Wörterbuch der mittelhochdeutschen Urkundensprache auf der Grundlage des Corpus der altdeutschen Originalurkunden bis zum Jahr 1300* (Sibylle Ohly and Peter Schmitt, Berlin, 1994 –), and *Kleines Mittelhochdeutsches Wörterbuch* (Beate Hennig, Tübingen, 2nd edn., 1998).

The gap between dictionaries of Middle High German and the *DWB*, which starts with the language of the mid 15th century, have, since 1989, been addressed in the *Frühneuhochdeutsches Wörterbuch* (Berlin/New York, 1989 –), published by Ulrich Goebel and Oskar Reichmann. Other reference sources for Early New High German are *Kleines frühneuhochdeutsches Wörterbuch* (Christa Baufeld, Tübingen, 1996) and *Frühneuhochdeutsches Glossar* (ed. Alfred Götze, 6th edn., Berlin, 1960).

Historical dictionaries also include etymological dictionaries. Among these, the best-known are Friedrich Kluge's *Etymologisches Wörterbuch der deutschen Sprache* (Berlin, 1883, 24th edn., 2002; CD-ROM), *Duden: das Herkunftswörterbuch – Etymologie der deutschen Sprache* (Mannheim 1963, 3rd edn., 2001), and the three-volume *Etymologisches Wörterbuch des Deutschen* (Berlin, 1989, 2nd edn., 1995) published by Wolfgang Pfeifer.

Synonym Dictionaries, Spelling Dictionaries, and Other Reference Works

Toward the end of the 19th century, the first dictionaries of synonyms appeared, initially classified by ontological aspects. Up until then, only some collections of discriminating synonymy were produced (e.g., Johann August Eberhard: *Versuch einer allgemeinen deutschen Synonymik*. Halle, Leipzig, 1795–1802). Then, adopting the model of Peter Mark Roget's *Thesaurus of English Words and Phrases* (1852), Daniel Sanders published *Deutscher Sprachschatz* (Hamburg, 1873–77, reprinted 1985). The *Deutsche Wortschatz* by Anton Schlessing (Stuttgart, 1881) was reworked numerous times until 1993 by Hugo Wehrle and Hans Eggers. One of the best-known onomasiological dictionaries is *Der deutsche Wortschatz*

nach Sachgruppen by Franz Dornseiff (Berlin/Leipzig, 1934, 8th edn., 2004; CD-ROM). The most recent edition, fully reworked by Uwe Quasthoff, includes approximately 90 000 entries, which have partly been updated by corpus research.

Some of the most frequently used dictionaries in German are spelling dictionaries. Since Konrad Duden published his *Vollständiges orthographisches Wörterbuch der deutschen Sprache* (Leipzig) in 1880, these dictionaries have served the orthographic standardization of German. *Duden*, issued in different versions between 1945 and 1989 in East and West Germany, was unrivalled as an authority for more than a century. The introduction of reforms to German orthography, beginning in 1998 and to be completed in 2005, led to a flood of new spelling dictionaries, including *Die deutsche Rechtschreibung* by G. Wahrig (Gütersloh, 2002). *Duden* defended its leading position, and in 2004 its 23rd edition was published. It is no longer purely a spelling dictionary, but a comprehensive, versatile dictionary. In addition to orthographic information, the articles contain semantic, grammatical, and etymological comments, and examples of usage.

Alongside the most successful spelling dictionary, the Duden publishing house publishes a large family of practical language reference works, for example a dictionary of synonyms (*Das Synonymwörterbuch,* 3rd edn., 2004), a syntagmatic dictionary (*Das Stilwörterbuch,* 8th edn., 2001), a pictorial dictionary (*Das Bildwörterbuch*, 5th edn., 2000), a pronunciation dictionary (*Das Aussprachewörterbuch,* 4th edn., 2000), a dictionary of idioms (*Redewendungen*, 2nd edn., 2002), a dictionary of 'foreign' words (*Das Fremdwörterbuch*, 7th edn., 2001), and others.

German Lexicography in the 21st Century

Several major lexicographical projects launched in the 20th century are still in progress, for example the *Goethe-Wörterbuch* of the Berlin and Göttingen academies. This has been issued in parts since 1978. With more than 90 000 lemmata it is the most comprehensive thesaurus for any author in the German-speaking lands.

Various older dictionaries are being reworked and reissued, for example the *Paul* and the *Langenscheidt Grosswörterbuch Deutsch als Fremdsprache* (Berlin, 2003, CD-ROM 2004). Several aspects make this learner's dictionary recommendable, including its up-to-date word list, the extensive coverage of compounds, appropriate handling of idioms, and the presentation of word usage in context.

Other lexicographical innovations include the *Variantenwörterbuch des Deutschen: die Standardsprache in Österreich, der Schweiz und Deutschland sowie in Liechtenstein, Luxemburg, Ostbelgien und Südtirol* (ed. Ulrich Ammon *et al.*, Berlin, 2004) and a dictionary of neologisms, *Neuer Wortschatz – Neologismen der 90er Jahre im Deutschen* (ed. Dieter Herberg *et al.*, Berlin, 2004). Despite the frequent reissue of the *Kleines Lexikon untergegangener Wörter* (Munich, 1971, 15th edn., 2004) by Nabil Osman, a full scholarly dictionary of archaisms remains to be undertaken.

The changeover to digital lexicography which began in the last decade of the 20th century has continued with new lexicographical information systems. These include, for example, the corpus-based information system *elexiko* of the Mannheim Institut für Deutsche Sprache (Elexiko). This database focuses on the written German standard language since about 1945 as it is used in national and regional newspapers. The *Digitales Wörterbuch der deutschen Sprache des 20. Jahrhunderts (DWDS)* of the Berlin Brandenburg Academy of Sciences has created a 'core corpus' of about 100 million text words, with a well-balanced selection of text types, covering the entire 20th century, publicly available for on-line research (DWDS). Behind this lies a much larger corpus, approximately 1 billion text words, some texts of which are subject to copyright restrictions and not publicly available, being used only for lexicographic research. One particular aspect of the *DWDS* is the building of links between the corpus database and the *WDG*, together with a word information system based on this. The *DWDS* also permits statistical inquiries concerning word and collocation frequencies, and research into bibliographical data. The *Wörterbuchportal* of the academies is a promising development. In addition to displaying the German academies' achievements in historical lexicography, it also presents a collection of links to academic dictionary projects and functions as a search tool for digitized scholarly dictionaries (Wörterbuchportal).

See also: Academies: Dictionaries and Standards; Adelung, Johann Christoph (1732–1806); Bilingual Lexicography; Campe, Joachim Heinrich (1746–1818); Corpora; Duden, Konrad (1829–1911); Frings, Theodor (1886–1968); German; Germanic Languages; Germany: Language Situation; Grimm, Jacob Ludwig Carl (1785–1863); Leibniz, Gottfried Wilhelm (1646–1716); Lexicography: Overview; Paul, Hermann (1846–1921); Schottelius, Justus Georg (1612–1676); Zarncke, Friedrich (1825–1891).

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Germanic Languages

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The Germanic languages include Dutch, English, German, and the Scandinavian languages. From their original home in northwest Europe, they have become one of the most widely distributed language groups, being spoken on five continents by at least 550 million native speakers. By far the largest proportion of these (over 70%) are first-language speakers of English.

The Germanic Language Group

The Germanic languages constitute a distinct branch of the Indo-European language family. Since the 19th century it has been conventional to distinguish three major subgroupings within Germanic:

- *West Germanic*, including English (with many varieties and descendants, notably Scots and numerous creoles and pidgins), German (with several relatively distinct varieties and offshoots, including Low German, Luxembourgish (Luxembourgeois), Pennsylvanian (Pennsylvanish), and Yiddish), Dutch (with its descendent Afrikaans), and Frisian (with three mutually unintelligible varieties: Western Frisian, East Frisian, and Northern Frisian).
- *North Germanic* in Scandinavia, comprising a western group that includes Icelandic, the closely related Faroese (together with the now-extinct dialects of other early Norse settlements), and Norwegian (with its two codified standard varieties Bokmål and Nynorsk); and an eastern group including Danish and Swedish. The mainland Scandinavian languages are mutually comprehensible to a significant degree.
- *East Germanic*, which is usually taken to include Gothic, Burgundian, and Vandalic and possibly some further languages such as Gepidic and Rugian. However, all these languages are now extinct and the evidence that they actually constituted a discrete group with common linguistic features is slight. Little is known of them except for Gothic, for which part of a 4th century Bible translation has survived. This is the earliest continuous text in any Germanic language.

The Origins and Early History of the Germanic Languages

The genetic relationship among the Germanic languages is clear from many lexical cognates (cf. English *house*, *red*, *I gave*; Dutch *huis*, *rood*, *ik gaf*; Norwegian (Bokmål) *hus*, *rød*, *jeg gav*; Gothic *hus*, *rauþs*, *ik gaf*), and this relationship was already recognized by scholars in the 16th century. The ancestor language, usually called Proto-Germanic, was probably spoken around the North Sea and the Baltic in the first millennium B.C. Within the Indo-European family, Proto-Germanic appears to be most closely related to Italic (and possibly Illyrian and Venetic), although there are significant affinities, particularly in morphology and lexis, with Baltic (and possibly Slavonic). Nevertheless, almost one-third of the core vocabulary that can be reconstructed for Proto-Germanic lacks any Indo-European cognates, notably words relating to the sea and seafaring, such as English *boat*, *sea*, and *ship* and the words for the points of the compass. Early lexical loans from Celtic (e.g., the ancestor of German *Reich* 'kingdom') testify to the earliest contacts of the Germanic peoples, as do a significant number of lexical loans from Proto-Germanic into Finnish (e.g., Finn. *kuningas* 'king'). These are particularly interesting because they still retain features and forms that have disappeared in even the earliest attested Germanic dialects and can only be reconstructed for the common ancestor.

The first longer account of the Germanic peoples is by the Roman historian Tacitus in his *Germania* of 98 A.D., by which time some Germanic tribes had moved southward from the shores of the Baltic into central Europe and come into contact and conflict with the Roman Empire as it expanded northward. The first linguistic records, from the 3rd century A.D. onward, are carved inscriptions using the Runic alphabet or fuþark (so-called after the first six letters of the alphabet). The origins of this writing system are obscure, although it appears to be based on an early Etruscan or north Italian alphabet, and it is not used for longer texts. Runic inscriptions have been found in many parts of northern and eastern Europe, and their language is remarkably uniform, irrespective of their provenance. It is sometimes erroneously referred to as Primitive Norse or Proto-Norse, but there is no evidence that its form is specifically North Germanic.

The relationship of the early Germanic dialects to one another is a matter of controversy. The assumption of an early three-way split into East, North, and West Germanic is no longer accepted, but no consensus has replaced it. A majority view at present is that the East Germanic group, specifically Gothic, split from the common ancestor first, leaving a North-West Germanic group that has been identified with the language of the early Runic inscriptions. This divided into the North Germanic and West Germanic

groups. North Germanic or Old Norse is the common ancestor of the modern Scandinavian languages; it is very close, if not identical, to the attested Old Icelandic of the sagas and the *Edda*.

West Germanic, on the other hand, as the ancestor of modern Dutch, English, Frisian, and German, appears to have been a much more diffuse grouping with few common features. It is probably best considered as a dialect continuum, although the relationship of the dialects within it and the development from the earliest stages into the modern languages and dialect groups are not clear in every respect. Within West Germanic, three main complexes of dialects have been identified: North Sea Germanic (sometimes referred to as *Ingwaeonic*, following the terminology of Tacitus), Weser-Rhine Germanic (or *Istwaeonic*), and Elbe Germanic (or *Erminonic*). Modern English and Frisian have their origin in dialects of the North Sea Germanic group. Early forms of Dutch (called Old Low Franconian) are poorly attested, but modern Dutch, like Low German (and its earliest form Old Saxon) seems to combine features of North Sea and Weser-Rhine Germanic. The principal characteristic of (High) German within West Germanic results from the Second Sound Shift, whereby inherited voiceless plosives developed into affricates or fricatives (cf. English *pepper*, *water*, *token* with German *Pfeffer*, *Wasser*, *Zeichen*). This change is commonly assumed to have occurred between the 5th and 7th centuries A.D. in the Elbe Germanic dialects and some of the more southerly Weser-Rhine Germanic dialects, which thereby combined to form the basis for modern German.

This view of the development of the Germanic languages has recently been challenged by Vennemann (1984), who put forward a new account of the development of the Germanic languages from the earliest times. In his view, the division reflected in the Second Sound Shift goes back to an underlying division within Proto-Germanic into Low and High Germanic, with (High) German thus separated from the other dialects at a very early stage. These views have not been widely accepted, but they succeeded in reopening a still ongoing debate on some of the more intractable problems in the early history of the Germanic languages.

Table 1 First Sound Shift (Grimm's Law)

Indo-European	*Latin*	*Gothic*	*English*
*trejes	trēs	þreis	three
*dekm̥	decem	taihun	ten
*dhur-	forēs	daur	door

The Germanic peoples played a significant part in the great migrations that followed the fall of the Roman Empire, and Germanic tribes spread over wide areas of Europe, although they were subsequently assimilated into the local populations. This has left substantial traces in the form of lexical loans in many languages of southern Europe (e.g., French *garder*, Italian *guardare*, and Spanish/Portuguese *guardar* from the Germanic root **wardōn* 'watch'). The lexical influence of Frankish, a West Germanic language, on early French, is of particular importance, and some 700 such loans can be dated from the 3rd to the 8th centuries.<roto-Germanic had only two tenses (past and nonpast), although this has been extended by periphrastic forms in all the descendent languages. Proto-Germanic also retained only one nonindicative mood, combining the functions of the I-E subjunctive and optative, although this is vestigial in all the modern languages except German and Icelandic. Characteristic of all the Germanic languages, however, is an extensive set of auxiliary verbs expressing modality (called modal auxiliaries), represented in English by *can*, *may*, *must*, *shall*, *will*, and so on. These verbs are typically highly irregular and syntactically deviant. Traces of the I-E synthetic passive are found only in Gothic (and there only in the present tense), and the passive is expressed through auxiliary constructions in all the modern languages. However, the Scandinavian languages have also developed a new inflectional passive deriving from the grammaticalization of the reflexive pronoun.

In the noun, the three I-E genders were retained, but these have been reduced to two (common vs. neuter) in standard Dutch and much of Scandinavian. English, Afrikaans, and some dialects of Danish, however, have lost all gender distinctions. Germanic kept four of the I-E cases, nominative, accusative, genitive, and dative (although early West Germanic has traces of an instrumental). These have been subject to further attrition in almost all the modern languages, with only Icelandic (with Faroese) and standard German retaining four cases. The other languages, in particular, no longer mark any verb arguments through inflections, except in the pronouns.

The original word order of Germanic is a matter of controversy, although majority opinion favors the assumption of underlying SOV. The sentence structure in all the extant older texts, however,

Table 2 Verner's Law

Indo-European	*Latin*	*Gothic*	*English*
*pəté̍r	pater	fadar	father

is very variable, and it has been viewed as flat, or nonconfigurational. The modern languages have moved to more fixed word order, with most of them exhibiting a characteristic verb-second (V2) structure in declarative main clauses, with the verb as the second constituent and the initial position typically being occupied by the sentence topic, which may not be the subject. English is the exception here, having moved to SVO in all clause types in the early modern period. The other West Germanic languages, with the exception of Yiddish, have a characteristic SOV structure in subordinate clauses.

See also: Afrikaans; Danish; Dutch; English, Early Modern; English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); English, Middle English; English, Old English; Gender, Grammatical; German; Gothic; Grimm, Jacob Ludwig Carl (1785–1863); Indo–European Languages; Luxembourgish; Norse and Icelandic; Norwegian; Runes; Swedish; Yiddish.

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Germany: Language Situation

J M Y Simpson

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In the Federal Republic of Germany (FRG), numerous varieties of German are spoken, as well as several long-established minority languages, and some languages that have been introduced since the late 1950s.

Standard German is the official language, used in administration, education, and the mass media. It is not rigidly homogeneous: a few ordinary words such as 'butcher' or 'cream' differ according to region, and there are one or two minor grammatical differences, while accents vary strikingly in line with those of local nonstandard German dialects. Such regional differences are not stigmatized. It is reckoned that upwards of 77 600 000 people in the FRG can use Standard German.

Regional nonstandard dialects are in use relatively far up the social scale. These differ greatly, those relatively far apart geographically being mutually unintelligible. They fall into two general groups: Low German (Plautdietsch) in the north and High German in the south, with a transition zone of Central German dialects. Even within Plautdeutsch, there are 20 or more mutually unintelligible varieties. The more extreme rural varieties are perceptibly approximating to the urban forms of their area. Varying according to the situation of speaking, some dialect speakers may use anything from extreme dialect to a locally accented, more or less standard German. The percentage of those who claim to be able to speak a dialect varies from 71% in Bavaria to 46% in northern Germany.

The political division that existed from 1948 to 1990 between the former FRG and the former German Democratic Republic (GDR) was reflected in the forms of the standard language. Political institutions or attitudes peculiar to one or other state had names not used in the other state, while certain 'political' words had different meanings, for example, *Aktivist* 'activist' (FRG) versus 'one who overfulfills his "plan"' (GDR). However, some nonpolitical terms were also different: *Schallplattenunterhalter* (GDR), *Diskjockey* (FRG) 'disk-jockey'; *Plaste* (GDR), *Plastik* (FRG) 'plastic'. While it is reasonable to suppose

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that regional differences in the meanings of political terms will disappear, there is no reason to think that nonpolitical vocabulary will become homogeneous.

Long-established minority languages are East Frisian (11 000 speakers) in three areas of northern Germany, North Frisian (10 000) in Schleswig–Holstein and its off-shore islands, Danish (50 000) in south Schleswig, and Sorbian (80 000 or more) in Upper Saxony and southern east Germany. The Frisian varieties appear to be dying out. In spite of the existence of Danish-speaking schools, the prospects for Danish do not look good. During the existence of the GDR, Sorbian was encouraged and its use was authorized in local government and schools. However, all speakers are bilingual in German, there are two distinct clusters of dialects, and its future is uncertain.

In the east of Germany, there are groups of speakers of Polish (100 000) and Latvian (8000), and in the west there may be upwards of 40 000 speakers of varieties of Romani.

After the late 1950s, an increasing number of 'guest workers' speaking languages from outside northern Europe settled in FRG urban areas, in some cases temporarily, in others more permanently. These included speakers of, among others, Arabic, Greek, Serbo-Croat, Spanish, and Turkish. Because of changing economic circumstances, many of these workers were encouraged to return home from the early 1980s onward. By the mid-1980s, the largest groups remaining were speakers of Arabic (94 000), Hindi (24 500), Kurdish (300 000), and Turkish (1 500 000). Of these, many second-generation speakers, educated in the FRG, are bilingual in German. How many from these groups will continue to live in the FRG remains unclear.

The principal foreign language taught is English, as was the case in the former FRG before reunification; previously, Russian was the principal foreign language taught in the former GDR.

See also: German.

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Geschwind, Norman (1926–1984)

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Norman Geschwind was born on January 8, 1926 in New York City. From an early date, Geschwind's intellectual interest was directed toward the study of human behavior, and his initial goal was to become a psychiatrist. He would have certainly shrugged off any mention of biology as irrelevant to the topic of human behavior, had he not taken up a course in neuroanatomy with Marcus Singer, who convinced him of the importance of biology for the understanding of behavior.

He graduated from Harvard Medical School in 1951. His postgraduate years were spent in the National Hospital in London. He was then appointed Chief Resident in Neurology at the Boston City Hospital. In 1958, he moved to the Boston Veterans Administration Hospital, where he had his first opportunity to examine aphasic patients with Dr. Quadfasel. Quadfasel was to introduce Geschwind to the classic neurological literature, notably the texts of connectionist aphasiologists such as Wernicke, Dejerine, and Liepmann. From 1969 until his death on November 4, 1984, Geschwind occupied the chair of neurology at the Harvard Medical School.

Geschwind's discovery of connectionist theories, at a time when they were disreputable or ignored, was to shape his vision of aphasia. Thus, he was inclined to think that selective disruption of processing centers and disconnections could account for a number of aphasic disturbances. Among his first studies was a report on a patient who was found to be unable to write or name objects placed in his left hand. Geschwind predicted a disconnection of the right hemisphere from the speech area, which was later confirmed by post-mortem examination. He also rediscovered a variety of anomia restricted to presentation of stimuli in a single modality (or 'isolated naming disturbance'), which he contrasted with the 'classical,' global form of anomia. For the

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former syndrome, he again hypothesized disconnection from the speech area. The latter was attributed to a lesion of the left angular gyrus. This zone was claimed to be the locus where perceptual attributes making up the referents of (concrete) words are associated.

Geschwind was also partly responsible for the renewed interest in transcortical aphasias, notably in that form of aphasia involving a disruption of both the motor and the sensory pathways to meaning ('isolation of the speech area'). As a connectionist, he laid much emphasis on 'pure' disturbances, in which a specialized mechanism is impaired, such as alexia without agraphia, or pure word-deafness. In this, he was following again the steps of his predecessors, Dejerine and Liepmann.

Last, it should be mentioned that Geschwind's investigations involved not only aphasic disturbances but also apraxias and agnosias, which he approached in the same connectionist spirit. A synthesis of his ideas can be found in his now classic paper of 1965.

See also: Aphasia Syndromes; Impairments of Proper and Common Names; Language Disorders: 19th Century Studies.

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Gesenius, Wilhelm (1785–1842)

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Gesenius was born at Nordhausen, Germany on February 3, 1786. He studied theology at Helmstedt 1803–1806, and then in 1806 he became a nontenured instructor at the Theological Faculty at Göttingen. In 1809 he took up a job as a teacher at a Gymnasium in Heiligenstadt. The following year he was appointed extraordinary professor of theology at the University of Halle and in 1811 became full professor there, where he stayed until his death on October 23, 1842. Gesenius authored works of lasting value in the area of Semitic philology, especially Classical Hebrew. He has been acclaimed for his efforts in making the study of the Hebrew language and literature a respectable field of investigation and not only a subservient field to theological studies.

In 1830 he was accused, together with his colleague Julius A. L. Wegscheider, of being a 'rationalist' by Ludwig von Gerlach in then influential *Evangelische Kirchenzeitung*. But Gesenius managed to survive without losing his job in the theological Faculty.

His most influential work is the two-volume *Hebräisches-deutsches Handwörterbuch* ... that appeared in 1810–1812. A second, improved, edition in 1815 appeared as *Hebräisches und chaldäisches Handwörterbuch über das Alte Testament*. This edition was several times revised by Gesenius himself and, after his death, by other scholars. From its tenth edition in 1886 onward the word *chaldäisches* is replaced by *aramäisches*. Its 17th edition by Frants Buhl, which appeared in 1915, is the last revision completed to date. The 18th edition started by U. Rüterswörden, R. Meyer, and H. Donner, which is a thorough revision, is not yet finished. Gesenius's standard lexicographic work is the *Thesaurus philologicus criticus linguae Hebraeae et Chaldaeae Veteris Testamenti,* which began in 1829 and was completed only after his death by E. Rödiger in 1858.

Not less influential is his *Hebräische Grammatik,* published for the first time as a pedagogical grammar in 1813. By 1842 it had reached 13 editions. E. Kautzsch reworked the grammar in 1909 and turned it into a reference grammar. A further reworking by G. Bergstrasser in 1918/1929 covered the phonology and the greater part of the morphology.

Gesenius's lexicon and grammar, in their updated editions and various translations, are still valuable as reference works. In the English-speaking world the latest, best-known version of Gesenius's lexicon is based on E. Robinson's English translation of Gesenius's 1833 Latin version *Lexicon Manuale Hebraicum et Chaldaicum in V.T. Libros,* which was edited with constant reference to Gesenius's own *Thesaurus* by F. Brown, S. R. Driver, and C. A. Briggs (hence the familiar 'BDB'), with the title of *Hebrew and English lexicon of the Old Testament* (Oxford 1907; reprinted with corrections 1953).

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Gesenius also published works on other Semitic languages than Hebrew, such as *Versuch über die Maltesische Sprache* (1910), *Palaeographische Studien über phoenizische und punische Schrift* (1835), *Scripturae linguaeque phoenicia monumenta quotquot supersunt edita et inedita* (1837).

See also: Hebrew, Israeli; Semitic Languages.

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Gesture and Communication

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As a field of study, gesture has become energized in recent years. There is now an organization (International Society for Gesture Studies) and a journal (*GESTURE*, founding editors Adam Kendon and Cornelia Müller). In preparing this article, I have aimed to balance the empirical basics of gestures with a theoretical perspective from which to regard gestures and see what insights they bring to an understanding of the nature of language.

The word 'gesture' covers a multiplicity of communicative movements, primarily but not always of the hands and arms. Often, gestures are assumed to comprise a channel distinct from speech, but careful investigation challenges this traditional view. Gestures and language are best thought of as a single system, larger than either language or gesture as traditionally assumed. It will be useful to begin our survey by drawing distinctions among different actions, all of which might be termed 'gesture.'

Kendon's Continuum

Adam Kendon once distinguished gestures of different kinds along a continuum that I named 'Kendon's Continuum,' in his honor (McNeill, 1992). The gestures we are mostly concerned with are the 'gesticulations.' See McNeill (1992) for details.

'Gesticulation' is motion that embodies a meaning relatable to the accompanying speech. Gesticulation is by far the most frequent type of gesture in daily use and it covers many variants and usages. It is made chiefly with the arms and hands but is not restricted to these body parts – the head can take over as a kind of third hand if the anatomical hands are immobilized or otherwise engaged, and the legs and feet too can move in a gesture mode. In a large sample of gestures, Shuichi Nobe found that the stroke phase of the gesticulation is synchronous with the coexpressive speech about 90% of the time (gesture phases are defined below). When strokes are asynchronous, they slightly precede the speech to which they link semantically, usually because of brief hesitations, and the time gap is small. Gesticulations rarely if ever follow their coexpressive speech (Kendon, 1972). There is no basis for the assertion that strokes occur during hesitations. Such a view has attainted urban legend status, but it is based on a misrepresentation of the original study by Brian Butterworth and Geoffrey Beattie (Butterworth and Beattie, 1978). They reported that the rate of gesture occurrence was higher during speech pauses than phonations. However, far more gestures occur during phonation than pauses, so the 90% figure is the result (Nobe also did not replicate their higher gesture rate during pauses, possibly because of different communicative situations: Nobe was looking at narrations, while Butterworth and Beattie had analyzed college tutorials, where gestures during pauses are likely to have had 'turn suppression' functions not prominent in narrations). The expression 'coexpressive speech and gesture' is explained below. Other controversies have revolved around the issue of whether gesticulations are communicative – 'made for the listener' – or beneficial primarily for speech production – 'made for the speaker' (cf. Krauss *et al.*, 2000; Alibali *et al.*, 2000). Gesticulations combine both universal and language-specific features. Speakers of every language studied thus far (and this is a sizable list: in our lab alone, English, Japanese, Mandarin [Mandarin Chinese], Korean, Spanish, French, German [Standard German], Italian, Turkish, Georgian, Russian, American Sign Language, Taiwanese Sign Language, and a few African languages) produce them, and the gesticulations for the same events in a cartoon stimulus show clear similarities across these languages. Yet there are also striking differences which are traceable

to characteristics of the languages the gestures are cooccurring with, in particular whether the language is, in Leonard Talmy's typology (Talmy, 2000), S-type or V-type (see McNeill and Duncan, 2000). Gesture space is oriented in terms of absolute compass direction by speakers of Guugu Yimithirr (Guguyimidjir) (an Aboriginal language with obligatory absolute orientation in its verb morphology) and also by speakers of Tzotzil (a Mayan language that lacks the lexical precision of directional reference as seen in Guugu Yimithirr [Guguyimidjir], but whose mode of living promotes exact spatial orientation, which is then embodied in gestures; see Haviland, 2000).

'Speech-framed gestures' are part of the sentence itself. The term is from Karl-Erik McCullough. Such gestures occupy a slot in a sentence, e.g., 'Sylvester went [gesture of an object flying out laterally],' where the gesture completes the sentence structure. These gestures time differently from gesticulations – they occupy a gap that fills a grammatical slot, rather than synchronizing with speech that is coexpressive.

'Emblems' are conventionalized signs, such as thumbs up or the ring (first finger and thumb tips touching, other fingers extended) for 'OK,' and others less polite. Kendon prefers the term 'quotable gesture,' referring to a potential for a more or less complete verbal translation – 'OK' translating into terms of approbation, for example. Emblems or quotable gestures are culturally specific, have standard forms and significances, and vary from place to place. Kendon (1995) has for some years studied the gesture culture of Naples, a locale with an exceptionally rich repertoire of quotable gestures (cf. de Jorio, an early 19th-century figure, in Kendon, 2000). These gestures are meaningful without speech, although they also occur with speech. They function like illocutionary force markers, rather than propositions, the mode of gesticulation, and the timing when they occur with speech, being quite different. A single Neapolitan emblem for 'insistent query' (the 'purse' or *mano a borsa*: prototypically, the hand palm up, the fingers and thumb loosely bunched together at the top, and rocking up and down) was observed in one case stretching over several utterances and then continuing into the next speaker's turn, still demanding clarification. This gesture is not employed in North America (a similar-looking gesture is used to mean that something is 'precisely so'), which illustrates the cross-cultural variation of the emblem. Emblems can blend both sequentially and simultaneously with gestures of other kinds. Many emblems have deep historical roots, far outlasting the spoken languages with which they occur. Some go back to Roman times (Morris *et al.*, 1979), including the infamous 'finger,' beloved of the American road – it would have been understood by Julius Caesar. Most emblems have iconic or metaphoric components. The contact of the thumb and forefinger in the 'OK' sign captures the idea of precision. But the emblem is also specified by a convention pairing the form of the gesture to the approbation meaning. The fixity of the emblem is the evidence of this. Putting the *second* finger in contact with the thumb is still precision but no longer is the 'OK' sign of approbation.

'Pantomime' is dumb-show, a gesture or sequence of gestures conveying a narrative line, with a story to tell, produced without speech. And at the other extreme of the continuum, 'signs' are lexical words in a sign language such as ASL. Sign languages have their own linguistic structures, including grammatical patterns, stores of words, morphological patterns, etc. The linguistic code of ASL is quite unlike that of English. Sign languages have evolved without the requirement of being coordinated with speech. In fact, hearing signers find producing speech and signs simultaneously to be disruptive to both. For an authoritative description, see Liddell (2003).

As one moves along Kendon's continuum, two kinds of reciprocal changes occur. First, the degree to which speech is an obligatory accompaniment of gesture *decreases* from gesticulation to signs. Second, the degree to which a gesture shows the properties of a language *increases*. Gesticulations are obligatorily accompanied by speech but have properties unlike language. Speech-framed gestures are also obligatorily performed with speech, but relate to speech in a different manner – sequentially rather than concurrently, and in a specific linguistic role. Signs are obligatorily *not* accompanied by speech and have the essential properties of a language. Clearly, therefore, gesticulations (but not the other points along Kendon's continuum) combine properties – gesture with language – that are unalike, and this combination occupies one communicative instant. A combination of unalikes, at the same time, is a key psycholinguistic fact and a framework for an imagery–language dialectic. The remainder of this article focuses on gesticulations. If no ambiguity results, from here on I shall use the simpler term 'gesture.'

Traditions of gesture study not summarized in this article because of length are gestures of the theater (Fischer-Lichte, 1992), histories of gesture studies (Bremmer and Roodenburg, 1991), 'neurogestures' (McNeill, 2005), gestures in human–computer interface design (Kita *et al.*, 1998), methods of gesture transcription and measurement (Quek *et al.*, 1999), and the gestures of children (Bates and Dick, 2002), including home signs (Goldin-Meadow, 2003).

The Iconic, Metaphoric, Deictic, Beat Quartet

These categories or, as I will later say, dimensions are inspired by the semiotic categories of C. S. Peirce. Elena Levy and I proposed a classification scheme with four categories: iconic, metaphoric, deictic, and beat. All are gesticulations or speech-framed gestures on Kendon's continuum.

Iconic: Such gestures present images of concrete entities and/or actions. For example, appearing to grasp and bend back something while saying "and he bends it way back." The gesture, as a referential symbol, functions via its formal and structural resemblance to event or objects.

Metaphoric: Gestures are not limited to depictions of concrete events. They can also picture abstract content, in effect imagining the non-imageable. In a metaphoric gesture, an abstract meaning is presented as if it had form and/or occupied space. For example, a speaker appears to be holding an object, as if presenting it, yet the meaning is not presenting a concrete object but an idea or memory or some other abstract 'object' (for examples, see McNeill, 1992; Cienki, 1998). This is a gestural version of the conduit metaphor that appears in expressions such as 'he packed a lot into that lecture,' where the lecture is presented as a container and the message as its contents (Lakoff and Johnson, 1980). Recent work on metaphoric gestures has greatly expanded the subject. Müller (2004) developed a new theory of metaphor as a dynamic process (whereby 'sleeping' metaphors are 'awakened' in context) in which metaphoric gestures play an essential part. Parrill and Sweetser (forthcoming) develops a new theoretical account based on 'mental spaces blending theory.' Metaphoric gestures often indicate that the accompanying speech is meta rather than object level – for example, saying "the next scene of the cartoon" and making a conduit cup of meaning gesture (iconic gestures, in contrast, favor the object level).

Deictic: The prototypical deictic gesture is an extended index finger, but almost any extensible body part or held object can be used. Indeed, some cultures prescribe deixis with the lips (Enfield, 2001). Deixis entails locating entities and actions in space *vis-à-vis* a reference point, which Karl Bühler called the 'origo' (Bühler, 1982; Haviland, 2000). Much of the pointing we see in adult conversation and storytelling is not pointing at physically present objects or locations but is abstract pointing, which Bühler referred to as "deixis at phantasma." The emergence of abstract pointing is a milestone in children's development. In striking contrast to concrete pointing, which appears before the first birthday and is one of the initiating events of language acquisition, abstract pointing is not much in evidence before the age of 12 and is one of the concluding events (McNeill, 1992).

Beats: Such gestures are so called because the hand appears to be beating time. Other allusions to the musical analogy use the term 'baton' (Efron, 1941). As forms, beats are mere flicks of the hand(s) up and down or back and forth, zeroing in rhythmically on the prosodic peaks of speech. This rhythmicity has made beats seem purely speech related. However, they also have discourse functionality, signaling the temporal locus of something the speaker feels to be important with respect to the larger context. One can think of a beat as a gestural yellow highlighter.

With these four categories, Levy and I were able to classify nearly all gestures in the narrative materials we collected. Other researchers have proposed more finely subdivided categories.

Dimensions Rather than Kinds

I wish to claim, however, that none of these 'categories' is truly categorical. We should speak instead of *dimensions* and say: iconicity, metaphoricity, deixis, 'temporal highlighting' (for beats), social interactivity, or some other equally unmellifluous (but accurate) terms conveying dimensionality.

The essential clue that these are dimensions and not categories is that we often find iconicity, metaphoricity, deixis, and other features mixing in the same gesture. Beats often combine with pointing, and many iconic gestures are also deictic. We cannot put them into a hierarchy without saying which categories are dominant, and in general this is impossible. A practical result of dimensionalizing is improvement in gesture coding, because it is no longer necessary to make forced decisions to fit each gesture occurrence into a single box.

Tight Binding

The temporal binding of speech and gesture is almost impervious to forces trying to interrupt it. The very heterogeneity of the following observations shows the inviolability of the speech–gesture unit (see McNeill, 2005 for details).

Gesture synchrony and DAF: Delayed auditory feedback or DAF has a dramatic effect on the flow of speech, which slows down, becomes hesitant and is subject to drawling and metatheses (spoonerisms). Nonetheless, despite the interruptions, speech and gesture remain in synchrony.

Gesture inoculates against stuttering: Mayberry and Jaques (2000) made two noteworthy observations. First, the onset of a gesture stroke inoculates against the onset of stuttering. Second, if stuttering

begins *during* a stroke, the speaker's hand freezes in midair and may fall to rest. In both observations, we see an incompatibility between the interruption of speech in stuttering and the occurrence of the meaningful gestures.

Gestures of the blind: Congenitally blind speakers, who have never observed gestures, nonetheless do gesture and do so as frequently as sighted subjects, and gesture even when they know are talking to another blind person (Iverson and Goldin-Meadow, 1998). This is dramatic evidence of a speech – gesture bond.

Information exchange: Information received in a gesture may be recalled later as speech (not gesture) (Cassell *et al.*, 1999). Symmetrically, Kelly *et al.* (1999) observed subjects recalling information presented in speech as having been gestural.

Gestures and fluency: Speech and gesture become complex or simple in tandem, even to the point of jointly disappearing (the gesture disappears along with speech, rather than replacing it).

To sum up binding, speech and synchronous coexpressive gestures form a tightly bound unit, capable of resisting outside forces attempting to separate them, such as DAF, stuttering, lack of visual experience of gesture, and loss of fluency. Speech and gesture also spontaneously exchange information in memory, so that when something is recalled the speaker cannot tell the original format. Tight binding clearly fosters an imagery–language dialectic by creating unbreakable psycholinguistic units within which it can take place.

Gesture Anatomy

The anatomy in question is temporal, an anatomy of 'phases.' The gesture illustrated in Figure 1 includes all phases except a final, retraction phase, which did not occur in this case because a new gesture followed immediately. The speaker had been given a comic book to read and was retelling the story to a listener from memory. The transcription, by S. Duncan, is as follows: "so he gets a / hold of a big [oak tree / and he **bends it way ba**ck]." Notation: / denotes a silent pause; [the onset of motion; underlining a hold; boldface the stroke;] the end of motion.

Unfolding in Time and Its Meaning

As this example illustrates, gestures pass through a series of phases, each with its own position and function in the gesture. The phases enable us to peer into performance dynamics. Kendon (1980) differentiated among what he termed "gesture units," "gesture phrases," and "gesture phases."

A gesture unit is the interval between successive rests of the limbs. In the example, the gesture unit

Figure 1 Gesture phases in the 'and he bends it way back' gesture. The insert is a frame counter (1 frame = 1/30 s.). The total elapsed time is about 1.5 s. Panel 1: Prepreparation position. Hand is shown just prior to lifting off from the armrest. Panel 2: A Prestroke hold occurs while saying 'he' – the hand waiting for 'bends.' This figure depicts the hand at the start position of the stroke (ready to pull down and to the rear). The preparation interval was slightly less than 1 s. Panel 3: Middle of stroke – 'way.' The hand has closed around the 'oak tree' and is moving downward and to the rear. Note how the speaker's own position in space defines the location of the oak tree and the direction of the bending-back movement – the gesture framed according to a 'first-person' or 'character' viewpoint. Panel 4: End of stroke and beginning of the poststroke hold in the middle of 'back.' Hand is at its farthest point to the rear. After the poststroke hold, the hand immediately launched into a new gesture.

included not only the interval from 'oak' to 'back,' but also further speech and later gestures not shown.

A gesture phrase is what we intuitively call a 'gesture' and it in turn consists of up to five gesture phases, in sequence:

- Preparation (optional): The limb moves away from a rest position into the gesture space, where it can begin the stroke. The onset of preparation shows the moment at which the visuospatial content of the gesture starts to take form in the cognitive experience of the speaker. 'Oak tree and' coincided with the preparation phase in the illustration, and it is noteworthy that the preparation commenced with the first mention of the object in the preceding clause – as the idea was introduced, so the next image flicked on to become a gesture.
- Stroke (obligatory in the sense that, without a stroke, a gesture is not said to occur): The stroke is the gesture phase with meaning; it is also the phase with effort, in the dance notation sense of focused energy. In the example above, the stroke was the bending back, the hand in a grip around something thick, timed with the coexpressive 'bends it way back.'
- Retraction (optional): The hands return to rest (not always the same position as at the start). There may not be a retraction phase if the speaker immediately moves into a new stroke, as was the case in the illustration.

In addition, Sotaro Kita identified:

- Pre- and poststroke hold phases (optional): Temporary cessations of motion either before or after the stroke motion; in the example a prestroke hold occurred during 'he' and a poststroke hold during the second half of 'back'; holds ensure that the meaningful part of the gesture – the stroke – remains semantically active during the coexpressive speech. Holds suggest that the stroke and the coexpressive speech comprises an idea unit created in advance, from the start of the preparation phase.

The gesture phases are organized around the stroke. This is the 'object' being presented. It is prepared for, withheld if need be until the coexpressive speech is ready, and held again until all linked speech is over. The full span of phases, from the beginning of preparation to the end of retraction, describes the lifetime of a particular gesture and its linked idea unit.

Coexpressiveness and Synchrony

Gesticulations (but not other points along Kendon's continuum) have the property that strokes synchronize with coexpressive speech. This section explains this concept. An example is illustrated in Figure 2. The speaker was describing a cartoon episode in which one character tries to reach another character by climbing up a drainpipe on the inside. The speaker is saying "and he tries going **up thróugh** it this time," with the gesture occurring during the boldfaced portion (the illustration captures the moment at which the speaker is saying the vowel of 'through'). Coexpressively with 'up' her hand rose upward, and coexpressively with 'through' her fingers spread outward to create an interior space. The upward movement and opening of the hand took place simultaneously, and both were synchronized with 'up through,' the linguistic package that carries the same meanings. The effect is a uniquely gestural way of packaging meaning – something like 'rising hollowness,' which does not exist as a semantic package of English at all. The gesture and the linguistic construction synchronize as a whole, not component by component. Thus, speech and gesture synchronize at the point where they are coexpressive and this, not the components, is the unit that aligns them.

Growth Points and Context

Synchronous combinations of such unlike modes of cognition – visuospatial-actional gesture synchronized with analytic-combinatoric speech – may be operative psycholinguistic units, termed 'growth points' or GPs (McNeill and Duncan, 2000). One way to think of a GP is as imagery that is categorized linguistically, an image with a foot in the door of language. A GP is inferred from the totality of communicative events, with special focus on speech–gesture synchrony and coexpressivity. It is called a growth point because it is meant to be the

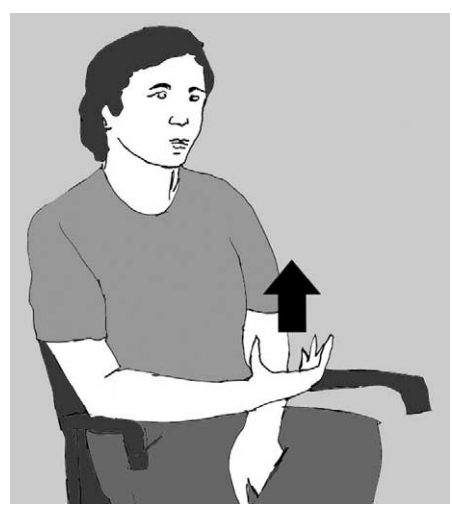

Figure 2 Synchronous, coexpressive gesture with 'up thróugh.' Accent indicates a stressed vowel.

initial form of a thinking-for-speaking unit out of which a dynamic process of utterance and thought organization emerges.

The Psychological Predicate Regarding the GP as a psychological predicate (a term from Vygotsky, 1986 – not always a grammatical predicate) suggests a mechanism of GP formation in which differentiation of a focus from a background plays an essential part.

The concept of a psychological predicate illuminates the theoretical link between the GP and the context of speaking. Defining a psychological predicate requires reference to the context; this is because the psychological predicate and its context are mutually defining. The psychological predicate (1) marks a significant departure in the immediate context, and (2) implies this context as a background. We have in this relationship the seeds for a model of real-time utterance generation and coherent text formation.

First, when gestures and speech synchronize they jointly form the contrast underlying a psychological predicate. Second, the form of the gesture embodies the content that makes this differentiation meaningful. These correspondences can be demonstrated by exploiting a quirk in the cartoon stimulus that we have employed, in which Sylvester attempts to reach Tweety by climbing a drainpipe conveniently running up the side of the building from street level to the floor where Tweety is perched; he does this twice – first on the outside of the pipe, then on the inside. If a speaker recalls both attempts and in the correct outside-inside order, the gesture–speech combination relating to the second attempt includes a focus on interiority; this is the differentiating element. If a speaker misses the outside attempt but does recall the inside attempt, or recalls them in reverse order, interiority does not now contrast with exteriority, and the gestures with such recall do not include it as a particular feature. These results have been reported by Susan Duncan at workshops; I summarize them, with illustrations, in McNeill, 2005.

Contexts and Catchments

The context of differentiation is an empirically approachable concept via gestures that organize themselves into 'catchments.' A catchment is recognized when one or more gesture features recur in at least two (not necessarily consecutive) gestures. The logic is that a discourse theme will produce gestures with recurring features. These gesture features can be detected. Then, working backwards, the recurring features offer clues to the cohesive linkages in the text with which they co-occur. A catchment is a kind of thread of visuospatial imagery that runs through a discourse to reveal the larger discourse units that emerge out of otherwise separate parts. The recurring features can include hand use (right hand, left hand, two hands similarly deployed, two hands differently deployed), space, orientation, trajectory, hand shape and position, and others, although these are the most common.

By discovering the catchments created by a given speaker, we can see what this speaker is combining into larger discourse units – what meanings are being regarded as similar or related and grouped together, and what meanings are being put into different catchments or are being isolated, and thus are being seen by the speaker as having distinct or less related meanings.

Viv's Catchments I shall use one speaker's recounting of an episode from the cartoon stimulus to demonstrate catchments and how they can be used to imply something of the dynamic process of utterance formation.

The episode involves a bowling ball, and follows directly the ascent inside the drainpipe described earlier. Tweety, seeing Sylvester, fetches a bowling ball and drops it into the top of the pipe; the ball and Sylvester meet in the middle; Sylvester shoots out of the bottom of the pipe, the bowling ball now inside him; he rolls, bowling ball style, down an inclined street and into a bowling alley; after a significant pause, there is the sound of pins being knocked over.

Viv's gesture performance reveals three catchments, recognizable from hand use and hand shape/position:

C1. The first catchment involves one-handed gestures, and accompanies descriptions of Sylvester's solo motion, first up the pipe, then out of it with the bowling ball inside him. Thus, C1 ties together references to Sylvester as a solo force.
C2. The second catchment involves two-handed symmetrical gestures that group descriptions where the bowling ball is the antagonist, the dominant force. Sylvester becomes what he eats, a kind of living bowling ball, and the symmetrical gestures accompany the descriptions where the bowling ball asserts this power.
C3. The third catchment involves two-handed asymmetrical gestures and groups items in which the bowling ball and Sylvester mutually approach each other in the pipe. Here, in contrast to the symmetric set, Sylvester and the bowling ball are equals differing only in their direction of motion.

With these catchments, we can analyze the real-time origins of the utterance and gesture in the accompanying example, in a way that incorporates context as a fundamental component. The illustrated example is in the symmetrical C2, which shows that

Figure 3 Downward stroke with '**it do**wn.'

one of the factors comprising its field of oppositions was the various guises in which the bowling ball appeared in its role of an antagonist. That is, the idea unit was not only dropping the bowling ball but the bowling ball as a force in its own right. We can write the meaning of the psychological predicate as 'Antagonistic Force: Bowling Ball Downward.' This was the context and contrast. Thus, 'it down' (see Figure 3), unlikely though it may seem as a unit from a grammatical point of view, was the cognitive core of the utterance – the 'it' indexing the bowling ball, and the 'down' indexing the significant contrast itself in the field of oppositions. And the verb 'drops,' therefore, was *excluded* from this GP; it referred to something Tweety did, not what the bowling ball, as a force, did.

Viv's gesture in Figure 3 was made with two symmetrical hands – the palms loosely cupped and facing downward as if placed on top of a large spherical object, and the hands moved down during the linguistic segments 'it down.' The inferred GP is this image of downward movement plus the linguistic content of 'it' (i.e., the bowling ball) and the path particle 'down.' The stroke *excluded* the verb, 'drops.' The full utterance was "Tweety runs and gets a big bowling ba[ll and drops **it do**wn the drainpipe #]."

The exclusion of 'drops' was not an accident. First, the preparation phase of the 'it down' gesture had two features that skip the verb. Preparation began at the first mention of the bowling ball in the preceding clause (again, preparation for the next gesture began with the object was first mentioned). This shows that the bowling ball was part of the discourse focus at that moment. And, second, preparation continued right *through* the verb, suggesting that the verb was irrelevant to this focus. Further, a brief prestroke hold seems to have preceded 'it down' (although coding varies), which, if present, targeted the stroke to 'it down.' Finally, a poststroke hold lasted exactly as long as it took to complete the spoken articulation of 'down,' which preserved the synchrony of the gesture and the word. So the stroke fully and exactly timed with just two words, 'it down,' and excluded a third, 'drops.' The rest of the utterance can be explained by 'unpacking' this GP via a construction (in this case, the caused motion construction, which provided the verb 'drops' as well as the ground element, 'the drainpipe'; cf. McNeill and Duncan, 2000).

Figure 4 Gestural mimicry. First panel is a gesture by the speaker to the right; second panel is mimicry by the speaker to the left.

Social Context

Lev Vygotsky, in his argument against Jean Piaget, famously asserted that everything appears in a child's development twice: first on the social plane, later on the psychological (Vygotsky, 1986). The concept of a social-to-psychological transition can be applied to gestures as well. Gestures imply a social other. If one denies access to a listener, the frequency of gesture declines (Alibali *et al.*, 2000). Increasing the number of listeners changes the shape of the gesture space and this in turn changes the direction of gestures depicting movements of characters in the story (Özyürek, 2000).

I shall conclude with examples of the social sharing of gestures. The research from which they are drawn is not yet published, but the phenomenon of social sharing or resonance through gesture is significant.

Mimicry and Two-Bodied Gestures Gestural mimicry occurs when one conversational partner, within a short time, reproduces the gesture of the other partner; the effect is often to cement a kind of social solidarity and is accordingly seen commonly between close friends. The example in Figure 4 from research by Irene Kimbara shows the woman on the

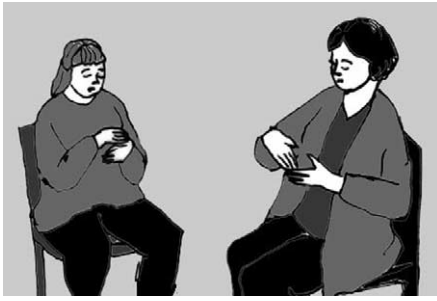

Figure 5 Gesture mimicry synchronized with the other's speech.

Figure 6 Gesture appropriation synchronized with the person's own speech.

left reproducing the gesture just performed by her friend on the right.

A different kind of shared gesture is also possible between strangers. Figures 5 and 6 are from Nobuhiro Furuyama, who studied the gestures of learners as they were instructed in a new motor task (origami). In each illustration, the learner is seated at the left (two different training sessions). In the Figure 5 example, the learner mimics the gesture of her tutor. The mimicry occurred without speech by the learner, but her *gesture* synchronized with the *tutor's speech*. As the tutor said "[pull down] the corner," the learner performed the gesture during the bracketed portion. The Figure 6 example, in contrast, shows the learner appropriating the tutor's *gesture* by combining it with her *speech*. The learner is saying "[you bend this down?]," and during the bracketed speech moved her hand to the tutor's hand, and then moved her hand downward and away (the illustration shows the start of the gesture). As Furuyama observes, the tutor had turned in his chair so that the same left–right gesture space was before him and the learner, a maneuver that might have invited her to enter his gesture space. It is striking that any taboo against strangers coming into physical contact was overridden while the hands were in a symbolic mode.

Examples of these kinds address what can be called collectively the 'social resonance' of gesture. Janet Bavelas has long been interested in this phenomenon. Bavelas *et al.* (2000) demonstrated resonance not from the viewpoint of shared feelings, the more traditional approach, but as joint cognition and storytelling; gestural repetition seems to act as grounding and in general conveys mutual understanding.

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See also: Body Language; Cognitive Linguistics; Coherence: Psycholinguistic Approach; Cohesion and Coherence: Linguistic Approaches; Discourse Anaphora; Discourse Processing; Figurative Language: Semiotics; Figures of Speech; Foregrounding; Gesture: Sociocultural Analysis; Gestures: Pragmatic Aspects; Iconicity: Literary Texts; Iconicity: Sign Language; Meaning, Procedural and Conceptual; Metaphor: Psychological Aspects; Metapragmatics; Narrativity and Voice; Pauses and Hesitations: Psycholinguistic Approach; Sentence Processing; Sign Language: Discourse and Pragmatics; Sign Language: Overview; Sign Language: Psycholinguistics; Spoken Language Production: Psycholinguistic Approach; Syntactic Constructions; Word and Image.

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Gesture: Sociocultural Analysis

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Gesture is Integrated with Utterance

When people come together to interact, they can exploit everything at hand (as we might say) to communicate with one another. They position their bodies in relation to both interlocutors and other copresent people; they manipulate objects in the surround; they orient their senses towards one another; they talk; they look; they listen; and they gesture – they move their bodies (and sometimes other entities as well) as part of interaction. Although this short article concentrates on gestures, mostly those performed with the hands, that form part of spoken utterances, much of what it describes could be extended to a wider range of 'gestural expression,' whether or not linked directly to speech, and including a variety of body parts (head, eyes, face, torso) and corporal techniques.

The keenest observers of human communicative capacities have always been interested in gesture.

Consider the expressive postures of clay or stone figurines from Palenque to Phnom Penh, or the fingers, hands, arms, faces, and bodies of human figures depicted on vases, walls, textiles, shields, masks, and canvases from Auckland to Greenland, or captured in snapshots and sketches from New York to New Guinea. Quintilian, the 1st-century Roman rhetorician, offered a treatise on how to use gesture artfully as part of oratorical persuasion. Grand speculative programs in the 18th and 19th centuries – programs which continue in perhaps less ambitious and explicit forms to the present day – found in gesture evidence for presumed universals in thought and language. Conversely, explorations of human diversity – especially in the 20th century – also found in gesture a fertile empirical ground to demonstrate divergence and cultural specificity. Important here was the rise of iconic recording technologies which allowed observers to reduce fleeting gestural performances to representation which could be indefinitely replayed and scrutinized for analysis. There is a related tension, in both pretheoretical and analytic fascinations with gesture, between nature and culture: between speech-accompanying gesticulation cast as 'pantomime,' 'protolanguage,' or 'natural pidgin' somehow grounded in presumed panhuman iconicity and expressivity, vs. the unpredictable culturally specific repertoire of gestures that clearly must be conventionally learned, used, and understood, and that remain opaque to non-natives. (Some Los Angeles natives perform an L-shaped hand on their foreheads to mean 'loser,' i.e., to indicate that some third person is a poor excuse for a human being – a gestural convention perhaps no less exotic that the Neapolitan 'hunger' or 'poor' gesture performed with a slapping motion toward the hip – see Kendon, 1992. The 'loser' gesture exists as an animated emoticon on at least one Internet instant messenger service.)

Contrasting bodily movements with other aspects of the utterances of which they form part, the expressive virtues of gesture both complement and differ from those of the digital, segmentable, and structurally contrastive elements of spoken language. Since it uses as an expressive medium the very body that is involved in human action in the first place, gesture can model action both directly and analogically. Even highly stylized pantomimes can illustrate aspects of action not verbally expressed, nor indeed easily expressible: complex configurations of objects and actors, perspectives, details of mechanics and effort in action. Contrasting with the linear flow of speech units, gesture unfolds in four dimensions, and easily combines multiple simultaneous signing vehicles (gaze, facial expression, posture, as well as hands and other extremities) in a miniature and multifunctional orchestra of expression. Utilizing space as well as time, gesture has a dimensionality, a potential persistence, and a spatial immediacy in the context of utterance not similarly available to sound. For example, a gesture can be held across a chain of utterances, thus providing a diagrammatic vehicle to anchor talk; or it can incorporate into a scene spatial elements – such as direction, distance, size, or shape – which receive no corresponding verbal expression.

Nonetheless, gesture and speech characteristically occur together, combining with still other expressive resources to coordinate interlocutors in the communicative process, and often with precise temporal and semantic coordination. Emblems – the culturally specific, learned gestural forms, with usually quite specific conventional readings, like an 'OK hand' or a locally defined obscene gestural imprecation – can cooccur with speech or, perhaps more often, simply replace it, even in the midst of conversational turns. They are thus a kind of language surrogate. Other sorts of gesture, however, seem to be inextricably linked to simultaneous speech. Researchers have repeatedly observed, for example, that depictive or representative iconic gestures – which seem to present images reminiscent of entities or events also receiving verbal mention – appear synchronized with, or temporally just antecedent to, apparently associated words, or 'lexical affiliates' as they are called. 'Formless' gestures, dubbed 'batons' or 'beats,' seem instead to track speech rhythm, falling at once on stressed syllables and points of presumed speaker emphasis. Furthermore, deictic gestures allow interlocutors to indicate referents spatially (although sometimes in virtual space), and thus provide a (sometimes seemingly indispensable) complement to roughly simultaneous spoken referential expressions, such as *this* or *that*.

Theorists adopt sometimes diametrically opposite positions, however, about the differences between gesture and speech as communicative resources. Some think gesture 'leaks,' betraying a speaker's true feelings and thoughts, perhaps in opposition to more treacherous (because more conscious?) words which may try to conceal them. Or they may see gestures as largely involuntary somatic twitches, simply reflecting the speaker's (or the mind's) struggle to externalize inchoate inner images as a linear sequence of verbal elements. This article will largely ignore the putative 'inner' processes that underlie gestural production, to concentrate instead on the semiotic and functional properties of gestures. We take for granted the communicative potential of gesture in the process of utterance, and its connections with social and cultural formations more generally. For just as gesture is integrated with utterance, tying words directly to a spatiotemporal context, it is also part of wider

cultural routines of the body, susceptible both to the stylization and persistence of custom – patterns of gesture have evidently remained largely intact in Naples for several centuries, much longer, no doubt, than patterns of speech – and to the ideological productions of culture to which we turn at the end of the article.

Meanings and Interactions

Gestures function like other signs, verbal or otherwise. To expand on a gestural typology already alluded to, a commonly cited Peircean trichotomy can be applied to gestures. Conventionalized – thus symbolic, in the Peircean sense – emblems, with specifiable 'citation' forms (thus, in Kendon's terms, 'quotable' – 'and then she did **this** [quoting the gesture]') and holophrastic as well as lexemelike meanings, except for their manual modality resemble certain spoken expressions. The conventionality can be seen partly in specific criteria of well-formedness (the circle of the 'OK hand' is made with the thumb and the index finger, with the others extended slightly upwards, not with just any fingers, and presumably not with other orientations of the hand, orientations which in other cultural settings can produce very different meanings). Conventionality is also evidenced by the families of use to which such culturally specific gestures are put. Indeed, emblems are in both form and function much like interjections, or 'response cries' (Goffman, 1976), which also may depart from the phonotactic canons of a language and which inhabit a characteristic expressive realm – often, for example, indexing various kinds of disapproval or designed for interpersonal social control – but which remain highly culture specific nonetheless.

There are symbolic and conventional aspects not just to a society's repertoire of emblems but to nonce gestures as well. Hand shape in gesture, for example, is sometimes highly specific: how one points, with what digits or other body parts, and what sorts of thing one can refer to with a specific sort of pointing gesture, are matters carefully (and symbolically) regimented in many cultural contexts. In Tepoztlan, Mexico (Foster, 1948), one used different hand shapes to show the height of a table, a donkey, or a child, and using the wrong sort of hand remains a potential insult throughout Latin America. Recent investigation proposes that even in spontaneous gesticulation different hand shapes come in 'families' with highly schematic shared meanings: 'precision' or 'offering,' for example, associated with the 'precision grip' (the touching thumb and index figure of the 'OK hand') or 'open palm' hands, or 'individuation' associated with a lone extended finger. Presumably, however natural the explanations for such groupings may seem, cultural tradition and transmission must be centrally involved in propagating such families of form.

Gestures are also heavily iconic, depicting aspects of objects and actions by selectively mirroring or diagraming shapes, movements, and configurations of entities or events that provide the vehicles for gestural interpretation. A Guugu Yimithirr man, for example, describes how his boat capsized in a storm. He gesturally evokes the rolling motion as the boat was picked up by the wind and tossed on its side (Figure 1), saying "like **this**." Resemblance is, of course, a feeble principle for interpreting a sign, and interlocutors must always infer what aspects of a demonstration they are to attend to – one reason that words and gestures frequently complement one another semiotically, or that gesticulation uninformed by the accompanying words may remain obscure, until the soundtrack (or the subtitles) are turned back on. Because gestures iconically – if schematically – demonstrate actions and depict objects, they can also incorporate varying perspectives or viewpoints on such action, often more directly than can syntactic and lexical devices which imply voice or valence. A gesturing hand can represent now an object, now a tool for operating on it, now an actor manipulating it, and now an observer of the scene. Gesture can also suggest granularity or resolution (for example, in gestures accompanying directions or instructions), as well as specifics of the configuration and shapes of objects – a principle exploited in sign language nominal classifiers, and used to advantage in spontaneous gesticulation as well. A hand holding even an imaginary object adjusts itself to its shape and weight.

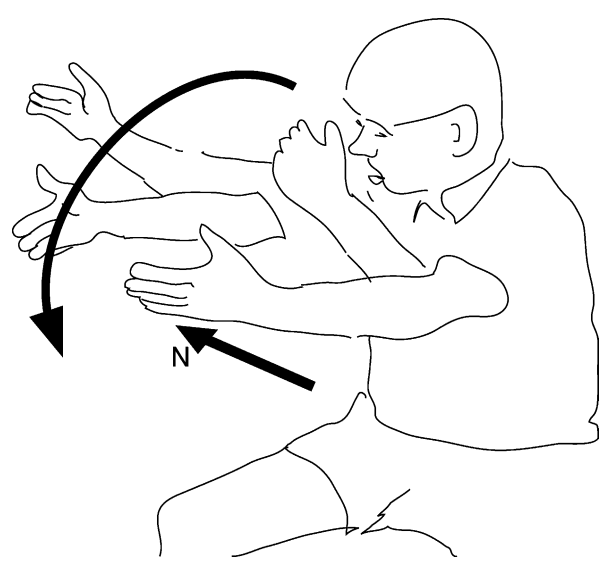

Figure 1 First shipwreck gesture.

Finally, gestures indexically project the contexts of their occurrence. The rhythmic gesticulations called beats, mentioned above, are almost pure indexes, tracking the speech stream much in the way a conductor tracks a score, and additionally parsing it into significant segments. Even the most wooden of gesturers – from Englishmen to presidential candidates – seem to punctuate their syllables gesturally. However, the observed synchrony between gestures in general and their apparently affiliated words is itself an indexical trace of the temporal unfolding of an utterance. A pointing movement, another classic indexical sign, may pick out a perceptually available referent, but it may also create an invisible one in thin air, leaving it available for later resumption by gestural (or spoken) anaphor. Clark (2003) describes a range of object manipulations, which he calls 'placing,' to achieve referential ends parallel to those of 'pointing.' Crucially, gestures of 'placing' depend for their success on the structure of space – and of particular culturally significant spaces (from store counter tops or queues, in Western society, to the hearth or the notorious witchcraft cave in, for example, indigenous Mexico).

Pointing gestures are of particular interest because they combine all the Peircean modalities and additionally require careful conceptual coordination between interlocutors to convey their meanings. Consider the case of Rosa, in Figure 2, who makes a complex double pointing gesture, when she reaches the climax of a story about an elderly woman who opened the downstairs door of her house to some threatening men. Afraid, she wanted to escape out the same door, but could not because she had left the upstairs door to the house itself unlocked. In Friulian, Rosa narrates the older woman's dilemma in the present and in the first person: "*Nopos la vie parze che o ai lepuarte viarte* [I cannot leave because I have the door open]." She performs the double pointing gesture in two stages: her left hand reaches out with the fingers extended loosely to the right when she says "I cannot leave"; then her right hand – which has accompanied the other in the move to the right – forms a pointing hand and points up to her left as she says "the door open." The gesture invokes diagrammatically the configuration of the house (an outside door to stairs which lead up to the main dwelling) which Rosa's audience knows well. It indexes the relevant locations in that conjured space. Rosa uses conventional index finger pointing to signal the unlocked door, and a looser pointing hand to show the blocked escape route. And, interactionally, the double point captures perfectly the protagonist's dilemma: a choice between two impossibilities.

Figure 2 Double pointing gesture.

Directional indexicality also infects gestures otherwise based on quite different semiotic principles. A gestural imprecation, for example, can be performed in a specific direction, indexing at once its target and its author. A depiction can combine the representation of a referent's size with an indexical indication of its position. In the shipwreck example mentioned above, the gesture not only illustrates the boat's rolling motion but also indexes the cardinal direction in which the boat flipped over, given prevailing storm winds. Contrast Figure 1, where the speaker has north to his right, and shows the boat flipping in front of him, i.e., to the west, with another performance of the same story where the narrator is facing north, and depicts the boat flip with a very different motion, but in the same direction (see Figure 3). Indeed, the shipwreck gesture illustrates a perhaps unexpected sort of gestural convention, since it is a norm for speakers of Guugu Yimithirr (and in other communicative traditions, too) that gestures depicting motion, real or hypothetical, remain faithful to cardinal orientation (Haviland, 1993).

Though most research has concentrated on gestural 'meaning,' gestures (along with attitudes of the body more generally) are clearly central in coordinating (inter)action. The preconditions of face-to-face communication involve positioning bodies to allow, restrict, or prevent mutual access. Moreover, states of talk can be restructured and reorganized in part by the talk itself, and in part by reorientations of interlocutors brought about by gesture, shifts in gaze, and adjustments of posture. Theories of the ontogenesis

Figure 3 Second shipwreck gesture.

of gesture often link children's manipulation of objects as the source for later gestural 'ritualization.' Pointing, for example, appears to grow out of grasping and reaching. Even in adults, handling objects, moving them, and directing attention to them and to the spaces around them seem to give rise to gestural routines which, in turn, can become routinized or 'grammaticalized' through the course of an interaction. Gesture is thus embedded in bodily techniques, themselves notoriously shaped by cultural practices.

Ideologies of Gesture

Like other cultural practices, gesture when it rises to explicit consciousness inspires metatheory and ideology. The most astute early students of gesture, from de Jorio to Efron, comment with skepticism on theories which purport to link the proclivity to gesture, or gestural exuberance, to aspects of personality or temperament, if not to gentility and good breeding, or even to race and national character. The fact that such links have been advanced, nonetheless, suggests something about a an ethnotheory of the communicative economy which gesture and speech jointly inhabit. The fact that some populations – ranging from Warlpiri women in mourning, who must not blurt out certain tabooed words (Kendon, 1988), to members of monastic orders who abjure the worldliness of words – voluntarily substitute elaborated, conventionalized systems of gesture for speech, is a kind of reversal of the common injunction on children in other societies not to point or impolitely overuse their hands in talk.

Arguments about the communicative virtues of gesture seem always to involve subtle and perhaps contradictory ideological stances: Roman orators (like modern-day politicians) hoped to become more persuasive through calculated use of gestures; but pop psychologists argue that 'body language' is truer – precisely because deeper and less susceptible to conscious manipulation – than words. Some theories find gestures peculiarly appropriate to situations where words fail – over great distance, or in situations of too much (or too little) noise; others find virtue in their surreptitious and silent potentialities (as in the case of the Cuna lip point [Sherzer, 1972], which can be a vehicle for clandestine criticism or mockery). Finally, the analytical debates about whether gesture is a speaker's or a hearer's phenomenon (i.e., whether it is, in the psychologists' parlance, 'communicative') reflect pernicious dichotomies that surround such culturally specific notions as volition and intention, individual vs. community, or knowledge/mind vs. practice/body.

See also: Gesture and Communication; Gestures: Pragmatic Aspects; Sign Language: Overview.

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Gestures: Pragmatic Aspects

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(Hand-) gestures play many diverse roles in human life and do many different jobs in social interaction. Gesture – simple emblems like the thumbs-up sign as much as ongoing gesticulation that accompanies talk – is a most flexible resource that is utilized in a multitude of cultural practices, ranging from legal proceedings to work in mines to the making of music and intimate moments of talk, and it is always in play when people collaborate with their hands on common tasks. The practices of gesture are heterogeneous and difficult to subsume under a common denominator, other than that the activity involves communicative action of the hands. The view adopted here is focused by the question how gesture serves persons – *embodied actors* – who are acting in the world together, within specific ecological and cultural settings, and together making sense of it; gesture is conceived as a mode (or set of modes) of bodily action by which the world is structured, known and understood, not in the first place as a system of signs or a mode of expression.

Gesture serves human activities, including conversation, in a number of different capacities that can be conceived as *alignment-types*: ways of aligning people, gesturing hands, and the situated world within which they interact. Alignment types are distinguishable on the basis of the framework of participant orientation within which gestures are perceived and understood, i.e., in terms of their alignment and coordination with gaze, speech, action, and the setting or landscape within which the interaction takes place. Six alignment types are distinguished here, leaving open the possibility that there are others:

1. hand gestures can aid in the structuring and making sense of the **world-at-hand** (i.e. the world **within** reach of the hand);
2. they can serve for orientation within and understanding of the **world-within-sight** (but **beyond** reach of the hands);
3. gestures can represent or **depict** the world in its absence, within the 'gesture space' (McNeill, 1992) that is created by the participants' orientation to the gesturing hands;
4. hand gestures, often in combination with other bodily action, can **embody communicative action** and discourse structure;
5. they can **mediate and regulate transactions**; and
6. they can construe content that is conveyed by the verbal utterance that they accompany (**ceiving/ception**).

In the following, the features of each alignment type are described, and gestural practices that are characteristic of it are discussed. The last section of the article delineates aspects of the coordination of gesture and speech.

Making Sense of the World at Hand

A great deal of inconspicuous gesturing occurs while people and their hands are actively engaged with the world at hand. Gestures arise as a byproduct of and in the service of practical action, disclosing features of the immediate scene, or otherwise involving the touching, feeling, grasping, and handling of whatever is at hand, and maybe the making of something from it. Gestural practices that are coupled with the world at hand are often excluded from the study of gesture, which is treated as movement in the air by empty hands. However, wherever cooperation involves the handling or making of things (including the making of graphic marks on paper), one finds manifold

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indexical, iconic, and symbolic actions of the fingers and hands, and often these are entirely indispensable, given the type of activity underway and the communication tasks that it raises for the practitioners (Ochs, Gonzales *et al*., 1996).

Among the 'jobs' that gestures do in the world-at-hand are: to structure the participants' perception of objects; to disclose intrinsic, invisible features and affordances of things; to analyze, abstract, and exhibit action; and to 'mark up' the setting. Gestures can arise as minimal modulations of instrumental acts, performed for the benefit of the coparticipants, e.g., in the context of demonstrations.

Genres of gestural practice found within the world-at-hand include, among others:

Tracing: An index finger, set of fingers, or hand is moved along a surface, thereby drawing a line, but also gathering tactile information, in order to discover (feel), disclose, and broadcast undisclosed features of objects or to inscribe real or imaginary marks on surfaces (e.g. to suggest possible features and fields of action). Goodwin writes:

> A quite general class of cognitive practices consists of methods used to divide a domain of scrutiny into a figure and a ground, so that elements relevant to the activity of the moment stand out. . . . Through these practices structures of relevance in the material environment can be made prominent (Goodwin, 1994).

Exploratory procedures (see Gibson, 1962): These are patterned actions by which hands systematically explore intrinsic object properties (texture, volume, consistency, temperature, brittleness) and affordances (what can be done with objects). While these actions serve the information-gathering needs of the actor, they are easily enhanced so as to disclose, i.e., make visible and broadcast, the qualities that are discovered through them. Demonstrative haptic or tactile explorations provide for shared understandings of the material features and functional characteristics of the things that require our attention.

Highlighting action and its accessories: Practical actions or their stages are elaborated through formal operation such as exaggeration, repetition, and segmentation, to disclose their logic, components, and characteristics to coparticipants. Gesturalization serves as a method for the self-explication of manual action. Minimal modifications – e.g., the repetition or exaggeration of a component act – can serve to draw attention to stages or accessories of the activity.

When the participants employ artifact-based representation practices (e.g., writing, diagramming, doodling) in addition to speaking and gesture, as is common in many lines of work, gesture can become aligned and enmeshed with them (Streeck and Kallmeyer, 2001), which can result in hybrid symbolic acts (e.g., symbolic gestures committed to paper, a line drawn on paper to emphasize a currently spoken word); situated, ephemeral graphic artifacts such as doodles and/or the acts of making them thus take on social-symbolic functions. Gesture is also indispensable as a medium for the interpretation of professional diagrammatic representations: architectural and engineering blueprints, for example, are enhanced by gestures showing motion, changes over time, or the dimension of height that the flat diagram lacks.

What distinguishes this entire variety of gesture uses from other basic varieties is their alignment within the material, perceptual, and cognitive ecology of the situation: they are perceived and understood by reference to their contiguity with objects and instrumental acts. In other words, the participants' visual attention encompasses gestures and things, and these elaborate one another. Gesture directs the recipient's attention, an effect that is also achieved by the placing of objects in the recipient's line of regard. Gesturing about and arranging objects are activities that serve epistemic functions and often go hand in hand (Kirsh, 1995).

Revealing the World within Sight

A different framework of person-gesture-world alignment is realized when the gesture orients the participants to the visible world beyond the reach of the hands. This is the prototypical realm of pointing: an extended index finger or hand (or another array of body parts whose constellation can be seen as a vector) enables the participants to coordinate their orientation so that they jointly focus their gaze on a distant object, feature, or location. Pointing is only one type of orienting behavior, however; posture, gaze direction, and head orientation can serve similar purposes, as can the placing of an object in the interlocutor's line of regard (Clark, 2003). And pointing is not universally executed with an extended index finger (Wilkins, 2003); other varieties include lip-pointing (Sherzer, 1972) and pointing by gaze and movements of the head. Within a given repertoire, there may also be pragmatically motivated alternatives such as pointing by index finger – to individuate an object among other objects – and pointing with the open hand – to select an object as an exemplar of a kind (Kendon and Versante, 2003). Handshape and motion patterns can also serve to **characterize** the focal object, i.e., to shape the recipient's perception of it. Gestures made in this mode serve spatial orientation as well as the sharing of sights: once a shared visual focus is established, what is seen together can then be structured by gesture; motions of the

fingers and hands project lines, vectors, points, etc., onto seen scenes, indicating **how** what is visible should be regarded. The visual field – i.e., the culturally structured landscape within sight – is thus augmented and made intelligible by layers of cognitive-manual actions and forms.

Depiction by Hand

The third alignment type of hand gestures is brought about when interaction participants turn away from the world and focus attention inside their interactional huddle, and, by their bodily orientation and positioning in space, mark off the space between them as territory of their interaction. The interaction space becomes the stage for hand gestures when attention is, however fleetingly, focused on the speaker's gesticulating hand(s) (Streeck, 1993). This happens whenever gesture is employed as a representation device, to depict aspects of the talked-about world, whether concrete or abstract, real or imagined. When gesture is used to depict or represent, for example in the context of narrative, recipient attention is solicited for the gesturing hands. This is done, for example, by including deictic expressions in the talk, some of which, for example deictic adverbs (Spanish *asi*, German *so*), seem to be primarily designed for this task. In the context of depiction, gesture is a foregrounded activity. Descriptive (depicting) gestures represent worlds in collaboration with speech, and they are understood by reference to what is **known** about the world, not what is seen at the moment.

While the category 'iconic gestures' is a familiar one, the actual study of gestural depiction is in its infancy (but see Müller, 1996; Kendon, 2004). The most detailed accounts describe iconic devices in sign languages of the deaf (Mandel, 1977), which however operate under different conditions and carry different representational loads; they function in part by virtue of their paradigmatic relations to other signs within large, conventionalized repertoires. Practices by which worlds are depicted on the gesture stage include the placing of imaginary objects on the stage; diagramming relations between them; enacting practical action schemata; sculpting volumes; and drawing outlines, among others. Some of these representational practices may be derived from other cultural practices (e.g., from drawing in sand). Most important, because most readily available to the hands, are acts of virtual grasping and handling, by which objects and instruments are evoked.

When complex imagery is assembled over time, as is the case when complex objects or events are described, the two hands often complement one another: one may 'hold' and classify the object, the other supply additional characterizations or arguments (Enfield, 2004). Repertoires of routinized and sometimes specialized methods of gestural depiction are part of the tacit communicative skills required by various professions, including designers and engineers.

Gestural depiction does not work by virtue of the hands producing shapes that **resemble** real-world phenomena, but rather because in a given context an action of the hand can be seen as **characterizing** a phenomenon or experience, and much as any phenomenon can be characterized by a multitude of words, it can be characterized by a multitude of gestures. Often, although essential to the success of the communication, the representational load of a gesture is minimal, because it is embedded within rich linguistic descriptions, and all it must do is to evoke a single feature for the practical purposes of the activity at hand (Arnheim, 1969).

Embodying Speech and Communicative Action

Another alignment type and functional genre of hand gestures that is common in the context of conversation, but also occurs interwoven with gestures of other alignment types, is the use of the hands in the embodiment of communicative action. This includes gesturing by which the communicative act performed (question, proposal, imploring, and so on); aspects of the pragmatic and syntagmatic structure of the unfolding utterance; and coherence relations between successive or separate utterance parts are shown or foreshadowed. A minimal version of this mode of gesturing are beats, i.e. hand movements characterized less by a distinct handshape or form than by repetitiveness and emphatic synchronization with the rhythm of speech, and signifying not so much by form as by changes in form which cue the beginning of a new speech unit. The pragmatic mode of gesticulation also includes pronominal referential gestures: pointing-like motions, often made by the thumb, which individuate and refer figuratively within the universe of discourse, marking acts of reference to nonpresent people, locations, or points in time. And it includes the display of the stance that the person takes towards an utterance or the content expressed. Pragmatic gesture encompasses all actions of the hands (and a variety of other body parts, notably the face, head, and shoulders) by which aspects of the communicative interaction are displayed. The category also includes recipient actions, such as head gestures of affirmation and negation or rejection that are known throughout human societies. Speech act gestures (gestures that embody illocutionary

force) often possess metaphorical quality: they figure aspects of the processes of speaking and communicating as handlings of physical objects or as conduit (McNeill, 1992) (*see* **Speech Acts and Grammar**).

The characteristic alignment of pragmatic gesturing is its occurrence at the periphery of the interaction space: such gestures are commonly executed outside the line of sight of the speaker and at the periphery of the visual range of the addressee. They are rarely subjected to the speaker's visual control. While this is the unmarked way in which communication is embodied, occasionally pragmatic gestures are made salient by being performed in the segment of the interaction space that is usually reserved for gestural depiction. Generally during conversation, the embodiment of speech and communicative action and process by hand gestures is a background process. But pragmatic gesturing is also the most ubiquitous, irrepressible, and perhaps indispensable variety of gesture, contributing greatly to the precision timing and entrainment that are characteristic of so much conversational interaction. Many societies have conventionalized at least some pragmatic gestures; some, such as that of southern Italy (Kendon, 1995), have evolved large repertoires (de Jorio, 2000 (1852)). Yet we also find immense individual variation in pragmatic gesturing; individuals tend to evolve habitual personal styles of gesticulation, and these idiosyncrasies are most obvious in pragmatic gesticulation.

Ordering and Enabling Transactions

Gesticulation in the pragmatic mode overlaps to a large extent with another usage variety; possible differences in alignment, however, suggest that it be treated as its own kind. This is gesticulation, that is also occupied with the communicative process, but at the same time addresses other interaction participants whose actions it is intended to regulate. This mode of gesturing can involve touching the other (Efron, 1972 (1942)), thereby eliciting attention or allocating a turn, soliciting response or attempting to silence it, and directing the attention of others to one another, among many other interactive and social-organization functions that these gestures serve. Many gestures blend the display of communicative action with the regulation of the behavior of others, and the distinction between these two modes is of only limited analytic value: at one end of the polarity, gestures are aligned with what the speaker is presently doing, and convey something about it; at the other end, they are performed in attempts to structure the actions of other participants. Often a gesture is aligned in both ways at the same time, or the two functions are realized at different points within the same gestural action.

Interactive or transactional gestures have enabled the development of codified, specialized gesture codes by which complex transactions such as vehicular traffic (the gestures of traffic cops), legal proceedings (as in medieval codes of law), or the making of music (through the gestures of conductors) are ordered or accomplished.

'Ceiving'

The last mode of gesturing included here is not usually treated as a distinct mode, but rather as the paradigmatic form of all gesturing other than pointing; however, it is easily distinguished in terms of the way it is aligned with the interaction participants' lines of regard as well as the current state and progress of talk. This is a mode of gesturing that is adequately described as 'thinking by hand': it involves the speaker's hands producing schemata in terms of which utterance content or narrated experience is construed. This mode is usually lumped together with gestural depiction (under the label 'iconic gesture'); however, although 'ceiving' or 'ception' is usually a component or means of gestural depiction (as well as of pragmatic gesticulation), it also occurs on its own, within an alignment framework that is different from both gestural depiction and pragmatic gesticulation. The 'pure' variety of ception is realized whenever speakers, **without attending to the process**, use their hands to give form to – i.e. construe – content. Often this is done via a simple or complex schema of grasping – by means of a prehensile posture (Napier, 1980), which is why this author labels it 'ceiving' or 'ception' (from Lat. *cap-*, take; a pattern thus formed is called a 'cept'). Ception is a bodily form of conceiving, i.e., of conceptually structuring content to be articulated in speech: this content-to-be-made-sense-of is **grasped** by an abstract prehensile action (the grasp occurring 'in the air').

The notions of ceiving/ception and cept that are introduced here are predicated upon a view of thinking as an activity not of the mind or brain but of the entire person, involving the body and its cultural skills in relevant ways, and of grasping by hand and other modes of handling objects as primary human forms of exploring, recognizing, and understanding the world, activities which provide numerous models after which linguistic concepts are formed, including the concept 'concept' itself, which depicts the process of making-sense-of (conceiving) as 'taking-hold-of-together,' i.e., as action by the hands. In ception, thinking-for-speaking draws upon the intelligence and world-knowledge of the hands. In contrast to depiction, during which the speaker **controls** the

activity of the hands, during ception the speaker is **dependent on** his or her body to 'come up with' an appropriate cept: the process of speaking becomes dependent upon embodied knowledge. Thus, when we observe speakers forming cepts while speaking, we witness the very process of embodied thought. Cepts, of course, are also formed and used during acts of depiction, in which case they depict phenomena in terms of ways of grasping or handling them. And many pragmatic gestures – metaphorical ones – are ceivings and articulate the process of communication as a handling of things (*see* **Pragmatic Acts**).

The extent to which speakers rely on 'pure' ceiving (i.e. ceptional acticvity of the hands performed outside the realm of conscious awareness and without specific depictive aims) to aid them in the formulating of talk and the making of sense appears to vary greatly. When the activity occurs, however, it is easily recognized: it involves the speaker orienting to the interlocutor, not to the gesture (ceiving is a background process), and performing largely haptic motions whose gestalt often coincides with subsequently uttered concepts. When interlocutors see the speaker actively searching for a concept (i.e., a word), they may volunteer one that fits the cept that the speaker has presented. In other words, listeners have privileged access to the speaker's gestured cepts (which is *not* the case during depiction).

Pragmatic Function and Placement of Gestures

Word searches demonstrate the importance that the relative ordering of gesture and speech has for the process of intersubjective understanding: during ception, manually performed cepts usually precede verbally articulated concepts. The hands are given an opportunity to find the first form that makes sense. Interlocutors are thereby afforded previews of concepts, enabling them to build understanding incrementally. Within the context of the other alignment frameworks, relative ordering of gesture and talk is organized differently and meets different tasks. When gesture is engaged with the world-at-hand, talk is often subservient to and made to fit the manual-visual procedures by which the scene is illuminated and its perception shaped. Pointing is coordinated with specific classes of linguistic expressions (deictics and demonstratives) (*see* **Deixis and Anaphora: Pragmatic Approaches**). During depiction special linguistic expressions and gaze direction are used to direct the recipient's visual attention to the gesture; gaze, talk, and gesture are orchestrated with great precision to render multimodal representations of worlds beyond the interaction space. Embodiments of communicative action, in contrast, and many other-directed, interactive, or transactional gestures are background processes, perceived peripherally (by listeners) or kinesthetically (by speakers), and providing an ongoing interactional framing and footing of the talk that occupies the focus of attention. Very important for the functions of pragmatic and interactional gestures, on the other hand, is their exact placement within the turns and sequences of interaction within which they occur (*see* **Conversation Analysis**). Gestures made just prior to or during the initiation of an utterance can foreshadow the speech act for which the turn is taken; ongoing gesticulation in mid-turn can mark the continuing relevance of the speech act frame of the turn, or the performance of a series of such acts, for example during extended turns at talk; and gestures made during or after utterance completion can indicate the kind of response that is sought for it, or the stance that the speaker takes with respect to what is conveyed (as is the case with shrugs, which are common during utterance completion).

All gesturing of the hands is co-orchestrated with speech prosody: gesture units coincide with prosodic units, and gesture strokes are coordinated with prosodic stress. In some specialized varieties (the gestures of rappers and conductors, for example), but also sometimes during ordinary conversation, gestural motions appear to map out the movement of the voice, thereby visualizing acoustic phenomena. To some extent, this coordination is a by-product of the self-synchrony of the human body: muscular actions of the limbs synchronize with muscular action of the vocal apparatus. At times, however, the hand's dancing to the vocal beat is a more deliberate practice of revealing the ongoing organization of speech, offering the recipient hand-packaged 'chunks' of talk by providing coherence via rhythmically placed iterations of a gestural act.

See also: Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Gesture: Sociocultural Analysis; Gesture and Communication; Pragmatic Acts; Sign Language: Overview; Speech Acts and Grammar.

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Ghana: Language Situation

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General Characteristics

Ghana is on the coast of West Africa, 7° north of the equator. Its total population is approximately 18 000 000, according to the 2000 census. The official language of the country is English, but all its immediate neighbors, Togo to the east, Ivory Coast to the west, and Burkina Faso to the north, are officially Francophone. There are approximately 50 indigenous languages, i.e., languages spoken by those who can claim a historical homeland within Ghana. Akan is the most widely spoken language, but no single language is the first language of a majority of the population.

Multilingualism

English is the official language of government and education, but not every Ghanaian speaks it. Most children, especially in the most rural areas, hear English only in school. Virtually all Ghanaians speak one or more indigenous languages, and bilingualism is very common; in urban areas, many people, especially those who come from other parts of the country, speak four or more languages. Anyone who has been to school speaks at least one Ghanaian language, and English at least to a degree. Many people speak Akan in addition to their own language.

Another widely spoken second language is Hausa, especially among people from northern Ghana and beyond who have migrated into urban centers. Hausa was first introduced into the country by trading caravans coming from the north of present-day Benin and Nigeria, and owes its present position as a lingua franca to its use by the colonial police and army, whose members were recruited largely from northern Ghana and regions to the east, where Hausa was already commonly spoken.

Language in Education

The Ghanaian policy on language in education has vacillated between requiring English as the only

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Language in Education

The Ghanaian policy on language in education has vacillated between requiring English as the only

medium of instruction at all stages and allowing instruction in all subjects in the local language (or the main language of the region, in the case of the less widely spoken languages) for the first 3 years of primary school. The latter was the policy for many years, but the Ministry of Education adopted an English-only policy in 2002. Ghanaian languages are still taught as subjects. After primary school, they are optional at all levels, including university level. Most adult literacy programs teach a local language, not English. These programs are conducted both by the Ministry of Education and by private institutions.

Language and the Media

Print

There is an active industry based on publishing in English. Publishing in Ghanaian languages, in comparison, is a small industry, consisting mainly of producing materials for educational and religious (Christian) use.

Electronic

Until the early 1990s, radio and television were government monopolies. Broadcasting was mainly in English, although selected Ghanaian languages were given weekly slots, for news and occasionally for drama. With the liberalization of media policy, many FM radio stations appeared; these broadcasters quickly adopted phone-in talk show formats that allowed or even encouraged use of Ghanaian languages. Today, virtually every major center has at least one FM station, and many broadcast mainly or even entirely in a Ghanaian language. Television broadcasting is still concentrated in Accra, the capital and largest city. Most television programming continues to be in English, with relatively few slots for news and drama in selected Ghanaian languages.

Indigenous Language Groups

The people in the forest and coastal savannah south and the savannah north differ linguistically and culturally. Ghanaians in the northern third of the country speak mainly languages of the Central Gur group, whereas people in the southern two-thirds speak languages that are grouped under the label 'Kwa'. Two Mande languages are also spoken in Ghana: Bisa (with about 137 740 speakers) is spoken in the far northeast and Ligby is spoken near the Ivory Coast border. In the following list, languages are grouped roughly according to closeness of relationship. Figures for numbers of speakers (where available, given in parentheses) are based on data in the 2000 Ghana Census report:

South

Group A

Akan (7 438 867) (language of the capitals of the Brong-Ahafo, Ashanti, Western, Central, and Eastern Regions).

Nzema (207 474), Ahanta (253 415), Aowin (109 946), Sehwi (211 334) (all spoken in the Western Region), Anufo (63 910) (Northern Region).

Guang languages: Gonja (211 703; spoken north of the others), Gichode, Dwang, Yeji, Nchummuru, Krachi (113 334 speakers for the last three combined), Nkonya (25 599), Okere, Larteh, Anum (156 890 for all three), Awutu, Efutu (108 723 for both).

Group B (languages of the Accra Plain)

Ga (587 412; the traditional language of the capital Accra), Dangme (799 805).

Group C

Ewe, the main language of the southern Volta Region (2 212 113).

Group D (several highly differentiated languages spoken in the central Volta Region)

Adele, Lelemi-Lefana, Siwu, Likpe (71 535 speakers of the last two combined), Santrokofi, Logba, Bowuli, Avatime, Nyangbo, Tafi (29 343 speakers for the last three), Kposo, Animere.

North

Group A

Frafra (426 029; the language of Bolgatanga, capital of the Upper East), Wali (173 536; in and near Wa, capital of the Upper West), Dagaare (641 926), Birifor, Safaliba (7 827), Buli (118 709), Konni, Nabt, Talni, Kusaal (378 007), Dagbani (746 924; the language of Tamale, capital of the Northern Region), Mampruli (200 393), Nanuni (78 812), Hanga.

Group B

Bimoba (113 130), Konkomba (474 293), Basaare (51 299), all spoken near the border with Togo.

Group C

Kasem (116 141), Sisaala (165 535), Chakali, Tampulma, Vagla (41 684), Deg (55 174), Delo.

See also: Akan; Education in a Multilingual Society; Ewe.

Language Maps (Appendix 1): Map 15.

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Gibraltar: Language Situation

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Measuring just 6 km^2 and stretching 4.8 km from north to south, Gibraltar, or 'the Rock,' as it is popularly known, is a small British colony with a population of just under 30 000 (see **Figure 1**). Situated on the Iberian Peninsula, it has remained a bone of contention between Spanish and British governments ever since it was seized by the Anglo-Dutch fleet during the War of the Spanish Succession (1702–1713).

After the occupation in 1704, most of the original Spanish inhabitants left and a new population emerged, of mainly Genoese and Jewish origin. After the signing of the Treaty of Utrecht (1713), which officially ceded Gibraltar to the British Crown, the population grew rapidly, with immigrants arriving from Italy, Malta, Morocco, Catalonia, Minorca, Portugal, and France. The colony's rich, multicultural makeup is reflected in the local lexicon, which contains several Italian, Arabic, and Hebrew borrowings. Today Gibraltar remains a multiracial society that is home to significant Jewish, Moroccan, and Indian communities.

Although English has been the official language of Gibraltar for three centuries and the small colony boasts the second oldest English-language newspaper in Europe, *The Gibraltar Chronicle* (founded 1801), Spanish has, until fairly recently, at least, remained the lingua franca. Indeed, well into the 20th century the majority of Gibraltarians spoke little if any English, and it was only really after World War II that concerted efforts were made to encourage the use of English. This was largely achieved through the implementation of a new education system, which mirrored that of mainland Britain and which made English the sole language of instruction in local schools.

Although most Gibraltarians today can communicate effectively in both Spanish and English, independently or simultaneously, language choice is often subject to context and situation. Though English enjoys prestige status and may be used in more formal contexts, Spanish or the code switching local variant known as 'Yanito' is still dominant in everyday situations and in the home domain, particularly among older speakers. Recent research, however, suggests that the situation may be changing. Whereas parents and grandparents tend to use Spanish and Yanito when speaking to each other at home, English is encouraged, when possible, among younger family members. Although in some cases youngsters may revert to Spanish or Yanito outside carer-orientated networks, the new generation of Gibraltarians, particularly those from educated middle-class backgrounds, appears to be using English as a spontaneous language choice far more than their predecessors did.

A pragmatic attitude toward the use of language generally prevails on the Rock, and locals will accommodate to the linguistic strengths and preferences of their interlocutors. However, inevitably, in some cases, language choice may be interpreted as a political statement. For some, being British yet speaking Spanish is not necessarily incompatible, whereas for others, language use may be seen as a reflection of national identity. In a colony that strongly defends its British status and vehemently opposes any moves toward devolution, being heard as well as seen to be British may be a statement of allegiance.

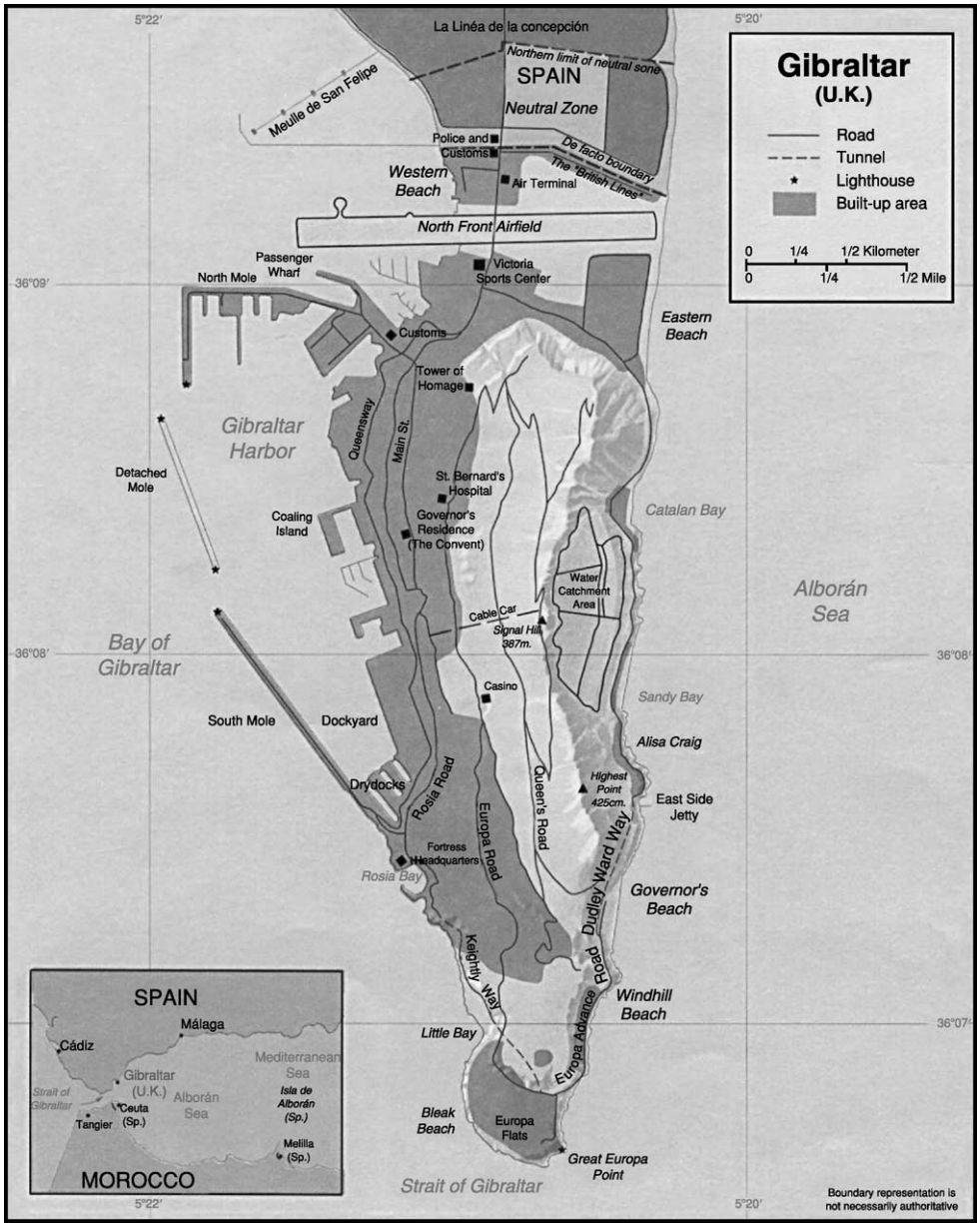

Figure 1 Gibraltar is a British colony located on the southern tip of the Iberian Peninsula, at the entrance of the Mediterranean; it is connected to the neighboring Spanish town of La Linea de la Concepción by a narrow isthmus. Measuring less than 5 km from north to south and made up largely of precipitous rock and cliffs, habitable space in Gibraltar is limited and housing is a considerable problem for the local population of 28 500.

See also: Bilingualism; Bilingual Education; Bilingualism and Second Language Learning; Code Switching; Code Switching and Mixing; Communicative Competence; English: World Englishes; Identity and Language; Identity: Second Language; Language Change and Cultural Change; Language Ideology; Language Loyalty; Language Maintenance and Shift; Language Politics; Lingua Francas as Second Languages; Malta: Language Situation; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Multilingualism: Pragmatic Aspects; Native Speaker; Puerto Rico: Language Situation; Society and Language: Overview; Spain: Language Situation; Spain: Lexicography in Iberian Languages; Spanish; United Kingdom: Language Situation; Yanito.

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Introduction

Gĩkũyũ (alternate names: Kikuyu, Gikuyu) is spoken as a first language by about one-third of Kenya's population, or about 10 million people. The speakers are known as the Agĩkũyũ (singular Mũgĩkũyũ) and they refer to their language as Gĩgĩkũyũ. The geographical dialects of Gĩkũyũ correspond to four administrative districts, which are Mt. Kenya (Kĩrĩnyaga), Northern (Nyĩrĩ), Central (Mũrang'a), and Southern (Kĩambu), but there is minimal differentiation among them. Gĩkũyũ is classified as a Thagicu language (Guthrie's zone E51) of the Central Northern Bantu family, and ultimately the Niger-Congo superfamily. Gĩkũyũ has borrowed significantly from Maasai (Purko and Ukwavi dialects), Swahili, and English. Gĩkũyũ is one of Kenya's most thriving languages with a vibrant presence in mass media and publications. It is broadcast on a number of community radio stations, and on national radio, KBC. Pamphlets, journals, and magazines are published regularly in this language, and books written in Gĩkũyũ are published each year in Kenya and abroad. The renowned writers Ngugi wa Thiong'o and Gakaara Wanjau maintain the language's international visibility by publishing major literary works in Gĩkũyũ. A standardized orthography was first published by the United Kikuyu Language Committee (UKLC) in 1947. It was revised and updated by UKLC's successor, UUGI (Ùũrũmwe na ũkũria wa Gĩgĩkũyũ) in 1984 and 2002. Two significant studies on the language have been done by Barlow (1960) and Armstrong (1967), and two grammar sketches by Gecaga (1953) and Mugane (1997). A Kikuyu-English dictionary by Benson (1964) is still in print.

Phonology

Gĩkũyũ is a tone language, where the syllable is the tone-bearing unit. In autosegmental terms, the syllable is the licenser of tone, i.e., it assigns one tone per syllable, regardless of its length (weight). These tones, however, are not marked in standard Gĩkũyũ orthography.

Gĩkũyũ has three levels of tone: high (H), mid (M) and low (L), as illustrated in the following examples: *gĩthiitũ* (MHL) 'charm', *mũthũngũ* (MHL) 'European person', *ikuua* (LLM) 'load', *njingiri* (HMH) 'musical rattles'.

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Syllables are always open, minimally consisting of a vowel (V) or a consonant-vowel (CV) sequence, and there are heavy and light syllables. Examples: V *o* 'they'; VV ***ooki*** 'newcomers, immigrants'; CVV ***tĩĩrĩ*** 'soil'; CV *ke* 'take', *ma* 'truth', *ha?* 'where?'; NCwV *ngwa* 'thunder'; NCyV *ndya* 'feast'; NCV *nda* 'stomach'.

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Gĩkũyũ has seven vowels: **a**, **e**, **i**, **ĩ**, **o**, **u**, **ũ**. There is contrastive vowel length so each vowel can be either long or short: for example, *tata* 'drip'/*taata*

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'aunt'; *kana* 'or'/*kaana* 'child'; *kara* 'etch'/*kaara* 'little finger'. At the phonemic level, the two high vowels **ĩ** and **ũ** are more centralized than the cardinals, **i** and **u** respectively. Examples: ***i**ra* 'yesterday'/ *ĩra* 'tell'; ***u**ga* 'say'/*ũra* 'run away'. Derived vowels, both long and short, are numerous in the language. The most common ones result from assimilation across morpheme boundaries, and reduplication of certain stems also induces V-length. Examples: *Gith**io**ra ũkĩra* → *Gĩth**io**r**oo**kĩra* 'Githiora, wake up'; *hit**i** **i**gĩrĩ* → *hit**ii**gĩrĩ* 'two hyenas'; *anak**e** **e**rĩ* → *anak**ee**rĩ* 'two warriors'; ***te*** 'discard' → ***teeateea*** 'waste'; *rĩa* 'eat' → *rĩĩarĩĩa* 'pick at food'; ***a**ria* 'talk' → *a**raa**ria* 'talk a bit'.

Diphthongs and triphthongs can also occur within stem boundaries, in normal speech, e.g., *k**ũi**na* 'sing', *k**iu**ga* 'half calabash', or across phrase/morpheme boundaries, e.g., *kĩmwĩr**eo**ke* 'then tell him/her to come', *mbũk**ũi**kumi* 'ten rabbits', *rek**eam**b**eoi**me* 'let him/her come out first'.

The glides **y**, **w** result predominantly from vowel sequences across morpheme boundaries, whereby **ĩ** becomes **y** and **ũ** becomes **w**, as the following examples illustrate: *kĩ-ũria* → *k**yũ**ria* 'question'; *ũ-othe* → *w**o**the* 'all'; *ũ-athani* → *w**a**thani* 'reign'. The high cardinal vowels **i** and **u** do not produce glides.

Consonants

Gĩkũyũ's inventory is made up of the following consonants:

nasals:	**n m ny ng'**
glides:	**w y r** (voiced alveolar flap)
stops:	**t k**
fricatives:	**th c h b g**

As in most Bantu languages, prenasalized consonants, **nd**, **mb**, **ny**, **ng'**, **ng**, **nj**, occur very frequently in Gĩkũyũ. Sometimes they occur as derived segments: for example, when an N-morpheme (prefix) comes into contact with an obstruent, it must produce a nasal consonant, as in the following examples involving the 1st person singular subject prefix N-: *rega* 'refuse' → ***nd**ega* 'refuse me'; ***k**ora* 'find' → ***ng**ora* 'find me'; *tũma* 'send' → ***ndũ**ma* 'send me'; *cuna* 'lick' → ***nj**una* 'lick me', etc.

Noun Classes

Gĩkũyũ is no exception to the chief characteristic feature of Bantu languages, namely the grouping of nouns into noun classes (see Table 1). These are based primarily on concordial properties, but there are discernible semantic relationships among members of each noun group.

The Concord System and Morphosyntax

The classification of nouns into these groups has important bearing on the language's grammar. Adjectives must agree with the number (singular or plural) and class of the head noun, somewhat like the behavior of the gender system in Romance languages. The noun also must be mapped onto the verb phrase by use of a 'marker' or prefix whose form is determined by the noun's class. In the illustrating examples in Table 2, the head noun is underlined, and its concordial prefixes highlighted in bold.

When coordinate phrases involve head nouns that belong to different classes, it becomes necessary to resolve the clash of subject concords. Two strategies are possible in such cases. One strategy opts for use of the human subject plural marker for final agreement or concord on the verb phrase, irrespective of the order of the coordinating clauses, e.g., *mwarimũ* (*a-/**ma**-) na huria* (*ĩ-/**i**-) **ma**gĩcemania* 'the teacher and the rhino met'; *huria na mwarimũ **ma**gĩcemania njĩra* 'the rhino and the teacher met'. The second strategy takes advantage of the plural subject prefix of inanimate, nonhuman nouns of the **kĩ-/i-/ci**-noun group, e.g., *muti (ũ-/ĩ-) na karamu* (***ga-/tũ-**) **ci**kiunika* 'stick and pen broke'.

Table 1 Gĩkũyũ noun classes

Noun prefix singular/plural	*Examples*	*General semantic content*
mũ-/a-	**mũ**ndũ, **mũ**rĩmi, **mw**arimũ	human; kinships; professionals
mũ-/mĩ-	**mũ**tĩ, **mũ**barĩki, **mũ**tũng'ũ	trees, plants; diseases; parts of body
i-/ma-	**i**buku, **i**niũrũ, **i**gongona, **i**ruga	inanimates; parts of the body; ceremony
kĩ-/i-/ci-	**Kĩ**mbaruuhia, **Gĩ**thweri, **gĩ**thiitũ	ceremonial, religious objects; liquids; languages
ø-/ø-	thonjo, thigiriri, ngi, ndutuura, huria, njogu	birds, insects, animals
rũ-	**rũ**ũĩ, **rũ**nyeki	long objects
ka-/tũ-	**ka**mũndũ, **ga**tu, **ka**nyũmba	diminutives
ũ-/ũ-	**ũ**thaka, **ũ**coorua, **w**agi; **ũ**cũrũ	abstracts; miscellaneous
ku-/ø	**kũ**gura; **gũ**thambia, **kũ**iya	verbal nouns; miscellaneous
ha-/ø; kũ-/ø	**ha**aha, **kw**ene, **kw**ao	locatives

Table 2 Examples of concord in Gĩkũyũ

Singular	*Plural*	*Gloss (in plural)*
mũndũ ũyũ **mũ**kuhĩ nĩ **a**rathoma ibuku	**andũ** aya **a**niini nĩ **ma**rathooma mabuku	'these short people are reading books'
kamũndũ gaaka **ga**kuhĩ **ka**rathooma ibuku	**tũmũndũ tũ**ũtũ **tũ**rkuhĩ **tu**rathooma mabuku	'these (dim.) small people are reading books'
riitho rĩake **rĩ**nene **rĩ**rona wega mũno	**maitho ma**ake **ma**nene **ma**roona wega muno	'his/her big eyes are seeing very well'
ibuku rĩakwa **rĩ**kuru **ri**rorĩire kũu	**mabuku ma**kwa **ma**kũrũ **ma**rorĩire kũu	'my old books got lost there'

Word Order in Gĩkũyũ: Subject-Verb-Object (SVO)

The chief elements of the verb phrase or sentence occur according to the following template:

nĩ (focus) + SM + TAM + (*kĩ*) + (OM) + (RF) + stem + FV (O)

RF = reflexive marker which may alternately occupy object marker position (OM). FV stands for final vowel and O for object. The latter is actually outside the main template, but is necessary for a fully formed sentence.

For example:

Kamau	nĩ-ari-ngi-re	mũbiira
Kamau	FOC-hit-TAM-FV	*the.ball*
'Kamau hit the ball'		
S	V	O

Verb morphology is very rich in an agglutinating language such as Gĩkũyũ. Derivation in the verb system, for example, is a highly productive process involving the use of extensions (infixes) inserted before the final vowel to create additional senses or meaning to the base verb. These are highlighted in bold in the following examples:

-ia/-thia (causative) e.g., *koma* 'sleep' → *komia/komithia* 'make sleep'
-ĩra/-era (applicative/prepositional) e.g., *thooma* 'read' → *-thoomera* 'read for/to'
-ũra (reversive) e.g.,*-hinga* 'close' → *-hingũra* 'open'
-ĩka/-eka (stative) e.g., *hingĩka* 'be closed', *thoomeka* 'readable'
-ana (reciprocal) e.g., *enda* 'like, love' → *-endana* 'love each other'
-anga (diffusive) e.g., *ita* 'pour' → *itanga* 'pour all over'.

A verb may have more than one extension in a single sequence, e.g., *hinga* 'close' → *hingũra* 'open' → *hingurithia* 'cause to open' → *hingũrithania* 'cause each other to open', etc.

Doubling the verb stem or reduplication diminishes the force of the action expressed by the verb. It also indicates repetition, e.g., *rũma* 'bite' → *rũmarũma* 'nibble/mince'; *rekia* 'let go' → *rekarekia* 'let go little by little'. In the case of verb stems consisting of more than two syllables, only the first two are repeated, e.g., *hingũra* 'open' → *hingahingũra* 'open a little'; *tindĩka* 'push' → *tindatindĩka* 'push a little'.

For negation, the marker *-ti-* is inserted in the verb phrase, immediately after the subject marker, e.g., *tũtigaathiĩ naak*e 'we will not go with him/her'. However, the negative form in subordinate phrases is marked with *-ta-*, e.g., *tũgaathiĩ tũtarĩ naake* 'we shall go without him/her'.

Tense and Aspect Marking

The tense-aspect system is very complex in Gĩkũyũ. Tense combines with aspect to produce a wide variety of temporal notions, in the order of TS-VB-AS-FV. (TS (tense); VB (verb); AS (aspect); FV (final vowel) which may differ according to aspect of the verb phrase). There are 9 major tenses, whose markers are highlighted in bold below:

-ra-: present progressive, current, e.g., *nĩarathooma*
ø/-ra-: current past (within a day), e.g., *nĩathoomire*
-a-: near past, e.g., *nĩathoomire*
-raa-: remote past, e.g., *nĩaraathomire*
-aa-: current past/future (within a day), e.g., *nĩagathooma*
-kũ-: near future (within the next few days), e.g., *nĩekũrĩthooma*
-rĩĩ-: remote future, e.g., *nĩndĩrĩthooma*
-ka-: present consecutive, e.g., *nĩagaathooma*
-kĩ-:parallel, e.g., *nĩekũgĩthooma*

There are three aspect markers, which are **-ag-** (stative/imperative/subjunctive), **-ĩĩt-** (perfect), and **-ir-** (completive). Twenty-seven combinations are possible in theory, but only about 20 are clearly attested in the language because some combinations are constrained by semantic considerations.

Nominal Derivation

Two broad types of noun can be distinguished in Gĩkũyũ. The first type consisting of a basic noun and its prefix only. This type of noun is not further divisible, e.g., *irigũ* 'banana', *mũcinga* 'gun', *kĩrĩma* 'mountain'. Like the others, these nouns can derive postpositional phrases using the locative suffix, *-inĩ*,

e.g., *irigũ**inĩ*** 'in the banana', *mũcinga**inĩ*** 'on/in the gun', *kĩrĩma**inĩ*** 'on/at the mountain', etc.

Derived nouns in Gĩkũyũ are easily and creatively generated by use of prefixation and/or suffixation. The former consists of such prefixes as: the diminutive prefixes *ka-/ga-/tũ-*, e.g., ***ka**mũici* 'little thief', ***tũ**mũndũ* 'little people'; the augmentative prefix *kĩ-*, e.g., ***kĩ**mũici* 'big thief', ***kĩ**mũndũ* 'big (gigantic) person'; and the collective class prefix *ma-*, e.g., ***ma**mũici* 'group of big thieves'.

Deverbal nouns are distinct in that they are formed through both prefixation and suffixation using the formula *mũ* + verb + ***i***, e.g., ***mũ**tegi* 'trapper' ← *tega* 'trap'; ***mw**aniki* 'dryer' ← *anĩka* 'put to dry'; ***mũ**korori* 'cougher' ← *korora* 'cough'. Verbs can also function as simple verbal nouns, e.g. *gũũka gwake ti kwega* 'his coming is not good', *kwaria kũũ nĩ kũũru* 'that talk is bad'.

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There are a large number of nominal derivations, creating nouns each expressing a unique meaning which is determined by the semantic argument. Such thematic roles include agent, patient, manner, result, occasion, or locative. For example, agent nominalization is very productive. It involves a nominalizing suffix *-i*, and an appropriate noun class prefix. A number of proper names of Agĩkũyũ are thus derived, e.g., *Mwaniki* 'one who cures skins' or *Mũrĩithi* 'one who herds'. The agent type of nominalization is also the source of many synthetic compounds such as *mũenda-andũ* 'a person who is kind to people'. Patient nominalization involves transitive verb stems with the suffix *-o* to describe 'the act of,' e.g., *mwiĩr**o*** 'telling oneself, self-deception', while reflexive *-ĩ-* can be added to the stem, e.g.*mwĩend**o*** 'state of liking oneself, selfishness'. Product nominalization uses the *mũ-* prefix or *kĩ-/gĩ-*, and the final vowel changes from *a* to *o*. Intransitive verbs mostly participate in this process, e.g., ***gĩ**caambio* 'defamation' ← *caambia* 'defame'; ***gĩ**thoomo* 'education' ← *thooma* 'read'; ***mw**andĩk**o*** 'handwriting' ← *andĩka* 'write'. Location-type nominalization involves the *i*-prefix for consonant-initial stems, and *rĩ-*for V-initial stems, e.g., ***i**kuuĩro* 'place of loading' ← *kuua* 'carry'; ***i**thũiro* 'sunset' ← *thũa* 'go down'. Nominalization of manner involves prefixation with *mũ-* and suffixation with *-ĩre*, e.g., ***mũ**kuu**ĩre*** 'manner of carrying' ← *kuua* 'carry'; ***mw**andĩk**ĩre*** 'writing style' ← *andĩka* 'write'. Occasion nominalization can occur with any verb type by prefixing with *i-* and leaving the final vowel unchanged. The resulting noun refers to occasions of an event specified by the verb stem, e.g., ***i**ceera* 'visit' ← *ceera* 'visit'; ***i**ruga* 'feast' ← *ruga* 'cook'.

See also: Academies: Dictionaries and Standards; Affixation; Applied Linguistics in Africa; Assimilation; Dissimilation; Inflection and Derivation; Kenya: Language Situation; Language Education: Grammar; Morpheme; Mother Tongue Education: Standard Language; Nominalization; Productivity; Template Morphology; Tense, Mood, Aspect: Overview; Tone in Connected Discourse; Verbs; Word Formation.

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Jules Gilliéron was born in La Neuveville, canton of Berne, Switzerland. He studied in Neuchâtel and Basle, Switzerland, and finally at the famous École pratique des Hautes Études, Paris, where he became a professor of dialectology [in the French system, 'maître de conférence'] in 1883. He acquired French citizenship in 1886.

Gilliéron was the founder of scientific dialectology in France. His first intensive experience with dialects was during a 3-week stay at a farm in the Roman

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Deverbal nouns are distinct in that they are formed through both prefixation and suffixation using the formula *mũ* + verb + ***i***, e.g., ***mũ**tegi* 'trapper' ← *tega* 'trap'; ***mw**aniki* 'dryer' ← *anĩka* 'put to dry'; ***mũ**kor-ori* 'cougher' ← *korora* 'cough'. Verbs can also function as simple verbal nouns, e.g. *gũũka gwake ti kwega* 'his coming is not good', *kwaria kũũ nĩ kũũru* 'that talk is bad'.

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There are a large number of nominal derivations, creating nouns each expressing a unique meaning which is determined by the semantic argument. Such thematic roles include agent, patient, manner, result, occasion, or locative. For example, agent nominalization is very productive. It involves a nominalizing suffix *-i*, and an appropriate noun class prefix. A number of proper names of Agĩkũyũ are thus derived, e.g., *Mwaniki* 'one who cures skins' or *Mũrĩithi* 'one who herds'. The agent type of nominalization is also the source of many synthetic compounds such as *mũenda-andũ* 'a person who is kind to people'. Patient nominalization involves transitive verb stems with the suffix *-o* to describe 'the act of,' e.g., *mwiĩr**o*** 'telling oneself, self-deception', while reflexive *-ĩ-* can be added to the stem, e.g.*mwĩend**o*** 'state of liking oneself, selfishness'. Product nominalization uses the *mũ-* prefix or *kĩ-/gĩ-*, and the final vowel changes from *a* to *o*. Intransitive verbs mostly participate in this process, e.g., ***gĩ**caambi**o*** 'defamation' ← *caambia* 'defame'; ***gĩ**thoom**o*** 'education' ← *thooma* 'read'; ***mw**andĩk**o*** 'handwriting' ← *andĩka* 'write'. Location-type nominalization involves the *i*-prefix for consonant-initial stems, and *rĩ*-for V-initial stems, e.g., ***i**kuuĩro* 'place of loading' ← *kuua* 'carry'; ***i**thũiro* 'sunset' ← *thũa* 'go down'. Nominalization of manner involves prefixation with *mũ-* and suffixation with *-ĩre*, e.g., ***mũ**kuu**ĩre*** 'manner of carrying' ← *kuua* 'carry'; ***mw**andĩk**ĩre*** 'writing style' ← *andĩka* 'write'. Occasion nominalization can occur with any verb type by prefixing with *i-* and leaving the final vowel unchanged. The resulting noun refers to occasions of an event specified by the verb stem, e.g., ***i**ceera* 'visit' ← *ceera* 'visit'; ***i**ruga* 'feast' ← *ruga* 'cook'.

See also: Academies: Dictionaries and Standards; Affixation; Applied Linguistics in Africa; Assimilation; Dissimilation; Inflection and Derivation; Kenya: Language Situation; Language Education: Grammar; Morpheme; Mother Tongue Education: Standard Language; Nominalization; Productivity; Template Morphology; Tense, Mood, Aspect: Overview; Tone in Connected Discourse; Verbs; Word Formation.

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Jules Gilliéron was born in La Neuveville, canton of Berne, Switzerland. He studied in Neuchâtel and Basle, Switzerland, and finally at the famous École pratique des Hautes Études, Paris, where he became a professor of dialectology [in the French system, 'maître de conférence'] in 1883. He acquired French citizenship in 1886.

Gilliéron was the founder of scientific dialectology in France. His first intensive experience with dialects was during a 3-week stay at a farm in the Roman

Valais, Switzerland, leading to a publication in 1880 in which he described—in today's terms—the phonology and morphology of the speakers of Vionnaz and its surrounding areas. This study was extended to a phonetic atlas of the Roman Valais (published in the same year). Following the suggestion of his Parisian teacher and friend Gaston Paris, he extended this small dialect atlas to a huge one covering the French dialects as a whole. The *Linguistic atlas of France (ALF)*, published in 1902–1910, was based on the data from 639 locations collected between 1897 and 1901 by Edmond Edmont, who, for this purpose, had invented a special phonetic alphabet.

The atlas was, indeed, Gilliéron's major achievement, but it also was permanently accompanied by the publication of explanatory notes and valuable monographs as interpretations of the maps. Gilliéron did not content himself with this basic research. At the same time that de Saussure gave his lectures in Geneva, Gilliéron was elaborating a structural approach to dialects in Paris. 'Dialect' was considered as a linguistic system with signs having an expression plane and a content plane. The description of dialects has to have a synchronic and an historical aspect. Gilliéron's theory on area-related linguistic change included both aspects in the description.

The synchronic lexical variation as shown on the maps must be explained historically. The replacement of one expression by another one may have two major reasons: (1) wear and tear of the expression (e.g., if only one phoneme remains), and (2) danger of homonymy/polysemy as a result of language change, jeopardizing communication. As early as 1880, while out of the way in the Roman Valais, Gilliéron had observed that the vitality of the speakers was the remedy for a wear-and-tear conflict. The words live in their and the speakers' surroundings ('linguistic biology'). The speakers are aware of a conflict. How the potential collision of homonyms was avoided is shown for an area in the southwest of France where two homonyms were the result of several sound changes (as such: *-us* > Ø, *c-* > *g-*, *-ll-* >*-t*): *gat*[1] meaning 'cock' (< Lat. *gallus*), *gat*[2] meaning 'cat' (< Lat. *cattus*). To keep communication working, *gat*[1] 'cock' was replaced in this area by other words (*see* **Dialects: Early European Studies**). The speakers individually take replacements from other language varieties, e.g., from standard French (*coq*) or from other stylistic levels (irony, e.g., *bigey* = 'village judge' for the cock on the muck heap early in the morning). Each word has its own history so that the linguist has to describe it individually. Not the entire word family is concerned with such changes if a danger of misunderstanding could be repaired on a lower level.

See also: Dialects: Early European Studies; Etymology.

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Gimson, Alfred Charles (1917–1985)

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A. C. Gimson was the leading phonetician of British English in the second half of the 20th century. He is known throughout the world for his works on English pronunciation, particularly for the textbook *An introduction to the pronunciation of English*, which despite its unduly modest title is still the standard work on the subject. (Since his death it has been extensively revised and rewritten, first by Ramsaran and then by Cruttenden.)

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See also: Dialects: Early European Studies; Etymology.

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As an undergraduate at University College London (UCL), Gimson gained first-class honors in French. It was at that time that he first came into contact with phonetics, through the classes in French phonetics conducted by Hélène Coustenoble, a lecturer in the Department of Phonetics headed by Professor Daniel Jones. This was in 1939, and upon graduation he was called up into the British army. There he acted as a forces liaison officer, first with the French and then with the Free Polish forces. By 1945 he held the rank of Major. As the war ended Jones intervened to get him an early discharge so that he could join his department as Lecturer in Phonetics.

Jones groomed Gimson as his successor. Upon Jones's retirement in 1949, Gimson took over from him as Secretary of the International Phonetic Association (IPA) and as Editor of its journal, the *Maître Phonétique*. In due course Gimson was to be responsible for transforming this journal (then written entirely in phonetic transcription, with the official parts always in French) into the *Journal of the International Phonetic Association*, written in ordinary spelling and with English as the official language. Later, he was elected President of the IPA.

In the 1950s, English phonetics was still dominated by Jones's approach. Valuable in its day, by then it was becoming dated. Gimson maintained Jones's emphasis on the importance of training in practical performance in producing and in recognizing sounds, but reinvigorated the phonetic theory and practice of English phonetics by propagating views deriving from contemporary American structuralist doctrine. This included such terminological innovations as *allophone* and the notational distinction between /phonemes/ and [allophones], two innovations that Jones, despite his great interest in phoneme theory, had never adopted. In addition, Gimson extended Jonesian ear-training exercises by including drills on minimal pairs, something now taken for granted.

When Gimson's *Introduction* first appeared in 1962, it was immediately accepted as the standard description of received pronunciation (RP), displacing Jones's own works from this role.

From 1946 until his retirement in 1983 Gimson remained at UCL. In 1966 he was appointed Professor of Phonetics, and in 1971, on the retirement of Dennis Fry he became Head of the newly amalgamated Department of Phonetics and Linguistics.

Unlike his earnest and perhaps excessively formal predecessor, Gimson had an easy, relaxed style of speaking and lecturing. In the 1960s he became popular as a broadcaster, made familiar to the British public through a series of brief talks on pronunciation he gave as part of the breakfast-time *Today* program on the BBC. But it is in the world of English as a foreign language (EFL) that Gibson's name is particularly well known. He made frequent overseas lecture tours at the invitation of the British Council, the Linguaphone Company, and local universities. His two textbooks, *English pronunciation practice* (1965, with G. F. Arnold) and *A practical course of English pronunciation: a perceptual approach* (1975), reflect his concern with the teaching of pronunciation in the EFL context.

Gimson's most enduring influence on EFL theory and practice is arguably in the matter of phonetic transcription. Although Jones had experimented with a number of different types of transcription for English (all within an IPA framework), his *English pronouncing dictionary* and other EFL-oriented works used a 'quantitative' notation in which vowel length was symbolized explicitly, but length-related quality differences only implicitly (thus *bead* biːd, *bid* bid, *caught* kɔːt, *cot* kɔt). By the 1960s this notation was facing serious competition in the 'qualitative' system used by Abercrombie and others, in which quality differences were explicitly shown and length marks not used (*bead* bid, *bid* bɪd, *caught* kɔt, *cot* kɒt). Gimson's 'quantitative-qualitative' system succeeded in achieving a synthesis of the two types, with both quantity and quality made explicit, even at the price of added redundancy (*bead* biːd, *bid* bɪd, *caught* kɔːt, *cot* kɒt). He popularized this notation first in his *Introduction* and then, crucially, in the 14th edition of Jones's *English pronouncing dictionary* (1977; Gimson had taken over the editorship in 1964). With minor variations, this notation has been virtually universally adopted in British-influenced phonetic usage.

In the UCL Department of Phonetics that Gimson took over, the main teaching load involved students of speech therapy, who were not actually registered for any university degree. Gimson played a major role in the reorganization of speech therapy education in Britain and the conversion of speech therapy (now called speech and language therapy) into an all-graduate profession. At UCL, with his departmental colleagues Adrian Fourcin and Evelyn Abberton, he was responsible for an arrangement whereby students of what became the National Hospital's College of Speech Sciences were registered for the B.Sc. as undergraduates of UCL. (Subsequently, the NHCSS actually became a part of UCL, as the Department of Human Communication Science, and its students now no longer have this roundabout mode of registration.) Under Jones, phonetics had been something of an orphan subject in university terms, taught only to occasional students and postgraduates; Gimson's legacy was a much stronger Department of Phonetics and Linguistics, with a large undergraduate body.

Gimson did not like people to call him by his first name. As a writer, broadcaster, or lecturer he was always just 'A. C. Gimson.' His friends and colleagues knew him as 'Gim' /gɪm/. It was only after his death that most of us discovered what his full name was.

In later life he suffered for some years from heart problems, which were treated with beta-blockers. He died unexpectedly of heart attack while mowing the lawn with an old-fashioned push-mower.

See also: Abercrombie, David (1909–1992); Coustenoble, Hélène Nathalie (1894–1962); Fry, Dennis Butler (1907–1983); Jones, Daniel (1881–1967); Phonetic Pedagogy.

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Givón, Talmy (b. 1936)

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Interdisciplinarity is the keyword in describing the academic background of Talmy Givón, one of the major voices in the development of the functional/typological approach in linguistics. He received his B.S. in agriculture from the University of Jerusalem, and his M.S. in plant biochemistry at UCLA, where he also completed M.A. and Ph.D. in linguistics. After teaching for 12 years at UCLA, he moved in 1981 to the University of Oregon, Eugene, where he was Professor of Linguistics until his retirement.

Givón's research has at all times been rooted in functionalism. His own brand of functional approach may best be described as heterogeneous and eclectic. He has always been eager to point out the close parallel to biology; the human sociocultural organization and cognitive-intellectual-communicative tools are to be examined from an evolutionary perspective. His *Bio-linguistics* (2002) is an attempt to reconcile linguistic views with Darwinian evolution and natural selection, showing how language operates as an intermediary between complex biological design and adaptive behavior without subjecting the human species to unique biological laws.

His focus has not been so much on developing a functional *theory* as such, but rather on *doing* functional linguistics in the sense of providing language description (he is particularly fond of taking the cross-language perspective, including not only Indo-European languages, but also non-Western languages and especially minority languages), although he "does not shy away from generalizations and explanations" (Givón, 1984: 25). In fact, he rejects the term as "methodologically unsound and unscientific," claiming that the prior delimitation of the scope of the grammar and its formalization "bias one's perception of new facts and freeze one's explanatory intuition" (Givón, 1984: 25). The watershed between functionalist and formalist linguistic frameworks is in where explanations come from, and what counts as an explanation. While agreeing in general with functionalists, who reject the idea that formalism may constitute explanation per se, Givón stresses in the revised edition of *Syntax: a functional-typological introduction* (1984) the importance of core formal properties, thus striking a balance between formal aspects on the one hand and pragmatic and semantic ones on the other.

Another distinctive feature of Givón's functional approach is its emphasis on the cognitive aspects of human language activities. His recent work investigates the cognitive foundations of language use, including studies of chimpanzees' capacity for syntax.

While he stresses the structural aspects of functionalism, his work is a major departure from Saussurean structuralism. Essential ingredients of his approach are the notions that iconicity may supersede arbitrariness, and that synchrony and diachrony may merge (particularly obvious in his famous dictum that "today's morphology is yesterday's syntax," inflectional morphology being the fossilized syntax of earlier historical stages; Givón, 1971).

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See also: Evolution of Syntax; Evolutionary Theories of Language: Current Theories; Functional Categories; Functionalist Theories of Language; Iconicity: Theory; Origin and Evolution of Language.

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Hans Glinz was born on December 1, 1913, in St Gallen, Switzerland. From 1932 to 1936 he studied philosophy, history, German, and French at the universities of Zurich, Lausanne, and Paris (Sorbonne). In 1936 he completed his high school teacher exam (*Sekundarlehramtsprüfung*). In 1946 he took his Ph.D. exam and completed his *Habilitation* (postdoctoral dissertation) in 1949. From 1957 to 1965 he held a professorship at the pedagogical academy in Kettwig, and from 1965 until his retirement in 1979 he was full professor at the Institute of German Studies at the Technical University of Aachen. In 1962 he received the Konrad Duden award.

The areas treated by Glinz comprise theory of grammar, theory of text, grammar of German, contrastive linguistics, orthography, and didactics of linguistics. Glinz is one of the most outstanding authors in the realm of German and general linguistics, especially in the area of syntax. His dissertation on the history of the sentence constituents has been quoted frequently.

His most remarkable work is his book *Die innere Form des Deutschen,* in which he elaborated new methods for analyzing sentences, for example, permutation tests (*Umstellproben*) and deletion tests (*Weglassproben*). These resembled very much the immediate constituent analysis developed by American structuralists (e.g., Bloomfield, 1933; Pike, 1943; and Harris, 1951), whom he did not know at that time, as he confessed in the preface to the 4th edition (1965). However, the influence of the '*inhalt-bezogene Grammatik*' ('content-related grammar'; see Weisgerber, 1953–1954) can be felt too. Glinz introduced a new grammatical terminology (e.g., *Spannfügteil* for 'conjunction' and '*Fallfügteil*' for 'preposition').

Besides predominantly theoretical books such as *Die innere Form*, Glinz wrote such practically oriented books as grammars of German and course books for schools of higher education, some of them in cooperation with his wife Elly. His numerous articles concern various grammatical and didactic topics. He was honored with commemorative publications (see, e.g., the festschrift edited by Brinker & Sitta, 1973).

See also: Bloomfield, Leonard (1887–1949); Harris, James (1709–1780); Pike, Kenneth Lee (1912–2000).

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See also: Evolution of Syntax; Evolutionary Theories of Language: Current Theories; Functional Categories; Functionalist Theories of Language; Iconicity: Theory; Origin and Evolution of Language.

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Hans Glinz was born on December 1, 1913, in St Gallen, Switzerland. From 1932 to 1936 he studied philosophy, history, German, and French at the universities of Zurich, Lausanne, and Paris (Sorbonne). In 1936 he completed his high school teacher exam (*Sekundarlehramtsprüfung*). In 1946 he took his Ph.D. exam and completed his *Habilitation* (postdoctoral dissertation) in 1949. From 1957 to 1965 he held a professorship at the pedagogical academy in Kettwig, and from 1965 until his retirement in 1979 he was full professor at the Institute of German Studies at the Technical University of Aachen. In 1962 he received the Konrad Duden award.

The areas treated by Glinz comprise theory of grammar, theory of text, grammar of German, contrastive linguistics, orthography, and didactics of linguistics. Glinz is one of the most outstanding authors in the realm of German and general linguistics, especially in the area of syntax. His dissertation on the history of the sentence constituents has been quoted frequently.

His most remarkable work is his book *Die innere Form des Deutschen,* in which he elaborated new methods for analyzing sentences, for example, permutation tests (*Umstellproben*) and deletion tests (*Weglassproben*). These resembled very much the immediate constituent analysis developed by American structuralists (e.g., Bloomfield, 1933; Pike, 1943; and Harris, 1951), whom he did not know at that time, as he confessed in the preface to the 4th edition (1965). However, the influence of the '*inhalt-bezogene Grammatik*' ('content-related grammar'; see Weisgerber, 1953–1954) can be felt too. Glinz introduced a new grammatical terminology (e.g., *Spannfügteil* for 'conjunction' and '*Fallfügteil*' for 'preposition').

Besides predominantly theoretical books such as *Die innere Form*, Glinz wrote such practically oriented books as grammars of German and course books for schools of higher education, some of them in cooperation with his wife Elly. His numerous articles concern various grammatical and didactic topics. He was honored with commemorative publications (see, e.g., the festschrift edited by Brinker & Sitta, 1973).

See also: Bloomfield, Leonard (1887–1949); Harris, James (1709–1780); Pike, Kenneth Lee (1912–2000).

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A further important indication of Hjelmslev's growing reputation outside Denmark was the appearance in 1955 of Berthe Siertsema's *A study of glossematics: critical survey of its fundamental concepts* (2nd edn., 1965), a book that remains one of the most detailed and constructively critical treatments of Hjelmslev's theory.

Most of the large-scale works emanating from the movement at this time were general and theoretical in nature. One exception is the book published in 1951 by Knud Togeby (1918–74) entitled *Structure immanente de la langue française*: although set within the framework of a version of glossematic theory, it is a sustained treatment of the form and substance of French (see below 'The Procedure Exemplified', for more detail). Another extended treatment of a particular language (Spanish) in a glossematic framework, also published in 1951, was Emilio Alarcos Llorach's *Gramática estructural* (*según la escuela de Copenhague y con especial atención a la lengua española*).

Uldall completed his Part I of the projected *Outline of glossematics* (in page proof as early as 1952), but the divergence of their views meant that Hjelmslev found himself unable to write his Part II to fit with it. Part I was eventually published on its own in 1957, the year of Uldall's death. Between then and his own death in 1965, Hjelmslev produced no other large-scale works.

For a fuller historical account of the movement, see Fischer-Jørgensen (1975: ch. 7).

Logical Positivism and Glossematics

The following four characteristics of logical positivism exerted a strong influence on glossematics:

- Metaphysical sentences are not false but meaningless, and must therefore be avoided.
- Science must account for as many empirical facts as possible by means of logical deduction from as few axioms (initial assumptions) as possible.
- Structural statements are to be preferred to statements of content.
- Scientific language should be a kind of algebra, with all terms being unambiguously defined.

Avoidance of Metaphysical Claims

Traditionally, the glossematicians claimed, the view had been taken that methods appropriate for the humanities were quite different from those appropriate for the sciences. According to this traditional view, the basis for the difference was that the unpredictable 'human factor' was central in the study of the humanities, but missing from the sciences, in which all variables were controllable.

A refutation of this position was attempted in terms of an analogy: "If two candles on the dining-table do not burn exactly alike . . . it might, analogously, be inferred that the candle factor is too strong to permit physics and chemistry to be merely mechanical in operation" (Uldall, 1957: 2). Clearly the 'candle factor' could be made explicit in terms of structural differences in the candles, the influence of air currents, and other controllable physical and chemical aspects of the situation. So the issue was whether or not linguistics could attempt to make relevant aspects of the 'human factor' more explicit.

To account for linguistic phenomena in terms of this human factor (or 'mind,' 'world-view,' etc.) without further explanation would clearly be to use language in a metaphysical way, which the logical positivists would have found objectionable. This avoidance of metaphysical language makes an interesting comparison with the antimentalism of the linguistics of the same period in the USA (*see* **Phonology: Overview; Post-Bloomfieldians**).

Deductive Reasoning

'Inductive' reasoning argues from observed data to inferred theory. However, any theory that is arrived at by this method cannot be tested by the same method. Testing needs a different method, 'deductive' reasoning, which proceeds in the opposite direction from inductive reasoning.

Deductive reasoning in fact assumes a theory and on that basis predicts the kinds of data that will be observed; the validity of the assumed theory may be tested by comparing these predictions with the data that actually occur – if the predictions are at variance with the data, the theory is thereby shown to be false, while if the fit between predictions and data is good, the theory is thereby supported, though not shown incontrovertibly to be true.

It is clear that, in any type of scientific enquiry, both types of reasoning are needed. There is, however, an important difference between the two: inductive methods are a matter of trial-and-error, and so are difficult, if not impossible, to describe coherently – deductive methods are a matter of drawing conclusions from premises using well-defined logical processes.

Glossematicians certainly use the two terms 'inductive' and 'deductive,' but it is important to bear in mind that their usage does not conform exactly to the more usual explanation of the terms given here.

Importance of Structural Statements

There are some areas, for example color perception, where it is difficult to make a precise statement of

content (e.g., 'A sees this color as a shade of green tending towards turquoise'); it is often easier to achieve precision by making relational statements such as 'A sees colors X and Y as distinct from each other, whereas B sees X and Y as the same color.' This relational statement leaves out of account the 'greenness' or 'turquoiseness' or other specific property of colors X and Y.

Extension of this approach to aspects of language description was one of the key elements in the thought of Saussure. When dealing with the inner system of a language, it was for him much less important to ask 'What are the physical properties of this sound?,' than to ask 'Are these two sounds the same, or distinct?' The glossematicians took this approach to a conclusion judged by some scholars to be beyond the limits of feasibility.

Reduction of Scientific Language to an Algebra

Sentences using constructions of the kind that are typical of metaphysical discourse (such as 'the form of this utterance is governed by certain ideas present in the speaker's mind') should be excluded from scientific discourse; furthermore, all terms used should be defined unambiguously. Although suitable algebras were available to glossematics for its purpose, its proponents, notably Uldall, seem to have expended a good deal of energy in attempting to evolve an algebra of their own.

Form and Substance in Glossematics

Saussure viewed the structural system of a language as a form linking two kinds of substance: phonic (sounds) and conceptual (ideas). Both kinds of substance were described by him as formless masses ('*masses amorphes*'), one phonetic and the other semantic. The worlds of sound and idea can be conceptualized only by having form superimposed on them by the structural system of a language.

Although glossematicians also use the term 'substance,' they take it in a different sense – they view it, not as the formless masses themselves (to refer to which Hjelmslev uses a term translated into English as 'purport'), but as the *result* of operating on purport in terms of the abstract distinctions of which the 'form' consists. Thus form is logically prior to substance.

Form and Substance in the Area of Sounds

In the area of phonology and phonetics, for example, the purport is the whole range of possible sounds which the human vocal apparatus is capable of producing, i.e., the subject matter of general (language-independent) phonetics. On the other hand, the substance is the (comparatively restricted) range of sounds actually used by speakers of a language or language variety, i.e., the subject matter of language-specific phonetics.

Thus, for instance, the continuum formed by the pharynx, palate, teeth, and lips is a matter of general human anatomy; it is therefore language-independent and belongs to purport. However, this continuum will be divided up differently in different languages: the form of the particular language acts on the purport to produce the substance of that language.

Many languages will have a substance exhibiting a division of this particular continuum into three, giving a three-way distinction of place of articulation: a back [k]-area, a middle [t]-area, and a front [p]-area. In other languages, the continuum is divided into four parts: the [k]-area may be further divided (as in Eskimo – uvular consonants distinguished from velar), or the [t]-area may be further divided as in Hindi – retroflex consonants distinguished from dental).

From the point of view of the form of a language, the fact that the 'place of articulation' continuum is divided into three, or four (or in some languages more) is more important than what the three, or four (or more) places of articulation within the substance actually are.

Form and Substance in the Area of Ideas

Here one might take as an example of purport the infinite range of different color hues that exist. Each language specifies this infinite range in terms of a number of basic categories, most notably in the area of hue; some languages have a larger number of basic color terms than others.

Not only words are involved in form in this area: examples are very common in which prefixes or suffixes relate to each other formally in this way. Take, for instance, the aspect of purport represented by the (language-independent) continuum of time. On the level of form, many languages have a two-way distinction that, when applied to this continuum, often gives rise to a basic 'past' versus 'non-past' division on the level of substance, a division made manifest in two different sets of inflections.

Logical Priority of Form

Glossematicians recognize that form as well as purport is twofold, and that therefore substance is twofold; this yields four areas of study within every language:

- 'content-substance' (roughly meanings of words and of morphosyntactic properties of the language);

- 'content-form' (roughly morphological, syntactic, and lexical structure of the language);
- 'expression-form' (roughly phonology of the language);
- 'expression-substance' (roughly phonetics of the language).

Content and expression are on a footing of equality – each of them is presupposed by the other. On the other hand, form is logically prior to substance – there can be no substance unless form has done its work.

The conclusion drawn by glossematicians from this logical priority is that the scientific description of form must be entirely independent of substance, and, *a fortiori*, of purport. The science of the expression is thus not a phonetics, nor is the science of the content a semantics. Expression-form was claimed to be independent of phonetics, on the grounds that expression-form may be manifested not only in sounds (as in a spoken language) but also in, for example, writing, Morse code, or manual signs. For both expression and content, a language must be described in terms of its own 'immanent' structure.

Form: Discovery and Verification

Critics of glossematics often raised the objection: 'How can anything be discovered about form without reference to substance?' After all, the basic tool for investigating how languages work has to be to ask the question 'Does changing a sound in an utterance change its meaning, and vice versa?' Glossematicians certainly used this tool in the form of the so-called commutation test: in their terminology; 'Does a change on the level of the expression entail a change on the level of the content, and vice versa?'

The apparent paradox is resolved by noting that it is not on the level of discovery that substance must be excluded from consideration. The discovery phase of any scientific enterprise is inductive (see above 'Deductive Reasoning') in nature: the investigator must begin by examining observable data, which of course must involve physical properties of substance. He or she then proceeds to set up hypotheses about what must be the abstract formal system capable of accounting for the data.

The workings of this formal system, on the other hand, are deductive (see above 'Deductive Reasoning'); here the starting point is the hypothesized basic entities, the relations between them being stated formally, i.e., in terms which are not related to substance. As the deductive process continues, the elements concerned are put into correspondence with more and more properties of substance.

This is what Hjelmslev meant when he claimed (1961: 79) that glossematics "would be an algebra of language, operating with unnamed entities, i.e., arbitrarily named entities without natural designation, which would receive a motivated designation only on being confronted with the substance." This approach is exemplified in 'The Procedure Exemplified,' below from Togeby's work.

The Analytical Procedure of Glossematics

The complete procedure, including both inductive and deductive aspects, is said by Siertsema (1965: 24–25) to be best understood in terms of seven steps. The important features of each step can be summarized as follows:

(a) For a particular language, the expression units (phonemes, syllables, etc.) and the content units (word-roots, prefixes, etc.) must be discovered by means of:
  (i) relationships holding between content units and (combinations of) expression units, established by applying the commutation test (see 'Form: Discovery and Verification'); and
  (ii) properties of substance of these units.

(b) Relationships holding between an expression unit and other expression units of that language, and relationships holding between a content unit and other content units of that language, must be described without reference to their substance.

(c) The units and their relationships are tentatively drawn up into a hypothesized system for the language.

(d) Steps (a)–(c) must be repeated for as many languages as possible.

(e) Extrapolation must be made from the total of relations actually found in these languages to the total of theoretically possible relations.

(f) These theoretically possible relations must be combined into a calculus that constitutes the system of language, rather than the system of a particular language or of many particular languages.

(g) Each particular language will then be characterized by the subset of actually occurring relations that it has 'selected' from the total of theoretically possible relations. This characterization will enable the tentative systems set up under (c) to be revised and brought nearer to their definitive form.

Steps (a)–(d) are clearly inductive, leading to a set of tentative language systems. Steps (e) and (f) introduce a deductive system that is universal, i.e., language-independent; this is then used in step (g) to make predictions that will be the means of making revisions to the tentative language systems.

This approach diverges markedly from that of the post-Bloomfieldians in American Structuralism, who believed that a sound theory should be based on the correct method of proceeding from observable data to hypothesized system. For them the inductive method alone was scientifically respectable, and they sought to work in terms of a completely specified discovery procedure (*see* **Phonology: Overview**; **Post-Bloomfieldians**; **Phonemics, Taxonomic**). Only steps (a) and (c) of the glossematic procedure would have won their full approval.

Basic Relations in Glossematics

If, as glossematicians held, relations between entities in a theory are more basic than the physical properties of those entities, then it is of fundamental importance to have a typology of such relations. The relations in fact constitute an important part of the axioms of the theory.

The basic dependence is '*a* presupposes *b*' (i.e., 'if *a* occurs, then *b* occurs' or '*a* cannot occur without *b*'). A more complex set of dependences can be built up on this foundation: for example, three complex dependences that crop up frequently in linguistic study are

(a) Interdependence – *a* presupposes *b* and *b* presupposes *a*. Here *a* and *b* may occur together, but neither of them without the other.
(b) Determination – *a* presupposes *b* but *b* does not presuppose *a*. Here *a* and *b* may occur together, and *b* may occur alone, but *a* may not occur alone (in which case *a* is referred to as the *variable* and *b* as the *constant*).
(c) Constellation – *a* and *b* are compatible but neither presupposes the other. Here *a* and *b* may occur together, *b* may occur alone, and *a* may occur alone.

There are other logical possibilities, such as '*a* precludes *b*', which are not given labels, on the grounds that they play no real part in the analysis of language systems or texts.

A further distinction is brought in, between syntagmatic ('both–and') relations and paradigmatic ('either–or') relations. Each resulting type of relation is referred to by a label as shown in Figure 1. Thus in looking at a language system, the relation between vowel and consonant is always a 'complementarity', since there are no languages that do not have both vowels and consonants. However, in looking at texts in languages, the situation will depend on the language. In those languages where all syllables have a vowel and at least one consonant, the relation is a 'solidarity'; in languages where some syllables consist of a vowel alone, the relation is a 'selection.'

Dependence	*'Both–end'*	*'Either–or'*
determination	selection	specification
interdependence	solidarity	complementarity
constellation	combination	autonomy

Figure 1 Types of dependence in glossematics.

The importance of this system of relations is not the terminology, but the fact that such relations, rather than any properties of substance, are felt to be of prime importance in glossematics.

The Procedure Exemplified

Togeby's *Structure immanente de la langue française* of 1951 puts forward a deductive system whose aim is to account for the whole range of possible texts in French. Some of the more detailed statements are specific to French (e.g., statement (c), Phonology, 'French: Description of the Expression' below), but many statements are to be taken as general (universal) (e.g., statement (6) in 'French: Description of the Content' (syntax) below. Some statements are included with the aim of completeness on the general level, but with the specific caveat that they do not hold for French (e.g., statement (d), 'French: Description of the Expression' (phonotactics) below.

The summary of this work given following is intended to show what glossematicians believed the description of a language had to cover. This included an inventory of the items that were important within a language and a statement of how these items could be combined. The scope of the description should be noted: unlike some other grammatical theories, this one went beyond the level of the sentence and attempted to give an account of the structure of larger bodies of material. Thus 'text' in the previous paragraph is intended to mean any discourse – not only written, but also spoken.

The description begins by introducing the entity 'text'. No definition of the term *text* is given directly, but in fact the sequence of statements that follows, if applied correctly, produces something that does constitute a correctly constructed text in French. All other terms in the description will gain a definition in analogous fashion. This illustrates Hjelmslev's claim about how the theory works (see 'Form: Discovery and Verification' above).

One type of statement within the theory deals with constructions: a 'syntagmatic' statement of the form X: Y + Z. This may be read as 'X has components Y and Z': the order of Y and Z is not necessarily sequential, at least as far as the 'content' part of the grammar is concerned. The similarity between these statements of the glossematic theory and

phrase-structure rules in generative grammar (X → Y + Z) is noteworthy.

The other type of statement deals with systems: a 'paradigmatic' statement of the form X: Y, Z, W, meaning 'Xs are either Ys or Zs or Ws.' Alternatively this may be cast in the form (1):

(1) X: Y
Z
W

Again, the parallel with one type of rule in generative grammar is noteworthy.

The set of operations is divided into three main sections:

- a set of operations that applies in parallel fashion to expression and content alike;
- a set of operations that applies to expression alone;
- a set of operations that applies to content alone.

Each set is then further subdivided into a syntagmatic subset (dealing with constructions on a particular level) and a paradigmatic subset (dealing with the elements from which a choice may be made at the appropriate point).

French: Description Involving both Expression and Content

The syntagmatic subset is named 'syntagmatics' and consists of the following operations:

(a) *Text*: expression line + content line. (The text is divided into two simultaneous parts, one on the level of expression, the other on the level of content.)
(b) *Line*: modulation sentences. (Each of the two lines is divided into successive units consisting of intonation plus sentence; see operation (c).)
(c) *Modulation sentence*: modulation unit + sensentence. (The modulation unit is a sentence-length sequence of intonation groups.)
(d) *Modulation unit*: modulation elements. (The modulation element is the intonation pattern associated with a single tone-group.)

The paradigmatic subset is named 'systematics' and consists of the following operations:

(a) *Elements*: phonemes; morphemes; morpho-phonemes; onomatopoeias.
This division is carried out on the basis of whether the element is associated with the expression ('phonemes'), with the content ('morphemes'), with both ('morpho-phonemes' – elements further defined in operation (b)), or with neither ('onomatopoeias' – expressions like *pstt*, which do not enter into constructions and which need not obey the normal phonological rules of the language).

(b) *Morpho-phonemes*: modulations; emphases. (Modulations are intonation elements; emphases are emphatic or contrastive stresses.)

French: Description of the Expression

The syntagmatic subsection is named '*Prosodie*', which might best be translated 'phonotactics' (*see* **Phonological Words**;). This consists of the following operations:

(a) *Sentence*: syllable-groups. (Syllable-groups are very much like words, but that term is reserved for the content (see 'French: Description of the content'); *see also* **Phonological Words**.)
(b) *Syllable-group*: word-accent + syllable-group. (An operation that does not apply for French; 'word-accent' refers to the tonal elements in languages like Swedish.)
(c) *Syllable-group*: syllables (*see also*).
(d) *Syllable*: accent + syllabic base. (Another operation that does not apply for French; 'accent' refers to tone in languages like Chinese, or word-stress in languages like English.)
(e) *Syllabic base*: nucleus + margin. (The syllabic base consists of the segments (vowels and consonants) that go to make up the syllable; the nucleus is formed of vowels or, in the absence of vowels, of consonants of high sonority (nasals or liquids) – the margin is formed of consonants.)
(f) *Margin*: consonants. (The fact that some consonants may precede the nucleus and others may follow it is not specifically noted in the operation: linear order of elements is not part of this section of the theory.)
(g) *Nucleus*: marginal vowel + central vowel + marginal vowel. ('Central vowel' not in the sense of 'midway between front and back', but indicating centrality within the nucleus – more prominence than the others, and often a greater degree of openness.)

The paradigmatic subsection is named 'phonology' and consists of four operations:

(a) *Phonemes*: accents; vowels; consonants. (French has no accents, i.e., distinctive stresses.)
(b) *Accents*: strong; weak.
(c) *Consonants*: (inventory of 17 for French)
(d) *Vowels*: (inventory of 10 for French)

French: Description of the Content

The syntagmatic subsection is named 'syntax' and consists of seventeen operations, beginning with 'sentence' and proceeding in a fashion resembling the

phrase-structure rules of generative grammar via 'words' down to the smallest grammatical elements, 'morphemes'. Examples of the operations involved (2):

4. *Clause*: circumstantial complement + clause-nucleus
5. *Circumstantial complement*: { preposition + object / subordinating conjunction + clause }
6. *Clause-nucleus*: subject + predicate
7. *Subject*: apposition + nominal phrase
8. *Predicate*: { object / attribute } + verbal phrase
15. *Word*: stem + inflexions
16. *Stem*: root + derivational marker.

NB: the numbering of the preceding subset of operations follows that of the text and differs from the summary table appearing later in the book.

The paradigmatic part is entitled 'morphology' and consists of the following statements:

2. *Morphemes*:
   inflexions
   roots
   derivational markers
   particles

3. *Inflexions*:
   verbal: mood, aspect, tense
   verbo-nominal: person, number
   nominal: case, comparison, gender

4. *Roots*:
   verbs: auxiliary verbs, ordinary verbs
   nouns: proper nouns, pronouns, numbers, substantives, adjectives

5. *Derivational markers*:
   prefixes, suffixes, nonfinite verb

6. *Particles*:
   adverbs, linking words, interjections
   linking words: subordinating conjunctions, prepositions, coordinating conjunctions.

Conclusion

Although the theory of glossematics has not been further elaborated since Hjelmslev's death, there can be no doubt that many linguistic scholars in Denmark, and also some outside Denmark, have been greatly stimulated by the views he put forward and the questions he raised. Fischer-Jørgensen's work (1975: ch. 7) is a good starting point for understanding the theory and how it developed; Siertsema (1965) gives a profound exposition and critique of Hjelmslev's work. More recently, Andersen (1990) has applied the principles of glossematics, with transformations and extensions, to an examination of computers and human–computer interaction.

Perhaps the best exemplification of the theory with special reference to a particular language is Togeby (1965). There is also in this work a considerable amount of valuable comparison with other approaches.

Of Hjelmslev's own works, Hjelmslev (1961) is in many ways central for the understanding of his theory; on the other hand, some of his collected essays (Hjelmslev, 1959, 1973) are considerably less difficult for the nonspecialist.

See also: Benveniste, Emile (1902–1976); Copenhagen School; Hjelmslev, Louis Trolle (1899–1965); Jakobson, Roman (1896–1982); Kuryowicz, Jerzy (1895–1978); Martinet, André (1908–1999); Phonemics, Taxonomic; Phonological Words; Phonology: Overview; Phonology: Overview; Post-Bloomfieldians; Prague School; Rask, Rasmus Kristian (1787–1832); Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism; Syntax of Words; Uldall, Hans-Jørgen (1907–1957).

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Glossolalia

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Language and Glossolalia

Glossolalia is a linguistically derivative phenomenon, possible only because those who use it – 'speak in tongues' in Christian terminology – already speak a natural language. Whereas language appeared millennia ago with a template imprinted in the brain as a distinguishing trait of *homo sapiens*, glossolalia is based on the human's skill to use the properties of language for other purposes. Whenever humans began to use 'make-believe language' – which is what glossolalia is – it must have been long after they could talk spontaneously for many other more immediately pragmatic purposes. Moreover, although language is a complex, rational code – with only suggestions (or vestiges) of expressive or playful functions that its earliest forms may have had – it has been used universally in several culturally significant ways: poetry, exorcism, curses, oaths, vows, and prayers, for example. These genres, however, are embroidered on the fabric of language, for one understands at the same time one experiences something else in a different realm of consciousness.

Paralinguistic features of language have undoubtedly characterized all languages everywhere since its appearance. Indeed, language may have been preceded by vocalisms of considerable variety for some of the purposes (and to some degree of achievement) for which millions before Socrates had used language. Of course, this was not seen by 'civilized' people like Socrates, for whom the chattering of barbarians ('primitive' peoples) could not be language. And, later, were their successors biblically literate, they might have compared the 'primitive' speech of newly discovered peoples with what they believed was the gibberish that the missionary–theologian Paul learned was being uttered at meetings of Christians in the city of Corinth.

When linguistic anthropologists began to understand both the cultures and the languages of non-western peoples, they discovered that linguistically deviant utterances were used in culturally significant ways: a shaman in an altered state of consciousness made pronouncements in a spirit's language that sounded like nothing a North American Indian was accustomed to, for the latter believed that there were just different kinds of languages – birds spoke to each other – because their own semiotic world was greater than ours. Nonetheless, feeling obliged to characterize linguistically unnatural utterances, anthropologists called shamanic and other anomalous speech glossolalia, and left it at that.

About the time that anthropology was evolving into a rigorous social science, so was psychology. Its practitioners also attended to the way some of their patients spoke to themselves and to real and imagined beings. Some of this was beyond understanding. It could not be submitted to study: it was elusive, it was gibberish. This also was called glossolalia. Indeed, anything out of which sense could not be made was glossolalia.

Better informed now, if we encounter varieties of speech that might be called abnormal, unnatural, incomprehensible, very much unlike normal language, and so forth, we do not contribute to human knowledge by classifying it as 'glossolalia.' A responsible writer would add a restrictive phrase like "but not like religious glossolalia." However, there are pseudolinguistic utterances so similar to what is found among some Christians that they might be called "secular (or profane) glossolalia," because the kind of glossolalia found in our era defines a particular form of pseudolanguage.

The Origin of Glossolalia

Although the word 'glossolalia' was first applied by commentators and historians to an allegedly peculiar speech in emergent Christianity, it is not itself a religious – that is, biblical – word. And whatever its origin, according to the *Oxford English dictionary* (2nd edition, 1989) it was not used in the English language until 1879 to refer to what one writer called "soliloquies of ecstatic spiritual emotion," when "terrible abuses of glossolaly [*sic*] broke out" and "entirely ruined the order of worship" in Corinth. The word is a compound based on the Greek words *γλωσσα* (*glossa*) 'tongue, language' and *λέγω* (*lego*) 'to speak.' This 'speaking in languages (tongues)' is mentioned in Mark 16:17, Acts 2, and I Corinthians 12–13. In the last passage the phenomenon is recognized by Paul as one of the gifts endowed by the Holy Spirit, not all of them similarly miraculous. It is clear in the text that the speech was incomprehensible and that, for the good of the Christian community, it had to be interpreted (not translated, glossolalists insist), the ability to do so also being one of the spiritual gifts. Since no sample occurs in the text, it is impossible to say what form it took and speculation would be useless. Naturally, many interpretations and explanations have been proposed (with frequent allusions to cultic behavior in the Mediterranean world), but consensus has never been – and can never

be – reached. Some believe that real languages were spoken (a phenomenon appropriately called 'xenoglossia' or 'xenoglossy'), as was supposed to have taken place miraculously on the Day of Pentecost (Acts 2); others that these were ecstatic, angelic, or heavenly languages. Some members of the modern charismatic movement accept that glossolalia may be miraculous but an 'expressive language' given by God for use in private prayer.

The History of Glossolalia

Outbreaks of glossolalia are alleged to have taken place among sectarian Christians since the beginning of Christianity (that is, since at least at Corinth), whether spontaneously in an 'ecstatic' state or in the belief that the New Testament phenomenon was reoccurring. Since there are no good descriptions of these events, all discussion is purely speculative.

Glossolalia became researchable only since the beginning of the twentieth century, when 'speaking in tongues,' the more common designation, came to be understood as a manifestation of 'being filled with the [Holy] Spirit,' an experience advocated as the ultimate in piety since the early revival movements in England and later in the United States up to the 19th century. This belief was adopted in the Pentecostal movement, originally considered a sect by other Protestant denominations. Marginal sociologically as well as theologically, it drew its followers from the socioeconomically and educationally deprived population of the United States. And because of the unrestrained exuberance of its worshipers, including altered states of consciousness, it was viewed with disrespect by other Protestants. Whereas sociologists and psychologists looked upon the movement with interest, no linguist ever did, and there are no serious descriptions of early Pentecostal glossolalia by any others.

Out of the Pentecostal subculture arose a new movement in the 1960s. Its followers were more likely to be privileged members of society and attracted Catholic and Orthodox Christians as well as Protestant. The defining characteristic of this Charismatic movement, differing from Pentecostal dogma, as the belief that glossolalia (still called 'speaking in tongues') was not just a spiritual gift but *evidence* of one's having been 'filled with the [Holy] Spirit.' The latter was the culminating experience (the 'second blessing') of being fully a child of God. Portable tape recorders now being ubiquitous, tongues could be recorded without restraint in public meetings and even in small groups and from individuals on request. Glossolalia now could be transcribed and subjected to linguistic analysis.

Explanations of Glossolalia

The first scholarly explanations of glossolalia were sociopsychological. It was alleged that this phenomenon was part of the emotional expression of deprivation and marginality in American society. (The early period of the movement coincided with the Great Depression.) On the other hand, psychological explanations, as late as the 1970s – at the height of the Charismatic movement – attributed this 'abnormal' linguistic behavior to altered states of consciousness (such as trance and 'possession') that were found in situations where 'ecstatic' states were induced by external factors such as long and repetitive singing or hypnosis. The latter explanation used the concept of 'dependent transference,' when a person in need of an authority figure and participating in a stressful group event abandons resistance to excessive behavior and, in a hypnotic state, allows the tongue to produce nonsense.

Glossolalia As a Linguistic Phenomenon

Glossolalia of the contemporary religious kind is indeed nonsense, because there is no correlation between units of sound with units of meaning. Nonetheless, it is a natural phenomenon, because it consists of authentic sounds from natural languages – most frequently those from one's native language – produced in sequence, as in natural language, but for the most part spontaneously. However, since a glossolalist unconsciously monitors (i.e., hears) what is being said, more and more can be 'learned' from one's own *glossa* (an extemporaneous 'language'). For the same reason, one can learn 'words' from other glossolalists. One widely used 'word' is some form of *shənda* (as in 'shunda'). Having acquired this word alone, the novice can go on to produce *shunda landa lasha, sundala landasa* . . . putting stress (emphasis) on any syllable and using any known or imagined sentence melody (intonation) one wants. The important thing is that the speaker *believes* that this is language and that it sounds like language. Some of it does, at a distance.

The selection of consonants and vowels is, of course, unconscious and so are the syllables constructed from them. The inventory of both sounds and syllables is generally limited, as illustrated above. Another characteristic is that glossolalic phonology is simpler than that of a speaker's language, and it appears that the speaker is reverting to an early stage of language in its acquisition by a child: e.g., *baba laba*. (Children are known to continue producing glossolalic utterances after having acquired some competence in natural language in playful creativity.)

Glossolalia is a natural phenomenon also because one does not have to be in an altered state of consciousness: one can pray or sing while driving a car at the maximum legal speed on a busy expressway. Everybody can produce a glossolalic utterance if they are uninhibited; they can even go on to make pronouncements, give a discourse, speak for God ... as experiments will demonstrate.

See also: Creativity in Language; Ideophones; Infancy: Phonological Development; Language Development: Overview; Phonological, Lexical, Syntactic, and Semantic Disorders in Children; Religion: Overview.

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Goffman, Erving (1922–1982)

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Erving Goffman ranks among the most celebrated sociologists in the world of the second half of the 20th century. His work ranged from urban anthropology to sociolinguistics, ethnology of communication, and microsociology with the study of social interaction. In spite of this diversity and his own refusal to subscribe to any particular trend, he is generally placed in the symbolic interactionist paradigm of sociological thought (School of Chicago).

Erving Goffman was born in 1922 in Manville (Alberta, Canada) of Ukrainian Jewish parents and spent his childhood in the Ukrainian Jewish community of Dauphin, near Winnipeg. He began studies in chemistry at the University of Manitoba in Winnipeg and worked at the National Film Board, in charge of propaganda documentaries, led by John Grierson. In 1945 he received a degree in sociology at the University of Toronto, following the teaching of the anthropologist Ray Birdwhistell, who taught that gestures, just as with institutions and social facts, are accountable of sociological analysis. After he got his M.A. in 1949 at the University of Chicago, with Everett Hughes, he was appointed research assistant at the University of Edinburgh, where he met Tom Burns, one of the leaders of British sociology. He spent more than 2 years (1949–1951) in one of the Shetland

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islands to gather material, based on the observation of conversational interactions, for his PhD thesis which he submitted in 1953 under the supervison of Lloyd Warner at the University of Chicago. From 1954 until 1957, he was a visiting scientist at two psychiatric hospitals, the National Institute of Mental Health in Bethesda, Maryland, and St. Elizabeth Hospital in Washington, D.C. From this experience he published *Asylum* (1961).

From 1958 to 1968, he held teaching positions at the University of California, Berkeley: visiting assistant, assistant professor, and eventually professor of sociology. From 1968 to 1982, he was offered the prestigious chair Benjamin Franklin of Anthropology and Psychology at the University of Pennsylvania. In 1981, he was elected President of the American Sociological Association. He died of cancer in November 1982 in Philadelphia.

Goffman was a part of the linguistic turn of the 1950s and 1960s, making significant contributions to linguistics by undertaking formal study of talk and developing the notions of public, self, face, demeanor, structures of attention and information, ritual, footing, and frame. His work is characterized by the interplay of concrete data and theoretical development and by the use of the metaphors of theater and stage management to draw attention to the manipulative and the moral aspects of social life.

From the time he wrote his dissertation (1953), Goffman was concerned with face-to-face interaction, and he implemented it in a formal linguistic way in his last works, *Frame analysis* (1974), *Forms of Talk* (1981), and the paper 'Felicity's condition' (1983a). Through the notions of response, footing, and frame, Goffman strengthened the connection between discourse analysis and conversation analysis. Opting for microanalysis as a method of study, he accounted for the ways in which the situatedness of speech contributes to the form and meaning of utterances, and he analyzed the procedures employed by people in their face-to-face dealings with one another. With his notion of footing, Goffman analyzed the structure of communication in social encounters. He made analytic distinctions by assigning different kinds of participant roles to hearers (the participation framework), either adressee, overhearer, or eavesdroppers, and to speakers (the production format), either animator, author, or principal. It is linguistics that provided the cues and markers to determine such footings. Levinson (1988) developed this topic in proposing a set of universal participant categories based on grammatical grounds.

It should be mentioned that when Goffman was at Berkeley, he worked on telephonic conversations with Garfinkel and Sacks while visiting them in 1963 at the Center for the Scientific Study of Suicide in Los Angeles. However, Goffman's views diverged from conversation analysis on several issues. He found it unnecessary to incorporate recorded data in his work and to analyze detailed actual interactional events. While conversation analysts use turn-taking organization, adjacency pair, and the organization of repair to deal with interaction, Goffman promoted the notion of face both as an account for action and as the motivating basis for the ritual organization of interaction. Finally, for Goffman, talk was not transparent, and conversation relied heavily on presuppositions and not on the sole turn-taking system claimed by conversation analysts.

It must be added that Goffman was an authentic stylist and that his books, noticed as early as 1959 with the publication of *Presentation of self in everyday life*, continue to be widely read outside of the restricted field of sociology. His writings, available in many languages, include eight books, three collections of essays, and at least 28 essays. His last book, *Forms of talk* (1981), was nominated for a National Book Critics Circle award in 1981.

See also: Conversation Analysis; Face; Frame Analysis; Frame Problem; Gender and Language; Gestures: Pragmatic Aspects; Interactionism; Medical Discourse: Psychiatric Interviews; Radio: Language; Sacks, Harvey (1935–1975).

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Gondi

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Introduction

Gondi (also written Gonḍi with ḍ representing the actual pronunciation) is a tribal language of the Central subgroup of the Dravidian family with a population of more than two million, the largest among the tribal languages of that family. Gonds of almost all regions call themselves *kōytūr* and their language *kōyāŋ*. It is spread over the five states of Madhya Pradesh, Chattisgharh, Maharashtra, Andhra Pradesh, and Orissa in India. Further, the tribe has roughly thirty social subdivisions, the well known among them being Raj Gonds, Madias, Murias, and Koyas. Because of the vast area occupied and the social subdivisions, the language has a number of dialects, which could be considered as separate languages rather than dialects because of the great variation exhibited. There is great scope for further study on the various aspects of the language. (Unless otherwise mentioned, all examples given below are from the Adilabad dialect of Andhra Pradesh.)

Phonology

Gondi contains ten vowels like the majority of its sister languages as shown in **Table 1**. The core consonant system that is common to most of the dialects is presented in **Table 2**. However, there are additional consonants in most of them. The Adilabad dialect not only retains the aspirated stops of Marathi loans, but the stops in some of the native words also take on aspiration as an additional feature, e.g., *phōṛd* 'sun.' In the northern area, while some dialects retain the contrast between r and ṛ, these two sounds merge into r in some others and into ṛ in still others. The dialects in the remoter parts of Chanda, Bastar (Muria Gondi), and the Koya area of Malkangiri have two r sounds, one a normal trill (r) and the other a strong trill (written r̲/R); the latter represents Proto-Dravidian. *t̲. In the Hill-Maria dialect, the original *r changes to a postvelar voiced fricative G; this dialect, on the other hand, preserves ḷḷ and ṇ. Koya shows glottalized t' and k' and retroflex ṇ but does not have h.

One important phonological feature that divides the entire Gondi area into three dialects is the development of Proto-Dravidian *c- in the word-initial position. The dialects of the north and west (e.g., Adilabad, Betul) show s- for it, those of the south and east show h- (e.g., Chanda, Bastar, Kanker), while it is elided in the Hill-Maria and the Koya dialects, e.g., *sovvōr/hovvōr/ovōr* 'salt.'

In some of the dialects, the contrast between short and long vowels is found only in the first syllable and vowel length is neutralized in noninitial syllables. In the Adilabad dialect, all vowels in noninitial syllables are invariably long, except in some recent loans. On the other hand, all vowels in such syllables are short in the Muria dialect.

Table 1 Vowels of Gondi

	Front		*Central*		*Back*	
	Short	*Long*	*Short*	*Long*	*Short*	*Long*
High	i	ī			u	ū
Mid	e	ē			o	ō
Low			a	ā		

Table 2 Consonants of Gondi (Core System)

	L[a]	*D*[a]	*R*[a]	*P*[a]	*Vel*[a]	*G*[a]
Stop						
VL	p	t	ṭ	c	k	
VD	b	d	ḍ	j	g	
Nasal	m	n			ŋ	
Fricative		s				h
Lateral		l				
Trill		r				
Flap			ṛ			
Semivowel	v			y		

[a]Abbreviations: D, dental; G, glottal; L, labial; P, palatal; R, retroflex; VD, voiced; Vel, velar; VL, voiceless.

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Introduction

Gondi (also written Gonḍi with ḍ representing the actual pronunciation) is a tribal language of the Central subgroup of the Dravidian family with a population of more than two million, the largest among the tribal languages of that family. Gonds of almost all regions call themselves *kōytūr* and their language *kōyāŋ*. It is spread over the five states of Madhya Pradesh, Chattisgharh, Maharashtra, Andhra Pradesh, and Orissa in India. Further, the tribe has roughly thirty social subdivisions, the well known among them being Raj Gonds, Madias, Murias, and Koyas. Because of the vast area occupied and the social subdivisions, the language has a number of dialects, which could be considered as separate languages rather than dialects because of the great variation exhibited. There is great scope for further study on the various aspects of the language. (Unless otherwise mentioned, all examples given below are from the Adilabad dialect of Andhra Pradesh.)

Phonology

Gondi contains ten vowels like the majority of its sister languages as shown in Table 1. The core consonant system that is common to most of the dialects is presented in Table 2. However, there are additional consonants in most of them. The Adilabad dialect not only retains the aspirated stops of Marathi loans, but the stops in some of the native words also take on aspiration as an additional feature, e.g., *phōṛd* 'sun.' In the northern area, while some dialects retain the contrast between r and ṛ, these two sounds merge into r in some others and into ṛ in still others. The dialects in the remoter parts of Chanda, Bastar (Muria Gondi), and the Koya area of Malkangiri have two r sounds, one a normal trill (r) and the other a strong trill (written ṟ/R); the latter represents Proto-Dravidian. *ṯ. In the Hill-Maria dialect, the original *r changes to a postvelar voiced fricative G; this dialect, on the other hand, preserves ḷḷ and ṇ. Koya shows glottalized t' and k' and retroflex ṇ but does not have h.

One important phonological feature that divides the entire Gondi area into three dialects is the development of Proto-Dravidian *c- in the word-initial position. The dialects of the north and west (e.g., Adilabad, Betul) show s- for it, those of the south and east show h- (e.g., Chanda, Bastar, Kanker), while it is elided in the Hill-Maria and the Koya dialects, e.g., *sovvōr/hovvōr/ovōr* 'salt.'

In some of the dialects, the contrast between short and long vowels is found only in the first syllable and vowel length is neutralized in noninitial syllables. In the Adilabad dialect, all vowels in noninitial syllables are invariably long, except in some recent loans. On the other hand, all vowels in such syllables are short in the Muria dialect.

Table 1 Vowels of Gondi

	Front		*Central*		*Back*	
	Short	*Long*	*Short*	*Long*	*Short*	*Long*
High	i	ī			u	ū
Mid	e	ē			o	ō
Low			a	ā		

Table 2 Consonants of Gondi (Core System)

	L[a]	*D*[a]	*R*[a]	*P*[a]	*Vel*[a]	*G*[a]
Stop						
VL	p	t	ṭ	c	k	
VD	b	d	ḍ	j	g	
Nasal	m	n			ŋ	
Fricative		s				h
Lateral		l				
Trill		r				
Flap			ṛ			
Semivowel	v			y		

[a]Abbreviations: D, dental; G, glottal; L, labial; P, palatal; R, retroflex; VD, voiced; Vel, velar; VL, voiceless.

Syntax

Word Classes

The following word classes may be recognized for Gondi: nouns (including pronouns and numerals), verbs, adjectives, adverbs (including expressives), particles, and interjections.

An adjective in Gondi agrees with the noun that is qualified in number and gender; this agreement rule, which is alien to Dravidian, is taken over from Indo-Aryan, for example:

persā marā
'big tree'
persā-ŋ marā-k
big-NON-M.PL. *tree*-PL.
'big trees'

pers-ōr māynāl
big-M.SG. *man*
'big man'
pers-ūr māynāl-īr
big-M.PL. *man*-PL.
'big men'

Adverbs may be divided into those of (a) time (e.g., *ninnē* 'yesterday,' *nēnḍ* 'today,' *nāṛī* 'tomorrow'), (b) place (e.g., *iggā* 'here,' *aggā* 'there,' *baggā* 'where'), and (c) manner (e.g., *bhāy* 'much,' *cokkōṭ* 'well').

Examples for particles include *ānī* 'and,' *mattī/battī* 'but,' *pajjā* 'afterwards.'

Examples for interjections include *hav* 'yes,' *āyō* 'no.'

Word Order

The favored word order in Gondi is S(ubject) O(bject) V(erb), for example:

vōr nā-kūn kottā-ŋ sī-t-ōr
he *I*-DAT *money* *give*-PAST-3M.SG.
'He gave me money.'

Gender and Number

Gondi shows a two-way distinction in gender, differentiating between men and all others (including women) in the singular and plural; but the masculine (+feminine) plural form also denotes, apart from men, a group of persons that contains at least one man:

vōr
'he'

vūr
'those men/men(/man) and women(/woman)'

ad
'she/it'

av
'those women/nonhumans'

Finite Verb Agreement

The finite verb shows agreement with the subject pronoun (or a corresponding noun in the case of the third person) by a change in the personal suffix (see Table 4), for example:

nannā vā-t-ōn
I *come*-PAST-1SG
'I came.'

For agreement between the demonstrative adjectives and the nouns qualified with regard to number, see 'Word Classes.'

Noun Morphology

Most of the nominal bases are underived but a few masculine ones have the suffix *-āl* and a few feminine ones *-āṛ* or *-ī*, for example:

novr-āl
'bridegroom'

novr-ī
'bride'

sēl-āṛ
'younger sister'

A nominal base is followed by the plural suffix when plurality has to be expressed. A case suffix/postposition, which occurs at the end, is preceded in most cases by one of the oblique suffixes *-d-*, *-t-* or *-n-* (conditioned variants).

Plural Suffixes

Most of the masculine nouns take the plural suffix *-r* (conditioned variants *-īr* and *-ūr*), for example:

kāṇḍī-r
boy-PL
'boys'

The plural suffix in the nonmasculine nouns has three variants: after a vowel, *-ŋ*; after a consonant, *-k*; after a disyllabic noun ending in l, *-īk*. There are some exceptions for the conditionings indicated, for example:

paṇḍī-ŋ
fruit-PL

mal-k
peacock-PL
'peacocks'

ḍuvvāl-īk
tiger-PL
'tigers'

Case Suffixes and Postpositions

The nominative is unmarked.

The accusative-dative suffix is *-ūn*. The case is unmarked in the case of inanimate nouns:

kōndā-t-ūn
bull-OBL-ACC/DAT
'bull (accus)/to the bull'

The instrumental-locative suffix is *-ē*:

kay-d-ē
hand-OBL-INSTR/LOC
'with/in the hand'

The ablative suffix is *-āl*:

kuhī-t-āl
well-OBL-ABL
'from the well'

The genitive suffix is *-ā* (variants *-nā*, *-vā*):

kuhī-t-ā
well-OBL-GEN
'of the well'

Examples for postpositions are: +*aggā* 'in, near,' +*karūm* 'near,' and +*pajjē* 'behind':

rō-t + pajjē
house-OBL-POSTP
'behind the house.'

Pronouns

The personal pronouns are:

nannā 'I'	marāṭ 'we'
nimmē 'you (sg.)'	mirāṭ 'you (pl.).'

The deictic and the interrogative pronouns are given below.

Distant	Proximate	Interrogative	
vōr	vēr	bōr	'he'
vūr	vīr	būr	'they (m.[+f.])'
ad	id	bad	'she, it'
av	iv	bav	'they (non-m.)'

The reflexive pronouns are *tannā* (sg.) and *tammō(ṭ/k)* (pl.).

Numerals

Dravidian cardinal numerals are preserved only up to seven in the Adilabad dialect (up to six in the Muria dialect and up to ten in the Betul dialect); the word for 'hundred' is also preserved in most of the dialects). These native numerals have separate forms for masculine and nonmasculine (see Table 3). The remaining numerals as well as all ordinals are borrowed in each dialect from the major language of the area.

Table 3 Native numerals of Gondi

Numerals	*Nonmasculine*	*Masculine*
1	undī	vorō-r
2	raṇḍ	i-vvīr
3	mūnd	mu-vvīr
4	nālūŋ	nāl-vīr
5	siyyūŋ	siy-vīr
6	sārūŋ	sār-vīr
7	ēṛūŋ	ēṛ-vīr
100	nūr	

The higher numerals borrowed from Marathi in the Adilabad dialect add the classifier *jhank* when they qualify a masculine noun and *jhanīk* when they qualify a feminine noun, for example:

āṭh jhank mās-ūr
eight CLASSIF *man*-PL
'eight men'

āṭh jhanīk veylō-k
eight CLASSIF *woman*-PL
'eight women'

Verb Morphology

Verb Bases

A verb base in Gondi can be simple or complex. The complex base is formed from the simple one by the addition of the transitive-causative suffix *-ūs* (conditioned variants: *-h*, *-pūs*). This suffix converts an intransitive into a transitive and an underived transitive into the corresponding causative, for example:

un- 'to drink'	u-h- 'to make to drink'
udd- 'to sit'	u-ppūs- 'to seat'
aṭṭ- 'to cook'	aṭṭ-ūs- 'to cause to cook'

Finite Verbs

A finite verb is distinguished from a nonfinite one by the presence of the personal suffix at the end of the former; a finite verb of the indicative mood is of the following structure (the past negative and the debitive are exceptions to this):

Verb Base + Tense/Negative Suffix + Personal Suffix.

There are five types of finite verb: past (suffix: *-t-*), present-future (suffixes: *-ānt-*, *-nt-*), future (suffixes: *-ak-*, *-k-*, *-n-*, *-ān-*, *-ār*), past habitual-cum-irrealis (suffixes: *-nd-*, *-d-*) and negative (nonpast; suffixes: *-ō-*, *-v-*) (see Table 4 for all the forms of *pā-* 'to beat').

The imperative suffixes are: 2sg.*-ā* (variants: -m, -Ø), 2pl. *-āṭ* (variants: *-mṭ*, *-ṭ*), for example:

Table 4 Finite forms of *pā-* 'To Beat'

	Past	*Pres.-fut.*	*Fut.*	*Past hab./irrealis*	*Neg.*
1 sg.	pā-t-ōn	pā-nt-ōn	pā-k-ā	pā-nd-ūn	pāy-ō-n
1 pl.	pā-t-ōm	pā-nt-ōm	pā-k-ōm	pā-nd-ūm	pāy-ō-m
1 pl (incl).			pā-k-āṭ		
2 sg.	pā-t-ī	pā-nt-ī	pā-k-ī	pā-nd-ī	pāy-v-ī
2 pl.	pā-t-īṭ	pā-nt-īṭ	pā-k-īṭ	pā-nd-īṭ	pāy-v-īṭ
3 msg.	pā-t-ōr	pā-nt-ōr	pā-n-ūr	pā-nd-ūr	pāy-ō-r
3 m (+f) pl.	pā-t-ēr	pā-nt-ēr	pā-n-īr	pā-nd-īr	pāy-ēr
3 fnsg.	pā-t-ā	pā-nt-ā	pāy-ār	pā-nd-ū	pāy-ō
3 fnpl.	pā-t-āŋ	pā-nt-āŋ	pā-n-ūŋ	pā-nd-ūŋ	pāy-ō-ŋ

aṭṭ-ā
cook-2SG
'Cook!'

aṭṭ-āṭ
cook-2PL
'Cook (pl.)!'

The corresponding negative imperative has the negative suffix *-m-/-v-* between the base and the personal suffix:

aṭ-v-ā/aṭ-m-ā
cook-NEG-2SG
'Don't cook (sg.)!'

aṭ-v-āṭ/aṭ-m-āṭ
cook-NEG-2PL
'Don't cook (pl.)!'

The past negative has the suffix *-makī(n)*, which is invariable for person, number, and gender:

tar-makī(n)
bring-PASTNEG
'(One) did not bring.'

The debitive has the suffix *-ānā*, for example:

tind-ānā
eat-DEB
'(One) must eat.'

Nonfinite Verbs

The past participle has the suffix *-sī* (variants: *-cī*, *-jī*):

vā-sī
come-PASTPP
'having come'

The present participle has the suffix *-sēr* (variants *-cēr*, *-jēr*), for example:

un-jēr
drink-PRESPP
'while drinking'

The negative participle has the suffix *-vāk*, for example:

veh-vāk
tell-NEGPP
'without telling'

The conditional (with the conditional suffix *-ēkē*) has three subtypes as illustrated below.

(1) Past conditional:
vā-t-ēkē
come-PAST-CONDI
'when one came'

(2) Nonpast conditional:
vā-n-ēkē
come-NON-PAST-CONDI
'when one is coming'

(3) Negative conditional:
vāy-v-ēkē
come-NEG-CONDI
'when one does not come'

Two types of verbal nouns are commonly used. One with the suffix *-māṛ* simply denotes action:

aṭ-māṛ
cook-VN
'cooking'

The other one with *-vāl* denotes action, agent, or goal:

veh-vāl
tell-VN
'telling/one who tells/the matter that is told'

See also: Dravidian Languages; India: Language Situation.

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Goodglass, Harold (1920–2002)

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Dr. Harold Goodglass, Professor of Neurology at the Boston University School of Medicine, pioneered the application of controlled psycholinguistic studies in the field of aphasia. Well-versed in both theory and description, his publications were always on the cutting edge of theoretical issues in the field. He published more than 130 research articles as well as books on topics such as category-specific problems in comprehension and production, syntax and agrammatism, and naming disorders. His books included *Psycholinguistics and aphasia* (co-authored with Sheila Blumstein) and *Anomia* (with Arthur Wingfield). However, Goodglass was best known for his healthy skepticism and careful attention to what the individual facts have to offer. For example, once left-hemisphere dominance for language in right-handers was demonstrated, many assumed that speech for left-handers would be right-hemisphere dominant. Careful study by Goodglass revealed that, contrary to popular belief, speech is mediated in the left hemisphere for most left-handers as well.

In collaboration with Edith Kaplan, Goodglass published *Assessment of aphasia and related disorders* and an accompanying test battery, *The Boston Diagnostic Aphasia Exam* (*BDAE*). This test instrument moved the object of study in aphasia from a series of case studies to a categorization of aphasia disorders and offered a basis for comparison between syndromes and among individual cases. The *BDAE* remains a primary assessment tool in the field. The training videotapes accompanying this test battery give a glimpse of Harold Goodglass's attentive, personable, and respectful approach to interacting with patients. Whether one-on-one or in front of a large grand-rounds audience, Goodglass interviewed all patients at their own pace and on their own terms.

Goodglass made his mark on the field of aphasia in many ways, not the least of which was passing on his methodology, knowledge, healthy skepticism, and respect for patients to numerous practitioners and researchers who had the opportunity to work with him. He is especially remembered as a dedicated and highly effective mentor to women in the profession. He was a founding member of both the Academy of Aphasia and the International Neuropsychological Symposium. He established the American Psychological Association's Clinical Neuropsychology Division and served as its first president from 1979 to 1980. He was awarded the APA Gold Medal Award for Life Achievement in the application of psychology in 1996.

After receiving a B.A. in French from City College in his hometown of New York in 1939, Goodglass served in the Army Air Force from 1942 to 1946, eventually earning the rank of captain. After his return he earned an M.A. from New York University in 1948 and his Ph.D. in psychology in 1951. Upon completion of his doctorate, Dr. Goodglass became the first psychologist for the National Veteran's Aphasia Center at the Veteran's Administration in Framingham, MA, established after World War II. Goodglass remained affiliated with the Center throughout his career as it moved to the Boston VA Hospital Aphasia Unit in 1952 and eventually became the Aphasia Research Center. In 1969, Goodglass replaced Dr. Norman Geschwind as

the director and remained at that post until his retirement in 1996, when the Center was renamed The Harold Goodglass Aphasia Research Center in his honor.

See also: Geschwind, Norman (1926–1984).

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Gothic

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Gothic is the only documented member of the East Germanic group of Germanic languages.

Early History and Wulfila's Gothic

From around the second century B.C.E. onward,various Gothic tribes migrated from southern Scandinavia to eastern and southeastern Europe, following the Vistula and Danube rivers and reaching the north of the Black Sea area by the middle of the 3rd century C.E. Tribes of Ostrogoths settled to the east of the River Dniestr and tribes of Visigoths to the west of it. In the 4th century C.E., in present-day Bulgaria, a translation of much of the Bible, based on a Greek text used in the diocese of Constantinople, was made by Bishop Wulfila (Ulfilas), a Visigoth. Portions of this (by far the greater part from the New Testament) have survived and, since this translation is the earliest literary record in any Germanic language, these are documents of outstanding importance for Germanic and Indo-European linguistic history. Significant writings in other Germanic languages begin to appear only four centuries later.

Most of Wulfila's translation has been lost. Just over half the Gospels are preserved in the surviving pages of the splendid Codex Argenteus, an Ostrogothic manuscript probably written in present-day Italy and dating from the 5th century; it is now in Uppsala. Other portions of the Gospels and of the Pauline Epistles, together with three chapters of Nehemiah, survive in various other manuscripts, the majority of them in Milan.

Wulfila designed an alphabet clearly based on that of Greek; a version used by later scribes appears in **Figure 1** with a widely used transliteration. (The two untransliterated symbols were used only to form numerals.) ⟨q⟩ is taken to be /kw/, ⟨þ⟩ to be /θ/, and ⟨ƕ⟩ to be /ʍ/ or /hw/. It may be assumed that this system is phonemic, though the following digraphs have the probable values: ⟨ei⟩ = /iː/, ⟨au⟩ = /ɔ/, ⟨ai⟩ = /ɛ/, and ⟨gg⟩ = /ŋg/. It is likely that intervocalically the letters ⟨b⟩, ⟨d⟩, and ⟨g⟩ denoted the voiced fricative allophones [β], [ð], [ɣ]. All other symbols may be given their IPA values (see **Figure 1**).

Wulfila's Gothic shows the typically Germanic features of

1. the 'First Sound Shift' development from Proto-Indo-European, thus Latin *pes* 'foot,' *tu* 'thou,' *centum* 'hundred' versus Gothic *fotus*, *þu*, *hund*;
2. strong versus weak verbs (respectively with vowel-change (*Ablaut*) versus a dental suffix in the past tense) e.g., *tiuhan* 'lead,' *haban* 'have' (infinitive) but *tauh*, *habaida* (1 sg. past);
3. weak declension of adjectives (used after a determiner) versus strong (used elsewhere), e.g., *sa goda hlaifs* 'the good bread,' *gods hlaifs* 'good bread.'

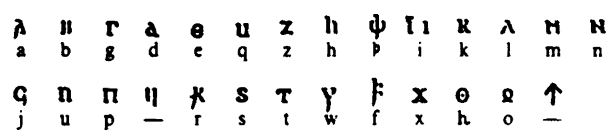

Figure 1 Reprinted from *Concise encyclopedia of language and religion,* Sawyer *et al.* (eds.), J. M. Y. Simpson, '*Gothic,*' p. 189, Copyright (2001) with permission from Elsevier.

Among various archaic features are the retention of a masculine nominative ⟨-s⟩, e.g., *fisks* 'fish' and reduplicating verbs, e.g., *greten* 'weep' (infinitive), *gaigrot* (1 SING PAST).

Morphologically, Gothic is fairly complex. Verbs show inflections for (a) past and nonpast tenses; (b) indicative, subjunctive (sometimes called 'optative'), and imperative moods, plus an infinitive form; (c) active and passive voices; (d) first, second, and third persons; and (e) singular, dual, and plural numbers. Nouns, adjectives, and pronouns show inflections for (a) masculine, feminine and neuter genders; (b) singular and plural numbers; and (c) nominative, accusative, genitive, and dative cases. However, there are not distinct morphological forms for every possible combination of these grammatical categories. Pronouns have in addition distinct forms for the dual number.

The syntax of Wulfilas's text is very strongly influenced by that of his Greek source: the original word order is closely followed and many Greek devices, such as characteristic participial constructions, are imitated. As a result almost no information is available on what a native Gothic syntax might have been.

Other records of early Gothic are meager in the extreme. They include fragments of a commentary on St John's Gospel (the *Skeireins*), a few marginal notes on Latin manuscripts (including a title deed from Ravenna, now in Naples), and one or two runic inscriptions that have been claimed to be in Gothic.

Sample Text

Jah	þan	bid-jaiþ	ni	si-jaiþ	swaswe	þai	
and	*when*	*pray-2.PL.PRES.SUBJ*	*not*	*be-2.PL.PRES.SUBJ*	*like*	*the-M.PL.NOM*	
liut-ans	unte	fri-jond	in	gaqumþ-im			
hypocrite-M.PL.NOM	*for*	*love-3.PL.PRES.INDIC*	*in*	*synagogue-F.PL.DAT*			
jah	waihst-am	plap-jo	stand-andans	bid-jan			
and	*corner-M.PL.DAT*	*street-F.PL.GEN*	*stand-PRES.PART.M.PL.NOM*	*pray-INF*			
ei	gaum-jaindau	mann-am.	amen	qiþ-a			
so that	*see-3.PL.PRES.SUBJ.PASS*	*man-M-PL-DAT*	*truly*	say-1.*SG.PRES.INDIC*			
izw-is	þatei	hab-and	mizd-on	sein-a			
you-DAT.PL	*that*	*have-3.PRES.INDIC*	*reward-F.SG.ACC*	*their-F.SG.ACC.STRONG*			

'And when you pray, do not be like the hypocrites, for they like to pray in synagogues and on street corners standing up, so that they may be seen by people. Truly I say to you that they have their reward.' (Matthew vi:5)

Other East Germanic Languages

Related East Germanic languages, spoken by tribes who emigrated from southern Scandinavia about the same time as the Goths and even earlier, include those of the Vandals (who eventually established themselves in North Africa) and of the Burgundians (who set up a kingdom in Gaul); both languages became extinct in the 6th and 7th centuries and almost nothing is known of them except personal and place names.

Influence of Gothic on Other Languages

The Visigoths engaged in missionary work, spreading their Arian version of Christianity (which held that Christ, though divine, was not equal with the Father) among other East Germanic tribes, for whom Gothic was apparently a lingua franca. For example, the Burgundians, Vandals, and Ostrogoths were converted in the 4th and 5th centuries. It has been claimed that this missionary activity led ultimately to the appearance of a few specifically Gothic linguistic forms in the Bavarian and Alemannic dialects of Old High German (a West Germanic language), and even as far afield as Old English. The route and extent of this influence, however, and the question of whether it was direct or indirect, are subjects of scholarly debate.

Later History and Crimean Gothic

Some Goths, forced out by invading Huns in the 3rd century, migrated westward and founded kingdoms in modern Italy (Ostrogoths), France, and Spain (Visigoths), but their power was shattered everywhere by the beginning of the 8th century and Gothic became extinct in the west.

The language lived on longer in the east, surviving in present-day northern Bulgaria until the 9th century and in the Crimea until the 16th century, according to accounts by travelers. One of the last of these was by Ogier Ghiselin (or Ghislain) de Busbecq, the imperial ambassador to the Ottoman court at Constantinople in 1560–1562, who recorded 68 Crimean Gothic words as well as some phrases and numerals, with Latin translations. This collection is of rather limited value, for it was published without his permission and may contain misprints; more importantly, his two informants were dubious, one being a native Greek speaker. A great lack is that of any indication of morphological variation and syntax. Nevertheless, it appears possible that Crimean Gothic was a descendant of a somewhat different variety of Gothic from that of Wulfila.

Busbecq also notated a short 'Gothic' song (the *Cantilena*) but he gives no translation and it has been variously claimed to be not Gothic but Turkish, Swedish or Italian.

By the end of the 18th century C.E. Crimean Gothic had apparently died out.

See also: Germanic Languages; Indo–European Languages; Ulfilas (Ulfila, Wulfila, Urphilas) (ca. 311–382).

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Government Phonology

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Government Phonology (GP) is a theoretical approach to characterizing and explaining the ways sounds (or, rather, phonological segments) are combined and organized in languages, both generally (across languages) and language specifically. Such organization is defined along two dimensions: internally to the segment itself, in terms of primes, and externally, in terms of forming syllabic units. As every phonological theory must, it also attempts to render a uniform, systematic explanation for varied sound changes, additions, and deletions that may arise when two morphemes combine within a word.

The theory of phonological government set out by Kaye, Lowenstamm, and Vergnaud in their seminal 1990 article (Kaye *et al.*, 1990) is mainly a theory of prosodic government or prosodic well-formedness of onset-rhyme sequences. In other words, the structure of a syllable or of a string of syllables within a word is a consequence of the relations that hold among phonological segments. These relations take the form of asymmetrical head/dependent (*see* **Dependency Phonology**) or governor/governee relations; the latter is from which GP takes its name. The contribution of GP is to draw a parallel with syntax by utilizing the same innate universal principles that appear to express certain properties of the mind, such as asymmetrical head/dependent relations (*see* **X-Bar Theory**). Moreover, as in certain syntactic approaches, a representation in GP theory is not necessarily surface true in terms of that representation being fully pronounceable as it appears. Rather, a representation can, for example, include positions that are empty of content, requiring the representation to be interpreted by appealing to certain principles and operations.

Government: Structural Relations within and between Constituents

The three syllabic constituents recognized by this theory are the Onset (O), the Nucleus (N), and the Rhyme (R). The Rhyme is a projection of the Nucleus head. In this way, syllables are characterized by Onset-Rhyme packages, rather than as constituents in themselves. The traditional coda position is also not recognized as a syllabic constituent of its own in GP, for it does not display the same properties universally as the other constituents do, namely, that the coda is not present in all linguistic systems and it cannot branch (cf. Kaye, 1990a). Rather, the coda, if present, occupies the 'postrhymal position' (cf. **Figure 1C**), i.e., the rightmost position of a binary branching rhymal constituent, and it must be followed by an onset (cf. **Figure 4B** and the discussion of 'Coda Licensing'). In traditional GP, a segment is linked to a syllabic constituent by means of an intermediary skeletal or timing tier represented by **x**. Each such syllabic constituent constitutes a governing domain that may be binary, unary, or null, with the exception of the Nucleus, which must always be present as it is the core of the syllable. **Figure 1** illustrates each maximal and minimal domain for each syllabic constituent Onset, Nucleus, and Rhyme (parentheses indicate optionality).

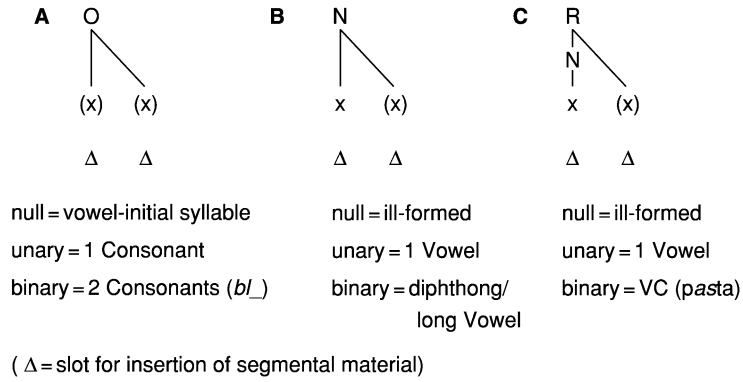

Figure 1 A representation of each constituent type: (A) Onset (B) Nucleus (C) Rhyme, showing the possible structural domains for each.

When a syllabic constituent branches, a governing domain is formed where one member is considered the head or governor and the second member is considered the dependent or governee. GP claims that, universally, governing domains within constituents are head-initial (i.e., the governor is the leftmost member) and thus exhibit left-to-right government. The determination as to which constituents may branch in a language will be subject to parametric variation in each language. Examples of this type of 'constituent government' are illustrated in Figure 2 (the head of each governing relation is underlined).

The possibility of having a branching nucleus within a branching rhyme (see Figure 3) is prohibited as government is strictly local between adjacent x-slots. A nucleus head cannot govern its postrhymal position when a nucleic dependent position is in between them (* = illicit representation).

This illicit structure can be understood to be the result of the configurational notion of 'c-command,' which subsumes notions of sisterhood and strict locality, where the first branching node that dominates the nucleic head must also dominate the skeletal point in question. In the case of Figure 3, the first branching node N dominates the nucleic head and its immediate sister under N, but not the coda position, which is contained in a higher branching node.

In addition to government within constituents, a variety of government relations between the higher-level constituents themselves are also claimed to be universal among languages. Although this type of government, called 'interconstituent government,' operates *between* different constituent types (cf. Figure 4), and as such might seem to indicate that the relations between the domains are not as cohesive as the governing relations within the constituents themselves (e.g., c-command does not apply here), the notions of strict locality and strict directionality do apply, albeit at a higher level. However, within interconstituent government, the head is final (rightmost in a binary relation), and government thus operates from right to left. Examples of this type of government (as presented in Kaye *et al.*, 1990) are illustrated in Figure 4.

The structure in Figure 4A illustrates the governing relation between an onset-rhyme sequence and captures the notion that an onset must be followed by a rhyme for the onset to be present; this ensures that an onset cannot exist in a syllable on its own. There is no reverse structural relation in which the presence of an onset is necessary to govern a preceding rhyme or nucleus. This phenomenon is encoded in the 'Licensing Principle,' which states that the only position within an onset-rhyme domain that need not be licensed is the head of that domain or the nucleus. The O←R sequence thus comprises a well-formed phonological string or syllable. The well-formedness of consecutive onset-rhyme sequences (or syllables) yields the Word.

While the structure in Figure 4B does depict a relation between an onset and a preceding rhyme, this type of government relation ensues only when the rhyme contains a postrhymal position (traditionally known as the coda). This type of structure (along with phonotactic constraints) accounts for the presence of certain postvocalic consonant sequences often found in languages (such as nasal-obstruent, fricative-stop, liquid-obstruent, *inter alia*). This specific relation between the terminal nodes of onset head and postrhymal dependent falls under the label of 'Coda Licensing.'

Figure 4C is a constituent relation that occurs at the projection on which only rhymes (i.e., nucleic heads) are visible and depicts the governing relation between two adjacent syllabic nuclei; this type of relation was originally designed to account for the possibility of vowel sequences, such as cases where no onset intervenes between two vowels, but it can also be extended to explain vowel harmony or stress phenomena (cf. Ritter, 1999).

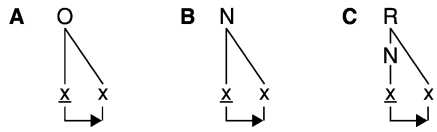

Figure 2 Representations of constituent government.

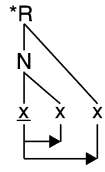

Figure 3 Prohibition of a ternary rhyme due to strict locality.

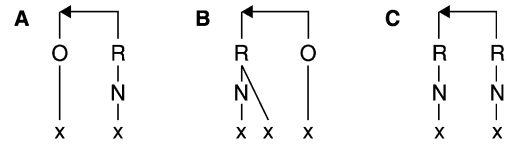

Figure 4 Representations of interconstituent government.

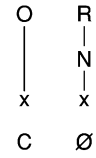

Figure 5 Representation of a surface word-final consonant followed by a final empty nucleus.

In their discussion of relations between constituents, Kaye *et al.* (1990) omit any discussion about the relation between two onset constituents. More recently, 'inter-onset government,' i.e., government between two onset constituents, has been addressed and explored more seriously (cf. Kaye, 1990b; van der Hulst and Ritter, 1998; van der Hulst and Ritter, 1999; Ritter, forthcoming).

Constituent government and interconstituent government are considered to be invariant structural relations that are a fundamental part of the innate knowledge of Universal Grammar. In addition to these structural relations, the Projection Principle was invoked to ensure that such governing relations must be maintained throughout, despite cases of morpheme concatenation, or where vowel deletion or insertion processes appear to occur (see discussion below about vowel-zero alternations). Such a principle guarantees that structure preservation of a domain will ensue and that rules of resyllabification, as occur in other generative theories, will not be invoked. Since resyllabification is disallowed in GP, a consonant, for example, whose position could fluctuate in other frameworks between word-final and syllable-initial when a vowel-initial morpheme is added (as in hea*t* vs. hea.*t*er), can only be represented structurally in GP as an onset followed by a nucleus that is empty of segmental content (see Figure 5).

In this example, the persistent onset status of /t/ is independently enforced by the interconstituent government relation in Figure 4(b), requiring that the presence of a postrhymal position be governed by an onset position. The principle of Coda Licensing enforces this relation by claiming that a postrhymal position must be licensed by a following onset. When there is no such onset to license this position, the post-rhymal position containing a segment will be unlicensed. To represent a word-final consonant in GP, then, the only remaining possibility is that the segment appear in an onset position; yet, according to the interconstituent government relation in Figure 4A, a rhyme must follow the onset to govern it. However, in the case of a word ending in a consonant with no audible vocalic sound, the rhyme then must be represented as phonetically inaudible. This is achieved by claiming that the rhymal position is present, but it is empty of segmental content.

Consequently, the principle of Coda Licensing ensures that single consonants are universally maximized into the onset position when they appear intervocalically or are domain final. Additionally, under this approach, a segment that would have been considered in other frameworks to be a word-edge extrasyllabic element will, in this approach, be handled as an onset followed by an empty nucleus that is not phonetically realized. The possibility of a domain-final nucleus to be empty is a parametric choice of a language. Languages that will allow final empty nuclei are those languages that allow words to end in consonants (as in English, Dutch, French). Languages that do not allow final empty nuclei are those languages that do not exhibit consonants at the ends of words (e.g., Italian).

Phonetically Empty Nuclei

As pointed out above, the notion of empty nuclei is integral to the approach of Government Phonology. Consequently, to constrain the usage and proliferation of such entities, the theory posits the 'Empty Category Principle.' This principle claims that (a) a licensed empty nucleus has no phonetic audibility, and (b) such an empty nucleus is licensed if (i) it is 'properly governed,' or (ii) it is domain-final in languages that parametrically opt to license domain-final empty nuclei. Whereas 'domain-final' empty nuclei are subject to parametric variation, 'internal' empty nuclei are subject to Proper Government. Proper Government is an operation that allows for an internal empty nucleus to receive no phonetic interpretation and thus be realized as inaudible when

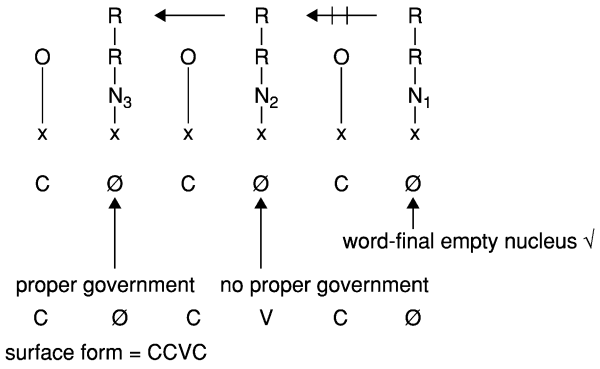

Figure 6 An example of proper government with a licensed word-final empty nucleus.

(a) it is followed by a phonetically contentful nucleus (on a level where only nuclei are projected), and (b) there is no governing domain (such as a coda-onset domain) separating the two adjacent nuclei. The direction for proper government will be parametrically set for each language; however, the tendency in the literature has been for the operation of proper government relations to scan from right to left throughout a word (see Figure 6).

In Figure 6, the language has set proper government to operate from right to left. It has also set the parameter for the licensing of final empty nuclei to be on. All nuclei in this example are represented as empty of any segmental content. Because the final nucleus is licensed to remain empty, it is not phonetically contentful and so cannot properly govern the penultimate nucleus to its left (N_2). If N_2 is not then properly governed, it will be unlicensed to remain empty and will be forced to be phonetically realized. Phonetic realization of an empty nucleus can differ in each language (cf. Kaye, 1990b; Charette, 1991; Ritter, 1995 for examples). Because N_2 is unlicensed to be empty and is phonetically contentful, it can properly govern the adjacent N_3 nucleus. N_3 will then be licensed to remain empty and will be phonetically uninterpretable. The postulation of internal empty nuclei and this type of proper government were designed to permit a vowel to alternate with zero when the vowel is 'underlyingly' empty (Kaye, 1990b). An example of vowel-zero alternation from Hungarian is given in Figure 7.

Phonetically empty nuclei also play an important role in GP's explanation of crosslinguistic differences observed among languages regarding the status of consonant sequences. While some languages, for example, permit triconsonantal sequences medially, others do not. Those languages which do not, when confronted by a sequence of three consonants, due to morpheme concatenation, will require some repair strategy such as consonantal loss or vocalic epenthesis

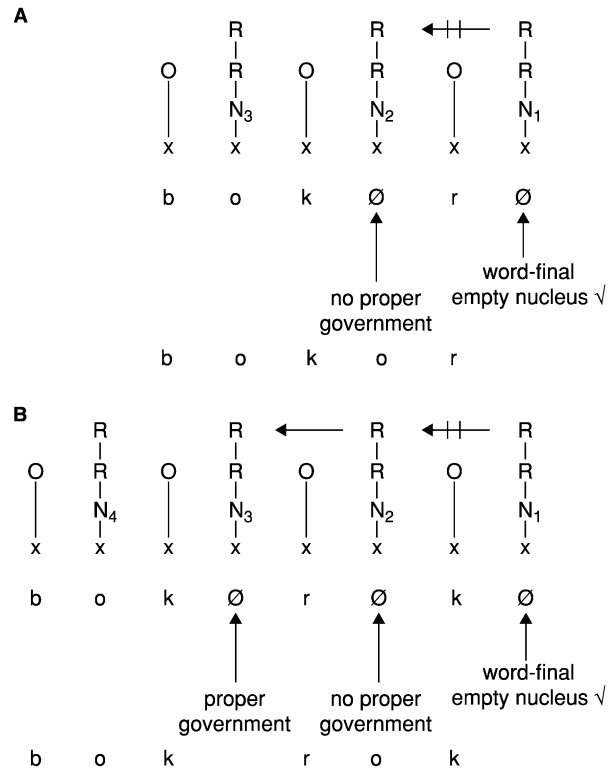

Figure 7 An example from Hungarian of vowel-zero alternation: (a) bokor: bush. NOMINATIVE, (b) bokrok: bush-PLURAL NOMINATIVE.

to break up the cluster. The principle of 'Government Licensing' was developed by Charette (1990, 1991) in an attempt to unify under one principled approach the different circumstances under which consonant sequences may be found. Government Licensing claims that an onset can only govern its preceding postrhymal complement interconstituently (cf. Figure 4B) if it is so empowered (i.e., given license to govern) by its following nucleus. Crosslinguistic differences arise as a consequence of whether a language parametrically selects that this nucleus, in order to empower its onset to govern, must be audible or can be phonetically null. If a language evidences surface triconsonantal sequences word internally (as in the word [pa*rvn*ir], allowed in certain varieties of French; also found in Polish), the triple cluster is represented as a two consonant cluster of postrhymal coda followed by a simplex onset, which then in turn is followed by an empty nucleus (the governor/licensor for this domain) and an onset following the nucleus (see Figure 8).

The parameter in this language type is set to allow the word-internal empty nucleus to be a licit government-licensor for the interconstituent cluster preceding it. In languages where one of the consonants of the governing onset-rhymal relation is lost, it is claimed that the empty nucleus following such a

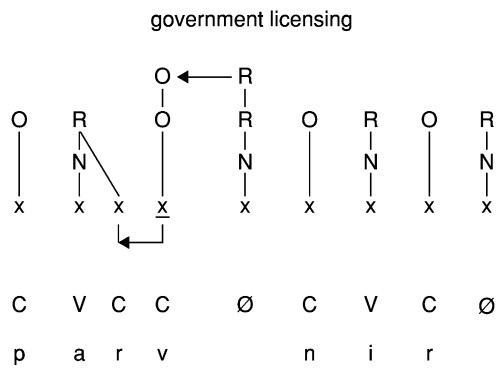

Figure 8 A representation of a surface word-medial triconsonantal cluster (example from French, parvenir: reach-INFINITIVE).

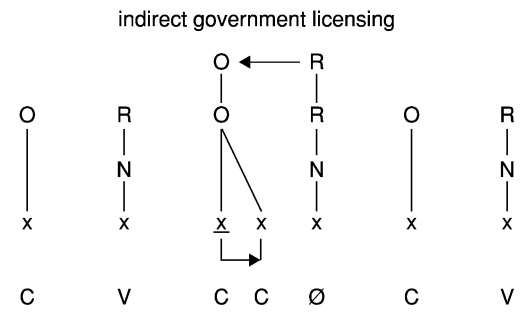

Figure 9 A representation of a surface word-medial triconsonantal cluster where indirect government licensing applies.

relation is not permitted to be a government-licensor and has not been parametrically selected as such by the language. The inability of the word-internal empty nucleus to government-license its preceding onset, will directly affect the ability of the onset to in turn govern its rhymal complement. The disallowance of this governing relation will necessitate the deletion of one of the component consonants.

Another type of case of a potential three-consonantal cluster occurs when a branching onset is involved. In this case, shown in Figure 9, the onset constituent must be licensed by a following nucleus in order for the head of the onset domain to govern its onset dependent. This is a form of '*indirect* government licensing.'

GP appeals to indirect government licensing as a separate parameter for word-internal empty nuclei in order to account for the fact that the pronunciation [li*brm*ən] (*librement*: freely) is *not* possible in any variety of French. The restriction on this pronunciation occurs because the word-internal empty nucleus following the onset domain of *-br-* has no licensing power in such a context. In Polish, on the other hand, this type of cluster can arise.

To account for the difference in consonant sequences that sometimes occur word internally versus those that occur word finally, a distinction is drawn between word-internal and word-final nuclei as government-licensors. Thus, in French, the pronunciation [tabl] (*table*: table) *is* possible because the *word-final* empty nucleus that is licensed to be silent can be an indirect government licensor to license the onset head /b/ to govern its dependent /l/. Separate parametric settings are needed to distinguish whether (a) internal empty nuclei can be government-licensors (either direct or indirect), and (b) whether domain-final empty nuclei can be government-licensors (either direct or indirect). These different possible settings will yield different language types.

Government versus Licensing

Government Phonology employs two different terms: *government* and *licensing*. Because it may not be readily clear from the nomenclature assigned to certain principles or processes using these terms what the effects of these two different notions are, some clarification is necessary. Given the original usage of the term, *government* is reserved for defining and limiting what the possible *structural relations* within and between constituents may be. In other words, government is concerned with building a structural framework from the skeletal level upward. *Licensing*, on the other hand, seems to be an extra feature (or layer) that ensures whether a position (while possibly viable in structural terms) is permitted to exist, depending upon its context. Thus, in the case of *government licensing*, though a language may have a parameter setting for branching onsets, the dependent of the onset may only be governed by its onset head if the onset head is itself *licensed* by its following nucleus (the head of an O-R package). Recall that the segmental quality of the *licensor* nucleus, be it full or empty, is what is crucial in such cases. When the nucleus is empty, the language will choose whether the empty nucleus can be a licensor for the onset-head governor. If the empty nucleus is not a valid licensor, the onset head will not be licensed to govern its dependent, and the dependent will be unrealized on the surface.

Licensing, unlike government, then, must look *below* the skeletal tier. This is especially apparent in the case of licensing at word edges, for example, word-final nucleic licensing. Here the type of content of the nucleic position, namely, segmental emptiness, is licensed by virtue of it being word-final. There is another type of licensing that occurs at the initial edge of the word and is reserved specifically for a rhyme that contains an empty nucleus followed by a post-rhymal position containing the segment /s/. This type of licensing is called 'magic licensing' and was

formulated to account for word-initial *sC* clusters that are found in a number of languages (Kaye, 1992). These two edge cases of licensing concern nuclei that are empty of content. Their special licensing needs come from the fact that they are anomalies to the Licensing Principle. Because a nucleus is the head of an O-R domain, it inherently must be contentful: the unmarked case. When a nucleus is empty of content, and thus marked, its existence comes into question, and it must be externally licensed to remain if the language allows for that choice. Similarly, the operation of 'proper government,' despite its name, behaves more like a *licensing* operation in its task of licensing empty nuclei to remain empty or not.

With respect to the notion of Coda licensing, this might appear to some to be a somewhat different phenomenon. Although the term utilizes the word *licensing*, it was originally conceived of as a *principle* of UG (cf. Kaye, 1990), which claimed that no domain could terminate in a closed syllable. In effect, it reiterates or reenforces an already existing interconstituent governing relation between a postrhymal position and its following onset; however, it goes further to specifically tackle the problem of single word-final coda consonants *vis à vis* closed syllable effects. It ensures that a single word-final consonant, having no following consonant as its onset licensor, cannot be represented in the postrhymal position. The only other structural means then in the theory for representing such a consonant is as an onset itself followed by an empty nucleus. Coda licensing could very well then be seen to fall under the auspices of licensing in that the existence of the coda position is dependent upon there being a consonant (naturally, of the appropriate segmental type) in the following onset. So, in this case, too, the notion of licensing assesses whether the ability to have a postrhymal position in a language that allows branching of rhymes is legitimate.

In effect, government sets forth the *universal laws* concerning structure within and between constituents. Licensing, however, appears to be the enforcer of those relations, by checking whether positions can exist depending upon the context they are in (in other words, the licensing relation they enter into with their licensor), for example, whether followed by an empty position, or depending upon their segmental content or lack thereof (cf. van der Hulst, forthcoming for a different view).

Intrasegmental Structure

In addition to GP appealing to notions of government and licensing to deal with segment external relations, the theory has also developed an approach to characterize the melodic content or internal structures of phonological segments; the two domains are not independent from each other because the internal content is claimed to determine the combinatory power of such segments. This theory does not adhere to distinctive features. Rather, the ultimate constituent of a phonological segment is referred to as an *element*. An element is a cognitive category, i.e., a phonological category that maps onto its own distinct acoustic signature or elemental pattern. Each univalent element is fully specified and has its own defining property, enabling it to be fully pronounceable. Some of the traditional GP elements and their salient properties are listed in Figure 10 for reference.

A	non-high	[a]	R	coronal
U	labial/round	[u]	?	occluded
I	front/palatal	[i]	h	noise
v	none	[ɨ]	N	nasal
I	ATR		H	high tone/stiff vocal chords
			L	low tone/slack vocal chords

Figure 10 Traditional elements used in GP.

A segment in the GP model may be composed of either a single primitive element, or a fused combination of primitive elements, for instance as in (A.I) (where I is the head) yielding the segmental expression [e]. When two or more elements combine to form a complex segment, they enter into an ordered relation of head/dependent (also termed head/operator). In this type of relation, one element assumes the role of the head, and, in so doing, contributes its salient acoustic qualities or characteristics to the segmental expression. The remaining elements within that expression act as dependents and can be considered as lending additional acoustic information that modifies or contributes to the sound in some way.

Originally, restrictions on the manner in which elements combine and are organized into segmental systems of vowels and consonants was explained by the 'Theory of Charm,' a three-valued system consisting of positive, negative, and neutral charm (Kaye *et al.*, 1985). The notion of charm seemed to correlate to some extent with the traditional concept of sonority classifications, ranking sounds in terms of their relative stricture. Elements of unlike charm value would attract each other while those of identical charm value would repel each other, and neutrally charmed elements had no restriction on combining. Tying this into the syllabic structure then, heads of domains, or governors, contained charmed segments while governees were charmless.

The notion of charm quickly gave way to the notion of complexity. 'Complexity' refers to the number of elements needed to compose a segment. Low complexity (for example, one element such as A characterizing a vowel /a/) corresponds with higher sonority. Correlatively, obstruents, being the most complex as they contain place elements as well as manner elements and voicing elements, are the least sonorous. Segmental complexity relations were then appealed to in order to determine whether a governing relation was well-formed. For a segment to be a governor, it had to be more complex than or as complex as its governee (cf. Harris, 1990).

Recent Developments

There have been movements to revise and minimize aspects of the traditional GP theory. One approach has been to do away with branching within constituents and claim only a strict CV theory (Lowenstamm, 1996, Scheer, 2004). This approach claims that appealing to a CVCV representation can more readily capture generalizations found in both templatic and nontemplatic languages regarding disparate phenomena such as compensatory lengthening, closed syllable shortening, the behavior of geminates and long vowels, and consonant clustering.

Another movement has focused on the internal aspects of the segment and attempts to eliminate a number of the elements listed in Figure 10, such that the few remaining elements can operate equally within vocalic or consonantal segments, yielding different phonetic interpretations depending upon which syllabic constituent they are associated with (cf. Jensen, 1994, Ritter, 1997). Moreover, it is claimed that by constraining the set of primitive elements that composes a segment, the factorial power of the various combinations of such elements is reduced, resulting in a less expansive and less powerful means of generating unattested speech sounds.

In an attempt to rid the theory of a few anachronistic elements that only appear in one type of segment and not another, an interesting approach has been appealed to, that of 'headed' vs. 'empty-headed' segments. The first proposal was aimed at eliminating the ATR element by positing tense vowels as headed expressions and lax vowels as empty-headed ones. In other words, a vocalic segment whose head position contains an element is considered an ATR or tense segment. A segment that has no element in its internal head position is a non-ATR segment or lax. The use of this headedness distinction was then generalized by Ritter (1997) to represent intrinsic manner distinctions in consonantal segments. Asymmetrical headedness was appealed to in order to mark the difference between segments made with total closure (namely, stops) and those made with partial or no closure (namely, fricatives, liquids, and glides). For example, if a language exhibits a phonemic distinction between labial stops and fricatives, this contrast is defined in terms of the labial element (U) being in the head position of the segment to represent the stop, and in the dependent position of an empty-headed segment for the fricative. In so doing, the glottal element could then be eliminated and supplanted by the notion that asymmetrical headedness corresponds to general phonetic characteristics of stricture.

See also: Dependency Phonology; Rhythm; X-Bar Theory.

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Grammar

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The Term 'Grammar'

There are many different ways in which the term 'grammar' can be understood. In its most widely used sense, grammar comprises syntax (the study of sentence structure) and morphology (the study of the structure of words). 'Grammar' can also refer to a physical object, i.e., a book, and one can felicitously say "I have at least six different grammars of English on my bookshelf." A grammar in this sense is a description of a language, and can be written from different perspectives. Thus, **school grammars** have as their aim to teach the basic principles of grammar. They are usually simplified and can be relatively unsophisticated. They also tend to be **prescriptive** in outlook, rather than **descriptive**. School grammars were very widely used in the 18th and 19th centuries. Similar in their aims, but more modern in outlook, because they are based on research in modern linguistics and are descriptive in outlook, are **pedagogical grammars**. These are used in many different teaching environments: secondary schools, foreign language teaching schools, as well as universities. Nineteenth century descriptive accounts of particular languages are called **traditional grammars**, while their modern (i.e., post-1950) counterparts are usually referred to as **descriptive grammars** or **reference grammars**. These works provide lengthy and detailed accounts of the entire field of grammar (as defined at the beginning of this article). On the history of grammar writing in English, see Linn (2005).

The term 'grammar' has also been used in a more specialized sense in the framework of linguistics developed by Noam Chomsky, and can have several meanings: it can refer to the mental blueprint that all humans are said to be endowed with (Universal Grammar, UG), or to the grammar that has evolved in an individual human being as a result of the interaction of the principles of UG with a particular linguistic environment ('That construction is not part of my grammar'). Finally, it can refer to a linguist's theory of the grammar of a particular language.

In what follows, this article will give a brief overview of the syntactic components of grammar.

Grammatical Categories, Functions, and Thematic Roles

All grammatical frameworks make use of categories such as **word classes** (noun, verb, adjective, etc.) and most also make use of **phrases** (noun phrase, verb phrase, adjective phrase, etc.). These combine to form **clauses** and **sentences**. The sentence in (1) can be represented as in (2) below, where word classes are indicated by means of a **labeled bracketing**:

(1) The chirpy postman claimed that he handed me the letters yesterday in the morning.

(2) $[_{S/MC}$ $[_{NP}$ $[_{Det}$ the] $[_{AP}$ chirpy] $[_{N}$ postman]] $[_{VP}$ $[_{V}$ claimed] $[_{SC}$ $[_{SCJ}$ that] $[_{NP}$ $[_{N}$ he]] $[_{VP}$ $[_{V}$ handed] $[_{NP}$ $[_{N}$ me]] $[_{NP}$ $[_{Det}$ the]$[_{N}$ letters]] $[_{NP}[_{N}$ yesterday]]$[_{PP}$ $[_{P}$ in] $[_{NP}$ $[_{Det}$ the] $[_{N}$ morning]]]]]]]

S=sentence, MC=main clause, NP=noun phrase, Det=determiner, N=noun, AP= adjective phrase, VP=verb phrase, V=verb, SC=subordinate clause, SCJ=subordinating conjunction, PP=prepositional phrase

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Further grammatical categories include **gender, number**, and **case**. Words that belong together distributionally as units are called **constituents** (all the bracketed strings in (2)). Not all linguists recognize the concept of constituent. In dependency frameworks, only the relationships between words are recognized.

All the labels assigned to the categories in (2) are **form labels**, which also perform a particular **function**. This includes the most prominent element of each phrase, referred to as its **head**. In addition, in (1)/(2) the NP *the postman* functions as the subject of the sentence, while the verb *claim* functions as **predicator**. The subordinate *that*-clause functions as the **direct object (DO)** of the verb, while within the subordinate clause, *he* is the subject, *handed* is the predicator, *me* is an **indirect object (IO)**, *the letters* is direct object, and *yesterday* is an **adjunct**. The form and function classes are defined primarily with reference to their distribution in most frameworks, though some frameworks opt to define the classes semantically and/or pragmatically.

Conventionalized patterns of language are called constructions. The notion of **construction** can be defined very narrowly (e.g., determiner + noun) or more broadly (for example, the *What's X doing Y?* construction, e.g., *What's this cork doing in my glass of wine?* discussed in Kay and Fillmore, 1999). Some linguists argue that constructions do not play a role in grammar at all; they regard them merely as epiphenomena (Chomsky, 1995: 170), i.e., as derivative entities with no primitive role to play.

At the syntax–semantics interface, the phrase *the postman* and the *that*-clause in the main clause, as well as the subject, IO and DO of the subordinate clause carry **thematic roles**. These concern the semantic role played by the constituents in the eventuality or situation expressed by the predicator. Thus in (1) *the postman* has the role of **agent** (active, animate instigator) in both clauses, while *me* has the role of **recipient**. *The letters* is the **patient/undergoer** of the action, sometimes also referred to as **theme**. There is no agreed set of thematic roles, but most linguists would recognize, in addition to the roles named above, **instrument**, **locative**, and **source**.

Not all linguists agree that the categories that are set up in particular grammars can always be strictly kept separate; some frameworks allow for **gradience** within and/or between categories.

Coordination and Subordination

Coordination and subordination are ways for languages to link units. When we coordinate units, we link units that are syntactically at the same level, i.e., the units are not dependent on, or embedded within, each other. Examples of coordination are given in (3):

(3) [Tom] and [Harry]
[the postman] and [his wife]
[cheap] and [cheerful]
[grudgingly] and [reluctantly]
[in the house] and [on the stairs]

We have already come across an example of subordination. In (1), the *that*-clause is a **subordinate clause**. Such clauses can perform a variety of functions. As we have seen, in (1) the clause functions as direct object. In (4) it functions as subject, while in (5) it functions as an adjunct:

(4) *That the minister should resign* is obvious.

(5) We expected to arrive on time, *when we left home*.

In (4) the subordinate clause is said to be **embedded**, because it is one of the obligatory elements required by the verb, while this is not the case in (5) (*see* **Subordination**).

Systems of Grammar

Grammars of languages make use of a number of **systems of grammar**. Each of these provides users of languages with a set of choices for a given classification. We distinguish three types of systems. What we might call **pattern systems** comprise a set of choices for a given classification. **Interface systems** linguistically encode a particular real world concept, eventuality, situation, or set of related meanings into a particular grammatical form or pattern. Finally, **information-ordering systems** offer users ways of presenting the propositional content of an utterance in different ways. Examples of each type of system follow below.

An example of a pattern system is a classification of clauses which comprises the **declarative**, **imperative**, **interrogative**, and **exclamative** types:

(6)	Tom always eats his dinner quickly.	declarative
(7)	Does Tom always eat his dinner quickly?	interrogative
(8)	Eat your dinner quickly!	imperative
(9)	How quickly Tom eats his dinner!	exclamative

Each of these patterns has its own unique syntactic properties, e.g., subject-auxiliary inversion in the case of interrogatives, or the lack of a subject in the case of imperatives.

The **pronoun classifications** of languages constitute another example of pattern systems. English uses *you* to address an interlocutor, while other languages

may have informal and polite forms, such as French *tu/vous*, German *du/Sie*, Dutch *jij/U*, etc. Some languages (especially in Africa) make use of **logophoric pronouns**. These typically occur in the subject position of clauses that are complements of verbs of saying, perception, cognition, etc., and indicate the person from whose point of view the proposition expressed is presented. Here is an example from Clements (1975: 142), cited in König and Siemund (2000):

(10) Kofi be yè-dzo
Kofi say LOG-leave
"Kofi said that he (=Kofi) left."

(11) Kofi be e-dzo
Kofi say 3.SG-leave
"Kofi said that he/she (≠Kofi) left."

In (10) the logophoric element *yè* indicates that the subject of the subordinate clause is to be interpreted as the same as the subject of the main clause, while no such interpretation is required for (11).

Examples of interface systems are **tense**, **aspect**, and **mood**. Tense is the way a language grammaticalizes (encodes) the real-world concept of time. Aspect is concerned with the way a particular event is viewed as progressing in time, while mood is the way a grammar encodes concepts such as necessity, possibility, permission, uncertainty, etc.

Voice is an example of an information–ordering system. Compare the two sentences below:

(12) The invaders demolished all the churches

(13) All the churches were demolished by the invaders.

These sentences have the same meaning (i.e., they express the same proposition), but differ in the way the components are presented. Thus (12) is more likely in a situation where the invaders have already been mentioned in the preceding cotext, and the churches represent new information, while in (13) it is the other way round.

As before, different languages make different uses of the systems of grammar.

Grammar Models

As noted at the beginning of this article, this overview of grammar is not wholly uncontroversial. In linguistic science, a large number of grammar models exist, among them Transformational Generative Grammar, Cognitive Grammar, (Radical) Construction Grammar, Head-Driven Phrase Structure Grammar, Lexical-Functional Grammar, and Dependency Grammar. These are discussed in separate articles.

See also: Subordination.

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Grammar, Early Medieval

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This article deals with the development of language studies from about 600 to 1100, a period which is conveniently divided into two by the Carolingian Renaissance (ca. 800 A.D.). The first medieval centuries are properly the Age of Grammar, whose method had established itself as an indispensable tool for Bible study. The study of dialectic and rhetoric were revived in the Carolingian reform, whereby the scheme of the Seven Liberal Arts was reinforced as the basis of secular learning. Medieval scholars held a unified approach to the study of the Liberal Arts, whose methods were in a constant interaction with each other and with theology.

In the Carolingian Renaissance, the dialectic began to receive an increasingly important role as a general tool of study relevant for all learning, both secular and religious. The dialectical method influenced the study of grammar in a manner that became fundamental for medieval culture. The origins of this development, which culminated in the speculative

Parsing and Grammar Description, Corpus-Based

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Introduction: Corpus-Based Investigations of Grammar and Use

English teachers and textbook authors often rely on their intuitions to choose the most important words and grammatical structures to focus on. For example, many English-language professionals believe that progressive aspect verbs (or 'the present continuous', e.g., *is working*) are much more common in conversation than simple aspect verbs (e.g., *works*). As a result, the teaching of progressive aspect has often been emphasized at the expense of simple aspect. However, empirical corpus studies show that such intuitions about language use are often incorrect. The present article introduces corpus analyses of grammar, illustrating the surprising research findings that result from this approach.

There have been numerous studies of grammar and use over the past two decades as researchers have come to realize that the description of grammatical function is as important as structure. In most cases, these studies focus on grammatical features that have two or more structural or semantic variants. By studying these features in naturally occurring discourse, researchers have been able to identify systematic differences in the functional use of each variant.

Functional research of this type became popular in the late 1970s and 1980s (see, e.g., Prince [1978] on the discourse functions of *wh*-clefts and *it*-clefts; Thompson on detached participial clauses [1983] and adverbial purpose clauses [1985]; and Schiffrin on verb tense [1981] and causal sequences [1985]). More recently, researchers on discourse and grammar have begun to investigate similar research questions, using the tools and techniques available from corpus linguistics, with its greater emphasis on the representativeness of the database and its computational tools for investigating distributional patterns in large text collections (for introductions to this analytical approach, see Biber *et al*., 1998; Kennedy, 1998; Meyer, 2002; Hunston, 2002).

The corpus-based research approach has resulted in several books dealing with particular grammatical issues in English (see, e.g., Tottie, 1991, on negation; Collins, 1991, on clefts; Mair, 1990, on infinitival complement clauses; Meyer, 1992, on apposition; Geisler, 1995, on relative infinitives; Johansson, 1995, on relativizers; Mindt, 1995, on modal verbs; Hunston and Francis, 2000, on pattern grammar; Rohdenburg and Mondorf, 2003, on grammatical variation; and Lindquist and Mair, 2004, on grammaticalization). Corpus-based analysis also provided the basis for the *Longman grammar of spoken and written English* (LGSWE; Biber *et al*., 1999), the first comprehensive reference grammar of English to systematically describe the grammatical patterns of variation and use in addition to structural aspects (see also the accompanying student grammar and workbook, Biber *et al*., 2002, and Conrad *et al*., 2002).

In some respects, early studies of grammar and discourse might be regarded as corpus-based investigations: they were empirical studies, based on analysis of grammatical variation in actual texts and combining quantitative and qualitative techniques. However, there was usually relatively little concern with the generalizability of the text sample in these earlier studies. Many of them used a 'convenience' sample – a collection of texts that was readily available to the researcher – with the implicit assumption that any sample of naturally occurring discourse would illustrate the same patterns of use.

In contrast, a key factor underlying recent corpus-based studies of grammar is the representativeness of the corpus itself. Two considerations are crucial for corpus design: size and composition (see Biber, 1993; Biber *et al*., 1998: 246–250). First, corpora need to be large enough to accurately represent the distribution of linguistic features; to study less-common features, including the use of individual words, a corpus should have hundreds of texts and many million words. The second consideration is equally important: the texts in a corpus should be deliberately chosen to represent particular registers (and dialects).

This article illustrates the importance of register for studies of grammar and use. It turns out that most functional descriptions of a grammatical feature are not valid for the language as a whole. Rather, characteristics of the textual environment interact with register differences, so that strong patterns of use in one register often represent only weak patterns in other registers. Thus, a complete functional analysis must consider the patterns of use across registers.

The following sections illustrate the interaction of grammar, use, and register with corpus-based analyses adapted from the *Longman grammar of spoken and written English* (Biber *et al*., 1999). Three case studies are presented, all of which focus on the use of verbs. These case studies illustrate the application of different research methodologies, together with the study of language use at different linguistic levels, as in Table 1.

Table 1 Overview of case studies

Case study	*Research methodologies*	*Linguistic level*
most common lexical verbs	POS-tagged corpus + database of all lexical verbs	lexical + part of speech
verb aspect: register distribution	grammatically-tagged corpus	grammatical
verb valencies	grammatical/syntactic-tagged corpus + interactive analysis	lexico-grammatical

Table 2 Composition of the subcorpora used in the analyses (taken from the LSWE Corpus; see Biber *et al.*, 1999: 24–35)

	Number of texts	*Number of words*
Conversation (BrE)	3436	3 929 500
Fiction (AmE and BrE)	139	4 980 000
News (BrE)	20 395	5 432 800
Academic prose (AmE and BrE)	408	5 331 800

The analyses are based on texts from four registers: conversation, fiction, newspaper language, and academic prose. Although these are general registers, they differ in important ways from one another (e.g., with respect to mode, interactiveness, production circumstances, purpose, and target audience). The analyses were carried out on the Longman Spoken and Written English (LSWE) Corpus, which contains c. 40 million words of text overall, with c. 4–5 million words from each of these four registers (see Table 2). All frequency counts reported in this article have been normalized to a common basis (a count per 1 million words of text) so that they are directly comparable across registers.

Computational Analysis of Grammatical Features in Corpora

In the LGSWE, corpus-based investigations of grammatical features were carried out using a variety of computational, interactive, and detailed 'manual' textual analyses. In all cases, the overarching concern was to achieve an accurate description of the distributional patterns of the target grammatical feature. Computational techniques made it feasible to analyze the patterns of use in a 20-million-word corpus. However, whenever automatic techniques produced skewed or inaccurate results, we shifted to interactive analyses or even manual analyses carried out on random subsamples of texts from each register. The guiding principles were to achieve an accurate grammatical description efficiently, using whatever techniques were required for that purpose, based on the most representative sample of corpus texts that could reasonably be analyzed. (In contrast, the focus of NLP projects is usually on the computational tools, rather than the grammatical description itself.)

As the first step for the grammatical analyses, we 'tagged' the entire LSWE Corpus, assigning codes for many grammatical features (such as 'plural common noun' and 'past-tense lexical verb'). The tagger, developed by the author for previous corpus-based studies, has both probabilistic and rule-based components, uses multiple large-scale dictionaries, and runs under Windows. This tagger achieves accuracy levels comparable to other existing taggers, but it is more robust than many taggers (with different probabilistic databases and rules for 'oral' versus 'literate' texts), and it analyzes a larger set of linguistic characteristics than most other taggers (e.g., distinguishing simple past tense, perfect aspect, passive voice, and postnominal modifier for past participle verbs; identifying the gap position for *wh-* relative clauses; identifying several different kinds of complement clause and the existence of *that-* complementizer deletion). In addition to the LGSWE, the tagger had been used previously for many large-scale corpus investigations, including multidimensional studies of register variation (e.g., Biber, 1988, 1995) and a major study of university spoken and written registers for the Educational Testing Service (Biber *et al.*, 2004). A number of more specific computational tools were developed for the LGSWE project, including programs to analyze specific linguistic variants and databases to create frequency lists (such as the verbs or adjectives found to be most common in the corpus).

Many analyses were complicated by the existence of ambiguous lexical items. It is often the most common words that serve the greatest range of functions. For example, the forms *get*, *go*, and *see* are some of the most common words in English, but each of these forms can function as a lexical verb (transitive or intransitive), as a copular verb (e.g., *go bad*), as part of a fixed discourse phrase (e.g., *you see*), or as part of a semimodal verb (have *got to*, be *going to*). The word *like*, also very common as a lexical verb, is even more flexible in the range of other functions it serves (including preposition, conjunction, and adverbial hedge). For other features, the grammatical variants in question relate to meaning distinctions and thus require a human analyst.

For example, one analysis in the LGSWE required identification of animate versus inanimate nouns, to investigate the use of activity and communication verbs with inanimate subjects in academic prose (e.g., *social science and the arts make contributions*; *crop residues provide breeding sites*; *these findings suggest that convergence may influence sequence*

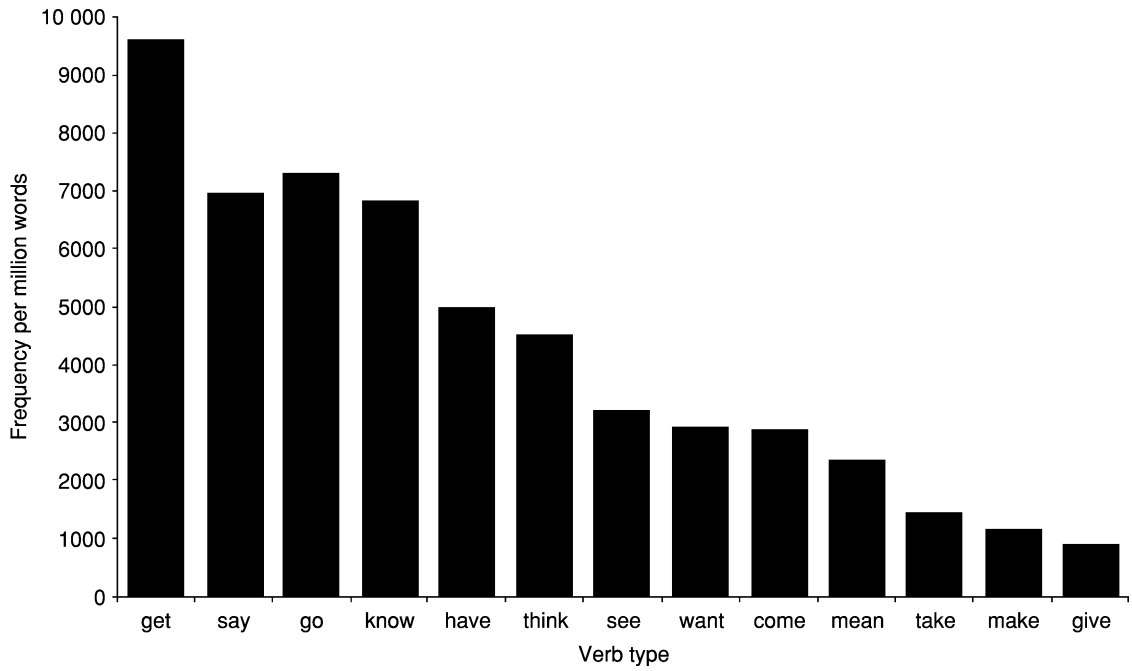

Figure 1 Frequencies in conversation of the most common lexical verbs (based on Biber *et al.*, 1999, Figure 5.9).

similarity). Although the most obvious animate nouns could be identified automatically, this analysis was carried out manually to ensure accurate identification of animacy. A second example involved the meaning distinctions associated with modal verbs. For example, the modal *must* can express personal obligation (*Students must turn in the exam to me before leaving class*) or logical necessity (*You must feel cold now*). It turns out, surprisingly, that the personal meanings of *must* are especially common in academic writing, while the logical meanings are prevalent in conversation (see Biber *et al.*, 1999: 493–495). Although detailed collocational information helps to disambiguate these uses, automatic analyses are generally unreliable for investigations of this type.

To ensure accurate descriptions of the patterns of use for such features, interactive software was developed to code corpus samples. These programs work in a similar way to a spelling checker in a word processor: the program automatically provides a 'best guess,' which is often correct, but all codes are checked and corrected (if needed) by a human analyst. In addition, concordancing software was used to confirm and revise (if needed) all automatic analyses.

Case Studies from the LGSWE

The Most Common Lexical Verbs across Registers

One area of research for the LGSWE was to identify the most common lexical verbs in each register and to compare the patterns of use across registers. With the part-of-speech–tagged LSWE Corpus, it was easy to identify all lexical verbs. (As stated earlier, several aspects of the tagging itself must be checked, though.) A simple program created a database of all lexical verbs and computed frequency counts for each verb in each register. The last step, then, was to compute normalized rates of occurrence (per million words) and output lists of the most common verbs in each register.

It turns out that there are literally dozens of common lexical verbs in English. For example, nearly 400 different verb forms occur more than 20 times per million words in the LSWE Corpus (see Biber *et al.*, 1999: 370–371). These include many everyday verbs, such as *pull*, *throw*, *choose*, and *fall*.

Given this large inventory of relatively common verbs, it might be easy to assume that that no individual verbs stand out as being particularly frequent. However, that is not at all the case: there are only 63 lexical verbs that occur more than 500 times per million words in a register, and only 12 verbs occur more than 1000 times per million words in the LSWE Corpus (Biber *et al.*, 1999: 367–378). These 12 most common verbs are *say*, *get*, *go*, *know*, *think*, *see*, *make*, *come*, *take*, *want*, *give*, *mean*.

It further turns out that there are large frequency differences among these 12 verbs, overall and in their register distributions. For example, Figures 1 and 2 plot the frequency of each verb in conversation and in newspaper language (cf. Biber *et al.*, 1999: 374–376). The verb *say* is listed first in these figures

because it is common in both spoken and written registers and thus has the highest frequency overall. This is not surprising, given the ubiquitous need to report the speech of others; it turns out that both speakers and writers rely heavily on the single verb *say* for this purpose, usually in the past tense and expressing either a direct or indirect quote. For example:

(1) You *said* you didn't have it. (Conversation)

(2) He *said* this campaign raised 'doubts about the authenticity of free choice'. (News)

The extremely high frequency of the verb *get* in conversation is more surprising. This verb goes largely unnoticed, yet in conversation it is by far the single most common lexical verb in any one register. The main reason *get* is so common is that it is extremely versatile, being used with a wide range of meanings. For example:

(3) Obtaining something:
See if they can *get* some of that beer. (Conv)

(4) Possession:
They've *got* a big house. (Conv)

(5) Moving to or away from something:
Get in the car. (Conv)

(6) Causing something to move or happen:
It *gets* people talking again, right? (Conv)

(7) Understanding something:
Do you *get* it? (Conv)

(8) Changing to a new state:
So I'm *getting* that way now. (Conv)

Several other verbs are also extremely common in conversation: *go*, *know*, and, to a lesser extent, *think*, *see*, *come*, *want*, and *mean*. News, on the other hand, shows a quite different pattern, with only the verb *say* being extremely frequent. However, all 12 of these verbs are very common in both registers in comparison to most verbs in English. For example, as noted above, verbs like *pull*, *throw*, *choose*, and *fall* occur only about 50–100 times per million words. Countless other verbs have even lower frequencies. In contrast, the majority of the 12 most common verbs occur more than 1000 times per million words in both conversation and news.

To give an indication of the overall importance of these 12 verbs, Figure 3 plots their combined frequency compared with the overall frequency of all other lexical verbs. Figure 3 shows that there are dramatic differences across registers in the use of these verbs. Taken as a group, these 12 verbs are especially important in conversation, where they account for almost 45% of the occurrences of all lexical verbs. In contrast, in academic prose these verbs account for only c. 10% of all lexical verb tokens. This general pattern is found for other word classes as well, in that conversation uses relatively few word forms with extremely high frequencies, and academic writing uses a much larger set of different word forms, but no individual word occurs with high frequency.

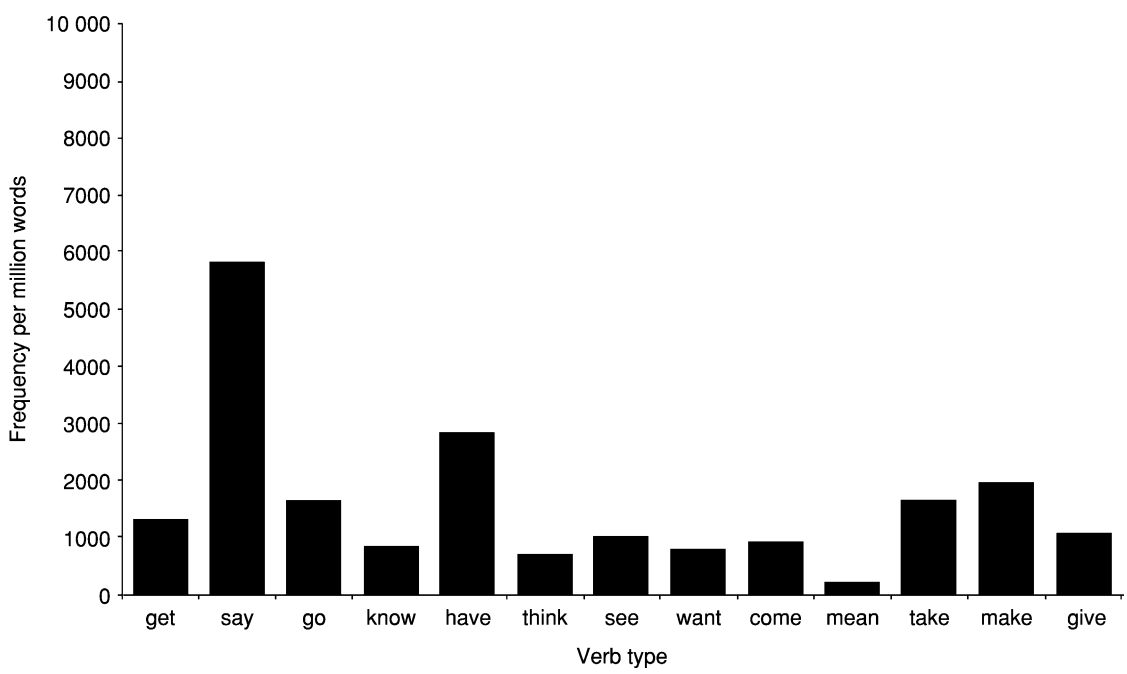

Figure 2 Frequencies in news of most common lexical verbs (based on Biber *et al.*, 1999, Figure 5.11).

Simple, Progressive, and Perfect Aspect across Registers

Verb aspect is an area of language use that is coded by many taggers and can thus be easily studied using a tagged corpus. For regular verbs, progressive aspect and perfect aspect are readily identified by the presence of the auxiliary verb (*be* or *have*) followed by a participle form (*-ing* or *-ed*). (Taggers also need to allow for the presence of intervening adverbs or *not*, as in *are not actually happening*). Most taggers incorporate lists of the irregular past-participle verbs, making identification of perfect aspect for these forms also straightforward (e.g., *have seen*, *had made*). Simple aspect verb phrases are the unmarked formal alternative; if a tagger accurately identifies all verbs, the simple-aspect verb phrases are the verbs that are not identified as progressive aspect or perfect aspect.

The corpus-based study of verb aspect is interesting because the actual patterns of use run directly counter to prior expectations. One of the most widely held intuitions about language use among English-language professionals is the belief that progressive aspect is the unmarked choice in conversation. One reflection of this belief is the prominent coverage given to progressive aspect verbs (the 'present continuous') in most ESL grammar textbooks (see Biber and Reppen, 2002).

As Figure 4 shows, the generalization that progressive aspect is more common in conversation than in other registers is correct. The contrast with academic prose is especially noteworthy: progressive aspect is rare in academic prose but common in conversation. The overall register distribution is somewhat surprising, in that progressive verb phrases are nearly as common in fiction as in conversation, and they are relatively common in news as well.

However, when we compare the use of progressive aspect with the use of simple aspect, we see that progressive aspect is certainly not the unmarked choice in conversation. Rather, as Figure 5 shows, simple aspect is clearly the unmarked choice, occurring more than 20 times more often than progressives in conversation. The following excerpt illustrates the normal reliance on simple aspect in natural conversation:

B: – What *do* you do at Dudley Allen then?
A: What the school?
B: Yeah. *Do* you –
A: No I'*m*, I'*m* only on the PTA.
B: You'*re* just on the PTA?
A: That'*s* it.
B: You *do*n't actually *work*?
A: I *work* at the erm –
B: I *know* you *work* at Crown Hills, *do*n't you?
A: Yeah.

In contrast, progressive aspect is used for special effects, usually focusing on the fact that an event is in progress or about to take place. For example:

(9) What'*s* she doing? (Conv)

(10) But she'*s* *coming* back tomorrow. (Conv)

With nondynamic verbs, the progressive can refer to a temporary state that exists over a period of time, as in:

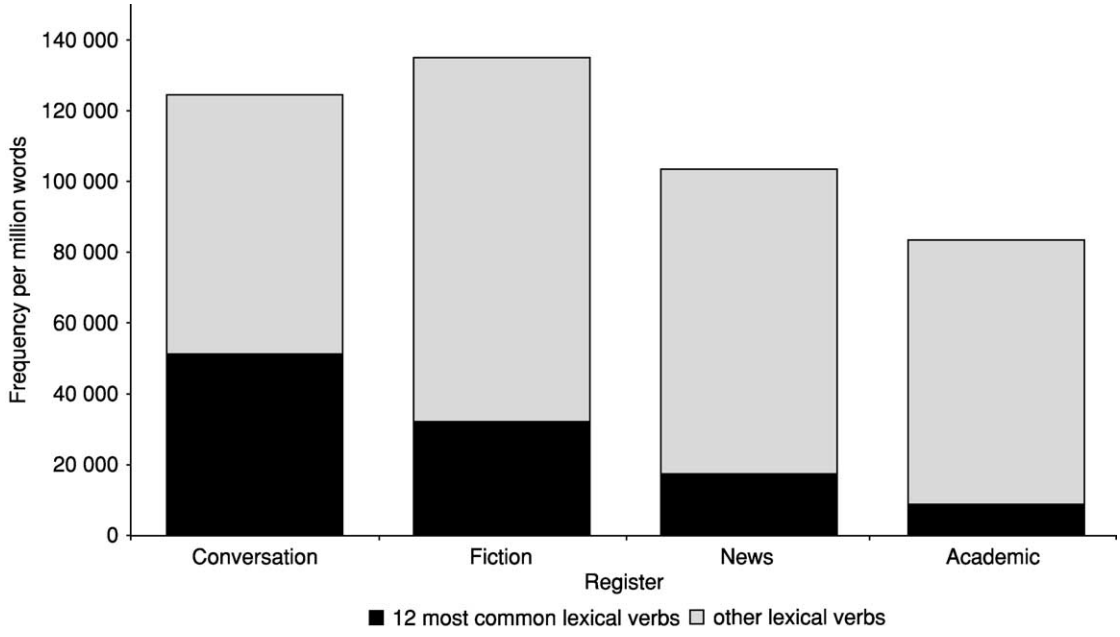

Figure 3 Distribution of the most common lexical verbs vs. other verbs, across registers (based on Biber *et al.*, 1999, Figure 5.8).

(11) I *was looking* at that one just now. (Conv)

(12) You should *be wondering* why. (Conv)

(13) We *were waiting* for the train. (Conv)

A few lexical verbs actually occur most of the time with the progressive aspect in conversation. These include *bleeding*, *chasing*, *shopping*, *starving*, *joking*, *kidding*, and *moaning* (see Biber *et al.*, 1999: 471–475). However, the norm – even in conversation – is to express verbs with the simple aspect.

The Interaction of Lexicogrammatical and Register Factors

The previous sections of this article illustrate the unexpected lexical and grammatical patterns of use that can be uncovered by corpus-based research. It further turns out that there are often complex interactions between word sets and grammatical variation. Such lexicogrammatical associations usually operate well below the level of conscious awareness, yet they are highly systematic and important patterns of use. In this section, I illustrate these associations through a comparison of the valency patterns for *stand*, *begin*, and *try* (see also Biber *et al.*, 1999: 380–392; Biber *et al.*, 1998: 95–100).

Many verbs take only a single valency pattern. For example, *wait*, *happen*, and *exist* occur only as intransitive verbs, while verbs like *bring*, *carry*, *suggest*, and *find* occur only as transitive verbs. However, there are many other verbs in English that can occur with multiple valency patterns, such as *eat*, *watch*, *help*, and *change*.

Stand, *begin*, and *try* are three verbs that have exactly the same potential for occurring with multiple valency patterns – all three verbs can occur with four different patterns.

(14) Simple intransitive (SV):
For a while he *stood* and watched. (Fict)
A number of adults and children have left the compound since the siege *began*. (News)
Well, we can *try*. (Conv)

(15) Intransitive with an optional adverbial (SV+A):
I just *stood* there. (Conv)
This effort *began* in January of 1981. (Academic prose)
I actually *tried* really hard on that paper. (Conv)

(16) Transitive with a noun phrase as direct object (SVO (NP)):
My mom couldn't *stand* it in the end. (Conv)
Mr. Hawke's government has *begun* its controversial plan to compensate the three main domestic airlines. (News)
I *tried* that one time. (Conv)

(17) Transitive with a complement clause as direct object (SVO (Comp-cls)):
I could hardly *stand* to watch that movie. (Conv)
He *began* to scratch slowly in the armpit of his alpaca jacket. (Fict)
I didn't *try* to hide it. (Conv)

A traditional grammatical description would simply note that all these verbs occur with the same

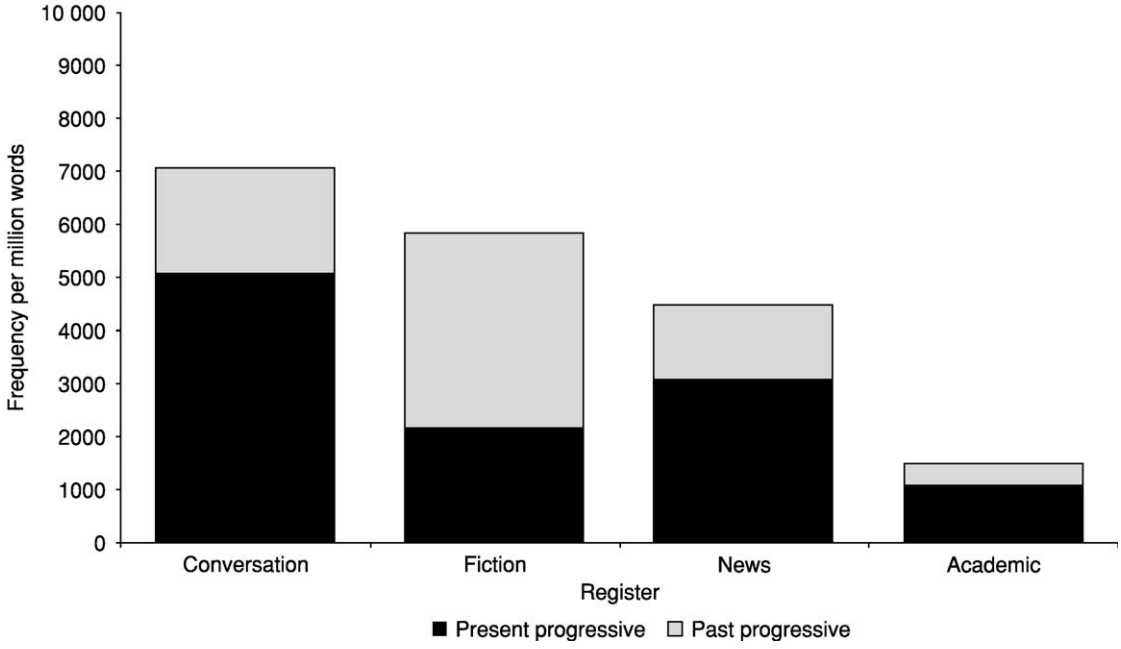

Figure 4 Frequency of present progressive and past progressive in four registers (based on Biber *et al.*, 1999, Figure 6.4).

four valency patterns. However, corpus-based analysis opens up the possibility of a use perspective on such points of grammar. Earlier sections of this article show how the use of grammatical features is conditioned by register; the present section shows how the use of grammatical patterns is conditioned by individual words (which is in turn conditioned by register).

It turns out that these three verbs have strikingly different preferred valency patterns, despite their identical valency potentials. Figure 6 shows the proportional use of each verb with each valency, comparing the patterns of use in conversation and newspapers. *Stand* usually occurs as an intransitive verb, often with an optional adverbial, while *begin* is more common with transitive patterns (especially with a following complement clause). The verb *try* has an even stronger preference for a following complement clause than *begin*.

Further, there are important register differences. For example, the pattern *begin* + complement clause is especially characteristic of conversation, while intransitive *begin* is more likely to occur in news and academic prose. (Note that this pattern runs contrary to the general intuition that dependent clauses are typical of formal writing but rare in conversation.)

These register differences reflect different typical functions. In conversation, *begin* usually has an aspectual function, marking the initiation of the action in the *to*-clause.

(18) Yeah, I couldn't *begin* to do this yesterday. (Conv)

(19) We're slowly *beginning* to see what he meant by that. (Conv)

(20) And then it *began* to get a bit darker. (Conv)

In contrast, *begin* is usually used in newspaper reportage and academic writing to identify the starting point of some event, organization, or institution, as in (21) and (22).

(21) The service *began* in Southwestern Bell Telephone's five-state territory in June. (News)

(22) The government pledged to open a top-level investigation into rioting last week that *began* during a nationwide general strike. (News)

In contrast, the predominant use of *stand* as an intransitive verb corresponds to its typical meaning marking a physical state, as in (23) and (24).

(23) I just sort of have to *stand* there while you two *stand* there laughing at me. (Conv)

(24) He *stood* alone in the empty hall. (Fict)

In this case, the relatively rare transitive pattern has a completely different meaning that could be paraphrased as *tolerate*; transitive *stand* is usually used in a negative context, to indicate what the speaker cannot tolerate, as in (25) and (26).

(25) Everybody in the break room can't *stand* her. (Conv)

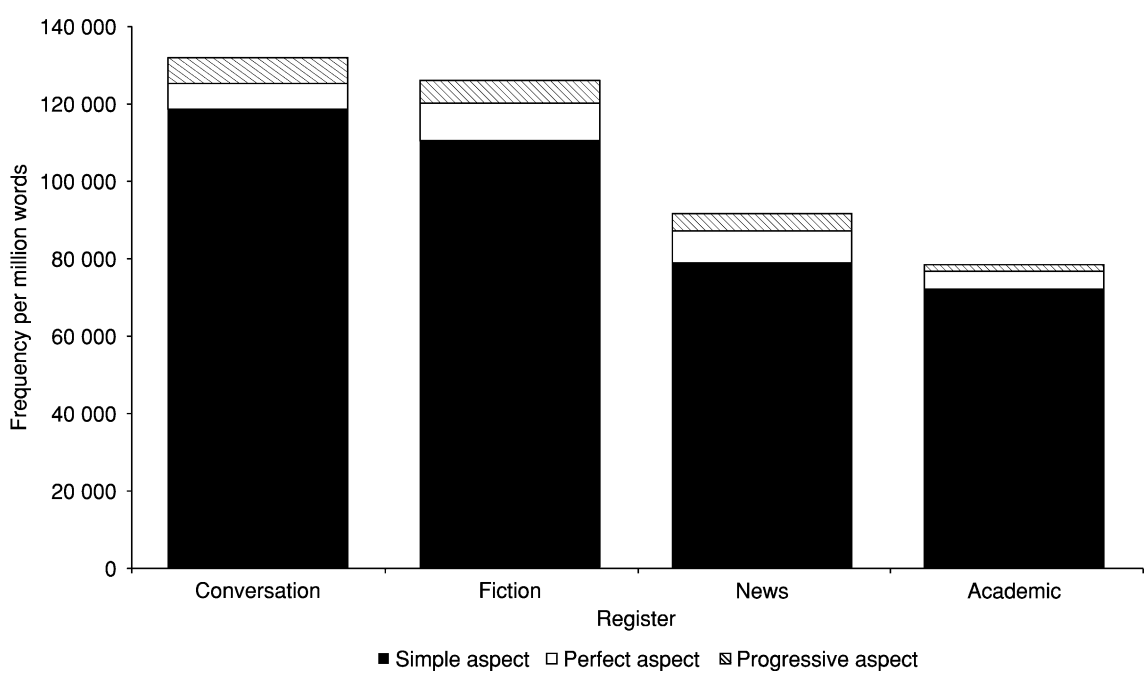

Figure 5 Frequency of simple, perfect and progressive aspect in four registers (based on Biber *et al.*, 1999, Figure 6.2).

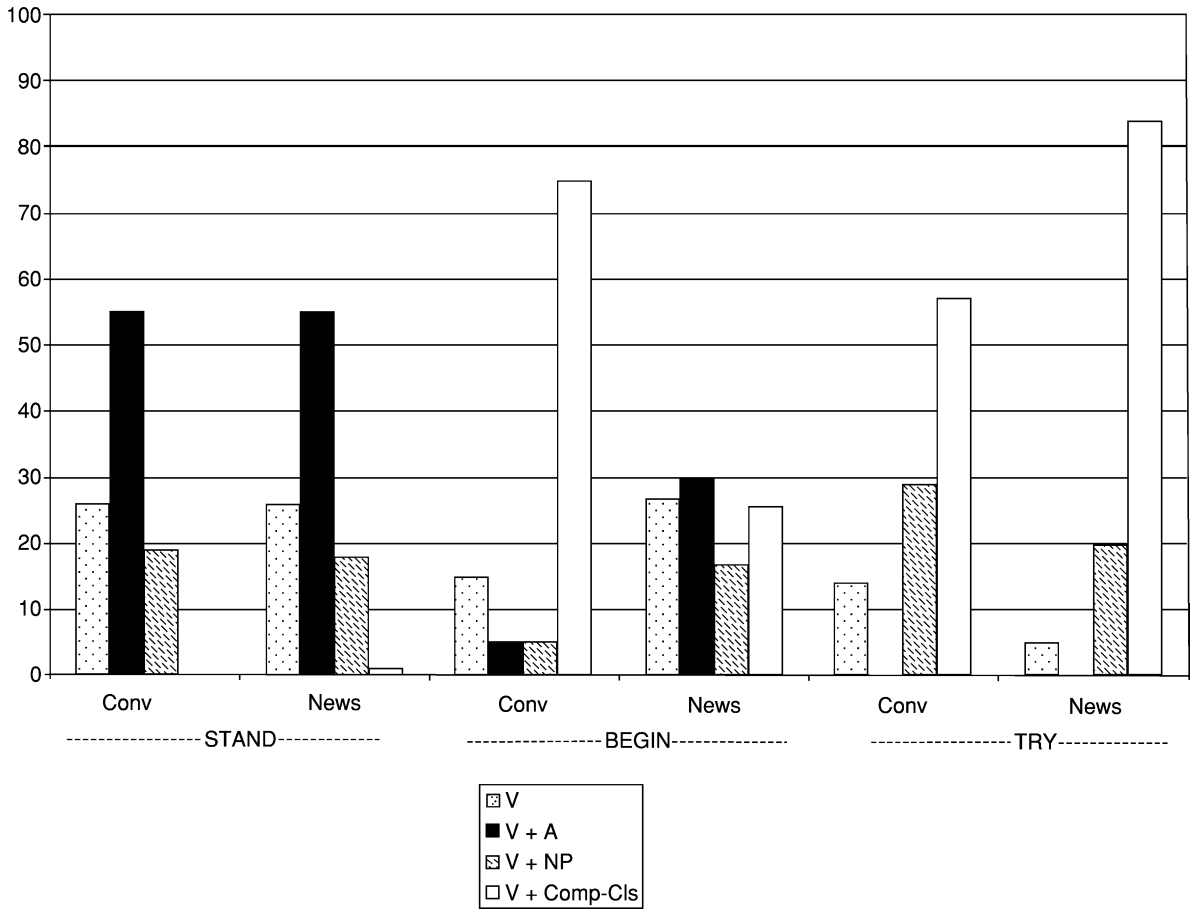

Figure 6 Proportional use of valency patterns for three verbs: *stand*, *begin*, and *try* (based on Biber *et al.*, 1999, Table 5.5).

(26) I couldn't *stand* to listen to him. (Conv)

In sum, corpus analysis in this case enables description of the different ways in which verbs are actually used. That is, although verbs often have the same potential for different valency patterns, corpus analysis makes it clear that the actual use of such verbs is highly systematic, with each verb's having its own preferred patterns, depending on its typical meanings and functions.

Conclusion

Corpus analyses of grammar are not likely to contribute to theoretical discussions of formal syntax, and they rarely uncover new grammatical devices that were not noticed before. Rather, the major contribution of corpus-based analysis is to study the actual patterns of language use, investigating the highly systematic patterns that structure our everyday use of grammatical features in speech and writing. These kinds of patterns operate below the level of conscious awareness and are usually not accessible to native intuitions. As a result, these patterns often went unnoticed prior to corpus-based study. However, as the analyses in this article illustrate, these important patterns correspond to major differences among sets of words, grammatical variants, and lexicogrammatical associations – and all these are distributed in systematic ways across registers.

See also: Corpus Linguistics; Corpora in Studies of Variation; Part-of-Speech Tagging; Perfectives, Imperfectives, and Progressives; Tense, Mood, Aspect: Overview.

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Parsing: Statistical Methods

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Overview

Statistical parsing, broadly, is the use of statistical methods to resolve tree-level syntactic ambiguities. Most work in theoretical syntax investigates grammaticality: the distinction between what we can or cannot say in a given language. In contrast, statistical parsers model the trends of what we do or do not say in practice, using these trends to resolve syntactic ambiguities, such as prepositional phrase attachment, relative clause attachment, and coordination scope. For example, in a phrase like *increases in economic indicators and decreases in exchange rates*, the second prepositional phrase can grammatically modify both conjuncts, but probably does not. While some utterances are deeply ambiguous, most are not, and therefore good statistical models can resolve most potential ambiguities correctly. In computational systems, it is useful to model syntactic trends because many syntactic ambiguities have semantic reflexes, and therefore syntactic models can constrain semantic interpretation.

Statistical parsers are systems which take sentences as input and produce syntactic analyses of those sentences as output. The outputs produced vary in richness from parser to parser. On the impoverished end of the spectrum, there are chunkers, which might only attempt to bracket simple nonrecursive noun phrases. Chunkers are sufficiently low-level that they often have more in common with part-of-speech taggers than with full parsers, which produce nested hierarchical structures. On the rich end, some parsers operate over detailed, feature-structured linguistic formalisms such as HPSG and LFG. Most parsers produce something in between, usually context-free phrase structure trees. Statistical parsers can either

may have informal and polite forms, such as French *tu/vous*, German *du/Sie*, Dutch *jij/U*, etc. Some languages (especially in Africa) make use of **logophoric pronouns**. These typically occur in the subject position of clauses that are complements of verbs of saying, perception, cognition, etc., and indicate the person from whose point of view the proposition expressed is presented. Here is an example from Clements (1975: 142), cited in König and Siemund (2000):

(10) Kofi be yè-dzo
Kofi say LOG-leave
"Kofi said that he (=Kofi) left."

(11) Kofi be e-dzo
Kofi say 3.SG-leave
"Kofi said that he/she (≠Kofi) left."

In (10) the logophoric element *yè* indicates that the subject of the subordinate clause is to be interpreted as the same as the subject of the main clause, while no such interpretation is required for (11).

Examples of interface systems are **tense**, **aspect**, and **mood**. Tense is the way a language grammaticalizes (encodes) the real-world concept of time. Aspect is concerned with the way a particular event is viewed as progressing in time, while mood is the way a grammar encodes concepts such as necessity, possibility, permission, uncertainty, etc.

Voice is an example of an information–ordering system. Compare the two sentences below:

(12) The invaders demolished all the churches

(13) All the churches were demolished by the invaders.

These sentences have the same meaning (i.e., they express the same proposition), but differ in the way the components are presented. Thus (12) is more likely in a situation where the invaders have already been mentioned in the preceding cotext, and the churches represent new information, while in (13) it is the other way round.

As before, different languages make different uses of the systems of grammar.

Grammar Models

As noted at the beginning of this article, this overview of grammar is not wholly uncontroversial. In linguistic science, a large number of grammar models exist, among them Transformational Generative Grammar, Cognitive Grammar, (Radical) Construction Grammar, Head-Driven Phrase Structure Grammar, Lexical-Functional Grammar, and Dependency Grammar. These are discussed in separate articles.

See also: Subordination.

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Grammar, Early Medieval

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This article deals with the development of language studies from about 600 to 1100, a period which is conveniently divided into two by the Carolingian Renaissance (ca. 800 A.D.). The first medieval centuries are properly the Age of Grammar, whose method had established itself as an indispensable tool for Bible study. The study of dialectic and rhetoric were revived in the Carolingian reform, whereby the scheme of the Seven Liberal Arts was reinforced as the basis of secular learning. Medieval scholars held a unified approach to the study of the Liberal Arts, whose methods were in a constant interaction with each other and with theology.

In the Carolingian Renaissance, the dialectic began to receive an increasingly important role as a general tool of study relevant for all learning, both secular and religious. The dialectical method influenced the study of grammar in a manner that became fundamental for medieval culture. The origins of this development, which culminated in the speculative

grammars of the 13th century, have only recently been traced back to the Carolingian reform. It was then that Priscian's *Institutiones grammaticae* entered into circulation, and began to receive philosophical commentary.

Elementary pedagogical grammar continued to flourish, and exegetical work was pursued as focused on Donatus's two grammars, *Ars minor* and *Ars maior*. Grammatical commentaries were developed in parallel with biblical exegesis, especially by Irish scholars. Furthermore, the question of Christian grammar continued to be relevant throughout the early medieval period. Grammar held a propaedeutic position in the medieval curriculum as an art by means of which one would proceed towards something higher, as emerges from Isidore of Seville's popular definition, "grammar is an art of correct speaking and the first of the Liberal Arts and the foundation of them all."

The Liberal Arts

The Seven Liberal Arts was an educational program that medieval scholars inherited from Late Antiquity and gave a thoroughly Christian interpretation. Before the birth of the universities, the Liberal Arts were regarded as the standard basis of general education and as an ideal form of universal knowledge. They were studied through encyclopedic works, which presented the basic doctrine of each Liberal Art in a concise and systematic manner. The most popular encyclopedias in the 6th and 7th centuries were Cassiodore's *Institutiones humanarum et divinarum litterarum* and Isidore's *Origines sive Etymologiae*; Martianus Capella's *De Nuptiis Mercurii et Philologiae* gained in popularity during and after the Carolingian reform. The Liberal Arts consisted of two parts; one dealt with the three linguistic and logical arts: grammar, rhetoric, and dialectic; while the other covered the four mathematical disciplines: arithmetic, geometry, astronomy, and music. Only the arts of discourse, known as the *trivium* in the Middle Ages, were studied independently before the 12th-century Renaissance, whereas the mathematical disciplines of the *quadrivium* were known through encyclopedias.

The Late Latin Inheritance

Early medieval scholars inherited a large number of grammars from Late Antiquity, which can roughly be divided into the following types:

1. The *artes*-type grammars present the doctrine of the parts of speech in a systematic manner. They concentrate on providing concise definitions of the eight parts of speech – or only a couple of them – and presenting their salient morphological and semantic properties, known as the 'accidents.' The length of these works vary. Donatus's *Ars minor* is by far the most concise of these grammars; his more advanced *Ars maior* dealt additionally with letters, syllables, and metrical feet, as well as grammatical errors (barbarisms, solecisms, etc.) and stylistic figures. Works of great length are those by Consentius, Diomedes, and Charisius.
2. Grammatical commentaries began to emerge in the 4th century as soon as Donatus's two works had come into existence. Donatus discussed the parts of speech in an authoritative manner, without providing any justifications for the doctrine, which therefore required explanation. Within the exegetical genre, commentators dealt with material that was absent from Donatus's grammar and which was covered in the more comprehensive *Artes grammaticae*. Such material includes, for instance, the etymological definitions of the parts of speech, the justifications for the order of their presentation, etc. Until the mid-9th century, commentaries focused solely on Donatus's works, but in the 9th century, other grammatical works also became the object of commentary, e.g., Eutyches, Phocas, and, most importantly, Priscian's *Institutiones grammaticae*.
3. The *regulae*-type of grammars concentrate on the formal features of one or more parts of speech and especially on the analogical patterns (*regulae*) of Latin inflection. Representatives of this genre include Eutyches, Phocas, Pseudo-Augustine, Martianus Capella, and Pseudo-Palaemon. Their works are collections of morphological paradigms, ordered alphabetically or otherwise, and completed with lists of examples. The structure and coverage of the *regulae*-type grammars – they may be restricted to the presentation of a couple of parts of speech – are such that they lend themselves less easily to pedagogical use. Many large grammars such as those of Priscian, Charisius, Diomedes, and Consentius combined various aspects by incorporating portions of the *regulae*-type material into the structure of an *ars grammatica*.

During the first medieval centuries, three works could claim to be universally known, namely Donatus's *Ars minor* and *maior*, as well as one of Priscian's minor works, *Institutio de nomine*, *de pronomine*, *de verbo*. The latter sets out a formally based system of classification of the inflecting parts of speech. The fates of the other Late Latin grammars during the

early Middle Ages can be related to the question of to what extent these grammars served to complete or supplement Donatus's grammars. In a situation where his two grammars provided an outline of the essential doctrine in a concise manner, it is unlikely that very short grammars of a similar kind could have competed in any way with the grammars of Donatus. Such short grammars as those of Asper, Dositheus, or Scaurus seem indeed to have fallen into disuse during the first medieval centuries, and only a sporadic use can be attested to St. Augustine's *Ars breviata* and to the grammar of Audax. An exception to this rule is the widely used grammar of Maximus Victorinus. By contrast, the comprehensive grammars of Charisius, Diomedes, and Consentius, combining aspects of both types of grammar, enjoyed considerable popularity. Out of a variety of *regulae*-type of grammars, Eutyches was the one to gain general popularity, while the use of Phocas was restricted to a few authors.

Insular Elementary Grammars

Early medieval developments of grammar are primarily associated with the British Isles, where a large number of pedagogical and exegetical grammars were produced during the first medieval centuries. By contrast, very little is known of grammar teaching on the Continent until the 7th century, when Isidore's *Etymologiae* appeared (636). This arrival may be because a more immediate need for rearrangement in the teaching material was felt by the recently converted people in northern Europe, who had to learn Latin as a foreign language. In the areas where contact with the Latin language had been more direct, the Late Latin grammars largely satisfied the needs of language teaching.

For a foreign student of Latin, all the Classical grammars would present certain difficulties – the most obvious defect being the poor coverage of Latin morphology. In his *Ars minor*, Donatus illustrates noun declension by five examples, which he chose on the basis of gender, and his treatment of the verb inflection is exhausted by one example only, namely the verb *legere* 'read.' On the other hand, the noun declensions were presented more elaborately in the *regulae*-type grammars, which used an unhelpful principle such as alphabetical order to organize them.

The main efforts of the Insular grammarians were focused on providing fuller presentations of the inflecting parts of speech. The discussion of nominal declensions is predominant, whereby the method of presenting them by declension rather than gender establishes itself, for instance in the grammars of Tatwine (d. 734) and Boniface (d. 754). It is also characteristic of Insular grammars to assign an important place to Christian vocabulary in the paradigms and the accompanying examples. The Insular grammarians felt free to rework their sources, combining and expanding them and eliminating unnecessary elements to their liking. This policy is made explicit by Boniface, who states that he never speaks on his own authority: "Not a single twig of a rule will be found grafted into this little book which is not firmly rooted in one of the Classical grammarians" (Law, 1982). The Insular tendency to concentrate on the formal features of the parts of speech found its strongest expression in the texts called *Declinationes nominum* or *Coniugationes verborum*. Such texts, which consist of collections of paradigms and examples, began to circulate at the end of the 7th century. The results of these wide-ranging experiments in describing Latin morphology entered the mainstream of elementary grammars, even though the Insular grammars themselves went out of use by the middle of the 9th century.

Christian Grammar

Grammar had been intimately associated with the study of pagan literature in ancient schools, and the use of secular arts in Christian education had to be justified over and over again by early medieval teachers. In their defense of grammar, they appealed to the authority of the early Church Fathers, and especially to Augustine, whose various works (*De doctrina christiana*, *De ordine*) were highly influential in legitimizing the use of the secular arts for Christian purposes. It was also important to assert the authority of the Bible over that of Donatus: the divine text of the *Vulgate* could not contain errors, it was unanimously maintained, and should therefore not be emended according to the rules of grammar.

It was commonplace in the medieval exegesis to think that the sacred text required special tools of interpretation. As a result of the Fall, God had ceased to speak to man directly; the Bible, on the other hand, speaks of spiritual issues obliquely, through enigmas. Thus, in addition to the literal or historical sense, the sacred text contains a deeper meaning, which was analyzed in terms of various figurative senses, allegorical (or spiritual), tropological (or moral), and anagogical (or prophetic). Whenever the sacred text appeared to contain something obscure or contradictory, it was not to be understood literally, but as an enigma, which required interpretation. The Christian use of the rhetorical tropes and figures was made legitimate in Augustine's *De doctrina christiana*, and in his footsteps, Bede claimed that the Christians used them before the Greeks. For instance, the majority of

the examples in his *De schematibus and tropis* come from Christian contexts.

One area that lent itself easily to Christianization was the body of examples drawn from Classical literature. The practice arose to replace – at least partly – the manifestly pagan examples with Christian ones, the earliest specimen of this approach being the *Ars Asporii* (or *Asperi*) from late 6th century Gaul. The anonymous author of this text is supposed to have depended on a widely known Christianized version of the *Ars maior*. The most striking example of Christian grammar is that of Smaragdus from the early 9th century, where 750 Biblical examples are used, of which about three-quarters come from the Old Testament.

A religious attitude to language study is also present in the two enigmatic works of Virgilius Maro Grammaticus, *Epistolae* and *Epitomae*. Virgilius, too, looked upon the grammatical text as a bearer of a deeper meaning, parallel to the sacred texts, but his message was less clear than that of Smaragdus, for instance. These works, long regarded as a parody of the pompous style of the Latin grammarians, have recently been open to a new interpretation. According to Law (1995), Virgilius was something of a heretic, one who defended the independent study of natural phenomena and the possibility of multiple ways to divine wisdom against the authoritative statements of various Christian figures (who had condemned the study of the secular arts for their own sake). Virgilius would therefore have hidden his meaning in the alluring complexities of his text.

Exegetical Grammar

Donatus's *Ars maior* became the object of several commentaries, which developed in intimate association with scriptural exegesis. The earliest surviving commentary, known as *Quae sunt quae omnem veritatem scripturae commendant*, displays many of the features of Hiberno-Latin Biblical exegesis. The commentary often incorporates quotations from the Church Fathers or the Bible, and seeks a religious interpretation for grammatical phenomena. It introduces the author, Donatus, and his work by means of a threefold introductory scheme based on the *locus*, *tempus*, *persona* and sometimes even the *causa scribendi*. The principal sources of this commentary are Pompeius and Consentius. Two Insular commentaries cover a few parts of speech only; *Aggressus quidam* is a brief text reworking the noun-section of the *Ars maior*, and *Ars Malsachani* is a long tract on the verb and participle. The Irish author makes use of a wide variety of Classical sources, including works by Consentius, Diomedes, Charisius, and Sergius, plus Priscian's *Institutio de nomine de pronomine et de verbo* and the works of Donatus.

A glimpse of the grammatical exegesis from the Mediterranean world in the 6th or 7th century is probably offered by the *Ars Ambrosiana*. This anonymous *Ars maior* commentary lacks most of the features characteristic of the Insular exegetical grammars; it fails to introduce Christian elements into the grammar and draws upon a group of sources that would be unusual for an Insular author: works by Pompeius, Consentius, Charisius, Diomedes, Maximus Victorinus, Sergius, Priscian, and Claudius Sacerdos, and also possibly Sergius' *Explanationes* I.

The Irish on the Continent, the *scotti peregrini*, seem to have introduced this type of pedagogy to the Carolingian schools. Several of their commentaries on the *Ars maior* survive from the early and mid-9th century (e.g., Murethach, Sedulius Scottus, the anonymous works known as the *Ars Laureshamensis* and *Ars Brugensis*). Commentaries were focused even on authors other than Donatus. For instance, Sedulius Scottus wrote commentaries on Eutyches, Phocas, and Priscian's *Institutiones grammaticae*. Towards the end of the 9th century, Remigius of Auxerre (d. ca. 908) commented upon a large number of authors, ranging from Vïrgil to Martianus Capella, Boethius, and Bede. Among the grammars that he commented upon are Donatus's two works, those of Eutyches, plus Phocas's and Priscian's minor works.

When the study of dialectic was revived in the Carolingian Renaissance, its method began to influence grammatical exegesis immediately. The commentators became increasingly aware of the presence of philosophical categories in the ancient *ars grammatica*, which were reminiscent of the Aristotelian categories. Such material became the object of meticulous analysis. One area that lent itself easily to philosophical elaboration were the definitions, which traditionally belonged to the domain of philosophers. Leaning on the philosopher's lists of definitions, the Carolingian grammarians distinguished up to 12 types of definition. Of these, the most common were the *definitio substantiae*, the definition of the essence, and *definitio soni*, the etymological definition; or, else, the commentators resorted to the method of Porphyry's *Isagoge*, asking what each part of speech has in common (*communio*) with the others, and what distinguishes it from every other part (*proprietas*).

Grammar for the *Provecti*

The principal object of philosophical commentary was Priscian's massive *Institutiones grammaticae*, launched into circulation during the Carolingian

Renaissance. Alcuin encouraged the use of the *Institutiones* by compiling *excerpta* based on its last two books, and by incorporating material from it into his own grammar, *Dialogus Franconis et Saxonis de octo partibus orationis*. This grammatical dialogue, which involves two mature pupils, combined the methods of grammar and dialectic in a way which marks the beginning of a more advanced, philosophical grammar in the Middle Ages. Thanks to Alcuin's policy, Priscian's grammar received philosophical commentary immediately. The *Scotti peregrini* made regular use of the *Institutiones* in their Donatus commentaries, and one of Sedulius Scottus' commentaries was focused on *Priscianus maior*.

Priscian's *Institutiones* is a massive compilation of 18 books, which often circulated in two parts in the Middle Ages. The first 16 books, known as the *Priscianus maior*, covers essentially the same topics as does the *Ars maior* – the letters, syllables, the parts of speech, and its descriptive framework is largely similar. Importantly, however, its philosophical semantics is much more explicit than that of Donatus. Moreover, while the *Ars maior* is concluded by a section on style, the last two books of the *Institutiones* contain an account of syntax, known as the *Priscianus minor*. This theory of syntax, which was inspired by Stoic logic, forms the basis of our traditional syntax. This field of grammar was properly developed in the High Middle Ages, but was not totally neglected in the Early Middle Ages either. Alcuin's *excerpta* were based on *Priscianus minor*, and an anonymous Priscian commentator in Paris introduced the subject – predicate distinction into grammatical analysis, using the vocabulary of Martianus Capella. Remarkably independent experimentation in the field of syntax is attested in the so-called St. Gall Tractate. In this anonymous tract, the rhetorician's argumentative *loci*, the Seven Circumstances, together with the methods of grammar and philosophy, provide the tools for syntactical analysis, as applied to a large number of Christian texts. The main concern of this author is the Latin word order.

Some 60 manuscripts of Priscian's principal work derive from the 9th and 10th centuries, most of which received marginal commentary. A number of excerpted versions of this book were compiled: the *excerpta* compiled by Peter of Pisa on the *Priscian maior*, the *Adbreviatio* of Ursus of Beneventum and the anonymous *Excerptiones de Prisciano*. Walahfrid Strabo produced works that combined material from the *Institutiones* with the doctrine of Donatus's *Ars minor* and *Ars maior*. Recently, a full commentary on the *Priscian maior* from the 9th century has been discovered, and attributed to Johannes Scottus Eriugena, the most prominent early medieval philosopher. Eriugena tackles Priscian's philosophical definitions of the parts of speech in a sophisticated manner, interpreting their originally Stoic vocabulary (substance, quality) in terms of the Aristotelian categories. In his principal work, the *Periphyseon*, Eriugena discussed the applicability of these categories to divine issues, and raised the question, in terms of negative theology, of the incapability of the human language to express divine issues.

The exegetical work on Priscian was often carried out anonymously and appears in the margins of the manuscripts. From the 11th century onward, commentaries based on such glosses are found written out continuously. Such are the anonymous commentaries known as the *glosulae*-tradition, whose earliest version has been dated to the latter half of the 11nth century. The central figures of the 12th century grammar, William of Conches (ca. 1125) and Peter Helias (ca. 1140) depended very much on the tradition of the gloss commentaries. It seems, thus, fair to conclude that there was continuity, from the Carolingian reform onwards, in the philosophical commentary on Priscian's *Institutiones grammaticae*.

See also: Bilingualism and Second Language Learning; Classical Antiquity: Language Study; Etymology; France: Language Situation; Interlanguage; Italy: Language Situation; Language Education: Grammar; Language Education Policy in Europe; Language Education: Vocabulary; Language Teaching: History; Linguistic Theory in the Later Middle Ages; Logic and Language: Philosophical Aspects; Philosophy of Language, Medieval; Priscianus Caesariensis (d. ca. 530); Second and Foreign Language Learning and Teaching; Word Classes/Parts of Speech: Overview.

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Grammatical Meaning

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Apparently, then, the relational concepts, which are in this particular case, definiteness of reference, singularity, declarative modality, and 'subjectivity' and 'objectivity' (meaning the roles as subject and object), and which are expressed through grammatical morphemes or word order, are responsible for the connections between the concrete elements. However, it is really only the last two, which correspond

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to the syntactic functions of the two nouns in the sentence, that are relational in the sense of specifying relations between the lexical elements. It is more difficult to understand why, for instance, singularity, 'expressed by lack of plural suffix *-s* . . . and by suffix *-s* in the following verb' has to be regarded as relational. Moreover, as Sapir notes, the cardinality of referents would not be systematically indicated in many languages, and can be expressed also by lexical means, e.g., by a numeral. The necessary conclusions are that not all relational (i.e., grammatical) concepts are equally essential in language. Sapir is thus led to postulate a category of 'concrete relational concepts,' which can vary from language to language, not only in their expression, but also as to their concreteness. Relational concepts such as subjectivity and objectivity on the other hand are not subject to this variation: "The fundamental syntactic relations must be unambiguously expressed" (p. 94). It does seem that Sapir gets a bit entangled in his own reasoning here. On the one hand, he no is longer able to use the distinction between concrete and relational as an explanation for what is grammatical and what is lexical in languages; rather, he takes the grammatical status of a concept as an indicator of its concreteness or relationality, thus opening himself to allegations of circularity. On the other hand, the unequivocally relational concepts, which have to be expressed in languages, no longer display themselves as clearly semantic: he himself speaks of 'fundamental syntactic relations.' Sapir's predicament does reflect the complexity of what Crystal (1997: 107) aptly calls "an area of study that falls uneasily between semantics and grammar."

Much of the uneasiness is related to the fact that distinguishing the contributions of grammar and lexicon to meaning is no less problematic than separating the roles of genes and environment in an individual. A neat division between grammatical and lexical meaning presupposes that linguistic expressions are like buildings where the building blocks (the lexical items) are independent of the cement (the grammar). But there is always a restricted number of ways in which a lexical item can be combined with others, and the meaning of the lexical item can often be expressed only in terms of what the resulting combination means. For instance, it is rather difficult to explain the meaning of a verb such as 'borrow' without placing it in a construction such as 'NP borrows NP from NP,' or to explain the meaning of 'father' without mentioning the persons involved in the 'x is the father of y' relation. In formal semantic frameworks such as Montague Grammar, the meanings of relational terms such as 'borrow' and 'father' are specified in terms of functions (in the mathematical sense of 'mapping') from the meanings of the argument expressions to the meaning of the whole. By abstracting away from the content of the specific lexical items, we may arrive at more general constructions, such as 'NP Verb NP Prep NP,' which, in formal semantic terms, have to be interpreted as second-order functions (that is, functions that take other functions as their arguments). It is at the level of constructions that the interface between grammar and meaning has to be sought, as has been argued by proponents of Construction Grammar, and the grammatical meaning of linguistic elements in general can only be understood in terms of their roles in larger constructions.

Grammatical markers and features such as word order and prosody undoubtedly serve the function of making it easier to grasp the structure of a complex expression, in particular the hierarchical relationships between elements. However, the choice of grammatical elements such as inflectional morphemes may also depend on factors that have little to do with the structure of a sentence and sometimes directly reflect extralinguistic features of the situation or of referents of the discourse. This makes it difficult to uphold a thesis that the meaning of inflectional markers (and of grammatical morphemes in general) is different in kind from that of lexical morphemes.

Rather, inflectional markers differ from lexical morphemes in the role their meanings play in the speech act. A past tense marker in a language such as English normally does not have the function of informing the listener that the event or state referred to took place in the past; rather, it is an obligatory feature (except in some specific styles or genres) of any verb that refers to a state-of-affairs in the past. A related property of inflectional markers is that it is typically difficult or impossible to focus on them or, what can be seen as a special case of focusing, to negate them separately.

See also: Syntax-Pragmatics Interface: Overview; Syntax-Semantics Interface.

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Grammaticalization

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Grammaticalization (also 'grammaticization') is generally regarded as a process by which linguistic elements (lexical, pragmatic, and sometimes even phonetic items) change into constituents of grammar, or by which grammatical items become more grammatical in time. Examples are the development of auxiliaries from lexical verbs, or prepositions from nouns; the development of inflections from free adpositions; and the change of word-orders that signal pragmatic meanings, like theme or rheme, into grammatical word-orders that signal the syntactic cases of subject and object. Furthermore, it includes the functionalization/grammaticalization of phonological or prosodic features, such as palatalization and initial mutations to distinguish different cases; number and gender in Irish; or a particular tone taking over the function of a nominal classifier in Chinese. The whole concept of grammaticalization can be characterized as the diachronic process and the synchronic state of coding of grammatical categories, such as case, number, gender, tense, aspect, mood, etc. (for a general reference work cf. Hopper and Traugott, 2003).

It is widely assumed that linguistic items historically go through the following stages:

(1) free lexical unit > function word > affix > zero

The change from free lexical units to function words builds up periphrastic, or analytical, constructions. In a further step, synthetic structures can develop via cliticization, or affixation. Here simple agglutination

is taken to precede an inflectional stage of affixation, which may end up as morphonological material, such as ablaut in the Germanic languages marking past tense (*sing – sang*). Finally, affixes can erode and either turn into meaningless phonological material ('phonogenesis'), or they are dropped altogether. Both alternatives often result in a functional renewal. Within this cycle we can see two basic subtypes of grammaticalization operating on the propositional level of language:

1. the functionalization of lexemes
2. cliticization/affixation.

Two further subtypes of grammaticalization can be distinguished:

3. the syntacticization of pragmatic relations, affecting the syntax of a language, for example, if word-order assumes a grammatical function
4. pragmaticalization, operating on the discourse level, e.g., the development of discourse markers or modal particles.

As a theoretical framework of linguistic change, grammaticalization relies on the interdependence between langue and parole, and on the gradualness of change that allows intermediate stages. So it challenges the discreteness of linguistic categories, even that between grammar and the lexicon. While in generative grammar syntactic change is regarded as autonomous, grammaticalization theory includes pragmatic, semantic, and phonetic motivations.

Earlier Thoughts about Grammaticalization

The term 'grammaticalization' was supposedly first used by Antoine Meillet (1912). He applied it to denote the evolution of grammatical forms (function words, affixes, etc.) out of former lexical material. However, similar ideas about the origin of grammar have a very long tradition (cf. Heine *et al.*, 1991; and Lehmann, 1995 on the history of research in grammaticalization). For example, von Humboldt (1822) and von der Gabelentz (1901) proposed that the source of inflectional endings is to be found in the lexicon, whereby lexical words gradually lose their independent character, lexical meaning, and original sound structure before they turn into affixes. Whitney (1875) described the genesis of grammatical forms in a similar way, referring for instance to the past tense inflection in English *–ed* having developed from a free form meaning 'did,' or the French future inflection *-ai*, as in *donner-**ai*** '(I) will give' having derived from the present form of *avoir* 'have.'

Meillet (1912) saw grammaticalization as one important principle of grammatical change besides analogy. He not only applied it to the evolution of inflections and function words but also included the functionalization of word-order in his studies (for a rejection of this concept see Heine and Reh, 1984). Unfortunately, he also provided examples that are not instances of grammaticalization, but rather belong to the field of lexicalization (*hiu tagu* 'on this day' > *heute* 'today'). This is a case of univerbation, the result of which is not an element of grammar, but a new lexical unit (see section on Grammaticalization and Lexicalization below). Discussions about the relationship between lexicalization and grammaticalization have become very prominent recently (Moreno Cabrera, 1998; Lehmann, 2002).

In the first two decades of the 20th century it were especially the Indo-Europeanists who applied the concept of grammaticalization to the evolution of the inflectional categories of Indo-European languages. Such approaches had a strictly diachronic orientation. When structuralism came up, and later generativism, studies in grammaticalization declined. Diachronic processes were no longer the center of interest, and the concept of grammaticalization synchronically challenged their fundamental theoretical constructs, such as the discreteness of categories and the autonomy of syntax.

An enormous renewal of interest in grammaticalization studies began only in the 1970s in America, probably with Givón's paper entitled, 'Historical syntax and synchronic morphology: an archaeologist's field trip,' containing the famous slogan "today's morphology is yesterday's syntax" (Givón, 1971: 413). In Germany in the 1980s, works on grammaticalization within the Cologne Project for the Study of Language Universals promoted a revival in this concept of grammatical change. Attention was mainly drawn to manifestations of grammaticalization in a wide range of languages and their consequences with regard to typological aspects or language universals.

Mechanisms Involved in Grammaticalization

The motivating factors for a grammaticalization process lie in the speaker-listener interaction. At the speaker's side it is the maximization of economy that leads to signal simplicity (see 'Phonetic Attrition' below) and the maximization of clarity or expressivity, resulting in innovation. In French, for instance, the negative particle *ne* has been reduced for economical reasons. On the other hand, speakers added semantically appropriate independent nouns to reinforce the negative meaning or make it more expressive. In Old French we find words like *amende* 'almond,' *areste* 'fish-bone,' *gote* 'drop,' *mie* 'crumb,' *pas* 'step,' *point* 'dot,' and others.

In the course of time, one of them (*pas*) has become the new grammatical predicate negator.

Listeners, on the other hand, have to cope with the innovation- and reduction strategies. They will always search for the most obvious interpretation, applying a particular mode of reasoning, namely 'abduction.' They proceed from the observation of a new structure and, on the basis of this, invoke a law. In the case of the French negation, they interpreted *pas* as the negative marker. At the same time other speakers might still have seen it as an optional emphasizer.

Other decisive factors for the triggering and continuation of a grammaticalization process can be found in the source meaning of the grammaticalized item itself, and also in changes in other subsystems of the language system. The source structures must imply some features of the target meaning and their semantic structure must be simple enough so that they can become schematized. Usually they are frequently occurring basic level terms. Temporal or aspectual grams (or grammemes) mainly derive from movement verbs (*go, come*) or verbs of physical state (*sit, stand*). Prepositions or conjunctions often have their sources in body part items (*after, in front of*). Other frequent sources are natural phenomena (*earth, sky*), human items (*person, father*), mental process verbs (*know, think*), quantifiers, and demonstratives (cf. Heine *et al.*, 1991).

The whole process of grammaticalization combines a number of certain general principles and mechanisms of language change. They can be considered as universally involved in the evolution of grammatical forms, as has been attested by studies on a wide range of languages. Only in their interaction they result in the codification of grammar.

Specific Mechanisms

Pragmatic Inferencing The abduction process leads to syntactic reanalysis. This, however, is accompanied by semantic changes. The new meaning, which is going to be grammaticalized in further development, may arise as a conversational implicature. These implicatures are invoked in particular linguistic contexts due to innovations by the speaker. They are pragmatic phenomena (*see* **Pragmatics: Overview**) that are based on lexical meaning and arising from *speech act* maxims, such as the maxim of extravagance (cf. Haspelmath, 1999). Speakers use explicit formulations in an unusual way in order to catch the attention of the audience. By this unusual use linguistic items can become ambiguous and receive alternative interpretations in the given context. Through frequent use in such contexts, these conversational implicatures can become conventionalized and turn into semantic features of the linguistic item that is undergoing the change. The new meaning now comes to be an integral part of a polysemous word. Thus, grammaticalizing items usually undergo a semantic change that leads from ambiguity to polysemy. Such semantic change is not confined to grammaticalization. However, here it always goes in the same direction. The implicature is more abstract than the original meaning, which allows a wider range of contexts in which the item can be used.

Metaphor/Metonymy There are two types of pragmatic inferencing: metaphor and metonymy. In metaphorical processes a term denoting a more basic or concrete entity is used to signify a more abstract one. This semantic change can be described in terms of transfers across conceptional domains. (cf. Heine *et al.*, 1991). The new meaning is not present in the context of the former use, but the inference is based on similarity between the concepts. This is, for instance, the case when body part terms are used to denote an abstract local position.

With metonymy, the new meaning is present in the context. It is based on contiguity. In the sentence s*he is going to the window,* a movement in progress with a local direction is expressed. In *she is going to open the window,* the movement in progress is directed on an action. This context contains a posterior or future event understood as part of the situation. Through frequent use in similar contexts, this implicature was conventionalized in English, and the meaning of posteriority or futurity became an integral part of the construction *be going to*. Most grammaticalization processes involve metonymical inferences.

Semantic Bleaching The semantic change of the lexical item to be grammaticalized is one of generalization of meaning, or bleaching. Since grammatical units refer to very abstract concepts, such as temporal relations (past, future) or case relations (possession, goal), the items to denote these concepts must acquire a very general meaning (English *–ed* meaning 'past,' English *of* meaning 'belonging to'). Semantic bleaching occurs with all grammaticalization processes on the propositional level at the first stage, i.e., with the functionalization of lexemes, when for instance the English lexical verb *have,* meaning 'possess', changed into an auxiliary to denote anteriority. At the second stage, the affixation stage, a further semantic change usually does not occur.

Grammaticalization processes on the discourse level, which can also be called 'pragmaticalization,' involve a semantic change of subjectification. This can be found, for example, in the evolution of evidentiality markers or modal particles.

Morpho-Syntactic Reanalysis Each process of grammaticalization that includes a categorial change involves a morpho-syntactic reanalysis. The reanalysis modifies the underlying representations, as in:

(2)	*she*	[*is going*]	[*to the policeman*]			
	she	[*is going*]	[*to ask the policeman*]	> *she*	[*is going to*]	[*ask the policeman*]
	Subj	Verb	Complement	> Subj	Aux	Verb + Object

Analogy The syntactic reanalysis cannot directly be observed, but becomes apparent only through modified surface manifestations, which are the result of analogy, or rule generalization. Analogy itself does not affect rule change; it concerns the rule spread within the linguistic system and within the community. Once reanalysis has occurred, the new grammatical construction can spread to other linguistic contexts. In the case of *be going to,* it can now be followed by a verb phrase that is incompatible with the former movement meaning of *go*, as in *she is going to receive a letter.* It can even combine with on-agent subjects, as in *it is going to rain*.

Phonetic Attrition Phonetic attrition results from the maximization of economy by the speaker in oral conversation. It particularly affects linguistic items that have undergone grammaticalization. Due to their rather abstract meaning, they have a lower information value than lexical words, which is often reflected in a weaker phonological form. It has turned out that when a lexical form splits into two uses (see 'Divergence' below), the lexical unit retains its full phonetic form, whereas the functionalized item undergoes phonetic reduction, as in *one* vs. *a(n), is going to* vs. *gonna*. Phonetic attrition can finally contribute to the renewal of a grammaticalization cycle. This obviously happened with the Old Germanic predication negator *ne*, which eroded completely in the Germanic languages and was replaced by other negators like English *not* or German *nicht*.

General Principles (cf. Hopper, 1991)

Layering A newly grammaticalized item does not necessarily replace an older one in the same functional domain. Similarly, it is not necessary that an older form must die out to initiate renewal. Instead, new grammatical strata are continually emerging, and older layers may well co-exist with new layers within the same functional area. For example, the old way of marking the past tense by changing the stem vowels in English (*sing – sang*) exists side by side with the new mode of past formation by adding a dental suffix (*work – worked*).

Divergence When a lexical form undergoes grammaticalization, it typically develops an additional use of the item side by side with the original lexical form before it splits into two different items. Thus the English indefinite article *a* is the result of the grammaticalization of the Old English numeral *ān*. In Middle English it split into the numeral *one* and the new article *a*. This principle of divergence is often the reason why an incipient process of grammaticalization that did not go to completion is taken for a reversal.

Specialization At the initial stage of grammaticalization, a particular lexical item often stands in free variation with a whole range of other forms with slightly different semantic shades (cf. Lehmann's (1985) parameter of paradigmatic variability below), which can all serve a similar communicative function. As grammaticalization proceeds, the number of possible choices is gradually narrowed down and one specific item, which has become more general in meaning, is specialized for this particular function. With increasing specialization, the chosen item finally becomes obligatory: speakers are no longer free to choose it in a particular context, but the context forces speakers to use it. This happened, for example, with the French negator *pas*, which in Old French was still used among other competitive words, as mentioned above, to intensify the predicate negation.

Persistence After the process of grammaticalization has taken place, traces of the original lexical meaning or of the original grammatical constraints of the source unit persist in the new abstract grammatical meaning. They relate it to its former history as a lexical unit. So one of the meanings of the future marker *will* in Modern English is still that of willingness or intention, the source meaning of the lexical verb *willan* in Old English.

Decategorialization At the beginning of grammaticalization chains, an element of a major category with discourse autonomy (cf. Hopper and Thompson, 1984), especially a noun or a verb, often loses this categorial autonomy and is downshifted to a secondary category, such as a preposition, conjunction, or complementizer. It tends to lose the morphological and syntactic properties that would identify it as a full member of the former major category (from Hopper, 1991: 30):

(3) our thanks were accepted by the mayor – **thanks** to his generosity

For a critical approach to decategorialization see Lehmann (2002), who did not necessarily treat the

genesis of minor word classes as an instance of grammaticalization. He distinguished, for instance, between more lexical and more grammatical adpositions, arguing that complex prepositions and conjunctions do not indicate incomplete grammaticalization processes; they are simply products of lexical change.

Grammaticalization from a Synchronic Perspective

From a synchronic perspective, linguistic units are ordered along a continuum between relatively unconstrained lexical and more constrained grammatical structure. They exhibit a certain degree of grammaticalization. According to Lehmann (1985), this degree of grammaticalization can be determined in terms of six paradigmatic and syntagmatic parameters. Each of these parameters corresponds to a specific process in the diachronic dimension of grammaticalization:

(4) Paradigmatic Parameters:

(a) integrity	↔	phonetic/semantic attrition
(b) paradigmaticity	↔	paradigmaticization
(c) paradigmatic variability	↔	obligatorification

Syntagmatic Parameters:

(d) scope	↔	condensation
(e) bondedness	↔	coalescence
(f) syntagmatic variability	↔	fixation

Thus (a) high integrity (little semantic and phonological substance) is a sign of strong grammaticalization compared to phonological and semantic complexity, which hint at a lower degree of grammaticalization (compare the prepositions *of* versus *in front of*). If (b) the item belongs into a small, tightly integrated morphological paradigm, rather than participating loosely in a semantic field, this would be an instance of strong grammaticalization, like for example the articles *the* and *a*, which form a closed class in English. Such items usually expose (c) low paradigmatic variability. Their use is largely rule-governed. If they instead allow a free choice according to communicative needs, it is an indicator of weak grammaticalization, as in Old French, where we still find a number of variable items to negate a sentence (*pas*, *amende*, *areste*, *gote*, *mie*, *point*,...; cf. 'Specialization' above). The (d) criterion of scope is somewhat controversial. While prototypical cases of strong grammaticalization usually have a narrow structural scope (case markers, classifiers, tense/aspect/mood markers, etc.), there are other items with a wide scope, such as complementizers or discourse markers, which may govern a whole clause or even modify a whole proposition (Bybee, 1985). The parameter of (e) bondedness relates to the fact that bound morphemes (affixes) are stronger grammaticalized than free items. (f) low syntagmatic variability (if the item fills a fixed slot in the syntactic structure) is similarly an indicator of a high degree of grammaticalization.

Unidirectionality

Well-established in diachronic perspectives of grammaticalization, though hotly debated, is the assumption that the change from less grammatical to more grammatical forms is irreversible. So it is argued that grammaticalization clines, like (5), cannot be reversed:

(5) lexeme > function word > clitic > inflection > zero

That means that a grammatical item, whether free or bound, cannot gradually gain in semantic complexity, pragmatic significance, syntactic freedom, and phonetic substance.

The concept of unidirectionality is not only based on extensive empirical evidence, but also on a number of theoretical considerations:

1. The generalization of meaning allows the use of the grammaticalized item in more and more contexts (*go* meaning 'to move' can only combine with agent nouns and directional complements, but *be going to* with a future meaning can take all kinds of subjects and verb phrases). A reversal of generalization would restrict the number of contexts and gradually increase the constraint in the environments of a form, which is very unlikely for a linguistic item that has reached a certain degree of abstractness and general use;
2. Decategorialization, the shift from major categories to minor ones (N > Preposition/Conjunction, V > Auxiliary/Preposition) is much more frequent crosslinguistically than its opposite. Alleged counterexamples to decategorialization are simple instances of conversion (*the ups and downs*) or secretion (*an ism*). These are the result of rather conscious, spontaneous word formations, and not of gradual degrammaticalization processes. Degrammaticalization is virtually impossible, because speakers have only limited conscious access to functional elements. Thus it is very unlikely that they should use them in place of less grammaticalized ones (cf. Haspelmath, 1999).
3. If the semi-modals *dare* and *need* seem to develop in the direction of lexical verbs today, this is no evidence of a reversal of grammaticalization. It only shows that changes need not go all the way to completion. According to the principle of divergence, the former lexical verb and the new

auxiliary-like form can coexist for quite a long time. In such a situation, it is possible that the innovative use cannot get hold in the language community and is finally given up. What looks like a reversal is just an incomplete change.

Still, most scholars acknowledge that exceptions to the unidirectionality hypothesis exist. One well-known potential example is the English possessive *–'s* morpheme. It seems to have developed from an inflection in Old English to a clitic in Modern English. If this was indeed the case, it must have gained in syntactic freedom, and we have a clear counterexample to the grammaticalization cline. However, there remain doubts about what really happened after the decay of the inflectional case system in English. One possible explanation could be that in the functional renewal process, the former genitive inflection *–s* was reinterpreted as a possessive marker and, supported by pronominal possessive constructions like *the king his castle,* was exapted into the function of a possessive clitic (on exaptation see Lass, 1990).

Since almost nothing is exceptionless, there might of course be instances of language change that run counter to the general grammaticalization cline. However, such occurrences are extremely rare compared to the large number of cases that support the unidirectionality claim.

Grammaticalization and Lexicalization

While grammaticalization is concerned with the development of grams, lexicalization refers to emerging lexemes. Both processes in general are not at all contradictory or mirror images, and we cannot say – as some people believe – that lexicalization is the reversal of grammaticalization. On the contrary, both processes have much in common. They just operate on different levels of the language.

Grammaticalization and lexicalization both usually involve reductive processes, which lead to an increased phonetic integrity. Morpho-syntactic reanalysis can be part of both a grammaticalization- and a lexicalization process. Semantically, however, the processes differ in that grammaticalization reduces the semantic complexity, resulting in a more abstract meaning, while lexicalization adds semantic components to make the meaning more specific. For example, *blackbird* comes to denote a specific type of bird and not just any kind of black bird (in this case it need not even be black). With increasing demotivation, the new sign becomes conventionalized and can no longer be processed analytically.

It is even possible that grammaticalization and lexicalization occur together in a given case: the Early Modern English discourse particle *methinks* 'I think' had derived from a once productively formed, impersonal construction by fossilization, conventionalization and partly demotivation (since impersonal constructions had become unproductive by that time). It therefore had changed into a symbol, a formula, and as such it had to be stored as a whole entity in the lexicon. The newly developed 'lexeme,' however, is classified as an adverb. Syntactically it operates as a disjunct to mark evidentiality. As such a discourse marker, it belongs to a relatively closed class of linguistic elements. So the new sign has immediately taken over a grammatical function on the discourse level and is thus grammaticalized.

Grammaticalization and Language Contact

Grammaticalization processes appear to be extremely productive in language contact situations, where such developments proceed faster. It has been noticed that under contact conditions affixes are often dropped, and new periphrastic constructions emerge. This seems to be brought about by the particular communicative needs that require more transparent linguistic means. For example, the erosion of the genitive and dative case inflections in Late Old English and Middle English, when English was in close contact first with Old Norse and later with Norman French, was accompanied by the increasing grammaticalization of the prepositions *of* and *to*. Thus the initiation of a new grammaticalization chain can be caused by particular communicative requirements.

However, it is also possible that specific features in the grammar of the contact language may interfere with a 'normal' grammaticalization process. A parallel category in a contact language may accelerate the evolutionary process of an emerging construction in the native language. Furthermore, a contact language may influence the source material or the particular path of grammaticalization.

Pidgin and creole studies are exceptionally attractive fields of research in the origin and development of grammaticalization phenomena. While pidgins can be characterized as pregrammatical stages of a language, relying basically on lexical words with a high degree of context dependence, in creoles the emergence of a new grammar can directly be observed. It has turned out that the processes of organization and coding of grammatical categories in the various pidgins and creoles of the world show significant parallels.

Current Trends in Grammaticalization Studies

During the last two decades, the amount of research within the framework of grammaticalization has

increased enormously. Numerous books and articles have been published and conferences are held regularly on the topic. Several collective works (Pagliuca, 1994; Giacalone Ramat and Hopper, 1998), conference volumes (Traugott and Heine, 1991; Wischer and Diewald, 2002; Fischer *et al.*, 2004), and even a *World lexicon of grammaticalization* (Heine and Kuteva, 2002) have appeared.

Among the topics that attract particular attention today are theoretical and terminological questions concerning the relationship between grammaticalization, lexicalization, and the problem of unidirectionality; the role of contexts in the process of grammaticalization; and the study and description of the paths of grammaticalization of individual linguistic items in various languages of the world. Many empirical works are based on large text corpora of spoken or written language (cf. Bybee *et al.*, 1994; Rissanen *et al.*, 1997).

While earlier studies focused to a great extent on central or traditional grammatical categories, such as tense, aspect, or case, much of the current work is done in formerly more or less neglected areas of grammar, for instance, discourse markers, honorifics, or classifiers. A further new tendency that has emerged is the aim of confronting and integrating grammaticalization theory with other theoretical works in descriptive and historical linguistics, such as philosophically and philologically oriented frameworks of language change, cognitive approaches, or even generative grammar (cf. Roberts and Roussou, 2003).

Although grammaticalization theory attracted occasional criticism, mainly from generative or traditional scholars (Newmeyer, 1998; Campbell, 2001; Joseph, 2001) who regard it as an epiphenomenal result of independent processes, the data which have been examined constitute convincing evidence that the mechanisms and principles involved in grammaticalization conform to a complex process of coding and organization of language, which is universally applicable to describe the evolution of grammatical forms.

See also: Abduction; Lexicalization; Metaphor and Conceptual Blending; Metonymy; Pragmatics: Overview.

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Grammatology

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Grammatology comes from Greek *gramma,* 'written sign,' pl. 'writing, book, text,' a neologism from I. J. Gelb (1952), who studied writing systems as such. It is used by the late French philosopher Jacques Derrida (1967a) in a work that gave rise to a special form of philosophy of language influenced by Heidegger's critique of metaphysics, Saussure's semiology, Lacan's psychoanalysis, and French structuralism (*see* **Heidegger, Martin (1889–1976); Saussure, Ferdinand (-Mongin) de (1857–1913); Lacan, Jacques (1901–1981); Structuralism; Discourse, Foucauldian Approach**). The term is sometimes used to designate further developments of Derrida's critical philosophy, and is then almost synonymous with 'deconstruction' (*see* **Poststructuralism and Deconstruction**).

Grammatology is thus a philosophical and historical reflection on the general features and effects of the semiotic phenomenon called writing (*see* **Writing and Cognition; Semiosis**).

Writing and the Voice

Literally designating the study of writing and writing systems, the term *grammatology* is taken here in the specific sense introduced by Jacques Derrida. In his critique of what he calls "Western Metaphysics" – which is for him an overall format of thinking based on the reference to Presence and Consciousness – a phenomenological distinction is made between writing and speech; the latter (as opposed to the former) is seen as the source of a significant experience of agency, an experience that lets the speaker feel and believe that the meaning of his utterance is as present to him as the sound of his own voice. In his reading of Husserl (especially the first of the *Logische Untersuchungen,* 1900–1901), Derrida (1967b) thus assumes that this experience of orally accessible 'presence' of meaning is constitutive in phenomenology altogether as a philosophy of Consciousness, as evidence of the 'presence' of consciousness to itself, and as a tie linking the voice and the phenomenon (*see* **Husserl, Edmund (1859–1938)**). The phenomenon in general is as 'near' and 'immediate' to the conscious subject as is the meaning of a spoken word or utterance, because the auto-acoustic experience of the speaker's own voice makes the expression of this meaning appear 'close' to him, so that the subject can know it as an 'immediately' appearing phenomenon.

The concept of consciousness as intention and intentionality is thus for Derrida a construction linking the phenomenon and its intentional (intended) meaning on the grounds of the voice. Western culture has privileged this experience by its phonetic writing, Derrida thinks. Written culture therefore has conserved the oral illusion of self-consciousness and made it a dominant feature of its philosophical idealism, its all-pervasive ideology or metaphysics: logocentrism. Nevertheless, writing remains different from speech; written language is never exactly identical to spoken language, even if it simulates it. Written texts have meanings that are different from those we find when we believe in this simulation, that is, when our reading follows the instructions of the simulated voice of someone who apparently wants to speak to us. But if the exteriorization performed in manifested speech is comparable to and inseparable from that of written language – if it is true, in a certain sense, that we always 'write,' even when we speak – then speech also turns out to be a sort of writing and therefore should distort the idea of the interiority of experienced meaning as much as literal writing does. Because of the exteriority of the written linguistic expression, we can never really phenomenologically 'experience' and 'know' what we are saying (indeed: writing), even if we do feel that we know what we want to say. Therefore, conscious intuitions about the meaning of 'online' expression cannot be trusted.

This grammatological argument of writing is used in order to 'deconstruct' metaphysics as a philosophy

of consciousness. Thinkers who have felt the threat of writing have discussed the graphic problem in terms of a subversive corruption of the pure and present oral expression by the impure and morally dangerous writing, and have thus opposed the vivifying 'living word' to 'dead letters,' or the true voice to the false written signs; or even the good voice as opposed to the evil writing. The uneasiness about writing and the writ can be found throughout theological, pedagogical, epistemological, and linguistic discourse. It has inversely, through a critical and 'deconstructive' interpretation of this kind, inspired a 'subversive' style of thought and a general negative and skeptical attitude to any values, principles, and possibly positive contents of consciousness that might be found in human discourse.

In Jacques Lacan's version of Freudian psychoanalysis, the deconstructive attitude is matched by a radical rejection of ego-psychology and other theories based on a self as representative of a stable, conscious 'I' (*see* **Psychoanalysis and Language**). In literary criticism, this militant antiphenomenological way of thinking has given rise to a deconstructionist style of reading, a trend in interpretation that considers the quality of literature to depend on its importance as a subversive antimetaphysical activity (Bloom *et al.*, 1988). It may be recalled that Roland Barthes already had distinguished 'style' and 'writing' along similar lines: 'style' is reactionary; 'writing' is militant and revolutionary (Barthes, 1953) (*see* **Pragmatics of Reading; Barthes, Roland (1915–1980)**).

However, the problem of understanding the difference between speaking and writing (in French, *l'écriture*) is not only a literary and philosophical issue concerning subjectivity and the first person; it is also important to linguistics and semiotics in that it concerns the very concepts of sign, signifier, enunciation, and language.

Writing and the Sign

Whereas most linguists maintain the Aristotelian view (*De interpretatione*: 1) that the written sign is a signifier of the signifier, and written words are the symbols of the words pronounced by the voice, the Danish linguist Louis Hjelmslev (1943) claimed that the distinction between form and substance on the level of expression should neutralize the difference of substances (here, voice versus writing), since only the immaterial form is or should be relevant to linguistic analysis (*see* **Copenhagen School**). Nevertheless, Hjelmslev continued to think of phonology as the proper formal representation of linguistic expression. Ferdinand de Saussure had vigorously followed Aristotle, but as Derrida (1967a) remarks, he not only on the one hand criticizes the phonetic deformations of words by the 'perverse' effect of writing, but on the other also describes the phonetic system of differences, which is essential to his concept of language as a sign system, as being analogous to a system of letters: writing is thus both alien to authentic language and a good model for it!

Derrida concludes that this ambiguity follows from Saussure's grounding belief in the sign as a basic unit, a belief Derrida characterizes as due to a 'theology' of the sign inherent in Western metaphysics (*see* **Sign Theories; Saussure, Ferdinand (-Mongin) de (1857–1913)**). In this 'semio-theology,' there is an interior meaning and a nearly interior (vocal, oral) expression of that meaning, and then an entirely exterior (written) expression of that first expression – and this secondary expression is a deformation of the primary one, a sort of sinful, fallen version of a signifier that originally was pure. Still, even in this view, phonology is 'like' writing, so the fallen seems inscribed in the pure in some strange way (also called 'arch-writing'). Of course, the 'purest pure' would be the entirely interior meaning existing before any sign let it 'fall' out into the world. This is essentially what Derrida sees in semiology: a belief that meaning is some spiritual substance that 'falls' into the world through the sign. He refers to this reading of semiology as a deconstruction of it. The very term *deconstruction* implies that the 'subversive' and ridiculing analysis of a concept or a doctrine will not be followed by any presentation of a constructive alternative. Instead, it invites a noncommitted skepticism.

The critique of the sign inspired by Derridean grammatology (Kristeva, 1969; Barthes, 1978; and others; see also Eco, 1984) generally accuses linguistic semiology based on Saussure (1962) of postulating a rigid, systemic foundation of meaning. A sign that contrasts another sign will have stable differences of meaning, anchored in stable differences of expression. Instead, the consideration of writing introduces, it is assumed, a dynamic, processual, and plastic view of language as a continuous production of meaning, fueled by the materiality of the signifier and by its unstable and ever-changing relation to other signifiers: its 'differance' (process of differing) as opposed to the static notion of 'difference' during the textual unfolding of symbolization. The model is often Freudian psychoanalysis, in which meaning is seen as emerging independently of the sign function and instead driven by the dynamics of an unconscious desire. Eco, who rejects differance in this sense, recognizes the need for a dynamic view of meaning and suggests that the sign has a built-in interpretative dimension, including inference, and that the use of entrenched codes in stable sign systems makes the

process of interpretation invisible but not absent (*see* **Eco, Umberto (b. 1932)**). The process is possibly but not necessarily stable, and never static. This is perhaps a rationalist's reply to an overtly anti-rationalist critique, but it leaves a question unanswered: How can there be two foundations of meaning, one – the sign function – assuming a code and another – writing – assuming its absence? The grammatological supplement would ask: how is it that 'code' happens to be a reference to writing (a book, codex)?

There may be other ways to set up a semiotics of writing. Here is one (cf. Harris, 1995): Since, for example, musical scores and mathematical formulae are equally 'written,' we might say that to write is in general to produce a list of mental instructions. These do not have to refer to language at all. But they can, and often do. Phonetic writing instructs the reader what to 'say' in order to present 'what the text says.' Correspondingly, musical writing lets us play what a 'text,' the score, instructs us to play, instead of playing our own music. Writing eliminates the performer's own 'voice' or enunciation and replaces it by some other instance's 'voice,' be this instance a person, an institution, or even a supernatural being. Hence the possible religious meaning of writing: the religions of the book let their sacred texts 'speak' to the believers from eternity.

In this perspective, literary writing exploits the grammatological possibility of expressing possible or just imaginable thoughts, feelings, and meaning patterns in general, without sealing the (textual) utterance by an author's biographical signature and personal identity. In this sense, it offers human minds the possibility of being 'others to themselves' in what they write, and to construct or reinvent their subjectivity rather freely. This is an important resource for all sorts of discourse where imaginative unfoldings are welcome. Therefore, it seems natural for literary writers and scholars to emphasize the 'subversive' aspect of writing (*see* **Narrativity and Voice; Literary Pragmatics**).

Writing and Subjectivity

Since literary texts imply a voicing that departs from the biographical subjectivity of a 'speaker' and thus allow a constructed, artificial enunciation, the meaning of such texts is not anchored in the given subjective conjunctures of their situation of production. This meaning therefore depends mainly on more general cultural contexts and their relevance to the linguistically given and its internal semantic structure. They have no definite pragmatics: there is no intending subject outside the text and no situation in which an utterer could intend anything, so all that remains is the structure of the written instructions for building up a meaning, a semantic whole, framed by the texts themselves. This is the challenge that gives rise to a structural semantics (Greimas, 1966) (*see* **Semantics–Pragmatics Boundary**). Texts are seen as containing abstract roles of sender and receiver (*destinateur, destinataire*), besides the narrative or otherwise structured discursive content. Such 'ghost speakers' in texts can carry simulacrums of feelings, beliefs, and attitudes of all kinds that contribute in essential ways to the final meaning of their literal purport (as in irony) (*see* **Irony**). In this sense, human phenomenology of emotions and so forth can be studied through systematic simulations, and psychology can be enriched by contributions from this 'experimental introspection' that literary works offer real readers for consideration or identification.

Anthropologically speaking, the absence of a personalized speaker often assigns authority to the written volume, be it a body of law, of knowledge, or of myths. The speaker is then an abstract, supernatural 'voice.' The textual volumes (rolls, books) are then often interpreted as 'bodies' and treated as precious immaterial beings, incorporated in costly material shapes that call for sacralization and worship, like relics. The precious volume of the writ is easily taken for a divine or diabolic or other supernatural fetish (cf. Borges, 1975). Even in modern Western cultures, oaths are taken on the material volume of sacred books, holy writs; even in profane political cultures embodying the volume of the nation's constitution is a revered book. The Book in general is felt as a transcendent body, a *corpus gloriosum*. Negatively, this phenomenon appears in the fears that provocative books produce and in books' subsequent treatment: They are still being burned in public, according to the principles introduced by the Inquisition, in the same spectacular way in which heretics were burned.

The powerful impact of language embodied in the written volume is manifest in literature, in science, and in religion. Grammars and dictionaries are less powerful in this emphatic sense, but still authoritative. The normative regulation of a language seems importantly dependent on such authoritative books and their inherent impersonal force of the speech acts involved (*see* **Speech Acts**). When new words or expressions are 'officially' adopted by a national language after having been used by reputable authors, they are inserted, accompanied by appropriate quotations, in these normative volumes, and this event sanctions them as worthy of being copied. Oral language use can differ drastically from the written norm without giving rise to any such change in respected norms, whereas literary writing, as quoted

in these normative books, is often the main source and argument for making terms or constructions accepted. This is well illustrated in French linguistic culture (*le bon usage*). In the Arab world, normative language control is an explicitly and directly religious phenomenon.

Writing and Technology

The Chinese wrote on paper in the 1st century B.C., and this new product replaced silk and bamboo in Turkestan in the 3rd century A.D. The Arabs learnt to use paper for writing in Samarkand and brought it to Spain in the 9th century; in the 12th century it was known in Italy; in the 13th in Germany; and in the 14th in England (Etiemble, 1985; Carter, 1955). Paper production in Europe developed a little later. During the Tang Dynasty (618–907), printing was practiced in China for magical and pedagogical purposes; the printer Wang Jie is known by his signature on a book from 868. In the 9th century, Feng Dao printed a first classical edition of Confucius (on wood). The Mongols carried the technique to Christian Europe at the time of their invasions. But the Koreans used iron plates around 1400. Gutenberg's (1400–1468) merit is to have understood the importance of this technique: He perfected ink and paper quality and made it possible to print on both sides with metal types. His first work was, of course, a Bible.

The Canadian Marshall McLuhan (1911–1980) declared in 1962 that the civilization of the book was anachronistic, and that the new electronic media would soon found a new type of world civilization, a 'global village' based on ultrafast transmission of information. The American G. L. Ulmer (1985, 1989), commenting on McLuhan, quotes Derrida: "this death of the book undoubtedly announces nothing but a death of speech and a new mutation in the history of writing, in history as writing . . . a new situation for speech, of its subordination within a structure of which it will no longer be the archon" (1967a: 18). Ulmer refers to Heidegger's critique of technology and recalls Derrida's term 'closure': there is no end of the book, but a closed era of linear writing, technologically submitted to speech. Beyond that closure, writing now displays a nonlinear force in aesthetics, and in particular in the visual arts as developed in the age of video and telecommunicated visuality, a force that he believes will trigger an ontological revolution against oral Presence (*see* **Cognitive Technology**).

In the contemporary world, computer technology is the predominant determinator of 'written' communication. It probably induces deep changes in human relations at all levels. The interface between man and machine has made the classical monological writing scene into a written dialogue between users, so, grammatologically speaking, instead of deconstructing Presence, this new screen-to-screen (instead of face-to-face) communication appears to expand the realm of intersubjective Presence.

The codes in which computer programs are written are metaphorically called 'language,' so human idioms are now often considered to be instances of 'natural language,' as if they were special variants of this basic operative writing, and not the other way round. The prestige of computer technology is so high that programming is about to become a crucial social activity – and its agents about to become the new, powerful 'masters of writing.' Correspondingly, forms of computational terrorism, of truly lethal violence obtained by writing programs multiplying destructive 'viruses' that destroy information, have developed (*see* **Adaptability in Human-Computer Interaction**).

Postscript

Writing is the most important semiotic factor in human civilization and its cultures. It conveys language across distances in space and time, and it defeats death in the elementary sense of allowing us to know our ancestors' thoughts and feelings in detail. Therefore, writing attracts philosophers' attention as much as it appeals to text-oriented linguists. From the grammatological speculations, prophecies, and debates, all intellectuals may learn that writing in general in fact constitutes a culturally necessary supplement to language, the manifestation of a symbolic dimension in human life that stays as difficult to understand, and even to tolerate, as ever, but also is as fundamental as ever in the human world of meaning.

"It is a striking paradox that the Western academic tradition, which has relied so extensively on writing – as opposed to oral transmission – for its very existence, has so far produced no comprehensive theory of writing itself." These are the opening words of the British linguist Roy Harris, whose book on the subject (1995) is, after Gelb, the first theoretically explicit and semiotically informed account of the semiology of writing. Harris shares Derrida's critique of 'logocentrism' as a pervasive European depreciation of all aspects of writing that cannot be treated as direct reflection of the spoken word; but then, instead of 'deconstructing' it, Harris suggests an empirically open-ended analysis of the culturally known processes of writing, whether related or unrelated to language, and offers a new and fresh start for the discipline of grammatology.

See also: Adaptability in Human-Computer Interaction; Barthes, Roland (1915–1980); Cognitive Technology; Copenhagen School; Discourse, Foucauldian Approach; Eco, Umberto (b. 1932); Heidegger, Martin (1889–1976); Hjelmslev, Louis Trolle (1899–1965); Husserl, Edmund (1859–1938); Irony; Lacan, Jacques (1901–1981); Literary Pragmatics; Narrativity and Voice; Poststructuralism and Deconstruction; Pragmatics of Reading; Psychoanalysis and Language; Saussure, Ferdinand (-Mongin) de (1857–1913); Semantics–Pragmatics Boundary; Semiosis; Sign Theories; Speech Acts; Structuralism; Writing and Cognition.

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Graph Theory

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A graph is a structure consisting of a set {v1, . . . ,vn} of objects and a set {e1, . . . ,en} of relationships between these objects. Objects are generally referred to as vertices or nodes; relationships as arcs or edges. Graphs are most commonly represented as diagrams in which vertices are depicted as points and edges as lines joining vertices, as shown in **Figure 1**.

A graph can be used to represent any situation that involves discrete objects and relationships defined among these. The type of graphs that have proved most useful in modeling natural language are hypergraphs that are rooted, connected, directed, and acyclic. Graphs that are rooted, connected, directed, and acyclic have a single root vertex from which every other vertex can be reached, and contain directed edges with no cycles. Hypergraphs are graphs whose edges connect more than two vertices, e.g., e3 in **Figure 1.** Graphs that have these properties are particularly effective in accommodating the hierarchical and reentrant (structure sharing) character of natural language constructs. For example, the structure of a sentence can be effectively described by a graph such as the one in **Figure 2,** where:

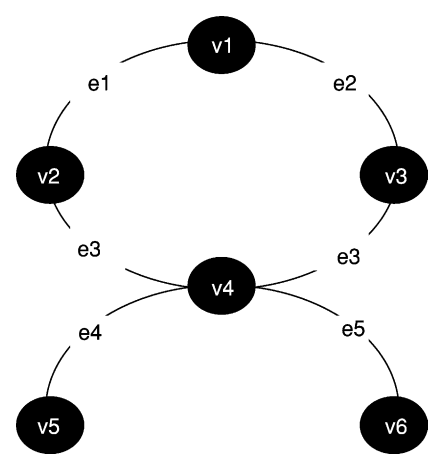

Figure 1 Example of graph.

- Vertices represent syntactic features and categories;
- Directed edges indicate functions defined over these features and categories;
- The convergence of the agreement edge from the noun [and verb] phrases into the agreement features vertex indicates that the verb and noun phrases must share the same values for person and number.

Graph theory underlies the theory of feature structures that has emerged as one of the most widely used frameworks for the representation of grammar formalisms, from the late 1970s onward. Some of the linguistic formalisms based on feature structure theory include functional unification grammar (Kay 1979, 1985), parse and translate II (Shieber *et al.*, 1983; Shieber 1984), lexical functional grammar (Kaplan and Bresnan 1982), unification categorial grammar (Zeevat *et al.,* 1987) and head-driven phrase structure grammar (Pollard and Sag, 1987, 1994).

Feature structures can be seen as a kind of labeled finite-state automata (Kasper and Rounds 1986, 1990) that specify graphs such as the one shown in Figure 2 For ease of representation, feature structures are usually depicted using an attribute-value matrix notation, where each bracketed grouping corresponds to a vertex in the graph-based description, each feature corresponds to an edge, and structure sharing is indicated with a repeated bracketed integer, as shown in Figure 3.

The main operations defined over feature graphs are subsumption and unification – for a comprehensive introduction to the theory of feature structures, see Carpenter (1992). Subsumption makes it possible to arrange feature structures into an inheritance hierarchy so that information that is common across linguistic objects need not be repeated. For example, properties that are common to all verbs (e.g., features such as tense and modality, and the presence of a subject) are specified once for a generic verb template and then inherited by specific verb templates (Flickinger, 1987; Sanfilippo, 1993).

Unification provides the means for integrating two feature structures into one feature structure. The unification of two feature structures is generally defined as a monotonic operation; the resulting feature structure contains all and only the information in the two feature structures. Such a definition of unification ensures that feature structures that have contrasting values do not unify, e.g., the agreement features of a singular verb phrase would not unify with the agreement features of a plural noun phrase.

However, a relaxation of monotonicity in graph unification may, in some cases, be useful. For example, most English verbs display strong similarities in their inflectional paradigm. It would therefore be useful to define a generic verb template from which all verbs inherit the same inflectional paradigm by default, and then let irregular verbs override inherited information which is incompatible. While appealing, default inheritance can be problematic if not used in a controlled manner. For example, it is well known that multiple inheritance can lead to situations difficult to resolve when conflicting information is inherited from parent nodes (Touretzsky *et al.,* 1987). Although a number of proposals have been developed to solve or obviate these problems (Gazdar, 1987; Carpenter, 1993; Copestake, 1993; Lascarides and Copestake, 1999), a general solution is still not available.

Two areas related to computational and mathematical linguistics where graph theory has had a strong impact include knowledge representation

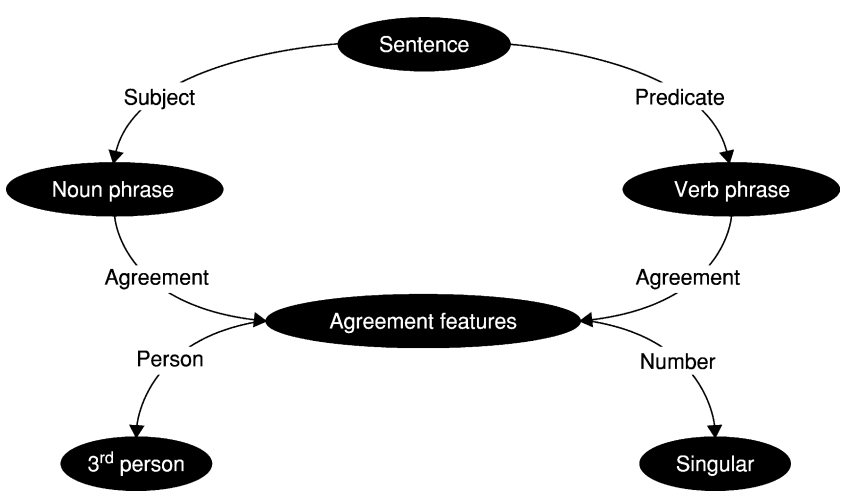

Figure 2 Graph representation of a simple English sentence such as *Hilary arrived.*

$$\begin{bmatrix} \text{sentence} & \\ \text{SUBJECT :} & \begin{bmatrix} \text{noun phrase} & \\ \text{AGREEMENT : [1]} & \begin{bmatrix} \text{agreement features} \\ \text{PERSON : 3rd person} \\ \text{NUMBER : singular} \end{bmatrix} \end{bmatrix} \\ \text{PREDICATE :} & \begin{bmatrix} \text{verb phrase} \\ \text{AGREEMENT : [1]} \end{bmatrix} \end{bmatrix}$$

Figure 3 Feature structure representation of the graph in Figure 2.

in artificial intelligence (Sowa, 1999; Brachman and Levesque, 2004) and social network analysis (Wasserman *et al.*, 1994; Scott, 2000). For a comprehensive introduction to graph theory and its applications see Gross and Yellen (2004).

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Grassmann, Hermann Günther (1809–1877)

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Hermann Grassmann, born on April 15, 1809, in Stettin, was a remarkable scholar because he distinguished himself as a brilliant mathematician, a linguist, and a Vedic scholar. He did theological and philological studies at the University of Berlin and taught himself mathematics as an autodidact. After passing the teacher's examination in those subjects, he taught at various grammar schools, from 1852 as his father's successor at the Marienstift in his hometown, Stettin, where he died on September 26, 1877. Apart from numerous philological and mathematical schoolbooks and other practical textbooks, he published studies on the theory of algebraic curves and on optics and color theory, discovered laws of tonal colors, and laid the foundations of vector analysis.

Disappointed by the lack of appreciation for his mathematical publications, beginning in 1849 he turned more and more to Indo-European and Indological studies. First, he familiarized himself with Sanskrit and particularly with its more archaic variant, the language of the Vedas. Immediately after the complete text of the Rigveda had been edited for the first time in 1861–1863, Grassmann set about compiling a dictionary for this most ancient Indo-Aryan text, even if at first only for his own use. He published his *Wörterbuch zum Rig-Veda* in 1872–1875 and thus created a valuable tool for generations of Vedic scholars. In order to expand it with regard to the interpretation of the text, he followed it up with a two-volume translation of the Rigvedic hymns in 1877.

The name Grassmann lives on in linguistics to this day with 'Grassmann's Law' (see Collinge, 1985: 47–61). As presented in a long article of 1863, this law concerns the deaspiration of the first of two aspirates in the sequence of two aspirates, either as initial and final root-consonants or as the initials of two successive syllables.

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Greece: Language Situation

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A well-known saying in Greek goes as follows: *η γλώσσα κόκαλα δεν έχει και κόκαλα τσακίζει - i γlosa kokala δen eçi ce kokala tsacizi* ('language does not have any bones and can break bones'). Interestingly, the word for language and tongue are the same, so in this case the reference to the spoken word is clear. The saying aptly reflects a widely held belief in Greece about the constitutive ('it can make things happen') and transformative power of language. Widely held views about the role of language in a community, often labeled as folklinguistics, are a valid and useful point of entry into local theories about communication. Another folklinguistic view in Greece involves the close link between language and culture which could be crudely summed up as follows: 'To be Greek you have to speak Greek.' This usually goes hand in hand with sentiments of pride for the language's continuity, which is by no means a fictional construction. Greek has undoubtedly got an

Grassmann, Hermann Günther (1809–1877)

R Schmitt, Laboe, Germany

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Hermann Grassmann, born on April 15, 1809, in Stettin, was a remarkable scholar because he distinguished himself as a brilliant mathematician, a linguist, and a Vedic scholar. He did theological and philological studies at the University of Berlin and taught himself mathematics as an autodidact. After passing the teacher's examination in those subjects, he taught at various grammar schools, from 1852 as his father's successor at the Marienstift in his hometown, Stettin, where he died on September 26, 1877. Apart from numerous philological and mathematical schoolbooks and other practical textbooks, he published studies on the theory of algebraic curves and on optics and color theory, discovered laws of tonal colors, and laid the foundations of vector analysis.

Disappointed by the lack of appreciation for his mathematical publications, beginning in 1849 he turned more and more to Indo-European and Indological studies. First, he familiarized himself with Sanskrit and particularly with its more archaic variant, the language of the Vedas. Immediately after the complete text of the Rigveda had been edited for the first time in 1861–1863, Grassmann set about compiling a dictionary for this most ancient Indo-Aryan text, even if at first only for his own use. He published his *Wörterbuch zum Rig-Veda* in 1872–1875 and thus created a valuable tool for generations of Vedic scholars. In order to expand it with regard to the interpretation of the text, he followed it up with a two-volume translation of the Rigvedic hymns in 1877.

The name Grassmann lives on in linguistics to this day with 'Grassmann's Law' (see Collinge, 1985: 47–61). As presented in a long article of 1863, this law concerns the deaspiration of the first of two aspirates in the sequence of two aspirates, either as initial and final root-consonants or as the initials of two successive syllables.

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A well-known saying in Greek goes as follows: *η γλώσσα κόκαλα δεν έχει και κόκαλα τσακίζει - i γlosa kokala δen eçi ce kokala tsacizi* ('language does not have any bones and can break bones'). Interestingly, the word for language and tongue are the same, so in this case the reference to the spoken word is clear. The saying aptly reflects a widely held belief in Greece about the constitutive ('it can make things happen') and transformative power of language. Widely held views about the role of language in a community, often labeled as folklinguistics, are a valid and useful point of entry into local theories about communication. Another folklinguistic view in Greece involves the close link between language and culture which could be crudely summed up as follows: 'To be Greek you have to speak Greek.' This usually goes hand in hand with sentiments of pride for the language's continuity, which is by no means a fictional construction. Greek has undoubtedly got an

impressively long history that spans about 3000 years. However, a blind adherence to this idea of continuity, often found in academic writings too, has at times obscured complex questions of language, ethnicity, and culture in favor of a simplistic narrative of Modern Greeks being the direct descendants of the Ancient Greeks and of a straightforward link between language and identity (cf. Tziovas, 2001). Though not unique to Greece as a modern nation-state, this link between language and a sense of collective belonging is exceptionally close in its case.

A terminological clarification is now in order: Amongst classicists, particularly in the Anglophone context, Greek tends to be reserved for Ancient Greek (Greek, Ancient) and is juxtaposed to Modern Greek. Outside academic circles, however, unqualified 'Greek' has earned its place in modern languages. At least 10 million people speak Greek as their first language in mainland Greece, and about 620 000 speak Cypriot Greek in Cyprus. There is also an increasingly large number of Greek speakers outside Greece, in various established diasporic communities, e.g., in the United States, Australia, Germany, but also in emerging professional and student communities, particularly in the Western world. Numerous studies have reported a high degree of Greek language maintenance for such communities, impressively so, particularly in comparison to the rapid language shift experienced by other linguistic minorities (see papers in Georgakopoulou and Spanaki, 2001). The active community support network, the role of the church, the close link between language and cultural identity, as presented above, and a romantic positive orientation to the homeland have all been implicated in this vitality of Greek. As a majority language in Greece, Greek is spoken alongside a number of established linguistic minorities (e.g., Arvanitika (Albanian, Arvanitika), a dialect of Albanian) which are undergoing a process of language loss and death (see papers in Alatis *et al.,* 1997), with the exception of the Turkish-speaking minority (in Thrace, Northern Greece) that is protected by the Treaty of Lausanne (1923). There are, however, several recent minorities (since the early 1990s) as a result of large-scale immigration, particularly from neighboring countries, e.g., Albania.

As a result of its long history, Greek exhibits an impressive coexistence of oral and literate traditions, including a cherished literary heritage, with two Nobelist poets in the 20th century. Even if numerous traditional genres are a dying breed (e.g., lament songs), the wealth of the language's oral tradition can nowadays be attested to in ordinary conversational exchanges, which are typified by an animated style of delivery that places emphasis on participation and empathy. This has been labeled by analysts as high-involvement style (Tannen, 1989). The frequency of storytelling and the value placed on a good (in the sense of well-performed) story as a display of the teller's communicative skill have also been noted (Georgakopoulou, 1997). Studies have also revealed ways of telling that were salient too in traditional genres, for instance, the importance of number three as an organizing principle in everyday stories, also found in folk songs.

Part of this impressive coexistence of the oral with the literate goes back to the language's long history of diglossia (dating as early as the Hellenistic period). In the emergence of Greece as a modern state in the early 19th century, diglossia involved the use of two varieties, a formal, purist variety (*katharevousa*) reserved for official and written purposes and an informal, low variety (*demotic*) reserved for spoken and informal occasions. This became a highly politicized and ideologically charged battle between two camps: katharevousa became the code of the conservatives, while demotic found ardent support from the left wing. The divisions started healing in 1976, when diglossia was officially abolished. In the aftermath of this abolition, what is currently known as Standard Modern Greek is based on demotic but presents numerous influences from katharevousa too (for details see papers in Alatis *et al.,* 1997; also in Georgakopoulou and Spanaki, 2001). Diglossia has bequeathed a certain metalinguistic awareness, at least to the speakers who are old enough to have been schooled in katharevousa. It is thus not uncommon for certain elements that stand out as katharevousa to be used for humorous and other stylistic purposes in various settings, e.g., the press.

In the modern world, Greek remains a lesser spoken and taught language. However, far from being marginalized or dispensable, even in contexts of acute globalization, such as computer-mediated communication and the Internet, the language is enjoying visibility and presence in a wide range of uses (see papers in Georgakopoulou and Spanaki, 2001) from email messages, which young Greeks are particularly keen on, to text-messaging, e-chats, and numerous cultural and academic websites.

See also: Cyprus: Language Situation; Greek, Ancient; Greek, Modern; Identity in Sociocultural Anthropology and Language.

Language Maps (Appendix 1): Map 138.

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Ancient Lexicography

Greek lexicography originated in the 5th century B.C. in the compilation of glossaries and in explanations of difficult words in the works of Homer and other authors. This glossographic activity flourished during the 4th and 3rd centuries B.C. in the philological school of Alexandria. The first attempt to compile a dictionary based on this tradition was made by Aristophanes of Byzantium in his work *Λέξεις* (*Lexeis*). In the 1st century A.D., the Alexandrian grammarian Pamphilos compiled a glossary, *Λεξικόν* (*Lexicon*), consisting of 95 books. Shorter versions of this work (epitomes) were produced by the grammarians Diogenianos (2nd century) and Hesychius of Alexandria (5th century) (edited by K. Latte, 1861). During the Byzantine era, Photios, Patriarch of Constantinople (9th century), compiled glossaries and etymological dictionaries. *Suda* (or *Suidas*) (10th century) is a combined glossary and encyclopedia (edited by A. Adler, 1928).

In Hellenistic times, after the conquests of Alexander the Great (4th century B.C.) the various Greek dialects were replaced by a common form of Greek (Koiné), which developed from the Attic dialect. In the 2nd century A.D. the Atticist movement, a reaction against the Koiné, required that good style entailed writing in the pure Attic dialect of the 5th and 4th centuries B.C., the language of the classical authors. In this tradition, puristic dictionaries were created for the first time, including words found in classical authors and neglecting words from the Koiné, the contemporary language. Such is the dictionary of Phrynichos. An exception is a synonymic dictionary, *Onomasticon*, by Ioulios Polydeukes (Pollux) (edited by E. Bethe, 1900).

Modern Lexicography

The Renaissance milestone for Greek lexicography is the *Thesaurus Graecae Linguae* (Paris, 1572) of Henri Estienne (or Henricus Stephanus). This vast dictionary gives Latin equivalents for Greek words, covering most classical Greek authors and providing citations that illustrate the context of the different senses and etymologies. The words are arranged not in strict alphabetical order, but grouped into derivational word families. Many dictionaries of the 17th and 18th centuries were based on Estienne's work, using modern vernaculars as the metalanguage.

The most important of these is Johann Gottlob Schneider's *Kritisches Griechisch-Deutsches Handwörterbuch* (1797–1798). Franz Passow developed this work in several stages; its final form, the *Handwörterbuch der griechischen Sprache* (Leipzig, 1831) has the following features: documentation of a word's history from its first occurrence, analysis of lexical meaning in terms of components, grouping together compounds and derivations, stating semantic relations between different senses of polysemous words, listing in alphabetical order. Passow's dictionary was revised by Friedrich Rost (Leipzig 1841–1857) and by Wilhelm Crönert (Göttingen, 1912–1914). In France, M. A. Bailly published the *Dictionnaire Grec-Français … à l'usage des élèves des lycées et des collèges* (Paris, 1894), which was revised by L. Séchan and P. Chantraine (Paris, 1963, 26th edn.).

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throughout their lives, producing six editions together (6th edn. in 1869), and Liddell produced two further editions. The 9th edition (*Liddell-Scott-Jones, LSJ*) was edited by Henry Stuart Jones (1925–1940), a *Supplement* was published by E. A. Barber in 1968, and a *Revised Supplement* by W. Glare in 1996. *LSJ* covers the whole surviving body of Greek literature from Homer to the 6th century A.D. It cites contexts of attestation of words for all senses. It does not include Christian authors and proper names, but is still the most complete Greek dictionary available.

The *Diccionario Griego-Español* edited by Francisco Adrados is even more comprehensive, including words from texts not in *LSJ*, such as Mycenaean Greek, Christian writers, place names, and words in inscriptions, papyri, and ostraca. The dictionary covers the period from Homer to 600 A.D. but also contains some Byzantine material based on selected documents which follow the classical tradition. Between 1980 and 2004, six volumes were published (α-*έκπελεκάω*), and the work continues.

With regard to Christian literature in Greek, Walter Bauer edited the *Griechisch-Deutsches Wörterbuch zu den Schriften des Neuen Testaments und der übrigen urchristlichen Literatur* (Gießen, 1928) which was translated into English by Arndt and Gingrich in 1957 and Gingrich and Danker in 1979. The 6th edition by Kurt Aland and Barbara Aland (Berlin, 1988) is a comprehensive revision. The *Patristic Greek Lexicon* edited by G. W. H. Lampe (Oxford, 1961) covers words used by Christian authors from the 1st to the 9th century A.D.

Special Dictionaries

Apart from dictionaries of individual authors, notable and valuable dictionaries include Wilhelm Pape's dictionary of proper names (Pape and Benseler, 1880), Friedrich Preisigke's *Wörterbuch der griechischen Papyrusurkunden* (Berlin, 1925–1931). The *Lexikon des frühgriechischen Epos* was initiated by Bruno Snell. It contains all words including proper names in Homer, Hesiod, and other early hymns and poetry. Mycenaean Greek is covered in Anna Morpurgo's *Mycenaeae Grecitatis Lexicon* (1963) and the *Diccionario micénico* edited by Francisco Aura Jorro (in progress). In 1992 Franco Montanari initiated the Poorly Attested Words in Ancient Greek project, a databank in the form of an electronic dictionary containing words that are only scantily attested (one or few occurrences), inadequately documented or formally and semantically problematic.

Etymological Dictionaries

The *Grundzüge der griechischen Etymologie* of Georg Curtius (Leipzig 1858–1862) served as input to the early Liddell-Scott. The standard references now are the *Griechisches etymologisches Wörterbuch* by Hjalmar Frisk (Heidelberg, 1960–72) and Pierre Chantraine's *Dictionnaire étymologique de la langue grecque* (Paris, 1968–1980).

Byzantine Greek

Postclassical and Byzantine Greek are lexicographically recorded by Du Cange (1688). E. A. Sophocles' *Greek Lexicon of the Roman and Byzantine Periods* (1870) covers the vocabulary of nonclassical authors between 146 B.C. and 1100 A.D. The *Lexikon zur byzantinischen Gräzität* (*LBG*), currently edited by Erich Trapp (Bonn/Vienna), will fill the lexicographic gap between the 9th and 12th century by including literary and scientific texts as well as documents and other selected sources. The first volume (A–K) was published in 2001.

See also: Greek, Ancient; Greek Lexicography, Modern; Greek, Modern; Latin Lexicography; Stephanus, Henricus (1531–1598).

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The Beginnings

Until the 16th century and beyond, it was not considered worthwhile to make collections of the vocabulary of contemporary Greek, which was regarded as an inferior form of the language. The first dictionaries of post-classical Greek were published outside Greece and were bi- or multilingual. Dictionaries of this time served either practical needs or scholarly interests. The first collection of vernacular Greek vocabulary was *Corona preciosa* (Venice, 1527), a small handbook for merchants in which Greek headwords were translated into Latin and Italian. The first dictionary of the vernacular, *Glossarium Graeco-Barbarum*, published in 1610 by Ioannes Meursi (Jan van Meurs) in Lyon, provided definitions of contemporary terms in Latin and Ancient Greek. Simon Portius published a trilingual dictionary of Modern Greek, Ancient Greek, and Latin (Paris, 1635). For the practical needs of Jesuit missionaries, the Jesuit monk Girolamo Germano published the *Vocabulario italiano et greco* (Rome, 1622), the first bilingual Greek-Italian dictionary. The *Thesaurus* of Gerasimos Vlachos (Venice, 1659) translated Modern Greek headwords into Latin, Italian, and French. The *Glossarium ad scriptores mediae et infimae Graecitatis*, by Du Cange (Lyon, 1688), contained words (scholarly and vernacular) and examples from medieval and contemporary written texts with definitions in Ancient Greek and Latin. It is still regarded as a major work of scholarship.

During the 18th century, dictionaries were compiled serving educational and commercial needs. The most important of these was Alessio da Somavera's Greek-Italian and Italian-Greek dictionary, *Tesoro della lingua greca-volgare ed italiana* (Paris, 1709). This work, ahead of its time, contained a rich collection of contemporary vernacular words with lists of synonyms in Greek and many collocations that showed the use of words in context.

The 19th Century

In the period preceding the Greek War of Independence, dictionaries were compiled for educational purposes, out of the publishers' desire to promote cultural identity. But the language covered was not the vernacular.

The first Greek scholar to compile and publish a dictionary inside Greece was Skarlatos Vyzantios. His dictionary (1835) translated Modern Greek words into Ancient Greek and French. It included an appendix of loanwords that he believed should have been expelled from the language. Despite the dictionary's conservative ideology, it was a considerable achievement. It provided grammatical information as well as collocations and examples of words in use.

In the years that followed, persistent controversies about "the language question" brought lexicography to a standstill. For the next 100 years, only bilingual dictionaries were compiled, and even these covered only the Katharevousa vocabulary. An exception was Stephanos Koumanoudis's dictionary of neologisms, *Συναγωγή νέων λέξεων υπό των λογίων πλασθεισών* (1900), a collection of about 60 000 words (ca. 1750–1900), with the date of each word's first attestation.

The 20th Century

Historical Dictionaries

The *Ιστορικόν Λεξικόν της Ελληνικής Γλώσσης* (*Historical dictionary of the Greek language*), compiled and published by the Academy of Athens, was based on the idea of Georgios Hatzidakis in 1908 to create a dictionary of the whole Greek language: Ancient, Medieval, and Modern, both standard and dialects. When it became clear that this goal was unachievable, emphasis was laid on the language from 1800 and especially the dialects. From 1933 to 1989, five volumes were published (reaching *δαχτυλωτός*). Since 2003, the dialectal material has been the only focus of the project.

Dimitrios Dimitrakos's *Μέγα Λεξικόν της ελληνικής γλώσσης* (*Comprehensive dictionary of the Greek language*) (nine volumes, 1936–1950) also had a diachronic focus, from Homer to the 20th century. It is written in Katharevousa and is based on existing dictionaries of Ancient Greek.

Dictionaries of Mixed Type

The *Προϊα* (*Proia*) (1933) was the first compendious and systematic monolingual dictionary. It was a dictionary of both the official language of the time (Katharevousa) and the spoken and literary form (Demotic). The definitions are in Katharevousa, but many examples show Demotic usage. The *Λεξικόν της νέας ελληνικής* (*Dictionary of Modern Greek*), by Ioannis Stamatakos (three volumes, 1952–1955), contained words mainly from Katharevousa. The definitions were written in Katharevousa. It often gives Ancient Greek equivalents.

Dictionaries of Standard Modern Greek

In 1976 Demotic was established as the official language, and the need for new dictionaries became urgent. The first serious attempt to publish a synchronic dictionary of the modern language was the dictionary of Tegopoulos and Fytrakis (1989); it was a list of contemporary words, though it omitted words that were no longer used but that were recorded in other dictionaries.

From the 1990s, Greek lexicography was enriched by compendious dictionaries. The *Λεξικό της Νέας Ελληνικής Γλώσσας* (*Dictionary of the Modern Greek language*), of Georgios Babiniotis appeared in 1998 (second edition, 2002). This dictionary was conceived as a collection of cultural information and provides a lot more information than is typical for dictionaries. It is a prescriptive dictionary (cf. the subtitle, *With comments on the correct usage of words*), with comments on the differences between near-synonyms, cognates, homonyms, orthographic variants, etc. It also presents extensive etymological information going back to Indo-European.

Scholars of the University of Thessaloniki, known for their demoticist ideology, have made a major contribution to Greek lexicography. One of the first dictionaries was Nikolaos Andriotis's *Ετυμολογικό λεξικό της κοινής νεοελληνικής* (*Etymological dictionary of common Modern Greek*) (1951, 1983), which focused from the beginning on standard Modern Greek only and is one of the most authoritative sources. Emmanouel Kriaras's *Λεξικό της σύγχρονης ελληνικής δημοτικής γλώσσας* (*Dictionary of the contemporary Demotic language*) (1995) was a serious lexicographic treatment of standard Modern Greek, and his monumental *Dictionary of medieval vulgar Greek literature, 1100–1669*, covered popular literature (written in the vernacular) of the late Byzantine and the early post-Byzantine period. The project continues, and an abridged version has already been prepared.

The *Λεξικό της Κοινής Νεοελληνικής* (*Dictionary of the common Modern Greek language*) (1998) of the Institute of Modern Greek Studies (INS), in Thessaloniki, is a scholarly descriptive dictionary of the modern language "as spoken by the average Greek of today, as written in modern Greek prose and in the daily and periodical press, as heard on radio and television." (Introduction, p. *ια*') Based on modern lexicographic and linguistic principles, it provides morphological information and paradigms, syntactic information, and many examples for senses and collocations. Its etymologies are authoritative. It was the first monolingual Greek dictionary to include phonetic transcriptions.

Anna Anastassiadis-Syméonidis (2002) edited the *Αντίστροφο λεξικό της νέας ελληνικής* (*Reverse dictionary of Modern Greek*), which contains 180 000 lemmas.

The Greek-English dictionary, compiled by Dimitrios Georgacas from the late 1960s to his death in 1990 was based exclusively on his archive, a corpus of Greek literary texts from the 19th and 20th centuries. It gives phonetic transcriptions, English definitions, examples with quotations from the literary corpus, and a historical and etymological part. Although only letter A was completed, the dictionary is a major work of bilingual lexicography and scholarship.

The Electronic Lexicography Department of the Institute for Language and Speech Processing in Athens has developed monolingual and multilingual electronic dictionaries for educational purposes, and electronic dictionaries of Greek Sign Language.

Other Types of Dictionaries

The *Αντίστροφον λεξικόν της νέας ελληνικής* (*Reverse dictionary of Modern Greek*), by Georgios Kourmoulis (1967), was the first reverse dictionary of Greek. It covers both Katharevousa and demotic. The *Αντιλεξικόν ή Ονομαστικόν της νεοελληνικής γλώσσας* of Theologos Vostantzoglou (1967), with 60 000 words, is an onomasiological dictionary modeled on Roget's *Thesaurus*. Special dictionaries include the slang dictionary *Λεξικό της πιάτσας*, by E. Zachos (1981).

Many glossaries and dictionaries exist for Greek dialects, of which two publications of the dialectal studies in the Academy are Anastasios Karanastasis's *Ιστορικόν λεξικόν των ιδιωμάτων της Κάτω Ιταλίας* (*Historical dictionary of the Greek dialects of southern Italy*) (five volumes, 1986–1992), and Athanasios Kostakis's *Λεξικό της τσακωνικής διαλέκτου* (*Dictionary of the Tsakonian dialect*) (three volumes, 1987).

See also: Greek, Ancient; Greek Lexicography, Classical; Greek, Modern; Identity and Language; Lexicography: Overview; Thesauruses; Vernacular.

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Relevant Website

http://www.komvos.edu.gr – Dictionaries edited by the INS in Thessaloniki are accessible online at this website.

Greek, Ancient

A Teffeteller, Concordia University, Montreal, Canada

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External History

Attested from the 14th century B.C., Greek has continued in an unbroken line of development down to the present day, the 'ancient' period coming to a close around 300 A.D. with the end of Hellenistic Greek. In the 1700 years from the Mycenaean period to the *koinē* and beyond, the language underwent significant changes in phonology, morphology, syntax, and lexicon. A member of the Indo-European family of languages, Greek has particular affinities with Indo-Iranian; its connections with Latin, once thought to be so close, in fact largely reflect cultural interaction, rather than subgrouping features.

We do not know when the language entered Greek lands, but it was in use on the mainland and on Crete in the second half of the second millennium B.C. During the first millennium, it was spoken, in one form or another, on the Greek mainland; the Aegean islands, including Crete, Cyprus, and Rhodes; in parts of Asia Minor; and in southern Italy and northern Africa. From earliest times, Greek existed as a collection of dialects, with Attic, the dialect of Athens, eventually dominating and serving as the foundation for the Hellenistic *koinē* and its further development into later stages of the language.

Dialects

Mycenaean

Mycenaean Greek was written in a syllabic script on clay tablets used for record keeping in the Bronze Age centers on the Greek mainland and on the island of Crete. Deciphered only in 1952, these documents, although they contain no literature (which presumably at this time was still maintained exclusively in an oral tradition) and (owing to the nature of their contents) offer only limited evidence particularly of syntax and verb morphology, nevertheless provide us with an invaluable source of information regarding the development of Greek from Proto-Indo-European. Although the Linear B syllabary does not mark all contrasts (e.g., one series of signs represents both [l] and [r], and there is no differentiation of [k], [k^h], and [g]; of [p] and [p^h]; or of [t] and [t^h], although both voicing and aspiration were phonemic in the language), the script does provide a series of signs for the labiovelars (PIE $*k^w$, $*g^w$, $*g^{wh}$), which by the time of alphabetic Greek in the 8th century B.C. had developed into the phonologically conditioned series of stops [p, b, p^h/t, d, t^h/k, g, k^h].

'Historical' Dialects

The dialectal status of Mycenaean is disputed. We know that it was not the only variety of Greek spoken in the second millennium because it shows innovations not shared by all of the later-attested dialects, such as assibilation of *–t* before *-i*); debate continues as to whether it should be grouped unqualifiedly with any of the so-called historical dialects attested in the first millennium (and, with the exception of Cypriot, written in an alphabetic script), although its affinities with Arcado-Cypriot are clear. The dialects are grouped as follows: Attic-Ionic (in Attica and its chief city Athens, the Ionic islands of the Aegean, and parts of Asia Minor), Aeolic (including Boiotian, Thessalian, and Lesbian), Doric (or West Greek, in the Peloponnese, the Doric islands of the Aegean, and parts of Asia Minor), Northwest Greek (on the northern mainland), and Arcado-Cypriot (in Arcadia and Cyprus). The old view, supported by the testimony of the ancient Greeks themselves, that the dialects entered Greece in three successive waves – Attic-Ionic, Aeolic with Arcado-Cypriot, and Doric with Northwest Greek – has recently been challenged by a model that locates the dialectal differentiation in Greece itself during the course of the second millennium.

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'Literary' Dialects

Certain dialects or conventionalized forms of them were associated with certain genres of literature. Thus, regardless of the native dialect of a given

author, dactylic hexameter poetry (epic, etc.) was predominantly in Ionic with a heavy admixture of Aeolic, choral poetry was in Doric, the dialogue of Athenian tragedy was in Attic (the choral lyrics were in Doric), and so on.

Phonology

Vowels

The phonological system included 10–12 vowels, subject to dialect variation: the short vowels [a, e, o, i, u] (with [u] fronted to [y] in Attic) and the long vowels [a:, e:, o:, i:, u:] (with [u:] fronted to [y:] in Attic). In addition, some dialects, including Attic, distinguished long open *e* and *o* (ɛ: and ɔ:), in addition to [e:] and [o:]. The situation was further complicated by the orthography (e.g., the long close *e* [e:] that arose from compensatory lengthening fell together with the original long *e* in some dialects and was written η, the pronunciation of which varied from higher to lower position in different dialects). Other dialects, which distinguished [e:] and [ɛ:], wrote the latter as η, the former as ει, a sign that had earlier represented the diphthong [ej] but had subsequently been reduced to a monophthong, thus allowing for the use of the digraph to represent compensatorily lengthened [e:] as well. Similarly, [o:] was written ου in those dialects that distinguished [o:] and [ɔ:] (ω). Four diphthongs remained in frequent use: [aj, oj, aw, ew] (written αι, οι, αυ, ευ). The status of υι is uncertain. The 'long' diphthongs [a:j, e:j, ɔ:j] (written αι, ηι, ωι or, with iota subscript, a Byzantine innovation, ᾳ, ῃ, ῳ) generally lost the glide or merged with the short diphthongs.

The Indo-European vocalic resonants **r̥ *l̥ *m̥, *n̥*, yielded vowel reflexes or vowel and consonant combinations (e.g., **n̥ > α/αν, *r̥ > αρ/ρα/ορ/ρο*).

A major dialectal feature of Ionic and, with exceptions, Attic is the raising of inherited [a:] to [ɛ:] (written η).

Consonants

There were nine stops, grouped in three points of articulation – labial, dental, velar – with each point of articulation having three types: voiceless, voiceless aspirate, and voiced: [p, p^h, b/t, t^h, d/k, k^h, g]. There were four resonants – the liquids [l, r] and the nasals [m, n] – and two fricatives: the dental [s] (with a voiced allophone [z] before voiced consonants) and the glottal [h], the so-called rough breathing (marked ') in word-initial position before some vowels, e.g., Ἑλλάς (*Hellas*), ἅγιος (*hagios*) 'holy', and before *r*, e.g., ῥόδον (*rhodon* 'rose') (where it may indicate not aspiration but a voiceless pronunciation). Initial [h] arose as a development from earlier [s], [j], etc. The velar nasal [ŋ] occurred as an allophone of [n] before velars and was usually written γ, e.g., ἄγγελος (*angelos*), cf. Eng. 'angel'. In the liquids λ represented a dental lateral [l], and ρ in non-initial position was apparently a voiced rolled *r*, as in, e.g., Italian. The three letters ζ, ξ, and ψ represented consonant clusters. The sound represented by ζ seems to have varied in different dialects and at different periods from [dz] to [zd], eventually simplifying to [zz] or [z]; ξ represented [ks] and ψ [ps]. The voiced semivowel [w], widely attested in Mycenaean, was dropped early in Attic-Ionic (cf. Myc. *wa-na-ka* = Hom. and Att. *anaks* ἄνακξ), but was retained by some dialects well into the historical period, where it was represented by the letter *digamma* (Ϝ).

The loss of digamma and of intervocalic *s*, etc., resulted in the vowel contractions characteristic of the later language. Many morphophonemic changes resulted in complex developments, particularly of consonant clusters. Constraints on word-final consonants left only final *-r, -s, -n*. The aspirated stops [p^h, t^h, k^h] developed by the later period into the corresponding fricatives [f, θ, χ].

Accent

Ancient Greek had a pitch accent: rising (acute ′), falling (grave ˋ), or rising-falling (circumflex ˆ), the latter restricted to long vowels and diphthongs. The accent was 'free,' subject to certain phonological and morphological constraints; it fell only on one of the last three syllables of a word and was recessive in verbs (a residue of an early stage in which the verb of a main clause was cliticized).

Morphology and Syntax

Ancient Greek has a very rich derivational and inflectional morphology. Use is made of prefixes, very rarely of infixes, and overwhelmingly of suffixes. Derivational processes depend primarily on composition and suffixation. The verbal morphology is especially complex.

Morphosyntax of Nominals

Ancient Greek has three declensional classifications for nouns and adjectives: *o*-stems, ᾱ-stems, and consonant stems. There are five cases (nominative, genitive, dative, accusative, vocative), three numbers (singular, dual, plural), and three genders (masculine, feminine, neuter). There are remnants of an instrumental case (e.g., the suffix *-phi* in Mycenaean and Homeric Greek) and the locative (e.g., *oikoi* 'at home'); otherwise, the functions of the locative, instrumental, and ablative cases reconstructed for

Proto-Indo-European are taken over by the genitive and dative in Greek. The dual category, already unstable in Homer, was eventually largely eliminated. Grammatical gender was not necessarily determined by natural gender; although terms for males and females were as a rule masculine and feminine, respectively, this was not exclusively the case, and inanimate objects could be categorized indiscriminately as masculine, feminine, or neuter.

Morphosyntax of Verbs

The verbal morphology encodes many morphosyntactic categories. Finite forms are marked for person and number; nonfinite forms include infinitives, participles, and other verbal adjectives. In addition to person and number, finite verbs are marked for tense, aspect, voice, and mood. The complexity of the Greek verbal system arises from its retention of the already complex system of Proto-Indo-European (PIE), to which is added a number of new categories of tense/aspect and voice (e.g., the future, the pluperfect, further contrasts of active, middle, and passive, etc.), and innovations in the aspectual status of the aorist and perfect. Thus, the PIE aspectual opposition of present/aorist/perfect, indicating, respectively, imperfective, perfective, and stative aspect, was maintained to a great extent, especially in the nonindicative moods and the nonfinite forms. However, in the indicative 'tenses,' the opposition of present/aorist/perfect was combined with distinctions of time that eventually overshadowed the original distinctions of aspect so that the aorist could be used simply as a past tense and the perfect came to develop a resultative use.

The tenses are present, imperfect, aorist, perfect, pluperfect, future, and future perfect. The categories of voice are active, middle, and passive (the middle indicating close involvement of the subject in the action, e.g., reflexive usage, etc.). The moods are indicative, subjunctive, optative, and imperative.

The Indo-European process of morpheme-internal vowel gradation (*Ablaut*), e.g., *e/o/Ø*, etc., was widely used in Greek. What began as a phonological process was morphologized already in the pre-PIE period and yielded many distinctions in both nouns and verbs in Greek, for example, the distribution seen in the following forms built on the root **pet* 'fly': *pétomai* 'fly,' *potḗ* 'flight,' and *pterón* 'wing'; within the verbal paradigm, examples are present *peíthō* 'I persuade,' perfect *pépoitha* 'I am persuaded.'

Syntactic Typology

Ancient Greek has a relatively free word order that resists simple classification in terms of SOV, SVO, and so on. More fruitful is a recent approach (Devine and Stephens, 2000) that sees the syntactic typology of Ancient Greek as changing from an earlier nonconfigurational type to configurationality, from a syntax of juxtaposition to a syntax of government and embedding. Particularly in its earlier stages (and in archaizing poetic traditions), Greek made pervasive use of discontinuous constituency, adjunct lexical arguments, null anaphora, and parataxis. Thus, the language of the Homeric poems, which were recorded in writing in the 8th or early 7th century B.C., but represent a prior oral tradition of a thousand years or more, is heavily paratactic, whereas 4th-century Attic prose is, by contrast, markedly hypotactic, with complex forms of subordination.

Specific features of interest in Greek syntax include the use of particles, the distribution of clitics, and the development of the article.

See also: Accent; Configurationality; Greek Lexicography, Classical; Greek, Modern.

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Greek, Modern

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General Overview

Although very much a living and vibrant language with speakers numbering in the millions around the world, Modern Greek actually began to develop thousands of years ago, when speakers of the ancient form of the language entered the Balkan peninsula some time in the early part of the second millennium B.C. These speakers moved quickly, according to most current accounts, into the southern part of the region – what is now northern and central Greece and the Peloponnesos – and into most of the neighboring islands of the Aegean Sea, including Crete as the most southerly point. This settlement area essentially defines the space where to this day the Greek language remains an enduring presence, though there has been spread into other areas, in some cases dating from ancient times.

Modern Greek is the official language of the Hellenic Republic (i.e., the Republic of Greece) where there are some 11 000 000 speakers, and also of the Republic of Cyprus, with some 600 000 speakers. In large part because of ancient colonization, Greek is found today in numerous communities and enclaves around the Mediterranean and Black Sea area, including Sicily, southern Italy, Alexandria (Egypt), and the region around the Crimean peninsula. Moreover, Greeks in modern times have migrated to many locations throughout Europe (but especially England), Australia (with a large concentration around Melbourne), and North America (particularly in New York, Chicago, Ohio, Florida, and Toronto), forming the modern-day 'Hellenic Diaspora.' Although Greek is mainly a second language in these diaspora communities, it is still robust and alive there, and these communities add perhaps as many as 2 500 000 speakers to the overall total of speakers of Greek worldwide.

The language is generally referred to as 'Greek' in English, but the linguistic autonym for Greek speakers is based on an entirely different root. Greek speakers call their language *eliniká* (i.e., 'Hellenic') or *neoeliniká* (i.e., 'neo-Hellenic'). Occasionally, the designation *roméika* is used also; it is literally, 'Romaic', a use deriving from the affinities many (Orthodox Christian) Greeks have felt for the Eastern Roman (or Byzantine) Empire, centered in Constantinople after the 4th century A.D.

The modifier 'modern' is generally used in referring to the language in English, in much the same way that the Greeks themselves often use *neo-*, literally 'new', in their self-designation (*neoeliniká*, as above). Indeed, the unadorned label 'Greek' in English usually refers to the ancient language. This usage recognizes the fact that the language has a long and rich documented history, being attested as early as the 14th century B.C. (so-called Mycenaean Greek) and continuing through ancient times and the Byzantine era up to modern times.

The modern form of the language is significantly different from its ancient Greek predecessor with regard to pronunciation and general structural features, but at the same time, as perhaps with all languages, there is noticeable continuity as well. The changes that set Modern Greek apart from the ancient language (e.g., the falling together of some eight distinct vocalic nuclei to [i], the shift from a pitch accent to a stress accent, a greater degree of analyticity in nominal and verbal constructions for earlier synthetic ones, among others) can be seen in nascent form in the period of the Hellenistic Koine. By the 10th century A.D., the language in many respects had a quite modern look to it. Still, it is customary to date the modern period of Modern Greek to approximately the 17th century, recognizing that even in the so-called Medieval Greek period, some structural differences from contemporary Greek were to be found (e.g., syntactically in the continued use of an infinitive, morphologically in the formation of the future tense, and phonologically in the expansion of a dental affricate and the elimination of a front rounded vowel), as well as numerous lexical differences.

Dialects of Modern Greek

Taken as a whole, Modern Greek exhibits great diversity across all its varieties, defined both geographically and socially. However, the considerable differences are largely masked by the dominance and ubiquity of the standard language, the variety that reflects the everyday usage of speakers in Athens and its environs, by far Greece's leading population center, with over 4 000 000 inhabitants, and the country's focal point for culture, economy, religion, and government.

Looking first at diversity from a geographic standpoint, the major modern regional dialects (following Newton, 1972a) that can be identified are Peloponnesian-Ionian Greek, traditionally viewed as the basis for the contemporary standard language; northern Greek, in a zone starting north of Attica

(where Athens is located) and extending up to and beyond Greece's second largest city, Thessaloniki; Cretan, the dialect of the island of Crete; Old Athenian, the dialect of Athens before the 1821 War of Independence and, as a result of various resettlements, found elsewhere in Greece into the early 20th century; and southeastern Greek, including Greek of the Dodecanese islands, as well as Cypriot Greek. However, modern Cypriot shows significant differences on all levels (phonological, morphological, and syntactic) that invite its classification as a separate language.

Two other important geographic varieties include (1) Tsakonian, the rather divergent form of the language, a direct descendant of the ancient Doric dialect that is spoken still in the eastern Peloponnesos; and (2) the Pontic dialects, which were once spoken along the Black Sea coast (Crimea area and Asia Minor), but are now mostly found in various parts of Greece as a result of the 1923 population exchanges with Turkey. Both Tsakonian and Pontic diverge significantly enough from the rest of Greek to merit consideration now as separate languages (though they are still clearly Hellenic).

Sociolinguistic Setting and Other Diversity

Geography and regional dialects account for only part of the diversity present in the Greek-speaking world; an additional crucial facet is the diglossia (in the sense of Ferguson, 1959) that Greek exhibits, as an outcome of centuries of cultural influence from the Classical Greek language and Classical Greece itself on modern speakers. Classical Greek and Classical Greece were treated as the prescriptive norms against which speakers of later stages of Greek generally judged themselves, resulting in a 'two-track system' for the language, with a consciously archaizing form that speakers and writers modeled on Classical Greek set against a vernacular innovative variety. With the founding of the new nation-state of Greece after the revolution of 1821, these two tracks developed into a significant register and stylistic difference between a high-style variety associated with official functions (those involving government, education, religion, and the like), known as *katharevousa* ('Puristic', literally 'the purifying' language), and the ordinary, day-to-day language of the people, known as *dimotiki* ('demotic', literally 'the popular' language). These two varieties vied for status as the primary form of the language; each had its advocates, for whom language attitudes tended to correlate with certain social attitudes and political positions, more conservative for advocates of *katharevousa* and more progressive for followers of *dimotiki*. The competition continued throughout most of the 20th century, with *katharevousa* generally being in the ascendancy for official use, but was resolved most recently by various governmental acts and actions in 1976 declaring *dimotiki* as the official language. Still, all throughout the various official and unofficial periods of diglossia, the usage that speakers exhibited has actually been mixed, showing borrowing between the two varieties, in particular with *katharevousa* forms incorporated into *dimotiki*. The present state of Standard Modern Greek is essentially *dimotiki*, but with significant borrowings from *katharevousa* involving grammar (morphology and syntax), pronunciation, and vocabulary.

Linguistic diversity for Modern Greek, therefore, involves the mixing of varieties of both a regional and stylistic/social nature and mutual interactions among them.

Structure of Modern Greek

Modern Greek's vowel system is fairly unremarkable, showing /i e a o u/ with no distinctive length or nasality. Consonants include /p t k f v θ ð s z x γ j r l m n t^s d^z/; /b d g/, although deriving in some analyses from underlying nasal plus voiceless stop combinations, are probably best taken as distinctive elements in their own right. Still, the consonants are somewhat overstocked with fricatives, by most typological standards.

Modern Greek has a distinctive stress accent, restricted to occurring only on one of the last three syllables in a word; to some extent, accent placement is tied to particular morphological categories, but in general there is some degree of unpredictability as to which of the final three syllables is to be stressed.

In its morphology, Modern Greek is for the most part synthetic and fusional, with grammatical endings marking two numbers (singular and plural) and four cases (vocative, nominative, accusative, and genitive, which covers some 'dative'-like functions) in the noun. In the verb, there is a complex interplay of realizations for tense (present, past, future), mood (indicative, imperative, subjunctive), aspect (perfective and imperfective, with the so-called perfect tense perhaps forming a third distinction), person (speaker, hearer, and other; that is, first, second, and third), and number (singular and plural). Endings carry most of the marking functions, but some categories are realized by prefixal (or prefix-like) elements, especially the future tense and subjunctive mood. Weak object pronouns under some analyses are considered to

be transitivity markers on the verb, thus possibly constituting a further inflectional category. Negation too might be considered to be realized via prefixal elements.

With regard to syntax, Modern Greek shows a significant degree of analyticity, even with its generally synthetic morphology. Sentential complementation is always via person- and number-marked finite clauses, as there is no infinitive proper in the language, and for some case functions, especially of the genitive case, prepositional phrases occur as alternatives. Word order is fairly free, responding more to pragmatic and discourse-related criteria, such as focus and topicalization, than to purely syntactic concerns. Dislocated elements are often cross-indexed, so to speak, on the verb through the use of agreeing weak pronouns (so-called object reduplication).

Much of what Modern Greek shows in the way of surface syntactic and morphological patterns that differs from Ancient Greek may be attributable to interactions between speakers of Greek and speakers of other neighboring languages in the Balkans during the medieval (i.e., pre-modern) period, though language-internal factors clearly played a major role too.

See also: Greece: Language Situation; Greek Lexicography, Modern.

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Greenberg, Joseph H. (1915–2001)

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Joseph Greenberg was a controversial, highly original, linguistic anthropologist and eminent scholar of language typology and universals, who also wrote about genetic relationships among languages.

As Greenberg himself (1986) tells the story, he started learning languages as a hobby. Before finishing high school in Brooklyn, NY, he had studied German, Latin, and Hebrew, picked up Yiddish, and taught himself some Classical Greek and Arabic. At Columbia, Greenberg took as many language courses as possible, then discovered comparative linguistics and anthropology late in his undergraduate years. A class with Franz Boas introduced him to Native American languages. He also developed an interest in Africa. Greenberg entered a doctoral program in anthropology at Northwestern, but also spent a year at Yale, where he was disappointed not to meet Edward Sapir, but did study with Leonard Bloomfield. He conducted fieldwork in Nigeria for his dissertation on the influence of Islam on African religions. Along the way he learned Hausa and puzzled over its relationship to other African languages. After five years in the Army, he accepted a position at the University of Minnesota. In 1947 he moved Columbia, then in 1962 to Stanford.

Thus, in his early career Greenberg was exposed to many languages, and to seminal figures in anthropology, American structuralism, and – through Roman Jakobson, at Columbia in the late 1940s – Prague School linguistics. All of these influences contributed to his distinctive approach to typology, universals, and genetic classification.

Greenberg's lifework may have first come to him when, as a self-taught adolescent learner of Arabic, he marveled at its similarity to Hebrew although "the reason for that similarity, of course, eluded me" (1986: 2). Greenberg devoted much of his career to defining cross-linguistic similarities and the reasons behind them. The mid-century American structuralists who trained Greenberg downplayed comparative and historical study of languages in favor of 'scientific' description. But Greenberg was reluctant to abandon his commitment to language comparison, or his curiosity about historical relations. He was attracted to Prague School contrastive studies and to Jakobsonian markedness and implicational relationships. On the other hand, he was enough of an American to question the rigor of European-style structuralism.

A breakthrough occurred for Greenberg in 1953, at a seminar where he presented descriptivist procedures for linguistic analysis to a mixed audience of scholars. After Greenberg spoke, the psychologist Charles E. Osgood responded mildly that, although those procedures seemed admirable, a more impressive goal would be for linguistics to discover "something that was true about all languages." To Greenberg, this comment "was to haunt me thenceforth and helped determine the direction of much of my future work" (1986: 13). With Osgood and James J. Jenkins, Greenberg wrote a 'Memoradum concerning language universals,' sketching out plausible universals. The memorandum was circulated among the linguists, psychologists, and anthropologists invited to a 1961 conference at Dobbs Ferry, NY, cohosted by Greenberg, to discuss language universals and their relevance to different disciplines.

The conference proceedings (Greenberg, 1966) include the memorandum and Greenberg's much-reprinted paper 'Some universals of grammar with particular reference to the order of meaningful elements,' initiating what is now recognized as Greenbergian typology. Working from published grammars, Greenberg surveyed 30 languages to distill 45 generalizations about word order, morphology, and the syntax of questions and subordination. Greenberg's universals are implicational ("If the nominal object always precedes the verb, then verb forms subordinate to the main verb also precede it"), or statistical ("With overwhelmingly greater than chance frequency, languages with normal SOV order are postpositional"), or absolute ("All language have pronominal categories involving at least three persons and two numbers"). Having identified 45 such universals, Greenberg speculated about how these facts pattern together to create coherent language types, and cautiously suggested some overarching typological principles. But his text is essentially a list of numbered universals loosely arrayed by topic. Greenberg minimized the difficulties of identifying language features, making it appear easy to decide whether (for example) objects precede or follow verbs. Moreover, he did not justify his universals with respect to external generalities, or otherwise explain why they are what they are.

Greenberg's article promised a panoramic vision of what human languages share and how they differ, then worked toward that goal using accessible terms and concepts. It launched the Stanford Project on Languages, which continued from 1967 to 1976 under Greenberg's codirection. This large, collaborative project amassed phonological, morphological,

lexical, syntactic, and semantic generalizations, published in four volumes (Greenberg, 1978). Varied as these papers are, Greenberg's influence is evident throughout, in the priority of empirical accuracy over theoretical generalization, in the concern for cross-linguistic representation, and even in the convention of presenting the universals in numbered lists.

'Data-driven' Greenbergian typology has been coolly received by 'theory-driven' Chomskyan generativism. Generativists look deeply into small numbers of languages, or even a single language – deeply enough to locate properties instantiated in native speakers' knowledge of grammar, but which are incompletely displayed in the surface facts of everyday language. To generativists, mass cross-linguistic comparisons are unlikely to locate the subtle properties that define language differences; instead, they try to discover what speakers know about language that cannot be derived by observing its use in the environment. Greenberg, not one to retreat from controversy, responded to this critique by insisting that the two approaches are complimentary, and moreover, that explanations in linguistics require access to comparative and diachronic facts (1991). Critics notwithstanding, Greenberg opened the way for modern linguistic typology, now developed richly by such varied scholars as Bernard Comrie, Matthew Dryer, John A. Hawkins, and Hansjakob Seiler.

Greenberg's research on the genetic classification is likewise both original and controversial. For Greenberg, the two branches of his work cohere; typological discoveries inform genetic research and vice versa. Greenberg brought his familiar data-intensive, low-tech, working style to bear on the classification of languages. Despite sometimes harsh criticism, he developed a technique of 'mass comparison,' searching the morphology and lexicon of many languages for shared sound/meaning correspondences. Greenberg painstakingly filled notebooks, in pencil, comparing the words and features of diverse languages. By this technique (and excluding nonlinguistic and typological evidence), Greenberg (1966) concluded that African languages comprised four families: Afroasiatic, Khoisan, Niger-Kordofanian, and Nilo-Saharan. His claim first scandalized Africanists, but has gradually achieved full acceptance.

Greenberg subsequently investigated the languages of Central and South America, Oceania, Australia, and Native America. His syntheses of large numbers of languages into small sets of families have been greeted with increasing skepticism. Scholars objected that his criteria for similarity were obscure, and that he ignored the gold standard of genetic proof, comparative reconstruction (Campbell, 1988). Moreover, some complained about factual errors (e.g., reviews in Greenberg, 1987). Undaunted, Greenberg's final work carried his method forth to postulate a breathtakingly comprehensive, 'Eurasiatic' family comprising Indo-European, Uralic, Altaic, Eskimo-Aleut, and other northern Asian languages. On his deathbed, Greenberg regretted having not worked on Southeast Asian languages. They alone remain unintegrated into his synthetic vision of the relatedness of human languages.

Greenberg (1971, 1990) reprint his varied shorter writings; Croft (2001) provides a bibliography of the later works. Greenberg, Croft, Denning, and Kemmer's (1990) Festschrift displays the range of Greenberg's influence.

See also: Africa as a Linguistic Area; Anthropological Linguistics: Overview; Bloomfield, Leonard (1887–1949); Comrie, Bernard (b. 1947); Historical and Comparative Linguistics in the 19th Century; Jakobson, Roman (1896–1982); Prague School; Structuralism.

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Greenland: Language Situation

Editorial Team

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Greenland, the world's largest island, is 81% covered with ice. Towns are found on the coast, mainly on the southern coast, where also the capital Nuuk (or Godhab) is situated. Greenland has a population of 56 000. Greenland was part of Denmark until 1979, when it became autonomous.

The main languages of Greenland are Greenlandic (Inuktitut), an Inuit language of the Eskimo-Aleut family, and Danish (with around 8000 speakers). Greenlandic falls into three major dialects, East, North, and West Greenlandic. North Greenlandic has fewer than 1000 speakers, and East Greenlandic around 3000 (Grimes, 2004), so that West Greenlandic with more than 40 000 speakers is the main dialect. There is also a substantial Greenlandic-speaking community in Denmark. Most Greenlandic speakers also speak Danish. Both Greenlandic and Danish are used in schools.

See also: Denmark: Language Situation; West Greenlandic.

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Greimas, Algirdas J.: Theory of the Sign

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Greimas's theory of sign builds on Saussure's, in which a sign was defined as an entity made up of something physical – sounds, letters of the alphabet, gestures, etc., – the 'signifier'; and the image or concept to which the signifier refers – the 'signified.' He gave the name 'signification' to the arbitrary dyadic relation that holds between the two. He considered these three dimensions of the sign to be inseparable, and he stressed that the linguistic system was made up of differences so that the mechanisms of language rested on two types of relations: groups of elements of the written or oral chain whose values are defined in terms of the other elements of the system – 'syntagmatic relations'; and associative relations or relations between elements of the utterance and other elements absent from the utterance – 'paradigmatic relations' (e.g., the sign *black* takes on its value in terms of all the absent colors of the chromatic paradigm).

Although Greimas's definition of sign depends in part on Saussure's, Greimas reconceptualized Saussure's theory in terms of Louis Hjelmslev's theoretical works. Under Saussurian influence, the term 'sign' was commonly linked with the minimal sign, the word, or the morpheme, and it is in this sense that language was defined as a 'system of signs.' But Saussure's notion of sign was deemed by Hjelmslev and Greimas to be restrictive because Saussure at the same time defined the sign as a totality and then separated expression from the content when establishing his analytical procedures. To avoid this contradiction, Greimas reverted to Hjelmslev's redefinition of the sign, in which the semiotic function 'semiosis' is considered as the relation of reciprocal presupposition that exists between the expression-form and the content-form whereby meaning is created at the moment of the linguistic act.

For Greimas, contrary to Anglo-American linguists for whom the sign is a given, the sign is first and foremost a construct that excludes the referent as a necessary condition for the existence of linguistics (Greimas and Courtés, 1982: 297). Moreover, for Greimas, there can exist enunciate or discourse signs, and in a seminal article, he suggested that since signs can be redefined as the conjunction of an expression-form and a content-form of varying dimensions, "a word, a sentence are signs, but they are also discourse insofar as they can appear as discrete units. Initially, poetic discourse can be considered as a *complex sign*" (1972: 10, my translation). In his theoretical writings, Greimas attempted to work out an analytical methodology based on the relationship of reciprocal presupposition between expression-form and content-form. Just as phonemes and phemes are the distinctive features of the plane of expression, sememes and semes are the distinctive features of the plane of content, or the semantic plane. In his

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early writings, he extended the parallelism and came to the conclusion that, theoretically at least, a combination of 20 or so semic categories could generate a quantity of sememes that could satisfy totally the needs of a natural language. The phonological model, based on the premise of a fundamental parallelism between two planes of language as well as the variable dimension of signs, remains the organizational principal of Greimassian semiotics. Since signs on the plane of expression signify in terms of differential gaps, and the gaps of the signifier correspond to the gaps of the signified, which in turn are interpreted as features of signification, one can analyze the manifest visual, auditory, or tactile units and decompose them into minimal subunits of semes considered as semantic features. In a later work (1987), Greimas proposed a multilevel semiotic model or grammar of analysis known as actantial theory, which can account for the organization and transformation of the minimal subunits or minimal signs.

See also: Actantial Theory; Augustine, Saint: Theory of the Sign; Barthes, Roland: Theory of the Sign; Eco, Umberto: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Jakobson, Roman: Theory of the Sign; Morris, Charles: Theory of the Sign; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Paris School Semiotics; Russian Formalism; Saussure: Theory of the Sign; Sign Theories; Structure and Structuralism: Semiotic Approaches; Text and Text Analysis; Texts: Semiotic Theory.

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Grenada: Language Situation

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Formerly a French possession and subsequently an English colony, since 1974 Grenada has been an independent state within the British Commonwealth. It is situated in the Caribbean and is part of the Windward Islands. The official language of Grenada is English; 95% of the 89 357 inhabitants are literate and 5699 are deaf. People of older age speak a form of Lesser Antillean Creole French, Grenada Creole French, also known as Patwa or Patois. Grenada Creole English, also known as Carriacou Creole English, is the variety of Windward Caribbean Creole English spoken on Grenada, which presents a strong influence from French Creole. The 15 radio and two television stations broadcast principally in English.

See also: Pidgins and Creoles: Overview.

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Grice, Herbert Paul (1913–1988)

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Herbert Paul Grice was born on March 15, 1913 in Birmingham, England, into the family of Herbert and Mabel (née Felton) Grice. His father was a successful businessman who manufactured small metal items. Herbert Paul was educated at Bristol Clifton College and at Corpus Christi College at Oxford University. While in college, Grice combined the study of classics with philosophy and later became a lecturer in philosophy at St. John's College, where he was elected a fellow in 1939. During World War II, Grice served his country in the Navy, first in the North Atlantic, then from 1942 in Navy Intelligence at the Admiralty. After his military service, Grice returned to Oxford's St. John's College. At the end of 1967 he left for the University of California at Berkeley, where he taught and conducted research, obtaining full professorship in 1975. In 1980 Grice retired from his university position, but remained active in pursuing his linguistic and philosophical investigations.

Herbert Paul Grice is generally known for his two most influential papers, 'Meaning,' published in 1957, and 'Logic and Conversation,' published in 1975. In 'Meaning', he distinguishes between two types of meaning: (1) the 'natural' or 'observable' meaning and (2) the 'nonnatural' meaning, that is, the idiosyncratic meaning of a particular communicator. In 'Logic and Conversation,' Grice argues that in order to communicate people need to cooperate while exchanging verbal information and proposes the 'cooperative principle'; "Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted direction or purpose of the talk exchange in which you are engaged" (Grice, 1975: 45).

The Gricean cooperative principle is subdivided into context-related maxims. According to the maxim of quantity, one should provide the listener with just the needed amount of information. The maxim of quality states that one should produce only texts that one believes to be true. One needs also to be relevant while communicating with others; and last but not least, one should communicate in a particular manner, that is, express oneself verbally in a clear way. Grice is probably best known for presenting an idea of 'conversational implicature' in terms of this theory. For example, let us suppose that A informs B, "I'm cold," and B replies, "Here is a blanket." B has conversationally implicated that if A takes the blanket, A is no longer going to be cold.

Grice is also regarded as the father of 'intention-based semantics,' in which the phrase 'timeless meaning' (i.e., conventional meaning) is of fundamental importance. As Gaukner explains, "That a certain form has a timeless meaning is normally necessary if a speaker is to reasonably expect that an utterance of that form of words will produce the intended effect" (2004). Grice's works helped establish pragmatics as the study of meaning embedded within its context. His impact is felt in many branches of contemporary linguistics, including the study of communicational grammars of discourses, conversational analysis, and even axiology.

See also: Conversation Analysis; Pragmatics: Overview.

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Grierson, George Abraham, Sir (1851–1941)

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Sir George Abraham Grierson was the originator and compiler of the monumental *Linguistic survey of India* (Grierson, 1903–1927). Completed in his 77th year, the *Survey* had been proposed to him as a work for life by Professor Robert Atkinson who, at Trinity College, Dublin, first developed in Grierson an interest in linguistics.

Grierson was born on January 7, 1851, at Glanageary, County Dublin. For 23 years, while an active member of the Indian Civil Service, he produced a vast series of publications bearing on the languages and orally transmitted literatures of North India, notably the Bihar dialects, the Hindi of Oudh and Braj, Kashmiri, and Gypsy Romani. His exemplary *Bihar peasant life* (Grierson, 1885) constitutes a linguistic-geographical study of vocabulary in which the implements and procedures of an agricultural province are described and illustrated. He compiled the first extensive bio-bibliography of literature in the modern Indo-Aryan vernaculars, and conspectus accounts of their distribution and affinities.

Grierson's *Linguistic survey of India* was presented to the government of India as intended to enable British administrators to communicate directly with the local populace, but it was devised rather with a view to revealing the richness of modern India's vernacular cultures to a West hitherto mesmerized by India's past. In 1898, after protracted negotiations, Grierson was permitted to reside and work in Camberley, Surrey, where he was assisted for a time by the Norwegian Sten Konow, who contributed much of the material relating to non–Indo-Aryan languages.

In its necessarily curtailed form, the *Survey* ensured that, for every patois that could be identified, one specimen of original narrative and the translation of one standard text would be collected, along with a list of words and test sentences. The provinces of Madras and Burma and the states of Hyderabad and Mysore declined to participate. As a result, only 179 of the 188 languages currently censused could be covered, together with 544 identified 'dialects.' Some 250 gramophone records illustrate forms of speech c. 1920. The inherent problems would have been insurmountable but for the fact that so well-qualified a philologist and linguist was able, as a civil servant, to divert to the task some of the administrative resources of the Imperial Government and its allies. For all its inevitable faults in detail, traceable usually to the effect of political geography in predetermining linguistic groupings, Grierson's classification remains adequate for practical purposes (notably the subsequent censuses of India and R. L. Turner's *Comparative dictionary of the Indo-Aryan languages*, 1966–1985) and a reference point for all research involving the languages of the subcontinent – Mon-Khmer, Tai, Tibeto-Burman, Munda, Dravidian, and Iranian, as well as Indo-Aryan. Materials for a subsequent *Ethnographical and linguistic survey of Burma*, compiled by L. F. Taylor, were lost as a consequence of the Japanese invasion of Burma.

After completing the *Survey* in 1927, Grierson went on publishing specimens of Indo-Aryan literatures well into his 80s. He died on March 9, 1941.

See also: Turner, Ralph Lilley, Sir (1888–1983).

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lexicon instead of the evolution of its grammatical structure. This he had done abundantly in his *Deutsche Grammatik*, of which the second edition (1822) of Part I (unlike the 1819 edition, which was devoted to morphology) constitutes an entirely new book, almost exclusively devoted to phonology ('Von den Buchstaben,' 1822: 1–595). This area is particularly suitable for historical research, since sound changes are the most obvious features of language evolution. Yet it was no longer the area of vocalism in Germanic (the causes and mechanisms of i-umlaut and similar changes had been recognized even before the completion of the 1819 edition) but the realm of particular series of consonants, in particular the evolution of the obstruents in Germanic, which had received his special attention. In the course of his research Grimm not only provided a general framework demonstrating the systematic nature of the shift of these consonants, which set them apart from the rest of the Indo–European language family, but also established another regular *Lautverschiebung*, which he saw as forming an integral part of the former. This was the shift of the Germanic voiceless stops to corresponding affricates or (double) fricatives in the High German dialects. These consonant shifts, which Grimm saw as forming a circle, were referred to by the later 1830s as 'Grimm's Law,' both in Germany and Britain. (The term was not first introduced by Max Müller as is frequently stated in the literature.)

Although Grimm (1822: 590) conceded that the "sound shift takes place in a general way, but never fully perfectly in details," his findings contributed to the establishment of the historical component of comparative philology in a way no other pre-1875 discovery did. In addition it was the second edition of his *Deutsche Grammatik* that established the importance of phonology in historical linguistics, an area largely ignored by Bopp, but pursued vigorously by Bopp's pupil August Friedrich Pott (*see* **Pott, August Friedrich (1802–1887)**) in his *Etymologische Forschungen* (1833–1836) and, a generation later, by the most important mid-19th-century linguist, August Schleicher (*see* **Schleicher, August (1821–1868)**), in his *Compendium der vergleichenden Grammatik* (1861–1862).

A few months after the dismissal of Jacob and Wilhelm Grimm from their professorships in Göttingen in 1837, the Berlin publishers Karl August Reimer and Salomon Hirzel, owner of the Weidmannsche Buchhandlung, in an effort to find suitable employment for these two illustrious scholars, proposed the compilation of a major dictionary of the German language. The project was intended to supplant previous works in the field, and given the historical approach Grimm had been advocating and practicing since 1816, it was clear that the lexicographical undertaking was to include all words in the German language that had existed since its earliest times, even if they had fallen into disuse. The organizational and logistical problems were tremendous (see Kirkness, 1980 for details). Work on the *Deutsches Wörterbuch* occupied the brothers Grimm until the end of their lives. In 1840 both accepted calls to the University of Berlin; the concluding volume appeared 100 years after their death, in 1960.

It is impossible to assess Grimm's scholarly accomplishments in one short article, even if attention is restricted solely to his linguistic work, which was just one among many of the fields to which he made lasting contributions. Although the importance of the work of such scholars as Adelung, Vater, Bernhardi, and others (to whom Grimm was indebted in many ways) should not be underestimated, it remains a fact that it was only from the early 19th century onwards, and with Rask, Bopp, Grimm, and a few others, that linguistic studies were developed into a recognized and organized profession. The importance and novelty of the approach was recognized by Grimm's contemporaries; his work became paradigmatic in many areas of German and Germanic studies. Although he argued in favor of retaining traditional Latin grammatical terminology, to him is owed a variety of terms, such as *Umlaut*, *Ablaut*, *Anlaut*, *Inlaut*, and *Auslaut* as well as (the not so successful) *Rückumlaut*, and, of course, 'strong' and 'weak' declensions, to which may be added *Brechung* ('breaking'), a phenomenon he was the first to describe.

See also: Adelung, Johann Christoph (1732–1806); Bopp, Franz (1791–1867); Norse and Icelandic; Pedersen, Holger (1867–1953); Pott, August Friedrich (1802–1887); Rask, Rasmus Kristian (1787–1832); Schlegel, August Wilhelm von (1767–1845); Schlegel, Friedrich von (1772–1829); Schleicher, August (1821–1868); Sound Laws.

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(For a full bibliography of Grimm's writings, see his 1871 *Kleinere Schriften 5*, 482–502.)

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Gross, Maurice (1934–2001)

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Maurice Gross, a leading French linguist, born in Sedan (France), on July 21, 1934, was educated in mathematics in the École Polytechnique in Paris (1955). He soon joined (1960–1964), as a translator computer scientist, the Computing Agency of the Army Laboratory dedicated to Machine Translation (French, English, German, Russian) in partnership with the CNRS. In 1961, he moved to Harvard and MIT as a UNESCO scholarship holder, where he met Chomsky and other American linguists. Going back to Paris, he joined the Blaise-Pascal Computing Laboratory, where he worked on formal grammars in association with Marcel-Paul Schützenberger. In 1966, he obtained his Ph.D. (with a comparison between French and English substantival clauses) at the University of Pennsylvania with Zellig Harris. He earned his Doctorat-ès-Lettres in 1969 from the Sorbonne for his theses *Lexique des constructions complétives*. He began as a linguistics professor (after a year as associate professor in Aix-en-Provence) at the University of Paris in 1968, founding the Linguistics Department of Vincennes with Jean Dubois and Nicolas Ruwet. Later (1972), he joined the Linguistics Department of the University of Paris 7, until his untimely death. He remained all his life very close to Harris's grammatical approaches (he also translated Harris's syntactic lectures at the University of Paris-Vincennes, 1976).

In 1967, he founded the LADL (Laboratory of Linguistics and Automatic Documentation) as part of the CNRS, and he built, with his team, an exhaustive, empirically-based inventory of the 'lexicon-grammar' of French which, 30 years later, still remains the most complete syntax-based lexicon available. Long before computers could facilitate large-scale lexically-based language study, this syntactic dictionary allowed an automatic data processing: each lexical entry (for example, a verb) is associated with all its syntactic uses in sentences, i.e., the different clauses built with this item, and these properties are mentioned using '+' or '−'. After an extensive study of French verbs on his principles, he and his team built each 'lexicon-grammar' of predicative nouns, adjectives, adverbs and conjunctions. This syntactic research on French was followed by similar researches all over the world by researchers who have adopted the Gross model of description on their own language (such as Romance languages, Greek, standard German, English, Korean, Malagasy, Arabic Languages, Mandarin (Chinese), and so on), insofar as this model of description serves as a computational model for any language. His own published papers and books reach 200 items, some of them, including two books, yet unpublished. Until his last days, he always was thinking on the results of his grammatical description and other subjects, as these unpublished works testify.

See also: Computational Language Systems: Architectures; Computational Lexicons and Dictionaries; French; Grammatical Meaning; Machine Translation: Interlingual Methods.

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Guadeloupe: Language Situation

Editorial Team

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Part of the Leeward Islands, Guadeloupe has been under uninterrupted French control since 1816, although French presence in the archipelago goes back to 1635. The French overseas department of Guadeloupe comprises six inhabited islands. Guadeloupe proper is in fact made up of two islands, Basse-Terre and Grand-Terre, which are divided by a narrow sea channel, and one of the Guadeloupian islands, Saint Martin, is shared with the Netherlands – the southern part of the island is known as Sint Maarten, and is part of the Netherlands Antilles. The official language of Guadeloupe is French and 90% of the 444 515 inhabitants are literate. A number of Lesser Antillean Creole French dialects are spoken by approximately 335 000 Guadeloupians: Guadeloupe Creole (Patwa, Patois, Kreyol), St. Martin Creole, Marie Galante Creole, and St. Barth Creole. There is also a dialect Virgin Island Creole English spoken in Guadeloupe known as St. Barth Creole English. The 18 radio and five television stations broadcast mainly in French, but also in Lesser Antillean Creole French.

See also: Pidgins and Creoles: Overview.

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Guam: Language Situation

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Southernmost of the Mariana Islands, Guam is situated in the northern sector of the Pacific Ocean approximately 3300 miles west of Hawaii, 1500 miles east of the Philippines, and 1550 miles south of Japan. Ferdinand Magellan's visit of 1521 is the first recorded Western contact with the island. Guam was formally claimed by Spain in 1565, but following the Spanish-American War in 1898, it was ceded to the United States, who purchased it from Spain in 1899. During World War II, Guam fell under Japanese control for a 3-year period. Today, Guam is an organized, unincorporated territory of the United States that comes under the jurisdiction of the Office of Insular Affairs, a division of the Department of the Interior. The official languages on Guam are English and Chamorro, an Austronesian language that shows Spanish influence. Both are taught in school and appear in official documents. About 50% of the population communicates in Chamorro and about 80% of ethnic Chamorros have some command of the language. Chamorro is gaining in importance and it is taught at the University of Guam.

See also: Austronesian Languages: Overview; North Mariana Islands: Language Situation.

Language Maps (Appendix 1): Map 150.

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See also: Austronesian Languages: Overview; North Mariana Islands: Language Situation.

Language Maps (Appendix 1): Map 150.

Guaraní

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Guaraní (or *Avañe'ẽ*) is the name of a language spoken in parts of the South American lowlands, in particular in the basin of the Paraná and Paraguay rivers. It is one of the official languages of Paraguay, where it is the mother tongue of a majority of the population. The present number of speakers of Guaraní is estimated at 5 000 000. It survives as a minority language in neighboring areas of Argentina (Corrientes, Misiones) and Brazil (Mato Grosso do Sul, Paraná). In Bolivia, Guaraní (*guaraní boliviano*) is the name used for the closely related Chiriguano language. Originally an Amerindian language, Guaraní is now used by most layers of the Paraguayan population, regardless of their Indian or mixed background. They often speak a variety of Guaraní with a heavy Spanish admixture, called *jopará*. More conservative varieties of Guaraní are spoken by tribal groups such as the Chiripá (called Nhandéva in Brazil), the Mbyá and the Paĩ-Tavyterã (or Kaiová). The purity of the Guaraní literary language is watched over by writers and academic institutions.

The Guaraní language is part of a larger family, Tupi-Guaraní, which has a wide distribution in the South American lowlands. The latter also includes Tupinambá, the language that was used as a general language (*língua geral*) along the coasts of Brazil before the 19th century. Tupi-Guaraní, in its turn, is part of a larger stock named Tupí, which may be distantly related to the Cariban and Macro-Ge families. The original area of diffusion of both Tupi-Guaraní and its Tupí sister languages appears to be the Guaporé basin in southwestern Brazil (state of Rondônia). The expansion of the Tupi-Guaraní peoples may have occurred shortly before the European conquest. The strong position of Guaraní in Paraguay is related to the consequences of Jesuit missionary policy during the 17th and 18th centuries (*see* **Paraguay: Language Situation**). The first authoritative grammar of Guaraní was written by a Jesuit, Antonio Ruiz de Montoya (1640).

Modern Paraguayan Guaraní differs from the language described by Montoya in that it has lost some of its original morphophonemic complexity. Guaraní is a mildly polysynthetic language with a loosely structured morphology. It uses both prefixes and suffixes, the former being more tightly bound to the root than the latter. Guaraní prefixes indicate person (of subject, object, and possessor), mood (subjunctive, imperative), reflexive, reciprocal, accompaniment, and causative (except for transitive stems). There are two portmanteau prefixes that indicate the combination of a first person actor with a second person patient, e.g., *po-hecha* [pohe'ʧa] 'I see you (plural)' (*po-* '1st person actor with 2nd person plural patient'). Suffixes indicate case, diminutive, collective, causative (of transitive stems), future tense, mood (wish, intention, etc.), nominalization, subordination, and several other verbal categories. Some grammatical categories (aspect, number, most tenses) are indicated by elements that are best interpreted as separate words, as in *o-mba'apo hína* [õmbaʔa'po 'hĩnã] 'he is working' (*o-* '3rd person actor; *hína* 'progressive aspect'). Negation is usually indicated by a combination of a prefix and a suffix, as in *nd-o-hó-i* [ndo'hoj] 'he does not go' (*nd(a)-..-i(ri)* 'negation'; *o-ho* 'he goes'). Noun incorporation (both of subject and object) is frequent, especially in the colloquial language. Most incorporated nouns refer to body parts; e.g., *che-akã-rasy* [šẽãkãra'sï] 'I have a headache' (*che-* '1st person subject'; *akã* 'head'; *(-r)asy* 'hurt').

Like many other South American lowland languages, Guaraní features a so-called active/stative system. That is, transitive verbs are inherently active, but intransitive verbs can be classified either as active or as stative; compare active *a-guata* [aɣ^{w}a'ta] 'I walk' (*a-* '1st person singular actor') and stative *che-mandu'a* [šẽmãndu'a] 'I remember' (*che-* '1st person singular subject'). Adjectives (quality verbs) can be treated as a subclass of the stative verbs. Possessed nouns can also express the notion 'to have'; e.g., *che-róga* [še'roɣa] 'my house' (*che-* '1st person singular possessor,' *(-r)óga* 'house'), but also 'I have a house.' This makes it difficult to distinguish between stative verbs, on one hand, and expressions of possession, on the other.

Many nouns and stative verbs are subject to an alternation of their initial consonant (the most frequent set is *t-/r-/h-*) depending on the construction in which the form occurs; e.g., *téra* 'name,' *che-réra* 'my name,' *héra* 'his/her name.' Most prefixed forms take *-r-*; forms with initial *r-* also indicate the core of a genitive construction, in which the modifier precedes the modified; e.g., *yvága rape* [ï'vaɣa ra'pe] 'the road to heaven' (*yvaga* 'heaven,' *tape* 'road').

Grammatical relations, except subject and inanimate object, are indicated by case markers, postpositions, or combinations of both. Case markers tend to merge with pronouns or pronominal prefixes into special forms; for instance, *ha'e* [ha'ʔe] 'he, she, it' with ablative *-gui(ve)* [ɣ^{w}i'(ve)] is realized as *(i)chugui* [(i)šu'ɣ^{w}i]; with comitative *-ndi(ve)* [ndi'(ve)] as *hendive* [hẽndi've], etc.

Guaraní is widely known from the linguistic literature as an example of the existence of prosodic nasality or nasal harmony (a common feature in Amazonian languages). It has six oral and six nasal vowels. Prosodic nasality takes its source from a (stressed) nasal vowel or a nasal consonant and spreads leftward covering the root that contains the source as well as all its prefixes. Suffixes show a more independent behavior: they may adapt to the root or maintain their own nasality/orality structure. When nasality is generated by a nasal consonant (/m/, /n/, /ŋ/, /ŋ^{w}/) the latter marks the beginning of an oral domain, hence it is realized as half-nasal half-oral [mb, nd, ŋg, ŋg^{w}], e.g., in *marangatu* /maraŋa'tu/ [MÃŘÃŋga'tu] 'holy' (the nasal domain is indicated in small caps). Guaraní roots generally have final stress. When stress is penultimate, rightward nasal spread can occur as well. Some suffixes are affected by rightward spread, e.g., *kuña* + *-pe* → *kuña-me* /ku'jã-me/ [kũ'ñãmẽ] 'to the woman' (*-pe* 'dative').

See also: Bolivia: Language Situation; Brazil: Language Situation; Paraguay: Language Situation; Tupian Languages.

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Guatemala: Language Situation

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Twenty-four languages are spoken in Guatemala: Spanish, the Arawakan language Garífuna, the language isolate Xinka, and twenty-one Mayan languages. Approximately half of the population of Guatemala is indigenous, totaling over seven million people (estimates of the indigenous population range from 40% to 60%). Estimates of the number of speakers of indigenous languages in 2001 (Richards, 2003) give figures of a little over three million, or only 50–60% of the indigenous population at that time.

Garífuna (Carib, Black Carib, and Caribe) is the language of an Afro-Caribbean group (Garífuna) located in the port areas of Livingston and Puerto Barrios that is relatively small in Guatemala. Few of its members are speakers of Garífuna. The group has ties to the larger Garífuna population of Honduras and to Garífuna communities in Belize and Nicaragua. The Garífuna were latecomers to Guatemala, arriving in 1805 (Richards, 2003: 54). The Garífuna language is Arawakan (a very large South American language family), and it became the language of this Afro-Caribbean group after Africans, brought to the Caribbean by the slave trade and ship-wrecked, intermarried with Arawakan speakers on the island of Saint Vincent, British West Indies. They were expelled from Saint Vincent in 1797 (Campbell, 1997: 402) and became established in the coastal areas of Central America shortly thereafter.

Xinka (Xinca) is a moribund language in southeast Guatemala. It once consisted of four related languages, all but one of which are probably now extinct, and has no known other affiliations (Campbell, 1997: 166). Xinka pre-dated Mayan groups in the area and probably at one time had a larger extension, because toponyms from Xinka extend into El Salvador and Honduras. Xinka speakers likely also had a simpler technology than did the Mayas, because most Xinka terms for domesticated plants come from Mayan languages (Campbell, 1978). The remaining Xinka speakers are estimated to be fewer than ten.

Twenty-one Mayan languages are recognized by the Academia de las Lenguas Mayas de Guatemala. They belong to five of the six branches of the Mayan language family (see **Figure 1**) and are spoken by what some estimate to be the majority population of Guatemala. The language names and numbers of speakers are given in **Table 1** (population estimates for 2001 from Richards, 2003). The language names are spelled according to the norms established by the Academia de Lenguas Mayas de Guatemala; alternative spellings are given in parentheses (the

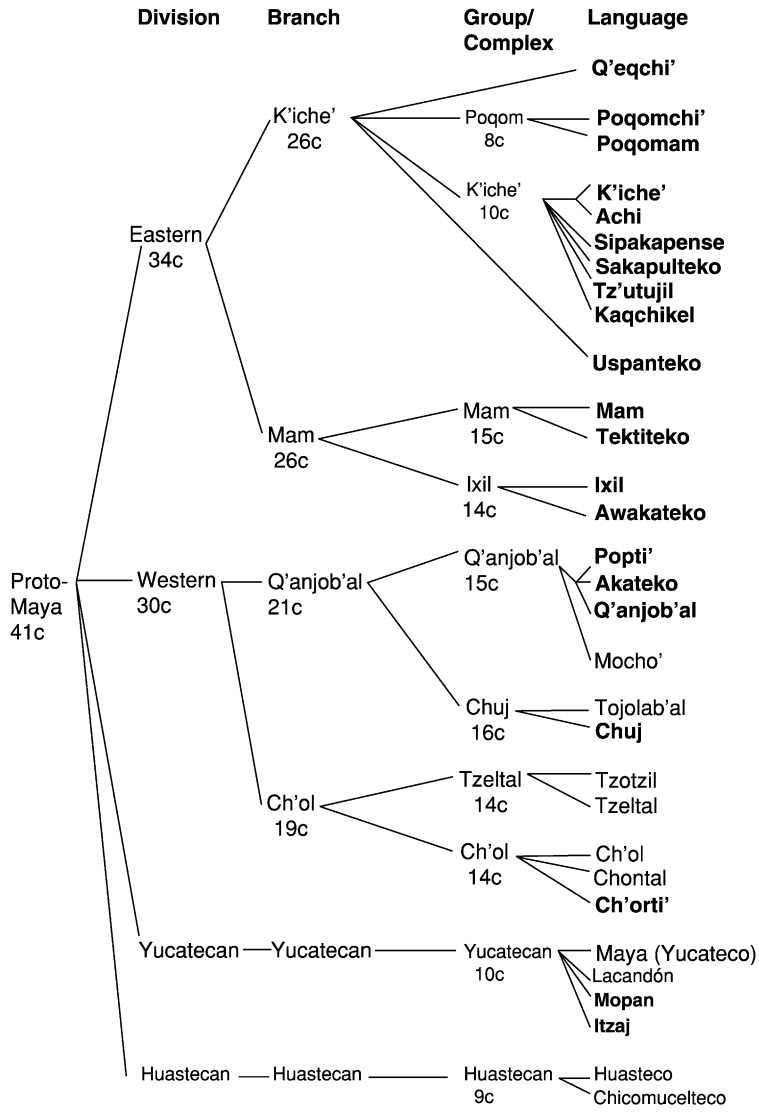

Figure 1 The Mayan language family (Kaufman, 1974: 85).

Ethnologue list of Mayan languages is notoriously inaccurate and will not be used here).

The exact number of Mayan languages spoken in Guatemala has been an issue of debate in recent years. In particular, the language Achi is linguistically a dialect of K'iche' but for sociolinguistic and political reasons is now considered to be a separate language, and the language Akateko until very recently was considered by its speakers to be Q'anjob'al. Discussions about the language/dialect status of several varieties of other languages are on-going. One current in that discussion is in favor of unification of language varieties to the extent possible; there have thus been proposals to consider Poqomam and Poqomchi' to be one language instead of two. At the same time, an opposite current promotes separation of languages as a marker of local identities. The most extreme case of proposed separation has been that of Chalchiteko, a dialect of Awakateko spoken by part of the population of the town of Aguacatán (the only town where Awakateko is spoken).

Language shift into Spanish is reducing the number of speakers of indigenous languages in Guatemala. Shift, in most instances, has been fairly recent (within the last 20 years), and Mayas themselves are not fully aware of the extent of the shift. Although the fact that children are not learning the language in many areas is self-evident, Mayas still tend to think of their communities as composed entirely of speakers of a Mayan language. The extent of shift into Spanish differs

Table 1 Mayan languages of Guatemala

Language	*Number of speakers*
Achi (Achí)	51 593
Akateko (Acateco)	5 572
Awakateko (Aguacateco)	16 272
Ch'orti' (Chortí)	9 105
Chuj	38 253
Ixil	69 137
Itzaj (Itzá)	123
Kaqchikel (Cakchiquel)	475 889
K'iche' (Quiché, K'ichee')	922 378
Mam	519 664
Mopan (Mopán)	468
Popti' (Jakalteko, Jacalteco)	38 350
Poqomam (Pocomam, Pokomam)	9 548
Poqomchi' (Pocomchí, Pokomchí)	69 716
Q'anjob'al (Kanjobal)	99 211
Q'eqchi' (Kekchí)	726 723
Sakapulteko (Sacapulteco)	3 940
Sipakapense (Sipacapense, Sipacapeño)	6 344
Tektiteko (Teko, Tectiteco)	1 241
Tz'utujil (Tzutujil, Tzutuhil)	47 669
Uspanteko (Uspanteco)	1 231

significantly for different regions and languages. In general, proximity to a major urban center or an international border increases the degree of language shift and loss, but local factors may speed up or retard the extent of the shift. Languages themselves range from moribund (Xinka) to highly endangered (Itzaj (Itzá), Mopan (Mopan), and Garífuna) to moderately or slightly endangered. Even the languages with the largest number of speakers include geographical areas that show advanced language loss (for instance, the city of Quetzaltenango in the K'iche' area). In spite of increased shift, a majority of the population in a majority of Mayan towns speaks a Mayan language.

Mayan languages have a series of plain voiceless stops and affricates matched by a series of glottalized stops and affricates, glottal stops, voiceless fricatives, and several voiced nasals, liquids, and glides. Most Mayan languages distinguish five long and five short vowels. Major word classes include nouns, transitive verbs, intransitive verbs (quite small; fewer than 50 roots), positionals (very large; 400–600 roots), adjectives (small; fewer than 50 roots), 'affect words' (large; more than 400 roots), and adverbs. They have a moderate amount of inflectional (mostly prefixing) and derivational (mostly suffixing) morphology, are verb-initial (either VOA or VAO), show ergative cross-referencing of arguments on verbs, and have passive and antipassive voices as well as several other voices (agent focus and applicative) depending on the language. Stative predicates are nonverbal.

Guatemalan Spanish is spoken natively by the non-indigenous population (Ladinos) and as a second language, and increasingly, a native language by part of the indigenous population. It is a distinct dialect of Spanish. It is characterized, among other things, by a phonology that is distinctly non-Caribbean (no *s* dropping and slower rate of enunciation); characteristic vocabulary, some of which is shared with Mexico or other countries in Central America; the use of a partitive or pleonastic possessive ("*tengo una mi camisa que me gusta mucho/I have a shirt that I like a lot*"); and the use of the *vos* pronoun and verbal forms for the marked second person singular, while *usted* is used for the unmarked second person singular. Spanish is the official language of Guatemala and the language for most official functions of the government, although bilingual education has brought the use of indigenous languages into the schools (starting about 20 years ago) and provision for the use of legal interpreters is currently beginning to be made.

See also: Mayan Languages; Spanish.

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Gudandji *See:* Wambaya.

Guillaume, Gustave (1883–1960)

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Gustave Guillaume was born December 16, 1883. His early education remains obscure, but in 1914 he became a student of Antoine Meillet (1866–1936; *see* **Meillit, Antoine (Paul Jules) (1866–1936)**) at the Ecole des Hautes Etudes in Paris, at Meillet's invitation. In 1919 he published *Le problème de l'article et sa solution dans la langue française* (awarded the Prix Volney), the first extensive examination of article function; articles are actualizers, which when added to an underlying noun, or noun in tongue (i.e., *langue*), creates a surface noun phrase, or noun in discourse (discourse replaces Saussure's term 'parole'; *see also* **Saussure, Ferdinand (-Mongin) de (1857–1913)**; **Saussurean Tradition in 20th-Century Linguistics**).

In 1929 he published *Temps et verbe. Théorie des aspects, des modes et des temps*, in which he presented verbal systems as cognitive systems having successive developmental stages, which can be detected by complexity of form and surface usage. Language is no longer seen as static, but as an activity, the creation of discourse. In 1931 he became vice-president of the Société Linguistique de Paris, and in 1934 its president.

Subsequent to the death of Meillet, he was appointed lecturer at the Ecole des Hautes Etudes in 1938, and taught there until his death in February, 1960. The classes had a regular clientele, some of whom attended year after year. During these 22 years, he further developed the view that a language is a cognitive structure, in which content is primary, and morphosyntax, since its only role is to make the content perceivable, is secondary. His Law of Coherence states that a content system (e.g., nominal number) is fully coherent, so that irregular plurals (e.g., mice, teeth) are just as regular in their cognitive content as other plurals. His Law of Simple Sufficiency states that the morphosyntax easily tolerates irregularity; it only has to be regular enough to reflect sufficiently the coherence of the content system that it marks. He also developed his views on the act of language, the cognitive activity of the speaker in creating discourse, a study to which he gave the name of 'psychomechanics,' since it deals with mental mechanisms.

In his last years he published one book and some 20 articles, gathered into a posthumous volume (1964). In his last decades his ideas began to be disseminated by others, notably Moignet, Stefanini, Molho, in France, and Roch Valin in Canada. On his death he left his papers, including the draft text of every lecture given during the 22 years at the Hautes Etudes, to Valin, who subsequently founded the Fonds Gustave Guillaume at Laval University in Quebec City as a research center in psychomechanics. By 2000, 16 volumes of the lectures had undergone joint publication in Canada and in France, with another 19 still to come. A volume of important excerpts has also appeared (1973); it was translated into English (1984), and then into half a dozen other languages. In 2003 an important manuscript that he had completed just before his death was published: *Prolégomènes à la linguistique structurale 1. Essais et mémoires de Gustave Guillaume*, a profound and coherent presentation of his linguistic thought, with a second volume in 2004, which also contains notes for two further volumes that he had planned. There are further volumes to come, and the fact that the value of these is undiminished after almost fifty years is an indication that Guillaume was a most original penetrating thinker, as recognized by his faithful audience at the Hautes Etudes (many of whom had distinguished careers of their own).

See also: Classical Antiquity: Language Study; French; Linguistic Anthropology; Meillit, Antoine (Paul Jules) (1866–1936); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics.

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Language Endangerment and State of Documentation

Several Guinean languages or varieties of languages are in danger of extinction. Language endangerment in the multilingual context of Guinea is mostly due to language shift to contact languages with higher prestige or weight. In the south of the country, however, in areas adjacent to Sierra Leone and Liberia, prolonged civil wars leading to the killing or relocation of parts of the population contribute as external factors to language death. The most threatened languages are spoken on the coast, where they are in contact with Soso, which spreads rapidly. Thus, some varieties of the Atlantic language Baga are already extinct, and others immediately endangered. The Atlantic languages Mmani, Nalu, and Landoma are also being replaced by Soso. In the Fuuta Jalon area, Pulaar is eliminating the Jalonke variety of Yalunka as well as the Atlantic languages Basari and Konyagi and pockets of other Mande languages. Toward the Malian border, varieties of Maninka attract speakers to the detriment of other languages. All the endangered languages of Guinea are not well described or altogether undescribed; in the cases of Mmani and Jalonke, a documentation and description is under way. For at least one variety of each of the major languages of Guinea, a grammatical description exists – although often with a limited scope. Even for these languages, more comprehensive descriptions are not available, however, and the documentation of corpora of primary data is practically nonexistent to date.

See also: Fulfulde; Mande Languages.

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Guinea-Bissau: Language Situation

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Guinea-Bissau has more than 23 major spoken languages and are presented here in their importance in terms of speakers, Creole, Balanta, Fula, Manjaco (Mandjak), Mandinga (Mandinka), Papel, Beafada (Biafada), Mancanha (Mankanha), Bijaco, Felupe (Ejamat), Portuguese, Mansonca, Banhum, Nalus (Nalu), Soninke, Pajadinka (Badjara), Baiote (Bayot), Cassanca, Cobiana (Kobiana), Bassari (Basari), Sarakule, Suso (Susu), Djacanca, Cassamacunda; though some authorities say there are as many as 31 different languages in the country. Among these, however, only four of them are written languages with agreed alphabets – Balanta, Bijaco, Creole, and Papel – each of which has a limited number of available literatures in the form of short stories, poems, and the Christian Bible (the New Testament) (Augel, 1996). The aim of this article is to review critically one of these written languages, Creole, by examining its meaning, etymology, and structure according to linguistic theory, and to review its use as the national language of Guinea-Bissau.

The term *creole* in the archaic Portuguese (Crioulo/Criolo) from 1632 to 1643 signified a mixed-race

person, as well as a male Negro born in Brazil. The term also stood for 'a white man or woman originating from the colonies, and in 1873, the slave who is born in the house of the master' (Corominas, 1934 and Vieira as quoted in Valkhoff, 1966). It was not, however, until the end of the 17th century that the term *creole* was used in writing to signify a language, which is a usage found, for example, in Coelho's work on Guinea-Bissau (1684); though it was still possible that the term may have existed long before it came to be written down in the seventeenth century.

Etymologically, the word *Creole* derives from the Latin *creare,* meaning 'to beget' or 'create'. The term it came to infer a language born out of the interaction between the Portuguese mercantile settlers who resided among the natives in Guinea-Bissau soon after the first contact in 1446 (Lingna Nafafé, 2001). It was in some of the old commercial towns and market centers in Guinea-Bissau, such as São Domingos, Cacheu, São Filipe, and Geba, that Creole emerged among these settlers. There are those, however, who espouse the view that Creole as a language originated in Cape Verde and was later taken into the mainland of Guinea-Bissau by the Cape Verdean merchants (Lobba and Mendy, 1994).

Other theories have also been proposed (Couto, 1992). Among them are five significant hypotheses. (1) The *monogenetic hypothesis* suggests that the Creole language had its origin as a pidgin of Portuguese (Valkhoff, 1966; Schuchardt, 1980; Bollée, 1977; Maurer, 1987; Perl, 1990). (2) There is the *continental hypothesis* that says Creole originated in mainland Guinea-Bisau and was subsequently taken to the Cape Verde; thus the Africans taken from Guinea-Bissau brought with them the Creole language (Barros, 1897 and 1899; Bull, 1989). (3) There is also the opposite view, an *insular hypothesis,* that states the Creole language originated in the Cape Verde and was then taken by Cape-Verdeans to Guinea-Bissau (Nolasco da Silva, 1970; Carreira, 1972; Quintino, 1964). (4) The *ambiguous hypothesis* suggests that Creole came about simultaneously from Cape Verde and Guinea-Bissau (Rougé, 1986). (5) There is a hypothesis based on *knowledge of the language* that states that pidgin, which became the base for Creole, originated in Portugal when interpreters who had been kidnapped from Guinea-Bissau exchanged their knowledge of the language, and thereafter Creole was taken to Africa (Zurara, 1949; Naro, 1978).

Today, Creole is the lingua franca in Guinea-Bissau, spoken by 60% of the population. Guinea-Bissau Creole as a language has a definite grammatical structure, syntax, and phonetics that are much closer to Guinea-Bissau languages. It borrows vocabulary extensively from Portuguese and its African counterpart (Barros, 1897 and 1899; Bull, 1989). However, although Creole is widely spoken by the majority of the people in the country, it is not yet being used as the language of education (Massa, 1996). This prospect has been hampered by political motives that emerged from the liberation movement of the 1960s (Cabral, 1974).

Cabral's contention was that Creole was based on the use of Portuguese as a language of scientific enquiry as opposed to the Balanta or Mancanha languages (Cabral, 1974). Cabral was one of the founders and a leader of PAIGC – the national party of Guinea-Bissau, which fought for national independence from Portugal. According to him, the colonizers' language could be regarded as a useful tool for the development of Guinea-Bissau society. He stated that 'Portuguese [language] is one of the best things that the whites [Europeans] have left us with . . . [it] can express concrete truths, relatives, for example, in science. For instance, we say that the Moon is a natural satellite of the Earth. Try saying 'natural satellite' in Balanta or in Mancanha!' (Cabral, 1974). It must be remembered that Cabral was writing at the time of the resistance movement, whose general sentiment was to reject what was viewed as imperialist, hence, colonialist. The cry of re-Africanization was a cry to return to Guinea-Bissau roots, that is, to Guinean culture. (Lingna Nafafé, 2001). Even so, if such borrowing is possible and acceptable, as Cabral proposed, it follows that the word *satellite* can be used in Balanta or Mancanha, for it is a Latin word that has already found its way into the Portuguese language.

Inside the country there has not been a clear discontinuity with Cabral's rationale. This has to be explained on the basis of the socio-political milieu of the minority elite in power who still regard the Portuguese language as a carrier of knowledge, even though it is only spoken by a minority of Guinea-Bissau's population. The debate on the importance of the Portuguese language in the country continues. However, it is not likely that Creole will soon threaten Portuguese as the language of formal education and the official language of Guinea-Bissau.

Language Maps (Appendix 1): Map 16.

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Gujarati

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History and Literature

Scholars historically distinguish Old Gujarātī (12th–15th centuries); Middle Gujarātī (15th–18th centuries); and Modern Gujarātī (18th century onward). Its antecedents are traceable to a distinct Old Western Rajasthānī literary form, despite the attestation of Jain Prākrit treatises and studies by Middle Indian grammarians of *Nāgara Apabhraṁśa*, a literary *Apabhraṁśa* of Gujarat. The 12th-century *Bharateśvarabāhubalirāsa* (1185) is the earliest work written in Gujarātī. Prose and verse compilations written from the 13th century onward exist and include the seasonal poem *Vasantavilāsa* and the 14th-century commentary, the *Ṣaḍāvaśyakabālabodhavṛtti*. Narasiṃ ha Mehtā's (c. 1414–1480) devotional ballads marked a new era in poetry, acquiring pride of place in its literary annals. The Gujarātī daily, *Mumbai Samācār* (established in 1822), is one of the oldest newspapers in Asia. Bombay Parsis were pioneers in Gujarātī and Urdū theater from the 1850s.

Dialects

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Guinea: Language Situation

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Overview and Major Languages

The republic of Guinea with its capital Conakry is located on the Atlantic coast of West Africa and has approximately 8 000 000 inhabitants. According to the Ethnologue (2004), 33 languages, including the official language French and Guinean Sign Language, are used in the country. Information on numbers of speakers and on criteria for identifying languages is unreliable, however. The colonial language French is used in administration and formal schooling but is not understood by the vast majority of the population. Schooling rates and school life expectancy are extremely low, and the scope and success of adult literacy programs are restricted. Therefore, the number of Guineans with a limited competence in French and resulting literacy in the roman script is low and stagnating, with estimates ranging from 28 to 35% (Ethnologue, 2004) to 43% (UN Statistics Division, 2003). The indigenous languages of Guinea all belong to the Mande and Atlantic branches of the Niger-Congo language phylum and have lexically and grammatically influenced each other considerably due to language contact.

Major Languages

Three of the vernacular languages are used as regional *linguae francae* in Guinea and partly also in neighboring countries. These languages are the Pulaar (Fuuta Jalon) variety of Fula, with more than 2 million speakers, Maninka, with close to 2 million speakers, and Soso (Susu) with approximately 800 000 speakers in Guinea. Fula is a major African language distributed in a dialect continuum over the entire Sahel belt. The Guinean variety of Fula is mainly spoken in the Fuuta Jalon, a mountainous area in the north of the country, but also by speech communities in the capital. Maninka belongs to the Manding dialect cluster, which covers large parts of Mali, Eastern Senegal, and the north of Côte d'Ivoire and is spoken in Eastern Guinea. Soso is the only vehicular language that is almost exclusively present in Guinea. Soso is spoken on the coast, in and around the capital Conakry. None of the indigenous languages is currently used as a medium of formal education or in official contexts. The national language policy of introducing eight languages into primary education, Pulaar (Futa Jalon), Kankan Maninka, Soso (Susu), Kisi (Northern Kissi), Guinea Kpelle, Loma, Konyagi (Wamei), and Basari was discarded after the death of the first president after independence, Sékou Touré, in 1984. Attempts to develop indigenous languages by equipping them with orthographies based on the roman alphabet have largely failed, partly because of competing existing literacies using nonroman scripts. Once the language of the theocratic Islamic kingdom of the Fuuta Jalon, Pulaar has a longstanding written tradition using an adapted Arabic script, the so-called Ajami, which is still prestigious and thriving. Due to the location of most Guinean languages in the sphere of influence of Islam, Q'uranic schooling and resulting literacy in Arabic are widespread and of greater weight than formal schooling throughout the country, except for mainly Christian areas in the south. Apart from standardized writing traditions such as Pulaar Ajami, literacy in Arabic is also often informally exploited for the writing of other Guinean languages in Arabic letters. For Maninka, the indigenous script Nko is still marginally in use and competes with Arabic writing traditions.

Mande Languages

Fourteen, or about half of the languages attested in Guinea, are Mande languages. With the exception of Dan and Mano, which belong to the Eastern branch of Mande and are spoken mainly in Côte d'Ivoire, they are Western Mande languages. Most of the other Mande languages are also attested in surrounding countries, e.g., Kpelle and Koranko (Kuranko) in Sierra Leone or Jahanka in Mali. Although also spoken beyond the borders of Guinea, Maninka, Soso, and possibly also Yalunka have more speakers in Guinea than outside.

Atlantic Languages

Seventeen, or slightly more than half of Guinean languages, belong to the Atlantic branch of Niger-Congo. Languages of both the Northern and the Southern branch of Atlantic are attested. By far the most important Atlantic language of Guinea is the Fuuta Jalon variety of Fula, also called Pulaar, followed by Northern Kisi (Northern Kissi) in terms of numbers of speakers. Some Atlantic languages, such as the Baga languages and East Limba, are confined to Guinea. Other language areas stretch across the borders into neighboring countries, such as Basari into Senegal and Landoma into Guinea Bissau.

Language Endangerment and State of Documentation

Several Guinean languages or varieties of languages are in danger of extinction. Language endangerment in the multilingual context of Guinea is mostly due to language shift to contact languages with higher prestige or weight. In the south of the country, however, in areas adjacent to Sierra Leone and Liberia, prolonged civil wars leading to the killing or relocation of parts of the population contribute as external factors to language death. The most threatened languages are spoken on the coast, where they are in contact with Soso, which spreads rapidly. Thus, some varieties of the Atlantic language Baga are already extinct, and others immediately endangered. The Atlantic languages Mmani, Nalu, and Landoma are also being replaced by Soso. In the Fuuta Jalon area, Pulaar is eliminating the Jalonke variety of Yalunka as well as the Atlantic languages Basari and Konyagi and pockets of other Mande languages. Toward the Malian border, varieties of Maninka attract speakers to the detriment of other languages. All the endangered languages of Guinea are not well described or altogether undescribed; in the cases of Mmani and Jalonke, a documentation and description is under way. For at least one variety of each of the major languages of Guinea, a grammatical description exists – although often with a limited scope. Even for these languages, more comprehensive descriptions are not available, however, and the documentation of corpora of primary data is practically nonexistent to date.

See also: Fulfulde; Mande Languages.

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Guinea-Bissau: Language Situation

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Guinea-Bissau has more than 23 major spoken languages and are presented here in their importance in terms of speakers, Creole, Balanta, Fula, Manjaco (Mandjak), Mandinga (Mandinka), Papel, Beafada (Biafada), Mancanha (Mankanha), Bijaco, Felupe (Ejamat), Portuguese, Mansonca, Banhum, Nalus (Nalu), Soninke, Pajadinka (Badjara), Baiote (Bayot), Cassanca, Cobiana (Kobiana), Bassari (Basari), Sarakule, Suso (Susu), Djacanca, Cassamacunda; though some authorities say there are as many as 31 different languages in the country. Among these, however, only four of them are written languages with agreed alphabets – Balanta, Bijaco, Creole, and Papel – each of which has a limited number of available literatures in the form of short stories, poems, and the Christian Bible (the New Testament) (Augel, 1996). The aim of this article is to review critically one of these written languages, Creole, by examining its meaning, etymology, and structure according to linguistic theory, and to review its use as the national language of Guinea-Bissau.

The term *creole* in the archaic Portuguese (Crioulo/Criolo) from 1632 to 1643 signified a mixed-race

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Dialects

Gujarātī spoken along the Baroda-Ahmedabad corridor is regarded as the standard/prestige dialect. (Whether the register of Nāgarī Brāhmaṇs carries

'RP' status remains debatable). Other dialects are Suratī (southern Gujarat), Carotarī (Charotari; central Gujarat), Kāthiāwārī (Saurashtra), and Pāṭānī (northern Gujarat). Pakistani Gujarātī is probably a Pāṭānī subdialect, and code switching is waning as the younger generation shifts to Urdū and provincial languages. Muslim speakers there and elsewhere obviously adopt Perso-Arabic lexicons – its largest word stock after Sanskrit – especially in religio-cultural discourse. Parsi Gujarātī, an ethnolect of the subcontinent's Zoroastrians is, however, readily intelligible. East African Gujarātī now contains Swahili loanwords. Kacchī (Kachchi) is semantically intermediate between Gujarātī and Sindhī and is also influenced by Mārwārī.

Grammar

Phonetically, Gujarātī is unique for murmured vowels developed from final /h/ and two open vowels, /ɛ/ and /ɔ/. An absence of contrast exists between short and long /*i*/ and /*u*/ vowels. Variable or invariable substantives and adjectives, as well as pronominals, have three genders (including the neuter) and two numbers; they inflect for direct and oblique forms, the latter with post-positions and clitics. Verbal forms have temporal, modal, and aspectual contrasts. Combinations of verbal nouns and adjectives with auxiliaries produce an elaborate variety of obligational and desiderative forms, and the vocabulary is rich in passive, causative, and double causative verbs (Cardona, 1965). Vector/compound verbs, a common New Indo-Aryan feature, are employed in restricted contexts with specific semantics.

Orthography

A manuscript dated 1592 (Mistry, 1996) attests that an alphasyllabic script derived from a Devanāgarī variant has been employed for writing Gujarātī and Kacchī since the 16th century. A cursive style replaced the standard Sanskrit script used in prose and verse when printing began during the 1830s. Independent and conjunct forms are expressed by 45 symbols: 8 vowels, 34 consonants, *anusvāra*, *visarga,* and a velar nasal grapheme. Written from left to right, Gujarātī is conspicuous for its absence of head strokes and varying phonemic modifications. As in other Brāhmī-derived scripts, the post-consonantal /*a*/ is evidently assumed in a consonant lacking diacritics. Devanāgarī-derived numerals were adopted with modified shapes for the digits 3, 5, 6, and 9.

See also: Code Switching; India: Language Situation; Indo–Aryan Languages; Indo–Iranian; Pakistan: Language Situation; Sindhi; Swahili; Zoroastrianism.

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Gullah

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Gullah is the name of the language spoken by the former African slaves and their descendants (also called Gullahs) living along the southeastern U.S. Atlantic coastline from the northern tip of North Carolina to Jacksonville, Florida, especially in the Sea Islands off the coast of South Carolina and Georgia and the bordering mainland areas (e.g., the low country). The Gullah language and its speakers are also respectively known as Geechee and Geechee(s), a local in-group term, and because of its negative connotation it is not used by outsiders. Other contemporary terms used to refer to the Gullah language and its speakers have included Sea Island Creole and Sea Islanders, but these terms have largely been restricted to the academic literature. Another more recent term that has sometimes been used to identify the Gullahs is Native Islanders, employed largely on Hilton Head Island to distinguish the native Gullah Sea Islanders from the influx of outsiders that began settling on the sea islands in the 1950s. However, this term has not received widespread acceptance among the Gullah population and Gullah still seems to be the preferred ethnic classification for the language and its speakers. Gullah has historical and linguistic links with Afro–Seminole, an offshoot of Gullah spoken by black Seminoles and their descendants, who were forced out of northern Florida to the west in the 1830s, and are now living in central Oklahoma, western Texas, and northern Mexico. The exact number of Gullah speakers today is uncertain because no census has attempted to distinguish the Gullahs from other African Americans living in the region.

History

The Gullahs are descendants of Africans brought from the Caribbean and directly from West Africa to provide the slave labor force for a plantation agricultural system, supported by English planters who began settling in the low country region in the late 1600s. The low country's rich fertile soil was ideal for the prosperous production of such plantation crops as rice, indigo, and the long-stapled Sea Island cotton for which the Sea Islands became known. The success of the plantation system was owed not only to the slave labor force but also to the agricultural and technical skills of the Africans, particularly in rice cultivation. Following the U.S. Civil War in 1865, the English planters abandoned their plantations, leaving the freed Africans and their descendants to eke out a living of their own. They engaged in small-scale farming, hunting, and fishing, and the relative isolation of the Sea Islands allowed them to preserve many of the traditions and customs of their African ancestors. Today, fish netting, basket weaving, woodcarvings, and quilting are some of the customs that characterize the rich cultural lifestyle of the Gullah people.

The etymology of the term Gullah has not yet been determined. Gullah may have derived from Ngola, the name of an African tribe in the Hamba basin of Angola, a West African region from which many of the Africans were transported, or it may have originated from Gola, the name of an African tribe and language near the Liberia-Sierra Leone border in West Africa. The etymology of Geechee is also unknown. Geechee may have derived from the Ogeechee River plantation in Georgia, the word gidzi in Mende to mean a country called Kissy (Liberia), or it may have come from the name of a tribe and language in Liberia. Equally obscure is how or when Gullah became the local ethnic classification for the enslaved Africans and their descendants living in the low country and their language. Historical citations show its first appearance in the literature in 1822, when the Charleston City Council records made reference to Gullah Jack and his company of Gullah or Angola Negroes. This indicates that its early use was associated with a particular group of Africans. However, the Gullah people and their language are far more diverse as both their historical development and language reveal.

Language Development

Gullah is the only English-based creole in the United States, although its origins are still speculative. Three hypotheses have been proposed of its development. One hypothesis suggests that Gullah developed from the Caribbean English spoken by the Africans and their descendants on plantations in the Caribbean and was brought with the African slaves when transported to the low country and subsequently learned and linguistically influenced by the Africans who were later imported into the region. Another hypothesis is that Gullah originated in a pidgin that developed on the West African coast and was brought with Africans imported to the low country. A third hypothesis suggests that Gullah developed on the plantations in the low country out of contact between English-speaking settlers and the various West African languages of the African slaves. Whatever the source, the retention of Africanisms in all components of the Gullah grammar is a common thread, and it is largely

these features, commonly associated with an African substratum, that is often used to distinguish Gullah from its English lexifier source.

Linguistic Characteristics

Gullah differs from General American English most obviously in its phonology. Some of these features include the use of the voiced bilabial fricative [**β**] or the voiced labiodental frictionless continuant [**ʋ**] for the voiced labiodental fricative [**v**] in English, e.g., [βɛri] cf. 'very,' [səʋænə] cf. 'Savannah'; the use of the voiced palatal nasal [**ɲ**] in, e.g., [ɲustə] cf. 'used to'; and the absence of interdental fricatives in, e.g., [tɪn] cf. 'thin' and [di] cf. 'the.' The prenasalized and labiovelar stops [**kp/gb**] were reported in early Gullah phonology but these sounds were largely used in the Africanisms, and although Africanisms are still present in the Gullah lexicon, they do not appear to be in widespread use among the Gullah today.

The Gullah lexicon is largely English. From his research conducted in the late 1930s, Lorenzo Turner was the first linguist to document over 4000 Africanisms in the Gullah lexicon, many of them used as basket names (e.g., Gullah nicknames). Today you can still hear in normal everyday conversations such African retentions as *buckra* 'white man,' *tita* 'elder sister,' *dada* 'mother or elder sister,' *nyam* 'eat/meat,' *sa* 'quickly,' *benne* 'sesame,' *una* 'you,' and *da* the verb 'to be.' Other Gullah Africanisms such as *cooter* 'turtle,' *tote* 'to carry,' *okra* 'plant food,' *gumbo* 'stew,' and *goober* 'peanut' are widely used in mainstream American English. In addition to direct loans, the Gullahs also employ a large number of calques, e.g., *day clean* 'dawn,' *day broad clean* 'full daylight,' *first dark* 'sunset,' *night shut-in* 'midnight,' *sweet mouth* 'flattery,' *bad mouth* 'to denigrate,' *i foot broke* 'to become pregnant,' *big eye* 'greedy,' and *hard head* 'dumb.'

Its most interesting features morphosyntactically include the pronominal form **unə** 'you' (2nd person sg/pl); nə 'and' (conj); də 'the verb be'; bɪn 'was'; sɛ/fə 'that' (complementizer); dɛm to refer to '& company' when postposed to proper animate nouns as in Suzi dem 'Susie and others' and 'those' as a demonstrative determiner to common nouns as in dem boy 'those boys.' Like its English lexifier creoles, Gullah also employs several preverbal auxiliaries within its tense, aspect and modal verbal paradigm. The primary auxiliaries are *də, ə, bɪn, don, dəz,* and *go,* which can occur alone or in combination with each other to express a wide range of tense, modal, and aspect meanings in past/nonpast contexts. These same forms function as lexical verbs. As an auxiliary [*də*] in *I də go* generally indicate durative and habitual meanings cf. 'I am/was going' and 'I generally go,' respectively. Habitual meaning is also expressed with the auxiliary [*d*ʌz]; the auxiliary [*də*] can also express iterative and perfective meanings. Its phonological variant [*ə*] indicates durative, habitual, iterative, and perfective meanings. The auxiliary [*don*] expresses perfective meaning in *I don go* cf. 'I have gone'; the auxiliary [*bɪn*] in, e.g., *I bɪn go* indicates anterior meaning cf. 'I went/had gone'; the auxiliary [*go*], as well as auxiliary [*ə*], expresses future meaning as in *I go go* or *I ə go* cf. 'I will/would go.' Gullah is not homogeneous, so the use of these grammatical forms and meanings may vary depending on the region (e.g., the sea island or mainland area the Gullah speaker originated) and sociocultural factors (e.g., age, education, socioeconomic status, etc.).

In the mid-1950s, developers launched the Sea Islands on an explosive growth in development and population called progress, which led to an unprecedented assault on the relatively stable Gullah people and their way of life. The Sea Islands, which had until then been isolated, were now connected by causeways and bridges to the mainland (only two islands, Daufuskie Island, South Carolina, and Sapelo Island, Georgia, still remain unattached to the mainland but have not escaped development). The possible extinction of the Gullah population was threatened and local organizations, such as the Penn Center, the Gullah Coalition, and Gullah Festival, were inaugurated and are now contributing to the preservation of the Gullah language and cultural identity.

See also: English, African American Vernacular; Pidgins and Creoles: Overview; United States of America: Language Situation.

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Gundert, Hermann (1814–1893)

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Hermann Gundert, a German missionary and pioneer of Dravidian linguistics, was born as the son of a merchant and founder of the Württemberg Bibelanstalt. He was educated at Stuttgart Gymnasium and, from 1827, at Maulbronn Seminar. After studies of theology at Tübingen, he passed the theological exams and received a Ph.D. there in 1835. He left immediately for India and started working at the British Mission in Tirunelveli under Karl Rhenius, who was also a Tamil scholar. After a brief time in Chittur, Tamil Nadu, he moved in 1838 to Basler Mission in Malabar (North Kerala). There he learned Malayalam, eventually to great perfection. He worked mainly in Tellicherry (now Talasseri). He was an eager educationalist and became Government's School Inspector for Malabar and Kanara in 1857. In 1859 an illness forced him to return to Germany, where he headed Calwer Verlag from 1860 onward. Gundert was one of the very first Western scholars to study the Malayalam language, and his grammar and dictionary remained for a long time the standard works in the field. The most important is the large dictionary, based on both extensive reading (with numerous text references) and wide experience of various forms of spoken language. He developed a special transcription to indicate the right pronunciation beyond the mechanical transliteration of the Malayalam script and strove to determine correct etymology for each work. In addition to the Bible translation (New Testament 1868, parts of the Old Testament) he also wrote a number of religious works in Malayalam. Many of his works appeared in the 1840s and 1850s in small lithographed editions in Mangalore and Talasseri. The biography of Hermann Mögling (1811–1881), his missionary friend and a noted Kannada scholar, appeared in 1882. His published diaries are an important source of his life and of 19th century South India.

See also: Malayalam; Missionary Linguistics.

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Gur Languages

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There are some 85 Gur languages within the Volta-Congo branch of the Niger-Congo family. These languages are used in an area that stretches from southeast Mali across the northern Ivory Coast, a large part of Burkina Faso, all of northern Ghana, northern Togo, northern Benin, and into northwest Nigeria. They predominate within the parallels 6°W and 2°E and 8°N and 14°N, the savannah lands north of the forest belt where the Kwa languages are spoken. The name 'voltaïque' is used in French.

The Speakers

The number of speakers of Gur languages is probably in the region of 12 to 15 million people. There is a wide range in the size of the Gur language groups; some are large, such as the Moore in eastern Burkina Faso numbering some four million; others are much smaller with only a few thousand speakers.

Gur Studies

The earliest record of Gur languages is found in S.W. Koelle's *Polyglotta Africana*, published in 1854, which includes word lists from 10 Gur languages. There was, however, little further mention of Gur languages until the 20th century. Westermann (1927) recognized the validity of Gur as a subfamily. Greenberg (1963) and Bendor-Samuel (1971) confirmed this classification and added considerable detail to earlier work.

The first in-depth study of any Gur language was the extensive work done by Manessy (1975, 1978) and Prost in the 1970s. The Summer Institute of Linguistics began research in Gur languages in northern Ghana in the 1960s; their efforts have produced several studies in recent years (see Naden, 1989).

Languages and Their Classification

Most of the Gur languages belong to two main groups – Central Gur and Senufo – but there are several languages that do not fall into either group. Furthermore, although there is little doubt about the grouping together of the languages in Central Gur and similarly of the languages in Senufo, this bringing together of these two major groups of languages into a single subfamily, Gur, is being increasingly questioned. However, because no other relationship to any other language group is any closer, Senufo remains within Gur for the time being.

Central Gur languages are found in northern Ghana, eastern Burkina Faso, and northern Togo and Benin and break down into two main clusters, Northern and Southern. In the Northern cluster, the Oti-Volta group predominates, with 27 out of 29 languages. These 27 languages can be subdivided into six unequal clusters with the largest, known as Western, having 13 languages, whereas the next largest, Gurma, comprises six languages. The Oti-Volta group includes a number of major languages, such as Moore, Dagaari, Dagbani, Frafra, Mampruli, Kusal (Kusaal), and Konkomba. It is noteworthy that the linguistic relationship among languages in the Oti-Volta group is considerably closer than that among languages in the Grusi group.

In the Southern cluster, the Grusi group comprises 20 of the 29 languages. The Grusi group is more scattered, with the seven eastern languages of the group being completely separated from the four northern and nine western languages by a substantial block of Oti-Volta languages.

Central Gur includes another dozen languages outside the Oti-Volta and Grusi groupings.

The Senufo group comprises 20 languages, of which 10 are related more closely to each other and form a subgroup, Senari. The Senufo languages are found on the western side of the Gur group in the northern Ivory Coast and southwestern Burkina Faso.

A further nine Gur languages do not belong to any of the groupings so far set up within Gur. Detailed studies of many more Gur languages are needed so that the relationships of the languages to each other can be established more clearly.

Structural Features

Phonetics and Phonology

Although there is a great deal of diversity among the Gur languages, a subgroup, such as Oti-Volta, includes languages with many features in common.

Consonant sets often include voiced and voiceless plosives and fricatives and nasals at five points of articulation: labial, alveolar, palatal, velar, and

labiovelar, plus l, y, and w. Phonetic [r] often occurs as a non-initial allophone of /d/.

The geographically contiguous northern and eastern Grusi languages display a vowel harmony system. A systematic contrast in vowel length is common throughout the Gur languages, as is the syllabic nasal.

All Gur languages are marked by contrastive tones, the domain of which is usually the syllable, but may be the word or the morpheme; these tones usually carry grammatical rather than lexical implications. There is no one tonal system; both terrace systems with two tones and downstep and systems with up to four contrastive pitch levels are found.

Both CV and CVC roots occur, as well as C(V) suffixes. In many languages, transitional vowels are inserted to avoid consonant clusters.

Grammar and Syntax

Most Gur languages have singular and plural class suffixes, and in some languages, pronouns and other NP elements concord with the head noun. The contrast between imperfective and neutral forms is very common and usually occurs by means of verbal extensions, though a tone change or vowel lengthening is also found. Other verbal categories are usually shown by particles, auxiliaries, or occasionally tone.

Aspect rather than tense is marked, though 'past' may be contrasted with 'nonpast' or 'future' with 'nonfuture,' and there are often time-depth particles (e.g., 'one day away' may be 'tomorrow' with future or 'yesterday' with nonfuture).

SVO is the predominant word order in Gur languages, though Senufo languages show SOV word order.

See also: Niger-Congo Languages.

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Malcolm Guthrie is widely known for his extensive and methodical research into the comparative linguistics and (pre)history of the Bantu languages of sub-Saharan Africa. Born February 10, 1903 in Hove (East Sussex), England, and having grown up in Ipswich (East Suffolk), Guthrie earned a B.Sc. in metallurgy at Imperial College London. In 1925 he went on to prepare for the ministry at Spurgeon's College, London, where his linguistic prowess became apparent in his study of Greek, Hebrew, and Latin. Guthrie later served as a Baptist pastor in Rochester (Kent) for several years.

Continuing his religious work, Guthrie served as a missionary with the Baptist Missionary Society at locations in the present-day Democratic Republic of the Congo, including Kinshasa (formerly Léopoldville), beginning in 1932. His work in the field spawned a lasting interest in the Bantu languages and it was not long after his arrival in Africa that he published a grammar and dictionary of Lingala (1935, subsequently revised and reprinted in French), a language which would be the subject of much of his later research, along with Chibemba (Bemba). In 1935 Guthrie took up studies at what would become the School of Oriental and African Studies (SOAS/University of London), most notably under Ethel O. Ashton (known for her work on Kiswahili (Swahili) and Luganda (Ganda)), while on furlough from his

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See also: Niger-Congo Languages.

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mission work. After his service as a missionary came to an end in 1940, he became a lecturer and, in 1942, senior lecturer at SOAS upon his return to England. Guthrie published a Lingala translation of the New Testament in 1942. He returned to Africa in 1942 to conduct linguistic fieldwork on a variety of Bantu languages and remained there until 1944. The data gathered during that visit would play a major role in Guthrie's later work, especially on Chibemba and his comparative studies of Bantu.

After returning to England once again, Guthrie was awarded a doctorate by the University of London in 1945 for his thesis entitled 'The tonal structure of Bemba.' Tonology would be of lasting interest to Guthrie. His growing attention to the areas of comparative language studies and classification resulted in the appearance of *The classification of the Bantu languages* in 1948. Guthrie became Reader in Bantu Languages in 1947 and beginning in 1950 and for the next 18 years, he headed the Department of the Languages and Cultures of Africa at SOAS. From 1951 until his retirement in 1970, Guthrie was Professor of Bantu Languages in the same department, which grew dramatically under his leadership. He also served on a wide variety of school (SOAS), university (London), and external administrative boards and committees and was Master of Downing College at Cambridge University from 1957 to 1972.

Although much of Guthrie's work is focused on particular languages such as Chibemba and Lingala, his comprehensive research on comparative Bantu encompassed over 200 languages. Guthrie established genetic relationships between Bantu languages with his two-stage method, which first involved collecting into comparative series cognate lexical items (those with similar meaning and which could be related by regular sound correspondences) from various languages. The relationships between the lexical items in each series were then symbolized using starred forms from the hypothetical proto-language referred to as Common Bantu. This work enabled Guthrie to hypothesize, in the second stage, about the origins of the Bantu languages and their speakers. The fruits of Guthrie's line of research using his empirical methodology would first appear in 1967 in his highly anticipated *Comparative Bantu,* still a standard reference and driving force in the field of African linguistics.

In 1968 Guthrie was elected a Fellow of the British Academy. His wife since 1931, Helen Margaret (née) Near, died that same year. Guthrie himself died November 22, 1972 from a heart attack. A great deal of his work on further comparative studies and on Chibemba, Lingala, and the Teke languages was left unfinished or still in the planning stages.

See also: Africa as a Linguistic Area; African Lexicography; Arabic Lexicography; Bantu Languages; Benue-Congo Languages; Language Families and Linguistic Diversity; Missionary Linguistics; Niger-Congo Languages; Proto-Bantu; Protolanguage; Sound Change; Southern Bantu Languages; Subgrouping Methodology; Tone: Phonology.

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Guugu Yimithirr

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The Language and Its Speakers

Guugu Yimithirr (Gu:guyimidjir) (hereafter GY) is the language originally spoken in the area between the Annan and Jeannie Rivers on the coast of northeast Queensland and inland. Most of its modern speakers now cluster around Cooktown, at the mouth of the Endeavour River. The language name combines *guugu* 'word' or 'language' with the comitative *yimi-thirr* 'this way' – thus, 'this kind of language' or 'speaking this way.' (Contrast the name of its southern sister Kuku-Yalanji, which has *yala* for GY *yii* 'this, thus.') GY contributed Australia's most widespread loanword to the languages of the world, via the word *gangurru* [IPA *g'aŋuru*] 'large grey wallaroo,' which was recorded as 'kangaroo' by members of Captain Cook's crew during their stay on the shores of the Endeavour in 1770. Speakers of the language were spared further contact with Europeans for about 100 years, when gold was discovered inland at the Palmer River in the mid-1870s. The consequent gold rush and invasion of the territory by settlers decimated local Aboriginal populations, and within 10 years the few surviving speakers of GY lived in scattered hunter-gatherer bands pushed off their lands or on the fringes of Cooktown and other smaller towns. A Lutheran mission established on barren land at Cape Bedford in 1885 became a refuge for the remaining GY speakers, and GY was the lingua franca of the community as legislation relocated Aboriginal children from a wide area – including many who spoke different languages – at the mission school. The earliest written information about GY derives from the Cape Bedford missionaries, systematized by W. E. Roth, the first Northern Protector of Aborigines. The 20th century saw a severe GY diaspora, as speakers of the language who had migrated to Cooktown and Cape Bedford were forcibly relocated to southern Queensland during World War II, and returned to their homeland in only a fraction of their already reduced numbers in the 1950s. Nowadays, though most GY speakers still live around Cooktown, others are scattered through other Queensland Aboriginal communities, and as far away as Melbourne and New Zealand. Despite repeated predictions, starting in the 1920s, that GY was on the verge of extinction, the language remains a central feature of life at the Hopevale community north of

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Cooktown, and there are currently more than 1000 speakers of the language, which has undergone rapid change over the past half-century.

Genetic Relations

GY is fairly typical of northern Paman languages, and is very closely related to Kuku Yalanji, still a relatively healthy language spoken in the rainforest to the south, with which it has perhaps 40%–50% lexical overlap. GY has a fairly typical Australian phonemic inventory. Although most stems are disyllabic and consonant initial, GY is closely related to the now extinct 'initial dropping' languages originally spoken to the north at Barrow Point and Flinders Island. Early accounts describe two varieties of GY, one *thalun-thirr* or 'coastal' and the other *waguurr-ga* 'inland,' though most diagnostic coastal lexical items have given way in modern speech to forms judged to be from the inland dialect. The language is now frequently written in a practical orthography which distinguishes two laminal series of stops and nasals (*th* and *nh* for laminodentals [d̪] and [n̪], and *j* and *ny* for laminopalatals [ɟ] and [ɲ], respectively), although earlier orthographies still survive, including one developed by missionaries which omits laminal (and other) contrasts entirely. Rhotics contrast between an alveolar trilled *rr* and a retroflex *r* [ɽ]. There is a typical three-way vowel contrast between *i*, *u*, and *a*, and vowel length is phonemic. There is further a complex interaction between vowel length, canonical stress and syllable patterns, and suffixing morphology. (Long vowels are doubled in the practical orthography; in this article a colon marks a 'lengthening' suffix, and a dollar sign a shortening one – see below.)

Basic Facts

GY is wholly suffixing, with free personal pronouns (which follow a nominative/accusative case-marking pattern – contrasting with ergative/absolutive morphology on other nominal elements) and no bound pronominal forms. Pronouns, normally only referring to animate entities, distinguish three persons, three numbers (singular, dual, and plural), and, for some speakers, also an inclusive/exclusive distinction in nonsingular first person. The case system is elaborate, with a variety of 'local' (locative/allative, ablative [= causative], superessive, abessive, adessive [= goal]) and peripheral syntactic cases (dative, purposive, instrumental) in addition to those marking the core syntactic relations of subject and object. This case system is elaborated still further with the morphologically hypertrophied cardinal direction roots, detailed below. Genitive constructions allow dual case marking, where a possessed nominal functions in some further case-marked role, as in the following examples (which also show the ergative/absolutive patterning of nouns and the nominative/accusative pattern of pronouns).

(1) nyulu yarrga thadaara biibaa-:ga-mi.
3S.NOM *boy.ABS* *go.REDUP.NONP* *father-GEN-LOC/ALL*
'the boy is going to his father's place.'

(2) jirraayn-da nyulu ngaliinh bama
man-ERG *3S.NOM* *2DU.ACC* *man.ABS*
ngarrbal daama-y
strange.ABS *spear-PAST*
galga thawuuny-ga-mun
spear *friend-GEN-INST*
'the man speared me and a stranger with a friend's spear.'

Verbs fall into three main conjugations, with several minor additional patterns. Morphologically productive verbal categories are again numerous, including past and nonpast tenses, repetitive and continuous aspects, and such moods as contrafactual, desiderative, cautionary, precautionary or 'lest' forms, and a morphologically incorporated negative (in addition to a periphrastic negative construction). A multifunctional verbal suffix -:*thi* marks a syntactically complex reflexive/reciprocal construction, as outlined below.

Word order is completely free, and there is no discernable favored or unmarked order for clausal or, indeed, phrasal constituents. Each word of a discontinuous nominal constituent, including determiners and adjectives, can be marked individually for case. Animate noun phrases frequently appear with both a full nominal head as well as the appropriate case form of an apparently pleonastic pronoun, so that the nominative/accusative case-marking pattern of pronouns frequently coexists within the same clause with the ergative/absolutive morphology on other nominal constituents.

Shortening vs. Lengthening Suffixes and the Rhythmic Canons

GY shows an intriguing interaction between suffixation, vowel length, and stress. Virtually all monosyllabic lexical words have stressed long vowels, and long vowels are usually also stressed. The language

seems to favor a syncopated syllabic pattern, with alternate syllables short and long, unstressed and stressed. Thus, for example, the progressive aspect is formed by a complex partial reduplication of disyllabic verb stems to produce trisyllabic stems, whose middle syllable is a lengthened (and stressed) version of the original second syllable. Thus, *balgal* 'he'll make it' vs. *balgaalgal* 'he is making it.' In addition, suffixes differ according to how they affect stress and length in the stem to which they attach. Most suffixes engender length (when it is not already present) on all disyllabic stems ending in a nonnasal consonant. Thus, *gambul* 'belly' + *-hi* 'LOC' → *gambuulbi* 'in the belly.' Other 'lengthening suffixes' additionally engender length even on disyllabic vowel-final stems. Thus, *yugu* 'fire' + *-:ngu* 'PURPosive' → *yuguungu* 'for the fire.' Still other 'shortening' suffixes shorten the long vowel in the second syllable of a disyllabic stem. Thus, *buurraay* 'water' + *-$a* 'PURP' → *buurraya* 'for water.'

The Morphology and Semantics of Cardinal Directions

Rather than base locative expressions on body-relative or egocentrically anchored perspectives, GY, like many other Australian languages, uses locational descriptors which insistently incorporate cardinal directions. Four lexical roots, *gungga-*, *jiba-*, *naga-*, and *guwa-*, correspond roughly to the English directions north, south, east, and west, respectively, except that the GY terms denote compass quadrants rather than idealized points. In virtually all circumstances, GY speakers keep track of cardinal orientation and incorporate the appropriate directional terms into descriptions of both distant places and immediate locations. In answer to a question like 'Where are you going?' one will answer, for example, *nagaar bayan-bi* 'east to the house.' To tell someone to move a bit 'that way' one must add the correct direction: *yarrba guwa-manaayi* 'move a bit that way to the west' (literally, 'thus west-be').

Whereas ordinary nominal expressions have just a single LOCative/ALLative form, and another ABLative form, the directional roots have more elaborated morphological possibilities. The LOC/ALL forms, for example with the root *naga* 'east,' number three:

(3) LOC/ALLforms
naga (0-form, 'east from a point')
naga-ar (R-form, 'to a point east')
naga-alu (L-form, 'east, over some point or obstacle')

Though all denote, in this case, motion in an easterly direction from some origo, each incorporates a different perspective or set of locational presuppositions. The least marked 0-form concentrates on the starting point of the trajectory, or emphasizes setting out toward the east. The second R-form focuses on the end point of the trajectory, also in the east, or emphasizes arrival. The third L-form is the most highly marked, presupposing some known or inferable location to the east through or beyond which the current trajectory is conceived to pass. Similar elaboration extends to ablative and other locational case morphology, providing delicate resources for GY directional precision.

The Syntax and Semantics of the 'Reflexive' Suffix *-:thi*

GY transitive verbs ordinarily require animate subject NPs, whose referents are in an agent thematic role, conceived of as consciously and voluntarily controlling an action performed on some normally distinct object – the theme or patient argument.

(4) nyundu minha wagi naaybu-unh
2s.NOM *meat*.ABS *cut*.PAST *knife*-INST
'you cut the meat with a knife.'

GY has a productive 'reflexive' construction, with the lengthening suffix *-:thi,* which encodes a basic variant of this situation, when agent and patient arguments are coreferential:

(5) ngayu(-ugu) wagi-ithi naaybu-unh
1s.NOM(-EMPH) *cut*-REFL *knife*-INST
'I cut myself with a knife.'

Interestingly, GY uses the same verbal inflection, with varying case forms on the accompanying arguments, to encode other sorts of situation which depart from the canonical transitive situation characterized above. Thus, for example, in a situation appropriate to what in other languages might be encoded by a passive construction – for example, when there is no agent, or when the agent only accidentally acts, or when the organization of the discursive context promotes the object of the action to a position of prominence – GY uses the same *-:thi* suffix on the verb.

(6) nganhi wagi-ithi naaybu-unh
1s.ACC *cut*-REFL *knife*-INST
'I got cut on the knife (by accident).'

Similarly, in a kind of generalized action in which no specific agent can be singled out, GY also has recourse to *-:thi.* A typical example might be

(7) nyulu gunda-athi
3s.NOM hit-REFL
'he had a fight/was in a fight.'

There is also a small group of GY verbs which occur **only** in 'reflexive' form with *-:thi*, mostly denoting actions typically performed without conscious outside agency ('come to an end,' 'explode,' 'finish,' among others).

Language Situation and Sociolinguistic Features

Because of the particular history of its speech community, and the rapidly shifting conditions under which it is learned and spoken, GY is a language in a dramatic state of flux and variation. The mix of 'tribal' origins of its modern-day speakers, and the range of circumstances in which it serves as a medium of interaction, have produced different levels or registers in which GY and different varieties of Aboriginal and standard English combine.

Traditionally in this part of the Cape York peninsula, Aboriginal people were polyglots, often practicing linguistic exogamy and able to communicate as they traversed dialect and language areas. Even within single dialects, other socially significant linguistic varieties, such as the so-called mother-in-law or brother-in-law languages, provided linguistically marked ways of displaying deference to certain classificatory kinsmen, or of marking intimacy with others. Historically, as speakers of different Aboriginal languages (as well as creolized varieties of other contact languages) either congregated or were forcibly brought together at the Cape Bedford mission, GY became the native language of many people who still had ancestral ties to other 'tribal' languages. As knowledge faded of these other languages, so too did the specialized subvarieties of GY disappear, since they were systematically linked to social practices and processes of transmission which were radically altered by the sometimes violent upheavals in Aboriginal society.

In modern Hopevale, and around Cooktown, where the great majority of current GY speakers live, the language is still widely used, although it has a diglossic functional relationship with English. In the somewhat anarchic conditions of language acquisition in this fragmented speech community, the language is also undergoing probably accelerated simplification, as paradigms once fraught with irregularity are allowed to conform to more productive morphosyntactic patterns. Moreover, different generations in the community, with different kinds of schooling and a variety of personal backgrounds and competence in Australian English, mix English and GY freely in a typified and self-identifying variety of Hopevale English which combines GY pronouns and individual lexical items with a largely English syntax.

See also: Australia: Language Situation.

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Guyana: Language Situation

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The sole official language of Guyana is English, a reflection that this country was a British colony (British Guiana) from 1803 to 1966, when it became independent. The population of just over 700 000 is multicultural, with the largest sector (50%) of the population of East Indian origin, the second largest (36%) of Creole (African) origin, 7% of Amerindian origin, and 7% of white, mixed, and Chinese origin. The majority of the population live in the coastal area, and the interior of the country is inhabited mostly by Amerindians.

Besides the official language, English, which is the medium of instruction in education and the language of the mass media, a widespread language in Guyana is the lingua franca, Creolese (Guyanese Creole English), an English-based creole language. Most cultural and/or ethnic groups, however, have their own languages. Creolese is used for interethnic communication and in informal settings; in addition, Creolese is used in several radio programmes. There are several varieties of Creolese that are attributable to the location (urban versus rural) and ethnic background of the users; these varieties form a creole continuum. The East Indian section of the population uses Hindi or Urdu for religious and ritual purposes, and many use Guyana Overseas Hindi, closely related to Surinamese Sarnami, in informal settings. In general, Guyana boasts a high literacy rate (*ca.* 95%), albeit mostly in English.

The largest number of different languages is spoken by the Amerindian groups, totalling ten languages. Six of the Amerindian languages belong to the Cariban language family, two belong to the Arawakan language family, and two are isolates. An overview of the Amerindian languages is given below, with alternative names in parentheses. Although there are few data on actual speaker numbers for the Amerindian languages, each language is followed by two numbers, first the number of the ethnic group (E), and the approximate number of speakers (S), where known. All of these languages are seriously endangered and are being replaced by English and/or Creolese. One factor that plays an important role in the spread of Creolese is that large portions of the population in and near the urban centers are of mixed origin. In particular, the Lokono and Warao now form highly mixed communities.

Cariban family:	Kari'na (Carib) (E: 3000); Akawaio (Kapon) (E: 3500); Patamona (Kapon) (E: 5000); Makushi (Pemon) (E: 7000; S: <5000); Arekuna (Pemon) (E and S: 450); Waiwai (E and S: 300)
Arawakan family:	Lokono (Arawak) (E: 15 000; S: <1000); Wapishana (E: 7000; S: <5000)
Isolates:	Warao (E and S: no data); Taruma (E and S: 5)

The status of the Amerindian languages is very low, and since the language of education is English, these languages are rapidly losing ground to English, although in recent years attempts have been made to produce teaching materials in some of the languages (e.g., Makushi and Wapishana).

See also: Arawak Languages; Cariban Languages; Hindi; Multilingualism: Pragmatic Aspects; Pidgins and Creoles: Overview; Suriname: Language Situation.

Language Maps (Appendix 1): Map 61.

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Gyarmathi, Sámuel (1751–1830)

V E Hanzeli

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Gyarmathi, medical doctor and pioneer of descriptive and comparative linguistics, was born in Kolozsvár (Rumanian: Cluj; German: Klausenburg), Transylvania on July 15, 1751, son of a Calvinist, middle-class family. He was educated in the colleges of Kolozsvár and Nagyenyed (Rumanian: Aiud; German: Strassburg), whose liberal curriculum, dominated by the philosophy of Christian Wolff, included a solid preparation in the natural sciences. He studied medicine on an Imperial scholarship at the University of Vienna and graduated M.D. in 1776. During his later life he was attached to the household of important noble families in Transylvania, appointments which allowed him to devote most of his time to his favorite endeavor: language studies. He died in the town of his birth on March 4, 1830.

In 1794 he published the first comprehensive grammar of Hungarian and the first 'grammaire raisonée' of a Central European language *Okoskodva Tanító Magyar Nyelvmester* (*Hungarian Grammar Taught Rationally*). After studying in Göttingen under A. L. Schlözer he wrote the first comparative study of the Finno–Ugric language family (1799), based on both lexicon and grammatical structure (following the more narrowly based model of J. Sajnovics (*see* **Sajnovics, Janos (1735–1785)**). His *Vocabularium* (1816) was the first attempt at an etymological dictionary of Hungarian. He also translated works of J. H. Campe, and played an important role in the Hungarian language reform movement. He was a member of the Society of Natural History of Jena, and a corresponding member of the Learned Society of Göttingen.

See also: Sajnovics, Janos (1735–1785).

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1981. In 1985 he was a visiting professor at the University of Warsaw.

Geach has written influentially on many topics in the history and philosophy of logic. He did much to show that the problems regarding the meaning of linguistic expressions that have exercised medieval logicians are the same as the problems addressed by modern ones. He also argued that several central elements of the pre-Fregean logical tradition, in particular the theory of the distribution of terms, are ill-conceived and unsound. Geach strongly opposed the dominant trend in British philosophy during the 1950s and 1960s known as 'ordinary language philosophy,' especially the then popular view that ordinary language has nothing to do with formal logic. His *Reference and generality* (1962) was meant as an extended proof to the contrary, containing as it does numerous applications of logical techniques to the analysis of English sentences. Geach's observations and theses in this area have greatly stimulated research in formal semantics. The most famous example of this is his discussion of the nature of reference involved in the sentence 'Any man who owns a donkey beats it' (1962: 117), which has engendered a widespread concern with so-called 'donkey sentences' and with the semantics of anaphoric pronouns in general.

Geach has also applied methods of logical analysis to the philosophy of mind (*Mental Acts*, 1957) and to the philosophy of religion (*God and the Soul*, 1969). In ethics (*The Virtues*, 1977), he has sought to revive an Aristotelian type of doctrine of the virtues.

See also: Anaphora: Philosophical Aspects; Donkey Sentences; Frege, Gottlob (1848–1925); Logic and Language: Philosophical Aspects; Ordinary Language Philosophy; Russell, Bertrand (1872–1970); Wittgenstein, Ludwig Josef Johann (1889–1951).

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Gedeo *See:* Highland East Cushitic Languages.

Gəʿəz

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Gəʿəz (Gəʿəz, Classical Ethiopic, Old Ethiopic) is the classical language of Ethiopia. Gəʿəz belongs to the Northern branch of Ethio-Semitic, which is part of South Semitic, a subgroup of the Semitic languages. The earliest extant texts are inscriptions from the 3rd century found in Northern Ethiopia, especially in the city of Aksum. From this time, Gəʿəz maintained its exclusive status as a medium of formal communication, until the 19th century, when it gave way to Amharic. Within the Ethiopian Orthodox Church it still holds a position comparable to the status of Latin in Catholicism. Gəʿəz was also the liturgical language of the Jewish community of Ethiopia, the Betä ʾƎsraʾel.

Gəʿəz is written in a quasi-syllabic script, developed on the basis of the Sabaean alphabet. Each sign represents either a combination of a consonant and a vowel or a simple consonant, e.g., አቡነ፡ ዘበሰማያት፡, representing the sequence *ʾa-bu-nä zä-bä-sä-ma-ya-t*, pronounced *ʾabunä zäbäsämayat* (‘Our father who art in heaven’). In its classical form, Gəʿəz phonology comprises 26 consonants plus a set of four labialized velar obstruents and seven vowels. Noteworthy are sets of lateral, pharyngeal, and laryngeal obstruents as well as a set of ejectives. In the traditional pronunciation as practiced by learned Ethiopians, many consonantal distinctions are lost under the influence of modern Ethio-Semitic languages.

Gəʿəz has a rich morphology based on the common Semitic system of three or four consonantal roots and vocalic patterns, with prefixes and suffixes used both in derivation and inflection, as in *ṣäḥafä* ‘he wrote’, *ṣäḥafku* ‘I wrote’, *nṣḥf* ‘we shall write’, *ṣäḥafi* ‘scribe’, and *mäṣḥaf* ‘book’. Grammatical categories of the noun are gender (male/female), number (singular/plural), and case (nominative-genitive/accusative). The verb has five tense–aspect–mood (TAM) categories (perfect, imperfect, jussive, imperative, and converb). Other categories of the verb are person, number (singular/plural), and gender (male/female, also for second person!). The syntax is based on a rather loose verb-subject-object word order, and agreement is not strict.

The vocabulary of Gəʿəz is to a large degree common Semitic. However, loanwords from Cushitic languages, especially Central Cushitic languages, form a sizable part of the Gəʿəz lexicon. Contacts with the Church of Alexandria paved the way during late antiquity for many Greek and, during the Middle Ages, Arabic loanwords. On the one hand, Gəʿəz shares many typological features with the Asian Semitic languages, such as Arabic or Hebrew. On the other hand, it shows features known from the modern Ethio- Semitic languages, which belong to the Ethiopian language area, also shared by the Cushitic languages, with their subject-object-verb syntax. The converb, already present in Gəʿəz, is typical for this area.

See also: Amharic; Ethiopia as a Linguistic Area; Semitic Languages.

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Gelb, Ignace J. (1907–1985)

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Coming from a strong philological background, Gelb developed an ever greater interest in theory, which he felt would help him better understand the data. This was within the atmosphere of great intellectual ferment that characterized the University of Chicago in the formative period of Gelb’s intellectual career, i.e., from the 1940s to the 1960s (and that, linguistically, can be characterized as Bloomfieldian structuralism). Within the Oriental Institute itself, other great Assyriologists were developing analogous interests, in particular Thorkild Jacobsen and Erica Reiner. This developing interest in theory took him in two major directions: the social sciences and linguistics. As a result, he did seminal work in both areas within the field of Assyriology, pioneering especially the application of a coherent methodology to explain structural relationships within the data. Besides linguistics, he contributed immensely to the study of socioeconomic structures in ancient Syro-Mesopotamia. His philological control of the data remained unparalleled throughout his career, lending an even greater credibility to his efforts.

He was born October 14, 1907, in Tarnow, Poland. He left when he was 18 to study first in Florence, Italy, and then in Rome, where he studied Semitic philology, and became particularly close to Giorgio Levi della Vida; he concluded his studies with a doctorate (laurea) from the University of Rome in 1929. He then went to the Oriental Institute of the University of Chicago, where he remained for the rest of his life. As a traveling fellow and research Associate from

H

Haas, Mary Rosamond (1910–1996)

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Haas, one of the products of Edward Sapir's Yale years, was, like her mentor, a linguist who knew many languages. She is best known for her research in four areas: (1) fieldwork, grammars, dictionaries, and diachronic investigations of various American Indian languages, such as Nitinat (the language of her first co-authored publication with Morris Swadesh, then her husband [Haas Swadesh and Swadesh, 1932]), based on fieldwork done on Vancouver Island the previous year), Tunica (a language isolate spoken in Louisiana – the subject of her 1935 Yale Ph.D. dissertation), Biloxi, Choctaw, Creek (Muskogee), Hichiti, Koasati, Mobilian Jargon (Mobilian), etc.; (2) studies on Thai, and to a lesser extent Burmese, such as a co-authored Thai reader (Haas and Subhanka, 1945), a co-authored textbook (Haas and Subhanka, 1946, 1948), an analysis of the Thai writing system (Haas, 1956b), and a comprehensive dictionary (Haas, 1964); (3) general historical linguistic theory and methodology (typical are Haas, 1966a and 1969); and (4) applied linguistics (Haas, 1943, 1953b).

Haas was born on January 23, 1910 in Richmond, Indiana. She attended Earlham College in her hometown, majoring in music and classics and graduating in 1930. Having read William Dwight Whitney and Henry Sweet while still an undergraduate, she became interested in linguistics and comparative philology, and in 1930 enrolled at the University of Chicago to study under Carl Darling Buck. She completed a course in Germanic linguistics (taught in German [German, Standard]) there with Leonard Bloomfield, but upon taking a course in the anthropology department with Edward Sapir, in which his book *Language: An introduction to the study of speech* (1921) was meticulously discussed, she was enthusiastically converted to Sapirian linguistic anthropology.

She accompanied her husband and Sapir (the newly appointed Sterling Professor of Linguistics and Anthropology) to Yale in 1931, where she took courses with Yale's other well-known linguists: Edgar H. Sturtevant, Eduard Prokosch, and Franklin Edgerton. Under Sapir's tutelage, she began her fieldwork in 1932 on the isolate Tunica with its last speaker, eventually publishing a grammar (Haas, 1941, a revised version of her dissertation), short sketch (Haas, 1946b), dictionary (Haas, 1953a), and collection of texts (Haas, 1950). She also did fieldwork on another endangered language, the isolate (now extinct) Natchez, in the 1930s, demonstrating her broad interests in the field of American Indian languages and following in Sapir's footsteps. She eventually became an authority on the Muskogean family, reconstructing Proto-Muskogean (Haas, 1946a, 1947, 1949, 1956). She also made contributions to the study of other American Indian families, such as Algonkian (Haas 1958a, 1958b, 1966b, 1967) and Hokan (especially Karuk (Karok); see the last three essays in Haas, 1978).

When World War II broke out, Haas was recruited in 1940, as were so many other of her contemporaries, to investigate and teach languages deemed important for the war effort. She began in 1940 to prepare pedagogical materials for the teaching of spoken Thai, first in Washington, D.C., and then at the University of Michigan from 1941–1943. After revising these materials, she went to the University of California, Berkeley to join the staff of the Army Specialized Training Program (the Director was A. L. Kroeber). She remained in Berkeley on an American Council of Learned Societies fellowship, and in 1946 became a research associate in the Department of Oriental Languages. She was appointed lecturer in Thai in 1947, and in the following year she was promoted to assistant professor of Thai and linguistics. Her work on Thai and Burmese focused on tonology, grammatical analysis (e.g., numeral classifiers; see Haas 1951), linguistic anthropology, sociolinguistics, writing essays on interlingual word taboos, word games, disguised speech, etc. She also pioneered applied linguistics by explaining how linguists could serve as teachers of foreign languages (Haas, 1943, 1953b). Similar topics were very much a pivotal part of her American Indian research; e.g., numeral classifiers, male/female language, sibling

terms used by marriage partners, etc. (many of her best-known essays are reprinted in Haas, 1978).

In 1953, Haas moved to the newly established Department of Linguistics at UC Berkeley as associate professor. She was acting chair of linguistics during 1956 and 1957 and chair from 1958 to 1964. She and Murray B. Emeneau founded the Survey of California Indian Languages in 1953; its first grantee was William Bright (the longtime editor of *Language*), who worked on Karuk for his Ph.D. dissertation. Many Berkeley Ph.D. dissertations were sponsored by the Survey, and some of those were published in the University of California Publications in Linguistics series. She was professor of linguistics at UC Berkeley from 1957–1977, and was chosen to serve as the Faculty Research Lecturer (the most prestigious honor bestowed on a Berkeley faculty member) for 1964 and 1965, which resulted in Haas (1969). She was elected to the American Academy of Arts and Sciences in 1974 and the National Academy of Sciences in 1978. She also held fellowships from the Guggenheim Foundation and the Center for Advanced Studies in the Behavioral Sciences. She was vice president of the Linguistic Society of America in 1956 and its president in 1963. She was also the Linguistic Society of America Professor in 1970.

Among her numerous awards, she received honorary doctorates from Northwestern University (1975); University of Chicago (1976); Earlham College (1980); and Ohio State University (1980). She was named Distinguished Lecturer of the American Anthropological Association in 1976, and when she retired the following year was awarded the Berkeley Citation (the highest honor the University can bestow) as well as the Wilbur Lucius Cross Medal by the Yale Graduate School Association. After retirement, she also accepted many visiting professorships in the United States and abroad. She was the recipient of three Festschrifts (e.g., Shipley, 1988).

Haas died on May 17, 1996 in her home in Berkeley. Further details of her life and career may be found in Golla *et al*. (1997).

See also: Bloomfield, Leonard (1887–1949); Edgerton, Franklin (1885–1963); Emeneau, Murray Barnson (b. 1904); Kroeber, Alfred Louis (1876–1960); Sapir, Edward (1884–1939); Sturtevant, Edgar Howard (1875–1952); Swadesh, Morris (1909–1967); Sweet, Henry (1845–1912); Whitney, William Dwight (1827–1894).

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Jürgen Habermas is one of the foremost social theorists and political philosophers of postwar Germany. He was born in Düsseldorf on June 18, 1929, and grew up in the town of Gummersbach. In the autumn of 1944, at the age of 15, he was sent to the front to serve as an assistant in the sickbay. He returned home in February 1945, three months before the final collapse of the Third Reich. Finishing his secondary school in the following years, he learned to appreciate the 'bourgeois constitutional state' as a historic achievement. He went to the University of Göttingen in 1949, spent a short period studying in Zürich and moved to Bonn in 1950, where he studied philosophy, history, psychology, German literature, and economics with Erich Rothacker and Oskar Becker. In a newspaper article published in 1953, he exposed Heidegger's association with Nazism. After obtaining his Ph.D. in 1954, he worked as a journalist. He married Ute Wesselhoeft in 1955; they had a son and two daughters. In 1956, Habermas became a research assistant to Theodor Adorno at the Institute for Social Research in Frankfurt, which was led by Adorno and Max Horkheimer. Thus involved with the Frankfurt school of philosophy, he developed a neo-marxist critical theory of society, which emphasized the importance for democracy of a public debate that is undistorted by financial and administrative powers. Because of a conflict with Horkheimer, he resigned in 1959 and managed to get a scholarship to finish the thesis for his second doctorate (Habilitation), which he obtained in 1961 under the supervision of Wolfgang Abendroth (*Strukturwandel der Öffentlichkeit*, 1962). At the recommendation of Hans-Georg Gadamer, Habermas was appointed professor of philosophy at Heidelberg in 1961. Taking sides with Adorno in the so-called 'Positivismusstreit,' he argued against Popper's critical rationalism that a critical social theory differs essentially from natural science. He stayed at Heidelberg until 1964, when he had the opportunity to become professor of philosophy and sociology at the University of Frankfurt. In the following period, he further established himself as a leading intellectual, whose views were influential, though not uncontroversial, in the student protest movement of the late 1960s. In this period he also traveled to the United States, where he held various visiting positions.

Habermas left the university in 1971 to become co-director, with Carl Friedrich von Weizsäcker, of the 'Max Planck Institute for research of the life conditions of the scientific-technical world' at Starnberg. During this period, he initiated a research program that he has been pursuing for the rest of his career, and which centers around communicative action. In 1981, he published his magnum opus, the 2-volume *The theory of communicative action* (Habermas, 1981). In 1983 he returned to the University of Frankfurt, where he once again became professor of philosophy. This period was marked by his vigorous defense of the emancipatory potential of modernist thought against the attacks by postmodernist, deconstructivist thinkers (*The philosophical discourse of modernity*, Habermas, 1985), and by the elaboration of his theory of communicative action in the field of ethics (*Justification and application: remarks on discourse ethics*, Habermas, 1991) and philosophy of law (*Between facts and norms: contributions to a discourse theory of law and democracy*, Habermas, 1992). After his retirement in 1994, he continued to write influentially on a number of political and cultural issues, such as the social implications of developments in biomedical science, and the political consequences of terrorism.

From a linguistic perspective, Habermas's main accomplishment was his attempt to put insights gained from the study of everyday linguistic practice at the heart of a theory of rational action and of society at large. Drawing on the work of Bühler, Austin, and Searle, he used a typology of speech acts to characterize the kind of rationality which underlies communicative action, and which he viewed as a potential for emancipation. He started from a distinction between success-oriented action and consent-oriented action. The former is exemplified both by

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instrumental actions using nomological knowledge of nature, and by strategic actions aimed at achieving coordination between rational agents. By contrast, consent-oriented action consists of a cooperative attempt to reach agreement about the interpretation of the situation that confronts the participants in communication, and about the best plans for action in that situation. When individuals engage in this kind of communicative action, there are three types of speech acts involved: constative, regulative, and expressive speech acts. Every speech act, regardless of type, is related to three sorts of validity claims, which can be accepted or rejected by the hearer. Thus, the hearer can reject a speech act for not being right with respect to norms (for example, an order can be unacceptable in a certain context), for not being truthful (when there is doubt about the intentions of the speaker), or for not being acceptable with respect to truth (for example, when the speaker assumes certain conditions to be fulfilled which in fact are not) (*Theorie des kommunikativen Handelns*, Habermas, 1981, I: 369–452).

See also: Austin, John Langshaw (1911–1960); Bühler, Karl (1879–1963); Gadamer, Hans-Georg (1900–2002); Heidegger, Martin (1889–1976); Speech Acts.

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Hadiyya *See:* Highland East Cushitic Languages.

Hahn, Adelaide E. (1893–1967)

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E. Adelaide Hahn's life (1893–1967) spanned that period in the history of linguistics when diachronic studies of language change gave way to synchronic structural studies of linguistic variation. It was also the beginning of the period in which structural linguistics gave way to generative linguistics. She was criticized at one point for being "behind the times" (obituary, Lane, 1967) because of her diachronic, as opposed to structural, approach to the study of classical languages in her 1953 book, *Subjunctive and optative: their origin as futures*. In reality, she proved to be quite ahead of the times throughout her long, prolific, and illustrious career, incorporating linguistic inquiry into her study of the classics, opening many doors that had previously remained closed to women in her field, and founding a groundbreaking undergraduate specialization in linguistics at Hunter College (also in 1953). Hahn was among the first group of women admitted to the New York Oriental Club in 1940. She went on to be the first woman to hold office in that organization when she was elected as vice president in 1952. She herself recognized the significance of being the first woman to hold office in the organization's 110-year existence. Also a charter member of the Linguistic Society of America, Hahn was the first woman to serve on its executive committee (1930, 1934) and be elected as its vice president in 1940, and as its first female president in 1946. In 1951, she held the prestigious Hermann and Clara H. Collitz professorship at the LSA Linguistics Institute held in Berkeley, California.

Hahn was an active participant in the Linguistic Society of America, presenting at almost every annual meeting and teaching (and learning) at nearly every Linguistics Institute held by that organization. Those who attended these events remember not only her incomparable linguistic and classical expertise, but also her outgoing personality and her trademark hats; she came to every event with a trunk full of hats for every occasion.

Hahn will always be inextricably tied to Hunter College in New York. After being home-schooled until the age of 13 by her mother, who was a Hunter graduate, Hahn entered Hunter College High School. After graduating, she went on to major in both Latin and Greek at Hunter College in 1915 and gained a master's degree in classics from Columbia University in 1917. She subsequently began teaching French at Hunter College. In 1921, she took an appointment there teaching Latin and Greek and eventually completed her dissertation at Columbia in 1929, *Coordinate and non-coordinate elements in Virgil*. Hahn remained at Hunter until her death in 1967. Her final book, *Naming constructions in some Indo-European languages*, was published posthumously in 1969.

Hahn was also a pioneer in bringing linguistics and the classics to the attention of lay audiences. She started by regularly publishing notes in the *Classical Weekly* and later moved on to writing regular letters to the editor in a number of popular New York newspapers, bringing classics to the forefront by showing allusions to classical literature in the modern writings of the day. She pre-figured the 'linguist's column' we now see carried on by individuals such as William Safire. It's impossible to think of this major figure and outstanding personality as 'old-fashioned.'

See also: Class Language; Collitz, Hermann (1855–1935).

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Haiti: Language Situation

Editorial Team

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Haiti occupies the western part of the island of Hispaniola, which was discovered by Christopher Columbus in 1492 and immediately claimed by him for the Spanish crown. The native Arawak Amerindians, who had given the name to the island ('*aiti* means 'mountainous'), were virtually wiped out within 25 years of Spanish occupation. French presence on the island grew from the beginning of the 17th century and in 1697 the Spanish ceded the western third of Hispaniola to the French. Haiti became one of the richest colonial possessions in the world; the staggering wealth generated by the colony was due in great part to the importation of African slaves. Guided by Toussaint L'Ouverture, the slaves rebelled in 1793 and defeated the French, gaining independence for the country in 1804. Continued political unrest, often plagued by violence, has turned Haiti into the poorest country in the western hemisphere, with 80% of the 7 656 166 inhabitants (July 2004) living in abject poverty.

The official languages of Haiti are French and Haitian Creole French. Literacy rates are between 23% and 33%. Haitian Creole French shows the influence of three West African languages: Wolof, Fon (Fon-Gbe) and Éwé. It is the mother tongue of the entire population, but there is bilingualism in French. In 1961, Haitian Creole French was granted legal and educational status, which has resulted in a growing literature in the language; despite this, it is still perceived as having a lower social status than standard French. The 67 radio and two television stations also broadcast in Haitian Creole French. Used as a second language only, Haitian Vodoun Culture Language, also called Langay or Langaj, is employed in religious rites, songs, and dances and it includes some Haitian Creole French words, as well as others which may have African or American Indian influence.

See also: Pidgins and Creoles: Overview.

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Hale, Kenneth L. (1934–2001)

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Born in Evanston, Illinois, he moved at age six to the family ranch in Arizona, where his first brush with language diversity began: as a student at the Verde Valley School in Sedona, Arizona, he got to know his roommates by getting to know their languages – first Hopi, then Jemez. At Tucson High School he learned Navajo, Tohono O'odam, Pachuco, Polish and any other language that came his way. At a time when educators were cautioning immigrant parents not to raise their children bilingual because it might hinder their acquisition of English, Hale was proving that he learned faster by working on more than one language at a time. Time and decades of research have proven him right.

For Hale, the study of language and culture always went hand in hand. He combined the study of anthropology and native American languages at the University of Arizona and received his B.A. in 1955. But he was also a full participant in the culture around him, spending his weekends bull-riding at 'jackpot' rodeos. In his senior year he won the bull-riding event at the University of Arizona rodeo and proudly wore the trophy belt buckle for the rest of his life.

Hale attended graduate school in linguistics at Indiana University, at the time a leading center in the study of native American languages. He studied under Charles Voegelin and received his M.A. in 1956 ('Class II prefixes in Navajo') and Ph.D. in 1959 ('A Papago grammar'). He taught at the University of Illinois and the University of Arizona before moving to the linguistics department at the Massachusetts Institute of Technology (1967–1999), where he combined cutting-edge theory with elegant field work.

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Hale continued to research Native American languages throughout his life, including not only languages of the Southwest, but also those as distant as Aleut, Penobscot, and the Misumalpan languages of Nicaragua. His language studies in Nicaragua defined the field of language research there. His most recent work on Ulwa (formerly called Southern Sumu) produced not only a dictionary and grammar sketch, but also established its status as a language independent from Mayagna (Sumu).

At every research site, Hale inspired and left behind specialists, where possible, native-speaking linguists to carry on the work. At MIT he set up the first program to train native speakers to become linguists. Hale single-handedly revolutionized the study of Native American languages by swelling the ranks of leading researchers with more than 25 native speakers who could mine the intricacies of their language in a way no others could. Bookshelves are not filled with dusty volumes disseminating Ken Hale's works, rather the field is infused with the linguists he has produced and the data he has so carefully left behind for us to continue to mine.

In addition to his status as a leading scholar in the study of native American languages in the United States and Central America, Hale is best known for his groundbreaking work on the historical reconstruction of Australian aboriginal languages. His conviction that the more languages you know the easier it is to know them allowed him to piece together complex evidence from disparate languages, revealing their genetic relation to one another. This evidence was obscured by phenomena such as the widespread deletion of initial syllables and an ever-changing lexical landscape resulting from taboo word avoidance, but a broad-based perspective on variation and an in-depth view of the cultures involved allowed the relevant patterns to emerge.

In the 1980s Hale spearheaded the Warlpiri Dictionary Project, designed to build a monolingual dictionary of Warlpiri for native speakers. His innovative lexicographic methods were narrative based, where the use of a given lexical item in context by a native speaker would trigger investigation into its meaning, grammar, and usage. The narrative elicited in that endeavor would present the next set of lexical items for study, and so on. For Hale, the lexicon was just one anchor point for delving into a more comprehensive consideration of all aspects of the language and culture.

Hale mentored almost every major figure currently investigating the aboriginal languages of Australia. His mark on this field is foundational and unmistakable. Since his first National Science Foundation–funded trip to Australia in 1959, Hale canvassed the country writing grammar sketches of over a hundred languages and conducting intensive grammar investigations into many more, including Arrente, Warlpiri, Lardil, Ngarluma, Kunwinyku, Mara, Garrwa, various Wik dialects and and Djabugay. Many of these languages, as was the case for Linngithigh, were endangered. The last native speakers passed their treasured knowledge on to Hale, who learned and documented them. The Institute for Aboriginal Studies in Canberra currently houses and maintains his legacy of work on these languages. Many languages (American and Australian) became extinct on October 8, 2001 when Hale took his last breath.

Hale saw the genius in every language, worked to preserve endangered languages, and always placed a priority on serving the mandate of the communities he studied. Many of the languages Hale studied can trace the development of their writing systems as well as literacy programs back to his initial influence.

In 1981 Hale was appointed the Ferrari P. Ward Professor of Linguistics at MIT. He was elected to the American Academy of Arts and Sciences in 1989 and to the National Academy of Sciences in 1990. He was elected President of the Linguistic Society of America for the years 1994–95. Numerous *Festschriften* have been compiled in his honor. His publications number over 160 scholarly articles, one book published after his death, and several edited volumes.

See also: Australia: Language Situation; United States of America: Language Situation; Voegelin, Charles Frederick (1906–1986) and Voegelin, Florence Marie (1927–1989).

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Robert A. Hall was a leading figure in American structuralism. His work on the reconstruction of Proto- Romance (Hall, 1950, 1976, 1984), on the nature and use of pidgins and creoles (Hall, 1966), and his defense of the American structuralism (Hall, 1987a, 1990), constitute, arguably, his most important achievements. He was also well known among students and colleagues as a mordant critic of generative linguistics (1987b). Hall also published several widely read and utilized textbooks from 1948 to 1968 (Hall, 1948, 1960, 1964, 1968) in which he explained the main concepts and techniques of American structuralism to a broad audience. He also wrote extensively on the Italian language, literary criticism, and foreign language teaching (a bibliography of his published works can be found in Danesi, 1987).

Hall was born on April 4, 1911, in Raleigh, North Carolina. He graduated with a B.A. from Princeton University in 1932. He received his A.M. from the University of Chicago the year after, and a Doctor of Letters from the University of Rome in 1934. At Princeton he majored in French and German literature. He was introduced to linguistics by Harry Hoijer while in graduate school at the University of Chicago. Hoijer's lectures, which were based on Edward Sapir's (1884–1939) textbook *Language* (1921), convinced Hall to change his area of specialization from literary criticism to linguistics. While at Chicago, he also took a course on the history of the French language with T. Atkinson Jenkins. Jenkins's focus on the role of etymology in the formal study of language fostered in Hall an abiding interest in historical linguistics and, especially, in the theory of linguistic reconstruction. This led him in the early 1950s to undertake extensive work on Proto-Romance.

From 1937 to 1946 Hall held teaching positions at the University of Puerto Rico, Princeton University, and Brown University. From 1946 to his retirement in 1977 he taught linguistics and Italian at Cornell University. At Cornell he developed a close personal and professional relationship with Charles F. Hockett (1914–2000).

As a summer lecturer at the Linguistic Institutes of Indiana University and the University of Michigan, he became a leading figure in the teaching of linguistics across the United States. It was at the 1938 Linguistic Institute that he became fascinated by Leonard Bloomfield's (1887–1949) ideas on applying linguistic ideas to language teaching, although he apparently argued with Bloomfield over the teaching of grammar to school-age children (Danesi, 1987: 55). During World War II Hall was put in charge of the U.S. Army's Italian courses at Yale University and the U.S. Navy's Pidgin English courses at Columbia, both of which were a consequence of his growing reputation as a researcher in applied linguistics and language teaching methodology. At various times in his career, Hall held executive positions in the Linguistic Society of America, the American Association of Teachers of Italian, the Wodehouse Society, and the Linguistic Association of Canada and the United States.

Throughout his academic career, Hall emphasized the need to be wary of turning linguistics into a formal discipline akin to mathematics and formal logic. Like other structuralists, he argued that any theoretical paradigm should be based on the painstaking collection and analysis of real data, not the idealizations of linguists themselves. He thus became an acerbic critic of generative linguistics and, especially, of Noam Chomsky's (b. 1928) anti-structuralist claim that an understanding of language as a universal faculty could be attained by studying syntactic rules as general principles of language design. Chomsky saw the efforts of American structuralists as well-meaning, but ultimately useless, because they revolved around making inventories of the isolated facts of language.

Chomsky's proposal became attractive in the early 1960s, since it gave eloquent expression to the age-old belief in Western philosophy that the rules of grammar corresponded to universal mental forms. Hall challenged the Chomskyan paradigm throughout the latter part of his career (Hall, 1987a, 1987b), arguing that abstract syntactic principles do not explain the semantic richness of languages, nor do they explain why languages change. As Bloomfield and Sapir before him had shown, in all sentences, the meaning of the constituent words, their relation to each other, and the forms they assume all affect syntax. This is not to imply that Hall denied the importance of studying universals in language structure. In one of his last works (1987b) he raised important questions about language: Are there general principles that underlie the grammatical rules of languages? Do these mirror historical and social processes? Do speakers of isolating languages perceive the role of sentence formation differently from speakers of agglutinating languages? Due in part to the efforts and persuasive counterarguments put forward by

Hall and other neo-Bloomfieldians, contemporary linguistic theory and methodology have, since Hall's death, become more eclectic and less partisan to one school of thought or the other than they ever were at any time in recent history.

Hall became a leading figure in the debate, in large part because of his engaging writing style, which was always lucid, terse, witty, and often tongue-in-cheek. His mastery of language could be seen saliently in his more popular writings. At times, his deeply-rooted joviality rose to the surface in amusing ways, as when he assumed the pseudonym of 'Berto Sala' for two of his fiction works (Hall, 1959, 1981). This was the Italian calque of his name (*Berto* = Robert, Sala = *Hall*).

Perhaps Hall's greatest contribution to the profession of linguistics was his popularizing of linguistic science to a broad audience of general readers with two early books, *Leave your language alone!* (1948) and *Linguistics and your language* (1960). At the time 'linguists' were viewed by people to be 'speakers of different languages' and commonly confused with 'polyglots.' Hall's books went a long way toward dispelling that confusion and establishing linguistics as a 'science of language' within the popular imagination. Hall's overall view of linguistics can be best summed up in a phrase he wrote in the former book: "The contribution of linguistics is simply part of the effort of all science in modern democratic society to find out the truth and to act upon it" (Hall, 1948: 249). Hall passed away on December 2, 1997.

See also: Applied Linguistics: Overview and History; Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Hockett, Charles Francis (1916–2000); Italian.

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Morris Halle, the initiator of and chief driving force of Generative Phonology, was born July 23, 1923, in Latvia. In 1940, he immigrated to the United States and studied engineering at the City College of New York (1941–1943), then served in the U.S. Army (1943–1946). He sought an M.A. degree in linguistics at the University of Chicago (1946–1948), then went to Columbia University to study with Roman Jakobson (1948–1949), and subsequently followed Jakobson to Harvard, from which he received a Ph.D. in linguistics (1955). During his student years, Halle worked for electronic acoustic projects at the MIT Research Laboratory and was hired in 1951 by the Language Department, primarily to teach German and Russian. In 1961, Noam Chomsky and Halle initiated a Ph.D. program in linguistics at MIT, which has trained many outstanding linguists. Halle was President of the Linguistic Society of America (1974). He retired from teaching at MIT in 1996; he is currently Professor of Linguistics, Emeritus.

Halle's decisive contribution, as the leading figure in the shift away from behavioristic structuralist phonology to mentalistic generative phonology, is traced back to his work on Russian voicing assimilation in the late 1950s. He advanced a syllogistic argument against the then dominant American structuralist phonology, maintaining that their biuniqueness requirement between phones and phonemes, and hence their notion of phonemes as minimal units of surface

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contrast, was untenable. He thus suppressed the external orientation of phonemes, expressed the phonetic output in terms of features, and linked the morphophonemic level directly to the phonetic output by the internal orientation of 'rules.' With this work as an onset, a decade later, generative phonology emerged in its earliest form, set forth by Chomsky and Halle (1968).

Throughout the evolution of generative phonology, Halle's work, ranging from the acoustic and articulatory properties of speech to the theoretical bases of the field, has concerned phonetic universals in line with features, the nature of rules, and the prosodic structures underlying stress and accent. The results of his theoretical studies have been illustrated and defended in detailed accounts of appropriate phonological aspects of individual languages, most notably of English and Russian, and Proto-Indo-European. The work of his students, who themselves have been movers of the field, underscores Halle's contribution as an influential educator. The development of the theory of distributed morphology and the elucidation of the nature of metrical verse also owe much to Halle's lasting contribution.

See also: Chomsky, Noam (b. 1928); Distributed Morphology; Evolution of Phonetics and Phonology; Generative Grammar; Generative Phonology; Grammar; Jakobson, Roman (1896–1982); Levels of Adequacy, Observational, Descriptive, Explanatory; Linguistic Features; Linguistic Universals, Chomskyan; Phoneme.

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M. A. K. Halliday was born in Leeds, UK. His father was Wilfrid J. Halliday, a teacher of English and Latin at Pudsey Grammar School and co-editor of the northern counties volume of the *Survey of English dialects* (1962). He was educated at Rugby School (1938–1942), then studied Chinese, as part of his military service, at the School of Oriental and African Studies (SOAS), University of London (1942–1943). After enlisting with the British Army in 1944, he worked with Military Intelligence in India, then returned to SOAS in 1945 as an instructor in Chinese in the military service courses. In 1947 he enrolled in the University of Peking and also taught English there; in 1948 he took his external London B.A. in Chinese. His postgraduate work for the University of London started at Peking University and continued at Lingnan University (Canton). But after his return to London in 1950, he transferred to Cambridge University, where he undertook a dissertation on the 14th-century Mandarin 'Secret History of the Mongols' under the supervision of J. R. Firth of the University of London. He became Assistant Lecturer in the Department of Chinese at Cambridge (1954) and received his Ph.D. in 1955. In 1958 he gave up his Cambridge position to take the post of Lecturer in the Department of English Language and General Linguistics, University of Edinburgh, and became Reader there in 1960. This period saw the development of his 'scale-and-category grammar,' whose principles are set out in his 1961 publication. In 1963 he moved to University College, London, as Director of the Communication Research Centre. There he was subsequently appointed Professor and founding Chair of the Department of General Linguistics (1965) and Director of the Nuffield/Schools Council Programme in Linguistics and English Teaching (1964–1970). In the latter period, the scale-and-category grammar gave way to its successor, 'systemic-functional grammar.' Halliday resigned his chair in 1971, and until 1975 undertook temporary positions at various

contrast, was untenable. He thus suppressed the external orientation of phonemes, expressed the phonetic output in terms of features, and linked the morphophonemic level directly to the phonetic output by the internal orientation of 'rules.' With this work as an onset, a decade later, generative phonology emerged in its earliest form, set forth by Chomsky and Halle (1968).

Throughout the evolution of generative phonology, Halle's work, ranging from the acoustic and articulatory properties of speech to the theoretical bases of the field, has concerned phonetic universals in line with features, the nature of rules, and the prosodic structures underlying stress and accent. The results of his theoretical studies have been illustrated and defended in detailed accounts of appropriate phonological aspects of individual languages, most notably of English and Russian, and Proto-Indo-European. The work of his students, who themselves have been movers of the field, underscores Halle's contribution as an influential educator. The development of the theory of distributed morphology and the elucidation of the nature of metrical verse also owe much to Halle's lasting contribution.

See also: Chomsky, Noam (b. 1928); Distributed Morphology; Evolution of Phonetics and Phonology; Generative Grammar; Generative Phonology; Grammar; Jakobson, Roman (1896–1982); Levels of Adequacy, Observational, Descriptive, Explanatory; Linguistic Features; Linguistic Universals, Chomskyan; Phoneme.

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universities (Brown, Nairobi, Illinois, Essex) and at the Center for Advanced Study in the Behavioral Sciences (Stanford). In 1976 he took up the position of Professor and founding Chair in the Department of Linguistics at the University of Sydney, NSW, where he remained until retirement in 1988. Subsequently he has held temporary positions at universities in Singapore, China, Japan, and the UK. He has received honorary degrees from universities in Australia, Canada, China, France, Great Britain, Greece, and India. He continues to reside in the Sydney area.

The scale-and-category grammar had its origins in the work of J. R. Firth, particularly his 'system-structure' theory. Halliday's scale-and-category model had a division of language into three strata: the intermediate level of grammar and lexis (together, 'form'); the upper level of context, which relates form to the situations of its use; and the lower level of substance in which language is encoded as sounds or written symbols. The grammar has four primary categories: unit, structure, class, and system. The units of inclusiveness—sentence, clause, group, word, and morpheme—are arranged on a scale of rank, on the principle that each higher unit includes one or more instances of the next lower unit. Each unit has its own distinctive structure potential, consisting of an inventory of structural elements. Each structural element is realized by a unit at the next lower rank, unless a 'rank shift' occurs: when the element consists of some unit at the same rank as, or higher rank than, its own unit. Particular units are also classified on the basis of their syntax (distribution in the next higher unit) and morphology (their distinctive structure potential). Classes and sub-classes are arranged on a scale of delicacy, from the most general classes to the most specific. System represents the paradigmatic relationship within sets of features at increasing degrees of delicacy. The scale of exponence arranges structural elements and the units they consist of successively in top-to-bottom description.

Systemic-functional grammar is a natural development of scale-and-category grammar. Whereas in scale-and-category system is one of four primary categories, in the later development it is the sole primary category. System represents paradigmatic choice at all levels and at all ranks. Choice in one system may imply a further systematic choice of terms; the logical dependency of one system on another is a network, which in principle is elaborated synoptically to comprise in a single network all paradigmatic choices at each stratum of a single language. The relation between the paradigmatic and the syntagmatic components of the grammar is handled by realization rules, which take as input combinations of choices within the network and produce strings of structural elements as output within units at whatever rank.

Function in systemic-functional grammar is understood in two senses. The primary or 'meta'-functions divide the general meaning of discourse into three parts: ideational meaning, itself split into experiential meaning (i.e., propositional) and logical meaning, then interpersonal, and finally textual. These functional divisions permeate the grammar from top to bottom. Any whole utterance or any single form may have propositional content and logical structuring and also implications for social intercourse, and at the same time possess important text-forming features. The second meaning of function is as a term for the elements of structure within units, e.g., subject within clause, or modifier within group.

Systemic-functional grammar has been extended into a number of other important language-related disciplines, such as clinical research and practice, discourse studies, educational theory, and natural language computation. Within the latter it has led to the development of the Nigel grammar component of the Penman text generation system.

See also: Cohesion and Coherence: Linguistic Approaches; Critical Applied Linguistics; Educational Linguistics; Firth, John Rupert (1890–1960).

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Hamann, Johann Georg (1730–1788)

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Johann Georg Hamann's contribution to the European and German period best known as *Sturm und Drang* was of significant importance. Hamann had a personal relationship with Kant (*see* **Kant, Immanuel (1724–1804)**), Herder (*see* **Herder, Johann Gottfried (1744–1803)**), and Jacobi, and his influence was also felt by Goethe and Schelling. Hegel and Kierkegaard were among those who later read and studied his works.

Hamann worked most of his life as an employee of the Prussian Customs outside of the official academic world. This personal aspect of his life, coupled with the undisputed obscurity of his works, their intentional unsystematic structure, and the sarcasm that at times distinguishes them, could lead us to pose the legitimate question of why his contribution is so highly regarded. We seek an answer in Hamann's own writings, which scholars have been studying for some time, mostly in an attempt to free his thought from the careless allegation of 'irrationalism' that usually stifles any need for further study. Hamann's thinking, as a whole, and particularly relating to his ideas on language, becomes evident in those writings in which the author discusses both Kant's critical thought (regarding the relationship between reason, language, and human existence and as expressed in his *Kritik der reinen Vernunft*) and that of Herder (regarding the origins of language and his 1772 *Preisschrift*). Hamann's assertion, which is unwavering and constant, is that it is not possible to 'conceptually' make a distinction between reason and language, as if the qualities belonging to the former were in some way different from the actual historical interaction of the latter, and that language has a divine source as proof of the necessary, founding interdependence between the creature and the Creator.

See also: Herder, Johann Gottfried (1744–1803); Kant, Immanuel (1724–1804).

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Born in London in 1920, Eric P. Hamp has proven to be one of the most prolific scholars of linguistics of recent times. He has written over 1000 scholarly articles on a wide range of diverse topics, from Indo-European languages to Native American languages. He received his Bachelor's degree from Amherst College in 1942 with a major in Classics. While his primary focus as an undergraduate was Latin, he also began studying Greek. Hamp often found opportunities to teach himself languages. For instance, upon graduation from Amherst, he had the opportunity to work for an office representing the Union of South Africa in Washington, DC, and through that experience he learned much about the Afrikaans language. In 1947, after serving in the U.S. military, Hamp went on to study Indo-European languages and linguistics at Harvard. While still a graduate student, he immersed himself in the study of the Celtic, Indic, and Slavic branches of Indo-European. After passing his comprehensive exams, he received a travel fellowship that took him to Paris, where he gained expertise in additional languages, including Albanian. His fascination with Albanian took him to the Cosenza province of Italy, where he conducted field

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work on the dialect of the Albanian-speaking population of Vaccarizzo. This subject became the topic of his doctoral dissertation, which he completed in 1954.

Hamp began teaching at the University of Chicago in 1950 and remained there until his retirement in 1990. He inspired many students to work on a broad array of linguistic topics, and his students and admirers honored him in two separate festschrift volumes (1990 and 1997). The 1990 volume includes an exhaustive bibliography of Hamp's articles, including some 960 entries. Hamp has remained an active scholar in his retirement, frequently attending scholarly conferences and presenting papers on historical linguistic topics.

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Handling Variation in Speech and Language Processing

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Introduction

The companion article (*see* **Speech Technologies: Language Variation**) describes the many sources and types of variation in spoken language that affect speech technology systems. In this article, we look at how such systems handle this variation.

Why Is Variation Generally Seen As a Problem?

Most speech and language processing systems involve some sort of pattern matching, whether that is explicit in terms of rules or finite state machines, or implicit via a model, such as the hidden Markov model. These rules or models are usually tailored to some data set (for statistical models, this tailoring is called training). Variation poses two distinct problems in this case.

Firstly, variation in the training data means that the rules or model must have sufficiently broad coverage to fit all of the data, and this breadth can lead to a system in which distinctions between classes become less clear. In the case of modeling data using statistical distributions, this ambiguity means larger variances, which in turn leads to more overlap between the distributions associated with different classes. Larger variances will lead to poorer performance in classification of unseen ('test') data.

Secondly, if the test data varies with respect to the training data, those rules or models that may be a good fit to the training data will not be such a good fit to the test data; again, this imprecision leads to poorer performance in terms of accuracy.

So, it appears that variation causes serious problems for these systems: more variation will almost always lead to worse performance. How can systems deal with variation, and in particular, how can accuracy be maintained even in the face of variation?

Further Reading

These articles are suggested reading on speech technology: (*see* **Speech Technologies: Language Variation; Natural Language Processing: Overview; Speech Recognition: Statistical Methods**). The textbooks listed in the bibliography offer further reading and references back to the original research papers for each technique: Jurafsky and Martin's book (2000) is recommended as a general introduction; Holmes and Holmes's book (2001) has more detail; Huang, Acero, and Hon's book (2001) is the most comprehensive. Suggested reading on variation includes: (*see* **Variation and Language: Overview; Corpora; Accent; Dialect Atlases; Subjective and Objective Measures of Variation**).

Speech Recognition

There are three distinct approaches to handling variation in automatic speech recognition (ASR) systems. Variation can be essentially ignored, the system can try to remove it through some pre-processing step, or the statistical model can be adapted to better model

work on the dialect of the Albanian-speaking population of Vaccarizzo. This subject became the topic of his doctoral dissertation, which he completed in 1954.

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Speech Recognition

There are three distinct approaches to handling variation in automatic speech recognition (ASR) systems. Variation can be essentially ignored, the system can try to remove it through some pre-processing step, or the statistical model can be adapted to better model

the noisy data. Often, many approaches are applied in a single system (Furui, 2001: 343).

Ignoring Variation

Since the ubiquitous model for ASR, the hidden Markov model, is a statistical model (*see* **Speech Recognition: Statistical Methods**), variation in training data does not prevent use of the usual training methods, such as Baum-Welch parameter estimation.

The most common form of variation is corruption of the speech signal with additive noise or convolutional (channel) noise. A simple approach to building a recognizer that will work with noisy data is to train it on similar noisy data. For example, a recognizer for telephone-quality speech would be best trained on such speech, and not on clean speech collected in a recording studio. However, any variation in the noise between training and test data will lead to a significant degradation in accuracy; in situations where the type of noise varies (e.g., recognition of mobile telephone speech), such an approach will not be successful. Because noisy speech data is difficult to collect, it is often artificially constructed by adding noise to clean speech, and/or passing the speech down a real or simulated telephone line.

When the type of noise is not known in advance, the system may be trained on a data set consisting of sub-sets, each of which contains a different type of noise. The resulting system will be more robust to previously unseen noise types.

Of course, there are other types of variation than additive or convolutional noise. Variations within and between speakers, between differing microphones, and in the type of speech (e.g., read text versus spontaneous conversation) also present challenges. It is possible to ignore all of these and simply train the system on data that matches the test data as closely as possible. However, when this training is impractical or impossible, such as when the variation changes over time, other techniques must be employed.

Removing Variation from the Signal

For speech transmission systems, like telephone networks, noise must be removed from the speech signal to improve intelligibility for the listener. However, in ASR it is not necessary to produce a clean speech waveform, only a parameterization of the signal, such as a sequence of cepstral vectors (*see* **Speech Recognition: Statistical Methods**). Therefore, techniques can be applied during or after parameterization of the waveform.

- **Cepstral mean subtraction** After parameterization, normalization is commonly applied. Even simple forms of normalization such as cepstral mean normalization, in which the long-term average of the cepstral vectors is subtracted from the cepstral vector for each frame, can be highly effective for removing channel variation and some speaker variation (Furui, 2001: 341).
- **Vocal tract length normalization (VTLN)** A difference in vocal tract length, such as between males and females, causes a shift in the formant space. A simple way of compensating for this disparity is to apply a speaker-specific frequency warping during parameterization. The warping factor can be estimated automatically from a small sample of speech.
- **Echo canceling and dereverberation** In telephony, signals are reflected back from the receiver along the telephone line, causing echos that impair intelligibility. Automatic echo cancellation is employed to remove these signals. Similar techniques may be applied before ASR. Echos also occur when speech waves are reflected off surfaces prior to being recorded by the microphone. The delay time between direct and reflected versions of the speech arriving at the microphone is much shorter than the echoes in telephony. This *reverberation* causes serious problems for ASR systems.
- **RASTA filtering** During parameterization, filtering can be applied. In RASTA filtering, bandpass filters are applied to remove both very slow and very rapid variations in the parameters, because these variations cannot be attributed to the speech signal (Hermansky and Morgan, 1994).

Adapting Hidden Markov Models

It is common for a system to have a large, well-trained set of hidden Markov models (HMMs) but be faced with test data that does not match the models well enough to enable high-accuracy recognition. There may be either speaker or noise mismatch. One approach taken in this type of situation is to adapt the models to the test data. This solution requires some adaptation data, for which we may or may not know the correct word sequence. To use methods that require a known word sequence in situations where this information is not available, an initial recognition pass can be used to give a noisy (errorful) estimate of the word sequence.

- **Maximum *a posteriori* (MAP)** Given some data with a known word sequence, the HMM parameters can be adjusted to maximize the likelihood of the new parameter values, given the adaptation data. This method can only adapt the parameters of the HMMs involved in modeling

the particular word sequence of the adaptation data – which will generally be a very small subset of all the system's parameters. Therefore, this method tends to be very slow.

- **Maximum likelihood linear regression (MLLR)** With only a limited amount of data, it is not feasible to retrain all parameters of a large set of HMMs. MAP adaptation only adjusts the parameters of those models corresponding to the adaptation data; in contrast, MLLR applies a transformation to all the parameters of the entire system at once. This transform is linear, and there may be either a single global transform matrix or a number of transforms applied to different classes of models. The transform can be learned from only small amounts of adaptation data.
- **Parallel model combination** This technique is only useful for adapting to noise, rather than speaker variation. If a model is available for the noise alone, it may be combined with a model for clean speech to produce a model of noisy speech. To obtain the model of noise at recognition time, it is necessary to locate parts of the signal without speech and use them to train the model. When the speech level relative to the noise (signal-to-noise ratio, SNR) is low, this technique is not trivial to do automatically.

Adapting the Language Model

Language models for ASR are usually N-gram models (*see* **Language Processing: Statistical Methods**) trained on very large amounts of data (e.g., 100 million words). Since there is no speech corpus sufficiently large, these models are invariably trained on text corpora, which usually means either newspaper text or text drawn from the World Wide Web. This text data will differ from transcriptions of speech, so some form of adaptation may be applied to make the models a better match for spoken language.

- **Pooling training data** One simple technique is to pool large amounts of text data with small amounts of speech transcriptions. When computing the N-gram counts, the speech data is usually more heavily weighted to compensate for the small quantity available.
- **Language model interpolation** An alternative to pooling data is to train two language models, one on each type of data, then interpolate the probabilities predicted by each model. The interpolation weights can be set to maximize the probability of some held-out data not used during training.
- **Cache-based adaptation** Within a single passage of speech, certain words will be temporarily much more likely than was observed in the training data. Cache-based models exploit this: words seen so far (in the recognizer output) are stored in a cache and used to train a low-order language model (a bigram or unigram). The probabilities predicted by this cache model are then interpolated with those from a general model.
- **Topic adaptation** Adaptation can also help in situations where the speech to be recognized changes topic from time to time, such as in broadcast news, causing sudden changes in the probabilities of some words. For example, as the topic shifts from sports results to the stock market, the probabilities of football players' names will decrease and the probabilities of company names will increase. To adapt to a given topic, we need some more data from this topic to train the language model. Information retrieval (*see* **Document Retrieval, Automatic**) techniques can be used to find this data.

Preventing Variation at the Source

It is sometimes simpler and more effective to prevent variation at the source, rather than attempt to remove it later.

- **Choice of microphone** Close-talking microphones produce a much better signal-to-noise ratio than lapel or desk-mounted ones. Directional or noise canceling microphones are designed to be much more sensitive to signals coming from a single direction (the speaker) than to ones coming from other directions (background noise) (Huang, Acero and Hon, 2001; Sect. 10.2).
- **Microphone arrays** In some situations, the use of multiple microphones can help reduce the amount of noise captured by the system (Huang *et al.*, 2001: section 10.4). Microphone arrays consist of two or more microphones spaced some distance apart. Just as humans use binaural hearing to localize sounds, a microphone array uses the arrival time difference of a signal between the various microphones to localize sounds. By 'beamforming,' the array can accept signals from just one direction and reject signals from other directions. Microphone arrays can also help remove reverberation by beamforming towards only the direct-path speech signal.
- **Dialogue design** In practical dialogue systems deployed today, the machine always has the initiative. This initiative allows the system designers to manipulate the dialogue in order to dramatically reduce the difficulty of the ASR task. For example, while a human telephone banking teller may ask the customer "How may I help you?", an automated system may ask "What sort of transaction would you like to make?". By effectively limiting the

range of possible answers, the system is able to impose a much more restrictive language model during ASR, and hence achieve a lower error rate. The language model will be switched at each turn in the dialogue.

Speech Synthesis

- **System architecture** By carefully structuring the architecture of a text-to-speech (TTS) (*see* **Speech Synthesis**) system, it is possible to partition the linguistic resources required by the various modules such that maximal re-use can be achieved. For example: the statistical models and/or rules used for expanding abbreviations may be shared across all accents of a language; the phoneme inventory may be shared across all speakers of a particular accent.
- **Pronunciation dictionary** Writing pronunciation dictionaries for tens of thousands of words by hand is extremely time-consuming and therefore expensive. It also takes a great deal of expert knowledge and, because consistency is important, cannot usually be distributed to a large team of people. However, a close match between the speaker and the pronunciation dictionary is crucial. To resolve this conflict, a method has been developed to generate accent- or speaker-specific dictionaries from a single language-specific but accent-independent 'meta-dictionary' using a relatively small set of rules and settings (Fitt & Isard, 1999).
- **Pitch marking** Most concatenative speech synthesis systems (*see* **Speech Synthesis**) require accurate pitch marking of the speech waveforms in the inventory. It is difficult to construct an automatic pitch marking algorithm that works "out of the box" for all speakers. Usually, some parameters, like the minimum and maximum expected pitch period durations, must be tuned to the individual speaker.

Other Speech Technologies

While variation is almost always a problem for ASR, sometimes variation between speakers is actually very useful.

- **Speaker identification** Identifying who is talking is a useful task in its own right (*see* **Speaker Recognition and Verification, Automatic**). The obvious application is security, e.g., telephone banking, building access control. Two distinct tasks can be identified: speaker identification ("Which one of a set of speakers is talking?") and speaker verification ("Is the speaker who they claim to be?"). Somewhat surprisingly, the parameterization of speech used for speaker-independent ASR is often the most effective one for speaker identification or verification, and similar statistical models are used (HMMs). However, discriminative training techniques (*see* **Speech Recognition: Statistical Methods**) are usually required to get high accuracy.
- **Speaker tracking** In multi-party speech, such as in a business meeting, we may wish to simultaneously recognize the speech of all speakers and annotate the resulting output with speaker identity. Since speakers overlap a great deal, we must use the different characteristics of each individual speaker (e.g., F0) to do this (possibly in combination with speaker location information obtained from a microphone array).
- **Speaker characteristic identification** Rather than the actual identity of the speaker, we may only be interested in certain characteristics. For example, a system may try to guess the gender of a speaker, and then use gender-specific models for recognition. Since most ASR systems are language-specific, a language guesser must be employed as an initial step when multiple languages are to be recognized. Automatically determining the accent of a speaker has applications in dialectometry (*see* **Dialect Atlases**).

Conclusion

While variation, from whatever source, can cause major problems for spoken language systems, a wide range of techniques are available to minimize the degradation in performance. These include: preventing variation; removing it from speech signals; transforming parameterized speech; adjusting the parameters of the statistical models.

See also: Accent; Corpora; Dialect Atlases; Document Retrieval, Automatic; Language Processing: Statistical Methods; Natural Language Processing: Overview; Speaker Recognition and Verification, Automatic; Speech Recognition, Automatic: History; Speech Recognition: Statistical Methods; Speech Synthesis; Speech Technologies: Language Variation; Subjective and Objective Measures of Variation; Variation and Language: Overview.

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Handwriting Recognition, Automatic

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Handwriting is a means of recording personal information as an aid to memory, as well as a means of communication with others. A pen together with paper or a small note-pad is often more convenient than a computer keyboard. Automatic recognition of handwriting has significance in reading handwritten notes in a personal digital assistant, postal addresses on envelopes, amounts in bank checks, forms, field notes, historical records, etc. The ultimate handwriting computer will have to process handwriting in an unconstrained environment, deal with many writing styles and languages, work with arbitrary user-defined alphabets and understand any handwritten message by any writer.

Fundamental characteristics of handwriting are that it consists of artificial graphical marks on a surface; its purpose is to communicate something; and this purpose is achieved by virtue of the mark's conventional relation to language. Each script has a set of icons, which are known as characters or letters, that have certain basic shapes. There are rules for combining letters to represent shapes of higher-level linguistic units. For example, there are rules for combining the shapes of individual letters so as to form cursively written words in the Latin alphabet.

Several types of analysis, recognition and interpretation can be associated with handwriting. Handwriting recognition is to transform written language in its spatial form of graphical marks into symbolic representation. For languages based on the Latin alphabet, the basic units of this symbolic representation are characters. Due to nonseparability of cursively written characters, recognition of words may be performed holistically; however, the resulting word is represented in terms of its characters. Handwriting interpretation is to determine the meaning or implication of a body of handwriting, e.g., determining the destination bar code of a handwritten address. Handwriting recognition and interpretation are processes whose objectives are to filter out the variations so as to determine the message—which are aided by knowledge of the subject domain, e.g., in the case of the physician's prescription, where a pharmacist uses knowledge of drugs. Handwriting identification is to determine the writer of a handwritten document from among a set of known writers. Signature verification is to determine whether or not a questioned signature matches the genuine signature samples of a given person. In contrast to recognition and interpretation, identification and verification are processes that determine the special nature of the writing of a specific writer. All of the above processes depend upon features extracted from the writing, some of which are illustrated in **Figure 1**.

Handwriting Input

Handwriting data is converted to digital form either by scanning the writing on paper or by writing with a special pen on an electronic surface such as a digitizer combined with a liquid crystal display. The two approaches are distinguished as static or off-line and dynamic or on-line handwriting, respectively. In the dynamic case, the two-dimensional coordinates of successive points of the writing as a function of time are stored in order, i.e., the order of strokes made by the writer is readily available. In the static case, only the completed writing is available as an image. The dynamic case deals with a spatiotemporal representation of the input, whereas the static case involves analysis of the spatioluminance of an image. The raw data storage requirements are widely different. The data requirements for an average cursively written word are: in the dynamic case, a few hundred bytes, typically sampled at 100 samples per second, and in the static case a few hundred kilobytes, typically sampled at 300 dots per inch. Paper documents, which are an inherently analog medium, can be converted into digital form by a process of scanning and digitization. This process yields a digital image. For instance, a typical 8.5×11-in page is scanned at a

resolution of 300 dots per inch to create a gray-scale image of 8.4 Mb.

Recognition rates are reported for either character recognition given a fixed alphabet or word recognition given a fixed set of words (or lexicon). Recognition rates are much higher for the dynamic case, e.g., static word recognition rates with lexicon sizes of 10 100 and 1000 were 95%, 85%, and 78%, respectively, for the top choice, whereas the dynamic word recognition rate for a lexicon of size 21 000 was 80%.

Dynamic recognition systems are available in personal digital assistants (PDAs) and tablet PCs. The performance of PDAs is acceptable for processing hand-printed symbols, and, when combined with keyboard entry, a powerful method for data entry has been created. Static recognition systems have made a significant economic impact for constrained domains such as postal addresses and courtesy amounts on bank checks.

Dynamic Handwriting Recognition

Dynamic recognition deals with the automatic processing of a message as it is written, using a digitizer or a stylus that captures information about the pen tip, generally its position, velocity or acceleration as a function of time. The sampled data is preprocessed for noise reduction, trace normalization and segmentation into units. Noise arises due to digitizer quantization, the digitizing process, erratic hand or finger movements, inaccuracies of the pen-up/pen-down indicator, etc. Noise reduction deals with data smoothing, signal filtering, and breaking connections. Normalization accounts for baseline drift, writing slant and script size.

Segmentation is at the message and word levels. Message segmentation processes are line detection, word segmentation, separating nontextual gesture commands, etc. Words are segmented into characters and sub-character strokes. Tentative segmentation is corrected during classification. Segmentation can be avoided by holistic recognition, particularly for small vocabularies. Some methods combine holistic recognizers with segmentation-based algorithms.

A pen-based computer needs to process a handwritten message as it is produced. The steps, ranging from various shape classification processes to ultimate shape recognition, will have to cope with the variability of message production. Some sources of variability are geometric, allographic and neurobiomechanical. Geometric variations refer to position, size, baseline orientation and slant. Allographic variations deal with the various models that are associated with a single character by different populations of writers. Neurophysiological and

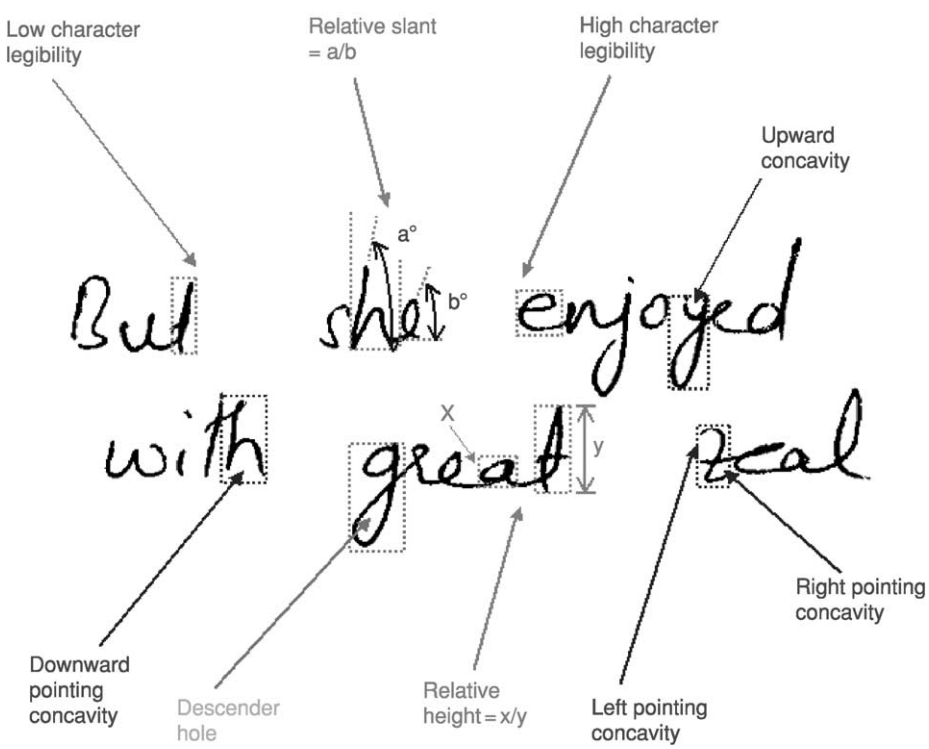

Figure 1 Examples of handwriting features.

biomechanical factors affect both the execution of an action plan or the production of individual strokes.

Recognition methods are either structural or statistical. Structural methods use rules to describe character shape. The rules are embellished by probabilities to capture variations of characters and words. Statistical methods represent shape by a feature list and classes by probability distributions in multidimensional feature space. Statistical methods can be grouped into generative and discriminative.

Generative methods are Bayesian methods, principal component analysis, cluster analysis, etc. Discriminative methods are exemplified by linear discriminant functions and support-vector machines. Artificial neural networks are implicitly generative. For instance, Kohonen self-organized feature maps are used to detect shape prototypes in a training set of characters – which is analogous to k-means or hierarchical clustering.

The hidden Markov model (HMM) is a doubly stochastic process that can be based on either discrete or continuous symbols. The former converts the feature vector into a discrete symbol using vector quantization. Symbol probabilities are for stroke shapes in a sliding window. The continuous approach uses variances and covariances of features to estimate the probability of the occurrence of an observed feature vector, which is usually assumed to be Gaussian. The goal of the HMM algorithm is to find the probability that a specific class is the most likely to occur given a sequence of observations. The essence of this approach is to determine the *a posteriori* probability for a class, given an observed sequence where the jump from one state to another is described by a Markov process. HMMs can be incorporated into a stochastic language model.

Cursive script recognizers do not yet take into account contextual anticipatory phenomena: for example, once handwriting is well learned, the neuromuscular effectors involved in that task normally act concurrently to speed up the execution. This generally leads to co-articulation and context effects. The sequence of strokes is not produced in a purely serial manner, i.e., one after the other, but parallel articulatory activity does occur, and there is important overlap between successive strokes or graphemes. The production of an allograph is thus affected by the surrounding allographs: it depends both on the preceding and following units. Many methods take into account the effect of the previous stroke over the actual stroke being processed but often neglect the simultaneous effect of the forthcoming stroke.

Personal adaptation can improve accuracy and usability of dynamic systems. A basic user-dependent system comes with a set of recognizable allographs for each character, but it allows the user's definition of his own set of symbols or gestures to take user preferences into account. This allows taking into account cultural determinants, handwriting learning systems as well as personal styles and evolution of handwriting habits over a long period of time.

Signature Verification

In signature verification, a test, or questioned, signature is compared with one or a few reference specimens collected from an enrolled user. It requires the extraction of writer-specific information from the signature signal, irrespective of its handwritten content.

Signature verification is based on the assumption of handwriting being singular, exclusive and personal. Signature verification presents a double challenge. The first is to verify that what has been signed corresponds to the unique characteristics of an individual, ignoring the content of the writing. Rejection of an authentic signature is a false negative. The second and more demanding task is avoiding the acceptance of a forgery as authentic, which is referred to as a false positive.

Tolerance levels for signature verification is smaller than that for handwriting recognition. Some applications may require an error of 1 in 100,000 for false negative and even less for false positive. A trade-off exists between the errors. Signature verification systems work with an error margin of about 2–5% between the two errors.

Evaluation of signature verification algorithms raises several difficulties. Theoretically, it is not possible to measure the false-positive rate, since it is not possible to define a good forger and prove existence/nonexistence of a forger. Practically, several methods have been proposed. The simplest ones rely on the use of random forgeries, i.e., picking a random true signature of a person and considering it as a forgery of the signature of another person. Many studies incorporate unskilled forgeries, and, in some rare cases, highly skilled forgeries. Definitions of random, skilled and unskilled imitations vary.

Principal verification methods are probabilistic classifiers, time warping or dynamic matching, signal correlation, neural networks, hidden Markov models, Euclidian or other distance measures, hierarchical approach combining a few methods, and Baum-Welch training. At the analysis level, the main approaches have focused on spectral analysis, cosine transforms, direction encoding, velocity, timing and shape features sets, shape features force, pressure and angles functions.

Dynamic signature verification occupies a specific niche among identification systems. On the one hand,

they differ from systems based on the possession of something (key, card, etc.) or the knowledge of something (passwords, personal information, etc.) because they rely on a specific well-learned gesture. On the other hand, they also differ from systems based on the biometric properties of an individual (fingerprints, voice print, retinal prints, etc.) because the signature is still the most socially and legally accepted means for identification. Its unique, self-initiated motoric act provides an active means to simultaneously authentify both a transaction and a transactioner.

Static Handwriting Recognition

The central tasks in off-line handwriting recognition are character recognition and word recognition. A necessary preliminary step to recognizing written language is the spatial issue of locating and registering the appropriate text when complex, two-dimensional spatial layouts are employed, a task referred to as document analysis.

Preprocessing operations performed prior to recognition are thresholding, or converting a gray-scale image into a binary black-white image; noise removal, extraction of foreground textual matter by removing, say, textured background, salt-and-pepper noise and interfering strokes; line segmentation, the separation of individual lines of text; word segmentation, the isolation of textual words; and character segmentation, the isolation of individual characters, typically those that are written discretely rather than cursively.

Thresholding is to extract the foreground (ink) from the background (paper). The histogram of gray-scale values of a document image typically consists of two peaks, a high peak corresponding to the white background and a smaller peak corresponding to the foreground. So the task of determining the threshold gray-scale value (above which the gray-scale value is assigned to white and below which it is assigned to black) is one of determining an optimal value in the valley between the two peaks. The gray-scale histogram defines the optimal threshold as one that maximizes the between-class variance, where the distributions of the foreground and background points are regarded as two classes. Each value of the threshold is tried, and one that maximizes the criterion is chosen. Improvements to this basic idea, such as handling textured backgrounds, measure attributes of the resulting foreground objects to conform to standard document types.

Stroke connectivity has to be preserved during noise removal. Digital capture of images can introduce noise from scanning devices and transmission media. Smoothing operations are used to eliminate artifacts introduced during image capture. Adaptive stroke filling with a neighborhood operator emphasizes stroke connectivity and prevents aggressive overfilling.

Interference of strokes from neighboring text lines is a problem that is often encountered. One approach is to follow strokes in thinned images to segment the interfering strokes from the signal. Thinning algorithms hold the promise of converting static handwriting to dynamic data, although artifacts such as spurs limit their use.

Segmentation into lines is more difficult than in the case of printed text. If the writing is on ruled lines, line segmentation is accomplished by examining the horizontal histogram profile at a small range of skew angles. When lines of text undulate up and down, ascenders and descenders frequently intersect characters of neighboring lines. One method is based on the notion that people write on an imaginary line that forms the core upon which each word of the line resides. This imaginary baseline is approximated by the local minima points from each component. A clustering technique is used to group minima of components to identify text lines.

Line separation is followed by a procedure to separate text into words. The focus is on identifying physical gaps assuming that gaps between words are larger than gaps between characters (Figure 2). However, exceptions are commonplace because of flourishes in writing styles with leading and trailing ligatures. Another method incorporates cues that humans use and does not rely solely on the one-dimensional distance between components. Writing style in terms of spacing is captured by characterizing the variation of spacing between adjacent characters as a function of the corresponding characters themselves. The notion of expecting greater space between characters with leading and trailing ligatures is incorporated into the segmentation scheme.

Isolation of words in a textual line is usually followed by recognizing the words themselves. Most recognition methods call for segmentation of the word into its constituent characters. Segmentation points are determined using features such as ligatures and concavities. Gaps between character segments

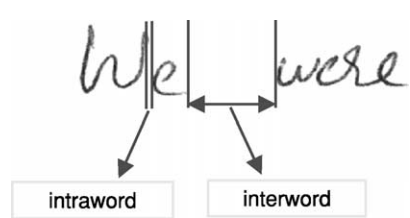

Figure 2 Word separation based on gaps.

(a character segment can be a character or a part of character) and heights of character segments are used in the algorithm.

Character Recognition

The basic problem is to assign the image of a handwritten character to its symbolic class. We discuss here some of the issues in the recognition of English orthography in its handwritten form. The typical classes are the upper and lower case characters, the ten digits and special symbols such as the period, exclamation mark, brackets, dollar and pound signs, etc. Shape features are extracted so as to assign the observed character to the appropriate class. Support-vector machines and artificial neural networks have emerged as fast methods for implementing classifiers. Algorithms based on nearest-neighbor methods have higher accuracy but are slower.

Recognition of a character from a single machine-printed font family on a well-printed paper document can be done very accurately. Difficulties arise when handwritten characters are to be handled. Some examples of segmented handwritten characters are shown in Figure 3. In the difficult cases, it becomes necessary to use models to constrain the choices at the character and word levels. Such models are essential in handwriting recognition because of the wide variability of handprinting and cursive script.

Word Recognition

A word recognition algorithm attempts to associate the word image to choices in a lexicon. Typically, a ranking is produced. This is done either by the analytic approach of recognizing the individual characters or by the holistic approach of dealing with the entire word image. The latter approach is useful in the case of touching printed characters and handwriting. A higher level of performance is observed by combining the results of both approaches. There exist several different approaches to word recognition using a limited vocabulary.

Figure 3 Examples of handwritten characters segmented from images.

Analytic word recognition based on determining presegmentation points followed by determining an optimal path through a state transition diagram is shown in Figure 4. In the holistic approach, the word image is represented by a fixed size vector, for example by imposing a fixed grid on the word image (Figure 5). Other holistic features are the upper and lower profiles of word images, which are represented as a series of vectors describing the global contour of the word image and bypass the segmentation phase. Word recognition involves preprocessing, a possible segmentation phase that could be avoided if global word features are used, recognition, and postprocessing. Performance of the methods is a function of the size of the lexicon.

When dealing with large lexicon sizes, performance can be improved by using a dynamic lexicon. For example, the lexicon is represented as a tree and the results of recognizing the first few characters are used to eliminate possible paths in the tree. In another method, word images are oversegmented such that after segmentation no adjacent characters remain touching. Instead of passing on combinations of segments to a generic recognizer, a lexicon is brought into play early in the process. A combination of adjacent segments is compared to only those character choices that are possible at the position in the word being considered. The approach can be viewed as a process of accounting for all the segments generated by a given lexicon entry. Lexicon entries are ordered according to the goodness of match. Dynamic programming is used to string the potential character candidates into word candidates, combine heuristics to disqualify certain groups of primitive segments from being evaluated if they are too complex to represent a single character, and take into account compatibility between consecutive character candidates.

Application of Static Handwriting Recognition

A noteworthy success of static handwriting recognition has been in reading postal addresses. The task of interpreting handwritten addresses is one of assigning a mail-piece image to a delivery address. An address for the purpose of physical mail delivery involves determining the country, state, city, post office, street, primary number (which could be a street number or a post office box), secondary number (such as an apartment or suite number) and finally the firm name or personal name.

The recognition task is considerably aided by knowledge of the postal domain. The task is one of

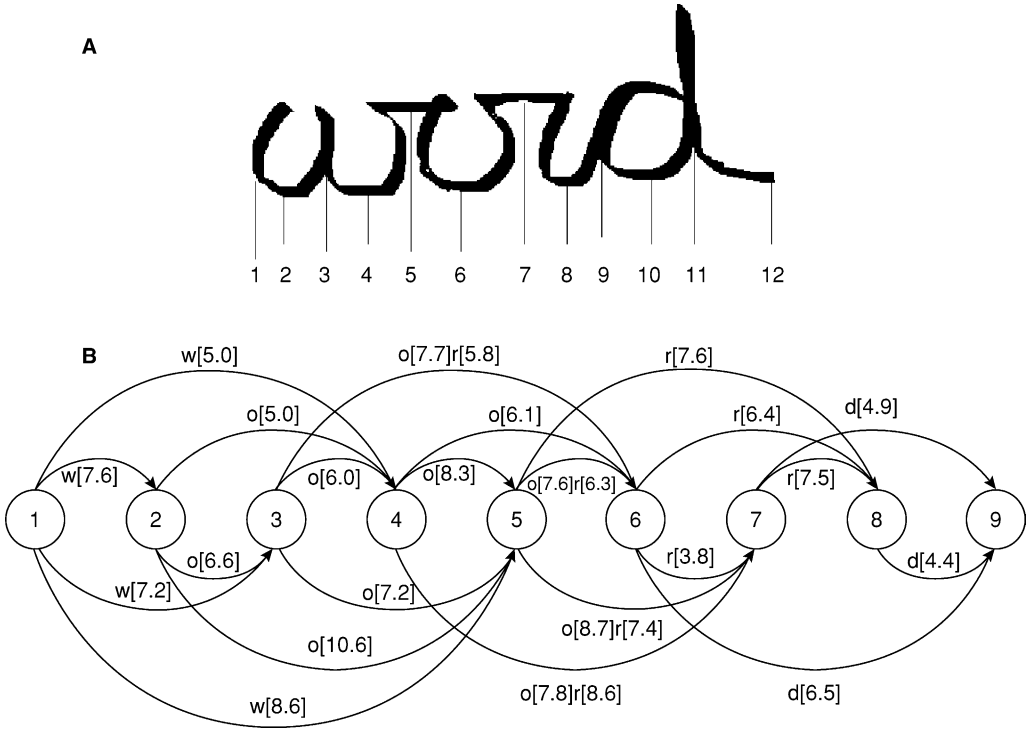

Figure 4 Analytic word recognition: (A) word with presegmentation points shown and (B) corresponding state transition diagram.

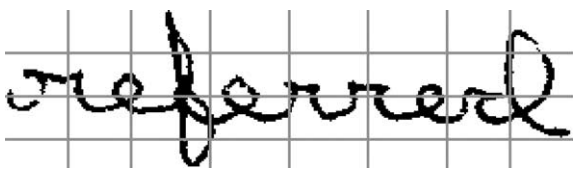

Figure 5 Holistic word recognition: a word is represented in an 8×4 grid and a feature vector is extracted.

interpretation rather than recognition since the goal is to assign the address to its correct destination irrespective of incomplete or contradictory information present in the writing. Systems currently in use by the United States Postal Service and other countries' postal services are able to correctly sort about 90% of handwritten addresses.

A gradation of class-discrimination problems is encountered: handwriting versus machine-print with two classes, handwritten numeral recognition with ten classes (Figure 6), alphabet recognition with 26 classes (Figure 7) and touching-digit pair recognition with 100 classes (Figure 8). Word recognition with a lexicon is a problem where the number of classes is dynamically determined by contextual constraints. Another problem encountered is similar to the problem of object recognition in computer vision: determining the destination address in a cluttered background.

Signature Verification

In static signature verification, a questioned signature image—as scanned and extracted from a bill, a check or document—is compared with known signature references. Unlike the dynamic case, there is no temporal information directly available, and the verification process relies on features extracted from the luminance of the trace only.

Although the extraction of a signature from a document background is already a very difficult problem in itself, particularly for checks, most of the studies published to date assume that an almost perfect extraction has been done. From a practical point of view, most researchers agree now that a solution will rely on the extraction from a signature of pseudodynamic features reflecting, for example, some specific characteristics used by a forensic document examiner as well as the automatic recovery of the stroke sequence in the signature image.

Handwriting Identification

Handwriting identification deals with comparing questioned writing with known writing exemplars and determining whether the questioned documents and exemplars were written by the same or different authors. Two issues of concern are the variability of handwriting within individuals, which are individual

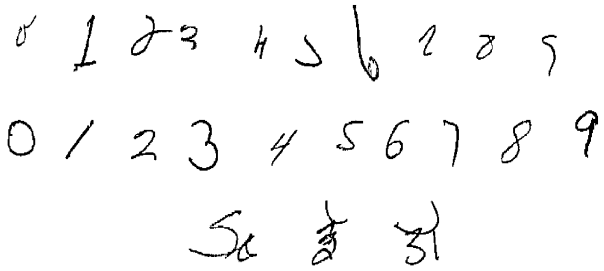

Figure 6 Ten-class discrimination (digits). Three sets of images are shown. The top row consists of difficult-to-read numerals. The middle row consists of fairly standard ones. The bottom row has non-digits, supplied to a digit recognizer, which must be rejected.

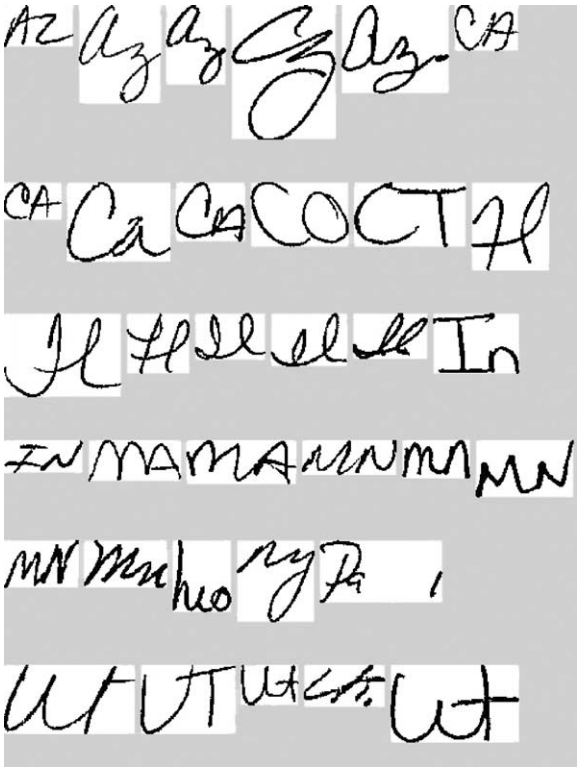

Figure 7 State abbreviations recognition with 66 classes. The valid abbreviations are AA, AE, AK, AL, AP, AR, AS, AZ, CA, CM, CO, CT, CZ, DC, DE, FL, FM, GA, GU, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MH, MI, MN, MO, MP, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, PR, PW, RI, SC, SD, SQ, TN, TX, TT, UT, VA, VI, VT, WA, WI, WV, WY. The figure shows image snippets containing two-letter abbreviations collected from actual mail.

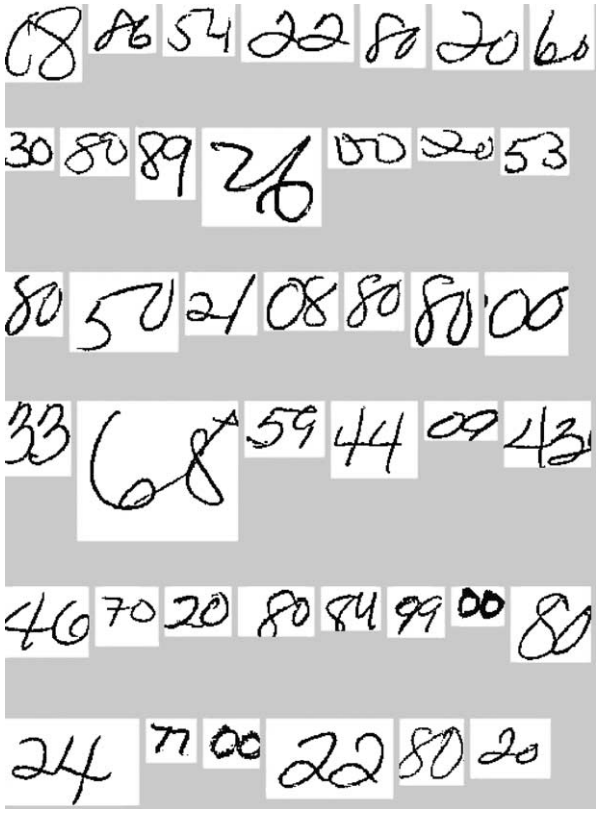

Figure 8 Hundred-class discrimination (digit pairs). Touching digit pairs can be hard to separate, and it may be preferable to treat them as a single unit consisting of 100 classes. The figure shows touching-digit image pairs extracted from ZIP Codes.

characteristics, and between individuals, which are class characteristics. The extraction of distinctive individual traits is what is relied on to determine the author of the questioned document.

Information about these two classes of variability is gathered based on the features for characterizing handwriting. Some of the elements of comparison are alignment (reference lines), angles, arrangement (margins, spacing), connecting strokes (ligatures and hiatuses), curves, form (round, angular or eyed), line quality (smooth, jerky), movement, pen lifts, pick-up strokes (leading ligatures), proportion, retrace, skill, slant, spacing, spelling, straight lines and terminal strokes.

Several of these features are readily computable based on handwriting recognition techniques. For instance, handwriting recognition procedures routinely compute baseline angle and slant so that a correction can be applied prior to recognition. The result of applying these procedures is then used to cluster different samples of handwriting in a multidimensional feature space. The writership of the questioned document is then established from its proximity to the exemplars. Most handwriting identification experts today almost entirely rely on manually intensive techniques. Tools have recently become available for automated handwriting verification and identification (Figure 9).

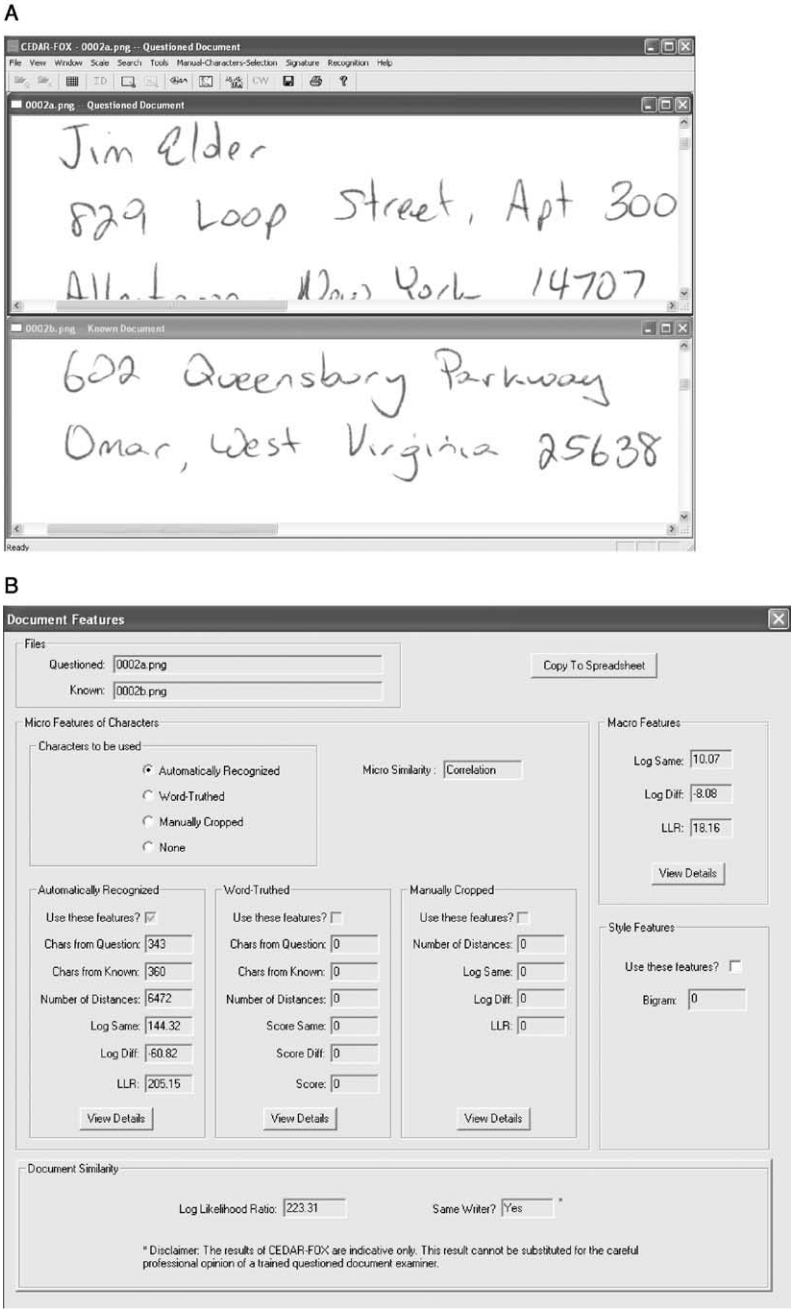

Figure 9 Screen shots of a software system for writer verification. The total log-likelihood ratio of the two documents (A) being written by the same/different writer are accumulated by the scores provided by several handwriting features (B).

Language Analysis and Processing: Language Models

Whatever the approach for recognition, dynamic or static, language models are essential in recovering strings of words after they have been passed through a noisy channel, such as handwriting or print degradation. The most important model for written language recognition is the lexicon of words. String matching algorithms between candidate words and a lexicon are used to rank the lexicon, often using a variant of the Levenshtein distance metric that incorporates various edition costs into the ranking process. String matching methods are often improved by incorporating dictionary statistics in the training data. Lexical subsets, in turn, are determined by linguistic constraints, e.g., in recognizing running text, the lexicon for each word is constrained by the syntax, semantics and pragmatics of the sentence.

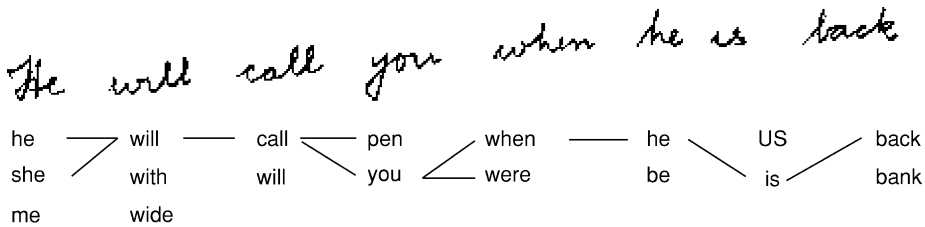

Figure 10 Handwritten sentence recognition. The path through top word choices is determined using part-of-speech tags.

The performance of a language model is evaluated in terms of the text perplexity, which measures the average number of successor words that can be predicted for each word in a text. The performance of a recognition system can thus be improved by incorporating statistical information at the word-sequence level. The performance improvement derives from selection of lower-rank words from word recognition output when the surrounding context indicates such selection makes the entire sentence more probable. Lexical techniques, such as collocational analysis, can be used to modify word neighborhoods generated by a word recognizer. Modification includes reranking, deleting or proposing new word candidates. Collocations are word patterns that occur frequently in language; intuitively, if word A is present, there is a high probability that word B also is present.

Methods to apply syntactic knowledge include N-gram word models, N-gram class (e.g., part-of-speech) models, context-free grammars and stochastic context-free grammars. N-Gram word models seek to determine the string of words that most probably gives rise to the set of output words that has been digitized or scanned. The problem with this approach is the difficulty of reliably estimating the parameters as the number of words grows in the vocabulary. A few alternatives to avoid this problem have been proposed: smoothing back-off models and maximum entropy methods. N-Gram class models map words into syntactic or semantic classes. In the first case, also referred to as the part-of-speech approach, for each sentence that has to be analyzed, a lattice of word/tag assignations is created to represent all possible sentences for the set of possible word candidates. The problem is to determine the best path through the lattice. The semantic approach relies mainly on machine-readable dictionaries and electronic corpora; it uses word definition overlaps between competing word candidates to select the correct interpretation. Other approaches that involve collocations are co-occurrence relations and the use of semantic codes that are available in some dictionaries.

So far, these approaches have been limited to proof of concept, and no large-scale experiments have been reported to demonstrate the effectiveness of semantic information in resolving ambiguities, although real-life analysis of human behavior suggests that this is very often the only way to proceed. An example of a handwritten sentence together with recognition choices produced by a word recognizer and grammatically determined correct paths is shown in Figure 10. An increase in the top-choice word-recognition rate, for example, from 80% to 95%, is possible with the use of language models.

Conclusion

Handwriting recognition has come of age from being a sleepy research area to general acceptance. In the dynamic or on-line case, handwriting recognition in personal digital assistants and tablet PCs is impressive. Dynamic signature verification systems have been marketed over the last few years. Most of the static or off-line successes have come in constrained domains, such as postal addresses, bank checks and census forms. The analysis of documents with complex layouts, recognition of degraded printed text and the recognition of running handwriting continue to remain largely in the research arena. While machine performance is beginning to become acceptable in both handwriting recognition and handwriting identification, major research challenges exist in word and line separation, segmentation of words into characters, recognition of words when lexicons are large, and the use of language models in aiding preprocessing and recognition.

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Hardenberg, Friedrich von (Novalis) (1772–1801)

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It could be said that the brevity of Novalis's life was in some ways mirrored in his work, which is astonishingly condensed in its richness and intensity of ideas. In point of fact, in 1802, merely one year after the poet's premature death, Friedrich Schlegel and Ludwig Tieck had already seen to the publication of two collections of his writings. Nonetheless, it is because of the edition of these very writings that the image of Novalis as a 'fragmentary' thinker has not only emerged, but also strengthened throughout the years. Such an image has shaped, almost without exception, the way Novalis's work has been interpreted until his *Nachlass* was finally discovered and studied in 1960. The discovery led to the publication of the historical and critical analysis of his work that is still ongoing today.

Novalis's 'new' image has therefore emerged from the analysis of his critical work. It has allowed the scholars to show the intrinsic relationship that exists between Novalis 'the poet' – the author of *Heinrich von Ofterdingen*, *Lehrlinge zu Sais*, as well of *Geistliche Lieder* and the *Hymnen an die Nacht* – and Novalis 'the theorist,' who dedicated numerous fragments to the works of Kant, Hemsterhuis, and, most of all, Fichte. It was in his *Fichte Studien*, which were written in 1795–1796, at the peak of his theoretical confrontation with Friedrich Schlegel, that Novalis laid the foundations not only of his own philosophical work, but also – although less overtly – of his linguistic and poetical work, mainly through important remarks about Fichte's concept of *Wechselwirkung*.

See also: Kant, Immanuel (1724–1804); Schlegel, Friedrich von (1772–1829).

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Harmony

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Vowel harmony is the name applied to a range of assimilatory phenomena involving vowel features, typically in contiguous strings of syllables. The term is not a primitive element of phonological theory, but instead serves as a pretheoretical classification, much like terms such as 'passive construction' in syntax, which are now recognized to apply to a heterogeneous set of phenomena. To apply the parallel given by Chomsky (2000: 8), the term 'vowel harmony' in phonology is like the term 'terrestrial mammal' in biology: they are "taxonomic artifacts, useful for informal description perhaps but with no theoretical standing."

Phenomena that have been grouped under this informal cover term, have, however, been valuable in providing a testing ground for many aspects of phonological theory, including the following questions:

- Does phonological computation involve rules or constraints?
- How is locality computed in phonology?
- Can rules apply iteratively?
- Do vowels and consonants consist of features from the same basic set?
- How does phonology interact with morphology?

These issues will come up as some standard cases are examined in the following discussions.

The term 'vowel harmony' is sometimes applied to static generalizations about lexical items. For example, the Finnish word *tyhmä* 'stupid' has only front vowels

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(*ä* stands for [æ]), and the word *tuhma* 'naughty' has only back vowels. Like most morphologically simple words (uninflected roots) in the language, these two forms contain only front vowels or only back vowels (a class of exceptions is discussed later). Such roots are sometimes said to be 'harmonic.' This generalization about roots may or may not reflect a computational property of the synchronic grammar – this depends on theoretical perspective – and it is assumed here that such facts represent descriptive generalizations about the lexicon (reflecting historical developments) that are possibly not encoded in a speaker's knowledge of language. Thus, henceforth, the term 'vowel harmony' is reserved for synchronic alternations. For example, when the elative suffix is added to the Finnish stem *tyhmä*, the surface form is *tyhmästä*, with a front vowel in the suffix that 'harmonizes' with the vowels (or one of the vowels) of the stem. When the elative suffix is added to *tuhma*, the result is *tuhmasta*, with a back vowel in the suffix, again harmonizing with the stem. The fact that this alternation is completely productive, applying trivially to known and invented stems, and involving many suffixes, suggests that we are dealing with a phonologically triggered alternation, and not a case of memorized allomorphy.

This simple data set gives rise to a number of interesting questions: What is the underlying representation of the elative suffix? What is triggering the harmony in the suffix? A plausible answer to the first question is that the suffix is underlyingly /-sta/, and that the vowel is changed to [ä] in front contexts. It is trivial to make this work – we can write a rule system that takes elative inputs with only /-sta/ and outputs [-stä] in the appropriate contexts. Another plausible solution is that the underlying suffix is /stä/, which is changed by rule to [-sta] in back contexts. An interesting third alternative that has been considered for the Finnish data, as well as many other cases, is that the elative suffix contains a segment lacking specification for the feature [back], and that either [+ back] or [−back] is filled in by rule in the appropriate context (see Inkelas (1995) for references and discussion on underspecification). We will adopt this position and symbolize the suffix with an underspecified vowel thus: /-stA/.

Possible answers to the question of what serves as the trigger of harmony are (a) the stem-initial vowel (the one furthest from the suffix), (b) the stem-final vowel (the one closest to the suffix), and (c) both stem vowels together. As we have suggested, these three choices actually cover a variety of conditions – for example, the relevant factor in (a) could be that the vowel is stem initial, or that it is furthest from the suffix. It turns out that no version of possibility (a) is ever the appropriate generalization – neither being stem initial nor furthest from the harmonizing target. There are putative cases of bisyllabic triggers for harmony (see Walker, 2001; Dresher and Zhang, 2000), thus instantiating possibility (c), but if they exist, they can perhaps be reduced to recursive chains of single-syllable conditions. Some version of possibility (b) seems most promising – in particular, the fact that the stem-final vowel is closest to the target is typically assumed to be the crucial factor.

Note, however, that the integration of this notion of closeness into a theoretical analysis is subject to great variation. The claim that it is this closest vowel that triggers harmony does not imply that the notion of closeness is inherently part of the relevant process or constraint set. In some analyses, all vowels may be potential triggers of harmony, but the effects of nonlocal triggers are blocked due to particular constraints on representations. (It is crucial to note in this regard that the oft-cited constraint against crossing association lines is logically incoherent, as demonstrated by Coleman and Local (1991).) In another type of analysis, the target vowel 'searches' for a trigger and the search terminates when one is found. Thus the locality of the trigger is just a result of the linear nature of the search, and there is no need for locality constraints or conditions in the computation.

Consider some data for Finnish neutral vowels:

(1a)	värttinä		'spinning wheel'
(1b)	värttinä-llA-ni-hAn	[värttinällänihän]	'with spinning wheel, as you know'
(1c)	palttina		'linen cloth'
(1d)	palttina-llA-ni-hAn	[palttinallanihan]	'with linen cloth, as you know'

Forms (1a) and (1b) are not surprising – they just seem to show the application of harmony to a string of suffixes. The uninflected form (1a) has all front vowels, and the suffixes in form (1b) are all front as well. In a case such as this, the question is whether the suffix vowels are all harmonizing with the stem-final vowel, or each with its immediate predecessor. For example, where is the final vowel, in the suffix [-hän], getting its [− back] value? Interestingly, phonologists may disagree about whether the trigger is the stem-final vowel, or the vowel of the /-llA/ suffix, but they will definitely agree that it is not from the immediately preceding vowel of /-ni/. This is because the forms (1c) and (1d) show that [i] does not conform to our expectations, given what we have seen so far.

The complex forms (1b) and (1d) both contain three suffixes and show several noteworthy phenomena. First of all, vowel harmony systems may contain neutral vowels, such as the vowel of *-ni*, which does not alternate with respect to the harmonic feature,

[back] in this case. The vowel is unchanging in both [+ back] and [−back] contexts. This particular type of neutral behavior, which allows harmony of its flanking vowels for either value of [back], is called transparency, since the vowel appears to be transparent to the process. Transparency has been approached in at least two ways: attributing special properties (or lack thereof) to the transparent vowels and defining the harmony triggers in such a way as to exclude the transparent vowels. The first approach again relies on the mechanism of underspecification. We mention here that consonants sometimes interfere in, or particpate in, harmony processes, but when they do not, the assumption is that they lack the relevant features. This approach to consonant transparency is basically identical to the underspecification approach to vowel transparency – in each case, the transparent segments are assumed to lack certain features. For vowels, the assumption is that they are filled in, in the course of the derivation, so that, for example, the vowel of *-ni* is underlyingly without a value for [back], but then receives [− back] after all harmony has occurred. For consonants, the assumption is that transparent consonants never have the relevant features; they lack them underlyingly and they exit the phonology without them. The second approach to transparency recognizes the possibility for arbitrary formal stipulation in rule statements.

Setting aside transparency, we see that these forms have multiple targets of harmony. Does the final vowel in each case receive its value by agreement with, or copy from, the stem-final vowel in the same computational step as the vowel of the /-llA/ suffix that is adjacent to the stem? Or does the harmony propagate iteratively, first affecting the closest potential target, which then serves as a trigger for the next potential target? These are the kinds of issues that harmony forces us to confront.

Vowel harmony systems vary along a number of dimensions. In Finnish, the harmonic feature is [back], but many languages have harmony of other features, two common ones being roundness and advanced tongue root ([round] and [ATR]). An example of the latter is Tangale (Kidda, 1993), which also exemplifies the other kind of neutral behavior, opaqueness. The /a/ vowel fails to harmonize, and furthermore blocks spreading of a harmonic feature. Examples (2a)–(2f) show Tangale ATR harmony:

(2a)	seb-U	[sebu]	'look' (IMP)
(2b)	kɛn-U	[kɛnʊ̈]	'enter' (IMP)
(2c)	peer-na	[peerna]	'compelled'
(2d)	pɛd-na	[pɛdna]	'untied'
(2e)	ɗob-Um-gU	[ɗobumgu]	'called us'
(2f)	ɗib-na-m-gU	[ɗibnamgʊ̈]	'called you (PL)'

We see in Examples (2a)–(2d) that the value of the [ATR] feature spreads rightward in Tangale, but that /a/ does not alternate. Examples (2d)–(2f) show that /a/, in addition to not alternating, blocks spreading of [+ATR] to subsequent affixes, spreading its own [− ATR] value instead.

Some languages have harmony of more than one of feature, and the details of the process may differ for different features. Turkish is a well-known case of both [back] and [round] harmony. Examples (3a)–(3e) show Turkish vowel harmony:

	GEN SG	NOM PL	GEN PL	
(3a)	ip-in	ip-ler	ip-ler-in	'rope'
(3b)	kɨz-ɨn	kɨz-lar	kɨz-lar-ɨn	'girl'
(3c)	sap-ɨn	sap-lar	sap-lar-ɨn	'stalk'
(3d)	yüz-ün	yüz-ler	yüz-ler-in	'face'
(3e)	son-un	son-lar	son-lar-ɨn	'end'

Observe that the high vowel of the genitive marker suffix in the singular shows a four-way alternation of front/back and round/nonround, depending on the preceding vowel. The nonhigh vowel of the plural suffix alternates with respect to the front/back properties of the preceding vowel (with a concomitant automatic height adjustment between low and mid). Interestingly, the genitive plural forms, which are formed by adding to the stem the plural marker followed by the genitive marker, do not show the same four-way alternation in the genitive. This supports the idea that the appropriate suffix alternants are computed, not memorized, since the genitive marker that appears with *yüz* is not constant. This also supports the idea that the harmony triggers do not refer to morphological information such as 'look to the stem final vowel for a vowel to agree with.' It looks like the genitive marker of *yüz-ler-in* has its [−round] value in agreement with the directly preceding [− round] vowel of the plural marker – in fact, the vowel of the plural suffix is behaving opaquely: it does not alternate and it seems to initiate its own span of harmony.

We have only seen examples of harmony spreading from stems to suffixes. Dominant/recessive harmony systems differ from this pattern in having particular feature values, the dominant ones, with which all vowels in a word must agree. If one of these dominant values is present on any morpheme, whether stem or affix, then the whole word will have dominant-valued vowels. If no morphemes have a dominant vowel, the whole word will have recessive-valued vowels.

Finally, mention must be made of the difficulty posed by languages such as Hungarian having robust harmony systems, but with classes of exceptions. Hungarian words such as *víz* 'water', not surprisingly, take front harmony suffixes, so the dative is *víznek*.

However, *híd* 'bridge', like a long list of other roots with front nonlow vowels, takes back harmonic suffixes, so the dative is *hídnak*. Accounts for such cases may draw on differences in phonological representation, morphological classes, and multiple phonologies within a language, among others.

See also: Akan; Finnish; Hungarian: Phonology; Turkish.

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Harrington, John Peabody (1884–1961)

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The phrase most commonly used to describe John Peabody Harrington is 'eccentric genius.' He was obsessive, driven, suspicious of others' motives, protective of his consultants and his data, and secretive with regard to the scope of his work. In spite of this, he made a singular contribution to the study and preservation of the native languages of North America. Over the course of more than 50 years of fieldwork, he collected data on over 100 different Native American languages. Harrington's phonetically detailed recordings are often the best and sometimes the only records that remain of the languages he worked on. Frequently, his work involved 'salvage' linguistics, recording languages that were on the edge of extinction. He felt keenly the urgency of the challenge to record dying languages and did his best to document as many of them as time and health would permit. He sought out every earlier record of each language he worked with and then assiduously 'rechecked' those attestations, most of which were not done with phonetic accuracy. Harrington has been criticized for this practice, but, in many cases, it was a useful technique for jogging the memories of consultants who had not spoken their languages for decades and ensured that older records could be properly interpreted.

Harrington was born in Waltham, Massachusetts, the elder of two sons of Mary Lydia Peabody and Elliot Augustus Harrington. The Harringtons traced their ancestry to before the American Revolution; at least one ancestor fought at the Battle of Lexington. They moved to Southern California in 1892, apparently for reasons of Elliot's health. The family was close, and in California they became successful farmers, growing apricots, walnuts, and other specialty crops on their land in the Simi Valley. Harrington became and remained a Californian; he seems never to have returned to Massachusetts as an adult, but neither did he ever lose his New England accent (as an aluminum disk recording of him interviewing his father in 1934 confirms).

Harrington was a born linguist. He studied German and Russian in high school, then majored in philology and classical languages at Stanford University, from which he obtained his B.A. in 1905 after only three undergraduate years. He was nominated for a Rhodes Scholarship by his Stanford mentor, Henry Rushton Fairclough, but did not show up to take the required placement test, a pattern that he would repeat throughout his life. On his own, he began studying Armenian with speakers he met in Southern California. His first field experience (according to his *curriculum vitae*) with California languages was with speakers of Ineseño Chumash as early as 1902. In 1905 and 1906, after obtaining his Stanford degree, he traveled to Leipzig and Berlin for training in the latest 'linguistic science' with scholars such as Karl Brugmann, August Leskien, Edouar Eduard Sievers, and Franz Niklaus Finck.

He had hoped to return to Berlin to do further work with Finck, but the latter's unexpected death in 1910 ended those plans. In Germany, Harrington would likely have undertaken fieldwork on Caucasian languages. But when it became necessary for him to stay in the United States, he took up the study of the native languages of North America in earnest. He

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The phrase most commonly used to describe John Peabody Harrington is 'eccentric genius.' He was obsessive, driven, suspicious of others' motives, protective of his consultants and his data, and secretive with regard to the scope of his work. In spite of this, he made a singular contribution to the study and preservation of the native languages of North America. Over the course of more than 50 years of fieldwork, he collected data on over 100 different Native American languages. Harrington's phonetically detailed recordings are often the best and sometimes the only records that remain of the languages he worked on. Frequently, his work involved 'salvage' linguistics, recording languages that were on the edge of extinction. He felt keenly the urgency of the challenge to record dying languages and did his best to document as many of them as time and health would permit. He sought out every earlier record of each language he worked with and then assiduously 'rechecked' those attestations, most of which were not done with phonetic accuracy. Harrington has been criticized for this practice, but, in many cases, it was a useful technique for jogging the memories of consultants who had not spoken their languages for decades and ensured that older records could be properly interpreted.

Harrington was born in Waltham, Massachusetts, the elder of two sons of Mary Lydia Peabody and Elliot Augustus Harrington. The Harringtons traced their ancestry to before the American Revolution; at least one ancestor fought at the Battle of Lexington. They moved to Southern California in 1892, apparently for reasons of Elliot's health. The family was close, and in California they became successful farmers, growing apricots, walnuts, and other specialty crops on their land in the Simi Valley. Harrington became and remained a Californian; he seems never to have returned to Massachusetts as an adult, but neither did he ever lose his New England accent (as an aluminum disk recording of him interviewing his father in 1934 confirms).

Harrington was a born linguist. He studied German and Russian in high school, then majored in philology and classical languages at Stanford University, from which he obtained his B.A. in 1905 after only three undergraduate years. He was nominated for a Rhodes Scholarship by his Stanford mentor, Henry Rushton Fairclough, but did not show up to take the required placement test, a pattern that he would repeat throughout his life. On his own, he began studying Armenian with speakers he met in Southern California. His first field experience (according to his *curriculum vitae*) with California languages was with speakers of Ineseño Chumash as early as 1902. In 1905 and 1906, after obtaining his Stanford degree, he traveled to Leipzig and Berlin for training in the latest 'linguistic science' with scholars such as Karl Brugmann, August Leskien, Edouar Eduard Sievers, and Franz Niklaus Finck.

He had hoped to return to Berlin to do further work with Finck, but the latter's unexpected death in 1910 ended those plans. In Germany, Harrington would likely have undertaken fieldwork on Caucasian languages. But when it became necessary for him to stay in the United States, he took up the study of the native languages of North America in earnest. He

had met Franz Boas's students Alfred Kroeber and Pliny Earle Goddard in a summer session course at the University of California at Berkeley; under their influence, he did his first major fieldwork with Mojave, Yuman, and Chumashan. From 1909 to 1915 he worked on several Pueblo languages under the tutelage of Edgar Lee Hewett at the School of American Archaeology in Santa Fe, New Mexico. He also taught summer school in San Diego, where, in 1915, he met Carobeth Tucker, whom he would marry a year later. Carobeth's keen ear and natural linguistic ability impressed Harrington and he began training her as a field assistant. Many of the field notes from 1916 to 1920 bear witness to her skill. They separated in 1920 and were divorced in 1921. Remarkably, Carobeth reactivated her career almost 60 years later, publishing several books on Chemehuevi language and mythology as well as a memoir, *Encounter with an angry god*, of her years living and working with Harrington. They had one daughter, Awona.

Most of Harrington's professional relationships were difficult, but those of his long-time acquaintances, collaborators, and assistants whom he trusted thought highly of him both intellectually and personally. His skills as a language analyst and grammatical theorist were minimal, but in fieldwork practice he had no peer. To enhance his superb training and maximize his use of time, he continually sought out and used new technology, including wax cylinders, aluminum disks, and specially fitted automobiles. Harrington often stored papers with friends and acquaintances or in warehouses, and scholars suspect that there are still caches of field notes which have not turned up in the decades since his death, but what has been located comprises a collection of staggering size: His field notes, correspondence, photographs, and personal papers occupy approximately 208 linear meters (683 linear feet) at the National Anthropological Archives (Smithsonian Institution). A smaller, but still substantial, collection resides at the Santa Barbara Museum of Natural History in California, and he is represented by correspondence and occasional sheaves of notes in many archives throughout the United States and Canada.

Many of the early curatorial pioneers of American museums were from the same Yankee subculture as Harrington, but he generally kept to himself, seeing most of them as 'armchair' scientists. The Boasians were exceptions; they were actively engaged in fieldwork and research, and most had employment at reputable academic institutions. Harrington considered them, especially Edward Sapir, as his intellectual equals, but worried that he had no such secure position. In February 1915, he was finally appointed an ethnologist at the Bureau of American Ethnology, a position he held until his retirement in 1954.

At the beginning of his professional career, Harrington was in contact with Boas and many of his students, including Sapir, but his general unreliability in following through with promised projects, his secretive nature, and his often thinly disguised anti-Semitism made these relationships difficult. In 1913, on the recommendation of Sapir, Boas appointed him to the committee of the American Anthropological Association charged with developing a comprehensive set of orthographic conventions for recording American Indian languages. He came through with a highly detailed set of recommendations, many of which were incorporated into the committee's final document, but the other committee members found Harrington trying, and dropped him from the committee on the pretext that he was not a dues-paying member of the AAA.

In the three decades following his divorce in 1921, Harrington's life settled into a pattern which he would sustain until his retirement. He disliked having to spend time in Washington, D.C., where his employers insisted he make periodic appearances, and he went to great lengths to avoid trips to the East Coast. On several occasions, he brought native consultants with him to Washington so that he would not lose valuable time away from them while he fulfilled his administrative duties. From a California 'base' in Santa Barbara, he undertook extensive fieldwork on Costanoan languages and continued his work with Chumashan, particularly Barbareño; he worked with three generations of speakers of that language. He often took secretive field trips to follow up on tips about possible speakers of other languages, and he trained several research assistants (including Jack Marr and Harrington's own nephew, Arthur Harrington) to extend his reach. He developed a close working relationship with other eccentric collectors of native languages and lore, including Frank Latta and C. Hart Merriam. The largest portions of Harrington's corpus are notes on Costanoan and Chumashan, but he worked at some time on languages belonging to nearly every language stock on the western North American coast and many inland languages as well.

A common misperception is that Harrington published very little. His output (not including his poetry) amounts to over 100 items. His data have been used in innumerable publications, and large portions of his notes have appeared as monographs by other scholars (see Bibliography). Ironically, the languages and cultures to which he devoted the greatest effort – the Chumashan and Costanoan – are hardly represented at all in his bibliography. Perhaps the most surprising

aspect of his legacy is the part that his recordings are playing in current language revitalization efforts. It is not unusual to find the descendants of some of the last speakers Harrington worked with looking to his collection for the materials they need – and can get nowhere else – in their efforts at language and cultural revival.

After his retirement, he lived in Santa Barbara, where he continued to work on Barbareño Chumash with Mary Yee, the last speaker of that language. Mrs Yee took care of him during his later years; at the end of his life, his daughter Awona brought him to San Diego where he passed away in 1961.

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Harris, James (1709–1780)

J L Subbiondo

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James Harris is credited with writing the most comprehensive philosophical grammar in eighteenth-century England. Clearly his work reflects the seventeenth-century tradition of John Wilkins (*see* **Wilkins, John (1614–1672)**) and his colleagues (*see* **Universal Language Schemes in the 17th Century**).

He was born on July 20, 1709, and educated at Wadham College, Oxford. Later he studied law at Lincoln's Inn and became a magistrate in Salisbury. He held a variety of high level political offices such as Lord of the Admiralty, Lord of the Treasury, and Comptroller to the Queen. He died on December 22, 1780 and was buried in Salisbury Cathedral. Throughout his life, he was devoted to the study of art, literature, music, philology, and poetry, and he wrote several treatises on his studies.

His principal work in linguistics was *Hermes: or, a philosophical inquiry concerning language and universal grammar* (1751), in which he argued that the study of language was inseparable from that of thought; consequently, he maintained that the study of language relied on logical inquiry as well as the experimental method. He defined philosophical grammar as "that grammar, which without regarding the several idioms of particular languages, only respects those principles that are essential to them all" (1751: 11). His approach to language study drew heavily upon two traditions: first, the ancient philosophical tradition as his copious references to Socrates, Plato (*see* **Plato and His Predecessors**), Aristotle (*see* **Aristotle and Linguistics**), and Priscian will attest; and second, the 17th-century empirical tradition.

More than any of his seventeenth-century predecessors, Harris blended an Aristotelian natural philosophy with Cartesian scientific method (*see* **Aristotle and the Stoics on Language**). He explicitly advanced the notion that a theory of language depended upon a theory of mind. He pointed out that the "mind, like other powers, can be only known from its operation" (1751: xiv) and only through logical analysis or "viewing the mind during its process" (1751: xiv). Thus, Harris insisted that the operation and the process of the mind ought to be the proper subjects of the grammarian because the source of language was the mind and the development of the utterance was connected to mental process. For Harris, grammatical speculation depended upon an integration of philosophy, logic, and science.

Harris recognized that semantics was crucial to linguistic analysis, and he argued that the basis of meaning was the conformation of the word to reality. Unlike the proponents of the 17th-century universal language movement who sought clarity in artificial

aspect of his legacy is the part that his recordings are playing in current language revitalization efforts. It is not unusual to find the descendants of some of the last speakers Harrington worked with looking to his collection for the materials they need – and can get nowhere else – in their efforts at language and cultural revival.

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languages, Harris believed that natural languages were capable of precision.

Hermes was subject to mixed criticism: some considered the work significant as is indicated by its many editions and foreign translations. Others found the work too abstract, old fashioned, and confusing (Aarsleff, 1967; Asbach-Schnitker, 1973).

See also: Aristotle and Linguistics; Aristotle and the Stoics on Language; Plato and His Predecessors; Universal Language Schemes in the 17th Century; Wilkins, John (1614–1672).

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Harris, Zellig S. (1909–1992)

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Zellig Sabbettai Harris was born in 1909 in Balta, Ukraine. He moved to Philadelphia, Pennsylvania, with his family when he was four. A student in the Oriental Studies department, he received his bachelor's (1930), master's (1932), and doctoral (1934) degrees from the University of Philadelphia, where he also appeared as an important figure of the 'Avukah' (1925–1943 Zionist student organization in the United States). He began to teach at the same University in 1931, and would go on to found the first linguistics department in the United States at that institution in 1946. His entire career lay there until his retirement in 1979. After that, he was associated with Columbia University. During World War II, like Bloomfield, he also was closely involved in the U.S. military development of teaching materials, and he wrote beginning handbooks for Pacific and Far East languages for the American landing troops in this whole area. Harris was the director of the Transformations and Discourse Analysis Project, sponsored by the U.S. National Science Foundation (1958–1980) at the University of Pennsylvania and later at Columbia University. In 1966, he was named to the prestigious position of Benjamin Franklin Professor of Linguistics. He was a faithfully contributor to *Language* and served as president of the Linguistic Society of America in 1955. He was a member of the American Philosophical Society and of the National Academy of Sciences. He was an active member of the kibbutz Mishmar Haemek and for years commuted between Philadelphia and Israel. His political opinions were close to socialism and anarchism. They are stated in the last book he wrote at the end of his life.

His master's dissertation on the 'Origin of the Alphabet' was published in the *Journal of the American Oriental Society* (1933), and his first book (and doctoral dissertation) *A grammar of the phoenician language* (1934) made a great impression and attracted the attention of Edward Sapir. He taught in 1937 at the Ann Arbor Linguistics Institute of the University of Michigan where Edward Sapir was the leading figure. His next book *Development of the Canaanite dialects: An investigation in linguistic history* (1939) is an exemplary philological study of the early history of the Canaanite branch of West Semitic (Phoenician dialects, Hebrew, Moabite, etc.).

By 1940 his attention had already turned to general linguistics, and from then on, the development of his thought may helpfully be divided into three, in part overlapping, phases. As he said himself, Harris was influenced by Sapir and by Leonard Bloomfield, although he did not formally study with either of them. Both tried to understand the phenomenon of meaning in language, just as Harris always did. The first phase began in 1942 and may be seen to end in 1955, with the study of other languages such as Native American languages, African languages, etc., articles on the morpheme and, above all, *Methods in structural linguistics* (1951), a book that made him famous. Harris restated and extended distributional methods of Bloomfield and Sapir.

A second phase began in 1952 with *Discourse analysis*. Inspired by algebra, he introduced the concept, and the term, of a grammatical 'transformation,' satisfying the needs of discourse analysis, applied to English and the languages of science. He also invented X–bar notation. His transformational theory was developed in more detail in *Mathematical structures of language* (1968). There, Harris presented an important alternative to the judgment of

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comparative acceptability. Instead of the grading of acceptability, a given sentence is 'out of context,' and the informant can provide a suitable context for it. In this theory a transformation works on a construction (or on two constructions in cases of conjunction).

In 1969, Harris changed his course. The basic ideas of Harris's last phase became clear in the 1970s, in papers in English and more fully in translation into French (1976) headed under 'operator grammar'. Any sentence of the base is a report. The limitation on the co-occurrence of words holds only within the operator–argument relation in a report. The role of transformations is different in this theory from what it was in Harris's previous theory. Reductions do not create new information, but introduce and thereby explain the ambiguities present in language. Harris was always prepared to use new techniques for the same purpose – to find formal properties of language, in particular properties that correspond to meaning or information. The new theory does not invalidate the previous ones; it only presents another aspect of the problem. In 1982, Harris published his masterpiece, *A grammar of English on mathematical principles*. In his last years, he published a book (1992), among others, of reflections on the variety of approaches he had been taking toward language. One can only admire the steadfastness with which he carried his project through. He was one of the half dozen or so American linguists whose work has had the greatest influence both in his own land and abroad.

See also: Chomsky, Noam (b. 1928); Constituent Structure; Critical Discourse Analysis; Syntax of Words; Transformational Grammar: Evolution.

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Hart, John (1501–1574)

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John Hart's date of birth must have been sometime in the summer of 1501. His family came from Middlesex, and although little is known about his life, he entered Heralds' College, also called the College of Arms, at an early age. He must have spent much of his life in government service, also abroad, probably in France, for he studied the works of Meigret and Peletier and other spelling reformers. In the late 1540s, he was appointed Newhaven Pursuivant Extraordinary, and in 1567 he was created Chester Herald. Hart knew Latin and French well and also had a good knowledge of Greek and Hebrew. He died in London in 1574.

Hart was the author of three works on English spelling and pronunciation. The first exists only in manuscript, *The opening of the unreasonable writing of our inglish toung* (1551), which he dedicated to Edward VI. The second is *An orthographie, conteyning the due order and reason, howe to write and painte thimage of mannes voice, most like to the life or nature*, published in 1569. The third came out 1 year later; a primer of reading according to Hart's new alphabet, it was titled *A methode or comfortable beginning for all unlearned*. In his spelling he tried to bring orthography into harmony with pronunciation. However, he could not free himself from traditional spelling. In choosing the form of speech, he was guided by the consent "of the learned and the literate." He wanted to teach the best English, and in his opinion "the flower of the English tongue" was used in the Court and in London.

Hart was an excellent phonetician; he was in fact the best phonetician of the 16th century. His *Orthographie* contains a detailed description of the phonology of the standard English of his time, and his fine observations in the consonantal range, which are mirrored in his spelling, include the aspiration of voiceless stops (thus, *pound* is rendered by him as *p-hound*, *pipe* as *p-heip*, and *open* as *o·p-hen*), a sentence-phonetic variation between /s/ (occurring before voiceless consonants) and /z/ (occurring before voiced sounds) as in <iz uel> (*is well*), <az ani>, but <is sed>, <ðis salt>, and a differentiation for *if* and *of* spelled <if> or <of> before a voiceless consonant but <iv>/<ov> before a vowel or voiced consonant, as in <iv iu> (*if you*). No spelling reformer or phonetician before him had made these observations. Hart also described sounds that occur in other languages; in this, as in the case of German *ch*, which he thought was *kh*, he was, however, less successful.

See also: Bullokar, William (c. 1531–1609); Mulcaster, Richard (1532–1611); Spelling Reform Proposals: English.

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Hattori, Shiro (1908–1995)

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Hattori Shirō (**Figure 1**) was born in 1908, in Mie Prefecture, in the Ise area, where he received his early education. He studied Japanese language and linguistics at Tokyo University under the guidance of Hashimoto Shinkichi (1882–1945), a leading authority on ancient Japanese epigraphy and modern Japanese morphology and syntax. Hattori developed an interest in historical linguistics and began to study affinities between Japanese and Northeast Asian languages such as Ainu, Korean, Manchu, and Mongolian.

In 1933 Hattori received a grant from the Tokyo Institute for Advanced Studies of Language that allowed him to study Altaic languages in Manchuria and Inner Mongolia. At the end of a decade of field research he became an associate professor of Linguistics at Tokyo University. He completed a book on the Mongolian writing system (*Mōko-ji nyūmon*) in 1943, and a study of Mongolian language (Mōko to sono gengo) in 1946. Hattori continued his Altaic research, culminating in a three-volume study (*Arutai shogengo no kenkyū*), published when he was eighty years old.

Following the end of World War II Hattori changed his field research focus to Hokkaido, where he gathered data on Ainu. His Tokyo University students assisted him in compiling a comprehensive Ainu dictionary (*Ainugo hōgen jiten*), published in 1964. These assistants later formed a new generation of Ainu scholars at universities in Japan and the West, regarding Hattori as the founder of the modern study of Ainu language and linguistics.

Hattori began work in phonetics and phonology, publishing a general study on the subject *(Onseigaku)*, in 1954. He had done research on Chinese historical

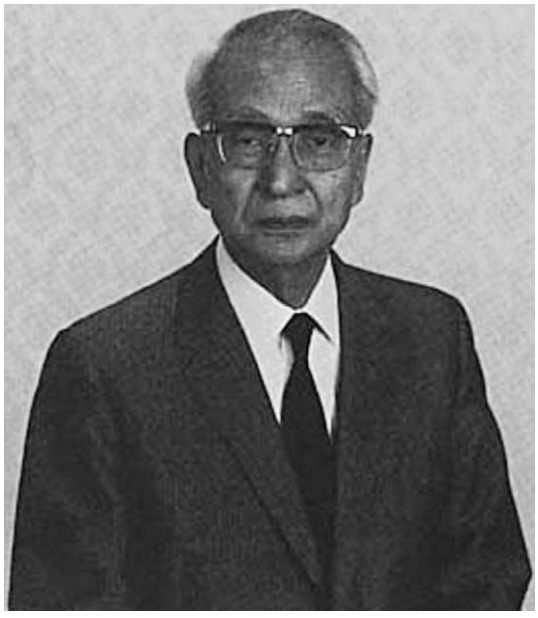

Figure 1 Hattori Shirō. Source: Tokyo University Press.

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See also: Ainu; Altaic Languages; Jakobson, Roman (1896–1982); Japan: History of Linguistics; Todo, Akiyaso (b. 1915).

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Haugen, Einar (1906–1994)

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Einar Haugen was born in Sioux City, Iowa to Norwegian immigrant parents; some years of his boyhood were spent in Norway. He graduated from St. Olaf College in Northfield, Minnesota in 1928, and studied English and Scandinavian at the University of Illinois at Urbana, receiving his Ph.D. in 1931. He then served on the faculty of the University of Wisconsin at Madison from 1931 to 1962, when he took a position in Scandinavian and linguistics at Harvard. He was granted honorary degrees by a number of U.S. and foreign universities, and served as president of the Linguistic Society of America, the American Dialect Society, and the Society for the Advancement of Scandinavian Studies. He frequently taught at summer linguistic institutes.

The Norwegian language and culture and its Scandinavian context, together with the experience of bilingualism, were central both to Haugen's scholarly work and to his life. He established the study of linguistic and social aspects of bilingualism within U.S. linguistics before there was a recognized field of sociolinguistics. His work encompassed the languages and literature of Scandinavia in their historical development as well as their modern forms. Both his descriptive works and his more theoretically oriented writings were richly endowed with empirical content. His explorations of 'semicommunication' (1966b), beginning in the 1950s, and his comprehensive view of bilingualism along axes of relative proficiency in and relative structural difference between the two languages of a bilingual, as a basis for exploration, are emblematic of his empirically rich and deeply nuanced understanding of bilingualism. As a senior figure in the Linguistic Society of America, Haugen sought to moderate the theoretical squabbles of American structuralism in the 1950s and to draw attention to other points of view, such as Louis Hjelmslev's work. He was among the first to champion

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Hausa

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Introduction

Hausa is a Chadic (Afroasiatic) language spoken by an estimated 30 million or more first-language speakers (more than any other sub-Saharan language), mainly in northern Nigeria and southern Niger. It is also spoken by diaspora communities of traders, Muslim scholars, and immigrants in (mainly) urban areas of west Africa (e.g., Ghana, Cameroon), and also in the Blue Nile Province of the Sudan. Hausa is the most important and widespread west African language and continues to expand as a transnational lingua franca.

Hausa is used extensively in commercial, governmental, and educational spheres, and in the mass media. There are a number of Hausa-language newspapers, and book publishing, television, and video production are active. Many radio stations, both African and international, broadcast in (mainly Standard Kano) Hausa, including the BBC World Service, Voice of America, Radio Deutsche Welle, and China Radio International. A number of universities in Nigeria and Niger offer undergraduate and postgraduate degree courses in Hausa, and there are specialists in Hausa language and/or literature involved in comparable programs at universities in Europe, the United States, Japan, China, and South Korea. It has the best dictionaries (Bargery, 1934; Abraham, 1962; R. M. Newman, 1990) and reference grammars (Caron, 1991; Wolff, 1993; P. Newman, 2000; Jaggar, 2001) of any African language.

Substantial borrowing from neighboring African languages, such as Kanuri (central), the Mande group, Tuareg (Tamahaq, Tahaggart), Yoruba and Fula(ni) a single language (with considerable dialectal variation), has enriched the Hausa lexicon. Most loanwords come from Arabic, English, and French, however, with Arabic loans encompassing such semantic fields as religion (Islam was introduced to the area more than 500 years ago), education, government, law, commerce, war, and horsemanship. Over the past 100 years, an ever-growing number of loanwords from English (Nigeria) and French (Niger) have been incorporated, typically denoting material objects and technology, education, and governmental and military positions.

Hausa has been written for more than 200 years in Arabic script ('àjàmi; see below for transcription), a system prevalent in Koranic schools and still used by many (mainly non-western-educated) Hausas for religious and literary purposes. However, 'àjàmi has been gradually supplanted by a modified Latin script/alphabet called bookòo (probably < English 'book'), which does not, however, mark contrastive tone or vowel length. Hausa dialects vary in phonology, lexicon, and grammatical morphemes, and can be broadly grouped into Eastern Hausa (e.g., Kano = Standard Hausa, the variety described here), Western Hausa (e.g., Sokoto), and dialects in Niger (e.g., Aderanci).

Phonology

Hausa (Standard/Kano) has 32 consonant and 12 vowel phonemes (10 short/long monophthongal pairs plus two diphthongs). (See **Table 1**.)

Hausa has two level tones, (H)igh (unmarked a[a]), and (L)ow (indicated with a grave accent on the first vowel à[a]), e.g., kiifii 'fish', màcè 'woman', roogòo 'cassava', sàuka 'get down'. There is also a contour (H͡L) Falling tone (indicated with a circumflex), which occurs on heavy syllables, e.g., râi 'life', kwântaa 'lie

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Table 1 Hausa: consonants

Consonants:							
vl	f	fy	t	c	k	kw	ky
vd	b		d	j	g	gw	gy
gl	ɓ		ɗ	'y	ƙ	ƙw	ƙy
vl			s	sh			
vd			z				
gl			ts				
	m		n				
			l				
			r				
			ř				
				y	w	h	ʔ

c [ʧ] and j [ʤ] = palato-alveolar affricates, sh = palatal fricative [ʃ]; ʔ = glottal stop (orthographic '); ɓ, ɗ = laryngealized (implosives), 'y = glottalized palatal glide, ƙ [k'] and ts [s'] = glottalized ejectives; r [ɽ] = retroflex flap, ř = alveolar tap/roll.
Vowels (i = short; ii = long): i, ii, e, ee, a, aa, o, oo, u, uu.
Diphthongs: ai, au.

down'. There are three syllable types: CV, CVV (long vowel or diphthong), and CVC (long vowels are forced to conform and are reduced in extra-heavy *CVVC syllables). When followed by a front vowel, the coronal stops t, d and fricatives s, z palatalize to c, j, and sh, j respectively, e.g., mèe sukà sàataa? 'what did they steal?', sun sàaci jàkaataa 'they stole my bag' (< *sàati), sun sàacee tà 'they stole it' (< *sàatee), taasàa 'metal bowl' → pl. taasooshii (< *taasoosii).

Morphology

Within the pronominal system, the basic cut is between the personal and nonpersonal sets. There are eight sets of personal pronouns, each of which comprises eight forms: five singular (masculine/feminine gender is distinguished in the second and third person singular), and three plural. Personal pronoun paradigms express various syntactic functions, e.g., independent, (in)direct object, possessive, and reflexive. Nonpersonal pronouns (marked for gender and number) include demonstratives, interrogatives, and indefinites.

The categories of tense-aspect/mood (TAM) and subject agreement (person, gender, number) are marked on a lexically independent preverbal 'person-aspect complex' (INFL), which includes an additional (ninth) plural impersonal form (usually with arbitrary human reference and equivalent to a null subject). The TAM morphemes can be either segmentable, e.g., (Habitual) ya-kàn zoo 'he regularly comes', or fusional, involving changes in tone and/or vowel length, e.g., (Perfective) yaa zoo 'he came' and (Subjunctive) yà zoo 'he should come', and the subject-agreement elements are morphologically related to the personal pronouns. There are 16 distinct affirmative and negative inflectional paradigms, with a major Perfective:Imperfective aspectual dichotomy.

Hausa verbs are categorized into seven basic and derived 'Grades' (Parsons, 1960), defined in terms of their morphology (a templatic tone pattern and termination) and argument structure, and resembling the *binyanim* verbal conjugations in distantly related Semitic languages. Of the basic Grades (0–3), Grade 2 verbs (two-syllable) are canonically LH tone and are exclusively transitive, with two core (nonoblique) arguments, e.g., (Hausa is SVO) Muusaa yaa 'àuri yaarinyàř 'Musa married the girl', Muusaa yaa 'àuree tà 'Musa married her'. These examples also demonstrate how the final vowel of a Hausa verb can undergo changes in quantity and/or quality conditioned by the word class of the following constituent, e.g., direct object noun or pronoun. The derived Grades (4–7) add their own valency and semantics to the core meaning of the base form, e.g., basic Grade 2 verb sàyaa 'buy' → derived Grade 4 sayèe 'buy up', Grade 5 sayař (dà) 'sell', Grade 6 sayoo 'buy and bring', and Grade 7 sàyu 'be completely bought up'. In the Imperfective, verbs are often replaced by participial-like verbal nouns, e.g., sunàa daawôo-waa 'they are coming back' (< Grade 6 daawoo 'come back' + 'wà- with floating L tone), mèe kakèe sàyee? 'what are you buying?' (< Grade 2 sàyaa 'buy' [Grade 2 verbal nouns are nonpredictable]).

Nouns are masculine or feminine gender in the singular (an inherited Afroasiatic feature), and gender is overtly marked. Most native Hausa nouns are vowel-final. Feminine nouns typically end in -aa, e.g., yaarinyàa 'girl', hùulaa 'cap', or suffix-(I)YAA or -(U)WAA, e.g., beebiyaa 'deaf mute (FEM)', gurgùwaa 'a cripple (MASC)'. Masculine nouns display a full range of final vowels (including -aa) and consonants, e.g., raamìi 'hole', beenee 'upper story', dilaa 'jackal', yaaròo 'boy', 'àbù 'thing', mùtûm 'man', ƙaamùs 'dictionary' (< Arabic).

Hausa noun (and adjectival) plurals are known for their complexity and involve suffixation, vowel insertion, and tonal melodies. They can be distilled into about 10 core classes, with the plural formation partially predictable from the canonical shape (e.g., tones, syllable structure) and, sometimes gender, of the singular. A disyllabic feminine singular with HL tone and final -aa, for example, will typically select a plural with the -ooCii suffix (where C = copy of final consonant of singular stem) and an all H tonal template, e.g. jiikàa 'grandchild' → pl. jiikookii. A disyllabic singular with a heavy CVV initial syllable and HH tones, on the other hand, is likely to pluralize by suffixing -àayee with HLH tones on the output, e.g., giiwaa 'elephant' → pl. giiwàayee.

Reduplication is pervasive, including (a) copying of a single consonant, e.g., past participial adjectives add a (MASC) suffix -aCCee, where CC = geminate copy of the stem-final consonant of the source verb, i.e., cìkakkee 'full, complete' < cikàa 'to fill'; (b) prefixal reduplication of the initial CVC- syllable of a sensory noun to form an intensive sensory adjective, e.g., zàzzaafaa 'very hot' (< zaaf-zaaf-aa) < zaafii); 'heat' (with gemination/assimilation of the coda C /f/); and (c) full reduplication (tones and segmentals), e.g., coocì-coocì 'churches' < coocì 'church', yâu-yâu 'this very day' < yâu 'today'.

Syntax

The basic word order is S-V-IO-DO (goal/recipient arguments precede theme arguments), e.g., (ditransitive clause).

(1) ɗaalìbîn yaa kaawoo
student.the 3MASC.SG.PERF *bring*
wà maalàminsà 'aikìi
to *teacher.his* *work*
'the student brought the work to his teacher'

In *wh*-questions, relative clauses, and focus constructions, displaced constituents are moved to clause-initial position and special 'focus' marking is triggered on the INFL (Hausa is discourse-configurational), e.g., (FOC-PERF = Focus Perfective).

(2) wàa kukà ganii
who 2PL.FOC-PERF *see*
'à kàasuwaa? (*wh*-question)
at *market*
'whom did you see at the market?'

(3) yaaròn kà nee mukà
boy.your COP 1PL.FOC-PERF
ganii (*ex situ* focus answer)
see
'it was your boy we saw'

(4) yaaròn dà mukà
boy.the REL 1PL.FOC-PERF
ganii (relativization)
see
'the boy that we saw'

Hausa is a pro-drop language, in that sentences can occur without overt NP subjects, e.g., $[Ø]_{subj}$ $[sun]_{infl}$ tàfi gidaa 'they have gone home', and it also licenses discourse-linked null (direct) objects, e.g., 'ii, naa sàyaa Ø 'yes, I bought (it)' (where Ø = null anaphor).

Negation in verbal sentences normally requires a double negative construction with the discontinuous morphemes bà(a) . . . ba, where the initial bà(a) occurs left-adjacent to INFL (following any overt subject), and the second is clause-final (though adverbs can occupy end position), as in (5) and (6).

(5) màataataa bà tà daawoo
wife.my NEG 3FEM.SG.PERF *return*
ba (Negative Perfective)
NEG
'my wife has not returned'

(6) bàa zaa sù yàr̃da ba (Negative Future)
NEG FUT 3PL *agree* NEG
'they will not agree'

The Negative Imperfective uses only an initial High tone marker, as in (7).

(7) baa sàa zuwàa
NEG 3PL.IMPERF *coming*
'they are not coming'

Within the NP, grammatical gender and number trigger agreement on: (a) prehead elements, including adjectival modifiers ([8], also posthead), indefinite determiners (8), interrogative determiners, and universal quantifiers (also posthead); as in (8) and (b) posthead elements, including definite determiners, demonstratives (also prehead), relatives, numerals, genitive phrases, e.g., possessive NP, as in (9).

(8) wani k̂àramin
INDEF.MASC.SG *small*.MASC.SG.*of*.MASC.SG
yaaròo
boy.MASC.SG
'a certain small boy'

(9) rìiga-r̃ Mammàn
gown.FEM-*of*.FEM *Mamman*
'Mamman's gown'

Like many African languages, Hausa has a lexically autonomous class of highly expressive, phonosemantic words known as 'ideophones,' which normally function and distribute (sometimes collocationally) like adverbials. Hausa ideophones have their own distinct phonological and phonotactic properties (e.g., final obstruents, anomalous tones), and are semantically marked. As sound-symbolic elements, they typically denote the intensity or manner of an action, event, or state, e.g., (distinctive sounds or visually distinctive actions or features) kwàngàr̃àm 'with a clang', shar̃af 'soaking wet', r̃asha-r̃asha 'all sprawled out', and can also function as adjectives, e.g., daɓaɓa 'pronounced (facial markings),' and fat 'pure (white)'.

Constructions lacking a canonical verbal element include clauses containing an Imperfective INFL and nonverbal predicate, as in (10) and (11).

(10) Hàliimà tanàa dà
Halima 3FEM.SG.IMPERF *with*
mootàa (possessive)
car
'Halima has a car'

(11) sunàa masallaacii (locative)
3PL.IMPERF *mosque*
'they are at the mosque'

Nonverbal clauses without any form of INFL include those in (12), (13), and (14).

(12) àkwai/baabù ruwaa nân (existential)
EXIST/NEG.EXIST *water* *here*
'there is/is not water here'

(13) gàa littaafìnkà (presentational)
PRES *book.your*
'here/there is your book'

(14) shii maalàmii nèe (equational/copular)
3MASC.SG *teacher* COP.MASC.SG
'he is a teacher'

See also: Africa as a Linguistic Area; African Linguistics: History; Afroasiatic Languages; Cameroon: Language Situation; Chad: Language Situation; Chadic Languages; Ghana: Language Situation; Niger: Language Situation; Nigeria: Language Situation; Phonology: Overview; Sudan: Language Situation; Syntax of Words; Syntax-Phonology Interface; Syntax-Semantics Interface.

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Havránek, Bohuslav (1893–1978)

O Leška

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Born in Prague in 1893, Bohuslav Havránek became a preeminent Slavist and an influential authority on the Czech language. He held positions at Masaryk University in Brno (1929–1945) and at Charles University in Prague from 1945 until his retirement in 1966. He also was a member of the Czechoslovak Academy of Sciences and directed the Institute for the Czech Language between 1946 and 1965.

Havránek played a significant role in the Prague Linguistic Circle during the interwar period, and he was instrumental in developing the field of Prague structural linguistics. He focused much attention elaborating on the written standard known as *spisovná čeština* ('Literary Czech') and its usage in Czech society. His other contributions at that time were in the fields of comparative Slavic grammar and the historical and comparative study of the Slavic literary languages. After World War II, Havránek led a collective of linguists and lexicographers dedicated to the publication of a multivolume dictionary of the Czech literary language, which was published by the Czechoslovak Academy of Sciences between 1960 and 1971. With Alois Jedliček he also prepared several editions of a comprehensive grammar of the Czech language. In addition, Havránek oversaw the publication of several leading Czech linguistic and philological journals, including *Slavia* and *Slovo i Slovesnost*. He was the recipient of the Czechoslovak Socialist Republic's State Prize in 1957 in recognition of his outstanding contributions to scholarship. Havránek was active in the Czechoslovak Committee of Slavists and was one of the organizers of the Sixth International Congress of Slavists held in Prague in 1968.

Havránek's legacy can be seen in the many volumes of dictionaries, grammars, handbooks, and readers of the Czech language. He seemed to have had a hand in most major projects, including a Czech–Russian dictionary, a dictionary of Old Czech, and a handbook of Czech orthographic rules. He contributed to the understanding of Czech dialects and the differences between literary and colloquial Czech.

See also: Communities of Practice; Czech.

(11) sunàa masallaacii (locative)
3PL.IMPERF *mosque*
'they are at the mosque'

Nonverbal clauses without any form of INFL include those in (12), (13), and (14).

(12) àkwai/baabù ruwaa nân (existential)
EXIST/NEG.EXIST *water* *here*
'there is/is not water here'

(13) gàa littaafìnkà (presentational)
PRES *book.your*
'here/there is your book'

(14) shii maalàmii nèe (equational/copular)
3MASC.SG *teacher* COP.MASC.SG
'he is a teacher'

See also: Africa as a Linguistic Area; African Linguistics: History; Afroasiatic Languages; Cameroon: Language Situation; Chad: Language Situation; Chadic Languages; Ghana: Language Situation; Niger: Language Situation; Nigeria: Language Situation; Phonology: Overview; Sudan: Language Situation; Syntax of Words; Syntax-Phonology Interface; Syntax-Semantics Interface.

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See also: Communities of Practice; Czech.

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Hawaiian

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Hawaiian belongs to the Eastern Polynesian branch of the Oceanic subgroup of the Austronesian language family, its nearest relatives being Tahitian and Marquesan.

Until the early 19th century it was spoken by the entire population of the Hawaiian islands, and it remained the main language for most of that century. However, the decline of the indigenous population, massive immigration, educational policies, and annexation by the United States (in 1898) have taken their toll, and Hawaiian was replaced by Hawai'i Creole English in the early 20th century as the main language of the native Hawaiian population. It is now estimated to have less than 1000 first-language speakers, mostly elderly individuals and the residents of the small island of Ni'ihau, out of a total population of over one million. Given the popularity of Hawaiian music among tourists, it could be said that Hawaiian is a language more sung than spoken.

Over the past 30 years grassroots moves to revive and revitalize the language, particularly through Hawaiian medium education from preschool (*pūnana leo*) to tertiary level, have had considerable success, and the number of speakers is increasing. Critics, however, point out that the style of Hawaiian spoken by this new generation who learned it in school is rather different from that of native speakers. It is now estimated that there are 3000 fluent speakers of Hawaiian. There is very little Hawaiian-language radio and TV programming, and no newspaper.

Hawaiian had no traditional written form, and was first recorded by Captain Cook and his companions in 1778. A Roman-based alphabet was devised by English-speaking missionaries in 1829, and has remained in use relatively unchanged. In the 19th century, Hawaiians developed a high level of literacy through Hawaiian medium schools, and there is a large body of Hawaiian language literature from that period.

The phoneme inventory of Hawaiian consists of eight consonants (h, k, l, m, n, p, w, and glottal stop) and 10 vowels (a, e, i, o, u, ā, ē, ī, ō, ū). There are no consonant clusters and syllables are open. In writing, vowel length and glottal stop have often not been marked systematically. Most modern writers and publishers use a macron to indicate a long vowel and an inverted apostrophe (or apostrophe) to indicate the glottal stop.

There is very little morphophonemics, and most grammatical functions are performed by affixation or the use of pre- and postposed particles. Pronouns distinguish four persons (including first person inclusive and exclusive) and three numbers (singular, dual, and plural). There are two categories of possession, depending largely on whether or not the possessor has control over the fact of possession. In noun phrases, the order is head + attribute. The basic word order is VSO:

ua	inu	au	i	ka	wai	wela
asp.	*drink*	*I*	*obj.*	*the*	*water*	*hot*

'I drank the hot water'

See also: Hawaiian Creole English; Tahitian.

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See also: Hawaiian Creole English; Tahitian.

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Hawaiian Creole English

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Hawai'i Creole English (locally called 'Pidgin') is the first language of the majority of locally born children and the first language of somewhat less than half the state of Hawai'i's population of just over a million. Varieties of pidgin and creole English in Hawai'i arose from contact between Hawaiians, Europeans (primarily English speakers, who contributed most of the vocabulary to the emerging pidgin), and the various immigrant groups (e.g., Chinese, Japanese, Portuguese, and Filipinos) brought to Hawai'i to work as indentured laborers on plantations from the 1850s onward.

Increasing contact between creole speakers and speakers of mainland varieties of English after World War II and the political incorporation of the islands into the United States as the 50th state in 1959 have blurred the boundaries between Standard English and the creole, and created a continuum of varieties. Although adjacent varieties of the continuum are mutually intelligible, the two extreme endpoints may often not be. This example illustrates the variation.

ai go give om da book fo yu most creole-like
ai gon give om da book fo yu
ai going give om da book fo yu
aim gonna give om da book fo yu
ail give om/him/her/them the book fo yu least creole-like
I will give him/her/them the book for you most standard English-like

The most decreolized (i.e., most English-like) varieties are found on the island of O'ahu, where three-fourths of the state's population is located, along with the capital, Honolulu, and the main U.S. military base, Pearl Harbor. The outer islands of Kaua'i and Hawai'i are the least decreolized.

Although most of the vocabulary of Hawai'i Creole English is derived from English, as many as a thousand Hawaiian words may have been in use at one time during the plantation era; several hundred were probably in fairly common use colloquially. Although this number is now fewer, partly due to the decline in knowledge of Hawaiian, many still persist in local English and many more in the Hawai'i Creole English of older speakers. Younger people tend not to know the meanings of some words, such as *pio*, 'turn off, extinguish', and *kumu,* 'girlfriend, sweetheart', but virtually every resident locally would know *ono* 'tasty'. Many of these Hawaiian words are being replaced by English ones, although in some cases the English variants are still different from mainland U.S. English, e.g., *grinds* 'food' (cf. *kaukau* 'to eat/food').

Distinctive grammatical features include the lack of the copula *be* (*you da boss,* 'you are the boss'), use of *get* in both possessive and existential constructions (*get one wahine she get one daughter,* 'There is a woman who has a daughter'), use of *stay* for locatives and progressives (*Leilani stay inside da classroom,* 'Leilani is inside the classroom', *Charlene stay working,* 'Charlene is working'), use of *wen* or *had* as a simple past tense marker (*Joe wen/had talk to da coach,* 'Joe talked to the coach'), use of *pau* (Hawaiian 'done, finished') as a completive marker (*Call me when you pau,* 'Call me when you are finished'), preverbal negation (*Stan no mo rice,* 'Stan doesn't have any more rice'), and use of *for* as a complementizer (*Darrell like know how fo play basketball,* 'Darrell wants to know how to play basketball'). Word order is generally subject-verb-object, as in Standard English, apart from topic/comment structures such as *big, da house,* 'The house is big', in which the comment appears first.

There is considerable variation in pronunciation among local residents of different ethnic and social class backgrounds. Generally speaking, however, the phonology of Hawai'i Creole English has a smaller inventory of distinctive sounds than many mainland varieties of English. The [r] after a vowel in words such as *shark* is usually absent in the most creole-like speech varieties (i.e., 'park' [pak]), and many of the diphthongs (double vowels) found in mainland varieties of English in words such as *coat* [kout] and *day* [deɪ] are single vowels in the creole (i.e., [kot], [de]). Hawai'i Creole English often has full vowels where mainland varieties use reduced ones, e.g., [tudei], 'today', vs. mainland [tχde], and 'mountain' [mauntχn] vs. mainland [maunten]. English interdental fricatives in words such as *they* and *think* tend to become stops in the creole (i.e., [de], [tink]). The stops in consonant clusters such as [tr] in words such as *try* are affricated (i.e., [črai]), and initial [s] in clusters such as [str] in words such as *stress* sounds more like [š]. There are also some stress and intonational differences, such as the use of falling pitch for yes/no questions, which also do not show the subject/auxiliary inversion typical of standard English, e.g., *you like go Honolulu*? 'Do you want to go to Honolulu?' The falling intonation pattern has been carried over from Hawaiian into creole. Rising pitch together with a final question particle are used as a confirmation check in utterances such as *no mo job fo you, aeh*? 'There isn't a job for you, right?'

Despite the lack of written norms, standardization, or any official recognition, there are nevertheless some writers who have attempted to use the creole as a medium for poetry, short stories, and drama by adapting English spelling to represent some of the distinctive characteristics of speech varieties in Hawai'i. Each writer has worked out his or her own *ad hoc* spelling system. This burst of literary creativity can be seen partly as a manifestation of opposition to colonialism and as an affirmation of distinctive local identity in which the use of creole plays a key role.

See also: Pidgins and Creoles: Overview; United States of America: Language Situation.

Language Maps (Appendix 1): Maps 47, 48.

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Hayakawa, Samuel Ichiye (1906–1992)

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Samuel Ichiye Hayakawa, known in the academic world as the semanticist S. I. Hayakawa, was born a Canadian, in Vancouver, British Columbia, on July 8, 1906. He received his primary and secondary education in public schools, and completed his undergraduate education at the University of Manitoba. He obtained an M.A. degree in English from McGill University in Montreal in 1928. He entered the Ph.D. program in English at the University of Wisconsin in 1930, receiving his degree in 1935, and served as an English instructor there from 1930 to 1939.

Hayakawa's achieved a national reputation as an authority on semantics when his book *Language in thought and action* appeared in 1938. In 1933, the Polish-American pioneer in semantics, Alfred Korzybski (1879–1950), had published his complex seminal work, *Science and sanity: an introduction to non-Aristotelian systems and general semantics*. Hayakawa's book was a popular introduction to the basic analytical concepts developed by Korzybski and other early semanticists. The educated general public in America had begun to show an interest in semantics, and both Hayakawa's book, and *The tyranny of words,* another introduction to semantics by the popular public affairs writer Stuart Chase (1888–1985), became best sellers in 1938.

In 1939 Hayakawa went to Chicago, where he first taught at the Armour Institute, an engineering school, now the Illinois Institute of Technology. In 1943, Hayakawa founded the journal *ETC: A Review of General Semantics,* continuing to serve as its editor for over a quarter century, until 1970. He joined the English faculty at the University of Chicago in 1950, further enhancing his national reputation through a 13-week television series on semantics for National Educational Television. In 1954, he published *Language, meaning, and maturity,* a collection of his essays which had appeared in *ETC*.

In 1955, Hayakawa moved to San Francisco, becoming a professor at San Francisco State College, carrying on an active career as a lecturer and writer as well. In 1959, he published *Our language and our world*, another collection of essays published initially in *ETC*. Most of Hayakawa's subsequent books were collections of previously published essays on semantics by himself or others, with one notable exception. This was his *Guide to synonyms and related words,* a large-scale original English thesaurus of his own design. Originally published in 1968, it remains in print today as a basic reference work, Hayakawa's least well-known but most permanent scholarly achievement as a linguist.

On the basis of this achievement, as well as his national reputation as a writer and lecturer, Hayakawa was appointed president of San Francisco State in 1968 until his retirement in 1973. As president, he became even more widely known, but this time for his determined and well-publicized opposition to militant student activism on campus, which won him a growing following among California conservatives.

Retiring from the academic world in 1973, Hayakawa began a new career as a conservative

Despite the lack of written norms, standardization, or any official recognition, there are nevertheless some writers who have attempted to use the creole as a medium for poetry, short stories, and drama by adapting English spelling to represent some of the distinctive characteristics of speech varieties in Hawai'i. Each writer has worked out his or her own *ad hoc* spelling system. This burst of literary creativity can be seen partly as a manifestation of opposition to colonialism and as an affirmation of distinctive local identity in which the use of creole plays a key role.

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Retiring from the academic world in 1973, Hayakawa began a new career as a conservative

newspaper columnist and politician. He was elected as a Republican U.S. senator from California, serving from 1977 until 1983. He then retired from the Senate, but still remained active as the leader of a movement known as U.S. English, advocating the retention of English as the sole official language of the United States. He resided in the San Francisco Bay Area, where he died on February 27, 1992.

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Hayyuj, Judah (10th Century)

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Known in Arabic as Abu Zakariyya Yahya ibn Dawud and in Hebrew as Judah ben David Hayyuj, he can be called the first 'scientific' Hebrew grammarian. He was born around A.D. 940 in Fez, Morocco, and died around 1010 in Cordoba, where he lived most of his life. Not very much is known about him; however, it is an established fact that he left Morocco to study in Cordoba in 960 under one of the leading grammarians of this era, Menahem ibn Jacob ibn Saruq.

Hayyuj was the first Hebrew grammarian to demonstrate that Hebrew was analyzable as having a system of triconsonantal roots. Writing almost entirely in Judeo-Arabic, he was able to establish the principle of root triconsonantality because he had an excellent knowledge of Arabic, in which the triconsonantal root is more conspicuous than in Hebrew. Indeed, the facts of Arabic morphology had been known long before Hayyuj's writings.

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newspaper columnist and politician. He was elected as a Republican U.S. senator from California, serving from 1977 until 1983. He then retired from the Senate, but still remained active as the leader of a movement known as U.S. English, advocating the retention of English as the sole official language of the United States. He resided in the San Francisco Bay Area, where he died on February 27, 1992.

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Hayyuj, Judah (10th Century)

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See also: Hebrew Linguistic Tradition.

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Head Feature Principle and Feature Distribution Constraints

D J Arnold, University of Essex, Colchester, UK

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Intuitively, the 'Head' of a phrase is the element that 'gives the phrase its grammatical character.' In the clearest cases (e.g., the preposition in a PP, the verb in a VP), most of the grammatical properties of the phrase are predictable from the properties of the Head (for example, its distribution, internal makeup, and semantics). Perhaps not all phrases contain such an element (problematic cases include coordinate structures and 'mixed categories' such as gerunds), but the idea that at least some do is very widely accepted. It has its roots in the traditional idea that phrases typically contain a word that 'governs' other elements, and the Bloomfieldian idea of 'endocentric' phrases – phrases that belong to the same form class as one of their elements. In one form or another, it plays a central role in essentially every modern grammatical theory (see, e.g., Corbett *et al.*, 1993).

As with other grammatical roles such as Subject and Object, one may take the notion of Head to be either a theoretical primitive, or not. In the latter case, one may define the Head to be the element of a phrase that has certain properties in common with the phrase as a whole (e.g., as the X in XP). This is the approach taken in X-bar Theory (*see* **X-Bar Theory**). If on the other hand the notion Head is taken to be a theoretical primitive, some sort of principle is required that will ensure the appropriate sharing of properties between Heads and phrases – some sort of Head Feature Principle (HFP). The purpose of this article is to give a brief and informal outline of how this and similar principles can be used in the description of grammatical phenomena.

The scope and value of these principles is best appreciated in the context of Constraint-Based frameworks with well developed feature theories, where the properties of phrases are represented as sets of features (i.e., sets of attribute-value pairs, where values may themselves be sets of features). One example of such a framework is HPSG (e.g., Pollard and Sag, 1994; Sag and Wasow, 1999), which will provide the basis for the discussion here. In this setting, the properties that are common to Heads and Mothers appear in the value an attribute HEAD, and the HFP can be stated simply as something like 'in a headed phrase, the value of HEAD on the Mother must be shared with that on the Head daughter' (nonheaded phrases would include coordinate structures, for example). If a 'tag' such as $\boxed{1}$ is used to represent the occurrence of a single value in different locations, then (assuming binary branching) the effect of the HFP can be taken as ensuring that rules describing headed constructions will be of the form (1a) or (1b), and trees representing headed constructions will be of the form (2a) or (2b), where the Head daughter is marked *H*.

(1a) $[HEAD\ \boxed{1}] \rightarrow XP\ [HEAD\ \boxed{1}]$

(1b) $[HEAD\ \boxed{1}] \rightarrow [HEAD\ \boxed{1}]\ XP$

(2a)

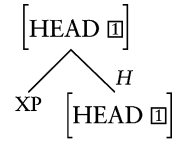

(2b)

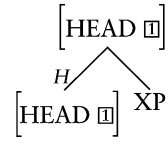

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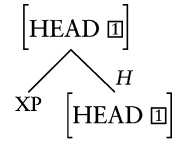

(2b)

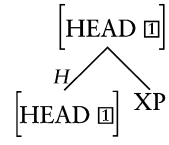

This allows a wide range of grammatical phenomena to be succinctly described. For example, suppose Number is treated as a Head feature of nouns and determiners. Given the HFP, a very simple account of determiner–noun agreement (see (3)) is possible: we simply require determiner phrases and associated $\overline{\text{N}}$s to have the same value (i.e., 'agree') for Number. The effect of this can be seen in (4a). The HFP ensures (a) that the same HEAD value ($\boxed{2}$) appears on DETP and DET, and (b) that a possibly different HEAD value ($\boxed{3}$) is shared between N, $\overline{\text{N}}$, and NP (possibly different, that is, except in the value of NUM). Notice that, as a result, DET and N are required to have the same specification for Number, from which follows the contrast in grammaticality between (3a) and (3b), since in the latter *this* is singular and *descriptions* is plural. In conjunction with the lexical information that *descriptions* and *these* are plural (pl), this gives (4b), where, redundantly, the values associated with tags have been spelled out everywhere, and where for readability, traditional category labels are shown on the nodes – presumably at least part of the information expressed by these labels should be coded in features (e.g., CAT:n, CAT:det), which are subject to the HFP.

(3a) These descriptions of the problem [are very useful].
(3b) *This descriptions of the problem [are very useful].

(4a)

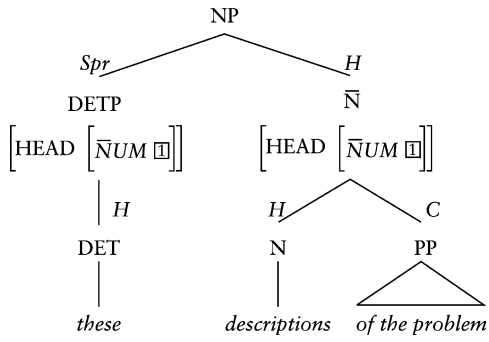

(4b)

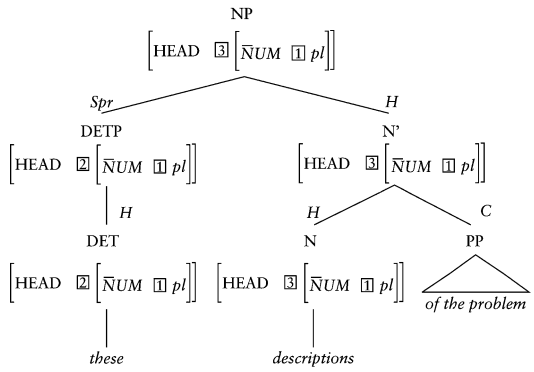

It is often natural and convenient to talk as though principles such as the HFP involved percolation of features up and down trees (e.g., to talk about plural marking 'percolating up' or 'projecting' from N to $\overline{\text{N}}$ and NP in (4b)). It is worth stressing that in the current context this is just a way of speaking: the HFP, and other principles on the distribution of features discussed here, are entirely nondirectional.

Once the basic idea of a principle such as the HFP is appreciated, the idea can be adapted to provide an account of a wide range of phenomena. I will exemplify two: lexical subcategorization (Complement selection), and Long-Distance Dependencies.

A verb such as *gave*, as in *Sam gave them to charity*, selects two Complements: an accusative NP and a PP marked with *to*. Suppose such information is represented lexically in a 'Complement list,' the value of a COMPS attribute. One way of implementing Complement selection involves removing elements from this list as a phrase is formed by combining a Head with a Complement. From a bottom-up perspective, Complements are 'canceled' from the COMPS list as phrases are built up. See (5). The particular requirements of *gave* can be expressed by stating that the first element of its COMPS list ($\boxed{1}$ in (5)) is CAT:n and CASE:acc, and that the second is CAT:p and PFORM:to. (If these are HEAD features, the HFP will ensure that they percolate down to the Heads of NP and PP, so that, for example, the nominal Head of the NP will be accusative, and the P in PP will be specified as PFORM:to, ensuring that the PP Complement is indeed Headed by *to*). A top-down perspective on this would be that Complements are added to the COMPS list as the tree grows downward, and only a verb lexically specified as allowing such Complements can be inserted under the bottom VP node.

(5)

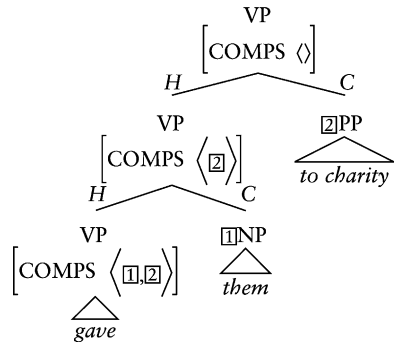

Of course, not all properties of Complements are available for selection by Heads (e.g., Heads are generally assumed not to select for phonological properties of Complements). If the 'selectable' properties are grouped under a feature (e.g., 'SYNSEM'), then the principle governing the distribution of the COMPS feature would be something along the lines of: '(in a headed structure) the COMPS value on the mother is

the COMPS value on the Head daughter, less the SYNSEM value of the Complement daughter,' or equivalently, 'the COMPS value on the Head daughter is the COMPS value on the mother, plus the SYNSEM value of the Complement daughter.'

In combination, the HFP and this 'COMPS principle' produce a radical simplification of the grammar. Essentially all Head-Complement constructions can be described in the very general form of either (6a) or (6b). The HFP takes care of appropriate choice of Head and Mother, the 'COMPS principle' ensures compatibility of Complement and Head.

(6a) $M \rightarrow H\ C$
(6b) $M \rightarrow C\ H$

The COMPS Principle is one instance of a principle that can be thought of as projecting information from the Head. Straightforward variations would deal with selection of Subjects and Specifiers by Heads. These separate principles could be collapsed into one Valence Principle, roughly: 'For any Valence feature V, the value of V on the Mother is the value of V on the Head, less the SYNSEM value of the V daughter.' A somewhat different projection principle would deal with semantic content. Leaving aside the issue of quantifier scope, in Head-Complement constructions the semantic content of the phrase is normally projected from the Head (i.e., the Head is interpreted as a functor applied to the contents of the Non-Head). Notice, however, that such a principle of feature distribution must be parameterized for different construction types. For example, in Head-adjunct constructions it is generally the adjunct that supplies the semantic functor, so here semantic content projects from the Non-Head.

There are also feature distribution principles that generally involve Non-Heads. For example, the principle governing the distribution of features used in many Constraint-Based approaches to describe Long-Distance (unbounded) Dependencies (LDDs) such as that between preposed Wh-elements ('fillers') and gaps in questions, relative clauses, etc.

(7a) I wonder [[who$_i$] [(he thinks) she longs for Δ_i]]
(7b) I wonder [[for whom$_i$] [(he thinks) she longs Δ_i]]

The idea here is that phrases are marked with a feature (SLASH) whose value indicates the properties of any gaps they contain. This feature is passed down via to the daughters of the phrase to the 'extraction site' (gap position). Since many languages allow multiple extractions, it seems clear that the value of SLASH should be a set. The elements of the set should contain all the information that is shared between the filler and the gap position. As a first approximation, the SLASH value on the mother should be union of the values on the daughters.

(8)

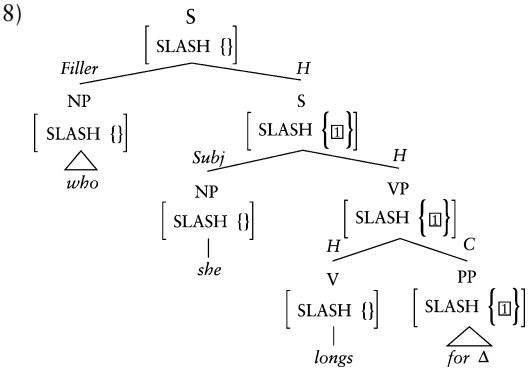

This ignores two special cases – the 'top' and 'bottom' of the dependency. The bottom of the dependency is easily dealt with, either by having a (phonologically null) lexical item that can function as a 'null Complement' in the gap position, or by having a principle that allows Heads to satisfy their complementation requirements using either overt Complements or elements of SLASH. The top is more problematic: it is important that the SLASH value corresponding to a gap does not percolate higher than the corresponding filler. Notice, moreover, that not all LDDs involve an overt filler. In a cleft construction like (9) *Kim* corresponds to the indicated gap, but it is not a filler (it is the Complement of *be*).

(9) It is Kim$_i$ [(that) she admires Δ_i]

The general solution is to have another set valued feature (often called TO-BIND), which will contain elements that are to be removed from SLASH: the value of SLASH on the mother should be the union of values on the daughters less the elements of this set. In the case of cleft constructions, the lexical entry for *be* can specify that this set should contain a value corresponding to its Complement; similarly, rules that deal with questions and relative clauses can ensure that the SLASH element corresponding to the filler is an element of the TO-BIND set of the Head, so that the SLASH value associated with the gap will not percolate beyond the construction.

Again, this approach can be extended and generalized to a Non-local Feature Principle (NFP) covering other features involved in LDDs – notably to the projection of features from relative and interrogative pronouns that permit phrases containing such pronouns to appear initially in English relative clauses and questions (e.g., *for whom* in (7b), the phenomenon of 'pied-piping'). Similar techniques can be used to deal with Quantifier Scope (along the lines of Cooper Storage (Cooper, 1983) see, e.g., Pollard and Sag, 1994).

The perspective of this discussion has been essentially that of HPSG (e.g., Pollard and Sag, 1994; Sag and Wasow, 1999), but these principles have their roots in earlier frameworks (notably GPSG (Gazdar *et al*., 1985) for the HFP and the approach to nonlocal dependencies, JPSG (Gunji, 1987) for the approach to Complement selection), and have equivalents in other frameworks – for example, in LFG (Kaplan and Bresnan, 1982; Bresnan, 2001), an $\uparrow = \downarrow$ annotation appears on the Head element in c-structure rules, identifying the f-structures of the Head and the Mother as in the HFP (different techniques are used for Complement selection and Long-Distance Dependencies).

There are of course many questions about the precise formulation of principles such as these, and about the their use in the analysis of particular languages and constructions (e.g., what features should be HEAD, SLASH, or SYNSEM features), but the principles themselves are not very controversial in general. It is rather the more fundamental assumptions that are controversial – such as whether 'feature percolation' is appropriate for the description of phenomena like Complement selection and LDDs, and what role the notion 'Head' should play in grammatical theory. However, a number of issues concerning these principles deserve mentioning as topics of on-going discussion (e.g., in the Proceedings of HPSG conferences: Müller, 2003; Kim and Wechsler, 2002; Van Eynde *et al*., 2001). One concerns the scope of the HFP. Suppose, for example, that instead of SLASH values being combined on the Mother, they are combined on the Head. They could then be percolated to the Mother by the HFP. There might perhaps be empirical advantages to this, and it might seem conceptually more attractive, emphasizing as it does the central role of the Head in grammatical constructions. A related issue is whether these principles should be 'strict' or hold only by default (see e.g., Ginzburg and Sag, 2001). Finally, a rather striking characteristic of these principles is their formal simplicity: they involve only statements of identity and very simple operations on lists and sets. It is an open question whether more complex operations might be required (for example in the analysis of coordinate structures where properties of the whole construction appear to depend on properties of the parts in rather complex ways).

See also: Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Long-Distance Dependencies; X-Bar Theory.

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Pollard C J & Sag I A (1994). *Head-Driven Phrase Structure Grammar*. Chicago: University of Chicago Press.

Sag I A & Wasow T (1999). *Syntactic theory: a formal introduction*. Stanford: Center for the Study of Language and Information.

Van Eynde F, Hellan L & Beermann D (eds.) (2001). *The Proceedings of the 8th International Conference on Head-Driven Phrase Structure Grammar, Norwegian University of Science and Technology, Trondheim, Norway*. Stanford: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2/.

Grammar (LFG; Bresnan, 1982), a revived, empirically based version of Categorial Grammar (CG, Ades and Steedman, 1982), and several other approaches all made their appearance, and HPSG has integrated ideas from each of these paradigms, in combination with insights developed in the Government and Binding (GB; Chomsky, 1981) paradigm.

Fundamentals of the Linguistic Framework

HPSG rests on two essential components: (i) an explicit, highly structured representation of grammatical categories, encoded as typed feature structures, whose complex geometry is motivated by empirical considerations against the background of theoretical desiderata such as locality, and (ii) a set of descriptive constraints on the modeled categories expressing linguistic generalizations and declaratively characterizing the expressions admitted as part of the natural language. The formal foundation of this architecture is discussed in a separate section below.

From a linguistic perspective, the set of descriptive constraints expressing the theory of an HPSG grammar consist of (a) a lexicon licensing basic words, (b) lexical rules licensing derived words, (c) immediate dominance schemata licensing constituent structure, (d) linear precedence statements constraining constituent order, and (e) a set of grammatical principles expressing generalizations about linguistic objects. The clearest way to illuminate the interaction of these components is to provide a concrete example.

Lexical Organization Consider the verb *put*, for which a partial lexical entry is shown in Figure 1.

As specified by the type in the top-left corner of Figure 1, this Attribute-Value Matrix (AVM) describes objects of type *word*. The PHON attribute here is simply taken to be a list of strings serving as a placeholder for an actual phonological representation for HPSG, as developed by Bird and Klein (1994) and Höhle (1999). The morphosyntactic information that characterizes local properties of linguistic expressions are specified under the CATEGORY feature, which, along with the semantic CONTENT, is identified by the LOCAL part of the SYNSEM value. The subset of CATEGORY properties that are necessarily shared between mother and head daughter in a local tree are packaged together under the HEAD feature.

$$\begin{bmatrix} \textit{word} \\ \text{PHON} \ \langle \textit{put} \rangle \\ \text{SYNSEM|LOCAL} \begin{bmatrix} \text{CATEGORY} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{AUX} \ - \end{bmatrix} \\ \text{VALENCE} \begin{bmatrix} \text{SUBJ} \ \langle \textit{NP} \ \boxed{1} \rangle \\ \text{COMPS} \ \langle \textit{NP} \ \boxed{2}, \textit{PP} \ \boxed{3} \rangle \end{bmatrix} \end{bmatrix} \\ \text{CONTENT} \begin{bmatrix} \textit{put-relation} \\ \text{PUTTER} \ \boxed{1} \\ \text{THING-PUT} \ \boxed{2} \\ \text{DESTINATION} \ \boxed{3} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Figure 1 A basic lexical entry.

The VALENCE feature specifies the combinatory potential of lexical items as lists of *synsem* objects (as opposed to lists of *signs*). Thus, neither phonological information (specified in PHON) nor the DAUGHTERS feature, which, as we will see, encodes constituent structure in objects of type *phrase*, can be selected for, incorporating the well-supported generalization that syntactic selection is independent of phonological form and is consistently local.

The specification of the valence features (SUBJ and COMPS) and CONT, specifying the semantic roles assigned by the head, make it possible to lexically associate the valents of a head with the semantic contribution of these valents to the relation it denotes. The boxed numbers indicate token-identity of the values specified. Instead of specifying such linking in each lexical entry, it can be derived from general linking principles (cf. Koenig and Davis, 2003, and references therein). The issue of lexical generalizations brings us to the question how the lexicon is defined.

The basic lexicon of an HPSG theory can be defined by the *Word Principle* shown in Figure 2, where each *Lexical-Entry* is a description of the kind we saw in Figure 1.

Whereas this principle illustrates the basic method for expressing a lexicon as a constraint, a wide range of approaches have been developed that do not take lexical entries of type *word* as primitives, such as realizational approaches to morphology (cf., e.g., Erjavec, 1996; Riehemann, 1998) or word syntax approaches (cf., e.g., Krieger and Nerbonne, 1993). The HPSG architecture also readily supports lexical generalizations through principles expressing constraints on sets of lexical elements, so-called *vertical generalizations*, as well as through lexical rules expressing relations between sets of lexical elements, referred to as *horizontal generalizations* (cf. Meurers, 2001; Bouma *et al.*, 2000, and references cited therein).

Phrasal Structures Turning to phrasal structures, consider the tree shown in Figure 3 (note that S, NP, VP, etc., are just abbreviations for AVM specifications; for space reasons, some attribute names are also abbreviated).

$$\textit{word} \rightarrow \textit{Lexical-Entry}_1 \vee \textit{Lexical-Entry}_2 \vee \ldots \vee \textit{Lexical-Entry}_n$$

Figure 2 The word principle.

As with all grammatical principles in HPSG, generalizations over phrasal structure are expressed as constraints. Figure 4 shows the relevant parts of the Immediate Dominance (ID) Principle, which essentially encodes a version of the X-bar schema (Jackendoff, 1977).

The first disjunct of the ID Principle is the Head-Subject schema, which licenses the upper local tree of the example in Figure 3; the lower local tree is licensed by the Head–Complement schema.

In addition to the Head–Subject and the Head–Complement structure licensed by the two disjuncts shown, Pollard and Sag (1994) assume only a small inventory of general schemata: Head–Adjunct, Head–Filler, Head–Marker, and a flat Head–Subject–Complement schema.

The subcategorization requirements specified under the VALENCE attribute in the lexical entry of *put* are realized as the result of the Valence Principle, which specifies that the valence requirements of a lexical head are identified with the SYNSEM value of the realized daughters, with all unrealized requirements being handed on to the mother of the local tree. This principle essentially is the phrase-structural analogue to Categorial Grammar's treatment of valence satisfaction as combinatory cancellation (though, unlike CG, HPSG's principle does not assume that all valence-driven combinations involve a functor combining with a single argument). In the example in Figure 3, we can see that the valence specification in the lexical entry of *put* requires an NP subject and two complements, an NP and a PP. In the lower tree, the two complements are realized as *a book* ($\boxed{5}$) and *on the table* ($\boxed{6}$). As a result of the Valence Principle, the VP mother of that local tree has an empty COMPS requirement. The SUBJ requirement is inherited unchanged from the lexical verb and realized as *John* ($\boxed{4}$) in the higher local tree, dominated by the fully saturated S.

The percolation of head information along the head projection is the result of the Head-Feature Principle (HFP), shown in Figure 5. The HFP is a straightforward adaptation of the Head Feature Convention of Gazdar *et al.* (1985); it ensures that in any headed structure, the HEAD specifications of a mother and its head daughter are token-identical. In our example in Figure 3, the category *verb* and the [AUX –] specification are shared as index $\boxed{7}$ between the lexical head *put* and its VP and S projections.

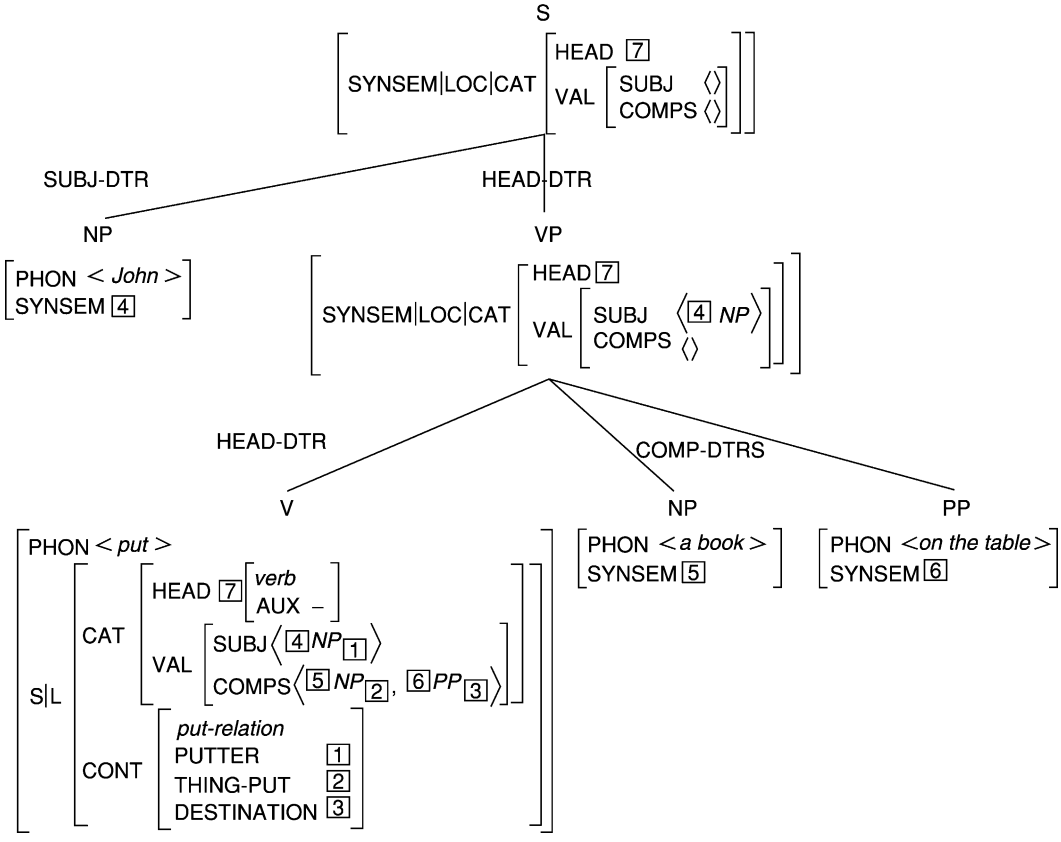

Figure 3 An example for a phrasal construction.

Capturing Dependencies

Arguably the essential test of a grammatical framework is its ability to capture, parsimoniously and inclusively, the ubiquitous grammatical dependencies of natural languages. Such dependencies are often grouped into two major classes: *local dependencies*, which hold over a limited syntactic domain and frequently depend on properties of a specific class of lexical items, and *nonlocal dependencies*, which appear to hold over arbitrarily large syntactic distances and are largely independent of the lexicon. In this section, we briefly review, mostly based on Pollard and Sag (1994), how the machinery available in HPSG leads to compact solutions to the problems posed by both dependency types in English.

Local Dependencies Phenomena such as agreement, auxiliary-choice morphosyntactic dependencies, subject selection, the active/passive relationship, and the so-called Raising/Equi constructions all exemplify what we refer to as local dependencies. In HPSG, these phenomena typically are all handled in terms of the selectional properties of lexical heads. We here sketch the analysis of control constructions as an illustration of this general approach.

Control Construction In line with the general HPSG strategy to reject those invisible elements for which there is no empirical evidence, in nonfinite constructions, the subject of the embedded verb is analyzed as not locally expressed. There is no need to assume an invisible realization of such subjects, as done in transformational grammar, since HPSG is based on richer linguistic data structures in which lexical specifications, such as subcategorization requirements, are explicitly represented. The questions of what is interpreted to be the subject of the nonfinite verb and why verbs selecting nonfinite complements differ with respect to what kind of controllers can occur are thus answered through the lexical specification of the control verbs.

A subject-to-subject raising verb like *seem*, for example, will have the partial description in the lexicon given in Figure 6. We see that the subject valence requirement of the subject raising verb is identified with the subject of the verbal complement. Note that the subject is not assigned a semantic role by the raising verb. In order to derive the fact that such raising is permissible only if the raised argument is assigned a semantic role elsewhere in the structure, Pollard and Sag (1994: 140) specified a general metaprinciple, the Raising Principle.

$$\begin{bmatrix} \textit{phrase} \\ \text{DTRS } \textit{headed-struc} \end{bmatrix} \rightarrow \begin{bmatrix} \text{SYNSEM|LOC|CAT} & \begin{bmatrix} \text{HEAD} & \left(\begin{bmatrix} \textit{verb} \\ \text{INV} & - \end{bmatrix} \vee \neg\, \textit{verb} \right) \\ \text{VAL} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle\rangle \end{bmatrix} \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{head-subj-struc} & \\ \text{HEAD-DTR} & \textit{phrase} \\ \text{SUBJ-DTR} & \textit{sign} \end{bmatrix} \end{bmatrix} \quad \text{(Head-Subject)}$$

$$\vee \begin{bmatrix} \text{SYNSEM|LOC|CAT} & \begin{bmatrix} \text{HEAD} & \left(\begin{bmatrix} \textit{verb} \\ \text{INV} & - \end{bmatrix} \vee \neg\, \textit{verb} \right) \\ \text{VAL} & \begin{bmatrix} \text{SUBJ} & \langle \textit{synsem} \rangle \\ \text{COMPS} & \langle\rangle \end{bmatrix} \end{bmatrix} \\ \text{DTRS} & \begin{bmatrix} \textit{head-comps-struc} & \\ \text{HEAD-DTR} & \textit{word} \end{bmatrix} \end{bmatrix} \quad \text{(Head-Complement)}$$

$$\vee \ldots$$

Figure 4 Immediate Dominance Principle.

$$\begin{bmatrix} \textit{phrase} & \\ \text{DTRS} & \textit{headed-structure} \end{bmatrix} \rightarrow \begin{bmatrix} \text{SYNSEM|LOC|CAT|HEAD} & \boxed{1} \\ \text{DTRS|HEAD-DTR|SYNSEM|LOC|CAT|HEAD} & \boxed{1} \end{bmatrix}$$

Figure 5 Head Feature Principle.

Based on the lexical specification in Figure 6, the properties of a raising verb fall out of the interaction with the rest of the architecture; in particular, the identification of the subject requirement of the two verbs implies that: If the embedded verb requires a nonreferential subject or permits a clausal subject, this is enforced by the raising verb realizing the subject. If the embedded verb has a subject with an idiomatic interpretation, the subject also has that interpretation when realized as an argument of a raising verb. In languages in which subjectless constructions exist, raising verbs can embed such subjectless complements. And passivization of the nonfinite complement results in a paraphrase.

In contrast, the partial lexical specification of a subject-to-subject equi verb like *try* in Figure 7 specifies semantic coindexing of the subject valence requirement of the subject control equi verb with the subject of the verbal complement. And the subject is assigned a semantic role by the subject control equi verb.

Nonlocal Dependencies Probably the strongest-seeming case for syntactic transformations was the existence of unbounded dependencies, particularly extraction phenomena. Given that certain valence requirements appear to be satisfied by elements arbitrarily distant from the selecting head, it is intuitively natural to suppose that they were moved there after selection. A derivational account thus seems attractive, even under the antitransformational stances evident in, e.g., Brame (1976).

The flaws in this line of thinking were made obvious in Gazdar's (1981) pioneering work on an explicit formal characterization of filler/gap linkages in a monostratal framework, which was assimilated into a feature-based account by Bear (1981) and Gazdar *et al.* (1985). In HPSG, the relevant feature is the set-valued SLASH, which takes as its value the LOCAL specifications of extracted elements.

The Filler–Head schema licenses the local tree realizing the filler as illustrated in Figure 8.

The Nonlocal Feature Principle has the effect of sharing the SLASH value of the mother with that of some daughter until it reaches the trace, which has the lexical entry shown in Figure 9. This entry identifies the properties of the nonlocally realized element specified under SLASH with its own LOCAL specification.

Taken together, the lexical entry and the general principles yield a structure for a sentence such as *What do you think Robin said?* as in Figure 10.

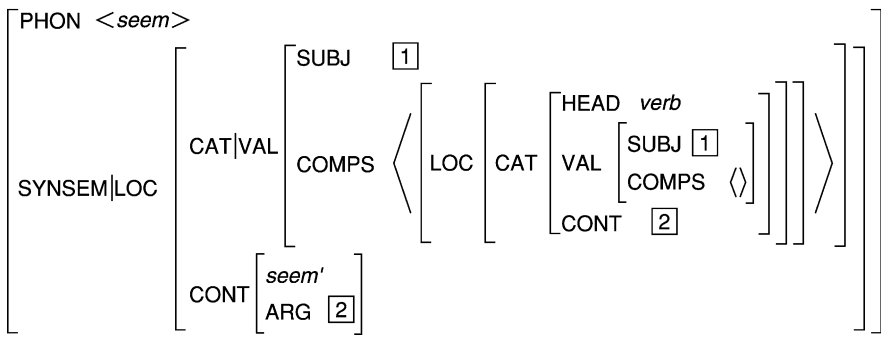

Figure 6 Partial lexical entry for a raising verb.

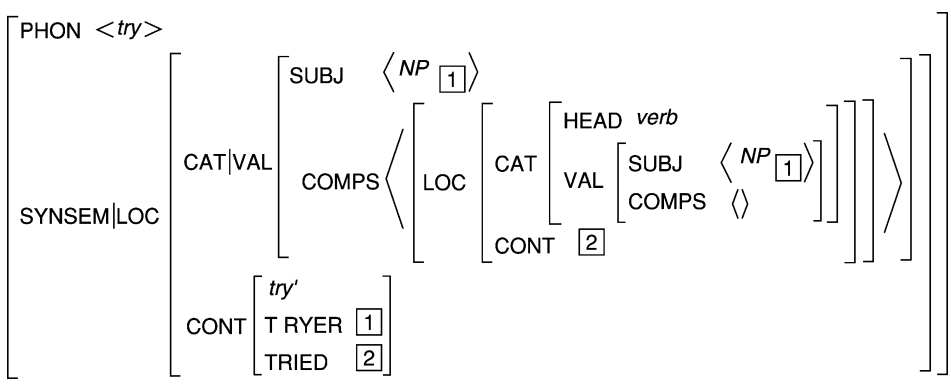

Figure 7 Partial lexical entry for an equi verb.

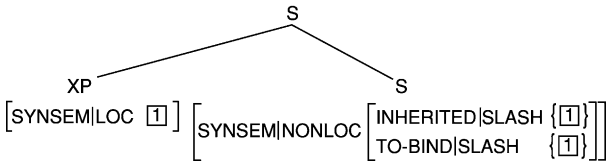

Figure 8 The local tree realizing the filler of a nonlocal dependency.

Note that *pace* Baker (1978), apart from the schema realizing the filler, the sentence is licensed by the same general ID schemata also used in nonextraction examples.

Independent support for the inherently local propagation of SLASH feature specifications as the vehicle for UDC dependencies comes from work on languages that visibly mark filler/gap pathways, as discussed at length in Zaenen (1983) and Hukari and Levine (1995). Such languages record by morpho- or phonosyntactic means the presence of each intermediate clausal step along the filler/gap pathway.

Other Dependencies In addition to the local and nonlocal dependencies, so-called middle distance dependencies arise in the context of coherence/verb-raising in the Germanic languages and of restructuring phenomena in the Romance languages – an issue we return to briefly in the next section when discussing argument attraction as the lexical specification underlying an analysis of these phenomena.

Finally, another kind of dependency relation, treated in considerable detail in Pollard and Sag (1992, 1994), involves the syntactic conditions that require, allow, or forbid coindexation of referring constituents. These conditions, collectively referred to as the HPSG Binding Theory, are formulated in HPSG not in terms of syntactic configuration but rather in terms of an obliqueness ordering that is lexically specified as a part of the selection properties.

Strands of Research

During the past decade, a vast literature in the HPSG framework has addressed empirical and theoretical issues arising in a wide range of languages. The scale of the enterprise allows only the most cursory overview; interested readers will find many of these issues taken up in breadth and detail in Kathol and Przepiórkowski (in press) and extensive on-line bibliographies of HPSG literature.

Beginning with the crosslinguistic breadth of coverage, a large collection of volumes has been devoted to the analysis of Romance languages (cf., e.g. Balari and Dini, 1997; Monachesi, 1999; Crysmann, 2003; Abeillé and Godard, 2003), Slavic languages (cf., e.g. Borsley and Przepiórkowski, 1999), German (cf., e.g. Nerbonne *et al.*, 1994; Kiss, 1995; Kathol, 2000; Müller, 1999, 2002; Meurers, 2000; Meurers and Kiss, 2001; Holler, 2001; De Kuthy, 2002). Japanese, (cf., e.g. Iida, 1995) Welsh, (cf., e.g. Borsley and Jones, 2005), and dozens of other languages. In addition, innumerable articles in journals, conference proceeding, and collections address the relevance of HPSG analyses to an understanding of complex phenomena in a variety of languages.

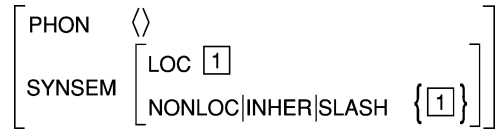

Figure 9 Lexical entry for elements not locally realized.

A good example of the latter is the analysis of clause union and restructuring phenomena in terms of argument attraction (Hinrichs and Nakazawa, 1994), which has had significant impact on analyses of languages as diverse as French and Korean. Similarly, the linearization-based approach to discontinuous constituency first proposed as a key to reconciling German constituent structure with the facts of word order in that language (Reape, 1996; Kathol, 2000; Müller, 1999) has been widely applied to problems of discontinuity in a variety of construction types in English, French, Portuguese Japanese, and Warlpiri. Another example is the introduction of a limited degree of nonlocality of selection into HPSG as a result of the work on case assignment in German reported in Meurers (2000: Chap. 10), which has proven useful in discussions of quite different phenomena, such as *tough* constructions in various languages (cf., e.g., Levine, 2001; Amaral, 2005).

Other work addresses questions of the grammatical architecture, such as the interaction of syntax, information structure, and intonation (Engdahl and Vallduví 1994; De Kuthy, 2002; De Kuthy and Meurers, 2003), and the integration of a range of semantic architectures into HPSG, such as Underspecified DRT (Frank and Reyle, 1995), Minimal Recursion Semantics (Copestake *et al.*, in press), Constraint Language for Lambda Structures (Egg *et al.*, 2001), and Lexical Resource Semantics (Richter, 2004a), which support innovative analyses of long-standing natural language puzzles, such as those posed by idioms (Sailer, 2003).

As should be expected of an active research community, the HPSG paradigm also includes significant diversity and disagreement about research strategies and analyses. One such issue concerns the choice between lexical and constructional approaches. Pollard and Sag (1994) account for the complex

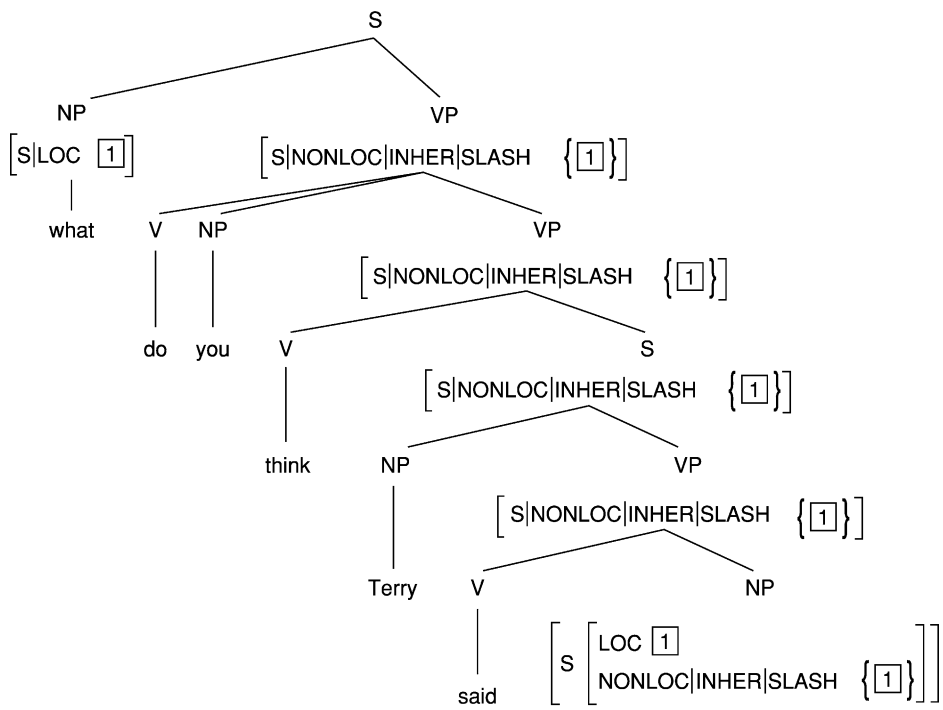

Figure 10 An example for a nonlocal dependency.

properties of relative clauses using null functional heads; Sag (1997) instead essentially revived the treatment of these adjuncts in Gazdar *et al.* (1985) by proposing to account for their behavior in terms of constructional characteristics inherited in a complex type hierarchy from supertypes. This approach has been further explored in Ginzburg and Sag (2001) and other work that increasingly links certain quarters within HPSG to the program of Construction Grammar (Fillmore and Kay, 1999). There is no consensus within HPSG that this is the optimal move, however, and research that minimizes reliance on structural types continues to emphasize the head-driven, lexical aspect of HPSG (cf., e.g., Müller, 2005). In a directly related issue, two principal strands of HPSG have developed with respect to the use of types. In one strand, new types are introduced for any class of objects to be generalized over and these types are arranged in large, crossclassifying taxonomies. The other strand emphasizes minimal linguistic ontologies in that new types are introduced only if they are necessary to refer to language properties that cannot otherwise be distinguished in the model (cf. Meurers, 2001; Koenig and Davis, 2003). Another source of diversity lies in the analysis of unbounded dependencies. Traceless versions of HPSG have been pursued in Pollard and Sag (1994), Bouma *et al.* (2001), and Ginzburg and Sag (2001), but this line of analysis is not universally accepted (cf., e.g., Levine, 2003; Müller, 2002: Chap. 6.2.5.1).

The foregoing discussion, while inevitably very incomplete, should give the reader an idea of the creative ferment that has characterized HPSG over the past decade. Nor has this innovative momentum been confined to the empirical/analytic side; it has, as we discuss below, also made itself evident in the formal and computational aspects of the theory, to which we now turn.

HPSG from a Formal Perspective

A Declarative Characterization of Natural Languages

The first step of a scientific approach to any empirical subject is the modeling of the domain. Models of empirically observable objects are established to capture the relevant properties of those objects. The theories then make reference to these models and express generalizations about which of the potential models actually exist and how their properties relate.

Correspondingly, Head-Driven Phrase Structure Grammar as a scientific approach to language specifies every grammar to have two components: the signature and the theory (in a formal sense). The *signature* of an HPSG grammar defines the ontology ('declaration of what exists'): which kind of objects are distinguished and which properties of which objects are modeled. It consists of the type hierarchy and the appropriateness conditions, defining which

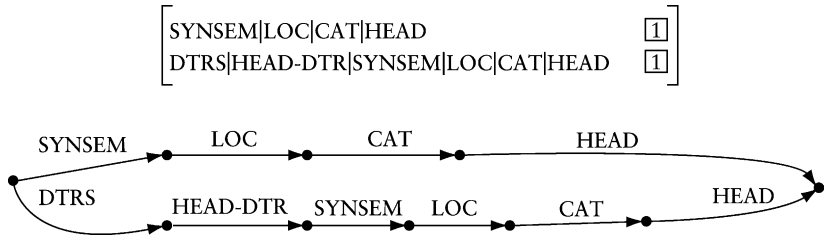

Figure 11 An example for token identity.

type has which appropriate attributes with which appropriate values. The *theory* of an HPSG grammar is a set of description language statements, often referred to as the constraints. The theory essentially singles out a subset of the objects declared in the signature, namely, those that are grammatical. A linguistic object is admissible with respect to a theory if and only if it satisfies each of the descriptions in the theory and so does each of its substructures. In the following, we take a closer look at the two components of an HPSG grammar.

Modeling the Domain What do the mathematical structures used as models for HPSG theories look like, and how are they related to the linguistic objects? Pollard and Sag (1994: 8) required the HPSG architecture to use typed feature structures (TFS) as models of linguistic objects. More precisely, they argued for modeling types (vs. tokens) of total linguistic objects (as opposed to partial information about them) and therefore assumed the models to be totally well-typed and sort-resolved feature structures.

Here, totally well-typed means that (a) "what attribute labels can appear in a feature structure is determined by its sort; this fact is the reflection within the model of the fact that what attributes ... an empirical object has depends on its ontological category" (Pollard and Sag, 1994: 18) and (b) "every feature that is appropriate for the sort assigned to that node is actually present" (Pollard and Sag, 1994: 18). Sort-resolvedness requires that every node is assigned a most specific type as value. Note that *type* and *sort* are often used synonymously; the same is true for *attribute* and *feature*.

It is important to realize that these requirements are not merely technical stipulations; they are a direct consequence of the decision that feature structures should serve as total models of linguistic objects. It is not uncontroversial within the HPSG community whether total models of linguistic objects are what is needed for linguistics. Problems for such total models arise in the analysis of coordination (Pollard and Sag, 1994: 203, fn. 39; Sag, 2003) and arguments for and against total models arise from the formalization of lexical rules and the representation of unrealized arguments (Meurers, 2001: 180–182; Pollard, 2001). At the same time, we will see in the next section that only total models support the classical negation needed for formulating the implicational constraints standardly used to express grammatical principles in HPSG.

Expressing the Theory Having clarified how linguistic objects are modeled, we can turn to the question of how to express the theory and how the theory characterizes the set of well-formed linguistic objects.

An HPSG theory is specified using a specific description language, sometimes written down in the form of *Attribute-Value Matrices* (*AVM*). The description language makes it possible to express that a feature structure has a certain type (e.g., *noun*), that the value of an attribute of a feature structure satisfies a given description (e.g., [CASE *nominative*]), or that the values of two attribute paths are *token identical*. Complex descriptions are obtained by combining descriptions with the help of conjunction, disjunction, and negation; in the AVM notation, conjunction is implicit.

The notion of token identity means that two paths point to the same node in the feature structure model; this is illustrated in Figure 11 with an AVM specifying token identity of HEAD values (as specified by the HFP discussed around Figure 5 above) and a small graph showing the relevant part of a feature structure denoted by this description.

Another identity notion sometimes referred to is *type identity*: Two feature structures are type identical if and only if they are of the same type, the same attributes are defined on both feature structures, and the feature structures that are the values of the attributes are type identical.

Turning to the second question, what does it mean for a theory to specify admissible feature structures? An HPSG theory simply is a set of descriptions that are interpreted as being true or false of a feature structure in the domain. A feature structure is admissible with respect to a certain theory if and only if it satisfies each of the descriptions in the theory and so

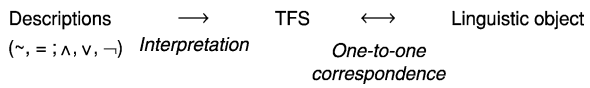

Figure 12 The setup desired in Pollard and Sag (1994).

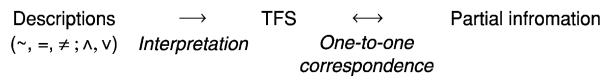

Figure 13 The setup of Carpenter (1992).

does each of its substructures. The descriptions that make up the theory are also called *constraints*, since these descriptions constrain the set of feature structures that are admissible with respect to the theory compared to the domain of feature structures specified by the signature. Note that the term constraint has been used for many different purposes – we use 'constraint' only to mean 'description that is part of the theory.'

Formalizing the HPSG Setup

The setup of HPSG characterized in the previous section is summed up in Figure 12. The usual symbols for description language operators are used: conjunction (∧), disjunction (∨) and negation (¬). Type assignment and path equality are noted as '∼' and '=', respectively.

Several logics have been proposed to provide the formal foundations for this setup. There essentially are two families of logics dealing with this task: the *Kasper–Rounds* logics (Rounds and Kasper, 1986; Moshier and Rounds, 1987; Carpenter, 1992; Copestake, 1993) and the *Attribute-Value* logics (Johnson, 1988; Smolka, 1988; King, 1989). In the following, we focus on two prominent representatives in the context of HPSG: the Kasper–Rounds logic defined in Carpenter (1992) and the Attribute-Value logic of King (1989). Figure 13 shows the setup proposed in Carpenter (1992), with '≠' as notation for path inequality.

The descriptions of Carpenter (1992) describe typed feature structures modeling partial information. Presumably there is a further level, in which the partial information is related to the linguistic objects, which is left undefined. This setup can also be seen to underlie an early model of HPSG (Pollard and Sag, 1987). Since partial information, not total linguistic objects, is modeled, Carpenter (1992) did not require the typed feature structures to be well typed or sort resolved.

The difference between the total models of linguistic objects assumed in HPSG since Pollard and Sag (1994) and the models of partial information of Carpenter (1992) has important consequences. Moshier and Rounds (1987) showed that in the setup of a Kasper–Rounds logic, full classical negation as part of the description language destroys subsumption monotonicity on typed feature structures – a property that, as Carpenter and others argued, must be upheld if feature structures are to function as models of partial information. Carpenter (1992: Chap. 15, p. 233) went one step further by stating that even for the formulation of implicational constraints with type antecedents (i.e., type negation), subsumption monotonicity cannot be achieved. The description language of Carpenter (1992) therefore contains only path-inequations, a weaker form of negation.

Turning to Attribute-Value Logics, King (1994, 1999) showed that his Speciate Reentrant Logic (SRL) can provide the setup we saw in Figure 12, i.e., the setup envisaged for HPSG in Pollard and Sag (1994). Descriptions are given a set theoretic interpretation: The interpretation of a description is a set of objects, i.e., an object satisfies a description if and only if it is in the denotation of that description. For example, the description *word* denotes the set of all objects of type *word*; and the description [CASE *nominative*] denotes the set of all objects for which the partial function CASE is defined such that the value of that function is an object of type *nominative*. Conjunction, disjunction, and negation as operations on descriptions are interpreted as set intersection, set union, and set complement, respectively.

Although King's SRL captures the basic HPSG setup, one conceptual difference is that Pollard and Sag (1994) envisaged modeling ***abstract*** linguistic objects (i.e., types) whereas SRL models ***concrete*** linguistic objects (i.e., tokens). But Pollard (1999) distanced himself from the earlier emphasis on types and adopted King's denotation function in place of an approach based on feature structure satisfaction and admission.

King's SRL falls short, however, in failing to provide relational expressions. Richter (2000) addressed this issue by defining the Relational Speciate Reentrant Language (RSRL), which added a bounded form of quantification and relations to the inventory of expressions. He showed in detail how this formal language can provide a direct and transparent formalization of the English HPSG in Pollard and Sag (1994), which turns out to require more relations than was traditionally assumed. Richter (2000, 2004a) can also be recommended as a comprehensive overview of the complex issues involved in formalizing HPSG.

Processing with HPSG-Based Grammars

Motivation

There are at least three motivations for implementing and processing with HPSG-based grammars. From a *linguistic perspective*, such work can provide important feedback on the empirical adequacy of the linguistic analyses, on the explicitness, completeness, and compatibility of the linguistic theories integrated in one grammar, and on the rigid and complete formalization of the linguistic architecture. From a *computational perspective*, grammar implementation can stimulate and test the development of systems that support parsing and generation with HPSG-based grammars. Finally, from an *engineering perspective*, deep processing with HPSG-based grammars is potentially useful for applied human language technology as, e.g., illustrated by the speech-to-speech machine translation project VerbMobil.

Depending on the perspective adopted, research on HPSG-based processing has emphasized different issues; it is important to note, however, that even from an engineering perspective the value added by basing grammar writing on HPSG as a linguistic paradigm derives from the insights provided by an active linguistic research community. The development of implementation systems that support a transparent and tractable way of implementing a grammar close to the linguistic theory thus is of particular importance for HPSG-based computational work. In the same vein, a thorough documentation of grammars (cf., e.g., Meurers, 1994; Gregory, 1997; Müller, 1999), including discussions motivating the differences between the linguistic theory and the implementation, is an essential component of such work.

Frameworks for HPSG-Based Processing

Since the early 1990s, a range of systems that support processing with HPSG-based grammars have been developed. Classifying these systems according to the means used for expressing grammars, one can distinguish systems that are (a) constraint-based in the sense that grammars for these systems consist of implicational statements constraining the domain directly, (b) relation-based in the sense that they make use of a relational level for organizing the grammar, i.e., the relational extension of the constraint language, or (c) a combination of the two. We here focus on providing an overview of the key theoretical distinctions relevant for characterizing the different systems; a detailed system comparison can be found in Bolc *et al.* (1996).

Systems Directly Constraining the Domain The Typed Feature structure System (TFS; Emele and Zajac, 1990) arguably was the first system that supported a direct implementation of HPSG theories (cf., also, Matiasek, 1994). TFS grammars consist of a set of implicational statements with type antecedents. Any description can be entered as a query, and the system returns a more specific description such that the description and each of its parts satisfies each constraint in the theory.

The advantage of this approach is that the organization of constraints in TFS is the same as that in the HPSG architecture: an HPSG theory is just a set of constraints, some of which happen to constrain lexical objects, whereas others constrain phrasal objects, etc. The TFS system supports only implicational statements with type antecedent though, not general negation, so that principles with complex antecedents cannot be directly encoded.

In line with the credo for reversible processing architectures (cf. Van Noord, 1993; Neumann, 1998; Minnen, 2001, and references therein), processing in TFS always amounts to applying constraints to whatever specification is given as the input – there is no specialized parsing or generation algorithm. This also leads us to the main disadvantage of the TFS approach: Since every linguistic constraint is treated in the same way, including type constraints on recursively defined data structures, TFS can run into significant control problems, which result in problems of efficiency and termination.

Systems Based on a Relational Backbone In the Comprehensive Unification Formalism (CUF; Dörre and Eisele, 1991; Dörre and Dorna, 1993), a theory is expressed using definite clauses as a relational extension of the description language (cf. Jaffar and Lassez, 1987; Höhfeld and Smolka, 1988). CUF thus essentially is a relational programming language like Prolog (Colmerauer, 1993), but with feature terms as arguments of the relations instead of first-order terms. Whereas CUF provides some advanced features, such as complex coroutining capabilities, related approaches have focused on providing a lean integration of typed feature structures into Prolog such as GULP (Covington, 1994) or ProFIT (Erbach, 1995b).

An HPSG theory is implemented in such a setup by rewriting it as a logic program. In the resulting reorganized grammar, the recursive constraints are encoded on a different level (relations) than the linguistic data structure constraints (arguments to the relations). A query to the system is a call to one of the relations, and the system returns the instantiation of the arguments required for the called relation to hold. Whether such a query results in parsing or generation (or some other kind of processing)

depends entirely on how the grammar was encoded as a logic program and which processing regime is applied to it.

Compared to the computational setup exemplified by TFS, in which the constraints on the domain are expressed directly, the advantage of the relational approach is that the grammar writer determines the order of execution of goals by the way in which one encodes the grammar as a definite clause program. The definite clause encoding also allows the efficient processing techniques of logic programming to be used; e.g., clause indexing, Earley deduction, goal freezing, and specialized algorithms for parsing or generation can be encoded in this setup (cf., e.g., Erbach, 1995a, and references therein).

The disadvantage of the relational systems is that the organization and expression of a grammar are entirely different from the organization of an HPSG theory as a set of constraints. A grammar with a relational backbone in general is related to the original linguistic HPSG theory only on an intuitive level (unless the relational encoding is the result of compilation of a set of constraints; cf. Götz and Meurers, 1995).

Phrase Structure as a Specialized Relational Backbone Probably the largest class of systems, such as ALE (Carpenter and Penn, 1994), LKB (Copestake, 1993), and Troll (Gerdemann and Götz, 1996), has opted for a particular relational approach: phrase structure grammars. Phrase structure is a relation demanding a fixed number of daughters (at runtime) and having a designated argument (in HPSG typically encoded under PHON) that satisfies the condition that the list of tokens covered by the mother is the concatenation of that covered by all its daughters. The key advantage of a phrase structure-based approach is that the most important recursive structure, syntactic constituency, is singled out and encoded in a format that readily supports efficient algorithms for parsing. These algorithms exploit the formal properties of the phrase structure relation for efficient indexing, memoization, and other optimizations, instead of relying on resolution to tackle general definite clause programs. Some of the systems also make it possible to combine phrase structure grammars with definite clause programs, so that, e.g., a phrase structure rule can refer to a general definite relation for concatenating or shuffling lists.

The phrase structure-based approach shares the general disadvantage of the relational encoding: that the organization and formulation of the grammar are different from those of the linguistic theory. Despite its somewhat confusing name, a Head-Driven Phrase Structure Grammar does not include phrase structure rules; as we saw above, an HPSG theory is a set of constraints, one of which typically encodes a set of immediate dominance schemata licensing syntactic structure. When one recodes such immediate dominance schemata into phrase structure rules, the specific restrictions inherent to phrase structure mentioned above have the effect that each immediate dominance constraint of the original linguistic theory results in a possibly very large set of phrase structure rules.

Combining Paradigms

As mentioned in the previous section, a relational backbone is advantageous for efficient processing. In contrast, implicational constraints support a more modular, underspecified encoding of grammars by making use of the elaborate structure that typed feature structures impose on the modeled domain. Several HPSG-based processing systems have thus been developed to combine the advantages of both encodings, such as the (new) ALE (Carpenter and Penn, 1994), TDL (Krieger, 1995), ConTroll (Götz and Meurers, 1997), the (new) LKB (Copestake, 2002), Hdrug (van Noord and Bouma, 1997), or TRALE (Meurers *et al.*, 2002; Penn, 2004). This development is reminiscent of the integration of the paradigms of (constraint) logic programming, functional programming, and object-oriented programming in general-purpose programming languages, such as LIFE (Aït-Kaci and Podelski, 1991) and OZ.

How the paradigms are combined in the HPSG implementation systems differs from system to system, reflecting the linguistic or engineering focus under which they have been developed. Let us illustrate this with three examples:

The ConTroll system was developed to reflect the linguistic and formal architecture of HPSG as closely as possible. It supports interleaved processing of implicational constraints and relational expressions controlled through delay statements and prioritized deterministic computation (Götz and Meurers, 1997). The implicational constraints can have complex antecedents, and the system strictly enforces inferences based on the appropriateness conditions formulated in the signature (Gerdemann, 1995). Constraints are enforced lazily (Götz and Meurers, 1999) in a way that ensures that every description returned as a result has at least one instantiation that is most specific with respect to the signature defined, i.e., every solution returned by the system describes a nonempty set of linguistic objects. But the system lacks a phrase structure backbone for efficient processing with large-scale grammars.

At the other end of the spectrum, the LKB is a system emphasizing efficient processing with a phrase structure backbone and basic type constraints (Copestake, 2002). The system supports efficient processing of large-scale grammars and is at the heart of a rich array of natural language engineering efforts (cf., e.g., Oepen *et al.*, 2000, and several articles mentioned in the next section). In support of efficiency, the system has a lean design: The description language does not include disjunction, negation, path-inequation, or macros; the basic type constraints are not intended for recursive processing; and the system does not support definite relations so that recursive processing is limited to the phrase structure component. To avoid costly computation, constraints and appropriateness conditions are not strictly enforced, in the sense that a solution returned is not guaranteed to have any specific instantiations that are well-formed.

The TRALE system attempts to cover a middle ground by combining the definite relations and efficient phrase structure backbone of the ALE system (Penn and Munteanu, 2003) with implicational constraints with complex antecedents and enforcing some, but not all, of the inferences possible through appropriateness. In support of efficient processing, implicational constraints are applied only when the antecedent subsumes the description being processed (Penn, 2004), in contrast to ConTroll, where the interpretation of negation is classical, potentially enforcing costly exploration of many disjuncts (unless a delay statement is specified to obtain the interpretation adopted by TRALE).

Strands of Research

HPSG-based processing is an active field of research; thus, in the remainder of this section we point out some of the strands of research.

In line with the current emphasis on human language technology and applied research, a major strand of work on HPSG-based processing is advancing the efficiency, robustness, and applicability of deep processing. This focus includes work on abstract machine compilation (cf., e.g., Wintner, 1997; Miyao *et al.*, 2000), an efficient reimplementation of a lean, phrase structure-based system in C++ (Callmeier, 2000), grammar compilation techniques (cf., e.g., Minnen *et al.*, 1995; Minnen, 2001; Meurers and Minnen, 1997), and a wide range of algorithmic improvements and techniques (cf., e.g., Kiefer *et al.*, 1999; Oepen *et al.*, 2000; Munteanu and Penn, 2004).

A related line of work relieves the HPSG-based deep processing of some of the processing burden by combining it with shallow processing techniques (cf., e.g., Frank *et al.*, 2003) or filtering with extracted context-free grammars (cf., e.g., Kiefer and Krieger, 2000; Torisawa *et al.*, 2000). Some of this work is organized around the Deep Thought project (http://www.project-deepthought.net/), which investigates such hybrid methods for the purpose of information extraction. Stochastic extensions of HPSG have been developed (Brew, 1995; Abney, 1997) and a combination of statistical and linguistic insights is, e.g., explored in the Delph-IN collaboration.

Another strand of research emphasizes and explores the relation of linguistic theory and grammar implementation (cf., e.g. Hinrichs *et al.*, 2004). Work in this strand includes research exploring the expressive means needed for transparent and modular grammar design (cf., e.g., Meurers *et al.*, 2003; Penn and Hoetmer, 2003; Penn, 2004), the development of a core architecture for multilingual grammar development (Bender *et al.*, 2002), and research developing processing regimes for linearization-based HPSG (cf., e.g., Kasper *et al.*, 1998; Daniels and Meurers, 2004; Penn and Haji-Abdolhosseini, 2003) – a paradigm providing modular and compact analyses for languages with relatively free word order (Müller, 2004). In the context of the MiLCA consortium (http://milca.sfs.nphil.uni-tuebingen.de/A4/), the relation between HSPG as a linguistic formalism, its formal foundations, and computational realization is explored from a pedagogical perspective (Richter, 2004b). This relation is also the topic of the CoGETI network.

A further strand of research concerns the integration of grammar implementation and computational semantics, as, e.g., reflected in the papers from the workshop on Semantics in Grammar Engineering included in HPSG (2004) and the HPSG Ellip project.

Finally, though we have focused on language processing from the perspective of computational linguistics, we should mention in closing that the HPSG paradigm has also been used for psycholinguistic research on human sentence processing. HPSG-based models of human language comprehension are, for example, explored in Semantics-Oriented Unification-based Language Processing (Konieczny, 1996), which integrates constraints from linguistic, conceptual, and discourse knowedge.

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Head/Dependent Marking

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Introduction

Every phrase has a head and one or more nonheads, and the morphology and syntax of the language make it possible to identify the syntactic relations within the phrase. Inflectional morphology, such as cases of nouns, possessive inflection of nouns, agreement of adjectives, and agreement of verbs, identifies the syntactic relations, and depending on the language and the phrase type, that marking may be on the head, on the nonhead, on both, or on neither. Head/dependent marking typology (Nichols, 1986, 1992), also known as the 'locus of marking' (Nichols and Bickel, 2005a, b, c), analyzes morphosyntactic marking in these terms. Languages tend to have predominantly one or another kind of marking in various phrases.

Essential points of head/dependent marking were worked out by Tesnière (1966) and especially Milewski (1967). Milewski's terminology is 'concentric' (head marking) vs. 'excentric' (dependent marking). After preliminary experimentation with Milewski's terms and with 'centripetal' vs. 'centrifugal,' Nichols (1986) proposed 'head marking,' 'dependent marking,' 'double marking,' 'free or floating marking,' and 'no marking' for the individual patterns and 'head-marking language,' 'dependent-marking language,' etc., for whole-language types. The term 'dependent' is taken from dependency grammar, but head/dependent marking typology is neutral as to dependency vs. phrase-structure grammar and is applicable in any syntactic analysis that recognizes heads.

Examples and Language Types

The following examples illustrate the marking types and also illustrate whole-language consistency in the marking types of different phrases. Head-marking patterns from Eastern Tzutujil (Tzutujil) (Mayan, Guatemala; Dayley, 1985) are illustrated by the following.

Head-marked NP (with possessive noun nonhead): marking on the possessed noun, no marking on the possessor:

(1) r-cheeuaal ja kinaq'
3s-stick the bean
'beanpole' (lit. 'the bean's stick') (148)

Head-marked PP: marking on the adposition; no marking on its object. Head-marked adpositions tend to be nominal in origin their inflection is identical to possessive inflection of nouns. They differ from other nouns only in being lexically specialized for relational use. They are generally called 'relational nouns' in the literature. For the purposes of crosslinguistic comparison, however, they may be regarded as an etymologically distinct type of adposition.

(2) ruu-majk jar aachi
3s-because.of the man
'because of the man' (153)

Head-marked clause: marking (agreement) on the verb; no marking on the nouns. Polysynthesis (not illustrated here), though defined variously, always involves strong clausal head marking.

(3) Nuuyoon x-Ø-in-b'an ja jaay
I-along TENSE-*3s-1s-made the house*
'I alone built the house' (155)

(4) X-in-ruu-ti7 jun ajqaaq xe7 weey
TENSE-1s-3s-bite a wasp under my-teeth
'A wasp bit me on the cheek' (305)

Dependent-marking patterns from Eastern Pomo (Pomoan, California; McLendon, 1996) include the following.

Dependent-marked NP: the possessor is in the genitive case and the head has no case:

(5) mí-bax xa-heʔè
*2s-*GEN *water-*SPEC
'your water' (532) (specific is a definiteness category)

(6) wáx péso?
*1s.*GEN *money*
'my money' (533)

Dependent-marked PP: the adposition is uninflected and its object noun takes a case required by the adposition:

(7) xa:lé:-Na di:té:
*tree-*LOC *against*
'(leaning) against the tree' (535)

Dependent-marked clause: subject and object have cases indicating those functions; the verb has no agreement. (AG denotes agent, i.e., ergative case; PAT denotes patient, i.e., accusative case.) Example (8) shows case marking with a transitive verb where the subject is nonhuman and the object is human; different valence categories of verbs and different agent and patient configurations require different cases:

(8) bu:ráqal-là: mí:p-al ša:k'-a
*bear-*AGENT *3s-*PAT *kill-*INDIC
'(A) bear killed him' (534)

Double marking means that both the head and the nonhead have inflectional morphology indicating their relationship. Very few languages are double

marking in all phrase types; one of those few is Central Siberian Yupik (Siberian Yupik) (Eskimoan: de Reuse, 1993; the following examples are in morphophonemic transcription). In a double-marked possessive NP, the possessor is in the relative case and the possessed noun agrees in person and number with the possessor:

(9) aghnagh-m atkuga
woman-REL *parka*-ABS.*3s*
'the woman's parka' (26)

In a double-marked PP, the object is in a case governed by the adposition and the adposition agrees with its object; like most head-marked adpositions, those of double-marking languages are usually relational nouns. In the Yupik relational noun construction, the object takes the relative case and the postposition is a noun in a local case followed by person–number possessive agreement with the object:

(10) manteghagh-m ilu-ngani
house-REL *area.inside*-LOC.*3s*
'inside the house' (29)

In the double-marked clause, subject and objects are case-marked and the verb agrees with both of them. The Yupik verbal agreement suffixes are mostly portmanteau morphs.

(11) qikmigh-ma negh-aa kayu-Ø
dog-REL.*1s* *eat*-IND.*3s–3s* *fish*-ABS
'My dog ate the fish' (30)

No marking is illustrated by Eastern Kayah (Eastern Kayah Li) (Tibeto-Burman: Karen, Thailand and Burma; Solnit, 1996), a prototypical isolating language with almost no inflectional morphology. In such a language, word order and lexical specialization are the only clues to syntactic relations.

Noun phrase:

(12) ne mò
2s *mother*
'your mother' (187)

(13) chā dʌ
chicken *egg*
'chicken egg; chicken's egg' (187)

PP (in Kayah Li, a preposition usually governs not a simple noun but an NP, structurally identical to a possessive NP, whose head noun is a part or location):

(14) dlɣ́ hi lē
at *house* *bottom*
'under the house' (211)

Clause: neither the subject nor the object has any case marking and the verb has no agreement:

(15) ʔa chɯ ʔa thwi
3 *stab* *3* *dog*
'He stabbed his (own) dog' (149)

(16) ʔa bulɛ vɛ́ hʌca
3 *exchange* *1s* *clothes*
'He exchanges clothes with me' (155)

Free or floating marking is illustrated by the following clause from Warlpiri, where the object agreement marker and tense marker are in second, or Wackernagel, position following the first tonic word (Simpson, 1983: 140 cited by Baker, 2001: 1433). These examples have case marking on the subject and object and floating marking of the object:

(17) kurdu-ngku ka-ju nya-nyi ngaju
child-ERG PRES–1SO *see*-NONPAST *1s*.ABS
'The child sees me'

(18) Kurdu-ngku ka-ju ngaju nya-nyi

(19) Nya-nyi ka-ju kurdu-ngku ngaju

(20) Ngaju ka-ju nya-nyi kurdu-ngku

(21) Ngaju ka-ju kurdu-ngku nya-nyi

(22) Nya-nyi ka-ju ngaju kurdu-ngku

The marking is affixal in the above examples, but it can also take the form of phonologically independent words. Subject and object markers in many Polynesian languages, and argument markers in Tagalog and other Philippine languages, are prenominal words that are best considered case words (they are usually called particles or prepositions in the literature), e.g., the object marker in (23) from Maori (Bauer, 1993: 86):

(23) Kei te kai raaua i ngaa kuumara
T/A *eat* *3du* OBJ ART.PL *kumara*
'They are eating the kumaras'

Fijian subject agreement is a separate word preposed to the verb:

(24) era la'o a gone
3p *go* ART *children*
'The children are going'
(Dixon, 1988: 33)

Head/dependent marking typology can be applied to other kinds of phrases as well, such as those with numerals, but there is no consensus on whether, cross-linguistically, the same word is the head in all such phrases. Interclause relations lend themselves to head/dependent analysis if the main clause is taken to be, or contains, the head of the entire complex sentence. Thus, subordination is dependent-marked if the subordinate clause contains a complementizer, nonfinite verb, or other marking of subordination; it is head-marked if the main clause contains a conjunction, particle, or special verb form indicating that it has a subordinate clause; it is double-marked if both clauses have markers; and it has no marking if it is asyndetic. All four possibilities can be illustrated with

English examples, if we assume that in the following the condition clause is subordinate and the consequence clause is main (relevant marking italicized):

(25) *If* it snows we'll cancel the meeting. (Dependent-marked)

(26) It was snowing hard, *so* we canceled the meeting. (Head-marked)

(27) *Whereas* heavy snows are frequent in early February; and
Whereas the availability of transport is unreliable during heavy snows;
Therefore, the Executive Committee resolves that the annual meeting will henceforth be held in April.
(Double-marked; two subordinate clauses to one main clause)

(28) We canceled the meeting, it was snowing. (No marking)

Similarly, relativization can involve a relative pronoun and/or participial or other nonfinite verb form in the relative clause (dependent-marked; the nonfinite morphology is the marking), internally headed relative with a gap or pronoun in the main clause (head-marked; the gap is the marking), correlative construction with markers in both clauses (double-marked), and probably simple juxtaposition of the two clauses (zero-marked). Clause chaining can involve marking of person, tense, etc., only on the main or final clause (head marking), marking of chained clauses with converbs, conjunctions, etc. (dependent marking), marking of both, e.g., nonfinite converb and tensed, person-marking main verb (double marking), or simple juxtaposition without overt marking of either clause (serialization, assuming that sharing of an argument is not taken to create a gap or other marking in either clause). Extending head/dependent marking to interclause relations entails some debatable analyses (as in the examples discussed here), and there is little crosslinguistic consistency between the marking of interclause relations and the head/dependent marking type of phrases and simple clauses; therefore, typological comparison is usually limited to these latter constituents.

Measuring Types

There are various ways in which head/dependent marking can be coded for crosslinguistic surveys. A *dense* survey, as in Nichols (1986, 1992), tabulates the marking type for both possessive NPs, NPs with adjectives, PPs, and clauses with three arguments, for both noun and pronoun arguments. This is time-consuming and inexpedient in that certain contexts prove to favor certain marking types: pronoun arguments, attributive adjectives, inalienable possessors, indirect objects, and subjects all turn out to have universally driven marking patterns that make them unrevealing for typological comparison. Pronouns often have cases when nouns do not, attributive relations are almost never head-marked, inalienable possessors favor head marking, indirect objects are commonly dependent-marked, and subject–verb agreement is strongly favored regardless of language type. PPs are hard to survey as some languages lack them and in many others they are indistinguishable from NPs. Hence, a *sparse* survey of only (alienable) possessor and (direct or primary) object marking is adequate to pinpoint language types (Nichols and Bickel, 2005c). The minimum possible is an *exemplar-based* survey that, identifies the marking of just one relation that adequately reflects whole-language type. Nichols and Bickel (2005b) found that the marking of noun objects of transitives is sufficient for these purposes. Note that, what suffices for plotting or statistical comparison may be less than what one would want in a typology database intended for long-term use and purposes other than identifying head/dependent marking types of languages. For such a database, a survey of possessors in general (alienable and inalienable) and both subject and object, for at least nouns and probably also pronouns, will both identify language types and cover the essentials required for comparison with most literature.

Cysouw (2002) and, implicitly, Baker (1996, 2001) split head/dependent marking into two parameters: head marking and dependent marking (Baker considers clause arguments only; Cysouw considers clauses and phrases). In this approach, a language has head marking if subjects and objects are marked on the verb (whether or not they also bear cases or adpositions, i.e., are double-marked).

Distribution

Languages have some tendency to show the same marking type in different phrases, especially when the universally driven patterns mentioned above are removed from consideration. That is, crossphrasal harmony is a universal tendency, though not a particularly strong tendency. Apart from this, NPs favor dependent marking and clauses favor head marking. There are some statistical affinities of head/dependent marking types for various other typological parameters: head marking and verb-initial order, head marking and split intransitivity, dependent marking and ergativity (Nichols, 1992: 100 ff.).

Head/dependent marking is fairly consistent in language families and thus evidently has good diachronic stability and resistance to diffusion (Nichols, 1992, 1995, 2003). It is a good indicator of large language areas: the head-marking type is common in the Pacific

Rim macroarea and infrequent elsewhere (Nichols, 1992; Cysouw, 2002); head marking in the Baker or Cysouw sense is an ancient Eurasian enclave feature found only in the Himalayas and the Caucasus (Bickel and Nichols, 2003, where the term used is 'polyagreement'). The distribution of head/dependent marking types, macroarea by macroarea, differs so much that no universal profile can be determined (Cysouw, 2002).

See also: Areal Linguistics; Case; Contact-Induced Convergence: Typology and Areality; Ergativity; Grammatical Relations and Arc-Pair Grammar; Linguistic Universals, Greenbergian; Noun Phrases; Polysynthetic Language: Central Siberian Yupik; Possession, Adnominal; Verbs; Word Order and Linearization.

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Head-Driven Phrase Structure Grammar

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The Linguistic Approach

Our discussion is primarily rooted in Pollard and Sag (1994) as the touchstone of the HPSG paradigm, based on earlier exploratory work (Pollard and Sag, 1987). This choice reflects the high degree of formal explicitness with deep and comprehensive coverage achieved in that work, which brought to fruition a line of research originating in the early 1980s. HPSG was heavily influenced by Generalized Phrase Structure Grammar (GPSG; Gazdar *et al.*, 1985), itself the product of a fertile period at the end of the 1970s and into the early 1980s when a number of explicit and comprehensive alternatives to transformational grammar began to emerge. GPSG, Lexical–Functional

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Range of Media Sites

Interest in health issues is growing and the mass media play an important role in the dissemination of information and attitudes on health and well-being to the general public through newspapers, magazines, television, radio, and the Internet. The media cover advances in medical treatments and new drugs; they alert their audiences to health risks; they promote the value of taking care of the self; and they act as advocates for change in sociopolitical issues, such as medical funding and health service delivery. The provision of health information is widely distributed across the media, occurring in news stories, documentaries, medical and science programs, and health promotion campaigns. In addition, health and illness are important themes in entertainment media forms such as television dramas, lifestyle shows, and soap operas. Advertisements also feature health promotion, cures, and treatments. Magazines, especially women's magazines, contain significant health content. Health and medical websites on the Internet provide a range of health-related material, and chatrooms and newsgroups facilitate patient to patient interaction and discussion.

Media information and images contribute to the background in which public attitudes to health and well-being are formed, expectations about health care delivery are developed, decisions related to treatment are made, and meanings of illness are understood. Media audiences have become health consumers increasingly encouraged to search out information, to take care of the self, and to expect high standards of medical care and accountability.

Range of Research

Research conducted into health and the media is spread across disciplines including sociology (or specifically, medical sociology), media studies, communication studies (or specifically, health communication), cultural studies, and psychology, and it ranges in methodology from classical quantitative content analysis to qualitative rhetorical or discourse analysis. Much of this work has tended to focus on media coverage of specific conditions such as cancer, HIV–AIDS, and mental illness; and on health issues such as smoking, alcohol use, drug use, diet and nutrition, and body image. Work has also been done on the way medical journalists report 'miracle cures' or 'breakthroughs' based on research sourced from scientific and medical journals. Research has been conducted on media panics and scare campaigns (*see* **Media Panics**). Among special journal issues related to health and the media, attention should be drawn to *Health 3(3),* (1999) (and its editorial by Lupton) and *Sociology of Health and Illness 25(6),* (2003) (and its editorial/overview by Seale).

Risk

A major way in which the media adds to the understanding of health and medical expectations in the lay public is through the coverage of risk. Although the media may see a role for themselves in exposing risks and hazards to the general population or in the failures of public institutions and utilities, the way the media convey risk can be problematic (see Singer and Endreny, 1993). Part of the issue in communicating risk through the media is the difficulty with a form of address that can speak to only a relatively anonymous subject, so that susceptibility and risk factors can be dealt with only in generalized terms rather than in anything approaching individual advice (Greco, 1993). In addition, the current media shift toward tabloidization and sensationalism means that situations of very low or unusual risk are sometimes mistakenly construed as health crises. The media emphasize dangers that, though serious, are relatively uncommon. This selective coverage of hazards and their associated risks using news values that emphasize the unusual, the new, the sudden, or the mysterious mean that stories of this kind receive disproportionate coverage, whereas more common (and often more serious) risks are downplayed or attenuated (such as those associated with smoking or lifestyle) (Kasperson and Kasperson, 1996).

Representations and Health Messages

Other work has looked more generally at health in the media and though some studies note the persistence of uncritical biomedical perspectives and discourses, other research suggests that a more challenging position has emerged. Karpf's (1988) study followed a range of radio and television shows in Great Britain from the 1920s and mapped the ideological debates that led to the rise of the medical consumer. She found toward the end of the time frame that, although the media were becoming more critical in their approach to medicine, they were still following official definitions of health, medicine was still portrayed as the triumphant conqueror of disease, and little was time spent on cultural

determinants of heath or the social origins of illness. Turow (1989) came to similar conclusions. He tracked changes in the doctor-show formula on U.S. television against a changing medical reality where medical resources had become more expensive and where the individual physician was no longer the sole care provider. By the 1970s, some shows occasionally revealed the difficulties of working in under-resourced hospitals, but Turow contended that such hospitals were portrayed as the exception rather than the rule, so that even these shows were not generalizing the problem of scarce resources to the broader medical system. In contrast, Bury and Gabe's (1994) analysis of representations of health and medicine in television programs found that though the medical model of health and illness still held considerable authority, the media used in their study were adopting a more critical and challenging position. Gwyn (2002) looked at representations of health, disease, medicine, and practitioners across a range of mainly British media forms, including television health documentaries and the news media. He noted that, especially in the documentaries, the discourses of medicine remain authoritative and even behavioral and lifestyle issues have become medicalized, with medical explanations and interventions.

There have been few overviews of research published in the area of health and the media. Signorelli's (1993) overview of empirical studies of health coverage reported some of the shortcomings in U.S. television programming such as bias or inaccuracies in health reporting, unhelpful risk communication, stigmatization of the mentally ill, problematic representations of smoking and of alcohol consumption, and unhealthy messages about food, nutrition, and weight. As Seale (2002) pointed out, this work compares media health with health 'reality' and as such it supported the highly critical assessment of the mass media's performance in conveying health messages that is held by health educators. Seale's own survey was more wide-ranging in that it covered a variety of analytical approaches "with a view to highlighting aspects of these that are the most helpful in understanding the rhetorical effects of media health portrayals" (2002: 27). His work led him to conclude that stock story forms and standard characters, oversimplification, stereotyping, and oppositions are key elements in media health representations, as are quantification for rhetorical effect and the use of metaphor to explain complex scientific concepts.

Meanings of Illness

Magazines, especially mass market women's magazines, contain significant health content interspersed with gossip, scandal, features, and advice. Though much of the content is straightforward health information, these magazines publish personal narratives of the illness experiences of celebrities and ordinary people that are often at odds with conventional biomedical accounts of illness, or at least they are telling a different type of story – one that involves their reaction to and their experience of serious illness rather than just its onset, diagnosis, treatment, and prognosis. These narratives, as evaluations of the meaning of illness for the patient's life, are sometimes triumphal accounts of overcoming illness, designed to inspire others in similar situations and sometimes emotional accounts of overwhelming adversity and suffering (McKay and Bonner, 2002). Contextualized within the tabloid discourse of mass market magazines, the main aim of these illness narratives is not to celebrate biomedicine (although medical success is often involved), but to find meaning in illness for sufferers, their families, and the magazine readership.

The Internet offers unprecedented access for its users to detailed medical information, opening up the realm of traditional Western medical authority to the lay public. Internet access may be contributing to a significant increase in health consumerism, and it is also transforming relationship between lay and medical expertise. Dedicated sites and personal home pages provide spaces for users to tell their stories and chatrooms give the opportunity for patient–patient access and interaction in the absence of doctors. These electronic 'virtual' communities provide interactive forums for those with chronic conditions to discuss their fears, their needs, and their activities, augmenting the meanings of illness by providing alternative, or at least parallel, resources to conventional medical interaction. Consumers of health information are becoming producers of health information, at least in the socioeconomic groups able to access the Internet (Hardey, 2002).

Health Promotion

Health promotion campaigns use the mass media to convey their messages of improving public health through rational choice based on taking responsibility for one's health by making changes to one's lifestyle. Taking personal responsibility for health now shapes the dominant perspective in health promotion (Minkler, 2000) and underpins the language of media campaigns. Although using the mass media for health promotion enables issues to be placed on the public agenda and thus raises public consciousness on particular health issues, it is sometimes difficult to attribute specific outcomes, such as attitude or behavior change, to media intervention (Wellings and

Macdowall, 2000). Health promoters can use conventional forms of media to put their message across, but they can also use 'edutainment' strategies (i.e., strategies designed to educate as well as entertain) to deliberately place health issues into episodes of television serials or soap operas (Egger *et al*., 1993). The effectiveness of this strategy is also difficult to evaluate since the health promotion messages are often subtle and secondary to the entertainment values of the program.

See also: Media and Language: Overview; Media Panics.

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Heard Island and McDonald Islands: Language Situation

Editorial Team

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Originally under British control, Heard Island and the McDonald Islands were transferred to Australia in 1947. The islands are now administered from Canberra by the Australian Antarctic Division of the Department of the Environment and Heritage. Situated in the Indian Ocean, these barren, sub-Antarctic islands are populated by large numbers of seal and bird species, but there is no permanent human population. Researchers visit the island for brief periods and are regulated by Australian law. As an Australian territory, English is the official language of the islands.

Hebrew Linguistic Tradition

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Origins

Though the Jewish tradition has always attached great importance to the Hebrew language of Scripture and its interpretation, Hebrew linguistics as a discipline only arose in the early Middle Ages, i.e., after the formative period of rabbinic Judaism. From the 8th century onward, we encounter the first manifestations of linguistic activity in the eastern regions of the Diaspora, which mirror developments in the neighboring Syriac and Arabic cultures. Mostly written in Arabic, the majority of these initiatives centered upon the classical Hebrew of the Bible.

First of all, there was the work of the Masoretes who, with the help of grammatical concepts, recorded all formal aspects of the process of textual transmission and established a definitive text of the Bible. This masoretic text henceforth served as the basis of all exegetical and linguistic study. Indebted to these efforts were the Karaites in Palestine and Byzantium, a fundamentalist current whose renunciation of the Talmud and rabbinic authority led to a renewed scrutiny of the biblical message. Their commentaries and translations strongly depended on grammatical methods, with an emphasis on word structure and semantics (rather than syntax). In Abbasid Iraq, Saadia Gaon (d. 942), head of a talmudic academy, introduced Hebrew equivalents of various Arabic linguistic genres, partly aimed against the Karaites. In the 10th-century Maghreb, we find a number of parallel compositions, particularly on lexicography.

The Medieval Period

It was on the Iberian peninsula, however, that Hebrew grammar was to receive its definitive form. In mid-10th-century Cordoba, the rival schools of Menaḥem ben Saruq and Dunaš ben Labrat produced a series of polemical treatises, in which the biblical idiom was subjected to a morphological-cum-lexical analysis. As Hebrew had been a 'dead' language for centuries, and these were the first linguistic treatises ever written in Hebrew, the authors had to make up their technical vocabulary as they went. They exploited the polemical format in order to refine this new apparatus, which at this stage made no formal distinction between grammar and lexicography (Menaḥem's *Maḥberet*, e.g., was structured as an alphabetically arranged dictionary). The main objective was to reconstruct and semantically identify the underlying base or root of all biblical lexemes. From this abstract root (Ab. *aṣl*) all forms and meanings attested in Scripture could be derived, by adding servile consonants to the radicals, following fixed patterns.

Initially these reconstructions were governed by a structuralist approach, which postulated mono-, bi-, and triliteral roots according to their occurrence in the biblical text. At the turn of the century, however, Judah Ḥayyûj introduced the concept of analogy (Ab. *qiyâs*), which resulted in the reconstruction of triliteral roots for all verbs, including those with so-called weak consonants (which tend to disappear in most derivations). This essential triliterality of the Hebrew root has remained the norm until today. Issues that accompanied the process of discovery and refinement concerned, among others, Hebrew phonology and the permutation of consonants; the autonomy of the biblical corpus and the status of postbiblical Hebrew, language development, and linguistic normativism; and the possibility of comparison with other Semitic languages, particularly Aramaic and Arabic. Unfortunately, a substantial part of this early Andalusian corpus (in particular the linguistic biblical commentaries) is now lost

linguistics. Israeli children should not be indoctrinated to believe that they speak the language of Isaiah – unless the teacher is referring to the 20th-century Israeli polymath and visionary Isaiah Leibowitz. Although revivalists have engaged in a campaign for linguistic purity, the language they created often mirrors the very cultural differences they sought to erase. The study of Israeli offers a unique insight into the dynamics between language and culture in general and in particular into the role of language as a source of collective self-perception.

See also: Description and Prescription; Genetics and Language; Hebrew, Biblical and Medieval; Intonation; Israel: Language Situation; Israel: Language Situation; Jewish Languages; Morphological Typology; Politics and Language: Overview; Semitic Languages; Word Stress; Yiddish.

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Hebrew Lexicography

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Biblical Hebrew Lexicography

The Early Period

The beginnings of Hebrew lexicography, more than a thousand years ago, were closely accompanied by the beginnings of Hebrew grammatical description, and both are linked to the name of Rav Saadiah Gaon (Egypt and Babylonia, 882–942). His dictionary *Ha-Egron* (902; Nehemiah Allony edition, 1969), only a fifth of which has survived, was rather short, and many of its entries were translated into Arabic. While not intended, therefore, to be a bilingual dictionary in the modern sense, this is actually what it was, at least to some extent. A supplement was appended in which the words were sorted by their last letter, as was commonly done in dictionaries of Arabic (for rhyming purposes). Another Hebrew-Arabic dictionary from the 10th century is *Kitab Jame' al-Alfaz* by the Karaite David ben-Abraham el-Fassi, written in Jerusalem between 930 and 950 in two versions, a long one and a short one (the latter was published by Skoss in 1936).

The first Hebrew–Hebrew dictionary was written somewhat later by Menahem ben-Saruq (Spain, mid-10th century), and it provoked a flurry of debates, initiated by the criticisms of his contemporary Dunash ben-Labrat, both on some fine points of grammar and on some explanations of biblical terms. Among other things Dunash asserted, for example, that the root of YGWN *yagon* 'distress' is GN while Menahem claimed it to be the one-letter root G (see Table 1 for the method of transcription used in this article). These criticisms were answered by Menahem's pupils, and the dispute was finally decided by R. Yaacov ben-Meir (known as Rabbenu Tam, France, 12th century). Both these

Table 1 The Hebrew alphabet

א	aleph	`	ו	waw	W	כ	kaf	K	ע	ayin	ʿ	ש	shin	š
ב	bet	B	ז	zayin	Z	ל	lamed	L	פ	pe	P	ת	tav	T
ג	gimal	G	ח	het	Ḥ	מ	mem	M	צ	tsadi	Ṣ			
ד	dalet	D	ט	tet	Ṭ	נ	nun	N	ק	qof	Q			
ה	he	H	י	yod	Y	ס	samekh	S	ר	resh	R			

In order to give the reader as faithful a picture as possible of the Hebrew words cited, they are represented in up to three forms: a letter-per-letter transliteration (when needed) in small capitals, as per this table; the pronunciation in italics; and an English translation.

dictionaries are arranged alphabetically by roots, i.e., the set of letters that remain fixed throughout all the derivations of a word. According to this view, while most roots were indeed of three letters, there were some roots of two letters and even some of just one letter, such as Z for the verb HZH *hizza* 'sprinkled,' since this is the only remaining letter in the conjugated form YZW *yazzu* 'they will sprinkle.' (In ben-Saruq's lexicon there were 14 such roots.)

Probably the finest achievement of medieval Hebrew lexicography is *Kitab al-ʼuṣul* 'The book of roots' by Yonah ibn-Janaḥ (Spain, 11th century). This dictionary, the second part of his *Kitab al-tankiḥ* 'The grammar book,' in which he describes the grammar of Biblical Hebrew, was the first lexicon to adopt the three-letter root concept devised by ibn-Janah's master, Yehudah Ḥayyuj. It was written in Arabic (as was common for many of the writings of Jewish authors at this period in the region), and was translated into Hebrew in the 12th century by Yehudah ibn-Tibon (Bacher edition, Berlin, 1894–1897). An abbreviated version was prepared by Shlomo Parḥon (Italy, 12th century) in his *Maḥberet he-arukh*. Another Hebrew dictionary in Arabic *Kitab*, *al-Istighnaʼ*, was compiled by Shmuel ha-Nagid (Spain, 11th century), but only a few fragments of what was apparently a comprehensive work have survived.

By far the most important Hebrew dictionary of the Middle Ages is *Sefer ha-shorashim* 'The book of roots' by R. David Qimḥi (usually abbreviated as RaDaQ; Provence, 13th century), which was in a sense the culmination of all the lexicographic works that preceded it. This dictionary (part of a larger work that included a treatise on Biblical Hebrew grammar), based mainly on the work of Ibn-Janaḥ, was translated into Latin, and had a decisive influence on the Christian scholars who later worked in the field of Biblical lexicography.

From the Renaissance until Modern Times

From the early Renaissance period onward, there was a steady decline in Biblical Hebrew lexicographical work by Jewish scholars: the bulk of the important achievements in this type of lexicography was achieved by Christian scholars, who were much influenced, as mentioned above, by the works of R. David Qimḥi. A representative lexicon of this category is the *Lexicon hebraecum et chaldaicum* by Johannes Buxtorf (Basel, 1607). Most prominent in this genre were the works of William Gesenius in the 19th century, in which the scientific discoveries of comparative Semitic linguistics and of Near East studies were integrated. His practical *Handwörterbuch* (Leipzig, 1810–1812) was very popular and went through at least five editions. His masterpiece, *Thesaurus philologicus criticus linguae hebraeae et chaldaeae veteris Testamenti*, published partly posthumously (Leipzig, 1829–1858), went through several new editions and adapted versions, notably a German edition by F. Buhl (Leipzig, 1895–1915) and an English one by F. Brown, S. F. Driver, and C. A. Briggs (Oxford, 1907), which was also reprinted many times. Finally, mention should be made of the important dictionary by L. Köhler and W. Baumgartner, compiled on scientific philological principles, the most recent edition of which, in English by M. E. L. Richardson, was published in 1996.

Lexicography of Talmudic Literature

All of the dictionaries mentioned so far concern themselves mainly with Biblical Hebrew, generally considered in the Middle Ages to be the only kind of Hebrew deserving of study and attention. Even then, however, there were attempts to deal also with Talmudic literature and even with the core of Hebrew literature available at the time. The first noteworthy work of this kind is *Kitab el-ḥawi* 'The comprehensive book,' by Rav Hai Gaon (Babylonia, 11th century), the last of the *gaonim* (the masters of the official Yeshiva, the Rabbinical Academy, in Babylonia), and of which, again, only fragments remain today. A very important work is *he-ʻArukh*, by R. Nathan ben-Yeḥi'el of Rome (11th century), which is a lexicon of Talmudic literature, including those parts of it that are in Aramaic. This work received many additions and supplements (of which *Tishbi*, by Eliyyahu Baḥur [Elijah Levita], Italy, 1541, should be mentioned), culminating in the scholarly *ʻArukh ha-Shalem* (Aruch Completum) by Ḥanoch Yehudah (Alexander) Kohut (Vienna, 1878–1892).

To complete the account of this genre, we mention two dictionaries that were published in the 19th century: *Neu-hebräisches und chaldäisches Wörterbuch über die Talmudim und Midraschim* by Jacob Levy (4 vols, Leipzig, 1876) and *A dictionary of the Targumim, the Talmud Babli and Yerushalmi, and the Midrashic literature* by M. Jastrow (2 vols, New York, 1903). The latter was reprinted several times and is still widely used today.

Hebrew Lexicography in Modern Times

The 19th Century

The 19th century witnessed a revival of Hebrew lexicography, motivated principally by the *Haskala* 'Enlightenment' movement among European Jewry.

A dictionary typical of this period is *Otzar ha-shoraṣhim* 'The compendium of roots' by Yehudah Leib ben-Zeev (Vienna, 1807). It is arranged by root, with an appendix that clarifies the root of certain difficult constructs. The explanations contain a translation into German, and the third part is in fact a German–Hebrew dictionary that can be also seen as a Hebrew thesaurus. The *Otzar* was reedited by several scholars, the fifth edition (prepared by Moshe Schulbaum, Lvov, 1889–1891) being in fact a new dictionary of Hebrew. Another important dictionary of the period is *ha-Otzar* by Shmuel Yosef Fünn (Warsaw, 1884–1904), which covers the Hebrew lexicon of the Bible, Talmudic literature, and later Hebrew writings, including the *Piyut* 'poetry' literature. It also gives translations into Russian and German. The Biblical Hebrew dictionary *Mishpat ha-'Urim* by Yehoshua Steinberg (1897), which likewise gives translations into Russian and German, should also be mentioned.

The 20th Century

The revival of Hebrew as a spoken language in daily life in the 20th century radically changed the face and range of activities of Hebrew lexicography, whose basic locus was now in Israel (Eretz Israel or Palestine until 1948). This is where most of the dictionaries mentioned in this section were published.

The first and most important step in this revival can be attributed to the great dictionary of Eliezer ben-Yehudah, *Millon ha-lashon ha-ivrit ha-yeshana veha-ḥadasha* 'Dictionary of the old and new Hebrew language.' This is a comprehensive lexicon of the Hebrew language in its widest spectrum, from Biblical times to the present day, including new words that were coined daily (including some coined by the author himself) to cope with the necessities of using this 'old new' language for all kinds of communication in a modern and complex environment. This work, particularly rich in citations from all strata of writing in Hebrew, was the first Hebrew–Hebrew dictionary in which the entries were arranged as lemmas (except for verbs, which were still arranged by root). It was also the first in which the emphasis was on a diachronic description of the meanings of words, their evolution through the ages, and their etymology. The first volume was published in 1908, and the entire dictionary, in 17 volumes (including one with a 'Comprehensive introduction'), was finally completed in 1959, long after the original author's death. Volumes 8 and 9 were edited by Moshe Zvi Segal, and volumes 10–16 by Naftali Herz Torczyner (Tur-Sinai). Both faithfully followed ben-Yehudah's original lexicographic plan and editorial policies. This work is the only truly comprehensive and authoritative historical dictionary of Hebrew on historical principles.

In 1938, the *Millon ivri* 'Hebrew dictionary' of Yehudah Goor (Garsovski) was published. Its second edition (1946) was, in its day, probably the most popular dictionary of Hebrew. A new era of Hebrew dictionaries opened with the publication of *Millon ḥadash* 'A new dictionary,' by Avraham Even-Shoshan, whose first edition (5 vols, 1948–1952) and in particular the second edition, *ha-Millon he-ḥadash* 'The new dictionary' (1966), dominated the dictionary scene in Israel for the second half of the 20th century. Besides covering the totality of the Hebrew lexicon, including recently coined words, this dictionary was the first to include the wealth of loanwords from foreign languages that were rapidly infiltrating everyday speech in Israel, not to mention a wealth of short encyclopedic entries from various domains such as botany, zoology, and chemistry. The dictionary text (entries, definitions, citations, and examples) was fully vocalized, which made it easily accessible to the multitude of citizens of Israel, many of them newly arrived in the country and still struggling with their Hebrew. This dictionary, whose name has become almost synonymous with the concept of 'Hebrew dictionary,' was reprinted very many times, but in the 40 years since its appearance in its second edition, no effort has been made to update it to reflect the rapidly changing world of the Hebrew language on one hand, and modern lexicographical principles, including those inspired by the emerging computerized lexicography, on the other. The latest version (edited by Moshe Azar, 2003) has been updated mainly with new entries, but the basic architecture and structure are not affected in any way.

Another large dictionary from the second half of the 20th century is the *Thesaurus of the Hebrew language* by Yaacov Kena'ani (18 volumes, 1960–1989), whose aim was to fully record every word ever used in a Hebrew text, including even the rarest ones, such as one-time words coined by poets. There were of course other dictionaries published with less ambitious scope during this period, including:

- *Me-aleph 'ad tav* 'From A to Z' by Meir Medan (1954, 1973)
- 'The Hebrew-Hebrew dictionary' by Reuven Alkalai (3 vols, 1969–1971)
- *Millon ha-hove* 'Dictionary of the present day', by Shoshana Bahat and Mordechay Mishor (1995), whose basic novelty was that the entries for verbs were in the present (participle) tense, rather than in the past tense as was traditionally done in other dictionaries. It also strictly adheres to what is

sanctioned by the Academy of Hebrew Language, so it serves as a guide to what is regarded as being formally correct in Hebrew linguistics
- *Millon sappir* by Eytan Avneyon (7 vols, 1998), published earlier in one volume as *The Concise Sapphire dictionary* (1997).

A dictionary that is radically different in its lexicographic principles, as well as in its design and structure, from all of the above is *Rav-Milim: the complete dictionary of Modern Hebrew* by Yaacov Choueka and the Rav-Milim team (6 vols, 1997). As a user-oriented work, *Rav-Milim* is synchronic rather than historical, descriptive rather than normative (although bad usage is clearly tagged as such), and comprehensive. It covers all registers of the language, from literary to slang, and from the refined to the vulgar, and all its strata, from the Biblical to the modern. It does not, however, aim to be exhaustive – for example, it omits historical curiosities, obsolete coinages used only once, and the like. All entries are arranged by lemma, including verbs, whose entries are in the past form (in the specific mode). The entire dictionary – including the entries – is written in *ktiv male* ('*plene*') spelling, with partial vocalization. Following the new sensitivity to meaning in context, acquired recently through extensive computerized processing of large corpora, the rich spectrum of the different meanings of an entry is deployed, and usage examples, carefully selected to highlight the appropriate sociolinguistic context, are given for every non-encyclopedic entry. For each entry, the word's 'family' (words with the same root and the same semantic field) is detailed. Special attention is given to collocations – compound nouns, verbal attachments, fixed phrases, idioms, etc. – and thousands of collocations, never recorded before, are explained. Also, it is the only Hebrew dictionary that has a computerized version, supporting a number of sophisticated search and analysis functions, available on the Internet.

Special Topics

The Academy of the Hebrew Language

Many projects and activities related to linguistic and lexicographic issues are being undertaken at the Academy of the Hebrew Language in Jerusalem. Relevant to this article is the Historical Dictionary Project, already under development for more than 40 years, whose aim is to compile a complete historical dictionary of the Hebrew language throughout its many generations. The project is still basically at the stage of compiling the required corpus. An illustrative brochure was produced in 1982 that gives a complete treatment of just one root, ʿRB. A CD was published by the academy in 2001, containing an authoritative collection of all Hebrew writings from the 2nd century B.C.E. to the middle of the 11th century C.E., based on the best manuscripts available. This forms part of the corpus on which the Historical Dictionary will eventually be based.

Another relevant activity of the academy is the coining of new Hebrew words in various domains such as medicine, law, accounting, psychology, optics, banking, sports, and many more. More than 100 000 words have been coined and officially recorded thus far by the academy. They can be accessed on line at the academy's website.

Dictionaries of Slang

Until the publication of *Rav-Milim*, slang and vernacular words were seldom included in regular Hebrew dictionaries. The first dictionary of slang was that by Raphael Sappan (1965, 1971), which was followed by the dictionary by Dan ben-Amotz and Netiva ben-Yehudah (2 vols, 1972–1982). A dictionary of military slang was compiled by Oded Ahiasaf (1993).

Bilingual Dictionaries

Many of the Hebrew dictionaries mentioned above, including some of the earliest ones, can be considered *de facto* as bilingual, since they contained translations of the entries in Arabic, German, or Russian. In the stricter sense of the word, however, we may mention first a few works that are of historical interest: *Tzemaḥ David* (Venice, 1587), a trilingual Hebrew–Latin–Italian dictionary by David de Pomis, dedicated to Pope Sixtus V; *Galut Yehudah* (Venice, 1612), a Hebrew–Italian dictionary by Leon da Modena; a Hebrew–Portuguese dictionary (Amsterdam, late 1600s) by Oliveyra Solomon; and *Meir Nativ*, a trilingual Hebrew–Russian–German dictionary by Yehudah Leib Germayza (Vilnius, 1835). Much closer to our times is the *English–Hebrew dictionary* by Israel Efros, Judah ibn-Shmuel Kaufman, and Benjamin Silk (1929), intended for learners of Hebrew as a second language. For every English entry, this work lists a large number of Hebrew equivalents; thus it can be viewed also as a lexicon of synonyms in Hebrew.

The second half of the 20th century saw the publication of a huge variety of bilingual dictionaries in a multitude of languages, due to the sociological context of Israel as a 'melting pot' of so many different linguistic communities. It would be a hopeless task to try to review this activity comprehensively, so let us just mention the Hebrew–English dictionary of Reuben Alcalay (1964–65; second enlarged edition, 1996), the *Megido* Hebrew–English and English-Hebrew dictionaries of Edward Levenstone and

Reuben Sivan (1965), and the Hebrew–German dictionary of Jaacov Lavy (1975). Special mention should be made of the dictionaries published by Hayim Baltsan for Hebrew–Russian and Hebrew–English, intended for Hebrew learners who hear Hebrew words but have difficulties in conceiving their spelling, so the entries are Russian/English phonetic equivalents of the Hebrew words, and the dictionary is sorted alphabetically by the transcribed entries.

Computerized Resources

Quite a number of computerized resources are now available for Hebrew. Regarding corpora, the following should be mentioned:

- *Maba'*, the Bar Ilan University Corpus of Modern Hebrew, which contains 199 books (novels and short stories), a full one-year set of issues of a local weekly magazine, news items from the Internet, collected articles from a daily newspaper, and the full minutes of six months' sittings of the Knesset, totaling in all 25 million words of modern Hebrew;
- the corpus of the Academy of the Hebrew language of early Hebrew writings (mentioned above);
- The Responsa Corpus of Bar Ilan University, available also on CDs to the general public, which contains many hundreds of books of rabbinical literature in Hebrew and Aramaic, encompassing almost 2000 years of writings and originating from all over the world.

Similar CD corpora of (different) rabbinical books have also been circulated in recent years in Israel, too numerous to mention here. In terms of software, two operational programs, both developed by Yaacov Choueka and the Rav-Milim team, can be mentioned: *Milim*, a program for the complete and accurate lemmatization and morphological analysis of any word in Modern Hebrew, and *Nakdan*, a program for the automatic vocalization of Hebrew texts with an accuracy of 98%.

Finally, a government-supported Knowledge Center for Processing Hebrew has recently been established at the Technion in Haifa, whose mission is to research and produce tools necessary for the intelligent processing of Modern Hebrew, including the building of appropriate tagged corpora and the dissemination of reliable operational software for such processing.

See also: Arabic Lexicography; Bilingual Lexicography; Hebrew, Biblical and Jewish; Hebrew, Biblical and Medieval; Hebrew, Israeli; Israel: Language Situation; Lexicography: Overview.

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http://www.melingo.com.

Heidegger, Martin (1889–1976)

G Moretti, Rome, Italy

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In the past 30 years, the abundance of literature that has been dedicated to Heidegger throughout the world gives us a clear measure of the significance of his contribution to philosophy. Heidegger's works have been translated into every major language, regardless of the intriguing linguistic peculiarities that distinguish them.

In 1924, Heidegger summarized Aristotle's biography as follows: "He was born, he worked, and he died." The same concept could be applied to Heidegger himself. In fact, for him life and work coincided in a way that was almost unparalleled among the authors of the 1900s. After examining the early stages of his own philosophical development, which culminated

Heard Island and McDonald Islands: Language Situation

Editorial Team

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Originally under British control, Heard Island and the McDonald Islands were transferred to Australia in 1947. The islands are now administered from Canberra by the Australian Antarctic Division of the Department of the Environment and Heritage. Situated in the Indian Ocean, these barren, sub-Antarctic islands are populated by large numbers of seal and bird species, but there is no permanent human population. Researchers visit the island for brief periods and are regulated by Australian law. As an Australian territory, English is the official language of the islands.

Hebrew Linguistic Tradition

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Origins

Though the Jewish tradition has always attached great importance to the Hebrew language of Scripture and its interpretation, Hebrew linguistics as a discipline only arose in the early Middle Ages, i.e., after the formative period of rabbinic Judaism. From the 8th century onward, we encounter the first manifestations of linguistic activity in the eastern regions of the Diaspora, which mirror developments in the neighboring Syriac and Arabic cultures. Mostly written in Arabic, the majority of these initiatives centered upon the classical Hebrew of the Bible.

First of all, there was the work of the Masoretes who, with the help of grammatical concepts, recorded all formal aspects of the process of textual transmission and established a definitive text of the Bible. This masoretic text henceforth served as the basis of all exegetical and linguistic study. Indebted to these efforts were the Karaites in Palestine and Byzantium, a fundamentalist current whose renunciation of the Talmud and rabbinic authority led to a renewed scrutiny of the biblical message. Their commentaries and translations strongly depended on grammatical methods, with an emphasis on word structure and semantics (rather than syntax). In Abbasid Iraq, Saadia Gaon (d. 942), head of a talmudic academy, introduced Hebrew equivalents of various Arabic linguistic genres, partly aimed against the Karaites. In the 10th-century Maghreb, we find a number of parallel compositions, particularly on lexicography.

The Medieval Period

It was on the Iberian peninsula, however, that Hebrew grammar was to receive its definitive form. In mid-10th-century Cordoba, the rival schools of Menaḥem ben Saruq and Dunaš ben Labrat produced a series of polemical treatises, in which the biblical idiom was subjected to a morphological-cum-lexical analysis. As Hebrew had been a 'dead' language for centuries, and these were the first linguistic treatises ever written in Hebrew, the authors had to make up their technical vocabulary as they went. They exploited the polemical format in order to refine this new apparatus, which at this stage made no formal distinction between grammar and lexicography (Menaḥem's *Maḥberet*, e.g., was structured as an alphabetically arranged dictionary). The main objective was to reconstruct and semantically identify the underlying base or root of all biblical lexemes. From this abstract root (Ab. *aṣl*) all forms and meanings attested in Scripture could be derived, by adding servile consonants to the radicals, following fixed patterns.

Initially these reconstructions were governed by a structuralist approach, which postulated mono-, bi-, and triliteral roots according to their occurrence in the biblical text. At the turn of the century, however, Judah Ḥayyûj introduced the concept of analogy (Ab. *qiyâs*), which resulted in the reconstruction of triliteral roots for all verbs, including those with so-called weak consonants (which tend to disappear in most derivations). This essential triliterality of the Hebrew root has remained the norm until today. Issues that accompanied the process of discovery and refinement concerned, among others, Hebrew phonology and the permutation of consonants; the autonomy of the biblical corpus and the status of postbiblical Hebrew, language development, and linguistic normativism; and the possibility of comparison with other Semitic languages, particularly Aramaic and Arabic. Unfortunately, a substantial part of this early Andalusian corpus (in particular the linguistic biblical commentaries) is now lost

and known to us only in fragments or through quotations.

In 11th-century Spain, Ḥayyûj's triliteral doctrine was perfected, with the help of Arabic models, by Abulwalid Marwân (Yonah) ibn Janâḥ, in a polemical correspondence with statesman and man of letters Samuel ha-Nagid (d. 1056). The results were summarized in Ibn Janâḥ's bi-partite *Kitâb at-Tanqîḥ* (The Book of Detailed Investigation), which, for the first time, consisted of a separate grammar and dictionary. Before long, the joint oeuvre of Ḥayyûj and Ibn Janâḥ, originally written in Arabic, achieved canonical status, in al-Andalus and beyond.

In 12th-century Italy and Provence, their works were translated into Hebrew by the traveling scholar Abraham ibn Ezra (d. 1164/7) and other Jewish emigrants from the Iberian peninsula. Towards the end of the century, the Qimḥi family in Narbonne took care of further dissemination through a series of abridged, didactic manuals in Hebrew. David Qimḥi's – again bi-partite – *Sefer ha-Mikhlol*, a systematic adaptation plus critique of Ibn Janâḥ's *Tanqîḥ*, became the central work of this new branch of linguistics.

For the next four centuries, this classical Andalusian-Provençal canon, with its characteristic blend of complementary phonology, morphology and lexicography, dominated Hebrew linguistics from England to North Africa and the Middle East. Numerous Hebrew adaptations were written. Occasionally, we come across local trends and predilections, individual forays into the adjacent fields of logic or poetics, and, in the 15th century, the incorporation of elements from Latin (scholastic) thinking.

Throughout the entire period, the grammars of Hebrew remained predominantly descriptive. For speculation on theoretical issues, such as the origin and nature of language and its relation to human thought and reality, we have to turn to the introductory chapters of linguistic works, to biblical commentaries and individual passages in works on logic and philosophy. One might say, however, that the most authentically Jewish philosophy of language lies embedded in the ontological and talismanic linguistic speculations of the Kabbalah. Like mainstream Jewish linguistic thinking, these mystical-magical doctrines were ultimately based on Aristotelian conceptions of language.

16th and 17th Centuries

Before the 16th century, the study of Hebrew grammar had been an almost exclusively Jewish pursuit. Even if medieval Christian scholars occasionally displayed an interest in Hebrew sources, they never studied the Hebrew language itself. With the exception of a few rudimentary excerpts, they produced no Hebrew textbooks. By contrast, the first half of the 16th century witnessed an outburst of Christian Hebrew erudition, fostered by two intellectual currents: (1) Renaissance Humanism and its ideal of *eruditio trilinguis*, i.e., the knowledge of Latin, Greek, and Hebrew; and (2) the Reformation, which, preferring the authority of the Bible to that of the Church, called for a new interpretation of Scripture and, with it, for the study of Hebrew.

The first generation of Christian Hebraists turned to the work of Jewish predecessors, especially the grammars of Moses and David Qimḥi, and to Jewish teachers. The most famous of these was Eliah Levita (d. 1549), author of several introductory works on Hebrew and Aramaic and teacher of, among others, Sebastian Münster (d. 1552). The Hebrew grammars written by Münster and his contemporaries remained rather elementary. They continued traditional Jewish elements (such as the tripartition of the language into noun, verb, and particle, and the word-based approach to syntax), while simultaneously introducing terminology, classifications, and definitions from the Latin tradition. At this stage, this procedure entailed no significant changes in grammatical content and methodology.

Throughout the 16th and 17th centuries, Christian Hebraism flourished in Western Europe. In the universities, prestigious chairs were founded. In the faculties of theology, Hebrew was taught as an introduction to the theological exegesis of the Old Testament or to Jewish antiquities, and occasionally for missionary purposes. Christian Hebrew grammars became increasingly sophisticated, often reflecting current developments in the Latin tradition or even recent critical approaches in Hebrew studies. In the Republic of Letters, countless popular grammars of Hebrew were published for a growing audience, and great energy was devoted to perfecting didactic strategies. For many years, the work of the Swiss Buxtorf family (father and son, d. 1629 and 1664, respectively) remained of seminal importance.

In contrast, Jewish interest in linguistic studies dwindled. In Germany and Central Europe, only a handful of rudimentary school manuals was published. In Amsterdam, several Portuguese-Jewish rabbis composed Hebrew textbooks, again to be used in the classroom, which foreshadow later, enlightened, developments. Written in Portuguese, these grammars were organized like grammars of Latin and combined elements from the Western tradition (e.g., the use of cases) with traditional Jewish classifications. Spinoza's *Compendium grammatices linguae hebraeae* (1677) forms the (rather idiosyncratic) climax of this small corpus.

The 18th Century

In the 18th century, Hebrew lost its prime position, when scholars such as Albert Schultens and his rational empiricist Dutch School began to emphasize the *utilitas* of other oriental dialects for reconstructing the *origines* of Hebrew. No longer regarded as the mother of all languages, the holy tongue became Arabic's inferior sister language. With (synchronic) language comparison taking center stage, the Christian Hebraist was replaced by the *professor linguarum orientalium*. In 1781, A. L. Schloezer finally introduced the genetic designation Semitic languages.

Simultaneously, a renaissance of Jewish Hebrew studies took place in Germany. At the beginning of the 18th century, the medieval heritage was reclaimed and updated by the controversial but influential Solomon Hanau. Toward the end, *maskilic* (enlightened) Jewish grammarians combined this indigenous model with criteria from the Latin school tradition and contemporary German *Sprachwissenschaft*. In doing so, they laid the foundation for the massive corpus of Hebrew school manuals written (in the various European vernaculars) during the 19th century.

19th and 20th Centuries

In 19th-century academic Hebrew studies, the impact of the historical-comparative analysis of the Indo-European languages was growing. This trend was strengthened by the discovery of Akkadian and other (cognate) languages. The systematic application of diachronic methods enabled scholars to reconstruct proto-Semitic forms, which for the first time added a dimension to biblical Hebrew that went beyond the authoritative masoretic text. In addition, there arose an interest in other Jewish languages besides biblical Hebrew, notably in Mishnaic Hebrew and Aramaic, due to the growing awareness of the Jewish context of the New Testament.

One outcome of the process of modern Jewish emancipation was the revival of Hebrew as a living language. First in Eastern Europe, where it was propagated as the language of Jewish literature and journalism, then in Palestine, where it became a spoken language. In three successive waves of immigration (from the 1880s onward), a comprehensive, secularized, Hebrew public sphere was established, which was soon institutionalized. From 1890 onward, the process was monitored by the Hebrew Language Committee (which was replaced by the Academy of the Hebrew Language in 1953). The chief ideologue of the revival, the Lithuanian-born Eliezer Ben-Yehuda (d. 1922), became a national icon of mythological proportions.

As the language of the State of Israel, Israeli Hebrew soon became both object and medium of intensive linguistic study. Today a plethora of linguistic methods, synchronic as well as diachronic, are applied to all phases of Hebrew and Aramaic by scholars in, especially, Israel, Europe, and the United States.

See also: Akkadian; Arabic Linguistic Tradition; Arabic; Hayyuj, Judah (10th Century); Hebrew, Israeli; Ibn Ezra, Abraham (ca. 1089–1164); Latin; Levita, Elijah (1469–1549); Qimhi, David (1160–?1235); Semitic Languages.

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Hebrew, Biblical and Jewish

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Hebrew is the language of the people who, from the 11th century B.C., were dominant politically and culturally in and around what is the State of Israel. Members of this people stopped living in most of its ancient lands in any significant numbers following the Roman suppression of the Bar-Kochba revolt in 135 A.D. Indeed, for some 500 years previously Jews (from Judah/Judea, in the south of Israel) had settled in large numbers throughout the Hellenistic and Persian world. Even though they retained a high level of ethnic exclusivity, Jews became identified, and tended to identify themselves, as being more a 'religious' than a 'national' group, and this has been of enormous significance for the survival of Hebrew over three millennia.

A Holy Language

From the early centuries A.D., Hebrew is frequently referred to as '*lēshōn ha-qōdesh*' 'the sacred language' in contrast to other languages spoken by Jews – particularly Greek, Aramaic, and, much later, Yiddish. In addition, the Hebrew of the Bible was sometimes regarded (by certain medieval writers, for example) as 'purer' than later varieties. It is possible that this view is attested as early as the second century B.C., when the Qumran community derided their religious adversaries as speaking an 'uncircumcized tongue' (Rabbinic Hebrew, perhaps). Jewish traditions claim that Hebrew was the language spoken at the creation, that the letters of the Hebrew alphabet were active in the creation (see *Alphabet: Religious Beliefs*), and that it is the only language understood by the angels and efficacious in prayer.

Biblical Hebrew

The main corpus of ancient Hebrew is the Bible (minus its Aramaic portions), consisting of 304 901 graphic word-tokens. The consonantal text of this corpus had achieved roughly its current state by the 2nd century B.C., after several revisions of its different parts. A point to be stressed is that Biblical Hebrew, as it has been handed down, comprises a literary, rather than an oral or 'colloquial,' corpus. The Bible is not a straightforward record of spoken utterances from biblical times, but is better viewed as a collection of written compositions, including literary versions of conversations, orally transmitted stories, etc.

The language of those parts of the Bible composed after the Jews' return from exile in Babylonia (538 B.C.) is sometimes called 'Late Biblical Hebrew,' and it differs from the 'Classical' literary language of before the exile (586 B.C.). Partly it represents a consciously 'archaizing' imitation of the earlier language and partly, like Rabbinic Hebrew, a distinct, naturally developed, stage in the history of Hebrew.

When the Bible is viewed as a single work, albeit a composite of different works, it is clear that it has been written, or at least edited, from a religious perspective and with religious motives. Even so, it contains relatively little material that was composed in order to express feelings of a specifically religious character. Far more representative are historical or epic narratives, historical fiction, social polemic ('prophecy'), and detailed regulations about law, the cult, and city planning. It has been claimed that Biblical Hebrew is particularly rich in vocabulary related to, for example, farming and water sources. But unlike the Arabic of the Qur'ān created in a state of religious fervor, Biblical Hebrew is restrained in its descriptions of and vocabulary for the divine. In short, the corpus is more concerned with a people whose religion was of major importance to it rather than with that religion itself.

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Hebrew is not the only language used in the great documents of Judaism. The Palestinian and Babylonian versions of the Talmud (5th to 6th centuries A.D.), excluding the Mishnah (ca. 225 A.D.), are both written mostly in Aramaic, as is the Zohar (late 13th century A.D.). Aramaic is also used for parts of the prayer book and even the Bible itself. Arabic (albeit often written in Hebrew characters) was the language of most of the great works of Jewish theology/philosophy written in territories under Muslim domination, especially Spain. Elsewhere in Europe, Yiddish was employed from the 17th century onward for devotional and ethical literature.

Moreover, even in biblical times, the use of Hebrew for secular (and nonliterary) purposes is attested on hundreds of inscriptions on seals, ostraca, stelas, etc. (These provide a further corpus of 'pre-Rabbinic' Hebrew along with various manuscripts of Ecclesiasticus and the majority of the Dead Sea Scrolls.)

The Decline of Hebrew

After the Babylonian exile, a variety of Hebrew known as 'Rabbinic Hebrew' developed. It existed until the 2nd century A.D. as a popular spoken dialect (Tannaitic Hebrew), represented in literary form by the Mishnah. Thereafter, it survived another eight centuries as a literary and scholarly dialect (Amoraic Hebrew). However, during even its early phase, Rabbinic Hebrew had to vie with Aramaic and Greek, and it is known that large Jewish communities in Egypt apparently spoke Aramaic (Elephantine) or Greek (Alexandria) exclusively. Although the testimony of Jerome in the late 4th century A.D. indicates a good knowledge of Hebrew among his Jewish informants, the emergence, from the 3rd century B.C. onward, of Greek and Aramaic translations/interpretations of the Bible (*Septuagint, Targums*) is a sign of Hebrew's decline. Moreover, because written Hebrew gives relatively few indications of vocalization, there was a danger that unlearned Jews would forget even how to read their Scriptures properly let alone understand them. The situation was made yet more difficult by the existence of versions of the Bible containing different readings of the consonantal text and contentious interpretations of passages by the emerging Christian movement.

The Masoretes

The 6th to 8th centuries saw a flowering of activity among various schools of Masoretes ('bearers of tradition'), who can perhaps be regarded as religiously motivated linguistic theorists. Their aim was to safeguard against corruption of the consonantal text and to provide a system of 'pointing' the basically consonantal Hebrew script to represent how it was to be pronounced at both segmental and suprasegmental levels. One of the systems developed by the Masoretes of Tiberias became dominant and is used in the oldest surviving undamaged manuscript of the whole Hebrew Bible. This document, *Codex Leningradensis B19*^{A} from 1008–1009, is reproduced in the universally accepted critical edition of the corpus, *Biblia Hebraica Stuttgartensia*. Much earlier texts of parts of the Bible also exist, most notably the second century B.C. Isaiah Scroll from Qumran Cave 1 (unpointed). Texts employing other Masoretic traditions have also survived, and different pronunciations of Hebrew, as well as different trends in morphology, etc., are represented by the various communities of the diaspora (e.g., Ashkenazic, Sephardic, Yemenite).

Hebrew in the Diaspora

After its complete demise as the day-to-day spoken language of the Jewish people and until its 20th-century revitalization as the principal language of the modern State of Israel, Hebrew survived as a language spoken and written by Jews in most diaspora communities in synagogue worship and religious texts. Hebrew was used, for example, in ceremonial documents, such as Torah scrolls, Passover *haggādōt*, and texts inside phylacteries and *mĕzūzōt*, as well as in synagogue and grave inscriptions. With the exception of the sermon and the prayer for the Royal Family (in the UK), Orthodox synagogue services are conducted throughout the world in Hebrew. Elementary Hebrew is traditionally taught to children in a *ḥeder* or 'synagogue-school.' All orthodox Jewish males have to be sufficiently competent in Hebrew to read out loud a portion of Scripture at the age of *bar-mitzvā* (13 years), and, thereafter, when called upon, at ordinary synagogue services. Note as well that Hebrew is imparted within the family in the context of festivals like Passover and *Hanukkah*. At a much more advanced level, Hebrew is also used for instruction within rabbinic academies (*yĕshībhōt*).

Literature

The use of Hebrew by Jewish writers never died out, even though its geographical center shifted through time in accordance with the fate of Jewish communities in different countries. Scholars like Rashi, the great 11th-century French Bible commentator, wrote in Hebrew. Indeed, the 'dynamic' of Hebrew – the cause of its internal developments and its ability to adapt to new circumstances, most notably the need to provide a language for what would become the State of Israel – has been one of literature, not speech. In

the 12th to 13th centuries A.D., for example, the Ibn Tibbon family, through their translations of Arabic works, accommodated Hebrew to the expression of a wide range of philosophical and scientific topics. Although medieval and earlier literature is frequently religious (including material written at relatively short notice, such as *responsa* to problems arising within particular communities), there is also a wealth of Hebrew poetry, especially from Andalusia, on profane themes.

Secular Contexts

Hebrew was also used as a lingua franca for Jews from different parts of the world, as well as in correspondence and in credit notes, contracts, and other commercial and legal documents within Jewish communities. Records of the Spanish Inquisition attest to the use of Hebrew in oaths, etc., by forced converts to Christianity. From the late 18th century, the widespread use of Hebrew for secular composition developed with the *Haśkālā* or Jewish 'Enlightenment.' This had less to do with Hebrew's status as a lingua franca than with the Enlightenment's negative view of the Yiddish dialects of European Jewry, associated by the reformers with the socially disadvantaged status of Jews and their allegedly low level of cultural achievement. It has also been claimed that Hebrew was in daily use in Palestine during the 19th century.

Hebrew in Other Languages

Jews have usually spoken the dominant language of their host community, on occasions developing specifically Jewish languages/dialects (Yiddish, Ladino, etc.), in which Hebrew has sometimes been of great influence, at least in vocabulary. Where such a development has not taken place, or where a Jewish language/dialect has been superseded by the dominant language, it is in most cases misleading to speak of a Jewish dialect (or sociolect) of a non-Jewish language. But in this situation, Jews continue to use a number of Hebrew expressions for items of Jewish culture (e.g., *siddūr* 'prayer book', *tĕphillīn* 'phylacteries', *ṭallīt* 'prayershawl') and in particular contexts (e.g., *mazzāl ṭōbh* 'congratulations'). The Israeli pronunciation given here represents that used by younger members of Jewish communities, who also tend to use more Hebrew expressions. But the Hebrew pronunciation of older Jews and their vocabulary often reflects that of the Jewish language/dialect once used by themselves or their parents (e.g., Ashkenazic /kōshēr/ for Israeli /kāsh'ēr/ 'kosher', Yiddish *shul* for Hebrew *bēt-kĕneset* 'synagogue').

Classical Hebrew has left a few direct traces in the religious vocabulary of other languages, although this has been through the medium of Bible translations rather than that of Jewish communities (e.g., *hallelujah, amen, behemoth, shibboleth*). In the occult, various terms, for example, names for God and other supernatural beings, have been taken over, often in garbled form, from Hebrew. More significantly, the vocabulary and phraseology of the languages of Christian countries have been influenced in a variety of ways by loan-translations from Hebrew via prestigious early, fairly literal, vernacular translations of the Bible. Hebrew also underlies many 'Christian' names (e.g., *Isabel, David, John, Jeremy, Sarah*), and is encountered in some Jewish surnames (e.g., *Cohen, Levi, Rabinowitz*).

The Study of Hebrew within Christianity

Historically, Hebrew has gained the scholarly attention of Christians wanting to gain a better understanding of the Old Testament or to facilitate attempts at conversion of the Jews. Until the beginning of modern 'scientific' analysis of the Bible, few non-Jewish scholars could have claimed a familiarity with Hebrew or the ability to contribute to its linguistic analysis on anything approaching the scale of the medieval Jewish grammarians. But it is possible that their efforts aided the long survival of Hebrew, and it is in large measure due to them that Hebrew, elementary Biblical Hebrew at least, still finds a place in the curricula of many universities.

See also: Hebrew, Biblical and Medieval; Judaism.

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Hebrew, Modern *See:* Hebrew, Israeli.

Hebrew, Biblical and Medieval

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Hebrew as a Northwest Semitic Language

Hebrew, the language in which most of the books of the Bible were written, is one of the languages or dialects documented since the end of the second millennium B.C. in Southwest Asia, from Mesopotamia to South Arabia and Ethiopia, through the Syro-Palestinian area (*see* **Semitic Languages**). In comparison with other languages of the same family, Hebrew is a relatively young language: Old Accadian and Eblaite were documented in the East in the third millennium B.C., and Ugaritic was used in many literary texts from the middle of the second millennium B.C. in the Northwest; Hebrew was known only several centuries later, at the end of the second millennium B.C. As do Phoenician, Moabite, and other languages used by small populations of speakers, Hebrew belongs to the Canaanite group, in the northwest area of this region, although it shares isoglosses with languages (e.g., Old Aramaic) from a different group.

Because the oldest Semitic languages had no system of writing, their written forms were derived from other linguistic families. In the Northwest, under the influence of Egyptian elements, an alphabetic system was created in the first half of the second millennium B.C.; this system was the direct forerunner of Phoenician script. From this system originated, among others, the Old-Hebrew writing system, replaced in the second half of the first millennium B.C. by the Aramaic one. It had only 22 consonantal signs, and some of the original 29 Semitic phonemes were not represented in a separated way. There were no signs for vowels, and some consonantal or semivocalic signs were used in certain cases for indicating the presence of particular vowels.

Hebrew has preserved very scarce traces of the old Semitic nominal flexion. The genitive construction, with a *nomen regens*, usually in a reduced form (*status constructus*), followed by another one, *nomen rectum,* is shared with most Semitic languages. It is also common in Semitic languages for the verbal flexion to use preformatives, afformatives, or infixes for expressing diverse aspects and variant forms of the basic sense of the root, such as passive, causative, intensive, reflexive, and reciprocal meaning, or modes (indicative, subjunctive, jussive, energetic, etc.). Hebrew has reduced in many cases some of the older modes and possibilities.

Biblical Hebrew

The origin and character of Biblical Hebrew are currently an object of controversy. This language has been from its beginning united with the history of the Israelites, a group of seminomadic tribes progressively established in the country of Canaan. The oldest preserved manifestations of the language are a few biblical poems and some inscriptions (probably from the 9th century on). Hebrew adopted the Phoenician-Canaanite system of writing. There were some dialectal differences in the languages used by the different tribes and groups of tribes, especially between the North and the South tribes. In any case, Biblical Hebrew was a literary language, different in many aspects from the colloquial tongue, and very likely, as Chaim Rabin has suggested, a compromise language, created in the royal Chancellery of Jerusalem in the times of David and Solomon (10th century B.C.), that could be understood by the different groups of tribes, from the north and the south of the country of Canaan. In some books traces of a more colloquial

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language can still be found, having characteristic traits of the language used in the North, as opposed to the standardized language of other Biblical books.

Biblical Hebrew was used as a living (literary) language during half a millennium. A recent study of the corpus of Biblical books has counted 450 934 Hebrew (with some Aramaic) words corresponding to 9981 terms (330 of them appearing only once). This means that only a reduced part of the living language has been preserved. Some of the words of the epigraphic texts of the epoch are not included in the Bible.

A few poetic texts of the Bible, such as the Song of Debora (Judges 5), the Song of Myriam (Exodus 15), the oracles of Bala'am (Numbers 23 and 24), the blessings of Jacob (Genesis 49), the blessings of Moses (Deuteronomy 33), etc., preserve some archaic elements that seem to be particularly connected to the Northern Israelite tribes and may reflect some of the typical dialectal traits of the region. These texts, and some epigraphic inscriptions from 9th century on, represent the most archaic samples of Hebrew in Biblical times. The most significant portion of the Biblical books was written in the classical prose used during the time of the Monarchy, whereas other prophetic and poetic texts were written between the 8th and 6th centuries B.C.E. It seems very likely that most of the writings received the final redaction during the exile in Babylonia or immediately after it.

The capture of Jerusalem, the destruction of the Temple built by Solomon, and the exile of the Judaic elites coincide with a notable reduction in the use of Hebrew and its diminishment as a living language. It was replaced in most places by Aramaic (even the old Canaanite script was replaced by the Aramaic one), and in the following centuries Biblical Hebrew was used only in artificial literary contexts or in prayers. The last Biblical books (some of them with parts in Aramaic) were written in the 2nd century. From that time on, Biblical Hebrew was employed, in a more or less artificial way, in a good number of the manuscripts found around the Dead Sea and in some literary genres written during the Middle Ages.

The differences in the diverse phases of Biblical Hebrew affected, for instance, orthography: because the points that marked the vowels were introduced only in the Middle Ages, diverse ways were developed for indicating certain vocalic sounds. In Archaic texts, for instance, the letter *–h* was used at the end of a word for marking the possessive pronoun *–o* 'his'; classical Hebrew uses *–w*. Postexilic Hebrew tends more to use the semi consonants *w, y,* for marking the presence of vowels (*scriptio plena*).

There are also differences in morphology: the poetic texts use archaic forms of suffix pronouns: *-(e)mo* (instead of the classic form *-(h)em*) 'to them.' In the old texts, it is possible to see traces of the Semitic nominal flexion that is practically nonexistent in the texts in classical Hebrew, whereas the prefixed article or the mark of direct object, *'et*, occurs much less frequently than in the prose texts of the Bible. The archaic relative pronouns *še-*, *ša-*, or *zeh*, *zo* / *zu* are in contrast with the classic *'ăšer*. Some archaic forms of the verb show that the old phase of the language is closer to other ancient Semitic languages. But the main forms ('conjugations') of the verb are stable along all the periods: beside the basic form, *qal*, there are the intensive *pi'el,* its passive *pu'al,* the causative *hif'il,* its passive *hof'al,* the passive *nif'al,* and the reciprocal *hitpa'el*. Particles are much scarcer in the archaic texts than in the later prose texts.

From the point of view of syntax, differences are observed in the use of some verbal forms, such as the preformative conjugation with an enclitic *wa-*. Archaic Hebrew prefers paratactic, asyndetic constructions, whereas later Hebrew adds many new particles and has preference for syndetic, hypotactic sentences.

The last Biblical books were written after the Exile in Babylonia, from the 6th to the 2nd centuries B.C., imitating the old classical, preexilic models, but without having direct contact with a living language, and under the influence of Aramaic and the spoken colloquial Hebrew that would be used by the Rabbis for their teaching and their discussions. Changes in the verbs include the rare use of the absolute infinitive and ultra-long verbal forms, or the reduction of the forms with conversive *waw*. The particles also change in a significant way, replacing some old forms with new ones and increasing in use. The lexicon also shows notable modifications, with many new words and loans from other close languages.

A particular form of late Biblical Hebrew can be seen in the manuscripts found around the Dead Sea. In 1947, seven old scrolls were found in a cave close to the remains of Jirbet Qumran; this was followed by the discovery of many other scrolls (almost 800 in a more or less fragmentary form, with Biblical and non-Biblical texts). Most of them were attributed to an Essenian sect that lived in the area in the 2nd and 1st centuries B.C., whereas others are considered to be from the time of the revolt of Bar-Kokba, in the 2nd century A.D. The language of most writings is close to late Biblical Hebrew, with some linguistic peculiarities.

Biblical Hebrew has evolved from different traditions that developed during the Middle Ages in the largest Jewish communities, in Palestine or in Babylon. These traditions adopted different systems of vocalization and represented different pronunciations

of Hebrew, and in some cases, small morphological changes. The Hebrew text of the Bible as vocalized and annotated by the Masoretes in Tiberiah (Galilee) has become the standard form of Biblical Hebrew.

Medieval Hebrew

A form of colloquial Hebrew that had been in use after the Exile had its literary reflex in the *Mishnah* and other rabbinical writings completed in the first centuries A.D. In the early Middle Ages, however, most Jewish communities had adopted Aramaic first, and from the 7th century on used Arabic or the languages of the host countries in their daily life and cultural expressions. Thanks to the study of biblical grammar and lexicography, the literary usage of Hebrew increased noticeably from the 10th century on, particularly in al-Andalus, within the Iberian Peninsula.

In al-Andalus, the western end of the Islamic empire, Jewish intellectuals who were using Arabic as their everyday language used Hebrew in their writings, and especially in their new poetry, inspired by the techniques of Arabic poets. Hebrew, for the Jews of Sepharad (the Iberian Peninsula), was a sign of identity and an instrument of cultural expression, not only in the traditional biblical and rabbinic fields of study, but also in new cultural forms that paralleled the best achievements of the dominant language, Arabic. The Bible served Jewish poets as a stylistic and linguistic model. The genres in prose could be written in the same tongue, but for dealing with technical subjects, such as science, medicine, or philosophy, and even in many cases for philological studies, the poets preferred Judeo-Arabic. Hebrew was employed as a kind of lingua franca for mutual understanding only in exceptional cases (for instance, when a Jewish traveler went from one community to another in far away regions).

The linguistic ideal for most Andalusian Jewish scholars was the 'pure language' – that is, the Hebrew of the Bible, used in the correct grammatical way and without any change or innovation; this excluded, in particular, the language of the rabbinical writings and the daring innovations of the synagogal poetry of the Byzantine epoch. This 'puristic' trend became particularly apparent in the secular poetry written at the end of the 11th century and during the first half of the 12th century, 'the golden age' of Hebrew poetry. The practice did not exclude the deep influence of Arabic. In the medieval secular poetry, quotations and expressions taken from the Bible were blended together with motives, images, and technical words coming from Arabic.

The medieval pronunciation of Hebrew in the regions under Islamic domain conformed in general to the rules or usages collected by the Tiberian Masoretes (who added vowels and accents to the consonantal text), with some peculiarities, such as the reduction from seven to five vowels. The influence of Arabic was especially clear in the pronunciation of the guttural and emphatic consonants, and also in the syntax, whereas the morphology followed, in general, the biblical patterns.

The Jews from the north of the Iberian Peninsula, Provence, and Italy developed a Hebrew literary prose and wrote in Hebrew their literary correspondence, ethical, exegetical, and philosophical treatises, polemics, books on history or travels, and scientific and medical writings. They also signed public documents and wrote notes on their commercial activities in Hebrew. Due to the limited number of words preserved in the biblical books, when some Jews, familiar with Islamic culture, translated scientific, philosophical, and philological works written in Arabic (by both Arabs and Jews) into Hebrew, they had to introduce new words into the old language to make it more flexible. These translators, especially the Tibbonid family in the south of France in the 12th and 13th centuries, enriched the language with many new words and lexical calques.

In the Christian kingdoms of Europe, the Jewish communities of northern France and the Rhine valley (Ashkenaz) adopted the local language of this region, Middle High German, and blended it with Romance (French) and Hebrew elements to form Yiddish, written in the Hebrew alphabet. Medieval Ashkenazi Jews used Hebrew mostly for prayer and for some juridical, ethical, and exegetical writings; it was not the pure biblical language, but a rather miscellaneous language, intermingled with rabbinic Hebrew and Aramaic, without well-defined grammatical rules, and with some influence from the vernacular languages. The Ashkenazi developed their own pronunciation of Hebrew, different from what was usually heard in Palestine or in the Islamic Empire.

See also: Arabic; Aramaic and Syriac; Asia, Ancient Southwest: Scripts, Epigraphic West Semitic; Bible; Hebrew Lexicography; Hebrew Linguistic Tradition; Judaism; Phoenician; Semitic Languages.

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Hebrew, Israeli

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Basic Information

The Israeli language (a.k.a. Modern Hebrew) is one of the official languages – with Arabic and English – of the state of Israel, established in 1948. It is spoken to varying degrees of fluency by its 6.8 million citizens (as of September 2004) – as a mother tongue by most Israeli Jews (whose total number slightly exceeds 5 million), and as a second language by Muslims (Arabic speakers), Christians (e.g., Russian and Arabic speakers), Druze (Arabic speakers), and others.

Hebrew (*see* **Hebrew, Biblical and Medieval**) was spoken by the Jewish people after the so-called conquest of Israel (c. 13th century B.C.). Following a gradual decline (even Jesus, 'King of the Jews,' was a native speaker of Aramaic rather than Hebrew), it ceased to be spoken by the 2nd century A.D. The Bar-Kokhba Revolt against the Romans, which took place in Judaea in A.D. 132–135, marks the symbolic end of the period of spoken Hebrew. For more than 1700 years thereafter, Hebrew was comatose – either a 'sleeping beauty' or 'walking dead.' It served as a liturgical and literary language and occasionally also as a lingua franca for Jews of the Diaspora, but not as a mother tongue.

Israeli emerged in Eretz Yisrael (or Palestine) at the beginning of the 20th century. Its formation was facilitated by Eliezer Ben-Yehuda, schoolteachers, and others to further the Zionist cause. Earlier, during the Haskalah (enlightenment) period from the 1770s to the 1880s, writers such as Méndele Mokhér Sfarím (Shalom Abramowitsch) produced works and neologisms which eventually contributed to Israeli. However, it was not until the early 20th century that the language was first spoken.

The genetic classification of Israeli has preoccupied linguists since the language emerged. The traditional school argues that Israeli is Semitic: (Biblical/Mishnaic) Hebrew revived. Educators, scholars, and politicians have contributed to this assumption, linking the history of language to the politics of national revival. The revisionist position, by contrast, defines Israeli as Indo–European: Yiddish relexified, i.e., Yiddish (the revivalists' mother tongue) is the 'substratum,' whilst Hebrew is only a 'superstratum' providing the lexis and lexicalized morphology (cf. Horvath and Wexler, 1997). A more recent hypothesis is that Israeli is a hybrid language, both Semitic and Indo–European. It argues that both Hebrew and Yiddish act equally as its primary contributors (rather than 'substrata'), accompanied by many secondary contributors: Russian, Polish, German, Judeo–Spanish (Ladino), Arabic, English, etc. (see **Figure 1**). Although Israeli phonetics and phonology are primarily Yiddish and its morphology is mainly Hebrew, the European contribution to Israeli is not restricted to particular linguistic domains and is evident even in its morphology.

Thus, the term 'Israeli' is far more appropriate than 'Israeli Hebrew,' let alone the common signifiers 'Modern Hebrew' or 'Hebrew' *tout court* (cf. Zuckermann, 1999, 2003, 2005).

Grammatical Profile

Israeli is a fusional synthetic language, with discontinuous, nonconcatenative morphemes with vowel infixation, for example:

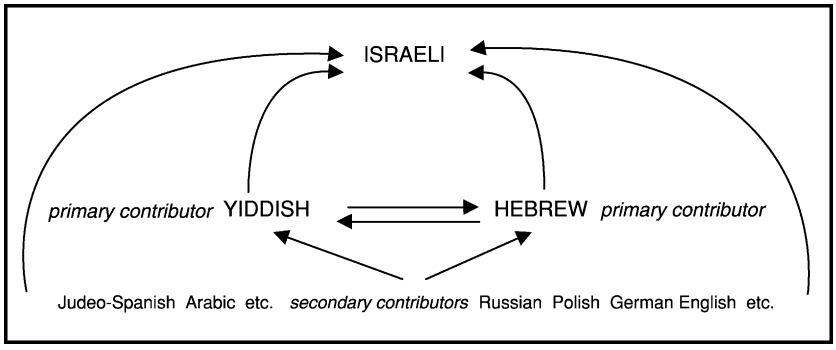

Figure 1 The Israeli hybrid hypothesis.

yoháv
*love.*3M.SG.FUT
'(he) will love'

mitahévet
*fall-in-love.*3F.SG.PRES
'(she) is falling in love'

yenadvú
*volunteer.*3PL.FUT
'(they) will volunteer (others)'

hitnudávti
*volunteer.*1SG.PAST.COERCIVE/INDUCIVE (*hit-a-é-* + *-u-á-*)
'I (was) volunteered (by force)'

However, Israeli is much more analytic than (Biblical/Mishnaic) Hebrew. Whereas the Hebrew phrase for 'my grandfather' was *sav-í* 'grandfather–1.SG.POSS,' in Israeli it is *sába shel-ì* 'grandfather GEN–1SG.' Still, Israeli sometimes uses the Semitic feature known as 'construct-state' (Israeli *smikhút*), in which two nouns are combined, the first being modified or possessed by the second. For example, *repúblikat banánot*, literally 'republic bananas,' refers to 'banana republic.' However, unlike in Hebrew, the construct-state is not highly productive in Israeli. Compare the Hebrew construct-state *ʔem ha-yéled* 'mother DEF-child' with the more analytic Israeli phrase *ha-íma shel ha-yéled* 'DEF-mother GEN DEF-child,' both meaning 'the mother of the child,' i.e., 'the child's mother.'

Israeli is a head-marking language. It is nominative–accusative at the syntactic level and partially also at the morphological level. As opposed to Biblical Hebrew – whose constituent order is VAO(E)/VS(E) – but like Standard European and English, the usual constituent order of Israeli is AVO(E)/SV(E). Thus, if there is no case marking, one can resort to the constituent order. Israeli is characterized by an asymmetry between definite Os and indefinite Os. There is an accusative marker, *et*, only before a definite O (mostly a definite noun or personal name). *Et-ha* is currently undergoing fusion and reduction to become *ta*. Consider:

taví	*l-i*	***et***	***ha-séfer***
give.2M.SG.IMP (puristically FUT)	DAT-1SG	ACC	DEF-book

'give me the book,'

where *et*, albeit syntactically a case marker, is a preposition, and *ha* is a definite article. This sentence is realized phonetically as *taví li* ***ta-séfer***.

Israel's first Prime Minister, David Ben-Gurion, did not like the *et* particle and would have liked to have replaced *taví li* ***et ha-séfer*** with *taví li* ***ha-séfer***. (It has been suggested that he was not keen on diplomatic relations with ***et****yópya* 'Ethiopia' for the same reason.) However, such a puristic attitude is hardly ever seen these days and *taví li* ***ha-séfer*** is nonnative.

Sound System

Israeli has five vowels: /i, e, a, o, u/. Its consonantal inventory reflects Yiddish (except that the latter has syllabic consonants). Unlike Hebrew, the pharyngealized (emphatic) consonants ק [*q*], ט [*ʈ*], and צ [*s̪*] have been neutralized and are pronounced [k], [t], and [s] respectively. Hebrew ע [ʕ], א [*ʔ*], and ה [h] are all 'pronounced' by most Israelis in the same way: most of the time, they are not pronounced. They are only pronounced (both ע and א as [*ʔ*], and ה as [h]) when in a postconsonantal position **within uncommon words**. Israeli ה [h] is also pronounced by some speakers at the beginning of phrases. The Hebrew alveolar trill ר [r] is pronounced in Israeli as a unique uvular approximant [ʁ̞], similar to the [ʁ] in many Yiddish dialects. For dyslexics, Israeli is much more problematic than Hebrew, the reason being that while Israeli's phonetic system is primarily European, it still uses a phonetically anachronistic Hebrew orthography. Thus, one should not be too surprised to see an Israeli child spelling עקבותיו (pronounced *ikvotáv*) 'his traces' as אכווטב.

Whereas the syllable structure of Hebrew was CV(X)(C), that of Israeli is (C)(C)(C)V(C)(C)(C). Israeli does not follow Hebrew spirantization rules. For example, most Israelis say *bekitá bet* rather than the puristic *bekhitá bet* 'in the second grade.' The stress is phonemic, e.g. *bóker* 'morning' and *bokér* 'cowboy.'

Nouns

Israeli nouns show number, normally only singular and plural. Each noun is either masculine or feminine, the latter often being created by adding a suffix to the unmarked masculine. For instance, whereas *mazkír* is 'male secretary,' *mazkirá* is 'female secretary' (note the addition of *-a*). Similarly, whilst *profésor* is 'male professor,' *profésor**it*** is 'female professor.' Pronouns have 'case forms' consisting of a preposition plus a suffix: nominative (e.g., *aní* 'I'), accusative (*otí* 'me'), dative (*li* 'to me') and genitive (*shelí* 'my'). However, NPs which are not pronouns do not bear case marking. The only exceptions are the above-mentioned accusative marker *et* (or *ta*), and the lexicalized allative ('to/towards') case (which, serendipitously, is based on the historical accusative case), e.g., *báit* 'house' → *ha-báyt-a* 'to the house'; *yerushaláim* 'Jerusalem' → *yerushaláym-a* 'to Jerusalem'; *tsafón* 'north' → *tsafón -a* 'to the north.' New allative phrases, e.g., *tel avív-a* 'to Tel Aviv', are not used unless one is trying to sound flowery or jocular.

Adjectives agree in number, gender, and definiteness with the nouns they modify, e.g.:

ha-yéled ha-gadól
DEF-boy *DEF-big*
'the big boy';

yelad-ím gdol-ím
boy-M.PL *big-M.PL*
'big boys.'

Verbs

As opposed to Biblical Hebrew, which had only a perfect–imperfect distinction, Israeli has three tenses: past, present, and future. In the past and future, verbal forms differ according to gender, number, and person. However, in the present tense, verbs are conjugated only according to gender and number and there is no person distinction. The historical reason is that the forms of the Israeli present can be traced back to the Hebrew participle, which is less complex than the historical perfect and imperfect forms.

Verbs are transitive, intransitive or ambitransitive (labile). Ambitransitivity is usually of the S=A type, e.g. *dan shatá etmòl* 'Dan$_s$ drank yesterday' (cf. *dan shatá etmòl bíra* 'Dan$_s$ drank yesterday beer$_o$'). However, owing to Americanization, there are more and more ambitransitive verbs of the S=O type, e.g., *ha-séfer mokhér tov* 'the-book$_s$ sells well' (cf. *grísham mókher et ha-séfer tov* 'Grisham$_s$ sells ACC the-book$_o$ well'); *yésh po máshehu she-meríakh ra* 'There.is here something$_s$ that-smells bad' (cf. *aní meríakh po máshehu ra* 'I$_s$ smell here something$_o$ bad').

Clauses

The main clause in Israeli consists of (a) clause-initial peripheral markers, e.g., discourse markers; (b) NP(s) or complement clause(s); (c) a predicate – either verbal, copular, or verbless; (d) clause-final peripheral elements, e.g. discourse markers. The only obligatory element is the predicate, e.g., *higáti* 'arrive:1SG.PAST.' Sentences (1), (2), and (3) are examples of a verbal, copular, and verbless clause, respectively.

(1) אסתר אכלה תפוח.
[ester]$_A$ {[akhlá]$_V$ [tapúakh]$_O$}
[Esther]$_A$ {[eat:3F.SG.PAST]$_V$ [apple]$_O$}
'Esther ate an apple'

(2) אסתר היא אחות שלי.
[ester]$_{CS}$ {[hi]$_{COP}$ [akhót shel-î]$_{CC}$}
[Esther]$_{CS}$ {[COP.F.SG]$_{COP}$ [sister GEN-1.SG]$_{CC}$}
'Esther is my sister'

(3) אסתר חכמה.
[ester]$_{VCS}$ {[khakham-á]$_{VCC}$}
[Esther]$_{VCS}$ {[clever-F]$_{VCC}$}
'Esther is clever'

There are many types of subordinate clause, e.g., adverbial (denoting comparison, time, place, condition, concession, reason, result, goal, state), adjectival/relative, nominal/complement. On complementation clauses in Israeli, see Zuckermann (forthcoming).

Concluding Remarks

The grammatical profile of Israeli demonstrates its binary nature, which has important theoretical implications for many branches of language science: contact linguistics, sociolinguistics, language revival/survival, linguistic genetics and typology, creolistics, and mixed languages. Genetic affiliation – at least in the case of (semi-)engineered, 'nongenetic' languages – is not discrete but rather a continuous line. The comparative method and lexicostatistics, though elsewhere useful, are not here sufficient. Linguists who seek to apply the lessons of Israeli to the revival of no-longer spoken languages should take warning.

Israeli affords insights into the politics not only of language, but also of linguistics. One of the practical implications is that universities, as well as Israeli secondary schools, should employ a clear-cut distinction between Israeli linguistics and Hebrew

linguistics. Israeli children should not be indoctrinated to believe that they speak the language of Isaiah – unless the teacher is referring to the 20th-century Israeli polymath and visionary Isaiah Leibowitz. Although revivalists have engaged in a campaign for linguistic purity, the language they created often mirrors the very cultural differences they sought to erase. The study of Israeli offers a unique insight into the dynamics between language and culture in general and in particular into the role of language as a source of collective self-perception.

See also: Description and Prescription; Genetics and Language; Hebrew, Biblical and Medieval; Intonation; Israel: Language Situation; Israel: Language Situation; Jewish Languages; Morphological Typology; Politics and Language: Overview; Semitic Languages; Word Stress; Yiddish.

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Hebrew Lexicography

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Biblical Hebrew Lexicography

The Early Period

The beginnings of Hebrew lexicography, more than a thousand years ago, were closely accompanied by the beginnings of Hebrew grammatical description, and both are linked to the name of Rav Saadiah Gaon (Egypt and Babylonia, 882–942). His dictionary *Ha-Egron* (902; Nehemiah Allony edition, 1969), only a fifth of which has survived, was rather short, and many of its entries were translated into Arabic. While not intended, therefore, to be a bilingual dictionary in the modern sense, this is actually what it was, at least to some extent. A supplement was appended in which the words were sorted by their last letter, as was commonly done in dictionaries of Arabic (for rhyming purposes). Another Hebrew-Arabic dictionary from the 10th century is *Kitab Jame' al-Alfaz* by the Karaite David ben-Abraham el-Fassi, written in Jerusalem between 930 and 950 in two versions, a long one and a short one (the latter was published by Skoss in 1936).

The first Hebrew–Hebrew dictionary was written somewhat later by Menahem ben-Saruq (Spain, mid-10th century), and it provoked a flurry of debates, initiated by the criticisms of his contemporary Dunash ben-Labrat, both on some fine points of grammar and on some explanations of biblical terms. Among other things Dunash asserted, for example, that the root of YGWN *yagon* 'distress' is GN while Menahem claimed it to be the one-letter root G (see **Table 1** for the method of transcription used in this article). These criticisms were answered by Menahem's pupils, and the dispute was finally decided by R. Yaacov ben-Meir (known as Rabbenu Tam, France, 12th century). Both these

Table 1 The Hebrew alphabet

א	aleph	`	ו	waw	W	כ	kaf	K	ע	ayin	ʿ	ש	shin	š
ב	bet	B	ז	zayin	Z	ל	lamed	L	פ	pe	P	ת	tav	T
ג	gimal	G	ח	het	Ḥ	מ	mem	M	צ	tsadi	Ṣ			
ד	dalet	D	ט	tet	Ṭ	נ	nun	N	ק	qof	Q			
ה	he	H	י	yod	Y	ס	samekh	S	ר	resh	R			

In order to give the reader as faithful a picture as possible of the Hebrew words cited, they are represented in up to three forms: a letter-per-letter transliteration (when needed) in small capitals, as per this table; the pronunciation in italics; and an English translation.

Reuben Sivan (1965), and the Hebrew–German dictionary of Jaacov Lavy (1975). Special mention should be made of the dictionaries published by Hayim Baltsan for Hebrew–Russian and Hebrew–English, intended for Hebrew learners who hear Hebrew words but have difficulties in conceiving their spelling, so the entries are Russian/English phonetic equivalents of the Hebrew words, and the dictionary is sorted alphabetically by the transcribed entries.

Computerized Resources

Quite a number of computerized resources are now available for Hebrew. Regarding corpora, the following should be mentioned:

- *Maba'*, the Bar Ilan University Corpus of Modern Hebrew, which contains 199 books (novels and short stories), a full one-year set of issues of a local weekly magazine, news items from the Internet, collected articles from a daily newspaper, and the full minutes of six months' sittings of the Knesset, totaling in all 25 million words of modern Hebrew;
- the corpus of the Academy of the Hebrew language of early Hebrew writings (mentioned above);
- The Responsa Corpus of Bar Ilan University, available also on CDs to the general public, which contains many hundreds of books of rabbinical literature in Hebrew and Aramaic, encompassing almost 2000 years of writings and originating from all over the world.

Similar CD corpora of (different) rabbinical books have also been circulated in recent years in Israel, too numerous to mention here. In terms of software, two operational programs, both developed by Yaacov Choueka and the Rav-Milim team, can be mentioned: *Milim*, a program for the complete and accurate lemmatization and morphological analysis of any word in Modern Hebrew, and *Nakdan*, a program for the automatic vocalization of Hebrew texts with an accuracy of 98%.

Finally, a government-supported Knowledge Center for Processing Hebrew has recently been established at the Technion in Haifa, whose mission is to research and produce tools necessary for the intelligent processing of Modern Hebrew, including the building of appropriate tagged corpora and the dissemination of reliable operational software for such processing.

See also: Arabic Lexicography; Bilingual Lexicography; Hebrew, Biblical and Jewish; Hebrew, Biblical and Medieval; Hebrew, Israeli; Israel: Language Situation; Lexicography: Overview.

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In the past 30 years, the abundance of literature that has been dedicated to Heidegger throughout the world gives us a clear measure of the significance of his contribution to philosophy. Heidegger's works have been translated into every major language, regardless of the intriguing linguistic peculiarities that distinguish them.

In 1924, Heidegger summarized Aristotle's biography as follows: "He was born, he worked, and he died." The same concept could be applied to Heidegger himself. In fact, for him life and work coincided in a way that was almost unparalleled among the authors of the 1900s. After examining the early stages of his own philosophical development, which culminated

between 1913 and 1915 in two publications, one on the psychologism of logic and one on Duns Scotus, Heidegger concluded that the questions of 'being' and of 'language' were already emerging in those early works, even though the works were youthful in character and still a long way from the themes that would absorb his attention in the future. The confrontation with the legacy of phenomenology and of neo-Kantianism (Husserl, Rickert, and Lask) (*see* **Husserl, Edmund (1859–1938)**) that characterized the early period of Heidegger's philosophical work culminated in the publication of his famous 1927 work, *Sein und Zeit*. In later years, both Hölderlin and Nietzsche appear to have influenced his thought, even though that is not always evident or uncontroversial; in point of fact, between 1934 and 1945, Heidegger dedicated important university courses to both philosophers. During that time, he began to lay the foundations of his future philosophical thought. The year 1934 witnessed his "rectorship interlude," in every way a sort of brief political and scientific adventure. The episode has been the object of excessive speculations on the part of some scholars and, as a consequence, has been somewhat overemphasized.

Upon his resigning as Rector of the University of Freiburg, Heidegger was subjected to a sort of 'isolation' within his own country, which lasted until the end of World War II. As a consequence, between 1935 and 1945 he published very little – in particular, *Platons Lehre von der Wahrheit* (1942), *Vom Wesen der Wahrheit* (1943), and *Erläuterungen zu Hölderlins Dichtung* (1944). In addition, the subsequent ban from further teaching precluded the circulation, at least until 1950, of whatever Heidegger had written in Germany during the war. Hence, of significance was the publication of his *Brief über den "Humanismus"* (1946), which allowed him to free his thought, publicly and clearly, from any 'existentialist' interpretation. The latter, in the wake of Marcuse's and Sartre's writings, had been progressively taking hold first in France, and afterward in other European countries, as well as in the English-speaking world.

The observations regarding the concept of 'truth' (*aletheia,* in Greek), and particularly the history of the West, since the time of Plato, allowed Heidegger to reconstruct, not only in the 1946 writing but in almost every work, the entire history of philosophy by summarizing it into the nonneutral notion of 'metaphysics.' According to Heidegger, this coincided with the history of the so-called *Seinsvergessenheit*, or 'forgetting of Being,' a 'movement' that was historically determined as well as inevitable. Therefore, 'truth' – whose original meaning, according to Heidegger, was 'openness' to the feeling of Being (hence Heidegger's translation of *aletheia* into the German *Unverborgenheit*) – is slowly but constantly constrained, and even forced into the connotation of 'correctness' (*orthotes* in Greek). This modification has allowed the technicality associated with modern and contemporary science (especially with Galileo and Descartes, [*see* **Descartes, René (1596–1650)**]) to overshadow the original philosophical idea of 'truth' as openness and is therefore responsible for the rise of the modern world as we know it.

From 1950 on, Heidegger's focus on the question of technicality was intertwined with his observations on the language of philosophy, and poetry in particular. According to Heidegger, poetry's role is to "say Being" in a way that is precise as well as original: that of the 'sacred.' Poetry can accomplish such a task without having to tie 'Being' exclusively to 'presence,' that is, to its practical significance in the human and natural worlds. In doing this, Heidegger went back to what he had already stated in his 1927 work, where he had made a clear distinction between the 'authentic' being-in-the-world (*in-der-Welt-sein*) and the 'inauthentic' one. Such interpretative curvature of his thought was particularly evident in his 1959 volume *Unterwegs zur Sprache,* which has often, yet erroneously, been defined by some scholars as an 'aesthetic' shift or as a 'literary' one, in general. In the years between 1950 and 1975, Heidegger's important observations, often delivered at public conferences, on poets such as Rilke, Trakl, Hebel, and George, attest not only to the deepening of this curvature but also to his great interest in the linguistic development of German poetry. This is also reflected in an exchange with the Jewish poet Paul Celan, although the outcome of such exchange was not a positive one.

Heidegger concluded his philosophical journey by alluding to an 'end' of philosophy that would coincide with the end of metaphysics and with the possible rise of a 'new' thought. This thought is relative to its being interpreted not as any other entity but as *Ereignis*. Such an allusion, in a way, compelled Heidegger to start a discourse with other scholars and with disciplines that by tradition had not always been able to communicate, such as physics, art history, linguistics, literary critique, and historiography. This approach often garnered important, although controversial, results. It is worth mentioning the numerous disagreements Heidegger had with some of the philologists of the time regarding his etymologic interpretation of certain Greek words, particularly of the term *aletheia*. As a consequence of this and other factors, Heidegger's legacy to philosophy likely constitutes one of the richest platforms for the philosophical thought of the century that has recently ended and of the one that has just begun. It is in fact

through Heidegger that the so-called hermeneutic perspective, which characterizes in some ways the continental way of philosophizing, is able to communicate with the 'analytic' perspective (*see* **Kant, Immanuel (1724–1804)**) typical of the Anglo-Saxon tradition.

See also: Descartes, René (1596–1650); Husserl, Edmund (1859–1938); Kant, Immanuel (1724–1804).

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Bernd Heine earned his Ph.D. in 1967 from Cologne University, with a thesis on Togorest languages, and in 1971 completed his Habilitation, also at Cologne University, with a thesis on pidginization in the Bantu language area. After teaching in Nairobi, he was appointed to the Chair of African Linguistics at Cologne University. He has held several visiting teaching positions in many parts of the world, is a member of several distinguished academies of science, and has been awarded a number of fellowships, among them the election as a member of the British Academy, of the Australian Research Council, as well as of the Nordrhein-Westfälische Akademie der Wissenschaften. He is president of the Standing Committee for the World Congress of African Linguists. As one of the world's leading Africanists, with extensive experience of field work in several African countries, he is to be credited with the promotion of the study of Khoisan languages as an area worthy of special focus. Another descriptive center of his work is his consistent emphasis on the importance of language contact phenomena in African languages. He is the leading figure in establishing African linguistics as a center of empirical and theoretical interest from the point of view of typology, structure, and sociolinguistics. His other, more theoretical, interest is centered on the concept of grammaticalization. Through a long series of articles and books, he has become one of the founders of grammaticalization theory and has promoted the study of grammaticalization to an area of major interest. Grammaticalization, the path from regular lexical items through ever more grammatical items, is conceived of not as a static state, but as a permanent dynamic process cutting across different types of morphemes and word classes.

In a synthesis of his positions on language contact and grammaticalization, Heine has held that grammaticalization and language contact should not be regarded as mutually exclusive, but as complementary major processes involved in linguistic change. The principles of grammaticalization are manifested irrespective of the involvement or not of language contact. It therefore appears to be the inherently 'stronger' process.

As regards the origin and shape of linguistic categories, Heine has consistently taken a semantic and functional stance. With the main function of language being to convey meaning, the structuring of language must make reference to this function, thus to factors lying outside language itself and relating to more general processes underlying human conceptualization and communication.

See also: African Linguistics: History; Grammaticalization.

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Helmholtz, Hermann Ludwig Ferdinand von (1821–1894)

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Hermann von Helmholtz was arguably one of the 19th century's greatest scientists and one of the most important physiologists of all time. According to one of his biographers, Helmholtz was "the last great scholar whose work, in the tradition of Leibniz, embraced all the sciences, as well as philosophy and the fine arts" (Turner, 1990). His unique strength was "the ability to integrate mathematical, theoretical and instrumentational elements into a complex yet unified structure" (Cahan, 1993).

He was born Hermann Helmholtz on August 31, 1821 in Potsdam, Germany, the eldest of four children of August Ferdinand Julius Helmholtz and Caroline Helmholtz, née Penn (descended from William Penn, the founder of Pennsylvania). He attended Potsdam Gymnasium, where his father taught philology and classical literature. His main interest was in physics, but his father persuaded him to study medicine at the Royal Institute of Medicine and Surgery in Berlin, because government scholarships were available in that subject area. He also attended lectures in chemistry and physics (by Gustav Magnus) at Berlin University, taught himself mathematics and philosophy (with emphasis on Fichte and Kant), and learned to play piano with a skill that later helped him in his work on the sensation of tone (O'Connor and Robertson, 2001). In his doctoral thesis (1842), at age 21, he argued strongly for physiology and medicine to be founded on the natural sciences, rejecting the existence of separate 'vital forces.' Such vitalism was advocated by most biologists in those days, including his own thesis adviser and lifelong mentor, Johannes Müller, the discoverer of the law of specific nerve energies. Müller did demand, however, "an empirical foundation for all scientific concepts" from his students (Königsberger, 1965). Helmholtz was encouraged in his views by his fellow students Emil Heinrich Du Bois-Reymond, who was to be the founder of experimental neurophysiology, and Ernst Wilhelm von Brücke.

Five years after finishing his thesis, Helmholtz published an influential paper (*Über die Erhaltung der Kraft*, 1847) in which he formulated the mathematical law of the conservation of energy, which Joule had postulated qualitatively earlier. The paper made him famous, he returned to Berlin with the help of Alexander von Humboldt, and in 1849, at age 28, he accepted the chair of physiology at Königsberg and also married Olga von Velten. He invented the ophthalmoscope in 1851, which gained him an international reputation. In the following years, he published his *Handbuch der Physiologischen Optik* (Vol. 1, 1856) and his theory of trichromatic color vision, which extended the work of Thomas Young and ended in a famous controversy with Ewald Hering, who advocated an 'opponent-color' theory. (Later studies proved both right.)

In 1855, Helmholtz was appointed chair of anatomy and physiology in Bonn. A leading world scientist, he transferred to Heidelberg in 1858 with the lure of a new Institute of Physiology. He was elected Fellow of the Royal Society in 1860. His wife died in 1859, and Helmholtz remarried in 1861 to Anna von Mohl, with whom he eventually had three children. While in Heidelberg, Helmholtz worked on physiological acoustics, publishing major studies about the perception of sound and on musical theory (e.g., Helmholtz, 1863). In mathematical appendices he advocated the use of Fourier series for the analysis of complex sounds.

In 1871 (one year after the death of Gustav Magnus), Helmholtz took over the chair of physics in Berlin and devoted most of his time to the study of physics (thermodynamics, electrodynamics, and electromagnetism). In 1877 to 1878 he served as Rector of the university, which position he used to speak publicly about such diverse but equally important topics as academic freedom and sensory perception (Helmholtz, 1877; 1878). In 1882 he was elevated to the nobility by Kaiser Wilhelm I, and in 1888 he

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became director of the newly founded Physikalisch-Technische Reichsanstalt in Berlin-Charlottenburg, a post he held for the rest of his life.

Students and research associates of Helmholtz included Heinrich Hertz, Max Planck, Wilhelm Wien, Arthur König, Henry Rowland, A. A. Michelson, and Michael Pupin. Helmholtz's studies in sensory physiology formed the basis of the work of Wilhelm Wundt, also a student of Helmholtz, who is considered one of the founders of experimental psychology.

The direct relevance of Helmholtz's work for language research is twofold:

1. *On the sensations of tone* (18XX) is usually cited for its fundamental importance for the understanding of hearing, the function of the cochlea and inner ear, and for making a connection between auditory physiology and music perception. Its contributions, however, go far beyond that. The work comments on almost every aspect of hearing and auditory perception, including to a great degree on the phonetics and phonology of speech (speech perception and production) in the section 'Über die Klangfarbe der Vocale.' Reference is made to earlier vowel theories of Willis and Donders and, in the English translation of 1885, of Wheatstone, Alexander Graham Bell (inventor of the telephone), and his father Melville Bell. Drawing an analogy between music and speech, Helmholtz explained the functioning of the human larynx as a reed instrument and understood the vocal tract as a series of resonators. On that basis, he developed a theory of speech synthesis more than 100 years before Klatt (see Klatt, 1987). In a section on 'Artificial vowels,' an experimental apparatus consisting of tuning forks and resonators is introduced that can successfully imitate speech sounds (first introduced in the *Münchener Gelehrte Anzeigen* on June 20, 1859). Regarding the perception of complex sounds, Ohm had stated the fundamental principle of physiological acoustics in 1843, concerned with the way in which we perceive combination tones. One of Ohm's critics, the physicist August Seebeck, tried to discredit Ohm's law by pointing out that we are unable to separate the harmonics in a combination tone. Helmholtz resolved the conflict by pointing out that there is 'synthetic perception' and 'analytic perception,' and compared the inability to perceive complex tones analytically with the inability to separate wavelength in composite colors. By making this distinction, Helmholtz preempted the 'synthetic' perception of complex sounds in higher areas of the auditory system, which is necessary for the perception of speech and music, without giving up Ohm's principle of Fourier analysis, which is implemented in peripheral hearing.

2. Helmholtz's second contribution was his lucid comparison of language and perception, both in terms of representational systems and in terms of their acquisition. He stressed how the formation of our perceptions is similar to the way in which we learn language. One of Helmholtz's declared goals was to investigate "the laws according to which ... sensations result in mental images of determinate external objects, that is, in perceptions" (Helmholtz, 1863). His investigations resulted in a strongly empiricist view that rejected Kant's philosophy that the concepts of time, space, and causation are innate (*a priori*) mental attributes reflecting divine reason. Helmholtz instead advocated Locke's view that all knowledge comes through the senses. Space in particular, according to Helmholtz, is a learned, not innate, concept. As an example, he cites the fact that "the blind can form complete intuitions of space without the aid of vision"(1878). Helmholtz went on to say that "there is a most striking analogy between the entire range of processes of visual perception ... and another system of [arbitrary] signs – I mean the words of our mother tongue" (1873–1881). In learning how to speak, a child must first "guess that the sounds it hears are intended to be signs at all; next, the meaning of each separate sound must be found out, by the same kind of induction as the meaning of the sensations of sight or touch ..." (1896). Some have compared Helmholtz's concept of 'signs' (a modern term would be 'mapped representations') with that of Wittgenstein (see Hyder, 1998).

See also: Bell, Alexander Graham (1847–1922); Bell, Alexander Melville (1819–1905); Brücke, Ernst (1819–1891); Kant, Immanuel (1724–1804); Leibniz, Gottfried Wilhelm (1646–1716); Wundt, Wilhelm (1832–1920).

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Hemon, Roparz (1900–1978)

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Born in Brest (Finistère) in 1900, Louis-Paul Nemo very soon became interested in the Breton language which was spoken by his grandparents. After spending some time in Britain learning English, he went to Paris to study for a degree in English (1922–1925). There he began to write essays in Breton under the pseudonym Roparz Hemon. He founded a literary journal in Breton, *Gwalarn* ('West,' or 'West wind'), which became the organ of a new cultural movement promoted by young writers. Inspired by their Breton nationalism, they all wanted to create a new Breton literature. Roparz Hemon was their leader. Completely devoted to the Breton revival, he was then far from being a linguist: what he considered his duty was to write very short grammars and dictionaries for the use of beginners. He had the utmost contempt for the professors who were studying the older states of Celtic languages without paying any attention to the living languages. What he deemed important in linguistics is what is called sociolinguistics, the study of the historical conditions of the decay of the Breton language, and the linguistic survey of Breton speakers. He also had some personal ideas about what should be done to create a Breton literature.

During the Allied forces' bombing of Brest in 1941 his house was destroyed and he lost his rich Breton library. The German occupation seemed to him to be the unique opportunity to restore the Breton language and culture: he agreed to collaborate, first as a radio speaker, then as the president of the newly founded Keltisches Institut in Rennes (1941–1944), an organization promoted by the Germans to seduce and unify all the different political and cultural Breton movements. He tried to unify the written language and proposed a new spelling (its main feature is the use of-zh- for what is pronounced /z/ in most dialects, but /h/ in the Vannes dialect). Arrested in 1945 and charged with 'cultural collaboration,' he was sentenced to ten years of 'indignité nationale,' which meant he could not work as a teacher anymore. He was also banned from Brittany. Later on he received a post in the Dublin Institute for Advanced Studies, where he began a scholarly and scientific career editing older texts and compiling a vast historical dictionary of Breton, published in roneotyped fascicles. It was quite a surprise for those who had read his venomous attacks against Celtic scholars and Celtic philology, in the first issues of *Gwalarn*. His *Historical morphology and syntax of Breton*, conceived as a traditional grammar, suffers from a lack of information both on the sources used, and on the relevant literature: the author seems to have systematically ignored what had been written before him, by Joseph Loth (*see* **Loth, Joseph (1847–1934)**), and *Le verbe breton* by Pierre Le Roux (*see* **Le Roux, Pierre (1874–1975)**), and others. His scientific work is restricted to two modest, but useful handbooks. He will be mainly remembered as a leader of the Breton cultural movement, to which he devoted his life with extreme courage.

See also: Le Roux, Pierre (1874–1975); Loth, Joseph (1847–1934).

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Eugénie Henderson was born in Newcastle in 1914. A specialist in the languages of Southeast Asia, she became the first female professor of phonetics in Britain in 1964. She retired in 1982 and died in London in 1989.

Henderson was introduced to phonetics at University College London (UCL) in the early 1930s. Daniel Jones, Professor of Phonetics at UCL, offered her private tuition and encouraged her to investigate the phonetics of Siamese. In 1938, he appointed Henderson assistant lecturer in the Department of Phonetics.

During the war, Henderson moved to the London School of Oriental and African Studies (SOAS). In 1942, she was appointed Lecturer in Phonetics in the Department of Phonetics and Linguistics, where she assisted J. R. Firth, later Professor of General Linguistics at SOAS, in running Japanese courses for army personnel. After the war, she decided against returning to UCL and in 1946 became a senior lecturer at SOAS, where she spent the remainder of her career.

The postwar years saw the development at SOAS of prosodic analysis, an approach to phonology that abandoned autonomous, segmental phonemic analysis as practiced, for example, by Jones, instead focusing on the interaction between phonetics and other levels of analysis, such as morphology and syntax, and assigning phonetic features to structural units throughout the linguistic hierarchy, such as the syllable and phrase. Henderson played an important role in its development and propagation; most notably, her *Prosodies in Siamese* was cited prospectively in Firth's 'Sounds and prosodies' (1948) and is widely considered the most convincing exposition of the prosodic approach.

Henderson was appointed Reader in Phonetics in 1952 and headed the Department of South East Asia and the Islands and the Department of Phonetics and Linguistics throughout the 1960s. In 1964, she obtained a professorship in phonetics. In her inaugural lecture, published as *The domain of phonetics* (1965a), she described phonetics as a branch of general linguistics best practiced alongside work in other linguistic disciplines. Her *Tiddim Chin* (1965b), an analysis of two texts based on fieldwork in Burma, was another comprehensive demonstration of this approach, with phonetic description informed by, and informing, grammatical analysis.

Like Firth, Henderson saw many of her linguistic views anticipated by the 19th-century phonetician Henry Sweet. She regularly cited Sweet in her teaching, and in 1971 she published a selection from his writings, taking its title, *The indispensable foundation*, from Sweet's description of the place of phonetics in linguistics.

Henderson's empirical work covered numerous varieties of Southeast Asian as well as Caucasian, Indo–Iranian, and Austronesian languages. In her retirement, she collated materials collected earlier for a Karen dictionary, but she died before completing the project, weeks after the publication of a festschrift in her honor, appropriately titled *South-east Asian linguistics*.

See also: Firth, John Rupert (1890–1960); Firthian Phonology; Jones, Daniel (1881–1967); Prosodic Aspects of Speech and Language; Sweet, Henry (1845–1912).

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Herder, Johann Gottfried (1744–1803)

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Born in Mohrungen, East Prussia, the son of a choirmaster and teacher, Johann Gottfried Herder went to Königsberg in 1762 and studied theology and philosophy with Kant and Hamann. He became involved in a critical examination of both Kant's rationality and Hamann's irrationality. In Riga in 1764, he taught at the cathedral school, then took up a position as a minister. He became well known for his essays and reviews, outlining a history of classical poetry from a universal–historical point of view (*Fragmente über die neure deutsche Literatur*, 1767–1768). He criticized the leading figures of both the Enlightenment and church orthodoxy. In *Kritische Wälder* (1769), he praised the freedom of arts and language.

He traveled in Europe in 1769 and spent four months in Nantes reading French Enlightenment authors. In his *Journal meiner Reise im Jahre 1769* (1769), an important text of the 'Sturm und Drang' literary movement, he looked at a universal history of ideas, transformed into pedagogical concepts. He visited Brussels, Antwerp, Leiden, Amsterdam, Hamburg (where he met Lessing), Euten, Darmstadt, Lübeck, and Strasbourg, where he met Goethe (1771); in Paris, he came close to French artistic life; he criticised the Encyclopedists, as did the German Romantics.

The Berlin Academy of Sciences raised the question of the origin of language, asking (1769) if man, left to his natural capacities, could invent language and by which means? (Introduction to Herder, 1772, reprint 1995: "En supposant les hommes abandonnés à leurs facultés naturelles, sont-ils en état d'inventer le langage? Et par quels moyens ... ?" Herder introduced his essay with the first part of this question: "Haben die Menschen, ihren Naturfähigkeiten überlassen, sich selbst Sprache erfinden können?") Herder's *Abhandlung über den Ursprung der Sprache*, was distinguished by the academy out of 30 propositions (and published in 1772).

Herder's role in literature expanded through his friendship with Goethe and the influence he had on him. Herder became a preacher at the court of the ruling house in Bückeburg (1771) and was married the year he formulated, in *Von deutscher Art und Kunst* (1773), an artistic ideal of intense passion, typical of the 'Sturm und Drang' movement; he adhered to this ideal mostly in his adaptations of what he called '*Volkslieder*.' Herder rejected an artificial divide between the common people ('*Volk*') and the intellectual elite, celebrating folk culture and folk literature and defending simple language based on the vernacular. Through Goethe's intervention, he became general superintendent of the Lutherian clergy in Weimar in 1776.

Ideen zur Philosophie der Geschichte der Menschheit (1784–1791), a most famous work in philosophy of history, showed his interest in continuity, development, and origins, and was criticized by Kant. Among others, he published *Zerstreute Blätter* (1785–1797), *Briefe zur Beförderung der Humanität* (1793–1797), *Christliche Schriften* (1794–1798), and translations (*Der Cid*, 1802–1803). *Metakritik zur Kritik der reinen Vernunft* (1799) was an empiricist attack on Kant's theoretical philosophy.

For Herder, language reflected the national character of its speakers (as in *Fragmente*), and this was similar to Humboldt's ideas. In the *Abhandlung*, he discussed Süssmilch's thesis about the divine source of language, and Condillac's theory about humans' animal-like biology being the source of language. He asserted language was not God-given but man-made. He suggested that the origin of language was a combination of gesture and natural reflex cries, developing into regular utterances, then into poetry. A specific human quality enabled man to identify an object by selecting the features which characterize it (the lamb is identified by its bleat, and the observer bleats mentally when seeing a lamb: this process contributes to language). Herder's idea was: let's accept this aptitude as a gift of nature; the key to human nature is the ability to perceive and to differentiate, the key to it is language, thought and language being bound together.

Herder had a big influence as a philosopher, a historian of literature, and a philosopher of language, due to his empirical approach to languages, his psychological theory of interpretation, his sense for variation, his rejection of normative judgments ("Jeder Mensch muss ... jeden Begriff in jedem Wort so verstehen, als wenn er ihn erfunden hätte," *Journal meiner Reise*, 1769). In 1784, in his philosophy of history, Herder reacted against the naturalism of his *Abhandlung*, and against the 'Aufklärung' movement, turning toward a sociology of language. This made a serious contribution toward including languages in the study of human evolution. Herder was between tradition and innovation; according to him, every linguistic system presented one 'vision of the world,' a 'Weltanschauung,' an 'internal form' of language. The genius of a language is at the same time the genius of a people's literature. True poetry draws from popular and national heritage.

He claimed France was decadent : "Man wohnt auf den Ruinen," "Die grosse Ernte ist vorbei" (*Journal meiner Reise*, 1769) (nevertheless, he placed the French language above all, even above Latin!). Herder also appeared as leading from a cultural nationalism to a political one. National Socialism easily managed to appropriate Herder's nationalist interpretation of *Volk* and *Nation*.

But opinions about Herder changed; uses of the term *Volk* have been reinterpreted. His universal perception of culture, his theory of diversity of languages, integrated in culture and life of nations, are greatly appreciated. His *Metakritik* (1799) even offered a system of grammatical categories, derived from fundamental and universal functions of sensible experience. We may learn from him concerning linguistic diversity, cognitive activity, and creativity.

See also: Condillac, Etienne Bonnot de (1714–1780); Hamann, Johann Georg (1730–1788); Humboldt, Wilhelm von (1767–1835); Kant, Immanuel (1724–1804).

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Hermeneutics

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Hermeneutics, the systematic study of interpretation, enjoys an uncertain status midway between an art and a science. It takes its name from the Greek messenger god Hermes, and the early use of ἑρμηνεύς 'interpreter' as it appears in Plato.

The first work that deals with interpretation as a process of principled enquiry is Aristotle's *On Interpretation* [Περὶ ἑρμηνίας], which is from that part of the *Organon* that deals with categories and logic. Aristotle is primarily concerned with designating nouns and verbs, and making extant the grammatical construction of propositions. He seeks to arrive at a procedure for the affirmation or denial of statements, and a reliable method for avoiding contradiction within and between statements. Aristotle's *Poetics* and the *Rhetoric* reflected on the organization of discourse, its ability to persuade, and its use of schemes and figures such as metaphor, metonymy, irony, and antithesis. Such rigorous, rhetorical analysis of speeches and written texts was the major approach to language in the classical period. To this, in later antiquity, there was gradually added a rudimentary philology; a regard for original meaning and its temporal modification, and in the Library at Alexandria, there developed rules of consistency in understanding and editing texts.

These developments became vital for the early church in the establishment of a canon of Christian texts, which had to be separated from an abundance of apocrypha and reliably translated. Important organizing principles of consistency, such as the belief that the New Testament realized the prophecies of the Old, made it possible to perceive a symmetry and completeness in Biblical texts, as well reduce the prolixity of interpretations. The pursuit of allegorical readings of the Pentateuch, such as those of Philo, attempted to reconcile Hebrew texts with Hellenistic philosophy by adducing a series of hidden meanings,

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Huponoia, which were often at alarming variance with the surface meaning. The dogma of the early church sought to establish an order and discipline in such readings, and hermeneutics became the area of theology concerned with this task.

A tradition of understanding and interpretation gradually developed, but this tradition was never entirely secure as we can see in Dante's multileveled allegory, explained in his *Letter to Can Grande*, and in the Renaissance taste for 'mysterious meanings,' in which the veiled obscurity of hermeticism, rather than unambiguous truth of clear exposition, seems to be the real goal.

The Reformation challenged the accepted practices of theological hermeneutics. Refusing to be bound by the instituted Catholic doctrine of tradition and asserting the interpretive freedom of the inspired individual soul, Lutheran exegesists developed a procedure of interpretation that recognized the vital role of the person making the interpretation. In *The idea of the good interpreter* (1630) Johann Dannhauer proposed a '*hermeneutica generalis,*' a universal hermeneutics that could be applied to all texts.

Both of these strands, the general and the particular, were developed by the chief modern exponent of hermeneutics, Friedrich Daniel Ernst Schleiermacher (1768–1834). Schleiermacher united the Kantian principle of the synthetic power of the mind to make sense of the world with a careful philological and grammatical examination of individual texts. The 'higher criticism' of contemporary exegesis sought to synthesize sacred writing on the basis that it was fundamentally the work of one unchanging Divine Author, however the incarnation of Christ at a particular moment, 'the *Kairos,*' meant that historical time and events also had a crucial importance for interpretation. This perspective is reflected in Schleiermacher's attention to the varieties of language used by individual Gospels, John being more Greek than Hebrew, and Luke being essentially Greek, and also how language as a system changed through time. To attain full understanding, one had to consider the meaning and usage of words at a particular time. Schleiermacher cited I. Cor. 12 in support of the idea that the Holy Spirit changes perspective from time to time, and from one human vessel to another. Schleiermacher reconciled the synchronic, the diachronic, and the eternal in his hermeneutic and also developed what he termed an art, '*Kunstlehre,*' of 'avoiding misunderstanding.' The most noted principle of Schleiermacher's art is the 'hermeneutic circle' in which the whole, whether it be an entire text or a context of language use, is understood through the examination of particular individual usage and texts, and conversely an individual passage or text is understood by looking at its general context or the whole text; the whole conditions the particular and the particular the whole.

Schleiermacher's chief successor in philosophical hermeneutics, Wilhelm Dilthey (1833–1911), continued the process of secularization, using hermeneutics as the basis for human sciences, *Geisteswissenschaften*, which proceed through understanding of the meaning of phenomena, in contrast to the physical sciences, which proceed through the explanation of phenomena. Individual expression and meaning is formed by the prevailing worldview, *Weltanschauung*, of a particular place and time, and by considering this formation objectively, it is possible for hermeneutics to understand an individual author better than he understood himself. So, Dilthey's vast biography of Schleiermacher painstakingly recapitulates Schleiermacher's ideas in their context. From this point, much hermeneutic thought becomes concerned with its own development.

In the 20th century, Paul Ricouer identified the 'hermeneutics of suspicion' in the work of Marx, Nietzsche, and Freud, who interpreted individual consciousness to be largely a deception wrought by the forces of production, the will to power, and the unconscious respectively. The interpreter has to meet guile with double guile and overcome the resistances and distortions of individual expression, so revealing the precarious abyss of truth that lies beneath the surface. Additional suspicious interpretation is the deconstruction of texts in the work of de Man and Derrida.

In the same period, the ontological hermeneutics of Martin Heidegger sought to uncover the historical nature of Being, and his pupil Paul Gadamer developed the notion of *Horizontverschmelzung*, the merging of the life worlds of the interpreter and the interpreted.

Latterly, Umberto Eco has tried to find a way of limiting and containing the proliferation of hermeneutic readings, and those deconstructive interpretations which seem, however sophisticated, to be at variance with plain sense.

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Hervás y Panduro, Lorenzo (1735–1809)

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Lorenzo Hervás y Panduro was born in Horcajo de Santiago, a small village near Cuenca (Spain) on May 10, 1735, and died in Rome, Italy, on August 24, 1809. He joined the Jesuit Order at the age of 11 and pursued a typical career, passing his novitiate in the Colegio de la Corte, studying theology and philosophy at the University of Alcalá de Henares, and being ordained as a priest in 1760. After teaching in Cáceres, Madrid, and Murcia, this period of his life was concluded by the expulsion of the Jesuits from Spain in 1767. Hervás went to Italy (Cesena, Rome) and started working on a large encyclopedia of mankind, which was published in Italian and included an early catalogue of the known languages of the world. Later Hervás published a much more extensive catalogue of the languages of the world in Spanish. The material classified by Hervás had been collected by his fellow monks while working as missionaries in foreign countries. Language descriptions, as well as translations of religious and catechist texts provided by this exceptional setting, were much more comprehensive than any personal linguistic experience could have been. Hervás became a member of the Royal Academy of Dublin and of the Etruscan Academy of Cortona, theologian to the Cardinal Albani, librarian of Pope Pius VII, and finally member of the Basque Economic Society.

Hervás' studies on the theory of language are subordinate to his attempt to create a synthesis between religious dogma and the new Enlightenment culture and philosophy. In this context, Hervás accepted empiricist methods of cognition and discussed common 'ideological' topics, such as the observation of communication among deaf people and the functional description of the relations between language and thought. Discussing subjects such as the origin of language and the relations between languages, thinking, and history of a people, Hervás did not conceal the contradictions between his fundamental position and the arguments borrowed from current linguistic theories. What helped him to reconcile Enlightenment theories of language with the biblical account of its origins was an emphasis on the arbitrary nature of language signs. It is especially the arbitrariness of the linguistic sign, along with diversity in language, that proves divine intervention. If men had developed language on their own, there would have been no differences among languages, because the same sense organs would have led to the same results everywhere. On this basis, a collection of the different languages of the world would become a collection of empirical evidence of the divine creation of language and the duality of language and thought. Following this anthropological objective of the catalogue,

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Hervás declared languages to be the best criterion for the classification of peoples. According to Hervás, there are three areas in which languages can differ: words, grammatical structure (*el artificio gramatical*), and pronunciation. Each of them can be useful in the comparison of languages and the classification of peoples, but the most reliable criterion is grammatical structure. The stability of grammar makes it a suitable guideline for the classification of peoples.

See also: 18th Century Linguistic Thought; Origin of Language Debate; Sign Theories.

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Hesitation Phenomena and Pauses

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Disfluency

Conversations involve two or more speakers producing utterances partly in succession, partly in overlap. Utterances must be formulated in real time in response to the immediate demands of the interaction. It is in the nature of such a complex task that the participants in a conversation will make errors during their turn at talk and face problems formulating and producing utterances in a short enough space of time. A typical problem is difficulty in finding an appropriate word or expression. If this problem arises when a speaker has already begun talking then the fluent production of an utterance must be temporarily suspended while an appropriate word or expression is looked for: the speaker hesitates. One might think that a speaker could accomplish this task by stopping talking and remaining quiet until an appropriate word or expression is found and then resuming their talk. However, speakers use a number of phonetic strategies which signal to other participants in the conversation that they are experiencing problems, but at the same time attempting to hold the floor.

This article describes the phonetic shape of some of the hesitation strategies used in English and other languages.

Pauses

Daniel Jones, a well-known British phonetician from the first half of the 20th century, considered pauses to have two main functions: "Pauses are continually made in speaking. They are made chiefly (1) for the purpose of taking breath, and (2) for the purpose of making the meaning of the words clearer" (Jones, 1969: 274).

Jones considered both kinds of pauses to be taken at major syntactic boundaries such as the end of

clauses or sentences. Although Jones didn't specify this, it soon becomes clear when we look at conversation that his description can only really be applied to a text being read out loud. Later research has shown that pauses have a wealth of different forms and functions in natural spoken discourse.

Some of the earliest and most important work to investigate hesitation and pauses was carried out by Goldman-Eisler in the 1950s and 1960s. The most important results of this research are described in Goldman-Eisler (1968). She drew her spontaneous speech from a number of sources: description of cartoon strips; discussions with adults and juveniles; psychiatric interviews. She also used controlled experiments, such as measuring the time it takes for a speaker to produce a word missing from a sentence. She hypothesized that hesitation could arise from three distinct areas in utterance planning:

- **content:** what the speaker wants to say;
- **syntax:** what order to place the words in;
- **lexis:** choice of words to use to express the semantic content.

One of the main findings to come out of this work was that pauses occur most frequently before content word classes such as nouns, etc., i.e., those places where the range of possibilities is greatest.

Although an unfilled pause represents a period of acoustic and auditory silence, it need not be a period of articulatory inactivity. Research on English conversation has shown that the way in which a speaker starts and ends a pause provides important information for other participants as to whether a turn is finished or not. In particular, by initiating a pause in a particular way a speaker can hold his/her turn despite the silence. Local and Kelly (1986) analyzed a number of pauses that occurred after conjunctionals, such as *but, well, so*. In a previous study of the same data, Jefferson (1983) had come to the conclusion that pauses after such items could involve talk being continued by the same speaker (= intra-utterance pause) or were considered by another speaker to be a legitimate location at which to begin his/her turn.

Local and Kelly showed that the pauses following conjunctionals fell into two different phonetic classes which correlated with different interactional behaviour: 'holding' and 'trail-off' silences. In the first, intrautterance 'holding' pause, the speaker begins the pause with glottal closure and holds this closure until the beginning of the next word after the pause. In the second type ('trail-off') there was no glottal closure, at the beginning of the pause. There was often an audible outbreath after the conjunctional, and speakers reduced tempo and loudness during the four or five syllables before the pause.

Um-ing and er-ing – Filled Pauses

Dictionaries generally include one or more entries describing sounds made when speakers hesitate. So, for instance, the Collins English Dictionary contains the entries *um* and *er* as "a sound made when hesitating in speech."

In addition to merely producing silent pauses of different types when hesitating, speakers often explicitly verbalize that they are experiencing difficulties by producing *er* or *um*. They have variously been called hesitation particles, editing terms, or merely filled pauses (in contrast to silent pauses).

One interesting feature of hesitation particles is that they are unlike the regular words of a language. This is not surprising, as one of their main functions is to signal that a speaker is having problems with finding the appropriate words. One question that remains unclear is the way in which hesitation particles fit into the sound systems of different languages. Levelt (1983, 1989) suggests that the vowel of hesitation particles in some languages may represent the neutral position of the vocal tract, whereas in others, the distinct noncentral vowel suggests that the form has become lexicalized, i.e., it is treated as a full-blown word of the language. He suggests that this is likely to be the case for Swedish [ɛ]. Likewise, the back open [ɑ] used in Chinese or the front rounded [ø] heard in French are both vocalic items that are distant from any neutral vocal tract position.

Although Levelt's division into lexicalized particles and neutral vowel particles is appealing, the division is problematic. Speakers of both German and English use hesitation particles with central vowels; however, acoustic studies (Shriberg, 1994; Pätzold and Simpson, 1995) for both languages have shown that the vowel qualities, despite being in the central area of the vowel space vary too much between speakers to be representative of a speaker's neutral vocal tract position. Pätzold and Simpson (1995) looked in detail at the hesitation particles produced by a small sample of North German speakers and found that the vowel qualities between speakers varied greatly. However, the vowels did share one important property: they were not the same quality as the vowels found in the regular lexical items of the speakers. Likewise, Shriberg (1994) found a similarly large variability in vowel qualities in a large corpus of spontaneous American English.

Other phonetic aspects of hesitation particles also set them apart from the words of a language. The

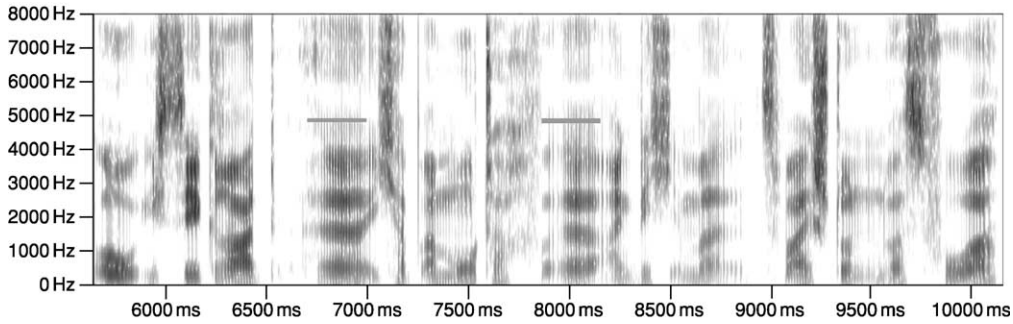

Figure 1 Sonagram of the conversation extract ''oh ich seh' grad äh ich hab' am Montag äh eigentlich immer zwei Stunden was vor'' (''oh I see I always have something for two hours Mondays'') spoken by a North German male. The extent of the two hesitation particles ''äh'' are marked in gray.

syllables are often longer and louder than the most heavily accented lexical syllables in an utterance. Extract (1) is taken from the Kiel Corpus (IPDS, 1995–1997) and illustrates well the hesitation particles used by a speaker in a typical conversational turn (Hesitation particles are marked in gray, is an audible in-breath).

(1) Montag den vierten äh siebenten vierundneunzig dann die Vorbereitung schön ja bleibt nur noch festzulegen oh ich seh' grad äh ich hab' am Montag äh eigentlich immer zwei Stunden was vor äh das wär' also besser könnten wir's dann vielleicht auf den Dienstag verschieben ist zwar'n bisschen knapp mit der Zeit da wir schon am Mittwoch los sollen aber vielleicht Dienstag den fünften.

(Monday the fourth seventh ninety-four then the preparation good right all that's left now is oh I see I always have something for two hours Mondays so it would be better perhaps to move it to the Tuesday it's a bit tight as we're supposed to leave on Wednesday but perhaps Tuesday the fifth).

Figure 1 contains oscillogram and sonagram of an extract from the turn in (1). This extract contains two hesitation particles, again marked in red. Comparison of these portions with the syllables of the words reveal that the vowels in the hesitation particles are longer and have relatively stable qualities.

Sound Duration and Quality

Two further phonetic strategies used by speakers to signal problems in utterance formulation are sound duration and sound quality. One of the most common examples of this in English is in the particular pronunciation of the definite article *the*. In fluent speech, *the* has two forms in many varieties of British English: [ði] before vowels, e.g., [ðijʌðəz] *the others* and [ðə] before consonants, e.g., [ðəbʊk] *the book*. However, in conversation at places where a speaker is experiencing problems, the form [ðiː] is often found, regardless of whether the following word begins with a consonant or a vowel.

(2) that he spent two years as director of thi: y laeng uh what do you call it, thi:y you know, the thing that Arthur Delaney. started, in Kuwait (S.2.14.330). [example from Svartvik and Quirk used in Fox Tree and Clark, 1997: 159].

Fox Tree and Clark (1997) examined different forms of *the* ([ðə, ði, ðiː]) in relation to different types of disfluency in a large corpus of British English conversation (Svartvik and Quirk, 1980). An example of a conversational extract used from the corpus containing different forms of *the* (in red) is shown in (2). Fox Tree and Clark's most important finding was that after 81% of 'the' pronounced as [ði] or [ðiː] speech was suspended. By contrast, such a suspension was only found in 7% of cases in which *the* was pronounced as [ðə]. They concluded that the pronunciation of *the* with a close front vowel, and with possible lengthening is a signal to the other participants in a conversation that a speaker is experiencing a problem.

More generally, lengthening of a sound to indicate hesitation is most commonly found in grammatical items, such as prepositions, articles, conjunctions, etc. As was said above, it is these items which most often occur before content word classes, such as nouns, where the speaker may be experiencing problems finding the appropriate item.

Example

The sonagram in Figure 2 is a short extract taken from a dialogue elicited using the map task scenario (Anderson *et al.*, 1991). In this scenario, two speakers are given fictitious maps. A path is marked on one of the maps and it is the task of the speaker with this map to instruct the other participant where the path runs. What neither participant knows is that there are small differences between the landmarks on each map.

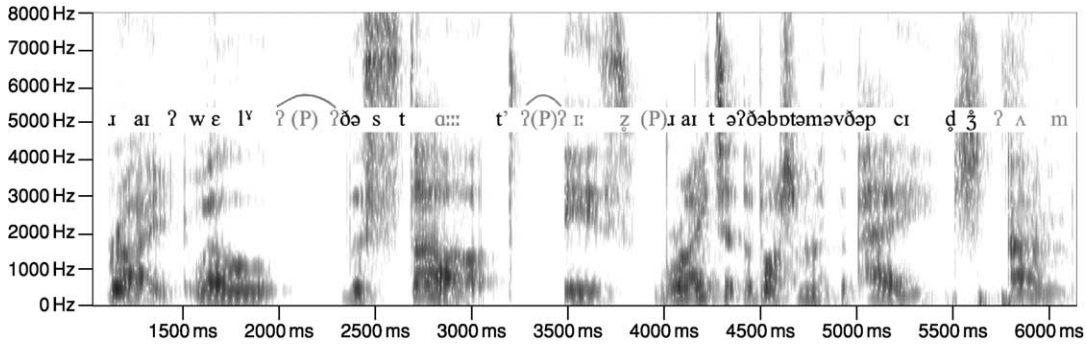

Figure 2 Sonagram and phonetic transcription of the conversation extract ''right well the start is right at the bottom of page um'' spoken by a female speaker. Portions which could broadly be linked with hesitation are marked in gray. Pauses are marked with (P).

The extract shown in Figure 2 is at the beginning of the dialogue and contains examples of many of the types of disfluency that have been discussed in this article. A broad phonetic transcription of the words and other interactional aspects of the extract have been approximately aligned with the relevant parts of the signal. Those parts of the extract that broadly can be associated with hesitation have been marked in gray.

The portions marked in gray make clear the relative amount of disfluent speech that can occur in a short extract of conversation. The first two pauses are of the 'holding' type that Local and Kelly (1986) describe, i.e., the speaker begins the pause by finishing one word with a glottal stop and holds this glottal stop until the beginning of the next word. Interestingly, in the second case the release of final alveolar plosive of *start* is ejective because a glottal stop has been formed before the stop closure is released. The words *start* and *is* are both long. The monosyllable *start* is approximately 750 ms long. By comparison the seven syllable stretch *right at the bottom of the* takes only approximately 1000 ms.

Hesitation and Speech Recognition

From the point of view of the person writing a computer program that recognizes spoken language, the speaker should ideally speaker in fluent, grammatically correct and semantically coherent sentences. However, as we have seen, conversational reality looks very different. Speakers produce silent and filled pauses throughout their talk, they break off utterances, leaving behind incomplete sentence fragments. Commercial applications such as a flight information and reservation services must be able to cope with the normal, disfluent speaker. For this reason, disfluencies, such as hesitation, have attracted a good deal of attention from speech technologists over recent years (O'Shaugnessy, 1992; Shriberg, 1994, 2001).

See also: Phonetics, Acoustic; Phonetics, Articulatory; Conversation Analysis; Prosodic Aspects of Speech and Language.

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Hesseling, Dirk Christiaan (1859–1941)

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Hesseling, a Dutch linguist and a true polyglot, counts as one of the fathers of modern creolistics. Born in Amsterdam, he enrolled in 1878 as a student of classical languages at the University of Leiden. In his student years he had the opportunity to visit Italy and Greece several times. In 1886 he defended a rather conventional doctoral thesis that dealt with an archeological subject and became a teacher of classical languages at the 'gymnasium' of the city of Delft. Accompanied by his young wife and two daughters, he spent a sabbatical in Paris in 1889, where he studied Modern Greek with Legrand and Psichari. There he became friends with the classical scholar Hubert Pernot (1870–1946), with whom he was to collaborate for many years. Following Hesseling's crucial turn towards the living languages, the year 1893 saw his appointment as a 'privaatdocent' (external unsalaried lecturer) in Modern Greek at Leiden University; in 1907 Hesseling was appointed to a special chair in that subject at the same university. As his courses were not compulsory, he always had a rather small number of students. Having retired in 1929, he died in Leiden in 1941.

Interested in the formation of the Greek *koine* and seeking to test his views on the development of modern Greek within the context of a general theory of linguistic change, Hesseling turned to the study of Afrikaans, the language of the Boers in South Africa, which is – in one way or another – a descendant of 17th-century colloquial Dutch. It was the first evidence of his interest in language contact and creole languages. Hesseling formulated the core of his approach to the origin of Afrikaans in an 1897 article and greatly elaborated his ideas on the subject in the book *Het Afrikaansch*, which was published in 1899 (2nd revised edition 1923) and is still regarded as the first truly scientific study of Afrikaans. He was of the opinion that Malay-Portuguese (Malaccan Creole Portuguese), the lingua franca in African ports, was the underlying cause for the curious and remarkably rapid grammatical transformation of the Dutch language at the Cape of Good Hope. As Ponelis (1999) points out, Hesseling placed emergent Afrikaans within the colonial Dutch contact situation. In his sociohistorical analysis of the 17th-century language contact situation at the Cape, he discounted the impact of either Koi or French and German on emergent Afrikaans. It was the creole Portuguese introduced by slaves that Hesseling considered to be the main factor in the development of Afrikaans from colloquial 17th-century Dutch.

Hesseling's views were favorably received by a number of linguists who elaborated them further. Objections against his hypothesis have been made by various South African scholars; D. B. Bosman (*Oor die ontstaan van Afrikaans*, 1923), for example, considered the change as a degeneration or corruption of Dutch as it was spoken by the numerous strangers of different nationalities, and partly assumes a spontaneous development. It was Marius Valkhoff who in 1966 brought Hesseling's work to the fore again and consequently provoked a fierce polemics.

Note that, Hesseling's involvement in the diachrony of early Afrikaans was partly stimulated by his passionate interest in the language politics of the emergent Afrikaans standard language. He was the first linguist of note who argued for the standardization of Afrikaans. His interest into language politics is also manifest in his writings on Dutch orthography. Hesseling was an fervent supporter of the simplification of the complicated Dutch spelling system, which was at the time mainly based on an antiquated version of written Dutch; he published a couple of excellent papers on this theme.

Having entered the field of creole studies by way of Afrikaans, Hesseling was to contribute to creolistics until the end of his life. In 1905 he published a monumental work on the Negerhollands of the Virgin Islands, which is a comprehensive historical study. As his bibliography (1939) shows, he also published

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on Papiamentu, on Canadian French, Ceylon-Dutch, and creolization in general.

In many respects, Hesseling can be seen as a follower of Hugo Schuchardt. They both held a Humboldtian conception of language, and both rejected Neogrammarian linguistic thinking. It appears that Hesseling shared Schuchardt's general approach to language and adopted various insights from him; in other respects he disagreed with the master of Graz. As the correspondence between Hesseling and Schuchardt reveals (cf. Gilbert, 1994), it was Hesseling who urged Schuchardt to publish the latter's now famous *Die Sprache der Saramakkaneger in Surinam* with the Royal Dutch Academy in Amsterdam in 1914. Other linguists he felt affinity with were Francisco Adolpho Coelho and Lucien Adam. At any rate, Hesseling's works constitute a fully fledged theory of creolization in its own right.

It is probably true to say that by writing in his native tongue and mostly on topics such as Afrikaans and Negerhollands, as distinguished and original a creolist as he was, Hesseling seriously limited his influence on modern creole research.

See also: Coelho, Francisco Adolpho (1847–1919); Humboldt, Wilhelm von (1767–1835); Schuchardt, Hugo (1842–1927); Valkhoff, Marius Francois (1905–1980).

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Heterosexism and/in Language

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Heterosexism

Heterosexism, like many other isms, points to particular social constellations and belief systems that privilege one way of inhabiting social space over others. In the case of heterosexism, that constellation involves the presupposition of a sex-based, binary distinction between male and female, a presupposition that provides a central and essentializing organizational strategy for many, if not most, cultures and societies spanning both space and time. This presupposition establishes heterosexuality as normal and normative and grounds a second binary distinction between heterosexuality and homosexuality, a distinction in which nonheterosexual forms of activity, identity, and community are denigrated or penalized and heterosexuality is privileged. Heterosexism captures the political, institutional, and cultural expression of this privilege. Assuming a girl has, or would have, a boyfriend is heterosexist, as is asking a stranger about his wife.

Just like other forms of oppression and discrimination, heterosexism can be manifest in both blatant and somewhat more insidious forms. Blatant heterosexism is found in areas of social life in which nonheterosexual identities are constructed as inferior, deviant, or deficient. Blatant heterosexism can be seen, for instance, in laws that govern criminally liable sexual behavior or that regulate who can and cannot be legally married. More insidious forms of

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Heterosexism and/in Language

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Heterosexism

Heterosexism, like many other isms, points to particular social constellations and belief systems that privilege one way of inhabiting social space over others. In the case of heterosexism, that constellation involves the presupposition of a sex-based, binary distinction between male and female, a presupposition that provides a central and essentializing organizational strategy for many, if not most, cultures and societies spanning both space and time. This presupposition establishes heterosexuality as normal and normative and grounds a second binary distinction between heterosexuality and homosexuality, a distinction in which nonheterosexual forms of activity, identity, and community are denigrated or penalized and heterosexuality is privileged. Heterosexism captures the political, institutional, and cultural expression of this privilege. Assuming a girl has, or would have, a boyfriend is heterosexist, as is asking a stranger about his wife.

Just like other forms of oppression and discrimination, heterosexism can be manifest in both blatant and somewhat more insidious forms. Blatant heterosexism is found in areas of social life in which nonheterosexual identities are constructed as inferior, deviant, or deficient. Blatant heterosexism can be seen, for instance, in laws that govern criminally liable sexual behavior or that regulate who can and cannot be legally married. More insidious forms of

heterosexism surface as a heterosexual bias through which nonheterosexual identities and communities are largely erased. Examples of this form of heterosexism are somewhat more difficult to specify, but include entitlement laws such as those governing inheritance, social services benefits and taxation, and cultural rituals such as school dances, 'family' picnics, and wedding receptions.

Heterosexism, Language, and Social Meaning

Given the seemingly nonlinguistic nature of heterosexism, in what ways is it useful to address the issue of heterosexism and language? This question recalls debates about sexism in language, which typically revolve around determining whether languages or speakers of languages bear the primary responsibility for creating and perpetuating sexism (or other isms). These debates are usually resolved through prescriptive interventions (such as guidelines on the use of gender-marked pronouns) and/or through a shift in focus away from language *per se* and toward language use. Critically, these debates highlight the potential for language and language variation to be part and parcel of sociocultural and political change.

Such debates also point to the linguistically constructed nature of social meaning. The fact that meaning is not fixed but rather emerges from ongoing social action means that it is impossible to predetermine what kinds of language use will be tied to social biases such as heterosexism or to predict what kind of linguistic patterns people with heterosexist or homophobic biases will exhibit. Language use that is interpreted as neutral by one person can be interpreted as sexist or heterosexist by another. Similarly, interactants can contest claims that their language use is biased. Despite these problems, the examination of heterosexism and language presents a number of benefits for the overall study of language. Refining social categories such as gender, which form the cornerstone of much research on language variation and change, constitutes one important benefit. Showing how language helps naturalize some versions of the social landscape over others presents another. Finally, the exploration of heterosexism and language illustrates how people resolve problems of adapting conventions of language use to changing social norms.

Heterosexism in Language: Kinship Terminology

As an example of how people can adapt linguistic conventions, some lesbians and gay men in the English-speaking world have reconfigured the English kinship system to help create new understandings of family relationships. Most kinship systems are centrally founded on heterosexual, procreative relationships and the (assumed) biogenetic ties that result. Although systems of kinship may differ in terms of how those biogenetic ties are conceived and ordered, most, if not all, encode some kind of gender binarism that at the very least locates a given individual (an 'ego') in terms of a web of relations organized according to gender distinctiveness. The English terms *mother/father*, *brother/sister,* and *aunt/uncle* are good examples of this binarism. English has a few gender-neutral kinship terms, for example, *cousin* or *spouse*, but in general the kinship system remains staunchly heterosexist even as family constellations have evolved to include a variety of groups of adults in myriad child-raising and nonchild-raising situations.

A look at the use of kinship terminology in some of these new family constellations reveals surprising patterns. For instance, work on kinship among gay men and lesbians in San Francisco, California, showed that gay men and lesbians who live in 'chosen' families (families consisting of close friends and romantic partners rather than kin) constitute those families in relation to their families of origin. Within such chosen families, traditional kinship terminology helps sustain nontraditional familial bonds. Thus, gay male and lesbian couples may reclaim spousal terms such 'wife' or 'husband' to refer to each other and in so doing disrupt the very gender binary traditionally encoded therein. Gay men and lesbians who use this terminology typically leave the gender specificity of the term intact (e.g., a lesbian will refer to her 'wife' and a gay man to his 'husband'), whereas homophobic discourses that use this terminology typically maintain the encoded binarism (e.g., deridingly asking a lesbian couple, "Who's the husband?"). Distinctions such as these illustrate the difficulties with trying to specify heterosexism within language itself. Even the blatantly heterosexist kinship system can be reinterpreted to capture nonheterosexist meanings.

Speakers may also use the available terminological system in novel ways. Thus, questions about whether someone is 'family' are sometimes used in the United States to covertly ask whether or not someone is queer. The 'auntie' relationship among U.S. drag queens captures a close intergenerational bond between an older (often retired) drag queen and a younger protégé, whereas the 'daddy/boy' relationship denotes a romantic relationship between an older and younger man. 'Daddy' relationships are also found in the leather community, where the 'daddy' is the dominant partner (male or female, young or old, 'top' or 'bottom'). These examples further illustrate the discursive flexibility available through language, even in seemingly closed systems like the kinship system.

Table 1 Female characters' use of the (ING) variable from six episodes of *Ellen*[a]

Character	*Character's sexual identity*	*Progressive verbs*	
		[ɪn]	*[ɪŋ]*
Ellen	Lesbian	62 (41%)	90 (59%)
Audrey	Nonlesbian	1 (10%)	9 (90%)
Paige	Nonlesbian	1 (6%)	16 (94%)
Laurie	Lesbian	13 (10%)	18 (90%)
Lois	Nonlesbian	0	8 (100%)
Random females (8)	Mixed (4 lesbian; 4 nonlesbian)	0	17 (100%)
Totals		77 (33%)	158 (67%)
	Lesbian	75 (41%)	108 (59%)
	Nonlesbian	2 (4%)	50 (96%)

[a]The difference between lesbian and nonlesbian characters in the use of this variable is significant at .01 (DF, 1).

Heterosexism and Language: Linguistic Variation

Many studies of language variation rely on quantitative analysis as a way of locating speakers (and their language use) in time and space. Although the social meaning of variation emerges *in situ* during face-to-face interaction, situating the social significance of that meaning typically requires a view of the data that goes beyond the strictly local. One such view occurs in the widespread popular assumption (or pseudo theory) that gay men sound more feminine than heterosexual men and lesbians more masculine than heterosexual women. Here, the power of an assumed, heterosexist gender binary is so strong that speakers use it to explain, justify, and order their perceptions of intragender variation in basically the same terms as they understand their perceptions of intragender variation.

Representations of Linguistic Variation in Popular Culture

Data from popular culture offers an excellent means of observing the extralocal process described earlier because popular culture often uses language as an especially powerful tool for presenting stereotypes about different kinds of people. A good example of language used in this way can be found in the television situation comedy *Ellen*, which aired on the ABC network in the United States from 1994–1998. Although this show had a strong following among gay men and lesbians from its start, the issue of homosexuality became front and center in 1997 when the main character openly acknowledged that she was lesbian. A number of different linguistic features showed variation that correlated with the sexual orientation of the characters on the show. So, for instance, the gay male characters on the show had higher average pitch values than did the heterosexual men, and the lesbians had lower average pitch values than the heterosexual women. This pattern mirrored the pattern for male and female characters more generally, with the men having lower average pitch than the women.

Similarly, characters showed differences in the realization of the progressive morpheme variable (ING). (ING) has two main variants in many varieties of English, a velar realization [ɪŋ] and an alveolar realization [ɪn]. Many studies of this variation have shown a correlation between the variant produced and gender, with the [ɪn] variant correlating with male gender and the [ɪŋ] variant correlating with female gender. The usage also correlates with other social factors (such as class, age and education level) and with situational changes (such as formality, politeness, and genre); however, these will not be of primary concern for this illustration.

In Tables 1 and 2, the characters have been divided first by gender (Table 1 shows all the female characters, and Table 2 shows all the male characters) and then by sexual orientation. When the variable /ɪŋ/ is compared for gender alone, there is a difference between the male and female characters. Although all characters produce more [ɪŋ] variants than [ɪn] variants, the female characters produce relatively more [ɪŋ] variants than the male characters (33% vs. 40%), a difference that is statistically significant ($p < .02$). The differences between male and female characters in the production of [ɪŋ] are mirrored by differences between lesbian and nonlesbian characters and by differences between gay and nongay characters. Although the various participants in this representation (writers, directors, actors, viewers) may or may not have perceived this pattern of language use as heterosexist, the fact that the same linguistic patterns that distinguished male and female characters also distinguished characters based on their sexual identities provides linguistic support for the foundation on which heterosexism is based, namely a naturalized, binary distinction between male and female. The

Table 2 Male characters' use of the (ING) variable from six episodes of *Ellen*[a]

Character	*Character's sexual identity*	*Progressive verbs*	
		[ɪn]	*[ɪŋ]*
Howard	Nongay	6 (55%)	5 (45%)
Peter	Gay	2 (15%)	11 (85%)
Spence	Nongay	8 (42%)	11 (58%)
Joe	Nongay	3 (75%)	1 (25%)
Random males (4)	Nongay	10 (50%)	10 (50%)
Random males (2)	Gay	4 (27%)	11 (73%)
Totals		33 (40%)	49 (60%)
	Gay	6 (21%)	22 (79%)
	Nongay	27 (50%)	27 (50%)

[a]The difference between gay and nongay characters in the use of this variable is significant at .04 (DF, 1).

degree to which the patterns found on *Ellen* resemble patterns from real-world lesbians and gay men is a matter in need of more research; however, much of the work that has been done on language and sexual identity has shown that gay and lesbian speakers make complicated use of the linguistic norms associated with both men and women. In addition, they also rely on norms that are specific to gay or lesbian identities and communities, once again highlighting the enormous flexibility afforded by linguistic variation.

Heterosexism is a general orientation to social life that often affects analysts as well as speakers, with the result being that many intragender variations are lost or ignored, especially when the focus turns to how 'women' or 'men' speak. A focus on the relationship of language and heterosexism calls attention to the importance of balancing similarities and differences within and across social groups, so that spurious generalizations are avoided and genuine patterns are identified. Such a focus also provides one specific way of organizing linguistic variation within a broader social and cultural matrix and in so doing helps mediate the production of social and linguistic meaning. Moreover, it offers a window into how speakers come to linguistic terms with changing social realities and cultural landscapes and ties the production of heterosexism to other oppressive discourses, such as racism, ableism, and sexism. There are many possible avenues for exploring heterosexism and language beyond those presented here. For instance, the discursive unfolding of heterosexism has been examined in contexts such as talk shows featuring lesbian and gay parents, college student slang, news accounts, and everyday conversation. Many disciplines outside linguistics have also seen considerable attention paid to the issue of heterosexism, among them psychology, communications, anthropology, sociology, political science, and cultural studies.

See also: Cameron, Deborah (b. 1958); Gender; Gender and Language; Gender and Political Discourse; Gender, Sexuality and Language; Identity and Language; Identity in Sociocultural Anthropology and Language; Indexicality: Theory; IN/ING Variable; Kinship Expressions and Terms; Language Attitudes; Language Ideology; Linguistic Anthropology; Media and Language: Overview; Queer Talk; Sexist Language; Television: Language.

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Highland East Cushitic Languages

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Demography

Highland East Cushitic (HEC) languages are spoken by some five and a half million people in south-central Ethiopia, in an area bounded generally by the 5th and 9th degrees of north latitude and the 37th and 39th degrees of longitude.

There are five HEC languages, from north to south Hadiyya, Kambaata, Sidaama, Gedeo (formerly Darasa), and Burji (formerly sometimes Bambala). A dialect of Hadiyya (i.e., mutually intelligible with it) separately reported in the 1994 census is Marak'o (or Libido). Dialects of Kambaata also separately reported in the census are T'imbaaro and a closely related pair Alaba and K'abeena. (Letters followed by apostrophes represent glottalic ejective consonants.) Sidaama has distinct regional dialects, as do Gedeo and Burji, but these are not usually distinguished by name or otherwise in the literature. A group of Burji left Ethiopia around the turn of the century, and live in and about the northern Kenya town of Marsabit.

Table 1 shows the numbers of ethnic-group members and first-language speakers of the five languages and nine named dialects as reported by the 1994 Ethiopian Census (Office of Population and Housing Census Commission of Ethiopia, 1998, vol. 1; also see Hudson, 2003). The 1994 Census reported 4 241 804 HEC first-language speakers, which is 7.9% of the 1994 Ethiopian total population of 53 477 265. Sidaama, the most populous HEC language, was the fifth most populous Ethiopian language, after Amharic (17 372 913), Oromo (16 777 975), Tigrinya (3 224 875), and Somali (3 187 053). The Census (Summary Report, 1998) suggested a multiplier of 1.37 to estimate 2005 total Ethiopian population, which yields a 2005 HEC first-language-speaker total of over 5.8 million. In fact, although Hadiyya and Sidaama may have increased speakers in such proportion, less populous varieties may have decreased.

Notice in **Table 1** that Alaba, K'abeena, and especially Sidaama are reported to have more first-language speakers than ethnic-group members. For Sidaama, this is consistent with its large number of speakers and presumptive function as a lingua franca in its region. The reason for this result for Alaba and K'abeena is less apparent.

The HEC territory is part of a linguistically diverse region of the West Rift Valley highlands where converge three of the six subgroups of Afroasiatic (Hamito-Semitic) languages: Cushitic, Semitic, and Omotic (the other three are Egyptian, Berber, and Chadic). Most of the HEC peoples share with Semitic 'Gurage' and Omotic peoples of this region a unique agro-ecology based on cultivation of the 'false banana' tree *ensete adulis*.

Classification

The HEC languages are Afroasiatic languages of the Eastern branch of Cushitic. The majority of Cushitic languages, some 19, are spoken in Ethiopia. The most populous Eastern Cushitic languages are

Table 1 HEC ethnic-group members and first-language speakers

HEC dialect	*Ethnic-group members, 1994 census*	*First-language speakers, 1994 census*
1 Burji	46 552	35 731
2 Gedeo	639 879	637 082
3 Hadiyya	927 747	923 957
4 Marak'o	38 093	36 612
Total 3–4	965 840	960 569
5 Kambaata	499 631	487 654
6 Alaba	125 894	126 257
7 K'abeena	35 065	35 783
8 T'imbaaro	86 499	82 803
Total 5–8	747 089	732 497
9 Sidaama	1 842 444	1 876 329
Total 1–9	4 241 804	4 242 208

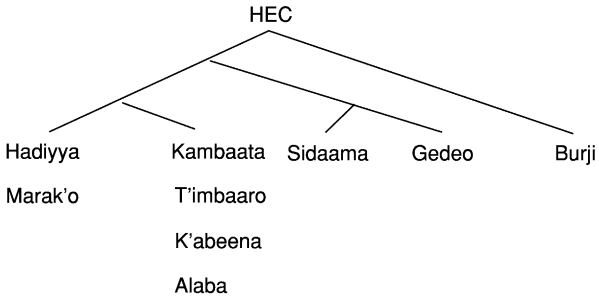

Figure 1 HEC language relationships.

Oromo and Somali. For an overview of Afroasiatic linguistics, see Hayward (2000). For a study of Cushitic grammatical characteristics, see Hetzron (1980), and for an overview of Cushitic classification, see Tosco (2000).

Figure 1 presents the tree-diagram of subgroupings within HEC, assuming mutual intelligibility within the Kambaata group. Burji is considerably divergent from the others, presumably reflecting its earlier separation from them. The general picture based on linguistic diversity, which is focused in southwest Ethiopia, is of south to north spread, with Burji the least moved and Hadiyya having diverged most recently from Kambaata. Oral traditions of these people often claim northern origins, but this is probably an influence of their Christian and/or Muslim faith.

Writing

The HEC languages were little written until the linguistic liberalization resulting after the Ethiopian revolution of 1974, which ended the unique official status of Amharic, and made Gedeo, Hadiyya, Kambaata, and Sidaama among the 15 languages promoted for literacy by the new government. Then the languages were written in the Amharic (Ethiopic) writing system. More recently, Ethiopian Cushitic languages have begun commonly to be written with the European-language alphabet. With further linguistic liberalization in the 1990s, Sidaama and Hadiyya, as the most populous languages of their areas, are now used, if limitedly, in primary education and local government, and in publications including newspapers, political writings, and fiction.

Typology

The HEC languages are typologically quite consistent as inflectional, suffixing, and head-final ('SOV'), and have closed syllables of limited types. A measure suggestive of diversity within HEC is percentages of cognates in a basic hundred-word list. Table 2 presents these figures for the five major HEC varieties, which range from 39% for Burji-Kambaata to 70% for Gedeo-Sidaama (Wedekind, 1990: 46). Mutual intelligibility between varieties is roughly expected by such figures from about 75–80% (see also Bender and Cooper, 1971).

Table 2 Percentage of cognates shared by five HEC varieties in a basic 100-word list

	Burji	*Gedeo*	*Sidaama*	*Kambaata*
Hadiyya	44	56	62	66
Kambaata	39	49	66	
Sidamo	47	70		
Gedeo	43			

Table 3 Ten basic words in five HEC varieties

Gloss	*Burji*	*Gedeo*	*Hadiyya*	*Kambaata*	*Sidaama*
bird	č'iid'aa	č'iʔa	č'iiʔ-iččo	č'iičču-ta	č'eeʔ-iččo
to bite	gama	gaʔma	gaʔmi	gaʔmu	gaʔma
bone	mič'a	miččʼo	mik'e	mik'a	mik'a
blood	č'eeǰi	mundee	t'iiga	k'egu	mundé
breast	ununa	unuuna	anuuna	anuuna	unuuna
to come	inta(j)a	daga	waari	waalu	daga
to die	re(j)a	re(ʔ)a	lehi	re(e)hu	rea
ear	d'aga	manša	mačč'e	mačč'a	mačč'a
five	umutta	onde	onto	onto	onte
foot/leg	luka	lekka	lokko	lokka-ta	lekka

A broad descriptive-comparative survey of the HEC languages can be found in Hudson (1976); additional comparative information focused on morphophonemics in Abebe *et al.* (1985); a study of subclassification and history in Hudson (1981); a Burji etymological dictionary in Sasse (1982); an HEC comparative dictionary in Hudson (1989); a comparison of Kambaata varieties in Crass (2001); and a survey of HEC morphology in Hudson (forthcoming). Analysis of Burji, Gedeo, and Sidaama texts is presented by Wedekind (1990) and of a Burji text by Kellner (2001). Some characteristic features of HEC grammar concerning phonology, verb and noun morphology, and syntax are discussed next.

Phonology

Typical HEC word structure, as well as information about other phonological characteristics, is suggested in Table 3, a selection of 10 basic words in the 5 languages. Words of Table 3 are written phonemically, but phonetic interpretation is straightforward. Characteristics that may be noted are typically open syllables, five-vowel system, contrastive vowel and consonant length, glottalic ejective consonants *t'*, *k'*,

Table 4 Epenthesis, assimilation, and metathesis in Gedeo past-tense verb formation

	Suffix of past tense	*af- 'get'*	*dar- 'tear' (vt)*	*daff- 'perspire'*
1 sg.	-enne	afenne	darenne	daffenne
2 sg.	-titto	affitto	dartitto	daffititto
3 sg.m.	-e	afe	dare	daffe
3 sg.f.	-te	affe	darte	daffite
1 pl.	-nenne	a[ŋ]fenne	darrenne	daffinenne
2 pl.	-tine	affine	dartine	daffitine
3 pl.	-ne	a[ŋ]fe	darre	daffine

č' (rarely also *p'*), glottalic implosive *d'* (in Burji 'bird', 'ear'), phonemic glottal stop, glottal onset *ʔm* ('bite'; there are also *ʔn* and *ʔl*), and word-internal syllables closed by sonorant consonants or the onset of long-consonants. In Sidaama and Kambaata, there are cases of final-syllable stress contrast, apparently resulting from shortened long vowels (cf. Sidaama and Gedeo 'blood').

Regarding HEC subclassification (Figure 1), apparent in Table 3 is the divergence of Burji, with its lesser number of apparent shared cognates, and the validity of subgroups Hadiyya-Kambaata and Gedeo-Sidaama, within which are more apparent cognates.

Characteristic of HEC languages other than Burji are pervasive processes of *i*-epenthesis, consonant assimilation, and nasal metathesis that 'conspire' to assure allowed syllable contacts when stems and suffixes combine in verb formation. These processes are illustrated in Table 4, which shows Gedeo past-tense suffixes in combination with verb stems *af-* 'get', *dar-* 'tear', and *aff-* 'perspire', the first with progressive assimilation by its stem-final obstruent of *t* of *t*-initial suffixes, the second with progressive assimilation by its stem-final sonorant consonant of *n* of *n*-initial suffixes, and the third with *i*-epenthesis between its stem-final long consonant and the consonant-initial suffixes.

Verb Morphology

The Gedeo examples of Table 4 also exemplify the typical paradigm of HEC verb formation, in which a monosyllabic verb stem combines with suffixes whose initial part is cognate with those of a general Afroasiatic pattern (seen as subject-prefixes in Semitic and Berber): first singular with an initial vowel (Gedeo *-enne*), second singular, second plural and third singular feminine in *-t* (*-titto*, *-ti-ne*, and *-te*), and plurals in *-n* (*-n-enne, -ti-ne, -ne*). Sidaama adds to the paradigm gender agreement in first-person and second-person singular, with final *o* for masculine and *a* for feminine, e.g., *afummo* 'I-masc. got', *afumma* 'I-fem. got'.

Also typical of HEC, with cognates elsewhere in Cushitic, are regular verb derivatives for causative in *-is*, passive in *-am*, and reflexive in *-id'* and its reflexes. Some examples from Sidaama are *aǰa* 'decrease' (vi.), causative *aǰisa* (vt.); *k'ana* 'suck', causative *k'ansa* 'suckle', *fana* 'open', passive *fanama*; *duna* 'pour', passive *dunama* 'leak', *afa* 'get', reflexive *afir'a*, *hasa* 'seek', reflexive *hasir'a*. Sidaama *r'* (of *-ir'* < *-id'*) is distinct from plain *r* only as it glottalizes preceding consonants, e.g., *k'ʔna* 'suckle,' reflexive of *k'ana* 'suck'.

A peculiar lexical phenomenon of Ethiopian languages whether Cushitic, Semitic, or Omotic, but perhaps particularly common in HEC, is verb compounds formed by words peculiar to the idioms plus the verbs 'say' for intransitives and 'do' for transitives. Examples with 'say' are Burji *naač'i i-* 'smile', Gedeo *dapp'i hiiy-* 'be tight', 'be quiet', Hadiyya *heešš y-* 'stoop', Kambaata *abb y-* 'rise', and Sidaama *beebi y-* 'be quiet'.

Noun Morphology

HEC has a singular ('singulative') as well as plural suffix, the former basically *-č*, or *-iččo* after obstruents. Plural formations are various, sometimes involving internal change, which is perhaps a Cushitic or Afroasiatic characteristic. Table 5 presents representative examples for all five languages.

The languages generally mark nominatives (and/or definites) with *-i*, but case marking is complex, perhaps under change, and more research is needed on this and others aspects of HEC grammar. Nominative vs. accusative marking has sometimes been considered a postergative phenomenon, as a generalization of the 'ergative' or subject-of-transitive case.

Sidaama (and perhaps other HEC languages to a lesser extent) has a phenomenon of gender-exclusive vocabulary (Anbessa, 1987). By a taboo on words beginning with the first syllable of her father-in-law's name, a woman must circumlocute or substitute words fixed in women's language for this purpose.

Table 5 Representative HEC singulars and plurals

Burji	*Gedeo*	*Hadiyya*	*Kambaata*	*Sidaama*
gota (sg.), gotanno 'sheep'	dureessa (sg.), dureeyye 'rich ones'	gaamelakiččo, (sg.), gaamela 'camels'	aburču (sg.), aburrata 'roosters'	hoončo (sg.), hoonna 'juniper trees'
hiliččo (sg.), hilaano 'calves'	geerčo (sg.), geeʔre 'old men'	hamašiččo (sg.), hamašša 'snakes'	bezzeečču (sg.), bezzeebeezzaa 'stars'	ille (sg.), illubba 'eyes'
č'uuwe (sg.), č'uuweenna 'chickens'	reččo (sg.), reʔe 'goats'	kina (sg.), kinnewwa 'stones'	lokkata (sg.), lokaakkata 'feet, legs'	ibiččo (sg.), ibiibe 'lice'

Table 6 Two sentences in HEC languages

Gloss	*HEC language*	*Sentence*
'This cow is fat'	Hadiyya	tu saay dilba-tte *this.fem cow fat-be.fem*
	Kambaata	ku saʔo gaana *this.masc cow fat*
	Sidaama	tini saa lowo-te *this cow fat/big-be.fem*
	Gedeo	tinni saa-yy-iččo furda-tt'e *this.fem cow-nom-sing fat-be.fem*
	Burji	ku saay-i gabboo-na *this.masc cow-nom fat-be*
'I cut (past) meat with this knife'	Hadiyya	maar ka billawi-n mur-ummo *meat this.masc knife-with cut-I.past*
	Kambaata	maala ka-n billawi-n murr-oommi *meat this.masc-with knife-with cut-I.past*
	Sidaama	maala tenné seet'e-nni mur-umm-o *meat this.fem knife-with cut-I.past-masc*
	Gedeo	maala konne šiifi-nni kut-enne *meat this.masc knife-with cut-I.past*
	Burji	maala ta sore-čč-ina mur-anni *meat this.fem knife-with-focus cut-I.past*

For example, a woman whose father-in-law's name begins with *ma* would use the word *basara* 'meat' instead of the usual *maala*.

Syntax

HEC syntax may be best presented in brief as in Table 6, which compares in the five HEC languages two sentences, one copular and one with a transitive verb.

See also: Africa as a Linguistic Area; African Lexicography; Afroasiatic Languages; Cushitic Languages; Ethiopia as a Linguistic Area; Ethiopia: Language Situation; Morphophonemics.

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Relevant Websites

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Hiligaynon

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Although legends and fabrications abound (see Scott, 1984), nothing is known historically prior to the Spanish. Alzina recorded that the Hiligaynons of Oton (Panay) traced their origin to Leyte (Kobak, 1969–70: 22), which correlates with the subgrouping.

The basic phonology of Hiligaynon consists of 16 consonants and 3 vowels; accent (stress) is contrastive. Native speakers educated in Spanish and English have an additional three consonants /f, j, ch/ and two vowels /e, o/. Accent (/á, í, ú/ with vowel length) occurs in an open penult. The vowel [o] is an allophone of /u/ in final syllables but is phonemic in loans. Accent predictably falls on a closed penult: *táytay* 'bridge.'

The glottal stop is written as a hyphen when it appears before another consonant: *bág-o* 'new,' *búg-at* 'heavy,' *gáb-i* 'evening.' It is ignored word-finally in most local publications; linguists have spelled it with *q* or an apostrophe. Accent, which is also not represented in the orthography, is critical in distinguishing words or derivations:

ámo 'boss' {Spanish}	*amó* 'thus, like that'
sá'og 'crawl'	*sa'óg* 'wear out by use'
bílin 'remain, stay'	*bilín* 'leftovers'
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Various morphophonemic changes apply in inflection and derivation:

Table 1 Hiligaynon sound system

Consonants				
Stops	Labial	Apical	Velar	Glottal
voiced	**b**	**d**	**g**	
voiceless	**p**	**t**	**k**	'
Fricatives	**(f)**	**s**		**h**
Affricates				
voiced		**(j)** [dy]		
voiceless		**(ch)** [ts]		
Continuants				
liquid		**l**		
rhotic		**r**		
semivowel	**w**	**y**		
Nasals	**m**	**n**	**ng**	
Vowels				
	Front	Central	Back	
High	**i**		**u**	
Mid	**(e)**		**(o)**	
Low		**a**		

Table 2 Hiligaynon Pronouns

Pronoun	*Topic*	*Oblique forms*		*Locative*
		preposed	*postposed*	
I	**akó**	**ákon**	**-ko / nákon**	**sa'ákon**
you [singular]	**ikáw / ka**	**ímo**	**-mo / nímo**	**sa'ímo**
he.she	**siyá**	**íya**	**níya**	**sa'íya**
we [+you / incl]	**kitá**	**áton**	**-ta /náton**	**sa'áton**
we [−you / excl]	**kamí**	**ámon**	**námon**	**sa'ámon**
you [plural]	**kamó**	**ínyo**	**nínyo**	**sa'ínyo**
they	**silá**	**íla**	**níla**	**sa'íla**

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you [plural]	**kamó**	**ínyo**	**nínyo**	**sa'ínyo**
they	**silá**	**íla**	**níla**	**sa'íla**

Intervocalic /d/ > [-r-]: *báyad* 'pay' > *bayáran* 'be paid'

With Spanish verbs, final /r/ changes to [-h-]: *probár* 'try' > *probahán* 'be tried.' Nasal final prefixes such as the distributive pang- yield nasal assimilation and consonant loss:

batí' 'hear' > *památi'* 'listen to,' *tíndog* 'stand' > *panindúgan* 'position,' *káhoy* 'wood' > *pangahóy* 'gather firewood'

Vowel loss is common with suffixation:

inóm 'drink' > *ímnon* 'be drunk,' *sunúd* 'follow' > *súndun* 'be followed'

Grammatical relations are shown by particles (*kag* 'and,' *na* 'now, already,' *mga* plural, *man* 'also, too,' *lang* 'only') or affixes: prefixes (*pag-* temporal verb, *ka-* companion noun), infixes (*-in-* passive past), suffixes (*-un* direct passive, *-an* local passive), or circumfixes (*ka* – an abstract noun, *gina* – an local passive progressive).

Nominals are inflected for case: common nouns (marked by *ang* topic, *sing*indefinite oblique, s*ang* definite oblique, *sa* locative) or personal names *(si* topic, *ni* oblique, *kay* locative; plural: *sanday* topic, *nanday* oblique, *kanday* locative). Demonstratives orient to person, locus, time, or anaphora. They have existential and verbal inflections.

Verbs are inflected for four voices (active, passive, instrumental, local), four tenses (past, progressive, contingent, future), three aspects (punctual, durative, distributive), and three moods (factual, command, potential).

Unmarked word order is V-S-O (verb-subject-object); because nominal constituents are case marked, word order can be free. Initial position by any nonverb usually serves to highlight or contrast.

(1) kahápon si Hwaníng nag'abút
yesterday TOP Johnny past active-arrive
'It was yesterday that Johnny arrived'

Two other markers are: *nga* (*-ng* after vowels), a ligature uniting nouns with other constituents and ka after numerals.

(2) matahúm nga babáyi
pretty LINK woman
'a pretty lady'

(3) ma'áyo-ng ága
ADJ-good-LINK morning
'good morning'

(4) duhá ka simána
two NUM week
'two weeks'

There are three negatives: *ayáw* 'don't!' IMPERATIVE, *walá'* + TOPIC or *waláy* + OBJ 'none' EXISTENTIAL, 'did

Table 3 Hiligaynon deictics

	Near me	*Near you*	*Far away*
Topic	**iní**	**iná'**	**ató**
Oblique	**siní**	**siná'**	**sádto**
Locative	**dirí**	**dirá'**	**dídto**
Existential	**yári**	**yára'**	**yádto**
Verbal	**karí**	**kará'**	**kádto**

Table 4 Hiligaynon verb inflection

Verbs	*Past*	*Progressive*	*Continent*	*Future*	*Command*
Active					
Punctual	**-um-**		**-um-**	**ma-**	**mag-**
Durative	**nag-**	**naga-**	**mag-**	**maga-**	**pag-**
Distributive	**naN-**	**nagapaN-**	**maN-**	**magapaN-**	**magpaN-**
Potential	**naka-**	**naka-**	**maka-**	**maka-**	
Passive					
Punctual	**-in-**		**-(h)on**	**-(h)on**	**-a**
Durative	**gin-**	**gina-**	**pag – on**	**paga – on**	**pag – a**
Distributive	**ginpaN-**	**ginapaN-**	**paN – on**	**paN – on**	
Potential	**na-**	**na-**	**ma-**	**ma-**	
Instrumental					
Punctual	**-in-**		**i-**	**i-**	**i-**
Durative	**gin-**	**gina-**	**i(g)-**	**iga-**	**ipag-**
Distributive	**ginpaN – an**	**ginapaN – an**	**ipaN –**	**ipaN-**	
Potential	**(ki)na-**	**na-**	**ika-**	**ika-**	
Local Passive					
Punctual	**-in – an**		**-an**	**-an**	**-i**
Durative	**gin – an**	**gina – an**	**pag – an**	**paga – an**	**pag – i**
Distributive	**ginpaN – an**	**ginapaN – an**	**paN – an**	**paN – an**	
Potential	**na – an**	**na – an**	**ma – an**	**ma – an**	

not' PAST or 'doesn't' PRESENT, and *díli'* 'will not' FUTURE or PREDICATIVE 'is not so'; a fourth, *bukún,* negates nouns and adjectives in some dialect areas.

(5) Walá' kitá sing baláy
NEG-EXIS we (incl) OBL house
'We have no house'

(6) Waláy baláy kitá
NEG-EXIS house we (incl)
'We have no house'

(7) díli' siyá manggaránun
bukún siyá manggaránun
neg-pred he/she rich
'He is not rich'

See also: Austronesian Languages: Overview; Bikol; Philippines: Language Situation; Tagalog.

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Hill, Archibald A. (1902–1992)

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Archibald Anderson Hill was born on July 5, 1902, in New York City. After the death of his father in 1908, he moved to California with his mother. He attended Pomona College and received his A.B. in 1923. He then went to Stanford University where he received his A.M. in 1924, and Yale University where he was awarded a Ph.D. in 1927. All these degrees were with a major in English. His interests extended into historical and structural linguistics, or neo-Bloomfieldian, as they were then called. He was the secretary-treasurer of the Linguistic Society of America from 1950 to 1968, and its president in 1969. He taught at the University of Michigan for four years, from 1926 to 1930, and at the University of Virginia from 1930 to 1952. In 1952, he joined Georgetown University as Vice-Director of the then Institute of Languages and Linguistics. From there he moved in 1955 to the University of Texas, where he taught until his retirement in 1972. He died in 1992.

His publications span the period from 1931–1975, beyond his retirement. They range in topics from literary and pedagogical to applied and theoretical linguistics (Jazayery *et al.*, 1978: 19–32). His career spanned the phenomenal growth and development in linguistics in America. He came into his own at the peak of the structural dominance in the field of linguistics in the 1950s, where the theory found its fuller articulation in books like *Methods in structural linguistics* (Harris, 1951) and *A course in modern linguistics* (Hockett, 1958), among others. His contribution was not so much theoretical as practical, and the best representative of his linguistic work is his *Introduction to linguistic structures: from sound*

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to sentence in English (Hill, 1958). It is here where one finds structuralism in action in a real language at all its levels, from phonetics to syntax, but not semantics, true to the claims of the theory.

It is within such a thorough application of the theory that one senses the rigor of structuralism. If one were to take a sample from this book as representative of the applications of the distributional method to discovering the essence of language, then chapter six on phonotactics is representative of such a method at its best, and it is a gem of a treatise on this abstruse topic for the beginner. All the chapters faithfully applied the structuralist methodology of distribution.

Just as structuralism was coming into its own, the winds of change were blowing across the linguistic landscape, and Chomsky's view of linguistics as expressed in his book *Syntactic structures* (1957) was getting a hearing and gaining ground among linguists. The publication of Hill (1958) might have been the last triumphalist call of the theory, as the Generative School was to supplant and supersede it within the decade across the linguistic landscape.

Archibald Hill holds the esteem of many colleagues in the fields of his interest. A 4-volume Festschrift (Jazayery *et al.*, 1976–1979) was dedicated to him on the occasion of his retirement and includes: (1) general and theoretical linguistics; (2) descriptive linguistics; (3) historical and comparative linguistics; and (4) linguistics and literature/sociolinguistics and applied linguistics. More than 150 linguists wrote the Festschrift, and it was a great tribute to a colleague.

See also: Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Harris, Zellig S. (1909–1992); Hockett, Charles Francis (1916–2000); Structuralism.

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Jane Hassler Hill was born in Berkeley, California on October 27, 1939. After taking her first course in linguistic anthropology at Reed College, Hill's fate as a scholar was sealed. Stirring a lifelong passion for language, Hill later continued her studies at UC Berkeley, where she completed a B.A. in anthropology in 1960, winning the prestigious departmental prize on graduation. For her graduate training, Hill traveled to UCLA, where she studied with William Bright and Harry Hoijer (*see* **Hoijer, Harry (1904–1976)**), two respected linguists in the Americanist tradition. There she completed an M.A. in linguistics in 1962, followed by a Ph.D. in anthropology in 1966. Hill is best known for her cutting-edge research in linguistic anthropology, encompassing everything from language contact and prehistory to worldview, racism, and language obsolescence. Hill is also a respected descriptive linguist.

Over the course of her career, Hill has contributed widely to Uto-Aztecan linguistics, starting with her dissertation on the Cupeño language of southern California. Following in the tradition pioneered by Franz Boas (*see* **Boas, Franz (1858–1942)**) and Edward Sapir (*see* **Sapir, Edward (1884–1939)**), Hill's work with several elderly Cupeño speakers led to the first definitive grammar of this virtually undocumented language, a study she followed with a series of articles on stress, lexicalization, clause structure, and verb classes. Decades before, one of Alfred Louis Kroeber's (*see* **Kroeber, Alfred Louis (1876–1960)**) students, Paul-Louis Fay, had conducted preliminary fieldwork on Cupeño, allowing Hill to compare Fay's notes with her own, and leading to a lifelong interest in language obsolescence. Hill has also published on issues of prehistory, contact, honorifics, and color terminology in the Uto-Aztecan language family.

Hill's longstanding interest in contact and attrition culminated with the publication of *Speaking Mexicano* in 1986, a work she coauthored with her husband, Kenneth Hill. Set in the Malinche Volcano

to sentence in English (Hill, 1958). It is here where one finds structuralism in action in a real language at all its levels, from phonetics to syntax, but not semantics, true to the claims of the theory.

It is within such a thorough application of the theory that one senses the rigor of structuralism. If one were to take a sample from this book as representative of the applications of the distributional method to discovering the essence of language, then chapter six on phonotactics is representative of such a method at its best, and it is a gem of a treatise on this abstruse topic for the beginner. All the chapters faithfully applied the structuralist methodology of distribution.

Just as structuralism was coming into its own, the winds of change were blowing across the linguistic landscape, and Chomsky's view of linguistics as expressed in his book *Syntactic structures* (1957) was getting a hearing and gaining ground among linguists. The publication of Hill (1958) might have been the last triumphalist call of the theory, as the Generative School was to supplant and supersede it within the decade across the linguistic landscape.

Archibald Hill holds the esteem of many colleagues in the fields of his interest. A 4-volume Festschrift (Jazayery *et al.*, 1976–1979) was dedicated to him on the occasion of his retirement and includes: (1) general and theoretical linguistics; (2) descriptive linguistics; (3) historical and comparative linguistics; and (4) linguistics and literature/sociolinguistics and applied linguistics. More than 150 linguists wrote the Festschrift, and it was a great tribute to a colleague.

See also: Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Harris, Zellig S. (1909–1992); Hockett, Charles Francis (1916–2000); Structuralism.

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region of central Mexico, among Mexicano speakers, a language that descends from classical Nahuatl, the book focuses on the structural effects of contact with Spanish. Over the centuries, Mexicano absorbed a number of features from Spanish, including nouns, verb roots, grammatical affixes, and syntactic templates. Though many Mexicano speakers are bilingual, the community as a whole has opted not to shift to Spanish across-the-board, owing to a pervasive ideology that attributes distance to Spanish and intimacy to Mexicano. Instead, the speakers of Mexicano have collapsed the opposition between the two languages in many settings, a situation that Hill and Hill describe as 'syncretism' rather than mere mixing. Once juxtaposed, speakers can either highlight or suppress the ideological overtones of the two speech forms, claiming the power, for instance, associated with Spanish or, alternatively, creating a subtle parody of the Spanish-speaking world. Ironically, a new ideology of purism, which places a strong preference on classical Nahuatl, now threatens what survives of the language today, with its strong Spanish influence.

Jane Hill has earned a reputation as one of the most distinguished scholars currently working in the tradition of linguistic anthropology. After a stint at Wayne State University, Hill accepted a position at the University of Arizona in 1983, where she currently holds the title of Regent's Professor. Hill also served a term as President of the American Anthropological Association in 1998–1999. In 2004, Hill was awarded the prestigious Viking Fund Medal, in recognition of her outstanding record of service and scholarly research in linguistic anthropology.

See also: Boas, Franz (1858–1942); Hoijer, Harry (1904–1976); Kroeber, Alfred Louis (1876–1960); Sapir, Edward (1884–1939).

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Hindi

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The Indo-Europeans came to India from the northwest about 4000 years ago. In India they called themselves *Arya,* 'noble honorable,' and called their country *Aryavarta,* 'abode of the noble.' Because of this ancient reference, today their language is known as *Indo-Aryan*. In regard to its structure and its continuity, Indo-Aryan can be divided into three periods: Old Indo-Aryan, Middle Indo-Aryan, and Modern Indo-Aryan.

Old Indo-Aryan is mostly represented by Sanskrit, which includes both Vedic and Classical Sanskrit. Middle Indo-Aryan is represented by three successive stages of development: Pali, Prakrit, and Apabhransha. Pali is the language of the canonical writings of the Theravada school of Buddhism. The various dialects recorded in the inscriptions of Ashoka (c. 250 B.C.) and other early inscriptions also belong to this first period. Prakrit, found mainly in drama and in the religious writings of the Jains, represents the second stage of development. Apabhransha, though known from texts of the 10th century A.D., was undoubtedly formed prior to this date. It represents the final stage of Middle Indo-Aryan. Hindi and modern Indo-Aryan languages, such as Assamese, Bengali, Gujarati, Kashmiri, Marathi, Nepali, Oriya, Panjabi, Sindhi, Sinhalese, and others, can be dated to about the end of the 10th century A.D. From then on, their development shows a gradual transformation into their present form.

As an Indo-Aryan language, Hindi is a branch of the Indo-European family of languages, and thus is a distant cousin of English, French, Greek, Russian, Spanish, and other Indo-European languages. The name 'Hindi' is a Persian word referring to the people who lived in the Sindhu river area. Later the word was used as a name for the language spoken around Delhi. This language has been called by other names, such as Hindavi, Hindui, and Hindustani. Hindi and Urdu are variants of the same language, which, in its common spoken form, used to be called Hindustani. Hindi is written in the Devanagari script, derived from one of the scripts used to write Sanskrit, while Urdu is written in a modified version of the Persian script, itself derived from the Arabic script. Along with Urdu, Hindi has been the dominant language of modern India and has had an impact on other Aryan and non-Aryan languages spoken in the country. Today it is spoken in most of India. In terms of total number of speakers, it ranks third in the world after Chinese and English. The percentage of the population of India that speaks Hindi is growing, and ranges upwards from 45%. Large language communities outside of India, including Nepal, Pakistan, Singapore, Malaysia, Burma, Mauritius, Trinidad, Guyana, and several countries in eastern and southern Africa also speak Hindi. Furthermore, Hindi is taught at many universities in the United States, Russia, Britain, and the Near East, as well as in other parts of Asia. Today Hindi is a symbol of Indian unity and nationality. It is the national language of India and the official state language of Bihar, Delhi, Haryana, Himachal Pradesh, Madhya Pradesh, Rajasthan, and Uttar Pradesh. Since Hindi has the largest number of speakers of any language in India, it is the medium of a great number of political, social, and cultural activities. Consequently, the economic and political influence of Hindi in India cannot be overlooked.

There are regional differences in Hindi, affected by the other languages that people speak. Within each regional variety of Hindi, there is considerable variation in speech according to the education and social standing of the speakers. This creates social dialects. Naturally, educated speech has more prestige and is thus embraced by government agencies, learned professions, political parties, the media, and institutions that attempt to communicate beyond their regional boundaries. It is this educated Hindi that has acquired the status of standard Hindi.

Underlying all these varieties, however, is a nucleus or common core shared by all speakers of Hindi. Unlike the other major modern Indo-Aryan and Dravidian languages of India, Hindi is not exclusively associated with any one region or province. Although it is the home language of a relatively small number of speakers (in Haryana, western Uttar Pradesh, northeastern Madhya Pradesh, and portions of eastern Rajasthan), Hindi in its various forms is a spoken and written language of practically all of northern India. It is also the most commonly understood Aryan language in the Dravidian south. Associated with all the different varieties of Hindi are the forms of formal and informal Hindi. The language used when giving instructions to a construction worker varies from the language used when discussing politics or poetry. Typically, the switch involves utilizing a particular set of lexical items habitually used for handling the topic in question. This tendency has produced informal Hindi, the language of everyday speech, which includes instructions to servants, waiters, workmen, clerks, etc., and formal Hindi, the language of films, newspapers, news magazines,

education, and literature. Formal Hindi is often marked by an abundance of words borrowed from Sanskrit. When the majority of borrowing is from Persian and Arabic sources instead of from Sanskrit, the language becomes formal Urdu.

Informal Hindi is usually used in speaking to children, and thus is acquired by children as their mother tongue. Children are often exposed to formal Hindi through their parents, but the actual learning of this variety is accomplished through formal education. In areas where the native language is different from Hindi, most speakers acquire Hindi through formal education. As stated earlier, Hindi spoken in these areas bears the influence of the native language, including elements from the native lexicon and phonology.

The sound systems of formal and informal Hindi constitute a single phonological system shared by both varieties; there are only a few phonemes and phonological rules found exclusively in formal or in informal Hindi. Like any language, the lexicon of Hindi consists of native words that have organically evolved from an earlier Indo-Aryan form and non-native words that have been borrowed from other languages. Sanskrit has been the primary source for borrowing in Hindi. After Sanskrit come Persian, Arabic, English, Turkish, and Portuguese borrowings, in that order. There are also a number of Dravidian words in Hindi, but most of them have come through Sanskrit. Hindi has also borrowed words from other modern Indo-Aryan languages, such as Bengali, Gujarati, Marathi, and Punjabi. As a result of these borrowings, the Hindi sound system has a large number of consonants and vowels, as shown in Table 1.

Like many Indo-European languages, Hindi has parts of speeches such as noun and pronoun, verb, adjective, adverb, postposition, and conjunction. Hindi nouns have two genders, masculine and feminine. Though these categories are largely conventional and do not necessarily correspond to natural gender, there is some element of semantic consistency for many nouns and their gender, which depend on sex, size, shape, and degree of abstraction. However, many gender affiliations remain arbitrary. The masculine gender nouns are associated with two different sets of stems and inflections and thus fall into two classes, *ā-stem*, such as gʰoɽā} 'horse,' and

Table 1

Hindi consonants	*Uvular*	*Glottal*	*Velar*	*Palatal*	*Retroflex*	*Alveolar*	*Dental*	*Labio-dental*	*Bi-labial*
Stops									
vls.	q		k		t		t		p
vls. asp.			kʰ		tʰ		tʰ		pʰ
vd.			g		ɖ		d		pʰ
vd. asp.			gʰ		ɖʰ		dʰ		bʰ
Fricatives									
vls.			χ	š	ʂ	s		f	
vd.		ʰ	ɣ			z			
Affricates									
vls.				c					
vls.asp				cʰ					
vd.				j					
vd. asp.				jʰ					
Nasals									
unasp.			ŋ	ɲ	ɳ		n	ɱ	m
asp.							nʰ		mʰ
Liquids									
unasp.					l ɽ	r	l		
asp.					ɽʰ		lʰ		
Semivowels				y				v	w

	Front		*Back unrounded*		*Back rounded*	
Hindi vowels	*Oral*	*Nasal*	*Oral*	*Nasal*	*Oral*	*Nasal*
high short	i	ĩ			u	ũ
high long	ī	ĩ̄			ū	ũ̄
mid short	e	ẽ			o	õ
mid long	ē	ẽ̄	a	ã	ō	ȭ
low short			ā	ã̄		
low long	ɛ̄	ɛ̃̄			ɔ̄	ɔ̃̄

non–ā-stem nouns, such as nāg 'snake.' The feminine gender nouns, likewise, are associated with two different sets of stems and inflections and thus form two classes: feminine *i-stem* nouns such as nānī 'maternal grandmother,' and *non-i-stem* nouns, such as bahū 'bride.' Hindi nouns also occur in various cases represented by two inflected forms of nouns: a *direct form*, which represents the function of a subject or a direct object and an *oblique form* with its postposition, which represents all other syntactic functions or cases. It is actually the postposition that indicates the particular case. An oblique form of a noun with the postposition kō also functions as a direct or indirect object (accusative or dative). When a transitive verb occurs in the *perfective*, the special postposition nē occurs directly after the subject, causing it to appear in its oblique form. This subject with nē is said to be in *ergative* case. In *ergative* constructions the verb agrees in number and gender with its direct object if this occurs in its direct form, that is, without any postposition; otherwise the verb, occurring in the masculine singular form, agrees with neither the subject nor the object. The non-ergative types of sentences in Hindi are the usual nominative-accusative type, in which the verb agrees with the subject in number and gender.

Hindi verbs are associated with the categories of *tense* (present, past, and future), *aspect,* (imperfective, perfective, and continuous), and *mood* (indicative, subjunctive, and imperative). These categories encode grammatical aspects of meaning, some quite specific and some relatively vague or generic.

In Hindi, in addition to *derivation*, by which new words are formed from existing words through affixation, for example, namak 'salt,' namkīn 'salty,' new words are also formed from existing words by processes known as *compounding*, for example, lāl pagaṛī 'red turban: a policeman,' and *reduplication*. To express the ideas of *continuance distribution*, *variety*, *exclusion*, or *emphasis*, words are often completely or partially reduplicated in Hindi, for example, bah-bah kar 'floating floating down: repeatedly floating,' g^{h}ar-g^{h}ar 'house-house: each house,' dēš-dēš 'country-country: various countries,' garam-garam 'hot-hot: real hot,' and badām-badām 'almonds-almonds: only almonds.'

As it can be seen from the following examples, Hindi is an SOV (Subject-Object-Verb) language and sentences in Hindi show a threefold agreement involving the inflectional categories of number, gender, person, and case. These agreements are (a) between a modifier (adjective, adjective participle, and genitive attributive) and the noun it modifies, for example, baṛā g^{h}ōṛā 'the big horse,' baṛē g^{h}ōṛē 'the big horses,' baṛī g^{h}ōṛī 'the big mare'; (b) between a predicative adjective and its subject, for example, (g^{h}ōṛā baṛā hæ 'the horse is big,' g^{h}ōṛē baṛe hæ̃) 'the horses are big,' g^{h}ōṛī baṛī hæ 'the mare is big'; and (c) between a finite or main verb with its subject or object noun or pronoun, for example, mē nē g^{h}ōṛā xarīdā 'I-ergative hors-masculine bought-masculine: I bought a horse,' mẽ nē g^{h}ōṛī xarīdī 'I-ergative mare-feminine bought-feminine: I bought a mare,' mē dōṛā 'I-masculine ran masculine', tum dōṛē 'you-masculine ran masculine,' tum dōṛī 'you-feminine anemone.'

See also: Hindustani; India: Language Situation; Indo–Aryan Languages; Indo–European Languages; Urdu.

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Hindu Views on Language

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From earliest times to the present day, Hinduism, considered as a religious rather than as a cultural phenomenon, has been based on the power and efficacy of words, and the 'saving knowledge' that brings about the ultimate welfare of the human being has traditionally been transmitted normatively by the spoken rather than the written word. In the Brahminic Hinduism that has in some sense regulated the lives of the majority of religious Hindus down the ages, the repository of saving knowledge has been the Vedas, which took over a millennium – from about 1200 B.C.E. to about the 2nd century C.E. – to assume their present form. The Vedas are regarded as *śruti*, or 'hearing': the hearing, that is, in the mind's ear by primeval sages in mythic time of a precise sequence of a large body of utterances comprising hymns, descriptions of rituals, explanatory and didactic stories, and expressions of religious teaching and experience. The language of the Vedas is a form of Sanskrit, and for traditional, orthodox Hinduism the Sanskrit of the Vedas has always had a mystique of its own, an inner potency that can be controlled and applied in certain circumstances for various ends.

Even in the present day, there is a residual deference in most Hindu minds toward the use of Sanskrit. This derives from the role Sanskrit played in Vedic religion, which in its early stages revolved around the Sanskritic utterance in the proper performance of the solemn sacrificial ritual and later involved the muttered or intoned use of Sanskrit as a meditative aid. The idea was that if ritual Sanskritic speech was implemented correctly, it brought about or disposed one to attain certain worldly or transcendent 'fruits', not excluding final liberation itself. This idea gave rise to the tradition of transmitting the *śruti* in word-perfect form, from generation to generation, in numerous schools of Vedic recitation and study. Thus the Sanskrit of the Vedas was not only sacred speech *par excellence* but also the model of all language, and in Hindu tradition, philosophical issues that later hinged on the nature of the Sanskritic language in the context of *śruti* have either no counterpart or only derivative relevance in the use of Sanskrit outside the *śruti*, or in the vernaculars.

In the earliest portion of the Vedic scriptures, consisting of hymns, perhaps the most important word for sacred speech is *vāc*. The Vedic understanding of *vāc* is implicit in verses such as the following: "By sacrifice [the priests] walked the track of Speech [*vāc*]. They found her entered within the sages. Having fetched her, they distribute her manifoldly. Seven celebrants chant her together" (*Ṛg Veda* 10.71.3). Here *vāc* is likened to a cow in whose track priests and sages walk. Thus in essence and origin, *vāc* is not an artifact, a human construct; she is discovered and then used in various ways for human well-being. Other texts imply that *vāc* exists essentially as an inexhaustible and unmanifest reservoir, like a river dammed up and unflowing, which then streams forth, via various promulgators, its power and purity intact, in the form of the Vedic syllables (see Killingley, 1986). It is through the sacrificial ritual (and later on in other ways) that humans benefit from *vāc* in manifest form. It is from this original conception of sacred speech that key philosophical views about the nature of language derived in Hindu tradition, often with the help of vigorous debate with the Buddhists and Jains, both of which denied the inherent power and validity of the Vedas. Indeed, it is this view that *vāc* is essentially unmanifest, becoming manifest only partially in syllables and sounds (and ideally in the Vedas), that enabled modern Hindu thinkers and activists in touch with their ancestral faith, like M. K. Gandhi (the Mahatma), to argue that human truth is only partial and that it should not be absolutized in any form. This goes some way toward explaining so-called Hindu doctrinal tolerance (note that Gandhi's incomplete autobiography was entitled *The story of my* ***experiments*** *with truth*; emphasis added).

In later Vedic texts (from at least the time of the early Upanishads, circa 8th century B.C.E.), the word *par excellence* that encapsulates and symbolizes the essence of the Vedas is *Oṃ*. A whole Upanishad – the short Māṇḍukya – is devoted to exploring the different levels of spiritual experience encapsulated by this syllable. Subsequently, various thinkers, largely but not exclusively Vedāntins, beginning with Gauḍapāda (circa 6th century C.E.), philosophize on the theological meaning of *Oṃ*. Thus the Vedāntin Rāmānuja (11th–12th century C.E.) augments his view that there is a structural correspondence between Vedic language and reality, including ultimate reality, by an analysis of the implications of *Oṃ*. According to this view, which is developed in the context of Rāmānuja's opposition to strict monism, language in its normative form, that is, Sanskrit as the language of the Vedas, cannot be interpreted to reveal an undifferentiated Brahman or Absolute. This is because there is a structural correspondence between Vedic Sanskrit (intrinsically differentiated as it is by way of inflected words, syntax, and other grammatical forms) and its ultimate referent

Brahman, on which the whole Vedic corpus converges semantically.

The conclusion is that Brahman is also differentiated internally – as the possessor of various attributes and modes of being – as well as from finite being. Implied here is a particular theory of denotation, viz., that (Vedic) substantives signifying material things (e.g., *gau*), have, besides their explicit empirical referents ('cow'), also an implied, metaempirical referent that only the eyes of faith can perceive, namely, Brahman the ultimate being who gives existence and intelligibility to all finite being (see Lipner, 1986). In contrast, the monists, drawing their inspiration from Śaṃkara, the great theologian who established the monist tradition around the 8th century C.E., argued that the ultimate import of scriptural language is an undifferentiated Brahman, intrinsically without distinction and existing ultimately as the only reality. Part of Rāmānuja's argument consists of analyzing *Oṃ* as the (somewhat mystical) consummation of the Vedas and denotative, as such, of their ultimate referent, Brahman. Even today, *Oṃ* is the epitome of sacred sound for most upper-caste Hindus.

Though the language of the Vedas was a subject of intense systematic concern – phonetically, etymologically, grammatically, and exegetically – from the beginning of the first millennium B.C.E., this concern was not philosophical in any strict sense of the term. Sustained philosophical attention to language first appears in the Mīmāṃsā Sūtras, attributed to Jaimini, in about the beginning of the common era. Jaimini contends, to some extent by implication, that those words of the Veda that denote (material) substantival entities (e.g., *gau* 'cow', *aśva* 'horse') have a natural (*autpattika*) and eternal (*nitya*) connection, not directly with the individual objects they denote, but with a sort of concrete-universal (*ākṛti*) of the individuals denoted, and that it is through its *ākṛti* that an object is instantiated.

This view of the natural and eternal relationship of (Vedic) naming-words to objects, to which the Vedāntins also generally subscribed, was directly challenged in due course by the Naiyāyikas, or logicians. The logicians argued that the relationship between words and their referents (*śabdārthasambandha*) is the result of original divine mandate passed on to humans in primordial time, and as such person dependent (*pauruṣeya*) rather than 'impersonal' or intrinsic (*apauruṣeya*), as in the Mīmāṃsā view (see Ganeri, 1999: 31–38). The debate about the *apauruṣeya* or *pauruṣeya* nature of Vedic speech was a central one in the history of Hindu philosophical inquiry and made verbal testimony in larger context – as a potential source of true cognition or belief – a subject of increasing philosophical importance (Ganeri, 1999). Indeed, the Indian debate about the power of Vedic words to signify has interesting correlations with some modern Western discussions about language as an innate human capacity.

Jaimini also contended that the unit of referential meaning – of epistemic judgment – is the sentence (*vākya*), a view with which most Hindu philosophers of language agreed. There was disagreement, however, concerning the basic units, the so-called building blocks, of meaning. Were these semantic units the syllable or word, or sentences, or language taken as a whole? All these positions found support among traditional Hindu thinkers. It seems that the ancient etymologist Yāska (perhaps 6th or 5th century B.C.E.) was something of an atomist in this respect: "To Yāska a term, singular or general, is simply *equipped* with a meaning .... The meaning is embedded in it, hence is objective and can be grasped intersubjectively .... I am inclined to conclude that Yāska considers syllables and single sounds to be meaningful units" (Kahrs, 1998: 27, 38). However, according to the logician Gadādhara (17th century), "the meaning of a word is explained in terms of its contribution to sentence meanings. The account lies between extreme atomism, exemplified in the Indian literature by the [ritualist] Bhāṭṭa school, and Bhartṛhari's [see below] 'Quinian' semantic holism" (Ganeri, 1999: 31).

Though the Vedāntins agreed with the Mīmāṃsā ritualists about the 'natural' (*autpattika*), eternal (*nitya*), and non-person-dependent (*apauruṣeya*) character of Vedic text, they argued that Vedic language is basically fact assertive – *yathābhūtavādi*: it 'states what is the case'. In this their stance was of a piece with the Hindu philosophical tradition about the nature of language as a whole, which has always tended to be realist, or favor a "direct referential" approach to meaning (Ganeri, 1999: 3). It was only in this way that the Vedāntins could derive information from scripture about the existence and nature of the supreme metaempirical reality, Brahman, to attain which was the goal of human existence. For the theologically agnostic ritualists, however, human fulfillment was bound up not in the attainment of some ultimate Being but in the proper performance of the sacrificial ritual and the various kinds of *phala* or fruit this engendered. This is why, for the ritualists, Vedic language was essentially injunctive (*kāryārtha*), concerned with how the ritual was to be performed. A modern Western counterpart of this debate is that between the so-called cognitivists and noncognitivists or expressivists about the nature of religious language.

But ritualist and Vedāntin alike opposed the *sphoṭa* theory of the Grammarians (for whom the philosophy of grammar was of particular importance). A leading light in the articulation of this view was Bhartṛhari

(6th–7th century C.E.), according to whom there is no cognition without some form of verbal expression. In fact, for Bhartṛhari the source of all being and intelligibility was a metaphysical reality, which may be described as a primordial 'Word' (*Śabda*), which has an inherent power (*śakti*) to burst forth (*sphuṭ*) into ontologically creative expression. The aim of his complex theory was to explain not only the production of being but also true and false cognition and final release by way of different forms of the *sphoṭa*, 'the word burst forth'. The ultimate form of the *sphoṭa* is Brahman, called *Śabdabrahman*, a view that can be derived from the Upanishads, e.g., *Bṛhadāraṇyaka Upanishad* 4.1.2.

A number of other schools and thinkers, more or less close to the Vedic pale, gave consideration to the nature of religious language, generally within the framework of the kinds of issues and views mentioned above. Thus in the many-streamed, ancient, and scripturally somewhat independent tradition of Tantra, which to some extent sought to coexist with Vedic authority and had a pervasive influence in Hinduism, the role of language is important.

Here the

> original Word, identical to the primal divine energy [*śakti*], is envisaged ... as phonic energy (*vākśakti*), eternal, indestructible, and all-pervading .... This word, this sound, is endowed with a creative force .... The word precedes the object, it brings it forth, it is the energy that upholds it, its innermost nature, that into which it will dissolve at the time of the cosmic resorption. The process of emanation ... appears generally as unfolding from an initial luminous vibration or sound (*nāda*), which is an extremely subtle state of pure phonic energy, which through a series of transformations and condensations will become less subtle, forming a concentrate or a drop (*bindu*) of sound-energy, from which, when it divides itself, worlds, humans, and language will come forth ... [In this process there is] the outward movement of emanation, converting itself into a movement of return to the source. (Padoux, 1990: 50–51)

Abhinavagupta (11th century), who was much influenced by ideas from Bhartṛhari (see above), is arguably the outstanding philosopher of the Tantric tradition.

The idea that the Vedic naming-word (*nāmaśabda*) has an inherent efficacious power has some affinity with a pervasive view that is current even today. This is the view popularized in the vernacular by poet-saints from the 15th century onward, the Sants. According to Sant teachings, the divine exists in the form of an eternal sound, *śabd, śabad*, or *nād* (<Sanskrit *śabda*, 'sound, word'; *nāda*, 'sound'), having an intrinsic salvific efficacy, which can be heard by advanced initiates and is also manifest in the poems of the Sants. This doctrine can be found in the Hindi poems of Kabīr, Sur Dās, and others, and among the Sikhs. Its affinity with the Vedic concept of the transcendent syllable is corroborated by the Sikhs' use of *ekoṅkār* (<Sanskrit *eka oṃkāra*, 'the one *oṃ* sound') as a name of God. However, there seems to be no noteworthy philosophical treatment of this aspect of Sant doctrine, nor did it generate a trend of systematic thought in the vernacular.

As we have seen, Hindu speculation about the nature of religious language has recurrently been concerned with metaphysical implications of *śabda* or 'Word' as in some sense creative. With the passage of time, this idea was translated into iconographic form as well as into various theories of aesthetics. A fine example of its iconographic rendering is the well-known representation of Śiva Naṭarāja or Śiva as Lord of the Dance of existence, in which Śiva is depicted as producing from the small two-faced drum held in his upper right hand the sound that creates, sustains, and destroys the world (see Coomaraswamy, 1971, especially chapter 6).

Modern Hindu thinkers who have considered the nature of language fall into two camps: those who have, for all practical purposes, severed intellectual links with their ancestral faith – by far the majority: these need not concern us further since there is nothing distinctively Hindu here – and those who have philosophized in the context of Hindu or wider Indian thought. Even here notable original thinkers have been directly concerned not so much with the philosophy of language as with metaphysical, epistemological, and soteriological issues, e.g., S. Radhakrishnan (1888–1975) and Aurobindo Ghose (1872–1950). However, from about the middle of the 20th century onward, there has been a growing trend, among both Indians and Westerners, not only to unearth, by way of critical exposition, the enormous conceptual wealth of traditional Hindu (and other Indian) inquiry into the nature of language, but also to incorporate into modern analytic discussion the philosophical implications of this inquiry. This is potentially an extremely important development in the comparative philosophy of language.

See also: Quine, Willard van Orman (1908–2000); Sanskrit.

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Hindustani

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Hindustani is a Central Indo-Aryan language based on Khari Boli (Khaṛi Boli). Its origin, development, and function reflect the dynamics of the sociolinguistic contact situation from which it emerged as a colloquial speech. It is inextricably linked with the emergence and standardization of Urdu and Hindi. The linguistic relationship among Hindustani, Urdu, and Hindi highlights the theoretical and empirical problems of linguistic analysis and description. It also reveals the politics of language conflict and identity in the complex sociopolitical and multilingual situation of India.

Origin and Development

Hindustani as a colloquial speech developed over almost seven centuries from 1100 to 1800. The Muslims conquered northern India from the 10th to the 13th centuries and settled down in the country, bringing with them their Persian language and culture. This mixing of cultures provided the contact situation for the emergence of Hindustani as a lingua franca. During this period, the literary language Apabhraṁśa seemed to be in a state of transition from Middle Indo-Aryan to the New Indo-Aryan stage. Some elements of early Hindustani appear in compositions of the saints of Nath Panth. However, the distinct form of the lingua franca Hindustani appears in the writings of Amir Khusro (1253–1325), who called it Hindwi. Chatterji (1960) argued that the term 'Hindustani' came to be used at the close of the 17th century. J.J. Ketelaer is said to have written the first European grammar of Hindustani in Dutch in 1715.

During the early stage of language contact, Hindustani showed a great deal of mixing of dialects. In particular, the western dialect group of northern India – Braj Bhasha, Bangaru (Haryanvi), and to some extent eastern Punjabi – formed the basis of the vernacular Hindustani. The Perso-Arabic words were also used by traders, religious men, Indian Muslim nobles, and common people. It needs to be emphasized that the Khari Boli base of Hindustani was firmly established only in the 18th century. It is also important to note that no long and connected specimen of the language is available during the period 1200–1650 for reconstructing its continuous history, except *Bikat Kahani* by Afzal, which appeared 300 years after Khusro.

The next important phase in the development of Hindustani is seen in the Muslim Sultanates of the Deccan by the end of the 14th century. In the 17th century, Hindustani flourished as a literary language of the North Indian Muslims who settled in the Deccan. It is referred to as Dakhini Hindi or Urdu. Although it shows some elements of local languages, such as Kannada and Telugu, it clearly attests to the source dialects of Panjabi and Haryanvi. Furthermore, the literary works produced in Dakhini or Hindustani were written in the Perso-Arabic script, which "fixed the orientation of the language," though Hindustani retained its indigenous character (Chatterji, 1960). The use of the Perso-Arabic script had serious implications for the development of Hindustani in the late 18th and 19th centuries.

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The development of Hindustani in North India lagged behind its use as a literary language in the Deccan. One of the reasons for this was the recognition of Persian as an official and court language and its acceptance by the North Indian elites and court nobles. Second, Braj Bhasha flourished as a literary language there. It was recognized by the Mughul emperor Akbar, and his courtier Khan Khanan Rahim used it for his poetic compositions. Though after Khusro an early form of Hindustani can be found in the poetry of Kabir and other religious preachers and saints, it was not cultivated as a literary language. Furthermore, Hindustani was spoken among the nobles at Delhi and Agra and by Moghul emperors from Akbar onward at home. However, it was not taken up seriously or written in the Perso-Arabic script in North India as in the Deccan.

It was only after Wali, a poet of Dakhini, arrived in Delhi that Hindustani began to develop as a literary language in the North. Wali used what is known as Rekhta/Hindi and showed that it was capable of great poetry. Rekhta means 'scattered' and implies that it had not yet so much been Persianized as happened later. It is known as the earliest form of Urdu-Hindustani poetical speech. Urdu as a language name occurs for the first time in 1776 in a couplet by the poet Mashafi (1750–1824). However, the use of Urdu referring to camp, court, or city (Zaban-e-Urdu or Zaban-e-Urdu-e-Shahi or Zaban-e-Urdu-e-Mualla) had been current since 1560.

After Wali, such stalwarts as Khan Arzu (1689–1756), Shah Hatim (1699–1781), and Mazhar Janejanan (1700–1781) made conscious efforts to Persianize Hindustani and weed out the Braj Bhasha or indigenous elements from it. Thus, Urdu-Hindustani was in a developed state by the end of the 18th century. John Gilchrist produced the first grammar of Hindustani. He justified the usage of the term 'Hindustani' for the language, as well as for its speakers. Insha Allah Khan Insha's *Darya-e-Latafat* (*The river of elegance*, 1807) presented an early linguistic study of the dialects of Delhi and Lucknow. There was also a tendency to identify Urdu-Hindustani largely as a Muslim language and Hindi/Hindwi as a language of the Hindus.

However, it is important to note two points about the development of Hindustani at the beginning of the 19th century. First, after the establishment of Fort William College by the British, prose began to be written in the emergent Khari Boli that formed the basis of Hindustani. Urdu-Hindustani and Hindi developed as two distinct styles of prose produced by the writers associated with Fort William College. Chatterji (1960: 211–212) rightly remarked that Hindustani "came out into the modern world as a vehicle of prose in its twin form, High Hindi and Urdu, about 1800." Second, the process of identification of Urdu with Muslim and of Hindi with Hindus continued during the entire 19th century and the first half of the 20th century. The development and standardization of both Urdu and Hindi had sociopolitical implications with regard to Hindustani (*see* **Urdu** and **Hindi**).

Forms of Hindustani

It is quite clear that the evolution of Hindustani was spread over seven centuries from 1100–1800. Before it was firmly established on the Khari Boli spoken in the surrounding region of Delhi, it was known by several names, such as Hindwi/Hindi, Dehalvi, and Rekhta, and was made up of several western dialects mixed together. The two forms of High Hindi and Urdu that emerged by 1800 may be described as a standardization of the grammar of the "Vernacular Hindustani" dialect (Chatterji, 1960: 169). The Perso-Arabic script and Perso-Arabic vocabulary of Urdu distinguish it from High Hindi, which uses Devanagari script and Sanskrit vocabulary.

The third form of Hindustani represents the basic Khari Boli and may be considered as Hindustani proper. It holds a balance in its vocabulary as it contains only those Persian and Sanskrit words that have been fully assimilated with the structure of its *tadbhav* or native words. According to Chatterji (1960), this form of Hindustani represents colloquial speech and can be terse as well as elaborate. It is simple in grammatical structure and precise in its sounds. In its spoken colloquial form, it is used for communication by a large number of speakers in India, Pakistan, and other parts of the world. It may therefore be considered, according to Chatterji (1960), as one of the great languages of the world.

Three other forms of Hindustani may be recognized, though they show a great deal of mixture from the local dialects and simplification of grammar. First, speakers of the Western Uttar Pradesh, Eastern Panjab, Haryana, and Rajasthan may speak what may be referred to as Vernacular Hindustani with their dialect accent or other features. They may be considered, as Kelkar (1968) maintained, to be 'adherent' speakers of Hindi and Urdu who easily ascend the scale of culture and education and accept them as super-posed languages. Second, it is possible to recognize what may be referred to as Bazaar Hindustani spoken by the masses in market situations across the country. This form may show a simplification of grammatical gender and mixing of local dialects, depending upon the region and the language contact situation. Finally, the Dakhini spoken in Karnataka,

Andhra Pradesh, and other regions in the South may be considered to be a form of Hindustani. Though it has a distinctive grammatical structure, in vocabulary it shows affinity with Hindustani. It is spoken mainly at home and shows some local literary activity. However, the Dakhini speakers regard standard Urdu as the super-posed variety and have accepted it for all formal purposes.

Hindustani as a Symbol of Unity

The process of the identification of Urdu and Hindi with Muslims and Hindus, respectively, that started in the early 19th century reached its culmination in the first quarter of the 20th century. The formation of voluntary language associations for these languages and the development of both Muslim and Hindu revivalism strengthened this identification. This congruence of linguistic and religious identities not only increased language conflict between Urdu and Hindi but also led to the expanded use of Hindustani. In the wake of the Indian independence movement, Gandhi saw the potential for the use of Urdu and Hindi to produce political conflict and so promoted Hindustani as a symbol of unity. In 1925, he persuaded the Indian National Congress to accept Hindustani as the official language for its proceedings. Under the influence of Gandhi, many national leaders emphasized the role of Hindustani not only for communal harmony between Muslims and Hindus but also for bringing about national unity. In 1937, Nehru recognized the potential of Hindustani to spread all over the country and declared that it should be officially recognized as an all-India language.

However, the acceptance and rapid spread of Hindustani at both regional and national levels failed to bring about any fundamental change in the position of the protagonists of Urdu and Hindi. The divergence between Urdu and Hindi languages, on the one hand, and the congruence of linguistic and religious identities, on the other, became so salient politically in the process of nationalism and nation formation that Hindustani failed as a symbol of unity. Das Gupta (1970:57) pointed out that the identification of national, linguistic, and religious solidarity was "more integral and pervasive" in the case of Muslims than with the Hindus.

After it became clear that India would be partitioned along religious lines, the question of Hindustani took a different turn in the fourth Constituent Assembly session in July, 1947. The persuasiveness of Hindustani as a national language had lost much of its appeal. The supporters of Hindi saw it as "a symbol of appeasement of the Muslim concern for Urdu" (Das Gupta, 1970: 130–131). They gave up their support for Hindustani and demanded that Hindi alone, written in the Devanagari script, be accepted as the official language of India. The acceptance of Hindi as the official language of India in 1948 gave the final blow to Hindustani as a symbol of unity. However, Hindi lost the overall support that Hindustani had gained at the national level in the wake of the independence movement. Recent debate on the failure of Hindustani as symbol of unity and a common language of both Urdu and Hindi speakers throws light on politics of nationalism, language engineering and acrimony between the two communities blaming one another for this (Rai, 2000; Hasnain and Rajyashree, 2004; Trivedi, 2004).

Problems of Linguistic Description

The problems of linguistic description of Hindustani are inextricably involved with those of Hindi and Urdu. Linguists, historiographers of Hindi and Urdu, and scholars of literature and textual criticism have mainly tried to grapple with the linguistic description of Hindi and Urdu, as is evident from the phonological and grammatical studies of those languages done during the last half-century. Kelkar (1968:1) has argued that contemporary standard Hindi-Urdu "consists of a gamut of integrated variation that need to be studied together – within a single frame work." However, he concentrated mainly on standard Hindi-Urdu and considered Hindustani as "relegated to history" (Kelkar, 1968: 9), though he included it under the Hindi-Urdu continuum of styles and took care of regional color to a certain extent.

Though the linguistic description of Hindustani has not drawn the attention of linguists for historical reasons, it raises several theoretical and empirical issues, which are relevant for linguistic analysis of both Hindi-Urdu and Hindustani. First, in addition to the dictionary of Hindustani written by John Gilchrist at the end of the 18th century, several other dictionaries were published in the late 19th century. It would be relevant to explore the range of borrowed Perso-Arabic words included in the dictionaries and to find out how far they have been assimilated or have become current in present-day colloquial speech. Second, the works of several writers have been published in both Urdu and Hindi and have been claimed equally as Hindi-Urdu writers. Prem Chand occupies an important position in this respect. It would be worthwhile to explore the distinctive alternative use of Sanskrit or Persian words in Hindi and Urdu versions of his works and to study whether the common vocabulary comprises native or *tadbhava* or fully assimilated Sanskrit and Persian words. Third, a number of textbooks have

been published for teaching standard Hindi and Urdu to foreigners. Although they reflect common core grammar and distinctive characteristics of the respective languages, it would be relevant to study the range of Sanskrit and Perso-Arabic words that form an integral component of these languages. Doing so would help determine how far these textbooks support the common base of colloquial Hindustani. Fourth, it would be necessary to explore to what extent the linguistic analysis of Hindi and Urdu is based on the spoken data. Only this type of analysis can show the extent to which they differ in the choice of Sanskrit and Persian words and to what extent these words are common in both the spoken varieties and represent the colloquial Hindustani.

Finally, some studies show lexical differences between Hindi and Urdu and question the notion that they are two distinct languages. They raise significant issues related to the processes of convergence and divergence, the difficulty of drawing boundaries between Sanskrit and Perso-Arabic words assimilated in both Hindi and Urdu, and the implications of choice for comprehension. These issues can be explored only on the basis of a large corpus. A corpus of 3 million words is now available for both Hindi and Urdu at the Central Institute of Indian Languages in Mysore. On the basis of a comprehensive sample, it would be possible to explore in what kinds of genres/texts both Hindi and Urdu show a common base of colloquial Hindustani and how they differ from one another, on the one hand, and from Hindustani, on the other, in terms of what kinds of Sanskrit and Perso-Arabic words they use. In short, the research on the issues raised above can bring an understanding of the basic linguistic structure of Hindustani and the superimposed structure of Hindi and Urdu that is characteristic of both the spoken and written styles.

See also: Hindi; India: Language Situation; Indo–Aryan Languages; Pakistan: Language Situation; Urdu.

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Hintikka, Jaakko (b. 1929)

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Jaakko Hintikka has been at the forefront of developments in logic, linguistics, and philosophy for decades. He was born in Vantaa, Finland, in 1929. He attended high school at Kerava, and after that went to the University of Helsinki. In 1948–1949, he was an exchange student at Williams College in Massachusetts. After obtaining his Ph.D. at Helsinki in 1956, he became a Junior Fellow at Harvard. In 1959, he was appointed Professor of Philosophy at the University of Helsinki, a post he kept until 1970, when he became Research Professor of the Academy of Finland. Dissatisfied with the funding policies of the Academy, he resigned in 1981. In 1964, he was John Locke Lecturer at the University of Oxford. From 1965 to 1982, he was also Professor of Philosophy at Stanford. From 1978, he held a professorial appointment at Florida State University, until he became Professor of Philosophy at Boston University in 1990, where he still teaches. In 1978, he married his second wife, Merrill Bristow Provence, with whom he wrote a series of joint papers and a book.

been published for teaching standard Hindi and Urdu to foreigners. Although they reflect common core grammar and distinctive characteristics of the respective languages, it would be relevant to study the range of Sanskrit and Perso-Arabic words that form an integral component of these languages. Doing so would help determine how far these textbooks support the common base of colloquial Hindustani. Fourth, it would be necessary to explore to what extent the linguistic analysis of Hindi and Urdu is based on the spoken data. Only this type of analysis can show the extent to which they differ in the choice of Sanskrit and Persian words and to what extent these words are common in both the spoken varieties and represent the colloquial Hindustani.

Finally, some studies show lexical differences between Hindi and Urdu and question the notion that they are two distinct languages. They raise significant issues related to the processes of convergence and divergence, the difficulty of drawing boundaries between Sanskrit and Perso-Arabic words assimilated in both Hindi and Urdu, and the implications of choice for comprehension. These issues can be explored only on the basis of a large corpus. A corpus of 3 million words is now available for both Hindi and Urdu at the Central Institute of Indian Languages in Mysore. On the basis of a comprehensive sample, it would be possible to explore in what kinds of genres/texts both Hindi and Urdu show a common base of colloquial Hindustani and how they differ from one another, on the one hand, and from Hindustani, on the other, in terms of what kinds of Sanskrit and Perso-Arabic words they use. In short, the research on the issues raised above can bring an understanding of the basic linguistic structure of Hindustani and the superimposed structure of Hindi and Urdu that is characteristic of both the spoken and written styles.

See also: Hindi; India: Language Situation; Indo–Aryan Languages; Pakistan: Language Situation; Urdu.

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Hintikka has been awarded numerous prizes and honorary doctorates and lecturerships. His first paper appeared in 1953, and over 300 papers of which he was the author or co-author have been published since. He has written and co-authored more than 30 books, and continues to write on a range of topics.

Hintikka's accomplishments in logic and linguistics are many and varied. He was a pioneer of possible-worlds semantics and modal logic. A central element in his work is a theory called Game-Theoretical Semantics, which he created in the late 1960s, and subsequently developed in collaboration with others. The theory was inspired by a Kantian perspective on knowledge and by the Wittgensteinian notion of 'language games,' the active practices in which linguistic meaning is constituted. Game-Theoretical Semantics uses the method of a strictly regulated game to determine the truth or falsity of a given sentence. If the player whose goal it is to verify the statement expressed by the sentence has a winning strategy, the sentence is true, and if the other player has a winning strategy, it is false. If applied to formal languages of first-order logic, the semantics is equivalent to the more usual Tarski-type definition of truth. But through modification of rules, the semantic games can also be applied to nonclassical logics. Furthermore, they can be employed in the semantics of natural languages. As Hintikka and his associates have shown, the theory can account for the semantic behavior of anaphoric pronouns and explain phenomena of coreference in English. It is not restricted to sentential meaning, but can deal with issues such as discourse anaphora as well. An important aspect of the theory is its ability to model imperfect information through partially ordered quantifiers, which, Hintikka has argued, occur in English sentences. Other major contributions to linguistic theory by Hintikka are concerned with the theory of questions and answers and with the methodology of linguistics.

Hintikka has achieved important results in mathematical logic. Besides, he has written at length on the philosophy of science, the history of philosophy and ideas, the foundations of cognitive science, and aesthetics. He has also contributed significantly to the philosophy of mathematics.

See also: Game-Theoretical Semantics; Logic and Language: Philosophical Aspects; Modal Logic; Tarski, Alfred (1902–1983); Wittgenstein, Ludwig Josef Johann (1889–1951).

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Hippocrates: Theory of the Sign

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Hippocrates was born c. 460 B.C. on the Greek island of Cos, and he died on the Greek mainland in the northern region of Thessaly c. 377 B.C., through which pass all the land routes connecting the Greek peninsula with the lands to the north. Thus he lived something like 83 years, and the place of his dying may be taken as symbolic of the lines of influence through which his work and memory would pass into the intellectual culture of later generations wherever medicine would come to be practiced in a scientific manner, that is to say, on the basis of accumulated observations linked by hypotheses premised on natural causes at work in the organs of the body. He was definitely a historical figure, yet the writings traced to him are more by influence than by authorship; whence his status is legendary, more than historical, but less than mythical.

Hippocrates is known as the 'Father of Medicine,' and by the same title (cf. Sebeok, 1986: 46) he enters also the history of semiotics, the knowledge arising from the study of the action of signs or 'semiosis.' For, of the triune tradition from which the field of semiotics has come to be fashioned, the medical tradition, with Hippocrates as its ancestral figure, is the oldest of the three clearly to take fashion. By a "sliding outward in an overlapping, telescope-like fashion" (Sebeok, 1989: 6), philosophical semiotics "emerges from the Hippocratic legacy." The "specifically linguistic preoccupation with signs," in turn, can be glimpsed at least as early as Plato's *Cratylus* (c. 399–390 B.C.) and *Sophist* (c. 359–347) (Deely, 2001: 57). Thus Sebeok deems the metaphor of a 'semiotic tripod' to be one historically justified to express the fact that semiotics globally considered is an interweave of the medical, philosophical, and linguistic traditions together, provided we are able to deal with "the ungainly figure of a three-legged stand with rubbery legs of unequal length" (Sebeok, 1975: 31). Hippocrates stands, in the perspective of this metaphor, as "the Father and Maestro of the semiotic development as a whole" (Kleinpaul, 1972: 103).

It is crucial to realize that, in the ancient Greek development of medicine and philosophy alike, words are not yet envisioned as signs. Only natural events (in contrast to divinations and supernatural auguries) are envisioned to constitute the realm of signs, σημεία ('semeia') (Manetti, 1993; cf. Deely, 2001). Not until Augustine will the ancient Greek notion of the σημεῖον ('semeion') be envisioned as a subspecies of sign in general, the natural sign, coordinate with the linguistic sign as the paradigm of the conventional sign.

Hippocrates established symptoms of disease – in other words, "clinical semiotics" (Shands and Melzer, 1975) – as paradigmatic to the study of signs in nature. Notice that such signs in large part are unwitting, connected with their signified objects quite apart from the volition, cleverness, or convention involved in 'intentional' signs. Hippocrates (and Galen after him) thus formulated "a broad, if not yet global, semiotic theory of diseases which, to rephrase it in the humblest terms, asserts that the most devastating among them amount to a problem of communication – cells and tissues respond to misinformation, or misinterpret environmental clues to which they overreact" (Sebeok, 1989: 8; cf. Thomas, 1974).

As the first to displace belief in the causes of ailments as supernatural and treatment as proper to magic and religion with the affirmation of natural causes and studied cures, by his establishment of symptoms as paradigmatic to the class of natural signs, Hippocrates also set human thought on the trail that would eventually lead to a global semiotics as the defining phenomenon of a postmodern intellectual culture embracing the study of the action of signs wherever that action occurs, which turns out to be everywhere that objects come to be known in the web of human experience.

See also: Augustine, Saint: Theory of the Sign; Indexicality: Theory; Phytosemiotics; Sebeok, Thomas Albert: Modeling Systems Theory; Sign Theories.

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Teruo Hirayama was born in 1909 in Miyazaki prefecture in the Kyūsyū area of Japan. For over 50 years he has been one of the most active field linguists in Japanese dialectology. By the time of his 70th anniversary, the localities he had surveyed exceeded 4000 in number. The linguistic materials Hirayama and his colleagues gathered and published have provided a firm basis for the comparative study of Japanese dialects. Hirayama's description of the accentual systems of Kyūshū dialects is of outstanding scientific value.

Hirayama graduated from Kokugakuin University, where he learned Japanese literature and linguistics, in 1935. This was the time when the linguistic study of Japanese lexical accents saw remarkable progress, exemplified by the discovery of the phonological correspondence of accentual systems among contemporary dialects (by Shirō Hattori in 1933) and the discovery of historical correspondence between the accentual system of 11th century Kyoto Japanese and those of contemporary dialects (by Haruhiko Kindaichi in 1937).

Under the influence of these studies, Hirayama began an extensive field survey of the Japanese dialects in the mid-1930s, and published his first book, *Zennihon Akusentono Shosō* (Aspects of Japanese accent), in 1940. His other early publications included *Kyūsyū Hōgen Onchōno Kenkyū* (Studies on the accent of Kyushu dialect, 1951) and *Nihongo Onchōno Kenkyū* (A study of Japanese accent, 1957), as well as many journal papers. As can be seen from the book titles, his main research interest was the accentual systems of Japanese dialects.

Hirayama started teaching Japanese linguistics at Tokyo Metropolitan University (known as Tokyo Metropolitan College before 1945) in 1940, became a full professor in 1962, and stayed in the position until 1973. He then moved to the Institute for Japanese Culture and Classics of Kokugakuin University and stayed there until 1979. While he was in these positions, Hirayama conducted collaborative field surveys with his students and colleagues. The results of the surveys included *Ryūkyū Hōgenno Sōgōteki Kenkyū* (Systematic survey of Ryukyu dialects, co-edited with Ichirō Ōshima and Masachie Nakamoto, 1966) and *Satsunan Shotōno Sōgōteki Kenkyu* (Systematic survey of Satsunan Islands, 1969), among many others.

Hirayama's most recent work is the massive nine-volume *Gendai Nihongo Hōgen Daijiten* (Dictionary of Japanese dialects, co-edited with Ichiro Oshima, Masao Ohno, Makoto Kuno, Mariko Kuno, and Takao Sugimura, 1992–1994). The first six volumes of the dictionary are devoted to a systematic linguistic description of the 'basic vocabulary' gathered from 72 localities all around Japan, and the last three are devoted to various indexes.

For his long-term contributions to Japanese linguistics, the Japanese government awarded Hirayama the title of Person of Cultural Merit in 1994.

See also: Hattori, Shiro (1908–1995); Japanese.

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Hirt, Hermann (1865–1936)

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Born in Magdeburg, Hermann Hirt studied Indo-European linguistics and Germanic philology in Leipzig and Freiburg. His teachers were the main representatives of the *Junggrammatiker* ('young grammarian') school: F. Zarncke, K. Brugmann, A. Leskien, and E. Sievers. However, Hirt went his own way quite early in reconstruction of Indo-European language and culture. His first book (Hirt, 1895) treated the less elaborate (at that time) problem of Indo-European accentuation in its relation to different language units: from syllable and word to phrase and sentence. The next publication (Hirt, 1900) was an attempt to find the connection between Indo-European vowel alternation (ablaut) and prehistoric evolution of Indo-European accent. These early works of Hirt were marked by one of the main features of his studies: the search for regularities, unifying the different elements of the protolanguage into an integral structure. Several years later, Hirt published a voluminous book on the Indo-Europeans and their culture (1905–1907). In his view, the Indo-Europeans were an agricultural community, and he placed their homeland in the plains of northern and northeastern Europe. He insisted on an interdisciplinary approach to linguistic palaeontology, including not only purely linguistic methods (like semantic reconstruction), but also the results of archaeological, ethnological, ethnographic, etc., investigations.

In 1896, Hirt received a position of associate professor at Leipzig University, and from 1912 till the end of his life he was a full professor at the University of Giessen. After rather practical publications on the history of German (German, Standard) (cf. Hirt, 1909) Hirt dedicated himself for a long time to his *Indo-European Grammar* (1921–1937), a work summarizing his thoughts on Indo-European and its reconstruction. The fate of Hirt's ideas was quite a paradoxical one. On the one hand, many of his solutions in Indo-European reconstruction were rejected by most of his colleagues (or recognized with substantial reservations); however, on the other hand, his general methodological positions and some parts of his reconstructions were widely accepted and are still in discussion nowadays. Hirt's reconstruction of Indo-European reduced vowels (i.e., he did not accept syllabic sonants for the protolanguage, positing a combination of reduced vowel + sonant instead) was not shared by most linguists, but the possibility of a vowel reduction in an early period of the protolanguage, and the connection between accent and vowel alternation and between vowel alternation and morphological structures were continued in reconstructions by many linguists (e.g., J. Kurylowicz or W. P. Lehmann). Besides this systemic approach, also very important was Hirt's view of the protolanguage as a real language, with its own history, including possibilities of structural transformations in the course of time.

See also: Indo–European Languages.

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in its incorporation of Schlegel's Romantic conception of language, aspects of which were to continue to underlie linguistic thought for much of the next half-century.

It was already acknowledged that language involved the expression of two kinds of content: that of the roots of the words and that of the various relationships among the roots; but languages differed in the way that the latter kind of content was expressed. In some, such as Sanskrit and the classical European languages, it was effected by changes in the form of the word itself; in others, such as Chinese and to varying extents many of the modern European languages, by the addition of further words or particles. Schlegel regarded the former type of language as far superior to the latter, because it was **organic**, a term which had deep significance in Romantic thought. Entities were 'organic' if they contained their whole essence and potential development within themselves, like a flower within a seed, otherwise their development was merely 'mechanical.' For Schlegel, Sanskrit and the classical languages were organic because all the content of the words was contained within the words themselves. Relationships were expressed by inner changes (inflections) rather than by additional words or particles. It is not clear whether he had in mind only the kind of modifications to the root known as 'ablaut,' found in English forms such as *sing, sang,* and *sung*, or whether he also included inflectional affixes in his definition of 'organic.' However, Friedrich's brother August Wilhelm clarified the matter by explicitly recognizing three types: those consisting only of roots and therefore (in his view) lacking any grammatical structure; those which make use of affixes with a meaning of their own; and 'inflectional' languages, which use changes in the roots themselves or add a small number of syllables to indicate such categories as case or tense. For him, as for his brother, the last of these was the most perfect, the second type less so, while the first was believed to be so imperfect as to make literary or scientific discourse virtually impossible.

The Schlegels' interests were really cultural and literary rather than linguistic, but their ideas were nevertheless influential. For a more technical linguistic contribution we must turn to three other scholars of the period who are regarded as the 'Founding Fathers' of 19th century historical and comparative linguistics: Rask, Bopp and Grimm. They all shared Schlegel's organic view of language, but their contributions were more sober, and they can be said to have put the analysis of language itself, as well as relationships among languages, on a surer footing.

The Danish scholar Rasmus Rask (1787–1832) has often been considered merely as a precursor of Grimm, recognizing the phonological relationships between Germanic and the other Indo-European languages which were later given more systematic form by the latter. The list of correspondences given in his prize essay *Undersögelse om det gamle Nordiske eller Islandske Sprogs Oprindelse* (*Investigation of the origin of the Old Norse or Icelandic language*), published in 1818, shows a clear grasp of these relationships, despite a number of errors (see Table 1). However, to restrict his contribution to this is to undervalue it, because his work reflects wide-ranging scholarship and a high degree of methodological sophistication.

Table 1 Rask's correspondences between Greek sounds and those of Latin and Icelandic

π	becomes *f*: πλατυς-*flatur*, πατηρ-*fadir*.
τ	becomes *þ* : τρεις-*þrír*, *tego-eg þek*, τυ - *tu* - *þú*.
κ	becomes *h* : κρεας-*hrœ*, *cornu-horn*.
β	is mostly kept : βλασανω-*blad*, βρυω-*brunnr*.
δ	becomes *t*: δαμαω-*tamr*, *dignus-tíginn*.
γ	become *k*: γυνη-kona, γενος-*kyn* or *kin, gena-kinn*, αγρος- *akr*.
φ	becomes *b*: φηγος-Danish *bøg*, *fiber*-Icel. *bifr*, φερω- *fero-eg ber*.
θ	becomes *d*: θυρη-*dyr*, θεος-Latin *deus*.
χ	becomes *g*: χυω-Danish *gyder*, εχειν-*ega*, χυτρα-*grýta*, χολη-*gall*.
'	becomes *s*: ἑξ-*sex*, ἁμα-*saman*, ὑπνος-*svefn* Danish *søvn*.

18th century speculations were largely based on lexical comparisons, which frequently produced spurious results. Rask recognized that lexical comparison of languages can be misleading and that the linguist must therefore concentrate on 'core' vocabulary:

> "A language, however mixed, belongs to the same language class as another, when the most essential, most concrete, most indispensable and very first words, the foundations of language, are common to them both."

However, he saw that grammatical correspondences are a more reliable guide to relationships, and, furthermore, that the more elaborate the morphology the older the language is likely to be:

> "Whichever language has the more complex grammar is the more unmixed, the more original, older and closer to the source; for grammatical inflections and endings are constantly worn off when new languages emerge."

He also noted that relationships need to be established by regular phonological correspondences, and even set up rules for determining them.

> "When correspondences are found between two languages in such words, in fact so many of them that rules can be deduced for the shifts of letters from one to the other, a basic kinship is found between these languages; especially when they are matched by similarities in the structure and system of the two languages."

(It should be noted that 'letter' at this time included 'speech sound'; the latter term was not yet in use.)

Despite this methodological awareness, the fact that Rask did not incorporate Sanskrit into his comparisons (though he covered many other languages, comparing Icelandic with languages from virtually all the families of Europe and even beyond) indicates that his work did not profit from the new discoveries and was in a number of respects a continuation of 18th century comparative methods rather than a radical new departure.

Franz Bopp (1791–1867) studied Sanskrit in Paris and in 1816 published his book *Über das Conjugationssystem der Sanskritsprache in Vergleichung mit jenem der griechischen, lateinischen, persisichen und germanischen Sprache* (*On the conjugation system of Sanskrit in comparison with that of Greek, Latin, Persian and Germanic*). This is mainly concerned with the morphological analysis of the ancient languages, and attempts to reveal the 'organic' nature of the verb forms of Sanskrit (in Schlegel's sense), which are considered to involve either modifications of the root or the fusing of the root with forms of the verb 'to be.' By comparing the Sanskrit forms with those of the other languages, he shows that this organic structure was gradually destroyed, to be replaced by mere 'mechanical' combinations. The personal endings of the verb are similarly considered to derive from independent pronouns. Bopp developed his morphological analysis in later work and to some extent moved away from Schlegel's view of the early Indo-European languages as inflectional. Because the inflections could be seen as independent meaningful elements, the original structure must in fact have been agglutinative. However, he continued to hold to Schlegel's conception of an originally perfect, organic language that later decayed. Although some of his analyses are fanciful, his systematic approach to morphological analysis and to the comparison of morphological structure – he was the first to use the term 'comparative grammar' – established itself as the model for subsequent work, and he is by many regarded as the true founder of the new comparative linguists, though it has also been maintained that his interests were **merely** comparative, and not historical, and that he thus continued the 18th century rationalist tradition.

Perhaps the best known of the early 19th century linguists is Jacob Grimm (1785–1863), principally for 'Grimm's Law,' which states in a systematic fashion the relationships between the Germanic consonants and those of the classical languages. In this he was certainly influenced by Rask; his formulation of the 'law' (the term is an anachronism, since he never used it himself) appeared in the second edition of his *Deutsche Grammatik* (*German[ic] grammar*) of 1822, after he had read Rask. Grimm's formulation of the *Lautverschiebung* ('sound shift') owed not a little to his Romantic idealism and also to his ignorance of phonetics, since by including the High German consonant shift, which had a similar form but was quite separate from the original shift, as part of the same process, and also by equating Germanic fricatives with the Greek aspirated plosives, he was able to view the whole process as a single, mystical, and organic whole (see Table 2).

Table 2 'Grimm's Law' according to Grimm

Greek	P	B	F	T	D	TH	K	G	KH
Gothic	F	P	B	TH	T	D	...	K	G
Old High German	B(V)	F	P	D	Z	T	G	CH	K

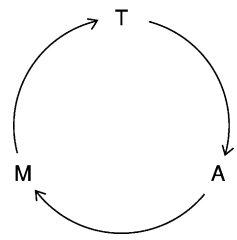

Figure 1 Grimm's 'Kreislauf.'

Using Latin terms for the different classes of sounds, where *tenues* (T)=voiceless plosives, *mediae* (M)=voiced plosives, and *aspiratae* (A)=voiceless aspirated plosives, Grimm is able to reduce the whole shift to a characteristically organic circular process, or *Kreislauf* (see Figure 1).

Grimm's Romanticism is also seen in his belief in the original perfection and subsequent decay of language, and in his view of language as a reflection of the character of a nation; for him, 'Grimm's Law' was an expression of the Germanic 'spirit.'

Standing somewhat apart from the work of Rask, Bopp, and Grimm is that of Wilhelm von Humboldt (1767–1835). A diplomat and educationalist as well as a linguist, and with a broad knowledge of language and languages, Humboldt belonged to an older generation than these three; indeed, though his main works were published in the 1820s and 1830s, in some respects he is an 18th century figure. His best known work, *Über die Verschiedenheit des menschlichen Sprachbaues und ihren Einfluss auf die geistige Entwickelung des Menschengeschlechts* (*On the variety of human language structure and its influence on the intellectual development of mankind*), was published in 1836, after his death. As Prussian Minister of Education, he was instrumental in

procuring for Bopp his chair in Berlin, and he was able to exercise considerable influence in promoting research and teaching in linguistics.

Humboldt's work differs from that of others of this period in not being primarily concerned with the historical development of languages; his interests were comparative and typological rather than historical. He is nevertheless a Romantic in his acceptance of the organic view of language, though for him this appears to be rather broader in scope than for his predecessors: a language is organic in the sense that all its parts belong together and must be seen in the context of the whole – a principle that foreshadows Saussurian structuralism. He is concerned with the *innere Sprachform* ('inner linguistic form') of a language, the organization of its grammar and meaning, as its defining characteristic.

Humboldt's writings are diverse and somewhat diffuse, but he is noted especially for two specific ideas: the typological classification of languages and the principle of linguistic relativity. In both cases there is considerable debate about Humboldt's originality and his sources, and there is no doubt that his views were a continuation and development of earlier ideas. Clearly, he did not invent typology, which, as we have seen, was an important aspect of the Schlegels' work, and language classification had been undertaken by 18th century scholars. Humboldt is, in fact, even skeptical about the possibility of a neat classification of languages, preferring to recognize a scale between the two extremes of inflecting and isolating languages. Nevertheless, his contribution is important, as he discusses the principles, and the difficulties, in greater detail than his predecessors. As far as the source of relativity is concerned, we may go back to Herder (1744–1803), and beyond. In his prize essay of 1772, entitled *Abhandlung über den Ursprung der Sprache* (*Treatise on the origin of language*), Herder had attempted to link language and thought, arguing that the two evolved together. Humboldt combined this idea with Romantic conceptions of the relationship between language and nation, and thus relativized Herder: language and thought may be interdependent, but because different peoples speak different languages, their thought must also be different. This principle influenced a number of subsequent scholars, and has often been regarded as a precursor of the 20th century Sapir-Whorf Hypothesis. Humboldt took from Kant the principle of the ordering of the world through our ideas, but again relativized it: we order the world through our language. Language is therefore not simply a finished product (*ergon*) but an activity (*energeia*). In all this, it becomes clear that Humboldt's interest in language comparison has as its aim not the history of languages as such, but rather languages as a reflection of different ways of expressing thought.

Linguistics at the Mid-century

The Romantic view of language and languages had been a major force during the first half of the century (though whether it had promoted or impeded linguistic study is a matter of debate), but by the middle of the century this view had begun to wane. The generation after Rask, Bopp, and Grimm saw a steady expansion and development of the subject; August Pott (1802–1887), for example, did extensive work on the Indo-European lexicon, while other scholars applied the approach adopted by Grimm in relation to the Germanic languages to other language families, including those of non-Indo-European stock. At the same time, the principles and methods of German scholarship were also spread to other countries; in England, for example, by Max Müller (1823–1900), in his popular *Lectures on the science of language* (1861).

From a theoretical point of view, the period is characterized by several intellectual movements of which the main two are the rise of a more objective, positivist approach, and, inspired particularly by Darwin's *The origin of species* (1859), the development of theories of historical evolution, both of which were to have an important influence on linguistics. These movements gave rise in particular to detailed 'scientific' work on language history and attempts to provide mechanisms and explanations for language change based on natural and physical, rather than the Romantics' supernatural and metaphysical, principles.

The most important linguistic scholar of the period is August Schleicher (1821–1868); indeed, some see the real 19th century revolution, the development of a 'scientific' historical discipline of language, as commencing with him. His *Compendium der vergleichenden Grammatik der indogermanischen Sprachen* (*Compendium of the comparative grammar of the Indo-European languages*) of 1861–1862, in which he summarized what was then known about the original Indo-European language and its development, showed how far the comparative and historical study of the Indo-European languages, as well as the methodology of comparative linguistics, had progressed since Bopp.

Bopp had ignored phonology in his work, but Schleicher deals with it extensively. Although Bopp had attempted to reconstruct the morphology of the original Indo-European language, Schleicher is both more thorough in his reconstructions and more confident of their validity, even to the extent of composing

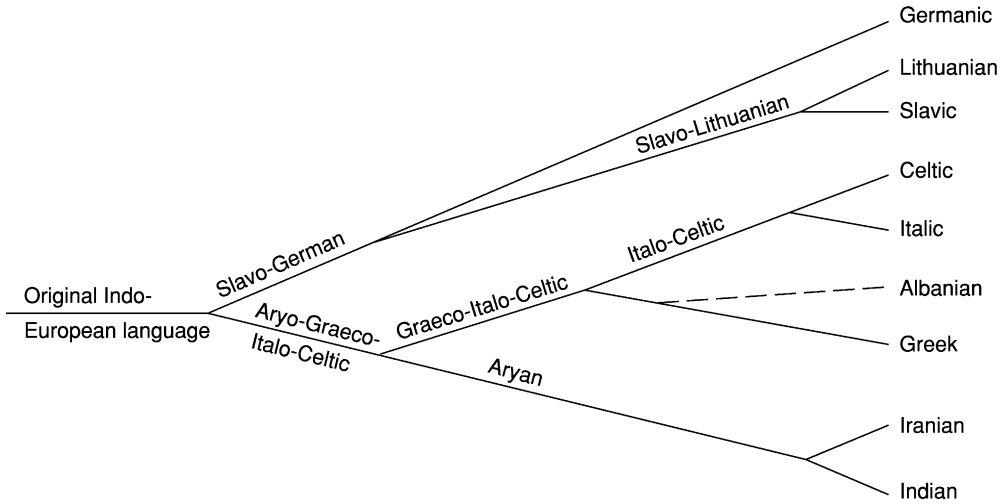

Figure 2 Schleicher's 'Stammbaum' for the Indo-European languages.

a fable in the assumed reconstructed language, an enterprise for which – perhaps somewhat unfairly – he was subsequently derided. For Schleicher, such reconstructions were part of the scientific methodology of comparative linguistics because they forced the linguist to give explicit form to his conclusions.

The innovation for which Schleicher is best known is the use of the **Stammbaum** or 'family tree' as a means of displaying the historical relationships between languages. This can be seen as following directly from the principles of reconstruction, because the method proceeds by progressively comparing languages and, in the process of arriving at ancestral forms, establishing degrees of closeness between languages. Schleicher's tree for the Indo-European languages is given as Figure 2.

In these respects, then, Schleicher's work can be seen as an attempt to demonstrate that language is amenable to scientific investigation, by the use of rigorous methodology. However, for Schleicher language was still to be regarded as an **organism**, though not quite in the Romantic sense of Schlegel. For him, language was like a biological organism, which is born, grows old and dies, and has an independent existence, separate from its speakers. Scientific investigation of this organism is therefore analogous to biology, and hence is a natural science, though, in common with other disciplines at the time, it was conceived in historical terms. It is also likely that the model for his Stammbaum was the botanical classification of Linné (Linnaeus).

With regard to his general approach to linguistic history, Schleicher could be characterized as a Hegelian (unlike Humboldt, who could be regarded as a Kantian), in the sense that he viewed the development of language in terms of **progression**. Hence the established typology of languages – isolating, agglutinating, inflecting – was interpreted as having a direction, with a period of growth followed by a period of decay. In 1863, following the publication of Darwin's *The origin of species* in 1859, Schleicher published a pamphlet *Die Darwinsche Theorie und die Sprachwissenschaft* (*Darwinian theory and linguistics*), but although he believed in an evolutionary process for language, he was no Darwinian, because unlike Darwin he maintained his belief in progress and decay. Nevertheless, he again insists that language is an organism, and advocates the application of the methods of the natural sciences, and especially biology, to the study of its development.

Most of Schleicher's reconstructions have been superseded, and his organic view was soon to be abandoned. Even his Stammbaum, though still popular today, was undermined by his student Johannes Schmidt (1843–1901). The tree assumes progressive splitting of languages, but this is an unrealistic model of change; Schmidt's alternative Wave Theory more realistically allows changes to spread from one language to another. Nevertheless, Schleicher is of considerable historical importance in the development of linguistics, and in particular for his advocacy of a 'scientific' approach to language history.

Other linguists of this period, too, looked to the natural sciences for legitimacy, but not always in the same way. Wilhelm Scherer (1841–1886), for example, in his *Zur Geschichte der deutschen Sprache* (*On the history of the German language*) of 1868, took geology as his model, which entailed abandoning not only Schleicher's organic conception but also with it his idea of progression. The geological concept of uniformitarianism – the principle that the forces operating at different times are the

same – cannot be reconciled with Schleicher's notion of a rise to perfection followed by decay; it also suggests that the causes of change are mechanical and lie with the speakers themselves.

We may observe that the mid-century developments just described, specifically the attempts to establish it as a natural science and to account for changes in 'mechanical' terms, were not restricted to linguistics. Similar ideas are found, for example, in sociology, with Herbert Spencer's 'social Darwinism' and his search for the principles of evolution of society. There was, in fact, much cross-fertilization of ideas among disciplines at this time. While linguists borrowed their models from the sciences, linguistic models of change were adopted elsewhere. Spencer and the anthropologist and historian Henry Maine both used language in support of their arguments for uniformitarianism and their belief in the regularity of change; Darwin himself used a linguistic analogy in explaining the development of some organs.

Linguistics in the 1870s

By the 1870s, the aspirations of Schleicher and others to make linguistics a science appeared to be coming to fulfillment. In particular, the idea of **regularity**, of 'laws,' a principle characteristic of the natural sciences, was becoming acceptable. In the early 19th century, such a principle would not have been contemplated; Grimm was unperturbed by the fact that some of the changes that he had described did not take always take place: exceptions simply indicated that "the stream of innovation has passed them by." Indeed, to regard language as completely subject to irresistible mechanical forces would have been incompatible with the Romantic view. But during the 1870s, evidence was accumulating of greater regularity in language change, as mechanical explanations were found for many of the apparent exceptions.

One example of this mechanical regularity is the 'Law of Palatals.' This 'law,' which cannot be attributed unambiguously to any single scholar, has the advantage of explaining two anomalies simultaneously: the occurrence of the Sanskrit palatal consonants and the vowel correspondences between Sanskrit and Greek or Latin. As far as the vowels are concerned, Sanskrit had only three: *a, i* and *u*, while Greek and Latin had five: *a, e, i, o,* and *u*. Although Sanskrit was no longer regarded as identical with the original Proto-Indo-European language, it was nevertheless assumed that many of its features were close to the original state, and it was therefore necessary to explain how the five-vowel systems of Greek and Latin could have arisen from the 'original' three-vowel system. However, the correspondences were too erratic to achieve this: Sanskrit *a* could correspond to Greek and Latin *a, e,* or *o* in an apparently random manner (although in fact, Latin, Greek, and other Western languages were generally in agreement on the vowel concerned). Further, Sanskrit had, in addition to velar consonants, a set of palatals, but the source of these is difficult to establish; furthermore, the two series only contrast before *a*.

The solution to this problem – the Law of Palatals – assumes that the five-vowel system of Greek and Latin, rather than the three-vowel system of Sanskrit, was original, and that palatalization of velar consonants occurred in Sanskrit before the front vowels *i* and *e*. Subsequently, *e* and *o* merged with *a* to give the Sanskrit system. At a stroke, this explanation accounts not only for the anomalies with the palatal consonants (in those cases where palatals occur before *a,* the *a* was originally *e*) but also for the difficulties with the vowels. It requires, of course, that the priority given to Sanskrit, which had hitherto been assumed to have maintained the original system, must finally be abandoned.

A second example of an explanation being found for apparent exceptions is Verner's Law, named after the Danish scholar Karl Verner (1846–1896), who discovered it in 1875. According to Grimm's Law, Indo-European voiceless plosives (*p, t, k*) become voiceless fricatives (*f, θ, x*) in the Germanic languages, but there are some exceptions, both in individual words and in the strong-verb paradigms, where voiced sounds occur instead in some stems. Thus, Sanskrit *bhrátar-*, *pitár-* correspond on the one hand to Latin *frater, pater* but on the other to Germanic (here Gothic) *broþar*, *fadar* ('brother,' 'father'), with a voiceless and voiced sound, respectively (*þ* represents a voiceless dental fricative; the voice distinction has been lost in modern English). Verner noticed that the voiceless sound appeared in Germanic when immediately preceded by the accent in Sanskrit (*bhrátar-*) and the voiced sound when the Sanskrit accent was elsewhere (*pitár-*), though the accent was always shifted to the initial syllable in Germanic. Again, therefore, an apparent exception was, on closer inspection, found to be subject to a rule.

The significance of these and other explanations cannot be overstated, because they appeared to indicate not merely that these particular anomalies and exceptions are susceptible to an explanation and are, in fact, after all regular, but that **all** such anomalies and explanations can similarly be explained. Whereas previously linguists may have acknowledged that there is no rule without exceptions, the contrary view was now expressed: that there is no exception without a rule, i.e., if there appear to be exceptions, it is simply because the relevant rule to account

for them has not yet been found. These cases, and particularly Verner's Law, were therefore hailed as a breakthrough: here was evidence that language change is completely rule-governed and therefore a demonstration of the scientific credentials of linguistics itself.

Verner published his article, entitled 'Eine Ausnahme der ersten Lautverschiebung' ('An exception to the first sound shift') in 1875, and in the following year another significant article appeared, written by Karl Brugmann (1849–1919), entitled 'Nasalis sonans in der indogermanischen Grundsprache' ('Sonant nasal in the original Indo-European language'), which, by postulating syllabic sonorant consonants in Proto-Indo-European, removed further anomalies, as it provided a source for otherwise exceptional sound correspondences in the different languages, and again reinforced the view of change as essentially regular. But the significance of this article went beyond that: it opened up the way to an understanding of the Indo-European **ablaut** (the vowel alternations found, for example, in English *sing, sang, sung*), as these consonants, with 'zero vowel,' fit neatly into the overall pattern of alternations, and it paved the way for the extraordinary monograph *Mémoire sur le système primitif des voyelles dans les langues indo-européennes* (*Memoire on the primitive vowel-system in the Indo-European languages*), published by Ferdinand de Saussure (1857–1913) in 1878, at the age of 21 (Saussure claimed to have made the same discovery as Brugmann at the age of 15). Saussure extended the pattern of the sonorants in the ablaut system to include long vowels, which he analyzed as combinations of short vowels and a further sonorant element which he called a *sonant co-efficient* and which was later called a *laryngeal*. Though virtually ignored at the time, Saussure's proposal was to lead to a complete revision of the reconstructed Proto-Indo-European system in the 20th century.

Though Brugmann's article was more modest, and these consequences were not suspected when it was published in 1876, it was nevertheless clear that the picture of Proto-Indo-European phonology it presented was potentially different from what had hitherto been assumed, especially in Schleicher's *Compendium*. Furthermore, the article involved a kind of reasoning that was not acceptable to the earlier generation of linguists; like Saussure's monograph, it was to some extent based on internal relationships within the reconstructed Proto-Indo-European language and could therefore be regarded as an early instance of what would later be termed **internal reconstruction**. What was at stake here, then, was more than just the tidying up of a few apparent exceptions; it involved the nature of the evidence that is admissible in historical and comparative linguistics.

The Neogrammarians

With these developments, the scene was set for the last phase in the development of 19th century historical and comparative linguistics: the rise of the Neogrammarian 'movement.' The term *Neogrammarian*, a translation of the German *Junggrammatiker* ('Young Grammarians'), was originally a term of ironic disapproval, a nickname given to a group of young and irreverently radical linguists in Leipzig (then the center of Indo-European studies), but it was adopted by the group themselves, at least initially. The linguists associated with this movement were, in addition to Brugmann, Hermann Osthoff (1847–1909), Berthold Delbrück (1842–1922), Hermann Paul (1846–1921), Eduard Sievers (1850–1932), Wilhelm Braune (1850–1926), and a number of others. They had been inspired in particular by the lectures of the Slavic linguist August Leskien (1840–1916), around whom they centered.

The group showed their hand as a result of a public breach with the establishment, personified in this case by the classical scholar Georg Curtius (1820–1885), who had earlier been responsible for establishing Leipzig as the center of linguistic study in Germany. This breach was provoked by the fact that Brugmann published his article on sonant nasals in an issue of a journal of which Curtius was the editor but on this occasion was edited, during Curtius's absence, by Brugmann himself. Curtius disapproved of Brugmann's article, and the argument between the two led to the closure of Curtius's journal and the founding of a new publication, the *Morphologische Untersuchungen auf dem Gebiete der indogermanischen Sprachen* (*Morphological investigations in the field of the Indo-European languages*), by Brugmann and Osthoff in 1878. In its first volume, Brugmann and Osthoff published a *Preface* which can be regarded as the manifesto of the Neogrammarian movement.

In this *Preface*, Brugmann and Osthoff rather provocatively criticize 'the older linguistics' for numerous alleged failings: it has approached its object without really understanding how human speech works; it has concentrated on the purely physical side of speech and neglected the psychological side; it has been obsessed with reconstructing the original language and ignored later developments, which it sees as decay and decline; it has been concerned with classical literary texts, which are artificial and unnatural, instead of the real, natural speech of living dialects; and so on. Fortunately, however, Brugmann and Osthoff continue, the

Neogrammarian movement has already begun to correct these errors. It has adopted the principles set out by Leskien in his lectures: that language cannot be separated from its speakers as an independent object, and that speakers must have been subject to the same influences in ancient times as operate today. These last two points are clearly aimed at Schleicher, who, as we have seen, treated language as a biological organism with a life of its own, which goes through different phases of birth, aging, and decay.

Brugmann and Osthoff conclude by presenting the two most important principles of the movement:

(1) "Every sound change, inasmuch as it occurs mechanically, takes place according to laws that admit no exception."

(2) "Since it is clear that form association, that is, the creation of new linguistic forms by analogy, plays a very important role in the life of the more recent languages, this type of linguistic innovation is to be recognized without hesitation for older periods too, and even for the oldest."

Most of the points made by Brugmann and Osthoff are uncontroversial today, but they were provocative and problematic at the time. Most controversial was the first of the two principles, the exceptionlessness of sound laws. This principle was also hinted at by Schleicher, though not followed through, and it was also stated by Scherer, but it is the Neogrammarians who adopted it as one of their major axioms and with whom it is associated. The other principle, that of analogy, was even less original and was recognized by many earlier scholars, but again the Neogrammarians elevated it to a major principle, counterbalancing the exceptionless principle: all changes could, in effect, be attributed to one or the other.

Though these two principles are given prominence, many of the other points of Neogrammarian doctrine are also important: the downplaying of the reconstruction of the proto-language in favor of understanding the **processes** of language change, the emphasis on the use of 'real' language, and the recognition of the uniformitarian principle, according to which the processes at work in ancient times are no different from those operative today.

The chief theoretician of the Neogrammarians was Hermann Paul, whose main work, *Prinzipien der Sprachgeschichte* (*Principles of the history of language*), was first published in 1880 and has gone through many editions since. Paul is quite explicit in his insistence that linguistics is a **science**, though a **cultural** and **historical** science rather than a natural one. Indeed, he argues that a scientific approach to language is necessarily historical, because the goal of science is explanation, and only history can explain language:

> "What is explained as a non-historical and yet scientific investigation of language is in fact nothing other than an incompletely historical one .... As soon as one goes beyond the mere observation of details, as soon as one attempts to grasp the context, to comprehend the phenomena, one has stepped onto historical ground."

Paul raises the question of the actual mechanism of language change. He adopts a psychological view, thus taking up Brugmann and Osthoff's complaint that earlier linguists (they had in mind Schleicher) had ignored psychology. The psychological aspects of language change had been discussed by the psychologist Wilhelm Wundt (1832–1920), but in Humboldtian terms, concerned with the psychology of the whole nation – see his later *Völkerpsychologie* (*Psychology of peoples*) of 1900–1920. For Wundt, language change involves a change in the 'collective mind' (*Volksseele*), but Paul stresses the role of **individual** psychology. For him, acts of speech leave behind kinesthetic and auditory impressions in the individual mind which are then recalled in subsequent speech acts, thus ensuring continuity through time but also a degree of variability which gives scope for change. There is also a social dimension, with the existence of a norm brought about through mutual influence among speakers. Change occurs though a shift in these impressions or in the norm, for example through the acquisition of the language by a new generation.

The influence of the Neogrammarians was immense, but they were not without their detractors. The main criticism was directed against the principle of exceptionless sound laws. For the Neogrammarians, this principle was fundamental, because it is the foundation of their claim that linguistics is a **science**. Leskien remarked that:

> "If one admits optional, contingent and unconnected changes, one is basically stating that the object of one's research, language, is not amenable to scientific recognition."

Criticism of this position came from various quarters, and not only the conservative tradition represented by Curtius. Another critic was Hugo Schuchardt (1842–1927), whose article 'Über die Lautgesetze: Gegen die Junggrammatiker' ('On sound laws: against the Neogrammarians') of 1885 argued against Neogrammarian doctrine on two counts: first, that by regarding sound changes as mechanical it excludes the individual speaker, and second, that changes are only without exceptions if we exclude many factors which are part of normal language

development, such as conflicts between different 'laws', and especially dialect mixture.

But the main argument against the exceptionlessness of sound laws came – ironically, in view of the Neogrammarians' championing of dialects as 'real language' – from dialect surveys, which began in the 1880s, with Wenker in Germany and Gilliéron in France. Dialect evidence undermined the much-vaunted regularity of sound changes, because these changes were found to be geographically far from uniform. For example, the isoglosses (boundaries) of different changes involved in the High German Consonant Shift, which created fricatives from earlier plosives, were found to be different for different consonants, and, worse still, the diphthongization of Middle High German vowels was found to have been implemented differently in different words, so that the isogloss for *hu:s* > *haus* was different from that for *bru:n* > *braun* and that for *u:s* > *aus*.

The most consistent criticism of the Neogrammarian position came from Romance linguists. The Romance languages are in a different position from most of the other Indo-European families, and from Proto-Indo-European itself, because the proto-language (Latin) had been preserved, and its evolution into the daughter languages is well-documented. The evidence from Romance dialectology offered many more instances of irregular developments. By the side of the Neogrammarian doctrine that 'sound laws have no exceptions,' we can place the Romance maxim, attributed to Gilliéron, that 'chaque mot a son histoire.'

Conclusion: Fin-de-siècle Linguistics

Although by the end of the 19th century the 'sound law' controversy had run its course, and indeed the Neogrammarian 'movement' had already petered out, the more general issues raised by the controversy – the extent to which language change is a regular process – continued into the 20th century. However, most of the principles of the Neogrammarians, such as their insistence on the scientific status of linguistics and on the necessity for close examination of real language data, were now generally accepted. Brugmann's impressive later work, *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen* (*Outline of the comparative grammar of the Indo-European languages*), published in five volumes from 1886 to 1900 with a contribution on syntax by Delbrück, exemplified these principles and became the authoritative source of information on its subject. The result of rigorous and consistent application of the comparative method, it stands as the culmination of, and a fitting monument to, a century of historical and comparative linguistic scholarship.

Although the theoretically most important and influential achievements were in the field of the Indo-European languages, the methods were applied to the historical study of other language families. The Semitic languages were well-known, but a comparative grammar was not published until 1890, by William Wright (1830–1889); the vexed question of the unity of the Finno-Ugrian family and its relationship to others (especially the Turkic family) was clarified by Otto Donner (1835–1909) in a paper of 1880, and a comparative grammar of Hungarian was published by József Szinnyei (1857–1943) in 1896. We may also note the important developments in an ancillary discipline which was fundamental to reliable comparison and reconstruction: phonetics. Until the publication in 1876 of Eduard Sievers *Grundzüge der Lautphysiologie zur Einführung in das Studium der Lautlehre der indogermanischen Sprachen,* later more conveniently entitled *Grundzüge der Phonetik* (*Principles of phonetics*), phonetics (at least in continental Europe; in England the subject developed independently) was largely the preserve of physiologists and suffered from some basic weaknesses; the previous standard work, Ernst Brücke's *Grundzüge der Physiologie und Systematik der Sprachlaute für Linguisten und Taubstummenlehrer* (*Principles of the physiology and systematics of speech sounds for linguists and teachers of the deaf and dumb*) of 1856, for example, erroneously treated the post-alveolar fricative [ʃ] represented by German *sch* as a coarticulated alveolar [s] and velar fricative [x].

However, the end of the century also saw the beginnings of a change of approach, and not only in linguistics but also in the natural sciences and in intellectual life generally. The absolutes and certainties of 19th century science were beginning to be undermined by relativism and indeterminacies, and the positivist outlook which had dominated the second half of the century was giving way to a more sceptical approach. Evidence of this trend in linguistics may be seen in such movements as the 'idealist' school of Benedetto Croce (1866–1952) and Karl Vossler (1872–1949). For Croce, language was first and foremost an **esthetic** phenomenon, and language change a **creative** process; Vossler, in his *Positivismus und Idealismus in der Sprachwissenschaft* (*Positivism and idealism in linguistics*) of 1904 sets against the positivist linguistics of the Neogrammarians a new 'idealist' linguistics, based on esthetics, culture, and individual creativity.

But a more serious threat to the fundamentals of 19th century historical and comparative linguistics was already developing. Throughout the century,

and in fact as its main defining characteristic, linguistics had been a **historical** discipline; indeed, as we have seen, Paul explicitly denied that a non-historical approach could be scientific. But the foundations of a non-historical, **synchronic** linguistics had already been laid by the Polish scholar Jan Baudouin de Courtenay (1845–1949), and it was on these foundations that Ferdinand de Saussure was to build in the early 20th century, establishing the primacy of the synchronic dimension. This development was also to mark the end of the German hegemony in linguistics. Thus, 19th century linguistics was to end in the same way that it had begun: with an intellectual revolution. This revolution, though, like the earlier one, was neither sudden nor complete.

See also: Dialects: Early European Studies; Neogrammarians; Sanskrit: Discovery by Europeans; Sound Laws; Verner's Law.

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Figure 1 British Sign Language examples. From 'Dictionary of D & D signs' (1895).

countries is television, because sign language broadcasts may be seen across the nation, and new lexical items or specific constructions used by the presenters (recognized as members of the language elite) may be transmitted and adopted by the community. (See Lucas *et al.*, 2001, and Sutton-Spence and Woll, 1999, for further examples of both internal and external changes in American and British sign languages.)

See also: Sign Language: Communities and Cultures; Sign Language: Interpreting; Sign Language: Lexicography.

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Historical Pragmatics

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Introduction

Historical pragmatics is a field of study that lies at the intersection of historical linguistics and pragmatics. It has established itself as an active field of inquiry since the mid-1990s as a result of a broadening of both historical linguistics, which started to replace a view of language as a coherent and homogeneous system by a more corpus-driven approach, focusing on genre-specific conventions and the internal variability of older stages of language, and a simultaneous broadening of pragmatics, which started to accept an increasingly wide range of data, including also written data. As a consequence, historical pragmatics defines itself as the study of pragmatic aspects in the history of specific languages. The field is also called historical discourse analysis or historical dialogue analysis (e.g., Brinton, 2001; Jucker *et al*., 1999). The choice of terms may sometimes imply a specific perspective, but often they are used interchangeably.

Data

Spoken interaction from the past is not directly available for inspection, but this is no longer seen as problematic for historical pragmatics for several reasons. Instances of recorded spoken language abound in historical data. Court records, for example, contain verbatim accounts of the words spoken during the course of legal proceedings in a law court. Plays consist almost entirely of fictional accounts of spoken language. Early scientific textbooks are often written in the form of fictional interactions between a master and a student. Narrative fiction may contain long stretches of reported discourse. And language teaching textbooks often provide model conversations, e.g., for the merchant traveling to a foreign country.

In all instances, the reliability of these data are an issue. Court proceedings were presumably formal and thus not typical of everyday language. Prescriptive models in language textbooks and representations of conversations in drama or fictional narratives cannot be taken as accurate renderings of the spoken language of any particular period. Therefore, on the one hand, these historical records of spoken language may give us an approximation of the real spoken language in different historical and sociocultural contexts; on the other hand, these instances warrant a pragmatic analysis in their own right. Thus, we may analyze the use of discourse markers in a play by Shakespeare, not because we believe that this is a particularly good approximation to how discourse markers were used in spoken conversations of Shakespeare's time, but because we are directly interested in how Shakespeare used discourse markers in his plays. (*see* **Discourse Markers**).

In addition, Koch and Oesterreicher (1985), in a widely adopted model, have argued for a need to distinguish between the realization of language in a particular medium, and the way language is realized on a scale ranging from the language of immediacy to the language of distance. As to the first, language may be realized either in the phonic code or in the graphic code. But this dichotomy has to be distinguished from the scale formed between instances of the language of immediacy, which is more typically (but not exclusively) realized in the phonic code, and the language of distance, which is more typically (but not exclusively) realized in the written code. While no historical language realized in the phonic code is still available, there is sufficient data on the language of immediacy, as for instance in diaries or in personal correspondence.

Moreover, even written texts that lack any connection to the spoken language and that are manifestations of the language of distance are always produced in a communicative context by writers who want to communicate with their readers, and as communicative events they are amenable to pragmatic analyses.

Topics in Historical Pragmatics

Several distinct subfields of historical pragmatics can be distinguished. The first approach, which has been

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Topics in Historical Pragmatics

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called 'pragmaphilology' by Jacobs and Jucker (1995), studies pragmatic aspects of historical texts in their sociocultural context of communication. Such studies are not new, except for their more explicit reliance on recently developed descriptive tools from the fields of pragmatics and discourse analysis. These may range from ethnographic descriptions of communicative events to the various forms of politeness attested in historical data and to discourse analytical investigations. They also include an approach that may be termed 'literary historical pragmatics.' Fitzmaurice (2002), for instance, provides a pragmatic reading of familiar letters in 17th- and 18th-century England which takes into account intended and unintended meanings implied and inferred by writer and audience. Sell (2000) deals with literary texts of the past. He argues that literary activity should be seen as communication in a strongly interactive sense, as it is affected by the different situationalities of sender and receiver. In the case of literature, sender and receiver are often separated not only in place but also in time. In this case, the literary critic, or the historical pragmaticist, has the task of mediating between the situationalities.

The second approach, diachronic pragmatics, studies the historical development of pragmatic elements, such as discourse markers or speech acts, or it studies the pragmatic causes of language change. To the extent that different stages in the history of a language are compared, historical pragmatics is a kind of contrastive analysis. As in any contrastive study, it is important to specify the *tertium comparationis*, i.e., the element that remains constant when different diachronic stages are compared. It has become standard to distinguish between 'diachronic form-to-function mapping' and 'diachronic function-to-form mapping' (see Jacobs and Jucker, 1995: 13). An example of the former are discourse markers or pragmatic markers, which are typically marginal forms with little or no propositional meaning that occur outside the syntactic structure and which function on the interactional or pragmatic level. Brinton (1996) examines a variety of such markers in Old English and in Middle English. In this case, linguistic forms that stay relatively stable are taken as a starting point, and their different functions at different stages of their diachronic development are traced.

If, on the other hand, a linguistic function, such as the expression of politeness, is taken as starting point, the term *diachronic function-to-form mapping* is used. In this case, the different realizations of this function in the course of time are studied. Arnovick (1999), for instance, traces the histories of a number of speech acts, such as promises, curses, blessings, greetings, and entire speech events, such as flyting and sounding, which she collectively calls *illocutionary biographies*. Jucker and Taavitsainen (2000) argue that histories of individual speech acts have to be situated within a multidimensional pragmatic space in which the speech act can be contrasted with neighboring speech acts.

Often, however, the distinction between these two perspectives is not easy, because in the course of time a particular linguistic element may change both its form and its function. And in some cases the object of investigation is not a particular form or a particular function but a more comprehensive system of interconnected entities, as in the case of address term systems (see Taavitsainen and Jucker, 2003). Many languages distinguish between a more polite and a more intimate personal pronoun of address, such as French *vous* and *tu* or Early Modern English *you* and *thou*. Some languages have more than just two such pronouns of address (e.g., German at some stage of its development, see Listen, 1999). Such systems undergo multivaried developments at different levels. Busse (2002) investigates the morpho-syntactic variability of the second person pronouns in the plays by William Shakespeare and seeks to identify the factors that influence the choice of *you* versus *thou* and *ye* versus *you*.

The cover term *diachronic pragmatics* is also used for approaches that study the pragmatic causes of language change. Traugott and Dasher (2002), for instance, argue on the basis of extensive corpus data from English and Japanese that there are predictable paths of semantic change because such changes are pragmatically motivated, that is to say they are bound up with mechanisms called *invited inferencing* and *subjectification*.

Recent Advances

To date, a disproportionate amount of research in historical pragmatics is devoted to the history of English, but important work has been carried out in several other and less-well researched languages. Xing (2004), for instance, investigates the pragmatic factors affecting the development of a specific focus particle in Mandarin Chinese. Lunde (2004) examines reporting strategies in medieval East Slavic hagiography and homiletics, and Collins's (2001) study is devoted to the distribution of reporting strategies in a corpus of medieval Russian texts.

The papers published by Bax (2003) testify to the importance of rituals in language change in diverse language situations, ranging from ancient Indo-European religious poetry (Vedic hymns) to ritual politeness in early modern Dutch letter writing and ritual aspects of contemporary mass sports events. The language of the mass media has also received

increasing attention from historical pragmaticists, for instance in the papers published by Ungerer (2000) and by Herring (2003), which provide an historical view on mass media communication, and thus show that historical pragmatic analyses can also be applied to changes in progress.

See also: Discourse, Foucauldian Approach; Discourse Markers; Literary Pragmatics; Media: Pragmatics; Politeness; Pragmatics: History; Pragmatics: Overview; Speech Acts.

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been sufficiently synthesized and methodologically developed by the generation of Georg Curtius (1820–1885) and, especially, August Schleicher (1821–1868), to the extent that one might speak of a 'paradigm' change having taken place at that time, of which the Neogrammarian tenets of historical linguistic research associated with the names of their former students, notably Karl Brugmann (1849–1919) and August Leskien (1840–1916), respectively, were the logical, if somewhat overstated, outcome.

A similar observation of the motives of history writing, it would seem, could be made about Holger Pedersen's (1867–1953) 1924 history of the achievements of 19th-century Indo-Europeanists, which was preceded by a similar and somewhat shorter account of his first published history in 1916, the year of the completion of Brugmann's second edition (and only in its first edition it was also Delbrück's) *Grundriss der vergleichenden grammatik der indogermanischen sprachen,* as well as the appearance of Saussure's posthumous *Cours de linguistique générale*. The need of such a summing up of history is expressed more clearly, perhaps, in Wilhelm Streitberg's (1864–1925) voluminous undertaking, entitled *Geschichte der indogermanischen sprachwissenschaft seit ihrer begründung durch Franz Bopp*. However, this is more of a stock-taking of the work accomplished in the various branches of Indo-European philology by that time than a regular 'History of Linguistics' (cf. Koerner, 1978a: 16–17, for details). Begun in 1916, the enterprise was abandoned after 1936.

After World War II, it appears that the histories by Malmberg (1964 [1959]), Iviç (1965 [1963]), Leroy (1963), and others, fulfilled a similar function of summing up previous attainments in linguistic science. However, this time the focus of attention was the post–1916 period in the history of linguistics, following the success story of Saussure's *Cours*, with its perceived emphasis on a nonhistorical approach to language. The Neogrammarian framework of linguistic research was propounded in the histories of Pedersen, the organizational efforts of Streitberg from 1916 onward, and other less influential books – and one may add that Pedersen, a second-generation Neogrammarian, reflects the positivist orientation of that school much more emphatically than the original group of scholars (note that neither Delbrück's *Einleitung* nor Paul's *Prinzipien* are even mentioned in his 300-page study of 1931 [1924]). Only in more recent years (e.g., Einhauser, 1990; Morpurgo Davies, 1999: 226–278) have the Neogrammarians received a more adequate treatment. By the same token, the histories by Malmberg, Iviç, Leroy, and other similarly slanted studies of the 1960s, put forward particular post-Saussurean trends as the most significant achievements of the discipline to date, whether Copenhagen-type, Praguean, or Bloomfieldian. Their endeavor, like that of Benfey, Raumer, Pedersen, Streitberg, and others from an earlier stage in the development of linguistics, was to a large extent the presentation of a framework of research in which they themselves had been brought up, and, concomitantly, an attempt to maintain the strength and impact of the structuralist mode of thought.

Celebratory or Propagandistic Histories of Linguistics

The second type of history writing activity may be characterized by the intention on the part of an individual usually in his thirties (not late forties or well above, as is generally the case with the first type: Benfey was sixty when his book appeared), again representing a particular group, to launch a campaign opposing previously cherished views and still prevailing doctrines. Thus in contrast to Benfey (1869), for example, Berthold Delbrück's (1842–1922) 1880 *Einleitung* (6th and last edition, 1919) served, together with Paul's *Prinzipien* of the same year (5th and last edition, 1920), to speak for a new generation of scholars eager to demonstrate that their achievements significantly surpassed previous attainments in the field, and that their theories rightfully replaced those taught by the preceding generation of linguists. The claim in favor of discontinuity is what characterizes this type of activity, and Delbrück's book is a prime example of this effort. Typically, Schleicher was depicted by Delbrück (1882: 55) as representing the conclusion of the phase of comparative-historical grammar inaugurated by Franz Bopp in 1816, and the *Junggrammatiker*, with whom he associated himself early in his career (soon after he had received Schleicher's chair at the University of Jena in 1873), as marking a decisive new turn in the field.

No comparable history of linguistics was written in the 1930s or 1940s with regard to structuralism, but a look into Bloomfield's *Language* (1933: 3–20) or Louis Herbert Gray's (1875–1955) *Foundations of language* (1939: 419–460) clearly suggests that the chapters devoted to the history of linguistics were an attempt to redress the development of the discipline and to document the superiority of the structuralist approach to any other theory or method hitherto put forward. This endeavor to prove earlier views to be insufficient and inadequate has by no means been abandoned by adherents of the prevailing modes of linguistic thinking of today. On the contrary, it can easily be shown that their advocates have been eager

not only to revive an interest in the history of linguistics itself but also to rewrite it to such an extent that the ideas of the generation immediately preceding the present one appear the least worthy of attention. As a matter of fact, what C. F. Voegelin in 1963 felicitously termed the 'eclipsing stance' that transformational-generative grammar had embarked on was best illustrated by Noam Chomsky himself, for instance in his lecture at the Cambridge, Massachusetts Congress of Linguists of 1962 (Chomsky, 1964). Soon thereafter, a number of his followers ardently engaged themselves in writing their particular view of history; compare the articles by Dingwall (1963), Bach (1965), or Bierwisch (1966). More recently, in 1980, Frederick Newmeyer published a book that constitutes the best example to date of this *pro-domo*, whiggish type of history writing. It selects and reinterprets past linguistic research in an attempt to prove his view that linguistics was made a science only in 1955 or in 1957, and by Chomsky, and that previous work was totally inadequate, barring a few minor incidental insights foreshadowing the 'revolution' in the field (cf. Koerner, 1983 and, more recently, 2002: Chap. 8, for a critical assessment of this kind of activity).

While Type I, i.e., the summing-up type, of history writing may appear more benign as it seems to represent matter-of-fact accounts (though one should not be too sure about this), Type II History of Linguistics can best be described as propagandistic in nature; the most successful example of this type is Chomsky's own *Cartesian linguistics* of 1966. This book presents the author's views regarding the ancestry of his own theories so brilliantly that many a young student of language was carried away by this new vision of history. Today, we can still discover a considerable amount of useful information in the histories written for the purpose of summing up previous work in the field, *viz*. the accounts by Benfey, Raumer, Pedersen, and others – although we may have become quite aware of their biases and shortcomings (for an assessment of these works, cf. Hoenigswald, 1986 and Koerner, 1990) – whereas histories of the second category, though written much more recently, are already dated. It appears that, once their propagandistic purpose has been satisfied in proselytizing for the new ideology, these works rapidly lose their initial impact and informational worth. After the publication of the second edition of *Language and mind* (Chomsky, 1972), we rarely see any historical references in his work, barring those to the ideas of Saussure and Jespersen (cf. Koerner, 1994). More recent comments on the subject (Chomksy, 1997a and 1997b) cannot be taken seriously and have been criticized accordingly in Joseph (1999).

Detached Histories of Linguistics (Problemgeschichte)

There is possibly a third type of the history of linguistics that is intended neither to advocate a particular framework or 'paradigm' nor to attempt to provide an argument in favor of a scientific revolution within the discipline. This type may occur at any time in the development of a particular field of research since its ultimate intent is less partisan than in the other two instances and often more holistic in attitude, though the motivation behind the work may be fairly personal. To my mind, the best example is Arens's 1955 *Sprachwissenschaft* (2nd enlarged ed., 1969), in which an attempt was made to delineate the development of Western linguistic thought from the early discussions of the Greeks about the nature of language to contemporary linguistic work, certainly with a view to indicating not only that our discipline has come a long way to gain those insights we now cherish and the methods we have developed, but also that we all have built, knowingly or not, upon the findings of previous generations of linguists, and that we owe much more to these scholars than we might ever become fully aware of.

While this Type III manner of presenting the history of linguistics might well have been the result of an individual choice, it appears that it still expressed the endeavor of a whole generation of scholars, namely, the rebuilding of a discipline after its almost total destruction after a world war. Taken in this way, Pedersen's 1931 book may well be included in the third category in that it sought to reestablish a linguistic tradition that in his belief should have continued to serve as a sound basis for subsequent work in the field of comparative-historical linguistics after World War I. But Pedersen's view of linguistics is such that his accounting cannot be compared to Arens's much more detached view of the evolution of linguistics during the 19th and the early 20th centuries.

Undoubtedly, other, often nonlinguistic, motives played a role in presenting the history of the discipline in one way or another. Thus it should be recalled that particular socioeconomic conditions, historical events, or political situations have often had a considerable influence on the motivation of writing the history of a particular discipline or the acceptance of a seemingly new theoretical framework of research or mode of thought – and, in this respect, histories of linguistics have failed to increase our awareness of the impact of matters or events outside the field. The works of Benfey and Raumer, for instance, were highly motivated by the rise of German nationalism (as

their prefaces suggest) and the aspiration to national unity, if not superiority, of Germany among the European powers. That such sentiments may well have played a role when after World War I German linguistic science did no longer hold sway in many parts of the world was pointed out by Malkiel (1969: 557) who observed that the success of Saussure's *Cours* "cannot be properly measured without some allowance for the feelings of that time: The acceptance of the leadership of a French-Swiss genius connoted for many Westerners then opposed to Germany a strongly desired, rationalized escape from the world of Brugmann, Leskien, Osthoff, and Paul."

Historiography of Linguistics

Despite the respect scholars may have for works of the third type, as exemplified by Arens's *Problemgeschichte*, some have felt a need for yet a fourth type of history writing (cf. Koerner, 1976 [1972] and Simone, 1975 [1973] for early expressions of this sentiment), namely, the presentation of our linguistic past as an integral part of the discipline itself and, at the same time, as an activity founded on well-defined principles which can rival, in terms of soundness of method and rigor of application, those of linguistics itself. This fourth type, now usually referred to as 'linguistic historiography' or, more properly, the 'historiography of linguistics' demands that the history of linguistics should not be merely subservient to the discipline, but should assume a function comparable to that of the history of science for the natural scientist. In short, while recognizing the important distinction between chronicle and history, recent contributors to the history of linguistics have gone a step further by distinguishing between history and historiography. This is partly an attempt to make clear a departure from previous work in the field, which only too often tended to be partisan–histories, or what Henry Butterfield termed 'Whig-histories,' and partly because previous histories did not provide a usable guide for the adequate treatment of past developments in the history of the language sciences, and thus failed to offer a better understanding of where current theories may lead us to.

The 1980s saw a variety of studies offering alternative lines of historiographic conduct, entering the debate over the proper approach to the history of linguistics, and suggesting ways that would lead to more adequacy of treatment (e.g., Schmitter, 1982; Grotsch, 1982; Christmann, 1987). However, no common ground has yet been established as to how to proceed in linguistic historiography, and indications are that the debate will continue for some time. Maybe this is a healthy sign.

Mid-Century Efforts in the History of Linguistics

New publications and, at times, a few insightful studies in the history of linguistics appeared in the 1960s, perhaps beginning with Paul Diderichsen's (1905–1964) work of 1960 on his compatriot Rasmus Rask (German translation, 1976). It was followed by works such as Iviç (1963; English translation, 1965), Leroy (1963; English translation, 1967), Tagliavini (1963), Malmberg (1964), Lepschy (1966; English translation, 1970), Mounin (1967), Robins (1967), Coseriu (1969, 1972), Helbig (1970), Szemerényi (1971), Jankowsky (1972), and others (see Koerner, 1978a for a full list down to 1976). Yet most of them relied uncritically on earlier accounts and rarely ventured into questions of historiographical method or touched upon matters concerning the philosophy of science, except perhaps for a fashionable nod in the direction of Thomas Kuhn's *Structure of scientific revolutions* of 1962. Most of these books are largely forgotten now, and are at times cited for criticism. Many of them had been produced following Chomsky's 'big splash' with his 1962 plenary lecture at the Ninth International Congress of Linguists held in Cambridge, Massachusetts (Chomsky, 1964), at which he first referred to his newly discovered ancestors. These works were following the fad of the day. Among the books of this period R. H. Robins' *Short history* of 1967 has shown the greatest 'staying power.' I think that part of the popularity was because it was the only one written by a native speaker of English, and so it stood aloof from any criticism of Chomsky's work, including the latter's incursions into the history of linguistics, and it was of a size that made it handy as a textbook. Like all the others of the time, its elegant narrative cannot disguise its scholarly flaws. I believe we have learned enough about the complexity of the subject that no reasonable person today will venture to undertake a similar attempt at covering 2500 years of Western history of linguistics in barely 200 pages. The late Bertil Malmberg's attempt of 1991 is most charitably described as an *Alterswerk*, the work of someone too old to read the signs of the times, not to mention the scholarship of the preceding twenty or more years. Such a work, based on little original research, rightly belongs to the 1960s. (Somewhat more successful in this regard was Swiggers's 1997 effort, done by a scholar born some 40 years later.)

Still, as far as individual scholarship is concerned, concentration on a particular subject instead of attempting to cover too much ground and too many centuries of development, has been more promising, e.g., Robins's rehabilitation of the Byzantine

grammarians (1993), Morpurgo Davies's monograph on 19th-century historical-comparative linguistics (1999), Graffi's survey of 19th- and 20th-century work in syntax (2000), or Coseriu and Meisterfeld's first part of a history of Romance linguistics (2003).

The More Recent Study of the History of Linguistics

During the 1960s, following various claims made by Chomsky that his own theories had little to do with the pursuits of his immediate predecessors and contemporaries, but instead follow quite different traditions such as those associated with the Port Royal grammarians and the work of Wilhelm von Humboldt, the bulk of the dissertations written on the history of linguistics were devoted to just these areas of interest, at times seriously distorting the true intent and purpose of these earlier authors. For instance, Sanctius's *Minerva* was studied because of a recent revival of interest on the part of generativists in the phenomenon of ellipsis, a subject to which Sanctius had made an important contribution (cf. Breva Claramonte, 1983).

Only from the 1970s onward – and quite independent of Chomsky's *Cartesian linguistics*, I may add – following the creation of the first journal for this particular field of interest in 1973, *Historiographia linguistica*, and various associated monograph series united under the umbrella title 'Amsterdam Studies in the Theory and History of Linguistic Science,' did serious work begin to emerge that challenged this *pro-domo* type of history writing. These and other organized activities (see below) led to the much more recent field of study, now generally referred to as the 'historiography of linguistics' (see Koerner, 1995a) or 'linguistic historiography' for short, an approach to the history of linguistics which is conscious of methodological and epistemological requirements in adequate history writing in linguistics as in any other discipline. (See under 'Remaining challenges in linguistic historiography' for the result of more recent decades.)

The Consolidation of Linguistic Historiography

Another indication of the history of linguistics having become a mature field of scholarly pursuit is its general professionalization. In 1978, the first International Conference on the History of the Language Sciences (ICHoLS) was held in Ottawa, Canada, the same year in which the Société d'Histoire et d'Épistémologie des Sciences du Langage (S.H.E.S.L.) was founded in Paris. In 1984, the Henry Sweet Society for the History of Linguistic Ideas (HSS) was established at Oxford, and several similar international and regional societies have been launched since; for instance, the Dutch society 'Geschiedenis van de Taalwetenschap' (Amsterdam) and the German 'Arbeitskreis *Geschichte der Sprachwissenschaft*' (Münster). Soon thereafter the North American Association for the History of the Language Sciences (NAAHoLS) was created late in 1987, followed by the establishment of the historically oriented Società di Filosofia del Linguaggio (SFL) in 1994 and the Sociedad Española de Historiografía Lingüística (SEHL) in 1995. Even outside Europe, the later 1990s saw the creations of history of linguistics societies launched in São Paulo and in Mexico City, for example. These associations and various others have organized and are organizing scholarly meetings, both national and international, and several of them on a regular basis, with participants from many countries in attendance.

In the meantime, further ICHoLS meetings have been held on a triennial basis: in 1981 (Lille, France), 1984 (Princeton, NJ), 1987 (Trier, Germany), 1990 (Galway, Ireland), 1993 (Washington, DC), 1996 (Oxford), 1999 (Fontenay near Paris), and 2002 (São Paulo), with the tenth congress scheduled to take place at the University of Illinois in August 2005. These ICHoLS meetings have regularly drawn over 100 participants from some 20 different countries and have proved useful in providing a liaison between the various members of the national or regional societies. Since its inception, proceedings of ICHoLS have been published on a regular basis, and so, they may reflect the progress that has been made in the field in general terms (cf. Koerner, 1980; Aarsleff *et al.*, 1987; Niederehe & Koerner, 1990; Ahlqvist, 1992; Jankowsky, 1995; Cram *et al.*, 1999; Auroux *et al.*, 2003).

Apart from supplying fora for direct, viva voce exchanges on a wider scale, we should not forget the importance of specialist periodicals and monograph series which provide outlets for research in the discipline. In addition to *Historiographia linguistica*, a second journal with similar goals, entitled *Histoire – Épistémologie – Langage*, was established in Paris in 1979, and more recently in 1991, a third journal, *Beiträge zur geschichte der sprachwissenschaft*, was launched in Münster, Germany. In short, if the professionalization of the subject is any guide, the history of linguistics has become a widely recognized and practiced field of scholarly research. And where monographs in the history of linguistics are concerned, everyone will agree that their number has been steadily increasing; a look at the 'Publications Received'

rubric of *Historiographia linguistica* illustrates this development very well.

In his 1978 foreword to the first collection of my papers, R. H. Robins identified three "types of writing required in the history of linguistics," apart from the "most primary stage of research," namely, the editing and publication of previously unedited texts. This latter kind of work has been done in various places, for instance, in the 'Grammatica Speculativa' series published by Frommann-Holzboog of Stuttgart (more recently, Kelly, 1996), and there are many others. These three 'types' are according to Robins (in Koerner, 1978b: xii–xiii):

1. General theoretical and methodological essays on the historiography of linguistics: what should the history of an academic discipline such as linguistics set out to achieve and how should it be undertaken for this purpose? Opinions, of course, differ on both these questions; a case in point is the applicability or nonapplicability of the Kuhnian concept of a scientific paradigm to the history of linguistic science.
2. Studies more restricted in their time and place, devoted to particular trends and movements of thought on language and the development of particular linguistic concepts.
3. Biographical accounts of the work of individual scholars who have been influential in the course taken by linguistic science during some part of its history.

Those familiar with my efforts in the history of linguistics over the past 30 and more years may agree that I have attempted to contribute in all three areas. Whether I was particularly successful in doing so is up to others to judge. But I think jointly, in many places of the world, including various countries not mentioned in the present account, we can surely state that all these three – if not four, including the editing of hitherto unpublished texts – types of historiographical work has been widely achieved.

This may be a quick *tour d'horizon* of our field, always speaking in general terms and not making particular claims about research in the various specialist areas of individual researchers, be it the Spanish Siglo de Oro, the 17th century in Britain, *le siècle des Lumières*, the early Middle Ages, the Classical or any other period, whether in the Western tradition or not. I may lay claim to only some knowledge in 19th- and 20th-century European and North American linguistics (e.g., Koerner, 2002), and usually do not venture much outside this territory. I believe all present-day historiographers are agreed now that effective research even in areas such as the classics (e.g., Taylor, 1987), the early or the late medieval period (e.g., Law, 1993 and Ebbesen, 1995, respectively), or any other period in the history of linguistic thought are best pursued by a team of specialists, not scholars working alone.

Remaining Challenges in Linguistic Historiography

Despite all the achievements referred to so far – and I know that I have barely touched the surface of what has actually been done in the historiography of linguistics, especially over the past 10 or more years – I do not think that there is much reason to be smug. I feel, although I know that I must leave it largely to the next generation to ensure continuity and quality of research in the field, that we must remain vigilant and not become self-indulgent, and remember that the history of linguistics should remain an integral part of the language sciences and not become a separate department, either organizationally or philosophically. In general, we should heed Raffaele Simone's recent observation "Purus historicus est asinus" (Simone, 1995; cf. also Koerner, 2003).

On the practical side, we still have to see the various multivolume histories – Schmitter (1987–), Auroux (1989–1992, 2000), Lepschy (1994 [1990]–1998) – come to completion, notably what I am inclined to call the *Jahrhundertwerk* in our field, namely, the trilingual *History of the language sciences / Histoire des sciences du langage / Geschichte der sprachwissenschaften* edited by myself, together with Hans-Josef Niederehe, Kees Versteegh, and Sylvain Auroux, which will be completed in 2005. The editors and about 250 individual contributors have been working quite conscientiously on making this first 'world history of the language sciences' a reality. Until then – as there are indications that the historical surveys edited by Auroux, Lepschy, and possibly Schmitter as well do not venture much beyond the advent of Saussurean linguistics – the *Concise history of the language sciences: From the Sumerians to the cognitivists,* edited by Ron Asher and myself, will have to serve the needs of those interested in the most recent history of linguistics (Koerner and Asher, 1995: 221–368).

But there are other concerns too. I do not think that the worries recently expressed by Frederick Newmeyer in his 1996 collection of papers on the history of generativism in North America need of necessity apply to us, but the suspicion is lurking that part of these might. In his introduction he reported that many of his colleagues "feared that [he] would become tarred with the brush of being an 'historian of linguistics', who, [...], occupy a status level even lower than that of a 'semiotician'" (p. 2). Newmeyer

further explained "That this attitude results from the belief that most people who write on the history of linguistics have only the most minimal training in modern linguistics and devote their careers to attempting to demonstrate that their pet medieval grammarian or philosopher thought up some technical term before somebody else's pet medieval grammarian or philosopher." I don't believe that we must take this apparent caricature too seriously. On one point at least I am in agreement with Newmeyer, namely, that a historian of linguistics should also be a linguist. This may not apply with the same stringency to pre–19th-century linguistics (although not only in 'modern,' i.e., generative linguistics), but I cannot imagine anyone making sense of the work of Pānini, for instance, who is not thoroughly trained as a grammarian of Sanskrit. Still, others have more recently voiced concern about the status of linguistic historiography and its impact on linguistics proper (Schreyer, 2000; Schmitter, 2003a), concerns that deserve to be addressed (Koerner, 2005b).

There are other issues – apart of the continuing battle for legitimatization and institutional support – of linguistic historiography – which I remain concerned about. They pertain to questions of methodology and epistemology, but also of what may be called 'quality control' (cf. Koerner, 2005b). I have addressed a number of these methodological issues in papers devoted to the concept of 'metalanguage' (see chapters in Koerner, 1989 and 1995b), the often careless argument of 'influence' (e.g., Koerner, 1987), and other issues, attempting a summary of the potential problems of disagreement on questions of method at the 1993 ICHoLS Conference (Koerner, 1995a). It seems to me that a broader consensus on these would be desirable for the further development of the craft, but it requires the will of the scholarly community to meet those challenges head on (cf. Koerner, 2005a, for a more detailed study). An important subject in linguistic historiography that requires more attention than it has received is the issue of ideology in linguistic argumentation (e.g., Koerner, 2000, 2001, 2004a). It seems to me that a broader consensus on, or at least a wider awareness of, these important subjects would be desirable in the further development of the craft, and not just with regard to linguistics in the Third Reich (see, e.g., Hutton, 1999; Hausmann, 2000; Knobloch, 2004).

See also: Bloomfield, Leonard (1887–1949); Brugmann, Karl (1849–1919); Chomsky, Noam (b. 1928); Generative Grammar; History of Linguistics: Discipline of Linguistics; Humboldt, Wilhelm von (1767–1835); Rask, Rasmus Kristian (1787–1832); Saussure, Ferdinand (-Mongin) de (1857–1913).

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History of Linguistics: Discipline of Linguistics

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Introduction

Language makes us human.

Whatever we do, language is central to our lives, and the use of language underpins the study of every other discipline. Understanding language gives us insight into ourselves and a tool for the investigation of the rest of the universe. Martians and dolphins, bonobos and bees, may be just as intelligent, cute, adept at social organization, and morally worthwhile, but they don't share our language, they don't speak 'human'. Linguistics, the scientific study of language, seeks to describe and explain this human faculty. It is concerned with three things: discovering precisely what it means to 'know a language'; providing techniques for describing this knowledge; and explaining why our knowledge takes the form it does.

These concerns may seem too obvious to need discussing, but the complexity of our knowledge of language becomes strikingly apparent when we see someone lose their language after they have had a stroke, or when we observe an infant who has yet to acquire the faculty that we deploy so easily. To understand these three concerns, we need a theory, and that is what linguistics provides.

The Meaning of 'Language'

That linguistics is 'the scientific study of language' has become a cliché, but what it means to be 'scientific' may not always be obvious, and what people mean when they use the word 'language' varies from occasion to occasion. Consideration of what is involved in being scientific is deferred until later in the essay, for now it suffices to observe that only a few aspects of language have been illuminated by theoretical (scientific) linguistics, so there are many areas where it has little, if anything, helpful to say. The situation is akin to that in biology, viewed as the science of living things. Despite their importance to us, biology has nothing to say about the definition of pets; similarly, despite their relevance to us, linguistics has nothing to say about the definition of dialects.

In everyday usage, 'language' is used differently, depending on whether it is construed as a property of the individual, of society, of the species, or as an autonomous entity in the world. Linguists working in the tradition of 'generative' grammar, the framework that has dominated linguistics for the last 50 years, argue that an 'individual' approach to language is logically prior to any other, but in principle we have the possible domains shown in (1), each suggesting different kinds of questions:

(1) Language and the Individual
Language and the Brain
Language and Society
Language and the Species
Language and Literature
Language and the World

Looking at 'Language and the Individual', the central question raised is 'what constitutes our "knowledge of language"?' What properties or attributes does one have to have to be correctly described

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History of Linguistics in Central and South America

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Spanish and Portuguese missionaries dedicated themselves to the study of non-Indo-European languages, resulting in the publication of a great number of works in or about the Amerindian languages. Although missionaries based and structured their works in agreement with the traditional Greco-Latin grammatical framework, they were forced by the linguistic facts to search for unconventional solutions in their descriptions, which never had been studied before in Europe. There is no doubt that their approaches were in many cases original and creative on all subdisciplines of grammar: phonology; orthography (the rendering of sounds never heard or written before); morphology–morphosyntax (their model predated ours, not yet elaborated, used to describe phenomena such as agglutination, incorporation, different word structure, processes of derivation, and composition in typologically different languages); syntax (e.g., topicalization, ergativity, different word order, the dichotomy active and nonactive, incorporation); and lexicography – another challenge for the missionaries and an important tool for the translation of religious texts.

Missionary works are important sources for other subdisciplines of linguistics, such as sociolinguistics (language variety, language change, standardization), pragmatics, translation theories, cultural anthropology; for reasons of space these will not be treated in this article. Descriptive linguistics always requires an underlying theoretical framework and reflects the linguistic thinking of the period in question. Interest in

missionary linguistics is increasing after a long period of silence and neglect of the many achievements of these premodern linguists (Zimmermann, 1997; Zwartjes, 2000; Zwartjes and Hovdhaugen, 2004). Following is a selection of the most important contributions to the history of language sciences in Central and South America.

Phonology, Orthography

It has been frequently observed that missionary grammars were deficient in their treatment of phonology. Writing of Mesoamerican languages, Suárez (1983: 4) observed that "friars coped rather well with simple systems like that of the Nahuatl, and even with those of moderate complexity in the consonants. However, rich vowel systems such as those found in Otomian and Chinantecan languages were markedly underdifferentiated, and tones were at most dimly recognized but in no case marked in orthography." This may be true if we compare the achievements and shortcomings of grammars of phonologically complex languages such as Otomi or Chinantec with completely innovative descriptions of other tonal languages in Asia such as Mandarin Chinese or Vietnamese by the Dominican Varo and the Jesuit de Rhodes. The latter devised a Roman-based orthography that contains a complex system of diacritic marks that is still in use today, although in a more sophisticated form. The tonal system of the Otomanguean family has never been described in a satisfactory way. Cárceres (1580), Neve y Molina (1767), and Alvarado (1962) did not distinguish clearly between sound, phoneme, and grapheme, as did all their colleagues in that period, and it is only in recent times that we find satisfactory descriptions of the tonal system. Nevertheless, some missionaries were aware of the tonal phenomena (Alvarado, 1962; Reyes, 1976). As Smith Stark (forthcoming) concluded, missionaries "showed ability to arrive at phonologically correct appraisals of the phonetic data. They appreciated the contrastive function of sounds and justified their analyses with minimal pairs. They engaged in a bit of phonological argumentation and included phonotactic information. The work of the Franciscan Olmos (1993) on Nahuatl, Gilberti (1987) and Lagunas (1983) on Purepecha and Cárceres (1907) on Otomi, and the Jesuits Rincón (1967) and Carochi (1983) on Nahuatl in particular stand out for their descriptive acumen." Of course, as Stark admits, "there are also many cases of *underdifferentiation*, as well as of *overdifferentiation* and of what might be called *displacement*." One of the main achievements of missionaries in New Spain are their descriptions of phonological features, with which they were unfamiliar, such as aspiration, glottalization, (*saltillo* 'the little jump, or glottal stop), more complex vowel quality, and contrastive vowel length. The attention to these features and their attempts to describe them are important contributions to the historiography of linguistics. The introduction of new letters demonstrates that sounds had to be graphically differentiated. One of the most illustrative examples are the new signs, *tresillos* and *cuatrillos*, in the grammars of Quiché and other languages of the Maya family, developed by the Franciscan de Parra in the middle of the 16th century.

In Hispanic South America the Roman alphabet was adapted by using diacritics, introducing new symbols, or combining existing symbols. The most creative solutions can be found in the grammars of Muisca (Lugo, 1978), Guarani (Ruiz de Montoya, 1994), Aymara (Bertonio, 1603), Mochica (Carrera, 1644) and Mapuche (Valdivia, 1606). According to the final conclusions of Calvo's article (forthcoming), the evaluation of the analysis of orthographic conventions and descriptive techniques is positive. Missionary linguists established the foundations of the study of many different Amerindian languages.

When comparing the solutions found in the chapters on orthography and phonology we can conclude that this was less developed in Brazil then in Hispanic America, and also compared to the Portuguese grammars in Asia, particularly the detailed analysis of sounds and letters in Japanese by Rodrigues and the impact the Portuguese missionaries have had on descriptions of Vietnamese. In Portuguese America, the most detailed description of the main characteristics of Tupinambá morphophonology has been realized by the pioneer Anchieta (1990); Figueira (1878) paid less attention to this subject, just as Mamiani did in his Kiriri grammar (1877).

Morphology, Morphosyntax

In missionary grammars of Mesoamerica, as in those of other continents in that period, the word (*dictio*) was the minimal meaning-bearing entity and a morpheme-like concept was still unknown. Nevertheless, missionaries often attempted to separate and define smaller entities between the word itself, introducing or redefining a great scala of innovative terms, particularly for the agglutinated suffixes, personal prefixes, infixes, etc. Some examples are: *particulas* (Gilberti, 1987), *semipronombre* (Rincón, 1967), *interposición* (Lagunas, 1983). Others preferred to use terms from the Hebrew tradition, such as 'affixo' (Molina, 1945; Carochi, 1983) or terms inherited from the Latin tradition, such as *silábica adjeción* (Reyes, 1976, probably inspired by Priscian). One of the most innovative aspects on the field of

morphology in Mesoamerica is the description of the phenomenon of 'incorporation' (Rincón, 1967; Carochi, 1983).

In Hispanic South America we find comparable attempts to classify smaller entities of the word (*dictio*). An illustrative example is the grammar of Aymara of Bertonio, where a specific metalanguage is developed for several particles, such as the *particulas generaliter symbolas, particulas particulariter symbolas,* and *particulas dyssymbolas*. Another innovation is the introduction of the term *transición*, the personal reference markers of subject and object within the verb, which can be found in the Jesuit grammars of the Andes, particularly in the Quechua grammar of González Holguín and the Mapudungun grammar of Valdivia. In the grammar of Achagua, we find the so-called *pronombres iniciales*, which is used for the personal prefixes (Neira and Ribero, 1928). A great scala of idiosyncrasies of Amerindian languages are described, such as the dual in Mapudungun (Valdivia, 1606), the first person plural inclusive versus exclusive in Tupinambá (Anchieta, 1990), Guarani (Ruiz de Montoya, 1994), as in the grammars of Quechua. It is illustrative that Latin was not always the model, because sometimes Spanish took over this role – the introduction of the term 'romances,' particularly used for periphrastical constructions, illustrates this strategy, whereas in other cases missionaries expanded the Greco-Latin paradigms. Valdivia recognized that the paradigm of the Mapudungun verb was richer and 'even more elegant' than the Latin verb, and this explains why he introduced the 'mixed tenses.'

It was a great challenge for the grammarians in Portuguese America to describe languages (Tupinambá and Kiriri) that do not share the same features of inflection known from Indo-European languages. According to Anchieta (1990) and Mamiani (1877), modes and tenses are not morphologically distinguished. Mamiani explained that they are distinguished by 'artigos.' In Tupi there are neither definite nor indefinite articles, so missionaries began right from the beginning to use the term 'artigo,' which became redundant, for other purposes. Since the pronominal system in Tupi is totally different from the traditional romance and Greco-Latin system, missionaries differentiated between several categories. According to Figueira, the first class of 'artigos' are combined with 'neutral verbs' (intransitive) and the second class (pronouns) cooccur with 'many active' verbs (transitive). In the Kiriri grammar of Mamiani, the 'artigo' also plays a central part in the paradigms as a 'declension marker,' as happened in the Portuguese grammars of Japanese of the Jesuits.

Syntax

Syntax was not the major concern of missionaries. Some authors in Mesoamerica (Rincón, 1967) even maintained that 'syntax' was nonexistent in Nahuatl, since features of an inflected language (agreement) were not recorded in this indigenous language. Nevertheless, much information related to morphosyntax and syntax can be found in the chapters on morphology. Although this is not the rule, grammatical functions such as 'subject,' 'predicate,' and 'object' are sometimes described. In most grammars, the traditional subjects of syntax, i.e., agreement, government, and word order, play a central part, and it is interesting that the section on syntax in the Brazilian grammars was almost absent in Anchieta's grammar, whereas his followers dedicated more paragraphs to this subject.

Novices from the old world were enabled to learn the grammar with texts. In the last section of a great number of grammars texts are appended, sometimes accompanied with translation theories, observations about stylistics, dialogues were included and even religious (monolingual or bilingual) texts. These texts are important sources since in many cases they are the only surviving records of extinct languages or dialects.

Lexicography and other relevant subjects for linguistic theory

The most important compilations, just to mention some of them, are the dictionaries of Nahuatl (Molina, 1945), Quechua (González Holguín, 1975), Guarani (Ruiz de Montoya, 1994) and Aymara (Bertonio, 1603). These authors used the lexicographical work of Antonio de Nebrija as their model and adapted it to the new world. These sources offer us many details related to the indigenous cultures and reveal the translation strategies of the missionaries in their attempts to render Christian terms in the indigenous languages. Lexicography in the Portuguese tradition is particularly important in Asia, and was much less developed in Brazil, although some 18th-century dictionaries of the 'Língua geral amazônica' have survived.

See also: Anchieta, José de (1534–1597); Language Teaching: History.

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Hitchiti *See:* Muskogean Languages.

Hittite

J G Macqueen

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Hittite is the name now given – its users probably called it Nesite – to the Indo–European language employed in the north-central area of Anatolia (modern Turkey) during much of the second millennium B.C. Large numbers of texts have been excavated, principally at the site of Boğazköy (Boğazkale), the ancient Hattusas, capital of the Hittite kingdom. As evidence for the language comes entirely from documentary sources, the number of speakers cannot be estimated; but it is probable that it was also the spoken vernacular of the area, at least from ca. 1700 to ca. 1300 B.C. During that period, it shows normal signs of linguistic change, but there is evidence, in the absence of continued change and in the increasing presence in the texts of forms which are Luwian in origin, to suggest that after ca. 1300 B.C it had become a 'dead' language, its use confined to the Hittite chancellery, and that its more southerly relative replaced it as a vernacular.

Phonology

Hittite is written in a local variety of the Mesopotamian cuneiform script (*see* **Mesopotamian Cuneiform Script**). This script, being basically unsuited to the language, makes full understanding of many phonetic features (e.g., vowel length; voiced versus voiceless stops) difficult. The vowel system shows *a* (which reflects both I-E *a* and I-E *o*), *e* and *i* (which are distinguished in earlier texts, but may well in later ones represent a single phoneme), and *u*. There are four orders of stops (labial, dental, velar, labio-velar), and lack of voice is often indicated by gemination in spelling, although the converse is by no means always the case. Hittite is unique among Indo–European languages in preserving the continuants known as laryngeals. The number and precise nature of these is still the subject of debate; but both voiced and voiceless varieties can be detected, and in some cases they can be seen to give *a*- or *o*- coloration to an original *e* vowel.

Morphology

Nominal morphology is characterized by the loss of both the feminine gender and the dual number. Earlier texts show a full range of case forms in the singular, although in later texts dative and locative have merged. In the plural, the range of case forms is much reduced. In noun formation, a striking characteristic is the preservation in productive use of heteroclitic *r/n* stem neuters and of action nouns in *-sar*, *-tar*, and *-war*/*-mar*.

The verbal system shows two tenses (present and preterite), two moods (indicative and imperative), and two voices (active and medio-passive), together with two infinitives, a supine, a verbal noun, and a participle. The present indicative of the medio-passive is often marked by a suffixed *-ri* which links it to the medio-passive in Celtic, Italic, and Tocharian. There are also two conjugations (the *mi*- conjugation and the *hi*- conjugation), the first of which corresponds to the I-E present while the second is perfect in origin with the addition of a present marker.

Syntax

Syntax is on the whole simple and straightforward, and corresponds in general to that of the archaic forms of other I-E languages. Characteristic of Hittite is a liking for 'chains' of particles and enclitic pronouns placed at the beginning of a sentence or clause. Another interesting feature is the 'quasiergatival' construction, in which a neuter subject with a transitive verb is not permitted, and so an original ablative case is reinterpreted as a nominative.

Example

A Hittite sentence showing some of the above features is (in syllabic transcription)

(1) *an-da-ma-za pa-aḫ-ḫu-u-e-na-aš-ša u-da-ni-i me-ik-ki na-aḫ-ḫa-an-te-eš e-eš-tin*,

to be read

(2) *anda-ma-tsa pahhwenas-a uddani mekki nahhantes esten*

and translated

(3) 'moreover, on the subject of fire also be greatly fearful,'

In this sentence, *anda* acts as an adverb of transition, but is ultimately linked to the form seen in Greek *éndon*, Old Latin *endo; ma* is a connective particle; *tsa* is a reflexive particle; *pahhwenas* is the genitive of *pahhwr*, an *r/n* stem noun cognate with Greek *pûr* and showing the presence of an original laryngeal; *-a* is an emphasizing particle; *uddani* is the dative-locative of another *r/n* stem noun with a basic meaning of 'word' and a possible ultimate connection with an I-E verb of saying (cf. Old Welsh *dy-wedut*); *mekki*

is an adverbial neuter singular of an adverb meaning 'much, many' (cf. Skt *mah-*, Gk *mégas*); *nahhantes* is the participle (cf. Latin *amans*, *amantis*) of a verb perhaps cognate with Old Irish *nar*, 'timid'; and *esten* is the 2nd pl imperative of the I-E verb for 'to be.'

Records in the Hittite language cease with the collapse of Hittite power ca. 1180 B.C. There are signs that the language of classical Lydia is a later relative; but the precise relationship is obscure.

See also: Indo–European Languages; Mesopotamian Cuneiform Script.

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Hjelmslev, Louis Trolle (1899–1965)

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The son of a prominent mathematician, Louis Trolle Hjelmslev was born on October 3, 1899, in Copenhagen. He studied comparative philology with Holger Pedersen (*see* **Pedersen, Holger (1867–1953)**) and took his master's degree in 1923. After a year in Prague, he went to Paris in 1926–1927 where most of the work that was published as *Principes de grammaire générale* (1928) was written. He wrote his dissertation on a traditional theme, viz. sound changes in Lithuanian, and was appointed Reader in Comparative Philology at Århus University in 1934, only to succeed Holger Pedersen as Professor of Comparative Philology at the University of Copenhagen (1937). Despite flattering proposals from abroad he stayed in Copenhagen for the rest of his life, though traveling widely, in particular after the war.

In his early years he was a tremendous worker and read extensively, but he was hit by a brain disease that slowly reduced his strength. When the disease started is hard to say, but his working tempo slowed down during the 1950s and his last five years were bitter ones. He died on May 30, 1965.

Hjelmslev was educated as a comparative philologist but he is better known for his participation in the structuralist movement. He claimed to follow through on Saussure's ideas in a way that no one else had done. Against the Prague school he maintained that the focus for a linguistic theory should be form only, and the distinction between form and substance is essential to his theory. His theory of language is called 'glossematics' and was developed in close collaboration with Hans Jørgen Uldall (*see* **Glossematics; Uldall, Hans-Jørgen (1907–1957)**). The most important works are *Essai d'une théorie des morphèmes* (1936), *Omkring Sprogteoriens Grundlieggelse* (1943, translated as *Prolegomena to a theory of language* by Francis J. Whitfield), *Le verbe et la phrase nominale* (1948), *La stratification du langage*, in *Word* (1954), and the posthumously published *Résumé of a theory of language* (1977, translated and edited by Francis J. Whitfield).

Hjelmslev had a tremendous impact on Danish linguistics, but he has also influenced in particular French structuralists, notably the Greimas school of structural semantics or semiotics.

It is a peculiar feature of his theory and his impact that he was concerned to establish a theory of language that either (as in *Prolegomena*) treated linguistics as the central scientific discipline, in that 'form' was seen to be the province of linguistics and the governing principle of the world as a whole, or held (as in *Stratification*) that both form and substance should be treated by a highly abstract and rigidly formalized algebraic linguistic theory. This last view seems to be more in line with the version of glossematics developed by Uldall.

In the 1980s, Hjelmslev's work again stirred up interest, partly because of his insistence on placing language in a broader semiotic framework, and partly because the Chomskyan era was drawing to a close in Europe. His work is readily available to the French-reading public (*Essais linguistiques* 1959, *Essais linguistiques II* 1973, *Nouveaux essais* 1985), while English and American readers may benefit from the early translations and the *Résumé*. All his

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Hjelmslev, Louis Trolle: Theory of the Sign

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Louis Hjelmslev (1899–1965) was a Danish linguist and a member of the Copenhagen School of linguistics. His influence beyond linguistics, into semiotics, has been great, though not always acknowledged. Chiefly, this work has been filtered through Roland Barthes' theory of the sign; however, Hjelmslev's distinctions have also been used and promoted at great length in the work of Deleuze and Guattari (1983). Hjelmslev's prominence in linguistics derives from his post as Professor of Comparative Philology at Copenhagen University (1937–1965) and, particularly, in his founding of 'glossematics,' an approach derived from Saussure's investigations into *la langue* and the latter's insistence that this is a form and not a substance. Hjelmslev founded the Copenhagen Linguistic Circle with Viggo Brondal in 1931, and the Circle's proceedings, along with other contributions, continue to be published today in *Acta Linguistica Hafniensia*, the journal founded by them in 1939.

French translations of Hjelmslev's work assured his influence on nascent structuralism in the 1950s, as did English translations of *An outline of glossematics* (1957, with Hans-Jørgen Uldall), *Resume of a theory of language* (1975), and especially *Prolegomena to a theory of language* (1969). Hjelmslev's work of the early 1930s had proceeded from broadly phonological principles and generally corresponded with contemporary trends in structural linguistics. The advent of his glossematics marked a shift in the analysis of *langue*. Whereas Hjelmslev had previously focussed on 'distinctive features' as elements of form, glossematics sought to identify elements precisely as 'functions' in relation to 'functives.' A function exists, for example, between a class and its components, a chain and its parts, or a paradigm and its members (or 'between' members, parts, or components). A functive, on the other hand, is the 'terminal' – at either end – of a function.

Hjelmslev proceeds from the preliminary notions that language is a system of signs and that the sign – by virtue of its being 'for someone' – must be construed as a 'function.' However, he insists that the sign conceived in this way must be clarified as a 'sign-expression.' As such, then, there are two planes to be considered in the analysis of language as a sign system. The first is the 'expression plane,' which has both a form and a substance. The second is the 'content plane,' which has the same. Both are made up of a restricted number of non-sign entities, *figurae* (such as phonemes), which can combine to produce an unlimited number of signs. The fact that there are two planes of the sign means that, for Hjelmslev, the notion of the sign as simply 'for someone' is limited. This view tends to see the sign as a matter of an 'indication' by an 'expression' of some external 'content,' whereas the Saussurean view, according to Hjelmslev, sees the sign as generated by the connection between an expression and content. If the sign-relation is seen as a function, however, the functives of expression and content can never be separable, and this has consequences for the conception of the sign. Chiefly, Hjelmslev's work contends that the sign does not just indicate; it is made up of 'content-substance' ordered into 'content-form.' It is juxtaposed for sign users with other examples of content-form (e.g., 'ring' might indicate both jewelery for the finger and something that emanates from the telephone), and it is also constituted on the plane of expression as an 'expression-form' (containing specifically organized *figurae*), which is itself ordered to an 'expression-substance' (other pronunciations, other enunciations by other people, etc.).

By initiating analysis of functions on the planes of expression and content, Hjelmslev sought to escape what he called the "halting division of linguistics into phonetics, morphology, syntax, lexicography, and

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By initiating analysis of functions on the planes of expression and content, Hjelmslev sought to escape what he called the "halting division of linguistics into phonetics, morphology, syntax, lexicography, and

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See also: Barthes, Roland: Theory of the Sign; Copenhagen School; Mythologies in Pop Culture; Saussure: Theory of the Sign; Structuralism in Anthropology.

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Charles Francis Hockett, the author of *A course in modern linguistics* (1958), was one of the leading American linguistic figures in the interregnum between Bloomfield and Chomsky. He was born on January 17, 1916, in Columbus, Ohio, as the fourth child of Homer Carey Hockett, professor of American history at Ohio State University, and Amy Francisco Hockett. At the age of 16, Charles enrolled at Ohio State, to receive his B.A. and M.A. in ancient history jointly in 1936. He went on with his studies at Yale. He majored in anthropology and linguistics and was awarded the Ph.D. in 1939 after submitting a dissertation on Potawatomi. He spent the next two years of postdoctoral studies at Chicago, where he encountered Bloomfield, and at Michigan.

He was drafted in February 1942, but after basic training was transferred to Army Service Forces, where his duty was first to supervise the learning of Chinese and Japanese by the military personnel, and later to prepare foreign language instructional materials at a language section of the U.S. Armed Forces Institute in New York.

Discharged in February 1946, he worked for a while with the American college dictionary, and then started his university teaching career by joining the newly formed Division of Modern Languages at Cornell University as assistant professor in charge of teaching Chinese. He remained affiliated with Cornell until his retirement in 1982. In 1957 he was invited to become a member of Cornell's Department

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Charles Francis Hockett, the author of *A course in modern linguistics* (1958), was one of the leading American linguistic figures in the interregnum between Bloomfield and Chomsky. He was born on January 17, 1916, in Columbus, Ohio, as the fourth child of Homer Carey Hockett, professor of American history at Ohio State University, and Amy Francisco Hockett. At the age of 16, Charles enrolled at Ohio State, to receive his B.A. and M.A. in ancient history jointly in 1936. He went on with his studies at Yale. He majored in anthropology and linguistics and was awarded the Ph.D. in 1939 after submitting a dissertation on Potawatomi. He spent the next two years of postdoctoral studies at Chicago, where he encountered Bloomfield, and at Michigan.

He was drafted in February 1942, but after basic training was transferred to Army Service Forces, where his duty was first to supervise the learning of Chinese and Japanese by the military personnel, and later to prepare foreign language instructional materials at a language section of the U.S. Armed Forces Institute in New York.

Discharged in February 1946, he worked for a while with the American college dictionary, and then started his university teaching career by joining the newly formed Division of Modern Languages at Cornell University as assistant professor in charge of teaching Chinese. He remained affiliated with Cornell until his retirement in 1982. In 1957 he was invited to become a member of Cornell's Department

of Anthropology, and was subsequently named the Goldwin Smith Professor of Linguistics and Anthropology. He remained at Cornell until retiring to emeritus status in 1982. Beginning in 1986, he was first visiting professor, then adjunct professor of linguistics at Rice University, an appointment still in effect at the time of his death on November 3, 2000.

While on furlough in 1942 he married a mathematician, Shirley Orlinoff, with whom he had five children. Hockett also wrote poetry and composed music, often performing with his family and colleagues. He tried his hand at various types of musical compositions, ranging from short pieces to chamber works to a full-length opera, *The love of Doña Rosita*.

With the advantage of retrospect, one can discern two stages in Hockett's research: a neo-Bloomfieldian structuralist stage and a poststructuralist follow-up stage, which actually overlapped at times in particular works. It is intriguing that the research that can be characterized as the latter in spirit has often been a prophetic prefiguration of the issues raised and proposals suggested many years later by linguists working in functional, cognitive, and relevance theory frameworks.

Although Hockett worked with and under many renowned linguists, beyond a doubt the major influence on him was Bloomfield. Hockett is considered Bloomfield's most important disciple and exegete. He collected, edited, and published much of Bloomfield's unfinished work, and in 1970, he produced *A Leonard Bloomfield anthology*. Hockett considered his own 1958 textbook to be essentially a commentary on and updating of Bloomfield's *Language* (1933), although it was an original volume that served as a standard introduction for generations of linguists. This is, for example, where he developed the design-feature approach to the study of communication. The original seven features were subsequently expanded and modified into the 13-feature system in Hockett (1960).

Like Bloomfield, Hockett excelled in linguistic description, providing a series of meticulous studies of a number of phenomena in Algonquian (Algonquin), Chinese, Fijian, and English. Although he is often regarded as being primarily a phonologist and one of the fathers of the applied linguistics movement, he has contributed significantly to linguistic theory, using his descriptive work as a platform for launching theoretical proposals. Among Hockett's legacy for generations of linguists we thus find the notion of portmanteau morph (a form that realizes two morphemes at once), introduced in Hockett (1947), and the distinction between the item and arrangement (IA), item and process (IP), and word and paradigm (WP) models of description, discussed in Hockett (1954). His *Manual of phonology* (Hockett, 1955) was innovative in its attempt to work out a principled typology of phonological systems along the lines of the Prague school, arguing for immediate constituents in phonology in a framework including the syllable. In characterizing these, he used terms such as onset, peak, interlude, and coda (a parallel probably arising from his keen interest in music).

A turning point in his research was the beginning years of generative revolution. The thread running through Hockett's work after the 1960s was the complete rejection of what he saw as the three pillars of post-Bloomfieldian linguistics (which he himself had been developing): the concept of language as a rigid and well-defined system (an outgrowth of the classical structuralist theory that he saw as central to generative linguistics), the adoption of an item-and-arrangement model, and the consensus that grammar and semantics should be kept separate (Hockett, 1968: 31–32). He came to realize that the available linguistic models were incapable of dealing even with most ubiquitous and natural phenomena of language in action, e.g., with blends. This led him to conclude that any adequate linguistic theory had to be dynamic and hearer centered. He took three basic mechanisms to be the fundamental elements in the generation of speech: "analogy; blending (unresolved conflicts of analogies), and editing." The title of his last full-length book (Hockett, 1987) reflects his intention to work further toward the formulation of a theory of hearing and speaking and redirect linguistic science toward a re-examination of the nature of language in terms of how it operated in, and in fact was created within, the speaking-hearing-understanding situation.

See also: Algonquian and Ritwan Languages; Animal Communication: Overview; Applied Linguistics in North America; Blend; Bloomfield, Leonard (1887–1949); Constituent Structure; Design Features of Language; Fijian; Morpheme; Post-Bloomfieldians; Structuralism.

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Hoijer, Harry (1904–1976)

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Harry Hoijer was one of the greatest anthropologist-linguists of the 20th century. He was born in Chicago to Swedish immigrant parents. He received his formal education at the University of Chicago: he received a B.A in engineering and mathematics in 1927, and an M.A. in 1929 and a Ph.D. in 1931, both in anthropology. As a faculty member at his alma mater, he honed his love of field work and developed an interest in the field of linguistics under the tutelage and influence of Edward Sapir; their relationship developed into collaborative work and led to Hoijer becoming Sapir's literary executor.

In 1940 Hoijer moved to UCLA, where he made significant contributions to the development and flourishing of the Anthropology Department as well as the interdisciplinary Linguistics Program, eventually serving as Chairman of each (1942–1943 and 1948–1952 in anthropology, 1959–1963 in linguistics). He was a much beloved and admired teacher; his prodigious and highly respected research earned him the reputation as the most renowned Athapaskanist, a distinction not at all diminished by the passage of time. His towering stature (he stood tall both physically and metaphysically) within and beyond the anthropological and linguistic scholarly community was well recognized: He was elected President of the American Anthropological Association (1958) and President of the Linguistic Society of America (1959), served as Chairman of the Committee on Research in American Indian Languages of the American Council of Learned Societies (1950–1969), was a consultant to the UNESCO Commission on Language and Mentality, and served on the editorial boards of the *International Journal of American Linguistics* and the *American Anthropologist*.

Hoijer was a highly productive scholar, authoring around 70 articles and books. His contributions cluster around the following themes: (a) detailed diachronic and synchronic studies (the latter based on elicitations from native speakers) of the phonological, morphological, syntactic, and semantic structures of American Indian languages, most notably Athapaskan; (b) discussion of issues of language and culture, including the relationship between language and thought ('Sapir-Whorf hypothesis'); and (c) collections of oral and written texts.

Hoijer's most significant works include *Tonkawa: an Indian language of Texas* (1933), based on his doctoral dissertation field work in Oklahoma on Tonkawa, a Coahuiltecan language; *Navajo texts* (1942), co-authored with Sapir; *An introduction to anthropology* (1953, 1st edn.), co-authored with Ralph L. Beals; *The phonology and morphology of the Navaho language* (1967), co-authored with Sapir; *Tonkawa texts* (1972); and *Navajo lexicon* (1974), based on Sapir's field notes.

Undena Publications published a series of anthologies, all with the subtitle *Essays in honor of Harry Hoijer* (Cavalli-Sforza *et al.*, 1986; Fernandez *et al.*, 1982; Greenberg, 1980; Mintz *et al.*, 1985; Sanders *et al.*, 1984). A list of Hoijer's writings was compiled by William Bright in 1964, supplemented by Victoria Fromkin in 1977 (Bright, 1964; Fromkin, 1977). A sample of Hoijer's works (correspondence, texts and notes, collections, audio recordings) is available at the Harry Hoijer Collection of the American Philosophical Society.

See also: Anthropological Linguistics: Overview; Sapir, Edward (1884–1939).

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Relevant Website

http://www.amphilsoc.org – American Philosophical Society.

Hokan Languages

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History of Scholarship

The Hokan Hypothesis

The Hokan hypothesis (the hypothesis that the Hokan languages are a genetic group descending from a common protolanguage) was the result of a taxonomically-motivated attempt in 1912–1913 by Roland P. Dixon and Alfred Louis Kroeber to deal with the very large number of apparently distinct genetic groupings of languages (according to John Wesley Powell's 1890 classification) known for aboriginal California – large in comparison with other parts of North America. Dixon and Kroeber, who had moderate amounts of (phonologically not very accurate) data from, and moderate amounts of familiarity with, a large number of California languages, felt that by looking at all the languages panoramically and grouping them by overall shared lexical similarities, a set of groupings could be achieved that might as well be viewed as genetic. This exercise yielded two primary sets of languages that Dixon and Kroeber labeled Penutian and Hokan, as well as some ungrouped languages. Penutian included Yokutsan (Yokuts), Miwokan, Costanoan, Wintuan (Wintu), and Maiduan; Hokan included Karuk (Karok), Shastan, Achumawi-Atsugewi (Achumawi), Pomoan (Pomo, Southeastern), Yanan (Yana), Esalen (Esselen), Salina (Salinan), Washu (Washo), and Yuman (Dixon and Kroeber, 1913a, 1913b).

Additions to the Hokan 'Core'

Later Kroeber added Seri and Chontal to Hokan (Kroeber, 1915). He (?Sapir) misguidedly tried to add Chumashan (Chumash) to Hokan. Edward Sapir, the most able American linguist between 1905 and 1925, who had done doctoral research on Takelma, added Takelma, Klamath (Klamath-Madoc), Sahaptian (Sahaptin), Alsea, Kusan (Coos), Chinookan (Chinook), Tsimshian, and Sayusla (Siuslaw) to Penutian. He added Pajalat, Yeme*, and Yue* to Hokan, but his efforts at adding Karankawe were misguided. He misguidedly tried to add Sutiaba to Hokan. In 1953, Greenberg and Swadesh added Tol to Hokan.

Hokan as a Superstock or Phylum

When originally proposed, the Hokan and Penutian hypotheses were not directly comparable to hypotheses of the order of Algonkian or Yuta-Nawan, because the numbers of resemblant forms that could be deployed and the sound correspondences that could be discerned were so few that any true genetic relationship that lay behind the phenomena was necessarily very remote. No certainty could be felt that such a hypothesis would ever be demonstrated to be correct through reconstruction. The terms 'family' and 'stock' had been used by comparative linguists since before 1800, but by 1900, most linguists felt these terms should be reserved for genetic groupings that were not in doubt. Consequently, the terms 'phylum' and 'superstock' began to be used between 1930 and 1960 to refer to such hypotheses as Hokan and Penutian. Proposed genetic groupings were often preceded by the prepound 'macro-,' thus Macro-Hokan, Macro-Penutian, and Macro-Chibchan.

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Doubters of the validity of the Hokan hypothesis may label it Macro-Hokan; those who believe in the hypothesis will speak of the Hokan stock.

Further Comparative Studies

Except for a small number of proposed reconstructions by Sapir, none of the above studies did more than assemble sets of resemblant forms with comparable (often identical) glosses or functions.

Since 1950, renewed efforts at establishing Hokan or parts of it have been devoted by linguists working on documenting these languages, especially as dissertations by graduate students at University of California at Berkeley (UC Berkeley). The Hokan comparative studies have been spin-offs of their documentation work. Even now, however, except for the reconstruction of Pomoan and Yuman, Hokan comparative studies at most surpass those of the period 1900–1940 by attempting to find sound correspondences among the resemblant forms compared. The other main achievement is that the data that are compared are for the most part phonologically accurate.

The Hokan stock is made up of the following (reasonably) well-documented languages and families: (1) Pomoan family; (2) Chimariko language; (3) Yanan small family; (4) Karuk language; (5) Shastan (Shasta) language; (6) Achuan family; (7) Washu language; (8) Salina language; (9) Yuman family; (10) Seri language; (11) Chontal language area; (12) Tol (= Jicaque) small family.

Some other poorly-documented languages are probably Hokan, but because of lack of data they cannot serve as the basis of reconstruction: Esalen, Kochimi* (Cochimí), Pajalat, Yeme* = Komekrudo, maybe Yue* = Kotoname.

Others often thought of as Hokan are probably not Hokan: Chumashan, Tonkawa, Karankawe. In any case, the first two, which are reasonably well documented, have not successfully been shown to be Hokan, in spite of Sapir's efforts.

Contra Sapir (1925) (aped in Greenberg, 1983) Tlapaneko-Sutiaba is Oto-Mangean, not Hokan. Whether Hokan and Oto-Mangean are related remains an open question. In Kaufman (1990), I suggest that they are indeed related.

To date, the most notable contributions to Hokan typology and comparative Hokan grammar have been made by Sapir, Jacobsen, Langdon, Gursky, Grey, and Oswalt.

Kaufman has a fair amount of evidence to suggest a North : South division, North being 1–9, and South being 10–17.

The Hokan hypothesis is widely known; it may be accepted by nonspecialists in American Indian languages, and is accepted (with a specific list of languages shorter than the list given in this article) by many specialists in languages of Oregon, California, and Meso-America. Specialists in American Indian languages with no deep familiarity with Hokan languages are generally skeptical of the Hokan hypothesis. This skepticism is largely because, although detailed comparative work leading to reconstruction has been carried out for some of the parts of the Hokan grouping (Yuman, Pomoan), comparative work at the level of the whole stock has not yet led to fully elaborated reconstruction of either phonology or grammar.

The Hokan languages are known from three separate areas: Alta California and Baja California; Southern Texas and Coahuila; Southeastern Oaxaca and Northern Honduras. Many languages of northwestern and northeastern Mexico have disappeared with essentially no documentation: some of these may have been Hokan. From the current distribution, we could imagine a Hokan homeland or primary geographical concentration in southern California with extensions to northern California and the southern plains (skipping over what?). The Hokan languages of Meso-America would have to represent migration, as might also those of the southern plains.

The time depth of Hokan is probably quite great, perhaps 8000 years, and the population movements that need to be postulated would possibly not have been associated with distinctive archeological traditions.

Evidence assembled by Kaufman suggests that Hokan and Oto-Mangean are genetically related. If so, proto-Oto-Mangean (ca. 6500 mc) would have developed from a Hokan-like language with some of the following changes:

1. syllable-final obstruents would have dropped or become laryngeals
2. surviving features of the changed consonants would have yielded a three-way tonal contrast
3. a thorough-going shift on the phrase and clause level from right-headedness (OV) to left-headedness (VO) would have affected all morpheme arrangements above the level of derivational morphology (which involved only full words and clitics).

The Hokan Languages Classified

In the following sections, % means that the language is extinct.

Northern Hokan

Sonoma

1. Pomo family [pPom] (total number of speakers < 200)

Western Pomo language area [WPom]
SouthWestern (Kashaya) Pomo emergent lg [SWPom] EL: ca. 50
Southern Pomo emergent lg [SPom] EL: < 40
Central Pomo (Yokaya & Boya) emergent lg [CPom] EL: < 40
%Northern Pomo lg [NPom]
NorthEastern (Salt) Pomo lg [NEPom] EL: 1
%Eastern Pomo lg [EPom]
SouthEastern (Sulphur Banks) Pomo lg [SEPom] EL: < 10

Northern California

2. %Chimariko [ch'imari*ko] language [Chi]
3. %Yana language area [pYan]
Yana emergent lg [Yan]
Northern Yana dial [NYan]
Central Yana dial [CYan]
Southern Yana dial [SYan]
Yahi emergent lg [Yah]
4. Karuk [karu*k] language [Kar] EL: 126
5. %Shastan family [pSha]
Shasta lg [Sha]
New River Shasta lg [NRSha]
Okwanchu lg [Okw]
Konomihu lg [Kon]
6. Achu family [pAch] (total number of speakers < 100)
Achumawi (Pit River) lg [Ach] EL: 81
Atsugewi (Hat Creek) lg [Ats] EL: 4
Atsuge (Hat Creek) dial [Ats-HC]
Apwaruge (Dixie Valley) dial [Ats-DV]

Great Basin

7. Washu language [Wsh] EL: < 10

California Coast

8. %Esalen language [Esa]
%Salina (Enalen) language [Sal]
Miguelenyo dial [Sal-M]
Antonienyo dial [Sal-A]

Southern Hokan

Southwest

9. Yuman-Kochimi* family [pYK] (total number of speakers ca. 2500)
Yuman division [pYum]
Pai language area [Pai]
Paipai emergent lg [Pp] EL: 300 BAJA
Havasupai-Hwalapai emergent lg
Havasupai dial [Hav] EL: 404
Hwalapai dial [Hua] EL: 440
Yavapai emergent lg [Yav] EL: 163
River language area [Riv]
Mohave emergent lg [Moh] EL: 234
Maricopa-Yuma emergent lg
Maricopa dialect [Mar] EL: 181
Yuma dialect [Yum] EL: 343
Dieguenyo language area [Die] EL: 97
Mesa Grande ('Iipay) emergent lg [MG]
Campo (Kumeyaay) emergent lg [Cam]
La Huerta (Tiipay) emergent lg [Hue]
Cocopa lg [Coc] EL: 321
Kiliwa lg [Kil] EL: 24-32 BAJA
%Kochimi* language [Cch]
10. Seri language [Ser] EL: <215 BAJA

Coahuila

%Pajalat (Coahuilteco) language [Paj]

%Yeme*an (Comecrudoan) family [pYem]
Yeme* (Comecrudo) lg [Yem]
Garza lg [Gar]
Mamulique lg [Mam]

%Yue* (Cotoname) language [Yue]

Oaxaca

11. Chontal (Tequistlatecan) family [pCho]
Huamelulteco = Lowland Chontal lg [LCho] EL: 1 k
Tequistlateco = Highland Chontal lg [HCho] EL: 3.6 k

Honduras

12. Tol (Jicaque) family [pTol]
Eastern Tol lg [ETol] EL: 350
%Western Tol lg [WTol]

Descriptive Work on Hokan Languages

From 1900 to 1950, the documentation of Hokan languages that stands the test of time includes Edward Sapir's documentation of Yanan and John Peabody Harrington's documentation of Karuk, Chimariko, and Salina. Just before 1950, Abraham Halpern documented Yuman.

Since 1950, Hokan languages of Meso-America have been documented first by members of the

Summer Institute of Linguistics and later by academic linguists from the United States.

Also since 1950, Hokan languages of Alta California (and Washu in Nevada) and Baja California have been the object of descriptive study leading to Ph.D. dissertations by students of the University of California at Berkeley. Since 1970, several linguists trained by Berkeley Ph.D.s have documented Hokan languages of Alta and Baja California.

Characteristics of Hokan Languages

Phonology

Phonemic Contrasts in Hokan Languages To get an idea of what the broadly general traits of Hokan phonological systems are, I present below those phonological contrasts that are common or predominant in these languages.

1. /C'/ vs. /C/: pPom, Chi, Yan, Sha, Ach, Wsh, Sal, Paj, pCho, pTol no /C'/: Kar, pYum, Ser, [Yem unclear]
2. /C^h/ vs. /C/: pPom, Chi, Yan, pAch, Wsh, pTol no /C^h/: Kar, Sha, Sal, pYum, Ser, Paj, pCho, [Com unclear]
3. /ṭ/ vs. /t/: pPom, Chi, Sal, [pYum] no /ṭ/: the rest
4. /ĉ/ vs. /ȼ/: Chi, Sha, Sal, Paj no contrast: the rest
5. /k^y/ vs /k/ or /q/: pPom, pYum no contrast: the rest
6. /q/ vs. /k/: [pPom], Chi, Ach, pYum no contrast: the rest
7. /k^w/ vs. /k/: pYum, Paj, Com, pCho no /k^w/: the rest
8. /f/ vs. /p/: Kar, Ser, pCho no /f/: the rest
9. /ŝ/ or /ṣ/ vs. /s/: pPom, Chi, [Kar], Ach, Wsh, Sal, pYum, Ser, Paj no contrast: Yan, Sha, Ats, Yem, pCho, pTol
10. /x^w/ vs. /x/: pYum, Paj, Yem, pCho no /x^w/: the rest
11. /h/ vs. /x/: [pPom], Chi, [Yan], Sha, Kar, Ach, [Sal] no contrast: the rest
12. /r/ vs. /l/: Yan, pAch, pYum no contrast: the rest
13. /e/ vs. /i/: pPom, Chi, Yan, Sha, Ach, Wsh, Ser, Paj, Yem, pCho, pTol no contrast: Kar, Ats, Sal, pYum
14. /o/ vs. /u/: pPom, Chi, Yan, Ach, Wsh, Paj, Yem, pCho, pTol no contrast: Kar, Sha, Ats, Sal, pYum, Ser
15. /ɨ/ vs. /i/ or /u/: Wsh, pTol no /ɨ/: the rest
16. vowel length: pPom, [Chi], Yan, Sha, pAch, Wsh, Sal, pYum, Ser, Paj no contrast: ?pCho, pTol
17. stress or pitch: pPom, Kar, Sha, pAch, Wsh, Sal, pYum, Ser, pCho no contrast: Chi, Yan, Yem, pTol.

Table 1 Basic consonants and vowels in Hokan languages

Consonants	*Vowels*
p t c k	*i u*
p' t' c' k'	*e o*
s ŝ x h	*a*
m n	
l	length /:/
w y	stress /*/

Note: only Kar, Yum, and Ser lack glottalized obstruents; only Cho and Tol lack vowel length; only Chi, Yan, Yem, and Tol lack contrastive stress.

A sort of common core that is predominant (though not universal) in the Hokan languages is shown in (Table 1).

Just in terms of the phonemic contrasts commonly found in Hokan languages, the set of phonemic contrasts shown in Table 2 is the maximum that is supported typologically (i.e., found in at least three branches).

Syllable Structure

A syllable may begin with a consonant or not; it may end with a consonant or not. Some languages tolerate syllable onsets of the shape /Cx/ or /CY/ (where Y is a semivowel); many languages tolerate syllable codas of the shape /YC/.

I postulate the following basic phonological structure for a proto-Hokan lexical item of one to three syllables that is not a compound ($ is syllable boundary):

(1) $([C(x)]V[H])$C(x/w)V(H) (Y) (C)$(+CV)

Grammar

Hokan morphology is typically OV, while several Hokan groups currently show VO syntax.

Grammatical traits that will be discussed are as follows: alignment and person markers, nouns, verbs, adjectives, interrogatives, and quantifiers; examination of these traits is followed by a discussion of word order.

Alignment and Person Markers Most Hokan languages (e.g., Yan, Yum, Ser) have accusative case-marking; some (e.g., Chi, C&E Pom, Cho) have active case-marking. While Ergative languages often have completely different sets of person markers for ergative versus absolutive case (Mayan, Philippine languages), Accusative (Yuta-Nawan [Uto-Aztecan] family, Sapotekan [Zapotecan] family) and Active (Siuan [Siouan] family, Masatekan [Popolocan] family) languages often show related or even identical

Table 2 Phonenic contrasts in Hokan languages

Consonants	*Vowels*
p t ṭ /ɸ/ ĉ k k^w *q*	*i u*
p^h t^h $ṭ^h$ /$ɸ^h$/ $ĉ^h$ k^h k^{wh} q^h	*e o*
p' t' ṭ' /ɸ'/ ĉ' k' $k^{w'}$ *q' ʔ*	*a*
f s ŝ x x^w *h*	
m n	*length /:/*
l	stress /*/
r	
y w	

markers for the case categories that encode Agent and Patient.

In Yanan, an Obj-Subj suffixed person-marking combination follows TAM markers on the verb. In Chontal, an Active person marker precedes the verb stem and a Neutral (= Stative) person marker follows all other verbal inflexional suffixes. In Yuman and Seri, a prefixed Obj-Subj combination precedes the verb. In Chimariko, Agent or Patient is prefixed to the verb (the category that is marked is chosen according to a person hierarchy). Since in Pom and Sal, verbs are not person-marked for subject and object agreement, it seems likely that proto-Hokan had no such marking. The Chontal order reflects its SIVO pattern (VO is favored by Meso-American languages: I means indirect object), and the Seri, Yuman, and Chimariko patterns reflect their current SV and OV word orders, which are probably the proto-Hokan orders as well, although the pattern with full NP arguments is specifically SOV, not OVS. The Yanan, Yuman, and Seri data suggest that in early Hokan there may have existed an O-V (O-S?) clitic combination for person markers. The Yanan order would then reflect the verb-first syntax of Yanan. If pHokan was an Active rather than an Accusative language, the alignment categories of the pronominal clitic combination would be Neutral-Active. See below for possessor marking on nouns.

Nouns The noun stem is made up of a root optionally followed by a nominalizer ('infinitive/gerund,' 'agentive'), or a 'first-order nominal suffix' (Pom, Chi, Wsh, Esa, Yum: not productive) and a 'second-order nominal suffix' ('diminutive,' 'female'). In Pomo and Chimariko, a noun root may be preceded by another noun root to form a noun-noun compound with the first noun modifying the second; Salina and Yuma have no such compounding, and the status of such compounds in proto-Hokan is still in doubt.

(2) | (NOMLZ) |
(ROOT) { **ROOT** } (NOM_2)
| (NOM_1) |

The noun word consists of a noun stem plus up to two preposed optional grammatical markers, a 'possession state prefix' ('absolutive of intimately possessed noun'/'substance or mass noun prefix' [Yum, Ser, Cho, Tol], 'body-part prefix'/'possessed state of intimately possessed noun' [Pom, Chi, Yum, Ser, Cho], 'indefinite third person (+/− possessive)'/ 'absolutive noun prefix' [Pom, Kar, Sha, Yan, Wsh, Sal, Yum, Ser]), and a 'proclitic classifier' ('proclitic count noun article,' 'proclitic mass/plural noun article,' 'absolutive noun prefix'), one optional 'possession state suffix' ('absolutive') and one obligatory 'case suffix.' The classifier has become a prefix in many languages.

The cases are both locative and relational, but the only relational cases that have etymologies are limited to Southern Hokan and encode switch-reference (same subject vs. different subject).

(3) (CLASS) (POSS) **NOUNSTEM** (POSS) CASE

Locative cases suffixes encode such functions as 'by means of,' 'from,' 'at,' 'in,' and so on.

Verbs The verb stem is made up of a root optionally preceded by a stativizer ('adjective-like intransitive'), a causativizer, or an incorporated instrumental prepound (Pom, Chi, Yan ['primary verbs'], ?Sha, *Kar, Ach, Ats, Wsh, Yum, Ser, *Cho) and optionally followed by a 'first-order verbalizer' ('to do X [X = noun, numeral]) and an incorporated 'directional postpound' (Pom, Chi, Yan, Kar, Sha, Ats, Wsh, Yum, Cho).

Both Northern and Southern languages have instrumental prepounds. Only Salina seems definitely to lack them. Instrumental prepounds encode such meanings as 'with the mouth,' 'by speaking,' 'by biting/chewing,' 'by blowing,' 'with the foot,' 'with the hand.' They are seemingly recruited mostly from noun and verb roots.

Both Northern and Southern languages have directional/locative postpounds. Again, only Salina seems definitely to lack them. Directional/locative postpounds encode such meanings as 'down,' 'up,' 'in,' 'out,' 'away,' 'thither,' 'hither,' 'here and there.'

It is not clear whether there is widespread simple noun incorporation or verb root compounding. No incorporation is found in ?Pom, Sal, or Yum. V-N incorporation is found in Yan, but is probably an innovation reflecting its VO syntax. Langdon (1988) shows that compound verb stems whose first member is not necessarily instrumental occur in Yana, Shasta, Atsugewi, and Washu.

(4) | (STAT) |
{ (CAUS) } **ROOT** ($VRBLZ_1$) (DIR)
| (INSTR) |

The verb word (or verb complex) consists of a verb stem plus up to three preposed optional grammatical markers and up to five postposed grammatical markers, of which one is obligatory. The preposed markers are [−1] pluralizer prefix (Yum, Paj, Pom, Yan, Ats), [−2] future proclitic (Yan, Kar, Wsh, Sal, Ser, Cho, Paj, Tol), [−3] temporal subordinator proclitic ('when, while, after': Pom, Yum, Sal). The postposed markers are [+1] passivizer suffix (Sal, Yum, Ser) or SHIFTER (infinitive, agentive), [+2] andative suffix ('to go and verb': Northern Hokan only), [+3] obligatory TAM_1 suffix (e.g., imperative, present, future/optative, past/completive, remote past, desiderative), [+4] TAM_2 suffix (e.g., conditional), [+5] TAM_3 enclitic (e.g., customary/habitual). Verb-TAM order is found generally in Hokan: Pom, Chi, Yan, Kar, Wsh, Sal, Yum, Cho.

(5) (TEMP SUBORD) (FUT) (PL) **VERBSTEM** (PASS) (ANDAT) TAM_1 (TAM_2) (TAM_3)

Adjectives Some adjective-like words act like nouns and some act like verbs. While it is possible that adjectives as a class originally had no independent existence, it is equally possible that there were two kinds of adjectives that were neither nouns nor verbs, as there are in Nahua (Yora), Mayan, and Bantu languages, to name just three cases.

Interrogatives In Amerindian languages and elsewhere, interrogative words are often encoded by lexical items that also have generic reference, such that *who?* = 'person,' *what?* = 'thing,' *where?* = 'place,' how? = 'manner,' and so on. This is also true of the interrogative words in Hokan languages.

Quantifiers Structurally, the numerical systems of Hokan languages do not reflect a widespread practice among their speakers of calculating or counting large numbers of things. There are three widespread etyma that mean 'one' and/or 'only, alone.' There are three that mean 'three', and two that mean 'two' (The Oto-Mangean stock also shows multiple etyma for most of the low numerical values, and little evidence for numbers above five). Etyma with values above three are found only in Northern Hokan. The various words for 'two' in the Hokan languages do not all reflect a single unitary proto-Hokan etymon, and the invented word *Hok[an]* does not directly represent any of them, although such was Dixon and Kroeber's intention.

Word Order The following remarks are based on a structural survey of certain languages only: Pomo (p.c. Oswalt, McLendon), Chimariko (TK), Yana (p.c. Hinton), Salina (p.c. Turner), and Yuma (p.c. Hinton, Langdon). Before much more can be done in this area, syntactic descriptions of Karuk (Bright), Shasta (Silver), Washu (Jacobsen), and Seri (Marlett) will have to be consulted, and descriptions of Achumawi, Atsugewi, Chontal, and Tol will have to become available.

Sentence-level Constituents On the level of the sentence, SOV word order is attested from Pomoan, Chimariko, Yuman, and Seri, and proto-Hokan probably had this order as well. Yanan has VSO, and Salina has VOS.

Noun Phrase Within the NP, the modifying adjective probably originally followed the noun it modified. Pomo, Chimariko, Yuman, and Seri all attest this, though Salina has AN order. As is well-known by now, NA order is neutral with respect to OV or VO constituent order, and not unharmonious with OV order.

There are two kinds of possessive constructions: one where the possessor [G] is an NP and one where it is a first or second person pronoun [Pn]. Several languages distinguish between intimate and casual possession or between kin terms vs. all other possessed nouns. The first type of possession in each case is marked by in several groups by prefixing or preposing a pronoun marker directly to the noun (Pom, Chi, Cho). The second type of possession is often marked by Pn-objective case # N (Pom, Yum). 'Objective case' is variously accusative, genitive, and benefactive in the various languages. When G is an N or NP it is preposed to the possessed N (in Pom, Chi, Sal, Yum, Ser). The possessor N(P) is case-marked objective (in Pom, Yum) and the possessed N is marked to agree for person of possessor (in Chi, Sal, Ser).

(6) G-obj/ben # N [Pom]
G # N-his [Chi]
G #his-N [Sal, Ser]
Pn-acc # N [Yum]
Pn-N [Pom (kin terms only; otherwise like G . . .N), Sal, Ser]
Pn:Erg-class-poss-N [Cho]
Pn:Neu-N [Chi (intimate possession)]
N-Pn:Act [Chi (casual possession)]

Proto-Hokan probably had postpositions, judging from the evidence of Pomo, Yuman, and Seri. These morphemes are not obviously related to nouns in most present-day languages (although they are in Seri), but their nominal origin is often apparent in etymologies that span the stock.

With the exception of the NA order, all of the word-order traits discussed above, as well as the positioning

of the TAM and case markers, are shared by proto-Yuta-Nawan, and – for all I know – proto-Penutian. These facts should not be taken as supporting either diffusion or genetic relationship between the three stocks; although either or both might be the case, they are not necessarily involved; these are morpho-syntactic phenomena that are quite typical of languages with OV syntax, and are found as well in Eurasia (e.g., Turkic family) and South America (e.g. Quechwa [Quechua] family). On the other hand, incorporated instrumental prepounds and directional postpounds are entrenched in Hokan, but sporadic in Yuta-Nawan (instrumental prefixes in Numic family only) and Penutian (instrumental prefixes and directional suffixes in Maidu, Klamath, and Sahaptian – hardly the 'Penutian kernel').

Viability

In pre-Columbian times most Hokan-speaking populations were nonagricultural, communities were small, and the total population for each language was under 10 000. At present most Hokan languages are dwindling (obsolescent – not being learned by children) or dying (moribund – spoken only by elderly people); several are dead already (marked with % in the classification). Since 1500, Tols and Chontals have become agriculturalists, but Tol is obsolescent, and few children are learning Chontal.

See also: Mexico: Language Situation; Pomoan Languages; United States of America: Language Situation.

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Holcot, Robert (d. 1349)

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Robert Holcot (Holkot) was born near Northampton, England c. 1290. Joining the Dominican order, he arrived at Oxford and would remain there as student and then teacher from 1326–1332. Holcot may have served in the capacity of Dominican regent master at Oxford until being called to the post of clerk for Richard de Bury, Bishop of Durham. In 1343, Holcot returned to Northampton and lived in the priory there until his death of the bubonic plague in 1349.

Dominican training at the time of Robert Holcot's education would have likely included the study of logic, grammar, philosophy, and theology. His training on the differences between faith and reason would have followed the teaching of Saint Thomas Aquinas. Holcot himself was more a follower of William of Ockham than of Aquinas. In fact, although not fully agreeing with Ockham on matters of epistemology with regards to intuition and abstraction, Holcot used other fundamental principles from the teachings and writings of Ockham as a basis for his religious philosophy.

Holcot tried to reconcile the impassable differences between logic and faith. Since the principle of non-contradiction is fundamental to a logical progression of thought, it is difficult to reconcile the Christian belief that God is omnipotent within the framework of that logical progression. For instance, 'If God is omnipotent, can God create a rock so big that even God can't move it?' For Holcot, the answer was that natural laws with regard to logic and the limitations of our own human language must not apply to God. There must be, in addition to Aristotelian logic, which is applicable to the natural order, a separate logic of faith that is applicable to God.

Also problematic for the faithful Christian was the notion of future contingents with regard to divine omniscience. In other words, if God knows all things and any contingency is able to either exist or not, God cannot have foreknowledge of something that is inherently contingent. Holcot reconciled this disagreement between the logical and the theological by arguing that (simply put) if God is omniscient, the debate over whether or not he can know the nature of a future contingency is moot.

The written works of Robert Holcot include his comments on Peter Lombard's *Sentences*. Written while at Oxford, Holcot's 'Comments' on the *Sentences* are considered to be his most famous work. His *Sermo finalis*, given at the end of his tenure at Oxford, employs double entendre, or puns, to address his disapproval of his successor. Also of importance, the *Sex articuli* is both a comment on epistemology and a criticism of Holcot's contemporaries. It is possible that the *Sex articuli* was intended to appear together with his comments on the *Sentences*. Other important works include comments on Matthew,

og Minne. She wrote and edited 10 scientific monographs, including work on texts from the Middle Ages, all within her broad field of research. In addition, Anne Holtsmark wrote 120 articles for the *Kulturhistorisk leksikon for nordisk middelalder* (Culture historical lexicon for the Nordic Middle Ages). She was one of the founders of the Old Norse Dictionary Association (Gammelnorsk Ordboksverk) and the Association for Norwegian Culture Research (Forening til Norsk Kulturgransking). From 1941, Holtsmark was a member of the Norwegian Scientific Academy. She received the Royal Norwegian Order of Saint Olav and the Icelandic Falke-order for her lifetime work.

Holtsmark's main interest was the medieval language and its sources in literary texts, and she ranks among the most important Scandinavian philologists, especially for medieval studies. In her scientific work, Holtsmark maintained a broad scope, including linguistics, literature studies, and broader cultural studies. She also worked in fields combining all disciplines, and she presented results not possible without considerable knowledge of all these fields. In all of her work, Holtsmark was known to be very accurate. She based her results on a very exact text analysis, be it literary or linguistic research. For this reason, Holtsmark's work is still of great importance for current medieval research in Scandinavian Studies. Anne Holtsmark died on May 19, 1974.

See also: Norse and Icelandic; Norwegian.

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Homans, George C. (1910–1989)

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George Homans was a pioneer of sociological exchange theory. Born in Boston, in the Back Bay area, Homans was the son of a prominent physician; his mother was a member of the famous Adams clan. He attended the St Paul's School, Concord, New Hampshire, and Harvard (B.A., 1932). He became well acquainted with Pareto's work just after graduation, and took up sociological investigations as a Harvard junior fellow. His teaching career began and continued in sociology at Harvard (1939–1980), with time out during World War II to serve as a naval officer, returning to the Department of Social Relations there in 1945 until the end of his scholarly career.

Homans devoted his intellectual efforts to explaining social behavior, or, in slightly different terms, to basing social sciences on propositions from behavioral psychology. Language plays no particular overt role in his conceptualization; rather than focus on verbal communication he turned to interpersonal interaction, especially exchange. His fundamental principle is that of instrumental conditioning, or less psychologically, the social feedback loop. Accordingly, in his 1961 *Social behavior*, his first general proposition is: "If in the past the occurrence of a particular stimulus-situation has been the occasion on which a man's activity has been rewarded, then the more similar the present stimulus-situation is to the past one, the more likely he is to emit the activity, or some similar activity, now" (p. 53).

His analysis of human interaction, which can be seen as a modern version of hedonism or utilitarianism, is found implicitly in his *English villages of the 13th century* (1941). It is demonstrated explicitly, but still predominantly inductively in his *Human group* (1950), which approaches various specific face-to-face social phenomena in behavioral terms. These include the Western Electric Hawthorne Works in Chicago, an East Coast slum gang, Tikopia families, a New England village, and an electrical equipment company. These groupings allow him to point out issues in social organization, which offer paradigms for understanding society on a larger, institutional and cultural scale as well.

Homans then went on to formulate more general behavioral principles, in terms of rewarded activities, and the exchanges in which they are involved, and to

show their applicability to a wide range of social phenomena. Interactions of different sorts serve as special cases of the same underlying behavioral dynamics, although the empirical and logical adequacy of his formulations, while generally evident, is not necessarily well motivated conceptually or factually compelling. For instance, reward tends to increase the frequency of rewarded behavior (as indicated above), but also tends to become decrementally effective because of satiation.

The same principles of exchange could have been brought to bear on features of language structure, variation, and change, had Homans been interested. The linguistics of the time tended to emphasize the descriptive structure of texts or the cognitive equipment of the speakers. Whether his interactive account would have fared better than that of his psychological colleague, B. F. Skinner, who did sketch out a theory of verbal behavior, based on individual operant principles, could hardly be anticipated *a priori*, but the very lack of attempts to carry it out tends to raise one's doubts, especially given the subsequent rise of cognitive psychology, which tends to undercut it from the outside.

It is to Homans's outstanding merit that he stated his exchange theory so generally, basing it on psychological experimentation of then current learning theory, and related it in detailed and insightful ways to a great variety of actual social activities. His principles have been adopted in guiding real-life sociopolitical policies to a degree never achieved by more mathematically sophisticated linguistic grammars.

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Honduras: Language Situation

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A crossroads of North American, Meso-American, and South American languages, Honduras has been home to indigenous Mayan, Uto-Aztecan, Misumalpan, Chibchan, and Arawakan languages, in addition to the colonial languages Spanish and English, and an English-based creole language. Spanish, the official language of government and the primary language of education, is also the most widespread lingua franca. However, in some areas, Spanish is often not spoken by the less educated Hondureños, and illiteracy is common. English, widely used in urban areas and in the department of Islas de la Bahía (e.g., Roatán), is the most popular foreign language.

The Spanish of Honduras has many Caribbean features, much more so than the Spanish of Guatemala or El Salvador. The loss of final [s] is especially prominent, even in the speech of university graduates. Indigenous language loss in favor of Spanish has accelerated in recent years, and the rate of Spanish monolingualism in western Honduras is very similar to that of El Salvador and even southern Guatemala. Near the Maya ruins at Copán, for example, only a handful of the 5000 ethnic Chortí Maya in Honduras can actually speak the Chortí language. The local Spanish is peppered with Chortí words and phrases, but the colloquial daily use of Chortí has ceased. The ethnic Pipil have forsaken their Uto-Aztecan speech for Spanish (*see* **El Salvador: Language Situation**). Similarly, the rapid loss of the language Lena by the Lenca people in favor of Spanish has resulted in its extinction. The former classification of Lena (Lenca) as Macro-Chibchan is rejected by some scholars, but a proper classification remains elusive. The ethnic Tolpan too are now mostly monolingual Spanish speakers, and capable speakers of their mother tongue Tol (also known as Jicaque) now number only a few hundred in the most isolated villages. Once classified as a Hokan language, Tol is now considered to be a language isolate, in danger of extinction. Even the speakers of the Chibchan language Pech (also known as Paya), who number roughly 1000, are bilingual in Spanish, and young speakers are very rare.

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The speakers of the Arawakan creole language Garifuna are even more international. Half of the world's quarter million Garinagu (of various Garifuna-speaking competencies) speakers live in Honduras, along the northern coast and, to a much lesser extent, on the Bay Islands. These people are well known as sojourners of the Caribbean and have communities in Belize, Guatemala, and elsewhere. Many of the males who travel for work speak English as well as Spanish, but the home use of Garifuna remains robust in Honduras.

Roatán and the other Bay Islands, as well as small parts of the northern coast of the mainland, are home to well over 10 000 first language speakers of Bay Islands Creole English. These speakers recognize British English as their standard, though their colloquial speech is a dialect of Western Caribbean Creole English. Beyond the Bay Islands, standard English is widely used among international workers and businessmen. In urban areas, there are English-language theatrical productions, and there is good availability of English-language radio and television programming.

See also: El Salvador: Language Situation; Guatemala: Language Situation; Pidgins and Creoles: Overview; Spanish.

Language Maps (Appendix 1): Map 59.

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Honorifics

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The term 'honorifics' refers to special linguistic forms that are used to signify deference toward the nominal referent or the addressee. The system of honorifics constitutes an integral component of the politeness dimension of language use, but whereas every language appears to have ways of expressing politeness, only certain languages have well-developed honorifics. Generally speaking, languages with highly developed honorifics systems are concentrated in Asia – Japanese, Korean, Tibetan, Javanese, and Thai are among the most familiar languages of this group. A thorough study of honorifics requires a two-pronged approach. The description of honorifics as grammatical forms is one approach and is relatively easy to accomplish, whereas the description of their actual use requires wider pragmatic as well as sociolinguistic perspectives, taking into consideration the elements of conversational situations, such as relationships between the speakers and the addressees, and the functional roles that honorifics play in communicative interaction. Though the pragmatic aspects of honorifics usage are gaining increasing attention in the field, descriptions are by and large purely grammatical, with little information on usage. This article endeavors to correct this imbalance by examining both the grammatical aspects of honorifics and the pragmatic and sociolinguistic issues; aspects of Japanese honorifics usage are particularly examined in some detail.

Referent Honorifics

'Referent honorifics', the most widely used grammatical form of honorifics, are used to show deference toward the nominal referents. Studies of the historical development of the honorifics system in the Japanese language indicate that referent honorifics are the most basic form of honorifics (*see also* **Japanese; Politeness**).

Titles

The commonest forms of referent honorifics are honorary titles used in conjunction with a name. Many languages have honorary titles; the English form *Mr* and the German form *Herr* derive from nouns designating higher social roles or divine beings. Also common are titles deriving from the names of kin terms or of occupations that are considered high in social

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standing (e.g., uncle, aunt, doctor, professor) or from ranks in specific social groups, such as military units (general) and business groups.

Honorific endings are similar to honorary titles; this grammatical form is used in Korean, Japanese, and other languages. The Korean suffix *-s'i* attaches either to the full name of a respected person or just to the family name of a person engaged in a menial labor, whereas the higher level ending *-nim* attaches to the combination of a family name and a professional title – e.g., *Kim kyoswu-nim* (Kim professor-SUFFIX) 'Professor Kim'. The Japanese ending *-san* and its higher level counterpart *-sama* attach to family names as well as to given names, yielding honorified forms – e.g., *Yamada-sama* 'Mr Yamada', *Masao-san* 'Masao (honorified first name)'. These are, in fact, part of the general amelioratory system of reference, which includes other endings such as *-kun* (used for the names of male equals or inferiors) and the diminutive *-tyan* (used typically for children's first names).

Pronouns

Pronominal forms, especially those referring to the addressee, namely, the second-person pronouns, are often the targets of honorific elaboration. The most well-known example of this is the use of plural pronouns, such as the forms for *you* (PL), *they*, and *we*, in reference to a singular addressee (or a third-person referent) as a sign of respect – French *vous*, German *Sie*, Russian *vy*, Tagalog *kayo* 'you.PL', *sila* 'they', Turkish *siz* 'you.PL', Ainu *aoko* 'we.INCL'. Javanese presents one of the most complex pronominal systems elaborated along the honorific dimension.

One notable aspect of honorifics having to do with the second-person pronominal forms is that many languages of Asia, e.g., Japanese, Korean, and Dzongkha (Bhutan), out of deference to a superior, simply avoid using these forms (see later, sections on Avoidance Languages and Forms of Honorifics). In these languages, the second-person reference, if the need arises, is made by the use of a professional title (e.g., Japanese *sensei* 'teacher', Korean *sacangnim* 'company president'), kin terms (e.g., Korean *emeni* 'mother'), or a combination of a kin term and an honorific ending (e.g., Japanese *ozi-san* 'uncle').

Nouns

Honorified nouns express deference either directly toward the referent or indirectly toward the owner, the creator, or the recipient of the referred object. As opposed to the first two categories of referent honorifics (titles and pronouns), there are far fewer languages with a system of honorified nouns. In languages in which honorified nouns are used, there are both suppletive and regular morphological processes as well as combinations of both. Korean nominal honorific forms *cinji*, *yonse*, and *songham* supplete *pap* 'meal', *nai* 'age', and *irum* 'name', respectively. Often suppletive honorific forms are loanwords borrowed from cultures of higher status. For example, the honorific forms *bida* 'father' and *manda* 'mother' for the native Thai words *po* and *me,* respectively, are from Pali. Likewise, many honorific forms in Javanese are loanwords from Sanskrit and Arabic – e.g., *arta* 'money' (Sanskrit) and *kuwatir* 'to fear' (Arabic).

Kin terms in Japanese are made honorific by the suffixation of honorific endings *-sama* or *-san*. There are degrees of respect: in comparing *o-kaa-sama* 'mother' and *kaa-san* 'mother', for example, the first form, with the honorific prefix *o-* and the *-sama* ending, is the more elevated form. Nominal honorific forms typically refer to objects possessed or created by respected persons. The favorite nominal honorific derivation in Japanese is constructed by means of the prefix *o-* or *go-* (e.g., *o-kaban* 'bag', *go-hon* 'book', *o-hanasi* 'talk', and *go-koogi* 'lecture'). A combination of suppletion and prefixation is observed in the Japanese form *o-mesimono* for *kimono* 'Japanese-style clothes' or *huku* 'Western-style clothes'.

The all-purpose Japanese nominal honorific prefixes *o-* (for native words) and *go-* (for Sino-Japanese loanwords) have their etymologies in words with meanings associated with greatness (for the native *o-*) and ruling (for the Chinese *go-*). Tibetan nominal honorific prefixes, on the other hand, have a classificatory scheme as their basis (Kitamura, 1974). Thus, the honorific form *bdu* for *mgo* 'head' functions as an honorific prefix for objects having to do with the head or upper/superior body part (e.g., *skra* 'hair' → *bdu-skra*, *zhwa-mo* 'hat' → *bdu-zhwa*). Likewise, the honorific forms *gsol* for *bzas* 'eat' and *btung* 'drink' go with objects having to do with foods and eating (e.g., *ito* 'food' → *gsol-chas*, *thab-tshang* 'kitchen' → *gsol-thab*).

Subject Honorifics

Just as the possession of something can be the target of honorification, a being or action can be honorified as a way of showing deference toward the referent of the subject nominal, namely, the actor. Of course, a subject nominal can be honorified by, for example, the choice of the second- or third-person pronominals (as previously noted), but the case under consideration involves alterations in verbal form. A case can be clarified by comparing a plain Japanese sentence, (1) *Tanaka ga ki-ta* (Tanaka NOM come-PAST) 'Tanaka came', and the honorific counterparts, (2) *Tanaka-kyoozyu ga ki-ta* (Tanaka-professor NOM come-PAST) and (3) *Tanaka-kyoozyu ga ko-rare-ta*

(Tanaka-professor NOM come-HON-PAST) 'Professor Tanaka came'. Sentence (2), with a professional title for the subject nominal, expresses a certain degree of deference toward the teacher. But a more appropriate form would be sentence (3), in which the verb also changes its form in accordance with the speaker's deference toward the referent of the subject.

Japanese, Korean, and Tibetan have a highly developed system of subject honorification. As shown in the preceding example, Japanese uses the passive/potential/spontaneous suffix *-(ra)re* attached to a verbal stem and derives the subject honorific verbal form: *ik-u* (go-PRES) 'go' → *ika-re-ru* (go-HON-PRES). Korean has the subject honorific suffix *-si* that attaches to a verbal stem: *o-ta* (come-IND) 'come' → *o-si-ta* (come-HON-IND). Tibetan uses the honorific form *gnang* for the verbs of giving and receiving as a productive subject honorific verbal suffix: *thugs* 'meet' → *thugs-gnang* (meet-HON), *bzos* 'make' → *bzos-gnang* (make-HON). In addition to these productive honorific forms, a fair number of suppletive subject honorific forms are also seen in all of these languages. The Japanese form *irassyaru* suppletes *iru* 'be', *iku* 'go', and *kuru* 'come'. *Khesi-ta* is the Korean subject honorific form of *iss-ta* 'be'. The Tibetan form *gnang* suppletes *ster* 'give', *btang* 'send', and *sprad* 'hand over'. In addition to these examples, Japanese has a circumlocution subject honorific form. This involves the following processes: (a) the conversion of the verbal complex into a nominalized form, (b) the attachment of the honorific prefix *o-/go-* to the nominalized form of the verbal complex, and (c) the predication of the subject by the verb *naru* 'become' together with the adverbial complement form of the nominalized verbal complex. This converts the sentence *Tanaka-kyoozyu ga aruk-u* (Tanaka-professor NOM walk-PRES) 'Professor Tanaka walks' to *Tanaka-kyoozyu ga o-aruk-i ni naru* (Tanaka-professor NOM HON-walk-NOMINALIZER DAT become), whereby the *o-aruk-ini* (HON-walk DAT) portion is the adverbial complement form of the nominalized verbal complex. Notice that this type of circumlocution is fully grammaticized in the sense that it is associated only with the honorific value, with no literal reading available. In fact, this grammaticization aspect is a basic defining characteristic of honorifics, distinguishing them from ordinary polite expressions such as English *Will you open the door for me?* and *Do you mind opening the door for me?*, which are still associated with literal meanings. The Japanese honorific prefixes *o-/go-* also attach to adjectival predicates, yielding the hird type of subject honorific form in the language – e.g., *Hanako wa utukusii* (Hanako TOP beautiful) 'Hanako is beautiful' → *Hanako-san wa o-utukusii* (Hanako-HON TOP HON-beautiful).

Humbling Forms

Deference toward a superior may be shown by humbling oneself or one's speech directed toward a superior. A fair number of languages have humbling first-person pronominals. The ordinary Thai first-person pronoun *chan* is replaced by *phom* or by the even more humbling form *kha* '(lit.) servant' or *kha cau* '(lit.) master's servant'. Korean *na* 'I' can be replaced by the humbling form *co*. In letter writing, a Japanese male may humble himself by referring to himself by the Chinese derivative *syoo-sei* '(lit.) small person'. In fact, the Japanese epistolary style contains a whole series of honorific/humbling noun pairs adopted from Chinese – e.g., *rei-situ* '(your) honorable wife': *gu-sai* '(my) stupid wife', *gyoku-koo* '(your) splendid piece of writing': *sek-koo* '(my) humble piece of writing'.

Less common are humbling verbal forms, which are sometimes called 'object honorifics', because they express deference toward the referents of nonsubject nominals by humbling the actor's action directed toward them. The Japanese humbling forms include both suppletive verbal forms (e.g., *sasiageru* and *o-me ni kakaru* for *yaru* 'give' and *au* 'meet', respectively), and a circumlocution, the latter being quite pervasive. The humbling circumlocution involves (a) the prefixation of the nominalized verbal form by the prefix *o-* and (b) the verb *suru* 'do'. This converts the plain form *Watasi wa Tanaka-kyoozyu o tazune-ta* (I TOP Tanaka-professor ACC visit-PAST) 'I visited Professor Tanaka' to *Watasi wa Tanaka-kyoozyu o o-tazune si-ta*. Tibetan also has a number of suppletive humbling forms of verbs – e.g., *thugs* 'meet' → *mjal*, *ster* 'give' → *phul*: *Nga pa-pha dang thugs byung* (I father.PLAIN with meet PAST) 'I met (my) father (plain)' → *Nga pa-lags dang mjal byung* (I father.HON with meet.HUM PAST) 'I met (my) father (humbling)'.

Subject honorification and the humbling processes are controlled by the referents of different nominals – the former by the subject nominal and the latter by the nonsubject nominal – and thus they can be, in theory, combined. Indeed, such a combination appears possible in Tibetan (Kitamura, 1974). As in the Tibetan example, the word *mjal* 'meet' is the humbling form, expressing the speaker's deference toward the person to be met. Recalling that *gnang* is the productive subject honorific form, the combination of *mjal* and *gnang*, *mjal gnang*, thus expresses the speaker's deference to both the person who is meeting someone and the one who is met – *Pa-lags sku-mdun dang mjal gnang song* (father.HON Dalai Lama with meet.HUM HON PAST) '*(My)* father met Dalai Lama (humbling-subject honorific)'. In the case of modern Japanese, however, such a combination of a subject

honorific form and a humbling form is generally avoided, and, when the occasion arises, simply a subject honorific form alone is used: *Tanaka-kyoozyo ga gakubu-tyoo ni o-ai ni natta* (Tanaka-professor NOM dean DAT HON-meet DAT became) 'Professor Tanaka met with the dean (subject honorific)'.

Addressee Honorifics

Addressee honorifics are those forms that show the speaker's deference toward the addressee. In the case of honorific second-person pronouns, the reference honorific function and the addressee honorific function converge, but certain languages have special addressee-oriented honorific forms. Perhaps the most familiar is the use of *sir, ma'am,* etc. in English, as in, *Yes, sir* or *Thank you, ma'am*. Many languages mark addressee honorifics by the use of particles: Tagalog *po*, Thai *kha* (for female speakers), *khrap* (for male speakers) Tamil *nka*, *lii*.

More elaborate systems are found in Korean and Japanese, both of which have special verbal endings. Korean and Japanese attach the suffixes *-sumni* and *– mas*, respectively. Notice that subject honorifics and addressee honorifics are again two independently parameterized systems, and therefore that one can, in principle, occur independently of the other. Thus, the Japanese subject honorific form *Tanaka-kyoozyu ga ika-re-ru* (Tanaka-professor NOM go-S.HON-PRES) 'Professor Tanaka goes' can be used by itself between two students. The subject honorific ending- *(ra)re* (S.HON) can then be combined with the addressee honorific ending *-mas* (A.HON), when the same sentence is uttered toward a respected person: *Tanaka-kyoozyu ga ika-re-mas-u* (Tanaka-professor NOM go-S.HON-A.HON-PRES). When the subject referent is not appropriate for showing the speaker's respect, only the addressee honorific form can occur, as in *Watasi ga iki-mas-u* (I NOM go-A.HON-PRES) 'I go'. In Japanese, even further respect toward the addressee can be shown by the use of humbling verbal forms. The sentence *Watasi ga iki-mas-u* can be made even politer by suppleting the verb *iku* 'go' by the humbling equivalent *mairu*, as in *Watasi ga mairi-mas-u*.

Avoidance Languages

The use of honorific forms may be conditioned by persons who are in the vicinity of a speaker, especially when a respected person being talked about is within earshot. Thus, a Japanese student who normally utters a plain form such as *Sensei ga ki-ta* (teacher NOM come-PAST) 'The teacher came' might use the subject honorific form *Sensei ga ko-rare-ta* when he notices the presence of the teacher in question.

Much more regulated forms of bystander honorifics are seen among the Australian aboriginal languages. A variation of the language, known as the 'mother-in-law' or 'brother-in-law' language, is used specifically in the presence of certain 'taboo' kin. In the case of the mother-in-law language of Dyirbal, a speaker must switch from the 'everyday' language, Guwal, to the mother-in-law language, Dyalnguy, when a taboo relative, e.g., a parent-in-law of the opposite sex, appears within earshot. Dyalnguy is in fact part of the avoidance behavior between certain taboo relatives that was once strictly observed in Australian aboriginal societies. A son-in-law avoids speaking directly to his mother-in-law, and the mother-in-law must use Dyalnguy in speaking to her son-in-law (Dixon, 1972). In Guugu Yimidhirr society, neither a male nor his mother-in-law can speak to each other directly, and, accordingly, the avoidance language is more like a 'brother-in-law' language, the form used typically when a male speaks to his brother-in-law or father-in-law (Haviland, 1979).

Avoidance language has an honorific function as well. In Guugu Yimidhirr, the brother-in-law language is to be used with kin who must be treated with respect. It is spoken slowly in a subdued voice, accompanied by a behavioral pattern of avoidance, effacing the addressee directly, e.g., by sitting sideways with some distance maintained. The Guugu Yimidhirr brother-in-law language also has linguistic features of honorific languages. For example, the everyday second-person plural pronoun *yurra* is employed as a second-person singular pronoun, as in the case of Russian *vy* and French *vous*. Honorifics often neutralize semantic distinctions made in ordinary words, and so does the Guugu Yimidhirr brother-in-law language. The polite second-person pronoun *yurra* 'you' neutralizes the distinctions among the singular, the dual, and the plural forms. With various suppletive forms, certain brother-in-law expressions show a marked difference from the everyday language: e.g., *Nyundu buurraay waami?* (you water found) 'Did you find water?' (everyday) → *Yurra wabirr yudurrin* (you water found) 'Did you find water?' (brother-in-law).

Speech behavior involving avoidance languages is akin to that of honorifics languages such as Javanese and Japanese in three other respects. Voice modulation is also seen in Javanese honorific speech, wherein "the higher the [honorific] level one is using, the more slowly and softly one speaks" (Geertz, 1968: 289). In the feudal society of Japan, inferiors were not permitted to speak directly to their superiors of the highest rank in close proximity to them. Emperors received courtiers behind a bamboo screen, and warlords were addressed by vassals of lower rank only from some

distance away. Avoidance of superiors is also manifested in the use of second-person pronouns and names. In languages such as Japanese, Korean, and Dzongkha, the use of second-person pronouns is avoided in addressing superiors. Japanese, for example, has a polite second-person pronominal form *anata* or the even more honorified form *anata-sama*, but these can never be used in addressing a superior; the form *anata-sama* is marginally usable in a highly impersonal situation. Likewise, in Japanese and many other societies (e.g., traditional China, Igbo), inferiors cannot use the given names of certain superiors in addressing them.

One of the parameters that determines the use of honorifics is the social and psychological distance between the interlocutors (see later, Use of Honorifics). The avoidance languages of Australia and similar speech behaviors in honorifics languages clearly point out this correlation, which is often reinforced by physical distance.

Beautification

Japanese has extended the honorific prefixes *o-/go-* to other uses wherein no respect for the referent, e.g., the possessor of the designated object, or for the addressee is intended. Thus, the prefixes may be attached to the nouns designating what belongs to the speaker or to no particular person; e.g., *watakusi no o-heya* (I GEN HON-room) 'my room', *o-biiru* 'beer', *o-nabe* 'cooking-pot'. This particular use of honorific prefixes is simply motivated by the speaker's demeanor and is called *bika-go* 'beautification language' in Japanese. The form is typically used by women, and accordingly those nouns that take beautification prefixes typically designate domestic matters such as household goods and foods.

Though beautification prefixes are not strictly honorifics, because they beautify even those nouns designating objects belonging to the speaker, their honorific origins are not entirely obliterated. The prefixes cannot be used for those nouns designating highly personal objects belonging to oneself, such as body parts. Even those who are prone to use beautification prefixes excessively would not use words such as *o-yubi* 'finger' or *o-asi* 'leg' in reference to their own fingers or legs, but they are perfectly appropriate as honorific forms used in reference to a respected possessor.

Form of Honorifics

Though the specific forms of honorifics vary considerably – some involving suppletion, others involving affixes or particles – it is possible to detect a certain general tendency in the formation of honorifics. The most basic characteristic is that honorific expressions avoid direct attribution of an action to the respected person, or sometimes to the speaker (out of humbleness in the latter case). Avoidance of speaking or avoidance of using second-person pronouns is an extreme case of this, but many languages use a special device for blurring the identity of an actor as a means of avoiding directness of expression.

The most widely adopted method of blurring or defocusing an actor is in terms of oblique referencing, which takes a number of forms. Less common than pluralization but an occasionally observed way of avoiding direct reference is the use of locational nouns and deictic expressions. The Japanese second-person pronominal *anata* 'you' has its etymology in the archaic expression *anata* 'yonder'. However, since this form has been fully grammaticized as a second-person pronominal, and since Japanese tends to avoid using second-person pronominals, the form *o-taku* 'HON-house' is often used as an honorific replacement for *anata*. Shifting person is another method of oblique referencing, as observed in Italian: *Lei va?* (she go) 'You (honorific) go?'. The most popular method of oblique referencing is in terms of shifting number from the singular to the plural. Polite plural pronominal forms are a case in point. Regarding the evolution of the honorific second-person plural forms in European languages, Brown and Oilman (1960) referred to a theory that attributes the polite use of the Latin plural form *vos* to the existence of the two emperors in the 4th century – one in Constantinople and the other in Rome. However, the widespread use of plural forms as second-person honorific pronouns in diverse languages such as Ainu (*see* **Ainu**), Tagalog (*see* **Tagalog**), Turkish (*see* **Turkish**), Guarijío (North America), and Guugu Yimidhirr indicates that the plurality in form has no direct connection to the concept of two emperors or to royalty. Pluralization is simply a favorite way of defocusing the identity of an actor across languages. Of course, only those languages that make a singular/plural distinction can exploit this method of agent defocusing. Indeed, if a language has plural verb forms, they may also be utilized as a means of subject honorification. For example, Ainu has plural verb forms that express the plurality of the affected object or the actor, and these plural forms may be used to express deference toward the referent of the subject nominal. The plural verb form *kor-pa* (have-PL) may mean either 'He/they have a lot of things' or 'He has something (honorific)'. Turkish also exploits the plural verb forms for honorific purposes: e.g., *Eşiniz daha gelmedi-ler mi?* (wife.your(HON) still arrive-PL Q) 'Has your (honorific) wife not yet arrived (honorific)?' and *Ali Bey*

orada-lar mi? (Ali-HON there-PL Q) 'Is Ali (honorific) there (honorific)?'.

In European languages, the role of plural agreement in the verb is not entirely clear. In the German and Russian languages, the choice of second-person plural subject forms for an honorific purpose automatically triggers verbal agreement – Russian *Vy* (PL) *videli* (PL) 'You saw'. The question is whether the plural verb form, independently of the plural pronouns, can be used as a mark of subject honorification. There are indications that in some European languages, plurality in the verb marks subject honorification, just as in the Turkish case; in Polish dialects (Comrie, 1975) an example is *Dziadek* (SG) *widzą* (PL) 'Grandfather sees (honorific)', and in a variety of German (Wolfgang Dressler, personal communication) there is *Sind* (PL) *der Herr* (SG) *schon bedient?* '(lit.) Are the Sir already served?'.

Some languages create a sense of oblique referencing by shifting case marking from the ordinary forms to special oblique markers. Korean particles *k'e* and *k'eso* are special honorific dative and ablative (archaic) particles, respectively. Japanese epistolary style replaces the normal nominative case particle *ga* for the subject nominal by the dative particle *ni* as a way of showing respect to its referent.

The passive construction effects agent defocusing, and an honorific expression is often derived in the development of the passive from the middle/spontaneous, as in the case of the Japanese subject honorific suffix *-(ra)re*, or in the development of the passive from the indefinite person construction, as in the case of Indonesian, wherein the passive prefix *di-*, which goes back to the third-person plural marker, also derives an honorific verbal form: e.g., *Silakan di-minum* (please HON-drink) 'Please drink'. Circumlocution-type honorifics observed in Japanese subject honorific and humbling forms are another way of avoiding direct attribution of the action to the respected agent or to the speaker. Shifting tense from the present to the past in polite speech, as observed in English (e.g., *Can you . . .?* → *Could you . . .?*, *Will you . . .?* → *Would you . . .?*) is analogous in method to oblique referencing and the circumlocution honorifics discussed here.

Honorific forms are marked as secondary forms, because they tend to be signaled by additional affixes or particles. The secondary nature of honorifics is seen even in suppletive forms from the fact they often do not make as fine semantic distinctions as do ordinary words. For example, the suppletive form *irassyaru* in Japanese obliterates the distinctions between *iru* 'be', *iku* 'go', and *kuru* come'. The Tibetan subject honorific form *gnang* and the humbling form *phul* neutralize the distinctions made between the ordinary words *sprad* 'hand over', *ster* 'give', and *btang* 'send'.

Finally, to a considerable extent, honorific expressions are iconic to the relevant social and psychological distances: the longer the form, the politer the expression. In the case of avoidance languages and some honorifics languages, physical distance accompanies honorific speech.

Distribution and Development of Honorifics

Among the various honorific forms in languages, certain types are more widely observed than others, and historically, certain forms change their category from one type to another. Synchronic distribution and historical development seem to be correlated to a great extent. More languages include referent honorifics, compared to addressee honorifics, and among referent honorifics, subject honorifics are more widely distributed than are humbling, nonsubject honorifics.

The fact that use of referent honorifics is more widespread than use of addressee honorifics is may seem strange in view of the fact that in conversation the addressee is more directly involved than the nominal referent is, and is accordingly expected to be a likelier target of the speaker's deference. However, the referent honorific system serves the function of the addressee honorific system when the subject referent and the addressee converge, as in the expression of *Are you leaving now?*. Thus, a referent honorific system is a useful system that allows the speaker to express deference, not only to a third-person referent, but also to the addressee as well. Whereas Japanese, Korean, Thai, and Javanese have both referent and addressee verbal honorifics, Tibetan and Dravidian languages appear to have only well-developed referent verbal honorifics. Unlike Japanese, Korean does not have a systematic humbling, or nonsubject, honorific system, and even among the Japanese dialects, e.g., Miyazaki, there are many that lack a systematic humbling verbal mechanism. In the diachronic dimension, the history of Japanese reveals that referent honorifics were more prevalent than addressee honorifics in 8th-century Japanese. Subject honorifics often give rise to humbling verbal forms, which in turn supply new addressee honorific forms.

Use of Honorifics

A more challenging aspect of the study of honorifics is the description of the actual use of honorifics in speech situations – e.g., who uses honorifics, whom they are used in reference to, and what their functions

are in communicative interaction. Since addressing these issues requires knowledge of actual speech situations in some detail, the focus here is on a single language, namely, Japanese, though preliminary remarks on some general concepts are in order. In the case of the avoidance languages of Australia, use of honorifics seems to be controlled rigidly according to the tribal membership and genealogical relationships that determine for each speaker which kinsmen (e.g., mother-in-law, brother-in-law) are taboo, and which are to be avoided and treated deferentially. Notice again that the notions of avoidance and of deference converge in the use of a special language. Indeed, the use of honorific speech in general is controlled by the social and psychological distance among the interactants.

Power and Solidarity

Brown and Oilman (1960), in a seminal work, identified two factors – 'power' and 'solidarity' – that determine social and psychological distance relevant to the use of honorific speech. Power, as determined in each culture according to social class, age, sex, profession, etc., establishes the superior–inferior relationship that characterizes a vertical social distance – the greater the power difference is, the greater the social distance is. Solidarity, on the other hand, determines a horizontal psychological distance. Those having the same or similar attributes (e.g., power equals; members of the same family, profession, or political persuasion) are solidaristic or intimate and short in psychological distance, whereas those that do not share attributes (e.g., power unequals; strangers) are distant. Brown and Oilman showed that these two differently defined parameters of distance are correlated with the use of pronouns in European languages (e.g., French *tu* vs. *vous,* German *du* vs. *Sie*). Owing to the work of Brown and Oilman (1960), the former, plain forms of pronouns are now customarily referred to in the literature as 'T-forms' and the latter honorific forms are referred to as 'V-forms.'

Power-based honorifics and solidarity-based honorifics reveal a difference in the reciprocity of the forms used among interactants. As in the case of German *du* used among intimates and *Sie* used among strangers, the solidarity-based honorifics are formally symmetric or reciprocal, whereas a strictly power-based system is nonsymmetric or nonreciprocal in that the inferior is obliged to use thex honorific forms (the V-forms) toward the superior, who returns the plain forms (the T-forms). Brown and Oilman showed that in the case of T/V variation in Europe, it was largely controlled by the power relationship until the middle of the 19th century, whereas in the 20th century solidarity has become a dominant factor.

Power-Based Honorific Pattern

Japanese honorific speech shows both power-based and solidarity-based aspects. When superiority is fairly rigidly determined, as in a business organization, and when the rank and age difference are major determinants of superiority, the power-based, nonreciprocal pattern is observed; an inferior consistently uses honorifics toward a superior. A superior might thus invite his subordinate for a drink by using plain form, (1) *Konban nomi ni ikoo ka* (tonight drink to go Q) 'Shall we go drink tonight?'. The subordinate must reply in the addressee honorific form, (2) *Ee, iki-masyoo* (yes go-A.HON) 'Yes, let's go', and must never reply in the plain expression, (3) *Un, ikoo* 'Yeah, let's go', which is appropriate only to his inferior or equal. When the subordinate asks his superior out, the reverse pattern obtains; the subordinate cannot use form (1) and must use its addressee honorific version, (4) *Konban nomi ni iki-masyoo ka* 'Shall we go drink tonight?', and his superior is most likely to reply with the plain form (3). As far as the inferior is concerned, this pattern of exchange must be maintained even if he and his superior are quite intimate and can converse quite informally. The mutual use of plain speech between non-equals is permitted only in an unusual circumstance, such as during the late hours of a drinking party, when all the formalities might be done away with.

Solidarity-Based Honorific Pattern

Whether a superior uses honorifics toward an inferior depends on a number of factors. Among these, a major factor is psychological distance or degree of intimacy. Though the use of plain or rough speech motivated by power on the part of a superior is occasionally encountered, it is becoming increasingly rare in contemporary Japanese society to see the power-based use of plain form – a major exception being a scene of conflict or dispute between power unequals, e.g., between an angry customer and a sales clerk. This trend is due to several factors. When a superior uses plain forms toward an intimate subordinate, it is a mark of intimacy, whereas use of honorific speech creates a distance and is a sign of formality. In other words, a superior's use of honorifics is solidarity based; honorifics are used (as in form (4) in the preceding section) when a superior and a subordinate are not very intimate, whereas plain speech (e.g., form (1)) is directed toward the subordinate as a sign of solidarity, whereby the sense of camaraderie is engendered. Notice, however, that between power unequals, only a superior has the option of using plain forms – inferiors must always use honorifics – unlike the mutual T-form exchanges in Europe. (Even

in Europe, it is power superiors who can initiate the reciprocal T.) Between power equals, the plain/honorific variation is by and large controlled by the solidarity factor; plain forms are used among intimates to confirm camaraderie, whereas honorifics are used between less familiar persons and strangers as a means of keeping psychological distance, by way of which the addressee's personal integrity is honored. In the majority of contemporary Japanese households, the solidarity factor has primacy over the power factor, and thus parents and children, and elder siblings and younger ones, also exchange plain forms, much like the use of *du* within the contemporary German family. This linguistic manifestation of the Western egalitarian ideology was introduced to Japan in the middle of the 19th century and it spread throughout the country after World War II.

China has witnessed perhaps the most dramatic effect of the egalitarian ideology on honorifics. The socialist revolution in 1949 and the cultural revolution of the 1960s wiped out the traditional social classes, and with the demise of the aristocratic and the elite classes, once-flourishing honorifics too were all but obliterated. The other manifestation of the egalitarian ideology is the use of honorifics on the part of power superiors, as described previously. Even Emperor Akihito of Japan uses honorifics when he addresses an ordinary citizen. Thus, the egalitarian ideology has facilitated the growth of reciprocal solidarity-based use of honorifics in Japanese as well. However, the reciprocal speech pattern can in principle go in either direction: toward the symmetrical honorific pattern or toward the symmetrical nonhonorific, plain pattern. As noted previously, the Chinese language has taken the path to the latter. Besides the solidarity factor, there seems to be another prevailing factor at work in languages that display the reciprocal honorific speech pattern.

Demeanor

Nonreciprocal plain/honorific exchanges can be observed in some Japanese families, especially between husband and wife and/or between parents and adult children (daughters in particular). The motivation for such an exchange seems hardly to be power based: instead, what underlies speech patterns observed in those families is the idea of proper language usage, which prescribes that superiors be treated deferentially through honorific speech. After all, honorifics are consciously taught and learned by the Japanese with this kind of prescriptive idea. This conscious teaching and learning of honorifics and their historical connection to the nobility has produced a situation in which appropriate honorific usage is regarded as a mark of good breeding.

The use and nonuse of honorifics as indications of class membership have the effect of making the use of honorifics part of the speaker's self-presentation effort, an aspect of what sociologist Erving Goffman (1956; *see* **Goffman, Erving (1922–1982)**) calls 'demeanor'. That is, though correct honorifics usage has the effect of paying respect to the addressee, it is at the same time a way of presenting the speaker as a cultivated person of good demeanor. The demeanor aspect of honorifics usage also has the effect of producing the reciprocal honorific speech pattern; speakers who have the prerogative of using either plain or honorific speech – as in the case of the Emperor, or power superiors in the business world, or professors in academic life – may constantly use honorifics as a way of self-presentation. An extreme manifestation of this in Japanese is the excessive use of the beautification prefixes *o-/go-* by women, whereby the level of politeness is at times consciously elevated to an absurd level.

Formality

Though the goal here is to isolate and delineate those factors that determine the use and nonuse of honorifics, these grammatical forms of language do not in reality occur in isolation. In an actual speech situation, all of the factors that control speech form are typically compounded. Take the notions of solidarity and of demeanor previously discussed: when a woman shops in an elegant boutique in Ginza in downtown Tokyo, she is likely to use honorifics, as in *Motto ookii no o-ari ka sira?* (more large one HON-have Q wonder) '(I) wonder if (you) have a larger one? (honorific)', as opposed to a plain form such as *Motto ookii no aru?* (more large one have Q) '(Do you) have a larger one? (plain)', which might be used when she is shopping in a neighborhood grocery shop. Here, it is likely that both solidarity and demeanor factors are at work. In addition, the formality factor involved in the former situation cannot be ignored.

Formality overrides all of the considerations previously discussed and requires the use of honorifics on the part of all of the concerned parties. Thus, power-equal colleagues, who normally exchange plain forms, would exchange honorifics in a formal meeting or on ceremonial occasions. Other factors contributing to the formality of the speech setting include the nature of the topic of conversation and the turns of conversation that occasion formality, such as the opening and closing of a new topic. One clear instance whereby the formality factor alone dictates the use of honorifics is letter writing. Letter writing is a formal activity, being associated with a long history of a variety of epistolary styles, and it triggers the use of honorifics even if the letter is addressed to an intimate

person. For example, a son, who usually uses plain forms to his mother, would write to his mother in the honorific style: on the telephone, he would say to his mother *Raisyuu kaeru yo* (next week return PART) '(I'll) come home next week, all right? (plain)', but he would write, *Raisyuu kaeri-masu* in the addressee honorific style.

Relativity of Social Distance

One final characteristic of Japanese honorific usage to be discussed here has to do with the relativity of the social distance of a nominal referent. The use of both subject honorifics and humbling forms is essentially determined by the social and psychological distance between the speaker and the nominal referent. A subject-honorific form would be used when the subject referent is a superior, or a humbling form would be used when an action is directed toward a superior. When this kind of pattern is absolutely maintained, regardless of the nature of the addressee, as in the case of the Korean honorific system, then a so-called absolute honorifics system exists. The Japanese honorific system differs from this in that the group identity of the addressee enters into the picture of proper honorific usage. Japanese society makes a rather clear division between those who belong to a social group and those who are outside. With respect to outsiders, insiders are treated as an extension of oneself. One consequence of this in regard to honorifics usage is that, with respect to outsiders, status differences among the members of a given social group are obliterated and members are identified with the status of the speaker. Accordingly, when speaking to an outsider, honorifics would not be used with respect to a member of the social group, e.g., family members or colleagues in a business firm; humbling forms would be used instead, even with respect to the superior's action. For example, a secretary would normally use honorifics with respect to her boss when she speaks to her colleagues, as (1) *Syatyoo wa soo ossyatte imasu* (company-president TOP so say.S.HON be.A.HON) 'The company president says so (subject honorific, addressee honorific)'. However, when she is speaking to someone from outside her company, she would treat her boss as if the boss were herself and would use humbling forms, as (2) *Syatyoo wa soo moosite orimasu* (company-president TOP so say.HUM be.HUM.A.HON) 'The company president says so (humbling, addressee honorific)'. Thus, in Japanese, with its relative honorifics system, the interpretation of honorific value is not as straightforward as in absolute honorifics languages such as Korean and Tibetan, in which the type (l) honorific form is consistently used regardless of the addressee. That is, in Japanese, the interpretation of the honorific index must take into account not only the usual relationships among the speaker, the nominal referent, and the addressee, but also whether the addressee is an insider or outsider with respect to the speaker's social group.

Conclusion

Human interaction is facilitated by minimizing conflict between interactants. One of the ways in which conflict arises is by mistreating people such that they feel that their personal integrity is threatened, that the expected camaraderie is not confirmed, or that the deference that their social standing has earned them has not been paid. Potential conflict is therefore removed when clarification of the relationships of the involved parties is made, and when they are maintained and reinforced with attendant protocols throughout an interaction. Human behavior, verbal or otherwise, is polite to the extent that it satisfies these requirements for facile interaction. Honorifics permit the speaker to express his relationship to the addressee and to the nominal referent in a highly codified manner. They indicate a speaker's recognition of the power and personal integrity of the person spoken to or talked about, and conversely they indicate a speaker's social and psychological position in relation to the involved parties. Thus honorifics remove potential conflict and facilitate communication. It is precisely because of this function of honorifics in smooth communicative interaction that they instantiate a prototypical case of politeness phenomena of language use, and this in turn inspires a study of honorifics within the framework of general theories of linguistic politeness, a field gaining increasing attention thanks to works such as Lakoff (1975) and Brown and Levinson (1987).

Apparently, all languages, regardless of the degree of elaboration in the honorifics system, have ways of making speech behavior polite. An interesting issue therefore is what difference, if any, possession of a highly elaborate honorifics system entails in the communicative function of languages. The relevant research, such as that of Hill *et al.* (1986), indicates that honorifics languages are more strongly indexical than are those languages (e.g., English) that lack an elaborate honorifics system. That is, different honorific forms are used according to different types of addressee, and thus honorific forms indicate the types of interactants. Hill *et al.* (1986) showed that American students use the same expression, *May I borrow your pen?*, to fairly diversified categories of people, including professors, strangers, physicians, and store clerks. On the other hand, Japanese students would use the super-polite form *Pen o*

okarisitemo yorosii desyoo ka '(lit.) Is it all right if I humbly borrowed your pen?' specifically to address their professors, but the middle-level polite form *Pen o kasite itadake masu ka* '(lit.) Is it possible that you give me the favor of lending me your pen?' to address classmates or other people, including strangers, physicians, store clerks, etc. Clearly the Japanese students' speech form sets their professors apart from other categories of people they interact with, reflecting the distinct status that the Japanese students, unlike their American peers, accord to their professors. In other words, the most elaborate honorific expression indexes the occasion in which the most relevant power superior is involved.

This kind of indexing function of honorifics is much more clearly seen in those languages in which speech levels are more rigidly determined in relation to speech situations. A given speech level, called a 'register' precisely for the reason being discussed here, in such a language indicates clearly what sort of interaction is involved. For example, Javanese has as many as 10 speech levels, and each register indicates the nature of interactants (Sakiyama, 1989). For example, the low, ordinary style *(Ngoko lugu)* is used when elders address younger ones, or between intimate friends. The middle style *(Madyå ngoko)* is used among female itinerant merchants, among country folk, and when the nobility address their subordinates. The highest form *(Kråmå inggil),* on the other hand, is used when a superior is to be treated with special deference (see also Geertz, 1968).

Honorifics, in sum, convey social meaning, as opposed to the referential meaning a sentence is normally understood to express. They indicate, among other things, the social categories of the people with whom the speaker is interacting. This in turn has the effect of making the speakers of an honorifics language more attentive to those factors (e.g., age, wealth, occupation, family background) that determine the categories of people. The speaker must ascertain quickly what kind of people he is dealing with so as to choose honorific forms appropriate to his interactants. Thus the presence or absence of an elaborate honorifics system may have a rather profound effect on how people perceive their environments and how they structure their communicative strategies.

See also: Ainu; Goffman, Erving (1922–1982); Japanese; Politeness; Power and Pragmatics; Pronouns; Social Aspects of Pragmatics; Tagalog; Turkish.

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Hopi

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Hopi is a Uto-Aztecan language of northeastern Arizona spoken by about 5000 people. Hopi culture focuses a rich ceremonial life on arid land corn (maize) cultivation.

Hopi orthography, which has become semi-official since the publication of the *Hopi dictionary* (Hopi Dictionary Project 1998), uses letter values close to those of the International Phonetic Alphabet but with some exceptions. The palatal glide is orthographic *y*. The high back unrounded vowel is orthographic *u*. Various letter combinations, such as *kw, ky, ng, ngw, ngy, qw, ts,* represent unitary sounds. Long vowels are written double. The apostrophe represents the glottal stop and is not written in word-initial position. Word stress is largely predictable, and only exceptional stress is represented orthographically. Unmarked stress is on the first syllable of disyllabic words and on the syllable containing the second mora of longer words, in other words, it is on the first syllable if it is long, i.e., has a long (double) vowel or ends in a consonant, and on the second syllable if the first syllable is short.

Hopi belongs to the Northern group of Uto-Aztecan languages. A diagnostic sound change for Northern Uto-Aztecan (NUA) is the development of Proto-Uto-Aztecan medial affricate *c to NUA -y-, cf. the words for 'moon', Hopi *muuya,* Nahuatl *mētztli*.

Because of the influence of the writings of B. L. Whorf, Hopi achieved a notoriety as a "timeless language" (Carroll, 1956: 216). As a response to this notion, Malotki devoted a large monograph (1983) to the demonstration that Hopi has an extensive way of talking about time and things temporal. Even Whorf's central claim that Hopi lacks spatial metaphors for time (Whorf, 1941: 83) does not hold up. The very word *qeni* 'space, room (for)' can be used with the sense 'time':

(1) Ya pumu-y kiihu-t
Q those-ACC house-ACC
amùu-tsa-ve hìisaq qeni?
them-between-at how.much space
How much space is there between those two houses?

(2) U-ngem qa qeni.
you-for not space
There's no room for you.

(3) Ya ùu-pe qa qeni, um nuy
Q you-at not space, you me
mihikqw tutuqayna-ni-qö?
at.night be.teaching-FUT-SUBORD(switch-reference)
Is there adequate time for you to teach me tonight?

(4) Pas qa qeni; pay kya as
very not space; already POTEN perhaps
ayo'wat santi-t aw qéni-ni.
to.another week-ACC to.it space-FUT
There is no time; maybe next week there will be time.

Nor is counting units of time foreign to Hopi, as seen in the following examples:

(5) Sunat yàasangwu-y sen hóyokpu-t
twenty year-ACC whether increased.amount-ACC
ang pep yes-kyàakyangw
along.it there live-SUBORD
qa hii-ta aw yuku-ya.
not anything-ACC to:it fix-PL
They stayed there twenty years and maybe more, but they never fixed anything.

(6) Pam siiva-y angsakis koyolaw-qw
he [his.own] money-ACC each.time be.stashing. away-SUBOR
oovi naalö-q yàasangwu-y ang
that's.why four-ACC year-ACC along-it
pam aw a'ni àmti.
he to.it very accumulate
Because he kept stashing away his money each time [that he got paid], after four years it really accumulated.

Typologically, Hopi is a head-final, left-branching language; it has a rigid Subject-Object-Verb structure:

(7) Taaqa taavo-t niina.
man rabbit-ACC kill
The man killed a/the rabbit.

and subordinate clauses precede the main clause:

(8) Pam peehu-t sami-t
he some-ACC fresh:corn-ACC
a'ki-qe pu' nima.
pick:corn-SUBORD then go:home
He went home when he had picked some fresh corn.

Exceptions are possible, especially for the sake of emphasis. If a subject or object appears after the verb, or if a subordinate clause occurs after a main clause, it is separated by an intonational break (represented by a comma):

(9) Qa an'ewakw tsovawta, sinom.
in great number were assembled people
A great many people were assembled.

(10) Pas sòosovik navotiwta,
very everywhere be.known,
puma so'qö.
they die.SUBORD(switch-reference)
It is known everywhere that they died.

Nouns inflect for number, case, and possessor. Demonstratives and pronouns inflect for number and case. For number, there are four categories to distinguish: singular (one), dual (two), plural (three or more), and distributive (for various types or in various locations). The singular form is unmarked. The dual form, with suffixed *-t(u-)* or *-m(u-),* is used almost exclusively for animate nouns; inanimates are construed as singular or dual from context. (Things such as clouds, stars, vehicles, and the wind that seem to move of their own accord, as well as sacred things such as places with shrines and developing ears of corn, are treated as animate.) Noun plurals are formed via suffixation, reduplication, suppletion, or combinations of these. Inanimate noun plurals always involve reduplication. Accusative forms are given in parentheses:

(11)

	sing.	du.	pl.
person	sino(t)	sino-t(u-y)	sino-m(u-y)
civilized person	hopi(t)	hopi-t(u-y)	hopìit(u-y)
cloud	oomaw (u-y)	oomaw-t(u-y)	oo'omawt (u-y)
man	taaqa(t)	taaqa-t(u-y)	tàataqt(u-y)
woman	wùuti(t)	wùuti-t(u-y)	momoyam (u-y)
boy	tiyo(t)	tiyo-t(u-y)	tootim(u-y)
old one	wu-y (wuu-kw)	wuu-yo-m (wuu-kw-mu-y)	wuuwuyom (wuu-wu-kw-mu-y)
little spoon	akùwya(t)	(= sg.)	a-'akùwya(t)
Hopi village	Hopìi-ki(t)	(= sg.)	Hopi-ki-ki(t)

Demonstratives and pronouns are identical in the dual and plural:

(12)

	nom.sing.	nom.du./pl.	acc.sing.	acc.dl./pl.
this	i'	ima	it	imuy
that	pam	puma	put	pumuy
that over there	mi'	mima	mit	mimuy
I/we	nu'	itam	nuy	itamuy
you	um	uma	ung	umuy

Verbs also show a range of pluralization types, but with verbs it is often the derivational suffix that undergoes the process:

(13)

	sing./du.	pl.
raise, perfect	aniwna	aniwna-ya
think, consider	wuuwa	wuuwa-ya
bury	aama	am-ya
look for	heeva	hep-ya
be called	maatsiwa	maa-matsiw-ya
pop out of the husk	tsayo	tsayòmti
wear out'	tsàakwa	tsakwàmti
descend	haawi	haani
die	mooki	so'a
sit, dwell	qatu	yeese
arrive	pitu	öki
be dancing	wunima	tiiva
be singing	taw-lawu	taw-lalwa
be grinding coarsely	hàakokin-ta	hàakokin-tota
have a field	paasa'y-ta	paasa'y-yungwa
go along picking corn	a'kiti-ma	a'kiti-wisa
go to pick corn	a'ki-to	a'ki-wisa

Dual subjects take the singular form of the verb. Compare the following (*tuwa* is the singular/dual subject form of the verb and *tutwa* the plural subject form; *itam(u-)* 'we' is identical in the dual and plural):

(14) Nu' kawayot tuwa. I saw a horse.
Itam kawayot tuwa. We (two) saw a horse.
Itam kawayot tutwa. We (several) saw a horse.

Transitive verbs may also require a different form of the verb, depending on whether the object is plural. Such verbs are also marked for plurality of subject.

(15) Nu' itàakawayoy pitsina. I brought our horse in.
Itam itàakawayoy pitsinaya. We (several) brought our horse in.
Nu' itàakawayotuy pitsina. I brought our (two) horses in.
Nu' itàakawaymuy ökina. I brought our (several) horses in.
Itam itàakawaymuy ökinaya. We (several) brought our (several) horses in.

Verbs are inflected for tense (unmarked, future, habitual) as well as subject number. Further, verbs divide into perfective and imperfective stems. In most contexts, unmarked perfectives are construed as past, while unmarked imperfectives can refer to past or present.

Hopi shows an exuberance of derivational suffixing as well as of compounding and noun incorporation into verbs (Hill, 2003). The incorporated noun may be the object of a transitive verb stem:

(16) tap-nina — kill a cottontail (or two) (tap- < taavo 'cottontail', niina 'kill singular/dual object')
tap-qöya — kill cottontails (qöya 'kill plural object')

or the subject of an intransitive:

(17) kwits-wunuptu — for smoke to rise up (kwits- < kwiitsingw 'smoke')
mori-'ùykurùmti — for beans to get planted all over (mori 'beans')
nup-'iwta — for there to be snow on the ground (nup- < nuva 'snow')

Verbs may also incorporate non-objects:

(18) Nu' i-tùmkwivi-y öngaspal-mortoyna.
I my-wild:greens-ACC brine-be:dipping:to:moisten
I'm dipping my wild greens in salt water.

Hopi is unusual in that incorporated nouns may be specific in reference rather than generic, as common in most languages that show such incorporation:

(19) Nu' pakiw-maqto-ni; noqw itam put enang nöönösa-ni.
I fish-go:hunting:for-FUT; so we that:ACC in:addition eat:PL-FUT
I'm going fishing; so we can eat it along with other food. (cf. *paakiw* 'fish')

Modifiers of the incorporated noun may appear as objects of the verb:

(20) Pangqaqw pam naat puuhu-t kwilatots-ma.
from:there he still new-ACC commercially.bought.shoes-PROG
He's coming from there wearing brand-new shoes. (*kwilatotsi* 'commercially bought shoes')

(21) Kikmongwi pas wuuhaqnìiqamu-y mong-'oya.
village.leader very many-ACC leader-put(PL.OBJ)
The village leader sure chose a lot of leaders. (cf. *mongwi* 'leader')

Modifiers may also be incorporated:

(22) puhu-hom-'oyiwta
new-ceremonial.cornmeal-be.offered
for fresh sacred cornmeal to be offered

(23) hihin-hopìi-tuqayta
slight-Hopi-know
know or speak a little Hopi

(24) su'aw-wuko-nup-'iwta
fairly-large-snow-be
for there to be a fairly large amount of snow on the ground

Hopi distinguishes among types of sources of information. Statements based on the direct knowledge of the speaker are unmarked. Statements based on evidence (but not direct experience) are marked by the inferential particle *kur*; statements based on conjecture use the potential modal *kya*; and statements based on secondhand knowledge or hearsay use the quotative particle *yaw*. *Yaw* is especially prevalent in story narration. These evidential particles are relatively free-floating in a sentence; they may occur anywhere before the verb:

(25) Isikwi hovàati. — My meat spoiled.
Isikwi kur hovàati. — My meat seems to have spoiled.
Isikwi kya hovàati. — (I'm afraid) my meat may have spoiled.
Isikwi yaw hovàati. — I hear my meat spoiled.

Dialectally, Hopi divides into three main varieties, differing slightly in pronunciation and vocabulary but with a high level of mutual intelligibility. A prominent phonetic difference resides in the differential development of a feature orthographically represented by the grave accent, as in *wùuti* 'woman'. In Third Mesa speech, such syllables have falling tone. In First Mesa speech and in the speech of the Second Mesa town of Mishongnovi (cf. Whorf, 1946), they end in aspiration. In the speech of the Second Mesa towns of Shipaulovi and Shungopavi, the grave accent feature disappears, such that these syllables are pronounced in the same way as syllables without the grave accent.

Some forms differ between a male speaking and a female speaking:

(26)

	feminine speaker	masculine speaker
very	hin'ur	a'ni
thank you	askwalí	kwakwhá(y)
good/pretty	nukwangw-	loma-
big ones	yangsayoqa	hohoskaya
be a large number	naavinta	kyaasta
it's good	is alí	is ali
too much	is ehe'tihi	is tathi

There exists a rich baby talk vocabulary, used speaking with (or as with) small children. Many baby talk words are phonologically quite distinct from normal speech. An example is *uu'na* 'bite' (non-baby *kuuki*), whose first syllable is pronounced with vocal tension and with the teeth together, a pronunciation not easily handled with the orthography. Sometimes there is no normal speech equivalent: *hòona,* 'dance like a kachina', is perfective; the nearest non-baby equivalent is the imperfective *kakatsina*.

A baby talk term may cover a different range of meaning from anything in normal speech: *Tooto* can refer to any insect (as well as baby animals or birds); there is no adult word that covers insects in general.

There is a seemingly archaic register of song and ritual speech. An example is *oo'oomawutu,* a song form of *oo'omawt* 'clouds', in which a number of phonological processes characteristic of normal speech are suspended: vowel shortening, syncope, and final short vowel deletion. This is reminiscent of the archaicaizing song/poetry register of French, in which the colloquial sound change of dropping the mute *e* is suppressed.

See also: United States of America: Language Situation; Uto-Aztecan Languages.

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Horacek, Blanka (1913–2001)

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Blanka Horacek was born in Vienna, Austria, on December 22, 1913. She studied German, French, and history at the University of Vienna from 1938 to 1943. In 1943, she received her doctoral degree from the University of Vienna in German, history, and philosophy, with a thesis on Grillparzer and Hormayr. After supplementary studies in Greek, Horacek became a lecturer at Vienna University. As scientific assistant at the Institute of German from 1949 to 1966, she wrote her postdoctoral qualification as a habilitation work on 'Die Kunst der Syntax in Wolframs "Parzival"' (The art of syntax in Wolframs 'Parzival'). She finished the habilitation in 1955 as lecturer in German linguistics and medieval German literature.

Horacek's linguistic work focused on style, syntax, and general grammar. After her postdoctoral thesis, she continued her stylistic studies in a systematic collection of syntax principles in German poetic language, which appeared as a monograph in 1964. In 1966, she supplemented these studies by 'verse principles' in a second edition. By setting the focus on 'art principles,' Horacek defined the special grammar for the language of arts, especially medieval poetic literature. She thereby combined literary interpretation with linguistic description. Horacek also focused on language history: her *Kleine historische Lautlehre* (Little historical phonology) has been one of the elementary basic books for students of German diachronic linguistics.

Horacek was professor of German linguistics and medieval German literature in Vienna from 1968 to 1979. Her focus was never limited to these two broad research topics, however; she also included modern literary studies and their connection to linguistics in her repertoire.

Horacek's list of scientific publications includes two monograph books and the editing of a festschrift for her teacher, Dietrich Kralik. On her main research topics, she published a considerable number of journal articles. She was honored with a festschrift by Ebenbauer, Knapp, and Krämer in 1974. Horacek was a member of the scientific council of the Institute for German Language in Mannheim, Germany. In Vienna, Horacek took part in the Vienna language

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Horacek established fundamental notions in the linguistic description of style and stylistics. Her broad range of studies allowed her as a philologist to keep up with the different research methods and disciplines of literature studies and synchronic and diachronic linguistics. Horacek was named a professor emeritus 1979. She died on December 30, 2001, in Vienna.

See also: German; Phonology: Overview; Style; Stylistics.

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Ján Horecký, born in Stupava, Czechoslovakia, in 1920, university professor and a member of the Learned Society of the Slovak Academy of Sciences, is a unique and prominent personality in the context of Slovak, and more widely, Slavonic and general linguistic studies, demonstrating great talents for creative, penetrating, and in-depth linguistic analysis. He is an author of many monographs and articles, presenting the results of, in many respects, frontier research. Importantly, Horecký has actually obliterated the opposition between 'major' and 'minor' linguistic topics.

No doubt, word formation, conceived of as a component of lexicology, has been the main thread of his linguistic efforts (1959, 1964, 1971, 1989, 1994). His onomasiological model of linguistic sign (1983) underlies a unique model of word formation. Horecký distinguishes between an ideal sign at the system level (including conceptual, semantic, onomasiological, onomatological, and phonological levels) and a communication sign with the ideal sign as its *signifié*. In this respect, Horecký co-developed (with M Dokulil) a new paradigm for the field of word formation that inspired several generations of Slovakists, Germanists, and Anglicists in Slovakia and abroad. While Horecký primarily concentrates on the semantic level, providing a detailed description of the inventory and hierarchy of and the relations between semantic distinctive features (1994), due attention is also paid to comprehensive description of other essential issues such as WF type, the distinction between word formation and morphematic analyses, and the description of individual levels of his dynamic WF model. His theoretical research has also yielded a comprehensive description of the derivational system of Slovak (1989, 2003).

As a general linguist (1978, 1983), Horecký does not explore linguistics in isolation. He sets it in a wider interdisciplinary context, reflecting the nature of the language system, relations between language, human mind, and speech community, and the role of language in cognitive processes. To Horecký, language is primarily a system of verbal behavior.

Horecký is an author of an original theory of literary language. He has developed a stratificational model of Slovak, reflecting the level of *parole*. Much attention in his work is also paid to language culture (2000, 2001).

Horecký established the foundations of mathematical linguistics in the former Czechoslovakia (1969) and has written a large number of articles on lexicography, with special focus on terminology. As a co-author, he also described the linguistic system of the Carpathian Romany (2000).

See also: Distinctive Features; Lexicography: Overview; Morpheme; Onomasiological Theory of Word Formation; Slavic Languages.

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Hornby, Albert Sidney (1898–1978)

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One of Hornby's major undertakings in his life was to compile the *Idiomatic and syntactic English dictionary* (ISED; Hornby *et al.*, 1942), which originated from Palmer's project, and it was published by the Japanese publisher Kaitakusha in 1942, shortly after Hornby was forced to leave Japan during World War II. Some of the features of the dictionary especially designed for learners of English include a clear indication of verb patterns, and a distinction between countable and uncountable nouns. In 1948, this dictionary was reissued under the new title *A learner's dictionary of current english* (ALDCE) by Oxford University Press (Hornby *et al.*, 1948). Further revised versions enriching its contents appeared as *The advanced learner's dictionary of current English* (Hornby *et al.*, 1963), and as *Oxford advanced learner's dictionary of current English* (Hornby, *et al.*, 1974).

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In 1961, Hornby established *The Hornby Educational Trust*, by donating a large portion of his royalty income from the dictionaries and the textbooks. The Trust came into operation in 1968, supporting overseas teachers who study the English language in the United Kingdom, and making funds available to help provide training for teachers of English, especially in developing countries and elsewhere where there is need for funding. In 1976, Hornby was appointed a fellow of the University College London, and in 1977, he received an honorary degree from the University of Oxford in recognition of his significant contribution to English language teaching.

See also: Learners' Dictionaries; Palmer, Harold Edward (1877–1949); Pedagogical Grammars: Second Language.

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Maria Hornung was born in Vienna on May 31, 1920 (maiden name Jechl). After her final high-school examination in 1938 she went to Vienna University to study German, English, and Romanic philology. She wrote her Ph.D. dissertation on a literary theme (Hornung, 1942), but soon developed an interest in Austrian–German dialectology and in April of 1942 she got a job ('war substitute') at the Wiener Wörterbuchkommission (Viennese Dictionary Commission) of the Austrian Academy of Sciences in Vienna. This was the beginning of her scientific career. Dialectology has been her main activity since 1948, when she was invited by the head of the Wörterbuchkanzlei (Dictionary Office), Anton Pfalz (1885–1956), to cooperate in this institution, because she – though born and raised in Vienna – spoke the Tyrolean dialect very well. East Tyrolia was her habilitation subject (Hornung, 1964). In 1964 Maria Hornung became a university teacher, and from 1969 to 1985 was professor of German linguistics at Vienna University.

Anyone researching the Bavarian dialects of Austria will find in the relevant scientific literature not only the name of the great Austrian scholar of dialectology and onomastics Eberhard Kranzmayer (1897–1975), but also the name of his eminent disciple and scientific successor, Maria Hornung. She devoted her life to Austrian dialectologic and onomastic studies, including the linguistic German enclaves in Northern Italy and Slovenia, colonized from Southern Austria in the Middle Ages. Her researches in the dialects of language enclaves are among her grand achievements. Together with her husband Herwig Hornung (d. 1987) she founded the Österreichisches Sprachinselmuseum (Austrian Language Enclaves Museum) in 1982. This museum contains many scientific documents and especially numerous folkloristic exhibits showing the life in these enclaves.

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Householder, Fred W., Jr. (1913–1994)

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different one' (. . .)" (Householder, 1971: 67). In chapters 9 and 10, Householder discusses 'phonemes and distinctive features' extensively, based on the procedures of classification and segmentation. Thus, the contrast-based phoneme is treated as a primitive. He sets out the present research position while questioning some underlying assumptions and testing the adequacy of the available descriptive theories of that time. In this respect, it is natural that one finds clear theoretical differences between Householder and Chomsky in terms of interpreting the relations between phones and phonemes (Householder, 1971: 199, 1965b).

Given the nonempirical solutions of the transformational grammar, Householder expresses his strong and objective disagreement to Chomsky and Halle's generative phonology, in which they attempted to do away with the phonemic theory in support of the economy of phonological derivation. According to Chomsky and Halle, phonemic transcriptions are 'regularized phonetic representations,' and the fundamental criterion of phonemic analysis on the part of the American structuralism is 'devoid of any theoretical significance.' On the contrary, Householder demonstrates that feature matrix notation is not economical than phonemic notation, and that the feature matrix-based classes are not always natural. This well-known debate also involves some methodological and philosophical issues in linguistics. This controversy has become one of the well-known good entrées to the theoretical issues in the literature.

Post-Bloomfieldian way of treating the linguistic data, i.e., a distributional analysis, is also observed in one of Householder's articles titled 'Some facts about who and whom' (1986), in which the relative frequencies of occurrence of the four basic types of human objective relative clauses in English are discussed. In the literature, Householder is also often cited for having drawn a distinction between 'hocus pocus' linguistics and 'God's Truth' linguistics in his review of Harris's *Method* (1952).

Householder is also well known for his works on the classics. He wrote on Homer, Aristotle, Dionysius Thrax, Apollonius Dyscolus, and Lucian. With his *Reference grammar of literary Dhimotiki* (with K. Kazazis and A. Koutsoudas), he made a significant contribution to the Modern Greek studies as well.

Even though Householder was originally an Indo-Europeanist, he became extensively acquainted with Turkish and Azerbaijani and even had opportunities to supervise dissertations on Azerbaijani, Hungarian, Finnish, Korean, Japanese, Classical Mongolian and Classical Manchu (Manchu). Householder also served the LSA (Linguistic Society of America) on many occasions and became the vice president (1980) and the president of the Society (1981). He was also elected to the prestigious American Academy of Arts and Sciences.

See also: Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Halle, Morris (b. 1923); Jacobsen, Lis (1882–1961); Sebeok, Thomas Albert (1920–2001); Smith, Henry Lee (1913–1972); Swadesh, Morris (1909–1967); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Hovland, Carl Ivor (1912–1961)

W A Hass, St Peter, MN, USA

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Carl Ivor Hovland was a pioneer psychological researcher in the experimental study of communication and propaganda.

Born in Chicago of Scandinavian Lutheran parents, Hovland received a B.A. (1932) and M.A. (1933) from Northwestern University, and a Ph.D. (1936) in psychology from Yale University under the mentorship of learning theorist Clark Hull. He stayed on the psychology faculty at Yale's Institute of Human Relations, leaving during World War II to engage in military research. He collaborated with moviemaker Frank Capra in the production of the documentary film series 'Why we fight,' shown to about 15 million new American soldiers and evaluated by Hovland's team of researchers. He then returned to Yale, became chair of the Psychology Department, and continued his empirical studies in persuasion and attitude change. His early death, shortly after his wife's, occurred after he himself was diagnosed with cancer.

Using before-after questionnaires, he was able to show that the propaganda films increased soldiers' knowledge of the background of the war, and, to a lesser extent, their attitudes favoring it, but had no measurable effects on their motivation to serve as soldiers. Two-sided presentations (including both pro and con aspects) turned out to be more effective with more intelligent or highly educated soldiers, as well as with soldiers who did not initially agree with the government's position. He discovered a 'sleeper effect,' in which a message may have a delayed impact on the recipient, even after the source of the message may have been forgotten. Recipients' mood also affected persuasibility, with groups provided with soda and peanuts showing more attitude change than groups without snacks. He also investigated the effects of source credibility, which tended to interact with the sleeper effect, as well as the effectiveness of fear appeals, which tended to produce more change if mild (rather than strong).

He did not show any particular interest in the structure of language, even though verbal components loomed large in his research and might well have led him to question how language itself was involved in attitude formation and change. His prolific line of research has inspired myriad basic and applied studies of mass communication in general and advertising in particular.

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Hsu-Shen (ca. 58–147)

B Sypniewski, Rowan University at Camden, Camden, NJ, USA

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Hsu Shen (ca. 58–147 A.D.) developed a method for organizing dictionaries of the Chinese language. His main work, the *Shuowen jiezi* (Explaining Simple and Compound Characters), set a standard that was used, with modifications, for centuries since it was first written about 120 A.D.

A Chinese dictionary is arranged differently than dictionaries of languages with alphabetic orthographies. An alphabet is a system of symbols reproducing, more or less accurately, the sound of words. Words can be organized in a list in alphabetical order. No equivalent system existed in Hsu Shen's day. Despite modern attempts to 'alphabetize' Chinese, a purely alphabetical system does not work for Chinese dictionaries because of the large degree of homophony in the Chinese language.

Hsu Shen's solution to this problem was to create a system which categorized the *zi* (characters) by radical. A radical is a portion of a character that, in some way, allows the pronunciation or meaning of the character to be discerned. Hsu Shen realized that it is not enough to simply list the *zi* by radical. Each group of characters needs an order of its own. If a group of characters is related by all having the radical *yi,* how should these *yi*-characters be organized? Each character was written in a strict, traditional way, with a fixed number of brushstrokes. Hsu Shen saw that they could be ordered by stroke count, with the simpler, probably more common, characters at

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Hsu Shen's radical groups numbered as high as 800. Today, there are around 200 in use, depending on the dictionary. Over the centuries, Hsu Shen's indexing system has been simplified for ease of use. Most modern dictionaries use the simplified radical list developed in the Ming Dynasty (c. 1615). Several dictionaries prior to the Ming had reduced the radical count from Hsu Shen's approximately 800.

Hsu Shen also included etymological information in the belief that this would be a useful memory aid. A current dictionary that provides this type of information is *Chinese characters – a genealogy and dictionary*.

Hsu Shen's method has proved useful but raises its own problems. Many Chinese characters contain phonetic information, but the phonetic information may refer to pronunciations that are no longer current. Using stroke counts depends heavily on knowledge of traditional writing methods and on the fonts used. Small font sizes often make accurate stroke counts difficult, if not impossible, for complex characters. The Chinese language has prompted hosts of reform methods, none of which have achieved universal acceptance. Simplification schemes run into cultural opposition as well as the flexibility of the language itself. There is no theoretical limit to the number of characters. In a sense, all dictionaries are special-purpose works.

See also: Chinese.

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Human Language Processing: Connectionist Models

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Connectionist psycholinguistics is an emerging approach to modeling empirical data on human language processing using connectionist computational architectures. Over the last 20 years, a wide range of psycholinguistic phenomena have been modeled, such as speech processing, impaired and normal reading, aphasic word production, and structural priming in sentence production. In this article, we will focus on syntax, and especially on the theoretical relationship between traditional notions in syntax (constituency, structure dependency, recursion) and connectionist networks, which do not appear to make reference to these notions intrinsically. For an overview of other aspects of connectionist language processing, see Christiansen and Chater (2001) and Rohde and Plaut (2003).

Connectionist models, or neural networks, are neurally inspired devices based on numerical computation, rather than symbolic manipulation. They are formed by several simple processing units called nodes, which mimic the activity of single neurons. Each node is excited or inhibited by information coming from other units to which it is connected. A set of homogeneous nodes that collectively represents some information is often called a layer. For instance, there could be a phoneme layer, a word layer, and so on. A popular architecture in connectionist psycholinguistics is the feed-forward network (**Figure 1**), where an input layer receives signals (e.g., raw words) from outside the network, an output layer sends signals to outside the network, and an intermediate layer of so-called hidden units does not directly connect to the outside of the network. Hidden unit layers are often considered the internal states that

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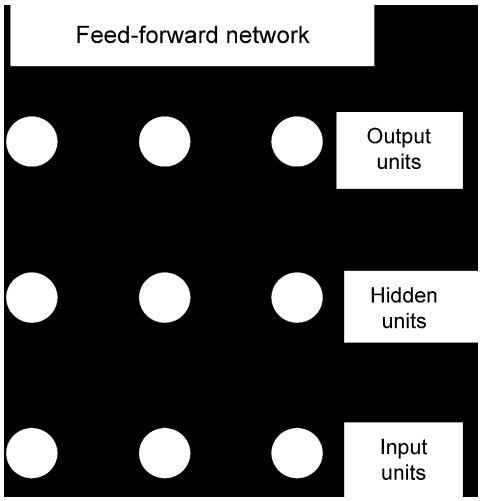

Figure 1 A standard feed-forward network containing three layers of units. Information flows bottom-up from input to output units. These types of networks are normally trained using the back-propagation algorithm, which minimizes the discrepancy between the network's actual and desired output.

represent the knowledge acquired by the network at the end of training. Information flows from input to output and training proceeds by adjusting the weights between single units until the network produces a desired output (for instance, the production of the correct word syntactic category in a given context).

Two aspects of neural networks are particularly interesting for syntactic processing: first, networks **learn** to perform some specific task, e.g., process an English sentence, from being exposed to relatively unanalyzed raw input, such as a sequence of words. This feature makes them suitable for explaining a great deal of language learning and language processing in a psychologically plausible manner. Secondly, the knowledge of the networks is not represented in any explicit way, but rather emerges as a pattern of neuronal activity between the interconnected nodes, in a parallel distributed processing fashion. This is particularly interesting because it contrasts with more traditional symbolic views in cognitive science, suggesting that humans process sentences by transforming representations according to sets of rules. For instance, a representation of the sentence *the girl liked a boy*, requires the constituents *the*, *a, girl, boy*, *liked*, and an explicit representation of the syntactic relationships between these constituents. The rules of syntax govern how constituents can be combined together, allowing, for instance, *the boy liked a girl* as a legal sentence, but not *boy girl a liked the*. Phrase structure rules describe the relationship between constituents in the above sentence:

S → NP VP
NP → (det) N
VP → V (NP)

Besides such constituent structure, to capture the full generativity of human language, recursion needs to be introduced, for instance by adding a new rule that adds a potential prepositional phrase (PP) to the NP:

NP → (det) N (PP)
PP → prep NP

These rules are recursive because the expansion of the right-hand sides of each can call the other. For example, the complex NP *the flowers in the vase* has the simple NP *the vase* recursively embedded within it. Because this process can be applied arbitrarily often, constructions of arbitrary complexity can in principle be generated. Constituency and recursion are some of the most fundamental concepts in linguistics. Since both are defined in terms of relations between symbols, symbolic models of language processing therefore incorporate these properties by fiat. In this article, we discuss how constituency, structure dependency, and recursion may fit into a connectionist framework, and the possible implications this work may have for linguistics and psycholinguistics.

Constituency

Connectionist models can address constituency in three increasingly radical ways. First, some models – especially early ones – are implementations of symbolic language processing models in neural hardware; for example, Fanty's (1986) network implementation of a context-free grammar contains explicit representations of the constituent structure of a sentence in just the same way as a nonconnectionist implementation of the same model would have. Connectionist implementations of this kind provide feasibility proofs that traditional symbolic models of language processing are compatible with a 'brain-style' computational architecture, although they add little that is new to the treatment of constituency. The remaining two classes of connectionist models actually **learn** to process constituent structure, rather than having this ability hardwired. One approach is to have a network learn from input 'tagged' with information about constituent structure. Kim *et al.* (2002) train a network to map a combination of orthographic and cooccurrence-based semantic information about a word onto a structured representation encoding the minimal syntactic environment for that word. With an input vocabulary consisting of 20 000 words, this model has an impressive coverage, and can account for certain results from the psycholinguistic literature

concerning ambiguity resolution in sentence processing. Henderson and Lane (1998) provide a model known as a simple synchrony network trained to parse sentences preencoded as parts of speech. The network takes the part of speech tags for the sentence constituents as input and is trained to output the parse tree fragment of a given constituent when that constituent is queried. The network learns to parse a corpus of written English reasonably well. However, because in these models constituent structure is compiled either into the input or the output representations, this style of model does not offer any fresh insight into how the linguistic constituency might operate, based on connectionist principles.

The third class of connectionist models addresses the more ambitious problem of learning the constituent structure of a language from untagged linguistic input. Such models have the potential to develop a new or unexpected notion of constituency, and hence may have substantial implications for theories of constituency in linguistics and psycholinguistics.

To understand how the more radical connectionist models address constituency, we can divide the problem of finding constituent structure into two interrelated parts: segmenting the sentence into chunks that correspond, to some extent, to linguistic constituents; and categorizing these units appropriately. The first problem is an aspect of the general problem of segmenting speech into appropriate units (e.g., phonemes, words, etc.) and more generally is an aspect of perceptual grouping. The second problem regards the general problem of classifying linguistic units, for instance, recognizing different classes of phonemes or establishing the parts of speech of individual lexical items. The segmentation and classification problems need not be solved sequentially. Indeed, there may be mutual influence between the decision to segment a particular chunk of language and the decision that it can be classified in a particular way. Nonetheless, it is useful to keep the two aspects of the analysis of constituency conceptually separate.

It is also important to stress the difference between the problem of assigning constituent structure to novel sentences, where the language is known, and the problem of acquiring the constituent structure of an unknown language. Statistical symbolic parsers are able to make some inroads into the first problem (Charniak, 1993). For highly stylized language input, and given a prestored grammar, they can apply grammatical knowledge to establish one or more possible constituent structures for novel sentences. But symbolic methods are much less advanced in acquiring the constituent structure of language, because this requires solving the hard problem of learning a grammar from a set of sentences generated by that grammar. It is therefore in relation to the **acquisition** of constituency that connectionist methods, with their well-developed learning methods, have attracted the most interest.

We begin by focusing on the problem of classifying, rather than segmenting, the linguistic input. One connectionist model (Finch and Chater, 1993) learns parts of speech of individual words by clustering words together on the basis of the immediate linguistic contexts in which they occur. The rationale is based on the replacement test: if two words are observed to occur in highly similar immediate contexts in a corpus, they probably belong to the same syntactic category. Finch and Chater used a single-layer network with Hebbian learning to store cooccurrences between target words and their immediate neighbors, such that each target word was associated with a vector representing the contexts in which it typically occurs. A competitive learning network classified these vectors, grouping together words with similar syntactic categories. This method is able to operate over unrestricted natural language, in contrast to most symbolic and connectionist models. From a linguistic perspective, the model slices lexical categories too finely, producing, for example, many word classes that correspond to nouns or verbs. On the other hand, the words within a class tend to be semantically related, which is useful from a cognitive perspective. The same method can be extended to classify sequences of words as NPs, VPs, etc. An initial classification of words is used to recode the input as a sequence of lexical constituents. Then short sequences of lexical constituents are classified by their context, as before. The resulting groups of phrases (e.g., Determiner-Adjective-Noun) are readily interpretable as NPs, VPs, PPs, and so on, but again these groupings are too linguistically restrictive (i.e., only a small number of NPs are included in any particular cluster). Moreover, this phrasal level classification has not yet been implemented in a connectionist network.

A different attack on the problem of constituency involves training simple recurrent networks (SRNs) on linguistic input (Elman, 1990). An SRN involves a crucial modification to a feed-forward network: the current set of hidden unit values is 'copied back' to a set of additional input units, and paired with the next input to the network (**Figure 2**). The current hidden unit values can thus directly affect the next hidden unit values, providing the network with a memory for past inputs. This enables it to tackle online sentence processing, where the input is revealed sequentially over time.

Segmentation into constituents can be achieved in two ways by an SRN trained to **predict** the next input.

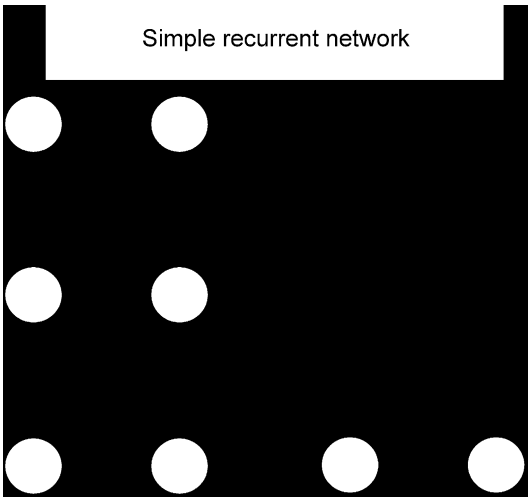

Figure 2 A simple recurrent network (SRN) is essentially a standard feed-forward network equipped with an extra layer of so-called context units. At each time step, an input propagates through the hidden units to the outputs (solid arrows). The hidden unit activation at the previous time step is copied back to the context layer (dashed arrows) and paired with the current input (solid arrows). Thus the hidden units influence the processing of subsequent inputs, providing a limited ability to deal with sequential inputs.

One is based on the assumption that predictability is higher within constituents than across constituent boundaries, and hence that high prediction error indicates a boundary. This method has been advocated as potentially applicable at a range of linguistic levels (Elman, 1990), but in practice has only been successfully applied on corpora of unrestricted natural language input in finding word boundaries (Cairns *et al.*, 1997). Even here, the prediction strategy is a very partial cue to segmentation. If the network is provided with information about naturally occurring pauses between utterances (or parts of utterances), an alternative method is to assume that constituent boundaries occur where the network has an unusually high expectation of an utterance boundary. The rationale is that pauses tend to occur at constituent boundaries and hence the prediction of a possible utterance boundary suggests a constituent boundary may have occurred. This approach seems highly applicable to segmenting sentences into phrases, but has also primarily been used for finding word boundaries in real corpora of language, when combined with other cues (Christiansen *et al.*, 1998).

So far, we have considered how SRNs might find constituents. But how well do they classify constituents? At the word level, cluster analysis of hidden unit activations shows that, to some extent, the hidden unit patterns associated with different word classes group naturally into syntactic categories, for SRNs trained on simple artificial grammars (Elman, 1990). These results are important because they show that even though the SRN may not learn to classify constituents **explicitly**, it is nevertheless able to use this information to process constituents appropriately (see Fodor and Pylyshyn, 1988 versus van Gelder, 1998). Another way of assessing constituency learning is to see if networks generalize to predict novel sentences of a language. The logic is that to predict successfully, the SRN must exploit linguistic regularities that are defined across constituents, and hence develop a notion of constituency to do so. However, Hadley (1994) points out that this type of evidence is not compelling if the novel sentences are extremely similar to the network's training sentences. He suggested that, to show substantial evidence for generalization across constituents, the network should be able to handle novel sentences in which words appear in sentence locations where they have **not** previously occurred. For example, a novel sentence might involve a particular noun in object position, where it has previously occurred only in subject position. This property of the human brain, which Fodor and Pylyshyn (1988) call systematicity, captures the idea that if one can understand the sentence *Bob loves Mary* one can also understand *Mary loves Bob*; the underlying knowledge that supports understanding of the first sentence enables understanding the second. Hence, to generalize effectively, the network must presumably develop some abstract category of nouns.

Christiansen and Chater (1994) addressed Hadley's challenge presenting evidence that connectionist models are able to attain strong generalization. In their training corpus, the noun *boy* was prevented from ever occurring in a noun phrase conjunction (i.e., noun phrases such as *John and boy* and *boy and John* did not occur). During training, the SRN had therefore only been presented with singular verbs following *boy*. Nonetheless, the network was able to correctly predict that a plural verb must follow *John and boy* as prescribed by the grammar. In addition, the network was still able to correctly predict a plural verb when a prepositional phrase was attached to *boy* as in *John and boy from town*, providing even stronger evidence for strong generalization. In contrast, when the SRN was presented with ungrammatical lexical items in the second noun position, as in *John and near*, it did not activate the plural nouns. Instead, it activated lexical items that were not grammatical given the previous context. This suggests that the SRN is able to make nonlocal generalizations based on the structural regularities in the training corpus (see Christiansen and Chater, 1994 for further details). If the SRN relied solely on local information it would not have been able to make correct

predictions in either case. Thus, the network demonstrated sophisticated generalization abilities, ignoring local word cooccurrence constraints while appearing to comply with structural information at the constituent level. Additional evidence of strong generalization in connectionist nets are found in Niklasson and van Gelder (1994) (but see Hadley, 1994 for a rebuttal).

Another strong test of generalizations that connectionist models seem to fail concerns equivalence relations: Marcus (1998) trained an SRN on sentences like *A rose is a rose* or *A tulip is a tulip*, but when given a novel sentence fragment like *A blicket is a*. . ., the SRN could not predict that *blicket* was going to be the next word because it activated all the words that it had seen in this sentence position (e.g., *rose*, *tulip*, etc.). This suggests that it did not develop abstract variable-based frames like *a X is a X*, where *X* is a variable that can be bound to any word. In reply to Marcus, Chang (2002) argued that a model of sentence production could generalize well if the input message was encoded in several separate representations that were linked together. Chang's architecture had one pathway for representing the mapping of object semantics to word forms and another for representing and mapping objects (and the words that describe them) into appropriate sentence positions. The model contained a bank of units representing event roles (agent, patient, etc.) that feeds onto a layer of lexical units (e.g., DOG, CAT, etc.). This way the model could represent the different roles of a word, say *dog*, in various events while activating a common semantics that all dogs have. Semantic units connected to word label units that represented the phonetics of each word, allowing the learning of a word label for each meaning. Since there was only one set of semantic units for different event role units, learning the mapping of the semantic feature DOG to the word label *dog* allowed the model to generalize this word to other event roles. Hence, even if the model had only experienced the sentence *the dog chases the cat*, it was able to generalize and produce a novel sentence *the cat chases the dog*.

Rohde (2002) developed a model (CSCP) that performs both comprehension and production of complex, multiclausal sentences using a larger corpus than previous models. In this respect, neural networks promise to scale up to real samples of natural language. The model deals with several sentence comprehension and production phenomena that involve discovery of constituent structure such as multiple verb tenses and voices, adverbs and adjectives, prepositional phrases, relative and subordinate clauses, and sentential complements. As in Chang (2002), the network has a semantic component, which is used to help the net predict the next word. The semantic component is also used to produce a word. When a word is selected for production, it is fed back into the comprehension input and the model proceeds to produce the next word, and so on. Therefore the model also claims that language production is learned primarily by formulating implicit predictions while attempting to comprehend one's language.

In this discussion, it must be noted that connectionist models do not mirror classical constituency precisely. That is, they do not derive rigid classes of words and phrases that are interchangeable across contexts. Rather, they divide words and phrases into clusters without precisely defined boundaries and treat them differently depending on the linguistic contexts in which they occur. This context-sensitive constituency can be viewed either as the undoing of connectionist approaches to language, or their radical contribution. The potential problem with context-sensitive constituency is the productivity of language: to take Chomsky's famous example, how do we know that the sentence *colorless green ideas sleep furiously* is syntactically correct, except by reference to a context-**insensitive** representation of the relevant word classes? This seems necessary, because each word occurs in a context where it has rarely been encountered before. But Allen and Seidenberg (1999) argue that this problem may not be fatal for context-sensitive notions of constituency. They trained a network to mutually associate two input sequences: a sequence of word forms and a corresponding sequence of word meanings. The network was able to learn a small artificial language successfully: it was able to regenerate the word forms from the meanings and vice versa. Allen and Seidenberg then tested whether the network could recreate a sequence of word forms presented to it, by passing information from form to meaning and back. Ungrammatical sentences were recreated much less accurately than grammatical sentences, and the network was thus able to distinguish grammatical from ungrammatical sentences. Importantly, this was true for sentences in which words appeared in novel grammatical combinations, as specified by the systematicity criterion, and as exampled in Chomsky's famous sentence. Thus, the context-sensitivity of connectionist constituency may not rule out the possibility of highly creative and novel use of language, because abstract relations may be encoded at a semantic level, as well as at the level of word forms.

If the apparent linguistic limitations of context-sensitive constituency can be overcome, then the potential psychological contribution of this notion is enormous. First, context-sensitivity seems to be the norm, throughout human classification. Second, much data

on sentence processing can be explained naturally by assuming that constituents are represented in a fuzzy and context-bound manner.

Structure Dependency

A linguistic concept intimately tied to constituency is structure dependency, the notion that grammatical knowledge relies on the structural relationships between constituents, rather than on the linear sequence of items. One of the fiercest arguments leveled at distributional models of learning (of which neural networks can be seen as an instantiation) concerns the uninformativeness of such mechanisms for detecting linguistically relevant properties (Pinker, 1984). Pinker argued that the most relevant properties of language are abstract, such as phrase structure configurations, grammatical relations, and syntactic categories, whereas information contained in raw input pertains to serial position, adjacency, and co-occurrence relations among words. To the extent that connectionist models, and in particular SRNs, process information simply relying on the linear sequencing of linguistic elements (at any level of analysis, phonemes, morphemes, words, etc.), they would seem doomed to fail to capture structure dependency. Reali and Christiansen (in press) demonstrated that SRNs could master a classic example of structure dependency in English, auxiliary fronting. In the generative linguistics framework, declaratives are turned into questions by fronting the correct auxiliary. For example, to turn the declarative form *The man who is hungry is ordering dinner*, it is correct to front the main clause auxiliary as in (1a), but fronting the subordinate clause auxiliary produces an ungrammatical sentence as in (1b) (Chomsky, 1980).

(1a) *Is the man who is hungry ordering dinner?*
(1b) **Is the man who hungry is ordering dinner?*

A structure-independent rule would move the first *is*, but the correct structure-dependent rule involves only the movement of the *is* from the main clause. Because children do not erroneously move the first *is* to the front of the sentence (Crain and Nakayama, 1987), and because they receive too little direct evidence for inferring correct auxiliary fronting (e.g., Chomsky, 1980), it has been claimed that structure dependency could not be learned from positive evidence by an associative mechanism. Reali and Christiansen trained SRNs to predict the next lexical category from a corpus of child-directed speech that contained no relevant examples of correct auxiliary fronting. The networks, tested on completely novel sentences, produced more accurate predictions for grammatical test sentences such as *Is the boy who is hungry nearby?* than for ungrammatical sentences, such as **Is the boy who hungry is nearby?* The prediction of the well-formed relative clause continuation, V (i.e., *is*), was highly preferred over the ill-formed version, ADJ (i.e., *hungry*). This pattern of predictions reflected the networks' sensitivity to the statistical properties of the corpus. The networks distinguished chunks of lexical categories that were more frequent in the training input from less frequent ones (i.e., the lexical categories corresponding to PRON V ADJ [*who is hungry*] vs. PRON ADJ V [*who hungry is*]). This work suggests that the networks were sensitive to the indirect statistical evidence present in the corpus, developing an appropriate bias toward the correct forms of AUX-questions without having a built-in rule for question formation.

Recursion

As with constituency, connectionist models have dealt with recursion in three increasingly radical ways. The least radical approach is to hardwire recursion into the network (e.g., as in Fanty's [1986] implementation of phrase structure rules) or to add an external symbolic (first-in-last-out) stack to the model (e.g., as in Kwasny and Faisal's [1990] deterministic connectionist parser). In both cases, recursive generativity is achieved entirely through standard symbolic means, and although this is a perfectly reasonable approach to recursion, it adds nothing new to symbolic accounts of natural language recursion. The more radical connectionist approaches to recursion aim for networks to *learn* to deal with recursive structure. One approach is to construct a modular system of networks, each of which is trained to acquire different aspects of syntactic processing. For example, Miikkulainen's (1996) system consists of three different networks: one trained to map words onto case-role assignments, another trained to function as a stack, and a third trained to segment the input into constituent-like units. Although the model displays complex recursive abilities, the basis for these abilities and their generalization to novel sentence structures derive from the configuration of the stack network combined with the modular architecture of the system rather than being discovered by the model.

The most radical connectionist approaches to recursion attempt to learn recursive abilities with minimal prior knowledge built into the system. In this type of model, the network is most often required to discover both the constituent structure of the input as well as how these constituents can be recursively assembled into sentences. As with the similar approach to constituency described above, such models may provide new insights into the notion of recursion in human language processing.

Before discussing these modeling efforts, we need to assess to what extent recursion is observed in human language behavior. It is useful to distinguish simple and complex recursion. Simple recursion consists in recursively adding new material to the left (e.g., the adjective phrases (AP) in *the grey cat* → *the fat grey cat* → *the ugly fat grey cat*) or right (the PPs in *the flowers in the vase* → *the flowers in the vase on the table* → *the flowers in the vase on the table by the window*) of existing phrase material. In complex recursion, new material is added in more complicated ways; for example, through center-embedding of sentences (*the chef admired the musicians* → *the chef who the waiter appreciated admired the musicians*). Psycholinguistic evidence shows that people find simple recursion relatively easy to process, whereas complex recursion is almost impossible to process with more than one level of recursion. For instance, the following sentence with two levels of simple (right-branching) recursion, *The busboy offended the waiter who appreciated the chef who admired the musicians* is much easier to comprehend than the comparable sentence with two levels of complex recursion, *The chef who the waiter who the busboy offended appreciated admired the musicians*. Because recursion is built into symbolic models, there are no intrinsic limitations on how many levels of recursion can be processed. Instead, such models must invoke extrinsic constraints, such as the competence/performance distinction, to accommodate the human performance asymmetry on simple and complex constructions. The radical connectionist approach models human performance directly without the need for extrinsic performance constraints.

The SRN model by Elman (1991) was perhaps the first connectionist attempt to simulate human behavior on recursive constructions. This network was trained on sentences generated by a small context-free grammar incorporating center-embedding and a single kind of right-branching recursive structure. In related work, Christiansen and Chater (1994) trained SRNs on a recursive artificial language incorporating four kinds of right-branching structures, a left-branching structure, and center-embedding. The behavior of these networks was qualitatively comparable with human performance in that the SRN predictions for right-branching structures were more accurate than on sentences of the same length involving center-embedding, and performance degraded appropriately when depth of center-embedding increased. Weckerly and Elman (1992) further corroborated these results, suggesting that semantic bias (incorporated via co-occurrence restrictions on the verbs) can facilitate network performance in center-embedded constructions similarly to the semantic facilitation effects found in human processing. Using abstract artificial languages, Christiansen and Chater (1999) show that the SRN's general pattern of performance is relatively invariant across network size and training corpus, and conclude that the human-like pattern of performance derives from intrinsic constraints inherent in the SRN architecture.

Connectionist models of recursive syntax typically use 'toy' fragments of grammar and small vocabularies. Aside from raising concerns over scaling up, this makes it difficult to provide detailed fits with empirical data. Nonetheless, some attempts have recently been made toward fitting existing data and deriving new empirical predictions from the models. For example, the Christiansen and Chater (1999) SRN model fits grammaticality ratings data from several behavioral experiments, including an account of the relative processing difficulty associated with processing center-embeddings (with the following relationship between nouns and verbs: $N_1_N_2_N_3_V_3_V_2_V_1$) versus cross-dependencies (with the following relationship between nouns and verbs: $N_1_N_2_N_3_V_1_V_2_V_3$). Human data have shown that sentences with two center-embeddings (in German) were significantly harder to process than comparable sentences with two cross-dependencies (in Dutch). Christiansen and Chater (1999) developed a measure of grammatical prediction error (GPE) that allowed network output to be mapped onto human performance data. GPE is computed for each word in a sentence and reflects the processing difficulties that a network is experiencing at a given point in a sentence. Averaging GPE across a whole sentence, Christiansen and Chater (1999) fitted human data concerning the greater perceived difficulty associated with center-embedding in German compared to cross-serial dependencies in Dutch (Bach *et al.*, 1986). The simulation results demonstrated that the SRNs exhibited the same kind of qualitative processing difficulties as humans on these two types of complex recursive constructions. MacDonald and Christiansen (2002) derived novel predictions concerning other types of recursive constructions, and these predictions were later confirmed experimentally. They mapped single-word GPE scores directly onto reading times, providing an experience-based account for human data concerning the differential processing of singly center-embedded subject and object relative clauses in human participants with different levels of reading comprehension ability.

Just as the radical connectionist approach to constituency deviates from classical constituency, the above approach to recursion deviates from the

classical notion of recursion. The radical models of recursion do not acquire true recursion because they are unable to process infinitely complex recursive constructions. However, the classic notion of recursion may be ill-suited for capturing human recursive abilities. Indeed, the psycholinguistic data suggest that people's performance may be better construed as being only quasi-recursive. The above-mentioned semantic facilitation of recursive processing further suggests that human recursive performance may be partially context-sensitive; for example, the semantically biased *The bees that the hive that the farmer built housed stung the children* is easier to comprehend than neutral *The chef that the waiter that the busboy offended appreciated admired the musicians* even though both sentences contain two center-embeddings. This dovetails with the context-sensitive notion of constituency, and suggests that context-sensitivity may be a more pervasive feature of language processing than typically assumed by symbolic approaches.

Connectionist Models of Language Processing

What is the significance of connectionist models of language processing? Will connectionism ultimately replace, complement or simply implement symbolic approaches to language? Early connectionists addressed this issue by attempting to show that connectionism could, in principle, capture aspects of language and language processing (Christiansen and Chater, 2001). These models showed that connectionist networks could in principle acquire parts of linguistic structure without extensive innate knowledge. Recent work has moved toward a connectionist psycholinguistics that captures detailed psychological data. This article has outlined several ways in which constituency and recursion – two fundamental properties of linguistic knowledge – may be accommodated within a connectionist framework, ranging from direct implementation of symbolic systems to the acquisition of constituency and recursion from untagged input. We have focused on the radical approach because this has the greatest potential impact on psycholinguistics and linguistic theory.

However, much of this research is still preliminary. Future work is required to decide whether promising, but limited, initial results can eventually be scaled up to deal with the complexities of real language input, or whether a radical connectionist approach is beset by fundamental limitations. Another challenge is to find ways – theoretically and practically – to interface models, which have been proposed at different levels of linguistic analyses, with one another (e.g., interfacing models of morphology with models of sentence processing).

Nevertheless, the connectionist models described in this article have already influenced the study of language processing. First, connectionism has helped promote a general change toward replacing box-and-arrow diagrams with explicit computational models. Second, connectionism has reinvigorated the interest in computational models of learning, by including learning properties, such as recursion and constituent structure, which were previously assumed to be present *a priori* in humans, and therefore taken for granted. Finally, connectionism tends to discard the separation between competence and performance as artificially construed, and possibly misleading. From this perspective, linguistic recursion is a conceptual artifact of the competence/performance distinction instead of a necessary characteristic of the underlying computational mechanism. In this light, the problem facing connectionist models of language processing is not whether they can implement some kind of recursive mechanism, but whether they will be able to account for the (limited) recursive structure found in natural language behavior purely in terms of nonsymbolic computation.

Connectionism has thus already had a considerable impact on the psychology of language. But the final extent of this influence depends on the degree to which practical connectionist models can be developed and extended to deal with complex aspects of language processing in a psychologically realistic way. Recent models have already started to scale up to more realistic corpora and sentence processing behaviors (Kim *et al.*, 2002; Reali *et al.*, 2003; Rohde, 2002). If realistic connectionist models of language processing can be provided, then the possibility of a radical rethinking not just of the nature of language processing, but of the structure of language itself, may be required.

See also: Associationism and Connectionism; Computational Approaches to Language Acquisition; Constituent Structure; Formal Models and Language Acquisition; Generalization; Generative Grammar; Human Language Processing: Symbolic Models; Language Processing: Statistical Methods; Morphology in Parallel Distributed Processing; Philosophy of Linguistics; Systematicity.

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Human Language Processing: Symbolic Models

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In this article we take 'symbolic models of sentence processing' to mean approaches in which processing is characterized in terms of relatively discrete, combinatorial representations. There are other properties of symbolic processing that are important for cognitive modeling more generally – for example, the ability of symbol processing to support Turing-general computation (Newell, 1990; Lewis, 2000a) – but for language processing, discrete combinatorial representations are often thought to be the hallmark of symbolic models. Defined in this manner, symbolic sentence processing models include approaches sometimes termed 'hybrid,' such as activation-based production system models, or localist connectionist models.

One important way to distinguish symbolic processing models is in terms of their ontological commitments, that is, the symbolic primitives out of which representations are composed. Arriving at an empirically and explanatorily adequate ontology of linguistic primitives is the traditional province of syntactic theory. Instead, we focus here on the variety of theoretical approaches to symbolic sentence processing that are largely orthogonal to the ontological distinctions made in syntactic theory – though often interacting with them in empirically and theoretically critical ways. We also focus here primarily on syntactic processing in comprehension, the domain of sentence processing that has received the most attention, though symbolic models exist that extend upward to discourse-level phenomena (Kintsch, 1988; Carpenter *et al.*, 1995).

The remainder of the article is organized around the following four broad approaches to symbolic sentence-processing theory, which jointly cover most existing models: (1) grammar-based approaches, which posit a tight link between competence grammars and processing phenomena; (2) symbolic complexity metrics and ambiguity resolution principles, which are abstract processing theories predicated on combinatorial syntactic representations; (3) approaches based on existing or independently motivated computational cognitive architectures; and (4) approaches based on probabilistic grammars, which appeal to frequency and experience, as encoded in a symbolic grammar formalism. Rather than surveying the entire literature, we illustrate each of the approaches by explaining the details of a few models, and provide pointers to the literature for other examples. We conclude the article with a brief section outlining points of commonality with connectionist models.

Grammar-Based Approaches

Chomsky (Chomsky, 1965) has long argued that any processing theory must include a theory of competence as a critical component, but given that a competence theory is a characterization of knowledge state that abstracts away from processing, it alone does not make processing predictions of the kind that bring it into contact with fine-grained psycholinguistic data: specific linking assumptions are required to bridge the gap. Grammar-based approaches presuppose a syntactic theory, and associate with it some fairly strong linking assumption so that the competence theory itself can be seen to drive the processing predictions.

The strongest form of this linking has been termed by Berwick and Weinberg as the type-transparency assumption. It states that "the logical organization of rules and structures incorporated in a grammar [is] mirrored rather exactly in the organization of the parsing mechanisms" (1984: 39). Many instances of this assumption can be found in the literature, and Berwick and Weinberg (1984: 39–82) provided an extensive discussion of the potential theoretical and empirical consequences of various positions.

In strong grammar-based approaches, the primitives of competence grammar are the principal explanatory force behind any observed processing difficulty. The metrics for determining processing complexity may differ as a function both of different underlying syntactic theories and of processor–grammar linking assumptions. Some theories rely on the history of the syntactic derivation and/or the number of basic operations involved (e.g., the derivational theory of complexity), while some rely on the number of rules used or violated (e.g., optimality theory).

The derivational theory of complexity (Miller and Chomsky, 1963; Fodor *et al.*, 1974) is the oldest such idea. Its central hypothesis is that the transformational model could be construed as a processing theory in addition to a competence theory (e.g., Chomsky, 1965) if "our performance on tasks requiring an appreciation of the structure of transformed sentences is some function of the nature, number and complexity of the grammatical transformations involved" (Miller and Chomsky, 1963: 481). Although early experiments showed little evidence to support such a connection between grammar and processing (e.g.,

Slobin, 1966), subsequent work has attempted to tackle the question in at least three distinct ways.

The Strong Type-Transparency Approach

One approach has been to redefine the architecture of grammar in the hopes of maintaining the strong type-transparency assumption. Examples are other versions of transformational grammar (Berwick and Weinberg, 1984; Phillips, 1990), lexical-functional grammar (Bresnan, 1978; Bresnan and Kaplan, 1982), and optimality theory (Fanselow *et al.*, 1999; Hoeks and Hendriks, 2004; Stevenson and Smolensky, forthcoming).

As an example of a sentence-processing model based on a new grammar architecture, we consider a specific approach based on optimality theory (OT) (Fanselow *et al.*, 1999). OT (Legendre *et al.*, 2000) is a grammar framework that assumes that there exists an evaluator, EVAL, and an ordered list of rules. The rules are violable, with the additional constraint – termed strict dominance – that no number of violations of a lower-ranked rule are as important as a violation of a higher-ranked one. Also provided is a function called GEN that takes as input a string (in sentence parsing, a string of words) and produces as output a set of so-called candidates. For example, given the set of words {*guess*, *we*, *saw*, *whom*} GEN would generate all the possible permutations. The candidates are simultaneously examined with respect to the ordered rules and a winning candidate declared based on the rule violations and subject to strict dominance.

This grammar architecture can be applied to sentence processing by relying on the following critical property of OT: the incremental, nonmonotonic application of the defeasible rule system allows for a ranking of contrasting sentence structures to be established, which predicts preferred parses. A simple example is the string {*guess*, *we*, *saw*, *whom*}. The two relevant rules whose relative ranking of candidates determine the outcome are antisymmetry (AS) and wh-criterion (whC); AS says that objects follow the verb, and subjects precede it, and whC that a constituent question must begin with a wh-phrase. Assuming that whC is ranked higher than AS, the winning candidate *guess whom we saw* violates only AS, whereas the permutations *guess we saw whom* and *guess we whom saw* violate the higher ranking whC constraint; and so on.

A potentially interesting property of OT is that it is considered a limiting case of a connectionist-inspired grammar formalism (Smolensky and Legendre, 2005); for example, the connectionist correlate to GEN is the start state of a network in which all possible constituents are represented as vectors, and the threshold logic units representing suboptimal candidates are deactivated, returning an optimal winner (Hale and Smolensky, 2001).

An Automata-Theoretic Approach

A second approach, championed by Joshi (Joshi, 1990; Rambow and Joshi, 1994), is to establish mathematical equivalences between grammar formalisms and computational automata, and then use processing complexity metrics naturally defined on these automata. Joshi presents complexity metrics over a (bottom-up) embedded pushdown automaton (BEPDA) to explain the difference in processing difficulty of, for example, Dutch vs. German center embedded structures (Bach *et al.*, 1986). The novel aspect of their automaton-based metric is that the BEPDA is related in a systematic way to the class of tree-adjoining grammars (TAGs), a framework for defining competence grammars (Abeillé and Rambow, 2000). The relationship is that for every TAG there is a BEPDA that accepts exactly the strings that the TAG generates, and for every BEPDA there is a TAG that generates exactly the set of strings that the BEPDA accepts. The uniqueness of this approach stems from the fact that formal models of competence and of performance are linked by the equivalence relation between the machinery; this mathematical relationship – rather than using a grammar formalism directly as a sentence-processing model – constitutes the link between grammatical representation and processing.

Grammatical Representations with an Information-Theoretical Constraint

The third type of exploration of the grammar–parser relationship is exemplified by the entropy reduction hypothesis (Hale, 2004). This model fixes a particular complexity metric (the reduction of entropy [Shannon, 1948] during incremental parsing) derived from a probabilistic grammar, and compares the effectiveness of modeling sentence-processing data with two distinct grammatical representational possibilities (Kayne's promotion analysis [Kayne, 1994] and Chomsky's adjunction analysis [Chomsky, 1977]). Although not an explicit goal of this approach, it provides a principled comparison between one set of representational assumptions vs. another in a precise manner. What makes this comparison possible is that the proposal is grammar independent and can be implemented for any grammar in the class of mildly context-sensitive grammars.

Some General Issues in Grammar-Based Models

In the grammar-based approaches, two general issues deserve comment. An assumption (either implicit or explicitly stated) in most grammar-based approaches

is that the human parser is incrementally constructing syntactic structures and, furthermore, that building syntactic structure is a prerequisite for semantic interpretation (e.g., Frazier and Clifton, 1996). But an interesting development in linguistic and psycholinguistic theory is the possible elimination of the distinction between syntactic structure building and semantic interpretation. In particular, the concurrent, incremental construction of a combined semantic and syntactic structure has emerged as an alternative position (Steedman, 2000). This has important implications for modeling real-time sentence-processing data, since considerable evidence now points to a simultaneous use of both syntactic and semantic information in constraining a parsing decision (Trueswell *et al.*, 1994).

The second issue is the relationship between various syntactic theories. Categorial grammars (Moortgat, 1997; Steedman, 2000), head-driven phrase structure grammar (Pollard and Sag, 1994), lexical-functional grammar (Bresnan, 1982), minimalism (Chomsky, 1995), tree-adjoining grammars (Abeillé and Rambow, 2000), and OT (Legendre *et al.*, 2000) are just some of the syntactic formalisms currently in existence. Significant progress has been made in exploring the connections between their very different representational assumptions (Vijay-Shankar and Weir, 1994; Frank, 2002), and these explorations raise an important issue: if one formalism *A* can be shown to be equivalent, in some well-defined sense, to some other formalism *B*, and if the ontology of *A* is argued to be associated with processing difficulty via some linking assumption to sentence parsing, then this implies that in reality the theoretical commitment of grammar-based approaches is to some common base of the equivalent frameworks rather to the specific primitives of a particular one. An important step in grammar-based approaches is thus identifying exactly what this common theoretical commitment is – what must be invariant about the grammar to derive the same empirical predictions. For example, is there an empirical motivation for characterizing dislocations such as wh-movement as movement rather than some kind of feature sharing? There have been attempts to distinguish between positing movement-based traces and lexical association accounts (Gibson and Hickok, 1993; Nakano *et al.*, 2000), but much more work remains to be done in this area.

Symbolic Models Involving Complexity Metrics and Ambiguity Resolution Principles

A second kind of model proposes complexity metrics or ambiguity resolution principles predicated on symbolic syntactic structures. The metrics and ambiguity principles can be defined without reference to a particular architecture for the competence grammar, though particular syntactic representations must be assumed in order to make specific predictions. The common underlying assumption of these models is that the metrics or principles are abstract characterizations of the resource-boundedness of human working memory for linguistic processing.

Ambiguity Resolution Principles

The best-known theory of this type is minimal attachment (Frazier, 1979). Minimal attachment is assumed to be a principle that accounts for attachment preferences in ambiguous sentences. Sentences such as *The girl saw the boy with the telescope* are ambiguous because, in the absence of a context, we do not know whether the prepositional phrase *with the telescope* modifies the verb *saw* or the noun *boy*. Minimal attachment provides a simple formal statement of which attachment should be preferred: it is the attachment that yields the simplest structure, where 'simplest' can be defined as the structure that introduces the fewest new syntactic nodes. Thus, minimal attachment depends crucially on the representational assumptions in some syntactic theory. For example, in the prepositional phrase attachment example, the minimal attachment prediction depends on the precise syntactic structure assigned to the VP-adjunct vs. NP-adjunct. Frazier (1979) assumed that the NP-adjunction introduces an additional syntactic node, predicting initial VP attachment in an NP-VP-PP ambiguity.

Another issue involving ambiguity is early vs. late closure (Frazier, 1979). The relevant phenomena can be illustrated in the following way. In a sentence such as *After the student moved the chair broke*, a prosodic break after *moved* (or a comma if the sentence is in written form) will 'close' the phrase *After the student moved* early; this is called early closure, and is the intended utterance. By contrast, if the sentence is spoken (or written) without a prosodic break (or comma) after *moved*, the perceiver tends to 'close' the phrase late, at the end of *the chair*, in this case incorrectly. This initial misanalysis is called late closure. In the absence of any prosodic information (and without any punctuation), such sentences often cause garden-pathing (initial misanalysis due to ambiguity).

Frazier proposed these principles with the specific idea of a constrained-capacity working memory system. Regarding late closure, Frazier (1979: 39) said, "It is a well-attested fact about human memory that the more structured the material to be remembered, the less burden the material will place on immediate memory. Hence, by allowing incoming material to be

structured immediately, Late Closure has the effect of reducing the parser's memory load." Similarly, regarding minimal attachment (1979: 40): "The Minimal Attachment strategy not only guarantees minimal structure to be held in memory, but also minimizes rule accessing. Hence, [minimal attachment is also an 'economical' strategy] in the sense that [it reduces] the computation and memory load of the parser." Thus, the limited capacity of working memory was a central motivating factor in the development of theories of ambiguity in sentence processing.

Going beyond the purely capacity-based explanation for ambiguity is Frazier and Clifton's theory of construal (Frazier and Clifton, 1996). One of the goals of this theory is to account for attachment ambiguities like *The girl with the hat that looked funny*. . . . Here, it is unclear who was funny, the girl or the hat. Construal predicts a preference for lower attachment (modification of *hat* rather than *girl)* as follows. Two kinds of relation are assumed, primary and secondary. Primary relations are, for example, those between verbs and their arguments, while secondary relations are relations between modifiers and the element modified, such as the modifying relative clause *that was funny* and the modifiable elements *girl* and *hat*. Frazier and Clifton proposed a construal principle, which (in a simplified form) states that if a nonprimary relation needs to be attached in a syntactic structure, this nonprimary relation must be associated with the phrase containing the most recent theta assigner. This last theta assigner is *with* and the phrase it occurs in is *with the hat*. This accounts for the low attachment preference.

General Structural Complexity Metrics

The theories discussed above focus on ambiguity resolution. Although ambiguity is an extremely important problem for efficient parsing, another important issue is the complexity of globally unambiguous sentences. Several theories attempt to address this issue. The most prominent ones are dependency locality theory (Gibson, 1998, 2000), and early immediate constituents (Hawkins, 1994, 1998, 2001); we describe the first one briefly.

Dependency locality theory (DLT) aims to account for processing difficulty in both ambiguous (garden path) structures and unambiguous ones, such as center embeddings. DLT assumes that during the course of sentence parsing, computational resources in working memory are needed for two aspects: storage of the structure built up thus far and integration of the current word into the structure built up thus far. Based on these two components, a cost metric is defined which predicts relative processing difficulty. There is a storage cost, measured in memory units (MUs), and an integration cost, measured in energy units (EUs).

Input words:	The	reporter	disliked	the	boy
Heads needed:	Noun, Verb	Verb	NP	Noun	–
Storage cost (MUs):	2	1	1	1	0

Figure 1 Illustration of DLT's storage cost computation.

Storage cost is computed as follows: 1 MU is associated with each syntactic head required to complete the current input as a grammatical sentence. For example, as shown in Figure 1, for the first word, *The*, a noun and a verb are needed to complete the sentence grammatically, so the storage cost is 2 MUs. At the second word, *reporter*, only a verb is needed, so the storage cost is 1 MU. For the next word, *disliked*, one NP is needed, so the cost is 1 MU. The cost for the next word, *the*, is also 1 MU, since only a noun is needed to complete the input string as a grammatical sentence. The last word incurs no cost since it can complete the sentence.

The cost of integrating a current word *A* with an existing structure *S* depends on locality, i.e., the distance between them. The processing cost depends on the complexity of the computations that took place between *A* and *S* and is assumed to be linearly related to the number of discourse referents (DRs) introduced between the two items. A DR is assumed to be "an entity that has a spatiotemporal location so that it can later be referred to with an anaphoric expression, such as a pronoun for NPs, or tense on a verb for events" (Gibson, 2000: 103).

Apart from storage cost and integration cost, the other factors that are assumed to affect comprehension difficulty are:

1. The frequency of the lexical item being integrated: the lower the frequency, the greater the processing difficulty.
2. The contextual plausibility of the resulting structure: the less plausible the final structure, the greater the processing difficulty.
3. The discourse complexity of the final structure: nonfocused entities and elements introduced using definite descriptions are less accessible (and are therefore harder to process) than focused entities. Least accessible of all are elements introduced using indefinite NPs: "Elements new to the discourse, which are usually introduced using indefinite NPs, require the most resources because they must be constructed in the discourse model . . . it is assumed that processing the head noun of an NP that refers to a new discourse object consumes substantial resources, and processing the head verb of a VP that refers to a new discourse event (also a discourse referent) consumes substantial

resources, but processing other words does not consume substantial resources in the discourse processing component of structure building" (Gibson, 2000: 103). Also see Warren (2001: 33–44).

4. If the current word is not compatible with the highest ranked structure built so far, there is reanalysis difficulty.

The storage and integration costs together provide a measure of integration time, which gives the complexity at any given point, as well the as overall complexity, of a sentence. Gibson assumed the following regarding these two costs: (i) integrations and storage access the same pool of resources; (ii) resources have fixed capacity; (iii) each predicted syntactic head takes up a fixed quantity of resources; and (iv) the overall acceptability of a sentence depends on the maximal integration time complexity experienced during the parsing process.

In sum, sentence processing according to the DLT is constrained by limited resources in working memory. This limit on resources is quantified in terms of integration and storage costs of linguistic elements as they are processed in real time.

Cognitive Architectures and Sentence Processing

Another approach to sentence-processing theory is to apply independently motivated theories and principles from cognitive psychology research. One instance of such an approach takes as its starting point a fixed cognitive architecture. These theories derive processing explanations from general cognitive processing principles such as activation decay and memory interference.

Activation-Based Architectures

Activation models have dominated the cognitive-architecture-based approaches. In activation-based models, symbolic long- and/or short-term memory elements have a continuous quantity (activation) associated with them that affects processing in some way. Early examples include the Just and Carpenter READER model, which was based on a production system architecture developed concomitantly with the sentence-processing model (Just and Carpenter, 1987). The READER model later evolved into a model of individual differences in language comprehension, with a quantitative parameter (amount of available activation) used to model differences in working memory capacity (Just and Carpenter, 1992). Several other sentence-processing models have been developed in general activation-based architectures developed jointly with a specific language model (Kintsch, 1988; Stevenson, 1994; Vosse and Kempen, 2000; Tabor and Hutchins, 2004; Tabor *et al.*, 2004).

Independent Cognitive Architectures

More recently, there have been attempts to derive sentence-processing models from independent cognitive architectures developed largely outside the domain of linguistic processing. Examples are the SOAR-based architecture in Lewis (1993) and the authors' ACT-R-based sentence-processing model (Lewis and Vasishth, forthcoming). As an example of this approach, and the cognitive architecture approach more generally, we briefly discuss our own model.

Brief Overview of ACT-R

The cognitive theory ACT-R (Anderson *et al.*, 2004) is implemented as a general computational model and incorporates constraints developed through considerable experimental research on human information processing. The ACT-R theory relevant for the present discussion and the parsing model are outlined next, and its empirical coverage is briefly discussed.

In its essence, ACT-R consists of two distinct systems, declarative memory and procedural memory. Declarative memory consists of items (chunks) identified by a single symbol. Each chunk is a set of feature/value pairs; the value of a feature may be a primitive symbol or the identifier of another chunk, in which case the feature/value pair represents a relation.

In addition to the memory systems, focused buffers hold single chunks. There is an architecturally fixed set of buffers, each of which holds a single chunk in a distinguished state that makes it available for processing. Items outside of the buffers must be retrieved to be processed. The three important cognitive buffers are a goal buffer, a problem state buffer, and a retrieval buffer. The goal buffer serves to represent current control state information, and the problem state buffer represents the current problem state. The retrieval buffer serves as the interface to declarative memory, holding the single chunk from the last retrieval. This structure has much in common with conceptions of working memory and short-term memory that posit an extremely limited focus of attention of one to three items, with retrieval processes required to bring items into the focus for processing (Wickelgren *et al.*, 1980; McElree and Dosher, 1993).

All procedural knowledge is represented as production rules (Newell, 1973) – asymmetric associations specifying conditions and actions. Conditions are patterns to match against buffer contents, and actions are taken on buffer contents. All behavior arises from production rule firing; the order of behavior is not fixed in advance but emerges in response to the dynamically changing contents of the buffers.

The sentence-processing model critically depends on the built-in constraints on activation fluctuation of chunks as a function of usage and delay. Chunks have numeric activation values that fluctuate over time; activation reflects usage history and time-based decay. The activation affects a chunk's probability and latency of retrieval.

ACT-R also assumes that associative retrieval is subject to interference. Chunks are retrieved by a content-addressed (McElree, 2000), associative retrieval process. Similarity-based retrieval interference arises as a function of retrieval cue overlap: the effectiveness of a cue is reduced as the number of items associated with the cue increases. Associative retrieval interference arises because the strength of association from a cue is reduced as a function of the number of items associated with the cue.

A Sentence-Processing Model Based on ACT-R

The sentence-processing model consists of a definition of lexical items in permanent memory defined in terms of feature/value pairs, and a set of production rules specifying a left-corner parser (Aho and Ullman, 1977) . The most important property of a left-corner parser in this context is that structure is built as input comes in; there is no waiting period (lookahead; cf. Marcus, 1980) before any parsing decisions are made. The motivation for such an incremental parsing model comes from previous work in the literature (see, for example, Tyler and Marslen-Wilson, 1977; Johnson-Laird, 1983; Scheepers *et al.*, 1999).

The model has been applied to five different published reading experiments (from three laboratories and two different paradigms). The simulations provide detailed accounts of the effects of length and structural interference on both unambiguous and garden path structures. The phenomena covered include an interesting novel prediction of the model, viz., a crossover interaction of the effect of length and structural interference on reanalysis cost vs. initial attachment cost: interference affects attachment more than reanalysis, while the reverse is true for length. The reason for this interaction is that the dispreferred structure does not receive additional activation boosts from participating in the ongoing parse, and so length disproportionately affects its retrieval during garden path reanalysis. This retrieval does not, however, incur greater interference cost, because that cost is determined by the intervening structures, which are often the same regardless of which interpretation was pursued. Van Dyke and Lewis (2003) obtained quantitative estimates of these effects and their interaction, using ambiguous and unambiguous versions of the constructions in (1). The model provides accounts of reading times in the critical disambiguating region and the ambiguous region (the latter testing predictions of load effects).

(1a) [short] The assistant forgot (that) the student was standing in the hallway.
(1b) [long/simple] The assistant forgot (that) the student who was waiting for the exam was standing in the hallway.
(1c) [long/complex] The assistant forgot (that) the student who knew that the exam was important was standing in the hallway.

An important result in this model is that all fits were obtained with one free scaling parameter that was fixed across all the simulations; all remaining quantitative parameters were set to default values from the ACT-R literature. The remaining theoretical degrees of freedom in the model are the production rules that embody the parsing skill, and these rules represent a straightforward realization of left-corner parsing conforming to one overriding principle: compute the parse as quickly as possible. This approach thereby considerably reduces theoretical degrees of freedom – both the specific nature of the strategic parsing skill and the mathematical details of the memory retrieval derive from existing theory, plus the assumption of fast, incremental parsing.

In summary, this sentence-processing model (a) provides an integrated, quantitative account of both length and structural complexity effects in both ambiguous and unambiguous constructions; (b) predicts reading times in both ambiguous and disambiguating regions; (c) probabilistically predicts both parsing failures and reading times; and (d) provides single-parameter quantitative predictions across multiple experiments and paradigms.

Probabilistic Models

In probabilistic models, the starting point is a set of symbolic rules that generate syntactic structures (an example is a context-free grammar specification). To such rules a probability is assigned in the following way: the probability of a rule's left-hand side expanding to the right-hand side is assigned a numerical value between 0 and 1, this number being the product of the probabilities of the right-hand side nonterminal symbols. All rules with the same left-hand side have a total probability summing to one, and a parse tree's probability is a product of the set of all rules used to generate the tree (Manning and Schütze, 1999).

Ambiguity Resolution Using a Probabilistic Approach

Probabilistic models capture an important aspect of sentence processing: the role of experience and frequency in language processing. They also furnish

good models of parsing preferences, of ambiguity resolution, and of gradedness in acceptability (Crocker and Keller, forthcoming).

We present next an instance of a probabilistic approach and show how it applies to a well-known ambiguity resolution issue (Jurafsky, 1996). This model takes as its starting point a syntactic formalism known as construction grammar. Construction grammar assumes that complex, nonlocal constructions are stored along with lexical entries in the mental grammar. Jurafsky's model assigns probabilities to each such construction, and these probabilities determine the likelihood of their being accessed. The probabilities, which are analogous to initial activation values of entities in the mental grammar, are assigned using a corpus (the Penn Treebank) to compute maximum likelihood estimates from relative frequencies. In addition, valency frequencies of verbs are taken from Connine *et al.* (1984).

The classic garden path sentence, *the horse raced past the barn fell*, is then explained as follows. Of the two possible interpretations, one has *raced* as an intransitive verb (main verb interpretation) and the other has *raced* as a transitive (reduced relative interpretation). The intransitive valence has a probability of 0.92, while the transitive one has a probability of 0.08. In addition the reduced relative interpretation requires a context-free grammar (CFG) rule to be applied as in (2):

(2) NP → NP XP

This rule's probability (computed from the Penn Treebank) is 0.14. The combination of the transitive verb valency probability and the CFG rule is $0.14 \times 0.08 = 0.0112$. Since this combined probability of the reduced relative interpretation is $0.92 \div 0.0112 = 82.14286$ times lower than that of the preferred interpretation, it is pruned away during processing because of an assumed beam search mechanism that rejects any parses that are too far away from the best.

Some Open Issues in Probabilistic Models

Two important issues in sentence processing that remain to be addressed in detail are: explaining moment-by-moment fluctuations in processing difficulty, and the relative difficulty of complex yet unambiguous sentences. The ability to explain reading time data gathered by methods like self-paced reading and eyetracking requires further refinement of probabilistic models, which generally provide a single real number for the full sentence parse, which serves as a measure of processing difficulty. The second issue is that current probabilistic models do not have as broad an account as some other approaches (Gibson, 2000; Hawkins, 2001; Lewis and Vasishth, forthcoming) of globally unambiguous sentences, such as subject vs. object relative clause processing, center embedding phenomena, etc. Some progress has been made in this direction (Crocker and Brants, 2000; Hale, 2001; Korthals, 2001; Narayanan and Jurafsky, 2002, Jurafsky, 2003; Vasishth and Uszkoreit, 2004), but much more remains to be done.

Symbolic Processing Models and Their Relation to Connectionist Models

We conclude by briefly considering symbolic models in terms of several properties normally associated with connectionist models: parallel processing, interactivity (simultaneous application of multiple constraints), and the graded, continuous nature of human performance.

First, it should be clear that parallel vs. serial processing is a distinction that is orthogonal to symbolic vs. nonsymbolic processing. For example, all of the prominent symbolic cognitive architectures (Soar [Newell, 1990], EPIC [Kieras and Meyer, 1997], and ACT-R [Anderson *et al.*, 2004]) include substantial amounts of parallelism. In the domain of sentence processing, most symbolic models also assume parallel processes – for example, the ACT-R-based model above assumes that memory retrieval happens in parallel with other cognitive and perceptual processes.

It is also worth clarifying here a potential source of confusion in the sentence processing literature that relates to the serial vs. parallel processing issue (Lewis, 2000b). A distinction is often made between serial and parallel parsing, but these terms are generally meant to refer to depth-first search vs. breadth-first search methods, respectively – that is, serial parsing pursues a single interpretation while parallel parsing pursues multiple interpretations. But this distinction is also orthogonal to serial vs. parallel processing as it is used elsewhere in the connectionist and symbolic modeling literature, where it simply refers to the temporal sequentiality or overlap of processes. Thus, one can have a serial-processing parallel parser, or a parallel-processing serial parser. In fact, the ACT-R model described above is an example of the latter.

Second (and related to parallel processing), simultaneous constraint interaction and constraint satisfaction from different sources (e.g., the immediate effect of context on parsing) is also completely consistent with symbolic processing. One example is the modular symbolic architecture sketched in Altmann and Steedman (1988), which involves multiple constraint satisfaction from different sources.

Finally, although we defined symbolic-processing systems as ones that manipulate relatively discrete combinatorial representations, such systems are still

capable of accounting for aspects of the continuous, graded nature of human performance. Examples are the probabilistic approaches in Hale (2004) and Crocker and Keller (forthcoming), optimality theoretic approaches, and the ACT-R model mentioned in this article (Lewis and Vasishth, forthcoming).

Looking ahead, it seems clear that labels such as 'symbolic' and 'connectionist' will continue to be at best vaguely descriptive categories, and sharper theoretical discussion will appeal to precisely articulated issues such as the nature of the parsing search strategy, the precise relationship of parallel processes in terms of memory and control, the distribution of linguistic knowledge across the architectural components, the nature of codified experience, and the interaction of language-specific and more general cognitive resources. The current class of symbolic cognitive models comprises a rich body of theory from which to pursue these and other pressing research questions.

See also: Generative Grammar; Human Language Processing: Connectionist Models; Information Theory; Language: Mathematical Complexity; Language Processing: Statistical Methods; Parsing: Statistical Methods; Psycholinguistics: Overview; Rational Analysis and Language Processing; Sentence Processing; Syntax: Optimality Theory.

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Human Language Technology

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Human language technology, or *technologies*, or *HLT*, is the name given collectively to the various areas of technology, especially computer technology, that involve applications to tasks in which language is central. Traditionally, three subfields have been recognized: speech technology, information or document retrieval, and natural language processing. Each is described in detail in a separate article in this encyclopedia, as are many of the specific topics of research and areas of application within each subfield. The use of the name *human language technology*, however, is usually intended to emphasize the unity of the field, the integration of elements from different subfields, and an emphasis on application rather than theory. For example, all three subfields would be involved in creating a system that took as its input video or audio recordings of news broadcasts, and automatically transcribed the soundtrack (using speech recognition) to create a written summary of the broadcast (using methods from natural language processing) and to retrieve segments of the video or audio in response to topical requests from a user (using methods from information retrieval).

The three subfields arose as distinct enterprises in separate disciplines with differing research methods and traditions – natural language processing in computer science, speech technology in electrical engineering and digital signal processing, and document and information retrieval in library science – and they have only recently been seen as together forming an integrated area of research with significant interests in common. Early moves in this direction were initiated by U.S. agencies that funded research in the subfields: the first Human Language Technology Conference was held in 1993 with the aim of bringing agency-funded researchers together to learn one another's methods, goals, and interests. In 2001, the conferences became an annual event and were opened to the general international research community; in 2003, their organization was turned over to the Association for Computational Linguistics (*see* **Association for Computational Linguistics**).

A related term, often used in Europe particularly since the early 1990s, is *language engineering* or *natural language engineering* (the latter being also the name of a research journal). While perhaps in practice natural language engineering is more centered on textual applications than on speech, this term, too, implies an orientation toward applications involving language with less regard for the discipline or subfield in which the work arises. Both terms are now commonly used in Europe.

See also: Association for Computational Linguistics; Document Retrieval, Automatic; Natural Language Processing: Overview; Symbolic Computational Linguistics: Overview.

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Human Language Technology

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journals.cambridge.org. – *Natural Language Engineering*.

Human Reasoning and Language Interpretation

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Psychologists concerned with deductive reasoning have developed a number of laboratory tasks, bodies of experimental data, and theoretical frameworks concerned with what undergraduate subjects do when presented with what are intended as the premises of classical deductive arguments (for a review, see Evans *et al.*, 1993). The linguistic materials used in these tasks often originate in logic textbooks, and the criteria of correctness used in assessing subjects' performance also originate in classical logic. The experimental subject is generally presented with these materials out of all context other than the injunction to 'say what follows' from the premises. The premises are like messages washed up in a bottle on the laboratory beach. Viewed from a suitable perspective, some of the data from these tasks may yet be extremely interesting as communications *in vacuo* and be made to speak to theories about communication under more normal pressures.

For example, when subjects are given the premises *If she has an essay, she's in the library* and *She has an essay,* then an overwhelming majority of them endorse the conclusion *She's in the library.* However, given the additional premise *If the library is open, then she's in the library,* about half of them withdraw the previous conclusion (Byrne, 1989). Subjects thus reason non-monotonically – an additional premise destroys the perceived validity of an earlier conclusion. Classical logic is always monotonic – adding premises never invalidates conclusions.

For another example, about 20% of undergraduate students given the premise *All A are B* and asked whether it then follows that *All B are A*, famously accept this as a valid conclusion. This pattern of reasoning is so well known among logic teachers that it was long ago dubbed the 'fallacy of illicit conversion.' Less well known is the fact that about 20% of undergraduate students given the premise *Some A are B* and asked whether it then follows that *Some B are A* refuse to accept this as a valid conclusion. Even more interestingly, these two 20% groups of subjects are disjoint. Subjects who commit the famous fallacy do not commit the less-illustrious error and vice versa (Stenning, 2002: Ch. 5; Stenning and Cox, in press). Again, the classification of correct reasoning and error are derived from classical logic in which the concept of validity stipulates that a valid conclusion must be true in all models of the premises.

By way of a last example, subjects can be given four cards with letters on one side and numbers on the other, a conditional rule to the effect that *If there's a vowel on one side then there's an even number on the other*, and the instruction to choose all and only the cards that they need to turn in order to test the truth value of the rule. Such undergraduate subjects overwhelmingly fail to turn over the vowel and the odd number that classical logic dictates they should. Most turn the vowel and the even number (Wason, 1968).

This last experimental observation provoked a search for materials that would make this reasoning as simple as the task appears, and this search eventually yielded the following observation. The rule was changed to a familiar drinking-age law: *If you drink alcohol, you must be over 18 years of age* and the cards described drinkers' ages and their drinks (16/20; whiskey/orange), and the subjects were asked to choose the cards they needed to turn to find out who, if anyone, was breaking the law. The vast majority turned the whiskey and the 16 card, just as classical logic dictates.

This observation gave rise to a widespread rejection of logic as a basis for a theory of human reasoning, the argument being that changing the content changes the reasoning, and logic stipulates that reasoning always proceeds *purely in virtue of form*, so logic is for the birds – or at least not for humans. This argument has provided inspiration to a number of influential theories of human reasoning: mental models theory (Johnson-Laird and Byrne, 1991), evolutionary psychology (Cosmides and Tooby, 1992), relevance theory (Sperber and Wilson, 1995), and dual-process theory (Evans, 2003).

All these observations of striking reasoning phenomena share the simplicity of the sentences involved. Simple conditional sentences or simple monadic quantifications might appear to be stony ground on which to develop rich theories of human interpretation. However, the present argument is that these materials can provide strong motivation for taking seriously, and at face value, some of the contributions of modern logic to the theory of interpretation. A theory of interpretation that can encompass these materials and situations has to regard interpretation as a process that assigns logical forms to sentences only in their communication setting – embedded in their tasks and contexts. Far from a translation process from sentences of English into logical sentences, the process of assigning logical form becomes one of setting a host of parameters affecting the nature of validity, the syntax and semantics of the language, the number and identity of truth values, and many other features. These parameters are set in virtue of what is

being done with the sentence – the participants' goals and understanding of each others' intentions – as much as by inspecting words in sentences.

To cut a long story short and bring an abstract logical treatment down to a concrete analysis of these examples, the drinking-age law is known from its content to have deontic force. As a consequence, assessing whether cases violate the law does not involve testing the truth value of the sentence, and the task is trivially easy. The vowels and consonants rule is likely, *in vacuo*, to be interpreted as a description, and this likelihood is reinforced by the instruction to assess its truth value. The truth conditions of conditional sentences occupy substantial shelf space in the philosophy of logic literature. On a lawlike interpretation of the conditional robust to exceptions, no amount of card turning will determine the truth of the rule, and so the subjects' logically correct response (on this logic) would be to reject the task as impossible. There is evidence of just such inclinations (Stenning and van Lambalgen, 2004).

This common lawlike robust interpretation of the conditional also arguably underlies the nonmonotonic reasoning in the first example of our diligent student's whereabouts. The task here is likely to be interpreted by the subject as to credulously interpret the premises in the experimenter's materials. Encountering the second conditional, *if the library is open then she's in the library*, with this mind-set is likely to result in its being interpreted as a repair to the first too-general statement – a nonmonotonic process that changes the interpretation of the first conditional so that the original conclusion is no longer valid in any logic. The credulous logic involved in this interpretation is different in its syntax, semantics, number of truth values, and concept of validity from the material implication of classical logic. Here the conditional is not a connective so much as a noniterable license-for-inference; its semantics are given by a three-valued interpretation in which the concept of validity is not the classical concept of the conclusion's truth in all models of the premises but rather its truth in *preferred* models on a certain technical definition of preference.

If many subjects can reasonably be expected to adopt a credulous attitude to the interpretation of experimenters' messages from the bottle on the laboratory beach, then this may also explain the patterns of fallacy and omission of valid conclusions in the quantified examples. *In vacuo*, our credulous construction of a model for the premise *All A are B* will have some As in it that are Bs, and when we are asked whether all the Bs in that model are As then, operating by what is called closed-world reasoning, the correct answer would be yes. So subjects with this strongly credulous preferred-model-construction understanding of the experimenter's intentions will commit what would be a fallacy of classical logic, if classical logical inference were what they were trying to do. A subject with a somewhat different, but still nonclassical, understanding of the experimenter's intentions might observe that the conditions under which a speaker would assert *Some A are B* are distinctively different from the conditions under which they would assert *Some B are A* – the same information is packaged for different audiences – and this might be sufficient to lead them, not unreasonably, to reject the idea that the one follows from the other. 'Following from' is, after all, a highly elastic concept in English. An approach along these lines invests in a theory of the many interpretational stances subjects may take. It stands some hope of explaining why the 20% of subjects who commit the fallacy don't fail to draw the conclusion and *vice versa*: having one model of the communication makes it unlikely that one holds other incompatible models simultaneously.

Logic has always been a game of two halves – interpretation and derivation – and modern logic is a representational supermarket of distinct systems for modeling the highly heterogeneous things that people can do in communicating. Logical reasoning (derivation) proceeds purely in virtue of form once an interpretation has been assigned, but the process of assigning an interpretation is as content-involved as it is possible to be. If derivation yields some unexpected result, reinterpretation is often the order of the day, so these processes are interleaved in real communication. Modern logic is a highly articulated framework for explaining why and how reasoning is so exquisitely sensitive to task, context, and content – possibly useful to birds but certainly essential to understanding human reasoning.

It is instructive to compare this logical approach to interpretation with Gricean programs of research, which assume the uniqueness of classical logic as an interpretation, but augment it by pragmatic principles such as Grice's maxims of quantity – "say as much as is needed but no more!" A number of psychologists have appealed to such programs to bridge the observed gaps between classical logic and their observations (Politzer, 2004; Roberts *et al.*, 2001). The two programs have much ground in common. For example, the closed-world reasoning that makes illicit conversion valid may be reconstructable in Gricean terms. Helpful speakers provide all and only relevant information and expect us to draw these implicatures. Taking the multiplicity of logics seriously and assuming that logical form is a function of much more than the sentences that appear opens up research to the rigors of formulating logical systems that model the

data. The Gricean (and related) programs have always been notoriously hard to compute. From a cognitive point of view, the logical approaches have opened up the issue of how the systems can be implemented in the mind. The default logic appealed to here turns out to be highly tractable and implementable in spreading activation networks (Stenning and van Lambalgen, in press). The next few years should determine which is the more productive program of research for semantics and pragmatics.

Assessment of peoples' reasoning requires a firm foundation on the interpretations they adopt. This does not mean that their reasoning will be perfect, or that they cannot be faulted for adopting inappropriate interpretations. The rich framework for interpretation provided by modern logic offers the apparatus to link formal studies with a much wider range of communication, both *in vacuo* and in context.

See also: Discourse Processing; Implicature; Information Structure in Spoken Discourse; Logic and Language: Philosophical Aspects; Logical Consequence; Logical Form in Linguistics; Modal Logic; Multivalued Logics; Neo-Gricean Pragmatics; Nonmonotonic Inference; Propositional and Predicate Logic: Linguistic Aspects; Quantifiers: Semantics; Semantics in Psychology.

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Humboldt, Wilhelm von (1767–1835)

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Humboldt was born in Potsdam into a family of Prussian nobility. (His full name was Friedrich Wilhelm Christian Karl Ferdinand Freiherr von Humboldt. Alexander von Humboldt [1769–1859], the famous natural scientist and explorer, was his younger brother.) After studying law at the universities of Frankfurt an der Oder and Göttingen in 1787–1789, Humboldt alternately traveled in Europe, worked as a jurist in civil service, and lived the life of an independent scholar (especially since his marriage into a wealthy family in 1791) for several years. From 1794 to 1797 he lived in Jena with his family, where he became close friends with Schiller and Goethe, and then in Paris from 1797 to 1801, where he met the 'Idéologues,' who advocated a materialist philosophy which had considerable influence on its time. From Paris he occasionally traveled to Spain. There he learned about the Basque language, which he began to study extensively in relation to the history and culture of the region and its people. From 1802 to 1808 Humboldt was Prussian ambassador to the Vatican in Rome, where he expanded his already vast knowledge of antiquity and the classical languages. Back in Germany he was appointed councillor of state, reformed the educational system, and founded the University of Berlin. From 1810 to 1818 Humboldt served as a diplomat in various European capitals and at several important conferences, and in 1819 he eventually became Prussian minister ('Minister für ständische und kommunale

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Angelegenheiten'). He retired from civil service on Dec. 31, 1819 (in the wake of the Carlsbad Decrees which imposed censorship on the press, supervision of universities and student organizations etc.), devoting most of his time to linguistic research and regularly presenting linguistic papers at the Berlin Academy. He studied several languages, including Sanskrit, native languages of America, partly from material his brother had acquired on his journeys (e.g., the native Aztec language in Mexico) and Malayo-Polynesian languages (e.g., Kawi). He introduced Champollion's discoveries on the Egyptian hieroglyphs to the German public. The work of the French sinologist J. P. Abel Rémusat led him to study Chinese as well. Humboldt died at his exquisite manor in Tegel (now in Berlin) in 1835.

Humboldt's versatility is legendary. He was an influential politician who combined his civil duties with sustained reflection on public matters, to which several writings, especially on the state and educational reforms, bear witness. He was also an art collector, writer, and translator (his translation of Aeschylus's *Agamemnon* is well known), but above all he was a humanist with a great talent for languages. As a young man he already took a keen interest in philosophical, philological, literary, and aesthetic issues and was considerably influenced by G. W. Leibniz, I. Kant, Schiller, and Goethe. Humboldt's writings on language, most of which appeared posthumously (the 17 volumes of his collective writings, *Gesammelte Schriften*, appeared in Berlin between 1903 and 1936; all citations in this article refer to this edition), are the product of research spread over several decades. They contain many discoveries and a host of subtle structural descriptions, bearing testimony to the author's consummate skill as a linguist, philosopher of language, and cultural anthropologist.

For Humboldt the study of language was part and parcel of a vast anthropological project, through which he ultimately tried to implement his conservative educational ideals. One of the most remarkable features of Humboldt's writings on language from a modern point of view is that they are always contributions to empirical linguistics and to the philosophy of language (including ideological assessments) at the same time. They are conceived as a synthesis of ideational insights into language in general on the one hand and minute observations based on empirical linguistic data on the other. Informed by a profound knowledge of many, often very different, languages, Humboldt was able to reconsider, from the vantage point of language, the philosophical issues of his time, especially those engendered by Kant's so-called transcendental philosophy, including the nature of thecategories of human understanding, reason, imagination, and morality. Unlike Herder, who attempted in vain to rewrite Kant's *Critique of pure reason* mainly by replacing reason with language (*Verstand und Erfahrung/Vernunft und Sprache. Eine Metakritik zur Kritik der reinen Vernunft*, 1781; cf. *see* **Herder, Johann Gottfried (1744–1803)**), Humboldt did not object to the central claims about reason and understanding that Kant had put forward in his three *Critiques*. On the contrary, Humboldt's own research can be read as an endeavor to adapt Kantian philosophy to the theory of language. At the same time, however, he succeeded in preserving the true assets of Herderian romanticism, which was directed against the rationalist logicistic tradition of the *Allgemeine Sprachlehre* ('Universal Grammar') in the 18th century, and combined the view that the study of language is the clue to understanding the spiritual and intellectual condition of mankind with the historically very important insight that the diversity of languages constitutes a universal aspect of language (Humboldt, 1903–1936: VI, 4–6). Not surprisingly, the collocation 'die Verschiedenheit des menschlichen Sprachbaues' ('the diversity of human language structure') enters into the title of Humboldt's two main texts on language (written 1827–1829 and 1830–1835). For Humboldt, language, nationhood, and the intellectual activity of the individual are indissolubly interconnected and can be separated only by an act of abstraction, which, although necessary, is legitimate within the purview of scientific research only (Humboldt, 1903–1936: VI, 119–128, 197, 241–245; VII, 46). Furthermore, language is, strictly speaking, comparable to nothing else (Humboldt, 1903–1936: IV, 16).

Humboldt believed that universal concepts and forms of understanding unique to the human species come to be realized in historical and culturally bound instantiations, and it is in these particularizations of the universal that natural language assumes a central role. A language is not merely a code based on conventions and used for communication. Humboldt even went so far as to reject the view that language is conventional altogether: according to him, such a view erroneously presupposes a shared conceptual world of objects prior to language (Humboldt, 1903–1936: III, 167; cf. VI, 119, 155). In the same vein, defining language as a tool for communication is bound to lead to mistakes (Humboldt, 1903–1936: VII, 20) because it is based on an external and arbitrary point of view. For Humboldt language is much more; it is the locus *par excellence* where the principles of human understanding and knowledge as well as the diversity of mankind meet. Language is the organ that shapes thought (Humboldt, 1903–1936: 'Die Sprache ist das bildende Organ des Gedanken,'

VI, 152, and VII, 53). At the same time, Humboldt was convinced that a rich inflectional system with complex grammatical forms was particularly beneficial for abstract (philosophical and formal) reasoning (Humboldt, 1903–1936: IV, 285–313).

Moreover, in every language there is a proper world view ("so liegt in jeder Sprache eine eigenthümliche *Weltansicht*," Humboldt, 1903–1936: VI, 180; cf. IV, 33, 420). This stance generally – but somewhat misleadingly – goes under the name of 'linguistic relativism' in linguistic historiography. Although it has had a profound and enduring influence on the later history of linguistics (*see* **Boas, Franz (1858–1942); Sapir, Edward (1884–1939); Coseriu, Eugenio (1921–2002)**), its reception rarely does full justice to the complexity and breadth of Humboldt's original thought, in which it is not some kind of challenging hypothesis but a corollary of a general idealistic focus on language. For Humboldt, linguistic worldviews are the natural result of the potentially infinite ways in which the universal language competence in man moulds the substance of experience. Furthermore, the rules and forms of meaning from which each language derives its individual character ('innere Form,' Humboldt, 1903–1936: VII, 86–97) generally display a common unitary principle. However, Humboldt's concept of the 'character of a language' differs substantially from the classificatory typologies put forward by earlier authors, such as J. C. Adelung and the brothers A. W. and F. Schlegel, and should not be mixed up with current linguistic typology, which is very different from Humboldt's in being based on comparative classifications of different languages. Although it has formed the basis for a new focus in (synchronic as well as diachronic) typological linguistic research, linguists have yet to consistently pursue the full implications of Humboldt's typology of language.

Humboldt's approach to the relationship between language, thought, and nationality is intimately linked to his Aristotelian view that language is an intentional creative activity (*enérgeia*) rather than a product fixed once and for all (*érgon*) (Humboldt, 1903–1936: VII, 46). Again, many linguists (see, e.g., **Chomsky, Noam (b. 1928)**) have taken up the important concept of *enérgeia*, yet generally in a fairly loose sense that differs substantially from its original meaning with Humboldt. For Humboldt the notion of *enérgeia* implies that language cannot be studied adequately from a naturalistic point of view (Humboldt, 1903–1936: VI, 151). Language is *enérgeia* because it is a mental process ('geistiger Process,' Humboldt, 1903–1936: VI, 146) that has reality in innumerable acts of speech only, not in a finite set of rules or fixed elements. As a consequence, language use is only partly a realization of an already acquired linguistic knowledge; it is, above all, the free and constant creation of such a knowledge. This also explains why languages unceasingly change (Humboldt, 1903–1936: VI, 243), their history reflecting the history of ideas, more or less corresponding organically to their inner forms, and why for Humboldt language ultimately finds its true realization in the genius of literature.

See also: Boas, Franz (1858–1942); Chomsky, Noam (b. 1928); Coseriu, Eugenio (1921–2002); Herder, Johann Gottfried (1744–1803); Sapir, Edward (1884–1939).

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Humor in Language

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There are many spoken and written varieties of humor, from puns to novels, but characteristic techniques recur in all forms of verbal humor, namely production of incongruity based on linguistic constructions or on the events described. Such incongruity can be represented as a clash between opposed semantic scripts. (*see* **Narrative: Linguistic and Structural Theories.**) Thus, in the classic one-liner:

> A panhandler came up to me today and said he hadn't had a bite in weeks, so I bit him.

The phrase "had a bite" belongs structurally to the build-up, while functioning as the script-switch trigger, that is, the unit around which the joke's dual meaning revolves. The script in force in the build-up, namely a panhandler seeking a handout from a passer-by, vanishes in the punchline, where a previously backgrounded script takes hold, in which the victimized passer-by becomes the attacker, while the panhandler becomes the victim. Recognition of the sudden script switch releases psychic energy as laughter, according to Freud (1960), Bateson (1953), and others. (*see* **Freud, Sigmund (1856–1939); Bateson, Gregory (1904–1980).**)

In everyday talk we find both spontaneous conversational joking (puns, banter, wordplay), personal anecdotes, and canned jokes (either narrative or non-narrative, as in riddle jokes). Conversational joking can be spontaneous or formulaic. (*see* **Formulaic Speech.**) Recurrent conversational situations call for formulaic witticisms like "Born in a barn?" to someone who leaves a door open, and typical joking strategies like hyperbole: "I had about a thousand books to return" and irony: "I love it when it sleets." These utterances generate humor through the speaker's pretense in evoking one script while believing another – often modeled theoretically as a violation of some conversational maxim or the principle of relevance. (*see* **Maxims and Flouting; Relevance Theory: Stylistic Applications.**) There are humorous sayings such as, "It's like déjà vu all over again"; allusions like "Though William shake his spear, Anne hath a way"; proverbial similes like "Colder than a well-digger's ass"; leave-taking formulas like "See you in the funny papers"; and so on.

A description of the syntax and semantics of jokes as in Raskin (1985) requires to be extended, in order to include a consideration of their interpersonal and social dimensions in real-life contexts (Attardo, 1994, 1997; Attardo and Raskin, 1991). Discourse analysis has begun to elucidate the performance aspects of joke and anecdote telling (Sacks, 1974; Norrick, 2001), and to explore how conversationalists create and respond to humor in interaction, in casual talk among friends (Norrick, 1993) and family members (Everts, 2003), as well as in institutional settings (Holmes, 2000). (*see* **Critical Discourse Analysis; Institutional Talk.**) We must view joke telling, punning, and teasing in relation to contextualization cues, gender, power, solidarity, and social distance, as well as principles of politeness and cooperation in order to understand how verbal humor can express aggression, yet still build rapport. Joking allows participants to signal their respective affiliations and to align themselves with respect to them. Humor provides a socially acceptable vent for strong emotions toward other people and groups. Some individuals joke with almost everyone; some people kid each other whenever they meet, developing customary joking relationships in which teasing and joking are habitual and competitive. Moreover, conversational humor often revolves around inside jokes – jokes only group members have the shared background knowledge to understand (*see* **Shared Knowledge; Irony; Politeness; Punning**).

See also: Bateson, Gregory (1904–1980); Critical Discourse Analysis; Formulaic Speech; Freud, Sigmund (1856–1939); Humor: Stylistic Approaches; Institutional Talk; Irony; Maxims and Flouting; Narrative: Linguistic and Structural Theories; Politeness; Punning; Relevance Theory: Stylistic Applications; Shared Knowledge.

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Humor: Stylistic Approaches

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Much work in stylistics has demonstrated a sustained and thoroughgoing interest in the connections between patterns of style and aspects of verbal humor. This interest stems in part from stylistics' general concern with text analysis and from its preoccupation with developing analytic models to help explain the ways texts function as discourse. Stylisticians are, however, also interested in humorous discourse as it intersects with the wider study of verbal play and creativity in language. This particular approach is embodied in Nash's seminal study (Nash, 1985), which draws upon a large range of texts, penned by the author himself, to illustrate the full spectrum of types of verbal humor. A further dimension of the stylistic analysis of humor, which works in parallel with the focus on the connections between textual patterns and the humor impulse, is its interest in the differences between humorous discourse and so-called 'ordinary' discourse. The concern here is therefore with exploring how the 'nonroutine' communication that is humorous discourse makes for a useful tool for exploring contrastively the more commonplace patterns of everyday social interaction (Simpson, 1998: 35).

An axiom that underpins most stylistic research on humor runs as follows: for a text to be humorous, it must exhibit (at least) some sort of stylistic **incongruity**. Importantly, the incongruity may operate at any level of language or discourse; that is, at any point on a linguistic continuum that extends from lexicogrammar right up to dialogue and discourse. Puns and related forms of verbal play illustrate well the type of incongruity that is situated at the 'grammatical' end of the continuum. The incongruity in puns occurs when some feature of linguistic structure simultaneously combines two unrelated meanings, thereby allowing a 'double meaning' to be located in what is in effect a chance connection between two elements of language. **Lexical** puns, for instance, are activated by a clash between polysemous lexical items such as homophones and homonyms, as in Groucho Marx's quip "We only shot two bucks, but that's all the money we had" (see further Simpson, 2003: 16–29).

Situated toward the opposite end of the continuum, some incongruities may be grounded in mismatches between text and discourse context, and this type of humor-inducing strategy has received fullest explication in stylistic research on drama dialogue. Stylisticians have been especially interested in oppositions between characters' speech strategies and the discourse context (within the play) in which these strategies are framed. Similarly, stylisticians have

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reached interesting conclusions about the humor mechanism by crossreferencing the way fictional characters interact on the stage with the way they might be expected to interact should they inhabit the 'real' interactive world of playwright and audience/reader. Indeed, this tradition of research has yielded many insightful studies of the Theatre of the Absurd, where rich comparisons can be drawn between the discourse world **inside** the play and the discourse world **outside** the play (see Burton, 1980; Short, 1989; Simpson, 2000; Herman, 1996). By way of illustration, consider the following short scene from N. F. Simpson's absurdist play *One Way Pendulum*, where a courtroom has been hastily assembled inside a domestic living room to facilitate Mr. Groomkirby's 'swearing in' ceremony:

> The Usher enters followed by Mr. Groomkirby, whom he directs into the witness box. Mr. Groomkirby takes the oath.
> Mr. Groomkirby: (*holding up a copy of* Uncle Tom's Cabin).
> I swear, by Harriet Beecher Stowe, that the evidence I shall give shall be the truth, the whole truth, and nothing but the truth.
> Judge: You understand, do you, that you are now on oath?
> Mr. Groomkirby: I do, m'lord (Simpson, 1960: 60).

Whereas a courtroom is an institutionally designated location that deals exclusively with legal proceedings, it manifestly cannot be set up *ad hoc* in a domestic living room. Moreover, there are established procedures for ritualized activities such as the swearing-in of witnesses, and shared assumptions between participants about the way these routines are conducted form part of the communicative context of a 'real' courtroom. Clearly, the 'swearing in' ceremony here violates the pragmatic preconditions that govern the ritual, and so the communicative competence that organizes everyday interaction for the reader/viewer of the play acts as a frame for interpreting the incongruity of the displayed interaction at the character level on stage.

The principle of incongruity as a humor-inducing technique can be extended, beyond its core sense as a stylistic twist in a pattern of language, to cover situations where there is a mismatch between what someone says and what they mean. This extended pragmatic sense equates roughly with the concept of **irony**. Many forms of irony are situated in a discursive opposition between what is asserted and what is meant, as embodied in an utterance such as 'You're a fine friend!' when said to someone who has just let you down. The irony here is located in a departure from Grice's maxim of 'truth' (which dictates that your interactive contribution must be true), although not all irony is explicable within the Gricean model. For example, another conceptual framework, arising from work in Relevance Theory, sees irony as 'echoic mention'; that is, as a type of usage where the utterance echoes other utterances and forms of discourse. This is apparent in an exchange such as the following

> A: I'm really fed up with this washing up.
> B: *You're fed up!* Who do you think's been doing it all week?

where the proposition about being fed up is used in a 'straight' way by the first speaker, but in an ironic, echoic way by the second (see Sperber and Wilson, 1981).

Irony, in both of the senses identified above, features especially prominently in stylistic research on parody and satire – two forms of verbal humor whose central stylistic incongruities are arguably built upon different kinds irony. The principle of echoic mention is absolutely central to parody's capacity to function as what Nash terms 'a discourse of allusion' (Nash, 1985: 100). Parody can take any particular anterior text as its model, although more general characteristics of other genres of discourse can also be brought into play. Once echoed, the stimulus text becomes part of a new discourse context so it no longer has the illocutionary force it once had in its original context, and that is what often engenders parody's ironic humor.

Satire has an aggressive element which is not necessarily present in parody. How this translates into stylistic terms is that satirical discourse, as well as having an echoic element, requires a further kind of ironic twist or distortion, of the more 'Gricean kind,' in its textual design. This additional distortion means that while parodies can remain affectionate to their source, satire can never be so. To illustrate, consider this famous passage from Jonathan Swift's satirical pamphlet *A Modest Proposal*:

> I shall now therefore humbly propose my own thoughts, which I hope will not be liable to the least objection. I have been assured by a very knowing American of my acquaintance in London, that a young healthy child well nursed is at a year old a most delicious, nourishing, and wholesome food, whether stewed, roasted, baked, or boiled; and I make no doubt that it will equally serve in a fricassee or a ragout (Swift, 1986 [1729]: 2175–2176).

The 'echoic irony' in Swift's text derives from its mimicking of the genre of the early eighteenth century pamphlet, and more narrowly the proliferation of pamphlets offering economic solutions to what was then perceived as the 'Irish problem.' However, the passage also contains an ironic distortion that marks it out as satire. This distortion comes through the

startling sequence where the persona proposes to alleviate the burden of overpopulation and starvation in Ireland by eating that country's children. This twist marks an abrupt shift from a framework embodying what is morally acceptable to a framework of abnormality and obscenity.

An important rider needs to be attached to the 'incongruity-based' stylistic work on humor sketched thus far, which is, to put it bluntly, that not all incongruities are funny. Indeed, the type of humor response that a single textual stimulus attracts can vary enormously from recipient to recipient and from context to context. The variability of the humor response has not escaped the attention of stylisticians, and more recent work in stylistic humorology has sought to address both sides, the stimulus and the response side, of the humor event. One model that has come to prominence in this respect is the *General Theory of Verbal Humor* (GTVH) (see Attardo 1997, 2001 for useful compact expositions of the model). A key postulate of the GTVH is that the incongruity element in a humorous text is bounded by a preceding 'setup phase,' which establishes a neutral context for the incongruity, and a 'resolution phase,' which describes the knowledge resources employed by the humor processor to resolve the incongruity. The GTVH thus marks a shift away from an entirely text-centered description of humor toward one that accords equal weight to both textual and cognitive mechanisms of humor processing.

A useful literary-stylistic application of the GTVH is Attardo (2002), which is an exploration of the techniques of verbal humor used in Oscar Wilde's *Lord Arthur Savile's Crime*. Of a number of extensions to the theoretical model, Attardo develops a mechanism for exploring the humor of longer texts– the GTVH traditionally concerns itself with short jokes and quips – part of which involves differentiating between 'punch lines' and 'jab lines.' In multiple joke-bearing texts, the punch line is a humorous instance at the end of a text, while the jab line is a humor instance anywhere else in a text (Attardo, 2002: 235).

Another area where stylistic investigation has sought to move beyond textual description to consider the sociopragmatic features of humor is Simpson's study of satirical discourse (Simpson, 2003). Simpson seeks to isolate the inferencing mechanisms that text processors need to use in order for a text to become satire. Especially important is the mechanism that allows a text's claim to 'sincerity' to be rescinded – a mechanism that is normally pressed into service on encountering ironic distortions like those sketched earlier. Translated to Swift's satirical text quoted above, the distortion at the textual level results, probably for most readers, in the sincerity condition being rescinded at the pragmatic level, the perlocutionary consequence of which is that the text is read as satire and not as a 'straight' or serious proposal.

Contemporary stylistic approaches to verbal humor will continue to develop models of analysis where descriptions of text are paralleled with descriptions of the text's impact, both social and cognitive, on its readers. One area that is yet to receive adequate scholarly scrutiny is to do with the intersection between humor and other stylistic devices. For instance, while a technique such as literary **foregrounding** relies on an incongruity in its textual design, there remains no adequate account of why some, but not all, foregrounded patterns in a text are funny. The same principal applies to figurative language, where the question again arises as to why, for example, some novel metaphors and metonymies are humorous and some are not. These questions will no doubt be addressed by stylisticians as ever more sophisticated methods of dealing with humorous language present themselves.

See also: Drama: Stylistic Aspects; Foregrounding; Humor in Language; Irony; Irony: Stylistic Approaches; Maxims and Flouting; Punning; Relevance Theory: Stylistic Applications.

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Hungarian

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History

Hungarian is a member of the Finno-Ugric branch of the Uralic language family. The Finno-Ugric peoples represented a kind of linguistic and areal unity, populating the southwestern slopes of the Ural Mountains, until 2000 B.C. Hungarian emerged from among the Ugric dialects around 1000 B.C. The Hungarian tribes left the Finno-Ugric homeland in 500 A.D. and occupied the territory surrounded by the Carpathian Mountains in 895, where they established a Hungarian Kingdom in 1000.

The first written records are Hungarian fragments in a Greek and a Latin text, dating from 950 and 1055, respectively. The first surviving coherent written Hungarian text originated in 1192–1195.

Hungarian has about 13.5 million native speakers, the largest number of speakers in the Uralic language family, 10 million of which live in Hungary. The Versailles Treaties in 1920 annexed one-third of Hungarian native speakers – together with two-thirds of the territory of Hungary – to neighboring countries. As a consequence, Romania now has 1.6 million indigenous Hungarian speakers; Slovakia has 520 000; Serbia-Montenegro, 290 000; Ukraine, 156 000; Croatia, 16 000; Slovenia, 7000; and Austria, 4000. The number of Hungarian speakers in the United States, Australia, and Western Europe is around one million.

Hungarian is fairly homogeneous areally; the only dialect displaying substantial lexical, phonological, and syntactic differences from standard Hungarian is the easternmost, archaic Csángó dialect in Romania.

Names for the Language

Hungarians call themselves and their language *magyar*. Others refer to them by variants of the ancient tribal name *Onogur* (e.g., *Hungarian, ungarisch, vengerski*).

Language Description

Phonology

Hungarian has the following 14 vowels: a[ɔ], á[a:], e[ɛ], é[e:], i[i], í[i:], u[u], ú[u:], ü[y], ű[y:], o[o], ó[o:], ö[ø], ő[ø:]. (In each pair of symbols, the first one is

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History

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The first written records are Hungarian fragments in a Greek and a Latin text, dating from 950 and 1055, respectively. The first surviving coherent written Hungarian text originated in 1192–1195.

Hungarian has about 13.5 million native speakers, the largest number of speakers in the Uralic language family, 10 million of which live in Hungary. The Versailles Treaties in 1920 annexed one-third of Hungarian native speakers – together with two-thirds of the territory of Hungary – to neighboring countries. As a consequence, Romania now has 1.6 million indigenous Hungarian speakers; Slovakia has 520 000; Serbia-Montenegro, 290 000; Ukraine, 156 000; Croatia, 16 000; Slovenia, 7000; and Austria, 4000. The number of Hungarian speakers in the United States, Australia, and Western Europe is around one million.

Hungarian is fairly homogeneous areally; the only dialect displaying substantial lexical, phonological, and syntactic differences from standard Hungarian is the easternmost, archaic Csángó dialect in Romania.

Names for the Language

Hungarians call themselves and their language *magyar*. Others refer to them by variants of the ancient tribal name *Onogur* (e.g., *Hungarian, ungarisch, vengerski*).

Language Description

Phonology

Hungarian has the following 14 vowels: a[ɔ], á[a:], e[ɛ], é[e:], i[i], í[i:], u[u], ú[u:], ü[y], ű[y:], o[o], ó[o:], ö[ø], ő[ø:]. (In each pair of symbols, the first one is

the letter denoting the phoneme; the second is its phonetic transcription.) The vowels form pairs differing in length; single or double accents mark long vowels. Hungarian displays vowel harmony; stems (except some recent borrowings) contain either only front vowels (ö, ő, ü, ű) and neutral vowels (e, é, i, í), or back vowels (a, á, o, ó, u, ú) and neutral vowels. Suffixes having both front-vowel and back-vowel allomorphs also participate in vowel harmony – (e.g., *kert-ész-ünk-kel* garden-er-our-with/*fodr-ász-unk-kal* style-ist-our-with).

The number of consonant phonemes is 24: p, b, t, d, ty[t^y], gy[d^y], k, g, f, v, sz[s], z, s[š], zs[ž], h, c[t^s], cs[č], dzs[j], m, n, ny[n^y], l, r, j. The letter combination *ly*, occurring in a small set of words, has the same phonetic value as *j*. Consonants also have long versions, indicated by doubling. Adjacent consonants at morpheme boundaries are subject to assimilation processes, among them voicing assimilation:

dob-t-am [do**pt**am]
throw-PAST-1SG
tép-d [té**bd**]
tear-IMP.2SG

Word stress falls on the first syllable of words, and phrasal stress falls on the first major category of phrases.

Morphology

Hungarian is an agglutinating language. Nouns are inflected for number and case. There are 18 cases, among them a rich system of adverbial cases denoting various location, goal, and source relations:

ház-ban
house-INESS
'in house'
ház-ba
house-ILLAT
'into house'
ház-ból
house-ELAT
'from house'

Possessed nominals bear a possessedness marker and a morpheme agreeing in person and number with the possessor:

lány-a-i-m-at
daughter-POSS-PL-1SG-ACC
'my daughters'

Verbs are marked for tense (present or past), marked for mood (indicative, imperative/subjunctive, or conditional), and bear an agreement suffix indicating the person and number of the subject.

vár-ok
wait-(PRES)-1SG
vár-t-ál
wait-PAST-2SG
vár-j-on
wait-IMP-3SG
vár-ná-nk
wait-COND-1PL
vár-t-ak vol-na
wait-PAST-3PL AUX-COND
'they would have waited'

Definite objects elicit the object-agreement suffix-*ja/e/i* (*lát-**já**-tok őt* see-OBJ-2PL him 'you see him'), which in many cases fuses with the subject agreement morpheme, yielding an objective conjugation. Verb stems usually denote processes or states; telic accomplishments and achievements are mostly derived by means of verbal particles prefixed to the verb: *eszik* 'eats' – *meg-eszik* up eats; *megy* 'goes' – *be-megy* in goes. Hungarian lacks passive voice. Infinitives selected by an impersonal matrix predicate have their own dative-marked subject, with which they agree in person and number.

Postpositions also agree in number and person with their pronominal complement:

mi mellett-ünk
we near-1PL
'near us'

ti után-atok
you-after-2PL
'after you'

Syntax

The Hungarian sentence displays a 'Topic Focus V XP' order. The topic, or topics, names the referent(s) that the sentence is about. Any argument can serve as topic:

***Jánosnak** oda-adta Péter a könyvet*
John-DAT PRT gave Peter the book

***Péter** oda-adta Jánosnak a könyvet*
Peter PRT gave John-DAT the book

***A könyvet** oda-adta Péter Jánosnak*
the book-ACC PRT gave Peter John-DAT

The immediately preverbal focus is the prosodically and pragmatically most emphatic constituent. If represented by a definite or a specific indefinite noun phrase, it expresses exhaustive identification. Thus *Péter JÁNOSNAK adta oda a könyvet* means 'It was to John that Peter gave the book'; *A könyvet PÉTER adta oda Jánosnak* means 'It was Peter who gave the book to John'. The postverbal order of

arguments is free. Universally quantified phrases such as *mindenki* 'everybody', *minden fiúnak* all boy-DAT 'to all the boys' stand between the topic and the focus. The verb, the focus, or both can be preceded by a negative particle: ***Nem** JÁNOS **nem** vett autót* not John not bought car 'It wasn't John who did not buy a car'. The negative particle triggers negative concord: *Senki nem vett semmit* nobody not bought nothing 'Nobody bought anything'. Interrogative phrases appear in the preverbal focus position (e.g., *János kit szeret?* John whom loves 'Who does John love?').

The noun phrase is head-final. Articles and attributive adjectives do not agree with the head noun. Numerals block the plural marking of the noun: *két piros alma* two read apple.

Hungarian is a pro-drop language. When combined with phonetically null morphemes, the copula is also dropped, cf.: *Éva beteg* Eve sick 'Eve is sick' – *Éva beteg vol-t* Eve sick be-PAST 'Eve was sick', *Beteg vagy-ok* sick be-1SG 'I am sick').

See also: Australia: Language Situation; Hungarian Lexicography; Hungarian: Phonology; Hungary: Language Situation; Romania: Language Situation; Serbia and Montenegro: Language Situation; Slovakia: Language Situation; Slovenia: Language Situation; Ukraine: Language Situation; Uralic Languages.

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Hungarian Lexicography

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Explanatory Dictionaries

The seven-volume monolingual dictionary of Hungarian, *A magyar nyelv értelmező szótára I–VII*, created during the 1950s by Bárczi and Országh (1959–1962), is the largest Hungarian dictionary of its type. Although today considered outdated from several viewpoints (entry selection, usage labels, grammar, etc.), it was recently published in electronic format, giving a new life to this old work. It contains some authentic quotations from Hungarian fiction, although not necessarily pertaining to each sense.

Based on the Bárczi and Országh seven-volume dictionary, a slightly modernized and considerably abridged one-volume version was compiled in the 1960s by Juhász *et al*. (1972). This work, *Magyar értelmező kéziszótár*, is still the most commonly used Hungarian monolingual dictionary. In the updated and corrected version by Pusztai (2003), a considerable effort was made to refresh the vocabulary of the dictionary, not only with neologisms, but also with several words from the vocabulary of Hungarians living outside present-day Hungary. Although a new, corpus-based monolingual dictionary of Hungarian has been impossible to produce due to the lack of financial and human resources, a 150-million-word synchronic electronic corpus of Hungarian was used at the final stage of Pusztai's 2003 edition to create a frequency index. The CD version of the dictionary has been published as well.

Historical Dictionaries

Some small historical dictionaries were compiled during the 19th century (see Budenz, 1873–1881; Szarvas and Simonyi, 1890–1893; Szily, 1902–1908). A new project for creating the *Historical dictionary of Hungarian,* underway for some years, currently aims to produce an eight-volume dictionary with some 100 000 entries, covering the period between 1772 and 2000. The entries are based on a 25-million-word electronic historical corpus, but also include the old-fashioned, hand-written dictionary slips. Each sense of each headword will be illustrated by corpus examples, including bibliographic reference to the sources. The first volume will contain letters A and B.

Another project (Szabó, 1975–2002) has been in progress for several decades; the goal is to collect and explain the words occurring in old documents

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Another project (Szabó, 1975–2002) has been in progress for several decades; the goal is to collect and explain the words occurring in old documents

and archives in Transylvania, a region of historical Hungary. Old manuscripts serve as resources, and each sense of each word is illustrated with authentic quotations with exact bibliographic reference.

Etymological Dictionaries

The most reliable etymological dictionary of Hungarian (see Benkő, 1967–1976) contains the etymology of the 10 000 most basic Hungarian words, based on and citing the earliest quotations found in archives or in printed sources. The updated German version (Benkő, 1993–1997) has made the Hungarian scholarly lexicography available to international expert users.

A specialized etymological dictionary of geographical names (see Kiss, 1988) mainly concentrates on place-names and features of the Carpathian basin, but it also includes well-known international names.

Other Monolingual Dictionaries

The first scholarly synonymic dictionary of Hungarian (see O. Nagy and Ruzsiczky, 1978) was followed by a new popular edition by Kiss (1998). Two brand-new phrasal dictionaries were published in 2003 (Bárdosi, 2003; Forgács, 2003); the Forgács volume was based on an electronic corpus of Hungarian newspapers.

Bilingual Dictionaries

After a centuries-long tradition of bilingual dictionary publishing, most of the earlier compiled dictionaries have now been thoroughly updated and republished (see Eckhardt and Konrád, 1999; Eckhardt and Oláh, 1999; Országh *et al.*, 1999; Országh and Magay, 2000; Halász *et al.*, 2002a,b). Several brand-new dictionaries have also been produced (e.g., Pálfy, 1999; Hessky, 2000, 2002; Perrot, 2000; Mollay, 2002). These user-friendly dictionaries employ up-to-date resources of international lexicography, including several example sentences, collocations and idioms, and systematic information on valencies. All of the most recently published dictionaries are computer-based and were either directly entered in extensible markup language (XML) format or were converted to this format at the end of the edition. They have all been published in compact disc (CD) format as well.

The Lexicographic Committee of the Hungarian Academy of Sciences

The Lexicographic Committee of the Hungarian Academy of Sciences was reestablished in 2000. Its main aim is to support scholarly lexicography, to coordinate the work of independent dictionary makers, and to help organize different levels of lexicography teaching at universities. One of the first and most important efforts of the committee was to compile a full bibliography of existing Hungarian dictionaries (Magay, 2004).

See also: Bilingual Lexicography; Computers in Lexicography; Etymology; Hungarian; Idiom Dictionaries; Lexicography: Overview.

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Hungarian: Phonology

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The phonology of Standard Hungarian has proved to be challenging from both the descriptive and theoretical points of view. Notable analytical treatises of the major patterns of the Hungarian sound system, with discussion of their impact on various theoretical models, include (among others) those of Hetzron (1972), Vago (1980), Abondolo (1988), Olsson (1992), Szende (1992), Kiefer (1994), Kornai (1994), Ritter (1995), Szigetvári (1999), Siptár and Törkenczy (2000), Hunyadi (2002), and Varga (2002). For detailed descriptions of the Hunagarian phonology, including elaborate citation of examples, exceptions, and vacillations, as well as variations in dialect, register, style, and speech tempo, see especially Vago (1980), Kenesei *et al*. (1998), Kiefer (1994) – notably the contributions of Siptár, Törkenczy, Nádasdy, and Varga – and Siptár and Törkenczy (2000), and references cited therein.

Phonemics

In the following descriptions of the Hungarian consonant and vowel phonemes, the orthographic representations are in italics and the phonemic representations (in terms of International Phonetic Alphabet symbols) are within slashes; this is followed by a description of the articulation; the significant allophones, if any, are within brackets.

Consonants

Hungarian consonants that are intervocalic or syllable final before pause (except for [h]) may be geminate (long). Geminates occur both underlyingly and in derived contexts as a result of morpheme concatenation ('fake' geminates) or assimilation; [vv] and [ʒʒ] are found only in derived environments. Orthographically, gemination is indicated with double letters; in the case of digraphs, only the first letter is doubled (e.g., short *sz* [s] vs. long *ssz* [ss]). Hungarian consonants are defined as follows:

p /p/: Voiceless unaspirated bilabial stop.
t /t/: Voiceless unaspirated dental stop.
ty /c/: Voiceless unaspirated palatal stop.
k /k/: Voiceless unaspirated velar stop.
c /ts/: Voiceless unaspirated dental affricate. This phoneme is voiced to [dz] before voiced obstruents by a general voicing assimilation process (see later, Obstruent Voicing Assimilation). For arguments that [dz] is not phonemic, see Kiefer (1994), Kenesei *et al*. (1998), and Siptár and Törkenczy (2000).
cs /tʃ/: Voiceless unaspirated alveopalatal affricate.
b /b/: Voiced bilabial stop.
d /d/: Voiced dental stop.
gy /ɟ/: Voiced palatal stop.
g /g/: Voiced velar stop.
dzs /dʒ/: Voiced alveopalatal affricate (rare).

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k /k/: Voiceless unaspirated velar stop.
c /ts/: Voiceless unaspirated dental affricate. This phoneme is voiced to [dz] before voiced obstruents by a general voicing assimilation process (see later, Obstruent Voicing Assimilation). For arguments that [dz] is not phonemic, see Kiefer (1994), Kenesei *et al*. (1998), and Siptár and Törkenczy (2000).
cs /tʃ/: Voiceless unaspirated alveopalatal affricate.
b /b/: Voiced bilabial stop.
d /d/: Voiced dental stop.
gy /ɟ/: Voiced palatal stop.
g /g/: Voiced velar stop.
dzs /dʒ/: Voiced alveopalatal affricate (rare).

f /f/: Voiceless labiodental fricative.

sz /s/: Voiceless dental fricative.

s /ʃ/: Voiceless alveopalatal fricative.

h /h/: Voiceless glottal fricative, exhibiting the following allophonic distribution: [h] prevocalically, voiced glottal fricative [ɦ] between sonorant segments and vowels, voiceless velar fricative [x] after back vowels in the coda of a syllable (that is, either word finally or before consonants), and voiceless palatal fricative [ç] (or a fronted version of [x]) after front vowels in coda positions (see later, /h/-Deletion, for further discussion).

v /v/: Voiced labiodental fricative.

z /z/: Voiced dental fricative.

zs /ʒ/: Voiced alveopalatal fricative.

m /m/: Voiced bilabial nasal, becoming labiodental [ɱ] before the labiodentals /f/ and /v/.

n /n/: Voiced dental nasal, having allophonic variants that reflect the place of articulation of a following labiodental, alveopalatal, or velar consonant (as part of a general assimilation process; see later, Nasal Assimilation).

ny /ɲ/: Voiced palatal nasal.

l /l/: Voiced dental lateral.

r /r/: Voiced dental trill.

j, ly /j/: Voiced palatal glide, having the following two allophones: voiceless palatal fricative [ç] in word-final position following a voiceless consonant, and voiced palatal fricative [j̊] in word-final position following a voiced consonant (in both cases, word-final position means either before pause or before a consonant-initial word, i.e., when /j/ can not be resyllabified into the onset position of a following syllable) But see Siptár and Törkenczy (2000) for arguments that /j/ should be classified as a liquid.

Vowels

Hungarian has 14 contrastive vowels; their phonological classifications vary across theories and analyses. The phonemic vowel inventory divides into seven short and seven long vowels. The quantitative difference is accompanied by qualitative differences in the case of nonhigh vowels.

i /i/: Short high front unrounded.

í /iː/: Long high front unrounded.

ü /y/: Short high front rounded (alternatively identified as /ü/).

ű /yː/: Long high front rounded (alternatively identified as /üː/).

u /u/: Short high back rounded.

ú /uː/: Long high back rounded.

e /ɛ/: Short upper low front unrounded.

é /eː/: Long upper mid front unrounded.

ö /œ/: Short lower mid front rounded (alternatively identified as /ö/or/ø/).

ő /øː/ Long upper mid front rounded (commonly identified as /öː/).

o /ɔ/: Short lower mid back rounded (commonly identified as /o/).

ó /oː/: Long upper mid back rounded.

a /ɒ/: Short upper low back rounded (commonly identified as /ɔ/). This vowel is assumed to be unrounded underlyingly, due to its morphophonemic patterning (see, for example, Vago (1980) and Siptár and Törkenczy (2000)). With this caveat, the phonemic symbol used here will reflect the phonetics.

á /ɑː/: Long lower low back unrounded (alternatively identified as central /aː/).

As expected, vowels become (slightly) nasalized before nasal consonants. The only other allophonic variation of note is the fact that under certain conditions of length variation, the nonhigh short vowels, which differ qualitatively from their long counterparts (cf. *e* /ɛ/ vs. *é* /eː/, ö /œ/ vs. *ő* /øː/, *o* /ɔ/ vs. *ó* /oː/, and *a* /ɒ/ vs. *á* /ɑː/), retain their quality distinctions. Thus, with respect to the process of compensatory lengthening (q.v.), *e* /ɛ/ lengthens to [ɛː], ö /œ/ lengthens to [œː], *o* /ɔ/ lengthens to [ɔː], and *a* /ɒ/ lengthens to [ɒː], and conversely, under surface vacillation of vowel duration, *é* /eː/, *ő* /øː/, *ó* /oː/, and *á* /ɑː/ shorten to [e], [ø], [o], and [ɑ], respectively.

Hungarian lacks underlying diphthongs. Nonsyllabic [u] ([w]) may form diphthongs with preceding low vowels, but only in a restricted set of loanwords, and in predictable phonological contexts.

Phonotactics

This discussion of phontactics is concerned with the most significant statements and generalizations regarding the permissible and impermissible segments and clusters of segments within words and syllables.

Syllables

The following template characterizes the segmental constitution of Hungarian syllables on the surface: (C) (C) (C)V(V) (C) (C) (C). With this template, syllables can contain a short vowel (V), a long vowel (VV), and up to three consonants (C) syllable initially and/or syllable finally. Any vowel can be the nucleus, whether followed by a coda or not, although some syllable types are subject to word-level restrictions (see the following subsections). Some of the syllable shapes have limited distribution or have segmental constraints; these are developed in the subsequent subsections.

Following generally accepted nomenclature, V is the nucleus of the syllable, prevocalic C is the onset, and postvocalic C is the coda; the nucleus and the coda together form the rhyme of the syllable. (An alternative syllabic organization gathers some or all of the segments of a syllable into morae, or weight units, rather than into onset/nucleus/coda constituents.) Based in part on phonotactic considerations, some peripheral consonants of a syllable may be best viewed in terms of an appendix constituent, rather than an onset or coda. On this view, Kiefer (1994) and Siptár and Törkenczy (2000) analyzed the basic Hungarian syllable as containing at most one consonant in the onset and at most two consonants in the coda. Nevertheless, for the sake of maximal clarity and utility of the facts, the ensuing generalizations are based on surface representations and are therefore independent of theory-specific analyses.

Intrasyllabic Restrictions There are no ostensible restrictions between the onset and the nucleus on the one hand, and between the onset and the coda on the other. Within the rhyme, two restrictions hold between the nucleus and the coda: (1) if the coda contains a bilabial consonant cluster (/mp/ or /mb/), then the nucleus must have a rounded vowel (phonetically – since /ɒ/, for which, it will be recalled, is rounded only on the surface, is included); (2) in monosyllabic root morphemes ending in a long vowel and a consonant cluster, the nucleus is either /e:/ or /ɑ:/, and the coda can not be a geminate (with few exceptions).

Syllabification As in just about all languages, an intervocalic single consonant must be syllabified as an onset: V.CV (the period indicates a syllable boundary). This generalization holds true within the phonological word: onset syllabification takes place within a morpheme as well as across suffixes, but is blocked between independent words, across a compound boundary, and between a preverb and a verb.

In the case of intervocalic CC sequences, the first C is syllabified into coda position, the second into onset position, i.e., VC.CV (intervocalic geminates are ambisyllabic). Again, the domain is the phonological word. If the intervocalic CC cluster is a possible word-initial cluster, then V.CCV syllabification is also possible, but only tautomorphemically. Thus, *ablak* 'window' may be syllabified either as *ab.lak* or *a.blak* (cf. *blúz* 'blouse'), but *láb-ra* 'onto (the) leg' may be syllabified only as *láb.ra*, even though *br* is a possible word-initial cluster (cf. *brácsa* 'viola').

Intervocalic CCC (and longer) consonant clusters follow the syllabification pattern of intervocalic CC clusters, but with two extra twists. First, if CCC is a permissible word-initial cluster, then three syllabifications are possible: e.g., *ost.rom*/*os.trom*/*o.strom* 'siege' (cf. *strand* 'beach'). Second, if the first two consonants are not permitted in coda position, then VCC.CV syllabification is disallowed: e.g., in *konflis kocsi* 'hansom-cab', the syllabification *konf.lis* is illicit since *nf* is not a possible coda.

Words: Consonant Positions

Word-Initial Consonants All consonants may occur at the beginning of a word, though /c/ is found only in one nominal root and in one interjection, and /ʤ/ is found only in some 20 words, all loans originally.

Word-Final Consonants All consonants may occur at the end of a word, with the exception of [h] (see later). In monosyllabic roots consisting of an initial consonant cluster, a short vowel, and a final single consonant, the latter must be a voiced obstruent.

Word-Initial Consonant Clusters Geminates are precluded in word-initial position. In initial CC clusters, the first C is an obstruent; the second C is almost exclusively a liquid (/l r/), or if the first C is /s/ or /ʃ/, nasal (/m n ɲ/), voiceless stop (/p t c k/), or labiodental (/f v/). In initial CCC clusters, the first C is /s/ or /ʃ/, the second C is a voiceless stop (/p t k/), and the third C is a liquid (/l r/).

Word-Final Consonant Clusters Geminates, save for /ʒʒ/ and /vv/, may occur word finally. Some are underlying only (tautomorphemic), but others can be either underlying or derived (through morphophonemic processes); /zz/ occurs only in derived contexts. Monosyllabic roots containing an initial consonant cluster followed by a short vowel cannot end in a voiced geminate.

Other final CC clusters (basic and derived) are mostly obstruent + obstruent, nasal + obstruent, liquid + obstruent, liquid + nasal, glide + obstruent, and glide + nasal. Final CCC clusters arise mainly through affixation; in roots they occur in a very limited number of loanwords (less than a dozen).

Word-Medial Consonant Clusters Heteromorphemic consonant clusters in word-medial position are subject to various morphophonemic processes (see later, Morphophonemics). In general, the prohibited heteromorphemic consonant cluster sequences are banned tautomorphemically as well. This is seen very clearly in the case of obstruent clusters. Derived obstruent clusters undergo voicing assimilation; in the same vein, underlying obstruent clusters must agree in voicing.

All consonants may occur as geminates in word-medial position, most of them in both underlying and derived contexts (word-medial /vv/ and /ʒʒ/ are always derived). Medial CCC clusters are almost exclusively derived through affixation. About 100 root morphemes (loans in origin) contain less than 10 medial CCC combinations. Medial CCC clusters are even rarer; a medial CCCCC cluster is found only in one word (*angström* [ɒŋkʃtrœm] 'angstrom').

Words: Vowel Positions

Word-Initial Vowels All vowels, short and long, may occur in word-initial position.

Word-Final Vowels All vowels (short and long), except /ɔ/ and /œ/ (more generally, these vowels may not occur morpheme finally), can occur in word-final position, with the following provisos: (1) In monosyllabic content words, final short vowels (light syllables) are disallowed (except in two cases). This prohibition fixes the length of Hungarian content words as minimally bimoraic (or its equivalent): words must either be monosyllabic, ending in a long vowel or closed by a consonant, or else polysyllabic. (2) Also prohibited is word-final /ɑː/ in underived roots (with few exceptions). (3) Word-final /iː/ occurs in less than five content words.

Vowel Sequences Some sequences of vowels derived by suffixation are eliminated by morphophonemic processes (see later). Otherwise, both underlying and derived vowel sequences are realized phonetically as follows: they either are broken up by an intrusive [j], or surface with hiatus. In general, intrusive [j] shows up between /eː/ sequences or if one of the adjacent vowels is /i/ or /iː/; hiatus obtains between any combination of low vowels and rounded vowels, and between identical vowels (except for /i/, /iː/, or /eː/, as per the preceding clause).

Morphophonemics

The following discussions of morphophonemics address the most salient segmental alternations of the language. General, across-the-board processes are described first. Nongeneral processes, i.e., unproductive, morpheme-specific, and lexically conditioned processes (though some may be predictable phonologically), are then addressed. Throughout, the following word constitution is assumed: underived roots or roots plus derivational suffixes make up the stem, followed by inflectional suffixes. The appearance and quality of linking vowels and apparent exceptions in the suffix system are not discussed here.

Assimilation

Vowel Harmony No other aspect of the phonology of Hungarian has attracted the interest of phonologists more than the phenomenon commonly referred to as vowel harmony. This process has been well described and analyzed and has made significant contributions to issues in a wide array of theoretical frameworks, including generative/rule based (Vago, 1976, 1980; Reiss, 2003), autosegmental (van der Hulst, 1985; Kornai, 1990; Kiefer, 1994; Siptár and Törkenczy, 2000), government (Ritter, 1995; Polgárdi, 1998), and optimality (Ringen and Vago, 1998), just to mention some, with highly selective references.

As a general rule, back vowels and front rounded vowels do not co-occur within the domain of the phonological word. This regularity is enforced both within roots as well as for suffixes. The system is root controlled in that the harmonic category of roots determines the harmonic shapes of suffixes, which have front and back alternants: *u/ü*, *ú/ű*, *ó/ő*, *a/e*, *á/é*, and *o/ö*. The last pair has a third alternant: *o* occurs after roots that govern back harmony in suffixes, and *ö* or *e* occurs after roots that govern front harmony in suffixes. The choice between *ö* and *e* is determined by the immediately preceding vowel (generally referred to as rounding harmony): *ö* occurs after rounded (front) vowels and *e* occurs after unrounded (front) vowels (one suffix is exceptional: it lacks the *e* variant). In particular, roots that contain only back vowels choose the back vowel variants of suffix vowels, and conversely, roots that contain only front vowels select the front vowel variants. Representative examples of the simplest cases of harmony are given in Example (1):

(1)

	1PL POSS	ALLATIVE	ADESSIVE	DELATIVE
'house'	ház-unk	ház-hoz	ház-nál	ház-ról
'book'	könyv-ünk	könyv-höz	könyv-nél	könyv-ről
'eye'	szem-ünk	szem-hez	szem-nél	szem-ről

The unrounded front vowels *i*, *í*, *e*, and *é* are commonly referred to as neutral or transparent, though the status of *e* is debated. These vowels are neutral in the sense that in roots they may co-occur freely with back vowels (as well as with front vowels, of course), and they are transparent in that in roots in which they follow a back vowel (as well as when they precede), suffix harmony is determined by the back vowel. Transparent patterning is also evident in suffixal *i*, *í*, and *é*: they are invariably front (i.e., do not alternate harmonically), but nevertheless let backness harmony propagate through them to the next alternating suffix vowel. (Clearly, invariable *é* and harmonic *é* – that is, the front reflex of *á* – must have

different underlying sources: /e:/ and /ɑ:/, respectively.) These properties are apparent in the following examples: *tányér* 'plate', *tányér-hoz* 'to (the) plate', *tányér-jai* 'his plates', and *tányér-jai-hoz* 'to his plates'.

Deviations from the preceding patterns can be grouped into five classes. First, in roots containing a back vowel followed by *e*, *é*, or two or more unrounded front (neutral/transparent) vowels, suffix vowels may vacillate between back and front (e.g., *Ágnes-nak* or *Ágnes-nek* 'to Agnes', *aszpirin-nal* or *aszpirin-nel* 'with aspirin'). As might be expected, there is a good deal of intraspeaker as well as interspeaker variability in these cases. Second, in some roots with a back vowel and a final *e* or *é*, only the front vowel variants are acceptable (e.g., *október-ben* 'in October', *oxigén-nel* 'with oxygen'). Third, in exceptional cases, roots (of foreign origin) may be disharmonic: they contain both front rounded and back vowels. In these words, root harmony is irregular, but suffix harmony is entirely regular: the last harmonic vowel governs harmony in suffixes (e.g., *operatőr-nek* 'to (the) cameraman', *nüansz-unk* 'our nuance'). Fourth, 60 or so almost exclusively monosyllabic roots containing *i* or *í*, less frequently *é*, govern back harmony (e.g., *híd-nál* 'at (the) bridge'). (The expected behavior is front harmonic: cf. *víz-nél* 'at (the) water'.) Fifth, there exist a few invariable suffixes with back vowels; however, the morphology places these suffixes outside the domain of vowel harmony.

Although the facts can only be sketched here, any serious inquiry into the vowel harmony system of Hungarian can but attest to its richness, depth, and complexity. The theoretical issues on which the Hungarian vowel harmony system has proved to have impact in the literature include, among others, the abstractness of phonological representations, the representation of transparency and opacity, the gradience of transparency, adjacency, underspecification, prespecification, monovalent vs. bivalent features, and feature geometry.

Obstruent Voicing Assimilation Obstruent consonants agree in voicing with a following obstruent (across word boundary as well). Examples are *ház* [hɑ:z] 'house', *ház-tól* [hɑ:sto:l] 'from (the) house', and *rész* [re:s] 'part', *rész-ben* [re:zbɛn] 'in part'. The sonorants /m n ɲ l r j/ are neither targets nor triggers. Two phonemes exhibit inconsistent behavior with respect to voicing assimilation: /v/ undergoes assimilation but does not cause it, and /h/ causes assimilation but resists it. This dual patterning of /v/ and /h/ with respect to the obstruent vs. sonorant classification (depending on syllable position) has received due attention in the literature.

Palatalization Dental stops become palatals before palatals (/c ɟ ɲ j/): /t d n/ become /c ɟ ɲ/, respectively (across word boundary as well). An example is seen in *szén* [se:n] 'coal', *gyár* [ɟɑ:r] 'factory', *széngyár* [se:ɲɟɑ:r] 'coal factory'.

Affrication Dental, alveolar, and alveopalatal stop and fricative and affricate sequences undergo an intricate manner of articulation assimilations (some across word boundary as well), resulting in affricates (e.g., *hat* [hɒt] 'six', *szám* [sɑ:m] 'number', *hat szám* [hɒʦʦɑ:m] 'six numbers').

Sibilant Assimilation A sibilant (/s z ʃ ʒ ʧ ʤ ʦ/) assimilates its place of articulation to a following sibilant (across word boundary as well), as in *kis* [kiʃ] 'small', *szamár* [sɒmɑ:r] 'donkey', *kis szamár* [kissɒmɑ:r] 'small donkey'.

Liquid Assimilation An /l/ fully assimilates to a following /r/ or /j/, as in *bal* [bɒl] 'left', *bal-ra* [bɒrrɒ] 'to (the) left)', bal-juk [bɒjjuk] 'their left'.

Nasal Assimilation An /n/ becomes bilabial before bilabials (across word boundary as well). Clearly, this is a larger process that subsumes the allophonic variation of /n/ described in the list of consonants in the first section (Phonemics). An example is seen in *szalon* [sɒlɔn] 'salon', *szalon-ba* [sɒlɔmbɒ] 'into (the) salon'.

/j/-Assimilation Suffix-initial /j/ fully assimilates to a preceding sibilant or palatal consonant, as in *vár* [vɑ:r] 'wait for', *vár-ják* [vɑ:rjɑ:k] 'they wait for it', but *hoz* [hɔz] 'bring', *hoz-zák* [hozzɑ:k] 'they bring it', *hagy* [hɒɟ] 'allow', *hagy-ják* [hɒɟɟɑ:k] 'they allow it'.

Length Alternations

Low Vowel Lengthening The low vowels *a* /ɒ/ and *e* /ɛ/ lengthen to *á* /ɑ:/ and *é* /e:/, respectively, before suffixes (except for two), no matter whether consonant initial or vowel initial; the low vowels stay short in word-final position, as in *kutya* 'dog', *kefe* 'brush'; *kutyá-ja* 'his dog', *kefé-je* 'his brush'; *kutyá-já-val* 'with his dog', *kefé-jé-vel* 'with his brush'; and *kutyá-i* 'his dogs', *kefé-i* 'his brushes'. This is established as a case of lengthening by the fact that all morphemes ending in a low vowel undergo it. The alternative view, shortening, would face a host of exceptions: there exist a good number of roots with final *é*, some with final *á*.

Degemination Geminate consonants become short next to another consonant, both within words and

across, as in *kedd* [kɛdd] 'Tuesday', *kedd-re* [kɛdrɛ] 'to Tuesday', and *kedd reggel* [kɛdrɛggɛl] 'Tuesday morning'. Fake geminates – that is, two identical consonants next to each other but belonging to separate morphemes – evidence the same story, as in *nyelv* [ɲɛlv] 'language', *vizsga* [viʒgɒ] 'examination', *nyelv-vizsga* [ɲɛlviʒgɒ] 'language (proficiency) examination'. Degemination is applied variably (optionally, obligatorily, or not at all), depending on factors such as the phonological constitution of the flanking consonant, speech style, and speech tempo.

Compensatory Lengthening In syllable coda positions, the sonorants /l r j n/ may be elided, generally in casual speech; to compensate for this loss, a preceding short vowel is lengthened. (Long vowels do not become longer as a result of this process.) The most common cases involve /l/; in the case of /n/, its loss is compensated for also by nasalizing the preceding vowel.

Compensatory lengthening is a postlexical, structure-changing process: height adjustment is suspended for nonhigh vowels. Accordingly, /ɛ/, /ɒ/, /ɔ/, and /œ/ lengthen to /ɛ:/, /ɒ:/, /ɔ:/, and /œ:/, respectively, as in *fel* [fɛl] 'up', *felmegy* [fɛ:mɛɟ] 'goes up', *az* [ɒz] 'that', *ar-ra* [ɒrrɒ] or [ɒ:rɒ] 'to that', *bolt* [bɔlt] or [bɔ:t] 'shop', and *zöld* [zœld] or [zœ:d] 'green'. These cases are in sharp contrast with lexical lengthening processes that must preserve distinctive values. Thus, for example, low vowel lengthening turns *a* [ɒ] into [ɑ:] rather than [ɒ:], and *e* [ɛ] into [e:] rather than [ɛ:] (see earlier, Low Vowel Lengthening).

Suffix Vowel Deletion

Suffixes that unquestionably begin with a vowel lose that vowel if appended to a morpheme that ends in a vowel, as in *könyv-ünk* 'our book' and *padló-nk* 'our floor'. Linking vowels, the analysis of which is not straightforward, evidence a similar pattern: cf. *könyv-ek* 'books' and *padló-k* 'floors'.

Suffix Vowel Epenthesis

A low vowel is inserted between verbal stems ending in CC and suffixes that are attached to the stem directly, without an intervening linking vowel. Compare the paradigms of the representative verbs *imád* 'adore' (ending in C) and *áld* 'bless' (ending in CC) in Example (2):

(2)

imád-ni 'to adore'	áld-ani 'to bless'
imád-sz 'you (SG) adore'	áld-asz 'you (SG) bless'
imád-nak 'they adore'	áld-anak 'they bless'
imád-na 'he would adore'	áld-ana 'he would bless'
imád-lak 'I adore you'	áld-alak 'I bless you'

Some stems resist low vowel epenthesis, whereas others allow it optionally.

Nongeneral Processes

/v/-Assimilation The initial consonant of the instrumental suffix *-val/vel* and of the translative suffix *-vá/vé* fully assimilates to a preceding consonant, as in *hajó* [hɒjo:] 'ship', *hajó-val* [hɒjo:vɒl] 'with ship', but *öröm* [œrœm] 'joy', *öröm-mel* [œrœmmɛl] 'with joy'.

/z/-Assimilation In the demonstrative pronouns *ez* 'this' and *az* 'that', the final /z/ fully assimilates to the consonant of a following CV-initial suffix, as in *idő* [idø:] 'time', *idő-ben* [idø:bɛn] 'in time', but *ez* [ɛz] 'this', *eb-ben* [ɛbbɛn] 'in this'.

/t/-Palatalization If the imperative suffix *-j* is appended to a verb ending in /t/, then /t/ palatalizes to /ʃ/ if preceded by a vowel and to /ʧ/ if preceded by a sonorant consonant (/t/ deletes if preceded by an obstruent consonant; see later, /t/-Deletion). An example is seen in *vár* [vɑ:r] 'wait', *vár-j* [vɑ:rj] 'wait!', but *üt* [yt] 'hit', *üs-s* [yʃʃ] 'hit!', *önt* [œnt] 'pour', *önt-s* [œnʧʧ] (or [œnʧ], reflecting the effect of degemination) 'pour!'. Once the /t/ palatalizes to the sibilant /ʃ/ or /ʧ/, /j/ fully assimilates to it by the process mentioned in the discussion of /j/-Assimilation. Seven underived verbal stems (roots) plus all stems derived by the causative suffix *-ít*, all of which end in a long vowel plus /t/, consistently pattern with verb stems that end in a consonant cluster. (Three verbal roots ending in a long vowel plus /t/ pattern with verbs ending in a vowel plus /t/.) Thus, for instance, the verb *fűt* 'heat' palatalizes its /t/ to [ʧ] (cf. *fűts* [fy:ʧʧ] 'heat!'), just like *önt*, and induces suffix vowel epenthesis (cf. *fűt-eni* 'to heat'), just like *áld*. Both of these facts fall out if, in verbs such as *fűt*, the long vowel is analyzed as VC, as was suggested in Vago (1980).

Metathesis Metathesis is observed in three roots, ending in clusters containing /h/ plus either /r/ or /j/. Word finally and before consonant-initial suffixes, the sequence /hr/ or /hj/ appears, broken up by a vowel (see later, Stem Vowel Syncope/Epenthesis), but before vowel-initial suffixes, /rh/ or /jh/ shows up (recall that orthographic *ly* = [j]):

(3)

	NOMINATIVE	DATIVE	PLURAL
'chalice'	kehely	kehely-nek	kelyh-ek
'fluff'	pehely	pehely-nek	pelyh-ek
'load/weight'	teher	teher-nek	terh-ek

/h/-Deletion About 10 nominal roots end in /h/ before vowel-initial suffixes. Otherwise, i.e., word finally and before consonant-initial suffixes, /h/ deletes

(regardless of whether the next word begins with a vowel or a consonant). An example is seen in *cseh* [ʧɛ] 'Czech', *cseh-nek* [ʧɛnɛk] 'to (the) Czech)', *cseh-ek* [ʧɛɦɛk] 'Czechs', *Csehország* [ʧɛɔrsɑ:g] 'Czech Republic', and *cseh katona* [ʧɛkɒtɔnɒ] 'Czech soldier'. Counterexamples abound, where /h/ is not deleted; in these cases, syllable-final /h/ is pronounced as velar [x] after back vowels, and as fronted-velar or palatal [ç] after front vowels, as in *doh* [dɔx] 'musty smell', *doh-tól* [dɔxto:l] 'from (the) musty smell', and *doh-os* [dɔɦɔʃ] 'musty'. Furthermore, roots that delete their final /h/ are unstable in that they develop variants that either optionally or obligatorily retain /h/. Since the glottal and velar variants (ignoring the fronted version of the velar) never contrast, it is possible to set up either one as the basic phoneme.

Stem Vowel Syncope/Epenthesis In several hundred historically old nominal and verbal roots, as well as in a few nominal derivational suffixes, a short mid vowel (adjusted for vowel harmony) appears between the last two consonants if these morphemes are word final or are followed by a consonant-initial suffix; if followed by a vowel-initial suffix, the short mid vowel is absent. An example is seen in *ökör* 'ox,' *ökör-rel* 'with ox', and *ökr-ünk* 'our ox'. These alternations have been analyzed in terms of both deletion and insertion; however, it is not possible to account for the facts in purely phonological terms.

Root Vowel Lowering In less than two dozen nominal stems, a final mid rounded vowel is lowered before suffixes beginning with /i/ or /j/, as seen in Example (4):

(4)

	NOMINATIVE	DATIVE	3PL POSS
'door'	ajtó	ajtó-nak	ajta-ja
'forest'	erdő	erdő-nek	erde-je

This process is unproductive, applying to a closed set of historically old nouns.

Root Vowel Deletion A vowel in root-final position is lost before vowel-initial derivational suffixes, as in *hülye* 'silly', *hülyé-sked(-ik)* 'act(s) silly' (derivation), *hülyé-i-nk* 'our fools' (inflection), *hülyé-nek* 'to (the) fool' (inflection), but *hüly-ül* 'becomes (a) fool' (derivation). Also, in about 10 nominal and adjectival roots, a final long high rounded vowel deletes before vowel-initial suffixes, as in *borjú* 'calf', *borjú-val* 'with (the) calf', but *borj-ak* 'calves'.

Root Vowel Length Alternation In nearly 100 roots, all monosyllabic or bisyllabic, ending in a single consonant, the final syllable has a long vowel, if that syllable is word final or is followed by a consonant-initial suffix; the final syllable has a short vowel before a (derivational or inflectional) vowel-initial suffix. An example is seen in *kéz* 'hand', *kéz-ben* 'in hand', and *kez-ünk* 'our hand'. This process is restricted to a closed set of roots. In verbs, most of the alternating vowels are high, but in nouns, they are mainly *e/é* or *a/á*.

Root Internal Vowel Shortening In a large set of roots (on the whole, borrowed words), a long vowel, no matter in what syllable, becomes short before suffixes that have the following characteristics: they are derivational, vowel initial, bisyllabic, and invariant with respect to vowel harmony. An example is seen in *miniatűr* 'miniature', *miniatür-izál* 'miniaturize'.

Root-Final /v/-Alternation In a little over 20 roots, the final segment is vocalized as a high or mid rounded vowel word finally and before consonant-initial suffixes; /v/ shows up before vowel-initial suffixes. The following three patterns are observed:

(5)

	NOMINATIVE	DATIVE	PLURAL
'village'	falu	falu-nak	falv-ak
'pipe'	cső	cső-nek	csöv-ek
'word'	szó	szó-nak	szav-ak

/t/-Deletion Verb stems that end in an obstruent consonant plus /t/ lose their final consonant before the imperative morpheme /j/. Thus, for example, when *fest* [fɛʃt] is concatenated with the imperative suffix /j/ (cf. *kér* 'ask', *kér-j* 'ask!'), first /t/ drops out and then /j/ fully assimilates to the preceding strident /ʃ/ (cf. /j/-Assimilation); the output is *fess* [fɛʃʃ] 'paint!'.

Suprasegmentals

Stress

Hungarian words receive primary stress on the initial syllable (except in cases involving function words, rhythmic stress, and contrastive stress); the existence of secondary stress at the lexical level has been the subject of debate. Lexical initial stress may be absent (or reduced to secondary stress) in the higher level patterns of sentential stress (influenced by syntactic structure), due, in particular, to enclisis and stress eradication.

Intonation

Hungarian words have the following major intonational patterns: (1) steady pitch, when the syntax or

pragmatics has an implicational function, (2) initial falling pitch, used primarily for questions containing interrogative pronouns (*wh*-questions), exclamations, imperatives, and declaratives, and (3) final falling pitch, used in the case of all other question types. On the whole, the intonational peak occurs in the initial syllable of the prosodic domain; in some cases (e.g., yes/no questions), it occurs in the penultimate syllable.

Emphasis and Contrast

Emphatic and contrastive elements must be in focus position syntactically. They are followed by falling intonation, due to the facts that the stressed initial syllable of the emphasized or contrasted word receives high pitch and that all subsequent primary stresses in the phrase are destressed (eradicated).

See also: Hungarian; Hungary: Language Situation; Rule Ordering and Derivation in Phonology; Underspecification.

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Hungary: Language Situation

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The Treaty of Trianon after World War I reduced the size and population of Hungary by about two-thirds, divesting it of virtually all areas that were not purely Magyar. After 1920, Hungary, once a multiethnic and multilingual kingdom, became a fairly homogeneous country in linguistic terms. Census data from 2001 show that 98.5% of 10.2 million people in Hungary claimed Hungarian as their mother tongue. (With about 3 million native speakers in the seven neighboring countries, Hungarian is a pluricentric language.)

According to the 2001 census, Armenian was claimed as mother tongue by 294 people, Bulgarian by 1299, Croatian by 14 345, German by 33 792, Greek by 1921, Gypsy (i.e., Romany and Boyash, an archaic dialect of Rumanian, collapsed in a linguistic fashion by the Hungarian Statistical Office) by 48 685, Polish by 2580, Rumanian (Romanian) by 8482, Ruthenian (Rusyn) by 1113, Serbian by 3388, Slovak by 11 816, Slovene (Slovenian) by 3187, and

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Ukrainian by 4 885 speakers. Compared with the 1990 census, some minorities are stable (Bulgarians, Gypsies, Rumanians), others have decreased (Croatians, Germans, Poles), while others have increased (Greeks, Serbs, Slovenes, Ukrainians). Over 135 000 people claimed a language other than Hungarian as their mother tongue, over 166 000 claimed they used such a language in their home, and over 314 000 claimed they belonged to a national or ethni minority. An estimated 30 000 Hungarians are deaf and another 300 000 are hard of hearing. The use of Hungarian Sign Language in deaf schools is barely tolerated. Minority languages, where and when spoken, are typically restricted to the home or to private conversations between friends. Under the Minorities Act of 1993, mother-tongue-medium education must be provided for minority children in a locality if at least eight children's parents demand it.

The national and ethnic minorities live dispersed among Hungarians in various parts of the country. Whereas Hungarians and Slovenes are autochthonous to Hungary, Croats, Serbs, and Rumanians settled in Hungary before or during the Ottoman Turkish occupation of the country in the 16th and 17th centuries. The majority of the Germans and Slovaks were settled in the newly liberated territories after the Ottoman Turks were driven out of the country in 1686. Gypsies have lived in Hungary since the 15th century.

The Hungarian language community in Hungary is a normatively oriented one with a strong tradition of stigmatizing nonstandard varieties and glorifying standard Hungarian as codified by purists associated with the Hungarian Academy of Sciences. In some respects, language cultivators and schoolteachers are aiming to change the speechways and the notions of correct speech of more than half the population of Hungary.

See also: Austria: Language Situation; Croatia: Language Situation; Hungarian; Romania: Language Situation; Serbian–Croatian–Bosnian Linguistic Complex; Slovakia: Language Situation; Slovenia: Language Situation; Ukraine: Language Situation.

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Husserl, Edmund (1859–1938)

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Edmund Husserl is the founder of modern 'phenomenology' (not to be confused with the philosophy of G. F. Hegel, who used the same term) and as such influenced many scholars, among them M. Heidegger, J.-P. Sartre, M. Merleau-Ponty, M. Scheler, E. Levinas, J. Derrida, and E. Coseriu. Husserl was born into a family of German-speaking Jews in the Moravian town of Prossnitz, then part of the Austrian Empire, now Prostějov in the Czech Republic. He moved to Leipzig in 1876 to study mathematics, physics, astronomy, and philosophy. He continued his studies in Berlin (1878–1881) and in Vienna, where he received his doctoral degree in 1883, at the age of 24. After attending Franz Brentano's lectures in philosophy in Vienna, Husserl moved to Halle, where he converted to Protestantism in 1886. In Halle he wrote his *Habilitation* thesis *Über den Begriff der Zahl* (1887) under Carl Stumpf, a student of Brentano, and became *Privatdozent* (1887–1901). His first published book, *Philosophie der Arithmetik. Psychologische und logische Untersuchungen* (1891), was based on that thesis and deals with the foundations of mathematics. Because of its psychologism, the book was reviewed very critically by Gottlob Frege. A decade later, Husserl himself was to refute psychologism in logic and philosophy once and for all in his influential *Logische Untersuchungen* (1900–1901). He became associate professor (1901–1906) and then professor (1906–1916) of philosophy at the University of Göttingen and eventually succeeded Heinrich Rickert as professor of philosophy at the University of Freiburg im Breisgau (1916–1928). He

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died in Freiburg in 1938. Husserl lost a son at Verdun during World War I; his second son, Gerhart Husserl, became a respected philosopher of law.

Although several of Husserl's manuscripts were published during his lifetime, often with the aid of assistants such as E. Stein, M. Heidegger, and E. Fink, most of his texts were published posthumously. After the publication of the *Logische Untersuchungen*, Husserl produced approximately 40 000 pages of shorthand manuscripts, which were rescued and transferred to Leuven (Belgium) shortly after his death, before the Nazis could confiscate and destroy them. (Today, there are Husserl Archives in Leuven, Freiburg, Cologne, New York, Paris, and Duquesne/Pittsburgh.) The manuscripts have been transcribed for publication since 1950 in the so-called *Husserliana* edition. They show that Husserl's thought evolved through various stages. From a philosophical and psychological account of the foundations of mathematics in the 1880s, he proceeded to a detailed elucidation of 'natural logic' and cognitive processes such as expressing thoughts, intentionality, abstraction, etc., around the turn of the century. During the first decades of the 20th century, Husserl's thinking broadened to encompass many important methodological issues, including the differences between realism and idealism, time consciousness, the genesis of logical categories out of everyday life experience, transcendental (Kantian) philosophy, and the relation between the individual and the community. Most texts of this later period were published only posthumously. The ambition grew in Husserl to present phenomenology as a general perspective from which all important philosophical problems could in principle be tackled. Finally, in the last stage of the development of his thought, Husserl set out to write a comprehensive critique of the pervasive objectivism and scientism he detected in the history of the sciences since Galilei, arguing that all scientific reasoning is founded – indeed necessarily rooted – in the human 'life world' (*Lebenswelt*).

Husserl's influence on 20th-century Western thought can hardly be overestimated. The primary reason for his lasting influence is the great variety of philosophical, epistemological, and logico-linguistic analyses that go hand in hand in Husserl's phenomenology. In addition, Husserl's work was and continues to be an impressive rebuttal of all kinds of amateurish philosophy. His credo that philosophy should be a 'rigorous science' ('Philosophie als strenge Wissenschaft' is the title of one of his most famous articles) still stands as a barrier to unfounded speculation, confused ideological reasoning, and superficial pseudophilosophy. If one looks at the more than 30 volumes by now published in the *Husserliana* edition, one is struck by the scope and breadth of Husserl's thought. Although many of his writings have, with hindsight, the character of introductions or preliminary assessments of particular topics and problems, together they constitute one of the most convincing modern syntheses of the theoretical rigor of the transcendental and idealistic tradition of German philosophy on the one hand, and an intellectual realism firmly rooted in empirical investigations of the mind and the foundations of human knowledge on the other. Husserlian phenomenology is above all an intellectual attitude, a way of 'doing philosophy' and of 'looking' at the world and the way human beings experience that world (the 'phenomena'). Its aim is to describe the conditions of common sense as well as scientific knowledge. To this end Husserl unravels the multiple relations between what is constituted through the activity of the mind and the ways the objects of knowledge present themselves through experience, thus accounting for what is rendered evident through the phenomena themselves (hence Husserl's famous call *Zu den Sachen selbst!* 'to the things themselves!'). In such a project, signs and processes of signification obviously play an important role, and Husserl must be credited with developing a thought-provoking theory of meaning that does justice not only to intentionality in general but also to some of the essential features of natural language and linguistic meaning.

Phenomenology can serve as an epistemological framework for all kinds of research within the field of the humanities, linguistics being no exception. Husserl's contribution to the philosophy of language and linguistic theory is unmistakable. Moreover, some of his findings in the phenomenology of meaning are still valuable. The central phenomenological concept is intentionality. For Husserl, consciousness is not a state of the mind but a dynamic attitude that always implies a 'directedness' toward some object(s) or state of affairs. In focusing on intentionality, the phenomenologist abstracts away from the accidental features of the phenomena he is considering and seizes what is essential to them (*Wesensschau*). This can be achieved, according to Husserl, by intuiting the objects **as** objects, i.e., as immanent parts of the intentional focus itself ('intuitive givenness'). Phenomenological 'reductions' of this kind have a number of remarkable consequences when applied to linguistics.

First of all, everyday language use is unveiled as being only a component part of complex cognitive and communicative processes in cultural contexts. In actual life, language is not given as a bare phenomenon but interwoven with acts of reference, knowledge of the world and culture, customs,

attitudes toward other speakers, associations, etc. Therefore, the study of language necessarily presupposes a reductive abstraction through which language proper can be distinguished from the innumerable concomitant aspects of language use; together all these aspects form the highly complex preliminary knowledge all language science is based upon.

Secondly, from a Husserlian perspective, meanings are to be distinguished from their (potentially infinite) instantiations in referential contexts because, unlike the latter, meanings are 'essences' or 'species.' Whenever a meaning is instantiated in a particular act of language use, the meaning itself is not present to the mind because consciousness is then focused on the object(s) or state of affairs referred to. Meaning is the necessary condition of the act of reference (cf. **Kant, Immanuel (1724–1804); Coseriu, Eugenio (1921–2002)**). On the other hand, it is irrelevant whether a particular object really exists or is a mere object of thought. As Husserl argues in the famous 'First investigation,' 'Expression and meaning' ('*Ausdruck und Bedeutung*') of his *Logische Untersuchungen*, "the object never coincides with the meaning." Conversely, entirely different 'ideal' meanings can be used to refer to one and the same object or state of affairs. Telling examples are *the victor of Jena* and *the vanquished at Waterloo* (both refer to Napoleon) or *a is larger than b* and *b is smaller than a*. There is one exception to the rule that meaning and reference do not coincide, though. This exception is, according to Husserl, the proper name. The meanings of appellative nouns (e.g., *horse* and *man*) are classematic, i.e., they designate classes and hence are potentially universal. Proper names, on the other hand, although also meaningful, are used to refer in a 'direct' way, not via lexical meaning. This means that whereas appellatives have a vast extension, proper names have only one extension, which is identical with their intension in a given speech act. Still, proper names can be equivocal because they can share one and the same form with other names (or words).

Husserl also emphasizes that not everything that a native speaker of a language interprets as absurd or nonsensical is actually meaningless. There is a clear distinction between ill-formed expressions that are indeed meaningless, like *a round or* or *a human being and is*, and expressions to which no object(s) or state of affairs are known to correspond but which nevertheless have a homogenous 'ideal' meaning, e.g., *a round square* and *all rectangles have 5 angles*. Such examples not only prove that meaning combinations in the Husserlian sense can be homogenous only if the individual meanings of the parts of an expression are compatible with one another; they also show that the objectivity of some intended meaning, and thus ultimately the truth of an expression (i.e., an utterance expressed on a particular occasion and intentionally directed toward one or more objects or states of affairs), depends on the phenomena in the world and cannot possibly be rendered by linguistic signs and significations alone (cf. **Plato and His Predecessors**).

Whenever Husserl talks about 'grammar,' 'expression,' 'meaning,' etc., he is dealing with abstractions, and he consistently refers to aspects of language in general, not to any actual language(s). Not surprisingly, Husserl was particularly sensitive to R. Descartes's and G. W. Leibniz's doctrines of a *characteristica universalis*, which Husserl partly tried to revive in his outline of a theory of 'pure grammar' (*Logische Untersuchungen*). There, Husserl is not so much concerned with what today's grammarians mean by 'grammar' (including 'syntax' and 'semantics') as with the structures of logical reasoning and their genesis in experience and consciousness, e.g., the structure of judgments of the form *S is p*, the difference between simple and complex meanings (*man* vs. *a man of iron*), etc. Crucially, however, such laws of logic can be assessed adequately only after one has tried to understand what 'meaning,' 'expression,' 'sentence,' etc., mean with regard to the signs of natural language.

See also: Coseriu, Eugenio (1921–2002); Kant, Immanuel (1724–1804); Plato and His Predecessors.

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Hymns

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Definition

The term 'hymn,' from Greek *húmnos*, means, in the broadest sense, 'song of praise,' directed especially to a deity. This type of song, which is connected to religious worship and responds to man's need to communicate with the divine, is typical of all cultures and later assumes a literary form. The most ancient hymns are Vedic, Sumerian-Babylonian, and Egyptian, dating from *ca*. 2000 B.C., followed chronologically by Greek, Latin and, related to the latter, though not exclusively, Christian hymns, which have continued down to the present time. In spite of the presence and importance of hymns in pagan culture, it is, without doubt, in Christianity that they occupy the most prominent place.

The object of the hymn, the deity (directly or indirectly), demands that the style of the composition be appropriate, in that the language used should be solemn and in verse, above all metrical, but also rhythmical. There are compositions with these characteristics, in prose, which pose the question of whether they can be truly considered hymns.

The structure of the hymns is generally tripartite: (1) invocation of the deity, often elaborated on by epithets; (2) praise of the deity; (3) concluding statement, accompanied by thanksgiving or petitioning of the deity. Christian hymns add a fourth part, the doxology or glorification of the Holy Trinity. In the case of Christian hymnody, the praise of the divinity can be done indirectly, that is, in hymns dedicated to the Virgin, saints and martyrs, divine mysteries, ecclesiastic feasts, and so on. In the study of structure, and especially of the religious language of hymns and prayers, the work of Norden (1913) remains fundamental. A comprehensive overview of pagan and Christian hymns can be found in the work of Lattke (1991).

Pagan Hymns

Greek literature offers a rich and varied selection of 'songs in praise of the gods and heroes.' These were composed in varying metrical versification, especially lyrical, and were often accompanied by musical instruments, such as the kithar or the aulos, by dancing, and with alternating modulation being predominant. However, not all were sung or composed in verse form. The most outstanding examples of Greek hymns are the Homeric Hymns; the lyrical hymns (e.g., the paean, a song to Apollo and the dithyramb, a song to Dionysus); the triumphal odes by authors such as Pindar; the hymns of Calimachus, or the Orphic Hymns.

In Latin literature, real hymns are rare; however, the role of Horace in subsequent hymnody would prove to be of great importance.

Christian Hymns

Early Christian 'Hymns'

Christian 'hymns' begin with the foundation of the Church. Early Christian communities, in their religious celebrations, sang their praises, following the Jewish tradition. These consisted mainly of psalms and canticles of the Old Testament (e.g., Vulg. Deut. 32: 1–43; Judges 5: 2–31; Judith 16: 2–21) and from the New Testament (e.g., Vulg. Luke. 1: 46–55; 1: 68–79; and 2: 29–32), to which the early Christians added, in the 2nd and 3rd centuries A.D., new hymns, based on Holy Scripture. For the most part, they were written in the Greek language, in prose, but

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of these little remains; some surviving examples are '*Dóksa en hupsístois*' (in Latin: '*Gloria in excelsis*'), '*Triságion*' and '*Phôs Hilarón*.'

Christian Hymns

Christian hymns, as such, appear in the 4th century A.D. with the twin aims of doctrine and apologetics, to defend the Christian faith from heresy. The precursor was St. Ephrem, in the East, who wrote hymns in Syriac; his example was followed by Gregory of Nazianzus (in Greek) and, in the West, by St. Hilary of Poitiers and St. Ambrose, the father of the Latin hymnody. These hymns were composed in stanzas, in the style of pagan poetry, and were sung in churches by the congregation. In the 4th century A.D., Prudentius composed hymns but with a different aim; his two collections of hymns (*Cathemerinon*, for the daily rounds, and *Peristephanon*, to the martyrs) were aimed at a select, learned public and are of a meditative nature.

From this time and throughout the Middle Ages, new writers appear who base their hymns on these models, but who also introduce new styles and content, ever enriching the hymnody. St. Augustine's definition of hymn (4th century: *Cantus est cum laude Dei* 'Song in praise of God'), which was valid at one time, must necessarily be broadened.

At first, these hymns were metrical, in verses, as in pagan poetry (especially iambic dimeter, the most popular, Sapphic stanza, trochaic and asclepiadic meter), but this slowly gave way to rhythmical poetry, which became the predominant form in the Middle Ages.

Hymns soon formed part of church liturgy in the Episcopalian churches of the East, as in monastic services in the West, where they were sung in antiphony during the daily liturgical hours by two choirs (*modulatio alternans*).

The majority of mediaeval Latin hymns are liturgical, some form part of Divine Office and others of the liturgy of the Mass. But there are also non-liturgical hymns such as those intended for personal meditation. This diverse and numerous body of hymns is collected in the fundamental work *Analecta Hymnica Medii Aevi*, by the Jesuits Dreves and Blume (1886–1922).

Some Latin hymnographers worthy of mention, not included *supra*, are Sedulius, Ennodius, Venantius Fortunatus, The Venerable Bede, Hrabanus Maurus, Notker Balbulus, Peter Abelard, Adam of St. Victor, or St. Thomas Aquinas.

During the Renaissance, the Humanists attempted to 'refine' the mediaeval rhythmical structure of hymns and to adapt them to the new Humanistic parameters, based on classical Latin (classical meters and elegant vocabulary *-latinitas-*), as well as composing new hymns. The contribution to hymnody brought about by, on the one hand, the Lutheran reform, and on the other, the Jesuits, must also be mentioned. With regard to the Roman Breviary, the reform carried out by Pope Urban VIII in 1632 was of great importance. In contrast to this reform, the Second Vatican Council (S.C. 93) determined to return the hymns of the Roman Breviary to their original form (cf. Lentini, 1968).

The tradition of Christian hymns continues to this day, especially in liturgical celebrations, and is common to all denominations.

See also: Bible; Christianity, Catholic; Christianity, Protestant; Hebrew, Biblical and Medieval; Prayer and Meditation; Religious Language.

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Hyponymy and Hyperonymy

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Hyponymy is the 'type of' relation among lexical items; for example *rose* is a hyponym of *flower* in that roses are types of flowers. In other words, if X is a hyponym of Y, then the extension of X is a subset of the extension of Y. Thus, we can say that hyponymy is a relation of inclusion. Its converse is hyperonymy (also called *hypernymy* or *superordinacy*); *flower* is the hyperonym (or superordinate) of *rose*. The term *hyponymy* is also used generally to refer to the relation that holds between a hyponym and hyperonym. While this relation is central to many theories of lexical organization, it is arguably not a lexical relation at all but instead a semantic relation that reflects the relations among the things words designate. Nevertheless, it is a central relation (along with incompatibility) in many theories of lexical organization. We can use an angle bracket (>) to indicate this relation between two expressions (e.g., *flower* > *rose*).

Hyponymy as a Paradigmatic Relation

Hyponym relations can be represented in tree structures, as in the abbreviated FRUIT taxonomy in Figure 1. The items in this tree can be considered to be parts of a hyponymic (or taxonomic) paradigm.

Note that the tree (and the relation itself) is asymmetrical, in that any word may have many hyponyms, but in most cases has only one immediate hyperonym. For example, *orange* has several hyponyms (*navel, Valencia, mandarin*), but each of these has only one hyperonym (*orange*), and it has only one immediate hyperonym (*citrus*), and so forth. Lyons notes (Lyons, 1977) that for some syntactic categories, hyperonyms are often of a different syntactic category than the hyponyms. For example, adjectives may have nominal hyperonyms, as in *emotion* > {*happy, sad, angry*}. Because hyponymy is considered to be a paradigmatic relation, and paradigmatic relations are generally defined as holding between members of the same syntactic category: Lyons dubs these cross-categorical relations *quasi-hyponymy*. But even in nominal taxonomies, we see some differences in syntactic categories at the highest levels. In Figure 1, while *citrus* can be used as a noun, it is more often used as an adjective (*citrus fruit*), as are the orange types (*navel, mandarin*) at the bottom extreme. And unlike the countable items at the basic level (*an apple, a pear*), *fruit* is in a non-count noun subcategory (*some fruit, a piece of fruit*). Such facts (in an otherwise straightforward taxonomy) raise the question of whether so-called hyponymy is the norm and thus challenge the notions that paradigmatic relations exist within specific syntactic categories and that hyponymy is a paradigmatic relation.

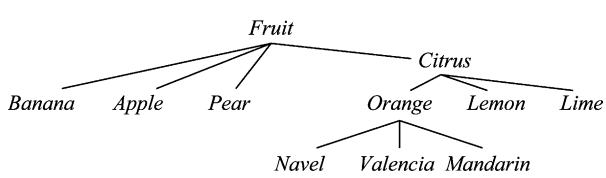

Figure 1 Hyponym relations in the FRUIT lexical field.

Another problem in defining and diagnosing hyponymy is that the natural language diagnostic 'X is a type of Y' is often in conflict with the set inclusion definition. For example, (1) is an odd statement, even though it is indisputable that the set of queens (in the 'monarch' sense of *queen*) is a subset of the set of women.

(1) ?A queen is a type of woman.

To get around these problems of definition, Cruse proposes that HYPONYM is a prototype-based category (Cruse, 2002). Taxonyms, hyponyms that felicitously occur in *type of* statements with their hyperonyms, are among the most prototypical cases of hyponymy in that they participate in entailment relations, and the extra specificity of the hyponym in relation to the hyperonym is central to the meaning of the hyponym. Other features of prototypical hyponym relations (such as *dog* > *terrier*) are directness of the relation (as opposed to *animal* > *terrier*, in which intervening levels have been elided) and sameness of non-denotative aspects of meaning/communicative function, such as register (i.e., as opposed to *pooch* > *terrier*). Such an approach accounts for the perception that some superordinate/subordinate relations are better examples of hyponymy than others.

Types and Properties of Hyponyms

Hyponymy, or at least taxonymy, is transitive, in that if X < Y and Y < Z, then X < Z. Such entailment relations contribute to classical syllogisms, as in (2):

(2) A terrier is a type of dog.
A dog is a type of animal.
∴ A terrier is a type of animal.

However, some items that pass the 'type of' diagnostic for hyponymy do not result in valid syllogisms, as in (3):

(3) A game console is a type of computer.
A computer is a type of office equipment.
A game console is a type of office equipment.

There are two problems with the second premise of (3) that result in the failure of the syllogism. First, the statement is only true when we interpret *a computer* as 'a (proto)typical computer'. So, *computer* in the second premise is defined using different criteria than in the first premise. The other problem here is that the *type of* relations in the two premises are not equivalent. The first premise tells us what a game console *is*, while the second one tells us what a computer *is used for*. While the first premise expresses taxonomic hyponymy (or *taxonymy*), the second is a case of functional hyponymy. Any term might have hyp(er)onyms of both types. For example, a dog can be both an animal (taxonomy) and a pet (function). The entailment relations in syllogisms are only reliably found with taxonomic hyponyms.

Hyponymy and Lexical Organization

Models of the lexicon often involve organization by semantic relation, as in network models (e.g., WordNet, Fellbaum, 1998) and semantic field theory (Lehrer, 1974). In such models, hyponymy is a key organizer of lexical items. The question arises, however, whether these relations are really relations among words (and hence should be represented in a modular lexicon) or if they are just relations among the meanings of the words or among the things that the words describe. Because hyponymy is most often defined as a relation of set inclusion, and because the sets involved are the extensions of the words, not the words themselves or their meanings (intensions), the necessity of representing hyponymy in the lexicon is called into question (Murphy, 2003). Instead, it could be said that the semantic relation of hyponymy is simply a linguistic reflex of the extensional relation of class inclusion. In this case, representing such information as lexical (i.e., specifically linguistic) information is redundant, as the information will already be available as part of our world knowledge. (This contrasts with the more arguably lexical relations of antonymy and synonymy.) Cruse's prototype-based approach above takes into account lexical issues (e.g., similarity of register) as well as the semantic issues. This is useful in metalinguistic discussions of'what's a good example of hyponymy', but again does not require direct representation in a lexicon because the relation between any two words is then derivable from the prototype model. Nevertheless, representation of hyponymy is useful in computational lexicons (such as WordNet) because the aim in these cases is to represent the knowledge base (including semantic relations) that makes using the lexicon meaningful.

Like computational lexicons, dictionaries rely heavily on hyponymy. The typical *genus-differentiae* structure of dictionary definitions involves giving a hyperonym (*genus*) of the defined word, then the means to differentiate the defined word from the set of hyponyms of that hyperonym. For example, *apple* might be defined as 'a (type of) fruit [*genus*], grown on a tree of the rose family, that is typically round and fleshy with thin red, yellow, or green skin [*differentiae*]'. Theories of lexical meaning that follow the model of dictionaries (i.e., in using semantic features or components, e.g., Katz, 1972) similarly give more detail in the representation of the meanings of hyponyms than in the representation of their hyperonyms. So, for example, the semantic representation of *apple* must access (either by inheritance or direct representation) all of the information in the semantic representation of *fruit*. In other words, the meaning of *apple* is the meaning of *fruit* plus some *differentiae*. However Wierzbicka (Wierzbicka, 1984) opposes this position, arguing that the meaning of *fruit* is more complex than that of *apple*. In her view, the word *fruit* does not (unlike *apple*) stand for 'a type of thing', but rather stands for a group of dissimilar types of thing. Therefore she argues that the meaning of *fruit* should encompass the meaning of *apple* (and *orange* and *banana*) rather than *vice versa*. See Bolinger (1992) for counterarguments to this position.

In conclusion, there's no doubt that class inclusion relations are central to cognitive processes such as categorization and reasoning. We use hyponym and hyperonym relations in defining words, and they are useful in creating coherence in discourse without repetition (so, we can refer to the same being as *Fido, the puppy, the dog, the terrier, the animal,* and so forth), and hyponyms and hyperonyms prompt each other in word association tests. Nevertheless, there is not clear evidence that the relation is a linguistic (lexical) relation rather than a cognitive-semantic relation (which reflects relations between referents). Still, the

class inclusion relation (if not the lexical relation of hyponymy) is central to most approaches to lexical semantic representation.

See also: Antonymy and Incompatibility; Extensionality and Intensionality; Lexical Fields; Lexicon: Structure; Meronymy; Paradigm versus Syntagm; Prototype Semantics; Synonymy.

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Iartseva (Figure 1) was born on November 3, 1906, in St. Petersburg, in the family of a mine engineer. In 1933, she graduated from the Leningrad pedagogical institute with a diploma for English teachers and took a postgraduate course at the Language and Thinking Institute (later on the Institute of Linguistics). There she studied languages of different genetic groups and got a thorough theoretical education under such outstanding scholars as V. M. Žirmunski, I. I. Meshchaninov, and L. V. Shcherba. Three years later, she received her candidate's degree for the thesis 'The development of complex sentences in English.' In 1940, she obtained a doctor's degree ('The development of the English verb') and became a scientific worker at the Institute. For many years, she headed the Department of Germanic Languages (1954–1988) and held the post of Director of the Institute (1968–1977). In 1968, she was elected Corresponding Member of the USSR Academy of Sciences.

Figure 1 V. N. Iartseva.

Iartseva's interests were on the theory and history of English, general linguistics, and Celtic studies. Her monographs dealing with different aspects of the history of English (morphology, syntax, the formation of literary language) have some specific features concerning the author's methodology, above all her approach to the subjects under investigation. Thus, the morphological structure of Old English is not analyzed from a traditional comparative-etymological point of view but described as a structure of the language of the period. Similarly, the development of a syntactic structure of the language is investigated mostly through structural changes affecting various types of word-combinations, not sentences, because word-combinations are considered to be basic units of language. When analyzing structural changes in English, she took into consideration the interrelationship between categories of different levels and viewed the changes in the context of more general problems. With respect to the development of literary language proper, she paid much attention to the formation of its dialectal basis and to stylistic and genre varieties of the language in their historical succession throughout the territorial and dialectal divisions of England.

The knowledge of many different languages acquired in her postgraduate years accounts for Iartseva's interest in typological problems. She wrote on the definition of a language type, on principles of classification of the world's languages, on methods of comparative and contrastive investigation of languages. In her book *A contrastive grammar* (1981), she came to the conclusion that 'small subsystems' within separate levels of language, especially grammatical subsystems that are formally and semantically correlated, should be taken as the basis for comparative investigation of typologically different languages.

About Celtic studies, she wrote on syntactic and morphological peculiarities that distinguish languages of the group from other Indo-European languages and qualified them as innovations, not as a product of the substratum influence. Her teacher in Celtic studies was Professor A. A. Smirnov, and after his death, she was for some time the only specialist in

this field in her country. At present, many people studying Celtic languages are her pupils.

Iartseva was one of the most active and inspiring personalities among the linguists of her generation in Russia. She was an initiator and chief editor of the multivolume encyclopedia *Languages of the world* (1993–2007), whose books contain descriptions of different groups of languages carried out in accordance with unified typological schemas (14 volumes will be published by 2005, 6 are in preparation). Another project of the kind undertaken on her initiative is the encyclopedia *The languages of Russia and adjacent states* in three volumes (2000–2005). She was also chief editor of *The linguistic encyclopedic dictionary* (1990). Under her supervision, eight conferences were held on problems of Germanic studies, attended by linguists from all regions of the Soviet Union (1956–1988). Iartseva took part in several International Congresses of Linguists as a member of the Executive Committee. In the years of the Cold War, she came into contact with Professor W. P. Lehmann and other American colleagues. Their cooperation brought about a series of conferences on urgent issues of linguistics (typology, semiotics, problems of reconstruction).

Besides research, she was active in lecturing, and at different periods of her life, she was chief of chairs of English philology, Germanic studies, and foreign languages at the universities of Leningrad, Moscow, and Sverdlovsk.

See also: Lehmann, Winfred Philipp (b. 1916); Shcherba, Lev Vladimirovich (1880–1944).

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Ibn as-Sarra-j, Muhammad ibn al-Sari- (d. 929)

Z Taha, American University in Cairo, Cairo, Egypt

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Abou Bakr Muhammad Ibn Sirry is known as Ibn as-Sarraj. The name as-Sarraj is related to the profession of making *suruuj* 'saddles.' He lived in Baghdad and died in 316/929. Ibn as-Sarraj was a student of Mubarrad, Zajjaj, and al-Farabi and started his own class shortly after the death of Mubarrad. He studied logic and music extensively. Several philosophers and logicians admired his style in presenting the information in his books, especially the one entitled *Al-Usul fil nahw*.

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According to Jamil Allush (1981: 161), the book entitled *al-mujaz* was published in Lebanon in 1965. However, the one book that attracted the attention of very few linguists until now is *al-uSul fil nahw*, which appeared for the first time in 1985.

Ibn as-Sarraj's contributions were especially in the areas of *qiyas, 9illah, and ishtiqaq*. Like all Basran grammarians, Ibn as-Sarraj was notorious for being very strict in *qiyas*. He started a new 'school,' which branched off the main Basran school and called it *madrasat al-qiyas*. After his death, Siyrafi and Ibn Jinni were successively in charge of it. Ibn as-Sarraj criticized Sebawayhi for trying to find a rule to every example that was *masmù* (heard). Ibn as-Sarraj called for discarding such irregularities even though they were "heard, said." For him they were irregularities, and he called the other grammarians to discard them (Dayf, 1983).

There has been a controversy over the content of his book *al-uSul fil naHw*. Later grammarians such as al-Anbari and Ibn Jinni argued that *al-uSul Fil naHw* was only a book on grammar rules. Other grammarians think that *al-uSul* was truly a book on the origins of *naHw*. Some of the supporters were Mohammad Eid, Shawqi Dayf, and Mohammad Amer, in addition to the editors of Ibn Jinni's *Sirr al-Sinàa*.

Perhaps his most pioneering contribution was in the area of syntactico-semantic analysis of the verbal sentence. Ibn as-Sarraj divided verbs into 'real' and 'unreal,' according to the meaning they convey and the morphological features they bear. He approached the concept of transitivity from an original standpoint, where he regarded the direct object of any verb to be an essential part for the meaning of the utterance to be complete. Unfortunately, what he introduced in that respect was not picked up by later grammarians, but rather by linguists such as Al-Jurjani and Ibn Jinni, who looked into the relationship between language and rhetoric.

See also: Arabic; Transitivity: Stylistic Approaches.

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Ibn Ezra, Abraham (ca. 1089–1164)

A Gianto, Pontifical Biblical Institute, Rome, Italy

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Abraham Ibn Ezra, grammarian, biblical commentator, poet, philosopher, and astronomer, was born in Tudela in 1089 (some suggest the year 1090 or 1092) and died in 1164 in an unknown locality. He lived in Spain, mostly in Cordoba, until 1140, when he moved, spending long sojourns in Italy (Rome, Lucca, Mantua, Verona), then France (Narbonne, Béziers, Rouen, Dreux) and England (London), and back to Rome via Narbonne.

Enjoying high esteem in Orthodox Judaism as one of the most important authors of biblical commentaries, Ibn Ezra wrote on almost every book in the Hebrew Bible. His interpretations show the influence of Neoplatonism and are often rationalistic. His commentary on the Pentateuch, finished shortly before his death, is one of his most important and authoritative works. His *Yesod Mora* explains the Biblical commandments with some Neoplatonic ideas. He also wrote a number of treatises on mathematics, astronomy, and astrology, such as *Sefer ha-Eḥad,* dealing with the peculiarities of the numbers 1–9, *Sefer ha-Mispar,* or *Yesod Mispar,* on

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arithmetical questions, and *Luḥot,* which contains astronomical tables. Ibn Ezra's 260 poems are included in his *Diwan*, which also contains the mystical composition *Ḥai ben Mekits* in rhymed prose. In addition to those found in the *Diwan*, he wrote many other poems with religious or secular themes. No work by Ibn Ezra in Arabic has been preserved, although he was known to be perfectly familiar with that language.

Though he did not bring many original insights into the Hebrew language, Ibn Ezra is certainly one of the fathers of Hebrew grammar. His greatest contribution lies in making available the best results of earlier Jewish philologists who wrote in Arabic. It was also Ibn Ezra who introduced European scholars to the triliteral theory of roots, the relation between Hebrew and Arabic, and the basics of poetical meters based on the works of Hayyuj hitherto known only in the more restricted circles of Arabic-speaking scholars.

Ibn Ezra's best-known philological work is *Moznet Leshon ha-kodesh,* also known as *Moznayim*. It contains clear explanations of the grammatical terms used in Hebrew grammar. His best grammatical work is *Sefer Tsaḥut,* which also contains a brief outline of modern Hebrew meter. His *Sefer ha-Yesod*, or *Yesod Dikduk*, is extant only in manuscript. *Safah Berurah* is a treatise on the Hebrew letters. The short monograph on numerals *Yesod Mispar* contains an appendix on the Babylonian-Hebrew system of marking the vowels.

See also: Hebrew, Biblical and Medieval; Ibn Janah (ca. 990–1050); Luzzatto, Samuel David (1800–1865); Saadya Gaon (882–942); Semitic Languages.

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The exact dates of Ibn Janah's life are unknown. Presumably he was born at Cordoba sometime between 985 and 990 and died in Saragossa in the first half of the 11th century. He was trained in letters in Lucena, where he also studied medicine and became a skillful physician.

While practicing medicine, he cultivated a great interest in the study of the Bible and the Hebrew language. In 1012, due to some unhappy political circumstance, Ibn Janah and a number of his colleagues had to leave Cordoba. After a considerable period of wandering Ibn Janah settled in Saragossa where he wrote all his works. In that city he also created a center of learning for younger pupils to discuss scientific questions in a free atmosphere. It was for them that he started to write. The traditional circles of Talmudic scholars in Saragossa were sometimes hostile to his approach. Ibn Janah was known to criticize their narrow-mindedness and ignorance, which, as he said, they tried to hide under a mantle of piety. He defended his own efforts by appealing to the example of the Geonim and of the teachers of the Talmud.

The *Kitāb al-Tanqīḥ* (Book of Minute Research) is Ibn Janah's chief work. The work, which is written in Arabic, discusses the Bible and its language, and was the first complete exposition of Hebrew vocabulary and grammar. It does not contain any discussion on vowels and accents which belong to Masoretic works. Yet this work is a rich mine of information on Biblical syntax, rhetoric, hermeneutics, and exegesis. The book has two parts, the first dealing with grammar and the second with lexicography. Each of these parts has a separate name and appears as a separate book. The first part is called *Kitāb al-Luma'* (Book of Many-Colored Flower-Beds). It is preceded by a very interesting grammatical introduction to the entire work and was translated into Hebrew by Judah ibn Tibbon (who translated *Luma'* by *Rikmah*). The second, that is, the lexicographical part of the work, *Kitāb al-Uṣūl*, also has a special introduction. Judah ibn Tibbon also translated it into Hebrew (*Sefer ha-Shorashim*).

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by the aid of the science of language, the endeavor to comprehend them from all sides becomes a more imperative duty the higher the end aimed at and the more our reason recognizes the greatness and majesty of Him who has revealed these books."

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Ibn Jinni (d. 1200)

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Ibn Jinni was born ʔabu ʔa-fatħ ʕuθmān ʔibn Jinni ʔal-mawsʕilliy (320–392 H/932–1002 A.D.) The two foundational schools of Arabic linguistics were the so-called Basrah and Kuwfah schools, which originated in the 8th century. Their founders, or their most prominent members, were Al-Khalīl (100–175 H/719–791 A.D.) and Sībawayh (140?–180 H/757–796 A.D.) for the Basrah school and ʔal-Kisāʔi. (119–189 H/737–805 A.D.) and ʔal-farrāʔ (144–207 H/761–822 A.D.) for the Kuwfah school. The two schools differed in their approaches to linguistics, and in time the theories of both were spread and practiced at emerging centers of linguistic studies. The Baghdad school of linguistics was one such direct and logical extension, which began more or less on the Kuwfah track of linguistics, with proponents from that school as its leading luminaries, and eventually included representatives of the Basrah school among its ranks. Overall, the members of each school borrowed or followed the arguments of one or the other school as they saw fit, or went their own separate ways and on their own track from the mother schools when they could propose deeper or more compelling arguments for their positions.

Ibn Jinni is at the heart of the Baghdad school of linguistics. He was born in Mawsʕil, in northern Iraq, and got his name 'Jinni' from his Greek father. At age seventeen, he joined the circle of ʔabu ʕaliy ʔal-fārisy (288–377 H/901–987 A.D.), the most prominent linguist of his time, who remained his teacher and mentor for the next 40 years. He traveled with him wherever he went and recorded a great deal of his comments, observations, and sayings, and was also a commentator on some of his writings. He quoted him often under the name of ʔabu ʕaliy, just like Sībawayh quoted Al-Khalīl. The relationship of Ibn Jinni to ʔal-fārisy is parallel to that between Sībawayh and Al-Khalīl. ʔal-fārisy was a fifth-generation linguist after Al-Khalīl, since he was taught by ʔal-mubarrad (210–285 H/825–898 A.D.), who was a fourth-generation linguist after Al-Khalīl of the Basrah school of linguistics. Though he favored the opinions and analyses of the Basrah school of linguistics, referring to the members of the school as *ʔasʕħābunā* 'our associates,' he also sided with some of the opinions and analyses of the linguists of the Kuwfah school, in addition to having his own. This melding was characteristic of the Baghdad school.

Ibn Jinni was a versatile linguist. He was not confined in his interests to linguistic analysis of Arabic, but was a poet in his own right, a man of literature, in addition to his linguistic work in phonetics, morphology, syntax, and semantics in their broad conceptions. He was a friend of the poet Mutanabbi (354 H/965 A.D.) and wrote a commentary on his poetry, as he did on the poetry of another poet, Abu Nuwwās (200 H/815 A.D.). His linguistic orientation veered towards that of the Basrah school, as he referred to the members of the school, in particular Sībawayh and Al-Khalīl, as *ʔasʕħābunā* 'our associates.' He had great interest in words, specifically, lexicon and morphology. To show his great interest in morphology, he wrote a multivolume commentary called *ʔal-munsʕif* on the treatise on *Tasʕriyf* 'derivation' by ʔal-māziniy (249 H/863 A.D.). But Ibn Jinni, despite his deference to his mentor and teacher and the school of linguistics he belonged to, was his own man in linguistics. He was the leading linguist of his generation, and his treatises are monuments to the linguistic literature of Arabic.

The breadth of his linguistic knowledge is reflected in his books. Although it is not possible to touch

by the aid of the science of language, the endeavor to comprehend them from all sides becomes a more imperative duty the higher the end aimed at and the more our reason recognizes the greatness and majesty of Him who has revealed these books."

See also: Hebrew, Biblical and Medieval; Ibn Ezra, Abraham (ca. 1089–1164); Luzzatto, Samuel David (1800–1865); Saadya Gaon (882–942); Semitic Languages.

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Ibn Jinni (d. 1200)

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His book *tasˤriyf ʔal-muluwkiy* 'The royal morphology,' is a treatise that delves in detail into the derivational processes of language, examining both simple and complex morphological forms and the processes that they are subject to. This was, in its way, a follow-up on his commentary on Al-Mazini's treatise. His most ambitious and comprehensive book is *ʔal-Xasˤāʔisˤ*, a work of 162 chapters, which fully displays his linguistic knowledge, his depth of understanding of linguistic issues, the breadth of his vision of Arabic grammar, and the novel manner in which he approached old problems with new and fresh understanding. Here one must mention, by way of example, one of the key issues that he discussed in the book in a new fashion: *ʔal-ʔištiqāq ʔal-ʔakbar* and *ʔal-ʔištiqāq ʔal-ʔasˤɣar* 'the major derivation' and 'the minor derivation.'

ʔal-ʔištiqāq ʔal-ʔasˤɣar 'the minor derivation' involves taking a form, say a tri-radical form like S-L-M, and deriving all the forms from this root without varying the sequential ordering of the three radicals, trying to find the commonality of meanings in all of them. For example, one takes the meaning of *salāmah* 'wholeness/peace' from all its derivations, e.g., *salima* 'he was safe', *yaslamu* 'he is safe', *sālim* 'safe', *salām* 'peace', and so on. The underlying notion is always maintained. *ʔal-ʔištiqāq ʔal-ʔakbar* 'the major derivation' involves taking the six different possible combinations of the three radicals, e.g., of Q-W-L: *q-w-l, q-l-w, w-q-l, w-l-q, l-q-w, l-w-q*, and trying to find a common intent not only in all six but also in all their respective derivations, in the same manner as the common intent was found in one in the minor derivation. This is more complex and demanding; in the case of this root, the commonality is lightness and speed. One can see the challenges that he posed for himself in such tasks. Ibn Jinni is a leading linguistic luminary of the 10th century.

See also: Al-Khalil (8th Century A.D.); Arabic Linguistic Tradition; Sibawayhi (8th Century A.D.).

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Ibn Mada'al Qurtubi (1120–1196)

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Ibn Madˤāʔ was the Arab Spanish linguist ʔabu ʔal-ʕabbās ʔaħmad ʔibn ʕabd ʔal-raħmān ʔal-laxmiy ʔal-qurtˤ ubiy (513–592 H/1120–1196 A.D.). One must trace the Arabic linguistic movement from its origins to its many destinations if one is to appreciate the issues that different linguists addressed. Its history is quite clear overall: Its origins are clearly the Basrah and Kuwfah schools of the 8th century, where the procedures of data analysis and the nature of valid linguistic data from the Qurʔān, the poets, and dialectal authenticity were set. Although modified over time, these approaches were never abandoned, only enhanced by subsequent generations of linguists. The spread of linguistic doctrines from the Basrah and Kuwfah schools to Baghdad, the center of power and the center of patronage, was natural. In the Baghdad school of linguistics, both schools found adherents, and also were integrated by judicious selection of what was found to be the more compelling in the two schools. Integration and innovation became the hallmark of the Baghdad school. ʔal-fārisy (288–377 H/901–987 A.D.) and Ibn Jinni (320–392 H/932–1002 A.D.), master and disciple, are typical representatives of this school.

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The spread of this linguistic movement followed in the heels of Arab military and political conquest westward, all the way to Spain. In Spain, language analysis in the eastern part of the Abbasid Empire (132–648 H/750–1250 A.D.) was nurtured and vigorously followed. By the 10th century, the Spanish school of Arab linguistics was as dynamic and creative as the schools in the East, especially in Baghdad. Their interests in language mirrored in each other many aspects, although differences existed due not only to the progress in reflection and research on Arabic but also to geography and contacts. Linguists from the East traveled to Spain; and linguists from Spain traveled to the East to study with the masters and then return with their cargo of books and knowledge to the centers in Spain. Linguistic studies, from lexicon to grammar and the other aspects of the language, had reached maturity of development, and serious linguists were beginning to take sides not only on issues, which they had always done in declaring their linguistic allegiance and linguistic preferences, but also on the more critical aspect of analysis and its overall value, say, to the wide use of the *ʕāmil* 'operator' and the teaching of the Arabic language. What one finds in Ibn Madˁāʔ reflects some of the anxiety that comes with the overburdening of the discipline with extra, although necessary, theoretical and other refinements and that seem to go beyond the interest or the comprehension of the ordinary linguist, language teachers, or learners.

Ibn Madˁāʔ favored simplification; one might say he was on the side of the learner, favoring doing away with much of the bewildering theoretical explanations for example, the complexity of reasons for this aspect or that, or the cause of this or that, or the cause of the cause of the same, and so on. He was not only on the side of simplification, but he also had theoretical reservations about what others were saying and doing. He thought he had a solution to the complexity of analysis offered by the ʔal-Naħawiyyuwn 'the grammarians/syntacticians,' and he laid it out in his little treatise called *ʔal-Radd ʕala ʔal-Naħawiyyiyn* 'A refutation of (the) syntacticians,' which attracted and still attracts much attention.

Ibn Madˁāʔ focused on some of the syntactic notions that he wished removed from linguistic discourse. For example, he took issue with linguists from Sībawayh (140?–180 H/757–796 A.D.) to Ibn Jinni on the question of inflectional variation in words as due to a set of *ʕawāmil* 'operators.'

Sībawayh had connected inflectional variation to the presence of the operator; Ibn Jinni elaborated on this, saying that it extended to the speaker doing the act of speech. This led Ibn Madˁāʔ to push it even further and say that God really is the ultimate operator, since the speech of the operator has ceased when one is at the point of articulating the affected item. In sentences like *ʔinna zaidan* (*ʕāqilun*) 'Indeed Zaid is intelligent,' by the time one begins to pronounce 'Zaid,' the operator *ʔinna* has ceased to exist, so it cannot be the cause of the case expression. Since the operator is not always overt/present, Ibn Madˁāʔ concluded that it is not really the cause of variation and one can do away with it. This is the type of argumentation that Ibn Madˁāʔ used to dispose of understood or implied operators in discourse and their implications in being the causes, whether approximate or remote, of the inflectional variations due to syntactic operators.

The approach of Ibn Madˁāʔ was to caricature the positions of other linguists to make them easy targets for his attacks. One would be remiss in not pointing out a similar clash between philosophy and religion at the time. This negative attitude towards operators is all the more curious when one recalls that Ibn Madˁāʔ, the antagonist of causes and operators, was a contemporary of Ibn Rušd (Averroes) (1126–1198), the renowned commentator on Aristotle's philosophical works, the definer and promoter of causes and causality in understanding the reality of things. The attack of Ibn Madˁāʔ parallels the case of ʔabu ħāmid ʔal-ɣazāliy (1058–1111), a Baghdad jurist and theologian, who mounted a similar attack against philosophy and philosophers in his book *Tahāfut ʔal-falāsifah* 'The incoherence of philosophers,' to which the Spanish Ibn Rušd, a jurist and philosopher, responded in his *Tahāfut ʔal-tahāfut* 'The incoherence of incoherence.' This really was an age of high intellectual achievement and the age of challenges and counter-challenges, and Ibn Madˁāʔ, among all the linguists, was very much in the spirit of the age.

See also: Arabic Linguistic Tradition; Ibn Jinni (d. 1200); Sibawayhi (8th Century A.D.).

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Ibn Si-na (980–1037)

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ʔibn Sīnā (his full name is ʔabuw ʕaliy ʔal-Husain ʔibn ʕabd ʔal-lāh ʔibn Sīnā), is known as Avicenna in the West. He was born in (370H/980 A.D.) in Xarmayθen near Bukhara in modern day Uzbekistan. It is universally acknowledged that ʔibn Sīnā was a man of genius with abundant energy and creativity that he poured into his voluminous contributions to many areas of knowledge. His *kitāb ʔal-šifaʔ* ('The book healing') is the first and the most thorough summa of knowledge ever composed by a single person. It includes all the branches of knowledge, from philosophy and theology to the natural and mathematical sciences. His *ʔal-qānuwn fiy ʔal-tˤib* ('The canon of medicine') is the most renowned medical treatise in the history of medicine. Its 12th-century translation into Latin became the textbook in many European universities in subsequent centuries. There are at least 100 authenticated texts attributed to him and, within a larger sphere of attribution, over 250 items. It is a matter of record that, in addition to his scholarly efforts and output, he was involved in politics, which might partially explain his frequent moves and changes of patronage and political allegiances, as we are reminded in his autobiography (Gohlman, 1974). The miracle of ʔibn Sīnā is that despite all his restlessness; his move from place to place; his changes of patronage; and his sybaritic, bachelor style of life, he managed to write and accomplish so much original work in many fields of knowledge, as indicated in Afnan (1958).

Among all of this superabundance, his linguistic contribution is seldom pointed out. There is a reference in his autobiography to an embarrassing episode where his linguistic competence in Arabic was challenged in the presence of his patron. As a result, he dedicated three years to the study of the language and wrote then a book *lisān ʔal-ʕarab* ('The Language of the Arabs'). (Gohlman, 68–70). The work has been lost. The only linguistic treatise that has come down to us is his *Risātat ʔasbāb ħuduwf ʔal-ħuruwf* ('Treatise on the causes of the occurrence of letters'), written at the request of his patron, ʔemir ʔabuw mansˤuwr ʔal-ʤabbān. Both the conception and execution of this treatise are remarkable. We have no evidence that there was any scientific and objective research on phonetics at the time of ʔibn Sīnā, but he wrote a fully articulated treatise, in six chapters, that includes all aspects of phonetics, as the titles of its chapters indicate: 1. On the cause (*sabab*) of the occurrence (*ħuduwf*) of sound (*is awt*); 2. On the cause (*sabab*) of the occurrence (*ħuduwf*) of letters (*ħuruwf*); 3. On dissection (*tašriyħ*) of the (*ħanʤarah*) larynx and the tongue (*lisān*); 4. On the detailed causes (*asbāb*) for each (*ħarf*) letter of the letters (*ħuruwf*) of the Arabs; 5. On the letters (*ħuruwf*) that are similar (*sabiyha*) to these letters (*ħuruwf*), but are not in the language (*luɣah*) of the Arabs; 6. On the fact that these letters (*ħuruwf*) may be heard in other than articulatory motions (*ħarakāt nutˤ qiyyah*).

This is the first treatise that speaks of phonetics in such an original and holistic manner until our times, almost 10 centuries later. Reflecting on the manner and matter of this treatise, one regrets all the more the loss of *lisān ʔal-ʕarab* ('The language of the Arabs') and its treasure of linguistic insights into Arabic by this man of genius. ʔibn Sīnā died in Hamadān in 1037.

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Iceland: Language Situation

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Icelandic, the national language of the Republic of Iceland, is spoken by a population of about 280 000. It is the language of government, politics, civil administration, religion, education, the press, and the media. Specialist scientific periodicals tend to use English as their official language. In schools and in institutions of higher education, Icelandic is the official language of instruction. The level of literacy throughout the country is extremely high (almost 100%).

Since 1999 the first foreign language to be taught in Icelandic schools is English. Before that it was Danish.

Among domiciled immigrants to Iceland, who make up a very small proportion of the population, the foreign languages that are most in use are English, Danish, Swedish, and Norwegian (Norwegian Nynorsk). As a result of emigration from southeast Asia in the late 1970s, there is a small group of Vietnamese speakers in Iceland.

Icelandic is spoken natively outside Iceland only by expatriates, who currently number about 17 000 and use it for social purposes only. The majority of such speakers live in Canada and the United States, but there are a few hundred each in most West European countries.

See also: Norse and Icelandic.

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Icelandic *See:* Norse and Icelandic.

Iconicity

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Iconicity is the idea that a formal property in a sign corresponds through similarity to a property of its referent. The idea was entertained and then rejected by Plato in the *Cratylus*. Plato's conclusion was restated by Saussure as "*l'arbitraire du signe*" and has been a mainstay of all versions of structuralism, including notably generative grammar (cf. Hockett, 1960; Chomsky, 1969). Most standard textbooks dismiss the topic with examples of individual words: *whale* is a small word for a large animal; *microorganism* is a large word for a small one; QED. The relationship between form and meaning is considerably more interesting than this once we analyze complex signs and sign systems using the notion of diagrammatic iconicity introduced by Peirce (1932), or indeed, Saussure's closely related notion of motivation. A diagram is an attenuated icon if the relationship among its parts in some way approximates the relationship among the elements to which these parts refer. Standard examples of the apparent diagrammatic iconicity of language then include the universal principle of isomorphism, which as a cognitive principle is largely responsible for the operation of grammatical analogy (i.e., "One form should correspond to one concept"). This can be thought of as the iconicity of paradigms. Other standard examples that correspond more to Saussure's motivation include the semantic compositionality of *dix-neuf* and other compounds; Behaghel's first law ("physical closeness corresponds to conceptual closeness";

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cf. Bolinger, 1975; Bybee, 1985; Haiman, 1985); several apparently universal ordering principles, such as the order of clauses in a narrative (*I came, I saw, I conquered*; cf. Jakobson, 1965) or in conditional constructions (protasis precedes apodosis; cf. Greenberg, 1966) corresponds to the conceptual or real-time order of the states to which the propositions refer; and the various uses of repetition and reduplication (cf. Moravcsik, 1978), such as XX typically means plurality, distributivity, iterativity, or emphasis of whatever is denoted by X. This type of motivation can be thought of as the iconicity of syntagms.

It is now widely recognized that systematic correspondences do exist between linguistic diagrams and extralinguistic reality, but the nature of these correspondences is often debated. Following Zipf (1935), it is now acknowledged that a principle of least effort is involved in the creation of linguistic structures, such that familiar, frequently mentioned and unsurprising concepts tend to be given reduced expression. We talk about cars and TV rather than automobiles and television, and there is no language known in which the words for *man* and *woman*—for all the inexhaustible fascination, mystery, and complexity of their referents—are seven-dollar words. It even seems that we consciously control the contrast between fuller and more reduced expressions of the same phonetic strings, depending on whether they are formulaic or novel (Van Lancker and Canter, 1981; Van Lancker, Canter, and Terbeek, 1981), or on whether they are to be interpreted as common nouns or anaphors (Haiman, 2003).

In some cases, the relationship between the reduction (and opacity) of a form and its predictability can be scalar, with different points along a linguistic continuum corresponding with different points along a conceptual continuum, exactly in accordance with an elaboration of Zipf's principle. A striking example is a correlation discovered and defined by Givon (1985) that seems to have considerable cross-linguistic validity: the length and complexity of an anaphoric expression will tend to covary with the remoteness in discourse of its antecedent, all the way from a full noun phrase down to zero. Givon considered this to be an iconic covariation, although the Zipfian motivation for the pattern is apparent.

Challenges to the principle of iconicity today take two forms. The first approach consists in demonstrating that many examples of iconicity in the literature (including possibly all variations on the markedness principle that "more form corresponds to more meaning") can be reduced, like Givon's principle, to economically motivated reductions, the basic principle being to give lesser expression to what is familiar or predictable. For example, the third-person singular of verbal and nominal paradigms is frequently zero. It could be that this is an icon of the third person as "the absent one" (cf. Benveniste, 1946), but it could be an economically motivated reduction of the most frequently occurring case. Iconicity would then be purely incidental, an epiphenomenal consequence of another drive.

The second approach consists of acknowledging the possible importance of iconicity in primitive signaling between speakers who share no common conventions—perhaps speakers of different languages, perhaps primitive speakers of the first human languages (cf. Grice, 1989: 358, whose insistence that "every artificial or non-iconic system is founded upon an antecedent iconic system" is an expression of this view)—but then emphasizing that through conventionalization iconicity will be very rapidly lost. First come charades and onomatopoeia (indeed, common sense makes us ask what other means there might possibly be at speakers' disposal), but, once speakers share a common culture, all the conventional features of normal grammar will rapidly appear in their communication, sometimes within a matter of minutes (cf. Bloom, 1979). Although it may seem like no more than common sense that speakers will find it easier to store and process icons than symbols (Givon, 1985), there is little solid evidence that has been adduced in support of this contention. In fact, Benveniste (in linguistics) and Berger and Luckmann (in culture) have recognized that people tend to accept whatever they are familiar with as perfectly natural and to reject all alternatives as alien and barbaric (cf. Anderson, 1990). Motivation, in this view, derives entirely from conventions that are "always already there." In a way, the argument from convention is related to the argument from least effort because much of the opacity of conventions results from streamlining. But this argument is one that should make the analyst even more skeptical about the possibility of encountering iconicity in any recorded language. If iconicity can be lost within 15 or 20 minutes in a contrived encounter, then what are the chances we will encounter it in languages that have been spoken for any longer than this time? To survive at all, it must be constantly recreated.

To counter such reasonable skepticism, it is necessary to demonstrate that iconicity is an independent and currently productive drive in the genesis of linguistic structures. The constant operation of analogy and the rarity of perfect synonymy may be taken as

evidence for the psychological reality of isomorphism or the iconicity of paradigms ("one form corresponds to one meaning"). The iconicity of syntagms is a different matter.

The best evidence for the psychological reality of motivation is the fact that where there are competing structures with roughly the same meaning, speakers will tend to select the form that corresponds to the specific meaning they prefer on the basis of motivation. Stock examples are the contrasts between *hair* (mass noun) and *hair-s* (count noun) or between *kill* and *cause to die* (cf. Wierzbicka, 1980, 1985). But it could be argued that the choice between preexisting structures is not the same as the creation of novel ones and thus provides at best pale evidence for the reality of motivation.

It may seem that the tension between iconic and economic or Zipfian motivation may be a straightforward one that reflects the competition noted by Passy (1890) and von der Gabelentz (1891) between the drive for clarity, on the one hand, and the drive for ease, on the other. Cases such as Givon's topic accessibility hierarchy and the motivation for the reduced expression of anaphors in general indicate that often the same formal contrasts may have one interpretation here and another one there.

Another example explicitly dealt with by Haiman (1985) is the contrast between light and heavy versions of the reflexive in a number of unrelated languages, including English. Given that there exists a conceptual contrast between introverted actions that people typically perform on themselves (verbs of grooming, dressing, and change of posture) and extraverted actions that they more typically do unto others, the Zipfian principle of economic motivation predicts that the light form of the reflexive is used where the verb is introverted, whereas the heavy form is used where the verb is extraverted. This is borne out in English and in almost all the languages where the light/heavy distinction for reflexives exists:

I shaved.
I kicked myself.

But there is another conceptual contrast that the same morphological distinction expresses. Light reflexives are typically middles or impersonal passives, that is, one-participant activities (cf. Langacker and Munro, 1975; Haiman, 1976). Heavy reflexives never function as impersonal passives because the heavy reflexive morpheme (typically a separate nominal expression) marks a second participant. Thus, the contrast between the next two sentences.

I got up.
I got myself up.

The strong sense of reflexives such as *I got myself up* in English is of a divided or alienated self. In this particular sentence, the subject denotes the will, the object the flesh. In languages that form their impersonal passives via a reflexive construction, such as Russian, the contrast is:

videt-sja
see-3.SING.REFL
's/he is seen, is visible'

videt sebja
see-3.SING self
's/he sees him/herself' (as in a mirror)

The sense of a divided self is, admittedly, weak in textbook cases of reflexivization involving mirrors (person vs. image of person), but recurs with overwhelming frequency in natural discourse, which is filled with descriptions of people who force themselves to do things they do not want to do, pat themselves on the back, feel proud of or sorry for themselves, hate themselves for their weakness, and so forth (cf. Haiman, 1998: Chap. 5, and the references cited there). Exactly the same formal contrast (light/heavy reflexives) can be iconically or economically motivated.

The light reflexive participates in another contrast, between intransitive and transitive verbs that involve a change of state. In those cases in which the verb root for related transitives and intransitives is the same, there are a number of possible means of expressing the contrast via derivational affixation (see Table 1). Sometimes one language will make the intransitive the basic form, while another language makes the transitive the basic form for the same verb. Thus in English, the verb *bear* (a child) is basically transitive, and the intransitive is the derived passive *be born*. In Turkish, the verb 'be born' is basic *dog-*, and the verb 'bear' is the derived causative *dog-dur-*. But the contrast is not an entirely random one. Zipfian considerations of economy lead us to expect that typically verbs that are generally performed on others will have the bare stem in the transitive and a derived mediopassive in the intransitive, whereas verbs that

Table 1 Affixation and transitivity

Intransitive	*Transitive*
Bare stem	Bare stem + causative
Bare stem + reflexive passive	Bare stem

are conceived of as spontaneous actions will more typically occur in the unmarked form in the intransitive, with a derived causative for the transitive. This is what Haspelmath (1993) found to be the case in a survey of 31 verbs in 21 languages – some complex derived expression (the anticausative) is favored for the intransitives formed from verbs such as *break*, where it is more probable that an outside force brings about the event. Conversely, actions such as *freeze,* which typically occur without an outside instigator, can be made transitive by the addition of some causative. So, the contrast is exactly parallel to that between introverted and extroverted reflexives, and is a function of purely economic principles: reduced expression is given to the predictable.

The presence of Iconicity can most clearly be demonstrated when it comes into conflict with economy and trumps it. Such cases are well known and leave no room for ambiguity. The most striking examples come from the expression of symmetry. Haiman (1985) showed that in Hua (Yagaria), the expression of reciprocity, a symmetrical relationship, cannot be given by a reciprocal pronoun (there are none) nor by straightforward sentential coordination because the structure S1 + S2, as in many Papuan languages, exhibits a morphological asymmetry between the first (medial) and the second (final) clause. The medial verb occurs with two verbal desinences M (medial) and A (anticipatory), which agree with the subject of S1 and S2, respectively, whereas the final verb occurs with a totally distinct F (final) desinence, which agrees with the subject of S2 alone. The morphological asymmetry of the verbal desinences (verb of S1 = V + M + A; verb of S2 = V + F) reinforces the syntactic asymmetry of order, so that a coordinate sentence such as S1 ['Max hit Harry'] S2 ['Harry hit Max'] can mean only something like 'Max hit Harry and thereupon/therefore Harry hit Max'. The problem of reciprocal symmetry is solved in Hua by making the second verb also into a medial verb whose M desinence agrees with the subject of S2 and whose A desinence agrees with the subject of S1. The whole coordinate construction, which models a closed ring, is treated as a nominalization that occurs with a light final verb that agrees with the subject of S1 + the subject of S2.

ebgi-ga-na	ebgi-ga-na ha'e
hit-3.SING.M-3.SING.A	hit-3.SING.M-3.SING.A do.3DL.F
'they hit each other'	

where DU indicates Dual. There is a more economically motivated way of saying this, which consists of stripping both the medial verbs of their personal desinences and nominalizing the verb stems by affixing the glottal stop:

ebgi-'	ebgi-' ha'e
hit-NOM.	hit-NOM. do.3.DL
'they hit each other'	

The latter does justice to both iconicity and economy, but the first satisfies iconic imperatives alone.

In the same way that we need to distinguish iconic from economic motivation, we have to separate iconically motivated symmetry of this sort from other cases that seem to be motivated by yet other drives. The drive for symmetry without iconic motivation is abundantly attested in a number of Southeast Asian and Oceanic languages. There is an enormous literature on this topic, some of which is summarized in Fox (1988). A particularly striking (if modest) example from English, first noted by Alan Cruttenden, is the phenomenon of radio announcements of tied scores, for example, *Sussex 2, Essex 2*. From the point of view of information structure, both scores are new information and should be read with the same intonation as *Sussex 2, Essex 3*. Yet they are not, with the paradoxical result that listeners hearing only *Sussex 2*... can turn off the radio because they already know the score. It is probable that announcers seeing the symmetrical segmental structure XY ZY before them assign it a (cognitively inappropriate but esthetically motivated) noniconic symmetrical intonation XyZy.

Because the results of an iconic imperative are constantly being eroded by other drives, and compromised in any event by the natural limitations of the one-dimensional auditory medium of language, cases in which it is nevertheless apparent are heuristically useful. A routinely exploited heuristic consequence of the principle of isomorphism is that recurrent cross-linguistic identity of form between two or more grammatical constructions must be a reflection of a perhaps unsuspected semantic commonalty; for example, such a commonalty is exhibited by protasis clauses in conditional sentences and sentential topics, whose semantic identity is now widely recognized (cf. Podlesskaya, 1992). A parallel heuristic consequence of the principle of motivation is that when a given construction recurrently exhibits formal symmetry, this formal symmetry is a reflection of possibly unsuspected conceptual symmetry; such a pattern is exhibited by the protasis and apodosis clauses of counterfactual conditional sentences, and a plausible semantic account for this symmetry has been offered by Haiman and Kuteva (2003).

Given that iconicity is widespread in human languages and given that the forces of conventionalization

immediately attack and destroy iconicity, the central problem is accounting for the fact that it nevertheless endures. For this to be so, it is not enough to suggest that iconicity was the original state of some conjectured proto-language. Rather, iconicity must be constantly created. Although it has been optimistically proposed that there are cognitive motives for iconicity, no evidence has ever been presented that iconic forms are easier to store or to access than symbolic ones. This suggests that an essentially esthetic impulse (perhaps simply the impulse to reproduce a given structure) is responsible for the creation of iconic forms (cf. Haiman, to appear).

See also: Iconicity: Theory; Ideophones; Motivation and Attitude in Second Language Learning; Naturalism; Productivity.

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Iconicity, Sign Language

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'Iconicity' is a term coined by C. W. Morris (1901–1979; *see* **Morris, Charles (1901–1979)**) that designates the measure of similarity between a sign and the object to which it refers (Bussmann, 1996: 215). The nature of this relation has been discussed and debated since antiquity. Jakobson (1990) traces the crucial question of iconicity's role in language, whether language attaches form to content by nature (*physei*) or by convention (*thesei*), to Plato's dialogue *Cratylus*. Socrates, the moderator of this debate, tends to think that representation by similarity is superior to the use of arbitrary signs but in the end tends to accept the position that conventionality plays a major role in language.

In American linguistics, Dwight Whitney (1827–1894; *see* **Whitney, William Dwight (1827–1894)**) also came down on the side of convention and was instrumental in a worldwide acceptance of the definition of language as a system of arbitrary and conventional signs. Perhaps the most influential linguist on this topic was Ferdinand de Saussure (1857–1913; *see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**), who, following Whitney, maintained that "the bond uniting the signans with the signatum is arbitrary" (Saussure, 1916: 67).

Linguists in the functionalist and cognitive schools often regard iconicity as an essential feature of language (Haiman, 1985). Givón's iconic imperative states that "all other things being equal, a coded

experience is easier to store, retrieve and communicate if the code is maximally isomorphic to the experience" (Givón, 1989: 97). Croft regards iconicity as a major type of external motivation for linguistic structure. In his view, the operating principle of iconicity is that "the structure of language reflects in some way the structure of experience, that is to say, the structure of the world, including (in most functionalists' view) the perspective imposed on the world by the speaker" (Croft, 1990: 164). Croft's view, which emphasizes the speaker's cognitive construal of the world, is compatible with modern cognitive linguistic theories, in which iconicity plays a major role.

Iconicity in Signed Languages

Signed languages, because of their visual modality, are particularly rich in iconicity. Much of the early work on American Sign Language (ASL), while it recognized the pervasive presence of iconicity, devoted its attention more to reducing the significance of iconicity than to studying what it tells us about grammatical structure. For example, studies examined the loss of iconicity over time in the lexicon (Frishberg, 1975), demonstrated that iconicity does not appear to play a role in language acquisition (Meier, 1980), and concluded that iconicity does not aid in the processing of signs (Klima and Bellugi, 1979).

Recent research has called into question some of these claims about the role of iconicity in signed languages. For example, Grote and Linz (2003) addressed whether the form of signs influences a signer's representation of the semantic domain of a sign's referent, particularly in the case of iconic signs. They hypothesize that the iconic relationship between a sign and its referent is not created purely via a likeness but is the result of "a mentally constructed correspondence between two cognitive products" (25). In one experiment investigating iconicity, deaf signers of German Sign Language, hearing speakers of spoken Standard German, and hearing bilinguals (Standard German/German Sign Language) were presented with a German Sign Language sign or a Standard German word, followed by a picture, and were asked to decide whether there was a semantic relationship between the two. Some of the pictures represented the iconic base of a German Sign Language sign, such as the beak of an eagle. Other pictures represented semantic features unrelated to the iconic base of a sign, such as the claws or the wings of an eagle. Finally, some pictures were completely unrelated to the sign or word they were paired with. Grote and Linz found that the deaf and hearing signers were faster to respond to pictures of the iconic base of a sign than to pictures that depicted other semantic features of the sign's meaning. Interestingly, the same pattern of results was found when the bilinguals were tested in Standard German.

Despite studies of this nature, the role of iconicity in signed language grammar is still quite controversial. An indication of how far the rejection of iconicity in grammar has gone is exemplified in Valli and Lucas (1995: 7), who note that while iconicity is present in the lexicon, iconicity "will not provide much insight into the interesting relationship between SIT and the noun CHAIR, and other noun-verb pairs. Nor will [iconicity] help explain how the movement of SIT can be modified to mean SIT FOR A LONG TIME (slow, circular movement) or SIT ABRUPTLY (short, sharp movement)."

Wilcox (2004) argues that the grammatical categories of noun and verb in ASL noun-verb pairs do exhibit an iconic relation. Nouns profile a bounded region in space both semantically and phonologically. Verbs profile phonological movement in space; semantically, movement in space is a prototypical example of a process, a defining property of the category 'verb' (Langacker, 1987). The descriptions of the two aspectual verb forms are striking in how transparently they demonstrate the iconic relation between meaning and form: slow, circular movements indicating the durative form and short, sharp movements indicating the punctual form.

Even those linguists who did acknowledge iconicity generally accepted that it played little role in the grammar of ASL. Klima and Bellugi (1979), for example, while recognizing the "two faces of signs: the iconic face and the encoded, arbitrary face" (70), concluded as follows:

> The iconic face does not show at all in the processing of signs in immediate memory. Historical change diminishes the iconic properties of ASL signs; some signs become more opaque over time, some completely arbitrary. (79)

Further, Klima and Bellugi claimed that the grammar of ASL works to override or submerge the inherent iconicity of signs:

> Grammatical operations that signs undergo can further submerge iconicity. Thus many signs, while having their roots deeply embedded in mimetic representation, have lost their original transparency as they have been constrained more tightly by the linguistic system. (34)

Using a cognitive iconicity analysis, Wilcox (2004) came to a different conclusion, arguing that although iconicity erodes in the lexicon, it emerges in the grammar. Cognitive iconicity is based on the theoretical model of cognitive grammar (Langacker, 1987), which claims that both semantic and phonological structures reside within a language user's conceptual

space. The typical case for language is that the semantic and the phonological poles of symbolic structures reside in distant regions of conceptual space. This great distance in conceptual space is the basis for Saussure's contention of "*l'arbitraire du signe*." Alternatively, when the phonological and semantic poles of signs reside in the same region of conceptual space, arbitrariness is reduced. According to the cognitive iconicity model, iconicity is regarded as a distance relation between structures that reside in multidimensional conceptual space (Gärdenfors, 2000). Cognitive iconicity thus is defined, not as a relation between the form of a sign and the real-world referent, but as a distance relation within our multidimensional conceptual space between the phonological and semantic poles of symbolic structures.

Cuxac (1999) adds the important notion of iconic intent. According to his model, iconicity is split into two subbranches according to whether or not it serves to represent experience iconically. The standard lexicon is composed of signs "without iconic intent." Cuxac calls signs formed with iconic intent "highly iconic structures" and regards these to be a highly distinctive feature of signed languages. Several types of highly iconic structures are identified, including transfers of size and form, transfers of situation, and transfers of person.

Several researchers have explored the link between iconicity and metaphor. According to Taub (2001), what is unique about signed languages is the way that iconicity and metaphor combine to create a "double mapping." In spoken languages, a metaphorical expression maps language about a concrete domain onto an abstract domain. In a signed language, the iconicity of the source-domain signs can be directly manipulated such that metaphorical expressions are a combination of (1) an iconic mapping between the source domain and the articulators and (2) a metaphorical mapping between the source domain and the target domain.

Also examining the relation between metaphor and iconicity, Bouvet (1996) investigated the semiotic basis of iconic signs in French Sign Language and argued that in many cases, the relationship between a sign and its referent is grounded in metaphorical projections of embodied, iconic representations. Bouvet demonstrated how signs for abstract concepts reveal a metaphorical projection of the conceptual domain onto the domain of the human body.

Iconicity in signed languages is receiving more research attention than ever before. In addition to studying iconicity as an instance of conceptual mapping, researchers have begun to examine its relationship to other cognitive processes, such as metaphor and metonymy (Brennan, 1990; Taub, 2001; P. Wilcox, 2000; Wilcox, Wilcox, and Jarque, 2004) as well as variation in iconicity by discourse context (Russo, 2004).

It appears that our understanding of the relation between *signans* and *signatum* greatly depends on the data that are studied. Historically, linguists based their understanding of the extent and theoretical significance of iconicity on data derived entirely from spoken languages, which led to the conclusion that iconicity was not an essential feature of the language system. Functional studies changed that view, leading Haiman (1980) to conclude that the structure of thought reflects the structure of reality to an extent greater than previously thought.

When data from signed languages are considered, iconicity becomes a far more common phenomenon with broad implications for our understanding of language and cognition. Wilcox (2004), for example, suggests that iconicity is symptomatic of an underlying unity of phonological and semantic space as domains within our conceptual space and that iconic congruence across these domains emanates from a common conceptual system that underlies and structures linguistic form and meaning.

See also: Cognitive Linguistics; Iconicity: Theory; Metaphor and Conceptual Blending; Metonymy; Morris, Charles (1901–1979); Saussure, Ferdinand (-Mongin) de (1857–1913); Sign Language: History; Whitney, William Dwight (1827–1894).

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Iconicity: Theory

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Iconicity Precedes Conceptual Signs

Starkly put, iconicity comes about through some resemblance between something and something else, and a sign is iconic if there is some resemblance between that which represents and that which is represented. But problems immediately arise, and they can be properly addressed only with some qualification of a sign as iconic.

Charles Sanders Peirce's semiotic theory in its most basic form specifies three different sign types – icons, indices, and symbols – and these are correlated with his three categories of the world's processes and of mental processes, Firstness, Secondness, and Thirdness. These three categories are briefly defined as follows:

1. Firstness *is* what *is*, and has not (yet) entered into any interrelation with any *other*. In this sense, it is no more than possibility. An icon, in and of itself, is a sign of Firstness: it is what it is, insofar as some resemblance between it and something else has not (yet) been foregrounded. (Examples: a triangle as an icon of some mountain, or a cloud formation as an icon of waves breaking when they head toward a beach.) Notice that there is neither foreground nor background: there is no more and no less than that which is.
2. Secondness *is* what *is*, insofar as it bears some interrelation with some *other* that it *is not*, though that interrelation has not (yet) been foregrounded by some potential interpreting agent. Secondness is actuality or existence, whether in the mind or in the physical world. An index as a sign chiefly of Secondness is something interrelated with something else by a physical or presumably 'real' interaction with that something else. (Examples: smoke and fire, a cup and its content, an arrow and what it indicates, or a thermometer and air temperature.) Notice that the interrelation involves interaction that is a matter of causality, contiguity, container–contained, or part–whole. Notice also that the index is a sign of some *particular* existent mental or physical world entity, and does not (yet) evince the idea of a general class of entities of which the sign could potentially be a sign.
3. Thirdness *is* what *is*, insofar as it brings about (mediates) an interrelated interaction between something and something else in the same way that it enters into the same interrelated interaction with that something and that something else. Thirdness entails mediation of something and something else by a third entity, leading to some motivated or otherwise potential or necessary interpretation. A symbolic sign is something that

Iconicity: Literary Texts

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Introduction

Definition

In a general sense, semiotic iconicity may be defined as form miming form as when pictures or photographs reflect an object in the real world. In a language context, a 'sign' (which may be a word or an assemblage of words) is said to mime the object or thought that the sign refers to when something in the sign (be it oral/aural or visual) reflects something in the object that is signified by it (its 'referent'). More generally, it can then be said that the sign mimes its meaning. The term 'iconicity' goes back to Morris who introduced it in his *Signs, language, and behavior* in 1946. Traditionally, the iconic sign has been divided into three hypo-icons, namely **image**, **diagram** and **metaphor**. Although all three hypo-icons play a significant role in natural as well as literary language, metaphor has been much more extensively discussed and mainly outside the context of iconicity (*see* **Metaphor: Stylistic Approaches**). Metaphor is also different from the other two hypo-icons in that there is no 'direct' iconic relation between the sign and its referent. Instead, it is based on a proportional analogy, whereby an existing sign x is extended to include a new, metaphorical referent because of a semantic analogy between the original referent α and the new one β. In other words, there is no direct relation between the level of form and referent, neither an 'imagic' one nor a 'diagrammatic' one. The differences can be represented as follows, in which $\updownarrow$ indicates an iconic relation, and $\neq$ a symbolic one:

image	*diagram*	*metaphor*		
sign	mapping of signs	sign x	$\rightarrow$	sign x
$\updownarrow$	$\updownarrow$	$\neq$		$\neq$
referent	mapping of referents	referent α	$\leftrightarrow$	referent β

This definition of iconicity is a strictly semiotic one. Nöth (2001) further differentiates between **exophoric** and **endophoric iconicity** (sometimes also called first- and second-degree iconicity). Whereas exophoric iconicity consists primarily in form miming an object or thought as we perceive it in the world, endophoric iconicity refers to a sign miming another sign (thus being purely intralinguistic); involving, in other words, the repetition of a sign. Even though endophoric iconicity is concerned with resemblances between signs, and not between the sign and the referent, such a repetition is only considered of literary interest when used with effect, i.e., when it adds extra meaning to the text.

Next to the **icon**, there are two other types of signs, the **index** and the **symbol**. The index is, like the icon, motivated, but not by resemblance to its referent but by relations of contiguity or causation. The symbol is a conventional sign, and its relation to the referent is arbitrary. It has to be noted that these three categories are not sharply delineated, symbols often develop out of motivated signs, and many icons also have an indexical relation with their referent (cf. White, 1999).

Image versus Diagram

'Images' or 'imagic icons,' that is, signs whose form is related to the referent by means of a 'natural' similarity, are often said to be exceptional in (spoken) language and restricted to a category of acoustically imitative words labeled 'onomatopoeic,' e.g., 'meow,' 'cuckoo.' (In visual language, i.e., in written and especially in signed language, the 'image' plays a larger role.) For this reason, structuralist and formalist linguists since de Saussure have underestimated the importance of iconicity in language. However, as most notably R. Jakobson (1971) kept pointing out, things begin to look different when C. S. Peirce's crucial distinction between the 'image' and the 'diagram' is adopted. In Peirce's taxonomy of signs, an iconic image is a single sign that resembles its referent with respect to some visual or aural characteristic. An iconic diagram, however, is an arrangement of signs, none of which necessarily resembles its referent but whose relationships to each other mirror the relationships of their referents. Thus, in Caesar's famous phrase '*veni, vidi, vici*,' the sequence of individually symbolic words presents an iconic diagram of the sequence of actions it enumerates.

Although conceding the arbitrary or 'symbolic' nature of the individual linguistic sign in isolation, a number of linguists in Jakobson's wake have emphatically drawn attention to the near universality of diagrammatic iconicity in the grammars of various languages, expressing not only chronological sequence, but also centrality versus peripherality, distance versus proximity, symmetry, quantification, etc. It is in the nature of literature to exploit all linguistic forms and, hence, also all iconic possibilities for aesthetic purposes.

History of Iconic Criticism of Literature

Whereas the study of iconicity in everyday language has become an accepted part of modern linguistics,

this is less the case with the literary uses of it. Because of an uninformed reduction of the notion of iconicity to that of imagic signs only, a restricted field of investigation offered itself to literary criticism along iconic lines. Thus, traditionally, the main objects of iconic investigations by literary scholars have been the literary use of onomatopoeia and sound symbolism, on the one hand, and of typography in pattern poetry and modern visual poetry, on the other. The presence of iconic diagrams in literary texts has been largely ignored. These mainly occur on the level of morphosyntax and discourse, although they also may be present on the phonemic and typographic level. Once we have recognized the diagram as an iconic sign, too, the presence of iconicity in literature becomes pervasive.

A large number of iconic studies of literature formed an integral part of books on stylistics. Already Spitzer had discussed iconic aspects in some of his stylistic studies, notably in *Linguistics and literary history* (1948), as did Davie (1955), Ullmann (1964), Hollander (1975), Epstein (1975), and Leech and Short (1981). Wimsatt (1976) made a strong plea for more research along iconic lines. Nänny (1986) offered an early survey of iconic aspects of literary texts. Attridge (1982: 287–295) studied iconic functions of poetic rhythms; Cureton (1980, 1986) analyzed the poetry of e. e. cummings from an iconic point of view. Anderson (1998) has presented the most comprehensive survey of iconic features in literary texts so far. Important recent studies of iconicity in literature can be found in the publications that have resulted from the international conferences on 'Iconicity in language and literature' (see the series edited by Nänny and Fischer, 1999; Fischer and Nänny, 2001; Müller and Fischer, 2003; Maeder *et al.,* 2005); evidence for this entry is partly based on the articles collected there.

Interpretation

Especially in literature, language has a surplus of meaning and works "at full stretch" (Nowottny, 1962: 85) by being 'hypersemanticized' (Cureton, 1980: 319) and consisting in a mixture of 'digital' and 'analogical' coding (Bernhart, 1977: 87); therefore, the perception of iconic features depends on the reader's awareness and readiness to recognize, so to speak, the analogical structure behind the digital surface form. As with metaphor, the awareness of iconicity is dependent on the recognition of similarity. Although texts have a range of potential iconicity, this is merely latent. As Givón (1985: 190) writes, "the notion of 'similarity' between two entities requires the *consciousness* of similarity on the part of some cognizing mind." Hence, iconicity, like beauty, is in the eye of the beholder: the perception of imitative form depends on the reader's capacity to see connections, to perceive similarities between the meaning of a sign or text and the formal means used for its expression.

However, not all iconicity is of the same degree. Icons may be divided into 'transparent' and 'translucent' ones (Pateman, 1986). That is, transparent icons are immediately recognizable (these often concern 'images'), whereas translucent ones (usually the more abstract diagrams) need a more careful scrutiny and some imagination. Thus, the transparent icon may be compared to an (explicit) simile, whereas the translucent icon is more like an (implicit) metaphor. In both cases, the reader or hearer is helped by the fact that iconicity is 'foregrounded.' As Haiman writes (*see* **Iconicity**): "The fundamental iconic nature of markedness is a virtual cliché: marked form corresponds to marked meaning."

The question of whether an iconic feature, be it imagic or diagrammatic, is the result of chance or of the poet's design has little relevance. What is important is that a similarity between form and meaning may be perceived intersubjectively. It is important to recognize that iconicity in literature is in the main semantically motivated. The semantic content of the verbal unit or its context has to activate and focus the normally latent mimetic potential. So most iconic interpretation moves from meaning to its formal miming (with the possible exception of 'phonetic metaphors' discussed later), although it is, of course, the form that provides the impetus. What is generally true of any sign is also true of the icon: the meaning of a sign is not fully contained within it but arises only in its interpretation. In short, an iconic dimension will only appear if the meaning of the textual passage is compatible with it. Because the recognition of iconicity is via the mind of the hearer/reader, it also must be clear that the categories of image and diagram are not always clear-cut. Although the imagic icon seems closer to 'reality,' it is still always an abstraction of it. In the diagrammatic icon, the similarity is only in the mapping, the signs themselves no longer reflect any actual features of the referents.

Iconicity in Poetry, Prose, Drama

It may be said that in terms of literary genres the presence of iconicity is highest in poetry, for poetry allows the most complex and innovative use of language in terms of sound and space (typography). According to one important literary tradition even, the Mallarmé-Valéry version of what Roland Barthes called 'Cratylism,' the mimetic or iconic virtue of

language is an especial privilege of poetry: it constitutes the poetic function proper and is seen as a compensation for and defiance of the arbitrariness of the sign. Prose, however, whether descriptive or narrative, offers a wide potential of iconic signification too. Literary works whose narrative is organized by means of the spatial order of a journey or the temporal sequence of a chronology are sequential diagrammatic icons of a comprehensive kind. Drama, being a literary genre that directly mirrors meaning by visible and audible action, gestures, costumes and stage-scenery provides fewer opportunities for the application of verbal iconic functions. Its relative lack of iconicity can perhaps also be explained by the fact that there is not enough time for the audience to grasp its effect; this is particularly true of diagrammatic icons. However, it is well known that, for instance, Shakespeare's plays are heavily iconic.

Imagic Iconicity

The Sound Level

The use of **onomatopoeia** (i.e., acoustic iconicity) and **sound symbolism** in literary texts, especially poetry, is widespread and common. A famous, often quoted example can be found in Lord Tennyson's *The princess* (vii, 202–203):

> The moan of doves in immemorial elms
> And murmuring of innumerable bees

The repetition of the nasals /m/ and /n/ in these two lines (12 occurrences!) suggests the continuously humming sound of "innumerable bees." All the words of the excerpt are, semiotically speaking, symbols by definition, except possibly 'murmur.' But most of them share the hypo-iconic quality of the onomatopoeic image. Thus, J. C. Ransom's famous parodic rendering of the second line as "the murdering of innumerable beeves" is beside the point because in this version there is no longer any miming of meaning: beeves do not hum.

Another interesting passage occurs in William Wordsworth's 'An evening walk' (ll. 143–150):

> How **b**usy the **e**normous hive with**in**,
> While Echo da**ll**ies with the va**r**ious **d**in
> **S**ome, hardl**y** heard their chi**s**sel's **c**linking **s**ound,
> **T**oil, **s**mall as **p**igmies, **in** the gu**lph** **p**rofound;
> **S**ome, **d**im betwe**en** th'aere**a**l **c**liffs **d**escr**y**ed,
> O'erwalk the viewless **p**lank **f**rom side to side;
> These by the **p**ale-blue **r**ocks that **c**easeless **r**ing
> Glad **f**rom their ai**r**y ba**s**kets ha**ng** and **s**ing.

Throughout this excerpt the high, bright, tense, and continuous sounds (given in bold) made by the clinking chisels in a Welsh slate quarry are onomatopoeically rendered by means of a repetition of the relatively high vowels /I/ and /i/ and the fortis plosives /t/, /p/, and /k/, in combination with sharp voiceless fricatives: /s/, /θ/, /f/, and 'singing' nasal and liquid continuants such as, /n/, /m/, /ŋ/, /r/, and /l/.

Onomatopoeia and sound symbolism are not separate phenomena but, rather, form a continuum. Onomatopoeia usually refers to complete acoustic signs, whereas the term sound symbolism is often preserved for **phonaesthemes**, i.e., iconic phonemes or phoneme clusters within the word. The above examples are closer to sound symbolism. A good example of a purer use of onomatopoeia is Eve Merriam's poem 'Weather.' Both onomatopoeia and sound symbolism are affected by the limitations of the phonological system of each individual language, but, in addition, sound symbolism is also influenced by language conventions (many phonaesthemes may be the product of endophoric rather than exophoric icons, cf. A. Fischer, 1999) and by social and cultural attitudes within a speech community. (For a list of sound symbolic icons. An interesting reference to the literary-critical use of sound symbolism is found in a passage from Alexander Pope's *An essay on criticism* (ll. 365–371), whose famous first line explicitly postulates an iconic connection between sound and meaning, which it exemplifies in the succeeding lines:

> The *Sound* must seem an *Echo* to the *Sense*
> *Soft* is the Strain when *Zephyr* gently blows,
> And the *smooth Stream* in *smoother Numbers* flows;
> But when loud Surges lash the sounding Shore,
> The *hoarse*, *rough Verse* shou'd like the *Torrent* roar:
> When *Ajax* strives some Rock's vast Weight to throw,
> The Line too *labours*, and the Words move *slow*.

Thus, in the first three lines the heavy accumulation of fricatives and nasals/liquids reinforces the idea of soft breezes and murmuring streams and echoes the idea of smoothness. Sound symbolism may also work syllabically or across the word, as is clear from the last two lines in the extract from Pope, where Ajax's labor is described in monosyllabic words with awkward consonant clusters either as part of the word ('Aja**x**,' '**str**ive,' '**thr**ow'), or across the word (Aja**x-str**, ro**ck's-v**, va**st-w**, wo**rds-m**).

The Visual Level

Alphabetic letters whose outlines mirror the contours of objects represent iconic images in the normal, visual understanding of the word 'image.' Examples of such letter-icons can be found in Shakespeare's reference to the circular Globe Theatre by the letter-metaphor "this wooden O" (*Henry V*, 'Prologue,'

l. 13) or in John Donne's use of the uppercase letter 'A' as an icon of what a pair of contemporary compasses looked like in "A valediction: forbidding mourning" (ll. 25–26): "If they be two, they are two so/**A**s stiff twin compasses are two." In *Absalom and Achitophel* (Part II, ll. 457–463) John Dryden uses the capital letter 'O' as a translucent icon for the corpulence of the Irish poet Thomas Shadwell, whom he gives the round biblical name 'Og.' A large number of letter-icons is also found in concrete poetry and particularly in the poetry of e. e. cummings, who uses the letters 'O'/'o' for the moon in his 'mOOn Over tOwns mOOn' (*CP* 383) or for a pair of eyes in "l oo k-" ('i will be,' *CP* 195).

Visual outlines of objects have often been created by the typography of **pattern poems** in order to suggest an iconic image of the object the text refers to (wing, flask, cross). The tradition of shaped poems goes back to the ancient Greeks and has had revivals in the Middle Ages, Renaissance, 17th and 20th century. George Herbert's poem 'The altar,' whose boundary evokes a classical altar, and his 'Easter wings' offer famous typographic icons. In modern times, a number of visual or concrete poems have iconic contours of objects: poets such as Apollinaire, the futurists (e.g., Marinetti), J. Hollander, E. Morgan, and many others have written shape poems.

Typographic iconicity may also be conveyed by absence rather than presence. Wolf (2005) shows how **blanks** can be used to suggest silence, as in this short poem 'Schweigen' ('Silence') by Eugen Gomringer:

schweigen schweigen schweigen
schweigen schweigen schweigen
schweigen schweigen
schweigen schweigen schweigen
schweigen schweigen schweigen

Another example of a meaningful blank or white line may be found in Emily Dickinson's poem 'Our lives are Swiss,' in which the blank line between the two stanzas suggests the white "solemn alps" between Switzerland and Italy.

Diagrammatic Iconicity

The Sound Level

Among the most frequent iconic diagrams used in poetry are **rhythm** and **meter**. As is all too familiar, poets have reinforced meaning through sound by controlling the speed and movement of their lines. They do this not only by their selection and arrangement of vowels and consonants, their disposition of pauses, but also by their choice and use of meter and rhythm. This enables poets to express feelings iconically (such as mourning and joy) but also slow and fast movements generally, for instance, galloping in Tennyson's 'The charge of the light brigade.' Conventional poetic metrics may be put in the service of iconicity as well. A somewhat unusual iconic use of the metrical mould of the heroic couplet can be found in Dryden's 'To the Memory of Mr Oldham,' ll. 3–4:

For sure our Souls were near ally'd; and thine
Cast in the same Poetick mould with mine.

The 'Souls' of the deceased young poet Oldham and of the older poet Dryden are actually and formally combined in the mould of the same couplet here (additionally foregrounded by the fact that 'mine' and 'thine' rhyme). But in order to emphasize his view that Oldham was a rougher poet, Dryden makes the second line, representing Oldham's line ('thine/Cast'), somewhat irregular (by means of a trochaic beginning) and less mellifluous (because of five voiceless plosives: **Cas**t, **po**et**ick**).

The repetition of sounds by means of **assonance**, **rhyme**, and **alliteration** may serve diagrammatic purposes. In the passage from Wordsworth's 'An Evening Walk' quoted earlier, the echoing of sounds, "Echo dallies with the various din," made by the clinking chisels is diagrammatically rendered by means of the repetition of the sharp and brief /I/ sounds. Quite generally, echoes are often diagrammatically mimed by a repetition of sounds and words. This is done, for instance, in Wordsworth's lines from '"Yes! It was the mountain Echo"' (ll. 1–4):

YES, it was the m**oun**tain Echo,
Solitary, clear, prof**ound**,
Answering to the sh**ou**ting Cuckoo,
Giving to her s**ound** for s**ound**!

In general, sound repetition foregrounds the phonetic link between two signs thereby foregrounding also a semantic link. The link only works when it is marked; in other words, in poems in which the use of rhyme or alliteration is conventional or follows a conventional scheme, the devices in question do not normally serve an iconic function (cf. Hollander, 1975: 121). Although rhyme usually works on the phonetic level, it has to be noted that rhyme may also work typographically, when poets make use of 'eye-rhymes.'

Most rhymes are based on a combination of phonic similarity or identity and semantic difference. As the poetic (nonconventional) device of rhyme links words in a nonsyntactic way, it may produce new semantic equations and correlations. Perfect

single rhymes, for instance, may be icons of resemblance or unity (cf. the 'thine/mine' rhyme in the couplet from Dryden, discussed earlier), whereas the dissonance of imperfect single rhymes may diagrammatically express disorder, dissimilarity, inaccuracy or even negation, but also doubt and uncertainty. For instance, in 'The first book of Statius his Thebais' (ll. 115–117), Pope makes use of an off-rhyme ('bear'/'prepare' – 'War') to suggest discord ('mutual Hate and War'):

> Go, and a Parent's heavy Curses bear;
> Break all the Bonds of Nature, and prepare
> Their kindred Souls to mutual Hate and War.

The off-rhyme also "Breaks the Bonds" of the pervasive pattern of the dominant heroic couplet. In Shakespeare's *Pericles*, (I.i.45–46),

> For death remembered should be like a mirror,
> Who tells us life's but breath, to trust is error.

The off-rhyme 'mirror/error' emphasizes the semantic 'error' by phonetic means.

Rhyme may also serve as a **phonetic metaphor** linking one sign to another sign, which is left unexpressed and is semantically unrelated, purely by its sound, and thus forcing a new connotation on the sign or creating irony through distance. Peter Howard made use of this to great effect in his poem 'A poppy,' in which he subliminally links words for flowers ('carnation,' 'violets,' 'samphire') with words related to 'war' (carnage, violence, gunfire), ending the poem with generals who were awarded 'petals.' The whole poem, which can only really be appreciated two-dimensionally, is an assemblage of iconic means in its use of colors, fonts, and (temporal) spacing.

Variations in **rhyme schemes** also may assume various iconic tasks such as indicating change and fragmentation. Symmetrical schemes may serve as iconic diagrams of an embrace, a frame or imprisonment, whereas a disruption of the rhyme scheme by non-rhymes may suggest the idea of uniqueness or solitariness. The three rhymes that characterize a triplet may diagrammatically suggest the number three (as in Dryden's 'To the pious memory of Mrs Anne Killigrew' [ll. 41–43]), but also circularity, centering, extension, excess, and continuity. In Donne's poem 'Woman's constancy' (from *Songs and sonnets*, ll. 5–11), the disruption of the rhyme scheme iconically reinforces the (hypothetical) change in the relationship between the speaker and his lover. In Shelley's sonnet 'Ozymandias,' the idea of fragmentation is suggested by a broken rhyme scheme. In a passage from 'The arrival of Ulysses in Ithaca' (ll. 53–55), Pope diagrammatically uses the off-rhyme of the third line of a triplet (which also breaks the scheme of rhyming couplets) to express 'solitary'-ness:

> Mean while *Ulysses* in his Country lay,
> Releas'd from Sleep; and round him might survey
> The solitary Shore, and rowling Sea.

The Visual Level

Ever since poetry was produced as printed text, poets have made use of the possibilities that print offered, such as differences in font, size of letters, spacing, color, special punctuation, etc. A prominent and useful iconic tool in the hands of poets is the manipulation of **lineation**. As with rhyme, both single lines but also variations in conventional lineation schemes may be used with iconic effect, suggesting size, distance, change etc. In his 'erosive poem' 'Archives,' Edwin Morgan presents an iconic diagram of historical attrition by the gradual fading out of lines until they become illegible. In e. e. cummings's poem 'l(a' (from *95 poems*), the lean shape of this text (most lines consist of one or two letters) suggests the outline of the number 1, the (al)oneness of the speaker as well as the pattern made by the solitary falling leaf.

Gradually, longer lines may offer a perfect diagrammatic icon of increase or growth as, for example, in Dryden's satirical characterization of Sir Fopling in his 'Epilogue to *The man of mode*' (ll. 19–22):

> His bulky folly gathers as it goes,
> And, rolling o'er you, like a Snow-ball growes.
> His various modes from various Fathers follow,
> One taught the Toss, and one the new *French* Wallow.

Increasing line-length mirrors the snow-balling of Sir Fopling's "bulky folly," steadily gathering weight, whereas the sixteen 'o/O's' of the passage present iconic images of a "rolling . . . Snow-ball" bowling down the four lines. By contrast, gradually shorter lines may function as iconic diagrams of decrease and decline. In the *Prelude* (Bk. III, ll. 10–12), Wordsworth uses line-shortening to indicate the sucking or contracting force of an eddy:

> The place, as we approached, seemed more and more
> To have an eddy's force, and sucked us in
> More eagerly at every step we took.

A well-known classic example of the use of the downward sequence of lines on the page as an icon of falling, is Milton's description of the fall of Satan in Book I of *Paradise lost* (ll. 740–746). By strategically placing line breaks, Milton uses a kind of imitative form for Satan's fall. Increasing and decreasing line length may also be combined: in T. S. Eliot's 'The love song of J. Alfred Prufrock,' the steady

growth in lines 45–48, followed by diminishing lines in the next stanza, iconically shows the way in which the life and decisions of the speaker's younger days 'reverse' (l. 58) now that he is experienced and coming nearer his life's end.

The overall lineation of a poem may also function as a diagrammatic icon of a speaker's condition. Robert Herrick's 'A Bacchanalian Verse' (first stanza):

> DRinke up
> Your Cup,
> But not spill Wine;
> For if you
> Do,
> 'Tis an ill signe;

expresses a state of drunkenness by the irregularity and staccato of lineation, reinforced by strong enjambment.

The relative (visual) length or shortness of a single line may diagrammatically reflect the semantic content of the line. A classic example is found in Pope's *An essay on criticism* (ll. 355–356), in which the second verse of the couplet mirrors the "slow length" of a snake iconically by an alexandrine whose extra foot prolongs the line:

> A *needless Alexandrine* ends the Song,
> That like a wounded Snake, drags its slow length along.

The remarkable length of the first line of Dickinson's poem 764 metaphorically refers to the premonitory long shadow cast by the setting sun:

> Presentiment – is that long Shadow – on the Lawn –
> Indicative that Suns go down –

An example of a short line expressing diminution or absence can be found in Pope's 'Moral essays: epistle III. to Allen Lord Bathurst' (ll. 281–282):

> Blush, Grandeur, blush! proud Courts, withdraw your blaze!
> Ye little Stars! hide your diminished rays.

The 'blaze' of 'Grandeur' and 'proud Courts' is set off in a prominently long line against the weakly shining 'little Stars' with their 'diminished rays.'

The manipulation of **line breaks** or line endings, whether end-stopped or run-on lines (enjambments), is an important part of the poet's craft. Inevitably, it often assumes iconic force too. In Ted Hughes's 'Second glance at a jaguar' (ll. 16–17), the jaguar's walking back and forth and turning corners all the time is iconically rendered by the way the pertinent descriptive line in his poem breaks:

> At every stride he has to turn a corner
> In himself and correct it . . .

The line-break immediately after "turn a corner" reinforces the jaguar's turning "in himself."

Poets have also made frequent iconic use of the **stanza-break** in order to mark hollowness or openness but also a barrier or separation. In his 'Lines on a young lady's photograph album' (*The less deceived*, ll. 13–14), Philip Larkin makes an impressive iconic use of this between stanzas 7 and 8:

> We know *what was*
> Won't call on us to justify
> Our grief, however hard we yowl across

> The gap from eye to page. So I am left
> To mourn (without a chance of consequence)

The Structural Level: Morphology

Morphological iconicity based on word structure appears often in natural language and is also frequent in literary texts. **Reduplication,** or the consecutive repetition of a morpheme, bound or free, is used in both (and indeed very common in relatively 'new' languages such as Pidgins and Creoles, cf. Kouwenberg, 2003) to indicate the repetition of an action, a frequentative sound or activity (as in 'murmur,' used in Tennyson's line earlier), plurality, intensity or continuity. James Joyce relies on it frequently in both *Ulysses* and *Finnegans wake*, as in the line, "[h]uggermugger in corners. Slop about in slipper-slappers for fear he'd wake" (*Ulysses*, The 'Hades' episode), in which reduplication is used (together with ablaut) as a frequentative and intensifier. Another device resorted to by Joyce is the **blending** of two free morphemes into one word in order to suggest simultaneity or 'oneness'; thus, in the same chapter, we find new lexicalizations such as "silkhatted head," "nose whiteflattened," "craped knocker" (i.e., a knocker "draped with crape").

Partial repetition occurs in **paronomasia,** which involves a similarity in sound between etymologically unconnected words whereby the formal correspondence suggests a semantic connection, as in this line from Shakespeare's *Romeo and Juliet* (III.iv.8): "These times of *woe* afford no times to *woo*" (italics added). A similar example can be found in Donne's *Devotions* (from the 'Seventeenth meditation'): where the phrase "for whom the bell tols"/ "it tols for him/mee/thee" occurs repeatedly, but is transformed at one point into "this bell that tels mee," showing both the urgency of its 'tolling' and what it has to 'tell' us. In most cases, as here, the paronomasia is foregrounded by further repetition of words or of structure. In like manner, the repetition of words by varying their inflexional morphemes (**polyptoton**) or derivational ones (**paronymy**) may serve iconic

ends. The line from *Richard II* (V.v.49), "I wasted time, and now doth time waste me," emphasizes, by the use of the past and present forms of the same verb, Richard's own earlier responsibility for his present state. Donne, in the 'Meditation' quoted earlier, uses the words 'translated,' 'translators' and 'translation' all within the same sentence in order to emphasize the constant 'translation' (i.e., 'transferal') of one action onto the next.

In general, the **repetition** of a word is one of the basic tools of the rhetorician's trade. Thus, the iteration of adverbs such as 'again' or 'oft(en)' performatively reinforces their meaning. This is done, for instance, at the beginning of Wordsworth's 'Tintern Abbey' (ll. 1–15) where 'again' is repeated four times, or in Coleridge's 'Frost at midnight' (ll. 23–26) where 'oft' is repeated three times. A similar iconic effect is achieved in Wordsworth's 'echoes loud / Redoubled and redoubled' (from 'There was a boy,' ll. 14–15), with the repetition enacting the echo. G. M. Hopkins's repetition of 'trod' in "Generations have trod, have trod, have trod; / And all is seared with trade; bleared, smeared with / toil" (from 'God's Grandeur,' ll. 5–6) stresses the monotony of generations of toil, which is further enhanced by the paronomasia in "bleared, smeared." In Wordsworth's 'Elegiac stanzas' (ll. 5–6), the repetition of words reinforces the ideas of both continuity and similarity: "So pure the sky, so quiet was the air! / So like, so very like, was day to day."

Combined with decreasing length, the iteration of a word may present an icon of acceleration as in J. Masters's *Bhowani Junction* (chap. 28):

> Pater [the engine-driver] tugged the whistle-cord again and [. . .]. Whooof! the platform began to slide back. [. . .] Whooof! I saw the Stationmaster writing in a notebook; whoof – a man could still walk beside the train; whoof – he'd have to run; whoof – run fast; whoof, whoof, whoof, whoof!

Masters reenacts the acceleration of a departing steam-engine by means of gradually decreasing phrases and word-length that he puts between the repeated acoustic icons 'whoof.'

In many cases the position of the repeated sign (or structure) adds to the effect of this iconic device; this, however, belongs more properly in the next section, syntax.

The Structural Level: Syntax

The repetition of a word or structure may be more foregrounded by giving the repeated sign the same initial or final position (**anaphora** and **epistrophe** respectively) or a clearly opposite position (**anadiplosis**). Thus, in Shakespeare's *The merchant of Venice* (III.iii.4–5):

> I'll have my bond, speak not against my bond, –
> I have sworn an oath, that I will have my bond

The repeated end-position of 'bond' emphasizes Shylock's fixation on the letter of the bond. In contrast, in the medieval poem 'The pearl,' the *last* word of each stanza is repeated in the *first* line of the next stanza: "To bye hym a perle wat three mascelle three. // This makele three perle, þat bo three t is dere" (ll. 732–733), in order to mime the perfect *round*ness of the 'immaculate pearl.' Herbert uses a very similar device in his poem 'A wreath' to suggest the way the wreath is woven together. Leech and Short (1981: 219) show how Joseph Conrad in his novel *The secret agent*, uses a similar 'chaining' device to suggest the halting perception of one of its characters.

Position may also be used without repetition, when the lexical content of the word itself reflects its position. Thus, the word 'end' is often put at the end of a line, passage or text. An early example is offered by Herbert's poem 'Paradise,' which ends on the capitalized 'END.' In Wordsworth's *Prelude* (Bk. VI, ll. 570–572), there is a passage that ends on the word 'end' and in which the words 'first' and 'midst' are also iconically positioned:

> Characters of the great Apocalypse,
> The types and symbols of Eternity,
> Of first, and last, and midst, and without end.

By manipulating the sequence of textual elements, writers may embody meaning in verbal form. A natural form of iconicity occurs when the signs are used in such a way that their order reflects the **chronological** order of the actions referred to. Poets also use sequencing to suggest **distance** or **proximity** (both temporal and spatial). They may foreground proximity by putting two (semantically or syntactically unrelated) signs next to one another, and distance by putting semantically or syntactically connected items at the opposite extremes of a line. Wordsworth's poetry offers an example of the latter in his *Prelude* (Bk. V, ll. 79–80), where he describes the dream of an Arab who had

> . . . underneath one arm
> A stone, and in the opposite hand, a shell.

'Stone' and 'shell,' are placed at the opposite ends of the line, reflecting left-hand and right-hand position.

Another way in which syntax may be manipulated is by the use of **ellipsis** and structural **parallelism**. Charles Dickens uses ellipsis as well as parallel structure (and lexical repetition) at the beginning of *Bleak House*,

> Fog everywhere. Fog up the river, where it flows . . .; fog down the river, where it rolls . . . Fog on the Essex Marshes, fog on the Kentish heights. Fog creeping into . . .; fog lying out on . . .; fog drooping on . . . Fog in the eyes and throats of . . .; fog in the stem and bowl of . . .

The ellipsis of finite verbal forms in the main clauses, and the repetition of the same structural patterns (prepositional phrases, *-ing* forms, 'where'-clauses) present a syntactic icon of London as "a world of stasis, devoid of real action" (Müller, 1999: 396). Another example of this can be found in Christina Rossetti's 'Sleeping at last,' which has not a single finite verb in the first two stanzas, describing death ("sleeping at last"). Syntactic parallelism together with **asyndeton** (an abrupt sequence of unconnected phrases) may be used as an iconic suggestion of simultaneity, "Women shrieked, cattle bellowed, dogs howled, men ran to and fro . . . " (Sir Walter Scott, *Old mortality,* 1893: 185), a device frequently employed by Dickens, too. Asyndeton is also used to suggest brief, vehement, jerky movements or inner agitation. Samuel Richardson makes frequent use of this to convey extreme emotional states in his novels *Pamela* and *Clarissa*. In contrast, **polysyndeton** (the repeated use of a connector), may suggest weariness, or something long drawn out as in *Macbeth*'s (V.v.19–20): "To-morrow, and to-morrow, and to-morrow,/ Creeps in this petty pace from day to day." Syntactic **subordination** may serve as a diagrammatic icon of hierarchy, of narrative distinction between primary, secondary and tertiary matters as, e.g., in Henry Fielding's *Tom Jones*, where the syntactic structure is a *mise-en-abyme* of the structure of the whole novel (cf. Müller, 1999: 402–406).

The degree of **transitivity** of a construction used may have an effect on the meaning of the text. We saw above that the absence of finite verbs suggests stasis. In a similar way the use of intransitive verbs may reflect nonfinality. In Raymond Chandler's *The little sister*, the following description occurs (Penguin ed., 49): "I collapsed on the floor. The door opened. A key rattled. The door closed. The key turned. Silence." The use of intransitive, or indeed ergative, verbs gives the atmosphere an air of suspension. No agent is mentioned, the effect is given but the cause remains unknown. Transitivity is also connected to the choice of subject. Animate subjects are highly transitive, while inanimate subjects distance the reader from the text, making him feel less involved. Jane Austen was fond of using inanimate subjects, which created the distance necessary for her irony to work. In chapter 18 of *Emma,* she describes Mrs. Weston's severe disappointment as follows:

> Mrs Weston was exceedingly disappointed – much more disappointed, in fact, than her husband, though *her dependence* on seeing the young man had been so much more sober: but *a sanguine temper*, though for ever *expecting* more good than occurs, does not always *pay* for its hopes by any proportionate depression. *It* soon *flies* over the present failure, and *begins* to hope again. (Italics added)

By using abstract nouns as subjects of verbs, which normally take animate subjects, we are removed from sharing the character's feelings.

A more clearly literary device is the use of **chiasmus**. Chiasmus is a verbal figure of repetition whose second half inverts the order of the elements in the first half: 1–2–3 >< 3–2–1. Obviously, this figure may be used as an iconic diagram for it obeys a certain relational order or arrangement of its constituents. But depending on the meaning an author wants to reinforce, this figure may be interpreted in various ways. To mention just a few, a chiastic arrangement may be seen as a dynamic, circular sequence that returns to its beginning (1>2>3:3>2>1) or as a sequence that inverts its direction (1> 2>3><3<2<1). But the pattern may also be interpreted as a static arrangement of components expressing symmetry, multiple bracketing or centering (1[2[3:3]2]1]) of the inner elements by the outer ones.

A simple example of chiasmus is found in *Macbeth* (I.i.11): The witches' "Fair is foul and foul is fair." This mantric phrase may be seen as an emblem, a *mise-en-abyme* of the plot of the play that starts out fair, deals with a lot of foulness and ends fair again. A chiastic order of letters that iconically reinforce the idea of enclosure is offered by Coleridge in a passage from his 'Frost at midnight' (ll. 51–52), in which the speaker remembers his school days and complains about his prison-like boarding school: "For I was reared/In the great city, pent 'mid cloisters dim." The reversal of the letters in 'mid' and 'dim' presents a small-scale enclosure, perfectly framing the secluded enclosure of the 'cloisters.' A chiasmus of sounds is used by Coleridge in the first line of 'Kubla Khan': "In Xanadu did Kubla Khan/A stately pleasure-dome decree." The chiastic sequence of the accented and unaccented vowels, /z**a:** na d**u: did** k**u:** bla k**a:**n/, may be said to allude to the symmetry of the 'dome.' The palindrome 'did' is the perfect pivot of the whole scheme.

Chiasmus also may be spread over a larger piece of text as in Blake's poem 'A divine image,' in which the 'fearful symmetry' of the divine form of man is iconically expressed across the two stanzas showing both a reversed position of four phrases within the lines as

well as across the lines, making the symmetry even stronger.

Structural chiasmus, making use of the same lexical items or letters, forms a transparent icon. Next to these there are also translucent icons, where the repeated signs are not in strictly reverse positions or where they involve synonyms and antonyms rather than the same sign. In *Soldier's home* (second paragraph), Hemingway uses such a chiasmus as a diagrammatic reflection of inversion, centering and quasi-visual symmetry:

> There is a *picture* which *show*s him on *the Rhine* with two *German girls* and another *corporal*. Krebs and the *corporal* look too big for their uniforms. The *German girls* are not beautiful. *The Rhine* does not *show* in the *picture*. (Italics added)

By looking only at the italicized items and ignoring the surrounding words, we can spot the chiasmus, which, interwoven with the narrative, one would normally not see. It is interesting to note that 'Krebs,' whose name stands at the fulcrum of the inversion, is the German word for crayfish, an animal that is famous for inverting its movement by walking forwards and backwards. This chiasmus functions as a quasi-pictorial verbal frame for the description of the photograph, as well as an emblem for the reversal of the soldier's outlook on life after his experience in the war. A chiasmus may become even more difficult to spot when the repeated elements are no longer lexically the same, as in Hemingway's 'Chapter IV' from *In our time*. To see the chiasmus, we have given the repeated elements in italics and highlighted the repeated *synonymous* expressions by putting them in bold.

> It was a *frightfully* hot day. We'd jammed an *absolutely perfect* ***barricade*** across the bridge. It was simply priceless. A big old wrought-iron grating from the front of a house. Too heavy to lift and you could ***shoot*** through it and they would have *to* ***climb*** *over it*. It was **absolutely topping.** They tried *to* ***get*** *over it*, and we ***potted*** them from forty yards. They rushed it, and officers came out alone and worked on it. It was an *absolutely perfect* ***obstacle***. Their officers were very fine. We were *frightfully* put out when we heard the flank had gone, and we had to fall back.

This chiastic order is an icon of a symmetrical opposition of enemy troops on the two sides of a bridge, across which the obstacle of a "big old wrought-iron grating" has been put. The chiastically centralized "absolutely topping" reflects the 'top' of the bridge, the soldiers' main aim, which both sides in the end do not reach/hold.

The Semantic Level

Since semiotics is concerned with the *interpretation* of signs, iconicity as a subfield is intimately connected with semantics. As was stated previously, a sign functions as an icon only via the perception of a language user: without interpretation there is no icon. The examples that have been discussed so far all rely heavily on form, it is the formal internal structure, the repetition of forms, or the way forms are ordered which suggest an iconic interpretation, with the language user perceiving some similarity with reality (exophoric) or between two forms (endophoric). Some iconic structures rely more heavily on meaning. The prime example is **metaphor**, which properly belongs to this section, since the similarity in form only occurs as the *result* of a perceived similarity in meaning. Some of the structures discussed earlier also rely more heavily on semantics, as is the case with chiastic constructions that are not mere formal repetitions but involve synonyms and antonyms. It is clear in such cases that without prior interpretation of these items there can be no recognition of a particular structural ordering. The same would be true for a syntactic parallelism that employs different lexical items, as in the quotation from Chandler earlier: "The door opened. A key rattled. The door closed. The key turned." One needs to know the meaning of those items in order to see that each sentence involves a subject and an ergative verb. Also the examples discussed in the previous section, where signs meaning 'end' are placed at the end, are only possible if one knows the meaning of the sign beforehand; the *form* of the sign does not contribute in any way to its iconicity. It is clear then that knowledge of the meaning of a sign is a vital part of all iconic recognition, and that in quite a few cases form only marginally contributes.

The Discourse and Narrative Level

A literary text as a whole also may be an icon of what it is about. Bolinger (1980: 18) notes a direct relation between the overall size or intricacy of the linguistic text and the ideas that the text expresses. To give a few examples: The highly idiosyncratic form, in terms of genre and style, of Hopkins's 'curtal sonnet' 'Pied beauty' mirrors the most highly individualized 'inscape' of God and of his creation, which the poem performatively celebrates. The extreme briefness of Ezra Pound's poem 'In a station of the metro'

> The apparition of these faces in the crowd;
> Petals on a wet, black bough.

iconically reflects the instantaneous associative perception expressed in it. The size of Melville's *Moby Dick* is an iconic image of its huge subject, the whale. In chapter 104, Melville explicitly refers to the iconic relationship between his "mighty theme" and the bulk of his "mighty book." Joyce's *Finnegans wake*, by contrast, may be interpreted as a diagrammatic icon of dreaming. Quite generally, the metonymic, additive structuring of realistic texts are an effort to offer icons of visible reality. As W. Bagehot observed, Dickens's complex and teeming novels reflect the unstructured richness of a modern metropolis, which also finds its daily icon in the newspaper front page. Similarly, both Joyce's *Ulysses* and T. S. Eliot's *The waste land* are, on one level at least, structural icons of city-life in which, according to Pound (1921: 110), "the visual impressions succeed each other, overlap, overcross, they are 'cinematographic.'"

Hemingway uses a chiastic arrangement in the short story *Indian camp* on the level of narrative to reflect the circularity of the cycle of day and night, birth and death so central to the story. The narrative of whole novels may also be organized chiastically as Ljungberg (2001) has shown with respect to the fiction of Margaret Atwood. Thus, *The robber bride* (1993) has a chiastic narrative order: it is organized by a frame narrative containing 'three different narratives, each of which forms a kind of palindrome in time and space' (ibid., 357), which has several iconic narrative functions.

In his first novel *Ochered'* ('The queue' 1985), the Russian writer Vladimir Sorokin uses a (typographic) structure that is defined by icons of space and time. This novel, a polylogue comprised entirely of snatches of conversation, mostly single words and phrases, has no narrator and is about people standing in a queue, waiting for roll-calls and passing their time by solving crossword puzzles, reading aloud notices from the newspaper, or discussing recent events. The excessive length of the queue is iconically rendered by the length of the printed column of mostly brief utterances that make up the whole novel, the repetition of identical types of expressions, the linear sequence of names. By creating the impression that the portrayal of depicted time (42 hours) seemingly converges with the time of depiction, the passage of time is also rendered iconically. The portrayal of a sexual act takes 18 pages and the absence of speech, silence, or sleep, are typographically reflected by white pages (cf. Ohme, 2003).

Degrees of iconicity also may be discerned in the narrative representation of speech and point of view. The use of indirect speech, for instance, is less iconic than free indirect speech and even less than written dialogue, which is most mimetic of real speech. Interior monologue (stream of consciousness) or digressiveness in narration is also highly iconic in its associative rendering of mental processes. Wolf (2001) shows that in the Romantic period landscape description began to be presented as paintings that emanated from the point of view of an involved viewer. In a similar way, Tabakowska (1999) shows how the relation between text and conceptual structure can be motivated by the perception of chronology or spacing (**perceptual iconicity**), but also by the perceiver's order of knowledge (**experiential iconicity**).

See also: Creativity in Language; Foregrounding; Iconicity: Sign Language; Iconicity: Theory; Iconicity; Jakobson, Roman: Theory of the Sign; Metaphor: Stylistic Approaches; Morris, Charles: Theory of the Sign; Peirce, Charles Sanders (1839–1914).

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Iconicity, Sign Language

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'Iconicity' is a term coined by C. W. Morris (1901–1979; *see* **Morris, Charles (1901–1979)**) that designates the measure of similarity between a sign and the object to which it refers (Bussmann, 1996: 215). The nature of this relation has been discussed and debated since antiquity. Jakobson (1990) traces the crucial question of iconicity's role in language, whether language attaches form to content by nature (*physei*) or by convention (*thesei*), to Plato's dialogue *Cratylus*. Socrates, the moderator of this debate, tends to think that representation by similarity is superior to the use of arbitrary signs but in the end tends to accept the position that conventionality plays a major role in language.

In American linguistics, Dwight Whitney (1827–1894; *see* **Whitney, William Dwight (1827–1894)**) also came down on the side of convention and was instrumental in a worldwide acceptance of the definition of language as a system of arbitrary and conventional signs. Perhaps the most influential linguist on this topic was Ferdinand de Saussure (1857–1913; *see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**), who, following Whitney, maintained that "the bond uniting the signans with the signatum is arbitrary" (Saussure, 1916: 67).

Linguists in the functionalist and cognitive schools often regard iconicity as an essential feature of language (Haiman, 1985). Givón's iconic imperative states that "all other things being equal, a coded

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Iconicity: Theory

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Iconicity Precedes Conceptual Signs

Starkly put, iconicity comes about through some resemblance between something and something else, and a sign is iconic if there is some resemblance between that which represents and that which is represented. But problems immediately arise, and they can be properly addressed only with some qualification of a sign as iconic.

Charles Sanders Peirce's semiotic theory in its most basic form specifies three different sign types – icons, indices, and symbols – and these are correlated with his three categories of the world's processes and of mental processes, Firstness, Secondness, and Thirdness. These three categories are briefly defined as follows:

1. Firstness *is* what *is*, and has not (yet) entered into any interrelation with any *other*. In this sense, it is no more than possibility. An icon, in and of itself, is a sign of Firstness: it is what it is, insofar as some resemblance between it and something else has not (yet) been foregrounded. (Examples: a triangle as an icon of some mountain, or a cloud formation as an icon of waves breaking when they head toward a beach.) Notice that there is neither foreground nor background: there is no more and no less than that which is.
2. Secondness *is* what *is*, insofar as it bears some interrelation with some *other* that it *is not*, though that interrelation has not (yet) been foregrounded by some potential interpreting agent. Secondness is actuality or existence, whether in the mind or in the physical world. An index as a sign chiefly of Secondness is something interrelated with something else by a physical or presumably 'real' interaction with that something else. (Examples: smoke and fire, a cup and its content, an arrow and what it indicates, or a thermometer and air temperature.) Notice that the interrelation involves interaction that is a matter of causality, contiguity, container–contained, or part–whole. Notice also that the index is a sign of some *particular* existent mental or physical world entity, and does not (yet) evince the idea of a general class of entities of which the sign could potentially be a sign.
3. Thirdness *is* what *is*, insofar as it brings about (mediates) an interrelated interaction between something and something else in the same way that it enters into the same interrelated interaction with that something and that something else. Thirdness entails mediation of something and something else by a third entity, leading to some motivated or otherwise potential or necessary interpretation. A symbolic sign is something that

interrelatedly interacts with something else, such interrelated interaction having been foregrounded by an interpreting agent such that that something (Firstness) and something else (creating Secondness) are brought into interrelated interaction in the same way that the interpreting agent (and hence the interpretation interrelated) interact with that something and something else. (Examples: *x* and a set of variables in algebra, or 'horse' and the organism so named.) Notice that there is no necessary interrelated interaction by resemblance or physical connection, but rather by a convention shared by some community of interpreting agents. Notice that a symbol or sign of Thirdness is a sign of generality, a sign that can be used as if it were standing in for an entire class of entities of which the sign is a sign. Notice, in addition, that the qualification, 'yet,' does not enter into Thirdness or symbolicity, since the triadic nature of the Peircean sign is now in effect. Finally, notice that the term 'interrelation' was introduced with Firstness and the term 'interaction' was introduced with Secondness, and with Thirdness the 'interdependency' of the triadic nature of the sign and of all signs was implied.

Without Iconicity, There Is neither Indexicality nor Symbolicity

Why, in a definition of iconicity, is there any need to introduce indexicality, symbolicity, and Peirce's categories? The answer is, first, because iconicity is by its very nature problematic, as mentioned at the outset. Nelson Goodman (1976b), among a host of scholars, and Peirce (1931–1935: vol. 2, §247; further references to Peirce's six-volume set of papers will be designated CP, with the volume and page number formatted as 2.247, for example) as well, point out that anything can be similar to anything else in some way or other. So the possibilities of iconicity would seem virtually unlimited; hence the question of bringing iconicity to some sort of conceptual order. Second, a sign is an image of that which it images, and thus exists as the idea of some interrelation between image and imaged. But an idea in its most basic, Peirce tells us, cannot be an icon, or more specifically a *pure icon*, except in the sense that it is no more than a possibility, Firstness. A "possibility alone is an Icon purely by virtue of its quality" (CP: 2.276). This is to say, an icon is no more than a quality that has not yet been specified. Strictly speaking, it is (as yet) neither existent nor nonexistent, thus it is no more than the possible content of attention or consciousness on the part of an interpreting agent. Peirce writes that when contemplating a painting, we may "lose the consciousness that it is not the thing, the distinction of the real and the copy disappears, and it is for the moment a pure dream – not any particular existence [Secondness], and yet not general [Thirdness]. At that moment we are contemplating an *icon*" (CP: 3.362). This would be the case of taking a map for the territory mapped, catching a glimpse of McDonalds's Golden Arches and unwittingly watering at the mouth, or noticing a Ku Klux Klan garment and spontaneously clenching our fists. The icon becomes that which is as it is, as if it were both what it is and the actual thing with which it interrelates.

Third, there is the problem of typology. The very idea that anything can resemble anything else in some imagined respect or other apparently throws things into disarray. How can we hope to bring order to the unruly mess? The obvious response is that we can bring order about by specifying a sign *as* a sign *of* a particular sort right here and now (an index, of Secondness), and, more effectively, by generalizing a sign *as* a sign *that* is this sort of sign because it evinces such-and-such a set of properties (a symbol, of Thirdness). This is to imply that the three basic signs as well as the categories cannot be disconnected: remove one leg of the semiotic tripod, and it falls in a heap. It also implies that lines of demarcation between sign types and the categories are fuzzy. This must be the case, for, if we take Peirce's process philosophy at face value, we must concede that everything is always becoming something other than what it was becoming. And finally, it implies that the sign process – the process of specifying and interpreting signs – is cumulative. In other words, in Peirce's words, "every symbol must have, organically attached to it, its Indices of Reaction and its Icons of Qualities" (CP: 5.119). This is because a symbol "is a sign naturally fit to declare that the set of objects which is denoted by whatever set of indices may be in certain ways attached to it is represented by an icon associated with it" (CP: 2.295). So any definition of iconicity necessarily entails the categories, as well as indexicality and symbolicity, and the same must be said of the latter two sign types as well as the former sign type.

Icons Are Necessary for Thought

The Peircean concept of the sign has it that reasoning takes place through iconic signs, whether by way of algebra (CP: 3.376), geometry (CP: 4.447), logic (CP: 4.447–448), or diagrams (CP: 2.282), as well as by resemblances (CP: 2.281) and pure imagery (CP: 4.448). Peirce grounds this idea in his premonition that "where certain relations subsist certain others

are found, and it accordingly requires the exhibition of the relations reasoned within an icon" (CP: 3.363). This is to say that at its roots, all communication is indelibly iconic in nature. Though in and of themselves icons cannot convey information, the only means of directly communicating ideas is *through* icons, and every indirect method of communication must be based on their use (CP: 2.314, 4.554). That is, when communication is indirect, icons exhibit the features of states of some quality or other, indices direct the potential sign interpreter's attention toward what *is* or *happens to be*, and symbols bring thought into the picture, thought engendered by the interpreter in collaboration with the sign. And a genuine sign emerges. It all came about, however, thanks to the icon. Icons, Peirce reiterated time and time again, are more fundamental than are the more developed sorts of signs, and without them those more developed signs could never hope to see the light of day.

Thomas Sebeok (1979: 117–118) critiques the notion that icons are exclusively visual: they can also be auditory, olfactory, gustatory, and tactile. And Umberto Eco (1976: 191–217) argues against the popular assumption that icons are exclusively connected by visual similarity to, or are motivated by, their object. Peirce by no means propagates this obvious penchant for imagery. Given, his notion of iconicity is vaguely related to the Platonic concept of mimesis, but it is expanded, as Aristotle built on Platonic foundations, from the visual to cognitive processes. In fact, Peirce repeatedly argued that logic – another name for semiotic, especially given its mathematical connections and its eminent availability to the knowing intelligence – comes by way of what he called "diagrammatic reasoning" through "abstractive observation" (Kent, 1997). And, one must emphasize, 'diagrammatic reasoning' is iconic through and through. Engaged in the activity of 'diagrammatic reasoning,' the interpreter

> Makes in his imagination a sort of skeleton diagram or outline sketch . . . considers what modifications the hypothetical state of things would require to be made in that picture, and then examines it, that is, *observes* what he has imagined . . . . By such a process, which is at bottom very much like mathematical reasoning we can reach conclusions as to what *would* be true of signs in all [such] cases. (CP: 2.227)

In other words, 'diagrammatic reasoning,' the initial stage of all reasoning and 'the only really fertile reasoning' by use of the faculty of imagination, is fundamentally iconic (CP: 4.571). The ultimate test of this product of imagination is observational, that is, indexical, which leads potentially to a determination of what *would occur* if a contrary-to-fact condition were the case, the *would be* relating that which was imagined to be the consequence of a hypothetical condition. This reasoning process entails *relations*, which, to complete the cycle, are most adequately accessible by means of diagrammatic constructs – that is, icons. The most suitable logic for studying the reasoning process is thus the most richly iconic (Gardner, 1968: 28–59). But this notion of iconicity does not guarantee concrete, visual imagery. On the contrary, thought by way of diagrammatic reasoning involves construction and contemplation of abstract, schematic blueprints, whether in the mind, on paper, or elsewhere, the primary focus of which rests on interconnectedness, not things or patterns, and not essences (CP: 2.282). Indeed, icons are good to think with.

Icons Have at Times Had Bad Publicity

Iconicity, unfortunately, was pushed aside by French semiology and exclusively linguistic concepts of communication, and the bias against iconicity and in favor of textuality (symbolism) continues in present poststructuralist and neopragmatic concerns. This is nowhere more evident than in the beginning of this trend, when Roland Barthes (1968: 10–11) stood Saussure on his head by rendering language the stepmother of semiology, rather than the other way round. On the other side of the Atlantic, the French brand of semiology exerted its early influence in the name of Jonathan Culler (1975: 17) among others, who jettisoned iconicity as more appropriate to the "concern of a philosophical theory of representation than of a linguistic based semiology." Eco (1976: 228) lamented that during the heyday of semiology, this linguistic imperialism created a "dangerous verbocentric dogmatism whereby the dignity of 'language' was conferred only on systems ruled by a double articulation." The same sentiment was evident outside the semiology-structuralist controversy. For example, the radical nominalist Nelson Goodman (1976a: 3–6) charged that iconicity by way of similarity created an unruly jungle that was no sufficient condition for representation. Even topologist René Thom, who was otherwise sympathetic to the semiotic enterprise, disparagingly wrote that the icon is of relatively little interest (1983: 261–271).

On the other side of the ledger, Eco (1976: 192–200) criticized Peirce's notion of iconicity on the grounds that icons are culturally coded by convention more flexibly than Peirce was willing to admit. Eco's argument, however, loses much of its sting, since Peirce attributed a conventional mode of representation to the material icon (CP: 2.276). This mode

is best illustrated in what Peirce calls *hypoicons*: possible signs that function iconically (as *images* by resemblance) indexically (as *diagrams* by some actual connection with that which they resemble), and symbolically (as *metaphors* through linguistic conventions) (CP: 2.276–320). Sebeok (1979: 113–114) compares hypoicons to two pervasive modes of representation in intellectual endeavors: James G. Frazer's magic by similarity and by contact or contagion, and Roman Jakobson's aphasic similarity and contiguity disorders, which derive from Saussure's axes of simultaneity and succession. By integration of Freud's condensation/displacement, Lacan's metaphor/metonymy, and other variations of the age-old theme of association by similarity and contiguity – which Peirce himself occasionally and rather apologetically evoked – this formulation could be extended almost indefinitely. Be that as it may, Peirce's division of hypoicons into images, diagrams, and metaphors once again evokes the categories, Firstness, Secondness and Thirdness. Let us briefly drill in on this theme.

Icons: Always Less Than Pure

Images provoke feelings of something yet unspecified, diagrams bring sensations of something that is other than that which they resemble, and metaphors afford a symbolic or linguistic allusion to something that *interdepends*, *interrelates*, and *interacts* with something else. Here, we find the source of 'diagrammatic thinking.' Here also we find the source of all thinking in iconicity, that which makes way for indexicality and symbolicity to emerge into the light of day, for the interdependent, interrelated interaction of all signs includes sign makers and sign takers. Signs are not merely a matter of what we do with signs, but also what signs do with us. Our semiotic worlds, including ourselves as signifying agents, are never fixed, independent, and autonomous entities. We are all emergent. In concert, we are all always becoming something other than what we were becoming. Since we are in the semiotic universe together, we usually manage to find some degree of balance, harmony, resonance, and consonance. But these are ephemeral islands within the vast ocean of disequilibrium, antagonism, offbeat syncopation, dissonance, and, above all, noise. Semiotic inconsistencies there always were and there always will be. And since we always find ourselves somewhere within our semiotic universe, there is no stepping outside, no ultimate transcendence, no knowing the totality: what we can know is never more than incomplete.

Indeed, ideally we would expect that iconicity, like similarity, enjoys relations of symmetry and reflexivity. This is the symmetry argument (Sebeok, 1976: 128). Actually, icons, good to think with as they emerge and merge into indexicality and symbolicity, are never symmetrical through time (Sonesson, 1994). Peirce's idea of our momentarily taking a painting for what is 'real' is pure iconicity, for sure. But it isn't iconicity *for* us, *for* consciousness (CP: 3.1, 3.362, 4.447, 4.531). When we become conscious *of* icons that are something other, *for* us, and when we acknowledge *that* they are icons of a certain sort because they sport such-and-such a set of characteristics, then those icons have already been navigating along the irreversible, irreflexive, asymmetrical, and transitive stream that inevitably brings on some degree of imbalance, dissonance, or disequilibrium.

Were an icon to evince perfect symmetry, like a sphere, then, granting Eco his say, a mirror image would be no sign at all. But icons, after having become part of thought, are always less than symmetrical. In this case, a mirror image of something less than symmetrical produces an enantiomorph. This is blemished symmetry that, at its most distorted, would put us in Alice's Wonderland. However, our icons are rarely so distorted. And fortunately so for us, for if an icon were complete, and if absolute symmetry prevailed, we would have none other than that map – once evoked by Peirce and Argentine writer Jorge Luis Borges via Josiah Royce – that is coterminous with the territory it presumably maps, such that to traverse the map is virtually the same as exploring the territory. Actually, just as there is never complete knowledge of an ideal symmetrical totality of our semiotic universe, so also there is never total antisymmetry or inconsistency (Bouissac, 1986: 194). We are apparently always floating along the stream, somewhere, between the ideal, well-formed whole, and a vast collection of unruly, unstructured particulars.

Of Mirrors, Triangles, and Tripods: Further Qualification of the Icon

Actually, the notion of mirror-imagery is indelibly binary in character. It is an elaboration on Saussure's metaphor of the signifier and the signified making up a sign, like two sides of a sheet of paper. This simply will not fly. We need triadicity. The triangle has often been evoked as a representation of Peirce's triadic notion of the sign. As the story goes, each corner of the triangle represents a sign component: *Representamen* (comparable to what usually goes as the sign), semiotic *Object* (often called, though somewhat erroneously, the referent of the sign), and *Interpretant* (which includes the sign's interpretation, and also the sign's maker and taker as well). The problem is that the triangle's sides, connecting the corners,

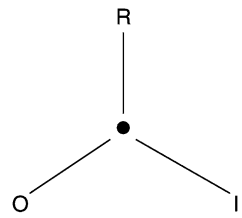

Figure 1 The asymmetrical tripod: Interpretant (*I*), Representamen (*R*), and Object (*O*). Only the central point is absolutely symmetrical.

make up no more than three binary relations. There is no genuine interdependent, interrelated, interactive triadicity.

So, consider a tripod (Figure 1). The Interpretant (*I*) comes into interrelated interaction with and mediates between the Representamen (*R*) and the semiotic Object (*O*) in the same way that *R* and *O* come into interrelated interaction with *I* and with each other. Only the central point, a swirling vortex, pure 'emptiness,' is absolutely symmetrical. But, of course, the point is not *for* mere feeble, fallible mortals: we need something we think we can grasp, namely, *R*s, *O*s, *I*s, and their myriad possible combinations. As a model, the tripod is asymmetrical: it teeters and totters, always tenuously in balance, veering now toward consonance and resonance, now toward dissonance, now threatening to collapse when one of the three legs falters.

But there is a mirror within iconicity. How so? Chiefly because there is the overriding tendency to take an icon – and by extrapolation any sign, for that matter – as just what is, and that is that. This is basically Aristotle's Law of Identity ('*A* is *A*'). If something is *A*, then it cannot be not-*A*. Another way of expressing identity might be '$A \equiv A$,' meaning '*A* is roughly identical to *A*.' If we see the icon and nothing but the icon, then that is all there is. In this sense, putting sentence 1 in Figure 2 in terms of positivity and negativity, we might say that 'The icon is (+) what it is (+),' or: '$+1 \times +1 = +1$.' That seems easy enough. The icon, '+1,' is a simple a sign in the mind. In other words, the icon, or '+1,' is the positive assertion of a thing as what it is. Peirce writes that anything, whether existent or nonexistent, natural or conventional, can be made out to be an icon insofar as it is like the thing iconized (CP: 2.247). Assume that an ant on the beach, while ambulating on the surface of a smooth patch of dry sand, makes a set of squiggles. This, for sure, is a naturally occurring event. Now assume that you look at it and you are able to make out a Winston Churchill caricature. Caricatures are the product of cultural convention. Was there a natural resemblance between the

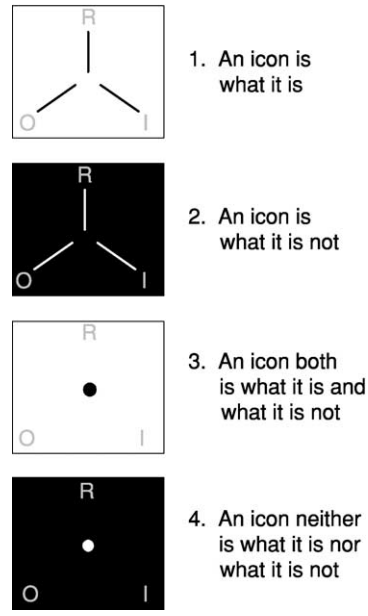

Figure 2 Iconicity. Interpretant (*I*), Representamen (*R*), and Object (*O*).

squiggles on the sand and Churchill's mug? Apparently. Was your iconizing the squiggles a conventional act? So it would seem. Was the icon a proper iconic sign before you made the connection? No. It was no more than a possible sign. The possible icon was just what it was, without there (as yet) existing any interdependent interrelation between the icon and that which it iconized. Could the icon have emerged as a proper icon without you, the semiotic agent? Hardly. The emergence of iconicity is necessarily *triadic*. Thus sentence 1 in Figure 2 illustrates the sign in the adjacent diagram as a set of connections without the central point or vortex – as was depicted in Figure 1 – that brings about the interdependent, interrelated interaction between Representamen, semiotic Object, and Interpretant – all of which at this point are possible, not actual. However, Peirce tells us in many ways that a genuine sign is not merely what it is. We do not simply sense things as what they are and nothing more than what they are. We sense them in terms of something *other*, something they *are not*. This ushers in Peirce's category Secondness. In this regard, the object of sentence 2 in Figure 2 is not merely what it *is*, but it implies what it is with respect to what, in some form or fashion, it *is not*. In other words, the resemblance is a matter of thought, which abstracts resemblances from nonresemblances (CP: 1.369). By sentence 1 you might assert 'That's Churchill.' It is what it is, positively, and with no other qualification. You are asking your audience to believe your assertion in terms of what the icon is, and apparently nothing more. You have wrapped the object up in

a neat conceptual package and classified it: this is only natural, it would appear. We usually try our best to transform our chaotic world into a sensible world, and in so doing we hardly notice what is actually taking place. And what is taking place? Raw experience. Sentence 1 is incomplete at best, for if you say the object is 'Churchill,' you have already classified it is as something *instead of* something else.

So, we might say in accord with sentence 2, 'The icon is (+) what it is not (−)', or '$+1 \times -1 = -1$'. The icon (+1) is implied by what it is not (−1) as the negation of itself. In other words, a thing, in being what it is not, is '−1'. Negativity accounts for the object of consciousness, just as does positivity. The squiggles in the sand resemble Churchill, yet Churchill's actual features had myriad characteristics that cannot be identified in the caricature. The icon *is* what Churchill in large part *is not*, and vice versa.

But this still is not enough. Sentences 1 and 2 fail to account for the Churchill image in and of itself. The two sentences need each other, for sure. Without each other's *otherness*, its Secondness, the icon as merely what it is, its Firstness, cannot become anything at all as a sign in the mind. We need both what it *is* and what it *is not*, as in sentence 3. So we have the equivalent of 'The icon *both* is (+) what it is *and* what it is not (−),' or '$+1 + -1 = 0$.' In the diagram adjacent to sentence 3, we have the central point, or vortex. But there are (as yet) no interrelations; there is only the interdependence of all possibilities of iconicity. You might possibly have called the squiggles in the sand 'Bob Hope,' 'Bill Clinton,' Charles Dickens's 'Scrooge', or one of many other people. But you did not. You identified the pattern as 'Churchill.' The central point, containing the range of all *possibilities*, cannot help but hold *contradictory* and even *inconsistent* images in its *both-and* embrace. But when you initially made your claim that it is 'Churchill,' you could have done so with no doubts in mind. At that juncture, it was *either* 'Churchill,' *or* nothing at all.

And yet…we still have not gone far enough. Sentences 1, 2, and 3 tell us about *possibilities* for iconicity: what a particular icon *is*, and what it *is not*, after we have interpreted it *as* a sign. But what about error, a change of mind, rejection of one interpretation in favor of another one? In response to this question, what if we turn sentence 3 inside out. We would have something tantamount to sentence 4, which is comparable to 'The icon is *neither* (−) what it is *nor* (−) what it is not, or $-1 + -(-1) = 0$.' Now we certainly wish to rebel, and with a vengeance: sentence 3 or sentence 4, what is the difference? Either way, we are left with zero, zilch. It is either blackness, a total blank, nothing at all, or it is whiteness, still an empty nothing. However, think about blackness as the absorption of the entire visible spectrum of wavelengths: all colors contained within and nothing given in return. And think about whiteness as the reflection of that same spectrum: all colors given and nothing retained within. In this sense, blackness and whiteness complement one another, like Yin and Yang. We cannot have the one without the other. *Both-and* and *neither-nor* must have a right to their place within semiosis just as much as *either/or*.

Now, put all this another way: notice that in the four sentences in Figure 2 we have the assertion of something, its negation, both its assertion and its negation, and neither its assertion nor its negation. Assertion is '$+1 \times +1 = +1$,' or '1^2.' Negation is '$-1 \times -1 = 1$,' or '-1^2.' Now the problem is with the square root of '−1' ($\sqrt{-1}$). It simply has no clear-cut answer. Apparently it neither *is* (+1) nor is it *not* (−1), or it can be conceived as both what it *is* (+1) and what it *is not* (−1). Take your pick as you so desire. Regarding this conundrum, mathematicians finally ended up by assigning the symbol '*i*' to '$\sqrt{-1}$.' But what is this '*i*,' this 'imaginary' value that forces itself on us when we wish to give account of the nature of a sign in the mind? Mathematicians called the square roots of negative numbers 'imaginary,' because such numbers were not compatible with the 'real' numbers – or, for that matter, with what we would like to consider 'reality.' Eventually, however, mathematicians came to realize that certain equations – most strikingly in relativity and quantum theory – could not be solved without the use of imaginary numbers, even though they continued to consider them strange and unwanted.

Contemplate, if you will, the sheer appearance of inordinate abstraction in the preceding paragraphs, and, I would suggest, you will find yourself gradually easing toward pure iconicity.

The Basic Nature of the Icon

An icon in the pure sense *is* what it *is*. When we sense it *as* an icon, Secondness has already entered the semiotic scene, for the icon now enjoys some *other* – ourselves as potential interpreting agents – and we as icons enjoy some *other* – the icon.

We might say that (1) the icon is in the *image of*, *similar to*, and *interdependent with* something other, (2) that something other is an index that *interacts with* what the icon *is not*, and (3) a potential Interpretant – consisting of the interpreting agent and the emergent sign meaning – of the icon brings the *is* and the *is not* together and mediates between them in such a manner that there is *both* the *is*, *and* the *is not*, and at the same time there is *neither* the *is*, *nor* the *is*

not. We see the icon as an icon, although deep down we know full well that it is not itself an icon in the pure sense but rather the sign that happened to be a possible icon, ready and willing to interact with us to become an index and an interpreted sign wrapped up in linguistic embossment: symbols. And so we talk interminably about this icon here and now, and any number of absent icons and actual icons, and the word 'icon' and other words having to do with 'icons.' But at its most basic, an icon emerges out of the central point, the vortex, pure 'emptiness,' of Figure 1. Then it enters into our anticipations and expectations and hopes and desires and fears. We initially experience the icon as 'some-*thing*' that is like 'some-*thing*' else that might bring on pleasantness or unpleasantness, depending on the context. But, at this moment, we are now far removed from mere 'emptiness.' It is like going from zero, '0,' to the 'empty set,' 'Ø.' Zero is just zero. It is emptied of everything, including even the memory of numbers. The empty set, in contrast, is just that: something that we notice happens to be empty. It is the 'noticed absence' of something that was or could have been or might possibly be partially or wholly filling the unoccupied space.

So we have 'pure emptiness' and the 'noticed absence' of something and the pluses and the minuses implied by Figure 2. Then comes the icon (or sign or Representamen) as Firstness, followed by an index (or semiotic Object) as Secondness, that is in need of a symbol (or Interpretant) to perform its role of mediation. All this, prior to the iconic sign's becoming an actual sign *for* us and construed *as* such-and-such (an index) because it carries a hefty load of characteristics that are of such-and-such a nature (a symbol). The initial stage of the Representamen, semiotic Object, and Interpretant is just that, the initial stage of a sign's process of becoming an icon, and only then can it take on actual indexical and symbolic properties. Which is to say once again that of the three sign types, the icon is all-important, for without it, indices and symbols could not have begun their becoming. Thus we see that in the final analysis, articulating iconicity is a hopeless task: once we sense it and say it, it is no longer *just* an icon, but is already something else.

See also: Barthes, Roland: Theory of the Sign; Eco, Umberto (b. 1932); Eco, Umberto: Theory of the Sign; Jakobson, Roman: Theory of the Sign; Peirce, Charles Sanders (1839–1914); Saussure, Ferdinand (-Mongin) de (1857–1913); Sebeok, Thomas Albert (1920–2001); Sebeok, Thomas Albert: Modeling Systems Theory.

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Idealization

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All scientific disciplines make certain idealizations about the data they are concerned with, and linguistics is no exception. Particularly in theoretical linguistics, much progress has been made possible by the distinction between competence and performance, where competence represents two kinds of idealization over the data that linguists work with.

The first reflects common practice in other empirical sciences: competence ignores noise in the data. As Chomsky (1965: 3) put it: "Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors [...] in applying his knowledge of the language in actual performance." This kind of abstraction is comparable to that made by an astronomer who assumes, for the purposes of calculating interplanetary forces, that the earth is a perfectly round object, despite the fact that its many mountains and troughs do not qualify it as such.

The second idealization implied by the competence-performance distinction is an abstraction from considerations of language use (comprehension and production). Thus, competence is a theory of an ideal speaker-hearer's knowledge of language and may tell us very little about how that knowledge is put to use in actual linguistic performance. It is fair to say that this second idealization is less widely accepted than the first. Some believe it is unnecessary, while others believe that we do not really have a theory of human language at all if we do not understand the mental processes that underlie it. There are a number of responses to such objections, two of which are briefly discussed in this article.

To begin with, linguists simply would not know as much about human language as they do today had they felt compelled to base their theories solely on psycholinguistic experimentation or computational modeling. Although research in psycholinguistics and computational linguistics has certainly increased our understanding of human language processing, hypotheses in this domain typically have recourse to the theory of competence. For example, it is often assumed that the human parser, when confronted with more than one possible continuation of the parse, displays particular preferences. But the hypothesized preferences rely on assumptions about the structures the parser builds, which are themselves derived from competence theory. In short, we cannot easily develop theories about *how* a computational device computes something if we do not know *what* that device is computing.

Finally, competence theory seems to express an irreducible aspect of human language. Suppose two computers were built with radically different underlying hardware architectures that, moreover, matched up with radically different computational processes. Suppose furthermore that both machines passed a kind of Turing test for language: their performance is indistinguishable from that of native speakers of some natural language. In this situation one would want to say that both computers speak that language, but the notion of identity required for this cannot be captured at the level of hardware or computation. Apparently, the commonsense notion of natural language is based on regularities in the mapping between sound and meaning. But the function that specifies these regularities is the competence grammar.

See also: Natural Language Processing: Overview; Psycholinguistics: Overview.

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See also: Natural Language Processing: Overview; Psycholinguistics: Overview.

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Ideational Theories of Meaning

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Ideational theories of meaning are commonly attributed to 17th- and 18th-century empiricist philosophers such as Thomas Hobbes, John Locke, George Berkeley, and David Hume, and received severe criticism from 20th-century philosophers of language, notably Gottlob Frege and Ludwig Wittgenstein. Unfortunately, the work of the earlier philosophers was seriously misunderstood by their later critics, and much of the criticism was misdirected. In fact, it is highly debatable whether the empiricist philosophers in question were offering theories of *meaning* in anything like the sense that the phrase 'theory of meaning' would now be understood (see Hacking, 1975, chapter 5).

Locke devoted an entire book (Book III, 'Of Words') of his greatest work, *An Essay Concerning Human Understanding* (Locke, 1975) to the topic of language, focusing on the communicative function of language, the advantages of language, and the abuses of language. According to Locke, the main purpose of language is to serve as a medium for the communication of thought from one thinker to another. Locke, like many of his contemporaries, favored an ideational view of thought – that is, he believed that thinking is essentially an exercise of the faculty of imagination and that thoughts consist in sequences of *ideas* in the minds of thinkers. *Idea* was a term of art in early modern philosophy, as ubiquitous then as the term *concept* is in present-day philosophical writing and playing a partly similar role, to denote a component or ingredient of the contents of thoughts. However, the empiricist philosophers used it equally to denote a component or ingredient of the contents of *sensory experiences*, reflecting the tight connection they presumed to obtain between thought and perception. Locke famously claimed that words "in their primary or immediate signification stand for nothing but the ideas in the mind of him that uses them" (Locke, 1975: 405) – one of the most misunderstood claims in the history of philosophy. Modern readers of Locke are apt to interpret him as claiming that the *meaning* of a word is an idea in the mind of the speaker, which suggests that he adopted a thoroughly subjectivist – indeed, almost solipsistic – theory of meaning. But such an interpretation mistakenly conflates *signification*, as Locke uses this term, with *meaning* in the semantic sense. Locke is not claiming that words *refer to* or *denote* ideas in the mind of the speaker, but simply that speakers primarily use words to *express* the contents of their own thoughts, for the purpose of communicating those thoughts to others. Locke could happily concede that 'dog' in my mouth refers to *dogs*, not to my *idea* of a dog. His point is merely that when I assert, for example, 'Dogs bark,' I am expressing a thought that I have concerning dogs – a thought which is about dogs by virtue of containing as one of its ingredients my *idea* of a dog.

To clarify this matter, it is useful to distinguish between three quite different kinds of relations: *semantic* relations, *cognitive* relations, and *expressive* relations (see Lowe, 1995: 145 and Figure 1).

Semantic relations are *word-to-world* relations, such as the reference relation between the word 'dog' and dogs. Cognitive relations are *thought-to-world* relations, such as the intentional relation between my idea of a dog and dogs, by virtue of which the former is 'about' the latter, or has the latter as its 'intentional object.' Expressive relations are *word-to-thought* relations, such as the signification relation (in Locke's sense) between the word 'dog' as used by

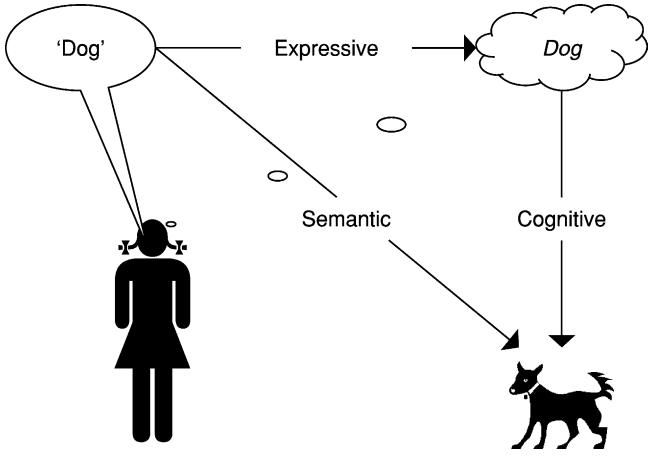

Figure 1 Locke's dog-legged semantic theory.

me and my idea of a dog. In these terms, modern critics of Locke and like-minded early-modern empiricist philosophers may be accused of misconstruing their account of linguistic signification as a theory of semantic relations, when in fact it is a theory of expressive relations. Locke's primary interest lies not in semantics but in the nature of thought and its relation to language, that is, in cognition and expression. Of course, given an account of word-to-thought (expressive) relations and an account of thought-to-world (cognitive) relations, it is possible to construct an account of word-to-world (semantic) relations, although it seems that Locke himself was not much interested in doing this in any detail. Such an account of word-to-world relations will be, in Simon Blackburn's vivid phrase, a 'dog-legged' semantic theory (Blackburn, 1984: 40), because it takes such relations to be the product of two other kinds of relations, cognitive and expressive. There may be problems with semantic theories of this type, but they will only be obscured by misunderstanding the Lockean theory of linguistic signification as *itself* being a theory of semantic, as opposed to expressive, relations. In saying that words are *signs* of ideas in the minds of speakers, Locke means that they are *indicators* of those ideas, which speakers can exploit to enable an audience to gain knowledge of what they are thinking (see Ott, 2004). Locke presumes that signification of this kind is artificial – the product of human invention – rather than natural, but that it is otherwise comparable to the indicator relation between dark clouds and impending rain, the former constituting evidence for the latter.

To evaluate the Lockean approach to language, we need to probe a little more deeply into his account of thought and ideas. Locke divides ideas into *simple* ideas of sensation and reflection, and *complex* ideas that are compounded by the mind out of those simple ideas. By 'reflection' Locke means what would now be called 'introspection.' Examples of simple ideas of sensation would be our ideas of colors, taste, and sounds, while examples of simple ideas of reflection would be our ideas of basic mental activities, such as thinking, desiring, and willing. According to Locke, many of our complex ideas are acquired by the mental process of *abstraction*, or what we might now call 'selective attention,' when we notice that certain types of simple ideas regularly accompany each other in our experience. For example, our complex idea of an *apple* will include various simple ideas of shape, size, color, and taste which we find that we regularly experience in conjunction with one another. It is a matter for dispute among Locke scholars whether or not he conceived of sensory ideas as mental *images*, and the textual evidence is far from conclusive (see Lowe, 1995: 35–47). It is much clearer that Berkeley, writing a little later, held an imagistic view of ideas and, perhaps wrongly, construed Locke as holding one too. Berkeley famously criticized Locke's theory of abstraction as being incoherent, but the cogency of the criticism seems to depend upon the interpretation of Locke's view of ideas as being imagistic. (Berkeley urged that Lockean abstract ideas must lack determinacy of content in a way that seems problematic only on the assumption that such ideas are, or are relevantly like, images: see Lowe, 1995: 158–161.) Setting aside the controversy over whether or not Locke was an imagist, the essential features of his ideational conception of thought reduce to the following. First, Locke is clearly committed to a strong version of the doctrine that thought is independent of language. Indeed, his central aim in discussing language is to show how easily language can lead us astray if we fail to notice the differences between it and thought. Second, he clearly believes that thinking, involving as he takes it an exercise of the faculty of imagination, is intimately related to and, with respect to its content, ultimately wholly indebted to *perceptual experience*, both sensory and introspective.

Modern critics of ideationism are not only apt to misconstrue the ideational account of linguistic signification as being a semantic, as opposed to an expressive, theory, but also to oversimplify the object of their criticism. For instance, it is sometimes lampooned as maintaining that *every* word in a speaker's mouth signifies a discrete idea in the speaker's mind, including words such as 'not' and 'but,' which Locke himself classifies as 'particles' and to which he devotes a chapter in the *Essay*. It is easy enough to poke fun at the suggestion that 'not' signifies an idea of 'notness,' in the way that 'red' supposedly signifies an idea of redness. But Locke himself suggested nothing so preposterous, contending instead that negative particles are used to convey a speaker's mental act or attitude of *denial* with respect to a certain thought-content (Locke, 1975: 471). Berkeley's version of ideationism was still more sophisticated, recognizing many uses of language other than simply to express the speaker's ideas – for example, to invoke an emotive response in an audience – and allowed, too, that often we think 'in words' rather than exclusively 'in ideas' (see Olscamp, 1970: 130–153).

Undoubtedly, the disfavor into which ideationism fell during the 20th century was largely due to the conviction that it rendered linguistic meaning excessively subjective. Frege's attack on it was integral to his more general onslaught on psychologism, which he saw as a dire threat to the objectivity of logic and mathematics. This is why he is at pains to distinguish sharply between 'ideas,' which he regards as purely

subjective psychological entities, and 'senses' of expressions, which he regards as mind-independent and intersubjectively graspable abstract objects (see Frege, 1960). Wittgenstein is equally antagonistic toward ideationism, which is a prime target of his famous 'private language argument' (see Wittgenstein, 1958: 94–96). Here again the complaint is that ideas are unsuited by their irredeemably subjective and private character to be recruited for a workable account of intersubjective linguistic meaning and communication, and that ideationism unavoidably degenerates into some form of scepticism or relativism.

To the extent that criticisms focusing on the privacy of ideas construe ideationism as postulating ideas as the *meanings* of words, they are misplaced for the reasons explained above. Even so, it is fair to ask of the ideationist how words can serve to *communicate* ideas, given the privacy of the latter – a privacy that Locke himself acknowledged and emphasized. Indeed, for Locke, it is precisely *because* ideas are private – 'invisible, and hidden from others' – that language, in the form of 'external sensible signs,' is needed to 'lay them before the view of others' (Locke, 1975: 405). One might suppose it to be a fatal difficulty for ideationism that no one has direct access to the ideas of another speaker and so is never in a position to tell whether or not the idea that he or she associates with a given word resembles the idea that is associated with it in the mind of someone else. However, Locke himself was fully cognizant of this seeming difficulty and was not at all disconcerted by it. It was he, indeed, who first drew attention to the notorious puzzle now known as the 'inverted spectrum' problem – the question of how I can tell whether the way in which blue things look to me might not be how yellow things look to someone else, and vice versa (see Locke, 1975: 389). Locke's answer is that it simply doesn't matter, for the purpose of the successful communication of thoughts between people concerning blue or yellow things. However, one might agree with Locke about this while failing to see how he was in a position to say it himself, given his commitment to an ideational theory of linguistic signification. For one might suppose that such a theory takes success in communication to consist in the *replication* in the hearer's mind of ideas which the speaker associates with the words that he or she utters. But there is no reason to tie ideationism to such a doctrine, nor any evidence that ideationists such as Locke espoused it. Ideationism is at most committed to the thesis that in successful communication of the speaker's thoughts to a hearer, ideas are evoked in the hearer's mind which *correspond* to those in the speaker's mind, in a sense of 'correspondence' which does not imply resemblance or replication. That such a correspondence obtains is subject to intersubjective confirmation without imposing upon the persons concerned the impossible burden of comparing each other's ideas, and it may be taken to be set up through the social processes of language teaching and learning (see Lowe, 1996: 172–177).

See also: Empiricism; Frege, Gottlob (1848–1925); Locke, John (1632–1704); Private Language Argument; Thought and Language: Philosophical Aspects.

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Identity and Language

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This article considers what identities are, how they depend on language, how that dependency may have come about, and how linguistics and affiliated disciplines have gone about analyzing it. Secondly, it examines how the very way in which we identify and conceive of languages is bound up with identity, usually that of a nation.

What Is Identity?

Your identity is, very simply, who you are. It has two basic aspects: your name, which serves first of all to single you out from others (the deictic function), and then that deeper, intangible something that constitutes who you *really* are, which we might think of as the *meaning* of your name (the semantic function). Names are obviously pieces of language, but less obvious is the role played by the language you speak, and how you speak it, in constructing that other, deeper aspect of your identity, both for yourself and others.

Imagine a group of strangers at a bus stop. The bus they are waiting for drives past without stopping, and the following remarks ensue:

A: Well fuck me.
B: I say, wasn't that the 23?
C: I'm like not believing this.

Picture in your mind what A, B, and C look like. You can probably say something about how they are dressed, their background, what they do, what they are like, and whether you would like them or not. It is extraordinary how much we are able to infer from what are, after all, a few squiggles on a page. We have an instinctive capacity to construct the identity of a whole person in our minds based on minimal input, and it is most effective when the squiggles represent something the person said.

Self-identity has long been given a privileged role in identity research. But the identities we construct for ourselves and others are not different in kind, only in the status we accord them. The gap between the identity of an individual and of a group – a nation or town, race or ethnicity, gender or sexual orientation, religion or sect, school or club, company or profession, or the most nebulous of all, a social class – is most like a true difference of kind. Group identities seem more abstract than individual ones, in the sense that 'Brazilianness' doesn't exist separately from the Brazilians who possess it, except as an abstract concept. Yet combinations of such abstractions are what our individual identities are made of, and group identity frequently finds its most concrete manifestation in a single, symbolic individual. The group identities we partake in nurture our individual sense of who we are, but can also smother it.

Bourdieu, discussing regional and ethnic identities, made an important point that applies to many other types of identity as well: although they essentialize what are actually arbitrary divisions among peoples, and in this sense are not 'real,' the fact that, once established, they exist as mental representations makes them every bit as real as if they were grounded in anything 'natural.'

> One can understand the particular form of struggle over classifications that is constituted by the struggle over the definition of 'regional' or 'ethnic' identity only if one transcends the opposition [...] between representation and reality, and only if one includes in reality the representation of reality, or, more precisely, the struggle over representations [...].
>
> Struggles over ethnic or regional identity – in other words, over the properties (stigmata or emblems) linked with the *origin* through the *place* of origin and its associated durable marks, such as accent – are a particular case of the different struggles over classifications, struggles over the monopoly of the power to make people see and believe, to get them to know and recognize, to impose the legitimate definition of the divisions of the social world and, thereby, to *make and unmake groups* (Bourdieu, 1991: 221).

The role played by names, labels, and other linguistic forms of classification-*cum*-text in the making and unmaking of groups along the lines Bourdieu described is why identity is ultimately inseparable from language.

Identity and the Functions of Language

Dunbar (1996) located the origin of language in the needs of higher primates to form social alliances in order to deal with challenges in their environment, including threats from powerful members of their own species. He believes that the essential functions of language for evolutionary purposes were phatic ones, with gossip – language of purely social content exchanged for social purposes – being the equivalent of the grooming that primates use to form and maintain social bonds. The move from physical to linguistic grooming is attributed by Dunbar to increasing group size. Early humans "must have faced a terrible dilemma: on the one hand there was the relentless ecological pressure to increase group size, while on

the other time-budgeting placed a severe upper limit on the size of groups they could maintain" (Dunbar, 1996: 77). Language made it possible to increase group size without losing social cohesion or the time needed to gather and hunt food. Because language can be directed at several people simultaneously, the rate of grooming is increased manifold.

Dunbar notes, "Being able to assess the reliability of a prospective ally becomes all-important in the eternal battle of wits" (Dunbar, 1996: 78–79). On the one hand, language serves the purposes of the individual who is seeking to make an alliance: "It allows you to say a great about yourself, your likes and dislikes, the kind of person you are; it also allows you to convey in numerous subtle ways something about your reliability as an ally or friend" (Dunbar, 1996: 78). It also serves the person being courted as a prospective ally: "Subtle clues provided by what you say about yourself – perhaps even how you say it – may be very important in enabling individuals to assess your desirability as a friend. We get to know the sort of people who say certain kinds of things, recognizing them as the sort of people we warm to – or run a mile from" (Dunbar, 1996: 79). He concludes, "Language thus seems ideally suited in various ways to being a cheap and ultra-efficient form of grooming. [. . .L]anguage evolved to allow us to gossip" (Dunbar, 1996: 79).

If we think about language from this perspective, its primary purpose is no longer necessarily restricted to one of the two traditionally ascribed to it, communication (by a speaker having an intention and wishing to transmit it to listeners) and representation (of the universe, as analyzed into the logical categories that languages are thought to contain). Before either of these, and in many regards enveloping them both, language exists, in this reversed perspective, for the purpose of *reading the speaker*.

Sociolinguistic inquiry into identity and language is concerned with how people read each other, in two senses. First, how the meanings of utterances are interpreted, not just following idealized word senses and rules of syntax as recorded in dictionaries and grammars, but in the context of who is addressing whom in what situation. Secondly, how speakers themselves are read, in the sense of the social and personal identities their listeners construct for them based on what they say and how they say it (a complex process, because most speakers' output is already shaped in part by how they have read their listeners). Every day each of us repeatedly undertakes this process of constructing our reading of people we encounter, in person, on the telephone, on the radio or the screen, or in writing, including on the Internet, based on their language – what they say and how they say it.

Targeting Identity in the Analysis of Language

Modern linguistics has moved slowly but steadily toward embracing the identity function as central to language. The impediment has been the dominance of the traditional outlook, which takes representation alone to be essential, with even communication relegated to a secondary place. This outlook was never the only one available, however, and when early 20th-century linguists such as Jespersen and Sapir came to investigate how language functions to define and regulate the role of the individual within the social unit at the same time that it helps to constitute that unit, they were not without predecessors. It was just that mainstream linguistics as it had developed within the 19th century was not inclined to see such questions as falling within its purview.

An overview of the development of such inquiry within linguistics and adjacent fields can be found in Joseph (2004), from which some key moments will be excerpted here. The first is Labov (1963), a study of the English dialect of Martha's Vineyard, an island off the coast of Massachusetts, where the diphthongs in words such as *right* and *house* are pronounced as [əy] and [əw] rather than [ay] and [aw]. This feature is not found in the dialects of the mainlanders who 'summer' on Martha's Vineyard, and with whom the Vineyarders (year-round residents) have a complex relationship of dependency and resentment. "It is apparent that the immediate meaning of this phonetic feature is 'Vineyarder.' When a man says [rəyt] or [həws], he is unconsciously establishing the fact that he belongs to the island: that he is one of the natives to whom the island really belongs" (Labov, 1963: 307). This is very much the sort of analysis of the effect of linguistic identity on language form that would characterize work in the 1990s and since, though it was sidelined in the mid-1960s by the statistical charting of variation and change.

In the meantime, one particular identity focus – gender – led the way in directing attention to the reading of identity in language. Lakoff (1973) argued that, in both structure and use, languages mark an inferior social role for women and bind them to it. Gender politics is incorporated directly into the pronoun systems of English and many other languages, through the use of the masculine as the 'unmarked' gender (as in 'Everyone take his seat'). Lakoff points to features that occur more frequently in women's than in men's English, such as tag questions, hedges,

intensifiers, and pause markers, which as marks of insecurity and of the role women are expected to occupy are fundamental to maintaining the status quo in gender politics.

As the notion of separate men's and women's language was accepted, the more general notion of the language–identity link was let in through the back door, leaving the way open for the study of group identities of all sorts beyond those national and ethnic ones traditionally associated with language difference. This was a challenge to a sociolinguistics that had been fixated on class differences. By the mid-1980s this shift was underway in the work of, for example, Gumperz (1982), Edwards (1985), and Le Page and Tabouret-Keller (1985), though it was really in the 1990s that it would come to occupy the mainstream of work in sociolinguistics and linguistic anthropology. (For a small but representational sample of studies see, on the sociological end, Fishman (1999); on the anthropological, Schieffelin *et al.* (1998); and in discourse analysis, Wodak *et al.* (1999).)

This work also received significant input from social psychology, where one approach in particular needs to be singled out: Social Identity Theory, developed in the early 1970s by Tajfel. In the years following his death in 1982, it came to be the single most influential model for analyzing linguistic identity. Tajfel (1978: 63) defined social identity as "that part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership." Within this simple definition are embedded at least five positions that in their time were quite revolutionary: that social identity pertains to an individual rather than to a social group; that it is a matter of *self-concept*, rather than of social categories into which one simply falls; that the fact of *membership* is the essential thing, rather than anything having to do with the nature of the group itself; that an individual's own knowledge of the membership, and the particular value they attach to it – completely 'subjective' factors – are what count; and that emotional significance is not some trivial side effect of the identity belonging but an integral part of it.

Beyond this, Social Identity Theory marked a break with other approaches in the fact that it was not concerned with analyses grounded in a notion of 'power,' but simply in the relative hierarchizations that people seem instinctively to impose on ourselves, most particularly in our status as members of 'in-groups' and 'out-groups,' which would come into even greater prominence in the 'Self-Categorization Theory' that developed as an extension of the original model, notably in the work of Tajfel's collaborator Turner (see Tajfel and Turner, 1979; Turner *et al.*, 1987; Turner, 1991).

Partly under the influence of such work, sociolinguists were beginning to reorient their own object of investigation. Milroy (1980) reported data from studies she conducted in Belfast showing that the 'social class' of an individual did not appear to be the key variable allowing one to make predictions about which forms of particular linguistic variables the person would use. Rather, the key variable was the nature of the person's 'social network,' a concept borrowed from sociology that Milroy defined as "the informal social relationships contracted by an individual" (Milroy, 1980: 174). Where close-knit localized network structures existed, there was a strong tendency to maintain nonstandard vernacular forms of speech – a tendency difficult to explain in a model such as Labov's, based on a scale of 'class' belonging where following norms of standard usage marked one as higher on the hierarchy and entitled to benefits that most people desire. Labov's early work on Martha's Vineyard had suggested that the answer lay in identity, specifically in the value of belonging to a group who, although not highly placed in socioeconomic terms, could nevertheless claim something valuable for themselves (in the Martha's Vineyard case, authenticity). Milroy's book provided statistical backing for such an explanation.

Although the inner workings of the social network depend somewhat on the amount of personal contact, the essential thing is that its members share *norms*. As attention turned to understanding the nature of these norms, two much publicized views had an impact. Fish (1980) had devised the concept of the 'interpretative community' to account for the norms of reading whereby people evaluate different readings of the same text as either valid or absurd. An interpretative community is a group sharing such a set of norms; its members may never come into direct physical contact with one another, yet share norms spread by the educational system, books, or the media. Soon after, Anderson (1991, first published in 1983) proposed a new understanding of the 'nation' as an 'imagined community,' whose members, like that of the interpretative community, will never all meet one another let alone have the sort of regular intercourse that creates a 'network.' What binds them together is the shared belief in the membership in the community.

Notably with the work of Eckert, sociolinguistic investigation of groups ideologically bound to one another shifted from statistically based examination of social networks to more interpretative examination of 'communities of practice,' defined as "an aggregate of people who come together around mutual

engagement in an endeavor" (Eckert and McConnell-Ginet, 1992: 464). In the course of this endeavor there emerge shared beliefs, norms, and ideologies, including, though not limited to, linguistic and communicative behavior. The advantage of the community-of-practice concept is its openness – any aggregate of people can be held to constitute one, so long as the analyst can point convincingly to behavior that implies shared norms or, better still, elicit expression of the underlying ideologies from members of the community. This line of research is thus continuous with another one that has focused more directly on the normative beliefs or ideologies by which national and other group identities are maintained. Some early work along these lines was published in Wodak (1989) and Joseph and Taylor (1990), and subsequently a great deal more has appeared, e.g., in Verschueren (1999), Blommaert (1999), and Kroskrity (2000).

Other features of recent work on language and identity include the view that identity is something constructed rather than essential and performed rather than possessed – features that the term *identity* itself tends to mask, suggesting as it does something singular, objective, and reified. Each of us performs a repertoire of identities that are constantly shifting, and that we negotiate and renegotiate according to the circumstances.

Coconstructing National Identity and Language

As mentioned at the outset, it is not simply the case that identity is built upon language. The reverse is also true. One of the first obstacles to be overcome in establishing a national identity is the nonexistence of a national language. The 'nation–state myth' – that basic view of the world as consisting naturally of nation–states – is bound up with an assumption that national languages are a primordial reality. Whatever difficulty we might have in determining the borderlines of who 'the Germans' are, whether the German-born children of Turkish immigrants are German for instance, or whether certain Alsatians are French or German, the German language is going to figure significantly in the equation. Hitler attempted to justify his initial invasions of neighboring countries on the grounds that these German-speaking peoples were inherently part of the German nation; and, as Hutton (1999) has shown, his policies of oppression and ultimately extermination of the Jews were underpinned by the argument that, although their language, Yiddish, was a form of German, their lack of a nation gave them the perverse racial peculiarity of not being able to have a 'mother tongue.' They therefore did not belong to the German body politic but were seen as a parasite within it.

But whether Bohemian, Alsatian, and Yiddish dialects were part of 'the German language' were not facts given in advance, nor even ones that a linguist could establish scientifically. The 'German language,' like every national language, is a cultural construct. It dates from the 16th century and is generally credited to Luther, who, in translating the Bible, strove to create a form of German that might unite the many dialect groups across what until the late 19th century was a patchwork of small and large states, linguistically very diverse. (This story is itself a part of the cultural construct, and although not false, it is considerably oversimplified – in order to shape up as a proper 'hero' myth, it ignores or marginalizes the work of many other individuals and broader cultural changes.) The prototype of the modern national language was Italian, which may seem surprising, given that Italy did not become a political nation until 1860, with full unification coming in 1870, just a year before that of Germany. Or perhaps not so surprising – the political divisions of the Italian peninsula may have been precisely what motivated the creation of cultural unity through linguistic means.

In the Romance-speaking world during the thousand years from the fall of the Roman Empire to the Renaissance, 'language' meant Latin, used for all official and written purposes, though what people spoke in nonofficial contexts was a local dialect, historically related to Latin though significantly different from village to village. There was, then, no 'Italian language.' That concept and its realization are credited – heroically, and again only semimythically – to Dante, author of the *Divina Commedia*. Dante's treatise *De vulgari eloquentia* (c. 1306), not published until 1529, lays out the process by which he claimed to discover, not invent, the national language of a nation that would take five and a half centuries to emerge politically. To the modern reader this all seems a fiction, a pretense of discovery in what will actually be Dante's invention of an illustrious vernacular – which will in turn camouflage how much of it is actually based on his native Tuscan. But Dante's *volgare illustre* became the template on which other modern European standard languages were modeled.

Once the national languages existed, however, their invention was promptly forgotten. The people for whom they represented national unity inevitably came to imagine that the language had always been there, and that such dialectal difference that existed within it was the product of recent fragmentation, when in fact it had preceded the unification by which the national language was forged. In the words of one prominent historian:

> National languages [. . .] are the opposite of what nationalist mythology supposes them to be, namely the primordial foundations of national culture and the matrices of the national mind. They are usually attempts to devise a standardized idiom out of a multiplicity of actually spoken idioms, which are downgraded to dialects [. . .]. (Hobsbawm, 1990: 51)

By the early 19th century this 'nationalist mythology' would lead to strong Romantic theorizations of national political identity being grounded in a primordial sharing of language. One of the strongest expressions was that of Fichte:

> The first, original, and truly natural boundaries of states are beyond doubt their internal boundaries. Those who speak the same language are joined to each other by a multitude of invisible bonds by nature herself, long before any human art begins; they understand each other and have the power of continuing to make themselves understood more and more clearly; they belong together and are by nature one and an inseparable whole. (Fichte, 1968 [1808]: 190–191)

Fichte was writing to rouse the 'German nation' to repel the advance of Napoleon. He was successful in doing so. However, in 1870 the shoe was on the other foot, when the Franco-Prussian War led to the German annexation of Alsace, a German-speaking province that had been part of France for more than two centuries and whose population was mainly loyal to France, despite their linguistic difference. This provoked a sharp turn away from the Fichtean view on the part of French linguists such as Renan (1882), who formulated a new view of national identity as based not on any primordially determining characteristic such as language, but on a shared will to be part of the same nation, together with shared memories.

The nation, in other words, exists in the *minds* of the people who make it up. This is the conception that Anderson (1991: 6) would return to in defining the nation as "an imagined political community." The 'legacy of memories' Renan pointed to would dominate future philosophical and academic attempts to analyze national identity. The other element, the collective 'will' of the people, would, however, have the deepest political impact, starting with the redrawing of the map of Europe at Versailles in 1919. It has continued to be the assumed basis for the legitimacy of the political nation up to the present time.

Billig, a colleague and collaborator of Tajfel, has explored how the "continual acts of imagination" on which the nation depends for its existence are reproduced (Billig, 1995: 70), sometimes through purposeful deployment of national symbols, but mostly through daily habits of which we are dimly aware at best. Examples include the national flag hanging in front of the post office and the national symbols on the coins and banknotes we use each day. Billig introduced the term *banal nationalism* to cover the ideological habits that enable the established nations of the West to be reproduced. In Billig's view "an identity is to be found in the embodied habits of social life" (Billig, 1995: 8), including language. Smith (e.g., 1998, Chapter 8) has emphasized how much of the effort of nationalism construction is aimed at reaching back to the past in the interest of 'ethno-symbolism,' and this can be seen particularly in the strong investment made by modern cultures in maintaining the 'standard language,' by which is meant a form resistant to change, hence harking backward. Hobsbawm placed great stress on the fact that enthusiasm for linguistic nationalism has historically been a phenomenon of the *lower middle class*.

> The classes which stood or fell by the official use of the written vernacular were the socially modest but educated middle strata, which included those who acquired lower middle-class status precisely by virtue of occupying non-manual jobs that required schooling. (Hobsbawm, 1998: 117)

These are also the people who become the mainstay of nationalism – not just by active flag-waving on symbolic occasions, but daily in the banal ways pointed to by Billig, including their use of 'proper language' and their insistence on its norms, for instance in conversation with their own children. Hobsbawm has suggested that, in Victorian times, the pattern was established whereby the lower middle classes (artisans, shopkeepers, and clerks) enacted their national belonging by showing themselves to be "the most 'respectable' sons and daughters of the fatherland" (Billig, 1998: 122). In other words, although their real identity was that of a social class, they masked it for themselves and others in a nationalistic guise. The mask was double-sided: in their obsession with 'speaking properly' as a mark of respectability, they were contributing to the linguistic construction of their nation.

At the start of this article, I wrote that identities are, first and foremost, names, and that the work of identity construction consists of supplying meaning for the name. In the case of national identity, language has traditionally been a key ingredient in this process for at least five reasons:

1. Groups of people who occupy contiguous territory and see themselves as having common interests tend to develop, over long stretches of time, ways of speaking that are distinctive to them, marking them out from groups who either are not geographically adjacent to them or else are perceived

as having different, probably rival, interests. In other words, language does tend to mark out the social features on which national belonging will come to be based – but it is only a tendency, because it also happens very frequently that the same way of speaking is shared by people with very different interests (religious ones, for instance), and that markedly different ways of speaking exist among a group of people who nonetheless see themselves as part of the same nation.

2. The ideology of national unity has favored a view that nations are real because those within them share a deep cultural unity, and this has coexisted with a widespread – indeed, nearly universal – belief that deep cultural unity is the product of a shared language. This is what Fichte meant by the 'invisible bonds' by which nature has joined those who speak the same language. Again, as with (1), it cannot be more than a tendency, because it is not the case that people who identify themselves as belonging to the same culture or nation think identically. Yet language is central to the *habitus* (an ancient term revived by Bourdieu): the fact that we spend our formative years attending long and hard to the task of learning words and their meanings from those around us results in our acquiring tastes, habits, and ways of thinking from them that will endure into adult life. The language does not somehow transmit culture and identity to its speakers – rather, the language is the *text* through the constant interaction with which older speakers transmit culture and identities (local and personal as well as national, ethnic, and religious) to the young. (In many cases the young will want an identity of their own and will attain it first of all by resisting the imposition of culture upon them by their elders.)
3. In addition to being the text of cultural transmission, the language is the principal medium in which texts of national identity in the more usual sense will be constructed. It is not the only such medium, nor the only powerful one, as Billig's exposition of 'banal nationalism' has shown. But the particular concepts that constitute a national identity correspond to words in the national language, embodied in 'sacred texts' of the nation such as a constitution or key works of the national literature, including the national anthem.
4. As universal education is adopted throughout the nation, inculcating standards of 'correct' language assumes a central role. Overtly, this is from a perceived duty to maintain the culture. However, as Hobsbawm has shown, such is the force of the language-culture-nation-class nexus that, especially for the upwardly mobile members of the lower middle class, being a 'proper' citizen and member of the community is inseparable from using 'proper' language.
5. Insofar as nations are not the historical essences they purport to be, but are constructs that inevitably involve a certain amount of arbitrary and even capricious divisions and classifications, when a nation wants to control who can live in it, vote in it, and enjoy state benefits, language can appear to be the most obvious test for deciding whether particular individuals belong to the nation or not. Most nations no longer have laws based on racial classification – which are rarely easy to apply in any case – yet many do require cultural qualifications to be met, which are likely to include language either overtly or indirectly.

Each of these factors has reinforced the others in giving the national language the force of a cultural–historical 'ethno-symbolic' myth as suggested by Smith (see earlier discussion). Within each, too, there is a contradiction or a caveat that has periodically pendulum-swung to prominence, such that the loss of belief in the national language and all it stands for is always potentially there and is bound to come to the fore at least periodically. The question that is unanswerable for now is whether national languages, together with the nations to which they are attached, represent a historical phase that is now on a course of decline heading for eventual disappearance, to be replaced with 'glocalization' – a term that has been coined to denote the combination of globalization with the resurgence of local, subnational sites of belonging – or whether they are an invention that has proven too useful for human social organization to be given up.

See also: Communities of Practice; Ethnicity; Ethnolinguistic Vitality; Gender; Interactional Sociolinguistics; Language Attitudes; Multiculturalism and Language; Social Class and Status; Sociolinguistic Crossing.

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Identity and Sameness: Philosophical Aspects

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Introduction

'Identity' and 'sameness' mean the same; their meanings are identical. However, they have more than one meaning. A distinction is customarily drawn between **qualitative** and **numerical** identity and sameness. Things with qualitative identity share properties; so things can be more or less qualitatively identical. Poodles and Great Danes are qualitatively identical because they share the property of being a dog, but two poodles will (very likely) have greater qualitative identity. Numerical identity, however, is not a matter of more or less. Numerical identity requires absolute qualitative identity and can hold only between a thing and itself. Its name implies the controversial view that it is the only identity relation in accordance with which we can properly count (or number) things or at least that so counting has a special status: x and y are to be counted as one just in case x is numerically identical with y.

Numerical identity is our topic. It is at the center of various philosophical puzzles but seems to many to be utterly unproblematic – for what could be less problematic than the notion just characterized: that of the relation that everything has to itself and to nothing else? A possible resolution of this apparent paradox (Lewis, 1986) is that there are indeed genuine puzzles stated in the language of numerical identity, but they

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Identity and Sameness: Philosophical Aspects

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Introduction

'Identity' and 'sameness' mean the same; their meanings are identical. However, they have more than one meaning. A distinction is customarily drawn between **qualitative** and **numerical** identity and sameness. Things with qualitative identity share properties; so things can be more or less qualitatively identical. Poodles and Great Danes are qualitatively identical because they share the property of being a dog, but two poodles will (very likely) have greater qualitative identity. Numerical identity, however, is not a matter of more or less. Numerical identity requires absolute qualitative identity and can hold only between a thing and itself. Its name implies the controversial view that it is the only identity relation in accordance with which we can properly count (or number) things or at least that so counting has a special status: x and y are to be counted as one just in case x is numerically identical with y.

Numerical identity is our topic. It is at the center of various philosophical puzzles but seems to many to be utterly unproblematic – for what could be less problematic than the notion just characterized: that of the relation that everything has to itself and to nothing else? A possible resolution of this apparent paradox (Lewis, 1986) is that there are indeed genuine puzzles stated in the language of numerical identity, but they

are not genuinely puzzles about identity, as they can be restated not using it. Philosophical debates about identity of which this is not true are just confusions.

The Logic of Identity

Numerical identity can be characterized, as just done, as the relation everything has to itself and to nothing else. But this is circular, because 'nothing else' just means 'no numerically non-identical thing.' It can be defined, equally circularly, as the smallest equivalence relation (an equivalence relation being one that is reflexive, symmetric, and transitive). Other circular definitions are available. Usually it is explained as the equivalence relation satisfying Leibniz's Law, the principle of the indiscernibility of identicals, that if x is identical with y then everything true of x is true of y. Intuitively this is right, but only satisfactory if 'what is true of x' is understood to include 'being identical with x'; otherwise, it is too weak to serve uncontroversially as a unique characterization of identity. Circularity is thus not avoided. The converse of Leibniz's Law, the principle of the indiscernibility of identicals, that if everything true of x is true of y, x is identical with y, is correspondingly trivial if 'what is true of x' is so understood, but with 'what is true of x' restricted, e.g., to qualitative, non-relational properties, becomes philosophically controversial.

Leibniz's Law itself has been subject to controversy in the sense that the correct explanation of apparent counterexamples has been debated. It is informative to be told that Hesperus is Phosphorus, but not that Hesperus is Hesperus (Frege, 1969); Giorgione was so-called because of his size, Barbarelli was not (Quine, 1963). Are these not cases in which something is true of x (Hesperus, Giorgione) but not of the identical y? No. The cases only illustrate the need for distinguishing Leibniz's Law from the principle of substitutivity: if 'x' and 'y' are co-designators they are substitutable everywhere without change of truth-value. The cases are not counterexamples to Leibniz's Law, but how best to explain such failures of substitutivity is debatable.

Relative and Absolute Identity

The view that characterizes identity as the equivalence relation that everything has to itself and nothing else and that satisfies Leibniz's Law may be called the classical view. These formal properties ensure that within any theory expressible by means of a fixed stock of one- or many-place predicates, quantifiers and truth-functional connectives any two predicates that can be regarded as expressing identity will be extensionally equivalent. They do not, however, ensure that a two-place predicate does express identity within a particular theory, for it may simply be that the descriptive resources of the theory are insufficiently rich to distinguish items between which the equivalence relation it expresses holds (Geach, 1972). For example, 'has the same income as' will satisfy these conditions in a theory whose descriptive resources do not enable one to distinguish persons with the same income (by not containing, e.g., the predicates 'is male,' 'is female').

Following Geach, call a two-place predicate with these formal properties in some theory an 'I-predicate' relative to that theory. Relative to a richer theory the same predicate, identically interpreted, may not be an I-predicate. If so it will not, and did not even in the poorer theory, express identity.

Quine has suggested that when a predicate is an I-predicate in a theory only because the language is limited, its sentences always can be reinterpreted so that the I-predicate in the newly interpreted theory does express identity. Each sentence will retain its truth-conditions, but the references of its subsentential parts will be different. Thus, Quine suggests, in a language that cannot distinguish possessors of the same income the predicates may be reinterpreted so that the predicate that previously expressed **having the same income** expresses identity. Correspondingly, there will be a shift in the ontology of the theory (from people to income groups) (Quine, 1963).

This situation provides the basis for one philosophical controversy about identity, whether identity is relative. Geach maintains that as no criterion can begiven by which a predicate expressing an I-predicate may be determined to express, not merely indiscernibility relative to the language, but absolute indiscernibility, we should jettison the classical notion of identity (Geach, 1991). Others, following Quine, regard classical identity as an always-legitimate interpretation of an I-predicate and indispensable to our understanding of quantification (Quine, 1963; Dummett,1991; Hawthorne, 2003).

Another, related, question, is whether numerical identity deserves its name. The procedure we use in counting is as follows: assign '1' to an object x and to whatever bears R to it and to nothing else, assign '2' to an object y to which '1' has not been assigned, to whatever bears R to it and to nothing else.... The number arrived at will be the number of objects in the domain counting by R. If R is an equivalence relation this procedure will yield a unique result. If R is not numerical identity a larger count will be possible using numerical identity, but if R is numerical identity no larger count will be possible. Thus, things related by numerical identity have to

be counted as one, whereas things related by weaker equivalence relations can be, but need not be, counted as one. So if numerical identity, classically characterized, is ever an intelligible interpretation of an I-predicate, it deserves its name.

Criteria of Identity

Leibniz's Law characterizes identity but provides no means of recognizing it – we cannot ever determine that x is y by first of all checking that everything true of x is true of y. Thus, we apply **criteria** of identity, standards by which identity is to be judged. Different kinds of thing have different criteria of identity and criteria of identity themselves have different logical forms. One distinction is between one-level and two-level criteria of identity (Williamson, 1990) for objects. The criterion of identity for numbers is two-level. The number of Fs is the number of Gs if and only if a one-one correlation exists between the concept F and the concept G. Numbers are the objects for which the criterion is stated but the condition is given as a relation not on those objects but on concepts (Frege, 1950). By contrast, the criterion of identity for sets given by the Axiom of Extensionality (sets are the same if they have the same members) and Davidson's (1980) criterion of event identity (events are the same if they have the same causes and effects) are one-level, the condition is given as a relation on the very objects for which the criterion is stated. Not all criteria of identity can be two-level. But it does not follow that the only legitimate notion of a criterion of identity remaining is that of a one-level criterion. Another option (Dummett, 1981) is to deny that a criterion of identity must be regarded as a criterion of identity for a type of **object**. At a basic level, on this view, what a criterion of identity is a criterion for, is the truth of a statement in which **no** reference to objects occurs. Such a statement may be expressed using demonstratives, for instance, by saying, 'This is the same cat as that,' pointing first to a tail and then a head. In this the demonstratives need not be construed as referring to objects anymore than reference is made to objects in a feature placing sentence such as, 'It's cold here' or 'It's colder here than there.'

Identity over Time

Criteria of identity can be employed synchronically, as in the example just given, or diachronically, to determine identity over time. Identity over time is a controversial notion, however, because time involves change. Heraclitus argued that one could not bathe in the same river twice because new waters were ever flowing in. Hume argued that identity over time was a fiction we substitute for a collection of related objects. Such views can be seen as based on a misinterpretation of Leibniz's Law: if a thing changes something is true of it at the later time that is not true of it at the earlier, so it is not the same. The answer is that what is true of it at the later time is, say, 'being muddy at the later time,' which was always true of it; similarly, what is true of it at the earlier time, suitably expressed, remains true of it. But the question remains of how to characterize identity across time through change given that such identity exists. On one view, a persisting object is to be thought of as perduring, having different temporal parts at different times, on another it is to be thought as enduring, existing at different times in its entirety (Lewis, 1986). On the former view, temporary qualities like being muddy are genuinely qualities but are possessed by the temporal parts of the persisting object, not the object itself. On the latter view, they are relations in disguise, relations that the persisting object stands in to different times.

Contingent Identity

Another controversy about identity is whether it can obtain contingently. Of course, there are contingently true identity statements – 'Benjamin Franklin was the first Postmaster General of the United States' – but Kripke (1980) argued that when the expressions flanking the identity sign were rigid designators designating the same object across all possible world (unlike 'the first Postmaster General') the identity statement had to be necessarily true, if true at all. Relatedly, he argued that identity itself was a necessary relation.

But some examples suggest that this conclusion is too sweeping – that even identity statements containing rigid designators may be, in a sense, contingently true. Consider a statue, Goliath, and the clay, Lumpl, from which it is composed (Gibbard, 1975). Imagine that Lumpl and Goliath coincide in their spatio-temporal extent. It is tempting to conclude that they are identical. But they might not have been. Goliath might have been rolled into a ball and destroyed, Lumpl would have continued to exist. The two would have been distinct.

The debate over contingent identity is concerned with the proper analysis of such examples.

Vague Identity

Like the impossibility of contingent identity, the impossibility of vague identity appears to be a straightforward consequence of the classical concept of

identity (Evans, 1978). For if a is only vaguely identical with b, something is true of it – that it is only vaguely identical with b – that is not true of b, so by Leibniz's Law, it is not identical with b at all. Of course, there are vague statements of identity – 'Princeton is Princeton Borough' (Lewis, 1988; 'Princeton' is indeterminate in denotation in standard usage between the township and the borough) – but the conclusion appears to follow that such vagueness is only possible when one or both of the terms flanking the identity sign is an imprecise designator. Relatedly, it appears to follow that identity itself must be a determinate relation.

But some examples suggest that this conclusion is too sweeping – that even identity statements containing precise designators may be, in some sense, indeterminate. Consider Everest and some precisely defined hunk of rock, ice and snow, 'Rock,' of which it is indeterminate whether its boundaries coincide with those of Everest. It is tempting to think that 'Everest' and 'Rock' are both precise designators (if 'Everest' is not is anything?) and that 'Everest is Rock' is nonetheless in some sense indeterminate (Tye, 2000).

The debate over vague identity is concerned with the proper analysis of such examples.

See also: Coreference: Identity and Similarity.

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Identity in Sociocultural Anthropology and Language

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Reflections of Identity in Language Use

The main focus of studies of language and identity in sociocultural anthropology (LISA) is on the interplay between global cultural categories ('census identities' such as gender, race, class, or others that may be culturally salient, such as kinship identities), and how these identities are constructed, performed, or challenged locally in speech events through linguistic forms. One of the distinguishing characteristics of the LISA approach is that rather than taking census and other identity categories as pre-given, it investigates how these categories are made relevant by and for language users. It is important to understand that LISA research does not lose sight of the larger picture; it attempts to discover how speakers' ideologies about census identities shape, and are shaped by, interaction. Identity as viewed in this tradition is therefore emergent but constrained: identities are created and re-created when speakers are actually talking to each other, but the way these identities emerge is contingent on the speakers' sociocultural discourses and ideologies.

Identities are named 'relationships' in cultural ideologies and interactions; identity categories such as census identities are a shorthand for identifying – and thinking about – the many ways that a person relates to others in the community.

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The debate over vague identity is concerned with the proper analysis of such examples.

See also: Coreference: Identity and Similarity.

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Identities are named 'relationships' in cultural ideologies and interactions; identity categories such as census identities are a shorthand for identifying – and thinking about – the many ways that a person relates to others in the community.

For example, by referring to gender or drawing on a gender identity in interaction, a person calls up a bundle of culturally-shared relationships to other people in their culture. A man may call up solidarity with another man through cultural ideologies of masculinity that identify men as a class of people who share certain social traits. In this sense, identities are 'imaginary' (cf. Anderson, 1991 on imagined communities and nationalism) or 'figured worlds' (Holland *et al.*, 1998). Because identities are relational, a person has no single fixed identity, only identities constructed and contextualized in interaction (and to the extent that an identity is psychologically real, it is based on the self's conception of its place in psychologically idealized models of interaction). LISA studies investigate the tension between ideologies of identity categories and their emergence in interaction through language and other communicative modes. LISA does not study the motivation of speakers to join identity categories, but it does show how such categories are reproduced in ideologies and cultural discourses through talk.

We might suppose that the most straightforward way of claiming an identity is to speak the language of that identity: one is Tongan when one speaks Tongan, Uzbekh when one speaks Uzbekh, etc. But this view is destabilized when speakers are multilingual (which seems to be the larger portion of the world's population). Does a Black-American-Heterosexual-Woman become Dominican when she uses Dominican Spanish, or an Australian when she uses Australian English? By investigating just these kinds of situations (Bailey, 2001) LISA researchers have shown that the 'language-equals-identity' model is too simple to represent actual interaction. This research challenges the notion that languages are single, invariant entities, and has shown that a language is full of many different voices: registers, styles, varieties, and even other languages. At the same time, LISA analyses incorporate speakers' own ideologies of language. For although we might objectively observe that language use is never pure, the subjective ideologies of language users is often quite different. Language users' understandings of "how language is supposed to be" affect the way they use it: they bias performance in certain directions, as sociolinguistic variationists have been able to measure.

The terms most used for such a mixed view of language in LISA are heteroglossia and polyphony, from the work of Russian literary theorist Mikhail Bakhtin. Bakhtin (1981) argued that words (and by extension other linguistic forms) carry the 'voices' of previous uses, into current contexts of use. That is, words have meanings beyond pure denotation and carry the residue of earlier situations of use. Heteroglossia, as Bakhtin uses the term, refers to the tension between the pure official language and more vernacular forms of language existing in a language community and used in a single text. Polyphony refers the use of different languages or varieties that meet on an equal footing (cf. Morris, 1994: 248–249). Bakhtin's focus was the novel, but LISA researchers have shown that heteroglossia and polyphony obtain in everyday conversation, and these properties of language help people to create identities in interaction. This view destabilizes both the simplistic view of 'a language,' and the assumption that by using a particular linguistic feature (e.g., word, pronunciation, or syntactic construction), one can perform an identity connected with a culturally-relevant population that is thought to use that linguistic feature.

Meanings that rely on the current or previous context, or both, are known as indexical meanings. All languages have such indexical meanings as part of their grammar. In English, the meanings of words such as *I* and *you* are associated with actual people only in the moment of speaking. Thai pronouns indicate not only speaker and addressee, but also their relative ages and genders (Simpson, 1997). Most indexical meanings – whether in a grammar or not – relate to the aspect of context that provides information about the speaker's identity. A linguistic feature indexes an identity because someone of that same culturally-relevant identity category has used it before, or has been represented as using it before (e.g., in media). Speakers rarely assert **directly** that they are, for example, a woman, or white, or Bosnian (although they do at times, and these moments are all the more interesting for their rarity). Rather, speakers more often rely on the processes of indexicality to create their identities.

Theorizing indexical meaning as it relates to identity has been the focus of much of the work of Michael Silverstein (1976, 1996) and Elinor Ochs (1992, 1993), who have made a number of important distinctions among indexical meanings that are crucial for understanding how identity and language are theorized. The first distinction is between direct and indirect indexicality (Ochs, 1992). Direct indexicality is a meaning relationship that holds directly between language and the stance, act, activity, or identity indexed. For example, in English, using certain syntactic forms such as imperatives will generally directly index a relationship of power. The imperative is associated with the context of a speaker who has the power to force the addressee to perform the action stated in the imperative. Indirect indexicality arises when the social relationship (in this case, power) is further indexed to an identity category, such as

masculinity. Thus we might notice that men use more imperatives than women, or there might exist (as in the United States) a cultural discourse such that men are supposed to be more authoritative than women. When this supposed connection is discovered, we might be tempted to say that imperatives index masculinity; however, it would be more accurate to say that imperatives indirectly index masculinity because they directly index power, and power is in turn associated with masculinity.

An illustration of this process can be seen in the American English address term *dude* (Kiesling, 2004). *Dude* is used most frequently by young white men, and indexes a stance of casual solidarity: a friendly, but crucially not intimate, relationship with the addressee. This stance of casual solidarity is a stance habitually taken more by young white American men than other identity groups. *Dude* thus indirectly indexes young, white, masculinity as well.

Such descriptions of indexicality are abstract, however, and do not take into account the actual context of speaking, such as the speech event and the identities of the speakers determined through other perceptual modes, such as vision. One of the most difficult aspects of indexicality is that indexes not only call up the previous contexts in which a linguistic feature has been used, but what previous context they call up can be influenced by the current context. Indexical meanings thus interact with the context of speaking, such that the (assumed or 'pre-existing') identity of the speaker can affect the indexicality of a form even as that form is seen as performing an identity. For example, in the United States, often when a women uses an imperative, a particular kind of authority – motherhood – is indexed: when a woman tells a friend (particularly a man) to "put on your coat," the response is often sarcastically, "Yes, mother." In this example, the use of an imperative directly indexes a stance of authority. In the dominant American cultural discourses of femininity, authority is indexed only in the context of motherhood, so this feminine role is indirectly indexed and available for comment by the addressee of the imperative. Such a response is not made when the speaker is known to be a man (unless the addressee wishes to refigure the speaker as a woman for some reason, in which case the layers of indexicality begin to become thick and tangled). One might argue that the content of the imperative is what indexes motherhood: mothers order their children to do things for the children's own good, especially putting on coats. This argument only points out just how specific indexicality can be, however, as a single phrase can call up the stereotypical class of people known in the United States as 'mothers.' In addition, we might observe that imperatives used by women are more often than not used with such 'motherly' content. In any case, note how even such a brief, unremarkable use of language leads to an intricate web of identity indexes. Such are the minute, commonplace, but complex indexical meanings that rely on and recreate identity discourses and ideologies.

These indexicalities are thus both sensitive to and indexical of social context and the other possible relevant identities being performed in a particular instance of talk-in-interaction. Bonnie McElhinny's (1994) study of police officers in Pittsburgh, Pennsylvania, is particularly relevant in this light. She showed that when the identity of being a police officer is salient in an interaction, such a speaker tends to use less affect in her or his speech. This lack of affect indexes a distant, emotionless stance, a stance that is not indexical of femininity in Pittsburgh. However, the women officers told McElhinny that they did not feel less feminine in these situations, because gender is less relevant as an interactional identity; in such interactions they think of themselves primarily as police officers. As women have joined men on the police force, the affectless and emotionless stance has thus come to index not so much masculinity, but 'police officer.'

Further complicating the connections between linguistic form and identity is the fact that indexes are always potentially creative as well as presupposing (Silverstein, 1976). That is, an index can be used to change what is in play in the context (creative) rather than simply respond to the already mutually understood context (presupposing). The classic example of such context-changing uses is that observed by Blom and Gumperz (1972) in Hemnesberget, Norway. In Hemnesberget at that time there was a diglossic situation in which the linguistic variety of Norwegian known as Bokmål was the official language of government and commerce, while Ranamål was the local variety (dialect) more typically used for intimate settings. Blom and Gumperz described an instance in which an inhabitant goes to the community office for official business and interacts with another local inhabitant with whom he is friends. The official business is conducted in Bokmål (indexing in a presupposing manner the situation), but when the official business is finished, the customer switches to Ranamål to indicate he wishes to have a less formal conversation about local matters. This switch from Bokmål to Ranamål is a creative index, because it changes the context from formal to informal, rather than responding to an external cue such as a change of setting or the arrival of a new participant.

While this distinction between creative and presupposing indexicality is important and useful to begin with, LISA researchers have more recently emphasized the fact that indexes always have both a creative and a presupposing aspect. Sidnell (2003), for example, described how language is used to create a male space in a Guyanese rum shop. While this setting is understood by the Guyanese to be a male space, it is nonetheless often populated by women for various reasons. Sidnell analyzed a stretch of talk-in-interaction in which one of the men drinking in the rum shop designs "his talk . . . to preserve the observable gender exclusivity of the activity" (2003: 338). That is, the way his talk is designed makes the space a male one even when he is addressing a woman in it, and thereby helps to recreate the 'male-only' context, in effect (creatively) peripheralizing women who are present.

A final complication comes from the 'level' of knowledge that speakers use in interpreting indexical meaning. While most indexical meanings are not overtly discussed by speakers, some linguistic features nevertheless become the focus of social discussion and overt knowledge. For example, Americans have become aware of, and can articulate, the masculine indexicality of *dude* (they are aware of its use on this societal level), but have much more trouble explaining what it means in terms of local stances. Morford (1997) analyzed the use of second-person pronouns in French in this light. She showed that on one level of indexicality, the use of *tu* and *vous* in French indexes a relationship between two speakers based on a reciprocal vs. asymmetric use of the forms. However, Morford found that French speakers have a knowledge about (for example) what kinds of families have asymmetric use between parents and children, and that some speakers make conscious choices about whether to use *tu* or *vous* with other speakers. Most importantly, these choices have to do with the interplay between this metapragmatic awareness and the kinds of identities that speakers wish to create. Morford cites one particularly vivid example of a teacher who explains that he constructs status as a teacher in part through his asymmetric use of second person address with the support staff of the school.

Performance of Identity in Mediated Social Practice

While the distinctions made above are important, individual indexical forms such as 'pronoun' or 'accent' are idealizations of meanings that are tangled in a messy, changing, and locally contestable web of meaning. That is, there are complex meaning relationships not just between a linguistic form and a specific social identity, but that there are also connections of meaning among different kinds of identities, and different social entities and categories such as institutions and census groups. LISA researchers do not search for psychological representations of such links, but rather they investigate the manner in which such connections are created and used in interaction. In fact, these connections need not be present in any individual's psyche before a speech event; it is by participating in the event itself that speakers bring indexicalities and identities about, because they are needed for speakers to 'make sense' of the talk. In this way, LISA is similar to critical discourse analysis (*see* **Critical Discourse Analysis**) in arguing that the interpretations that speakers make of the ongoing talk based on 'background knowledge' or conversational principles (*see* **Pragmatics: Overview**) are not used in a value-free way but are a resource for doing identity in interaction.

One of the most significant bodies of work along these lines is Jane Hill's (1993, 1995, 1998) work on what she calls "mock Spanish." In this work, the process of indirect indexicality and the ideological structuring of background knowledge come together to reproduce racist discourses that are covert even for those using them. Hill took as her starting point the nonce borrowing of Spanish (or forms that resemble Spanish) by Anglos, such as *Hasta la vista, baby*, popularized by actor and politician Arnold Schwarzenegger in the film *Terminator*. Hill showed that these forms of Spanish are used strategically by speakers to create an ironic speaker stance with respect to stereotypically Hispanic (Latino) identity, stances that are often demeaning to this identity category (e.g., lazy, disorderly, given to rudeness), in effect distancing the self from such identities by gently parodying their principal index, Spanish language forms.

A similar process is at work in a conversation I analyzed between two white American fraternity men (Kiesling, 2001). The two men in that conversation discuss the roster of the fraternity's intramural basketball team. Embedded in this discussion is a short exchange in which each boasts about his basketball ability. At strategic points in both parts of this speech event, the interactants use linguistic features of African American Vernacular English (AAVE) (*see* **English, African American Vernacular**) to index their boasting stance, as well as a stance of basketball expertise. The crucial point is that the men are not trying to 'be black,' but they are drawing on an association of 'blackness' with basketball and boasting. In other words, when performing 'basketball player' it helps to perform 'black' as well.

A similar point was made by Bucholtz (1999), who showed that AAVE features are used in a fight narrative told by a white male high school student in California to represent a tough stance. Other articles appearing in the same journal issue as Bucholtz's made similar points and represent an important body of work for LISA understandings of language and identity.

Issues of race and racism in language, and gender and sexism in language have therefore been central in LISA research. Over the past decade, Susan Gal and Judith Irvine (Gal and Irvine, 1995; Irvine, 2001) have developed an influential set of concepts for understanding how speakers' ideologies of language are involved in the social production of indexicals of identity categories. Their view recognized three semiotic effects of ideology as a factor in indexicality: iconicization, recursivity, and erasure. Iconicization is the ideological endowing of a linguistic feature with and characteristic that is taken to be like some essence of a recognizable identity or type of person. In the example from Hill above, mock Spanish is understood to be iconic of some inherent characteristic, laziness or disorderliness, of Spanish speakers. Recursivity is the manner in which ideologies are represented in parallel recurring form with respect to multiple levels of social organization. In the example above, stereotyped differences between black and white men in the United States (the stereotyped black characteristics of athletic prowess and fighting ability) become the basis for negotiating differences between fraternity brothers, both of whom are white. In effect this use recursively reproduces the black-white identity distinctions in interactions with only white male speakers. Finally, erasure is the effective simplification of both formal and sociological complexities of experience, and can render all but a single term of a schematic dichotomization invisible to speakers. In all of the above examples, the Anglo white language style is invisible as a specifically alternative register, while the Spanish and AAVE are marked and highly salient; the white Anglo vernacular register is erased and re-enforced as normative by such uses, rendering its social peripheralizing power less visible.

Studying Identity through Language and Contextualized Language Variation

Up to this point, we have generally focused on language and identity as performed when speakers use languages or varieties they recognize as different. But the processes of indexicality, and the tendencies toward iconization, recursivity, and erasure are at work even when a single variety is being used, not only when varieties (or languages) are mixed. As sociolinguistic variationists continually remind us, language is inherently variable in both grammar and use (Guy, 1996); such variability is a valuable resource for speakers in identity work. Several researchers have been incorporating insights from LISA studies into the search for how this variability is used by speakers to create social meaning.

Penelope Eckert (2000, 2002) is the most prominent of these researchers and has done the most to move this new perspective of meaning in variation forward. She advocates understanding variation as a resource for creating personal styles and "stylistic practice as a process of *bricolage*, in which ways of being are transformed through the strategic reuse of meaningful resources." (2002: 5) In her ethnographic analysis of sociolinguistic variation in a Detroit-area high school, she showed how vowel variants vary alternately with other aspects of social practice and style, such as 'cruising' (driving around a particular route with friends without a destination) and wearing wide pants cuffs. She showed that while the variables she analyzed have general meanings throughout the school (e.g., whether they are associated with the urban rather than suburban areas of Detroit), they are used in specific clustered ways to create personal styles by individuals.

Students of Eckert's are moving this view of variation and identity forward considerably. Sarah Benor (2001) investigated how the language of Orthodox Jews differs depending on their background and orientation to integrate into the Orthodox community. Her work is significant in two respects. First, it showed that identity is not just about the outward practices and styles of speakers, but that the internal orientations and ideologies of speakers can influence their use of language, and that the relationship between these orientations and language use are not necessarily linear. Second, she showed that adults, as they become integrated socially and ideologically into a new community with a different way of speaking (even if that new way is based on the rate of use of a linguistic variant), can change their speech to the new way of speaking. This finding suggests that speakers have much more control over how they speak than is often assumed. Benor's work showed further the Eckertian view that most variables provide general meaning resources that acquire specific meanings in local contexts, since each analyzes essentially the same linguistic form, but show how its indexicality changes depending on the community and the individual speaker's style.

I have been working with a more atomistic view than Eckert's, but one that is consistent with her perspective. This view focuses on the performance

of stances in interaction rather than personal styles. We can understand Eckert's personal styles to be repertoires of stances; the variables used habitually by speakers to create these styles are primarily concerned with creating stances – relationships of the moment. In an analysis of the *-ing* variable used in a college all-male fraternity in the United States (Kiesling, 1998), I showed that the men who speak with a high rate of the 'standard' velar variant [-ŋ] in meetings are more likely than those whose rate is lower to be taking a stance at that point highlighting their structural power in the fraternity (through age or office-holding). These men also use grammatical forms that help them take an epistemic stance of certainty. Men who use the nonstandard coronal articulation [-n] in meetings tend to take a stance that highlights their connections to the aggregate of men (solidarity) or their ability to work hard for the fraternity. They also tend to use more profanity and other nonstandard features, such as double negatives and *ain't*. The point is that these differing rates of the variable shows the fraternity men to be taking particular stances at various points in specific interactions; it is not just that each man is from a certain class or ethnic background and uniformly reflects that in speech production. Moreover, one can explain why – in the context of the situation, the man's personality, and cultural discourses and ideologies of masculinity, for example – he would take such a stance. This focus on stance moves us further toward an explanation of why speakers use the forms they do, and how these forms mean in interaction.

Such an interactionally local understanding of the indexicality of linguistic forms does not entail that wider cultural discourses, in this case norms of gender, are not also being indexed. In fact, we see here how the meanings of variation also exhibit the property of recursivity: the kinds of stances that the men take, sorting themselves out relationally, are all stances that index masculinity in their culture as well. In other words, they are able to 'be men' of one or another sort – not more or less male – while they are using **either** variant, because the dominant cultural discourses of masculinity include approved types that are both structurally or intellectually powerful (the standard users) and that are friendly or physically powerful (the nonstandard users). These cultural discourses are being recursively played out in the momentary stances the men take in the meetings.

In terms of method, in all of these directions of research, we find a curious marriage between the quantitative, objective, paradigm of variationist linguistics and the qualitative, subjectively-focused view of culture and interaction from sociocultural anthropology. One of the crucial ways that anthropology has informed the study of language and identity is in fact a focus on the speaker's interpretive frameworks, to which we turn now.

Ethnographic Investigation of People's Interpretive Frameworks

One of the strengths of LISA studies is the in-depth investigation of the speakers' interpretive frameworks – how speakers themselves respond to language as reflective or constitutive of identity. This metapragmatic awareness, and its relationship to other indexicalities, is an important area of research in LISA. Silverstein (2001) proposed a classification that specifies under what kinds of conditions, and how, a linguistic form is likely to be accessible to metapragmatic awareness. While there is not space to explain these principles here, Silverstein's work suggested that certain types of linguistic forms are more accessible resources for speakers to use to connect with identities.

Holland and Skinner (1987) took another approach, and argued that identities be understood as organized in the cultural models that speakers hold for the world. Such models are more specific than ideologies; they are in essence normative narratives of life trajectories or domains to which actual people are compared, especially in language. Holland and Skinner used the cultural model concept to understand how women at a southern U.S. college semantically organize the language they use to describe men.

Such interpretations of the relationship between language and identity are beginning to be articulated with traditional dialectological questions about how language relates to place. Johnstone (2004a, 2004b) suggested that a speaker's emplacement – that is, being culturally connected to place – is not simply another census identity, but one that is discursively negotiated like others. Speakers who live in the same geographical space take different orientations to it as a culturally meaningful place, and local dialect forms may function in various ways in everyday talk, in self-conscious performances, and in metalinguistic talk about the dialect, to index these orientations. The use of dialect forms to index orientation to place may help determine which forms are preserved and which are lost over time. This work indicates that even such taken-for-granted categories as place are ideologically organized by speakers, and that this ideological organization can affect the way speakers use language, and its meaning in terms of identities.

Language and Identity over Time

Future research in LISA is likely to focus on further understanding the ways in which indexicality works to create identities in interaction, from a number of perspectives. For one, the question of awareness is still a very open one, in which even what counts as awareness is not entirely clear. One can imagine a typology of awareness that can then be matched with Silverstein's accessibility hierarchy. Awareness may also be promoted by the media as well as face-to-face communication, and it is not clear the ways in which these modes of mediation differ for the creation of identity categories and indexicalities. Finally, the ways in which the use of these indexicalities construct and re-create identity categories, and especially relations of dominance among them, will continue to be a puzzle for some time.

See also: Critical Discourse Analysis; Discourse, Foucauldian Approach; English, African American Vernacular; Identity and Language; Media and Language: Overview; Politics and Language: Overview; Pragmatics: Overview; Spoken Discourse: Types; Understanding Spoken Discourse.

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Identity: Second Language

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Interest in second language identity in the field of applied linguistics is best understood in the context of a shift in the field from a predominantly psycholinguistic approach to second language acquisition (SLA) to include a greater focus on sociological and anthropological dimensions of second language learning, particularly with reference to sociocultural, poststructural, and critical theory. Researchers of second language identity have been interested not only in linguistic input and output in SLA, but in the relationship between the language learner and the larger social world. In particular, these researchers have examined the diverse social, historical, and cultural contexts in which language learning takes place and how learners negotiate and sometimes resist the diverse positions those contexts offer them.

Many researchers interested in second language identity are also interested in the extent to which relations of power within classrooms and communities promote or constrain the process of language learning. It is argued that the extent to which a learner speaks or is silent or writes, reads, or resists has much to do with the extent to which the learner is valued in any given institution or community. In this regard, social processes marked by inequities of gender, race, class, ethnicity, and sexual orientation may serve to position learners in ways that silence and exclude. At the same time, however, learners may resist marginalization through both covert and overt acts of resistance. What is of central interest to researchers of second language identity is that the very articulation of power, identity, and resistance is expressed in and through language. Language is thus more than a system of signs; it is social practice in which experiences are organized and identities negotiated.

After tracing the genesis of work in second language identity from the 1970s to the present day, this chapter outlines some of the major theoretical influences on second language identity research. It then examines four trajectories of research that have much promise for the future: identity and investment, identity and imagined communities, identity categories and educational change, and identity and literacy.

The Historical Context

In the 1970s and 1980s, applied linguistics scholars interested in second language identity tended to draw distinctions between social identity and cultural identity. While 'social identity' was seen to reference the relationship between the individual language learner and the larger social world, as mediated through institutions such as families, schools, workplaces, social services, and law courts (e.g., Gumperz, 1982), 'cultural identity' referenced the relationship between an individual and members of a particular ethnic group (such as Mexican and Japanese) who share a common history, a common language, and similar ways of understanding the world (e.g., Valdes, 1986). In my own earlier work (Norton Peirce, 1995), I initially examined identity as a social construct as opposed to a cultural construct because I debated whether theories of cultural identity could do justice to the heterogeneity within the groups encountered and the dynamic and changing nature of identity observed in my research. As Atkinson (1999) has noted, past theories of cultural identity tended to essentialize and reify identities in problematic ways. In more recent years, however, the difference between social and cultural identity is seen to be theoretically more fluid, and the intersections between social and cultural identities are considered more significant than their differences. In this more recent second language research, identity is seen as socioculturally constructed, and scholars draw on both institutional and community practices to understand the

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conditions under which language learners speak, read, and write the target language.

A brief review of some of the articles published in the special issue of the *TESOL Quarterly* on Language and Identity exemplifies the increasingly interdisciplinary approach to second language identity research characteristic of the 1990s. I argued at the time that while the contributors framed their notions of identity in different terms, the similarities between the conceptions of identity were more marked than their differences (Norton, 1997). Thus Morgan (1997), for example, who was particularly interested in *social* identity, nevertheless explored the relationship between intonation and identity with reference to the dominant *cultural* practices of a particular group of Chinese immigrants in Canada. He did not, however, reify these cultural practices, but sought to understand them in relation to the dynamics of ethnicity and gender. Schecter and Bayley (1997), who were particularly interested in *cultural* identity, nevertheless sought to understand their research with reference to larger *social* debates over the terms of Latino participation in American society, suggesting that social relations of class are important in understanding the relationship between language and identity. Duff and Uchida (1997), indeed, collapsed the distinctions between the social and the cultural by arguing for a sociocultural theory of identity in which identities and beliefs are co-constructed, negotiated, and transformed on a regular basis through language.

The diverse research covered in the 1997 *TESOL Quarterly* special issue, as well as special issues of *Linguistics and Education*, edited by Martin-Jones and Heller (1996), and *Language and Education*, edited by Sarangi and Baynham (1996), anticipated the wide range of research on second language identity characteristic of the early years of the 21st century. A number of monographs on the topic have appeared in catalogs and conferences (Day, 2002; Kanno, 2003; Miller, 2003; Norton, 2000; and Toohey, 2000); a growing body of research, common themes of which are discussed below, have been published in a wide variety of journals including *The Modern Language Journal* (Potowski, 2004), *TESOL Quarterly* (Lam, 2000; Maguire and Graves, 2001), and *Journal of Second Language Writing* (Hyland, 2002; Ramanathan and Atkinson, 1999); and there has been the establishment in 2002 of the award-winning *Journal of Language, Identity, and Education*, edited by Tom Ricento and Terrence Wiley, which has already published an exciting array of research on second language identity.

Current research on second language identity conceives of identity as dynamic, contradictory, and constantly changing across time and place. Indeed, a recurring theme throughout much of the research is that of 'transition.' Many of the participants in research projects on second language identity are undergoing significant changes in their lives, whether moving from one country to another (Kanno, 2003) or from one institution to the next (Harklau, 2000). Such transitions can be productive for language learning, providing learners with enhanced skills at negotiating bilingual identities; other transitions can be more problematic, as learners struggle to accommodate changing expectations in different institutional contexts. In such changing sets of circumstances, identities that might be seen as contradictory may in fact be constructed within contexts that are themselves sites of struggle (Cummins, 2000).

Theoretical Influences

A broad range of theorists have been influential in shaping current research on second language identity, most notable of whom are Bakhtin (1981, 1963/1984), Bourdieu (1977, 1979/1984), Weedon, and Lave and Wenger (1991). All of these theorists, while working within diverse disciplinary frameworks, are centrally concerned with both institutional and community practices that have an impact on learning.

Mikhail Bakhtin (1981, 1963/1984) takes the position that language needs to be investigated not as a set of idealized forms independent of their speakers or their speaking, but rather as situated utterances in which speakers, in dialogue with others, struggle to create meanings. For Bakhtin, the notion of the individual speaker is a fiction, as he sees all speakers constructing their utterances jointly on the basis of their interaction with listeners in both historical and contemporary, and both actual and assumed, communities. In this view, the appropriation of the words of others is a complex and conflictual process in which words are not neutral but express particular predispositions and value systems.

Pierre Bourdieu (1977, 1979/1984), a contemporary French sociologist, focuses on the often unequal relationships between interlocutors and the importance of power in structuring speech. He suggests that the value ascribed to speech cannot be understood apart from the person who speaks and that the person who speaks cannot be understood apart from larger networks of social relationships. In this view, when a person speaks, the speaker wishes not only to be understood, but to be believed, obeyed, and respected. However, the speaker's ability to command the attention of the listener is unequally distributed because of the symbolic power relations between them. To redress the inequities between what Bourdieu calls 'legitimate' and 'illegitimate' speakers, he argues

that an expanded definition of competence should include the "right to speech" or "the power to impose reception" (1977: 648).

The work of Christine Weedon, like that of Bakhtin and Bourdieu, is centrally concerned with the conditions under which people speak, within both institutional and community contexts. Like other poststructuralist theorists who inform her work, Weedon foregrounds the central role of language in her analysis of the relationship between the individual and the social, arguing that language not only defines institutional practices, but also serves to construct our sense of ourselves and our "subjectivity" (Weedon, 1987: 21). Weedon notes that the terms *subject* and *subjectivity* signify a different conception of the individual than that associated with humanist conceptions of the individual dominant in Western philosophy. While humanist conceptions of the individual presuppose that every person has an essential, unique, fixed, and coherent 'core,' poststructuralism depicts the individual (i.e., the subject) as diverse, contradictory, dynamic, and changing over historical time and social space.

A shift from seeing learners as individual language producers to seeing them as members of social and historically constituted communities is of much interest to anthropologists Jean Lave and Etienne Wenger. Lave and Wenger (1991) argue that what they call "situated learning" is an integral and inseparable part of social practice, as newcomers are mentored into the performance of community practices. Their notion "legitimate peripheral participation" represents their view that communities are composed of participants who differentially engage with the practices of their community and that conditions vary with regard to ease of access to expertise, to opportunities for practice, to consequences for error in practice, and so on. From this perspective, then, educational research might focus not so much on assessing individual 'uptake' of particular knowledge or skills, but on the social structures in particular communities and on the variety of positionings available for learners to occupy in those communities.

Rather than seeing language learning as a gradual individual process of internalizing a neutral set of rules, structures, and vocabulary of a standard language, the work of Bakhtin, Bourdieu, Weedon, and Lave and Wenger offers applied linguists ways to think differently about language learning. Such theory suggests that second language learners need to struggle to appropriate the voices of others; they need to learn to command the attention of their listeners; they need to negotiate language as a system and as a social practice; and they need to understand the practices of the communities with which they interact. Drawing on such theory, becoming a 'good' language learner is seen to be a much more complicated process than earlier research had suggested (Norton and Toohey, 2001).

Research Trajectories

Research on second language identity has taken a number of interesting directions that hold much promise. The four trajectories I wish to examine address research on identity and investment, identity and imagined communities, identity categories and educational change, and identity and literacy.

Identity and Investment

In my research with immigrant women in Canada (Norton, 2000; Norton Peirce, 1995), I observed that existing theories of motivation in the field of SLA were not consistent with the findings from my research. Most theories at the time assumed motivation was a character trait of the individual language learner and that learners who failed to learn the target language were not sufficiently committed to the learning process. Such theories did not do justice to the identities and experiences of the language learners in my research. For this reason, I made the case that the notion of 'investment' might help to extend notions of motivation in the field of SLA. The notion of investment, inspired by the work of Bourdieu, signals the socially and historically constructed relationship of learners to the target language and their often ambivalent desire to learn and practice it. If learners 'invest' in the target language, they do so with the understanding that they will acquire a wider range of symbolic and material resources, which will in turn increase the value of their cultural capital. Unlike notions of instrumental motivation, which conceive of the language learner as having a unitary, fixed, and ahistorical 'personality,' the notion of investment conceives of the language learner as having a complex identity, changing across time and space, and reproduced in social interaction. An investment in the target language is best understood as an investment in the learner's own identity.

The notion of investment has sparked considerable interest in the field of applied linguistics (see Pittaway, 2004). McKay and Wong (1996), for example, have drawn on this concept to explain the English language development of four Mandarin-speaking students in Grades 7 and 8 in a California school. They note that the needs, desires, and negotiations of students are not simply distractions or deviations from an ideal language learning situation; on the contrary, they

must be regarded as constituting "the very fabric of students' lives and as determining their investment in learning the target language" (McKay and Wong, 1996: 603). Angelil-Carter (1997) found the concept useful in understanding the language development of an English language learner in South Africa, noting how the student's investment in prior discourses impacted on his acquisition of written academic discourses. Skilton-Sylvester (2002), drawing on her research with four Cambodian women in adult ESL classes in the United States, has argued that traditional views of adult motivation and participation are limited because they do not address the complex lives of adult learners or their investment in learning English. Her findings suggest that an understanding of a woman's domestic and professional identities is necessary to explain the investment in particular adult ESL programs. Potowski (2004) uses the notion of investment to explain students' use of Spanish in a dual Spanish/English immersion program in the United States. She notes that no matter how well-run a language program is, unless a learner's investment in the target language is consistent with the goals of the program, target language growth may not meet expectations. Potowski makes the case that the notion of investment makes an important contribution not only to the study of SLA, but to research on heritage language maintenance.

Identity and Imagined Communities

An extension of interest in identity and investment concerns the imagined communities that language learners aspire to when they learn a new language. In Norton (2001), I drew on my research with two adult immigrant language learners to argue that while the learners were initially actively engaged in classroom practices, the realm of their desired community extended beyond the four walls of the classroom. This imagined community was not accessible to their respective teachers, who, unwittingly, alienated the two language learners who then withdrew from the language classroom. The work of Lave and Wenger (1991) and Wenger (1998) helped me to make sense of this data. In many second language classrooms, all of the members of the classroom community, apart from the teacher, are newcomers to a set of language practices and to a community that includes those language practices in its activities. The question that arises then is what community practices do these learners seek to learn? What, indeed, constitutes 'the community' for them?

For many language learners, the community is one of the imagination – a desired community that offers possibilities for an enhanced range of identity options in the future. The community may also be, to some extent, a reconstruction of past communities and historically constituted relationships. In essence, an imagined community assumes an imagined identity, and a learner's investment in the target language must be understood within this context. Learners have different investments in particular members of the target language community, and the people in whom learners have the greatest investment may be the very people who represent or provide access to the imagined community of a given learner. Of particular interest to the language educator is the extent to which such investments are productive for learner engagement in both the classroom and the wider target language community. Such questions have been taken up more extensively in a coedited special issue of the *Journal of Language, Identity, and Education* on Imagined Communities and Educational Possibilities (Kanno and Norton, 2003) in which Adrian Blackledge, Diane Dagenais, Farah Kamal, Yasuko Kanno, Bonny Norton, Aneta Pavlenko, and Sandra Silberstein explore the imagined communities of specific groups of learners in Canada, Japan, Pakistan, the United Kingdom, and the United States.

Identity Categories and Educational Change

While much research on second language identity explores the multiple and intersecting dimensions of learners' identities, there is a growing body of research that seeks to investigate the ways in which particular relations of race, gender, class, and sexual orientation may have an impact on the language learning process (Norton and Toohey, 2004). Innovative research that addresses these issues does not regard such identity categories as variables, but rather as sets of relationships that are socially and historically constructed within particular relations of power. Ibrahim's (1999) research with a group of French-speaking continental African students in a Franco-Ontarian High School in Canada explores the impact on language learning of 'becoming black.' He argues that the students' linguistic styles, and in particular their use of Black Stylized English, was a direct outcome of being imagined and constructed as Black by hegemonic discourses and groups. From a slightly different perspective, Taylor's (2004) research in an anti-discrimination camp in Toronto, Canada, argues for the need to understand language learning through the lens of what she calls *racialized gender*. The stories of Hue, a Vietnamese girl, and Khatra, a Somali girl, are particularly powerful in this regard, supporting the view held by Kubota (2004) that a color-blind

conception of multiculturalism does not do justice to the challenges faced by language learners of diverse races and ethnicities.

Similarly, the work of scholars such as Ehrlich (1997) and Pavlenko (2004) is particularly insightful with regard to intersections of gender and language learning. Their conception of gender, which extends beyond female-male divides, is understood to be a system of social relationships and discursive practices that may lead to systemic inequality among particular groups of learners, including women, minorities, elderly, and disabled. Pavlenko, for example, argues for the need to understand the intersections between gender and other forms of oppression, noting that both girls and boys who are silenced in the language classroom are more likely those from the working class. In a similar spirit, Nelson (2004) explores the extent to which sexual orientation might be an important identity category in the second language classroom. Of central interest is the way in which a teacher can create a supportive environment for learners who might be gay, lesbian, or transgendered. Interest in identity categories and language learning is gaining momentum. A special issue of the *TESOL Quarterly* on Gender and Language Education, edited in 2004 by Kathy Davis and Ellen Skilton-Sylvester as well as an edited volume *Gender and English Language Learners* (Norton and Pavlenko, 2004) are available.

Identity and Literacy

Researchers of second language identity have become interested not only in the conditions under which language learners speak, but in the extent to which identities and investments structure their engagement with *texts*. There is growing recognition that when a second language learner reads or writes a text, both the comprehension and construction of the text is mediated by the learner's investment in the activity and the learner's sociocultural identity. By way of example, Norton Peirce and Stein (1995) demonstrate how the meaning of a South African reading comprehension text shifted when the social conditions under which it was read changed. They argue that the changing social occasions created different kinds of investments on the part of the students, and as the students' identities shifted from compliance to resistance, so did their interpretation of the text. Student resistance is also a theme in Canagarajah's (2004) literacy research with Tamil students in Sri Lanka and African American students in the United States, in which he demonstrates how students learning a second language or dialect sometimes engage in clandestine literacy activities to resist unfavorable identities imposed on them.

Much emerging research on literacy and second language identity also addresses the impact of literacy practices on relationships beyond the classroom. Lam (2000), for example, studied the Internet correspondence of a Chinese immigrant teenager in the United States who entered into transnational communication with a group of peers. She demonstrates how this experience of what she calls *textual identity* related to the student's developing identity in the use of English. The research of Kramsch and Thorne (2002) indicates, however, that not all transnational Internet communication leads to positive identity outcomes. In their study of the synchronous and asynchronous communication between American learners of French in the United States and French learners of English in France, they found that students had little understanding of the larger cultural framework within which each party was operating, leading to problematic digital exchanges. Ramanathan and Atkinson (1999), indeed, make the case that there is much need for cross-cultural writing research to better inform both teachers and students of the sociocultural knowledge of student writers from diverse regions of the world.

Scholars such as Luke (2004), Kress (1993), and Ivanič (1997) have influenced much research on the relationship between literacy and second language identity. While Luke's work has focused on the contribution of critical literacy to second language education and Kress's on the conception of text as a socially and historically constituted genre, Ivanič has explored the notion of writer identity, making the case that writers' identities are constructed in the possibilities for self-hood available in the sociocultural contexts of writing. Ivanič's distinctions between the "autobiographical self," the "discoursal self," and the "authorial self" have been useful in writing research with both young second language learners (Maguire and Graves, 2001) and college-level students (Hyland, 2002; Starfield, 2002).

Conclusion

Research on second language identity has struck a chord in the field of applied linguistics, opening up multiple avenues for research on every aspect of the field. While this chapter has focused on the identity of the second language learner, there is now increasing interest in the identity of the second language teacher (Johnston, 2002; Lin, 2004), the second language teacher educator (Goldstein, 2003; Pennycook, 2004), and the second language researcher (Hawkins, 2004; Leung *et al.*, 2004). If we take seriously the argument that the identity of the second language

learner is not a personality variable but a socially and historically constructed relationship to both institutional and community practices, then it follows that teachers, researchers, administrators, testers, and policy makers are all implicated in the range of identities available to the second language learner. There is every indication that the interest in second language identity will grow in momentum, enriching existing trajectories of research and forging new, exciting directions.

See also: Applied Linguistics: Overview and History; Critical Applied Linguistics; Interlanguage; Motivation and Attitude in Second Language Learning; Politics of Teaching.

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Ideophones

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Introduction

The study of ideophones dates back to the end of the 19th century, but it was especially influenced by Diedrich Westermann (1927, 1937) who examined the sound symbolism of a special class of onomatopoeic words called 'Lautbilder' ('*sound pictures*') in West African languages, which "describe an object or denote an event as a whole" (Westermann, 1937: 159).

Until the late 1970s, ideophones were almost exclusively described for African languages, but no ideophones were reported for languages of the Khoisan family. In recent years, an increased interest in ideophones has provided us with detailed studies in Khoisan, as well as in European, Asiatic, Australian, and Amerindian languages (cf. Asher, 1982; Nuckolls, 1996; Kita, 1997; Alpher, 2001; Voeltz and Kilian-Hatz, 2001) so that it is now established that the existence of ideophones is not restricted to some African language families but seems to be a universal feature of human language. Examples of ideophones are in English *wop, wiggle-waggle, tic-tac, ding-dang-dong, ptt ptt ptt* or in Southern Sotho (Sotho, Southern) *nele* ('disappear and be silent for a long time'), *shwɛrɛrɛ* ('tell lies'), *ɲɛkɛthɛ* ('have a salty taste'), *hlanahlana* ('fly up and down and from side to side'), and *tlɔpɔrɔ* ('be straight') (Kunene, 1978: 50ff.).

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Most students of ideophones still refer to the definition given by Clement Doke (1935: 118), who created the term 'ideophone' according to their function in Bantu languages as a "vivid representation of an idea in sound. A word, often onomatopoeic, which describes a predicate, qualificative or adverb in respect to manner, colour, sound, smell, action, state or intensity." There are, however, no formal criteria that define a word class of ideophones crosslinguistically. Therefore, there still exists confusion on how to classify ideophone-like words in a given language. The consequence is that ideophones are either ignored in grammars and/or if they are described at all, such descriptions consist only of a word list, or the study concentrates on a language internal analysis. Two methodological approaches can be distinguished, which are summarized in the following sections.

Formal Approach

Similar to interjections, ideophone-like words behave differently than the well-known classes of nouns, verbs, adjectives, or adverbs, because they may be phonologically aberrant and are mostly morphologically invariable *simplicia*. Despite such formal anomalies compared to other word classes, ideophones syntactically parallel them in some respect, so that it is not always clear in a given language if they should be interpreted as a phonological and/or morphological aberrant subclass of other lexical word classes or if they form a word class of their own. Ideophones may occupy the slot of a verb, noun, adverb, or adjective in the sentence where they are embedded. In some languages, their distribution may be restricted to only one of these positions, and they are, therefore, categorized as subclass(es) of those words which they replace. They form a subclass of nouns, e.g., in Somali (Tosco, 1998: 129), of verbs, e.g., in Tsonga (Marivate, 1985: 214), or of adverbs, e.g., in Yagua (Payne and Payne, 1990: 457). In most languages, however, two or more such syntactic functions may be assigned to them, depending on which slot they occupy. They may be adjectives, adverbs, and verbs in Wolaitta (Wolaytta) (Amha, 2001: 56ff.), and in Pastaza Quechua (Quechua, Pastaza, Southern) they may be used as adverbs, verbs, nouns, adjectives, or intensifiers (Nuckolls, 1996: 9f, 141f.). They behave similarly in Gbaya-Bogoto so that Péli (1991/2: 30) characterizes their syntactic behavior as extremely mobile and flexible. Ideophones that are categorized as a subclass are often described under various different terms like 'nonverbal verbs' (Marivate, 1985: 214), or 'ideophonic verbs, nouns and adverbs' (Newman, 1968).

Based on these language specific descriptions, only a few efforts have been made to extract formal criteria that may be common to a word class ideophone crosslinguistically. In Bantu languages, ideophones form a more coherent class of words syntactically than in other language families. Based on Doke's functional definition given above, Samarin (1971) compares ideophones in a survey of over 150 Bantu languages and draws up a list of formal features that are common to ideophones in Bantu. These include a predictable derivation of ideophones and striking parallels with verbs that often differ from ideophones only in a predictable final vowel. Whereas this list is an instrument to differentiate ideophones from other word classes in Bantu, not all of these features are applicable to languages of other language families. This is confirmed by Childs (1987, 1994) in a survey of ideophones in African languages, where he lists some properties of ideophones, like sound-symbolism, possible phonetic anomalies and violations of phonological rules, the lack of morphology except for reduplication or vowel lengthening, the fact that they are apart from the syntax of the surrounding utterance that is called "syntactical aloofness" by Kunene (1978), and finally, their close connection to gestures. However, no feature seems to be unique to ideophones crosslinguistically (Childs, 1994: 182), and no feature is shared by all ideophones in a specific language, so that ideophones may better be described in a prototype approach (Childs, 1987).

Discourse Pragmatic Approach

Because formal properties alone may not be sufficient to separate ideophones from other words, other investigators highlight their sound-symbolic nature, which is connected to their special pragmatic function in discourse. Most authors assign a special expressive function to ideophones or characterize them as part of an expressive register. Therefore, they are named 'expressive adverbs,' e.g., in Bambara (cf. Dumestre, 1981), 'expressive onomatopes' in Urubu-Kaapor (Urubú-Kaapor) (cf. Kakumasu, 1986), or simply 'expressives,' e.g., in Semai (cf. Diffloth, 1976). Ideophones consist of a combination of motivated sounds that imitate an event rather than to describe it. Fortune (1962: 6) characterizes ideophones in Shona as part of the event level in being "a vivid re-presentation or re-creation of an event in sound." Similarly, Kunene (1978: 3ff.) focuses in his study on the shift of participant roles whereby the speaker becomes the actor of the ideophonic event and the hearer becomes a witness. Kock (1985: 52) claims

that the communicative purpose of ideophones is to actualize the event which it describes. And Nuckolls (1996: 12) states that "the distinction between a speech event and a narrated event is blurred [because] the speech event *becomes* the narrated event." Kita (1997) finally sees Japanese ideophones, which he calls 'mimetics,' as part of the affecto-imagistic dimension, which is complementary to the analytic dimension containing descriptive information. From this perspective, ideophones are not just expressive variants of other words but are a complementary mode or dimension of speech.

Whereas the slot that an ideophone occupies in the sentence was a major criterion for its syntactic categorization as subclass of verbs, nouns, adverbs, or adjectives, Kunene (1978) rejects this argument as misleading. According to him, the assignment of such a syntactic function seems merely triggered by the translation into the reference language. He demonstrates in Southern Sotho that the semantics and function of ideophones remain the same in all kinds of various syntactic environments, being invariably a 'dramaturgic predicate,' even if its position might change; therefore, ideophones are 'syntactical aloof' from the rest of the sentence.

Based on Kunene's thesis that ideophones behave pragmatically *and* grammatically differently, the study of Kilian-Hatz (1999) represents the first typological attempt to define a word class 'ideophone' crosslinguistically. In combining formal, sound-symbolic, and pragmatic features shared by ideophone-like words in 138 languages of the world, an ideophone is defined as a proper word class that is complementary to descriptive word classes of the analytic dimension (i.e., nouns, verbs, adjectives, and adverbs) on the one hand and to the purely appellative interjections and exclamations on the other hand. Other than descriptive words, ideophones convey another mode of perception by simulating an immediate sensory experience of an event that hearer and speaker share with each other; this creates a social intimacy of the speaker community (cf. Nuckolls, 1996: 12ff.), which is a characteristic of informal speech and an expressive language register, where ideophones are exclusively found. The simulation of an event implicates that the event takes place in the imagination, and thus, ideophones are inherently affirmative in nature and are not subject to negation or interrogation.

The semantic concepts of ideophones vary from audible, visible, and tactile perceptions, as well as smell and psychological states, but a language contains at least audible ideophones. An interesting areal phenomenon is that the intension of colors like 'bright white' or 'bright red' is expressed by ideophones in African languages and in Malagasy. In contrast to words of the analytic register, each denoting only a part of an event, an ideophone denotes an event as a whole and represent an independent, complete sentence- or clause-like utterance, which forms its own intonation unit (Kilian-Hatz, 1999: 234 ff.).

Comparable to a live broadcast on the radio, the speaker, by using ideophones or direct speech, raises the illusion that the verbalized event or situation happens simultaneously at the moment of its production/pronunciation. In this perspective, speech level and event level are identical (cf. von Roncador, 1988, who terms this kind of level shift 'Referenzverschiebung' ('*shift of reference*') on which his definition of direct speech is based). Ideophones and direct speech differ only insofar as direct speech quotes a speech act, whereas ideophones report an extralinguistic event like a sound, a smell, a taste, a visual impression, a movement, or a psychic emotion. Due to the striking formal and functional parallels of direct speech with ideophonic clauses, the latter are even defined as a special form of direct speech; cf. Voeltz (1971) and Kunene (1978) for Bantu languages and, more generally, von Roncador (1988: 125). Like utterances of direct speech, ideophones are either obligatorily or optionally introduced into the context by a *verbum dicendi,* as demonstrated in ex. (1) from Southern Sotho and/or by a complementizer as in ex. (2) from Tamil.

Southern Sotho

(1a)	bá	thóla	bá-re	tú.
	they	*kept quiet*	*they say/do*	*tu*

Or:

(1b)	bá	thóla	*tú*.
	they	*kept quiet*	*tu*

'They kept quiet – (they kept) dead-quiet' (Kunene, 1978: 29).

Tamil

(2)	Ava	**kupu kupu**-ŋŋu	aʐutaa.
	she	QUOT	*weep*.PAST.3sg.F

'She wept with a sobbing sound' (Asher, 1982: 242).

Alternatively, a small set of so-called dummy verbs (cf. Childs, 1994: 187f) like 'do,' 'give,' 'go,' 'have' and 'be/become' as in English '*The cork cried/went pop*' (Oswalt, 1994: 302) or a perception verb like 'hear,' 'see,' 'smell,' 'taste,' etc., as in the Zulu ex. (3) is used to introduce ideophones into the context. Another way to embed the ideophonic utterance similar to direct speech in a narrow sense is by an

introduction that is shortened to an agent, as in the examples (4) and (5).

Zulu

(3) Niyamuka **mfo.**
you.PRES.*smell* *of evil smell*
'You smell bad' (Voeltz, 1971: 147).

Gbaya

(4) Wanto **záďáďá**
W. *adamant*
'Wanto was adamant' (Noss, 1986: 253).

Yir-Yoront (Yir Yoront)

(5) Ngoyo **kʊt!**
'I [spread it], kat!' (Alpher, 1994: 168).

As with a clause of direct speech, grammatical relations between an ideophonic clause and other constituents of the descriptive context are not expressed morphologically. Ideophones are syntactically aloof and invariable. The interaction of ideophones and descriptive context takes place on the narration level where the descriptive text is interrupted by ideophonic utterances. The descriptive context can be understood as the frame wherein the ideophonic event is realized. Ideophones may be integrated by two ways into the context. In the first type of integration, they may replace a descriptive sentence or clause. In this context, ideophones are completely isolated, as demonstrated in ex. (6), taken from the Adamawa-Ubangi language Baka with a series of ideophones, or they form one clause in a series of clauses, as in the English example '*Our eyes met.* ***Zing.*** *Cupid!*' (Oswalt, 1994: 302).

Baka

(6) **Wòàwòàwòàwòà,** **pɔ̀ɔ̀,**
the hunters are discussing — the chimpanzee interrupts eating
kung, **wóoò,**
a spear strikes the chimpanzee — the chimpanzee falls down
pao, **tung.**
the chimpanzee breaks a branch — hard falling the chimpanzee arrives on the ground
(Kilian-Hatz, 1999: 29).

In the second type of integration into the context, the ideophone accompanies a verb, adverb, adjective, or even a clause like a nonverbal gesture by either anticipating it as in (7a) or by being a paraphrase in apposition to it as in (7b) and as in the German ex. in (8)

Gbaya

(7a) **Rut**, a yeé kɔ.
'Flash, it entered a hole' (Noss, 1986: 251).

(7b) A yeé kɔ **rut.**
'It entered a hole **rut** (like a flash)' or 'It entered a hole – flash' (ibid.).

German

(8) Da knallt **—peng—** die Tür.
there *bang*.3sg.PRES *bang* *the* *door*
'There the door bangs: Bang.'

Languages differ typologically in that ideophones (a) may be used preferably with, or are even restricted to accompany, only one kind of phrase (e.g., a noun phrase or a verbal phrase) or (b) may replace or accompany more than one or even all kinds of phrases and clauses, as is the case in most Bantu languages. From this perspective, ideophones that are categorized as a subclass of adverbs, e.g., in Yagua (Payne and Payne, 1990: 457) in the formal approach, may be interpreted as ideophonic clauses that are paraphrases in apposition to or anticipating a verbal state or event.

Unlike descriptive words, ideophonic utterances consist of one word only wherein the whole information is bundled synthetically. Their special performative function of verbalized dramatization is achieved by the inherent sound-symbolic nature of ideophones. Information is encoded in language-specific, sound-symbolic submorphemic units that may consist of a syllable, a sound, or a tone that follow each other iconically according to the sequence of single components of an event (cf. Weakly, 1977). According to Rhodes (1994), such submorphemes may be phonetically realized in either a 'wild' or merely a 'tame' manner by means of a speaker-dependent preference to express only one or more than one nuance of an event in one submorpheme. This realization may lead to phonological anomalies. Here it is noteworthy that only the so-called 'tame' ideophones are prone to change the word class and may derive into nouns or verbs, or vice versa.

See also: Africa as a Linguistic Area; Ewe; Iconicity; Sound Symbolism.

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Idiolect

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Definitions

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- The sum total of language of one person, including all possible utterances.
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The additional restriction for these two definitions is time; a person's idiolect may be constrained to one particular time, thus partially equating *idiolect* with *style*. The term *idiolect* is often invoked to define a dialect as an aggregation of idiolects, either as an abstraction or as a mathematical average. Thus, some claim that idiolects are the only real linguistic objects, but others dispute this claim, arguing instead that the regularity of grammar appears at the level of dialect. Despite its apparent creation as a scientific term, it has been embraced by nonlinguists, often

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with positive connotations of individual personal expression.

Precedent for *Idiolect*

Although the term itself did not appear until 1948, the concepts behind the term have been a part of linguistic scholarship since the end of the 19th century.

The *Junggrammatiker* in general and specifically Paul, in *Prinzipien der Sprachgeschichte,* argued against the metaphor of languages as living organisms, instead advocating the locus of language in the minds of individuals. Paul disputed *Völkerpsychologie* and conversely implemented terms such as *individuellen Sprechtätigkeit, individuelle Verschiedenheiten, individuellen Sprachen,* and *individuelle Unterschiede.* Modern interpretations of Paul's work now employ *idiolect* in discussing his ideas.

In contrast to the *Junggrammatiker,* Saussure (1972: 30) deemphasized diachronic analysis in favor of synchronic analysis, but he retained the concept of the individual locus of language: "... l'exécution n'est jamais faite par la masse; elle est toujours individuelle, et l'individu en est toujours le maître; nous l'appellerons la *parole.*" Saussure (1972: 141) does use the prefix *idio* when discussing the focus of synchronic linguistics: "L'objet de la linguistique synchronique générale est d'établir le principes fondamentaux de tout système idiosynchronique ...." It is not clear whether such uses prompted any coining by later writers, but these concepts found a stable home in the term *idiolect.*

The first use of the term *idiolect* is by Bernard Bloch (1948: 7) in revising a set of postulates by Leonard Bloomfield: "The totality of possible utterances of one speaker at one time in using a language to interact with one other speaker is an *idiolect* .... Our definition implies (a) that an idiolect is peculiar to one speaker, (b) that a given speaker may have different idiolects at successive stages of his career, and (c) that he may have two or more different idiolects at the same time." Bloomfield himself had captured the concept of idiolect in writing: "If we observed closely enough, we should find that no two persons – or rather, perhaps, no one person at different times – spoke exactly alike" (1933: 45). Bloch coined the term in order to establish a locus for language inside the larger abstractions of speech community and language.

Usage

Like terms such as *language* and *dialect,* the meaning and import of *idiolect* can be contentious at times. One specific debate has been whether idiolects are the real object of linguistic scholarship or not.

Weinreich *et al.* (1968) essentially banished the term from sociolinguistics when they strongly opposed the nested view of language whereby an aggregate of idiolects make up a dialect. Instead, they argued that only the grammar of the speech community had consistent patterns and that individuals acquired their patterns from the speech community grammar. Weinreich *et al.* (1968) associated the term *idiolect* with Paul and Saussure: "...we will dwell on Hermann Paul, who apparently was the first to isolate the language of the individual as the most legitimate object of linguistic study. We will trace the hardening of the paradox in the Saussurean period, when homogeneity of language – assumed to be found in the idiolect – was drawn upon as a prerequisite for analysis." Thus, within sociolinguistics, language variation patterns of individuals were not often studied except when aggregated to approximate and reveal the language variation patterns of the speech community.

At the end of the 20th century, variationists began again to study specifically the language variation patterns of individuals and, at times, use the term *idiolect.* Nahkola and Saanilahti (2004: 75) employed *idiolect* in a real-time study of diachronic variation where they focused on change over the life of individuals (e.g., "Our study suggests that categorical linguistic features are inclined to remain categorical in the idiolect"). Here, they employ the second sense of the term above.

See also: ; Bloch, Bernard (1907–1965); Bloomfield, Leonard (1887–1949); Labov, William (b. 1927); Language/Dialect Contact; Neogrammarians; Paul, Hermann (1846–1921); Saussure, Ferdinand (-Mongin) de (1857–1913); Speech Community; Structuralism; Style.

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Idiom Dictionaries

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There exist numerous dictionaries of idioms for practically all languages, covering a more or less long literary tradition (see the select bibliography at the end of this article). Obviously, it is not possible to describe here all these dictionaries in detail. So this article will instead concentrate on some linguistic problems in the basic prerequisites for compiling idiom dictionaries, and show how various dictionaries solve these problems.

The first question that must be answered by idiom dictionaries concerns the very notion of idiom. When working on such a dictionary, the lexicographers have to know exactly what they understand by 'idiom,' otherwise they would face serious difficulties deciding which expressions should be included and which should not. Also, the users have the right to know what they can expect to find in a given dictionary. Though idiom research has quite a long tradition and has become an internationally developed linguistic discipline today, we are still far from being able to give a definite and generally accepted answer to the question 'what is an idiom?' Consequently, this is the first question to be discussed in this article. The second question faced by every dictionary of idioms is 'what are the specifics of idiom semantics and pragmatics?' Without answering this question it is hardly possible to develop an adequate entry structure.

Idioms as a Special Type of Phraseme

There are both objective and subjective factors which make the inventories of expressions included in various 'dictionaries of idioms' somewhat incomparable. These factors can be divided into two groups:

- factors due to different interpretations of the notion of idiom;
- factors due to different interpretations of the needs of the user.

As far as first group is concerned, the reasons for relevant differences may lie both in different terminological traditions and in different theoretical foundations adopted by lexicographers. Here I can only touch on the main terminological problems. Recently, there was published a list of about 70 terms that have appeared in different fields of research to describe phrasemes and related phenomena (though some of them do not mean exactly the same thing), such as 'coordinate constructions,' 'collocations,' 'complex lexemes,' 'fixed expressions,' 'formulaic language,' 'lexical(ized) phrases,' 'multiword lexical phenomena,' 'phraseologisms,' 'phrasemes,' 'phraseological items,' 'ready-made expressions,' 'set phrases,' 'stock utterances,' and many more (cf. Wray, 2002: 9). Here I use the term 'phraseme' as a hypernym for all kinds of phrasal lexical items, figurative as well as nonfigurative.

In spite of the terminological chaos, there is a consensus about the main features of phrasemes. According to the most general definition, phrasemes are conventional multiword units of the lexicon showing various kinds of formal and/or semantic irregularities. Phrasemes are stable by definition: as soon as an expression has become conventionalized, it will be reproduced in discourse as a prefabricated unit of language (cf. Burger *et al.*, 1982: 1). In other words, phrasemes are multiword units of the lexicon, and as such they are, like all lexical units, relatively stable in form and meaning.

Thus, all phrasemes are subject to lexicographical description. The question is, however, should they be described in one dictionary or should a special dictionary be developed for every type of phraseme? In principle, both ways are possible. Older traditional phraseological dictionaries were often just mixed collections of different types of phrasemes, proverbs, and other more or less fixed expressions; see, for example, Stoett (1974) and Ter Laan (1983) for Dutch; Mikhel'son (1984) for Russian; Lapucci (1969) for Italian; Koskimies (1906) and Kuusi (1988) for Finnish. Even if it has the word 'idiom' in the title it does not mean that such a work includes exclusively idioms in the strict sense of this term. The current trend in lexicography, and linguistics in general, is one towards more specific dictionaries. This also applies to phraseological dictionaries; compare dictionaries of idioms in a strict sense, such as Molotkov (1986), Moon (1995), Longman (1998), Spears (2000), Duden (2002), and Baranov and Dobrovol'skij (forthcoming). For dictionaries of this kind the question of the distinctive features of idioms is of decisive importance.

There is a long tradition in lexicon research of classifying phrasemes into classes such as restricted collocations, phrasal verbs, routine formulae, idioms, proverbs, and the like. The consensus here is that the central group of phrasemes is that of idioms. A crucial property of idioms is their semantic irregularity

(or idiomaticity), which is closely related to the property of figurativeness. Furthermore, it is generally agreed that idioms, for the most part, are not frozen elements of a language and that they are usually arbitrary only from the point of view of their production, but not from the perspective of their understanding, because most of them are clearly motivated by underlying structures of knowledge (for more detail see Dobrovol'skij and Piirainen, 2005). Still there is no general consensus about where to draw the line between idioms and other phraseme types (*see* **Idioms**). The differences between various linguistic schools concerning the extension of idiom class are (at least, to a certain extent) due to different terminological traditions in different languages. So, in English the term 'idiom' can be traditionally used in the sense of 'phraseme,' i.e., it may be understood as an umbrella term for all possible fixed expressions. This use is very uncommon in Russian or German, so that if the term 'idiom' is used the German and Russian readers are normally aware of the fact that a given dictionary contains exclusively idioms in a strict sense. Here we see that a seemingly scholastic problem has practical lexicographic consequences.

What place do idioms occupy in the large class of phrasemes? It would be desirable that the theoretical model of idioms be as close as possible to the 'natural' way most linguists (and, above all, most lexicographers) understand this category. The linguists' understanding is based on the idea that idioms are the most irregular category among phrasemes. Since, in terms of idiomaticity theory (cf. Baranov and Dobrovol'skij, 1996), irregularity manifests itself through idiomaticity and stability, these features must be more salient and represented more explicitly in idioms than in other phrasemes.

Idiomaticity is understood as a semantic reinterpretation and/or opacity, while stability is understood as frozenness or lack of combinatorial freedom of a certain expression. Idioms can be thus defined as phrasemes with a high degree of idiomaticity and stability. In other words, idioms must be fixed in their lexical structure (however, this does not exclude a certain variation), and they must be, at the same time, semantically reinterpreted units (i.e., they do not point to the target concept directly but via a source concept) and/or semantically opaque. So, *tilt at windmills*, *drive someone into a corner*, or *(as) dead as a doornail* are idioms, and *make/take a decision*, *accept the challenge*, *strong coffee*, or *heavy rain* are not because the former expressions are more irregular than the latter ones. The current approaches to phraseology also distinguish between proverbs (e.g., *every dog has its day* or *beggars can't be choosers*) and idioms with sentence structure (also called sentence idioms or speech formulae; e.g., *the coast is clear* or *the die is cast*). The distinguishing features are to be found on different levels: in the type of semantics, in pragmatics, and in the semiotic status of sentence idioms vs. proverbs.

As far as the factors of the second group are concerned, i.e., the different interpretations of the needs of the user, they influence the structure of idiom dictionaries no less than the differences in understanding the notion of idiom. Differences in the number of entries are often due to the fact that some dictionaries focusing on idioms also include current proverbs and sayings (Kari, 1993; Lubensky, 1995; Beltrán and Yáñez, 1996; Van Dale, 1999; Bárdosi, 2003; Forgács, 2003), as well as some collocations (Cowie *et al.*, 1993; Lubensky, 1995; Petermann *et al.*, 1995).

Differences of this kind may also be due to the attitude toward less common idioms, e.g., obsolete or old-fashioned expressions. Compare dictionaries which are trying to cover the entire range of idioms, such as Schemann (1993), Lubensky (1995), Van Dale (1999), Duden (2002), or Rey and Chantreau (2003), on the one hand, and smaller dictionaries concentrating on relatively frequent present-day idioms (Moon, 1995; Dobrovol'skij, 1997; Lurati, 2001), on the other. A special lexicographic type is represented by dictionaries which include current usage only, but do not restrict themselves to frequent expressions, such as the corpus-based Baranov and Dobrovol'skij (forthcoming) with some 7000 entries drawn from texts between 1960 and 2003. Of course, this dictionary is not an exception. Many present-day dictionaries with a sound theoretical background are based on large collections of evidence of actual usage, e.g., Cowie *et al.* (1993), Moon (1995), and Forgács (2003), just to name a few.

Another parameter concerns the register of included expressions. Some dictionaries avoid including idioms used only in slang or perceived as vulgar or obscene (e.g., Molotkov, 1986; Petermann *et al.*, 1995), others try to represent current usage in all stylistic registers (e.g., Baranov and Dobrovol'skij, forthcoming). There are also special dictionaries which focus on idioms with vulgar and obscene constituents, aiming to fill the gap that is typical of traditional academic dictionaries (e.g., Bui, 1995).

Often the lexicographers' decisions about what to include in a dictionary and what to leave out depend on the potential users. For example, Lubensky (1995) is aimed primarily at English-speaking learners of

Russian. The inventory of head phrases in this dictionary is largely determined by this orientation.

Idiom Semantics and Pragmatics as a Lexicographic Issue

In this section, the focus is on the specifics of idiom semantics and pragmatics. If an idiom is explained via a corresponding near-synonymous word it remains unclear what the difference is between the idiom and that word. From a practical point of view, this method of idiom representation is acceptable if the dictionary is aimed at speech perception rather than speech production. The aim of an active dictionary of idioms is to demonstrate the specific features of idiom use in discourse. There are various different, ways to achieve this goal. Some of them will be briefly discussed here.

Not only theoretically grounded idiom research but also practical lexicography needs to go into detail when describing the meaning of idioms. This can be demonstrated with the help of the following example. Consider idioms (1) and (2).

(1) German *den Bock zum Gärtner machen*
'to make the ram/he-goat into the gardener'
'to allow a person, who seems likely to do harm in a given field of activities, to do just these things'

(2) Russian *puskat' kozla v ogorod*
'to let the he-goat into the kitchen garden'
'to allow a person, who seems likely to do harm in a given field of activities and to derive benefit for himself/herself, to do just these things'

Idioms (1) and (2) are very similar with regard to both their meanings and their lexical structure. So, it is understandable why all German-Russian and Russian-German dictionaries treat them as full equivalents. Nevertheless, these idioms show subtle semantic differences, which have to be taken into account while compiling an active dictionary of idioms. The semantic interpretations of (1) and (2) differ with regard to the semantic element 'to derive benefit for himself/herself,' which is part of the meaning of the Russian idiom (2) but not of the German idiom (1). Semantic differences such as these are of prime importance for bilingual lexicography. The lack of research findings in this area is responsible for the fact that so far no one has compiled a bilingual dictionary of idioms which pays enough attention to the semantic differences between nearly equivalent idioms. See for more detail Dobrovol'skij (2000).

It does not mean, of course, that there are no idiom dictionaries with good semantic explications. Compare, *inter alia*, dictionaries such as Cowie *et al.* (1993), Lubensky (1995), Moon (1995), Longman (1998), Speake (1999), Spears (1999), and Lurati (2001), which, in most cases, explain and define idioms very exactly. See also the semantic definition of (2) from Lubensky (1995): "to allow s.o. access to some place where he may be esp. harmful or to something that he wants to use or exploit for personal gain."

Semantic definition is not the only way to explain the meaning of an idiom. The ordering of head phrases can itself have an explanatory function. Compare onomasiological dictionaries (thesauri) such as Schemann (1989), Galisson (1984), Duneton and Claval (1990), Spears (2000), Bárdosi (2003), and Baranov and Dobrovol'skij (forthcoming). In an idioms thesaurus the entries are grouped not alphabetically, but according to their semantic fields (for details see Dobrovol'skij, 1995).

In bilingual dictionaries the means of explaining the meaning is not primarily the semantic definition but a set of equivalents from the target language. But since similar idioms in the source and target languages, in most cases, do not coincide in all their relevant features (cf. examples [1] and [2]), additional means of semantic explanation are also needed. These can be both semantic definitions and usage notes provided in addition to equivalents. A very convincing example of this technique is found in Lubensky (1995).

Since for adequate usage of idioms it is necessary to have knowledge not only about their semantics but also about their pragmatics, the entry structure has to include a special section for pragmatic information. This kind of information can be presented either in the form of usage notes or in the form of usage labels. For example, explaining the meaning of the idiom *kick the bucket*, Moon (1995) included the note "used to refer to someone's death in a light-hearted or humorous way," whereas Cowie *et al.* (1993) used the label 'informal' (example from Hanks, 2000).

Some dictionaries of idioms (occasionally) give etymological information (e.g., Molotkov, 1986; Cowie *et al.*, 1993; Lubensky, 1995; Duden, 2002; Rey and Chantreau, 2003), others do not (e.g., Moon, 1995; Baranov and Dobrovol'skij, forthcoming). Both decisions are acceptable; it depends on the users addressed by a given dictionary. However, what is extremely important with regard to etymology is that this information should not be mixed up with the semantic and pragmatic explanations. Otherwise it may turn out to be misleading by reflecting not the current usage, but the origin of a given idiom.

Last but not least, an idiom dictionary (at least, an active one) has to include illustrative material. Here

idiom dictionaries show a range of possibilities: from brief invented examples to rich literary citations. In bilingual dictionaries, illustrations can be translated by the lexicographers themselves or (in case of literary citations) they can be presented along with their published translations.

Concluding Remarks

Idiom dictionaries benefit from the rapid development of large text corpora. Corpora help not only to quickly find more and better authentic examples, but also to adequately divide the semantic structure of a given idiom into different readings, describe its syntactic behavior, and provide acceptable semantic definitions and usage labels. However, corpora alone cannot solve the problems of appropriate lexicographic representation of idioms. What is also needed, to no lesser extent, is a sound theoretical background, a clear understanding of the relevant linguistic specifics of idioms.

See also: Corpus Approaches to Idiom; Idioms; Phraseology.

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Idioms

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The term *idiom* may be defined as an institutionalized multiword construction, the meaning of which cannot be fully deduced from the meaning of its constituent words, and which may be regarded as a self-contained lexical item. For example, in Modern English the expression *haul over the coals* makes little sense if each word is interpreted separately and literally; it has to be decoded as a single semantic unit: 'to admonish severely.'

Beneath this broad definition are grouped a large number of different constructions that inhabit intersecting spectra of semantic opacity, compositional fixity, and syntactic function.

Semantic Opacity

At one extreme are phrases in which each word defies literal understanding: *cut the mustard* 'to come up to the expected standard', *eat crow* 'to admit humiliatingly that one was wrong', *kick the bucket* 'to die'. Such idioms may contain fossilized words that have no independent existence in Modern English: for example *pig in a poke* 'a purchase which turns out not to be what the vendor claimed', where *poke* is an old word for a bag or sack.

Some fixed phrases may contain elements used in their literal sense. In *get down to brass tacks* 'to start frankly discussing the essentials of a matter', for instance, *get down to* is broadly speaking being used as it would be in a (small) range of other collocations (for example, *get down to business*). Such elements may be variable (for example, *know the ropes, show someone the ropes*, where *the ropes* are 'the special methods or procedures').

In some cases, all the main word elements have their literal meaning, and it is only the particular combination in which they appear that confers a meaning beyond the sum of the parts: *bread and butter*, for example, is 'bread spread with butter' (as a fully metaphoricized idiom it can also mean 'a source of income').

Many fixed phrases have a meaning that could not be described as literal (perhaps because their genesis was obviously metaphorical, or because they preserve a usage no longer current in the language) but which nevertheless yield fairly readily to interpretation: *behind the times* 'old-fashioned', *daylight robbery* 'a sale at an extortionate price', *the talk of the town* 'a subject widely discussed or gossiped about'.

At the other extreme of the meaning spectrum are institutionalized phrases that are completely semantically transparent: *beneath contempt, from bad to worse, go wrong*. Within this category come many clichés and also so-called 'freezes' (Fenk-Oczlon, 1989), in which pairs of words are fixed in a particular order (*knives and forks, friends and neighbors*). Their compositional fixity allies them with idioms, but most linguists would exclude them from full membership of the category because of their semantic transparency.

Combinations of this sort shade into collocations, in which the choice of words to express another word's lexical or grammatical relationships is severely restricted (*afraid of, arrive at/come to/reach a decision*).

The closer to the opaque end of the spectrum a multiword construction is, the more likely it is to be regarded as a fully fledged idiom, but assignment to a particular category may depend on the delicacy of judgment applied to the semantics of a particular combination. As we have seen, *bread and butter*, which from a formal point of view is a freeze, is more than the sum of its semantic parts; and some might claim that the same is true of, for example, *knives and forks*, the combination of which narrows down the interpretation of its constituents to eating implements.

Many compound nouns satisfy the criteria of semantic opacity applied above. For instance, the semantic force of *green* in *green room* 'room for performers when not on stage' is not readily deducible (it probably comes originally from the painting of the room green to rest the artists' eyes after the glare of the limelight). However, such compounds are generally not regarded as idioms unless the complete lexical item is metaphoricized, for example, *blue blood* 'noble or royal

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ancestry', *dark horse* 'a secretive or little-known person who does something unexpectedly remarkable,' *knight in shining armor* 'someone who comes bravely to the rescue'. The referent of *green room* is literally a type of room, so the term does not qualify as an idiom.

Grammatical and Compositional Fixity

Most idioms that function as verbs or nouns participate in the inflectional variations normal for their word-class: verbs, for example, can be marked by a particular person or tense (*She has let the cat out of the bag*), and nouns can be pluralized (*bears with sore heads*). Beyond this, however, many idioms are subject to a range of grammatical restrictions, and are capable to a greater or less degree of being altered or added to or having their word order changed.

The most firmly fixed verbal idioms resist passivization and other standard transformations: *Fred kicked the bucket* (= died) is well-formed; **The bucket was kicked by Fred* and **It was the bucket that Fred kicked* are not. Others are not so restricted syntactically: *I'm used to having my leg pulled* (= being teased) is no less acceptable than *You're pulling my leg!*

Fixed idioms do not allow insertions or alterations: **call it another day* would not be an acceptable variation on *call it a day* 'to finish what one is doing'. On the other hand, *leave no stone unturned* 'to make every possible effort' could legitimately be expanded to *leave no legal stone unturned*, and *You can't keep a good man down* could be recast as, for example, *You can't keep a good politician down*. *Kick the bucket* cannot become **kick the pail*, nor (except in language play) can *spill the beans* 'to reveal secrets' be **spill your beans*, but *Your eyes are bigger than your stomach/tummy/belly* are all equally acceptable.

Transitive verbal idioms may have a vacant slot for a direct object (*sweep* (someone) *off their feet* 'to overwhelm someone suddenly by inspiring a strong emotion of love within them for you'), an indirect object (*give* (someone) *a piece of one's mind* 'to scold someone angrily'), or a prepositional object (*clap eyes on* (someone) 'to see someone').

At the most 'fluid' end of the spectrum are constructions such as *what is X doing Y?*, seeking elucidation of an incongruous situation (as in *What's that muddy boot doing on the table?*) and V + obj + *away*, denoting the using up of time by a particular activity (as in *They danced the night away*) (Kay and Fillmore, 1999; Jackendoff, 1997). In idioms of this sort, the overall meaning appears to be determined more by the syntactic structure than by any semantic properties of the fixed elements, and they have been termed 'constructional idioms'. (Idioms of this sort, midway between completely fixed idioms, which have to be interpreted as indivisible units, and ordinary non-idiomatic combinations, which are interpreted according to fully productive grammatical rules, require a new type of grammar to elucidate them. An approach termed 'construction grammar' (Kay and Fillmore, 1999; Jackendoff, 2002: 181) has been proposed, which deploys a set of extra, bolt-on rules, beyond the general grammar of the language, to deal with these semi-idioms.)

Established norms of fixity are always liable to be set aside by creative language users. Once the basic models are in existence, it is perfectly feasible that such utterances could be produced as 'There'll be no *bucket-kicking* (= dying) around here yet' (violating syntactic fixity) or 'Never *darken* my *patio* again' (perhaps said to an unwelcome barbecue guest; replacing the expected *door* with *patio* and thus violating compositional fixity).

A related but subconscious phenomenon is the splicing of two or more idioms together, as in *count your lucky stars*, combining *count one's blessings* and *thank one's lucky stars*, both invoking gratitude for good fortune, and *Don't burn your bridges until you've come to them*, combining *burn one's bridges* 'to take an irrevocable step' with *cross one's bridges before one has come to them* 'to act prematurely'. The resulting blend (often superficially plausible, but, if not involving nearly synonymous idioms, semantically incongruous when more closely examined) is related to the 'mixed metaphor' problem.

Diachronically, idioms are no more fixed than any other element of the lexicon. Constituent words may change over time (*have something at one's fingers' ends* 'to be very familiar with or skilled at something' has largely been replaced in Modern English by *have something at one's fingertips*). And semantic change, which is inherent in the initial process of metaphoricization (*jump the gun* 'to anticipate the starting pistol in a race' > 'to act precipitately'), may continue to operate: *beg the question*, for instance, originally meant 'to assume something is true without showing any proof', but it is now frequently used for 'to avoid giving a direct answer to a question' and also for 'to seem to invite an obvious question'.

Syntactic Function

Idioms occupy a wide range of syntactic roles, from membership in individual word classes to predicates and entire sentences.

Verbs

Idiomatic verb phrases function syntactically as verbs in a sentence. Their internal structure is commonly V + O, with or without further elements: *change hands* 'to be exchanged', *stick one's neck out* 'to take a great risk', *clap eyes on* 'to see', *make heavy weather of* 'to perform (a task) too laboriously', *rattle* (someone's) *cage* 'to agitate someone'. Idiomatic combinations of verb + particle (phrasal verbs) are usually categorized as idioms, too: *shut up* 'to stop speaking', *take in* 'to deceive', *back down* 'to resile from a previous position', *play away* 'to have an extramarital sexual relationship', *root for* 'to support enthusiastically', *put up with* 'to tolerate'. Combinations with other adverbials are also frequent: *go* (someone's) *way* 'to behave in the way someone wants', *cut both ways* 'to have an equal effect on both parties', *go west* 'to die or be broken', *live in sin* 'to cohabit sexually when not married'. Other fairly frequent patterns are a verb with the dummy object *it*: *lump it* 'to put up with a disagreeable state of affairs'; and combinations of two or more verbs with a conjunctive: *pick and choose* 'to be excessively selective'.

Verbal idioms can frequently function as the entire predicate of a sentence: [*He*] *threw in the towel* (= gave up); [*The bridge*] *blew up* (= was destroyed by explosion).

Nouns

Nominal idioms may be formed by either premodification of a noun: *the hot seat* 'a position of uncomfortable difficulties', *salad days* 'time of youthful inexperience', *monkey business* 'dishonest or suspicious activities', *the bum's rush* 'abrupt ejection or dismissal'; or postmodification: *fish out of water* 'someone in an uncomfortably unfamiliar or inappropriate situation', *salt of the earth* 'someone very honest, dependable, etc.', *manna from heaven* 'an unexpected source of relief'; or by conjunction of two or more nouns: *sackcloth and ashes* 'extreme contrition', someone's *pride and joy* 'someone or something regarded with particular affection and pride', *meat and drink* 'a main source of pleasure, encouragement, etc.', *any Tom, Dick, or Harry* 'any unspecified ordinary person'.

A high proportion of nominal idioms are evaluative, quasi-adjectival, and as such generally appear as predicates: 'Tom was a real *tower of strength* (= was very supportive) through those difficult times.' 'That exam was a *piece of cake.*' (= was very easy).

Adjectives

Adjectival idioms may be formed by premodification of an adjective: *brand new* 'completely new', *dirt poor* 'extremely poor'; by postmodification: *dyed-in-the-wool* 'inveterate', *holier-than-thou* 'sanctimonious', *wet behind the ears* 'inexperienced'; and by conjunction: *hot and bothered* 'excited and annoyed', *tired and emotional* 'drunk', *spick and span* 'very clean and tidy', *footloose and fancy-free* 'free from entanglements (mainly physical freedom)'. Similes, which function adjectivally, can be categorized with idioms if their meaning is not transparent: *bright as a button* 'lively and clever', *crazy like a fox* 'astute'.

Adjectival idioms based on prepositional phrases are by their nature usually found in predicates: 'I'm feeling rather *under the weather'* (= unwell), 'They're *in cahoots'* (= collaborating), 'You're *out of your mind'* (= insane), 'He's *over the hill'* (= past his best age); but prenominal use is not ruled out: 'an *in-your-face* (= confrontational) attitude', 'an *out-of-touch* (= unaware of current developments) prime minister'.

Adverbs

Many adverbial idioms are compositionally similar to adjectival idioms: *by and large* 'generally speaking', *on and off* 'irregularly', *once or twice* 'a few times', *by the skin of one's teeth* 'by a very narrow margin', *from A to Z* 'completely, from beginning to end', *on paper* 'theoretically'. Other types occur, though: *all along* 'from the beginning', *ever so* 'extremely', *no end* 'greatly'.

Others

Idioms can also function as prepositions (*in view of* 'after taking (something) into consideration', *by dint of* 'by means of', *to the tune of* 'in the amount of', *over and above* 'in addition to') and conjunctives (*not to mention* 'and also', *as long as* 'on condition that').

Idioms can also constitute complete utterances or sentences: (*Well,*) *I never* 'I am surprised'. Many are jussive: *Never mind* 'Do not concern yourself', *God forbid* 'I hope that will not happen'; or are used interjectionally: *Big deal!* (used to disparage an exaggerated claim), *Not on your life!* 'Certainly not!', *So there!* (used as a verbal riposte). Standardized (or clichéd) sayings (*Great minds think alike*, *There's one born every minute*) merge into fully-fledged proverbs (*Many hands make light work*). More-or-less buried literary allusions (*There's the rub* – identifying a drawback; originally from Shakespeare's *Hamlet*) make a significant contribution to idioms of this sort.

Clichés

The term *cliché* implies a value judgment, of overuse and consequent staleness. It denotes an institutionalized expression, of greater or less semantic

transparency, which has been heard and seen so often that it strikes one as annoyingly hackneyed, and condemns its user as unoriginal. Membership of the category is adjudicated subjectively, and so will differ from person to person, but there are usually several high-profile phrases in circulation that most people would agree to stigmatize: for example, *at the end of the day* 'when everything has been taken into consideration', *the name of the game* 'the main idea or intention', *in this day and age* 'now'. The desirability of originality is a comparatively recent phenomenon: before the 19th century, the use of stock expressions was not seen as worthy of condemnation, and *cliché* in its present-day usage is not recorded in English before the 1890s.

See also: Collocations; Construction Grammar; Idiom Dictionaries; Phraseology.

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Ihre, Johan (1707–1780)

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Johan Ihre was a Swedish historian, comparative linguist, dialectologist, and runologist who was born in Lund in 1707 and died in Uppsala in 1780.

At the age of 10 Ihre moved to Linköping and in 1720, after the death of his father, who had been a professor of theology in Lund and then dean in Linköping, moved to Uppsala. In Uppsala he took up studies of theology, history, and classical and modern languages, among other subjects, and graduated in 1728. From 1730 to 1733 he traveled around Europe and received his doctor's degree in 1731. In 1735 he was appointed professor of Latin poetry and in 1738 professor of the Skyttean chair of Politics and Eloquence, where he gave lectures on European history and politics. At the same time he also gave lectures on the Swedish language, which led to extensive comparative and historical studies. Ihre was outspoken in theological and political matters, which led to conflicts; he was also heavily fined in a trial (1750). He refrained from such activities thereafter and devoted himself entirely to his scholarly work.

The Silver Bible, *Codex argenteus*, at the university library of Uppsala caught his interest, and together with his assistant Erik Sotberg he revised and considerably improved earlier editions (*Ulphilas illustratus*, 1752, 1755) and published a great number of other dissertations, 450 altogether. In 1766 the first dictionary of Swedish dialects, *Swenskt dialectlexicon*, appeared and in 1769, the first Swedish etymological dictionary, *Glossarium Suiogothicum*. The latter took no less than 30 years to complete and must be regarded as one of Ihre's most important achievements. Its aim was to determine the position of Swedish in relation to other European languages. Three works on the history of the runes were published as dissertations: *De runarum in Svecia antiquitate* (1769), *De runarum patria et origine* (1770), and *De runarum in Svecia occasu* (1771–1773). A dictionary, *Lexicon runarum*, was never finished.

Ihre is generally regarded as Sweden's most outstanding linguist, nationally and internationally highly esteemed by his contemporaries. Ihre was a very good, entertaining, and popular lecturer, taking a vivid interest in his students. The value and originality of his results were questioned, e.g., by Rasmus Rask, and still are today (Hovdhaugen *et al.*, 2000: 119–121). There is no doubt, however, that he, particularly in his *Glossarium Suiogothicum*, was a forerunner and pioneer of comparative and historical linguistics of the early 19th century, basically arriving

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See also: Adelung, Johann Christoph (1732–1806).

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Ilocano

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Ilocano (Iloko, Ilokano, Samtoy) is an Austronesian language with 8 million speakers whose ancestral homeland is northwest Luzon Island, Philippines. It is the third largest language in the Philippines after Tagalog (the basis of the Philippine national language) and Cebuano (Sugbuhanon). Ilocano is the largest member of the Cordilleran language family of Northern Philippine languages. Within the family, Ilocano forms its own branch with no close relatives. Other Cordilleran languages include: the Alta branch, the South Cordilleran languages of Kallahan, Ibaloi, Pangasinan, and Ilongot; the Central Cordilleran languages of Isinai, Ifugao, Balangao, Bontok (Bontoc), Kankanay (Kankanaey), Kalinga, and Itneg; Arta; and the Northern Cordilleran languages that can be subdivided into the Cagayan Valley languages of Gaddang, Itawis (Itawit), Agta, Ibanag, Atta, Yogad, and Isneg (Isnag), and the North East Luzon branch that comprises Paranan and the Dumagat (Agta, Casiguran Dumagat) languages.

The original Ilocano provinces include Ilocos Norte, Ilocos Sur, and La Union, but Ilocanos have migrated extensively and even predominate in many localities in the neighboring provinces of Abra, Pangasinan, Tarlac, Benguet, and Cagayan. In the provinces of Abra and Pangasinan, many of the Ilocano speakers are ethnically Tinguian or Pangasinan, respectively, who have traded in their native tongues for the more prestigious *lingua franca*. There are also large communities of Ilocano speakers in the major urban centers of the United States, most notably in California and Hawaii.

Unlike most of the major languages of the Philippines, dialectal variation in Ilocano is minimal. There are two main dialects, Northern and Southern, easily distinguishable by slight lexical differences, intonation patterns, and the pronunciation of the native phoneme /e/, which is pronounced as the *e* in English *let* in the Northern dialects of Ilocos Norte and parts of Ilocos Sur, and as a high, central-back unrounded vowel [ɯ] in Abra, the southern parts of Ilocos Sur, La Union, Tarlac, and Pangasinan.

Ilocano has 15 native consonantal phonemes, and a glottal fricative used in one native word in the southern dialect, *haán* 'no', the colloquial variant of *saán*, as well foreign loans (see **Table 1**). Of the consonants, 14 (all but the glottal stop) may appear geminate in roots; the glottal stop only occurs geminate across morpheme boundaries: *agaC-árak* [agaʔʔá:rak] 'smelling of alcohol'.

Stops are unaspirated and, in final position, unreleased. The voiceless velar stop is pronounced quite

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Stops are unaspirated and, in final position, unreleased. The voiceless velar stop is pronounced quite

Table 1 Ilocano consonants

	±*Voice*	*Labial*	*Dental*	*Alveolar*	*Palatal*	*Velar*	*Glottal*
Stops	–	p	t			k	–
	+	b	d			g	
Fricative	–			s			(h)
Affricates	–			ts, /ty/			
	+			/dy/			
Lateral	+			l			
Tap/trill	+			r			
Glide	+	w			y		
Nasal	+	m		n		ng	

Table 2 Ilocano vowels

	Front	*Central*	*Centralized back*	*Back*
High	i		e	u
Mid	(ɛ)			(o)
Low		a		

far back and fricates before vowels. Unlike in Tagalog, glottal stop does not phonemically appear word-finally. Glottal stop is not represented orthographically word-initially, and word-medially, it is represented with a hyphen. Syllables have mandatory onsets, so the basic syllable structure of the language is CV(C): *ába* 'taro' [ʔá:.ba].

The phonemes /t/, /d/, and /s/ palatalize to [tʃ], [dʒ], and [ʃ] before the palatal glide /y/ or its equivalent (i + vowel), e.g., *siák* 'I' [ʃak], *tián* 'belly' [tʃan], *idiáy* 'there' [idʒay]. Because of many borrowings from English, Spanish, and colloquial Tagalog where these palatal sounds are not complex phoneme sequences, the phonemic status of [tʃ], [dʒ], and [ʃ] is open to debate.

Ilocano has four native vowel phonemes /i, e, a, and u/. The new phonemes /o/ and /ɛ/ are post-Hispanic (only in loanwords) (cf. Table 2). In the northern dialects, the phoneme /e/ is pronounced as /ɛ/, not differentiated from its pronunciation in Spanish loanwords.

The high vowel [u] is lowered considerably in word-final syllables, and is thus usually represented in the orthography, e.g., *ások* 'my dog' /á:su = k/.

Sequences of two vowels other than the diphthongs /ia/, /io/, and /ua/ are pronounced as two syllables, with an intervening glottal stop in careful speech, *saán* [sa.ʔan] 'no' but: *al-aliá* 'ghost' [ʔal.ʔal.ya].

Stress is phonemic, e.g., *siká* 'you, familiar' vs. *síka* 'dysentery'. There, are, however, certain environments that attract stress. Stress falls on the last syllable if the penultimate syllable is closed: *paltóg* 'gun', *takkí* 'excrement', *tig-áb* 'belch', *pugtó* 'guess'. Exceptions to this rule include words of foreign origin or words with a velar nasal coda preceding a final syllable: *bibíngka* 'rice cake', *karámba* 'jar' (Spanish loan). In native words, stress also falls on the last syllable if the last vowel is preceded by a consonant and glide: *sarunuén* 'follow', *aniá* 'what'.

Orthographic double vowels following two consonants usually take stress on the first vowel, with an intervening glottal stop or syllable boundary, e.g., *kanabraang* [ka.nab.rá:.ʔang] 'gong', *kulláaw* [kul. lá:.ʔaw] 'owl'. Words that include two identical CVC sequences separated by a vowel usually will carry the stress on the vowel separating them: *salísal* 'compete', *batíbat* 'nightmare'. There are, however, a few exceptions: *yakayák* 'sieve', and *pidipíd* 'closely set together'.

Vowels before geminate consonants and in stressed open (CV) syllables are automatically lengthened: *sála* 'dance' [sá:.la], *babbai* 'girls' [bà:b.bá:.ʔi]. Open reduplicated syllables in roots that contain a vowel sequence also bear secondary stress/lengthening: *na.ka-bà:-ba.ín* 'shameful'.

Like its sister Philippine languages, Ilocano is a head-marking, predicate-initial language. When two nominals appear postpredicately, the agent normally precedes the patient: *P{in}artí ti baró ti kaldíng* (slaughter{PERF.TRANS} ART bachelor ART goat) 'The bachelor slaughtered the goat'. The initial position in Ilocano syntax is reserved for the predicate so constituents in this position are predicative: *Tabbéd ni Bong*. 'Bong is stupid', *alutiít* '(it is a) house lizard'. When a noun phrase does precede a predicate for pragmatic reasons, it is preceded by a pause or the predicate marking particle *ket*. The phrase *Napintas ni Alessandra* 'Alessandra is pretty' can appear inverted as: *Ni Alessandra … napintas* or *Ni Alessandra ket napintas*.

Most syntactic structures follow a head + modifier pattern. Genitives follow their nouns > *ti uken-ko* 'my puppy', *ti uken ni Rafael* 'Rafael's puppy'.

Table 3 Ilocano voice

Transitivity	*Orientation*	*Affix*	*Perfective*	*Example*	*Gloss*
Intransitive	Actor	*ag-*	*nag-*	***ag**katáwa*	'to laugh'
		-um-	*-imm-*	*d**um**akkél*	'to grow, become big'
Detransitive		*mang-*	*nang-*	***mang**án*	'to eat'
Transitive	Patient	*-en*	*-in-*	*surát**en***	'to write something'
	Directional	*-an*	*-in–an*	*surát**an***	'to write to someone'
	Conveyance	*i-*	*in-; iny-*	***i**súrat*	'to write down'
	Benefactive	*i–an*	*in(y)–an*	***i**daít**an***	'to sew for someone'
	Comitative	*ka-*	*kina-*	***ka**tugáw*	'to sit with someone; seat mate'
	Instrumental	*pag-*	*pinag-*	***pag**íwa*	'to slice with; knife'

Table 4 Ilocano articles

	Non-personal, singular	*Non-personal, plural*	*Personal, singular*	*Personal, plural*
Core	*ti* (neutral), *diay* (definite)	*dagití*	*ni*	*da*
Oblique	*ití*	*kadagití*	*kenní*	*kadá*

Typical of the native languages of the Philippine archipelago, there is a rigid voice distinction in the verbs whereby the semantic relationship between the verb and the pivot (the syntactically most privileged absolutive argument) is signaled by the verb's derivational morphology (Rubino, 2000).

The various voices in Ilocano are shown in Table 3. Each affix has an infinitival/imperative form and a perfective form. Initial CVC reduplication of the verb is employed for progressive (continual) verbs. So the actor voice verb *agdigos* 'take a bath' inflects as *agdigos* 'take a bath', *nagdigos* 'took a bath', *agdigdigos* 'is taking a bath', *nagdigdigos* 'was taking a bath.' The enclitic *=(n)to* which is realized as *=nto* after vowels and *=to* after consonants denotes future time, e.g., *agdigosto* 'will take a bath', *agdigoskanto* 'you will take a bath'. Other derivational possibilities with the root *digos* include *agindidigos* 'pretend to bathe', *pagdígos* 'used for bathing', *kadigos* 'bathing mate', *panagdigos* 'bathing', *idigos* 'to bathe with (+instrument), *agpadigos* 'have a bath', *padigosen* 'bathe someone else', *pagdigusan* 'bathing place', etc.

Ilocano also has a potentive mode used for actions that are abilitative, coincidental, involuntary, or accidental. Potentive verbs are formed with the prefixes *ma-ka-* or *na-ka*, e.g., *na-dungparko ti lugan* 'I accidentally hit the car' vs. *D{in}ungparko ti lugan* 'I hit the car (on purpose)'.

Compared to many other Philippine languages, the Ilocano noun marking system is rather simple, with only two case distinctions, a core case (for the two arguments that appear with a transitive verb or the one argument that appears with an intransitive predicate) and an oblique case for other referents. As is shown in Table 4, plurality in nouns may be expressed by the article. Most countable nouns may also be pluralized by reduplication, e.g., *lalaki* 'boy' > *lallaki* 'boys', *sabong* 'flower' > *sabsabong* 'flowers', *kailian* 'townmate' > *kakailian* 'townmates'.

Ilocano has six sets of pronouns, which encode eight personal distinctions. There are three first person plural distinctions in the language, dual (you and I), exclusive (we but not you), and inclusive (we and you). The second person plural pronouns may be used to a single address to express politeness.

Independent pronouns are used predicatively (see Table 5). Ergative (genitive) and absolutive pronouns are enclitic; they behave like suffixes that do not attract stress shift, e.g., *Napán-ak idiáy* 'I went there', *sá-ak napán* 'then I went'. Monosyllabic enclitics are usually not immediately segmentable by native speakers and some show allomorphic variation dependent upon phonological environment. After the suffixes *–an* (NOMINALIZER; DIRECTIONAL) and *–en* (PAT), the first and second person ergative enclitics fuse with the final *n* to *–k*, and *–m*, respectively, e.g., *basaek*/ basa-en = k(o)/ 'I'll read it'. The first and second ergative enclitics also lose their final vowel after vowels, e.g., *adi-m* 'your younger brother', unless they follow the monosyllabic adverbs *sa* 'then' or *di* 'negation' or precede the adverbial enclitic *=(e)n* 'now, already' in which they maintain their full forms, e.g., *kuarta-k* 'my money' vs. *kuarta-ko-n* 'It's my money now'.

When two enclitic pronouns meet in Ilocano, they fuse in such a way that some agentive distinctions are neutralized. Thus *gayyem-nak* may mean both 'I am your friend' or 'I am his/her friend'; *Ay-ayaten-da-ka* can mean 'They love you' or 'We love you'.

Table 5 Ilocano pronouns

Gloss	*Indep*	*Ergative*	*Absolutive*	*Oblique*	*Independent*	*Reflexive*
1s	*siák*	*=k(o)*	*=ak*	*kaniák*	*kukuák, bágik*	*bagík*
2s familiar	*siká*	*=m(o)*	*=ka*	*kenká*	*kukuám, bágim*	*bagím*
3s	*isú(na)*	*=na*	–	*kenkuána*	*kukuána, bágina*	*bagína*
1 dual incl	*data*	*=ta*	*=ta*	*kadatá*	*kukuáta, bágita*	*bagíta*
1 pl excl	*dakamí*	*=mi*	*=kamí*	*kadakamí*	*kukuámi, bágimi*	*bagími*
1 pl incl	*datayó*	*=tayó*	*=tayó*	*kadatayó*	*kukuátayo, bágitayo*	*bagítayo*
2 pl, (2 sg formal)	*dakayó*	*=yo*	*=kayo*	*kadakayó*	*kukuáyo, bágiyo*	*bagíyo*
3 pl	*isúda*	*=da*	*=da*	*kadakuáda*	*kukuáda, bágida*	*bagída*

Table 6 Ilocano articles and demonstratives

Visibility	*Range*	*Article*	*Demonstrative, core, singular*	*Demonstrative, core, plural*	*Demonstrative, oblique, singular*	*Demonstrative, oblique, plural*
Visible ↓ Neutral	Proximal	*toy*	*daytóy*	*dagitóy*	*kadaytóy*	*kadagitóy*
	Medical	*ta*	*daytá*	*dagitá*	*kadaytá*	*kadagitá*
	Distal	*diay*	*daydiáy*	*dagidiáy*	*kadaydiáy*	*kadagidiáy*
Out of sight	Recent	*tay*	*daytáy*	*dagitáy*	*kadaytáy*	*kadagitáy*
	Remote	*di*	*daydí*	*dagidí*	*kadaydí*	*kadagidí*

Ilocano deictics include spatial/temporal demonstratives (which have abbreviated article forms) and temporal adverbs that mark relative time. The temporal adverbs are *itá* 'now, today', *itattá* 'right now', *itattáy* 'just a while ago, immediate past', *itáy* 'a while ago, recent past', and *idí* 'a while ago, remote past'. Temporals can mark both verb phrases and temporal nouns: *N-ag-paráng idí*. (PF-ACT-appear REM.PST) 'It appeared a while back', *idí rabií* (REM.PST night) 'last night'. There is also a future marker *(in)ton(o)* that precedes temporal nouns; it cannot be used as a temporal adverb: *intón bigát* (FUTURE morning) 'tomorrow'.

The nontemporal Ilocano demonstratives mark three degrees of spatial orientation and two degrees of temporality (see Table 6).

The recent and remote articles and demonstratives are used for referents that are not visible in the speech event. They mark referents that may be dead, nonactual, or somehow distanced from the speech event. Referents that are recently activated into the consciousness of the speaker may also appear with a nonvisible demonstrative. Compare *N-ag-paráng ni Erning*. 'Erning appeared/showed up' vs. *Nagparáng daydi Erning*. 'The late Erning appeared (as a ghost)'; *Ania ti nágan = mo?* 'What is your name (*nagan*)' vs. *Ania tay náganmo [manén]*? 'What was your name [again], (I used to know it)?'

See also: Austronesian Languages: Overview; North Philippine Languages; Philippines: Language Situation; South Philippine Languages.

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Imaging and Measurement of the Vocal Tract

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Imaging Techniques to Measure the Vocal Tract

The internal structures of the vocal tract are difficult to measure without impinging upon their normal movement patterns. Imaging techniques overcome that difficulty because they measure internal movement without directly contacting the structures. Imaging techniques keep increasing in popularity because of their reduced cost, improved measurement capabilities, and global depiction of the tongue or vocal tract. Three well-known imaging techniques have been applied to speech research: computed tomography (CT), ultrasound, and cine-magnetic resonance imaging (MRI), including tagged cine-MRI (tMRI). Imaging systems provide very different information than do other physiological measures; that is, they provide information about the shape and position of the entire imaged structure rather than a single point on the structure. The imaging techniques described in this article create images in a fundamentally similar way. They construct a tomograph, or an image of a slice of tissue, by projecting a thin, flat beam through the tissue in a single plane.

Four tomographic planes are used in imaging (see Figure 1). They are the sagittal, coronal, oblique, and transverse (axial) planes. The midsagittal plane is a longitudinal slice, from top to bottom, down the median plane, or midline, of the body (dashed line). The parasagittal plane is parallel to the midline of the body but off-center. The coronal plane is also a longitudinal slice. It is perpendicular to the median plane of the body. The oblique plane is inclined between the horizontal and vertical planes. Finally, the transverse plane lies perpendicular to the long axis of the body; in MRI, it is called the transaxial plane, or more commonly, the axial plane.

Computed Tomography (CT)

The first tomographic technique of interest is computed tomography (CT). CT uses X-rays to image slices (sections) of the body. Crosssectional (tomographic) images are made by projecting very thin X-ray beams through a slice of tissue from multiple angles and reconstructing the projections into a single image using a computer. (Encyclopaedia of Medical Imaging, v.1). Figure 2 depicts a CT scanner. The scanner rotates around the body, taking multiple images. The computer composite includes structures that are visible in some scans but obscured in others. Using this technique, tissue slices less than a millimeter thick can be collected rapidly, 15 Hz or faster, and multiple slices (16 or more) can be collected simultaneously. From this multislice dataset, planar sections can be reconstructed in any direction.

The advantage of CT over traditional projection X-rays is its ability to separate objects in the projection direction. X-rays overlay such objects. Thus, a lateral X-ray presents the two sides of the jaw as one, or as multiple shadows. The transverse orientation of the CT displays both sides clearly. Figure 3 shows a

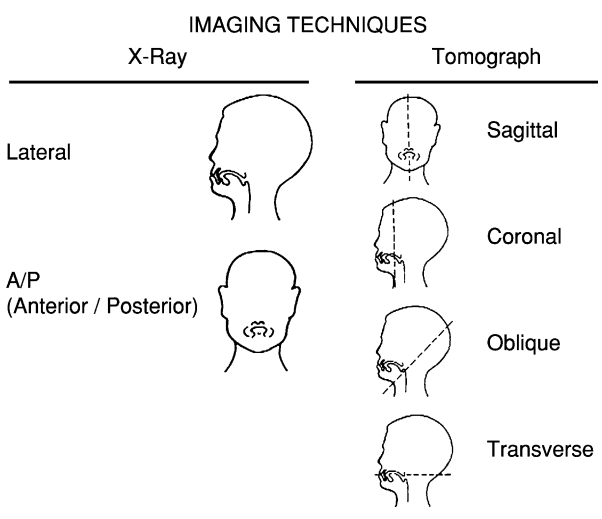

Figure 1 Scan types used in through-transmission and tomographic imaging. There are two X-ray angles contrasted with four tomographic scanning planes.

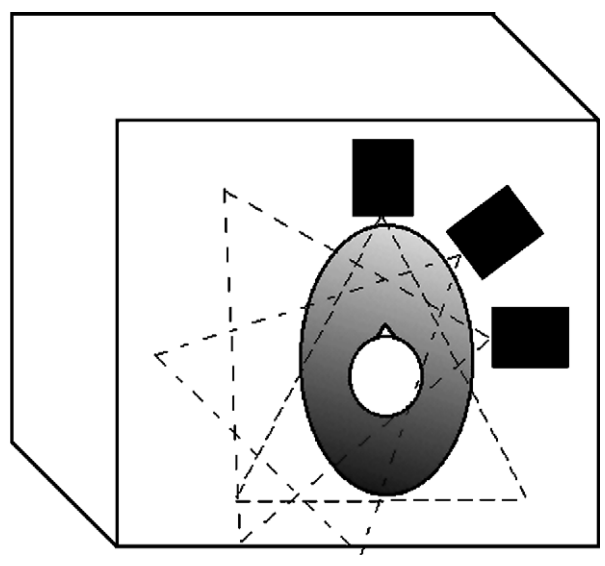

Figure 2 Schematic of a subject in a CT scanner.

transverse CT of the oropharynx at rest. A vertebral bone appears in the center of the image (white). Just above this, the airway can be seen (black), with the epiglottis and valleculae seen above it. The thyroid cartilage (white) surrounds the airway on three sides. The soft tissue is gray. CT can image soft tissue more clearly than X-rays can because it produces a composite X-ray. By digitally summing a series of scans, the composite section has sharper edges and more distinct tissue definition.

An alternative method of CT data collection is Spiral CT. Spiral CT collects multiple slices at the same time by collecting a single spiral-shaped slice instead of multiple flat planar slices. In the mid 1980s, the cable and drum mechanism for powering the rotation of the machine was replaced with a slip ring. The slip ring allows the CT scanner to rotate continuously, creating a spiral image. Spiral CT scans have very high resolution, but take 20–30 sec to create, and hence are too slow for imaging continuous speech.

Currently the biggest limitation of CT is the radiation exposure. CT is an X-ray. Therefore, only a limited amount of data can be collected on a single subject. In addition, the subject is supine or prone, so gravitational effects on the speech task are different than they are when the subject is upright, and thus some behaviors may not be identical. On the positive side, CT can image the entire tract by sectioning multiple planes for analysis. In addition, the images are extremely clear, and the edges are easy to measure.

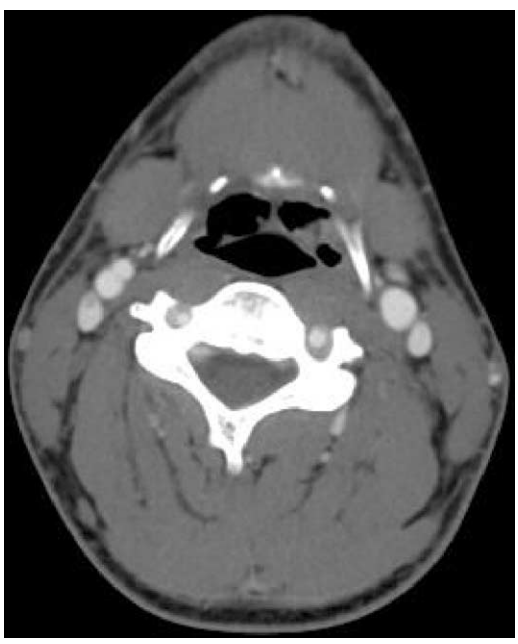

Figure 3 CT image of a transverse section of the oropharynx at rest.

The sections are also quite thin (less than 0.5 mm), which allows composite three-dimensional vocal-tract shapes to be constructed by combining multiple sections.

Ultrasound

The most convenient imaging technique is ultrasound. Ultrasound is convenient because the machines are portable, affordable, and easy to use. The ultrasound process is also noninvasive and comfortable for the subject. Ultrasound produces an image by using the reflective properties of sound waves. In the simplest technique, A-mode, a piezoelectric crystal, stimulated by an electric current, emits an ultra high-frequency sound wave. The crystal both emits the sound wave and receives the reflected echo. The sound wave travels through the soft tissue and reflects back when it reaches an interface with tissue of a different density, like bone, or when it reaches air. The best reflections are perpendicular to the beam (see Figure 4, first line). Steeply inclined interfaces refract the sound and may not be visible (second line). Soft tissue typically has an uneven edge (third line). To see a section of tissue, rather than a single point, one needs multiple crystals organized into an array or B-scan transducer. In a B-scan, up to 128 crystals fire sequentially and image a wedge-shaped section of tissue of up to 140 degrees, with the origin at the transducer. Using basic principles of sound conduction, the computer converts the returning echoes into a gray scale video image. The conversion is done by displaying stronger echoes as brighter, whiter edges, and echoes that arrive later in time as being farther away from the transducer.

Figure 5 shows a sagittal image of the tongue. To create such an image, the transducer is placed below the chin and the beam is passed upward through a 1.9 mm-thick section of the tongue. This thin wedge-shaped section is shown in the inserted head picture (see Figure 5). When the sound reaches the air at the surface of the tongue, it reflects back and creates a bright white line. The black area immediately below the line is the tongue body. The border between the white reflection and the black tissue is the surface of the tongue. Interfaces within the tongue may be visible. For example, the genioglossus muscle may be seen in the anterior tongue. Figure 6 depicts the coronal tongue. The smaller crosssectional tongue surface contains a small midsagittal depression. The genioglossus muscle and the muscles of the floor of the mouth appear as black areas. Measurement error on such images is better than 0.7 mm.

The 2-D (two-dimensional) planar image sequences can be visually inspected and analyzed quantitatively.

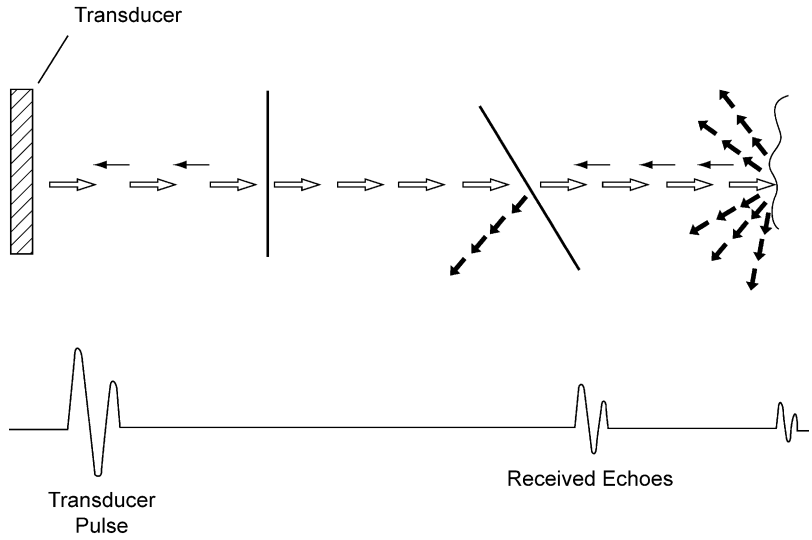

Figure 4 Schematic of ultrasound reflection patterns emanating from surfaces at different angles to the beam.

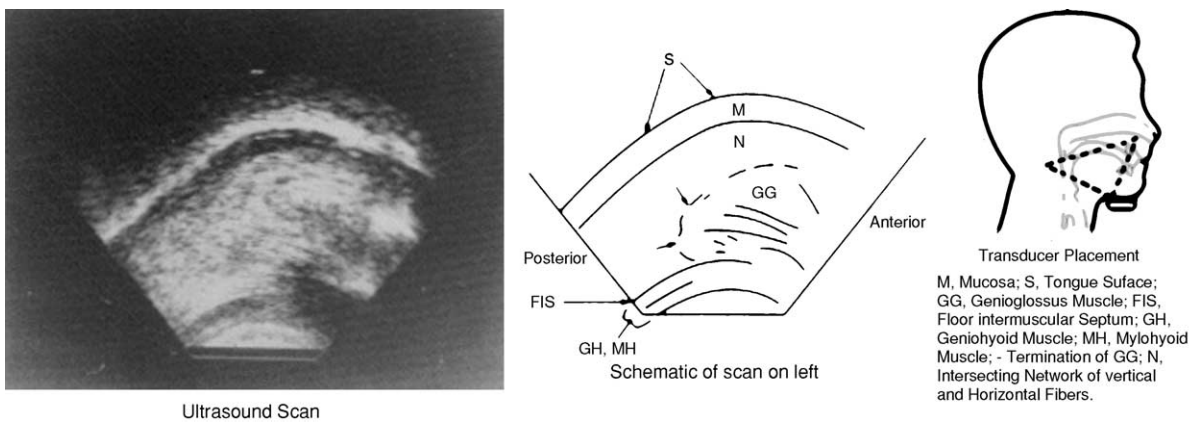

Figure 5 Ultrasound image of a sagittal section of the tongue at rest, a schematic of the structures imaged, and a schematic showing the location and direction of the ultrasound beam.

To more clearly visualize tongue motion, it is valuable to view the ultrasound movie as a series of sequential frames. To do this, the contour of the upper tongue surface is extracted using edge detection software (Li *et al.*, 2004) and displayed as a time-motion series (Parthasarathy *et al.*, 2004). Figure 7 shows the time-motion series of midsagittal tongue contours during the word 'golly.'

The viewer is facing the tongue as if looking into the speaker's mouth. The 'surface' is not a 3-D tongue surface. Instead, it is a single midline slice of the tongue that changes shape over time as the word 'golly' is spoken. In this series, color indicates tongue height, with blue representing high and red representing low. The tongue tip is closest to the viewer, and the leftmost frame shows the high back tongue position (blue) expected during the transition from /g/ to /ɑ/. The tongue deforms locally, elevating the tip as it transitions into /l/. The tongue blade elevates for /i/. In addition to visual inspection, the data can be analyzed quantitatively. Multiple repetitions of an utterance can be compared. Calculations, such as the average and standard deviation, can be made for each contour in multiple repetitions of a sequence like 'golly.' Multiple datasets can be compared as well. Two utterances that differ in some way, such as minimal pairs, can be compared quantitatively by calculating global (RMS) and local (segment) differences between each contour of a sequence. [Note that this software is publicly available from the University of Maryland. The Maryland Tongue Analysis Package includes EdgeTrak and Surfaces. EdgeTrak semi-automatically extracts tongue contour edges from a sequence of black and white images, particularly ultrasound. EdgeTrak can also extract and overlay palate contours. Surfaces displays contour sequences

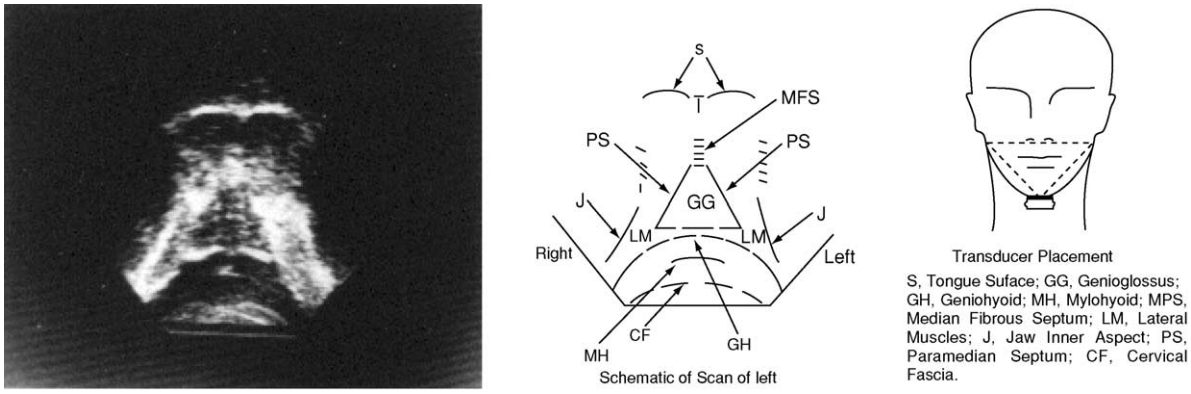

Figure 6 Ultrasound image of a coronal section of the tongue at rest, a schematic of the structures imaged, and a schematic showing the location and direction of the ultrasound beam.

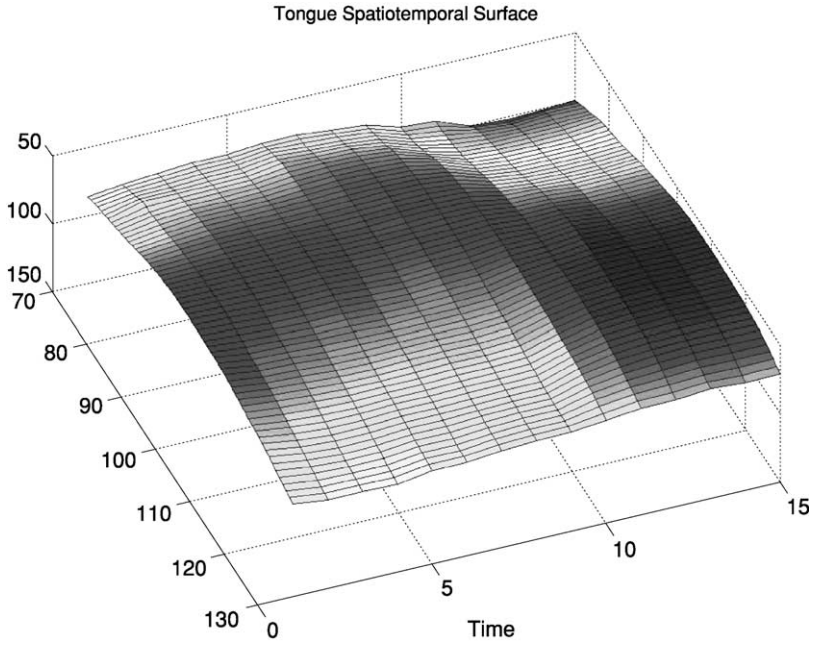

Figure 7 Time-motion display of the midsagittal plane of the tongue for the word golly. The leftmost frame is 'g' and the rightmost frame is 'y.' Blue is the highest and red the lowest point. The tongue deforms over time from a high body, to a high tip, to a high blade.

and numerically analyzes them by calculating averages, standard deviations, RMS differences, and local differences.]

Three-dimensional (3-D) or volumetric ultrasound is offered by several companies. Three-dimensional machines typically contain a 2-D transducer that collects a scan in the ordinary way and is then moved mechanically to another location (a few degrees away) to collect the next scan. The internal computer reconstructs the echoes and displays a 3-D volume plus three 2-D planes with multiple slices in each. Frame rates are 24 Hz. There are two drawbacks to 3-D machines, however. First, the data are stored in proprietary format from which 3-D movies or single jpg frames (not a series) can be saved. This makes tongue extraction impractical. Second, there is an enormous amount of data. At 24 fps $\times$ 3 dimensions (sagittal, coronal, transverse) $\times$ 10+ sections in each dimension, the tongue is represented by 720 frames per second. Thus, even if the images could be stored for analysis, their measurement would be slow. In addition, the ultrasound technology is the same as that of 2-D machines, so image quality is not improved and subjects that image badly in two-dimensions also image badly in three-dimensions.

Three-dimensional tongue surfaces, however, can be reconstructed from planar ultrasound data. They can be reconstructed for static phonemes using as few as

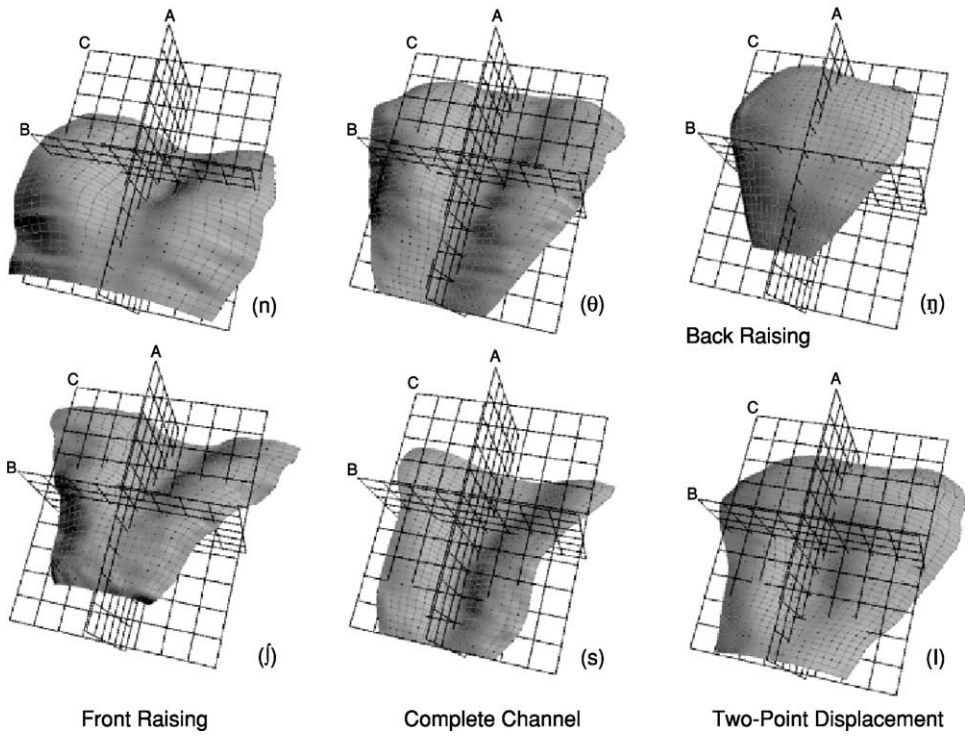

Figure 8 Three-dimensional reconstructions of six American–English consonants.

five coronal ultrasound slices of data. Figure 8 shows six American English consonants (Stone and Lundberg, 1996). The tongue tip is at the lower left, and each grid line is 0.5 cm long. Four distinct tongue shapes can be seen: front raising, back raising, complete channel, and two-point displacement.

Similarly 3-D motion can be reconstructed from planar motion. Figure 9 shows a time-motion sequence or 3-D tongue surfaces for the phrase 'it ran a lot.' The reconstructions are based on five coronal and one midsagittal slice.

The vocal folds may be imaged by placing the ultrasound transducer at the front of the neck, at the thyroid notch (Adam's apple), and pointing directly back in the transverse plane (see Figure 10). The vocal folds appear as two gray, wedge-shaped structures in the middle of the image. They are vibrating, but the vibration cannot be seen in a still frame. Instead, the approximating edges of the folds appear as a dark area. The laminae of the thyroid cartilage appear as oblique, divergent white lines just above the folds. The arytenoids appear as bright white dots at the lower margins of the vocal folds. Ultrasound images of the vocal folds reveal abduction and adduction, the existence of tumors, abnormalities, and asymmetries. Real-time videotapes show 'fluttering' of the vocal fold edges. However, the vibration (100 Hz or more) is actually too fast for the ultrasound frame rate (30 Hz), which is why measurement of vocal fold vibration is not practical from ultrasound images.

There are several limitations of ultrasound imaging. The first, which is the inability to see anything but the tongue, can be overcome with certain data collection procedures (Stone *et al.*, 2004). The air at the tongue's surface reflects the sound wave, so that the structures on the far side of the vocal tract, like the palate and pharyngeal wall, cannot be imaged. However, during a swallow, the tongue contacts the palate as the bolus is pushed into the pharynx. During this time, the sound passes beyond the tongue surface to the palate bone and reflects back. Thus, the palate can be measured. If the head and transducer are held steady, the palate can be used as a reference for tongue position. The second disadvantage is the partial obscuration of the tongue extrema by the jaw and hyoid bone. Bone refracts the sound wave, creating an acoustic shadow or dark area obscuring as much as 1 cm of the tongue tip and parts of the tongue root. The tip may be imaged, however, if there is a great deal of saliva in the mouth or if the tongue is low in the mouth.

An advantage of ultrasound is its relatively fast scan rate. The scan rate, typically 30 Hz (some machines collect at 90 Hz), is adequate to image tongue movement for vowels and most consonants, though not fast enough to measure vocal fold

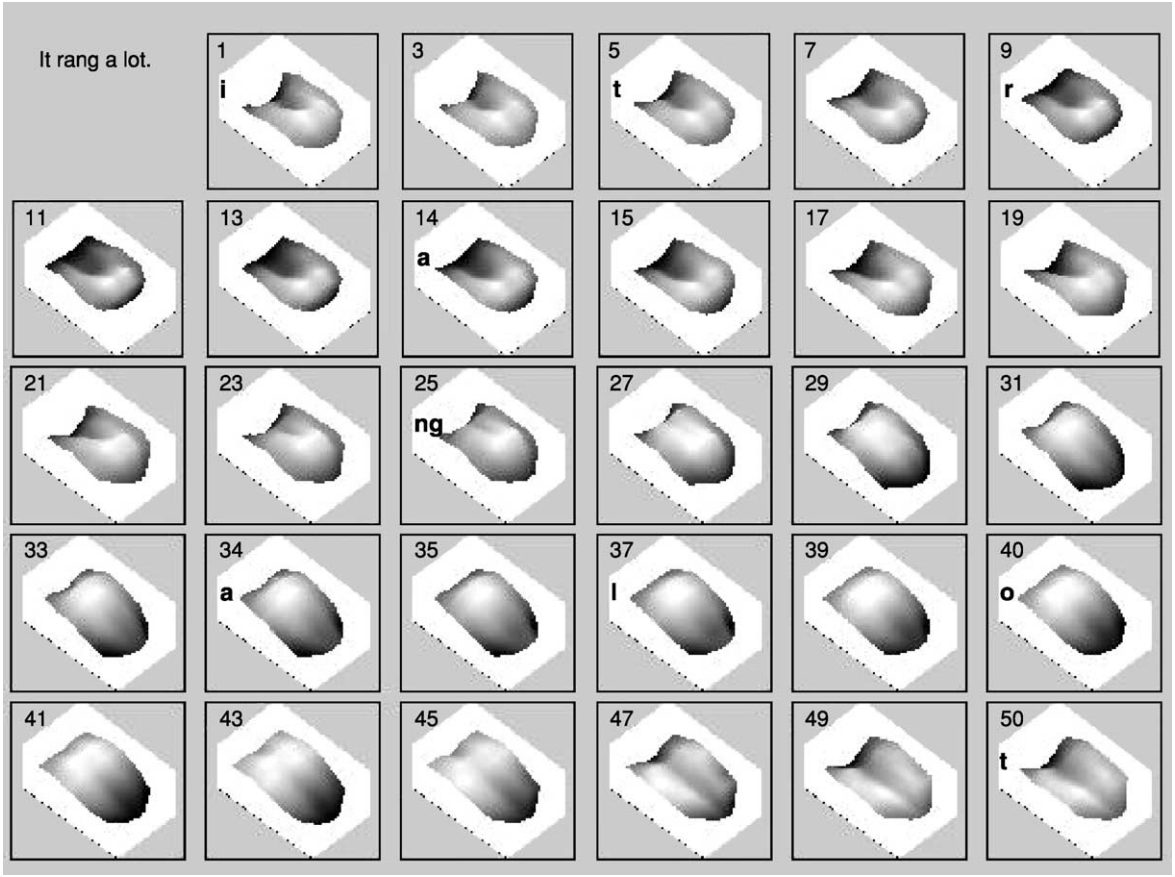

Figure 9 A time-motion display of 3-D tongue surfaces reconstructed from contours collected in the midsagittal and five coronal planes (from Yang and Stone, 2002).

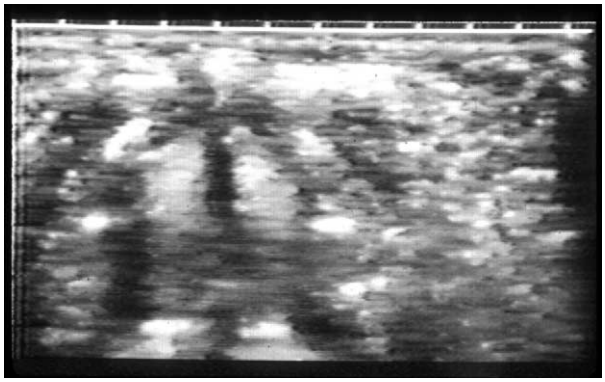

Figure 10 Ultrasound image of the vocal folds in closed (phonation) position.

vibration. A second advantage is that it has no known biological hazards, because the transduction process involves only sound waves. In addition, the real-time, multiple-plane capabilities capture intricate tongue movements and allow reconstruction of the complex three-dimensional deformation of the tongue surface. Finally, the portability of ultrasound machines makes them excellent tools for field work or use in other nonlaboratory data collection environments.

Magnetic Resonance Imaging (MRI)

The third tomographic technique is magnetic resonance imaging (MRI). MRI uses a magnetic field and radio waves rather than X-rays to image a section of tissue. Most MRI machines are 1.5 Tesla, and some machines exert a stronger magnetic field (3 Tesla), which in some cases improves image quality. The software used to run the machine, not the hardware, determines what image types can be acquired. Three types of MRI are used for tissue analysis: tagged Cine-MRI (tMRI), diffusion tensor imaging (DTI), and functional MRI (fMRI). An MRI scanner consists of electromagnets that surround the body and create a magnetic field. MRI scanning detects the presence of hydrogen atoms, which occur in abundance in water and fat. In Figure 11, picture A represents a hydrogen proton spinning about an axis that is oriented randomly. B shows what happens when a magnetic field is introduced. The proton's axis aligns along the direction of the field's poles. Even when aligned, however, the

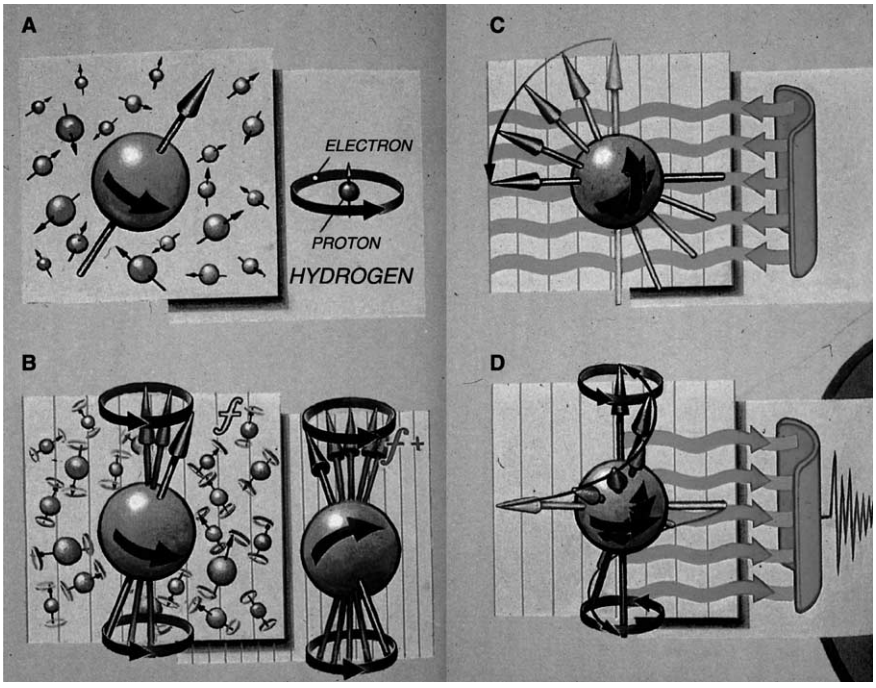

Figure 11 Artist's rendition of the effects of MRI scanning on hydrogen protons. (After Davis Meltzer, 1987, *National Geographic*. Reproduced with permission.)

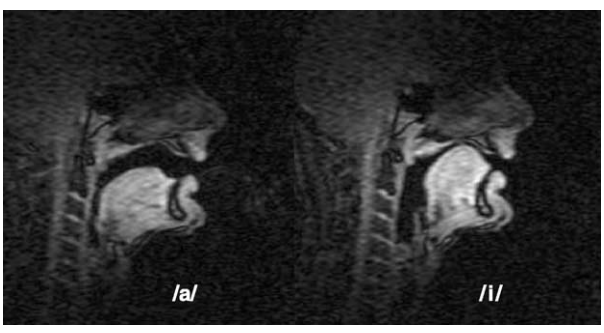

Figure 12 Midsagittal MR images of 'i' and 'a.'

proton wobbles, or precesses. In picture C, a short-lived radio frequency (RF) pulse, vibrating at the same frequency as the precession, is introduced. This momentarily knocks the proton out of alignment. D shows the proton realigning, within milliseconds, to the magnetic field. As it realigns, the proton emits a weak radio signal of its own. The emitted radio signals are assembled as a gray scale image in which greater hydrogen density creates whiter tissue. Because the signal emitted by the protons is very weak, many repetitions of the task are collected and the signals summed. The vocal tract appears black, as do the teeth, since neither contain water or fat. Marrow within the bones, which is high in water and fat, and the fat surrounding the head, which is high in hydrogen, are bright white. Figure 12 shows MR images of /a/ and /i/. The tongue, lips, and soft palate are light gray, and their edges are clearly visible.

Of particular interest when measuring the vocal tract is motion. Cine MRI is similar to other cine techniques in that it divides a moving event into a number of still frames. Because the proton emissions from one repetition of an utterance are weak, collecting tongue motion using only one repetition of a task requires a long frame length, and thus summation time is longer (e.g., 4 Hz) or results in fairly poor image resolution. For good resolution of tongue motion and fast frame rates, multiple repetitions are needed, and the 'still frames' from each repetition are summed. This creates a stronger signal for each frame and improved object detail. However, the repetitions must be very precise to prevent blurring. MRI can be collected at fast frame rates, with single or multiple repetitions; more repetitions allow faster frame rates by summing the repeated measures.

Tagged Cine-MRI Tagged Cine-MRI (tMRI) combines Cine-MRI and tissue tagging to identify and track the motion of specific tissue points in a structure such as the tongue. This combination of techniques allows tMRI to image the 'global surface' motions typical of traditional MRI and other imaging techniques as well as the 'local tissue point' motions observed with point-tracking methods, at 15–30 Hz. Tags are a way of marking the tissue prior to collecting

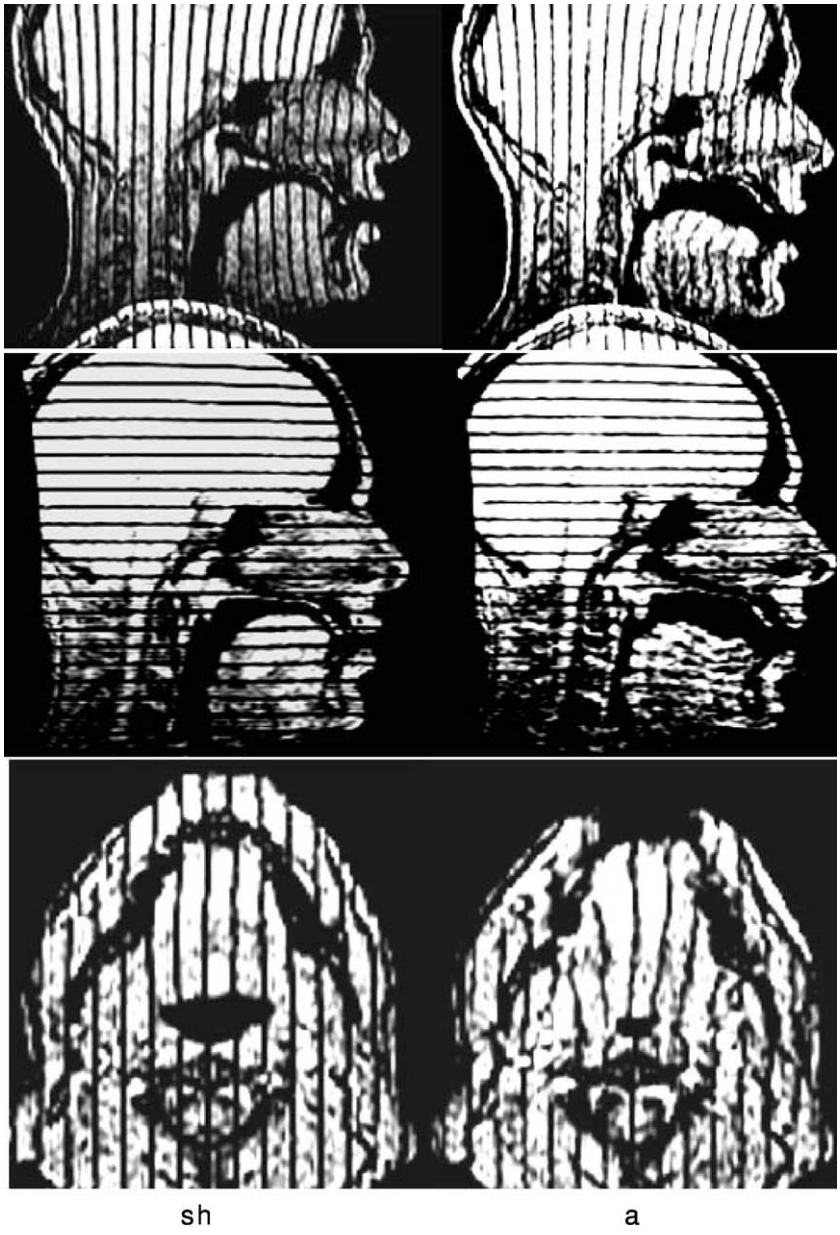

Figure 13 Reference and deformed frames for 'sh' (left) and 'a' (right). The three tag planes capture horizontal, vertical and lateral motion respectively.

the MR image sequence. Tags are created by applying a spatial gradient to the tissue, which demodulates the protons in alternating planes. Demodulation causes the alternating planes of protons to spin out of phase with the rest of the tissue. The demodulated protons are invisible to the machine when the image is read. The invisible proton planes appear as black stripes on the image (see Figure 13). If two orthogonal tag planes are applied, a grid of tags appears (see Figure 14). This magnetic effect is temporarily retained by the tissue (600–1200 ms). Therefore, as the tongue changes shape, the deformation of the invisible proton planes (black) is distinct from the deformation of the visible proton planes, and local tissue motion can be seen (see Figures 13 and 14). Non-cine tagged MRI captures two moments in time. First, a 'reference' state is acquired while the subject holds the tongue steady. The tongue is then moved to a 'deformed' state and a second image is acquired. Shape differences between the reference and deformed tags can be compared (see Figure 13). Tagged Cine-MRI, tMRI, captures continuous motion on multiple frames during the performance of the task (see Figure 14). From the tag deformations, tissue

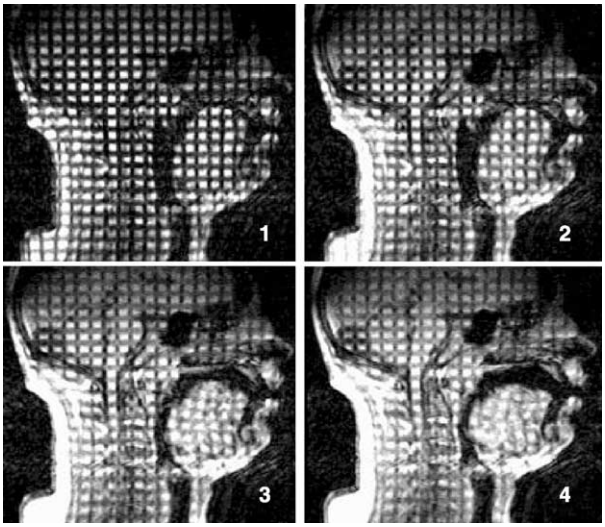

Figure 14 tMRI frames for 'ka.' The /k/ is in frame 1 and the /a/ in frame 4. The CV motion and local internal tongue deformation can be seen in frames 2 and 3.

points can be tracked and muscle compression calculated during speech.

Diffusion Tensor Imaging Diffusion Tensor Imaging (DTI) was developed in the early 1990s. DTI measures random thermal displacement of water molecules in tissue. DTI has virtually microscopic spatial resolution and images tissue fibers (e.g., muscle) with their orientations. The direction of greatest molecular diffusion parallels the local fiber direction. This is very useful in determining muscle composition, and a fiber map can be drawn and superimposed on a structural image such as an MRI. The fiber map can differentiate among nerve fiber pathways and detail anatomical structures based on their fiber architecture.

Two substantial disadvantages of this technique, however, preclude its use for measuring oropharyngeal structures. First, when fiber directions cross within a single voxel (3-D pixel) the underlying fiber structure is not evident. This situation is typical of oral musculature, especially the tongue, where fiber interdigitation is typical. Second, DTI is sensitive to motion, including respiration. Its use is, therefore, limited to detailing tongue anatomy, not physiology.

Functional MRI Functional MRI (fMRI) of the brain uses the same MR machine as standard MRI, tMRI, and DTI. fMRI is a method of MRI scanning in which tissue contrast is based on blood flow differences, not hydrogen content differences. fMRI detects changes in the neuronal activity of the brain that are blood oxygen level-dependent (BOLD) during the performance of various tasks. In other words, fMRI reflects brain function, not structure. The premise is that spatially distinct, distributed areas of the brain are connected into functional networks organized to produce specific tasks. If these networks can be imaged, they can be mapped geographically to detail brain function during human behavior. Increased neural activity in a region causes increased demand for oxygen, and that oxygen is brought to the region by blood. Replacement of deoxygenated blood with oxygenated blood produces a more uniform magnetic environment, which increases the longevity of the MRI signal. fMRI signals are snapshots that are collected at 10–20 Hz. Multislice recording of the brain and multiple repetitions can be recorded. Some limitations exist in the use of fMRI for speech research. First, the visible effects of the increase in oxygen occur some time after the event itself (0.5 to 8 sec), which results in poor temporal resolution. Second, signals can vary even with no change in brain state. To overcome the latter problem, fMRI usually compares sets of images before and after the task.

As with all instruments, MRI has several drawbacks in general. The first is the time frame. Static MRI and DTI require long periods of immobility for a good image. fMRI has a slow response time. Cine and tMRI require multiple, very precise repetitions. A second drawback is the width of the section. Whereas CT sections are less than 1 mm wide, and ultrasound sections are less than 2 mm, MRI sections are usually 5–10 mm wide. A tomographic scan compresses a three-dimensional volume into two dimensions, which is like displaying a cylinder as a circle. Therefore, in a slice that is 5 mm wide, items that are actually 5 mm apart in the crosssectional plane of the image will appear to be in the same plane. Thus, the hyoid bone and epiglottis might appear in the same transverse slice even though one is several mm below the other. A narrower width on MRI requires a longer exposure time. However, this technology is undergoing improvement, and MRI will undoubtedly require fewer repetitions and use thinner slices in the future.

Final drawbacks for MRI and CT are that the subject must be lying supine or prone, the machine may be unpleasant for some subjects, and use of the machines is costly. A supine or prone position changes the location of gravity with respect to the oral structures and normal agonist/antagonist muscle relationships. Unpleasantness and cost also limit their use when compared to ultrasound. Despite these nontrivial drawbacks, CT images both soft and hard tissue. MRI can image any plane of the body, and tagging allows the tracking of tissue points. Ultrasound provides large quantities of time-motion data

with a single repetition, thin slices, and a noninvasive method. This is more complete movement data on the tongue than can be obtained from any other instrument.

Imaging techniques provide more complete information about vocal tract behavior than are available from direct measures like point-tracking techniques or electropalatography, because imaging techniques measure the inaccessible parts of the tract (e.g., the pharynx), and they measure planes rather than (or in addition to) points. In the future, as their scan rates increase, imaging systems will become more accessible and more widely used. The expanded datasets and multiple perspectives gained from imaged data are transforming the nature of speech science research.

Point-Tracking Measurements of the Vocal Tract

Point-tracking systems measure individual tissue points by affixing pellets to the articulators and tracking their movement during speech. Typically, multiple articulators can be measured at the same time, and tracking speed is fast, so that interarticulator timing measures are quite good. Three point-tracking systems, the electromagnetic articulometer, the X-ray microbeam, and the Optotrak are significantly improving the quality of vocal tract measurements.

Electromagnetic Articulometer (EMA)

The EMA tracks fleshpoint movement by measuring the movement of small receiver coils through alternating magnetic fields. Two such instruments that use roughly similar principles have been developed in Germany (Schonle *et al.,* 1987) and the United States (Perkell *et al.,* 1992). A single 3-D EMA system, which is now being developed and produced, will be introduced here as well (Articulograph AG500, Carstens, Inc., Munich, Germany).

The 2-D Electromagnetic Midsagittal Articulometer (EMMA), (Perkell *et al.,* 1972) A clear plastic assembly, suspended from above, is fit around the subject's head. Three transmitter coils, one above the forehead, one below the chin, and one at the nape of the neck form an equilateral triangle. The transmitter coils each produce an alternating magnetic field that is driven at a different sinusoidal frequency than are the others in order to generate three alternating magnetic fields. The use of three transmitters, and thus three overlapping fields, ensures accuracy in locating the receiver coils, which are placed at midline on vocal tract structures. The receiver coils are small, insulated coils attached with adhesive to articulatory structures at midline. As the alternating magnetic fields pass through the receiver coil, they induce an alternating signal in the receiver coils. The voltage of this signal is inversely related to the distance between the transmitter and the receiver coil. The best resolution in the field space is found in the center, i.e., in the midline of the oropharyngeal region, where measurement resolution is calculated at below 1 mm. A computer algorithm calculates the actual location of the receiver coil as it moves in xy space over time.

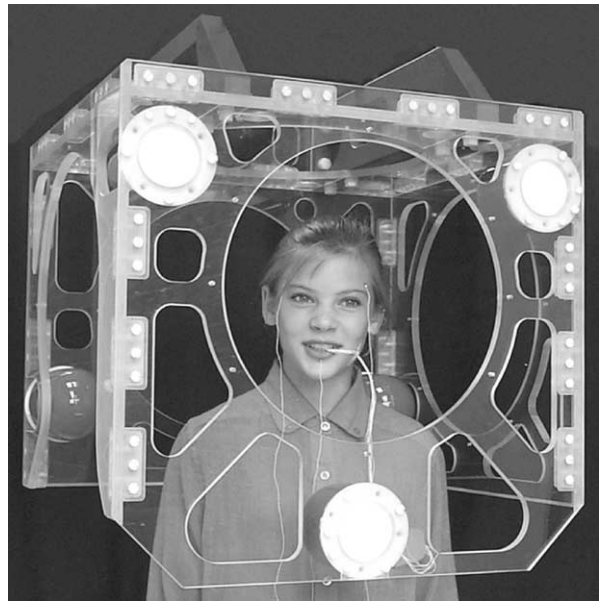

Figure 15 The 3-D Carstens EMA system. The head mount contains the transmitter coils; receiver coils are placed on the structures to be measured. (Reproduced with permission from Brigitta Carstens.)

One disadvantage of this system is that only points are measured, and so the behavior of the entire articulator is largely inferred. This is most problematic for the soft tissue structures like the lips, tongue, and velum, whose movements are more fluid than rigid. A second disadvantage is that the data can only be collected at midline and are subject to some error as the articulators rotate left to right. The biggest advantages are the rapid tracking rate and the abililty to track multiple articulators simultaneously. In addition, actual tissue points are measured; tissue motion or compression can be directly measured. Because of these two features, it is possible to measure interaction among the articulators and ask questions about interarticulator timing and programming.

The 3-D Articulograph, AG500 (EMA) (Carstens, Inc.) The 3-D EMA system uses six transmitter coils placed in a spherical configuration on a cube-shaped structure that surrounds the subject's head (see Figure 15). The transmitter coils produce

alternating magnetic fields of different frequencies, which allow their distances from the receiver coils to be tracked in xyz space, including translation and two rotation angles. The receivers can be placed anywhere within the region of interest. The spatial resolution is better than 1 mm and rotation is detected at about 1 degree of accuracy. This system, in the final stages of development, will include 3-D directionality of the tracked motion trajectories, compensation for head movements, and conversion of data into a head-based coordinate space.

The biological hazards of EMA are small. The articulometer uses fairly short exposure times and low field strengths. However, its use is not recommended with pregnant women, and the machine contains a warning: 'Strong magnetic fields may pose a risk to the health of a subject. To avoid such risks, the eld strengths produced by any EMA system should be measured and compared to published permissible exposure standards.'

X-ray Microbeam

The X-ray Microbeam facility is located at the University of Wisconsin, Madison, WI. The X-ray Microbeam uses an extremely thin X-ray beam to track the motion of small gold pellets that are affixed to one or more articulators using dental adhesive. The beam is 0.4 mm thick, and the pellets are 2–3 mm in diameter. Gold pellets are used because gold is an inert metal and because, as the X-ray dosage is very small, only a very dense metal can be detected. The system was designed to reduce radiation dosage to well below that of a dental X-ray in order to both avoid radiosensitive areas such as the eyes and reduce secondary photon scatter. The X-ray beam focuses primarily on the pellets so that the surrounding tissue receives only minimal radiation.

The 2-D position of the beam is computer controlled. As with traditional X-rays, the X-ray Microbeam originates on one side of the subject, passes through the subject's head, and is detected by a scintillation counter on the far side. Up to 1000 pellet positions are sampled per second. Thus, if 10 pellets are used, they can each be sampled 100 times per second. Differential sampling rates are also possible. The pellets are sampled initially in rest position to determine baseline xy displacement. A computer algorithm causes the beam to scan the area in which the pellet is predicted to move. The prediction is based on the pellet's previous displacement, velocity, and acceleration. Each pellet is scanned in turn. Positioning accuracy of the beam is 62 microns.

There are several advantages to the X-ray Microbeam. The rapid rate and accuracy of tracking make this an excellent system for examining timing-related coarticulatory effects, kinematic parameters such as velocity and acceleration, and the intercoordination of the articulators. In addition, the technique is unobtrusive, and the low radiation dosage allows for reasonably large datasets to be collected on each subject.

The X-ray Microbeam requires a large support staff and exists in a single location: Madison WI. Therefore, use of this system requires considerable travel for most investigators and their subjects. The machine provides point-tracking information, which is very similar in nature to the EMA data. However, it does expose the subject to radiation, albeit a small amount. Given the limited access to the X-ray Microbeam, this machine may be underutilized in the future. The facility has created a database from its collection, however, which is publicly available from the X-ray Microbeam, University of Wisconsin, Madison, WI, USA. This database is very convenient for those who would like to use point-tracking data and do not have access to an EMA system or the Microbeam itself.

Optotrak

A third point-tracking system, designed to measure surface features, is Optotrak (Northern Digital, Inc, Waterloo, Canada). This device tracks the movement of points in three-dimensional (xyz) space. Thus, Optotrak can measure side-to-side movement as well as anterior-to-posterior and superior-to-inferior movement. The system consists of markers placed on surface structures, sensors that track their positions, and a system unit that controls the timing of the marker emissions and the sensor processing. The markers are lightweight, flat, circular disks that come in two diameters, 7 mm and 11 mm. Embedded in the center of each marker is a small semiconductor chip that emits an infrared signal. Up to 256 markers can be used at one time. A strip of three sensors acts as a camera and tracks the movement of the markers. This is not a video system in which marker positions are filmed. Rather, each sensor contains a lens and signal-processing circuitry that records the infrared emissions of the marker. The sensors are prealigned so that they measure the position of each marker in three-dimensional space.

The instrument is particularly well suited to tracking lip and jaw motions in three-dimensions and examining relationships between them and head position. Its advantage over the other two point-tracking systems is that it provides three-dimensional motion data. The third dimension allows measurement of rotation and is needed for complete understanding of speech kinematics and motor control.

The system's disadvantage is that it is limited to external use, unlike the X-ray Microbeam and articulometer, because its sensors must maintain 'visual' contact with the LEDs. Therefore, it cannot be used inside the mouth and so does not shed light on the inaccessible structures within the vocal tract. Two more disadvantages are common to all point-tracking systems. First, the markers or their attached wires may interfere, at least minimally, with truly natural speech. Second, only fleshpoints are tracked, not the entire structure. For rigid structures like the jaw, the entire structure can be reconstructed. Although the deformation of soft tissue structures like the tongue, lips, and velum is incompletely measured, an adequate number of markers can provide a fairly accurate representation.

Inductance/Impedance Measures

Inductance is the momentum of a current through a wire. The flow of current through a wire creates a magnetic field that surrounds the wire. The magnetic field's strength is proportional to the current. Therefore, changes in the current cause changes in the magnetic field. Conversely, a magnetic field will produce a current in a wire placed within the field. These two effects occur simultaneously, so that a wire that is conducting a current (a conductor) produces a magnetic field, which then induces a new current in the original conductor. The induced current will be in the opposite direction from the original current and 90 degrees out of phase. This effect, called 'reactance,' slows down and speeds up the flow of the original current. An inductive transducer takes advantage of this effect. An increase in current enlarges the magnetic field and slows down the rate of flow. The slower flow then reduces the magnetic field, which increases the flow. The effect only works with alternating current, because a constant magnetic field would slow the current to a constant degree. Only with alternating current does the current flow change in systematic ways. (Baken, 1987). The inductance properties of a coil of wire, i.e., the specific changes in the current, depend on the diameter-to-length ratio of the wire. Thus, stretching or compressing a wire will alter its inductance properties. An application of this phenomenon, discussed later in this article, is the inductance plethysmograph, which is used to measure respiration.

Impedance transduction measures the degree to which an electric current is impeded, or disrupted, by a physiological event. Impedance is a combination of resistance and reactance. Thus, it is closely related to inductance. In this case, an electric current is passed through part of the body. Changes in the conduction of the current reflect changes in body activity rather than changes in the diameter-to-length ratio of the wire. An alternating current source is placed at one electrode, and an impedance detector is placed at another electrode. The physiological event is placed between the two electrodes so that the event will alter the flow of current, causing a change in impedance. Examples of this technique discussed later in this article are the electroglottograph, which measures vocal fold vibration, and the electropalatograph, which measures tongue–palate contact.

Electric current can be passed through the body without sensation or harm if the current is of a sufficiently high frequency and low amplitude. Frequencies that are too low, below the kilohertz range, will cause stimulation of sensory receptors. Amplitudes that are too high will cause heating of the tissue.

Electroglottography (EGG)

The EGG measures the impedance (or rather its inverse, conductance) of the vocal folds as they vibrate during phonation. From that, the device estimates changes in the vocal fold contact area. As the vocal fold contact area increases and decreases during phonation, so does the conductance. Thus, the EGG indirectly measures the vibratory pattern of the vocal folds during speech. When the vocal folds are completely closed, the conductance is high and the vocal fold vibratory pattern is visible. When they are open, conductance is zero and no vibration occurs.

EGG is an analog system, and thus has an infinite sampling rate. The resultant high temporal resolution is a major advantage of the system. EGG provides key information on vibratory patterns such as open quotient, speed quotient, duty cycle, aperiodicity, irregularities, and so forth. Other advantages are that the instrument is comfortable, and no sensation results from the current passing through the tissue. Furthermore, the vocal folds are very inaccessible to measurement. The EGG overcomes that inaccessibility. The electric current used in the EGG is of low amplitude and several MHz in frequency. This ensures that the current will neither produce heat nor be felt. A disadvantage is that the EGG is sensitive to extraneous movement, which requires that the subject does not move.

Plethysmograph

The inductance plethysmograph, currently marketed as Respitrace, measures changing lung volume during respiration and the relative contribution of the rib cage and abdomen. A wire band is fitted around the chest and/or abdomen. As the body expands and contracts during respiration, the wire stretches and compresses. A change in inductance is caused by the

change in body diameter, that is, the length ratio of the wire varies with the crosssectional area of the body part it surrounds. In the plethysmograph, the contributions to breathing of the rib cage and the abdomen are assessed independently and can be combined to calculate lung volume.

The disadvantages of both systems are that the events, lung volume and vocal fold vibration, are derived from other measures, which reduces resolution. In addition, extraneous movements cause variation in inductance and produce unwanted signals. Therefore, the subject must not move. These are not insurmountable problems, however, and impedance transduction has much potential for measuring biological events.

The advantages of these measures are several. They are practical and simple to use. The electrodes are simple to apply, do not penetrate the skin, and are comfortable for the subject. Finally, the electrodes are affected very little by temperature and barometric pressure.

Electropalatography (EPG)

Electropalatography (EPG) is a computer-assisted system that uses impedance transduction to sense and display tongue–palate contact in real time during oral motor activities such as speech and swallowing. The system consists of an external input/output (I/O) module, a PC-based printed circuit card, connecting cables, and software. A custom-fitted 0.5-mm-thick acrylic pseudo-palate is worn by the subject and connected to a computer that samples the electrode activity at 100 Hz or more. Embedded into the pseudo-palate are 62–96 contact electrodes, each about 1 mm in diameter (see Figure 16).

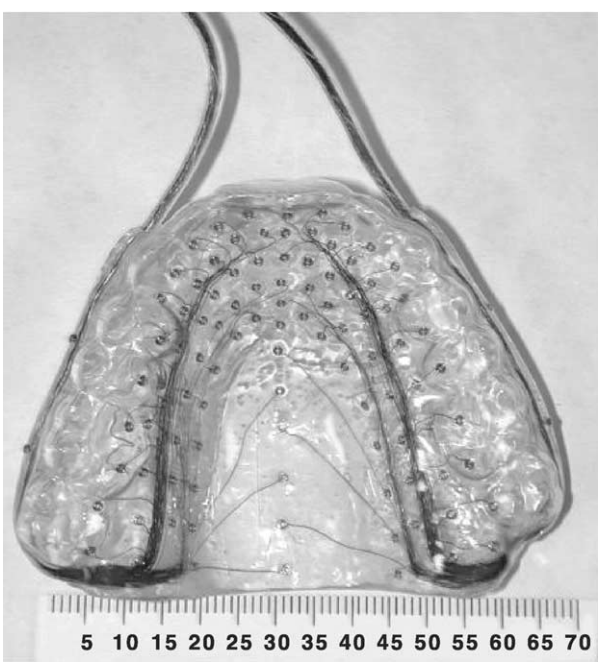

Figure 16 Custom made pseudopalate with 96 electrodes used to record tongue–palate contact.

The grounded pseudo-palate introduces a high-frequency, low-amplitude, harmless current. With the Palatometer activated, a nondetectible DC current is sent through the fine wires to the electrodes that will register tongue–palate contact at a sweep rate of 100 samples per second. The contact information is relayed to the computer and displayed on the monitor in a pattern closely resembling the actual electrode layout on the pseudo-palate. The uncontacted, individual electrodes appear on the screen in a different color from the contacted electrodes. The electrodes sense on-off contact, and the contact information is stored on a dedicated PC as a movie or series of frames using the Palatometer software.

The strength of EPG is that it provides detailed information on tongue–palate contact. The weakness of EPG is that it provides data only during tongue–hard palate contact. Information on the actual movement of the tongue is missing. This system is suitable for and has been used to study tongue movement during applications in linguistics, speech pathology, and swallowing. Linguistics research has studied phoneme-specific contact characteristics and lingual-coarticulatory effects in different languages (Hardcastle *et al.*, 1989). In speech pathology, EPG has been used as a biofeedback tool in articulatory remediation (Fletcher *et al.*, 1991). In swallowing, timing and patterning of tongue–palate contact for different swallowing tasks has been studied (Chi-Fishman *et al.*, 1996).

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http://www.speech.umaryland.edu – Software is available here.
http://www.articulograph.de – *Carstens' page on Articulography-Electromagnetic systems for visualization of speech movement inside the mouth*.
http://www.ndigital.com – *Northern Digital Inc.'s home page (makers of Optotrak)*.
http://www.medsch.wisc.edu/ubeam/ – *X-ray* Microbeam database at the University of Wisconsin is available here.

Imaging Brain Lateralization

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Although there are still debates on the specific networks in the left hemisphere that contribute to language processing, most researchers adhere to the view that 'low-level' processing, including phonological, morphological, syntactic, and semantic processing, predominantly engages the left hemisphere. (*see* **Imaging Brain Lateralization: Words, Sentences, and Influencing Factors in Healthy, Pathological, and Special Populations**.) Right hemisphere involvement or dominance is usually attributed to 'high-level' processing, involving, for example, the comprehension or production of discourse and pragmatic (including social) aspects of language.

Integrating Semantics

Meaning developing from incoming words through spoken or written sentences is integrated rapidly with global discourse-level semantic information, usually within less than 600 milliseconds (for a summary see van Berkum *et al.*, 2003). For example, when hearing a sentence such as *Dutch trains are red*, the semantic content of the sentence (i.e., that Dutch trains are of red color) is rapidly understood. However, at the same time, every person familiar with Dutch trains will also know that this is not true because Dutch trains are, in fact, yellow. In this example, semantic information does not coincide with pragmatic world knowledge. The question, thus, is whether there is a distinction between the integration of linguistic meaning (semantic information) and world knowledge (pragmatic information). Some researchers don't think so. Using functional magnetic resonance imaging (fMRI) scanning and recording of event-related potentials (ERPs), Hagoort *et al.* (2004) compared semantic and world knowledge violations and their correct counterparts using sentences such as *The Dutch trains are yellow/white/sour and very crowded*. Applying fMRI and ERPs to the same stimuli provided the researchers with information on the time course of the ongoing processes as well as on the spatial distribution of the underlying neural substrates. They observed an ERP component (the N400) that is very sensitive to semantic integration processes occurring in a time window between 250 to 550 milliseconds after the critical stimulus for both world knowledge violation and semantic violation. This indicated that lexical-semantic knowledge and general world knowledge were both integrated in the same time frame during sentence interpretation.

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The neural substrates that were activated when the critical words occurred were identified with fMRI and were all shown to be in the left hemisphere (left inferior prefrontal cortex, BA45 and 47) for both the semantic and the world knowledge violation condition. These findings were viewed as evidence that the left hemisphere, and specifically the left inferior prefrontal cortex, plays a role in the integration of both world knowledge and lexical semantic knowledge.

It seems, though, that at least for the integration of lexical semantic knowledge (pragmatic knowledge has not been investigated), other brain areas – such as the left posterior fusiform gyrus and the anterior temporal lobe bilaterally (Kiehl *et al.*, 2002) – are also implicated. A specific involvement of the right hemisphere in lexical semantic meaning integration has been suggested by Federmeier and Kutas (1999). They used the ERP technique while presenting the critical stimuli to single hemispheres. Participants had to read pairs of sentences with different endings, such as: '*Checkmate,' Rosaline announced with glee. She was getting to be really good at chess/ monopoly/ football*. The target word at the end of the sentence was either an expected word (*chess*) or an unexpected word, thus creating contextual violation. The unexpected word could be from an expected category (*monopoly*) or an unexpected category (*football*). The target words were presented to either the left or the right hemisphere. The authors found a negativity (the N400) for contextual violations. However, this component differed according to the side of presentation. With presentations to the left hemisphere, the negativity was reduced when violations occurred within a category (*monopoly*). With presentation to the right hemisphere, the negativity was of similar amplitude for both within-category and between-category violations. The authors concluded that both hemispheres process message-level meaning but that they use qualitatively different processing strategies in the way new information is integrated into the sentence context. The right hemisphere compares new information directly with the context information and follows an 'integrative' strategy whereas the left hemisphere compares whether the new information matches the expectation that has been built-up and is thus more 'predictive.'

Hemispheric sentence contribution during sentence comprehension is also influenced by the information that the sentence conveys, such as abstract information or information that can be visualized. For example, when reading or listening to high- or low-imagery sentences and making true/false judgments, both hemispheres are implicated, but it seems to be the left hemisphere (intraparietal sulcus, frontal operculum, temporal area) that generates the internal representations that are used in maintaining and communicating the sentence information – possibly reflecting working memory functions (Just *et al.*, 2004).

In summary, lexical semantic and pragmatic information seems to be integrated very quickly and simultaneously during sentence processing. Specific neural substrates in the left hemisphere have been implicated in the integration of both types of information. For lexical semantic integration, involvement of the right hemisphere has also been shown. Little is known, however, about the neural substrates involved in the integration of pragmatic information. It seems that both hemispheres contribute to lexical semantic integration, with each hemisphere possibly using qualitatively different processing strategies to integrate new information into the sentence context.

Discourse-Related Studies

The idea that the right hemisphere is dominant for discourse and pragmatic processing is based on observations with patients who have suffered damage to the right hemisphere. Such patient studies, however, have not provided conclusive evidence for this idea inasmuch as discourse and pragmatic problems have also been observed in patients with bilateral frontal, left frontal, or diffuse damage to the brain. Several explanations for the observed impairments have been proposed and include an inability to appropriately draw inferences, to integrate information, or to construct mental models. We will explore whether neuroimaging techniques have clarified the contribution of each hemisphere to discourse and pragmatic processing.

It is obvious that a text is easier to comprehend when the topic under discussion is a familiar one. This is, in part, because information on familiar topics can be integrated and inferences drawn on these more easily. For example, it can be difficult to comprehend a text about how to use a video recorder when the headline is missing, that is, without a clarification of the general context of the following information. Several neuroimaging studies indicate right hemisphere dominance in tasks in which the theme or topic guides comprehension or requires topic maintenance (Caplan and Dapretto, 2001; St. George *et al.*, 1999). The specific neural substrates activated within the right hemisphere show **rough** overlapping in right inferior frontal and temporal regions. Drawing inferences from a discourse to judge the theme or moral of a story is also associated with right hemisphere activation (orbital part of the inferior frontal gyrus,

BA47; anterior portion of the middle temporal gyrus, BA21) (Nichelli *et al*., 1995). Note that besides right hemisphere activation, the left hemisphere language network is usually also activated, indicating the presence of low-level language processing, such as word retrieval and syntactic parsing. Both hemispheres (especially the dorsolateral prefrontal cortex) seem to be involved when the generation of an inference is necessary to maintain coherence in a text. Once an inference is successfully generated, the right hemisphere takes over to integrate the inference into the internal knowledge base of the reader/writer (Mason and Just, 2004). However, not all tasks that involve making inferences activate the right hemisphere. Deductive and syllogistic verbal reasoning tasks and the judgment of local coherence when reading sentences have been shown to activate specific regions in the left hemisphere (left frontal, left temporal, and left cingulate regions for deductive and syllogistic verbal reasoning and left frontomedian wall, posterior cingulate, and precuneal regions for judging coherence; Ferstl and von Cramon, 2001; Goel *et al*., 1998). One explanation of this left hemispheric involvement is that the generation processes involved in these tasks operate on easily available information and are relatively automatic. No high-level integration processes are necessary.

The comprehension of discourse and pragmatic aspects are also influenced by the way stress and intonation are used, and some models have proposed that prosody is lateralized to the right hemisphere, although the evidence is not clear cut (for a review see Baum and Pell, 1999). Right hemisphere activation is reported by one functional imaging study investigating recognition of emotional prosody by applying stress and intonation to words or sentences that conveyed the speaker's emotional state (anger, surprise, sadness, or happiness) (Buchanan *et al*., 2000). Increased activation was reported in the right inferior frontal gyrus and right inferior parietal regions. Considering that the right prefrontal cortex has generally been implicated in the processing of emotions, it remains open whether the observed right hemisphere activation is specific to prosody or to the emotional component involved. In a review of the literature, Baum and Pell (1999) concluded that a clear-cut division that assigns prosody to the right hemisphere is unwarranted.

Investigating the Pragmatics of Communication

When we talk about the pragmatics of communication, we talk about language in use and in context. That not everything that is said is meant in a direct, straightforward way is best exemplified when we use figurative language such as metaphors or irony. To comprehend the information the other person wants to convey entails inferring the other person's intention, or attributing mental states.

Attributing Mental States

We constantly draw on our experience and knowledge and on information from the environment to make sense of the world. Taking a different perspective and inferring the mental state of other people (that is, their intentions, knowledge, beliefs, or desires) is fundamental to successful interaction. Several neuroimaging studies have investigated the neural substrates underlying the attribution of mental states (such as discussed in the theory of mind; for a summary see Abu-Akel, 2003; Gallagher and Frith, 2003). Although neuroimaging studies do not always report corresponding regions of activation, there are three areas that have been reported to be consistently active in theory-of-mind tasks (for a summary see Gallagher and Frith, 2003, and Figure 1): the medial prefrontal cortex (in some studies slightly left lateralized), the right or bilateral superior temporal sulci, and the temporal poles bilaterally. The medial prefrontal cortex is associated with the ability to represent mental states that are 'decoupled' from reality. The superior temporal sulcus seems involved in processing explicit behavioral information such as the perception of intentional behavior, and the temporal poles have been implicated in the retrieval from memory of personal experiences.

Another interesting observation is that the brain reacts in characteristic manners when we predict other people's actions as opposed to when we predict our own. Predicting one's own actions preferentially activates the left dorsal premotor area, whereas predicting other people's actions activates the left paracingulate cortex, right superior temporal sulcus, and cerebellar vermis (Ramnani and Miall, 2004). Interestingly, when observing one's own action brain activation (left parietal, left operculum, and bilateral premotor cortex) starts earlier compared with watching other people's actions (Grèzes *et al*., 2004). The reason could be that when one observes one's own action, there is a closer match between simulated and perceived action than there is when one observes the actions of others.

It is important to realize that different types of theory-of-mind tasks may activate different neural substrates and that activation can occur at different points in time. Investigations using the EEG/ERP technique have identified two negative ERP components:

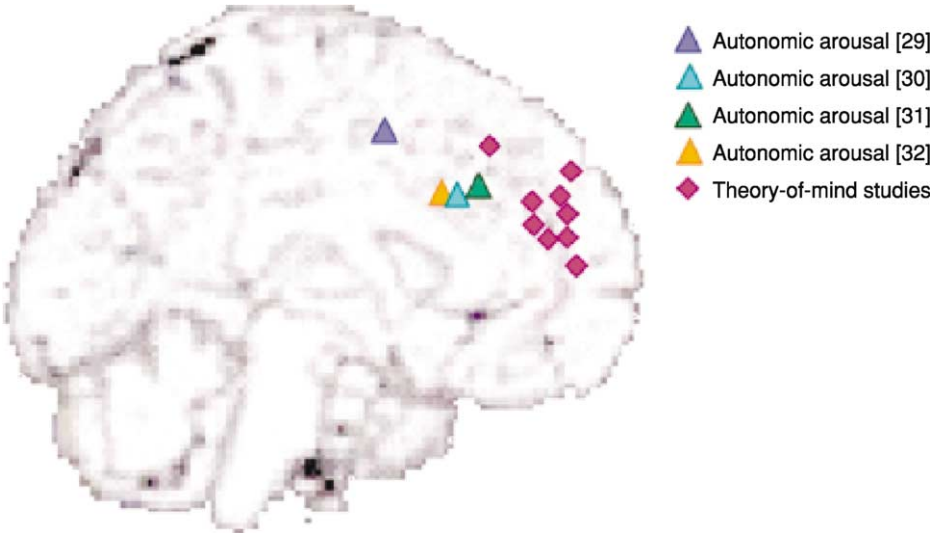

Figure 1 A summary and display of areas of activation found in the medial prefrontal cortex (anterior paracingulate) during theory-of-mind tasks. Also displayed are areas of activation in other areas of the medial prefrontal cortex (the anterior cingulate cortex) found to be associated with autonomic arousal, cognitive demand, and response conflict. [29] Critchley H D *et al.* (2000). 'Cerebral correlates of autonomic cardiovascular arousal: a functional neuroimaging investigation in humans.' *Journal of Physiology London 523*, 259–270. [30] Critchley H D *et al.* (2001). 'Neural activity in the human brain relating to uncertainty and arousal during anticipation.' *Neuron 29*, 537–545. [31] Duncan J and Owen A M (2000). 'Common regions of the human frontal lobe recruited by diverse cognitive demands.' *Trends in Neuroscience 23*, 475–483. [32] Barch D M *et al.* (2001). 'Anterior cingulate cortex and response conflict: effects of response modality and processing domain.' *Cerebellum Cortex 11*, 837–848. Taken from Gallagher HL & Frith C D (2003). 'Functional imaging of 'theory of mind'.' *Trends in Cognitive Science 7(2),* 77–83. © Elsevier, with permission.

one between 270 and 400 milliseconds when decoding others' emotional mental states and another around 800 milliseconds when making belief judgments (Liu *et al.*, 2004; Sabbagh *et al.*, 2004). Whereas the generator for the early negativity was identified in the right hemisphere (right orbitofrontal cortex and right anterior medial temporal cortex), the late negativity was generated in the left hemisphere (left orbitofrontal cortex). Orbitofrontal activation has been associated with emotional processing (Damasio *et al.*, 2000) whereas the right medial temporal activation would fit with other studies that implicate this region in theory-of-mind tasks.

Finally, the ability to infer other people's mental states has also been investigated in schizophrenic and autistic patients during imaging. Based on a nonverbal comic strip depicting a simple story, schizophrenic patients had to attribute intentions to others (Brunet *et al.*, 2003). Compared with healthy participants, schizophrenic patients did not activate the right prefrontal cortex, a region that has been shown in several studies to be implicated in theory-of-mind tasks. Autistic patients, on the other hand, demonstrated activation patterns similar to those of healthy people in right hemispheric and bilateral regions, except that there was generally less activation (Castelli *et al.*, 2002).

Investigating Figurative Language

Right hemisphere involvement in figurative language (such as in the comprehension or production of metaphors, humor, and idioms, or the making of requests) has been claimed ever since it was observed that some people with damage to the right hemisphere show problems interpreting figurative language appropriately. The idea of right hemisphere involvement in the comprehension of figurative language also has its roots in psycholinguistic models of figurative language comprehension.

A lively debate in psycho- and neurolinguistics has surrounded questions such as whether metaphors can be understood as quickly and automatically as regular sentences, whether specific processing stages are necessary for their comprehension, whether the same processes underlie the comprehension of different types of metaphors, and whether such differences are represented in different parts and sides of the brain (for a summary see Glucksberg, 2003). Despite the numerous psycho- and neurolinguistic studies, only a few neuroimaging studies have directly investigated this question. In a positron emission tomography (PET) study, participants had to make plausibility judgments while listening to sentences (plausible metaphors, implausible metaphors) and to

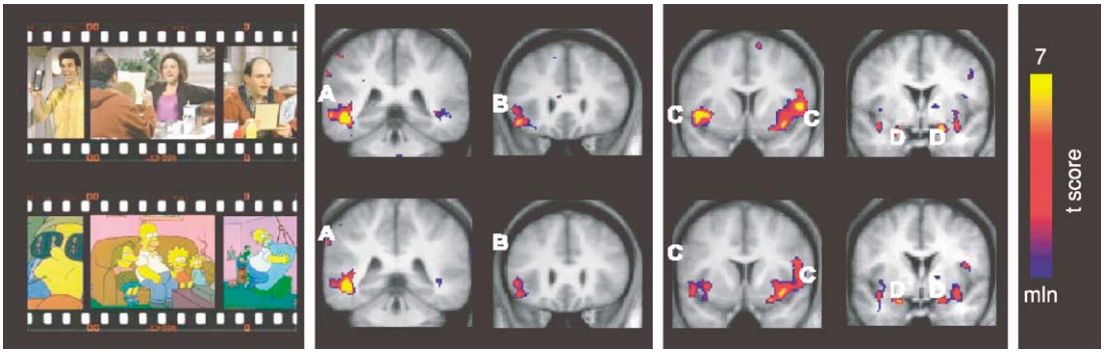

Figure 2 Displayed are averaged activation maps based on subjects viewing *Seinfeld* (upper panel) and *The Simpsons* (lower panel) sitcoms. A functional dissociation between humor detection and humor appreciation was described. In the coronal brain images, the left side of the image corresponds to the left hemisphere. In both studies, humor detection led to greater activation in the left posterior middle temporal gyrus and the left inferior frontal gyrus. By contrast, humor appreciation yielded greater activation bilaterally in the insular cortex and the amygdala. Taken from Moran *et al.* (2004). 'Neural correlates of human detection and appreciation.' *Neuroimage 21*, 1055–1060. © Elsevier, with permission.

random word strings. Greater activation in the right hemisphere (right inferior frontal gyrus, the right premotor cortex, and the right posterior temporal cortex) was found when comparing plausibility judgments of metaphoric sentences with those of literal sentences (Bottini *et al.*, 1994).

Understanding jokes is, in a way, similar to metaphoric or other figurative language in that what is meant is not said. Comprehending jokes, however, involves more than just understanding what is meant. Neuroimaging studies using fMRI have identified dissociated neural substrates for a cognitive and an affective element of humor (Goel and Dolan, 2001; Moran *et al.*, 2004; see Figure 2). Unfortunately, the neural substrates identified by the two groups do not correspond. For the affective component, one study described the medial ventral prefrontal cortex and bilateral cerebellum (Goel and Dolan, 2001) whereas the other study found the bilateral amygdala and bilateral insula to be activated (Moran *et al.*, 2004). The left insular region (BA44/4) was also activated in the Goel and Dolan study (2001), but it was related to phonological, not affective, joke processing. For the cognitive component, both studies identified the posterior middle temporal gyrus to be implicated, but in the right hemisphere in one study (Moran *et al.*, 2004) and in the left hemisphere in the other (Goel and Dolan, 2001). The left posterior inferior temporal gyrus (Goel and Dolan, 2001) and the left inferior frontal gryus (Moran *et al.*, 2004) were also involved.

Taken together, the right hemisphere contributes to keeping track of the topic or theme of a discourse and to drawing high-level inferences, including attributing mental states to others and interpreting figurative language, and to integrating meaning into a larger discourse or social context. The right hemisphere thus seems to be indispensable for successful pragmatic and social communication. Inconsistencies remain, however, concerning the specific neural substrates or networks involved. It is also possible that not all neural substrates and networks involved have yet been identified.

In addition to its role in low-level language processing, the left hemisphere is also involved in deductive and syllogistic reasoning processes and in establishing local coherence, that is, in low-level inferencing processes (for a summary see Bookheimer, 2002).

See also: Imaging Brain Lateralization: Words, Sentences, and Influencing Factors in Healthy, Pathological, and Special Populations.

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Imaging Brain Lateralization: Words, Sentences, and Influencing Factors in Healthy, Pathological, and Special Populations

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Classically, the brain has been divided into two sides – the right and the left. To the inexperienced eye, both sides look the same, although a closer look reveals subtle anatomical differences. For example, an anatomical area situated at the end of the superior temporal gyrus, the planum temporale, is much larger on the left than its right-sided homologue. In addition, Broca's speech area and the primary auditory cortex (Heschl's gyrus) are larger in the left hemisphere than in the right (for a summary, see Toga and Thompson, 2003). These anatomical structures surround or overlap brain regions important for language. It seems natural to ask whether these anatomical or structural differences are in any way reflected at a behavioral, functional, or even biochemical level (for a detailed discussion, see Hugdahl, 2000). Early models of brain asymmetry tried to establish such relationships primarily by observing the language performance of patients with damage to specific regions of the brain or behavioral tasks performed with healthy individuals. Based on such data, language production and some aspects of syntactic processing were suggested to be localized in the left side of the brain, and indeed, in particular, to areas of the inferior frontal gyrus (Broca's area). Language comprehension was localized in the posterior temporal–parietal region (Wernicke's area) (Figure 1).

Since the advent of neuroimaging techniques, new possibilities have opened up to investigate anatomical/structural and functional/behavioral relationships. Although these techniques allow, to some degree, to watch 'the brain in action,' each has its own strengths and weaknesses. As is the case with all complex techniques, data from each of these imaging methods need to be interpreted with those particular strengths and weaknesses in mind. The most common of these neuroimaging techniques are positron emission tomography (PET) and functional magnetic resonance imaging (fMRI); these are both particularly appropriate for discovering *where* in the brain specific events happen. Techniques based on electrical or magnetic signals (electroencephalogram (EEG) or magnetoencephalogram (MEG)), on the other hand, are more suitable in determining *when* they happen.

Research on the mind/brain–language relationship has not only produced a wealth of insights but also raised new questions or rephrased old ones. This article focuses on research that has used neuroimaging techniques (PET, fMRI, and EEG) to investigate language and, more specifically, explores what neuroimaging research has contributed to our understanding of what happens in the 'left' and 'right' side of the brain at the word and sentence level.

Imaging Single Word Lateralization

Imagine that you see a string of symbols such as *oppmtrgt* or *flower*. Approximately 200–250 ms after seeing these symbols or hearing the corresponding sounds, your brain has determined that one is a word and the other is a nonword; slightly more time is needed if the word is less frequently used (such as flower vs. tungsten). Approximately 400 ms after seeing or hearing a word, the brain has assigned some meaning to it. Where in the brain do these fast processes take place? Is one hemisphere more implicated than the other in these abilities? Generally, when people listen to speech stimuli, such as syllables, single words, pseudowords, foreign words, or sentences, most studies report involvement of both hemispheres; only a few report slightly more activity in the left hemisphere (Binder and Price, 2001) (Figure 2). During these listening tasks, the brain regions consistently activated according to fMRI or PET studies

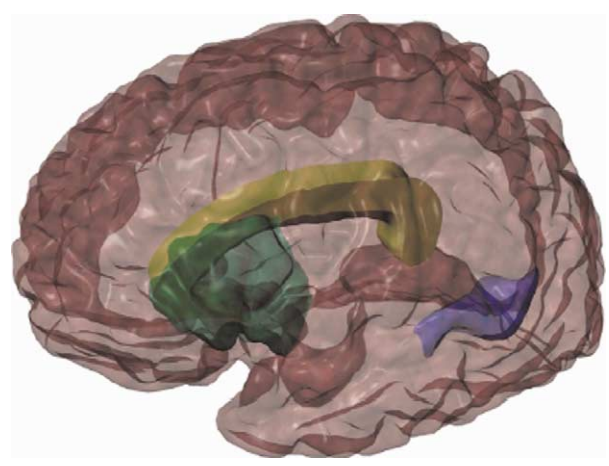

Figure 1 Anatomical sites of the classical language areas identified in a transparent surface model of the human cerebral cortex. Broca's speech area (green) and Wernicke's language-comprehension area (blue) are identified on a transparent surface model of the human cerebral cortex. All cortical regions are interconnected through the corpus callosum (yellow) with corresponding systems in the opposite brain hemisphere. From Toga A W and Thompson P M (2003). Mapping brain asymmetry. Reproduced with permission from Nature Reviews Neuroscience. Copyright (2003) Macmillan Magazines Ltd., www.nature.com/reviews.

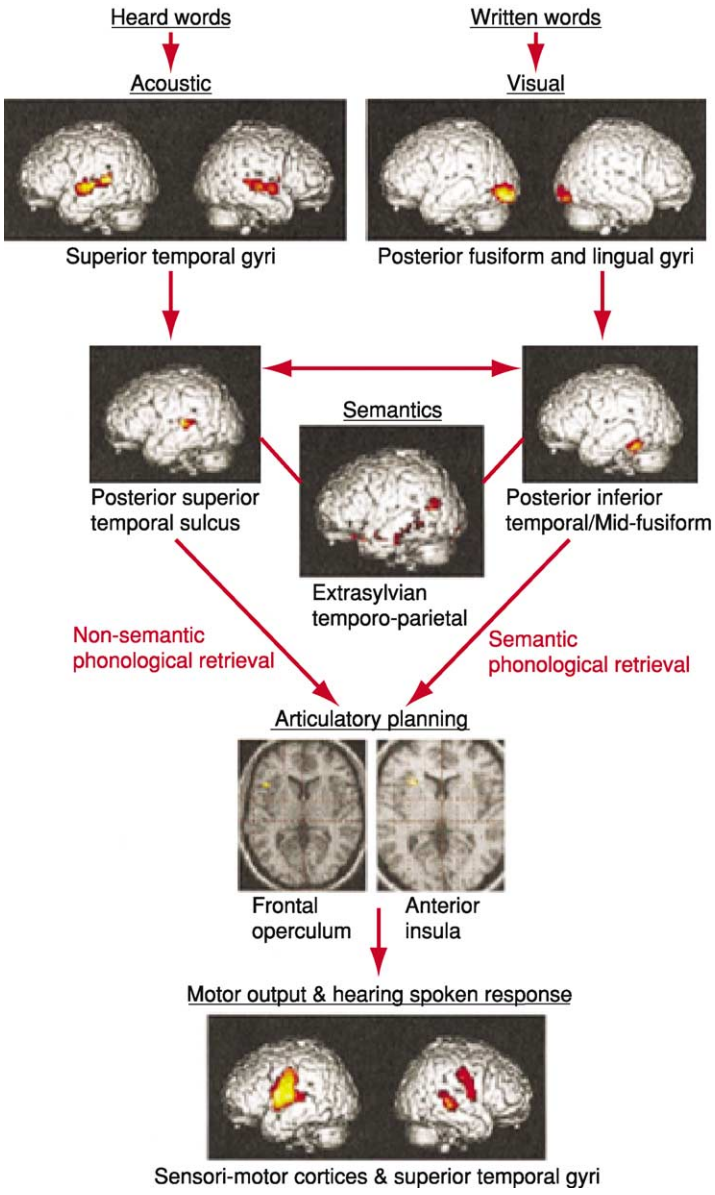

Figure 2 Summary of the results of functional imaging studies on word repetition, word retrieval, and word reading. The top row shows brain areas activated during the acoustic processing of heard words and visual processing of written words. Activation is predominantly bilateral. The second row, left side, shows brain activation related to the phonological processing of speech sounds relative to environmental sounds. In the center, semantic decisions relative to phonological decisions on the same words are shown, and the right side shows activation associated with retrieving the name (via lexical semantics) relative to seeing visual controls and saying 'Okay' or 'Yes.' Note that the activation is predominantly left lateralized. The third row presents transverse slices and shows activation in the left anterior insula and left frontal operculum during phonological output. Bilateral activation is shown in the fourth row and exhibits motor areas for articulation and auditory processing of spoken response for reading aloud relative to reading silently. The red arrows connect these areas to indicate the proposed model of auditory and visual word processing. From Price C J (2000). 'The anatomy of language: contributions from functional neuroimaging.' *Journal of Anatomy 197(5)*, 335–359. Reproduced with permission from Blackwell Publishing.

are in the superior temporal gyrus (including the planum temporale) of both hemispheres. Based on these observations, it has been suggested that the superior temporal region in both hemispheres plays a critical role in auditory perception but is less implicated in processing lexical–semantic or syntactic information. Lateralization to the left is associated with other aspects of auditory processing. For example, when healthy volunteers listen to tones, sounds of animals, instruments, and words, the highest activation for the

perception of words is exhibited within the left superior temporal sulcus and in the left inferior frontal gyrus.

Phoneme processing is also lateralized to the left side of the brain. Areas of brain activation during phoneme processing involve the left frontal operculum (around the anterior insula and BA45) and a more posterior dorsal region near the inferior frontal gyrus/premotor boundary (BA44/6). Although the left supramarginal gyrus also seems to contribute to phoneme processing, this region is also activated in a variety of other tasks, such as pitch discrimination of auditory tones, reading visually presented words relative to picture naming, and reading pseudowords relative to words (for a summary, see Binder and Price, 2001).

Word generation (exemplified by tasks such as 'Name all words that start with F' or 'Name all animals you can think of') is a frequently used paradigm in functional imaging studies. This task involves phonological but also word retrieval processes and consistently produces activation in the left hemisphere (the frontal operculum and inferior frontal gyrus (BA44–47)). These areas overlap with regions that are also activated in phoneme processing. Additional areas of activation have been described in the posterior part of the middle frontal gyrus and inferior frontal sulcus, the mid-dorsal part of the precentral sulcus (BA6, 8, and 44) and the left posterior temporal lobe (BA37). Some of these specific regions in the left hemisphere (left frontal operculum and the left posterior ventral temporal area) are activated independently of the type of stimulus cue or the modality in which the stimulus is presented. Evidence for this comes from studies on blind subjects when reading Braille (Büchel *et al.*, 1998) or when comparing active generation of words with listening to words or semantic judgments on heard words (Warburton *et al.*, 1996).

Tasks involving word meaning also invoke activation that is strongly lateralized to the left hemisphere. The single most consistently activated area within the left hemisphere is the angular gyrus (BA39). This region has been interpreted as a multimodal 'convergence' zone involved in storing or processing very abstract representations of sensory experience and word meaning. Other regions that are frequently activated with the meaning of words are those associated with memory functions, such as the dorsal prefrontal cortex (including medial aspects of BA8 and 9) (for a summary, Binder and Price, 2001).

It was previously mentioned that the extraction of word meaning is preferentially processed in the left hemisphere. The question arises, however, whether or not this is true for the whole spectrum of words ranging from abstract words (such as 'creativity') to concrete words (such as 'television'). Several nonimaging studies – often within the context of specific theories of word processing such as the dual coding model – have investigated the neural bases of abstract and concrete word processing. The dual coding model assumes that abstract words are represented only in verbal symbolic codes, whereas concrete words additionally activate nonverbal, imagery-based representations (Paivio, 1991). Within this framework, it has often been assumed that abstract words are represented in the left and concrete words in the right hemisphere. Neuroimaging studies investigating concrete and abstract nouns, however, have not shown such a clear-cut division. Most studies comparing concrete versus abstract nouns report increased activation for concrete nouns predominantly in the left hemisphere, and several studies have found greater activity for abstract than concrete words in the right hemisphere (for a summary, see Fiebach and Friederici, 2003) (**Figure 3**). Other researchers report no difference in activation between abstract and concrete nouns in the two hemispheres but differences within the left hemisphere. For example, a fMRI study using a lexical decision task (Fiebach and Friederici, 2003) reported a double dissociation within the left hemisphere: abstract words elicited increased activation in the pars triangularis (BA45) of the left inferior frontal gyrus and concrete words led to an activation increase in basal regions of the left temporal lobe.

Taken together, neuroimaging studies have shown that auditory perception involves both hemispheres, whereas phoneme processing and word processing engage predominantly the left hemisphere, regardless of the modality in which the stimulus is presented. The findings are inconsistent with regard to the processing of words with specific characteristics, such as concrete versus abstract words.

Imaging Sentence Lateralization

When listening to or reading sentences, we constantly determine 'Who did what to whom?' That is, we establish the meaning of the sentence. Is there a hemisphere that is dominant for these processes, and are there areas in the brain that are specialized for syntax alone? Traditionally, damage to the anterior regions of the left hemisphere has been associated with language problems as observed in patients with Broca's aphasia. Broca's aphasia was typically linked with damage involving the left inferior frontal cortex (BA44/45), leading to the idea that this was an area specialized for syntactic processing. Do imaging data support this idea? To test this idea with

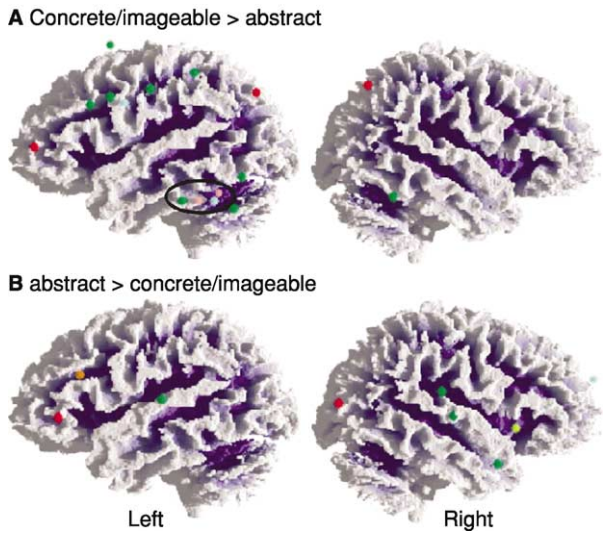

Figure 3 Fiebach and Friederici (2003) visualized brain areas exhibiting greater activity for concrete words than for abstract words (A) or greater activity for abstract than for concrete words (B). Each colored dot represents the results of a particular study reviewed by Fiebach and Friederici. Note that medial and subcortical activations are not displayed. Reproduced with permission from Fiebach C J and Friederici A D (2003). 'Processing concrete works: fMRI evidence against a specific right-hemisphere involvement.' *Neuropsychologia 42*, 62–70. © Elsevier.

neuroimaging, one would need to design tasks that tease out syntactic processing alone. This, however, would be very difficult to accomplish, and it is thus not surprising that the different approaches and stimuli that have been used have not produced consistent activation patterns.

Some researchers compared simple versus complex sentences and reported activations predominantly in the left hemisphere (Broca's area (BA44/45), occasionally extending to BA47, 6, 9; left angular/supramarginal gyri (BA39, 40); and cingulate gyrus (BA23, 24, 31, 32)) (for a summary, see Kaan and Swaab, 2002). However, not all such studies have reported significant activation in Broca's area – an inconsistency that suggests that this region is not necessarily implicated in all aspects of syntactic processing. For example, Friederici *et al*. (2003), using fMRI, compared correct sentences to sentences with syntactic or semantic violations. Bilateral activation (midportion of superior temporal gyrus, insular cortices, and posterior superior temporal gyrus) was observed in sentences containing semantic violations, whereas sentences with syntactic violations activated only the left hemisphere (anterior and posterior portion of the superior temporal gyrus, left posterior frontal operculum adjacent to BA44, and basal ganglia). Activation in classical Broca's area was not observed.

Another question frequently asked concerns the relationship between syntax and semantics. Do they activate common or separate brain areas? Alas, neuroimaging research has produced mixed and partially inconsistent results. An interaction between syntax and semantics was reported in several regions of the left hemisphere, including Broca's region, the left cingulate, left posterior middle frontal gyrus, and left inferior parietal cortex (for a summary, see Ben-Shachar *et al*., 2004). It remains unclear, however, whether Broca's and Wernicke's areas are activated conjointly or whether each region is activated individually, and how specific this is for either syntax or semantics. Another series of studies also reported activation in the right hemisphere and indeed in the right homologue of Broca's and Wernicke's regions. A consistent set of brain regions was activated when comparing 'movement' sentences ('John gave the red book to the professor from Oxford'/ 'John gave to the professor from Oxford the red book') to 'non-movement' sentences while manipulating topicalization and wh-questions (Ben-Shachar *et al*., 2004). In both conditions, activations included regions only in the left hemisphere (inferior fontal gyrus and ventral precentral sulcus) and bilaterally (posterior superior temporal sulcus). It was hypothesize that the bilateral posterior temporal activation was related to maintenance of the 'moving element' in memory.

Various researchers have suggested that the amount of material that is processed (i.e., the 'processing load') needs to be considered. In this context, the question has been raised to what degree Broca's area is involved in memory processes. For example, a sentence such as 'The student who imitated the professor dropped his books' (subject relative clause) seems to require less working memory resources than 'The student who the professor imitated dropped his books' (object relative clause). Several studies report activation in Broca's and Wernicke's areas. Investigating center-embedded subject- and object-relative clauses, McDonald and Christiansen (2002) found increased activation in both Broca's *and* Wernicke's areas for object-relative clauses compared to subject-relative clauses and for subject-relative clauses compared to active conjoined clauses. Similarly, comparing subject-relative clauses in Japanese (a verb-final language) and manipulating center-embedded vs. left-branching structures showed an increase in activation in the left inferior frontal gyrus (BA44 and BA45), the posterior portion of the left superior temporal gyrus (BA22; i.e., Wernicke's area), and the left dorsolateral prefrontal cortex (posterior part of BA9) (Inui *et al*., 1998). In Japanese, center-embedding with canonical word order seems to entail a greater working memory load than fronting an object in

noncanonical word order. However, a series of PET studies comparing center-embedded object relatives ('The juice [that the child spilled] stained the rug') vs. right-branching subject relatives ('The child spilled the juice [that stained the rug]') performed by Caplan and colleagues consistently showed increased activation in Broca's area only, although the exact locus of activation withinBroca's area varied: the pars opercularis (BA44) (Caplan *et al*., 1998; Stromswold *et al*., 1996) and the pars triangularis (BA45) (Caplan *et al*., 1999, 2000).

Taken together, and consistent with some behavioral studies, these neuroimaging studies indicate that Broca's area is not involved in all aspects of syntactic processing. In addition, although functional neuroimaging studies investigating syntactic processing report predominantly left hemisphere activation, bilateral and right hemisphere activation is also reported. The observed activation patterns may indicate that different aspects of syntactic processing activate different parts of a network in both hemispheres (Kaan and Swaab, 2002). For example, incoming words of a sentence activate phonological, syntactic, and semantic information that may be reflected in the activation of the middle and superior temporal lobes in the left hemisphere. Other left hemisphere activation, such as that of the anterior temporal lobe, may reflect accessing stored information or encoding of information for later use. Increased processing load requires storing nonintegrated material in which the inferior frontal gyrus (Broca's area) might be implicated. Bilateral or right hemisphere activation may reflect aspects of prosody, discourse, and pragmatic integration processes but also control and memory processes.

Imaging Hemispheric Lateralization in Patients

Other questions of interest concern whether changes in language lateralization occur after damage to specific brain regions, such as in patients suffering from intractable epilepsy, children with extensive brain damage in early childhood, schizophrenic patients, or patients recovering from a stroke.

Defining Hemispheric Lateralization for Presurgical Patients

The gold standard to determine language lateralization in patients who need to undergo surgical intervention, such as tumor removal or epilepsy surgery, has been the Wada test, a procedure during which one hemisphere is selectively anesthetized. Since fMRI has become more available, the question as to whether noninvasive fMRI provides similar or possibly even better information than the Wada test has been raised. This seems, indeed, to be the case. Studies are consistent in their evaluation that there is good agreement between the Wada and the fMRI procedure (Adcock *et al*., 2003; Bazin *et al*., 2000; Binder *et al*., 1996; Gaillard *et al*., 2002; Sabbah *et al*., 2003; Yetkin *et al*., 1998). Some researchers even reported more sensitivity of the fMRI technique concerning the involvement of the nondominant right hemisphere (Adcock *et al*., 2003). It should also be noted that due to time constraints of the anesthetic agent used in Wada testing, rather simple language tasks had to be used. This limitation does not pertain to fMRI, which allows for more flexibility in language testing. Finally, several neuroimaging studies noted the higher variability of language dominance in epilepsy patients (Adcock *et al*., 2003; Sabbah *et al*., 2003; Springer *et al*., 1999).

Language Lateralization in Other Patients

It has been an accepted common wisdom that children recover faster or better after their brains have been damaged than do adults. For obvious reasons, there are only few neuroimaging studies with young children. One such study monitored the recovery of language abilities in a boy with intractable epilepsy before and after the left hemisphere was removed (Hertz-Pannier *et al*., 2002). After surgery, the boy showed rapid recovery of receptive language functions but slower and incomplete recovery of expressive language and reading as measured by fMRI. A year later, a shift of language-related networks to the right hemisphere (right inferior frontal, temporal, and parietal activation) during expressive and receptive tasks was observed in agreement with the notion of the superior plasticity of the child's brain and the ability of the right hemisphere to take over some expressive language functions. Another study (Holland *et al*., 2001) investigated developmental patterns of brain activation associated with a verb-generation task in 13 healthy children/adolescents aged 7–18 years using fMRI. The regions of activation found were similar to those of adults with predominantly left hemisphere activation (inferior frontal gyrus). Similar results were reported by Balsamo *et al*. (2002). Generally, it appears that the degree of lateralization increased with age and proficiency in language skills, leading to a shift in activation toward greater lateralization in the left hemisphere (Holland *et al*., 2001).

In schizophrenic patients, increased activation in the right hemisphere in response to low-level language tasks has been consistently reported (Artiges *et al*., 2000; Greene *et al*., 2001; Sommer *et al*., 2003). Some researchers have hypothesized that the increased activation reflects a failure to inhibit

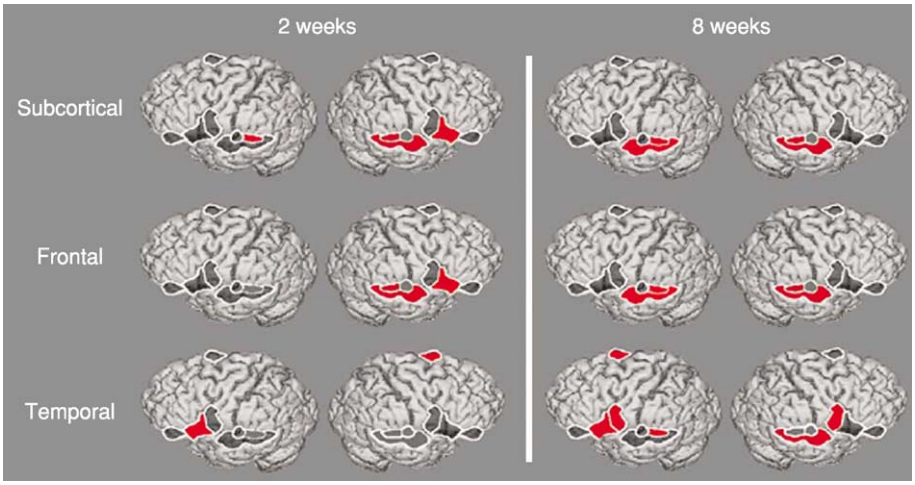

Figure 4 Results of a PET study in left hemisphere stroke patients with various aphasic syndromes. The patient group with subcortical and frontal lesions improved substantially and activated the right hemisphere (inferior frontal and right superior temporal gyri) at baseline. Left superior temporal gyrus activation occurred at follow-up. Patients with temporal lesions improved only in word comprehension and activated the left Broca area and supplementary motor areas at baseline. Precentral gyrus bilaterally and right superior temporal gyrus were activated at follow-up but not the left superior temporal gyrus. Reproduced with permission from Heiss *et al.* (2003). 'Disturbance and recovery of language function: correlates in PET activation.' *Neuroimage 20(1)*, 542–549. © Elsevier.

nondominant language areas in patients suffering from schizophrenia (Greene *et al.*, 2001; Sommer *et al.*, 2003).

Clinical recovery from aphasic syndromes can be observed over weeks, months, and even many years after a stroke. Imaging studies have tried to elucidate the neural mechanisms underlying this recovery (for a review of recovery and PET studies, see Heiss *et al.*, 2003) (Figure 4). It has been suggested that recovery in right-handed, left hemisphere language-dominant patients includes undamaged portions of the language network in the left hemisphere and, to a lesser extent, homologous right hemisphere areas (Rosen *et al.*, 2000). Although there might be some contribution by the right hemisphere, it is the reactivation of areas in the left hemisphere that seems essential for recovery of language functions. Predominant activation of structures in the affected hemisphere have been related to good recovery (Heiss *et al.*, 2003).

Interestingly, pharmaceutical intervention in aphasic stroke patients with piracetam (a nootropic agent that has been shown to generally enhance cognitive functions in some patients) has been shown to improve language performance. This, in turn, was reflected in an increase in activation in the left hemisphere (left transverse temporal gyrus, left triangular part of the inferior frontal gyrus, and left posterior temporal gyrus), whereas a trend toward a decrease in activation was observed in the right hemisphere (right inferior frontal gyrus) (Heiss *et al.*, 2003).

Imaging Special Populations

In addition to investigating the contribution of each hemisphere in patient groups, neuroimaging studies have also investigated whether the brain is lateralized differently in people with particular characteristics, such as in people using sign language or people who know more than one language.

Left hemisphere specialization for language has usually been demonstrated with regard to the vocal tract as the primary articulator. However, what if the articulator consists of hands, such as used by deaf users of American Sign Language? Whereas some functional neuroimaging studies have reported largely left-lateralized brain activity for signing, others have shown more right hemisphere involvement than is seen in spoken language (for a summary, see Corina *et al.*, 2003). This discrepancy has been attributed to interpretation problems due to different demands of the motor system involved in signing. Corina *et al.* (2003) performed a PET study using a lexical–semantic word generation task in deaf signers. They observed activation in the left hemisphere (dorsolateral prefrontal cortex (BA46)), dorsal operculum (pars triangularis and opercularis (BA44/45)), and ventral operculum (par orbitalis (BA47)) and concluded that linguistic–semantic processing relies on left hemisphere regions regardless of the modality in which a language is realized.

Numerous neuroimaging studies have investigated brain activation in people who know more than one

language. Inconsistent results are found, however, when comparing these studies. Some researchers report no interhemispheric difference for different languages (Klein *et al*., 1999), whereas others report language-sensitive regions in second languages exclusively in the left hemisphere (Kim *et al., 1997*) or in both hemispheres (Dehaene *et al*., 1997), or report different findings for different participants (Chee *et al*., 2001). Reasons for these inconsistent results are probably due to variables that were not accounted for or are inconsistent in these studies; these include different scanning techniques; different tasks, stimuli, and paradigms used; different languages investigated; differences in proficiency level; differences in the age of acquisition of the nonnative language; differences in length of exposure to the second language; lack of distinction between male and female participants; and differences in methods of analyzing the neuroimaging data (e.g., ROI, individual vs. group data). Considerable variability among subjects in the precise spatial location, spatial extent, and magnitude of these activations has also been reported (for a summary, see Binder and Price, 2001). The importance of distinguishing the level of processing evoked by the task has been noted by Pillai *et al*. (2003). For example, right hemisphere activation occurred only in a phonological (rhyming) task and not in a semantic (verb–noun association) task in the nonnative (but not native) language. Involvement of the right hemisphere appears to be related to the cognitive demands of the tasks and possibly to the level of proficiency (Perani *et al*., 1998). In fact, level of proficiency has been shown to be more important than age of acquisition in eliciting specific patterns of brain activation. Left hemispheric dominance for the native as well as the nonnative language for high-proficiency adults who had acquired their second language late in life has been described by Perani *et al*. (1998). In addition, in these adults, some right hemisphere activation for one but not the other language was seen. These findings contrasted with adults exhibiting low language proficiency who showed different areas of activation for both languages only within the left hemisphere, regardless of age of acquisition of the nonnative language. Another factor that needs to be considered is which languages are compared. For example, in bilinguals, some right hemispheric involvement was found when reading Chinese, whereas reading in English recruited only regions in the left hemisphere (Liu and Perfetti, 2003). Generally, there seems to be little support for the hypothesis that languages learned later in life entail more right hemispheric involvement as both the native and the nonnative language recruit large brain areas in the left hemisphere (Vingerhoets *et al*., 2003).

Taken together, there is no evidence from imaging studies to support a specific role for the right hemisphere in bi- or multilingual people. Note, however, that we cannot draw any conclusions from these studies concerning the involvement of the right hemisphere or the interaction between the two hemispheres during the *process of learning* a foreign language at different stages in life.

Imaging Gender

A long-debated issue concerns an old hypothesis that language functions are more lateralized to the left side of the brain in men and represented more bilaterally in women. It has been shown that the left planum temporale is much larger than its right homologue in males, whereas in females this difference is not significant. This observation seems to provide some anatomical support for reduced asymmetry of lateralization for females for language tasks (Kulynych *et al*., 1994). However, neither nonimaging studies nor imaging studies have yielded consistent results (for a summary, see Binder and Price, 2001; Kansaku and Kitazawa, 2001; Kimura, 2000). Some neuroimaging studies that investigated low-level processing using a verb generation task, word completion task, or semantic word judgment task reported no lateralization differences in men or women (Buckner *et al*., 1995; Jaeger *et al*., 1998). Others, however, using rhyming judgments or passive listening to spoken narratives, found more bilateral activation in women than in men (Kansaku *et al*., 2000; Phillips *et al*., 2000).

Aside from methodological differences, another reason for these discrepant findings could be the different types of stimuli used and different task demands. In addition, many of these neuroimaging studies relied on group data. There is, however, evidence for high individual variation, as shown in a study by Vikingstad *et al*. (2000). Individual data demonstrated that the lateralization index varied continuously from left hemisphere dominant to bilateral representation. In males, language was primarily lateralized in the left hemisphere. In females, approximately half showed left lateralization and the other half bilateral representations. There is thus a possibility that more women than men show bilateral activation in language tasks. Lacking more evidence, however, there is no clear picture about language lateralization in men and women.

Imaging Handedness

There is a widely held belief that language is lateralized in the left side of the brain in right-handed

people and in the right side in left-handers. Research, however, tells a somewhat different story: language is lateralized in the left in the majority of right- and left-handers. Functional imaging studies using low-level language tasks consistently report that in approximately 96% of right-handers, speech and language are lateralized to the left, and in the remaining 3% they are lateralized to the right or bilaterally. In left-handers, 70% show left lateralization and 30% right or bilateral lateralization (Pujol *et al.*, 1999; Szaflarski *et al.*, 2002; Toga and Thompson, 2003). IIn addition, family history of sinistrality strongly influences personal handedness and scores on the language laterality index (Szaflarski *et al.*, 2002). Although these studies argue for a strong relationship between handedness and side of language lateralization, due to a lack of studies it would be premature to conclude that this relationship also holds at higher levels of language processing. Furthermore, brain damage may destabilize this otherwise strong relationship between handedness and language laterality. For example, in right-handed patients with epilepsy, language lateralization proved more variable than in healthy right-handed individuals (Springer *et al.*, 1999). This variability in the epilepsy group was related to weaker right-handedness and also to age of brain injury.

See also: fMRI Studies of Language; Imaging Brain Lateralization.

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Immigrant Language Education

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In a democracy, educational policy objectives and priorities mainly derive from what majority public opinion, as a government's main guide, desires or tolerates (Wright, 1994). This holds also – and in view of the powerless position of minority groups probably even more so – for the objectives of language education policies regarding immigrant minorities. A main characteristic of public opinion is its changeability. Its dynamics are affected and constituted not only by sociocultural, political, and economic circumstances and developments, but also by sporadic incidents, such as 9/11. Moreover, public opinion is substantially influenced by ideas, perceptions, and comments disseminated by mass media, politicians, scholars, and public opinion leaders. Despite their inclination to continuous change, these opinions are nevertheless generally situated within clearly defined domains, containing a limited array of possibilities. With respect to the field of immigrant language education, it can be observed that public, political, and scholarly opinions have been oscillating on a continuum that is marked at the extremes by unconditional assimilation and by unconditional pluralism (Kroon and Vallen, 1997).

Assimilation versus Pluralism

In immigrant language education, the distinction between assimilation and pluralism basically reflects the fundamental dilemma or tension between desirability and feasibility, i.e., the extent to which desirable educational innovations are feasible within a specific societal context, including competing agencies and actors, competing means and goals, competing strategies and procedures, and unending financial and time constraints (Kaplan and Baldauf, 1997).

Assimilation means that immigrant minorities are expected to adapt to mainstream characteristics of the host society and to give up their own identity, language, and culture. In theory, only those immigrants whom one can no longer notice to have once been 'different' from the dominant group are considered to be completely assimilated. Assimilation as a result of an immigrant minority language policy, whether explicitly formulated or functioning implicitly, seems to be an ideal goal for many nation states. As a consequence of recent sociopolitical developments, as well as changing attitudes toward the ongoing processes of immigration, this propensity toward assimilation is gaining more political and practical importance and support. This, of course, has serious consequences for immigrant language education, as will be demonstrated.

Pluralism means that the people in a society function alongside each other without having to give up their ethnic, cultural, and linguistic identity. In an ideal pluralist society, all groups have an inalienable right recognized to retain their culture, language, and traditions, according to their own level of desire. The main reason that no state-sanctioned, completely pluralist society exists is probably that consistently implemented and consequently practiced pluralism – which of course runs the risk of developing into voluntary separatism or involuntary segregation – is unacceptable to the powerful majority. The existence and survival of any society apparently needs a limited degree of social, cultural, and linguistic cohesion and homogeneity, which is in part brought about by a certain level of assimilation or integration of immigrant minority groups (Kroon and Vallen, 1994).

Language as a Right, a Resource, or a Problem

The position taken on the continuum of assimilation and pluralism has important consequences for the perception of immigrant minority languages. Baker (2001) distinguishes three (conscious or subconscious) basic orientations or dispositions regarding multilingualism: language as a problem, language as a right, and language as a resource. In the language as a *problem* orientation, cognitive, personal, social, and political problems can be involved. Multilingualism, i.e., the existence of immigrant minority languages in a given society, is perceived as a handicap that can only be solved by submersion, assimilation, or transition into the majority language. In this view, immigrant minority languages are at both the societal and personal level predominantly connected with problems of poverty, deficits, and underachievement in school, and insufficient social and vocational mobility and integration into the majority culture. The underlying belief is that immigrant minorities could solve most of these problems by learning and speaking the language of the majority. In contrast, the language as a *right* orientation looks upon multilingualism and the individual's right to choose a language as a basic and fundamental human right. This position, realizable at both the individual and group level and at the territorial (both national and international) and domain level, is taken by several writers, such as Skutnabb-Kangas *et al.* (1995) and May (2001); see

Blommaert (2001), however, for a fundamental criticism. Third, in the language as a *resource* orientation, multilingualism is considered a form of capital, both at national and individual levels. This position combines second and foreign language teaching arrangements with immigrant minority language education. Its assumption is that linguistic variation will not lead to separation or disintegration, but that coexistence of national unity and language diversity is possible and desirable.

According to Baker (2001: 375), each of these orientations recognizes

> "that language is not simply a means of communication but is also connected with socialization into the local and wider society, as well as a powerful symbol of heritage and identity. The differences between the three orientations lie in the socialization and identity to be fostered: assimilation or pluralism, integration or separatism, monoculturalism or multiculturalism."

Baker's (2001) distinction can easily be connected to the four types of state ideologies that, according to Bourhis (2001), generally shape the integration and language policies of immigration societies. The ideological position of a state concerning the integration of immigrants has important consequences for their possibilities to preserve their first language (L1) and culture in the host society and to acquire the society's dominant language (L2). In a *pluralist* ideology, the state provides support for language classes and facilitates cultural activities in order to promote L1 maintenance alongside L2 proficiency. A *civic* ideology expects immigrants to adopt the values, norms, and language of the mainstream society. The state does not, however, interfere with the private values of its citizens regarding language and culture, nor does it provide any facilities for the maintenance of immigrant minority languages or culture. An *assimilationist* ideology expects a general adaptation to the mainstream society, especially aimed at accelerating linguistic and cultural shift. An *ethnicist* ideology, finally, has much in common with an assimilation ideology, but on top of it, it explicitly counteracts linguistic and cultural diversity and makes it difficult for immigrant minorities to be accepted legally and/or socially as full and equal members of the mainstream society. In a democratic society, one or a combination of these ideologies – reflecting the possible variety of a society's members' opinions – via elections can become the guiding principle for dealing with immigrant language policies. It goes without saying that majority opinions in this respect have a much better chance of becoming dominant than immigrant or minority perspectives. It also goes without saying that majority opinions are primarily located at the more assimilationist side of the continuum. It must be noted, however, that many members of minority and immigrant groups are persuaded by social and economic pressure to accept assimilationist beliefs.

Minority and Majority Languages in Education

The 1997 *Encyclopedia of Language and Education* had a separate volume on *Bilingual Education* (Cummins and Corson, 1997). In the introduction to this volume, Cummins (1997: xi) states that although a "large majority of countries throughout the world offer some form of bilingual education," bilingual education for minority groups is

> "highly controversial" because it "is accurately seen by both advocates and opponents as at least potentially a challenge and form of resistance to dominant group hegemony which is perceived to be weakened by the 'infiltration' of diverse languages into 'mainstream' societal institutions such as schools."

In Cummins and Corson (1997), bilingual education, generally speaking, is presented as a successful and still developing contribution to improving educational opportunities of immigrants and other minorities and/or creating a culturally and linguistically diverse pluralist society.

What is referred to as bilingual education, through the years actually consisted of quite a number of different approaches that in the course of time have undergone considerable changes and used a host of different designations to refer to the languages that were the focus of attention. Anthologies such as Extra and Gorter (2001) and Extra and Yağmur (2004) contain terms such as 'native language,' 'mother tongue,' 'own language,' 'vernacular language,' 'community language,' 'ancestral language,' 'heritage language,' 'language of origin,' 'nonindigenous minority language,' 'allochthonous (minority) language,' 'immigrant (minority) language,' 'ethnic minority/group language,' or 'language other than English' – all referring to different policy visions of the languages involved and at the same time "all euphemisms intended to recognize that they are not the majority language" (Kaplan and Baldauf, 1997: 21; see also Kroon, 2003).

A main distinction to be made here is between approaches in which the immigrant minority language is used in a maintenance or transitional program or any other approach as a language of instruction in a variety of school subjects on the one hand, and approaches in which the immigrant minority language is a teaching subject in its own right, within, connected to, or outside the curriculum on the other

hand. Experience shows that minority language used for instruction, although not widespread, has a much greater impact on educational arrangements than minority languages taught as a subject. Whereas teaching immigrant minority languages as a subject to immigrant minority pupils does not necessarily influence a school's regular curriculum and might even go unnoticed by the majority, using immigrant minority languages as a language of instruction clearly affects and changes the school's image and as such more easily becomes a controversial issue in public and scholarly debate.

Almost a decade after Corson and Cummins' (1997) critical but basically positive evaluation of ongoing developments in bilingual education all over the world, a negative shift in public and scholarly appreciation of including immigrant minority languages in education seems to be imminent – if it has not already happened. The main reason for this shift – often triggered by opinion leaders giving voice to assumed general feelings and fears regarding the increasingly multicultural character of society, and soon adopted by politicians and governmental authorities, formally representing these concerned citizens – seems to lie in changing evaluations and opinions regarding the long-term viability of multicultural societies (Cuperus *et al.*, 2003). The rhetoric and practice of bilingual education in the last three decades or so of the 20th century can be characterized as mainly based on pluralist or civic ideologies that favored or accepted multiculturalism and as a consequence considered multilingualism as a right or at least as a resource, and argued in favor of including immigrant and other minority languages in education. In the first decade of the 21st century, however, mainly assimilationist and sometimes ethnicist ideologies have come to the fore that reject or oppose multiculturalism and as a consequence consider multilingualism first of all as a problem and as a threat to society, and so argue in favor of reducing or abolishing immigrant minority language teaching in schools altogether. This negative shift in the appreciation of including immigrant minority languages in education more often than not has gone hand in hand with a shift in national immigration and integration policies, leading to strict, defensive, restrictive, and daunting immigration laws and regulations, and accompanying integration measures for those immigrants, refugees, and/or asylum seekers who succeed in being admitted to their country of choice. Such measures generally include the compulsory acquisition of a certain level of proficiency in the dominant language of the host country and of some knowledge of the country's history and aspects of its contemporary organization of society. Depending on the strictness of a country's immigration and integration policies, language courses and tests for so-called 'newcomers' are sometimes organized, in the country of origin or in the immigration country, e.g., before or after entry, and they can also be made compulsory for those immigrants who have already lived and worked much of their lives in the immigration country.

In such policies, the authorities' central focus is on promoting or requiring the acquisition of the dominant language of the country of immigration, which for the majority of immigrants is a second language, via an extensive and diversified offer of second language teaching methodologies. These can vary from second language courses for newly arrived immigrants giving access to regular forms of education or work, to integrated, content-based second language courses for second-generation immigrants in mainstream classrooms (see Baker, 2001 and Van den Branden, 2006). But hard-core, L2-immersion without any special provisions for the first and second generation immigrant pupils involved is still widespread. In such cases, the authorities do not attach any official value to immigrant minority languages and do not include them in regular state-funded education arrangements, and may even oppose their use and preservation. As a consequence, as a first step, maintenance and transitional forms of bilingual education are abolished, then immigrant minority language teaching as a subject is moved outside the regular curriculum and the school, and there is no effort to use immigrant minority languages as support languages for immigrant minority pupils within the regular curriculum. In this view, knowledge of the dominant majority language is perceived as decisive for being a citizen, whereas knowledge of immigrant minority languages simply does not count and is totally left to the initiative of the immigrant minorities involved.

It is remarkable to observe how easily the 'monolingual habitus' (Gogolin, 1994) that is reflected by this restrictive policy position regarding multilingualism and language teaching in the context of immigration can be turned into a 'multilingual habitus' when it comes to formulating policies concerning foreign language proficiency of the so-called European citizen, who as consequence of internationalization and globalization is expected to know, besides his or her own national language, at least two other national languages of the European Union (Block and Cameron, 2002). The same politicians who downplay the position of immigrant minority languages in forms of bilingual education, at the same time plea for establishing bilingual schools that use English as

a language of instruction instead of or alongside the national language (De Bot *et al.*, 2001). The mantra of multilingualism is permanent, only the ingredients can change.

See also: Bilingualism and Second Language Learning; Education in a Multilingual Society; Language Education Policy in Europe; Language Policies: Policies on Language in Europe; Language Policy in Multilingual Educational Contexts; Language Policy in Multilingual Educational Contexts; Migration and Language; Minorities and Language; Minority Languages: Education; Multiculturalism and Language; Politics of Teaching; Teaching of Minority Languages.

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Immunity to Error through Misidentification

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Suppose I overhear a conversation and so come to believe the fact in (1).

(1) Ernie owns a poodle.

Two simple errors I may make are these: I may be mistaken because Ernie owns a greyhound. If so, I have predicated the wrong thing of Ernie. Or I may be mistaken because it is Bert who owns the poodle. In this case I have misidentified the poodle's owner. The latter is called an error of misidentification. To say that an utterance is immune to error through misidentification (IEM) is to say that this sort of mistake has been ruled out. If I see a dog in front of me and so form the belief in (2), I cannot be wrong about *which* dog my judgment is about (although I can make other sorts of mistakes – perhaps the dog is not a highland terrier, or perhaps I am hallucinating and there is no dog).

(2) That dog is a highland terrier.

Whether or not an utterance about something is IEM depends on how the utterer is thinking about that thing and how he or she has come to know facts about it. The phenomenon interests philosophers because certain 'I'-utterances are IEM, and since many

a language of instruction instead of or alongside the national language (De Bot *et al.*, 2001). The mantra of multilingualism is permanent, only the ingredients can change.

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Whether or not an utterance about something is IEM depends on how the utterer is thinking about that thing and how he or she has come to know facts about it. The phenomenon interests philosophers because certain 'I'-utterances are IEM, and since many

writers take 'I'-utterances to express first-person thoughts, it seems that this fact can shed light on first-person thinking. The next section explains how someone must think about/come to know about *x* for an utterance about *x* to be IEM. In a later section, the main positions in the debate about IEM 'I'-utterances are presented.

IEM

There are different ways for an utterance to be IEM. To come to grips with the phenomenon, we first need to understand what it is for an utterance to be *open* to this kind of error (OEM). In the first example, if the poodle belongs to Bert, I make an error of misidentification when I judge (1), because I mistake Ernie for the poodle's owner. In other words, I judge that Ernie is numerically identical with the owner of the poodle, and my judgment is false, because the person who owns the poodle is Bert. Thus we can see that an error of misidentification consists in mistakenly judging that one thing is numerically identical to another, and it is primarily judgments of numerical identity, as in (3), that are OEM.

(3) The person who wrote *Crime and Punishment* is Dostoevsky.

Some subject-predicate judgments are also OEM. This is because they depend on judgments of numerical identity (Evans, 1982: 180). Suppose that I see a llama standing in a field and wearing a blue blanket and make the subject-predicate judgment in (4).

(4) My sister's llama is wearing a blue blanket.

That, in turn, depends on two further judgments. One is a perceptual-demonstrative judgment about *that* llama (the one I can see), as in (5).

(5) That llama is wearing a blue blanket.

The other is a judgment of numerical identity, as in (6).

(6) That llama is my sister's llama.

If (6) is false, in judging (4), I will misidentify the llama that is wearing a blue blanket. Hence, (4) is OEM, because it depends on (6).

Since a judgment will be OEM if it either is or depends upon a judgment of numerical identity, it follows that a judgment will be IEM if it is not of these types. There are many different kinds of judgments that are IEM. However, discussion in the literature tends to focus on IEM subject-predicate judgments. These are perceptual-demonstrative judgments – i.e., judgments that are wholly based on direct awareness of the thing the judgment is about, as in (5).

(5) That llama is wearing a blue blanket.

It is clear that (5) is IEM – I cannot be wrong about *which* llama is wearing a blue blanket (although my judgment can go wrong in other ways, e.g., if the blanket is not blue, there is no blanket, or there is even no llama). The example in (5) is IEM because I both identify the object of the judgment (the llama) and come to know that it is wearing a blue blanket on the basis of my seeing it in the field. As a result, (5) does not depend upon a judgment of numerical identity, and so the possibility of error through misidentification has been ruled out.

IEM 'I'-Utterances

Philosophers are primarily interested in IEM because some 'I'-utterances are IEM. It seems, e.g., impossible to utter the sentence in (7) and be mistaken about *which* person is in pain.

(7) I am in pain.

It is widely held that 'I'-utterances express first-person thoughts. If this is so, then the fact that some are IEM can shed light on the nature of first-person thinking, and the self. Nearly all writers accept that some 'I'-utterances are IEM (see, however, Campbell, 1999), but the source of this immunity is disputed.

What is perhaps the most influential account of IEM 'I'-utterances assimilates them to perceptual-demonstrative judgments. Those 'I'-utterances that are IEM appear to express subject-predicate judgments. When I utter (7), I seem to be saying that some object (myself) satisfies the predicate 'in pain'. We see in the first section of this article that a subject-predicate judgment will be IEM if it is wholly based on direct awareness of the thing the judgment is about. Many writers are thus led to conclude that an utterance such as (7) is IEM because it is wholly based on direct awareness of oneself – I observe myself and observe that I am in pain. These writers thereby treat 'I' as a perceptual-demonstrative comparable to terms such as 'this' and 'that' (note, however, that these terms also have uses that are not perceptual-demonstrative). But 'I' does not behave like other perceptual-demonstrative terms. I can use a term such as 'that' to refer to lots of different things; sometimes an utterance of 'that' will fail to refer to anything – e.g., if I hallucinate a llama before me, my attempts to refer to it using 'that' will fail. In contrast, it is traditionally claimed that I can only refer to myself using 'I,' and 'I' cannot fail to refer. Thus, the self-awareness that underlies 'I'-utterances that are IEM cannot be like ordinary forms of observation. First, I use a perceptual-demonstrative term such as 'that' to refer to something I currently see. 'That' can be used to refer to lots of different things,

because I can see many entities. If 'I' is a perceptual-demonstrative that can be used to refer only to oneself, it follows that its use must be based on awareness one can have only of oneself. Second, perceptual-demonstratives can fail to refer because we can have illusory experiences, where we seem to perceive an object that is not in fact there. Since 'I' cannot fail to refer, the awareness that underlies its use must not allow for the possibility of complete hallucination in this way.

Various objections to the perceptual-demonstrative account of IEM 'I'-utterances have been raised. Anscombe (1981) objected that the only sort of awareness that could fit the bill would be introspection of a nonphysical self. This claim creates trouble for the view that IEM 'I'-utterances should be treated as perceptual-demonstrative judgments because theorists these days take the self to be a physical entity. A further problem was raised by Shoemaker (1968). On the perceptual-demonstrative view, I make an utterance like (9) on the basis of direct awareness of the thing the judgment is about – myself. However, Shoemaker argued that observing a self and noticing that it is in pain only allows me to judge (8) in the same way that observing a llama and noticing that it is wearing a blue blanket allows me to judge (5).

(8) That self is in pain.

(5) That llama is wearing a blue blanket.

But (8) is clearly not equivalent to (7). First-person thoughts have a special role in bringing about action (*see* **Essential Indexical**). I may, e.g., see myself reflected in a shop window, notice that the person I see reflected is standing in the way of the street sweeper, and so judge (9).

(9) That person is obstructing the street sweeper.

But even if I am cooperative, I will not move out of the way unless I believe (10).

(10) *I* am obstructing the street sweeper.

If observing a self and noticing that it is in pain allows me only to judge (8), to judge (7), I will have to make the judgment of numerical identity (11).

(8) That self is in pain.

(7) I am in pain.

(11) I am that self.

It is unclear on what basis I could judge (11). Moreover, as we have seen, if a subject-predicate judgment depends upon a judgment of numerical identity, then it is OEM. It follows that if I judge (7) on the basis of (8) and (11), then (7) will be OEM. But (7) is IEM; thus, I cannot judge (7) on the basis of (8) and (11). Shoemaker concluded, therefore, that IEM 'I'-utterances cannot be based on self-observation.

Evans (1982) attempted to give a perceptual-demonstrative account of IEM 'I'-utterances that did not fall prey to these objections. We have seen that 'I' differs from other perceptual-demonstrative terms in that I can refer only to myself using 'I', and 'I' cannot fail to refer. It follows that IEM 'I'-utterances must be based on a form of awareness that one can have only of oneself and that does not allow for hallucination in the same way as a sense like vision, where I can seem to see an object that is not there. Evans suggested that proprioception – the 'inner' sense of one's body, its temperature, limb position, movements, etc. – satisfies both of these conditions. Indeed, it gives rise to 'I'-utterances that are seemingly IEM. If, e.g., I feel that my legs are crossed and utter (12), I surely cannot be wrong about which person has their legs crossed.

(12) I have my legs crossed.

Evans held that all IEM 'I'-utterances are based upon proprioceptive experience of one's body.

Anscombe objected to the perceptual-demonstrative account of IEM 'I'-utterances, because it seemed that only introspection of a nonphysical self could satisfy the relevant conditions. Evans's account silenced this objection, because proprioception is awareness of one's body. It could also deal with the worry raised by Shoemaker. Shoemaker claimed that observation of a self could license only a judgment such as (8), rather than (7).

(8) That self is in pain.

(7) I am in pain.

Judgments (7) and (8) are not equivalent, because they have different implications for action. One might think that Shoemaker could make the same objection to Evans's account: proprioceptive experience allows me only to judge, e.g., (13) and not the first-person judgment (12).

(13) That body has its legs crossed.

(12) I have my legs crossed.

However, proprioceptive experience allows us to act unreflectively on the information given in that experience. Suppose that I feel a mosquito crawling on my arm; I can immediately slap my arm without thinking about doing so. In particular, I do not need to identify the arm I can feel the mosquito crawling along as *my* arm. The way in which proprioceptive awareness has an immediate bearing on my actions suggests that it is awareness that is distinctively first-personal. It follows that it can license a first-person judgment such as (12), not merely a judgment such as (13). Thus,

Evans's account does not fall prey to Shoemaker's objection.

Evans's account, however, is not free from problems. It is perhaps conceivable that I could have proprioceptive experience of another's body if my brain were appropriately 'wired' to their limbs. In such a case I might judge (14).

(14) I have an itch in my left foot.

But since my proprioceptive experience comes from their body, not mine, in judging (14), I misidentify the person whose left foot is itchy. Examples such as this are famously taken to show that judgments based on proprioceptive awareness of one's body are not IEM.

Wittgenstein, who is credited with first noticing that certain 'I'-utterances are IEM, gives a radically different analysis of such utterances. To understand his account, we need to distinguish between utterances and judgments. I have so far spoken as if they are interchangeable. In many cases this is acceptable, because utterances are often used to express judgments. Suppose I am asked a question in class and answer (15).

(15) The capital of England is London.

My utterance expresses a judgment that London is the capital of England – by uttering (15), I express my commitment to the existence of a particular country, the existence of a particular city, and the obtaining of a particular relation between them. However, not all utterances express judgments. Suppose that I utter (16) as the punch line of a joke.

(16) John's donkey is drunk.

Unlike (15), (16) does not express a judgment – I am not committed to the existence of John or his donkey. Since an error of misidentification consists in mistakenly judging that one thing is numerically identical to another, if I make an utterance that expresses no judgment, my utterance will be IEM. When I utter (16), I am not committing myself to the existence of some particular donkey, which I believe to be drunk. It thus makes no sense to suppose that I could misidentify the donkey in question.

Wittgenstein (1953) accounted for the IEM status of certain 'I'-utterances in this way. He argued that some present-tense 'I'-utterances that involve psychological predicates, such as (17), cannot be understood as expressing judgments.

(17) I feel dazed.

Instead, we should think of them as expressing one's psychological states in much the same way that groaning sometimes expresses pain. 'I'-utterances of this sort are IEM; they have this status, according to Wittgenstein, because they do not express judgments. A consequence of this view is that 'I,' as it is used in these utterances, does not refer to anything. It makes no sense to talk of a groan as having a referent. Since utterances like (17) express psychological states in the same kind of way that groaning sometimes expresses pain, 'I' as it is used in (17) does not refer to anything. Most have dismissed Wittgenstein's 'no-reference thesis,' as this view is called. It is also unclear how IEM 'I'-utterances involving *physical* predicates (assuming that there are such utterances) should be treated on the Wittgenstein picture. Suppose a particular bodily sensation prompts me to utter (12).

(12) I have my legs crossed.

It is unclear how (12) could be treated as expressing a state in the same way that groaning can be understood as expressing pain.

See also: Essential Indexical; Sense and Reference: Philosophical Aspects; Thought and Language: Philosophical Aspects.

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Impairments of Proper and Common Names

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The distinction between common and proper names is a fundamental one in lexical semantics. The two categories, in fact, are distinguishable from one another since they have a different type of reference. This fact has been shown to impinge on the kind of processing each category undergoes. Neuropsychological research in the past 20 years has indeed uncovered a series of phenomena that critically contribute to the understanding of how proper names are processed in the brain with respect to common names. These findings could be interpreted in light of past and current philosophical and linguistic theories on the nature of proper and common names, that, in turn, received empirical support. Thus, the role of a very important dimension, that of the amount of 'sense' in Frege's (1892) terms, was highlighted, and it became possible to distinguish semantics referring to individuals from general semantics.

Relevant philosophical and linguistic theories can be summarized as follows. Proper names are thought to relate to their reference in a 'token' (individual) as opposed to 'type' (categorical) fashion, which is the case for common nouns. In other words, while proper names refer to individual entities, common nouns refer to categories of items. According to philosophers like Frege (1892) or, more recently, Kripke (1980), proper names are pure referring expressions, in that they carry little if any sense or connotation beyond that of the reference. In other words, proper names do not entail any description of the entity they designate. Changing basic features and properties over time does not change the proper name of a given single entity. Another way of expressing this fact is to tell that proper names have an arbitrary relation with their reference. As Semenza *et al.* (1998) have observed, a name designating a category applies to a set of attributes that overlap or interact with each other via high-probability connections. In the set of attributes labeled by a proper name, instead, attributes combine together incidentally, being related to each other only by virtue of belonging to entities that are unique. This distinction resembles closely that universally made between semantic and episodic memory mechanisms, but with an important difference: the mechanisms in question are more peripheral and operate at the lexical level.

In neuropsychology, cases were discovered whereby, as a result of a brain lesion, patients were affected by selective anomia for proper names, with normal retrieval of common names. Cases of the reverse pattern – proper name selective sparing – have also been reported.

Anomia for proper names, in general, affects retrieval in all testing conditions and comes in different varieties, the most common (so-called 'pure proper name anomias') being those originating with a deficit at a postsemantic level (i.e., failure to access the name's phonological form from an intact semantic system, e.g., Semenza and Zettin, 1988, 1989; Lucchelli and De Renzi, 1992; Hittmair-Delazer *et al.*, 1994). The phonological level itself seems to be spared in these patients, since they maintain the ability to read aloud irregularly spelled proper names. This type of anomia comes in two different subtypes: one concerns all proper names, while the other is limited to people's names only. It is still unclear whether proper names other than people's ones are easier than the latter or rather have particular properties that may help in circumventing the deficit. Most of these patients seem little if not at all sensitive to phonemic as well as semantic cueing, but a combination of both types of cue has been shown to yield some improvement. Cases, however, have been reported of patients showing a significant improvement when aided with a phonological cue (e.g., Lucchelli and De Renzi, 1992; Otsuka *et al.,* 2005). Other cases have been shown, instead, to derive from a problem within the semantic system (e.g., Miceli *et al.*, 2000), where information about individual people seems to be selectively lost with respect to information about other entities, or from the isolation of information on individual entities from both the general semantic system and the output lexicon (Van der Linden *et al.,* 1995; Semenza *et al.,* 1998). Thus, while some patients cannot retrieve the name but have no problem showing they know everything else about the individual, other less frequently observed patients seem to be selectively impaired in the semantic store containing all the information about that individual, including the corresponding name. In 'isolation' cases the information was available but could only be triggered by providing the proper name itself. A last variety, only very recently described, is that of 'prosopanomia' (Semenza *et al.,* 2003), a face-specific optic aphasia, where patients cannot retrieve the names of people by just looking at their faces but they can do so on definition. They have no trouble recognizing the face, but like optic aphasics, they seem instead unable to retrieve enough semantic information from the visual stimulus (in this case, specifically, only from faces) to activate the name.

Anomias for proper names arising at the retrieval level are also important for their concomitant symptoms. While, at least in the purest cases, they seem to come as the only reported symptom, careful neuropsychological assessment systematically uncovers a revealing constellation of associated deficits. Semenza and Zettin (1989) first showed that their proper name anomic could not retrieve a member of an arbitrarily related word pair given the other. The same patient and similar ones could not retrieve 'token' information arbitrarily connected with other information, such as known phone numbers of people, titles of wordless pieces of music, dates of known events, etc. This finding provides support for theories of proper names as pure referring expressions, whose link with the entity they represent is arbitrary, nondescriptive (i.e., unlike with common nouns, not implying attributes), and thus devoid of sense.

Cases of selective sparing of proper names are more complicated than proper name anomias and do not seem to tell a straightforward story. Two main factors contribute to this state of uncertainty and, consequently, to the difficulty in identifying the nature of the functional deficit. First, in general, sparing of proper names has been found in otherwise very severely affected patients. This fact has seriously hampered the possibility of testing the patients in the desirable level of detail. Second, the conditions in which proper names are selectively spared appears to differ widely from case to case; in fact, unlike in cases of the most common (postsemantic) proper name anomia, which all look rather similar, no single reported case of proper name sparing closely resembles any of the others. For instance, the first such case ever observed (McKenna and Warrington, 1978) concerned only the names of nations. In another case, reported by Cipolotti *et al.* (1993), the patient could be tested only in writing, where he could retrieve only names of countries and famous people. In the case reported by Semenza and Sgaramella (1993), the patient could not retrieve any name, and selective preservation of proper names emerged only in the middle of a gibberish jargon, and, more clearly, after phonemic cueing in picture naming. In contrast, Cipolotti's (2000) patient showed proper name superiority just for countries and only in oral naming and reading aloud. In another case (Schmidt *et al.*, 2004), preserved sparing was shown only in the written condition in a patient whose articulation was totally impaired. This patient showed semantic knowledge about items whose (common) name he could not retrieve and never committed paragraphias; these facts led the authors to suggest that the functional deficit could be located in accessing, from an intact semantic level, an intact orthographic lexicon. Unfortunately, the patient's extremely severe articulation problems prevented assessing the status of his phonological lexicon. In the case described by Lyons *et al.* (2002), the patients not only missed common nouns but also the correspondent semantic information: in contrast, the patient showed a normal ability to retrieve people's names and the corresponding biographical information.

With one exception, none of the patients with proper name sparing described in the literature truly mirrors reported cases of anomia for proper names. Because of the severity of the cases, only limited testing results are available for any one patient, so it has been very difficult to locate the deficit at a particular processing stage.

This review thus shows that a convincing double dissociation in the processing of proper and common names, the clearest evidence for separate systems, has not been described at all processing stages. The only exception is indeed constituted by two cases, the proper name anomia studied by Miceli *et al.* (2000) and the proper name selective sparing reported by Lyons *et al.* (2002). These cases really mirror each other, insofar the former, as reported above, missed the knowledge of the semantics of individual entities while preserving knowledge of categorical entities, while the latter, instead, showed exactly the reverse pattern.

Strangely, the most frequent pattern of proper name anomia (i.e., where the defect has been located at the postsemantic lexical activation level) is not clearly mirrored by any case of proper name sparing. Before Miceli *et al.* (2000) and Lyons *et al.* (2002) had described their patients, the lack of a double dissociation could be taken as meaning that the processing of the two categories follows the same path. Semenza (1997), however, warned against this last interpretation by pointing out that the patients reported in Semenza and Zettin (1988, 1989) could retrieve virtually all items in their presumed premorbid vocabulary, and were well within, if not superior to, normal level in the retrieval of common names. They could indeed retrieve very difficult abstract names and correctly name in a minute a high number of items from odd common name categories. In contrast, they were profoundly impaired with proper names to the point that they could retrieve only their own name and that of a few family members. The fact that they were unable to retrieve the names of people they had known all their lives and met almost every day indicates that this dissociation cannot be determined by low frequency or familiarity of such items; rather, it

suggests that proper names have a separate processing pathway.

The problem remains of why, with about two dozen cases of anomia for proper names described in literature, their selective sparing is still so hard to find. One possible explanation is that the retrieval of proper names is simply more difficult than the retrieval of common nouns. This position is widely held and anecdotally supported, but experimental confirmation has been difficult to obtain (Cohen and Burke, 1993). In fact, the main methods used in the past to demonstrate proper names' relative difficulty with respect to common names proved to be largely inadequate. It is indeed very hard if not impossible to match for perceptual difficulty visual stimuli consisting of pictures of faces (for proper names) and pictures of objects (for common names). Diary studies, instead, collecting participants' naming failures in a given period of time, were hampered by the obvious fact that one often hardly notices missing a common name, while missing a proper name may cause serious embarrassment.

Thus, the best available evidence for proper names being indeed more difficult to process rests mainly on two types of relatively recent observations. One concerns the so called 'baker–Baker' paradox: it is easier to learn that a face belongs to a baker than it is to learn that the same face belongs to a Mr Baker (McWeeny *et al.,* 1987; Cohen, 1990). This effect cannot be attributed to differences in the phonological form or frequency of occurrence of occupations versus proper names. Another methodology – repetition of supraspan lists of words – shows a significantly weaker priority effect when the list is composed of proper names than when it is composed of common nouns matched to proper names for frequency, length and phonological complexity (Hittmair-Delazer *et al.,* 1994; Semenza *et al.*, 1996; Pelamatti *et al.*, 2003). This effect widens with age and exposure to high altitude and comes to an extreme with Alzheimer's disease.

Proper name recognition has also been studied in neuropsychology. A selective deficit in proper name recognition *vis-à-vis* sparing of the comprehension of common names was first reported by Verstichel *et al.* (1996) in a patient who showed the same dissociation in output. Sparing in recognition of proper names relative to common ones has also been reported (Saffran *et al.,* 1980; Van Lanker and Klein, 1990), generally after major damage to the left hemisphere.

Once established that proper and common names follow different functional pathways, an important and debated issue concerns localization of proper name processing in the brain. Reported investigations so far employed lateralization techniques, ERPs (Evoked Response Potentials), neuroimaging, and classic clinical–anatomical correlation.

Ohnesorge and Van Lanker (2001), reviewing findings via lateralization techniques on proper name recognition, came to the following conclusions: greater accuracy is found in the right visual field for both common proper names; famous proper names are overall more accurately recognized; no field difference exists for famous proper names in categorization tasks and for more familiar items. The authors suggested that both hemispheres can process famous proper names and that the right hemisphere contributes to personal name recognition because it may be specialized for items of 'personal relevance.'

An ERP study carried out by Proverbio *et al.* (2001) revealed that tacit retrieval of a proper name phonological form is reflected in a strong activation of left anterior temporal and left centrofrontal areas, while the same task shows greater involvement of occipitotemporal areas with common names.

Neuroimaging studies (Damasio *et al.,* 1996; Gorno Tempini *et al.,* 1998; Rotschtein *et al.,* 2005) seem to indicate a critical role of the left temporal pole in naming of faces and that proper name categorization depends on the left–anterior middle–temporal region.

Finally, the anatomoclinical correlation method (Semenza *et al.,* 1995; Yasuda *et al.,* 2000) allowed researchers to reach the following conclusions: a) in proper name anomias, the left temporal lobe is often damaged; b) several cases are determined by left-sided lesions clearly outside the temporal lobe, including the basal ganglia, the thalamus, and the occipital lobe; c) the left temporal lobe is most often damaged also in selective sparing of proper names; and d) at least one case of selective sparing of proper names followed a lesion in the left temporal pole. The most recent review (Yasuda *et al.,* 2000) thus concluded that various aspects of proper name retrieval may be sustained by different structures differently participating in a complex network: existing speculations about the specific role of each of these structures remains at present unwarranted.

In summary, localization studies lead to the suggestion that a dedicated module dealing with proper name retrieval probably exists, but it is either subject to great interindividual variation or it is distributed throughout a large portion of the left hemisphere.

See also: Aphasia Syndromes; Lexicon, Generative; Proper Names: Semantic Aspects; Reference: Psycholinguistic Approach; Semantics of Spatial Expressions.

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Imperatives

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Imperatives can be defined as constructions of grammar that typically express a state of affairs as desirable by the speaker and that furthermore appeal to the hearer(s) to fulfill the desire. Thus, sentence (1) is an imperative. It has the meaning just described, and the construction type is defined in terms of grammar, especially syntax (the clause lacks a subject and it starts with a finite verb) and, less so, morphology (the bare form of the verb is highly polyfunctional).

(1) go home now

Sentence (2) expresses the same meaning in Polish; in this language, there is unique imperative morphology.

(2) idź teraz do domu
go.IMP.IMPERF.2.SING now to house
'go home now!'

Sentence (3) expresses more or less the same meaning, but this is not so much due to grammar as to the use of lexical items, most particularly, the volitional predicate *want*.

(3) I want you to go home now

Sentence (4) is not an imperative either.

(4) if only you would go home now

Sentence (4) does express a desire by the speaker, but it does not encode an appeal to the hearer to go home. The appeal is not part of the semantics of the *if only* construction, even though it could convey it as a Gricean implicature.

Next to imperative constructions that can be called typical, we can find atypical ones. In a permission, the speaker's desire is less salient than that of hearer, to the extent that even the speaker can say that he or she does not want the state of affairs.

(5) I don't want you to go home now, but go anyway

But even then, there is still at least the speaker's desire to gratify the hearer's wish. In an advice or in an instruction, however, the component of the speaker's desire is even less relevant and in the pluperfect imperative of Dutch (Haeseryn *et al.*, 1997: 1634), there is a desire, but it is past and unfulfillable.

(6) if you want to go to the station, take bus 66

(7) had je mond maar gehouden!
had your mouth but kept
'you should have kept your mouth shut!'

In the narrative imperative of Russian (Fortuin, 2000: 134), finally, there is no desire whatsoever.

(8) stala ja sosedok rassprašivat' a oni mne
started I neighbors interrogate and they me
vsë i rasskaži
all and tell.IMP.PERF.2.SING
'I started to interrogate the neighbors . . . and they just told me everything'

The polyfunctionality sketched in the previous examples can be dealt with in two ways. In a monosemantic approach, one attempts to define a meaning that is common to all relevant uses. Because of the multiplicity of uses, this one meaning will be relatively abstract (see, e.g., Davies, 1987: 145). In a polysemantic approach, it suffices to describe the relevant uses as being related to one another, thus allowing them to constitute a polysemantic network. In both approaches, one could also decide that a certain use is not in fact an instantiation of the one general meaning or a partner in the polysemy network and that it, rather, illustrates a case of homonymy. The Russian narrative imperative is a case in point; see Fortuin (2001: 134–161) for a discussion of the homonymy account in contrast to monosemantic and polysemantic accounts.

Similar polyfunctionality issues arise when we demarcate imperatives from optatives, subjunctives, or irrealis constructions. In modern Persian (Western Farsi), the subjunctive has a variety of uses, both in dependent and in independent clauses. In independent clauses, it can express desire and exhortation to first, second, and third persons. The Persian imperative has the typical meaning previously sketched. In the second-person singular, it is formally different from the subjunctive, but not in the second-person plural (see Table 1). We could thus conclude that Persian only has an imperative second-person singular and that the second-person plural uses are taken care of by the subjunctive form or perhaps a

Table 1 Subjunctive and imperative paradigms in modern Persian (Western Farsi)

		Subjunctive		*Imperative*	
SG	1	*be-xar-am*	'that I buy'		
	2	*be-xar-i*	'that you buy'	*be-xar*	'buy'
	3	*be-xar-ad/e*	'that he/she buys'		
PL	1	*be-xar-im*	'that we buy'		
	2	*be-xar-id/in*	'that you buy'	*be-xar-id/in*	'buy'
	3	*be-xar-and/an*	'that they buy'		

Source: Lazard (1992: 146–148).

Table 2 Una immediate imperative

Person	*Example*	
1SG	*buk-nun*	'let me sit down right now!'
2SG	*buk-dum*	'sit down right now!'
3SG	*buk-dur*	'let him sit! down right now'
1DU	*buk-nunum*	'let's sit down right now, you and me!'
2DU	*buk-durum*	'sit down right now, you two!'
3DU	*buk-durung*	'let both of them sit down right now!'
1PL	*buk-nub*	'let's sit down right now!'
2PL	*buk-darut*	'sit down right now!'
3PL	*buk-nung*	'let them sit down right now!'

Source: Louwerse (1988: 36).

Table 3 Una imperatives

Example		*Imperative paradigm*
buk-num	'let me sit down right now!'	Immediate imperative
buk-u-num	'let me sit down!'	Near deferred imperative
buk-wama-nun	'let me sit down in a while!'	Regular deferred imperative
buk-wa-nun	'let me sit down later on!'	Remote deferred imperative
bu-ra-nun	'let me sit down continually!'	Continuous imperative

Source: Louwerse (1988: 36–37).

more general subjunctive-imperative. Traditionally, however, Persian is credited with both a singular and a plural imperative, and we just remark that the imperative plural is identical to the subjunctive second-person plural. In cases in which there is no form that is dedicated to the typical function of imperatives, we could, of course, say that the language lacks an imperative, as in the Malayo-Polynesian language Manam, for which Lichtenberk (1983: 187–191) mentions an irrealis form that has as one of its uses something considered typical for imperatives. Another example is the Australian language Nunggubuyu, in which a form can have both future and imperative readings (Heath, 1984: 343–344).

A point of controversy is whether imperatives are exclusively second person. One can embrace a wide view, in which constructions such as English (9), Russian (10), and Korean (11) (Sohn, 1999: 274) are also considered to be imperatives (e.g., Birjulin and Xrakovskij, 2001).

(9) let's go now!

(10) pust' oni sejčas idut
let they now go.IND.PRS.IMPERF.3.PL
'let them go now!'

(11) nay ka ka-ca
I NOM go-IMP
'let me go!'

Alternatively, and more commonly perhaps, constructions such as (9) to (11) are given labels such as hortative, jussive, propositive, or injunctive (e.g., Ammann and van der Auwera, 2004). The difference between the two approaches may be only a terminological one, but the issue can again be related to degrees of prototypicality. The prototypical imperative was claimed to involve an appeal to the hearer to fulfill a desire of the speaker. In the most typical imperative, the hearer is him- or herself in control of the desired state of affairs and can thus fulfill the desire in a straightforward way. In (9), (10), and (11), the situation is a little special. In (9), there is an appeal to both the hearer and the speaker. In (10), the appeal is still directed toward the hearer, but the latter is not in control. The hearer is only called on to create the circumstances favorable to the third party's action, but it is the latter that has to act. In (11), the speaker talks to him- or herself; he or she is both the speaker and the hearer.

Just as languages differ as to whether they have grammaticalized more or less dedicated second-person imperatives, they also differ as to whether they have grammaticalized non-second-person constructions such as (9)–(11) (see van der Auwera *et al.*, 2004). Both *let's* and *pust'* transparently derive from a 'let' verb and can be considered particles now, the Russian one more clearly so than the English one; but, whereas *let's* is used only for the first-person plural, Russian *pust'* is only used for the third persons. Thus, neither Russian nor English has a homogeneous full person paradigm.

This can be contrasted with a paradigm such as Table 2, the immediate imperative of the Papuan language Una. The high degree of homogeneity is evident: For each slot, there is a stem followed by a person-number suffix. The regularity can also be illustrated by the fact that Una has no fewer than five imperative paradigms. Table 3 illustrates the first-person singular in each of the paradigms.

The Una paradigms also illustrate that imperatives can exhibit considerable morphological complexity. In languages with a small paradigm, however, the striking feature is, rather, the morphological simplicity, especially of the second-person singular, which is often just a bare stem or root of the verb or even a shortened form of it. Consider the Uralic language Udmurt. Its second-person singular imperative is normally expressed by a stem, but when the stem ends in an *-ï* that is preceded by a single consonant, this *-ï* is lost and the imperative is thus a simplified stem (Csúcs, 1998: 289)

(12a) vetlï
go.IMP.2.SING
'go!'

(12b) gïr
plough.IMP.2.SING
'plough!'

The negation of the imperative is often called prohibitive or, less often, vetative. One reason for giving it a special label is that prohibitives are frequently not compositionally derivable from positive imperatives. Consider the Australian language Djingili. Imperatives are marked with the suffix *-mi* and prohibitives by *-ji*, and this *-ji* is different from the normal indicative negation, the adverbial *angjkula* (Pensalfini, 2003: 101, 230).

(13a) dunjumi-ji, mankiya-mi
poke-PROH sit-IMP
'don't poke me, sit still!'

(13b) angjkula langkaj-nya-ju ngarru
NEG hear-SING-do 1.SING.ACC
'you're not listening to me!'

Other types are shown in (14)–(15). In the Spanish sentences in (14), we get the ordinary indicative negative marker, but it combines with a subjunctive rather than an imperative. In the Homeric Greek example in (15a) (*Iliad* 1.32), the prohibitive uses the imperative verb and *mê*, not the indicative negative marker *ou*, as in (15b) (*Iliad* 1.24).

(14a) canta
sing.IMP.2.SING
'sing!'

(14b) no cantes
NEG sing.SBJ.PRS.2.SING
'don't sing!'

(15a) mê m' erethize
NEG me provoke.IMP.PRES.2.SING
'do not provoke me!'

(15b) all' ouk Atreīdêi Agamemnoni
but NEG Atreidês. Agamemnon.
DAT.SING DAT.SING
hêndane thûmoi
please.IND.IMP.3.SING soul.DAT.SING
'but the thing did not please the heart of Agamemnon, the son of Atreus'

As the English translations in (15) show, the English prohibitive uses the same verb as in the imperative and the same negation as in the indicative.

See also: Grammaticalization; Lexicology; Mood and Modality in Grammar; Negation; Performative Clauses; Speech Acts and Grammar; Speech Acts: Definition and Classification; Speech Acts, Literal and Nonliteral; Speech Acts; Tense.

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Implicature

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The Basic Notions

The term '*implicature*' goes back to the philosopher Paul Grice, as laid down in his seminal article 'Logic and Conversation' (Grice, 1989), which is the published version of a part of his William James lectures held in 1967 at Harvard University (*see* **Grice, Herbert Paul (1913–1988)**). In Grice's approach, both 'what is implicated' and 'what is said' are part of speaker meaning. 'What is said' is that part of meaning that is determined by truth-conditional semantics, while 'what is implicated' is that part of meaning that cannot be captured by truth conditions and therefore belongs to pragmatics. Several types of implicature are distinguished. Figure 1 shows the Gricean typology of speaker meaning (cf. Levinson, 1983: 131).

The most widely accepted type of implicature is the *conversational implicature*. According to Grice, it comes in two ways, generalized conversational implicature (GCI) and particularized conversational implicature (PCI). The following example from Levinson (2000: 16–17) illustrates this distinction:

Context, 1 Speaker A: What time is it?
Speaker B: Some of the guests are already leaving.
PCI: 'It must be late.'
GCI: 'Not all of the guests are already leaving.'

Context, 2 Speaker A: Where's John?
Speaker B: Some of the guests are already leaving.
PCI: 'Perhaps John has already left.'
GCI: 'Not all of the guests are already leaving.'

Because the implicature ('. . . not all . . .') triggered by *some* arises in both contexts, it is relatively context-independent. Relative context-independence is the most prominent property of GCIs. In addition, GCIs are normally, or even consistently, associated with certain linguistic forms. For example, if someone utters *Peter is meeting a woman this evening* it is, because of the indefinite article, standardly implicated that the woman is not his wife, close relative, etc. (cf. Grice, 1989: 37; Hawkins, 1991). In contrast to GCIs, PCIs are highly context-dependent, and they are not consistently associated with any linguistic form.

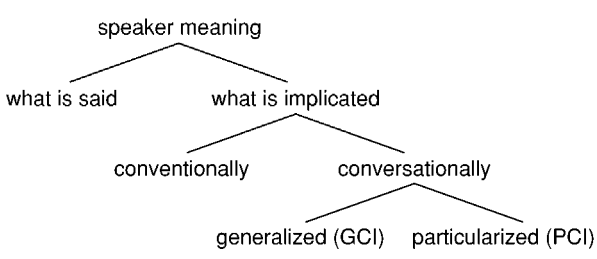

Figure 1 Gricean typology of speaker meaning.

The distinction between conversational implicatures and *conventional implicatures* draws on the observation that in coordinations like *Anna is rich but she is happy*, the truth conditions are just the truth conditions of the coordination *Anna is rich and she is happy*, with the exception of the contrastive meaning of *but*. This meaning is not truth-functional, and it is not context-dependent either; hence, there is some motivation for assuming the category of conventional implicature.

Note that there may be further types of implicature, e.g., implicatures of politeness or style that are neither conventional nor conversational (cf. Leech, 1983; Brown and Levinson, 1987).

Conversational implicatures come about by the *exploitation* (apparent flouting) or *observation* of the *cooperative principle* (CP) and a set of maxims (Grice, 1989) (*see* **Cooperative Principle; Maxims and Flouting**):

Cooperative Principle
Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

Maxim of Quantity
1. Make your contribution as informative as is required (for the current purposes of exchange).
2. Do not make your contribution more informative than is required.

Maxim of Quality
Try to make your contribution one that is true.
1. Do not say what you believe to be false.
2. Do not say that for which you lack adequate evidence.

Maxim of Relevance
Be relevant.

Maxim of Manner
Be perspicuous.
1. Avoid obscurity of expression.
2. Avoid ambiguity.
3. Be brief (avoid unnecessary prolixity).
4. Be orderly.

These maxims and submaxims are conceived as rules of rational behavior, not as ethical norms. They figure prominently in the derivation of an implicature.

The basic idea of such a derivation is best illustrated with a simple dialogue. Imagine that I ask my colleague *Is Markus there?* and she answers *There is a pink Porsche behind the library building*. Understood literally, such an answer does not make any sense. However, as I assume that my colleague is cooperative, and remembering that Markus drives a pink Porsche, I can figure out that Markus is in the library. In working out this information, I have made use of the assumption that my colleague's answer has been relevant with regard to my question. Thus, conversational implicatures display the property of *calculability*. A general scheme for the working out of a conversational implicature is given by Grice (1989: 30–31):

> A man who, by (in, when) saying (or making as if to say) that *p* has implicated that *q*, may be said to have conversationally implicated that *q*, provided that (1) he is to be presumed to be observing the conversational maxims, or at least the Cooperative Principle; (2) the supposition that he is aware that, or thinks that, *q* is required in order to make his saying or making as if to say *p* (or doing so in *those* terms) consistent with this presumption; and (3) the speaker thinks (and would expect the hearer to think that the speaker thinks) that it is within the competence of the hearer to work out, or grasp intuitively, that the supposition in (2) is required.

Table 1 lists some of the most typical cases covered by the CP and the maxims. Examples for each case are given below the table. For further classical examples, see Grice (1989) and Levinson (1983). In what follows, '+>' stands for 'implicates conversationally':

(1) War is war. +> 'There is nothing one can do about it.'

(2) Some men were drunk. +> 'Not all of them were drunk.'

(3a) He is a fine friend. +> 'He is not a fine friend.'
(3b) You are the cream in my coffee. +> 'You are my best friend.'

(4) There is life on Mars. +> 'Speaker believes that there is life on Mars.'

(5) Speaker A: I'm out of petrol.
Speaker B: There is a garage round the corner.
+> 'The garage is open.'

(6) Speaker A: Look, that old spinster over there!
Speaker B: Nice weather today, isn't it? +> 'No comment.'

(7) She produced a series of noises that resembled "Sì, mi chiamano Mimi". +> 'Her singing was a complete disaster.'

(8) Anna went to the shop and bought jeans. +> 'She bought the jeans in the shop.'

Table 1 Typical cases of implicature

Maxims	*Exploitation*	*Observation*
Quantity	Tautology (1)	Scalar implicature (2)
Quality	Irony, metaphor, sarcasm (3)	Belief implicature in assertions (4)
Relevance	Implicatures due to thematic switch (5)	Bridging (6)
Manner	Implicatures due to obscurity, etc. (7)	Conjunction buttressing (8)

For further illustration of the exploitation/observation dichotomy, look at (1) and (8). As to (1), tautological utterances are always true, which amounts to their being fundamentally uninformative. There is no situation where a speaker wants to tell someone that something is identical with itself. Thus, it seems that the utterer of (1) has violated the first maxim of Quality. Gricean reasoning then leads the hearer to the insight that this violation was only apparent (cf. Autenrieth, 1997). In (8), we have a simple conjunction of two sentences. If the meaning of *and* were to be the same as the meaning of the logical operator, it could not be explained that there is an additional meaning 'and then.' Grice's view is that we may identify the semantic meaning of *and* with the pure connecting operation known from logic as long as we are able to derive the additional meaning from the maxims. The observation of the fourth maxim of Manner, "Be orderly!", will do this job (cf. Posner, 1980). Both observation and exploitation are in line with the general pattern for working out an implicature.

Besides the property of calculability, conversational implicatures display the properties of variability and cancellability. *Variability* means that there are contexts where the speaker utters the same utterance, but the respective implicature does not arise. Thus, the implicature is dependent on the specific context in which it arises. (This does not exclude the notion of relative context-independency in the case of GCIs.) *Cancellability* (or defeasibility) means that it is possible to withdraw an implicature within the situation of utterance without any contradiction. For example, it is possible to utter *Some men were drunk, indeed all*. Reversely, conversational implicatures should be *reinforceable*, as Sadock (1978) proposed. Thus, it is possible to conjoin the content of an implicature with the utterance that triggers that implicature, as in *Some of the girls were reading books but not all*.

Conventional implicatures are neither calculable, nor variable, nor cancellable. However, they are said to be detachable, i.e., if the elements that trigger them are replaced, the respective implicature does not arise.

By contrast, conversational implicatures are *non-detachable*, i.e., if there is an expression X′ that shares meaning with expression X that triggers the implicature, the same implicature should arise. For example, if *She is very beautiful* gives rise to an ironical implicature, then *She is a real beauty* should have the same effect (Sadock, 1978: 287). (An obvious exception to this are Manner implicatures.)

For further illustration, consider focus particles like *even*. An utterance such as *Even JOHN drives a Porsche* has the same truth conditions as the corresponding utterance without the focus particle, i.e., *John drives a Porsche*. The additional meaning of the type 'John is the least likely to drive a Porsche,' being related to a contextually given set of other individuals (e.g., Gustav, Bettina, Markus . . .), may be considered as a conventional implicature (cf. König, 1991), because this meaning appears to be neither truth-conditional nor context-dependent. Moreover, if *even* is replaced by another focus particle, the respective implicature is not triggered. However, if the conventional implicature is bound to the specific lexical item *even*, and for this reason is detachable, then the implicature seems to be part of the literal meaning of this lexical item. Therefore, it is difficult to distinguish between conventional implicatures on the one hand and entailments (belonging to the 'what is said') on the other hand. For this and other reasons, some researchers do not accept that there is a category of conventional implicature (cf. Bach, 1999; for a logical approach, see Potts, 2005).

Beyond Grice

The reception of the Gricean framework has been largely dominated by the wish to develop a more systematic architecture of maxims. Moreover, the Cooperative Principle has been on trial, as other aspects (e.g., logical, anthropological, cognitive, etc.) became more attractive. The prevailing tendency has been to reduce the set of maxims proposed by Grice. Three major reductive approaches have been developed: (a) the tri-heuristic approach by Levinson (2000), (b) the dual principle approach by Horn (1984), and (c) the monoprincipled approach by Sperber and Wilson (1995) and Carston (2002). These approaches are outlined in the following sections. It should be mentioned, however, that there are other important approaches that elaborate on the Gricean framework, e.g., Gazdar (1979) or Atlas (2005), as well as radical criticisms such as Davis (1998). For useful surveys, see Levinson (1983: Ch. 3) and Rolf (1994).

Presumptive Meanings: Levinson's Theory of Generalized Conversational Implicature

Levinson develops his revision of Grice's maxims from three heuristics that follow from the anthropological need to overcome the "fundamental bottleneck in the efficiency of human communication, occasioned no doubt by absolute physiological constraints on the articulators" (Levinson, 2000: 28). Accordingly, Grice's rationalistic CP plays no role. The heuristics are (Levinson, 2000: 31–33):

Levinson's Heuristics
Heuristic 1: What isn't said, isn't.
Heuristic 2: What is simply described, is stereotypically exemplified.
Heuristic 3: What's said in an abnormal way, isn't normal; or Marked message indicates marked situation.

Heuristics 1 corresponds to Levinson's Q-principle (see maxim of Quantity 1 in Grice's framework), Heuristics 2 to Levinson's I-principle (Grice's maxim of Quantity 2), and Heuristics 3 to Levinson's M-principle (Grice's maxim of Manner 1 and 3). These three principles are said to derive GCIs. For the correspondences to Grice, and a typical example, see Table 2.

Where inconsistent implicatures arise, they are "systematically resolved by an ordered set of priorities" (Levinson, 2000: 39), among them Q > M > I, where '>' is understood as 'defeats inconsistency.'

Table 2 Correspondences between Levinson's Heuristics and Principles, and Grice's Maxims

Heuristics	*Principles*	*Grice's Maxims*	*Example*
Heuristic 1	Q-Principle	Quantity, 1	Q-Implicature: (a) Some colleagues were drunk. +> 'Not all of them were drunk.' (scalar implicature) (b) The doctor believes that the patient will not recover. +> 'The doctor may or may not know that the patient will not recover.' (clausal implicature)
Heuristic 2	I-Principle	Quantity, 2	I-Implicature: Anna turned the switch and the motor started. +> 'Anna turned the switch and then/therefore the motor started.' (conjunction buttressing)
Heuristic 3	M-Principle	Manner, 1 and 3	M-Implicature: Bill caused the car to stop. (vs. Bill stopped the car.) +> 'He did this indirectly, not in the normal way, e.g., by use of the emergency brake.' (periphrasis)

Levinson (2000: 153–164) gives some examples for Q > I, Q > M, and M > I. An example for Q > M is *It's not unlikely that Giant Stride will win the Derby, and indeed I think it is likely.* Here, as Levinson (2000: 160) points out, the first conjunct gives rise to the M-based implicature 'less than fully likely,' because of the double negative *not unlikely*, while the second conjunct triggers the Q-based implicature 'it is possible it is likely,' because of the use of *think*, which does not entail the complement clause. In this case, the Q-implicature of the second conjunct defeats the M-implicature of the first. (However, as Traugott, 2004: 11 observes, *indeed* may serve as a M-implicature cancelling device.)

The Q-principle is defined as follows (Levinson, 2000: 76):

> ***Q-principle***
> **Speaker's maxim:** Do not provide a statement that is informationally weaker than your knowledge of the world allows, unless providing an informationally stronger statement would contravene the I-principle. Specifically, select the informationally strongest paradigmatic alternate that is consistent with the facts.
> **Recipient's corollary:** Take it that the speaker made the strongest statement consistent with what he knows, and therefore that:
>
> a. if the speaker asserts $A(W)$, where A is a sentence frame and W an informationally weaker expression than S, and the contrastive expressions $<S, W>$ form a Horn scale (in the prototype case such that $A(S)$ entails $A(W)$), then one can infer that the speaker knows that the stronger statement $A(S)$ (with S substituted for W) would be false [...]
>
> b. if the speaker asserted $A(W)$ and $A(W)$ fails to entail an embedded sentence Q, which a stronger statement $A(S)$ would entail, and $\{S, W\}$ form a contrast set, then one can infer that the speaker does not know whether Q obtains or not (i.e., $\{P(Q), P \sim (Q)\}$ read as 'it is epistemically possible that Q and epistemically possible that not-Q'

The I-Principle mentioned in the Speaker's maxim requires that a speaker should not be more informative than necessary (see below). Wherever it is possible, the speaker should build on stereotypical assumptions. In the Recipient's corollary, two cases are distinguished, namely scalar implicature, involving Horn scales (named after Laurence Horn, see the next section) and clausal implicature, involving contrast sets.

In the case of *scalar implicatures*, we need a *Horn scale*: given a scale <q, p> with p as an informationally weak and q as an informationally strong element, the assertion of p implicates the negation of q. In such cases, the speaker is supposed to be as informative as possible, thus observing the Q-principle (or the maxim of Quantity). Therefore, the speaker could not say more than he actually did, and this means that the stronger statement does not hold. A classical example is the utterance p = *Some colleagues were drunk* implicating q = 'Not all of them were drunk'. In the case of *clausal implicatures*, we need *contrast sets*. Let {know, believe} be a contrast set. Then p = *The doctor believes that the patient will not recover* implicates q_1 = 'The doctor may or may not know that the patient will not recover' (Levinson, 2000: 110). The crucial point is that clausal implicatures indicate epistemic uncertainty about the truth of the embedded sentence. Note that, because <know, believe> also form a Horn scale, there is a scalar implicature as well: in this case p implicates q_2 = 'The doctor does not know that the patient will not recover.'

Well-known Horn scales include the quantifiers <all, most, many, some>, connectives <and, or>, modals <necessarily, possibly>, <must, should, may>, adverbs <always, often, sometimes>, degree adjectives <hot, warm>, and verbs <know, believe>, <love, like>. Contrast sets include verbal doublets like {know, believe}, {realize, think}, {reveal, claim}, {predict, foresee}, and others (cf. Levinson, 2000: 111).

Now consider the I-principle (Levinson, 2000: 114–115):

> ***I-Principle***
> **Speaker's maxim:** the maxim of Minimization. 'Say as little as necessary'; that is, produce the minimal linguistic information sufficient to achieve your communicational ends (bearing Q in mind).
> **Recipient's corollary:** the Enrichment Rule. Amplify the informational content of the speaker's utterance by finding the most *specific* interpretation, up to what you judge to be the speaker's m-intended [= meaning-intended] point, unless the speaker has broken the maxim of Minimization by using a marked or prolix expression.
>
> Specifically:
>
> a. Assume the richest temporal, causal and referential connections between described situations or events, consistent with what is taken for granted.
>
> b. Assume that stereotypical relations obtain between referents or events, unless this is inconsistent with (a).
>
> c. Avoid interpretations that multiply entities referred to (assume referential parsimony); specifically, prefer coreferential readings of reduced NPs (pronouns and zeros).
>
> d. Assume the existence or actuality of what a sentence is about (if that is consistent with what is taken for granted).

This principle is said to cover a whole range of implicatures: conditional perfection (9), conjunction

buttressing (10), bridging (11), inference to stereotype (12), negative strengthening (13), NEG-raising (14), preferred local coreference (15), the mirror maxim (16), specialization of spatial terms (17), and possessive interpretations (18) (cf. Levinson, 2000: 117–118).

(9) If you mow the lawn, I'll give you five dollars. +> 'If you don't mow the lawn, I will not give you five dollars.'

(10) Bettina wrote an encyclopedia and sold the rights to Elsevier. +> 'Bettina wrote an encyclopedia and then sold the rights to Elsevier.'

(11) Gustav unpacked the picnic. The beer was warm. +> 'The beer was part of the picnic.'

(12) Markus said 'Hello' to the secretary and then he smiled. +> 'Markus said "Hello" to the female secretary and then Markus smiled.'

(13) I don't like Alice. +> 'I positively dislike Alice.'

(14) I don't think he is reliable. +> 'I think he is not reliable.'

(15) John came in and he sat down. +> 'John_i came in and he_i sat down.'

(16) Harry and Sue bought a piano. +> 'They bought it together, not one each.'

(17) The nail is in the wood. +> 'The nail is buried in the wood.'

(18) Wendy's children +> 'those to whom she is parent'; Wendy's house +> 'the one she lives in'; 'Wendy's responsibility' +> the one falling on her; Wendy's theory +> 'the one she originated'

The M-principle is defined as follows (Levinson, 2000: 136–137):

M-principle
Speaker's maxim: Indicate an abnormal, nonstereotypical situation by using marked expressions that contrast with those you would use to describe the corresponding normal, stereotypical situation.
Recipient's corollary: What is said in an abnormal way indicates an abnormal situation, or marked messages indicate marked situations, specifically:
Where *S* has said p, containing a marked expression *M*, and there is an unmarked alternate expression *U*, with the same denotation *D*, which the speaker might have employed in the same sentence-frame instead, then where *U* would have I-implicated the stereotypical or more specific subset *d* of *D*, the marked expression *M* will implicate the complement of the denotation *d*, namely $\bar{d}$ of *D*.

The M-principle is supposed to cover a range of cases, among them lexical doublets (19) and rival word formations (20), nominal compounds (21), litotes (22), certain genitive (23) and zero morph constructions (24), periphrasis (25), and repetition (26) (cf. Levinson, 2000: 138–153).

(19) She was reading a tome [vs. book]. +> 'She was reading some massive, weighty volume.'

(20) Ich nehme den Flieger [vs. das Flugzeug]. (= I take the plane [vs. the airplane]) +> 'Fliegen ist nichts Besonderes für mich.' (= 'Flying is quite normal for me.')

(21) This is a box for matches (vs. matchbox). +> 'This is a (nonprototypical) box specially made for containing matches.'

(22) It took a not inconsiderable effort. +> 'It took a close-to-considerable effort.'

(23) the picture of the child (vs. the child's picture) +> 'the picture depicts the child'

(24) She went to the school/the church/the university (vs. to school, to church, to university, etc.) +> 'She went to the place but not necessarily to do the associated stereotypical activity.'

(25) Bill caused the car to stop. (vs. Bill stopped the car.) +> 'He did this indirectly, not in the normal way (e.g., by using the emergency brake).'

(26) He went to bed and slept and slept. +> 'He slept longer than usual.'

Note that only the first ('Avoid obscurity of expression') and the third ('Be brief (avoid unnecessary prolixity)') submaxims of the Gricean maxims of Manner survive in Levinson's M-principle. Levinson views the second submaxim ('Avoid ambiguity') in connection with 'generality narrowing', which is subsumed under the Q-principle (Levinson, 2000: 135). The fourth submaxim ('Be orderly') is not needed any more, because the notorious cases of 'conjunction buttressing' fall under the I-principle in Levinson's framework. Moreover, Levinson (2000: 135) notes the general cognitive status of this general semiotic principle of linearization, and he questions its status as a maxim.

It seems that many of the cases in (19)–(26) may be explained in terms of the Q- or I-principle; in other cases, it is not at all clear that we have the same denotation, as required in the Recipient's corollary of the M-principle, thus throwing into doubt whether a separate M-principle is really needed. By comparison, Horn's (1984) approach (sketched in the next section) has no separate maxim/principle of Manner. For further discussion, see Meibauer (1997) and Traugott (2004).

Obviously, the maxim of Quality and the maxim of Relevance are not maxims that figure in the

derivation of GCIs. The only comment on the maxim of Quality Levinson gives is that this maxim "plays only a background role" in the derivation of GCIs; maybe he has the sincerity conditions for assertive acts in mind (Levinson, 2000: 74). Note that Grice (1989: 34) needed the maxim of Quality to derive the implicatures in the cases of irony, metaphor, and sarcasm (*see* **Irony**). In contrast, Levinson argues that irony and sarcasm are cases of PCIs (Levinson, 2000: 386, Fn. 2), a claim that seems somewhat premature at least when considering cases of conventional irony and sarcasm. The maxim of Relevance is a maxim that, according to Levinson (2000: 74), derives only PCIs. However, this maxim seems to play a role when it comes to disambiguation and 'ellipsis unpacking' (Levinson, 2000: 174, 183) (*see* **Relevance Theory**).

In addition to the revision of the Gricean maxims just outlined, Levinson sketches a radical revision of the widely accepted Gricean view of the interaction of grammar and pragmatics according to which in language production, conversational implicatures are supposed to operate on, and follow the semantic representation of, the said (Levinson, 2000: 173). Levinson finds this view basically wrong:

> Grice's account makes implicature dependent on a prior determination of 'the said.' The said in turn depends on disambiguation, indexical resolution, reference fixing, not to mention ellipsis unpacking and generality narrowing. But each of these processes, which are prerequisites to determining the proposition expressed, may themselves depend crucially on processes that look undistinguishable from implicatures. Thus, what is said seems both to determine and to be determined by implicature. Let us call this *Grice's circle*. (Levinson, 2000: 186)

According to Levinson, there are at least five phenomena that show the influence of GCIs on sentence meaning (Levinson, 2000: 172–187). First, GCIs (of the scalar type) are involved in the disambiguation of ambiguous constructions like *some cats and dogs*, for only the bracketing *[[some cats] and dogs]*, with the appropriate implicature 'some but not all cats, and dogs in general,' is appropriate in the sentence *He's an indiscriminate dog-lover; he likes some cats and dogs*. Second, the resolution of indexicals is dependent on the calculation of GCIs, e.g., *The meeting is on Thursday.* +> 'not tomorrow' (when tomorrow is Thursday). Third, reference identification often requires GCIs, e.g., *John came in and the man sat down.* +> 'The man was not identical to John.' Fourth, in ellipsis unpacking, as in simple dialogues like *Who came? – John <came>*, the missing information is constructed on the basis of Relevance and I-Implicature. Finally, there is the case of generality narrowing, e.g., if someone utters *I've eaten breakfast* +> 'I've eaten breakfast [this morning]' where the Q-principle is activated.

In order to resolve the dilemma of Grice's circle, i.e., to account for 'pragmatic intrusion,' Levinson proposes an alternative model (Levinson, 2000: 188). This model contains three pragmatic components, namely Indexical Pragmatics, Gricean Pragmatics 1, and Gricean Pragmatics 2, and two semantic components, namely Compositional Semantics and Semantic Interpretation (model-theoretic interpretation). The output of Compositional Semantics and Indexical Pragmatics is input for Gricean Pragmatics 1. The output of Gricean Pragmatics 1 is input for Semantic Interpretation, and its output ('sentence meaning, proposition expressed') is input for Gricean Pragmatics 2, whose output is 'speaker meaning, proposition meant by the speaker.'

Whereas Indexical Pragmatics and Gricean Pragmatics 1 are presemantic pragmatic components, Gricean Pragmatics 2 is a postsemantic pragmatic component. It seems that Gricean Pragmatics 2 deals with PCIs ('indirection, irony and tropes, etc.,') whereas Gricean Pragmatics 1 deals with GCIs ('disambiguation, fixing reference, generality-narrowing, etc.'). At the heart of Levinson's approach is his analysis of GCIs, precisely because it is here that arguments for this new model of the semantics-pragmatics interaction may be found.

Division of Pragmatic Labor: Horn's Q- and R-Principles

Central to Horn's approach to implicature is the insight that implicatures have to do with "regulating the economy of linguistic information" (Horn, 2004: 13). In contrast to Levinson, Horn (1984) assumes only two principles, the Q-principle and the R-principle:

> **Q-principle**
> Make your contribution sufficient: Say as much as you can (given R).
> (Lower-bounding principle, inducing upper-bounding implicatures)
> **R-principle**
> Make your contribution necessary: Say no more than you must (given Q).
> (Upper-bounding principle, inducing lower-bounding implicatures)

The Q-principle collects the Gricean maxims of Quantity 1 as well as Manner 1 and 2, while the R-Principle collects Quantity 2, Relation, and Manner 3 and 4. The maxim of Quality is considered as unreducible, as truthfulness is a precondition for satisfying the other maxims (Horn, 2004: 7).

The Q-principle aims at the maximization of content. It is a guarantee for the hearer that the content is

Table 3 Application of the Q-Principle to scalar implicatures

Statements	*Lower bound, one-sided (what is said)*	*Upper bound, two-sided (what is implicated qua Q)*
a. Pat has three children	'... at least three ...'	'... exactly three ...'
b. You ate some of the cake	'... some if not all ...'	'... some but not all ...'
c. It's possible she'll win	'... at least possible ...'	'... possible but not certain ...'
d. He's a knave or a fool	'... and perhaps both ...'	'... but not both'
e. It's warm	'... at least warm ...'	'... but not hot'

sufficient. The hearer infers from the speaker's failure to use a more informative or briefer form that the speaker was not in a position to do so. Scalar implicatures are a case in point. The R-principle aims at the minimization of expression, and consequently, the minimization of the speaker's effort. According to Horn, this principle holds for all indirect speech acts.

The following table, which is adapted from Horn (2004: 10), shows how the Q-principle works in the case of scalar implicatures (Table 3). The two-sided reading is the default case.

According to Horn, the conflict between the Q-principle and the R-principle may be resolved, as expressed by the following principle (Horn, 1984: 22):

> **The Division of Pragmatic Labor**
> The use of a marked (relatively complex and/or prolix) expression when a corresponding unmarked (simpler, less 'effortful') alternative expression is available tends to be interpreted as conveying a marked message (one which the unmarked alternative would not or could not have conveyed).

Levinson (1987: 73) argues that Horn mixes up two things here that properly should be distinguished, namely minimization of content on the one hand, and minimization of expression on the other. According to Levinson, splitting up the maxims of Manner in the way Horn does is mistaken, because the Manner maxims are fundamentally dependent on form, and thus related to minimization of expression.

Following Horn's original work, much research has been done on Horn scales, e.g., by Hirschberg (1991), Fretheim (1992), Matsumoto (1995), Sauerland (2004), van Rooy (2004). In this connection, three further areas of research deserve to be singled out.

First, as shown in Horn (1989: Ch. 4), there is the phenomenon of *metalinguistic negation*. For example, when uttering *It's not warm, it's hot!* the first part of the utterance gives rise to the scalar implicature 'It is not hot,' but this implicature is obviously denied in the second part of the utterance. Typically, utterances of this type have a humorous, ironical, or sarcastic flair (cf. Chapman, 1996 for an overview and Carston, 1996 and Iwata, 1998 for an echo-theoretic interpretation) (*see* **Negation**).

Second, there is some discussion about the exact status of the Horn scales in the lexicon, e.g., how are elements selected for scales, how is the ordering of the elements achieved, etc. An influential approach is the one by Hirschberg (1991), who argues that there exist, in addition to lexical scales, scales that are induced pragmatically or on the basis of real-world knowledge. For example, when speaker A asks *Did you get Paul Newman's autograph?* and speaker B answers *I got Joanne Woodward's*, implicating 'not Paul Newman's,' we are dealing with a salient scale of autograph prestige <Newman, Woodward>. Consequently, Hirschberg (1991: 42) denies that there is any principled distinction between GCIs and PCIs.

Third, the economical aspect of Horn's reduction of the Gricean apparatus has recently become very attractive within *Bidirectional Optimality Theory* (cf. Blutner, 2004). This theory assumes that sentences are semantically underspecified, and therefore are in need of enrichment. A function *Gen* is assumed that determines for each common ground the set of possible enrichments. Bidirectional (i.e., taking the perspective of speaker *and* hearer) Optimality Theory then stipulates that a form-meaning pair is optimal if and only if it is taken from the set defined by *Gen*, and that there is no other pair that better fulfills the requirements of the Q- and I-principle. For an application and further discussion, see Krifka (2002) (*see* **Pragmatics: Optimality Theory**).

Relevance Theory: Carston's Underdeterminacy Thesis

Relevance theory is a cognitive theory of meaning whose major claims are that semantic meaning is the result of linguistic decoding processes, whereas pragmatic meaning is the result of inferential processes constrained by one single principle, the *Principle of Relevance*, originally proposed in Sperber and Wilson (1995) (*see* **Relevance Theory**). However, the connection to the Gricean maxim of Relevance is rather

weak, as can be seen from the following definitions (Carston, 2002; for other versions, see Wilson and Sperber, 2004):

> ***First (Cognitive) Principle of Relevance***
> Human cognition is geared towards the maximization of relevance (that is, to the achievement of as many contextual (cognitive) effects as possible for as little processing effort as possible).
> ***Second (Communicative) Principle of Relevance***
> Every act of ostensive communication (e.g., an utterance) communicates a presumption of its own optimal relevance.

Carston (2002) questions the standard division of labor between semantics and pragmatics and argues that pragmatics contributes much more to the construction of explicit meaning ('what is said') than generally assumed. Her overall aim is to establish relevance theory as a theory of cognitive pragmatics. The relevance theoretic approach is, according to Carston, "to be characterized as a sub-personal-level explanatory account of a specific performance mechanism conducted at the level of representations-and-procedures" (Carston, 2002: 11).

Carston's *underdeterminacy thesis* says that linguistic meaning generally underdetermines what is said. Pragmatic inferences are not only necessary to determine implicatures, but also to fix the proposition directly expressed by an utterance. This discrepancy between the meaning encoded in linguistic expressions and the proposition expressed by the utterance of these expressions ('what is said') is illustrated by various cases (over and above the well-known cases of ambiguities and indexical resolution): missing constituents (27), unspecified scope of elements (28), underspecifity or weakness of encoded conceptual content (29), overspecifity or narrowness of encoded conceptual content (30):

(27a) [Where is the book?] On the top shelf.
(= 'The book is on the top shelf.')
(27b) Paracetamol is better. [than what?]
(27c) This fruit is green. [which part of the fruit?]

(28a) She didn't butter the toast in the bathroom with a knife. [different stress changes the information structure]
(28b) There's nothing on TV tonight. [nothing that is interesting for you]

(29) I'm tired. [predicate is too weak]

(30) Her face is oblong. [predicate is too narrow]

In all these cases, additional inferential steps are necessary to understand what the speaker intends to say.

Since linguistically encoded meanings are necessarily incomplete, pragmatics makes an essential contribution not only to the construction of *implicit meaning* but also to the construction of *explicit meaning*. In the spirit of Relevance Theory, Carston proposes a three-level model of semantic and pragmatic interpretation of linguistic expressions.

The first step involves semantic decoding of linguistic expressions. The output of the semantic decoding is an impoverished, nonpropositional semantic representation, which Carston calls logical form. It can be described as a "structured string of concepts with certain logical and causal properties" (Carston, 2002: 57) containing slots indicating where certain contextual values must be supplied. Hence, the output of the semantic decoding device is an incomplete template or scheme, open to a range of compatible propositions.

In the second step of interpretation, the hearer reconstructs the proposition intended by the speaker through pragmatic inference. Thus, pragmatic inference bridges the gap between what is linguistically expressed (incomplete conceptual schemata/logical form) and what is said (full propositional representations). For example, when a speaker utters the subsentential expression *on the top shelf* in a given context of utterance, the hearer is supposed to reconstruct the missing constituents to yield the intended proposition 'The marmalade is on the top shelf'. The pragmatic interpretation device is constrained by the First (Cognitive) Principle of Relevance, as proposed by Sperber and Wilson (1995).

Finally, there has to be a third step of interpretation, in which the hearer determines implicatures, i.e., 'what is meant.' Thus, Carston assumes that pragmatic inference is necessary for the second and third step of interpretation. In this cognitive approach, the bulk of utterance interpretation has to be done by pragmatic inference.

The pragmatic device of interpretation relies not only on linguistic information but also on additional information gained from context, perception, and world knowledge. Here, Carston essentially refers to Searle's theory of mind, especially his notion of *Background* (cf. Searle, 1980). Utterances are interpreted against a set of more or less manifest background assumptions and practices. Consider, for instance, the following five sentences: (a) *Jane opened the window*, (b) *Jane opened her book on page 56*, (c) *Jane opened the wall*, (d) *Jane opened her mouth*, (e) *The doctor opened her mouth*. Carston assumes that the encoded meaning of the English verb *open* does not vary in all five examples, although *open* receives quite different interpretations, depending on a set of background assumptions about different practices of opening. The Background is construed as a set of

weakly manifest assumptions and practices in an individual's cognitive environment. Since the Background always supplies additional meaning to the interpretation of an utterance, the proposition expressed by an utterance cannot be fully determined by the meaning of its parts and the mode of their combination. Consequently, the principle of semantic compositionality (*see* **Frege, Gottlob (1848–1925)**) does not hold for the proposition expressed, but only for the underdetermined logical form (i.e., the first step of interpretation).

As does Levinson (2000), Carston, too, argues that Grice does not account for the fact that 'what is said' is not independent from pragmatic input. However, Carston and Levinson differ in their approaches to the question of how the pragmatic intrusion problem needs to be dealt with. As shown above, Levinson develops a pragmatic subtheory of GCIs, dealing only with the pragmatic processes involved in the elaboration of 'what is said'. By contrast, Carston favors a unitary account of all pragmatic processes, irrespective of whether they contribute to the 'what is said' or to different implicated assumptions (corresponding to Levinson's PCIs).

Carston's (2002: 377) use of the terms *explicature* and *implicature*, essentially based on Sperber and Wilson's (1995: 182) distinction between explicit and implicit assumptions/propositions, is spelled out in the following way (cf. Carston, 1988):

> **Explicature**
> An ostensively communicated assumption that is inferentially developed from one of the incomplete conceptual representations (logical forms) encoded by the utterance.
> **Implicature**
> An ostensively communicated assumption that is not an explicature; that is, a communicated assumption which is derived solely via processes of pragmatic inference.

The difference between explicatures and implicatures lies essentially in the way they are supplied: explicatures are developments of the logical form that they contain as a proper subpart, whereas implicatures are derived purely inferentially. In regard to these two kinds of pragmatic enrichment, the cognitive approach Carston promotes motivates the distinction between 'communicated assumptions' and the 'inferential steps' leading to them. Carston argues that explicatures are construed by means of interpretative hypotheses rather than by (generalized) implicatures.

Consider the example: *John came in and he sat down*. The preferred interpretation for the personal pronoun *he* in the second sentence is the coreferential one. Following Levinson, this interpretation results from an I-implicature. Carston argues that this implicature must be a proposition like '*He* refers to whomever *John* refers to', "a propositional form representing a hypothesis about reference assignment" (Carston, 2002: 151). She rejects the idea of reference assignment being an implicature and rather identifies it as an interpretative hypothesis like 'John came in and he, John, sat down,' which is derived online and only confirmed if it meets the expectation of relevance. Carston claims that this strategy is able to resolve the dilemma of Grice's circle, for the simple reason that interpretation processes can be effected simultaneously.

Finally, the cognitive approach leads Carston to reject *conventional implicatures*; these are subsumed under the procedural elements. Relevance Theory distinguishes between concepts as constituents of mental representations, and procedures that constrain pragmatic inferences. Conventional implicatures conveyed by expressions such as *moreover* and *therefore* do not contribute to the conceptual part of the utterance, but point the hearer to the kind of pragmatic processes she is supposed to perform (cf. Blakemore, 2002) (*see* **Meaning, Procedural and Conceptual**).

Bach (1994), who tries to defend the Gricean notion of 'what is said,' criticizes the notion of explicature and proposes instead the term *impliciture* (cf. also Bach, 2001). Implicitures are either *expansions* of 'what is said,' as in *You are not going to die [from this little wound]* or *completions*, as in *Steel isn't strong enough [for what?]*. In these cases, "the resulting proposition is not identical to the proposition expressed explicitly, since part of it does not correspond too any elements of the uttered sentence"; hence Bach considers it "inaccurate to call the resulting proposition the explicit content of an utterance or an explicature" (Bach, 1994: 273).

Carston views Relevance Theory as a cognitive theory of utterance understanding that aims at the subpersonal level, where processes are fast and automatic. Thus, it should be clear that this theoretical goal differs from that pursued by Grice (cf. Saul, 2002). It must be noted, however, that arguments from psycholinguistic research are called for in order to constrain the theory.

First, it may be asked how children acquire implicatures and what roles maxims, principles, and the like play in this process. There are studies on the acquisition of irony and metaphor by Winner (1988) as well as studies on the role of Gricean principles in lexical acquisition (cf. Clark E V, 1993, 2004). More recently, studies have been done on the acquisition of scalar implicatures, in particular dealing with the hypothesis that small children are "more logical" than older children and adults, in that they more

readily accept the "some, perhaps all" – reading of the quantifier *some* (cf. Noveck, 2001; Papafragou and Musolino, 2003).

Second, there is some evidence that hearers do not first compute the literal meaning, then the nonliteral or indirect meaning, but that they arrive at the nonliteral/indirect meaning earlier or in a parallel fashion (cf. Shapiro and Murphy, 1993; Récanati, 1995; Gibbs, 2002; Giora, 2003). It is obvious that experimental research is very important for implicature and explicature theory (cf. Wilson and Sperber, 2004: 623–628).

Quality Reconsidered

In the development of neo-Gricean approaches to implicature such as Horn's and Levinson's, the Gricean maxim of Quality has been neglected (*see* **Neo-Gricean Pragmatics**). Thus, genuine pragmatic matters such as metaphor, irony, sarcasm, lying, etc. have become largely unattractive for some implicature theorists, although metaphor had been featured as a cardinal case of maxim exploitation already early on (cf. Levinson, 1983: 147–162). Relevance Theory, on the other hand, which takes a stand on Grice as well as on neo-Gricean approaches, has developed an independent theory of irony; moreover, Carston (2002: Ch. 5), analyzes metaphors as instances of *ad hoc*-concept construction. In neither of these approaches, however, does the maxim of Quality play any role (*see* **Metaphor: Psychological Aspects**).

First, consider *irony*. If a speaker A utters *X is a fine friend*, referring to a person who has betrayed a secret of A's to a business rival, then the first maxim of Quality is flouted (Grice, 1989: 34). Because it is obvious that A does not believe what he says, the hearer reconstructs a related proposition, i.e., the opposite of p. The ironical implicature qualifies for the status of an implicature, because it is calculable, context-dependent, and cancellable. Note that this substitutional analysis is in contrast to the additive nature of other types of implicature. However, this approach has been criticized for several reasons: (i) The analysis cannot account for ironical questions, requests and understatements, (ii) it cannot explain the distinction between irony and metaphor, because the latter is also explained with regard to the first maxim of Quality, and (iii), it is not fine-grained enough, because it does not follow from 'He is not a fine friend' that he is not a friend at all.

The Gricean approach to irony has been most prominently attacked by relevance theorists (Sperber and Wilson, 1981; Wilson and Sperber, 1992; Sperber and Wilson, 1998). Following Sperber and Wilson, ironical utterances have four main properties: (i) They are mentioned, not used, (ii) they are **echoic** in nature, (iii) the ironical interpretation is an implicature that is derived through recognition of the echoic character of the utterance (Sperber and Wilson, 1981: 309), (iv) the ironical speaker displays a dissociative attitude towards the proposition uttered. Take the utterance *What lovely weather!* as an example. When uttered during a downpour, the speaker cannot mean the opposite, because this would be uninformative. Instead, he wants to convey that it was absurd to assume that the weather would be nice. Thus, the ironical utterance is a case of echoic mention of a previously entertained proposition. Types of echo include sarcastic repetition (31), attributed thoughts (32), norms (33) and standard expectations (34) (cf. Sperber and Wilson, 1998):

(31) A: I'll be ready at five at the latest.
B: Sure, you'll be ready at five.

(32) A: I'll be ready at five at the latest.
B: You mean at five tomorrow?

(33) A: I'll be ready at five at the latest.
B: You are so punctual.

(34) A: I'll be ready at five at the latest.
B: It's a great virtue to be on time!

Thus, the echo theory of irony does not imply that there is always an original utterance that is exactly reproduced. The echo theory is constrained in that most utterances cannot be interpreted as echoes, and echoic interpretations must contribute to the relevance of an utterance.

Several objections to this theory may be made (cf. Sperber and Wilson, 1998): (i) The notion of an echo is far too vague; it does not make sense to look for an echo in cases of conventional irony, e.g., when somebody utters *Boy, is it hot!* when it is icy cold. (ii) Because not every echoic mention is ironical, echoic mention is not sufficient to explain ironical interpretation. (iii) It is not clear why the substitution of the opposite should not be a starting point in the search for the dissociative attitude of the speaker towards the proposition. (iv) Relevance Theory cannot explain why hearers often fail to grasp the relevance of an ironical utterance.

Second, consider *metaphor*. For Carston (2002), metaphors are cases of *ad hoc* concept construction. *Ad hoc* concepts are those concepts "that are constructed pragmatically by a hearer in the process of utterance comprehension" (Carston, 2002: 322). Typical instances of *ad hoc* concepts come about via narrowing or broadening. *Narrowing* may be illustrated by utterances like *Ann is happy*, where the concept associated with *happy* in a particular context is much narrower than the encoded concept. The case

of *broadening* is exemplified by utterances like *There is a rectangle of lawn at the back*, where it is very unlikely that the encoded concept of *rectangle* is communicated. Both processes are cases of constructing an *ad hoc* concept that contributes to the explicature.

If metaphors are *ad hoc* concepts, then they are part of the explicature as well. Thus, in *Mary is a bulldozer*, the logical form of *bulldozer* is associated with an *ad hoc* concept **BULLDOZER*** differing from the concept **BULLDOZER** usually encoded by this word. In this approach, metaphor isn't an implicature any more, as Grice (1989) and Levinson (1983) would have it, but an explicature.

Recall that for Horn (1984), the maxim of Quality was unreducible. Since then, its domain of application has considerably shrunk. However, it still seems to play a role when it comes to the analysis of lying, deception, insincerity, and – maybe – irony (cf. Wilson and Sperber, 2002; Meibauer, 2005). In Levinson's (2000) approach, matters of irony, etc., are dealt with in the component called Gricean Pragmatics 2. Maybe it is there that the maxim of Quality will have a comeback. It is clear that some version of the maxim plays also a role in the definition of success conditions for assertive illocutions (*see* **Irony**).

Implicature and the Grammar/Pragmatics Interface

As has become clear from the sketch presented here of Levinson's and Carston's frameworks, pragmatic inferencing is powerful enough to influence semantic representations (*see* **Semantics–Pragmatics Boundary**). However, when it comes to pinpoint the exact relations of implicatures to illocutions on the one hand, and sentence types on the other, there still are many open questions.

First, consider implicatures *vis-à-vis* illocutions. Even if both are associated with an individual speech act, these notions refer to different entities: an additional proposition, in the case of implicature, vs. a type of act such as a promise, assertion, request etc., in the case of illocution.

An important connection between illocutions and implicatures is usually seen as obtaining in the case of *indirect speech acts* (*see* **Speech Acts; Pragmatic Acts**). According to Searle (1975), a reconstructive process that leads the hearer from the secondary illocutionary point (the 'literal' illocution) to the primary illocutionary point (the intended illocution) is similar to the scheme of reasoning that Grice proposed for conversational implicatures; step 2 of his sample derivation even includes principles of conversational cooperation (compare also the speech act schema proposed by Bach and Harnish, 1979). Accordingly, indirect speech acts have sometimes been analyzed as implicatures, for example the question *Can you close the window?*, meant as a request to close the window, a case that is related to the R-Principle as proposed by Horn (1989, 2004).

A case in point is the *rhetorical question*. Whereas Meibauer (1986) analyzes them as indirect speech acts, i.e., interrogative sentences types associated with assertive force and polar propositional content, Romero and Han (2004) analyze negative *yes/no* questions like *Doesn't John drink?* as connected with a positive epistemic implicature such as 'The speaker believes or at least expects that John drinks.' It is not clear at first sight whether such analyses are compatible; in any case, as Dascal (1994) has shown, the notions of implicature and speech act are independently motivated, and should not be confused. Thus, the question of their interrelation requires further research.

Second, consider implicatures vis-à-vis sentence types. It is widely accepted that there is a systematic connection between sentence types such as declarative, interrogative, and imperative, etc., and illocutions such as assertion, question, and request, etc.; moreover, in some approaches the existence of an intermediate category 'sentence mood' is assumed (cf. Sadock and Zwicky, 1985; Harnish, 1994; Reis, 1999; Sadock, 2004; Zanuttini and Portner, 2003). However, while it is conceivable that sentence types determine a certain illocutionary potential, the analogical notion of an 'implicature potential' has never been proposed, probably because of the authors' concentration on lexical elements that give rise to GCIs.

However, there are several observations showing that such a concept is not totally mistaken. Consider the following examples:

(35) Who is the professor of linguistics at Tübingen? +> Someone is the professor of linguistics at Tübingen.

(36) [I gave the encyclopedia to Bettina.] You gave the encyclopedia to WHOM?

(37) Visit Markus and you'll get new ideas! +> If you visit Markus then you'll get new ideas.

(38a) This is good. +> This is not excellent.
(38b) Is this good? *+> Is this not excellent?

In (35), we have the case of an existential implicature that is typically bound to *wh*-interrogatives, but shows the properties of variability and cancellability. (Its classification as an existential presupposition,

cf. Levinson, 1983: 184, has been abandoned, because it does not survive the negation test.) Example (36) illustrates the echo-*wh*-question. As Reis (1991) has persuasively argued on the basis of German data, these sentence types are neither 'echo-*wh*-interrogatives' nor *wh*-interrogatives. Instead, these utterances are regular instances of any sentence type, and their interrogative force is explained as a conversational implicature triggered by the *wh*-element (see also Reis, 1999). Another example showing that implicatures are sensitive to sentence types is the conditional imperative in (37) (cf. Davies, 1986; Clark, 1993). Finally, if elements that trigger scalar implicatures are in the scope of a question operator, the respective implicature may be blocked, as shown in (38) (the asterisk * denotes a blocked or unallowed implicature). In summary, then, there is evidence of a systematic interaction between implicatures and sentence types. The question is, then, how and where to account for this interaction.

A detailed analysis of the sentence type-implicature relation is developed in Portner and Zanuttini (2000). They concentrate on negated *wh*-interrogatives and exclamatives in Paduan, a northern Italian dialect spoken in the city of Padua:

(39a) Parcossa *no* ve-to anca ti!? (*wh*-interrogative)
Why NEG go-s.cl also you
'Why aren't you going as well!?'

(39b) Cossa *no* ghe dise-lo! (*wh*-exclamative)
what NEG him say-s.cl
'What things he's telling him!'

The point is that the NEG-element has no negative force. In principle, there are two strategies for analyzing examples like (39): First, as a special type of negation, nonpropositional, expletive, or modal in character. The second strategy, as proposed in Meibauer (1990) on the basis of German data, is to assume regular negation, and to derive the modal effect from pragmatic principles. Portner and Zanuttini (2000), drawing on the latter approach, assume that exclamatives are factive. The negation particle *no* triggers a conventional implicature, which says that the lowest element from a set of alternative elements (that are possible in a contextually given scale) is true. In cases like (39a), there is an expectedness scale {less expected < more expected}, in cases like (39b), there is an unexpectedness scale {more expected < less expected}. The scales are dependent on the respective sentence type. While it is not clear (i) whether exclamatives constitute a separate sentence type at all (cf. d'Avis, 2001), (ii) why the implicatures are of the conventional type, and (iii) how the relevant scales are obtained from the context, it should be clear that such an approach paves the way for a more empirical research on the interplay of sentences types and implicatures.

Conclusions

On the basis of the foregoing sketch of three major approaches to implicature theory, we may state some of the prevailing tendencies. To begin with, there is a striving to understand implicatures in terms of economy. This is true for Levinson's insight that implicatures help to overcome "the slowness of articulation," as becomes clear from his slogan "inference is cheap, articulation expensive" (Levinson, 2000: 29), as well as for Horn's appeal to the principle of least effort and Sperber and Wilson's view on optimal relevance. Lately, recent developments in Optimality Theory have shown attempts to integrate the interplay of maxims into their frameworks.

Second, there is a tendency to reject the classic dual distinction between 'what is said' on the one hand, and 'what is implicated' on the other. Instead, a three-level approach to meaning is favored, cf. the distinction in Levinson (2000: 21–27) between sentence meaning, utterance type meaning, and speaker meaning, or Carston's three-level model of utterance interpretation. However, there is considerable terminological confusion here, as the diagram in Levinson (2000: 195) impressively shows; confusion that has to do with the still unsolved problem of finding demarcation lines or fixing the interfaces between 'what is said' and 'what is meant.' Further discussion of the question of level architecture can be found in Récanati (2004).

Obviously, the second tendency is connected with the widely accepted view that some sort of underdeterminacy thesis is correct, and that there are presemantic pragmatic processes that are input for model-theoretic interpretation (cf. Levinson, 2000: 188), or are necessary to fix full propositional representations (cf. Carston, 2002).

As has become clear, there are still many problems to solve: the status of the maxims of Relevance and Manner, the distinction between GCI and PCI, the status of conventional implicatures, the interaction of implicatures with illocutions and sentence types, to name only a few. Besides, the role that implicatures play in many areas, such as those of language acquisition and language change, awaits much further research.

See also: Cooperative Principle; Grice, Herbert Paul (1913–1988); Irony; Maxims and Flouting; Meaning, Procedural and Conceptual; Negation; Neo-Gricean Pragmatics;

Pragmatic Acts; Pragmatics: Optimality Theory; Relevance Theory; Semantics–Pragmatics Boundary; Speech Acts.

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IN/ING Variable

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(1928), Jespersen (1926), Rooth (1941), Dal (1952), Mossé (1938), Irwin (1967).

Several properties of the (ING) variable have maintained its scholarly popularity. First, a wide variety of people talk about it: For over two centuries, nonlinguists and linguists alike have discussed for various dialects the prescriptive values of 'G-dropping,' the nonacademic name for the [ɪn] variant of this variable. As reported in Houston (1985: 338), Lowe provides the following homophonous pairs of words: *coffin* and *coughing*, *coming* and *cumin*, *heron* and *herring*. Each of these pairs indicates that the author was aware that <ing> was linked to an [ɪn] articulation. The first negative prescriptive evaluation Houston found derives from a letter to the editor of a British newspaper in 1902 which decried "a disloyal crusade against the Queen's English . . . which . . . will . . . deprive present participles of their final 'g.' (1985: 338)" By the 20th century, it appears that the public assumed the velar nasal articulation to be the basic form from which the coronal pronunciation derived.

The second property of the (ING) variable which makes it popular among sociolinguists is the relatively easy set of methodologies involved in its collection. For sociolinguists in research projects or for pedagogical class projects, reliably conducting analysis of (ING) is relatively easy: trained undergraduates and seasoned professors can both yield dependable results for recorded interviews as the two variants are impressionistically simple to discern.

Third, and perhaps most important, the sociolinguistic variable (ING) has a richly complex path of diachronic variation while maintaining a relatively clear synchronic profile. Synchronically, (ING) variation can be used to map out social dimensions; diachronically, (ING) variation involves several realms of language change for over a millennium. For sociolinguistics, the (ING) variable is like the fruit fly (drosophila) for biology, a complex subject yielding results for researchers with different goals. (ING) has had diachronic (phylogenic) development; its synchronic (ontogenetic) variations in the speech community reflect mutations in areas of the lexicon, morphology, and phonology as well as extensive social variation.

Historical Roots of ING

The (ING) variable has had a long diachronic path. Like several of its Germanic sisters, Old English had the roots of *-ing*. Along the path towards Modern English, these separate, apparently stable forms merged to become the modern suffix *-ing*. Irwin (1967) reported that the feminine suffix *-ung* for verbal nouns was replaced by the masculine suffix for verbal nouns, *-ing*: e.g., OE *hael* 'to heal'; *haelung* 'the act of healing' was rendered as *haeling*. By the end of the 13th century, this gender distinction appears to have been completely lost, with the *-ing* form as the sole survivor.

Irwin (1967) examined <nd> and <ng> forms from the 8th to the 15th centuries; her scholarship indicates that the majority <nd> forms were replaced by the <ng> forms in the 15th century. It appears that <nd> forms did not replace <ng> forms: the alternations were not random confusion but a unidirectional replacement. Houston (1985: c. 100) reported that the geographic area where *-ing* replaced *-ind* in the 15th century maintained higher probabilities of the velar variant in the 20th century. It is partially with this alternation between *-ing* and *-ind* that the alternation between the velar and alveolar nasals of modern *-ing* arose. The full diachronic story appears to have other possible influences (Houston, 1985: 164), but these three suffixes were the major players.

In the transition from Middle to Early Modern English, Houston (1985) described a vowel situation which may have led the orthographic overlap of <ing> for both *-inde* and *-inge*. Several studies reported variability of the preceding vowel between [ɪ], [ə], and even high tense [i] (Houston, 1985; Woods, 1978). In the south of England, where the printing houses of London were establishing the orthographic standards, the high vowel before the nasal allowed the coronal nasal of *-ind* to be heard more as a velar. This influence may have contributed to the merger of the suffixes. Houston, in contrast with previous scholars, argued for the establishment of the modern spelling system as a reflection of the lack of distinction between verbal and nominal forms of the suffix. Previous scholars, for example Wyld (1936), had argued that a pre-Early Modern English [ɪn] articulation was affected by the orthographic <ing>, resulting in a pronunciation of [ɪŋ].

Prescriptive Commentary

Of note for (ING) is the use of the orthographic apostrophe, as in *walkin'*. Although this is the clear favorite for orthographically marking the coronal [n], it is relatively new in relation to the actual alternation between these forms. The apostrophe does not appear until the 19th century (Houston, 1985: 53). Before this convention, Houston argued that a final <e> marked the released velar stop in forms such as *sinnynge*. For those authors of fictional works who used the apostrophe to mark a speaker as of lower socio-economic status or less educated, Houston (1985: 350) did not find that the apostrophe's marking of [n] follows the grammatical constraint found

for modern speakers or pre-apostrophe documents. She claimed (1985: 362) that the authors did not share these grammatical constraints and were not aware of them. The presence or absence of <e> does correlate with the grammatical constraint (Houston, 1985: 361).

Conditions of Synchronic Variation

The sociolinguistic variable (ING) encompasses, in part, the English inflectional progressive morpheme and the English derivational gerundial morpheme, both spelled <ing>, as in the following examples: *she is walking*; *walking is fun*. Labov (1989: 87) reported a grammatical set of conditionings within an implicational hierarchy where the [ɪn] variant was favored "most in progressives and participles, less in adjectives, even less in gerunds and least of all in nouns like *ceiling* and *morning*." With these monomorphemic lexemes such as *ceiling*, the variation between the coronal and velar nasals is not an alternation of morphemes, but a switching of places of articulation. As a sociolinguistic variable, (ING) is a coherent whole with two variants; however, (ING) is not the result of a single linguistic process.

Most studies focus on unstressed *-ing*, following Labov (1972). Thus, monosyllabic words such as *ring*, *king*, *sing*, and *bring* are not considered possible environments. For most speakers surveyed, this category of lexemes does not vary in the velar place of articulation of its final nasal. Stress patterns may also affect realizations of *-ing* in multisyllabic words. Houston (1985: 22) found the velar variant to be nearly categorical in the words *everything* and *anything* but nearly absent in the words *something* and *nothing* for Southern U.S. speakers, although this pattern was not robust for her British urban data. Houston reasons that the *-ing* syllable receives secondary stress in *everything* and *anything* but not in the disyllabic words *something* and *nothing*.

Beyond prosodic concerns, another phonological factor Houston (1985: 19) discussed is the regressive homorganic assimilation and the progressive homorganic dissimilation for [n] and [ŋ]. For example, in *peeling carrots* the following velar favors an [ŋ] and *feeling tired* the following alveolar favors [n]; in *speaking up* and *sending out*, the preceding consonants disfavor homorganic articulation of [ŋ] and [n] respectively. However, Labov (2001: 87) claimed that "there seems to be no strong phonological conditioning before following velars or apicals."

One important typological quality of these phonetic variants relates to implicational tendencies: the velar nasal is not as common as the alveolar nasal in the world's languages; its distribution in the inventory of English sounds is more restricted; children acquire the velar nasal latter than the alveolar (Grunel, 1987). It could well be that such tendencies for [ŋ] to be disfavored could have played a role throughout the history of these forms.

An important quality of the (ING) variable is that no modern study has shown a change in progress. Despite its abundant linguistic and social variation, it does not appear to be undergoing diachronic variation currently.

Social Factors

Fischer (1958) employed (ING) in his foundational work on a New England village. Labov (1966) was the first study to detail social constraints on (ING). This work demonstrated both socio-economic effects, specifically an inverse relationship between socioeconomic status and rate of [ɪn], and stylistic effects, specifically an inverse relationship between formality and the rate of [ɪn]. In general, these results have been found in every community where (ING) has been studied: the variant [ɪn] is associated with both informality and lower socioeconomic status (see Labov, 2001: ch. 3).

Many sociolinguistic studies have examined the (ING) variable, including the following: Shuy *et al.* (1968) for Detroit, Labov (2001) for Philadelphia, Trudgill (1974) for Norwich, Woods (1978) for Ottawa, Reid (1978) for Edinburgh, Douglas-Cowie (1978) for Northern Ireland, and Wolfram and Christian (1976) for West Virginia. Variation in the (ING) variable has been noted in Australia, Canada, England, Ireland, New Zealand, Scotland, and the United States. Only in South Africa is there a native English-speaking population which reportedly does not vary between [n] and [ŋ] for the (ING) variable (Gordon and Sudbury, 2002: 81). Labov (2001: 90) reported that "Southern States English, northern English, and Scots stand out [because] there the /in/ form is used almost exclusively in speech, even of the most formal kind."

Within the United States, researchers have studied (ING) usage in both African-American and European-American communities. Anshen (1969) compared these two ethnic groups in the southern United States, finding several similarities: For both ethnic groups, men use [ɪn] more than women.

(ING) is one of the consummate sociolinguistic variables. Its complete story involves both diachronic and synchronic variation, both internal and external factors. Three original Old English forms merged over the centuries into one form for one regional dialect. This one dialect established the prescriptive orthographic standard as <ing>, covering for two

different suffixes and monomorphemic forms. The modern grammatical patterns for (ING) are now a synchronic echo of these previously heterophonous morphemes. Social differentiation arose between the two forms, where the southern English [ŋ] was considered standard and the [n] nonstandard. This social distinction may have arose after the regional differentiation came to the level of consciousness.

See also: Assimilation; Labov, William (b. 1927); Old English Dictionaries; Sociophonetics; Synchronic and Diachronic Variation.

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Incorporation

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Incorporation is the grammatical phenomenon whereby a word contains morphemes that can be understood as separate elements of a proposition. The term is sometimes used more narrowly to refer only to cases where the morphemes are joined by compounding or where the grammatical or semantic relation is restricted in one way or another, and it is sometimes used more generally to include certain cases where the morphemes are not clearly joined morphologically at all.

different suffixes and monomorphemic forms. The modern grammatical patterns for (ING) are now a synchronic echo of these previously heterophonous morphemes. Social differentiation arose between the two forms, where the southern English [ŋ] was considered standard and the [n] nonstandard. This social distinction may have arose after the regional differentiation came to the level of consciousness.

See also: Assimilation; Labov, William (b. 1927); Old English Dictionaries; Sociophonetics; Synchronic and Diachronic Variation.

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Incorporation

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Incorporation is the grammatical phenomenon whereby a word contains morphemes that can be understood as separate elements of a proposition. The term is sometimes used more narrowly to refer only to cases where the morphemes are joined by compounding or where the grammatical or semantic relation is restricted in one way or another, and it is sometimes used more generally to include certain cases where the morphemes are not clearly joined morphologically at all.

The most discussed examples of incorporation come under the rubric of noun incorporation (NI), particularly those in which a noun and a verb are compounded, producing a structure in which the noun expresses an argument or part of an argument of the verb. In the most typical kind of NI, the noun that is compounded with the verb designates the objective or theme argument of the predicate and it was in this sense that the word *Einverleibung* was originally used in describing facts of "Mexican" (Náhuatl) by von Humboldt (1988), who contrasted a sentence with an independent verb and object: *ni-c-qua in nacatl* "I-it-eat the meat" with the incorporated form *ni-naca-qua* 'I-meat-eat'.

Other grammatical and semantic relations that come under the heading of NI include instruments, locatives and goals, equatives, possessa, and, to a limited extent, subjects, as illustrated by these examples from Sapir (1911):

da^{a}-sgek!eīha (Takelma)
ear-keep.listening
'He kept listening'

ni-k-tle-watsa in nakatl (Náhuatl)
I-it-fire-roast the meat
'I roast it in a fire'

djī-yā-dja-s (Yana)
taste-person-off,away-PRES.FEM
'It tastes like human flesh'

buī-djalil$^{\varepsilon}$ ai'gadú-isi-wandja (Yana)
kick-calf.of.leg-PRES-3singSUBJ.1singOBJ
'He kicks my calf'

ti-karíh-ihu$^{\varepsilon}$ (Pawnee)
3sg.INDIC-stone-be.large
'The stone is large'

Roughly speaking, the more like a subject a noun is, the harder it is to incorporate; the more animate a noun is, the harder it is to incorporate; and the more definite it is, the harder it is to find in a NI structure. Potential examples such as *John-eat the meat* with *John* as an incorporated noun have not been attested.

NI has also been taken to include examples where derivational morphology rather than compounding is the morphological technique used in forming the complex verb, as in the following example (Sadock, 1980), where-*lior*-is a bound morpheme that never occurs as an independent verb:

Suulut timmisartu-lior-poq. (West Greenlandic Inuktitut (Greenlandic Inuktitut))
Suulut airplane-make-INDIC.3sg
'Sulut made an airplane'

Examples in which verbal meanings combine are sometimes referred to as verb incorporation, and similarly for preposition incorporation, adverb incorporation, and adjective incorporation, where adjective meanings combine with nouns as in Chukchee (Chukot).

The demotion of independent nominals to a kind of verbal adjunct, often lacking case markers, determiners, and the like, has also been dealt with as NI even though the facts of such languages as Greek, Hungarian, and Niue, etc., do not support the conclusion that the noun forms a morphological unit of any kind with the verb. Still, there are many analogies.

Controversy over the nature of NI arose already in the early 20th century in an exchange between Alfred Kroeber and Edward Sapir. Kroeber (1909) had defined noun incorporation, following von Humboldt's example, as "...the combination into one word of the noun object and the verb functioning as a predicate of a sentence." Sapir (1911) objected, saying that "...the combining of a morphologic requirement with an independent syntactic one yields, on general principles, a definition of too narrow a scope for the discussion of as fundamental a problem as noun incorporation...." Sapir instead offered an entirely morphological definition: "It is this process of compounding [a noun and a verb to form a verb] that it is here proposed to call noun incorporation, no matter what the syntactic function of the noun logically is."

Much the same controversy that Kroeber and Sapir were involved in reemerged 70 years later in the debate between adherents of some fairly strong version of the lexicalist hypothesis, including both formalists and functionalists, and those who did not accept it. The question is whether there is any independent syntactic or semantic status to the parts of a word that might be construed as a verb and an object or whether the word is to be taken as syntactically and/or semantically indivisible, regardless of its internal morphological structure.

Representing the anti-lexicalist point of view, Sadock (1980) argued that certain facts of West Greenlandic Inuktitut indicated that the word is not a syntactic atom (and hence not a semantic atom either), presenting evidence that the incorporated noun functions as the syntactic head of an NP object. Eskimo (Eskimo-Aleut) languages, however, use suffixal, denominal verbalizing affixes rather than compounding as the morphological technique for joining the elements of the word and had therefore been specifically excluded by Sapir as offering genuine examples of NI. The evidence for the syntactic function of

the incorporated noun in West Greenlandic cited by Sadock (1980) included the fact that:

1. Any noun in the language may be incorporated.
2. The incorporated noun may be modified by an external phrase.
3. The incorporated noun may be specified by an external possessor.
4. The external modifier agrees with the incorporated noun.
5. The incorporated noun may be referential and may introduce new entities into the discourse.
6. The incorporated noun cannot be "doubled" by a full external NP.

Partly similar facts have been adduced in Southern Tiwa, Mohawk, and many other languages where the morphological facts do fit Sapir's definition.

Mithun (1984), Di Sciullo and Williams (1987), Rosen (1989), van Geenhoven (1996), and others, however, continued to maintain a lexicalist point of view from a variety of different theoretical perspectives. Mithun proposed an evolutionary scheme for the development of NI that included the following four-way typology of noun–verb compounding. This typology was presented as a hierarchy such that no higher type should exist in a language without all of the lower types being present as well:

Type I: Lexical compounding NI, in which the compound expresses a "unitary concept" and the noun is not referential and hence cannot be modified or determined. When applied to a transitive verb, it reduces the valence, producing an intransitive.

Type II: Case-manipulating NI, which resembles Type I, but keeps the valence intact so that another argument may assume the grammatical status of the incorporated noun.

Type III: Discourse structure manipulating NI, which "... is used to background known or incidental information." The incorporated noun may refer to a previously introduced topic but does not present information, that "... might obstruct the flow of information."

Type IV: Classificatory NI, in which a general N is incorporated producing a V of narrowed meaning. The valence of the verb is not altered, so it may be accompanied by a more specific external NP that identifies the argument rather than simply indicating the kind of thing it is. The external argument may "double" the incorporated noun if it is modified and therefore narrower in meaning.

Mithun's discussion is important because it stresses that not all NI is necessarily similar within a single language let alone across languages. It also provides a useful catalogue of some of the ways that incorporative phenomena vary in their functional, semantic, and syntactic properties. The four-way classification, however, is not exhaustive, there being numerous examples of NI in the literature with mixed properties from more than one of the classes. There are also facts, such as the possibility of introducing a discourse topic in incorporated form, that do not appear to be allowed according to Mithun's taxonomy.

In the cases of NI taken up by Mithun, "... all languages which exhibit such morphological structures also have syntactic paraphrases." It is natural for the incorporated form and the independent form to differ semantically or functionally, but incorporation is obligatory in some languages in some circumstances and where it is, there is no contrast with an independent form and therefore no necessary functional role for NI. Harrington (1910) had already observed for the Tiwa of Taos Pueblo, where, he wrote, "The singular direct object *must be compounded*" [emphasis original]. In the related language of Isleta Pueblo (Southern Tiwa), Allen *et al.* (1984) say that inanimate direct object heads of NPs must be incorporated whether or not they occur with a numeral or demonstrative. The numeral or demonstrative remains as an independent expression outside the verb in such a case. It is difficult to see what the functional role of incorporation might be in the absence of a contrast with a competing form of expression.

yede ti-shut-pe-ban (Southern Tiwa)
that 1sing.A-shirt-make-PAST
'I made that shirt.'

(The personal prefix here indicates the subject's person and number and the class of the object, in this example class A, in agreement with *shut* 'shirt'.)

In the formal camp, the important work of Baker (1988) reoriented the analysis of NI within GB. He essentially abandoned the lexicalist hypothesis, arguing that a good deal of the known behavior of NI constructions could be predicted by assuming that incorporation is the movement of a syntactic head under the restrictions that movement is otherwise known to obey. He showed, for example, that the well-documented resistance of subjects to incorporate, particularly transitive subjects and agentive intransitive subjects, could be reduced to the fact that the trace of movement of such an incorprated noun would not be properly governed. There are, however, exceptions to the ban on incorporation of transitive subjects, notably in Koyukon Athapaskan (Koyukon) (Axelrod, 1990), and though the examples in Koyukon are "potent" inanimates and might be

analyzed in such a way as to allow proper government under incorporation, the treatment would have to be *ad hoc* for Koyukon and not applicable to most other languages with NI where incorporation of a transitive subject is quite impossible.

kko' sots'eeyhyeedzoyh (Koyukon Athapaskan)
kko'-sots'eeyh-ye-ee-Ø-dzoyh
around-wind-OBJ.3sing-MOD/ASP-CLASS-MULTIPLE.OBJ
'The wind is moving them around.'

Baker uses the same head-movement mechanism for deriving productive morphological causatives as verb incorporation and applicatives as preposition incorporation. Morphological causatives had been the subject of debate concerning the lexicalist hypothesis in the 1960s and 1970s. In mainstream syntactic research, the lexicalist approach held sway until Baker's work made a syntactic analysis of causatives respectable once again. More controversially, Baker's work also treated antipassives as the incorporation of an indefinite object and passives as a species of verb incorporation.

Sadock (1985) used the facts of syntactically important NI to argue for a model in which morphology and syntax are autonomous components, each generated separately and possibly producing noncongruent structures for the same example. NI would be an example of such noncongruence rather than movement within the syntactic module. A lexicalist account of NI in the HPSG framework is found in Malouf (1999).

Di Sciullo and Williams (1987), however, argued that a lexicalist account could be maintained in the face of Baker's arguments. Rosen (1989) also took a strictly lexicalist position on the treatment of NI, reducing Mithun's typology to just two members: Compound NI and Classifier NI. If Mithun's scheme was not exhaustive, then Rosen's is *a fortiori* not. More recently, van Geenhoven (1996) provided a syntactically lexicalist account of West Greenlandic NI by using sophisticated semantic techniques.

It seems fair to say, though, that incorporative phenomena in natural languages have now resulted in the widespread (but certainly not universal) rejection of the lexicalist hypothesis in favor of derivation of at least some noninflectional word structure within the syntax in a manner rather similar to that of generative semantics.

See also: Compound; Functionalist Theories of Language; Generative Semantics; Government Phonology; Grammar; Head-Driven Phrase Structure Grammar.

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Indefinite Pronouns

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General

In traditional grammar, the term 'indefinite pronouns' is often used quite widely, comprising not only words like *something* and *anybody*, but also generic pronouns such as English *one* or French *on*, quantifiers such as *few*, *many*, *all*, and *every*, and 'identity pronouns' such as *other* and *same*. Given the heterogeneity of the category thus understood, a more restrictive approach seems motivated, in which the term is used only of expressions with indefinite reference in a narrower sense (Haspelmath, 1997). This would, for English, basically leave us with *some* and *any* and their derivatives, also including words such as *somewhere* and *anytime* which are, strictly speaking, pronominal adverbs, but which semantically share most of their properties with the other members of the respective series and therefore deserve to be treated together with them. ('Indefinite proforms' would probably be the most 'correct' term.) A further delimitation has to be made in that more highly grammaticalized morphemes such as indefinite articles should be not be included, in keeping with the tradition not to see them as proforms. It should be noted, however, that semantically, indefinite pronouns have much in common with other indefinite noun phrases.

As we have already seen, English indefinite pronouns form what we can call 'series' – sets of pronouns sharing an 'indefiniteness marker' such as *some* and *any*. Each member in the series is connected to an ontological category such as time, place, person, thing, quantity, etc. (it may be noted that these categories are essentially those postulated by Aristotle – in fact, in choosing his categories, Aristotle at least partly seems to have been guided by the Greek pronoun system). Not infrequently, the morpheme that identifies the ontological category is formally identical to the corresponding interrogative pronoun, as in German *irgendwo* 'somewhere,' with indefiniteness marker *irgend-* and ontological category marker *wo* 'where,' or Russian *kto-to* 'someone,' formed by adding the indefiniteness marker *-to* to the interrogative pronoun *kto* 'who.' As noted by Haspelmath (1997: 24), indefinite pronouns universally tend to be derived, and typically from interrogative pronouns – the opposite direction is hardly attested.

The *Some–Any* Distinction

The existence in English of two series of indefinite pronouns – the *some* series and the *any* series – has given rise to an extensive discussion in contemporary linguistic and philosophical literature. In the development of generative-transformational grammar, the distribution of *some* and *any* in English was first seen as a purely syntactic problem that could be given a relatively straightforward syntactic solution (Klima, 1964) but after some time it became clear that the factors that governed the choice were at least partly pragmatic (Lakoff, 1969). Already in the pre-Chomskyan period, linguistically oriented logicians such as Hans Reichenbach tried hard to make sense of the relations between *some* and *any* and the quantifiers of predicate logic (Reichenbach, 1980). In the ensuing discussion, which is still going on, new frameworks such as Jaakko Hintikka's game-theoretical semantics have been invoked as helpers. In a crosslinguistic perspective, it may be noted that the existence of more than one series of indefinite pronouns is a rule rather than an exception, but precise analogues to *some* and *any* are hard to find in other languages. Yet the distribution of the English indefinite pronouns obeys general principles which manifest themselves in seemingly chaotic but nonetheless systematic patterns in human languages.

In English, the *any* series can be said to have two major types of use. The first one is in contexts connected with 'negative polarity' in the wide sense, also including, for example, questions and conditional protases. We thus get a contrast between the negated sentence (2), with *any*, which contrasts with the affirmative sentence, (1), where *some* is used.

(1) I saw someone

(2) I did not see anyone

The second type of use where we find the *any* series is for expressing what is often called 'free choice,' as in

(3) Anybody can do this

Attempts to reduce the ambiguity between the negative polarity use and the free choice use (e.g., Reichenbach, 1980: 105) to a difference in scope run into problems with examples where stress is used to disambiguate the two readings (Dahl, 1970: 39), as in *Can I take any* ***apple?*** and *Can I take* ***any*** *apple?*

The prominence of negative polarity in the choice between different series of indefinite pronouns, and the particular combination of negative

polarity readings with 'free choice,' is far from universal. Other distinctions, notably ones having to do with the specificity of referents, are often more salient. For instance, in Russian, the two series in *-to* and *-nibud'* may disambiguate classical cases such as the following, where only *some* is possible in English:

(4) ona xočet najti kogo-to
she *want*.PRES.3SG *find*.INF *someone*
ambiguous but with the preferred reading 'she wants to find someone [a specific person]'

(5) ona xočet najti kogo-nibud'
she *want*.PRS.3SG *find*.INF *someone*
only nonspecific: 'She wants to find someone [nobody in particular]'

Functions of Indefinite Pronouns

Taking a crosslinguistic perspective, Martin Haspelmath defined nine different functions of indefinite pronouns (Haspelmath, 1997):

1. specific, known to the speaker (***Somebody*** *called while you were away, guess who!*)
2. specific, unknown to the speaker (*I heard* ***something****, but I couldn't tell what kind of sound it was*)
3. nonspecific, irrealis (*Please try* ***somewhere*** *else*)
4. polar question (*Did* ***anybody*** *tell you anything about it?*)
5. conditional protasis (*If you see* ***anything****, tell me immediately*)
6. indirect negation (*I don't think that* ***anybody*** *knows the answer*)
7. standard of comparison (*In Freiburg the weather is nicer than* ***anywhere*** *in Germany*)
8. direct negation *(I didn't see* ***anybody****)*
9. free choice (***Anybody*** *can solve this simple problem*).

Haspelmath claims that these functions can be ordered in an 'implicational map,' as in Figure 1, where an indefinite pronoun series will always express a contiguous subset of functions, as shown in Figure 2, representing English, Russian, and Japanese. (For clarity, only two series of pronouns from each language are shown.) In addition, however, the choice between indefinite pronouns can be influenced by factors not represented in Figure 1, such as the speaker's expectations – for instance, if s/he expects a positive or a negative answer to a question, and differences in focus or emphasis, including distinctions relating to the notion of scalarity.

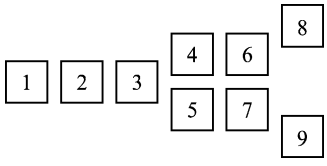

Figure 1 Haspelmath's implicational map for indefinite pronouns. Adapted from Haspelmath M (1997). *Indefinite pronouns.* Oxford: Clarendon Press, with permission.

Diachronic Developments

Diachronically, indefinite pronouns tend to arise from a limited number of sources, the most common being phrases with original meanings such as 'whatever it may be,' 'it does not matter which,' or 'it is the same which,' which come to acquire the 'free choice' function and then spread first to the functions adjacent to it in Figure 1 and then to more distant ones. For instance, the Russian indefinite pronouns ending in *-nibud,'* such as *chto-nibud'* 'something, anything,' which derives from *chto ni budi* 'whatever may be,' thus a typical expression of free choice. In modern Russian, however, *chto-nibud'* has a number of uses (see Figure 2) in which the free-choice meaning is weakened or inappropriate. An other possibility is for indefinite pronouns to arise at the other end of the implicational map – from 'dunno' constructions like the one exemplified by Old Norse *ne wait ek hwariR* 'I do not know who,' which is the source of

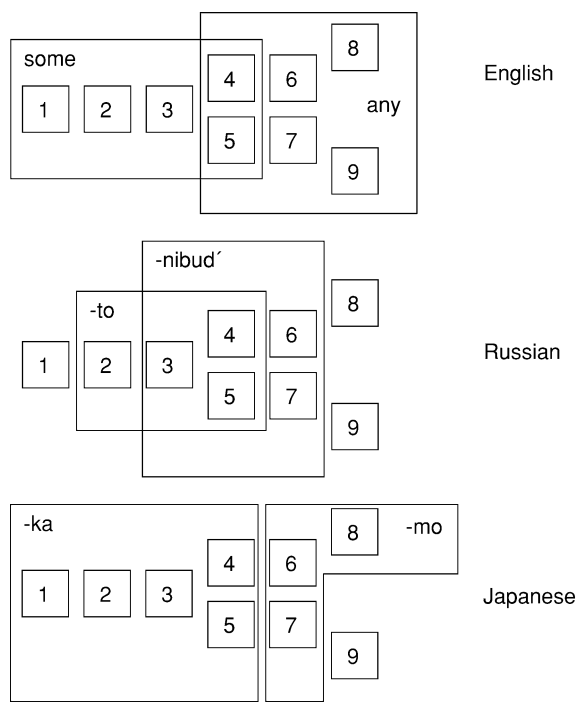

Figure 2 Functions of indefinite pronouns in English, Russian, and Japanese. Adapted from Haspelmath M (1997). *Indefinite pronouns.* Oxford: Clarendon Press, with permission.

Scandinavian indefinite pronouns such Swedish *någon* 'some, someone', which has expanded its domain of use so as to be possible in all the functions in Figure 1 (this is crosslinguistically somewhat exceptional). (In the Latin phrase *nescio quid* 'something' the origin is still transparent.) The two diachronic paths are similar in that somewhat similar literal meanings – 'it does not matter which' or 'I do not know which' – are backgrounded or disappear, but they differ in whether they start at the most or least specific end of the implicational map. A third diachronic source of indefinite pronouns is combinations of focus particles (*even*, *also*) with interrogative pronouns, nouns with general meaning, or the numeral 'one,' as in Japanese *nan-demo* 'whatsoever,' from *nani* 'what' and *-demo* 'even.' Sometimes interrogative pronouns used by themselves obtain functions as indefinite pronouns. This appears to happen particularly often in contexts such as conditional protases, as in Latin *Si* ***quis*** *vult post me sequi*... "if someone wants to follow me...". Nouns with general meanings such as 'person' and 'thing' can also develop uses in which they become indistinguishable from indefinite pronouns.

Inherently Negative Pronouns

In negative contexts, indefinite pronouns such as the members of the *any* series compete with 'inherently negative pronouns' such as *nobody*. Cf. English:

(6) I did not see anybody

(7) I saw nobody

However, as noted by Haspelmath (1997: ch. 8), the distinction between indefinite and inherently negative pronouns is far from unproblematic: originally indefinite pronouns sometimes obtain a negative import when used by themselves, for instance in the answers to wh-questions. Thus, in French, 'never' is expressed by a combination of the negation word *ne* and the pronominal adverb *jamais*, with the earlier meaning 'ever' (originally deriving from Latin *jam magis* 'even more'). However, used by itself in the answer to a question, *jamais* now means 'never,' without any support by a negative word. Compare also an expression such as *jamais vu* 'never seen.' In a question like (8), on the other hand, *jamais* can still be used without negative import:

(8) Es -tu jamais allé en France?
are you ever go.PP to France
'Did you ever go to France?'

Such facts may be taken as support for treating inherently negative pronouns as a subspecies of indefinite pronoun, as Haspelmath (1997) suggests. On the other hand, in some languages, inherently negative pronouns behave in a way that suggests that they are even synchronically derivable from a combination of a negation morpheme and an indefinite pronoun. Thus, in Swedish, a negative pronoun such as *ingenting* 'nothing' can only be used if the result of replacing it by a negation *inte* 'not' immediately followed by an indefinite such as *någonting* 'something,' is also grammatical. We thus obtain contrasts as illustrated by the following examples.

(9a) Jag köpte inte någonting
I buy.PAST not nothing
'I did not buy anything' (negation adjacent to indefinite pronoun)

(9b) Jag köpte ingenting
I buy.PAST nothing
'I bought nothing' (negation adjacent to indefinite pronoun)

(9c) Jag har inte köpt någonting
I have not buy.SUP nothing
'I did not buy anything' (negation non-adjacent to indefinite pronoun)

(9d) *Jag har köpt ingenting
I have buy.SUP nothing
'I have bought nothing'

See also: Articles, Definite and Indefinite; Definite and Indefinite; Descriptions, Definite and Indefinite: Philosophical Aspects; Generic Reference; Polarity Items; Pronouns; Referential versus Attributive; Specificity.

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Indeterminacy, Semantic

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Contemporary philosophy has presented two significant challenges to the determinacy of meaning, one contentiously associated with Ludwig Wittgenstein through the work of Saul Kripke (*see* **Rules and Rule Following**) and the other, the topic of this entry, traceable to the behaviorism of W. V. Quine by way of his thought experiment concerning radical translation.

Quine purports to offer two distinct arguments for semantic indeterminacy, which he sees as a consequence of the thesis of the *indeterminacy of translation*: "manuals for translating one language into another can be set up in divergent ways, all compatible with the totality of speech dispositions, yet incompatible with one another" (1960: 27). This thesis has semantic implications for Quine, because as a behaviorist he holds that meaning is nothing above and beyond what is preserved in translation. This article will discuss both arguments for this thesis and reactions to them in separate sections below, focusing largely on the so-called argument 'from below' (1970: 183).

The Argument from Below

The radical translator, says Quine, is someone who has at her disposal only the behavior of the speaker of the alien tongue she is trying to translate and the observable objects and events that grace the locale she shares with the speaker. More carefully, Quine focuses not on those objects and events themselves, but on the stimulations they produce at the speaker's nerve endings (*see* **Radical Interpretation, Translation and Interpretationalism**) and on the speaker's observed disposition to assent to or dissent from sentences that the translator puts to her as queries under given *stimulus-conditions*. If she can formulate correct hypotheses about the speaker's terms for affirmation and dissent, then this evidential constraint entails that the field linguist can translate *observation-sentences*, which are among the class of sentences to which assent is cued directly to particular occasions and to which, moreover, assent varies little or not at all with changes in the background information available to the speaker (1960: 42). The thought here is that reports of observations are reports of things observed on particular occasions (unlike talk of biological speciation or social justice), and those things are importantly independent of the speaker's background beliefs and mental states (unlike hallucinations, for example). Each such sentence has what Quine calls a *stimulus-meaning* – the ordered pair of its positive stimulus-conditions (those prompting assent to the sentence) and its negative stimulus-conditions (those prompting dissent from the sentence). Logical connectives such as 'not,' 'and,' 'or,' and 'all' can also be translated, because "one's interlocutor's silliness, beyond a certain point, is less likely than bad translation" (59). This 'principle of charity' (59n) has it that, for example, a speaker will not typically affirm both a sentence and its negation. We can, as well, identify but not necessarily translate sentences that are *stimulus synonymous* (those provoking assent and dissent respectively under exactly the same stimulus conditions) and sentences that are *stimulus analytic* – those to which the speaker will assent, if not to nothing, on every stimulus occasion (54–55).

Quine begins with sentences because a speaker assents to (or dissents from) utterances of sentences, not to (or from) isolated subsentential terms. But a thorough 'translation manual' should tell us how to match up individual words or other subsentential expressions (1960: 69). The radical translator may thus formulate a set of *analytical hypotheses* (68), which break down sentences into their component parts, words, which can then be found in other sentences. A survey of their occurrences in different sentences makes it possible to pair those words with words of the translator's language, eventually yielding a comprehensive translation manual, whose adequacy can be further tested by recombining the isolated words into new sentences and observing the speaker's pattern of assent and dissent to them. However, Quine contends, there will always be more than one overall system of analytical hypotheses that will yield workable translations, because local incompatibilities in competing hypotheses can always be compensated for by making changes elsewhere in the system. Thus, to take a trivial case, in the French '*ne . . . rien*,' '*rien*' can be translated either as 'anything' or as 'nothing,' says Quine, "by compensatorily taking '*ne*' as negative or as vacuous" (1969a: 37).

Worse still, even if one's analytical hypotheses isolate a particular word, the reference of that word may itself remain 'behaviorally inscrutable' (1969a: 35), for there is no empirical test that will decide between translations of the word '*gavagai*' as 'rabbit' and as 'undetached rabbit parts,' given that apparent evidence against one translation can again be compensated for by making adjustments elsewhere in

the system (*see* **Holism, Semantic and Epistemic**). Inquiries whether this *gavagai* (rabbit) is the same as that *gavagai* (rabbit) may as easily be taken as inquiries whether this *gavagai* (rabbit part) belongs with that *gavagai* (rabbit part) (33). Beyond the level of observation-sentences and logical connectives, Quine contends, translation is radically indeterminate.

Quine assumes that overt bodily behavior is the only relevant evidence for the field linguist's efforts (1990: 37–38; *see* **Behaviorism: Varieties**), and he allows that the radical translator might have access to the totality of such evidence – that competing translation manuals might "accord perfectly . . . with all dispositions to behavior on the part of all the speakers concerned" (1969a: 29). Therefore, his conclusion is not merely that I cannot *know* what the unique, correct translation of the speaker's utterances is, but that there is *no fact* about what their unique, correct translation is, because all the relevant evidence leaves the question unanswered. Moreover, Quine holds that the same considerations apply to understanding a speaker of my own language – even when that speaker is myself. "On deeper reflection, radical translation begins at home" (46). This is because first as a learner of my own language and then as an interpreter of my colinguists, I have access to no more evidence than the radical translator does. It follows that meaning itself is radically indeterminate.

Reactions to the Argument from Below

Critics have complained that behaviorism is false and, so, that Quine's argument fails to establish its conclusion (Chomsky, 1969); and that Quine, in spite of his avowed behaviorism (Quine, 1990: 37), helps himself to nonbehaviorist data about the speaker's *nonobservational* terms for assent and dissent (Hockney, 1975: 421; Glock, 2003: 178) and about the communicative exchange between speaker and radical translator (Glock, 2003: 175–182). Assent and dissent cannot simply be read from the speaker's behavior, and they cannot intelligibly be assigned stimulus-meanings. The only way that the field linguist can identify terms of assent and dissent is by assuming that the speaker *wants* to be interpreted and understood, that the speaker *understands* that she is being interpreted, that the speaker is familiar with performing the *speech acts* of *answering* a question and *correcting* the linguist's proffered usage, and so on. These assumptions are all ruled out by Quine's behaviorism.

Critics have also doubted whether there really could be entire alternative translation manuals of the sort Quine envisions. The contention, very roughly, is that the compensatory changes that Quine imagines making to other terms in one's translation manual in order to preserve one's favored translation of some given term would quickly come into conflict with the behavior of the speaker (Evans, 1975: 345–346) . If I translate *gavagai* as 'undetached rabbit part' instead of as 'rabbit,' for example, I may have to translate the speaker as allowing that an undetached rabbit part is white if and only if the entire rabbit is white (Miller, 1998: 139). But this has consequences for how I should translate the speaker's word for 'white' in other contexts, and I should not be surprised to discover that I want to translate her as affirming that snow is white, even when visible patches of it have been visited by local sled dogs.

The Argument from Above

Quine might try to meet some of these objections by appealing to the argument 'from above' (1970: 183). Physical theory, says Quine, is underdetermined by the available evidence. More than one set of physical hypotheses could be compatible with the totality of empirical evidence. However, even if we select a particular physical theory on pragmatic grounds, Quine contends, our linguistic theory will remain underdetermined relative to our physical theory – "even if we 'fix' the physics" (Putnam, 1978: 53), nonobservational meaning will remain underdetermined. Linguistic hypotheses are underdetermined by a set of *more basic* 'facts' that are themselves already underdetermined. It is this double underdetermination that distinguishes semantic indeterminacy from normal empirical underdetermination.

Reactions to the Argument from Above

It is not clear, however, that this second argument operates independently of the argument from below, for the only plausible reason for thinking that the linguistic data are doubly underdetermined with respect to physical theory seems to be that mere physical behavior and the observation-sentences it undergirds are more evidentially basic – the only evidence we have to go on – and rival systems of analytical hypotheses are compatible with that evidence (Kirk, 1986: 140–146; Miller, 1998: 147). Moreover, as Chomsky complains, even if linguistics remains underdetermined once the physics has been fixed, it is equally true that the physics remains underdetermined once the linguistics has been fixed (Chomsky, 1980: 20; Rorty, 1972: 451–453). Only if we grant physics a special privilege could there be a problem for the determinacy of meaning.

Quine's work has, nonetheless, been very influential in analytical philosophy of language, leading especially to the varieties of *interpretationalism*

defended by Donald Davidson and Daniel Dennett (*see* **Radical Interpretation, Translation and Interpretationalism**).

See also: Behaviorism: Varieties; Compositionality: Philosophical Aspects; Holism, Semantic and Epistemic; Radical Interpretation, Translation and Interpretationalism; Rules and Rule Following.

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Indexicality: Philosophical Aspects

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In most of our linguistic interchanges and thinking episodes, we rely on context to select items of discourse and items of thought. One often succeeds in talking and thinking about something because one is situated in a given context. In natural language we have tools whose specific function is to exploit the context of use in order to select an item in one's surroundings. If one says, 'It is raining here' while in London, one refers to London because one's utterance occurs in London. Were one to utter the same sentence in Paris, one would be referring to Paris. We can use the very same words and yet refer to very different items. When you use 'I', for instance, you refer to yourself, whereas when I use it, I refer to myself. We use the very same linguistic expression with the same conventional meaning. It is a matter of who uses it that determines *who* the referent is. Moreover, when Ivan, pointing to Jane, says 'she' or 'you,' he refers to Jane; Jane, however, cannot refer to herself using 'she' or 'you' (unless she is addressing an image of herself). If we change the context – the speaker, the time, the place – in which these expressions occur, we may end up with a different referent.

Among the expressions that may switch reference with a change in context, we have personal pronouns ('my', 'you', 'she', 'his', 'we'...), demonstrative pronouns ('this', 'that'), complex demonstratives ('this pencil', 'that brunette in the corner'...), adverbs ('today', 'yesterday', 'now', 'here'...), adjectives ('actual', 'present'), and possessive adjectives ('my pencil', 'their car'...).

These expressions have been termed, following Peirce, *indexicals*. Indexicals constitute the paradigm of context-sensitive expressions, i.e., those expressions that rely on the context of use to select an object of discourse. Reichenbach (Reichenbach, 1947) claimed that indexicals are *token reflexive*, for they can be defined in terms of the locution 'this token', where the latter (reflexively) self-refers to the very token used. So, 'I' can be defined in terms of 'the person who utters this token', 'now' in terms of 'the time at which this token is uttered', 'this pen' in terms of 'the pen indicated by a gesture

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See also: Behaviorism: Varieties; Compositionality: Philosophical Aspects; Holism, Semantic and Epistemic; Radical Interpretation, Translation and Interpretationalism; Rules and Rule Following.

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accompanying this token', etc. The reference of an indexical expression depends on its particular linguistic meaning: 'the utterer of this token' is the linguistic meaning (the *character* (Kaplan) or *role* (Perry)) of 'I', while 'the day in which this token is uttered' is the linguistic meaning of 'today', and so on. The meaning of an indexical can be viewed as a rule which one needs to master to use an indexical correctly. An indexical's linguistic meaning can be conceived as a function taking as its argument the context and giving as its value the referent/content (this is Kaplan's famous content/character distinction).

It is often the case, however, that the linguistic meaning of expressions such as 'this', 'that', 'she', etc., together with context, is not enough to select a referent. These expressions are often accompanied by a pointing gesture or demonstration, and the referent will be what the demonstration demonstrates. Kaplan (1977) distinguishes between *pure indexicals* ('I', 'now', 'today', . . .) and *demonstratives* ('this', 'she', . . .). The former, unlike the latter, do not need a demonstration – or *directing intention*, Kaplan (1989) – to secure the reference.

In their paradigmatic use, pure indexicals differ from demonstratives insofar as the latter, unlike the former, are perception based. When one says 'I', 'today', etc., one does not have to perceive herself or the relevant day to competently use and understand these expressions. To competently use and understand 'this', 'she', etc., one ought to perceive the referent or demonstratum. For this reason, when a pure indexical is involved, the context of reference fixing and the context of utterance cannot diverge: the reference of a pure indexical, unlike the reference of a demonstrative, cannot be fixed by a past perception.

Moreover, a demonstrative, unlike a pure indexical, can be a vacuous term. 'Today', 'I', etc., never miss the referent. Even if I do not know whether today is Monday or Tuesday and I am an amnesiac, when I say 'Today I am tired,' I refer to the relevant day and to myself. By contrast, if one says 'She is funny' while hallucinating, or 'This car is green' while pointing to a man, 'she' and 'this car' are vacuous.

In addition, pure indexicals cannot be coupled with sortal predicates, while 'this' and 'that' often are used to form complex demonstratives such as 'this *book*', 'that *water*'. Sortal predicates can be considered to be *universe narrowers* which, coupled with other contextual clues, help us to fix a reference. If one says 'This liquid is green' while pointing to a bottle, the sortal 'liquid' helps us to fix the liquid and not the bottle as the referent. Moreover, personal pronouns which work like demonstratives (e.g., 'she', 'he', 'we',) have a built-in or hidden sortal. 'She', unlike 'he', refers to a female, while 'we' usually refers to a plurality of people, of whom one will be the speaker.

Indexicals are generally conceived of as singular terms that contribute a referent to what is said. According to the *direct reference* view (from Kaplan and Perry), utterances containing indexicals express singular propositions, i.e., propositions whose constituents are the referents of the indexicals. As such, indexicals are usually characterized as expressions whose interpretation requires the identification of some element of the utterance context, as stipulated by their linguistic meaning. Thus, an utterance of 'I am tired' expresses a proposition containing the referent of the first person pronoun, and one understands it insofar as one knows to whom the term 'I' refers in the context in which it is uttered. The linguistic meaning governing the use of the indexical – such as 'the agent of the utterance' *qua* meaning of 'I', 'the day of the utterance' *qua* meaning of 'today' – does *not* feature as a constituent of the proposition expressed.

If indexical expressions are characterized as singular terms contributing their referents into what is said (i.e., the proposition expressed), adjectives such as 'local', 'distant', 'actual' – not to mention count nouns like '(a) foreigner', '(an) enemy', '(an) outsider', '(a) colleague' – would not fall into the same category, for they do not contribute a referent to the proposition expressed. Yet they are, plausibly, context-sensitive expressions. 'Local', 'foreign', and 'native' in 'A *local* bar is promoting *foreign* wine' and 'A *native* speaker should correct your essay' do not contribute a specific individual or individuals to the proposition expressed. Hence, they are not singular terms. It should be evident that context-sensitivity does not merely concern singular terms. It is worth distinguishing between indexicals *qua* singular terms, contributing their referents to the proposition expressed, and *contextuals qua* expressions which, though context-sensitive, are not singular terms. Adjectives such as 'tall', 'big', 'small', 'old', etc., also are context-sensitive, insofar as one is only tall/small/big/old . . . relative to a comparison class. Jon may be too short to play tennis and yet too tall to be a jockey, while Jane may be too old to join the army and too young to take early retirement. But see Cappelen and Lepore (2004) and Borg (2004) for the view that words such as 'tall', 'foreigner', 'old', and the like are not genuinely context sensitive.

Proper names, like indexicals, also contribute individuals into the proposition expressed. As such they are singular terms, too; yet they are not indexicals (but see Recanati, 1993 for a different view). Nouns such as 'Monday', 'February', and the like also seem to contribute specific individuals in the proposition

expressed. They are best viewed in the same light as count nouns, i.e., as nouns such as 'lemon', 'frog', and 'table' (see Corazza, 2004). As such, they can be used to build singular terms. This happens when they are coupled with an indexical expression such as 'this', 'next', 'last' and they contribute to complex demonstratives of the form 'next week', 'last Saturday', 'next Christmas'. This peculiarity parallels the way count nouns can participate in building complex demonstratives such as 'these lemons', 'that table', 'this pen'. (King, however, defends the view that complex demonstratives are quantified terms).

One of the major features of indexicals differentiating them from other referential expressions (e.g., proper names: 'Plato', 'Paris'; mass terms: 'silver', 'water', terms for species: 'frog', 'raspberry', and so on) is that they are usually used to make reference *in praesentia*. That is, use of an indexical exploits the presence of the referent. Usually in a communicative episode involving an indexical, the referent is in the perceptual field of the speaker and contextual clues are used to raise the referent to salience (see Smith, 1989; Sidelle, 1991; and Predelli, 1998 for a discussion of indexicals used to refer to objects not present, e.g., answering machines, post-it notes, etc.)

When indexicals are not used to make reference *in praesentia* they exploit a previously fixed reference. 'That boy' in '*That boy* we encountered yesterday was in trouble with the police' does not refer to someone present. In cases like this, the indexical makes reference *in absentia*. One can thus distinguish between the context of utterance and the context of reference fixing. In our example, the speaker and the hearer appeal to a past context to fix the reference. The gap between the two contexts would be bridged by memory. Another way to handle examples like this would be to argue that, in such cases, the indexical expression works like an anaphoric pronoun linked to a tacit initiator. In the sentence 'In 1834 Jane visited her parents, *now* two old, sick people,' 'now' does not refer to the time of the utterance. It refers to 1834. It does so because it is anaphorically linked to '1834', and, as such, it inherits its reference from it. A similar story could be told about 'that boy': it inherits its reference from a tacit initiator, i.e., an unpronounced NP which is nonetheless presupposed in the discourse situation. To stress this interpretation, consider the following exchange: Jane: 'It is raining'; Jon: 'Then I won't be there before tomorrow.' In saying 'It is raining,' Jane tacitly refers to the location she is in, say London. With 'there', Jon refers to the very same location and we can claim that he does so because 'there' works in an anaphoric way, inheriting its value from the tacit reference made by Jane.

Furthermore, indexicals differ from other referential expressions insofar as (in their paradigmatic use, at least) they cannot be deferential. While one often relies on the so-called division of linguistic labor when using non-indexical expressions (e.g., proper names or mass terms), one cannot depend on the same phenomenon when using an indexical. One can, for instance, competently use 'Feynman' or 'elm' even if one does not know who Feynman is and even if one is unable to tell an elm from a pine. Indeed, a blind person can utter 'that vase' when she has been told that there is a vase in front of her. In these uses the reference is fixed by someone else (it is deferentially fixed). However, these are far from being the paradigmatic uses of an indexical such as 'that/this'. In their paradigmatic uses, they refer to something the user is perceptually aware of. This difference between indexicals and other terms parallels the fact that when using proper names, mass terms, and the like, context is in play before the name is used. As Perry suggests, we often use context to disambiguate a mark or noise (e.g., 'bank', or 'Socrates' used either as a tag for the philosopher or for the Brazilian football player). These are pre-semantic uses of context. With indexicals, though, context is used semantically. It remains relevant after the language, words, and meaning all are known; the meaning directs us to certain aspects of context. This distinction reflects the fact that proper names, mass terms, etc., unlike indexicals, contribute to building context-free (eternal) sentences, that is, sentences that are true or false independently of the context in which they are used.

To sum up, philosophers have made several key claims about indexicals. They are tools whose function is to exploit context, and their hallmarks include not having a fixed referent, not being easily deployed *in absentia* of the thing referred to, not being used deferentially, and having context play (not just a pre-semantic role, i.e., determining which word has been used, but also) a semantic role. Philosphers have found that indexicals come in at least three varieties: pure indexicals ('I', 'now'), demonstratives ('this', 'she'), and contextuals ('foreign', 'local'). Key differences between the first and second variety are that, in contrast to pure indexicals, demonstratives are more perception-based, they may be vacuous, they can be combined with sortals, and directing intentions play a quite central role in their use. In addition to attracting the attention of philosophers, indexicals have also captured the interest of those working within the boundaries of cognitive science for several reasons (see, for instance, Pylyshyn, 2003 on how indexicality is relevant to the study of vision): they play crucial roles when dealing with such puzzling notions as the

nature of the self (see for instance the importance of 'I' in Descartes' cogito argument), the nature of perception, the nature of time, psychological pathologies, social interaction, and psychological development (see Corazza, 2004).

See also: Pragmatic Determinants of What Is Said; Semantic Value.

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Indexicality: Theory

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Indexicality in Peirce's Categories and Sign Typology

'Indexicality' is a feature of the 'index,' one of three types of signs identified by Charles S. Peirce, the other two being the 'icon' and 'symbol.'

According to Peirce, a sign is something that stands for something else, in some respect. It creates in the mind of the interpreter an equivalent sign, or perhaps a more developed sign, that is, an interpretant (2.228 – As is common in Peircean scholarship, quotes and citations will be identified by volume and paragraph number from Peirce [1931–1958]). That the sign stands for something in some respect means that it does not refer to the object in its entirety (dynamic object), but only to a part of it (immediate object). Furthermore, a sign subsists for Peirce according to the category of 'thirdness,' that is, it presupposes a triadic relation between itself, the object, and the interpretant thought, which is itself a sign. And given that it mediates between the interpretant sign and the object, the sign always plays the role of third party.

The icon is characterized by a relation of similarity between the sign and its object.

nature of the self (see for instance the importance of 'I' in Descartes' cogito argument), the nature of perception, the nature of time, psychological pathologies, social interaction, and psychological development (see Corazza, 2004).

See also: Pragmatic Determinants of What Is Said; Semantic Value.

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Indexicality: Theory

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Indexicality in Peirce's Categories and Sign Typology

'Indexicality' is a feature of the 'index,' one of three types of signs identified by Charles S. Peirce, the other two being the 'icon' and 'symbol.'

According to Peirce, a sign is something that stands for something else, in some respect. It creates in the mind of the interpreter an equivalent sign, or perhaps a more developed sign, that is, an interpretant (2.228 – As is common in Peircean scholarship, quotes and citations will be identified by volume and paragraph number from Peirce [1931–1958]). That the sign stands for something in some respect means that it does not refer to the object in its entirety (dynamic object), but only to a part of it (immediate object). Furthermore, a sign subsists for Peirce according to the category of 'thirdness,' that is, it presupposes a triadic relation between itself, the object, and the interpretant thought, which is itself a sign. And given that it mediates between the interpretant sign and the object, the sign always plays the role of third party.

The icon is characterized by a relation of similarity between the sign and its object.

The symbol is a sign "in consequence of a habit (which term I use as including a natural disposition)" (4.531). The symbol is never pure but contains varying degrees of indexicality and iconicity; similarly, as much as a sign may be characterized as an index or icon, it will always maintain the features of symbolicity: a sign to subsist as such always requires the mediation of an interpretant and recourse to a convention.

The index is a sign that signifies its object by a relation of contiguity, causality, or by some other physical and mechanical connection. This relation also depends on a *habitus* or convention: e.g., the relation between hearing a knock at the door and someone on the other side who wants to enter. Convention relates the knocking to the knocker, but contiguity/causality predominates to the point that we are surprised if we open the door and nobody enters. Types of index include: (1) 'symptoms,' medical, psychological, natural, or social phenomena (actual contiguity + actual causality; (2) 'clues,' natural phenomena, attitudes, and inclinations (presumed contiguity + nonactual causality); (3) 'traces,' physical or mental (nonactual contiguity + presumed causality). "An 'index,'" says Peirce, "is a sign which would, at once, lose the character which makes it a sign if its object were removed, but would not lose that character if there were no interpretant" (2.304).

Signs subsist in the dialectic between symbolicity, indexicality, and iconicity. The symbol is never pure but contains varying degrees of indexicality and iconicity; similarly, a sign that is prevalently indexical or iconic maintains the characteristics of symbolicity – it requires the mediation of an interpretant sign and recourse to a convention.

Symbolicity refers to the sign's conventional character, the relation of constriction by convention between a sign and its object established on the basis of a code, a law. To say it with Peirce: "I define a Symbol as a sign which is determined by its dynamic object only in the sense that it will be so interpreted. It thus depends either upon a convention, a habit, or a natural disposition of its interpretant, or of the field of its interpretant (that of which the interpretant is a determination)" (letter from Peirce to Welby, 12 October 1904, in Hardwick, 1977: 33).

Indexicality refers to the compulsory character of the sign, to the relation of cause and effect, of necessary contiguity between sign and object: "I define an Index as a sign determined by its dynamic object by virtue of being in a real relation to it" (Hardwick, 1977: 33). The index requires mediation by an interpretant sign and recourse to a convention. But in the case of the index, unlike symbols, the interpretant does not decide on the object. On the contrary, the relation between sign and object preexists with respect to interpretation, it is an objective relation and in fact conditions interpretation. The sign and that which it stands for are given together independently of the interpretant. Nonetheless, this independence does not exclude the necessity of recourse to a convention to organize the relation between sign and object as a sign relation.

Indexicality belongs to the category of 'secondness,' one of Peirce's three categories, the other two being 'firstness' and 'thirdness.'

- Firstness is the mode of being of that which is such as it is, positively and without reference to anything else.
- Secondness is the mode of being of that which is such as it is, with respect to a second but regardless of any third.
- Thirdness is the mode of being of that which is such as it is, in bringing a second and third into relation to each other (8.329).

Firstness (in-itselfness, originality), secondness (over-againstness, obsistence) and thirdness (in-betweenness, transuasion) are universal categories. Peirce's categories help to explain logicocognitive processes and therefore at once the formation of signs. Analyzed in terms of Peirce's typology of signs, firstness coincides with the sphere of iconicity. Something that presents itself as firstness, presence, 'suchness,' pure quality is characterized by the relation of similarity (1.356–1.358). Analyzed in terms of Peirce's typology of signs, thirdness coincides with the sphere of symbolicity. Together with the other two categories, thirdness guides and stimulates inquiry and therefore has a heuristic value. The inferential relation between premises and conclusion is based forever on mediation, that is, on thirdness.

Secondness is the category according to which something is considered relatively to or over against something else. It involves binarity, a relation of opposition or reaction. From the viewpoint of signs, secondness is connected with indexicality. The icon, which is governed by firstness, presents itself as an original sign, the symbol, which is governed by thirdness, as a transuasional sign, while the index, which is governed by secondness, is an obsistent sign (2.89–2.92).

Any sign may be taken as something in itself, or in relation to something else (its object), or as a go-between (mediating between object and interpretant). On the basis of this threefold consideration, Peirce establishes the following correspondences between his trichotomy of the categories (all his trichotomies contain thirdness insofar as they are trichotomies) and three other important trichotomies in his semiotic system: firstness: qualisign, icon, rheme; secondness:

sinsign, index, dicisign (or dicent sign); thirdness: legisign, symbol, argument (2.243). Symbolicity is the sign dimension that shares most in thirdness, because it is characterized by mediation (or in-betweenness), iconicity by firstness or immediacy (or in-itselfness), and indexicality by secondness (or over-againstness). The category of secondness, together with firstness and thirdness are the omnipresent categories of mind, sign, and reality (2.84–2.94).

On the level of the typology of signs, firstness, secondness, and thirdness correspond to iconicity, indexicality, and symbolicity; on the level of logic, they correspond to abduction, deduction, and induction; and on the level of ontology, to agapism, anancism, and tychism.

From the viewpoint of logic, inference regulated by secondness and indexicality corresponds to deduction (while inference regulated by firstness and iconicity corresponds to abduction, and inference regulated by thirdness and symbolicity corresponds to induction). In fact, in the case of an 'obsistent argument' or deduction, the conclusion is compelled to acknowledge that the facts stated in the premises, whether in one or both, could not be if the fact stated in the conclusion were not there (2.96).

Indexicality and Logic

From the viewpoint of ontology, of universal being, secondness, and in sign typology, indexicality is present in the law of 'anancasm' or necessity. According to Peirce, this necessity regulates the evolutionary development of the universe together with 'agapasm' (creative love, which corresponds to firstness) and 'tychasm' (causality, which corresponds to thirdness) (6.287–6.317).

To indexicality and respectively secondness or obsistence, a binary category, there corresponds a relation of relative alterity in which the terms of the relation depend on each other. Effective alterity, the possibility of something being-on-its-own-account, absolutely, *per se*, autonomously, presents itself as firstness, or orience, or originality, according to which something "**is what it is without reference to anything else** within it or without it, regardless of all force and of all reason" (2.85). An effective relation of alterity is not possible in terms of binarity, indexicality, secondness, obsistence. Relations of alterity are not possible in a system regulated exclusively by secondness, therefore, binarity, where an element exists only on the condition that it refer to another element and would not exist should this other element be negated. "Take, for example, a husband and wife. Here there is nothing but a real twoness; but it constitutes a reaction, in the sense that the husband makes the wife a wife in fact (not merely in some comparing thought); while the wife makes the husband a husband" (2.84).

In the succession deduction–induction–abduction, the degree of alterity increases. Says Peirce: "Abduction is the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new idea; for induction does nothing but determine a value, and deduction merely evolves the necessary consequences of a pure hypothesis. Deduction proves that something **must** be; induction shows that something **actually is** operative; abduction merely suggests that something **may be**" (5.172). Abduction is the inferential process by which the rule that explains the fact is hypothesized through a relation of similarity (iconic relation) to that fact. This rule that acts as the general premise may be taken from a field of discourse that is close to or distant from that to which the fact belongs, or it may be invented *ex novo*. If the conclusion is confirmed, it retroacts on the rule and convalidates it (ab- or retro-duction). Such a retroactive procedure makes abductive inference risky, exposing it to the possibility of error; at the same time, if the hypothesis is correct, the abduction is innovative, inventive, and sometimes even surprising.

Peirce connected indexicality and deduction:

> An Obsistent Argument, or **Deduction**, is an argument representing facts in the Premiss, such that when we come to represent them in a Diagram we find ourselves compelled to represent the fact stated in the Conclusion; so that the conclusion is drawn to recognize that, quite independently of whether it be recognized or not, the facts stated in the premisses are such as could not be if the fact stated in the conclusion were not there; that is to say, the Conclusion is drawn in acknowledgment that the facts stated in the Premiss constitute an Index of the fact which it is thus compelled to acnowledge (2.96).

Indexicality and Dialogicality

In inference, the relation between the premises and conclusion may be considered in terms of dialogue between 'interpreted signs' and 'interpretant signs' (Ponzio, 1990: 49–61). The degree of dialogicality and alterity is low in induction – where the relation between premises and conclusion is determined by habit and is of the symbolic type – and in deduction – where the conclusion is a necessary derivation from the premises in a relation of the indexical type. To be precise, the degree of dialogicality in the relation between interpreted (premises) and interpretant (conclusion) (an indexical relation) is minimal in deduction: once the premises are accepted the conclusion is compulsory. Induction (where the relation between

premises and conclusion is symbolic) is also characterized by unilinear inferential processes: identity and repetition dominate, but the relation between premises and conclusion is no longer compulsory. Instead, in abduction the relation between the argumentative parts is dialogic in a substantial sense. The relation between premises and conclusion is predominantly iconic, therefore a relation of reciprocal autonomy. Consequently, abductive inference can generate sign processes at high levels of dialogicality and otherness, therefore responses that are risky, inventive, and creative with a minimal margin for convention or symbolicity and mechanical necessity or indexicality.

An approach to indexicality in terms of dialogue has its source in a theoretical framework that may be identified as Peircean-Bakhtinian (from Russian philosopher Mikhail Bakhtin), and its basis in the distinction between 'formal dialogicality' (which refers to the fact that a text is enacted or represented in the 'form of a dialogue') and 'substantial dialogicality' (which concerns the 'degree of dialogicality' in a given text, whether formally a dialogue or not). These two concepts of dialogicality do not necessarily coincide: a formal dialogue does not necessarily imply substantial dialogue, while the latter does not necessarily take the form of a dialogue. Signs and arguments are formally dialogical as the result of a dialogue between interpreteds and interpretants, according to varying degrees of dialogicality. From a semiotic perspective, the relationship between interpreteds and interpretants results in signs which – on a scale ranging from a maximum degree of monologism to a maximum degree of dialogism, otherness, and creativity – may be (prevalently) indexical, or symbolic, or iconic; from the perspective of logic, the relationship between interpreteds (premise) and interpretants (conclusion) results in arguments or inferences and is of the deductive, inductive or abductive type. The varying balance in indexicality, symbolicity, and iconicity in any given sign situation, whether formally a dialogue or not, involves variations in the degree of otherness and dialogicality regulating the relationship between the interpreted (premise) and interpretant (conclusion) of an argument: therefore, argumentative value may also be measured in terms of the degree of substantial dialogicality (Ponzio, 1990: 215–232).

Theory of Indexicality in a Peircean Semiotic Framework

Peirce's recognition of the need for the index may be connected with his interest in Duns Scotus's realism and the notion of *aecceitas* (thisness), which indicates the single thing in contrast to universality, i.e., the reality of actuality or secondness: "hic and nunc," Peirce observes, "is the phrase perpetually in the mouth of Duns Scotus" (*CP* 1.459). "The index has the being of present experience" (4.447) of *hic* and *nunc*. An index "is a sign which refers to the Object it denotes by virtue of being really affected by that Object" (*CP* 2.248), where the word "really" resonates to Scotus's doctrine of *realitas et realitas* (Sebeok, 2001: 87). To demonstrate the centrality of indexicality in Peircean semiotics, Thomas A. Sebeok (2001) observed that Peirce contended that no matter of fact can be stated without the use of a sign serving as an index, because 'designators' compose one of the main classes of indexes and because designation is "absolutely indispensable both to communication and to thought. No assertion has any meaning unless there is some designation to show whether the universe of reality or what universe of fiction is referred to" (8.368). Indexes "whose relation to their objects consists in a correspondence in fact ... direct the attention to their objects by blind compulsion" (1.558). Deictics of various kinds, including tenses, that offer the most clear examples of indexicality.

Indexicality, iconicity, and symbolicity are three complementary rather than antagonistic categories. Peirce returned repeatedly to his sign typology. By 1906, he had classified 66 different types of signs. However, the most important in all his reflections on signs was a trichotomy formulated in relation to his original typology and presented in an article of 1867, 'On a new list of categories' (1.545–1.559). With this trichotomy, Peirce identified three types of signs: icons, indexes, and symbols. Sebeok evidenced that all three are present in nonhuman semiosis as well (for a synthesis of the comparison between the human world and the world of other animals relatively to this typology, see Sebeok, 2001). From the perspective of sign types, there is no difference between human and nonhuman semiosis. In the light of Sebeok's research, it is now clear that icons, indexes, and symbols are present both in languages (which are human) and in nonlanguages.

As observes Sebeok elaborating on Peirce's typology, not signs but sign aspects are the object of classification. The hybrid character of the sign should now be obvious with respect to its distinction into symbol, index, and icon. The Peircean conception of the relation between symbol, icon, and index has very often been misunderstood. In fact, these terms were thought to denote three clearly distinguished and different types of sign, each with characteristics so specific as to exclude the other two. Now we know that signs that are exclusively symbols, icons, or indexes do not exist in the real world. Furthermore (and what most interests us here) in Peirce's theory, the symbol is a

mere abstraction. It is never conceived as existing as a pure symbol but is always more or less mixed with iconicity and indexicality, or to say it with Peirce, it is always more or less 'degenerate.'

This denotion implies that more than being signs in their own right, the icon and index represent different levels in 'degeneracy of the symbol.' The symbol is not purely a symbol but almost always takes the characteristics of either the icon or index. The symbol may be represented iconically as a body in a state of unstable equilibrium, in which the stabilizing symbolic force is counteracted by iconic and indexical forces. But this image establishes a relation of contrast between symbol, index, and icon, when in fact they are not separate or distinct, nor are they in a relation of opposition.

Otherwise, with respect to the symbol, we would have signs that are purely icons or purely indexes and not simultaneously symbols; or symbols with no traces of iconicity or indexicality. Perhaps the image that best accounts for the relation of the symbol to the index and icon is that of a filigreed transparency with uneven traces of iconicity and indexicality, as opposed to pure transparency.

Indexicality is at the core of the symbol, given that the symbol depends on the interpretant as a result of its relation to the object. This relationship is what makes a sign a symbol. This result means that transuasion, which characterizes the symbol as a transuasional sign, is considered in its obsistent aspect (2.92), and that the index is an obsistent sign. On the other hand, insofar as it is determined by the instances of what it denotes and being a general type of law, the symbol entails indexicality. In the sign considered as a symbol, identity hinges upon the alterity of the sign, which is determined by mediation of the interpretant, so that, insofar as it is a symbol, "a sign is something by knowing which we know something more" (8.332). However, this expansion is so because the sign is not only a symbol, or better, the very fact of being a symbol involves iconicity and indexicality given that thirdness, the mode of existence of the symbol, presupposes firstness and secondness or originality and obsistence, which correspond respectively to the icon and index.

From the viewpoint of its relation to the object, the sign is a symbol insofar as it involves the mediation of an interpretant; from the viewpoint of its relation to the interpretant, the sign-symbol is an Argument. This statement is true if the sign-symbol distinctly represents the interpretant that it determines as its Conclusion through a proposition that forms its Premise, or more generally, its premises (2.95). Depending on the type of sign relation established in the argument between premises and conclusion, three kinds of arguments are possible: Deduction, Induction, and Abduction. Though differentiated, all three belong to the sphere of the symbolic and are of the transuasional order.

Peirce used the term 'Transuasional logic' to indicate the doctrine of the general conditions of determination of the interpretant (the conclusion) through propositions acting as premises (2.93). But three types of arguments are possible because they do not belong to the sphere of the symbolic alone. This means that not only the category of Transuasion comes into play but also that of Originality and Obsistence (2.84–2.96). In Peirce, the term Symbol indicates the genuine Sign obtained by abstracting from the two levels of 'degeneracy' of the sign. These are: the minor level – that of the Index; and the major level – that of the Icon. In the Symbol or genuine Sign, signification depends on the relation to the interpretant, whereas in the Index and Icon the capacity to signify is relatively autonomous with respect to the relation to the interpretant (2.92).

By virtue of the relation between icon, index, and symbol – a relation neither of autonomy and indifference nor of opposition, but rather of reciprocal implication – the sign is at once identical to itself and other.

The relation of implication changes in balance depending on whether the iconic, symbolic, or indexical aspect dominates, which is determined by the type of semiosis in course. All signs are symbols to the extent that they signify through mediation of an interpretant, but precisely because of such mediation they are not symbols alone.

In Peirce's semiotics, symbols, indexes, and icons overlap in such a way that if the symbol were purely symbolic, the relation between premises and the conclusion in the argument would paradoxically be indexical and not symbolic, and would not, in fact, give rise to a transuasive argument or induction. The latter presupposes a hypothesis resulting from a preceding abduction that implies iconicity (2.96). Let us suppose that the relation between premises and conclusion is purely analytical and is wholly contained within the symbolic universe, the conventional/arbitrary, the Law; in other words, let us suppose that the relation between the symbol and interpretant is of mere identity. In this case, the relation between premises and conclusion is deductive and as a constrictive argument, it is endowed with the character of indexicality.

Mutual complicity between symbol, icon, and index should now be obvious. These three different shades of the sign are in turn implied in the cognitive

process. This implication means that they are at once categories of logic and semiotics (Ponzio, 1990: 197–214).

Indexical Types of Verbal and Nonverbal Signs and Signals

The main types of indexical signs include: (1) symptoms, (2) clues, and (3) traces. Let us consider them in detail.

In the case of the symptom, the relation of the interpretant to the interpreted is of contiguity and causality: blotchy skin (interpreted), liver disease (interpretant); smoke (interpreted), fire (interpretant).

In the case of the clue, the relation of the interpretant to the interpreted is of causality (but not given in present time), on the basis of a presumed relation of contiguity: a cloudy sky as a sign that it will rain; a bloodstain on a glove as a clue that the owner is the assassin.

In the case of the trace, the relation of the interpretant to the interpreted is of contiguity (not given in present time) on the basis of a presumed relation of causality: a footstep is interpreted as the trace of a man or animal; a phobia as the trace of a certain event.

Symptoms, clues, and traces are not produced as the repetition of a pre-established interpretant of identification: they are not the result of a coding process, nor are they endowed with communicative intentionality (otherwise they would be signals: smoke used to signal one's presence or to transmit messages; footsteps left expressly by a person to signal his or her trajectory). However, these signs are interpretable because of their typicality, that is, they are already known, they have already been seen, and they repeat certain distinctive features. A preliminary moment of identification or recognition is also necessary: a footstep repeats certain distinctive features that characterize it as the imprint left by an animal, a man's or woman's shoe, a bare foot; if left by an animal, it may be characteristic of a horse (whether shod or not), a deer, etc. Similarly, a certain somatic fact appears as a symptom insofar as it repeats characteristics that identify it as that particular symptom and that link it to pathological state; in the same way, clouds mean rain if they are identified as that certain type of cloud that carries rain.

Thus traces, symptoms, and clues, also, have an identification interpretant that is determined on the basis of one's own experience or of others, and is established on the basis of a given tradition or social practice.

Similarly to signals, the relation between interpreted and interpretant is fixed on the basis of a law: in fact, handbooks are available for identification of given types of symptoms or clues or traces on the basis of specific distinctive features. A handbook of medical symptomatology or hunting are two such examples. By consulting handbooks as though they were signal codes or language dictionaries, specific traces, symptoms, or clues may be decoded even when one has no previous direct experience of them.

In some cases, symptoms, clues, or traces are produced intentionally and are predetermined by the identification interpretant in the course of their very production. In such cases, they function as signals, even if masked as symptoms, clues, or traces. An actor who recites rage or fear, a person who pretends to be moved, feigns illness, leaves footprints on the ground so as to be followed (e.g., to set a trap), or to divert the pursuer, intentionally produces symptoms, clues, and traces according to distinctive features foreseen by the identification interpretant. Therefore, contrary to what the interpreter believes, the latter does not come into play exclusively when such features are being decoded (Ponzio, 1990: 44–36).

In signals disguised as symptoms, clues, or traces, the success of pretence depends on the fact that these signs remain distinct from signals, that is, they appear to be uncoded and devoid of an identification interpretant produced intentionally by a sender: they must not seem characterized by the identification interpretant 'at the source,' but only when they are actually being read and decoded. Thus, those cases in which symptoms, clues, and traces are signals highlight the distinction between such signs and signals as well as the distinction between the latter and verbal signs in their signal dimension rather than generally invalidating this distinction, that is, between the signs in question and signals.

Besides acting as signals, verbal signs, when such aspects as those mentioned in the preceding paragraph come into play, may also function as symptoms, clues, or traces: without speaker or writer intention, a piece of discourse, whether written or oral, may be read as indicating a specific social status or place of origin, it may betray impatience or uneasiness, foresee a certain development in the relation between interlocutors, indicate that the person speaking is in a hurry to conclude the conversation, etc. We qualify verbal signs that are symptoms, clues and traces as paraverbal signs.

Therefore, verbal signs have dual signality: as far as they are intentional, they are also signals, and as far as they are unintentional, they may also be symptoms, clues, and traces. Dual signality in verbal signs

becomes triple when unintentionality is recited, calculated, or feigned, that is, when that which seems to be a symptom, clue, or trace in the verbal sign is, in reality, a disguised signal.

Indexicality in Verbal Language

Indexicality is discussed by Peirce to solve the problem of the connection between verbal language and referents in the real world. Verbal language is characterized by conventionality and 'diagrammatization.' Diagrammatization makes verbal language a 'sort of algebra'; consequently, it seems to be a sphere apart, separate from its objects. But thanks to indexicality, that is, to an association of contiguity, verbal language is not reducible to an algebric system.

Indexicality enables language to pass from the level of diagrammatization to the level of application of its diagrams.

The relation between the phonia *book*, the object *book*, and the graphia *book* is 'conventional': however, traces of indexicality are also present, owing to the relation of continguity established between phonia and object, and phonia and graphia. In this case, continguity would seem to be established 'by convention.' But once this convention has been learned, it is a bond and continues to subsist thanks to the fact that the name and the object or the phonia and the graphia of the same word are given in a relation of continuity (Ponzio, 1990: 37–43).

Jakobson studies the indexical factor in verbal language in 'Shifters, verbal categories and the Russian verb' (1971 [1957]). The indexical function in verbal signs is carried out by a special class of grammatical units he calls 'shifters.' As characterized by Jakobson, shifters are 'symbol-indexes' because their dominant aspect is given in the combination of indexicality with conventionality.

An example of shifters is the personal pronoun. On one hand, *I* is conventional because we can only know what it means if we know the convention on the basis of which we interpret it as referring to its object under some aspect (a person considered under the aspect of speaking subject) and therefore as situated on the same interpretive trajectory as *ego*, *je* and *moi*, *ich*, *io*, etc. From this point of view, the sign *I* is a symbol. On the other hand, in order to refer to its object, that is, to the speaker, it must be in an 'existential relationship' with it. Therefore, *I* is also an index. The personal pronouns *I* and *you* may be interpreted as referring **alternatively to the same object**, according to whether it carries out the function of 'speaking subject' or 'subject spoken to.' This multiplicity is possible on the basis of a convention and at once on the basis of the fact of functioning as an index in the literal sense of a pointing finger.

Indexicality plays a fundamental role in verbal language. As Sebeok observed (1991: 128–143), Peirce highly valued the function of shifters owing to the connection between verbal language and its referents. Designations – exemplified by the various types of deixis, including verbal tenses – said Peirce:

> . . . are absolutely indispensable both to communication and to thought. No assertion has any meaning unless there is some designation to show whether the universe of reality or what universe of fiction is referred to. (8.368, note 23)

Two texts by Peirce on 'indexicality' in verbal language seem particularly significant, a paper of 1892 and another of 1893 (respectively in the third and fourth volumes of *Collected papers*). Peirce considers the problem of indexicality as part of his quest to solve the problem of how verbal language, characterized by diagrammatization, which makes it like algebra, is able to connect up with its referents. This connection is only possible, says Peirce, thanks to indexicality, that is to say, association of continguity:

> It is not the language alone, with its mere associations of similarity, but the language taken in connection with the auditor's own experiential associations of contiguity which determines for him what house is meant. It is requisite then, in order to show what we are talking or writing about, to put the hearer's or reader's mind into real, active connection with the concatenation of experience or of fiction with which we are dealing, and, further to draw his attention to, and identify, a certain number of particular points in such concatenation. (3.419)

The function of indexicality is to make language pass from the level of diagrammatization to the level of application of its diagrams. The recurrent distinction between subjects and predicates of propositions, implies the distinction, says Peirce, between the indicative part of discourse and what it affirms, questions, or commands about it.

Indicatives assert nothing (2.291). They only serve to draw attention to something, and if compared to verbs, they would be considered as imperatives, such as *be careful*, *look there*. Words like *this* or *that* "have a direct, forceful action upon the nervous system, and compel the hearer to look about him," says Peirce, "and so they, more than ordinary words, contribute towards indicating what the speech is about." Concerning the term 'pronouns' used for such words as *this* or *that*, Peirce observes that nouns would be more appropriately designated as

"pro-demonstratives" (3.419), as substitutes of indicators, that is deictics.

Terms like *this* or *that* are indexes with the function of drawing attention to what one means no differently from the expression *attention!* or similar cries. Terms like *this* or *that* refer to other words in written discourse; in this case, their function is no different from the relative pronouns *who* or *which*, etc., nor from use of the letters of the alphabet to indicate the issue in question in a text (naturally on the understanding that similar letters stand for the same thing). These terms continue to function as indexes that "de-algebrize" language (2.287).

"A possessive pronoun," said Peirce, "is an index in two senses": in the sense that it indicates the possessor, and in the sense that it denotes the thing possessed.

Peirce attributed the character of indexicality to indefinite pronouns such as *any*, *every*, *all*, *none*, *whoever*, etc., which he called 'universal selectives'; and to indefinite pronouns like *some*, *something*, *somebody*, which he called 'particular selectives.'

Furthermore, adverbs of place and time, etc., must also be taken into consideration in relation to indexicality, together with such expressions as *the first*, *the last*, *the seventh*, *the first part*, etc., and prepositions and prepositional phrases such as *above*, *below*, *to the right of*, *to the left of*, etc. (2.289–2.290).

Peirce also observes that while terms that carry out an iconic function in discourse – similarity, quality, etc. – may be described, those, instead, with the function of index escape description.

Given that it is the ultimate condition of semiosis and communication, indexicality may be considered as the extreme limit of semiotic description.

See also: Anaphora: Philosophical Aspects; Anthroposemiotics; Body Language; Connectives in Text; Deixis and Anaphora: Pragmatic Approaches; Direct Reference; Discourse Anaphora; Discourse Markers; Indexicality: Philosophical Aspects; Peirce, Charles Sanders (1839–1914); Pragmatic Indexing; Reference: Psycholinguistic Approach; Referential Relations in Spoken Discourse; Referential versus Attributive; Sign Theories; Significs: Theory; Social Semiotics; Structure and Structuralism: Semiotic Approaches.

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Indexing, Automatic

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An historical perspective on indexing shows an important tie between human indexing and ease of retrieval of information. Two early forms of indexing, requiring different skills from a human indexer, were back-of-the-book indexing, which allowed a reader to search for specific information within a book, and subject heading assignment, which was used to classify a book within a library system. Most automatic indexing research focuses on documents in electronic form and assumes indexing at a document-level granularity with a strong emphasis on its purpose in document retrieval. Natural language indexing exports part of a document's content into a separate file to serve as a text surrogate for retrieval purposes. Controlled vocabulary indexing creates an index file by assigning to a document terms from an external lexical resource. Both approaches have their advantages and limitations. In information retrieval, the problem of matching query terms and document index terms is largely due to the fact that one idea can be expressed in many different ways: the paraphrase problem. In a Web environment, terabytes of information amplify this paraphrase problem and render it multilingual. As longer documents appear on the Web, interactive forms of indexing should be investigated not only to retrieve documents but to browse efficiently through them. Although indexing has been much studied, as the large body of literature on both human and automatic indexing acknowledges, much work remains ahead to handle the constant growth of electronic information.

"pro-demonstratives" (3.419), as substitutes of indicators, that is deictics.

Terms like *this* or *that* are indexes with the function of drawing attention to what one means no differently from the expression *attention!* or similar cries. Terms like *this* or *that* refer to other words in written discourse; in this case, their function is no different from the relative pronouns *who* or *which*, etc., nor from use of the letters of the alphabet to indicate the issue in question in a text (naturally on the understanding that similar letters stand for the same thing). These terms continue to function as indexes that "de-algebrize" language (2.287).

"A possessive pronoun," said Peirce, "is an index in two senses": in the sense that it indicates the possessor, and in the sense that it denotes the thing possessed.

Peirce attributed the character of indexicality to indefinite pronouns such as *any*, *every*, *all*, *none*, *whoever*, etc., which he called 'universal selectives'; and to indefinite pronouns like *some*, *something*, *somebody*, which he called 'particular selectives.'

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Natural Language Indexing

Natural language indexing, also known as free-term indexing, or extraction indexing, aims first at finding terms within a document that would best characterize its content and second at storing these terms to allow easy retrieval of the original document. Early work, presented at the first International Conference of Scientific Information in 1959, pioneered the field with a strong computational flavor by exploring storage strategies. Herbert Ohlman presented his permutation index, allowing each non-stop-word of a title to serve as an index, and independently, Hans Peter Luhn presented an automatic version of the Key Word in Context (KWIC) idea, which he had developed at IBM. Present-day research on automatic indexing takes a strong linguistic flavor, focusing on methods to extract good index terms from a document.

The Natural language indexing process consists principally of the following three steps (Salton, 1989): (1) find individual words in the text; (2) remove function words and highly frequent words; and (3) compute a weight for each remaining word according to how well it characterizes the text. Even the first two steps, seemingly easy, present challenges. For example, periods are not always good word delimiters as they might occur within abbreviations, and filtering 'a' as a function word is problematic when it takes a semantic value, as in *vitamin A* (Anderson and Pérez-Carballo, 2001b).

The first step presents a further challenge as the notion that index terms should be words is debatable. Many researchers rather suggest the extraction of phrases to provide specific index terms. More complex approaches using tagging or even shallow parsing are necessary to extract phrases. Phrases carry more semantic meaning than individual words and can improve the specificity of the indexing language by being less ambiguous (Moens, 2000). Unfortunately, phrases have one main problem: their forms vary and many variants exist to express the same concept. As much as stemming is used on words to conflate variations into a single index term, some process of normalization would be needed to find phrase variants and assign them to a single concept.

The third step of assigning a weight to each term is both difficult and debatable, as even human indexers do not agree on which index terms best represent a document. The notion of discrimination value (DV) of a term, as introduced by Salton (1981), is the difference between the document collection density when this term is used as an index term and when it is not. The degree of specificity of a term is an indicator of its discrimination value. General terms tend to be assigned to many documents and create a compressed document space where it seems as if all documents are similar. On the other hand, specific terms tend to create a uniformly distributed document collection, as if all documents were uniquely characterized. The solution lies in a middle ground where a good index term has an average specificity with the capability of clustering the document space, where clusters are documents likely to be considered similar by a search user.

The weight w_{ij} of an index term j in document i of a collection of n documents should represent its DV, but as this is very computationally-intensive to calculate, it is approximated mainly by two factors: term frequency, tf_{ij} (frequency of term j in document i), and inverse document frequency, idf_j, where $idf_j = -\log(n/df_j)$. (frequency of term j in all n documents) (Salton, 1981). Most equations found in the literature on statistical approaches to indexing present different combinations of these two factors. As examples, here are four variations for w_{ij}:

$$w_{ij} = 1 \tag{1}$$

$$w_{ij} = tf_{ij} \tag{2}$$

$$w_{ij} = tf_{ij} \times \log\left[\frac{(n - df_j)}{df_j}\right] \tag{3}$$

$$w_{ij} = (\log(tf_{ij}) + 1) \times idf_j. \tag{4}$$

In addition to frequency-related features, some heuristics about text structure can be devised. Words found in the title or at the beginning of each paragraph can be considered as deserving extra weight. Certain types of documents might even have specific structures to be explored. For example, in lecture transcripts, words of sentences containing a summarizing or presentation statement could be attributed a higher weight as could words around a citation in a scientific article, as we can assume these sentences introduce important ideas.

The weight assignment process is very difficult to evaluate. In general, natural language indexing is evaluated in an extrinsic manner, meaning indirectly via an information retrieval (IR) task. Isolating the index performance from the entire IR system's performance is therefore difficult. IR is evaluated via precision and recall to determine whether the documents retrieved are actually relevant ones (precision) and whether relevant documents as established by a particular authority (human judges) are actually retrieved (recall). As index term discrimination value has been linked to recall and precision (Salton, 1981), the IR evaluation should be indicative of the effectiveness of the index terms in the process.

Controlled Vocabulary Indexing

Controlled vocabulary indexing, also called assignment indexing, selects a set of index terms from an external resource to be assigned to a document. Different external resources exist, displaying different levels of granularity and types of organization. Subject headings, most often used in human indexing, are organized in a classification hierarchy. The National Library of Medicine's Medical Subject Headings and Unified Medical Language System, as well as the Library of Congress Subject Headings, are examples of such repositories. A finer grain resource with more complex relations among its terms is a thesaurus. Such relations include broader term (*dog – animal*), narrower term (*dog – poodle*), and related term (*dog – canine*). A fundamental difference exists between thesauri and subject headings as the latter offers an *a priori* attempt to represent the whole of the structure of the universe and the former, in contrast, is usually derived from existing and growing collections of books and journals in a subject discipline. An even more rigid *a priori* established hierarchical system is the classification codes. For example, Melvil Dewey, at the end of the 19th century, began with 10 classes of knowledge and developed the Dewey Decimal Classification (DDC) as a purely hierarchical classification system representing all human knowledge. The DDC is still used extensively in current-day library systems. The largest problem is the mutual exclusivity implicit in every hierarchical classification scheme. In that respect, thesauri are more flexible as they allow interconnections between classes.

Terms in a thesaurus, subject headings, or classification codes can all be seen as labels that an automatic process would attempt to assign to a document. Assignment indexing is perceived from the natural language processing community as a text classification task, sometimes further associated with text filtering and routing. Although rule-based approaches have been investigated (for a success story of rule-based classification of Reuters news stories, see Hayes and Weinstein (1991)), these approaches are quite time-consuming and currently machine-learning approaches are popular alternatives to text classification. In a supervised setting, classification rules are learned from a labeled training set and can be used to infer classes for texts from a test set. An overview of classification techniques (statistical, learning of rules and trees, and neural networks) as well as feature selection for text classification can be found in Moens (2000). Early insight on thesaurus construction, indexing, and classification can be found in Sparck Jones (1971).

In contrast to natural language indexing, controlled vocabulary indexing tends to be evaluated in an intrinsic way, by comparing directly the labels automatically assigned with those assigned by human indexers. This, of course, assumes that human indexers are correct. Unfortunately, the literature shows experiments where much disagreement exists not only among judges but also between multiple instances of indexing the same document by the same judge. Fugmann (1999) suggested predictability of an index term as a good indicator of its relevance, since many terms can be near-synonyms or paraphrases of the same concept and therefore we cannot assume that two indexers would choose the same one (consistency), but we can assume that given one, we can predict the other (predictability). This notion is yet to be seen in automatic indexing evaluation.

Even beyond the problem of synonymy, some authors have argued that objective indexing does not exist and that any indexing task is to be performed from a point of view. For example, Mother Goose rhymes could be important for research specialists from the perspectives of fairy tales, myths, English literature, English history, and psychoanalysis (Harter, 1986). These problems are less likely to occur when many categories can be assigned to a text.

Indexing as Filling the Conceptual Gap in Information Search

Search uncertainty is defined as the latitude that users have in choosing search terms, also sometimes referred to as the paraphrase problem. The probability is small (experiments reported in the literature estimate it at 20%) that two people will use the same term (symbol) to describe the same idea (concept). Indexing relying on symbols, not concepts, is therefore problematic (see Riloff and Lehnert (1994) for further analysis). Synonymy (many symbols for the same concept) impacts on recall performance of the information retrieval task as many texts are not retrieved because they express the query's idea using different symbols. On the other hand, polysemy (many concepts for the same symbol) impacts on precision as it will cause the retrieval of many irrelevant documents discussing a different sense of a query symbol.

Synonymy and Normalization

Normalization and expansion are two opposite solutions to the same synonymy problem. Either a query term is the starting point from which an expansion occurs to find all its synonyms in the hope that one of them will be present in a text or all term variants

found in a text are merged into a single normalized term to which the query term is also matched. Controlled vocabulary indexing, discussed above, is a form of normalization.

Unfortunately, resources that represent particular document collections well are not always available nor are they always constructed at the desired level of generality. To attempt normalization or expansion without an external resource, one must explore methods for automatic construction of thesaurus (Chen *et al.*, 1998). Such construction is done on a particular collection to try to establish relations between words. Thesaural relations of narrower, broader, and related terms are then approximated via similarity measures based on word co-occurrence in text (see Salton and Lesk (1968) for a comparison of different measures in early work). There is currently much interest in research on corpus-based statistical estimations of word similarity.

With a similar intent to reduce space but using a different approach, latent semantic analysis (Deerwester *et al.*, 1990) addresses the concept–symbol problem by attempting to find the underlying semantic structure of the term–document relation. In this particular case, the space reduction does not lead to specific identifiable concepts, but to unlabeled distributed concepts.

The automatic methods above lead to unnamed relations of similarity between terms. A different approach would be the semiautomatic construction of a terminological database in which variants are grouped by concept with explicit relations of hyperonymy, meronymy, and synonymy between concepts. This idea is further discussed below, but research has not yet provided fully automatic approaches for such construction.

Polysemy and Interactive Approach

Polysemy, in the context of document retrieval, is quite problematic. Queries are usually short, one or two words, and therefore do not provide sufficient context to attempt any word sense disambiguation strategy. Research efforts are then pushed toward the interaction between the user and the large set of documents retrieved. Document clustering, by grouping related documents, almost *de facto* performs word sense disambiguation as documents within a single cluster are likely to promote the same sense of a word. Indexing plays an important role in document clustering as document similarity can be established based on documents' index term vectors. Other features, such as citations in scientific articles, have also been used for document clustering. Citation indexing (Giles *et al.*, 1998) assumes that articles all citing a particular article of interest will have enough in common to be clustered. Co-citation indexing (Anderson and Pérez-Carballo, 2001b) establishes a similarity between two documents if a number of articles refer to them jointly.

Many clustering strategies exist. A good review of hierarchical document clustering can be found in Willett (1988).

Once documents are clustered, interactive topic maps allow users to navigate from one document to another to find related documents to a single query. A topic map helps the user through a conceptual space as it shows documents with graphical distance proportional to their real distance.

User interaction can also be used to identify relevant and nonrelevant documents. It is likely that nonrelevant documents include senses of the query term that are not of interest. Relevance feedback promotes constant re-indexing as weights of more promising terms contained in the relevant documents can be increased. This should indirectly lead to finding more appropriate documents from the user's point of view. It is an interesting way of addressing the problem of objective indexing mentioned above, with an iterative process from objective to subjective.

Not only can documents be clustered, but index terms can be clustered and shown graphically to users to help them refine their query. A thesaural organization of index terms can allow a user to find more-general or more-specific terms to enlarge or narrow the query. This idea, taken to its limit, proposes a prenormalization step and constrains the user to a menu-based search with a limited fixed set of index terms. A middle ground might be a conceptual indexing approach (Woods, 1997), which automatically establishes a taxonomy of terms found in the document collection. This taxonomy can then be used to support browsing and navigation in conceptual space. It escapes the limitations of traditional library classification hierarchies by allowing conceptual categories to have multiple parent categories. An interesting feature is that it allows the automatic location of the most specific concepts that subsume an input query term. This conceptual indexing is meant to be used within an interactive browser focusing on the conceptual neighborhood of an input request.

Web Indexing

Most Web page indexing is based on full text indexing, meaning that all words (with the exception of stop words) found in a document serve as index terms. Weighing approaches dependent on inverse document frequency (Salton, 1981) are not applicable in a Web environment since the full collection is

not accessible. Neither linguistic nor statistical approaches are much in use. On the other hand, given the nature of the Web and its high content of proper nouns, sets of heuristics (rules) could be developed for particular types of knowledge to be extracted, such as company names or proper names (see Moens (2000)).

Future Web indexing must investigate Web organization through the conceptual (rather than symbolic) content of its pages, as well as through its hyperlinks. Investigations are foreseen in information value estimation, document content redundancy evaluation, semantic tagging, and categorization and organization of documents. The Semantic Web is a step in that direction, as it promotes semantic meta-tagging of information. Solutions to the polysemy and synonymy problems mentioned earlier via normalization and interactive browsing should be implemented. Variations on natural language indexing and controlled vocabulary indexing strategies should be investigated to respectively find specific terms present in the documents through specific queries and assign general category labels for general searches.

Furthermore, in a global village society, information retrieval (the main use of indexing) should become multilingual. This topic is much studied in international competitions on Cross-Language Information Retrieval. Although most approaches presented at these competitions rely on finding equivalent terms in different languages for a specific query term in one language, an alternative is to assign index terms in many languages to document collections. For such a purpose, the development of multilingual resources of controlled vocabulary is essential. As an example, the Dewey Decimal Classification has been expanded into the Universal Decimal Classification system, available in three languages (French, English, and Standard German (German)) and with increased flexibility through thesaural relations. Much more effort is needed in multilingual resource development for use in automatic indexing and other applications.

Back-of-the-Book Indexing

With collections (and the Web) containing not only more but also longer documents, interest in multidocument indexing and abstracting as well as in intradocument indexing and browsing is emerging. Identifying sections of documents with different index terms somewhat takes us back to back-of-the-book indexing, well known by human indexers but barely discovered by the natural language community. Nevertheless, important related activities, such as keyphrase extraction and term extraction, have been explored. Like back-of-the-book indexing, these activities are concerned with the extracted terms themselves as representative of the content of the text and not with their role in information retrieval. Keyphrase extraction focuses on single documents generating a small index list for use as a condensed abstract of a document. Term extraction focuses on multidocuments generating a large index list for full coverage of a domain with interrelations between terms. A KWIC tool can easily link the extracted terms (or keyphrases) to their context of occurrence in a document. Much less obvious is how to find not all but significant contexts and passages related to a term. This feature is unique to back-of-the-book indexing and important efforts should be applied in this area for future research on indexing.

Keyphrase Extraction

The intent of keyphrase extraction is to serve a highly condensed summary of a text to a human reader in the form of a short list of keyphrases. These keyphrases can be seen as highly selective index terms. They can be highlighted in the text for facilitating reading (skimming).

Jones and Paynter (2002) surveyed three keyphrase extraction systems, two of which investigate machine learning approaches, using texts containing author-assigned keyphrases to train their model. Although keyphrase extraction uses features similar to those used in natural language indexing (term frequency, inverse document frequency, and position in document), viewing the extraction task as a learning task is unique. It unfortunately has the disadvantage, like any learning task, of requiring labeled data, meaning in this case a collection of documents with author-assigned keyphrases.

Keyphrase evaluation has been attempted in an intrinsic manner (in contrast to the natural language indexing tradition) by looking at the overlap with author's keyphrases. Since many authors' keyphrases are not taken from the text, this type of evaluation is problematic. Human evaluation has also been suggested for a subjective evaluation of how good each keyphrase is. This is very time-consuming and the interjudge agreement is low (see Jones and Paynter (2002).

Term Extraction

Starting with a collection of texts on a single domain, term extraction and organization aim at building a terminological database in which terms are interrelated via semantic relations such as synonymy, hyperonymy, and meronymy. Interestingly, these are also relations found between the headings and subheadings of back-of-the-book index entries.

Most term extraction systems combine statistical and linguistic approaches used in natural language indexing. Savary and Jacquemin (2003) provided a survey and comparative analysis of term extraction approaches. Language-dependent syntagmatic patterns indicative of candidate terms are often used. Such patterns for English could be AN, ANN, AANPN, NN, NPAN, NPN, NPNN, where A is adjective, N is noun, and P is preposition. One main aspect of a construction of a terminological database is that the terms extracted must have term quality. Within the field of terminology, a term shows particular characteristics distinguishing it from other single and multiword units. Most importantly, a term must display a particular meaning within a particular domain. This aspect is also valid for determining whether or not a unit should become an entry in a back-of-the-book index.

Importance is given to discovering term variants and including them in the terminological database. This is essential if such a resource is to be used for normalization purposes as mentioned above. Variants can be of different types. Given a normalized term such as '*genetic disease*,' an inflectional variant can be *genetic diseases*; a syntactic variant, *disease is genetic*; a semantic variant, *hereditary disease*; and a morphological variant, *genetically determined forms of disease* (Jacquemin, 2001).

Any list of terms automatically extracted is examined by a terminologist before being included in a terminological database. Such a process is tedious, and the more effort that is put into limiting the list to appropriate candidates, the more time is saved by the terminologist. Term extraction software offers similarity to machine-aided indexing software, mentioned below.

Not surprisingly, the evaluation of term extraction, performed intrinsically, is time-consuming and subjective. Evaluation is reported as silences (as opposed to recall in information retrieval) and noise (as opposed to precision). To estimate silences, a terminologist must go through a whole corpus to identify terms that should have been included in the terminological database. Given the human effort involved, this is rarely seen. More often, noise is reported when looking for automatically extracted terms that have been judged by terminologists as not qualifying as terms.

Automatic Indexing: The Next Steps

The large body of literature focusing on automatic indexing and its application in information retrieval emphasizes the importance of that tie. Automatic indexing also continues to be seen as two different activities, one of free-term indexing and one of assignment indexing, first reserved for a human indexer and now an integral part of text classification and filtering systems. Both types of indexing have their advantages and disadvantages. Free-term indexing carries ambiguity through synonyms and homographs becoming index terms, but it allows a high degree of expressiveness and flexibility. In contrast, assignment indexing has a controlled way of dealing with synonyms and homographs and does not contain ambiguity but its expressiveness and flexibility are limited (Harter, 1986).

Adaptability should be a major concern when developing new approaches. For example, the reliance on external resources, such as a cataloguing system, can make it difficult to adapt to new texts, as classification codes are fixed and preestablished. Not relying on any external resource assumes that we either attempt automatic or semiautomatic construction of some normalizing resource or opt for a natural language indexing approach. The former solution stills presents a concern about adaptability as automatic thesaurus construction (and latent semantic analysis) usually assumes a fixed collection. The latter solution leads to the difficult paraphrase problem and orients research towards document clustering and iterative indexing via relevance feedback.

With growing interest in automatic indexing, some researchers have wondered about the role left for the human indexer. In addition to providing much insight into human (also called intellectual) indexing, Anderson and Pérez-Carballo (2001a, 2001b) suggested that viewing all documents as being of equal value is adequate and proposed some ideas for the evaluation of the value of a document (user rating, citations, etc). A more important document might then be worth investing human indexer time to make sure as many user searches as possible can lead to it. This is an interesting combination of automatic and human indexing processes. Another type of combination is machine-aided indexing (MAI). As manual intellectual indexing is time-consuming, expensive, and subjective, MAI can help indexers be more consistent within their indexing process (intraindexer) and among a group (interindexer).

In the future, a user's interaction with his or her personal and public environment (the Web) must be better understood by the research community on automatic indexing.

The Web forces a multimedia and multilingual view of documents. For the multimedia aspect, although we did not discuss sound, image, and video indexing in this article, we acknowledge the interest and challenges awaiting those in that field. For example, within broadcasting agencies, it would

be a great advantage to have good indexing of video at the scene level. If closed captions are provided, then text-based indexing approaches can be used on video segments (presegmented by scene, for example). Speech transcripts (generated either automatically via speech recognition or manually) can also lead to text-based indexing. As for the multilingual aspect, it forces us to reconsider some of the English-oriented approaches exposed in this article. Although indexing is not a language-specific activity, some issues might be different in different languages. For example, although finding words can be problematic in English, it is even more so for Asian languages, such as Mandarin Chinese (Mandarin), that have no obvious word boundaries. In such case, *n*-grams (combinations of *n* successive characters) can be an alternative way of indexing. *N*-grams are language independent and have also been used on English texts. Another example is stemming, which would be a more crucial step for highly inflectional languages, such as romanance languages, than it is for English.

As for the user's personal space, the future also lies in better organization of personal and business information. Personal computers now hold gigabytes of text files (as well as e-mails, software products, and images) that are left to the user to organize in a primitive file directory hierarchy, and unless special search programs are used, personal computers are still assumed to be searched by address (file name) and not by content (index terms). There is clearly a mismatch between the efforts used for indexing for the Web and large document collections and those used for personal data management. An equally pressing need is the organization of corporate intranets, which are becoming quite large and which deserve attention to their indexing and normalization processes. Documents, e-mails, and mostly software legacy in companies desperately need proper indexing for better storage and retrieval.

Many long documents are part of personal space, Intranet, and the Web and deserve segment coverage, stimulating more research to be carried out in the field of automatic back-of-the-book indexing for efficient document browsing.

See also: Classification of Text, Automatic; Concordances; Disambiguation, Lexical; Document Retrieval, Automatic; Hyponymy and Hyperonymy; Information Extraction, Automatic; Language Processing: Statistical Methods; Lexical Acquisition; Lexicography: Overview; Named Entity Extraction; Natural Language Processing: Overview; Part-of-Speech Tagging; Stemming; Summarization of Text, Automatic; Synonymy; Terminology and Terminological Databases; Text Mining; Text Retrieval Conference and Message Understanding Conference; Thesauruses; Web Searching.

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India: Language Situation

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Linguistic diversity has been the historical memory of India since even before it became a modern nation after independence. It remains the foundation of its cultural and political edifice in the present. The 114 *languages* enumerated in the 1991 census are an abstraction of 1576 *mother tongues* named by speakers by classifying them under names identified as distinct languages by the census, most of which are major languages. Each of these mother tongues is reported by 10 000 and more speakers, and any mother tongue reported by a lesser number of speakers is not counted in the total. The number of languages is reduced in another way by the decision to keep out of count the mother tongues that are not assigned to any language or language family; some of these unassigned mother tongues are likely to be distinct languages. The number of such mother tongues, which are not assigned to a language or have under 10 000 speakers, is 1796. The mother tongues with less than 10 000 speakers, whether assigned to a language or not, are not listed individually by name; they are clubbed under the name 'other mother tongues' under languages to which they are assigned or under no language when not assigned. The census distinction between mother tongue and language and its way of assigning mother tongues to languages explain partially the decennial difference in the number of languages. For a comparison of the total number of languages: the number enumerated in the census in 1961 was 193, in 1971 it was 105, and in 1981 it was 109 (Bhattacharya, 2002). The linguists differ in their estimate of the number of languages from the census. The number of Dravidian languages, for example, is 17 in the census (1991) and 26 for linguists (Krishnamurti, 2003), who nevertheless differ among themselves in according language status to dialects and so in the number of languages. The Survey of People of India (Singh and Manoharan, 1993), which does not differentiate between mother tongue and language and is based on self-report by ethnic communities (not individuals), puts the number at 191. The preceding shows that the number of languages is an administrative or a linguistic construct. The number of grammatically distinct languages in India can be placed around 200. Given the large population size (1028 million in 2001), language density (the ratio of languages to the population) is low, viz., 1:5 million.

The speaker strength of languages varies from under 30 (Andamanese) to over 337 million (Hindi). Hindi has the largest number (48) of mother tongues (excluding those having less than 10 000 speakers) grouped under it, 19 of which have more than one million speakers. With similar grouping of mother tongues under their name, the speakers of the languages listed in the constitution constitute 96.2% of the population in 1991, which was 95.58, 95.37, and 87.13%, respectively, in 1981, 1971, and 1961. The new additions to the list or schedule in the Constitution alone do not account this decennial increase. As the language is a construct, so too is its speaker strength.

The languages are categorized by their legal status. Twenty-two languages (14 in 1950) are called *scheduled languages* by virtue of being listed in the Constitution for the specified purpose contributing to the development of Hindi as the official language of the country; the place in the list has, however, come to be interpreted politically as constitutional recognition and as representing the nation. No language is given legally the status of the *national language* in the Constitution. The *tribal languages* (101 in 1961, 89 in 1991) are the mother tongues of communities identified as tribal in the Constitution. The languages that

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Table 1 Scheduled languages and their mother tongue speakers (1991)

Language	*Speakers*	*Percentage*
Hindi	337 272 114	40.2
Bengali	69 595 738	8.3
Telugu	66 017 605	7.9
Marathi	62 481 681	7.5
Tamil	53 006 368	6.3
Urdu	43 406 932	5.2
Gujarati	40 673 814	4.9
Kannada	32 753 676	3.9
Malayalam	30 377 176	3.6
Oriya	28 061 313	3.3
Punjabi	23 376 744	2.8
Assamese	13 079 696	1.6
Maithili***	7 766 597 (included in Hindi figure)	>1.0
Santali***	5 216 325	,,
Sindhi*	2 122 848	,,
Nepalese**	2 076 645	,,
Konkani**	1 760 607	,,
Manipuri**	1 270 206 (also called Meithei)	,,
Bodo***	1 221 881	,,
Dogri***	89 648	,,
Kashmiri	56 693 (partial figure)	,,
Sanskrit	49 736	,,

*Indicates the language included in the eighth schedule through a constitutional amendment and the number of stars indicates the three occasions when the amendment was enacted since the Constitution was adopted in 1950.

are not listed in the Constitution or are not spoken by tribes are commonly called *nonscheduled and nontribal languages*. They are five in 1991. The *official languages* in the states and the Union, which could be from any of these three categories, are 18, which are voted by legislatures to be the languages of governance. The *regional languages* are those that have a literary tradition and belong to an identifiable region of the country. The division of the country into states based on the majority language makes the regional languages generally, not necessarily, the official languages of the states. English, which is neither a scheduled, tribal, or regional language, is a coofficial language of the Union and the official language of one state (Nagaland); it is continued to be used in administration in practice in most states as the legacy continued from the colonial past. The Central Literary Academy lists 22 *literary languages* (not coterminous with the scheduled languages) to be eligible for national literary awards.

The languages in these categories are not mutually exclusive, and they crisscross. A scheduled language (Sanskrit, Sindhi, Nepalese [Nepli], Maithili, Bodo, Santali), for example, may not be an official language of a state. An official language (Mizo, Khasi) may not be scheduled and may be tribal. Two tribal (Bodo, Santali) and one mother tongue subsumed under Hindi (Maithili) are scheduled languages. This reflects the historical and political characteristics of language status in the multilingualism of India (Table 1).

Table 2 Language families and their speakers (1991 census)

	Number of languages	*Percentage of population*
Indo-European	20	75.30
Dravidian	17	22.53
Austro-Asiatic	14	1.13
Sino-Tibetan	63	.97

Ethnic and linguistic communities are not coterminous. Although there are 4635 ethnic communities in India according to the Survey of People of India (Singh and Manoharan, 2003), its contemporary census report (1991) gives a total of 3372 mother tongues, irrespective of their population size. This suggests that language is not the sole identification of ethnicity, and ethnically different communities have the same mother tongue. This also suggests language shift mostly from the mother tongue of a minor community to the mother tongue of a major community. Fifty-eight per cent of speakers from tribal communities had a nontribal mother tongue in 1981, which is an increase from 51% in 1971 and 43% in 1961. Though no figures are available of mother-tongue shift of an entire tribal community, the individual shifts suggest possible existence of community-wide shifts. The preceding figures show that though India is traditionally a country with stable multilingualism among minorities, language shift is on a gradual increase, particularly in tribal communities integrated into the market economy controlled by the majority communities.

Historically, the languages of India belong to four large genetic families leaving out the unclassifiable languages (mother tongues). They are Indo-European (Indo-Aryan and Dardic), Dravidian, Austro-Asiatic (Munda and Mon-Khmer) and Sino-Tibetan (Tibeto-Burman and Thai). The largest number of languages is Tibeto-Burman followed by Indo-Aryan, Dravidian, and Munda. All the languages of Sino-Tibetan (except Meithei) and Austro-Asiatic are tribal. Languages whose literary traditions started before the colonial period are 11 in Indo-Aryan, one in Dardic (Kashmiri), four in Dravidian, and one in Tibeto-Burman (Meithei). Indian languages use 10 script systems other than a revived old script (for Meithei) and a newly invented script (Ol chiki for Santali); eight of the major scripts are derived from Brahmi, of which Devanagari is used by more numbers of languages; two (Perso-Arabic and Roman) are exocentric (Table 2).

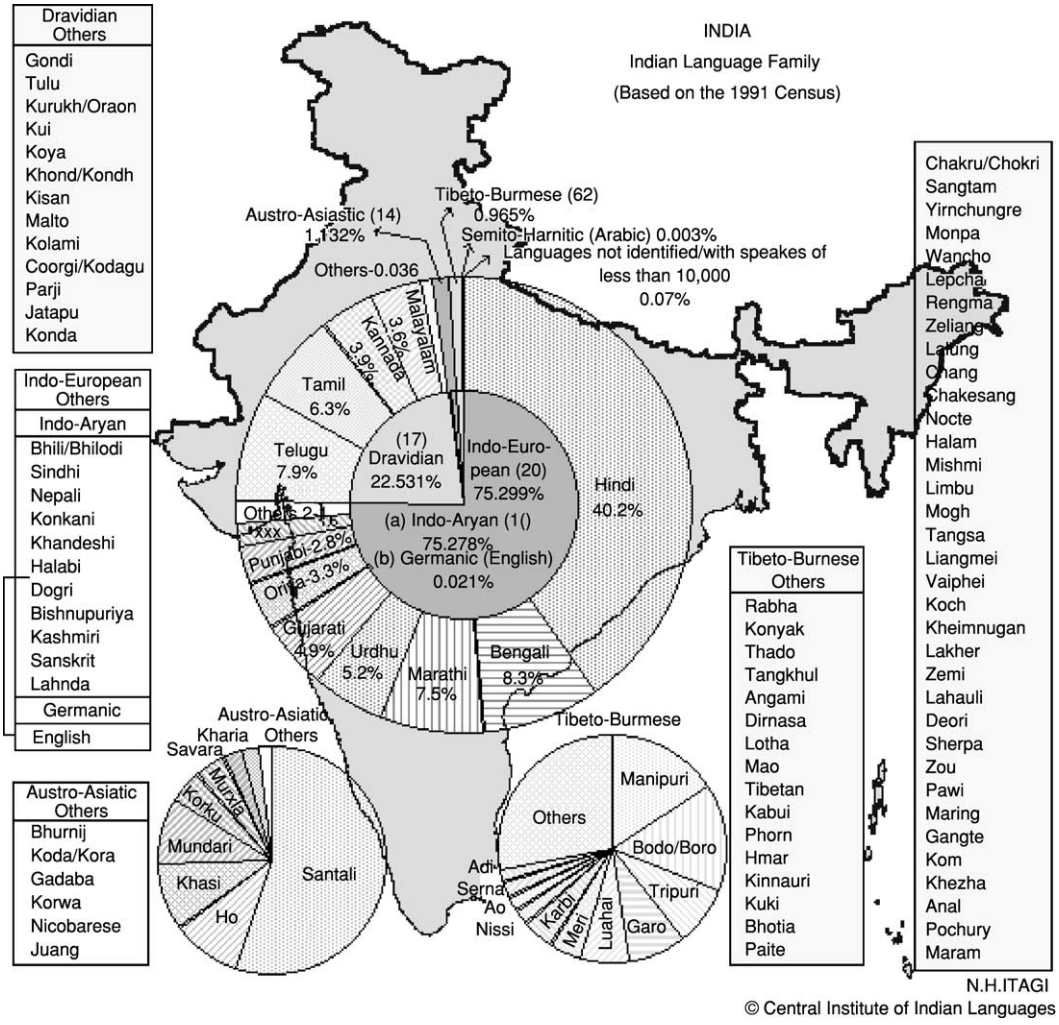

Figure 1 Distribution of languages. Figures in brackets refer to the number of languages (inclusive of mother tongues grouped under them) in each language-family. Reproduced from www.ciil.arg, based on the 1991 Census, Central Institute of Indian Languages, with permission.

The geographic distribution of languages does not match their genetic affiliation except that the Sino-Tibetan languages are endemic to the northeastern region, and Munda languages are concentrated in the hilly tracts of the eastern-central region (see **Figure 1**).

The demographic distribution of languages is such that there is no majority language at the national level. The speakers of Hindi, including all mother tongues under it, constitute less than 50% of the total population, and its mother tongue speakers are regionally concentrated. At the state level, however, there are majority languages with their demographic strength ranging from 96% (Kerala) to 63% (Manipur); there are also states like Nagaland and Arunachal Pradesh with no majority language. Each of the 28 states from the smallest to the largest is multilingual like the country. This multilingualism is recognized by the language policies at the state level to a greater extent in education and to a smaller extent in public administration, judicial processes, and business transactions. At the national level, multilingualism is more widely distributed with the use of the majority language of the states not only in the domain of education but also in other domains.

There are 18 official languages in India including the two (Hindi and English) of the Union government. This number increases when the languages that are given official status in a specific region within a state are included. Thirty-three languages are offered as medium of school education, and 41 languages are offered for teaching (NCERT, 1999). The students learn three languages (at least two in one state (Tamilnadu) and in schools run by the central government), which are the official language of the state and the two official languages of the Union. The students of states where Hindi is the official language learn

another Indian language; the students of linguistic minorities, which has the demographic strength to influence educational policy, can learn their mother tongue in lieu of one of the three school languages at some level of school education or in addition to them.

Despite their different genetic origins, the languages of India have converged to share grammatical features due to intensive and extensive interaction between their speakers, which makes India a linguistic area. Coupled with shared cultural beliefs and practices, the linguistic convergence facilitates communication across linguistic regions. India is a communication area, where multilingualism is not a barrier to communication. Indian multilingualism is not just demographic with 200 languages, and it is functional with scores of languages being used in public domains like public administration, education, and judiciary, as indicated earlier. There are languages restricted to private domains supporting family life (including endogamous marriage) and cultural practices (including religious rituals). They are minor and minority languages, which may be endemic to a place or transplanted from another place. Although their use in private domains helps their maintenance over generations, they make multilingualism pyramidal. There are more languages used in private domains than in public domains. There are more languages used in lower levels in public domains than in higher domains. The functional hierarchy and stratified status of languages based on their history, demographic strength, and political power lead to language conflicts. The conflicts range from claiming recognition for public function and legal status, to claiming territory to bring the speakers of a language under one political jurisdiction or to be in majority to have political and administrative control to promoting one variety of a language as the standard for upward mobility over others (Annamalai, 1979). The language conflicts are resolved by conceding to, or compromising on, the demands. The switch from the constitutionally mandated one official language of the Union (Hindi) to two languages (Hindi and English), extension of the constitutional list of languages, reorganization of state boundaries along language lines, and addition/deletion of languages taught in schools are some examples of the results of such a political process. The democratic political system of the country makes political solutions to language conflicts possible.

Multilingualism is the expression of the functional relationship between languages, which is shaped by the political, economic, and cultural values the languages have. The values are bound to change due to external factors such as political and economic changes and ethnic and human rights awareness. They have changed for Indian languages since independence. The position of English in Indian multilingualism has changed from being the symbol of colonial power and exploitation to be the symbol of economic and technological power for the progress of the country and the individuals. This change has created divergence between the language policy of the government and language preference of the people. There is increasing market demand for schools in the private sector to teach subjects in schools through the medium of English as a way of learning English. English, which has been the language of the elite, has increased its seductive power to be embraced by the general population. This is a change with significant consequences to Indian multilingualism.

Although the bilingualism in English is believed to give an advantage to Indians to link with the world, there is grassroots bilingualism in Indian languages, mostly in Hindi or a regional language. The link between the common people is through this bilingualism. Communication is smooth because the language boundaries in grassroots bilingualism are porous, enabling people to move easily between languages. Language competence is not aimed at the standard variety of the languages and is contingent on the need to perform the distributive functions specified for the languages. Indian multilingualism is marked by distributed use of languages and relative competence in them.

See also: Areal Linguistics; Dravidian Languages; Hindi; Indo–Aryan Languages; Indo–European Languages; Multilingualism: Pragmatic Aspects; Tamil.

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Indian Lexicography

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Ancient Sanskrit Lexicography

The native lexicographical tradition in India goes back to ancient Sanskrit literature. A dictionary is usually called **nighantu** or **kosha** in modern Indian languages. These terms go back to Sanskrit, where the term *nighantu* has no meaning other than a lexicon, but the term *kosha*, like thesaurus, originally meant a store or treasury. The nighantus, which are concerned with the interpretation of sacred literature, are glossaries of obscure words found in Vedic texts. A scholar called Yaska, who lived a couple of centuries before Christ, prepared a work known as **nirukta** 'explanation', which is an etymological commentary on the words found in a nighantu. Therefore, the term *nirukta* has now come to mean 'etymology'. The koshas, which are not based on any specific texts, have some unusual properties. They are written in verse and include nouns and indeclinables but not verbs. The words are arranged according to topics. They deal with synonyms and homonyms and were meant for the use of poets. The best-known kosha in Sanskrit is the lexicon prepared by a Buddhist scholar, Amarasinha, who was also a poet. This dictionary is usually known as *Amarakosha* ('Amara's dictionary') rather than by its actual name, *Namalinganushasana*. Amarasinha is believed to have lived in the sixth century A.D. This native lexicographical tradition prevailed for centuries in Sanskrit, Middle Indo-Aryan, and Modern Indo-Aryan languages.

European Influences

In the 17th century, European scholars studying Indian languages started preparing bilingual dictionaries for Indian languages modeled on European dictionaries. Several of Indian are comprehensive works, which are not limited to the basic vocabulary items of the language and their meanings but truly present a glimpse of the life and culture of the people that speak the language. Because the Portuguese arrived in India earlier than other Europeans, it is not surprising that the earliest European dictionaries of Indian languages were prepared by them. The Portuguese Jesuit Henrique Henriques is said to have prepared a Tamil–Portuguese dictionary prior to 1550, but no copy of that work has been found. Three prominent works among the extant ones are Diogo Ribeiro's *Vocabulario da lingoa canarim,* a Konkani–Portuguese dictionary compiled in Rachol, Goa, in 1626; Antaõ de Proença's *Vocabulario tamulico com a significaçam Portugueza,* published in 1679; and Manoel da Assumpçam's *Vocabulario em idioma Bengala e Portuguez,* published in 1743. Ribeiro's *Vocabulario* was not published. The full title of Ribeiro's work indicates that it is based on the work of earlier Jesuit scholars. Prominent among them was Thomas Stephens, the first Englishman in India, and the author of the first printed grammar of Konkani. Ribeiro's dictionary is closely modeled on the dictionaries of Latin and Greek. It faithfully follows this tradition in citing the various parts of speech: the verbs are cited in the first person singular present. The nouns are cited in the nominative singular followed by the oblique singular suffix. In Greek and Latin dictionaries, the nominative singular is followed by the genitive singular. It should be noted, however, that the Konkani oblique, having evolved from an earlier genitive, often indicates the genitive case without further marking. The adjectives are cited in the nominative singular masculine, followed by the nominative singular feminine and the nominative singular neuter suffixes. Ribeiro's dictionary has copious information on the religious beliefs, rituals, customs, and etiquette of the Goan people.

The Jesuits in Goa devised a systematic Roman transcription for Konkani, which was used in Ribeiro's Konkani dictionary as well as other Konkani works produced by them. We can appreciate its significance when we compare these works with the early Hindi works prepared in the 18th century, such as Captain George Hadley's *Grammatical remarks on the practical and vulgar dialect of the Indostan language, commonly called Moors, with a vocabulary, English and Moors* (published in 1772), where the representation of Hindi sounds in Roman transcription is chaotic. Soon after, however, Sir Willam Jones devised a systematic Roman transcription that could be used for Sanskrit and modern Indian languages. He was, of course, unaware of the transcription devised by the Jesuits in Goa about 200 years earlier. A Roman transcription based on the transcription of Sir William Jones, often in addition to the native script, has been adopted in many dictionaries of Indian languages published in the 19th and 20th centuries.

Several noteworthy bilingual dictionaries of Indian languages prepared by European scholars appeared in the 19th century. William Carey, who had already published a Marathi–English dictionary in 1810, published *Dictionary of the Bengalee language* in 1825. Carey was a Baptist missionary whose primary mission was the translation of the Bible. He is known for his study of several Indian languages

such as Bengali, Oriya, Panjabi, Marathi, Telugu, and Kannada. James Molesworth is known for his Marathi–English dictionary (*A dictionary of Marathi and English,* 1831, 2nd edn. 1857) and English–Marathi dictionary (*A dictionary, English and Marathi,* 1847, 2nd edn. 1873). When he was about 16 years old, Molesworth joined the army and came to India. He acquired great proficiency in languages like Marathi and Hindi and was given an appointment as a linguist in the Native Infantry. Monier Monier-Williams' English–Sanskrit Dictionary (*A dictionary, English and Sanskrit*) appeared in 1851 and *Sanskrit–Eng Dictionary* in 1872 (2nd edn. 1899). Monier-Williams was Boden Professor of Sanskrit at Oxford University. The monumental *Sanskrit Wörterbuch* (a Sanskrit–German dictionary, also known as the Petersburg Dictionary), compiled by Otto Böhtlingk and Rudolph Roth, appeared during the period 1855–75. *A dictionary, Telugu and English* by Charles P. Brown was published in 1852. He was also the author of many other learned works. *A dictionary in Assamese and English* by M. Bronson appeared in 1867. *A dictionary of Urdu, classical Hindi, and English* by John Platts, who taught Persian at Oxford University, appeared in 1884. Although it is not called a dictionary, William D. Whitney's *The roots, verb forms and primary derivatives of the Sanskrit language* (1885) presents the Sanskrit verb roots arranged alphabetically along with their derived forms. In the last decades of the 19th century, German missionaries from the Basel Mission published dictionaries for coastal Dravidian languages such as Kannada, Malayalam, and Tulu through the Basel Mission Book and Tract Depository, Mangalore. Among these works, Gundert's *A Malayalam and English dictionary* appeared in 1872. The best-known work among the Basel Mission publications is Ferdinand Kittel's *A Kannada–English dictionary,* published in 1894. Kittel's dictionary has an abundance of Kannada idioms and sayings. It includes both Old Kannada and Modern Kannada vocabulary. Although statues of other Europeans have been brought down in India after the country became independent, a statue of Ferdinand Kittel was installed in Bangalore (the capital of the Kannada state, Karnataka) in 2001 in recognition of Kittel's lexicographical contribution. It was inaugurated by the chief minister of the state.

Although an English dictionary, Yule and Burnell's *Hobson–Jobson,* published in 1886, deserves to be mentioned in an article on the dictionaries of Indian languages, because it deals with the history of thousands of words of Indian origin that were used by the British in India.

More bilingual dictionaries that are equally noteworthy were published in the 20th century. George Grierson's *A dictionary of the Kashmiri language* was published in 1916–32. *The Pali Text Society's Pali–English dictionary* by T. W. Rhys Davids and William Stede appeared in 1921–25. *Tamil lexicon,* edited by J. S. Chandler, S. V. Pillai, and others, appeared 1924–38. Ralph Turner's *A comparative and etymological dictionary of the Nepali language* appeared in 1931. P. O. Bodding's *A Santal dictionary* appeared in 1934.

Turner's *A comparative dictionary of Indo-Aryan languages* (1966–71) and *A Dravidian etymological dictionary* by Thomas Burrow and Murray Emeneau (1968, 2nd edn. 1984) have made a significant contribution to the study of comparative Indo-Aryan and Dravidian linguistics. A project for the preparation of a comparative Indo-Aryan dictionary was envisaged by Turner in the early decades of the 20th century. It was proposed by Sir George Grierson that such a dictionary should form an appendix to the volumes of his great linguistic survey of India in 1920. Turner lived long enough to publish his splendid work almost 50 years later. Manfred Mayrhofer's *Kurzgefasstes etymologisches Wörterbuch des altindischen,* published in 1956–80, is a valuable contribution to Sanskrit etymological studies.

The Rise of Indigenous Lexicographic Scholarship

Many noteworthy dictionaries, monolingual as well as bilingual, were published by Indian lexicographers toward the end of the 19th century and in the 20th century. Among the major monolingual dictionaries of Indian languages that appeared during this period, one can mention Kashi Nagari Pracharini Sabha's *Hindi shabdsagar* (a Hindi dictionary), edited by Shyamsundardas and other Hindi scholars (1929), *Maharashtra shabdkosh,* edited by Date and other Marathi scholars (1932–38), *Rajasthani sabadkos,* by Sitaram Lalas (1962), and *Kannada nighantu,* by G. Venkatasubbiah (1971–79).

V. S. Apte's *The practical Sanskrit–English dictionary* appeared in 1890. Its substantially revised and enlarged version by P. K. Gode and C. G. Karve was published in 1957. Hargovind Das's *Paia Sadda Mahannavo* (a Prakrit–Hindi dictionary) appeared in 1923. The *Ardhamagadhi dictionary* by Shatavadhani Jain Muni Shri Ratnachandraji Maharaj also appeared in 1923. The second edition of Hardev Bahri's *English–Hindi dictionary* appeared in 1969. Sukumar Sen's *An etymological dictionary of Bengali (1000–1800 A.D.)* was published in 1971.

Monsignor Sebastião Dalgado, a Goan priest and lexicographer, who prepared a Portuguese–Konkani dictionary in 1883, a Konkani–Portuguese dictionary in 1893, and *Influência do vocabulário Português em línguas Asiáticas* in 1913 (translated into English by A. X. Soares in 1936 under the title *Portuguese vocables in Asiatic languages*), published his magnum opus, *Glossário Luso-Asiático*, in 1918–21. This work, which is modeled after Yule and Burnell's *Hobson–Jobson*, deals with lexical items from Indian languages as well as other Asiatic languages that have entered the Portuguese language.

Several dictionaries dealing with special vocabularies have appeared in the last few decades. Krishnamurthi's *Mandalika vrittipadakosam*, which appeared in 1962, is a Telugu dictionary of agricultural vocabulary. Helmut Nespital's *Dictionary of Hindi verbs* appeared in 1997. Several such dictionaries, such as *Rajpal English–Hindi dictionary of technical terms* by Hardev Bahri (4th edn., 2001), are concerned with technical terminology.

A number of major works on Indian languages by Indian or foreign scholars have appeared since 1980. Panjab University's *English–Punjabi dictionary* appeared in 1981. In 1984, Central Hindi Directorate (which is under the Ministry of Human Resources Development, Government of India) published *Bharatiya bhasha kosh* (a dictionary of Indian languages), which is a 14-language dictionary: Hindi to Panjabi, Urdu, Kashmiri, Sindhi, Marathi, Gujarati, Bengali, Assamese, Oriya, Telugu, Tamil, Malayalam, and Kannada. Central Hindi Directorate has also published several trilingual dictionaries (regional language–Hindi–English or Hindi–regional language–English) such as *Gujarati–Hindi–English trilingual dictionary* (1984–85), *Hindi–Sindhi–English trilingual dictionary* (1989), and *Hindi–Assamese–English trilingual dictionary* (1989). *Tulu lexicon*, a Tulu–Kannada–English dictionary that appeared in 1988–1997, was prepared by U. P. Upadhyaya and his associates after a systematic dialect survey of the Tulu-speaking areas. Both regional dialects and dialects spoken in various communities were investigated. They collected idioms, sayings, and vocabulary from written sources as well as that used in various occupations, at fairs and festivals, in religious ceremonies, folk performances, and games. *The Oxford Hindi–English dictionary* by R. S. McGregor, which appeared in 1993, has fulfilled the long-felt need for a reliable Hindi–English dictionary. The fascicles of Manfred Mayrhofer's *Etymologisches wörterbuch des Altindischen* (an etymological dictionary of Sanskrit), which is an extended version of his *Kurzgefasstes etymologisches Wörterbuch*, started appearing in 1986. A greatly revised version of an English–Kannada dictionary first published by Mysore University in 1946 started appearing in 1989 (second edition, 2000) under the title *The Mysore University English–Kannada dictionary*. The fourth and final volume of this work appeared in 2004.

See also: Bengali; Bilingual Lexicography; Dravidian Languages; Greek Lexicography, Classical; Greek Lexicography, Modern; Hindi; India: Language Situation; Indo–European Languages; Jones, William, Sir (1746–1794); Kannada; Latin Lexicography; Malayalam; Portuguese; Sanskrit; Telugu.

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Individual Recognition in Animal Species

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No empirical evidence is required to convince even the most skeptical reader that humans use distinctive facial and vocal features as cues for recognizing other individuals, and that individual recognition provides the foundation for our social relationships. Based on our own experiences, we also know that the recognition of a particular individual, say a friend or colleague, entails a multifaceted representation, or concept, of that individual. In other words, we often possess knowledge about recognized individuals gained through previous social interactions that goes far beyond the mere characteristic appearances of their faces or sounds of their voices. This knowledge, in part, determines the conditions for our present and future social interactions.

But what can be said of the role of individual recognition in the social behavior of nonhuman animals? There is ample evidence from a range of species that other animals also base many of their social interactions on an ability to recognize other individuals, such as relatives, mates, and members of their social group. However, providing a general and concise answer to questions about 'social recognition' in animals is exceedingly difficult, given the diversity of social recognition systems found in nature, the diversity of species and behavioral contexts in which social recognition has been investigated, and the diversity of approaches and perspectives taken by animal behaviorists in their investigations of social recognition. Therefore, no short review of the subject, including this one, can be comprehensive.

In this article, the basic components common to all social recognition systems, and two general mechanisms that mediate social recognition in animals, are described, and several different perspectives on social recognition in animals are briefly discussed. Because most animal studies investigate the role of communication in social recognition, the article will focus on communication-based social recognition systems. Several evolutionarily important behavioral contexts of communication-based social recognition are described, with an emphasis on acoustically mediated social recognition systems, and three experimental approaches to the study of social recognition in animals are briefly discussed. Finally, a general model of communication-based social recognition is outlined, making explicit how different perspectives on social recognition may be integrated. Readers of this article, especially those not accustomed to thinking about the behavior of nonhuman animals, should keep the following two points in mind:

1. We should expect social recognition systems to differ among species, and these differences should reflect adaptations to different species-typical social environments within constraints imposed by an animal's perceptual and cognitive systems.
2. What humans experience as individual recognition likely represents one end of a continuum of complexity in the evolved perceptual and cognitive abilities that underlie social recognition.

Components and Mechanisms of Social Recognition

Here, 'social recognition' will refer to the ability of animals to recognize different **social categories** of individuals within their own species. The nature of these social categories is always an empirical question. They may be very broad—for example, related versus unrelated individuals, or familiar versus unfamiliar individuals—or each social category may correspond to a particular individual, so that multiple, familiar individuals are recognized as distinct social categories, as is the case for humans.

Social recognition systems have five necessary components:

1. Animals must provide information about their membership in a social category using so-called 'signature signals' or other recognition cues that differ between the social categories that pose the recognition problem;
2. Animals must perceive differences in the signature signals and recognition cues that identify particular social categories;
3. Animals must compare a perceived signal or cue to an internal neural representation that may be either innate or learned;
4. Animals must decide whether a perceived signal or cue matches their internal neural representation; and
5. Animals must posses a behavioral repertoire diverse enough to allow different behavioral responses to different social categories.

These components are explained in further detail later in this article, in the context of communication-based social recognition systems. Readers are referred to Beecher (1990; 1991), Sherman *et al.* (1997), and Bradbury and Vehrencamp (1998) for well-developed and thoughtful treatments of the components of recognition systems.

Animal behaviorists have identified several potential mechanisms that can mediate social recognition. The two mechanisms that have been the subject of most empirical and theoretical studies are 'phenotype matching' and 'familiarity.' An animal's phenotype refers to its observable appearance, characteristics, and behaviors, and it is influenced by the genes it inherits from its parents and by its environment. Phenotype matching occurs when animals match another animal's phenotype to an innate or learned representation of either their own phenotype ('self-referent phenotype matching') or that of a familiar individual. Because the relatedness of two individuals is proportional to the number of copies of genes that they share, and the degree of similarity in their phenotypes is influenced by the number of shared genes, phenotype matching can be one way that animals behaviorally discriminate between relatives and non-relatives, or among animals related by different degrees. In some cases, related individuals, such as siblings, may also live in a common environment that can influence their phenotypes in similar ways, for example, by giving rise to similar odors. Such cues can also mediate social recognition based on phenotype matching, and this represents one form of social recognition that is not based on communication signals.

Social recognition may also be based on mechanisms that involve an acquired familiarity with the phenotypic characteristics that distinguish among social categories. In other words, instead of matching an individual's phenotype to their own or that of another individual, animals learn about and remember the phenotypes of the individuals comprising social categories through prior observations of, or interactions with, those individuals. In this case, recognition is mediated by comparing sensory input with a previously learned representation of the phenotype that identifies the social category posing the recognition problem. Much of the work on the role of familiarity in social recognition has focused on the ability of animals to learn to recognize social categories based on differences in communication signals, and this will be the topic of the remainder of this article. Before describing communication-based social recognition systems in more detail, however, it is worthwhile to first consider a number of perspectives on social recognition in nonhuman animals.

Perspectives on Social Recognition in Animals

Among animal behaviorists, there are different perspectives on the question of social recognition in animals that stem as much from the diversity of social recognition systems as from the rich diversity of approaches used to study animal behavior. One of these perspectives is based in ethology, the biological study of behavior that developed in the first half of the 20th century and attempts to answer questions about the causal mechanisms, development, evolution, and function of animal behaviors. It is from an ethological perspective that social recognition is most often treated as a communication problem. Researchers working from this perspective often define social recognition operationally, in terms of the behavioral discriminations that animals make among social categories and the features of communication signals or other recognition cues that make discrimination possible. Thus, an ethological perspective tends to emphasize the sensory input that makes recognition possible and the behavioral interactions that result from recognition.

The field of behavioral ecology developed as an outgrowth of ethology in the 1970s and focuses on the adaptive value of social behaviors, the ecological and social factors that influence these behaviors, and the mechanisms that allow these behaviors to evolve. Behavioral ecological perspectives on social recognition are more often concerned with recognition as an evolutionary adaptation for directing appropriate social behaviors toward other members of an animal's social group and the implications of recognition for survival and reproduction. Behavioral ecologists also address questions related to the genetic mechanisms that underlie the evolution of social recognition and the ecological and social factors that favor the evolution of social recognition systems.

Following the cognitive revolution that occurred in psychology in the 1950s and 1960s, many of the principles of cognitive psychology, which emphasize internal mental processes, began making important contributions to the study of behaviors in a diversity of animal species in the 1980s and 1990s. This culminated in approaches to animal behavior variously termed 'animal cognition,' 'cognitive ecology,' and 'cognitive ethology.' From a cognitive perspective, social recognition is often treated as a question about social knowledge and social categorization and is defined representationally, in terms of the complexity, specificity, and dimensionality of the internal representations of familiar individuals that result from previous experience. Thus, the cognitive perspective tends to emphasize not sensory input and behavioral output, nor the evolution of social recognition, but instead the internal processes and representations that are involved in social recognition and the roles that such representations play in social interactions.

All of these perspectives are valuable because they address different, but related, questions about social

recognition that complement one another. Efforts that integrate these different perspectives will likely continue to shed new light on both the mechanisms and evolution of social recognition systems in animals. As described below, the study of communication-based social recognition systems provides rich opportunities for integrating these perspectives.

Communication-Based Social Recognition Systems

A simple conceptualization of animal communication would consist of an animal acting as a 'sender' to produce a 'signal' that is perceived by another animal acting as a 'receiver.' Communication-based social recognition can be defined operationally as occurring when receivers direct appropriate behaviors toward one or more particular social categories of senders in response to signals, while withholding these behaviors from other social categories of senders, based on an acquired familiarity with distinctive properties of the signals produced by the sender or senders of the social categories to which the behaviors are directed. Several important points about this definition should be made explicit. First, recognition is an inherently internal product of the receiver's nervous system that must be inferred by researchers from the receiver's discriminative behavioral responses to signals produced by senders of different social categories. Second, recognition is based on familiarity with communication signals; that is, learning plays a critical role in allowing receivers to form memories that encode the distinctive properties of signals that distinguish social categories of senders. Finally, the above definition does not require that recognition based on communication signals involve the formation of mnemonic representations that are more complex than representations of signals themselves. However, the possibility that social recognition involves an integrated, multifaceted neural representation of the sender as an external referent is certainly not excluded by focusing on communication-based social recognition.

Defined in this manner, communication-based social recognition has been demonstrated in fish, amphibians (frogs and salamanders), reptiles, birds, and mammals. Moreover, social recognition is mediated by communication signals in a diversity of sensory modalities, including vision, audition, chemoreception, and electroreception, and it occurs in a number of evolutionarily important behavioral contexts. Four behavioral contexts in which communication-based social recognition has been widely studied are kin recognition, territorial neighbor recognition, mate recognition, and so-called 'true individual recognition.'

Behavioral Contexts of Communication-based Social Recognition

Kin Recognition Some animals learn to behaviorally discriminate among related and unrelated individuals, or among individuals related by different degrees, based on differences in communication signals. This form of social recognition, termed 'kin recognition,' is commonly associated either with choosing an optimally related mate, for example to avoid the deleterious effects of inbreeding, or with directing certain behaviors toward relatives that function to increase their survival and reproduction. The study of kin recognition was greatly advanced by the formulation of kin selection theory by behavioral ecologists. Kin selection theory can explain the evolution of some of the apparently altruistic behaviors stemming from kin recognition as adaptations that allow individuals to propagate copies of their own genes into the next generation by improving the survival and reproduction of genetically related individuals.

Kin recognition based on chemical signals called pheromones is well known from rodents and other mammals. Parent-offspring recognition is a form of kin recognition that has evolved numerous times in animals that provide parental care for their offspring, especially in species that have social systems in which the offspring from different sets of parents intermingle while still under the care of their parents. Parent-offspring recognition based on acoustic signals has been studied in colonially breeding species, such as some swallows, seabirds (e.g., penguins), pinnipeds (e.g., seals), and bats. In these colonial species, the young are often left in a communal crèche, sometimes consisting of thousands of densely packed individuals, while the parents leave the area to forage. Parents and offspring are able to reunite in these very crowded social conditions by recognizing individually distinctive vocalizations.

Territorial Neighbor Recognition In species in which individuals defend territories, territory holders commonly exhibit behaviors that indicate that they recognize their nearby territorial neighbors, a form of social recognition termed 'territorial neighbor recognition.' Most commonly, territory holders are shown to exhibit low levels of aggression toward their nearby, established neighbors and high levels of aggression toward unfamiliar 'strangers' that may attempt to take over the territory or to establish a new nearby territory. Displays of lower levels of aggression toward familiar neighbors are thought to evolve in

species that defend long-term multipurpose or breeding territories, as opposed to feeding territories. This form of territorial neighbor recognition is usually presumed to be an evolutionary adaptation that allows territory holders to avoid the costs of repeated aggressive interactions with neighbors that already possess their own territory and therefore represent less of a threat to territory ownership than strangers that may attempt a territory takeover.

Songbirds represent the most thoroughly studied taxon when it comes to neighbor recognition. Territorial male songbirds discriminate among neighbors and strangers, and even among multiple neighbors, based on a combination of individual differences in songs and spatial cues related to the location of a neighbor's territory. Some songbirds even among appear to retain long-term memories of the songs of their neighbors from previous breeding seasons. Similar acoustically mediated recognition systems have also been described in territorial seabirds, fish, and frogs, although long-term memories for neighbors' signals have not been investigated in these taxa. Neighbor recognition has also been investigated in territorial lizards, which can recognize their neighbors based on visual and chemical cues. Some electric fish may also recognize neighbors based on individual differences in self-generated electrical signals known as electric organ discharges.

Mate Recognition Another form of social recognition, termed 'mate recognition,' refers to behavioral discrimination by an individual between its mate or breeding partner and other members of the same species. Mate recognition can play a role in maintaining the pair bond and in synchronizing shared parental duties, such as the care of eggs or young. An ability to recognize one's mate is particularly important in socially monogamous species that form long-term pair bonds. Mate recognition based on acoustic signals has been most studied in animals that live in large colonies, such as colonial seabirds, in which parents coordinate their parental care duties, and in which spatial cues may provide little assistance in locating a mate. Because of other uses of the term 'mate recognition' in the literature, it is important to distinguish this form of social recognition from 'species recognition'; 'mate recognition' is often used to describe the recognition of an individual of the opposite sex as a member of the same species and therefore as a potential mating partner.

'True Individual Recognition' Finally, a number of studies of so-called 'true individual recognition' demonstrate that some animals recognize multiple, familiar, and often unrelated individuals as distinct and unique social categories. This form of social recognition, which bears its somewhat anthropocentric name in part because it approaches more closely our own human experience, appears to function in animal species with highly developed social structures, in which individuals often live in organized social groups. For example, in bottlenose dolphins, in which individuals form long-lasting associations, individual dolphins can discriminate among multiple familiar individuals based on individual differences in so-called 'signature whistles.' Some birds, such as the song sparrows described later in this article, may also be capable of such true individual recognition based on individual differences in vocalizations.

A number of studies of social cognition in nonhuman primates have established that some primates not only recognize multiple familiar individuals as distinct social categories – both visually and acoustically – but they also possess social knowledge about these individuals, such as the social alliances they form, their relatedness to other individuals, and their rank order in dominance hierarchies. This is the case, for example, with group-living baboons, which are discussed in more detail later. Thus, it seems clear that, like humans, some other animals, such as highly social, group-living primates, are able to form integrated, multifaceted representations of multiple familiar individuals that are more complex than a mere representation of communication signals or other simple cues associated with these individuals.

Methods Used to Investigate Communication-Based Social Recognition

Because social recognition is an internal process that involves comparing sensory input to an internal neural representation, and because nonhuman animals cannot simply tell us about their recognition experiences, the study of social recognition in animals requires observations and experiments that inform us about an animal's recognition abilities based on its behavioral interactions with other individuals or its behavioral responses to communication signals from different social categories of senders. Three experimental designs that are commonly used to investigate communication-based social recognition are 'discrimination experiments,' 'habituation-discrimination experiments,' and 'conditioning experiments.'

Discrimination Experiments In a discrimination experiment, typically two different signals are presented to test the hypothesis that the intended receiver will behaviorally discriminate among the signals, at least one of which is presumed to be familiar to the subject. The alternatives might be familiar versus

unfamiliar signals, the signals of two different familiar individuals, or the unmodified signal of a familiar individual versus an experimentally modified version of the same signal. Experiments usually consist of either presentations of different alternatives in separate test periods separated by some intervening time interval, or simultaneous presentations in a two-alternative choice test. Some experiments use actual conspecific individuals as stimuli instead of experimentally presented communication signals.

Habituation-Discrimination Experiments The habituation-discrimination paradigm involves repeatedly presenting a response-eliciting stimulus during an initial 'habituation phase' until the response habituates. The stimulus is often a communication signal from a particular social category, although real individuals are sometimes used. During a subsequent 'discrimination phase,' subjects in the control group experience additional presentations of the habituating signal, and subjects in experimental treatment groups experience novel signals that are in some way different from the habituating signal, such as a signal from a different social category. The prediction is that if subjects perceive the novel stimulus as the signal of a new or different social category, then the habituated responses of the treatment groups should be greater than those of the control group during the discrimination phase.

Conditioning Experiments In conditioning experiments, subjects are trained, using classical or operant conditioning techniques, to respond differently to signals from different social categories of senders. In contrast to discrimination experiments and habituation-discrimination experiments, which take advantage of an animal's natural behavioral repertoire and can therefore be conducted in the field, conditioning experiments are conducted under controlled laboratory settings that involve the experimenter determining what constitutes a correct behavioral response. In classical conditioning experiments, the behavioral response often involves some sort of reflex to a stimulus (e.g., Pavlov's salivating dogs). The responses in operant conditioning experiments often involve behaviors such as pecking a lighted response key or pressing a lever in response to a stimulus to obtain a food reward and to avoid punishment. Once animals are trained to distinguish among social categories with a certain level of correct responses, recognition abilities are then tested in probe trials in which test signals belonging either to the same social categories or to different ones are presented to test the subject's ability to distinguish among social categories.

A Model of Communication-Based Social Recognition

Given the importance of communication in the social recognition systems of animals, including humans, it is worth illustrating a general model of how communication signals can mediate social recognition. One requirement for communication-based social recognition is that communication signals be distinctive among the social categories of senders that pose the social recognition problem. These so-called 'signature signals' can arise when the signals produced by senders of different social categories differ in the presence/absence of certain signal attributes, or as illustrated in Figure 1, when the among-category variation in signals exceeds the variation that occurs within social categories.

The two-dimensional and three-dimensional plots in Figure 1 illustrate two important points. First, signals usually vary in multiple dimensions that can potentially provide independent information about a sender's membership in a particular social category. Second, the signals of different social categories may be well separated along some signal dimensions, while there may be extensive overlap along other signal dimensions. For example, the signals of social categories 4 and 5 in Figure 1 overlap considerably along signal property 2 but are well separated along signal properties 1 and 3. It may be the case that at least some social categories overlap on all signal properties. We should, therefore, expect receivers to evolve to use as recognition cues those signal properties that most reliably distinguish among senders from different social categories.

The comparative work of Beecher and colleagues on vocally mediated parent-offspring recognition in swallows has highlighted the fact that evolution can also act directly on the signals produced by senders, making them more distinctive among social categories in species in which social recognition is evolutionarily advantageous. The calls of chicks in colonial-breeding cliff swallows and banks swallows, in which young are left in communal crèches, and in which parents rely on calls to reunite with their chicks, are more individually distinct than the calls of chicks in the solitary-breeding barn swallows and rough-winged swallows, in which the requirements for parent-offspring recognition are less demanding.

The Basic Model

Figure 2 depicts a multistage hierarchical model of communication-based social recognition that highlights the internal processes of the receiver's nervous system that mediate recognition. While the stages in the model may be expected to vary somewhat

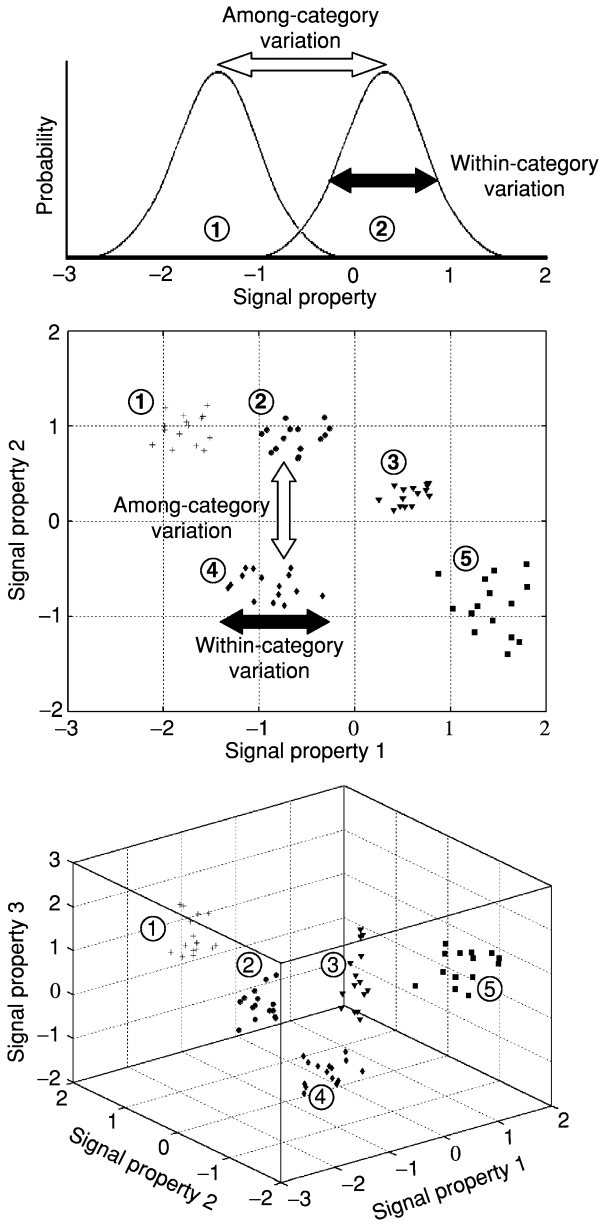

Figure 1 Schematic illustrations of distinctiveness in communication signals among social categories of senders. *Top:* Two probability density functions illustrating the likelihood that two social categories (1 and 2) have the specified values of a single signal property. *Middle:* Scatter plot illustrating the values of 15 signals from each of five social categories (individuals in this case) in a two-dimensional 'signal space.' Each axis represents values for a different signal property. For example, for an acoustic signal, the two signal properties might represent spectral frequency and signal duration. *Bottom:* Scatter plot illustrating the separation among social categories in a three-dimensional signal space bounded by values of three signal properties. Axis values in all three plots represent deviations of signal properties from a standardized population mean value of zero. (Top and middle figures adapted from Insley *et al.,* 2003.)

according to sensory modality, for the most part, similar or parallel processes should be expected across sensory modalities.

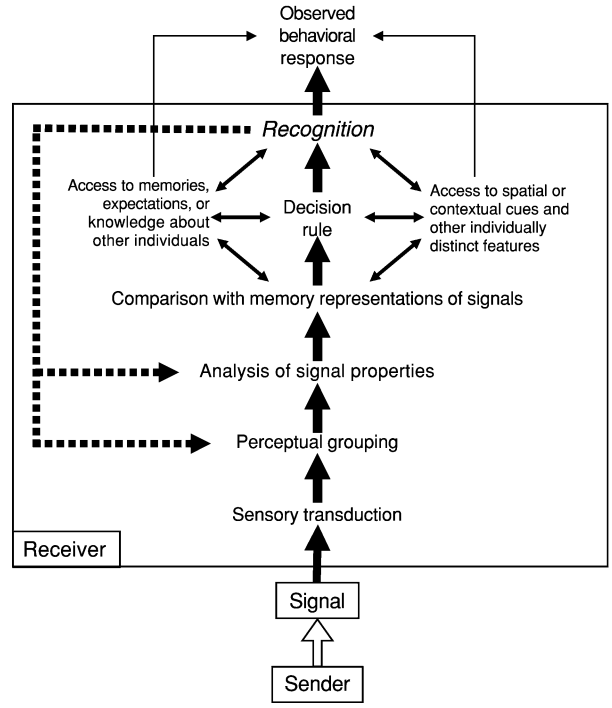

Figure 2 Schematic model of communication-based social recognition. The model depicts the processes involved in recognition that take place in the receiver's nervous system. The open arrow *(bottom)* depicts the requirement that senders produce signals that are distinctive among the social categories of senders posing the recognition problem (see **Figure 1**). Thick black arrows depict bottom-up processes leading from sensory transduction of a signal to the behavioral output of the receiver. Dashed arrows depict potential top-down influences of recognition on earlier perceptual processes. Thin black arrows depict possible associations between the mnemonic representation of the signal and other sources of information encoded in memory that can influence the decision rule and recognition, as well as the observed behavioral output. Note that the hierarchical arrangement of stages in the model does not necessarily imply that processing between stages is organized sequentially. (Adapted from McAdams, 1993.)

The perceptual processes involved in communication-based social recognition begin in the receiver's sensory system, with the transduction of communication signals into neural activity. The sensory system may then be required to perform some kind of perceptual grouping, by which the neural representation of the to-be-recognized signal is perceptually segregated from those of other signals, stimuli, or noise in the environment and integrated into a coherent perceptual object based on the signal's physical and temporal properties. Once a perceptual object of a perceived signal has been formed, the sensory system must analyze this representation to determine the perceived signal's salient properties. The properties of a receiver's perceptual representation of the signal must then be compared to those of a mnemonic representation of the signal that was formed as a result of previous

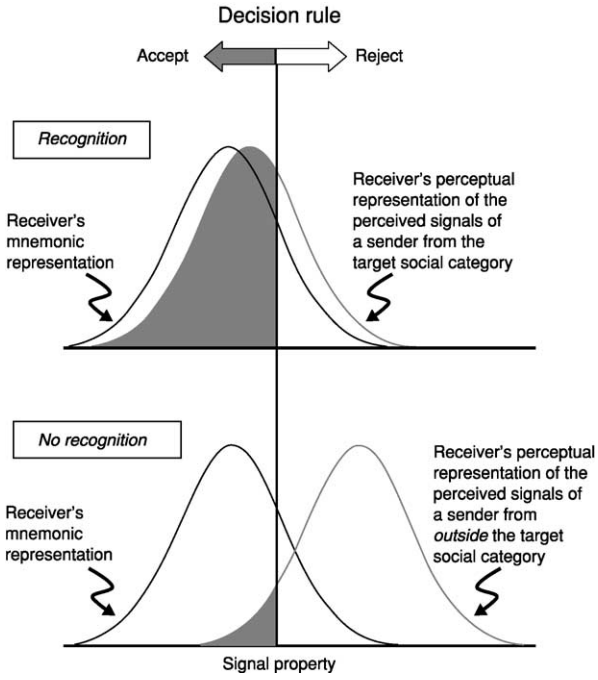

Figure 3 Matching between perceptual and mnemonic representations of signals. Receivers must use some form of a decision rule to determine whether or not their perceptual representation of a signal adequately matches the representation stored in their memory. The shaded area represents the probability that the perceived signals of a sender from the to-be-recognized target social category *(top)*, or a sender from outside the target category *(bottom)*, will be accepted (i.e., recognized) as coming from a sender of the target social category, given the location of the receiver's decision rule (vertical bar). The variance in the receiver's mnemonic and perceptual representations of a sender's signals can arise from sources such as within-individual variation or habitat-induced variation in the sender's signals and internal noise resulting from spontaneous neural activity and the statistical nature of stimulus-driven neural activity in the receiver's nervous system.

recognition learning. At this stage, receivers must use some decision rule, or matching algorithm, to determine whether their perceptual representation of the signal adequately matches their representation in memory, followed by a judgment about the sender's category membership.

The matching process between a receiver's perceptual and mnemonic representations of a sender's signal is sometimes modeled as two probability density functions of the values of some signal property that serves as a recognition cue (Figure 3). The probability distributions on the left in Figure 3 represent the receiver's mnemonic representation, which encodes a range of values for a particular signal property that can be attributed to senders from a particular social category with a specified probability; the distributions to the right represent the receiver's perceptual representations, which encode a range of values for the same signal property after perceiving a signal, again with a specified probability. If there is an adequate match between the perceptual and mnemonic representations, as illustrated in the upper panel of Figure 3, then recognition can be said to occur and the receiver should accept the sender as belonging to a particular target social category (e.g., mate, parent, offspring, or neighbor). The lower panel illustrates a situation in which there is an inadequate match, resulting in the rejection of the sender as belonging to the particular target social category. Evolution should equip receivers with a decision rule that maximizes the number of correct behavioral responses while minimizing the number of recognition errors. Thus the location of the decision rule should depend on the relative benefits of correct responses, the costs of errors, and the probabilities of correct and incorrect responses given the degree of overlap among the signal properties of individuals posing the recognition problem.

Finally, for observers and experimenters to acquire evidence that recognition has occurred, it is necessary that receivers respond differently to signals from different social categories of senders. It is also important to bear in mind, however, that the internal process of recognition may, in fact, occur in the absence of any overt behavioral discrimination if the most evolutionarily appropriate behavior is to respond similarly to different social categories of senders. The fact that recognition can occur in the absence of a behavioral discrimination is a perennial problem in the study of animal recognition systems, especially in the interpretation of negative results.

The Extended Model: Integrating Ethological and Cognitive Perspectives

As stated earlier, we should expect animal recognition systems to differ among species, and these differences should reflect species differences in ecology, phylogenetic history, and the complexity of perceptual, social, and communication systems. A consideration of how species may be expected to differ provides a way to integrate the ethological and cognitive approaches to studying social recognition.

Dimensions of Communication-Based Social Recognition The mnemonic representations of communication signals that are formed through recognition learning and that mediate social recognition (Figures 2 and 3) can be expected to differ among animal species along three dimensions: specificity, complexity, and temporal stability (Figure 4).

'Specificity' refers to the breadth of the social categories that represent the social recognition problem and can range from dichotomous social categories (e.g., related versus unrelated, familiar

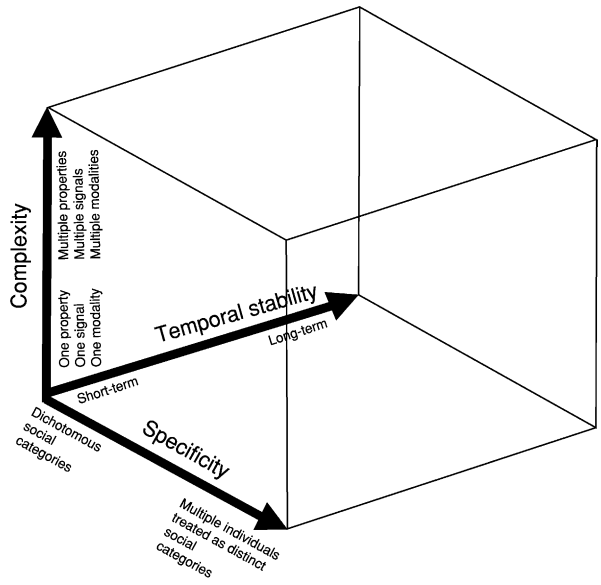

Figure 4 Three dimensions of communication-based social recognition. Species should be expected to differ in the specificity, complexity, and temporal stability of their mnemonic representations of recognized communication signals, as well as in the extent that these representations are integrated with other sources of information.

versus unfamiliar, or mate versus non-mate) to the situation where multiple familiar individuals are treated as distinct and separate social categories, such as in so-called 'true individual recognition.'

'Complexity' can refer to at least three different characteristics of a recognition system. First, because multiple properties of communication signals (e.g., spectral and temporal properties of acoustic signals) can exhibit variation that potentially can be used for recognition (Figure 1), complexity can refer to the number of different signal properties encoded in memory within a particular sensory modality. Second, in species that communicate using a repertoire of signals in a particular sensory modality, complexity can refer to the number of signal types that are recognized from a particular social category. Finally, because social recognition in some animals is mediated by multiple sensory modalities, such as vision and audition, complexity can also refer to the number of different sensory modalities involved in recognition.

'Temporal stability' refers to the time over which encoded representations of signals persist in memory. In species in which individuals interact only briefly, relatively short-lived memories may be sufficient to solve any particular recognition problem, whereas in species in which individuals interact over longer periods, or with longer intervals between interactions, long-term memories may be required for social recognition.

Integration of Signals with Other Information Questions related to the extent that mnemonic representations of communication signals are integrated with other sources of information or social knowledge go to the heart of combining ethological and cognitive perspectives on social recognition. Other sources of information may not only facilitate recognition of communication signals but may also have more direct influences on an animal's behavioral response (Figure 2). This information may include memories of previous social interactions, expectations about future social interactions, and previous knowledge about other individuals gained through observations and previous social interactions. The way that representations of acoustic signals can be integrated with other forms of social knowledge is perhaps best illustrated with two examples from the literature.

As mentioned above, an integration of representations of communication signals with social knowledge about recognized individuals is known from primates with complex social structures. For example, Cheney and Seyfarth (1999) used ingenious field playback tests to demonstrate that some species of monkeys, such as baboons, possess information about the family relationships of other individuals. In one experiment, pairs of unrelated female baboons were presented with acoustic playbacks that simulated a fight occurring either between two of their familiar relatives or between two familiar individuals that were not related to either subject. When the acoustically simulated fight, which consisted of previously recorded threat grunts and screams, was presented, females looked toward the speaker longer during the playbacks and looked toward each other longer following playbacks when the simulated fight was between their relatives, as opposed to between two non-kin. Females were also more likely to interact in a friendly manner following a fight between two non-kin compared to a fight between two of their relatives. These results can be interpreted as indicating three important aspects about vocally mediated social recognition in baboons. First, subjects recognized the fighting individuals by their threat grunts and screams, two acoustically different signals. Second, subjects recognized the relatedness between one of the simulated fighters and themselves. Third, subjects recognized the relatedness between the other fighter and the other paired subject. Thus, representations of familiar acoustic signals were integrated with other social knowledge about the senders that included information about relatedness to self and relatedness to others.

The extent to which such integration between representations of signals and social knowledge plays a role in the social recognition systems of

non-primates has unfortunately received much less attention. However, in a study of song sparrows, a songbird in which males recognize their territorial neighbors, the results of playback tests by Beecher *et al.* (1996) suggested that territorial males in this species may also possess social knowledge about their territorial neighbors. In song sparrows, neighboring territorial holders tend to share a number of song types in their song repertoires. When the songs of a familiar neighbor were played back from the neighbor's territory, subjects responded by singing a song type that they shared with that neighbor, but that was different from the song type sung by the simulated neighbor. In contrast, when a stranger's song was presented from a neighbor's territory, subjects responded with a song type from their repertoire that they did not share with that particular neighbor. These results suggest that male song sparrows recognize an individual neighbor as a distinct social category (i.e., 'true individual recognition'), that they possess knowledge about the song types that they do and do not share with their recognized territorial neighbors, and that this social knowledge plays a role in social interactions over territory boundaries.

In addition to social knowledge about other individuals, receivers may also possess information about the significance of current spatial or contextual cues related to the context in which the signal was perceived (Figure 2). Spatial location is often regarded as an important cue in some forms of recognition. For example, what could appear on the surface to be parent-offspring recognition may, in fact, represent behaviors guided by a simple rule followed by a parent, such as 'find the nest and feed the young in the nest.' Therefore, studies of social recognition often strive to demonstrate the location-independence of behaviors thought to be guided by social recognition. In some recognition systems, however, spatial or contextual cues may also function as what psychologists refer to as 'occasion setting stimuli,' in which the recognition of a signal in one context elicits one behavioral response, while recognition of the same signal in a different context elicits a different response. One example of this may be the location-specificity of reduced levels of aggression between territorial neighbors. In songbirds, hearing a neighbor's songs from the direction of the neighbor's territory elicits low levels of aggression, while hearing the same song played back from a different or 'incorrect' location elicits an intense aggressive response. It is usually presumed that a familiar neighbor singing from an unfamiliar location represents a threat to the status quo of established territorial boundaries. Thus, information about context can directly influence a receiver's behavioral response to a recognized signal.

Looking Forward

One challenge for future research is to understand the nature of the neural representations that underlie communication-based social recognition in terms of their specificity, complexity, and temporal stability; the processes that lead to their formation; and the extent to which neural representations of communication signals are associated or integrated with other encoded information and social knowledge about the sender. A second challenge for future comparative research is to discover the ecological and phylogenetic bases of similarities and differences among species in the learned representations involved in social recognition and their underlying neural mechanisms. More effort should be made by animal behaviorists to integrate, both within and across species, an understanding of the internal processes mediating social recognition, such as those illustrated in Figure 2. It will be important in these endeavors to keep in mind that the representations underlying recognition in different animal species likely fall along continua of specificity, complexity, and temporal stability and are likely to differ in the extent to which they are integrated into multifaceted representations of recognized individuals. Therefore, exploration of social recognition in animals will require a genuine willingness to examine recognition systems in terms delimited by the animals' social, perceptual, and communication systems.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Vocal Learning; Birdsong; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Marine Mammals; Frog and Toad Communication; Non-human Primate Communication.

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Indo-Aryan Languages

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Indo-Aryan languages (sometimes also called 'Indic' languages) are spoken in India, Pakistan, Bangladesh, Nepal, Sri Lanka, Bhutan and Maldives – the group of seven countries also known as the South Asian Association of Regional Cooperation (SAARC) countries. More than two-thirds of the total population of South Asia speaks Indo-Aryan languages. Owing to 20th-century migrations, considerable numbers of Indo-Aryan speakers have settled in non-SAARC countries, especially in Europe and North America. Indo-Aryan constitutes the largest language group in the Indo-European language family in terms of numerical weight of speakers (said to be approximately one-fifth of the total world population, the total number of speakers exceeding 700 000 000) as well as in terms of the total number of languages in the family (more than 70, of which 24 or more enjoy official status and have literary history). Some of the major languages in the family, both in terms of number of native speakers and literary history, are Hindi, Urdu, Bengali (known to its native speakers as Bangla), Assamese, Punjabi, Gujarati, Marathi, and Oriya. Sanskrit, in terms of historical significance and role in the development of modern

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Indo-Aryan languages, notwithstanding the very small number of native speakers (only a few hundred), enjoys a very important position within the Indo-Aryan language family. Romani/Romany (popularly known as the 'Gypsy' language), also a language of Indo-Aryan origin, is spoken by several million people in various countries around the world.

Being a region of enormous linguistic diversity, the sociolinguistic situation of South Asia projects a very complex picture. Indo-Aryan languages are in constant and intimate contact with languages belonging to different language families, viz., Tibeto-Burman, Iranian, Dravidian, and Austroasiatic (Munda) languages. In South Asia, from region to region, the accents, dialects, and languages change. The dividing lines between languages are often distorted by large numbers of overlapping and interwoven dialects. It is extremely rare that speakers use only one language; multilingualism is the norm. Speakers often switch between two or more languages. In the context of multilingualism, English, a foreign language, plays a major role. It has a special status in South Asia as a medium of higher education, often associated with social prestige and power. In India, after 54 years of independence, English continues to be the second official language along with Hindi and other official languages. As a result of multilingualism, code switching, and borrowing, most Indo-Aryan languages, especially those of wider communication, have been considerably influenced. This has resulted in the emergence of various mixed languages, pidgins, and creoles. The contact situation has also led to gradual loss of native languages among many regional groups of people.

Distribution of Major Indo-Aryan Languages

Broadly speaking, Modern/New Indo-Aryan (NIA) languages fall into four geographical groups: northwestern, southwestern, midlands, and eastern. The northwestern group includes Sindhi, Punjabi, Lahnda/Lahndi, Pahari, Dogri, Kashmiri, and other Dardic languages. The southwestern language group comprises Gujarati, Marathi, Konkani, Maldivian, and Sinhala (the official language of Sri Lanka). Major languages in the eastern group are Bengali, Assamese, and Oriya. The midlands Indo-Aryan group consists of Hindi and its different dialects, Urdu (the official language of Pakistan) and its various dialects, a variety of dialects known as Eastern and Western Hindi, and many other languages. At the level of the colloquial language spontaneously spoken/heard on radio, television, or other media, and in the schools/colleges of northern India and Pakistan, Hindi and Urdu are virtually one language. They share a single, identical grammatical system and most of the vocabulary. What makes them two distinct languages are their separate writing systems, different borrowing strategies, and a very robust language ideology. For political purposes, they are essentially two languages.

In terms of total number of speakers, Hindi ranks first, with over 337 million speakers (Cardona and Jain, 2003: 4). It is considered to be the third to fifth most widely spoken language in the world. The term 'Hindi belt' refers to the regions of India with major concentrations of Hindi speakers, viz., the states of Bihar, Uttar Pradesh, Rajasthan, Haryana, Himachal Pradesh, Delhi, and Madhya Pradesh. Hindi is also widely spoken in Mumbai, with distinct regional peculiarities. In addition to Hindi, several other native regional languages, very close to Hindi in mutual intelligibility, are spoken in the Hindi belt. Urdu is spoken by approximately 43.4 million people in India, 6.4 million people in Pakistan, and 275 000 people in Bangladesh. It serves as the lingua franca among the Muslims of South Asia living in and outside the subcontinent. In several studies of Hindi dialectology, Urdu has been listed as one of the dialects of 'Hindi,' or Hindustani. Historically, Urdu developed from Khari Boli, or 'Hindavi,' which originated in the Delhi area and was considerably influenced by Kauravi, Hariyanavi, Mevati, eastern Punjabi, and Braj Bhaśa, which, in turn, have developed from the literary language *Śauraseni Apab^{h}-ramśa* of Middle Indo-Aryan.

Other major NIA languages with considerably large number of speakers are Bengali (approximately 69.6 million speakers in India, primarily in West Bengal, and 108.6 million speakers in Bangladesh), Marathi (approximately 62.5 million speakers, mainly spoken in Maharashtra), Gujarati (the language of Gujarat, with approximately 40.67 million speakers), Oriya (the language of Orissa, with approximately 28.06 million speakers), Punjabi (approximately 23.37 million speakers in India, mainly in Punjab but also in several other states, and 50.9 million speakers in Pakistan), Assamese (the language of Assam, with approximately 13.08 million speakers), Sindhi (approximately 9.9 million speakers in Pakistan and 2.12 million speakers in India), Nepali (approximately 2.076 million speakers in India and 9.3 million speakers in Nepal), Konkani (approximately 1.76 million speakers in India) (Cardona and Jain, 2003: 4–5), and Kashmiri (over 4 million speakers in the Jammu & Kashmir state (*Ethnologue*, n.d.).

The NIA languages are primarily spoken in South Asia, except for Romani, the only Indo-Aryan language spoken outside the subcontinent. The Romani language evolved as a result of the migration of a

population of mixed ethnic and linguistic backgrounds from different parts of India. The migration, which started in the 1100s and continued into the 14th century, took this mixed population to several countries, viz., the Byzantine Empire (Greece), Serbia, Croatia, Bulgaria, Romania, Hungary, Germany, France, Rome, Spain, Catalonia, Cyprus, Switzerland, Russia, and the United States (a total population of approximately 12 million people around the world). Despite obvious Iranian and European influence, Romani is built on a central Indo-Aryan core. It has several regional dialects, Vlax being considered as the 'standard' dialect by various scholars.

Historical Development

The Indo-Aryan language group is a major branch of the Indo-Iranian language subfamily, constituting the easternmost group within the Indo-European language family. Research on Indo-Aryan languages leading to the discovery of their relationship to the rest of the languages in the Indo-European family represents a major breakthrough in historical and comparative linguistics. The development of Indo-Aryan languages can be traced back to a continuous span of at least 3500 years (Masica, 1991), although many scholars argue for a much earlier date of origin. The period is broadly divided into three stages: Old Indo-Aryan (c. 1500 to 600 B.C.), Middle Indo-Aryan (c. 600 B.C. to A.D. 1000), and Modern/New Indo-Aryan (A.D. 1000 onward) (Masica, 1991).

Based on their geographical distribution, Middle Indo-Aryan (MIA) dialects are classified into four main groups that developed into the present-day NIA languages: northwestern, southwestern, midlands, and eastern. In terms of phonological changes, the most conservative group consists of the northwestern dialects of the MIA, which have retained many of the Old Indo-Aryan (OIA) features and even some Indo-Iranian ones not attested in OIA. To this group belong languages such as Punjabi, Sindhi, Lahnda, Pahari, and many languages of the Dardic group, including Kashmiri. Some of the most characteristic features with respect to the phonological system of the northwestern group include retention of three sibilants (palatal *ś*, dental *s*, and retroflex *ṣ*) of the OIA. In many languages, these have merged into *s* or *s* and *ś*; the distinction between the OIA liquids *l* and *r* has also been maintained only in certain northwestern (Shahbazgarhi and Mansehra) and in western (Girnar) groups, whereas elsewhere, they merged with *l*. The most advanced group is the eastern dialect of MIA, which has undergone the greatest number of changes.

The oldest and the best contemporary records of MIA are the Aśokan inscriptions (3rd century B.C.) in various dialects written in Kharoṣṭhī on rock edicts (e.g., Mansehra and Shahbazgarhi versions, which represent the northwestern dialects). Owing to certain changes peculiar to the dialects, the terms *Pāli* and *Apab^{h}ramśa* have been employed to refer to the Aśokan dialects. *Prakrit* is a general term often used in the context of MIA dialects to refer to the vernacular varieties other than *Pāli* and *Apab^{h}ramśa*. *Pāli*, the language of the Hinayana Buddhist canon and based on a midland dialect (Masica, 1991: 52), and a representative of the early MIA, developed in northern India before 200 B.C. but was produced much later in Sri Lanka, Burma, and Thailand (Masica, 1991: 56). Most advanced literary dialects of the MIA are the *Apab^{h}ramśa* dialects, which form a rich source of literary texts dating back to A.D. 600 and earlier. In opposition to *Pāli*, *Prakrits*, and *Apab^{h}ramśa*, is the more prestigous *Sanskrit* (the term *Sanskrita* means 'adorned/polished/cultured (language)'). No single attested Vedic dialect has been proved to be the predecessor of the Classical Sanskrit.

Indo-Aryan languages represent a source of a rich literary tradition over thousands of years. The first recorded texts, the Vedic hymns, date back to 1500 B.C. Study of grammar occupied a very important position in the ancient Indian educational system. Students had to study Vedas as well as ancillaries to Vedas, the *Vedāṇgas*. The latter included *śikṣa* 'phonetics', *vyākraṇam* 'grammar', *c^{h}andas* 'meter', *niruktam* 'etymology' (i.e., explanation of difficult Vedic words), *jyotiṣam* 'astronomy' (the Vedic calendar), and *kalpaḥ* 'ceremonial' (i.e., prescribing the rituals and laying down the procedures for carrying out sacrifices and other ceremonies) (Subrahmaniam, 1999: 1). Extensive information on the details of OIA of different time periods and areas is available in Vedic recitation in *Prātiśāk^{h}ya* works and in the classic works of ancient Indian grammarians such as Pānini (between the 6th and 4th centuries B.C.) and Patanjalī (2nd century B.C.) (Cardona and Jain, 2003: 7). Pānini's *Aṣṭad^{h}yāyī* is an elaborate treatise on Sanskrit grammar consisting of eight (*aṣṭa*) chapters (*ad^{h}yāya*). There is a total of 4000 *sūtras*, which are algebraic-formula-like grammatical statements and rules traditionally assigned to six types: *samṇa* (definitions of technical terms), *parib^{h}āṣā* (interpretation of grammatical statements), *ad^{h}ikāra* (defining the scope of a grammatical rule), *vid^{h}i* (signifying operational rules of grammar), *niyama* (restricting the scope of *vid^{h}i sūtras*), and *atideśa* (extending the scope of *vid^{h}i sūtras*) (Singh, 1991: 1).

Writing Systems

Two very popular ancient Indo-Aryan writing systems are Kharoṣṭhī and Brāhmi. Whereas Kharoṣṭhī is written from right to left and was widely used in northwest India and Central Asia, Brāhmi is written from left to right and was popular elsewhere. Kharoṣṭhī was in use from the Aśokan period until around the 4th century A.D., and is generally agreed to be a derivation of Aramaic. Several theories have been put forth for the origin of Brāhmi. Although Indian scholars have argued for the indigenous origin of Brāhmi, many Western scholars have assumed Brāhmi to be derived from a Semitic prototype (Masica, 1991: 133). Some archaeologists argue for the emergence of Brāhmi in the 5th century B.C., but with the discovery of the Indus Valley (Harappan) civilization of c. 2500–1800 B.C. in the early 20th century, with its still undeciphered script, a new dimension was added to the question of the actual time of origin for the Brāhmi script. Many scholars now believe Brāhmi to be a derivation of the Harappan script, although some disagree, considering this to be a radical viewpoint.

Most modern Indo-Aryan writing systems have emerged from Brāhmi. The best known contemporary and widely used script that originated from Brāhmi is the Devanāgri/Nāgri script. Devanāgri, in various modified forms, is used to write several languages, including Sanskrit, Hindi, Bengali, Marathi, and Nepali. It is an outcome of several developmental stages following Brāhmi. Shāradā, a close relative of Brāhmi, which was used for writing Kashmiri several centuries ago, has been recently argued by some scholars to be the immediate predecessor of Devanāgri, which is built on the same system and corresponds with Shāradā letter for letter, although the letters have considerably changed in form. Shāradā is closely associated with the Takri alphabet used for writing Punjabi.

Modified forms of Perso-Arabic (Nastālīq) are currently used to write Urdu, Sindhi, Punjabi (Gurmukhi and Nastālīq are the officially recognized scripts for writing Punjabi), Kashmiri, Shina, and Khowar. Perso-Arabic writing systems for Urdu and Kashmiri are officially recognized whereas those for Shina and Khowar are still struggling for recognition. Representation of additional sounds not present in Persian/Arabic is achieved by use of additional diacritics to suit the specific phonemic inventories of different languages. Redundant Arabic graphemes are retained only in the spelling of Arabic or Persian borrowings, as are certain redundant letters of neo-Brāhmi (Masica, 1991: 151). Representation of Indo-Aryan vowels in Perso-Arabic script, however, is slightly problematic, especially in languages with large vowel inventories. Short vowels are not represented in this system. Reading, therefore, is often a stressful exercise for nonnative speakers and sometimes even for the native speakers beginning to read a language. It is difficult to distinguish between /e:/, /ai/, and /i:/ in word-medial position because only one symbol is used to represent all three of these vowels. Similarly, there is only one symbol representing the vowels /u:/, /o:/, and /au/ in postconsonantal position. Official script for Kashmiri is more advanced in this respect. Each vowel of the 16-vowel system is represented differently with the help of particular diacritics that are commonly used in literature and are officially recognized.

In the Maldive Islands, a script called Tana/Thaana is used. This script is argued to be phonologically quite efficient, and, written from right to left, is a complete innovation. Tana employs symbols, some of which are based on Arabic diacritics and numerals (Masica, 1991: 152). Konkani is probably the only language that seriously uses Roman script for writing. Representation of peculiar sounds is achieved by use of diacritics and special writing conventions.

Phonological Characteristics

Various phonetic and phonological changes characteristic of the Indo-Aryan group distinguish it from the Iranian group of the Indo-Iranian language family. These include (1) reduction of final consonant clusters; (2) absence of voiced sibilants (except in certain NIA languages/dialects, for which voiced sibilants resulted at a later stage of development); (3) retention of voiced aspirated stop consonants, thus having a fourfold distinction of stop consonants in terms of manner of articulation (except in the northwestern languages, which were influenced by contact with Iranian languages); (4) retention of /l/ vs. /r/ distinction in Classical Sanskrit and many central and (north-) western languages and dialects of MIA and NIA (In Iranian languages, /l/ and /r/ indiscriminately merged into /r/); and (5) development of retroflex consonants, a possible result of Dravidian influence on Indo-Aryan languages and an innovation in the Indo-European languages (Note that Burushaski, a language isolate spoken in the region between South and Central Asia, also possesses retroflex consonants). OIA typically consists of a large number of two-consonant and three-consonant clusters that occur at initial, medial, and final positions. However, a large number of these clusters are drastically limited in MIA by several phonological operations, including epenthesis or assimilation in place and manner of articulation. OIA final consonants were generally

lost in MIA dialects, with the exception of *m*, which developed into its vocalic counterpart *m̥*, as in Pāli *puttā* from Sanskrit *putrāt* 'son' (ablative singular) and *putrās* 'son' (nominal singular), but Pāli *puttāṁ* from Sanskrit *putram* (Cardona, 1987: 441). Dissimilar consonants were assimilated in interior clusters by progressive or regressive assimilation, depending on the nature of consonants involved. Examples are Pāli *puttā*, *satt^{h}i-*, and *vagga-* from Sanskrit *putrā-*'son', *sakt^{h}i-* 'thigh', and *varga-* 'group' (Cardona, 1987: 441). Another MIA development was fricative weakening or lenition (except in some dialects), primarily in the postconsonantal position (i.e., s > h/C_; e.g., Pāli *b^{h}ikk^{h}u* from OIA *b^{h}ikṣu* 'monk'; the process is accompanied by consonantal assimilation), and also in preconsonantal position, when weakening is accompanied by metathesis and gemination (e.g., Pāli *sukk^{h}a* from OIA *śuṣka*, with intermediate stages of *sukṣa* and *sukha*, respectively, in which the series of changes involve metathesis followed by fricative weakening and gemination, respectively; and Pāli *pupp^{h}a* from OIA *puṣpa* via intermediate stages of *puhpa* and *pupha*, in which the series of changes involve fricative weakening followed by metathesis and gemination, respectively) (Bubenik, 1996: 46). In the later stages of MIA, the OIA geminates that were created as a result of consonantal assimilation (preserved in some dialects, e.g., Pāli) were degeminated. This was accompanied by compensatory lengthening of the preceding short vowel (e.g., OIA *paśyati* 'sees', *śiṣya* 'disciple' > Pāli *passati*, *sissa*, and Ardha Magadhi *pāsai*, *sīsa*), (Bubenik, 1996: 28). Compensatory vowel lengthening is also observed in several NIA languages in which vowel lengthening follows the degemination of MIA geminates, as in Hindi *sāt*, Bengali *śāt*, and Marathi *sāt* from MIA *satta*, resulting from OIA *sapta* 'seven'. Exceptions are Punjabi, Kashmiri, and some northwestern Indo-Aryan languages (e.g., Kashmiri *sat^h* vs. Hindi *sāt* 'seven'). OIA allowed light, heavy, and overweight syllables of the type VC, VCC, and V:CC, respectively. In MIA, long vowels were generally shortened in overweight syllables (V:>V/_CC). For instance, OIA *gātra* 'limb' and *grīṣma* 'summer' were replaced by MIA *gatta* and *gimha*, respectively (Bubenik, 1996: 29). Another way of eliminating heavy syllables in MIA was through epenthesis (e.g., MIA *sūriya* from Sanskrit *sūrya*). In many MIA dialects, the three sibilants, *ś* (palatal), *s* (dental), and *ṣ* (retroflex), merged into dental *s*. The distinction of three sibilants (and sometimes two) was, however, retained in the northwest dialects.

Although a remarkable stability is observed in the phonological system of NIA *vis-à-vis* that of MIA, and hence, OIA, different phonological operations affect both consonantal and vocalic sounds, thus differentiating the phonological systems of different NIA languages. The basic Indo-Aryan system of stops (which is also that of Sanskrit and the OIA) theoretically involves five distinctive articulatory positions of the tongue, namely, **labial**, **dental**, **retroflex** (or '**cerebral**'), **palatal**, and **velar** (for example, /*p t ṭ c k*/). Typical Indo-Aryan stop consonants are distinguished as voiceless vs. voiced (e.g., *p* vs. *b*) consonants, and unaspirated vs. aspirated (e.g., *p* and *b* vs. *p^h* and *b^h*, respectively) consonants. Some of the phonological changes taking place during the MIA stages continued through NIA, but several new developments also occurred. Voiced aspirates were lost in some languages, especially those of the northwest, being replaced by the corresponding voiced unaspirated obstruents (e.g., Kashmiri and Punjabi). In Punjabi, emergence of a tonal system worked as a compensation, whereby the OIA voiced aspirates were devoiced in addition to loss of aspiration. Retroflex consonants were often replaced by corresponding alveolars in many NIA languages, except in certain phonological environments. Some NIA languages and dialects reveal a tendency to replace the Indo-Aryan palatal stop /c/ by a 'dental' or alveolar affricate [ts]. This is observed in Nepali, some dialects of Bengali, certain Rajasthani dialects, Kumauni, many West Pahari dialects, and several others (Masica, 1991: 94). In some languages and dialects, MIA /c/ surfaces as [c] in certain environments (e.g., before front vowels or palatal glide /y/) and as [ts] elsewhere. A further development in certain languages/dialects is a phonemic contrast between /c/ and /ts/, as in Marathi, Konkani, some West Pahari dialects, and Kashmiri. A step further is realized in the Southern Mewari dialect of Rajasthani, the Chittagong dialect of Bengali, and Assamese, in which the [ts] representation of /c/ is replaced by [s], thus, reducing the phonemic inventory. Palatalized consonants have developed in Kashmiri and some Dardic languages. A complete range of five phonemic nasals (labial /m/, dental /n/, retroflex /ɳ/, palatal /ɲ/, and velar /ŋ/) is found in Dogri, Kalasha, Shina, Sindhi, and some other languages (Masica, 1991: 95). However, in most other languages in this group, many of the different articulatory positions of nasals are often phonologically conditioned. The most frequently occurring nasals are /m/ and /n/. Phonemic palatal nasal /ɲ/ is found in Kashmiri, in which it is a result of a phonologically conditioned diachronic change whereby the palatal vowel inducing palatalization was eventually lost. Although most MIA dialects (except certain northwestern and some central dialects) had lost the distinction between the OIA liquids /l/ and /r/ (they merged with either /l/ (Eastern dialect) or with /r/),

all NIA languages have both /l/ and /r/ sounds. Certain languages, such as Oriya, Gujarati, many varieties of Rajasthani, Bhili, Punjabi, and some dialects of Lahnda, have developed a retroflex version of the lateral ɭ. Retroflex flap [ɽ] has often been taken as an allophonic variant of /ɖ/ in certain environments in many languages and in certain dialects of some languages. In some rural varieties of Kashmiri, /r/ surfaces as retroflex [ɽ] or even as [ɖ] intervocalically, whereas in Standard Kashmiri, the same phoneme surfaces as [r] in all phonological environments (e.g., [koːɽi]/[koːɖi] vs. [koːri] 'girls'). Most Eastern NIA (Magadhan) languages have lost the phonemic contrast between *ś* and *s*, but in some traces these are still seen in free variations of [ś] and [s]. A two-way distinction of *ś* vs. *s* is found in certain languages only in specific environments. In certain dialects of Maithili, for example, [s] occurs before back vowels and [ś] occurs before front vowels, whereas *ś/s* phonemic contrast is observed before central vowels (e.g., *śālu* 'a variety of grain sorghum' vs. *sālu* 'hedgehog') (Masica, 1991: 98). Typically, there are two semivowels in NIA languages – palatal /y/ and labial /v/. In a number of languages, the occurrence of the semivowels is restricted to semi-predictable intervocalic glides. Their position is weakest in eastern Indo-Aryan and strongest in western Indo-Aryan. There is a phonetic as well as an historical difference between the eastern glides, late in origin and sometimes optional, and western preservations of original OIA semivowels. In many NIA languages, /v/ has a distinctive *w*-like allophone occurring before round vowels (the contact between the upper teeth and the inside of the lower lip in *v* is a loose one).

The basic OIA vowel system is a 10-vowel system constituted of *a*, *aː*, *i*, *iː*, *u*, *uː*, *e*, *o*, *aiː*, and *auː*. As a result of various phonological changes during the history of their development, most NIA languages possess vowel systems considerably different from each other as well as from the OIA vowel system. The minimal NIA vowel system consists of six vowels, which falls into two types: the *Oriya type* (/*i e a ɔ o u*/) and the *Nepali/Marathi type* (/*i e*; *a ə*; *o u*/). The latter vowels also occur in Lamani and Sadani (Masica, 1991: 109). There are differences in vowel quality, height, etc., of the corresponding vowels in different languages. Bengali has a seven-vowel system, with an additional /æ/ added to the Oriya type vowels. Other vowel systems are the eight-vowel systems of Gujarati (/*i e ɛ*; *a ə*; *ɔ o u*/) and Assamese (/*i e ɛ a; ɒ ɔ o u*/); the nine-vowel systems of Dogri, Rudhari, Sairaki, and several West Pahari dialects; and the 10-vowel systems of Hindi and Punjabi (/*i iː e œ; a ə; ɔ o u uː*/). The Hindi and Punjabi systems are closest to OIA and are thus considered be the typical Indo-Aryan vowel system: historically, the OIA diphthongs /*ai*/ and /*au*/ were monophthongized into long vowels /*æ*/ and /*ɔ*/ at a much later stage of development and are often represented as /*ai*/ and /*au*/ (*ai* and *au* are retained in some dialects). Additional vowel systems include the 11-vowel systems of Padari, Bhadrawahi, Kumauni, and Konkani, with varying modifications, and the 12- to 13-vowel systems of Braj, Bundeli, some dialects of West Pahari, and Bashkarik (Masica, 1991: 112). There are languages with even larger vowel systems. For example, Kashmiri has a 16-vowel system consisting of front vowels /*i iː e eː ɛ*/, central vowels /*ɨ ɨː ə əː a aː*/, and back vowels /*ʉ uː o oː ɔ*/, with three contrasts in height (high, mid, and low). Up to 20 vowels are found in some Dardic languages. Most NIA languages have nasalized vowels. These vowels are predictable in some languages (in the vicinity of nasal consonants) but in others they are contrastive/phonemic in nature. Certain languages have also developed a tonal system, such as Punjabi (prosodic tone), Lahnda, Dogri, some West Pahari dialects (Khalashi, Kochi, Rudhari), some Dardic languages (e.g., Khowar, Shina, Gawarbati), and Dacca Bengali. Stress in NIA is generally predictable and the position of stress is fixed, although stress patterns may considerably differ from language to language in terms of complexity of rules/constraints determining stress.

Morphosyntax

Old Indo-Aryan verb morphology exhibits tendencies toward simplification. The aspectual system is much reduced. Within the tense system, the distinction between formal perfect and imperfect is eliminated, leading to a two-way contrast in the preterit from the original three-way contrast. The modal system also went through simplification, so that the subjunctive and indicative gradually were eliminated (Cardona and Jain, 2003: 11). Despite such tendencies, the OIA verb system is very rich as compared to the MIA and NIA systems.

During the development of MIA, there was a general leveling down of the rich OIA morphological system by means of various analogical extensions and operations. Contrast between OIA active and medio-passive was lost, as was the contrast between two kinds of future marking in later stages of MIA. Also, distinction among aorist, perfect, and imperfect was generally eliminated. Productive preterit is provided by sigmatic aorist (Cardona, 1987: 444). Because no final consonants are found in MIA, a reduction in the rich declensional system of OIA consonant stems gives rise to a vowel-ending type only. OIA nominals fall into a number of inflectional types, viz., stems ending in *-a*, *-i*, *-u*, *-an*, -C(onsonant), and *-nt*. Although the OIA vocalic

stems remain as such, the consonant ending stems are thematized in the MIA dialects (e.g., Pāli *vijju* < *vidyut* is inflected as an *-u* stem; Pāli *b^{h}aranto* < *b^{h}arant-* is inflected as an *-a* stem) (Bubenik, 1996: 72). In *Ard^{h}a-Magad^{h}i* (AMg), *nt*-stems are thematized (Bubenik, 1996: 67). Thematic stems are remodeled in the MIA dialects (e.g., Sanskrit *devaḥ* (nominative singular) > Pāli *devo*, Sanskrit *devam* (accusative singular) > Pāli *devã*) (Bubenik, 1996: 68). In case of nominal paradigms, although OIA maintains the distinction of singular, plural, and dual categories, there is a complete loss of the dual category in MIA. This is also evident in most NIA languages.

The extensive case inventory of OIA was considerably reduced in MIA, especially in later stages. The OIA dative merged with the genitive, and in late MIA, there was merger of the instrumental case with the locative (Bubenik, 1996: 69). Further down the lines of development, nominal paradigms dichotomized into direct (nominative, accusative) and indirect cases, which eventually fused together, providing the groundwork for the NIA oblique case (e.g., in *Apab^h-ramśa*). Toward its development into NIA, the MIA clitics system also dichotomized into one direct and one oblique form. The oblique form is only used with postpositions (e.g., Hindi/Urdu *-ā* 'NOM.SG' vs. *-e* 'OBL.SG'; Hindi/Urdu *-e* 'NOM.PL' vs. *-õ* 'OBL.PL'). In the system of pronominal clitics, the formal distinction between the direct and oblique forms is found only in OIA and Pāli. Such distinction was lost in some dialects of the MIA (Bubenik, 1996: 90). OIA nominals also had a three-way distinction in gender features, viz., masculine, feminine, and neuter. Although Pāli preserved the three-way distinction of gender, many MIA dialects underwent a gradual simplification in the alignment of three genders. A thematic neuter gender marker was a common target for leveling, which was reassigned masculine ('default') gender in *Ard^{h}a-Magad^{h}i*, for example. Leveling was achieved by various series of phonological changes in different gender marking endings (e.g., shortening of final long vowels, deletion of final consonants, convergence of various kinds of stems, and other phonological changes). With a few exceptions, such as Gujarati, which retained the OIA distinction of masculine, feminine, and neuter gender, most NIA languages have only masculine and feminine distinctions. In case of nominal declension, some of the forms were lost in MIA. These were replaced by the corresponding pronominal forms, resulting in identical declension for nominals and pronominals, as in OIA *devaḥ* (nominal declension) vs. Pāli *devo* (nominal declension) and *so* (pronominal declension) (Bubenik, 1996: 92). Another morphological change characteristic of MIA is the resegmentation of inherited causatives (Bubenik, 1996: 120).

Different changes in the syntactic system led to the development of an ergative syntax in NIA. In many NIA languages, the perfective is semiergative. In ergative constructions in most NIA languages, agreement between the subject and the verb is blocked. Although typical Indo-Aryan languages show subject-object-verb word order, an exception is Kashmiri, which is a verb-second language, with the inflected verb occupying the second position of the clause.

See also: Bangladesh: Language Situation; Bengali; Bhutan: Language Situation; Gujarati; Hindi; Hindustani; India: Language Situation; Indo–Iranian; Kashmiri; Lahnda; Maldives: Language Situation; Marathi; Nepali; Nepal: Language Situation; Panini; Punjabi; Romani; Sanskrit; Sindhi; Sinhala; South and Southeast Asia: Scripts; Sri Lanka: Language Situation; Urdu; Pakistan: Language Situation.

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Indo-European Languages

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Cross-linguistic comparison of words and phrases had already become fashionable in the 17th and 18th centuries. In 1786 Sir William Jones famously postulated the kinship of Sanskrit, Greek, and Latin (and possibly the Germanic and Celtic languages), a grouping to which in 1813 Thomas Young gave the title 'Indo-European' (IE) (although the Germans long preferred 'Indogermanisch'). In 1816 specific historical studies appeared, some by Raynouard on the Romance languages (descendants of Latin) and others by Bopp, who added Avestan and Lithuanian to Jones's list. From Grimm's 1822 work on, geneticism flourished and until the 1870s remained Sanskritocentric (but see section on analogy). The tally of IE languages came to include two that apparently stood alone (despite their internal dialectal splits) – Albanian and Armenian – and six subgroups: Balto-Slavic, Celtic, Germanic, Indo-Iranian, Italic, and Greek. To these were later added two Asian members: Tocharian in 1893 and Hittite in 1917, the latter together with Palaic and Luwian (for sure) and Carian and Lycian (almost certainly) forming the 'Anatolian' subgroup. The status of one or two tongues is still debated: Lycian, Phrygian, and 'Illyrian.' With all these and their descendants taken into account, the current total of known IE languages is around 140 (Collinge, 1995a).

Comparative Reconstruction of the Indo-European Language Family Tree

Comparative reconstruction of the family began with linguists using the following techniques.

1. Interlingual comparison of the categories and structures of grammar (done first by Bopp) is usually considered central. This sector is by and large the least subject to outside influence, although some internal alterations have to be discounted (for example, the changing of lexical elements into grammatical forms); and shifts of even the basic type of syntax do occur (see later section on typology). Phonology then long took first place (after Rask, 1818; and Grimm, 1822); this is understandable, as speech sounds are anatomically limited and their shifts easier to plot. Now, however, 'lexical diffusion' is recognized: sound changes occur more quickly in words of certain types and frequency and later spreading.
2. August Schleicher was first to regularize the use of the family tree (borrowed from scientists) to display descent-relations. He also insisted that 'proto' forms (the theoretically established items of a no-longer-extant parent language) be recognizable, and he standardized the marking of them with a prefixed asterisk.
3. It has long been realized that a compared language's evidence must first be cleansed by removing those changed items whose shifts are quite internal to that language and whose earlier shape is diagnosable by 'internal reconstruction.'
4. Possibly the most salutary control is that of 'uniformitarianism,' first proposed by James Hutton in a lecture in 1785. This rules, to cite its negative aspect, that hypotheses as to past entities and behavior must not venture outside the range of historically testified examples.
5. In the 1870s the 'Neogrammarians' (see Collinge, 1995a: 204–205) made their contribution, which still merits a mention. They outlawed those comparative statements of item change that ignored manifold nonconformities. Shifts must be exceptionless (though they accepted analogy as an interfering force; see later section on analogy). This corrective was necessary at the time; since then, many valid accounts of apparently irregular change have been offered, and causation (which they ignored) has been examined.

Revisions to Indo-European Language Theories

Following these developments in the classification of IE languages were a long succession of revisions and discoveries, some helpful, others disturbing, a few still to be finally assessed.

First among the helpful stands the identification by numerous scholars of 'analogy' as a cause or steerer of change. More particular were the increasingly precise analyses of the original phonology of proto-Indo-European (PIE). Its velar consonants were found (Ascoli, 1870) to be of varied sorts. Then several scholars realized that a local palatalizing effect, once recognized outside Sanskrit, established */e, a, o/* as the true set of original lower vowels.

Brugmann (1876) noted how 'sonant' root consonants (nasals, to which Osthoff added liquids) might within words become vocalized or accompanied by inset vowels. Next, the high vowels */i, u/* were seen as likely to become consonantal */j, w/* in the right context and were in fact 'semivowels.'

Perhaps most striking was the discovery – following a hint by Saussure – that PIE had possessed some deep guttural sounds (vaguely 'laryngeals'), which outside

Anatolian were themselves lost but were replaced by lengthening of neighboring vowels or the insertion of a vocalic element into the syllable.

Theories of Historical Language Change

The earliest disturbing theory was that of Johannes Schmidt (1872), following an idea of Schuchardt's, that historical changes moved like waves across a body of water, being possibly wider, of varying strength, and less adjacent than tree-branching suggests. Sapir (1921) recognized 'drift' as shifts that are certain to occur independently sooner or later in any language.

Again, arrays of apparently distinct shifts within a language may be reflexes of one more general feature change ('conspiracy' theory).

Yet another mechanism for relating shifts and fixing them in time is known as 'glottochronology.' Under this theory, divergence of languages from a common stock is timed by counting the number of words, from a list of shared items, no longer found to be cognate. It has been applied again to IE recently, in attempts to precisely date the origin of IE languages, but it has also long been denounced as untrustworthy, because lexical borrowing is the readiest kind of interlingual interference.

Lastly, disturbing for its effects on the family tree, comes the 'glottalic' hypothesis (see Salmons, 1993). This was promoted most keenly by Gamkrelidze and Ivanov (1984) but forcibly rejected by others, notably Baldi (1999). The traditional, but questionable, set of PIE stop consonants has its simple voiced items */b, d, g/* replaced by the glottalized units */p', t', k'/* (aspiration being seen as an unstable additive to the buccal stops). This idea does explain the curious rarity of supposed */b/* in PIE (because */p'/* is phonically awkward), but the apparent prevalence across the extant languages of the realization of these glottalics as plain **voiced** forms is troubling. Moreover, Germanic (and Armenian) would then be isolated as retaining the original voicelessness (in contrast to Grimm).

Other Theories

Some suggestions that may assist the comparative IE historian are still to be finally assessed. Promising was Johanna Nichols's finding (1986) that marking of a grammatical grouping (such as a noun phrase) – whether on the head member or on the dependent or on both or on neither, or a mixture of these – is a conservative feature and so a clue to genetic status.

Indo-European languages are predominantly dependent-marking. There is certainly resistance to change of marking position, so that at least **non**-relatedness, or late relatedness by geographical movement, may be provable. Time and further research should clarify this.

More in fashion at present is the mathematical-cladistic approach. 'Cladistics,' originally a technical term in biology, is the calculus of family relationships based on shared innovations rather than on simply inherited items. It was brought into linguistics first by Hoenigswald (1987). Now the methodology has been computationalized (see Ringe *et al.*, 2002) as a supplement to traditional family tree study. Applied to the tricky problem of IE subgrouping, cladistics has the interesting result of confirming as unusual the behavior and placing of Germanic (see above, on the glottalic theory). Otherwise, the usual tree is re-established, with Anatolian and Tocharian as early departers and the subgroups Greco-Armenian, Balto-Slavic, and Indo-Iranian forming a joint core. Difficulties are still acknowledged.

Remaining Questions Regarding Classification of Indo-European Languages

First, is an agreed-upon IE tree attainable at all? The various subgroups are themselves soundly based and their membership largely agreed upon; but their relative positioning and chronological fixing (for Hoenigswald, their topology and metrics) are yet unsettled. Revised trees are constantly offered.

Second: Does typology help or hinder? Although it might seem that all IE languages should agree in sound-types and syntactical systems, there are notable discrepancies. For example, the contrast between Hittite verbal categories and those of Greek or Latin, or the present syntax of Hindi or Panjabi versus that of Sanskrit. Genetically linked languages do come to differ in grammar, so Ossetic (Osetin) is now very unlike other Iranian languages generally. Understandable are attempts to trace in IE grammar a syntactic type-change sequence 'active'→'ergative' →'accusative' and a reversal in part.

Next is the question of whether it is possible to arrive at a precise date and location for the family's origin. It is doubtful. Russia, the Black Sea region, and even India have been proposed as birthplaces, and fixing a time of birth is most uncertain (see Clackson, 2000: 451). The current fight is between those who favor a starting point 6000 years ago in Eastern Europe and recent adherents of a beginning (based on biological calculation) 8700 years ago in Anatolia (see Gray and Atkinson, 2003).

Fourth, does archeology help? Pointers such as the 'agricultural dispersal' process have been used to co-map the movements of IE people and of their

languages (Renfrew, 1987; but note his 1999 rethinking). The two developments have rarely shown a firm consensus as to timing or relationships. Firmer clues may lurk; the field is open.

Next, what of the theory of 'nostraticism'? Holger Pedersen introduced the term 'nostratic' in 1903 to cover the establishment of a linguistic super-group that included IE. Enthusiasts followed. Greenberg actually sought to put together all even remotely interaccessible tongues, including Japanese and Inuktitut. Indo-European was linked with South (and even North) Caucasian, Sino-Tibetan, or even Na-Dene language families. The evidence offered is mostly of supposed lexical equations, although Greenberg did use a selection of morphological likenesses. The notion caused much opposition and seems now to be out of favor.

There are some quite opposed concepts of developing linguistic relationships. 'Convergence' has been canvassed – that is, likeness in language caused by areal contact of people rather than (or as well as) by genetic descent ('divergence'). Trubetzkoy (1939) pressed it for IE (see also Hock, 1986: 491–498), while others posited it for other families (notably Weinreich, 1968). Later a general periodic analysis was espoused (Dixon, 1997), based on the biological notion of 'punctuated equilibrium.' This proposes that languages in areal contact during periods of equilibrium suffer the relatively minor diffusion of features each to each, which misleads observers into supposing a family connection; then come periods of punctuation, in which whole language splits do occur. This in-and-out sequence justifies family trees where the size of the evidence defends them (as for IE); it also allows undeniable likenesses between members of different families (IE included).

Definitions of Terms

'Indo-European' is the name of the group of tongues deduced by comparative study to be genetically related. The continued suitability of the name may be questioned. Indian evidence is no longer the major source of relevant information it had been, and since the discovery of Tocharian and the Anatolian subgroup, both in Asia, 'European' is less essential. (Possibly the title 'Eurasian' might be substituted?)

'Proto-Indo-European' indicates the purely theoretical form of the ancestral language, which was formulated by reconciling the reflexes perceived in the group's tongues ('comparative reconstruction'). Proto-Indo-European is not itself a totally integrated working language but rather a summary of deductions. Its sources are manifold and involve languages themselves that are somewhat historically tangled. Description of PIE may be 'systematic,' as by Brugmann (1897–1916), who gave a static and optimistic account of its categories and forms, or 'realistic,' as by Gamkrelidze and Ivanov (1984), for whom PIE is unstable and offers a set of stages of development. (For more information on this, see Lehmann, 2003: 245ff.)

Pre-Proto-Indo-European (PPIE) is a title often used to cover all that can be posited about PIE in its earliest pre-diaspora period (Renfrew, 1999: 271, 284). Sometimes it means 'pre-morphological PIE' – that is, a specific stage before the fully organized condition of PIE syntax and morphology (Collinge, 1995b: 4). Some writers have preferred to use the terms 'PIE I,' 'PIE II,' and so forth.

Conclusion

It is noteworthy that a number (almost a hundred) of 'laws' have been formulated to register apparently regular shifts, and their environments, in individual IE languages or sub-groups, or even across the whole family. The scope of these laws (both as to categories and languages) varies widely, and their validity is always subject to challenge.

See also: Cladistics; Grammar; Grimm, Jacob Ludwig Carl (1785–1863); Jones, William, Sir (1746–1794); Phonology: Overview; Proto-Indo-European Morphology; Proto-Indo–European Phonology; Proto-Indo–European Syntax; Punctuated Equilibrium and Language Change; Reconstruction, Morphological; Reconstruction, Syntactic.

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Thanks to the survival of nearly continuous documentation, the history of both Indo-Aryan and Iranian can be traced back for around three millennia. Anatolian is attested earlier, but Indo-Iranian ranks together with Greek as the branch of the IE family with the longest recorded history. Indo-Iranian languages have served as the vehicle for high literary cultures and for the fundamental texts of five major religions (Hinduism, Buddhism, Jainism, Zoroastrianism, Manichaeism).

In the historical period, the development of the Indo-Iranian languages is conventionally divided into three stages (Old, Middle, and New) in both subgroups. Comparison between Old Indo-Aryan (OIA or Old Indic: Vedic and Classical Sanskrit) and Old Iranian (OIr: Avestan and Old Persian) make it possible to reconstruct the principal features of prehistoric Indo-Iranian.

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undifferentiated Indo-Iranian in the Near East in the second millennium B.C. Documented only during the most recent stage of Indo-Iranian, the Nuristani languages (formerly often called Kafiri), which are spoken in present-day northeastern Afghanistan, also raise problems of classification. They have been explained variously as Iranian (but distant from Pashto), as Indo-Aryan, or as belonging to a separate branch of the Indo-Iranian family.

Indo-Iranian Phonology

The Indo-Iranian vowel system consisted of three short vowels **a*, *i*, *u*, their long counterparts **ā*, *ī*, *ū*, and a pair of short and long diphthongs **ai*, *au*, and **āi*, *āu*. There were also two vocalic liquids ** r̥*, *l̥*.

This simple vowel system resulted from the merger of the IE short vowels **e*, *o*, *a* > Ind-Ir.**a* (Skt. *mádhu-*, YAv. *maδu-*'intoxicating drink', cf. Grk. *μέθυ-*; Skt. *dadárśa*, Av. *dādarəsa* 'I have seen', cf. Grk. *δέδορκα*; Skt. *yájate*, Av. *yazaite* 'worships', cf. Grk. *ἄζεται*). However, at the earliest stage of Ind-Ir. the merger was not complete as palatalization occurred before IE**e*. In open syllables, IE**o* > Ind-Ir.**ā* (Brugmann's Law: Skt *dā́ru-*, Av. *dāuru-*'wood', cf. Grk. *δόρυ*) and merged with **ā* < IE**ē*, *ō*, *ā* (Skt. *rāj-*'king', cf. Lat. *rēx*; Skt. *āśú*, Av. *āsu-*'swift', cf. Grk. *ὠκύ-*; Skt., Av., OP *mātar-*'mother'; cf. Lat. *mater-*). Of the IE resonants, which were allophones of **y,v,n.m,r,l* in the parent language, **i*, *u* continued unchanged, the vocalic nasals **n̥*, m̥ > Ind-Ir.**a* (Skt. *saptá,* Av. *hapta* 'seven'; cf. Lat. *septem*), and the vocalic liquids **r̥*, *l̥* were preserved as vowels only in OIA (Skt. *mṛtá̄-* 'dead', cf. Lat. *mortuus*).

Cases of vocalic hiatus in the earliest OIA and OIr. poetic traditions and the quantities of some final vowels suggest that the inherited IE laryngeal phonemes survived in some form into Indo-Iranian (Ved. trisyllabic *vaata-*'wind' <**vaHata-*). The development of **r̥H*, **l̥H* is complicated (>*ir*/*ur* before vowels, >*īr*/*ūr* before consonants in Skt., but >*ar*(*ə*) in Av.: Skt. *tirás*, Av. *tarō* 'across', ppp. *tīrṇá-*'crossed'; Skt. ppp. *pūrṇá-*, Av. *parəna-*'filled'). Between consonants, an inherited laryngeal sometimes vocalized >*-i-* (Skt., OP *pitā* nom. 'father', cf. Grk. πατήρ, Lat. *pater*), but *-i-* from this source is of more restricted occurrence in Iranian than in Indic (OAv. nom. *ptā*, dat. *fəδrōi* 'father'; OAv. *dug(ə)dar-*, YAv. *duγδar-* 'daughter', cf. Skt. *duhitár-*, Grk. *θυγάτηρ*).

Ablaut alternations inherited from the parent language are often continued directly: Skt. *ásti* 'is', *sánti* 'are', Av. *asti*, *hənti*, OP *astiy*, *ha(n)tiy*, cf. Lat. *est*, *sunt* (IE **e*/zero). However, there was a major restructuring of ablaut into a system of quantitative contrasts involving three grades:

lengthened	full	zero
Skt. *rājānam* 'king' (acc.)	*rājan* 'O, king' (voc)	*rājñas* 'of a king'
Skt. *cakāra* 'he has done'	*cakara* 'I have done'	*cakrur* 'they have done'
Av. *srāuuaiieiti* 'makes hear' (pres.)	*sraotā* 'hear!' (aorist)	*sruta-*'heard' (ppp.)

Indo-Iranian had a large number of obstruents: voiced stops, voiced aspirates, voiceless stops, and perhaps also voiceless aspirates:

**b*	**bh*	**p*	**(ph)*
**d*	**dh*	**t*	**(th)*
**j*	**jh*	**c*	
**g*	**gh*	**k*	**(kh)*

All four series existed in Indo-Aryan, but the voiceless aspirates are variously considered to be inherited from IE, or to have developed from clusters of voiceless stop + laryngeal within Indo-Iranian (Skt. *pṛthú-* 'broad' < IE ** pl̥tHu-* 'broad'; Av. nom. *paṇtā̊* < **ponteH-s*, gen. *paϑō*<**pn̥tH-os* 'path'), or to represent innovations within Indo-Aryan only. OIA also shows a series of retroflex stops (*ṭ*, *ṭh*, *ḍ*, *ḍh* and a retroflex nasal), but these are unlikely to have existed in the Indo-Iranian ancestor, as they are not shared by OIr.

The IE labiovelars underwent a very early conditioned split, producing Indo-Iranian palatals before original front vowels (Skt., Av., OP *-ca* 'and', cf. Lat. *-que*; Skt., OP *jīva-* 'alive'; cf. Lat. *vīvus*; Skt. *hánti*, Av. *jaiṇti* 'kills', cf. Hitt. *kuenzi*) and velars elsewhere (Skt. *yákṛt*, Av. *yākarə* 'liver', cf. Grk. *ἧπαρ*; Skt. *gnā́-*, Av. *g(ə)nā-* 'goddess', cf. Grk. *γυνή*; Skt. *gharmá-*, Av. *garəma-* 'heat', cf. Lat. *formus*). On the other hand, the IE palatal stops **ḱ*, *ǵ*, *ǵh* probably developed into affricates in Indo-Iranian, and further developed to OIA *ś*, *j*, *h,* but to sibilants in most of Iranian (Skt. *śatám*, Av. *satəm* 'hundred', cf. Lat. *centum*; Skt. *ájati* 'drives', Av. *azaiti*, cf. Lat. *ago*; Skt. *áṃhas-*, Av. *ązah-* 'distress', cf. Grk. *ἄγχω* 'I throttle').

There was a partial merger of IE **l* with **r*, but not in all varieties of Old Indic (Vedic *raghú-* 'quick', Classical Skt. *laghu-*, cf. Grk. *ἐλαχύ-*, Lat. *levis*), nor completely in Iranian (Av. *rayu-*'quick'; but NPers. *lištan* 'to lick', cf. Grk. *λείχω*).

IE **s* developed four allophones in Indo-Iranian; **s*, **z*, and **š*, *ž* after **r̥*, *r*, *u*, *ū*, *au*, *āu*, *k*, *i*, *ī*, *ai*, *āi* (the RUKI rule). These sibilants are all continued in OIr. where **š* is also found after **p*, *b(h)*, and **s* > *h* before vowels. In OIA **š* > retroflex *ṣ* but **z*, *ž* (>*ẓ*) were lost, the latter with compensatory lengthening of the preceding vowel and retroflection of the following stop (contrast Av. *mižda-*, Skt. *mīḍhá-* 'reward', cf. Grk. *μισθό-*).

Morphology of Nouns and Pronouns

Vedic, Classical Sanskrit, and Avestan show that Indo-Iranian retained the full IE range of eight cases (nominative, accusative, instrumental, dative, ablative, genitive, locative, vocative) and three numbers (singular, dual, plural). The inflections of thematic nouns and adjectives (stems in *-a* <IE**-e/o*) continued those of the IE parent language (masc. sg. **-as*, *-am*, *-ā*, *-āi*, *-āt*, *-asya*, *-ai*, *-a*, etc.) apart from the remodeled gen. pl. in *-ānām*, and a second nom. pl. in **-āsas*, which was of limited distribution. On the other hand, the inflection of *ā-* stems was remodeled under the influence of *ī-* stems at an Indo-Iranian date (sg. **-ās*, *-ām*, *-ayā*, *-āyāi*, *-āyās*, *-āyā(m)*, *-ai*).

Although inflection depended primarily on the type of stem, for non-thematic stems, it also depended to some extent on inherited patterns of accentuation and ablaut: contrast the rare type of closed genitive sg. OAv. *cašmə̄ṇg*(< **cašmán-s*) from *cašman-* 'eye' and the more frequent 'open' type Ved. *aryamṇás* from *aryamán-* 'hospitality'. Even when the Vedic evidence indicates that the accent had become fixed on one syllable, the alternations in ablaut between the suffix and the inflection were continued (from Ved. *tákṣan-*, Av. *tašan-* 'craftsman': acc. sg. Ved. *tákṣāṇam*, Av. *tašānam*; gen., dat. Ved. *tákṣṇas*, *tákṣṇe* Av. *tašnō*, *tašne*). A parallel distinction between 'strong' and 'weak' cases characterized the inflection of many types of Indo-Iranian nominal stems.

Indo-Iranian had a large number of demonstrative pronouns, some of which were also employed in anaphoric function (**sá-/tá-*), and as third person pronouns (**a-*, Skt. *asya*, *asmāi*, etc.; Av. *ahe*, *ahmāi*, etc.). There were some characteristic pronominal inflections, which probably began to spread to pronominal adjectives in Indo-Iranian: e.g., nom. pl. masc. **-ai* (Skt. *té*, Av. *tōi* 'those'; Ved. *anyé*, YAv. *aṅiie*, OP *aniyai-ciy* 'others'). Some demonstratives combined several stems (Skt. nom. sg. *ayám*, *iyám*, *idám*, acc. *imám*, *imā́m*, *idám*, instr. *enā́*, *ayā́*, dat. *asmái*, *asyái*; YAv. nom. sg. *aēm*, *īm*, *imat̰* 'this', etc.). In the personal pronouns, singular and plural were normally based on completely different stems ('you': nom. sg. Skt. *tvám*, OAv. *tuuə̄m*; nom. pl. Skt. *yūyám*, OAv. *yūš*, *yūžə̄m*), and in the oblique cases there were two sets of forms, one accented, the other enclitic ('me': gen. Skt. *máma*, OAv., OP *manā*, dat. Skt. *máhyam*, OAv. *maibiiā*; enclitic gen.-dat. Skt. *me*, OAv. *mōi*, OP *-maiy*).

Verb Morphology

The Indo-Iranian finite verb system was of considerable complexity because of its large number of intersecting categories, of voice, tense, aspect, and mood. Tense/aspect distinctions were expressed by different stems (present, aorist, perfect, and a seldom attested future), and three sets of personal inflections, which distinguished active and middle voice. The augment *a-* (<IE**e-*) was also prefixed to forms indicating past time.

Within these tense/aspect categories, the morphology of the stems varied, particularly in the present, which served as the basis for both present and imperfect tenses. Many more formal types than the 10 classes recognized for Sanskrit by the Indian grammatical tradition may be reconstructed: for instance, thematic presents built with the IE suffix **-ske-/-sko-* (Skt. *pṛcchati*, Av. *pərəsaiti* 'asks'), reduplicated thematic presents (Skt. *tiṣṭhati*, Av. *hištaiti* 'stands'), athematic root presents where the accent remained fixed on the root (Skt. *váste*, OAv. *vastē* 'wears'). In the aorist category, only s-aorists were morphologically distinctive (Skt. *ábhārṣam* 'I brought', *ápaviṣṭa* 'it purified itself'), while the other types, root aorists, *a*-aorists, and reduplicated aorists resembled imperfects. However, in Indo-Iranian individual verbs developed their own individual systems of contrasts.

The perfect, which originally indicated a state (Skt. *jāgā́ra*, Av. *jaγāra* 'is awake') or the result of a past action (Skt. *tatákṣa*, Av. *tataša* 'has fashioned') was regularly characterized by a special set of inflections and reduplication (an inherited exception is Skt. *veda*, OAv. *vaēdā* 'I know').

The moods were indicative, imperative, subjunctive, optative, and the 'injunctive'. From a formal point of view, the injunctive resembled an unaugmented imperfect or aorist, and its original function was to mention an action without specifying time or mood. An important use of the injunctive was in prohibitions with the particle **mā́* (Skt. *mā́*, Av, OP *mā*, cf. Grk. μή). The imperative was characterized by distinctive inflectional endings, subjunctives, and optatives by morphemes that could be added to any tense/aspect stem (subjunctive **-a-*, giving **-ā-* in thematic stems; optative **-yā-/-ī-*, thematic **-ai-*).

The distinction between active and passive was often realized in finite forms merely by the contrast between active and middle endings. However, present stems in *-ya-* and a particular type of intransitive aorist (RV *ádarśi*, *ádṛśran* 'it, they became visible') were also employed with passive value (RV *avāci*, OAv. *auuācī* 'is/has been said'). The most frequent passive form was the ppp. in *-tá-* (< IE **-tó-*), which was destined to become one of the most important elements in the evolution of the verb system in both the Iranian and Indo-Aryan branches.

Syntax

The word order of Indo-Iranian must have been predominantly SOV, but, as the earliest Vedic and Old Avestan poetry shows, there was a large range of possible variations. In prose, genitives and other qualifiers normally preceded the noun that they determined (Skt. *manor jāyā* 'wife of Manu', OP *kurauš puça* 'son of Cyrus'). Enclitic particles, unaccented pronominal forms, etc., occupied second position (Wackernagel's Law), and a string of particles followed the first word of a sentence, which was frequently a 'preverb' as univerbation only took place later. According to Vedic evidence, the finite verb was unaccented in main clauses, but regained its accent in subordinate clauses. Subordination was by means of relative adverbs such as **yád* 'when, since' (Skt. *yát*, YAv. *yat̰*), **yáthā* 'so that, as' (Skt. *yáthā*, YAv. *yaθa*), **yádi* 'if' (Skt. *yádi*, OP *yadiy*) and the relative pronoun **yá-* (< IE **yó-*; Skt., Av. *yá-*), which frequently correlated with a demonstrative pronoun in the main clause.

Nominal compounds were a typical feature of Indo-Iranian sentence structure, but they rarely exceeded two members, whereas in Classical Sanskrit multiple members became regular. Exocentric compounds were particularly frequent (Skt. *ugrábāhu-*, Av. *uγrabāhu-* 'strong-armed', Skt. *ṣaḍakṣá-*, Av. *xšuuaš.aši-* 'six-eyed').

Lexicon

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See also: Avestan; Indo–Aryan Languages; Indo–European Languages; Iranian Languages; Sanskrit.

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Indonesia: Language Situation

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Indonesia is the fifth most populous country in the world, numbering about 180 million people in 1992. Stretching across the equator between southeast Asia and Australia, it is an archipelago of thousands of islands where an incredible diversity of languages is found. Grimes (1988) lists 669 languages that are spoken partly or entirely within the Republic of Indonesia. While this number cannot be regarded as a firm count, since only scanty information is available regarding many of these languages, nonetheless it clearly establishes Indonesia's ranking among the countries of the world as second in the number of distinct living languages. (Papua New Guinea is first and Nigeria is third.)

Distribution and Classification of the Languages

The distribution of these hundreds of languages across the country is far from even. There are only a few score languages spoken in western Indonesia, which is very densely populated, while there are hundreds of languages spoken in the more sparsely

Syntax

The word order of Indo-Iranian must have been predominantly SOV, but, as the earliest Vedic and Old Avestan poetry shows, there was a large range of possible variations. In prose, genitives and other qualifiers normally preceded the noun that they determined (Skt. *manor jāyā* 'wife of Manu', OP *kurauš puça* 'son of Cyrus'). Enclitic particles, unaccented pronominal forms, etc., occupied second position (Wackernagel's Law), and a string of particles followed the first word of a sentence, which was frequently a 'preverb' as univerbation only took place later. According to Vedic evidence, the finite verb was unaccented in main clauses, but regained its accent in subordinate clauses. Subordination was by means of relative adverbs such as **yád* 'when, since' (Skt. *yát*, YAv. *yat̰*), **yáthā* 'so that, as' (Skt. *yáthā*, YAv. *yaθa*), **yádi* 'if' (Skt. *yádi*, OP *yadiy*) and the relative pronoun **yá-* (< IE **yó-*; Skt., Av. *yá-*), which frequently correlated with a demonstrative pronoun in the main clause.

Nominal compounds were a typical feature of Indo-Iranian sentence structure, but they rarely exceeded two members, whereas in Classical Sanskrit multiple members became regular. Exocentric compounds were particularly frequent (Skt. *ugrábāhu-*, Av. *uγrabāhu-* 'strong-armed', Skt. *ṣaḍakṣá-*, Av. *xšuuaš.aši-* 'six-eyed').

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See also: Avestan; Indo–Aryan Languages; Indo–European Languages; Iranian Languages; Sanskrit.

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populated islands of eastern Indonesia. Thus, the languages of western Indonesia boast many thousands or even millions of speakers, while the majority of languages in eastern Indonesia have only a few hundred to a few thousand speakers. These differences are largely due to differences in topography and degree of civilization. In western Indonesia, societies were already highly developed by 1000 A.D., as evidenced by the historical record of powerful kingdoms, the ruins of magnificent architectural monuments, and an ancient written literature. By contrast, eastern Indonesia in the 1990s was covered by huge expanses of rain forest and swamps (Irian Jaya) or fragmented into hundreds of islands (Moluccas), populated by ethnic groups many of which are either swidden agriculturalists or seminomadic.

Somewhat more than half the indigenous languages spoken in Indonesia belong to the Austronesian, or Malayo–Polynesian, family. The remaining languages are usually classified as Papuan languages, which essentially means 'non-Austronesian,' since these languages do not all belong to a single genetic family. Besides these indigenous languages, there are several Chinese languages spoken by approximately 2 million ethnic Chinese who are scattered throughout the country.

All the languages boasting 1 million or more speakers are Austronesian (aside from Chinese). The following list of these languages is based on Grimes's (1988) estimation of number of speakers:

Javanese (Central Java)	70 million
Sundanese (Sunda) (W. Java)	25 million
Madurese (Madura) (E. Java)	9 million
Minangkabau (W. Sumatra)	6–7 million
Batak languages (N. Sumatra)	5.5 million
Balinese (Bali) (Bali)	3 million
Buginese (Bugis) (S. Sulawesi)	2.5 million
Acehnese (Aceh) (N. Sumatra)	2.2 million
Banjar (Kalimantan)	1.8 million
Sasak (Lombok, Sunda)	1.5 million
Makassarese (Makasar) (S. Sulawesi)	1.5 million
Lampang (Lampung) (S. Sumatra)	1.5 million
Rejang (S.W. Sumatra)	1 million

This list includes neither Indonesian, the national language, nor Malay, the most widespread lingua franca, both of which number millions of speakers. Because of the unique position of these two languages in the life of the country, they will be discussed more fully below.

While the Austronesian languages are spread throughout the entire country, the non-Austronesian languages are concentrated exclusively in eastern Indonesia: 13 on Halmahera Island in the Moluccas, 17 on Timor and neighboring islands, and the vast majority, approximately 200, in Irian Jaya. Although these languages are collectively called Papuan, they are not in fact all genetically related, i.e., they cannot be shown to be descended from a single ancestral language. Scholars have posited a time depth of about 40 000 years for the entrance of the ancestors of the Papuan languages into the area, as compared with a posited time depth of only about 6000 years for Austronesian speakers into Indonesia. Because of the tremendous time depth, it has not been easy to establish genetic relationships for the non-Austronesian languages, and the ones that have been suggested are not as solidly established as those proposed for the Austronesian languages.

Some 60 different genetic families have been posited for the Papuan languages, although not all these families are represented in Indonesia (see Foley, 1986; Wurm, 1975). The best-known and largest of these within Indonesia is the Dani language family, spoken by 270 000 people inhabiting the central highlands of Irian Jaya. Other Papuan languages of Indonesia include Asmat (upward of 50 000 speakers) and Ekari (100 000) in Irian Jaya, Ternate (42 000) in the Moluccas, and Bunak (50 000) in Timor. All the other Papuan languages of Indonesia are spoken by numerically small groups.

Lingua Francas

As expected in a linguistically pluralistic society, lingua francas have always played an important role in intergroup communication. Of all the lingua francas, the most important by far is Malay. For over 1000 years, it has served as the lingua franca in harbors and bazaars throughout Southeast Asia. When the earliest Europeans arrived in the Indonesian archipelago, they found Malay already in widespread use. In each major center of contact, the local languages influenced the Malay spoken there, giving rise to many regional dialects of Malay. These are still widely spoken in the 1990s.

The National Language

During the time of Dutch colonial control (until 1942), the official language was Dutch but, because Malay was more widely known, it became increasingly important both as an administrative language and as a medium of instruction in schools. Riau Malay, the dialect spoken in central Sumatra near Singapore, became the standard. In the early part of the 20th century, Malay became associated with the nationalist movement for independence. In 1928 young

nationalists declared Bahasa Indonesia, their new name for Malay, to be the national language. Their aspirations were not fully realized until independence came in 1945, and Bahasa Indonesia (Indonesian) was decreed to be the national language.

The choice of Indonesian as the national language is sociolinguistically remarkable in that it was at the time the mother tongue of only 5% of the population. However, it was a politically fortuitous choice because it was so strongly associated with nationalism, it was already in widespread use, and it avoided the factionalism that would have resulted had the choice been one of the majority languages, such as Javanese or Sundanese (42 and 15%, respectively, of the population). From the time of independence, the government has been engaged in developing and promoting the Indonesian language. Thousands of words, especially in technical areas, have been introduced, and grammar and spelling have been standardized (see Alisjahbana, 1984). The position of Indonesian in the 1990s is an enviable story of the successful establishment of a single language as the national language in a linguistically pluralistic society. It enjoys great prestige and virtually all citizens aspire to know the language, since it is viewed as the vehicle for upward socioeconomic mobility. It is the official language of government, education, and mass communication.

Multilingualism and the Status of Minority Languages

The rich linguistic diversity of Indonesia is respected in its constitution, which obliges the state to support the maintenance of the 'regional languages.' Thus the place of minority languages in the life of the people is officially honored. The Ministry of Education and Culture permits education in the mother tongue through the third primary school level, so long as Indonesian is simultaneously being taught to prepare students for instruction exclusively in Indonesian from the fourth primary level onward. Journalism and broadcasting sometimes employ a regional language. The government, however, has thus far not embarked on major programs to develop the minority languages. Nonetheless, these languages continue to flourish because Indonesian is still the mother tongue of only a minority.

In this country where most people speak more than one language, diglossia is widespread. In a typical diglossic situation, the mother tongue is used for 'low' speech functions such as conversation with family and friends, folklore, and cultural events, while Indonesian is used for 'high' speech functions such as official communications, school, and interaction with the government. Since many people have not yet mastered standard Indonesian, they sometimes mix Indonesian with regional Malay for 'high' speech functions.

Literacy

In 1978 it was estimated that 26% of the population between ages 10 and 45 was illiterate. Due to the expansion of the education system, by 1986 the Indonesian government reported only 10% illiteracy among the same age group. These statistics assess only basic literacy, defined as the ability to read the Latin alphabet and Arabic numerals. Statistics for functional literacy or median reading levels are unavailable.

See also: Balinese; Madurese; Malay; Riau Indonesian.

Language Maps (Appendix 1): Maps 86–101.

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Infancy: Phonological Development

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This article provides an overview of phonological development with a focus on production patterns occurring between birth and three years, during which the majority of development occurs. General requirements of phonological acquisition are discussed briefly, followed by a description of prelinguistic vocal development, the transition to speech, and phonological characteristics of first words. Phonetic inventories and error patterns of children acquiring English are discussed.

Phonological Development: What Is Learned?

Within linguistics, the branch of phonology involves the study of sound systems, often in reference to the system of a particular language. A description of the phonological system includes the phonemes and allophones of the language, the phonotactic patterns affecting permitted sequences of phonemes within words, and the suprasegmental features of stress, tone, and timing, among other features. There is a long-standing debate as to which aspects of phonology are 'learned' and which are innate; a full discussion of this issue is beyond the scope of this article. It is clear, however, that acquisition of the phonological system of a language involves knowledge (implicit or explicit) of the phonological properties of that language, phonological representations of the words of the language, and mastery of the articulatory and phonatory gestures associated with adult-like pronunciation of these words. Thus, phonological acquisition involves both cognitive–linguistic learning and the development of the speech-motor skills needed for production.

A key aspect of the cognitive aspect of phonological learning revolves around 'mental' representations that are stored and accessed in the encoding and decoding of words. In spite of a good deal of research regarding the nature and complexity of these representations, key questions remain unanswered, including:

1. Does the child have an auditory representation for word recognition (a form that is presumably close to the adult form) and an articulatory representation for production (a form that may be quite different from the adult form)?
2. If there is a single representation for both perception and production, how are auditory and articulatory features linked within that representation?
3. What is the 'unit' of storage in mental representations? Phonemes? Features? Syllables? Words? Some combination of these?
4. Do the units of storage change as vocabulary grows?
5. Is the mental representation relatively abstract, containing only essential segmental/suprasegmental information, or is phonetic detail included?
6. Are suprasegmental features such as stress and timing included as part of the representation, or are these features coded as 'rules' that apply during word production?
7. How do children's incorrect productions influence their mental representations?
8. Do mental representations change as new words are added to the receptive and productive lexicon?

It should be noted that some of these questions are not unique to the study of developmental phonology. In spite of years of theoretical and experimental research by psychologists, linguists, and speech scientists, there is a lack of consensus on the nature (and number) of mental representations in adult speakers. It is agreed, however, that some type of mental representation is necessary for the perception and production of words. To understand the word *cat*, for example, an individual must have a stored version of the sound sequence associated with the word; the individual must be able to differentiate the word *cat* from similar sounding words, such as *hat, cap, cut,* and *kite*, among others. In a similar manner, production of the word *cat* involves knowledge of the target sound sequence and the articulatory movements needed to distinguish it from other words with similar sound patterns.

Speech Perception

Several months before they produce their first words, infants can recognize words from the ambient language, indicating that they have some sort of storage for those words. Research on infant speech perception has shown that many aspects of phonological learning occur before the comprehension of words (Jusczyk, 1996). In the first 6 months of life, infants demonstrate a remarkable ability to discriminate speech sounds from a variety of languages. After 6 months, discrimination abilities decline and language-specific sensitivity increases. Thus, infants exposed to English can detect the difference between dental and retroflex /t/ phonemes of Hindi at 6 months but not at 12 months. Increased sensitivity to the sound patterns of the input language is apparent not only at the segmental level, but also with regard to phonotactic patterns and prosodic features. Research shows that

infants pay attention to statistical properties of the language they hear, recognizing permissible sequences and frequency of occurrence of phonological features in the input.

Research on infant perception highlights the large gap between perception and speech production in infancy: even before babies utter their first words, many aspects of the perceptual system are nearly adult-like. A major challenge during the period of early acquisition, then, is to learn to **produce** speech so that it resembles the speech the child hears. For instance, a child acquiring English must learn to block the air stream completely for stop consonants and to block it partially for fricatives; to raise the velum for nonnasal consonants and vowels and lower it for nasals; to position the tongue so that it touches the alveolar ridge to make /s/; to begin vocal fold vibration 50 ms (or more) after release of closure to produce initial /p/; and to lower the sides of the tongue to produce /l/. Some of this speech-motor learning occurs prior to the onset of meaningful speech, as shown in the overview of prelinguistic development provided here.

Prelinguistic Development

In the first 12 months, the infant produces a wide variety of vocalizations; some of these are 'speech-like' in that they share features of adult productions, while others, like coughs or burps, bear little resemblance to speech. By definition, 'prelinguistic' vocalizations are non-meaningful, even though they may resemble real words. Thus, productions of [mama] or [dædæ] at 7 months, though sometimes interpreted as attempts to produce *mommy* and *daddy*, are classified as prelinguistic vocalizations unless it can be shown that they have the stable sound-meaning relationships of conventional adult-based words. Word production lags behind comprehension by several months: around 9 months, infants begin to demonstrate limited comprehension of words and simple phrases in particular contexts; by 12 months, the average receptive vocabulary is around 50 words according to parental report (Fensen *et al.*, 1993). First words typically appear between 11 and 14 months, with an average onset of 12 months.

Ages and Stages in the Prelinguistic Period

Most vocal productions in the first month of life are classified as reflexive vocalizations (e.g., cries, coughs, and hiccups) and are thought to be automatic responses reflecting the physical state of the infant. In contrast, nonreflexive vocalizations (e.g., cooing, babbling, and playful yelling and screaming) are productions containing some of the phonetic features found in adult languages (Oller, 2000). Nonreflexive vocalizations pass through a sequence of developmental stages, beginning with vowel-like utterances at 2 months and progressing through a period of vocal play to productions of sequences of consonant–vowel strings toward the end of the first year. All infants, in all linguistic communities, pass through the same stages of early vocal development. Although called 'stages,' the periods are not discrete, and vocalizations from previous stages continue to be used in subsequent ones. The onset of a new stage is marked by the appearance of vocal behaviors not observed (or observed only rarely) in the preceding period; the new behaviors do not necessarily constitute the most frequent vocalization type during that stage.

Stage 1 (0 to 2 Months): Phonation

The first stage is characterized by productions that bear little resemblance to speech. The vocal behaviors of this stage consist primarily of reflexive (sometimes called 'vegetative') vocalizations, such as crying, fussing, coughing, sneezing, and burping. These vocal types are referred to as 'reflexive' because they involve automatic, involuntary motor patterns. Some nonreflexive vowel-like productions occur at this stage.

Stage 2 (2 to 4 Months): Cooing

This stage is characterized by a new type of vocal production that occurs as infants begin smiling and interacting with adults in their environment. 'Coos' are characterized by nasal resonance and are generally perceived as containing vowels and consonants produced at the back of the mouth (velars, uvulars) and back vowels. Consonant–vowel syllables occurring in this period lack the timing of opening and closure gestures found in syllable timing of adult speech.

Stage 3 (4 to 6 Months): Vocal Play

Although the vocalizations of the previous period still occur, new productions in this stage range from repetitions of vowel-like elements to squeals, growls, yells, raspberries (bilabial or labiolingual trills), and friction noises. It seems as though infants are intentionally exploring the capabilities of the vocal tract. The predominant type of vocalization may vary from week to week or even from day to day, making it difficult to characterize an infant's productions without an extensive sample. During this period the infant produces some consonant–vowel (CV) syllables; however, the timing of the transition between

consonant and vowel is slower than that occurring in adult CV syllables.

Stage 4 (6 to 10 Months): Canonical Babble

This stage is characterized by the appearance of syllables composed of alternating consonants and vowels. These syllables occur as single syllables or as strings of repeated syllables, such as [baba]. Because the timing and phonetic characteristics of these syllables are similar to those of adult speech, the productions may resemble words of the language, e.g., [mamama], [dædæ]. Multisyllabic utterances in this stage are categorized as reduplicated babbles (i.e., strings of identical syllables like [bʌbʌ]) or variegated babbles (syllable strings with varying consonants and vowels, like [bagɪ]). While both types of utterances occur in this stage, reduplicated babble predominates initially, while variegated babble increases after the infant reaches 9 to 10 months of age.

Stage 5 (10 Months and Older): Jargon Babble

This stage of babble, also called 'intonated' babble, often cooccurs with both canonical babbling and with the appearance of words. Jargon babble is characterized by strings of sounds and syllables uttered with a variety of stress and intonational patterns. To many adults, it seems as though children are speaking in whole sentences but are using their 'own' language, rather than the standard language spoken by older children and adults around them.

The Sounds of Babble

The repertoire of speech sounds changes dramatically during the first year of life. In the first 6 months, vowel articulations tend to predominate, and most consonantal sounds are produced in the back of the mouth. With the onset of the canonical babbling stage, there is a shift toward labial and coronal consonants, with frequent occurrences of [m], [b], and [d] in particular. Between 6 and 12 months, the consonantal repertoire expands considerably, but claims that babies produce all the sounds of all languages of the world (Jakobson, 1968) in this period have not been substantiated. In fact, a limited set of phones accounts for the great majority of consonantal sounds produced. According to Locke (1983), the consonants [p b m w t d n j k g h] comprise about 90% of the consonants produced by infants raised in American English–speaking environments. Crosslinguistic research has shown that these same manner classes predominate in the babble of infants raised in all linguistic environments.

In the late stages of the prelinguistic period, infant vocalizations show general effects of the ambient language. Babies gradually stop using sounds that do not occur in the ambient language, such as [h] in French, and their syllables start to acquire the timing and pitch contour of the language around them. Thus, while infants from all language communities tend to produce vocalizations with stops, nasals, and glides, there are systematic differences in the frequency of occurrence of particular sound classes and syllable structures that reflect the proportional use in the linguistic input (Vihman, 1996).

The Transition to Meaningful Speech

First words typically appear during the period of canonical babble, and for the next 7 to 10 months, babble and speech coexist. By the age of 18 months, the proportion of babbled utterances has declined markedly, and words and short phrases begin to predominate. Babble and early words share the same phonetic properties in terms of sound types and syllable shapes (Stoel-Gammon, 1992). The consonants that occur most frequently in canonical babbling – stops, nasals, and glides – are the same sound classes that predominate in early word productions, and the manner classes that are infrequent in babble – namely liquids, fricatives, and affricates – are precisely those that appear later in the acquisition of speech. Moreover, the CV syllable structure that is characteristic of the canonical babbling period is also the most frequent syllabic type in early word productions. Developmentally, the sounds of babble serve as the building blocks for the subsequent production of words.

There is strong evidence linking prelinguistic production patterns with general speech and language skills throughout early childhood, indicating continued influence from the babbling period. Longitudinal studies have shown correlations between (1) the age of onset of canonical babble and the age of onset of meaningful speech; (2) the amount of vocalization at 3 months and vocabulary size at 27 months; (3) the number of CV syllables produced at 12 months and the age at which first words are produced; (4) use of consonants at 12 months and phonological skills at 3 years; and (5) the diversity of syllable and sound types at 6 to 14 months and performance on speech and language tests at 5 years. In each case, more in the prelinguistic period (i.e., more vocalizations at 3 months; more CV syllables at 12 months; more consonants in babble) is linked to better performance on speech and language measures. These correlations provide further support for the view that babbling serves as a foundation for subsequent acquisition of speech and language. Infants who produce a greater number of prelinguistic vocalizations, particularly a greater number of canonical utterances with a variety

of consonants and vowels, have amassed a greater arsenal of 'building blocks' that can be recruited for the production of words.

Development of Articulatory–Auditory Links

Infants are exposed to two types of input during the pre-linguistic period: the speech of those around them and their own productions. Both are crucial for the acquisition of speech. Adult input (often modified in the form of child-directed speech) provides the basis for learning the sound–meaning associations that underlie word meaning. Hearing their own vocal output is also important for children's production of words, as it is the basis for establishing links between oral-motor movements and the resulting acoustic signal. Thus, the 6-month-old who frequently produces the syllable [ba] becomes aware of the tactual and kinesthetic sensations associated with production of this syllable and of the auditory signal that results from the production. Once this step is accomplished, infants must recognize that that the babbled syllable [ba] resembles the adult words *ball*. When these two types of learning have occurred, the prelinguistic form [ba] can serve as the basis for production of the word *ball*.

Speech production has a skill component and, as with any skilled activity, practice increases the control and precision with which a movement is performed. Thus, the more often a baby makes the movements that shape the vocal tract to produce particular sounds and sound sequences, the more automatic those movements become and, ultimately, the easier it is to execute them in producing meaningful speech. Babies who have a large stock of practiced syllables have an advantage in early word acquisition because they have a larger repertoire of phonetic forms to which meaning can be attached (Vihman, 1992).

As noted previously, word production requires awareness of the link between a particular sequence of speech sounds and a particular meaning and the knowledge of the articulatory movements needed to articulate the sequence of sounds that resembles the target. If the sequence of speech sounds is present in the child's babble, as in the case of the nonmeaningful [ba] used subsequently for the word *ball*, the change from babble to speech is minimal in terms of articulation. In contrast, acquisition of a word like *shoe* involves learning not only the link between sound and meaning but also a set of unfamiliar articulatory movements. The disparity in the amount of learning involved in acquiring the words *ball* and *shoe* leads to the prediction that, all other things being equal, target words with phonetic properties that mirror a child's prelinguistic vocalizations will be acquired earlier than words with features (e.g., speech sounds, syllable shapes) that are not present in the prelinguistic repertoire.

Sounds and Syllables of the 'First-Word' Period

The first-word period, from the onset of meaningful speech to acquisition of a 50-word vocabulary, is characterized by a phonetic inventory of simple syllabic structures and a small segmental repertoire. (The term 'phonetic inventory' is used here to describe the elements occurring in a child's productions and does not take into account accuracy of production.) In English, syllable types predominating in the first-word period include CV (consonant–vowel), CVC, and CVCV; in terms of consonantal repertoire, productions are composed primarily of stops, nasals, and glides, with a few fricatives, mainly in word-final position.

Research on first-word production in languages other than English reveals the same general properties in terms of sound classes and syllable structure: in all languages, CV syllables tend to predominate, and stops, nasals, and glides occur frequently. Language-specific influences are apparent, however, in the frequency of occurrence of particular sound classes, syllable types, and stress patterns. For example, children acquiring English produce many CVC words and disyllables with trochaic stress; French-learning children, by comparison, produce more disyllabic forms, more words with iambic stress, and more nasals, all features of French.

In spite of the presence of common production patterns, substantial individual variation does occur, presumably arising from a combination of innate and environmental factors. Individual differences have been noted in a range of domains, including consonantal repertoire in babble, 'favorite' sounds in early words, rate of acquisition, degree of phonetic accuracy, variability of production within and across words, and number and type of errors in word productions.

Beyond First Words

The end of the first-word stage, around 18 months, is signaled by a rapid increase in vocabulary size, an expansion of the repertoire of segments and syllable shapes, and the onset of two-word utterances. By 24 months, the typically developing child learning English has acquired a productive vocabulary of 250 to 350 words and can produce multiple-word sentences. Although the child's phonological system is

far from complete, the basic elements are present: the child can produce words with labial, alveolar, and velar stop consonants, both voiced and voiceless; labial and alveolar nasals; glides; and some voiceless fricatives. In terms of syllable structures, the repertoire includes open and closed syllables that can combine to form disyllabic words. In addition, the average 2-year-old can produce some words with consonant clusters in initial and final positions. Compared with consonants, the vowel repertoire at 24 months is relatively complete, although some lax vowels and the r-colored vowels may be missing. By age 36 months, the phonetic inventory of the typically developing child has expanded to include consonants from all place, manner, and voice classes of English, as well as a variety of syllable and word shapes. Although the productive repertoires of typically developing children may be quite similar at 36 months, the developmental paths leading to the repertoire will vary considerably. For this reason, it is difficult to talk about 'order of acquisition' of phonemes because, in spite of general patterns, there is no fixed order.

With expansion of syllable types and segmental repertoire, accuracy of production improves markedly between 24 and 36 months. A majority of children acquiring English can accurately produce all stops, nasals, and glides, as well as /f/ and /h/ in some word positions (see below); by 42 months, the repertoire of accurate segments, at least in some word positions, has increased to include /s, v, ʃ, tʃ, dʒ, r, l/.

Effects of Word Position, Word Length, and Word Stress

Phonological development involves more than learning accurate storage and production of individual speech sounds; accurate production is heavily influenced by the phonetic context in which the target sound occurs. In English, for example, fricatives, velars, and liquids are likely to appear first in word- (or syllable-) final position. As might be expected, production accuracy is affected by syllable structure, with a singleton consonant less prone to error than the same consonant in the context of a cluster. Thus, /s/ may be produced accurately in the word *sun* but not in the word *spoon* or *star*.

Two more factors that influence segmental production are word length and word stress. In general, words of three or more syllables have more errors in syllabic structure and segmental accuracy than shorter words. Stress patterns of the target language also play a role. Almost all disyllabic words in the lexicon of a 2-year-old acquiring English conform to a trochaic pattern of a strong (or stressed) syllable followed by a weak (unstressed) syllable, as in *BAby, TAble, MOmmy*, *COOkie; DOggie* (where capital letters indicate the stressed syllable). There are occurrences of words with iambic stress (a weak syllable followed by a strong syllable), as in *baLLOON, caNOE, guiTAR*, but words with iambic stress are less frequent and tend to appear later in the child's productive vocabulary. Attempts to produce trochaic and iambic words yield quite different outcomes: trochaic words are produced with two syllables from the early stages; iambic words, in contrast, are often reduced to a single syllable. Resulting forms may include the entire strong syllable, e.g., [nu] for *caNOE*, or the onset of the weak syllable followed by the rime of the second syllable, e.g., [bun] for *baLLOON*. Words of more than two syllables are also affected by stress pattern. In English, the predominant form is reduction of the three-syllable form to a two-syllable trochaic production. For example, in the word *animal*, the medial syllable is omitted, while in the word *baNAna,* the initial syllable is dropped.

Child Productions: Adult Targets

A child's phonological system can be described in two ways: through an independent analysis, i.e., with a focus on the child's productions without reference to the adult model; or via a relational analysis, i.e., comparing the child's production to the adult model. Each type of analysis provides important information. An independent analysis includes a summary of the child's phonetic inventory, i.e., a list of segments, sound classes, syllable and word structures, and suprasegmental patterns in the child's speech. A 'relational' analysis, in contrast, focuses on similarities and differences between the child's pronunciation of a word and the target form.

As most adults are aware, mispronunciations are one of the hallmarks of child speech. In some cases, the mispronunciation is so profound that it is impossible to determine what the child was trying to say; in this case, the child's form is classified as unintelligible. At the age of 2 years, about half of a child's utterances are intelligible (i.e., can be understood by an adult who is not familiar with the child). By the age of 3 years, the level of intelligibility increases to 75%, and by age 4, it is 100%. This does not mean that the child's productions are fully adult-like by age 4; rather, it means that the errors do not interfere with intelligibility. Although the level of intelligibility is closely linked to the child's productive phonology, it can also be influenced by other factors, such as syntactic complexity and pragmatic context.

Differences between a child's production of a word and the adult target can stem from problems in a

number of areas: with perception of the adult input; with storage and/or retrieval of the word form; or with the articulatory movements associated with production. In some cases, several of these 'problems' may be involved in single production. Studies of speech perception in infants and young children, however, indicate that children have relatively accurate perception of target forms; moreover, they are often aware that their production is incorrect. For example, Smith (1973) noted the following exchange with his son:

Father: Say 'jump.'
Child: Dup.
Father: No, 'jump.'
Child: Dup.
Father: No, 'jummmp.'
Child: Only Daddy can say 'dup.'

Comparisons of children's productions and adult targets show that the differences between the two are not random but can be described in terms of phonologically based 'phonological processes' that simplify the target by reducing syllabic complexity or substituting one sound class for another. These processes can be divided into four types: syllable structure processes, substitution processes, assimilation processes, and voicing processes. Examples of each of the types, based on the acquisition of English, are provided below.

Syllable Structure Processes

'Syllable structure processes' affect the overall 'shape' of a syllable or word by omitting one or more elements (segments or syllables) from the target form. The influence of the primitive CV syllable shape, common in babble, can be seen in these examples:

1. Omission of a weak syllable, usually in initial or medial position, from the target form; e.g., *telephone* produced as [tɛfon] or *about* produced [baʊt]
2. Omission of the final consonant of a word, e.g., *dog* produced [da] or *ball* produced [ba]
3. Omission of one or more consonants in a cluster, e.g., *snow* produced as [no] or *ant* produced as [æt]

Substitution Processes

'Substitution processes' involve substitution of one sound class for another. Consonants that appear in the child's form tend to be those occurring in babble and in the early word stage. Examples include:

1. Substitution of stops for target fricatives and affricates, e.g., *see* is produced [ti], *zoo* is [du], and *chin* is [tɪn]. The stop is produced at the same (or nearly the same) place of articulation as the target phoneme.
2. Substitution of alveolar stops for target velar stops, e.g., *key* is produced as [ti] and *go* is produced [do].
3. Substitution of alveolar consonants for target alveolo-palatal consonants, e.g., *shoe* is produced [su] and *juice* is [dzus].
4. Substitution of glides for prevocalic liquids, e.g., *red* is produced [wɛd] and *light* is [jaɪt] or [waɪt].
5. Substitution of vowels for post-vocalic liquids and syllabic liquids, e.g., *door* is produced [dɔə] and *bottle* is produced [badu].

Assimilation Processes

'Assimilation processes' (also referred to 'harmony' processes) affect the segments, primarily the consonants, of a target word by making one consonant more like another. These forms resemble reduplicated syllables of canonical babble and early word forms such as *mommy, daddy,* and *baby.* Examples include:

1. Assimilation of a nonvelar consonant to a velar consonant in the same words, e.g., *dog* is produced [gag]
2. Assimilation of a nonlabial consonant to a labial consonant in the same word, e.g., *boat* is produced [bop]
3. Assimilation of a nonnasal consonant to a nasal consonant in the same words, e.g., *bean* is produced [min]

Context-Sensitive Voicing Processes

'Context-sensitive voicing processes' affect the voicing feature of prevocalic and word-final obstruents. Examples include:

1. Voiceless obstruents (primarily stops) in prevocalic position are produced as their voiced cognate, e.g., *two* is produced [du] and *papa* is produced [baba].
2. Voiced obstruents in word-final position are produced as their voiceless cognate, e.g., *cheese* is produced [tʃis]; *bag* is produced [bæk].

In some cases, a single word may be affected by more than one process. For example, when *table* is produced as [bebu], initial /t/ is assimilated to the following labial and syllabic /l/ is rendered as a vowel; when *surprise* is produced as [pwaɪs], the target form is affected by deletion of the initial weak syllable, by gliding of /r/, and by devoicing of word-final /z/.

The patterns described above have been described within a number of theoretical frameworks, including analyses based on features, phonemes, or

'correspondence' rules; more recently, nonlinear models, connectionist approaches, and optimality theoretic descriptions have appeared. Regardless of the phonological framework, the patterns are the same: word productions tend to be simplified to reflect the basic elements that were used in the prelinguistic stages. In terms of views on phonological acquisition, the primary differences across current phonological theories lies in proposals regarding underlying representations, in the emphasis on prosodic versus segmental aspects of development, and in formal descriptions of differences between child productions and the target form.

Summary and Conclusion

This article has provided a brief description of phonological development from birth to 3 years, with emphasis on production and examples primarily from English. It should be remembered that, for the child, the goal of phonological development is not to learn the phonology of the target language but to learn to recognize words from the input and to produce adult-like forms as output.

Basic production patterns first appear in the prelinguistic period, during which the fundamental articulatory patterns emerge: CV syllable structures and use of stop, nasal, and glide consonants. As children begin to recognize and attempt to produce words, they must move beyond the basic repertoire and learn to produce the phonetic, phonological, and prosodic features of the target language.

See also: Generative Phonology; Harmony; Infancy: Sensitivity to Linguistic Form; Metrical Phonology; Natural Phonology; Phonology: Optimality Theory; Underspecification.

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Infancy: Sensitivity to Linguistic Form

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Until recently, much of our understanding of how first language develops has come from children's utterances, and particularly their errors. However, recent work on language development in infants has revealed their remarkable sensitivity to linguistic form, especially as it is embodied in the statistical patterns of their input. This article will outline three domains of sensitivity: phonology, the lexicon, and syntax.

The Development of Phonetic Categories

Although infants in the first months of life appear to be able to discriminate most speech sounds used in the world's languages, adults are not. The groundbreaking research of Werker and colleagues has shown that infants lose their ability to discriminate non-native consonant contrasts, and therefore become more like adults, some time between 8 and 10 months of age (Werker and Tees, 1984). These results are generally taken to indicate that infants have begun to form categories of those speech contrasts that are relevant in their language. What causes infants to form phonetic categories has been a puzzle. We might naïvely assume that infants lose their ability to discriminate sounds that are not in the input. However, such an assumption misses the point that many acoustic differences that are phonemic in one language appear in another language as allophones of a single phoneme. For example, English-speakers have the option of releasing or not releasing and aspirating word final stops. Thus, English-learning infants may be exposed to both released and unreleased stops, but this phonetic difference does not affect meaning in English. The same acoustic difference does affect meaning in Hindi. What causes the English-learning infant and the Hindi-learning infant, both of whom hear variation in aspiration in their input, to treat aspiration differently?

One hypothesis is based on the observation that infants show a decline in non-native consonant discrimination at roughly the period of development that they begin to recognize and produce first words (Best, 1995; Jusczyk, 1985; Lalonde and Werker, 1995; MacKain, 1982; Werker and Pegg, 1992). Perhaps associating word forms with meanings as part of building a lexicon causes learners to focus on which aspects of form are relevant to meaning and which are not. Another hypothesis about the mechanism that underlies infants' focus on the phonetic features that are relevant in the target language concerns their attention to the statistical properties of their input (Jusczyk *et al.*, 1990; Kuhl, 1993; Maye *et al.*, 2002). On this view, an English-learning infant might hear a continuum of different degrees of aspiration on word-final stops, with most of the values clustering around a particular point in the acoustic distribution. That is, English-learning infants are likely to hear a monomodal distribution of aspiration. Hindi-learning infants are also likely to hear a range of aspiration values; however, the values should cluster around two points in the distribution – one for segments in which the speaker intends aspiration and the other for intentionally unaspirated segments. Thus, the Hindi-learner is exposed to a bimodal distribution of this acoustic variable. Recent research by Maye and colleagues using the preferential listening technique suggests that even 6-month-olds respond differently to mono-versus bimodal distributions of speech sounds (Maye *et al.*, 2002).

The Development of the Lexicon

A great deal of research over the past decade has focused on the cues that infants might use to identify potential word forms, and particular, to segment words from the speech stream. Suggested segmentation cues include words produced in isolation (Brent and Siskind, 2001), phrase-final position (e.g., Fernald *et al.*, 2001; Saffran *et al.*, 1996b), language-specific canonical stress patterns (e.g., Echols *et al.*, 1997; Johnson and Jusczyk, 2001; Morgan and Saffran, 1995), phonotactic information (Christophe *et al.*, 1994; Johnson and Jusczyk, 2001), and the probability with which one syllable is followed by another (Jusczyk *et al.*, 1999; Morgan and Saffran, 1995; Saffran *et al.*, 1996a).

Once word candidates have been segmented from the speech stream, they must be compared to existing words in the lexicon. There is some evidence that infants' ability to access stored word representations is highly dependent on there being an acoustic match between the stored word and the currently heard one. For example, infants are better able to recognize words spoken by the same talker at familiarization and test (Houston and Jusczyk, 2003). One topic of current debate in infant lexical development is whether infants gradually become more and more competent at accessing stored word forms (Swingley and Aslin, 2002), or whether there is a discontinuity in lexical representation that occurs when infants begin to associate word forms with referents (Stager and Werker, 1997; Werker *et al.*, 2002).

The Development of Syntax

The first studies examining infants' sensitivity to the syntactic forms of utterances involved making modifications to the language the infant was already learning. Shady *et al.* (1995) demonstrated that 10.5-month-olds could discriminate normal English sentences from sentences in which determiners and nouns were reversed (e.g., "kitten the"). Other studies demonstrated that infants at a similar age could discriminate normal English sentences from those in which a subset of grammatical morphemes (e.g., a, was) were replaced by nonsense syllables (Shafer *et al.*, 1998). Santelmann and Jusczyk (1998) showed that 18-month-olds, but not 15-month-olds, discriminated sentences in which auxiliaries and verb inflections were grammatically correct (e.g., "is running") from sentences with mismatches ("can running").

Other studies have asked what infants are able to learn about the syntax of an artificial language with very brief exposure in the laboratory. Gómez and Gerken (1999) presented 12-month-olds with a subset of strings produced by one of two finite state grammars. Half of the infants were trained for about two minutes on strings from Grammar 1 and half on strings from Grammar 2. During test, both groups of infants heard strings in which new vocabulary was substituted for the syllables in the training grammar (e.g., JED, FIM, TUP, DAK, SOG replaced VOT, PEL, JIC, RUD, TAM, respectively). Infants showed a preference for strings that were consistent with their training grammar, suggesting that they had abstracted some aspect of grammatical structure above and beyond pairs of specific elements. Other researchers (Marcus *et al.*, 1999) found a similar result with 7-month-olds who were exposed to a simpler grammar. In both sets of studies, it is likely that infants were relying on a pattern of repeating and alternating syllables to determine whether what they heard during test was the same as or different from the training stimuli, making the task somewhat different than most aspects of syntax learning.

Still other studies combine learning in the lab with natural language. In one study, 17-month-old English-learning infants were exposed to a Russian gender paradigm with six masculine and six feminine noun stems each appearing with two case endings (Gerken *et al.*, 2005). Two of the feminine and two of the masculine words were withheld during familiarization and presented at test (grammatical items), along with the same stems with the opposite gender case endings (ungrammatical items). Infants discriminate grammatical from ungrammatical items, but only when a subset of the familiarization stimuli contained a second indicator of gender (/k/ on feminine stems and /tɛl/ on masculine stems.

Summary

The studies outlined in this article suggest that infants approach the task of language learning with very sophisticated statistical pattern detection and storage abilities. They raise the possibility that much of the work of language acquisition in the toddler to early school years is to link the language forms noted in infancy with meaning. It remains to be seen whether and how such domain neutral abilities interact with any biological endowment specifically for language.

See also: Design Features of Language; Infancy: Phonological Development; Language Development: Overview; Language Processing: Statistical Methods; Speech Perception.

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Inference: Abduction, Induction, Deduction

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Abductive reasoning was championed by the early pragmatist Charles Peirce as an empirically focused procedure for the construction of classes and categories from observed data. He defined it as follows:

> The surprising fact, C, is observed; But if A were true, C would be a matter of course, Hence, there is reason to suspect that A is true (Peirce, 1940: 151).

Abduction does not really require that the fact observed be surprising. Peirce's definition of abductive reasoning is presented as a syllogism. We use (a1), (a2) to mark assumptions; '∧' is logical conjunction; and '(c)' is the inferred conclusion of valid reasoning procedure.

(1) (a1) Fact C is observed;
∧ (a2) If A were true, C would be a matter of course;
———
(c) There is a reason to suspect that A is true.

Abductive inferences lead to testable hypotheses about states of affairs. Data are correlated on the basis of their similarity or by analogy with some known system, usually with an eye to their apparent function or relevance within the emerging general description. An example of abductive reasoning in historical linguistics is (2).

(2) (a1) In the ancient Indic language Sanskrit, words for numbers 2–7 are *dva, tri, catur, pañca, ṣaṣ, sapta*. These are similar to number words in European languages known to be related to one another: e.g., Slovak *dva*, Latin *duo* '2'; Slovak *tri*, Italian *tre* '3'; Latin *quattuor* '4'; Welsh *pump*, German *fünf* '5'; Spanish *seis*, English *six* '6'; Latin *septem* '7'.

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Abductive reasoning was championed by the early pragmatist Charles Peirce as an empirically focused procedure for the construction of classes and categories from observed data. He defined it as follows:

> The surprising fact, C, is observed; But if A were true, C would be a matter of course, Hence, there is reason to suspect that A is true (Peirce, 1940: 151).

Abduction does not really require that the fact observed be surprising. Peirce's definition of abductive reasoning is presented as a syllogism. We use (a1), (a2) to mark assumptions; '∧' is logical conjunction; and '(c)' is the inferred conclusion of valid reasoning procedure.

(1) (a1) Fact C is observed;
∧ (a2) If A were true, C would be a matter of course;
———
(c) There is a reason to suspect that A is true.

Abductive inferences lead to testable hypotheses about states of affairs. Data are correlated on the basis of their similarity or by analogy with some known system, usually with an eye to their apparent function or relevance within the emerging general description. An example of abductive reasoning in historical linguistics is (2).

(2) (a1) In the ancient Indic language Sanskrit, words for numbers 2–7 are *dva, tri, catur, pañca, ṣaṣ, sapta*. These are similar to number words in European languages known to be related to one another: e.g., Slovak *dva*, Latin *duo* '2'; Slovak *tri*, Italian *tre* '3'; Latin *quattuor* '4'; Welsh *pump*, German *fünf* '5'; Spanish *seis*, English *six* '6'; Latin *septem* '7'.

∧ (a2) If Sanskrit were related to these European languages (i.e., they all have a common ancestor), the similarity would be a matter of course.

(c) There is a reason to suspect that Sanskrit is related to European languages.

(2(a1)) collapses several similar observations. We could deconstruct (a1) and (a2) into a series of syllogisms like (3).

(3) (a1) Sanskrit *dva* means '2'
∧ (a2) Slovak *dva* also means '2'

(c) Perhaps Sanskrit is related to Slovak (What other evidence is there?)

(2(a2)) is an imaginative leap because Sanskrit is separated by time and thousands of kilometers from the European languages, and it was spoken by a different race. (2(a2)) expresses the intuition underlying the creation of the hypothesis in (2(c)). The essential contribution of intuition to scientific theory is widely recognized among philosophers of science.

> Pure logic could never lead us to anything but tautologies; it could create nothing new; not from it alone can any science issue. [...T]o make arithmetic, as to make geometry, or to make any science, something else than pure logic is necessary. To designate this something else we have no word other than *intuition*. [... L]ogic and intuition have each their necessary role. Each is indispensable. Logic, which alone can give certainty, is the instrument of demonstration; intuition is the instrument of invention (Poincaré, 1946: 214f., 219).

> The supreme task of the physicist is to arrive at those elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to these laws, only intuition resting on sympathetic understanding of experience can reach them (Einstein, 1973: 221).

The abduced hypothesis (2(c)) can be inductively confirmed by finding additional systematic correspondences leading to the recognition of an Indo-European language family. Once a part of the system is recognized and predictions about the whole system begin to be made, the investigator moves from abduction – hypothesizing – to hypothesis testing and inductive reasoning.

Before Peirce, abduction was included within induction. An example of inductive inference is (4).

(4) (a1) Every day till now the sun has risen in the east.

(c) If we check tomorrow, the sun will have risen in the east.

The inductive inference (4(c)) is a prediction based on sampling; (a1) can be deconstructed into a set of assumptions: *On day 1 the sun rose in the east* ∧ *On day 2 the sun rose in the east* ∧ ... *Yesterday the sun rose in the east* ∧ *This morning the sun rose in the east*. If the sampling technique is good, the prediction will probably be verified: (4(c)) is highly probable given the assumption (4(a1)), but it is not necessarily going to be the case. Inductive inference is used in linguistics: for instance, if you are told that almost all French nouns ending in *-ion* are feminine then you can inductively infer that the next French noun you encounter that ends in *-ion* will most probably be feminine. Induction uncovers tendencies, but not certainties, and so it is open to dispute; so, the problem with inductive reasoning is exactly that it identifies conclusions in which we have some degree of confidence (given the assumptions) but not the kind of confidence that is given to deductions.

Inductivism argues from particular instances to a general hypothesis or model for a universal set of instances (Bacon, 1620 I: 19; Mill, 1970: 188). The inductive method assumes that there is a natural order that can be discovered through rational means by inspecting natural phenomena. If this underlying assumption were correct, the inductivist model would be the only model possible because it is determined by natural order and natural laws; it is a reflection of nature. Inductivist models can be illustrated by Newtonian physics and, because language is a natural phenomenon, American structuralist linguistics: "The only useful generalizations about language are inductive generalizations" (Bloomfield, 1933: 20). But

> There is no inductive method which would lead to the fundamental concepts of physics. Failure to understand this fact constituted the basic philosophical error of so many investigators of the nineteenth century. [...] Logical thinking is necessarily deductive; it is based upon hypothetical concepts and axioms (Einstein, 1973: 299).

In formal semantics and other formal systems deductive reasoning is required because, provided the assumptions are correct and the reasoning process valid, a consistent conclusion is guaranteed. For instance, from any proposition p we can validly deduce p.

(5) (a) Max weighs 250 pounds.

(c) Max weighs 250 pounds.

More interesting deductions involve more than one assumption, e.g., from (a1) *A bachelor is a man who has never married* and (a2) *Max is married*, we can deduce that (c) *Max is not a bachelor*. Even Aristotle did not recognize that this is only true when there is a referent for Max. Aristotle wrote, "When we have proved that an attribute applies to all of a kind, we shall have proved that it belongs to some of the kind"

(*Topics,* 1984: 109ª4). In Aristotle's scheme, it is therefore possible to make the following chain of valid inference: *No horse is a unicorn* → *No unicorn is a horse* → *Some unicorn is not a horse*. The first proposition is true and can be represented in the predicate calculus as $\forall x[Hx \rightarrow \neg Ux]$, and the final proposition has the form $\exists x[Ux \wedge \neg Hx]$, which asserts the existence of unicorns. The conditional $\forall x[Hx \rightarrow \neg Ux] \rightarrow \exists x[Ux \wedge \neg Hx]$ is false if $\exists x[Ux \wedge \neg Hx]$ is false, i.e., when there are no unicorns. Aristotle, like the ordinary language user, assumed the existence of referents for the terms in statements, so for him *No horse is a unicorn* does entail *Some horse is not a unicorn*. An Aristotelian syllogistic is

(6) (a1) All humans are mortal.
∧ (a2) All Greeks are human.

(c) All Greeks are mortal.

If we vary this by making premise (6(a1)) false, *All humans are immortal,* the conclusion must be *All Greeks are immortal* – clearly demonstrating that false assumptions will lead by valid argument to consistent but probably false conclusions. Not always, though:

(7) (a1) All women are cats.
∧ (a2) All cats are human.

(c) All women are human.

It follows that we must get our assumptions right if we are to use deductive inference to seek true conclusions. Note that valid reasoning is defined within a system (a logic), whereas truth is defined in relation to (models of) worlds.

A hypothetico-deductive model, e.g., of language, is the inverse of the inductivist model. Hypothetico-deductivism postulates an abstract general theory of the phenomena in question in terms of a defined vocabulary consisting of a specified set of symbols with an interpretation specified for each vocabulary item; there will also be an explicit syntax consisting of a set of axioms and rules for combining the vocabulary items and a set of axioms and rules for interpreting theorems (i.e., sentences) of the metalanguage. This is why mathematical models of natural phenomena are preferred.

> The essential thing is the aim to represent the multitude of concepts and propositions, close to experience, as propositions, logically deduced from a basis, as narrow as possible, of fundamental concepts and fundamental relations (Einstein, 1973: 287).

The theorems, well-formed formulae, or sentences that output from the model should correspond with real-world data, such as utterances in the object-language. However, the correspondences will have to be evaluated intuitively. There may be no way of ensuring that the linguist's intuitions are good, because it is not known quite what intuition is. In a coming together of all three kinds of inference, it is reasonable to suppose that the kind of data-gathering enterprise carried out by inductivists (which relies on abductivism) creates a corpus that ought to provide the best opportunity for the linguist's intuitions to work on. The corpus will also offer data against which to check the products of any hypothetico-deductive theory a linguist creates.

Linguistic theorizing needs the bottom-up data gathering and preliminary classification from phenomenological inductivism and the top-down hypothesis construction from hypothetico-deductivism. They cannot be related in neat temporal sequence; experience tells us that the linguistic researcher must expect to go to and fro between them, reviewing the data to abduce (intuit) hypotheses, and then checking the hypotheses against the data, using some sort of evaluation procedures. Data needs to be classified using inductivist principles; yet classification and taxonomy deal with abstract objects that are essentially similar to the theoretical constructs of a hypothetico-deductive system. It follows that the inductivist's choice of data, indeed the very perception of the data, involves a categorial process that cannot, in the end, be satisfactorily distinguished from hypothetico-deductivism. We are into a chicken and egg argument if we try to rigidly determine which is prior. The significant lesson is that abductivism, inductivism, and deductivism are complementary, and all are essential to the advancement of linguistic science.

We have looked at three different kinds of inference. Abductive reasoning is used in figuring out classes, categories, and functions of observed phenomena – i.e., arriving at a hypothesis. With abductive reasoning the conclusions are based on a best guess; once predictions are built on the results of abduction, we have induction based on samples of the data (market research is one practical use of induction). Deductive inference is the move from assumptions to valid conclusions by observing strict rules of procedure (identified in systems of logic) that guarantee a valid conclusion from the assumptions by preserving monotonicity (q.v.); the assumptions must be correct if the conclusions are to accord with the facts. As Peirce (1940: 154) says:

> These distinctions [between abductive, inductive, and deductive reasoning] are perfectly clear in principle, which is all that is necessary, although it might sometimes be a nice question to say to which class a given inference belongs.

Any thorough account of natural language understanding uses all three kinds of inference. (It must also recognize defeasible pragmatic inferences of the Gricean kind; see Sperber and Wilson, 1995; Harman, 1999; Levinson, 2000.)

See also: Abduction (01390); Aristotle and Linguistics; Aristotle and the Stoics on Language; Categorial Grammars: Deductive Approaches; Default Semantics; Implicature; Metalanguage versus Object Language; Monotonicity and Generalized Quantifiers; Nonmonotonic Inference.

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Inflection and Derivation

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Introduction

Inflection and derivation are traditional notions in the domain of morphology, the subdiscipline of linguistics that deals with the internal structure of words. Inflection deals with the different forms of a word. For instance, the English words *walk*, *walks*, *walked*, and *walking* are considered different word forms of the lexeme WALK. The notion 'lexeme' is used for the more abstract notion 'word' and is represented by means of small capitals. In a dictionary of English, these four different word forms do not receive separate lexical entries, but are dealt with in one entry, that for the verbal lexeme WALK. The noun *walker*, on the other hand, is not considered as a form of the lexeme WALK, but as a different lexeme, with a different meaning and a different lexical category (it is a noun). It usually has its own lexical entry in a dictionary. The lexeme WALKER is considered to be the product of derivation, the creation of a new lexeme through the application of a morphological process of affixation, the attachment of the suffix *-er* to a base lexeme.

The distinction between inflection and derivation is primarily a functional one: it refers to different functions of morphological processes, the creation of different forms of lexemes versus the creation of different lexemes. The formal means for these different functions may be the same, as is the case for the English examples used here: in both inflection and derivation, use is made of the process of suffixation. Another morphological process that may be used in both inflection and derivation is vowel alternation. For instance, vowel alternation is found in the past tense form of *to fall*, which has the form *fell*. The latter form is also that of the related causative verb for *to fall*, the verb *to fell*. Thus, both inflection and derivation are formally different from compounding, the morphological process in which lexemes are concatenated to form new complex words. The cover term for derivation and compounding is word formation.

The English plural noun *walkers* can be decomposed morphologically as follows: *walk-er-s*. This word consists of the stem *walker* and the plural ending *-s*. Thus, the stem of a word is the word form minus its inflectional markers. The stem *walker* in turn consists of a simplex stem (that is, a root) and

Any thorough account of natural language understanding uses all three kinds of inference. (It must also recognize defeasible pragmatic inferences of the Gricean kind; see Sperber and Wilson, 1995; Harman, 1999; Levinson, 2000.)

See also: Abduction (01390); Aristotle and Linguistics; Aristotle and the Stoics on Language; Categorial Grammars: Deductive Approaches; Default Semantics; Implicature; Metalanguage versus Object Language; Monotonicity and Generalized Quantifiers; Nonmonotonic Inference.

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the derivational suffix *-er*. The distinction between word and stem is the main formal correlate of the distinction between inflection and derivation. Normally, the creation of new lexemes is performed on the basis of the stem form of a lexeme, not on the basis of one of its inflectional forms. For instance, the Italian noun *macchina* 'car' consists of a stem *macchin-* and an inflectional ending *-a*. The word *macchin-ista* 'driver' is derived by adding the suffix *-ista* to the stem. If we used the full word form *macchina,* the wrong form *macchina-ista* would have been derived.

A consequence of the distinction between inflection and derivation is that we expect inflection to be peripheral to derivation; derivation creates stems from stems, and subsequently, inflection creates concrete word forms from stems. This expectation is confirmed by Greenberg's Universal 28, which reads as follows:

> Universal 28. If both the derivation and the inflection follow the root, or they both precede the root, the derivation is always between the root and the inflection (Greenberg, 1963: 93).

Three different issues concerning the distinction between inflection and derivation are topics of debate among linguists. The first issue is that of the formal criteria for distinguishing between these two notions. How do we know whether a certain morphological process belongs to the domain of inflection or to that of derivation? Is there a sharp boundary between the two categories? The second issue is that linguists have discussed which properties are typical for inflection and which ones for derivation. For instance, it has been claimed that inflection is more productive than derivation. The third issue is that of the position of inflection and derivation in the grammar. Do they belong to the same morphological module of the grammar or are they different modules? These three issues will be dealt with in the following sections of this article.

Formal Criteria

Obligatoriness

A first criterion for distinguishing between inflection and derivation is that inflection is obligatory, whereas derivation is optional. For instance, each English noun must be marked as either singular or plural. Hence, the category number is an obligatory category of English, and hence inflectional. Similarly, in languages with case systems, each noun must be marked for a specific case. In most languages, verbs are marked obligatorily for a specific tense and often for person and number of the subject of the clause. Note that this is true even if there is no overt marking for a particular inflectional feature. For instance, there is no overt number marking for English singular nouns. There are also nouns that, for semantic reasons, do not have plural forms, such as *milk* and *abstractness*. These nouns must nevertheless be considered singular nouns because they trigger singular number agreement with verbs. In contrast, no obligatory morphological expression is involved in using the agent noun for the verb *walk*, that is, the word *walker*, with the suffix *-er* that creates de-verbal agent nouns. The use of this word is a choice made by the language user for purely semantic reasons. Hence, we consider *walker* a case of derivation.

Syntactic Relevance

A second criterion for the demarcation of inflection and derivation is that of syntactic relevance; inflection has been defined as that part of morphology that is relevant to syntax (Anderson, 1992). Particular word forms may be required by syntactic context. This is the case for syntactic configurations in which agreement between constituents is required. The rule of subject–verb agreement in English, for instance, indicates that a specific verb form is required by the subject of the clause, a verb form with the same properties for the categories number and person. In Dutch and German (Standard German), a pre-nominal adjective must agree in gender, number, and definiteness with the nominal phrase of which it forms a part. Noun phrases may have to carry a specific case depending on their syntactic function. In Latin, the subject is marked by nominative case and the direct object by accusative case. In the case of rection (or government), words require a specific form of the words in the phrase that they govern. German prepositions, for instance, require a specific case form of the words in the nominal phrases that they govern.

This does not mean, however, that inflection is always governed by syntax. In Latin, for instance, the accusative form of the word *Roma* 'Rome' is *Romam*. This is the form to be used when this noun functions as the direct object of a clause, but it can also function as an adverbial phrase, with the meaning 'to Rome.' In the latter case, the accusative form is not required by syntactic context, but a choice made by the language user in order to express a particular piece of information. This is called semantic case. The same applies to the use of plural number for the noun BOOK in *John read these books*. The choice for the plural form of *book* is not dictated by the syntactic context.

It should be realized, however, that one cannot claim that derivation has no relevance to syntax whatsoever. Since derivation may indicate a change of syntactic category, this fact in itself is already of relevance to syntax. In the case of derivation of verbs, the derived verb may also have a specific syntactic

valence. For instance, the derivation of causative verbs leads to the creation of transitive verbs that indicate the obligatory presence of a direct object, as in *John whitened the walls*. Hence, the derivation of causative verbs has syntactic relevance. The difference with inflection is that the choice of a particular derived word is not governed by syntactic context.

Change of Syntactic Category

A third criterion of demarcation is that derivation may change the syntactic category of its input forms, whereas inflection is always category-neutral. This criterion reflects the idea that inflection creates forms of the same lexeme, unlike derivation, which determines the lexical category of the lexemes it creates. For instance, the Dutch diminutive suffix -(*t*)*je* is considered to be a derivational suffix since it always creates nouns, whatever the lexical category of its input: *hond* 'N, dog' - *hond-je* 'N, doggy'; *blond* 'A, blond' - *blond-je* 'N, blond girl'; *speel* 'V, to play' - *speel-tje* 'N, toy.'

Note that this does not indicate that derivation must be category-changing. When we add the suffix *-er* to the noun *London*, we derive a word of the same nominal category. Yet, this is a clear case of derivation since *Londoner* and *London* are two different lexemes. They also belong to two different subcategories of nouns: whereas *London* is a proper name that cannot be preceded by a determiner (**the London*), Londoner is a count noun (*the Londoners*).

The evaluative morphology of some languages is a problem for this criterion. In Italian, for instance, evaluative suffixes create lexemes of the same lexical category as their inputs: *tavolo* 'N, table' – *tavolino* 'N, small table'; *giallo* 'A, yellow' – *giall-ino* 'A, yellowish' (Scalise, 1986). That is, this suffix is transparent to the lexical category of its inputs. Yet it looks like derivation because it creates new words with meanings that are distinct from those of the input words.

Inversely, there are forms of inflection that are not completely category-neutral. This applies, for instance, to the infinite forms of verbs such as participles and infinitives (Haspelmath, 1996). Infinitives, for instance, are forms of verbal lexemes. Yet they exhibit both verbal and nominal properties. They can combine with determiners and adjectives, which is typical of nouns. At the same time, they exhibit verbal properties such as co-occurrence with prepositionless nominal phrases, as in the following Dutch sentence:

(1) Het je moeder cadeautjes gev-en
the your mother presents give.INF
moet afgelopen zijn
should finished be
'You should stop giving presents to your mother'

Participles can function as pronominal adjectives while at the same time keeping their verbal properties, as illustrated by the following German example (Haspelmath, 1996: 44):

(2) der im Wald laut singende Wanderer
the in.the forest loud singing hiker
'the hiker who is singing loud in the forest'

The present participle *singend* is inflected as a prenominal adjective with the inflectional ending *-e*, whereas its co-occurrence with a locative adverbial *im Wald* and the adverbial *laut* indicates that it still has verbal valence as well. Thus, inflection may have effects on syntactic category. In contrast to the situation for derivation, in inflection the syntactic category of its inputs is preserved.

Paradigms

Inflection is typically associated with paradigms. A paradigm is an abstract pattern of cells, with each cell having a particular value for one or more inflectional categories such as number, case, tense, or aspect. For each lexeme of a particular lexical category, the cells of the paradigm are filled with particular word forms. This paradigmatic organization of the inflectional forms of a lexeme reflects the idea that inflection is obligatory in the sense discussed above. Of course, one may also organize the set of derivationally related lexemes into a paradigm. For instance, for English verbs one might assume a paradigmatic cell for 'agent noun.' However, there are many English verbs for which this cell might be hard or impossible to fill, as is the case for verbs such as *to die* and *to fall*. This stands in contrast with inflection where the cells of paradigms are (almost) always filled. An exception to this generalization is that nouns may lack plural forms, mainly for semantic reasons. In Russian, some verbs have defective paradigms, with one or more empty cells.

The notions of 'suppletion' and 'periphrasis' that are used in the analysis of inflectional systems also reflect the idea of obligatoriness and the idea of a paradigmatic organization of inflectional forms. For instance, if we say that *went* is the suppletive past tense form of *to go*, this presupposes that the past-tense cells of the verb *to go* must be filled by some word form. The same applies to *worse*, which is considered the suppletive comparative form of *bad*. On the other hand, there is no particular reason that we would want to consider *thief* as the suppletive agent noun of the verb *to steal*, instead of the derived noun *stealer*.

We speak of periphrasis if one or more cells of a paradigm cannot be filled by a particular word form. Instead, a combination of words must be used. For instance, in Latin there are no synthetic forms for the

passive perfect of verbs. Whereas the third-person singular present-passive form of the verb *laudare* 'to praise' is *laudatur* '(s)he is praised,' the perfect counterpart cannot be created by morphology and is expressed by a combination of a participle and a form of the word *esse* 'to be': *laudatus est* '(s)he has been praised.'

Related to the notion paradigm is the observation on inflection that many languages have different inflectional classes for the paradigms of lexemes. In Latin, for instance, there are five different declensional classes for nouns. This means that there are five different ways of computing the different word forms of the cells of a Latin noun. Many languages have different conjugations for the computation of verbal word forms. This illustrates that the relation between form and morphosyntactic information in the realm of inflection might be quite complicated. Another example of this complex relation between form and meaning in the domain of inflection is that more than one inflectional property is often expressed by one morpheme. In Indo-European languages, case and number are usually expressed by the same morpheme. The morpheme *-i* of Latin *hort-i* 'garden, GEN.SG' expresses both number and case. It is therefore a case of multiple exponence: two morphosyntactic properties are expressed by one and the same morpheme. The derivational morphology of Indo-European languages, on the other hand, is usually agglutinative, with each property being expressed by a separate morpheme. Thus, inflection and derivation may differ as to their formal morphological properties.

These distinguishing formal properties of inflection have led to formal models of inflection in which the paradigm plays a central role such as the Word-and-Paradigm Theory of Matthews (1972) and the realizational theories of inflectional morphology of Anderson (1992) and Stump (2001). In realizational theories, inflectional rules are seen as operations that spell out the phonological form of a lexeme for each combination of morphosyntactic features that may be assigned to that lexeme. That is, they indicate how a particular array of morphosyntactic features is realized. It is an open issue in present-day morphological theory to what extent the realizational model is an appropriate model for derivational morphology as well. In many ways, derivation is structurally similar to compounding, which suggests a primarily syntagmatic analysis of derived words, with affixes being concatenated to stems. For instance, there is a strong structural similarity between compounds and English derived words such as *help-ful* and *category-wise*, and the meaning of these words can be derived straightforwardly from those of their constituent morphemes.

Another characteristic of inflection is that inflectional paradigms may make use of more than one stem for computing the different forms of a lexeme. That is, there is formal variation without concomitant grammatical or semantic differences. The Latin verb *ponere* 'to put' has three different stem forms, *pone-*, *posu-*, and *posit-*, as in *pone-o* 'I put,' *posu-i* 'I have put,' and *posit-us* 'put, past participle.' This is no exclusive property of inflection: stem allomorphy also occurs in derivation, as illustrated by the English word pair *drama/dramatic*, where the adjective has been derived from a second stem form *dramat-* (Aronoff, 1994).

Semantic Differences

Is there any difference between the semantic categories expressed by inflection and those expressed by derivation? Inflection is used cross-linguistically for a number of categories:

- Nouns: number, gender, definiteness, case
- Verbs: valency, tense, aspect, mood, person, number, gender
- Adjectives: degree, number, gender, case, definiteness.

Derivation, on the other hand, is used for a much wider range of semantic categories. In this respect, derivation is closer to the lexical expression of meaning than inflection.

Bybee (1985) has proposed to interpret the semantic difference between inflection and derivation in terms of the notion 'semantic relevance'. "A meaning element is relevant to another meaning element if the semantic content of the first directly affects or modifies the semantic content of the second" (Bybee, 1985: 13). Bybee argued that there are two factors that determine whether a certain notion is expressed inflectionally or derivationally: relevance and generality. The less relevant a category is for the root, and the more general it is, the better it lends itself to inflectional expression. The inverse applies to derivation. For instance, the meaning element 'causative' is usually expressed by derivational means (if not by lexical means) because that meaning is very relevant to the meaning of the stem. On the other hand, an inflectional category, such as tense, is not so much of direct relevance to verbal stems, but locates the state of affairs expressed by a clause with respect to the time of speaking. Hence, tense does not modify the meaning of the verbal stem and has a deictic function instead. Correlating with this semantic distinction, we see that the morphological expression of tense in paradigms is quite general, whereas the morphological expression of causative may be possible for a

restricted number of verbal roots only. Inflection of the agreement type such as person-number marking on verbs and gender marking on adjectives and verbs has no obvious relevance to the meaning of the stem, and hence this kind of contextually determined morphology is the prototypical case of inflection.

According to Bybee (1985), this gradual semantic difference between derivation and the different kinds of inflection correlates with the order in which derivational and inflectional elements occur in a word: derivational elements are closer to the root than inflectional elements because they have a higher semantic relevance. In addition, the order of inflectional elements in an inflectional word form reflects different degrees of relevance. For instance, since the category of aspect is more relevant for the meaning of the stem than tense, tense morphemes tend to be peripheral to aspectual morphemes. Person and number markings on verbs (necessary for reasons of agreement only) are peripheral to tense marking.

Properties of Inflection and Derivation

Inflectional processes are said to be fully productive, whereas derivational processes may exhibit different degrees of productivity. This seems to be a natural corollary of the fact that inflection is obligatory. However, this is not completely true, since there might be competing inflectional processes with the same function, some of which may be unproductive. English plural nouns are created by the productive process of suffixation with one of the allomorphs of the suffix /z/, but there are also closed sets of nouns with a different plural forms, such as nouns of Greek origin in *-on*, as in *prolegomenon/prolegomena*. The past tense of English verbs is normally formed by adding *-ed* to the verbal stem, but there is also a set of verbs of which the past tense form is created by means of vowel change, as in *ride/rode*. Hence, inflectional rules can be unproductive.

Inflectional forms of lexemes are usually semantically regular, whereas derived words may exhibit all sorts of semantic idiosyncrasies. The derived word *baker*, for example, does not just denote 'one who bakes,' but is used to denote a certain profession. The de-verbal noun *dwelling*, as in *my humble dwelling*, does not denote the act of dwelling, but a location. Semantic idiosyncrasies in inflectional forms are much rarer, but do exist. For instance, the English plural form *brethren* is irregular, both formally and semantically, since it does not simply mean 'brothers,' but is used to denote male members of a religious community. In Dutch, the plural form of the noun *letter* 'letter,' *letteren*, is used to denote the scientific domain of arts and humanities.

A psycholinguistic difference that is sometimes claimed to correlate with the distinction between (regular) inflection and derivation is that between computation and storage. The idea is the following. Regular inflectional forms are processed on line: they are created by the speaker and parsed (decomposed) by the hearer. Hence, they may be assumed to be computed. Derived words, on the other hand, are stored as such in the mental lexicon and are retrieved as wholes from that lexicon in production and perception. This assumption concerns the differences in semantic regularity between inflection and derivation observed above; storage is often essential for assigning the right meaning to a derived word or for choosing the correct derived word, whereas regular inflectional word forms can be computed. Irregular inflectional forms, on the other hand, must be stored in the lexicon, for obvious reasons. For instance, the past tense form of *walk* is the regular, and hence predictable, form *walked*, whereas the past tense form of the verb *to fall*, the word form *fell*, is not predictable. This idea is referred to as the Dual Mechanism Theory of morphological processing (Pinker, 1999; Clahsen, 1999).

The Dual Mechanism Theory is based on the role of frequency in lexical decision tasks. In such tasks, subjects must decide whether a particular word (form) is correct. The frequency of occurrence of a word (form) may play a role in performing such tasks. The response latencies in lexical decision tasks correlate with frequency: a more frequent word will be recognized faster and will thus have shorter response latencies than a word of low frequency. This frequency effect is interpreted in terms of activation level. A word with a high frequency has a higher initial level of activation in the mental lexicon than a word with low frequency. Frequency effects presuppose the storage of the word (forms) involved. Hence, if there are no frequency effects for a particular word (form), one may conclude that it is not stored in lexical memory. Pinker (1999) and Clahsen (1999) argued, for English and German, respectively, that regular inflectional forms do not exhibit frequency effects, unlike irregular ones. This is explained by the assumption that only irregular inflectional forms are stored. According to Clahsen *et al.* (2003), derived words always show frequency effects, even the regular ones. Hence, derived words must be assumed to always be stored. Hence, the Dual Mechanism Theory should be restricted to the domain of inflection.

However, it has been shown in more recent psycholinguistic research that regular inflectional forms are also stored in the lexicon when they have a high frequency of occurrence (Stemberger and MacWhinney, 1988; Baayen *et al.*, 1997) since such regular forms also show frequency effects. In other words, the fact

that a correct inflectional form can be computed without lexical information does not necessarily indicate that the language user may not also make use of his or her vast lexical memory in the case of inflection and store and retrieve such complex forms.

A related psycholinguistic distinction between inflection and derivation is the family size effect (Baayen *et al.*, 1997). In the case of derivation, what counts in predicting differences in response latency between derived words is not so much the token frequency of the word forms for that word, but rather the number of morphologically related words (related in terms of derivational processes and compounding), that is, the size of its morphological family. The more family members a word has, the higher its initial level of activation in the mental lexicon.

Differences between inflection and derivation have also been found in studies of language users who suffer from certain forms of aphasia. For instance, Badecker and Caramazza (1989) investigated the language of an Italian aphatic and discovered that he made many inflectional errors, but almost no derivational ones. On the other hand, there are also speakers with agrammatism (aphatics with poor syntax and almost no function words) whose inflectional morphology is not affected and also preserved as their derivational morphology (De Bleser and Bayer, 1988). A survey of possible psycholinguistic differences between inflection and derivation can be found in Bertinetto (1995).

Morpheme Order and the Theory of Split Morphology

The functional differences between inflection and derivation and their formal correlates have led some linguists to propose the Theory of Split Morphology (Perlmutter, 1988; Anderson, 1992). In this theory, derivation is assumed to be accounted for by a pre-syntactic component of the grammar. This component generates derived lexemes in their stem forms, which are then inserted into syntactic structure as created by the syntactic component. Inflection, on the other hand, is accounted for in a post-syntactic component, because the choice of the correct inflectional form of a lexeme depends on the syntactic context in which it occurs. A consequence of this organization of the grammar is that inflectional elements will be peripheral to derivational elements, a prediction that is in accordance with Greenberg's Universal 28 mentioned above.

An earlier variant of Split Morphology is the theory of level ordering, as proposed for English by Kiparsky (1985). In this approach, all morphology is pre-syntactic. However, the set of morphological rules is ordered in two or more levels. Inflectional rules are located at the last level of the lexical component of the grammar and word formation at a preceding one. Hence, inflection is predicted to be peripheral to derivation. However, irregular inflectional forms such as the plural form *lice* of the noun *louse* may be formed at an earlier level, because in English, irregular plurals may occur within compounds, as in *lice-infested*. Although it may be true for English that only irregular plurals feed word formation, this restriction does not apply to related languages such as Dutch. For instance, Dutch has compounds such as *scholen-gemeenschap* 'lit. school-s community, comprehensive school' with the regular plural noun *scholen* 'schools' in first position. This compound contrasts with the Dutch compound *school-gemeenschap* 'school community,' with the singular or stem form of *school* in first position.

Therefore, the hypothesis of level ordering and, more generally, the hypothesis of Split Morphology are empirically inadequate as a general theory of how inflection and derivation interact, since it categorically excludes inflectional forms to form inputs for derivation, which is empirically incorrect (Booij, 1994, 1996). For instance, in many languages participles, which have both verbal and adjectival properties, can be used as stems for de-adjectival word formation, as in English *excitedness*, in which the past participle feeds derivation of nouns by means of the suffix *-ness*. In Dutch, the comparative forms of adjectives can be used as stems as well, as in the verb *ver-erg-er* 'to worsen' derived from the comparative form *erg-er* of the adjective *erg* 'bad'. Since comparative forms are usually classified as inflectional forms, this also forms a problem for the Split Morphology Hypothesis. It has also been observed that plural forms of nouns may function as stems in derivation. This is, for example, the case in Dutch, where the collective suffix *-dom* is added to plural nouns, as in *held-en-dom* 'heroism' with the morphological structure ROOT-PLURAL-COLLECTIVE. The root form is the noun *held* 'hero', which is followed by the regular plural suffix *-en*. Similar observations on Spanish and Portuguese can be found in Rainer (1996).

Compounding, another major type of word formation, also appears to use plural nouns as building blocks, as in Italian *lava-piatti* 'dish-washer,' a combination of the verbal stem *lava* 'to wash' and the plural noun *piatti* 'dishes.' Note that this compound has a singular meaning even though one of its constituents is plural.

Some linguists deny an absolute distinction between inflection and derivation and consider them to form one continuum (Bybee, 1985; Dressler, 1989). In this

view, interactions between derivation and inflection of the kind discussed above come as no surprise since it is the kind of inflection that is close to derivation that may feed derivation.

Although the Split Morphology Hypothesis faces certain problems, we must somehow account for the fact that derivation usually takes stems as their inputs, that is, words minus their inflectional elements. As pointed out above, that is the main formal reason for keeping inflection and derivation apart. In order to solve this paradoxical situation, we might distinguish between two types of inflection, inherent inflection and contextual inflection. An example of inherent inflection is the formation of plural nouns. In most contexts, the use of the plural form of a noun is not required by syntactic context, but a purely semantic choice based on what the language user wants to convey. The choice of specific finite forms of verbs, and of case forms of nouns, on the other hand, is governed mostly by syntactic context and then qualifies as contextual inflection. Participles and infinitives also qualify as cases of inherent inflection. The crucial observation is that it is only inherent inflection that can feed word formation processes such as derivation and compounding (Booij, 1994, 1996). This suggests that inherent inflection is halfway between derivation and contextual inflection. This is in line with the observation that inherent inflection may have class-changing effects, just like derivation, as observed above. In some psycholinguistic experiments, this distinction between inherent and contextual inflection is reflected by differences in frequency effects. For instance, Dutch verbal plurals are different from noun plurals as to frequency effects in lexical decision tasks. In certain tasks, verbs do not show a frequency effect, unlike nouns (Baayen *et al.*, 1997, 2003).

Yet, even inherent inflection cannot feed derivation, or more generally, word formation, on all occasions. For instance, the Dutch de-nominal suffix *-er*, which forms nouns, cannot be attached to plural nouns. The noun *wetenschapp-er* 'scientist' derived from the noun *wetenschap* 'science' is well formed, but we cannot add this suffix to the plural noun *wetenschapp-en* although this is an existing and well-formed plural noun of Dutch: **wetenschappen-er*. The crucial condition in the case of Dutch appears to be that inflectional elements must appear at the right edge of a prosodic word (Booij, 2002). Hence, plural suffix can appear word-internally before suffixes such as *-achtig* '-like' because the stem of such suffixes forms a prosodic word of its own, as in *boeken-achtig* 'books-like, bookish', which consists of the prosodic words (bukən) and (ɑxtəx). Therefore, the plural noun *boeken* 'books' can appear before the suffix *-achtig*.

In a number of languages, verbs may be preceded by so-called preverbs, which look like derivational prefixes. Classical examples of such word combinations are the particle verbs of Germanic languages. For instance, German *anrufen* 'to phone' looks like a word since it has a specific idiosyncratic meaning. However, the particle *an* can be separated from the verb in main clauses, as in *Johann ruft seine Mutter an* 'John calls his mother.' The past participle of *anrufen* is *an-ge-ruf-en*, with the inflectional prefix *ge-* before the root and after the particle. We might therefore think that this is a case in which a derivational prefix precedes an inflectional one, thus forming an exception to Greenberg's Universal 28. However, *anrufen* is not a word, but a lexicalized word combination, as is clear from the fact that it can be split in main clauses. Consequently, the position of the inflectional prefix *ge-* is as expected. Thus, if inflectional elements appear in between verbal stems and preverbs, this is no counterexample to the generalization that inflection tends to be peripheral with respect to derivation. Detailed studies of such preverb–verb combinations and their interaction with inflection can be found in Booij and van Marle (2003).

In sum, it is only in very specific circumstances that inflectional morphemes can appear inside derivational morphemes. Hence, Greenberg's Universal 28 remains an important generalization about the relation between inflection and derivation.

See also: Affixation; A-Morphous Morphology; Compound; Dual-Mechanism Morphology; Internal Modification; Lexical Phonology and Morphology; Morphology and Language Processing; Morphotactics; Paradigm Function Morphology; Productivity.

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Influence of Literacy on Language Development

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What Is Literacy?

Literacy is a complex phenomenon with linguistic, social, educational, and political aspects. It includes the roles of written language in various social groups and settings, the structure of different types of text, and the tension between nonstandard and standard varieties. A central role belongs to the social capital residing in the mastery of complex written language. Every literate society obliges its children to spend many years subjected to rigorous formal education in which the teaching of complex written language is central. In spite of this, many literacy practices are at odds with practices found in formal education. The differences between spoken and written language bear directly on theories of first-language acquisition. In grammar and vocabulary, written language is far more complex than unplanned spoken language. Complex constructions are acquired after the age of seven and much later, and the study of literacy and written vs. spoken language does not support theories of rich innate linguistic knowledge.

One view of literacy is that it concerns how children learn to connect letters and sounds and that it is

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One view of literacy is that it concerns how children learn to connect letters and sounds and that it is

primarily the business of those who teach younger children. Another interpretation is that literacy (literacies or literacy practices) has to do with the role of written language in a given society, especially how different groups use written language and the intertwining of written and spoken language in different situations. It also has to do with the organization of different types of text and how groups create their own text types rather than following the prescriptions of language arbiters (see Heath, 1983; Barton and Hamilton, 1998) This aspect of literacy leads to the issue of language, political power, and social capital (Collins and Blot, 2003) and the impact of literacy on the developing world.

In connection with first-language acquisition, all these aspects of literacy are important. Social capital is relevant because of the immense prestige of written language and because many children speak nonstandard varieties. Nonstandard varieties are not acceptable in the classroom and are not written; consequently, children who speak a nonstandard variety learn the standard. Because nonstandard and standard varieties of a given language can differ massively in syntax and vocabulary (see Miller, 2003; Kortmann, 2004), the task of learning written English is significantly more difficult for such children.

Children do not learn just the mechanics of syntax and vocabulary, centrally important though these are. They also have to learn to produce texts with the correct structure. Barton and Hamilton (1998) cited the case of the firefighter who was promoted to a senior position. One of his new duties was to take the minutes of meetings, but because he had been left to his own devices by the teachers and had left school at age 15, he had no training in advanced written English. He solved the problem by adapting previous minutes in the minute book, eventually becoming competent enough to write his own minutes. Heath (1983) discussed how those children in Trackton experienced in literacy practices lacking stories with the beginnings, middles, and ends that the school required; they were assessed as being less literate than children who did know the required story structure.

Literacy, Vocabulary, and Grammar

The rest of this article focuses on the vocabulary and syntactic structures that children have to control in order to master the written variety of their native language. An essential concept is magnasyntax, based on the term magnavocabulary introduced in Ong (1982: 103). Ong's idea was that an established written language acquires over the centuries a massive vocabulary, used in a large range of text types and recorded in dictionaries. Users can revive archaic words and analysts can reveal general patterns, but no user knows more than a small fraction of the magnavocabulary.

Formal text types contain a large number of lexical items that do not normally occur in unplanned speech; for instance, in English the set includes the extensive and much-prized Greco-Latinate vocabulary but also rare or archaic words from the Germanic core (not to mention the many borrowings from French and Italian having to do with literature and music). Children can learn this vocabulary only by private reading and formal teaching (and to some extent by having parents who use it). Eighteen-year-olds in their final year of secondary schooling typically have a respectable knowledge of literary English and technical terms from a number of subjects such as mathematics, physics, geography, and history, but tertiary education requires the intense learning of more vocabulary.

Magnasyntax

Established written languages are described in comprehensive grammars covering contemporary texts but also texts from previous centuries. Like magnavocabulary, magnasyntax is available to any user of English. For instance, conditions are typically expressed by conditional clauses in English: *if you forget your passport, you will be in trouble*. They can also be expressed in spoken English by imperatives: *forget your passport and you will be in trouble*. In very formal English, conditions can be expressed by yes-no interrogatives of the structure *was/were/should* + subject noun phrase, as in *should you require further information, telephone our office*. The construction is rare, marks texts as most formal and the writer as an expert user of written English, and belongs to magnasyntax.

Relative clauses illustrate magnasyntax rather well. Unplanned speech contains the sort of relative clauses in (1).

(1a) the applicant that got the job
(1b) the applicant that we preferred
(1c) the applicant we preferred
(1d) the applicant that I gave my vote to
(1e) the applicant I gave my vote to

The relative clauses are introduced either by the invariable conjunction *that* or by no conjunction; that is, they are contact clauses, as in (1c) and (1e). There is no pronoun in the relative clause referring back to *applicant*, just a gap: *the applicant that* [ ] *got the job*, *the applicant that we preferred* [ ] (where the boldface square brackets mark the gaps). The gaps are typically the subject or object, but are occasionally the

indirect object as in (1e). Prepositions come at the end of the clause.

More complex are *wh* relative clauses as in (2).

(2a) the applicant whom we preferred
(2b) the applicant to whom I gave my vote

The relative clauses in (2) are complex in that the *wh* pronoun is at the beginning of the clause, whether it is the subject or object, and the prepositions are also at the front of the clause, particularly in formal written English. Most complex of all are examples such as those in (3).

(3a) the hospital admitted several patients that month, for all of whom chemotherapy was the appropriate treatment
(3b) we read several government reports the gold lettering on the covers of which was admired by all the officials
(3c) he went to London, in which city he stayed for twenty years
(3d) she is not a person on whom to rely

The complexity lies in the *wh* pronoun's being part of a complex phrase, such as *for all of whom* in (3a) and *the gold lettering on the covers of which* in (3b); being the determiner of a noun, as in *in which city* in (3c); or being in an infinitival clause as in (3d), *on whom to rely*. These structures are absent from unplanned speech, but occur in formal writing.

Children learning to speak do not use structures missing from spontaneous spoken language. Perera (1984: 88–158, 223–247) gave an excellent overview, whose main points are reproduced here; her major finding is the number of constructions that are not mastered until age seven or much later.

- Only half of a set of 10-year-olds could accurately interpret the structure subject-verb-second object-direct object as in *we showed her the book*.
- Eleven-year-olds regularly use adverbs in verb phrases, as in *have been always trying*, but 6-year-olds rarely do.
- The sequence determiner-noun-prepositional phrase, as in *the toys in the box*, is rare between the ages of 5 and 12.
- Apart from set phrases such as *mum and dad*, coordinated noun phrases are not used extensively before age 5 and only become frequent between the ages of 8 and 13; the earliest coordinated noun phrases function as direct objects.
- The full passive appears late in children's speech; only 30% of a sample of 11-year-olds used a full passive, as in *the cup was broken by Susan*.
- Children under age 11 do not use finite or nonfinite clauses as the subject, as in *that the school team won made everyone happy* and *to see that film would be cool*.
- Thirty percent of a sample of 19-year-olds misunderstood free relative clauses after verbs such as *ask*, as in *ask Helen which book to read*.
- Children who use various adverbial clauses of time do not always understand the relationship between the main clause and adverbial clause.
- Only 40% of a sample of 9-year-olds used relative clauses in subject noun phrases.
- Primary school children generally do not use relative clauses introduced by *whom*, *whose,* or a preposition plus a relative pronoun, as in *the shop in which we bought it*.

Perera's observations accord with the examples of children's writing in Rosen and Rosen (1973: 137–138). One 7-year-old produced a coherent text with a beginning, middle, and end and correct syntax, but the syntax was simple, consisting of a contact complement clause, one adverbial clause of time, and one of reason but otherwise consisting of main clauses connected by *and*. The noun phrases were simple, apart from two that could have come from the teacher. An 11-year-old produced a text with more complex syntax, consisting of a complement clause, two adverbial clauses of time, two of condition, and two gerunds, *kept splitting the pieces up* and *by splitting the five and half inches in half*. The noun phrases were all simple.

Literacy, Magnasyntax, and Theories of First-Language Acquisition

Complex and Simple Syntax Many theorists of first-language acquisition argue that children are exposed to small quantities of data and to data of poor quality and are deprived of evidence as to which utterances are grammatically correct. Under these assumptions, the acquisition of the complex grammar of, say, English can only be explained by children's having a rich innate knowledge of constraints on syntactic structures. This knowledge is assumed to apply to all languages because children acquire whatever language is spoken by the community they are born into. (And many children acquire more than one language.) Detailed studies of unplanned speech, which is what children are mostly exposed to, raise the possibility that the assumption of rich innate knowledge is not necessary. Unplanned speech is distinguished by simple syntactic constructions, a restricted range of vocabulary, and the extensive use of fixed expressions and collocations. In contrast, theories that invoke rich innate knowledge are based on complex generative models of grammar designed

to handle the most complex constructions. These complex constructions occur not in unplanned speech but in written language. The latter is, arguably, learned rather than acquired and, as previously described, Perera demonstrated that many complex constructions central to the grammar of English are not used or understood even by teenagers. Because these constructions are considered to be part of adult competence, we cannot say that children acquire their first language by the time they reach the age of four. And because the structures typical of written language and learned between the ages of 4 and 11 or even later are rather numerous, we also cannot regard them as mere exceptions (see Pinker, 1994: 273.) Moreover, examples that are usually treated as belonging to a single construction should be treated as representing several constructions. Four-year-olds who use and understand *the picture I drew* do not necessarily use or understand *the book in which I found the poem* and should not be said to have acquired the relative clause construction; rather, they have acquired one of the many relative clause structures.

Degenerate Data A consideration of literacy casts doubts on other assumptions in various theories of first-language acquisition. For example, published written texts are not degenerate and not meager. They are carefully checked by copy editors, and material for children is edited with special care. A given text may not be elegant, but it will conform to the canons of standard written English, will have no hesitations or anacolutha, and will be coherent. Moreover, written texts are not evanescent; they stay on the page and they can be and are consulted again and again. Children read their favorite stories again and again and when very young they have their favorite stories read to them again and again (in houses where reading takes place, of course).

Explicit Instruction Children are encouraged to read at school. Difficult texts are explained, and they construct dictionaries containing new words. There is instruction and focused feedback, comments targeted at inappropriate syntax, vocabulary, or style. Teachers draw their attention to special constructions, encouraging students to combine clauses into the complex sentences that attract praise and to widen their vocabulary in the prized body of Greco-Latinate derivatives. Of course, such instruction may be resisted by students, especially when they are speakers of nonstandard varieties and are being advised to abandon their native variety and adopt the alien standard variety. Such resistance is also more frequent among teenage males than other groups.

Loss of Literacy

Heath (1983) made the important point that people who have a certain command of literacy when they leave school may lose that command. She observed that the workers at the Trackton mills never had the occasion to use written English; the mill management explained written documents to the workers and wrote down the workers' answers to questions, for example, on applications for loans. The workers who did not use written language at home quickly lost their literacy skills.

Written Language as Optional

According to Pinker (1994: 16), writing is an optional accessory and the real engine of verbal communication is the spoken language that we acquired as children. An alternative view is that literate users of a given language use many syntactic structures, a huge complex vocabulary, and much derivational morphology that they did not acquire as small children. Nor can language be considered no more of a cultural invention than upright posture and not as a cultural artifact that we learn in the same way we learn to tell the time (Pinker 1994: 18). In any language, the various genres and registers and their corresponding syntax and vocabulary are cultural artifacts that have been consciously developed and elaborated, and these conventional elaborations have to be learned by the children in a given society. Children may know the rules for writing fairy tales at an early age, but the rules for writing scientific papers, business reports, and legal documents are typically not learned before the age of 20.

See also: Clause Structure in Spoken Discourse; Communities of Practice; Discourse, Narrative and Pragmatic Development; Identity and Language; Literacy Practices in Sociocultural Perspective; Mother Tongue Education: Nonstandard Language; Subordination in Spoken Discourse; Text and Text Analysis.

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Information Extraction, Automatic

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Introduction: Extraction and Retrieval

Information extraction (IE) is a technology based on analyzing natural language in order to extract snippets of information. The process takes texts (and sometimes speech) as input and produces fixed-format, unambiguous data as output. This data may be used directly for display to users, or may be stored in a database or spreadsheet for later analysis, or may be used for indexing purposes in information retrieval (IR) applications such as Internet search engines like Google.

IE is quite different from IR:

- an IR system finds relevant texts and presents them to the user;
- an IE application analyzes texts and presents only the specific information from them that the user is interested in.

For example, a user of an IR system wanting information on trade group formations in agricultural commodities markets would enter a list of relevant words and receive in return a set of documents (e.g., newspaper articles) that contain likely matches. Users would then read the documents and extract the requisite information themselves. They might then enter the information in a spreadsheet and produce a chart for a report or presentation. In contrast, an IE system would automatically populate the spreadsheet directly with the names of relevant companies and their groupings.

There are advantages and disadvantages with IE in comparison to IR. IE systems are more difficult and knowledge-intensive to build, and are to varying degrees tied to particular domains and scenarios. IE is more computationally intensive than IR. However, in applications where there are large text volumes IE is potentially much more efficient than IR because of the possibility of dramatically reducing the amount of time people spend reading texts. Also, where results need to be presented in several languages, the fixed-format, unambiguous nature of IE results makes this relatively straightforward in comparison with providing the full translation facilities needed for interpretation of multilingual texts found by IR.

The rest of this article:

- discusses the origins of IE and the parameters that condition its performance in application settings (see 'Language Computation without Understanding' below);
- presents some application scenarios in which IE is being deployed (see 'Application Scenarios' below);
- gives a canonical definition of five subtasks that collectively characterize the spectrum of IE systems (see 'Five Types of IE' below);
- looks at the development of IE research subsequent to the MUC (message understanding conferences) program of the late 20th century (see 'IE After MUC' below).

See also **Natural Language Processing: Overview**. Other overview sources on IE include: Cowie and Lehnert (1996); Appelt (1999); Cunningham (1999); Gaizauskas and Wilks (1998); Pazienza (2003).

Language Computation without Understanding

Information extraction in the sense discussed here grew out of work in the late 1980s and 1990s the Message Understanding Conferences (MUCs related to Grishman and Sundheim (1996); Sundheim (1995); Chinchor (1998) – *see* **Text Retrieval Conference and Message Understanding Conference**). (Previous work in computation with human language had attempted similar things in some cases, and indeed a related term "fact extraction" was in use as far back as the 1960s. A formal and widely accepted definition of IE did not emerge until the work discussed here, however.) These events were particularly distinctive because they employed a strict quantitative evaluation procedure where different research

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sites first defined a precise task, then implemented competing systems that were measured against human-annotated data in a controlled environment. Although this type of experimental procedure seems obvious in many other branches of science, its use prior to MUC was uncommon in many language processing contexts (perhaps due to the early association between the work and phenomenological fields such as linguistics, as opposed to empirical experimentation or engineering – Boguraev *et al.*, 1995). The experimental cycle of the MUC competitions drove progress in IE and led to the canonical definition that is presented below in 'Five Types of IE.' The series also contributed much of our understanding of how to measure the performance of IE systems (*see* **Natural Language Processing: System Evaluation**).

The MUCs were held over the decade from 1987; following this IE work took several directions, including commercialization of some of the basic techniques, additional work on portability (see 'Portable IE') and, most recently, connecting with efforts related to the general project of the Semantic Web Berners-Lee (1999) (see 'Ontology-Based IE' below).

An important outcome of the last 15 years of work on IE is that the community now understands reasonably precisely the various parameters that influence the performance of the technology in diverse application settings. (In other words, the scientific work has laid the basis for the engineering of practical systems.) The next section looks at these parameters.

Complexity vs. Specificity

The difference between the general project of language analysis (or understanding) and the more restricted enterprise of extraction is a response to the low performance of analysis in the general case. To illustrate, imagine that we wish to build an application which uses language analysis to support some of its functions. Then consider that items of information to be extracted can vary in complexity (e.g., we may be interested simply in people names or in complex events that involve multiple participants) and in specificity (e.g., we may be interested in general information reported in any way in any text or in specific domains reported in particular ways in certain types of text). If we plot the acceptable performance level of analysis components on a graph of complexity vs. specificity of the information to be extracted (Figure 1), then there is an obvious trade-off to be made between the two: the more complex the data to be extracted, the more specific must be the domain of discourse; the simpler the data, the more generally the extraction algorithms may be applied. This two-dimensional view of IE performance hides a number of subtle issues. Specificity of an IE task is in itself multidimensional, being influenced by both text type and genre. For example, a seminar announcement text (a very specific text type, easy for IE systems to analyze) may be harder or easier to process depending on genre. For example, if it is a seminar series about famous historical figures there may be ambiguity between the speakers' names and those of their subjects. Conversely, if the series relates to mobile telecommunications, the regularity and specificity of the terminology typical of this genre should make structural analysis easier. Therefore we must also consider the parameters text type and subject (or genre, or domain):

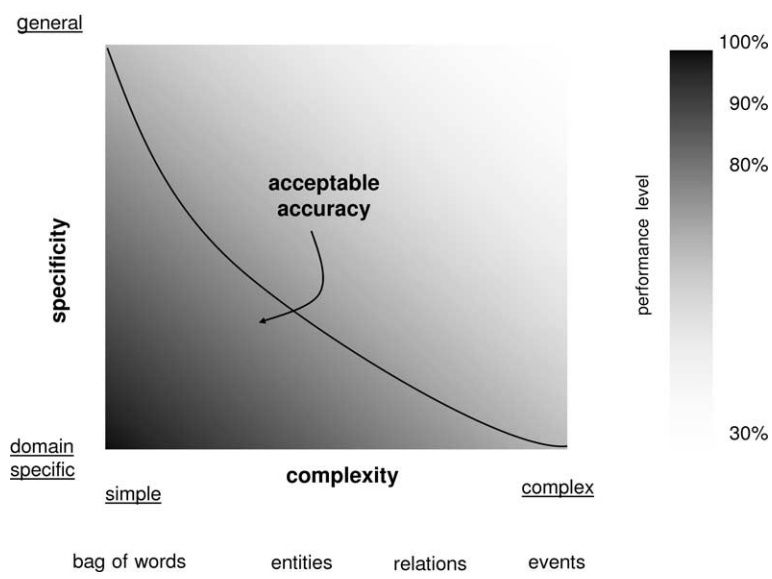

Figure 1 Performance trade-off relative to specificity and complexity.

- Text type: the kinds of texts we are working with, for example: *Wall Street Journal* articles, or email messages, or novels, or the output of a speech recognizer.
- Domain: the broad subject matter of those texts, for example: world events, or symptoms of a deficiency in a particular enzyme, seminar announcements, financial news, requests for technical support, or tourist information, and the style in which they are written, e.g., informal, formal.

Finally there is the question of the particular types of information that the IE user is interested in, for example: personal names, rocket launches, mergers between companies, problems experienced with a particular software package, or descriptions of how to locate parts of a city. We return to this issue in 'Five Types of IE' below.

Application Scenarios

This section contains some scenarios that illustrate how IE application software can mediate between the text and the structured information needs of various types of user. In each case, the user specifies an information need to IE development staff, who then prepare a custom extraction system. The input materials are increasingly defined as subsections of the World Wide Web, either the formal materials of news, company sites, etc., or the informal Web of weblogs, mailing lists and wikis. The IE developers must analyze the problem according to the dimensions outlined in 'Complexity vs. Specificity' above, and determine how to combine human and machine processing so as to attain the required performance profile (see 'Portable IE' below).

The types of scenario given here are of increasing relevance due in large part to the explosive growth, dynamic nature and multilingual content of the Web.

Financial Analysts

The Web contains various indications of how a company is viewed, and whether or not it can be expected to perform strongly in the coming period. Some of this data is already highly analyzed, e.g., financial news in English. Other data, in other languages, or from less well scrutinized sources, is both voluminous and obscure. IE can enable analysts to answer questions such as

- How many instances predicting strong performance for a particular company are out there?
- Over the past year how has the profile of predictions for this company changed?
- How many positive/negative sentiments were expressed for the company?

Marketing Strategists

The dynamic adjustment of marketing spending is currently made more difficult by the lack of metrics that indicate the impact of campaign elements. IE can support campaign tuning today based on yesterday's results, producing outputs such as:

> In this morning's IT press 7% of articles discussed your company. The average proportion of the article directly relating to your company was 33%. The figures for the other key players in your sector are summarized in the following table...

Similarly, we can measure the extent of media coverage relative to spend events:

> Company Y exhibited at Comdex. In the week following the exhibition 20% of the press that covered Comdex mentioned Y.

PR Workers

Public relations staff are concerned to identify negative reporting events as quickly as possible in order to respond. IE can be configured to report like this:

> The table below summarizes 12 negative reporting events concerning your company in the last 24 hours of IT news...

Media Analysts

IE can be used to create a range of media metrics, for example the media distance, or extent of collocational association, between concepts and products/companies:

> The media distance between your company and the subject of XML is 0.09; for IBM the value is 0.2.

Five Types of IE

By the time that it ended in 1998 (the final conference was MUC-7 (SAIC 1998)) the MUC programme had arrived at a definition of IE split into five tasks:

- Named entity recognition (NE)
  Finds and classifies names, places, etc.
- Coreference resolution (CO)
  Identifies identity relations between entities.
- Template element construction (TE)
  Adds descriptive information to NE results (using CO).
- Template relation construction (TR)
  Finds relations between TE entities.
- Scenario template production (ST)
  Fits TE and TR results into specified event scenarios.

In simpler terms, NE is about finding entities, CO about which entities and references (such as pronouns) refer to the same thing, TE about what attributes entities have, TR about what relationships between entities there are, and ST about events that the entities participate in. Consider these sentences:

> The shiny red rocket was fired on Tuesday. It is the brainchild of Dr. Big Head. Dr. Head is a staff scientist at We Build Rockets Inc.

NE discovers that the entities present are the *rocket*, *Tuesday*, *Dr Head* and *We Build Rockets Inc*. CO discovers that *it* refers to the rocket. TE discovers that the rocket is *shiny red* and that it is Head's *brainchild*. TR discovers that *Dr Head* works for *We Build Rockets Inc*. ST discovers that there was a rocket launching event in which the various entities were involved.

The scenarios presented above in 'Application Scenarios' deploy these five types of information invarious combinations (and with various typical performance profiles).

These various types of IE provide progressively higher-level information about texts. They are described in more detail below, with examples (see also the extended example in 'An Extended Example').

Named Entity Recognition

The simplest and most reliable IE technology is *Named entity recognition* (NE – *see* **Named Entity Extraction**). NE systems identify all the names of people, places, organizations, dates, amounts of money, etc. So, for example, if we run the text in Figure 2 (*The Independent*, London, 4th August 2004.) through an NE recognizer, the result is as in Figure 3. (The results shown here and below are from IE software distributed with the GATE system (Cunningham 2002) – *see* **Computational Language Systems: Architectures**.)

All things being equal, NE recognition can be performed at up to around 95% accuracy (see also 'Complexity vs. Specificity'). Given that human annotators do not perform to the 100% level (measured in MUC by interannotator comparisons), NE recognition can now be said to function at human performance levels, and applications of the technology are increasing rapidly as a result.

The process is weakly domain dependent, i.e., changing the subject matter of the texts being processed from financial news to other types of news would involve some changes to the system, and changing from news to scientific papers would involve quite large changes.

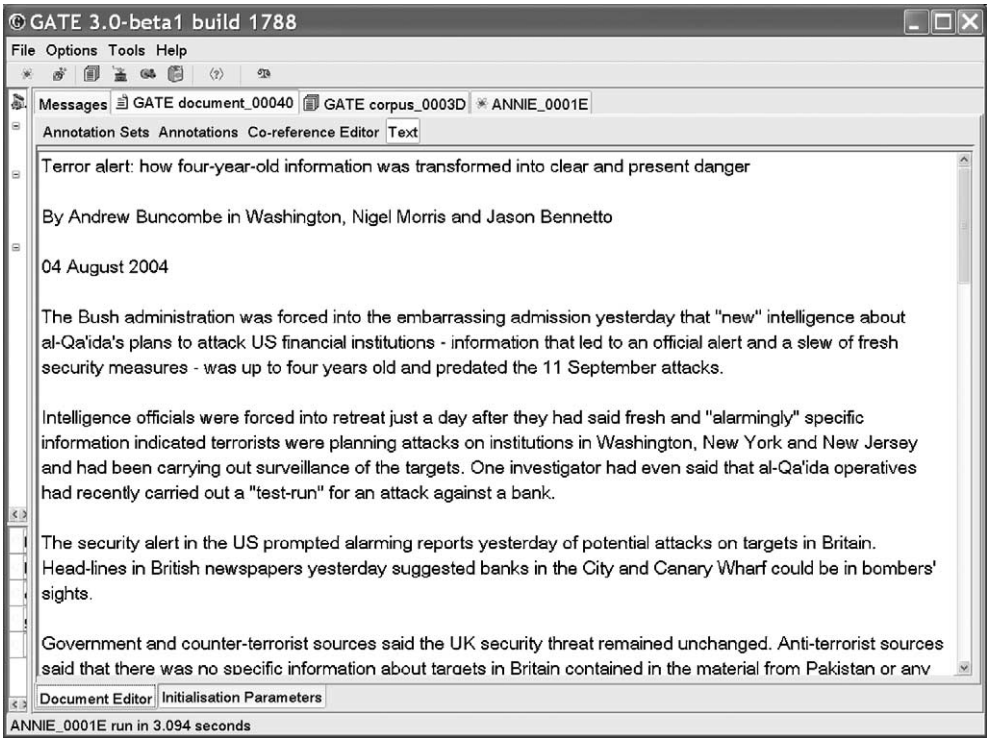

Figure 2 An example text.

Coreference Resolution

Coreference resolution (CO) involves identifying identity relations between entities in texts. These entities are both those identified by NE recognition and anaphoric references to those entities. For example, in

Alas, poor Yorick, I knew him Horatio.

coreference resolution would tie 'Yorick' with 'him' (and 'I' with Hamlet, if sufficient information was present in the surrounding text).

This process is less relevant to users than other IE tasks (i.e., whereas the other tasks produce output that is of obvious utility for the application user, this task is more relevant to the needs of the application developer). For text browsing purposes, we might use CO to highlight all occurrences of the same object or provide hypertext links between them. CO technology might also be used to make links between documents. The main significance of this task, however, is as a building block for TE and ST. CO enables the association of descriptive information scattered across texts with the entities to which it refers. To continue the hackneyed Shakespeare example, coreference resolution might allow TE or TR analysis to situate Yorick in Denmark. Figure 4 shows results for the example text from Figures 2 and 3.

CO breaks down into two subproblems: anaphoric resolution (e.g., 'I' with Hamlet); and proper-noun resolution. Proper-noun coreference identification finds occurrences of same object represented with different spelling or compounding, e.g., 'IBM,' 'IBM Europe,' 'International Business Machines Ltd.,' etc.). CO resolution is an imprecise process, particularly when applied to the solution of anaphoric reference. CO results vary widely; depending on domain perhaps only 50–60% may be relied upon. CO systems are domain-dependent.

Template Element Production

The TE task builds on NE recognition and coreference resolution, associating descriptive information with the entities. For example, from the Figure 2 text the system finds out that the 'Bush administration' is also referred to as 'government officials,' and adds this as an alias.

Template elements for the example text are given in Figure 5. The format is an arbitrary one; the point to note is that it is essentially a database record, and could just as well be formatted for SQL (structured query language) operations, or reading into a spreadsheet, or (with some extra processing) for multilingual presentation. See 'An Extended Example' for an example in a simplified format.

Good scores for TE systems are around 80% (on similar tasks humans can achieve results in the mid-90s, so there is some way to go). As in NE recognition,

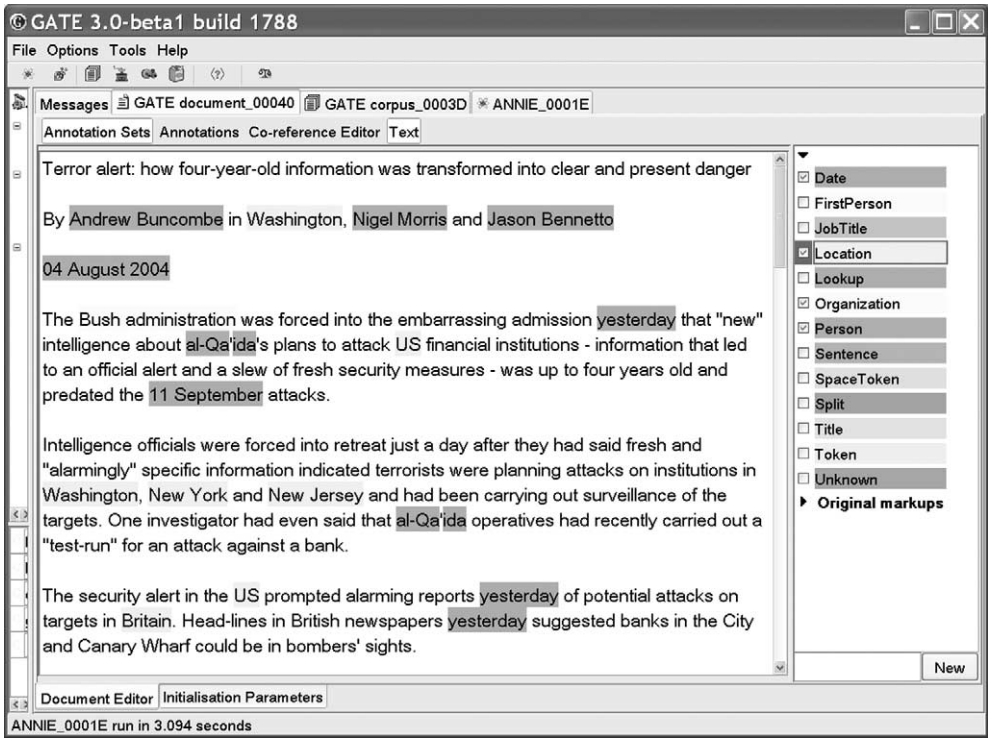

Figure 3 Named entity recognition.

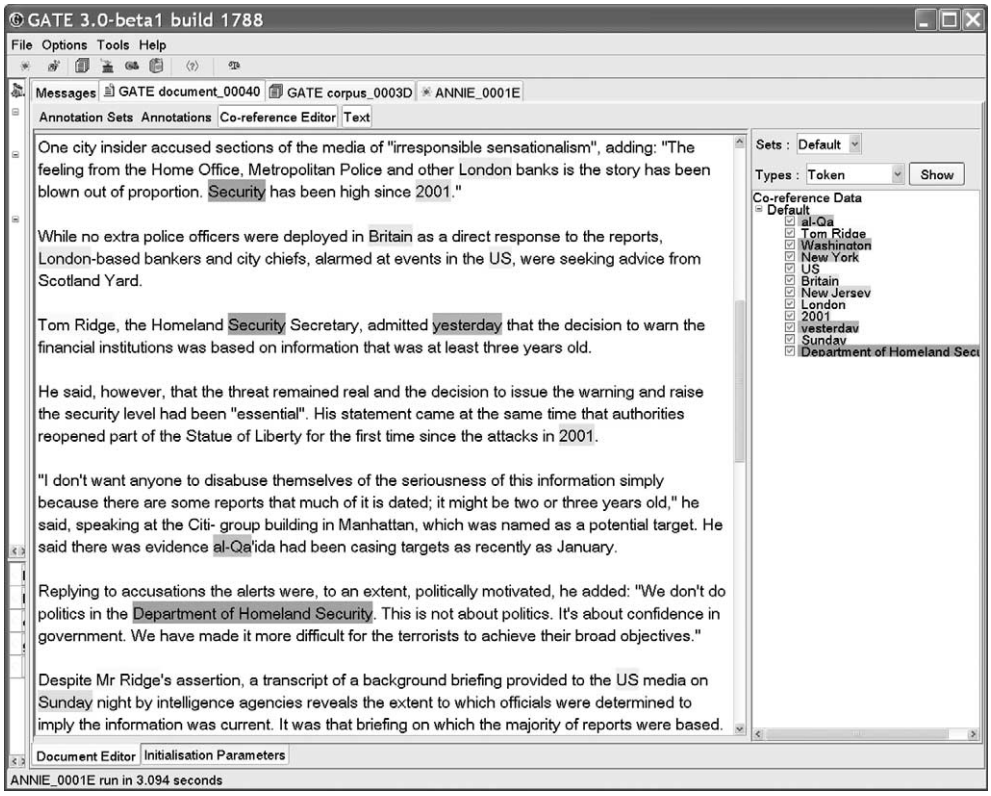

Figure 4 Coreference resolution highlighted in example text.

the production of TEs is weakly domain-dependent, i.e., changing the subject matter of the texts being processed from financial news to other types of news would involve some changes to the system, and changing from news to scientific papers would involve quite substantial changes.

Template Relation Production

Before MUC-7, relations between entities were part of the scenario-specific template outputs of IE evaluations. In order to capture more widely useful relations, MUC-7 introduced the TR task – see Figure 6. As described in Appelt (1999), "The template relation task requires the identification of a small number of possible relations between the template elements identified in the template element task. This might be, for example, an employee relationship between a person and a company, a family relationship between two persons, or a subsidiary relationship between two companies. Extraction of relations among entities is a central feature of almost any information extraction task, although the possibilities in real-world extraction tasks are endless." In general, good TR scores reach around 75%. TR is a weakly domain-dependent task.

Scenario Template Extraction

Scenario templates (STs) are the prototypical outputs of IE systems, being the original task for which the term was coined. They tie together TE entities and TR relations into event descriptions. For example, TE may have identified Isabelle, Dominique and Françoise as people entities present in the Robert edition of Napoleon's love letters. ST might then identify facts such as that Isabelle moved to Paris in August 1802 from Lyon to be nearer the little guy, that Dominique then burned down Isabelle's apartment building and that Françoise ran off with one of Gérard Depardieu's ancestors. A slightly more pertinent example is given in Figure 7, adapted from MUC-6 ARPA (1995).

ST is a difficult IE task; the best MUC systems score around 60%. The human score can be as low as around 80+%, which illustrates the complexity involved. These figures should be taken into account when considering appropriate applications of ST technology. Note, however, that it is possible to increase precision at the expense of recall: we can develop ST systems that do not make many mistakes, but that miss quite a lot of occurrences of relevant scenarios. Alternatively, we can push up recall

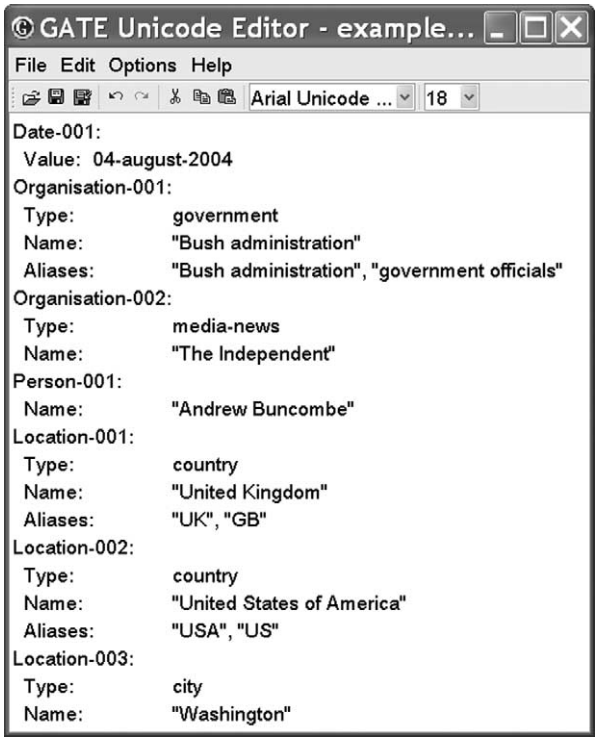

Figure 5 Template elements.

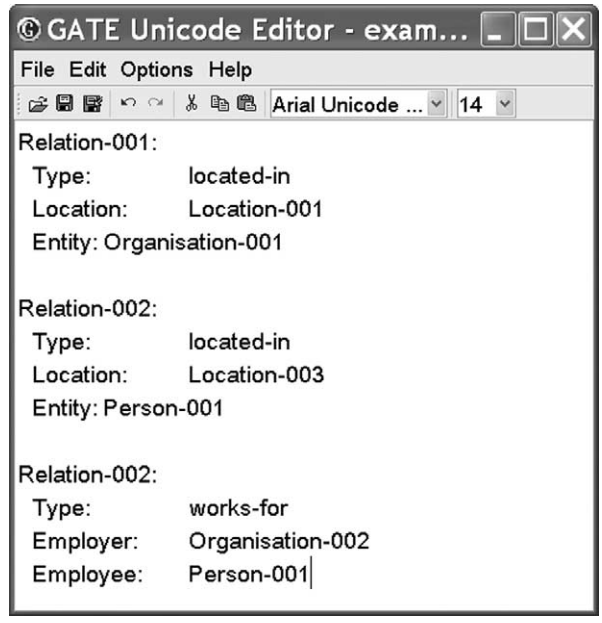

Figure 6 Template relations.

and miss less, but at the expense of making more mistakes.

The ST task is both domain-dependent and, by definition, tied to the scenarios of interest to the users. Note, however, that the results of NE, TR and TE feed into ST. Note also that in MUC-6 and MUC-7 the developers were given the specifications for the ST task only 1 month before the systems were scored. This was because it was noted that an IE system that required very lengthy revision to cope with new scenarios was of less worth than one that could meet new specifications relatively rapidly (see 'Portable IE'). As a result of this, the scores for ST in MUC-6/7 were probably slightly lower than they might have been with a longer development period. Experience from previous MUCs and from subsequent work suggests, however, that current technology has difficulty attaining scores much above 60% accuracy for this task.

An Extended Example

So far we have discussed IE from a general perspective. In this section we look at the capabilities that might be delivered as part of an application designed to support analysts tracking international drug dealing.

When the system is specified, our imaginary analyst states that "the operational domains that user interests are centered upon are ... drug enforcement, money laundering, organized crime, terrorism, legislation." The entities of interest within these domains are cited as "person, company, bank, financial entity, transportation means, locality, place, organization, time, telephone, narcotics, legislation, activity." A number of relations (or links) are also specified, for example between people, between people and companies, etc. These relations are not typed, i.e., the kind of relation involved is not specified. Some relations take the form of properties of entities – e.g., the location of a company – while others denote events – e.g., a person visiting a ship.

Working from this starting point, an IE system is designed that:

- is tailored to texts dealing with drug enforcement, money laundering, organized crime, terrorism, and legislation;
- recognizes entities in those texts and assigns them to one of a number of categories drawn from the set of entities of interest (person, company, etc.);
- associates certain types of descriptive information with these entities, e.g., the location of companies;
- identifies a set (relatively small to begin with) of events of interest by tying entities together into event relations.

For example, consider the following text:

Reuter – New York, Wednesday 12 July 2005.

New York police announced today the arrest of Frederick J. Thompson, head of Jay Street Imports Inc., on charges of drug smuggling. Thompson was taken from

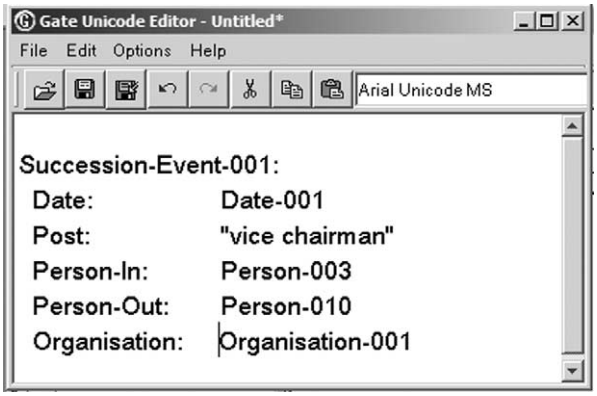

Figure 7 Scenario template.

his Manhattan apartment in the early hours yesterday. His attorney, Robert Guliani, issued a statement denying any involvement with narcotics on the part of his client. "No way did Fred ever have dealings with dope," Guliani said.

A Jay Street spokesperson said the company had ceased trading as of today. The company, a medium-sized import-export concern established in 1989, had been the main contractor in several collaborative transport ventures involving Latin-American produce. Several associates of the firm moved yesterday to distance themselves from the scandal, including the midwestern transportation company Downing-Jones.

Thompson is understood to be accused of importing heroin into the United States.

From this IE might produce information such as the following (in some format to be determined according to user requirements, e.g., SQL statements addressing some database schema).

First, a list of entities and associated descriptive information. Relations of property type are made explicit. Each entity has an ID, e.g., ENTITY-2, which can be used for cross-referencing between entities and for describing events involving entities. Each also has a type, or category, e.g., company, person. Additionally, various type-specific information is available, e.g., for dates, a normalization giving the date in standard format.

Reuter
- id: ENTITY-1
- type: company
- business: news

New York
- id: ENTITY-2
- type: location
- subtype: city
- is_in: US

Wednesday 12 July 2005
- id: ENTITY-3
- type: date
- normalization: 12/07/2005

New York police
- id: ENTITY-4
- type: organization
- location: ENTITY-2

Frederick J. Thompson
- id: ENTITY-5
- type: person
- aliases: Thompson; Fred
- domicile: ENTITY-7
- profession: managing director
- employer: ENTITY-6

Jay Street Imports Inc.
- id: ENTITY-6
- type: organization
- aliases: Jay Street
- business: import-export

Manhattan
- id: ENTITY-7
- type: location
- subtype: city
- is_in: ENTITY-2

Robert Guliani
- id: ENTITY-8
- type: person
- aliases: Guliani

1989
- id: ENTITY-9
- type: date
- normalization: ?/?/1989

Latin-America
- id: ENTITY-10
- type: location
- subtype: country

Downing-Jones
- id: ENTITY-11
- type: organization
- business: transportation

heroin
- id: ENTITY-12
- type: drug
- class: A

United States
- id: ENTITY-13
- type: location
- subtype: country

(These results correspond to the combination of NE and TE tasks; if we removed all but the type slots we would be left with the NE data.)

Second, relations of event type, or scenarios:

narcotics-smuggling
- id: EVENT-1
- destination: ENTITY-13
- source: unknown
- perpetrators: ENTITY-5, ENTITY-6
- status: on-trial

joint-venture

id:	EVENT-2
type:	transport
companies:	ENTITY-6, ENTITY-11
status:	past

(These results correspond to the ST task.)

Multilingual Extraction

The results described above may be translated for presentation to the user or for storage in existing databases. In general, this task is much easier than translation of ordinary text, and is close to software localization, the process of making a program's messages and labels on menus and buttons multilingual. Localization involves storing lists of direct translations for known items. In our case these lists would store translations for words such as 'entity,' 'location,' 'date,' 'heroin.' We also need ways to display dates and numbers in local formats, but code libraries are available for this type of problem.

Problems can arise where arbitrary pieces of text are used in the entity description structures, for example the descriptor slot in MUC-6 TE objects. Here a noun phrase from the text is extracted, with whatever qualifiers, relative clauses, etc. happen to be there, so the language is completely unrestricted and would need a full translation mechanism.

IE After MUC

In this section we bring the story up-to-date by looking at developments in IE system portability, the ACE program which succeeded MUC, and the project of automated annotation for semantic web applications.

Portable IE

A particular IE application might be configured to process financial news articles from a particular news provider (written in the house style) and find information about mergers between companies and various other scenarios. The performance of the application would be predictable for only this conjunction of factors. If it was later required to extract facts from the love letters of Napoleon Bonaparte as published on wall posters in the 1871 Paris Commune, performance levels would no longer be predictable. Tailoring an IE system to new requirements is a task that varies in scale depending on the degree of variation in the parameters discussed in 'Complexity vs. Specificity.'

Therefore a central track of IE research addresses the issue of portability, and this has been one of the most fruitful areas of development since the end of the MUC program in the late 1990s.

We can distinguish three broad currents of work in this area:

1. Learning extraction rules of models from annotated examples.
2. Embedding learning systems within end-user systems.
3. Supporting the development of rules/models by skilled specialist staff.

The first approach is to learn part or all of the extraction system from annotated training data. The advantage is a reduction in the need for skilled staff to perform system porting. The disadvantages are:

- only simple data can be extracted, or complex data from simple texts, such as seminar announcements (in fact many of the algorithms currently common in this area were developed for screen scraping which is a simpler task than most language analysis). (Screen scraping is the process of deleting the presentational elements of data or text, e.g., as displayed on a web page, in order to allow further processing of the data. Sites that provide comparative shopping lists are often based on scraping the pages of competing suppliers and representing the data for comparison purposes.);
- large volumes of training data may be required.

Surveys of work in this area are to be found in Cardie (1997); Daelemans and Osborne (2003).

Secondly, researchers have attempted to embed learning within end-user tools where the users correct IE suggestions. This approach addresses the problem of the costs of producing training data associated with the learning approach by speeding up the annotation process. A cyclical method known as mixed-initiative learning is used, where the user begins by doing all the annotation work manually while the system learns in the background. When the quality of the learned models is high enough, the system can then propose annotations to the user; correction of mistakes is fed back into the learning algorithm. See Day *et al.*, (1997); Grishman (2001). Mixed initiative learning was reinvented as adaptive IE in later work.

Lastly, IE system portability can be maximized by providing a development environment for skilled staff to adapt a core system. The advantages are:

- the core system can be designed for robustness and portability;
- extraction data complexity is not limited by a learning algorithm;
- all the engineering aspects of the process can be taken care of by the infrastructure (from data visualization to performance evaluation).

The disadvantage is that the adaptation process is labor intensive, and it is difficult for end-users to acquire the necessary skills. A survey of work is available (Cunningham and Scott, 2004); *see* **Computational Language Systems: Architectures**.

ACE: Automatic Content Extraction

The automatic content extraction program (ACE, 2004; Maynard *et al.*, 2003) is a successor to MUC that has been running since a pilot study in 1999, which has continued the competitive quantitative evaluation cycles of its predecessor. ACE differs from MUC in three significant ways:

1. Several of the five MUC tasks defined in 'Five Types of IE' are conflated in ACE. The NE and CO tasks become a single entity detection and tracking (EDT) task in ACE, and the TE and TR tasks a single relation detection and tracking task. The ST task is renamed event detection and characterization.
2. The ACE tasks are more complex than their MUC counterparts in several ways. In the EDT task, for example, there is a more fine-grained taxonomy of entities, and it is necessary for systems to interpret metonymic entity mentions, requiring semantic analysis of the texts under consideration. Also, multiple domains and sources are used, including materials output from automatic speech transcription and optical character recognition programs.
3. The evaluation results from the ACE program are not public. Whereas in MUC all the competition results were made public, ACE results are restricted to the participants. The utility of the program for nonparticipants is therefore much lower than for MUC.

Ontology-Based IE

The Semantic Web aims to add a machine-tractable, re-purposeable layer of annotation relative to ontologies to complement the existing web of natural language hypertext (Fensel *et al.*, 2002; Davies *et al.*, 2002; Bechhofer *et al.*, 2003). In order to realize this vision, the creation of semantic annotation, the linking of web pages to ontologies, and the creation, evolution and interrelation of ontologies must become automatic or semiautomatic processes, and a significant body of recent work has looked at the application of ontology-based IE (OBIE) (Bontcheva, 2004) in this context. Figure 8 illustrates the way in which IE and other language technologies can be used to bring together the natural language upon which the current web is mainly based and the formal knowledge needed for a semantic web. Figure 9 illustrates OBIE in action: the ontology hierarchy appears on the right, with an annotated document in the center of the pane. OBIE poses two main challenges:

- the identification of concept instances from the ontology in the text;

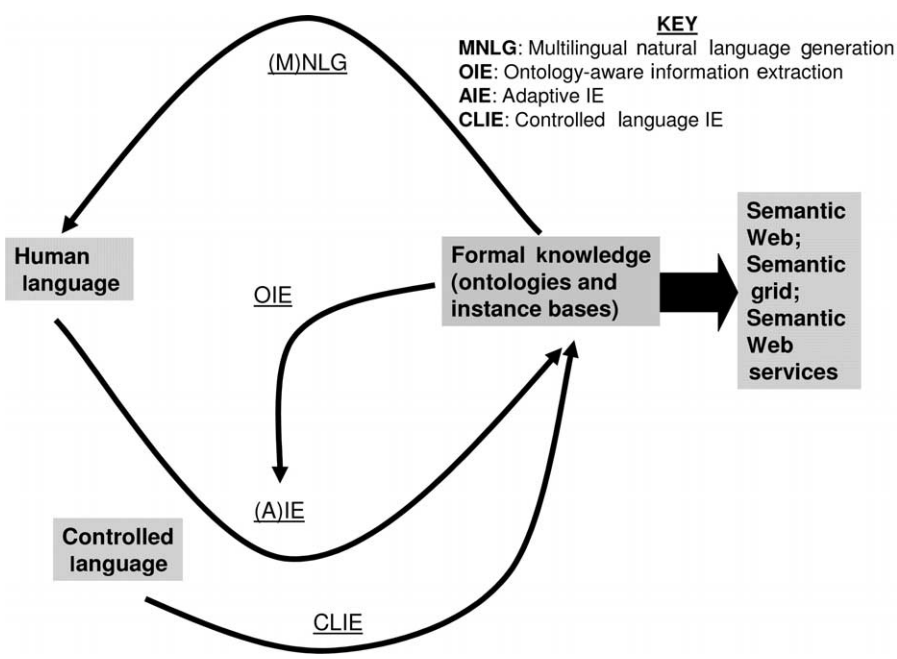

Figure 8 Closing the language loop.

- the automatic population of ontologies with instances in the text.

Identification of instances from the ontology If the ontology in question is already populated with instances, the task of an OBIE system may be simply to identify instances from the ontology in the text. Similar methodologies can be used for this as for traditional IE systems, using an ontology rather than a flat gazetteer. For rule-based systems, this is relatively straightforward. For learning-based systems, however, this is more problematic because training data is required. Collecting such training data is, however, likely to be a bottleneck. Unlike traditional IE systems for which training data exist in domains like news texts in plentiful form, thanks to efforts from MUC, ACE and other program, there is a dearth of material currently available for Semantic Web applications. New training data need to be created manually or semiautomatically, which is a time-consuming and onerous task, although systems to aid such metadata creation are currently being developed.

Automatic ontology population In this case an OBIE application identifies instances in the text belonging to concepts in the ontology, and adds these instances to the ontology in the correct location. It is important to note that instances may appear in more than one location in the ontology, because of the multidimensional nature of many ontologies and/or ambiguity, which cannot or should not be resolved at this level.

Example systems The knowledge and information management system (KIM, Popov *et al.*, 2004) is an extendable platform for knowledge management which offers IE-based facilities for metadata creation, storage, and semantic-based search. It also includes a set of front-ends for online use that offer semantically enhanced browsing.

Magpie (Domingue *et al.*, 2004) is a browser add-in that uses IE to facilitate the interpretation of web-pages and collaborative sense-making. It annotates web pages with metadata in a fully automatic fashion and needs no manual intervention. It automatically populates an ontology from relevant web sources, and can be used with different ontologies. The principle behind it is that it uses an ontology to provide a very specific and personalized viewpoint of the web pages the user wishes to browse.

The SemTag system Dill *et al.* (2003) uses IE to perform large-scale semantic annotation with respect to the TAP ontology. It first performs a lookup phase annotating all possible mentions of instances from the TAP ontology. In the second, disambiguation phase,

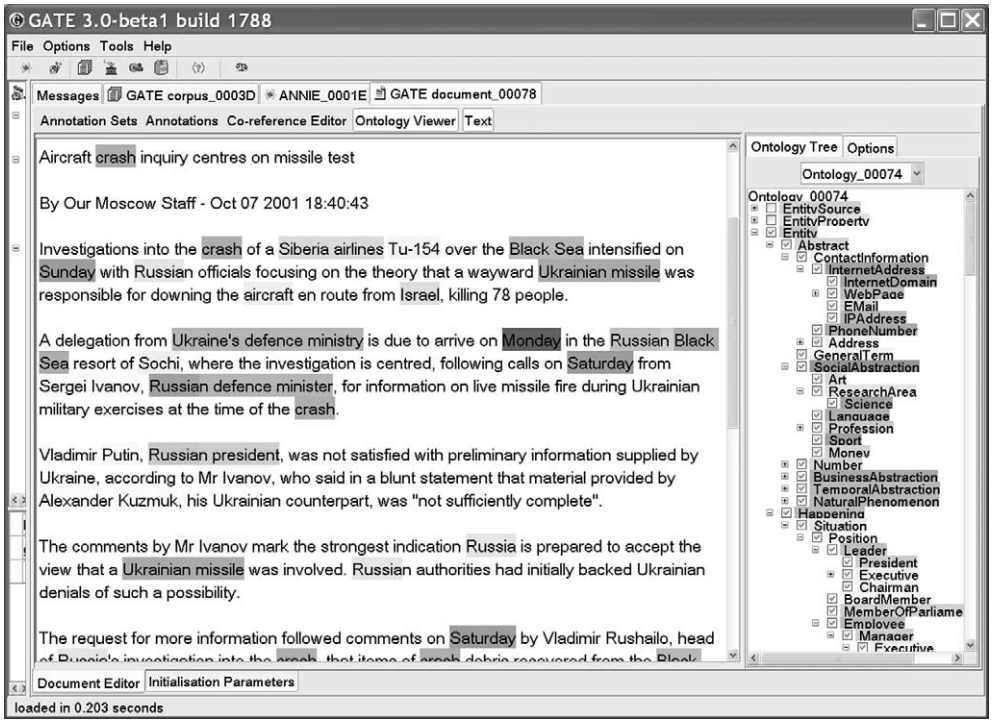

Figure 9 Ontology-based IE in action.

SemTag uses a vector-space model to assign the correct ontological class or determine that this mention does not correspond to a class in TAP.

Acknowledgments

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See also: Computational Language Systems: Architectures; Human Language Technology; Language Processing: Statistical Methods; Named Entity Extraction; Natural Language Processing: Overview; Natural Language Processing: System Evaluation; Text Retrieval Conference and Message Understanding Conference.

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Information Structure in Spoken Discourse

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When producing spoken discourse, it is important for speakers, in order to transmit their message properly, to give it a structure that may support the appropriate understanding of the message on the part of the listener. This is normally done by marking some words or word groups as more important than others and by 'packaging' the message into units of different sizes. The listener, on the other hand, will perceive words or word groups as being more or less important and will detect different types of boundaries that will enable him or her to interpret the utterance on the basis of a division into units to be identified as paragraphs, subparagraphs, sentences, clauses, phrases, and others. The message as uttered by the speaker and interpreted by the listener will thus have a structure that can be characterized in terms of important information and of boundaries between units of different extension. This type of structure is commonly referred to as the information structure of a discourse.

Although the essence of these considerations seems to be uncontroversial, there are nevertheless divergent opinions on what may be considered to belong to information structure, and it is not always clear which categories should be used for the description of its different forms of manifestation. The reasons for this may be that the concept of 'important information' is interpreted differently, descriptions may be based on divergent theoretical assumptions, or either the sentence (or an equivalent linguistic expression) or the discourse may be in the focus of description. Regarding information structure in (spoken or written) discourse, research on its forms and functions is confronted with the problem that a discourse is a complex system of structural spheres within which information structure has to be assigned its theoretically and methodologically adequate place.

For the current purpose, it is assumed that some of the problems implied by the subject of this article may be adequately treated by referring to a global, modular approach to discourse analysis. Following an introduction to some frequently used basic concepts (topic, comment, active concept, semiactive concept, new concept, focus and presupposition), the central aspects of the subject are presented based on a distinction between elementary and complex organization forms in discourse, particularly between information structure and topical organization. Then, the phenomenon of 'punctuation,' which is an inextricable part of the subject under discussion, is discussed.

Basic Concepts

The concepts most frequently used in research work on information structure in discourse can be categorized into three different points of view.

Topic and Comment

First is the distinction between 'topic' and 'comment.' In using these terms allowance is made to the fact that in uttering a (minimal) discourse unit the speaker 'says something about something'; in other words, there is something that has to be regarded as the already established 'matter of current concern' about which new information is added. The added information is named 'comment,' whereas the information that has already been established and thus can serve as an anchoring point for the new information is designated as 'topic.' It is this 'aboutness' relation that connects the two categories. As Lambrecht (1994: 127) stated,

> A referent is interpreted as the topic of a proposition if in a given discourse the proposition is construed as being about this referent, i.e. as expressing information which is relevant to and which increases the addressee's knowledge of this referent.

In the discourse, *I saw John yesterday. He was angry*, the pronoun *he* in the second sentence refers to the topic (it is the 'topic expression'), whereas *was angry* designates the comment that is about this topic. A distinction has to be drawn between sentence topic and discourse topic. A sentence topic (*he* in the cited example) does not necessarily have to be congruent with the grammatical subject of the sentence in

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question. This may be illustrated by Lambrecht's example, *As for Rosa, John didn't really love her.* In this sentence, the pronoun *her* refers to the topic (which has been introduced by the phrase *As for Rosa*), and the open proposition *John didn't really love* designates the comment of this topic. As opposed to a sentence topic, a discourse topic is meant to be a referent that is pragmatically salient beyond the limit of a single sentence. There is a third category that has to be taken into account in connection with the topic–comment dichotomy. It is a discourse constituent that is apt to guarantee the spatiotemporal anchoring of the event being expressed and that has been called 'framework' by Chafe (1976).

The Status of Information

Another way of making relevant aspects of information structure explicit is to characterize 'information units' with respect to their 'referential status,' which is subject to various changes when discourse is produced and comprehended (Brown and Yule, 1983; Chafe, 1987; Prince, 1981). Three cases can be distinguished.

The first case concerns information units that are, at a given moment, already in the speaker's and the listener's mind (or are assumed by the speaker to be in the listener's mind); these are 'active' concepts (Chafe, 1987) that only have to be 'evoked' (Prince, 1981). For example, in the already cited discourse, *I saw John yesterday. He was angry*, the speaker, by using the noun phrase (NP) *John* in the first sentence, refers to an individual the corresponding concept of which hereafter is active and can be evoked by using the pronoun *he* in the second sentence. Also among the active information units are the speaker and the listener as well as objects or individuals that are contained in the speaker's and the hearer's sphere of attention. An active concept does not necessarily have to be congruent with a topic (although topics are mostly referents that correspond to active concepts); an example of an active information unit that is not a topic is *guy* in example (3).

Second, there are information units that are, in a certain sense, at the periphery of the speaker's and the listener's consciousness and are called 'semiactive' or 'accessible.' A concept may be accessible because it was active earlier or because it can be inferred from a concept (or a conglomeration of concepts, a scenario, or a schema) that was active earlier (or is still active).

The third type of information units groups those concepts that the speaker has to activate before or during the utterance of a given discourse unit (and/or that he or she assumes the listener will have to activate as well) because they were neither active nor semiactive earlier. These concepts are 'new' or 'brand-new' in the sense that they have been transferred from the inactive state to the active state. The cognitive cost of this procedure is in proportion to the 'newness' of the concept. Prince (1981: 236) allows for a further differentiation between brand-new entities that are 'anchored' and those that are 'unanchored.' "A discourse entity is anchored if the NP representing it is linked by means of another NP, or 'Anchor,' properly contained in it to some other discourse entity." In a discourse such as *I got on a bus yesterday and the driver was drunk*, the entity represented by *a bus* is unanchored, whereas in a discourse such as *A guy I work with says he knows your sister*, the NP *a guy I work with*, containing the NP *I*, represents an entity that is anchored because that entity is linked to the speaker. These two types of anchoring reflect degrees of identifiableness of a referent in a discourse (cf. also Lambrecht, 1994: 165).

The distinction between active, accessible, and new information units was first made in relation to the referential status of entities that are denoted by noun phrases. As discussed later, other entities, such as those that are represented by verb phrases and adjective phrases, can be treated analogously.

Focus and Presupposition

A third distinction of relevance is that between 'focus' and 'presupposition' (or 'focus frame'). Following a rather general characterization, it will be agreed that a focus marks some discourse unit by setting it off against a background (corresponding to the presupposition) in such a way that the relation to a set of possible alternatives is asserted. In this respect, what is emphasized is an aspect that would have to be located at the semantic level of sentence structure. On the other hand, as Lambrecht (1994: 52) stated, one has to admit that the distinction between focus and presupposition relates to the fact that a speaker, in making an assertion, always expresses a proposition that is "pragmatically structured" because it

> reflects not only a state of affairs but also the speaker's assumptions about the state of mind of the hearer at the time of utterance, by indicating what is assumed to be already given and what is assumed to be new.

In other words, a pragmatically structured proposition may contain a presupposition ("the set of propositions lexicogrammatically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered") and an assertion ("the proposition expressed by a sentence which the hearer is expected to know or take for granted as a result of hearing the sentence uttered"). A focus, then, is "the semantic component of a pragmatically structured proposition

whereby the assertion differs from the presupposition" (Lambrecht, 1994: 213). For instance, if a question such as *Where did you go last night, to the movies or to the restaurant?* is followed by the answer *We went to the réstaurant* (where the acute accent shows the place of the main sentence accent), then *restaurant* marks the focus of the answer.

Information Structure and Topical Organization

In analyzing phenomena of information structure in spoken discourse, the interest of the linguist can be directed toward the structural properties of individual minimal discourse units and their linear concatenation, on the one hand, or toward more complex aspects of discourse structure, on the other hand. A theoretically and methodologically based distinction of these two perspectives is discussed in the global and modular approach to discourse analysis that has been elaborated by Roulet and collaborators (Filliettaz and Roulet, 2002; Roulet, 1997). In this approach, a distinction is made between modules and organization forms. Modules are the components of the model dealing with the elementary dimensions of discourse organization (i.e., syntax, lexicon, textual hierarchy, referential dimension, and interactional materiality). Organization forms can be elementary or complex. Elementary organization forms result from a combination of elementary dimensions, whereas complex organization forms result from what are called 'couplings' between elementary organization forms or between elementary dimensions and elementary organization forms. Regarding information structure, it is treated as something that is defined in an elementary organization form (called 'information structure'), on the one hand, and something that is defined in a complex organization form (called 'topical organization'), on the other hand.

Information Structure as an Elementary Organization Form

A piece of discourse is assumed to be a minimal discourse unit (or 'discourse act' or 'act') if it has reached a certain degree of completion, such that its content can be transferred into the 'discourse memory' (Roulet *et al.*, 2001). It may be difficult to decide whether, in a given case, the transferring procedure has actually been brought about. However, it is possible to rely on certain tests that may give rather clear indications of what would be an adequate decision. Thus, it will be clear that the unit in question is a minimal unit if it is possible to continue with a definite expression that anaphorically refers to a noun phrase of that unit (which would be the case, e.g., in *We invited Peter*$_i$ *in order to give the poor old man*$_i$ *another chance*; this sentence would then correspond to two discourse acts, the first one ending with *Peter*).

When the linear concatenation of discourse acts is taken into account, information structural articulation manifests itself primarily in the way in which 'thematic continuity' and the different modes of 'thematic progression' are organized.

Thematic continuity obtains in a structure being produced in two phases, such that a referent that shall be talked about is introduced as (part of) a comment in the first part of that structure before being used as a topic in its second part. Languages such as French dispose of special constructions, so-called 'presentational clefts' (cf. an example such as *il y a un camarade d'usine qui me ramène*, '(there is) a friend of mine from the factory (who) drives me back'), which can be used to fulfill the pragmatic maxim, "Do not introduce a referent and talk about it at the same time" (Lambrecht, 1987: 254).

Regarding thematic progression, three types have to be distinguished: progression with constant topic, linear progression, and progression by reference to a 'distant topic.' Cases of progression with constant topic are those in which the topic of a discourse act is identical to the topic of the preceding act or can be derived from it (e.g., on the basis of an associative anaphora or a part–whole relation). A topic is thus not obligatorily identical with an activated (or given) concept (in the sense discussed previously); it may be semiactive as well. In the case of linear progression, the topic of a discourse act follows from the comment of the preceding act. Topics of these two types can be referred to by a 'topic expression' (which in the case of the constant topic is normally a pronoun or an anaphorically used noun phrase), but they may also stay implicit. The following is a French example containing, in the third act, a constant topic that stays without topic expression (and is indicated between brackets) (from Roulet *et al*, 2001: 249):

(1) 1. *et cette histoire qu'on m'a racontée*
2. *qui est peut-être une légende*
3. (HISTOIRE) *que vous portiez toujours la même chemise pendant que vous écriviez un roman.*
1. 'and this story I heard of'
2. 'which is perhaps a legend'
3. 'that you always wore the same shirt when you were writing a novel'

The following example is a case of linear progression, where the topic of the second act (STARTED WALKING) remains unexpressed as well:

(2) *And they started walking. Toward these houses.*

Drawing a distinction between progression with constant topic and linear progression leads to the definition of a third type of thematic progression: The topic of a given discourse act has been introduced into the actual discourse by the utterance of an act that precedes several acts that come in between this act and the act in question, such that one might speak of 'progression by reference to a distant topic.' This type of thematic relation may play an important role in connection with the speaker's task of closing a larger chunk of discourse.

Topical Organization as a Complex Organization Form

The topical organization of discourse comes into view when information structure (as described in the previous section) is coupled with what is defined in some of the other modules of the global discourse organization. For instance, if information structure is coupled with the dimensions of syntax and the lexicon, one focuses on the linguistic means that can be used in different ways with respect to the choice of topic expressions or detachment constructions. Thus, in order to refer to a topic, a personal pronoun, a demonstrative pronoun or noun phrase, or a definite noun phrase may be chosen, depending on how the topic has to be searched for. (The use of a demonstrative pronoun, for example, presupposes that the topic referent can be found in the immediate context of the utterance.) Regarding detachment constructions, different types of detachment have been shown to be in relation with the previously mentioned forms of thematic progression: dislocation, hanging topic, '*thème détaché* c'est' (Stark, 1997), and others. (Thus, it has been observed that right dislocation can mark the particular saliency of a topic, whereas left dislocation, besides introducing a 'lexical support' for a pronominal topic expression, can fulfill various other functions, such as the function to simplify discourse processing or to trigger some special inference; cf. Lambrecht, 2001; Prince, 1997.)

Linking informational structure to the domain of 'knowledge about the world' (which is described in the module called 'referential dimension') may help to understand the processes by which changes in the status of discourse units are brought about. One can hypothesize that those processes are normally based on networks of conceptual representations that are activated in the development of verbal interactions. Thus, in example (1) cited previously, a mental concept STORY is activated by the utterance of *et cette histoire qu'on m'a racontée*. If one assumes that this implies the activation of other concepts, such as VERACITY and CONTENT, forming part of a conceptual network of which STORY is the central element, then it is possible to think that the speaker (and also the listener) of (1), at the moment of starting the third discourse act (*que vous portiez toujours* ...), will be able to use the conceptual relation between 'story' and 'content' in order to reconstruct the topic of this discourse act (cf. Roulet, 1998).

Finally, information structure can be linked to hierarchical structure. If this is done, the task of describing the processes underlying that type of thematic progression that has been labeled 'progression by reference to a distant topic' may be fulfilled in an adequate way. It will thus be seen that a constituent from a distant discourse act can be relatively well identified as the topic of an actually uttered discourse act if, for instance, the two acts are located at the same level of the hierarchical structure of discourse (which may be the case when the distance is created by a number of hierarchically subordinated acts coming in between).

Periodical Organization

Oral discourse shows an articulation that is determined by the conditions of its production. It is 'punctuated' in that it is partitioned into units the format of which is marked by prosodic features, syntactic constructions, and the use of certain discourse markers. In part, the interpretation of these units depends on how the information packaged in them has been structured. Punctuation of oral discourse is a phenomenon that, in the model of Roulet *et al.* (2001), is treated in a complex organization form called 'periodical organization' and that can be described by coupling information from the phono-prosodic and the information structure organization forms (among others). Among the phenomena of periodical organization that have raised particular interest are 'information flow' and the division of oral discourse into 'paragraphs.'

Information Flow

Spontaneous oral discourse is usually partitioned into relatively small units (cf. Chafe, 1987; Levelt, 1989). Normally, these units contain no more than five or six words. One is allowed to assume that the division of discourse into such units is determined by the manner in which speakers are treating the information they want to transfer. Out of large amounts of information, at subsequent points in their communicative activity, speakers will choose only those very small amounts of information that they can bring to the focus of their consciousness (or 'activate') at any one time. Information units that can be focused on correspond to concepts of objects, properties, and events – concepts that are typically expressed in

noun phrases, verb phrases, and adjective phrases. The number of information units that can be activated at the same time will be responsible for the extension of the segment of discourse with which these information units are referred to. Since the activation of information units affords time, it is plausible to assume that those segments of discourse are separated by pauses and other functionally equivalent means, such as discourse markers, repetitions of words, syntactic parallelisms, and, most important, a single, coherent intonation contour under which the segment can be subsumed (Kotschi, 1996a, 1996b). Segments that are separated by these formal markers are usually called 'intonation units.'

Intonation units normally contain more than one information unit. A typical distribution can be observed in the following example (cited in Chafe, 1987; the individual intonation units are indicated by numbers; the dots indicate brief breaks in timing (..) or full-fledged pauses (. . .); two hyphens indicate lengthening of the preceding segment; and the acute accent shows intonations peaks):

(3) (from a conversation about the importance for university teachers to have personal contact with their students)
1. . . . *It's fúnny though,*
2. . . . *I dó think that makes a díffference .. but,*
3. . . . *Í can recall . . .uh- - . . . a big undergraduate class that Í had*
4. . . . *where .. éverybody lóved the instrúctor,*
5. . . .*a - - nd .. he was a . . . real .. uh .. óld world . . .*
   Swíss– . . . guy,
6. *.. this was uh .. a biólogy course,*
7. . . . *a–nd he- - . . . left áll of the– sort of uh– . . . real cóntact with stúdents .. up to .. his assístants.*

Without counting discourse markers, hedges, epistemic attitudes, and the like, one can say that the sequence of this example contains the following information units (which have been separated by a plus): *it + 's funny + I + that + makes a difference + I can recall a big undergraduate class that I had + everybody + loved + the instructor + he + was a real old world Swiss + guy + this + was a biology + course + he + left all of the real contact with _ up to _ + students + his assistants*. The concepts corresponding to these information units can be in one of three activation states: active (or given), semiactive (or accessible), or inactive. A concept that has been active before has only to be evoked and therefore exacts only a minimal activation cost. When a concept is semiactive, it may be activated by deriving it from some other concept, and the activation cost will be somewhat higher. Finally, a concept that has to be transferred from an inactive state into an active state demands rather high activation cost. In (3), this is illustrated as follows: in line 1, *it* is in the state of an already active concept (which refers to what the speaker is about to say), whereas *'s funny* is a concept that the speaker has transferred from an inactive to an active state. In line 4, both *everybody* and *the instructor* refer to concepts that have been in a semiactive state (inasfar as they are accessible from the schema 'undergraduate class' that has been evoked in line 3). In addition to these, the information units *that*, *I can recall a big undergraduate class that I had*, *he*, *guy*, *this*, *course*, and *he* represent given concepts, *students* and *his assistants* refer to accessible concepts, and all the other information units stand for new concepts. The totality of the processes, by which semiactive and inactive concepts are transferred into active concepts (as well as those by which activated concepts may fall back into the state of semiactive concepts because they have not been evoked again for some time), is designated by the metaphor of 'flow' in Chafe (1994). Information flow may have important effects on such linguistic features as intonation, stress, word order, and pronominalization and is closely interrelated with thematic continuity and thematic progression.

Chafe hypothesizes that in spoken discourse, each intonation unit verbalizes one and only one new concept, and that in addition it may refer to one (or more than one) active concept and/or to one (or more than one) semiactive concept. For Chafe, the general restriction to one new concept per intonation unit is due to the cognitive work that the speaker has to perform in order to activate an inactive concept. The hypothesis concerning this 'one new idea constraint' can obviously be strengthened on the basis of data from other languages (cf. Kotschi, 1996a, 1996b), although it is still dependent on the somewhat optimistic assumption that the question of whether or not a linguistic expression corresponds to a single information unit can be answered satisfactorily in every single case.

Division into Paragraphs

From a slightly different perspective, consideration is given to the structure of discourse units that show a greater extension than do intonation units while still being identified and interpreted partly on the basis of prosodic features. Those units, especially the ones that sometimes are designated as 'paragraphs' (or 'mouvements périodiques'; Roulet *et al.*, 2001), may be characterized as manifesting a certain type of bipartite articulation, which shows a certain affinity with topic–comment articulation, without being identical to it. According to Morel and Danon-Boileau (1999), who studied spoken French discourse, paragraphs normally fall into two parts, a 'preamble'

and a 'discourse focus' (*rhème*) (which in special cases may be followed by a *postrhème*, i.e., a constituent that, showing an invariably low intonation contour, immediately follows the discourse focus; Blanche-Benveniste, 1997). Allowed by the possibility of recursive structuring, a paragraph can become the preamble of another, hierarchically superior paragraph.

In principle, the preamble will show considerable structural variety and can be much longer than the discourse focus. The latter, on the contrary, tends not only to be relatively short but also to not allow the same structural variety as the former. The discourse focus can be characterized as the constituent by which the speaker presents a piece of information that, without being necessarily 'new,' is likely to be subject to disagreement or discussion, whereas the preamble specifies the conditions in accordance to which the discourse focus may be adequately interpreted. The preamble can consist of up to five subconstituents, namely a 'connector' (which specifies the relation between the whole paragraph and some information in the discourse memory), an 'evidential expression' (*point de vue*) (allowing the listener to identify the source of the information to be given), a 'modal expression' (*modus dissocié*) (an item that may express an axiological judgment of the speaker or some epistemic modality), a 'frame' (specifying the domain for which the predication of the discourse focus is to be validated), and a 'detached lexical support' (which is a cover term for (parts of) constructions known as 'presentational cleft' (Lambrecht, 1987), '*thème détaché* c'est' (Stark, 1997), and 'left dislocation' (Prince, 1997)). Within the preamble, these five subparts can be well distinguished from one another and they appear in a fixed order. In uttering them, the speaker brings about something like an 'operation of decondensation.' This is in accordance with the fact that it is within the preamble where most of the hesitation phenomena, pauses, false starts, corrections, and other traces of 'formulation work' can be observed. Throughout the preamble, the process of formulation thus seems to be reflected and controlled by the speaker. In contrast, the utterance of the discourse focus seems to have been 'premeditated.' It shows a significantly lesser degree of formulation work, it is shorter than the preamble, and it is produced at a higher speech rate.

The following example illustrates a possible distribution of the elements that may occur in a paragraph:

(4) (from a conversation about linguistic norms)
mais moi je me souviens la première fois que j'ai reçu une lettre de ma marraine qui est quelqu'un que j'aime énormément c'était truffée de fautes
'as for me, I remember, when for the first time I received a letter from my godmother, someone whom I love very much, it was crammed with spelling errors'

In this case, the speaker has produced a relatively 'complete' sequence in which only the detached lexical support is lacking (Table 1).

In general, preambles in which all five positions are filled are rather exceptional. An actual constituent, however, may take over the function of a constituent that has been left unsaid:

(5) (from a conversation about cosmetic operations; Morel and Danon-Boileau, 1999)
et puis moi le risque c'est de ressortir avec des erreurs quoi
'and moreover, I would be afraid I might come out showing an inexactness'

The noun phrase *le risque* serves as support for the discourse focus and can, because of the semantics of its noun, also be understood as a modal expression (Table 2).

Table 1 Structure of a paragraph (Example 1)

Preamble					***Discourse focus***
Connector	*Evidential expression*	*Modal expression*	*Frame*	*Detached lexical support*	
mais	*moi*	*je me souviens*	*la première fois que j'ai reçu une lettre de ma marraine qui est quelqu'un que j'aime énormément*		*c'était truffée de fautes*

Table 2 Structure of a paragraph (Example 2)

Preamble					***Discourse focus***
Connector	*Evidential expression*	*Modal expression*	*Frame*	*Detached lexical support*	
et puis	*moi*	←	←←←	*le risque*	*c'est d'ressortir avec des erreurs quoi*

See also: Cohesion and Coherence: Linguistic Approaches; Connectives in Text; Topic and Comment.

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Information Theory

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'Information theory,' a term that arose sometime in the mid-1940s, refers to mathematical models of the amount of information in a message (Bar-Hillel, 1955). The desire of army intelligence and the telephony industry to find ways of transmitting a signal that did not deteriorate with distance or contain noise gave rise to the modern field of communication theory, including the notion of quantifying information. Claude Shannon (1916–2001) is credited with the innovations that led to the digital revolution. By equating truth values in Boolean logic to on-and-off electrical switches, Shannon showed how binary digits could be used in the analysis of switches and computer circuits. In his seminal paper, 'A mathematical theory of communication' (1948), Shannon demonstrated that language information could also be quantified as binary units. Working with a basic model of communication (a source message is transmitted over a noisy communication channel and is reconstructed at the destination), his major innovation was that all sources of information have a source rate and communication channels have a capacity rate, and these can be measured in the same units – binary digits, or bits. Information can be accurately transmitted over the channel if the source rate does not exceed the channel capacity.

See also: Cohesion and Coherence: Linguistic Approaches; Connectives in Text; Topic and Comment.

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The notion of quantifying information in bits has two fundamental principles. The first is that messages contain redundant information, and thus can be reduced to (or, more accurately, modeled by) a set of choices, the sum of which is less than the original message but still accurately represents the values of the original message. Consider, for example, sending a message in bits that contains one consonant, either a /t/, /d/, /p/, or /b/. Assuming that each consonant is equally likely, the message would contain 4 bits of information; the actual consonant in the message would be 'on,' and the others would be 'off':

(1)	t	d	p	b
	1	0	0	0

The fact that one bit is 'on' means that the other three are necessarily 'off,' which results in a lot of redundancy in the message. The redundancy can be reduced by using a representation of the data that reduces the number of choices encoded in the message, such as phonetic features:

(2)	**Voicing**	0 for voiceless, 1 for voiced	0	1
	Place	0 for bilabial, 1 for alveolar	0	1

In this model, it is necessary only to encode the values for two choices, reducing the average number of bits from 4 to 2.

The second principle of quantifying language information is the brilliant notion of Hartley (1928) that information is estimable via mathematical means. Following his suggestion that information can be quantified in logarithms, Shannon (1948) demonstrated that the amount of information in a source message is estimable by the logarithm of the number of available choices. The use of logarithms base 2 corresponds to binary digits, the same unit of measure used for channel capacity. Using Example (1), since the message, M, equals four equally likely values (consonants), $M = 4$, the information value of M, IM, is

$$IM = \log_2(4) = 2\text{bits}.$$

The information value of a message is a mathematical notion and should not be confused with any aspect of the meaning of the message. Shannon (1949: 3) made clear that the IM is distinct from the meaning of the message: "Frequently these messages have *meaning*; that is they refer to or are correlated with ... certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem."

Hartley's proposal of a mathematical model of information was based on the assumption that the possible values of a message were equi-probable. Shannon, on the other hand, showed that it is possible to exploit statistical knowledge about a source to reduce the estimate of the IM. His intuition was that distributional constraints, such as 'e' being expected when it follows 'th,' etc., reduce the redundancy of a message. Shannon (1949, 1951) employed *entropy*, a measure of the amount of information in a random variable (Manning and Schütze, 1999) to demonstrate that an unequal distribution of choices lowers the estimated IM. Entropy, H(x), denoted with an 'H' out of respect for Hartley (Devlin, 1999), is formalized as

$$\mathrm{H}(x) = -\sum p(x) \times \log p(x).$$

Shannon (1949) used letter frequency and context to compute the per-letter entropy of English as 2.3 bits. In 1951, he had participants predict letters in order to compute upper and lower bounds on their information value. He also demonstrated that increasing the number of letters in the context reduces the entropy (an upper bound of 1.3 bits for a context of 100).

Changing the assumptions of the consonant distribution in Example (1) illustrates how distributional constraints lower the estimated IM. Rather than assuming an equi-probable distribution, the following probability distribution is assumed: $p(\mathrm{t}) = 0.75$; $p(\mathrm{p}) = 0.15$; $p(\mathrm{d}) = 0.07$; $p(\mathrm{b}) = 0.03$. Thus,

$$\begin{aligned} H(x) = \quad & 0.75 \times -0.41504 &&= -0.31128 \\ & +0.15 \times -2.73697 &&= -0.41054 \\ & +0.07 \times -3.8365 &&= -0.26856 \\ & +0.03 \times -5.05889 &&= -0.15177 \\ & &&= \quad 1.114 \end{aligned}$$

The unequal distribution of the consonants reduces the average number of bits from 4 (for equi-probable choices) or 2 (when some redundancy is removed) to 1.114.

Shannon's formulization of entropy and further permutations of it (cf. Kolmogorov complexity, in Cover *et al.* (1989)) remain the core of information theory. Information theory is slowly expanding from an engineering tool to a modeling device in traditional areas of linguistics, such as phonology (Goldsmith, 2001; Bell *et al.*, 2003) and semantics (Resnik, 1999). However, the greatest contribution of information theory to linguistics is in computational linguistics, specifically statistical natural language processing. Although the field is too large to review here (see Charniak, 1993; Manning and Schütze, 1999; Jurafsky and

Martin, 2000), simply put, information theory (specifically, entropy and cross-entropy) is useful for evaluating how well a model fits the data. However, various instantiations of information theoretic principles have other important functions as well, such as measuring collocational strength (mutual information) or the difficulty of a search task (perplexity) (for a complete review, see Cover and Thomas (1991)).

See also: Communication, Understanding, and Interpretation: Philosophical Aspects; Computational Linguistics: History; Language in Computer-Mediated Communication; Language: Mathematical Complexity.

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Informative Analysis

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Every speech act makes at least one illocutionary point. There is often more than one hearer, and the speaker may have different intentions toward (messages for) different hearers. All those who can reasonably consider themselves hearers are expected, as part of the cooperative endeavor, to keep tabs on what is said, so that if called on to participate in the discourse they may do so appropriately. Clark and Carlson (1982: 332) account for these facts through their 'informative analysis.'

> [T]he speaker performs two types of illocutionary act with each utterance. One is the traditional kind, such as an assertion, promise or apology; this is directed at the addressees. The other, called an informative, is directed at all participants in the conversation – the addressees and third parties alike. It is intended to inform all of them jointly of the assertion, promise, or apology being directed at the addressees.

Does every utterance in fact contain such an informative?

Suppose Sam utters (1) to H_1, H_2, and H_3.

(1) Will the last one of you to go to bed please turn out the light?

The informative analysis postulates the following illocutions:

(2) Sam **informs** H_1, H_2, and H_3 that Sam **requests** the last one of them to go to bed to please turn out the light.

The claim is that all hearers are informed of the request, but for the last one of them to go to bed (suppose it is H_2) the illocutionary point is that of a request – no request is made of H_1 or H_3. The traditional and simpler view is that the request is made of all three hearers because at the time of

Martin, 2000), simply put, information theory (specifically, entropy and cross-entropy) is useful for evaluating how well a model fits the data. However, various instantiations of information theoretic principles have other important functions as well, such as measuring collocational strength (mutual information) or the difficulty of a search task (perplexity) (for a complete review, see Cover and Thomas (1991)).

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utterance it is unknown who will eventually comply with the request (perhaps none of them). This view is justified by a realistic true report of (1): Sam asked that the last one of us to go to bed should turn out the light. It would be unnatural to say Sam informed us that the last one of us to go to bed should turn out the light or for any of H_1, H_2, or H_3 to report Sam asked me to turn out the light; this is logically correct but pragmatically false because it ignores the true implicatures of (1).

(3) [Traffic cop addresses Ed in the presence of passenger Jo] Please show me your driver's license.
[Ed ignores the request, so the cop addresses Jo] You heard me ask him to show me his driver's license, didn't you?

It would not have been natural for the cop to say to Jo *I informed you that I asked him to show me his driver's license, didn't I?* (although he might say *I am asking this man to show me his driver's license*). In (3), the cop describes to Jo what she is doing and, indirectly, remakes the request of Ed. However, there is no confirmation of the informative analysis.

All entailments and implicatures of a proposition within the utterance are communicated, giving rise to indirect (and occasionally unintended) illocutions. Strictly speaking a speaker does not **tell** the hearer these things, but **lets them be known**.

(4) [Susan's mom to Susan's fiancé Fred in front of Susan] Why are you playing around with that Mabel?

Sentence (4) entails that Mom believes Fred is two-timing Susan. Her question directly challenges Fred to explain himself; but, if there has been no prior reference by any participant to Fred's affair, it also succeeds in indirectly (and tactlessly) informing Susan of the content of her mother's belief. This informative is not, however, sanctioned by the informative analysis, which requires that the challenge be inferred from the informative; in (4), the informative is inferred from the challenge.

Further examples can be brought against the informative analysis for proposing additional machinery to speech act analysis that serves no useful function (see Allan, 1986). The important point is that participants in a discourse keep tabs on what is said to whom and on everything that is implied in an utterance (Lewis, 1979). The informative analysis mistakes the communicative presumption (if an utterance appears to be linguistic, it is intended to communicate and is worth interpreting), cooperative expectations from participants, and the perlocutionary effects of utterances for the speaker's illocutionary intentions.

See also: Speech Acts; Speech Acts: Definition and Classification.

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Ingarden, Roman (1893–1970)

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Roman Ingarden, born in Krakow, studied mathematics and philosophy (in Krakow, and then in Lvov with K. Twardowski), from 1912 to 1915 with E. Husserl in Göttingen. Later, he followed Husserl to Freiburg, where in 1917 he defended his dissertation *Intuition und Intellekt bei Henri Bresson.* After he obtained his Ph.D. in 1918, Ingarden returned to Poland for the rest of his life. First he was a grammar school teacher; after his habilitation thesis *Essentiale Fragen* was defended in 1925, he was appointed Associate Professor and, in 1933, full Professor at the Jan Kazimierz University in Lvov. During World War II (when universities were closed), he continued teaching in secret and worked on his major work, *The controversy over the existence of the world I, II* (published in Krakow in 1947 and 1948). After World War II, he moved to Jagellonian University in Krakow where he was offered a chairmanship. From 1949 until 1957, in the period of hard Stalinism, his academic career was interrupted by a ban from teaching

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(for being an 'enemy of materialism'). Despite the difficulties of that period, he continued his work, and after being reappointed to his position in 1957, he soon published *The ontology of the work of art* (1962) and *Experience, artwork and value* (1969). He died suddenly in 1970.

Ingarden's best known works deal with aesthetics, especially literature, namely, with the ontological status of works of art of various kinds and with our means of cognizing them. His phenomenological approach to aesthetics strongly influenced the work of Michel Dufrennes. There are also strong resonances between Ingarden's work on the ontology of art and contemporary analytic works in aesthetics and in the development of the schools of New Criticism and Reader Response Theory (René Wellek and Wolfgang Iser, respectively).

In his *Literary work of art*, written around 1926 and first published in German in 1931, Ingarden attempted to determine the 'mode of existence' of a literary work, presenting compelling reasons to reject both attempts to identify literary works with 'real' objects or events, such as copies of texts or the psychological experience of authors or readers, and attempts to identify works of art with platonistic ideal objects, such as manifolds of sentences or sentence meanings.

As Ingarden ultimately argued, a literary work is a purely intentional formation, derived from the sentence-forming activities of its author(s) and founded on some public copy of these sentences. For its existence and essence, it also depends on a relation to certain ideal meanings attached to the words forming the text. Every literary work is composed of four strata: (1) Word sounds and phonetic formations of higher order (phrases, sentences, paragraphs); (2) Meaning units (from individual word meanings to meanings of phrases, sentences, paragraphs, etc.); (3) Schematized aspects (visual auditory or others, by the meanings of which the characters and places represented in the work may be apprehended); and (4) Represented entities (the objects, events, states of affairs, represented in the literary work and forming its characters, topics, etc.).

Each of the strata has its typical sorts of aesthetic value; thus, we may distinguish the values of rhythm, alliteration, interesting juxtapositions of ideas and concepts, and quasivisual beauty of the scene presented from the values of positive or negative characters and surprising plots. Nevertheless, those strata do not exist separately but rather form an organic unity. There are different forms of mutual dependence and influence among the strata that may contribute other aesthetic values and merits (or demerits) to the work. In cooperation with other strata, the stratum of represented objects may present metaphysical qualities such as the tragic, the dreadful, the peaceful, etc. The work of literature as a whole is a polyphonic harmony.

In 1928, Ingarden expanded his analyses of the ontology of art from literature to music, painting, and architecture in a series of essays published after World War II, as *The ontology of the work of art* (Ingarden *et al.*, 1989). In addition to those works, Ingarden also undertook a general work on the ontological status of the aesthetic object and on the nature of aesthetic values. Aesthetic values manifest themselves in the aesthetic objects created through concretizing the work of art and characterize the aesthetic object as a whole. Since various aesthetic objects may be based on one and the same work of art, these may also differ in their aesthetic values. This can help account for the variety of aesthetic judgments concerning the same work of art. Ingarden's goal is to account for the legitimate role of consciousness in constituting many of the objects and properties experienced by people, avoiding a pure subjectivism or universal social constructivism.

See also: Edmund Husserl (1859–1938).

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Inghen, Marsilius von (ca. 1335/40–1396)

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Marsilius of Inghen, Netherlandian scholastic and a master at the universities of Paris and Heidelberg, was an active participant in the 14th-century appropriation of Aristotelian logic into western philosophy and theology. A disciple of the Parisian nominalist John Buridan, he inclined toward the *via moderna*, but exhibited intellectual creativity and independence on numerous points. In the area of logic, Marsilius was a nominalist: individuals within a single species have no shared essence; however, the resemblance of such individuals is the basis for universal concepts, which exist solely in the human mind. In the area of natural philosophy, Marsilius argued that scientific knowledge must be based on sense data and self-evident propositions. For Marsilius, such a notion as the *creatio ex nihilo* cannot be derived without faith and thus does not belong to the legitimate propositions of natural philosophy. Nonetheless, Marsilius accepted that faith enjoys greater authority than reason and that in conflict reason must bow to faith inasmuch as the latter comes from God, who does not err. Delving into theology and epistemology, he argued that natural reason can form adequate concepts of and true propositions about God. Some indication of his enduring significance is to be noted in the use of the term *via marsiliana* in Germany after his death in reference to the *via moderna*, and in the oath stipulated in the 1427 statutes of the University of Louvain obliging doctoral candidates to foreswear teaching his doctrines, along with those of Buridan and Ockham.

See also: Aristotle and Linguistics; Linguistic Theory in the Later Middle Ages; Nominalism; Philosophy of Language, Medieval.

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Ingressives

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The terms 'ingressive,' 'inceptive,' and 'inchoative' are all used to refer to the notion the beginning of an activity or state and to verbs, verb forms, and derivational processes connected to this notion. Sometimes, the terms are used indiscriminately, but there is a tendency to reserve 'inchoative' for the beginnings of states. In this article, 'ingressive' will be used as a cover term.

Ingressive meanings may be expressed in many ways in languages: by auxiliaries or auxiliary-like verbs, by derivational processes, or by inflectional means. In English, the productive way of expressing ingressivity is by verbs such as *begin* (taking verbs as its complement) or *become* (taking nominal elements or adjectives as its complement). In other languages, the same verb may show up with all word classes, e.g., Russian *stat'* 'begin, become' (originally a movement verb 'to stand up'). The English unproductive suffix *-en* as in *darken* is an example of a derivational ingressive (inchoative) that combines with adjectives. The Russian ingressive prefix *za-* combines with verbs as in *zapet'* 'begin to sing.' As regards inflectional forms, it does not appear to be common for such forms to have ingressivity as their primary meaning.

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However, perfective forms of stative verbs may acquire an ingressive (inchoative) meaning, for example Greek aorist or French passé simple. In general, ambiguities between stative and ingressive readings are common, in particular with verbs such as English *realize* and *understand* or posture verbs in other languages.

See also: Aspect and Aktionsart; Inflection and Derivation; Perfectives, Imperfectives, and Progressives; Tense, Mood, Aspect: Overview.

Innate Ideas

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The question of whether there are any innate ideas or concepts goes back to ancient times and is at the center of the dispute between empiricists and nativists. Empiricists maintain that the mind has little innate structure and that all of our concepts are based on perception. In contrast, nativists maintain that the mind has a great deal of innate structure, including a stock of innate concepts of considerable abstraction (e.g., CAUSE, AGENT, NUMBER).

The traditional dispute between empiricists and nativists, especially in the 17th and 18th centuries, often confounded psychological issues with epistemological ones. While the former address how the mind is organized and how it develops, the latter address the grounds for justifying our beliefs. Contemporary theorists view the psychological issues as being largely independent of the epistemological issues. Contemporary theorists also draw upon empirical studies of the mind to support their claims. The cognitive sciences – from linguistics to developmental psychology to cognitive anthropology – all bear on the innateness controversy. At the same time, questions about innate concepts continue to be hotly debated among philosophers. One issue concerns what it means to say that a concept is innate and whether the notion of innateness has explanatory value. A second and related issue concerns which concepts (if any) are innate and how arguments for innate concepts are to be evaluated.

What Is Innateness?

Empiricists and nativists disagree about the innate structure of the mind. The disagreement is sometimes mischaracterized by saying that nativism is the view that the mind has an innate structure. This is a mistake, because the point of contention isn't about whether or not something is innate but is about how rich our innate endowment is. Even the most diehard empiricists maintain that the mind has an innate structure that is partly responsible for why humans develop the concepts they do. Even the behaviorist, as W. V. O. Quine notes, "is knowingly and cheerfully up to his neck in innate mechanisms" (1969, pp. 95–96). What distinguishes empiricists from nativists is that empiricists think that there are no innate concepts and that the innate mechanisms that explain how we acquire our concepts are general-purpose mechanisms (for empiricists the same mechanisms, ultimately based on our perceptual systems, are responsible for the development of such diverse concepts as NUMBER, BELIEF, SQUIRREL, and AXE). In contrast, nativists embrace innate concepts and allow that the mind may have considerable innate differentiation.

Some theorists are skeptical of the dispute between empiricists and nativisists because they think that little sense can be made of the idea that anything is innate. This poses a potential challenge (to both nativists and empiricists) to clarify the notion of innateness.

One proposal is that innate concepts are ones that are genetically determined. Unfortunately, the notion of genetic determination is itself problematic. Every phenotypic trait is dependent upon both genetic and environmental factors (including the embryonic environment); none can be traced to the genes uniquely. In addition, the appeal to genetic determination relies on a misleading picture that a genotype is a blueprint specifying a detailed sketch of an organism's phenotypic properties. But according to modern genetics, the relationship between genes and phenotypes is far more indirect (Sterelny and Griffiths, 1999; Marcus, 2004).

Another proposal is that innate concepts involve a greater influence of the genes than the environment in

However, perfective forms of stative verbs may acquire an ingressive (inchoative) meaning, for example Greek aorist or French passé simple. In general, ambiguities between stative and ingressive readings are common, in particular with verbs such as English *realize* and *understand* or posture verbs in other languages.

See also: Aspect and Aktionsart; Inflection and Derivation; Perfectives, Imperfectives, and Progressives; Tense, Mood, Aspect: Overview.

Innate Ideas

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Another proposal is that innate concepts involve a greater influence of the genes than the environment in

the sense that innate concepts are bound to emerge in a wide range of environments (Sober, 1998). A related proposal is that a concept is innate to the extent that its development is canalized; that is, there is a developmental process that is bound to form the concept regardless of environmental variation (Ariew, 1996). One problem with these sorts of approaches is that some concepts are likely to emerge across a wide range of environments not because they are innate but simply because they are readily *learned* in a wide range of environments. A second problem is that for an account of this kind to work we must be given a principled specification of the relevant environmental variation (Cowie, 1999; Samuels, 2002).

Another approach is to explain innateness in terms of the kind of explanation that accounts for a concept. Samuels (2002) suggests that a psychological structure is innate when it is posited by a correct psychological theory and yet there isn't a psychological account of how it is acquired. For example, a concept is innate if we must turn to a neurobiological explanation of its acquisition. Of course, this leads to the problem of clarifying what counts as a psychological (as opposed to a nonpsychological) explanation, but perhaps this distinction is well enough understood in practice.

Which Concepts are Innate?

Much of the contemporary discussion about which concepts are innate has centered around Jerry Fodor's notorious claim that all **lexical concepts** are innate. Roughly, lexical concepts are ones that are encoded by single words in natural language, as opposed to phrases – for example, the concept DOG is a lexical concept.

Fodor's original presentation of his argument has the feel of a paradox (Fodor, 1975). The argument begins with the distinction between learning and other fortuitous ways of acquiring a concept (e.g., bumping your head in just the right way or undergoing futuristic neurosurgery). Fodor claimed that learning, in contrast with these other ways of acquiring a concept, should be understood as a rational process in which hypotheses are tested. The problem, as Fodor saw it, is that hypothesis testing requires that one already have the concept one is attempting to learn. He points out that in so-called concept learning experiments, subjects are required to sort stimuli in accordance with a novel concept. But if the correct hypothesis is, for example, that the concept in question is the concept of something that is blue or square, then one would have to have prior possession the concept BLUE OR SQUARE – the concept that is supposed to be learned – in order to even be in a position to frame and test the hypothesis. In later work, Fodor refined his argument by allowing that learning in some sense can take place so long as the acquired concept is complex. Learning is understood to be a process in which a new concept is constructed from previously available constituents in the course of framing and testing a hypothesis (Fodor, 1981). The problem now, however, is that the evidence is supposed to suggest that lexical concepts aren't complex, that they are actually atomic or primitive concepts (*see* **Concepts**). Fodor concluded that lexical concepts can't be learned, and hence that they must be innate.

The logic of Fodor's argument has been endorsed by such prominent cognitive scientists as Ray Jackendoff and Steven Pinker, who have agreed that concept learning can only be a process where complex concepts are assembled from their constituents (Jackendoff, 1989; Levin and Pinker, 1991). Where they have disagreed with Fodor is about the evidence regarding conceptual structure, maintaining that lexical concepts do in fact have the structure that would allow them to be learned. In contrast, philosophers have often simply dismissed Fodor's argument on the grounds that his strong form of nativism is inconsistent with evolution (Putnam, 1988). They point out that natural selection couldn't have given us an innate conceptual system that incorporates concepts of no utility to our ancestors (e.g., PROTON and SAXOPHONE).

Both of these reactions are unsatisfactory. The appeal to evolution barely addresses Fodor's argument. Simply dismissing his conclusion tells us nothing about where the argument goes wrong and gives us no insight whatsoever into how concepts can be learned. The strategy of localizing the disagreement to one about conceptual structure is certainly better. But it still embraces Fodor's fundamental assumption that there is no way of expanding the combinatorial expressive power of the conceptual system.

Another approach to Fodor's argument embraces the challenge of showing how a primitive concept can be learned (Margolis, 1998; Laurence and Margolis, 2002). The way to do this is to frame the issue of learning side by side with a theory of content that is suitable for primitive concepts, e.g., a causal theory of content. Roughly, on a causal theory of content, a concept's content is fixed by its standing in a nomic-causal relation with the property it expresses. These nomic relations aren't basic laws, so they must be supported by mechanisms that sustain the link between a concept and its corresponding property – sustaining mechanisms. Typical sustaining mechanisms involve inferential dispositions, but because of

the assumption of conceptual atomism, different people (and the same person at different times) can have different sustaining mechanisms for the same concept. What matters for the possession of a primitive concept is the property it is nomically connected to, not the mechanism that establishes the connection. The question of how a concept is acquired then becomes the question of how these sustaining mechanisms are established.

For natural kind concepts, one important type of sustaining mechanism may combine an appreciation of the typical appearance of a kind with a general disposition towards psychological essentialism (the view that instances of a natural kind have a common set of properties that bind them together and that account for the kind's appearance but are themselves not readily observable; see Gelman, 2003). If this is right, then acquiring a natural kind concept can be explained roughly as follows. Certain cues suggest that an object is an instance of natural kind; one is then disposed to keep track of its salient physical characteristics; and this information is organized around a new representation to interact with the general essentialist disposition. The result is a representation that is elicited by things with a similar appearance but that is withheld in those cases where the evidence suggests that the essential properties are missing.

It's natural to describe this whole process as one where a concept is learned, so it illustrates how a primitive concept **can** be learned. However, it doesn't follow that empiricism has been vindicated. Concept learning along these lines may depend upon innate cognitive mechanisms of considerable richness. For example, the model presupposes a disposition towards psychological essentialism and an ability to track natural kinds. These may very well be innate.

Moreover, nativist research has been flourishing in recent years with its focus on areas of cognition that are thought to be subserved by domain-specific systems. These are cases of distinct cognitive mechanisms that are differentiated in their developmental trajectory, that employ specialized computational operations, that draw upon a distinctive body of information, and that may be associated with specialized neural circuits. Some suggestions along these lines are a domain for reasoning about minds, a domain for reasoning about physical objects, a domain for reasoning about biological phenomena, and a domain for reasoning about social exchanges (Hirschfeld and Gelman, 1994; Carruthers *et al.*, 2005). Connected with these domains are strong candidates for innate concepts, including BELIEF, PHYSICAL OBJECT, ANIMAL, and CHEATER.

See also: Causal Theories of Reference and Meaning; Cognitive Science and Philosophy of Language; Concepts; Definitions: Uses and Varieties; Empiricism; Externalism about Content; Innate Knowledge; Mentalese; Natural Kind Terms; Representation in Language and Mind.

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Innate Knowledge

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Debates over the existence and nature of innate knowledge have a long and complex history, in both philosophy and psychology in general and in language and linguistics in particular (see, e.g., Stich, 1975). As one might expect, such debates have produced many distinct and competing notions of innate knowledge and have also resulted in much disagreement over the existence of either necessary or contingent connections between any particular proposals (see, e.g., Griffiths, 2002). However, there are two senses of innate knowledge that consistently dominate both classical and contemporary work. First, that some set of 'ideas' or 'justified true beliefs' are present at birth, and, second, that there exists some set of domain-specific psychological mechanisms, capacities, faculties, or representations which are in some to-be-specified way biologically or genetically pre-determined.

Defense of innate knowledge in the first sense arguably began with Plato, who claimed that as we can be shown to possess 'genuine knowledge' for which experience is insufficient, then such knowledge must ultimately be something 'recollected' from what we already know. Philosophers of the Enlightenment also considered in detail the question of what kinds of knowledge may be innate, and in so doing questioned what the very notion of innate might mean. In direct contrast to Plato, John Locke (1690) argued that there are, in fact, "no innate principles in the mind" because, among other things, no useful meaning can be given to the notion of innate. Locke argued that if there were any innate principles, then either these principles must be present in our minds from birth, or there must be some 'mark' by which we can distinguish in adult minds those principles which are innate from those acquired by experience. But, Locke claimed, any supposedly innate principles are clearly not present in the minds of infants and 'idiots,' nor can the required marks be found. Thus, Locke concluded, no useful meaning can be given to the notion of innate in the context of explanations of the origins and development of human knowledge.

Note, however, that Locke's arguments here speak only to an understanding of innate knowledge in the first sense given above. Thus even if such arguments are correct, it remains entirely possible that there exists innate knowledge in the second specified sense. Moreover, there are now sound theoretical and empirical reasons to believe that innate knowledge in this second sense does actually exist (see Carruthers *et al.*, 2005, for a more detailed discussion of what follows).

Physiological traits such as teeth or pubic hair can be usefully understood as innate in this second sense, and there seems no reason to think that some psychological traits could not be similarly so understood. Furthermore, since the middle of the 20th century, results from research in linguistics and other areas of cognitive science, inspired by the pioneering work of Noam Chomsky (1965, 1967) appear to show that there exist various specific psychological traits which necessarily cannot be acquired via individual experience – as well as other traits which perhaps could be so acquired but which demonstrably are not. Thus there do indeed appear to exist some psychological traits that bear a 'mark' that distinguishes them from those that are experientially acquired. So much so, in fact, that for many core cognitive domains (e.g., language, naive physics, and number) virtually all contemporary researchers and theorists accept that there exists some degree of domain-specific innate knowledge – in the second sense – relevant to the domain in question. As Chomsky notes, all contemporary linguists agree that "the question is not whether innate structure is a prerequisite for learning, but rather what it is" (1980: 310), and it is with regard to the specific details of this innate structure that debate between linguistic nativists and non-nativists now occurs.

Evidence for an innate language faculty comes from a wide variety of theoretical and empirical sources, most of which are driven by what have been termed 'arguments from the poverty of the stimulus' (see, e.g., Chomsky, 1967, 1981; Laurence and Margolis, 2001; Pinker, 1994). These arguments claim to show, through a variety of different means, that the linguistic competence acquired by normally developing children cannot be – or demonstrably is not being – acquired using predominantly empiricist or general-purpose learning methods and mechanisms. Rather, nativists claim, these arguments show that there must exist a considerable amount of innate knowledge which enables children to bridge the 'gap' between the language-related input they receive, and their resultant linguistic abilities. Indeed, when one considers the way in which research in linguistics has proceeded in recent years, it rapidly becomes clear just how large this gap is, and thus just how much innate linguistic knowledge children must actually possess in order to bridge it. Contemporary linguists have discovered a huge number of subtle, but nonetheless fundamental, regularities in

our linguistic behavior and have put forward many different theories concerning the structure of language. Moreover, linguists have yet to comprehensively determine the grammar of even a single human language. This alone suggests that children's linguistic input is too impoverished to provide them with data sufficient to reach the one correct grammatical hypothesis, which they nonetheless reliably reach by the age of six years old.

In addition, there are theoretical decisions which the developing child needs to make – and reliably makes – but with which linguists have struggled for some considerable time. For example, are rules construction-specific or is sentence structure dictated by the interaction of a number of non-construction-specific rules? Are rules optional or mandatory? Do rules apply in a fixed order, or are they unordered? And so on. There is in fact a theoretically enormous range of grammatical hypotheses that the child could consider during language acquisition, but all normal children nonetheless always arrive at exactly the right hypothesis at approximately the same age. Moreover, all normal children also arrive at exactly the right hypothesis via pretty much the same route. If children were largely empiricist learners, one would expect that each child would try out a huge number of different grammars during language development, and also that the types of mistakes children would make would be highly variable. However, the sorts of errors children make are in fact highly circumscribed (Pinker, 1994; Crain and Pietroski, 2001). This (and much other) evidence therefore overwhelmingly supports the claim that there exists some degree of innate linguistic knowledge. The greater the amount and complexity of such innate knowledge one believes there is, the more nativist one is about our language abilities.

With regard to the actual content of our innate knowledge, many theorists (in linguistics and elsewhere) first draw a distinction between the information that cognition in any given domain requires, and the computational processes which operate on this information in that domain. More specifically, theorists often refer to representational modules and computational modules respectively (see, e.g., Fodor, 1983, 2000; Pinker, 1997; Samuels, 2000). The issue of what makes a cognitive capacity or faculty modular is complex and somewhat controversial (*see* **Modularity**), but to a first approximation, representational modules are domain-specific bodies of data (where this data is organized and integrated in the right kind of way), and computational modules are domain-specific processing devices. Thus, for instance, "a parser might be conceived of as a computational module that deploys the contents of a [representational] module devoted to linguistic information in order to generate syntactic and semantic representations of physical sentence forms" (Samuels, 2000: 19). Similar distinctions and consequent models can be generated in various other cognitive domains. Once these distinctions are made, however, it becomes clear that some components of either or both kinds of module could be innate in any given domain, and thus that specifying the details of our innate endowment will require considerable care. In addition, as our innate linguistic endowment will involve at least some extremely specialized representations and computations specific to human grammar, there is no reason to expect there to be any direct isomorphism between the details of our innate linguistic endowment and those of our innate endowment in other cognitive domains. Claims about the details of the innate knowledge appropriate to any given cognitive domain must therefore ultimately be made only in the light of the appropriate domain-specific investigation.

Furthermore, while it is clearly the case that not all language-specific representations or computational processes are innate (i.e., children clearly determine which representations and processes they should actually use on the basis of the input from their local environment), there is also no reason to believe that all the innate components required for language acquisition are language-specific. That is, successful language acquisition may also require the operation of innately specified but more domain-general processes, such as 'statistical samplers,' which can or do operate on any auditory or other input. However, the need for such domain-general processes does not detract from the claim that some innate language-specific components also exist. The linguistic capacities children acquire, and the routes by which these capacities are reached, admit of no other explanation.

This is not to say that linguistic nativists are all agreed on the details of our innate language-specific components. Mark Baker (2005), for example, points out that while it is clear that something like the Head Directionality Principle exists as part of our innate linguistic endowment, it is not yet clear whether this principle is innately specified as:

> 1. Combine a word with a phrase to make a larger phrase by putting the new word first *or* by putting the new word last.

Or as:

> 2. Form a new phrase by adding a word to a phrase.

More generally, there is still much disagreement between linguistic nativists over whether our innate

linguistic endowment is overspecified (as in 1) or underspecified (as in 2). Chomsky and many linguists who follow him currently argue broadly in favor of the former, whereas Steven Pinker, most 'functional' linguists, and most developmental psychologists argued broadly for the latter. Resolution of this debate will ultimately be an empirical matter, of course, but current theoretical arguments do not tell decisively either way. Nor is it clear how similar issues in other cognitive domains should either influence or be influenced by results from language acquisition. Thus despite the overwhelming nature of the theoretical arguments and empirical data outlined in the previous paragraphs in favor of linguistic (and other) nativism, there still exist some significant – though healthy – disagreements between even the most canonical nativists over exactly what the details of our innate endowment are. Nonetheless, such disagreements should not obscure the fact that, in the linguistic domain and elsewhere, our innate endowment is undeniably both rich and complex.

Finally, there is also the question of how our (neuro-)biology is able to implement or otherwise provide the innate knowledge which our linguistic and other cognitive abilities require. Given that aspects of our linguistic competence are not the product of our linguistic experience, it seems that these aspects must therefore be part of our biological endowment. This may strike one as somewhat counter-intuitive, but as Stephen Crain, Andrea Gualmini, and Paul Pietroski (2005) have recently argued "[o]ne cannot insist that our shared biology cannot give rise to knowledge of specific contingent linguistic facts if the available evidence suggests that our shared biology does just this." Moreover, it may turn out that the nature of these innate linguistic facts actually provides us with useful information about the manner in which human biology has evolved, given the evolutionary pressures and constraints which (proto-)language use will have imposed upon the primate lineage. Indeed, investigation into the interplay between our innate linguistic knowledge and the evolution of our species-typical biology, will undoubtedly be one of the more complex and fruitful areas for future research. The same is also likely to be true with regard our investigation into and our understanding of the innate knowledge involved in other cognitive domains.

In sum, then, in one important sense of 'innate knowledge' the existence of such knowledge in the context of linguistic and various other cognitive capacities is no longer in any serious doubt. However, much work is still required before our understanding of the specific nature of this knowledge will be complete.

See also: Chomsky, Noam (b. 1928); Cognitive Science: Overview; Concepts; Innate Ideas; Locke, John (1632–1704); Modularity; Plato and His Predecessors; Protolanguage.

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Kazuko Inoue, among the first generative grammarians and a leading figure in the field of Japanese syntax, was born on April 17, 1919, in Osaka, Japan. She graduated from *Tsuda Eigaku Juku* (present Tsuda College, Tokyo) (1939). During her years as an English teacher in Osaka (1951–1963), she obtained opportunities to study in the United States, at Mills College (1951–1952) and at the University of Michigan (1957–1958; 1960–1961), where she received an M.A. in English linguistics (1958) and a Ph.D. in linguistics (1964). In 1963, she joined the faculty of the International Christian University, Tokyo, first as Lecturer (1963–1965), and then as Assistant Professor (1965–1967), Associate Professor (1967–1971), and Professor (1971–1985). In 1985, Inoue moved to Tsuda College and in 1988 to Kanda University of International Studies, where she became President of the University (1990–1997). She was President of the Linguistic Society of Japan (1983–1985). She was a member of various government councils including those of the Japanese Ministry of Education, Science, and Culture and the Japanese National Commission for UNESCO. She was the leader of the Center of Excellence project (1996–2001) at Kanda University, a large-scale research base funded by the government for the development of linguistics. Inoue is currently Professor Emeritus at Kanda University and is a member of the Science Council of Japan (since 2000).

Inoue's significant contribution to the field of generative grammar lies in her work on Japanese syntax. She was among the first to apply generative theory to a language other than English, namely, Japanese, and thereby advanced a research frame seeking linguistic universals across language boundaries. Her work in the late 1960s and 1970s anticipated the further development of generative syntax, from its early form with English as the focus of attention to a new orientation with principles and parameters in the 1980s, where examination of data from a wide range of languages received theoretical grounding. The introduction of linguistics as a science to the Far East owes much to her vital work, both her original work and her translations of some of the highly influential books in the field.

Linguist and social developer Inoue, born Japanese and female in the early 20th century, is an inspiring role model for young scholars, regardless of their gender, but for female scholars in particular since she is among the few women who have been recognized for their contributions to the professional world.

See also: Generative Grammar; Japanese; Principles and Parameters Framework of Generative Grammar.

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Kazuko Inoue, among the first generative grammarians and a leading figure in the field of Japanese syntax, was born on April 17, 1919, in Osaka, Japan. She graduated from *Tsuda Eigaku Juku* (present Tsuda College, Tokyo) (1939). During her years as an English teacher in Osaka (1951–1963), she obtained opportunities to study in the United States, at Mills College (1951–1952) and at the University of Michigan (1957–1958; 1960–1961), where she received an M.A. in English linguistics (1958) and a Ph.D. in linguistics (1964). In 1963, she joined the faculty of the International Christian University, Tokyo, first as Lecturer (1963–1965), and then as Assistant Professor (1965–1967), Associate Professor (1967–1971), and Professor (1971–1985). In 1985, Inoue moved to Tsuda College and in 1988 to Kanda University of International Studies, where she became President of the University (1990–1997). She was President of the Linguistic Society of Japan (1983–1985). She was a member of various government councils including those of the Japanese Ministry of Education, Science, and Culture and the Japanese National Commission for UNESCO. She was the leader of the Center of Excellence project (1996–2001) at Kanda University, a large-scale research base funded by the government for the development of linguistics. Inoue is currently Professor Emeritus at Kanda University and is a member of the Science Council of Japan (since 2000).

Inoue's significant contribution to the field of generative grammar lies in her work on Japanese syntax. She was among the first to apply generative theory to a language other than English, namely, Japanese, and thereby advanced a research frame seeking linguistic universals across language boundaries. Her work in the late 1960s and 1970s anticipated the further development of generative syntax, from its early form with English as the focus of attention to a new orientation with principles and parameters in the 1980s, where examination of data from a wide range of languages received theoretical grounding. The introduction of linguistics as a science to the Far East owes much to her vital work, both her original work and her translations of some of the highly influential books in the field.

Linguist and social developer Inoue, born Japanese and female in the early 20th century, is an inspiring role model for young scholars, regardless of their gender, but for female scholars in particular since she is among the few women who have been recognized for their contributions to the professional world.

See also: Generative Grammar; Japanese; Principles and Parameters Framework of Generative Grammar.

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Insect Communication

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Communication in insects has little in common with the elaborate use of language in humans. However, mainly because insects provide such a rich source of independently evolved communication systems, this group can hardly be ignored when describing the basic principles – causes, mechanisms, and consequences – of communication in nature.

To capture the essence of communication, various definitions have been proposed (Wilson, 1975; Bradbury and Vehrencamp, 1998). Nearly all authors agree that communication involves the transfer of information by a sender to a receiver, and that the vehicle that carries the information is the signal. Another integral point of most definitions is that the perception of the signal, and thus the received information, changes the behavior of the receiver. Here, we follow Wilson (1975) and subsume as communication those cases of information transfer that (a) change the behavior of the receiver in some way, (b) are adaptive or useful to one or both participants, and (c) involve intent on the communicator's part. The latter criterion is important, so as to exclude signals accidentally transmitted to the detriment of the sender, for example tracks or the rustling of mice in hay, which predators can use as cues to locate their prey. Such involuntary transmission of information is distinguished from communication in that it does not involve signals (Bradbury and Vehrencamp, 1998).

Probably due to the sheer number of insect species – roughly every second animal species is an insect – insects have evolved almost every conceivable way of communicating (Greenfield, 2002). Nearly every part of the body, from antennae through head, legs, wings, and body to genitalia, is used in some species for signal production or perception. Here we describe some of the various examples insects provide to explain the basic principles of communication.

One possible way to characterize the stunning diversity of communication in insects is by the physical modality and the sensory channel that are used for signal transmission. Insects communicate with visual, chemical, vibratory, and acoustic signals. All these forms of communication have independently evolved in many different groups of insects. Acoustic communication, for example, has evolved on numerous occasions in moths (Conner, 1999), grasshoppers and their allies (Greenfield, 2002), and many other insect groups (Yager, 1999). The four different channels for communication provide different advantages and disadvantages for communication. For example, different signals travel at different speeds. Visual signals travel at the speed of light (3×10^8 m/s). Acoustic signals travel at the speed of sound (in air 340 m/s). The spread of vibratory signals depends on the substrate and can be slower by about two and faster by about one order of magnitude compared to acoustic airborne signals. Finally, chemical signals propagate via diffusion or can be carried along with the wind (a few centimeters or meters per second). Because chemical signals are often by-products of metabolism, they can be comparatively cheap to produce. Depending on their physiochemical properties, they can have a long range, but they are often difficult to locate, they cannot transfer much information, and it takes time to switch them off. Visual signals can be switched on and off quickly, and in the absence of obstacles they have a medium range, but they are conspicuous for visually hunting predators. Vibratory signals have a very limited range but can transfer information to nearby receivers in a way that limits eavesdropping by predators. Acoustic communication, finally, has an intermediate to long range and also allows information to be transferred with signals that can quickly be altered. Most importantly, acoustic signals have the advantage that they can move around obstacles so that insects can communicate acoustically in dense vegetation, e.g., in meadows or forests. But producing them is often costly in terms of energy and eavesdropping by acoustically orienting predators can be a problem.

For several reasons, we concentrate our article on acoustic communication in insects as this signaling modality will be of most immediate relevance for those interested in language and linguistics. In addition, the general patterns of communication in insects can be well illustrated by examples of acoustic communication. And, due to space limitations, the article would lose more in depth compared to what it could gain in breadth when dealing with all signal modalities. The following section describes how acoustic signals are produced by the senders and detected by the receivers. A section thereafter then deals with the reasons why insects communicate, i.e., what benefits can accrue from communicating acoustically. In both sections, only a very small proportion of the huge number of sensory organs, sound-producing organs, and benefits of acoustic signaling can be mentioned. We have structured the second section around the advantages insects can gain from acoustic communication according to the receivers of the signals: potential predators, competitors, and mates. Theoretically,

signals could also be directed toward potential prey, but we are not aware of any acoustic signal that is used for this purpose. Visual signals, however, are occasionally used in this context: some firefly females (Lampyridae) attract their prey, heterospecific males, by mimicking prey-specific sexual signals, whereas some species of praying mantis (Mantidae) mimic flowers to attract their prey.

How Insects Produce and Detect Sound

Acoustic communication implies the ability to generate and detect sound. Insects have been remarkably innovative in this respect, with different insects having transformed different parts of their body into sound generators and detectors. The design of these generators and detectors, in turn, displays an almost bewildering diversity, representing multiple evolutionary solutions to how sounds can be detected and produced. This structural diversity is well reflected by the concert of distinct, mostly species-specific sounds insects are able to produce, which cover a frequency range of about 10 octaves and include barely audible hums as well as acoustic impacts louder than the noise of a concrete drill.

Sound can be generated when a vibrating structure sets the particles that make up the air into vibration, i.e., converts mechanical energy into acoustic. Specifically, the vibrations of the structure cause alternating compressions and rarefactions of the air, which propagate away from the vibrating structure at the speed of sound. This propagation is brought about by oscillations of air particles, which move back and forth from regions of high pressure to regions of low pressure, thereby turning low-pressure regions into high-pressure ones and vice versa. The two components, pressure and particle velocity, both contribute to the intensity of sound.

Flying insects inevitably generate sound by the movements of their wings. Though a mere by-product of locomotion, the faint, continuous sound produced by the wing-stroke is exploited by the males of some insects (e.g., mosquitoes, chironomid midges), which use it as an acoustic cue to detect and localize their females during flight (for a review, see Clements, 1999). Some insects additionally shake their wings to produce acoustic signals on purpose. Males of the fruit fly *Drosophila melanogaster* and some related drosophilid and tephritid flies generate courtship songs by fanning one of their wings while sitting on the ground (for a review, see Bennet-Clark and Ewing, 1977). With the wing-beat being decoupled from the requirements for flight, the sound can now be structured by moving the wings in specific temporal patterns, which allows the production of highly specific songs. This possibility has been exploited by the males of a number of drosophilid species, which produce courtship songs by rhythmically flipping their wings at distinct, species-specific intervals (Bennet-Clark and Ewing, 1977).

The sounds produced by moving the wings are usually restricted to frequencies below approximately 1 kHz, which is about the maximum rate at which the flight muscles drive the wing. A clever trick to overcome this frequency limitation is found in wax moths, which manage to produce high-pitched, ultrasonic sounds by moving their wings. The trick they employ resides in a tymbal mechanism. The moths have simply coupled their wing-bases to convex cuticular blisters (the tymbals) that buckle in and out like beer cans as soon as the wing is moved. Each buckling leads to a brief ultrasonic pulse of roughly 0.1 ms duration and very high sound frequencies of approximately 75–130 kHz (reviewed by Spangler, 1988). Hence, in wax moths, the activity of muscles no longer dictates the frequency of the sound, yet this mechanism still imposes a lower limit on the rate at which the sound pulses can be produced. Other insects have overcome the rate limitation imposed by muscular contractions. Much like wax moths, cicadas produce their prominent sounds by means of tymbals, yet their tymbals make use of an additional trick. In cicadas, the tymbals are not coupled to the wings but located laterally on the abdomen and are activated by abdominal muscles. Each tymbal comprises a series of ribs that buckle sequentially as the muscle contracts. The result is a fast burst of several sound pulses, with the intervals between the pulses of a burst no longer depending on the speed at which the muscles contract (for a detailed description of cicada sound production, see Young and Bennet-Clark, 1995).

An alternative, widespread method of producing fast sound bursts at various frequencies is stridulation. Here, structural vibration – and, hence, sound – is generated by rhythmically rubbing two body parts against each other, be it the two forewings (e.g., crickets, katydids), a leg and a wing (e.g., most grasshoppers, some noctuid moths), a leg or wing and the abdomen (e.g., certain grasshopper species), or scales on the genitalia and the abdomen (some sphingid moths) (for reviews, see Scoble, 1995; Ewing, 1989; Gerhard and Huber, 2002). Usually, one of the body parts involved in stridulation bears a sharp-edged cuticular scraper, whereas the cuticle of the other is toothed like a file. As the scraper moves across the file, the respective body appendages are set into vibration, resulting in the emission of sound. The courtship songs of grasshoppers well illustrate the complexity of the songs that can be produced that way (Helversen and Helversen, 1994). In these

insects, the hind leg bears a row of pegs (the file) that is rubbed along a protruding vein (the scraper) of the fore wing. Each time the scraper strikes a peg, a moderately damped acoustic impulse ensues. Subsequent impulses produced during one to-and-fro movement of the leg together form one syllable, with several syllables produced in series giving rise to a chirp. Grasshoppers repeat these chirps at stereotypic intervals, resulting in sequences that, reproduced at a regular rate, make up the complex songs these animals use to attract their mates.

The mechanisms insects employ to detect sound are about as complex as the ways by which their sounds are produced. Only things are – in principle – reversed: much as vibrating structures are used to generate sound, sound can be detected by measuring the vibrations of structures that move in response to sound. In effect, structures specialized to vibrate in response to sound and mechanosensory cells specialized to measure vibrations are the two principal components that make up an insect ear. The latter, the mechanosensory cells that mediate hearing in insects, are specialized neurons that are embedded into multicellular stretch receptors, known as chordotonal sensilla (for a review, see Field and Matheson, 1998). Spanning different regions of cuticle, these sensilla monitor relative movements of different body parts. Besides this proprioceptive function, a chordotonal sensillum can be employed for hearing if one of the cuticular regions it connects to vibrates sufficiently in response to sound to mechanically activate the sensillum. This sound receiver can take different shapes, depending on the parameter of sound to which it mechanically responds. Particle velocity receivers are light structures that directly follow the movements of the air particles in the sound field. Pressure receivers, in turn, are thin membranes that, spanning an air sac, are mechanically displaced by the pressure oscillations in the sound field.

Examples of particle velocity receivers are found in mosquitoes and drosophilid flies such as the fruit fly *Drosophila melanogaster*, which all rely on the particle velocity component to detect the faint, low-frequency sounds produced by the wing-stroke of conspecifics. In all these insects, hearing is mediated by the antennae, whereby the distal, third segment of each antenna constitutes the sound receiver. This receiver is proximally suspended by an antennal joint and, in addition, by the auditory chordotonal sensilla housed in the antenna's second segment, with the neurons comprised by the sensilla transducing the receiver's vibrations into electrical responses. Louder, high-pitched sounds as produced by tymbal mechanisms and stridulation are usually detected via ears endowed with pressure-receiving tympanal membranes (tympanal ears), which are formed by implementing tympanal membranes in various parts of the insect body, including the mouth parts (choerocampine hawkmoths), the neck (some parasitoid flies), the thorax or its appendages (e.g., noctuid moths, praying mantids, katydids, lacewings), and the abdomen (e.g., wax moths and other pyralids, geometrid moths, cicadas, grasshoppers, locusts, tiger beetles) (for reviews, see Scoble, 1995; Ewing, 1989; Yager, 1999; Gerhard and Huber, 2002). In most of these cases, the auditory chordotonal sensilla mechanically couple to the internal surface of the tympanum and are mechanically activated when the tympanum moves in response to sound.

While translating acoustic signals into electrical responses, hearing organs preprocess the information forwarded to the central nervous system. This preprocessing can involve highly sophisticated mechanisms such as the amplification of the ear's mechanical input by means of active movements of neurons, the amplification of directional cues by the acoustic or mechanical coupling of two ears, and the spectral analysis of incoming sound by mechanically channeling distinct frequency components to distinct populations of neurons, similar to what is known from vertebrate ears (e.g., Robert and Göpfert, 2002; Gerhard and Huber, 2002).

Why Insects Produce Sound

Acoustic communication can have different functions. One potential way to classify the bewildering variability of functions is to categorize them according to the receiver to which the produced sound is directed. Having in mind the three main problems an individual has to solve, (1) to survive, (2) to collect resources, and (3) to reproduce, the most important receivers are potential predators, competitors, and mates. The following paragraphs will describe some selected examples for each of these three groups.

For insects, as well as for other animals, communication with potential predators can increase the sender's chances of survival. Concerning the production of acoustic signals there is a clear parallel to visual signals that decrease predation risk. In some insects, acoustic signals are produced to show that the sender is unpalatable, the acoustic version of the visual combination of red and black, or black and yellow stripes. Such acoustic mimicry can be found in some tiger moths (Arctiidae), which signal their unpalatability with acoustic signals directed to hunting bats. However, detection of predators usually causes a cessation of sound production, a function similar to camouflage, which is widespread in insects. Other sounds

that are probably also directed towards predators are disturbance sounds, which various insects emit when grabbed by a predator or molested by an entomologist. These sounds, which include hissing, buzzing, or creaking, are not well examined, but may mimic snakes, bees, wasps, or the sounds that occur when a predator such as a bird bites on a twig. In all these cases, the insects have a chance to survive the initial attack if the predator is frightened or no longer interested in the seemingly unrewarding object. Even in those cases where signals are not directed towards predators, predators can have a large influence on the evolution of signals. Especially where predators or parasites can use acoustic signals to locate prey, some characteristics of the produced signals might be selected to decrease prey detection or location by the predators. In various groups of insects alterations in signal traits, or the evolutionary loss of signal production, have been attributed to selection by predators in line with these arguments (Greenfield, 2002). Notably, another crucial role for predators in the evolution of acoustic communication is certainly that selection by predators has been the most important driving force behind the evolution of ears. Since the evolution of acoustic signaling is unlikely to occur without the previous existence of hearing organs, noninsect predators and especially echo-locating bats may have played an eminent initial role for the evolution of insect acoustic communication.

A second important aspect is communication with potential competitors. As birdsong probably serves two different functions – courtship towards females and demonstration of strength towards competitors – acoustic signals in insects are likely to serve a dual function as well. In many insect species where the signals are generated only by males, the males are not randomly distributed across the available space. Usually, their nearest neighborhood distance is larger than expected from random spacing, and males are more regularly spaced than females. Apparently, the signaling males avoid each other, thereby reducing interference between their signals. Interestingly, in some species there are males that stay close to other, signaling males, yet these males refrain from signaling themselves. Such satellite behavior is known for crickets, where the silent, satellite males are choosy, preferring to gather with other males that are especially attractive to females. However, satellite behavior and spacing are not the only possible outcomes of acoustic competition. Males might, for example, try to increase their attractiveness to females in the presence of competitors. Signaling rate and amplitude have been shown to increase in some insect species and other signaling traits might also be changed by the presence of potential competitors. Competition might also lead to temporal coordination of acoustic signaling (Greenfield, 1994). In some species such coordination leads to alternation of acoustic signals so that males signal within the pauses of their competitors' signals. In other species, males synchronize their acoustic signals, potentially to avoid a degradation of the species-specific temporal pattern. Or, synchronization may occur because each male attempts to signal first. Such male behavior is likely to be advantageous, because in many species females prefer the leading signal when choosing between the synchronized signals of different males (Greenfield, 2002). Insect males that come into close contact often produce rivalry songs. These rivalry songs often have similarities to courtship signals but are usually easily distinguished from them. These similarities probably reflect the evolutionary origin of rivalry signals from courtship signals. The function of these rivalry songs might be to communicate the sender's sex to the competitor to avoid sexual harassment or they might function as an honest threat signal, analogous to roaring in red deer.

The third and most intensely studied aspect of acoustic communication in insects is communication with potential mates. Generally, males produce the majority of signals in all these communication systems. The underlying cause of this asymmetry between the sexes is the differential investment of males and females in their offspring. Female reproductive success is mainly limited by egg number and thus the amount of resources females can invest. Male reproductive success, in turn, is mainly limited by the number of mates a male can gain. Due to this difference between the sexes, selection on males to attain a larger number of matings is comparatively strong. For this reason, males signal to attract females, court them, and in some cases even consistently harass them. Due to sexually active males, females need not invest much in finding mates, and can optimize mate choice. In response to male acoustic signaling, responsive females of many species approach the males phonotactically. In several groups, females have evolved acoustic response signaling. This behavior probably has the advantage that in these cases the males have to accomplish the potentially dangerous phonotaxis.

Potential information contents of male acoustic signals include the male's position, his species identity, and his quality as a mate. For a male it is important to provide reliable information about his position, otherwise female phonotaxis might be impeded. However, predators or parasites might also cue in on acoustic signals, hence a compromise between those two pressures should be expected in nature. Since males cannot benefit from matings with heterospecific

females, males should also be selected to produce species-specific songs. This selection pressure, together with female avoidance of hybridization, probably explains why acoustic courtship signals can often be used for species identification. As a result of female mate choice among conspecific males based on information on male quality contained in their acoustic signals, there is also selection on males to signal their quality honestly. Due to intense competition between males, sexual selection can be strong and lead to the comparatively fast evolution of elaborate acoustic ornaments equivalent to such complex visual ornaments as the peacock's tail.

The final question to be tackled in this article is why females can benefit from intraspecific mate choice based on the males' acoustic signals. As explained above, females usually cannot increase their reproductive success by mating with a larger number of males. However, they can potentially gain from mate selection if mates differ in their effects on female reproductive success. Such potential effects are generally classified into two categories, direct and indirect benefits. Direct benefits are those that allow the female to produce more or better-nourished offspring, and indirect benefits are ones that are due to differences in the genetic quality of the offspring. Theoretically, females can gain direct benefits, for example, if they prefer males that provide nutritious nuptial gifts, or males with a lower risk of transferring diseases during copulation, or males that enable females to minimize risk and energetic costs during phonotaxis by calling with signals that facilitate their location by the females. Indirect benefits can be due to heritable differences in male genetic quality, concerning either attractiveness or viability, or due to genetic compatibility with the female. However, there is an alternative to these explanations, which assume that the benefit of sexual selection accrues as an effect of female choice. Female preferences could in principle be due to pleiotropic effects (not selected side effects) that reflect the effects of other selection pressures that have shaped the nervous and sensory system.

In conclusion, signals in acoustic communication can serve various tasks. Often single types of signal or individual traits of signals are likely to be influenced by antagonistic selection pressures. Signals should for example be easy to locate for females but as difficult as possible to locate for predators and parasites. Likewise, signals should easily be recognized as species specific, and thus close to the species-average signal, but should be outstanding when intraspecific female choice is considered. Probably due in part to these antagonistic selection pressures and the strong sexual selection that acts on the males' acoustic courtship signals, variation in acoustic signals between species is enormous. Like the similarly variable morphological structures used in courtship and copulation, the acoustic signals are assumed to have evolved comparatively rapidly and can often be used as traits to distinguish closely related species.

See also: Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Signal Detection; Bee Dance; Birdsong; Categorical Perception in Animals; Development of Communication in Animals; Frog and Toad Communication.

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Inspiration and Revelation

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Recently, there has been widespread disagreement among Christian theologians about where revelation is to be found; this variance has led to further disagreement about the nature of revelation. Thus theologians who believe that revelation is located primarily, if not exclusively, in scripture tend to have a propositional view of the nature of revelation, whereas theologians who believe that revelation is located primarily in divine activity in the world tend to have an event-oriented view of revelation. These disagreements have led many theologians to question the usefulness of the concepts of revelation and inspiration. Any useful account must therefore acknowledge the difficulties, and, if possible, provide a way to overcome at least some of them.

The Concept of Revelation in Everyday Discourse

Given that revelation and inspiration are heavily contested concepts in theology, it will be helpful to consider how the concept of revelation is used in everyday or ordinary discourse. A consideration of how revelation is used in everyday or ordinary discourse is important for two reasons. First and foremost, the ability to locate divine revelation depends on a prior understanding of what it is that constitutes revelation. This prior understanding derives directly from the usage of the term in everyday discourse. Thus a consideration of how the term is used in everyday discourse will shed light on how it can and should function in theological discourse. Second, a consideration of how revelation functions in everyday discourse will provide rich suggestions for resolving the disagreements that plague appeals to revelation and inspiration in theology.

In everyday discourse, the concept of revelation is closely tied to the activity of revealing. By definition, the content of a revelation is something that is disclosed by one person to another. Thus, a revelation is not like a rock or tree or some other aspect of the world that persons normally encounter without the help of others. Rather, as one scholar puts it, "In everyday language the main location of discourse about revelation is in the arena of interpersonal relations" (Abraham, 1982: 10). Otherwise put, the content of a revelation is primarily, though not exclusively, given by persons to other persons. It follows the schema, *m* reveals *a* to *n*. It will help, then, to pay attention to three aspects of the verbal form of the concept, i.e., *to reveal*.

The first thing to notice about the verb *to reveal* is that it is grammatically different from other verbs such as *to eat* and *to sleep*. Whereas *to eat* and *to sleep* are task verbs, *to reveal* is an achievement verb. Achievement verbs designate activities whose success depends entirely upon achieving certain goals. Task verbs designate activities often undertaken in an effort to bring about the goals designated by achievement verbs. In this respect, *to reveal* is more like *to educate* and *to heal* than it is *to lecture* and *to prescribe medication*. Consider the activities of educating and healing. Educators and physicians perform a variety of tasks in an effort to educate or to heal. However, educating and healing are achievements that are logically distinguishable from the many tasks that might be undertaken in an effort to achieve the desired goals in each case. Thus, an educator might give lectures, make assignments, grade and return papers and examinations, and so on, without achieving what she takes to be the goal of educating. Similarly, a doctor might prescribe medicine or exercise and not obtain the goal of healing. Educating and healing require the realization of goals in, through, and sometimes in spite of the tasks undertaken along the way. The same is true for revealing.

If revealing is an achievement verb, then it is safe to surmise that a variety of tasks might be undertaken in pursuit of the goals associated with revealing. Thus, George Mavrodes rightly revises the schema given above as follows: *m* reveals *a* to *n* by means of (through, etc.) *k*. In this schema, *k* signifies the tasks or activities by means of which or through which persons seek to reveal. Putting the matter this way shows up another grammatical difference between revealing and other activities such as sleeping or eating. Sleeping and eating, like whistling or singing,

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Recently, there has been widespread disagreement among Christian theologians about where revelation is to be found; this variance has led to further disagreement about the nature of revelation. Thus theologians who believe that revelation is located primarily, if not exclusively, in scripture tend to have a propositional view of the nature of revelation, whereas theologians who believe that revelation is located primarily in divine activity in the world tend to have an event-oriented view of revelation. These disagreements have led many theologians to question the usefulness of the concepts of revelation and inspiration. Any useful account must therefore acknowledge the difficulties, and, if possible, provide a way to overcome at least some of them.

The Concept of Revelation in Everyday Discourse

Given that revelation and inspiration are heavily contested concepts in theology, it will be helpful to consider how the concept of revelation is used in everyday or ordinary discourse. A consideration of how revelation is used in everyday or ordinary discourse is important for two reasons. First and foremost, the ability to locate divine revelation depends on a prior understanding of what it is that constitutes revelation. This prior understanding derives directly from the usage of the term in everyday discourse. Thus a consideration of how the term is used in everyday discourse will shed light on how it can and should function in theological discourse. Second, a consideration of how revelation functions in everyday discourse will provide rich suggestions for resolving the disagreements that plague appeals to revelation and inspiration in theology.

In everyday discourse, the concept of revelation is closely tied to the activity of revealing. By definition, the content of a revelation is something that is disclosed by one person to another. Thus, a revelation is not like a rock or tree or some other aspect of the world that persons normally encounter without the help of others. Rather, as one scholar puts it, "In everyday language the main location of discourse about revelation is in the arena of interpersonal relations" (Abraham, 1982: 10). Otherwise put, the content of a revelation is primarily, though not exclusively, given by persons to other persons. It follows the schema, *m* reveals *a* to *n*. It will help, then, to pay attention to three aspects of the verbal form of the concept, i.e., *to reveal*.

The first thing to notice about the verb *to reveal* is that it is grammatically different from other verbs such as *to eat* and *to sleep*. Whereas *to eat* and *to sleep* are task verbs, *to reveal* is an achievement verb. Achievement verbs designate activities whose success depends entirely upon achieving certain goals. Task verbs designate activities often undertaken in an effort to bring about the goals designated by achievement verbs. In this respect, *to reveal* is more like *to educate* and *to heal* than it is *to lecture* and *to prescribe medication*. Consider the activities of educating and healing. Educators and physicians perform a variety of tasks in an effort to educate or to heal. However, educating and healing are achievements that are logically distinguishable from the many tasks that might be undertaken in an effort to achieve the desired goals in each case. Thus, an educator might give lectures, make assignments, grade and return papers and examinations, and so on, without achieving what she takes to be the goal of educating. Similarly, a doctor might prescribe medicine or exercise and not obtain the goal of healing. Educating and healing require the realization of goals in, through, and sometimes in spite of the tasks undertaken along the way. The same is true for revealing.

If revealing is an achievement verb, then it is safe to surmise that a variety of tasks might be undertaken in pursuit of the goals associated with revealing. Thus, George Mavrodes rightly revises the schema given above as follows: *m* reveals *a* to *n* by means of (through, etc.) *k*. In this schema, *k* signifies the tasks or activities by means of which or through which persons seek to reveal. Putting the matter this way shows up another grammatical difference between revealing and other activities such as sleeping or eating. Sleeping and eating, like whistling or singing,

are activities that are often, in a manner of speaking, complete in themselves. It is entirely acceptable simply to speak of persons sleeping and eating. It is not necessary to say anything else in order to have a sense of completeness about such activities. Persons eat and sleep, whistle and sing. They do not simply reveal. It makes perfect sense to say, *Sarah sleeps* or *Sarah eats*. On the contrary, *Sarah reveals* is a grammatically incomplete proposition. Grammatically speaking, *Sarah reveals* requires an object if it is to be coherent.

When undertaken in the context of interpersonal relations, revealing is generally, but not always, a reflexive activity. Otherwise put, in the context of interpersonal relations, persons generally reveal themselves to others. To be sure, persons might reveal the location, say, of a secret treasure, but more often than not, persons reveal things about themselves. Thus *Sarah reveals* ***herself*** is a perfectly intelligible proposition. It is quite normal for persons to reveal to one another their desires, wishes, ambitions, thoughts, fears, pasts, and so on. Moreover, persons reveal such things about themselves through a variety of tasks, including speaking, writing letters, as well as nonlinguistic actions. Indeed, the common expression, 'actions speak louder than words,' points to the revelatory nature of nonlinguistic actions. In each case, however, the tasks of writing letters or speaking are distinguishable from the activity of revealing. As a reflexive activity, revealing takes place in and through writing, speaking, or nonlinguistic activities only if persons succeed in making something known about themselves through these activities. The crucial thing to see, however, is that revealing as a reflexive activity is not tied to any one task that persons might undertake in an effort to reveal themselves. On the contrary, persons reveal themselves through a variety of tasks. Indeed, the achievement of revelation, like the achievement of education or of healing, will often depend on the performing of a whole range of tasks.

At this stage, it is possible to give a descriptive account of Mavrodes' schema as follows. Revealing as a reflexive activity is achieved when, through the performing of an entire range of tasks, persons succeed in making themselves known to others. However, one final similarity between revealing and other achievement verbs needs to be noted. Like educating or healing, revealing as a reflexive activity is constituted by varying degrees of success. Thus, persons rarely, if ever, succeed in revealing everything there is to know about their selves. For that matter, even when the goal is to reveal only one aspect about a person's self, say, an ambition or a desire, persons often find it difficult to do so successfully. Even when they are exceedingly careful in their choice of words or in their nonlinguistic activities, persons are often surprised to learn that others understood them in a markedly different way than they intended themselves to be understood. To correct such misunderstandings, persons often find that it is necessary to reveal more about themselves. Success in revelation often depends on how much else is known about the person attempting to reveal her (or his) self.

Revelation and Inspiration in Theological Discourse

The history of the concepts of revelation and inspiration in theological discourse are closely intertwined. Three major developments in this history are especially important. The first development concerns the distinction between what is sometimes referred to as general revelation on the one hand, and special revelation on the other. It is common to associate the emergence of this distinction with the late medieval Catholic theologian Thomas Aquinas, although the distinction certainly shows up in the works of theologians who pre-date Aquinas. On this distinction, human persons can purportedly know some things about God, e.g., that God exists, that God is eternal and the like, simply by observing the creation or by attending to moral conscience. However, because there are many things concerning God that human persons cannot know by observation of the natural order, e.g., what God's intentions are towards human persons, there is also need for special revelation. For Aquinas, as for most Catholic theologians after him, special revelation takes place in the Incarnation, crucifixion and resurrection of Jesus Christ as disclosed in the scriptures and in church tradition.

The second major development worth noting takes place as a result of the Protestant Reformation. Unlike Aquinas and other Catholic theologians, Protestant theologians, following Martin Luther and John Calvin, have often restricted special revelation to scripture, eliminating as viable sources of divine revelation general revelation through creation or through moral conscience on the one hand, and special revelation in church tradition on the other. In an effort to secure scripture as the one reliable locus of divine revelation, many Protestant theologians developed and deployed theories of divine inspiration. On these theories, the scriptures could be relied upon as disclosing knowledge of God because God had inspired the authors of scripture. Consequently, theologians came to associate divine revelation almost exclusively with the inspired propositions set down in scripture.

The third major development in the history of the concepts of revelation and inspiration in Christian theology occurs in the mid-20th century. Beginning

as far back as the 17th century, the rise of modern biblical criticism caused many to call into question prevailing theories of divine revelation and inspiration. By the 20th century, the notion that divine revelation was located primarily, if not exclusively in scripture, was largely discredited. To be sure, some theologians defended the notion of propositional revelation vociferously, but the vast majority of theologians either gave up on divine revelation and inspiration altogether, or they began to theorize about other, nonpropositional forms of revelation. Two leading nonpropositional theories about the loci of divine revelation quickly emerged. One group of theologians, following the 19th century German theologian Friedrich Schleiermacher, sought to relocate divine revelation in experience. Another group of theologians emphasized what came to be known as 'the mighty acts of God in history' as the primary, if not exclusive, locus of divine revelation. Thus, by the mid-20th century, divine revelation was said to occur either in and through experience or in and through historical events, but not in and through the propositions given in scripture.

Revelation and the Word of God: A Way Forward

As an achievement verb, revelation cannot be strictly identified with any one task by means of which persons strive to reveal themselves. Indeed, like educating and healing, revealing is an activity accomplished through an entire range of tasks, including both verbal and nonverbal activities. Persons reveal themselves through their words *and* their actions. Consequently, it is difficult to see why accounts of divine revelation should limit themselves to one divine activity designed to achieve revelation. Put simply, it is conceptually odd to think that God only reveals God's self by inspiring prophets to set down propositions about God in scripture, or that God only reveals God's self through experience or through mighty acts performed in human history. It is theologically more productive, not to mention more conceptually compelling, to allow to God the same range of tasks or activities for revealing God's self that we normally allow to human persons. Otherwise put, useful accounts of divine revelation cannot exclude the tasks undertaken by God to reveal God's self in and through creation and the moral law within, in and through the inspiring of prophets and apostles, in and through the activities of God in human history and in human experience, and ultimately in and through the Incarnation of the Word of God. Going forward, what is needed is an account of divine revelation that refuses to limit divine revelatory activity to any one locus, taking seriously the manifold ways that God has sought to make God's self known to human persons.

See also: Bible; Testimony.

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Institutional Talk

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Institutional talk has been analyzed extensively by conversational analysts. Drew and Heritage (1992: 3–4) define it in the following way: "the institutionality of an interaction is not determined by its setting. Rather, interaction is institutional insofar as participants' institutional or professional identities are somehow made relevant to the work activities in which they are engaged." By disembedding talk from its institutional setting, this view misses the real point about institutional language: the fact that it is situated (Gumperz, 1982) (*see* **Context Principle; Context, Communicative**).

Institutional talk is embedded in power relations, and in order to understand what is really at stake, these relations have to be made explicit. Fairclough (1989) draws attention to the different meanings of the term 'power.' We can think of physical power, as

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of one person over another. However, institutional power is usually enacted by consent. Power can be seen as both a product and a process by which the members of an institution organize their activities. For Foucault (1980: 98), power is exercised through a "net-like organisation," in which individuals are participants both as its "consenting target" and as the "elements of its articulation." This means that the subaltern positions in an institution (for example, patients in hospitals) contribute in certain ways to unequal power relations, by accepting as the natural order of things that doctors in "standard medical interviews" should have interactional control over the distribution of turns at talking, the selection and change of topics, and what kind of questions are answered (Fairclough, 1992: 138–139) (*see* **Power and Pragmatics; Discourse, Foucauldian Approach**).

As Mey notes, "the case of the medical interview is an outstanding instance of the institutionalized discourses in which the value of the individual's linguistic expression is measured strictly by the place he or she has in the institution. Only utterances which meet the criteria of the official discourse are allowed . . ." (Mey, 2001: 301).

Institutional talk is often gendered (Graddol and Swann, 1989). In the following example in my study of doctor–patient communication in Brazil, a doctor manipulates a woman into breastfeeding her baby, against her argument that she has to go to work (Table 1) (Magalhães, 2000: 159–163).

The doctor's male authority is manifested in an absolute interactional control, in terms of the topic and the turns at talking. In terms of the topic, he controls entirely what is talked about, commanding the mother, with verbal and nonverbal arguments (for example, by hitting his desk), to go back to breastfeeding.

The doctor furthermore controls turn-taking by overlapping speech, as when the woman notes that when she breastfeeds, the baby is still hungry. Overall in this example, we see how institutional talk is embedded in power relations by means of the interactional control exercised by those in power (*see also* **Gender and Language**).

Table 1 Example of institutional talk in doctor–communication

Summary of the woman's arguments	*Summary of the doctor's arguments*
She has to go to work. Work demands involvement, making it difficult to go on breastfeeding. She is weak, and her milk does not feed the baby properly. So the baby is hungry	Breastfeeding must be applied in all cases. The doctor does not discuss the woman's particular case. In fact, he does not even explain why the baby has to be breastfed. He counters her argument that her milk does not feed the baby properly by saying that it does

See also: Context, Communicative; Context Principle; Discourse, Foucauldian Approach; Gender and Language; Power and Pragmatics.

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Integrational Linguistics (IL)

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Integrational Linguistics (IL), developed by the German linguist Hans-Heinrich Lieb and others since the late 1960s, is a general, non-generative approach to linguistics that aims at providing a comprehensive theoretical framework for the description of arbitrary languages. The name 'Integrational Linguistics' has been used in publications since 1977, antedating the use of the same name for an entirely unrelated approach originating from the work of Roy Harris.

Over the past three decades, IL has developed (i) a general theory of language (Integrational Theory of Language) that covers both the systematic features of language systems and the phenomenon of language

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Over the past three decades, IL has developed (i) a general theory of language (Integrational Theory of Language) that covers both the systematic features of language systems and the phenomenon of language

variability in a unified way, and (ii) a theory of grammars (Integrational Theory of Grammars), understood as part of a theory of linguistic descriptions. The separation of a theory of language from a theory of grammars is a major feature of IL by which it differs from approaches with a generative orientation.

After an initial emphasis on the Integrational Theory of Grammars, work in IL has been characterized by a steady and continuous refinement of the Integrational Theory of Language based on empirical data from typologically diverse languages, avoiding basic revisions as they occurred in Chomskyan Generative Grammar.

General Features

The term 'integrational' is motivated by the following 'integrative' features of the approach as a whole:

1. Linguistics is construed as a well-defined discipline in its own right but is also placed within a wider system of interrelated disciplines. Contrary to the conceptions proposed by Noam Chomsky, which reduced linguistics first to psychology and later to biology, IL adopts a non-reductionist stance: such disciplines as biology, psychology, sociology, and anthropology are conceived as neighboring disciplines of linguistics, disciplines that each share a branch with linguistics (biolinguistics, psycholinguistics, sociolinguistics, etc.); and linguistics itself is construed as a branch of (human) semiotics.
2. A broad view of linguistic subject matter is taken: linguistics deals with all aspects of natural languages that are directly or indirectly relevant to their use. This includes not only systematic aspects of languages, i.e., aspects related to structural properties of 'linguistic systems' in a traditional sense, but also the internal variability of languages; the relationship between languages and the structure of the societies in which they are used; the relationship between communication in a language and actions by, or psychological processes in, a speaker; the neurophysiological and psychological foundations for learning and mastering a language; and aspects of the development and decline of languages.
3. It is assumed that each major aspect of natural languages (the morphological, the syntactic, the semantic, etc.) must be characterized in its own right, which includes showing its interrelations with other aspects. This is achieved in IL by developing separate but interrelated theories for each major aspect (Integrational Morphology, Integrational Syntax, etc.) that form coherent parts of a larger 'Integrational Theory of Language Systems' (see below).
4. A nonlinguistic theory (e.g., a psychological or sociological theory) may be integrated with a theory of language, and relevant parts of a general theory of language are, as a rule, integrated with each language description (itself a theory of one or more individual languages or language varieties): the language description is formulated 'in terms of' a theory of language, that is, it incorporates and employs terms, definitions, assumptions, and theorems from the underlying general theory. This idea of 'theory integration' is made precise in the Integrational Theory of Grammars.

IL is opposed to basic assumptions that characterize linguistic cognitivism in its 'non-intentionalist varieties:' the objects of linguistics are construed not as mental or neurophysiological mechanisms or corresponding 'representations,' but as natural languages conceived as abstract, extramental entities; a grammar of a language is an empirical theory (ideally, an empirical axiomatic theory) of that language, in a sense of 'theory' that requires sets of statements among the theory's components (see Lieb, 1974/1976). Hence, the traditional generative as well as the more recent cognitive conceptions of grammars as algorithms are rejected: from the very beginning, grammars were construed in IL not as algorithms but as 'declarative' theories (theories that make claims formulated as statements, and carefully keep apart a description from the entities described), a position that is currently being seriously considered also in other approaches. Natural languages are seen to arise from abstract, extramental objects (such as phonetic sounds). However, these objects are associated with concrete physical events (such as utterances of phonetic sound sequences) and are involved in the content of mental states or events that are connected with language use and knowledge. IL is thus compatible with a non-cognitivist, 'intentionalist' mentalism that may be proposed as typical of a 'New Structuralism.' (See Lieb, 1992a, 1992b for a more detailed discussion.)

Given these characteristics, the common but rather constrained distinction between 'formalist,' 'functionalist,' and 'cognitivist' schools of linguistics does not apply to IL, which exhibits features of all three kinds of approaches. Major advantages of IL may be seen in (i) the fact that it was developed in view of the full spectrum of linguistic diversity from the outset, (ii) its integration of all levels of linguistic description (from phonetics to sentence semantics) within a unified theoretical framework, (iii) its inclusion of both system-based and non-system-based properties of

languages, (iv) its development both of a theory of language and a theory of linguistic descriptions, and (v) the ontological explicitness and consistency of all its theories, making it a framework suitable for the description of individual languages as well as for contrastive linguistics, linguistic typology and universals research.

IL adopts a positive and constructive attitude toward Western linguistic tradition and regards itself as a part of this tradition. In syntax and morphology, the Integrational Theory of Language centers around a formally explicit, consistent, and vastly enriched version of theoretical conceptions underlying actual grammar writing since antiquity, embedding them in a broader scientific context that comprises linguistics and its neighboring disciplines; and the Integrational Theory of Grammars applies modern means to account for the intricacies of actual descriptive work.

Integrational Linguistics strives for logical soundness even in informal descriptions and makes extensive use of naive set theory in formulating its theories in order to achieve explicitness and clarity.

The Integrational Theory of Language

The Integrational Theory of Language contains two major subtheories: (i) the Integrational Theory of Linguistic Variability, which is 'conflated' with (ii) the Integrational Theory of Language Systems. One of the most distinctive features of the Integrational Theory of Language is its adherence to ontological explicitness and constructiveness: the ontological status of every linguistic entity postulated by the theory is clearly determined (explicitness), and every entity is a logical or set-theoretical construct ultimately related to a small number of sets of basic entities that include, in particular, objects and events in space-time (constructiveness).

The Integrational Theory of Linguistic Variability

From its inception, IL has regarded linguistic variability, i.e. the changeability of languages along dimensions such as time, geographical space, social stratification etc., as an essential property of natural languages that has to be treated in any realistic theory of language; certain idealizations, such as Chomsky's 'completely homogeneous speech-community,' are rejected.

The Integrational Theory of Linguistic Variability thus aims at providing a theoretical framework for variation research (including studies in sociolinguistics, dialectology, and historical linguistics) and a basis for a realistic theory of language systems. The theory centers around the notion of 'idiolect,' in a specific sense of the term that avoids traditional problems: an idiolect is a homogeneous part of an individual speaker's share of a language (a speaker's total share of a language, called a 'personal variety,' is not an idiolect in this sense but is a set of idiolects). Such an idiolect, understood as an individual (linguistic) means of communication of a person during a certain period of time, simultaneously belongs to a certain period of the language, to a certain dialect, sociolect, register, medial variety, etc. A natural language (understood as a historical language during the entire span of its existence, or a period – a major temporal part – of a historical language) is construed as a set of idiolects, and each variety of the language is a subset of the language. Sets of idiolects (such as languages and their varieties) are called 'communication complexes.' The varieties of a language are given through its 'variety structure': a classification system whose source is the language itself.

Ontologically, an idiolect is construed as a (possibly infinite) set of abstract sentences: form-meaning pairs consisting, in the case of a spoken rather than a written or signed idiolect, of a structured phonetic sound sequence and a meaning of this sequence. For each idiolect in a language, there is a system (idiolect system) that specifies which form-meaning pairs are elements of the idiolect. Every idiolect system consists of (technically: is an *n*-tuple whose components are) a phonetic, phonological, morphological, syntactic, lexico-semantic, and sentence-semantic part; and each part determines a different type of properties that the form-meaning pairs must have in order to belong to the idiolect. In written idiolect systems, the phonetic and phonological parts are replaced by a graphetic and a graphematic part, in signed idiolect systems by a cheremic and a cherematic part. (There may be other components in addition to the ones listed above; the precise structure of idiolect systems is a matter of ongoing research.) The parts of an idiolect system are grouped into the sound system (script system, chereme system), the morphosyntactic (or grammatical) subsystem, and the semantic subsystem of the idiolect system. (There is no pragmatic part or subsystem – 'pragmatic' properties of form-meaning pairs, as far as they are determined by the idiolect system itself, are covered by the semantic subsystem, or else indirectly by the idiolect's place in the variety structure.) Finally, a *system for* a language (or language variety) is a construct of properties shared by every *system of* every idiolect in the language (or language variety). Idiolects, varieties, languages, and their systems are all construed as extramental and abstract.

Systems of idiolects (idiolect systems) and systems for languages differ from each other both ontologically and in their relation to speakers' minds. Idiolect

systems are *n*-tuples (as specified above) whereas language systems are sets of properties of such *n*-tuples. Moreover, for every idiolect that is a means of communication for a given speaker, there must be a (psychological and physiological) internal basis in the speaker that corresponds to a system of this idiolect, but there is no such internal basis for entire language systems. From an IL point of view, distinguishing between language systems, idiolect systems, idiolects (themselves no systems), and speaker-internal bases for idiolects is a cornerstone for a realistic theory of natural languages and language use. (For a full representation of the Integrational Theory of Linguistic Variability and discussion of rival theories, see Lieb, 1993a; for the conceptions of languages and idiolects, see also Lieb, 1983a: part A.)

The Integrational Theory of Language Systems

The Integrational Theory of Linguistic Variability is conflated with the Integrational Theory of Language Systems. The latter is concerned mainly with (i) making general assumptions on the properties of idiolect systems in arbitrary languages and (ii) developing a conceptual framework, and corresponding terminology, for their description.

The well-known problems in defining a truly universal terminology (applicable in the description of arbitrary languages) in the face of linguistic diversity are tackled in IL by making a number of essential metatheoretic distinctions, implicit in linguistic tradition but typically blurred in modern approaches. Most importantly, a distinction is made between the *definition* of a term and the *identification* of corresponding linguistic entities in given idiolect systems. For example, terms such as 'phoneme,' 'suffix,' 'verb,' 'singular,' 'accusative,' etc. are construed not as categorial terms (denoting sets of linguistic entities) but as names of two-place relations ('is-a-phoneme-of,' 'is-a-suffix-of,' etc.) between linguistic entities and idiolect systems *S* (e.g., SLEEP is-a-verb-of S_E, SCHLAFEN is-a-verb-of S_G, where S_E and S_G are, respectively, an English and a German idiolect system: one and the same relation [is-a-]verb[-of] holds between SLEEP and S_E, SCHLAFEN and S_G, etc.). Names for categories of a given idiolect system are then derived from such relational terms: the expression 'verb-of-S_E' denotes the set of all verbs of S_E (a category), i.e., denotes the set of all linguistic entities that are related to idiolect system S_E by the relation [is-a-] verb[-of]. While the relational term 'verb' is defined in the Integrational Theory of Language Systems so as to allow for *arbitrary* idiolect systems, the corresponding categories (verb-in-S_E, verb-in-S_G, etc.) must be *identified* in a grammar for individual idiolect systems, and the identifying properties may vary greatly among the systems of idiolects in different languages or even within a single language. It is a task not of a general theory of language but of theories of individual languages or language varieties – e.g., of individual grammars – to formulate identifying properties for the entities (categories, etc.) postulated for the idiolect systems of a given language (or variety). (Consider, for instance, a language in whose idiolect systems *S* all infinitive forms of verbs – and only such forms – have a certain prefix, giving rise to an identifying property for the category infinitive-in-*S* in the idiolect systems of this language. Clearly, this criterion should not be used to define the term 'infinitive' in a general theory of language.) Given this distinction, a term like 'verb' may be *defined* by means of word- or sentence-semantic criteria; the syntactic nature of the corresponding categories in individual idiolect systems is still guaranteed by the fact that the categories can be *identified* by resort to the syntactic means of the idiolect systems (morphological marking, word order, intonation) and, possibly, properties of lexical meanings. Defining a term in a general theory of language does not, however, imply that there are corresponding entities in all idiolect systems (for instance, we can formulate a general definition of 'adjective' although there may be languages without adjectives).

The elements of a category in a given idiolect system may, and usually will, have additional relevant properties not needed for identifying the category. (In the above example, the infinitive forms may show certain tense distinctions.) Such properties must still be included in a *complete characterization* of the category. Finally, each entity proposed by a general theory of language or by a theory of an individual language, variety, or idiolect should also be *justified* by metatheoretic considerations. Consider, for example, the set of all adjective forms of a given English idiolect system whose sound sequences start with /bl/. Such a set should hardly be postulated as a syntactic category of this idiolect system, even though the set would easily be identified, and a corresponding term would easily be defined.

From an IL point of view, distinguishing between the definition of a term, the identification and characterization of a corresponding entity in an individual idiolect system, and the justification for postulating such an entity in a theory of a specific language, is a prerequisite both for formulating a general theory of language (one of the main goals of linguistics) and for successfully integrating theories of individual languages or language varieties with such a theory. Integrational Linguistics appears to be the only modern approach to explicitly adopt the fourfold distinction between definition, identification, characterization

and justification, implicit in Western linguistic tradition with its insistence on the *semantic* definition of many general terms used in identifying *syntactic* entities as described in individual grammars. (For a detailed discussion of the underlying metatheoretic principles, see, in particular, Budde, 2000: chapter 1; for an application in a general theory of parts of speech, using German for orientation, see Budde, 2000: chapters 2–10.)

Reflecting the basic structure of spoken idiolect systems (see above), the Integrational Theory of Language Systems comprises Integrational Phonology, Integrational Morpho-Syntax (with Integrational Morphology and Integrational Syntax), and Integrational Semantics (Integrational Lexical Semantics, including morpho-semantics and word semantics, and Integrational Sentence Semantics). For medial types of idiolect systems other than the spoken one, suitable subtheories – corresponding to Integrational Phonology – are provided for but have not yet been worked out in detail (Integrational Graphematics for written, Integrational Cherematics for signed idiolect systems).

The most detailed representation to date of the Integrational Theory of Language Systems as a whole (excluding Integrational Phonology) is found in Lieb (1983: parts B to F); for Integrational Syntax see also Lieb (1993b), for Integrational Semantics Lieb (1979; 1980; 1992c). Integrational Phonology (the last component of the theory to be developed) is presented in Lieb (1999; 2005a). Sackmann (2005b) is an introduction to Integrational Syntax and Morphology, including more recent developments, that contains numerous examples of analyses. For major applications of IL in linguistic description, see, for example, Richter (1988), Moltmann (1992), and Eisenberg (1998/1999), concentrating on German; Sackmann (2005a) for Mandarin Chinese; see also the contributions in Sackmann (ed.) (2005) and the book series *Studies in Integrational Linguistics* in general. The conception of (morphological and syntactic) paradigms, fundamental in IL, has recently been further elaborated in Lieb (2005b).

Integrational Phonology Integrational Phonology is a 'declarative' two-level phonology that postulates two distinct levels (or 'parts') in the sound system of any idiolect system, a less abstract phonetic and a more abstract phonological one. Phonetic and phonological sounds are both conceived as sets of auditory properties of speech-sound events, hence, as abstract real-world entities. (Speech-sound events are concrete entities, located in space-time.) Phonological sounds differ from phonetic ones by a higher degree of abstraction: While sounds on the phonetic level (i.e., part) of an idiolect system contain all properties that characterize normal utterances of entities of the idiolect system, phonological sounds contain only those properties that are functional in the idiolect system, that is, are relevant with respect to distinctions in the morphological, syntactic, or semantic parts of the system.

Phonological words and morphs (on the phonological level) as well as phonetic words (on the phonetic level) are construed as 'structured sound sequences,' that is, ordered pairs consisting of (1) a phonetic or phonological sound sequence (called the 'basis' of the morph or word) and (2) a phonetic or phonological structure of the sound sequence – itself a pair of (2a) a constituent structure and (2b) an intonation structure of the sound sequence. ('Sequence' is understood in the Integrational Theory of Language in a specific, set-theoretical sense that allows for the limiting cases of empty and one-member or 'unit sequences.') The constituent structure relates parts of the sound sequence to one of the sound categories Vocalic-in-*S*, Consonantal-in-*S*, and VocalicGroup-in-*S*, thereby determining a syllable sequence (possibly empty) for the sound sequence. The sound categories (simultaneously belonging to the phonetic and the phonological level) are uniformly construed as sets not of individual sounds but of sound *sequences* of the idiolect system, allowing a treatment of affricates and long consonants (elements of Consonantal-in-*S*), diphthongs and long vowels (elements of Vocalic-in-*S*) and the like alongside simple vowels and consonants. The intonation structure assigns sets of 'auditory values' (pitches, degrees of loudness, phonation modes etc.) to the syllables of a (syllabic) sound sequence identified by the constituent structure. Prosodic phenomena in both accent languages and tone languages are then treated in a unified way: differences of tone or stress are represented through sets of auditory values directly within a specific component of a phonological word, namely, the phonological intonation structure, which is properly linked to the (syntactic) intonation structures of syntactic units in which the phonological word occurs; and tone languages differ from accent languages mainly in the way phonological intonation structures are 'processed' in syntactic intonation structures. The constituents of a structured sound sequence are connected through phonological relations (p-nucleus, p-complement, p-modifier).

The phonetic-phonological properties of an idiolect system are to a large degree determined by the way sound sequences combine to form more complex ones, and the way phonetic sound sequences are related to phonological ones. There is a 'connection function' on the phonological level that takes pairs of

structured sound sequences and assigns to each pair another such sequence, and a 'connection function' on the phonetic level that takes such pairs and assigns to each pair a *set* of structured sound sequences. Both levels are connected through a 'variant relation' relating structured phonetic sound sequences to structured phonological sound sequences. While the two connection functions jointly represent the 'phonotactics' of the idiolect system, the variant relation is only partly analogous to the 'allophone' relation in structuralist phonology and avoids its problems (treatment of diphthongs, affricates etc.) by connecting structured phonetic with structured phonological sound *sequences* instead of connecting individual sounds. Phonetic variants of a complex structured phonological sound sequence may be determined not only phonetically but also phonologically, by underlying sequences on the phonological level. The variant relation is postulated as a third component of the sound system of an idiolect system, in addition to its phonetic and phonological parts.

Integrational Syntax and Morphology Integrational Syntax is akin in spirit to Lexical Functional Grammar, notwithstanding basic differences, and includes essential ideas of Valency Grammar. Among modern approaches to syntax, Integrational Syntax may well be closest to the grammatical tradition as it has developed in the West since antiquity. In particular, Integrational Syntax is Word-and-Paradigm, an orientation that has recently been gaining followers also elsewhere in linguistics. Integrational Syntax is a surface syntax: no 'deep structures' and no empty syntactic units or categories are allowed; true, an 'empty phonological word,' properly defined, is assumed for the treatment of phenomena such as ellipsis, and the empty sequence is used to deal with so-called optional complements. Integrational Syntax is also a 'syntax as a basis for semantics' in the sense that every meaning of a complex syntactic unit is obtained from the lexical meanings of its primitive meaningful parts on the basis of one of its structures. (The nature of lexical meanings is specified in Integrational Lexical Semantics, while ontological questions regarding syntactic meanings and the details of syntactic-semantic meaning composition are treated in Integrational Sentence Semantics.)

Among the syntactic entities postulated in Integrational Syntax for the syntactic part of arbitrary idiolect systems, there are: syntactic base forms, syntactic units, syntactic paradigms, lexical words, syntactic categories (either syntactic unit categories or word categories), syntactic structures, and syntactic functions.

A syntactic unit of an idiolect system is a sequence of syntactic base forms. (Again, unit sequences, but not the empty sequence, are allowed as a limiting case of syntactic units, that is, a syntactic unit may contain a single syntactic base form.) In a system of a spoken idiolect, the syntactic base forms are precisely the phonological words occurring in the phonological part of the system (analogously, for systems of written and signed idiolects).

It is an essential feature of Integrational Syntax that a clear distinction is made between lexical words and forms of lexical words (called 'syntactic word forms' or simply 'syntactic words'): every lexical word is an ordered pair consisting of a syntactic paradigm or 'word paradigm' (the form component of the word) and a concept that is a meaning of the paradigm (the meaning component of the word); a syntactic paradigm is a (non-empty) set of pairs, each consisting of a syntactic word form and a 'categorization' of the word form, that is, a set of syntactic categories such that the word form is an element of each category in the set; and any syntactic word form is also a syntactic unit, hence, a sequence (possibly, a unit sequence) of syntactic base forms (phonological words in the case of spoken idiolects). A given syntactic word form may combine with several categorizations within a single paradigm (syncretism); and a single paradigm may have a number of different meanings (polysemy), which leads to the same number of different lexical words (identical in their form components). Both the notion of paradigm and the notion of concept are generalized so as to allow for lexical words also where traditionally one would not speak either of a paradigm or of a lexical meaning.

Given the distinction between syntactic units (including syntactic word forms) and lexical words, two main types of syntactic categories are postulated for the syntactic part of any idiolect system. Type 1 syntactic categories (also called 'syntactic unit categories') are sets of syntactic units of the idiolect system, and include the syntactic constituent categories as well as word form categories like cases, numbers, tenses, and definiteness categories. The type 1 syntactic categories of an idiolect system are given through a classification system (a system of cross- and subclassifications) on the set of all syntactic units of the idiolect system, called the 'Syntactic Unit Ordering.' Type 2 syntactic categories (also called 'word categories') are sets of lexical words. They include the 'parts of speech' of the idiolect system and their subcategories. The type 2 categories are given by the 'Lexical Word Ordering,' a classification system on the set of all lexical words of the idiolect system. Both the Syntactic Unit Ordering and

the Lexical Word Ordering are components of the syntactic part of an idiolect system.

Any syntactic unit can be assigned at least one syntactic structure. The syntactic structures of a unit are to jointly represent all formal information (including intonation) that is relevant with respect to the syntactic meanings of the unit. This is achieved by construing the syntactic structures of a syntactic unit as triples consisting of (i) a constituent structure, (ii) a marking structure, and (iii) an intonation structure of the unit. The *constituent structure* identifies constituents of the unit by associating certain parts of the unit with syntactic constituent categories like Noun form, Verb form, Verb Group etc., and captures the positions of syntactic base forms within the unit. The formal conception of constituent structures developed in IL allows for easy surface treatment of discontinuous constituents (whose proper treatment was a key motivation, in early Generative Grammar, for deep structures) and avoids any restriction to binary branching with its well-known empirical problems. The *marking structure* contains additional categorial information beyond what is provided by the constituent structure. Each primitive constituent of the syntactic unit, that is, each occurrence of a form of a lexical word in the unit, is assigned a 'marking': a set of pairs each consisting of two sets of categories. The first set contains syntactic unit categories of which the word form itself is an element; more specifically, the set is identical with a categorization the word form has in the paradigm of a lexical word to which the word form belongs; if the word form has several categorizations in the paradigm, then all these categorizations appear as first components of pairs in the marking of the primitive constituent, thus, the marking has several elements. The second set contains word categories (in particular, government categories) characterizing the lexical word itself. Finally, the *intonation structure* is a sequence of modified intonation structures of the syntactic base forms occurring in the syntactic unit. The syntactic intonation structure is crucial for syntactic accents and for the distinction of sentence types (as far as this is based on intonation patterns).

Traditional grammatical relations such as subject, object, attribute, etc. are reconstructed in Integrational Syntax as functions ('grammatical functions') taking 'syntactic quadruples' as their arguments. Each quadruple consists of (i) a syntactic unit (or concatenation of units) of an idiolect system, (ii) a syntactic structure the unit or concatenation has in the system, (iii) an assignment of lexical meanings to the primitive constituents contained in the unit given the structure and the system (called a 'lexical interpretation'), and (iv) the system itself. The values of such grammatical functions are two-(or more)-place relations among constituents of the syntactic unit. (Grammatical functions are only one type of 'constituent functions,' which also include 'scope functions' like negation and qualification, and 'phoric functions' like antecedent; and there are other types of syntactic functions besides the constituent functions.) Syntactic functions play a central role, via their semantic content, in the composition process by which syntactic meanings of a syntactic unit are constructed from the lexical meanings of its primitive constituents. Incorporating features of Valency Grammar, Integrational Syntax construes subject and object functions as derived from more basic complement functions that simultaneously cover all complements of a single verbal nucleus; it generalizes the notion of valency to arbitrary lexical words, excluding purely auxiliary words.

This reconstruction of traditional conceptions, which distinguishes between (universal) syntactic functions on the one hand and their values for individual syntactic quadruples on the other, again allows to formulate general *definitions* for the names of syntactic functions in the Integrational Theory of Language, and to *identify* their occurrences in the syntactic units of specific idiolect systems by statements in a grammar. Such identification, relative to the syntactic structure and lexical interpretation contained in a given syntactic quadruple, typically depends on the marking structure more than on other components of the syntactic structure, or the lexical interpretation. In particular, government categories, given through classifications in the Lexical Word Ordering and contained in the marking structure, are crucial to identifying the values of the complement functions relative to the syntactic quadruple. Type 1 categories, contained in the marking structure, may also play a role in the identification of syntactic function values. For example, the identification of subject constituents as opposed to object constituents may depend on case categories (cf. German *Der Kellner* [NOM] *mochte sie.* 'The waiter liked her.' vs. *Den Kellner* [ACC] *mochte sie.* 'The waiter she liked.').

Integrational Morphology, concerned with the analysis of phonological words (and other medial types of syntactic base forms) into meaningful parts, is largely analogous to Integrational Syntax. The morphological entities postulated for any idiolect system are morphological base forms, units, paradigms, categories, structures, and functions as well as lexemes. Morphological base forms (morphs) are entities of the same ontological type as syntactic base forms, structured phonological sound sequences in the case of a spoken idiolect; morphological units are sequences of morphological base forms; and 'lexemes' are conceived as ordered pairs consisting of a

morphological paradigm and a concept that is a meaning of the paradigm, similarly to the lexical words in syntax. For any syntactic base form there is a 'morphological analysis': a pair consisting of a morphological unit and a morphological structure of the unit. A morphological unit that is the first component in an analysis of a syntactic base form is a 'morphological word.' A morphological structure of a morphological unit is a triple consisting of a morphological constituent structure, marking structure, and intonation structure. Two main types of morphological categories are assumed. Type 1 morphological categories (also called 'morphological unit categories'), given through the 'Morphological Unit Ordering' of an idiolect system, are sets of morphological units; they include morphological constituent categories, maximally, Stem form, Affix form, and Stem Group, as well as possible subcategories of Stem form and Affix form. Cross-linguistically, there must be stem forms in the idiolect systems of any language whereas the categories Affix form and Stem Group need not occur. Type 2 morphological categories ('lexeme categories') are sets of lexemes and are given through the 'Lexeme Ordering' of the idiolect system. They include the top-level lexeme categories Stem and Affix (comparable to the parts of speech in syntax) and their subcategories. Morphological functions (e.g., morphological complement, modifier, and nucleus) are comparable to grammatical functions in syntax in taking 'morphological quadruples' as their arguments and assigning relations among morphological constituents as values. They figure, via their semantic content, in morphosemantic meaning composition.

The *lexicon* of an idiolect system is construed as a pair consisting of the *lexeme lexicon* and the *word lexicon*. The former is the set of all lexemes (hence, the source of the Lexeme Ordering), and the latter is the set of all lexical words (hence, the source of the Lexical Word Ordering), of the idiolect system.

Integrational Semantics Integrational Semantics treats lexical meanings (i.e., meanings of morphological or syntactic paradigms and their forms) as entities entirely different from syntactic meanings (meanings of simple or complex syntactic constituents obtained through syntactic meaning composition). Consequently, meaning composition, too, is construed differently for lexical and for syntactic meanings. Integrational Lexical Semantics (with Integrational Morphosemantics and Integrational Word Semantics as its parts) combines the psychological and the realist traditions in semantics. Lexical meanings are construed as concepts in a psychological sense: an n-place concept (with $n > 0$) is the property of being a (human) perception or conception in whose content a certain non-empty set of n-place attributes of real-world entities occurs as a subset. The set of attributes is called the (n-place) intension of the concept, and the set of real-world entities that have all attributes is called its (n-place) extension. The extension but not the intension may be empty. In the case of a 1-place concept, the attributes in the intension are properties, and the extension is a set of individual real-world objects. If $n > 1$, the attributes are n-place intensional relations between real-world entities, and the extension is the set of n-tuples of real-world entities among which the n-place relations in the intension hold. Such 'relational concepts' typically occur as lexical meanings of verbs and adpositions (prepositions, etc.) but also of other kinds of relational words. The only concept for which the notions of intension and extension are not defined is the (0-place) 'empty concept,' occurring as the meaning component of lexical words such as auxiliaries and modal particles, and of all affixes, that is, of linguistic entities whose contribution to meaning composition is not based on lexical meanings. Given the notion of empty concept, the IL conception of concepts is both flexible and powerful enough to assign meanings to lexical words of any kind.

A conception is a mental state, and a perception a mental event, located in the brain of an individual. By identifying concepts not with such mental entities but with (extra-mental) properties of mental entities, Integrational Lexical Semantics can account for the potential intersubjectivity of concepts, a problem that any psychological meaning conception must face: while perceptions and conceptions are tied to an individual, a concept may well be a property shared by perceptions or conceptions located in different individuals.

Lexical meaning composition is based on morphosemantic composition functions whose arguments are (n-tuples of) concepts and whose values are again concepts. Such semantic functions occur in the semantic content of morphological functions such as morphological complement, modifier, and nucleus, and operate on the basis of (morphological or semantic) application conditions.

In Integrational Sentence Semantics, sentence meanings are construed as intensional relations between potential utterances and potential speakers. For any syntactic unit that has a sentence meaning, the meanings of the unit jointly represent a necessary condition for successful utterances of the unit. Each (simple) sentence meaning consists of at least (i) a referential part: a set containing exactly one 'referential meaning' for each referential expression of the syntactic unit; (ii) a propositional part: a pair consisting of a directive part (determining a speech act type)

and a proposition; and (iii) a propositional background, consisting of what the speaker co-expresses with the proposition. The referential part and the propositional background of a sentence meaning may be empty.

Syntactic meaning composition is based on semantic composition functions associated with (i) the syntactic functions in an idiolect system, by the 'syntactic function interpretation,' (ii) with syntactic categories like tense or definiteness categories, by the 'syntactic category interpretation' (both are components of the sentence-semantic part of the idiolect system). Syntactic meaning composition starts from the lexical meanings of the primitive constituents in a syntactic quadruple: 'basic syntactic meanings' are pairs of a concept, assigned to a primitive constituent by the lexical interpretation, and a 'contextual embedding' of the concept that involves potential speakers and utterances. Next, basic syntactic meanings are transformed into 'intermediate syntactic meanings' for non-primitive constituents by means of syntactic-semantic composition functions that are associated in the idiolect system with syntactic functions such as complement and modifier. Finally, the intermediate (and, possibly, basic) meanings are further processed by semantic functions that are associated with the syntactic nucleus function, so as to yield 'complete syntactic meanings,' which are either referential meanings or sentence meanings.

It appears that Integrational Sentence Semantics combines the meaning-as-use tradition in semantics (relating sentence meanings to speakers and utterances) with features of the psychological tradition (lexical meanings as concepts in a psychological sense, speaker attitudes as essential to sentence meanings) and with features of the realist tradition (e.g., extramental status of lexical and of syntactic meanings, the compositionality principle for complex meanings).

The Integrational Theory of Grammars

Integrational Linguistics emphasizes the distinction between theories of language and theories of language descriptions. A description of a language is understood as a theory (formulated by the linguist) of the language; similarly, for descriptions of varieties or individual idiolects. Traditionally, grammars are most important among such descriptions, which also include descriptions of (parts of) the variety structure of a language, such as a description of a language's development in time or distribution in geographical space. 'Grammar' is here used in a broad sense, covering not only morphological and syntactic but also phonological and semantic descriptions. A description of the lexicon, i.e. a dictionary, is again construed as a theory of its object (see Drude, 2004). Since the Integrational Theory of Grammars deals with the relation between language descriptions and their objects, it presupposes both the Integrational Theory of Linguistic Variability and the Integrational Theory of Language Systems.

On an IL view, grammars have three fundamental properties:

1. Ideally, they are empirical axiomatic theories. IL does not propose to replace traditional, non-axiomatic grammars by axiomatic theories. Rather, an axiomatic format for grammars is seen as an ideal reference point for non-axiomatic, declarative grammars that allows for a more stringent formulation of such grammars, a formulation that avoids inconsistencies and circularities without having explicit resort to axiomatization. The empirical basis of grammars is ultimately seen in acts of communication on the one hand and mental states and events on the other: it is such acts or states and events that directly or indirectly provide the data for a grammar.
2. Grammars are to be formulated so as to account for language variability both within and between languages, i.e., they must presuppose a theory of linguistic variability.
3. They are formulated 'in terms of' a theory of language: a grammar includes terms, definitions, assumptions, and theorems from a theory of language that is presupposed in the grammar. These are used in the grammar (i) to provide descriptive terms for categories and other entities of the language under description, and (ii) to interact with terms, definitions, assumptions, and theorems that are specific to the grammar.

Typically, the axioms and theorems of a grammar of a language or language variety are formulated as universal implications over the systems of the idiolects in the given language or variety. For example, consider a traditional statement on a language variety, such as '*hack* "taxi" is a noun in Colloquial American English.' This is construed as equivalent to, 'For all *S*: If *S* is a system of some element of Colloquial American English, then ⟨*hack*, 'taxi'⟩ is an element of Noun-of-*S*,' which may be a sentence of a grammar that contains 'Colloquial American English' as an axiomatic constant, denoting a certain subset of English.

Generally, an integrational grammar is not an algorithm but a 'declarative' theory: its formulas have the form of statements; thus, the grammar's axioms and theorems can be understood directly as statements on the language, variety, or idiolect described by the grammar. Excepting the language needed for

formulating the semantic part of a grammar, integrational grammars may be formulated using an appropriate version of set theory. (For further details, see Lieb, 1983: sec. 0.2 and part G, and Lieb, 1993a: part V; for a critical evaluation of the Integrational Theory of Grammars from the perspective of the philosophy of science, see Falkenberg, 1996.)

See also: Declarative Models of Syntax; Discontinuous Dependencies; Formalism/Formalist Linguistics; Functionalist Theories of Language; Linguistics: Approaches; Structuralism; Valency Grammar; Variation and Language: Overview.

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⟨http://www.germanistik.fu-berlin.de/il⟩ – Homepage of Integrational Linguistics. [Includes a number of introductory texts on IL, a comprehensive bibliography, as well as up-to-date information on research activities and recent publications.]

Integrational Linguistics and Semiology

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Introduction

The term 'integrationism' is applied to an approach to language and communication originally developed by a group of linguists at the University of Oxford during the 1980s, and continued internationally since then. Historically, integrationism is sometimes regarded as an offshoot of Firthian linguistics (*see* **Firth, John Rupert (1890–1960)**), but that interpretation is contentious. An alternative is to see integrationist thinking as developing the view of language sketched in Wittgenstein's *Philosophical investigations* (*see* **Wittgenstein, Ludwig Josef Johann (1889–1951)**).

By 'integrational linguistics' is to be understood the application of integrationist principles to the study of language. The International Congress of Linguists included panel sessions on integrational linguistics at the 15th (Quebec 1992) and 16th (Paris 1997) world congresses. Publications which discuss integrationist approach in most detail are Davis and Taylor (1990); Toolan (1996); Harris (1996); Harris (1998); Harris and Wolf (1998); Davis (2001); and Davis and Taylor (2003). An International Association for the Integrational Study of Language and Communication was founded in 1998, and now has members in more than twenty-five countries. It holds biennial conferences (London 2000 on 'The Language Myth in the Western Tradition'; New Orleans 2002 on 'Language and History'; Birmingham 2004 on Language Teaching and Integrational Linguistics'). *Integrationist Notes and Papers* (2003–) publishes items of related interest.

Overview

Integrationism claims to offer a perspective on language and communication that differs radically from that adopted by mainstream schools of thought in linguistics and neighboring disciplines. Integrationists differentiate forms of communication according to the range of activities typically integrated by the participants, and by the kinds of integrational proficiency typically required for participation. From an integrationist perspective, the term 'language' does not correspond to any one mode of communication, but straddles or conflates several. For integrationists there is no clear-cut, universal distinction between the linguistic and the non-linguistic, or between 'knowledge of a language' and 'knowledge of the world.' (Integrationists sometimes refer to this as the 'principle of non-compartmentalization.') On this fundamental issue, integrationists stand at the opposite end of the theoretical spectrum from mainstream work in linguistics of the 20th century (as exemplified by Saussure, Bloomfield, Chomsky, and many others). Integrationists propose a linguistics that is 'lay-oriented'; that is, deriving its basic concepts from the first-order communicational experience of lay members of the community.

Thus, for integrationists, the analysis of communication at all levels has to take into account three types of factor: biomechanical, macrosocial, and circumstantial. Integrationists reject abstractions such as 'grammatical rules,' invariant 'lexical items,' and the rest of the metaphysical apparatus that sustains all current versions of 'autonomous' linguistics (*see* **Autonomy**). Autonomous linguistics, at least as defined in Newmeyer (1986), is virtually co-extensive with what integrationists call 'orthodox' modern linguistics. According to Newmeyer, Saussure was the theorist who formulated "the classic statement" of the autonomy of synchronic linguistics, while Chomsky was "the world's leading exponent of autonomous linguistics."

This rejection of orthodox/autonomous linguistics reflects the integrationist tenet that communication cannot be decontextualized. There is no question of distinguishing between the study of 'languages' and the study of their 'use,' because this already presupposes an *a priori* dichotomy between the user and the system to be used. For integrationists, human beings are not language-users but language-makers (Harris, 1980): they are constantly making and remaking language as they go. They do this by exercising and extending their integrational proficiency in all forms of communication available to them. It is this creative faculty which holds the key to human linguistic achievements. The linguistic sign has as its basic function in communication the integration of past, present, and (anticipated) future experience, giving rise to what integrationists call the 'principle of cotemporality.' This principle obliges the linguist to recognize that one of the fundamental characteristics of the sign is its location in time.

Approaches which, on the contrary, assume the validity of treating languages as static 'codes' existing independently of their 'uses' and 'users' are criticized by integrationists as being 'segregationist.' A segregationist approach is the foundation of traditional grammar in Western education, from Dionysius Thrax onwards. Segregationism is also the main charge integrationists level against orthodox

modern linguistics. Segregationism insists on boundaries where in practice there are none. It misrepresents – in the integrationist's view – the relationship between language and communication, and in so doing misrepresents language. The integrationist denies that there are any 'autonomous' systems of linguistic signs of the kind that orthodox theorists assume. This leads to what is perhaps the most controversial claim associated with integrationist thinking: that 'languages' do not exist (On 'linguistics without languages,' see Joseph, Love and Taylor, 2001). In other words, languages, for the integrationist, are not part of anyone's first-order linguistic experience, but metalinguistic constructs serving a variety of ideological purposes.

Integrational Semiology

Integrationism treats communication as being invariably mediated by signs of some kind. It makes strong assumptions about the semiological conditions under which communication is possible. But it rejects the orthodox 'sender–receiver' model, whereby discrete 'messages' are passed along a line or channel of transmission from one individual to another.

Integrationism also makes very strong assumptions about the capacities required of an individual in order to engage in communication. These divide into 'biomechanical,' 'macrosocial,' and 'circumstantial' capacities. The first relates to the human organism and the human ability to integrate a wide variety of physiological and mental activities. (For example, the very diverse biomechanical requirements for phonation and audition: deafness interferes with communication in quite different ways from speech impediments.) The macrosocial dimension relates to the ability to integrate particular activities into a general framework provided by social conventions of various kinds, ranging from religious ritual to traffic regulations. The circumstantial factor relates to the ability to integrate one's activities into whatever conditions may obtain at the time. These three sets of parameters are regarded by integrationists as the foundational infrastructure of all human communication, of whatever modality.

From all this it follows that the integrationist conception of the sign is to be distinguished from at least the following.

1. The sign conceived of as a physical object of some kind. (Thus the motorist's warning triangle is not a sign when lying in the boot of the car.)
2. The sign conceived of as an abstraction underlying and giving meaning to physical objects (as in the Highway Code, where we are given explanations of how to interpret certain visual configurations that appear on public notices erected by local authorities).
3. The sign conceived of as a psychological unit linking a form and a meaning (e.g., as proposed by Saussure, a mental association between a certain sound-image and its corresponding concept).
4. The sign conceived of in Peircean terms of types and tokens. (The integrationist sign is neither a type nor a token. Words, as listed and defined in dictionaries, are not linguistic signs but metalinguistic abstractions.)

All this carries over to visual and other forms of communication. Thus, for instance, neither the physical object which exists uniquely as Michelangelo's statue *David*, nor anyone's public or private image of that statue, nor any collective representation or reproduction of the corresponding images, qualify as examples of an integrational sign. The sign is not to be equated with the original exemplar or any extrapolation therefrom. It exists as a construct by reference to which certain communicational activities (pointing to the statue, or photographs of it, or talking about the statue, or referring to what other people have said or written about the work of Michelangelo, in some particular instance) are integrated. Apart from such integrational activities, the sign as such has no existence. The 'name' of the work (*David*) is subject to exactly the same conditions of communication. It goes without saying that signs do not depend on having some 'real object' as what they 'stand for,' or any 'real person,' whom Michelangelo might have believed he was depicting.

For integrationists the linguistic sign, like all other signs, is a product of contextualization, resulting from and facilitating the integration of particular activities in particular circumstances. Thus, for instance, looking up a word in a dictionary is not a process of discovering or verifying the given facts about a given sign whose existence is independently guaranteed by God, or Nature, or Society (or even the academic consensus of lexicographers). Far from it. For obvious reasons, therefore, integrational semiology is anathema in orthodox linguistics, which is based from start to finish on the hypostatization of units such as 'word,' 'phrase,' 'sentence,' etc. taken over from traditional grammar.

At the most general level, the axioms of integrational semiology may be stated as follows:

1. What constitutes a sign is not given independently of the situation in which it occurs or of its material manifestation in that situation.
2. The value of a sign (i.e., its signification) is a function of the integrational proficiency which its identification and interpretation presuppose.

Under the principle of cotemporality, a sign can never be repeated. It can only be reintegrated into the communication process by the production of a subsequent sign. Integrational proficiency is accordingly construed not as a 'competence' in the sense of orthodox linguistics, but as a situated ability to deploy the biomechanical, macrosocial and circumstantial skills required in a particular communication situation. Thus, for the integrationist, there is no such achievement as 'integrational proficiency in English' (or any other language), even though in a particular case familiarity with certain English words might be one of the macrosocial factors involved in the process of communication. Likewise, there is no level at which the individual can be treated semiologically as just a stereotypical – or deviant – 'speaker of language *X*,' or 'musician of school *Y*.' There are no 'completely homogeneous communities' of the kind appealed to by some linguistic theorists. (The point is not just that they cannot be found in the 'real world,' but that their postulation is theoretically incoherent.) The individual is always unique and exploits that uniqueness semiologically as participant in a series of open-ended communication situations.

The Language Myth

For integrationists, the traditional Western notion of languages as spoken or written systems corresponding to such names as 'English,' 'Latin,' or 'French' answers to nothing in first-order experience and in any case falls foul of the theoretical maxim known as 'Occam's Razor.' It is therefore discarded. There is no theoretical need for such systems to be postulated as occupying an intermediate position between language (as a human 'faculty') and speech or writing (as human activities). The conviction that such intermediate entities 'really exist,' or are at least necessary fictions for purposes of linguistics, is referred to by integrationists as 'the language myth' (Harris, 1981; Harris, 2002; Farrow, 2005).

The language myth has a long history that goes back to Classical antiquity and has become enshrined in most European education systems. It was encouraged politically by the rise of the nation-state with its ideal of 'one country–one language' and the foundation of national language academies. The emergence of modern linguistics as an academic discipline was strongly influenced by these sociopolitical ideologies (Hutton, 2002). Language-teaching today is criticized by integrationists as one of the most powerful agencies which continue to propagate the language myth to new generations. The analysis of this myth and its implications is therefore seen as an essential first step towards the goal of 'demythologizing' linguistics.

In rejecting the language myth, integrationists reject the orthodox view that language is 'rule-governed.' They see human communication as an unregulated continuum embracing both verbal and nonverbal signs. In its canonical versions, the language myth is based on two ancient fallacies about communication. These, although logically independent, lend each other powerful support. One is the assumption that speech is a form of 'telementation,' a means of conveying thoughts from one individual mind to another individual mind. Its twin thesis is that effective communication through speech or writing requires a fixed code into which thoughts can be 'encoded' for transmission. (This second thesis is sometimes referred to by integrationists as the fallacy of 'linguistic determinacy.') The fallacy of telementation and the fixed-code fallacy are seen as being mutually complementary in the following sense. Telementation provides an (alleged) explanation of how fixed codes function and what they are for; while fixed codes in turn provide an explanation of how telementation is possible. But this simplistic binary structure of interdependence is itself mythical. In practice, interpersonal communication is a creative, multidimensional form of contact between individuals, but operating in conditions that individuals do not necessarily control. Nor, even if they do, are they necessarily aware of the communicational implications.

Integrationists trace the language myth back in various forms from early generative grammar to Saussure, from Saussure back to Locke and Port-Royal, and thence via medieval modistic grammar to Aristotle. The language myth still provides the framework, often unacknowledged, or even unrecognized (Farrow, 2005), for most segregationist accounts of linguistic structure. Integrationists accordingly regard the 'demythologization' of contemporary linguistics as an important objective.

As integrationists have pointed out, the language myth plays a considerable role in contemporary social institutions: for example, in the law (Sinsheimer, 2005). Recent work has addressed the more general question of how society's macrosocial supercategories (such as art, history, science) are semiologically constructed (Harris, 2003; Harris, 2004; Harris, 2005). In these respects integrational linguistics goes far beyond the narrow scope recognized by proponents of linguistic orthodoxy.

'Standard' Languages and Dialects

A key component in the program of demythologization concerns the widespread belief (both among academics and the general public) in so-called 'standard' languages. These hypothesized public codes are among the mythical objects allegedly described by

orthodox grammarians and lexicographers. They are often set up as approved codes to be taught to foreign learners. The usages identified as standard are those from which deviation is rejected as 'incorrect.' Despite claims to the contrary, the whole notion of a standard language, as propagated in modern linguistics and associated educational programs, is intrinsically prescriptive. In rejecting it, together with its social and political implications, integrationists have pointed out the complete failure by linguists to identify any objective set of criteria by which a standard language might in practice be unambiguously identified. This is not only because linguistic usage is constantly changing, both quantitatively and qualitatively, but because the problem of identifying the membership of a language community, and specifying qualifications for membership, is theoretically intractable.

The notions 'standard' and 'dialect' are head and tail of the same segregationist coin. The result of this spurious opposition is that many teachers are encouraged to treat 'dialect' as the equivalent of 'nonstandard' or ('substandard'), since 'standard' automatically carries implications of superiority in one respect or another. Integrationists point out that the function of the opposition of 'standard versus dialect' in segregationist thinking is actually to solve a theoretical as well as a pedagogic dilemma; namely, how to reconcile the manifest fact of linguistic diversity between speakers with the need to identify a determinate code to which the linguist's analytic procedures may be applied. When orthodox linguists are challenged on this score, they resort to a multiplication of standards. Thus 'standard English' proliferates into 'standard American English,' 'standard Scottish English,' 'standard Welsh English,' and even 'standard English English.' The fact that there is no limit in principle to this multiplication of standards demonstrates, for integrationists, the absurdity of the concept.

Speech and Writing

One main thrust of integrationist work has been to demythologize the important relationship between speech and writing, which has had a pervasive effect on thinking about language in the Western tradition (*see* **Western Linguistic Thought Before 1800**). Misconceptions about this relationship are endemic in literate societies. Integrationists point out the inadequacy of treating writing as just a conventionalized transcription of speech. A comprehensive integrational analysis has been proposed for the various forms of writing (Harris, 1995). It starts from the assumption that, since the biomechanical, macrosocial, and circumstantial requirements for written communication are quite different from those for spoken communication, there is no way that one can be regarded as an alternative implementation of the other. The widespread notion that writing contrasts with speech as 'visual' communication versus 'oral' communication is also taken to be mistaken. Writing, viewed from an integrationist perspective, turns out to be a more powerful and flexible form of communication than speech could ever be.

Conclusion

The prospects for any reconciliation between integrationist thinking and orthodox linguistics seem remote, given the wide difference between them in epistemological assumptions. If integrationists are right, much of what passes for linguistic structure in the orthodox view is actually no more than an artifact of the codification procedures employed to 'describe' it. Whether orthodox theorists can offer any effective rebuttal of this fundamental critique remains to be seen.

See also: Autonomy; Firth, John Rupert (1890–1960); Semiology and the Focus on Language; Western Linguistic Thought Before 1800; Wittgenstein, Ludwig Josef Johann (1889–1951).

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Intensifiers

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Terminology

The term *intensifier* is here used for expressions such as English *him-/herself*, for Latin *ipse*, Italian *stesso*, Russian *sam*, Mandarin *ziji*, German *selbst*, etc., and their counterparts in other languages. There is no generally established label for these expressions and most of the terms used, such as *emphatic reflexives*, *emphatics*, *pronouns of identity*, *particles*, *scalar adverbs*, etc., are highly misleading even for individual languages, to say nothing of cross-linguistic studies. The term *intensifier*, first used in Moravcsik (1972) and Edmondson and Plank (1978), has the advantage of being more or less free of such misleading connotations, though it is also sometimes used for adverbs of degree such as *very* or *extremely*.

Intensifiers such as the ones listed above are most easily identified across languages in terms of their prosodic and their semantic properties. They are invariably focused and thus stressed. Another reasonably general property seems to be the fact that they are used as adjuncts rather than arguments within a sentence. As far as their other morphosyntactic properties are concerned, they may differ quite strikingly from language to language. In those cases in which their etymology can be established beyond reasonable doubt, we also can say that they typically derive from expressions for body parts ('head', 'heart', 'body', 'bone', 'eye', but also 'soul' and 'mask'). This etymology is still visible in Semitic, Indic, Caucasian, and many African languages, as well as in creoles (cf. Heine, 2000, 2003).

A further characterization of intensifiers is possible if one examines their typical uses. Four different use types can be distinguished, not all of which are found in each language, however. The following four uses can be found in a wide variety of languages, but there are many languages that have only the first two. The third use type seems to be the rarest of the four and the fourth use is often associated with a specific form that is differentiated from the other uses. The following English examples provide an instance of each use:

(a) the adnominal use

(1) Writers themselves, rather than their works, should be examined for their sense of social responsibility.

(b) the adverbial exclusive use (≅ 'alone')

(2) Mrs. Dalloway wanted to buy the flowers herself.

(c) the adverbial inclusive use (≅ 'too')

(3) If he's busy breaking the rules himself, he could hardly demand that they do otherwise.

(d) the attributive/possessive use

(4) This is a matter between you and your own conscience.

In English, as in many other European languages, the same intensifier (X-*self*) can be used in three different contexts and with three different interpretations. In its adnominal use X-*self* is adjoined to the right of an NP (or DP) and exhibits agreement with that constituent. The adverbial use also exhibits agreement with a nominal constituent, although the intensifier is not adjacent to that constituent but in construction with a VP or a projection thereof (cf. (2)–(3)). The two adverbial uses are primarily differentiated on the basis of their meaning and because there is a certain complementarity between these uses, they may well be the result of contextual factors interacting with one univocal adverbial

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Intensifiers such as the ones listed above are most easily identified across languages in terms of their prosodic and their semantic properties. They are invariably focused and thus stressed. Another reasonably general property seems to be the fact that they are used as adjuncts rather than arguments within a sentence. As far as their other morphosyntactic properties are concerned, they may differ quite strikingly from language to language. In those cases in which their etymology can be established beyond reasonable doubt, we also can say that they typically derive from expressions for body parts ('head', 'heart', 'body', 'bone', 'eye', but also 'soul' and 'mask'). This etymology is still visible in Semitic, Indic, Caucasian, and many African languages, as well as in creoles (cf. Heine, 2000, 2003).

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intensifier. In attributive (possessive) contexts, Modern English uses a special intensifier (*own*), but as late as the 17th century the intensifier *self* could still be used in such contexts.

(5) . . . and syddan hit his discip(ul)um sealde to þicganne for his sylfes lichaman and for his agan blod. '. . . and then gave it to his disciples to take and eat as if it were his own body and his own blood.' (Wulfstan Pol 3 (Jos) 17)

In other words, *own* fills a gap in the distribution of X-*self* in Modern English in contrast to earlier forms of that language or languages like Turkish, where the same expression (*kendi*) is found in the adnominal, adverbial, and attributive functions (*kendi odam* 'my own room'). In addition to these four uses, further uses of the same expressions with different though related meanings can be found in many languages (e.g., German *Selbst der Chef* 'Even the boss,' d*erselbe Verbrecher* 'the selfsame criminal,' etc.).

As far as their morphology and distribution are concerned, intensifiers have special properties and cannot be subsumed under any of the established lexical (or functional) categories. In a large number of languages they inflect for the morphosyntactic features typically associated with nouns or pronouns (number, gender, person, case) and the fact that they invariably agree with a noun or noun phrase suggests that they should be analyzed as a specific subclass of adjectives. Such an analysis is particularly tempting in those cases where intensifiers precede rather than follow an adjacent noun, as in the case of Spanish *mismo*, Italian *proprio*, Zapotec *lagakh* or English *own*. In an equally wide variety of languages, intensifiers are invariant particles and manifest a partial overlap in their distribution with focus particles like 'alone,' 'too,' 'only,' 'even.' Moreover, the versatility in their syntax, illustrated by the examples (1)–(4), is also similar to the distribution of focus particles. Semantically and prosodically, however, they differ strikingly from both adjectives and focus particles. As pointed out above, intensifiers are invariably stressed and thus focused, rather than being merely associated with a focus (like focus particles) or stressed under specific contrastive conditions (like adjectives). This striking prosodic property is closely linked to, and in fact a consequence of, their meaning. As pointed out in Eckardt (2002) and Hole (2002), intensifiers can simply be analyzed as denoting the identity function and thus would make a completely trivial contribution to the meaning of a sentence if they were not focused. Under stress and focus these expressions denote functions that map the value denoted by their nominal co-constituent onto alternative values, i.e. entities defined in terms of the value given. Applied to a preceding noun phrase like *writers* in (1), the intensifier simply leads to the very same semantic value as the noun phrase alone (i.e., 'writers'). The effect of the focus and stress on *himself*, however, is that the denotation of *writers* is mapped onto alternative values, i.e., values definable in terms of this expression (e.g., 'their families,' 'their ideas,' 'their works,' etc.). In (1), the third of these possible alternatives is in fact the alternative envisaged by the speaker and explicitly given in the context. More often than not such alternatives can also be described as 'entourage, periphery' of the value denoted by the co-constituent taken as the center (cf. König, 1991). These characteristic prosodic and semantic properties strongly argue for assigning intensifiers to a class of their own.

Parameters of Variation

Intensifiers may differ strikingly in their formal, distributional, and selectional properties across languages, but they do so quite systematically and within very clear limits.

Agreement vs. Invariance

One of the most striking parameters concerns their morphological makeup: Intensifiers may agree with their co-constituents in terms of morphological features typically associated with nouns (the so-called φ-features) or simply be invariant (particles). Examples of invariant, particle-like intensifiers are found *inter alia* in Albanian, Bambara, Modern Breton, and all Germanic languages other than English.

German

(6) [Sie *selbst*] hat es mir gesagt.
she-INT has it- 1SG.-DAT said
'She herself told me about it.'

In the other languages, by contrast, intensifiers inflect for some of the φ-features mentioned above (gender, number, person, case), thus manifesting agreement with the nominal constituent to which they relate syntactically and with which they interact semantically (their 'co-constituent'). The set of languages that manifest such agreement includes English, the Romance languages, the Finno-Ugric, and the Turkic languages:

Finnish

(7) Saa-n-ko puhua johtaja-lle
may-1SGPRES-Q speak director-ALL
itse-lle-en
INT-ALL-3POSS
'Could I talk to the director himself?'

Relation to Reflexive Anaphors

Intensifiers play an important role in the genesis, reinforcement and renovation of reflexive anaphors (cf. König and Siemund, 2000; König, 2003), and one of the most interesting parameters of variation therefore concerns their relationship to reflexive anaphors. Three options can be distinguished among the languages of the world: (a) intensifiers and reflexives are identical in their formal properties and only differ in their distribution, reflexive anaphors occurring in argument position and intensifiers in adjunct positions; (b) intensifiers and reflexives are formally differentiated, differing thus in both their form and their distribution; and (c) intensifiers and reflexives share morphological material or are at least similar in their formal properties, though not in their distribution.

Complete formal identity between intensifiers and reflexives is found in all of the following languages: English, Mandarin, Finno-Ugric, most Caucasian, Indian, Semitic, and Turkic languages. In grammars of these languages intensifiers are often categorized as emphatic reflexives and discussed in the same chapter or section as reflexives (e.g. Huddleston and Pullum, 2002: 1483–1498).

(8a) The bride herself remained calm throughout the ceremony.
(8b) The bride is looking at herself in the mirror.

In languages of the second group (b), intensifiers and reflexive markers are clearly distinct and are never discussed under the same heading in the relevant grammars. Examples from French exemplify an equally widespread situation among the languages of the world:

French

(9a) Pierre se déteste.
'Peter hates himself.'
(9b) Pierre lui-même va nous adresser la parole.
'Peter himself will talk to us.'

Reflexive markers in such languages are generally highly grammaticalized instances of the pronominal strategy for marking reflexivity (cf. Faltz, 1985) and are also typically employed as middle markers (i.e., markers of derived intransitivity) in anticausative, modal passive, and reciprocal constructions (cf. Kemmer, 1993).

The third type identified by the parameter of variation under discussion includes all those cases where intensifiers and reflexive markers share some morphological material without being formally identical. The typical situation here is that the reflexive marker is analysable as intensifier + some additional morpheme, e.g., a personal pronoun or reflexive pronoun. This type thus also includes Dutch and the Scandinavian languages, in which a reinforcement of the basic reflexive pronoun (*zich*, *sig*) by the intensifier has been grammaticalized for all stereotypically other-directed predicates.

Selectional Restrictions

The following parameter of variation makes intensifiers very different from focus particles, but is not all that surprising in view of the adjective-like inflectional behavior exhibited by these expressions in many languages: intensifiers may or may not exhibit selectional restrictions with regard to the nominal constituents they interact with. It is, however, not the language as a whole that imposes specific restrictions but specific intensifiers in individual languages. Examples of intensifiers with no, or at least almost no, combinatorial restrictions are German *selbst*, Spanish *mismo* and Amharic *–ras-*. A differentiation quite frequently found among the distribution of intensifiers relates to the opposition between animate and inanimate nouns. In Japanese *zisin* is only used with animate nouns, whereas *zitai* is used with inanimate nouns:

Japanese

(10a) *Taroo-zisin* *kyouzyu-o* *sonkeisiteiru.*
Taro-self professor-ACC honours
'Taro himself honours the professor.'

(10b) *Kono hon-zitai* /*zisin *yomunoga* *muzukasii.*
this book-self to.read difficult.is
'This book itself is difficult to read.'

Other frequent differentiations relate to the distinction between local, temporal, and abstract nouns vs. the rest (e.g., French *même* vs. *lui*-même, *elle-même*) and to person distinctions (1st and 2nd person vs. 3rd person in Basque), so that the relevant selectional restrictions are describable in terms of the well-known Animacy Hierarchy.

See also: Adjectives; Focus; Focus Particles; Selectional Restrictions; Word Classes/Parts of Speech: Overview.

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Intention and Semantics

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A compelling idea is that words have meanings because speakers who use them have intentions of some kind. Intentions underpin semantics. One proposal of how this might work is based on Locke's idea (1975) that the function of a language is to express preexisting thoughts; thoughts are correlated with sentences through intentions. So intentions are the glue binding thoughts to words.

Grice (1958, 1969) adopts this Lockean view. Grice divides verbal meaning into two kinds: so called 'speaker-meaning' and 'sentence-meaning.' Speaker-meanings are the contents of particular utterances on occasions. They are the contents of illocutionary acts (in the sense of Austin, 1962) performed by production of sentences. Illocutionary acts include assertions, orders, questions, etc. Speaker-meanings may diverge from sentence-meanings, which are literal meanings. U may employ 'The church is a rock' but convey as speaker-meaning that the church is a strong support for its members; U may utter 'The meal is edible,' conveying as speaker-meaning that it is not very good.

Grice begins his analysis of meaning by examining the intentions underpinning speaker-meaning. Grice takes the intentions that do the job to be communicative intentions. A communicative intention is social: it is directed toward an audience. In communication – speaking-meaning something – a subject U intends that her audience H gain a certain state *r*, a belief, desire, intention, etc. Grice's great insight was into the structure of the communicative intention, which he characterized thus:

> **C**: U means something by utterance *S* if and only if U utters *S* and intends that H acquire characteristic *r* and U intends that H do so partly by recognizing this very intention.

The intention is a **reflexive intention**: an intention that falls within its own scope. Many philosophers have been wary of the reflexive treatment of communication and have attempted to explicate communicative intentions in terms of hierarchies of intentions. See Grice (1969), Strawson (1964), and Schiffer (1972). But the results are unwieldy.

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Speaker-meanings are, then, acts with the form **C**. The different types of speaker-meanings or illocutionary acts, that is, assertions and orders etc., are determined by the different characteristics *r* intended. Grice (1971: 123) analyzes assertions and orders thus:

> **GA**: U asserts (to H) that P by uttering *S* iff U utters *S* reflexively intending that H believe that U believes that P.
> **GO**: U orders (H) to do F by uttering *S* iff U utters *S* reflexively intending that H form an intention to F.

Such proposals about *r* are problematic, however. Restricting ourselves to assertion, **GA** is refuted by apparent cases in which U lacks an intention that H believe that P – e.g., where U either *(a)* is indifferent as to H's belief, because, for example, U is engaged in polite conversation without intending to persuade; or *(b)* believes H won't believe her. (See Alston, 2000). Bach and Harnish (1979), suggest the primary intention should rather be:

> that H has a reason to believe that U believes that P.

If, as suggests Recanati (1986), reasons are defeasible, then U can provide a reason for H to believe P, even though U knows it is undermined by further information, such as that H believes U is a liar.

Assuming that some such explication of *r* works, how can we use speaker-meaning to analyze sentence-meaning? Grice (1971) introduces practices and conventions thus:

> **SM1**: *S* means that *P* for U iff U has the practice that if she desires to reflexively intend that H gain *r*, then she (may) utter *S*.

The 'may' here can be taken as rule permissibility or epistemic 'may.' **SM1** allows words to be ambiguous, and for there to be different ways of saying the same thing. Grice notes that the regularity governing use of the sentence *S* does not itself have to be one that correlates use of *S* with full-fledged reflexive intentions. Rather we simply need:

> **SM2**: *S* means that *P* for U iff U has the practice that if she desires to intend that H gain *r*, then she (may) utter *S*.

If the conventions/practices governing sentences have this form, we can then explain how speaker-meanings – full illocutionary acts – emerge in particular utterance events. In uttering *S*, U intends H to think thus:

> U's policy is that if U intends that H have *r*, then U (may) utter *S*.
> U uttered *S*, so (given context) I can infer that U intends that H have *r*.
> U intends that H have *r*.
> So, I should have *r*.

Thus, U is intending that H have *r*, partly in virtue of recognizing U's intention that she have *r*. But this is just reflexively intending that H have *r*.

To analyze word-meaning we need regularities such as:

> **WM**: The word Ω means *O* for U iff U has the practice that if U desires that H believe U believes something about *O*, then U (may) utter a sentence . . .Ω . . . .

Given that U has such dispositions for the basic vocabulary of her language, we can deduce the kinds of dispositions that will underpin her production of novel (unuttered) sentences. We provide thereby a compositional account of the meaning of sentences in U's language.

Platts (1979: 86–94) doubts this last point. He thinks the very thing we are meant to be explicating, sentence-meaning, will have to be brought in to fix the intentions that U would have if she were to use novel sentences. Blackburn (1984: 127–129) objects that it is just the practices and dispositions themselves that fix what we would intend, and thus mean. Nothing else need back up such dispositions.

A more serious objection to the Gricean account of meaning is that repertoire rules for the words require us to appeal to the semantic relation of **aboutness**. **WM** invokes U's believing something **about** object *O*. Aboutness is related to denotation, that is, a representational relation between mental state or word and world. But meanings, one might think, are simply representations. So, as Devitt and Sterelny (1999: 150–151) point out, the Gricean analysis effectively leaves unexplained the realm of content as such. Perhaps we need a Fodorean (1975) language of thought hypothesis to finish the story. Or perhaps there is some way of giving a pragmatic reduction of representation in terms of an inferential semantics (Brandom, 1994). Or we should see Grice's analysis of speaker-meaning and its relation to sentence-meaning as merely providing an explanation of what it is for particular speakers to use one language – whose representational contents are abstractly defined in terms of truth-conditions – rather than another (Lewis, 1975). If so, as Blackburn (1984: 134) points out, there is no rivalry between intention-based semantics and formal truth-conditional approaches, *contra* Strawson (1964).

Or there is this possibility. An intention-based semantics might change tack by denying that meanings, *qua* semantic interpretations, are representations as such. This approach is found in Barker (2004). It contends that the semantic interpretations of words and sentences are not representational contents but speech act types – acts whose nature is not merely representational. These speech acts are a specific kind

called 'proto-speech-acts.' A proto-act is uttering a word, phrase, or sentence and **advertising** certain intentions to denote, represent, or communicate. Advertising is engaging in the behavior characteristic of a speaker who, following certain rules, intends to do something. In uttering a name, for example *Pegasus*, U utters a term, *Pegasus*, and advertises an intention to denote an object, something called *Pegasus*. If U utters 'I saw Pegasus,' she wants H to believe she has the intention she advertises, but if she asserts 'Pegasus does not exist,' she does not. What defines a name's meaning is not any object denoted, since like *Pegasus* it might be empty, but the proto-referring act associated with it. The meaning of *Pegasus* is that proto-referring act all of whose tokens are nodes of a certain referential tree: that subset of uses of the name *Pegasus* that we group together as instances of the name for the mythical flying horse.

The meaning of a declarative sentence is a 'proto-assertion.' A proto-assertion involves two parts: advertising *(a)* a representational intention and *(b)* a communicative intention. In uttering 'Snow is white,' U advertises intentions *(a)* to represent that snow is white, and *(b)* to **defend** the intention to represent snow's whiteness. Defending is dialectical engagement with an audience H: in defending an intention to represent that snow is white, one wants H to accept or reject such an intention in her own case, and to give reasons for rejection. H judges correct an **assertion** of 'Snow is white' – where U really does intend to defend an intention to represent that snow is white – iff H accepts what U defends.

Assertion of 'Snow is white' is a **report**, since what is defended is a representational intention. But not all assertions are reports. Utterance of 'Haggis is tasty' is an expression of taste: U advertises intentions to *(a)* represent her possession of a gustatory preference state of liking haggis, and to *(b)* defend that gustatory preference state. Preference states are not representational. H judges correct U's assertion iff H accepts the gustatory preference state in her own case; not if and only if H thinks U has represented correctly her, U's, state.

In this framework, all logically complex sentences have expressive proto-assertions as their meanings. Negations express rejective states. In uttering 'Snow is not white,' U advertises intentions to *(a)* represent that she has a rejective state with respect to intending to represent snow is white, and to *(b)* defend that rejective state. In uttering 'Haggis is not tasty,' U expresses rejection of the gustatory property. And so on for other logically complex sentences. Statements of the form '*S* is true' are expressive as well; U expresses her acceptance of the state defended in assertion of *S*. Because sentence-meanings are not representations, we are not committed to logically complex entities in the world, such as negative or universal facts, or mysterious properties of truth.

A compositional semantics can be built through constructing meanings in terms of proto-acts, proto-referrings, and proto-assertions. Proto-assertions, for example, can embed in logical compounds. In 'either *S* or *R*,' *S* and *R* are proto-asserted. Hence **advertising** intentions is weaker than the condition articulated above of giving a defeasible reason to believe.

This approach does not attempt to explicate representation in speech act terms. Rather, it displaces representation as the keystone of meaning. Names and sentences don't have to denote/represent to be meaningful. Truth-bearers are not propositions, *qua* representational contents, but assertions: acts of defending states. This account does not tell us what denotation and representation are, but, unlike the Gricean approach, it is not committed to saying that meaning resides in such relations holding. The result is an intention-based semantics that seriously challenges the dominant truth-conditional approach to meaning.

See also: Assertion; Compositionality: Philosophical Aspects; Expression Meaning versus Utterance/Speaker Meaning; Ideational Theories of Meaning; Thought and Language: Philosophical Aspects; Truth Conditional Semantics and Meaning.

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Interactional Sociolinguistics

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'Interactional sociolinguistics' (IS) can be described as the application of interpretive methods of discourse analysis to gain detailed insights into the many communicative issues that arise in today's social environments, by means of systematic investigation of how speakers and listeners involved in such issues talk about them in the conduct of their affairs. This description is couched in general terms and includes a minimum of technical terminology, but it builds on premises that need to be spelled out in more detail. For instance, the notion of 'discourse' has become widely used in the general academic literature, with such expressions as the 'discourse(s)' of science, of mathematics, or of psychiatry. These terms often replace established categorizations for disciplines or specialist activities as a way of focusing on what practitioners do rather than relying on established nominal labels.

'Formal linguists' are concerned with the grammatical rules of specific languages and dialects and look at discourse as a string of utterances that can be reduced to the grammar and lexicon of constituent sentences and analyzed by established analytical procedures. 'Sociolinguists,' on the other hand, deal with the talk of individuals speaking as members of specific groups and engaging in context-bound encounters where, along with grammar and lexicon, social and cultural forces constrain both what can be said and how it can be said. It follows that to participate in an encounter requires both linguistic and social knowledge.

But how does language interact with the social? Earlier sociolinguistic investigations turned to the published ethnographic literature for social information. In today's complex and rapidly changing societies, however, established social science concepts such as class, gender, and ethnic group cannot account for the ever-increasing diversity of the social ecologies in which we live. Social knowledge is increasingly seen as constructed through interaction. Discursive practice, the argument goes, rests on interaction, requiring the active participation of speakers and listeners, who use knowledge of the entire semiotic situation – of which speaking is a part – along with their linguistic knowledge to understand what is intended at any one point.

Theoretical Roots

A main motivation for interactional linguistic research is the search for replicable qualitative methods of sociolinguistic analysis that can provide insights into the inherent linguistic and cultural diversity that characterizes current communicative environments. These methods are also used to document the impact of the diverse environments on members' everyday lives without relying on traditional social science categorizations. It is by now evident that diversity can no longer be treated as primarily a matter of distinctions among bounded, locally homogeneous language/culture units. Regardless of where we live, diversity is all around us. A large and ever-growing number of empirical sociolinguistic studies testify to its extent and significance, even in areas and domains of activity traditionally considered to be monolingual and monocultural. Questions of diversity loom large in public debates and in the recent social science writings that have greatly transformed our current thinking about social and cultural phenomena. Yet so far most attempts to deal with the communicative import of diversity, particularly its role in everyday communication, continue to rely on essentialized, taken-for-granted notions of culture and group on the one hand and dialect, style, or speech variety on the other. Such attempts to explain what happens in talk in terms of extra-communicative notions, whose relationship to real-life discursive practices is highly questionable, are unlikely to yield replicable results.

The 1960s writings on 'ethnography of communication' (EC) in a sense laid the foundation for current IS research. In his well-known 1960s critique of post–World War II Whorfian studies, Hymes (1962) argued that the failure of current research to provide empirical validation of relations between linguistic and

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But how does language interact with the social? Earlier sociolinguistic investigations turned to the published ethnographic literature for social information. In today's complex and rapidly changing societies, however, established social science concepts such as class, gender, and ethnic group cannot account for the ever-increasing diversity of the social ecologies in which we live. Social knowledge is increasingly seen as constructed through interaction. Discursive practice, the argument goes, rests on interaction, requiring the active participation of speakers and listeners, who use knowledge of the entire semiotic situation – of which speaking is a part – along with their linguistic knowledge to understand what is intended at any one point.

Theoretical Roots

A main motivation for interactional linguistic research is the search for replicable qualitative methods of sociolinguistic analysis that can provide insights into the inherent linguistic and cultural diversity that characterizes current communicative environments. These methods are also used to document the impact of the diverse environments on members' everyday lives without relying on traditional social science categorizations. It is by now evident that diversity can no longer be treated as primarily a matter of distinctions among bounded, locally homogeneous language/culture units. Regardless of where we live, diversity is all around us. A large and ever-growing number of empirical sociolinguistic studies testify to its extent and significance, even in areas and domains of activity traditionally considered to be monolingual and monocultural. Questions of diversity loom large in public debates and in the recent social science writings that have greatly transformed our current thinking about social and cultural phenomena. Yet so far most attempts to deal with the communicative import of diversity, particularly its role in everyday communication, continue to rely on essentialized, taken-for-granted notions of culture and group on the one hand and dialect, style, or speech variety on the other. Such attempts to explain what happens in talk in terms of extra-communicative notions, whose relationship to real-life discursive practices is highly questionable, are unlikely to yield replicable results.

The 1960s writings on 'ethnography of communication' (EC) in a sense laid the foundation for current IS research. In his well-known 1960s critique of post–World War II Whorfian studies, Hymes (1962) argued that the failure of current research to provide empirical validation of relations between linguistic and

cultural variability may be a result of the fact that, contrary to the prevailing assumptions, variability is not just a matter of distinctions among community-wide, presumably homogeneous grammatical and semantic structures. As Hymes (1974) suggests, many aspects of language function, which at the time had received little attention, play a major and often crucial role. His early programmatic writings set out an initial program for comparative research on both structure and function. The main argument was that such analyses, if they are to be empirically viable, must focus on specific situations of speaking, defined as interactively constituted, culturally framed encounters and not attempt to explain talk as directly reflecting the norms, beliefs, and values of communities seen as a disembodied, hypothetically uniform whole (Gumperz and Hymes, 1964, 1972). Instead of relying on community-wide generalizations as the bases for comparison, Roman Jakobson's (1960) notion of the 'speech event' was adopted as an intermediate level of analysis. Events, on the one hand, constitute units of verbal interaction, where what is said is socially and culturally constrained, so that valid ethnographic information on what are relevant norms and constraints can more readily and verifiably be obtained by event level analysis than if one were to build on generalizations about the community-wide values. At the same time, events are made up of stretches of talk that are subject to linguistic analysis in their own terms.

The initial EC studies concentrated largely on named, bounded gatherings rather than unmarked everyday talk – public performances, ceremonies, magical rites, ritual practices, political oratory, and judicial proceedings of various kinds – such as can be found in societies throughout the world. Ethnographic research served to gather information on beliefs, values, and appropriateness norms as they applied to the event. Findings tended to be generalized by formulating 'rules of speaking,' which governed participation and conduct in the event and choice among available speech styles that made up the communities' linguistic repertoires (Bauman and Sherzer, 1989; Blount and Sanches, 1977; Sanches and Blount, 1975). Event-focused comparative investigations served to call attention to the analytical importance of situated talk and to the need for new data on inter- and intrasocietal variability of linguistic structures and language usage. Yet as Brown and Levinson (1978) demonstrated, structuralist usage rules can never be made precise enough to predict what people actually do with talk. Among other things, they fail to account for the many, often unforeseeable contingencies that govern everyday behavior, as was argued in Bourdieu's (1977, 1991) well-known critique of structuralism.

When detailed descriptions of situated performances became available, the notion of 'event' as the extralinguistically defined unit of language usage also turned out to be untenable. Anthropologist-folklorists concentrating on verbal performance discovered that, more often than not, events were not clearly bounded. Rather, the participants' definition of what the relevant context is 'emerged' in the course of the performance itself (Bauman, 1988; Bauman and Briggs, 1990; Hymes, 1981). In such cases, as Hanks puts it in a well-known article on genre: "The idea of objectivist rules is replaced by schemas and strategies, leading one to view genre as a set of focal and prototypical elements, which actors use variously and which never become fixed in a unitary structure" (1987: 681, quoted in Bauman and Briggs, 1992). That is to say, invocations of context are perhaps best seen as communicative strategies for conveying indexical information, and we do not need to confine event analysis to named entities. Any string of utterances bounded by a detectable beginning and an ending that provide evidence for the outcome can be treated as an event.

Initial insights into the cognitive functioning of context invocation come from studies of 'code switching' (Auer, 1998), a term that is commonly used to refer to alternation among different languages or language varieties within the same community. Such alternations are found throughout the world, particularly in situations of rapid social change, and are frequently described via rules that specify the situational constraints governing language usage. In the old Roman Catholic Church service, for example, Latin was considered appropriate for prayer, while for sermons, the native language was to be employed. Yet if we examine switching as it enters into the discursive practices that constitute an event, it soon becomes apparent that the situation is more complex. As with the folk performances mentioned above, it is not the situation that determines language use; rather, it is the language or style, among other signs, which, when interpreted in relation to the ongoing talk, evokes a shift in contextual presuppositions. Code switching, in other words, functions as an metapragmatic signaling strategy that is employed indexically to suggest or evoke an 'envisionment' that yields the presuppositions in terms of which constituent messages are to be understood.

While both event evocations and code-switching function metapragmatically (Silverstein, 1976, 1993), they are 'phenomenologically distinct' (to use the current linguistic anthropologists' term). Event analysis yields general information or envisionments about

what is expected in the event as a whole and what the likely outcomes are. Code switching, on the other hand, is signaled via shifts at the level of individually isolable grammatical forms. Such shifts can be seen as indexical 'contextualization cues,' which, when processed simultaneously with grammatical and lexical signs and nonlexicalized background knowledge, serve to construct the contextual ground for turn by turn, situated, sentence-level interpretation and thereby suggest how constituent messages should be understood (Gumperz, 1982). In other words, contextualization cues represent speakers' ways of providing information to interlocutors and audiences about how language is being used at any one point in the ongoing stream of talk. What sets them apart from lexicalized metadiscursive signs is that they include purely suprasegmental signs, such as stress, intonation, volume, rhythm, and so forth. Since no utterance can be pronounced without suprasegmental signs, contextualization cues are ever present in the talk. They provide direct evidence for the necessary role that indexicality plays in talk.

Contextualization strategies signal by cueing indirect inferences. Since in conversation we could not possibly express all the information that interlocutors must have to plan their own contributions and attune their talk to that of their interlocutors, it is easy to see the reason for this indirectness. But finally and perhaps most importantly, indirect (not overtly lexicalized) signaling mechanisms are for the most part culturally or subculturally specific. For example, prosody, rhythm, and phonetically marked locally specific features of pronunciation are among the principal means by which we identify where people are from and 'who' they are – that is, assess their social identity. In fact, we are socialized into society via indexical communication, and through indexical signs we indicate our 'stance' *vis-à-vis* what is happening (Ochs, 1996).

If we accept that (a) interpretation is always context dependent, and (b) that contextual presuppositions shaping interpretations are themselves subject to constant change in the course of an interaction, then we cannot expect to find the kind of one-to-one mappings of form to meanings that we associate with referential communication. Contextualization cues serve to retrieve the frames that channel the interpretive process by trimming the decision-making tree – that is, limiting the range of possible understandings.

In talking about the functioning of indexical signs in interpretation, it becomes necessary to distinguish between meaning in the linguists' sense of reference and 'situated inferences.' The latter are crucial in communicative practice. In everyday talk, situated inferences always take the form of assessment of what a speaker intends to convey by means of a message, and these are often quite different from propositional content. For example, if Giovanni and Paolo had just been talking, and I asked the former, "What did you do with Paolo?" he will not answer, "I made a statement" or "I performed a speech act." A more likely answer would be, "I asked him for a favor" or "I asked him if he was free this evening." Moreover, even if Giovanni had said, "I asked him a question," I would not take this as referring to grammatical or speech act categories but as rather as telling me what he wanted from Paolo. Communicative practices are forms of actions, and conversational inferences are made by human agents acting in the real world.

By arguing that all communication is intentional and based on inferences, we are in some ways building on Garfinkel's notion of interpretative procedures to look at the inferential aspects of speaking. But Garfinkel is not specific as to what he means by inferencing or by the 'method' by which members' interpretive processes can be retrieved, apart from saying that we need to resort to background information on how and why a particular inference came about. How do we know what kinds of background knowledge are relevant at any one time? Is it enough simply to speak of 'extra-communicative background knowledge'? We must assume that information about contextual frames and how they interact with grammar and background knowledge is communicated in the course of discourse-level communication, where discoursing is treated as an intrinsically interactive process. It becomes necessary to clarify the specifics of what happens in the interaction as such, to assess what is intended.

Conversational analysts (Atkinson and Heritage, 1986) set out to implement Garfinkel's program. Their work has shown brilliantly what can be learned through detailed sequential analyses of speaking practices. Sequencing alone cannot by itself account for situated interpretation. Sequential ordering relies on just one of the many indexical processes that affect inferencing. Assessments of communicative intent, at any one point in an exchange, take the form of hypotheses that participants in an encounter can either confirm or reject in the course of an exchange. As conversational analysts point out, focus on members' procedures is a necessary analytical prime. The problem for IS then becomes not just to determine what is intended, but to also discover how interpretive assessments relate to the signaling processes through which they are negotiated.

How can we overcome the inherent ambiguity of inferential processes? In my own empirical field

studies, I have worked out a set of procedures along the following lines. Relying on data from previously collected targeted ethnographic observations, the IS analyst begins with turn by turn scanning of the recorded materials at two levels of analysis: (a) content, and (b) grammatical form, prosody, and rhythmic organization to isolate event units. The units should be marked off from others in the recorded data by at least some thematic coherence and by detectable beginnings and ends. Lectures, ceremonies of various kinds, interviews – that is to say named units of the type normally studied by ethnographers of communication – exemplify one type of event. But event sequences can also be extracted from everyday conversations and other casual encounters. For instance, narrative sequences may alternate or come interspersed with more formal discussion, argument, banter, and the like. In performing this segmentation we seek to discover natural interactive sequences to provide empirical evidence either to confirm or disconfirm analysts' interpretations – evidence against which to test assumptions about what is intended elsewhere in the sequence. These event sequences then form the base units for further analysis of conversational inferencing.

In phase two of the analysis, events are transcribed. The goal here is to prepare 'interactional texts' by setting down on paper all those perceptual cues – verbal and nonverbal, segmental and nonsegmental, prosodic, paralinguistic, and so on – shown by past and ongoing research to be demonstrably relied upon by speakers and listeners as part of the inferential process. This enables us not only to gain insights into situated understandings, but also isolate recurrent form–context relationships and show how they contribute to interpretation. These relationships can then be studied comparatively across events to yield more general hypotheses about members' contextualization practices.

In turning to conversational inference and its role in communicative practice, let me give some concrete examples to show how I view the process of understanding. Some time ago, while I was driving home from the office, my radio was tuned to a classical music station. At the end of the program the announcer, a replacement for the regular host who was returning the next day, signed off with the following words: "I've enjoyed being with **you** these last two weeks." I had not been listening very carefully, but the extra strong stress and volume on *you*, in a syntactic position where I would have expected an unaccented pronoun, caught my attention. It sounded as if the speaker was producing the second part of a formulaic exchange of compliments. But since there was no one else who could have spoken the first part (something like: "I enjoyed **being** with you") on the program, I inferred that by the way the host contextualized his talk, he was indirectly – without putting it "on record" – implicating (Grice, 1989) the first part, something like: "I hope you have enjoyed listening to me" (Gumperz, 1996). A second, somewhat more complex example comes from my analysis of the crossexamination transcript of the victim in a rape trial.

> Counsel: "You knew at the time that the defendant was interested in you, didn't you?"
> Victim: "He asked me how I'd been … just stuff like that."

In both cases, I had to search my memory of past communicative experience to construct a likely scenario or narrative plot that might suggest possible interpretations. In example one, my initial hypothesis conflicted with what I knew from listening to the radio program. My search triggered a different, more plausible scenario. In the second example, I relied on what I knew about crossexaminations as adversarial trial proceedings, where the attorney attempts to expose weaknesses in the defendant's testimony. But while these general facts tell us something about participants' motives in their choice of verbal strategy, we need to turn to what they actually said to understand what they intended to convey. By the words he chose, and by the way he contextualized his talk, the counsel raised the possibility that the defendant and the victim had a prior relationship. The victim's move, on the other hand, positioned as it is immediately after the attorney's question, implicates a different scenario, one where the two were merely casual acquaintances. In this way she sought to deny and in a sense ward off the questioner's potential attack on her testimony by suggesting another implicature.

I use the term 'activity' or 'envisionment' to refer to the above type of constructs. My claim is that all interpretation rests on such constructs. 'Activities' are an aspect of what Goffman (1974) calls 'frames' and are subject to constant change in the course of the exchange. That is, they do not apply to events as wholes; rather, they apply to each component move. I argue that, ultimately, all interpretation at the level of discursive practice relies on these constructs.

This view of understanding has some similarity to cognitive scientists' notions of 'scene,' but IS sees activities as evoking the actions of actors engaged in strategically formulating and positioning their moves to accomplish communicative ends in real-life encounters. In so doing, they rely on their presuppositions about mutual rights and obligations, as well as on ideologies of language and individuals' personalities, to get their message across. This implies that, in

addition to meaning assessment in the established sense, there are always social relationships that are continuously negotiated and renegotiated by means of the same interpretive processes by which content is assessed.

It is useful to distinguish between two levels of inference in analyses of interpretive processes: (a) global inferences of what an exchange is about and what mutual rights and obligations apply, what topics can be brought up, and what is wanted by way of a reply, as well as what can be put in words and what is to be left implied; and (b) local inferences concerning what is intended with any one move and what is required by way of a response. In this way it becomes possible to account for changes in frame as a function of the sequential positioning of moves. Both levels of interpretation involve activities as cognitive constructs. The first is related to what Goffman calls 'framing,' while the second deals with something like the conversational analyst's 'preference organization.' While contextualization cues assist in retrieving the knowledge on which activity constructs are based, they do not work in isolation. Interpretation always relies on cooccurring symbolic, lexical, and indexical signs. Signs such as prosodic contextualization cues, pausing, and others are usually produced and interpreted without conscious reflection and are therefore particularly useful in revealing frequently overlooked aspects of the interpretive process, which tend be highly sensitive to cultural variability.

Interactional sociolinguistics does not claim, of course, that the methods described here solve the problem of interpretive ambiguity. The aim is to find likely solutions that are plausible in that they show how component actions cohere in the light of an event as a whole, whether it is a three-part string of moves or a longer encounter. Inferential procedures are not like assessments of the truth or falsity of specific interpretations. The method resembles conversational analysts' ways of reconstructing the general procedures that conversationalists employ in formulating specific actions. However, it goes beyond conversational analysis in that the concern is with situated online interpretation. In studies of intercultural and interethnic communication, these methods have been useful in detecting systematic differences in interpretive practices affecting individuals' ability to create and maintain conversational involvement.

Ultimately, agreement on specific interpretations presupposes the ability to negotiate repairs and renegotiate misunderstandings, agree on how parts of an argument cohere, and follow thematic shifts and shifts in presuppositions – i.e., sharing indexical conventions. A basic issue is to show how these tasks are accomplished, and it is for this reason that IS puts so much stress on contextualization processes. Such metapragmatic activity is important for participation in everyday interaction. Without metapragmatic strategies, conversationalists do not learn and do not profit from their own misunderstandings. And this clearly has to do with verbal ability at the level of communicative practice, because it is on such practices that our ability to assess and evaluate the significance of what we perceive rests.

Let me present one more example to illustrate the multiplicity of inputs to the interpretative process. A young elementary school student, when asked to read, replied, "Ah ca-an't read." The teaching assistant thought he meant to say that he was not able to read. Examples like this have often been cited in the literature on classroom learning in support of assertions that African–American students have difficulty with literacy learning. But when we discussed this example with a group of African–American graduates, they pointed out that the expression carried contoured intonation, and given the expression's positioning after the teaching aid's question they would interpret the student as saying, essentially, "I don't want to do it right now. I want company in reading." On the basis of experiences like these I became alerted to the fact that for those familiar with African–American conventions, the differences between 'contoured' and 'noncontoured' intonation may carry information.

Such uses of prosody are not only found in African-American speech. Consider the following example I recently heard in Cambridge from someone talking about his college, King's. "Fellows of King's are well known, to fellows of King's." The second phrase is set off from the first, and therefore foregrounded, by lowering of pitch and volume. This suggests that *well known* is restricted, so as to highlight the interpretation, and that the compliment phrase applies only to other fellows of King's, not to the public at large. Understanding, as structuralists have taught us always relies on selective perceptions based on our knowledge of oppositions, and this is true for indexicals as well as for symbolic relationships. All interpretive assessments are relational. They are made with reference to something else, not necessarily directly represented in talk. Nevertheless, as the examples show, assessment involves reasoning that is intrinsically dialogic, in the sense that positioning within an exchange is essential to communication.

Conclusion

Interactional sociolinguistics does not claim to present an integrated grand theory of language, culture, linguistic ideology, interaction, and communication.

In view of the many radical transformations that mark much of the known world, such a theory would be premature. Rather, it draws upon an eclectic array of recent theories to find ways of uncovering the phenomenological grounding of communicative problems in today's social life to sharpen our understanding of the multiplicity of forces that underlie interpretation and thereby draw on what we have learned in recent years to prepare the ground for more productive theorizing.

See also: Code Switching; Conversation Analysis; Identity and Language.

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Interactionism

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The term 'interactionism' refers to a sociological approach that can be summarized in terms of the following positions. First, that interactionism is a broad perspective in sociology that owes its origins to work carried out by sociologists working at the University of Chicago between the World Wars I and II during the last century. This description applies particularly to the work of Robert Park and W. I. Thomas. However, interactionism is also connected with the tradition of symbolic interaction developed through the social psychology of George Herbert Mead, who was also based at the University of Chicago, in his famous book *Mind, self and society* (1934). Mead's triadic formulation expresses a core theme of interactionism, namely the continuum between individuated forms of life and 'wider' social processes. Other influences include the Iowa School associated with the more positivistic work of Manford Kuhn, and the later work and distinct interactionist ideas associated with Erving Goffman. The precise origins of interactionism and symbolic interactionism are contested territory (Fisher and Strauss, 1978).

Interactionism is often associated with qualitative forms of inquiry and ethnography. However, in terms of precedents and origins, the Chicago School did not favor the qualitative over the quantitative and utilized a range of methods during the course of research into urban life. However, it is the case that sociologists associated with interactionism have developed and promoted qualitative and ethnographic forms of inquiry that resonate with interactionist concerns (Gubrium and Holstein, 2002; Atkinson and Housley, 2003). Issues and innovations surrounding methodology have been an important conduit for the export and reception of interactionist ideas across the social sciences.

Interactionism is committed to empirical work and seeks to explore the social and moral organization of the world. More specifically, interactionist studies have explored the role of labeling and social types in institutions and organizations. For example, the processing of people through medical institutions is tied to interactional work associated with moral ascription, accounts, and definitions that have a powerful effect on medical outcomes and the access to scarce medical resources. W. I. Thomas's dictum concerning the 'definition of the situation' (Thomas, 1923) is seen as crucial in understanding the workings of such forms of social organization. The concept of career (Goffman, 1963; Matza, 1964) has been central to examining the formation and transformation of self and identity through time and has been important in conceptualizing social identity as an active process rather than an ascribed state where action and agency have little relevance. This notion has contributed to the development of interactionist theories of deviance (Matza, 1969), educational experience (Hargreaves *et al.*, 1975) and emotional labor (Hochschild, 1983). A crucial idea here is the way in which this perspective relates to the 'interaction order,' where such an order is accomplished through interaction on a routine and mundane basis. Knowledge and expertise, for interactionists, is grounded in situated practices and action. Thus, medical or educational knowledge is realized in action and not in second hand accounts or decontextualized 'bodies of knowledge'. Consequently, interactionist studies have contributed extensively to the sociology of the professions, knowledge, and expertise (Atkinson, 1981).

For interactionism, society is a continuum within which notions of the 'macro' and 'micro' have little relevance. Social organization is viewed as an emergent property of interaction and agency. Consequently, the way in which interactionism tackles notions of organization has relevance and resonance with more recent debates on complexity and organization.

Interactionist inquiry has sought to explore the character and organization of social phenomena through the exploration of face-to-face interaction, language, gesture, dress, narrative, stories, practices, and other 'documents of life' (Plummer, 1983). The spatial scales of interactionism do not merely involve 'people' and 'interaction.' Rather space and place have important roles in early and contemporary interactionist forms of inquiry. These conceptual concerns can be found in the Chicago School's examination of subculture and the social ecology of the city to studies of community life and institutional interaction. Furthermore, the cultural and linguistic turns within the social sciences were not felt particularly strongly within this tradition due to the fact that both linguistic and cultural practices have always been central to interactionist concerns. As Rock (1979: 116) notes, forms of language mediate the "workings of consciousness, the self and social interchange." Consequently, for interactionism, language is a central feature of social life and forms the bedrock from which society is understood to emerge and unfold within scenes, settings, and encounters. Language and symbolic action are seen as central to the

practical accomplishment of the morality of types, moral careers, being, and becoming. Furthermore, the work of Erving Goffman (1959) on face-to-face interaction was influential in the development of conversation analysis and Harvey Sacks' ethnomethodological work on the interactional organization of talk. The wider movement of discourse studies exhibits a conceptual debt to Goffmanian metaphor and thinking. In more general terms, interactionism demonstrates how culture is used and accomplished within situated action and has, in many respects, pre-empted many of the observations touted by 'postmodernism' in relation to social identity and linguistic practice (Atkinson and Housley, 2003: 159–167). The focus of interactionism on the social as process has become an accepted principle within the social sciences, although this accomplishment has often been at the expense of acknowledging the important role of interactionism in promoting this understanding.

Interactionism has cross disciplinary relevance within the social sciences and is of import to linguistics due to its long association with the examination of the role of language and language use in social context. The pragmatic basis of interactionism is consistent with its North American origins, although its reception and use in the social sciences is universal. Interactionism continues to influence sociology, cultural studies, studies of language and discourse, and social science methodology. In many respects, social science has now taken on board interactionist insights as part of core orthodoxy.

See also: Conversation Analysis; Discourse Semantics; Ethnomethodology; Identity and Language; Institutional Talk; Stereotype Semantics.

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Interactive Fiction

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The term '*interactive fiction*' (IF) refers to computer programs that provide textual, natural language output and accept a similar sort of input from the user, who is also called the '*player*' or '*interactor.*' The input from the interactor influences events in a simulated world, while the output describes what happens in this world. An IF program, often called a '*game*' or sometimes a '*work of IF*,' may involve graphics and sound, but a natural language exchange and a simulated world are, traditionally, the defining elements. Interactive fiction works are computer programs, simulated spaces, and generated narratives, and while they fall into the broad category of computer games, they have literary aspects as well. The complex nature of IF helps to explain how these simple-looking programs have continued to interest authors, interactors, and critics for several decades.

Early IF works such as *Adventure* and *Zork* were originally programmed and enjoyed noncommercially, beginning in the mid-1970s. In the 1980s, after home computers appeared, IF became big

practical accomplishment of the morality of types, moral careers, being, and becoming. Furthermore, the work of Erving Goffman (1959) on face-to-face interaction was influential in the development of conversation analysis and Harvey Sacks' ethnomethodological work on the interactional organization of talk. The wider movement of discourse studies exhibits a conceptual debt to Goffmanian metaphor and thinking. In more general terms, interactionism demonstrates how culture is used and accomplished within situated action and has, in many respects, pre-empted many of the observations touted by 'postmodernism' in relation to social identity and linguistic practice (Atkinson and Housley, 2003: 159–167). The focus of interactionism on the social as process has become an accepted principle within the social sciences, although this accomplishment has often been at the expense of acknowledging the important role of interactionism in promoting this understanding.

Interactionism has cross disciplinary relevance within the social sciences and is of import to linguistics due to its long association with the examination of the role of language and language use in social context. The pragmatic basis of interactionism is consistent with its North American origins, although its reception and use in the social sciences is universal. Interactionism continues to influence sociology, cultural studies, studies of language and discourse, and social science methodology. In many respects, social science has now taken on board interactionist insights as part of core orthodoxy.

See also: Conversation Analysis; Discourse Semantics; Ethnomethodology; Identity and Language; Institutional Talk; Stereotype Semantics.

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Interactive Fiction

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The term '*interactive fiction*' (IF) refers to computer programs that provide textual, natural language output and accept a similar sort of input from the user, who is also called the '*player*' or '*interactor.*' The input from the interactor influences events in a simulated world, while the output describes what happens in this world. An IF program, often called a '*game*' or sometimes a '*work of IF*,' may involve graphics and sound, but a natural language exchange and a simulated world are, traditionally, the defining elements. Interactive fiction works are computer programs, simulated spaces, and generated narratives, and while they fall into the broad category of computer games, they have literary aspects as well. The complex nature of IF helps to explain how these simple-looking programs have continued to interest authors, interactors, and critics for several decades.

Early IF works such as *Adventure* and *Zork* were originally programmed and enjoyed noncommercially, beginning in the mid-1970s. In the 1980s, after home computers appeared, IF became big

business. Thanks to the existence of sophisticated, free development systems for IF, individual authors have continued to make many interesting literary and gaming innovations.

Formal Qualities of Interactive Fiction

The parser and the world model are the essential components of an interactive fiction work. The parser is responsible for translating the text typed by the interactor into meaningful actions within the simulated world. The world model drives that simulation. It models the setting or space, the objects within the space, the physical laws, and even other characters.

The interactor's input usually consists of short commands to a character, called the 'player character.' Thus, typing *ask the librarian about the freeway* commands the player character to question another character, *pick up the book* means the player character is to take possession of a book that is in the immediate area, and *go east* is a command to walk in the direction specified. Frequent commands can usually be abbreviated; for instance, *east* means the same thing as *go east,* and can be further abbreviated to *e*. It is also possible to type directives that affect the game state rather than indicating action within the simulated world; *quit, save,* and *restart* are examples of these. For examples of interaction, see Figure 1.

Interactive fiction works are often able to recognize most meaningful inputs, since the textual exchange that goes on is supposed to refer to the simulated world. Simple actions within the world, and some forms of conversation with characters, are usually possible. Interactive fiction parsers can be brittle, however; unanticipated phrasings of an ordinary command, and less usual sorts of input, are sometimes not understood. Rule-based techniques have been used for understanding input, a task that involves some complexities, such as resolving the referents of pronouns used by the interactor.

The IF world is simulated with a graph of locations or areas, also called 'rooms' in deference to the first IF work, *Adventure*. (That work of IF was set in a cave, areas of which were called 'rooms' by cavers.) These locations may be connected in arbitrary ways, creating mazes or impossible configurations. They may contain not only the player character but also other characters, containers, objects, and vehicles. The player character is also a container of sorts, carrying objects that can be enumerated by typing *inventory*. In many early adventure games of this cave-crawl sort, the aim was to explore a simulated space, finding treasures and keys along the way. Players often mapped the environment on paper. Interactive fiction soon required other sorts of activities, such as the interrogation of suspects, the understanding of principles behind an unusual world, and the expression of one's understanding through actions in the world.

History and development

Adventure was the first work of IF and may still be the most famous. It was initially written in Fortran by Will Crowther, probably in 1975, on a PDP–10 owned by Bolt, Beranek, and Newman, the same computer that sent the first e-mail message. Crowther's program accepted one- or two-word commands, simulating a specific cave in Kentucky that he had explored. The interactive framework and the presence of puzzles was inspired by the noncomputer role-playing game *Dungeons and dragons*. Don Woods, at Stanford University, found the program online; he polished and expanded it, releasing the version that became canonical in April 1976. It spread through the ARPANET in the late 1970s. A common joke was that *Adventure* had set the whole field of computing back by two weeks as everyone who had access to a computer struggled to solve it. *Adventure* was never an official project for either of its creators, who allowed it to be freely distributed and reimplemented.

Several *Adventure* players wrote their own games and tried to improve on this instant classic. Tim Anderson, Marc Blank, Bruce Daniels, and Dave Lebling wrote a less realistic but more elaborate cave crawl, *Zork,* at the Massachusetts Institute of Technology, in MDL on a PDP–10. *Zork* (also known, briefly, as *Dungeon*) accepted longer input phrases, extended the world model to include containers and vehicles, and featured a character, the thief, who was elaborately described and who played an interesting role in the interactive experience. Other early IF included the massive *Acheton* (by Jon Thackray, David Seal, and Jonathan Partington) and other games for Cambridge University's Phoenix mainframe computer, as well as *Haunt,* created by John Laird at Carnegie Mellon University.

By 1978 Scott Adams had started selling his *Adventureland,* a primitive, *Adventure*-like game for home computers that was the first of a popular series of games sold by U.S.-based Adventure International. Scott and Alexis Adams also published the code to their *Pirate adventure* in a magazine in 1980, offering an important early illustration of how IF could be programmed.

Three of the *Zork* creators joined with others to found Infocom in 1979. Infocom became the most successful U.S. IF company, developing 35 titles, many of which were both engaging as games and

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Old Winery                                        Score: 0
(in Meldrew Hall)                                 Turns: 4          June 3rd, 1993


It's become a matter of pride now not to give up. That tourist map of Paris must be up
here somewhere in all this clutter, even if it has been five years since your last trip.
And it's your own fault. It looks as if your great-grandfather was the last person to tidy
up these lofts...

CURSES
An Interactive Diversion
Copyright (c) 1993, 1994, 1995 by Graham Nelson.
Release 16 / Serial number 951024 / Inform v1600 Library 5/12
Standard interpreter 1.0

Attic
The attics, full of low beams and awkward angles, begin here in a relatively tidy area
which extends north, south and east. The wooden floorboards seem fairly sound, just as
well considering how heavy all these teachests are. But the old wiring went years ago, and
there's no electric light.

A hinged trapdoor in the floor stands open, and light streams in from below.

>go north

Old Winery
This small cavity at the north end of the attic once housed all manner of home-made wine
paraphernalia, now lost and unlamented. Steps, provided with a good strong banister rail,
lead down and to the west, and the banister rail continues along a passage east.

You can see a labelled glass demijohn (which is closed) (in which are a nasty-looking red
battery and a tourist map) here.

As you disturb the still air, the attic key, which was balanced on top of the demijohn,
slips onto the floor and disappears into a crack in the floorboards. Your spirits sink as
it does, rattling down some distance. How on earth are you going to get it back?

>look at the map
The good news is that it has excellent grid references, which are easy to look up. The bad
news is that it is a map of central Hamburg.

>open the demijohn
Your hands slip on the screw-top of the demijohn and can't get a grip.

>
```

Figure 1 The beginning of an interaction with *Curses,* an important interactive fiction work from the mid-1990s, is shown in this screenshot. The interactor typed the text that appears after the > prompt; the rest of the text was printed by the computer program.

compelling from a literary standpoint. These included *Zork I-III,* a home computer trilogy adapted from the mainframe *Zork*; *Deadline,* a mystery by Blank; *A Mind Forever Voyaging,* a dystopia by Steve Meretzky; *Trinity,* a politically charged fantasy by Brian Moriarty; and an IF adaptation of *The hitchhiker's guide to the galaxy,* which Douglas Adams wrote with Meretzky. While Infocom dominated IF in the United States, other companies developed interesting and innovative works: Synapse recruited Robert Pinsky to write *Mindwheel,* which was published in 1984; Thomas Disch, a well-respected novelist, created *Amnesia* (published in 1986) with the Cognetics Corporation.

During the 1980s, Australia's Melbourne House released several games, including an adaptation of J. R. R. Tolkien's *The hobbit* by Philip Mitchell and Veronika Megler. This 1983 release was still based on textual commands and replies, but it also incorporated graphics that showed what the current area looked like, a technique first used in *Mystery house,* a 1980 game by Ken and Roberta Williams. In the United Kingdom, Level 9 was the first major IF company. Founded by Pete, Mike, and Nick Austin, the company's many IF releases include the 1983 *Snowball,* a science-fiction adventure by the three brothers, and Pete Austin's 1987 *The knight orc,* in which the player character is humorously hateful. Magnetic Scrolls, founded in the United Kingdom in 1984 by Anita Sinclair, Ken Gordon, and Hugh Steers, started off producing IF for more advanced 16-bit computers. Their first title was *The pawn,* written by Rob Steggles, with graphics by Geoff Quilley.

The commercial success of IF did not last long into the 1990s. While this has led some to believe that the form is dead or irrelevant, IF actually seems to have simply returned to the production and distribution model of the late 1970s: Today, people skilled as both programmers and writers develop IF unofficially and offer their work for free online, just as Crowther and Woods did. Development has been enabled by free IF languages, mainly Graham Nelson's Inform and Mike Roberts's Text Adventure Development System, and has been spurred on by the online IF Competition, a contest for short games that has run annually since 1995.

Since developments in the mid-1990s (most notably, Graham Nelson's 1993–1995 *Curses* (**Figure 1**), released at the same time as Inform), IF authors have continued to innovate. Dan Shiovitz's *Bad machine* (1998) joins concepts of 'codework' (in which English and programming language typography are combined) with IF's systematic simulated world. Adam Cadre's *Varicella* (1999) is an intricate palace intrigue with a cast of vile characters. Emily Short's *Galatea* (2000) situates a complex 'chatterbot' (or conversational character) in a museum gallery. Andrew Plotkin's *Shade* (2001) presents what looks like a clichéd one-room game in an apartment, but the player character's ordinary actions reveal a disturbing reality.

While this summary history has only covered English-language IF, IF has been written in other languages at least since the commercial era of the 1980s. Communities of independent IF authors who write in German, Italian, Spanish, and other languages have been active since the 1990s.

Connections to other Literature and Computing

The many aspects of IF suggest connections to literary, computational, and gaming developments in the past, as well as to broader categories of game and literature. Because IF has several interesting aspects, it is sometimes marginalized in discussions of computer games or of electronic literature by those would prefer to place it in someone else's category. Interactive fiction is also less approachable and more demanding than many other types of computer literature or games. However, some find IF particularly interesting precisely because of the demands it places on the interactor and because of its many unusual aspects.

From one perspective, IF works are machines for producing texts. The history of such machines extends back beyond the electronic computer to the ancient Chinese oracle, the I ching, and to Raymond Llull's 13th-century wheel for generating all possible true propositions about God. In the 20th century, such machines took more explicitly literary forms; Raymond Queneau's *Cent mille millard de poèmes* (1961), a stack of sonnets 10 layers deep whose 14 lines can each be interchanged, is one example. Although the *Poèmes* are quite unlike *Adventure* in their tone, appearance, and workings, the author of an IF does have to deal with the fact that a particular text may be seen in many different contexts, just as Queneau did. Formality regularly is sometimes part of the answer to this difficulty, as it was in the *Poèmes*.

An IF program is also a machine for understanding texts. It shares this quality with Terry Winograd's 1972 system SHRDLU, a powerful system for natural language understanding that had a world model and parser and that seems to have been an indirect influence on early IF. SHRDLU graphically presented a 'blocks world' that could be manipulated by a robot, who was commanded with sentences, but it was not designed to offer a compelling space for exploration, a challenging quest, or an overarching riddle. Another predecessor was Joseph Weizenbaum's 1964–1966 *Eliza*, which ran the *Doctor* script to simulate a psychotherapist. *Eliza/doctor* did not understand inputs deeply and did not model a world, but it did provide a compelling scenario that drew people to interact with it.

Interactive fiction grew out of a tradition of recreational computing, one that extended back past the 1962 creation of *Spacewar,* the first modern video game. Numerous simple but engaging games had been developed before *Adventure;* one important one was the much less descriptive, but nevertheless

innovative, cave game *Hunt the wumpus,* written by Gregory Yob in Basic in 1972. *Adventure,* in addition to being the first IF work, was also the first in the adventure game category. Interactive fiction has generally been an influential part of that category, which takes its name from *Adventure* and includes point-and-click graphical adventures that do not involve an exchange of language, such as *Myst*. Although less directly descended from interactive fiction, action-adventure games such as *Tomb raider* have also been influenced by IF.

While IF makes up an important part of computer gaming, the exchange of writing that takes place allows IF to have interesting literary dimensions as well. IF works, which have been presented at literary readings and have been taught and studied in literary contexts, are examples of electronic literature, as are works of hypertext fiction, chatterbots (in the vein of *Eliza/doctor*), interactive poems, and other electronic documents and computer programs that have important literary aspects.

See also: Literature and the Language of Literature; Natural Language Interfaces; Natural Language Understanding, Automatic.

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http://www.wurb.com/if/index – Baf's guide to the IF archive.

http://www.ministryofpeace.com/if-review/ – The IF archive, the main repository for free IF since the early 1990s.

Intercultural Pragmatics and Communication

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Intercultural Pragmatics

In her book *The Opposite of Fate* the American writer of Chinese descent, Amy Tan (2003: 54), writes of a time when tragedy hit her life and when, as a result, she decided to quit the doctoral program in linguistics that she was pursuing at the time: "The doctorate, I decided, would be a worthless appendage. Besides (...), how was I bettering the world by teaching others to examine the intricacies of dead languages and the like?" Amy Tan's words echo these of the linguist Dell Hymes (1996: xii), who speaks of the fascination of modern linguistics with "aspects of language as an abstract formal device" and who sees as a more worthwhile and more timely goal "to think about language as part of life" (Hymes, 1996: x) and to develop a "linguistics that someone needs (...) – a linguistics that every student of human life should know, that one would like everyone to know (...), that should be part of general education" (Hymes, 1996: 220).

Intercultural pragmatics is a part of contemporary linguistics which is most concerned with "language as a part of life," indeed, with language as it affects millions of lives in the contemporary world, and which arguably every student of human life should know. It is a discipline that has developed in response to what Istvan Kecskes (2004), the editor of the new journal *Intercultural Pragmatics*, calls "the challenges of a new era."

These challenges of a new era involve, above all, interaction among people from different cultures. Pragmatics as a part of linguistics has always been concerned with interpersonal interaction – but (as will be discussed below) in the past it was often locked in a monolingual and monocultural framework, derived,

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These challenges of a new era involve, above all, interaction among people from different cultures. Pragmatics as a part of linguistics has always been concerned with interpersonal interaction – but (as will be discussed below) in the past it was often locked in a monolingual and monocultural framework, derived,

essentially, from the English language and Anglo culture. In the contemporary world, however, a monolingual and monocultural perspective on language use is no longer tenable, and in fact has become glaringly irrelevant and obsolete.

In a recent book entitled *Becoming Intercultural*, the Korean-American scholar Young Yun Kim (2001: 1) writes: "Millions of people change homes each year, crossing cultural boundaries. Immigrants and refugees resettle in search of new lives (...) In this increasingly integrated world, cross-cultural adaptation is a central and defining theme." Cross-cultural adaptation is particularly relevant to immigrants and refugees, but the need for cross-cultural understanding extends further. In modern multiethnic societies, newcomers need to learn to communicate with those already there; and those already there need, for their part, to learn to communicate with the newcomers. In a world that has become a global village, even those living in their traditional homelands need to develop some cross-cultural understanding in order to be able to cope with the large world confronting them in a variety of ways.

Language has been defined, traditionally, as a tool for communication, and linguistics as the study of language. In practice, however, the dominant linguistic paradigm of the second half of the 20th century had very little to do with human communication, and even less with problems of cross-cultural communication. In the last three decades, however, linguistics has 'greened' and the formalistic approaches of generative grammar have been supplemented, if not supplanted, by approaches more concerned with meaning, culture and people, than with formalisms.

The "pragmatic turn" (Mey, 2004) in linguistics is part of this 'greening.' But the paradigms of pragmatic research that at first came to the fore were derived largely from philosophical speculation based on English (especially in the works of Austin, Searle, and Grice) and did not reflect the mass phenomenon of interaction among people from different cultural backgrounds. As Kecskes writes in his editorial in the first issue of *Intercultural Pragmatics*, "We live in an age of globalization that is characterized by rapid changes in every field of life. This is resulting in a revision of theories and ideas in several branches of the humanities and sciences, including pragmatics. The existing paradigms cannot always accommodate new research. This is especially true for pragmatics, which is considered a perspective in language and communication rather than the study of a particular aspect of language" (Kecskes, 2004: 1).

Intercultural pragmatics studies, above all, problems arising in communication between people with different cultural backgrounds and different cultural expectations. A good example of such problems is provided by Amy Tan's account of the difficulties that her Chinese-American mother continually faced in her interactions with other Americans. As Amy Tan reports, "... some of my friends tell me they understand 50 percent of what my mother says. Some say they understand 80 to 90 percent. Some say they understand none of it, as if she were speaking pure Chinese. But to me, my mother's English is perfectly clear, perfectly natural. It's my mother tongue. Her language, as I hear it, is vivid, direct, full of observation and imagery. That was the language that helped shape the way I saw things, expressed things, made sense of the world." Amy Tan's mother's English was fluent, but its grammar was non-standard, and her way of speaking made it appear "fractured", "broken", "limited" – and her "limited" communicative competence made her also appear to be limited as a person. "I know this for a fact, because when I was growing up, my mother's 'limited' English limited my perception of her. I was ashamed of her English. I believed that her English reflected the quality of what she had to say. That is, because she expressed them imperfectly her thoughts were imperfect. And I had plenty of empirical evidence to support me: the fact that people in department stores, at banks, and at restaurants did not take her seriously, did not give her good service, pretended not to understand her, or even acted as if they did not hear her."

Aware of the limitations of her communicative competence in English, Amy Tan's mother often got her daughter to speak to people on the phone pretending that she was her mother. For example, when Amy was fifteen, she had to call her mother's stockbroker in New York presenting herself as "Mrs. Tan."

> And my mother was standing in the back whispering loudly, 'Why he don't send me check, already two weeks late. So mad he lie to me, losing me money.' And then I said in perfect English, 'Yes, I'm getting rather concerned. You had agreed to send the check two weeks ago, but it hasn't arrived.' Then she began to talk more loudly. 'What he want, I come to New York tell him front of his boss, you cheating me?' And I was trying to calm her down, make her be quiet, while telling the stockbroker, 'I can't tolerate any more excuses. If I don't receive the check immediately, I am going to have to speak to your manager when I'm in New York next week.' And sure enough, the following week there we were in front of this astonished stockbroker, and I was sitting there red-faced and quiet, and my mother, the real Mrs. Tan, was shouting at his boss in her impeccable broken English.

What is at issue here is not just the grammatical incorrectness of the mother's English, but above all, her way of speaking – her loudness, her shouting, her

emotional intensity, her "directness" (as Tan describes it), her inability to use understatement such as "I'm getting rather concerned."

Amy Tan's attitude to, and interpretation of, her mother's difficulties is in itself instructive, as it reflects aspects of the confusion and theoretical insecurity that have until recently plagued the field of intercultural pragmatics, and to some extent still do. On the one hand, the vignettes offered in Amy Tan's book clearly show differences between Chinese communicative norms and expectations and the Anglo-American ones, and throw light on cultural misunderstandings related to those differences. On the other hand, Tan, like many linguists of her generation, is clearly frightened of stereotyping, and she prefers to deny the reality, or at least describability, of cultural differences such as those between Chinese and American culture, professing instead her faith in human universals. And yet her own experience, conveyed with great talent in her books, clearly reflects the reality of those differences, and the urgent need for them to be described and widely understood – especially in countries where people of different cultural backgrounds have to live together. Thus, at times Tan's observations and intuitions as a writer come into conflict with the ideologies that can perhaps be traced to her linguistic education in the 1970s.

In the 1970s, the pragmatic scene was largely dominated by the search for the universals of politeness and for the universal maxims of conversation. The widely accepted paradigms were those of Brown and Levinson's (1978) theory of politeness, which affirmed "pan-cultural interpretability of politeness phenomena" (Brown and Levinson, 1978: 288), and Grice's theory of conversation, which posited a number of universal conversational principles.

In 1978, Brown and Levinson set out "to describe and account for what is in the light of current theory a most remarkable phenomenon. This is the extraordinary parallelism in the linguistic minutiae of the utterances with which people choose to express themselves in quite unrelated languages and cultures" (Brown and Levinson, 1978: 60). A quarter of a century later, it is increasingly widely accepted that this "extraordinary parallelism" was largely an illusion due to that "light of current theory." What is seen as more remarkable today is the extent of cross-linguistic and cross-cultural differences in ways of speaking. Brown and Levinson (1978: 61) described it as their goal "to rebut the once-fashionable doctrine of cultural relativity in the field of interaction" and "to show that superficial diversities can emerge from underlying universal principles and are satisfactorily accounted for only in relation to them." Their major conclusion was that "interactional systematics are based largely on universal principles" (Brown and Levinson, 1978: 288). Today, it is increasingly accepted that those diversities in ways of speaking and interacting are not superficial at all and that they can be largely accounted for in terms of different cultural attitudes and values; and the "cultural relativity in the field of interaction" is increasingly seen as a reality and an important subject for investigation.

In 1983 this author presented, at a meeting of the Sydney Linguistic Circle, a paper entitled 'Different cultures, different languages, different speech acts: English vs. Polish' (Wierzbicka, 1985), which argued that the supposedly universal maxims and principles of politeness were in fact rooted in Anglo culture and which in time became the nucleus of her book *Cross-cultural Pragmatics* (Wierzbicka, 1991/2003). The paper argued, in particular, that the "freedom from imposition," which Brown and Levinson (1978: 66) saw as one of the most important guiding principles of human interaction, was in fact an Anglo cultural value, and that the avoidance of "flat imperative sentences," which Searle among many others attributed to the "ordinary conversational requirements of politeness," did not reflect "universal principles of politeness" but rather, expressed special concerns of modern Anglo culture. At the same time, some other linguists, too, were raising their voices against the 'universals of politeness' approach to pragmatics and were arguing in defense of culture as a key factor determining ways of speaking, trying to link the language-specific ways of speaking with different cultural values. The scholars who in the inhospitable post-Gricean climate of the 1980s (or so) were opposing a facile universalism and pioneering intercultural (as against pancultural) pragmatics, included, among others, Ho-min Sohn, the author of "Intercultural communication and cognitive values" (1983); Tamar Katriel, the author of *Talking straight: Dugri speech in Israeli Sabra culture* (1986); Yoshiko Matsumoto, the author of 'Reexamination of the universality of face: politeness phenomena in Japanese' (1988); James Matisoff, the author of *Blessings, curses, hopes, and fears: psycho-ostensive expressions in Yiddish* (1979); Thomas Kochman, the author of *Black and white styles in conflict* (1981); and Sachiko Ide, the author of a study on the Japanese value of *wakimae* or 'discernment' (1989). In the 1990s, the broadly-based intercultural pragmatics grew further, bearing rich fruit in the works of authors such as Donal Carbaugh, the author of *Talking American* (1988); Cliff Goddard, the author of papers such as 'Cultural values and 'cultural scripts' of Malay' and 'Communicative style and cultural values – Cultural scripts of Malay' (1997, 2000); Jean Harkins, the author of *Bridging two worlds: Aboriginal English*

and cross-cultural understanding (1994); Felix Ameka, the author of studies on Ghanaian conversational routines and the editor of a special issue of the *Journal of Pragmatics* on interjections (1992); Michael Clyne, the author of *Intercultural communication at work: Cultural values in discourse* (1994), and many others. Last but not least, an important role was played by two open-minded and cross-culturally alive journals: Jacob Mey's *Journal of Pragmatics* and Marcelo Dascal's *Pragmatics and Cognition*.

Outside linguistics, there were anthropologists who did not give in to the superficial and anti-cultural universalism of the time and who continued to focus on the language particulars and to probe the links between ways of speaking, ways of thinking, ways of feeling and ways of living. To mention just a few names and works, particularly important from a linguistic point of view: Catherine Lutz, the author of the classic book *Unnatural emotions: Everyday sentiments on a Micronesian atoll and their challenge to Western theory* (1988); Richard Shweder, the founder of cultural psychology and the author of *Thinking through cultures – Expeditions in cultural psychology* (1991); Dorothy Holland and Naomi Quinn, the editors of *Cultural models in language and thought* (1987); Roy D'Andrade and Claudia Strauss, the authors of *Human motives and cultural models* (1992), and Claudia Strauss and Naomi Quinn (1997), the authors of *A cognitive theory of cultural meaning*. Here, too, two journals played an important role: *Ethos* and *Culture and Psychology*.

There were also some philosophers who started to question the universalist pragmatic theories of Grice, Griceans, and neo-Griceans from a philosophical as well as cross-linguistic point of view. In particular, Wayne Davis (1998) argued in a book-length critique that "the Gricean theory has been barren" and that "the illusion of understanding provided by the Gricean theory has only served to stifle inquiry" (Davis, 1998: 3). "The Gricean explanation of common implicatures" is, Davis argued, "undermined by the existence of nonuniversal implicature conventions" (Davis, 1998: 183). For example, Grice and his followers had claimed that the correct interpretation of a tautology like *War is war* could be calculated from some universal maxims of conversation. Davis pointed out that this claim is refuted by the observation that such tautologies receive different interpretations in different cultures, and he concluded: "The moral is clear. Generalized tautology implicatures (...) are not explained by Gricean Maxims" (Davis, 1998: 46). In a similar context, Davis (1998: 168) quoted and endorsed the present author's own observation that "from the outset, studies in speech acts have suffered from an astonishing ethnocentrism" (Wierzbicka, 1985: 145).

> Many of the criticisms I present have been known for some time. But the import and seriousness of the defects individually and collectively have not been widely appreciated, and the problems have had little impact on the general acceptance of Gricean theory. The best known critics of the Gricean theory have either expressed confidence that solutions would be found within the Gricean framework (...) or presented alternative theories with similar defects (Sperber and Wilson, 1986). (...) Only one author (Wierzbicka, 1987) has argued that the conception is fundamentally flawed. (Davis, 1998: 3)

From the historical, as well as theoretical, point of view, it is important to note that a powerful impulse for the rise of intercultural pragmatics in the last decade came from the growing field of studies focussed on cross-cultural (or intercultural) communication. When in her 1986 book *That's not what I meant!* Deborah Tannen stated that "the future of the earth depends on cross-cultural communication," she was expressing a perception which was growing, especially outside academic circles, but also increasingly within. At a time when every year millions of people crossed the borders, not only between countries but also between languages, and when more and more people of many different cultural backgrounds had to live together in modern multiethnic and multicultural societies, it was becoming increasingly evident to many scholars that research into differences between cultural norms associated with different languages was essential for peaceful co-existence, mutual tolerance, necessary understanding in the workplace and in other walks of life in the increasingly global and yet in many places increasingly diversified world. It was more and more frequently noted that the once popular assumption that the principles of politeness were essentially the same everywhere and could be described in terms of universal maxims such as those listed in Leech's *Principles of Pragmatics* (1983) flew in the face of reality as experienced by millions of ordinary people – refugees, immigrants, the children of immigrants, caught between their parents and the society at large, cross-cultural families and their children, and also by monolingual stay-at-homes who suddenly found themselves living in societies that were ethnically, culturally and linguistically diverse.

The tremendous practical importance of identifying, and describing, the culture-specific norms of politeness and, more generally, norms of interpersonal interaction has been increasingly recognized in the field of language teaching. In this field, too, the realization grew steadily over the last decade or so

that 'Grice's Razor,' which extolled the economical virtues of concentrating on the supposed universality of the underlying principles and which cut off unnecessary culture-specific explanations, spelled out a disaster for the students' communicative competence and their ability to survive socially in the milieu of their other language. As Kramsch (1993: 8–9) put it in her book *Context and culture in language teaching*, "If (...) language is seen as social practice, culture becomes the very core of language teaching. Cultural awareness must then be viewed both as enabling language proficiency and as being the outcome of reflection on language proficiency. (...) Once we recognize that language use is indissociable from the creation and transmission of culture, we have to deal with a variety of cultures."

The present writer's long polemics against the 'universals of politeness' and 'universal principles of human conversation' was rooted in her own experience as a language migrant (to use a term introduced by Besemeres, 2002) – from Polish into English, especially academic English, and also, into Australian English (Wierzbicka, 1997). On a very small scale, her 1997 cross-cultural memoir illustrates a noteworthy aspect of intercultural pragmatics as it has evolved over the last decade or so: the new alliance between, on the one hand, linguistic pragmatics, based on 'hard' linguistic evidence and rigorous linguistic analysis, and, on the other, the growing field of study focused on the 'soft' data of personal experience of cross-cultural and cross-linguistic living.

I will illustrate this alliance with three excerpts from that memoir, which deliberately takes a personal rather than objective perspective. As many recent writers on the subject have argued, such a personal perspective legitimizes the insistence with which proponents of intercultural pragmatics have been challenging, in the last decade or so, the earlier paradigms. Commenting on her life in Australia, to which she emigrated from Poland in 1972 (having married an Australian), the author wrote:

> I had to start learning new "cultural scripts" to live by, and in the process I became aware of the old "cultural scripts" which had governed my life hitherto. I also became aware, in the process, of the reality of "cultural scripts" and their importance to the way one lives one's life, to the image one projects, and even to one's personal identity.
>
> For example, when I was talking on the phone, from Australia, to my mother in Poland (15,000 km away), with my voice loud and excited, carrying much further than is customary in an Anglo conversation, my husband would signal to me: 'Don't shout!' For a long time, this perplexed and confused me: to me, this 'shouting' and this 'excitement' was an inherent part of my personality. Gradually, I came to realise that this very personality was in part culturally constituted. (Wierzbicka, 1997: 119)

The realization of the close links between one's ways of speaking, one's personality and one's cultural background raised for the author the question that countless other immigrants are constantly confronted with: to what extent was it desirable, or necessary, to adapt to one's new cultural context (changing oneself in the process)?

> Early in our life together, my husband objected to my too frequent – in his view – use of the expression *of course*. At first, this puzzled me, but eventually it dawned on me that using *of course* as broadly as its Polish counterpart *oczywiście* is normally used would imply that the interlocutor has overlooked something obvious. In the Polish 'confrontational' style of interaction such an implication is perfectly acceptable, and it is fully consistent with the use of such conversational particles such as, for example, *przecież* ('but obviously – can't you see?'). In mainstream Anglo culture, however, there is much more emphasis on 'tact', on avoiding direct clashes, and there are hardly any confrontational particles comparable with those mentioned above. *Of course* does exist, but even *of course* tends to be used more in agreement than in disagreement (e.g. 'Could you do X for me?' – 'Of course'). Years later, my bilingual daughter Mary told me that the Polish conversational expression *ależ oczywiście*: 'but-EMPHATIC of course' (which I would often replicate in English as 'but of course') struck her as especially 'foreign' from an Anglo cultural point of view; and my close friend and collaborator Cliff Goddard pointed out, tongue in cheek, that my most common way of addressing him (in English) was 'But Cliff....'. (Wierzbicka, 1997: 119)

Thus, the author had to learn to avoid overusing not only "of course" but also many other expressions dictated by her Polish cultural scripts; and in her working life at an Anglo university, this restraint proved invaluable, indeed essential.

> I had to learn to 'calm down', to become less 'sharp' and less 'blunt', less 'excitable', less 'extreme' in my judgements, more 'tactful' in their expression. I had to learn the use of Anglo understatement (instead of more hyperbolic and more emphatic Polish ways of speaking). I had to avoid sounding 'dogmatic', 'argumentative', 'emotional'. (There were lapses, of course.) Like the Polish-American writer Eva Hoffman (1989), I had to learn the use of English expressions such as 'on the one hand..., on the other hand', 'well yes', 'well no', or 'that's true, but on the other hand'.
>
> Thus, I was learning new ways of speaking, new patterns of communication, new modes of social interaction. I was learning the Anglo rules of turn-taking ('let me finish!', 'I haven't finished yet!'). I was learning not to use the imperative ('Do X!') in my daily interaction

> with people and to replace it with a broad range of interrogative devices ('Would you do X?' 'Could you do X?' 'Would you mind doing X?' 'How about doing X?' 'Why don't you do X?' 'Why not do X?', and so on). (Wierzbicka, 1997: 119–120)

As these quotes make clear, for writers whose view of intercultural pragmatics was informed by their own personal experience, their knowledge of what was involved was not purely theoretical: above all, it was practical. They were convinced that the insistence on cultural differences was not only theoretically justified (because these differences were real) but also that acknowledging them, and above all, describing them, was vitally important for the practical purposes of intercultural communication and understanding; and in the case of immigrants, of daily living.

The 1991 edition of Wierzbicka's *Cross-cultural pragmatics* was an attempt to challenge the Gricean and Brown and Levinsonian paradigms, and to expose the anglocentric character of various supposedly universal maxims, principles and concepts (including the key concept of 'face,' which was the linchpin of Brown and Levinson's theory of politeness). Twelve years later, when the expanded second edition of the book was published, the tide had changed. Nonetheless, paradoxically, while the universalist pragmatic frameworks developed in the 1970s were gradually losing their appeal, the program of actually **describing** the different ways of speaking and thinking linked with different cultures continued to encounter a great deal of resistance.

As the differences between cultures and subcultures were increasingly celebrated, there was also a growing suspicion of any generalizations as to what exactly these differences might be. Diversity was seen as beautiful but also as inherently elusive and indescribable. With the growing emphasis on diversity, the view gradually developed that diversity was everywhere, and that while those differences could and should be celebrated, they could not be described. Thus, in many quarters, there developed a great fear of the notion of culture (especially, a culture), and attempts to identify any differences between particular cultures came to be seen as static culturologies.

Those who promote intercultural pragmatics accept, of course, that cultures are not essences, that cultures are not monads, and that cultures have no fixed contours. But they refuse to conclude from this that cultures cannot be discussed, described, and compared at all. They point out that it would also be a conclusion denying the subjective experience of immigrants, and one going against their vital interests; and that to deny the validity of the notion of culture-specific discourse patterns (including Anglo discourse patterns) is to place the values of political correctness above the interests of socially disadvantaged individuals and groups. In particular, they argue that with the increasing domination of English in the world, both Anglos and non-Anglos need to learn about various Anglo cultural scripts, and that to try to describe these scripts, and to explain the values reflected in them, is not to indulge in stereotyping, but on the contrary, it is to help Anglos to overcome their inclination to stereotype immigrants as rude, while at the same time helping immigrants to better fit in, socially, and to improve their lives (cf., e.g., Wierzbicka, 2002a, 2002b).

In this context, it has become more and more clear that the key issue is that of the metalanguage in which different speech practices and norms can be usefully described and compared. At a time when the English language was commonly taken as a baseline for all comparisons, even those pragmaticists who were more interested in cross-linguistic variation than in supposed universals of politeness or a supposedly universal logic of conversation often assumed that English lexical categories provided legitimate analytical tools for such comparisons. In particular, it was widely assumed that English words such as 'request,' 'apology,' and 'compliment' could be relied on as such tools, and that one could study how requests, apologies, compliments and so on are realized in this or that language and culture (cf., e.g., Blum-Kulka *et al.*, 1989). The fact that many other languages do not have words corresponding in meaning to such English categories was either ignored or dismissed as unimportant.

Similarly, English folk-categories such as directness, formality, harmony or politeness were accepted uncritically as valid tools for intercultural pragmatics, as were also lexical categories of technical English such as 'face' (Brown and Levinson, 1978), 'relevance' (Sperber and Wilson, 1986) and so on. As discussed, for example, in Goddard (2004: 144), the ethnocentrism "inherent in choosing a descriptive metalanguage which is language-specific and culture-specific (. . .) necessarily imposes an 'outsider perspective'" on the language and culture described in such terms. At the same time, the alternative practice of using indigenous terms (e.g. *enryo*, *wa*, *omoiyari* in the case of Japanese) involved obvious translation problems in reverse.

The approach to intercultural pragmatics advocated and implemented in the so-called NSM approach seeks to solve the crucial problems of a suitable metalanguage for intercultural pragmatics by pointing to the existence of a shared lexical and grammatical core in all languages – a core which can be used as a culture-neutral and language-independent natural

semantic meta-language (hence the term "NSM"). This approach has now identified, on an empirical basis, 60 or so universal semantic primes, whose English exponents are linked with simple words such as 'good' and 'bad,' 'someone' and 'something,' 'people,' or 'know,' 'think,' and 'want.' (For exponents in languages other than English, see Goddard and Wierzbicka (eds.), 2002). Relying on this empirically established set of primes, the proponents of the NSM approach to intercultural pragmatics have produced a large body of detailed, highly specific descriptions of culture-specific norms and practices, formulated neither in technical or semitechnical English terms such as 'formal' and 'informal' or 'direct' and 'indirect,' nor in terms of English folk categories such as 'apology,' 'compliment,' 'sarcasm,' 'understatement' and so on, but rather, in terms of simple words which have equivalents in all languages.

The identification of universal semantic primes that have lexical exponents in all languages has allowed NSM researchers to develop a theory of cultural scripts, where a cultural script is a hypothesis about culture-specific attitudes, assumptions and norms formulated in simple words and testable in consultation with native speakers and cultural insiders. This theory has now produced a large body of fine-grained culture-specific descriptors and cross-cultural comparisons. (See, e.g., Goddard 1997, 2000, 2004; Goddard and Wierzbicka (eds.), 2004, in press; Wierzbicka, 1991/2003, 1996, 2002b.)

The proponents of the cultural scripts approach to intercultural pragmatics argue that the use of such concepts can free researchers from what Goddard (2004) calls "terminological ethnocentrism" and give them a neutral, culture-independent metalanguage for describing different cultural norms. At the same time, the use of such concepts allows them to capture the native speaker's point of view, without distorting it through the application of descriptive tools rooted in the English language or Anglo academic culture.

On this point, the NSM-based approach to cross-cultural pragmatics differs radically from that characteristic of works like Blum-Kulka *et al.*'s (1989) *Cross-cultural pragmatics: Requests and apologies* or Kasper (and the subsequent work by Blum-Kulka and her colleagues). The proponents of the NSM approach argue that while the works in this tradition must be appreciated for their attention to cultural differences reflected in ways of speaking, they cannot escape the charge of terminological, and not only terminological, ethnocentrism. Given that words such as 'requests' and 'apologies' stand for conceptual artifacts of the English language, using them as analytical tools inevitably involves imposing an Anglo perspective on other languages and cultures. To describe ways of speaking across languages and cultures in terms of folk categories encoded in English is like describing English talk in terms of Japanese, Hebrew or Russian folk categories (e.g., the Japanese *wakimae*, cf. Ide, 1989, the Hebrew *dugri*, cf. Katriel, 1986, or the Russian *vran'e*, cf. Wierzbicka, 2002b); but of course nobody would wish to describe English in such terms.

As the present author (cf., e.g., Wierzbicka, 1991/2003) and colleagues have repeatedly argued, the conviction shared by so many semanticists and pragmaticists that it is all right to try to describe all languages through English terms untranslatable into the language of speakers whose ways of thinking those terms are supposed to explain and illuminate, shows the same Anglocentrism that the Gricean and post-Gricean maxims, principles, and conversational postulates once did. Such an anglocentrism is sometimes defended in the name of science. For example, Kay and Berlin in various publications defend the use of English words such as 'color' to analyze thought processes of speakers of languages that have no word like 'color' in the name of scientific discourse. Their opponents (including the present author) argue that English has no special status in describing the ways of thinking of speakers of languages other than English. Words such as 'good' and 'bad' or 'say,' 'think,' 'know' and 'want,' which, as evidence suggests, have morpholexical exponents in all languages, free the analysts from an Anglo perspective, while allowing them at the same time to retain a mini-lexicon of 60 or so English words as a practical lingua franca for articulating different culture-specific conventions, norms and values (and more generally, ways of thinking). For example, claims that in many societies people are guided in their ways of speaking by principles such as 'don't impose' or 'be relevant' depend on the English words 'impose' and 'relevant,' which have no equivalents in other languages. To say that speakers of those other languages are deeply concerned about some values which – as it happens – can only be formulated in English means to give English a privileged position in the humankind's mental world.

The theory of cultural scripts seeks to formulate norms, values and principles of language use in words which, unlike 'impose' or 'relevant,' have equivalents in all other languages, that is words that, it is argued, stand for universal human concepts. These universal words (or word-like elements) are the same words in which semantically encoded meanings are also explicated.

For other current approaches to intercultural pragmatics, see, in particular, the first issue (2004, 1) of the new journal *Intercultural Pragmatics*.

See also: Culture in Language Teaching; Identity in Sociocultural Anthropology and Language; Identity: Second Language; Language Change and Cultural Change; Natural Semantic Metalanguage; Politeness; Speech Genres in Cultural Practice.

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Interjections

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Interjections

Interjections are words that conventionally constitute utterances by themselves and express a speaker's current mental state or reaction toward an element in the linguistic or extralinguistic context (*see* **Context, Communicative**). Some English interjections are words such as *yuk*! 'I feel disgusted', *ow*! 'I feel sudden pain', *wow*! 'I feel surprised and I am impressed', *aha*! 'I now understand', *hey*! 'I want someone's attention', *damn*! 'I feel frustrated', and *bother*! 'I feel annoyed'. Such words are found in all languages of the world. This article surveys the different uses and definitions of the term 'interjection' and the different types of interjections that are found in the languages of the world. It also explores the relationship of interjections to other pragmatic devices such as particles, discourse markers, and speech formulae. (*see* **Formulaic Language**).

The Definition of Interjection

Interjections may be defined using formal, semantic, or pragmatic criteria. From a formal point of view, an interjection is typically defined as a lexical form that (a) conventionally constitutes a nonelliptical utterance by itself, (b) does not enter into construction with other word classes, (c) does not take inflectional or derivational affixes, and (d) is monomorphemic (*see* **Inflection and Derivation**).

This definition characterizes the core members of the interjection class. It captures most of the elements that have traditionally been described as interjections. In many languages this includes (a) words that are used to express emotions such as disgust and its related feelings, for example, English *yuk*!, *ugh*!, and *phew*!, German *pfui*!, Dakota *xox*!, Polish *fu*! and *fe*!, Russian *fu*!, and Danish *fy*!; (b) words and expressions for greetings, leave-taking, thanking, apologizing, etc. (English *hello*, *thank you*, and *goodbye*, French *adieu*); (c) swear words (English *shit*!, French *merde*! and *sacredieu*!); (d) attention-getting signals (English *hey* and *psst*, Russian *a'u*, Japanese *oi* and *nee*); (e) some particles and response words (English *yes* and *no*, Japanese *hai* and *iie*); (f) words directed at animals (English *whoa*); and (g) onomatopoeic words and iconic (*see* **Iconicity**) depictives (Polish *sza* 'hush' and *hu-hu* 'boo').

It, however, excludes some other items, such as English *well*, which have sometimes been included in the interjection class, because they are not capable of forming independent nonelliptical utterances. Some scholars believe that the formal definition, which is essentially the traditional definition, is too broad since it encompasses different semantically definable classes such as speech formulae that could be distinguished from the typical interjections on semantic grounds.

From a semantic point of view, prototypical interjections may be defined as conventionalized linguistic signs that express a speaker's current mental state, attitude, or reaction toward a situation. This definition narrows down the class of interjections and excludes onomatopoeic words, for example, which are descriptive rather than expressive.

In terms of pragmatics, interjections are context-bound linguistic signs. That is, they are tied to specific situations and index elements in the extralinguistic context. They cannot be fully interpreted unless they are situated in the appropriate discourse (*see* **Discourse Markers**) and social context. Being context-bound (i.e., indexical (*see* **Pragmatic Indexing**) interjections embody presuppositions about discourse and social context that could be explicated in terms of propositions (*see* **Propositions**). For instance, if someone utters the English *ouch*!, he or she indexes himself or herself as experiencing a sudden and sharp pain. Once the speaker is identified, this utterance can be fully interpreted.

The interpretation of other interjections, however, involves not only contextualization and substitution of elements in the context for arguments in the propositions underlying them, but also complex processes of conversational inference (*see* **Inference: Abduction, Induction, Deduction**) That is, the arguments in the propositions underlying the interjections are not fully specified as in the case of *ouch*!. The identity of the arguments is open to context-based inference. For instance, one of the propositions underlying the Russian *porá* as an interjection is 'it is time for someone to do something that is given by the context'. The 'someone' in the proposition can be the speaker, the hearer, or both. The exact identity of the agent of the action is figured out by inference. It cannot be filled out by a straightforward substitution of the contextual elements for the arguments in the proposition.

Closely related to their indexical nature is the fact that interjections are typically and commonly accompanied by physical gestures (*see* **Gestures: Pragmatic Aspects; Kinesics**). For instance, in some

languages of West Africa (e.g., Akan, Éwé (Gbe), and Ga-Dangme), there is an interjection, *atúù*!, which is used to welcome people and is uttered at the same time as the interlocutors hug each other. Sometimes physical gestures may substitute for interjections. For this reason, the boundary between gestures as semiotic signs and interjections as linguistic signs is sometimes hard to draw.

Characteristics of Interjections

Interjections tend to be phonologically and morphologically anomalous. They may be made up of sounds and sound sequences that are not found in other parts of the language. In English, the interjection spelled 'tut-tut' is phonetically a series of dental clicks – sounds that are not used otherwise in the language. Some English interjections do not contain any vowels, for instance, *psst*!, *sh*! From the point of view of the main sound system of English, these are 'nonwords'. However, phonological anomaly is not a definitive criterion for the class of items because there are other interjections that conform with the patterns of the main sound system (e.g., English *yuk*).

Morphologically, interjections do not normally take inflections or derivations in those languages that make use of such forms. This is one of the reasons why they have been classified together with particles and other uninflected words like adverbs (*see* **Adverbs**). It should be noted here that some interjections that evolve from verbs (*see* **Verbs**) could carry a particular inflection, but they do not obey the agreement rules of the language in question. In other words, the inflections together with the verb stem have become frozen and form a completely new word. Notice that although the French form *tiens*! 'look!, hey!, here!' is homophonous with the second–person singular form of the verb *tenir* 'to hold', *tiens*! is used as an interjection to both singular and plural.

Most interjections are simple monomorphemic words. However, some interjections seem to be formally complex. Thus, there are multimorphemic ones that constitute a phonological word such as English *Goddammit*! These may be referred to as complex interjections. The French forms of *oh là là*!, *he là*!, and *hop là*!, for instance, may be included here. Apart from these, there are multiword expressions, phrases, which can be free utterance units and refer to mental acts, for example, English *bloody hell*!, *dear me*! *thank God*!, etc. These utterances may be referred to as interjectional phrases. They usually have peculiar syntax.

Since interjections are words that can constitute utterances by themselves, the term 'interjection' may be used to describe either a word class or an utterance type. When it is used in reference to a sentence type, it is considered to be a minor sentence type.

Types of Interjections

There are different ways of classifying interjections. One classification is based more or less on the form of the interjection and the other on the communicative function of the interjection. Along the formal dimension, interjections may be divided into two broad classes: primary interjections and secondary interjections.

Primary interjections are little words or 'nonwords,' which in terms of their distribution can constitute an independent nonelliptical utterance by themselves and do not normally enter into construction with other word classes (English *Gee*!, *Oops*!, etc., French *Aïe*!, *Hem*!, Longgu (Austronesian) *sss* 'I want you here', and *ŋŋŋ* 'I feel relaxed').

Secondary interjections are those words that have an independent semantic value but which can be used conventionally as nonelliptical utterances by themselves to express a mental attitude or state. Under secondary interjections fall such alarm calls and attention-getters as English *Help*!, *Fire*!, swear and taboo (*see* **Taboo Words**) words such as English *Fuck*!, *Screw*! French *Bordel*!, *Chiotte*!, and other words used emotively such as English *Bother*!, *Drat*!, etc.

In terms of their function, interjections can be categorized according to the traditionally recognized functions of language such as expressive, conative, phatic, etc. (Bühler, 1934; Jakobson, 1960). This functional classification is based on what is perceived to be the predominant function of the item in question with respect to its semantics.

Expressive interjections are vocal gestures that are indicative of the speaker's mental state. They may be subdivided into two groups: the emotive and the cognitive. The emotive ones are those that express the speaker's state with respect to the emotions and sensations they have at the time (English *Yuk*! 'I feel disgusted'; *Ouch*! 'I feel sudden pain'; Western Arrarnta (Aranda; Australian) *yekaye* 'I feel shocked'). Cognitive interjections are those that pertain to the state of knowledge and thoughts of the speaker at the time of utterance (English *Aha*! 'I now know this'; *oh-oh*! 'I now know something bad can happen'; Russian *ogo*! 'I now know something surprising'; Éwé *ehẽ!* 'I now remember'; Warlpiri (Australian) *karija* 'I don't know').

Conative interjections are those expressions that are directed at an auditor. They are aimed at getting someone's attention or they demand an action or response from someone (English *sh*! 'I want silence

here'; *eh*? 'I want to know something'; Australian English *cooee* and Russian *a'u*, which are used to keep contact with people in the bush). Presentational interjections with the meaning 'I want you to take this thing I am holding out to you now', which are found in various languages, may be classified as conative interjections (e.g., Italian *to*!, Japanese *hai*! (in one use), Aranda (Australian) *me*!, and Gunwinggu (Mayali; Australian) *nja*!). Calls to animals, etc., also belong here as conative interjections.

Phatic interjections are used in the establishment and maintenance of communicative contact (*see* **Communicative Principle and Communication**). A variety of conventional vocalizations that express a speaker's mental attitude toward the ongoing discourse, that is, backchanneling or feedback signaling vocalizations (*see* **Conversation Analysis**), may be classified as phatic (English *mhm*, *uh-huh*, *yeah*). Included in this class also are interjections used in the performance of various interactional routines, such as greeting and leave-taking, and in the organization of discourse (e.g., English *OK*).

Interjections as Peripheral Elements

There are at least three senses in which one can talk about interjections as being peripheral to language. One is that interjections are peripheral to language as a whole: they are paralinguistic. Interjections are viewed as an accompaniment to language or communication rather than being a form of linguistic communication themselves. However, interjections form a distinct subset of paralinguistic vocalizations because of their conventionality. This conventional subset of paralinguistic elements seems to be on the boundary between verbal and nonverbal communication. From that point of view, it seems true that interjections are somehow peripheral to language.

Another interpretation of the peripherality of interjections is based on their syntactic independence. Since interjections do not enter into construction with other elements, they are not well integrated into the clause grammars of languages.

Finally, because some interjections are made of sounds that are not found elsewhere in the language system, they are said not to belong to the main sound system. However, phonological aberrance is not restricted to interjections alone but is a feature also of other elements in natural languages such as pronouns and demonstratives, which are considered by linguists to be part of the core of the language system. For instance, in Ngan'gityemerri (Australian), the palatal nasal [ɲ] occurs word initially only in two words in the language: in the second-person singular pronoun *ɲiɲi* 'you' and in the onomatopoeic word *ɲurrŋ* 'sniff'. These words display a peculiar phonological structure with respect to the rest of the language. Similarly, in English the sound [ð] occurs word initially only in pronouns, demonstratives, and other deictic (*see* **Deixis and Anaphora: Pragmatic Approaches**) elements such as *this*, *that*, *they*, *there*, and *then*. Such words are also thus phonologically anomalous, but they have not been thought of as peripheral linguistic elements. The peculiar phonology of some interjections should therefore not be used as an argument for considering interjections as peripheral to the language system.

Interjections, Pragmatic Devices, and Pragmatic Functions

Interjections share their context-boundedness with other pragmatic devices, viz., particles, vocatives, and routines (*see* **Pragmatics: Overview**) in general. That is, they are all produced in reaction to a linguistic or extralinguistic context and can be interpreted only relative to the context in which they are produced. Nevertheless, interjections form a distinct class. They differ from particles in their relative syntactic independence. That is, whereas particles are fully integrated into the syntax of utterances and cannot constitute independent nonelliptical utterances by themselves, interjections can be utterances by themselves and they are always separated by a pause from the other utterances with which they may co-occur. Interjections always constitute an intonation unit by themselves. They are only loosely integrated into the grammar of the clause. This feature of interjections as both words and utterances sets them apart from other word classes including particles.

Interjections are a category of routines – linguistic expressions whose occurrence is socially defined with respect to standardized communication situations and which are produced automatically (or semiautomatically). Some researchers believe that because of this there is no difference between prototypical interjections and one-word routine formulae (*see* **Formulaic Language**). Others believe that there is a fundamental difference. The latter argue that linguistic activities involving interjections do not constitute conversational encounters nor are they speech acts (*see* **Speech Acts**), whereas formulae always involve conversation and are speech acts. Closely allied to this difference is the claim that interjections do not have addressees, although they may be directed at people who are the intended interpreters of the communicative act in which they are involved (compare *She said thank you to him* and *She said wow to him*).

Note that *thank you* is a formula and *wow* is an interjection. Nevertheless, interjections and formulae share a number of commonalities: both are forms of language that are found in most, if not all, languages, yet they encode culture-specific meanings in these languages; both forms are also indexical. It is traditional for both types of words to be described as interjections, but such a use of the term interjection is too broad.

Some interjections may be used as discourse markers. That is, they may serve to mark the boundaries of discourse units (e.g., English *oh*, *ah*). Other interjections can function as interrogative tags (e.g., English *It's tasty*, *eh*?).

Interjections share their anomalous phonological nature with onomatopoeic words. For this reason, descriptive grammars usually include onomatopoeic words and iconic depictives as a subclass of interjections. Furthermore, some interjections, like onomatopoeic words, do display a fair amount of sound symbolism. Nevertheless, one can still distinguish between interjections and onomatopoeic words and ideophones. First, onomatopoeic words, etc., tend to be descriptive rather than expressive of a mental state as interjections are. Second, the ideophones, etc., may not be able to stand on their own as utterances without being elliptical. Notice that the use of interjections as utterances in themselves does not involve ellipsis.

Issues in the Analysis of Interjections

As mentioned earlier, interjections are simultaneously words or lexemes and utterances. This feature has consequences for their grammatical and semantic analysis. The grammarian is unsure as to whether they are words or sentences. The semanticist or lexicographer does not seem to have an adequate means of dealing with lexemes, which both predicate and refer, as interjections do by virtue of being utterances. From the point of view of pragmatics, the debate about whether or not interjections are speech acts remains to be resolved. Some of these problems and research on different types of interjections in several languages of the world have been discussed in a special issue of the *Journal of Pragmatics* (Ameka, 1992).

See also: Adverbs; Communicative Principle and Communication; Context, Communicative; Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Discourse Markers; Formulaic Language; Gestures: Pragmatic Aspects; Iconicity; Indexicality: Theory; Inference: Abduction, Induction, Deduction; Inflection and Derivation; Kinesics; Pragmatic Indexing; Propositions; Speech Acts; Taboo Words; Verbs.

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Interlanguage

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Interlanguage

The notion of 'interlanguage' has been central to the development of the field of research on second-language acquisition (SLA) and continues to exert a strong influence on both the development of SLA theory and the nature of the central issues in that field.

The term interlanguage (IL) was introduced by the American linguist Larry Selinker to refer to the linguistic system evidenced when an adult second-language learner attempts to express meanings in the language being learned. The interlanguage is viewed as a separate linguistic system, clearly different from both the learner's 'native language' (NL) and the 'target language' (TL) being learned, but linked to both NL and TL by interlingual identifications in the perception of the learner. A central characteristic of any interlanguage is that it fossilizes – that is, it ceases to develop at some point short of full identity with the target language. Thus, the adult second-language learner never achieves a level of facility in the use of the target comparable to that achievable by any child acquiring the target as a native language. There is thus a crucial and central psycholinguistic difference between child NL acquisition and adult second-language (L2) acquisition: children always succeed in completely acquiring their native language, but adults only very rarely succeed in completely acquiring a second language. The central object of interlanguage research is to explain this difference – essentially, to describe and explain the development of interlanguages and also to explain the ultimate failure of interlanguages to reach a state of identity with the target language. Thus, some central research questions are: What are the psycholinguistic processes that shape and constrain the development of interlanguages? How are these different from those processes that shape and constrain the development of native languages? How might these differences account for the phenomenon of fossilization?

The Interlanguage Hypothesis

Origins of the Concept of Interlanguage

The notion that the language of second-language learners is in some sense autonomous and crucially distinct from both NL and TL was developed independently at about the same time in the work of several different researchers (see Selinker, 1992, for a detailed account of the historical development of this notion). Slightly different conceptualizations of learner language were referred to as 'approximative system' by Nemser and as 'transitional competence' by Corder. However, the notion of interlanguage seemed to be the one that caught on and which was used in the literature on second-language acquisition in the 1990s.

Prior to the development of the idea of interlanguage, contrastive analysts had asserted that the second-language learner's language was shaped solely by transfer from the native language. Because this was assumed to be so, a good contrastive analysis of the NL and the TL could accurately predict all the difficulties that learner would encounter in trying to learn the TL. These claims were made on logical grounds and almost always supported only by reference to anecdotal evidence. It is important to note that these claims were not supported by reference to data obtained from the systematic study of learner language itself, but usually only to utterances that analysts happened to have noticed and remembered. Unfortunately, it is all too likely that analysts tend to notice data that their theories predict and not to notice data that do not fit their theories. Learner utterances that were clear evidence of transfer were noticed and quoted, but learner utterances that did not provide evidence of transfer apparently went unnoticed or were classified as 'residue.' Thus, in the late 1950s and the 1960s, there were virtually no systematic attempts to observe learner language and to document scientifically the way in which learner language developed, or to independently and objectively verify the strong claims of the contrastive analysis hypothesis that language transfer was the sole process shaping learner language.

Lado (1957: 72), in an influential statement, explicitly characterized the predictions of contrastive analysts as statements that should be viewed as hypothetical until they could be validated by reference to 'the actual speech of students.'

Error analysis was an enterprise born of the attempt to validate the predictions of contrastive analysis by systematically gathering and analyzing the speech and writing of second-language learners. For perhaps the first time in history, the focus moved from teaching materials and hypotheses about second-language learning problems, to the systematic observation of learner language. The focus was what scientific study could reveal about the real problems of second-language learners. Preliminary evidence from early

studies began to come in, the results of which showed an increasingly large 'residue' of errors that did not in fact seem to be caused by transfer as contrastive analysts had predicted. These errors became an increasingly major source of difficulty for the contrastive analysis hypothesis, a hypothesis that had posed the interesting question of what shapes learner language, but which, increasingly clearly, could not answer that question satisfactorily.

Corder (1967, 1981) was the first and most persuasive scholar to develop an alternative framework: the idea that second-language learners do not begin with their native language, but rather with a universal 'built-in syllabus' that guides them in the systematic development of their own linguistic system, or 'transitional competence.' Thus, the second-language learner's transitional competence is different from either the NL or the TL or even some combination of the two, since it begins with an essential, simple, probably universal grammar. Corder also pointed out that the native language often serves as a positive resource for second-language acquisition, facilitating the learning of TL features that resemble features of the NL. Corder argued that second-language learners' errors were evidence of the idiosyncratic linguistic system that they were building and so were valuable data for research into the nature of the 'built-in syllabus.' Corder called for research involving the analysis of learner errors gathered longitudinally, proposed a framework for eliciting and analyzing those errors, and posed the goal as one of characterizing the built-in syllabus and the transitional competence of second-language learners. His students and colleagues set about pursuing that enterprise.

The term 'interlanguage' was most persuasively introduced and developed into a set of testable hypotheses by Selinker (1972), after long conversations with Corder and other scholars in the field. The interlanguage hypothesis was intended to, and did, stimulate systematic research into the development of the language produced by adult second-language learners, with a view to objectively identifying psycholinguistic processes (transfer included) that shaped learner language, explaining how learners set up interlingual identifications across linguistic systems, and accounting for the troubling tendency of adult learners to stop learning, or to fossilize.

Defining Interlanguage

The term interlanguage was defined by Selinker (1972) as the separate linguistic system evidenced when adult second-language learners attempt to express meaning in a language they are in the process of learning. This linguistic system encompasses not just phonology, morphology, and syntax, but also the lexical, pragmatic, and discourse levels of the interlanguage. The interlanguage system is clearly not simply the native language morphological and syntactic system relexified with target language vocabulary; that is, it is not the morphological and syntactic system that would have been evidenced had the learner tried to express those meanings in his or her native language. Just as clearly, it is not the target language system that would have been evidenced had native speakers of the target language tried to express those same meanings. Rather, the interlanguage differs systematically from both the native language and the target language.

Interlanguage is usually thought of as characteristic only of adult second-language learners (but see 'Revised Interlanguage Hypothesis' below), that is, learners who have passed puberty and thus cannot be expected to be able to employ the language acquisition device (LAD) – that innate language learning structure that was instrumental in their acquisition of their native language. Children acquiring second languages are thought to have the ability to re-engage the LAD and thus to avoid the error pattern and ultimate fossilization that characterize the interlanguages of adult second-language learners.

Central to the notion of interlanguage is the phenomenon of fossilization – that process in which the learner's interlanguage stops developing, apparently permanently. Second-language learners who begin their study of the second language after puberty do not succeed in developing a linguistic system that approaches that developed by children acquiring that language natively. This observation led Selinker to hypothesize that adults use a latent psychological structure (instead of a LAD) to acquire second languages.

The five psycholinguistic processes of this latent psychological structure that shape interlanguage were hypothesized (Selinker, 1972) to be (a) native language transfer, (b) overgeneralization of target language rules, (c) transfer of training, (d) strategies of communication, and (e) strategies of learning. Native language transfer, the process that contrastive analysts had proposed as the ***sole*** shaper of learner language, still has a major role to play in the interlanguage hypothesis; though it is not the ***only*** process involved, there is ample research evidence that it does play an important role in shaping learners' interlanguage systems. Selinker (1972, 1992; following Weinreich, 1968: 7) suggested that the way in which this happens is that learners make 'interlingual identifications' in approaching the task of learning a second language: they perceive certain units as ***the same*** in their NL, IL, and TL. So, for example, they may perceive NL 'table' as exactly the same as TL 'mesa,' and develop an interlanguage in which *mesa*

can (erroneously in terms of the TL) be used in expressions like 'table of contents,' 'table the motion,' and so on. Selinker followed Weinreich in pointing out an interesting paradox in second-language acquisition: in traditional structural linguistics, units are defined in relation to the linguistic system in which they occur and have no meaning outside that system. However, in making interlingual identifications, second-language learners typically 'stretch' linguistic units by perceiving them as the same in meaning across three systems. An interesting research issue is how they do this and what sorts of units are used in this way; for example, they could be linguistic units like the taxonomic phoneme or the allophone, or syllables. Selinker raised questions about the ability of traditional linguistics frameworks, based as they are on assumptions of monolingualism, to handle interlanguage data in which transfer across three linguistic systems plays a central role.

A second psycholinguistic process is that of overgeneralization of target language rules. This is a process that is also widely observed in child language acquisition: the learner shows evidence of having mastered a general rule, but does not yet know all the exceptions to that rule. So, for example, the learner may use the past tense marker-*ed* for all verbs, regular and irregular alike: *walked*, *wanted*, *hugged*, *laughed*, **drinked*, **hitted*, **goed*. The overgeneralization error shows clear evidence of progress, in that it shows that the learner has mastered a target language rule, but it also shows what the learner has yet to learn. To the extent that second-language learners make overgeneralization errors, one might argue that they are using the same process as that employed by first-language learners.

Transfer of training occurs when the second-language learner applies rules learned from instructors or textbooks. Sometimes this learning is successful; that is, the resulting interlanguage rule is indistinguishable from the target language rule. But sometimes errors result. For example, a lesson plan or textbook that describes the past perfect tense as the 'past past' can lead the learner to erroneously use the past perfect for the absolute distant past – for all events that occurred long ago, whether or not the speaker is relating these to any more recent or foregrounded event, as in the isolated statement, *'My relatives had come from Italy in the 1700s.' These have also been called 'induced errors.'

Strategies of communication are used by the learner to resolve communication problems when the interlanguage system seems unequal to the task. When, in the attempt to communicate meaning, the learner feels that the linguistic item needed is not available to him, he can resort to a variety of strategies of communication in getting that meaning across. So, for example, if the learner wants to refer to an electrical cord in English and does not know the exact lexical item to use in referring to it, he can call it 'a tube,' 'a kind of corder that you use for electric thing I don't exactly the name,' or 'a wire with eh two plugs in each side.' The linguistic forms and patterns used in such attempts may become more or less permanent parts of the learner's interlanguage (*see* **Communicative Language Teaching**).

Strategies of learning are used by the learner in a conscious attempt to master the target language. One such strategy of learning is learners' conscious comparison of what they produce in IL with the NL and a perceived target, setting up interlingual identifications (see the example given above for transfer). Other examples of learning strategies are the use of mnemonics to remember target vocabulary, the memorizing of verb declensions or textbook dialogues, the use of flash cards, and so on. Clearly, such strategies are often successful, but they can also result in error. Memorized lists can get confused with one another, for example, or the mnemonic mediator word may become confused with the TL word. An example of the latter might be that an English-speaking learner of Spanish might use a mediator word *pot* in order to remember that the Spanish word for *duck* is *pato* – but might end up using *pot* in interlanguage references to a duck.

Research evidence was provided to show that all five of these psycholinguistic processes could affect the construction of interlanguages, and a call for more research went out. Many research projects were undertaken in response to this call to investigate each of these hypothesized processes, and the result was a flurry of papers, conferences, and publications, and ultimately something that was referred to as a field of research on second-language acquisition.

The Relevant Data for the Study of Interlanguage

In his 1972 paper, Selinker stated clearly that the relevant data to be used in the study of interlanguage consisted of utterances produced by second-language learners when they were trying to communicate meaning in the target language. The relevant data were clearly ***not*** learner utterances produced in response to classroom drills and exercises where the learner was focusing attention on grammar rules or target language form. Just as clearly, the relevant data were ***not*** the learner's introspections and intuitions about what was grammatical in the target language; such data, according to Selinker, would not provide information about the interlanguage system, but only

about the learner's perception of the target language system – and these were different things.

It is important to note that although Selinker was clear about what ***he*** thought the relevant data of interlanguage study were, there was disagreement on this point from the beginning. Corder, for example, argued early on and strongly that researchers ought to draw on a whole range of data sources in exploring learners' language, and learner intuitions of grammaticality were clearly a valuable data source. Others, particularly those investigating the role of universal grammar in SLA, have shared Corder's perspective.

A serious question, however, is this: when one uses different data elicitation techniques in the study of interlanguage, do all those data pools provide information about the same linguistic system? There are, after all, three linguistic systems involved: NL, IL, and TL. If one asks a second-language learner whether a given sentence is grammatical, one cannot be sure whether that learner's response is based on the NL norm, the IL norm, or the learner's perception of the TL norm; all of these may differ strikingly from the IL norm revealed when one analyzes that same learner's utterances produced in the attempt to communicate meaning. In essence, the most basic research design question involved in the study of interlanguages – what data shall one use to study interlanguage? – raises very complex issues concerning the relationship between intuitions of grammaticality, language production, and language perception, very similar to issues raised by Labov (1970) in sociolinguistic work. This issue is unresolved in SLA research and in fact is complicated by evidence that interlanguage seems to vary by discourse domain (see 'Revised Interlanguage Hypothesis' below).

Development of the Interlanguage Hypothesis to the Early 1990s

Soon after Selinker set out the Interlanguage Hypothesis, Steve Krashen (1981) proposed the Monitor Model. The Monitor Model initially relied heavily on the work of a group of researchers (the creative constructionists) who claimed that there was ***no*** evidence at all of native language transfer in the morpheme accuracy rates of child second-language learners; thus, the contrastive analysts had got it all wrong, at least as far as children were concerned. Where the Interlanguage Hypothesis accords a central role to native language transfer, the Monitor Model does not. The Monitor Model suggests that when second-language learners, adult or children, acquire a second language unconsciously, there will be no evidence of native language transfer; it is only when they consciously learn a second language that transfer effects appear. The study of the role of universal grammar in the process of second-language acquisition similarly has tended to downplay the role of native language transfer in that process. One of the contributions of the Interlanguage Hypothesis to the field of second-language acquisition in the early 1990s is, thus, a historically rooted, research-based, and theoretically motivated framework for the study of second-language acquisition, which can easily account for both the role of native-language transfer and of universal grammar in shaping interlanguage.

The Revised Interlanguage Hypothesis

In 1993, the central claims of the Interlanguage Hypothesis remained essentially unchanged, and the intervening years have provided substantial support for them. However, there have been some modifications and expansions since its first detailed proposal in print in 1972. Some of these have been hinted at and will be expanded on below.

The original interlanguage hypothesis was restricted to apply only to adults acquiring second languages. However, evidence emerged subsequently that children in language immersion programs, such as the French immersion programs in Canada, also produce interlanguages, in that they evidence apparently fossilized linguistic systems with substantial influence from native language transfer. There appear to be sociolinguistic reasons for this phenomenon; the children receive native-speaker input only from their teacher, and give one another substantial nonnative input. They have not usually been given enough opportunity and incentive to produce what Swain calls 'comprehensible output' – attempts to use the interlanguage to communicate meaningfully with significant others. To the extent that these children produce interlanguages in these contexts, there is some question whether they are using their LADs to internalize the target language or whether they are using those psycholinguistic processes described as more characteristic of adults learning second languages. A great deal more research is needed with this population in order to find out how, if at all, they differ from adult learners.

A second expansion of the IL hypothesis has occurred in response to the growing interest in the influence of universal grammar on the development of interlanguage. The crucial question here, early on, was this: universal grammar is assumed to be central to the development of natural languages, but is interlanguage a natural language? There have been two positions taken in response to this question. Selinker's initial hypothesis takes the first position: that it is not, at least as the notion 'natural language' has

been defined in linguistics. This early position argues: (a) natural languages are produced by LADs; (b) language universals exist in human languages by virtue of the way in which the language acquisition device is structured; (c) but interlanguages, unlike native languages, fossilize and evidence native language transfer; (d) interlanguages therefore are a product of latent psychological structures, not LADs; (e) so interlanguages do not have to obey language universals. Adjémian (1976), and following him others, took the opposing position that interlanguages ***are*** natural languages (although, unlike other natural languages, IL rule systems are 'permeable'). As natural languages, interlanguages do have to obey language universals; central to this position is the view that interlanguages are products of the same language acquisition device that produces native languages. In this view, interlanguages fossilize because of complex changes in cases where parameters have already been set for one language and a second language must be learned. Debate on this issue is certainly ongoing and lively.

A third modification has been a growing emphasis on something barely hinted at in 1972: the way in which interlanguage development seems to vary in different social contexts, or discourse domains. Increasing evidence seems to show that learners can produce a significantly more fluent, grammatical, and transfer-free interlanguage in some social contexts than in others. International teaching assistants, for example, may be more fluent and grammatical in lecturing on their academic field than when talking about an everyday topic like favorite foods or bicycling. Key processes such as fossilization may be more prominent for a given learner in one context than in another. This variation in interlanguage production, documented in dozens of studies reviewed in Tarone (1988), is probably related to the problem of data elicitation discussed above and certainly has profound implications for data elicitation in research. As suggested above, SLA researchers have argued for the use of a range of elicitation devices in investigating interlanguage. However, if learners do vary at a single point in time in the fluency and grammaticality of the language they produce, depending on variables such as topic, focus on form, interlocutor, and so on, then how are researchers to handle the data they elicit when they do use a variety of tasks? Minimally, when researchers interpret their data, they need to keep the data from each elicitation technique separate and to keep track of the contextual variables that were in play in each elicitation. Conceptually, this chameleon-like character of ILS raises serious questions about whether and how traditional linguistic notions developed to account only for monolinguals can apply to interlanguages. This is a complex problem for SLA researchers to resolve.

A fourth issue that has occasioned substantial discussion in the literature centers on the phenomenon of fossilization itself and whether it is inevitable. Selinker argued essentially, that no adult learner can hope to ever speak a second language in such a way that he or she is indistinguishable from native speakers of that language. There are inevitable forces that lead to the cessation of learning. In Selinker's view, there are neurolinguistic reasons for this inevitability. Scovel proposed the Joseph Conrad Phenomenon, in order to draw attention to the very common case where an adult learner's phonological system may fossilize, but the morphology, syntax, and lexicon may not, continuing to develop until reaching full identity with the target language. Scovel (1988), like Selinker, argued that the causes of phonological fossilization are neurolinguistic in nature and related to the process of cerebral lateralization, which is completed at puberty. But there is certainly disagreement among interlanguage researchers as to both the inevitability of fossilization and (relatedly) the causes of fossilization. Typically, those who argue that fossilization is caused by sociolinguistic forces (such as the NL group pressure to conform, or one's need to identify with the NL social group rather than the TL social group) also argue that fossilization is not an inevitable process. Such researchers suggest that if learners can identify with the TL social group, or if their need is great enough, they will be able to continue learning the second language until their production/perception is indistinguishable from that of native speakers. This issue also is far from settled, since it relates to matters of human potential rather than humans' actual behavior.

There has been some change in the way in which some of the psycholinguistic processes shaping interlanguage are viewed. For example, native language transfer is viewed as operating selectively; some things transfer from the NL to influence IL, and some things do not. A crucial question in the 1990s, therefore, is: What gets transferred? Can we predict in advance what NL characteristics will influence an IL and which ones will not? One promising notion is that of multiple effects: when NL transfer combines with other influences, such as markedness factors, learning strategies, or transfer of training, then there will be greater likelihood of fossilization. So, for example, an early stage of verbal negation common among all second-language learners involves putting a negator (like *no*) before the verb. Learners whose native languages (like Spanish) do negate verbs this way (as in *Juan no habla* for *John does not talk*) will be more likely to fossilize at this stage (producing

John no talk). Thus, negative NL transfer has the effect of amplifying the possibilities for fossilization when it interacts with other negative influences. Another psycholinguistic process shaping interlanguage is the learning strategy. A great deal of research has been done (e.g., Cohen, 1990), using elicitation techniques such as verbal report, in order to gain insight into the ways in which learners may consciously set about trying to internalize aspects of the target language. Some interlanguage researchers have drawn heavily on the work of cognitive psychologists who have studied the influence of the use of mnemonics on memory. The result of this research has lent itself easily to educational applications, such as the establishment of workshops and even centers to train students in the use of language-learning strategies.

Finally, research on interlanguage has expanded far beyond its original focus on phonology, morphology, syntax, and lexis, to include the sociolinguistic component of communicative competence. Research on interlanguage includes comparative work on the way in which learners execute speech acts across three linguistic systems; Cohen and Olshtain (1981), for example, have studied the way learners attempt to apologize, using their interlanguage, in target language social contexts, and compared this to the way native speakers of both the NL and the TL apologize in the same contexts. Learners' politeness strategies in NL, IL, and TL have been examined on a number of levels by researchers such as Beebe, who have explored miscommunications that have arisen when learners have transferred NL politeness strategies into IL–TL communications.

The Interlanguage Hypothesis provided the initial spark that ignited a field of research on second-language acquisition/learning, and it continues to provide what some feel to be the most productive framework for research. The research questions it originally raised continue to be among the most central and interesting research questions in the field.

See also: Communicative Language Teaching; Labov, William (b. 1927); Second Language Acquisition: Phonology, Morphology, Syntax.

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Internal Modification

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Internal modification is the name given to morphological processes whereby some inflectional property or derivational relationship is signaled not by adding new material to the base (that is, by affixation) but by changes internal to the base itself. Examples involving inflectional properties are English *feet* (plural of *foot*) and *sang* (past tense form of *sing*), Maori *waahine* (plural of *wahine* 'woman'), and Welsh *egyr* ('he or she opens,' third-person singular present of the verb *agor* 'to open'). Examples involving derivational relationships are English verb/noun pairs such as *sing/song*, *believe/belief*, and *torménti/tórment*. Such changes can affect vowels, consonants, or suprasegmental characteristics such as stress.

Internal modification and affixation are not mutually exclusive. Here are two examples involving inflection: English *wives*, in which plurality is signaled both by the suffix *-s* and by the voicing of the final consonant of the stem *wife*, and Zulu

John no talk). Thus, negative NL transfer has the effect of amplifying the possibilities for fossilization when it interacts with other negative influences. Another psycholinguistic process shaping interlanguage is the learning strategy. A great deal of research has been done (e.g., Cohen, 1990), using elicitation techniques such as verbal report, in order to gain insight into the ways in which learners may consciously set about trying to internalize aspects of the target language. Some interlanguage researchers have drawn heavily on the work of cognitive psychologists who have studied the influence of the use of mnemonics on memory. The result of this research has lent itself easily to educational applications, such as the establishment of workshops and even centers to train students in the use of language-learning strategies.

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Internal modification and affixation are not mutually exclusive. Here are two examples involving inflection: English *wives*, in which plurality is signaled both by the suffix *-s* and by the voicing of the final consonant of the stem *wife*, and Zulu

ukushunyayelwa 'to be preached,' in which the passive is signaled both by the suffix *-wa* and by the replacement of a labial consonant by a coronal one (the corresponding active stem being *-shumayel-*, seen in *ukushumayela* 'to preach') (Doke, 1973). An example involving derivation is the relationship between the noun *reference* and the verb *refer*: the noun exhibits both a suffix *-ence* and a shift in stress from the second to the first syllable of the stem.

Typological and Diachronic Issues

Internal modification is less pervasive than affixation in the sense that many languages, even some morphologically complex ones, make little or no systematic use of it. On the other hand, there are languages in which it is extremely productive and regular. An example is Fula (Nigerian Fulfulde), in which adjectives and nouns participate systematically in patterns of class or gender agreement manifested in part by changes in the initial stem consonant, so that (for example) *ranee-* 'white' shows up also as *danee-* or *ndanee-*, depending on its agreement context (Arnott, 1970). The consonantal changes in Zulu passive stems are equally systematic. Better known examples can be found in the Semitic languages, in which the basic meaning of verb roots is typically expressed by their consonants, and the intervening vowels (sometimes with the help of affixes) express only grammatical properties and derivational relationships. Thus, underlying the English words *Muslim* and *Islam* is a Classical Arabic root meaning 'submit,' consisting of just the three consonants *s-l-m*. Moreover, even though internal modification may be less widespread in general than affixation, no morphological function has been identified that is never fulfilled by internal modification and for which affixation is therefore the only option.

Perhaps relevant to this puzzlingly lopsided state of affairs is the way in which at least some internal modification has originated. In all languages, there exists modification of the purely phonological kind illustrated in the English words *ten* and *tenth*: in *ten*, the root terminates in an alveolar nasal, but in *tenth* the nasal is dental. No linguist would regard that as a morphological phenomenon, however, because it is so clearly due to assimilation to the following interdental fricative, a process that is articulatorily natural and (in English) exceptionless (occurring also in *seventh, synthetic, anthem,* etc.). But this assimilation is relevant in that it resembles the Old English origin of the contemporary alternation illustrated by *wives* and *wife*. In Old English, there was no phonological opposition between voiced and voiceless fricatives: a fricative was voiced when it occurred between voiced sonorant segments (e.g., between vowels) and voiceless elsewhere. This is a natural and typologically widespread kind of voicing assimilation. In Old English, therefore, the alternation between [wif] and [wiv] as pronunciations of the root *wif-* was purely phonological: the plural form was pronounced ['wivəs] because the suffix [əs] contained a vowel. Later, however, a phonological change occurred that has no parallel in *ten* and *tenth*: the suffixal vowel was dropped. The alternation between [f] and [v] therefore lost its phonological motivation. The alternation survived, but now as a morphological phenomenon. Root-final fricative voicing became part of the expression of plurality in a small number of frequently used nouns such as *wife*, *path*, and *house*.

In a similar fashion, the vowel of English *feet* and *geese* is the residue of a purely phonological process whereby a Proto-Germanic plural suffix *-i* triggered an assimilatory fronting of the root vowel, whose original back version survives in *foot* and *goose*. After the suffix disappeared, the fronted root vowel remained, acquiring a morphological function as it lost its phonological motivation. And in Zulu, the alternation between labials and coronals triggered by the passive suffix *-wa* started as a purely phonological process of dissimilation: contiguous labials were avoided when a labial-final stem such as *-boph-* 'tie' was followed by *-wa*, so that (for example) the passive counterpart to *ukubopha* 'to tie' is *ukuboshwa* 'to be tied.' But in due course, this alternation lost its purely phonological character, and its contemporary status as a morphological process is confirmed by the fact that the dissimilation can now apply even when the labial and the *-wa* suffix are not contiguous, as we have already seen in *ukushunyayelwa*.

Some internal modifications, then, are clearly residues of phonological change operating on an earlier situation where the mode of morphological expression was affixal (or, at least, more consistently affixal than the relevant later stage). This observation has affected the theoretical handling of internal modification, to which we now turn.

Theoretical Issues

It was recognized early in the development of general linguistic theory that many complex words can be analyzed as a linear string consisting of a root, which contributes the core of the word's meaning, and one or more affixes, which are bound forms contributing various modifications to its meaning or signaling its grammatical function in its context (*see* **Affixation**). These linear segments, labeled 'morphemes' by Baudouin de Courtenay (1972: 153),

seemed obvious candidates to be regarded as the minimal elements of grammatical analysis, especially in those languages with no writing system to support a traditional analysis in terms of 'words.' Morphemes in this sense are also treated by many linguists as Saussurean 'signs.' Thus, given the attractiveness of this root-and-affix style of morphological analysis, it is not surprising that theoretical approaches to internal modification have tended to subordinate it to affixation. I will discuss three modes of subordination and then mention briefly approaches in which, ostensibly at least, affixation and internal modification are treated on a par.

We have noted that internal modification and affixation may cooperate to fulfill the same function, as in *wives*. Some linguists have argued that in such situations it is the affix that is the primary or even sole exponent of the meaning or function in question, the internal modification being due to an ancillary phonological or morphophonological rule – a rule that is meaningless in the sense that what triggers it is the affix itself, not what the affix expresses (Bloch, 1947; Mel'čuk, 1996). Thus, for example, Halle and Marantz (1993), founders of the 'Distributed Morphology' approach, analyze the English past participle form *broken* in terms of an affix *-en* and a readjustment rule that, in this verb, changes the stem vowel from /eɪ/ to /ʊ/. How, then, are we to treat the past tense form *broke*, which displays internal modification too, but has no affix? For some, *broke* is an alternant of *break* with a more specific meaning (not just 'break' but 'break, [+past]'), which is used in preference to *break* in appropriate contexts. Other linguists, however, posit an affix here too: a zero or null affix meaning 'past,' which, just like the suffix *-en*, can trigger the /eɪ/-to-/ʊ/ rule. It is clear that, if zero affixes can be posited entirely freely, all internal modification can be treated as a byproduct of affixation. But this merely shifts internal modification out of morphology proper into a no-man's-land between morphology and phonology. Therefore, most linguists have been rightly wary of the zero-affix tactic.

The Natural Morphology school of Mayerthaler, Dressler, and Wurzel (Dressler *et al.*, 1987) handles the lopsidedness of the relationship between affixation and internal modification rather differently. According to them, various principles of naturalness compete for influence in the grammars of individual languages, and internal modification is the result of certain kinds of conflict between these principles. The most natural (or least marked) method of morphological encoding is affixal, with each root and affix being transparent (i.e., having only one meaning in all contexts) and each piece of morphological content being expressed uniformly (i.e., by the same root or affix in all contexts). This yields what has been called the 'One Form–One Meaning' pattern, or OFOM. However, other principles, both morphological and nonmorphological, militate against OFOM. Strict adherence to OFOM tends to yield long words containing many affixes. However, the most natural size for a word (or at least a 'content word' such as a noun, verb, or adjective) is approximately two syllables, constituting a phonological foot. From this point of view, an Arabic word such as *Islam*, even though it uses internal modification, is more natural than an English word such as *development*, which uses affixation only. Thus, internal modification contributes to one kind of naturalness, namely, optimal word length, by allowing more morphological information to be packed into fewer syllables.

More influential kinds of naturalness conflict, however, arise between morphology and phonology. Phonological naturalness promotes both assimilations of the kind ultimately responsible for the vowel in *feet* and the [v] sound in *wives* and dissimilations of the kind illustrated earlier in Zulu. Therefore, in terms of Natural Morphology, internal modification arises through the sacrifice of a degree of morphological naturalness in order to promote phonological naturalness. Languages can differ considerably, however, with respect to how the trade-off between these conflicting principles is negotiated.

A third way of subordinating internal modification to affixation is to analyze it as merely another kind of affixation. McCarthy (1981) pioneered an approach to the morphology of Arabic and other Semitic languages in terms of 'morphemes' located on distinct phonological 'tiers,' all linked to a single 'skeleton' of consonant and vowel positions (see also Lieber, 1987). Thus, in the Arabic word *islam*, *i-a* is an affix linked to the vowel positions in the skeleton VCCVC, whose consonant positions are linked to the root *s-l-m* 'submit' on a different tier. Likewise, English *feet* might be analyzed as containing an affix [i] or perhaps an affix consisting of just the feature [-back], linked to the vowel position in a CVC skeleton. However, this kind of analysis is less attractive in English because of its sporadic character, by contrast with its pervasiveness in Arabic. As with zero affixes, there is a risk of trivializing the difference between affixation and internal modification through a definitional trick.

A more radical approach to internal modification characterizes theories that treat as basic not roots and affixes but word forms and their paradigmatic relationships (Anderson, 1992; Stump, 2001). These approaches treat affixation and internal modification alike, as involving phonological changes to a base

form. The fact that some changes add material but others alter what is already there is of no theoretical importance. It is therefore assumed at the outset that the puzzle of the lopsided relationship between affixation and internal modification is likely to have no interesting solution; the lopsidedness is presumably a diachronic residue that general morphological theory need not concern itself with. A contrary view, citing evidence for differences between how affixes and stem alternants are integrated into inflection patterns, is taken by Carstairs-McCarthy (2002). Whether the latter view is too optimistic is a matter of current investigation.

See also: Affixation; A-Morphous Morphology; Arabic as an Introflecting Language; Distributed Morphology; Natural Morphology.

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International Phonetic Association

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The International Phonetic Association (IPA) is the major and oldest representative organization for phoneticians throughout the world. Its primary function is to provide the academic community with a notational standard for the phonetic representation of all languages: the International Phonetic Alphabet (also IPA). The Association's activities are directed by an elected council of 25 members and five office bearers (president, vice president, secretary, treasurer, editor); the editor works alongside an editorial team. In 2004, its total membership exceeded 600 in more than 50 countries.

The Association was founded in Paris in l886 under the name of *Dhi Fonètik Tîtcerz' Asóciécon* (the *FTA*), and was itself a development of *L'Association Phonétique des Professeurs d'Anglais.* Under the leadership of Paul Passy, a language teacher, the Association pressed for phonetic notation to be used in schools as a method of helping children to acquire a realistic pronunciation of foreign languages. In addition, phonetic notation was also considered beneficial in devising programs to help young children to read. From an initial eleven members in France in 1886, the membership quickly increased, until, by 1914 – the high point of the Association's existence in terms of membership and influence in educational circles – there were more than 1750 members in 40 countries, most of them school teachers.

In January 1889, the name of the Association was changed to *L'Association Phonétique des Professeurs de Langues Vivantes* (AP), and, in 1897, to *L'Association Phonétique Internationale* (API) – in English, the *International Phonetic Association* (IPA).

It was the Danish phonetician Otto Jespersen who first suggested, in 1886, that there should be what he called an International Phonetic Association, which would devise an international alphabet rather than a set of different alphabets specific to particular languages. Passy himself favored the compromise of an International Society made up of a confederation of national bodies, whose aim would be "the

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The International Phonetic Association (IPA) is the major and oldest representative organization for phoneticians throughout the world. Its primary function is to provide the academic community with a notational standard for the phonetic representation of all languages: the International Phonetic Alphabet (also IPA). The Association's activities are directed by an elected council of 25 members and five office bearers (president, vice president, secretary, treasurer, editor); the editor works alongside an editorial team. In 2004, its total membership exceeded 600 in more than 50 countries.

The Association was founded in Paris in l886 under the name of *Dhi Fonètik Tîtcerz' Asóciécon* (the *FTA*), and was itself a development of *L'Association Phonétique des Professeurs d'Anglais.* Under the leadership of Paul Passy, a language teacher, the Association pressed for phonetic notation to be used in schools as a method of helping children to acquire a realistic pronunciation of foreign languages. In addition, phonetic notation was also considered beneficial in devising programs to help young children to read. From an initial eleven members in France in 1886, the membership quickly increased, until, by 1914 – the high point of the Association's existence in terms of membership and influence in educational circles – there were more than 1750 members in 40 countries, most of them school teachers.

In January 1889, the name of the Association was changed to *L'Association Phonétique des Professeurs de Langues Vivantes* (AP), and, in 1897, to *L'Association Phonétique Internationale* (API) – in English, the *International Phonetic Association* (IPA).

It was the Danish phonetician Otto Jespersen who first suggested, in 1886, that there should be what he called an International Phonetic Association, which would devise an international alphabet rather than a set of different alphabets specific to particular languages. Passy himself favored the compromise of an International Society made up of a confederation of national bodies, whose aim would be "the

advancement of the science of phonetics and its application to practical teaching." Jespersen's proposal, however, failed to gain the support of a majority of the FTA's membership, and the Association continued as a forum for language teachers dedicated to the cause of phonetic script rather than as an organization of academic phoneticians. Within a few years, the gradual increase in the number of items dealing with matters unconnected with the concerns of mainstream language teachers (e.g., specimens of Mandarin Chinese and Armenian) in the Association's journal (see below) heralded the shift toward phonetic rather than applied phonetic concerns. Items dealing with language-teaching matters have, nevertheless, always continued to be published, although the emphasis is now firmly on phonetic matters *per se*.

The Association's first journal was *Dhi Fonetik Titcer – FT* for short – published from May 1886 onward; it quickly established itself as the focus of the Association's activities. In January 1889, the name was changed to *Le Maître Phonétique* (*mf*), at the same time as French became the Association's official language. In 1971 the *mf* became the *Journal of the International Phonetic Association (JIPA),* and the official language reverted to English. *JIPA* has been published twice per annum since 1971.

From the very start, the journal was printed as far as possible in phonetic script. (In many issues, a variety of phonetic scripts illustrating the range of symbolizations possible within the Association's conventions was the norm.) It was only with the publication of *JIPA* from 1971 onward that phonetic script gave way to traditional orthography.

Over the years, the format of each issue of the journal has tended to be one of articles on aspects of the descriptive phonetics of languages or language varieties, comments on phonetic notation, and examples in phonetic script *(spesimɛn,* as they were known in French in the *mf)* of the pronunciation of languages. The reading passage used to illustrate the pronunciation has normally been, from 1911 onward, the *Fable of the north wind and the sun*. In addition, smaller items have been published describing the academic and social activities of members of the so-called *famille phonétique*. The character of the articles has always tended to reflect the descriptivist articulatory orientation of the Association; relatively little has been published on topics dealing with phonological theory or experimental phonetics, although the latter is now receiving more attention than in the past.

A series of supplements and loose inserts to the journal has been published at irregular intervals since 1888. One of the most important of these is *The principles of the International Phonetic Association,* which appeared first in French in 1900, in English in 1904, in German in 1928, in Italian in 1933, and in Spanish in 1944. The *Handbook of the International Phonetic Association* (1999), the successor to the *Principles* has an introductory section explaining phonetic notation, followed by transcriptions of *The north wind and the sun* in 29 languages from around the world (including Amharic, Igbo, and Tukang Besi [Tukangbesi, South]), and concluding with information about the computer coding of phonetic symbols, extensions to the IPA alphabet for the representation of pathological speech, and the administrative structure of the Association. Further *spesimɛn* covering more than 100 languages can be found in various issues of the journal itself. In addition, three issues of *Miscellanea phonetica*, collections of articles on phonetic topics, have been published (1914 [issued 1924], 1954, 1958).

A further aspect of the Association's activities since 1908 has been the organization of examinations in phonetics, leading to the award of a Certificate of Proficiency in the phonetics of English, French, or German.

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Relevant Website

http://www.arts.gla.ac.uk/ipa/index.html – IPA website.

International Speech Communication Association

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The International Speech Communication Association (ISCA) is a worldwide nonprofit organization that supports research in all aspects of spoken-language communication. The Association was founded in 1988 as the European Speech Communication Association (ESCA). It is incorporated in France, governed by a 13-member board, and composed of members from all over the world.

Language and speech are arguably the most important endowment that sets us humans apart from other species and that has generated the enormous wealth and diversity of human culture. The science of language and speech has a history that goes back centuries, but it has only been in the second half of the 20th century that computer technology made possible the detailed analysis of the processes that enable human communication. And it is in conjunction with the advances in spoken language science that speech technology has blossomed in the last few decades and has brought such wonders such as the bionic ear, the reading machine for the blind, music stored on a computer chip, forensic identification of anonymous callers, and computers giving information about how to find the nearest French restaurant.

ISCA is a professional organization of spoken language researchers, scientists, and engineers. It bridges the gap between basic research and applied research, both at universities and in commercial organizations. This research leads to more and better applications of the information and communication technologies, using the most effective and efficient mode of communication that humans have developed, namely, the spoken language.

Members of the Association are engaged in research in the disciplines related to spoken language. These include areas as diverse as linguistics and phonetics (*see* **Phonetics: Overview**); human speech production and perception (*see* **Phonetics: Overview** and **Speech Production**); physiology and pathology of speech (*see*); speech signal processing; speech coding and transmission, and speech enhancement; speech synthesis (*see* **Speech Synthesis**); automatic speech recognition, understanding, and spoken language translation (*see* **Speaker Recognition and Verification, Automatic** and); speaker and language characterization; speaker authentication and forensic speaker recognition; audiovisual speech communication (*see* **Audio-visual Speech Processing** and **Speech Recognition, Audio-Visual**); spoken language technology for the aged and disabled and in rehabilitation, education, and second-language learning (*see* **Human Language Technology**); human factors in speech communication systems; etc.

One of the Association's foremost engagements is the organization of international conferences and research workshops, which brings together the leading researchers in speech science and speech technology. The biennial Eurospeech conferences, which have been held under the auspices of ESCA and ISCA since 1989, took place in different European cities: 1989 in Paris, France; 1991 in Genoa, Italy; 1993 in Berlin, Germany; 1995 in Madrid, Spain; 1997 in Rhodes, Greece; 1999 in Budapest, Hungary; 2001 in Aalborg, Denmark; and 2003 in Geneva, Switzerland. More recently, another series of conferences, the International Conference on Spoken Language Processing (ICSLP) has come under the organization of ISCA after the Permanent Council of ICSLP merged with ISCA in 2004. ICSLP conferences have taken place in 1990 in Kobe, Japan; followed by 1992 in Banff, Canada; 1994 in Yokohama, Japan; 1996 in Philadelphia, Pennsylvania (USA); 1998 in Sydney, Australia; 2000 in Beijing, China; 2002 in Denver, Colorado (USA); and in 2004 in Jeju, Korea. The two conference series are now known as Interspeech conferences and each features more than 1000 participants and more than 700 papers.

ISCA also has a strong involvement in organizing and supporting smaller specialist research workshops where spoken language researchers gather to present and discuss cutting-edge work in new and emerging disciplines within the field of speech science and technology. Every year, a number of such workshops take place and some recently held events include a Speech Synthesis Workshop in Pittsburgh, Pennsylvania (USA); Speech Technologies in Advanced Language Learning in Venice, Italy; the Odyssey 2004 Speaker & Language Recognition Workshop in Toledo, Spain; Multimodal Dialogue in Mobile Environments in Irsee, Germany; and Audiovisual Speech Processing in St. Jorioz, France.

The Association has approximately 1400 members from more than 40 countries and the membership is distributed over universities, other private and public research institutions, and the speech, information, and communication industries.

See also: Applied Voice Input and Output Society; Audio-visual Speech Processing; Human Language Technology; Phonetics: Overview; Speaker Recognition and Verification, Automatic; Speech Production; Speech Recognition, Audio-Visual; Speech Synthesis.

Relevant Website

http://www.isca-speech.org – International Speech Communication Association.

Internet and Language Education

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History of the Internet

Computer power is 8000 times less expensive than it was 30 years ago. If we had similar progress in automotive technology today, you could buy a Lexus for about $2. It would travel at the speed of sound and go about 600 miles on a thimble of gas (Wagschall, 1998).

In the space of scarcely a decade of widespread availability, the Internet has affected and even transformed many aspects of people's lives in the technologized world. To be sure, the basic structure of the Internet has existed since the 1960s, but it was not until the 1990s that it began to be used extensively by the general population, and not until the mid-1990s that schools started to use it for educational purposes (Keating and Hargitai, 1999).

Sometime around the early to mid-1990s was also the time that most educators started to receive e-mail service, either privately or through their institutions. The precise dates and degrees of availability vary widely from country to country and institution to institution, with countries such as Finland and the United States being early leaders, and universities and colleges having earlier and easier access than elementary or secondary schools. Most (if not all) educators have access to e-mail and to the Internet in industrialized countries, but also increasingly in the developing countries (see Warschauer, 2003). However, the degree, quality, and/or frequency of access still varies widely.

The Internet as Classroom

The Internet has made it possible for institutions to offer courses and entire degree programs online, so that in the words of enthusiasts, the 'two-by-four-by-six' constraints of classroom instruction have been broken. This phrase, first used by Tiffin and Rajasingham (1995: 87), reverberated around the online learning conferences of the late 1990s to indicate how the Internet had managed to supersede the *two* covers of the textbook, the *four* walls of the classroom, and the *six* daily hours of (high school) instruction.

The first years of the Internet boom led to enthusiastic activity in setting up online classes, courses, and programs. A large number of universities started planning to offer online or distance degree programs. In their 1997 guide to external degrees, Spille *et al.* (1997) listed 122 accredited universities in the United States that offered distance degrees.

In addition, several large consortia or 'virtual universities' sprang up in the United States, the three largest being California Virtual University (CVU), Western Governors University (WGU), and Southern Regional Electronic Campus (SREC). These were originally not universities offering actual courses or degrees, but they acted as brokerage institutions, with online catalogues, searchable databases, and multiple enrollment options. All had plans to establish corporate links and to offer information on corporate training providers. CVU was discontinued in 1999. WGU is now an accredited university and offers degrees in education, business, and information technology. However, its degrees are not universally recognized. SREC has now evolved into the SREB (Southern Regional Education Board) 'electronic campus,' in which a large number of southern colleges and universities in 15 states participate. Courses offered include some foreign language courses (about 30), but many of these are taught by videotape or audiotape, and are thus not truly online, i.e., Internet-based.

Other countries also have their online institutions or consortia, e.g., the Canadian Virtual University (CVU – not to be confused with the now-defunct California version) offers a rather extensive menu of foreign language courses. Similar to their U.S. counterparts, many of these are textbook plus video/audio-based, but some offer supplementary materials on the Internet. Other international institutions

See also: Applied Voice Input and Output Society; Audio-visual Speech Processing; Human Language Technology; Phonetics: Overview; Speaker Recognition and Verification, Automatic; Speech Production; Speech Recognition, Audio-Visual; Speech Synthesis.

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include the Erasmus Student Network in Europe, aimed at facilitating exchange programs and study abroad, CIEE (Council on International Educational Exchange), and many others.

When one looks at the actual mechanisms and materials that are used to offer 'online' language classes, one often finds that they operate with a traditional textbook, supplemented perhaps with a CD-ROM, video and/or audiotapes (all these purchased by the student, and sent by regular mail), with at times an online component. In other words, most 'online' courses are only in part online (and often minimally, or optionally). Thus, many courses are a mixture of traditional distance education practices (distributing materials by mail) and additional Internet and e-mail services. This may gradually shift toward more fully online technologies, as course management systems (CMS) become better (and more affordable) and as Internet technologies, such as voice over IP and streaming audio and video become more accessible.

Accessibility continues to be an important issue. While it is possible in most places now to get Internet access (if only in Internet Cafes, where an hour's access may be quite cheap by Western standards), in many countries access at home may be expensive, because even local calls may be charged per minute. Thus, a group of students in the United States communicating with a group of students in say, Japan, may encounter inequalities of access, not because of differences in equipment, but because of the cost of telephone bills. Massive expansion of broadband access (cable, DSL, etc.) will equalize access in many areas. However, there will remain vast areas of the globe, and numerous neighborhoods in even the most well-connected countries, where access continues to be difficult.

Online courses and programs receive mixed reviews. As mentioned above, initial enthusiasm was considerable, even though detractors have been equally vociferous. A scathing indictment was David Noble's *Digital diploma mills* (1998), which cited numerous ways in which online programs may shortchange students, cut corners, reduce the quality of education, and commercialize and commodify knowledge as merchandise bought and sold over the Internet.

The advantages and disadvantages of online learning are fairly predictable. Among the advantages are individualization, flexibility, and independence from time and space constraints (i.e., study when you want, where you want). Disadvantages include the lack of face-to-face interaction, technical problems, and dependence on self-motivation. Interestingly, instructor-student interaction, which one would expect to be less in online classes, is often reported to be in fact the opposite: students and instructors often report that they have in fact more and better interaction online than they would in the equivalent classroom setting (e.g., large undergraduate or high school classes, where individual attention is minimal). A final logistical problem of online courses can be the administration of official tests and exams at a distance (e.g., how to prevent cheating and how to arrange for proctoring).

A crucial requirement (perhaps *the* most crucial requirement) of a successful online course or program is the development of a (virtual) community of learning, a social context. An online 'space' must be created that fosters a sense of belonging and that encourages (and requires) learners to communicate with one another. Simple steps along the way may be for all learners to post personal bios and photographs, the use of chat rooms where learners can get to know each other (in small groups) informally, and the design of collaborative activities and projects. Several online environments have been designed that encourage the development of such communities (e.g., Svensson, 2003), and clearly such three-dimensional, highly visual, and multimodal virtual landscapes can be attractive for certain groups of students. As mentioned above, CMS are constantly becoming more versatile, integrating graphics, audio, video, animation, interactive games and quizzes, and more. Of course, the need for such bells and whistles varies with the type of student: Some will always prefer a more no-nonsense information and debate-based approach driven by professional goals and requirements.

Research and Resources: The Internet as Tool

In language courses we rely on textbooks, dictionaries, and libraries; on exposure to the target language from a variety of sources; and of course on interaction with fellow students, teachers, and if possible other target-language speakers. What can the Internet offer to assist learners in their quest for language sources, resources, and guidance?

The Internet can serve as a useful tool for language learners, either in full online classes, or as supplements to regular classes (in so-called *hybrid* formats, which combine classes with online work) in these three ways: (1) information about languages and linguistics; (2) authentic language use and language samples; (3) opportunities for interaction. A fourth way, practice opportunities, will be discussed after these three, in the next section.

Information about Languages and Linguistics

Let's say you want to check the vowel chart of Quechua. Before the mid-1990s, you would try to find a source on your shelves or in the library, or perhaps order books via Interlibrary Loan, and so on. Now you type the words *Quechua vowel chart* into one of the major search engines, and within a few seconds you are looking at the vowel chart (the accuracy being dependent upon the original source).

To give another example, perhaps you are citing a research paper, but you are missing a particular detail such as a page number or the author's initials. Instead of searching in libraries or hunting through your files to find the original or your notes, you now might find the information through an Internet search in a fraction of the time and effort: someone, somewhere will probably have a reading list posted that has the information you need.

As these examples show, the researcher, student, and teacher of language can find an enormous amount of information about language and languages on the Internet, although the quality of that information will have to be evaluated on a case-by-case basis. A number of websites and portals, such as Ethnologue, the Yamada Language Center, Bob Peckham's Famous French Links, the AATG links for German, among many others (see 'Relevant Websites'), attempt to guide the visitor to particular categories of information and services (such as specialized language fonts) and in some cases evaluate or comment on the sites listed. In addition, there are a number of online journals on CALL (Computer-Assisted Language Learning), many of them free of charge.

In sum, the student of linguistics and of any particular language can find an abundance of information on the Internet. Language teachers can use the Internet to design research projects for their students, as well as to incorporate authentic texts (including audio and video) in class. As Internet technology advances, it becomes easier to obtain on-the-spot transcripts of video fragments, to find ready-made lesson notes for news clips, or to compile a list of online activities in grammar, vocabulary, and so on.

Authentic Language Use and Language Samples

Most language teachers and students agree that using authentic materials is beneficial for a number of reasons, especially if this can be accompanied by carefully designed activities and lesson plans. Finding suitable authentic materials can be quite difficult and time-consuming, of course, and here the Internet once again has a plethora of resources available. In some cases, teaching materials such as transcripts and prototype activities (as mentioned above) are made available on websites, but in most cases the teacher or student must decide how to evaluate, interpret, and deal with the materials found. Once again, as in examples mentioned above, the quality, veracity, or representativeness of the authentic language samples must be evaluated by the user.

A host of other potential issues may affect the use of authentic language samples from the Internet. Let's say a teacher of Chinese wants to use a video clip from a news broadcast in Chinese in tomorrow's lesson. This video clip may be available now on a news website, but there is no guarantee that it will still be there tomorrow. Furthermore, relying in class on accessing a live website has its risks: the site may be down, the local server may be down or suddenly slow down to a crawl, and so on. Therefore, the teacher may have to download the clip to the hard drive, but perhaps this is not allowed because of copyright restrictions, or space restrictions, or special software may be required. To use the resources available on the Internet at short notice, a number of prerequisites may apply. It is neither automatic nor risk-free.

A different, but no less thorny issue relating to the abundance of authentic materials available on the Internet in written form is the ease of cutting and pasting material into essays and writing projects. The ease of access to quotes and academic sources makes unattributed use of quotes easy. As in other areas, however, the Internet offers some solutions to the problems it has itself created: there are a number of excellent websites and services available to not only spot plagiarisms but also to discuss ways of preventing and dealing with it in foreign language writing classes.

Opportunities for Interaction

As mentioned earlier, by the mid-1990s, most academic institutions had begun providing e-mail access for faculty, staff, and students. In addition, increasing numbers of people began to have e-mail access from their home, first by modem, then by cable, DSL, or other broadband connections. In some countries adult access to e-mail is as high as 90% (for example, in the United Kingdom, Australia, and The Netherlands, according to a 2002 Nielsen Ratings survey). Chat and instant messaging (IM) are less ubiquitous, yet in some countries (e.g., Brazil and Spain) more than 40% of adults were reported to use it. In addition, young adults in the United States now report that they hardly use e-mail anymore (except to communicate with parents and teachers Thorne, 2003); but use IM most of the time that they are online (which can literally be 24 hours a

day in the United States where there are generally no time limits). Many young people routinely have several windows open in which they communicate with several friends separately and simultaneously, while also listening to music and claiming to be doing their homework. If this is true, and if the homework indeed gets done satisfactorily, then the Internet has truly brought multitasking to the younger generations, too.

The effect of various forms of online interaction in language learning have not yet been fully investigated, although a number of studies have been conducted. Lamy and Goodfellow (1999) compared asynchronous (e-mail or discussion list) and synchronous (chat) communication in an online French class, and they found that asynchronous communication was particularly well suited for language learning, because it allows for a combination of reflective and conversation-like language use. Thorne (2003) found that students required to participate in asynchronous online learning were relatively unmotivated until they discovered IM connections with their counterparts abroad; through IM they started getting to know them, and this also involved flirtatious and romantic encounters online. What it really means for online language learning remains unclear at this point. The slower, more monitored medium of e-mail and threaded discussion allows the learner to focus more on accurate and edited language use (Lamy and Goodfellow, 1999), whereas the more spontaneous medium of IM is generally quite tolerant of errors, but places a high premium on effective communication of interpersonal meanings. It will clearly take significant longitudinal research efforts to establish the learning potential of the various modes of Internet interaction.

Activities: The Internet as Tutor

Ever since the Internet became popular for language learning in the mid-1990s, enterprising teachers have been putting up language activities, quizzes, and games. During the first few years, most online activities were actually a step back (pedagogically speaking) from the sorts of things teachers had been doing with actual software (such as Hypercard) since the 1980s. Online activities tended to be fairly mechanical, often based on blank-filling or multiple choice, with little meaningful feedback. The design challenges were considerable, but the technologies were not versatile and only minimally interactive. New web design technologies and advances in speed of access, audio and video compression, and more powerful web browsers have resulted in a greater variety of online language practice opportunities. These now include listening comprehension based on audio and video clips, animated writing tutorials for Japanese and Chinese, drag-and-drop vocabulary and phrase matching, and many others. In addition, feedback may be individually tailored, so that the level of the activity is adjusted in accordance with the responses of the student (e.g., Jim Cummins's 'e-lective' reading program).

In addition to activities designed for individual practice, the Internet also offers opportunities for collaborative work. Examples include the following:

- *WebQuests* – inquiry-oriented group projects (designed by Bernie Dodge of San Diego State University) that use Internet resources to investigate particular topics. Free websites exist (especially Dodge's original WebQuest page at SDSU) that facilitate the design of such projects as well as the sharing of results, e.g., in the form of final presentations.
- *Concordancing* – A concordance program searches texts or corpora of texts for certain words, word combinations, or phrases in context, making it an ideal tool for collaborative investigations of vocabulary, grammar, or idiom usage. Sample concordance and corpus websites exist for a number of languages; in addition, the major search engines can also be used as concordancers of sorts: Typing in a particular word or string will bring up many examples of the particular items in question, which can then be investigated by students in groups and reported on. A large set of links and resources, as well as pedagogical advice, can be found on the website of Michael Barlow.
- *Project Poster* – A nonprofit web-based service that allows students and classes to quickly put together some text and images in the form of a simple website that can then be used for class presentations.

There are many other resources available on the Internet that can be used for students working in groups to engage in project-based learning. As one further example, the University of Iowa has an excellent website for phonology and pronunciation in English and Spanish, with animated diagrams and video clips of articulation. Language learners can use this website (and many others on a variety of language topics) to investigate, discuss, and practice aspects of pronunciation.

Equality, Democracy, and the Internet

In various places above I have alluded to certain inequalities in access to and the use of technology in education. Such inequalities have generally been referred to as the "digital divide" (Warschauer, 2003). In the early days of technology use in education, there

was a clear division between the traditional haves and have-nots in society in terms of hardware, software, and access. Thus, in the United States, affluent suburban schools were the first ones to get computers and Internet access, whereas inner city and rural schools were left behind. There was a fear that poor schools and minorities would once again miss out on equal opportunities for learning with the new technologies. As a result, a strong push was made in the United States to ensure that the digital divide would be bridged. Special programs were set up to provide disadvantaged schools and areas with heavily discounted computers and connections. One such program, initiated during the Clinton-Gore administration, is E-Rate, which provides broadband connections and equipment to underserved districts and schools at discounts of up to 90%. In addition, many grant proposal requests encourage (or require) the inclusion of technology in educational project proposals, thus allowing grant recipients to beef up the technological infrastructure of their institutions.

In the early years the Internet was heavily English-dominated. It was hard to find websites in other languages, and in fact the technologies to use scripts other than Roman (non-alphabetic, or so called 'double-byte' scripts such as Japanese and Korean, or right-to-left scripts such as Arabic and Hebrew) were primitive. But a common standard, Unicode, has become widespread, and this technology enables the encoding of any writing system. A related issue has been the worry that the English-dominated Internet would contribute to the increasing marginalization (and extinction) of minority languages. However, as Warschauer shows, the variety of websites in languages other than English has increased significantly. In 1997, 81% of websites were written in English, but in 2000 this percentage had dropped to 68% (Warschauer, 2003: 96). In addition, many websites are bilingual or multilingual, and online translation tools, such as Babelfish, exist that can automatically translate a website into another language (imperfectly, but in most cases comprehensibly).

According to *Technology counts* (2004), availability of computers and access to the Internet are now much improved in the United States, with just a few percentage points separating richer and poorer schools in terms of number of students per computer, and number of classrooms connected to the Internet.

Internationally, there are still vast discrepancies from country to country as well as from region to region within countries (this summary is based on data in *Technology Counts*, 2004). In Europe, Finland, Sweden, and Austria are among the leaders in school computer use, whereas France, Germany, and Italy have less access and connectivity. In Africa, many countries have few computers in schools, with South Africa and Egypt standing out as having respectively about 17.5% and 31% of schools equipped with computers. Asian countries also vary greatly in terms of access. Both South Korea and Japan have made enormous efforts to get computers into every classroom. Poorer countries such as Mongolia, Vietnam, and Laos are much farther behind. A similar situation pertains in Latin America, with Chile ahead of all other countries, and the poorer countries such as Bolivia, Ecuador, Peru (as well as most Central American countries) lagging far behind.

However, these numbers, interesting though they may be, do not tell the whole story. Number of students per computer or number of classrooms connected to the Internet tells us little or nothing about the quality of their use in education. It goes without saying that technology can be used well or badly, efficiently or wastefully, productively or destructively, innovatively or mind-numbingly. And from this perspective, comparing the amount or even sophistication of technology across places and schools is of limited interest. Much more important is a comparison of what is done with the technology, and here reliable data are extremely hard to come by. Yet, there are numerous reports of vast differences in the pedagogical aspects of technology use between rich (middle-class, suburban) schools and poor (rural, inner-city, high-immigrant) schools. In the former you tend to see more open-ended applications, web and graphic design programs, and students engaged in creative projects. In the latter, you tend to see students working on so-called 'integrated learning systems' or a variety of basically 'drill-and-kill' CD-ROM programs, essentially lock-step language practice without much imagination or creativity involved. In the former, you tend to see more group work in an open classroom setting, in the latter it is more likely to be individual work in a computer lab or in a corner of the classroom. Thus, the digital divide may be perpetuated even if inequalities of equipment and connectivity are overcome, because of the lack of training of teachers and students with the technology and its creative use and because of a lack of upgrading of the curriculum.

There are a number of things that need to be done to overcome this second, far more insidious educational inequality. The first is teacher education. It has often been recommended that at least one-third of a technology budget should be spent on teacher professional preparation and inservice development. This recommendation is rarely if ever followed in practice. In most cases, once the equipment and software, and the building and wiring of labs are paid for, little

money (if any) is left over for teacher training. The few workshops available (often offered by vendors) tend to be shallow and cursory, technology-oriented rather than pedagogy-oriented, and scarcely address the integration of technology into a meaningful and challenging curriculum. Even in CALL conferences, a majority of presentations focus on new technologies and innovations, rather than on solid classroom practices.

Now that many countries (India, South Africa, Brazil, South Korea, Japan, and so on) are engaged in a major push to make computers available in every classroom, early signs are once again that the issue of integrating technology into the curriculum is largely ignored or at best neglected. Unless a consistent policy is established of putting teacher training and curriculum development *before* computer purchasing and infrastructure (in budgeting terms), these countries will find that, to quote Larry Cuban's conclusion from surveys in the famed Silicon Valley, computers are "oversold and underused" (not to say, "misused," too). The following quote from Phil Agre expresses the dilemma well:

> It is extraordinarily common for organizations to invest large sums in complex computers without any investment in training. Schools often invest their scarce resources in computers without any thought to the curriculum. In some cases, the responsible authorities are duped by claims that the systems are easy to use. In other cases, it is assumed that computers will pay for themselves by displacing staff, and therefore further investments in human capital seem like the opposite of that intention. In each case, what is neglected is what Kling (1992) calls the web of relationships around the computer. Computers are easy to see, but webs are not. (Agre, 1999)

Unless the issues of teacher preparation and curriculum development are addressed in an energetic fashion, inequalities in the innovative, equitable, and responsible use of technologies will persist regardless of how many work stations, applications, wires, or wireless networks schools are bombarded with.

Future

The future of technology in language education is like the opening paragraph of Dickens's *Tale of two cities*: "It was the best of times, it was the worst of times . . . ." The trend can go in either direction, the crucial element being what is to come first: quality of pedagogy and curriculum or the latest, fastest, glitziest hardware, software, and connectivity? As an educator with a long-standing interest in technology, I can only sustain a belief in its beneficial effects if I think that it can improve the quality of the educational experience of our students. I can only defend this belief because I have kept this mantra firmly in mind over many years:

- Pedagogy first
- Curriculum second
- Computers third.

In the end, it is up to the teacher and the student to define the role of technology in learning. There are many exciting examples of good and creative work already available, and surely many more to come, especially if teachers and students demand them and actively participate in their development. At the same time, there are strong commercial and administrative forces that will always try to tug the development toward more mechanical, mass-produced, test-oriented functions. It is important to realize the dynamics of instruction both at the micro and the macro levels, so that effective action can be promoted.

See also: Modes of Participation and Democratization in the Internet.

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Interpretation: Theory

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The problem of interpretation has long been at the center of numerous disciplines: hermeneutics, philosophy of language, literary criticism, psychoanalysis, anthropology, philology, to name but a few. In each of these contexts, the term 'interpretation' obviously assumes different meanings; it may mean to attribute sense to a text through a close reading (in a reader-oriented literary criticism, for example), to bring about a fusion of horizons between the author and the reader of a text, through a philosophical pre-comprehension of the Sense (in a hermeneutical perspective), to reconstruct reasons and anticipations of neurotic symptoms (in psychoanalysis), or to trace the palimpsest of a certain term through its linguistic occurrences (in the field of philology). It may therefore be an act of 'decodification,' 'reconstruction,' 'verification,' or 'listening,' where the subject-object relationship assumes different forms of balance.

The category of interpretation has, however, always contributed to 'define' semiotics as a discipline. If, in fact, this is the science of signs – the discipline that deals with the processes of signification – then it is clear that it cannot prescind from the necessary and implicit work of 'decodifying' those signs, reading them and thus using them. After all, if we look at the origins of semiotics, we can see that its antecedents are indeed to be found in two highly interpretative activities and forms of knowledge: divination and medicine, whose very purpose was to succeed in correctly interpreting signs having no immediate significance, through symptoms, hints, and its own previous competences.

Again in ancient times, Aristotle defined the sign as a relationship of logical 'implication,' therefore as an 'interpretative' relationship: if q, then p (meaning: if smoke, therefore fire; meaning: smoke is a sign of fire). The Stoics considered the sign *(lektòn)* a proposition, as such, deriving from a judgment (that is, already a form of interpretation) and destined to be inserted into implicative kinds of logical forms. A few centuries later, Augustine, in the *De Magistro*, claimed that it is up to the human mind (therefore, an interpretative instance) to return words to the things of which they were signs, because the relationship between words and things is not of mere correspondence, or co-belonging (according to the theory of language defined 'cratilea' – from the Platonic dialogue *Cratilo*), but a relationship 'mediated' by the sign, and as such, to be interpreted.

These brief references to the archaeology of the concept of 'interpretation' are merely to hint as to how sign and interpretation have, from the origins of semiotics, been co-implied and reciprocally defined.

Interpreting, however, is not just a decoding process that every act of reading and communicating involves; it is – not only from a hermeneutical but also a philosophical perspective – a dimension present at all levels of semiotic activity (from the perceptive one to the cognitive) that therefore defines man as rational being.

C. S. Peirce, in particular, has characterized in a highly interpretative sense his whole theory of knowledge and his theory of semiotics, recognizing an interpretative component even at the lowest levels of the cognitive elaboration – that is, on a perceptive and, even earlier, on an emotional level. In fact, whenever there is the definition of a predicate, according

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to Peirce there is 'inference,' that is, reasoning. Reasoning is never an ideal contemplation or intuitive knowledge or automatic mental association; be it 'deductive reasoning' (where the result derives from the application of a rule to a single case), 'inductive reasoning' (where, by observing a case or a result, a rule is generalized despite there being no certainties or guarantees of completeness), or 'abductive reasoning' (where it is assumed that a certain phenomenon is the case of a possible rule, such as, when seeing a red rash on the skin we imagine it to be an allergic reaction, hypothesizing the rule whereby a certain intolerance generates a certain kind of irritation), every predication requires hypotheses and verifications, in comparing and passing from premise to conclusion. The structure of the inferences on which all reasoning is based is always tripartite as in every classic syllogism; it expects a case, a rule (which, as such, is already a sign), and a result. These three elements, depending on the reasoning produced, enter into different relationships but are always co-present; every state of conscienceness (so every thought but even, much sooner, every perception or emotion) is the result of the re-elaboration – and therefore the interpretation of the 'data' supplied by the two premises of the syllogism.

All reasoning is therefore inferential (because innate or intuitive knowledge does not exist) and even sensations (being at the origin of our cognitions) arise as a result of multiple impressions 'interpreted' according to preceding schemes, cognitions, and interpretative habits (including corporal ones). Our attention is invariably selective, submitting only portions of reality to our reasoning – portions in some respects pertinent, and so, in some way, pre-interpreted. The selected reality then produces an accumulation of sensations that, in turn, generate emotions that will be 'interpreted' by our conscienceness and transformed into descriptive judgments and assertions.

The process from attention to the emotions to reasoning mainly occurs according to patterns made recurrent both by our somatic constitution (which, for example, under normal perceptive conditions, will always make us associate the stimulus of a sudden, excessive luminosity with the reaction of closing our eyes) and by our former experiences, capitalized in cognitive and embodied forms of memory (the child 'learns' to stay away from fire). This is how 'habits' – interpretative habits – are formed, "when, being aware of carrying out a certain act *m*, on various cases *a,b,c,* we get to carry it out whenever the general event *l* occurs, where *a,b,c,* are special cases" (Peirce, C. P., 5: 297).

The forming of habits is typical not only of perceptive inferences but of all our semiotic activity, that is, of all our interpretative practice.

Interpretation is, in theory, never-ending, because every interpretant may become the object of a new sign, thereby setting off an open chain of interpretations, but these interpretations tend to converge in interpretative 'habits,' culturally conditioned and shared behavioral trends – the 'final-logical interpretants.'

Thus, the meaning of experiences (emotional, cognitive, and cultural) lies in the 'effects' they produce, just as the meaning of every single sign lies in the interpretants it generates. It is what is defined as a 'pragmatic maxim,' contrary to every universalistic abstraction and every theoretic imperialism. The meanings change continuously because they vary according to the effects they produce; there is a relationship of continuity between meaning, interpretation, and action.

Interpretation, therefore, proceeds inferentially, formulating hypotheses starting from clues and then elaborating predicates – definitions, explanations, and interpretative habits. Being in a process dimension which makes it run transversally from one stage to the next of the cognitive elaboration (e.g., from sensation to cognition) and from one level to the next of knowledge (from the individual to the collective), interpretation lives on 'transpositions.' According to Peirce's lesson, in fact, the moment it enters the circle of semiosis every object – being a physical impression or a highly complex and structured aesthetic text – gets explained and translated into an interpretant that will, in turn, be explained by another interpretant that will, in turn, find yet another definition, in a chain of transpositions that transform the interpretation into a process of continuous translation of one sign into another.

This 'translative' aspect of interpretation was particularly emphasized by Roman Jakobson, who explicitly quoted Peirce when he distinguished three kinds of translation (interlinguistic, intrasemiotic, and intersemiotic) in order to characterize human language. Hence Jakobson's idea of language and communication appears mobile and composite: significant practices are not univocal, definite forms of communication but a set of translative processes forever *in fieri*, where the concept of equivalence without residues (man = rational animal) is not sufficient. The signs, the texts, never have just one single meaning, one single interpretation, or one single translation – they can enter into many different translative and communicative processes that all together go to make up the space of 'intertextuality.'

The texts of a culture, therefore, never exist separately from each other, exclusively within the ambient

where they were produced. As explained by Juri Lotman, they exist in a social, semantic, and pragmatic universe (the universe of culture) where they cross over, superimpose, and 'react' to each other and become modified. Indeed, to be informative, communication (be it individual or the communication of a certain culture with its internal subsystems or with other cultures) must always add something new as it proceeds – it has to introduce something extraneous, something untranslatable at first. Through small shocks – small 'explosive moments,' says Lotman – these extraneous components introduce moments of discontinuity into the system of a language or culture; destined to be re-absorbed, they will be interpreted and will, in turn, become foreseeable and therefore homogeneous.

The whole development of the culture (or semiosphere) is therefore a succession of small perturbations and hypotheses used to explain and incorporate them. As Peirce claimed, from the cognitive point of view, semiosis occurs when a surprising, anomalous fact strikes our attention and obliges us to formulate hypotheses that permit us to explain it and include it in our cognitive system.

Semiosis and translation – the incessant production of meanings and the normalization of interpretative habits – interweave to make up the fabric of culture.

The continuity of meaning, interpretation, and translation is also the basis of Umberto Eco's semiotics. In fact, Eco introduces an interpretative component at the very heart of his conception of the sign. He does not, in fact, define the sign by a mere relationship of equivalence (man = rational animal) nor by the sum of essential defining traits (as in so-called dictionary semantics, where the sign 'man' is given by 'human,' 'mortal,' 'biped,' 'erect,' and so forth) but by an open structure with several defining traits and contextual marks that may or may not be activated according to the circumstances. The sign, therefore, never implies an automatic decodification but an interpretative process wherein some directions of sense and not others are activated, starting from a semantic potential.

Thus is defined an 'encyclopaedic' semiosis.

The category of 'encyclopaedia' is central for the interpretative semiotics of Umberto Eco; it indicates the set of representations in which the interpretative processes come into contact with the archive of knowledge that, according to Peirce's lesson, constitutes habits. Semiosis is a continual movement within the encyclopaedia, which constitutes its 'background' (as we said, every sign exists in a cultural context) and its continually unstructured 'product' (semiosis creates and changes the encyclopaedia through continual new interpretations of sense). The encyclopaedia of a culture (or of a subject belonging to a certain culture) can therefore never be described in an exhaustive way; it is always mutable, subjected to the pushes and pressures of the cultural context's evolution. As we said, it is not a dictionary made up of equivalences, but a network that can be crossed in different directions according to different interpretative paths. Within an encyclopaedic semantic model, the meanings are given not through decodification but through abduction; the subject interprets the sign 'in some respects' by reverting to other signs, highlighting certain aspects in the passage from one sign to another, from one point in the encyclopaedia to another.

The possible interpretative paths are therefore many and unpredictable; they vary from interpreter to interpreter, because the 'formation' of each individual's encyclopaedia – his knowledge – is different. Nevertheless, contrary to what is claimed by deconstruction, according to Eco, some 'limits of interpretation' do exist. The principle 'everything goes' is not valid. Signs never have just one possible interpretation but have some incorrect interpretations, some wrong senses. To paraphrase two titles by Eco: the work is open, but the interpretation has some limits.

For Eco, the relationship with a text is one of 'cooperation.' The text is a 'lazy machine' that never says everything. It always has an opaque component that the reader has to interpret, but this is just a strategy that directs the reader's interpretative moves, through a series of clues, suppositions, anaphoras. The reader has to collaborate in filling in the text's open gaps (the implicit, the suppositions), making interpretative hypotheses co-textually pertinent in relationship to the entire textual area and verifying the coherence.

See also: Abduction; Inference: Abduction, Induction, Deduction; Semiosphere versus Biosphere.

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Interpreted Logical Forms

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Interpreted logical forms (ILFs) were originally introduced by Harman (1972) to answer the question: What are the objects of propositional attitudes (belief, desire, hope, regret, etc.)? The theory has since been developed by a number of philosophers, most notably Higginbotham (1986, 1991), Segal (1989), Larson and Ludlow (1997), and Larson and Segal (1995). Seymour (1996) has suggested that ILF theories can also solve certain puzzles in quotational environments.

Propositional Attitude Reports

Consider the following two propositional attitudes:

(1) Lois believes that Superman can fly.

(2) Lois believes that Clark Kent can fly.

It is an 'intentional fact' that Lois may have the attitude displayed in (1) without having the attitude displayed in (2). It is a 'semantic fact' that sentences reporting these propositional attitudes may differ in truth value. Are these facts the same? No: one is a fact about intentionality, and the other is a fact about semantics. Is this difference important? According to the theory of ILFs advanced by Ludlow, Larson, and Segal, it is. Giving a semantics for propositional-attitude reports, which is the goal of the ILF theories, has virtually nothing to say about propositional attitudes themselves: "The ILF theory . . . (as a semantic theory) . . . addresses only the truth conditions of sentences involving *believe, think, assert*, etc., it does not address the beliefs, thoughts, and assertions of persons" (Larson and Ludlow, 1997: 1035). By contrast, the ILF theory proposed by Higginbotham (1986, 1991) countenances a closer relationship between the theory of propositional attitudes and the semantics of attitude reports.

Since Frege (1892), a huge amount of attention has been given to the aforementioned semantic fact, which has become known has 'Frege's Puzzle.' Frege discovered that if 'Superman' and 'Clark Kent' refer to their ordinary referents in (1) and (2), according to the principle of substitution, that co-referring expressions may be substituted *salva veritate*, (1) and (2) should share a truth value. Since they intuitively do not, the principle of substitution seems to fail in propositional-attitude contexts. Frege's puzzle has given rise to the very difficult project of giving a semantic theory that deals satisfactorily with propositional-attitude reports.

Frege offered a solution based on his sense/reference distinction. In addition to extensional entities (individuals, sets, and relations-in-extension) he postulated senses or modes of presentation, which we now sometimes call intensions, and which are, roughly, ways of determining referents. Briefly, in

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(1) Lois believes that Superman can fly.

(2) Lois believes that Clark Kent can fly.

It is an 'intentional fact' that Lois may have the attitude displayed in (1) without having the attitude displayed in (2). It is a 'semantic fact' that sentences reporting these propositional attitudes may differ in truth value. Are these facts the same? No: one is a fact about intentionality, and the other is a fact about semantics. Is this difference important? According to the theory of ILFs advanced by Ludlow, Larson, and Segal, it is. Giving a semantics for propositional-attitude reports, which is the goal of the ILF theories, has virtually nothing to say about propositional attitudes themselves: "The ILF theory . . . (as a semantic theory) . . . addresses only the truth conditions of sentences involving *believe, think, assert*, etc., it does not address the beliefs, thoughts, and assertions of persons" (Larson and Ludlow, 1997: 1035). By contrast, the ILF theory proposed by Higginbotham (1986, 1991) countenances a closer relationship between the theory of propositional attitudes and the semantics of attitude reports.

Since Frege (1892), a huge amount of attention has been given to the aforementioned semantic fact, which has become known has 'Frege's Puzzle.' Frege discovered that if 'Superman' and 'Clark Kent' refer to their ordinary referents in (1) and (2), according to the principle of substitution, that co-referring expressions may be substituted *salva veritate*, (1) and (2) should share a truth value. Since they intuitively do not, the principle of substitution seems to fail in propositional-attitude contexts. Frege's puzzle has given rise to the very difficult project of giving a semantic theory that deals satisfactorily with propositional-attitude reports.

Frege offered a solution based on his sense/reference distinction. In addition to extensional entities (individuals, sets, and relations-in-extension) he postulated senses or modes of presentation, which we now sometimes call intensions, and which are, roughly, ways of determining referents. Briefly, in

attitude contexts, 'Superman' and 'Clark Kent' do not refer to their ordinary referents, but to their ordinary senses. Since 'Superman' and 'Clark Kent' refer to different senses in (1) and (2), we shouldn't expect to substitute them *salva veritate*. In this way Frege preserves the principle of substitution, but at a cost. First, he introduces intensions, which seem to many to be dubious entities (Quine, 1961). Second, he violates Davidson's (1968) requirement of 'semantic innocence' – that expressions should have the same semantic values in all contexts.

ILF theories aim to offer a semantic theory of propositional-attitude reports that can avoid these supposed problems. They aim to give a purely extensional semantics for attitude contexts, while preserving semantic innocence. Achieving these aims would make them extremely attractive. (See Larson and Segal, 1995: 437 for their rejection of intensional strategies for preserving semantic innocence.)

ILF theories are standardly embedded in a Davidsonian truth-theoretic semantics for natural language. The introduction of ILFs allows one to provide truth conditions for sentential complements embedded in propositional-attitude reports **within** the truth-theoretic-semantics framework. (For a clear explanation of why the Davidsonian framework (without ILFs) is not adequate to capture the truth conditions of propositional-attitude reports, see Larson and Segal, 1995: 415–418.)

What Are ILFs?

The basic idea is that propositional-attitude verbs express relations between an agent and an 'interpreted logical form.' The 'logical form' part of an ILF is, roughly, a sentential complement (a syntactic item), which usually takes one of the following forms: 'a is F,' 'a's being F,' or 'that a is F.' (Lexical items are part of an expression's logical form.) The 'interpretation' part of an ILF is the assignment of referents to parts of the sentential complement. ILFs can be represented with phrase structure trees whose terminal nodes are pairings of the relevant lexical items with their referents, and whose nonterminal nodes are pairings of the relevant phrasal categories with their referents. Simplifying, the sentential complement in an attitude reports such as

(3) Lois believes John is funny

receives the following ILF:

<S, True>
<NP, John> <VP, John>
<'John', John> <'Funny', John>

In a nutshell, ILFs are a combination of syntactical (linguistic) and referential (nonlinguistic) material – they are hybrids relative to purely syntactical approaches and purely referential approaches. (See Larson and Segal, 1995: 419–422 for a discussion of purely syntactical approaches.) Since ILFs conjoin only lexical items and extensional referents, ILF theories provide a purely extensional semantics for propositional-attitude reports.

Puzzles and Problems

An adequacy test for any semantics of the attitudes is how well it does in solving traditional puzzles. To begin, consider the way in which the linguistic and nonlinguistic features of ILFs allow them to solve one puzzle involving names and one puzzle involving demonstratives. I call these the 'simple name puzzle' and the 'simple demonstrative puzzle.' (The use of the term 'simple' here is of course theory relative. Russellians (e.g. Salmon, 1986, and Soames, 1987) have great difficulty with name puzzles.)

The Simple Name Puzzle

Most agree that the following two belief reports can differ in truth value, despite the fact that 'Fido' and 'Rex' refer to the same dog (this is a variant of the aforementioned Clark Kent/Superman case):

(4) John believes that Fido barks.

(5) John believes that Rex barks.

John, for example, may only know the dog by the name 'Fido' and so only believe (4). Because ILFs are partly constituted by lexical items, the ILF theory can easily account for the difference in truth value between (4) and (5). Since 'Fido' and 'Rex' are different lexical items, the ILFs associated with the sentential complements in (4) and (5) will be different.

The Simple Demonstrative Puzzle

Consider

(6) John believes that that is funny

used to report John's referring to a comedian's skit with the use of the embedded demonstrative. Now consider (6) used to report John's referring to a TV show with the embedded demonstrative: clearly a different belief report. A purely sententialist theory of the attitudes (one that appeals only to syntactical items) has difficulty accounting for this difference. In both instances, John would be standing in relation to the same sentential complement, 'that is funny.' Since ILFs contain the referents of lexical items, they can easily account for differences between belief reports

that share sentential complements. In this case, one ILF would contain the comedian's skit as the semantic value of the embedded 'that,' and the other would contain the TV show.

These two puzzles show the power of ILF theories. The lexical features of ILFs allow them to be fine-grained enough to solve simple name puzzles without postulating intensional entities. The objectual features of ILFs prevent them from being too coarse-grained (as purely syntactical theories are) to solve simple demonstrative puzzles.

Consider now two further puzzles that prove to be more difficult for ILF theories. I call these 'the hard name puzzle' and 'the hard demonstrative puzzle.'

The Hard Demonstrative Puzzle

Suppose that John assents to

(7) That is a philosopher

while pointing to his professor in philosophy class (context 1), but denies (7) while pointing to a man seen from behind (he doesn't know it's his professor) at a party (context 2). Relative to these different contexts, then, intuitively,

(8) John believes that that is a philosopher

according to the context in which it is uttered, can differ in truth value. On its face, since the sentential complement, 'that is a philosopher,' and the referents assigned to its parts are the same in both contexts, ILF theories appear unable to account for the possible difference in truth value.

Larson and Ludlow (1997) respond to the hard demonstrative puzzle by appealing to a Burgean (1974) idea about the semantic values of demonstratives: according to Burge, the semantic value of a demonstrative is a pairing of what is demonstrated and the act of demonstration. By including acts of demonstration in the semantic value of demonstratives in attitude contexts, Larson and Ludlow can account for the truth value differences of (8) since the acts of demonstration will be different in the two contexts. Relative to context 1 the semantic value of the demonstrative will be <x, a1>, where x is the philosopher and a1 is the speaker's demonstrative act, and relative to context 2 the semantic value will be <x, a2> where a2 is a distinct demonstrative act from a1.

Pietroski (1996) argues that it is unclear whether this response is nonFregean and well motivated. That is, Pietroski observes that acts of demonstration can affect the truth of (8) but not the truth of (7). This, he claims, concedes the Fregean point that a demonstrative way of thinking of a referent affects the truth value of a sentence with an **embedded** demonstrative. Pietroski suggests that Larson and Ludlow can avoid this complaint by agreeing with Burge (1974), on grounds independent of attitude contexts, that the semantic values of demonstratives are **always** ordered pairs of the thing demonstrated and the act of demonstration.

A suggestion made by Higginbotham (1991) may provide an alternative way of dealing with cases like (8). In discussing an objection to both Creswell's (1985) structured meanings account of the attitudes and Larson and Ludlow's theory of ILFs, Higginbotham argues that both fail to include a crucial parameter in their accounts: "... namely that complement sentences are to be understood as if their speakers said them" (1991: 352). Lau (1995) argues that applying this parameter to (7), relative to context 1, in uttering (7) John would understand himself as referring to his philosophy professor and (8) would turn out true, but relative to context 2, John would not understand himself as referring to his philosophy professor and (8) would turn out false. Although this suggestion accounts for this case, more would need to be said about how this new parameter should be incorporated into the semantics.

The Hard Name Puzzle

Kripke's (1997) Paderewski case (and others like it) pose a more difficult challenge for ILF theories. Suppose John comes to know his shy neighbor, who never plays music at home and does not own a piano, as 'Paderewski.' Thus (9) is true:

(9) John does not believe that Paderewski is a pianist.

John also attends many concerts where he meets his favorite pianist, also called 'Paderewski.' Although these are the same Paderewski, John does not realize this. So, it is also true that

(10) John believes that Paderewski is a pianist.

There seems to be no way of distinguishing John's beliefs either in terms of lexical items (since there is only one linguistic item, 'Paderewski') or in terms of semantic values (since there is only one referent, Paderewski). So ILF theories apparently attribute contradictory beliefs to John.

The different responses to this puzzle (and the complexity of some of them) are evidence that it is particularly difficult for ILF theories. Larson and Ludlow (1993) suggest that although (9) and (10) contain the homophonous 'Paderewski,' there are really distinct syntactical items in play – 'PaderewskiI' and 'PaderewskiII' (much as there are distinct

syntactical items associated with 'bank'). They argue that since there are actually two names in (9) and (10), different ILFs would be assigned to them, thus avoiding the assignment of contradictory beliefs to John.

Many (e.g., Forbes, 1996; Taylor, 1995; Richard, 1990) have found this response implausible. They argue that unlike the term 'bank,' there is only one name 'Paderewski' in our common language. John certainly doesn't seem to have had a private baptism, introducing two names into his idiolect; rather he picked up the name in the ordinary way. Since he picked up the name in the ordinary way, and our language only has one name, John is using only one name. (See Pietroski, 1996: 366–368 for a different objection to Larson and Ludlow's solution to the Paderewski puzzle.)

Ludlow (2000) attempts a different response to the Paderewski puzzle, arguing that it dissolves on a correct understanding of language and the goals of ascribing propositional attitudes. First, language is not an external, social object, but what Chomsky (1986) calls an I-language – each person has her own lexicon, relying on substantial overlap with others for communication. Second, in ascribing propositional attitudes we are not trying to describe what is going on in an agent's head. Rather, we are helping a hearer construct a theory of an agent's mental life. Our focus, therefore, should be on the relationship between the ascription and the hearer, not on the ascription and the bearer of the attitude. Working with the hearer is a complicated process that involves theories of tacit belief, of goals of belief ascription, and of belief ascription logistics. But most importantly for Paderewski cases, the speaker and hearer are engaged in a negotiation about the best expressions for ascribing a propositional attitude to the agent. In Paderewski cases we need some way of distinguishing between an agent's beliefs, and the speaker and hearer negotiate this by choosing distinct expressions. Signaling John's beliefs about Paderewski *qua* piano player will involve an appropriate choice of expression – perhaps speaker and hearer will use the expression 'Paderewski *qua* piano player.' Similarly for John's beliefs about Paderewski *qua* shy neighbor. The upshot is that we do not get a straightforward contradiction of the form (Fa & ~Fa) – our different I-languages grant us fluidity with our lexicons, making contradictions across discourses unlikely.

Prospects

Interestingly, this response to the Paderewski case is related to another common complaint about ILF theories. Maintaining that ILFs are partly constituted by English lexical items results in several related difficulties: if a monolingual French speaker believes that Fido barks, he does not believe an ILF with English expressions; ILF theories seem incapable of capturing the idea that English and French speakers believe the same thing (or something very similar) when they believe that Fido barks; phonetically distinct sentential complements cannot co-refer. These problems result from the plausible idea that a semantic theory ought to capture what is grasped in understanding sentences of a language; and speakers using different languages can presumably grasp the same thing. This immediately forges a close link between the objects of the attitudes and the semantics of attitude ascriptions.

These problems may be dealt with semantically or pragmatically. Davidson (1968), Lepore and Loewer (1989) and Higginbotham (1986) suggest a semantic solution by building a notion of same-saying or similarity into the truth conditions for attitude reports. Agents stand in intentional relations to ILFs similar to (or that say the same thing as) those involving English lexical items. The similarity or same-saying relation provides a way of capturing what is common among thinkers across languages and thinkers without linguistic abilities. This is accomplished by indicating a close relation between the theory of propositional attitudes and the semantics of attitude ascriptions.

Larson and Ludlow (1997), Larson and Segal (1995), and Larson (2000) offer a pragmatic solution. Similarity of propositional attitude or same-saying is a matter of usage, not content: it is a pragmatic matter whether two propositional-attitude sentences can be used to report the same attitude. The form of this pragmatic solution has been cast in different ways. In Larson and Ludlow (1997), choosing the best propositional-attitude sentence is based on the same considerations Ludlow (2000) appealed to in addressing the Paderewski puzzle: speaker and hearer work out the best attitude ascriptions based on theories of tacit belief, goals of belief ascription, and belief ascription logistics. Larson and Segal (1995) rely on the notion of **expression** to elucidate their pragmatic solution. In short, when an ILF is used to report an agent's belief, it is not that an agent is standing in a relation to an ILF; rather, the ILF is **used to express** what the agent believes: "to believe an ILF is to have a belief expressed by it, to desire an ILF is to have a desire expressed by it, and so on" (Larson and Segal, 1995: 445). Explicating believing and desiring in terms of the notion of expression is not part of the semantics – it is an explanation of what believing and desiring an ILF involves. So, to believe that grass is green is to **believe an ILF**, which means to have a belief that is expressed by

that ILF. But what does an ILF express? The answer to this question seems to present ILF theorists with a dilemma. Either an ILF expresses a proposition, something that transcends any specific language, or an ILF expresses something that involves English expressions. The first horn of the dilemma seems to lead in the direction of Fregean propositions, and the second horn of the dilemma does not seem capable of capturing what a French speaker believes.

In summary, ILFs are combinations of linguistic items and nonlinguistic items. Their linguistic features are at once their most coveted and their most objectionable feature. They provide a solution to a traditional name puzzle without postulating intensional entities. But if the semantics of attitude reports indicate what we stand in relation to when we believe, desire, and hope, it is problematic to appeal to English expressions. If one chooses a semantic solution to this problem, building a similarity or same-saying relation into the truth conditions, then a careful consideration of these relations is required. If one chooses a pragmatic solution, one must decide whether one has given up too much in surrendering the idea that the semantics of attitude reports overlaps in a natural way with the theory of the attitudes.

See also: Propositional Attitude Ascription: Philosophical Aspects; Representation in Language and Mind; Semantics–Pragmatics Boundary; Sense and Reference: Philosophical Aspects; Thought and Language: Philosophical Aspects.

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Interviewing and Examining Vulnerable Witnesses

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Successful participation in the legal system depends to a considerable extent on the ability to manipulate language. Many people who are usually very fluent and articulate speakers feel that they are at a disadvantage in the legal process, because of such factors as the use of complicated legal terms (*see* **Legal-Professional Language in Jury Trial**), the asymmetrical power relations between legal professionals and other participants, and the often serious consequences of the legal matters in which they are involved. Yet, it is clear that some people are more vulnerable than others in the legal process, and to define this vulnerability necessarily involves a consideration of sociolinguistic issues because of the centrality of successful language use to successful outcomes in legal contexts. This article begins by looking at participants in the legal system who are vulnerable because of enduring aspects of their social identity, such as native language variety and age, and concludes by looking at those whose vulnerability is due primarily to their situated identity in the legal matter in which they are participating; for example, victim-witnesses.

Although this article defines vulnerable participants in sociolinguistic terms, it is important to point out that a number of governments around the world have formally defined vulnerable witnesses as part of the process of enacting special measures to assist them in coming to court, understanding the process, and giving evidence. For example, such witnesses may be permitted to give direct evidence from a separate room via closed-circuit television. In the terms of such provisions, vulnerable witnesses are usually defined foremost as children, and the category often also includes people with mental, learning, and sometimes physical disabilities. It may also include intimidated witnesses, such as survivors of abuse. In some jurisdictions, such as the Northern Territory of Australia, the status of vulnerable witness is extended also to people who experience difficulty related to linguistic or cultural difference. The sociolinguistic view of 'vulnerable participants' used in this article corresponds to the most inclusive of the various legal definitions.

Second Language Speakers

Arguably, the most vulnerable adult participants are those who do not speak the dominant or official language of the country, which is generally also the language of the legal process. Whether they are immigrants, indigenous people, or visitors, all accused persons have the right to an interpreter if they do not understand or speak the language sufficiently to understand the evidence given against them. This is a basic human right formalized in 1966 in Article 14 of the International Covenant on Civil and Political Rights (ICCPR). However, this human right is only required to be provided to accused persons. Thus, it does not necessarily extend to the large numbers of people in legal contexts around the world whose participation is not as a suspect, but in some other capacity, in either a criminal or a civil case, such as witness, plaintiff, or litigant. Although some countries provide varying levels of interpreting support to such people, it is not consistent, and it is generally far from adequate (*see* **Court Interpreting**) for a discussion of issues affecting second language speakers.

Deaf People

Although all second language speakers can be seen as inherently vulnerable participants in the legal process, within this group, deaf people are even more vulnerable for several reasons. First, many people do not realize that deaf sign languages are full and complex languages, so that deaf sign language users are indeed second language users (Brennan and Brown, 1997). Second, many people fail to recognize hearing impairment or deafness and so wrongly attribute certain behaviors, including silence, to noncooperation or resistance. Similarly, facial expressions that convey emotions in hearing people may function quite differently as part of sign language (*see* **Sign Language: Interpreting**). Castelle (2003) discusses the implications of such differences for police officers, who are often trained to study facial expressions and other nonverbal behavior of suspects generally, without an understanding of relevant differences between spoken and sign languages. Third, consistent with the dominant monolingual Anglo-centric bias of the legal system in many English-speaking countries (see Eades, 2003b), some courts in the United States have failed to understand the crucial difference between American Sign Language (a complete language, one that is not related to English), and transliterated forms of English, such as finger-spelling. Thus, in some jurisdictions in the United States, interpreters have been directed to use Signed English (rather than American Sign Language) for Deaf jurors because of the mistaken belief that this would somehow make the interpretation more accurate (Mather and Mather, 2003). Doing so is the same as interpreting from one spoken language to another by interpreting a string of indi-

vidual words, rather than the utterance as a whole. By considering the interpretation of idioms in this way, we can begin to see the kinds of communication pitfalls that could result!

As with speakers of second languages, sign language users often face difficulties in having access to competent interpreters. Hoopes (2003) has pointed to difficulties in one large U.S. city where deaf suspects were interviewed by police officers who had inadequate training in American Sign Language (ASL). The police officers' attempts to use ASL in giving the Miranda Rights (= police caution) and in carrying out the interrogation indicated a positive development in recognizing the communication needs of deaf people. Yet, the results – in such cases where the police officer is not a fluent sign language user – can be disastrous for deaf suspects in terms of lack of understanding of their rights, as well as the charges against them, and of particular questions during the interrogation.

Important linguistic differences between signed languages and spoken languages present particular challenges for interpreting in the highly constrained communicative events in the legal process. Although spoken language is linear – comprising one meaningful unit spoken after another – sign languages use several different signs in combination to make meaning. Thus, as Hoopes (2003) has pointed out, a sign language interpreter must pay attention to all of these articulators at once: (1) dominant hand, (2) nondominant hand, (3) eye gaze, (4) eyebrow posture, (5) cheek posture, (6) mouth posture, (7) head movement and posture, and (8) shoulder posture. Studies have shown that second language learners of sign languages tend to concentrate on manual aspects of the language, with less successful use and interpretation of the other (nonmanual) signs, such as mouth posture.

Second Dialect Speakers and Other Minority Group Members

Second dialect speakers are people who speak not the language of the legal process, but a related dialect, often an unstandardized one that is stigmatized and denigrated in society generally. Although communication difficulties are not as extreme as with second language speakers, in some ways second dialect speakers are even more vulnerable than those who speak a second language. This is because they are often wrongly assumed to be speakers of the dominant language or people who are too uneducated, lazy, or ignorant to speak 'properly' (Eades, 1995). Some two decades ago, Wodak-Engel's (1984) study in Austrian courts found that 'justice relates to class' and that the working-class Viennese dialect of working-class defendants contributed to their difficulties with 'image making' in courts where Standard German of the middle class was the norm. This negative relationship between the use of a nonstandard dialect and legal reactions to its speakers was also revealed in Jacquemet's (1992, 1996) study of dialect use in the large mid-1980s trial of Mafia gang members (*camorra*) from the Naples area of Italy. Defense lawyers tried to impugn the credibility of prosecution witnesses on the basis of their use of nonstandard dialect in their courtroom testimony. However, this use of dialect caused no comprehension difficulties for any of the participants, and the judge refused to disallow its use.

Despite the indications that in many countries a large number of participants in the legal process are likely to be speakers of nonstandard dialects, there is remarkably little relevant linguistic research on this issue. Indeed, although African–Americans in the United States are six times more likely to be imprisoned than white Americans, there is virtually no linguistic research that examines African–American interactions in the legal process. Morrow's (1993, 1996) work with Yup'ik Alaskans shows that even when these people speak "local Yup'ik-influenced English," the norms of interaction relating to the management of talk are fundamentally different from those of mainstream American speakers of English. This fundamental difference has serious consequences for the delivery of justice, particularly in relation to the central role of interviews in the legal process and the sociolinguistic mismatch with Yup'ik ways of speaking.

Most of the research on speakers of nonstandard dialects in legal contexts has focused on Australian Aborigines, whose imprisonment rate is the highest recorded for any ethnic group in the world (with indigenous adults at least 15 times more likely to be in prison than nonindigenous adults and the situation for young people being even worse). There are many factors contributing to this ongoing over-imprisonment, including effects of dispossession, over-policing, and selective application of the law. Further, the situation applies throughout the whole country both to speakers of traditional Aboriginal languages and of Aboriginal English varieties. Linguistic work that examines speakers of traditional indigenous languages has shown the need for well-trained interpreters, as well as a legal system that understands not only how to work with interpreters but also the significance of considerable cultural differences in the effective use of interpreting (see Cooke, 1995, 2002, 2004). Further, it has become clear that cultural differences affect the effectiveness of the legal process itself (Walsh, 1994; Cooke, 1996).

Yet, many indigenous Australians do not speak a traditional language; rather, they use a dialectal variety of English in their dealings with the law. Most of the research on Aboriginal English in the legal system has focused on speakers of acrolectal varieties, which overlap to a considerable extent with other varieties of Australian English. Despite the fact that these Aboriginal English varieties do not sound very different, there are important pragmatic features, which are often unrecognized or misinterpreted and which can affect speakers in their dealings with the law. This may well be a major reason why the participation of second dialect speakers in the legal system has not attracted much linguistic research – where lexical and grammatical differences between the stigmatized and the standard dialects are not great, the pragmatic and cultural differences can be overlooked.

For example, in the Anglo legal system and in society generally, silence in an interview is generally taken to mean that a speaker has nothing to say. In contrast, many speakers of Aboriginal English (as well as traditional Aboriginal languages) use silence as a positive and productive part of communication. Yet, this use of silence is often not understood by legal professionals – of whom very few are Aboriginal – and considerable miscommunication can arise in legal interviews, whether they are in a lawyers' office, a police station, or a courtroom. Many people who interview Aboriginal people are unaware that their answer will often begin with a silence. Not hearing an immediate reply to the question, the interviewer often moves on to another question. In effect, the interviewer has interrupted the first part of the reply, thus preventing the Aboriginal interviewee from providing an answer.

Another pragmatic feature found to be crucial in understanding Aboriginal participants in the legal process is 'gratuitous concurrence' – namely, freely agreeing to a yes/no question, regardless of either the speaker's understanding of the question or his or her belief about the truth or falsity of the proposition being questioned (Liberman, 1981; Eades, 1994). One reason that this pragmatic feature is particularly prevalent in Aboriginal societies relates to the widespread cultural norm that harmony and agreement should be preserved at an immediate level and that differences can be worked out in due time. The use of gratuitous concurrence in legal contexts can be very problematic for Aboriginal interviewees. Once a person has agreed to a proposition in a context such as a police interview, it can have life-changing implications. It is likely that this pragmatic feature, which has been observed in intercultural communication in indigenous Australia for many decades, is also found in many other intercultural communication situations around the world. Further, it is undoubtedly more prevalent in situations of power asymmetry, which characterizes interactions in the legal process. In such interactions, it can have disastrous consequences for the minority participant (see Gibbons, 2003).

An interactional sociolinguistics approach, examining such features as silence and gratuitous concurrence, was part of the successful appeal case of an Aboriginal woman in Queensland in the 1990s, who claimed to be wrongfully convicted of murder (Eades, 1996). This claim was based on inadequate representation by the appellant's lawyers because their pretrial interviews with their client were so marred by intercultural misunderstanding that they were unable to find out her full story. They asked her questions and did not wait for her answers. She thought that they were not interested in her answers, whereas they thought that she had nothing to say. An understanding of cultural differences in the use of silence and gratuitous concurrence helped explain why her lawyers had never found out her story before her trial.

The use and interpretation of silence in interactions in legal settings is an under-researched topic, which is likely to be relevant to many social groups other than Australian Aboriginal people. A number of sociolinguists and anthropologists have pointed out that Native Americans use silence quite comfortably in their interactions, and the failure of other Americans to recognize this aspect of pragmatics can result in miscommunication. Gumperz (2001) drew on such research in his analysis of the way in which the silence of a Native American man was used against him in a murder case. Researchers have pointed to legal implications of misinterpretation of silence in other situations of intercultural communication. For example, in the Hernandez case in the United States in 1990, the U.S. Supreme Court upheld a state court's decision that had disallowed Spanish speakers from serving as jurors in a case in which evidence was to be given in Spanish and interpreted into English. The main reason for the decision was that two of the Latino jurors hesitated before agreeing that they would accept the interpreter's translation of the testimony (rather than relying on the original Spanish testimony). Montoya (2000) argued that a misunderstanding of the brief silence (or pause) of the two jurors in this case led to a decision that amounted to linguistic discrimination. The decision also prevented Mr. Hernandez from being tried by a jury of his peers!

Given the importance placed in the legal process on the 'demeanor' of witnesses as an indication of their truthfulness and credibility, cultural differences in communicative style can play a crucial role. Such

nonverbal behavior as eye contact is widely recognized in sociolinguistic and communication research as varying among different cultural groups. To what extent are such cultural differences recognized and understood by legal professionals? And to what extent are they implicated in the effective or noneffective participation of members of minority cultural groups in the legal process? These are some of the questions awaiting further sociolinguistic research.

Most linguistic research on second dialect speakers in the legal process has looked at pragmatic features involved in intercultural communication. However, recent critical sociolinguistic research has argued that it is not enough to analyze Aboriginal English use in the legal process without situating this type of discourse analysis in an investigation of wider power struggles at both institutional and societal levels (Eades, 2002, 2003a, 2004). Further, it is not only Aboriginal communicative style and the wider sociopolitical situation that have been examined in studies of the participation of Aboriginal English speakers in the legal system. Eades (2000) argued that an obsession on the part of judges and lawyers with the discourse structure of the court and a lack of awareness of fundamental aspects of the everyday cultural values and practices of Aboriginal people combine to silence Aboriginal people in court.

There is still much research to be done on speakers of second dialects and people in other cultural minorities in many countries. A related issue concerns speakers of pidgin and creole languages, whose sociolinguistic situation has many similarities with those of second dialect speakers (*see* **Pidgins and Creoles: Overview**). Many people are unaware of the distinction between a pidgin or creole language on the one hand and its lexifier language on the other, and thus, the same issues arise concerning ignorance about differences in language and communicative style; in addition, there is frequent prejudice against speakers of these languages.

Children

Another particularly vulnerable group of participants in the legal process comprises children. There is a wealth of psycholinguistic research on general child language acquisition, which has established a considerable knowledge base about developmental aspects of child language (*see* **Language Development: Overview**). There is also a wealth of psychological research on child witnesses, examining such issues as memory, culpability, understanding, and the ability to distinguish truth from fantasy. Drawing on these two significant fields of research, linguists have carried out studies on interactions involving child witnesses in the legal process. Most notable are two books by linguists, written primarily for professionals involved with child care, welfare, and protection – one in the United Staes (Walker, 1999) and the other in the United Kingdom (Aldridge and Wood, 1998).

Aldridge and Wood's book is based on 100 transcripts of video-recorded interviews of children in abuse cases by a police officer. Written primarily as a report of research and richly illustrated with transcript data, this book provides empirically grounded insights into children's use of language, as well as miscommunications with them in these legal interview situations. Walker's book was written explicitly as a handbook, so it does not report on a particular study, but rather, it synthesizes an impressive amount of relevant literature from psychology and linguistics in a very accessible and richly referenced handbook (see also Brennan and Brennan, 1988; Walker, 1993).

Although children have often been seen as unreliable witnesses, perhaps the most important research finding is that even very young children can say what they know if they are asked the right questions in the right way (Walker, 1993). However, asking the right questions in the right way is something that is often not done, whether for reasons concerning rules of evidence, legal manipulation, ignorance, or incompetence. In drawing on relevant psychological and psycholinguistic literature (especially Walker, 1993) and showing just what happens when children are asked different kinds of questions (Aldridge and Wood, 1998), these two books are able to provide practical guidelines about how to ask questions. Some of these guidelines might seem self-evident, such as reducing the processing load that children must carry by aiming for simplicity and clarity in questions. Yet, others are perhaps less obvious, and they reveal the importance both of ongoing research on child language and on the training of those who work with children in the legal process. For example, Walker advises that the ability to respond reliably to questions that ask for inferences about the internal processes of behavior of others is not well-established until children are 10 to 13 years old. Aldridge and Wood explain the significance in interviewing children of the order of acquisition of prepositions – starting with locative, then connective, temporal, attributive, and finally agentive. They advise that children younger than about 6 years old have difficulty understanding agentive preposition use (as for example in 'What does the man push the pram with?)

Courts in a number of countries have made some provision for the vulnerability of child witnesses – for example, by allowing them to give evidence on closed-circuit television, thus alleviating them of the trauma of being face-to-face in court with a suspect

against whom they are testifying. However, children are often required to be present in court for cross-examination, when they are sometimes provided some support by having a screen between them and the accused. Other provisions that attempt to accommodate the vulnerability of child witnesses include the modification of the test of competency for a child witness to take an oath in court. Some countries, such as Canada and England, extend such provisions to witnesses who have difficulties in communication because of either a physical or mental disability.

Intellectually Disabled People

Although a number of legal professionals and governments recognize the vulnerability associated with people of intellectual disability, it seems to be not yet subject to linguistic research, with the exception of work by two Australian researchers in the mid-1990s, Brennan and Brennan (1994). The aim of Brennan and Brennan's work was to address communication issues affecting the ways in which police officers respond to people with an intellectual disability. Their work drew on the Australian Law Reform Commission's consultations with intellectually disabled people, as well as their own interviews with police officers. The latter revealed a number of misconceptions about intellectual disability, and it resulted in the production of training materials for police officers. This material provides a framework for assessing communicative effectiveness, which includes such linguistic issues as helping police officers understand the complexity of certain questions types. This pioneering work highlights the need for sociolinguistic analysis of interactions between intellectually disabled people and legal professionals (not limited to police contexts, but also investigating other legal contexts, such as lawyer–client and courtroom interactions).

Vulnerable Participants due to Situated Identity

This article has so far looked at people whose participation in the legal system is vulnerable because of some stable feature of their social identity, such as age, disability, or native language. However, another group of participants is arguably vulnerable due to their situated identity in the particular legal process; namely, victim-witnesses. These are people who testify as prosecution witnesses in criminal cases against the person who has abused them. Arguably, the most vulnerable group comprises those who have suffered sexual abuse, where there is invariably no other witness (unlike in many cases of assault and other crimes against a person). Indeed, most child witnesses in legal proceedings have dealings with the legal system as victim-witnesses in abuse cases. Thus, they can be seen to be doubly vulnerable, by virtue of age, as well as their status as victims presenting evidence against their accused abuser (Brennan, 1994).

Apart from the work dealing with children, most linguistic research on victim-witnesses is concerned with women in sexual abuse and/or domestic violence cases. Most detailed is the work of Matoesian (1993), Ehrlich (2001), and Trinch (2003).

Matoesian argues that the ways in which rape victim-witnesses are crossexamined amounts to a reproduction of rape. In a carefully argued book, he examines both social structure (namely, the patriarchal structure of society generally and the trial process specifically), and individual agency (the specific ways in which participants in the rape trial struggle over contested meanings and ideologies). The ongoing patriarchy of the trial process is evident in the frequent bias toward male definitions of consent and male norms about logical responses to a crime. The important role that is played by linguistic research such as Matoesian's work is in showing the mechanisms through which this patriarchy is produced and reproduced. Matoesian used Conversation Analysis to uncover the workings of power in rape trials, focusing on such linguistic features as question form, topic management, and evaluative commentary. His detailed study – both at the microanalytical level of courtroom interaction and the macroanalytical level of the patriarchal structure of society – provides a damning explanation of why, despite significant changes to the law relating to rape, rape still remains effectively decriminalized and legitimized in many instances (see also Conley and O'Barr,1998; *see* **Conversation Analysis**).

Although Matoesian's work focused on the revictimization of victim-witnesses, Ehrlich's work (2001, 2002) examines the ways in which the talk in rape trials constructs the character of defendants and victims and defines the events being investigated. Examining such linguistic features as the presuppositions embedded in lawyers' questions, as well as the grammar of nonagency, Ehrlich showed how courtroom talk defines and delimits meanings; for example, defining victims as "ineffectual agents" who "consented" to sex by failing to resist. Interestingly, Ehrlich (2002) examined one case in which such language work partly functioned to bring in a feminist perspective through the lawyer's reformulation of the victim's statements during direct examination (e.g., from the witness's "sex . . . without my permission" to her lawyer's "sexual activity that was forced on you").

Trinch's work (2001a, 2001b, 2003) with Latina women's narratives of domestic abuse was not concerned with the adversarial world of the courtroom. Rather, she focuses on the interviews that these women had with lawyers and paralegals. Her analysis looks at discrepancies between the women's oral stories and the written affidavits produced by the interviewers to be used in seeking a protective order from the courts. She found that, although the legal professionals and paralegals were enabling the women to be heard by the legal system, they were at the same time selecting those parts of the women's stories that they considered important to the legal process, thus silencing or distorting parts of the women's stories. In its illumination of linguistic ideologies about what counts as a 'good story' in the legal process and of the way that stories function to represent 'the truth,' this work has important implications for a wide range of participants in different legal contexts. Trinch's analysis shows that the women's powerlessness is reproduced by the ways in which their stories are distorted so that a temporary and individual solution can be found to the widespread societal problem of violence against women.

Thus, it can be seen from the sociolinguistic work discussed in this section that the situated identity of victim-witnesses is inextricably bound up with their enduring age and/or gender identity either as children or as women in a patriarchal society. Further, Trinch's work showed the added vulnerability that Latina women have in not sharing linguistic and discourse norms with the dominant society, which is so influential in the shaping of norms within the legal process.

Conclusion

Linguistic research demonstrates that there are a number of different ways in which participants in the legal system may be vulnerable – for example, due to the cognitive demands of courtroom cross-examination (children), linguistic differences in the language of the legal process (second language and second dialect speakers and deaf people), or the ways in which their vulnerable situated identity can be exploited in the adversial system (victim-witnesses). Much work remains to be done to uncover the linguistic details of how language is actually working in such situations and to work with legal professionals in redressing the injustices that can result.

See also: Conversation Analysis; Court Interpreting; Language Development: Overview; Legal-Professional Language in Jury Trial; Pidgins and Creoles: Overview; Sign Language: Interpreting.

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Intonation

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Introduction

Intonation is present in every utterance in every language. A well-formed utterance contains minimally one intonationally defined phrase, which is termed variously 'intonation phrase,' 'intonational phrase,' 'tone group,' 'tone unit,' or 'breath group.' Such a phrase entails tonal marking of some kind, at one or both of its edges and/or on at least one prominent element within it. The currently most widespread phonological framework for representing intonation is termed 'autosegmental-metrical,' starting with the work of Pierrehumbert (1980), and is treated in detail in Ladd (1996), in which the term was coined. It is generally claimed in this framework that the division of utterances into phrases and the assignment of relative prominence to elements within the phrase – leading to the **prosodic structure** – is the task of **prosody** (in the narrow sense of the term). This represents the **metrical** aspect, which was first proposed by Liberman and Prince (1977). The association of tonal entities – the tune – with the prosodic structure is the task of **intonation** (also in its narrow sense). This represents the **autosegmental** aspect, which has its origins in the work of Goldsmith (1979) and Leben (1975). However, this distinction between prosody and intonation is rather artificial, since the terms are often used interchangeably – not only in more traditional phonetic models such as the British School (Crystal, 1969; Cruttenden, 1997), but also within phonological models of intonation which embrace the autosegmental-metrical framework. In this

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account, we use the term intonation, in its broad sense, to cover both aspects.

Phonetics and Phonology of Intonation

Phonetically, intonation is expressed through the following channels: (a) perceived pitch, (b) loudness, (c) vowel quality (e.g. reduction) and voice quality, and (d) relative length of segments, syllables, and words. Their approximate acoustic correlates are: (a) estimated fundamental frequency over time (F0), (b) relative intensity, (c) spectral quality (formant bandwidth and spectral tilt) and voice source, and (d) relative duration in, for example, milliseconds. For example, the word 'can' in the sentence 'John can cook' can be made prominent by virtue of a pitch obtrusion, along with it being louder, more clearly articulated, and longer than it would otherwise be: 'John CAN cook' Similarly, the word 'cook' can be clearly marked as phrase final (as it would be in 'John can cook,' as opposed to 'John can cook pasta,' where it is phrase medial) with a drop in pitch, a decrease in loudness, a creaky voice, and lengthening of the segments.

However, intonation's primary channel is perceived pitch, corresponding to fundamental frequency in the acoustic signal. By pitch obtrusion we mean that the pitch of the syllable entails a glide or jump up or down from the pitch of the syllables surrounding it. Such obtrusions are determined phonologically in terms of abstract discrete values assigned to tonal entities. These tonal entities can be regarded as either pitch configurations (Crystal, 1969; Tench, 1996; Kohler, 1991), or targets, as is the case in the autosegmental-metrical framework. In the latter framework, targets specify only specific points in the F0 contour, interpolation filling in the rest.

Targets are represented phonologically as 'tones,' which normally have one of two values, H(igh) or L(ow). H tones correspond to high targets, often referred to as 'peaks,' L tones to low targets, referred to as 'valleys' or 'troughs.' A further level, M(id), is used in a small number of accounts, often for transcribing intonation patterns that have a chanting nature ('stylized intonation' or the 'calling contour', Ladd, 1978). Since there are often more syllables in an utterance than intonational tones, the question arises as to how these tones are distributed. They are in fact anchored to prominent elements and edges of domains, or phrases. This anchoring corresponds to the two major tasks tones can carry out: lending of prominence to elements within phrases (words and parts of words, such as 'can' above), and marking the edges of those phrases (such as the edge coinciding with the edge of the word 'cook' above).

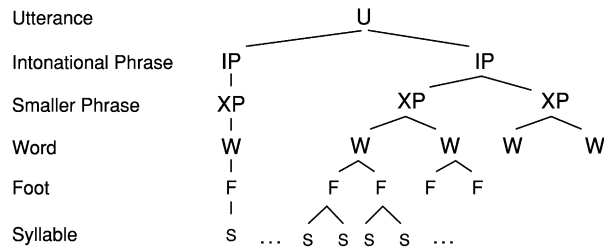

Figure 1 The Prosodic Hierarchy, adapted from Keating *et al.* (2003).

Phrasing and Prosodic Structure

Autosegmental-metrical phonology allows for multiple levels of phrasing. The phrases that are relevant for intonation differ from language to language. There is no universal prosodic structure, although some of the higher and lower levels of this structure appear to be common to a wide range of languages. Figure 1 provides a simplified prosodic structure, reflecting the part of prosodic structure that is currently accepted by most researchers in the field. It can be interpreted as follows. An Utterance (U) contains one or more Intonational Phrases (IP); an IP contains one or more Smaller Phrases (XP); an XP contains one or more Words (W), a W contains one or more Feet (F), which in turn contains one or more Syllables (s).

The Smaller Phrase (XP) represents the phrase or phrases between the Intonational Phrase and the Word. There is no common structure at this intermediate level. Depending on the language under investigation and on the theoretical bias of the investigator, an XP could be a Phonological Phrase (φ, or PP), an intermediate phrase (ip, note use of lower case), or an Accentual Phrase (α, or AP). For example, according to Gussenhoven (and others, 2004), English has the following prosodic constituents (for '>' read 'is higher in the prosodic hierarchy than'):

(1) Utterance (υ) > Intonational Phrase (ι) > Phonological Phrase (φ) > Phonological Word (ω) > Foot (Σ, or F) > Syllable (σ)

Pierrehumbert and Beckman (1988) and Beckman and Pierrehumbert (1986) provide a similar hierarchy for English, but with one crucial difference: in their account, between the Intonation(al) Phrase and the Prosodic Word there is an intermediate phrase in place of the Phonological Phrase.[1] We return to this difference in the next section, showing that although

[1]The term *Intonational Phrase* tends to be used in theories concerned primarily with the prosodic structure (e.g., Liberman and Prince, 1977; Hayes, 1995) and *Intonational Phrase* in those dealing primarily with tonal representations (e.g., Pierrehumbert and Beckman, 1988; Ladd, 1996). The two terms are equivalent.

the intermediate phrase and phonological phrase are roughly the same in size, they are not equivalent.

Prosodic structure is also involved in determining the pronunciation of sounds in a language. At the ends of domains there is a slowing down of the articulators, which is reflected in the signal as **final lengthening**, as would be the case in the word 'cook' above. The larger the domain, the greater the degree of final lengthening (*inter alia*, Wightman *et al*., 1992). More recently, research has concentrated on the beginnings of domains, and the strengthening of segments in this position: **domain initial strengthening** (see, e.g., Keating *et al*., 2003). For example, a sound such as /t/ in English is pronounced at the beginning of a given domain with greater strength (e.g., greater area of contact between tongue and palate, greater aspiration) than at the beginning of a domain lower in the prosodic hierarchy. Furthermore, connected speech processes such as assimilation occur to a greater extent across smaller boundaries than across greater ones. This resistance to assimilation is also considered to be due to initial strengthening in the sense that the segment preserves its identity, thus enhancing the contrast with adjacent segments (syntagmatic contrast), and possibly even enhancing a contrast with other segments which might occur in that position (paradigmatic contrast).

Another effect on the pronunciation of sounds is stress and accent. For instance, a /t/ at the beginning of a stressed syllable is stronger than one at the beginning of an unstressed syllable: compare /t/ realizations at the beginning of 'tomorrow' and 'tomcat,' where /t/ in 'tomcat' is stronger. Moreover, /t/ at the beginning of a syllable bearing a pitch accent is stronger than one at the beginning of a syllable which is stressed but bears no pitch accent: Compare initial /t/ in the word 'tomcats' in 'I like TOMCATS best' with 'Why not? I LIKE tomcats,' where the former /t/ is stronger.

Edge Tones

Some prosodic constituents are marked tonally, in that they have tones at one or both of their edges. For Pierrehumbert and Beckman and for Gussenhoven, the Intonation(al) Phrase has a **final edge tone**, also referred to as a **right edge tone**. For Pierrehumbert and Beckman, this final tone is obligatory; for Gussenhoven it is often present but may optionally be absent. Furthermore, Pierrehumbert and Beckman's account of English allows for an optional IP **initial edge tone (left edge tone)**, but this initial edge tone can only be High; a phonetically low or mid pitch in initial position is not represented with a phonological tone.

The intermediate phrase in Pierrehumbert and Beckman's account has an obligatory final edge tone too, leading to a sequence of two edge tones at the end of Intonation Phrases: that of the final intermediate phrase in the IP, and that of the IP itself. The Phonological Phrase in Gussenhoven's account has no tones at either edge. The relative scarcity of edge tones in Gussenhoven's account has repercussions for the analysis of intonation patterns such as the one shown in Figure 2(A), and analyzed in two different ways in Figure 2(B), (C).

Whereas in Gussenhoven's model there is no edge tone after the word 'cooks,' and the rise is analyzed as part of the pitch accent, in the Pierrehumbert and Beckman style model the rise is achieved through an H-intermediate phrase edge tone (although a rising pitch accent, e.g., L* + H, is also possible). In Gussenhoven's model, the final fall to low on 'broth' is mainly due to the HL sequence in the pitch accent. In the Pierrehumbert and Beckman style model, it is due to an interpolation between the H*pitch accent and the following L- edge tone. Comparing the inventories and combinatory possibilities of both models, falls and fall-rises are always decomposed in Pierrehumbert and Beckman's model: H* L-(L%) for falls and H*L-H% for fall-rises; Gussenhoven captures these falling and falling rising contours with complex pitch accents: HL and HLH.

Returning to Figure 2 above, the **trailing** tones of Gussenhoven's model appear to play a similar role in specifying the contour as the ip edge tone of Pierrehumbert and Beckman. We return to the issue of ip edge tones below, where phonetic alignment details may provide a clue as to which account is more adequate.

Pierrehumbert and Beckman's (1988) account of Japanese provides the following hierarchy:

(2) Utterance > intermediate phrase > Accentual Phrase > Word > Syllable > Mora

In their account of Japanese, there are obligatory edge tones both initially and finally for two constituents: the Utterance and the Accentual Phrase. There is a difference, however, in the way these tones are associated. In Japanese, the edge tones are not simply associated at the edge of the phrase, but are additionally associated with a sonorant mora at or near the edges of each phrase. The section on **secondary association** examines this phenomenon in more detail.

Pitch Accents

We have just explored the properties of tones whose function is to mark edges – **edge tones** or **boundary tones**. Tones or combinations of tones associated with prominence are referred to as **pitch accents**. They can

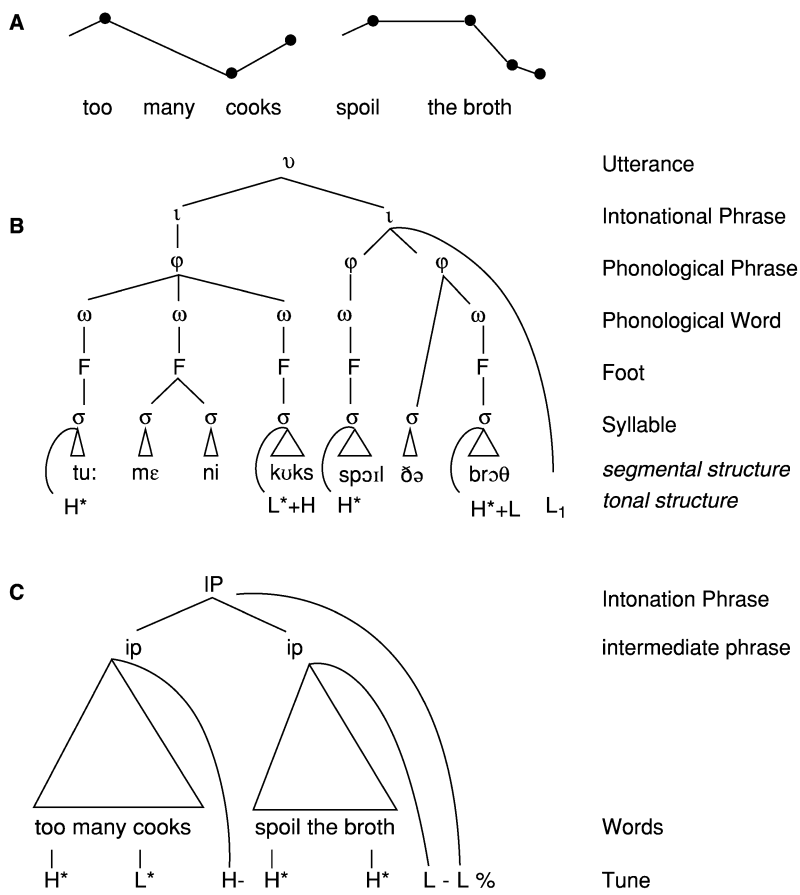

Figure 2 Stylized intonation contour for 'Too many cooks spoil the broth,' (A), and Gussenhoven's analysis (B), both reproduced with permission from Gussenhoven (2002: 271), and one way of analyzing the contour in a Pierrehumbert and Beckman style model, (C). Alternatively, it could be analyzed as having two IPs wih two edge tones after 'cooks.' Reproduced from Gussenhoven C (2002). 'State of the article: phonology of intonation.' *Glot International 6(9/10)*, 271–284, with permision from Blackwell.

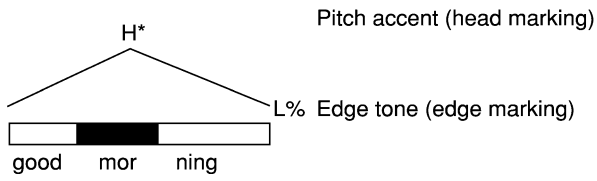

Figure 3 Anchoring of tones to a prominent element (H* to head) and to a phrase edge (L% to edge). Dark bar represents stressed syllable.

also be seen as the markers of the strongest elements, or **heads**, of phrases in the prosodic structure. The head of an IP is the strongest syllable of the Intonation Phrase. This is the syllable bearing the nuclear pitch accent.

Figure 3 provides a simple example where head marking and edge marking are clearly distinct.

We can observe that there is a pitch peak roughly aligned in time with the stressed syllable of 'morning.' This pitch peak marks the head of the phrase by means of a high pitch accent, H*. The final low pitch marks the final edge of the phrase with a low boundary tone, L%. Not all languages have pitch accents. Korean, for example, only has edge tones (Jun, 1996).

Pitch accents were originally analyzed in autosegmental terms as comprising one 'starred' tone and optionally one 'unstarred' tone. The star diacritic on a particular tone was used to indicate association with a **tone bearing unit** (TBU), often taken to be a vowel or syllable. The other tone was 'floating,' or unassociated. The TBU was also marked with a star. Figure 4 shows a typical association between the starred tone of a pitch accent and a TBU, as represented in earlier studies, e.g., Leben (1975).

In current autosegmental-metrical models the TBU does not need to be marked, since it is the strongest element, or head, of a constituent. However, the star notation has been maintained in the tonal representation. In autosegmental terms, the unstarred tone cannot strictly be considered to be unassociated, since this means that it would be deleted (e.g., by the process of **stray tone erasure**, a process whereby tones that have no association to another autosegmental tier are deleted). To resolve this problem,

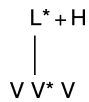

Figure 4 Association of a tone with a tone bearing unit (vowel), e.g., in the word 'tomato,' where the second syllable (and therefore the second vowel) is assigned a star.

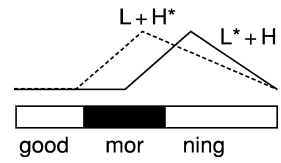

Figure 5 Bitonal pitch accents with schematic pitch contours.

autosegmental-metrical theory treats pitch accents as a sequence of tones packaged together, a relation symbolized by the + sign. It was proposed in Pierrehumbert and Beckman (1988), and elaborated on by Grice (1995), that the packaging of the two tones in bitonal pitch accents might be represented as a branching structure. Although the star notation was maintained as a convenient shorthand, the strong node of the branching structure represents the starred tone.

The issue as to how it can be determined which of the two tones has the primary association (i.e., which is the starred tone) has been the subject of much debate in recent years, backed up by research into the exact timing of tonal targets with landmarks in the acoustic signal, such as syllable or segment onsets and offsets.

Most studies on **phonetic alignment**, or tune-text synchronization, have concentrated on pitch accents involving a rise throughout the accented syllable. Figure 5 shows how two pitch accent types occurring in a given language would be analyzed in terms of starred tones. The leftmost trace (dashed line) shows a typical rise for L + H*, as it might be realized in English. Here the peak occurs during the accented syllable, and the beginning of the rise is at its left edge. The rightmost trace (solid line) shows a typical L* + H accent, also as it might be realized in English. In L* + H, the peak occurs later, and the rise begins well into the accented syllable.

Arvaniti *et al.* (1998) subjected to close scrutiny the tacit assumption that the **phonological association** of a tone with a tone bearing unit means **phonetic alignment** with that tone bearing unit (as is the case for H* and L* of the pitch accents in Figure 5). Since their findings for Greek revealed that both of the F0 events corresponding to the L and H of a bitonal LH pitch accent fell outside the lexically stressed syllable with which they were associated, it was clear that this assumption was too strong. Thus, exact synchronization with a landmark in the strong syllable appears to be unnecessary for a tone to be starred. However, the fact that the pitch accent investigated involved a separate anchor for each tone strengthened the arguments within autosegmental metrical theory that intonation should be modelled as targets between which there is interpolation, rather than as configurations.

Ladd *et al.* (1999) later investigated peak timing in English, and found that both tones of a bitonal pitch accent (corresponding to the F0 valley and the peak) were aligned in a consistent way to the same segmental landmarks, regardless of articulation-rate-induced changes in segment durations. However, although synchronization experiments have shown that the phonetic reflex of association cannot be taken to be simply an alignment in time with the segment or constituent with which they are associated, this line of research has yet to provide a definitive answer to the question asked by Arvaniti *et al.* (2000): "What is a starred tone?"

The transcription of the leftmost pitch accent as L + H* in Figure 5 is somewhat controversial, since it involves a starred tone preceded by another tone, a **leading tone**. Not all autosegmental-metrical models of intonation have leading tones, and those that do not would transcribe the contour as simply H*, arguing that there is no categorical difference between the contours in Figures 3 and 5. However, more recent studies, even those that tend not to make use of leading tones in general, allow for a H leading tone in 'early peak' contours (H + L* or H + !H*), where there is a clear peak on the syllable preceding the accented syllable (see, for example, Gussenhoven, 2004).

The issues of pitch accent structure and the status of leading tones are discussed at length in Grice (1995), Ladd (1996), and Gussenhoven (2004).

We have provided the principles behind current pitch accent analyses without an inventory of pitch accents used by each model for individual languages. For the inventory of pitch accents in English intonation according to Pierrehumbert's model, see the section on ToBI.

Secondary Association and Phrase Accents

'Secondary association' involves an association of a tone with an additional element further down the prosodic tree, typically with the smallest TBU in a given language, such as a syllable (e.g., English) or sonorant mora (e.g., Japanese and Roermond Dutch). Figure 6 shows a prosodic tree for Japanese from Pierrehumbert and Beckman (1988). Japanese has edge tones at the levels of the utterance and accentual phrase. Starting with the first four left-most tones in the tree (LHLH), the utterance initial L tone has a

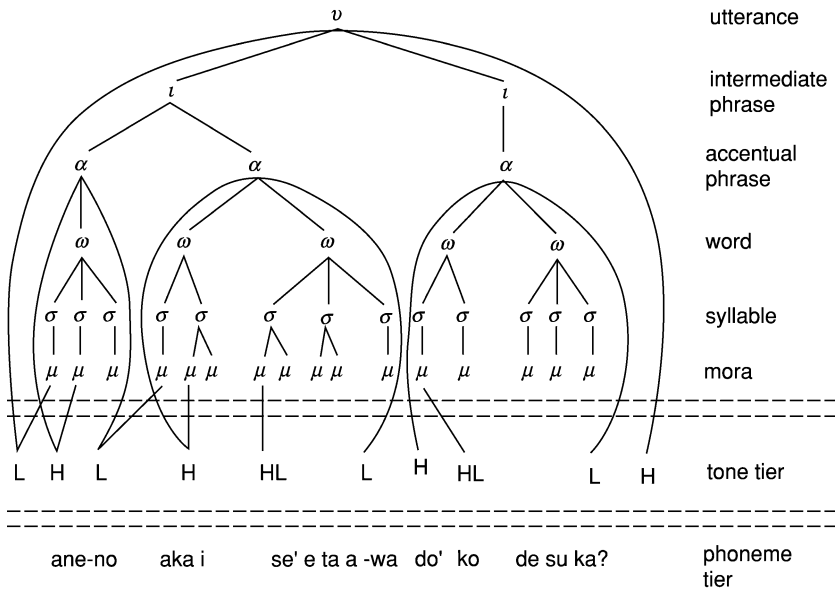

Figure 6 Prosodic structure and tonal association for the sentence ''Ane-no akai se'etaa-wa do'ko desu ka?'' (Where is big sister's red sweater?), from Pierrehumbert and Beckman (1988: 21) with kind permission from MIT Press. Japanese has lexical tones (HL on se' and do'); other tones are intonational.

secondary association to the first sonorant mora of the phrase (μ). The accentual phrase initial tone goes to the second mora (since the first is already taken by the higher level edge tone). The accentual phrase final edge tone, L, is secondarily associated with the first mora of the next accentual phrase, and the initial tone of that accentual phrase goes to the second mora. However, note that not all edge tones have a secondary association.

Edge tones for tonally demarcated phrases may also be secondarily associated to internal constituents other than the mora (or syllable). There can, for example, be a secondary association to a word or foot. This is then realized by an association to the strongest element of that word or foot (for many languages this means that there is an association with a stressed syllable). This is the case for the **phrase accent**, a tone or tonal structure that is primarily an edge tone, but is realized on stressed syllables some distance from the edge of the phrase. Grice *et al.* (2000a) pointed out that phrase accents can serve both head-marking and edge-marking functions (*see* Figure 3), either simultaneously or in linguistically conditioned alternation.[1]

[1]In fact, the term 'phrase accent,' sometimes also called 'phrase tone,' had been previously used to denote a tone of unclear status occurring between the nuclear pitch accent and the edge tone of the intonation phrase. Grice *et al.* redefine the term, giving it a clear definition and functionality. The phrase accent is not to be confused with the **phrasal accent**, which is another term used by researchers concentrating on prosodic structure for **nuclear accent** – the final accent in the phrase.

Figure 7 shows an example of the phrase accent H tone in the LHL question tune in Standard Greek. H alternates between being prominence lending, as in (A), and delimiting, as in (B). Observe that in (A) H co-occurs with a stressed syllable in a similar way to the H* pitch accent in Figure 3, whereas in (B) it is towards the end of the phrase.

Grice *et al.* (2000a) showed that when there is no postnuclear stressed syllable available as anchor for a phrase-accent, it occurs close to the phrase edge. It can therefore alternate between head marking (as in (A), when there is a postfocal stress) and edge marking (as in (B), when there is none). They show that this alternation is characteristic of phrase accents in many languages.

Their analysis of the English fall-plus-rise can be seen as additional evidence for a compositional analysis of nuclear contours: H* L-H%. L-has a secondary association to a stressed syllable after the nuclear one, as in (3) below, where there is a fall starting on the nuclear syllable, 'REA' of 'REASONABLE,' and the rise begins on the word 'costs'. The symbols before these two words are **tonetic stress marks** as used in the British School (see, e.g., Cruttenden, 1997), they are used iconically to symbolize a fall beginning high in the speaker's pitch range and a rise beginning low. The word bearing the nuclear accent is in upper case, the one bearing the phrase accent is in italics.

(3) It seems perfectly \ REASONABLE
to take the /*costs* into account.

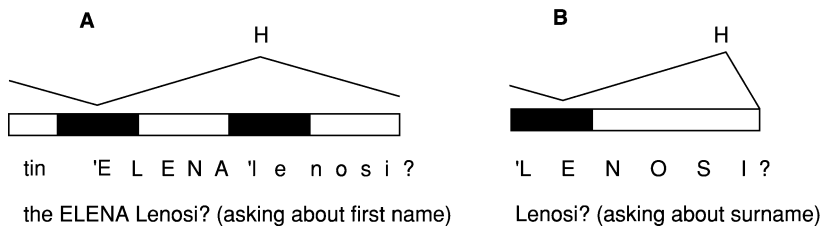

Figure 7 The phrase accent in Standard Greek yes-no questions. Dark bar represents focal (nuclear) stress, light bar represents postfocal (postnuclear) stress.

This type of alignment is not captured in Gussenhoven's model, where the fall-rise is accounted for as a complex HLH pitch accent.

The phrase accent (under its current definition as an edge tone with stress-seeking properties) has since become a central part of the intonation analysis of a number of different languages and varieties. Evidence for stress-seeking phrase accents has been found in regional varieties of German and Swedish. However, the exact definition of the phrase accent is still controversial; see Gussenhoven's survey on intonational phonology (2002).

Downstep and Upstep

It is, of course, not possible to capture the scaling of intonation contours using a simple model of High and Low tones. This problem was solved by introducing operators on H tones in the form of 'downstep' and 'upstep.' Downstep is present in almost all models; a downstepped H tone is scaled lower than a previous H tone and often marked with an exclamation mark before the downstepped tone, e.g., !H*. In Pierrehumbert's (1980) model, downstep was triggered by a L trailing tone of a previous pitch accent. Thus, a sequence H* + L H* is realized as a peak followed by a peak at a lower pitch. Ladd argued against this local conditioning for downstep and accounted for it using a metrical structure whereby a downstepped tone is dominated by a weak branch (see Ladd, 1996, for discussion). The phonological basis for downstep is still controversial.

Upstep is also a process that can be triggered by rule: in Pierrehumbert (1980) every high intermediate phrase edge tone, H-, triggers upstep on the following Intonation Phrase edge tone. However, there are models that allow for upstep on pitch accents as well as on edge tones; e.g., in the German autosegmental-metrical transcription system GToBI, it is marked with a '^' symbol, before the H (Grice *et al.*, 2004). Upstep is also present on pitch accents in other models, such as INSTINT (Hirst and Di Cristo, 2000).

ToBI

A theoretical study of prosody, whether based on introspection or on carefully controlled experiments, needs to be validated in the real world. An analysis of recordings of natural speech informs us as to which prosodic forms speakers actually produce and, depending on the context within which the recordings were made, gives more or less an indication of their functions.

Since annotating speech is a time-consuming process, and since current phonological models of prosody are not sophisticated enough to allow for (fully) automatic annotation, it was considered necessary to arrive at a consensus transcription and labelling system for capturing the most important aspects of intonation and junctural phenomena (tones and break indices respectively), so that recordings and the associated annotations could be shared across different sites.

Such an initiative was first taken for the intonation of English, from which the ToBI (Tones and break Indices) framework was conceived (Beckman and Hirschberg, 1994; Beckman and Ayers-Elam, 1997). The framework is defined as follows:

> ToBI is a framework for developing community-wide conventions for transcribing the intonation and prosodic structure of spoken utterances in a language variety. A ToBI framework system for a language variety is grounded in careful research on the intonation system and the relationship between intonation and the prosodic structures of the language. http://ling.ohio-state.edu/~tobi/

A ToBI transcription consists of a speech signal and F_0 record, along with time-aligned symbolic labels relating to four types of events. The two main event types are tonal, arranged on a **tone tier** and junctural, arranged on a **break index tier.** There is additionally a tier containing an orthographic transcription, the **orthographic tier,** and a further tier for the annotation of nontonal events such as voice quality or paralinguistic and extralinguistic phenomena, the **miscellaneous tier.**

Table 1 English ToBI pitch accents

H*	'peak accent'
L*	'low accent'
L + H*	'scooped accent'
L* + H	'rising peak accent'
H + !H*	'clear step down onto the accented syllable'

The original ToBI inventory for (Mainstream American) English has five basic pitch accents, as given in Table 1. The tonal part of the transcription is based on the work of Pierrehumbert (1980) and Beckman and Pierrehumbert (1986).

All of the H tones in the above inventory may be marked with a '!' diacritic, which indicates that they are downstepped relative to the immediately prior H tone. The downstep diacritic is obligatory in the H + !H* accent. The others, if downstepped would be transcribed !H*, L + !H*, L* + !H, and, in principle, !H + !H*. The prerequisite for using a ! diacritic is that there must be at least one H tone prior to the downstepped tone from which there can be a step down.

As outlined in the section on edge tones, two domains have an obligatory right edge tone: the 'intermediate phrase' and the 'intonation phrase.' Intonation phrases contain at least one intermediate phrase. The tones available at the right edge of the intermediate phrase are L- and H-. The right edge of an intonation phrase is automatically the right edge of an intermediate phrase. It is customary to label the sequence of tones at these two right edges together. Since there is also the choice of H or L tone at the intonation phrase boundary, there are four combinations to choose from: L-L%, L-H%, H-H% and H-L%. The '-' diacritic is used for intermediate phrase boundaries and '%' for intonation phrase boundaries.

The English ToBI system distinguishes between five **break indices** or levels of perceived juncture between words transcribed on the orthographic tier. They are numbered from 0 to 4. The lowest degree of juncture between two orthographic words is level 0, where the words are grouped together into a 'clitic group,' e.g., between 'did' and 'you' pronounced as 'didya.' Level 1 is the default boundary between two words in the absence of any other prosodic boundary. Levels 3 and 4 correspond to intermediate phrase and intonation phrase boundaries. Mismatches between the tone and break index tiers are expressed by a '-' diacritic (for instance, 4-, meaning that the perceived juncture is of the intermediate phrase boundary type when the tonal transcription contains an intonation phrase edge tone) and by break index level 2. Level 2 is used (*inter alia*) when the perceived juncture is even less than that for an intermediate phrase while the tonal transcription contains an edge tone.

Figure 8 gives an example of a ToBI transcription.

On the tone tier, (B), the first intonation phrase 'actually' has one pitch accent, H*, and has a falling-rising boundary, L-H%. The second is divided into two intermediate phrases, 'next week' and 'I am on vacation.' 'Next week' has one pitch accent, H*, and ends at a level around the middle of the range, transcribed as a downstepped H tone, !H-. In the second intermediate phrase, the transcriber was uncertain as to whether there was a pitch accent on 'I' or not; such uncertainty is marked with '*?' The nuclear accent is on 'vacation' and involves a rising accent with a leading tone, L + H*, followed by a fall to the bottom of the range, L-L%. The tones tier also contains an indication of the highest intonationally relevant F0 (ignoring spurious values) within the intonation phrase. This is transcribed as 'HiF0,' and the F0 value with which this label is time aligned is used as a rough indicator of pitch range.

On the break index tier, (D), instead of plain 4, 4- after 'actually' indicates that the perceived juncture at the phrase boundary is weaker than would be expected for an intonation phrase boundary. After 'next week,' the perceived juncture matches with the tonal transcription: an intermediate phrase boundary, 3. Break index 4 marks the end of the second intonation phrase. The default break index is 1, signalling a non-cliticized juncture between two words. This default juncture is transcribed after 'next' and between the words in 'I am on vacation,' indicating, among other things that the speaker did not produce 'I'm.' A rough indication as to the location of creak, and thus irregular F0 values, is given by a label on the miscellaneous tier (E).

ToBI systems for other languages have since been developed, building on the experience gathered for English but basing their categories on research into the structure of the language concerned.

Languages with a complete description of their specific ToBI system, with guidelines for use, training materials, and published transcriber consistency results are German (GToBI), Japanese (J_ToBI), and Korean (K_ToBI). Systems under development are Italian (IToBI), Greek (GrToBI), Serbo-Croation, Cantonese, Mandarin, and Spanish. These systems are all presented in a book outlining the ToBI framework and the ToBI systems in a number of languages (Jun, 2004).

ToBI annotated corpora are becoming important resources for investigations into the form and

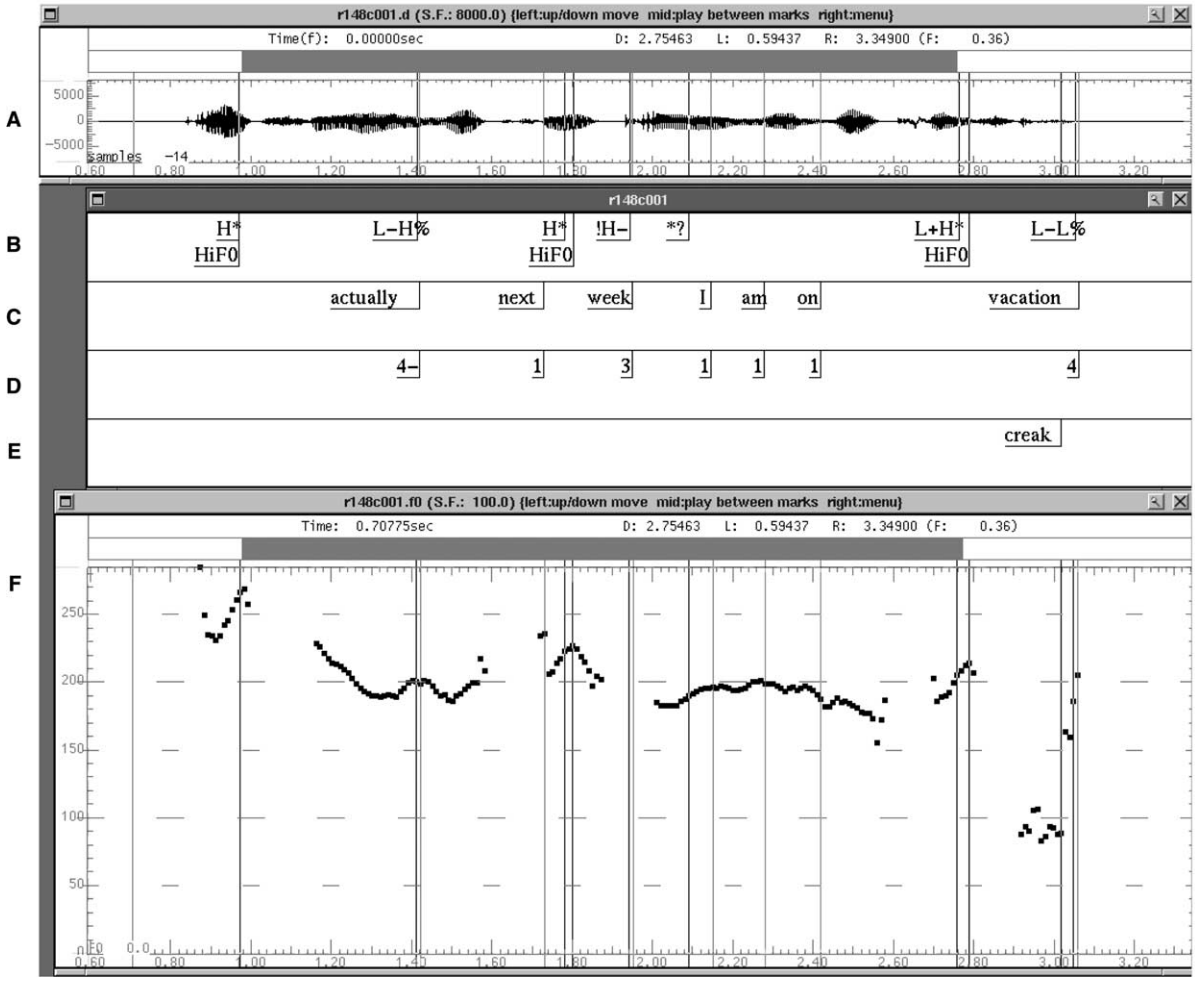

Figure 8 ToBI transcription: (A) speech waveform, (B) tone tier, (C) orthographic tier, (D) break index tier, (E) miscellaneous tier, (F) F0 track; reproduced with kind permission from Springer Science and Business Media from Grice *et al.* (2000b), transcription by Laura Dilley, MIT.

distribution of tonal and prosodic entities (Dainora, 2004). When combined with annotations at other levels, such as information structure and dialogue act categorization, they are an invaluable source of information as to prosodic functions (Baumann *et al.*, 2004).

An autosegmental-metrical system, also with training materials, and based on Gussenhoven's model of intonation, is ToDI (Tones in Dutch Intonation; Gussenhoven *et al.*, 1999). Some of the theory behind Gussenhoven's model is included in the IViE system for transcribing regional varieties of English (Nolan and Grabe, 1997), although the IViE system introduces a tier that captures fine acoustic-phonetic (and to some extent auditory-phonetic) timing details.

Functions of Intonation

A representative sample of functions that intonation can fulfill is shown schematically in Figure 9.

At the level of semantics, intonation is often used to mark **information structure** within sentences. According to Steedman (2000), within each **theme** (what the sentence is about, or sentence topic) and **rheme** (a comment about this topic), there is provision for a background-focus partitioning. Focus can be said to reflect an abstract notion of contrast between alternatives available in the discourse context (Rooth, 1992), and in many languages it is marked by means of pitch accents (while background is often marked by lack of accent) or by the type of pitch accent. In Korean, which has no pitch accents, focus is marked by means of phrasing.

At the pragmatic level, intonation is used to encode distinctions such as whether an utterance is intended as a request for information (e.g., Request) or as a request for the interlocutor to perform a particular action (e.g., Command). There are four major categories of **communicative illocutionary**

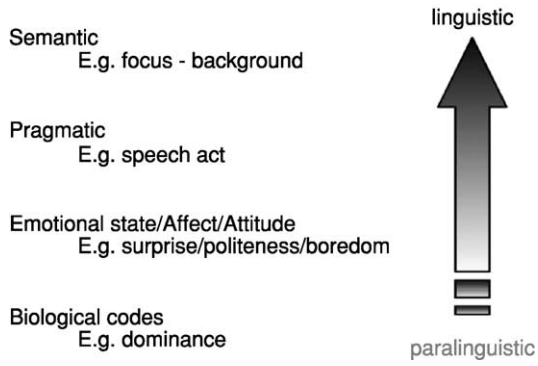

Figure 9 The functions of intonation.

acts: constatives, directives, commissives, and acknowledgments (Bach and Harnish, 1979; Searle, 1969), examples of which are statements, requests, promises, and apologies respectively. Much research has been carried out on **questions**, a special type of directive, and how they are marked intonationally. Although polar questions are often marked with a final rise (H% edge tone), there are a great many languages that have a rising pitch accent followed by a final fall, constituting an LHL sequence (see, for instance, the question tune described for Standard Greek in the section on secondary association and phrase accents). Intonation plays a crucial role in distinguishing polar questions from, e.g., statements if there is no distinct interrogative syntax or question particle (as in Italian).

Intonation is also used to signal **emotional states** of varying degrees of intensity, **speaker affect**, and **attitude**. Since these are generally considered to be external to grammar, and therefore paralinguistic, studies on their realization have concentrated on non-discrete aspects of intonation, such as pitch range, rather than on phrasing and prominence relations or pitch accent type. However, there are many cases where discrete means are used to signal paralinguistic meaning. For example, a final H% tone is often used to signal uncertainty or politeness (Cruttenden, 1997). A L* accent is used in 'scathing intonation' (Monaghan, 2000). Although the expression of these meanings has been grammaticalized, it is claimed that there is a universal basis to this means of expression in the form of **biological codes**, the most established of which is the **frequency code** (Ohala, 1994), whereby high pitch corresponds to submissiveness or friendliness and low pitch to dominance or aggression. Two further biological codes, introduced by Gussenhoven (2002) are the **effort code** and the **production code**.

To sum up, intonation is active at many different levels of communication, in areas deemed purely linguistic as well as those considered more peripheral to linguistic inquiry. However, since the intonational expression of many functional levels occurs simultaneously, it is not possible to understand the expression of one level without an taking into account the way the others are expressed.

See also: Autosegmental Phonology; Metrical Phonology; Phonological Phrase; Prosodic Aspects of Speech and Language; Speech Acts.

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Intonation and Syntax

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As an integral part of any linguistic mechanism, intonation relates both to phonetics (with respect to the nature of its units) and to syntax (with respect to its area of application). Intonation is a suprasegmental tool, concerning only semantic units.

What Is Syntax?

It is necessary to distinguish between 'formal' and 'communicational' syntax. The former concerns anâlysis of specific grammatical (syntactic) structures: sentences (*propositions* in French). A sentence is a particular set of links between its constituents (Perrot, 1978). As for communicational syntax, it deals with the message such structures convey. Its area is the utterance, i.e., a communication unit endowed with prosodic features and specific word order.

A sentence is usually a syntagma, i.e., a binary structure whose terms are linked by a 'determining' (T′) – 'determined' (T) relation. A sentence is necessarily a predicative syntagma: the speaker assigns a T′ to a T. A sentence, in as much as it provides a structural basis for the utterance, is the most convenient way to communicate. But a single word or a word group, a syntactic structure or an interjection can, if the extra-linguistic situation demands it, becomes an utterance and assumes the function of a communication unit, provided that it is actualized, i.e., adapted to the concrete situation, endowed with an appropriate word order and specific intonation. In the whole language

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system, intonation is the actualization tool *par excellence*. An utterance may not have a syntactic structure (i.e., not be a sentence), but it necessarily has its own specific phonic structure: intonation.

In Russian, for instance, one-word sentences are not rare. A sentence such as:

(1) **Вечерело**.
Vecherelo.
'Evening was closing in.'

becomes an utterance as long as it is endowed with a rise and fall structure of fundamental tone (F_0), with the fall near and/or on the stress syllable (Figure 1). If the voice movement is not wide enough, it has to be compensated for by enhancing the difference in intensity levels between the prestressed syllable(s) and the stress syllable. Let us note that, in an emotionally neutral declarative utterance, voice intensity decreases. As for vowel length, this will depend on the place the word occupies in the sequence of words that make up the utterance.

Utterance intonation always conveys a meaning. Every alteration of intonation is undoubtedly linked to a change in the speaker's mind: the rise in tone of a question utterance is necessarily linked with a question arising in thought; in the same way, lack of knowledge, hesitation, and emotion that naturally follow provoke a higher pitch.

Intonation enables the utterance modality to be expressed, the utterance itself to be divided into 'utterance members,' i.e., semantic units arranged according to a specific viewpoint and their semantic importance in the given context, and the boundaries of the utterance to be set, isolating it from other communication units.

Marking Modality

Different types of intonation enable us to distinguish between assertions, questions, and exclamations. For example, in French, between assertion and exclamation:

(2a) Le train arrive.
'The train is coming.'

(2b) Le train arrive !
'The train is coming!'

or in Russian between assertion and question:

(3a) Мой нож у тебя.
Moj nozh u tebja.
'You're the one who has my knife.'

(3b) Мой нож у тебя?
Moj nozh u tebja?
'Are you the one who has my knife?'
(Figures 2, 3)

In marking utterance modality, alterations in intonation may be supported or challenged by syntactic or/and lexical elements. See Peshkovsky's compensation law (Пешковский, 1928). In French, for instance, if we compare the following utterances:

(4a) Est-ce qu'il viendra ?
'Will he come?'

(4b) Viendra-t-il ?

(4c) Il viendra ?
'He will come?'

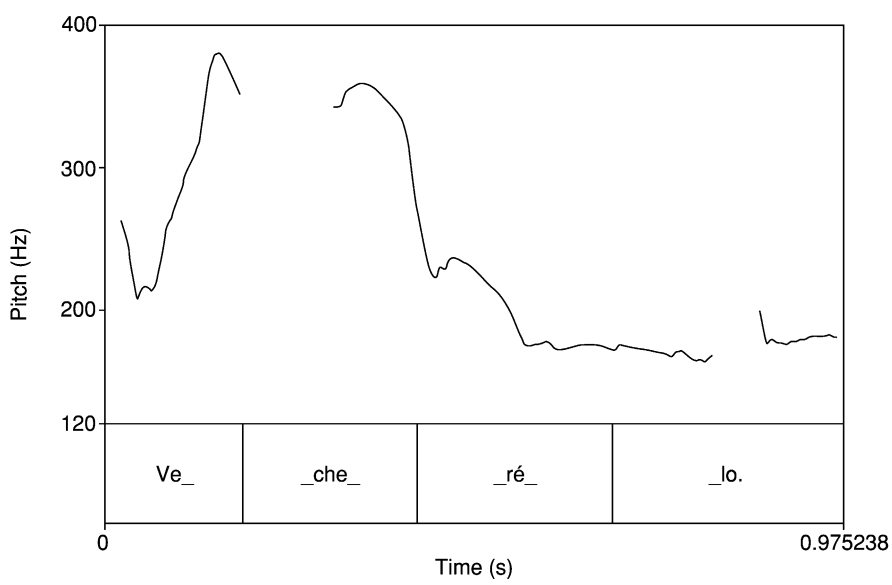

Figure 1 Example (1).

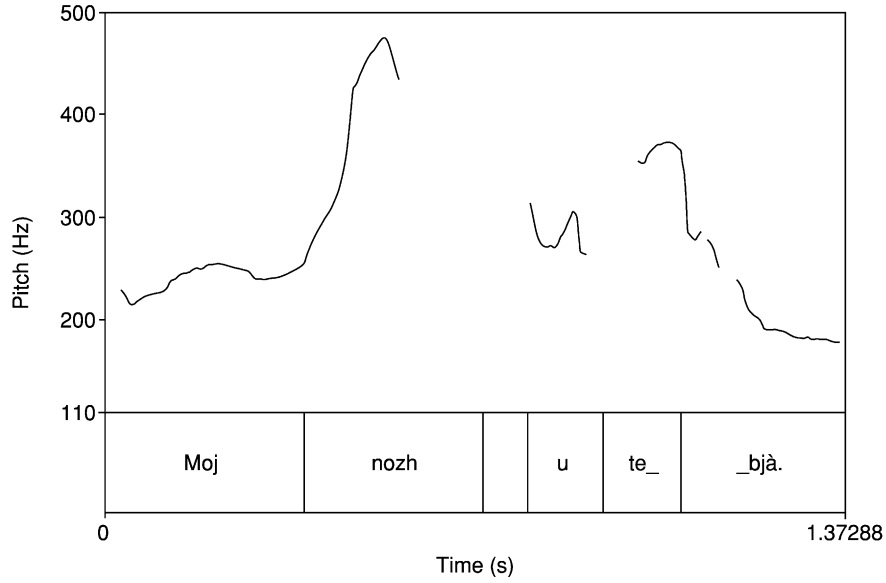

Figure 2 Example (3a).

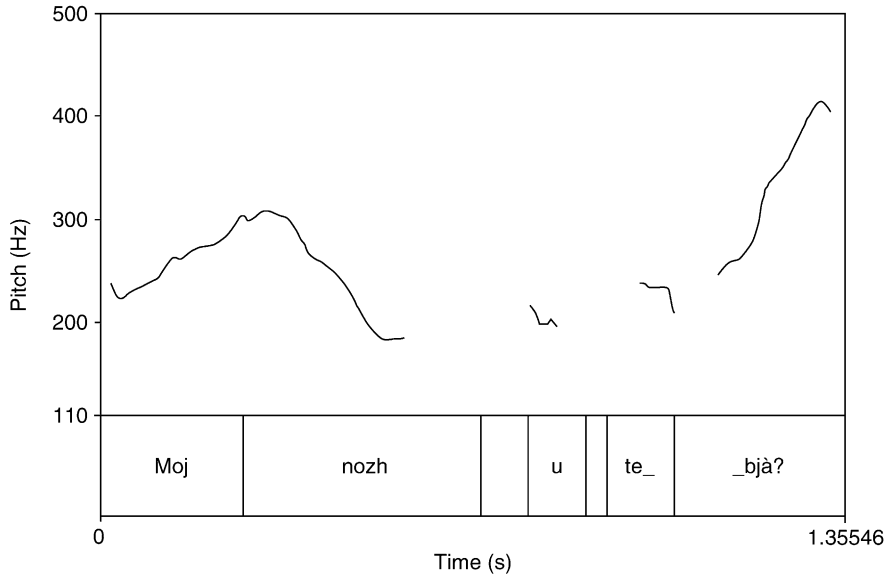

Figure 3 Example 3(b).

we note a sharp contrast in the movement curve of F_0: the tone movement is more wide-ranging when no lexical or grammatical device adds to intonation in order to mark a question. See (4a): final 8.5-st rise of F_o and positive or rising interval, between prestress and stress. When the question is marked by lexical-syntactic tools, the melodic curve is close to that of an assertion one (a negative or falling 7-st interval in (4a) and 8.5-st in (4b)) (Figures 4–6).

In the same manner in Russian:

(5) У тебя ли мой нож?
U tebja li moj nozh?
'Do you have my knife?'

the presence of the interrogative particle /l'i/, which marks the core of the question, flattens the melodic curve (interrogative rise: 7 st), Figure 7, while in (3b), where intonation is the only tool marking the question, the melodic curve significantly gains in importance (10.5 st rise).

Furthermore, this compensation law applies to commands and requests. Imperative intonation is much more pronounced in the absence of grammatical forms of imperative mood. Thus the Russian imperative form *Замолчи!* (Zamolchi! 'Be quiet!') can be endowed with an intonation close to that of an assertion, while the infinitive form, *Молчать!*

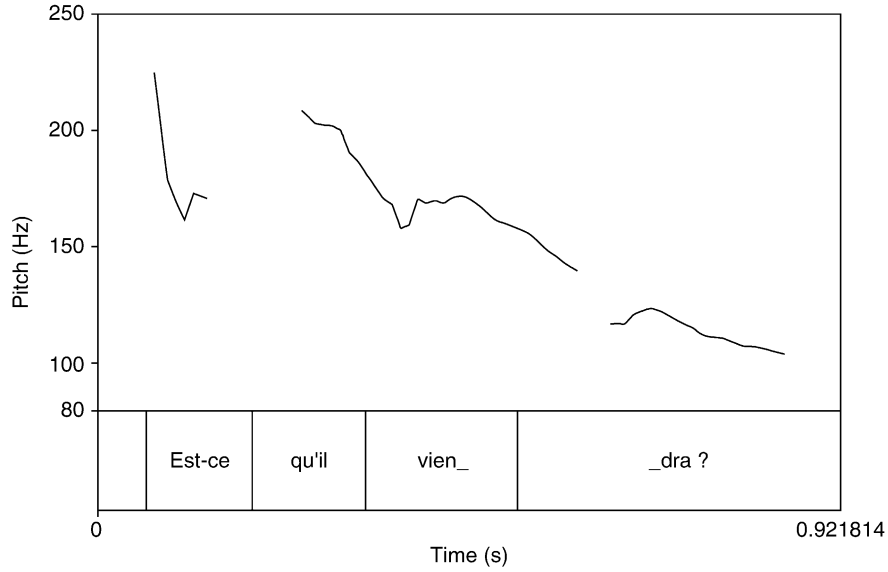

Figure 4 Example 4(a).

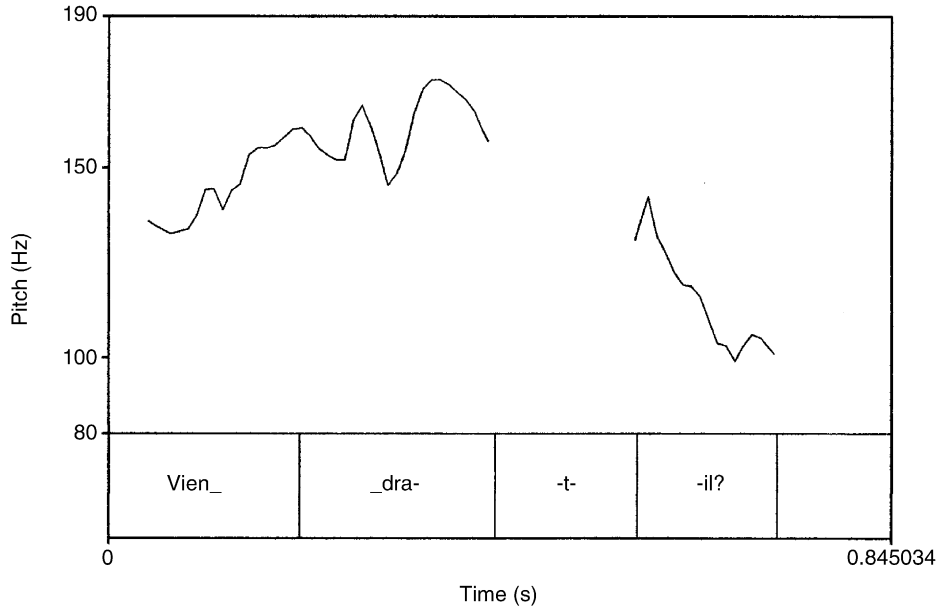

Figure 5 Example 4(b).

(Molchat'! 'to be silent = Silence!'), acting as an imperative, needs to be endowed with a special intonation in order to be perceived as a command.

Segmentation into Semantic Units

It is impossible to assert that intonation serves some or other specific syntactic structures. There is, indeed, no specific intonation relating to coordination, nor is there for subordination. Intonation in strings of sentences, forming complex syntactic sets, is governed by rules that do not take into account formal structures. But in some cases, intonation, because of its ability to segment a communication unit, can clear up ambiguity in certain linear strings. Thus, in the French sentence *Pierre a parlé de ses frasques avec Marie* (Rossi, 1999), intonation allows the speaker to clear up ambiguity by segmenting the given unit in different ways and forming different rhythmic groups :

(6a) Pierre a parlé de ses frasques | avec Marie.
'Peter talked of his escapade | with Mary.'
(6b) Pierre a parlé de ses frasques_avec Marie.
'Peter talked of his escapade_with Mary.'

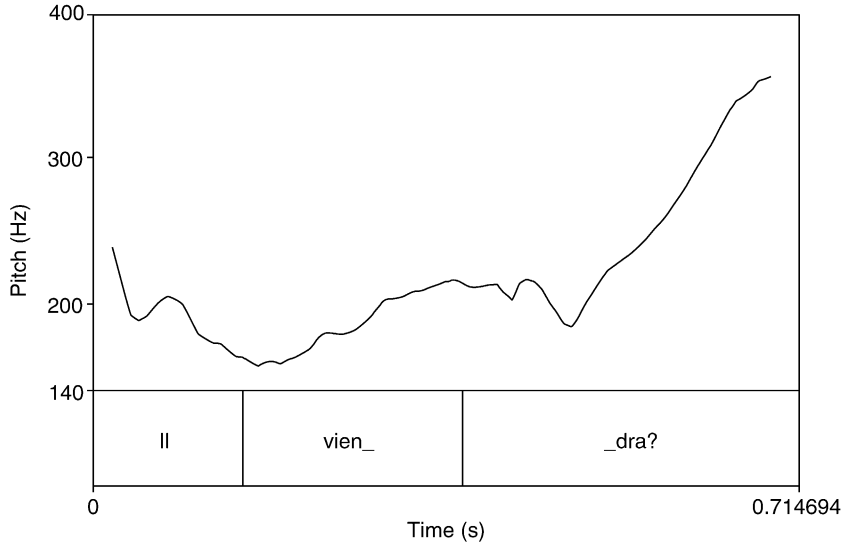

Figure 6 Example 4(c).

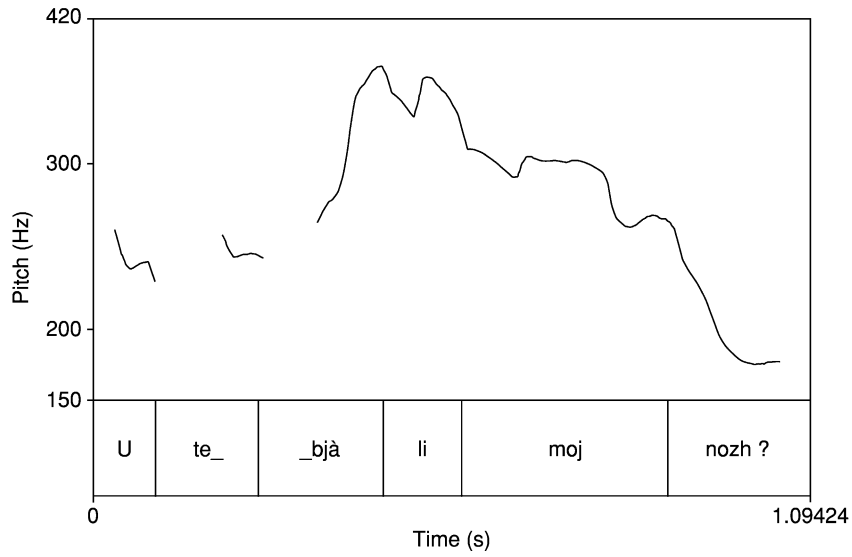

Figure 7 Example 5.

In the same way in Russian, ambiguity conveyed by the formal homonymy of an anaphoric can be cleared up by intonation. For example, *Как удивили его слова старика. [Kak udivili ego slova starika.]*. In this utterance, intonational segmentation allows the speaker to constitute either the syntagma udivili‿ego [surprised him] or the syntagma ego‿slova [his words].

(7a) Как удивили его | слова старика.
Kak udivili ego | slova starika.
'How he was amazed by the old man's words.'

(7b) Как удивили | его слова старика.
Kak udivili | ego slova starika.
'How his words amazed the old man.'

This interaction between intonation and syntagmatics, however, is not very frequent.

Intonation concerns merely semantic units and does not take part in the definition of syntactic functions. Vsevolodsky-Gerngross (Всеволодский-Гернгросс, 1922) demonstrated that syntax does allow formal intonation rules to be established. He considers that intonation rests on a logicopsychological basis but not a syntactic one. Intonation does not take account of syntax. Units, which are separated by syntax ('utterance' or 'parts of an utterance') may match with syntactic units or they may not, given that the separating principles in both cases are quite different.

Both Constituents of Utterance

In formal syntax, analysis defines syntactic functions as different constituents of the sentence, while in communicational syntax the functions of semantic units are defined by arranging them in a specific perspective. At the beginning of the 20th century, a theory of the 'real' or 'actual' division of sentences was developed in Prague. Intonation splits the minimal utterance into two constituents. This cleavage has nothing to do with the subject–predicate distinction, nor with any opposition of a grammatical type. These two constituents are the main elements constituting the message. The Czech linguist Mathesius (1939) called them, respectively, the starting point and nucleus of information. Later, other terms appeared in order to designate the two constituents of the message: thema/purpose, thema/rhema, topic/comment, *support/apport (d'information)*, etc. Whatever terms are used in order to designate these two utterance constituents, the conclusion is obviously always the same: the first member serves as a basis for the information, whereas the second one presents the information itself; the latter is the very purpose for which the message is uttered. Every constituent is realized according to a specific melodic figure, which Karcevski (1931) defined as tense intonation and lax intonation. An assertive utterance is naturally performed with a tense intonation in the first constituent and with a subsequent lax intonation in the second one. Depending on the context, the order of syntactic groups may be modified, but groups with tense intonation always precede those with a lax intonation, as in German, English, French, Italian, and Russian, respectively, in the following examples.

(8a) Eine große Feuersbrunst || gestern.
(8b) Gestern || entstand eine große Feuersbrunst.
(8c) A big fire || broke out last night.
(8d) Last night || a big fire broke out.
(8e) Un grand incendie || a éclaté la nuit dernière.
(8f) La nuit dernière || un grand incendie a éclaté | près de chez nous.
(8g) Un grande incendio || è scoppiato la notte scorsa.
(8h) La notte scorsa || è scoppiato un grande incendio.
(8i) Большой пожар || вспыхнул вчера ночью. Bol'shoj pozhar vspyhnul vchera noch'ju.
(8j) Бчера ночью || вспыхнул большой пожар. Vchera noch'ju vspyhnul bol'shoj pozhar.

Each constituent of an utterance may include several lexical units, one of which constitutes the central element. The selection of that element obeys only requirements of context or situation. In other words, it does not depend at all on its syntactic function within the framework of the sentence. The relevant point of the tone movement in each constituent is the interval. Tense intonation is characterized by a positive interval of the tone in the central element of the first constituent (called 'thema'), which Karcevski calls 'anticadence.' The function of the anticadence is to keep the attention of the person we are speaking to. The rising tone of the anticadence calls for a resolution. Such a resolution is provided by the part that includes a negative interval: i.e., the 'cadence,' in the second part of the utterance (called 'rhema') (Table 1) (Figures 8–17).

Table 1 Tone movement in the utterance

Ex. 08	*Thema*	*Rhema*
	↑ (anticadence)	↓(cadence)
c	↑ 8.5	↓ 5
d	↑ 7.5	↓ 10
e	↑ 4.5	↓ 7
f	↑ 5.5	↓ 8.5
g	↓ 6.5 + ↑3.5	↓ 6.5
h	↑ 3	↓ 6.5
i	↑ 7	↓ 7
j	↑ 8	↓ 7

An utterance may include several members, characterized by an anticadence: several thema for one rhema. The more distant the resolution because of numerous anticadences, the more intensely expected the cadence itself will be.

In terms of meaning, the utterance constituent that includes the anticadence is not self-sufficient. Its functional importance lies in the fact that it calls for the anticadence of the second constituent, which must be considered as a function of the first one. This phenomenon is observed either within the utterance (in the links between thema and rhema) or in a supraphrastic set such as 'question + answer,' where the anticadence in the question calls for a cadence in the answer.

In syntactic structures with two bound elements, the second element always conveys the mark of binding (ending, preposition, conjunction). At the intonational level, on the contrary, the mark of binding is conveyed by the first member: modifications of the tone in the first utterance member foretell further events (this is why intonation is said to have a progressive character). In any utterance performance, the thema with a tense intonation calls for a rhematic part with a lax intonation. Such is the intonative mechanism of a declarative utterance. On the other hand, a thema with a lax intonation (with a falling tone) calls for a nucleus with a tense intonation. In such a case, a question arises. In Russian, which is a language without interrogative tools such as the

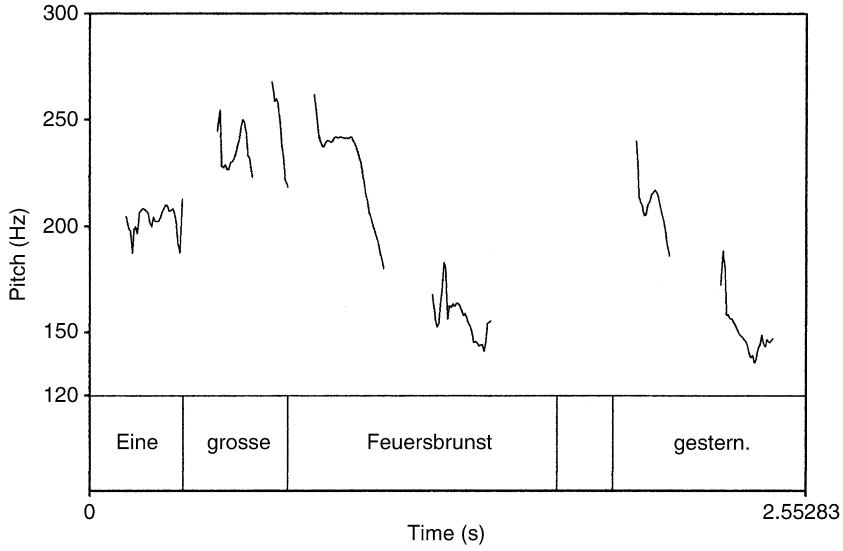

Figure 8 Example (8a).

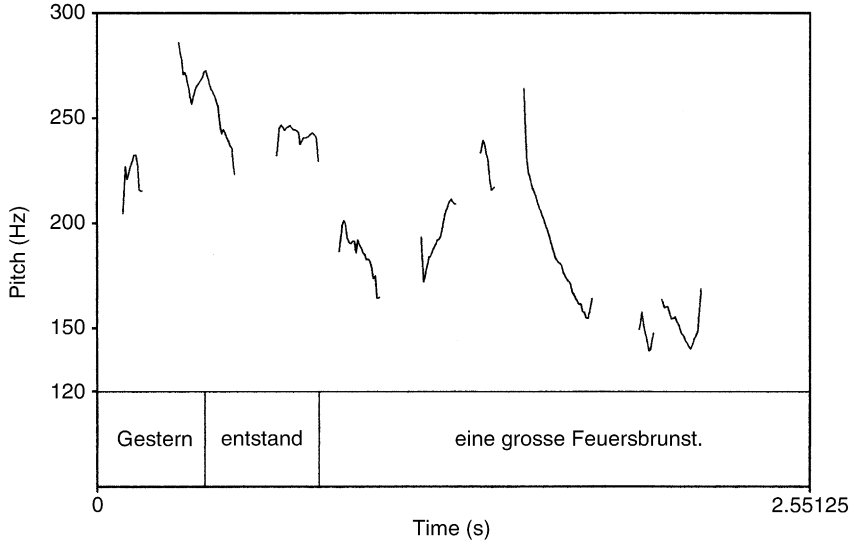

Figure 9 Example 8(b).

French *est-ce que*, it has been proven (Fougeron, 1991) that hearers need hear only the thema (Moj nozh), in order to determine the type of utterance, and say whether it is assertive or interrogative. Thus, in the example (3) quoted above:

(3a) Мой нож ↗ у тебя ↘.
(3b) Мой нож ↘ у тебя ↗?

In the light of what we said above, we can give a formal definition of the utterance thema: the thema is the element or the sequence that stands at the beginning of the utterance, only one element of which is marked by a specific melodic figure – rising or falling (depending on modality) – and that is possibly separated from the rest of the utterance by a pause. The rhema, on the other hand, is a postpositive element placed after the thema; its nucleus is marked by a cadence, i.e., a fall in the tone in the stress syllable of the nucleus. These definitions, based on formal features, take no account of such notions as 'given' vs. 'new' which do not fall within the province of linguistics and can apply either to thema or to rhema. What is actually new in each message is the relationship the speaker establishes between both utterance constituents.

Does Everything Finally Resolve into a Thema + Rhema Structure?

Utterance members can only be defined on the basis of text analysis relying on formal features. The above definitions of thema and rhema lead us to reject

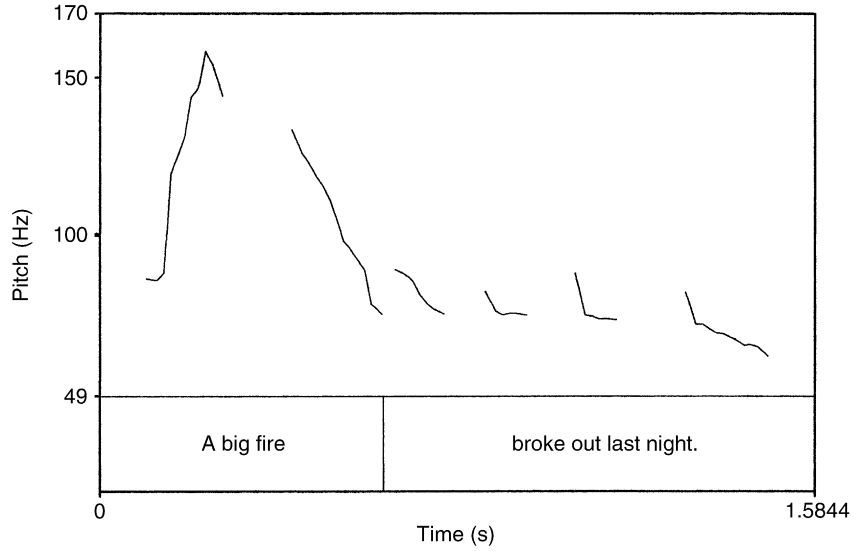

Figure 10 Example (8c).

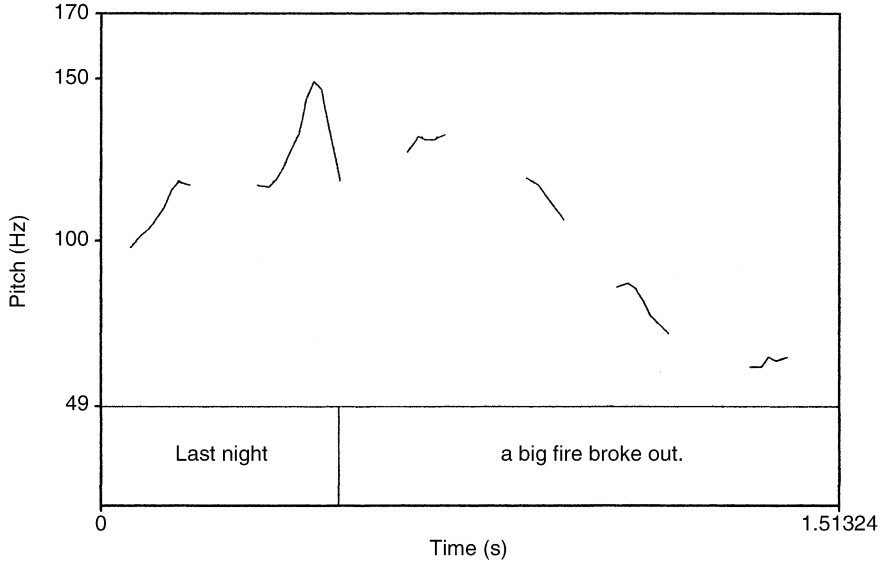

Figure 11 Example (8d).

the Rhema + Thema order, which some linguists consider as possible, either in utterances loaded with a particular emotional tonality (AH CCCP, 1970, 1980), or, for example, within an answer to a question (Rossi, 1999). Actually, the term that designates 'what matter is spoken of' and is considered as the starting point, cannot lie at the end of the message. Such an order can hardly be justified if we consider the thema as known, or given, all notions that are not included in our definition. Analysis of texts shows that what is generally presented as an R + T order applies to utterances that do not fit into the narrow binary frame of utterance members. In this type of sequence, for example in Russian:

(9) Вчера мы легли поздно. **Отец** вернулся
Vchera my legli pozdno. **Otec** vernulsja.
'Yesterday we went to bed late, my father is back.'

the shifting of the utterance stress – i.e., the cadence – to the subject, at the very beginning of the utterance (while in Russian its default place is in the end), conveys a relationship of cause and effect which, in this utterance, is marked by intonation alone. The predicate *vernulsja* (is back) on no account is to be considered as a thema. It is an integral part of the rhema, it is inseparable from the nucleus- subject (*Otec*) and contributes to the formation of a contracted message: 'We went to bed late 1) *because of* my father, 2)

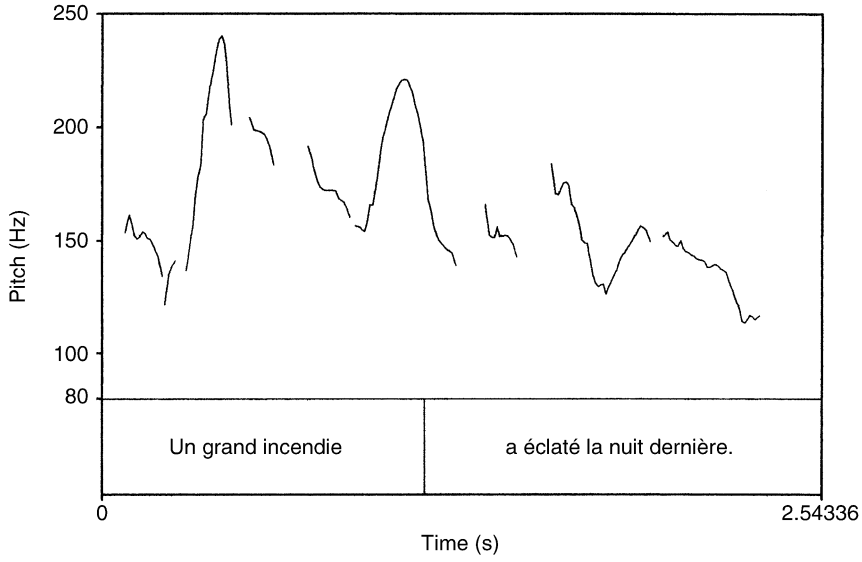

Figure 12 Example (8e).

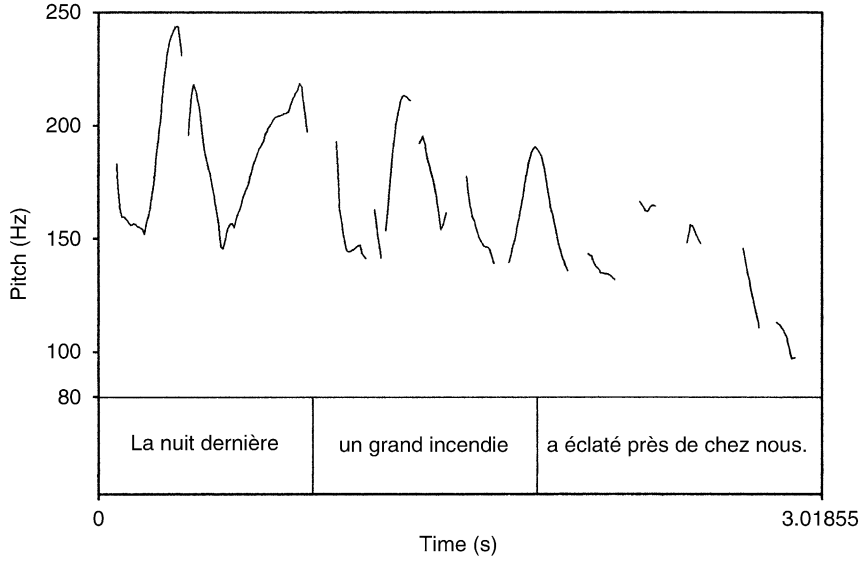

Figure 13 Example (8f).

because he is back.' The utterance stress put on the initial element leaves no room for the thema and does not allow segmenting the utterance. The latter must be considered as entirely rhematic (Figure 18).

The mere presence of such postpositive elements, placed after the nucleus, should induce us to leave behind the narrow binary frame of message organization. Moreover, close examination of several types of message forces us to take into account other constituents whose functions are determined by the organization of information.

In the following dialogue in French (from Rossi, 1999):

(10) "Combien l'avez-vous payé?"
"**Vingt couronnes** je l'ai payé."
'How much did you pay for it?'
'Twenty crowns I paid for it.'

the reply is considered by Rossi as composed of the rhema (*vingt couronnes* 'Twenty crowns') followed by its thema (*je l'ai payé* 'I paid for it'). Nevertheless, the function of this last part does not in any way match the function of a thema, and moreover this segment is not endowed with formal marks of the thema, particularly anticadence. The only argument in favor of considering the second part of the answer as a thema is that it is a known element of the context.

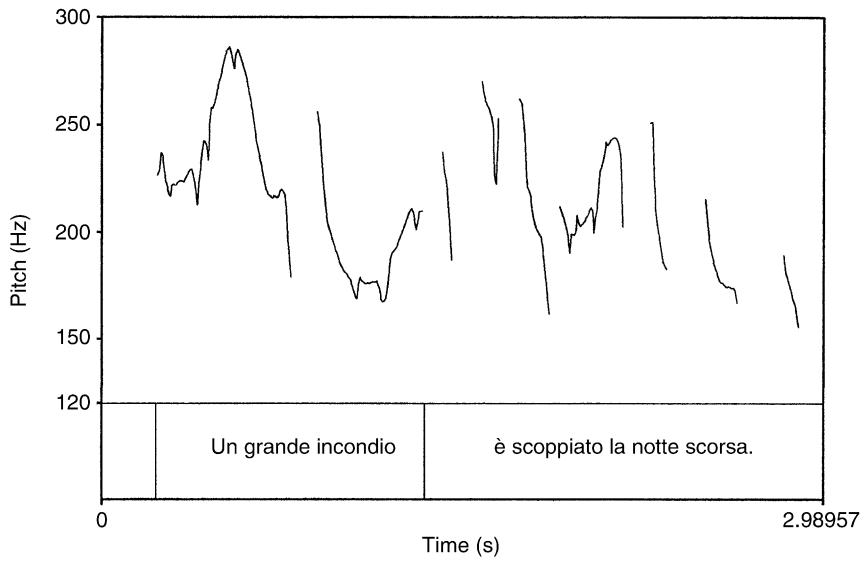

Figure 14 Example (8g).

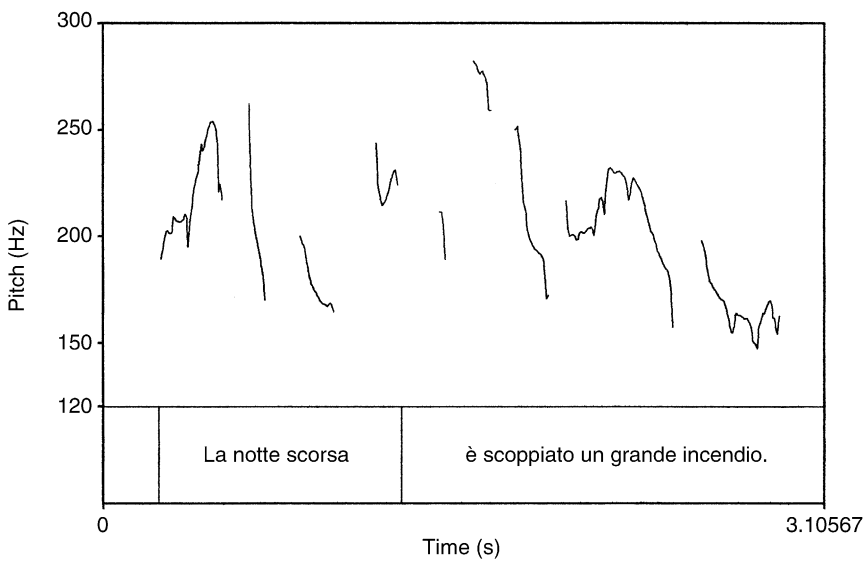

Figure 15 Example (8h).

But, as we pointed out above, such a notion is not relevant and cannot take part in the definition of the thema. In such cases, it seems more appropriate to go beyond the frame of the (T + R) dichotomy and consider the last sequence as a third constituent of the message, a sort of reminder (r) (Figure 19).

Moreover, this dialogue constitutes more than a communication unit, for it is a supraphrastic set that is still liable to 'actualized division.' The question in this case plays the role of thema. Anticadence stress in all cases precedes cadence stress. So the structure of this set will be: "T ?" "R + r."

Let us consider another case, more frequent in French, where the T + R dichotomy is obviously inappropriate:

(11) "Marie a demandé à tout le monde de l'aider, mais personne n'a pu."
"Et Pierre ?"
"Pierre, Marie ne le connaît pas."
'Mary asked everybody for help, but nobody could.'
'And Peter?'
'Peter, Mary does not know him.'

In this case, the order SVO, so common in French, has been modified. The direct object is shifted to the head of the utterance, in some way beyond the utterance, and for this reason is taken up again by the anaphoric *le* and thus brought to the fore. This order induces the opposition 'Peter' (who might help her) vs. 'everybody.' Of course, the mere utterance

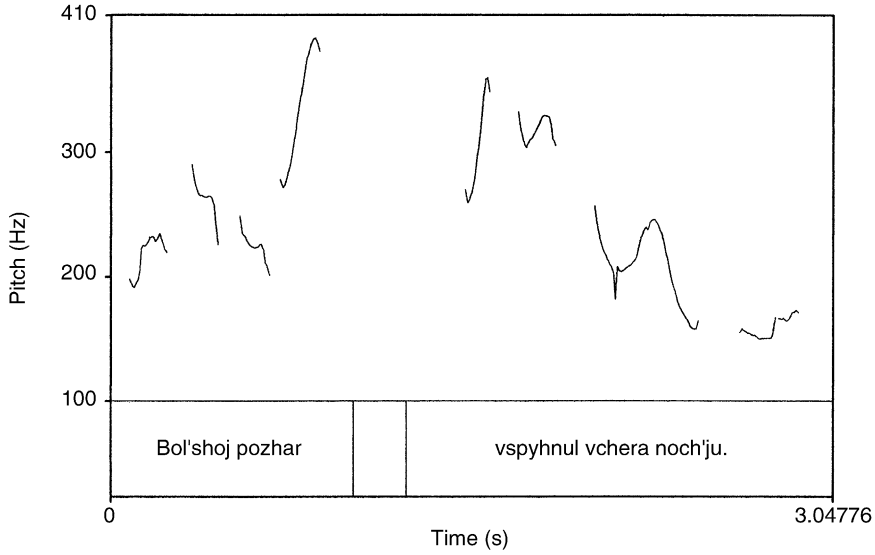

Figure 16 Example (8i).

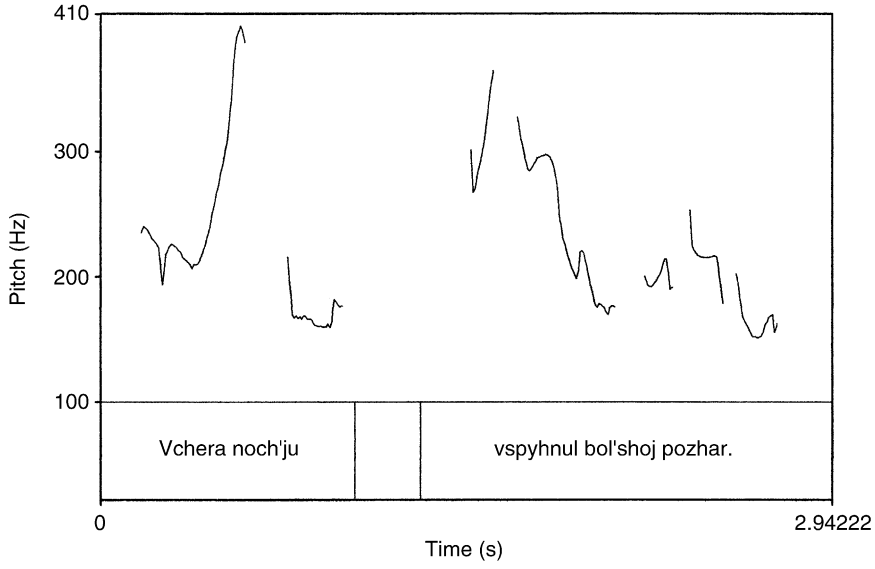

Figure 17 Example (8j).

Marie ne la connaît pas. 'Mary does not know him' remains quite possible, but deletion of the component *Pierre* 'Peter' suppresses all contrast. The two utterance constituents do not have the same function, neither in the sentence nor in the utterance. *Marie* 'Mary' is a subject in the sentence and the thema of the utterance, while *Pierre* 'Peter' no longer has a function within the frame of the message (Perrot, 1978). This is an element that resists the ordinary dichotomic analysis and is called by some linguists a *préjet* (preject) or topic.

The Russian language does not allow the speaker to shift emphasis syntactically in this way, via displacement (topicalization) followed by an anaphoric (*Pierre, ... le* ... 'Peter, ... he ...'). Russian manages to mark focalization by intonation alone. In an assertive utterance, indeed, the 'neutral' thema is characterized by a rise of the tone by 6 or 7 st. However, in the following utterance:

(12) **Вы** аристократ, а я демократка.
Vy aristokrat, a ja demokratka.
'**You** are an aristocrat and I am a democrat.'

the thema (*Vy* 'You') is focalized (marked) and therefore the rise is 12 st (female voice). It is followed by a fall in the tone toward the initial syllable of the rhema (in accordance with the syllabic structure of the individual elements, the fall may also occur either in

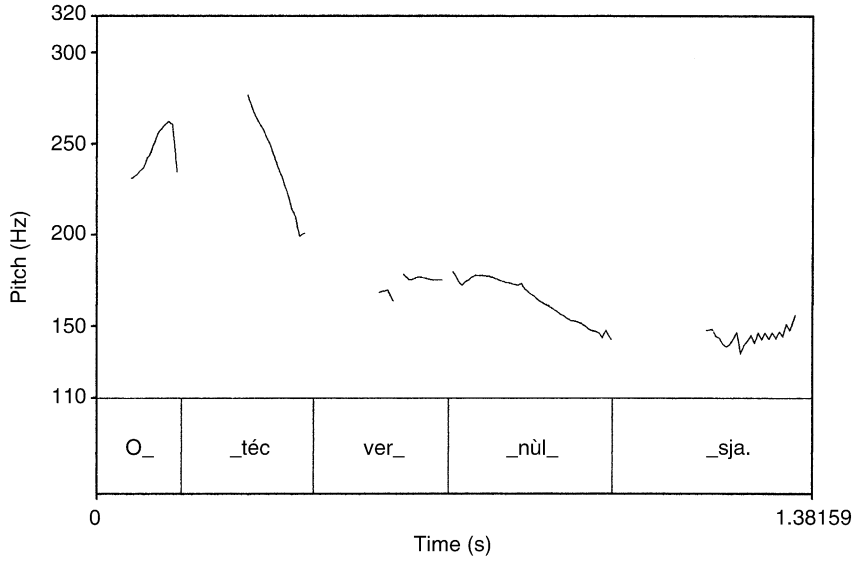

Figure 18 Example (9).

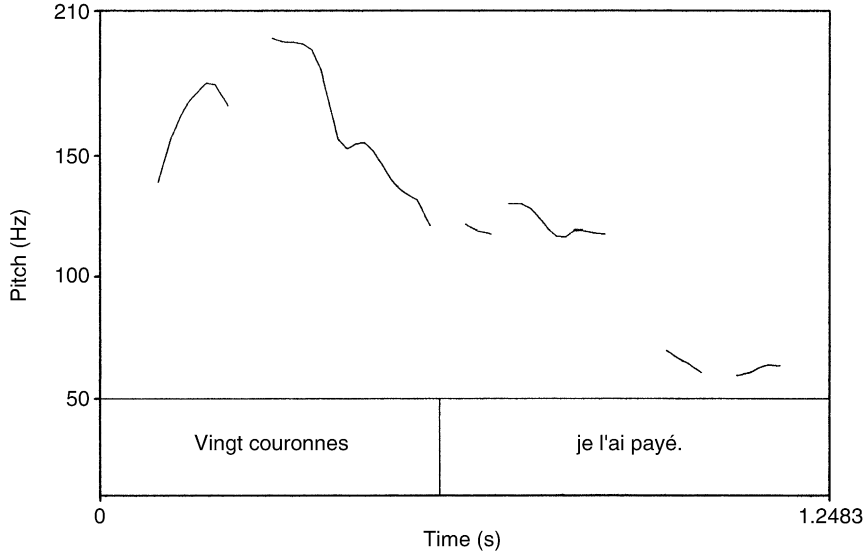

Figure 19 Example (10).

the vicinity or in the poststress syllables of the thema). This drop in the melodic curve is always perceived as a pause, even when there is no attested break in the voice. This means of emphasizing the thema is not a mere tool of 'expressiveness.' It obeys specific construction rules (text syntax). In order to establish a contrast, it directs the utterance toward the subsequent context (Figure 20).

Karcevski's System

Serge Karcevski (1931) proposed a system of intonation based on qualitative differentiation of utterance members. He singled out notions of equality and inequality. These notions mark four semantic categories, corresponding to four structural relationships. A specific intonation corresponds to each of these relationships. This system is summarized in Table 2.

This system conveniently describes one-word utterance members and also whole sentences.

Of all the different intonative structures, the most important is symmetry intonation, which cleaves the utterance into two parts, and opposes the rising part (tense intonation) to the falling one (lax intonation); see examples (3) and (8).

Graduated intonation differentiates the rectilinear movement. It enables the arrangement in order

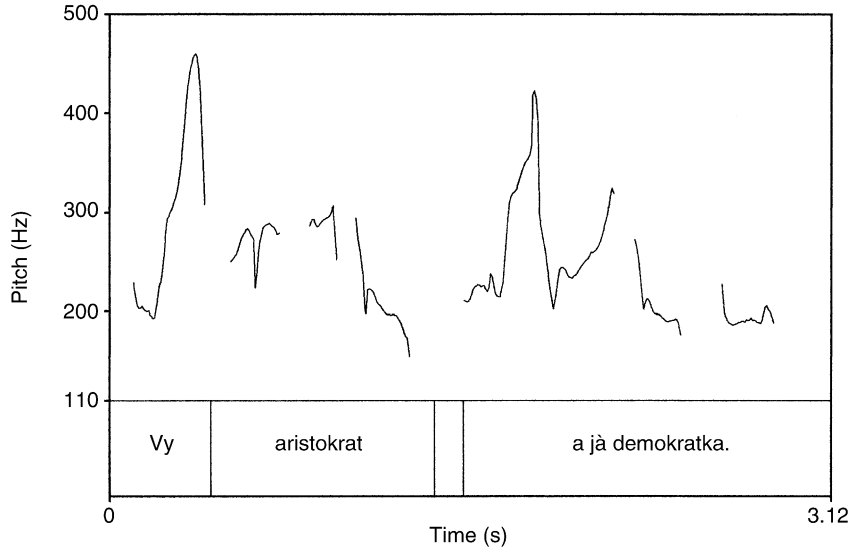

Figure 20 Example (12).

Table 2 Karcevski's system

Qualitative differentiation		*Structural relationships*	*Intonation*
Equality	*Inequality*		
Contrast (closed series)		Symmetry (contrasting equality)	Symmetrical intonation
	Gradation (open series)	Staggering (open inequality series)	Graduated intonation
Similarity (open series)		Repetition (open similarity series)	Similarity intonation
	Contrast (closed series)	Asymmetry (contrast by means of inequality)	Asymmetrical or neutral ('embedded') intonation

of increasing importance of the utterance members marked by anticadence. Karcevski gives the following examples from English and Russian, respectively (Figures 21, 22):

(13a) I don't see | **how you** | **with all your goodness** | **can act like that** || and be proud | of what you have done.

(13b) Я не понимаю | **как вы** | **с вашей добротой** | **можете так поступать** || и ещё хвалится тим.
Ja ne ponimaju | **kak vy** | **s vashej dobrotoj** | **mozhete tak postupat'** | i eshchë khvalit'sja ètim.

The last example is from French (Figure 23).

(14) **Grâce à un montage alerte, à une direction d'acteurs sans faille et à des dialogues joliment spirituels,** il relève le défi avec élégance.
'Thanks to a brisk final cut, a perfect direction and prettily witty dialogues, he took up the challenge with style.'

The stress of each rhythmic group enhances the tension induced by the preceding one up to the final lax intonation.

In intonation of similarity, the intonation of the first term is repeated on all the following terms. It may be performed only in strings composed of several members, identical with respect to their syntactic functions and independent of each other. The intonational profile has to be prominent in order to allow its repetition without variations. This type is among those typically found in lists, for example, below in French (Figure 24).

(15) Je suis à la retraite, **je ne sais pas quoi faire, je m'ennuie, je m'embête, je tourne en rond.**
'I am retired, I don't know what to do,
I am bored, I am fed up, I'm getting nowhere.'

The following example is in Russian (Figure 25).

(16) **Планы, отчеты, лекции, конференции,** жизни нет.
Plany, otčëty, lekcii, konferencii, žizni net.
'Schedules, reports, lectures, conferences, hard life!'

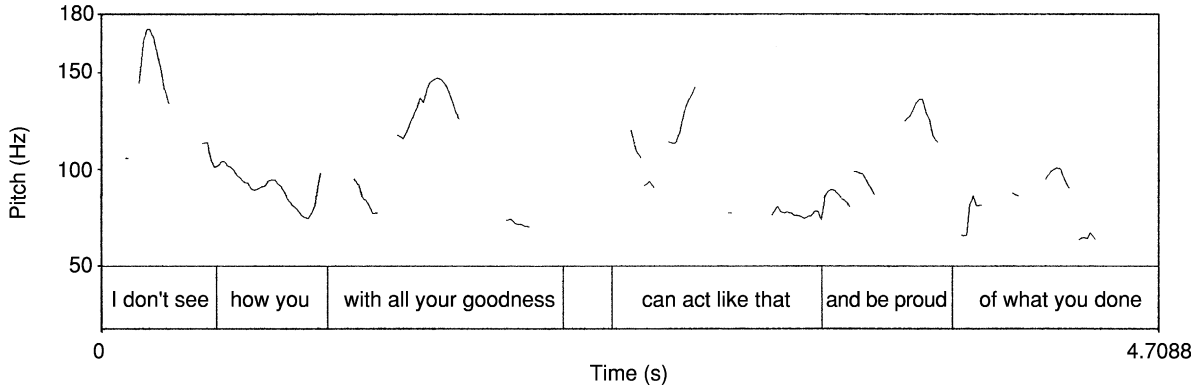

Figure 21 Example (13a).

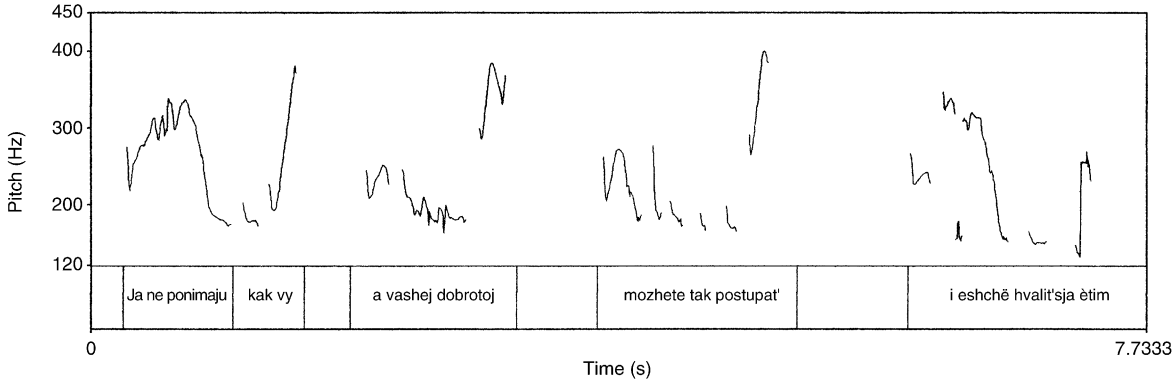

Figure 22 Example (13b).

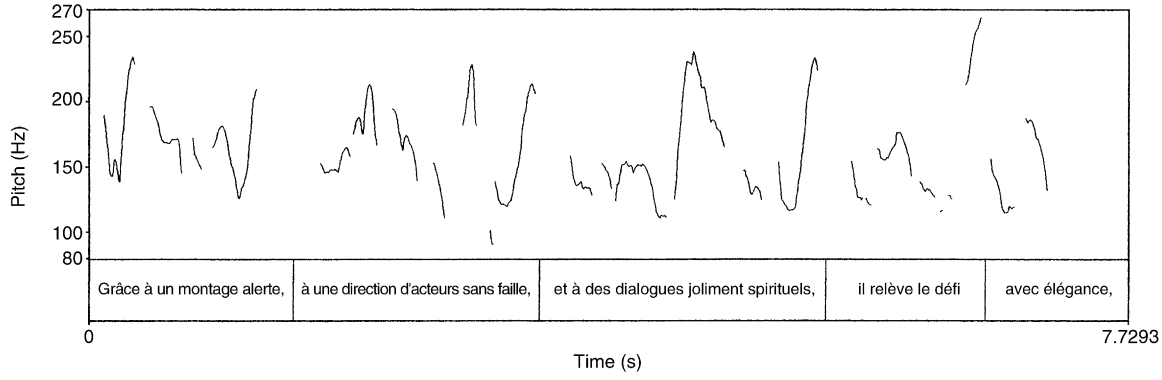

Figure 23 Example (14).

The string of similarity may be performed with a decreasing tone (15), and also a rising one (16).

Asymmetrical intonation, or embedding intonation, is in contrast with all other types of intonation. The sequence is performed with a tone level lower than the preceding one, a low intensity, and an accelerated tempo. The embedded sequence does not participate in the utterance tension, and can be deleted. There is a category of words or syntagmas that is embedded in order to mark the speaker's various subjective viewpoints or feelings. Thus in French: *sûrement* ('surely'), *sans doute* ('undoubtedly'), *bien sûr* ('of course'), *i(l) m'semble* ('it's likely'), etc.; in Russian : *к счастью* (k schast'ju 'fortunately'), *по-моему (po-moemu, 'In my opinion'), кажется* (kazhetsja 'seemingly'). There are also special syntactic structures, whole sentences, which, in a given context, can behave embedded units

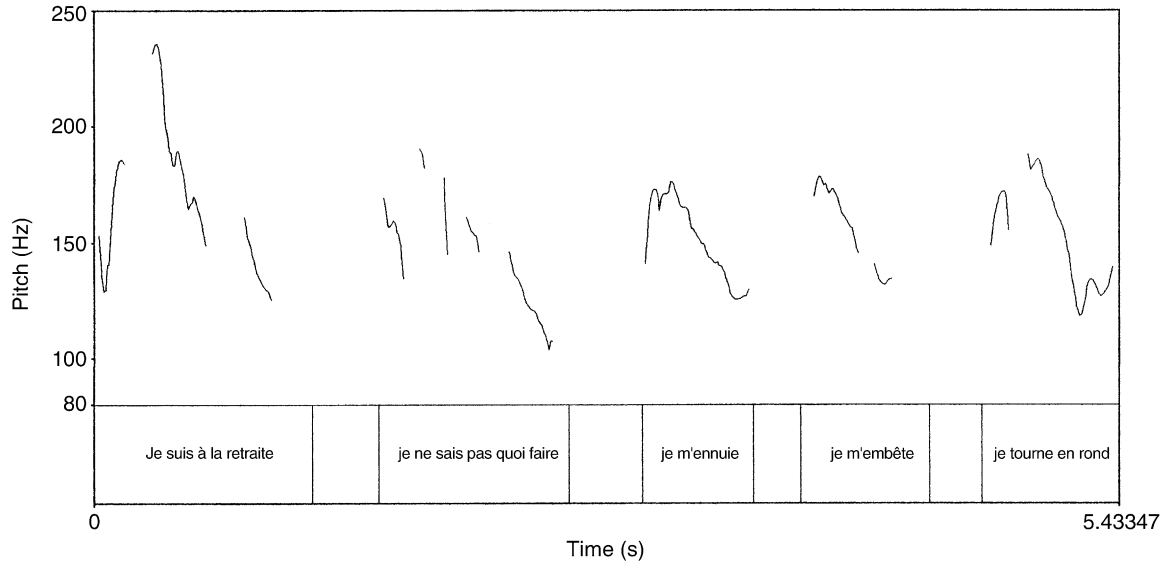

Figure 24 Example (15).

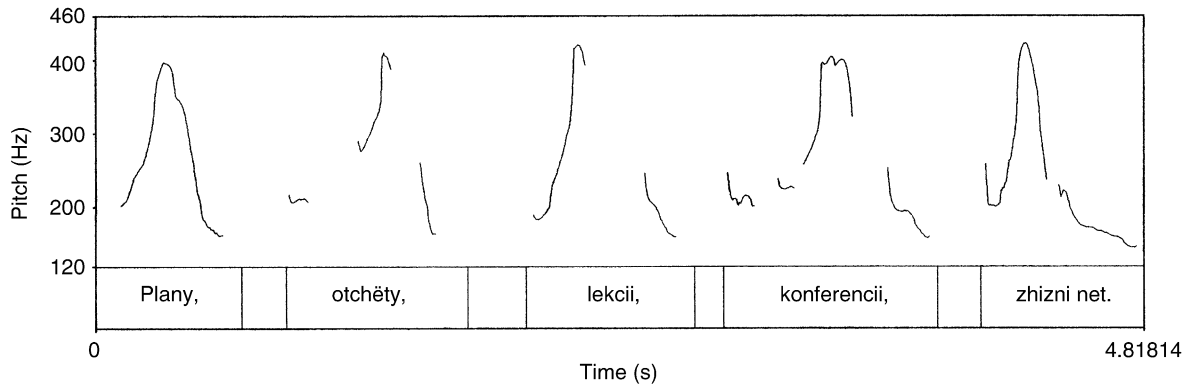

Figure 25 Example (16).

and are characterized by embedded intonations. So in French:

(17) Bon, qu'il vienne, **je ne sais pas**, vers cinq heures.
'Well, let him come, I don't know, about five.'

with a pronounced phonetic reduction [ʃ̄epa] (Figure 26). or in the following utterances in German and Russian, respectively (Karcevski, 1931) (Figures 27, 28):

(18a) So diese Fische | schlecht gesalzen | das Salz hat sie nicht durchdrungen | **sie sind fett** | ganz gewiß kommen Würmer hinein.

(18b) А вот рыба, | которая недосолена, | **её соль Нехорошо взяла,** | она **жирная,** | обязательно червячок заведётся.
A vot ryba, | kotoraja nedosolena, | **ёё sol'** nehorosho vzjala, | ona zhirnaja, | objazatel'no chervjachok zavedëtsja.
'But that sort of fish | it's not salted enough | salt didn't permeate it, | it's fatty | sure the maggots will get at it.'

This specific intonation is frequently observed in the sequence placed after the nucleus, see: *je l'ai payé* ('I paid for it') (Figure 19), *otec* ('father') (20).

The system of intonation proposed by Karcevski makes no reference to the syntactic organization of sentences. This is why it allows us to go beyond the T + R dichotomy and provides an analysis of informational organization that is valuable for all kinds of messages.

Nuclear Stress

Besides the few questions pointed out above concerning the composition of the rhema, it is not useful to consider what some call 'utterance stress' or, in our terminology, 'nuclear stress,' since it concerns the nucleus of the rhema. This stress does not endow the utterance with any implicit information. Broadly speaking, its place is at the end of the utterance or at least in its final part: see (8) above. In some

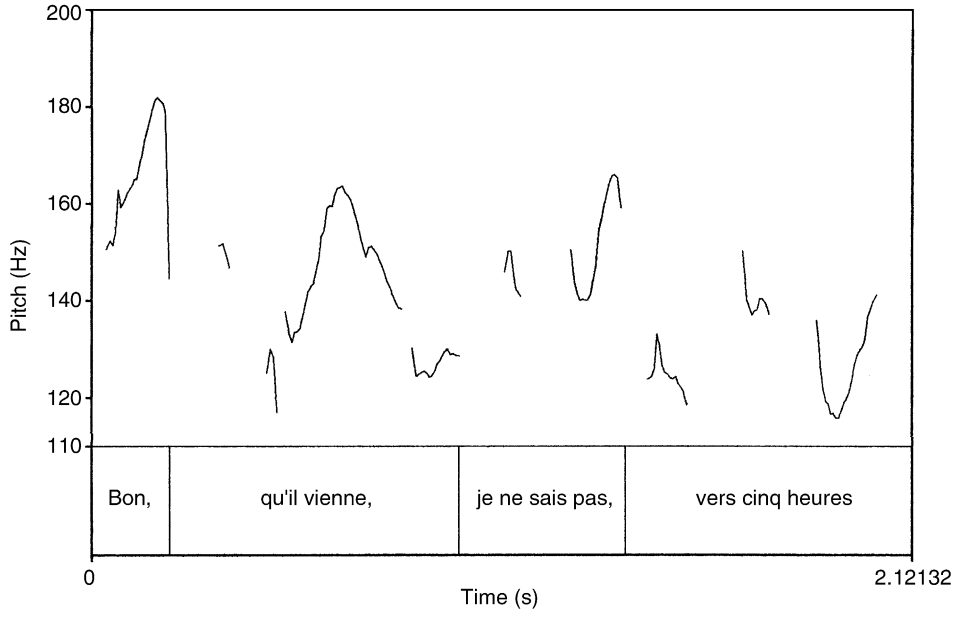

Figure 26 Example (17).

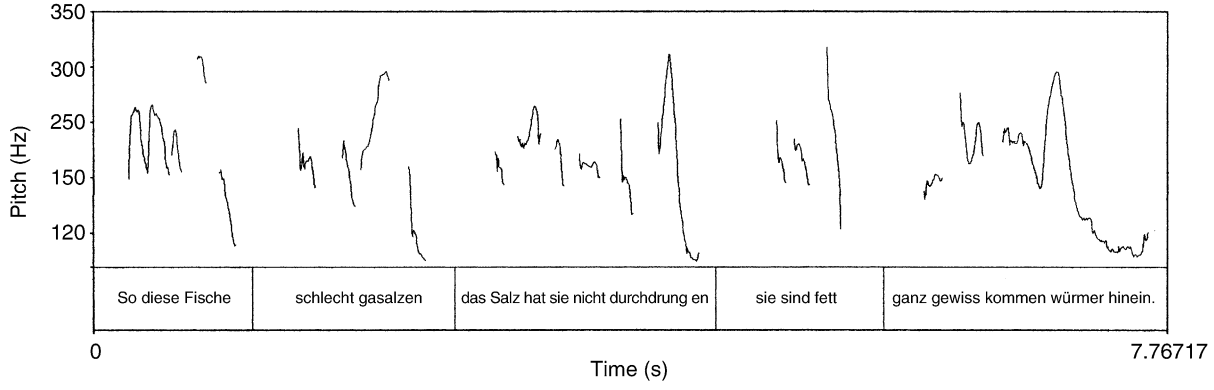

Figure 27 Example (18a).

cases, nuclear stress may be shifted within the boundaries of the utterance or moved up to its head. This shifting is not, as has been claimed (Adamec, 1966; АН СССР, 1970, 1980; Ковтунова, 1976), a tool for marking an additional emotional content, but allows the speaker to establish interphrastic relationships, which, in such a case, do not have lexicosyntactic marking (9).

It is the same in the following dialogues in French and Russian, respectively:

(19) "Vous avez visité l'appartement ? Il vous convient ?"
"Mon père seul l'a vu, moi j'irai demain."
'Did you visit the flat? Does it suit you?'
'Only my father visited it. I'll go tomorrow.'

(20) "Как отец? Еще в больнице"
"**Вернулся** отец."
"Kak otec ? Eshche v bol'nice ?"
"***Vernulsja*** otec."
'How is your father? Still at hospital?'
'Back he is, my father.'

The shifting of the nuclear stress in (19) takes part in the rejection (partly lexicalized by the word *seul*) of the presupposition 'You think we **all of us** visited the flat.' Meanwhile in (20), the shifting of the predicate-nucleus up to the head position is enough to mark the clash between the speaker and the other person. In that example, however, if the negation is lexically marked (for instance by the word *Net* 'No'), the normal canonical order is restored and the nuclear stress is placed again at the very end of the utterance: **Нет**, отец **вернулся** ('No, my father is back'). Utterances with initial nuclear stress are always oriented toward the left, i.e., they are more tightly linked with the preceding context.

When the nuclear stress is conveyed by a word, which is a part of a closed system (like a pronoun), it marks an exclusive choice (3a).

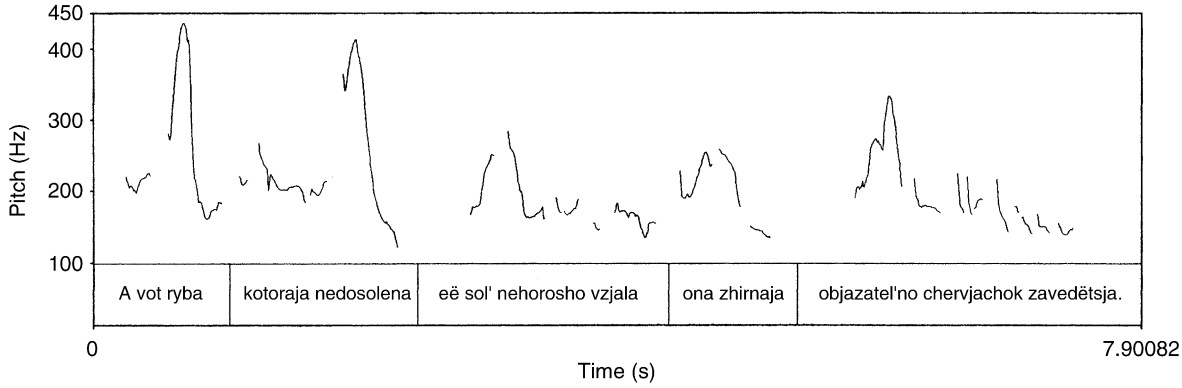

Figure 28 Example (18b).

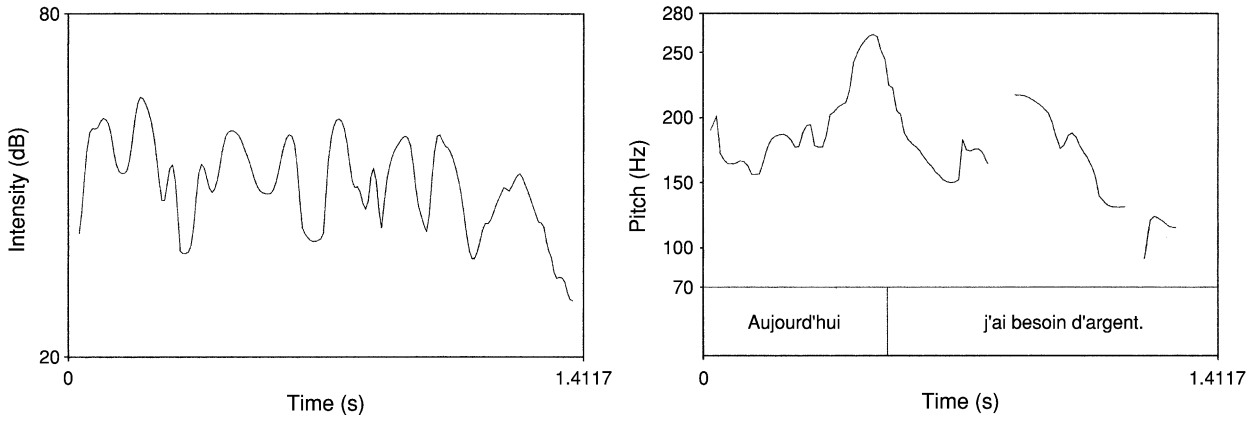

Figure 29 Example (24a).

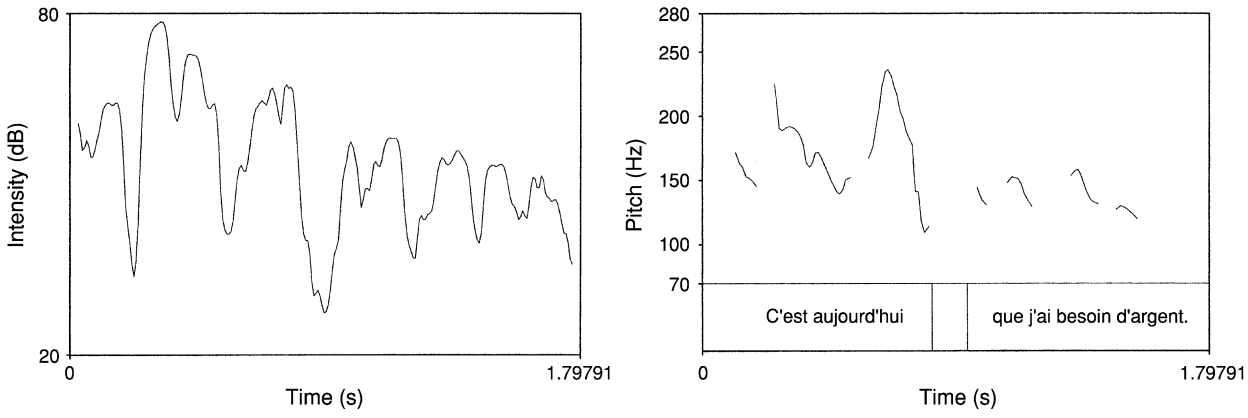

Figure 30 Example (24b).

In Russian, utterances whose informational nucleus matches the syntactic nucleus (verbal predicate) mark a contrast on the level of assertion. These utterances are almost always parts of a dialogue. So, in Russian, the utterance:

(21a) Кирилл / **поступил** в институт.
Kirill / **postupil** v institut.
'Cyril **did pass** the entrance examination for university.'

is a polemical utterance. Its speaker intends to emphasize the positive modality in order to reject the negative presupposition of the interlocutor. Meanwhile:

(21b) Кирилл / поступил в **институт.**
Kirill / postupil **v institut.**
'Cyril passed the entrance examination **for university.**'

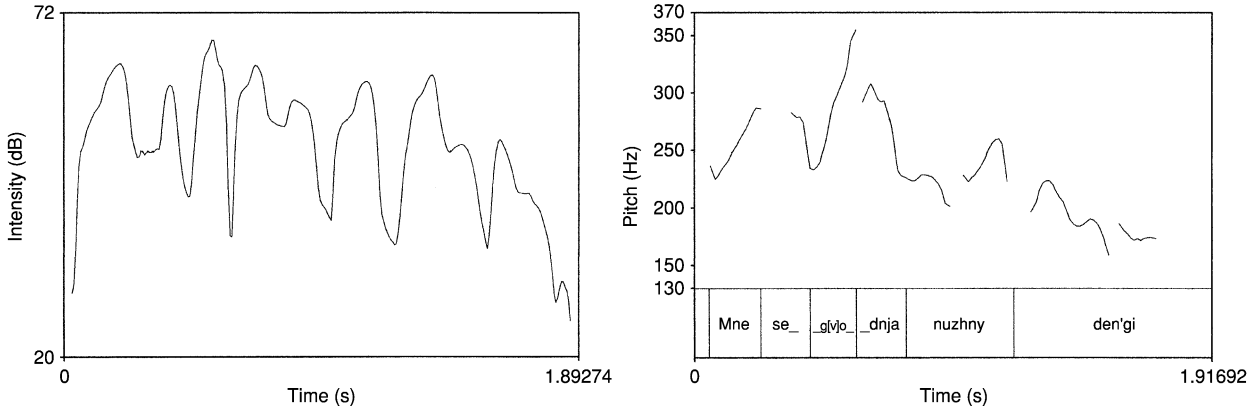

Figure 31 Example (24c).

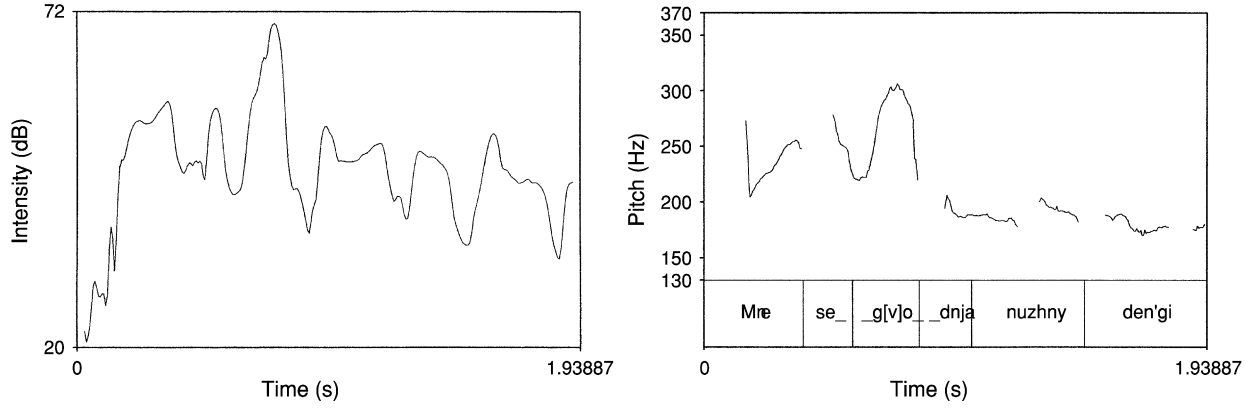

Figure 32 Example (24d).

is a neutral informational utterance whose information nucleus does not match the syntactic nucleus.

Furthermore, if sentences consist only of the subject and the predicate, the latter may always get the nuclear stress. It is quite different in sentences comprising secondary members. In that case, we observe some limitations with the verbal aspect. In Russian, for instance, in order to express a process by means of a sentence of the type SVO, a verb in the imperfective aspect (whose usual meaning is the indication of process) cannot carry nuclear stress. The latter is put on the complement:

(22) Брат говорит **по телефону**.
Brat govorit **po telefonu**.
'My brother is **on the phone**.'

However, in an utterance informing about negative modality, nuclear stress is always put on the predicate. This fact must be explained by the polemical character of the negative utterance, which "supposes a prior assertion" (Karcevski, 1937), which it aims to reject.

(23) "Nous allons attendre ton père."
"Non, il **ne viendra pas** avec nous."
'We are going to wait for your father.'
'No, he **won't go** with us.'

Exclusive Stress

Besides nuclear stress there is another type of rhematic stress: exclusive stress. This stress is broadly used in languages that lack forms like the French *c'est . . . qui/que*. This specific stress, just like nuclear stress, may be put on either unit of the speech string. Nevertheless, it differs from nuclear stress both in formal and in functional aspects. Formally, this stress is characterized by the rise-and-fall movement of the tone within the boundaries of the stress syllable (a positive interval toward the stress vowel may take the place of the rising tone) and a very high intensity, even when that element is at the end of the utterance. As for its function, this stress yields implicit information relating to a paradigmatic contrast, as in these examples in French and Russian (Figures 29–32):

(24a) Aujourd'hui j'ai besoin **d'argent**.
(24b) **C'est aujourd'hui que** j'ai besoin d'argent.

(24c) Мне сегодня нужнь **деньги**. – (nuclear stress)
Mne segodnja nuzhny **den'gi**.
'Today I need **money**.'

(24d) Мне **сегодня** нужны деньги. – (exclusive stress)
Mne **segodnja** nuzhny den'gi.
'I need money **today**.'

The Utterance End Intonema

According to Karcevski (1933), "Intonation is a tension oriented towards the final communication term." Peshkovsky (Пешковский, 1938), on the other hand, considers that the utterance intonation is a particular stress that arranges around itself the utterance elements. Some Russian linguists (Златоустова, 1962; Матусевич, 1976) consider that the utterance stress marks the final term of the utterance and thus indicates the limit of the utterance. But, as we have already pointed out, the element with nuclear stress is not necessarily the final one. This function is held by an intonational unit, an utterance end marker, which is characterized by an F_0 level behind the average frequencies of the speaker, and also by the important length of the final vowel or of the last stressed vowel, and finally by the low intensity of poststress syllables.

Units making up a supraphrastic set behave in some way just like utterance members: each unit, by modifying its utterance end marker, prompts us to wait for the following one. Only the last utterance is actually marked by the real cadence.

See also: Discourse Semantics; Feature Organization; Intonation; Latent Semantic Analysis; Linguistic Features; Pragmatics and Semantics; Prosodic Aspects of Speech and Language; Prosodic Cues of Discourse Units; Semantics of Prosody; Spoken Discourse: Word Order; Syntactic Features and Feature Structures; Syntax-Semantics Interface; Word Order and Linearization.

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Inupiaq

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Introduction and Dialectology

Inupiaq (Inupiatun, North Alaskan and Inupiatun, Northwest Alaska) is an Eskimo-Aleut language spoken in Alaska, part of the Inuit branch or Eastern group of Eskimo languages and distinct from the Yupik languages. Extending across the Arctic from Alaska through Canada to Greenland, Inuit varieties differ from each other in significant ways but nowhere is there found a sharp internal break that would constitute a language border, and so they are considered a dialect continuum (Figure 1). The Inuit groups of the Eastern Arctic are a diaspora that spread from Alaska, and the Bering Sea area is recognized as the homeland of the Eskimo-Aleut language family and people (*see* **Eskimo-Aleut**).

Inupiaq comprises two dialect groups, North Alaskan Inupiaq (NAI) and Seward Peninsula Inupiaq (SPI), each with two dialects. NAI includes the North Slope and the Malimiut dialects, with the former spoken along the Arctic coast and the latter found around Kotzebue Sound, along the Kobuk River and south at the head of Norton Sound. SPI includes the Qawiaraq dialect, found along the northern shore of Norton Sound, on the southeastern Seward Peninsula and at Teller, and the Bering Strait dialect is found along the shores of Bering Strait and on the offshore islands, King Island (now uninhabited), and Little Diomede. Dialects are distinguished primarily in terms of phonology, lexicon, and morphology and include a number of subdialects.

Phonology and Writing

The Alaskan Inupiaq writing system was developed by Roy Ahmaogak, a Barrow Inupiaq minister, and linguist Eugene Nida in 1946 and has undergone revisions since. Current orthographic symbols are given below with equivalent phonetic symbols in parentheses where the two differ. The entire palatal series is absent in SPI, *z* is present only in the Bering Strait dialect, and *e* has limited occurrence, found in SPI only, particularly on Little Diomede Island.

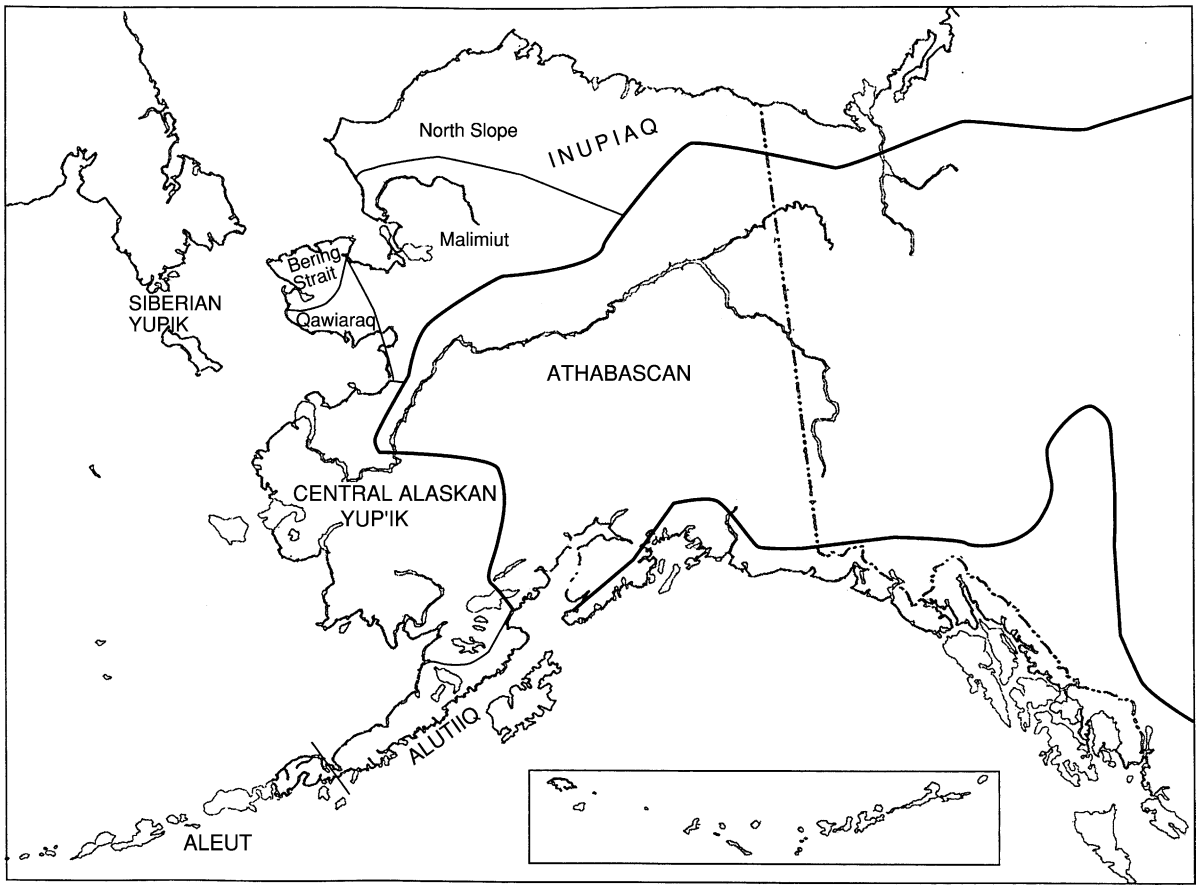

Figure 1 Eskimo-Aleut languages of Alaska.

Consonants:

p	t	ch(č)	k	q	‘(ʔ)
	ɬ(ḷ)	ḷ(ḷ)	ḷ(lʲ), y	g (ɣ)	ġ(ʀ)
m	n	ñ	ŋ		

Vowels and diphthongs:

i	e(ɨ)	u
		a

Consonants and vowels can be long and are then written double. Any two vowels with the exception of *e* may be paired: *ai ia ua au iu ui*. In most of Malimiut, certain diphthong pairs have coalesced and are pronounced identically: *ia* and *ai* are pronounced [e:], *au* and *ua* are pronounced [o:], and *iu* is pronounced like *ii* as [i:]. A major phonological phenomenon in Inuit languages is consonant assimilation, which increases in magnitude as one travels east (*see* **West Greenlandic**). Alaskan Inupiaq has differentiated clusters, although the North Slope dialect has assimilation by manner of articulation. Palatalization of alveolar consonants is notable in NAI, with palatalization of some velars found in much of Malimiut. A major distinguishing feature of the Inuit branch is the simplification of the Proto-Eskimo four-vowel system by the merger of the central vowel ɨ, principally with i. Reflexes of historical *i* trigger progressive palatalization of alveolars and assibilation of prevocalic *t* in NAI: NAI *iñuk* ‘person’ but SPI *inuk* and NAI *isiq-* ‘enter’ but SPI *itiq-*. Reflexes of the fourth vowel ɨ are typically [*i*] but may undergo deletion or alternation with other vowels.

Morphology and Syntax

Inupiaq is a highly polysynthetic language, and suffixation creates very long words, so that a word is often equivalent to an entire English sentence. Words are typically constructed of a noun or verb stem, one or more derivational suffixes, and an inflectional ending, and may be singular, dual, or plural in number. Examples are from the North Slope dialect:

(1) atuġ-nia-ŋit-chuk
sing-FUT-NEG-3du/INTRANS
‘they (two) will not sing’

Verbs may be intransitive or transitive, and transitive verb endings mark number and person of both subject and object.

(2) tautuk-kaat
see-3plSUBJ/3singOBJ
‘they see him/her/it’

The verb ending here expresses the subject and direct object, and pronouns are unnecessary, although they can be added in, as can nouns. Pronouns express person and number but not gender, which is expressed only by nouns. There are no articles.

(3) aŋutit aġnaq tautuk-kaat
men.pl woman see-3plSUBJ/3singOBJ
‘the men see the woman’

Word order is Subject-Object-Verb, although the complex inflectional system makes free word order possible. Through the influence of English, many speakers now prefer SVO order.

Lexicon and Ethnonyms

Lexical borrowing is primarily from Russian and English. Although the Russians never had a permanent presence in Inupiaq Alaska, the dozen or so Russian borrowings found in Inupiaq were probably introduced through trade with mainland Yupiks to the south and are found principally in SPI and Malimiut. Early English borrowings were introduced beginning in the late 19th century through contact with traders and whalers and were well integrated phonologically (e.g., *palauvak* ‘flour’). Modern-day bilingualism often gives rise to use of English words in Inupiaq speech, but these occurrences cannot be considered true borrowings.

Besides indicating the name of the language, ‘Inupiaq’ can also be used in English either as an adjective (e.g., the Inupiaq language) or a singular noun for a person (e.g., an Inupiaq from Barrow). The plural ‘Inupiat’ also is used for people (the Inupiat people, the North Slope Inupiat). With consonant palatalization, NAI uses the spellings ‘Iñupiaq’ and ‘Iñupiat,’ whereas SPI lacks palatalization and uses ‘Inupiaq’ and ‘Inupiat.’ Alaskans also use ‘Eskimo,’ although this term is disfavored in Canada.

Population and Viability

There are some 13 500 Inupiat in Alaska, about 3000 of whom speak the Native language. Inupiat are now bilingual or speak only English. Most speakers are in their late forties or older, and in some areas the youngest Inupiaq speakers are in their sixties or even seventies. The language shift to English is brought about by a number of factors: government, education, and media are largely in English (although Inupiaq is often heard on the radio); monolingual English speakers have lived among the Inupiat for decades; and airplanes have made travel outside the area easy. In addition, past Inupiaq language use was discouraged and often punished by teachers and school officials. In 1998, a majority voted to make English Alaska’s official language, sending a negative message in the view of Native language supporters.

The continued use of Inupiaq as a spoken language is threatened, and efforts at revitalization consist largely of school language classes. Language immersion programs exist in elementary schools in Kotzebue and Barrow, from which it is hoped that new generations of Inupiaq speakers will emerge.

See also: Canada: Language Situation; Eskimo-Aleut; West Greenlandic; United States of America: Language Situation.

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Invented Language in Literature

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Invented Language and Literary Worlds

All creative language, articulated in literary texts, is invented language, of course. However, all creative fiction depends on a greater or lesser degree of difference between our actual world and the imagined world of the text. Even a highly realist and naturalistic narrative, even a documentary faction or even a historical reconstruction are all likely to depart in small ways from the hard reality, and the form of expression used to articulate the divergent world will need to be different (and invented) from the language that is **really** real. As soon as a proper name for a character ('Snoopy,' 'Hamlet,' 'Heathcliff') is used, this invention serves to mark the divergence of worlds from that of the reader. Even words with apparently stable referents are used inventively in literary fiction: Dicken's 'London' is not our London; Philip Pullman's different 'Oxfords' are explicitly not our Oxford; even Wilfred Owen's Great War trenches are his literary projection of that landscape, rather than the landscape itself.

Furthermore, literary authors tend to express themselves in ways that are commonly regarded as 'poetic' or 'expressive.' This stylistic creativity can be manifest as metaphorical compounds (the Old English 'mere-stape' – 'sea-stepper' for a ship), or as lexical blends (e.e. cummings's 'manunkind'), or as grammatical disjunction (Robert Heinlein's 'the door dilated'), and so on. In most literature, though, these examples of departures from everyday language are minimal and serve only to mark out a local effect. They are usually one-off creations rather than being part of a thoroughly worked-out and systematic linguistic structure.

In this article, more radical linguistic inventiveness will be discussed, ranging from the creation of sets of new words that have a strong iconic value, to the creation of fully-fledged invented language systems. The functions of such creative artifacts will also be discussed, but it is worth pointing out at the beginning that the primary function of new language in literary fiction is to delineate the distance and connections between the reader's world and the world imagined in the text. Whether the invented language is for local ornamental color or seems intended for a central thematic purpose, imaginary lexis, grammar, and pragmatic patterns play an important role in establishing the readerly perception of escapism or political comment. Delineating the difference between the textual world and the reader's world is the first step in determining the significance of the work, in making identifications for empathy or satire, in being able to generalize the specifics of the story-world onto principles for the reader's world.

This article begins with the smallest scale of linguistic inventiveness, in new words and new uses for existing words, before going on to consider higher level discourse creativity, and then full invented language systems. In setting out this scale, however, it is important to realize that a few well-placed new words can have as significant an effect as thoroughly imagined rich linguistic innovation. Therefore, this article will consider the artistic function of inventiveness separately. The article ends with a consideration of

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the linguistic assumptions that seem to underlie these linguistic experiments. Since most examples of invented language come from the genres of science fiction and fantasy, the way that sf authors have imagined the science of linguistics is relevant to the discussion.

Neologism and Neosemy

New words ('neologisms') are a particular feature of science fiction (sf) and fantasy literature, where they have also been termed 'lexoids' (Mary Ellen Ryder, personal communication). Sf filled its early adventure stories with 'ray-guns,' 'ion-drives,' and 'teleporters,' and featured 'warp-speed' 'starships,' 'flying saucers,' and 'cyborgs.' There are clearly several types of word-formation at work here, drawing on all of the available resources of lexical generation in English. The following typology of neologisms is drawn from Stockwell (2000: 115–138).

Perhaps the most common form (unsurprisingly for a Germanic-based language like English) is compounding. Here, root words can be placed together as a single word lexical blend ('teleport,' 'holodeck,' 'cyberspace'). The most common source for such compounds draws on noun-combinations (N+N), as in 'wormhole' and 'starship' and hyphenated forms, such as 'ion-gun' and 'rim-world.' Because of the commonality of the source lexis here, it is fairly easy to work out a meaning for such neologisms, especially as they are always used in a disambiguating narrative context. N+V forms ('warp-drive,' 'terraform') also occur, and even Adj+V ('Newspeak') and V+Adj ('spindizzy'). Single-word neologisms such as these are typical of technologically-based science fiction, where a new invention or technical phenomenon requires an invented and brief label.

Compounding can also take the form of multi-word lexical items, such as 'flying saucer,' 'dilithium crystal,' 'tractor beam,' 'force field,' and many others. These, too, are very common in science fiction as they carry the flavor of a technical specification as well as often drawing on a scientific register. A less common form of phrasal circumlocution is also found, where the sense of 'newness' is diminished because the source elements are easily recognized. Examples such as 'sense-of-we-feeling,' 'Bug Eyed Monster,' or 'cultural engineering' retain a sense of a familiar phenomenon modified in the imagined world. All of these examples are fairly easy to understand.

Neologisms can also be created by borrowing. In this case, the borrowing can be from either terrestrial or imagined alien languages – though of course often the imagined alien language bears uncanny resemblance to root morphemes in terrestrial languages. In early sf, words were often borrowed from languages perceived by the British or American writers to be exotic. The proto-science fictional *Historie of the man in the moone* (1634) by Bishop Francis Godwin has the moon people speaking 'Lunarian,' based on his rather sketchy understanding of how Chinese sounded.

Alien borrowing (the 'Daleks' from *Dr Who,* or the 'Wookies' from *Star Wars*) can always be imagined as having terrestrial influences, of course. By far the most common source languages for neologistic borrowing are Greek and Latin, because of their use in much technical terminology and perhaps also because the decline in classical education over the last century has rendered the etymology more obscure and exotic. 'Sol,' 'Luna,' and 'Terra' have become common names for our local star system. 'Android,' 'cybernetics,' and 'cryogenics' all have Greek origins.

Straightforward original creation is rare, since the etymological origins of neologisms can usually be perceived. Usually only proper names show real creation, and these are then turned into full neologisms by grammatical derivation: 'Odonism,' 'Naderites,' 'Morlocks.' Such derivation also leads to 'back-formation,' where analogous forms are created: 'white holes,' 'corpsicle,' and 'astrogation.' The last two of these also illustrate longer coinages being abbreviated – it is common to find such shortened back-formations breaking the usual morphological boundaries: 'droid' is a broken form of 'android'; and the malicious race of 'Borg' are broken down from 'cyborgs,' which is itself an abbreviated and blended version of 'cybernetic organism,' which in turn consists of two words drawn from Greek.

Shortened forms like these, together with abbreviations, are another means of creating neologisms. 'Fax' (from 'facsimile'), 'bionics' (from 'biological electronics'), and 'cyborg' are all shortened forms that have become perceived as lexical items in their own right. Acronyms formed from the initial letters of phrases have also become lexicalized, and pronounced either 'atomically' in their separate elements ('UFO,' 'ESP,' 'ET') or 'molecularly' as a phonetic sequence (as in 'ufologist,' one who investigates unidentified flying objects; and 'esper' who has the power of extra-sensory perception; and the research organization 'SETI,' searching for extraterrestrial intelligence).

Of course, all the usual morphological inflections of English (such as the 's'-plural, the 'ing'-participle, the 'ed'-past suffix, and so on) further extend most of these neologisms. It is rare, however, with single neologisms to find inflectional creativity in literature. There is no parallel of the historical shift in

English from the third-person verb suffix '-eth' to '-s' ('maketh' to 'makes'), for example. Where there is innovation in grammatical particles, these tend to form part of a fully-fledged imagined linguistic system, rather than simply being associated with isolated neologisms.

Aside from neologisms proper, literary fiction tends to rely on 'neosemy' (a term coined in Stockwell, 2000), in the sense of a new meaning developed for an existing word. The neologism 'utopia' for example (from Thomas More's 1516 work (1910)) was coined as a proper name for his idealized island but has since been extended to refer to any idealized state, and inflected into 'utopian,' and back-formed into 'dystopian' and 'heterotopian.' A 'flying saucer' and a 'black hole,' strictly speaking, should be regarded as neosemes rather than neologisms. Neosemes have the advantage in literary fiction of making the imagined world seem close and more nearly extrapolated from the reader's familiar world. Neologisms, by contrast, can seem relatively disjunctive and alien.

Dialectal Extrapolation

More extensive than neologistic innovation but falling short of a full invented language, dialectal invention is a common compromise in literary fiction. Imagining the appropriate register or dialect that applies in the projected world allows the texture of difference to be established while not making undue demands on the reader to engage in detailed decoding. Sometimes, the dialectal projection is simply a product of a high density of neologisms and neosemes, drawn from source lexis that is reasonably easy to recognize. The futuristic dialect of William Gibson's *Sprawl* series of novels works like this (in fact, it was developed largely from 1970s Canadian biker slang):

> Molly was snoring on the temperfoam. A transparent cast ran from her knee to a few millimeters below her crotch, the skin beneath the rigid micropore mottled with bruises, the black shading into ugly yellow. Eight derms, each a different size and colour, ran in a neat line down her left wrist. An Akai transdermal unit lay beside her, its fine red leads connected to input trodes under the cast.
>
> He turned on the tensor beside the Hosaka. The crisp circle of light fell directly on the Flatline's construct. He slotted some ice, connected the construct, and jacked in. (Gibson, 1984: 98–99)

This passage, from the novel *Neuromancer* (itself a punning lexical blend neologism), displays neologisms that are easy to decode in isolation ('micropore'), in context ('snoring on the temperfoam'), and with a little etymological knowledge ('derm'). There are abbreviations that would be familiar to sf readers ('trodes' from 'electrodes'), as well as some neosemic usage: 'ice' as access to cyberspace, 'construct' as a noun for a software program, and 'jacked' applied to a human body rather than a machine's cable.

Similarly, Jeff Noon's 1993 novel *Vurt* draws on the street-slang of early 1990s Manchester, with some neologistic blends:

> Shadowcop! Broadcasting from the store wall, working his mechanisms; flickering lights in smoke. And then a flash of orange; an inpho beam shining out from the shadowcop's eyes. It caught Mandy in its flare-path, gathering knowledge. She ducked down from the beam, banging, hard-core, on the van doors. (Noon, 1993: 7)

Here the new phenomena are explained by the context, and rather than a clumsy definition being supplied, information is presented appositionally ('gathering knowledge') that is consistent with the point of view of the narrator. Both of these examples of dialectal extrapolation serve not only to gesture towards the alternate world, but also serve as part of the characterization in the texts. It is noticeable that literary fictions that feature dialectal innovation tend to be strongly focalized through a participating character: the narrative is thus their dialect, and the invented language takes the reader quickly into the conscious world of the novel.

Such dialectal invention is fairly minimal, of course, and some writers have developed the principle of dialectal extrapolation to underline the alternativity of their imagined worlds. Anthony Burgess, in his 1962 novel *A clockwork orange*, creates a dialectal slang for his violent gang-characters Alex and his 'droogs' (friends). Like many lexical items in the novel, this word derives from transliterated or anglicized Russian, along with 'baboochka' (old woman), 'bezoomny' (mad), 'bitva' (battle), 'gulliver' (head), 'horrorshow' (good), 'koshka' (cat), 'krovvy' (blood), 'malchick' (boy), 'skazzed' (said), 'voloss' (hair), and many others. The slang is called 'Nadsat,' the suffix equivalent to 'teen' at the end of the Russian words for the numbers 11 to 19. Nadsat also includes some Cockney-derived words and other inventions: 'viddy' (see), 'pretty polly' (money), 'platties' (clothes), and so on.

Nadsat serves to increase the reader's involvement with the focalizer, Alex, but replacing many of the words also allows scenes of 'ultra-violence' and rape to be portrayed with an immediacy that the reader might otherwise recoil from more instantly. In this way, the novel pitches the reader into Alex's mind

more effectively than if the narrative had been written entirely in Standard English.

The dialectal style serves a thematic purpose in the novel, rather than being merely ornamental or part of the background enrichment of the imagined world. Similarly, Russell Hoban's *Riddley Walker* (1980) presents an even more thoroughly realized dialectal extrapolation to symbolize the postapocalyptic fall of civilization, as seen through the eyes of the eponymous protagonist:

> Stoans want to be lissent to. Them big brown stoans in the formers feal they want to stan up and talk like men. Some times youwl see them lying on the groun with ther humps and hollers theywl say to you, Sit a wyl and res easy why dont you. Then when youre sitting on them theywl talk and theywl tel if you lissen. Theywl tel whats in them but you wont hear nothing what theyre saying without you go as fas as the stoan. You myt think a stoan is slow thats becaws you wont see it moving. (Hoban, 1980: 158)

Here, the written language of the future is imagined as a return to spoken vernacular forms with grammatical patterns reminiscent of existing rural non-standard southern British English (the demonstrative 'them,' negative concord 'wont hear nothing,' relativizer 'what theyre saying'). The effect is to convey a simple-minded consciousness through which the reader must reconstruct the historical catastrophe that has befallen the country. The extrapolation relies on a set of assumptions about language change, of course, and an identification of spoken dialect with simplicity and social regression. Such extrapolation is artistically successful even if it is sociolinguistically dubious.

Hoban's style requires a great deal of effort on the part of the reader, with a corresponding risk that the reader might consider the task too onerous. The tactic has been pushed to its extreme by Brian Aldiss, in his psychedelic novel *Barefoot in the head* (1969). Here, he imagines a Europe bombed by psychotropic drugs that gradually disorientate the main character, Charteris. As the novel progresses, the lexicogrammatical patterning gradually comes to mirror Charteris's hallucinogenic perception:

> In the square they milled and sledded letting their origins down with mood music thrombic. The body hair buttressed and limbs rebuddied. Metamorphin slipper waker-slip. What they heard they herded and sluice-jiuces ran underfoot. As he luted their animinds. Ages went down into oceanic undertow. Civilians poured in and the old grey and biscuit buildings titaniced down into a glacial cobblesea. Inunvation of hands, plattening feet of limbic brand. Churning flowermotion with eddying scuffles sob-streperous among the one-backed beats. (Aldiss, 1969: 210)

More than 200 pages of this prose are incredibly difficult to read, but the effect can be rewarding if a great deal of attentive effort is expended. The transformations rely largely on lexical blending and collocational clashes, but for the most part the language is still recognizably derived from English. However, further linguistic experimentation has moved beyond existing natural languages altogether, an area that this article will consider in the next section.

Neographies

Inventing new languages is not simply the preserve of literary fiction. The Internet features many hundreds of 'neographies' that have been constructed either as part of literary or cinematic worlds, as extensions of such languages as imagined by fans of the originals, as experiments for teaching aspects of linguistics, or simply as the hobby of numerous people who enjoy inventing new principled artificial language systems. (Enter 'conlang' as an Internet search term to find most of these). By contrast with natural languages, artificial or constructed languages have no real native speakers – though some, like Ludovic Zamenhoff and Clara Zilbernik's Esperanto and its predecessor Johann Schleyer's Volapük, aspire to be used as genuine international languages.

Planned languages or constructed languages ('conlangs') are regarded by their enthusiasts as falling into three categories. Firstly, auxiliary languages ('auxlangs') are those like Esperanto or stripped down technical languages like Basic English, Business English, or Air Traffic Control English. Secondly, languages developed for artistic purposes ('artlangs') encompass invented languages that appear in literary works, as well as invented languages that appear in their own supporting worlds, and invented languages existing only for their own sake. The last two types are particularly prevalent as pastimes posted on the Internet. Thirdly, logical languages ('loglangs') are those devised usually by linguists, philosophers, or cultural critics as a means of demonstrating or teaching some point of principle in linguistics or philosophy – though most computer program languages would also count as loglangs.

For example, from 1955 the sociologist and science fiction writer James Cooke Brown invented a loglang called 'Loglan,' created to test out the Sapir-Whorf hypothesis in linguistics (which, briefly, draws a strong connection between linguistic structure and the patterns of thought that are then determined and constrained by language). The aim was to be as regular, principled, fixed, and stable as possible, since failures in these features in natural languages, it was argued, were what led to ambiguity and logical

lapses. If the strong form of the Sapir-Whorf hypothesis were true, then the speaker of Loglan should be a more logical thinker than the speaker of a natural language. The Logical Language Group released a public-domain version of the language as Lojban in 1987. Loglan and Lojban are based on predicate logic, with predicate functions (roughly, verbs) and participants (roughly, nouns); there are no adjectives or adverbs. Lojban has a greater vocabulary, with the aim of becoming a widely-used expressive language.

The science fiction writer Robert Heinlein was attracted to logical languages such as Loglan (and in fact refers directly to it in his 1966 novel *The moon is a harsh mistress*). In his 1949 novella, 'Gulf,' he also imagines a language called 'Speedtalk,' in which whole basic English words are represented by single syllables or phonemes. This brevity cuts down on the length of utterances required to set out a proposition and allows faster communication of complex ideas. In the story, the language develops superintelligence. Heinlein does not give extended examples of Speedtalk, of course; his artistic purpose is satisfied merely by gesturing towards the existence of the language rather than by realizing it fully. Loglan, by contrast, aims at full transparency and manifestness. This distinction – based on how fully-developed the language is – seems a more useful scale than the loglang/artlang distinction, based on aims and purposes that cannot always be known.

'Neographies,' the common Internet term for invented languages, points to the written nature of most constructed languages. As in most education systems in the world, principles that seem to apply to written language are applied exactly to spoken discourse, and literary authors imagine their languages – even when presenting speech forms – in terms appropriate to writing. This style is not surprising given that the languages involved are expressed in literary text and have no real native speakers to enunciate them. However, it also foregrounds the symbolic or emblematic value of the language itself rather than its value simply as a medium of communication, which spoken discourse foregrounds.

In George Orwell's (1948) *1984*, for example, the main character is employed on the 'Newspeak' dictionary. Newspeak is the version of English aimed at by the repressive state apparatus of IngSoc and Big Brother in the novel: its objective is to cut down the vocabulary of the language in order to diminish the capacity for complex or subversive thought. Clearly, the principles of Newspeak fly in the face of much current linguistic orthodoxy. The idea ignores the ever-shifting processes of linguistic change, ignores dialectal variation, regards dictionaries as comprising and fixing the lexicon, and makes a strong Sapir-Whorfian connection between language and the determination of thought. It also deals only with vocabulary and does not say much about syntactic expression, and it does not deal with the subversive and creative possibilities of metaphorical extension and compounding.

Of course, none of this matters, because Orwell was not extrapolating the future but caricaturing his present in 1948. Newspeak stands as a warning about linguistic impoverishment and the dangers of rhetorical manipulation by politicians and institutions. The novel itself is not written in Newspeak; presumably its political message could not be rendered in the language. No character in the novel even expresses themselves in an extended way in Newspeak: most of the material on the language is given in an appendix to the novel, and only the odd few words ('doublethink,' 'plusgood,' 'duckspeak') are used in the course of the narrative itself. Newspeak is a neograph that is gestured towards for its symbolic value rather than enacted.

Where invented languages are mentioned but do not appear fully, it is usually because they are imagined to be so far in advance of the reader's pitiful mind that the narrator cannot render them in a way which would be at all comprehensible. In Greg Bear's *Thistledown* series, for example, beginning with the 1985 novel *Eon*, the humans from the distant future have dispensed with the monodimensionality of natural language and augmented it with visual projected images and symbols:

> The President's advocate was not pleased with the news Olmy brought.
>
> 'The P.M. had no suspicion of this when you alone were sent?' Toller picted. The symbols that flashed between the two men came from pictor torques around their necks, devices which generated and projected the graphicspeak that had developed over the centuries in the Thistledown and in the Axis City. (Bear, 1985: 258)

'Picting' can only be referred to, not shown, in this way. The implication is that picting is not only far superior in propositional efficiency but also allows a greater precision of complex emotions and shading to be applied to communication.

This indirect gesturing is common for invented languages, with Thomas More adopting the tactic in his 1616 *Utopia*. At the end of the text, he adds "A metre of four verses in the Utopian tongue":

> Utopos ha Boccas peu la chama polta chamaan.
> Bargol he maglomi baccan soma gymnosophaon.
> Agrama gymnosophon labarem bacha bodamilomin.
> Volvala barchin heman la lavolvala dramme pagloni.

Looking suspiciously like a blend of morphemes from modern European languages, particularly Italian and Greek, these phrases are 'translated' into an English verse that takes up twice as many lines. Clearly the primary point is to emphasize the economy of the Utopian language and the poverty in which it can be only "rudely englished." The text ends with a note from "The printer to the reader," in which he apologizes for not reproducing the characters of the Utopian alphabet since, strange as they are, he does not have them yet.

By contrast, in his *Culture* novels, Iain M. Banks provides the graphology for his synthetic galactic language, Marain, but adopts the same strategy of withholding the lexicogrammar as being too advanced for contemporary readers:

> Those of you unfortunate enough not to be reading or hearing this in Marain may well be using a language without the requisite number or type of personal pronouns, so I'd better explain that bit of the translation.
>
> Marain, the Culture's quintessentially wonderful language (so the Culture will tell you), has, as any schoolkid knows, one personal pronoun to cover females, males, in-betweens, neuters, children, drones, Minds, other sentient machines, and every life-form capable of scraping together anything remotely resembling a nervous system and the rudiments of language. (Banks, 1988: 99)

Here, he gestures towards the language without actually revealing it. However, at the end of the novel, he does sign off the narrator using Marain graphology, the symbols of which comprise angular lines on a square grid and look to a nonreader like Japanese katakana graphemes. The alien writing is followed by the name of the narrator, and it is easy to work out that there is a phonetic correspondence between the symbol and the name.

In a note posted to several Internet newsgroups and which will appear in the second edition of his 1991 short story collection, *The state of the art*, Banks has worked out this systematic graphological system. A nine-bit binary code such as 'xooxxxxoo' can be drawn as a 3 x 3 grid:

xoo
xxx
xoo

This graph then resembles the Marain grapheme that looks like an alphabetical 'T' on its side – this represents the phoneme /w/. There are 512 possible symbols on the 3 x 3 grid, comprising all phonetic sounds articulatable by humanoids, plus mathematical operators and symbols for chemical elements and so on. Symbols can be rotated and mirrored, and similar symbols share phonetic properties. Further complexity can be achieved by increasing the 9-bit grid to a 16, 25, or larger size grid, and by cubing the grid into other dimensions. Banks adds that "while Marain was designed to be as quintessentially clear, concise and unambiguous a language as it is within the wit of human and machine to devise" it also "enables the Culture Minds fully to indulge their seemingly congenital predilection of unnecessary obfuscation, wilful contrariness and the fluent generation of utter and profound confusion in others." In spite of all the graphological specification, the lexicogrammatical workings of Marain remain hidden in the nature of the advanced technological utopia that is the Culture.

Some neographies, though, are worked out far beyond the requirements of the fictional world they occupy. The most famous are J.R.R. Tolkien's numerous constructed languages for the races of Men, Elves, Dwarves, Orcs and others in his fictional world most well-known through *The lord of the rings* series. Tolkien's invented languages include Telerin (the language of the Sea-Elves), Doriathrin (the mother tongue of Lúthien), Nandorin (the Green-Elven language), Khuzdul (the secret language of the Dwarves), Entish (the language of the tree-creatures, the Ents), Orkish, Adûnaic (the vernacular of Númenor), and the two most well-known and most developed, Quenya and Sindarin. Several of Tolkien's languages only have a few words and grammatical features (Entish is merely described as very long-winded and impossible to render in writing), but the last two are strongly reminiscent of Finnish and Welsh, and are fully worked out grammatically with large vocabularies. Quenya is High Elvish and Sindarin is Grey-Elven, with their own histories detailing their dialectal divergence and ultimately different linguistic patterns. Both have elaborate grammatical systems with a complex tense and aspect system, case inflections, and declensions, and rules for syntactic sequencing. Quenya, in particular, was designed for its aesthetic appeal, with Latin sounds blending with the Finnish-derived ones to reduce the number of consonants and so make the language sound more euphonious.

Clearly, Tolkien's invention becomes a scholarly activity beyond the artistic purpose of the novels, though it also adds a richness to the texture of his imagined worlds. The success of these inventions can be judged by the numbers of ardent enthusiasts still engaged in Elvish philology and in trying to piece together the development of Tolkien's linguistic imagination. These activities have also developed far beyond the boundaries of the fictional world in which they originated; and while they are not anywhere near natural languages, the Elvish languages approach a

degree of richness that raise them towards the level of auxiliary languages.

Functions and Assumptions of Invented Languages

In general, there are three broad functions of neographies in literature. The first function is elaborative: the language is present to lend an ornamental richness to the imagined landscape, and works essentially as detailed lyrical description. Klingon, in the *Star trek* universe primarily exists for elaborative purposes. Invented by linguist Mark Okrand for the film, Klingon is the language of an aggressive and war-like race and so it is marked by guttural, uvular phonemes that are felt to convey its harshness. Of course, this phonoaesthetic harshness is perceived only relative to English-speaking norms. Klingon has a dictionary and hundreds of speakers, and some Shakespeare plays have been translated. More eccentrically, portions of the Bible have been rendered into Klingon – directly from the Greek and Hebrew!

Secondly, invented language has an indexical function, which is to assist in the creation of the imagined world and increase the reader's sense of its plausibility. This function is indexical because it is one of the main mechanisms by which readers can determine the degree of accessibility between their own world and the imaginary world. A fully-fledged language helps to create a sense of realism and allows readers to build characters through a focalization in their own vernacular. Hergé's *Tintin* stories featured a Balkan country where Syldavian is spoken. This language was not fully developed by Hergé and includes some contradictory features, but it is drawn very clearly from Dutch and German. The language is being used to mark out the sense of difference and foreignness of the country, in relation to the French of Tintin and his readers.

Thirdly, neographies have an emblematic function in the sense that the language itself represents a thematically important idea. Newspeak, Utopian, Marain, and Brian Aldiss's psychedelic language are all thematically important carriers of the political polemic, comment, or satire of the works in which they feature.

Since most writers of literary fiction are not linguists, several of the assumptions on which their neographies are based do not correspond particularly well with modern linguistic orthodoxy. Most noticeable is the Sapir-Whorf hypothesis that seems to be held in its strongest possible form by many writers. Samuel Delany's *Babel-17* (1968) goes beyond Newspeak in imagining a language which, if learned, subverts the speaker's mind and makes them act traitorously without even realizing it. Neal Stephenson's (1993) *Snow crash* similarly imagines an ancient Sumerian language that is close to the linguistic infrastructure of human brains, which can be manipulated by 'neurolinguistic hackers' in order to 'crash' the mind of anyone who reads it. The literalness of the notion of deep structure and the linguistic determinism displayed in these texts is striking.

The norms for evaluations assumed by many English writers are always English language norms, so alienness is indexed by phonetic and lexicogrammatical systems that are exotic only in relation to English. This cultural specificity is not surprising but gives rise to many of the assumptions about phonoaesthetics that are manifest in invented languages.

Finally, it must be remembered that the literary context is an artistic one, where poetic license ought to be allowed. Fictional extrapolations in the dimension of linguistics seem to be evaluated in a more rigid way than comparable speculations in other sciences. It is striking that debates over linguistic patterns adopted by literary writers become very vehement, as if the language itself, even though imaginary in origin, has a status and reality of its own, and a life beyond the world in which it belongs.

See also: Back-Formation; Compound; Creativity in Language; Language Change, Intentional; Language Planning and Policy: Models; Languages for Specific Purposes; Neologisms; Newspeak; Phonetic Transcription: History; Possible Worlds: Stylistic Applications; Sapir, Edward (1884–1939); Semantic Change: Bleaching, Strengthening, Narrowing, Extension; Whorf, Benjamin Lee (1897–1941).

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Iordan, Iorgu (1888–1986)

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Iorgu Iordan was born the son of a modest family, on September 29, 1888 in Tecuci, a Moldavian town in Romania, and died on September 19, 1986. He studied German Language and Literature, and Law, and finished a Ph.D. on Modern Philology at the University of Iasi (1919) with a dissertation on Romanian phonetics.

From his contact in the early 1920s with other linguists (W. Meyer-Lübke, L. Spitzer, Ferdinand Brunot, Antoine Meillet, and Mario Roques, among others) in Berlin, Bonn, and Paris, but especially from the courses he followed with W. Meyer-Lübke, he became acquainted with the comparative method. This approach of the linguistic object he faithfully continued and developed in his career as a teacher and scholar. At the same time, his attention in his classes and research was increasingly being devoted to the "individual aspect of the evolution of the language," following an idealistic methodology à la K. Vossler. His friendship in Bonn with Leo Spitzer, who defended an idealistic stylistics, must have been of great importance to this development.

Once in Paris, the contacts with J. Gilliéron, whose seminars he attended, had a formative impact on Iorgu Iordan and increased his interest in the investigation about the individual and geographic facets of the language.

All these aspects and influences were absorbed into his scientific production. At least four books reflect the linguistic conceptions and guidelines of the prominent linguist that Iorgu Iordan was: *Rumänische Toponamastik* (Bonn-Leipzig, 1924), *Limba romînă actuala. o gramatica a 'greselilor'* (1943, rev. 1948), *Stilistica limbii române* (1944, rev. 1975), and *Introducere în studiul limbilor romanice. Evolutţia şi starea actuală a lingvisticii romanice* (1932, rev. 1962). The first has contributed in a special way to a better international knowledge of the Romanian language and has promoted its study at the level of the comparative studies of the Romance languages, earning him the epithet of patriarch of Romanian linguistics. The fourth, translated into many languages, has launched Iorgu Iordan as being among the most remarkable linguists. In this book, the author presents a complete, accurate, and objective critical review of the principal currents and its scholars that represent the linguistics scenario in the first half of the 20th century. Regarding the Romance languages, another important study was the reelaboration of the book *Introducere în linguistica romanică* (1957) in collaboration with Maria Manoliu-Manea, which was published with the same title in 1965. The Spanish edition of this book, *Manual de Lingüistica románica*, translated by Manuel Alvar (1972), has been an indispensable item in every bibliography concerning the Romance languages.

His numerous studies on the comparative aspects of the Romance languages did not prevent him from dedicating himself also to the specialized study of Spanish. In this respect, he also was responsible for the creation of the first chair of Spanish Studies in Bucharest.

In addition to his scholarly activities, Iorgu Iordan held various notable administrative positions. These included the presidency of national and international linguistic associations, ambassador (in Russia, 1945–1947), visiting professor, dean of the Faculty of Philology (1947–1950 and 1956–1957), rector of the University of Bucharest, and many others. However, the founding of the Institute of Linguistics of Bucharest, which he ran as director from 1949 to 1952 and later from 1958 to 1970, and the creation of a department concerned with the Romance Languages reveal his capacity and intuition as a scientific administrator. As a director of this institute, Iorgu Iordan was responsible for two major scientific projects: the coordination of the Dictionary of

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Rumanian, the so-called *Dicționarul Limbii române al Acadeemiei*, and the elaboration of the *Crestomația Romanică* (1962–1972). Many well-known Romanian linguists such as Maria Iliescu, Maria Manoliu-Manea, Sanda Reinheimer, and Marius Sala have collaborated on this last project.

As an international recognition of his scientific value, Iorgu Iordan was made honorary president, from 1968 onward, of the *Societé de Linguistique Romane*, which he cofounded; he was a member of the *Junta Directiva de la Asociación International de Hispanistas*, a collaborator on many Editorial Boards of Linguistic Journals, and *Doctor Honoris Causa* of several universities (Berlin, Gand, Rome, Montpellier, etc.).

As a first-class teacher and researcher, Iorgu Iordan also stood out as a source of knowledge and inspiration for his students. Many of them would become distinguished scholars working all over the world, nevertheless united by a tangible bond between them, once forged by their old teacher.

See also: Brunot, Ferdinand (1860–1938); Contact-Induced Convergence: Typology and Areality; Gilliéron, Jules (1854–1926); Lexicography: Overview; Meillit, Antoine (Paul Jules) (1866–1936); Meyer-Lübke, Wilhelm (1861–1936); Romance Languages; Spanish; Spitzer, Leo (1887–1960); Vossler, Karl (1872–1949).

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used for θ and *t*, respectively, but in a few manuscripts ⟨ṭ⟩ is *t* and ⟨ṭ⟩ is θ. Vowels are marked using the Syriac pointing system, which makes this the only variety of Sogdian script in which the crucial distinctions between *a-* and *ā-*, *ĭ* and *ĕ*, *ŭ* and *ŏ* are indicated in the script. Short *a* is noted also with other consonants, e.g., *wa*.

See also: Aramaic and Syriac; Avestan; Iranian Languages; Persian, Modern; Persian, Old.

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Iran: Language Situation

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Main Language Families

Three main languages families are spoken in Iran, covering discrete areas, but overlapping in places. This is facilitated by the thinness of the population in parts. The majority group in terms of number of speakers and geographical area is the Iranian group of the Indo-European family, spoken as original local languages over most of the country except in Azerbaijan and Khuzistan. The national language Persian (Farsi) was originally a dialect of the region of Fars and has a written history in the present alphabet of about 1000 years. It is spoken in all the main cities and in the northeast. Kindred dialects are those of Fars and of the Lur tribes of the south. Other Iranian varieties include (Schmitt, 1989: 294–295) (i) Kurdish in the west, (ii) Tati and Talishi in the north west, (iii) Gilaki and Mazandarani north of the Elburz mountains, (iv) Central dialects around Hamadan, Tehran, Isfahan, and Yazd, and (v) Baluchi in the southeast. Most of these are quite distinct from Farsi and not mutually intelligible with it. However, only Kurdish, Baluchi, and to a lesser extent Luri are usually accorded separate language status, because of the political power of their speakers. Kurdish and Baluchi are written languages. The next in size is the Turkic group, represented by Azeri in the north west (Azerbaijan), by Uzbek, spoken by the Turkomans in the northeast, by large numbers of Turkish speakers in Fars in the southwest, of particular importance being the tribal Qashqai and Khamse and in other localities, spreading round from northeast to southwest interspersed with the Iranian-speaking population. The two groups overlap considerably, this sometimes resulting from resettlement by previous governments. The third, the Semitic group, is represented by Arabic spoken in Khuzistan in the southwest and at various localities along the Gulf Coast, the Makran Coast and possibly also by some of the nomadic population of Fars among the Khamse. There are also Arabic speaking populations in the northeast around Sarakhs and in the east around Birjand. The above are all non-minority languages, spoken over large areas by native populations spanning the borders of Iran and neighboring states. Persian spreads into Afghanistan (known there as Darri) and Tadjikistan (known there as Tadjik). Turkic spreads into Turkey and Azerbaijan in the west, into Turkmenistan and other central Asian states in the northeast, and into Afghanistan in the east. Arabic spreads westward into Iraq. The population of the Persian Gulf islands speak Arabic or Persian or are bilingual.

Minority Languages

Minority languages, spoken by mainly, but not exclusively urban ethnic minorities include Armenian, an Indo-European language spoken by the Christian Armenians, Georgian, a Caucasian language spoken by the Georgian Christians, Syriac, a Semitic language spoken by the Nestorian Christian Assyrians (āšūrīhā) an Arabic dialect spoken by some of the Jewish population, akin to the *qiltu* dialects of Northern Iraq (Blanc, 1964: 7), and an Indo-European variety spoken by some of the Ghorbati or Kawli, the Gypsies of Iran, which may be a dialect of Persian.

Status of the Different Languages

Persian is the main medium of instruction in schools and is the language of the media and the administration. Turkic, Kurdish, Arabic, and Baluchi, however, are of considerable local importance, being the language of rural elites. The case of Arabic is slightly different since Khuzistan, being the major oil region, has undergone considerable immigration and urbanization, so that Arabic is heard more often in rural areas. Here we intend the spoken dialect, which is akin to the southern *gilit* type of Southern Iraq (Blanc, 1964: 7). The classical, literary language is accorded high esteem especially by the present regime because of its association with Islam. Persian is understood universally in the towns and widely in rural areas, but even after the efforts of the Pahlavi regime to universalize it by means of education and the media, it is not everywhere spoken or even understood in rural areas. Note also that the appellation Arab or Turk does not necessarily imply a language affinity, but may be only a political one, as with some of the 'Arab' tribes of Fars and Afghanistan who speak Persian or Turkish (Barth, 1961: 131). The main languages taught in schools are Classical Arabic, taught as a language of liturgy and scholarship, but not as a spoken tongue, and English. At an earlier stage, French was more common.

See also: Indo–Iranian; Persian, Modern; Turkmen.

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Iran: Scripts, Old Persian, Aramaic, Avestan

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Writing systems for Iranian languages include cuneiform (Old Persian); scripts descended from 'imperial' Aramaic (earliest monuments of Chorasmian, Sogdian, Parthian, and Middle Persian, as well as Avestan, derived from the Middle Persian script); two Syriac scripts, Estrangelo or 'Manichean' (Middle Persian, Parthian, Bactrian, Sogdian, Modern Persian) and 'Nestorian' (Christian Sogdian, Modern Persian); Hebrew (Modern Persian and local Persian dialects: Judeo-Persian); Arabic (Modern Persian, Chorasmian, Kurdish, Pashto, Balochi); Brahmi (Khotanese, Tumshuqese, Sogdian); Greek (Bactrian); Cyrillic (Ossetic, Tajik); Georgian (Ossetic); and Latin (Kurdish, Ossetic).

Old Persian Cuneiform

Old Persian is written in a cuneiform script, but with only a small number of signs. There are 3 vowel signs ⟨a, i, u⟩, 33 signs of the form 'consonant + vowel' (CV), 8 logograms, a word separator, and numerals. The CV signs contain the vowels *a*, *i*, or *u* ⟨Ca, Ci, Cu⟩, but the set of ⟨Ci⟩ and ⟨Cu⟩ signs is not complete. There are only 4 ⟨Ci⟩ signs and 7 ⟨Cu⟩ signs, and most of the ⟨Ca⟩ signs also have to serve for the missing ⟨Ci⟩ and ⟨Cu⟩ signs. Thus, crucial morphological distinctions such as the 3rd singular endings active *-tiy* and middle *-taiy*, both ⟨-ta-i-ya⟩, are not indicated. The ⟨Ca⟩ signs are also used where a consonant is followed by no vowel, before other consonants, or in word-final position (only *m*, *r*, and š).

The vowel signs ⟨a, i, u⟩ are used initially (when the word begins with a vowel). Medially, ⟨a⟩ is used to write long *ā*. The signs ⟨i⟩ and ⟨u⟩ are used medially to write short *i* and *u* and long *ī* and *ū*. They are preceded by the ⟨Ci⟩ and ⟨Cu⟩ signs whenever these exist. Very rarely in the attested corpus, ⟨Ci⟩ and ⟨Cu⟩ are used alone to indicate consonant plus *i* or *u*. In final position, they are followed by ⟨ya⟩ and ⟨va⟩ (*-ĭy, -ŭv*).

Certain sounds that are expected from the etymology of the words are not written in the Old Persian script, notably *h* before *u* and *m* and nasals before consonants, although they may be present both in transcriptions into other languages and in later stages of Persian:

h: *Ahuramazdā* is spelled ⟨a-u-ra-ma-za-da-a⟩, but ⟨a-ḫu-ru-ma-az-da-'⟩ in Akkadian; the Middle Persian form is *Ōhrmazd*; *ahmiy* 'I am' is spelled both ⟨a-mi-i-ya⟩ and ⟨a-ha-mi-i-ya⟩; with *tauhmā* ⟨ta-u-ma-a⟩ 'family', cf. Av. *taoxman*-'offspring', NPers. *toxm* 'seed'; and with *ahrīka* ⟨a-ra-i-ka⟩ 'on the side of the Evil one', cf. Mid. Pers. *ahrīmen* 'the Evil one';

nasals: *Kambŭjiya-* is spelled ⟨ka-ba-u-ji-i-ya⟩, but Elamite ⟨kán-bu-zi-ia⟩, Akkadian ⟨kam-bu-zi-ia⟩, Aramaic ⟨kmbwzy⟩, Greek *Kambúsēs*; with *bandaka* 'bondsman', spelled ⟨ba-da-ka⟩, cf. Middle Persian *bandag* 'servant'.

The script was therefore not quite phonemic. It is also not certain to what extent the written consonants were unambiguous; for instance, diachrony and synchrony suggest that ⟨ja⟩ may be for both /ǰ/ and /ž/, if these were separate phonemes. (See Table 1.)

Numerals

The numerals are simple: the unit is 𐎡 '1', 𐎡𐎡𐎡 is '3', etc.; 'ten' is 𐎻 (𐎻 𐎡𐎡𐎡𐎡𐎡 '19', etc.); and '20' is' 𐎼 (𐎼 𐎡𐎡𐎡 '27', etc.). The only higher numeral attested is 𐎡𐎡 𐎼 '120'.

Scripts Derived from Aramaic

All the Iranian scripts derived from Aramaic express vowels other than short *a* by means of *matres lectionis* as follows: ⟨'⟩ initially = short or long *ă*- (long initial *ā*- is often written ⟨''-⟩); between vowels = long *ā* (in the Sogdian script also short *a*).

⟨y⟩ and ⟨w⟩: between vowels = short or long *ĭ* or *ĕ* and *ŭ* and *ŏ*, respectively; in the Sogdian script ⟨'y⟩ and ⟨'w⟩ is used for *āy* and *āw* (also ⟨''y, ''w⟩) or instead of ⟨y, w⟩; in the Manichean script initial ⟨'y-⟩ *ĭ*- may be distinguished from ⟨'y⟩ *ē*-. In Christian Sogdian in the Nestorian Syriac script, vowel quality/quantity is sometimes indicated by vowel marks.

Scripts Derived from Imperial Aramaic

During the Achaemenid period (549–330 B.C.E.), Aramaic ('Imperial Aramaic') was used as the chancellery language, and the Aramaic script was subsequently, at the latest by the Parthian period (ca. 210 B.C.E.–224 C.E.), adopted by several Iranian states: Parthia, the local Persian dynasty, Chorasmia, and Sogdiana. There is a small corpus of Aramaic documents from Bactria from the 4th century B.C.E., and Aramaic was also used in the edicts of King Aśoka (3rd century B.C.E.) written in ancient Bactria and Gandhara (northern Pakistan).

From the early Parthian period (2nd–1st centuries B.C.E.) there are a number of inscriptions, some of which are clearly in Iranian languages, presumably Parthian (thus, e.g., the wine receipts from Nisa, east of the Caspian Sea), although the fact is obscured by

Table 1 The Old Persian syllabary

Ca		Ci		Cu	
𐎠	a	𐎡	i	𐎢	u
𐎣	ba				
𐎤	ca				
𐎥	ça				
𐎦	da	𐎧	di	𐎨	du
𐎩	fa				
𐎪	ga			𐎫	gu
𐎬	ha				
𐎭	ja	𐎮	ji		
𐎯	ka			𐎰	ku
𐎱	la				
𐎲	ma	𐎳	mi	𐎴	mu
𐎵	na			𐎶	nu
𐎷	pa				
𐎸	ra			𐎹	ru
𐎺	sa				
𐎻	ša				
𐎼	ta			𐎽	tu
𐎾	θa				
𐎿	va	𐏀	vi		
𐏁	xa				
𐏂	ya				
𐏃	za				
𐏈 𐏈 : (word dividers)					

Logograms

𐏂𐎠	XŠ = xšāyaθiya	𐏑	BU = būmiš
𐏒	DH1 = dahạyāuš	𐏓	AM1 = Auramazdā
𐏒𐏒	DH2 = dahạyāuš	𐏓𐏒	AM2 = Auramazdā
𐏔	BG = baga	𐏓𐏂	AMha = Auramazdāha

the extensive use of aramaeograms (heterograms, ideograms). Others are more likely to be in faulty bureaucratic Aramaic. By the 2nd century C.E., the official Parthian script had reached its standard form.

The Middle Persian variant, seen on the coins of pre-Sasanian kings, evolved in southern Iran in the late Parthian period and became the official script of the Sasanian empire (224–651 C.E.), seen in royal and private inscriptions from the 3rd to the 5th centuries. Variants of this script are found on the coins of the Sasanian kings. A more cursive variant of the Middle Persian script used for writing on paper is the so-called Psalter script, known from a fragmentary manuscript of the Psalms of David found in Chinese Turkestan. This script developed via a simplified epigraphic variant (known from funerary inscriptions) into the so-called (Book) Pahlavi script, used in the Zoroastrian books. The final stage is the almost indecipherable script used in the Pahlavi papyri and parchments of the late Sasanian early Islamic period.

The Avestan script is a composite script made on the basis of the Psalter and Book Pahlavi scripts.

The Chorasmian script is known from a few inscriptions; it was later replaced by the Arabic script.

The Sogdian script is known in three principal forms. The earliest form is used in letters written on paper and dating from the early 4th century C.E. and in a few short inscriptions from northern Pakistan. The common Sogdian script is a cursive variant found in secular documents and in Buddhist and Manichean manuscripts, of which two stages are distinguished: the 'formal' or 'sutra script,' and the more ambiguous 'Uighur' variant. (See Table 2.)

Use of Aramaic Letters

The Aramaic alphabet contained letters for numerous sounds not found in Iranian. Some of these were adopted to write sounds that were not found in Aramaic (⟨ṣ⟩ for Iranian *č* [tʃ] and ⟨ḫ⟩ for the fricative velar /x/; ⟨l⟩ in Sogdian for /δ/), but even so the Aramaic alphabet contained more letters than were needed, and ⟨ṭ, ʿ, q⟩ were never used in writing Iranian words (except with numerical values; differently in the Syriac scripts). In Middle Persian, ⟨l⟩ is used more often than ⟨r⟩ (= ⟨w⟩) to write *r*. In Aramaic documents from the mid-Parthian era, ⟨ḫ⟩ and ⟨ẖ⟩ are being confused, and, in Parthian and Middle Persian, ⟨ẖ⟩ is confined to final position in aramaeograms while ⟨ḫ⟩ is written elsewhere, regardless of their etymologies. Aramaic ⟨ẖ⟩ was also used in Parthian and Sogdian for the feminine ending *-ă̄*, which resembled the Aramaic ending *-ā*, but this became a mere convention when the ending was lost both in Parthian and in Sogdian in 'heavy' stems.

The Middle Persian Script

Typical of the development of the Middle Persian script is the ever-increasing merger of letters into the same shape, for example:

Inscriptions/Psalter	>	Pahlavi
⟨ʾ⟩ 𐡀 / 𐡁 and ⟨ḫ⟩ 𐡇 / 𐡄	>	𐭠
⟨w, ʿ⟩ 𐡅 / 𐡏, ⟨n⟩ 𐡍 / 𐡌, final ⟨-ȳ⟩ 𐡉 / 𐡊	>	𐭥
⟨ʾp⟩ 𐡐𐡀 / 𐡐𐡁 and ⟨ʾc⟩ 𐡒𐡀 / 𐡒𐡂	>	𐭩𐭥

Out of the 22 distinct letters of the Aramaic alphabet and the 18 of the inscriptions and the *Psalter*, the Pahlavi alphabet distinguishes only 12 letters, which have to do duty for 21. As we see from Table 3, some of these letters have at least two different orthographic values (Psalter forms in parenthesis). As the script

Table 2 The Main Iranian scripts developed from Aramaic and Syriac

Aramaic	Early Parth. (Nisa)	Parth. inscriptions	MPersian inscriptions	Pahlavi Psalter	Pahlavi	Sogdian Ancient Letters	Sogdian sutra script	Manich. Sogdian	Christ. Sogdian
ʾ									
b (β)									
g (γ)									
d									
h̲									
w									
z									
(j)/(ž)									
ḥ (x)									
ṭ									
Y (-ȳ)									
K (x)									
l (δ)									
m									
n									
s									
ʿ									
p (f)									
ṣ [c]									
q									
r									
š									
t									

The table contains a selection of initial, medial, and final variants.

is strongly cursive, there are numerous positional variants.

Of these, ⟨ʿ⟩ and ⟨q⟩, as well as ⟨h̲⟩ (= + ⟨m + w, n⟩) are found only in aramaeograms, transliterated as ⟨O, Q, E⟩, and ⟨Q⟩ is found only in ⟨QDM⟩ *abar* 'on'.

In Indian manuscripts, ⟨š⟩ is replaced by ⟨y'⟩.

To remedy the ambiguities, diacritical marks are sometimes used (not always etymologically correct): ⟨d⟩, ⟨g⟩, ⟨y⟩, ⟨ǰ⟩ (initial).

In practice, therefore, most of the time Pahlavi has to be read word by word or morpheme by morpheme, rather than letter by letter. For instance, *Ohrmazd*, inscr. ⟨'whrmzd⟩ became ⟨'whrmzd⟩ = ⟨'w'wm'⟩ = ⟨'nhwm'⟩ (hence the traditional Parsi pronunciation *anhuma*). The word *yazdān* 'god(s)', inscr. became ⟨yz̲d̲'n'⟩ = ⟨y''ww⟩, which was distinguished from *dēwān* 'demons', inscr. , Pahl. ⟨ŠDYAn'⟩ = ⟨š'''ww⟩ (= ⟨y''''ww⟩ with ⟨y'⟩ for ⟨š⟩) by the number of loops,

Table 3 The 12 distinct Pahlavi letters

	ʾ (ʾ), h (h)		z		p
	b		k		c
or	d (), g (), y ()		l		š
	w, ʿ, r (), n ()		m, q		t

which in the manuscripts are sometimes multiplied even further (, etc.). The word *mǎzdēsn* 'Mazdayasnian' is usually written like *mahist* ⟨mhyst'⟩ 'greatest' with ⟨yt⟩ for ⟨sn⟩.

The name of the devil, Ahrimen, is sometimes written up-side-down .

The Avestan Script

The Avestan script was invented probably sometime in the 6th century C.E. in order to write down the Avestan texts, which until then had been transmitted only orally. It is an alphabetical script, in which each allophone of the language as recited at the time corresponds to one letter. The earliest known forms of the Avestan and Pahlavi scripts are those of the 13/14th-century manuscripts and probably represent later developments of the original script. Some letters may have been added in the course of time. (See Table 4.)

The alphabet was based upon the official Pahlavi script, using diacritical marks (e.g., ⟨ī⟩ and ⟨ū⟩ from ⟨i⟩ and ⟨u⟩ and some letter forms from different stages of the Pahlavi script (e.g., Psalter ⟨d⟩). It has also been suggested that ⟨ə⟩ was adopted from Greek ε.

By the time of the earliest manuscripts, the original value of some of the letters was no longer known, notably, the distribution of the three sibilants ⟨š, ṣ, ś⟩ is not consistent in the manuscripts, and their values have been inferred on linguistic grounds. Several letters are found only in certain manuscripts (e.g., ⟨ń⟩ and ⟨ġ⟩). ⟨y, Y⟩, and ⟨v⟩ are used only initially, while ⟨uu⟩ and ⟨ii⟩ are used medially.

Syriac Scripts

Two forms of Syriac script were used for Iranian languages. The Manichean script, a modified estrangelo (sometimes, but probably apocryphally, ascribed to Mani), was used for Middle Persian, Parthian, Bactrian, Sogdian, and Persian (it was also used for the non-Iranian Tokharian and Old Turkish).

Table 4 The Avestan alphabet

a	ā	ą̊	å	ą
i	ī	e	ē	ə
u	ū	o	ō	ə̄
b	β	p	f	m
				^{h}m
d	δ	t	θ	n
			t̰	
g	γ	k	x	ŋ
ġ				
j		c		ń
Y-			ś	ŋ́
y-				
v-			x^{v}	$ŋ^{v}$
s	z		h	ṇ
š	ž			
ś				
ṣ				

The Nestorian script was used by the Christians at Turfan.

The Manichean Script

As in the Sogdian script, Syriac ⟨l⟩ was used to write *δ*. Diacritics were used to express specifically Iranian sounds, e.g., superscript double dots over ⟨b⟩ = ⟨*β*⟩, ⟨g⟩ with a loop = ⟨*γ*⟩. The only new letter, ⟨⟩, is commonly transliterated as ⟨ǰ⟩, while ⟨z⟩ with double dots is transliterated as ⟨ž⟩.

Initial sibilant + stop took a prosthetic vowel written ⟨ʿ⟩ (Mid. Pers. ⟨ʿsp'h̲⟩ = *əspāh* 'army', Parth. ⟨ʿsp'd⟩ = *əspāδ*). Words with *ē* or *ī* and *ō* or *ū* may be distinguished by the use of ⟨ʿ⟩ or ⟨'⟩ (e.g., Mid. Pers. ⟨'yg⟩ *ēg* 'then' versus ⟨ʿyg⟩ *ī(g)*, relative particle; ⟨zwr⟩ *zōr* 'strength' versus ⟨zʿwr⟩ *zūr* 'deception').

Sometimes, letters marking vowels are left out and the omission indicated by super/subscript dots (e.g., ⟨w⟩ with double dots for ⟨'wd⟩ *ud* 'and' and ⟨š⟩ with double dots for ⟨'wš⟩ *u-š* 'and he/by him/his'). In the Bactrian Manichean script, the double dots were used to distinguish the palatal *ś* and *ź* from the presumably palato-alveolar *š* and ž.

The Nestorian Script

This script included vowel marks and contains a new letter ⟨⟩ (corresponding to Man. ⟨⟩, but commonly transliterated as ⟨ž⟩). The letters ⟨t⟩ and ⟨ṭ⟩ are most often

used for θ and t, respectively, but in a few manuscripts ⟨ṭ⟩ is t and ⟨t̰⟩ is θ. Vowels are marked using the Syriac pointing system, which makes this the only variety of Sogdian script in which the crucial distinctions between *a-* and *ā-*, *ĭ* and *ĕ*, *ŭ* and *ŏ* are indicated in the script. Short *a* is noted also with other consonants, e.g., *wa*.

See also: Aramaic and Syriac; Avestan; Iranian Languages; Persian, Modern; Persian, Old.

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Iran: Language Situation

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Main Language Families

Three main languages families are spoken in Iran, covering discrete areas, but overlapping in places. This is facilitated by the thinness of the population in parts. The majority group in terms of number of speakers and geographical area is the Iranian group of the Indo-European family, spoken as original local languages over most of the country except in Azerbaijan and Khuzistan. The national language Persian (Farsi) was originally a dialect of the region of Fars and has a written history in the present alphabet of about 1000 years. It is spoken in all the main cities and in the northeast. Kindred dialects are those of Fars and of the Lur tribes of the south. Other Iranian varieties include (Schmitt, 1989: 294–295) (i) Kurdish in the west, (ii) Tati and Talishi in the north west, (iii) Gilaki and Mazandarani north of the Elburz mountains, (iv) Central dialects around Hamadan, Tehran, Isfahan, and Yazd, and (v) Baluchi in the southeast. Most of these are quite distinct from Farsi and not mutually intelligible with it. However, only Kurdish, Baluchi, and to a lesser extent Luri are usually accorded separate language status, because of the political power of their speakers. Kurdish and Baluchi are written languages. The next in size is the Turkic group, represented by Azeri in the north west (Azerbaijan), by Uzbek, spoken by the Turkomans in the northeast, by large numbers of Turkish speakers in Fars in the southwest, of particular importance being the tribal Qashqai and Khamse and in other localities, spreading round from northeast to southwest interspersed with the Iranian-speaking population. The two groups overlap considerably, this sometimes resulting from resettlement by previous governments. The third, the Semitic group, is represented by Arabic spoken in Khuzistan in the southwest and at various localities along the Gulf Coast, the Makran Coast and possibly also by some of the nomadic population of Fars among the Khamse. There are also Arabic speaking populations in the northeast around Sarakhs and in the east around Birjand. The above are all non-minority languages, spoken over large areas by native populations spanning the borders of Iran and neighboring states. Persian spreads into Afghanistan (known there as Darri) and Tadjikistan (known there as Tadjik). Turkic spreads into Turkey and Azerbaijan in the west, into Turkmenistan and other central Asian states in the northeast, and into Afghanistan in the east. Arabic spreads westward into Iraq. The population of the Persian Gulf islands speak Arabic or Persian or are bilingual.

Iranian Languages

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Iranian languages have been spoken for 3000 to 4000 years in various parts of southern Russia and the Caucasus, Central Asian republics, Xinjiang, Afghanistan, Pakistan, Iran, Iraq, and Turkey, as well as in the diaspora. The language spoken by the largest number of people today is (New) Persian (*see* **Persian, Modern**), or Farsi. Iranian languages are closely related to the Indo–Aryan (*see* **Indo–Aryan Languages**) languages, with which they constitute the Indo–Iranian (*see* **Indo–Iranian**) subgroup of the Indo–European language family, to which most European languages also belong.

The Iranian languages are known from three main periods, commonly classified as Old, Middle, and New (modern) Iranian. Historically, this division corresponds roughly to (1) the pre-Achaemenid and Achaemenid period (down to ca. 300 B.C.E.), (2) the period down to the Arabic invasion of Iran and the spread of Islam (7th century C.E. in the west, up to 11th and 12th centuries C.E. in the east), and (3) the Islamic period.

Iranian languages are written in a large variety of ancient and modern scripts (*see* **Iran: Scripts, Old Persian, Aramaic, Avestan**).

Old Iranian Languages

Avestan (*see* **Avestan**), the language of the Avesta, was spoken in areas of Central Asia, Afghanistan, and eastern Iran from the 2nd millennium till about 500 B.C.E. Two stages of the language are known, the older of which is comparable to the oldest Indic seen in the Rigveda and was therefore probably spoken about the mid 2nd millennium B.C.E., while the younger is comparable to Old Persian and was probably spoken ca. 1000–500 B.C.E. The Avestan texts were transmitted orally for 1000 to 2000 years and written down only in about the 6th century C.E.; the earliest manuscripts date from the 13th century. Its phonetic form is therefore that of the latest oral transmitters. The present Avestan corpus is relatively small.

Old Persian (*see* **Persian, Old**), ancestor of Middle and New Persian, was spoken in southwestern Iran in the first half of the 1st millennium, till about 400 B.C.E. It was the official language of the Achaemenid dynasty and was written in a cuneiform script. The Old Persian corpus is quite small.

Numerous words in the Old Persian inscriptions have a phonetic form different from what is considered to be genuinely Old Persian. It is assumed these are from Median, a language spoken to the north of Old Persian, of which no texts survive.

Middle Iranian Languages

Khotanese (*see* **Khotanese**), spoken in the kingdom of Khotan in southwestern Xinjiang, is known from a variety of texts dating from about the 6th century to the end of the 10th century C.E. Tumshuqese, spoken in Kucha in northwestern Xinjiang, is known from the same type of sources, but much less well. These two languages were written in the southern and northern variants of Brahmi, respectively.

Sogdian (*see* **Sogdian**), spoken in Sogdiana, modern Central Asia, is known from texts dating from the 4th to the 10th century. It was written in Sogdian, Manichean, Syriac, and, occasionally, northern Brahmi scripts.

Chorasmian (*see* **Chorasmian**), spoken in the Chorasmian state along the upper Oxus/Syr Darja as late as the 14th century, is known from inscriptions, coins, and interlinear glosses in two Arabic works, a legal work and a dictionary. It was originally written in Chorasmian, later in Arabic script.

Bactrian (*see* **Bactrian**), spoken in the Greco–Bactrian kingdom founded by soldiers of Alexander the Great in northern Afghanistan, is best known from royal inscriptions and private documents dating from the 2nd to the 8th century. It was written in lapidary and cursive Greek and in Manichean scripts.

Parthian, spoken in the Parthian kingdom to the northeast of the Caspian Sea, is known from inscriptions, letters, economic and legal documents, and Manichean texts dating from about the 1st century B.C.E. to the 10th century. It was written in Parthian and Manichean scripts.

Middle Persian (also Pahlavi; *see* **Pahlavi**), was spoken in southwestern Iran and became the official language of the Sasanian dynasty. It is known from a large variety of texts, notably Zoroastrian texts, dating from about the 1st century B.C.E. to the 13th century, although it had been replaced by modern Persian as a spoken language by about the 8th century. It was written in Middle Persian and Manichean scripts.

New Iranian Languages

This section addresses the main literary languages spoken today, many of them now also in the diaspora, especially in Europe and America.

Various forms of Persian (*see* **Persian, Modern**) are spoken throughout Iran, Afghanistan, Tajikistan, and in adjacent areas. It is written in Arabo–Persian, Cyrillic (Tajik), and Hebrew scripts (Judeo–Persian).

Ossetic (ossette) is spoken in Ossetia, in the southern Caucasus, in two main variants, Digoron (the more archaic) and Iron, with subvariants. It is written in the Cyrillic script, except in the south, where Georgian is used.

Kurdish (northern, central, and southern) is spoken in three principal variants in eastern Turkey and Syria, northern Iraq, and western Iran, as well as in surrounding areas. It is written in a modified Persian or standard Turkish Latin script.

Balochi (*see* **Balochi**; or Baluchi, in several dialects) is spoken in eastern Iran and western Pakistan, but also in southern Afghanistan and Central Asia. It is written in the Arabo–Persian script.

Pashto (*see* **Pashto**; several dialect groups) is spoken mainly in Afghanistan and Pakistan. It is written in the Arabo–Persian script.

All the modern languages contain a large number of Arabic words and a smaller number of Turkish words. The easternmost dialects have also borrowed extensively from Indic languages. Differently, Ossetic has borrowed extensively from the neighboring Caucasian languages.

Nonliterary languages and dialects comprise the following:

Northwestern and central Iran: Taleshi on the western shore of the Caspian Sea and Tati dialects from Iranian Azerbaijan through the Central Province and into Gilan; the Caspian dialects (Gilaki in Gilan, Mazanderani, and several dialects on the northern edge of the great salt desert, the Dasht-e Kavir); Gurani (Bajelani) and (including Awromani) in eastern Iraq and western Iran; and Zaza (Dimli) in eastern Turkey; and the Central dialects, comprising a number of more or less interrelated dialects spoken north and south of the Dasht-e Kavir.

Southwestern and southern Iran: Lori (Luri) (in several varieties) and Bakhtiari; Fars dialects; Larestani (in several dialects) in Larestan; dialects in the area from Bandar-e ʻAbbas (Bandari) and Hormoz to Minab and Bashkardi in Bashakerd; and Kumzari on the Musandam peninsula across the Strait of Hormoz (it is unknown whether this is spoken today).

Afghanistan and Central Asia: Parachi and Ormuli (Ormuri) in central Afghanistan and across the border in Pakistan; Ishkashmi and Sanglechi to the west of the Wakhan corridor; Yidgha and Munji/Munjani in eastern Afghanistan and western Pakistan respectively; the Yazghulami-Shughni (Yazgulami-Shugni) group in northern Afghanistan and Central Asia, including Sarikoli in western Xinjiang; Yaghnobi (Yagnobi) in the Yaghnob valley in Tajikistan; and Wakhi in the Wakhan corridor in northeastern Afghanistan.

Genetic Relationships among the Iranian Languages

Only the Persian languages are descended in a more or less direct line. Of the other dialects, the following are more closely related than others: Yidgha–Munji and Bactrian; Yaghnobi and Sogdian; and Wakhi and Khotanese.

Characteristic Phonological Features of Iranian Languages

Phonetic developments differentiating Iranian from its Indo-Iranian ancestor and so also distinguishing it from Old Indic include the following (*see also* **Indo–Iranian**):

1. Indo-Iranian *s* after vowels became Iran. *h* (e.g., OInd. *asura-*, Av. *ahura-* ʻlordʼ).
2. Voiced aspirated stops and affricates lost the aspiration (e.g., OInd. *bhara-*, OIran. *bara-* ʻcarryʼ; OInd. *dhā-* ʻto placeʼ and *dā-* ʻto giveʼ, OIran. both *dā-*; Indo-Iran. *$*\check{j}^h$ an-* ʻstrikeʼ > OInd. *han-*, Av., OPers. *jan-*).
3. Indo–European palatal velars (*$\hat{k}$, $\hat{g}$, $\hat{g}^h$*) and palatalized velar stops (*k^y, g^y, g^{yh}*) developed differently in Indic and Iranian (approximate phonetic values: *ś* [ʃ], *ć* [tʃ], *ź* [ʒ], *ǵ* [dʒ], *š* [ʂ], *č* [tʂ], *ž* [ʐ], *ǰ* [dʐ>]):

IEur.	proto-IIr.	OInd.	proto-Ir.
*$\hat{k}$, $\hat{g}$, $\hat{g}^h$	*ć, ǵ, $ǵ^h$	ś, č, h	*ć, *ǵ, *ǵ
*k, g, g^h	*k^y, g^y, g^{yh} > *č, ǰ, $ǰ^h$	č, č, h	*č, *ǰ, *ǰ

4. The Indo-Iranian unvoiced stops *p, t, k* became spirants *f*, *θ*, *x* before other consonants, including original laryngeals (*H*) (OInd. *cakra-*, Av. *caxra-* ʻwheelʼ; OInd. *trita-*, Av. *θrita-* ʻthirdʼ; OInd. *priya-*, Av. *friia-* ʻdearʼ; Indo-Iran. **ratHa-*, OInd. *ratha-*, Av. *raθa-* ʻchariotʼ; but **pt* → **pt* > Av. *pt*: Av. *hapta* ʻseven,ʼ NPers. *haft*).
5. The geminated dentals *-tt-*, *-$dd^{(h)}$-* (*-t^st-*, *-$d^zd^{(h)}$-*) became *-st-*, *-zd-* (OInd. *vitta-*, Av. *vista-* ʻfoundʼ < *vid-*; OInd. *addhā* ʻtruly,ʼ OPers. *azdā* ʻwell-knownʼ).
6. Indo–Iranian laryngeals remained between vowels but were lost between consonants (Iran. **daHah* ʻgift,ʼ OAv. *da'ō*, spelled *då*; Indo–Iran. **pHtar-* ʻfatherʼ > OAv. *ptar-*, OInd. *pitar-*), although a vowel was inserted (or the vocalized laryngeal kept) in initial groups (YAv., OPers. *pitar-*).

Proto-Iranian in turn split into several distinct dialect groups characterized, among other things, by the developments of the palatal affricates *ć, ǵ* and the groups *ćw* and *ǵw*.

Proto-Ir.	SW-Iran.	Central-Iran.	NE-Ir.
*ć, ǰ	θ, d	s, z	s, z
*ćw, ǰw	s (θ), z	sp, zb	ś, ź

To the southwestern group belong the Persian languages and the other languages of southwestern and southern Iran (Bakhtiari and Lori, Fars dialects, Larestani, and Bashkardi). To the northeastern group belong Khotanese and Wakhi. All the others belong to the central group. Examples: Indo–Iran. *daća '10,' OPers. *daθa, Av. *dasa*, Khot. *dasau*; Indo–Iran. *aǰʰam 'I,' OPers. *adam*, Av. *azəm*, Khot. *aysu*; Indo–Iran. *aćwa- 'horse,' OPers. *asa-*, Median, Av. *aspa-*, Khot. *aśśa-*, Wakhi *yīš*; Indo-Iran. *-ijwā(n)- 'tongue,' OPers. *hizān-*, MPers. *izbān*, Khot. *biśāa-* /βiźāa-/.

Characteristic Features of Morphology and Points of Syntax

Avestan and Old Persian are still of the Indo–European type (like Greek, Old Indic), with complex morphologies.

In the nominal and pronominal systems, Old and Young Avestan have three numbers (singular, dual, plural), eight cases (nominative, accusative, genitive, dative, instrumental, ablative, locative, vocative); in Old Avestan, the ablative singular has a distinct ending only in the *a*-declension (*-āt̰*), while in Young Avestan, the final *-t̰* is found in all declensions. Old Persian has only six cases and was also losing dual forms.

The Avestan verbal system is based on three stems: present, aorist, and perfect (e.g., *kar-* 'to do': PRES *kərənao-*, AOR *kar-/car-*, PERF *ca-kar-*). All the Indo-Iranian moods are preserved. There is a past participle in *-ta-* (e.g., *kərə-ta-*) and several infinitives. In Old Avestan, the three stems are associated with different aspects: not completed event (present, imperfect, injunctive); completed event (aorist); present result of past event (perfect). In Young Avestan and Old Persian, the aspect system survives mainly in modal forms; in Old Persian, aorist modal forms form a suppletive paradigm with present forms. The Young Avestan present injunctive (present stem with secondary endings) and the Old Persian imperfect (augment plus present stem with secondary endings) became general narrative tense, expressing continuous or punctual actions and events, as well as anteriority, depending on context (YAv. *kərənaom* [*-aom* < *-aw-am*] 'do-1ST.SING,' OPers. *a-kunav-am* 'PAST-do-1ST.SING' = 'I did, (when . . .) I had done.'

An innovation common to Young Avestan and Old Persian is the optative used (with or without augment) to express habitual actions or events in the past (YAv. *apataiiən* < *a-pat-aiy-ant* 'PAST-fall-OPT-3RD.PL' = '(the demons) used to run about'; OPers. *avājanyā* < *ava-a-jan-yā-t* 'down-PAST-strike-OPT-3RD.SING' = 'he used to kill'). This usage continues in several Middle Iranian languages.

Old Persian is in the process of developing a split-ergative verbal system, with an ergativic perfect tense contrasting with the ancient imperfect (*a-kunav-am* 'PAST-*do*-1ST.SING' = 'I did/had done' versus *manā kar-t-am* 'I.GEN-DAT do-PAST.PART-NOM.SING. NEUT' = 'I have done [it]').

The Middle and New Iranian languages exhibit a variety of developments that represent smaller or greater innovations compared with Old Iranian.

Points of Historical Phonology

We may distinguish between languages with conservative phonologies, characterized by the survival of surd stops and affricates after vowels (comparable to Italian in this respect), and languages where these are voiced or dropped (comparable to Spanish and French). Sogdian and Balochi are of the former type, the others at various stages of the latter.

Final syllables are lost to various degrees, e.g., OIran. NOM.SING *aćw-aʰ 'horse': Av. *asp-ō*, OPers. *as-a*, Khot. *aśś-ä*, Sogd. *asp-í*, Parth., MPers., NPers. *asp*, Pashto *ās*.

The Indo–Iranian syllabic *r* <r̥> developed differently from *ar* in most languages (Av. <ərə>, OPers. <ar>, MPers. *ir/er, ur*, etc.; e.g., Av. *zərəδaiia-* 'heart,' Parth. *zirδ*, MPers. *dil* [*-rd* > *-l*]; Av. *mərə-ta-* 'dead,' OPers. *mar-ta-*, MPers. *murd*).

All the Old Iranian diphthongs were monophthongized. Fronting and backing of vowels (umlauting) is common in both diachrony and synchrony.

In Chorasmian, Khotanese, and many modern East Iranian languages, the old palatal affricates *č* [tʃ] and *ǰ* [dʒ] became dental affricates *c* [ts] and *j* [dz], while new palatal affricates developed from the velar stops by palatalization.

The groups *xt, ft* became *γt, βt* (with various further developments) in Ossetic and eastern languages (Av. NOM.SING *duxt-a* 'daughter,' Sogd., Chor. *δuγd-á*, Khot. *dūt-a* /δūd-a/, Bactr. <logd-a> = *lugd-a*, Pashto *-lə́* [< *luw in *tər-lə́* 'uncle/aunt's daughter']; MPers. *haft* '7,' Sogd. *aβt*, Khot. *hauda*, Pashto *owə́*, Shughni *ūvd*, Wakhi *ib*).

Some modern East Iranian languages also have retroflex series, e.g., sibilants *š* [ʃ], *ṣ* [ʂ], *ž* [ʒ], *ẓ* [ʐ]; affricates *ts, tš, tṣ, dz, dž, dẓ*, etc. In Pashto, the phonetic realization of the retroflex sibilants defines four dialect areas, going from southwest to northeast: *pašto, paṣto, paxto, paxto*.

The development of consonant groups is especially varied:

θr: OPers. *ç*, MPers., etc., *s*; Sogd. (and several mod. dialects) *š*; Khot. *dr-*,*-r-*; Parth., Bactr. *hr*; Ossetic *rt* (e.g., OIran. NOM.SING **puθr-ah* 'son': OPers. *puç-a*, MPers. *pus*, NPers. *pesar* [changed after *pedar* 'father']; Sogd. *pəš-í*, Khot. *pūr-ä*, Parth. *puhr*, Bactr. <pouro> = *puhr*; Oss. *firt*; OIran. **θrāi̯ah* 'three': MPers. *sē*, NPers. *se*; Sogd. *šē*; Khot. *drai*; Parth. *h(e)ray*, Bactr. <uarēio> = *harēy*, Shughni *aray*; Oss. *ærtæ*, Wakhi *truy*; Munji *x̌iray*).

rs: remains in Ossetic and several eastern languages but commonly becomes *š* in western languages; Pashto and some others have *ṣt* (e.g., **pr̥sa-* 'ask,' Pashto *puṣt-*); the Shughni group has variously *x̌c, ws* (Shughni *pex̌c*, Roshani *paws-*).

rt: frequently remains or becomes *rd* (Wakhi *mərt* 'dead', MPers. *murd*); it becomes retroflex *ṭ* [ʈ] in several eastern languages (e.g., Khot. *muḍa-*), which further becomes retroflex flap *ṛ* [ɽ] (e.g., Pashto *mṛə*), or loses retroflexion and becomes *d* or *g* (Shughni *mūd*, Roshani *mɛwg*).

št: Oss. *st*; Bactr., Pashto *t*; Shughni group *x̌t*; Yidgha-Munji *šk*^{y}, *šč* (Av. *ašta* 'eight,' OPers. *aštā*, MPers., NPers. *hašt* [with *h-* from *haft* 'seven'], Bactr. <atao> = *ata*, Pashto *atə́*, Shughni *wax̌t*, Yidgha *aščo*).

Points of Historical Morphology and Syntax

Three genders are still found in Sogdian and Khotanese. Two genders are found in Bactrian and Chorasmian and in many modern languages. Persian and many modern languages have no gender.

The dual remains in Sogdian and Chorasmian. The numerative forms used only after numerals in Sogdian and Pashto incorporate old dual forms.

In several Middle and New Iranian languages, marked plural forms are restricted to animate nouns or are used to express individuality.

Definite articles from demonstrative (or relative) pronouns are found in Sogdian, Bactrian, Chorasmian, and Ossetic. In the modern languages, indefiniteness is usually expressed by a suffixed 'one.' Definiteness (topicalization, etc.) is expressed in a variety of ways (which is addressed later, in the section on direct object marking).

The western languages (Middle Persian, Parthian, Bactrian) have reduced the older, six-case system to a two-case system (direct case for the older nominative and accusative[?] and oblique for the other cases), while the eastern languages (Tumshuqese, Khotanese, Sogdian) preserve the Old Persian-type six-case system. In several declensions in Sogdian, in Chorasmian, and in the later stages of Khotanese, the nominative and accusative singular are no longer distinguished (exceptions in the pronouns). Several modern languages preserve the two-case system, sometimes with the addition of one or more local cases. Balochi and other eastern languages have nominative, genitive (possessive), oblique, and a case for the direct/indirect object. Ossetic, to some extent influenced by Caucasian languages, has the largest number of cases, including nominative, genitive, and dative (grammatical cases) and (local cases) allative, ablative, inessive, adessive, equative (expressing language and likeness), and comitative (only Iron).

In Sogdian, a system of light versus heavy stems developed: stems containing at least one long vowel or a diphthong (including *ar, an, am*) attracted the stress, causing loss of short final vowels (e.g., NOM.SING *asp-í* 'horse,' LOC.SING *asp-yá*, versus NOM.SING *mə́θ* 'day,' LOC.SING *mə́θ-ī*; IMPERF.3RD.SING *wan-á* 'did' versus *wēn* 'saw').

Several Middle and New Iranian languages use affixes to mark the direct object, depending on degree of specificity and definiteness. The most common contrast is unmarked = indefinite versus marked = definite. The markers are of three main types, all older indirect object markers: (1) ending derived from older case ending (usually *-e*, *-i*); (2) from older prepositions meaning 'to' (Manichean Parthian [less commonly Middle Persian] *ō* and Bactrian *abo* from OIran. *abi* 'to([ward])'; Bashkardi *be-* from OIran. *pati* 'to([ward])'); (3) from older prepositions meaning 'from, on account of,' etc. NPers., Balochi *-rā* [from OPers. *rādiy* 'on account of,' MPers. *rāy*, indirect object marker]; Shughni group *a(z)-* [OIran. *hača* 'from']).

In the eastern Middle Iranian languages, as well as in several modern East Iranian languages, the noun has two distinct declensions, one going back to the old vocalic stems, the other to extended *ka*-stems (feminine variously, *kā-, kī-, čī-*, and, analogically, *čā*-stems).

The western languages (Middle Persian, Parthian, Bactrian) continue, to varying extents, the Old Persian use of the relative pronoun as relative particle or *ezafe* (Mid. Pers. *ī*, Parth. *čē*, Bactr. *i-*). In New Persian and related dialects, the use of the ezafe is common. The so-called inverted ezafe found in some languages is the oblique case, e.g., Mazanderani *pēr-e kiya* 'father-OBL house' = 'the father's house.' Possession is of the type 'I have' or 'for me is.'

In verb morphology, innovations include the development of new marked present (continuous) tenses and the restriction of the unmarked old present to, sometimes remarked, modal functions; restructuring of the stem systems into pairs of intransitive-passive and transitive–causative verbs; the restructuring of the past tense systems by the addition of the new

perfect system seen in Old Persian; and, when this becomes the regular past narrative tense, the creation of a new perfect system, using various strategies.

Continuous or progressive tenses are marked already in Sogdian, where a particle meaning 'being' is added to the personal forms (*δār-am-skun* 'hold.PRES-1ST.SING-PROG' = 'I am holding'). In Khotanese, petrified participles meaning 'sitting,' 'standing,' 'going' probably modify the verb in the same sense. In the modern languages, a variety of affixes are found. In Persian and the southwestern dialects, we find prefixes originally meaning 'always' (Class. NPers. *hamē* and *mē-*, NPers. *mī-*; Bakhtiari and Lori *ī-* and *ei-*). The Tati and Caspian dialects use a present participle in **-ende* + copula (e.g., **kun-ende-ī* > *kennī* 'do-PRES.PART-COP.2ND.SING' = 'you are doing, you do'). Several languages use constructions of the type 'be in doing': Gilaki *kār-a āmon dar-a* 'work-CONN come.INF in-COP.3RD.SING' = 'he is coming'; Larestani *a-kerdā-em* 'a-doing I am, I am doing'; NBashk. *a-kerdén-om*, SBashk. *be-kért(én)-īn*; Balochi *raw-ag-ā int* 'a-go-ing he is, he is going'. Some eastern languages use a suffix derived from 'stand' (Yaghnobi *-išt*, e.g., *šáw-om-išt* 'go-1ST.SING-CONT' = 'I am going,' imperf. *a-šáw-i-m-išt* 'PAST-go-IMPERF-1ST.SING.CONT' = 'I was going').

The old present acquires modal functions and can be marked (e.g., NPers. subjunctive *kon-am* 'do-1ST.SING' or *be-kon-am* 'SUBJ.do-1ST.SING' = 'I may do').

The imperfect is still characterized by the augment in Middle Persian (only example *a-ger-īy* 'PAST.do-PASS.3RD.SING' = 'was made,' cf. OPers. *a-kar-iya*), Chorasmian, Sogdian, and Tumshuqese (*a-cchu* 'I went'), and in modern Yaghnobi (*a-kún-i-m* 'PAST-do-IMPERF-1ST.SING' = 'I did'). In Chorasmian and Sogdian, the augment is lost in verbs without original prefix; in verbs with prefix, the augment appears as lengthening of the vowel of the original prefix (e.g., Sogd. *θβar-*, IMPERF *θ-ā-βar-*, Chor. *haβir-*, IMPERF *h-ā-βir-* 'gave,' cf. OPers. *frā-bara* < *fra-a-bara* 'forth-PAST-carry-3RD.SING' = 'he gave') or as *m-* (e.g., Sogd. *m-anγaz-* 'began', Chor. *m-ikk-* 'did', analogically from forms with prefix *ham-*, cf. OPers. *ham-a-taxša-iy* 'PREV-PAST-labor-1ST.SING.MID' = 'I labored'). Several modern languages and dialects have imperfects with a suffix *-i-*, which may continue the Old Iranian preterital optative (e.g., Yaghnobi IMPERF *a-šáw-i-m* 'I was going,' PRES.SUBJ *šáw-om* '(that) I go').

In Middle Persian, Parthian, and Bactrian, the (narrative) past tense system (completed action) is based on the older split ergative seen emerging in Old Persian; Sogdian and Choresmian instead use the auxiliary 'to have' in transitive constructions and 'to be' in intransitive ones (Sogd. *ək^{r}-t-u-δār-am* 'do.PAST-ACC.NEUT.SING-have.PRES-1ST.SING' = 'I did, I have done'); and Khotanese has a form with an originally active (possessive) participle plus 'to be' (*dä-t-aimä* 'see-PAST-1ST.SING.MASC' = 'I saw, I have seen' < **dīta' āh ahmi* 'having-seen I am'). As the old original perfect replaced the inherited imperfect (injunctive) as past narrative tense, new strategies were invented to express the perfect. The most common is the use of a past stem extended by *-ag* > *-e*, etc. (NPers. *kárd-am* 'I did', *kard-é-am* 'I have done') or *-ss-* (from the older 'stand'; Larestani *če-d-e* 'go-PAST-PERF.3RD.SING' = 'he has gone,' but *če-ss-em* [*-d-s-* > *-ss-*] 'go-PAST.PERF-1ST.SING' = 'I have gone,' Kumzari *zur-s-e* [*zur-* < *zat-*] 'he has struck').

Punctual aspect is often marked by the prefix *b-* or similar, which also marks modal functions in many modern Iranian languages.

The old modal forms were generally preserved in Middle Iranian: subjunctive, optative, and imperative everywhere; the injunctive (with various modal functions) in Chorasmian, Sogdian, and Khotanese. In the modern languages, old modal forms survive as archaisms (NPers. *zende b-ād* 'alive be.3RD.SING.SUBJ' = 'long live!'), and, instead, modal functions are left unmarked in contrast to the marked present (continuous) or are marked by a prefix, often *b-*.

Directional prefixes are common, more or less closely connected with the verb. For instance, the Late Khotanese adverbs *vā*, *ttā*, *hā* and the Pashto prefixes *rā, dər, wər* indicate the direction of the action or movement toward first, second, or third person and can also simply substitute for the personal pronouns. Ossetic has a complex system of spatial prefixes indicating the direction of the motion relative to location and speaker.

See also: Avestan; Bactrian; Balochi; Chorasmian; Indo–Aryan Languages; Indo–Iranian; Iran: Scripts, Old Persian, Aramaic, Avestan; Khotanese; Pahlavi; Pashto; Persian, Modern; Persian, Old; Sogdian.

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Iraq: Language Situation

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The Republic of Iraq is home to a variety of different ethnic groups who speak different languages. Of the total 25 374 691 population (2004 census), it is estimated that 75 to 80% of the people are Arabs; 15 to 20% are Kurds; and the remainder, about 5%, is made up of Turkmans, Assyrians, Armenians, and other relatively small groups.

Arabic is the official language of Iraq and is regarded as the mother tongue of more than three-quarters of the population. The written language is a modified version of Classical Arabic, but a diverse set of spoken varieties of Arabic are used. Different dialects of Arabic spoken in Iraq include Mesopotamian Arabic (with almost 12 million speakers), with the alternate names Iraqi Arabic or Furati; North Mesopotamian Arabic, also known as Syro-Mesopotamian Vernacular Arabic, Moslawi, or Mesopotamian Qeltu Arabic; Gulf Arabic, also known as Khaliji, with the dialect Zubair Faau; Judeo-Iraqi Arabic, a greatly endangered dialect, also known as Iraqi Judeo Arabic, Baghdadi Arabic, or Yahudic; and Najdi Arabic, spoken in the south between the rivers up to the Syrian border, with the dialects North and Central Najdi.

Generally, there are two broad groups of spoken Arabic: (a) The spoken Arabic of the Muslims of central and southern Iraq, which can be divided into two subgroups: urban and rural/nomadic. It resembles Gulf Arabic. The Muslim Arabic dialect of Baghdad belongs to this group, and acts as a lingua franca. (b) The spoken Arabic of non-Muslim Arabs, as well as of Muslim Arabs in the north, notably in the province of Mosul. This dialect has marked similarities with some Syrian sedentary dialects.

Iranian languages are the second most commonly used in Iraq. Both Northwestern and Southwestern Iranian languages are used. Among these languages, Kurdish [Kurdi] has the largest community. Kurds have a standard written language and several dialects such as Bajelani, Mukri, Garrusi, Sulaymani, Kolya'I, Zangana, Kermanshahi, Surchi, Herki, and Kurmanji or Northern Kurdish, with the dialects Hakari and Jezire. Other important languages of this group are Gurani, also known as Hawrami or Hawramani, and Zaza [Dimili]. Among the Southwestern Iranian languages, the best known are Lori [Luri] (with the dialects Feyli, Laki, and Bakhtiari), and Persian, which is often spoken along the Iraq-Iran border, and in some Shi'ite holy cities.

Iraq is also interesting for the Aramaic languages spoken in it. The dialects of Neo-Aramaic are spoken in some Christian villages in the north, as well as in central Iraq. Some important members of the Aramaic language family in Iraq are Assyrian Neo-Aramaic or Neo-Syriac, used by the Assyrians, who constitute less than 1 percent of the population and live mainly in the major cities and in the rural areas of northeastern Iraq. Koy Sanjaq Surat is an Aramaic language with 800 to 1000 speakers in the Northern Iraqi town of Koi-Sanjaq and the nearby village of Armota. Chaldean Neo-Aramaic has 100 000 to 120 000 speakers as of 1994.

Iraq, especially its northern part, has been home to diverse linguistic minorities, some of whom were there long before the Arab influx. Technically speaking, Iraq hosts members of Altaic, North Caucasian, and Gypsy languages, in addition to those already noted. The most important Caucasian languages spoken in Iraq are Adyghe (also known as West Circassian or Adygey) and Armenian. Armenian, with about 60 000 speakers, is spoken by an urban community of Armenian descent concentrated in the larger cities.

Of the Altaic group, Azerbaijani and Turkman [Turkmen] are noteworthy. Azerbaijani is spoken mainly in the cities of Kirkuk, Arbil, and Rowanduz, as well as in towns and villages in the southeast from Kirkuk as far as Al Miqdadiyah, Khanaqin, and Mandali, and in several places in the Mosul region. The Turkomans are believed to constitute somewhat less than 2% of the population, and live along the border between the Kurdish and Arab regions. A number of Turkomans also live in the city of Irbil.

Of the minor languages used in Iraq, we should also mention Mandaic, used by the Mandaian people living by the Iranian border with Iraq, and some in Khuzestan province in Iran. The total number of Mandaic speakers is not known. They have a standard written language, though most are fluent in Arabic and Persian.

The only known Gypsy language spoken in Iraq is Domari, with 50 000 speakers as of 1970. This language is also known as Middle Eastern Romani. Nearly all minority language speakers are bilingual in their mother tongue and Arabic.

See also: Arabic; Indo–Iranian; Minorities and Language; Variation in Arabic Languages.

Language Maps (Appendix): Map 102.

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Ireland, Republic of: Language Situation

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Although this has succeeded in encouraging large numbers to learn the language, little progress has been made in the area of language use. Irish is returned in census reports as known by over one million, about 30% of the population, but because of self-reporting it is difficult to establish real levels of fluency and literacy. Native speakers of Irish have been recently estimated at around 2%, perhaps 60 000 in all, with about 10 000 living in viable language communities in two western countries. In addition, there are families in English-speaking areas where both parents are fluent Irish learners and where Irish is the everyday language. There are no estimates of the numbers of such families, but a figure of around 2% of the population would not be unreasonable. All Irish speakers are bilingual in English, and code switching is common among native speakers of Irish but not between fluent Irish learners. The Constitution recognizes two official languages, Irish, 'the first,' and English, but there is no statutory provision to formalize their relative status. Most Parliamentary business is transacted through English, with all Acts and most official forms being available in both languages. The main language of the media is English, with an Irish language radio channel. Instruction in most schools and in higher education is through English, but there are a number of Irish-medium schools, both primary and secondary. French, German, Spanish, and Italian are taught as foreign languages in secondary schools.

See also: United Kingdom: Language Situation.

Language Maps (Appendix 1): Map 139.

Irish Lexicography

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mostly on the purpose for which they were compiled: to inform native speakers of Irish or to instruct native English speakers. The four main dictionaries dealing with modern Irish usage were all published in the 20th century, namely, Fr. Patrick Dinneen's *Irish-English dictionary* (1927), Fr. L. McKenna's *English-Irish dictionary* (1935), Tomás de Bhaldraithe's *English-Irish dictionary* (1959), and Niall Ó Dónaill's *Irish-English dictionary* (1977).

Irish speakers owe the greatest debt to Dineen's work (1927). Its success and popularity has been fostered over generations, as it was the dictionary used to teach Modern Irish to several generations of Irish speakers and learners. It helped standardize Irish grammar and idiom and regulate spelling conventions. De Bhaldraithe's dictionary (1959) was the first to include the new formulated standard spelling and grammar, published in 1958 under the title *Graiméar na Gaeilge: an caighdeán oifigiúil*. All subsequent publications and dictionaries have been written using this standard or some slightly emended form.

The 1959 and 1977 dictionaries were compiled in the Department of Education. Due to the many cultural and linguistic changes undergone by both the Irish and English languages, vocabularies in both languages have undergone and are undergoing major changes. There is, therefore, a need for continuous updating and review.

The *Dictionary of the Irish language*, which was based mainly on Old Irish (600–900 A.D.) and Middle Irish (900–1200 A.D.) materials, was published over a 150-year period, the last fascicle appearing in 1976. A decision was then taken to continue with a similar lexicographical project on Modern Irish, covering the period 1600–1900. This was indeed an urgent necessity. The aim was to produce a monolingual historical dictionary, using the standard modern forms as headwords. A decision was taken in 1984 that the dictionary should appear in the form of fascicles, and the drafting of letter *A* began. Tomás de Bhaldraithe resigned his post as Chief Editor in 1994. Subsequently, a review of the procedures being implemented by the dictionary staff concluded that its objectives needed to be redefined. For the next decade or so, the main objective was to produce a computerized dictionary archive for Modern Irish. This work has now been made available electronically (2004). The work on the dictionary itself remains incomplete.

Phase 2 of the new English-Irish dictionary is due to begin in 2005. It is expected that it will take three to five years to complete. The dictionary will contain some 70 000 headwords and will be corpus-based. The Irish language component in the dictionary will include the three principal varieties spoken in Ireland. The English language in the dictionary will be the language of Ireland, both Northern Ireland and the Republic. While foregrounding Irish English, it will also include standard British and American English and well-known words and phrases from other varieties. An electronic version of the dictionary will also be made available.

See also: Ireland, Republic of: Language Situation; Language Policies: Policies on Language in Europe; Lexicography: Overview; United Kingdom: Language Situation.

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Irony

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The term 'irony' is commonly used to describe both a linguistic phenomenon (verbal irony) and other phenomena including 'situational' irony (i.e., irony of facts and things dissociated from their linguistic expression; Shelley, 2001) such as a fire-station burning to the ground, various more-or-less philosophical ideas (Socratic irony, Romantic irony, Postmodern irony), and even a type of religious experience (Kierkegaard, 1966). While there may be connections between situational and verbal irony, it does not appear that literary and religious uses can be fruitfully explained in terms of linguistic irony. This treatment will be limited to verbal irony.

Other definitional problems include the purported distinction between irony and sarcasm. While some have argued that the two can be distinguished (for example, irony can be involuntary, while sarcasm cannot be so), others maintain that no clear boundary exists. A further problem is presented by the fact that in some varieties of English, the term *irony* is undergoing semantic change and is assuming the meaning of an unpleasant surprise, while the semantic space previously occupied by *irony* is taken up by the term *sarcasm*.

The word *irony* goes back to the Greek *eironeia* (pretense, dissimulation) as does the history of its definition and analysis. Irony is seen as a trope (i.e., a figure of speech) in ancient rhetorics and this analysis has remained essentially unchallenged until recently. In the traditional definition irony is seen as saying something to mean the opposite of what is said. This definition is demonstrably incorrect, as a speaker may be ironical but not mean the opposite of what he/she says; cf. *It seems to be a little windy* (uttered in the middle of a violent storm), in which the speaker is saying less than what is meant. Similarly, overstatements and hyperbole may be ironical (Kreuz and Roberts, 1995).

A recent and fruitful restatement of the irony-as-trope theory has been presented by Paul Grice who sees irony as an implicature, i.e., as a deliberate flouting of one of the maxims of the principle of cooperation. Relatedly, speech-act approaches to irony see it as an insincere speech act. Initially, Grice's approach saw irony as a violation of the maxim of quality (i.e., the statement of an untruth) but this claim has been refuted, as seen above. Broadening the definition to, for example, 'saying something while meaning something else,' runs the risk of obliterating the difference between irony and other forms of figurative or indirect speech. However, this loss of distinction may be a positive aspect of the definition, as has been recently argued (Kreuz, 2000, Attardo, 2002).

While the idea of 'oppositeness' in irony is problematic, approaches to irony as negation have been presented (Giora, 1995), who sees irony as 'indirect' (i.e., inexplicit; cf. Utsumi, 2000) negation; related ideas are that of contrast (Colston, 2002) and inappropriateness (Attardo, 2000).

A very influential approach to irony is the mention theory (Sperber and Wilson, 1981), which claims that an utterance is ironical if it is recognized as the echoic mention of another utterance by a more or less clearly identified other speaker. Furthermore, the ironical statement must be critical of the echoed utterance (cf. Grice, 1989: 53–54). Similar theories based on the ideas of 'pretense' and 'reminder' have been presented as well. Criticism of the mention theory notes that not all irony seems to be interpretable as the echo of someone's words, or that if the definition of mention is allowed to encompass any possible mention it becomes vacuous (since any sentence is potentially the mention of another sentence). Furthermore, there exists an admittedly rarer, non-negative, praising irony, called *asteism* (Fontanier, 1968: 150). An example of asteism might be a colleague describing Chomsky's *Aspects of the theory of syntax* as a 'moderately influential' book in linguistics. Other approaches to irony include the 'tinge' theory, which sees irony as blending the two meanings (the stated and the implied ones) with the effect of attenuating the ironical one (Colston, 1997).

All the theories of irony mentioned so far share the idea that the processing of irony is a two-step process in which one sense (usually assumed to be the literal meaning) of the utterance is accessed and then a second sense of the utterance is discovered (usually under contextual pressure). Thus, for example, in a Gricean account of irony as implicature, the hearer of an utterance such as *That was smart* (uttered as a description of clumsy behavior, such as spilling one's wine upon someone's clothing) will first process the utterance as meaning literally roughly 'This behavior was consonant with how smart people behave' and then will discard this interpretation in favor of the implicature that the speaker means that the behavior was *not* consonant with how smart people behave. This account has been challenged recently by 'direct access' theories.

The direct access theories claim that the hearer does not process the literal meaning of an ironical

utterance first and only later accesses the figurative (ironical) meaning. Rather, they claim that the literal meaning is either not accessed at all or only later. Direct access interpretations of irony are squarely at odds with the traditional interpretation of irony as an implicature. Some results in psycholinguistics have been seen as supporting this view (Gibbs, 1994). The mention theory of irony was commonly interpreted as a direct access theory, but recent work (Yus, 2003) seems to indicate that it too can be interpreted as a two-step process. Other researchers (e.g., Dews and Winner, 1999) have presented contrasting views which support the two-step approach, although not always the claim that the literal meaning is processed first: claims that interpretations are accessed in order of saliency (Giora, 2003) or in parallel have been put forth.

Psycholinguistic studies of irony have focused on children's acquisition of irony (Winner, 1988), progressively lowering the age at which children understand irony to under ten years old; on the neurobiology of the processing of irony (McDonald, 2000), emphasizing the role of the right hemisphere alongside the left one (in which most language processing takes place); and on the order of activation of the various meanings in the ironical text. A significant issue is the degree and nature of the assumptions that the hearer and speaker must share for irony to be understood; this can be summed up as the 'theory of mind' that the speakers have. In particular, irony involves metarepresentations (Bara *et al.*, 1997, Curcó, 2000).

Considerable attention has been paid to the optional markers of irony, i.e., primarily intonational and kinesic indications of the speaker's ironical intent. While several phonological and other features have been considered 'markers' of irony, it appears that none of these features is exclusively a marker of irony. Reviews of markers include phonological (e.g., intonation), graphic (e.g., italics, punctuation), morphological (e.g., quotatives), kinesic (e.g., winking), and contextual clues (Haiman, 1998).

Recently, the social and situational context of irony as well as its pragmatic ends have begun being investigated in sociolinguistics and discourse/conversation analysis as well as in psycholinguistics. Work on the social functions of irony has found a broad range of functions, including in- and out-group definition, evaluation, aggression, politeness, verbal play, and many others (e.g., Clift, 1999; Anolli *et al.*, 2002; Gibbs and Colston, 2002; Kotthoff, 2003). It is likely that this list may be open-ended.

The relationship between irony and humor remains underexplored, despite their obvious connections, although some studies are beginning to address the interplay of irony and other forms of implicature, such as indirectness, and metaphoricity. Finally, it is worth noting that dialogic approaches to language (e.g., Ducrot, 1984) see irony as a prime example of the co-presence of different 'voices' in the text (*see* **Literary Pragmatics**), in ways that avoid the technical problems highlighted in the mention theories.

See also: Figures of Speech; Implicature; Negation; Pragmatics: Overview; Relevance Theory; Speech Acts.

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Irony: Stylistic Approaches

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Most books or articles on the topic start with a warning that the concept of irony is elusive (Muecke, 1970) and that it takes many forms. Myers (1981: 410) said that "in irony we inherit both a device and a concept." Nash (1985) alerted us to the lack of consistency in usage even among literary critics. Although dictionaries offer definitions and exemplifications, they point to the complexity of the phenomenon rather than enlighten the reader. The word has both positive and negative connotations today, a mark of its complex history and range of functions in discourse. The word does not appear in the English language until the 16th century and is only commonly used by speakers from the early 18th century onwards. Clearly the phenomenon existed before it was named, even prior to the Greek word from which the English word derives. The word *eironeia* to describe the Greek philosopher Socrates's treatment of his conversational opponents is first recorded in Plato's *Republic*. Socratic irony today refers to a discourse strategy whereby the speaker pretends he or she is learning from an interlocutor whilst trying all the while to uncover the flaws in that person's argument (Nilsen and Nilsen, 2000).

Conveniently, a distinction is often made between situational irony and verbal irony. In the first we have an observer who notices a state of affairs or event which is in some way incongruous. The second is a rhetorical device. We have an ironist who produces a linguistic message whose meaning is other than the literal meaning, in many cases understood to be the opposite of the literal meaning conveyed. There is a discrepancy between the words and what the speaker means by these words, an opposition between the surface and the underlying meaning. This is also called traditional irony in most writings and is often attributed to Aristotle (Barbe, 1995).

An oppositional model of verbal irony holds that the speaker says the opposite of what he or she means. In this account, irony is unveiled by a process of substitution of lexical items or propositions. In the case of stable irony (Booth, 1974), where the intended meaning is fairly clear, as in "What a lovely day!" uttered on a day when the weather is anything but pleasant, meaning may be retrieved by word substitution (e.g., 'lovely' for 'awful'), an example of lexical-antonymy. Oppositeness is at the heart of Raskin's semantic theory of humor (STH) (Raskin, 1985) where he discussed oppositeness in terms of local antonymy, two opposite meanings arising from a particular discourse. At the propositional level, consider Myers's (1981: 411) example "I always wanted to spend the summer in Detroit," uttered by a speaker who does not want to spend the summer in Detroit. Here we have an example of negation at the propositional level. Some linguists argue that examples like the one above constitute an instance of criticism coupled with a complaint, also known as nonce irony. Common irony refers to expressions which have become stock phrases in a language, such as "that's a likely story!" (Barbe, 1995: 18–22).

When considering verbal irony, a number of assumptions need clarification. One often-debated issue is that of intentionality and sincerity of the

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When considering verbal irony, a number of assumptions need clarification. One often-debated issue is that of intentionality and sincerity of the

ironist. Here the focus is on the production of an ironic text. This approach has been popular in stylistic analyses of literary texts, concerned with identifying devices employed by writers. The rhetorician Quintilian claimed that the ironist 'intends' to convey something which is other than what he or she says, thus effectively being insincere. Albeit not universally held, this view still finds many supporters today. Interestingly, the anti-intentionalist position is refuted on the basis that if the text can be read ironically, it is read "as if it were intended to be ironical" (Muecke, 1978: 364), highlighting the importance of the speech community's conventions of usage over the individual speaker's intentions. However, Gibbs *et al.* (1995) provided convincing evidence that intention is not necessary for irony to occur. They show that hearers are perfectly able to recognize the ironic meaning created by a sentence whilst knowing at the same time that the speaker's intention was not to convey irony. It is true that instances of dramatic irony rely on this, as is the case when readers of a book, or an audience at a play, know something that the characters themselves do not know. In the world of theatre, the *ingénu* who utters sincerely the words of the playwright is a good example of unintentional irony. The speaker is separate from the ironist, the animator of the utterance distinct from the author of the utterance (Goffman, 1979).

Haiman (1990: 188) explained that the distinction between sarcasm and irony is rooted in intention. Whilst sarcasm is intentional, it is not a necessary condition for irony. "To be ironic, a speaker need not be aware that his words are 'false' – it is sufficient that his interlocutors or his audience be aware of this." Sarcasm is often categorized as a form of irony and some researchers use the term interchangeably (Attardo *et al.*, 2003). However, for some, it is a type of indirect criticism which is perhaps more personal and more blunt, and where the speaker's intentions to criticize are more obvious. Barbe (1995: 28) distinguished between the two by considering whose face is more threatened by the utterance. In the case of sarcasm she claims the speaker is compromising him- or herself, and thus a sarcastic comment constitutes a face-threatening act for the speaker.

As for the notion of double significance, and more precisely the clash between the literal and implied meaning, it is clear that the meanings are not necessarily in a relation of 'opposition' in the strict sense, as is often presumed. When making use of hyperbole it is possible to speak the truth whilst conveying an additional meaning. Myers's example of the comment "I love people who signal," uttered by a passenger after the driver attempts a left turn without signaling (Myers, 1977: 172), is a good case in point. Here the speaker is not saying she does not like people who signal, a negation of the declaration, neither is she being sincere about loving all people who signal. As well as exaggeration, understatement may be used ironically, effectively flouting Grice's maxim of quantity – which suggests that your contribution must be as informative as is required, but no more than is required, for the purposes of the current exchange (Levinson, 1983). The ironist is speaking the truth, but implies, by omitting to give as much information as is required, that there is a conversational implicature to be inferred by the hearer (*see* **Maxims and Flouting**). Ironical quotations and interjections do not fit into the traditional oppositional model of irony either.

Irony can make use of metaphors (*see* **Metaphor: Stylistic Approaches**). Overusing metaphors, placing unfitting metaphors, and juxtaposing unlikely metaphors are useful devices for the production of irony. In the case of explicit irony (as in a sentence starting with, for example, 'ironically' or 'isn't it ironic') the speaker brings to the recipient's attention an incongruous occurrence, communicating the nonverbal irony of fate. But in most instances of irony, which are implicit, inference is the key to uncovering the 'true' meaning. However, as with all instances of irony, interpretation is idiosyncratic and it is not certain that meaning will be recovered by the hearer. This has led many researchers to shift their focus away from the ironist to the recipient of the message (*see* **Irony**) (Kaufer, 1981; Giora, 1995; Giora and O'Fein, 1999a, 1999b).

Building on Sperber and Wilson's echoic interpretation model (Sperber and Wilson, 1981; Wilson and Sperber, 1992) and the pretense and theater models (Clark and Gerrig, 1984; Haiman, 1990), Clift (1999) concluded that in naturally occurring conversations, irony is not necessarily located in the utterance itself, thus giving credence to the view that irony cannot reliably be identified on the basis of linguistic description alone. Irony emerges from dynamic conversational activity and is exploited by creative speakers as part of their turn-taking involvement. For Clift, irony may emerge from a flouting of a conversational expectation, a tension between 'slots' and the 'items' that fill them (Clift, 1999: 547). Irony in natural conversation serves an important discourse and social goal and is used in the management of interpersonal relationships (Norrick, 1993). It can be used to criticize whilst not losing face and at the same time minimize the threat to the face of the listener, thus adhering to rules of politeness. It can be used to display wit and solidarity and to affirm bonds between conversationalists too (affiliative vs. nonaffiliative purposes).

In pragmatics it is postulated that recognition of irony lies in the markers used to direct the recipient of the message to the right interpretation. Contextual clues can appear at all levels of language: word, clause, utterance, and discourse. In speech, pointers include kinesic (ranging from gestures to nods and smiles) and phonic (tone of voice, stress, pitch, etc.) markers. Another pointer to irony may come from the contribution being inappropriate in relation to the context or the cotext, even when on the surface the contribution seems relevant. Contradictory clauses are also a trigger. One indicator is the use of register clashes. During an informal conversation one might shift from an informal style to a formal style for ironic effect, for example, or insert phraseology which belongs to another field of discourse. An unusual collocation may alert the speaker (or reader) to the existence of an ambiguity. Jane Austen's opening sentence in *Pride and Prejudice*,

> "It is a truth universally acknowledged that a single man in possession of a good fortune must be in want of a wife,"

combines overstatement ('universally,' 'must be') with a contradiction ('good fortune' / 'in want of') to indicate that the sentence must not be taken at face value. The choice of lexis points to an incongruity and alerts the reader to another intended meaning. Markers, however, are pointers and do not constitute irony *per se*.

Although verbal irony does not always imply a script opposition or negation of the literal message, it allows for a double perspective to be conveyed. This may explain why much irony falls into the realm of humor (*see* **Humor in Language**), as the perception of a contrast is at the heart of Incongruity Theories and Surprise Theories (Goldstein and McGhee, 1972). Attardo (1994) placed the word 'irony' within the semantic field of humor, and claimed that irony and humor overlap significantly (Attardo, 2001). Others have argued that irony and humor share the same mechanisms (Giora, 1995). Irony is used to express an evaluative judgment, to convey an attitude about the interlocutor, an event, or more generally about some aspect of one's universe of belief (Martin, 1992) with the possible outcome that it can have the perlocutionary effect of being humorous, a desirable quality for most. For the recipient, satisfaction is gained from the process of decoding the multiple readings. In literature, techniques used by writers which signal that humor is present also enhance the reader's experience. Triezenberg (2004) explained that, for example, as a device, repetition with skillful variation is a potent humor enhancer. She also drew attention to the importance of cultural factors and shared background knowledge for ensuring that humor is decoded and fully appreciated. In order to achieve a "secret communion" (Leech and Short, 1981) between author and reader, a complex range of linguistic and nonlinguistic factors needs to be combined.

The general theory of verbal humor (*see* **Humor: Stylistic Approaches**) was developed to describe the conditions necessary for a short text to be considered humorous, and aims to provide an explanation of the cognitive processes involved in the processing of humorous texts (Attardo, 2001, 2002). From considering the structure of the joke, the theory has been extended to attempt to analyze humorous literary texts. Although some attest to its literary stylistics value, others argue that it is hitherto not adequate to account for the aesthetic qualities of literary writing (Triezenberg, 2004). Nevertheless, irony as well as humor is a linguistic resource which speakers and writers employ skillfully and acquire as part of their linguistic competence, and recognize in others' performance. No absolute agreement can ever be reached about incidences of irony and their interpretation, as usage as well as interpretations are rooted in the social and linguistic conventions of a particular speech community at a specific point in time. To the extent that any instance of language use can be analyzed using rigorous methods of linguistic and stylistic analysis, it is possible to say something about the mechanisms employed in the use of irony, even if the concept itself is constantly evolving.

See also: Humor in Language; Humor: Stylistic Approaches; Irony; Maxims and Flouting; Metaphor: Stylistic Approaches.

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Iroquoian Languages

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The Iroquoian Family

The Iroquoian languages are indigenous to southeastern and northeastern North America. The family consists of two major branches: Southern Iroquoian and Northern Iroquoian.

Southern Iroquoian is represented by just one language, Cherokee, spoken today primarily in Oklahoma and western North Carolina. There are clear dialect differences between western and eastern Cherokee and within each, many of which predate the forced marched of the Cherokee from North Carolina to Oklahoma in 1838.

Northern Iroquoian consists of several subgroups. The first to break away from the main branch developed into Tuscarora, Nottoway, and Meherrin. The Tuscarora were first encountered in eastern North Carolina, but early in the 18th century most moved north to rejoin other Northern Iroquoians. Their descendants now live primarily in two communities, one at Six Nations on the Grand River in Ontario, the other near Niagara Falls in New York State. Nottoway and Meherrin were once spoken near the Virginia and North Carolina coasts. All that remains of Nottoway are two wordlists recorded during the early 19th century. The only record of Meherrin is two town names, sufficient to identify the language as Iroquoian. The Meherrin merged with those Tuscarora who did not migrate north in the 18th century.

The next group to separate from Northern Iroquoian became the Huron. They comprised a confederacy of four nations totaling around 20 000 people when they encountered Champlain in 1615 in present southern Ontario. In 1649, they were decimated by the Five Nations Iroquois. Some survivors formed a settlement at Lorette near modern Quebec City. Others joined the remnants of neighboring Iroquoian nations, the Tionontati (Petun), Erie, and Neutral, and migrated west toward Detroit and ultimately into Oklahoma. This group became known as the Wyandot. Both Huron proper at Lorette and Wyandot in Oklahoma were last spoken in the 20th century.

The remaining Northern Iroquoians separated into several subgroups, whose territories extended across present New York State. These were the Five Nations (with Tuscarora, the Six Nations), members of the League of the Iroquois. To the west were the Seneca and Cayuga. In the center were the Onondaga, near

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Iroquoian Languages

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The Iroquoian Family

The Iroquoian languages are indigenous to southeastern and northeastern North America. The family consists of two major branches: Southern Iroquoian and Northern Iroquoian.

Southern Iroquoian is represented by just one language, Cherokee, spoken today primarily in Oklahoma and western North Carolina. There are clear dialect differences between western and eastern Cherokee and within each, many of which predate the forced marched of the Cherokee from North Carolina to Oklahoma in 1838.

Northern Iroquoian consists of several subgroups. The first to break away from the main branch developed into Tuscarora, Nottoway, and Meherrin. The Tuscarora were first encountered in eastern North Carolina, but early in the 18th century most moved north to rejoin other Northern Iroquoians. Their descendants now live primarily in two communities, one at Six Nations on the Grand River in Ontario, the other near Niagara Falls in New York State. Nottoway and Meherrin were once spoken near the Virginia and North Carolina coasts. All that remains of Nottoway are two wordlists recorded during the early 19th century. The only record of Meherrin is two town names, sufficient to identify the language as Iroquoian. The Meherrin merged with those Tuscarora who did not migrate north in the 18th century.

The next group to separate from Northern Iroquoian became the Huron. They comprised a confederacy of four nations totaling around 20 000 people when they encountered Champlain in 1615 in present southern Ontario. In 1649, they were decimated by the Five Nations Iroquois. Some survivors formed a settlement at Lorette near modern Quebec City. Others joined the remnants of neighboring Iroquoian nations, the Tionontati (Petun), Erie, and Neutral, and migrated west toward Detroit and ultimately into Oklahoma. This group became known as the Wyandot. Both Huron proper at Lorette and Wyandot in Oklahoma were last spoken in the 20th century.

The remaining Northern Iroquoians separated into several subgroups, whose territories extended across present New York State. These were the Five Nations (with Tuscarora, the Six Nations), members of the League of the Iroquois. To the west were the Seneca and Cayuga. In the center were the Onondaga, near

modern Syracuse. To the east were the Oneida and the Mohawk. The languages are now mutually unintelligible, though they share many structural features. Seneca is now spoken in three communities in western New York: Cattaraugus, Allegany, and Tonawanda. Most Cayuga left New York State after the Revolutionary War, some going to Six Nations in Ontario, and others to Oklahoma. The language is now spoken primarily at Six Nations. It was last spoken in Oklahoma late in the 20th century. Onondaga is spoken at Six Nations and at Onondaga south of Syracuse. Oneida is spoken near London, Ontario, and Green Bay, Wisconsin. There are six Mohawk areas: Kahnawà:ke and Kanehsatà:ke in Quebec; Ahkwesáhsne, which straddles Quebec, Ontario, and New York State; and Ohswé:ken (Six Nations), Thaientané:ken, and Wáhta' in Ontario. Most speakers now live in the first three.

Several other Iroquois languages are known to have existed as well. In 1534, Jacques Cartier encountered people along the St Lawrence River around present Quebec City. Vocabulary in his ship's logs and appended wordlists indicate that these people, now known as the Laurentian, spoke several Northern Iroquoian languages, at least one of which was not ancestral to any of the modern languages. When Champlain returned to the area in 1603, these people had disappeared. They are, however, the source of the name Canada. Another group, the Susquehannock or Andaste, were encountered by Captain John Smith about 1615 in the lower Susquehanna Valley in Pennsylvania. Their language, known through a wordlist recorded by the Swedish missionary Johan Campanius in 1696, was last spoken in the mid-18th century.

Phonology

The consonant inventories of the languages generally consist of one series of obstruents (reflexes of *t, *k, *tʃ, *k^{w}, *s), one of resonants (*n, *r, *w, *j), and one of laryngeals (*h, *ʔ). Voicing is not distinctive. Noteworthy is the lack of labials. Most of the languages have four oral vowels (*i, *e, *a, *o) and two nasal vowels (*ɛ̨, *ǫ). In Proto-Northern-Iroquoian, stress was penultimate, and open, stressed syllables were lengthened.

There have been several innovations of interest. One is stress in Cayuga. Cayuga stress placement depends on syllable count from both edges of the word. Primary stress falls on the penultimate syllable, providing that it is even-numbered counting from the beginning of the word: *satkáhthoh* 'Look!' If the penult is odd-numbered, it is stressed only if it is open: *senhotǫ́:koh* 'Open the door!' If the penult is odd-numbered and closed, stress is antepenultimate: *sasaky'atáwihsih* 'Take your shirt off!' Epenthetic vowels, added after the establishment of basic penultimate stress in Proto-Northern Iroquoian, are not counted, like the *-a-* stem joiner in *sakyá'tawi't* 'Put your shirt on!' Stress on the second of two adjacent vowels moves to the first: *sasanaháowe:k* 'Put your hat back on!' If conditions are not met for penultimate stress, and there is no antepenultimate syllable, the word carries no stress: *sahsyǫ'* 'you returned.'

Cayuga shows another interesting innovation. In odd-numbered syllables closed by a laryngeal, the laryngeal feature spreads leftward over the entire syllable. If the laryngeal is h, the full syllable is devoiced. (Devoicing is shown orthographically by underlining.) If the laryngeal is glottal stop, the full syllable carries creaky voice, indicated here by a wavy underline: *wahsí'ta'keh* 'on its foot.'

Several of the languages have developed distinctive tone under the effect of laryngeals. In Mohawk, stressed syllables generally show high pitch (if short) or rising pitch (if long). Stressed syllables closed by a laryngeal (glottal stop, or h followed by a resonant), however, developed a special pitch contour: a rise followed by a deep fall. The triggering laryngeal subsequently disappeared before a consonant. There are now contrasts, such as *oká:ra'* 'story' (with rising tone) and *okà:ra'* 'eye' (**okáhra'*). (Mohawk examples are given here in the community orthography. Nasalized vowels ʌ̨ and ɥ̨ are written en and on respectively, glottal stop with an apostrophe ', vowel length with a colon :, stress accompanied by high or rising tone with an acute accent, and stress accompanied by falling tone with a grave accent. The palatal glide j is represented by i. Other symbols have approximate IPA values.) Western Cherokee underwent more complex changes resulting in tone. Feeling (1975) distinguishes three level tones (2, 3, 4), a rising tone (23), and two falling tones (32, 21, written 1), as in *a^{1}hyv^{23}ki^{3}di^{2}ýa* 'he's capturing him.'

Morphology and Syntax

All of the languages are polysynthetic. Verbs in particular can be composed of large numbers of meaningful parts (morphemes), like Mohawk *en-hske-rhar-átst-en-'* 'you will promise me' (FUT-2. sing/1.sing-expect-CAUS-BEN.APPL-PER). All verbs contain at least three parts: a pronominal prefix, a verb root, and an aspect suffix. The pronominal prefix refers to the core arguments of the clause: *-hske-*'you/me' in the verb above. The prefix appears in the verb whether or not there are coreferential independent nominals in the clause as well, but it is fully referential in its own right.

There is little evidence of Subject or Object categories. The pronominal prefixes show grammatical Agent/Patient patterning. The semantic basis underlying the system is still clear. Agent prefixes typically represent participants who are actively in control and instigating events or states, as in Mohawk ***ra-tahónhsatats*** '**he** is listening,' ***ra-ná:ie*** '**he** is conceited,' or ***rá-hsere's*** '**he** is chasing it.' Patient prefixes typically represent participants who are affected by a situation but not in control: ***ro-thón:te'*** '**he** hears it,' ***ró-ta's*** '**he** is sleeping,' or ***ró-hsere's*** 'it is chasing **him.**' The system is now fully routinized, however. Speakers do not judge degrees of control as they speak; they simply learn which set of prefixes to use with each verb.

Agent prefixes are used in both events and states (*jump, be conceited*), and Patient prefixes are used in both events (*holler*) and states (*be poor*). The system is thus basically Agent/Patient rather than Active/Stative. Superimposed on it, however, is one element of Active/Stative patterning. Some verbs occur only in the Stative: *rahseró:hen'* 'he is quick-tempered,' *ró:ten* 'he is poor.' Others occur in all three aspects: Habitual *ratè:kwahs* 'he escapes,' Perfective *wahatè:ko'* 'he escaped,' Stative *rotè:kwen* 'he has escaped.' With verbs like *escape*, which describe a change of state, the Stative aspect form typically has a Perfect meaning: *he has escaped*. All Perfect Stative verbs occur with Patient prefixes, whether their Habitual and Perfective forms appear with Agents or Patients.

The Northern Iroquoian languages show extensive, productive noun incorporation. The Southern language Cherokee shows traces of incorporation embedded in the lexicon, indicating that incorporation was productive in Proto-Iroquoian. Incorporation is a process whereby a noun stem is compounded with a verb stem to form a larger verb stem: *-itskeronti-* 'saliva-throw = to spit.' There is no explicit specification of the semantic role of the incorporated noun; it simply indicates the involvement of a type of entity, often as a semantic patient, but sometimes as an instrument, location, source, or goal. Examples can be seen in Mohawk *wa-ho-n-**itsker**-ón:ti-'* FACTUAL-MASC.sing.AGT-MIDDLE-**saliva**-throw-PER 'he **saliva**-threw = he spit' and *ka-**hseriie't**-áner-en'* NEUTER-**cord**-tie-STATIVE 'it is **cord**-tied.' Incorporation is used pervasively to create new vocabulary and also to manipulate the flow of information through discourse. Important new participants are typically introduced with independent nominals, but those that are already part of the scene or of peripheral importance may be carried along as incorporated nouns.

Lexical categories are clearly distinguished by their internal morphological structure. Particles, by definition, are morphologically unanalyzable (*tóka'* 'maybe,' *oh* 'what,') though they may be compounded (*nek tsi* 'the only' for 'because'). Nouns contain a prefix specifying the gender of the referent or its possessor, a noun stem, and a noun suffix: *ka-nà:tsi-a'* NEUTER-kettle-NOUN.SUFFIX 'kettle,' *ake-nà:tsi-a'* 1.sing.ALIENABLE.POSS-kettle-NOUN.SUFFIX 'my kettle.' Alienable and inalienable possession are distinguished. Verbs follow an entirely different pattern, and can be quite complex morphologically. In addition to the obligatory pronominal prefix, verb root, and aspect suffix, they may contain various prepronominal prefixes. In the Northern languages, these are the Partitive, Contrastive, Coincident, Negative, Translocative, Factual, Duplicative, Future, Optative, Cislocative, and Repetitive. They may contain a Middle, Reflexive, or Reciprocal prefix. As seen above, they may contain an incorporated noun stem. Following the verb root, there may be one or more derivational suffixes, such as an Inchoative, Reversive, Causative, Instrumental Applicative, Benefactive Applicative, Distributive, or Purposive. After the aspect suffix, there may be a postaspectual suffix: a Past, Continuative, or Progressive. Such structure can be seen in the Mohawk *a-khe-'nikonhr-áks-a't-e'* OPT-1.sing/INDEF-mind-be.bad-CAUS-PER 'I would insult someone,' or *ia'-te-iako-hah-a-hiia'k-on-hátie'* TRANSLOCATIVE-DUPLICATIVE-FEM.PAT-road-STEM. JOINER-cross-STATIVE-PROG 'she was crossing the street.'

The morphological composition of particles, nouns, and verbs is thus entirely distinct. Noun stems never appear in the verb stem position of verbs, and verb stems never appear in the noun stem position of nouns. The match between internal morphological form and external syntactic function, however, is not isomorphic. Some morphological particles function syntactically and semantically as nominals, such as *è:rhar* 'dog.' Morphological verbs can function syntactically as predicates, as nominals (without further derivation), or as full clauses, as below.

Nahón:ne'	tehniiáhse
n-a-honn-e-'	te-hni-iahse
PART-OPT-MASC.PL.AGT-go-PER	DUPLICATIVE-MASC.DU.AGT-be.together.STAT
'they would go there'	'they two (males) are together'

niristì:sere's	nahshakotihahónnien'.
ni-rist-i'ser-e'-s	ne = a-hshakoti-hah-onni-en-'
MASC.DU.AGT-steel-drag-STAT-DIST	the = OPT-MASC.PL/3.DPL-road-make-BEN.APPL-PER
they (males) steel drag around	the they would road make for them

'They would go serve as guides for two surveyors.'

Finally, there is no basic, syntactically defined word order. In part because of the richness of the verbal morphology, the proportion of verbs to nouns and of predicates to nominals is much higher in Iroquoian languages than in many languages of Europe and Asia. There are few oblique or adjunct nominals. When clauses do contain multiple constituents, all orders are not only possible, they can also all be seen to be pragmatically motivated by the discourse at hand.

See also: Oneida; United States of America: Language Situation.

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Isixhosa *See:* Xhosa.

Islam and Arabic

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Arabic today is the main language of nearly 300 million people in the Middle East and North Africa. Since 1974 it has been recognized as one of the official languages of the United Nations. Like Hebrew, Aramaic, and Syriac, Arabic belongs to the Semitic group of languages. In the course of history it has been the language of a religion, a transnational state, and a widespread centuries-long civilization that has produced a rich heritage of knowledge, wisdom, and culture. It is used for religious purposes by 1.3 billion Muslims worldwide, and it is the language in which Islamic knowledge at its highest level has always been conducted. This status was achieved as a result of its connection to Islam through its sacred scripture, the Qur'an. The effect of the Qur'an on the Arabic language was, to an extent unknown for any other language of the world, dramatic, profound, and lasting.

The Impact of the Qur'an

Before the spread of Islam, Arabic was confined to the Arabian Peninsula, where it was spoken and used as a literary language by the native Arab population. Very little written material survives from the early centuries of the Christian era, the earliest being the Namara inscription in the Syrian desert, dated 328 C.E.; the output of the Arabs, particularly in poetry, was preserved as an oral tradition. In fact the Qur'an, when it was compiled in one volume, about 14 months after the death of the Prophet Muhammad (632) under his successor Abu Bakr, was the first book in Arabic. Thereafter, however, in line with the first revelation of the Qur'an in 610 C.E.:

> Read! In the name of your Lord who created: .... Read! Your Lord is the Most Bountiful One who ***taught by***

Finally, there is no basic, syntactically defined word order. In part because of the richness of the verbal morphology, the proportion of verbs to nouns and of predicates to nominals is much higher in Iroquoian languages than in many languages of Europe and Asia. There are few oblique or adjunct nominals. When clauses do contain multiple constituents, all orders are not only possible, they can also all be seen to be pragmatically motivated by the discourse at hand.

See also: Oneida; United States of America: Language Situation.

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> Read! In the name of your Lord who created: .... Read! Your Lord is the Most Bountiful One who ***taught by***

> ***[means of] the pen,*** who taught man what he did not know. (Q. 96:1–5)

the Arabs began to use the pen in earnest.

Before Islam, the Arabic script, derived from a Nabatean version of Aramaic, was rudimentary, containing only the consonants, and even among these there was no distinction between groups of letters of the same shape such as those representing *b, t,* and *th* or *j, h,* and *kh*. The script was developed in the Islamic era in order to achieve accurate pronunciation of the words of the Qur'an. Vowel signs and diacritical dots were introduced mainly by Al-Khalil ibn Ahmad Al-Farahidi (d. 786 C.E.), as commanded by the Ummayad governor Al-Hajjaj ibn Yusuf. This development continued further into the refinement of Arabic calligraphy as the noblest art of Islam, all to write and celebrate the word of God.

Within the space of 100 years after the death of the Prophet Muhammad in 632 C.E., Arabic had spread outside the Arabian Peninsula, both with the Arab armies and with emigration, into the Levant, the Fertile Crescent, Egypt, North Africa, and Spain, and in the East to Persia and beyond. It was to supersede, to a greater or lesser extent, such local languages as Aramaic, Greek, Coptic, Berber, and Persian, though naturally this process took some time. Arabic was first used for religious, administrative, political, and high cultural purposes and later spread to the population at large in the Middle East and North Africa, to become permanently the language of the majority. Persians wrote in Arabic for the first three centuries after Islam spread to Persia, and although Persian gradually regained precedence, Arabic left behind a great contribution of vocabulary and phraseology, particularly in religious and cultural fields. The Arabic script was also adopted for many Islamic languages, including Persian and later Urdu, Punjabi, Turkish, Hausa, Swahili, Malay, and Indonesian. Later Turkey changed, in 1928 and under European influence, to using the Roman script, as did many other countries, including Malaysia and Indonesia. Even in these countries, however, Arabic with its script continued to be used for religious studies.

Arabic Linguistic Scholarship

The Arabs did not study the grammar of their language before the Qur'an: it was in order to protect and understand the text of the Qur'an that Arabic grammar began to be codified. This started a flourishing tradition of Arabic linguistic scholarship. The important linguistic studies produced therein still command the admiration of modern linguists. Arabic phonetics, which started in order to describe exactly the proper pronunciation and articulation of the Qur'an, developed into a science of *tajwid,* good recitation of the Qur'an, an art that continues to develop. Similarly, the study of Arabic syntax flourished for the service of the Qur'an.

Especially significant in this field are works of the outstanding scholar, Abdul Qahir ibn Abdul Rahman al Jurjānī (d. 1078 C.E.), who dedicated his *Dalā'il al-I'jāz* and his *Asrār al-balāgha* to investigating the style and rhetoric of the Qur'an, in an attempt to identify the reasons for the inimitability (*i'jāz*) of its language. To give a brief example, two key concepts were discussed by al-Jurjani and others: context and internal relationships. The importance of context (*maqām*) was recognized and formulated for the study of the text of the Qur'an by Muslim linguists. In this respect, their work anticipated by many centuries modern linguistic thinking about the crucial importance of context in understanding discourse. Internal relationships were encapsulated in the dictum: *al-Qur'an yufassir ba'duhu ba'da* (different parts of the Qur'an explain one another), which, given the structure of Qur'anic material, was argued to provide the most correct method of understanding the Qur'an.

The text of the Qur'an was crucial for the development of the Arabic science of rhetorics, but Arab writers also drew on the text of the Qur'an in their study of the principles of literary criticism. This can be seen in the celebrated work of the famous critic Ibn al-Athir in his book *Al-mathal al-sā'ir fī adab al-kātib wa sha'ir* ('On the criticism of prose and poetry'). Lexicography was another discipline that was started to serve the Qur'an and flourished to a great extent in the Arabic tradition, the first, a landmark dictionary, being *Kitab al-'ayn* by Al-Khalil Ibn Ahmad (died 786 C.E.). As stated by Suyuti (d. 1505 C.E.), a writer on many subjects including Qur'anic studies and linguistics, the Qur'an was in fact the source for all branches of Arab knowledge.

The status of linguistic studies in the Arabic tradition was elevated because of its connection with the Qur'an. In our first grammar lessons, at the primary school of Al-Azhar in Cairo (the oldest functioning institution of Islamic learning in the world, opened in 972 C.E.), we were taught *Al-Mabadi' al-'ashara,* The Ten Introductory Aspects, with which the textbook began; we then learned that these ten aspects, as handed down by the ancient tradition, were points to be considered when embarking on any branch of knowledge. They included the definition of that particular branch, its name, its issues, its founder, its relation to other subjects, its status among other subjects, and how the Shari'ah views the learning and application of that subject. The status of grammar, we were told, was very high because it ensures correct

understanding and reading of the Arabic text of the Qur'an. As such its study was a communal obligation on the Muslim community. Thus learning grammar and linguistics, in addition to any educational or secular purpose, was a religious duty in Al-Azhar and similar traditional institutions of learning in the Muslim world.

Expansion of Arabic Knowledge

In the early centuries of Islam, the Muslims, inspired by the Qur'anic injunction, 'Say, "Lord increase me in knowledge"' (20:114), considered it their duty to translate (into Arabic), absorb, and develop the valued knowledge of ancient civilizations, such as Greece, Rome, Persia, India, and China. This provided another channel by which the local literary output in Arabic grew under Islam. In this case it drew in external sources to form another part of the vast corpus of learning in Arabic. Some of this Arabic scholarship was then, from the 12th century C.E., translated into Latin and acted as a contributing factor to the European Renaissance. The great tradition of learning in Arabic was developed not only by Arabs but also by Muslims from all over the world in their service of Islam. Chief among these were scholars from Persia and Central Asia, writing in Arabic. Worthy of special mention are scholars of Qur'anic exegesis (e.g., Al-Rāzī, d. 1209), the compilation and criticism of Prophetic sayings (hadīth) (Bukhārī, d. 870; Abū Dāwūd, d. 888; Tirmidhī, d. 892; and Al-Nasā'ī, d. 916), Arabic linguistics (e.g., Sibawayhi, d. 793 and Al-Jurjanī, d. 1078), and philosophy (Ibn Sīnā, d. 1037 and Al-Farābī, d. 950).

Arabic Studies in the West

We may mention here another vigorous tradition of Arabic linguistic scholarship, this time in Western universities (especially since the 17th century). This tradition was, from the beginning, driven above all by its relevance to Islam, and it produced monumental works in the study of Arabic and Islam in the leading centers of learning and in various European languages such as Dutch, English, French, German, Italian, Russian, and Spanish.

Memorizing the Qur'an, and Its Use in Worship

It is the Arabic Qur'an that is considered to be the word of God, not any translation. This makes Muslims throughout the world eager to learn some of it in Arabic. Both Arabs and non-Arabs, including women, are known to memorize the whole Qur'an or a large amount of it. There are international Qur'an recitation competitions held in Malaysia, Indonesia, and Iran, to name but a few, sometimes state funded, where the Qur'an is recited from memory. There is one particular passage, the first Sura, *Al-Fātiha*, which all Muslims learn, as it is an obligatory part of the five daily prayers in Islam, and normally, in addition to this, they learn other short passages. Muslims all over the world perform their daily prayers in Arabic, in imitation of the Prophet's example, and in keeping with the unbroken tradition, even though, according to at least one school of law, the Hanafi, if they do not know Arabic, they can perform the prayer in their own language. If we assume a group of ten Muslims come together from differing linguistic backgrounds, with no common language, they can all pray together, as it is the same Arabic prayer for all of them. Any of them is, moreover, eligible to lead the prayer.

As the Qur'an and Hadith are in Arabic and are the fundamental sources of Islamic law and teaching, the main classical works of the different schools of law, which are followed to this day, are all written in Arabic. This means that advanced Islamic studies in non–Arab Muslim countries are conducted in Arabic by the followers of all the various schools, Shāfi'ī in South East Asia, for instance, Hanafī in South Asia and Turkey, Ja'afarī in Iran, and Mālikī in West Africa. Thus Islam has kept Arabic alive in the religious scholarship of non-Arab Muslims. Even within the central area of the Islamic world, the Arab Middle Eastern and North African countries, it is Islam that has kept the Arabic language alive and given it this unrivaled position. The literary language, common to all Arabs, is used for writing, education, and formal speech. The connection of Arabic to the Qur'an has secured this position for the Arabic language up to today. Around the beginning of the 20th century in Egypt, for instance, there were calls for the adoption of English or of the Roman script for writing, or even the local Arabic dialect of Egypt. These were fiercely rejected because it would have meant cutting off the following generations from the language of the Qur'an and Hadith, Islamic Law, and the Arabic literary heritage.

Arabic in Western Cities

In recent times, Muslims have settled in every continent, including Europe and America. Arabic schools are set up for their children, also mosque schools, where the Arabic Qur'an is taught. It is remarkable that Muslims from non-Arab countries such as South Asia, Turkey, and Africa insist on having a Friday sermon in Arabic from the pulpits in Europe and

America, even if they have additional sermons in their own languages normally preceding the prayer time. Despite the growing body of Muslim writing on Islam in European languages, Arabic, the language of the Qur'an, still has a privileged position that cannot be replaced by any other language.

See also: Al-Jurjani, Abd Al-Qahir (10th Century A.D.); Al-Khalil (8th Century A.D.); Al-Zajjaji, Abu Al-Qasim (10th Century A.D.); Arabic Linguistic Tradition; Arabic; Islam in Africa; Islam in East Asia; Islam in Southeast Asia; Islam in the Former Soviet Union; Muslim/Islamic Language Education in Pakistan and India; Qur'an; Semitic Languages; Sibawayhi (8th Century A.D.).

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Islam in Africa

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After the death of the Prophet Muhammad in 632 A.D., Arab Muslim forces overtook most elements of the Byzantine-ruled areas of the Middle East, and then in 639 moved into the African continent, taking over Egypt from the Byzantines, and then moving westward through North Africa. They reached what is now Tunisia and established their fortress town at Qairawan in 670, and by the end of the 7th century they had occupied land up to the coast of the Atlantic Ocean, though not taking over territory very far south of the Mediterranean Sea.

Importantly for them, the Berber populations of their occupied territories mostly converted to Islam. In this way, Islam passed on to Saharan nomads, particularly the Berber Sanhaja of the western Sahara. With a renewal and growth of their faith in the mid-11th century, the Sanhaja formed a movement, known as the Almoravids, that then occupied all of the region of modern Morocco, and moved into the area of Spain formally overtaken by Arab Muslims. As widespread Saharan nomads, their faith to Islam soon began to have influence on West African black populations. The Massufa clan of the Sanhaja migrated along the southern region of the Sahara in the late 11th century, some of them settling in Walata, Sane (near Gao), and the Takedda region; some Sanhaja took up an area that later became Timbuktu, and, indeed, it was Sanhaja scholars who later made Timbuktu a major center of Islamic learning.

Among early West Africans to adopt Islam were the Dyula (also called Wangara), a clan of the Mande ethnic group, the rest of which later became Muslims. The Dyula mainly engaged in trade and moved widely around West Africa, influencing other peoples to adopt Islam. Another important ethnic group to largely adopt Islam was the Fulani (or Fulbe), nomadic cattle owners, who moved from the edge of the southern Sahara down into the Inland Delta of the Nile river and then elements of this group moved to other areas, such as Futa Toro and Futa Jallon, and eventually moved eastward into northern Nigeria and on to Chad and Dar Fur. By the 9th century, North African Muslims (Arab/Berber) began to cross the Sahara for trade, including to obtain slaves, and no doubt they had influence of conversion on the rulers they contacted.

Among the early and most celebrated persons converted to Islam were a number of rulers in the Sahel zone: the ruler of Takrur, in the Senegal river area;

America, even if they have additional sermons in their own languages normally preceding the prayer time. Despite the growing body of Muslim writing on Islam in European languages, Arabic, the language of the Qur'an, still has a privileged position that cannot be replaced by any other language.

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Among the early and most celebrated persons converted to Islam were a number of rulers in the Sahel zone: the ruler of Takrur, in the Senegal river area;

the king of the Zuwa dynasty in Gao, and the ruler of Kanem, just north of Lake Chad. All of these conversions were in the 11th century. Later, rulers of major empires promoted Islam, making pilgrimages to Mecca, e.g., Mansa Musa of Mali in 1324 and Askiya Muhammad of the Songhay Empire in 1497. As a pious Muslim, Askiya gave support to the Islamic community of Timbuktu, a city of Muslims ever since its initiation in the early 12th century. Muslim scholars migrated there from North Africa and from Saharan oases, and when Mansa Musa returned from his pilgrimage, he stopped in Timbuktu and had the Great Mosque (Jingere Ber) built, a Muslim shrine soon afterward to be added to with the large Sankore mosque. The most celebrated scholarly clan to settle in Timbuktu was the Aqit family of the Sanhaja Massufa, coming from Masina in the south of the Inland Delta.

Many works on aspects of Islam – especially shariah – were written in Arabic in Timbuktu, especially in the 15th–17th centuries, and even down to the 20th century. Some Muslim scholars possessed large libraries of such manuscripts – many still in existence – and in 1973 a huge public library of manuscripts was founded: the Ahmad Baba Center (Centre de Documentation et de Recherches Historiques Ahmad Baba [CEDRAB]). Ahmad Baba (1556–1627), after whom it was named, was one of the most celebrated Timbuktu scholars, a member of the Aqit family, though he was exiled to Morocco in 1594, returning home in 1608. He wrote nearly 70 works, and became celebrated in Morocco as well as in West Africa.

A West African scholar who once quoted him was the Fulani Uthman ibn Muhammad Fudi (or Usman dan Fodio), who set up a jihad in the Sokoto region of northwestern Nigeria in 1804, creating an Islamic empire out of most of the Hausa states of what is now northern Nigeria. His ancestors had migrated to that region from Futa Toro in the 16th century, though Islam had other influences in Hausaland. Kanem became an early Islamic state, and in the 13th century took over what is now Bornu, and from there, to the west of Lake Chad, Islam then had influence farther west. There was also influence in one area of Hausaland from the Dyula. Some of them had moved south from Jenne to obtain the gold being mined in what is now southern Ghana, to be taken to Jenne and then Timbuktu for trans-Saharan trade. When Songhay took over the Inland Delta in the 1470s, the Dyula decided to take the gold to a different trans-Saharan trading location, and so some of them went off to Kano, others of them having already converted the ruler of that city and state, a trading zone with trans-Saharan interconnections.

Islam later spread farther south in West Africa. In the second half of the 17th century, some scholars moved from Timbuktu to the north of what is now the Republic of Ghana. In the same period, some Dyula also settled in that area, and a century or more later Hausa migrants moved into the region, so the area between the Black and White Volta rivers became a new region of Islam, and by the 19th century a source of Arabic-Islamic writings. Similarly, in what is now Nigeria, Islam's influence moved south, following the early 19th-century jihad that created the Sokoto Caliphate. The Nupe adopted Islam, and in 1824 the northern Yoruba town of Ilorin became part of the Caliphate, and soon produced Muslim scholars who wrote Arabic treatises. Some later moved south as far as Abeokuta and Lagos; notably Adam al-Iluri (1917–1992), who set up at Agege, near Lagos, an Arabic and Islamic training center in the mid-20th century, and published there many of his 70 Islamic writings and those of some of his colleagues.

Although West Africa became a major area of Islamic writings, Islam became the main religion of other areas of Africa. Many nomadic Arabs moved into Egypt south of Cairo, and by the 14th century began moving farther south, causing Islam to take over the Christian kingdom of Nubia in the north of the present Republic of the Sudan. In the following centuries, Arab Muslim nomads in Egypt took over much of what is now that republic, while others moved directly from Arabia across the Red Sea. In 1820–1821, the Sudan was taken over by Egypt, then part of the Ottoman Empire, and some 60 years later a north-Sudan Muslim scholar, Muhammad Ahmad ibn Abdullah, declared himself to be '[God-]guided' – the Mahdi, a position normally seen as the final reviver of God's will for humanity. Early in 1885, he took over the main city of Khartoum, after controlling all the rest of the Muslim-inhabited sectors of the country, and died a few months later, to be succeeded by a successor: the *khalifa*. Although in 1898 the Sudan was occupied by the British and the Egyptians, who fought and killed the Khalifa, it remained, except for the far south, a land of Islam, including Darfur, a Muslim state to the west, now on the border of the Chad Republic.

Bordering the Sudan to the east is the state of Ethiopia (plus Eritrea), which was originally a Christian land, but its lowlands became Islamic territories in the 14th century. Some Muslims from Mecca had fled to an area of northern Ethiopia in 615, and the Arabs later respected Ethiopians, even before some converted to Islam. Ethiopia then borders Somalia, now nearly 100% Muslim, with some of its tribes, although not ethnically fully Arab, claiming that

they migrated to the Horn of Africa from Arabia many centuries ago. Early in the 20th century, just as the British were beginning to occupy a northwestern area of the Horn, a Muslim man, Mohamed Abdille Hassan (1864–1920) referred to by some as a *mahdi*, brought together many other Somalis, attempting to get them to abandon the Qadiriyya Sufi order and adopt the Salihiyya order that he had adopted in a visit to Mecca, and also to reject colonialism. The Salihiyya Sufi order was a product of Sufi teachings promoted by Ahmad ibn Idris, who moved out of Morocco in 1789, along North Africa to Cairo and then Upper Egypt, and finally into Arabia – Mecca and then Yemen. His teachings produced a number of branches of his movement. Other than the Salihiyya, several parts of Africa received his disciples. Libya, for example, got Muhammad al-Sanusi (1787–1859), of Algerian origin, whose order, the Sanusiyya, took off in Jaghbub and then expanded into southern Libya, and later, under his successor, into much of Chad. Another disciple was Muhammad Uthman al-Mirghani (1793–1852), from a Meccan Sharifian family, who was sent by his teacher to Eritrea, where he was treated hostilely and returned to Mecca; then he went to Upper Egypt and later into the Sudan for 4 years, promoting *al-Mirghaniyya*; and when in Kordofan, a man called Isma'il al-Wali took over some of his teachings and set up his own order, the Isma'iliyya. Al-Mirghani's Sufi teachings then became known as al-Khatmiyya, and he promoted them elsewhere in the Muslim lands of the Sudan. Also, another branch of the Idrisiyya (the teachings of Ahmad ibn Idris) was taken down into East Africa, where the Swahili populations were already Muslims. The Swahili population and language had, in fact, come to exist through Arabian visitors and settlers from the early centuries of Islam.

Islam also became practiced much farther south – in what is now called South Africa – mainly by people of Asian origin, brought into the region by colonial authorities: by the Dutch in the 18th century, many as slaves, including some from West or East Africa; then in the late 19th century the British brought Indians as indentured laborers. Through their presence, some local black Africans converted to Islam. In Cape Town, several mosques were built in the center of the city, and recently the Koran has been translated into their Xhosa language.

As for Sufi orders – or *tariqas* as they are called in Arabic – two carried strong spiritual influence on western Africa. The first was the Qadiriyya, originating in Baghdad in the 12th century under the teachings of Abd al-Qadir al-Jilani, later adopted in North Africa and by Saharan tribes such as the Kunta, an Arab-Berber tribe containing intellectuals, originally in the Touat oasis, who moved south from the 17th century and split in two, with a major group just north of Timbuktu and governing Timbuktu in part of the first half of the 19th century. The Qadiriyya was also adopted in northern Nigeria (notably by Uthman ibn Muhammad Fudi) and in Senegal. Another *tariqa*, the Tijaniyya, overtook it in the 19th century, though not among the Kunta. Ahmad al-Tijani (1737–1815), the founder of that Sufi order, was born in an Algerian oasis Ayn Madi, and then moved to Fez in Morocco. His teachings – following study of other Sufi *tariqas* – were adopted by the Idaw Ali tribe of southern Mauritania, and were also promoted by al-hajj Umar ibn Sa'id of Futa Toro in Senegal, who later conquered much of present-day Mali. The Tijani *tariqa* became appreciated in Senegal, and led by the shaykh Ibrahim Niasse (1902–1975), it was adopted by many West Africans as he traveled into Mali, Ghana, and Nigeria, and subsequently on to Chad and the Sudan. In Senegal, another *tariqa* was created: the Mouride order, inspired by Ahmad Bamba (1855–1927), originally a Qadiri. In the second half of the 20th century, however, Sufi *tariqa*s – especially the Tijaniyya – were opposed in speech and writing by Africans who had spent time in Arabia and come under the conveying influence of the Wahhabiyya movement. Whereas Sufi orders put little emphasis on *shari'ah*, the Wahhabiyya created its own Islamic law views, based on the Hanafiyya, though all West African Muslims belonged to the Maliki *madh'hab*.

See also: African Linguistics: History; Berber; Chadic Languages; Hausa; Islam and Arabic; Language Education Policies in Africa; Mande Languages; Nilo-Saharan Languages; Qur'an; Somali; Songhay Languages.

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Islam in East Asia

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Generally, the Muslim population in China is scattered over the country but concentrated unevenly in certain areas; as a result, Islam in China shows a considerable diversity of detail, although the basic Islamic principles are preserved in the form of community. Chinese Muslims are a group of different ethnic groups, languages, customs, and cultures. Therefore, Islam in inland China is always in interaction with Chinese religions and Chinese cultures; however, Islam in the frontier regions of China is connected with its counterparts in Central Asia, South Asia, and South-East Asia.

The first bearers of Islam to China were not missionaries but merchants who came to China by the Silk Road on land and for the spice trade by sea. The official contacts of the Arab Caliphate and the Chinese Empire began in 651 as the Caliph Uthman sent an envoy to Xi'an, the capital under the Tang Dynasty (618–907). Another large wave of Muslim immigrants consisted of the warriors who were sent by the Caliph Jafar Mansur of the Abbasid Dynasty in 755 to help the Chinese empire quell a rebellion. After recapturing the capitals of China, these soldiers were given the right to stay in China as a gratuity for their service. Their settlements developed into Muslim communities.

The earliest period of Islam in China did not exercise much influence over the Chinese people. The Muslims lived in a special section of a town and kept their own customs and way of living, had their own administration system, built mosques, and appointed their own judge to be in charge of religious and legal affairs. In a riot in 878, the revolting Chinese peasants besieged Canton, in which about 120 000 Muslims, Christians, and Jews were killed and their communities looted. However, during most of this period, the relations between the Muslims and the Chinese were peaceful.

When the nomadic Mongols conquered China, they brought many Muslims in their troops from Central Asia and Persia, and so began the second influx of Muslims to China who settled. The Muslims were important allies and aides of the Mongols in ruling this empire and forced the large subject population to submit to the new authority. The sizeable Muslim groups became elites in Chinese society. Not a few Muslims were appointed by the Mongols to the posts of prime minister, minister, and governor, etc. Muslim scientists made contributions to Chinese culture on astronomy, mathematics, geometry, architecture, medicine, and the technologies of handicrafts and weaponry. The spread of Muslims all over the country took place during this Mongol Dynasty (1271–1368). When Marco Polo and Ibn Battuta traveled in China, both noticed that China had an impressive Muslim population, and many towns and cities had special Muslim resident sects, and there were even Sufi monasteries active in the communities.

In Chinese Turkistan, Islam follows another mode. In the 10th century, an Uighur king of the Qara Khan Dynasty under the influence of an older Sufi from Central Asia was converted to Islam and given a Muslim name, Sutuk Baghra Khan. About 200 000 Uighurs also followed him in conversion. The new converts waged Jihad to conquer the other neighboring Uighur kingdoms, which upheld Buddhism, Manichaeism, and Shamanism. However, the Islamization of this region was a long process, and after the turn of the 16th and 17th centuries the whole region called Xinjiang today became part of the Islamic world.

The privileges of Muslims continued during the Ming Dynasty (1368–1644), when the majority Han people resumed their sovereignty over China. The position of Muslims in China did not meet great change except that the first emperor of the dynasty prohibited the Muslims from exercising their 'foreign culture'. Islam in inland China began a rapid acculturation process. Many Muslims devoted themselves to learning Chinese literatures, and in this way they became officials of the civil and military services in the empire. Many Muslims lost their Central Asian identities in this period when they spoke Chinese language and wore local clothes, although some Persian and Arabic terms were kept for their Islamic services. However, the Turkic Muslims retained their Central Asian Islamic culture and ethnic identities due to their close contacts with that region.

In the Qing Dynasty (1644–1911), the relations between Muslims and non-Muslims and between Muslims and the imperial authorities deteriorated, which led to the rigorous policy of suppressing the Muslims. More than ten million Muslims lost their lives in the two major confrontations during the 18th and 19th centuries.

When the Republic (1911–1949) was founded, the Muslims were one of five nationalities in China with equal rights in politics. This change of status in economic, social, and cultural life strengthened contacts with other parts of the Islamic world and reawakened the national consciousness of the Muslim peoples. New-style Islamic schools were set up in many communities. A national network of Islamic associations

was established. But in the 1940s, discontented by the high-handed policy and worsening economic situation, the Turkic Muslims in Xinjiang rose up and founded the short-lived Eastern Turkistan Republic.

The Communist regime replaced the Republic in 1949. Under the extremist leftist influence, the 'Religious Reform' was launched in 1958. Many mosques were closed, and the clerics were put into labor camps. The hostels of the Sufi orders and saints' tombs were forced to be demolished. The religious rights of Muslims had never been threatened to such a degree as during the Cultural Revolution (1966–1976). All religious activities were stopped, and many believers were killed as counter-revolutionaries.

However, since the beginning of the 1980s, the new Chinese leaders have embarked upon a more pragmatic policy with regard to religious affairs. Islam has gained a dramatic revival. China has more than twenty million Muslims with more than 30 000 mosques, according to country's official statistics. Several sects such as Shi'a, Ikhwan Movement, Salafiyya, Jahriyya, Khufiyya, and Qadriyya, as well as Qadim, the traditional Sunni mainstream, are allowed free operation. Many Islamic schools have been established to train the young people in Islamic knowledge and tradition. Every year thousands of Muslims sponsor themselves to go to Mecca on pilgrimage. Many communities publish their own magazines and newspapers to promote Islamic doctrine. Occasional clashes occur between Muslims and non-Muslims or local authorities because of different interests. In Xinjiang, some Uighur Muslims inspired by the event of the newly independent Central Asian republics fight for separatism under the banner of Jihad. The Communist regime through closely monitored organizations such as the Association of Islam tries hard to make Islam accommodate to the Chinese economic-market-type socialism to keep social stability.

Islam affected the Korean peninsula at first through indirect contacts via China in the period of the 10th to the 13th centuries. The *Koryosa* chronicle informs us that Muslims came to Korea through commercial activities and were treated as honored guests by the Kingdom's government (Jeong, 1452). When the Mongols controlled Korea in 1270, some Central Asian Muslims served as administrative officials and settled down in the peninsula where they formed communities. However, in 1427 the government issued a decree prohibiting Islamic performance and customs, and so therefore mostly assimilated the immigrant Muslims. The emergence of new Muslim communities in Korea has taken place 500 years later, in the second half of the 20th century, as South Korea became a strong country economically and came to rely on oil from the Middle East, which led Muslim foreigners to to Korea for trade, study, and work. There is no exact figure for the Muslim population in Korea, but they are certainly not a big community, and mainly composed of Muslim immigrants and local converts.

Islam traveled to Japan about 1891–1922, and some local Japanese embraced this faith. This was followed by Tartar Muslim migrants from Central Asia in 1923 to 1952. In 1956, the Muslim missionaries from Pakistan and India started going to Japan, playing an important role in the spread of Islam. In the late 1950s, students from Muslim countries went to study at Japanese universities. In 1961, the Muslim Students Association was founded. In 1974, the Islamic Center was established in Japan. Several big Japanese cities including Tokyo have mosques supported by Islamic countries such as Saudi Arabia. The Japanese Muslim population is estimated at less than 50 000.

See also: China: Religions; Chinese; Islam in Southeast Asia; Japan: Language Situation; Jewish Languages; Korea, Republic of (South): Language Situation; Persian, Modern; Saudi Arabia: Language Situation.

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Islam in Southeast Asia

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Islam came to Southeast Asia peacefully and over several centuries. While mainland Southeast Asia by and large remained faithful to Buddhism in its various forms and expressions, Islam had a particular impact on the peoples of insular Southeast Asia speaking Western Austronesian or Indonesian languages. Islam thus took hold of the Indonesian archipelago, parts of the southern Philippines and of the Malay Peninsula, a region often referred to as 'the Malay world.' Southeast Asian Muslims generally follow Sunnite traditions and adhere to the Shafi'i school of law. There are doubts whether traces of an earlier presence of Shi'ite elements in West Sumatra indicate a significant change of allegiance or are due to fairly recent contacts with Indian Shi'ites brought to the region under the British at the beginning of the 19th century.

Although Islam found a more ready acceptance among (coastal) ethnic groups which had previously had contact with Indian religions, it did not, however, replace these completely. But, just as there are pockets of Hinduism and Buddhism alive in the archipelago and in particular on Java and Bali, so too Islam is to be found beyond the Peninsula – on the mainland in Burma, and among the Cham of Kampuchea and Vietnam who, significantly, speak an Indonesian language. The Cham, like so many Southeast Asian peoples, were converted to Islam through the Malays and are said to have received the faith from Brunei and Aceh. Yet, the importance of strong links with Kelantan in the north of the Peninsula, which appear to be of a more recent date, should not be underestimated. The origins of the small, indigenous Muslim community found in Burma must be sought entirely with Indian immigrants, and a once famous Muslim settlement in 17th-century Ayudhya was probably mainly populated by foreign merchants.

At the beginning of the 21st century, there are about 30 million Muslims living in Malaysia (the home of the great majority), Singapore, Brunei, Southern Thailand (Patani), and the Southern Philippines. Indonesia, with 170 million Muslims, is the country with the largest number of Muslim citizens in the world. There is no comprehensive theory to explain the process of Islamization of the Malay world, which followed a different course in almost every ethnic (and thus linguistic) group in which it occurred in the region. One assumes, however, that traders of various nationalities played an important part and that, at least in its early years, Islam came via the southern part of the Indian subcontinent, totally bypassing Moghul culture in the process. This is an important point, since Islam hardly influenced Southeast Asian sciences or culture in the broader sense, focusing almost exclusively on theology and law. As far as existing forms of art were concerned, it would appear that the acceptance of Islam led to the disappearance of many artistic and creative expressions which were not of an immediately religious nature. Others had to adapt radically in order to survive.

The Trengganu Stone inscription of the 13th century, which perhaps not surprisingly deals with legal matters, is the first example of Malay written in Arabic script and clear proof of the even earlier presence of the religion in the region, yet historical evidence would indicate that a more widely spread Islamization only began from the 15th century onwards. This was also the period when Sufi brotherhoods flourished internationally and when, after the Mongol conquest, Indian Ocean trade reached new peaks of intensity.

Once Islam had reached the archipelago and established a first foothold in the coastal trading cities of Sumatra, the Malay language became its main carrier, and it is not surprising that of the languages of Southeast Asia, it is Malay which has been influenced most by Islamic traditions. At some point, being a Malay even became synonymous with being a Muslim. Through Malay, the religion reached the northern coast of Java and most other islands. By the end of the 19th century, the process of Islamization of the Malay world can be said to have been completed, even though some Indonesian Muslims argue that after the conversion of the body, there still remains the task of converting the soul.

In the process of Islamization, Indian scripts and their derivatives were gradually replaced by a modified Arabic script which is closer to its Persian form. This is called *Jawi* in the Malay world where it is still used widely in preference to 'Roman' script, and *pegon* in Javanese (which otherwise adhered to its original, Indic script), where it is used exclusively for writing Islamic texts. Most significantly, *Jawi* provided for additional letters to convey the sounds of *ch, g, ng, ny,* and *p*, which are not found in standard Arabic.

Arabic also exerted its influence on syntax, morphology, and lexicography. While it is true to say that the influence on syntax and morphology is more clearly felt in the realm of theological literature, Qur'ānic exegesis, grammar, and jurisprudence, the influence of lexicography extended much further and

led to the reception and total absorption of a wide range of words of Arabic and Persian origin, extending well beyond the purely religious sphere. The important concept of traditional (non-Islamic) law and custom, which is seen in opposition to Islamic law, is only known under its Arabic term '*adat*.'

It is interesting, however, that even under the influence of Islam the Indic heritage was not completely suppressed, as is evinced by the survival of a Tamil word such as *lebai* for the mosque official and Sanskrit terms for key Islamic concepts such as the fast – *saum* in Arabic, but Sanskrit *puasa* in most Indonesian languages – and the religious disciple, who is still called a *santri*. Equally interesting is the fact that the planners of modern Indonesian, besides drawing on European languages, turn to Sanskrit rather than Arabic when it comes to the coining of new words and expressions. It is worth remembering, however, in this connection that in the late 20th century the influence on Indonesian of Javanese, which had always been more influenced by Sanskrit, was stronger than that of Malay. In view of the ethnic distribution of Indonesia's population, 60% of whom speak Javanese and only 5% Malay as their first language, this would appear natural, although non-Javanese Muslims find this Javanese influence hard to accept.

See also: Arabic; Austronesian Languages: Overview; Indonesia: Language Situation; Language Education Policies in Southeast Asia; Malayo-Polynesian Languages; Malaysia: Language Situation; Philippines: Language Situation; South Philippine Languages.

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Islam in the Former Soviet Union

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Some 80 million Muslims (2003) live in the territories of the former Soviet Union, a Muslim population second in size only to those of such countries as Indonesia, Pakistan, Bangladesh, and India. Almost all are Sunni (as are the majority of Muslims in general) of the Hanafi school. There are, however, some Shi'ites in Azerbaijan and several thousand Ismailis, followers of the Aga Khan, in the Pamir mountains of Tadjikistan, in the regions adjacent to Pakistan, Afghanistan, and China.

Taken as a whole, the Muslims amount to some 20% of the total population of the old Soviet territories. However, there is considerable ethnic diversity among them. Some 85% are Turkic; of these, the Uzbeks (22.6 million) are the most numerous, constituting the third largest nationality after the Russians and the Ukrainians. Those belonging to the Iranian family account for 8% the Tadjiks (6 million) are by far the largest nationality in this group. The Caucasian family includes such peoples as the Avars, Laks, Lezgis, and Dargis; none very large in size, they speak languages that are almost wholly mutually incomprehensible.

Muslims are concentrated in three regions: in Central Asia (60%), Transcaucasia (20%), and the Volga region and Siberia (20%). Islam was brought to Central Asia and Transcaucasia by Arab invaders in the 7th century, scarcely 20 years after the death of the Prophet. It gradually gained ascendancy, to become in time the dominant force in those societies. The Tatars and Turkicized Mongols of the Golden Horde, who accepted Islam during the 13th and 14th centuries, carried the religion to the far side of the Urals, along the Volga and Siberia; it remained restricted to the tribes of the Golden Horde, however, and did not spread to the Slav population, who remained Christian.

The power of the Golden Horde began to wane during the 15th century, while that of Muscovy grew ever stronger. The capture of the Tatar strongholds of Kazan (1552) and Astrakhan (1556) by Ivan the Terrible brought Muslims under Russian control for the first time. For much of the next two centuries,

led to the reception and total absorption of a wide range of words of Arabic and Persian origin, extending well beyond the purely religious sphere. The important concept of traditional (non-Islamic) law and custom, which is seen in opposition to Islamic law, is only known under its Arabic term '*adat*.'

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the Tatars suffered severe repression and religious persecution. It was not until the reign of Catherine the Great (1762–1796) that matters improved. During this period the community revived. A Muftiat was created in Orenburg in 1788 with responsibility for Muslim affairs. Tatars were granted a number of concessions in both religious and secular affairs; the latter included the restoration of the privileges of the Tatar nobility.

In the 19th century, many more Muslims came under Russian rule. Azerbaijan and the Caucasus were incorporated into the empire in the first half of the century, Central Asia in the second. For the most part, however, the Russian colonial administration interfered little in the everyday life of the indigenous peoples. Muslim institutions continued to function as before. Christian missionary activity was minimal.

When the Bolsheviks took power after the 1917 Revolution, one of their first acts was to reassure the "toiling Muslims of Russia and the East" that their beliefs and customs were henceforth "inviolable." Yet by the end of the 1920s, a fierce antireligious campaign had been launched throughout the USSR. In the Muslim regions, mosques were closed, the Qur'ān and other religious works confiscated, Muslim courts and schools abolished, teachers and scholars killed or imprisoned. The Arabic script, used for centuries by all the Muslims of Central Asia, Transcaucasia, Siberia, and the Volga, the visible symbol of Islam and symbolic link with fellow believers throughout the world, was replaced first by the Latin (1930), then the Cyrillic (1940). These changes of script effectively ensured that all forms of pre-Revolutionary literature, secular and religious alike, became inaccessible to future generations, because, quite simply, they became illegible.

During World War II, the Soviet government adopted a more conciliatory attitude toward religion. For the Muslims, four regional Spiritual Directorates were created, each headed by a Mufti, to administer such manifestations of Islam as were now allowed to reappear. The largest and most important Directorate was seated in Tashkent, the capital of Uzbekistan; its Mufti played the role of unofficial ambassador to Muslim communities abroad, acting as a mouthpiece for Soviet views on such matters as the Arab-Israeli conflict. Two *madrasa* (religious colleges) were reopened for the training of Muslim functionaries (in Tashkent and Bukhara), and public worship was permitted in a small number of mosques. Twenty to 30 carefully chosen representatives were allowed to go on the *hajj* (annual pilgrimage to Mecca); a tiny amount of religious literature was printed. Most of these measures were intended to impress Muslims abroad. They were too limited to have any real effect on the life of Soviet Muslims.

Truly fundamental changes did not come until the late 1980s, when the policy of *perestroika* ('restructuring') resulted in more mosques being opened in 1989 than had previously been allowed over several decades. Extensions to the two existing *madrasa* were sanctioned, and two new ones opened in Baku and Kazan. A new edition of the Qur'ān (50 000 copies) was printed in 1989, and translations into the local languages (Uzbek, Kazakh, etc.) were put in hand. A small but growing number of works on Islam are becoming available to the public at large. The Arabic script is being taught in schools (as an optional subject) and in evening classes; in some republics, there is a movement to have it reintroduced as the national script, in place of the Cyrillic script. In Tajikistan, for example, a law passed in the mid-1990s laid down that the Arabic script be used for writing the Tajik (Tajiki) language, but this law has never been implemented. What has happened is the replacement of the Cyrillic by the roman script. In some of the other republics, e.g., Kyrgyzstan, both Russian and the local language written in the Cyrillic script have been retained as official languages, while in others, e.g., Turkmenistan, Russian has been retained with the local language written in roman script as official languages.

The languages of Soviet Muslims underwent considerable change between the 1920s and the 1990s. Language planning policies were introduced in the 1920s. Consequently, new literary languages were consciously developed on the basis of selected dialects for many large and small ethnic groups. Some Muslim groups had had no standard, unified written form of their languages before this period; for others, such as the Uzbeks, the classical literary medium (Chagatai/Old Uzbek) was replaced by a form closer to the vernacular dialects. Large numbers of Russian loanwords (more accurately, Western European loanwords borrowed through Russian) were incorporated into these languages. In some cases, they introduced new concepts (e.g., in the fields of ideology, administration, Western-style science and technology); in others they replaced existing Arabic/Persian terms (e.g., in Uzbek, Arabic *dorilfunun* was replaced by Russian *universitet* 'university'). Occasionally, old and new forms coexisted as synonyms (e.g., in Uzbek, Arabic *iqtisod* and Russian *ekonomika* 'economy' are used as exact equivalents). Toward the end of the 1980s, a growing sense of resentment against the Russification of these languages became apparent. This heralded a move to reinstate the Arabic/Persian elements, parallel to the move to change the script from the Cyrillic back to the Arabic.

After the disintegration of the Soviet Union, the great problem that faces the leaders of Islam is how

to respond to the changed situation: in the past, their principal concern was to preserve the basic functional framework of the religion: now they are able, and indeed encouraged, to take a more active role in society, to help in its moral regeneration. It is not an easy task. They have yet to come to terms with it.

See also: Calligraphy, Islamic; Christianity in Central Asia and the Near East; Islam in the Near East; Kazakh; Tatar; Turkmen; Uzbek.

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Islam in the Near East

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While Islam numbers among its adherents speakers of very many languages, it is dominated linguistically by Classical Arabic (*al-lugha al-fuṣḥā* 'the pure language') to an extent that not even medieval Christianity can be said to have been dominated by Latin. The Qur'ān, as the actual word of God, must be read or recited in Arabic. It is widely disputed whether it is permissible to translate the Qur'ān and thus modify, if not pervert, the divine revelation. Many translations have, of course, been made, by Muslims as well as by non-Muslims, and an English translation was authorized in 1984 by the University of al-Azhar in Cairo, the most widely respected repository of Sunni orthodoxy, but the permissibility of translation remains a live issue. The prayers of the five canonical times must also be recited in Arabic. Only the Friday sermon is generally given in the vernacular in non-Arab communities.

Islam and Classical Arabic – A Symbiosis

It may reasonably be argued that it is the universal use of Arabic for religious purposes that largely sustains the very considerable cohesion of the Muslim brotherhood, bridging as it does the gulf between Sunni and Shi'i Islam, and even that between the Ahmadi movement and the rest. However imperfect a Muslim's command of Classical Arabic may be, it has become, as the medium in which the word of God was revealed, part of his heritage, which is to be revered and cherished.

It may also be argued that to an even greater degree, it is Islam that has, reciprocally, sustained Classical Arabic. The idiom of the Qur'ān is not precisely that of the other surviving literature of its period – the pre-Islamic and early Islamic poetry – or of that of later periods. This is inherent in the doctrine of the inimitability (*i'jāz*) of the Qur'ān. It is, however, closer to the language that has survived, with remarkably little change, to become what is now known as 'Modern Standard/Formal Arabic' than are, for example, most 16th-century forms of European languages to their modern counterparts. It is this language that the Arabs use for writing of all kinds, for formal oral communication – lectures, broadcasts, speeches, etc. – and, to some extent, for communication with speakers of 'dialects' that differ greatly from their own. It is the spoken native tongue of no one, and proficiency in its use varies greatly according to the degree of education of the user.

It is still uncertain what the relationship is between Classical Arabic and the various forms of speech (which are not generally represented in writing) that are familiarly referred to as the Arabic 'dialects,' collectively known in Arabic as *al-lugha al-'āmmiyya* 'the common language,' *al-lugha al-dārija* 'the current language,' or *al-lahajāt* 'the idioms, the dialects.' Traditionally, it has been claimed that these are simply offshoots of the classical language that have become differentiated from it and from one another in the course of time. However, the theory has been advanced that a more complicated process of pidginization and creolization among the non-Arab subject peoples of the Islamic empire should be recognized as having taken place. Whatever the answer, the result has been that these 'dialects' are as different from one another as are the various languages of the Romance group. They are, to all intents and purposes, separate languages and might well already have been

to respond to the changed situation: in the past, their principal concern was to preserve the basic functional framework of the religion: now they are able, and indeed encouraged, to take a more active role in society, to help in its moral regeneration. It is not an easy task. They have yet to come to terms with it.

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recognized as such but for two factors, which are partly interconnected.

The first of these factors is Arab nationalism. This, although fostered by those who have had an interest in so doing, has never proved particularly powerful and is indeed somewhat specious; the great majority of those who consider themselves Arabs have little enough direct link with the original Arab conquerors of the 7th century. The second is the importance that the Arabic language has for Islam. It is this that has, on the one hand, preserved it virtually in its pristine form and, on the other, given it a status that has caused its offspring to be regarded, even by those who speak them, as inferior. The 'dialects' are referred to in terms of greater or lesser 'purity' according to the degree to which they diverge from the classical norm. That this is attributable to the influence of Islam is suggested by the case of Maltese; here one finds a descendant of Arabic that has developed in an entirely non-Muslim environment over more than seven centuries, has adopted its own Romanized system of writing, and has been recognized as a language in its own right. Elsewhere, non-Muslim speakers of various 'dialects' have formed minorities within territories under Muslim domination.

Classical Arabic, then, is in effect a hieratic language for Muslims, although it is hardly recognized as such by those who consider themselves Arabic speaking. The extent to which the vernaculars are permeated with classical expressions, largely of a religious nature, perhaps tends to disguise the fact. Thus, the frequent citation of verses from the Qur'ān and the Hadith of the Prophet, exclamations such as *al-ḥamdu li-Lāh* 'praise be to God!', *bismi l-Lāhi r-Raḥmāni r-Raḥīm* 'in the name of God, the Compassionate, the Merciful', *a'ūdhu bi-l-Lāh* 'I take refuge in God (i.e., God forbid!)', and even the customary exchange of greetings, *as-salāmu 'alaykum* 'peace be upon you!' – *wa-'alaykumu s-salām* 'and upon you be peace!', in all of which the inflections of the classical language, absent from the vernaculars, are generally retained, strengthen the belief that other features of everyday speech represent a falling short from a classical perfection. On a secular level, the predilection of the educated for quoting medieval classical poetry, in which the inflections are necessary for the meter, also reinforces this. Thus, although Classical Arabic is not a natural medium for them, 'Arabic-speaking' Muslims do not feel it to be so divorced from their own native speech as, for example, Russian speakers regard Old Church Slavonic. For non-Arab Muslims, of course, Arabic is a hieratic language. Since, however, in many cases their familiarity with it is exclusively in a religious context – whether simply as used in worship or also as encountered in the study of secondary theological literature – they may not be in a position to differentiate between 'varieties' of 'Arabic.' In addition, they are disposed to follow the Arabs in regarding 'Arabic' as one language, proficiency in which is attained by different people to different degrees. Thus, although it is to them a hieratic language, it is not one that is equally remote from all believers; their Arab coreligionists have the enviable advantage of possessing it as their native medium of communication.

Other Islamic Languages

There is no documentation extant for the evolution of Pahlavi into Islamic Persian during the first three centuries after the Arab conquest; all Persians apparently wrote in Arabic, even though they presumably still spoke some form of their native tongue. When Persian emerged, it was heavily arabicized. A large proportion of its vocabulary was borrowed directly, and Arabic phrases were also adopted wholesale – not merely pious expressions and other religious idioms, but ordinary secular elements as well. It was at first still possible to use a less arabicized version, as can be seen in Firdawsi's epic the *Shāhnāmah*, in which, since it is concerned with preconquest history, Arabic phraseology would clearly be inappropriate. This, however, appears to have been regarded as deliberate archaizing, and although the *Shāhnāmah* has always remained immensely popular, no subsequent writers followed Firdawsi's example. The degree to which the language of individual authors was consciously arabicized, however, differs greatly; in general, prose is more affected than verse, and the more orotund the style adopted, the more Arabic it appears.

Oddly enough, some items of Persian religious terminology survive, used interchangeably with their Arabic equivalents, and sometimes in preference to these, for example, *namāz* 'prayer' (Arabic *salāt*), *paygh̲āmbar* 'messenger, prophet' (Arabic *rasūl, nabī*), and *Kh̲udā* 'God' (Arabic *Allāh*). Arabic, however, was a dominant influence; sometimes even Persian syntax seems to be approximating to Arabic. Persian and Arabic words were readily compounded, as in *kh̲idmatgar* 'servant' (Arabic *kh̲idma* 'service' + *-gar*, a Persian suffix indicating 'one who does something'), and *dawlat-bar-andāz* 'revolutionary' (Arabic *dawla* 'state' + *bar-andāz*, a participial form from the Persian verb *bar-andāk̲h̲tan* 'to cast down'); Persian plural endings were attached to Arabic singular nouns, side by side with Arabic plurals, e.g., *ḥālathā* (Persian plural suffix *-hā*, for inanimate objects) and *ḥālāt* as plurals of *ḥāla* 'state/condition' and *gh̲ulāmān* (Persian plural suffix *-ān*, generally for animate beings) and *gh̲ilmān* as plurals of *gh̲ulām* 'boy/slave'.

It appears possible that the Persian word *musulmān* 'Muslim' may have come into existence through a misreading of such a hybrid, *muslimān* 'Muslims' (*muslim* + plural suffix *-ān*), requiring the formation of a further plural *musulmānān*.

The languages that appeared somewhat later on the Islamic scene, such as Turkish and Urdu, borrowed largely from Persian, taking over in the process the Arabic borrowings already naturalized there. Persian itself, from about the 15th century, came to replace Arabic as the principal cultural, if not religious, language of Eastern Islam. It continued to enjoy this position until the last century; of the poetry of Muhammad Iqbal, the celebrated Urdu poet, a sizable proportion is in Persian.

Attempts have been made to 'purify' both Turkish and Persian by replacing the 'alien' elements with 'native' ones. Atatürk's efforts in the 1920s to do this for Turkish had some success; modern Turkish contains a great deal less Arabic and Persian vocabulary than Ottoman Turkish, although much remains, some of it, no doubt, unrecognized as such. The last Shah, Muhammad Reza, became an enthusiastic propagandist for the 'Aryan' character of Persian civilization, and accordingly encouraged the resurrection of Persian terms to replace Arabic; thus, 'agriculture' became *kasẖāvarzī* instead of *zirā'at* and 'student' *dānisẖ-jū* (literally, 'knowledge seeker') instead of *ṭālib*. How much of this linguistic engineering will survive the Islamic revolution, with its inevitable emphasis on Arabic, remains to be seen. In fact, both the Turkish and the Iranian initiatives may be regarded as moves in campaigns of secularization. In Atatürk's case, the campaign was overt and acknowledged; in Muhammad Reza's case, it was covert, but nevertheless real, consequent upon the opposition that both his and his father's policies of modernization had encountered from the Iranian religious leaders.

The Arabic Script

The Arabic script, with various modifications, was almost universally adopted for other languages of the Muslim world; this remained the case until earlier this century, constituting a further bond between Muslims. The respect in which it was held amounted almost to reverence. The art of calligraphy was highly valued, and the Arabic script, often in highly ornate and fantastic forms, became one of the principal features of all the decorative arts. Poetry abounds in metaphors and similes taken from the shapes of the letters.

It has been retained for Persian, Urdu, and Pashto, all three of which are, of course, the languages of regions in which Islam is particularly strong. With some qualifications, it is reasonably well suited to these languages, although the absence of short vowels means that they cannot be read aloud by someone who does not know them. Turkish abandoned the Arabic script in 1928. It was not well suited to a language with a sophisticated vocalic system, but this reform was also a further step in Atatürk's attempt to diminish the influence of Islam in Turkey; it distanced the newly literate both from the Qur'ān and associated Arabic writing and from the corpus of Islamic Turkish and Persian literature. The modified Latin orthography of modern Turkish works well, but it does tend to disguise the Arabic and Persian borrowings in its reproduction of their Turkish pronunciation: the elements *ajzā'* 'components, drugs' (plural of Arab *juz'*) and *kẖānah* 'house, shop' (Persian) are barely recognizable in *eczane* 'chemist's shop'; *fevkalâde* 'extraordinary' appears somewhat far removed from its Arabic original *fawq al-'āda*. Kurdish, which is, somewhat distantly, related to Persian, has modified the Arabic script in such a way that short vowels can be represented; this expedient also disguises the shape of the Arabic, Persian, and Turkish elements, but it appears to have had no antireligious origin.

See also: Arabic; Islam and Arabic; Maltese; Qur'an.

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Island Constraints

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The Phenomena

Chomsky (1964) observed that there was a restriction on the family of displacement operations collectively known as A-bar movement or extraction (including topicalization, wh-movement, relative clause formation, and others), such that given two noun phrases (NPs), one embedded inside the other, only the topmost NP can be displaced. Ross (1967) suggested that this phenomenon is part of a larger pattern of constraints on movement that limit movement from certain kinds of constituents. In Ross's terminology, a syntactic constituent that disallows movement from within itself is known as an 'island.' The constraints that govern this behavior are known as 'island constraints.'

As a point of contrast, consider the following pair of grammatical sentences, where the second is taken to be a question version of the first:

(1a) I said [$_{CP}$ that John wanted [$_{TP}$ Mary to ask Bill [$_{TP}$ to bake **a cake**.]]]
(1b) **What** did you say that John wanted Mary to ask Bill to bake *t*?

Movement of the wh-word (*what*) that is the object of the verb *bake* is allowed to cross a large amount of structure. Now consider movement out of a similar sentence, but one where the starting place of the wh-word is in a clause that is inside an NP. Sentence (2) shows an example where the embedded clause is a complement to the noun; sentence (3) shows an example where the embedded structure is a relative clause:

(2a) I concealed [$_{NP}$ the fact [$_{CP}$ that John baked **a cake**].
(2b) ??**What** did you conceal the fact that John baked *t*?

(3a) I saw [$_{NP}$ the man [$_{CP}$ who baked **that cake**]]
(3b) ***Which cake** did you see the man who baked ***t***?

The sentences in (2b) and (3b) are subject to what Ross called the '*Complex NP Constraint*' (CNPC), and are known as (complex) NP-islands. This constraint simply says that extraction out of a clause within an NP is ungrammatical.

NPs are not the only island, however; Ross observes that any element (including clauses) in subject position is also an island for extraction. This can be seen in (4); (4a) and (4b) show a pair where we are extracting an object out of a tensed clause in subject position. (4c) and (4d) show the same thing with a nonfinite subject clause.

(4a) [$_{CP}$ That the police would arrest **several rioters**] was a certainty.
(4b) ***What** was that the police would arrest *t* a certainty?
(4c) [$_{TP}$ To read ***Great Expectations*** in peace] was all he wanted.
(4d) *What was to read ***t*** in peace all he wanted?

This is Ross's *Sentential Subject Constraint* (SSC).

Closely related to the CNPC and SSC is Ross's *Left Branch Condition* (LBC), which restricts movement of an NP that is the left branch of a larger NP.

(5a) I liked [$_{NP}$ [$_{NP2}$ **John**]'s friend].
(5b) ***Whose** did you like ***t*** friend?

Finally, Ross also proposed the *Coordinate Structure Constraint* (CSC), which disallows extraction of either member of a conjunction:

(6a) I liked **Mary** and **John**.
(6b) *Who did you like Mary and ***t***?
(6c) *Who did you like ***t*** and John?

In addition to Ross's islands, a number of other island types have been proposed, including negative islands (Schafer, 1995) and wh-islands (Chomsky, 1973). The latter are perhaps the most important kind of island. Wh-islands involve displacement of two wh-elements. One movement is to the front of the embedded clause; the second crosses over the first, and puts the wh-element at the beginning of some higher clause. (7a) represents a declarative clause. (7b) and (7c) show that movements of both the embedded NPs are acceptable independent of one another. (7d) shows that movement of both NPs together results in ungrammaticality.

(7a) Bill said [$_{CP}$ **Mary** loves **pineapples**.]
(7b) Bill asked [$_{CP}$ **what**$_i$ Mary loves t_i.]
(7c) **Who**$_j$ did Bill say [$_{CP}$ t_j loves pineapples.]
(7d) *Who$_j$ did Bill ask [$_{CP}$ what$_i$ t_j loves t_i]

The Subjacency Condition

In the government and binding theory of the late 1970s and 1980s, an attempt was made to capture all of the island phenomena (or a significant portion thereof) with one formal constraint. The most successful attempt at this came in the form of the *Subjacency Condition* (Chomsky, 1973; Koster, 1978; Rizzi, 1982); this constraint limited wh-movement by specifying dominating categories as ***bounding nodes***. Crossing too many bounding nodes in one swoop

resulted in ungrammaticality. A typical formalization of the subjacency condition is given in (8):

(8) A-bar movement may not cross two or more bounding nodes. Bounding nodes are NP and TP (= S).

In order to see how this accounts for islands, it is worth showing how it allows for long distance wh-movement as in (1). The underlying idea is that movement is *cyclic*. Although the movement in (1) appears to be long distance, it actually happens in shorter hops. Each hop lands in the specifier of a CP. As such, most cases of movement will only cross one bounding node (a single TP). This can be seen in (9) below, where each bounding node is circled. Each step in the movement crosses only one bounding node.

(9a) $[_{CP}$ did $[_{TP}$ you think $[_{CP}$ what$_i$ that $[_{TP}$ Millie said $t_i]]]]$?

move #1

(9b) $[_{CP}$ What did $[_{TP}$ you think $[_{CP}$ t_i that $[_{TP}$ Millie said $t_i]]]]$?

move #2

Contrast this with an NP-island, such as (2b), the structure of which is given in (10):

(10) ?? $[_{CP}$ **What** did $[_{TP}$ you conceal $[_{NP}$ the fact $[_{CP}$ that $[_{TP}$ John baked t $]]]]]$?

Successive cyclic movement will allow the first movement of the wh-word to cross only a single bounding node, which is acceptable:

(11) ?? $[_{CP}$ did $[_{TP}$ you conceal $[_{NP}$ the fact

$[_{CP}$ what that $[_{TP}$ John baked $t_i]]]]]$?

move #1

However, subsequent movement to the highest CP specifier will result in a Subjacency violation, crossing both the NP node and the higher of the two TP nodes:

(12) ?? $[_{CP}$ What did $[_{TP}$ you conceal $[_{NP}$ the fact $[_{CP}$ t

**move #2*

that $[_{TP}$ John baked $t_i]]]]]$?

A similar account can be given to wh-islands: movement of the first wh-word does not violate the constraint:

(13) *$[_{CP}$ did $[_{TP}$ Bill ask $[_{CP}$ what$_i$ $[_{TP}$ who loves $t_i]]]]$

move #1

Movement of the other wh-word will necessarily result in a Subjacency violation, because it will not be allowed to stop in the embedded specifier of the CP (which is occupied by *what*), so it will cross two TP bounding nodes:

(14) *$[_{CP}$ who$_j$ did $[_{TP}$ Bill ask $[_{CP}$ what$_i$ $[_{TP}$ t_j loves $t_i]]]]$

**move #2*

The subjacency constraint also explains the left branch condition, the sentential subject constraint, and some cases of the coordinate structure constraint (although not all). An important outgrowth of the research into subjacency was the observation that there was crosslinguistic variation in what counted as a bounding node. For example, Rizzi (1982) observed that CPs (S′) and not TPs (S) in Italian were bounding nodes. This kind of observation was influential in the development of casting crosslinguistic variation in terms of narrow parameters.

The Empty Category Principle and the Condition on Extraction Domains

Huang (1982) observed that extraction from adjuncts and specifiers was consistently worse than that of extraction of complements. Huang proposed the *Condition on Extraction Domains* (CED), which limits grammatical extraction to positions that are governed. (Roughly, government corresponds locally c-commanded by a lexical [theta role-assigning] head or by an antecedent.) The heart of this idea is contained in Chomsky's (1981) *Empty Category Principle* (ECP), which requires that the traces of A-bar movement be governed. Chomsky (1986) attempted to unify the ECP, subjacency, and other locality conditions (such as the binding conditions) in a system called *Barriers*. At the time of the writing of this entry, Barriers is widely considered to have been a failure.

Relativized Minimality

Rizzi (1990) first observed that every kind of movement (A-bar movement, A-movement (or NP-movement) and head movement) has some kind of locality constraint on the relationship between the displaced item and its starting position or trace. In each case, the moved item must c-command the position it moves to; and there can be no potential intervening candidate for the element at the top of the movement chain. In other words, given a structure such as (15), where Y and X are of a like type of category (wh-element, or NP or head), then a movement chain formed between X and Z is ungrammatical.

(15)

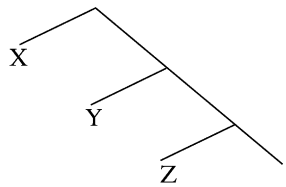

This differs from previous approaches where what was at stake in locality conditions was the nature of the categories that dominate the trace. Here, what is of relevance is the nature of the categories and positions that c-command the trace.

Island Constraints in the Minimalist Program

The relativized minimality approach has been very influential in the formulation of constraints on island phenomena in the minimalist program. In the earliest versions of the program (e.g., Chomsky, 1994), island effects were captured by making reference to a version of relativized minimality, whereby there are economy constraints that compare derivations of sentences and look for the most economical. One such constraint is *Shortest Move* (SM). This constraint gives preference to derivations where each movement moves to the closest potential landing site. Skipping that landing site (for example, because it is filled with another wh-word) will result in a dispreferred derivation. In later versions of the program (e.g., Chomsky, 1995), SM is replaced by an absolute condition that is part of the definition of the movement operation (known as ATTRACT). This condition is the *Minimal Link Condition*, which for any given landing site always prefers the closest potential filler. Refinements to this approach can be found in Collins (1997), and criticisms can be found in Johnson and Lappin (1999). In the most recent version of the minimalist program (Chomsky, 2000), known as *phase theory*, island effects reduce to the way in which the syntactic tree is derived. Very small, local structures (known as *phases*) are generated piece by piece from the bottom of the tree. Operations may only apply within these phases, or from the topmost position within the phase (the phase edge); this ensures that each step in the movement will be limited to occur either within a given phase or between adjacent phases, giving rise to successive cyclicity.

Approaches to Island Effects in Other Theories

Outside of Chomskyan linguistics, other approaches to syntax have attempted to capture some of the same results. Following the work of Gerald Gazdar (1981) in generalized phrase structure grammar, proponents of head-driven phrase structure grammar (HPSG) make use of the fact that the theory relies on licensing constraints on subtree structures (similar in many ways to the licensing constraints that hold of minimalist phasing). In HPSG, island conditions are at least partly stated as conditions on these licensing constraints. For example, the CSC falls out from the requirement that the rule which licenses coordination stipulates that neither conjunct may contain a gap (see Sag *et al.* [2004] for a textbook treatment, and Johnson and Lappin [1999] for a more in-depth analysis). In lexical functional grammar, long-distance dependencies are expressed in terms of the notion of functional uncertainty, whereby functional relations such as FOCUS (which governs wh-questions) search for a potential variable to satisfy their features. There are conditions on the search, called inside-out constraints, which limit the search space within the f-structure (see Falk, 2001 for an accessible introduction to these ideas). In the functionalist literature, the most common approach is to try to explain subjacency as a processing or memory constraint. For example, Pritchett (1991) suggests that subjacency reduces to the desire of the parser to match up displaced elements and gaps. When too many choices are available, the parser crashes. For a critical review of such approaches, see Lasnik (1999).

See also: Chomsky, Noam (b. 1928); Complement Clauses; Constituent Structure; Generative Grammar; Principles and Parameters Framework of Generative Grammar; Relative Clauses; Syntactic Variables and Variable-free Syntax; Syntactic Variation.

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Isle of Man: Language Situation

Editorial Team

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Isolated Language Varieties

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The term 'isolation' and its corollary 'mobility' have continued to be key factors in the determination of the actuation, embedding, and trajectory of linguistic change. Although isolation has rarely been studied in and of itself as an independent linguistic variable (Chambers, 1995), dialectologists have been irresistibly drawn to isolated communities (and to isolated speakers for that matter) for their import descriptively and theoretically, since Gauchat's (1905) cornerstone study of the community of Charmey in the Swiss Alps. Such communities yield vital evidence into earlier stages of various dialects, including African American Vernacular English, Appalachian English, and even mainstream American English, to name a few. Additionally, insular and postinsular communities allow for rigorous investigation into language variation and change, particularly with respect to those language communities that are moribund – that is, those that are in danger of dying out within a generation or two. The case of Faetar, a Franco-Provençal dialect spoken in the villages of Gaeto and Celle in southern Italy and historically brought to the region by French immigrants in the 14th century, is such an example of a moribund language variety. Analysis of the phonological system of Faetar, particularly the phonological status of the schwa (absent in standard Italian), has provided rich data on the specifics of how language contact affects each of the languages in the contact situation (Nagy, 2001).

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maintenance and change have come under considerable scrutiny, and this criticism has led to dynamic definitions of isolation itself as well as the formulation of comprehensive principles by which to measure the influence of insular and postinsular communities on language change.

The Concept of Isolation

Categories of Isolation

Sociolinguists use the term 'isolation' to indicate relative degree of separation of a particular language community from surrounding contact varieties. Categories of separation may include (Montgomery 2000: 44–45).

- Physical (involving proximity to other communities, especially towns)
- Sociological (involving the frequency and variety of contact with other communities)
- Economic (involving the exchange of goods, services, and ideas with other communities)
- Psychological (involving the orientation and affinity of one community toward others, attachments to one's own culture, and openness to change)
- Cultural (involving the maintenance of distinctive practices and beliefs)
- Technological

Crucially, these categories are not discrete. In fact, each one may be dependent on, connected with, or reinforced by another. For example, sociological isolation, where speakers are separated in their day-to-day contact from surrounding communities, may be directly predicated by the community's physical remoteness. An example is the community of Smith Island, Maryland, where the islanders are quite socially isolated. Smith Island is not a tourist spot or an ideal place for retirement. Moreover, the island does not attract newcomers who are looking for a place to settle. In fact, the population of Smith Island is declining quickly, down from 650 in 1970 to 350 today. Certainly, the community's physical remoteness has played a role in this social isolation, as it is not and more than likely will never be accessible by bridge from the mainland, and the island is only accessible by day via private ferry service (see more discussion of Smith Island below).

Additionally, a particular community's isolation may be a compound of several factors, such as economic practices as well as access to the media or technology. Or, a group of speakers' psychological isolation might be dependent on the extent of its cultural isolation. Take, for example, the Lumbee Indians of Robeson County, North Carolina, who are discussed in more detail below.

This community of speakers has struggled to maintain a distinctive American Indian culture since the 1835 passage of the Revised State Constitution of North Carolina, which mandated that people of color did not have the rights and privileges afforded those who were white. This legislation effectively deprived the Lumbee of their ethnic identity as American Indians since the Lumbee no longer had a discrete identity in the eyes of the government; instead, they were grouped with other people of color.

Such a classification has had an essential effect on how they have defined themselves in relation to other groups. In an important sense, the Lumbee historically have been caught between whites and blacks, and such an indeterminate status has served to foster a sense of otherness apart from both white and black.

In addition to physical or geographic remoteness, sociological or dense, multiplex networks, and economic autonomy, supplemental classifications of isolation, such as community size and historical continuity have also been offered. Isolated communities, indeed, tend to be small in population size (e.g., a few hundred); however, this is not a categorical qualification. For example, the insular community of Lumbee Indians of Robeson County consists of upwards of 45 000 members.

Further, even though many isolated communities may have had significant out-migration and some in-migration over the course of their histories, the historical continuity of the communities tend to remain constant at their core. Most isolated communities have a central core of members who are able to trace back their family lineage to the local inception of the community. More than that, however, true membership of these isolated communities is often tied to such lineage (i.e., whether a speaker's parents, grandparents, and great-grandparents were raised in the area).

While general categories for isolation are critical in the classifications of insular language varieties, the picture is even more complex. With respect to sociological isolation, for example, it is equally important to investigate the various types of contact that are involved as it is to identify the levels of contact facing an insular community (Schilling-Estes, 2002). So, for example, is the contact related to personal associations (e.g., friends, social clubs) or business or economic factors (i.e., work)? Is that contact passive or active (e.g., one-on-one communication or television); mandatory (e.g., one is required by commitment) or optional (e.g., because of personal choice)? Additionally, where does that contact take place?

Is the contact within or outside of the particular community in question?

Types of Isolated Communities

In addition to the classifications that are associated with isolated communities, there are also varying types of isolated communities. That is, open vs. closed and endocentric vs. exocentric communities. Andersen (1988) maintains that it is not unusual for open communities (e.g., those that allow in-migration) to be attitudinally closed, or for closed communities to be open in terms of a wider view of the world. Endocentric communities, however, tend to remain focused on their own internal norms, whereas exocentric communities may be aware of norms outside of their own community reference. Increasing contact with isolated communities, then, may exacerbate or blur lines of distinction depending on psychological factors (Wolfram, in press). As Andersen (1988: 74–75) states, "It may be primarily an attitudinal shift from endocentric to exocentric which changes the course of development of a local dialect when it becomes part of a wider socio-spatial grouping [i.e., when it becomes more open] and not just the opening up of new avenues of interdialectal communication."

Criticism of the Concept of Isolation

Isolation, in whatever way it is categorized, is not a dichotomous classification. In other words, communities are not simply either isolated or nonisolated. Rather, isolation is relative over time, geography, and social space, even in the most extreme dialectical situations.

However, criticism has been leveled at linguists both from within the linguistics discipline and from outside (e.g., historians of Appalachia – see Montgomery, 2000) pertaining to the validity of isolation as a descriptive classification or as an explanatory tool. Many sociolinguists feel that adequately describing the sociohistorical and sociocultural context of a particular community is enough to satisfy an understood set of qualities related to isolation. However, such *ipso facto* classifications can miss the crucial differences that classify very different sociocultural isolated communities. Take, for example, Tristan da Cunha (Shreier, 2003). The island of Tristan da Cunha is located along the maritime mountain ridge, which divides the Atlantic Ocean longitudinally. The closest settlement to the island is Jamestown, St. Helena, about 1400 miles away. There have been periods in this island's history where there was no mail service at all for at least a decade, and today, while they have more contact with the outside world than they ever had (e.g., satellite telephone, television, Internet), this contact is relatively new – since the mid-1990s.

Such isolation is self-evident for this community and has unique linguistic consequences. For example, *useta* + past tense verb (*I useta came*), is a structure distinctive to this community of speakers, created in the learning process of English in a multicontact community. However, this feature has become a dynamic, surviving construction precisely because of the island's fertile isolation.

Similarly, it has been suggested that the extraordinarily high density of discrete languages in Papua New Guinea is at least partly due to the very rugged terrain and historical isolation of speech communities there. For other communities, such as Appalachia, where mountainous regions and pockets of remoteness less clearly separate its speakers from surrounding language varieties, though, such descriptors of isolation may be deceptive and assume a solidarity of the region and stagnancy of the language that does not exist.

Those in favor of rigorously re-investigating the properties of isolated communities assert that sociolinguists have fallen into a trap of treating all isolated communities as the same without regard to the situated context of those communities within the wider scope of language contact. In other words, linguists have not typically asked the question of isolation as compared to what? Why should one community be more isolated than another? Furthermore, under close examination, are all those communities labeled as isolated truly that isolated after all?

Despite critical investigation into the premise and usefulness of isolation as a linguistic construct, however, the role of isolation (or conversely mobility) in dialect development, maintenance, and change has been continually reinforced in a wide array of research.

The Role of Isolation in Language Change

Two principles have historically worked together to situate and describe isolated dialect situations. They are the founder principle and the relic assumption. The founder principle (Mufwene, 1996, 2001) maintains that the linguistic characteristics of a particular speech community are determined by the language that was originally brought into the region. Thus, Appalachian English, for example, is strongly influenced by the language(s) of its original inhabitants (e.g., the Scots-Irish). Likewise, in the case of African American Vernacular English, the issue of donor dialects is still under considerable investigation. The relic

assumption (Andersen, 1988) presumes that isolated dialects will be conservative in their trajectory of linguistic change and will actually remain relatively unchanged after they are clearly formed.

Although there is undeniable and copious support for both of these principles, emerging evidence of isolated communities dampens the principles' associated underlying assumptions:

1. that isolated communities are stagnant with respect to change;
2. that as isolated communities come into contact with surrounding varieties, those communities' distinctiveness disappears;
3. that isolated communities progress on the same trajectory of language change in the midst of outside contact.

The Study of Lumbee English Perfective *Be*

The example of Lumbee English perfective *be* – that is, forms of *be* that are used in aspectual contexts where current varieties of English typically use the perfective form *have*, as in sentences such as *I'm been there before* for *I've been there before* or *You're got my number* for *You've got my number* – yields strong contradiction to the assumptions that isolated communities are stagnant and that they lose their distinctiveness as language contact increases.

The Lumbee Indian Community of Robeson County, North Carolina, have lived in a tri-ethnic situation for close to two centuries with African and Anglo-Americans in Robeson County, NC, located in the southeast corner of North Carolina along Interstate 95 by the South Carolina border.

The county's ethnic populations are near equal proportions, with the Lumbee comprising the largest population of upwards of 45,000. Although no one knows the exact relationship between these three ethnic groups in the earliest contact of the county area, we do know that for well over a century, the ethnic groups have remained separate and distinct. *De facto* segregation exists even beyond the most recent effort to integrate the groups, which involved the desegregation of the county schools in the early 1970s.

The ancestral languages(s) of the Lumbee – as with many American Indian peoples – is unrecoverable: there are no vestiges of American Indian source language features in their current variety of English. Sociohistorical and archaeological evidence does, however, suggest that northern Iroquoian (primarily Tuscarora), Siouan, and Algonquian languages may have had a formative influence. Indeed, it is quite possible that the Lumbee are descendants of a multitribal and/or multiethnic contact situation rather than members of one exclusive native tribe.

Reportedly, the Lumbee were speaking English in their first contact with European immigrants who began inhabiting the Robeson County area around 1730. Where the Lumbee learned their English is still a matter of speculation. Highland Scots (who migrated along the Cape Fear River and spoke varieties of Scottish Gaelic and English) and Ulster Scots (who filtered down into the Piedmont of North Carolina from Pennsylvania and Virginia and spoke a Scots-Irish variety of English) were the principal European language groups of the Robeson County area. However, African-Americans – reportedly brought into the area as slaves by the European groups – were also a significant group in the county.

The current language profile of the Lumbee demonstrates selective alignment of language features with regional and ethnic contact varieties of English, such as general Southern, Appalachian English, and African American Vernacular English. At the same time, however, the Lumbee maintain a few relic features that reflect earlier versions of their English contact varieties. One such feature is perfective *be*.

Perfect *be* is exclusively used by the Lumbee in the context of Robeson County, making the form a localized marker of ethnicity for this group. The use of perfect *be* is widespread in the Lumbee community, spanning all age groups, including both the perfect uses of *is* and *are* (Dannenberg, 2003).

The perfect uses of *be* do not appear to be lexically restricted to co-occur with specific verbs or restricted to particular phonological contexts. Syntactically, perfect *be* may appear in an assortment of contexts, including in embedded clauses (e.g., *I don't know whether I'm still got it or no* or *When you got people, you're got resources*), which demonstrates its flexibility. At the same time, however, perfect *be* is syntactically obligated to occur immediately after the subject in its conjugated forms, and that subject tends to be the first person singular pronoun *I*. Although perfect *be* does, albeit rarely, occur with noun phrases as with other pronominal subjects, such as *we* and plural *you*.

Perfect *be* is a robust form in Lumbee English. Thus, it is not surprising that there are extended and analogous uses of *be* in this variety. For example, there are instances where the perfect *be* actually marks as simple past construction, as in *That's what we're called it, Baby Ruth* – i.e., *That is what we called it when we were little*. In addition to the simple past context, there are also cases where the nonconjugated form of perfect *be* is used in perfect and

simple past constructions, as in *He don't know I be went up to the courthouse and took me some papers out on him* and *I told her don't get it cause Mama be got it*, respectively. Lastly, there are cases of perfect *be* where a hypothetical and/or counterfactual context is marked. For example, when the construction, *They be take their honeymoon there* was uttered, the couple had not married yet, nor had they decided a honeymoon destination. In another example, *We bout be bought all of them for $50 dollars*, the buyers had not actually purchased the items for the sum listed.

Perfect *be* for Lumbee English is a relic form, a retention of an earlier form offered by early contact varieties of English, but relic, here, does not connote static. Indeed, the case of perfect *be* reflects the complexity of a language system as it has configured and reconfigured itself over time.

The Study of Smith Island, Maryland

As the case of Lumbee use of perfective *be* disputes the notion that isolated communities are stagnant with respect to language change, so does the case of Smith Island. Smith Island is located off the coast of Maryland, approximately 10 miles from the mainland Delmarva Peninsula. Schilling-Estes (2002) reports that the island is only accessible by day via a private ferry service, and that the community is largely homogenous. The historical continuity of the residents of Smith Island is also indisputable, with many residents able to trace back their family's lineage to the 1600s. Moreover, Smith Island residents have been able to subsist autonomously in maritime-related activities, although that is changing at present. At the same time that residents are being forced to seek jobs outside of the community (and off the island), the islanders "continue to remain highly focused socially and attitudinally on their local ties" (Schilling-Estes, 2002: 66). Islanders, who sought a high-school education, at one time stayed on the mainland during the school week, as there was no high school on the island. Today, the children are being shuttled to and from the mainland for school on a daily basis.

Smith Island is by all classifications an isolated community, even though current islanders are coming into more and more contact with mainlanders, and in their 1999 study, Wolfram and Schilling-Estes examined two variables in order to demonstrate the level of change in the community over time. The two variables in question were raised /ay/ (as in r*oi*ght for r*i*ght) and glide-fronted /aw/ (as in s*ai*nd for s*ou*nd) (Wolfram *et al.*, 1999).

Investigating generational uses (those born between 1899 and 1932, those born between 1942 and 1961, and those born between 1965 and 1971) of both variables from interviews conducted in 1983, Schilling-Estes and Wolfram found that both the raised /ay/ and the glide-fronted /aw/ had increased quite significantly over the three generations. Crucially, they found that these variables actually increased when used in the younger generations; in fact, older speakers had low levels of these features. Thus they concluded that raised /ay/ and glide-fronted /aw/ were not relic features, retained from earlier vestiges of the language, but rather innovative uses that demonstrated dialect concentration rather than dissipation as this community came into more contact with surrounding mainland varieties.

This pattern of concentration holds true for Smith Island with respect to morphosyntactic variables as well. An example is the past *be* paradigm (that is, for negative contexts, leveling to *wasn't* or *weren't* as in *I wasn't/weren't there* and for positive contexts, leveling to *was*), examined in Schilling-Estes (2002). The data illustrate that there was a complete shift of *wasn't* and *was* leveling from the earliest generation studied, where the be paradigm use reflected the typical pattern of usage in vernacular American varieties, to the third generation, where there was categorical *weren't* use for negative contexts (that is, 100%) and some regularization to *was* in positive contexts (22%). As Schilling-Estes (2002) reports, gender differences in the uses of past *be* exacerbate the differences between the generations. In fact, although it took women three generations to switch to categorical usage of *weren't* in negative contexts, the men reached the shift in only two generations. This rapid shift from one usage to the next for male Smith Islanders may be tied to outside contact: men had wider networks than women on the island.

Thus, with the case study of Smith Island, we have further seen that isolated communities can indeed be quite innovative and dynamic with respect to language change. Moreover, in the case of the Lumbee and Smith Island, we have also seen that communities can remain distinctive, even in the face of language encroachment. The Lumbee have selectively carved out a distinctive niche in the context of a tri-ethnic environment and successfully negotiated their identity over time and social space with respect to perfect *be*. Smith Islanders have not only remained unique in the midst of increasing contact with outside communities, but have actually increased their distinctiveness through the concentration of phonological and morphological features. But what do we make of the other assumption that isolated language communities progress on the same trajectory of language change in the midst of outside contact? As the case studies of African American Vernacular English in

Beech Bottom and Hyde County, North Carolina, directions of language change in isolated communities can be quite disparate. Focusing on these two separate case studies in North Carolina highlights that even in a specific geographic region, trajectories of language change may be quite different.

The Case of Hyde County, North Carolina

Hyde County, North Carolina, is located on the eastern seaboard of North Carolina and encompasses coastal mainland as well as the Outer Banks barrier islands. Mainland Hyde County, the geographical region of the study is a long-term biracial community that has been historically one of the lowest populated counties in the state. Currently, there are more than 5000 residents in the county. The terrain of the county is marshy wetlands and the county has been socially detached – in fact, many African adults interviewed reported that they had not left the county until adulthood. In their 2002 investigation into the properties of African American Vernacular English (AAVE) use in Hyde County, Wolfram and Thomas (2002) examined several features well-documented in other studies of AAVE as well as European contact varieties in the Pamlico dialect area in order to situate Hyde County AAVE within regional and wider contact norms. They examined r-lessness (e.g., *cah* for *car*), several phonological variants – including /ai/ (*tide*), /au/ (*house*), /o/ (*boat*), /u/ (*boot*), /e/ (*day*), /ɔ/ (*bought*) – third person s-marking (*The dogs barks*), copula absence (*She going nuts* or *They going nuts*), and past tense *be* regularization (negative *weren't* and positive *was*).

Analysis of each of these features shows a mixed alignment. Clearly, older African-Americans within the county tend to align with their European American cohorts in the county. Older African-American speakers' rates of postvocalic r-lessness and the vowel systems of the speakers solidify this alignment. At the same time, though, younger speakers within the county appear to be moving away from the more traditional vowel systems and aligning with the wider AAVE norm, even though they still show vestiges of the local norm. For example, r-lessness is on the increase from the older generations to the younger generations, but the youngest group still has lower frequency of r-lessness as compared to general AAVE. Moreover, fronted /o/ among younger African-American Hyde County speakers continues to mark them as separated from other AAVE communities.

With respect to the morphosyntactic variables, the alignment is less clearcut. The use of verbal -s, where typically third person -s attaches to plural subjects that tend to be noun phrases as opposed to pronominals, indicates that elderly African-American speakers preferred verbal -s attachment, regardless of subject type, while Hyde County European speakers followed the general pattern, selecting verbal -s with noun phrases. The absence of verbal -s on third person verbs is a well-established descriptive feature in general AAVE. The contrast between European and African-American speakers with respect to this feature is quite clear. All generations of African-American speakers in Hyde County regularly delete third person -s where European American speakers do not.

Copula absence delineates a similar pattern. Among African-American speakers, we would expect a high rate of the copula with *is* as well as a high rate with *are* as per the typical pattern of copula absence in AAVE. Further, we would expect that European American speakers would have some *are* absence, while we would not expect *is* absence. Wolfram and Thomas (2002) report that African-American copula absence in Hyde County is distinctive to that group. Indeed, European Americans in the county do not even have copula absence to a limited degree.

Leveling to *was* and *weren't* in Hyde County patterns are much the same as the above phonological variables. Older African-Americans level to *was* in positive contexts and *weren't* in negative contexts, mirroring European contact variety norms. However, young African-American speakers level to *was* in both positive and negative contexts, much more in line with current varieties of AAVE.

The case study of Hyde County illustrates that in this isolated community, younger African-American speakers are aligning with an outside norm, diverging from their European American cohorts in the region. This trajectory of change is quite different from another African-American community of Beech Bottom, North Carolina.

The Case of Beech Bottom, North Carolina

Beech Bottom is a very small community of self-reported multiethnic speakers (speakers claim European and mixed African-American, European American, and American Indian status) in the southern Appalachian mountain range in Avery County. The community is geographically detached from larger towns and cities and the mountainous terrain hinders access to locations outside of the immediate region. The community is closely knit, and there are only a half-dozen long-term residents of the area. The isolation of this community is certainly without question.

Like the Hyde County study, the investigation of Beech Bottom examines several variables in order to situate speakers within the wider context of local and regional contact norms. Among those features studied were 3rd person plural -s absence and attachment, copula absence, copula absence and past tense *be* regularization, consonant cluster reduction (as in *wes*' for *west*), r-lessness, /ai/ glide reduction (as in *tahm* for *time*), and an overall analysis of the vowel system of representative speakers.

Overall with respect to -s attachment, (Mallinson and Wolfram, 2002) reports that African-Americans and European Americans basically are aligned. Although there are subtle differences in some constraint orders, it appears that -s attachment is declining for both groups over time. At the same time -s attachment demonstrates alignment, 3rd person -s absence illustrates ethnic disparity among the older generations: older European American speakers have a low rate of absence while older African-American speakers have much higher rates of absence. Younger generations of African-American speakers, however, appear to have much lower rates of absence, suggesting a movement toward the local European American variety.

Past *be* also indicates alignment between the groups, with both leveling to *was* in both positive and negative contexts, which is typical of the Appalachian region. Further, regarding r-lessness, the groups are quite similar – that is, both have a high incidence of rhoticity, and both groups reduce the glide on /ai/, both of which are also characteristic of Appalachian varieties.

Conversely, copula absence illustrates dissonance between the groups: African-Americans show much higher rates of absence that their European cohorts. The same holds true with consonant cluster reduction where there is a strong ethnolinguistic divide between the European American and the African-American speakers.

Thus, in this isolated, dwindling community of speakers, African-American speakers are moving toward local European American norms. This movement is clearly contradictory to the Hyde County example, where African-American speakers are on a path of change toward wider AAVE norms. In two isolated communities, then, there are very disparate trajectories of change in the face of contact and change.

Accounting for Relative Variation of Isolated Communities

With obvious differences in the patterns of language variation, maintenance, and change from one isolated community to another, are there common properties that sociolinguists can draw on with respect to concepts of isolation and its effect on language change? Toward an understanding of the complexities and relativity of the concept of isolation, Wolfram (in press) outlines seven principles that may apply to isolated dialect communities:

1. The Principle of dialect exclusion. This principle is designed to account for those dialects that are separated from continuing dialect diffusion among socially dominant groups. Through exclusion, such isolated dialects may have selective retention of features and/or independent language change.
2. Principle of selective change. Under this principle, dialects may exploit dialect structures that may result in divergence. These dialects may be conservative with respect to change or the changes could be accelerated.
3. Principle of regionalization. While independent language change takes place in peripheral dialect communities, isolated dialects may converge with or diverge from other isolated dialects as well as from core dialect communities. This process leads to regionalization.
4. Principle of social marginalization. This principle states that when nonmainstream dialects are marginalized, then those dialects occupy a low status in comparison to socially ratified dialects. Thus, the features of those dialects will be socially stigmatized.
5. Principle of vernacular congruity. There are natural linguistic properties, such as analogical leveling, regularization, and generalization that facilitate language change. Given that those communities that are socially disenfranchised will presumably have less pressure to preserve irregular structures that are socially preferred, such change may unite otherwise disparate communities.
6. Principle of peripheral community heterogeneity. This principle suggests that small communities are quite heterogeneous with respect to intracommunity variation. Such variation may be correlative of the specified ethnic or social boundaries of the community, or the variation could be a result of systematic individual variation. Regardless, small communities can tolerate substantial, long-term variation.
7. Principle of localized identity. Above all, speakers tend to embrace distinctive symbolic tokens of local identity, resulting in the perpetuations of dialect features beyond the enclave community. This perpetuation may be in the form of dialect focusing or intensification.

Isolated language varieties are complex entities of sociolinguistic study. How to precisely identify, categorize, and systematize these kinds of communities of study is still a matter of considerable debate. Out of this debate, however, have come several clear classifications of what isolated dialects actually are and formative principles by which to measure the efficacy of isolated communities as areas of study. Despite controversy along the way, isolated language varieties are the window into lingering questions pertaining to language actuation, embedding, maintenance, and change.

See also: Copula Variation; Cultural and Social Dimension of Spoken Discourse; Endangered Languages; Ethnolinguistic Vitality; Identity and Language; Language/Dialect Contact; Native Speaker; Reversing Language Shift; Social Psychology and Language; Spatial Variation (Geolinguistics); Variation in Native Languages of North America.

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Israel: Language Situation

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In 2003, the population of Israel was 6 748 400 (77% Jewish, 19% Arabs, and 4% other minorities). About half of the Jewish people are Ashkenazi and half are Sephardi. The literacy rate is 95% (population percentage over age 15 with ability to read and write). Israel is a highly multilingual country. The *Ethnologue: languages of the world* (see Grimes, 2000) lists 36 languages for Israel; of these, 33 are living languages and 3 are extinct. Israel is a country based on immigration, which partly explains its language diversity.

Hebrew and Arabic are the two official languages of Israel. It is estimated that 4 500 000 Israelis have functional competence in Hebrew, as opposed 2 000 000 who are competent in Arabic (Spolsky and Shohamy, 1999). Hebrew is the dominant language in all walks of life. It is taught as a mother tongue in most of the Jewish schools (except in some ultra-orthodox schools, where Yiddish is the language of instruction) in all stages of education. Hebrew is also learned by all of the minorities as a second language from the 3rd grade on. Modern Hebrew is the national language of the Jews.

Israel is a country based on immigration, therefore the dialects in Israel depend on the origin of parents, and not on geographical location. Israelis who came from Oriental countries before or during the 1950s spoke a distinctly Sephardic (Oriental) variety of Hebrew. However, most second- or third-generation Israelis from these origins shifted to the Ashkenazi Hebrew, so that the Oriental dialect is disappearing except as a socially marked variety.

Arabic is the mother tongue and the main national language of more than 1 million Arab citizens of Israel. Arabic is likewise a community language of hundreds of thousands of Sephardic Jews. Arabic in Israel is a minority language and is legally recognized as a second official language. Arabic is taught as mother tongue in all Arab schools in Israel, from the 1st to the 12th grades, and in several institutes for teacher training. It is also learned by hundreds of thousands of Jews as a foreign language (Amara, 2002; Amara and Mar'i, 2002).

Though Hebrew and Arabic are recognized official languages in Israel, the state of Israel and its society are not publicly bilingual. The status accorded to Arabic in Israeli law is still devoid of any practical significance in Israeli public life. For all intents and purposes, Hebrew is virtually the only language of Israeli civic life. By and large, this is the language in which the Israeli public domain 'speaks'. It is the language of bureaucracy, of higher education, and almost exclusively of the domestic electronic media, and, most importantly, it is the language of those sectors of the labor market that are open to the minority population. The main significance of the status of Arabic in Israel appears, then, not in regard to the society as a whole, but to be the extent of the protection it affords to the internal life of the minority population, especially in regard to the right to education in the minority tongue (Saban and Amara, 2002).

English is the most commonly used foreign language in Israel. It is spoken in both public and private domains (e.g., higher education, electronic media, street signs, and shop signs). The country's laws are also published in English translation, with some delay. English is a compulsory subject from the 3rd or 4th grade on. English is the mother tongue of more than 100 000 Israelis. French is taught optionally as a second foreign language from 5th to 12th grades. Because of the special status of French in the world for political, commercial, social, and cultural reasons, French may be chosen as the second language in place of Arabic.

Immigration remains a major influence on the Israeli language landscape. Recent immigrants, mainly the million Russians and 75 000 Ethiopians, still use their immigrant languages in the home and in the immediate neighborhood. Russian is offered as an optional language for new immigrants through the system. Many established immigrants maintain their own languages (e.g., Polish, Romanian, French, German, Arabic, or Turkish) in their homes and in community settings.

The many Jewish languages that flourished in the Diaspora (such as Ladino, Yiddish, and Judeo-Arabic, with many varieties) are losing ground to the dominant language of the country. Except for Yiddish, maintained in some ultra-orthodox communities, Jewish languages are disappearing in Israel.

In addition to Arabic, which is the major minority language, several minority languages used by non-Jews are reported in Israel. The prominent ones are Armenian, Domari (Nawari), and Adyghe.

Non-Israelis, tourists, and foreign workers (e.g., Thai, Chinese, Filipino, and Romanian) use their own languages, and when they cannot use them or Hebrew, they try to use English as a substitute. Pidginized Hebrew is reported among foreign workers (Elhanan-Granik, 2001).

See also: Arabic; Hebrew, Israeli; Immigrant Language Education.

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Italian

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Italian is the official language of the Republic of Italy. It is spoken in Italy (including the Republic of San Marino and the Vatican City), and outside Italy, in the Canton Ticino (it is one of the official languages of the Swiss Confederation) and, with different degrees of vitality, in areas such as those of Nizza, the Principality of Monaco, Corsica, Istrian and Dalmatian towns, and Malta. It also survives in Eritrea, and where there are large communities of Italian emigrants, particularly in the United States (about four million speakers), and in Canada, Argentina, Brazil, and Australia (about half a million each).

Number of Speakers

The inhabitants of the Italian Republic numbered about 57 million in 2002. The number of speakers of Italian is, however, more difficult to establish, mainly because there is no simple way of relating the use of the Italian language with Italian ethnic origin or cultural allegiance, in the case of emigrants, and even with Italian citizenship in the case of the residents of Italy. For the latter, the problem is posed not so much by the linguistic minorities within the boundaries of the Italian republic (speakers of German, ca. 280 000, mainly in South Tyrol; of Occitan and Franco–Provençal, ca. 115 000; of Slovene, ca. 53 000; of Serbo–Croatian, ca. 3000; of Albanian, ca. 100 000; of Greek, ca. 30 000; of Catalan, ca. 15 000), but rather by the presence of the so-called 'Italian dialects.'

Genetic Relationships

The term 'dialect,' in the Italian tradition, is used to refer not to different varieties of the same language but, rather, to 'siblings' of Italian. Italian is based on the literary Tuscan (more specifically Florentine) of the fourteenth century. This in turn derives from Spoken Latin and is therefore a Romance language. But Latin during the period from the sixth to the ninth century gave origin, in Italy, to a myriad of Romance languages, which can be classified into over 15 major groups (broadly coinciding with the Italian regions) such as Piedmontese, Lombard, Venetian, Ligurian, Emilian, and so on. These Italian 'vernaculars', in Italian 'volgari' (a term used to designate the living languages, in the Middle Ages, as opposed to Latin, which was no longer native to any group of speakers, but was the standard written language) in their modern forms constitute the Italian dialects (Sardinian and Friulian are sometimes classified as Italian dialects, sometimes as separate Romance languages). The differences between these dialects can be very pronounced. Speakers of Bolognese and of Neapolitan find each other's dialects as unintelligible as would, say, speakers of French and Spanish.

History

External History

Literary Florentine, as used by the great Tuscan writers of the fourteenth century, Dante, Petrarch, and

See also: Arabic; Hebrew, Israeli; Immigrant Language Education.

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History

External History

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Boccaccio, was gradually accepted as the national standard language and finally codified as such at the beginning of the sixteenth century. The '*Questione della lingua*' (question of the language) was a central concern for the culture of the time with ideological and political, as well as linguistic and literary, implications. Against the proposers of contemporary Tuscan, and of a supraregional '*lingua cortegiana*' (language of the courtiers), the solution that prevailed was the one defended by the Venetian humanist, Pietro Bembo. The model he upheld was archaic Tuscan, which did not imply subservience to any of the rival modern political powers in Italy and was consistent with the principles of classicism and imitation then prevailing.

This had important consequences for the linguistic history of Italy. On the one hand Italian appears to be exceptionally 'conservative': it must be almost unique, among modern national languages, in having changed so little through eight centuries of documented history, and in allowing a twentieth-century reader to approach thirteenth-century Tuscan texts with minimum effort. On the other hand (and this is perhaps the condition for such stability) this language remained a standard written model, accessible only through literacy, like Latin, rather than acquired as a native language. The vast majority of the people, who were illiterate, did not have access to the literary language, and in speech used exclusively their native dialect. It has been calculated that at the moment of political unification in 1860 the number of the inhabitants of the country who could use Italian was at most about 10%, perhaps as low as 2.5%. In 2005, after 145 years of existence of a unified Italy, Italian was assumed to be known to all Italians, but statistics indicated that almost one-half of the population still preferred to use a dialect rather than the national language.

Internal History

The main points to be mentioned in the change from Latin to Italian include the following.

Phonology The opposition of long and short vowels in Latin was replaced by a distinction determined by stress and syllable structure: long vowels are obligatory in free stressed nonfinal syllables, short vowels in other conditions (i.e., in checked stressed, free stressed final, and all unstressed syllables). In stressed syllables the five Latin vowel qualities became seven, with long *ē* and *ō* giving midhigh [e] and [o], short *Ĕ* and *Ŏ* giving midlow [ɛ] and [ɔ] (these broke into [jɛ] and [wɔ] in free syllables). In unstressed syllables only five vowels are used: [i], [e], [a], [o], [u]. The consonant system undergoes the following main changes: assimilation (e.g., [kt] > [tt], as in *factum* > *fatto*); palatalization and assibilation before front vowels (as in *cenam* [ke:nam] > *cena* [tʃena]); *hodie* > *oggi*, *medium* > *mezzo*); sonorization, which applies unsystematically, as in *stratam* > *strada*, but *amatam* > *amata*. Initial *h* and final consonants (apart from nasals and liquids in proclitics: *un*, *per*, *il*, etc.) are dropped.

Morphology The case system of the Latin declension disappears and prepositions are used instead: *di uomo* replaces Latin *hominis*. The neuter gender disappears. The Latin verb pattern is basically preserved, with the introduction of 'analytical' or compound forms for the passive (*è amato* for *amatur*), the future (*amare ho*, whence the new synthetic *amerò*, for *amabo*), the perfect (*ho amato* for *amavi*, although this survives as *amai*), and so on.

Syntax The freedom of Latin word order is reduced, as syntactic function is signaled by linear position rather than case endings: for 'Paul saw Peter' the only normal and unequivocal structure in Italian is '*Paolo vide Pietro*,' whereas in Latin *Petrum Paulus vidit* would be equally clear in any of the six theoretically possible combinations of these three words.

Written Records

The first dated text in an Italian vernacular is found in the account of a court case in Campania in the year 960 A.D. (the *Placito capuano*). The original record in Latin has been preserved; it includes the statement repeated by some witnesses in the vernacular: *sao ko kelle terre per kelle fini que ki kontene trenta anni le possette parte sancti Benedicti* ('I know that those lands within those boundaries which here are contained, for 30 years the party of St Benedict owned them'). Several, mostly short vernacular texts, are found subsequently until the thirteenth century, when 'Italian' literature proper begins, with religious compositions, the poetry of the Sicilian School, and finally Tuscan poetry.

The vernacular must have been used in speech for a long time before the document of 960. There are several texts that appear to represent an attempt to fix in writing a kind of vernacularized Latin by lowering it toward the spoken language, or raising the latter to conform to the conventions of written Latin. One of the best-known documents of this 'compromise' is a riddle apparently jotted down in Verona, at the beginning of the ninth century on a page of a prayer book; it refers to the act of writing, under the guise of describing the work of a farmer: '*se pareba*

boues alba pratalia araba & albo uersorio teneba & negro semen seminaba' (a plausible rendering, among many which have been proposed: 'he was driving oxen, he was plowing white fields and he was holding a white plow, and he was sowing black seed'); some features appear more Latin than vernacular (e.g., *-b-* for *-v-* in the imperfects, final *-n* in *semen*, etc.); others are more vernacular (e.g., fall of final *-t* in the imperfects, *e* in *negro*, etc.). However, many traits present in dialects are attributed to the substratum of pre-Latin idioms spoken in Italy at the time of Romanization. For instance, a Neapolitan feature such as *-nn-* for *-nd-* belongs to Oscan and is found in the Latin graffiti of Pompeii, preserved under the ashes from the eruption of Vesuvius in 79 A.D. This, however, does not entitle us to suggest that Neapolitan was spoken in the first century A.D.

Writing System

The Italian writing system derives from the Latin one. It uses the Roman alphabet as it was adapted for the vernacular during the Middle Ages. Palatalization created some problems, which are solved in the Italian spelling conventions, by using – in front of *i* and *e* – *c*, and *g* for the palatals [tʃ] and [dʒ], and *ch* and *gh* for the velars [k] and [g]. But the system does not render all the oppositions of Tuscan phonology. In particular there are individual letters that correspond to contrasting sounds: *e* to [e] and [ɛ], *o* to [o] and [ɔ], *s* to [s] and [z], *z* to [ts] and [dz]; the last two alveolar affricates, which are always long intervocalically, are represented in spelling sometimes by *z* and sometimes by *zz*. These points leave a trace in the history of the language. As Italian was adopted as a national language in its written rather than spoken form, it became established, in different parts of Italy, with phonological counterparts, for these 'ambiguous' letters, which may be different from the Tuscan ones. Considering that contemporary Tuscan does not constitute an undisputed standard, Tuscan pronunciations like *b*[ɛ]*ne*, *ca*[s]*a*, or [ts]*io* are not felt, in present-day Italian, to be more correct than Northern ones like *b*[e]*ne*, *ca*[z]*a*, or [dz]*io*.

Individual Characteristics

Among the Romance languages Italian would appear to be typologically more similar to Spanish than to French.

For syntax, one frequently noted feature is that it is a 'pro-drop' language (i.e., it does not need to express the pronominal subject of a verb and that, consistently, it can put the subject after the verb). The adjective has two positions: postnominal if it is restrictive, and prenominal otherwise.

Morphology is conservative within a traditional Indo–European pattern; adjectives, nouns and verbs are subdivided into classes, without apparent semantic justification. An adjective may behave like *ross-o* (MASC SG), *ross-a* (FEM SG), *ross-i* (MASC PL), *ross-e* (FEM PL); or like *verd-e* (MASC and FEM SG), *verd-i* (MASC and FEM PL); or like *par-i* (MASC and FEM SG and PL). A noun may behave like *la cas-a* (FEM SG) *le cas-e* (FEM PL); or *il poet-a* (MASC SG) *i poet-i* (MASC PL); or *il libr-o* (MASC SG), *i libr-i* (MASC PL), and so on. A verb may behave like *cant-are*, or *ved-ere*, or *dorm-ire*. Each conjugation has a vast array of different forms according to person (*canto*, *canti*, *canta*), number (*canta*, *cantano*), tense (*canto*, *canterò*, and, with aspectual distinctions, *cantava*, *cantò*), and mood (*lui canta*, *che lui canti*). There is a complex pattern of agreement for gender and number that involves nouns, articles, adjectives, and past participles: *è arrivata una ragazza alta, è arrivato un ragazzo alto*. A notable feature in Italian derivational morphology is the productivity of evaluative suffixes (often called 'alteration'): the following forms are based on *libro*: *librone, libretto, librino, libruccio, libraccio*, etc.

Phonology

The rhythm of Italian is syllable timed. There are seven vowels, very similar to the cardinal ones: /i/, /e/, /ɛ/, /a/, /ɔ/, /o/, /u/. In unstressed syllables the opposition of midhigh and midlow vowels is neutralized, the quality of the other vowels remains distinct. There are two semiconsonants: /j/ and /w/, and 21 consonants: /p/, /b/, /t/, /d/, /k/, /g/, /ts/, /dz/, /tʃ/, /dʒ/, /f/, /v/, /s/, /z/, /ʃ/, /m/, /n/, /ɲ/, /l/, /ʎ/, /r/. Typologically uncommon is the systematic opposition of long to short consonants, which applies to all the items listed apart from six: /z/ is always short, and /ts/, /dz/, /ʃ/, /ɲ/, and /ʎ/ are always long intervocalically.

Illustration

Here follows a sentence (1) quoted for illustration:

(1) *A Venezia è più facile che si senta parlare il dialetto che l'italiano.*
'In Venice it is easier to hear people speaking dialect than Italian.'

Phonemic transcription: /a vve'nɛttsja ɛ ppju f'fatʃile ke ssi 'sɛnta par'lare il dja'lɛtto ke ll ita'ljano/. Note that this sentence is pronounced in Venice without 'syntactic doubling' (i.e., the lengthening of initial consonants in specified conditions) and with some of the variations mentioned above in the section,

'Writing System': /a ve'nɛtsja ɛ pju 'fatʃile ke si 'senta par'lare il dja'letto ke l ita'ljano/. In the local dialect this would be: /a ve'nɛsja ze pju 'fasie ke se 'seŋta par'lar el dja'eto ke l ita'ljaŋ/.

Note the gender and number agreement between articles and nouns; the use of the subjunctive governed by *facile che*; the interesting construction with *si*, which can be interpreted as an impersonal (with *si* acting as the indefinite subject of *senta*: 'one hears'), or as a passive, with the infinitive clause (*parlare*) acting as sentential subject ('speaking is heard'). Also, the subject of the infinitive need not be specified: '*si sente parlare*' 'one hears [someone] speak.' There is no dummy subject for *è* ('it is'), and the sentential subject clause introduced by *che* comes after the verb. The first *che* acts as a complementizer, and the second *che* as a conjunction within the comparative structure (*più . . . che*).

Sociolinguistic Points

As mentioned above, in Italy there are many linguistic enclaves in which 'foreign' languages are spoken, and in some cases their use is 'protected' by special legislation. For the majority of Italians the traditional situation was one of diglossia (with the local dialect used in speech, and literary Italian in writing. After political unification, and particularly as a consequence of far-reaching social changes, such as internal migration (mostly from the south to northern industrial conurbations) and the influence of the mass media, Italian has been widely adopted in speech as well. Regional differentiation is clearly marked in phonology, identifiable in lexis, and less clearly noticeable in grammar. A colloquial variety of the language has developed that has been called 'popular Italian'; this appears to be gaining acceptability, and some of its features are penetrating into the standard written language (e.g., *gli* is now frequently found in writing for 'to them,' and sometimes even for 'to her,' as well as for the traditional 'to him'). The dialects have been diagnosed often as terminally ill and on the point of demise. In fact, they have proved remarkably resilient in ordinary usage, and sometimes they appear to be taken up by people (including the young) as a way of reasserting their own group identity and reacting against an alienating process of national equalization. There has also been a striking vitality in dialect poetry, often using very local, individual forms of the dialect, rather than a generalized, regional variety.

Descendants

Italian played an important part in the formation of the lingua franca used in the past in the Mediterranean. Since the Renaissance there have also been varieties of '*lingua zerga*' employed by vagrants. A level of 'slang' is generally thought not to be popular in Italian because its functions were filled by the dialects. A curious form of English slang, called 'parlyaree' or 'polari,' traditional among sailors, actors, and gays (and now surviving in the form of lexical relics) was based on Italian. Italian-based creoles seem to exist or to have existed in Eritrea, Argentina, and Brazil (Harris and Vincent, 1987: 20).

Languages Influenced

The influence of Italian has been mainly felt, in all the major European languages, at the level of high culture, in the lexis of music and the figurative arts. In the Renaissance, and for a long time subsequently, an acquaintance with Italian was thought to be part of the cultural equipment of educated people in most European countries.

History of Linguistic Investigation

More than for other European languages, linguistic awareness and a discussion of linguistic matters (the *Questione della lingua*) has always been very relevant for Italian intellectuals. During the Renaissance the description and codification of the language was an important part of national culture, and the *Vocabolario* (1612) of the Accademia della Crusca was the first of the great national dictionaries to be published. Less important was Italy's contribution to linguistic studies (including the historical investigation of the Italian language and dialects) during the nineteenth and twentieth centuries.

See also: Indo–Aryan Languages; Indo–European Languages; Italian as a Fusional Language; Italian Lexicography; Italy: Language Situation; Romance Languages.

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Italian as a Fusional Language

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In a fusional language words are inflected (and derived) by using affixes whose boundaries are difficult to identify due to the tendency of affixes to fuse with one another and with the root. The numerous occurrences of allomorphy and the tendency of morphs to simultaneously encode several meanings result in the fact that there is no one-to-one correspondence between morphs and morphemes, thus making linear segmentation difficult.

Other terms are sometimes used instead of *fusional*: *flectional, inflectional*, or *inflecting, inflective*. The term *fusional* should be preferred to others referring to inflection because both agglutinating and polysynthetic languages can be highly inflectional.

Morphological Typology

The fusional type is one of the main morphological types. The classification of languages by morphological types is part of the standard terminology of linguistics, but it is also strongly criticized by the majority of typologists for three main reasons: (1) because the classification criteria are rather vague and difficult to apply in a consistent way; (2) because the morphological type is defined in terms of mutual favorability of properties rather than of implicational correlations, resulting in a low predictive power; and (3) because morphological typology has a holistic background.

The vagueness of the classification in morphological types is shown by the lack of consensus on both the number of types and the number of parameters identifying them (the three most-used parameters are (1) the ratio of morphs to word forms, (2) the number of morphemes to morphs, and (3) the degree of word-internal modification of morphs (Greenberg, 1954).

Modern linguistics has disavowed the ideological prejudice dating back to the 19th century, according to which the fusional morphological type was regarded as being superior to other types. Just like these, the fusional type is a combination of functionally interconnected features, which – as a whole – form an ideal construct characterizing (the whole, or some aspects of) the morphology of languages. Languages are rarely pure types; they usually mix elements of different types. Assigning a language to a specific type depends on the preponderance of features considered significant (the quantification of such features is a difficult problem to solve from a practical point of view).

Despite criticism, the classification by morphological types is convenient and widely used to rapidly identify a number of features that tend to cooccur in the morphology of a language, and also to assess the extent to which a language moves away from such ideal constructs, both in a synchronic and in a diachronic perspective (some authors argue that languages tend to move toward a typological goal (Dressler, 1985).

The Fusional Type

The best-known attempt to establish a list of features that cooccur in morphological types is the one made by Skalička (1966). The features that tend to cluster in languages displaying fusional morphology can be listed as follows:

1. Words are formed by a root and (one or more) inflectional affixes, which are employed as a primary means of indicating the grammatical function of the words in the language. Agreement is widely employed.
2. High degree of modification of internal morpheme boundaries, with a consequently difficult linear segmentation.
3. Tendency to cumulate morphological meanings in a single affix (with consequent asymmetry between the semantic and formal organization of grammatical markers).
4. Word-class distinction is maximal. Inflection is rich, regarding both the number of inflectional classes and the extension of paradigms.
5. Stem suppletion; many cases of both homonymy and synonimy among affixes; clear distinction between inflectional and derivational affixes.
6. A slight correlation with syntax can be seen in the relatively free word order (but there are also fusional languages with a fairly fixed word order).

The fusional type is differentiated from the isolating type by the use of bound morphs and the clear-cut distinction between word classes; it is differentiated

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The best-known attempt to establish a list of features that cooccur in morphological types is the one made by Skalička (1966). The features that tend to cluster in languages displaying fusional morphology can be listed as follows:

1. Words are formed by a root and (one or more) inflectional affixes, which are employed as a primary means of indicating the grammatical function of the words in the language. Agreement is widely employed.
2. High degree of modification of internal morpheme boundaries, with a consequently difficult linear segmentation.
3. Tendency to cumulate morphological meanings in a single affix (with consequent asymmetry between the semantic and formal organization of grammatical markers).
4. Word-class distinction is maximal. Inflection is rich, regarding both the number of inflectional classes and the extension of paradigms.
5. Stem suppletion; many cases of both homonymy and synonimy among affixes; clear distinction between inflectional and derivational affixes.
6. A slight correlation with syntax can be seen in the relatively free word order (but there are also fusional languages with a fairly fixed word order).

The fusional type is differentiated from the isolating type by the use of bound morphs and the clear-cut distinction between word classes; it is differentiated

from the agglutinating type by the kind of juncture between morphemes and the nonbiunivocal correspondence between morphs and morphemes. In the synthetic vs. analytic distinction, the fusional type tends toward the synthetic end.

The fusional type is largely represented in Indo–European languages, especially the most conservative ones. Latin, Slavonic, and Romance languages are the ones that are most often mentioned as good representatives of this morphological type. The main features identifying the fusional type will be described hereafter using examples drawn from Italian.

Affixal Inflection and Agreement

Italian makes wide use of inflectional affixes (nouns, verbs, adjectives, pronouns, articles are usually inflected, whereas adverbs are invariable). Inflection is obtained by replacing the word ending.

The two following sentences show an example of agreement in the singular and in the plural:

quell-a buon-a ***tort-a*** *è finit-a, l-a avrei mangiat-a volentieri*
'that good pie is finished, I would have eaten it with pleasure'
quell-e buon-e ***tort-e*** *sono finit-e, l-e avrei mangiat-e volentieri.*

All the underlined elements agree in number and gender with the feminine noun in bold, the auxiliary agrees only in number, the adverb is invariable; it should be noted that agreement also affects the pronoun and the participle in the second clause.

Cumulative Exponence in Adjectival Inflection

The main adjectival inflectional class has four endings

bell-o 'nice' (sing MASC)
bell-i (PL MASC)
bell-a (sing FEM)
bell-e (PL FEM)

Each affix codes two grammatical meanings at the same time (i.e., gender and number). Regarding adjectival inflection, the Italian language is more fusional than other Romance languages. In Spanish, for example, the gender and the number are expressed by two separate morphs, and the morph for the plural is the same for the two genders:

hermos-o (sing MASC)
hermos-o-s (PL MASC)
hermos-a (sing FEM)
hermos-a-s (PL FEM)

The other important inflectional class employs two affixes: *-e* for the singular, *-i* for the plural. Homonymy is therefore observed between the affixes from the two classes (*-e* can signify both PL FEM and sing MASC or FEM; *-i* can signify both PL MASC or FEM). Compared with Latin, Italian has lost the ability to form the comparative through affixation (the few affixal comparatives in use are instances of fused exponence: in *migliore* 'better' and *minore* 'minor' it is not possible to segment the lexical base from the comparative suffix), whereas the superlative form is productively obtained by using the suffix *-issimo* (*bello/bellissimo* 'very beautiful').

Noun Inflection and Affixal Homonymy

A recent classification of Italian nominal inflection proposed by D'Achille and Thornton (2003) – superseding the very unsatisfactory traditional classification based on the endings of the singular form of nouns – distinguishes five inflectional classes (defined as a set of lexemes whose members each select the same couple of endings for singular and plural), plus a sixth class consisting of invariable nouns (the bottom line of Table 1 shows the percentage of types of each class in the Italian basic vocabulary).

Class 1 consists of masculine nouns in the overwhelming majority (*libro/-i*), with very few feminine exceptions (*mano/-i*). Class 2 is made up of feminine nouns only. Class 3 consists of masculine nouns by approximately 45% (*fiore/-i*), of feminine nouns by the same percentage (*siepe/-i*), and of ambigeneric by 10% (*cantante/-i* may be used both for a male or a female singer). Class 4 is mostly composed of masculine nouns (*poeta/-i*) but includes a couple of feminine nouns as well (*ala/-i*); in class 5 nouns are masculine in the singular and feminine in the plural (*uovo/-a*); all the nouns ending in a stressed vowel or in a consonant (class 6) are invariable, but class 6 also includes invariable nouns ending in each of the four vowels used as inflectional endings, except for /a/ in feminine nouns (MASC: *cinema, golpe, kiwi, stereo*; FEM: *consolle, ipotesi, radio*). Although there seems to be a tendency to express the singular by

Table 1 Nominal inflectional classes and percentage of types of each class in the Italian basic vocabulary

Nominal Inflectional Class	*1 sing/PL*	*2 sing/PL*	*3 sing/PL*	*4 sing/PL*	*5 sing/PL*	*6 sing/PL*
Endings	-o/-i	-a/-e	-e/-i	-a/-i	-o/-a	invariable
%	41.2%	30.3%	20.6%	1.2%	0.2%	5.4%

means of back vowels (*o* MASC, *a* FEM) and the plural by means of front vowels (*i* MASC, *e* FEM), the cases of affixal homonymy are quite numerous (remember that class 3 uses front vowels both for the singular and for the plural, and it includes masculine and feminine as well as ambigeneric nouns). Although on the one hand, the recent trend toward an increase of invariable nouns ending by a vowel curbs the ratio of inflected nouns, on the other it decreases the degree of correlation between form and inflectional class. The low predictability of both the inflectional class and gender is clearly shown in Table 2, which refers to singular (Thornton, 2001).

Traces of Case in Pronouns

Italian has lost a fusional feature that characterizes Latin nominal inflection: the case. However, one can detect traces of case in the Italian pronominal system. The choice of the correct form of certain pronouns (Table 3) demands a decision that depends on whether pronouns express a subject, a direct, or an indirect complement.

The system of stressed pronouns distinguishes three persons for the singular and three for the plural. The third-person singular has distinct forms on the basis not only of gender, but also of the feature ± human. The third-person plural subject differentiates gender but not the ± human feature. In the spoken language, the pronouns *lui, lei*, and *loro* tend to broaden their functional scope and are frequently used both as subject and nonsubject, even for nonhuman referents.

The Table 4 shows clitic pronouns with the function of direct and indirect complement.

The use of such pronouns is complicated by rules of reciprocal ordering as well as by allomorphy: all clitic pronouns that end in *–i* replace the vowel with /e/ if followed by another clitic.

ti racconto una storia '[I'll] tell you a story'
te la racconto'[I'll] tell it to you'
te lo porto '[I'll] bring it to you'
portaglielo 'bring it to him/her'

The pronoun *le* (singFEM) becomes *gli* when followed by another clitic, which results in homonymy and consequent breakdown of gender distinctions:

mostrale la stanza 'show her the room'
mostragli la stanza 'show him the room'
mostragliela 'show it to her/him'

Homonymy occurs also with other unstressed forms (*ci* and *vi* are also locative adverbs; *lo, la, gli*, and *le* articles) and with stressed pronouns in postverbal position (*te lo prendi con te* 'you take it/him with you').

Verb Inflection

The verb is the word class with the richest inflection both in number of forms and variability (many high-frequency verbs have irregular inflection). Tense, mood, person, and number are expressed affixally.

The most relevant features of the fusional type appear even within regular inflection. Grammatical meanings can be expressed as fused in a single morph (in the form *amo*, 'I love,' there is no other overt expression than the ending-*o* to code indicative mood, present tense, first-person, singular), as well as realized through a combination of several affixes, with complex exponence relations holding between morphs: in *canterébbero* '[if] they would sing' three morphemes (conditional, third person and plural) are signaled by the entire termination-*rébbero* as a whole. A linear segmentation is not possible because *-bb-* occurs only with forms that are both third person and conditional. The final *-ro* expresses plural and again third person, the stressed *-e-* occurs consistently only in conditional forms, and the *-r-* occurs with futures and (again) conditionals (Matthews, 1970).

A suprasegmental modification (stress on the last syllable) suffices to distinguish between two regular verb forms like *tème* (INDIC PRES 3sing) and *temé* (INDIC preterit 3sing).

Table 2 Low predictability of gender distinction on the basis of the singular ending of nouns

-o	prevailing MASC, but also FEM (*mano, foto*)
-a	prevailing FEM, but also MASC (*papa, clima*)
-e	equally divided between MASC (*fiore, cantante*) and FEM (*siepe, cantante*)
other	equally divided between MASC and FEM

Table 3 Stressed personal pronouns

Stressed Pronouns	*1 sing*	*2 sing*	*3 sing*	*1 PL*	*2 PL*	*3 PL*
Subject	io	tu	+hum: egli (MASC) ella (FEM) −hum: esso (MASC) essa (FEM)	noi	voi	essi (MASC) esse (FEM)
Nonsubject	me	te	+hum: lui (MASC) lei (FEM) −hum: esso (MASC) essa (FEM)	noi	voi	loro

Table 4 Clitic personal pronouns

Clitic Pronouns	*1 sing*	*2 sing*	*3 sing*	*1 PL*	*2 PL*	*3 PL*
ACC	mi	ti	lo (MASC) la (FEM)	ci	vi	li (MASC)le (FEM)
DAT	mi	ti	gli (MASC) le (FEM)	ci	vi	-

Table 5 Indicative present regular inflection of the three traditional verbal classes

INDIC PR	*Class-a-sing*	*PL*	*Class-e-sing*	*PL*	*Class-i-sing*	*PL*
1	càn̲t-o	càn̲t-iàmo	tèm-o	tem-iàmo	àpr-o	apr-iàmo
2	càn̲t-i	càn̲t -à-te	tèm -i	tem-é-te	àpr-i	apr-i-te
3	càn̲t-a	càn̲t -ano	tèm -e	tèm -ono	àpr-e	àpr-ono

Table 5 shows instances of regular inflection of indicative present for the three traditional classes on the basis of the thematic vowel (accent marks have been added, even though not in use in normal orthography). Noteworthy, are the cumulative expression of more meanings by means of a single ending, and the omission of the thematic vowel with the exception of the second plural.

The thematic vowel may also undergo some allomorphies: in class *-a-* it is replaced by /e/ in the indicative future (*amerò*) and the present conditional (*amerei*), in class *-i-* by /e/ in the present participle (*aprente*) and in the gerund (*aprendo*), in class -e- by /u/ in the past participle (*voluto*), and by /i/ in the derivation of deverbal nouns and adjectives (*temibile*, *spremitura*).

The indicative imperfect is the tense that least identifies with the fusional type, for it shows the best correspondence between morphs and morphemes in Italian conjugation (Table 6). But also in the imperfect the categories of person and number, as well as those of mood and tense, merge in a single morph. The person–number affixes largely overlap (even though not entirely) with those of the present, whereas the morph *-v-* has no other use in the conjugation.

Besides synthetic forms, there are also analytic forms resulting from the combination of an auxiliary and a past participle. The main auxiliary verbs are *essere* 'to be' and *avere* 'to have'; both are highly irregular

INDIC PRES *sono, sei, è, siamo, siete, sono*
INDIC preterit *fui, fosti, fu, fummo, foste, furono*
INDIC IMPERF 1PERS *ero*, INDIC FUT 1PERS *sarò*; PP *stato*

The auxiliary expresses tense, mood, person, and number, whereas the past participle can either agree in gender and number or be employed in the citation form (singMASC), whereas the agreement between

Table 6 Indicative imperfect inflection of regular class -a- verbs

INDIC Imperfect class -a-	*sing*		*PL*
	1	cant-à-v-o	cant-a-v-àmo
	2	cant-à-v-i	cant-a-v-àte
	3	cant-à-v-a	cant-à-v-ano

participle and subject is systematic with verbs whose auxiliary is *essere* (*i ragazzi sono partiti* 'the boys have left'/*la ragazza è partita* 'the girl has left'), in verbs whose auxiliary is *avere* the agreement is with the object, and it occurs only within limited contexts (*hai comprato le pere? sì le ho comprate* 'have you bought the pears? Yes, I have bought them').

The indicative future and the present conditional are interesting from a typological point of view. They have stemmed from an analytic origin to reach a fusional state.

Many verbs have an irregular conjugation. The majority belong to the *-e-* class, some others to the *-i-* class, only three to the *-a-* class. The traditional classification does not allow to catch the similarities between *-e-* and *-i-* classes. Dressler *et al.* (2003) classify Italian verbs in two macroclasses based on the productivity criterion, as well as on formal correlations that allow us to also take into account the subdivisions within each class.

It would be neither possible nor helpful to mention here all the instances in which the verbs depart from the regular conjugation model. Idiosyncrasies occur primarily in the present (indicative and subjunctive), the preterit, and the past participle.

Pirrelli and Battista (2000) show that in the irregular conjugations the modifications of the stems range along a continuum from minor phonological processes to clear suppletion instances.

Table 7 Examples of stem modifications in the indicative present inflection of some very frequent irregular verbs

	nascere	*'be born'*	*udire*	*'hear'*	*sedere*	*'sit'*	*finire*	*'finish'*	*dovere*	*'must'*	*andare*	*'go'*
	sing	*PL*	*sing*	*PL*	*sing*	*PL*	*sing*	*PL*	*sing*	*PL*	*sing*	*PL*
1	'nasko	na'ʃːamo	'ɔdo	u'djamo	'sjɛdo	se'djamo	fi'nisko	fi'njamo	'devo	do'bːjamo	'vado	an'djamo
2	'naʃːi	na'ʃːete	'ɔdi	u'dite	'sjɛdi	se'dete	fi'niʃːi	fi'nite	'devi	do'vete	'vai	an'date
3	'naʃːe	'naskono	'ɔde	'ɔdono	'sjɛde	'sjɛdono	fi'niʃːe	fi'niskono	'deve	'devono	'va	'vanno

Table 8 Examples of stem modifications in the indicative preterit inflection of some very frequent irregular verbs

	venire 'come'		*perdere 'lose'*		*fondere 'melt'*	
	sing	*PL*	*sing*	*PL*	*sing*	*PL*
1	vénni	venìmmo	pèrsi	perdémmo	fùsi	fondémmo
2	venìsti	venìste	perdésti	pérdéste	fondésti	fondéste
3	vénne	vénnero	pèrse	pèrsero	fùse	fùsero

Table 7 displays the phonetic transcription of indicative present conjugation of six irregular verbs that exhibit a number of stem alternations: palatalization before a front vowel (*nascere*), ablauting of root vowel (*udire*), diphthongization (*sedere*), *-isc-* insertion and palatalization (*finire*), ablauting, consonant labialization and lengthening (*dovere*), and stem suppletion (*andare*).

Two things are noteworthy here. The first is that phonological phenomena responsible for the stem modifications are synchronically inoperative. The second is that these different phenomena are distributed according to a recurrent pattern – which is visible also in the stress position within the regular conjugation: on the one hand 1,2,3sing 3PL on the other 1,2PL (Vincent, 1988).

The most common irregular modifications of preterit stems concern lengthening of final consonant (*venire*), replacing of final consonant with /s/ (*perdere*), and other more complex phenomena that include ablauting of root vowel and deletion/insertion of consonants (*fondere*). Even in the preterit a morphological pattern of stem alternation is detectable, which distinguishes 1,3sing 3PL vs. 2sing 1,2PL (see Table 8).

Even though the majority of alterations were originally phonologically motivated, their present distribution is morphological in nature and paradigmatically governed.

Affixes

Obligatoriness, higher systematicity in mutual relationships, and degree of productivity clearly distinguish inflectional from derivational affixes in fusional languages. Yet the number of productive Italian derivational affixes and the variety of meanings they express are fairly high (Grossmann and Rainer, 2004). Whereas derivation employs both suffixes and prefixes, inflection employs suffixes only. In productive processes the degree of phonological fusion between the stem and derivational affixes is rather low. A higher degree of phonological integration is present instead with interfixes. Some interfixes are semantically void (*congress-u-ale* 'concerning congresses'), the majority express connotative value when combined with evaluative suffixes (*test-ol-ina* 'nice small head'). Words containing interfixes are rather difficult to be segmented. This is because interfixes occupy an intermediate position between the root and the suffix, and generally their morphemic and syllabic boundary does not coincide.

The clear-cut difference between affixes and roots characterizes Italian as a fusional language and distinguishes it from agglutinating languages, which grant affixes greater autonomy (Plungian, 2001). In Italian the coordination between bound elements referring to a same root is marginal (*micro- e macroeconomia* 'micro- and macroeconomy'); moreover, there is no use of a single affix referring to a coordinated group (cf. Spanish *afirmativa o negativamente* 'affirmatively or negatively'). Another fusional trait of Italian derivation is the signaling through the change of inflectional class of derivatives formed by means of conversion, which belong to the same word class as the base (*banana* FEM, PL *-e* 'banana'-> *banano* MASC, PL *-i* 'banana tree').

Word Order Mobility

The Italian basic word order (SVO) is more flexible than what we encounter in less-fusional languages.

Agreement (in gender and number) provides cohesion among words within phrases, and a certain degree of mobility freedom for the phrases themselves. Instead, single words are less free to move compared to words in more inflecting languages, such as Latin, for instance, (Simone, 1993). Whereas in Latin, the use of cases allows to signal on each word its relational syntactic functions, thus rendering it relatively autonomous within the phrase, in Italian the analytic expression (through prepositions) of syntactic relations demands the proximity and the reciprocal ordering of words within the phrases. Thus, order variation occurs primarily at the level of the reciprocal ordering of phrases (many instances of topicalization, cleft sentences, postverbal subject position). Adjectives stand out from other word classes for a higher degree of movement freedom within the phrases. Even though the unmarked position of the qualifying adjective is postnominal (according to the basic order SVO), this may vary, which at times effects a change in meaning (cf. *famiglie numerose* 'large families' and *numerose famiglie* 'several families').

See also: Arabic as an Introflecting Language; Chinese as an Isolating Language; Finnish as an Agglutinating Language; Italian; Morphological Typology; Morphological Universals; Morphophonemics; Natural Morphology.

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Italian Lexicography

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The birth of Italian monolingual lexicography can be traced back to the end of the 15th century, when the first lists of vernacular words were compiled. The first printed monolingual inventory, *Le tre fontane* by Niccolò Liburnio, was published in Venice some time later, in 1526. Partly following Bembo's proposals with respect to the *querelle de la langue* (according to which Petrarch's language should have been the model for poetry and Boccaccio's language for prose), Liburnio lists and defines terms taken from the works of Dante, Petrarch, and Boccaccio. Other dictionaries published in those years had the same purpose, to encode and define the lexicon of the 14th-century Tuscan classics, to be imitated by those aspiring to linguistic elegance: e.g., Lucilio Minerbi's *Vocabulario* (Venice, 1535); Francesco Alunno's *Le Osservazioni sopra il Petrarca* (Venice, 1539; 1550), and *Le ricchezze della lingua volgare sopra il Boccaccio* (1543).

The *Vocabulario di cinquemila Vocabuli Toschi* by Fabricio Luna (Naples, 1536) has been described as the first true Italian dictionary, ordered alphabetically and listing 5000 terms taken from the works of various authors of different cultural and geographical origins, but also from contemporary usage. Alberto Acarisio's *Vocabolario, grammatica, et ortographia de la lingua volgare* (Cento, 1543) is interesting both for the richness of data encoded for each lemma (compared to other works of the time, Acarisio's work pays more attention to scientific terminology

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and to phraseology) and for an attempt to encode many lemmas that are not found in the works of the 14th-century classics. Other prominent lexicographical works of the time are Alunno's *Fabrica del mondo* (Venice, 1548), which is divided into 10 sections and may be considered the first methodical Italian dictionary, and Giacomo Pergamini's *Memoriale della lingua*, first published in Venice in 1602 and then reprinted various times.

The first *Vocabolario degli accademici della Crusca* was published in Venice in 1612 and became a model for monolingual European lexicography. It conformed to new and scientific criteria: orthographical and grammatical norms were stated, more coherent modes of defining entries were used, and various standardizing expedients were adopted. Again, the main aim of the work was to indicate the best linguistic norm, by referring to the three main 14th-century writers, but also to other texts written in Florence in the same period, following proposals put forward by Leonardo Salviati. The *Vocabolario* was enlarged and republished many times until 1923 and, although criticized because of the limits it imposed on contemporary language use, it contributed substantially to the definition and diffusion of a national language. A new project, initiated in 1965, aims at historical documentation and is now realized by the *Opera del Vocabolario Italiano*, an institute of the C.N.R. (*Consiglio Nazionale delle Ricerche*).

Various dictionaries were compiled in the 17th and 18th centuries aimed at contesting the primacy of the Tuscan language, while other works followed fundamental principles which had inspired the *Crusca* dictionary, indicating possible additions and innovations to it.

In the 19th century, while the *querelle de la langue* was still engaging personages like Alessandro Manzoni and Graziadio Isaia Ascoli, new dictionaries were produced that included new technical terms, referred to new sources and took into account current colloquial usage. However, the most important work of the time is the *Dizionario della lingua italiana* (Torino, 1861–1879) by Niccolò Tommaseo and Bernardo Bellini: notwithstanding some limitations of the work (e.g., etymologies are often ill-founded), the richness of examples still makes it a useful lexicographical tool.

Among the many dictionaries of Italian published from the beginning of the 20th century up to now, we find both large scholarly dictionaries and more practical ones. The *Grande Dizionario della lingua italiana* (1961–2002), founded by Salvatore Battaglia, is an unsurpassed historical dictionary (UTET, Turin) comprising 21 volumes. The *Lessico Universale Italiano* (Istituto dell'Enciclopedia Italiana, Rome, 1968–1981), in 24 volumes, has qualities of both an encyclopedia and a dictionary. Another great dictionary is the *Grande dizionario d'uso della lingua italiana* directed by Tullio De Mauro and containing 263 000 lemmas: first published in 1999 (UTET), it was updated in 2003, when the seventh volume was published. Among the many practical dictionaries, just two examples may be mentioned: Nicola Zingarelli's *Vocabolario della lingua Italiana*, first published in 1917, then reprinted and updated many times up to the present day, most recently by Miro Dogliotti and Luigi Rosiello (Zanichelli, Milan, 2004); and the *Dizionario della lingua italiana* by Giacomo Devoto and Gian Carlo Oli, first printed in 1967 and also republished many times: the 2004–2005 edition is by Luca Serianni and Maurizio Trifone (Le Monnier, Florence). While electronic versions of these and other contemporary dictionaries are also published, pioneering work has been carried out (notably at the ILC-CNR [*Istituto di Linguistica Computazionale-Consiglio Nazionale delle Ricerche*], Pisa) to produce online lexical resources, first of all the *Dizionario-macchina dell'italiano*. Another lexical online resource recently developed (*ILC*, 1996–2001) is *ItalWordNet*, a thesaurus-like resource, basically structured in the same way as *WordNet,* a system whose design is inspired by current psycholinguistic theories of human lexical memory, developed at the Cognitive Science Laboratory at Princeton University in the United States.

Beside monolingual dictionaries, other lexicographical works are worthy of mention: etymological dictionaries (e.g., the one by M. Cortelazzo and P. Zolli, recently republished in 1999 by Zanichelli); frequency lexicons (LIF [*Lessico italiano di frequenza]*, by U. Bortolini, C. Tagliavini, and A. Zampolli, for Garzanti-IBM, Milan, 1972; LIP [*Lessico di frequenza dell'italiano parlato],* T. De Mauro, F. Mancini, M. Vedovelli, M. Voghera, for Etas, Milan, 1993); regional dictionaries (a notable example is the *Vocabolario Siciliano*, founded by G. Piccitto and subsequently directed by G. Tropea, 1977–2002).

See also: Academies: Dictionaries and Standards; Ascoli, Graziadio Isaia (1829–1907); Computational Lexicons and Dictionaries; Computers in Lexicography; Dictionaries and Encyclopedias: Relationship; Italian; Italy: Language Situation; Thesauruses; WordNet(s).

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Italy: Language Situation

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It is traditionally taken for granted that Italy is basically a monolingual state, and that Italian is the national/official language, used not only in literature but also in government, administration, newspapers, and of course as the medium of instruction in schools and universities.

The reality is different. It is useful to consider two distinct sets of facts. One concerns the existence of so-called minority languages within the Italian territory. There are enclaves in which foreign languages are spoken; this may result from an earlier immigration of communities that preserved their language through the centuries – as is the case in villages in central and southern Italy, where the inhabitants speak Albanian (ca. 100 000), Greek (ca. 30 000), Catalan in Alghero (ca. 15 000), and Serbo–Croatian (ca. 3000); or it may result from the inclusion within the Italian boundaries of populations speaking foreign languages – as in the case of German in South Tyrol (ca. 280 000), Occitan and Franco-Provençal in Piedmont (ca. 115 000), and Slovene in the Veneto (ca. 53 000).

The second set of facts concerns the use of so-called Italian dialects. These are separate and, on the whole mutually unintelligible, Romance languages, classifiable into 15 or so regional groups (Ligurian, Piedmontese, Lombard, Venetian, Tuscan, etc.); they are cognates (rather than varieties) of literary Italian, which is itself based on Tuscan. Many linguists consider Sardinian, Ladin, and particularly Friulian, as separate languages. Here the situation is complicated by the difficulty of establishing how widespread the use of dialect is. It was calculated that at the time of unification only a small minority (suggested figures range between 2.5–10%) of the inhabitants of the new state knew Italian. It appears that in the 1980s, about half of all Italians still used a dialect at home and with friends (this applies particularly to southern Italy and the Veneto). The novelty is that even dialect speakers are mostly bilingual with Italian. Although traditionally the dialect was used in all circumstances (some speakers employing it even in the context of high culture), diglossia seems to prevail, Italian being the high variety (used in public life, in official contexts, and for elevated topics), and dialect the low variety (used in the home and for personal, everyday exchanges).

The status of minority languages was, until World War II, mostly unrecognized. Successively the regions of Trentino–Alto Adige and of the Valle d'Aosta have obtained full recognition for the use of German and French, respectively, in education and in public life. This also applies, to a lesser extent, to Sardinia and Friuli–Venezia Giulia. Political pressure is mounting to extend similar recognition to other 'foreign' minority languages, and even to some of the regional dialects, such as Lombard or Venetian.

Complex linguistic problems are posed by new waves of immigration, mainly from Africa, in the late 1980s and early 1990s. As for foreign languages studied in schools, French, which was dominant until World War II, has since lost its primacy to English.

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Ivory Coast: Language Situation

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Ivory Coast, officially named Côte d'Ivoire, is situated in West Africa, approximately between Latitude 8° 00′ N and Longitude 5° 00′W. The country has an area of 322 460 km^2 and a population density of 50 inhabitants/km^2. The country is bordered on the south by the Atlantic Ocean, on the west by Guinea and Liberia, on the north by Mali and Burkina Faso.

The population is currently estimated at 17 327 724. The official census of 1998 (*Récensement Général de la Population et de l'Habitat*) estimated the literacy rate at 45%. The percentage of males is about 57% while that of females is about 43% (2003 estimate). The percentage of foreign immigrants is believed to be close to 26%, which has consequences for the migrant languages spoken in Ivory Coast (mainly Moore [Mòoré], Fulfulde, Soninke, Maninkan [Maninka], Bambara [Bamanankan], Krahn, Glio [Glio-Oubi]).

Number of Languages and Language Families in Côte d'Ivoire

The French colonial borders – that were established from 1893 to 1960 and definitely remained – did not take into consideration the actual ethnic and language boundaries and used political and geographic criteria. This has resulted in the splitting of the language groups that lie along the borders (see also Kropp-Dakubu 2000a,b,c).

For instance, the languages Anyi and Nzema are spoken both in Ghana and Ivory Coast, across the political borders of today. Speakers of the Senoufo and Manding language families stretch beyond the borders of Ivory Coast, into Mali, Sierra Leone, Guinea, and Burkina Faso. Dan and Guere are spoken in Ivory Coast and Liberia as well. The languages were spoken in these areas long before the colonial boundaries were established. This situation is different from most recent cases of immigration, involving the use of a language in the already established borders by the French and British.

The heterogeneity and the relatively large but so far often inaccurate number of languages of Ivory Coast raise the question of the criteria of language identification (as opposed to dialects), mutual intelligibility, genetic classification, relationship between social status and levels of usage, and political or cultural importance of the languages. The issue impels one to clarify which criteria are necessary or sufficient, and in many cases go beyond mere linguistic criteria. For example, earlier works on Ivorian languages (Delafosse, 1904) equated language with ethnicity, while even more recent sources often (Ethnologue, 1988) do not distinguish between local languages and recent foreign languages.

The following list presents the indigenous languages of Ivory Coast in alphabetical order based on most recent linguistic criteria:

- Abbey (Abé)
- Abidji
- Abron
- Abure
- Adiukru (Adioukrou)
- Aizi, Aproumu
- Aizi, Mobumrin
- Aizi, Tiagbamrin
- Alladian
- Anyin
- Attié
- Avikam
- Baule (Baoulé)
- Beng
- Bété, Daloa
- Bété, Guiberoua
- Beti (Eotile)
- Dan (Yacuba)
- Dida, Lakota (Dieko, Gabo, Satro, Guébie, Brabori, Ziki)
- Dida, Yocoboué
- Dioula (Jula)
- Ebrié (Cama)
- Ega (Diés, Egwa)
- Esuma (Essouma)
- Gagu (Gagou, Gban)
- Godié
- Guéré, Central (Wé, Southern)
- Guro (Kweni)
- Kodia (Kwadia, Kwadya)
- Kouya (Kowya, Sokya, Kuya)
- Krobu (Krobou)
- Krumen
- Kulango, Bondoukou
- Kulango, Bouna
- Mwan (Muan, Mona, Mouan, Muana, Mwa)
- Neyo (Gwibwen, Towi)
- Nyabwa (Nyaboa, Niaba,Nyédébwa)
- Nzema (Appolo, Nzima)
- Senoufo, Cebaara (Senari)
- Senoufo, Djimini
- Senoufo, Niarafolo-Niafolo (Senoufo, Nyarafolo)
- Senoufo, Palaka
- Senoufo, Shempire
- Senoufo, Tagwana

- Téén
- Toura
- Wan
- Wané
- Wobe (Wé, Northern)
- Yaouré

Despite the large diversity of the ethnic groups, it is possible to group the Ivorian languages into four greater families by using linguistic criteria: Mande, Kru, Akan, Voltaic or Gur (cf. map below, Figure 1). The name 'Voltaic' has long been used in the francophone area but is being abandoned for the name 'Gur,' which means 'language' (Gurma, Gurunsi).

1. The Mande group is located in the northeast of Côte d'Ivoire, and covers the Manding (Delafosse's Malinke, Bambara, Dioula) and the southern Mande. In the western central part of the country live the Dan in a mountaneous area, surrounding the city of Man (cf. Braconnier *et al.*, 1983; Tera, 1986).
2. The Kru group: The central-western and southwestern areas are occupied by the Kru or Maguwe, of which the major ethnic group is the Bete.
3. The Gur group contains Senufo as a set of diverse languages including Lobi, Tagbana, Cebaara, and is geographically located in the north.
4. The Kwa group covers the east, center, and southeast of Ivory Coast. The most numerous subgroup is the Baule language with about 60 dialects. Sixteen languages compose the Kwa group in the Ivory Coast: Baule, Agni (Anyin), Abron, the lagoon languages (Ebrié, Abouré, Esuma, Adiukrou, Abidji, Avikam, Alladian, Eotile, Abbey, Mbatto or Ngula (Mbato or Gwo), Nzema, Abidi (Abidji)), and three isolates: Ega, Attie, Krobu.

An official census conducted in 1998 provides the following percentages of the individual ethnic groups: Akan 42.1%, Gur 17.6%, Northern Mande 16.5%, Kru 11%, Southern Mande 10%, others 2.8% (including only 130 000 Lebanese and 14 000 French). If that census is to take into account all the African and other ethnic groups, one has to revise the percentages by computing the approximate 26% that constitute one-third of the total population of Ivory Coast.

The non-Ivorian population includes people from Malba Birifor, Bissa (63 000), Dogoso, Maasina Fulfulde (1200), Glaro-Twabo, Eastern Karaboro (5000), Khe, Mòoré, Nafaanra, Sìcìté Sénoufo, Siamou, Southern Toussian, Turka, Vietnam, Burkina Faso (3 000 000), Mali (754 000), Guinea (238 000), Liberia (200 000) and others (345 000) (1993). Ghanaians approach almost 500 000, Europeans almost 20 000 (the number includes French, binationals, Germans, and Belgians). Syro-Lebanese are estimated at 100 000.

The geographic distribution of the ethnic groups is as follows in the north Senoufos (9.7%), Dioulas (3.4%), Malinkes (8.5%); in the center Guros (3.6%) and Baules (6.6%); in the west the Dans or Yacubas (5.9%), Betes (5.7%), Gueres (3.4%), Wobes (1.7%), Krumen-Didas-Bakwes-Godies (2.1%); in the south, the Ebriés (Cama) -Mbatos (Gwas) (0.7%), Adiukrus-Abidjis-Alladians-Avikams (1%), and Nzemas, Abbeys (1.4%).

The largest individual (first) language in Ivory Coast is Baule, because the Senufos use different languages. In practice, the language that is most used as a second language in markets and for commercial, cultural, and religious activities is Dioula. The list of the languages in Table 1 is not comprehensive, but includes the 17 most widely distributed languages. Though the list indicates 1.2% native Dioulas, the number of users may be about 14.5%. Investigations made on conversations in the markets estimate that 88% of the verbal exchanges in such environments are performed in Dioula.

Multilingualism and Diglossia

The national or official language, the *lingua franca* is French. French still remains the official language, widely used in schools, sometimes at different school levels, and is the obligatory language for administration and the major language of the media. Because of the contact situation, a local indigenous French has emerged, including new variants, one of which is called 'nouchi,' a slang or a secret language derived from French and the Ivorian languages, used as in daily communication and in popular songs.

Multilingualism is the most common factor among all the minority languages. The issue is not how perfect the second language is under control but how often it is used. Second languages are frequently used on a daily basis. For instance, all the Manding (formerly Malinke) use Dioula as a second language in religious, commercial, and cultural activities. This situation is valid for all the Senufos. The Ega use Dida in everyday life, but their own Ega language in the family, though the situation is more complex, because exogamy favors marriage with the Dida women, so that Ega children grow up with Dida. All the Eotile speak Anyi, Abure, and Nzemas at the respective ethnic borders where the Eotile villages are located in enclaves. All the Aizi perfectly speak Adiukru, a major, more commercially and culturally powerful

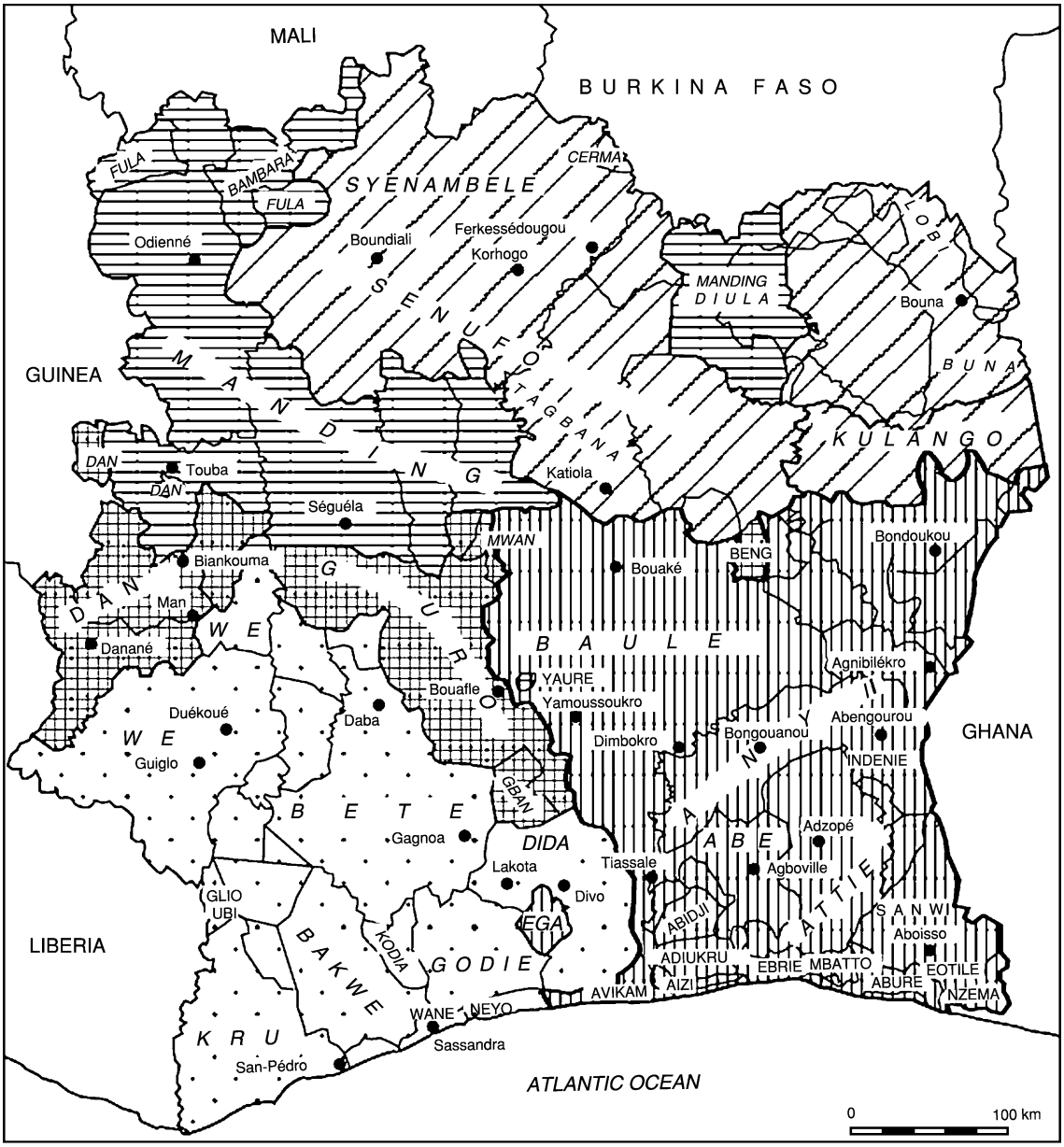

Source : Atlas of C. I., plate B 2

Conception: AHOUAF-realisation: SANOGOS.IGT-LATIG janvier 2005

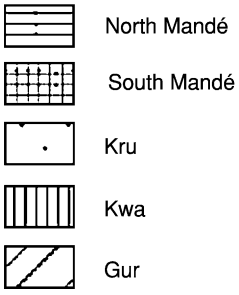

Figure 1 Language use in Ivory Coast.

Table 1 Language use in Ivory Coast

Language	*Number of Speakers*	*Percentage*	*Linguistic Affiliation*
1. Baule	2 130 000	14.8%	Kwa
2. Senufo	1 245 500	8.7%	Gur
3. Dan	800 000	5.5%	Mande
4. Anyi	610 000	4.2%	Kwa
5. Attie	381 000	2.6%	Kwa
6. Guere	317 688	2.2%	Kru
7. Bete	280 000	1.9%	Kru
8. Dioula	179 000	1.2%	Mande
9. Abbey	170 000	1.1%	Kwa
10. Mahou	169 100	1.1%	Mande
11. Wobe	156 300	1.0%	Kru
12. Lobi	155 800	1.0%	Gur
13. Kulango	142 000	0.9%	Kru
14. Brong (Abron)	131 700	0.9%	Kwa
15. Dida	101 600	0.7%	Kru
16. Adiukru	100 000	0.6%	Kwa
17. Soninke	100 000	0.6%	Mande

ethnic group. The Krobu in general speak Adiukru and Abbey very fluently, and sometimes Baule. The Mbatto generally speak Attie or Abure as second languages.

The Wan speak Guro and Baule-Kode and the Nguin speak Baule as a second language. The Mau generally use Dioula as a second language but only older Mau people speak Dan fluently, in specific cases of trade with the Dans. The Yaure speak Guro and Baule as second languages, respectively at the Guro and Baule borders; the Gagu use Baule and Bete as second languages, respectively at the Baule and Guro borders. The Brong and Kulango use each other languages as second languages, and the Tagbanas are generally bilingual with Baule.

In all cases of multilingualism in Ivory Coast, specific situations determine whether the speakers prefer one type of language or the other, suggesting a strong case for diglossia. The typical language that is used for religious and commercial cases is Dioula, at the market (about 70%), and secondly Ivorian French and Baule (30%) in proportion with dominance of Dioula in trade activities. French is definitely used for administration and the local native languages are used at home.

Ivorian French and Argots

It is estimated that 36% of the population up to six years old use a variant of French called 'Français Populaire Ivoirien' (cf. Djite, 1989a,b). More than 1 million of the illiterate population use a pidgin French called 'Français de Moussa' or 'Francais de Dago,' which is more or less similar to 'Français de petit nègre,' difficult to understand for non-Ivorian Francophones.

A number of researchers and most recent studies have established a Standard Ivorian French used in the official newspapers and in the public media (radio and television) and by students (cf. Boutin, 2002; Hattiger, 1981; Lafage, 1989).

Though Kouadio (2000) suggests that there are three types of variants, a high, middle, and lower class level, in practice, there may be also three registers: formal, informal, and popular or pidgin that are used by all classes, according to the situation and the speakers. The formal register is used in the public media, schools and universities, the second in informal situations, and the last by illiterate people.

Variants of French used by illiterates, called Moussa or Dago French (pidgin types according to Kokora 1980, 1983a,b) as mentioned above, are quite well known and have been often stigmatized in the newspapers or on the TV and radio.

Nouchi is a secret language that has been made popular, thanks to well known music groups (Zuglu) and local reggae musicians (Serges Kassy).

Language Policy and Use

There has been no clear policy for the development of local languages. Many projects have set French as the priority standard language. The reason is that, contrary to other West African Francophone countries, there is no national language such as Wolof in Senegal, Bambara in Mali, Moore in Burkina Faso, Gen-Mina in Togo, Fon (Fon-Gbe) in Benin, and Akan in Ghana. Though the Baule and Anyi block are the dominant languages, they are not the dominant trade languages as is Dioula, which is a favorite for a national language because of its widespread use all over the country (cf. Djite, 1988; Tera 1986).

Nevertheless, there were attempts to introduce local languages, such as Dan, Cebaara, and Attie, until the CE1 or CM2 (that is, from Grade I to Grade 5) in some very restricted projects. But although such projects proved to be successful for the teaching of sciences and Maths, they never acquired a national status due to their often detrimental effects on the acquisition of spoken French.

Most descriptive work on Ivorian languages, especially with respect to the Atlases (cf. Hérault 1983 on Kwa, Marchese 1983 on Kru, Mensah and Tchagbale 1983 on Gur, Halaoui *et al.* 1983 on South-Mande, Braconnier *et al.* 1983 on North-Mande) were carried out by the Institute of Applied Linguistics which was created by Law no. 66–375 of September 8, 1966. Further additions regarding teaching reforms were introduced in 1977 and extended by Law no. 96–696 of

September 7, 1995. The closest collaborator for the Atlases was the Summer Institute of Linguistics.

The Bible Society has also contributed to translation of the Bibles into the following languages: Abbey, Abidji, Adiukru, Alladian, Anyi, Attie, Avikam, Baule, Bete, Birifior, southern Bissa, Cebaara, Cerma, Dan, Dida, Ebrie, Fula, Macina (Fulfulde, Massina), Gban, Guro, Guere, Diula, Karaboro, Kulango, Krumen, Southern Lobiri, Nyabuwa, Nzema, Senufo, Djimini, Tagbana, Teen, Tura and Wobe.

As reported by Kouadio (2000), 20 hours out of 168 hours per week of radio broadcasting are given in 14 languages, that is: Abbey, Adiukru, Attie, Baule, Bete, Dida, Dioula, Ebrie, Guere, Krumen, Kulange (Kulango, Bondoukou), Senufo, Dan, and Moore. The National Television broadcasts 3 hours out of 81 per week in local languages.

A number of Ivorian languages are isolated among different other larger language groups, for example, Beng (Ngain, Nguin, Gan) with 17 000 speakers, Aizi Mobumri, Wan (Mona), and Gagu, Yaure. Some of these languages are endangered, and documentation on them would benefit the linguistic and the speaker community. Two examples of endangered languages in Ivory Coast are Mbre (Bre, Bere, Pré Pisia), a recently discovered language of unknown affiliation in central Ivory Coast spoken by about 200 speakers the Bondosso and Nitanbo villages, for which only sketchy descriptions exist, and the last remaining dialect of Eotile (Beti, Betibe), a Kwa language whose other dialects are extinct, but whose remaining dialect is used by a fishing community on Aby Lagoon.

See also: Akan; Burkina Faso: Language Situation; Ghana: Language Situation; Gur Languages; Kru Languages; Kwa Languages; Mali: Language Situation; Mande Languages; Niger-Congo Languages.

Language Maps (Appendix): Map 6.

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Iyer, L. Vishwanatha Ramaswami (1895–1948)

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L. Vishwanatha Ramaswami Iyer (also Aiyar) was born on October 25, 1895, in Thrissur, Kerala. He did his Intermediate (pre-university) studies as a State Scholar at Maharaja's College, Ernakulam. He received his B.A. (1914) in geology as a student of Presidency College, Chennai, and his B.L. (1916) in law, as a student of Law College, Chennai. After a brief period of legal practice and high school teaching, he earned an M.A. in English language and literature, and he joined his alma mater Maharaja's College on November 29, 1922, as an assistant professor of English. He spent the rest of his life at Maharaja's as a teacher and researcher, and died – aged only 52 – on January 31, 1948, in Thrissur, while on sick leave.

Known to his acquaintances as LVR, Iyer made lasting contributions to Dravidian Linguistics, even though he had no formal education in linguistics and his job required no mastery of Dravidian matters. With a flair for languages and a passion for linguistics, he learned as many as 18 languages (Indian and non-Indian, literary and non-literary), read avidly all the linguistics publications available to him, and refined his linguistics skills through personal contacts with several leading linguists, such as Suniti Kumar Chatterji. He preferred to write articles and monographs rather than lengthy books and published them in a wide variety of Indian and international journals. Limiting himself to Dravidian linguistics, he wrote – according to an estimate – nearly 200 articles on language evolution, word derivation, language reconstruction, phonetics, phonology, morphology, etymology, syntax, and semantics. His primary interests were Malayalam, Tamil, and Tulu, but he also wrote on and drew on many other languages such as Greek, Kannada, Telugu, Kui, Kuvi, Kurukh (Kurux), Gondi, and Brahui. He penned numerous book reviews and translated books and articles, including Romain Rolland's life of Gandhi from French to English.

The most noteworthy of Iyer's works are those he wrote on (1) *Lilatilakam*, a grammatical treatise of the 14th century, and its relation to Malayalam and Tamil; (2) the phonetics, phonology, morphology, and evolution of Malayalam; (3) the Dravidic Sandhi; (4) the language of ancient Tamil literature; (5) the Dravidian – especially Tamil – verbs; (6) the language features of Tulu, Kui, and Kurukh; and (7) comparative Dravidian and the evolution of Dravidian languages. His works are treasured even today for the abundant data they contain and for the creative ways in which Iyer manipulates them. Since no other linguist had explored Dravidian languages as thoroughly as he did, he was a pioneer in many areas of Indian linguistics, and he was acknowledged, even during his lifetime, as a leading authority on Indian philology. Linguists concerned with India, such as Murray B. Emeneau, Jules Bloch, and Thomas Burrow, have held Iyer's works in high esteem, and Kamil V. Zvelebil, another eminent Dravidolgist, says of Iyer's writings that they "contain rare insights, valuable data, and path-breaking ideas."

There exists no published compilation of all the articles that Iyer wrote, and his few books (e.g., Iyer, 1925, 1936, 1944) are out of print and hard to get. A volume edited by Subramoniam and Nair (1978) brings together the essays of five Dravidian linguists on the contributions and limitations of Iyer. It also has a large bibliography of Iyer compiled by Gopala Pillai.

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J

Jaberg, Karl (1877–1959)

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Trained in Zurich under Emile Freymond and at the *École des Hautes Études* in Paris where he studied with Jules Gilliéron, Karl Jaberg spent his entire university teaching career (1907–1945) at the University of Bern. Dialect geography, lexical history, and semantics constitute the main components of his research and were masterfully combined in many of his historically slanted lexical studies. His dissertation (1901) dealt with the evolution of pejorative meanings in French, and his *Habilationsschrift* (1906) examined verbal inflection in a Franco-Provençal dialect. Unlike his teacher Gilliéron, Jaberg's work involved diachronic and comparative analysis of the synchronic distribution of lexical items. He was codirector (with Jakob Jud) of the *Sprach und Sachatlas Italiens und der Südschweiz* and the author of many studies on individual lexical items written from the perspective of diachronic onomasiology, *Wörter und Sachen*, and cultural history. In addition, Jaberg wrote on the broader methodological issues of dialect geography (see especially, Jaberg 1908, 1936; Jaberg and Jud, 1928). Questions concerning the psychological side of language as well as its affective and expressive use as a communicative instrument and how these characteristics could affect the formal development of a word also attracted Jaberg's attention. Toward the end of his career, he became interested in the effects on lexical history of popular beliefs and superstitions, e.g., his study on the Romance terms for the birthmark (Jaberg, 1957), his only piece published in English (original German version in Jaberg, 1965: 282–322).

Selections of Jaberg's essays have been collected in Jaberg (1937, 1965). Complete bibliographies of his writings are available in the supplement to Heinimann (1958: 9–18) and in Jaberg (1965: 325–334). Detailed discussion of his life and work can be found in Heinimann (1958), Malkiel (1959), Terracini (1959), Boléo (1960), and Hilty (1997).

See also: Gilliéron, Jules (1854–1926); Jud, Jakob (1882–1952).

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Jackendoff, Ray S. (b. 1945)

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Ray S. Jackendoff was born on January 23, 1945, in Chicago (Illinois, USA). As a student of Chomsky, his work on syntax adopts the generativist framework. However, his interest for semantics has set him at the junction of multiple theoretical trends (generative grammar, cognitive science and semantics, philosophy of mind). He is now a professor at Brandeis University, near Boston.

In his first book (1972), he argued against specifying semantic conditions on transformations or representing semantic information in deep structure. Jackendoff defends a strict separation of syntactic processes and of semantic rules. He ascribes to the semantic component the function of relating deep structure to a semantic decomposition of lexical items and clauses and of providing rules of interpretation for anaphora, pragmatic structure, and arguments in modal contexts.

His activity veered thereafter toward syntactic matters. The outcome was a theory of phrase structure (1977), the X-bar syntax, in which all lexical categories were described as instantiating a common hierarchical pattern with three levels of constituency. X-bar syntax has since been incorporated in government and binding theory.

The idea that semantic generalizations must be formulated independently from syntactic ones was pursued in his *Semantics and cognition*. In this book, propositional representations ('conceptual structures' or CS) built out of semantic primitives clearly form a kind of *lingua mentalis*. Semantics, it is claimed, must ultimately reduce to cognitive psychology. CS also function as a *sensus commmunis*. Thus, visual and linguistic informations are said to communicate through CS. Most importantly, CS representing spatial relations are regarded as providing the machinery with which other fields (such as time or possession) can be conceptually organized and rendered expressible. The theory of CS is considerably elaborated in Jackendoff's 1990 book, which dealt with a number of semantic issues such as the conceptual representation of thematic roles, the description of different semantic fields (motion and causation), and the composition of CS of lexical items with those of adjuncts.

Since the 80s, Jackendoff's activity aims toward a description of the functional architecture of the language faculty and its interaction with other cognitive processes. His approach has remained remarkably consistent: the language faculty is segmented into three rule systems (on the phonological, syntactic, and conceptual levels) that communicate, through interface rules, with each other and with other processing systems (such as the perceptual systems). Two topics have been particularly explored: the relation of processing levels to conscious awareness (1987) and the interface with visual representations (notably the cerebral and cognitive constraints on the linguistic expression of spatial relations).

See also: Chomsky, Noam (b. 1928); Cognitive Semantics; Consciousness, Thought and Language; Generative Grammar; Language of Thought; Language, Visual Cognition and Motor Action; Meaning: Cognitive Dependency of Lexical Meaning; Semantic Primitives; X-Bar Theory.

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Jackson, Kenneth Hurlstone (1909–1991)

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Kenneth Jackson was born in Surrey on November 1, 1909 to a business family. Having been educated locally, he was elected a scholar of St John's College, Cambridge, from which he graduated in 1931 in Classics. However, he switched to Celtic in the new department of Anglo-Saxon, Norse, and Celtic and graduated in 1933 with the Allen Research Student Scholarship, which was awarded to him again the following year. He spent his first year as a Research Student at the University of Bangor, North Wales, where he attended the lectures of Ifor Williams and Thomas Parry. The second year of his Research Studentship was spent in Dublin, where he studied under Osborn Bergin. He spent a month each year in Wales and in the Blasket Islands off the coast of County Kerry, Ireland. In both of these places, he began his publishing career with 'Coracle Fishing Terms' from Wales and '*Dhá Scéal ón mBlascaod*' from Kerry, which were published in 1933. He transcribed stories from Peig Sayers, the well-known storyteller of the Blaskets, in the International Phonetic Alphabet. He published during those years two books, *Early Welsh gnomic poems* and *Studies in early Celtic nature poetry* (both in 1935). On returning to Cambridge, he was elected Fellow of St John's College and appointed Lecturer in Celtic. In 1939, he was appointed Lecturer and later Associate Professor and Professor of Celtic at Harvard. During the war, he acted as censor on behalf of the British and American authorities in Bermuda. In 1950, he was appointed Professor of Celtic in Edinburgh, where he was to spend the rest of his life. By 1953, he had completed the work that was to bring him fame, *Language and history in early Britain*. This was an examination of the changes that took place in the early languages of Britain, in Anglo-Saxon, Irish Gaelic (Irish), Latin, and Welsh, from the 5th to the 7th centuries, their historical significance, and how they could be dated. It is a monumental work of scholarship. Jackson's next great work was *A historical phonology of Breton* (1967), an attempt to establish "a framework in which all the chief historical problems are raised and discussed." Again, it was a book of immense learning, but it has not received the same attention as *Language and history,* probably because of the limited number of scholars who study Breton in English-speaking countries. In addition to these works, Jackson edited a number of Irish and Welsh texts, principally *The Gododdin* (1969), *The Gaelic notes in the Book of Deer* (1972), and *Aislinge Meic Con Glinne* (1990), this last text containing the notes on Middle Irish that Jackson contributed as a replacement for the historical grammar of Irish that he had projected. Add to these a lecture that has led to much controversy, *The oldest Irish tradition: A window on the iron age* (1964), in which he claimed that the earliest Irish tales provide us with a vivid picture of life in the Iron Age, a claim hotly disputed. He died on February 20, 1991.

See also: Bergin, Osborn Joseph (1873–1950).

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Jacobsen, Lis (1882–1961)

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Elisabeth (Lis) Jacobsen, born on September 1, 1882 in Copenhagen, was a Danish runologist, language historian, lexicographer, and entrepreneur. Lis Jacobsen was born into the prominent Danish family of Jewish origins, the Rubins. Her cousin was the celebrated professor of psychology Edgar Rubin. While she was a student he and she joined a discussion group that included, among others, Niels and Harald Bohr. She was first educated as a teacher, but having married the philologist Jacob Peter Jacobsen in 1903, she began to study Nordic philology at the University of Copenhagen with his encouragement and was awarded the gold medal for a prize essay in 1908. She took her magister degree in 1908. In 1910 she was awarded the degree of doctor of philosophy for her dissertation on the sources of the Danish

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Jacobsen, Lis (1882–1961)

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Elisabeth (Lis) Jacobsen, born on September 1, 1882 in Copenhagen, was a Danish runologist, language historian, lexicographer, and entrepreneur. Lis Jacobsen was born into the prominent Danish family of Jewish origins, the Rubins. Her cousin was the celebrated professor of psychology Edgar Rubin. While she was a student he and she joined a discussion group that included, among others, Niels and Harald Bohr. She was first educated as a teacher, but having married the philologist Jacob Peter Jacobsen in 1903, she began to study Nordic philology at the University of Copenhagen with his encouragement and was awarded the gold medal for a prize essay in 1908. She took her magister degree in 1908. In 1910 she was awarded the degree of doctor of philosophy for her dissertation on the sources of the Danish

national norm. Typically, she argued that the language of the secular administrative body of the royal chancellery was more important for the creation of a Danish orthographical norm than was the bible translation of Christian III (1550). The work was intended to be the first volume in a comprehensive history of the Danish language, but Jacobsen soon realized that the sources needed for such a project were not available yet. In 1911 she consequently founded the Danske Sprog-og Litteraturselskab (DSL) as a society for the edition of dictionaries and early Danish texts. The DSL soon became, and has since then remained, the primary purveyor of critical editions of central Danish works as well as dictionaries based on a thorough examination of the available sources. Jacobsen never attained the affiliation with the university for which she was obviously qualified, but probably served the interests of the national linguistic scene better by creating her own power base outside the traditional institutions.

It takes a rather rare combination of fund-raising talents, organizational powers, and philological know-how to be a linguistic entrepreneur on the grand scale, but Jacobsen had it all. She was vital in securing the establishment and quick completion of the great standard Danish dictionary *Ordbog over det danske Sprog* (*ODS*), published in 28 volumes from 1915 to1956, being its administrator and organizer from the beginning. She continued this line with the much smaller popular version *Nudansk ordbog* (*NO*), published in two volumes in 1952 and 1953, with a number of later editions. As a runologist, she completed the two-volume edition of L. F. A. Wimmer's *Danske Runeindskrifter* (with E. Moltke, 1941–1942) and wrote a classic paper on the interpretations and misinterpretations of runic inscriptions, 'Wimmers landmandsstene' (1926).

During the German occupation of Denmark she had to escape to Sweden, where she lectured on Danish and paved the way for the postwar Nordic cooperation between the national language boards. Jacobsen's vision of a history of Danish was meanwhile accomplished by her colleague Peter Skautrup in his five volumes on the history of the Danish language, *Det danske Sprogs Historie* (1942–1968), which was deeply and avowedly inspired by her sociolinguistic viewpoint and was published by the DSL. Nordic cooperation was also the key to the grand *Kulturhistorisk leksikon for nordisk middelalder* (1956–1978), which was conceived and planned by Jacobsen.

Jacobsen was first and foremost an organizer and entrepreneur, but she was also a linguist and philologist with a conception of language that united historical and sociolinguistic perspectives while respecting the traditional role of dialects in the Danish philological milieu. She ranks among the best linguistic authors with her refined style and her superb talent for fruitful polemics. She died on June 18, 1961.

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Jagić, Vatroslav (1838–1923)

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Vatroslav Jagić was a famous Croatian philologist and a leading voice in Slavic philology during the late 19th and early 20th centuries. Jagić was born in the northern Croatian town of Varaždin on July 6, 1838, to a shoemaker's family. The trajectory of his professional life began when he left his hometown for Vienna to study classical philology and Slavic languages with Franc Miklošič, a famous teacher whom Jagić would succeed 25 years later. After graduation, he taught for nine years at a Gymnasium (high school) in Zagreb, Croatia, and after receiving a doctorate in philosophy from Leipzig University in Germany, Jagić was appointed Professor of Comparative Linguistics in Odessa, Ukraine. Three years later, in 1874, Jagić moved to Berlin, where he taught Slavic philology and revitalized interest for this discipline

national norm. Typically, she argued that the language of the secular administrative body of the royal chancellery was more important for the creation of a Danish orthographical norm than was the bible translation of Christian III (1550). The work was intended to be the first volume in a comprehensive history of the Danish language, but Jacobsen soon realized that the sources needed for such a project were not available yet. In 1911 she consequently founded the Danske Sprog-og Litteraturselskab (DSL) as a society for the edition of dictionaries and early Danish texts. The DSL soon became, and has since then remained, the primary purveyor of critical editions of central Danish works as well as dictionaries based on a thorough examination of the available sources. Jacobsen never attained the affiliation with the university for which she was obviously qualified, but probably served the interests of the national linguistic scene better by creating her own power base outside the traditional institutions.

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Jacobsen was first and foremost an organizer and entrepreneur, but she was also a linguist and philologist with a conception of language that united historical and sociolinguistic perspectives while respecting the traditional role of dialects in the Danish philological milieu. She ranks among the best linguistic authors with her refined style and her superb talent for fruitful polemics. She died on June 18, 1961.

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Jagić, Vatroslav (1838–1923)

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Vatroslav Jagić was a famous Croatian philologist and a leading voice in Slavic philology during the late 19th and early 20th centuries. Jagić was born in the northern Croatian town of Varaždin on July 6, 1838, to a shoemaker's family. The trajectory of his professional life began when he left his hometown for Vienna to study classical philology and Slavic languages with Franc Miklošič, a famous teacher whom Jagić would succeed 25 years later. After graduation, he taught for nine years at a Gymnasium (high school) in Zagreb, Croatia, and after receiving a doctorate in philosophy from Leipzig University in Germany, Jagić was appointed Professor of Comparative Linguistics in Odessa, Ukraine. Three years later, in 1874, Jagić moved to Berlin, where he taught Slavic philology and revitalized interest for this discipline

among scholars. After six years in Berlin, Jagić spent another six years teaching at the university in Saint Petersburg, Russia, and in 1886 moved to Vienna as the successor to his teacher Miklošič. In that era, Vienna was the center of philology; Jagić's home, where he continued teaching Slavic seminars after retirement, was a gathering place for the most famous Central and East European Slavists of the time. In his later days, Jagić was appointed member of the Upper House of the Austrian Parliament.

Jagić's understanding of philology was manifested in the journal *Archiv für slavische Philologie* (*Archives for Slavic Philology*), which he established in 1875 with the intention to make it the principal forum for Slavic philology. Jagić's aim was to widen the borders of philology to include, besides language itself, linguistic and literary artifacts such as old scripts and monuments, as well as Slavic folklore and culture. Jagić was faithful to this goal during his 45-year editorial reign. At the time when Croatia was part of the Austro-Hungarian monarchy, Jagić embraced the political ideas and views of Bishop Josip Juraj Strossmayer, who believed that raising the level of a nation's culture is the only way to freedom. With Franjo Rački, Ivan Kukuljević, and others, Jagić worked on preserving Illyrian traditions under the South Slavic (Yugoslav) name. This orientation was exemplified by Jagić's interest in the life and work of Juraj Križanić (1618–1683), a Dominican priest who was known for his promotion of pan-Slavism and cooperation of the Catholic and Orthodox Churches. Jagić's most important publications (among about 600 attributed to him) are *Historija književnosti naroda hrvatskoga ili srpskoga* (*History of the literature of the Croatian or Serbian people), Tajni jezik u Slavena (Secret language among Slavs),* and *Prilozi slavenskoj sintaksi (Contributions to Slavic syntax)*. His studies of Old Church Slavonic argued that it did not originate in the central plains of Pannonia as most experts claimed, but rather in southern Macedonia. Jagić was also famous for his commentaries on mediaeval Slavic texts and correspondence of famous Slavic philologists (Dobrovski and Kopitar, among others). Jagić was influential as a literary critic, as he argued for realistic depiction of life in literature. He died on August 5, 1923, in Vienna, Austria.

See also: Miklošič, Franc (1813–1891); Old Church Slavonic; Serbian–Croatian–Bosnian Linguistic Complex; Slavic Languages.

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Jakobson, Roman (1896–1982)

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Roman Jakobson (**Figure 1**), an American philologist and linguist of Russian Jewish descent, was born in Moscow. He moved to Prague in 1920 and to the United States during World War II. He graduated from Moscow University and participated in the Russian avant-garde movement in literature. When he moved to Prague, he pursued his doctorate at the University of Prague. From 1933 to 1939, he taught at the Massaryck University, Brno, but left Czechoslovakia during the Nazi occupation. He then traveled to Uppsala in Sweden, to Denmark, and to Norway before leaving for New York in 1941. He taught at the École Libre de Hautes Études, a French/Belgium free university accommodated by the New

among scholars. After six years in Berlin, Jagić spent another six years teaching at the university in Saint Petersburg, Russia, and in 1886 moved to Vienna as the successor to his teacher Miklošič. In that era, Vienna was the center of philology; Jagić's home, where he continued teaching Slavic seminars after retirement, was a gathering place for the most famous Central and East European Slavists of the time. In his later days, Jagić was appointed member of the Upper House of the Austrian Parliament.

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Roman Jakobson (Figure 1), an American philologist and linguist of Russian Jewish descent, was born in Moscow. He moved to Prague in 1920 and to the United States during World War II. He graduated from Moscow University and participated in the Russian avant-garde movement in literature. When he moved to Prague, he pursued his doctorate at the University of Prague. From 1933 to 1939, he taught at the Massaryck University, Brno, but left Czechoslovakia during the Nazi occupation. He then traveled to Uppsala in Sweden, to Denmark, and to Norway before leaving for New York in 1941. He taught at the École Libre de Hautes Études, a French/Belgium free university accommodated by the New

Figure 1 Roman Jakobson (1896–1982).

School for Social Research in New York. He then taught at Columbia University (1943–1949) before becoming a professor at Harvard in 1949 and at MIT in 1957. In 1982, Jakobson died in Boston, Massachusetts.

He was a prolific author, and much of his work was dedicated to literary studies, but his role in the development of structural linguistics is also important. There have been many studies of his publications in English, in particular through the twentieth century, but significantly less of what he published in Russian has been examined. Most of these primary sources are now available for research.

In Moscow, Jakobson, along with the other young intellectuals, and G. O. Vinokur and P. Bogatyrev in particular, were involved in the creation of the Moscow Linguistic Circle, taking part in the debates that began to be developed in the second half of the nineteenth century on Slavic philology, poetics, dialectology, and folklore in the Old Russian Empire. After the death of F. E. Korsh (1843–1915), Jakobson chaired the Moscow Linguistic Circle until his departure for Prague. Traditionally, F. F. Fortunatov's Moscow School advocated a formal, logical approach to language study. A somewhat different treatment of the same themes predominated in St. Petersburg, where the OPOIAZ – Society for the Study of Poetic Language – was created in 1916 (it ceased to exist in 1923). Jakobson was a member of OPOIAZ, along with V. Shklosky, I. Tynianov, and B. Eikhenbaum. In St. Petersburg, the 'Kazan' School of J. Baudouin de Courtenay (1845–1929) and his disciples predominated. Both the Moscow Linguistic Circle and OPOIAZ are usually referred to as the Russian Formalists. However, influential studies in language, linguistics, and literature were not limited to these two centers in the Old Russian Empire and the Soviet Union: the city of Kharkiv, with its university, was fundamental, as was the legacy of O. O. Potebnia, with his disciples, in Moscow, St. Petersburg, and elsewhere, and the activities of the Historical-Philological Society (created in 1876).

After moving to Prague, Jakobson met Prince Nikolai Trubetzkoy (1890–1938) at a time when Prague was a hub of intellectual activity enabled by the intellectual climate fostered by T. G. Massaryk. Jakobson's main interests in the period continued to center on Slavic philology and literary studies. He was one of the founding members of the Prague Linguistic Circle, along with V. Mathesius (who was president until his death in 1945) and N. Trubetskoy, S. Karchevskii, and J. Murařosvký, among others. The Prague and Copenhagen centers became known as schools of structural linguistics. The former benefited from the Jakobson's move to the United States, where he promoted it.

The focus of Jakobson's writings during his Moscow and Prague periods is primarily aimed at literature, new art aesthetics, and philology (rather than linguistics), including Slavic philology, comparative philology, sound patterns and phonemics, literary language, the influence of folk literature on literature, folk songs, Futurism, aesthetics, poetics, versification, Russian and Slavonic culture and comparative mythology. It was after his arrival in the United States that Jakobson increased his output in phonology and, later, in linguistics, but he continued to describe himself as a Russian philologist.

There is still much research to be pursued on the evolution and sources of his ideas. For example, during the Moscow/Prague period, Jakobson wrote on literary themes and authors such as Trediakovsky (1915), Khlebnikov (1920, using his pen name R. A. [Roman Aljagrov] and for his own poetry), Maiakovsky (1931), Pushkin (1937), and Pasternak (1935).

Some of Jakobson's writings were dedicated to specific languages: Russian and its dialects, Czech, Bulgarian, and others. He also wrote on a number of linguists/philologists such as Durnovo (1926), Mathesius (1932), Shakhmatov (1920), and Peshkovskii (1933) (the latter two were disciples of O. O. Potebnia).

With P. Bogatyrev, he wrote on Slavic philology in Russia during the period of 1914–1921 (1922–1923). In the late 1920s, he produced two articles on phonetics and the phonological history of Slavonic languages. In 1931, he published a paper on the principles of historical phonology and entries on

'phoneme' and 'linguistics' for a Czech scientific dictionary in 1932 and 1935.

Jakobson was interested in identifying universals in languages, and he consequently disregarded relevant crucial differences. The idea of shared grammatical features as opposed to shared origin was part of his theory of universals. On the same basis, he postulated a development of the Slavonic verbal system (1932) based on a single stem. In 1936, he also published an article on the Russian/Slavonic case system based on the same idea. In 1938, he presented a paper on his theory of phonological affinities at the Fourth International Congress of Linguists in Copenhagen. In 1939, he wrote an article on the structure of phonemes. These pieces were the beginning of his work on phonology and linguistics.

In addition, in the 1920s and 1930s, Jakobson also had an interest in the sociology of language and national self-determination. These topics appeared in his papers in 1920–1921 and 1931. The latter year focuses on the proposed Eurasian linguistic union within the Eurasian ideological movement proposed by Russian émigrés in the 1920s and 1930s, characterized by an idiosyncratic linguistic and cultural approach.

His 1941 *Kindersprache, Aphasie und allgemeine Lautgesetze* (Jakobsen, 1971a: 328–401) has generated much research, as it suggests that there might be a universal order in the acquisition of speech sounds. His cooperation with N. Trubetskoi resulted in the furthering of the theory of distinctive features for the phonemes – the components of sounds. A phonetic feature distinguishes one phoneme from another (e.g., voiced/voiceless). The presupposition in this theory is that a set of features is applicable to distinguish phonological differences in all languages.

The concept of distinctive features, along with other concepts related to sound patterns, sound, and meaning, were expanded after Jakobson arrived in the United States. The Technical Report for the MIT Acoustics Laboratory, *Preliminaries to speech analysis* (1952) was jointly published with G. Fant and M. Halle. With Morris Halle, in 1956, in *Fundamentals of language*, the authors put forward the idea that a set of 12 binary oppositions, a bundle of 12 features, would be sufficient to give an account of all of the distinctions in all languages. The languages differ only in the manner that they combine these features. This contributed to the subsequent developments in phonological theory. For instance, A. Martinet outlined his views on Jakobson's phonology in his 'Substance phonique et traits distinctifs' (1957–1958).

Jakobson promoted the application of linguistics to literature. Some of the concepts that he used were those of iconicity, markedness, metaphor and metonymy, and communicative functions. He created a model of communicative functions based on the work of Karl Bühler and others. He argued that a shared code was not sufficient, but a context was essential in the communicative function. The components of communication are the addresser and the addressee and context, message, channel, and code. Therefore, depending on the focus of the component of communication, the functions are emotive (focuses on the addresser's attitude to his or her own message; e.g., interjections and emphatic speech), conative (focuses on the addressee; e.g., vocative), referential (refers to the context), phatic (refers to the contact/channel of communication between two speakers), metalinguistic (refers to the code itself, language about language; i.e., metalanguage), and poetic (refers to the additional component of a message apart from content). Each piece of discourse requires an analysis to identify which of the above functions predominate.

The seven volumes of Jakobson's *Selected writings* (1962–1984) offer an outline of the main areas of Jakobson's many interests. The correspondence of Jakobson with Trubetskoi and others in the interwar period (Toman, 1994) offers interesting insights into both the circulation of ideas and the characters of the personalities.

The acquaintance with C. Levi-Strauss has generated another strand of interaction and influence. The 1980 *Dialogues* with Krystyna Pomorska (his last wife) is another source. *The sound shape of language* with L. Waugh in 1986 represents another element in the history of Jakobson's thoughts. There are many publications on his life and works. Equally there is a great deal of comment about his works by Jakobson himself. Indeed, the accounts of intellectual histories in language sciences and the other areas that interested Jakobson are selective and have not been sufficiently researched. His eleven essays edited by K. Pomorska and S. Rudy (1985) *Verbal art, verbal sign, verbal time* are meant to be mainly an introduction to his works in poetics but also have relevance to his linguistic ideas.

See also: Bühler, Karl (1879–1963); Fant, (Carl) Gunnar (Michael) (b. 1919); Halle, Morris (b. 1923); Jakobson, Roman: Theory of the Sign; Levi-Strauss, Claude (b. 1908); Martinet, André (1908–1999); Mathesius, Vilém (1882–1945); Potebnja, Alexander (1835–1891); Shklovsky, Viktor Borisovich (1893–1984); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Jakobson, Roman: Theory of the Sign

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Introduction

Roman Jakobson (1896–1982), the Moscow-born linguist and semiotician who carried out most of his work in the United States, is perhaps best known for his model of communication (Jakobson, 1960) – a model that is based on a social-dynamic theory of the sign. A student of Russian linguist Nikolai Trubetzkoy (1890–1939), Jakobson was a founding member of the Prague Linguistic Circle in 1920 (Koch, 1981: 225–226). Most of his writings on semiotics were published in the 1960s and 1970s, during his professorship at Harvard University (e.g., Jakobson, 1960, 1966, 1970, 1971, 1974, 1978, 1985).

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Jakobson, Roman: Theory of the Sign

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Introduction

Roman Jakobson (1896–1982), the Moscow-born linguist and semiotician who carried out most of his work in the United States, is perhaps best known for his model of communication (Jakobson, 1960) – a model that is based on a social-dynamic theory of the sign. A student of Russian linguist Nikolai Trubetzkoy (1890–1939), Jakobson was a founding member of the Prague Linguistic Circle in 1920 (Koch, 1981: 225–226). Most of his writings on semiotics were published in the 1960s and 1970s, during his professorship at Harvard University (e.g., Jakobson, 1960, 1966, 1970, 1971, 1974, 1978, 1985).

Theory of the Sign

Jakobson argued that the Saussurean view of the sign as an arbitrary structure – that is, one that has no motivation for being as it is through resemblance or simulation to its referent – was ultimately a useless one (*see* **Saussure: Theory of the Sign**). Taking his cue from Otto Jespersen (1860–1943), Jakobson saw signs as 'shifters' pointing to the cause and context of an utterance. Shifters are indicators of place (*here*, *there*), time (*now*, *then*), and specificity (*this*, *that*) that are context-sensitive.

The notion of shifter led to his model of communication, which has become widely used in both semiotics and linguistics. This consists of six constituents:

1. An addresser who initiates a communication;
2. A message that he or she wishes to convey and which he or she recognizes must refer to something other than itself;
3. An addressee who is the intended receiver of the message;
4. A context that provides the framework for encoding and decoding the message – e.g., the phrase 'Help me' takes on a different meaning depending on whether it is uttered by someone lying motionless on the ground or by someone in a classroom who is working on a difficult math problem;
5. A mode of contact (face-to-face, phone, etc.) by which the message is delivered between an addresser and an addressee;
6. A code (such as language, gesture, etc.) providing the signs for encoding and decoding messages.

Jakobson then pointed out that each of these constituents determines a different communicative function:

1. **Emotive**. This is the intent of the addresser in the communication act.
2. **Conative**. This is the effect the message has (or is intended to have) on its receiver.
3. **Referential**. This is any message that is constructed to convey information ('Main Street is two blocks north of here').
4. **Poetic**. This is any message constructed to deliver meanings effectively, like poetry ('I like Ike').
5. **Phatic**. This any message designed to establish, acknowledge, or reinforce social relations ('Hi, how's it going?').
6. **Metalingual**. This is any message that refers to the code used ('The word noun is a noun').

Conclusion

Jakobson's model suggests that sign use goes well beyond the function of simple information transfer. Signs are shifters that determine who says what to whom, where and when it is said, and how and why it is said; that is, sign use is motivated and shaped by the setting, the message contents, the participants, and the goals of each interlocutor. In-depth assessments of Jakobson's importance to semiotics can be found in Waugh (1976), Krampen (1981), and Eco (1985).

See also: Iconicity; Jakobson, Roman (1896–1982); Jespersen, Otto (1860–1943); Morris, Charles: Theory of the Sign; Saussure: Theory of the Sign; Semiotics: History; Structuralist Phonology: Prague School; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Nikolaj Feofanovič Jakovlev was born in the village of Bulgarin (in the Saratov region of the Russian Federation) on May 19, 1894, and died in Moscow on December 30, 1974. A Russian linguist, he was one of the founders of the Moscow School of Phonology and a specialist in Caucasian languages and the theory of orthography.

Jakovlev graduated from Moscow University in 1916. He became a professor in 1946 and obtained his Ph.D. in 1947. He held various posts at the Institute of Linguistics of the USSR Academy of Sciences in Moscow from researcher (1936) to Head of the Caucasian Languages Department at the same Institute (1942–1950). Jakovlev was also a member of the All-Union central committee of a new alphabet.

Phonology in Russia dated back to the 1870–1880s and was founded by Baudouen de Courtenay. However, its general theory was formulated by Ščerba, Jakovlev, Trubeckoj, and Jakobson half a century later.

Since 1920 Jakovlev has organized and led fieldwork trips to the Caucasus to study Caucasian languages that did not have written tradition and were used only for oral communication.

In 1923, on the basis of a linguistically consistent theory of a phoneme worked out by him, Jakovlev devised a mathematical formula for inventing systems of characters with which Caucasian languages could be written. It opened up new horizons for 70 Caucasian peoples for whom a new alphabet was first introduced on the basis of Latin and later Cyrillic.

He has also shown serious interest in fundamental linguistic problems of Caucasian languages concerning their grammatical structure and lexicon, which led Jakovlev to writing a grammar of the Kabardian-Cherkes language (1948). During his fieldwork in the Caucasus he gathered materials for the Kabardian language dictionary and got it published in 1927.

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Jamaica: Language Situation

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Jamaica's 2.6 million people mostly speak the English-lexified Jamaican Creole, known locally as Patwa. (The Ethnologue name, Southwestern Caribbean Creole English, is used by neither Jamaicans nor creolists.) Patwa is a language of strong ethnic and national identification, spoken abroad in Canada, the UK, and the United States by well over 500 000 people. (On distinctive British varieties, see Sutcliffe, 1982; Sebba, 1993.) Patwa constitutes the basilect and mesolect of a Creole continuum (DeCamp, 1971); it is largely unintelligible to nonJamaicans. The widely-spoken acrolect, Standard Jamaican English, has emerging written/standard norms (Shields, 1989; Sand, 1999); though native to a small minority, education is largely in English. Patwa has increasingly penetrated broadcast and print media since independence in 1962. Jamaican Sign Language, apparently related to ASL but with some BSL-derived signs, is used in deaf schools.

Patwa arose from British colonialism, African slavery, and the plantation economy (Le Page, 1960). It developed between 1655, when English soldiers captured Jamaica, and 1750 – a century of massive increase in the African population – though some important features are not attested for another century (Lalla and D'Costa, 1990). Standard Jamaican is a recognized national variety of English, genetically descended by normal transmission from British dialects. Basilectal Patwa differs radically from English grammar, and emerged from profound language

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contact, structural mixing and creolization between Africans and English speakers (Alleyne, 1988); it is not genetically descended from English, nor from African languages, though they are historically linked.

Table 1 Implicational scale: variable Patwa features[a]

Creole 'C':	/ ***d*** /	/ ***t*** /	*pikni*	*no ben*	*nana*	*nyam*
Speaker 4	C	C	C	C	C	C
Speaker 3	C	C	C	C	C	*e*
Speaker 7	C	C	C	C	*e*	*e*
Speaker 2	C	C	C	*e*	*e*	*e*
Speaker 6	C	C	*e*	*e*	*e*	*e*
Speaker 1	C	*e*	*e*	*e*	*e*	*e*
Speaker 5	*e*	*e*	*e*	*e*	*e*	*e*
English *'e'*	/ ð /	/ θ /	*child*	*didn't*	*granny*	*eat*

Adapted from DeCamp, 1971: 355.

[a] This table illustrates unidimensional Creole continuum for Jamaican Patwa. It uses six surface forms (three lexical, two phonological, and one syntactic) which are unrelated to each other, and charts their distribution for seven Patwa speakers, in an implicational display (see Rickford, 2002 for discussion of this device). For each item, the Patwa element at the top of the column is matched with its English equivalent at the bottom. The table does not attempt to represent individual variability or intermediate (mesolectal) elements, but it does successfully stratify each speaker into a separate cell, contrasting the acrolect to the basilect, with a range of intermediate patterns.

Creolists disagree whether a pidgin developed in Jamaica, or existed previously on the African coast and was relexified; or whether Patwa developed by abrupt creolization. African sources included Kwa and Bantu languages, especially Akan Twi, partially maintained by Jamaican Maroons, rebel Africans who achieved independence from England in 1739. The ritual Maroon Spirit Language resembles Suriname Creoles (Bilby, 1983). British sources include non-standard regional English dialects from London, Bristol, West Midlands, Liverpool, Scots and Irish English. Late-arriving migrants (post-1845) of Indian, Chinese, and Syrian heritage neither influenced the language's genesis nor evolved ethnic dialects.

Patwa exhibits some regional variants, especially in western Jamaica; more salient are urban/rural and social variation (Patrick, 1999). Patwa was long subordinated to standard English by an elite minority controlling power and official culture. Limited access for most Jamaicans to standard English resulted in the (post-)Creole continuum, a chain of minimally distinct varieties stretching from the acrolect to the basilect (DeCamp, 1971). Discrete, categorical approaches (community bilingualism, standard/dialect, and diglossia) have proven inadequate to describe the Jamaican language situation (Table 1).

Demographically, the mesolect – the intermediate range of speech varieties – dominates. It incorporates

Table 2 Relative influence of constraints on past-marking, by speaker (Patrick, 1999: 265)[a]

	Did/Neva		*Verb inflection*			
	±*Punctual*	±*Anterior*	±*Punctual*	±*Anterior*	*Prec. Envt*	*Foll. Envt*
Roxy	. . .	. . .	∅	∅	❶	✸
Rose	. . .	. . .	∅	∅	❶	✸
Noel	. . .	. . .	∅	∅	❶	✸
Olive	. . .	. . .	∅	∅	❶	✸
Opal	. . .	. . .	∅	❶	∅	✸
Matty	✸	❶	∅	❶	∅	✸
Bigga	. . .	. . .	✸	∅	❶	≈
Tamas	✸	❶	✸	∅	❶	≈
Mina	✸	❶	✸	∅	❶	≈
Dinah	✸	❶	✸	∅	❶	≈

❶ Primary constraint
✸ Secondary constraint
≈ Equivocal constraint
∅ Not significant
. . .(Not applicable)

[a] Table 2 has similar goals as Table 1, but does take into account individual variation and mesolectal elements. It displays part of the variability in past-marking among twelve individual speakers from the city of Kingston, for both preverbal invariant Creole markers of past reference (mesolectal *did*, and its negative counterpart *neva*) and English-like verb inflection. (Not all speakers use both.) Instead of focusing on the occurrence of unrelated surface forms, however, it identifies the relative strength of linguistic constraints – both Creole- and English-valued, phonological and grammatical – governing elements of the same grammatical subsystem: past-marking in the urban Patwa mesolect. Though each speaker does not have a distinctive pattern, a range of patterns does occur, including (for some speakers) both English-like phonological forms and contexts, and classic Creole constraints (anteriority and punctuality, which affect both the use of invariant preverbal particles and verb inflection, sometimes for the same speaker). The table demonstrates a systematic but variable mesolectal grammer, and ordered inherent variation within the Patwa mesolect.

elements of English structure within a systematic but variable Creole grammar: it lacks categorical agreement, but possesses many English forms and inflections, governed by both English and Creole linguistic constraints (Table 2). It shows strong, stable sociolinguistic patterns of speech production and evaluation, with highly focused Patwa norms but diffuse English norms (Patrick, 1999). It is not produced synchronically through language mixing (although Jamaicans do codeswitch and styleshift), but predates the basilect.

Fundamental reference works include a dictionary (Cassidy and LePage, 1967) and transformational grammar (Bailey, 1966); contemporary descriptions include Devonish (2004) and Patrick (2004).

See also: Akan; Bantu Languages; Kwa Languages; Language Change and Language Contact; Pidgins and Creoles: Overview.

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Japan: History of Linguistics

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Historically, language study in Japan has had two main streams: foreign-language study for the purpose of assimilating various new forms of knowledge from abroad, and inquiry into the mother tongue to protect national identity and manifest the excellence of Japanese culture. From this viewpoint, the history of linguistic thought in Japan is characterized by three major landmarks. First, in the Nara and Heian periods (710–1192), in the stream of Chinese influence on the Japanese language, awareness of the mother tongue arose with national identity. Second, in the Edo period (1603–1867), while *kangaku* (classical Chinese learning) and *yogaku* (Western learning) thrived, the *kokugaku* (national learning) movement gained ground, focusing on textual and exegetical study of Japanese classical literature based on language study. Third, in the course of Westernization after the Meiji restoration (1868), the *kokugogaku* (scientific study of Japanese) school assimilated the fruits of Western linguistics into Japanese study and explored their own methods.

This article lays emphasis on the tradition of inquiry into foreign languages and the mother tongue by Japanese intellectuals and scholars, weighing up the aforementioned three major periods in the history of language thought in Japan.

elements of English structure within a systematic but variable Creole grammar: it lacks categorical agreement, but possesses many English forms and inflections, governed by both English and Creole linguistic constraints (**Table 2**). It shows strong, stable sociolinguistic patterns of speech production and evaluation, with highly focused Patwa norms but diffuse English norms (Patrick, 1999). It is not produced synchronically through language mixing (although Jamaicans do codeswitch and styleshift), but predates the basilect.

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This article lays emphasis on the tradition of inquiry into foreign languages and the mother tongue by Japanese intellectuals and scholars, weighing up the aforementioned three major periods in the history of language thought in Japan.

Language Awareness and National Identity

In a narrow sense, there was no systematic inquiry into language in Japan before the *kokugaku* movement of the 18th century. In spite of Japan's long and rich literary tradition, expanding from the 8th century, no equivalent to Dionysius Thrax can be found in the early and medieval periods. However, the people had a keen awareness of the linguistic uniqueness of their mother tongue, which was closely related to a consciousness of national identity against highly advanced foreign civilizations.

Belief in *Kotodama*, or the Miraculous Power of Words

Ancient Japanese people recognized the miraculous power of words and worshipped *kotodama* (the spirit of words). In *Man'yoshu*, an anthology of poetry compiled in the late 8th century, poets admired Japan as the land where the soul of language flourishes, and the preface to *Kokinwakashu*, the first collection of Japanese verse, compiled by royal command in about 905, stated: "Japanese poetry can move heaven and earth, induce the gods and demons to appreciate the beauties of nature, render men and women harmonious, and soothe the hearts of doughty warriors." It was thus strongly believed that the sacred and miraculous power of the native Japanese language, if expressed in the form of a *waka* (a 31-syllable Japanese poem) or a *norito* (a Shinto ritual prayer), could exert a significant influence on people, the entire world, and even the gods.

Chinese Influence and Language Awareness

The Japanese writing system is indebted to Chinese, and no indigenous script has ever been developed. *Kojiki* (*Record of ancient matters*, 712) was transcribed in Chinese characters solely as phonetic signs, and *Nihonshoki* (*Chronicles of Japan*, 720) was written perfectly in classical Chinese style. It was not until the 10th century that the two syllabaries, *katakana* and *hiragana*, which were developed out of simplified Chinese characters, were widely used throughout the country.

It is not clear when *kanji* (Chinese characters) first reached Japan, but the scholar Wani from the Korean peninsula is said to have brought 11 volumes of Chinese writings, including the *Analects of Confucius*, as early as the 4th century. While the Japanese people of that time introduced overwhelmingly higher systematized philosophy and religious dogma such as Confucianism and Buddhism, they continued to respect their own traditional values. In terms of language consciousness, they continued worshipping the miraculous power of their mother tongue and used *kanji* for the 'male' domain of learning and writing, for example, official documents, scholarly texts, and formal letters, and *yamatokotoba* (the pure native language written in *hiragana*) for expressing things spiritual, emotional, sentimental, etc. Describing love and human nature, Lady Murasaki's 11th-century *Genji-monogatari* (*The tale of Genji*) was written almost entirely in *yamatokotoba*.

Language Study as National Learning

The dichotomy of using classical Chinese as the medium of official and scholarly writing and pure Japanese, untainted and unfertilized by Chinese, for emotional content remained for many centuries. From the 9th century onwards, therefore, language study was confined to classical Chinese texts. In addition, after the arrival of Buddhism, phonological study of *Bongo* (Sanskrit) in Buddhist scriptures was conducted exclusively by Buddhist monks. In either case, Japanese was not considered appropriate as a subject of rigorous study.

The first group with a particular interest in the Japanese language was the Portuguese missionaries, mostly Jesuits, who came to Japan in the 16th century. The Jesuit priests reported back to Europe on the excellence of Japanese people and culture and published books to encourage systematic study of the Japanese language. But the works were written neither in Japanese nor in Chinese, but in Portuguese, and had no intrinsic influence on language study by Japanese intellectuals.

Prelude to the *Kokugaku* Movement

In the 17th century *kangaku* reached its peak. In particular, the *kogaku* (study of antiquity) school, established and fostered by Ito Jinsai (1627–1705) and Ogyu Sorai (1666–1728), exceeded the level of classical scholarship in China at that time, emphasizing the original trust of Confucianism and rejecting the dogmatic interpretation of the Confucian canon by the Neo-Confucian tradition from Chu Hsi. Their approach to the Chinese texts was shaped by a philological and exegetical rigor to examine the original meaning of the texts by means of removing the arbitrary interpretations and commentaries that might obscure the original teachings of Confucius.

In addition to the flourishing *kangaku*, *yogaku*, represented by *rangaku* (Dutch learning), was triggered by the encounter with the Dutch, the only Westerners who were allowed to engage in foreign

trade under the national seclusion policy of the Tokugawa government. For this new learning in various fields such as medicine, chemistry, military science, etc., the *rangaku* scholars depended entirely on textual interpretation of Dutch books based on a direct translation method, which resulted in the learning of Dutch grammar growing in popularity. The translation in 1774 of *Kaitaishinsho* (*New book of anatomy*) by Sugita Genpaku (1733–1817) and others from a Dutch original was a remarkable achievement of the *rangaku* school.

The *Kokugaku* Movement and Its Characteristics

In the 18th century a fierce nativist reaction emerged against the dominance of foreign studies. An especially strong opposition came from the *kokugaku* movement against *kangaku*. Traditionally, four scholars form the lineage of the orthodox *kokugaku* school: Kada no Azumamaro (1669–1736), Kamo no Mabuchi (1697–1769), Motoori Norinaga (1730–1801), and Hirata Atsutane (1776–1843). Through the textual and exegetical study of Japanese classical literature and ancient writings, the *kokugaku* scholars insisted, for the purpose of identifying and appreciating typical Japanese mentality and morality, on a return to *yamatogokoro* (original Japanese ways of thinking), that is to a time before Japan had been corrupted by *karagokoro* (Chinese ways).

Among these *kokugaku* scholars, Norinaga's achievement deserves special attention. Influenced by a monk of the Shingon sect, Keichu (1640–1701), the forerunner of *kokugaku*, Norinaga conducted a philologically oriented investigation of ancient Japanese thought and culture to explain the peculiarity and preeminence of *yamatogokoro*. Through his study of *Man'yoshu* and *Genji-monogatari*, he re-evaluated the *mono-no-aware* (sensitivity in literary creation) of the ancient Japanese people to refute the claims of Confucian rationalism introduced at a later stage.

Norinaga's greatest linguistic achievement is the *Kojikiden* (1764–1798), in which he not only explicated the ancient Japanese system of morality, but also succeeded in showing how to read the text of *Kojiki*, written in Chinese script, as phonetic signs for *yamatokotoba*. By means of studying the ancient language and literature Norinaga contrived to grasp intuitively the world that the ancient people experienced, an attitude which parallels the approach of German philologists of the 19th century. Norinaga's inductive method in philological and exegetical studies of Japanese classical literature provided a model for many succeeding generations of scholars.

In the Wave of Modernization: From the Traditional Method to Scientific Study

During the period of modernization in the late 19th and early 20th centuries, Japan learned eagerly from the West the ideal forms for promoting science and technology. The leaders in various areas of that period imported from Western countries what they considered the best. Besides *rangaku*, therefore, many other European languages, particularly English, German (Standard German), and French, became popular for the practical reason of digesting the various new accomplishments of learning. In this intellectual climate, the new wave of philology and linguistics rushed into Japan from the West and extended its influence over the entire academic world. First, foreign scholars invited to the imperial universities initiated modern linguistics, and subsequently their students and the *ryugakusei* (scholars and students studying abroad to absorb the most advanced findings of science and technology) played an important role in the department of *hakugengaku* (philology and linguistics), with which linguistic sciences in Japan commenced.

Western Influence on Japanese Linguistics

The new generation of Japanese scholars devoted themselves to Western linguistics and the scientific study of the Japanese language. They were under the strong influence of German historical and comparative linguistics.

Bun'yu Nanjo (1849–1927) and Junjiro Takagushu (1866–1945), scholars of Sanskrit and Buddhism, studied as *ryugakusei* Sanskrit grammar under the guidance of Friedrich Max Müller (1823–1900) at Oxford. Though Sanskrit was known to Buddhist monks as early as the 9th century, they began new Buddhist studies directly from the Sanskrit texts based on the comparative method, not through the Chinese translation or assistance.

Kazutoshi Ueda (1867–1937), the first professor of linguistics at Tokyo Imperial University and considered the father of modern Japanese linguistics, studied the comparative and historical method under the Neogrammarians at Leipzig and thereby provided the foundation of the *kokugogaku* school in Japan. He initiated the historical study of Japanese phonology and lectured on the history of Japanese linguistics, which was crucial in establishing the popularity of German linguistics, particularly Hermann Paul's *Prinzipien*. On this basis, various branches of Japanese linguistics were established by Ueda and his students, e.g., Katsuji Fujioka (1872–1935) in Altaic linguistics, Izuru Shinmura (1876–1967) in lexicology, Shinkichi Hashimoto (1882–1945) in Japanese

grammar, and Kyosuke Kindaichi (1882–1971) in Ainu philology. The next generation of linguists, Hisanosuke Izui (1905–1983) and Harushige Kodzu (1908–1973), concentrated more on Indo-European and European linguistics. The Western influence on Japanese linguistics and general linguistics in Japan was so great that almost all the major linguistic works in European languages were translated into Japanese. Ferdinand de Saussure's *Cours de linguistique générale* (1916) was translated by Hideo Kobayashi (1903–1978) in 1928, the world's first translation of the work.

In the *kokugogaku* school, some scholars took a stand against the attempts to schematize Japanese linguistics according to the Western model. From a psychological standpoint, Motoki Tokieda (1900–1967) advocated the theory of *gengokateisetu* (theory of language as a process) in opposition to the structuralists' perspective, notably to Saussure's concept of language. In the *kokugaku* school, Shinobu Orikuchi (1887–1953), following Norinaga's approach to text interpretation, established a folkloric approach to the essence of the Japanese psyche.

After World War II, the linguistic tendency in Japan shifted from European influence to American influence. The younger scholars studied Bloomfieldian linguistics and later Chomskyan linguistics, and applied their accomplishments to Japanese language study. In this sense, present-day linguistic study in Japan proceeds in parallel with the world's dominant stream.

See also: Buddhism, Japanese; Fujioka, Katsuji (1872–1935); Japan: Language Situation; Japan: Writing System; Japanese; Kobayashi, Hideo (1903–1978); Kodzu, Harushige (1908–1973); Motoori Norinaga (1730–1801); Nanjio, Bunyiu (1849–1927); Tokieda, Motoki (1900–1967); Ueda, Kazutoshi (1867–1937).

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Japan: Language Situation

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Japanese, as the official language of Japan, usually refers to the standard or common variety of the language. It was formed in the early 20th century, based on a variety of the Tokyo dialect. Establishing a standard language was essential at that time when Japan was modernizing itself after 250 years of isolationism. The standard language is the language of education and mass communication and is understood by over 126 million people throughout Japan.

The standard language is widespread, particularly in its written form. This does not mean, however, that the written convention has been completely formalized or stabilized. Since its establishment, the standard language has undergone various stages of modification, particularly in the area of *kanji* (Chinese characters) and *kana* (syllabary symbols) use. *Kana* symbols are phonetic in nature and are used together with *kanji* characters in sentences. However, until the end of World War II, these symbols represented the classical Japanese pronunciation. With the postwar reforms, they now reflect the sound of the modern language more accurately. A major problem in the writing system, however, has been the use of *kanji*, particularly its large inventory. Proposals were made to limit the number for practical purposes. The current 'List of Characters for General Use (*Toyo Kanji Hyo*)' recommends 1945 characters for daily use, though 3000 characters are used regularly in publications.

The use of honorific language and that of loanwords are also constant topics of debate for both

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The use of honorific language and that of loanwords are also constant topics of debate for both

written and spoken forms of the standard language. Modern Japanese inherited a complex honorific system developed fully in medieval Japan, which emphasized the difference in the hierarchical social status among the speaker/writer, listener/reader, and referents. Modern Japan, however, has moved toward a more egalitarian society, and the honorific system has been simplified. The system is now more concerned with the treatment of the addressee according to the speaker's relationship with the addressee and the level of formality of the speech situation.

English became an important foreign language in the Meiji Period (1868–1912). It has been the most influential supplier of loanwords in Modern Japanese, especially after World War II. The majority of the loanwords, which is about 10% of the vocabulary used in the language, are from English. Loanwords are usually pronounced according to the Japanese sound system, but some are pronounced in more innovative ways. Some loanwords are firmly established in the lexicon (*/rajio/* < 'radio,' */batto/* 'baseball bat'), while others are not (*/akusesu/* 'access,' */hippu hoppu/* 'hip hop'). While the use of loanwords is a solution to the accommodation of new ideas and products that are entering the life of Japanese people at an increasingly faster pace, the overuse of loanwords in the area of public services has become a social concern. Attempts have been made to replace some new loanwords with semantically more transparent Sino-Japanese based words.

Though many Japanese can and do speak the standard variety, some may also use their own regional dialects for daily life in their community. Dialect areas are first divided between the mainland and Ryukyu (Okinawa). The mainland dialect area is further divided into eastern, western, and southern dialects. The eastern dialects are spoken from the eastern to northeastern part of Honshu, the largest of the four major islands, and include the 12 million speakers of the Tokyo dialect. The western dialects are spoken in the west and southwest part of Honshu and on the smallest major island of Shikoku. They include two important subdialects: Kyoto dialect, a descendant of the language used in much of the classical literature from the 8th through 16th centuries, and Osaka dialect with approximately 8 million speakers. The southern dialects are spoken on Kyushu Island, the southern most major island.

Ryukyu dialects are spoken on the Okinawan archipelago extending off Kyushu Island to the east of Taiwan. Ryukyu dialects are completely unintelligible to the speakers of other dialects. There are 1.3 million inhabitants, but monolingual speakers of the dialects have almost completely disappeared; those over 50 years of age are proficient both in a vernacular and the standard Japanese, while the younger generation is rapidly moving toward a state of monolingualism in standard Japanese.

The dialect of Hokkaido, the northern-most major island, is a mixture of other dialects due to immigration from different parts of Japan since the mid-19th century driven by the Japanese government's development policy.

Ainu was once spoken on this island. It is unrelated to Japanese, though its genetic affiliation is not established. While the number of people of Ainu ethnicity is estimated at 24 000 or more, there are only few living native speakers of the language, partly due to the government's earlier assimilation policy, which included a ban on the use of Ainu. However, the Ainu New Law of 1997 formally recognized this ethnic group as an indigenous minority, and there is now a government-supported revival movement for the language and culture of Ainu.

Among the foreign languages spoken in Japan, Korean, Chinese, and English have special places. Many Koreans came to Japan during the period of Japan's annexation of Korea (ending in 1945) and remained in Japan afterward. Koreans are now the largest minority group with 1 million people, but the number of ethnic Koreans who can speak the language has been diminishing in spite of the Korean community's effort to teach students in bilingual schools at different levels of education.

Although Japanese learn a large number of Chinese characters and use Sino-Japanese vocabulary extensively in writing and speech, few can use Chinese as a spoken language. This is due to a long tradition that treats the Chinese language as a language of high culture, and not for oral communication. There are 50 000 ethnic Chinese consisting of an older generation of Cantonese speakers and a newer generation of Mandarin speakers. The younger ethnic Chinese do not speak Chinese as their first language, and some attend Chinese language school to maintain their linguistic heritage. The recent upsurge in the number of migrant workers, students and returnees from various parts of China, however, has changed the demographic and linguistic profile of Chinese in Japan.

English is not used as a general means for oral communication, and the proficiency in English is limited despite the fact that most Japanese have studied English for 6 years by the time they graduate from high school. There have been movements to change this trend.

See also: Ainu; Japanese.

Language Maps (Appendix 1): Map 103.

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Japan: Writing System

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Description of the Current Writing System

The primary elements of modern Japanese writing are *kanji* 'Chinese characters' and two syllabaries called *hiragana* and *katakana* (collectively, *kana*). This mixture of character types is often described by saying that Japanese has three distinct scripts, but that is misleading. Any Japanese utterance can be written entirely in *hiragana* or *katakana*. Indeed, before 1945, either *hiragana* or *katakana* could be used as the default syllabary to supplement *kanji*. By contrast, not every Japanese utterance can be written with *kanji* alone. There once were forms of writing in which only *kanji* were used, but they are seldom encountered today. Moreover, modern spelling rules for *hiragana* and *katakana* differ, the two sets of *kana* are not freely interchangeable in ordinary usage, and roman letters and arabic numerals (A–Z, a–z, 0–9) as well as punctuation marks and typographical symbols of both Western and Japanese origin are now frequently used.

Kana

Despite the appellation 'syllabary,' the basic unit that *kana* represent is actually the mora. These are the so-called short vowels (V), with or without a preceding consonant (CV) or a consonant-glide combination (CyV); the mora nasal /N/ (a one-beat resonant with several conditioned allophones); and the mora obstruent /Q/, which precedes obstruents and causes a one-beat delay in their release. Japanese syllables consist of one or two (occasionally more) morae; the distinction between syllable and mora is essential for the description of pitch accent, present in most dialects but not indicated in standard orthography (for further details, see Vance, 1987).

Number and Form The two sets of *kana* contain 48 basic shapes, of which 47 are traditionally arrayed, as shown in **Table 1**. This arrangement, called the *gojūon-zu* or '50 sound chart' (despite its gaps), is first attested around 901. It is meant to be read from the upper right corner in Chinese style so that the order of morae is *a i u e o, ka ki ku ke ko, sa si su se so*, etc. This ordering was inspired by the *siddhaṃ* script for Sanskrit, and is currently the standard collating sequence for word sorting analogous to

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Table 1 Modern *Kana* and their *Kanji* sources

w-		r-		y-		m-		h-		n-		t-		s-		k-		ø-		
わ	ワ	ら	ラ	や	ヤ	ま	マ	は	ハ	な	ナ	た	タ	さ	サ	か	カ	あ	ア	-a
和		良		也		末		波	八	奈		太	多	左	散	加		安	阿	
ゐ	ヰ	り	リ			み	ミ	ひ	ヒ	に	ニ	ち	チ	し	シ	き	キ	い	イ	-i
爲	井	利				美	三	比		仁		知	千	之		幾		以	伊	
		る	ル	ゆ	ユ	む	ム	ふ	フ	ぬ	ヌ	つ	ツ	す	ス	く	ク	う	ウ	-u
		留	流	由		武	牟	不		努	奴	川		寸	須	久		宇		
ゑ	エ	れ	レ			め	メ	へ	ヘ	ね	ネ	て	テ	せ	セ	け	ケ	え	エ	-e
惠	慧	礼				女		部		祢		天		世		計	介	衣	江	
を	ヲ	ろ	ロ	よ	ヨ	も	モ	ほ	ホ	の	ノ	と	ト	そ	ソ	こ	コ	お	オ	-o
遠	乎	呂		與		毛		保		乃		止		會		己		於		

alphabetization. (Another collating sequence still occasionally encountered begins *i ro ha ni ho he to*, etc.)

In reading Table 1, note the following:

1. *Katakana* are shown to the right of the corresponding *hiragana* in the unshaded cells. The *kanji* from which the *kana* is/are believed to have arisen are shown underneath in shaded cells. Column headings give the initial consonant of the mora represented by the *kana* below (zero in the case of the first column); the row headings give the final vowel. N.B. /si/ = [ʃi], /ti/ = [tʃi], /tu/ = [tsɨ], /hi/ = [çi], /hu/ = [ɸɯ].
2. Morae of the form CyV are written by combining the appropriate Ci *kana* with a small version of the appropriate yV *kana*. For example, /kya/ きゃ キャ; /syu/ = [ʃɯ] しゅ シュ; /tyo/ = [tʃo̞] ちょ チョ. There once was a mora /kwa/, written くゎ and クヮ. This kind of digraphic notation has been extended to innovative morae such as /kwo/ クォ, /ye/ イェ, etc., which occur in new loanwords and so are seldom seen in *hiragana*.
3. A diacritic called *nigori* or *dakuten* indicates the voicing of an obstruent initial; e.g., /gi/ ぎ ギ; /zu/ ず ズ; /de/ で デ; and /bo/ ぼ ボ. Modern /h/ originated as /p/; hence the *kana* in the *h*-column are used for morae in *b*-. Modern /p/ is marked with another diacritic, called *maru* or *handakuten*; e.g., /pa/ ぱ パ.
4. The morae /wi we wo/ have merged with /i e o/. Only the *kana* for /wo/ is in current use (the *katakana* is seldom seen); see 'Historical Spellings' below.
5. The mora nasal /N/ (usually romanized as syllable-final *n*) is written with *hiragana* ん and *katakana* ン (not part of the *gojūon-zu*). The mora obstruent /Q/ (usually romanized as a geminate) is notated with *hiragana* っ, *katakana* ッ – small versions of the *kana* for /tu/.

Function Since 1945, *katakana* have been used, like italics in English, for the transcription of unfamiliar loanwords and for emphasis; they were also used for writing telegram forms and are still seen in certain kinds of computer output. *Hiragana* are the default

kana for ordinary writing; they are used for postpositions, many adverbs, sometimes for nouns, and the variable endings of verbs and adjectives (in which case they are called *okurigana* 'send-off *kana*'). They are also the currently preferred *kana* set for notating the intended readings of *kanji* (*furigana*); e.g., the personal name 土井 can be Tsuchii or Doi, so it is sometimes necessary to write 土井(つちい) or 土井(どい) to make the reading clear. (Historically, *katakana* were adapted from *kanji* specifically to serve as *furigana*, but are thus used less often today.)

The modern notations for so-called long vowels and innovative morae in *hiragana* and *katakana* differ. For example, the syllable /too/ is written とう ⟨to u⟩ in *hiragana* (とお ⟨to o⟩ in a few words) but usually ー ⟨to :⟩ in *katakana*, where the 'long' mark ー (*bō*) has no *hiragana* counterpart. Likewise, *hiragana* ねい ⟨ne i⟩ or, in a few words, ねえ ⟨ne e⟩ are both used for /nee/, whereas modern *katakana* usage prescribes ネー ⟨ne:⟩. An example of an innovative mora is [ti]. In native and Sino-Japanese morphemes, /ti/ is realized [tʃi] and is represented by *hiragana* ち or *katakana* チ; to accomodate the [ti] some speakers produce in recent loanwords like [pa:ti:] 'party' (cf. more conservative [pa:tʃi:]), a new digraph notation is therefore used, viz. *katakana* ティ. (The parallel *hiragana* てい is possible but rare since innovative morae occur in loanwords.)

Kanji

In theory, any character used to write Chinese can be pressed into service in Japanese; but in practice, far fewer are actually seen. A handful known as *kokuji* 'national characters,' devised in Japan on the model of *kanji*, are usually lumped together with *kanji* despite their non-Chinese origin, e.g., 峠, which stands for the native word *tōge* 'mountain pass.'

Number and form The script reforms implemented in the period 1946–1959 included a governmentally authorized list of 1850 characters (the *tōyō kanji*) that capped the number to be used in official documents, educational curricula, and to a large extent in the public media. In 1980, the policy of limiting the number of *kanji* in general use was greatly weakened and a modified list of 1945 characters (the *jōyō kanji*) was issued. Despite this conservative backlash, however, *kanji* usage has been gradually declining for decades as the Japanese proclivity for borrowing new words has diluted its long-time cultural dependence on China. An analysis of 1 001 154 characters of running text in the 4245 Kyodo News Agency dispatches over 1 week in 1971 showed that only 46.1% of them were *kanji* even though those *kanji* accounted for 86.8% of the 2601 distinct character types in the same sample (Hayashi *et al.*, 1982: 206). Indeed, many *kanji* are seldom seen outside dictionaries: in 1963, the commonest 800 accounted for 90% of all those used in newspapers (Hayashi *et al.*, 1982: 245).

As part of the 1946–1959 reforms, the shapes of many of the *tōyō kanji* were simplified. Some changes were quite minor (adding or omitting a single stroke; connecting two disjoint strokes), but others were fairly drastic. For example, 沢 for 澤 (one reading of which is *sawa* 'mountain stream'), 昼 for 晝 (*hiru* 'noon'), 尽 for 盡 (*tsuku(su)* 'exert oneself, exhaust'). Although largely based on simplifications that had evolved in handwriting over the centuries, the Japanese changes are often different from the character simplifications later introduced in China. For instance, 傳 has been simplified to 伝 (*tsuta(eru)* 'tell, inform') in Japan but to 传 in the People's Republic of China.

Function Though the large number and complex shapes of the *kanji* used in Japanese are often remarked upon, the principal difficulty of the writing system lies in the fact that the typical *kanji* can take multiple 'readings.' Readings consist of one or more morae and generally fall into two categories: *kun* and *on*. *Kun* originated as glosses on *kanji*; they are Japanese words or parts of words that meant something like the literary Chinese words the *kanji* were used to write. *On* originated as Japanese attempts to pronounce Chinese syllables in different periods of history. The largest group, *kan-on*, were established in the 8th century; the less numerous *go-on*, accumulated in earlier centuries, now predominate in Buddhist terminology; a much smaller group, called *tōsō-on*, entered Japan together with Zen Buddhism in the 13th century; and there is a catch-all category called *kan'yō-on* 'customary *on*,' which lexicographers cannot otherwise explain. Today, *on* from different periods or *on* and *kun* may be found side by side within the reading of a single string of *kanji*.

The 1945 *jōyō kanji* can collectively take 2187 *on* and 1900 *kun*: 664 (34.1%) take just a single *on*; all the rest (apart from the few *kokuji* on the *jōyō kanji* list that take only one *kun*) have two or more readings (Hayashi *et al.*, 1982: 249–251). Moreover, the higher its frequency of occurrence, the more readings a *kanji* is likely to take, especially if allophonic variants are counted separately. For example, the heavily used *kanji* 日, usually read *hi* 'sun; day' in isolation, can also stand for the boldface portions of (in broad phonetics) [**ni**hon] or [**nip**pon] 'Japan,' [mai**nit**ʃi] 'every day,' [**nik**ki] 'diary,' [**nitt**ʃu:] 'throughout the day,' [**niʃ**ʃoku] 'solar eclipse,' [**nis**seki] 'Japan Red Cross,' [sai**dʒitsu**] 'holiday,' [getsuyo**:bi**] 'Monday,' and [mik**ka**] '3 days; 3rd-day of a month.' In cases called *jukujikun* 'multiple character glosses,' two or

more *kanji* are glossed with a single native word that, at least synchronically, cannot be analyzed into a corresponding string of readings. This is the case, continuing the previous example, with 昨日 *kinō* 'yesterday,' 今日 *kyō* 'today,' 明日 *ashita* or *asu* 'tomorrow,' and such names as 春日 *Kasuga*, 日下 *Kusaka*, and 日向 *Hyūga*. The other side of this coin is the exploitation of an *on* or *kun* of a *kanji* to write part of a word with which it has no etymological connection. This kind of contrived usage (like English ⟨EZ⟩ for 'easy' or ⟨K9⟩ for 'canine') is called *ateji* and was especially popular in the Meiji period; e.g., *kurabu* 'club' (today just クラブ in *katakana*) was written 倶楽部 because the characters could be read individually as *ku*, *ra(ku)*, and *bu* and broadly hinted at the false etymology 'together + fun + place.'

A few *kanji* have readings that are, strictly speaking, neither *on* nor *kun*. The *kokuji* 働, which is 動 (an authentic *kanji*) with the addition of the so-called 'man' radical on the left, was invented to represent *hatara-* in the Japanese verb *hataraku* 'work'; later, with the pseudo-*on dō* (lifted from 動), it was used in the Sino-Japanese compound *rōdō* 労働 'labor'; cf. Chinese 勞動 (PRC simplified 劳动) *láodòng*. The readings *zero* 'zero' for 零, *pēji* 'page' for 頁, and *doru* 'dollar' for 弗 could likewise be called pseudo-*kun*.

Much psycholinguistic research has been devoted to the question of how readers apprehend and remember *kanji*. Although one continues to read that they function purely as logograms or even ideograms, the preponderance of evidence suggests otherwise (Matsunaga, 2002; Kess and Miyamoto, 1994, 1999; Paradis *et al*., 1985). The idea that *kanji* function logographically is made superficially plausible by the fact that a single native word, or a part thereof, can be used to gloss many different *kanji*. For instance, the verb *hakaru* はかる 'plan; measure; consult with' may also be written 図る, 計る, 測る, 量る, 諮る, or 謀る to emphasize the connotations 'design,' 'compute,' 'gauge,' 'size up,' 'confer,' or 'plot,' respectively, though in all likelihood, *hakaru* has always been a single polysemous verb, not a six-way homonym.

Moreover, what counts as the *kun* of a *kanji* is not always well defined. For instance, it is now common to write *wakaru* 'understand' 分かる, with 分 for *wa*, because, though the *-ka-* is invariant in all forms of this verb, it has a cognate *wakeru* 'divide, share.' But one still sometimes sees 分る, with 分 for *waka*. There are even some uninflected Sino-Japanese words that have become so nativized that they may be found entirely in *kana*; e.g., たいへん for 大変 *taihen* 'a lot.'

Punctuation, Alphanumerics, and Other Symbols

Japanese texts now regularly include a wide variety of symbols not covered by the rubrics of *kana* or *kanji*. Twine (1984) outlines the rise of punctuation in the Meiji period. For a description of the large number of symbols in the UNICODE standard counted as Japanese, see Lunde (1999).

Japanese texts are often formatted in traditional Chinese style. Vertical columns of characters run from the top of the page to the bottom, covering it from right to left. Page folds in this style are on the right side of the book, pamphlet, or newspaper. In much modern writing, the Western style has become more common, especially in academic work, where it frequently necessary to embed equations and other alphanumeric strings in Japanese-language text. Some Japanese symbols (e.g., *bō*) are rotated 90° counterclockwise to accommodate this format.

The most distinctive symbols are the Japanese comma 、 and period 。, the word separator ・, *kana* repeat mark ゝ (ゞ when voicing is added), the *kanji* repeat symbol 々, and the paired quotation marks 「 . . . 」 and 『 . . . 』. (The Western pairing "..." has also been adapted in the form ″. . . ″ in vertical format.) Especially in newspapers and magazines, abbreviations for units are often written as clusters of small *katakana*, e.g., kilo- ㌔, gram ㌘, meter ㍍, and percent ㌫. Besides the familiar (. . .) [. . .] { . . . }, many documents make graphic distinctions among a rich assortment of filled and outline bullets, and paired enclosure symbols, e.g., 【 . . . 】 〔 . . . 〕 〈 . . . 〉 《 . . . 》. 'Right' and 'wrong' are conventionally ○ *maru* and × *peke* or *batsu*; with Chinese numerals, 〇 is used for 0. Also worth noting are the libel-dodging ○ ○ *maru-maru* 'so-and-so,' currency sign ¥ 'yen,' attention-grabbing ※ *komejirusi* 'rice sign,' and Post Office logo 〒 for 'postal code.' Encircled characters such ①②③, ㊤㊥㊦ 'top, middle, bottom' and ㊧㊨ 'left, right' are surprisingly common; icons like ☎ 'telephone number,' 📠 'fax number,' and ✉ 'mailing address' are gaining currency. The Japanese typographic imagination seems to know no bounds. (Many insights in Hansell's (2002) discussion of the integration of alphanumerics into Chinese writing carry over *mutatis mutandis* to Japanese.)

Alternative Methods

Two less common ways of writing Japanese should be mentioned if only because both belie the claim that the use of *kanji* and *kana* have rendered the Japanese insensitive to word boundaries. In both cases, the insertion of spaces between written words (*wakachigaki*) is an essential part of the system.

One is Japanese braille, which was developed in the 1880s and, unlike other braille systems, is based on *kana*. See Unger (1984) for further details, including a summary of braille *wakachigaki* rules.

The other is romanization, which now plays a more important part in Japanese writing than meets the

eye. Other than script reform advocates, few Japanese produce documents in romanized form, but because of word processors (*wāpuro*), a large and growing segment of the population types using a QWERTY-like keyboard. Although input systems are available that convert code numbers or keystroke sequences directly into individual *kanji*, *kana*, and other symbols, or allow the user to inscribe a character on a touch-sensitive tablet, the overwhelming majority of users input romanized Japanese and press function keys that instruct the software to convert these strings into the desired output characters. (Keyboards for *kana* typing are available but are used more by older, computer-shy novices.) Thus, from a psychological standpoint, most Japanese who use computers work in romanized Japanese even though they may never read extended romanized texts.

History of the Writing System

Apart from some artifacts produced in China that made their way to Japan in the early centuries of the first millennium, Chinese writing probably first came to Japan in the 5th century by way of visitors from the kingdom of Paekche, located in the southwest quadrant of the Korean peninsula. Attempts to explain the pictures found on bell-like bronze *dōtaku* of the Yayoi period (ca. 300 B.C.E.–300 C.E.) as primitive writing are unconvincing. The so-called *jindai moji* 'divine-age script' of Hirata Atsutane (1778–1843), sometimes still mentioned in crank literature, is obviously based on Korean *han'gŭl*, a product of the 15th century.

Origins of *Kana*

Kanji were used in many different ways in Old Japanese writing. The graphic deformation of those *kanji* used in the role now played by *kana* did not occur until the early 10th century. Before that time, *kana* were just ordinary *kanji* – now called *man'yōgana* after the 8th-century poetry anthology *Man'yōshū* – that were used to represent a mora (occasionally a string of two) because of a link between one of the readings of the *kanji* and the mora(e). In the 8th century, from which our oldest extant Japanese books date, several different *kanji* were used in the *kana* function for each syllable. Most of the *kanji* shown in Table 1 were typical *man'yōgana*. (*Hiragana* ん /N/ was derived from 无 after the *gojūon-zu* was already established. The source of *katakana* ン /N/ is uncertain, and sources other than those shown have been proposed for *katakana* ツ /tu/, サ /sa/, and *hiragana* つ /tu/.)

The number of the descendants of the different *man'yōgana* used for each syllable gradually dwindled over time, but as late as the 20th century, rival *kana* for the same syllable could be found in print. The now abandoned shapes are retroactively called *hentaigana* 'irregularly shaped *kana*.'

Historical Spellings (*Kanazukai*)

As might be expected, changes in *kana* spellings did not keep pace with changes in pronunciation over the centuries and became inconsistent as writers struggled to reconcile what they heard with the way they had learned to write. Until 1945, a system of rationalized etymological spellings, developed by late-18th/early-19th-century scholars, was in general use. The difference between this system and the one that has been in use (with a few minor changes) since the Occupation are shown in Table 2. Prewar Japanese were supposed to distinguish the *jō* of *jōdan* 'joke' じよう, *jōzu* 'skillful' じやう, *jōzetsu* 'verbose' ぜう, *jōbu* 'healthy' ぢやう, and *rokujō* '6 *tatami* [mats]' でふ in writing even though they all sounded alike. (Note also that the use of small versions of や *ya* ゆ *yu* よ *yo* did not become regularized until after the war.) Modern orthography has retained just a few anachronisms, most notably は *ha*, へ *he*, and を *wo* for the postpositions now pronounced *wa*, *e*, and *o*, respectively. Also, [dʒi] and [(d)zɨ] in the standard language are now written じ /zi/ and ず /zu/, respectively, in most contexts, although some of these syllables were once phonemically distinct /di/ and /du/ (still heard in some dialects), for which ぢ for /di/ and づ for /du/ are available.

Insofar as the modern spellings are much closer to present-day pronunciation, a great deal of Japanese phonological history can be surmised simply by comparing the old and new spellings. For example, original /p/ has lenited in initial position to /h/, with allophones [ç] before /i, y/, [ɸ] before /u/, and [h] elsewhere. In medial position, lenition caused /p/ to merge with original /w/; later, /w/ (from all sources) went to zero except before /a/. Most modern /p/ arose from a source other than original /p/; this is why /h/ rather than /p/ alternates with /b/ morphophonemically, just as /t/ alternates with /d/, /s/ with /z/, and /k/ with /g/. Of special importance is the analysis of *man'yōgana* usage, which shows that the language of the 8th-century capital area (Nara) had many more distinct syllables than later stages of the language (see Lange, 1973 for details).

Quasi-Chinese Methods

There are two obsolete methods of writing Japanese in which *kana* were used purely for annotational purposes or not at all. One is called *kanbun* 'Chinese text'. In principle, any literary (classical) Chinese text

Table 2 Pre-1945 *Kana* spellings

/ /	*Current*	*Obsolete*	/ /	*Current*	*Obsolete*	/ /	*Current*	*Obsolete*
i	い	ゐ ひ						
u	う	ふ						
e	え (へ)	ゑ へ						
o	お (を)	を ほ ふ						
ka	か	くわ	ga	が	ぐわ			
zi	じ	ぢ						
zu	ず	づ						
wa	わ (は)	は						
yū	ゆう	ゆふ いう いふ						
ō	おう	おほ わう あう はう						
kō	こう	こふ かう かふ くわう	gō	ごう	ごふ がう がふ ぐわう			
sō	そう	さう さふ	zō	ぞう	ざう ざふ			
tō	とう	たう たふ	dō	どう	だう だふ			
nō	のう	のふ なう なふ						
hō	ほう	ほふ はう はふ	bō	ぼう	ぼふ ばう ばふ	pō	ぽう	ぽふ ぱう ぱふ
mō	もう	まう						
yō	よう	やう えう えふ						
rō	ろう	ろふ らう らふ						
kyū	きゅう	きう きふ	gyū	ぎゅう	ぎう			
syū	しゅう	しう しふ	zyū	じゅう	じう じふ ぢゆう			
tyū	ちゅう	ちう						
nyū	にゅう	にう にふ						
hyū	ひゅう	ひう	byū	びゅう	びう			
ryū	りゅう	りう りふ						
kyō	きょう	きやう けう けふ	gyō	ぎょう	ぎやう げう げふ			
syō	しょう	しやう せう せふ	zyō	じょう	じやう ぜう ぢやう でう でふ			
tyō	ちょう	ちやう てう てふ						
nyō	にょう	ねう						
hyō	ひょう	ひやう へう	byō	びょう	びやう べう	pyō	ぴょう	ぴやう ぺう
myō	みょう	めう						
ryō	りょう	りやう れう れふ						

Table 3 Principal differences among Romanization systems

Kana (Katakana)	*Hepburn*	*Kunrei-shiki*	*Nippon-shiki*
クワ グワ	ka, ga (*older* kwa, gwa)	ka, ga	kwa, gwa
シ	shi	si	si
シャ シュ ショ	sha, shu, sho	sya, syu, syo	sya, syu, syo
ジャ ジュ ジョ	ja, ju, jo	zya, zyu, zyo	zya, zyu, zyo
チ	chi	ti	ti
ヂャ チュ チョ	cha, chu, cho	tya, tyu, tyo	tya, tyu, tyo
ヂャ ヂュ ヂョ	ja, ju, jo	zya, zyu, zyo	dya, dyu, dyo
ツ	tsu	tu	tu
ヅ	zu (*older* dzu)	zu	du
フ	fu	hu	hu
ヲ	o (*older* wo)	o	wo
ン	n (*older* m before b, m, or p)	n	n
トウ トオ トー	tōō, tōō, tōō	tô, tô, tô	tô, tô, tô
ネイ ネエ ネー	nei, nē, nē	nei, nê, nê	nei, nê, nê
シリーズ	shiriizu	sirîzu	sirîzu

could be read in a variety of literary Japanese according to rules for glossing individual *kanji* (occasionally strings of *kanji*), supplying postpositions and grammatical endings as needed, and permuting the resulting phrases in conformance with Japanese syntax. In practice, although some Japanese writers understood how to write proper literary Chinese, aberrant varieties arose in Japan. *Kana* notations and a system of special punctuation marks came to be used to guide the reader in deciphering *kanbun*. Crawcour (1965) remains the best introduction in English.

Sōrōbun refers to an epistolary variety of *kanbun*, used from the 15th through 19th centuries, characterized by the heavy use of the polite auxiliary verb *sōrō* < *samurau* 'serve' (cf. *samurai* 'one who serves'). Kiyose (1983) is an easily accessible introduction to *sōrōbun*.

Romanization

The first romanization system for Japanese was created in the 16th century by Portuguese missionaries. It affords us an unusually clear view of Late Middle Japanese phonology. (There are also some contemporary *han'gŭl* transcriptions of Japanese that are helpful in this regard.)

Before the 1880s, romanization of Japanese words in the West was not standardized. Around 1885, two well-thought-out systems were proposed: the one used in the third edition of James Curtis Hepburn's Japanese–English dictionary, and the Nippon-siki system of Tanakadate Aikitu. The government proclaimed a compromise between these two systems by Cabinet Order (*kunrei*) in the 1930s, reconfirmed in the 1950s. Today, ISO Japanese romanization reflects this *kunrei-siki* standard; journalists, politicians, and academics in the West tend to cling to the Hepburn system despite the use of *kunrei-siki* among geographers, scientists, and (with some variations) linguists.

Table 3 shows the differences among the three principal systems. The three rows at the bottom illustrate the treatment of so-called long vowels within single morphemes. Adjacent vowels at morpheme boundaries are properly written out mora by mora: e.g., *suu* 'suck' ≠ *sū* or *sû* 'number'; *tou* 'ask' ≠ *tō* or *tô* 'east.' In Hepburn, *ii* is preferred even when there is no morpheme boundary between the two morae (e.g., the personal name Iida), but *ī* is sometimes seen anyway (e.g., for '[the letter name] E'). In all three systems, an apostrophe follows *n* for the mora nasal /N/ (*hiragana* ん) before *y* or a vowel.

See also: China: Writing System; Japanese.

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Japanese

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Japanese is spoken by virtually the entire population of Japan – some 128 million people in 2004. In terms of native speakers, the number easily surpasses the number of speakers of the major European languages (German and French), ranking sixth among the languages of the world, after Chinese, English, Russian, Hindi, and Spanish. Yet, among the major languages of the world, Japanese occupies a unique position in a number of respects. Unlike the languages spoken on the European, American, and Asian continents, the Japanese language, being spoken in an island nation, is physically isolated from other languages. Also, unlike major European languages such as English and Spanish, Japanese is primarily spoken within the confines of its national boundaries, with no other country using it as either a first or second language. Moreover, Japanese is the only major world language for which the genetic affiliation to other languages and language families has not been conclusively proved.

As in the case of other language isolates, including Basque and Burushaski (and the geographical neighbors of Japanese, Ainu and Korean) (*see* **Ainu** and **Korean**), the genealogy of Japanese has been a perennial problem that has attracted the attention of both specialists and laymen alike. Hypotheses have been presented assigning Japanese to virtually all major language families. Although attempts to relate Japanese to the Altaic family have been most systematic and perhaps most persuasive (*see* **Altaic Languages**) two views have attracted increasing attention in recent years: (1) that Japanese consists of an Austronesian substratum and an Altaic superstratum, and (2) that Japanese is an Austronesian–Altaic hybrid or mixed language, in which not only simple lexical mixtures but also morphological hybrids, e.g., Austronesian verb roots with Altaic inflectional endings, are recognized (*see also* **Austronesian Languages: Overview**).

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Among individual languages, Ryukyuan, Ainu, and Korean are the strongest candidates proposed as possible sister languages; in fact, the Japanese–Ryukyuan connection has been firmly established, and Ryukyuan, spoken in Okinawa, is now considered to be a dialect of Japanese (*see* **Ryukyuan**). A Japanese–Ainu relationship has been hypothesized, but evidence is scanty. There have been attempts to make more systematic comparisons between Japanese and Korean, but even here reliable sets of cognates are extremely small in number.

Being a mountainous country with numerous islands, Japan is an ideal setting for fostering language diversification. Indeed, Japanese is extremely rich in dialectal variations, and different dialects are often mutually unintelligible. However, Japan is linguistically completely unified by a uniform writing system and by the spread of the standardized speech, based on the Tokyo dialect, making oral communication possible among speakers of different dialects. The long literary history of Japanese, which dates back to the 8th century, finds its root in the borrowing of Chinese characters as a means of transcribing Japanese. Simplification of Chinese characters gave rise to two kinds of syllabary, or kana, i.e., *hiragana* and *katakana*. In addition to Chinese characters and the two types of syllabary, the Japanese writing system includes the Roman alphabet, which was introduced in the late 16th century by Portuguese and Spanish missionaries. All four types of writing systems have been retained today, and it is not unusual to see contemporary Japanese sentences written with a mixture of all of them (*see* **Japan: Writing System**).

The historical contacts with foreign cultures have left strong marks in the Japanese lexicon, which is characterized by a high percentage of loanwords. Roughly 60% of the Japanese vocabulary consists of loanwords of Chinese origin, a figure comparable to the proportion of Latinate words in the English vocabulary. Among the non-Chinese loanwords, or roughly 10% of Japanese vocabulary, English loans stand out, often replacing older loans from Portuguese, Spanish, and Dutch as well as even some Chinese loans.

Another salient feature of the Japanese lexicon is the presence of a large number of sound symbolic or mimetic words, which depict not only the sounds of natural objects and animals but also the manners of action and even states of mind. Thus, a dog barks *wan-wan* and it pours rain *zaa-zaa*; an old man walks *yobo-yobo* 'wobbly' and an old lady chatters *peya-kutya*; and your head aches *zuki-zuki* 'throbbingly,' your stomach hurts *tiku-tiku* 'stingingly,' and your nerves are irritated *ira-ira*.

Segmental phonology of Japanese – at least the speech of Tokyo and surrounding areas – is rather simple, with five vowel phonemes /a e i o u/ and 16 consonantal phonemes /p t k b d g s h z r m n w j N Q/. A noteworthy feature of Japanese segmental phonology is the distinction between a syllable and a mora. A mora is a unit that can be represented by one letter of kana (a Japanese pseudo-character used in syllabic writing). A word such as *simbun* 'newspaper' consists of two syllables, but a Japanese speaker further subdivides the word into four units, *si*, *m*, *bu*, and *n*, which correspond to the four letters of kana used in the written form. The consonantal archiphonemes /N/ and /Q/ correspond to moraic consonants seen in words such as *simbun* 'newspaper,' *simpai* 'worry,' *hakkiri* 'clearly,' and *kossori* 'stealthily,' wherein the first segments of the consonant clusters, *m*, *k*, and *s*, constitute moras. Since these moraic consonants are homorganic to the following consonants, there is no contrast among them other than in terms of the nasality feature. And since the only consonant that ends a word is the moraic nasal *n*, the words *simbun*, *simpai*, *hakkiri*, and *kossori* are phonemicized, respectively, as /siNbuN/, /siNpai/, /haQkiri/, and /koQsori/. The units of syllable and mora each play important roles in the accentual system.

Japanese is arguably a tone language, wherein the pitch pattern can be high followed by low (HL) or low followed by high (LH). Pitch height alone distinguishes minimal pairs such as *hasi* (HL) 'chopstick' versus *hasi* (LH) 'bridge' and *ame* (HL) 'rain' versus *ame* (LH) 'candy'; however, the Japanese accentual system is characteristically different from archetypical tone languages of the Chinese type, in which it is necessary to specify the tone for each syllable. In the case of (Tokyo) Japanese, once the place of pitch drop for a given word or a minor phonological phrase is specified, the pitch shape can be fully predicted. Thus, *hasi* 'chopstick' and *hasi* 'bridge' can be specified as /ha'si/ and /hasi'/, respectively, so that in the former, high pitch drops after *ha*, whereas in the latter, all moras are high except for the initial one. A pitch drop in the latter form is observed only when it is followed by another element, such as the nominative particle *ga*, as in the minor phrase /hasi'ga/ (LHL) 'bridge NOM.' The word *hasi* (LH) 'edge' is representable as /hasi/ without any accent; indeed, there is no pitch drop here, even in a phrase such as /hasi ga/ (LHH) 'edge NOM.' Pitch changes occur at mora boundaries, and the accent marker indicating the location of pitch drop is assigned to the unit of syllable. For example, the three-mora, two-syllable word *ganko* 'stubborn' contains the accent marker in the initial syllable, /ga'Nko/, surfacing with the pitch shape of HLL. There is no word in which the second mora of the

first syllable carries the accent, such as /gaN'ko/, which would presumably be pronounced as LHL or HHL if the syllable were the unit of tone inflection.

Japanese is an agglutinative language with primarily suffixing morphology. Both verbs and adjectives inflect for tense, but they are distinguished by different tense suffixes: *mi-ru* 'see-PRES' and *mi-ta* 'see-PAST' versus *utukusi-i* 'beautiful-PRES' and *utukusi-kat-ta* 'beautiful-EXPL-PAST' (EXPL = expletive). In addition to the inflecting adjectives, adjectival nominals are similar in meaning to adjectives but, like nominal predicates, call for tense-carrying copula (COP) in their predicative function: e.g., *kirei-da* 'pretty-COP-PRES' and *kirei-da-tta* 'pretty-COP-PAST.' These tense suffixes combine with various auxiliary-type suffixes, often resulting in a fairly long verbal complex: *ika-se-rare-ta-gara-na-i* (go-CAUS-PASS-DESI-show-NEG-PRES) 'do not show signs of wanting to be made to go.'

Japanese syntax is consistently head-final. The basic word order is subject-object-verb: *Taroo ga hon o yonda* (Taro NOM book ACC read-PAST) 'Taro read a book.' Postpositional particles are used instead of prepositions, as in the example, wherein the nominative and accusative (ACC) particles *ga* and *o*, respectively, mark the subject and the object. Modifiers precede the heads that they modify: *takai hon* (expensive book) 'expensive book' [*Taroo ga katta*] *hon* ([Taro NOM bought] book) 'the book Taro bought,' *Taroo no ie* (Taro GEN house) 'Taro's house,' *sono hon* (that book) 'that book,' *san-satu no hon* (three-CLASS GEN book) 'three books,' *hayaku hasiru* (quickly run) 'run quickly,' *tabe-tai* (eat-want) 'want to eat,' *Taroo yori kasikoi* (Taroo than smart) 'smarter than Taro.' Subordinating conjunctions occur after subordinate clauses, which in turn come before main clauses: [*Taroo ga kita*]-*node minna ga kaetta* ([Taro NOM came]-because everyone NOM went home) 'Because Taro came, everyone went home.'

One of the most important aspects of Japanese grammar has to do with the topic construction. The topic particle *wa* attaches to various nominals and adverbials, yielding topic sentences that contrast with nontopic sentences in the following manner:

Nontopic sentence (1):

(1) Taroo ga Ziroo no hon o yonde-iru
Taro NOM Jiro GEN book ACC read-be
'Taro is reading Jiro's book'

Topic sentences (2) and (3):

(2) Taroo wa Ziroo no hon o yonde-iru
Taro TOP Jiro GEN book ACC read-be
'Taro is such that he is reading Jiro's book'

(3) Ziroo no hon wa Taroo ga yonde-iru
Ziroo GEN book TOP Taro NOM read-be
'Jiro's book is such that Taro is reading it'

The basic difference between topic sentences and nontopic sentences is that the former are statements about certain things, represented by topic nominals, and the latter are statements describing the occurrences of events. For example, nontopic sentence (1) describes the event of Taro reading Jiro's book. On the other hand, topic sentences (2) and (3), respectively, describe something about 'Taro' and 'Jiro's book.' Thus, sentence (1) answers a question such as 'What is happening?,' whereas sentences (2) and (3), respectively, would be used in answering questions such as 'What is Taro doing?' and 'Where is Jiro's book?' In Japanese, it is the *wa*-marked topic nominal that accurately represents the traditional Western definition of subject as something that is being talked about. The *ga*-marked subject nominal, on the other hand, is more consonant with the other definition of subject, namely, that it expresses an actor or agent. In other words, in Japanese, the two notional definitions of subject are distributed over two distinct syntactic relations, whereas in English and other European languages, these largely converge on the single subject nominal.

Japanese has no agreement marker, but it freely omits pronouns. Thus, the following type of exchange is not uncommon:

(4) *Oo kita ka* (Oh came Q) 'Oh (you) came?'

(5) *Un kita* 'Yeah (I) came'

Of course, the omissions of pronouns are permitted only when they are recoverable from the context; one type of clue for the recovery is found in the honorific endings. Humbling forms together with the polite (POL) ending such as *Mair-imasu* (go.HUMBLE-POL) 'go' and *O-tazune simasu* (HON-visit do-POL) 'visit' indicate (a) that the subject is either a speaker or someone close to the speaker (by use of the humbling forms) and (b) that the addressee is someone worthy of respect (by use of the polite ending). On the other hand, honorific forms with the plain ending, such as *Oide-ni naru* (go.HON-ADV become.PLAIN) 'go' and *Otazune-ni naru* (HON-visit-ADV become.PLAIN) 'visit' indicate (a) that the subject is other than the speaker and is someone worthy of respect (honorific forms) and (b) that the addressee is someone close to the speaker, to whom the speaker is not obliged to show respect (plain ending). Thus, both the addressee axis (for polite endings) and the referent axis (for honorific and humbling endings) control honorific phenomena independently, though they often converge, as when the addressee is also the referent of the subject nominal (*see also* **Honorifics**).

Another clue that helps identify the nature of the speaker is sentence final particles, some of which are

different for male and female speakers. The final particle (PART) *wa* is a typical female form, whereas *zo* occurs in rough male speech. Since these discourse particles occur in intimate speech, an expression such as *Mair-imasu wa* (go.HUMBLE-POL PART) '(I will) go' indicates that the subject is the speaker (humble form), that the addressee is someone worthy of respect (polite ending), and that the speaker is a woman who is on intimate terms with the addressee (final particle).

Thus, Japanese, though it lacks agreement markers, has a number of grammatical features that not only indicate the nature of the subject but also index the social relationships between the speaker and the addressee and between the speaker and the nominal referent, as well as the gender of the speaker. These features, on the other hand, require the speaker of Japanese to predetermine the social relationships between the speaker and the addressee and the nominal referent, so that appropriate combinations of honorifics and discourse particles can be chosen. Japanese, in other words, is a highly context-sensitive language in which individual expressions encode various factors that make up conversational contexts in which they are embedded.

See also: Ainu; Altaic Languages; Austronesian Languages: Overview; Honorifics; Japan: Language Situation; Japan: Writing System; Japanese Lexicography; Korean; Ryukyuan.

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Japanese Lexicography

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There are three broad categories of dictionaries for the Japanese language: (a) Chinese–Japanese character dictionaries (*Kanwa Jiten*), (b) Japanese monolingual dictionaries (*Kokugo Jiten*), and (c) specialized dictionaries (*Tokushu Jiten*), which include thesauruses and terminology dictionaries. In terms of lexicographical development, it would be fair to divide the chronology into four main periods or stages: (1) the dawn of premodern lexicography (900 A.D.–1868 A.D.), (2) Westernization and rapid development of modern lexicography before World War II (1869–1945), (3) expansion of the dictionary market and projects (1946–1999), and (4) the electronic age (2000–).

The Dawn of Premodern Lexicography (900 A.D.–1868 A.D.)

Development of Kanwa Jiten

The oldest of the three categories of dictionaries is the Chinese–Japanese character dictionary. In the 7th century, Buddhism was introduced into Japan by way of Korea. Because there was no indigenous writing system in Japan at that time, the Buddhist monks had to learn how to read and write Chinese by consulting imported Chinese monolingual dictionaries, such as *Erya* (爾雅), *Shuowen Jiezi* (説文解字), and *Yupian* (玉篇). Gradually they compiled a list of Chinese characters with Japanese translations, which grew into a genre of *Kanwa Jiten* (漢和辞典; Chinese–Japanese character dictionaries). The first Chinese character dictionary produced in Japan was the *Shinsen Jikyou* (新撰字鏡), compiled by a Buddhist monk, Shouju, probably between 898 and 901 A.D. Following the *Shinsen Jikyou*, numerous Chinese–Japanese character dictionaries appeared. Among those produced from the Heian period (794 A.D.–1185) through the Edo period (1600–1868), four stand out: *Tenrei Banshou Meigi* (篆隷万象名義, 30 vols., early 9th century[1]) by a Buddhist monk, Kukai; *Ruiju Myogi Shou* (類聚名義抄, 10 vols, late 11th century, author unknown); and *Jikyou* (字鏡) and *Wagokuhen* (和玉篇) (dates and compilers unknown). The primary aim of these dictionaries was to provide information on how to read Chinese characters and their translations by using the Japanese writing system (*Manyogana*, a set of Chinese characters developed in the 8th century to

[1]An electronic version of *Tenrei Bansho Meigi* has been developed in Japan. See further details at http://homepage3.nifty.com/shikeda/kkg178.html.

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be used as phonetic symbols to represent Japanese syllables, and *katakana* and *hiragana*, a system of 48 syllabic writing units for writing non-Chinese loan words and indigenous Japanese words, respectively).

Development of Kokugo Jiten

Because Chinese–Japanese character dictionaries were not able to describe Japanese indigenous words, there was a pressing need for Japanese monolingual dictionaries. One of the earliest extant examples of such a dictionary is the *Iroha jirui shou* (色葉字類抄), compiled by Tachibana no Tadakane between 1174 and 1181. It is a prototype of similar dictionaries in use today. Unlike Chinese character dictionaries, its entries are arranged according to sound (using *iroha* poetry) rather than Chinese characters. Nowadays most monolingual dictionaries are generally arranged on the basis of the standard *gojyuon* (50-sound) system. Notable examples of premodern monolingual dictionaries produced from the late Muromachi period (1333–1568) to the late Edo period include: *Setsuyoushu* (節用集; the first one was compiled in the mid-Muromachi period, with various subsequent versions appearing throughout the Edo period); *Wakun no shiori* (和訓栞, compiled by Tanikawa Kotosuga in the mid-Edo era; the first monolingual dictionary arranged in the *gojyuon* system); and *Gagen shoran* (雅言集覧, compiled by Ishikawa Masamochi from 1826–49; revised by Nakajima Hirotari in 1887; the first monolingual dictionary illustrating the meanings of old Japanese words with examples from authentic texts) (Kimura, 2002).

Early Western Influence

In the Azuchi-Momoyama (1573–1597) and the Edo (1600–1868) periods, lexicographical methods used in Europe were introduced through the Europeans who had contact with the Japanese under special circumstances. Among them were the Jesuit missionaries who compiled bilingual dictionaries such as *Rahonichi Jisho* (*Dictionaricum Latino-Lusitanicum ac Iaponicum,* 1595) and *Nippo Jisho* (*Vocabulario lingua de Iapam com adeclaraa em Portugues,* 1603). During the Edo period, the Netherlands was the only country that was allowed to have trade relations with Japan. People learned *Rangaku* (i.e., Dutch studies) in order to absorb Western culture. Inamura Sanpaku and others translated François Halma's Dutch–French dictionary, *Woordenboeck der Nederduitsche en Fransche Taalen* (1708), and compiled a Dutch–Japanese bilingual version called *Halma Wage* (波留麻和解, published in 1796; 80 000 entries). This version was called 'Edo Halma,' while the one translated later in 1816 by Hendrick Doeff, head of the Dutch trading post at Nagasaki, was called 'Nagasaki Halma.' The latter version was never printed, and students at the Tekijuku academy of Dutch studies in Osaka made their own manuscript copies. It was later revised by Katsuragawa Hoshu and published under the title *Oranda jii*.

It was not until the introduction of Western lexicography in the Meiji era that Japanese lexicography began its modern phase of development. One of the most influential dictionaries was James Curtis Hepburn's Japanese–English dictionary *Waei Gorin Shusei* (和英語林集成; 1867; Japanese–English: 20 772 entries; English–Japanese and: 10 030 entries). Due to its systematic description of Japanese words, this dictionary not only influenced other bilingual dictionaries (Japanese–German and Japanese–French, among others) but also had a great influence on the development of Japanese monolingual dictionaries. The third edition (Japanese–English: 35 618 entries; English–Japanese: 15 697 entries), which appeared in 1886, was especially famous as it introduced Hepburn's Romanization, a transliteration scheme for writing Japanese, for the very first time. This Romanization system became the standard in Japan and is still used today.

Westernization and Rapid Development of Modern Lexicography (1869–1945)

Meiji Restoration and Educational Reform

Two important watersheds in the development of Japanese dictionaries occurred in the late 19th and early 20th centuries. One was the introduction of foreign dictionaries and lexicographical methods in the late Edo period. The other was the system of compulsory education instituted in the early Meiji period (1868–1912). Because of this education reform, mass production of all types of dictionaries took off in Japan.

Among the dictionaries compiled during this period, *Genkai* (言海, edited by Otsuki Fumihiko) was the most influential and ambitious (Yamauchi, 1965). It originally started as a government-led lexicographical project. After the Meiji Restoration, the new government wished to have a new unabridged monolingual dictionary. This was influenced by linguistic nationalism in major Western countries, which had led to large-scale monolingual dictionary projects (e.g., the *Oxford English dictionary* in the United Kingdom, Grimm's *Deutsches Wörterbuch* in Germany, Webster's *An American dictionary of the English language* in the United States, and Littré's *Dictionnaire de la langue française* in France). The

government appointed around 10 Japanese language scholars for this work, and the first section of what was then called *Goi* (語彙) was published in 1871. The project had to be terminated, however, due to the lack of government funding and conflicting editorial policies among the team members. Otsuki Fumihiko was asked by the Education Ministry to take over this job in 1875 and spent 17 years completing the rest of the dictionary almost single-handedly. The first edition was published in 1889, and robust sales resulted in more than 500 printings by the beginning of the Showa period (around 1930).

Genkai was roughly based on Webster's dictionary in terms of its editorial policy. The criteria for selecting and organizing entries, especially for inflected forms, compound words and idioms, were much more refined and scientific than in previous dictionaries. It contained 39 103 entries, each of which consisted of information such as pronunciation, part of speech, word origin, senses, and citations. In particular, the structure of the entries became more scientific; definitions were ordered on historical principles and supplied with illustrative examples wherever possible. If a firm definition or explanation could not be fully established, a phrase such as *to iu ha ikaga* (i.e., 'suggested') was added after the description. Japanese linguistics was still in its infancy at that time, and the objective attitude adopted in the dictionary toward the description of the language became an important milestone in its development. *Genkai* was highly regarded and welcomed by scholars and became the most authoritative dictionary during the Meiji era, with a high academic standing among Japanese scholars and the general population alike. Most modern Japanese dictionaries are still influenced by *Genkai* to some extent.

After *Genkai* set the standard for medium-sized Japanese monolingual dictionaries, many attempts were made to match or even surpass this work. Among these attempts were *Jirin* (辞林, 1907; revised as *Kojirin* in 1925) by Kanazawa Shozaburo, *Jien* (辞苑, 1935) by Shinmura Izuru, and *Jikai* (辞海, 1952) by Kindaichi Kyosuke.

The publication of *Genkai* encouraged publishers to provide more thorough descriptions of the Japanese language, which led to some attempts to publish more comprehensive, unabridged dictionaries. For instance, *Genkai* was later revised and updated by Otsuki's successor, Okubo Toshio, and other Japanese language scholars at the University of Tokyo. This enlarged version was entitled *Dai-Genkai* (大言海, 4 vols, 1932–37; c. 80 000 entries). Other unabridged dictionaries in the early 20th century include *Dai Nihon Kokugo Jiten* (大日本国語辞典, 4 vols, edited by Matsui Kanji & Ueda Kazutoshi, 1915–19; c. 220 000 entries; most examples with references), *Nihon Daijiten Gensen* (日本大辞典言泉, by Haga Yaichi, 1921–29; many encyclopedic entries), and *Daijiten* (大辞典, 24 vols, by Heibonsha, 1934–36; encyclopedic in nature).

Expansion of the Dictionary Market and Projects (1946–1999)

After World War II, Japan needed some time to recover from its chaotic state. In the 1950s, however, rapid recovery and economic growth encouraged dictionary publishers to produce dictionaries capitalizing on their prewar heritage. *Jien* (1935), for example, was revised and updated and renamed *Kojien* (広辞苑, edited by Shinmura Izuru, 1955; 200 000 entries), which became a best-selling medium-sized monolingual dictionary for a long time.

Major dictionaries published in the latter half of the Showa period are:

- *Jikai* (辞海, edited by Kindaichi Kyosuke, 1952; 130 000 entries)
- *Shincho Kokugo Jiten* (新潮国語辞典, edited by Yamada Toshio, 1965; 130 000 entries)
- *Nihon Kokugo Daijiten* (日本国語大辞典, edited by Kankokai, 1972–1976; 450 000 entries)
- *Gakken Kokugo Daijiten* (学研国語大辞典, edited by Kindaichi Haruhiko and Ikeda Yosaburo, 1978; 100 000 entries)
- *Kadokawa Kokugo Daijiten* (角川国語大辞典, edited by Tokieda Motoki *et al.*, 1982; 155 000 entries)
- *Gensen* (言泉, edited by Hayashi Oki, 1986; 150 000 entries)
- *Daijirin* (大辞林, edited by Matumura Akira, 1988; 220 000 entries)
- *Kodansha Color Nihongo Daijiten* (講談社カラー版日本語大辞典, edited by Umesao Tadao *et al.*, 1989; 175 000 entries).

One of the largest and most comprehensive dictionaries is the 20-volume *Nihon Kokugo Daijiten* completed by Shogakukan Publishing Co. Ltd. in 1976. This project was ambitious in the sense that they designed the dictionary with the *Oxford English dictionary* as their model, with not only definitions for the entries but also information on their origins and citations showing a chronological range of meanings, from the time the word entered the language to the present. It contains 450 000 entries, with 750 000 illustrative examples from more than 30 000 references. Detailed descriptions are provided for pronunciation variants (regional differences in accents), and more than one etymology is given for words of uncertain origin. Definitions in this dictionary are ordered according to word-sense derivation, and citations are

given with clear references. It is also noteworthy that this dictionary makes reference to all the major Japanese dictionaries published before the Meiji period to indicate whether the given word was already listed in those dictionaries (Kurashima, 1997).

Nihon Kokugo Daijiten was welcomed enthusiastically by the Japanese public as an authoritative monolingual dictionary. The second edition was published in 2001 (500 000 entries; 1 million citations) and is the biggest monolingual Japanese dictionary published so far.

During this period, hundreds of monolingual Japanese dictionaries were produced, catering to all the different sectors and niches of market. The major trends in modern Japanese lexicography can be summarized as follows.

1. Attention has shifted away from mere explanations of difficult terms to more careful linguistic descriptions of ordinary words. Unabridged monolingual dictionaries in Japan used to cover classical words and phrases more fully and provided rather sparse treatment of modern usage and vocabulary. Even the most popular dictionary, *Kojien* (1995), had ordered word senses on historical principles. Its rival, *Kojirin*, on the other hand, lists the most recent senses first, beginning with modern usages and working backward to the word's origins. Nowadays, even small, compact dictionaries deal with everyday words in some detail.
2. Illustrative examples are now also taken from modern texts. Citations used to be from classical literature and were given only for the more difficult terms. Contemporary dictionaries use more examples from contemporary texts.
3. There has been a growing awareness that the needs of the end user should be taken into account in designing a dictionary. This is shown in the fact that monolingual dictionaries designed especially for schoolchildren now focus on more productive knowledge of vocabulary (everyday expressions, collocations, word choice, etc.).

This period was also characterized by the publication of more Chinese-character dictionaries and various types of terminological dictionaries. Of the numerous *kanwa jiten* published for general use, the following achieved a particularly wide circulation: *Kanwa Daijiten* (1903), jointly compiled by Shigeno Yasutsugu, Mishima Takashi, and Hattori Unokichi (1867–1939), and *Daijiten* (1917), by Ueda Kazutoshi. The most comprehensive of the modern kanwa jiten is the *Dai Kanwa Jiten*, compiled by Morohashi Tetsuji and published in 1955–60.

By the year 2000, there were already more than 2500 terminological dictionaries available. Some are general dictionaries with a special emphasis on certain technical fields, whereas others are more like lists of terminology along with translation equivalents and brief comments. There are dictionaries that deal exclusively with recently coined words, slang, trade terms, place and personal names, recently introduced loan words, acronyms, sports and leisure activities, and so on. Field-specific dictionaries exists for such subjects as mathematics, physics, chemistry, computer science, linguistics, Japanese literature, world literature, music, history, geography, medicine, social work, transportation, architecture, communication, law, economics, management, business, education, the performing arts, and movies.

The Electronic Age (from 1985)

In the field of natural language processing, a nine-year project called the EDR (Electronic Dictionary Research) (1986–1994) was launched. It aimed to produce dictionaries for human language technology. The EDR electronic dictionary is a machine-tractable dictionary that catalogues the lexical knowledge of Japanese and English (a word dictionary, a bilingual dictionary, and a co-occurrence dictionary), and has unified thesaurus-like concept classifications (a concept dictionary) with corpus databases (the EDR corpus). It is now widely available for research and commercial purposes.

As computer technology advanced in the late 20th century, Japanese lexicography gradually moved into a new age of electronic publishing. The first CD-ROM dictionary was *Saishin kagaku yogo jiten* (最新科学用語辞典, *A new dictionary of scientific terms*, Sanshusha) in 1985. In 1987, Iwanami Press published the CD-ROM version of *Kojien*, the most popular monolingual dictionary in Japan, which triggered a rapid growth of the electronic dictionary market. In 1991, Fujitsu, Sony, Dai Nippon Printing Co. Ltd, and Iwanami Press, all involved in the production of *Kojien*, founded the EPWING Consortium, and most publishers involved in electronic dictionary publishing joined it. Until the Internet and Web technology began to flourish, this EPWING Consortium facilitated the appearance of various types of electronic dictionaries on the market. Sony's *Denshi book* (Electronic Book DD–25) became very popular because it contained several dictionaries from different publishers on the same diskette. More recently, websites such as Yahoo and Infoseek have begun to provide free Web dictionary services, in which major unabridged monolingual dictionaries such as *Dai jirin* (大辞林 233 000 entries) and *Dai jisen* (大辞泉 220 000 entries) can be accessed via the Web. Also, pocket electronic dictionaries

produced by Casio, Seiko, Sharp, and Sony all contain several Japanese monolingual as well as Chinese character dictionaries. The electronic dictionary market is rapidly growing in Japan, and the market share will soon exceed that of paper dictionaries. The most popular type of these electronic dictionaries is the all-in-one type, which contains more than 30 different titles, including all types of Japanese dictionaries (monolingual, Chinese character, thesaurus, old Japanese, idioms, proverbs, and loan words), different English dictionaries (monolingual, Japanese–English, English–Japanese), encyclopedias, and some specialized dictionaries such as dictionaries of medicine and new words.

See also: Japan: Writing System; Japanese.

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Jargon

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The word *jargon* probably derives from the same source as *gargle*, namely Indo-European **garg-* meaning throat, and it originally referred to any noise made in the throat. In Middle English it was generally used to describe the chattering of birds, or human speech that sounded as meaningless as the chattering of birds. It was used (contemptuously) to refer to trade languages such as *Chinook Jargon* (q.v.). Jane Austen used *jargon* in the sense 'cliché' (*Sense and sensibility*, Ch.18). Today,

> Jargon is the language peculiar to a trade, profession, or other group; the language used in a body of spoken or written texts dealing with a circumscribed domain in which speakers share a common specialized vocabulary, habits of word usage, and forms of expression.

This definition includes what some scholars call 'specialist' or 'technical' language, 'restricted' language (Firth, 1968: 98), 'sublanguage' (Kittredge and Lehrberger, 1982), and others 'register' (e.g., Zwicky and Zwicky, 1982; Wardhaugh, 1986).

Jargons differ from one another grammatically and sometimes phonologically or typographically, as can be seen by comparing a statement of some of the requirements on the cricket field with the two-line excerpt from a knitting pattern, then the wedding invitation that follows it, and all of these with the excerpt from a Wordsworth poem and a text message version of that (such as might be conveyed using the SMS facility on a mobile phone).

> A fast-medium right arm inswing bowler needs two or three slips, a deep third man, a gully, a deepish mid-off, a man at deep fine leg and another at wide mid-on.

> Cast on 63 sts: Knit 6 rows plain knitting.
> 7th row: K4, wl. fwd. K2 tog to the last 3 sts. K3.

Sue and Graeme Cannon
together with
Anne and Bob Ervin
extend a warm invitation to
Natalie and friend
to share with us the joyous occasion of the wedding of
Vikki and Ken
in the gardens of Nathania Springs, Monbulk
at 4.45pm on Sunday 10th May 1992
Following the ceremony, a celebration will be held
in their honour at the adjoining reception centre.
R.S.V.P. 1st May, 1992

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Following the ceremony, a celebration will be held
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R.S.V.P. 1st May, 1992

Earth has not anything to shew more fair:	erth nt a thng so brill
Dull would he be of soul who could pass by	hes dul v soul pssng by
A sight so touching in its majesty.	sght of mjstic tch.
(Wordsworth *Upon Westminster Bridge*)	(Peter Finch *N Wst Brdg*, a text message version of the Wordsworth lines from http://.guardian.co./uk//// |0,12241,785819,00.html in September2002)

A jargon is identified by one or more of the following criteria.

i. **Lexical markers.**
   a. Vocabulary specialized for use in some particular domain (the subject matter of a jargon). The lexical relations among specialized vocabulary will reflect the accepted taxonomies within the domain (e.g., forms, varieties, species, genera, families, orders, classes in biology).
   b. Idioms and abbreviations (e.g., in telecommunications, *DNA* 'does not answer', *MBC* 'major business customer', *HC&F* 'heat coil and fuse', *LIBFA* 'line bearer fault analysis'; in linguistics, *Noun Phrase* and NP; in logic, *if and only if* and *iff*; in biology, ♂ and ♀).

ii. **Syntactic markers** such as
   a. imperatives in recipes and knitting patterns;
   b. large numbers of impersonal passives in reports of scientific experiments (e.g., *It was observed that* . . .);
   c. full noun phrases in place of pronouns in legal documents (e.g., *A term of a sale shall not be taken to exclude, restrict, or modify the application of this Part unless the term* [not 'it'] *does so expressly or is inconsistent with that provision*).

iii. **Presentational markers**.
   a. Prosodic (voice quality, amplitude, rhythm, etc.) and paralinguistic and/or kinesic (gaze, gesture, etc.) characteristics within a spoken medium, typographical conventions within a written medium; e.g., a hushed tone and minimal kinesic display is more frequently expected in funeralese than in football commentary or anecdote; in mathematics, {a,b}, <a,b>, and (a,b) will normally have different and conventionally prescribed interpretations; in linguistics, language expressions that are mentioned rather than used are usually italicized.
   b. Format in which a text is presented; this is particularly evident in the written medium, as can be seen from the preceding four examples.

Jargon has two functions:

1. to serve as a technical or specialist language;
2. to promote in-group solidarity, and to exclude as out-groupers those people who do not use the jargon.

To the initiated, jargon is efficient, economical, and even crucial in that it can capture distinctions not made in the ordinary language. Linguists, for instance, redefine everyday terms such as *sentence, word, syllable,* and *grammar* and add a number of new terms to overcome imprecision and to distinguish things that nonlinguists ignore and, in consequence, ordinary language lacks terms for. They distinguish between *grammatical, orthographic*, and *phonological words* as well as introducing terms such as *lex, lexeme, morph,* and *morpheme* to capture additional distinctions.

Jargons, like bureaucratese (the language of government and corporate offices), have two motivations. One, shared with criminal jargon and slang, is the exclusion of out-groupers. The second motivation is to augment the bureaucrat's self-image by using a Graeco-Latinate lexicon, which (to the outsider, at least) obfuscates the commonplace (and often trivial) and endows it with gravity; this achieves a double-whammy by also mystifying and intimidating the clientele. We rarely uncover such blatant lexical substitution as

> [*Emendation to the traffic plan for a London borough*] Line 5. Delete 'Bottlenecks', insert 'Localised Capacity Deficiencies'. (Quoted in Cutts and Maher, 1984: 45)

No wonder Charles Dickens referred to Whitehall as the Circumlocution Office.

Because it is founded on a common interest, the most remarkable characteristic of a jargon is its specialized vocabulary and idiom. Although jargons facilitate communication among in-groupers on the one hand, on the other they erect communication barriers to keep out-groupers out. It is, of course, out-groupers who find jargon 'abounding in uncommon or unfamiliar words,' and therefore "unintelligible or meaningless talk or writing; gibberish" (*Macquarie Dictionary,* 1991). If the out-grouper is sufficiently rancorous she or he might also conclude the jargon is 'debased, outlandish or barbarous.' For some jargons such as legalese or linguisticalese, the in-group is fairly well defined. For others, such as stock market reports and games such as bridge, football, and cricket, there is barely an in-group at all except

among professionals. For language dealing with death (outside the funeralese of the bereavement industry), birth notices, and recipes, there is even less of an in-group – though there is a special vocabulary and there are conventional patterns of expression for all of these. The facts are clear: where in-groupers are associated with a particular trade or profession, they constitute a well-defined group; they are somewhat less well defined by a common recreational interest; and the most ill-defined in-groups are those defined merely by a temporary interest in the topic of the jargon – such as those members of the public who publish birth notices.

It follows that every text/discourse, including social chitchat, is jargon of one kind or another and that everybody uses at least one jargon. In fact, almost everybody controls several jargons and often many. It is often the case that an expert in one domain (an in-grouper with respect to its jargon) needs to explain something within the domain to a novice outside the domain (an out-grouper) with minimal use of jargon. An example would be where a lawyer needs to explain some point of law to a client, or a doctor needs to explain a medical condition to a patient, and educationists most all of the time. Any jargon is in constant contact with others, and it should be fairly obvious that jargons are not discrete from one another: all of them borrow from language that is common to other jargons. The following is an excerpt from a chatroom interchange replete with chatroom jargon such as *lol* (the acronym from "laughing out loud," which is used here more like a grin in *f2f* 'face to face' conversation as a mark of empathy), *j/k* 'just kidding', and emoticon smiles :), :-) and wicked smile >:); there is also jargon appropriate to in-group discussion of computer hardware, but note the divergence into less esoteric matters than disk drives and controllers. This mixing of jargons is very common in regular conversational discourse.

<Darkman-X> so wait becuz i have the onboard raid controller i could fit 2 hdd's on the raid controllers and 2 on the ide controllers?
<mark> RAID is just a standard of combining different drives.. you can make a raid out of scsi drives along side ide drives if you want
<mark> you could make a raid out of a hard drive and a ram drive
<mark> just forget about the raid stuff
<Darkman-X> lol
<mark> and picture it as another ide controller
<mark> thats all it is unles syou setup the raid stuff
<Darkman-X> so wait i can have 2 hdd's on the raid, 2 on teh primary ide and then 2 drives on the secondary ide?
<mark> i guess.. tried reading the manual?
<Darkman-X> lol manual?
<mark> :)
<mark> didnt your motherboard come with any papers
<Darkman-X> iz that that book that says A7V333 on it?
<[RaW]> yes
<Darkman-X> lol the one that i'm using to prop up my comp table?
<[RaW]> probably
<Darkman-X> whoops
<Darkman-X> :-)
<Darkman-X> j/k
<JoHn> lol
<[RaW]> yur supposed to use your school books for that dummy
<Darkman-X> ummm no i dun wanna look at em
<Darkman-X> they're evil
<[RaW]> keep your motherboard manual close to your heart
<[RaW]> >:)
<Darkman-X> lol
(*Sic*. Logged August 29, 2002)

A jargon cannot be precisely defined because the boundaries of any one particular jargon are impossible to draw nonarbitrarily.

It is impossible to taboo jargon. Jargon cannot be translated into 'ordinary English' (or whatever language) because there is no such thing. Changing the jargon alters the message: a speaker simply cannot exchange *faeces* for *shit* or *terrorist* for *freedom-fighter* or even *bottlenecks* for *localised capacity deficiencies* without changing the connotations of the message the person intends to convey. There is no convenient substitute for some jargon: to replace legalese *defendant* with *a person against whom civil proceedings are brought* is communicatively inefficient. It would be inappropriate for a lawyer not to use jargon when creating a legal document: that is exactly what legalese is for. Legal language is difficult because laws are complex and not because lawyers try to obfuscate. Similar remarks apply to other well-motivated uses of jargon.

For additional discussion, see Partridge, 1952; Hudson, 1978; Gowers, 1987; Green, 1987; Lutz, 1989; Asprey, 1991; Nash, 1993; Burke and Porter, 1995; Lutz, 1999; Allan, 2001; Bell, 2003; Allan and Burridge, 2006.

See also: Register: Overview.

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Jarring, Gunnar (1907–2002)

B Sigurd, Lund, Sweden

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Gunnar Valfrid Jarring, Turkologist and diplomat, was born on October 12, 1907 and died on May 28, 2002. He studied German and Scandinavian languages at Lund University, but it was during his comparative Indo-European studies with Herbert Pettersson and Slavic studies with Sigurd Agrell that he became interested in the Turkish languages. Turkish, in particular East Turkish, was represented by Gustaf Raquette, docent at Lund since 1924. Raquette and his missionary colleagues at Kashgar in East Turkestan (currently Xinjiang) were willing to receive Jarring, and he traveled by train and on horseback via Moscow over Pamir to Kashgar. There he started to collect linguistic data and manuscripts, which formed the basis of his later work. The collection was stored at the Lund University library. Unfortunately, Jarring contracted Typhus fever, which decreased his working capacity in Kashgar.

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Jarring, Gunnar (1907–2002)

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See also: Agrell, Sigurd (1881–1937).

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Javanese

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Table 1 Javanese consonants

Consonant type	*Labial*	*Dental*	*Retroflex*	*Palatal*	*Velar*	*Glottal*
Voiceless stops	*p*	*t*	*ʈ*	*c*	*k*	*ʔ*
'Voiced' stops	*b*	*d*	*ɖ*	*j*	*g*	
Nasal	*m*		*n*	*ɲ*	*ŋ*	
Fricative			*s*			*h*
Approximant	*w*		*r, l*	*y*		

divided into seven subdialects (Nothofer, 1980). The central and eastern dialect variants have not yet been studied in much detail.

Standard Javanese is the language as it is spoken in the area of Surakarta and Yogyakarta. Javanese has speech levels that are based on the principle to whom and about whom one talks. The level chosen depends on factors such as age, status, and respect. The degree of politeness is expressed by lexical or affixal choices. The speech levels are a Javanese innovation. Clynes (1992) argues that this system was well established by the 15th century. Sundanese (Sunda), Madurese (Madura), Balinese (Bali), and Sasak (but not Malay) have borrowed these speech levels. The position of Javanese in the Western Malayo-Polynesian subfamily has been a matter of dispute. While Dyen (1965) and Nothofer (1975) grouped Javanese with Malay, Sundanese, and Madurese, Nothofer (1985) suggests that the latter three – although not necessarily constituting a subgroup – are more closely related to each other than they are to Javanese. Javanese is one of the few Austronesian languages whose history can be traced because of the existence of older texts. The oldest records date back to the 8th century. Zoetmulder (1974) deals with Old Javanese literature and Zoetmulder (1982) is an Old Javanese-English dictionary.

Javanese Phonology

Consonants

The Javanese consonant system resembles that of other languages of western Indonesia. There are features that are common to Javanese and Madurese only. Both languages share a phonemic distinction between dental and retroflex stops. The 'voiced' consonants of Javanese are pronounced like voiceless stops with breathy voice of the following vowel (Fagan, 1988; Arps *et al.*, 2000). The consonants are shown in Table 1.

Vowels

Nothofer (1980) suggests a system of six vowel phonemes, shown in Table 2.

Javanese has the following allophonic rules (Clynes, 1995; Nothofer, 1980): /*i*/, /*u*/ are realized as [*I*], [*ʊ*] in closed syllables and as [*i*], [*u*] elsewhere. /*ə*/ is always realized as [*ə*]. The phonemes /*e*/, /*o*/ are realized as [*ɛ*] and [*ɔ*] in closed syllables, in open syllables where the vowel in a following open syllable is high, and in open syllables where the vowel in a following syllable is identical or /*ə*/. In all other positions, these phonemes are realized as [*e*] and [*o*]. The phoneme /a/ appears as [*ɔ*] word-finally and in penultimate open syllables where a following open syllable has /a/. Otherwise, it appears as [*a*]. Allophonic variation also depends on the initial phoneme of suffixes: the addition of a consonant-initial suffix results in the treatment of the stem-final vowel as if it appeared in a closed syllable and the addition of a vowel-initial suffix will cause a high vowel in the stem-final closed syllable to behave as if it appeared in an open syllable.

Morphology

Verbal affixes include the following: *N-* indicates an 'active' and *di-* a 'passive' transitive verb, *kə-* marks 'accidental passive.' *-ke* forms transitive verbs whose patient is the causee or benefactee, while *-i* forms transitive verbs in which the undergoer is the location or goal of the action. Intransitive verbs with *-an* indicate 'nonchalance, to be in the state of, to busy o.s. with.' The suffix *-a* with the sense 'in case, assuming, although' occurs with nonverbs (e.g., pronouns, adjectives) and verbs. Arps *et al.* (2000) call it the 'irreality-suffix.' It is distinguished from the verbal suffix *-a,* which is an imperative marker. The suffix *-ən* is added to nouns denoting physiological conditions and forms verbs meaning 'undergo the physiological process of (the noun).' The nominal affixes include *-an,* which derives nouns that stand as objects of an action indicated by the verb; *kə- -an*, used to nominalize qualities; nouns formed with *pəN-* refer to a person carrying out the action of the verb or an instrument with which the action is performed; and *pə-an* nouns refer to a process or result of an action indicated by the verb or to the location where an action of the corresponding verb occurs.

The meaning of total reduplication of nouns is 'diversity, completeness,' while that of verbs has

Table 2 Javanese vowel phonemes

Vowel type	*Front*	*Central*	*Back*
High	*i*		*u*
Mid	*e*	*ə*	*o*
Low		*a*	

the sense of 'durative, intensive, iterative.' Verbal reduplication can also involve vowel variation in the first member of the doubled form.

Writing System

After the World War II, the publication of texts in Javanese script (hanacaraka or caraka) came to an end. Actually, the Latin script began to replace the Javanese alphabet at the beginning of the 20th century. The traditional script originates from a Pallava script of southern India.

See also: Austronesian Languages: Overview; Indonesia: Language Situation.

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Jèrriais

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Background

Jèrriais is the dialect spoken on Jersey, the largest of the Channel Islands. It is related to the Norman dialects of northern France. (For details of Jersey's linguistic history, including its Anglicization and the decline in speaker numbers, *see* **Channel Islands: Language Situation**.)

According to the 2001 Census of Jersey, there then remained only 2874 speakers of Jèrriais, (3.2% of the total resident population). Some two-thirds of these were over age 60 and only 113 speakers declared Jèrriais to be their usual everyday language.

Phonological Structure

Although the phonological structure of Jèrriais is similar to that of standard French, there are also significant differences. Marked regional variation is still very much in evidence in modern Jèrriais, with

Table 2 Javanese vowel phonemes

Vowel type	*Front*	*Central*	*Back*
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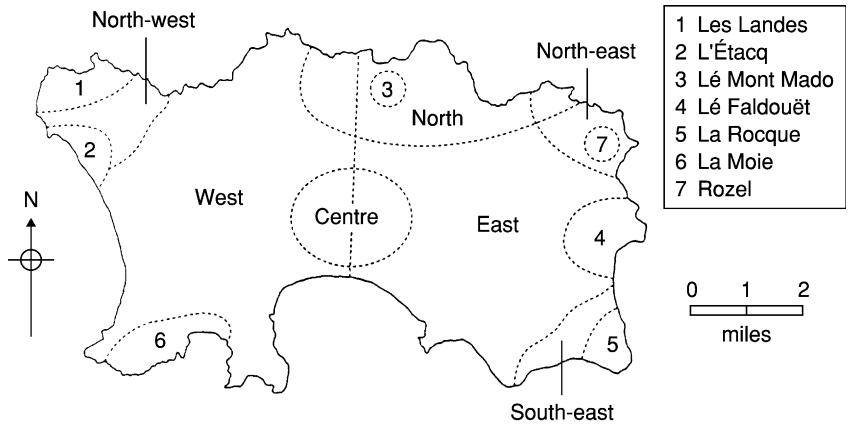

Figure 1 Jersey's 'linguistic pockets.' Reproduced with permission from Jones M C (2001). *Jersey Norman French: a linguistic study of an obsolescent dialect.* Oxford: Blackwell.

the sub-varieties usually categorized in two main groups: East and West Jèrriais (see **Figure 1**). Even more localized variation is readily observable, although with the decline in speaker-numbers, these so-called linguistic pockets are fast disappearing. This internal variation has never been based on any administrative or other territorial boundaries within Jersey, but many of the Islanders feel it to be intrinsically linked with parish boundaries (see **Figure 2**), and the practice of using the name of parishes to refer to the sub-dialects of Jèrriais is well established, although not strictly correct. Unless stated, the following comments relate to most varieties of Jèrriais.

Vowels:
Oral: /i e ɛ y œ a u o ə/; the French vowels /ø/ and /ɔ/ are lacking
Nasal: /ẽ ɛ̃ œ̃ õ ɑ̃/;

Unlike in standard French, vowel length is phonemic and all vowels, except /ə/, can be either short or long. Long /a/ is usually realized phonetically as [ɑ]. Jèrriais therefore has 27 vowel phonemes (17 oral, 10 nasal) compared to the 16 of standard French.

Consonants:
Stop: /p b t d k g/
Fricative: /f v s z ð ʃ ʒ h/
Affricate: /tʃ dʒ/
Nasal: /m n ɲ/
Lateral: /l/
Trilled: /r/; this corresponds to the uvular *r* of standard French

/ð/ (written *th*) occurs mainly as a result of the assibilation of intervocalic /r/ in western Jersey and some northern parts of Trinité and St. Martin e.g., *dithe* 'to say' (Fr. *dire*). In St. Ouen, /ð/ also occurs as a development of intervocalic /z/, e.g., *maîson* /meðõ/ 'house' (/me(j)zõ/ elsewhere).

In standard French, the affricates /tʃ/ and /dʒ/ only occur in borrowings, e.g., *match*, *gin*. However, in Jèrriais they can occur as the result of the secondary palatalization of /k/ and /g/, e.g., *tchoeu* /tʃœ/ 'heart', *dgèrre* /dʒɛ:r/ 'war' (Fr. *coeur*, *guerre*) and of /t/ and /d/, e.g., *mêtchi* /metʃi/ 'profession', *dgix* /dʃi/ 'ten' (Fr. *métier*, *dix*).

Like standard French, Jèrriais preserves no trace of Latin /h/. /h/ was introduced into the French phonemic system in words borrowed from the language of the Germanic invaders who dominated northern Gaul in the 5th to the 8th century. The sound disappeared from standard French in the early modern period (16th–18th century) but remains in Jèrriais, e.g., *housse* /hus/ 'holly' (Fr. *houx*).

In many parts of Jersey, when /l/ is the second element of a consonant cluster, it frequently undergoes delateralization to /j/, e.g., *clios* /kjo/ 'field' (Fr. *clos*). In St. Ouen, however, the more conservative form /kʎo/ is still to be heard amongst older speakers. St. Ouen also retains the /ʎ/ pronunciation word-finally in words such as /fiʎ/ *fil'ye* ('daughter') whereas, elsewhere in Jersey, /ʎ/ has become depalatalized to /l/.

The velar nasal /ŋ/ occurs in standard French only in borrowings, e.g., *le shopping* /ʃɔpɪŋ/. Despite its restricted distribution, it is generally given phonemic status. The sound also occurs in Jèrriais in English borrowings such as *blanket*, *dinghy* /blæŋkɛt/, /dɪŋi/. However in Jèrriais /ŋ/ is not considered to be phonemic.

Glides The three glides of standard French (/j ɥ w/) also occur in Jèrriais but there is a tendency for /ɥ/ to be replaced by /w/.

Vocabulary

Most of the vocabulary of Jèrriais is shared with standard French, but regional variation is also

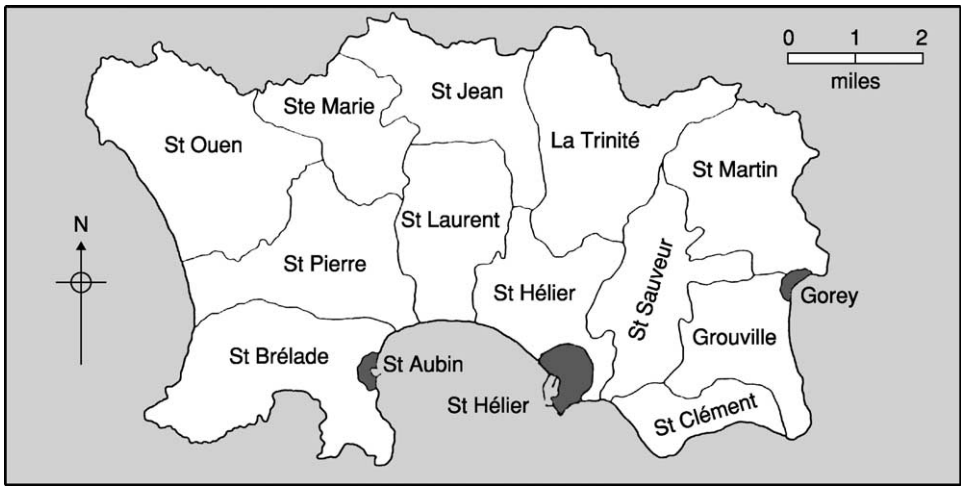

Figure 2 The twelve parishes of Jersey. Reproduced with permission from Jones M C (2001). *Jersey Norman French: a linguistic study of an obsolescent dialect.* Oxford: Blackwell.

apparent in the lexis of Jèrriais, e.g., *pêtre* 'spider' (WJ), *ithangnie* (EJ). The dominant influence of English has had far-reaching linguistic consequences, most noticeably in the lexis, where borrowings abound in many everyday domains. Some of these are well established, e.g., *bouchet* 'bucket', *ticl'ye* '(tea)kettle' while others are more recent, e.g., *software*. The semantic adaptation of Jèrriais words on the basis of their English equivalents is also found, e.g., *J'n'sais pon comment chenna* ***travaille*** 'I don't know how that **works**', as are calques of English phrasal verbs and other expressions, e.g., *i'tchit bas* 'he fell down'; *j'chèrchis pouor* 'I looked for it'.

Morphosyntax

The more striking morphosyntactic differences between Jèrriais and standard French include:

i. the Old French distinction of number in masculine nouns and adjectives between *–el* (s.), *-eaus* (pl.), e.g., *chastel* 'castle', pl. *chasteaus*; *novel* 'new', pl. *noveaus* 'new', has been lost in standard French as a result of the creation of a new analogical singular based on the plural, e.g., *château* ~ *châteaux* (both pronounced [ʃato]), *nouveau* ~ *nouveaux*, though the original singular remains before vowels, e.g., *le nouvel an* 'New Year'; in Jèrriais, the distinction is maintained, *châté* ~ *châtchieaux*, *nouvé* ~ *nouvieaux*;
ii. the first person plural personal pronoun subject *nous* is replaced by *jélj'*, e.g., *j'pâlons* (Fr. *nous parlons*) 'we speak';
iii. there is no specific feminine third person plural subject personal pronoun, *i'* serving for both genders (cf. Fr. *ils* masc., *elles* fem.);
iv. adjectives of color almost invariably precede the noun, e.g., *lé nièr cat* 'the black cat' (Fr. *le chat noir*);
v. the preterite tense, which has gone out of use in informal spoken French, though it survives in the formal written language, is widely used in spoken and written Jèrriais, e.g., *j'donnis* 'I gave'. Certain third person plural preterite forms are restricted to St. Ouen, e.g., *i'vidrent* 'they saw', *i'fûdrent* 'they went' (for *i'vîtent*, *i'fûtent* elsewhere)
vi. the imperfect subjunctive, now virtually defunct in spoken French, also survives, e.g., *j'voulais qu'i'l'sûsse* 'I wanted him to know'.

The dominance of English on Jersey is also leading to an increase in frequency of syntactic constructions more isomorphic with English.

Language Planning

Since being introduced into the education system in 1999, Jèrriais is now offered on an extra-curricular basis in most of the Island's schools. It also features in a couple of weekly radio slots and in a fortnightly newspaper column. However, Jèrriais enjoys no more than a token presence on television. Language planning measures receive very little official backing, and with the exception of the Jèrriais education initiative, which has received funding from the States of Jersey, have been left in the hands of groups of enthusiasts.

Jèrriais has been codified via a dictionary (Le Maistre, 1966) and grammar (Birt, 1985). The standard variety is based largely on the sub-dialect of St. Ouen.

Literary Tradition

Although the important 12th-century writer Wace (c. 1100–1179) is known to have come from Jersey,

no literary writings in Jèrriais exist until the 19th century. The first author to use the dialect as a medium for his work was Matthieu Le Geyt (1777–1849). Jersey produced several poets and writers during the course of the 19th and 20th centuries; much of their output was published in newspapers and periodicals. Although collections of satirical short stories in Jèrriais were published in pamphlet form from the third quarter of the 19th century onward, the first complete volume of prose to be published in Jèrriais was George Le Feuvre's *Jèrri jadis* (1973).

See also: Channel Islands: Language Situation; French.

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Jespersen, Otto (1860–1943)

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Otto Jespersen was born on July 16, 1860, in Randers, Denmark. In 1870 his father died, and 4 years later, his mother died as well. Although Jespersen had been very interested in languages as a child and had studied a number of them on his own (including Italian, Spanish, Greek, and Old Norse), following family tradition, he originally studied law at the University of Copenhagen, where he enrolled in 1877. After 4 apparently unhappy years of studying law, during which time he partially supported himself by working as a shorthand reporter in the Danish Parliament, he switched fields to Romance languages. In 1887 he was awarded a master's degree in French and spent the next year abroad, in England, France, and Germany, improving his knowledge of the local languages, establishing contacts with various scholars, and studying phonetics and Old and Middle English. On his return to Denmark, Jespersen began teaching French and English at various schools. In 1891 he was awarded a doctorate from the University of Copenhagen for a dissertation about the case system of English. He continued school teaching until 1893, when he became professor of English at the University of Copenhagen, where he would remain (excluding visiting positions) for the remainder of his career. Jespersen served as visiting professor at Columbia University and the University of California at Berkeley in 1909–1910 and as rector of the University of Copenhagen in 1920–1921. He retired from the University of Copenhagen in 1925 but continued to publish at a prodigious rate until his death in 1943.

Jespersen was the recipient of numerous scholarly honors, receiving honorary doctorates from Columbia University (1910), St. Andrews University (1925), and the Sorbonne (1927). He was invited to lecture at the Congress of Arts and Sciences, held in conjunction with the World Fair, in St. Louis in 1904. He was elected to the Danish Videnskabernes Skelskab in 1899 and served as president of the Fourth International Congress of Linguists, held in Copenhagen in 1936. He had a wide circle of students, friends, and admirers, as evidenced by the two separate volumes of papers dedicated to him.

Jespersen was an exceptionally productive scholar who contributed to a number of fields within linguistics. He is perhaps best known for his work on English, phonetics, general linguistics, language pedagogy, and historical linguistics. His most important contribution to English linguistics is certainly his monumental *Modern English grammar on historical principles* (published in seven parts, 1909–1949). Although the organization of the work may seem random at first glance, as volume 1 deals with the history of English phonology, volumes 2–5 with syntax, and volume 6 with morphology, and then volume 7 returns to syntax, it is one of the truly great books of linguistics and a fitting culmination of a life's work on linguistics and the English language. Jespersen also wrote a number of shorter works on English linguistics, including his outstanding *Growth and structure of the English language* (Jespersen, 1938), which was used for many years in university classes and translated into Japanese. The quality of this work is perhaps best indicated by the fact that it won the Volney Prize from the French Institute (Juul *et al*., 1995: 137).

Jespersen was an outstanding phonetician. Although he seems to have originally become interested in phonetics because of its possible applications in language teaching, he quickly became fascinated with it in its own right. He published a general handbook of phonetics early in his scholarly career (Jespersen, 1897; the work was later translated into German, but unfortunately not into English) and even developed his own system of phonetic transcription. True to what originally piqued his interest, Jespersen did not neglect the role of phonetics in language pedagogy. For example, he prepared a textbook of French in which French words were given in phonetic transcription, with an eye toward improving students' pronunciation from the beginning of their studies.

Yet Jespersen was not limited in his research; he often worked on questions of general linguistics. Perhaps his best known book in this area was *Language, its nature, development, and origin* (Jespersen, 1922), which deals with topics like child language, causes of language change, and the history of linguistics. Jespersen was also deeply concerned with problems of language pedagogy. He prepared textbooks or readers for Danish, French, and English, as well as more general works on the subject. Finally, he also published extensively on historical linguistics, including a groundbreaking paper originally published in 1886, which contested the Neogrammarian dogma that sound laws were exceptionless, and also often treated historical questions in his more general works. His most important contribution to this field is probably his work on efficiency as a cause of language change (see especially Jespersen, 1941). Although it would be misguided to argue that Jespersen saw efficiency as the cause of all language change, he certainly contended that it played an important role. In addition, Jespersen worked on a number of

other subjects not discussed here, including international languages, English literature, and syntax (see Jespersen 1893, 1924, and 1928, among others).

See also: Artificial Languages; English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); Neogrammarians; Phonetics: Overview.

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Jewish Languages

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Introduction

Ethnic and religious groups use language as one means of constructing and expressing their distinctness from other groups. Jews are no exception. Wherever Jews have lived – from Baghdad to Brooklyn, Amsterdam to Odessa – they have spoken somewhat differently from their non-Jewish neighbors. These differences have been as small as the addition of a few Hebrew words and as large as a vastly different lexicon, syntax, and phonology. Therefore, the term "Jewish language" refers to any linguistic variety spoken by Jews that differs to some extent from the non-Jewish language(s) around it. The field of Jewish language studies examines the distinct linguistic practices of the Jewish people around the world.

Jewish languages generally exist in a situation of triglossia with the local non-Jewish language(s) and with a liturgical combination of Hebrew and Aramaic (Weinreich, 1980; Rabin, 1981; and Fishman, 1985). The Jewish language is used mostly for intra-community speech and sometimes for writing. Speakers also generally have at least some knowledge of the co-territorial non-Jewish languages and use them in their interactions with non-Jews. Hebrew and Aramaic have played a very important role in Jewish life. Biblical and rabbinic literatures are studied regularly in their original languages, and daily prayers are conducted mostly in Hebrew and Aramaic. Hebrew is also used for contemporary rabbinic and liturgical production, as well as some other literary functions.

Jewish languages have been documented in many parts of the Jewish diaspora: Yiddish (sometimes referred to as Judeo-German), Judeo-Spanish (also called Ladino, Judezmo, Dzhudezmo, Jidyó, Spanyol, Spanyolit), Judeo-Greek (Yevanic, Romaniyot), Judeo-Italian (Italkic, including local varieties like Judeo-Venetian), Judeo-Portuguese, Judeo-French (Zarphatic, Western Loez), and Judeo-Provençal (Shuadit) in Europe; Judeo-Arabic (Yahudic), Judeo-Aramaic (Targum, Kurdit), Judeo-Persian (Jidi, Parsic, Judeo-Tadjik, Judeo-Tat, Bukharan), Judeo-Georgian (Gurjuc, Gruzinic), Judeo-Crimean Tatar (Krimchak), and Judeo-Berber in the Middle East, North Africa, and the former Soviet Union; Judeo-Malayalam in India; and Jewish English (Yinglish, Yeshivish) in the New World. Some of the larger and better-studied cases are described in separate sections below.

Scholarship

The scholarly recognition of a phenomenon of Jewish languages goes back to the beginning of the 20th century, when Yiddish became the object of serious academic study. Mieses (1915) presented the first large-scale exploration of Jewish linguistic varieties. In late 1970s and early 1980s, Jewish languages

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started to be studied intensively, following the publication of two major studies of Yiddish that discussed them in a historical context (Birnbaum, 1979; Weinreich, 1980). Around this time, scholars in Israel and the United States edited symposia (Rabin *et al.*, 1979), collections of articles (Paper, 1978; Fishman, 1985; Gold, 1989) and a short-lived journal (Gold and Prager, 1981–1987). More recently, there has been a wave of renewed interest in the subject, as evidenced by the Jewish Language Research Website (www.jewish-languages.org) and the Jewish Languages Mailing List (www.jewish-languages. org/ml).

History

The presumed monolingualism of the early kingdoms of Israel and Judah gave way, in the centuries after the Babylonian exile in the 6th century B.C., to a Hebrew-Aramaic bilingualism (Chomsky, 1957). By the end of the Temple period 2000 years ago, these languages were supplemented by a widespread knowledge of Greek, which was used with distinctive Jewish features (Wexler, 1985). Thus, Judeo-Aramaic and Judeo-Greek were the earliest Jewish languages that existed in a diglossic relationship with Hebrew.

Judeo-Aramaic was a Jewish adaptation of the major language of wider communication of the Middle East in the millennium before the Common Era. It grew into an important spoken and written Jewish language in Palestine and in the Jewish Diaspora in Babylon, where it was the main language used in the Babylonian Talmud (Greenfield, 1978; Katz, 1985). Among Jews as well as other inhabitants of the region, it was generally replaced by Arabic as a spoken language as a result of the spread of Islam, but it has continued to the present day as a Jewish language in more isolated regions such as Azerbaijan (Garbell, 1965) and Kurdish Iraq (Sabar, 2002).

The third partner in Palestinian trilingualism was Judeo-Greek, widely adapted in Hellenic colonies in Palestine and used by Diaspora Jews throughout the eastern Mediterranean and later in Italy. Judeo-Greek, also called Yevanic, was replaced in most areas starting in the 4th century. An exception is the communities of Romaniote Jews in Greece, which used Judeo-Greek until the influx of Sephardic Jews in the 16th century, when Judeo-Spanish became the majority language of Jews in Greece. Pockets of Judeo-Greek speakers maintained their language in Ioannina, Chalkida, and elsewhere until they were destroyed in the Nazi Holocaust. Few speakers survive today.

Soon after the Roman destruction of Jewish political independence in Palestine in the second century A.D., Hebrew lost its vitality. But it remained firmly entrenched as the language of Jewish religion and literacy, its transmission supported by a religious educational system. Over the next centuries, Jews in exile picked up local languages and developed their own distinctly Jewish varieties, depending in large measure on the nature of their relations with non-Jewish neighbors. As Jews migrated, they generally lost their former language and adapted linguistically to their new land, incorporating distinctive linguistic features. However, two languages defied this trend: Yiddish and Judeo-Spanish, Jewish varieties of Germanic and Hispanic languages, respectively. These languages continued to be used even centuries after their speakers migrated to new lands, where Slavic and Balkan languages were the norm.

In the modern period, when Jews have been able to integrate more fully into some societies, the distinctness of their languages has generally diminished. Yiddish, Judeo-Spanish, and other Jewish languages with long histories have lost significant numbers of speakers due to the combined effects of the Nazi Holocaust and Jews' cultural and linguistic assimilation into new societies in North America, Europe, and Israel. In the 21st century, Jews generally have full competence in the local languages, vernacular and standard. But their speech also tends to maintain some distinctive features, influenced by Hebrew and Aramaic as well as by the Jewish languages spoken by their ancestors.

Common Linguistic Features

Jewish languages tend to have a number of features in common. Structurally, they are generally based on a spoken variety of a non-Jewish language (Yiddish was based on medieval German and Judeo-Spanish on 15th century Spanish), with a large proportion of borrowings from Hebrew and Aramaic, from earlier Jewish languages, and from other contact languages (Weinreich, 1980). In addition, contemporary Jewish languages tend to be influenced by Israeli Hebrew as a result of affiliations with the State of Israel (Benor, 2004).

The Hebrew and Aramaic influences on Jewish languages are mostly lexical, but some phonological and morphosyntactic influences have been documented as well. Hebrew and Aramaic loan words are most common in the semantic fields of religious life, names of individuals and groups, and euphemism. Until recently, Jewish languages were generally written in Hebrew characters, because of common educational and literacy practices. Orthographic practices have varied, especially in the representation of vowels.

Jewish languages are often strongly influenced by a language spoken by the group's ancestors. In the case of Yiddish, the main previous Jewish language was Judeo-French. In the case of Judeo-Spanish, the main previous Jewish language was Judeo-Arabic. And in the case of Jewish English, the main previous Jewish language was Yiddish. These previous languages provide influences in lexicon, as well as other areas. In addition, the previous languages have a major impact on the use of Hebrew and Aramaic: which words are used, how they are pronounced, and how they are integrated morpho-syntactically.

Most Jewish communities have used the local language in distinctive ways in their translations of biblical and liturgical texts. These translations tend to render the local lexicon in word-for-word imitations of the Hebrew syntax. This practice is referred to in various ways, e.g., Judeo-Arabic *Sharḥ*, Yiddish *Taytsh*, and Judeo-Spanish *Ladino*.

The revitalization and re-vernacularization of Hebrew as part of the Zionist enterprise have produced a new situation, where modern Israeli Hebrew is markedly distinct from its earlier forms. Is this new variety to be considered a 'Jewish language'? Some have argued that it is too different from Diaspora Jewish languages to be classified with them. On the other hand, it shares many features: strong influence of the previous Jewish language (the Yiddish base is most evident in the highly modified grammar), a special place for Hebrew-Aramaic lexical items, borrowing from the co-territorial non-Jewish languages (including spoken Arabic and the widely known English), and Hebrew orthography.

The Most Widely Spoken Jewish Language: Yiddish

Distinctive linguistic features can be seen in the history of Yiddish, the most widely spoken Jewish language (Birnbaum, 1979; Weinreich, 1980; Katz, 1985; Weigel, 2002). According to the commonly accepted view (Weinreich, 1980), Yiddish was born towards the end of the first millennium A.D. when Judeo-French-speaking Jews started to settle in the Rhineland. During the more tolerant period that preceded the Crusades, these communities shifted from Judeo-French to a variety based on the German spoken in the area. This Judeo-German included elements of Hebrew and Aramaic, as well as other distinctive features. As a result of expulsion, persecution, and changing economic opportunity, many Jews migrated from Germanic-speaking to Slavic-speaking areas and brought their German language with them. In the changed social conditions, the developing Yiddish language maintained its German base while admitting influences from local Slavic languages in lexicon, morphosyntax, phonology, and discourse. In addition, Hebrew and Aramaic elements survived from previous generations, and new ones were added, mostly through contact with liturgical and rabbinic texts. A few Judeo-French lexical elements endured.

Over the centuries, Western Yiddish disappeared as a spoken language, assimilating towards co-territorial German, except in a few areas, like French-speaking Alsace. In eastern Europe, Yiddish developed into a complex web of dialects, differing mostly in phonology but also in lexicon and grammar.

Yiddish documents have been identified as early as the 13th century, and we have examples of epic poems written in Yiddish from the time of the Renaissance. In the early modern period, Yiddish was used mostly in women's religious literature, including translations and explanations of the Bible and liturgy. The mid-19th century saw the flowering of Yiddish literature, stemming from the eastern European Jewish Enlightenment. In the early 20th century, Yiddish became the object of language planning efforts, including a standardized orthography and linguistic documentation and research.

Events of the 20th century, especially immigration to America and Israel and the Nazi Holocaust, led to a major decline in the use of Yiddish, and today it is used as an everyday language mostly by the elderly and by pockets of Hasidic Jews in the New York area, Israel, and elsewhere (current estimates of total number of speakers range from 200 000 to 400 000). Reversing language shift efforts continue in educational and cultural programs, especially in New York, Montreal, Antwerp, and Mexico City. Young non-Hasidic Jews there and elsewhere continue to use Yiddish as an everyday language in an effort at revitalization.

Judeo-Spanish

Judeo-Spanish is an Hispanic language taken by exiles from Spain after the expulsion of 1492 to northern Europe, the Balkans and Turkey (Sephiha, 1979; Malinowski, 1982; Bunis, 1993; Harris, 1994; Quintana, 2002). There has been much debate about the name of this language: in addition to Judeo-Spanish, commonly used glottonyms are Ladino, Judezmo, and Spanyol, with some scholars maintaining that Ladino should refer only to the calque (word-for-word) translation language variety.

Already in Spain, Judeo-Spanish exhibited influences from Jewish and non-Jewish varieties of Arabic, as well as other distinctive features. When Sephardic Jews migrated, elements of Turkish, Greek, Bulgarian, and other languages were added. In addition, archaisms and independent developments distinguished

Judeo-Spanish from contemporaneous peninsular Castilian. Distinctive dialects of Judeo-Spanish formed throughout the Ottoman Empire. In the 19th and 20th centuries, the high-status French language had a major impact, due to influences of religious and secular education.

Judeo-Spanish developed literary functions, including a significant religious literature, a strong oral folk literature, and a corpus of modern belles lettres. There was rapid language loss in the 19th century as a result of emigration, Westernization, and assimilation. The Judeo-Spanish-speaking community in Greece and other Balkan countries was mostly wiped out in the Holocaust. Speakers in Turkey shifted first to French and more recently to Turkish. Today, it is estimated that there are only 30 000–50 000 speakers, mostly elderly.

A North African variety of Judeo-Spanish, called Haketiya, developed in northern Morocco after the 1492 expulsion. Its speakers mostly shifted to Spanish with the establishment of the Spanish Protectorate at the beginning of the 20th century.

Judeo-Arabic

Since even before the Muslim conquest of the Arabian peninsula in the 7th century A.D., Jews have lived alongside Arabic speakers, and they have spoken Jewish varieties of Arabic (Blanc, 1964; Blau, 1981; Hary, 1992; Bar-Asher, 1998). These have included Hebrew and Aramaic influences – mostly lexical, but also phonological, morphological, and syntactic. They have also included archaisms, standardized hyper- and hypo-corrections, and other distinctive features. Judeo-Arabic varieties have been documented in Iraq, Egypt, Syria, Morocco, and Yemen. Due to the migration of Jews within the Arab world, some varieties have features in common with other varieties of Judeo-Arabic that do not exist in the local non-Jewish Arabic dialects.

In the Middle Ages, many important Jewish religious and philosophical works were written in Middle Arabic and Judeo-Arabic. A word-for-word, or calque, translation variety, called *Sharḥ*, was used for translations of biblical, rabbinic, and liturgical texts. In addition, Judeo-Arabic was used for religious and secular literary production in the 19th century.

Most Jews in Arab lands immigrated to Israel in the 20th century, acquiring Israeli Hebrew and relegating Judeo-Arabic to private use. Those who stayed in Morocco tended to shift to French, and those who immigrated to North America and France tended to shift to the local languages there. It is estimated that there are currently 400 000–500 000 speakers (Grimes, 1996), mostly middle aged and older.

A Contemporary Jewish Language: Jewish English

Also referred to as Judeo-English, Yinglish, and Yeshivish, Jewish English is an umbrella term for the contemporary in-group varieties spoken by Jews in America, England, and other English-speaking countries (Gold, 1985; Steinmetz, 1986; Weiser, 1994; Benor, 2004). Jewish English is based on the local variety of English with many influences from Yiddish, textual Hebrew and Aramaic, and Israeli Hebrew in lexicon, syntax, phonology, and discourse. Because of the widespread literacy in contemporary English-speaking countries, Jewish English is not written in Hebrew characters. However, Hebrew loan words are sometimes inserted in their original orthography.

The varieties of Jewish English spoken by Orthodox Jews, especially those in larger, more isolated communities, are most distinct from general English, often to the point of being unintelligible to non-Jews and to non-Orthodox Jews. Orthodox Jewish English is a young language variety, and the number of speakers is growing as the Orthodox community expands. Although Jewish English is the youngest Jewish language that has been researched, it is likely not the only one that is gaining, rather than losing, speakers. As researchers explore the language of other contemporary Diaspora communities, it is expected that they will find similar distinctively Jewish linguistic practices.

See also: Bilingualism; Code Switching; Hebrew, Biblical and Jewish; Hebrew, Israeli; Language Change and Language Contact; Language Maintenance and Shift; Minorities and Language; Yiddish.

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Jiwarli

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Introduction

Jiwarli (Djiwarli) is an Australian Aboriginal language and was traditionally spoken along the upper reaches of the Henry River, a tributary of the Ashburton River, in the northwest of Western Australia. The language was unrecorded until 1978 and is now extinct, the last speaker, Mr. Jack Butler, having passed away in May 1985. Before his death, Jack Butler worked with Peter Austin to record over 70 texts in a range of genres, a lexicon of some 1500 words and elicitation of morphological paradigms and syntactic constructions. Publications on the language include a bilingual dictionary (Austin, 1992), a text collection (Austin, 1997), articles on morphosyntax (Austin and Bresnan, 1996; Austin, 1995, 1998, 2000, 2001) and a website. The language has become known in the linguistic literature for its nonconfigurational syntax (see Austin and Bresnan, 1996; Baker, 2000, and below), and it also shows switch-reference and a complex system of case-marking that reflects clause type (Austin, 2004). A reference grammar is in preparation.

Language Relationships

Jiwarli is closely related to its immediate neighbors, Warriyangka (Warriyangga), Thiin, and Tharrkari (Dhargari) as members of the Mantharta subgroup (*mantharta* being the word for 'person'). The languages share up to 80% common vocabulary and a similar grammatical system. Tharrkari has undergone a number of historical phonological changes that make its phonetics and phonology highly unusual for an Australian language (see further below). None of the Mantharta languages has any native speakers today, though some knowledge of words and expressions remains among descendants. The Mantharta languages are most closely related to the Kanyara languages spoken to their west and northwest: Payungu (Bayungu), Pinikura (Binigura), Purduna (Burduna), and Thalanyji (Dhalandji). They share approximately 60% cognate vocabulary and have a number of grammatical features in common, including switch-reference and clause linkage effects on case-marking (Austin, 1996, 2004). Today only Thalanyji continues to be spoken by older members of a single family living near Onslow, Western Australia. The Kanyara and Mantharta languages belong to the widespread Pama–Nyungan family, which covers the southern two-thirds of Australia (*see* **Australia: Language Situation**), and are most closely related to the Nyungic languages spoken to their east.

Linguistic Characteristics

Phonology

The phonological system of Jiwarli is typical of languages of the region, with contrastive stops at six points of articulation, a nasal for each stop position, a lateral for each nonperipheral stop, a flap, a semi-retroflex continuant, and two glides. Table 1 gives the relevant consonants in their practical orthographic form. There are just three vowels: high front *i*, high back *u*, and low *a*, with a phonemic length contrast mainly, but not exclusively, found in the first syllable of words. Tharrkari has undergone a number of historical phonological changes that have resulted in the creation of a stop voicing contrast (unusual in Australia) and, in one dialect, complete loss of laterals.

The general structure of Jiwarli roots is CV(C)CV(C). Every word in Jiwarli must begin with a consonant and end in a vowel; roots can end in a consonant but if otherwise unsuffixed *-ma* is added to nasal-final roots and *-pa* to roots ending in *l*, *rl*, *ly*, or *rr*. Word-initially only nonapico-domal stops and nasals and the two glides are found. Word-medially

Table 1 Consonants

	Bilabial	*Lamino-*		*Apico-*		*Dorse-velar*
		dental	*palatal*	*alveolar*	*domal*	
Stop	*p*	*th*	*j*	*t*	*rt*	*k*
Nasal	*m*	*nh*	*ny*	*n*	*rn*	*ng*
Lateral		*lh*	*ly*	*l*	*rl*	
Flap				*rr*		
Continuant					*r*	
Glide	*w*		*y*			

Table 2 Substantive cases

	A	*S*	*P*	*Dative*	*Locative*	*Allative*
boy	*wirtangku*	*wirta*	*wirtanha*	*wirtawu*	*wirtangka*	*wirtarla*
girl	*kurlkingku*	*kurlki*	*kurlkinha*	*kirlkiyi*	*kurlkingka*	*kurlkirla*
dog	*thuthungku*	*thuthu*	*thuthunha*	*thuthuwu*	*thuthungka*	*thuthurla*
fire	*karlangku*	*karla*	*karla*	*karlawu*	*karlangka*	*karlarla*
tree	*wurungku*	*wuru*	*wuru*	*wuruwu*	*wurungka*	*wururla*
hill 'roo	*mathantu*	*mathanma*	*mathannha*	*mathanku*	*mathanta*	*mathankurla*
tongue	*thalanythu*	*thalanyma*	*thalanyma*	*thalanyku*	*thalanytha*	*thalanykurla*
chin	*nyinyarntu*	*nyinyarnma*	*nyinyarnma*	*nyinyarnku*	*nyinyarnta*	*nyinyarnkurla*
wind	*yuwalpalu*	*yuwalpa*	*yuwalpa*	*yuwalku*	*yuwalpala*	*yuwalkurla*
cousin	*ngathalpalu*	*ngathalpa*	*ngathalpanha*	*ngathalku*	*ngathalpala*	*ngathalkurla*
barb	*ngarlirrpalu*	*ngarlirrpa*	*ngarlirrpa*	*ngarlirrku*	*ngarlirrpalu*	*ngarlirrkurla*

there are limited consonant clusters, primarily homorganic nasal plus stop, and apical nasal or lateral plus peripheral stop (*p* and *k*). Vowel clusters are not found. Words borrowed from English are generally restructured to meet these phonotactic constraints, e.g., *walypala* 'white man' (from 'white fella'), *ngayirlanma* 'island.'

Morphology

Jiwarli, like other languages of the Pama–Nyungan group, is entirely suffixing in its morphology. There are two major word classes, nominals and verbs, with nominals showing a rich system of case-marking and verbs marking tense/aspect/mood and dependent clause categories. Nominals can be subdivided into substantives (which cover both noun and adjective concepts in a language like English), pronouns, locationals, and demonstratives. Minor word classes include adverbs, particles, and interjections.

Nominals in Jiwarli inflect for case, with the syntactic functions of intransitive subject (S), transitive subject (A), and transitive object (P) showing a split-ergative pattern of syncretism in the case forms determined by animacy:

- for the first person singular pronoun, S and A fall together as a single (unmarked) form
- for inanimate nominals and demonstratives, S and P fall together as a single (unmarked) form
- for all other nominals, there are three forms for S, A, and P functions

In addition to the three main cases (nominative for S, ergative for A, accusative for P) there are also the following case forms:

- dative, marking alienable possession and complement of certain verbs
- allative, coding direction toward a place
- locative, coding location in a place, and complement of verbs of speaking
- ablative, coding direction from a place and cause

The actual forms of the cases are affected by the phonological shape of the root, e.g., whether it ends in a vowel or not, what kind of vowel or consonant is root-final, and how many morae it contains (long vowels counting as two mora). Table 2 sets out a sample substantive declension.

The coding of transitive object P varies according to clause type and crossclausal reference relations: in certain dependent clauses (for details, see below) P is marked as dative or as allative. In addition, case is added to dependent clause verbs to indicate crossclausal coreference (see below), and manner adverbs in transitive clauses carry an ergative case agreement marker.

Jiwarli has a rich system of nominal word-building morphology that involves suffixation between the root and case inflection. Categories encoded in word-building morphology include number (dual, paucal, plural), having (e.g., *yakan-jaka* 'married [lit. spouse-having]'), lacking (e.g., *yakan-yirra* 'unmarried [lit. spouse-lacking]'), and kin dual and plural (e.g., *kurta* 'older brother,' *kurtarra* 'pair of brothers').

Pronouns in Jiwarli distinguish three persons and singular, dual, and plural number; in the first person non-singular there is an inclusive–exclusive contrast. Demonstratives encode a proximal and distal contrast. Table 3 sets out the basic pronoun and demonstrative forms.

Verbs morphologically distinguish between main verb and dependent verb inflections. Main verbs encode tense/aspect/mood categories such as past habitual, present, future, and imperative. Dependent verbs occur in hypotactically linked clauses and encode clause type (relative tense plus aspect) plus crossclausal coreference or non-coreference of subjects (S or A), i.e., switch-reference (see further details in the syntax section below). There are five morphologically determined verb conjugations: conjugations one and two are primarily, but not exclusively, transitive,

Table 3 Pronouns and demonstratives

	A	*S*	*P*	*Dative*	*Locative*
1sg	*ngatha*	*ngatha*	*ngathanha*	*nganaju*	*ngathala*
1dlincl	*ngalilu*	*ngali*	*ngalinha*	*ngalimpa*	*ngalila*
1dlexcl	*ngalijuru*	*ngaliju*	*ngalijunha*	*ngalijungu*	*ngalijura*
1plincl	*nganthurralu*	*nganthurru*	*nganthurranha*	*nganthurrampa*	*nganthurrala*
1plexcl	*nganthurrajuru*	*nganthurraju*	*nganthurrajunha*	*nganthurrajungu*	*nganthurrajura*
2sg	*nhurralu*	*nhurra*	*nhurranha*	*nhurrampa*	*nhurrala*
2dl	*nhupaluru*	*nhupalu*	*nhupalunha*	*nhupalumpa*	*nhupalura*
2pl	*nhurrakaralu*	*nhurrakara*	*nhurrakaranha*	*nhurrakarampa*	*nhurrakarala*
3sg	*panhaluru*	*panhalu*	*panhalunha*	*parnumpa*	*panhalura*
3dl	*pulalu*	*pula*	*pulanha*	*pulampa*	*pulala*
3pl	*thanalu*	*thana*	*thananha*	*thanampa*	*thanala*
this	*yilu*	*yinha*	*yinha*	*yirnu*	*yila*
that	*ngulu*	*ngunha*	*ngunha*	*ngurnu*	*ngula*

Table 4 Verb inflections

Inflection	*Conj 1*	*Conj 2*	*Conj 3*	*Conj 4*	*Conj 5*
Main clause verb inflections					
Usitative	*-laartu*	*-rraartu*	*-artu*	*-artu*	*-artu*
Past	*-rninyja*	*-rninyja*	*-nyja*	*-nyja*	*-nyja*
Present	*-nha*	*-nha*	*-inha*	*-inha*	*-a*
Future	*-lka*	*-rrka*	*-ira*	*-ra*	*-ra*
Imperative	*-nma*	*-nma*	*-ma*	*-ma*	*-ma*
Irrealis	*-nmararni*	*-nmararni*	*-mararni*	*-mararni*	*-mararni*
Dependent clause verb inflections					
ImperfSS	*-rnu*	*-rnu*	*-nhu*	*-nhu*	*-nhu*
ImperfDS	*-niya*	*-niya*	*-iniya*	*-iniya*	*-iniya*
PerfSS	*-rninyjalu*	*-rninyjalu*	*-nyjalu*	*-nyjalu*	*-nyjalu*
PerfDS	*-rninyjaparnti*	*-rninyjaparnti*	*-nyjaparnti*	*-nyjaparnti*	*-nyjaparnti*
PurpSS	*-ru*	*-rru*	*-yi*	*-ngku*	*-a*
PurpDS	*-lpuka*	*-rrpuka*	*-puka*	*-puka*	*-puka*
Intentive	*-lkarri(ngu)*	*-rrkarri(ngu)*	*-irarri(ngu)*	*-rarri(ngu)*	*-rarri(ngu)*
Might	*-lkangu*	*-rrkangu*	*-irangu*	*-rangu*	*-rangu*

and conjugations three, four, and five are intransitive. Table 4 sets out the verb conjugations.

Verbs show limited word-building morphology, mainly transitivizing and detransitivizing affixes that shift conjugation and transitivity. There are also category-changing affixes:

- nominalizing suffixes that create agent or instrument nominals from verbs
- verbalizing suffixes that create intransitive (inchoative) or transitive (causative) verbs from nominals.

The minor categories of adverb, particle, and interjection show no morphological variation. However, there is a set of postinflectional suffixes that may be attached to words of any class to encode various information status concepts, such as *-rru* for 'new information' and *-thu* for 'old information.' These affixes are ubiquitous in texts.

Syntax

Jiwarli is a nonconfigurational language (Hale, 1983; Austin and Bresnan, 1996; Baker, 2000) and shows the following syntactic characteristics:

- free word order, in which any possible order of sentence constituents is found (Austin, 2000)
- split-NP syntax, in which nominals understood as referring to a single entity can be separated in the clause by other constituents (each nominal bearing a relevant case marker)
- free argument ellipsis, in which nominals of any person or number whose reference is clear from the context can be freely omitted (Austin, 2001).

The following example illustrates split-NP syntax:

(1) *Karla* *wantha-nma-rni* *jarnpa* *juma*
fire.ACC give-IMPER-hence light.ACC small.ACC
'Give me a small fire light' [T52s15]

Free elipsis of arguments is seen in the following (see also line 68 in the text example below):

(2) *Wirntupinya-nyja-rru*
kill-PAST-NEW.INF
'(They) killed (him)' [T42s25]

Jiwarli also shows interesting interclausal syntax. Dependent clauses occur hypotactically located on the margins of main clauses, and their verbs encode clause type plus switch-reference, i.e., (non-)coreference of subject (S or A) between the main and dependent clause. In same-subject clauses the dependent clause subject is obligatorily unexpressed (these being 'control' structures). When the main clause is transitive, some same-subject dependent clause verbs carry an ergative case marker in agreement with the controlling subject nominal. The following examples illustrate this:

(3) *Mantharta* *kumpa-inha* *wurnta-wu*
man.NOM sit-PRES shield-DAT
yinka-rnu
adze-IMPERF.SS
'The man sits adzing a shield' [N11p31s3]

(4) *Nhurra-kara-lu* *thika-nma*
you-PL-ERG eat-IMPER
yarrukarri-ngu-ru-thu
want-IMPERF.SS-ERG-old.INF
'You eat it if you want it!' [N11p39s3]

For different-subject dependent clauses, if there is coreference between the (omitted) subject of the dependent clauses and a nonsubject in the main clause, an agreement case marker appears on the dependent verb, as in:

(5) *Tharla-nma* *yinha* *julyu-nha*
feed-IMPER this.ACC old man-ACC
kamu-rri-ya-nha
hunger-INCHOAT-IMPERF.DS-ACC
'Feed this old man who is becoming hungry!' [JIT13s1]

Notice that there is a complex interaction between the marking of P inside the dependent clause (as dative, allative, or accusative) depending on clause type and crossclausal coreference relations. Table 5 illustrates this.

Table 5 Coding of P

	Dependent object
Intentive Imperfective-SS Perfective-SS Imperfective-DS Perfective-DS	Dative
Purposive-SS	Allative
Purposive-DS Might	Accusative

The significance of these patterns is explored more generally in Austin (2004).

Particles in Jiwarli have scope over the whole clause and encode such semantic concepts as negation, possibility, etc. An example is *warri* 'not' in (see also *kaji* 'try' in text line 15 below):

(6) *Nhaa-rri-nyja* *nhurra* *warri*
what-INCHOAT-PAST you.ERG not
kurlkayi-rnu *wangka-iniya-wu* *nganaju*
listen-IMPERF.SS talk-IMPERF.DS-DAT I.DAT
'Why didn't you listen to me talking?' [T35s7]

Text Example

The following extract (Text 43 in Austin, 1997) exemplifies the morphological and syntactic characteristics of Jiwarli and shows a little of the cultural background of the language. It comes from a traditional story in which one bird steals fire from the people, who then ask the Peregrine falcon to get it back from the thief:

(7) *Ngana-lu* *ngunha* *karla* *mana-ra*
who-ERG that.ACC fire.ACC get-FUT
'Who will get the fire?'

(8) *Nhurra* *parru*
2SG.NOM then
'How about you?'

(9) *Nhurra* *karlathintirnira* *kurukurura,*
2SG.NOM Peregrine falcon Peregrine falcon
nhurra *yini-thu*
2SG.NOM name.NOM-OLD.INF
'You are karlathintirnira Peregrine falcon, (that's) your name.'

(10) *Ngaa*
yes
'Yes'

(11) *Ngunha* *thurni-nyja-nthi*
that.NOM laugh-PAST-just
'He just laughed'

(12) *Yana-nyja* *ngunha* *purtipala-rru*
go-PAST that.NOM pretty.NOM-NEW.INF
'He was pretty now'

(13) *Wantha-rninyja* *juuri* *wangkarr-a*
put-PAST paint.ACC throat-LOC
'(They) put paint on (his) throat'

(14) *Wantha-rninyja* *kala-pa* *wangkarr-a*
put-PAST like this-SPEC throat-LOC
'(They) put (it) like this on (his) throat'

(15) *Kaji* *nhurra* *yana-ma* *mana-ngku*
try 2SG.NOM go-IMPER get-PURP.SS
ngurlu *karla-rla*
that.ALL fire-ALL
'You try to go and get the fire'

See also: Australia: Language Situation.

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Johnson, Samuel (1709–1784)

W Hüllen, Düsseldorf, Germany

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Samuel Johnson was born as the son of a bookseller in Lichfield in 1709 and died in London in 1784. He was an intellectually precocious boy, devouring literature in a desultory manner, and later a young man of often unpredictable habits and uncouth appearance. This was to become his lifestyle, which alternated with lapses into deep melancholy. In spite of the irregularities of his character, his deep sympathy for underprivileged persons and servants was unanimously praised. At Oxford (Pembroke College), he read Greek and 'metaphysics.' In 1729, he left the university before obtaining a degree, probably because his means failed. (The degree of LL.D., which later became habitually attached to his name, was conferred upon him by the University of Dublin as late as 1765 and by the University of Oxford even later in 1775. He rarely used it himself.) After several attempts at gaining a position at schools in the neighborhood of Lichfield, he left for London in 1737, where he stayed for the rest of his life.

Samuel Johnson was determined to make a living as an *homme de lettres* and, after enduring utmost poverty for many years, finally succeeded in doing so. His literary works were of only limited success. Today they are regarded as fine, though obsolete, specimens of classicist literature. Apart from their formal achievements, they gave rise to the general appreciation of Samuel Johnson as a morally strong and religiously motivated character. Among them were the tragedy *Irene* (1736, staged by Garrick in 1749), the long poem 'Vanity of Human Wishes,' written in the imitation of the tenth satire of Juvenal (1749), and the novel *Rasselas, Prince of Abyssinia* (1759). All of them quote historical examples of the deceptive nature of human achievements and the everlasting and unique salvation in God. They propose this message using a severe and dignified eloquence that was felt to be exemplary.

More successful were Johnson's *ad hoc* publications (prologues to plays, reviews, political pamphlets) and his contributions to various journals. From 1731 on he wrote regularly for the *Gentlemen's Magazine*. Among his contributions written between 1738 and 1744 were parliamentary debates, some of which he only corrected or wrote on the basis of reports; he was never in the gallery himself. Between 1750 and 1752, he issued the *Rambler*, which appeared twice a week, by writing the whole paper himself with a few exceptions. The project was not successful but later gained a high reputation and good sales when it was edited in collected volumes. In 1753 and 1754, he contributed to the *Adventurer.* Between 1756 and 1758, he edited the *Literary Magazine, or Universal Review*, again writing a good many of the articles

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himself. All this meant accomplishing an enormous amount of work, even during the period when he was busy compiling his dictionary. The pecuniary conditions of his life improved considerably when he was granted a pension by George III in 1762.

Samuel Johnson then became an outstanding figure of the intellectual scene in London. Nearly every distinguished man of letters of the period came into contact with him, with the exception of the disliked David Hume (Dictionary of National Biography, DNB). In 1763, he made the acquaintance of James Boswell, and started a friendship that lasted even beyond the grave, as his friend published the well-known and exemplary biography *Life of Samuel Johnson* (1791). In the same year, the 'Club' was founded – a regular gathering of influential intellectuals in London, where he was the master of conversation, an ability in which he excelled like nobody else. In 1764, his long acquaintance with Mr and Mrs Thrale (later Mrs. Piozzi) began. He almost became a member of their family. These were also the years of his most mature literary achievements – the Shakespeare edition (1765) and the *Lives of the English poets* (1779–1781).

On June 18, 1746, five booksellers from London contracted with Samuel Johnson to produce a dictionary of English within three years for the sum of 1575 pounds. On April 30 of the same year, Johnson wrote his plan for the dictionary, and he sent a slightly altered version to the Earl of Chesterfield one year later. His hopes of patronage and financial assistance, however, came to nothing. Later, he complained bitterly about this. For nine years, Johnson and six amanuenses worked on the project. Its first volume appeared on April 15, 1755. The two volumes together contained 2300 folio pages with 40 000 entries in total. Each of them consists of the lemma, the determination of word class, in the case of a derived word its stem, etymological references, the definition of meaning(s) by synonym or paraphrase, and quotations from 'good authors.' The amanuenses culled the lemmata and the quotations from books, while Johnson himself provided the definitions and selected the quotations. Both are rightly regarded as praiseworthy and as showing his true genius for language. The dictionary is introduced by a grammar, a history of the language, and a preface. In this preface, Samuel Johnson explained the achievements of his work and admitted that many of his initial aims could not be accomplished. It is a moving testament to his intellectual sincerity.

Samuel Johnson praised the copiousness, energy, variety, and purity of the English language, as used by 'good' authors from Spencer to the Restoration of 1660, but he criticized a lack of order and rules since then. For him, this was the consequence of ignorance, vulgarity, and caprice. He wished to counter these with the ideals of classical rhetoric – brevity, congruity, and perspicuity. It is in this ambition of fixing language use in the sense of these ideals that he admitted having failed. His idealist belief in the necessity of a linguistic norm was thus challenged by the realism of the evaluation of his own work.

The *Dictionary of the English language* was the unquestioned lexicographical authority for language use in England until 1887, when the first volume of what was later to become the *Oxford English dictionary* appeared. It was taken by many as a substitute for a centralized linguistic academy such as the Italians and the French had (and have).

See also: Academies: Dictionaries and Standards; English, Later Modern (ca. 1700–1900); English Lexicography; Rhetoric: History; Synonymy.

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Johnston Atoll: Language Situation

Editorial Team

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Johnston Atoll, located in the central Pacific Ocean between the Hawaiian and Marshall Islands, is one of the most isolated places in the world. Of volcanic formation, Johnston Atoll is a broad, shallow platform of about 50 square miles with four islands and a marginal, emergent reef on its northwestern side. In 1858, both the United States and the Kingdom of Hawaii annexed the uninhabited Atoll, which eventually became an American possession. Initially, the atoll was exploited for its guano deposits; subsequently, it became a designated wildlife refuge, but this last incarnation did not last long. In the 1930s, the Atoll passed into the hands of the military. Johnston Atoll has been chosen for test launchings of nuclear missiles and it contains a landfill of plutonium-contaminated waste; more than 4 million pounds of chemical weapons have been destroyed on Johnston since 1990. The military has been gradually decreasing its activity and presence on the Atoll, and as of January 2004, Johnston's population had fallen to about 200 Air Force and civilian personnel, all English-speaking.

Jones, Daniel (1881–1967)

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Daniel Jones, the leading British phonetician of the 20th century, was born in London on September 12, 1881, the son of a successful London barrister. He was educated at Ludgrove preparatory school, Radley College, and University College School before going on to read mathematics at Cambridge. Jones graduated with a B.A. in 1903 (converted by payment to M.A. in 1907) but while still a student discovered that he possessed remarkable linguistic talents. Out of interest, he began attending language courses during his vacations, and it was on one such occasion at Marburg, Germany, in 1900 that he was to encounter the renowned language teacher and skilled practical phonetician William Tilly. Jones later explained that this was his introduction to phonetics, and he held Tilly in highest regard thereafter (Collins and Mees, 1999: 12–17).

After graduation, Jones was reluctantly persuaded by his father to take up law. Nevertheless, by pleading ill health, Jones managed to interrupt his legal training in 1905 in order to spend a year in Paris studying under the eminent linguist Paul Passy, whom he soon got to know as a personal friend, and whose niece he married in 1911. Passy acted as guide and mentor to Jones in these early years, encouraging him to take the International Phonetic Association (IPA) examination and to make phonetics his career. Jones performed brilliantly for the IPA certificate, which turned out to be the only linguistic qualification he was ever to obtain (apart from honorary doctorates, Dr. Phil., Zürich, 1936; LL.D., Edinburgh, 1958). He did, however, take private lessons in practical ear-training from Henry Sweet, whom he was later to regard as another strong formative influence.

In 1907, Jones was called to the bar, but never practiced as a barrister, having in the meantime obtained a part-time post teaching phonetics at University College London – then in its infancy as an academic discipline in Britain. The new subject proved popular with students, and eventually, in 1912, Jones was able to set up his own phonetics laboratory and was appointed by London University to be head of the first British university department of phonetics. He was promoted to Reader in 1914 and awarded a chair in 1921 – a post in which he remained until 1949. Upon retirement, he was designated Professor Emeritus.

The year 1912 was also coincidentally when Bernard Shaw completed his first drafts of *Pygmalion,* a play mainly concerned with phonetic matters, and Jones was called upon to provide him with help and advice on technical points. Contrary to previous belief, it now seems likely that it was Daniel Jones, rather than Henry Sweet, who was the chief inspiration for Shaw's fictional phonetician hero Henry Higgins. To avoid any suspicion that Higgins was based on a living phonetician, and thus prevent a possible libel suit, Shaw appears to have attempted to fog the issue by inserting into the Preface to the first published edition of the play (1916) deliberately distracting remarks about the recently deceased Sweet (Collins and Mees, 1999: 97–103).

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In this initial period of his career, Jones produced a flood of publications, his first commercial success being the compact *Pronunciation of English* (1909). The more ambitious *Outline of English phonetics* (1918), aimed at the nonnative learner, was much more comprehensive and can claim to be the earliest reliable full account of what Jones was later to term 'Received Pronunciation' (RP). Its descriptive framework penetrated linguistics worldwide, influencing Bloomfield and the post-Bloomfieldians of the American Structuralist School. In 1913, Jones co-edited (with Hermann Michaelis) the *Phonetic dictionary of the English language*, the first serious attempt at a dedicated pronunciation dictionary for English in over 100 years. It was soon overtaken by the success of Jones's own *English pronouncing dictionary* (1917a). The *EPD* (as it is always known) rapidly became the recognized authority on RP usage and (in revised form) remains in print to the present day.

Jones pioneered research on non-European languages, producing concise but significant early studies, notably on Cantonese (Jones and Woo, 1912), Tswana (Jones and Plaatje, 1916), and Sinhalese (Sinhala) (Perera and Jones, 1919). Jones's truly groundbreaking research on tone languages is now once again beginning to get the recognition it deserves. His notable description of Tswana contains the first systematic analysis of a register tone language taking in downstep (Jones and Plaatje, 1916: xxv–xxxi). Jones (1917b) expanded on this research; a later innovation was the raised exclamation mark (!) commonly used for the downstep feature (Jones, 1928: 3). Jones's work on African languages was subsequently continued and expanded by several of his London colleagues and pupils, including Lilias Armstrong, Ida Ward, Clement Doke, Eugénie Henderson, A. N. Tucker, and Jack Carnochan.

Jones did not neglect European languages. The *Pronunciation of Russian* (co-authored with Michael Trofimov), for a long period the only reliable phonetic description in English of the sound system of that language, was published in 1923. At the very end of his life Jones was to rewrite this book together with Dennis Ward, and under the new title *Phonetics of Russian* it appeared in 1969. In 1927, Jones produced (with Emile Stéphan) *Colloquial French,* issued with what at the time was considered a startling innovation – no fewer than 15 gramophone discs containing approximately 90 minutes of spoken material. This proved to be a most successful pioneering example of the audio-lingual method and can be regarded as a milestone in applied linguistics and the history of language teaching.

Jones's (1917c) article, published in *Nature*, is the first detailed exposition of his influential theory of cardinal vowels. Based on ideas derived in part from Paul Passy but also showing the influence of Alexander Melville Bell, Henry Sweet, and the British phonetician Richard Lloyd, it provided a simple dual-parameter model of vowel description based on tongue-arch height and lip-shape. Despite the lack of adequate supporting radiographic evidence, Jones subsequently elaborated the theory, arriving eventually at a system of eight rounded and eight unrounded front and back vowels at supposedly articulatorily equidistant intervals, plus two close central vowels (Collins and Mees, 1995). Jones produced three disc recordings of the cardinal vowels (1917d, 1943, 1956), the last version being nowadays the best known. The cardinal vowel system – although today in some disrepute in the light of contradictory instrumental data – has been widely used since its inception, and much present-day vowel description still derives ultimately from Jones's model (cf. Butcher, 1982). It is noteworthy that a diagram based almost totally on Jones's vowel scheme still appears on the current (1996) IPA chart (see Figure 1).

Jones was the first English writer (from 1917 onward) to use and promulgate the word 'phoneme' in its current sense, borrowing the term from the followers of Baudouin de Courtenay and interpreting it

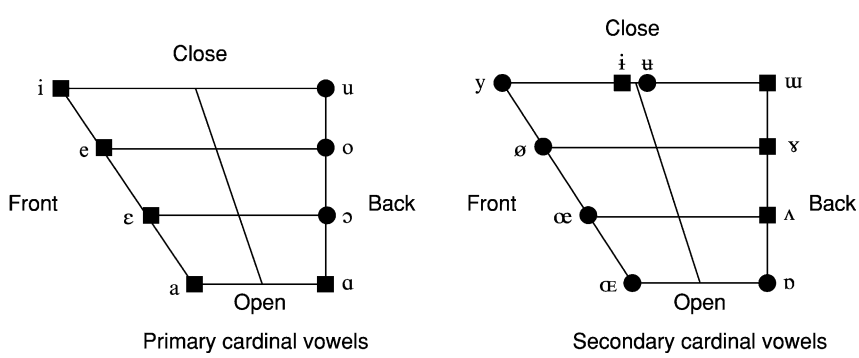

Figure 1 Jones's system of primary and secondary cardinal vowels in updated form. Lip shape is indicated by squares (spread-neutral) and circles (rounded).

as a 'family of sounds' related by physical criteria. As a result, the phoneme principle became firmly established in British linguistics well before the advent of either the Prague School or American structuralism, as Jones himself points out in his *History and meaning of the term 'phoneme'* (1957). After Jones suffered a nervous breakdown in 1920, his dynamic productivity diminished somewhat, but he went on in his later years to write numerous articles and produce important revisions of his major works. His main effort was directed to writing *The phoneme* (1950), which he regarded as his life's work. On publication, even though the large collection of reliable language data was much admired, Jones's static theoretical position – essentially unchanged from 1917 – disappointed contemporary critics.

Jones was, together with Paul Passy, the main force behind the IPA (Assistant Secretary 1906–1927; Secretary 1927–1950; President 1950–1967). He was also editor of its influential journal *Le Maître Phonétique* and from 1906 onward played a leading role in spreading the IPA alphabet worldwide. Jones was an active supporter of English spelling reform and also helped devise schemes for new alphabets for African and Indian languages. In 1926, he became a founding member of the BBC Advisory Committee on Pronunciation and from 1942 to 1967 was chief pronunciation advisor to the BBC. In this role, he was to a degree responsible for reinforcing the notion of 'BBC English' as a standard, but Jones himself was from early on in his career advanced in his libertarian views on pronunciation. Although he revived the Victorian term 'received pronunciation' and the abbreviation RP in the (1926) third edition of the *EPD*, he deprecated any attempt to prescribe a standard pronunciation model for native speakers. He was a keen observer of linguistic change, and was the first to note the spread of glottalization in British English and the increasing influence of popular London speech on RP, thus foreseeing the advance of what is nowadays termed 'estuary English' (Collins and Mees, 2001).

Although now somewhat dated, Jones's works (many of which have recently been re-issued together with hitherto unpublished notes, lectures, and correspondence; Collins and Mees, 2003) remain outstanding both for their detailed phonetic observation and their lucidity. They established him as the best-known phonetician of his generation, and his ideas and methods, propagated by colleagues and pupils forming what Jones (1948) himself termed the London School of Phonetics, have continued to influence many areas of phonetics and pronunciation teaching. (Note that the term London School was later, confusingly, applied to a totally different group of linguists, namely J. R. Firth and his followers.)

Jones can fairly be placed among the leading figures in 20th century linguistics and, together with Henry Sweet, can be considered the greatest of all British phoneticians.

Despite crippling illness, Jones remained working on his publications even in his last years. He died on December 4, 1967, at his home in Gerrards Cross, England.

See also: Armstrong, Lilias Eveline (1882–1937); Bell, Alexander Melville (1819–1905); Doke, Clement Martyn (1893–1980); Phoneme; Phonetic Classification; Phonetic Pedagogy; Phonetic Transcription: Analysis; Shaw, George Bernard (1856–1950); Sweet, Henry (1845–1912); Tilly, William (1860–1935); Ward, Ida Caroline (1880–1950).

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Jones, William, Sir (1746–1794)

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Although the law was his profession, Sir William Jones is most famous for his contributions to linguistics, specifically for his 1786 observation about possible genetic relationships between Sanskrit and certain other languages, which formed the basis of scientific historical/comparative linguistics. A spectacular polyglot (sometimes credited with knowledge of over 20 languages) born in 1746, Sir William showed his interest in languages at an early age, thoroughly mastering Latin, Greek, French, and Italian while a schoolboy at Harrow, and at the same time beginning to study Hebrew and Arabic. In 1764 he enrolled at Oxford, where he continued his studies of languages, adding Portuguese, Spanish, and Persian to his repertoire. In 1766 he became a Fellow of University College, Oxford; in 1772 a Fellow of the Royal Society; and in 1773 a member of the Literary Club headed by Samuel Johnson. In 1768 he received a B.A. from Oxford and an M.A. from the same institution in 1773. Financial pressures eventually caused him to switch his field of study to law, and in 1774 he began practicing law in London. In March 1783 he was appointed to a judgeship in Calcutta and was knighted at the same time. (Edgerton [1946] notes that Jones had been a candidate for this position since 1778, and that his appointment had been delayed because of his open opposition to British action in the American Revolution.) Shortly after arriving in India, Jones founded the Asiatick Society (later renamed the Asiatic Society of Bengal) and presided over the society until his death. Life in India unfortunately adversely affected his health, and Jones died before reaching his forty-eighth birthday in 1794.

Although Jones was not able to devote himself fully to linguistics because of the heavy commitments of his judgeship, and despite his early death, Jones produced a substantial amount of linguistic scholarship (to say nothing of his writings on various legal topics, as well as on other subjects of interest to him, like chess). Jones's most famous work is certainly his lecture, originally presented to the Asiatick Society in February 1786, in which he advanced the theory that Sanskrit was certainly related to Latin and Greek, and possibly to the Celtic, Germanic, and Iranian languages as well. Most importantly, he suggested that this relationship was genetic (i.e., that the relevant languages were descended from a common ancestor). This proposal remains the basis of comparative linguistics.

Even if this had been Jones's only contribution to linguistics, his place in the history of the field would have been secure. However, this was not the only important piece of linguistic scholarship produced by Jones. His interest in Persian had led him to write a Persian grammar, originally published in 1771. Although this work was certainly flawed (see Cannon [1958] for extensive critical discussion), it also filled a gap and remains a testament to Jones's ability (all the more so given that he had apparently taught himself the language and that he was not yet 25 years old when it was published). Jones was also well-known for his translations of Indic and Iranian texts; his first effort in this area, a translation of a Persian manuscript on the life of Nadir Shah into French, was undertaken at the request of the king of Denmark, who owned the manuscript in question, and was published in 1770. The same year he published a book-length study of Persian poetry (Jones, 1770), as well as translations of some of Hafiz' odes into French. Possibly even more important than his

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translations of Persian poetry, however, are his translations of Sanskrit texts. He was the first, for example, to translate the *Sakuntala* into English; his version was itself later translated into a number of European languages, including a German version that inspired Goethe to mention it in one of his own poems. Jones also translated Chinese texts, albeit somewhat less successfully.

The 1993 publication of his collected works, as well as the 1990 biography by Garland Cannon and the consistent citation of his 1786 lecture in historical linguistics handbooks should ensure that Sir William Jones is not forgotten.

See also: Historical and Comparative Linguistics in the 19th Century; Indo–European Languages; Iranian Languages; Sanskrit.

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Jonson, Ben (1572–1637)

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Better known as a dramatist and poet than a grammarian, Benjamin Jonson (usually called Ben Jonson) learned classical literature at Westminster School, under William Camden, and St. John's College, Cambridge. After joining the English troops in Flanders, he returned to London and began working for the stage both as a player and as a playwright in approximately 1595. In 1598 he killed a fellow actor in a duel. Escaping the gallows by benefit of clergy, he became a Roman Catholic during imprisonment, but abjured 12 years later.

His first extant comedy, *Every man in his humour*, which launched him to instant literary fame, was performed by the Lord Chamberlain's company at the Globe in 1598, with Shakespeare in the cast. Following this work, his representative comedies made him the founder of the tradition of 'comedy of humours' or 'comical satires.' His first extant tragedy, *Sejanus*, a play based on Tiberius and his Captain of the Guards, was ill received by the audience at large, but was greatly admired by cultivated persons for his classical erudition.

The accession of James to the throne in 1603 provided him with opportunities to write a long series of court masques. His classical learning and his unique talent for erudite pageantry commended him to King James and Queen Anne. James granted him a pension, thus making him the *de facto* first Poet Laureate. His poems were published in *The forest* (1616) and *Underwoods* (1640). As a literary critic he was the most potent vindicator of the tradition of classical drama and writer in that tradition in sharp contrast to the romantic drama of the preceding Elizabethan Age. His *Timber, or discoveries* (1640) is a landmark achievement in the history of literary criticism. Called the 'rare Ben Jonson,' he was buried in Westminster Abbey with a portrait bust put up on the south wall of Poets' Corner.

Jonson's substantial knowledge of classical literature led him to regard the *status quo* of English as an unruled language. This recognition of his made him one of the very few who wrote a grammar book for English before the 18th century. The relative freedom of grammatical rules in Elizabethan English began to move toward an increasingly stricter code. His *English grammar* is as strongly influenced by Petrus Ramus as many other early English grammarians such as Alexander Gill and Charles Butler were. At the same time, the influences of the traditional Latin grammar books of the Middle Ages such as Alexander de Villa-Dei's *Doctrinal*e are observed in such idiosyncratic technical terms as 'asyndeton' and 'polysyndeton.' The first manuscript of his *English grammar* was destroyed in a fire that ruined his library, one of the richest in England, in 1623. His extant *English grammar* was included posthumously in the two-volume folio edition of his works in 1640.

See also: English, Later Modern (ca. 1700–1900); Ramus, Petrus (1515–1572).

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Joos, Martin (1907–1978)

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Martin Joos [džows] was born in Wisconsin. He studied electrical engineering at the University of Wisconsin for a time, but never completed an undergraduate degree. He was one of the field workers on the Linguistic Atlas of New England project in 1931–1932, then completed an A.M in 1935 and a Ph.D. in 1941 at Wisconsin. He was a lecturer in German at the University of Toronto from 1935 to 1942. From 1942 to 1946, Joos worked as a linguist and cryptographer at the Signal Security Agency in Washington and was an associate editor of *Studies in Linguistics*. He became an Associate Professor in the German department at the University of Wisconsin in 1946 and Professor in 1949, chairing the department from 1962 to 1964. From 1967 to 1972, he was again at Toronto, as Professor and Director of its Center for Linguistic Studies. He received Emeritus rank in 1972.

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Joos was a most unconventional man: he seemed interested in everything around him, yet also absorbed in his thoughts to the point of distraction. He was a very effective teacher. Although his irreverence for social and professional conventions (except as data) would frequently and in some cases permanently exasperate his colleagues, he took his students, sophomores and all, very seriously, treating them with courtesy and patience: the *Readings* were prepared for them, above all. His 1972 paper on a single word in *Parzifal* shows something of what his classes were like. I have heard several versions of a quip about him: "If you ask Martin Joos what time it is, he'll tell you how to build a watch." He might well have accepted this as a compliment. And that watch would keep time.

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Jordan: Language Situation

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Jordan is predominantly an Arabic-speaking country. It occupies an area of 92 000 km^2 and borders Syria (on the north), Iraq and Saudi Arabia (eastern border), the Gulf of Aqaba (on the south), and Palestine and Israel (western border). Jordan became an independent political entity in 1923, first as an emirate under British protection, then as an independent kingdom, since 1946. Its population in 1946 was no more than half a million; Jordan now has 5.4 million people. In addition to a very high birth rate, the growth in Jordan's population has resulted from the displacement of Palestinians from Israel, the West Bank, the Gaza Strip, and Kuwait (during the Gulf War). The country is also host to hundreds of thousands of workers from Egypt, Sri Lanka, the Philippines, Pakistan, and Iraq (since 1990).

English, the major foreign language, is taught in all state and private schools as a compulsory subject and is used as the medium of instruction in the faculties of science and medicine in higher education. It is also widely used in the business and banking sectors, and as a lingua franca in communications with non-Arab residents. French is considered the second foreign language, and is taught as such in many private schools, but is not ordinarily used outside the classroom. Jordanian Arabic borrows extensively from English and contains a number of borrowings from French.

The most important ethnic and linguistic minority group is Circassian (estimated to be 60 000 people). The Circassian language (a North Caucasian language of the western group) is undergoing a shift in favor of Arabic. The second most important group is the Chechen-Ingush (an estimated 10 000 people); members of this group are generally bilingual in Chechen-Ingush (a North Caucasian language, of the eastern group) and Arabic. The Circassians and the Chechens in Jordan are descendents of the 19th- and 20th-century emigrants from North Caucasia. Their languages are mutually unintelligible (for details on both communities, see Al-Wer, 1999). Another minority language, Armenian, is spoken by 4000 people (see Al-Khatib, 2001). Domari is spoken by some 35 000 people. There is also a small community of Turkomans, speakers of a variety of Turkish (see Moawwad, 1999). Jordan has a national sign language (Arabic acronym, LIU).

Jordanian Arabic is classified into two major dialect groups. Broadly speaking, the eastern and southern dialects are of the Najdi type and have fewer speakers compared to the northern and northwestern dialects, which are classified as (southern) Levantine (see Cleveland, 1963). Within the Levantine group, the most important distinction is between the Haurani type, exemplified by the dialects of the cities of Ajloun (in the north), and Sult (in the northwest), and the Madani (or urban) type. The Madani dialects are very similar to those spoken in the major cities in the region (e.g., Jerusalem, Damascus, and Beirut). The emerging dialect of Amman, the capital city of Jordan, has a predominance of phonological features that are akin to the urban Levantine group (for details, see Al-Wer, 2002).

See also: Arabic; Variation in Arabic Languages.

Language Maps (Appendix 1): Map 104.

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Jakob Jud spent his entire university teaching career at the University of Zurich, where he studied under H. Morf and L. Gauchat. He also trained under J. Gilliéron and M. Roques in Paris.

Jud specialized in dialect geography and lexical paleontology, stressing the relationship between words and culture. Jud first came to the attention of his fellow Romanists with a series of early papers based on his Habilitationsschrift (*Sprachgeographische Untersuchungen*), which challenged, on the basis of lexical distribution, several etymologies proposed by Wilhelm Meyer-Lübke. Unlike Gilliéron, who limited his purview to French and to the synchronic data available in his own *Atlas linguistique de la France*, Jud viewed the geographic distribution of lexical items from a dynamic and pan-Romance perspective; excellent examples are the word studies in Jud (1925–1926). He examined lexical variation across the ROMANIA to demonstrate how the study of Romance loans in neighboring Germanic and Celtic languages could throw light on the diffusion of Latin lexical items in the late Roman Empire (Jud 1914, 1946). The close connection between lexical variation and culture can be seen in his essays on French, Italian, and Rhaeto-Romance ecclesiastical terminology (reprinted in Jud, 1973). Most of Jud's lexical studies deal with these languages, with occasional incursions into Spanish.

His most important single undertaking was the *Sprach- und Sachatlas Italiens und der Südschweiz* (1928–1940), prepared in collaboration with his friend and Bern colleague Karl Jaberg. From the beginning, Jud had a deep, abiding interest in Rhaeto-Romance language and culture. He wrote a number of studies to demonstrate the linguistic independence of this language group and to combat the claims made in fascist Italy that Rhaeto-Romance was an extension of Northern Italian varieties. As a result of the growing inaccessibility in the thirties of German journals to foreign specialists, Jud cofounded (with Arnald Steiger) the journal *Vox Romanica*, which continues to be the organ of Swiss Romanists. Sixteen representative studies and a complete bibliography of Jud's publications can be found in Jud (1973). Appreciations of his life and work can be found in Steiger (1952) and Kristol (1997).

See also: Gauchat, Louis (1866–1942); Gilliéron, Jules (1854–1926); Jaberg, Karl (1877–1959); Meyer-Lübke, Wilhelm (1861–1936).

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Judaism

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The Language of Judaism

Hebrew, an ancient northwest Semitic language, has served as the principal language of Judaism, even after the Jews ceased to speak Hebrew as their everyday language. The Hebrew Scriptures ('Old Testament,' 'written Torah') of ancient Israel were mainly in Hebrew. Brief sections of Ezra and Daniel are in Aramaic. The Scriptures were translated into Greek, Aramaic, and other languages, but in the synagogue were and are declaimed in Hebrew. The great commentaries to Scripture, written by the Rabbinic sages of the first six centuries of the Common Era, were written in Hebrew, and philosophy, poetry, and liturgy favored that language as well. That preference for Hebrew persisted, even though it was explicitly

Jud, Jakob (1882–1952)

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Jakob Jud spent his entire university teaching career at the University of Zurich, where he studied under H. Morf and L. Gauchat. He also trained under J. Gilliéron and M. Roques in Paris.

Jud specialized in dialect geography and lexical paleontology, stressing the relationship between words and culture. Jud first came to the attention of his fellow Romanists with a series of early papers based on his Habilitationsschrift (*Sprachgeographische Untersuchungen*), which challenged, on the basis of lexical distribution, several etymologies proposed by Wilhelm Meyer-Lübke. Unlike Gilliéron, who limited his purview to French and to the synchronic data available in his own *Atlas linguistique de la France*, Jud viewed the geographic distribution of lexical items from a dynamic and pan-Romance perspective; excellent examples are the word studies in Jud (1925–1926). He examined lexical variation across the ROMANIA to demonstrate how the study of Romance loans in neighboring Germanic and Celtic languages could throw light on the diffusion of Latin lexical items in the late Roman Empire (Jud 1914, 1946). The close connection between lexical variation and culture can be seen in his essays on French, Italian, and Rhaeto-Romance ecclesiastical terminology (reprinted in Jud, 1973). Most of Jud's lexical studies deal with these languages, with occasional incursions into Spanish.

His most important single undertaking was the *Sprach- und Sachatlas Italiens und der Südschweiz* (1928–1940), prepared in collaboration with his friend and Bern colleague Karl Jaberg. From the beginning, Jud had a deep, abiding interest in Rhaeto-Romance language and culture. He wrote a number of studies to demonstrate the linguistic independence of this language group and to combat the claims made in fascist Italy that Rhaeto-Romance was an extension of Northern Italian varieties. As a result of the growing inaccessibility in the thirties of German journals to foreign specialists, Jud cofounded (with Arnald Steiger) the journal *Vox Romanica*, which continues to be the organ of Swiss Romanists. Sixteen representative studies and a complete bibliography of Jud's publications can be found in Jud (1973). Appreciations of his life and work can be found in Steiger (1952) and Kristol (1997).

See also: Gauchat, Louis (1866–1942); Gilliéron, Jules (1854–1926); Jaberg, Karl (1877–1959); Meyer-Lübke, Wilhelm (1861–1936).

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Judaism

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The Language of Judaism

Hebrew, an ancient northwest Semitic language, has served as the principal language of Judaism, even after the Jews ceased to speak Hebrew as their everyday language. The Hebrew Scriptures ('Old Testament,' 'written Torah') of ancient Israel were mainly in Hebrew. Brief sections of Ezra and Daniel are in Aramaic. The Scriptures were translated into Greek, Aramaic, and other languages, but in the synagogue were and are declaimed in Hebrew. The great commentaries to Scripture, written by the Rabbinic sages of the first six centuries of the Common Era, were written in Hebrew, and philosophy, poetry, and liturgy favored that language as well. That preference for Hebrew persisted, even though it was explicitly

stated that translation of Scripture into Aramaic was allowed, and the use of the vernacular for various purposes made explicit.

The prophet Zephaniah (3:9) speaks of the future, in which "I (God) will change the speech of the peoples to a pure speech," meaning Hebrew. Called 'lashon haqqodesh,' or Holy Language, the Hebrew language is accorded religious status in Judaism. A community with roots deep in the past, diverse and widely scattered, affirms its coherence through privileging a single language, Hebrew. Hebrew is a way for "identifying one's original religious allegiance" (Aaron, 2000a: 271). "By relating to their language as holy, Jews transformed Hebrew into a kind of ritual object, parallel . . . to the Torah-scroll itself . . . part of a religious system" (Aaron, 2000a: 268–9).

Language of Prayer; Languages of Daily Life

Even though Hebrew enjoyed the status of a religious artifact in Judaism, the languages of the Israelites in the Land of Israel in late antiquity were Aramaic and Greek. Leading Rabbinic sages knew Greek and encouraged some of their disciples to use it (Mishnah-tractate Abodah Zarah 3:4). While it was not the language of daily life, Hebrew enjoyed privileged standing in certain liturgical settings, but by no means throughout. But since not everybody knew Hebrew, provision was made for the recitation of obligatory prayers in any language, and these included the recitation of the creed, the Shema ("Hear O Israel, the Lord our God, the Lord is one") and the presentation of the Prayer ("Eighteen benedictions").

> Mishnah-tractate Sotah 7:1–2
>
> 7:1 A. These are said in any language: (1) the pericope of the accused wife (Num. 5:19–22), and (2) the confession of the tithe (Deut. 26:13–15), and (3) the recital of the Shema, (Deut. 6:4–9), and (4) the Prayer, (5) the oath of testimony, and (6) the oath concerning a bailment.
>
> 7:2 A. And these are said (only) in the Holy Language (Hebrew): (1) the verses of the first fruits (Deut. 26:3–10), (2) the rite of removing the shoe (Deut. 25:7), (3) blessings and curses (Deut. 27:15–26), (4) the blessing of the priests (Num. 6:24–26), (5) the blessing of a high priest (on the Day of Atonement), (6) the pericope of the king (Deut. 17:14–20);
>
> B. (7) the pericope of the heifer whose neck is to be broken (Deut. 21:7f.), and (8) (the message of) the anointed for battle when he speaks to the people (Deut. 20:2–7).

What is limited to Hebrew are few items, mostly involving texts supplied by Scripture, as indicated. Here the key is that the recitation must be verbatim, hence not only a fixed text, as in the Shema and the Prayer, but a set text that Scripture prescribes, in so many words, in Hebrew.

Translations of Scripture into Aramaic (called Targumim) and Greek were enunciated in public worship, but Scripture had to be read, first of all, in Hebrew. The following concerns the public declamation, on Purim, of the scroll of Esther, which had to be read in Hebrew, not in translation:

> Mishnah-tractate Megillah 2:1
>
> A. One who reads the Megillah (scroll of Esther) out of (its literary) sequence has not fulfilled his obligation.
>
> B. (1) If he read it from memory, (2) if he read it in translation into any language, he has not fulfilled his obligation; (3) but one may read it to non-speakers of Hebrew (*le'uzot*) in other languages. (4) And a speaker of another language who heard Ashurit (the text read from a scroll written in Hebrew language and in square script) has fulfilled his obligation.

But that is only one aspect of the matter of public worship and communal rites. When it comes to prayer, Hebrew was not privileged. The Shema, the Credo recited in worship, could be said in any language, so too the formal petitions or The Prayer par excellence were said in the vernacular. But in the history of Judaism from antiquity forward, the use of Hebrew in synagogue worship predominated. Home rites, such the liturgy, Haggadah ('Narrative') recited at the Passover Seder, also were developed principally in Hebrew. Prayer other than in Hebrew, while licit, thus was discouraged: "When one petitions for his needs in Aramaic, the ministering angels do not listen to him, for they do not understand Aramaic" (Neusner, 1995; Bavli Shabbat, 112b).

Aramaic was the everyday language of the Rabbis of the Judaic academies, but they produced in Hebrew the law code, the Mishnah, and its supplement, the Tosefta, and commentaries, the Talmud of the Land of Israel and the Talmud of Babylonia. Their Hebrew differed from that of Scripture. But education in the Hebrew of Scripture and of the Rabbinic writings was integral to the religious nurture of the young (see Neusner, 1987; Sifre to Deuteronomy XLVI:I).

The Role of Language Analysis in the Law of Judaism

The legal literature of Judaism is written in Hebrew and in Aramaic. The law codes, the Mishnah, Tosefta, and related collections, are in Hebrew. The analytical work of commenting upon the law is in Aramaic. By their choice of the very language in which they would express what they wished to say on their own account

they differentiated themselves from their antecedents. When it came to citations from prior, non-scriptural authorities, they used one formation of the Hebrew language, specifically, Middle, or Mishnaic, Hebrew; when it came to the conduct of their own analytical process, they used one formation of the Aramaic language, Eastern or Talmudic Aramaic. They never alluded to authoritative facts, they always cited them in so many words; but the indication of citation – in a writing in which the modern sigla of quotation marks and footnotes were simply unavailable – came to expression in the choice of language. In point of fact, the Talmud of Babylonia or Bavli is in one language, not two, and that language is Aramaic. The infrastructure of the document, its entire repertoire of editorial conventions, and sigla are in Aramaic.

When a saying is assigned to a named authority, the saying may be in Hebrew or in Aramaic, and the same named authority may be given sayings in both languages – even within the same sentence. But the editorial and conceptual infrastructure of the document comes to expression only in Aramaic, and when no name is attached to a statement, that statement is always in Aramaic, unless it forms part of a larger, autonomous Hebrew composition, cited by, or parachuted down into, 'the Talmud.' Rightly have the Talmudic masters in the Yeshiva-world hypostatized the Talmud in such language as, "the Gemara says. . ." because the Talmud speaks in a single voice; forms a unitary discourse, beginning, middle, and end; and constitutes one wholly coherent and cogent document, everywhere asking questions drawn from a single determinate and limited repertoire of intellectual initiatives – and always framing those questions, pursuing those inquiries, in Aramaic.

And yet the Talmud also is full of Hebrew. So we must ask where and why framers of this writing utilize the Hebrew language, and when we may expect to find that they speak – rather, 'the Talmud speaks' – in Aramaic. Specifically, what signal is given, what purpose is served by the bi- or multilingualism of the Talmud, what do we know without further ado, when we are given a composition or a component of a composition in Hebrew, and what is the implicit meaning of making a statement in Aramaic? The answer is that the choice of language signals a taxonomic meaning, and language serves as a medium for the classification of discourse, hence, language serves as a medium of taxonomy. In a writing that utilizes two languages, the choice of one over the other conformed to rules of communication and marked what was said as one type of statement rather than another. If we know which language is used, we also know where we stand in the expression of thought, and the very language in which a statement is made therefore forms part of the method of thought and even the message of discourse of the document.

The Role of Language Analysis in the Theology and Exegesis of Judaism

In reading Scripture, Judaism brought to bear a particular theory of how language works (Aaron, 2005: 400). The Rabbinic exegetes of Scripture distinguished their version of Hebrew from that of Scripture; italics signify Aramaic, plain type, Hebrew:

> Bavli Hullin 137b
>
> **V.5** A. *When Issi bar Hini left (to go to the Land of Israel), R. Yohanan found him teaching his son (our Mishnah at L, with a variation in the plural suffix of the word sheep): "Five sheep (masculine plural suffix,* rhylym)."
>
> B. *He (Yohanan) said to him, "It was taught (in the Mishnah differently, namely using the plural feminine suffix): 'Sheep (rhylwt).'"*
>
> C. *He (Issi) said to him, "That is the way it is written in scripture,* 'Two hundred sheep (rhylym) (Gen. 32:15).'"
>
> D. *He (Yohanan) said to him,* "The Torah has its own language and the sages have their own language. (You should not confuse the two.)"

Their rules of exegesis corresponded with ordinary speech. Thus the argument from analogy (*gezerah shavah*) is a commonplace. Verses that share the same word choice are asked to clarify the meaning of one another. Various particles of speech serve to signal an inclusive meaning of a given concept. Thus, in Aaron's words (Aaron, 2005: 402), "The rules of common logic that normally govern colloquial discourse are transformed by virtue of the Rabbinic conceptualization of the Torah's language. This transformation results from a distinct theory of word meaning, one that allows for exegetical processes that violate what we would otherwise consider the norms of everyday speech. The upshot is that the text of the Torah bears meanings below its surface. When God revealed his words through Moses his prophet, he provided for layers and layers of meaning.

The traits of the Hebrew language, including its alphabet, yielded theological lessons. "The very letters themselves receive their forms by virtue of divine intent" (Aaron, 2005: 407).

> **Genesis Rabbah I:X.**
>
> **I.** A. ("In the beginning God created" (Gen. l:l):) R. Jonah in the name of R. Levi: "Why was the world created with (a word beginning with the letter) B?
>
> B. "Just as (in Hebrew) the letter B is closed (at the back and sides but) open in front, so you have no right to

expound concerning what is above or below, before or afterward."

C. Bar Qappara said, "For ask now of the days past which were before you, since the day that God created man upon the earth" (Deut. 4:32).

D. "Concerning the day *after* which days were created, you may expound, but you may not make an exposition concerning what lies before them"

E. "And from one end of the heaven to the other" (Deut. 4:32).

F. "(Concerning that space) you may conduct an investigation, but you may not conduct an investigation concerning what lies beyond those points."

Aaron explains, "Midrash relies on a concept of meaning that violates the rules of everyday language usage, even as it relies upon them to convey its meanings . . . Midrash becomes a vehicle in ordinary language by which to uncover hidden meanings embedded in the extraordinary language of God's revelation" (Aaron, 2005: 410).

Conclusion

Until the beginning of the 20th century, Hebrew served as the language of synagogue worship and other ritual occasions, study of the Torah or divine revelation, and legal and theological discourse. It was the international language of Judaism, superseding the local languages spoken by Jews. It was comparable in function to Latin in Western Christendom. This ritualization of the language is explained by Aaron in the following language (Aaron, 2000a: 283):

> During the Rabbinic period, despite relatively low levels of Hebrew literacy among common Jews, Hebrew began serving as Judaism's language in ritual contexts. The success of this ritualization of language was part of a conceptualization of language that sought to transcend the common level of semantics we normally ascribe to simple utterances . . . With ritualization, meaning could be found not only in the semantic values of the words read but also in the act of recitation itself . . . The whole Rabbinic enterprise is founded upon a meta-semantics of sorts, one that holds that meaning is at once rooted in the words of Torah but not identical to their common connotations."

Hebrew was and is by no means the only language identified with the Jewish group and with Judaism. Yiddish (based on Hebrew and German), Ladino (based on Hebrew and Spanish), Judeo-Arabic, Judeo-Persian, and other local languages have flourished. But when it came to the creation of the Jewish state, the State of Israel, it was Hebrew that was chosen for renewal, and that became the language of the new and renewed culture of the Jewish people.

See also: Aramaic and Syriac; Hebrew, Biblical and Jewish; Hebrew, Israeli.

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Junius (Francisci Filius), Franciscus (1591–1677)

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Franciscus (or Francis) Junius F. F. (called 'filius,' son, to distinguish him from his nephew of the same name) was born on January 29, 1591, in Heidelberg, Germany, the son of the French-born Calvinist theologian François du Jon (Junius the Elder). Gerardus J. Vossius, the renowned humanist who became his brother-in-law, was headmaster of his Latin school and interested him in more advanced studies of the older stages of the Germanic languages. Junius studied the arts and theology (under his uncle, the anti-Remonstrant Gomarus) at

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Leiden. For a short time, Junius served as a priest in Hillegersberg but then resigned and went to England, where he lived with the Howard family as a tutor, antiquarian, and art historian for more than 20 years, publishing his *De Pictura Veterum* in 1637.

Back in Holland in 1642, he began his second phase (which lasted until his death in Windsor, England, on November 19, 1677), first as an etymologist interested in roots, and later as a lexicographer developing corpora. He also collected and edited medieval manuscripts and old books, which he heavily annotated. Since about 1644, he studied the Old Germanic languages (which he came to accept as a grouping of its own) and planned an etymological dictionary of Dutch, his *Etymologicum Teutonicum*, a project he never realized. In 1647–1648, he studied the Frisian language in Friesland (see article by P. H. Breuker in Bremmer 1998: 129–157).

Returning to England in 1648, Junius advised William Somner, who worked on a *Dictionarium Saxonico–Latino–Anglicum* (1659). From 1651 to 1674, Junius lived in Holland again, editing and commenting Old High German (*Observationes in Willerami*, 1655, repr. 1992) and Old English texts (*Cædmonis monachi paraphrasis poetica*, 1655, repr. 2000). From 1654 he was able to work on the sixth-century *Codex Argenteus* that his nephew Isaac Vossius had received as a present from Sweden. It contains the Gothic translations of parts of the Gospels by Bishop Wulfila (fourth century). This work resulted in Junius's *Gothicum Glossarium* (1665), the first lexicon of Gothic ever.

Other lexicographical work by Junius is contained in the edition of the *Gothic Gospels*, with glossary, he published with Thomas Marshall (1664–1665). His *Etymologicum Anglicanum* was only edited by Edward Lye in 1743. Projected books, partly contained in the more than 120 unpublished manuscripts he bequeathed to the Bodleian Library, Oxford (see article by E. G. Stanley in Bremmer 1998: 159–176), are glossaries on Chaucer, Otfrid, Cædmon, and Ælfric. There are also extant materials and lexicographical transcripts for a Latin–Old English dictionary (MSS Junius 113–116d) and his Old High German glossaries A-P (MSS Junius 116a-e). Later researchers draw heavily on his material (e.g., G. Hickes, *Linguarum veterum septentrionalium thesaurus* [1705], and E. Lye, *Dictionarium Saxonico-et Gothico-Latinum*, ed. O. Manning [2 vols., 1772]). For literature on Junius see Breuker (2000) and esp. Romburgh (2004).

His studies of Old and Middle Frisian, Anglo-Saxon, the Scandinavian languages, Gothic, Frankish, and Old High German earned him an important place in the early development of Old Germanic studies and comparative philology.

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Jury Instructions

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Although jury trials are not used in all countries, they are used in most ADVERSARIAL or COMMON LAW jurisdictions. Those include Britain (apart from Scotland), continental Europe (including East Europe), the United States, Canada, Australia and New Zealand, as well as many other countries influenced by colonialism by those countries and continents. Trial process in all these jurisdictions includes the giving of instructions by the judge to the jury. In the United States, the instructions are almost always drawn from standard or pattern instructions, previously drafted models produced by bodies of lawyers and judges whose charge is to accurately state the current law. That is not often true in other jurisdictions. Further, the bulk of the research on the comprehensibility of jury instructions has taken place inside the United States. In many countries, jury proceedings are kept secret. Jurors are not allowed to discuss the deliberation process after the trial is concluded. For all these reasons, this article deals almost exclusively with the language of jury instructions used inside the United States. For information about other jury systems, readers may want to consult Vidmar (2000) and such articles as Thaman (1999).

Juries are used in both civil and criminal trials. Legal language in general has been recognized as being difficult for laypersons at least since Mellinkoff (1963) (see also Tiersma, 1999 and updates at his web page). But jury instructions present a special difficulty for jurors. In every jury trial, the trial judge, the expert on law, must instruct jurors, putative experts on fact, on the operative law. The judge must also instruct the jurors in how to apply the law to the evidence in the case. Jurors then must decide on blame or guilt, and the degree thereof, based on the evidence they have heard and the instructions they have received.

It has long been known that jurors do not always understand their instructions, particularly in the United States, where a great deal of research has been carried out by both judicial theorists and social scientists. Jurors may misunderstand the law or may misunderstand how they are to apply the law. Information about juror confusion has come from a number of sources. Case law (opinions) sometimes report the contents of notes sent by jurors to judges during deliberation; case law in some states allows testimony about conversations among jurors during deliberations; and of course, empirical evidence shows clearly that rewritten instructions that provide context, offer synonyms for difficult terms, and shorten sentences and modify grammatical constructions are much better understood than are pattern instructions.

Some lawyers and judges and also some social scientists assumed for a long time that jurors had difficulty understanding their instructions primarily because of the legal terms often used – often either Latin terms or terms of art, legal terms with specialized senses in law. When serious empirical study of juror comprehension by social scientists began (Charrow and Charrow, 1979), however, the findings indicated clearly that grammatical structures, including the structure of complex sentences, were a major source of problems. Although lay jurors are sometimes confused by Latin terms, such as *mens rea* and *res ipsa loquitur*, or legal terms of art, such as *infant* or *foreign corporation*, they are more often confused by specific grammatical structures and sentence complexity. In fact, the exact syntactic and semantic bars to jurors' comprehension of instructions are now well documented by linguists and psycholinguists. Researchers have demonstrated that modifying grammatical structures, simplifying sentence structure and giving additional information about the meanings of terms, particularly abstract terms, assist jurors to comprehend their instructions.

Further, jurors may be uncertain about the meanings of some highly abstract legal terms. One of the most difficult concepts to explain is that of *reasonable doubt*. Although the level of proof required in civil cases is a *preponderance of the evidence*, in a criminal case, it is *proof beyond a reasonable doubt*. The former can be quantified, but the latter cannot (see Tiersma, 1995; Dumas, 2002).

Legal systems have been slow to modify the pattern instructions used in most U.S. jurisdictions, partly because of the importance of precedent in law and partly because of judicial reluctance to relinquish any control over the jurors. Jury instructions are often worded to reflect the language in a statute, particularly in criminal cases (Solan, 2003), or an appellate opinion rather than to communicate a concept effectively to lay jurors. The judicial response to juror questions that reveal uncertainty about the meaning of jury instructions has typically been to respond by simply rereading the relevant portion of the instructions. There is, of course, no evidence that mere repetition of instructions is helpful when jurors report confusion. Indeed, some studies suggest that the typical judicial response to juror questions about

instructions treats the lack of comprehension as though it were a matter of not having heard, rather than not having understood.

History of Jury Instructions

The pattern or uniform jury instructions used in most U.S. jurisdictions represent in most cases an attempt on the part of the drafters to state the law accurately. Accuracy requires constitutional and statutory adequacy. Accuracy does not require comprehensibility by laypersons, and until recently such comprehensibility was not a primary goal of the drafters of pattern instructions.

The pattern instruction movement became influential in the late 1930s, when the judges of the Superior Court of Los Angeles published *The book of approved jury instructions* (generally referred to as the BAJI instructions). Other jurisdictions (Washington, D.C., Florida, Chicago, Nebraska, Colorado, and Utah) developed pattern instructions over the next two decades. Then in the mid-1950s, the Illinois Judicial Conference recommended the drafting of accurate and impartial instructions in order to correct some perceived abuses, and the recommendation was carried out under the supervision of the Illinois Supreme Court. Following that, the highest courts of a number of states followed the lead of Illinois and prepared their own pattern instructions. At this time, almost all U.S. states have pattern instructions, though the extent to which their use is mandated varies (see Nieland, 1979; Kelley and Wendt, 2002).

Pattern instructions were a step forward with respect to consistency and economy of time and effort. As they came into existence, they served as readily available instructions so that individual instructions did not have to be prepared for every legal case. Their weakness is their form; they are written in dense, complex language and are often modeled on appellate opinion language, language written by judges primarily for other judges to read. In general they are designed to be read, not to be heard read aloud. The judicial appeal of mirroring appellate language is that it is unlikely to give rise to a reversal for error. Put simply, jury instructions full of legalese are unlikely to be reversed for error by appellate courts if they use the same language used by those courts.

Pattern instructions can sometimes be modified by agreement of the parties, often as a result of a *charge conference* (sometimes called a *charging conference*), during which the judge meets with counsel for all parties and outlines the instructions. Counsel may request changes, though the judge makes all final decisions.

In recent years, some jurisdictions have taken a close look at problems in jury systems, particularly that of comprehensibility of instructions, and have initiated reform programs designed to increase comprehensibility and generally improve the lot of lay jurors. Some major studies are those by the National Center for State Courts (Munsterman *et al.*, 1997), California (Kelso, 1996), the District of Columbia (Council for Court Excellence, District of Columbia Project, 1998), New York (New York Jury Project, 1994), and Arizona (Dann, 1993). Two jurisdictions, Arizona and California, have made sweeping changes in their jury systems, including revision of instructions. Another jurisdiction, Tennessee, has implemented a number of changes based on the recommendations of a Jury Reform Commission (*Report of the Tennessee Bar Association Commission on Jury Reform,* 1999) and is continuing to consider suggestions (Cohen, 2003).

Similar recommendations have been made in all such studies. Pattern jury instructions present semantic and syntactic difficulties for lay jurors, difficulties that can be alleviated by careful rewriting of instructions. In addition, the methods of delivery of instructions need revision.

Comprehension Problems

The first major empirical study of pattern jury instructions was that of Charrow and Charrow (1979). In their study of 14 standard civil jury instructions (in Maryland), they tested comprehensibility by asking subjects to paraphrase the instructions, tested for understanding of legal concepts, and tested revised instructions. They found that the following grammatical constructions posed serious difficulties for many jurors:

1. Nominalizations
2. *As to* prepositional phrases
3. Unusual positions of phrases (removed from the elements they modify)
4. Deletion of *wh-* constructions and complements
5. Negatives, especially multiple negatives
6. Passives, particularly when used in subordinate clauses
7. Sentence complexity arising from multilayered subordination and embedded noun clauses.

In addition, Charrow and Charrow found that problems were presented by technical vocabulary, especially for abstract concepts such as *reasonable doubt*, and the use of doublets and triplets. Sentence length *per se* did not pose a problem – i.e., the number of words per sentence was not a good indicator of complexity. Revised instructions prepared to eliminate the

problems listed were much more comprehensible to jurors. All their results have been verified in subsequent research by other researchers.

It has been suggested (see Peter Tiersma's professional Web page) that if the mock jurors used in the Charrows' research had actually watched a trial, heard argument, and deliberated among themselves, juror comprehension might have been increased and might even have compensated for inadequate instructions. To test these and other points, Elwork, Sales, and Alfini (1982) reported results of research in which they showed a videotape of a criminal trial to volunteer jurors who served in mock juries. The mock juries watched the videotape, after which they were given either the original jury instructions or rewritten jury instructions. After verdicts were reached, the volunteers were questioned about legal points raised in the instructions. Those who had received the original instructions gave correct answers 40% of the time on average. Those who had received the revised instructions gave correct answers 78% of the time.

Another major study was that of Steele and Thornburg (1988), who, citing Charrow and Charrow (1979), addressed issues of comprehensibility from a judicial point of view, observing that the needed changes in jury instructions will "need to be supported by changes in the law that w[ill] create incentives for lawyers to worry as much about comprehensibility as they do about technical correctness" (p. 108).

Steele and Thornburg also addressed issues of the method of delivery of instructions, suggesting that jurors should be given copies of their instructions to use during deliberations.

It has, of course, been pointed out numerous times (see summaries in Dumas, 2000 and Gibbons, 2002) that the text of jury instructions is not the only factor affecting comprehension. Dumas has summarized delivery issues, taking the position that if the legal system had taken early research on the syntax and semantics of jury instructions totally seriously, they might well have made the suggested changes, but that if nothing else had changed, little improvement in comprehension might have occurred, and judges and lawyers might have concluded that the revisions were relatively unimportant. Methods of delivery and timing of delivery must also be considered (p. 67).

Gibbons has pointed out (drawing on research reported by Lieberman and Sales, among others), "There is ample research to show that linguistic issues are a part, but not all of the problem. There may also be psychological issues in jurors' understanding and acceptance of instruction" (2003: 179).

A forthcoming book (Dumas, 2005) suggests that changes are needed in all the following areas:

- Introductions to instructions (outlines, roadmaps)
- Syntactic complexity
- Semantic complexity
- Abstract concepts
- Timing and delivery
- Methods of delivery of jury instructions
- Instruction in the use of jury instructions.

Additional studies were cited earlier. They continue today. Of great importance are recent changes in California, particularly the approval of revised civil instructions, discussed in detail following.

Reform Efforts

In a sense, the creation of pattern instructions can be said to have begun the reform effort. However, because the wording of pattern instructions is responsible for most of the comprehension problems with jury instructions today, it makes more sense to date reform efforts from 1979, when Charrow and Charrow published their study. Serious efforts have thus continued for 25 years. Given the clear cross-disciplinary consensus about the difficulties of dealing with long, complex sentences and such terms of art as *mitigation* and *reasonable doubt* that has emerged, it is difficult to understand why the legal system has been so slow to make needed improvements to the pattern instructions. It must be attributed to ongoing judicial reluctance to relinquish control over the jurors.

But serious and quite successful efforts at reform have been made in several jurisdictions. Arizona was one of the first jurisdictions to make important and influential changes in the jury system as a whole. Most of the Arizona Committee's 55 recommendations were adopted by the Arizona Supreme Court in 1995; at least one follow-up study has reported positive results. Both the methods and conclusions of the reform commissions that carried out some of the studies are quite similar. In most cases, lawyers, judges, and jurors (the lawyers representing both prosecutors and defense lawyers in criminal cases and both plaintiffs' lawyers and defense lawyers in civil cases) studied the existing jury system and scholarly evaluations of that system, then made specific recommendations for change. Each recommended changes in many facets of jury procedures, though none has recommended the kinds of changes that will alter the traditional character of the American jury system.

The history of the Tennessee Bar Association is representative. It was created as a result of a presentation at an Annual Dinner of the National Center for State Courts at the Supreme Court Building in

Washington, D.C., in late 1997. TBA president-elect Pam Reeves heard Judge Michael Dann of Arizona describe the Arizona effort and similar jury reform projects in other states. After consulting with members of the Tennessee Supreme Court, Ms Reeves appointed the Tennessee Jury Reform Commission to review existing Tennessee jury practices, recent social science research, and developments in other jurisdictions and to make appropriate recommendations.

Each of three committees (jury administration and management, pretrial management and postverdict issues; jury selection and trial procedures; jury instructions) made recommendations, which were submitted to the entire Commission for discussion and approval. The conclusions of the Commission are contained in the May 1999 *Report of the Tennessee Bar Association Commission on Jury Reform* (hereafter *Report*). (See Cohen and Cohen, 2003 for a recent review of enactment of the recommendations.)

Reforms in New York and the District of Columbia have also been important. However, ongoing reform efforts in California deserve special attention. In July of 2003, the California Judicial Council unanimously approved approximately 800 new civil jury instructions and special verdict forms for use in California trial courts. The texts of the new instructions and verdict forms had been in preparation since 1997, when the Judicial Council created the Task Force on Jury Instructions in response to the 1996 statement by the Blue Ribbon Commission on Jury System Improvement to the effect that jury instructions would be more useful if they were stated in more understandable language. Though the new instructions are not required, their use is encouraged. (Details of the revision and comparisons of the new instructions with the older BAJI instructions are available at the website of the California Judicial Council. Some details are also available at Peter Tiersma's website.)

The Judicial Council also approved the preparation of new criminal instructions; they are expected to be submitted for approval by 2006.

Conclusion

Pattern instructions are not well understood by the average juror. The complexity of pattern instructions is multifaceted. Instructions are quite complex syntactically, and they should be rewritten so that they are less complex syntactically so as to be comprehensible to nonlawyers with limited formal education. But although it is true that revision of problematic linguistic constructions improves comprehensibility, that alone does not appear to be completely adequate.

In addition, there is evidence that a higher level of comprehension can be achieved by (1) providing roadmaps early in the instructions, (2) avoiding the use of arcane vocabulary items whenever possible, and (3) clarifying the meanings of difficult abstract concepts by providing concrete, perhaps narrative, examples.

All these steps are necessary both because of the inherent complexity of pattern instructions and perhaps also because of the nature of the Anglo-American legal process, which operates by means of a reasoning pattern in which a case is tried, a proposition descriptive of the case is made into a rule of law, and the proposition becomes a precedent to be applied to future similar situations. Future situations arise, some of which may eventually be sufficiently different from the original situation to prompt a rethinking of the original rule and perhaps a revision of it. It is thus essential that jurists be able to discern similarities and differences among objects and situations.

Roadmaps

During their time in the courtroom, jurors resemble nothing so much as students taking a course – or several courses simultaneously – in a new and arcane subject. They must absorb new information, learn new procedures, and digest and use new standards quickly and with no time for reading, reviewing, or consulting with others. They may, for example, need to learn a great deal about constitutional law, criminal procedure, medical standards, and human psychology all within a few days. In addition, they must judge the credibility of witnesses, often expert, who contradict each other's testimony. They need all the help they can get. One way to assist them in the instructions is to tell them exactly what they are going to hear before they hear all the details. A roadmap, a list or diagram telling jurors where they are headed and by what route that can expect to arrive there, can provide an outline of jury instructions.

Syntactic and Semantic Complexity

As noted earlier, pattern instructions often closely track statutory or appellate opinion language. Appellate opinions are specifically directed to judges (i.e., legal professionals trained in law and accustomed to using legal discourse on a daily basis). Further, they are designed to be read by judges, not listened to. They are necessarily characterized by lengthy sentences containing many clauses, a great deal of subordination, and arcane vocabulary items, including legal terminology and mysterious doublets. All those characteristics present comprehension problems.

Difficult Abstract Concepts

Many legal concepts are difficult to define; *reasonable doubt* is one such concept. Others are

proximate cause, defective and unreasonably dangerous, and *present cash value*. One way of explaining such concepts to lay jurors is to give examples or brief narratives. One possible corrective is paraphrasing. Another corrective involves the addition of an example. Some issues may require the addition of both positive and negative examples. Finally, some issues may suggest a need for both paraphrase and examples. Here is such an example making use of some of these strategies:

Some of these legal concepts or principles can be difficult for laypersons to understand. I hope this example will illustrate for you a practical example of proximate cause: it is negligence for a driver to drive a car that has bad, or slick, tires. If that automobile with bad tires slams into the rear of a car because the driver could not stop due to a combination of slick tires and wet pavement, then the negligence of the driver in driving with bad tires would be a proximate cause of the accident.

But it is possible for a person to be negligent without that negligence being a proximate cause of the accident. If the driver of that car with bad tires is stopped for a red light and is struck in the rear by another car, obviously the bad tires had nothing to do with the accident. In other words, the driver's negligence in driving a car with bad tires was not a *proximate cause* of that accident.

To find a party to be 'at fault,' you must find that party was negligent *and* that the negligence was a proximate cause of the injury or damage for which a claim was made. You must then determine the percentage of fault of each party whom you have determined is at fault.

Timing of the Delivery of the Instructions

It is traditional in most jurisdictions to provide most jury instructions, particularly those involving substantive law, after all the evidence has been presented and just before deliberation. This may invite jurors to form opinions about the proper outcome of the case well before they are instructed in the applicable law. It is widely believed that the single most important factor in the determination of juror attitude is juror reaction to the opening statements delivered at the very beginning of the case, when lawyers outline their theories of the case and prepare jurors for the evidence they will hear. Thus pretrial instruction in substantive law might improve jury performance.

Delivery of the Instructions

Whatever the exact manner of delivery, instructions prepared to be read should not be delivered orally in a rapid monotone. Jury instructions are often lengthy and complex. A number of changes in the delivery process could help to make the communication more effective. Judges could provide summaries as well as roadmaps (discussed earlier); they could make use of multimedia formats, particularly charts, decision trees, or simple 'bullet' summaries; and they could be careful to maintain eye contact with jurors and in general pay full attention to the legitimacy, dignity, and humanity of the jurors and their role.

Current research tells us that legal jargon is neither the sole nor a major source of incomprehensibility in jury instructions, though it can present special problems (*proximate cause*, *stipulate*, *mens rea*, *beyond a reasonable doubt*, etc.). The textual problem is overwhelmingly sentence structure, also difficult grammatical constructions such as nominalizations, vague or unusual prepositional phrases, doublets, especially of legal terms, and passive constructions, particularly in subordinate clauses. Other issues include presuppositions underlying jury instructions in opposition to the presuppositions underlying attorney strategies, the nature of the task, and the highly abstract nature of the instructions. Remedies are available: simplify sentence structure, paraphrase difficult concepts, add examples and narratives to the pattern instructions, answer jurors' questions, and give jurors written copies of their instructions.

Reform must acknowledge frankly that the jury's role as finder of fact has to compete both with requirements of legal procedure, particularly those implicating constitutional issues, and also with the judicial perception that the jury must be highly constrained and controlled. In the courtroom, the judge is the domain expert on law and procedure. Lip service is paid to the idea that the jury is the trier of fact and is, therefore, a domain expert in its own right. But jurors are not treated as experts. If they were, they would have greater freedom in certain areas, would be able to take notes and ask questions, and would be provided instructions that are not so arcane and convoluted as to be incomprehensible to most people.

See also: Legal Semiotics; Legal-Professional Language in Jury Trial.

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K

Kalkutungu

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Kalkutungu (also Kalkatungu (Kalkatung) and Kalkadoon) is a Pama-Nyungan language, and, like many other Australian languages, it is largely agglutinative, although with a good deal of irregular bound forms. Nouns are inflected for case and verbs for tense, aspect, mood, and modality. Word order is controlled by discourse principles with few grammatical constraints.

Kalkutungu has a typical phoneme inventory with two laminal series of stops, nasals, and laterals. In company with the Arandic languages to the west, at some stage in the past Kalkutungu underwent a change involving the loss of initial consonants and in some instances initial syllables. This has resulted in words with initial *a*, such as *arnka* 'to be ill' (cf. Yalarnnga *yarnka*) and words with initial homorganic nasal-stop clusters such as *mpaya* 'you two' (cf. Yalarnnga *nhumpala*).

The core case marking opposes an ergative case for the agent of a transitive verb (A) and an unmarked absolutive (alternatively nominative) for an intransitive subject (S) and object (O). The ergative-absolutive distinction applies to free pronouns as well as to nouns, but there is a system of clitic pronouns that oppose a subject set covering S and A functions to an object set. An odd feature of Kalkutungu is that although these clitics are obligatory with auxiliaries and in the perfect and imperfective aspects, they are otherwise optional and used rather sparingly. The following examples illustrate the core case marking and clitic pronouns. Note in (2) that the ergative expresses the instrument used to perform an action as well as the agent.

(1) marapayi ingka-nha-na ntiya-piyangu tawun-kunha
woman.ABS go-PT-3PL.SUBJ hill-ABL town-ALL
'the women went from the hill to the town'

(2) marapayi-thu ngayi kanimayi-nha-ngi-na rupu-ngku
woman-ERG me.ABS tie-PT-1SING.OBJ-3PL.SUBJ rope-ERG
'the women tied me up with rope'

There is a derived two-place intransitive construction, the antipassive, in which the subject appears in the absolutive and the object is demoted to the dative. In independent clauses, this construction is used to signal reduced semantic transitivity. It is used, for instance, to indicate a generic object as in (3b) rather than a specific object as in (3a), and it is obligatory in the imperfective.

(3a) marapai-thu rumpa-mi ithirr
woman-ERG grind-FU seed.ABS
matyamirla-thu
grindstone-ERG
'the woman will grind the seed with the grindstone'

(3b) marapai rumpa-yi-mi
woman.ABS grind-AP-FU
ithirr-ku matyamirla-thu
seed-DAT grindstone-ERG
'the woman will grind seed with the grindstone'

In dependent clauses, the antipassive is used to signal co-reference between the agent of the dependent clause and the S or O of the governing clause. In (4), (5), and (6), we have a type of subordinate clause used to express purpose adjuncts and complements to directive verbs. These are characterized by a purpose auxiliary, which hosts clitic pronouns. In (4), the agent of the purpose clause is co-referent with the S of the governing clause so the purpose clause appears in the antipassive, as is evident from the marking on the verb and the dative marking for the patient. In (5), the agent of the subordinate clause is co-referent with the O of the governing clause, so the antipassive is used. In (6), however, the agent of the purpose clause is coreferent with the allative-marked *mangarnaan-kunha* 'to the doctor', so no antipassive is used.

(4) ngayi ingka-nha nha-wu thuwarr-ku
I.ABS go-PT this-DAT snake-DAT
lhaa ngulurrma-yi
PURP.1SING.SUBJ catch-AP
'I went to catch the snake'

(5) nga-thu tjaa pati-nha thuku-wu
I-ERG this.ABS tell-PT dog-DAT
kuntu a-yi ngayima-yi
not PURP-3SING.SUBJ chase-AP
'I told this one not to chase the dog'

(6) nhaa nga-thu unpiyi nga-tji nhawurr
this.ABS I-ERG take I-DAT child.ABS
mangarnaan-kunha a-yi puthurr-puni
doctor-ALL PURP-3SING.SU good-make
'I took my child to the doctor for him/her to cure her'

A feature that Kalkutungu has in common with a number of other Australian languages is insubordination, whereby a subordinate clause becomes independent. Sentence (7a) provides an example; compare it with (4), (5), and (6). Essentially, a verb such as *ingka* in (4) is redundant and over time such verbs have been dropped in some circumstances to yield a construction in which the erstwhile dependent clause is independent. Witness the ergative on the agent in (7a), compared to the absolutive in (4). This construction, in which clitic pronouns are obligatory, makes an interesting comparison with (7b), in which the future tense is used and no clitics.

(7a) nyin-ti a-ngi lha?
you-ERG PURP-1SING.OBJ hit
'are you going to hit me?'

(7b) nhakaakuwa nyin-ti ngayi lhami?
why you-ERG me.ABS hit-FU
'why are you going to hit me?'

Kalkutungu has two applicative constructions. In one, a dative can be promoted to object. If there is a patient object, this is retained, so there is a double object construction. In sentence of (8a), the beneficiary is expressed in the dative. In (8b), the beneficiary is now O and is expressed by an object clitic.

(8a) utjan nga-tji intji-ya
firewood I-DAT chop-IMP
'chop some wood for me'

(8b) utjan intji-tjami-ya-ngi
firewood chop-APPL-IMP-1SING.OBJ
'chop me some wood'

In the other applicative, an instrumental or locative can be promoted. If there is a patient object, it is demoted to the dative. The principal function of this construction is to provide for the anaphoric deletion of the instrumental or locative in purpose or other subordinate clauses. Example (9) is typical. The knife is understood to be the instrument in the purpose clause, but it is covert. The patient is demoted to the dative. Note this demotion is not in response to coreference between the agent of the purpose clause and S or O, as in (4) and (5). Note too that the same marker *-nti* functions as a causative and applicative.

(9) kankari iti-nti-ya ati-ntji
knife. ABS return-CAUS-IMP meat-DAT
lhaa pintji-nti
PURP-1SING. SUBJ cut-AP
'bring the knife so I can cut the meat with it'

The final example is another sample of the instrumental applicative in which the instrument *utjula* 'net' has been promoted to O, pushing the patient *wakarri* 'fish' into the dative. It serves to illustrate two common principles of discourse. First, it is common to represent a nominal with a pronoun or other generic expression early in the clause with a more specific noun later. In (10), *nhaa* 'this' anticipates *utjula* 'net'. Second, the focus is normally placed first in the clause, in this instance *yawun* 'big'.

(10) yawun nhaa nga-thu utjula
big.ABS this.ABS I-ERG net.ABS
wakarri-yi ngurlurr-manti
fish-DAT catch-AP
'I use a big net to catch fish with'

See also: Australia: Language Situation; Australian Languages; Case; Ergativity; Head/Dependent Marking.

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Kambaata *See:* Highland East Cushitic Languages.

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Born in Tokyo in 1912, Takashi Kamei graduated from the department of Japanese language and literature of the University of Tokyo in 1935, thereafter spending most of his career teaching linguistics at Hitotsubashi University in Tokyo. He also conducted academic researches and gave lectures at Cambridge University, Freie Universität Berlin from 1950 to 1953, and at the University of Arizona in 1975. He was also invited to give lectures on linguistics at various universities in Japan, including the University of Tokyo, Keio University, and International Christian University.

Most of Kamei's works are unknown to the academic world outside of Japan, mainly because most of them are written in Japanese. Some exceptions are 'A Saussurian mystery' (1982) and others listed below, but to some western scholars they might seem very complicated or tantalizing. Even Japanese scholars find it rather difficult to grasp what he really means owing to his unique writing style.

For Kamei, the historical study of language should not exist to compose and support the theoretical basis of linguistics, nor should it merely be the search for examples suited to establish such theories. It must be the pursuit of the development of a given language in its entirety, and in fact has that nature as its destiny. Expressing this from a negative point of view, the history of language can be nothing other than the history of a certain concrete individual language. From the point of view of comparative linguistics, French is one form of Neolatin. However, French is no language other than French and therefore is referred to as an individual subject, i.e., French, and by the same token it must not be considered as Latin. Metaphorically speaking, the moment Latin ceased to exist, French sprang to life. The interpretation of this kind of linguistic history cannot be made only considering a given language as a single code system. The work of the linguistic historian is therefore to take the detailed results of researchers in the field of diachronic linguistics and bring them once more correctly within the envelope of history.

In his own way, Kamei was comparable to Hugo Schuchardt in the sense that he always sat on the opposition benches vis-à-vis the mainstream of rationalism of linguistics of the 20th century, just like Schuchardt was always against the Neogrammarian way of thinking in the 19th century.

Kamei was one of the chief editors of *The Sanseido encyclopaedia of linguistics* (6 vols), published from 1988 to 1996 in Japan. It contains descriptions of more than 3500 different languages of the world and about 1500 important terminologies of linguistics. He also made a huge contribution to the understanding of the *seidaku* concept that had confronted scholars of Japanese for such a long time.

See also: Japan: History of Linguistics; Japanese; Schuchardt, Hugo (1842–1927).

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Kamilaroi *See:* Gamilaraaya.

Kannada

S N Sridhar

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Kannada (formerly referred to sometimes as 'Kanarese' or 'Canarese') is a South Dravidian language spoken by about 28 million people primarily in the state of Karnataka, South India, where it is the official language. It is also spoken in the neighboring states of Tamil Nadu, Andhra Pradesh, Kerala, and Maharashtra.

History

Kannada is written in a variety of the 'alpha-syllabic' Brahmi system. The earliest written record, the Halmidi inscription (ca. 450 A.D.), already shows the influence of Sanskrit. The history of the language is conventionally divided into three periods, Old Kannada (up to ca. the thirteenth century A.D.), Middle Kannada (up to ca. the nineteenth century), and Modern Kannada (the nineteenth century onward).

Literary and Grammatical Tradition

Kannada has a world-class literary tradition, but few works have been translated. It also has a rich grammatical tradition. The first extant literary work, Nagavarma's *Kavirajamarga* (ninth century), is a treatise on poetics and includes the earliest grammar of Kannada. Kesiraja's *Śabdamaṇidarpana* (1260) is the classic grammar of Old Kannada. The other major grammar is Bhattakalanka's *Karna:taka Śabda:nuśa:sana* (1604), written in Sanskrit. Modern descriptions include Kittel (1903), Spencer (1950), Bright (1958), Schiffman (1983), and Sridhar (1989). Srikanthaiah (1960) and Bhat (1978) include other important descriptions in Kannada.

Variation

Three major regional varieties are recognized: the dialect of the former and present capitals – the Mysore/Bangalore Kannada, the Dharwar (northern) Kannada, and the Mangalore (coastal) Kannada. The Brahmin variety of Mysore Bangalore forms the basis of the standard language. It retains aspirated consonants and consonant cluster combinations in Sanskrit-derived words (which occur with high frequency in this variety). There are other caste varieties, which differ in phonology, morphology, syntax, and the lexicon. Kannada is a diglossic language.

Kannada is interesting from the point of view of historical sociolinguistics because of the millennium-old controversy between the elitists and populists on the one hand and the purists and the pragmatists on the other concerning the proper literary style – a debate that continues to this day.

Structure

Kannada morphology is agglutinative, suffixing, and quite regular. Nouns are marked by cases, postpositions, number, and occasionally gender. Verbs indicate tense, aspect, and agreement in number, person, and gender. Negation is expressed as main verb and as a suffix. Word order is subject–object–verb. The verb normally (but not always) ends the sentence. Modifiers (e.g., adjectives, adverbs, and subordinate clauses) precede their heads; auxiliaries follow main verbs. Compounding is very common in nouns and verbs. Normally, only one finite verb occurs per sentence: the syntax relies heavily on participles, gerunds, and infinitives. A number of these points are illustrated in the following sentence:

ni:nu	*nenne*	*meccida*	*a:*	*mu:ru*	*puṭṭa*
you	yesterday	admired	those	three	little

makkaḷu	*a:ṭa*	*a:ḍi*
children	game	play – past participle

daṇidu	*waḷamaneyalli*	*nidde*
tire – past participle	inside room – locative	sleep

ho:gidda:re.
go – past participle – continuous – 3 (human) plural
'Those three little children whom you admired yesterday have gone to sleep after playing and getting tired.'

Importance of Language Contact

Kannada has successfully assimilated an enormous amount of Sanskrit, Prakrit, Perso–Arabic, New Indo–Aryan, and more recently, English elements. This influence is manifested in the rather substantial stock of loan words, the productive use of Sanskrit derivational morphology, code-mixing, and calquing, which have been the preferred strategies for modernization throughout its history. This openness to borrowing sharply distinguishes Kannada from its sister language, Tamil.

Kannada and Linguistic Theory

Evidence from Kannada has played an influential role in several areas of modern linguistic inquiry. These include the status of grammatical relations, especially

nonnominative subjects, in syntactic theory; processes of syntactic and morphological convergence; morphological levels in derivation; caste dialects; and syntactic and psycholinguistic models of bilingual code-switching, among others.

See also: Dravidian Languages; India: Language Situation; Tamil Linguistic Tradition.

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Kant, Immanuel (1724–1804)

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Kant was born in Königsberg (now called Kaliningrad and a part of Russia), at the time the administrative center of East Prussia. In 1740 he entered the university of his native city to study theology, philosophy, physics, and mathematics. After receiving his doctorate in 1755, he became a *Privatdozent* and earned his living mainly as a private tutor. He never left the area of Königsberg during his entire life. In 1770 he was finally appointed professor of logic and metaphysics at the university of Königsberg after refusing several offers from other universities since 1764. He held his position until 1796, serving as rector of the university in 1786 and 1788.

Kant has often been ranked among the most influential thinkers of all time, on a par with Plato, Aristotle, St. Thomas, Spinoza, Leibniz, Hegel, Nietzsche, and others. His 'transcendental philosophy' has had a long-lasting impact on the history of philosophy and of Western thought in general. It is considered a groundbreaking epistemological framework for assessing the aims, methods, and limits of human knowledge, including moral and aesthetic judgments. Kant's fame is based mainly on his three major works, his so-called *Critiques*, viz., the *Critique of pure reason* (1781, second revised edition 1787), the *Critique of practical reason* (1788), and the *Critique of judgment* (1790). Apart from these books, however, Kant wrote a great number of treatises on a variety of subjects, including natural history, theology, religion, and law.

Kant's philosophy marks the beginning of 'idealism' and is the single most influential synthesis of rationalist and Enlightenment thought on the one hand and empiricist considerations (i.e., a realistic stance) on the other. According to Kant, thinking (understanding) and perceiving are two distinct faculties of the mind, which are related in a complex way. He believed that everything human beings can know about the external world goes back to mental acts in which data are perceived or experienced according to rules and forms of understanding imposed on the data by the mind itself. For Kant, both the data and the rules and forms of understanding are real, but the mind must impose its own constraints on the data for experience to be possible. Although essential component parts of human knowledge are not derived from experience (on this issue Kant is in opposition to the philosophy of David Hume), they are ultimately inconceivable without at least presuming the possibility of their being applied to data in experience. For example, assessing a causal relation between two events in the world means, according to Kant, that causality is projected by the mind onto the events and cannot be found in the latter as such, but at the same time causality is nothing without real-world events to which it can be applied. Thus the world we experience is not simply a product of our minds; rather, our knowledge is confined to

nonnominative subjects, in syntactic theory; processes of syntactic and morphological convergence; morphological levels in derivation; caste dialects; and syntactic and psycholinguistic models of bilingual code-switching, among others.

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what we can conceive in the first place (the 'phenomena'). On the other hand, we also have to presuppose a world in its own right that is wholly external to us and consists of things as they are in themselves (called 'noumena' or *Dinge an sich* by Kant), about which we can know nothing.

Although he presupposes semiotic functions for language throughout his work, Kant does not explicitly address language for its own sake in his writings, apart from a few passages on language in the *Critiques* and in sections 38–39 of his 1798 treatise on *Anthropology*. The fact that Kant paid so little attention to language in his work was criticized severely by some of his contemporaries, in particular his former student Johann Gottfried Herder (the author of one of the most famous essays on *The origin of language*, 1772). Interestingly, Kant never found it necessary to respond to this criticism. However, Kant's philosophy eventually proved important historically for both the philosophy of language and the epistemology of linguistics (*see* **Humboldt, Wilhelm von (1767–1835)**). Well known in this regard is Kant's new list of 'categories' (*see* **Aristotle and Linguistics**). These categories are defined as "pure concepts of understanding." According to Kant, they are indispensable to experience and common sense as well as to scientific knowledge. Kant proposes a list of 12 categories, which he subdivides into four classes (quantity, quality, relation, and modality); they include basic concepts of reasoning, such as unity, totality, negation, causality, possibility, necessity, etc. Like the Aristotelian categorical concepts, the Kantian categories have a strong bearing on linguistic forms: not only do they correspond to concepts inevitably couched in words and phrases in Kant's philosophical system; they also show that language and reason mutually presuppose each other. (Observe that the four Gricean conversational maxims of quantity, quality, relation, and manner refer, albeit in a loose sense, to Kant's system of categories. (*see* **Grice, Herbert Paul (1913–1988)**.) Finally, Kant's famous logical distinction between 'analytic' and 'synthetic' judgments is also intimately linked to the linguistic form of propositions. Whereas analytic propositions add nothing to the concepts one already has (and therefore cannot be denied), synthetic propositions can be achieved only by appealing to something outside them, i.e., experience or intuition, thus supplying new information, which is in principle falsifiable (*see* **Quine, Willard van Orman (1908–2000)**).

See also: Aristotle and Linguistics; Grice, Herbert Paul (1913–1988); Humboldt, Wilhelm von (1767–1835); Quine, Willard van Orman (1908–2000); Thought and Language: Philosophical Aspects.

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Kanuri

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One of the earliest documents on an African language, a short vocabulary dating back to the 17th century, involves data from Kanuri, also known as Yerwa, or Bornu; the name 'Beriberi' is considered to be derogatory by Kanuri speakers. Kanuri is a major language in terms of the number of speakers; estimates for Nigeria range between three and four million, whereas in neighboring countries like Cameroon, Chad, and Niger, there may be around half a million speakers. Kanuri forms a dialect cluster with Kanembu, which is spoken by a distinct ethnic

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group mainly in Chad. Kanuri-Kanembu is part of the Saharan family, a well-defined subgroup within the Nilo-Saharan phylum.

Kanuri was intimately linked with the Kanem-Borno empire for almost 1000 years. Its role as the *lingua franca* of northern Nigeria was reduced in favor of Hausa during colonial times. Parallel to Hausa, a modified Arabic script known as Ajami was used in Kanuri for several centuries. The orthography based on Roman script and developed during the British colonial period was standardized in 1974. Today, Kanuri is used in mother-tongue education as well as on the radio and in television in Nigeria. It is also taught at university level, e.g., at the University of Maiduguri (Nigeria).

One of the earliest detailed analyses of Kanuri is Lukas (1937), who had already showed that Kanuri has two distinctive tone levels, low and high, as in *kànúrì* ('Kanuri person') or *kànùrí* ('Kanuri language'). These register tones may also be combined to build complex tones; the so-called 'mid' tone established by Lukas (1937: 3) represents a downstep high tone, i.e., a conditioned variant of the high tone. As further shown in Lukas' pioneering study, as well as in more recent analyses by Hutchison (1981), and by Cyffer and Geider (1997), Kanuri also has an intricate system of consonant alternation, resulting in complex morphophonemic alternations.

One interesting typological property of Kanuri is the relatively small number of verbs. More than 95% of the predicative structures are formed by a combination of the light verb *n* ('say, think') and some complement (for example: *le+n* ('go')). This latter strategy is common in a range of Nilo-Saharan languages stretching from Kanuri in the Lake Chad region to Nara in Eritrea (*see* **Nilo-Saharan Languages**). Both complex predicates of this type and basic verbs are inflected for subject, tense-aspect-mood, as well as object (in the case of first and second person). Derivational argument modulation (more specifically, neutro-passive, causative, applicative marking) and pluractional marking is also expressed in the verbal complex.

Kanuri is head-final at the clausal level, involving verb-final structures, preverbal complementation, and the use of postpositions, but nominal modifiers follow the head noun. From a historical-comparative point of view, Kanuri grammar appears to be characteristic for the Saharan group within Nilo-Saharan. Interestingly, however, the lexical structure of Saharan languages appears to be less stable, as argued by Cyffer (2000).

See also: Nigeria: Language Situation; Nilo-Saharan Languages.

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Kapampangan

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Kapampangan (Pampangan) is spoken mainly in Pampanga Province and in parts of Tarlac, Nueva Ecija, Bulacan, and Bataan provinces of Luzon, the Philippines. It is one of the largest languages in the Philippines. The number of its speakers is estimated as 1 897 378 (1990 census).

Phonology

Kapampangan has the consonants [p, b, t, d, k, g, ʔ, s, tʃ, ʤ, m, n, ŋ, l, r, w, y] and vowels [i, e, a, ø, u].

Overview of Kapampangan Grammar

Word Order

Like other Philippine languages, Kapampangan is a predicate-initial language. Clitic pronouns and clitic adverbs usually occupy the second position of a clause, and clitic pronouns are almost always obligatory, even when their coreferent noun phrases are present.

(1) Masakit-ya ing lalaki
sick-ABS.3SG DET.ABS.SG man
'the man is sick'

Case Marking

Kapampangan has three cases: topic, genitive (or nontopic), and oblique. Since Kapampangan exhibits

group mainly in Chad. Kanuri-Kanembu is part of the Saharan family, a well-defined subgroup within the Nilo-Saharan phylum.

Kanuri was intimately linked with the Kanem-Borno empire for almost 1000 years. Its role as the *lingua franca* of northern Nigeria was reduced in favor of Hausa during colonial times. Parallel to Hausa, a modified Arabic script known as Ajami was used in Kanuri for several centuries. The orthography based on Roman script and developed during the British colonial period was standardized in 1974. Today, Kanuri is used in mother-tongue education as well as on the radio and in television in Nigeria. It is also taught at university level, e.g., at the University of Maiduguri (Nigeria).

One of the earliest detailed analyses of Kanuri is Lukas (1937), who had already showed that Kanuri has two distinctive tone levels, low and high, as in *kànúrì* ('Kanuri person') or *kànùrí* ('Kanuri language'). These register tones may also be combined to build complex tones; the so-called 'mid' tone established by Lukas (1937: 3) represents a downstep high tone, i.e., a conditioned variant of the high tone. As further shown in Lukas' pioneering study, as well as in more recent analyses by Hutchison (1981), and by Cyffer and Geider (1997), Kanuri also has an intricate system of consonant alternation, resulting in complex morphophonemic alternations.

One interesting typological property of Kanuri is the relatively small number of verbs. More than 95% of the predicative structures are formed by a combination of the light verb *n* ('say, think') and some complement (for example: *le+n* ('go')). This latter strategy is common in a range of Nilo-Saharan languages stretching from Kanuri in the Lake Chad region to Nara in Eritrea (*see* **Nilo-Saharan Languages**). Both complex predicates of this type and basic verbs are inflected for subject, tense-aspect-mood, as well as object (in the case of first and second person). Derivational argument modulation (more specifically, neutro-passive, causative, applicative marking) and pluractional marking is also expressed in the verbal complex.

Kanuri is head-final at the clausal level, involving verb-final structures, preverbal complementation, and the use of postpositions, but nominal modifiers follow the head noun. From a historical-comparative point of view, Kanuri grammar appears to be characteristic for the Saharan group within Nilo-Saharan. Interestingly, however, the lexical structure of Saharan languages appears to be less stable, as argued by Cyffer (2000).

See also: Nigeria: Language Situation; Nilo-Saharan Languages.

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Kapampangan

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Kapampangan (Pampangan) is spoken mainly in Pampanga Province and in parts of Tarlac, Nueva Ecija, Bulacan, and Bataan provinces of Luzon, the Philippines. It is one of the largest languages in the Philippines. The number of its speakers is estimated as 1 897 378 (1990 census).

Phonology

Kapampangan has the consonants [p, b, t, d, k, g, ʔ, s, tʃ, ʤ, m, n, ŋ, l, r, w, y] and vowels [i, e, a, ø, u].

Overview of Kapampangan Grammar

Word Order

Like other Philippine languages, Kapampangan is a predicate-initial language. Clitic pronouns and clitic adverbs usually occupy the second position of a clause, and clitic pronouns are almost always obligatory, even when their coreferent noun phrases are present.

(1) Masakit-ya ing lalaki
sick-ABS.3SG DET.ABS.SG man
'the man is sick'

Case Marking

Kapampangan has three cases: topic, genitive (or nontopic), and oblique. Since Kapampangan exhibits

an ergative system in pronominal case marking, these cases may also be called absolutive, ergative, and oblique, respectively, which are the terms used in this article.

Negation

Sentential negation is expressed by the predicate-initial *e*.

(2) E-ya masakit ing lalaki
NEG-ABS.3SG sick DET.ABS.SG man
'The man is not sick'

Existence and Possession

Both existence and possession are expressed by the existential particles *atin(g)* ('there is, be present, have') and *ala* ('there is not, be absent, do not have'). (LK = linker, realized either as = *ng* [after vowels, *n*, and the glottal stop] or *a* elsewhere)

(3) Ating metung a babai-ng malagu
EXIST one LK woman-LK beautiful
'there was a beautiful woman'

(4) Atin-ya-ng kapatad a lalaki
EXIST-ABS.3SG-LK sibling LK man
'he/she has a brother (male sibling)'

Lexical Classes

Nouns Nouns may be monomorphemic or derived by affixation. A limited number of nouns may be pluralized with vowel lengthening (e.g., *lalá:ki* 'man' and *la:lá:ki* 'men,' *babá:i* 'woman' and *ba:bá:i* 'women').

Noun phrases are formed with other lexical classes, such as adjectives and verbs, by use of the linker.

(5) ing bayu-mu-ng imalan
DET.ABS.SG new-ERG.2SG-LK dress
'your new dress'

(6) ing balita-ku-ng dimdam
DET.ABS.SG news-ERG.1SG-LK heard
kang Mike
DET.OBL.SG Mike
'the news I heard from Mike'

Table 1 Determiners in Kapampangan

	Absolutive	*Ergative*	*Oblique*
Common nouns			
SG	ing, = ng	ning	king, keng
PL	deng/reng	reng	karing
Personal names			
SG	i	= ng	kang
PL	di/ri	ri	kari

Verbs Verbs derive for focus (actor, patient, directional, beneficiary, and instrumental; see section on focus constructions) and inflect for aspect (contingent [contemplated, future], perfective [completed, past], and imperfective [incompleted, progressive, present]). Verbs derive by way of affixation (prefixes, suffixes, and infixes), reduplication, vowel alternations, vowel lengthening, and combinations thereof. Some other affixes denote causative, aptative (abilitative, accidental, and coincidental actions), and distributive (states or actions distributed over space and time, and repetitive actions).

Adjectives Adjectives may be monomorphemic or derived, with affixes, such as *ma-* (plural *manga-*), which is the most common adjective-forming prefix. The comparative degree is marked by *mas* (e.g., *mas maragul* 'bigger'). Superlative adjectives are formed with the prefix *peka-* (*pekamaragul* 'biggest').

Determiners Determiners, also called articles, case markers, or noun markers, prenominally indicate the case (absolutive, ergative, or oblique) and number (singular or plural) of the nouns they qualify, and whether the nouns are common or personal (Table 1).

Pronouns Pronouns may be clitic or free. Some combinations of two clitic pronouns (ergative and absolutive) may be fused into one word; e.g., *na* (ERG.1SG) + *ya* (ABS.3SG) becomes *ne* (Table 2).

Focus Constructions

In Kapampangan, as in other Philippine languages, the morphology of the verb indicates the semantic relationship between the predicate and the absolutive argument. In an actor-focus construction, the absolutive argument is semantically an actor, and the verbal predicate takes appropriate actor-focus affixes. Likewise, in a patient-focus construction, the absolutive argument is semantically a patient, and the verbal predicate takes patient-focus affixes. In the following examples of each focus construction, the boldfaced argument is the absolutive.

Actor focus:

(7) Mamangan la-ng manuk
eating ABS.3 PL-LK chicken
'**they** are eating chicken'

Patient focus:

(8) Kakanan de ing manuk
eating ERG.3PL + ABS.3SG DET.ABS.SG chicken
'they are eating **the chicken**'

Table 2 Pronouns in Kapampangan

	ABS (clitic)	ABS (free)	ERG (clitic)	OBL (free)
1 SG	ku	yaku, aku	ku	kanaku, kaku
2 SG	ka	ika	mu	keka
3 SG	ya	iya	na	kaya
1 DUAL	kata	ikata	ta	kekata
1 PL INCL	katamu, tamu, kata, ta	ikatamu, itamu, ikata, ita	tamu, ta	kekatamu, kekata
1 PL EXCL	kami, ke	ikami, ike	mi	kekami, keke
2 PL	kayu, ko	ikayu, iko	yu	kekayu, keko
3 PL	la	ila	da/ra	karela

Directional focus:

(9) Dinan me-ng
give.to ERG.2SG + ABS.3SG-LK
pera ita-ng anak
money that.ABS.SG-LK child
'give some money **to that kid**'

Beneficiary focus:

(10) Pangadi me
pray.for ERG.2SG + ABS.3SG
'pray **for him/her/it**'

Instrumental focus:

(11) Penyulat ne
wrote.with ERG.3SG + ABS.3SG
ini-ng lapis
this.ABS.SG-LK pencil
'he/she wrote **with this pencil**'

See also: Clitics; Ergativity; Malayo-Polynesian Languages; North Philippine Languages; Philippines: Language Situation; Pluractionals (Distributives); Reduplication; Southeast Asia as a Linguistic Area; Tagalog.

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Karachay-Balkar *See:* Turkic Languages.

Karaim *See:* Turkic Languages.

Karakalpak *See:* Turkic Languages.

Karuk *See:* Hokan Languages.

Kashaya *See:* Pomoan Languages.

Kashmiri

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Kashmiri, known to its speakers as kəːśur/koːśur or kəːśɨr zabān ('Kashmiri language'), is spoken by around 4 million people in India (*Ethnologue*, n.d.), primarily in the Kashmir valley (kəśiːr) and its surrounding regions in the state of Jammu and Kashmir (J & K). Sizeable population of Kashmiri speakers also live in other states of India. Approximately 0.1 million Kashmiri speakers have been reported to live in Pakistan (*Ethnologue*, n.d.). Kashmiri speakers are also found in various other countries. Major regional dialects of the language spoken in J & K state include: Standard Kashmiri (in and around Srinagar; used for educational and literary purposes), Kashtwāri/Kishtwāri (Kishtwār valley, southeast of Kashmir valley); Poguli (southern Banihal); Sirāji (several villages of district Doda); Rāmbani (Ramban and adjoining areas), and Bunjwali. Poguli and Sirāji are considerably influenced by Dogri (an Indo-Aryan language close to Punjabi (Panjabi)). Speakers of many of these dialects often argue for the separate existence of their native speech as full-fledged languages rather than dialects of Kashmiri. Information available on Kashmiri dialects is generally based on secondary sources.

There is a possibility of existence of more regional dialects in addition to the above-mentioned, but no detailed research on Kashmiri dialectology is available so far. Besides the major regional dialects, there are conspicuous differences between urban and rural Kashmiri on the one hand (in terms of accent, phonology, and lexicon; rural Kashmiri has preserved many archaic forms not used in urban speech) and between Muslim and Hindu Kashmiri on the other (mainly in terms of borrowings; while Hindus use more Sanskrit loans, Muslims commonly borrow from Persian (Farsi, Western) and Arabic for the corresponding words. The terms 'Persianized' and 'Sanskritized' Kashmiri are sometimes used to refer to these social dialects).

Historical Development

Kashmiri has been classified along with a number of languages grouped under the title 'Dardic.' Dardic languages are spoken in the extreme north of India and northwestern Pakistan, extending into Afghanistan. There has been considerable debate over the classification of Dardic languages as to whether they are a third branch of Indo-Iranian language family (other two being Indo-Aryan and Iranian), or (at least, some of them) are of pure Indo-Aryan origin. Dardic languages have preserved many archaic Indo-Iranian features otherwise lost in the modern Indo-Aryan languages. They have also developed certain features not found in other Indo-Iranian languages. Nevertheless, the term 'Dardic' constitutes a geographical convention rather than a linguistic expression. Like other Dardic languages, Kashmiri has similarities with both Indo-Aryan as well as Iranian. After continuing debates over a long period of time, many linguists have agreed upon an Indo-Aryan origin for Kashmiri. The term 'Dardic,' however, has gained much popularity, and is still used in view of the regional peculiarities shared by Kashmiri and other languages of the group.

Kashmiri belongs to the North-Western group of the Middle Indo-Aryan (MIA) languages/dialects, which includes several Dardic languages (e.g., Shina, Khowar, Torwali), Punjabi, Sindhi, and Lahnda (Panjabi, Western). One of the characteristic features with respect to the phonological system of the North-Western group is the retention of certain features lost elsewhere. In many modern Indo-Aryan languages, Old Indo-Aryan (OIA) sibilants – *ś* (palatal), *s* (dental) and *ṣ* (retroflex) – merged into dental *s*. Kashmiri retains two sibilants, the palatal *ś* and the dental *s*. Like other Dardic languages, Kashmiri also retains the consonantal component *r* in the derivatives of the OIA syllabic *r̥*, which had a number of reflexes in MIA, viz., *a*, *i*, or *u*.

Kashmiri vocabulary can be broadly categorized into Kashmiri/Dardic, Sanskrit, Punjabi, Hindi/Urdu, Persian, and Arabic origins. Kashmiri occupies a special position in the Dardic group, being probably the only Dardic language that has a written literature dating back to the early 13th century, a writing script of its own, and the largest number of speakers among the Dardic languages. An important part of Kashmiri is its rich tradition of oral and written literature. Some of the very famous genres of Kashmiri oral literature and folklore are *rov*, *vanɨvun*, *c^{h}akɨr*, *ladi:-śah*, and *lukɨ-pəːt^{h}ir*.

Writing Systems

Originally, Kashmiri was written in the Shāradā script, an ancient indigenous character of Kashmir. Shāradā is argued to be the predecessor of Devanāgri/Nāgri, which is built on the same system and corresponds with Shāradā letter-for-letter, although the letters

have considerably changed in form. Shāradā is closely associated with Tākri alphabet used for writing Punjabi, but, with a complete range of symbols for different vowels characteristic of Kashmiri. Its use is highly restricted to a handful of Hindu priests in writing *za:tuk/Janam-patri* ('horoscope'). The most popularly employed and officially-recognized script in current use is a modification of Perso-Arabic (Nastālīq) script. Devanāgari (again with modifications to cater to the specific requirements of the Kashmiri phonemic inventory) is also used and is popular among Hindus. Tākri (Kashtwāri and some dialects of the adjoining areas) and Roman scripts have also been employed but these have failed to gain recognition.

Phonological Characteristics

Both open and closed syllables are permitted in Kashmiri. Closed syllables, however, are preferred to open syllables. In rapid speech, in polysyllabic words with a sequence of adjacent CV syllables, speakers may drop medial vowels in favor of closed syllable structure. Final vowels are often deleted. Clusters comprising two consonants are quite common but only specific sequences can form a cluster in a particular position. Initial clusters are restricted to the type *Cr-* where the first consonant of the cluster is an obstruent. Final clusters are comprised of a homorganic nasal followed by an obstruent. The distribution of stress in Standard Kashmiri is influenced by a complex interplay of quantitative, positional, and rhythmic constraints. Primary stress appears on the word-initial syllable, which is always stressed. Stress occurs on every syllable containing a long vowel – CV:(C).

Kashmiri maintains the basic OIA pattern of five articulatory positions along with features of voice (e.g., *k* vs. *g*) and aspiration (e.g., *k* vs. k^h). Its consonant system has survived with various alterations, losses, and additions. Some of the characteristic changes are those involving the loss of aspiration of voiced plosives, change of MIA palatal affricates to those of the corresponding dental affricates, word-final aspiration of voiceless stops, and fricative weakening/lenition ($s > h$) in certain environments. There are 27 consonantal phonemes in Kashmiri that have evolved from the Old/Middle Indo-Aryan phonological system. In addition, Kashmiri has also adopted a number of consonants from the Persian and Arabic phonemic inventory. The latter include the labio-dental voiceless fricative (*f*), voiceless and voiced velar fricatives (*x* and *γ*), and uvular and glottalic stops (*q* and *ʔ*). They are found only in Persian/Arabic borrowings and are used only by literate Kashmiris in Standard Kashmiri, especially in formal speech. In informal speech and among the illiterate population, these are replaced by p^h, k^h, *g*, *k*, and *a* respectively.

Like most of the New Indo-Aryan (NIA) languages, Kashmiri vowels are subject to various phonological operations that are not only regular but also extended over a larger domain than most of the other IA languages. A significant number of changes take place in accordance with the nature and position of the vowels in a particular linguistic domain (syllable/morpheme/word). Various such changes include: vowel harmony, *svarabhakti* (vowel epenthesis), consonantal assimilation, and final vowel deletion. Kashmiri has a 16-vowel system consisting of front vowels /*i*, *i:*, *e*, *e:*, *ɛ*/, central vowels /*ɨ*, *ɨ:*, *ə*, *ə:*, *a*, *a:*/, and back vowels /*u*, *u:*, *o*, *o:*, *ɔ*/ with three contrasts in height (high, mid, and low). Kashmiri phonemic inventory is distinct in the IA languages in having central vowels /*ɨ*, *ɨ:*, *ə*, *ə:*/ (absent in most NIA languages) and dental affricates.

Morphosyntax

Kashmiri, like other IA languages, is a postpositional language. However, its word order is unique among the IA languages. Unlike other IA languages, which are typically verb-final, Kashmiri is a V2 language. That is, the inflected verb occurs at the clause-second position. In sentences with a main verb and an inflected auxiliary verb, the main verb occurs sentence-finally. Thus, the basic word order is essentially SVO(V). This is true of the matrix as well as embedded clauses, and also of *yes-no* questions and questions where the *wh*-phrase is the syntactic 'subject.' In other question formations, the *wh*-phrase occupies the clause-second position, with the inflected verb occupying third position. In most environments, V2 is obligatory. However, in certain syntactic environments, such as correlatives and conditional clauses, V2 is optional. The sentence initial position is occupied by syntactic 'subject' or any other constituent ('topic'). Except for the fixed position of the verb (and *wh*-phrase in case of questions), word order is fairly flexible. V2, characteristic of Germanic languages, is a well-developed syntactic phenomenon in Kashmiri, a non-Germanic language.

Complementation in Kashmiri is observed by optionally inserting complementizer *ki/zi* in front of the embedded clause. Relative clauses are formed by a relative-correlative construction with a pre-nominal relative pronoun in the modifying/relative clause and a correlative pronoun in the main clause following the relative clause. Relative-correlative construction is a typical areal syntactic feature.

Kashmiri is a split-ergative language. Case morphology is more or less typically Indo-Aryan. Based on thematic roles and verb class, the only argument of an intransitive clause receives either a zero/nominative case or a dative case. The most agent-like argument of a transitive clause in perfective aspect receives an ergative case and the other argument (if any) receives a nominative or dative case depending on its thematic role and the verb class. Subjects of a few intransitive verbs may appear in ergative case (e.g., verbs like *as-un* 'to laugh', *vad-un* 'to weep/cry'). Case ending behaves like a postposition so that the noun phrase appears in oblique form (a typical Indo-Aryan syntactic feature).

Kashmiri verb phrase is rich in agreement. Both subject and object agreement markers may appear on the verb. Subject agreement, however, is blocked in dative/ergative constructions where the syntactic subject is in dative/ergative case.

One of the characteristic features of Kashmiri among the Indo-Aryan languages is its three-way (instead of the typical two-way) distinction of the demonstrative pronoun, viz., (1) proximate *yi/yim* 'this/these', (2) visible *hu/hum* 'that/they (masculine)' and *ho/homa* 'that/they (feminine)', and (3) invisible/remote *su/tim* 'that/they (masculine)' and *so/tima* 'that/they (feminine)'.

Sociolinguistics of Kashmiri

Not many native speakers of Kashmiri can read the language, irrespective of their educational background. For a long time, Kashmiri has not been taught in schools. According to the three-language policy of India, languages generally taught in the schools of J & K state are Urdu (a non-native language and the official language of the state), Hindi (official language of India), and English (second official language). There is a significant amount of prestige associated with Urdu, Hindi, and English in wider linguistic domains. These factors and increasing urbanization and globalization have played a significant role toward a gradual language loss with many Kashmiri speakers.

Sample (Srinagar/Standard Kashmiri)

(1)	ga:ś$_i$-an	von	sali:m$_j$-as	(zi/ki)
	Gasha-ERG.	say.PAST.PERF.	Salim-DAT.	COMP
	agar	a:si-hund$_k$	mo:l$_k$	
	if	Asi-Gen.M.SG.	father	
	gar-i	o:s$_k$	tam-is	
	home-LOC.	be.PAST.M.SG.	3SG.OBL.-DAT.	
	van-un	ma:j-i	samk^h-un	
	tell-Infin.	mother.OBL.-DAT.	meet-INFIN.	

'Gasha$_i$ told Salim$_j$ (that) if Asi's father$_k$ was home, he$_j$ should tell him$_k$ to meet (X's$_{i/j/k/l}$) mother'

See also: Areal Linguistics; Dardic; Harmony; India: Language Situation; Indo–Aryan Languages; Indo–Iranian; Lahnda; Pakistan: Language Situation; Punjabi; Sindhi.

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Relevant Website

http://www.ethnologue.com/show_language.asp?code=kas

Kate Hermansz, Lambert ten (1674–1731)

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Lambert ten Kate, who is considered to be one of the founding fathers of Germanic linguistics, was born of Mennonite parents in Amsterdam. He became a partner in his father's corn trade but resigned in 1706. "Being wealthy enough," as his first biographer has it, the versatile ten Kate "laid aside Commerce, in order to cultivate his Studies," which included various fields of both arts and sciences.

In 1707–1710 ten Kate composed his short *Gemeenschap tussen de Gottische spraeke en de Nederduytsche* ('The relationship between the Gothic and Dutch languages'). The insight that the conjugation of verbs in Dutch and Gothic follows the same pattern prompted ten Kate to divide the Gothic verbs into six classes. It is in the verbal conjugation system that ten Kate recognized the regularity of vowel alternation, which eventually led him to the discovery of what Grimm would later call 'Ablaut.' In all respects the *Gemeenschap* has proved to be more valuable and more fruitful than the work of his English predecessor, Hickes.

The years 1710–1723 saw the full development of these and other interesting linguistic observations into the main body of his *Aenleiding tot de kennisse van het verhevene deel der Nederduitsche sprake* ('Introduction to the sublime part of the Dutch language,' i.e., its etymology). Among other things, the classification of the Gothic verbs was elaborated here and applied to all the Germanic languages he was acquainted with. Ten Kate provided proof that the 'irregular' verbs were subject to rules that obtained not only in Gothic, but were valid for all branches of Germanic. The second volume of the *Aenleiding* includes two long alphabetically arranged listings of Germanic words derived from strong verb roots. As ten Kate deemed the verb to be the very first part of speech, and consequently the uppermost in the hierarchy of the *partes orationis,* this specimen of a *lexicon etymologicum* could thus be considered as a lexicon of root words.

Ten Kate's main concern was to find regularity in language, taking great care to test the rules he had discovered against an extensive corpus of linguistic data. Abandoning the techniques of ancient etymology, the Amsterdam private scholar described and justified his own research methods very carefully. Thus, he actively contributed to the empirical turn in the intellectual climate of the Dutch Republic at the beginning of the eighteenth century. As such, his works are a fine illustration of the paradigm shift that took place in Dutch linguistics around 1700 under the influence of Newtonian thought. They stand out in the 18th century as a highly successful contribution to the study of historical linguistics, in terms of both its contents and its methodology.

See also: Grimm, Jacob Ludwig Carl (1785–1863).

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An outstanding scholar, educator, and administrator, Sumitra Mangesh Katre was born in Honnavar, Karnataka, on April 11, 1906. After his schooling in Mangalore, he obtained a B.A. (Hons) in mathematics and Sanskrit from Madras University (1928). Subsequently, he went to the School of Oriental and African Studies, London, and obtained a Ph.D. in linguistics (1931). On his return to India, he taught at several colleges before entering the Deccan College Postgraduate and Research Institute, Pune, as Professor of Indo-European Philology in 1939. Three years later, he became the director of the institute and served in that capacity until his retirement in 1971. He then moved to the United States as a resident and taught in the Department of Oriental and African Languages and Literature at the University of Texas, Austin (1971–1976). He died on October 21, 1998, in San Jose, California.

Katre wrote 12 books and approximately 250 articles and edited several tomes on linguistics. His most noteworthy publications relate to Sanskrit manuscripts (Katre, 1949–1955), Paninian studies (Katre, 1967, 1987), Paninian lexicography (Katre, 1968–1969, 1971, 1981), Prakrit and Indo-Aryan studies (Katre, 1944, 1964, 1968), and the formation of Konkani (Katre, 1966). His *Introduction to Indian textual criticism* (1954) and *Lexicography* (1965) are highly practical textbook-like volumes.

Katre is perhaps best remembered for his dedication to the spread of linguistics in India. He pioneered the teaching of linguistics in Indian universities by actively initiating programs, influencing authorities, and educating future linguists. The Language Project, of which he was the director from 1954 to 1960, held linguistic conferences for the first time in India and conducted summer and fall schools of linguistics for the formation of linguists. Due to the Project, illustrious linguists from overseas visited India and promising Indians went overseas for linguistic training. Katre also contributed to the spread of linguistics by his active involvement in several linguistic journals, such as *New Indian Antiquary*, *The Oriental Digest*, *Indian Linguistics*, *The Bulletin of the Deccan College*, and *The Indo-Iranian Journal*, serving as an editor, board member, or founder. He gave new life to the Linguistic Society of India by having it moved from Calcutta to Deccan College, Pune, and making it the preeminent all-India organization of linguists.

A monumental project that Khatre conceived and headed for 20 years (1951–1971) is the *Encyclopaedic dictionary of Sanskrit on historical principles*. This dictionary was more than 25 years in preparation, involving excerpts from 1500 books from the Vedic period to the 18th century, and based on a data bank of 11 million words. Although the original project has been modified, several volumes have been published, and when completed, with approximately 20 000 pages, it is expected to be the largest dictionary ever made.

Katre held many administrative and consultative positions in leading academic institutions and organizations, such as the Bhandarkar Oriental Research Institute, the University Grants Commission, and the Central Institute for Indian Languages. He represented the government of India at many international conferences, such as the Congress of Linguistics in London (1952), the Congress of Linguistics in Oslo (1957), and the Munich Session of the International Congress of Orientalists (1957).

He delivered the *Wilson philological lectures* at Bombay University (1941) and the *Pratibha Devi memorial lectures* at Gauhati University (1957). He was honored with two felicitation volumes: *Indian Linguistics* volumes 29 and 30 (1968–1969) and the *Bulletin of the Deccan College Postgraduate and Research Institute* volumes 51 and 52 (1991–1992).

See also: Sanskrit.

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Kātyāyana (3rd Century B.C.)

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Pāṇini, Kātyāyana, and Patañjali belong to the beginning of the grammatical tradition in India. We have no records of linguistics prior to Pāṇini, whose grammar of the Sanskrit language, *Aṣṭādhyāyī*, has commanded the respect of linguists everywhere. But the quest for economy inspired by the oral tradition eventually made the task of comprehending it enormously complicated and it became intelligible only when studied with a commentary.

The major commentaries on Pāṇini are the *Vārttikas* (Explanatory rules) of Kātyāyana, which examine approximately one-third of Pāṇini's *sūtras*, and the *Mahābhāṣya* (The great commentary) of Patañjali, which is mainly concerned with explaining the *vārttikas* of Kātyāyana.

Patañjali's date (2nd century B.C.) is known through the references to the Shunga king Pushyamitra and to the invasion of the Bactrian Greeks (Belvalkar, 1976: 27). A considerable interval must have elapsed between Kātyāyana and Patañjali and between Pāṇini and Kātyāyana. Accordingly, Pāṇini is believed to have lived in the 5th century B.C., which is in accordance with the native tradition that connects him with the and king of Magadha, and Kātyāyana is believed to have lived not long after Pāṇini, in the 3rd century B.C. (Burrow, 1973: 48; Belvalkar, 1976: 24).

Kātyāyana, a descendant of the sage Kati, is known to have written two other works, the *Vājasaneyi Prātiśākhya* and *Kātyāyana śrauta Sūtra* (Belvalkar, 1976: 24). In his *Mahābhāṣya*, Patañjali calls Kātyāyana a *dākṣiṇātya* 'Southerner' (Ray, 1963: 89; Belvalkar, 1976: 25). He has been also identified with Vara-ruci, the author of *Prākrita-Prakāśa*. The *vārttikas*, for which Kātyāyana is justly famous, have not survived separately in manuscript form. They occur in Patañjali's *Mahābhāṣya*, which is mainly concerned with explaining and criticizing the *vārttikas*.

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- Pāṇni's *sūtra* (P2.3.61).

preṣyabruvorhaviṣo devatāsampradāne

"(In the Vedas the genitive case ending is used to express the sense of accusative) after (a word denoting) offering in connection with (the verbal bases) *preṣya-* 'to send forth' and *bru-* 'to declare,' when an oblation is made to a deity."

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"(The Pāṇinian phrase *haviṣaḥ* should be changed to) *haviṣo'prasthitasya* 'an oblation which has not been held ready'."

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haviṣo'prasthitasyeti vaktavyaṃ

"The (statement) *haviṣo'prasthitasya* should be made. (For instance) *indrāgnibhyām chāgam havirvapāṃ medaḥ prasthitaṃ preṣya* 'Send forth to *Indra* and *Agni* the oblation (consisting of the organs of) a goat, marrow, (and its) fat which are held in readiness'."

In this example given by Patañjali, the word *haviṣ* is qualified by *prasthita* 'held in readiness', and the genitive ending is therefore not used. Instead, the words *haviṣ*, *chāga*, *vapa*, and *medas* occur with accusative endings.

There are some *vārttikas* of Kātyāyana that are, however, overruled by Patañjali (Vasu, 1962: 1: 300–301; Joshi and Roodbegen, 1981: 25), as in the following example.

- Pāṇini's *sūtra* (P2.3.62).

caturthyarthe bahulaṃ chandasi

"The sixth (genitive case ending is) often (used) to express the sense of the fourth (dative case ending) in the *Veda*." (For example, *puruṣmṛgas candramasaḥ* 'the male antelope to the very moon' in which the genitive *candramsaḥ* (not the dative *candramase*) is used.)

- Kātyāyana's *vārttika* offers an addition to P2.3.62.

ṣaṣṭhyarthe caturthīvacanaṃ

"The fourth (dative) case ending should be prescribed to express the sense of the sixth (genitive case ending in the Veda)."

- Patañjali, citing Kātyāyana's *vārttika,* illustrates it with this example.

yā kharveṇa pibati tasyai kharvas. tasyā it prāpte...

"'to her who drinks from a damaged vessel a defective (son is born)'. (Here) when (the genitive form) *tasyāh* (genitive 'to her') is about to apply (the dative form *tasyai* 'for her' is used)." But then Patañjali comments that the *vārttika* is not needed if the *sūtra* P2.3.62 is split into two:

caturthyarthī

"the fourth case ending (is used to express the sense of the sixth case ending)" and

tato'rthe bahulaṃ chandasīti

"to express the sense (of the fourth case ending the sixth case ending is) often used in the Veda."

Hence, Patañjali sees that once Pāṇini's *sūtra* P2.3.62 is understood as having two constituents, both the genitive and dative uses are explained by it and Kātyāyana's *vārttika*, suggesting an addition, is not needed.

Commenting on Kātyāyana's *vārttikas*, the celebrated 18th-century grammarian Nāgojibhaṭṭa said: "*vārttikamiti. sūtre'nuktaduruktacintākaratvaṃ vārttikatvam*" ("The characteristic feature of a *vārttika* is criticism in regard to that which is omitted or imperfectly expressed in a *sūtra* of Pāṇini") (Kielhorn, 1985: 2). It must be mentioned that a critical look at the *vārttikas* shows Kātyāyana to be a judicious admirer of Pāṇni, one who dispassionately examines Pāṇini's *sūtras*; considers objections that have been actually raised or that might be raised; and corrects them, offers additions to them, or advises that they be abandoned only when no other course is left open (Kielhorn, 1963: 47).

See also: Nagojibhatta (d. 1755); Panini; Patanjali (2nd Century B.C.).

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Katz, Jerrold J. (1932–2002)

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Jerrold Katz's Career

Katz received a Ph.D. in Philosophy from Princeton University in 1960. In 1961 he became Research Associate in Linguistics at the Massachusetts Institute of Technology, and he was appointed Assistant Professor of Philosophy there in 1963. He quickly rose through the ranks at MIT, becoming Professor of Philosophy in 1969. He was appointed Distinguished Professor of Philosophy and Linguistics at the Graduate Center of the City University of New York in 1975, a position he held until his death. He wrote or coauthored 11 books and over 75 articles on philosophy and linguistics, and edited or co-edited three books.

Semantics in Generative Grammar

Katz started out with the goal "to try to understand meaning in natural language using some form of Fregean intensionalism to provide a semantic theory for Chomsky's theory of generative grammar, which ... at the time had no semantic theory" (Katz, 2004: ix). He published a seminal paper with Jerry Fodor (Katz and Fodor, 1963) that proposed that semantics is a component of generative grammar, and that semantic interpretations (senses) are assigned to syntactic structures by projection rules that have some of the formal properties of transformations. In addition, they proposed that the meanings of lexical items and of the structures containing them are expressed using combinations of semantic markers that are "intended to reflect, in their formal structure, the structure of the concepts they represent" (Katz, 1972: 101). A year later Katz published a book with Paul Postal (Katz and Postal, 1964) that proposed that deep structure (underlying syntactic structure) fully determines meaning (equivalently, that syntactic transformations are meaning-preserving). This idea, along with several others that were developed around the same time, was incorporated into the standard theory of generative grammar formulated in Noam Chomsky (1965), in which deep structures are mapped (1) by projection rules to semantic interpretations and (2) by syntactic transformations to surface structures, and ultimately to phonetic interpretations.

Katz (1972) provided the most complete account of his semantic theory; two later revisions were his elaboration of the theory of illocutionary force (Katz, 1977) and his revised treatment of presupposition (Katz and Langendoen, 1976; Katz, 1979). The book also provides a vigorous defense of his views against both generative semantics and the variety of interpretive semantics found in the extended standard theory.

Language as an Abstract Object

Katz was an early champion of Chomskyan mentalism (or psychologism or conceptualism) in linguistics (Katz, 1964), according to which linguistic theory is identified with the theory of knowledge of language. However, not long after collaborating with Chomsky in a defense of mentalism (Chomsky and Katz, 1975),

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Katz (1972) provided the most complete account of his semantic theory; two later revisions were his elaboration of the theory of illocutionary force (Katz, 1977) and his revised treatment of presupposition (Katz and Langendoen, 1976; Katz, 1979). The book also provides a vigorous defense of his views against both generative semantics and the variety of interpretive semantics found in the extended standard theory.

Language as an Abstract Object

Katz was an early champion of Chomskyan mentalism (or psychologism or conceptualism) in linguistics (Katz, 1964), according to which linguistic theory is identified with the theory of knowledge of language. However, not long after collaborating with Chomsky in a defense of mentalism (Chomsky and Katz, 1975),

Katz rejected mentalism in favor of (Platonic) realism, according to which languages are abstract objects, and the proper theory of language is about those objects themselves, not our knowledge of them (Katz, 1981). He described this change as follows (Katz, 2004: x):

> I had been wondering about how well Frege's realism about senses, to which I was committed, squared with Chomsky's psychologism about language, to which I was also committed. I reached the conclusion that . . . a theory of abstract senses could not be fitted into a theory of concrete syntactic structures in the human mind. My solution was to adopt a realist view of grammar as a whole, a move that seemed the right choice in light of the fact that the words and sentences that grammars are theories of are plausibly regarded as types and hence as abstract objects.

In moving from mentalism to realism, Katz saw himself as extending Chomsky's revolution that overthrew empiricism in favor of rationalism, and nominalism in favor of mentalism. A fully rationalist theory of language demands that it be realist, not mentalist (Katz, 1996; see also the papers in Katz, 1985). Katz's philosophy of mathematics was similarly realist and rationalist (Katz, 1998).

Sense, Reference, and Logic

Sense is the central construct of Katz's semantic theory, in which the meaning of an expression is the set of its senses. Katz defined sense as "that aspect of the grammatical structure of sentences that is responsible for their sense properties and relations" (Katz, 2004: 17). Sense is both decompositional (words and morphemes have internal structure in the form of semantic markers) and compositional (semantic markers are combined in accordance with their syntactic structure and projection principles). Katz did not provide a complete account of sense; for example, he did not list the primitive semantic markers. Rather, he gave many examples of senses of lexical items, such as color adjectives and English verbs like *chase* and *gossip*, and statements of particular projection rules for combining them. He used the framework to address such classical philosophical problems as the color-incompatibility problem (Katz, 2004: 152–165).

In later work, Katz asserted both that sense does not determine reference and that the theory of sense is not reducible to the theory of reference, unlike Frege's account, as interpreted by Rudolf Carnap, as functions from possible worlds to extensions in them (Katz, 2004: 21). Katz had earlier affirmed, following Frege, that sense determines reference (Katz, 1972: 240). But he went on to develop a maximally 'thin' notion of sense, according to which sense merely 'mediates' reference (Katz, 1988, 2004: 47). Katz's reformulation of the relation of sense to reference was intended to put intensionalist semantics on a firm foundation, enabling it to deal effectively with problems that Quine and others have raised, such as the indeterminacy of translation, the analytic-synthetic distinction, and the meaning of proper names and natural-kind terms. Katz also broke with the Frege-Carnap tradition by holding that senses are not represented by formulas in first-order predicate logic, which he maintained is insufficiently restrictive for linguistic semantics. His own theory of sense is mereological: semantic entailment is determined by the part-whole relations among senses, according to the 'beams in the house' analogy of Kant, rather than the 'plant in the seed' analogy of Frege.

Overall, Katz's work is distinguished by its bold independence of thought and its focus on foundational questions in philosophy of language, linguistics, and mathematics.

See also: Carnap, Rudolf (1891–1970); Chomsky, Noam (b. 1928); Fodor, Jerry (b. 1935); Frege, Gottlob (1848–1925); Kant, Immanuel (1724–1804); Mentalese; Philosophy of Mind; Quine, Willard van Orman (1908–2000).

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Kayardild

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Speakers of Kayardild were traditionally hunter-gatherers, with a strong emphasis on marine resources, building stone walls around the coasts to catch fish and hunting for turtle and dugong. The traditional population numbered between 120 and 150. Isolated from European contacts until the 1940s, the entire tribe was removed from their homeland in the early 1940s to the mission on Mornington Island, from which date rapid language loss set in: no one born

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after the move to Mornington grew up to be a fluent speaker, and today fewer than 10 speakers remain.

Apart from scanty early word lists, all materials on the Tangkic languages were recorded since the early 1960s. Practical orthographies were developed in this period. These use digraphs for a variety of phonemes, making use of *r* before a stop or nasal letter to denote retroflexion: thus *rd* for /ʈ/ and *rn* for /ɳ/; *h* after a stop or nasal letter to denote a laminointerdental articulation (with the blade of the tongue between the teeth); thus *th* for /t̪/ and *nh* for /n̪/. Other graphemes, standard in Australian orthographies, are *ng* for /ŋ/, *ny* for /ɲ/, *rr* for trilled or flapped /r/, *r* for /l/ and *j* for /c/. Distinctive vowel length is shown by doubling the letter, e.g., *aa* for /a:/.

Phonologically, Kayardild is a typical Australian language, with paired stops and nasals at six points of articulation (bilabial, velar, laminodental, laminopalatal, apicoalveolar and apicoretroflex), a single stop series without voicing contrast, no fricatives, two rhotics (a glide and a tap/trill), and a simple vowel inventory: three vowels (*a*, *i*, *u*) plus length. Primary stress falls on the first syllable unless attracted onto a long vowel.

Kayardild is typical of Australian languages in employing a rich system of case suffixes, which allow for great freedom of word order. Beyond this, the case systems of Kayardild and the other Tangkic languages are remarkable for several reasons. Firstly they exhibit 'double case marking' (see Dench and Evans, 1988; Plank, 1995), since one NP embedded in another inflects both for its own case (e.g., the possessive) and that of the head: cf. Kayardild *thabuju-karra* [brother-POSSESSIVE] 'brother's,' *wangal-nguni* [boomerang-INSTRUMENTAL] 'with the boomerang,' *thabuju-karra-nguni wangal-nguni* 'with brother's boomerang.' Secondly, Kayardild and Lardil add a further 'modal case' inflection, etymologically a case suffix, which marks tense/mood on most nonsubject NPs as a partly parallel system to the tense/mood inflection on the verb. Example (1) gives a Kayardild example using the 'modal ablative' (glossed M.ABL) to mark past tense on the object and instrument NPs in addition to the verbal 'past' inflection.

(1) dangka-a burldi-jarra yarbuth-ina
man-NOM hit-PST bird-M.ABL
thabuju-karra-nguni-na wangal-nguni-na
brother-GEN-INST-M.ABL boomerang-INST-M.ABL
'the man hit the bird with brother's boomerang.'

Thirdly, Kayardild has a further 'complementizing' use of case suffixes, to indicate various types of interclausal relations such as being a clausal complement, as illustrated by the 'complementizing' use of the oblique in (2); note that it goes on all words of the subordinate clause, outside any other inflections. It is also used – on all words except the topicalized object – in strings of topic chains.

(2) ngada kurri-ja, dangka-ntha
1sgNOM see-PST man-NOM
burldi-jarra-ntha yarbuth-ina
hit-PST-C.OBL bird-M.ABL-C.OBL
thabuju-karra-nguni-na wangal-nguni-na
brother-GEN- boomerang-
INST-M.ABL-C.OBL INST-M.ABL-C.OBL
'I saw that the man had hit the bird with brother's boomerang.'

Finally, Kayardild can add a layer of 'associating case' on all nonsubject NPs of clauses whose verb has been nominalized.

Much of the how this strange system evolved has now been reconstructed with the help of data from Yukulta, the most conservative Tangkic language and representative of the proto-Tangkic situation in having an ergative: absolutive case system; see Evans (1995) for a summary. Essentially, the main clause structures found in Kayardild and Lardil result from either reanalysis of alternative semitransitive structures in Yukulta, or from the generalization of Yukulta subordinate clause morphology, with case-marking interclausal relations, e.g., proprietive for purposive or ablative for prior time, smeared over both the subordinate verb and its overt NPs. A series of catastrophic changes has thus led Kayardild and Lardil to have grammatical systems that are organized quite differently from that in Yukulta, despite the fact that almost all grammatical morphemes are cognate. These changes make the Tangkic languages a fascinating case of radical and intertwined diachronic developments linked to the abandonment of an ancestral system of ergative case marking.

Another strange feature of Kayardild is a further set of case inflections, semantically and structurally part of the set of 'normal' case inflections but with the peculiarity that they convert their hosts, morphologically, from nouns into verbs. Beneficiaries, for example, take the 'verbal dative' case *-maru-*, which then takes regular verbal inflections (3), but which is distributed across all words in the noun phrase like a case inflection. Etymologically this derives from a verb meaning 'put' but structurally it is now a part of the regular system of case suffixes.

(3) ngada waa-jarra wangarr-ina
1SgNOM sing-PST song-M.ABL
ngijin-maru-tharra thabuju-maru-tharra.
my-V.DAT-PST brother-V.DAT-PST
'I sang a song for my brother.'

Like many other Australian languages, Kayardild has a complex set of derivatives from compass terms. To locate an entity one normally says things like 'the

east uncle' or 'the groper coming from the east'; some examples of derivatives based on the root ri- 'east' are *riinda* 'coming from the east,' *rilungka* 'eastwards,' *riliida* 'heading ever eastwards,' *riyananganda* 'to the east of,' *ringurrnga* 'east across a geographical boundary,' *riyanyinda* 'at the eastern extremity of,' *rilumirdamirda* 'sea-grass territory to the east,' *rilurayaanda* 'from one's previous night's camp in the east,' *rilijulutha* 'move to the east' and *riinmali* 'hey you coming from the east.'

See also: Australia: Language Situation; Australian Languages; Endangered Languages; Future Tense and Future Time Reference; Tense; Word Classes/Parts of Speech: Overview.

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Kaytetye

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Kaytetye is the only member of the northern branch of the Arandic subgroup of the Pama-Nyungan language family, whose southern branch includes Arrernte (Aranda) and other languages (Hale, 1962; Koch, 2004). It is spoken in the southern part of the Northern Territory of Australia around Barrow Creek and Wauchope. Its speakers number around 200. Most contemporary people of Kaytetye descent speak, in addition to or instead of Kaytetye, one of the neighboring languages – Alyawarr, Anmatyerre (both Arandic), or Warlpiri – and varieties of English. The current language of young people differs in a number of respects from that documented in the 1960s and 1970s by Hale and Koch.

Kaytetye phonology includes the typical Australian consonants, plus a set of pre-stopped nasals, rounded consonants, and a velar glide (the unrounded counterpart to *w*). An even more rare feature is a set of pre-palatalized apical consonants. The system of unrounded consonants and their orthographic representation is shown in **Table 1**. Rounded consonants are indicated by *w* after the consonant (cluster). The vowel system consists of just /a/, a high/mid-central vowel (spelled *e* in the orthography), and a marginal /i/. There is no rounded vowel phoneme, but /e/ has rounded allophones.

Atypical phonotactic features include common word-initial V(C) syllables and final CV syllables with no coda consonant and an obligatory vowel /e/; only word-internal syllables have the full structure CV(C). Word stress falls on the first CV(C) syllable. A word like *arr<u>kwen</u>tyarte* 'three' illustrates these features (where the stressed syllable is underlined). The atypical phonology results from a series of sound changes that are described in Koch (1997, 2004).

Nouns inflect for number and case, in the typical Australian fashion, but with some complications (Koch, 1990). Kin nouns, as illustrated in **Table 2**, are inflected for the (singular) person of possessor, by means of prefixes (former dative pronouns) for second and third person, and a suffix or zero for first person. A suffix *-nhenge* marks the category 'dyadic', designating both persons in a relationship, e.g., 'mother and child(ren)'.

Dual and plural personal pronouns, as seen in **Table 3**, mark a kinship-related category called

Table 1 Unrounded consonants (atypical segments in boldface)

	Labial	*Velar*	*Lamino-dental*	*Lamino-palatal*	*Apico-alveolar*	*Apico-postalveolar*	*Pre-palatalized apical*
Stops	p	k	th	ty	t	rt	**yt**
Prestopped nasals	**pm**	**kng**	**tnh**	**tny**	**tn**	**rtn**	**ytn**
Plain nasals	m	ng	nh	ny	n	rn	**yn**
Laterals			lh	ly	l	rl	**yl**
Tap/trill					rr		
Approximants		**h**		y		r	

east uncle' or 'the groper coming from the east'; some examples of derivatives based on the root ri- 'east' are *riinda* 'coming from the east,' *rilungka* 'eastwards,' *riliida* 'heading ever eastwards,' *riyananganda* 'to the east of,' *ringurrnga* 'east across a geographical boundary,' *riyanyinda* 'at the eastern extremity of,' *rilumirdamirda* 'sea-grass territory to the east,' *rilurayaanda* 'from one's previous night's camp in the east,' *rilijulutha* 'move to the east' and *riinmali* 'hey you coming from the east.'

See also: Australia: Language Situation; Australian Languages; Endangered Languages; Future Tense and Future Time Reference; Tense; Word Classes/Parts of Speech: Overview.

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Laterals			lh	ly	l	rl	**yl**
Tap/trill					rr		
Approximants		**h**		y		r	

Table 2 Kin noun inflection

	'Elder brother'	*'Mother'*
1Sg	alkere-ye	arrwengke_
2Sg	ngk-alkere	ngk-arrwengke
3Sg	kw-alkere	kw-arrwengke
Dyadic	alkere-nhenge	arrwengke-nhenge

Table 3 Twelve words for 'we'

	Same moiety, same generation	*Same moiety, opposite generation*	*Opposite moiety*
Dual inclusive	ayleme	aylake	aylanthe
Dual exclusive	aylene	aylenake	aylenanthe
Plural inclusive	aynangke	aynake	aynanthe
Plural exclusive	aynenangke	aynenake	aynenanthe

Table 4 Associated motion stems for intransitive and transitive verbs

Relative time of motion	*Gloss*	Angke *'talk'*	Kwathe *'drink'*
Prior	VERB after SUBJ goes	angkeyene-	kwatheyene-
	VERB after SUBJ comes	angkeyetnye-	kwatheyetnye-
	VERB after SUBJ returns	angkeyalpe-	kwatheyalpe-
	VERB after non-SUBJ arrives	angkeyayte-	kwatheyayte-
Subsequent	VERB before SUBJ goes away	angkerrayte-	kwathelayte-
	VERB before SUBJ returns	angkerralpe-	kwathelalpe-
Concurrent	VERB while SUBJ comes	angkeyernalpe-	kwatheyernalpe-
	VERB while SUBJ goes along	angkerrape-	kwatherrapeyne-
	VERB continuously/repeatedly while SUBJ goes along	angkerrangkerrenye-	kwathelathelarre-
	VERB once while SUBJ is on the way	angkelpangke-	kwathelpathe-
Prior and subsequent	go and VERB and then return	angkenyayne-	kwathenyayne-

'section' (Koch, 1982), which distinguishes whether the participants belong to different patrimoieties (e.g., *I and my mother/spouse/sister's child*) or the same moiety; and if the latter, to the same or opposite set of alternate generation levels (e.g., *I and my siblings/grandparents/grandchildren* vs. *I and my father/brother's children*).

Verbs may inflect for the category of 'associated motion' (Koch, 1984), indicating distinctions in the direction and relative timing of movement by thesubject (usually), using markers that partially differ according to the transitivity of the verb stem (Table 4) and derive in part from former verbs of motion.

In semantics, the expression of feelings and emotions is characterized by the use of the reflexive construction of 'hear' and the mention of body parts, especially *aleme* 'stomach' (Turpin, 2002).

> *Rewenhe aleme eyterrtye-le elpathe-nke errpatye*
> 3RDSING.REFL stomach person-ERG hear-PRES bad
> 'That person feels bad'

Available language resources include a non-technical learner's guide (Turpin, 2000) and picture dictionary (Turpin and Ross, 2004), each of which includes an audio component, and a text collection (Thompson, 2003)

See also: Arrernte; Australia: Language Situation; Warlpiri.

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Kazakh

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Location and Speakers

Kazakh (*qazaq tili*, *qazaqša*) belongs to the northwestern or Kipchak branch of the Turkic language family, more specifically to its southern or Aralo-Caspian group. Until the early 20th century, it was called Kazak-Kirghiz, whereas Kirghiz was referred to as Kara-Kirghiz. Kazakh is primarily spoken in the Republic of Kazakhstan (*Qazaqstan Respublikasi*), a vast country situated at the center of the West Eurasian steppe zone. It borders on Turkmenistan, Uzbekistan, Kyrgyzstan, and China in the south, and on the Russian Federation in the north and west. Kazakh is also spoken by minorities in Xinjiang (China), Uzbekistan, Mongolia, Turkmenistan, Kyrgyzstan, the Russian Federation, Tajikistan, Afghanistan, etc. The number of speakers is at least 10 million. There are more than seven million in Kazakhstan, more than one million in Xinjiang, and almost one million in Uzbekistan.

Kazakh is, along with Russian, the official language of the Republic of Kazakhstan. Kazakh–Russian bilingualism is widespread. Though Kazakhs constitute half of the population of the republic, many have a low proficiency in their mother tongue. Russians make up 37% of the population. The declaration of Kazakh as the state language in 1989 was met by protests from the non-Kazakh population. In 1995, Russian was proclaimed the language of interethnic communication. Russian has a dominant status in public life as the main language of instruction, science, business, and communication in professional domains.

Karakalpak (*qaraqalpaqša*), an independent language in the political sense, is a slightly Uzbekicized variety of Kazakh. It is spoken by c. 450 000 persons, mainly in the Autonomous Republic of Karakalpakstan (*Qaraqalpaqstan Respublikasi*) in Uzbekistan, on the lower course and in the delta of the Amudarya River. Small groups of speakers live in other regions, e.g., in the Khorezm and Fergana regions of Uzbekistan and in the Dashkhowuz region of Turkmenistan.

Origin and History

Kazakh goes back to the Kipchak varieties of Uzbek tribes, who founded a huge steppe empire in the second part of the 15th century. Separatist Kazakh tribes split off from the Uzbeks during their migrations, and moved into the northern steppe regions. The ancestors of the Karakalpaks belonged to one of the most important confederations under the Golden Horde. At the beginning of the 17th century, the Kazakhs occupied Tashkent, which remained their capital until 1723. In the 18th century, Kazakh and western Mongol tribes fought for supremacy in the steppes between the Altay mountains and the Caspian Sea. The Kazakh empire disintegrated into three so-called hordes, of which the Great Horde submitted to Russia in 1717. The Kazakh territory was incorporated into Russia in the mid-19th century. A Kazakh constituent republic of the Soviet Union was established in 1920. Kazakhstan declared its sovereignty in 1990 and its full independence in 1991.

Related Languages and Language Contacts

Kazakh is closely related to Karakalpak, Kipchak Uzbek and Noghay (Nogai). Kipchak Uzbek, a vanishing variety formerly spoken mainly in the north and northwest of Uzbekistan, goes back to the original language of the Uzbek nomads. Kazakh has had old close contacts with Mongolic languages, and the recent influence on it of Russian has been strong. The southern part of Kazakhstan constitutes an intensive contact zone with Uzbek (Northern Uzbek). The Kazakh varieties spoken in China have been relatively little influenced by Chinese.

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The Written Language

Kazakh did not possess a written variety in the pre-Russian period. Official documents were mostly written in Chaghatay (Chagatai) or Tatar. At the end of the 19th century a written language emerged. It was based on the dialect of the northwestern regions, where the Russian and Tatar influence was strong.

The Arabic script was used up to 1929. It was replaced by a Roman-based alphabet, which was abandoned in 1940 in favor of a Cyrillic alphabet. There are currently plans to adopt a Roman-based script again. In China, Kazakh is written in Arabic script, after an unsuccessful experiment with a Roman-based (pinyin) alphabet in the 1970s. Written Kazakh of China is still oriented towards the standard language used in Kazakhstan.

Karakalpak was established in 1925 as a language in the political sense and as a written language. Its orthography differs considerably from that of Kazakh. After the Arabic and Roman scripts had been employed for a few years, the Cyrillic alphabet was introduced in 1940. The transition to a new Roman-based script has begun.

Distinctive Features

Kazakh exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation, e.g., *A* = *a*/*e*. Hyphens are used here to indicate morpheme boundaries.

Phonology

Kazakh has a front vowel *æ*, which is lower than the mid-high *e* and restricted to the first syllable. It has emerged through fronting of *a*, e.g., *bæri* 'all.' High vowels are often reduced, relatively short, but not lowered as in Tatar and Bashkir. Initial *e*-, *o*- and *ö*- are often pronounced with a prothetic glide, e.g., ^{y}*eki* 'two,' ^{w}*on* 'ten.' Initial *t*- is mostly preserved, e.g., *til* 'language' (cf. Turkish *dil*). As in most Kipchak languages, final -ɣ is labialized in monosyllabic stems, e.g., *taw* 'mountain' ← *ta:*ɣ. The affricate *č* has developed into the fricative *š*, e.g., *üč* 'three' ← *üš*, whereas *š* has developed into *s*, e.g., *tas* 'stone' ← *taš*. Word-initial *ž*- corresponds to *y*- or *ǰ*- in other Turkic languages, e.g., *žol* 'way' (Turkish *yol*). However, *ǰ*- is found in older Kazakh texts.

According to front vs. back sound harmony, a suffix vowel is back if the preceding syllable has a back vowel, and front if the preceding syllable has a front vowel. This type of sound harmony also affects consonants, e.g., *qar*-ɣ*a* [snow-DAT] 'into the snow,' *köl-ge* [lake-DAT] 'into the lake.'

According to rounded vs. unrounded harmony (labial harmony), a suffix vowel is rounded if the preceding syllable contains a rounded vowel, and unrounded if the preceding syllable contains an unrounded vowel. Spoken Kazakh displays this kind of harmony not only in high suffix vowels, but also in low vowels, e.g., *üy-dö* [house-LOC] 'in the house,' *tüskön* [fall-PART] 'fallen,' *öl-gön* [die-PART] 'dead.' However, *o* is not admitted, e.g., *qol-da* [hand-LOC] 'in the hand' instead of **qol-do*. The rounding effect decreases with the distance from the first syllable, e.g., *üy-dö* [house-LOC] 'in the house,' *üy-ümüz-de* [house-POSS.1PL-LOC] 'in our house.' The rounded vs. unrounded harmony is not reflected in the orthography, which does not represent the suffix vowels *ö*, *ü*, and *u*.

Kazakh exhibits numerous consonant changes, mostly assimilations, in clusters containing dentals, liquids and nasals. Suffix-initial *d*-, *l*-, *n*-, and *m*- occur after stem-final vowels and often after nasals, sonorants, and glides, but they are otherwise assimilated. Suffix-initial *d*-, *l*-, and *n*- are assimilated to *t*- after voiceless stem-final consonants, e.g., *at-tar* [horse-PL] 'horses' ← *at-lar*. Suffix-initial *d*- is assimilated to *n*- after stem-final nasals, e.g., *adam-nan* [man-ABL] 'from the man.' Suffix-initial *l*- and *n*- are changed to *d*- after most consonants, e.g., *köz-der* [eye-PL] 'eyes,' *qïz-dï*^{ŋ} [girl-GEN] 'of the girl.' Suffix-initial *m*- is changed to *b*- after stem-final -*z* and -*ž*, e.g., *žaz-ba*- [write-NEG] 'not to write.'

Loanwords are mostly pronounced according to indigenous phonotactic rules. Consonant clusters are dissolved through consonant deletion, or insertion of high prothetic or epenthetic vowels, e.g., *xalïq* 'people' (Arabic *xalq*), *ïras* 'true' (Persian *rast*), *pïratsent* 'percent' (Russian *procent*), *telgirep* 'telegraph' (Russian *telegraf*), *kerewet* 'bed' (Russian *krovat'*). The consonants *f* and *x* in loanwords are replaced by *p* and *q*, e.g., *aptobus* 'bus,' *qat* 'letter.' The phonological adaptation was largely reflected in the old Arabic and Roman orthographies, but since the introduction of the Cyrillic script, Russian loanwords are written in their original form.

Grammar

The comparative suffix is -*rAK* (after consonant-final stems -*(I)rAK*), e.g., *ülken-irek* [big-COMP] 'bigger.' There is an instrumental case in -*Men*. The reflexive pronoun *öz* is used attributively or as a noun with possessive suffixes, e.g., *öz üy-im* [self house-POSS.1SG] 'my own house,' *öz-im bar-dïm* [self-POSS.1SG go-PAST-1SG] 'I went myself.'

The old flexion of pronouns is preserved, and not replaced by flexion of the nouns as in some other

Turkic languages. Pronouns ending in *-l*, e.g., *bul* 'this,' replace *-l* with *-n* in most oblique cases. The initial *b-* in *bul* is changed to *m-* in the genitive, accusative, and locative. The demonstrative pronouns *bul*, *osï*, and *mïna* are used for referents within the range of view, while *ol*, *sol*, and *ana* are used for referents out of sight. Some demonstratives exhibit emphatic forms, e.g., *mïna-w*.

The second-person plural marker *sIŋ-dAr* combines the second-person singular marker with the plural suffix. The marker *-sIz* expresses politeness when used to one addressee, whereas *-sIz-dAr* is the corresponding polite plural marker.

The suffixes *-LA-p* and *-LA-GAn*, whose first element *-LA* derives verbs stems from nouns, form approximative and multiplicative numerals, e.g., *žüz-de-gen* 'hundreds.'

Kazakh has a present tense in *-A* plus person markers, e.g., *kel-e-di* [come-PRES-3.SG] 'comes.' It has emerged from a construction containing a converb ending in *-A + tur(ur)* 'stands'. The old present tense form in *-(A)r* is mostly used with modal meanings, e.g., *kör-er-miz* [see-AOR-1.PL] 'we will see.' A more focal present tense, i.e. with a narrower focus on the ongoing event, is formed with the converb suffix *-(I)p* and one of the verbs *otïr* 'sits,' *žür* 'goes,' *žatïr* 'lies,' *tur* 'stands,' e.g., *žaz-ïp žatïr* [write-CONV lies] 'is writing.' The suffix *-AtIn* (*-ytIn* after vowel-final stems) forms a habitual past. There is an intentional in *-MAK*, e.g., *kel-mek-piz* [come-INTENT-1PL] 'we want to come,' and a necessitative in *-MAK-šI*, e.g., *sat-paqšï-mïn* [sell-NEC-1SG] 'I must sell.' Kazakh displays complex verbal compositions expressing actionality, aspect-tense, and evidentiality. A number of auxiliary verbs are used in postverb constructions based on the converbs in *-A* and *-(I)p* and mostly specifying the manner of action, e.g., *žan-ïp ket-* [burn-CONV go] 'to burn down.' Evidential forms are the indirective past in *-(I)p*, with *-DI* in the third person, e.g., *kel-ip-ti* [come-CONV-3SG] 'apparently came.' The evidential (indirective) copula particle *eken* combines with various items, e.g., *kel-e-di eken* [come-PRES-3SG INDIR. COP] 'apparently comes,' *kel-gen eken* [come-PART EV] 'has apparently arrived.' Unlike more Iranicized languages such as Uzbek and Turkmen, Kazakh has a weakly developed system of conjunctions.

Lexicon

The basic vocabulary related to the traditional way of life is of Kipchak Turkic origin. There is also a rich modern Kazakh vocabulary with numerous neologisms, e.g., *xalïqaralïq* 'international.' Many words are of Persian (Farsi) and Arabic origin, introduced via Tatar and Chaghatay, e.g., *bazar* 'market,' *apta* 'week,' *nan* 'bread,' *aqïl* 'intellect,' *γïlïm* 'science,' *maγïna* 'meaning,' *waqït* 'time.' Due to close contacts with other nomadic groups, Kazakh also exhibits many words of Mongolic origin, e.g., *olža* 'booty.' Kazakh of China has a fairly strong early layer of Mongolic loanwords, but relatively few loans from Chinese, at least in the written language. Russian words have been borrowed from the second half of the 19th century on. In the Soviet period, calques on Russian models and neologisms were generally preferred to loanwords. There is now a certain tendency in the written language to reduce the number of Russian loans in favor of words of native or Arabic–Persian origin.

Dialects

In spite of its huge extent, the Kazakh-speaking area exhibits little dialectal variation because of a high degree of mobility of the speakers of Kazakh throughout their history. The standard language is based on the northwestern dialect. The southern and western dialects differ from it in some respects. For example, initial *y-* is often found, e.g., *yaq* 'side' instead of *žaq*. Common Turkic *č* is often found instead of standard Kazakh *š*. Changes of suffix-initial consonants are less common. They are, on the other hand, stronger in the easternmost dialects spoken in China and Mongolia, e.g., *bala-dar* [child-PL] 'children' instead of *bala-lar* [child-PL]. The rural Kipchak Uzbek dialects in the north and northwest of Uzbekistan have been largely de-Kipchakicized and are now practically extinct due to the abandonment of the nomadic lifestyle.

The Karakalpak language displays most of the phonetic and morphophonemic characteristics of Kazakh. Word-initial *ǰ-* is, however, found instead of *ž-*, e.g., *ǰol* 'road.' Suffix-initial *l-* is not assimilated, e.g., *tas-lar* [stone-PL] 'stones' instead of *tas-tar*, *qïz-lar* [girl-PL] 'girls' instead of *qïz-dar*. There are a few morphological differences, stemming from the influence of Oghuz and Uzbek. The future suffix *-AžAK* is a loan from Oghuz. The first- and second-person plural personal markers *-MAn* and *-sAN* instead of Kazakh *-MIn* and *-sIN* are similar to Uzbek *-man* and *-san*. The vocabulary differs to a certain degree from that of Kazakh and contains more words of Arabic and Persian origin. Karakalpak has two main dialects, one northeastern and one southwestern. Certain nominally Karakalpak and Kazakh dialects in the region of Khorezm belong to the Southwestern or Oghuz branch of Turkic.

See also: Altaic Languages; Kazakhstan: Language Situation; Mongolic Languages; Turkic Languages; Uzbek.

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Kazakhstan: Language Situation

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The Republic of Kazakhstan became independent in 1991. In 2004, the population of Kazakhstan (2 717 300 sq km) was 14 953 126: 57.19% Kazakhs; 27.24% Russians; 15.57% others; 53.8% of the population speak two or more languages, 46.2% are monolinguals (**Table 1**).

The major religions are Islam and Orthodox Christianity.

Kazakh is the state language. Both Kazakh and Russian can be officially used in state and local government institutions, including in the courts and in the military; in legal, business, customs, and other

Table 1 Kazakhstan. Ethnic groups and knowledge of languages[a]

Ethnic group	*Population size*	*As percent of total population*	*Percent of those who claim to speak*				
			Their native language	*The nonnative language*			
				Kazakh	*Russian*	*English*	*German*
Total	14 953 126	100.00	90.0	11.2	54.8	0.7	0.3
Kazakh	7 985 039	53.40	99.4	–	75.0	0.7	0.2
Russian	4 479 620	29.96	100.0	14.9	–	0.9	0.4
Ukrainian	547 054	3.66	16.1	12.6	99.5	0.5	0.3
Uzbek	370 663	2.48	97.0	80.0	59.2	0.1	0.0
German	353 441	2.36	21.8	15.4	99.3	0.3	–
Tatar	248 954	1.66	37.1	63.6	96.9	0.8	0.2
Uighur	210 365	1.41	81.3	80.5	76.1	0.5	0.1
Belarusian	111 927	0.74	13.5	9.9	99.4	0.4	0.3
Korean	99 665	0.67	25.8	28.8	97.7	1.8	0.3
Turks	75 933	0.55	75.5	74.7	75.9	0.4	0.1
Azeri	78 295	0.52	50.1	63.4	86.0	0.3	0.1
Polish	47 297	0.32	9.1	9.9	98.9	0.5	0.6
Dungan	36 945	0.25	48.9	35.9	95.1	0.3	0.0
Kurdish	32 764	0.22	68.8	61.2	76.9	0.1	0.1
Chechen	31 799	0.21	58.6	39.5	94.1	0.4	0.2
Tajik	25 659	0.17	56.8	67.9	35.8	0.2	0.0
Bashkir	23 225	0.16	28.2	58.3	97.9	0.4	0.2
Moldovan	19 460	0.13	21.8	17.8	99.2	0.3	0.2
Ingush	16 900	0.11	58.2	22.6	96.9	0.6	0.1
Armenian	14 758	0.09	45.4	21.8	97.5	1.4	0.3
Greek	12 703	0.08	26.8	26.4	98.2	1.2	0.3
Chuvash	11 851	0.08	23.7	19.0	99.3	0.4	0.3
Kyrgyz	10 897	0.07	38.3	88.8	80.7	0.7	0.2

[a]The table lists ethnic groups that are 10 000 people and larger. In Kazakhstan there are more than 120 ethnic groups.
Source: Smailov (2000).

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[a]The table lists ethnic groups that are 10 000 people and larger. In Kazakhstan there are more than 120 ethnic groups.
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Figure 1 Kazakh speakers in Kazakhstan by oblast (region). Source: Smailov (2000). 'Itogi perepisi naselenia 1999 goda v Respublike Kazakhstan 2: Naselenie Respubliki Kazakhstan po nationalnostam i vladeniu jazykami (The Results of 1999 census in the Republic of Kazakhstan 2: Population the Republic of Kazakhstan by ethnicity and languages).' Almaty: Statistics Agency of the Republic of Kazakhstan.

Table 2 Use of Kazakh and Russian

Domains	*Kazakh*	*Russian*
Government communications	25.0	75.0
Preschools (as percent of total number of preschools)	25.0	75.0
Schools (as percent of total number of students)	49.4	47.2
Universities (as percent of total number of students)	32.0	68.0
Dissertations defended (as percent of total number of dissertations)	14.0	86.0
Newspapers (as percent of single circulation)	18.1	81.9
Magazines (as percent of annual circulation)	24.2	75.8
Printed matter (as percent of total number of copies)	33.3	66.7

Sources: Nysanbayeva (2000), Gosudarstvennaya programma funktsionirovaniya i razvitiya jazykov na 2001–2010 gody (2001), Smailov (2002a,b).

documentation; in road and other signs; in mass media (broadcasting in Kazakh must be no less than half of all broadcasting time). Kazakh and Russian are required school subjects.

The knowledge of Russian is almost universal among non-Russians. Most language minorities underwent language shift and were linguistically Russified. A high language maintenance rate is observed only among Turkic-speaking non-Kazakh groups (they also have a good command of Kazakh). A total of 3.3% of schoolchildren attend minority language schools: Uzbek, Uyghur, Tajik, German, and Tatar. There are radio programs and newspapers in German, Ukrainian, Korean, and Uyghur.

Twenty-five percent of Kazakhs are monolingual Kazakh speakers; 99.1% of Kazakhs claim to know Kazakh, which is viewed as a primary symbol of Kazakh identity; there is a wide discrepancy between actual and stated native language proficiency. The level of knowledge of Kazakh varies from region to region (Figure 1).

State language policy is aimed at the restoration of the functional domains of the Kazakh language, at the acquisition of Kazakh by the general population, and at corpus planning. Support for Kazakh at the state level has decelerated language shift among Kazakhs and has strengthened the position of Kazakh as the language of the government, mass media, education, and science. Russian remains the dominant language (Table 2).

See also: Bilingualism; German; Identity and Language; Kazakh; Korean; Language Maintenance and Shift;

Minorities and Language; Russian; Tajik Persian; Tatar; Uyghur; Uzbek.

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Kiyozo Kazama is a Japanese Indo-Europeanist who succeeded Harushige Kodzu (*see* **Kodzu, Harushige (1908–1973)**) at the University of Tokyo in 1972. Born in traditional downtown Tokyo in 1928, he studied Indo-European comparative linguistics with Prof. Kodzu. After working as a research assistant in the department of linguistics at the University of Tokyo, he taught linguistics at Nagoya University. In 1972 he started to teach Indo-European comparative linguistics at the University of Tokyo, from where he retired with the title of Emeritus Professor in 1989. Meanwhile he studied at the University of Vienna (Universität Wien), funded by a scholarship from the Japanese Ministry of Education (1973–1974).

One of his major fields is Indo-European kinship terms, on which he wrote his doctoral dissertation in 1978. Its revised version is published in Japan as *Studies in Indo-European kinship terms* (1984). This compilation and interpretation of new materials presents a major new synthetic viewpoint of Indo-European kinship terms, going beyond Delbrück's memorial work *Die indogermanischen Verwandtschaftsnamen* (1889).

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works, including 'Recent trends in Indo-European laryngeal theory' (1964: 45).

See also: Greek, Ancient; Kodzu, Harushige (1908–1973); Latin.

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Kempelen, Wolfgang von (1734–1804)

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Wolfgang von Kempelen was born in Bratislava (Pressburg) as the son of an official servant. He studied law and philosophy in Vienna, where he attracted the attention of Maria Theresa because of a translation of an act of law from Hungarian into German and was soon appointed Secretary and eventually Counselor of the Imperial Royal Court. Kempelen took a keen interest in physics and mechanics and also classical and modern languages and literature, writing poetry and authoring a drama. In other words, he was very creative and a man of versatile talent. Kempelen proved his skill as a constructor, as an organizer, and above all as an inventor of different useful devices. In his time he reached world-wide fame because of a less useful invention, a chess machine (the 'Turk'), which turned out to be a fraud: hidden inside it was a legless but skillful chess player! Kempelen died in Vienna at the age of 71.

The reason why Kempelen's name is still remembered in linguistics today, however, is his construction of a speaking machine, which was no joke but a very serious enterprise, on which he worked for 20 years without being able to finish the fourth version of it. The third version consisted, roughly, of a bellows (lungs), a compression box (bronchus), an ivory reed (vocal cords), a leather resonator (mouth), and two small pipes (nostrils). Bellow, resonator, and pipes were modified by means of the hands. In this way Kempelen was able to produce vowels and consonants, even short words and phrases.

The construction of the machine also resulted in a close study of the phonetic prerequisites of speech, which resulted in a book (*Mechanismus der menschlichen Sprache,* 1791) containing a thorough and, for his time, accurate description of speech organs and articulation, and also of his speaking machine. His introduction contains general reflections on human language and the origin of language. Basing his opinion on J. G. Herder, Kempelen argued against the idea that language is of divine origin as propagated, for example, by J. P. Süßmilch and A. Court de Guebelin. He was generally skeptical of speculation and showed a soundly critical mind. Referring to Hungarian and non-European languages, he not only rejected the idea of one proto-language of man but also the idea of a common origin of the other European languages. This is far from the standpoint taken by J. Grimm *et al.*, but Kempelen also saw the possibility of substrates ("*Vermischung der Völker*") and the necessity to consider not only words but also syntax and word order, which are less prone to change, by the comparison of languages.

In his passion for mechanical devices and automates, Kempelen was significant for his time and a typical exponent of the Cartesian (mechanistic) world conception. His speaking machine was unique, although there had been a simultaneous experiment in 1780 by C. G. Kratzenstein, St. Petersburg, whose device, however, could only produce vowels. Kempelen was also the first to understand that the mouth cavity and not, which had previously been assumed, the larynx was important for the quality of vowels. His work was developed further theoretically and practically up to the computerized speech synthesizer technique of today.

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See also: Greek, Ancient; Kodzu, Harushige (1908–1973); Latin.

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Benjamin Hall Kennedy was a distinguished classical scholar of wide reading, with a great talent for composition in Greek, Latin, and English verse, as can be seen, for example, in his work *Between whiles* (1877). He also edited several classical authors. His greatest contribution to the study of classics in England, however, was the publication of several successful school grammars, beginning with the *Latinae grammaticae curriculum, or a progressive grammar of the Latin language* in 1844.

Born at Summer Hill, near Birmingham, Kennedy spent his youth at Shrewsbury School, where he soon developed into a brilliant student. In 1823, he went to St John's College, Cambridge, where he gained several university awards. On his graduation Bachelor of Arts as 'Senior Classic' in 1827, he was elected fellow and classical lecturer of St John's College in 1828. Eight years later, he succeeded Dr Samuel Butler as headmaster of Shrewsbury (1836–1866). The last 22 years of his life he was Regius Professor of Greek at Cambridge.

In his lifetime, Kennedy was considered the greatest classical teacher of his century (Page, 1937–1938: 1303) for his powerful and enthusiastic manner of teaching, giving his pupils a lasting love for the classics. Today he is chiefly remembered for his grammar *The revised Latin primer* (1888), still widely used after revisions in 1909, 1930, and 1962. Its predecessor, *The public school Latin primer*, was published in 1866. It was commissioned by the headmasters of the nine chief English public schools – Shrewsbury included – with the encouragement of the Royal Commission of 1861, which recommended the use of a common Greek and Latin grammar in public schools. As the commissioners had selected the *Latinae grammaticae curriculum* as the basis of the new Latin grammar, Kennedy was asked to write the didactic manual. Subsequently, he also produced an advanced grammar as a supplement, *The public school Latin grammar* (1871), followed by an elementary version of the *Primer* entitled *The shorter Latin primer* (1888).

The *Primer* received a lot of criticism. Nevertheless, it rapidly became the standard Latin grammar in the public schools of England. Among its innovations was the introduction of the new case-order NOM (– VOC) – ACC – GEN – DAT – ABL, which, although adopted from – in addition to the Dane J. N. Madvig – the English grammarians T. H. Key and H. J. Roby (Kennedy, 1866: iv), remained linked in the English tradition with Kennedy's grammar and became the standard sequence in Britain (Allen-Brink, 1980).

See also: Latin; Madvig, Johann Nicolai (1804–1886).

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Kenya: Language Situation

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Typology

The Niger-Congo phylum is the largest. According to Heine and Mohlig (1980), approximately 65% of Kenyans speak one Bantu language or another (e.g., Swahili, Luhya (Luyia), Kamba, etc.), while about 3% of Kenyans speak a Cushitic language (e.g., Somali, Borana, Burji, etc.) belonging to the Afroasiatic phylum. The Nilo-Saharan family is represented by many Nilotic languages of the eastern Sudanic subgroup, which make up about 30% of the total languages spoken in Kenya (e.g., Masai [Maasi], Luo, Nandi, etc.). Each of the groups can further be broken into a number of dialect clusters. Area distribution of languages in Kenya makes a striking contrast. The majority Bantu languages are spoken in only about 20% of the national territory, while Nilotic languages occupy about 35% and the Cushitic languages more than 40% of Kenya's territory.

Kenya's Bantu languages are commonly divided into three general groups: western (Luyia, Kuria, etc.), central (Gikuyu, Kamba) and Coastal (Swahili, Digo, etc.). Guthrie's 1967–1971 classification places nearly all of them, except for Taveta (G21) and Swahili (G42), in Zone E. (SIL's [1990] Ethnologue lists the two as G20 and G40, respectively. It also lists Luyia and Bukusu in the J30 group, contrary to Guthrie's classification into E32 and E31c, respectively.) All languages except Swahili are tone languages, whereby distinctions in pitch are as important in a word as distinctions in consonants and vowels in indicating differences of meaning. Tone may also indicate grammatical differences. Some languages have two to four distinct tone levels while others have two, sometimes three levels plus a slight lowering of nonlow tones (downstep). In addition to tones, the chief characteristics of Bantu languages are noun classes whereby the head noun in a sentence or phrase 'agrees' with verbs and 'concords' with its modifiers such as adjectives, singular, and plural forms accordingly, as in the following highlighted examples from Swahili:

*M**ti** h**uu** ni m**refu***	'this tree is tall'
*m**iti** h**ii** ni m**irefu***	'these trees are tall'
*m**toto** m**dogo** amelala*	'the small child is sleeping/ asleep'
*w**atoto** w**adogo** wamelala*	'the small children are sleeping/ asleep'

There are no Khoisan languages found in Kenya. The chief, well-known characteristic of these languages are clicks, or consonant sounds that are found in the initial position of almost every noun, verb, and adjective. Immigrants who have settled in the country for a few generations maintain languages of the Indo-European family alive, such as Punjabi (Punjabi, Eastern), Gujarati, Hindi, and English. There exists also a Kenyan Sign Language (KSL) for the deaf, approved by relevant official institutions such as the Kenya National Association of the Deaf. KSL appears mainly unrelated to other countries' sign languages, although it has been standardized with slight variations since 1961. It would appear, for example, that the deaf in neighboring Uganda and Tanzania do not really understand KSL, but those living in different parts of Kenya can understand each other completely even with some dialect differences. There is a manual alphabet for spelling and a dictionary.

Languages and Dialects

The common difficulties of establishing clear boundaries between languages and dialects are found in Kenya, which is why the estimate of total languages ranges from 30 to 60, according to different published reports. The problem is most acute when dealing with the numerous, contiguous Bantu languages spoken by two-thirds of the Kenyan population. More crucially, dialect boundaries are not clearly cut isoglosses, but rather dialect continua. In the case of Kenya, further obfustication is the result of a lack of distinction between language, ethnicity,

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and culture. Nonlinguistic factors (e.g., prestige, historic-cultural ties, etc.) in a country where ethnolinguistic nationalism is prevalent may at times overshadow strict linguistic criteria normally applied to demarcate language and dialect boundaries. Where for example, Masaba, Luyia, and Bukusu are treated as different languages, linguistically this may not be so readily evident, as mutual intelligibility among them is quite high. Conversely, less mutually intelligible languages such as a Kipsikiis and Nandi are considered dialects of the same language, Kalenjin. Population data and censuses of the past have used ethnic rather than linguistic affiliation to identify people. For example, the northeastern part of the country is considered Somali-speaking because it is seen as little differentiated culturally. Yet, in addition to the more numerous Somali speakers, there are a number of distinct Oromo (Cushitic) languages such as Borana, Boni, and Garreh-Ajuran. People often identify as Luhya or Kalenjin, terms that cover several differentiated dialects and even languages. Many may also identify as Swahili because of religious and cultural practices, without letting it be known that their vernacular language is really different.

Swahili

Swahili language occupies a special position in Kenya's linguistic landscape. It is the national and official language of Kenya, now a part of the new draft constitution (2003) as such. Linguistically, it is of the coastal Bantu subgroup (G40), with several distinctive dialects spoken on the Indian Ocean islands of Lamu, Pate, Pemba, and Zanzibar. The language developed to become the common coastal language as early as the 13th century and has been greatly influenced by Arabic, with some loan words from Hindi, Persian, Portuguese, and English. Its capability to adapt to changing contexts has contributed to its unique position among the languages of East and Central Africa. Swahili is the universal lingua franca of Kenya today in small-scale trade and media. It is closely connected with urban life and with certain occupations. Our recent survey of language use in Nairobi revealed, for example, that although only 7% of the total number of respondents ($n = 1,300$) reported Swahili as a first language, more than 50% use Swahili in their household interactions with other family members (Githiora, 2002). Swahili is in theory used as a medium of instruction in urban schools, but in practice English plays a larger role, according to teachers who participated in the same survey. However, Swahili is taught as a subject at all levels of education in Kenya, with many graduates specializing in Swahili each year from the three main national universities. Radio and television broadcasts may be heard in Swahili, English, and various Kenyan languages. In rural areas of Kenya, Swahili is usually encountered only in radio and television broadcasts, shops or business run by nonlocals, or in Swahili newspapers and pamphlets. In rural schools, children are taught in their local language up to Standard 4, but are taught Swahili as well as English as a second, examinable language. Overall, about two-thirds of Kenyans can make use of Swahili as opposed to less than one-sixth who know English (Heine and Mohlig, 1980: 61). The relationship between language, power, and ideology becomes highly relevant, as well the history and trajectory of Swahili during the modern, colonial, and post-colonial periods. For example, the language is closely connected with ethnic neutrality, urban life, and with certain occupations. Consequently, its functional roles within Kenyan society are strongly linked to the rural–urban divide, and to socioeconomic class. In addition to its geographical dialects, at least one distinct urban Swahili-based mixed code known as Sheng (Githiora, 2002) has emerged since the time of independence in the 1960s, and its influence is being felt far in the rural areas as well. Growing attention to this urban, mixed code is important in so far as how the code affects communication, education, and the desired spread and use of standard Swahili in Kenya.

Multilingualism and Language Policy

There is a high level of multilingualism among Kenyans, as citizens speak at least one other second language in addition to their first. Put differently by Heine and Mohlig (1980), Kenyans have on average a second language competence of 1.01 languages. A recent study of multilingualism and language use in Nairobi city, a microcosm of Kenya's linguistic mosaic, showed that the average number of languages spoken by a city resident is actually three, while a 25% of the total sampled live in bilingual households (Githiora, 2002). The higher mean figure in the findings in Nairobi city are probably because urban dwellers tend to speak both Swahili and English, unlike rural Kenyans. Kenya's language policy is best defined as nonexistent, despite a 1969 declaration by the ruling party (KANU) in parliament at that time, whereby Swahili was to become the official language of the country within a 5-year period. This declaration was made in good spirit, but it lacked the backing of any serious research on Kenya's sociolinguistic situation, nor was there a defined method in implementing the proposal. There was no scientific basis for defining the different roles that each or some of the 50 odd languages and their dialects could play

in different tasks within a modern Kenyan state. Such a sociolinguistic understanding would not come about until the 1980 publication of the *Atlas of Kenya's languages and dialects* by Heine and Mohlig, but even so, no concrete policy proposals have emerged backed by this ambitious study. Today, bills, parliamentary debates, laws, and statutes are still drafted in English, but parliamentarians who wish to can debate in Swahili while court interpreters a provide translation service into Swahili or any other Kenyan language as required, including Kenyan Sign Language (KSL) for the deaf.

Minority and Endangered Languages

While Swahili dominates study and discussion of Kenya's languages, a number of minority languages occupy an important position as they relate to issues of endangered languages, language contact, shift, and death. Among the larger groups of speakers, a form of stable bilingualism exists where, for example, two-thirds of Kenyans can speak Swahili, and a far smaller number are competent in English without losing competence in their vernacular languages. The situation is different in the case of smaller ethnolinguistic communities whereby bilingualism tends to be of the assimilating type. One of the consequences of cultural assimilation and adoption of the lifestyle of larger, economically better off communities is language shift which is seen as a necessity to adapt to the new value system. In most cases, it implies major changes of lifestyle such as a shift from fishing to pastoralism as in case of El Molo, Kenya's most endangered language whose estimated number of speakers left ranges from 8 to 500 on the shores of Lake Turkana in northern Kenya. This process culminating in a complete language shift has taken place (i.e., the languages are nearly extinct) among the Yaaku and Omotik, two Cushitic language speaking communities in favor of Masai, a Nilotic language. A similar process of cultural and linguistic assimilation by Gikuyu-, Kalenjin-, and Masai-speaking communities also places Okiek, a Nilotic language second on the list of Kenyan near-extinct languages. It is telling that the three assimilating communities mentioned above refer to the Okiek people and language as Ndorobo. Another case is that of Suba, a Bantu language that is also nearly completely absorbed by the larger, numerically dominant Luo (Nilotic) language. No significant pidgins have emerged from Kenya. What has been termed as Cutchie Swahili (Asian Swahili) or Shamba Swahili spoken by Asian immigrant traders and European settler farmers respectively is basically a nonstandard Swahili sociolect. The only true pidgin language of Kenya is Nubi (or Kinubi), a creolized form of Arabic spoken by a small minority of people whose origins date back to the colonial period in northern Uganda and Sudan, who now live in two communities; the larger one in Nairobi city's Kibera quarter, and a smaller one a few kilometers from Kisii town in western Kenya.

See also: Applied Linguistics in Africa; Bilingualism and Second Language Learning; Contact-Induced Convergence: Typology and Areality; Education in a Multilingual Society; Endangered Languages; Gikuyu; Identity: Second Language; Language Change and Language Contact; Language Education: Grammar; Language Education Policies in Africa; Language Policy in Multilingual Educational Contexts; Language Surveys; Lingua Francas as Second Languages; Luo; Sign Languages of the World; Swahili; Tanzania: Language Situation; Tone: Phonology.

Language Maps (Appendix 1): Map 17.

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Relevant Website

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Keres

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Introduction

Of the 21 Pueblo tribes in the American Southwest, one speaks Zuni, a language isolate; another speaks Hopi (Uto-Aztecan family) in several Arizona villages. In New Mexico, Tanoan pueblos (speaking Tiwa, Tewa, or Towa, related to Kiowa) are interspersed with those speaking Keres (or Keresan, *Quirix* or *Quires* in 16th-century Spanish; Davis, 1959).

Historically, Keres borrowed lexically from other pueblo languages via bilingual speakers, now a defunct process. Keresan has two major dialect divisions: Eastern (Rio Grande Valley) and Western (Colorado River drainage). Mutual intelligibility among dialects increases with proximity (speaker populations follow in parentheses as cited in Mithun, 1999, from Valiquette, 1995), Western: Acoma (1930)/Laguna (2060); Eastern: Zia (504)/Santa Ana (384)-San Felipe (1985)/Santo Domingo (2965)-Cochití (525).

Beginning in 1598, Spanish influences were strong only in the area of material culture (livestock, new crops, trade goods, and technologies). The impact was slighter in nonmaterial domains (e.g., religion) because of indigenous resistance resulting in the Pueblo Revolt of 1680–1692.

Surrounded by denser Spanish populations, the Eastern dialects received the most loanwords via Spanish bilingualism that persisted into the mid-20th century. English displaced Spanish as the regional lingua franca but provided fewer loans. Keres linguistic literature is scant, despite intensive Pueblo ethnographic work.

Structural Overview

Keres consonantal series are plain (b, d, d^y, g), aspirated (p, t, ʧ, k), and glottalized (p', t', ʧ', k') stops and affricates; sonorants (m, n, r, w, y, m', n', r', w', y'); and fricatives (s, ʂ, ʃ, s', ʂ', ʃ'). There are two laryngeals (ʔ, h); five long and short vowels, voiced and voiceless contextually (i, e, a, ɨ, u); and as many as four pitch accents (high ´, falling ˆ, breathy ˋ, and glottal '), depending on the dialect. Morphologically, Keres is polysynthetic, exhibiting distinct sets of prefixes on active and stative verbs to express nominal arguments without independent pronouns. Pronominal prefixes, with the subject and object fused into one morpheme, undergo especially complex phonological alternations and simultaneously encode five subject and object persons, including an indefinite and a fourth or obviative person (when the subject is hierarchically lower than the object). Also simultaneous is modality (negative, dubitative, hortative, negative hortative, future hortative, and indicative). Singular, dual, and plural numbers occur. Voice requires its own set of pronominal prefixes followed by the reflexive-reciprocal prefix /-a-/ or the passive /-aʔa- or –a'-/. Benefactives are expressed discontinuously by prefixes and suffixes. Aspect (continuous, fulfilled, and state) is suffixal, as is adverbial subordination. Some intransitive pronominal agreement examples are [ʂ-u'pɨ] 'I or you ate,' [k-u'pa] 'he ate' versus the transitives [s'-ˋaku] 'I bit you', [ʧ'-ˋaku] 'you bit me,' [ʂ-ékʉ] 'I bit (him),' [s'-ˋaku] 'he bit (him),' [sg-àku] 'someone bit him' (Mithun, 1999: 438–440). The following sentences are from Davis (1964) as quoted in Mithun (1999):

ʔe ʂu ʔe yúsi n'ɨ ʔeu dya:mi ʔeu ʂu ʔe yúsi n'ɨ t'-a'gúyan-e
from there down EMPH eagle from there down 3.DUB-PASS-send-PL
'then the eagle was sent down from above'

ʂu ʔe hauʔ dí-uw'ác'i
PRT PRT toward 3.DUB-approach
'(the eagle) approached'

Language, Culture, and Society

The Keres language reflects the traditional interrelated cultural concerns of the Pueblo peoples, principally religious ceremonialism, agriculture, and theocratic governance. This has given rise to elaborate esoteric terminologies distinguishing the realms of the sacred from the profane. The latter categories may vary from pueblo to pueblo. There is baby talk as well as a difference between male and female speech in frequently occurring words (Kroskrity, 1983; Sims and Valiquette, 1990).

Recently, there have been vigorous efforts in some Keresan pueblos to counteract language shift (Pecos and Blum-Martinez, 2001; Sims, 2001).

See also: Hopi; United States of America: Language Situation.

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Ket

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Ket [KET] is also known as Yenisei Ostyak and Imbat[skij] Ket. There are probably fewer than 200 mother tongue speakers out of an ethnic population of 1100–1200 (Krivonogov, 1998). Ket is spoken in north central Siberia along the Yenisei river and its tributaries (e.g., Yelogui), in northern Krasnoyarski Kray, spoken mainly in the villages of Sulomai, Kellog, Surgutikha, and Maiduka. Ket is the sole surviving member of the Yeniseic language family. Related languages include Arin, Assan, and Pumpokol, which became extinct by mid-18th century; Kott, which lasted until the mid-19th century, originally spoken to the north, west, and south of Krasnoyarsk. The closely related Yugh (also known as Sym-Ket) became extinct only in 1980s, and was last spoken in Vorogovo village. Yeniseic language speakers shifted to Russian or various Turkic varieties, in particular Chulym Turkic, Xakas, Shor, and Northern Altai varieties. Yeniseic speakers previously occupied the territory south along the Yenisei to the mouth of the Dupches River. Yeniseic-speaking peoples once occupied a large area in western and central Siberia, based on the widespread use of Yeniseic hydronymics across the area. Presumably, the attested Yeniseic peoples were encroached upon and marginalized areally by the advance at various periods of Samoyedic- and Ob-Ugric-speaking peoples from the west, and Turkic and Tungusic from the south and east, until they occupied their attested position along the Yenisei. The Xiong Nu of the Chinese chronicles may have spoken a Yeniseic language.

There are three dialects of Ket: Northern, Central, Southern. Mainly Southern Ket survives in such villages as Kellog and Sulomaj. Ket is severely endangered but enjoys high status in the villages where Ket people dominate. Only a handful of young people are learning the language as a first language, but Ket instruction in primary schools has begun in certain villages (e.g., Kellog), based on the written form of Ket developed by native Ket scholars and Professor Heinrich Werner.

Ket is unique among central Siberian languages for its unusual system of tone. Tones appear as a prosodic feature of the two leftmost syllables (if present) in Ket words (Vajda, 1999).

(1) Southern Ket
$^{1}s^{j}ul^{j}$ 'blood'
$^{2}s^{j}u^{ʔ}l^{j}$ 'white salmon'
$^{3}s^{j}u{:}l^{j}$ 'sled'
$^{4}s^{j}ul^{j}$ 'cradle hook'
(Vajda, 1999: 5)

Tone differentiates both lexical and grammatical forms in Ket.

(2) Southern Ket

ásèl	'ski'	*àsél*	'type of large covered houseboat'

Davis I (1959). 'Linguistic clues to northern Rio Grande prehistory.' *El Palacio 66*, 73–84.
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(Vajda, 1999: 5)

Tone differentiates both lexical and grammatical forms in Ket.

(2) Southern Ket

ásèl	'ski'	*àsél*	'type of large covered houseboat'

bʌ̀ntán	'mallard duck'	*bʌ́ntàn*	'mallard ducks'

(Vajda, 1999: 13)

The Ket dialects differ tonally primarily in the realization of the fourth tone, which may be falling with a short vowel and no pharyngealization (Southern Ket), or pharyngealized with a long vowel (Central and Northern Ket).

(3)

Southern Ket	Central Ket	Northern Ket	gloss
⁴sʲɛlʲ	*⁴sʲɛ:lʲi*	*⁴sʲɛ:lʲi*	'reindeer'
⁴asʲ	*⁴a:sʲe*	*⁴a:sʲe*	'feather'
⁴ɨrʲ	*⁴ɨ:də*	*⁴ɨ:rʲe*	'spring'

(Vajda, 1999: 7)

Although Ket is unique among the languages of Siberia for its tone/register system (certain Ket tones, e.g., tone 2, are associated with pharyngeal tension), Ket is typical of north-central Siberian languages for its elaborate case system (Anderson, 2003). Nouns may appear in one of ten or eleven case forms. Ket is unusual for Siberian languages in distinguishing three genders or noun classes, roughly masculine, feminine, and other/neuter. One set of the case forms encodes these distinctions. Others do not and appear to be more recently fused postpositional constructions.

(4) Ket

hɨb-daŋa	*hun-diŋa*
son-DATIVE. MASCULINE	daughter-DATIVE. FEMININE
'to (his) son'	'to (his) daughter'

(Werner, 1997: 105)

In addition, Ket makes extensive use of case forms on verbs as well within a highly diversified system of case-marked clausal subordination that dominates complex sentence structure in the languages of the region.

(5) *-diŋalʲ* Ablative → 'after,' 'since'

Ket

bu	*ətn-asʲ*	*du-ɣ-a-raq-diŋalʲ*
he	we-INS/COM	I-SEP-PRES-live-ABL
dɔŋ	*sɨkŋ*	*u-ɣɔñ*
three	year.PL	III-go

'three years have passed since he's been living with us'

(Werner, 1997: 353)

Among the most noteworthy features of Ket from a typological and areal perspective is its elaborate and highly complex verbal system. There are many different structural positions or slots within the Ket verb, the exact number of which is debated by Ket specialists (e.g., Werner (1997) assigns 18 such slots (14 prefix positions, a root, and three suffix positions), while Vajda (2003), on the other hand, considers there to be 10 such slots in the Ket verb (eight prefix position, root + one suffix position). Some examples of complex Ket verb forms include the following:

(6)

da-bágdɛ̀ŋ-ú-ɣ-à-vɛt	*d-us'-n-ba-ɣɔ-v-in'-tet*
3FEM-drag-3NEUT.OBJ-DIR-PRES-ITER	3M-INCORP-DER-1-PST-INAN-PST.PRF-hit
'she drags it often'	'he has hit me'
(Vajda, 2003: 63)	(Werner, 1997: 156)

Morphosyntactically, Ket stands out for its unusual predilection for multiple encoding of a single category, e.g., subject in verbs or plurality in nouns. Examples of this kind of redundant encoding may be seen in the following examples.

(7) Ket

d-dəŋ-b-it-n	*¹qa-ŋ-s-eŋ-naŋal'*
1-1PL-INAN-transport-PL	chief..-PL-..chief-PL-PL:ABL
'we transport it'	'from the chiefs'
(Shabaev, 1987; Werner, 1995)	
	< ⁴qa[:]s 'chief'

A number of proposals have been offered on the possible wider genetic affiliation of the Yeniseic languages, including connections with Burushaski, Sino-Tibetan, and Northeast Caucasian languages of Eurasia, as well as Athabaskan (Na-Dene) languages of North America. To date, only the latter proposal has met with any positive reactions among specialists.

See also: Endangered Languages; Russian Federation: Language Situation.

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Khakas *See:* Turkic Languages.

Khalaj *See:* Turkic Languages.

Khalkha *See:* Mongolic Languages.

Khasi

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The Khasi are a group of Mon-Khmer speakers living predominantly in the Khasi and Jaintia Hills region of Megahlaya state in northeastern India, with a smaller number in Assam, West Bengal, and Manipur states. In some sources, the Khasi have been called Khuchia. The vast majority of Khasi people (ca. 90%) live in India, with a further 10% living across the border in Bangladesh. Khasi [KHI] is the only language of the Mon-Khmer group of Austroasiatic spoken this far to the west.

Traditionally the Khasi are divided into a number of 'dialect' groups, but perhaps it is more sound from a linguistic perspective to speak of a small group of related languages sometimes labeled Khasic or Khasian. These 'dialects' or closely related languages include the following (Grimes, 2000; Parkin, 1991):

(1) Khasic languages
a. Amwi [AML]
b. Bhoi
c. Lyngngam
d. Pnar (aka Synteng or Jaintia) [PBV]
e. Khynriam or Cherrapunji/Standard Khasi [KHI]
f. War

Of these dialects/languages, Lyngngam is most linguistically distant from the standard Khasi dialect, while Pnar is the closest. Amwi is also quite distant from Standard Khasi. Lyngngam may include a linguistically Khasified Garo element (a Tibeto-Burman language), while War and Bhoi may include assimilated Mikir (Tibeto-Burman) elements. The Pnar (Synteng/Jaintia) ruled a kingdom in the region from at least 1500 to 1835, when it was disbanded by the British colonial authorities (Parkin, 1991: 58). Further Khasic varieties include Lakadong and Mynnar. Other local Khasic varieties may (in fact probably do) exist, and there is also considerable microlevel variation.

According to figures from the India Missions Association in 1997, there were just under 1 million total Khasi speakers, including all the above mentioned dialects/languages (the actual estimated figure is 950 000). Khasi is a literary language and a language of media and government in Meghalaya. There are even radio and television broadcasts in the Standard Khasi language. Phonologically, Khasi exhibits some areally and typologically atypical initial clusters, e.g., [bt], [ks], [kt], [ktH], and so on.

(2) *bta* 'wash/besmear face' *ksew* 'dog' *kti* 'hand' *kt^{h}áw* 'grandfather'

Syntactically, Khasi is SVO, while other Khasic languages show different basic word orders as well as many other different features.

(3) <u>*Khasi*</u>
phi-m ʔiithuʔ ya ŋa
you-NEG recognize OBJ I
'don't you recognize me?'
(Rabel, 1961: 61)

Morphosyntactically, Khasi is characterized by use of gender markers and a system of personal verb inflection, albeit within a predominantly isolating structure.

(4) <u>Standard Khasi</u>
u khinnaʔ u-m bam
DET.M boy MASC-NEG eat
'the boy doesn't eat'
(Nagaraja, 1993: 5)

In addition, there is evidence of a now (mainly) covert noun-class system that manifests itself in the form of lexicalized prefixes in noun stems. This system of gender classifiers is highly marked for Austroasiatic. This and the unusual phonology of Khasi set it apart from its sister languages spoken to the east.

In terms of verbal derivational morphology, Khasi, like its sister languages to the east, makes use of a causative prefix consisting of a labial consonant in various allomorphic realizations.

(5) i. <u>Khasi</u>	<u>Khasi</u>	<u>Khasi</u>
ph-rung 'penetrate'	*ph-láit* 'clear away'	*b-ta* 'wash/besmear face'
< *rung* 'enter' (Henderson, 1976b: 487)	< *láit* 'be free' (Henderson, 1976b: 487)	(Henderson, 1976b: 487)

Negative occurs in the form of either an enclitic to a subject pronoun or gender agreement marker or proclitic to the verb stem, depending of the tense/aspect value of the clause. Note also the presence of fused subject+tense forms in Standard Khasi as well.

(6) <u>Standard Khasi</u>

phi-m ʔiithuʔ ya ŋa	*ŋan ʔm-thoʔ*
you-NEG recognize OBJ I	I.FUT NEG-write
'don't you recognize me?'	'I'm not writing'
(Rabel, 1961: 61)	

Standard Khasi
u khinnaʔ u-m bam
DET.M boy MASC-NEG eat
'the boy doesn't eat'
(Nagaraja, 1993: 5)

In Bhoi, another language of the Khasic subgroup of Mon-Khmer, the negative has a different phonological shape and occurs between the lexical verb and a postposed gender/agreement marker.

(7) Bhoi
u khannaʔ bam re u
DET.M boy eat NEG MASC
'the boy doesn't eat'
(Nagaraja, 1993: 5)

Bound aspectual or tense morphemes are rare in Eastern Austroasiatic. There is, however, a quasi-bound suffixal past tense marker in *-laʔ* and a future in *-diʔ* in Lyngngam, a language of the Khasic subgroup.

(8) Lyngngam

brə kyu	*di-laʔ*	*liŋba*	*laʔtap*
man 3PL	go-PAST	through	forest

'the men went through the forest'
(Nagaraja, 1996: 43)

nə dənni	*nə di-laʔ*	*tu dənni-diʔ*
I go.NPAST	I go-PAST	he go.NPAST-FUT
'I go'	'I went'	'he will go'

(Nagaraja, 1996: 44)

mi binnəŋ-diʔ	*mi baŋ-laʔ*
you eat.NPAST-FUT	you eat-PAST
'you will eat'	'you ate'

(Nagaraja, 1996: 44)

In terms of nominal derivation, Khasi, like virtually all Austroasiatic languages, may derive deverbal nominals through a process of *-n-* infixation. Note that sometimes the derived noun reflects a more archaic phonological form than the verb stem it (historically) derives from, e.g., the preservation of initial *s-* in the word for 'wing' while the corresponding verb stem 'fly' has shifted this to *h-*.

(9) Khasi

shnong	*sner*
'village' < *shong* 'sit, dwell'	'feather, wing' < *her* 'fly'

(Henderson, 1976b: 517–518)

Like many Austroasiatic subgroups (Anderson and Zide, 2002), Khasic languages show irregular correspondences in the free-forms of nouns, while the corresponding 'underlying' (usually CVC) roots are clearly cognate across the subgroup. Note the following forms in this regard:

(10) Irregular Khasic correspondences

Khasi	Lyngngam	Synteng	Amwi	Lakadong
ksew	*ksu:/'su:*	*ksaw* ~*kswa*	*ksiá*	*ksaw*
sim	*sim*	*sim*		
khmat	*kh'mat*	*khmat*	*ma:t*	*ma:t*
khmut	*leo- 'mut*	*khmut*	*mur-koŋ*	*mur-koŋ*

Mynnar	War	gloss
ksow	*ksià*	'dog'
ksem	*ksem*	'bird'
	ma:t	'eye'
	myrkoŋ	'nose'

(Fournier, 1974: 86–92)

That elements like *k-/kh-* are historically prefixes in Khasi is attested to by such facts as the following alternations. The original root forms appear as CVC 'combining form' elements in compounds.

(11) Khasi
kti but ***tii****pdeŋ* 'middle finger.' (Rabel, 1961: 44)
khmat but ***matliʔ*** 'white of eye.'
also ***ʔiimat*** 'eye' < see-eye/face (Rabel, 1961: 149)
khnaay 'mouse. rat' but ***naay****saaw* 'small red hill mouse'

Note in this regard also the following alternations:

(12) Khasi
kpa, kmi(e) 'father, mother' (non-vocative) vs.
ʔii ***paa*** *ʔii* ***mey*** address term used by children to parents 'da ddy/mommy' (Rabel, 1961: 49)

See also: Austroasiatic Languages; India: Language Situation; Mon-Khmer Languages.

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Khmer

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Khmer (Cambodian)

In the Kingdom of Cambodia, most of the population of 10 716 000 (1998 UN) are considered speakers of Khmer. Its dialectal varieties are spoken by around 1.3 million ethnic Khmer people in the northeastern and eastern provinces of Thailand. The former variety is called Northern Khmer, or sometimes Surin Khmer. Another variety is spoken by more than one million people of the Khmer ethnic group, called Lower Khmer, in southern Vietnam.

Khmer is one of the major languages of Mon-Khmer subgroup of the Austroasiatic language family. It is a typical Mon-Khmer language in that phonemically its native words are either monosyllabic or disyllabic; it has no tonal distinction and is of the isolating type syntactically.

Script and Written Records

Khmer script is one of the oldest scripts in mainland Southeast Asia that originate in South India. Archeology has shown that the communication between Southeast Asia and India dates back to the beginning of the Christian era. Khmer legend, according to the Chinese document, says the local queen married the prince from India, and they became the founders of the Khmer kingdom, which suggests the existence of local matrimonial authority influenced by the Indian civilization, such as Hinduism.

The oldest Khmer inscription in old Khmer dates from 611 C.E., in addition to which there are also undated inscriptions, or presumably older ones written in Sanskrit. The inscriptions spread not only in Cambodia, but also in parts of Thailand and southern Vietnam, which suggests that the ethnic group was formerly more widespread than it is in the present and once exerted a strong cultural influence over the area.

Phonology and Phonetics

A Khmer native word is either monosyllabic or disyllabic. In a disyllabic word, a minor syllable precedes a major syllable. In a minor syllable, the inventory of possible vowels is smaller than in a major syllable. A major syllable is pronounced with stress when preceded by a minor syllable. Using the abbreviations

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C for a consonant, V for a vowel, F for a syllable final consonant, 'r' for a liquid and parentheses for an optional element, a minor syllable can be either CVF or C(r)V, where only nasals can appear as F.

Likewise, a Khmer major syllable can be illustrated as C (C) V F. Vowels are either long or short. The long and short contrast is also found among diphthongs. A short vowel occurs only in a checked syllable: it must be followed by a syllable-final consonant, whereas a long vowel can occur both in an open and checked syllable.

Consonants

Consonants in the syllable-initial position are given in Table 1, where the IPA symbols, when necessary, are given in the brackets.

Of these consonants, only nasals /m, n, ɲ ŋ/, unreleased stops /p˥, t˥, c˥, k˥/, a glottal stop /ʔ/, fricatives /v, y, h/ and a liquid /l/ can occur in the word-final position as well. /r/ in the word-final position, once pronounced, is lost except in the Northern Khmer dialect in Thailand. /f/ appears only in loanwords.

The distinction between voiceless unaspirated and voiceless aspirated stops can be found only in the syllable initial or intervocalic position. Voiceless aspirated consonants could be further analyzed as consonant clusters /p/ + /h/, /t/ + /h/, /c/ + /h/, /k/ + /h/, as there are some words that have an infix between the first stop and the second fricative /h/. Characteristic of the Khmer consonants is that Khmer allows a variety of two-consonant combinations in the syllable initial position of a major syllable. Regarding the above aspirated stops as consonant clusters, 84 combinations in total are possible.

Vowels

Modern Khmer has a complicated vowel system. Although several dictionaries have been published for Khmer, there is no consensus as to the vowel phonemic system. As a result, almost every dictionary has its own phonemic transcription. The main reason for the discrepancy is that some assume the existence of resister contrast, i.e., contrast between 'breathy' and 'clear' phonation type, but others do not.

Table 1 Khmer consonants

p	t	c [tɕ]	k	ʔ
ph	th	ch [tɕh]	kh	
b[ɓ]	d[ɗ]			
m	n	ɲ	ŋ	
	r l			
(f) v	s y[j]			h

Table 2 shows the standard Khmer long vowels and diphthongs in phonetic transcription with the transliteration of orthography of Indic origin. The register contrast, which had been regarded as phonemic, has been lost in the dialects in Cambodian territory, and diphthongization has occurred in compensation. See Minegishi (1985) for details of phonetic values of Khmer dialects. According to Wayland and Jongman (2003), the remnant of phonation contrast is observed in the dialect of eastern Thailand.

Note that, "æ, ɨ̄, ə" are transliterations for Khmer original scripts, which do not exist in the ordinary Indic script system. A '1' following the transliteration means that the consonant preceding the vowel symbol is of voiceless group; '2' indicates the preceding consonant of the voiced group. In addition, there are diphthongs /ɯə, ɔə, uə/. In total, there are 12 long vowels and eight diphthongs. This complexity is attributable to the loss of voiceless and voiced contrast in the syllable-initial position for stops and successive divergence of vowels. See 'Historical Phonology' below for details. Table 3 shows the Khmer short vowels and diphthongs.

Historical Phonology

The phonemic reconstruction by Sakamoto based on Khmer inscriptions has established the old Khmer vowel phonemes as */i, e, ɛ, a, aa, (ɯ), ə, u, o, ɔ, ɒ, ɒɒ, iə, uə/.

By the above reconstruction and modern orthography, diachronic changes in their phonological systems can be internally reconstructed as follows.

Formerly, Khmer had a phonemic contrast, e.g., /*kaa/ and /*gaa/ as its orthography shows, where the

Table 2 Khmer long vowels and diphthongs

Phonemic	*Orthography*
iː	ī-2
eː	e-2
e̯ː	e-1
ɛː	æ-2
aɛ	æ-1
ɯː	ɨ̄-2
ə̯ː	ə̄-2
əː	ɨ̄-1
aə	ə̄-1
iə	ā-2
aː	ā-1
uː	ū-2
o̯u	o-2
oː	ū-1
o̯ː	a-2
ɔː	a-1
ao	o-1

difference is between voiceless and voiced consonants. Later, the vowel following the voiced consonant changed its quality; /*kaa/ and /*gèa/, where phonemic contrast between the consonants still existed and the difference in the vowel register, i.e., 'clear' versus 'breathy' phonation type respectively, was irrelevant. Later on, the voiceless and voiced distinction in stops was lost and the difference in the voice quality in turn carried the phonemic contrast; /*kaa/ and /*kèa/. In the present, the voice quality is no longer phonemic; instead vowel articulation is relevant; /kaː/ and /kiə/. The divergence of vowels is well preserved in the standard Khmer around Phnom Penh area, but in the rest of the country, vowels have merged again to simplify the vowel system. As a result, most of the dialects have only /iː, eː/ as long front vowels, etc. Northern Khmer, conversely, has retained most of the vowel contrast as monophthongs.

Tonal Contrast

As is usual in Mon-Khmer languages, Khmer does not have tones. The only exception, however, is the colloquial style of Phnom Penh dialect, which has acquired a tonal contrast, a level tone versus a raising-falling one: the latter is a compensation for the phonemic change /r/ into /h/, and the successive loss of /h/.

Morphology

Khmer, although syntactically of an isolating type, has a large number of derivational prefixes and infixes, which have been fossilized and are no longer productive in word formation. A word may have either a prefix or infix, but not both. Thus, native words are either monosyllabic or disyllabic. Like other Mon-Khmer languages, Khmer has no suffix. It has prefixes and infixes for causativization, specification, nominalization, intransitivization, repetition, etc., and infixes representing instrument, agent, result, object, etc., of an action.

Grammar

Khmer is an isolating language with no inflection in verbs, nor case marking in nouns. As a result, classifying word classes must be done by means of their distribution and class meaning. Noun modifiers follow the noun, verb modifiers follow the verb.

Table 3 Khmer short vowels and diphthongs

i	ɯ	u
e	ə	o
ɛ		^{w}ɔ
ɛə	a	ɔ

Khmer's main word classes are as follows, although further classification considering the syntactic distribution is possible: nouns, numerals, classifiers, demonstratives, pronouns, verbs, preverbs, adverbs, expressives, conjunctions, and final particles.

Of these, classifiers are few in number and rarely used except for counting persons, animals, or books. There are two demonstratives. Pronouns are a subclass of nouns, most of which are also used as nouns. Along with titles and kinship terms, choice of pronouns shows relative social positions. Verbs can be further classified as active and stative (adjectival) verbs. Preverbs may precede verbs adding modal meaning, such as 'may, must,' etc., to them. Adverbs may follow a verb. Expressives are a subclass of adverbs, describing noises, shapes, movements, emotions, etc. Final particles may be in the sentence-final position to denote the intentions and emotions of the speaker, etc.

The basic word order is Subject+Verb+(Object). A modified noun (head) is followed by a modifier. Nouns and stative verbs can be used as modifiers. Prepositions (or a noun grammaticalized as a preposition) precede a noun.

The typical noun phrase can be described as follows where optional elements are in parentheses.

Noun+(Verb)+(Numerals)+(Classifier)+(Demonstrative)

In case a clause is used for the noun modifier, the word order is as follows.

Noun+(Relative clause marker+Clause)+(Demonstrative)

A verb may be followed by a noun to form a verb phrase. Several verbs, sometimes with a noun inserted in between, form a serial verb construction, or verb serialization without any change in verbal forms, such as V(N)V(N), etc. In a serial verb construction, two or more verbs may be in various semantic relations, such as an action and its direction, an action and its objective, successive actions, an action and its result, an action and its manner, or an action and its means, etc.

Vocabulary

As one of the earliest languages in Southeast Asia that has accepted Indianization, earlier Hinduism, and later Theravada Buddhism, Khmer has borrowed Sanskrit and Pali loans, especially for religion, administrative, and other cultural vocabulary. It also has exerted a huge influence over adjacent Thai, which in turn borrowed a large number of Khmer words, such as honorific vocabulary used for the royal family. As a result of long-term contact with Thai, Khmer also borrowed many words from Thai.

See also: Austroasiatic Languages; Cambodia: Language Situation; Mon-Khmer Languages; Thailand: Language Situation.

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Khoesaan Languages

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The recognition of Khoisan (Khoesaan) as one of the four language phyla in Africa received initial impetus mainly through the 'Macro-Khoisan Hypothesis' of Joseph Greenberg, first published in 1950. This controversial phylum comprises his 'Click languages,' which formerly were known as 'Hottentot' and 'Bushman' languages, respectively. Dorothea Bleek (1929) had paved the way for their integration into one family by challenging the prevalent view that Hottentot as a Hamitic language had been influenced by Bushman, and by suggesting instead that Nama (as representative of Hottentot) was a Bushman language with Hamitic admixture. Bleek divided the Bushman languages into Northern, Central, and Southern groups. In essence, these divisions are still recognized today, although their validity is open to challenges (see **Table 1**).

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Only some 30 Khoesaan languages still exist today, with the great majority of languages being extinct.

See also: Austroasiatic Languages; Cambodia: Language Situation; Mon-Khmer Languages; Thailand: Language Situation.

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Only some 30 Khoesaan languages still exist today, with the great majority of languages being extinct.

Table 1 Southern African Khoesaan languages

Branch	*Languages* (*† = [virtually] extinct*)
1. Northern (*Ju*)	!Xung (DC), Jul'hoan, ‖Xau‖'e, !'O!xung
2. Southern (*!Ui-Taa*)	
2.1 †*!Ui*	†|Xam, †|'Aunî, †ǂKhomanî, †‖Xegwi
2.2 *Taa*	!Xõõ (DC), †Kakia
Isolate	ǂHõã
3. Central (*Khoe*)	
3.1. Khoekhoe	
3.1.1. Northern/Namibian	Khoekhoegowab DC (= Nama, Damara, Hai‖om, ǂĀkhoe)
3.1.2. †Southern/South African	†!Gora ('Korana'), †Xri ('Griqua'), †Cape Khoekhoe (DC)
3.2. Kalahari Khoe	
3.2.1. Western	Khwe, Buga, ‖Ani (DC); Naro (DC); ‖Gana, |Gui, ǂHaba (DC);
3.2.2. Eastern	Shua, Ts'ixa, Danisi, |Xaise, †Deti; Kua-Tsua (DC)
4.	†Kwadi (Angola)
5.	Sandawe (Tanzania)

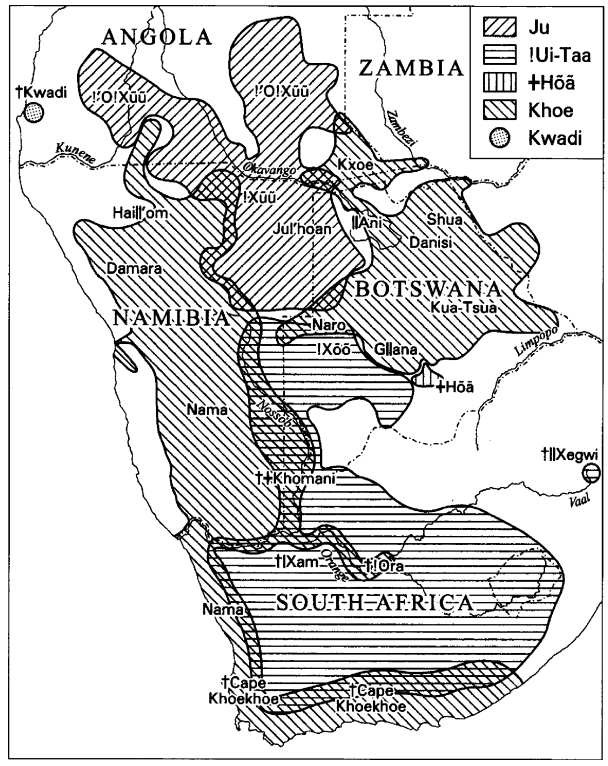

Figure 1 South African Khoesaan languages (precolonial situation). (Note: '†' = language now extinct.) Map reproduced with kind permission of Cambridge University Press from Güldemann T & Vossen R (2000). 'Khoisan.' In Heine B & Nurse, D (eds.). *African languages: an introduction.* Cambridge: Cambridge University Press. 100, map 5.5.

With the possible exception of Khoekhoegowab in Namibia (formerly better known as 'Nama,' and for classificatory purposes briefly referred to as 'Khoekhoe'), virtually all of these languages can be considered to be endangered.

While the Northern (*Ju*) and Southern (*!Ui-Taa*) branches with the isolate ǂHôã are spoken by hunter-gatherers (Bushmen/Saan), the languages of the Central branch (*Khoe*) are today spoken by Khoeid (Nama; !Gora/!Ora, Xri, and Cape Khoekhoe being extinct), Saaid (of especially the Kalahari Khoe branch), and Negroid (Damara) peoples. Linguistic and racial classifications of these groups are thus not coextensive. The following classification is largely based on the classifications of Köhler (1989) and of Güldemann and Vossen (2000). The reader is referred to the latter publication for more detailed information on Khoesaan languages. For a classification of !Xung and Jul'hoan dialects (Northern Khoesaan) see Snyman (1997), for Central Khoesaan see Voßen (1997), and for dialects of Khoekhoe(gowab) Haacke *et al.* (1997). Several of the language names below represent dialect clusters (DCs). The iconic classificatory names *Ju*, *!Ui*, *Taa*, and *Khoe* mean 'human being' in their respective branches. The now extinct Kwadi was probably related to Namibian Khoekhoe. Although Sandawe does show evidence of affinity to Central Khoesaan, *i.a.* also in its tonology, recent research by Bonny Sands (1998b) considers Hadza of Tanzania to be an isolate with no satisfactory evidence for a genetic relationship to Khoesaan, despite lexical similarities and the use of clicks (Figure 1).

Before the Bantu diaspora, Khoesaan peoples probably inhabited the entire Southern Africa up to the east coast of South Africa and into southern Angola. Displacement and absorption led to a drastic reduction of territorial domains, which was further aggravated by the arrival of European colonizers in the seventeenth century. Social marginalization still determines the life of all groups considered to be Saan. Khoekhoegowab in Namibia is the only Khoesaan language that is officially recognized for language-planning purposes and is a major subject at university level. Demographic figures are largely based on estimates, totalling over 200 000 for Southern African Khoesaan. Khoekhoe(gowab), with 175 554 speakers (1991 census of Namibia), represents by far the largest Khoesaan speech community and constitutes some 12.5% of the Namibian population.

The most conspicuous phonological characteristic of Khoesaan languages is the use of click consonants (Table 2). Clicks consist of an influx and an efflux phase. The influx (basic click) produces the actual

Table 2 The 20 click variants of Khoekhoegowab

Influx	*Efflux*				
	Glottal stop	*Voiceless velar stop*	*Delayed glottal fricative*	*Voiceless velar affricate*	*Voiced nasalization*
Dental ǀ	[ǀʔ]	ǀg [ǀ]	ǀh [ǀɦ]	ǀkh [ǀxʰ]	ǀn [ŋǀ]
Alveolar	! [!ʔ]	!g [!]	!h [!ɦ]	!kh [!xʰ]	!n [ŋ!]
Palatal	ǂ [ǂʔ]	ǂg [ǂ]	ǂh [ǂɦ]	ǂkh [ǂxʰ]	ǂn [ŋǂ]
Lateral	ǁ [ǁʔ]	ǁg [ǁ]	ǁh [ǁɦ]	ǁkh [ǁxʰ]	ǁn [ŋǁ]

Table 3 The six main citation melodies of Khoekhoegowab and their sandhi correlates (as recorded by Eliphas Eiseb)

Citation	*Sandhi*	*Gloss*
!ȍmìs	*!ȍmìs*	to butt
!ȍmís	*!ȍmís*	female genitals, udder
!ȍmìs	*!ȍmìs*	to force escape from burrow (of: aardvark)
!ómìs	*!ȍmìs*	to coagulate;
		to remove thorn with aid of utensil
!ȍ̃mís	*!ómìs*	fist
!ȍmí̃s	*!ȍmìs*	pollard

clicking sound and is produced without pulmonic airstream. There are five influx variants: ⊙ (bilabial), ǀ (dental), ! (alveolar), ǂ (palatal), and ǁ (lateral). Each of these influxes then combines with a specific number of effluxes, depending on the language. This efflux constitutes the resumption of the pulmonic egressive airstream, and its nature depends on the manner of release of the posterior, velaric (and at times glottalic) closure. The bilabial 'kiss-click' ⊙ is manifest only in Southern Khoesaan. The number of effluxes can vary from five in Khoekhoe(gowab) to 16 in !Xõõ, yielding a total of 83 click variants in the latter language, with a total of 117 consonants (cf. Traill, 1985) – a possible world record.

The tonology of Central Khoesaan languages is typologically most akin to those of Southeast Asian languages on account of perturbational (sandhi) processes and the interaction of tonal and segmental phonemes, with depressor consonants triggering tonogenesis (development of contrastive pitch as compensation for the depletion of consonantal contrasts).

According to research thus far, available roots in Khoesaan languages appear to be generally bimoraic. Roots of at least Central Khoesaan languages are disyllabic, with syllable and mora being in isomorphic relation; hence tonal melodies (**Table 3**) consist of a sequence of two register (level) tonemes. The following minimal set illustrates the six main melodies of Khoekhoegowab in citation and sandhi form (Haacke, 1999. The second syllable of *!om* consists of a syllabic nasal [m]. Verbs are quoted here in their infinitival form with the third person fem. sg. pgn-marker *s*). Vowel qualities generally vary between oral and nasalized vowels; in addition, pharyngealized, laryngealized, and breathy vowels or their combinations are found in most non-Khoekhoe languages.

The most distinctive morphological characteristic of Central Khoesaan languages is that they mark nouns for sex gender with postclitic person–gender–number markers, whereas Northern and Southern languages do not. This occurs most consistently in Khoekhoegowab, which marks nouns for person (third, as well as first or second), gender (masculine, feminine, neuter/common), and number (singular, dual, and plural). Non-Central languages have little inflectional morphology. Whereas Non-Central languages have SVO constituent order, Central languages have SOV order in the case of lexically specified NPs.

See also: Botswana: Language Situation; Namibia: Language Situation; Phonetics, Articulatory; Phonetic Classification; South Africa: Language Situation.

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Khoikhoi *See:* Khoesaan Languages.

Khoisan Languages *See:* Khoesaan Languages.

Khotanese

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Khotanese, an Eastern Middle Iranian language spoken in the kingdom of Khotan in southwestern Xinjiang, is known from manuscripts on paper and wood found in the Khotan area, as well as in the caves at Dunhuang. The related language Tumshuqese, spoken in Kucha in northwestern Xinjiang, is much less well known. They were written in the southern and northern variants of Brahmi, respectively.

Three stages of Khotanese can been distinguished: Old, Middle, and Late, corresponding to texts from, roughly, the 5th–6th, 7th–8th, and 9th–10th centuries, up to the end of Buddhism in Khotan (ca. 1000).

Written remains consist mainly of Buddhist texts from all three periods, economical and legal documents from the Middle Khotanese period, and letters from the Late Khotanese period.

Khotanese and Tumshuqese contitute the northeastern branch of the Iranian languages, in which Indo-Iran. *ćw, ǰw* [tʃw, dʒw] became *ś* [ʃ], *ź* [ʒ]. This feature is only shared by modern-day Wakhi spoken in northeastern Afghanistan.

The phonology of Khotanese is of the Middle Iranian type in which, for instance, *č* [tʃ] and *ǰ* [dʒ], spelled *c* and *j*, had become [ts] and [dz], spelled *tc*, and *js* in the Brahmi alphabet. There are two non-Indic vowel marks, transcribed as *-ä* ([-ə]?) and *-ei*.

Khotanese had retroflex consonants (*ṭ, ṭh, ḍ, ṇ*) in both indigenous words (in which, e.g., *ḍ* < *rd, ṇ* < *žn*) and in Indic loanwords. It is not clear whether the aspirated stops, *kh*, etc., were spirants [x], etc., or actually aspirated stops [k^h], etc. It is possible that they were originally spirants, as in other Iranian languages (cf. Khot. *khara-* 'donkey,' Avestan *xara-*, Persian *xar*, etc.), and only later became stops, as suggested by the way Chinese was written in Brahmi in Khotan.

The non-Indic sound *z* was written *ys*. The voiced sibilants *ź* and *ž* were originally not distinguished in writing from *ś* and *ṣ*, but later various strategies for distinguishing them were invented (written double = unvoiced, single = voiced; a subscript curved line (transliterated as ') to indicate the voiced pair; e.g., *śärä* and *śśärä* [*śərə*] 'good,' but *śätä* [*źədə*], *śe* [*źe*] 'second'); the line also probably indicated rhotasized vowels (*nei* [*nei*^{r}] 'nectar' < **näžä*). There was a single-flap *ṛ* and a trilled *r*.

While intervocalic voiced stops had already been lost in Old Khotanese, intervocalic *k* and *t* still remained in the oldest texts (phonemically *g* and *d*), and final *-i*, *-ä*, and *-u* were still distinct. The development from Old via Middle to Late Khotanese in the

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main involved the loss of distinction between final short vowels and their loss after nasals and in some other positions (e.g., Okhot. *aysu* 'I' > MKhot. *aysä*, LKhot. *a*; OKhot. NOM/ACC *suhāvatānä/u* 'utilities' > MKhot. *suhāvāṃ* > LKhot. *suhāvau*); and the merger of *uṃ* and *āṃ* (e.g., OKhot. GEN-DAT PL *rruṃdänu* 'the kings' > MKhot. *rrāṃdāṃ* > LKhot. *rraudau* [approx. [rɔ:dɔ:]).

The original six-case system is reduced in Middle Khotanese by the merger of the nominative and accusative (except in pronouns), and further reduced in Late Khotanese to a three- or two-case system. There are three genders, the neuter being of limited use.

The verbal system is of the Eastern Middle Iranian type. There are two stems, present and past (e.g., PRES *bar-*, PAST *buḍa-*; PRES *häm-* 'become,' PAST *häm-äta-*). Khotanese has preserved the Old Iranian moods (indicative, imperative, subjunctive, optative, injunctive), as well as active and middle. The past of intransitive verbs is of the common Iranian type (*buḍ-ä mä* 'carry.PAST.INTRANS-SING.MASCCOP.PRES.1ST.SING' = 'I was carried' > 'I rode'), while that of transitive verbs is based on an active past participle plus copula (*buḍ-e* < **bṛta-āh* 'carry.PAST.TRANS-SING.MASC [COP. 3RD.SING = Ø]' = 'he carried,' *buḍ-ätä* 'she carried'; *buḍ-aimä* < **bṛta-āh ahmi* [COP.PRES.1ST. SING] 'I [MASC] carried,' *buḍändä* 'they carried,' *buḍ-ändä mä* [COP.PRES.1ST.PL] 'we carried').

Perfect/pluperfect and modal forms are formed from the past tense (e.g., perfect: *nei* [<*ne* + *ī*] *hvat-e śtä balysä* 'NEG-EMPH.PART speak.PAST.TRANS.-SING. MASC COP.3RD.SING Buddha-SING.NOM' = 'the Buddha has not at all said'; pluperfect: *cīyä rr-e bäysänd-ä vät-ä* 'when king-SING.NOM awaken.PAST. INTRANS-MASC COP.PAST.INTR-3RD.SING-MASC' = 'when the king had awakened'; pluperfect optative: *ka nä va ysär-u gyast-a balys-a dāt-u hvat-ändä v-ī-ro ne gāvu vamas-īro* 'if they.ENCL.OBL PARTICLE 1000. SING.NEUT lord.PL.NOM-ACC buddha.PL.-NOM-ACC law. SING.ACC speak.PAST.TRANS-PL.MASC/FEM COP-OPT-3RD.PL NEG at-all understand.OPT.3RD.PL' = 'even even if a thousand lord buddhas had spoken the law to them, they would not at all understand').

The 'potentialis' is formed with a past participle with the ending-*u* (SING ACC NEUT) and the verbs *yan-* 'to do' (active) and *häm-*'become' (passive) and expresses possibility and completion of action (e.g., *ne hvat-a häm-āre* 'NEG speak.PAST.PART-PLUR.MASC become.PRES.-3RD.PL' = 'they cannot be said/expressed,' *ne hvat-u yan-īmä* 'NEG speak.PAST.PART. NEUT do.PRES-1ST.SING' = 'I cannot say (it),' *cīyä hvat-u yuḍ-ändä* 'when speak.PAST.PART.NEUT do.PAST.TRANS-3RD.PL = 'when they had spoken').

Tumshuqese also has the old augmented imperfect (e.g., *a-ch-i* 'PAST-go-3RD.SING' = 'he went, he has gone'), though the augment may be added only to monosyllabic forms (cf. *bar-i* 'he carried').

The lexicon contains numerous borrowings from Indic, both Middle Indic and Classical Sanskrit. In the Middle and Late Khotanese periods, we also find a small number of Chinese and Tibetan words.

See also: Iran: Language Situation.

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Kiel/Kiliaan, Cornelis van (1530–1607)

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Cornelis Abts alias van Kiele (he signed as C. Kiel or Cornelis van Kiel), the first great lexicographer of what is now the Dutch language, was born in Duffel (now in the Belgian province of Antwerp, then part of the Duchy of Brabant) not before 1530. His name was latinized into Kilianus (hence Modern Dutch Kiliaan). He may have studied law and the three Biblical languages at Louvain University. The bookkeeping diary of the Antwerp printer and publisher Christophe Plantin mentions his name in February 1558 as a compositor and in 1565 as a corrector, which he was to remain until his death on Easter Sunday, April 15, 1607.

Apart from this work, Plantin charged him with translations into Dutch of grammars and dictionaries, e.g., Robert Estiennes *Dictionarium Latinogallicum* (translated 1564; edition now lost); the Dutch section in the anonymous *Dictionarium Tetraglotton*

main involved the loss of distinction between final short vowels and their loss after nasals and in some other positions (e.g., Okhot. *aysu* 'I' > MKhot. *aysä*, LKhot. *a*; OKhot. NOM/ACC *suhāvatānä/u* 'utilities' > MKhot. *suhāvāṃ* > LKhot. *suhāvau*); and the merger of *uṃ* and *āṃ* (e.g., OKhot. GEN-DAT PL *rruṃdänu* 'the kings' > MKhot. *rrāṃdāṃ* > LKhot. *rraudau* [approx. [rɔ:dɔ:]).

The original six-case system is reduced in Middle Khotanese by the merger of the nominative and accusative (except in pronouns), and further reduced in Late Khotanese to a three- or two-case system. There are three genders, the neuter being of limited use.

The verbal system is of the Eastern Middle Iranian type. There are two stems, present and past (e.g., PRES *bar-*, PAST *buḍa-*; PRES *häm-* 'become,' PAST *häm-äta-*). Khotanese has preserved the Old Iranian moods (indicative, imperative, subjunctive, optative, injunctive), as well as active and middle. The past of intransitive verbs is of the common Iranian type (*buḍ-ä mä* 'carry.PAST.INTRANS-SING.MASCCOP.PRES.1ST.SING' = 'I was carried' > 'I rode'), while that of transitive verbs is based on an active past participle plus copula (*buḍ-e* < **bṛta-āh* 'carry.PAST.TRANS-SING.MASC [COP. 3RD.SING = Ø]' = 'he carried,' *buḍ-ätä* 'she carried'; *buḍ-aimä* < **bṛta-āh ahmi* [COP.PRES.1ST. SING] 'I [MASC] carried,' *buḍändä* 'they carried,' *buḍ-ändä mä* [COP.PRES.1ST.PL] 'we carried').

Perfect/pluperfect and modal forms are formed from the past tense (e.g., perfect: *nei* [<*ne* + *ī*] *hvat-e śtä balysä* 'NEG-EMPH.PART speak.PAST.TRANS.-SING. MASC COP.3RD.SING Buddha-SING.NOM' = 'the Buddha has not at all said'; pluperfect: *cīyä rr-e bäysänd-ä vät-ä* 'when king-SING.NOM awaken.PAST. INTRANS-MASC COP.PAST.INTR-3RD.SING-MASC' = 'when the king had awakened'; pluperfect optative: *ka nä va ysär-u gyast-a balys-a dāt-u hvat-ändä v-ī-ro ne gāvu vamas-īro* 'if they.ENCL.OBL PARTICLE 1000. SING.NEUT lord.PL.NOM-ACC buddha.PL.-NOM-ACC law. SING.ACC speak.PAST.TRANS-PL.MASC/FEM COP-OPT-3RD.PL NEG at-all understand.OPT.3RD.PL' = 'even even if a thousand lord buddhas had spoken the law to them, they would not at all understand').

The 'potentialis' is formed with a past participle with the ending-*u* (SING ACC NEUT) and the verbs *yan-* 'to do' (active) and *häm-*'become' (passive) and expresses possibility and completion of action (e.g., *ne hvat-a häm-āre* 'NEG speak.PAST.PART-PLUR.MASC become.PRES.-3RD.PL' = 'they cannot be said/expressed,' *ne hvat-u yan-īmä* 'NEG speak.PAST.PART. NEUT do.PRES-1ST.SING' = 'I cannot say (it),' *cīyä hvat-u yuḍ-ändä* 'when speak.PAST.PART.NEUT do.PAST.TRANS-3RD.PL = 'when they had spoken').

Tumshuqese also has the old augmented imperfect (e.g., *a-ch-i* 'PAST-go-3RD.SING' = 'he went, he has gone'), though the augment may be added only to monosyllabic forms (cf. *bar-i* 'he carried').

The lexicon contains numerous borrowings from Indic, both Middle Indic and Classical Sanskrit. In the Middle and Late Khotanese periods, we also find a small number of Chinese and Tibetan words.

See also: Iran: Language Situation.

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See also: Dutch; Etymology; Dutch and Flemish Lexicography.

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In 1261, Kilwardby was elected Provincial Prior of his order, a post he held until 1272. On October 11, 1272, he was appointed Archbishop of Canterbury by Pope Gregory X. He was noted for being charitable to both the poor and the members of his order, giving the necessary money to establish housing for the Blackfriars in London.

In March of 1277, Kilwardby visited Oxford and issued a condemnation of 30 propositions in grammar, logic, and natural science taught there at the time. As a former teacher of logic and grammar, he judged the propositions to be erroneous in nature. The fault, as Kilwardby saw it, was in both the Averroist nature of the propositions and the method of teaching them. Kilwardby was on the Augustinian end of the logic dichotomy that had been seen earlier at the University of Paris. It was not his intention to denounce the propositions as heretical, only to prevent the teaching of them. Kilwardby's condemnations came just days after Etienne Tempier, Bishop of Paris, condemned 219 propositions dealing with Averroist philosophy, advancing the more Christian, Augustinian version of logic taught in the universities.

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See also: Aristotle and Linguistics; Priscianus Caesariensis (d. ca. 530).

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Relevant Website

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Kimatuumbi: Phonology

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Kimatuumbi is a Bantu language spoken by approximately 60 000 people in Kilwa District of Tanzania. It is a part of the Rufiji-Ruvuma subgroup in the Nurse (1988) classification, designated P13 in Guthrie (1971). General characteristics of the Rufiji-Ruvuma languages are discussed in Odden (2003). As is typically the case in Bantu languages, most phonological processes in the language pertain to prosody – tone, vowel length, and syllable structure – with a bit of segmental phonology regarding vowel harmony and nasal + consonant sequences.

Aspects of Kimatuumbi phonology have been discussed in various publications, for instance Cowper and Rice (1987), Hayes (1990), Odden (1987, 1990), Truckenbrodt (1999), focusing particularly on theoretical consequences of certain phrasal sandhi rules of the language, as well as Rosenthall (1994) discussing vowel sequences. Odden (1996) provides a comprehensive overview of the morphology and phonology of the language.

Segmental Inventory

The 'core' segmental phonemes of the language are as follows:

(1)	p	t	č	k	i		u
	b			g	ɪ		ʊ
	m	n	ñ	ŋ	ɛ		ɔ
	w	l	y			a	

almost completely (*De ortu scientiarum,* a basic summary of human science, being the great exception). In order to simplify the research process, he created a detailed set of indices, both alphabetical and analytical, and a set of chapter summaries of the works of Augustine.

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(1)	p	t	č	k	i		u
	b			g	ɪ		ʊ
	m	n	ñ	ŋ	ɛ		ɔ
	w	l	y			a	

Additional phonemes with restricted distribution exist. Surface [d] is common but nearly always preceded by a nasal, e.g., [kyúundð] 'knot' where it is in complementary distribution with [l]. Since *d* exists in a few words not preceded by a nasal, e.g., [daámu] 'blood,' [diíwai] 'wine,' it must be granted marginal phonemic status. The voiced consonants written *b, d, g* are pronounced as implosive [ɓ ɗ ɠ] when not preceded by a nasal, thus more narrowly [ɗaámu], [ɓðna] 'to see,' [ɠálaambuka] 'to change.' Phonetic [ɟ] exists only after a nasal ([ñɟíiŋgiilɛ] 'I entered'), in complementary distribution and morphophonological alternation with the implosive palatal [ʄ] ([ʄ'íiŋgya] 'to enter.') Surface [ʄ'] itself is almost always limited to root-initial position before the vowel [i], and there it is in free variation with [y], hence [yíiŋgya] 'to enter.' It does also appear elsewhere in a few loan words, such as [ʄ'aáʄ'i] 'judge.' Other restricted phonemes are [v], [f], [z], and [r], which only appear in loanwords ([zaábu] 'gold,' [kɔlɔfiíndɔ] 'walking stick,' [ɗɛréva] 'driver.'

The consonant transcribed as [č] may be pronounced [č], [t^s] or [s]. Some speakers appear to always use [s], whereas others tend more toward [č]. In addition, there are lexical preferences (but not requirements) for [s] vs. [č], where [suuŋgulá] 'rabbit' tends to be pronounced with [s] and [čaáŋgu] 'mine' tends to have [č]: but, [čuuŋgulá] and [saáŋgu] are sometimes used. Words such as [suuŋgulá] are mostly loanwords and reflect the original Swahili consonant (*sungura*).

To simplify transcriptions, the implosive/nonimplosive variants are not noted because they are predictable, and the voiced palatal obstruent is written [j]. Since there is no contrast between [e o] and [ɛ ɔ], the mid vowels are written as [e o]. For the sake of comparing data presented here with that published elsewhere, [ɪ ʊ] here correspond to [i u] elsewhere, while [i u] here correspond to [ɨ ʉ] used elsewhere, the latter using the traditional Bantuist diacritic for the 'superhigh' vowels. Finally [ŋ] will be used here rather than [n'] found elsewhere.

Vowel length is distinctive, and is indicated by doubling the vowel. The language has H and L tones, which phonologically functions as a H-toned versus toneless distinction. The interpretation of tone marks is as follows, using [a] to represent any vowel:

(2)	á	a	aa	áa	aá
	short H	short L	long L	long fall	long rise

All contour tones appear on long vowels, and there are no level-H long vowels except in one lexical item [sáána] 'very,' which derives from Swahili, and certain cases of vowel contractions.

Syllable Structure

Syllables in Kimatuumbi never have a coda consonant, except in a few loan words ([boóksi] 'box,' [bakteéliya] 'bacteria'). There are also no diphthongs, i.e., bivocalic syllable nuclei, in the language: vowel sequences such as [ui], [oi], [ai], [ao], etc., are disyllabic, thus [tá.u.na] 'to chew' has three light syllables. There are numerous lines of evidence showing the lack of diphthongs discussed in Odden (1996). One relevant example is that such sequences do not trigger the tone rule Heavy Retraction where /u.kaa.té/ becomes [u.kaá.te] 'you should cut,' as shown by [u.ta.u.né] 'you should chew,' not *[u.ta.ú.ne], since there is no preceding heavy syllable.

Consonant onsets conform to the pattern NCG, N standing for nasal, C standing for any consonant, and G standing for glide. Any of these elements is optional. The following data illustrate the onset possibilities.

(3)	No onset	áka	'net-hunt'
	C-onset	bendeéla	'flag'
		yúba	'hide'
		maána	'meaning'
	CC-onset	bwiími	'greed'
		kyaátí	'valley farm'
		mbaángo	'warthog'
		mméya	'white ant'
		mwaábí	'sorcerer'
	CCC-onset	mbweégá	'side'

Segmental Phonology

The main segmental processes of Kimatuumbi pertain to N + C sequences and vowel height harmony: additional processes of *l*-insertion, *b*- and *g*-deletion, and glide deletion are discussed in Odden (1996, Sect. 3.3–7).

NC Interactions

Kimatuumbi is somewhat unusual among Bantu languages in having two distinct sets of phonological alternations affecting nasal plus consonant sequences, which ultimately relates to the derivational source of the NC sequence. NC sequences arise directly by morpheme concatenation involving the class 9–10 noun prefix /ñ/ or via a rule optionally reducing the 1sg pronoun prefix /ni/ to *n*, triggering changes which are referred to as *n*-type alternations. A partially distinct set of alternations arise from the optional or obligatory reduction of various prefixes of the form /mu/ to just a nasal, which are referred to as *mu*-type alternations. The different processes are summarized in (4).

(4)

underlying *consonant*	n	mu — *Interaction type*
p,t,č,k	[mb,nd,ñǰ,ŋg]	[mp,nt,ñč,ŋk]
b,d,l,j,g,l	[mb,nd,nd,ñǰ,ŋg]	[mm,nn,nn,ññ,ŋŋ]
m,n,ñ,ŋ	[m,n,ñ,ŋ]	[mm,nn,nn,ññ,ŋŋ]
w,y	[ŋgw,ñǰ]	[ŋŋw, ññ]

Common properties transcending the two nasal classes include place assimilation, and approximant-hardening where [w l y] become [gw, d, ǰ]. The types of nasals are differentiated in terms of whether they trigger postnasal voicing (the *n*-type nasal does), postnasal nasalization (the *mu*-type nasal does), or degemination (the *n*-type nasal does). Examples of these processes are given below: n-type alternations are illustrated using the 1sg perfective verb and the mu-type use the 2pl perfective: the optional unreduced 1sg and 2pl variants motivate the underlying consonant.

(5)

n-type		mu-type		
1sg subject	*2pl subject*			
ni-téliike	n-déliike	mu-téliike	n-téliike	'cook'
ni-bwéeni	m-bwéeni	mu-bwéeni	m-mwéeni	'see'
ni-nóolite	nóolite	mu-nóolite	n-nóolite	'sharpen'
ni-wíile	ŋ-gwíile	mu-wíile	ŋ-ŋwíile	'die'

Vowel Harmony

As in most Bantu languages, vowel coocurrence is most free in root-initial position, and is highly restricted within the stem thereafter. Only underlying /a i u/ are found in postinitial position, and are subject to height harmony whereby /i/ becomes [e] after [o e], [ɪ] after [ɪ ʊ], and /u/ becomes [o] [o] (but not [e], and [ʊ] appear after [ɪ ʊ]. The high vowels [i u] then appear elsewhere. An illustration of the pattern with the causative suffix /iy/ is seen below.

(6)

plain	*causative*	
čáag-a	čáag-iy-a	'grind'
ín-a	in-iy-a	'dance'
kʊ́n-a	kʊ́n-iy-a	'grate'
číinj-a	číinj-iy-a	'slaughter'
ʊ́ʊg-a	ʊ́ʊg-Iy-a	'bathe'
bóol-a	bóol-ey-a	'de-bark'
čéeŋg-a	čéeŋg-ey-a	'build'

Examples with the vowel /u/ harmonizing in the second syllable include [bʊ́tuka] 'run,' [típuka], 'pound to flour' [čápuka] 'get soiled,' [tʊ́ʊmbʊka] 'fall,' [pílʊka] 'trip over,' [épuka] 'avoid' [bómoka] 'be destroyed.'

Hiatus Resolution

Like many Bantu languages, Kimatuumbi has phonological processes that eliminate vowel sequences, but unlike a language such as Kikerewe, which has absolutely no vowel sequences, elimination of vowel hiatus in Kimatuumbi is only partial. Many of the hiatus-eliminating strategies in the language are optional or are subject to restrictions on morphosyntactic domain: ultimately, quite a number of V + V sequences remain. One of the interesting concomitants of these rules is that the remaining vowel is compensatorily lengthened.

Glide formation affects prevocalic high vowels, and can be easily motivated in verb paradigms by combining subject or object prefixes plus a vowel-initial vs. consonant-initial roots.

(7)

Infinitive	*3p-V-past*	*1s-V-past*	*1p-V-past*
čón-a	ba-čón-ite	ni-čón-ite	tu-čón-ite
éleew-a	ba-éleew-ite	ny-eéleew-ite	tw-eéleew-ite
ʊ́bʊk-a	ba-ʊ́bwiik-e	ny-ʊʊ́bwiik-e	tw-ʊʊ́bwiik-e
ʊ́ʊg-a	ba-ʊ́ʊg-ite	ny-ʊʊ́g-ite	tw-ʊʊ́g-ite
ák-a	ba-ák-ite	ny-aák-ite	tw-aák-ite
áam-a	ba-áam-ite	ny-áam-ite	tw-áam-ite
	2s-V-past		
	u-čón-ite	'draw'	
	w-eéleew-ite	'understand'	
	w-ʊʊ́bwiik-e	'climb'	
	w-ʊʊ́g-ite	'bathe'	
	w-aák-ite	'net-hunt'	
	w-áam-ite	'emigrate'	

Glide formation is subject to a number of conditions. For example, it is optional in domain-medial syllables (see 'Organization of Rules' below), it does not affect long vowels (Odden, 1996: Sect. 4.1.1), it has a few lexical exceptions, and has complex tonal conditioning where H toned vowels do not undergo glide formation before a long vowel.

The second main hiatus-reduction process is Vowel Contraction, where /a+i/ and /a+u/ optionally become [ee] and [oo]. This rule only applies between prefixes or proclitics and prefixes, never involving a root-initial vowel. Examples of this involving /a/ in a subject or tense-aspect prefix, plus /i/, /u/ in a subject or object prefix can be used to motivate this process.

(8)

uncontracted	*contracted*		
ba-i-káatite	beekáatite	(ba- 'they', -i-'it')	'they cut it (cl. 9)'
ba-u-káat-ite	bookáatite	(-u- 'you')	'they cut you'
ka-i-bolá	keebolá	(ka- 'when')	'when it (cl. 9) rotted'
ka-u-bolá	koobolá	(-u- 'it (cl. 3)')	'when it (cl. 3) rotted'

Root-initial vowels do not undergo contraction, so [a-ínite] 'he danced' never becomes *[eénite]. Long [aa] also cannot contract: cf. [naa-i-káatite] 'I cut it,' *[nee-káatite].

Also falling in the category of hiatus-resolving strategies is the desyllabification of an underlying or derived syllabic nasal, with compensatory lengthening of the preceding vowel. Although most Bantu languages with contrastive vowel length have predictably long vowels before NC clusters, Kimatuumbi no

longer has such lengthening as part of its active phonology. Within roots, vowels are generally long before NC sequences, for example *áandika* 'to write,' *kúʊmbwa* 'to beat,' *lisaambalá* 'hide.' Because vowel length within the stem is restricted to (approximately) the last three moras, short vowels are found before NC in words such as *yánjaaya* 'to turn something drying,' *simbasiímba* 'road,' *yúmbItIka* 'to be quick,' *lipúndugulu* 'fog.' Even so, there are cases of short vowels before NC within the last three moras: *kičénjele* 'cock's comb,' *lukóngobe* 'hardwood,' *nčongóma* 'thorn-tree,' *ntíndí* 'buttermilk.' There is also no active lengthening across morpheme boundaries, thus the noun class prefix vowel is not lengthened in *ki-ndoólo* 'sweet potato,' *ka-ngápa* 'little bog,' *tu-ndó* 'little buckets,' nor is there any lengthening at the phrasal level (*mbusi ngúlú 'big grating stool,' kila ndó 'every bucket')*.

However, there is the **appearance** of lengthening before a class of NC clusters, namely those involving reduction of /mu/. As argued in Odden (1996: Sect. 4.1.7–8), this is because as an intermediate step in the derivation, /mu/ reduces to a syllabic (moraic) nasal, which then transfers its mora to a preceding vowel if there is one. The vowel-lengthening concomitant of reduction of *mu-* can be seen in (9). The examples in (9a) involve phrasal combinations of a verb plus a locative where the locative prefix /mu/ optionally reduces, and the examples in (9b) involve lengthening of the prefix *ka-* 'when' before the 2pl subject /mu/.

(9a) agonjite mú-kilíndɪɪlo ~ agonjiteé ŋ-kilíndɪɪlo
'he slept in the guard house'
naatíkwiibiikámumipúkó ~naatíkwiibiikáammipúkó
'I put them in the bags'

(9b) kamuteleká ~ kaanteleká 'while2pl.werecooking'
kamukalaáŋga ~kaaŋkalaáŋga 'while 2pl. were frying'

Tone

Bantu languages typically have a number of restrictions on the surface and underlying placement of tone in a word, and Kimatuumbi imposes more than the usual distributional restrictions on words. A difference must be made between noun tone, which is lexical, and verb tone, which is purely predictable by reference to phonological and morphological factors.

Nouns

With very few exceptions, noun stems have at most a single underlyingly H-toned syllable, and the underlying position of H is noncontrastive within bimoraic syllables. What is striking about noun tone in Kimatuumbi is that on the surface, this highly restricted nature of tonal specifications is not obvious. Typical examples illustrating the divergence between underlying and surface tones are given in (10).

(10)	mpaká	'boundary'	/mu-paká/
	ntíndí	'buttermilk'	/mu-tíndi/
	mikóta	'canes'	/mi-kota/
	mbaká	'cat'	/ñ-paká/
	ndími	'tongues'	/ñ-límí/
	ñáma	'meat'	/ñama/
	ŋkaáte	'loaf'	/mu-kaaté/
	ntóopé	'handle'	/mu-tóope/
	mpúuŋga	'paddy'	/mu-puuŋga/
	mboópo	'machete'	/ñ-poopó/
	ndooñá	'lip-rings'	/ñ-tóoña/
	ŋguúbe	'pig'	/ñ-kuube/
	masípitaáli	'hospitals'	/ma-sipitaalí/
	nčímbɪlíílí	'drip'	/mu-čımbılıılı/
	sipitaáli	'hospital'	/sipitaalí/
	njeénjemá	'mosquito'	/ñ-čeenjéma/
	matóondolo	'steinbucks'	/ma-tóondolo/
	ndoóndolo	'steinbuck'	/ñ-tóondolo/
	kipííkɪɪtí	'piece of wood'	/ki-pıkıtı/

One of the sources of opacity in the noun tone system is that while all nouns have a H tone in their citation form, the same is not true at the phrasal level. Compare the examples in (11a) with those in (11b).

(11a)	*N*	*'it's not N'*	
	ki-wíkɪlyo	ŋga ki-wıkılyo lí	'cover'
	mi-kóta	ŋga mi-kota lí	'sugar canes'
	ki-kóloombe	ŋga ki-koloombelí	'shell'
	ŋ-guúŋguni	ŋga ŋ-guuŋguni lí	'bedbug'
(11b)	lu-kóŋgobe	ŋga lu-kóŋgobe lí	'wood'
	ma-tógolo	ŋga ma-tógolo lí	'waterbucks'
	ki-kálaaŋgo	ŋga ki-kálaaŋgo lí	'pan'
	diíwai	ŋga diíwai lí	'wine'

Nouns such as the first set have no underlying H tone and those in the second group have an underlying H. This distinction is neutralized prepausally, by a rule assigning H to the second mora of the word to any toneless word in prepausal position. Words such as [ki-kóloombe], which have a CV noun class prefix, have their H on the first stem syllable: nouns with no moraic prefix such as [ŋ-guúŋguni] are what show that the correct generalization is 'second vowel of the word.'

Two rules assign additional H tones to a noun beyond the underlying lexical tone, whose operation contradicts the surface generalization that stems have only a single H. First, H is assigned to the root-initial mora when a mora-bearing noun class prefix – other than the class 5 prefix /li-/ – precedes the stem and the lexical H is not on the following syllable. A number of nouns allow both nonmoraic and moraic prefixes, which results in alternations in the tone of the root-initial syllable.

(12)	sipitaáli	'hospital'	ma-sípitaáli	'hospitals'
	bisikúti	'biscuit'	ka-bísikúti	'little biscuit'
	čwaakalá	'lime'	ma-čwáakalá	'pieces of lime'
	solokó	'black beans'	lu-sólokó	'black bean'

Examples such as *ma-paká* 'cats,' *ma-poópo* 'machetes,' where the root-initial mora precedes a H tone, illustrate the necessity of a toneless vowel between the target of H-insertion and the lexical H in the stem.

The second source of multiple H tones inside a stem is a Tone Copy rule that assigns H tone to the final vowel after a penultimate H tone. This rule only applies prepausally, so in certain phrase-medial positions, the final H will be lacking (because of a phrasal tone rule assigning H, discussed in 'Phrasal Tone Insertion' below, the typical phrasal context where the final H is surface absent is VP-medial).

(13)	lukópé	lukópe . . .	'eyelid'
	lulímí	lulímɪ . . .	'tongue'
	kikwɪkwíɪkwɪ	kikwɪkwíɪkwɪ . . .	'belch'
	lukóonjí	lukóonji . . .	'finger'
	lutebéelé	lutebéelé . . .	'amaranthus'

Besides restricting underlying H tones to one-per-stem, there is also no underlying contrast between rising and falling tones, even though such a distinction is made on the surface. In nouns, most rising tones come from the rule Heavy Retraction, where a H tone shifts leftward to a long vowel forming a rising tone. Since a phrasal sandhi rule shortens long vowels in phrase-medial position (see 'Shortening' below), the underlying position of the (unretracted) H tone can be detected relatively easily by including a modifier that induces vowel shortening.

(14)	mabiíbi	/ma-biibí/	'grandmothers'
	kiboóko	/ki-bookó/	'stick'
	asíkaáli	/a-sikaalí/	'soldiers'
	kipílɪílɪ	/kipílɪílí/	'scorpion'
		mabibí gaángu	'my grandmothers'
		kibokó kilaáso	'long stick'
		asíkalí awaáá	'dead soldiers'
		kipílɪílí ŋkúlú	'big scorpion'

In the examples above, the retracted H is underlyingly on the word-final vowel. The H may also be on a penult that is preceded by a long vowel, as in (15). In that case, the H is both subject to spreading to the final syllable by Tone Copy, and also is retracted.

(15)	ligaándamá	/ligaandáma/	'spleen'
	nguúngutá	/nguungúta/	'bean'
	lutʊútʊlú	/lutʊʊtúlʊ/	'popcorn'
	kipɪíkɪítí	/kipɪɪkíítɪ/	'wood'
		ligandáma liikúlú	'big spleen'
		ngungúta yaángu	'my bean'
		lutʊtúlu lwaángu	'my popcorn'
		kipɪɪkíítɪ kikúlú	'large wood'

Verb Tone

The overwhelming majority of Bantu languages have a contrast between H-toned and L-toned or toneless stems, expressed underlyingly by a two-way tonal contrast on the first root syllable. Kimatuumbi is one of a small number of tonal Bantu languages that have lost verbal lexical tone distinctions – Yao, Makonde, Makua, Kikuria, and Olusaamia are other examples – and instead assign surface tone based purely on the verb's tense-aspect category. In Kimatuumbi verbs, a H is assigned to a particular position – stem-initial, stem-final, second-stem vowel, or third-stem vowel – depending on inflectional category.

The pattern of most basic verb forms is that H is assigned to the first-stem vowel. This pattern is used in the infinitive, perfective, future, and certain verb-focal forms.

(16)	*infinitive*	*3p perfective*	*1pl future*
	lúba	ba-lúbite	twaa-lúba
	báamba	ba-báambite	twaa-báamba
	čáŋgaala	ba-čáŋgaalite	twaa-čáŋgaala
	pápaakiya	ba-pápaakiiye	twaa-pápaakiya
	pákatika	ba-pákatiike	twaa-pákatika
	láambata	ba-láambiite	twaa-láambata
	káčabanika	ba-káčabaniike	twaa-káčabanika
	kéeŋgeemba	ba-kéeŋgeembite	twaa-kéeŋgeemba
		3s strong verb-focus	*prog*
		eendánoo-lúba	'ask'
		eendánoo-báamba	'top'
		eendánoo-čáŋgaala	'wonder'
		eendánoo-pápaakiya	'grope'
		eendánoo-pákatika	'shake down'
		eendánoo-láambata	'lick'
		eendánoo-káčabanika	'be confused'
		eendánoo-kéeŋgeemba	'dig up'

Strong verb-focus forms such as [eendánoolúba] are best translated as 'he is even *asking*.' By comparison, the weak verb focus forms, which lack the prefix *-noo-*, assign H tone to the final vowel of the stem.

(17)	*3s pres. prog. verb-focus*	*3p past verb-focus*	
	eendaá-lʊbá	baatí-lʊbá	'ask'
	eendaá-baambá	baatí-baambá	'top'
	eendaá-čaŋgaalá	baatí-čaŋgaalá	'wonder'
	eendaá-papaakiyá	baatí-papaakiyá	'grope'
	eendaá-pakatiká	baatí-pakatiká	'shake down'
	eendaá-laambatá	baatí-laambatá	'lick'
	eendaá-kačabaniká	baatí-kačabaniká	'be confused'
	eendaá-keeŋgeembá	baatí-keeŋgeembá	'dig up'

In most dependent clause verb tenses (relative clauses, when-clauses, and 'without V-ing' clauses), a H tone is assigned to the second stem vowel.

(18)	*when we V*	*without V'ing*	
	patú-lʊbá	wanga-lʊbá	'ask'
	patú-baámba	wanga-baámba	'top'
	patú-čaŋgáala	wanga-čaŋgáala	'wonder'

patú-papáakiya	wanga-papáakiya	'grope'
patú-pakátika	wanga-pákatika	'shake down'
patú-laámbata	wanga-laámbata	'lick'
patú-kačábanika	wanga-kačábanika	'be confused'
patú-keéŋgeemba	wanga-keéŋgeemba	'dig up'

Past tense subordinate verbs as well as deverbal stative adjectives have an additional H tone on the stem-final vowel.

(19) 'when you V'd'	'in a V'd state (cl. 7)'	
paú-lʊbíté	ki-lʊbá	'ask'
paú-baámbité	ki-baámbá	'top'
paú-čaŋgáalité	ki-čaŋgaálá	'wonder'
paú-papáakiiyé	ki-papáakiyá	'grope'
paú-pakátiiké	ki-pakátiká	'shake down'
paú-laámbiité	ki-laámbatá	'lick'
paú-kačábaniiké	ki-kačábaniká	'be confused'
paú-keéŋgeembite	ki-keéŋgeembá	'dig up'

H tone is assigned to the first-stem vowel in the subjunctive and participial tenses.

(20) 'you should V'	'while I was V-ing'	
u-lʊbé	kani-lʊbá	'ask'
u-baámbe	kani-baámba	'top'
u-čaŋgaále	kani-čaŋgaála	'wonder'
u-papaakíye	kani-papaakíya	'grope'
u-pakatíke	kani-pakatíka	'shake down'
u-laambáte	kani-laambáta	'lick'
u-kačabánike	kani-kačabánika	'be confused'
u-keeŋgéembe	kani-keeŋgéemba	'dig up'

Forms such as [u-baámbe] and [kani-baámba] derive from intermediate *ubaambé* and *kanibaambá*, H tone is assigned to the third *stem* vowel, but the H shifts left by Heavy Retraction. One difference between nouns and verbs in the application of heavy Retraction is that the rule will shift a H to a prepenult long syllable in a noun ([kipɪíkɪɪtí] ← /kipɪɪkíɪtɪ/ 'wood') but not in a verb (u-papaakíye 'you should grope').

The final tone pattern used in the verb system assigns H tone to the first and third vowels of the stem, in deverbal nominalizations selecting the suffix *-i*.

(21) n-núbí	'asker'	m-máambí	'one whotops'
ŋ-kógotí	'scraper'	n-čáŋgaáli	'wonderer'
n-nóŋgeláaŋgi	'converser'	m-pápaákiyi	'groper'
m-pákatíki	'shaker'	n-náambáti	'licker'
ŋ-káčabániki	'confused person'	ŋ-kéeŋgéembi	'digger'

Phrasal Phonology

Kimatuumbi has a rich set of phonological alternations applying at the phrasal level. Some of these are utterance level rules which only care whether a word is at the end of an utterance or not, while others are sensitive to the specific syntactic relations between the involved words.

Shortening

One sandhi rule is Shortening, which shortens long vowels within a stem when one word is followed by another word, provides that they are in a head-modifier relationship. Examples of this involving nouns and adjectives are seen in (22), and verbs followed by objects or adverbs are seen in (23).

(22) ki-kóloombe	'cleaning shell'
ki-kólombe čaáŋgu	'my cleaning shell'
ki-kólombe kikúlú	'big cleaning shell'
li-peésa	'money'
li-pesá lyé	'the money'
li-pesá lyanáalyoobíté	'money that I lost'
(23) naa-kálaaŋgite	'I fried'
naa-kálaŋgite mapíiŋgá	'I fried eggs'
naa-kálangite liíso	'I fried yesterday'
u-paánde	'you should plant'
u-pandé maloómbe	'you should plant corn'
u-pandé paapasá	'you should plant the day after tomorrow'
u-pandé lí	'you should not plant'

Shortening interacts with verb focus, so that a focused verb does not undergo shortening.

(24) neendá-twɪɪká misígó	'I'm *lifting* the loads'
aatí-pwaatá Mambóondo	'he *followed* Mamboondo'
tweendeé-kuŋuundá lí	'we aren't *filtering*'
toola lusólokó	'just *take* the bean!'

If the following word is not a modifier of the previous word, there is no shortening. For example, inside the VP, one noun does not undergo shortening when followed by another word outside of the noun's phrase; nor does an adjective undergo shortening before another adjective.

(25) naa-m-péi	Mamboondo	eéla	'I gave M. money'
I-him-gave	*Mamboondo*	*money*	
naa-ki-bwéni	kikóloombe	líilí	'I didn't see a shell'
I-it-saw	*shell*	*NEG*	
mbopó	ndaáso	ngulú	'big long machete'
machete	*long*	*big*	

Verbs do not undergo shortening when followed by a sentential adverb, which is outside of the verb's phrase; nor is there shortening in the verb of a subordinate clause that is followed by a word of the matrix clause.

(26) aa-kálaaŋga	sáána		'he will really fry'
he.fut-fry	*really*		
naa-m-péi	ywaá-kaátite	eéla	'I will give money to the one who cut'
I-him-gave	*who.he-cut*	*money*	

Phrasal Tone Insertion

Another syntactically conditioned phonological rule of Kimatuumbi is Phrasal Tone Insertion, which adds a H tone between maximal projections that are dominated by a maximal projection:

(27) [$_{Xmax}$ ... [$_{Ymax}$ __] [$_{Zmax}$] ...]

This configuration rule is found in a number of contexts, for example between a subject NP and a VP.

(28)	Mambóondo (/Mamboomdo/)	P.N.
	Mamboond**ó** aawíile	'Mamboondo died'
	kiyógoyo	'bird (sp.)'
	kiyógoy**ó** čaatí tUUmbUká	'the bird fell'

H tone is inserted at the end of each phrase coming before the verb, which may include objects and adverbs owing to the free word order of the language.

(29) iíjuma 'Friday'
iíjum**á** kiyógoy**ó** Mamboond**ó** naampéi lí
'I didn't give Mamboondo a kiyogoyo on Friday'

Tone insertion only applies to the end of the phrase that is a sister to the VP; thus an adjective inside the subject NP does not receive any H.

(30a) mund**uu** ntokómaú a-wíile 'a sluggish person is dead'
person sluggish he-be dead
*mund**úu** ntokóma**ú** awíile

NP and sentential conjunctions are also subject to this rule.

(30b) patúkatítee ñam**á** Ukumú akuŋundite wíímbI
when-we-cut mean U. he-filtered beer
'when we cut the meat, Ukumu filtered the beer'
mpuuŋg**á** na kindoólo 'rice and sweet potato'
rice and sweet potato
kikálaaŋgó aú kibIgá 'frying pan or a pot'
frying pan or pot

The juncture between a VP and a sentential adverb provides another context for this rule.

(31)	niimpéendiile	'I like him'
	niimpéendiilé píta	'I really like him'
	aakálaanga	'he will fry'
	aakálaangá kwaáli	'perhaps he will fry'

Initial Tone Insertion

Two of the syntactically conditioned rules are sensitive to crossing sentence boundaries. One of these rules, Initial Tone Insertion, places a H at the beginning of certain words – a relatively arbitrary collection of adverbs, function words, and agreement prefixes, plus nouns beginning with a long vowel – when the preceding stem has no medial H.

(32)	kindoló **ča**-Mambóondo	'sweet potato of Mamboondo'
	kiwIkílyo **čá**-Mambóondo	'cover of Mamblondo'
	tu-tyatyakíkiye **ma**laáU	'we should make plaster tomorrow'
	twaa-tyátyakikiya **má**laáU	'we will make plaster tomorrow'
	paní-teléka **lii**yawá	'when I cook pumpkin'
	ni-teleka **líi**yawá	'I cook pumpkin'

Unlike Shortening, the interacting words do not need to be in the same phrase, thus H can be assigned to the instrumental prefix *na-* when preceded by a toneless direct object. H tone can also be assigned to a word in a subordinate clause, conditioned by the preceding word in the matrix clause.

(33) naammúlige Kiwiiyo **ná**-mboópo 'I killed Kiwiyo with a machete'
I-him-killed Kiwiiyo with-machete
naammúlige **ká**apangá kaási 'I killed him when hewasworking'
I-him-killed when-he-do work

But no H is inserted when the trigger word is in a subordinate clause and the target is in the higher clause.

(34) aambákiye pánga twaabúUka kindaái
he-me-told that we-will-return tomorrow
'He told me that we will return tomorrow'
*aambákiye pánga twaabúUka kíndaái

As noted in Odden (1996: Sect. 6.1.4), this motivates the condition that the trigger command the target, in the traditional sense of command.

Lengthening

A second sentence-level rule with a clause-mate condition is Lengthening, which lengthens a vowel before a CV(C)V noun stem. Examples of this are seen in (35).

(35)	aatweti ñoóme	'he took a cat'
	aatwéti ndó	'he took a bucket'
	aatwétii ñáma	'he took a bottle'
	aatwétii píli	'he took a puff adder'

This rule also applies to the class 5 noun prefix /li-/, but not any other noun class prefixes.

(36)	lii-yawá	'pumpkin'	ma-yawá	'pumpkins'
	lii-kútI	'coconut leaf'	ka-kútí	'little coconut leaf'

Failure of Lengthening to cross a sentence boundary is seen below:

(37) ni-yuwine [$_s$ mbaká awíile 'I heard that the cat died'
I-heard cat it-died

The relevance of internal sentence boundaries is not a widely discussed aspect of the syntax–phonology interface problem, and it is not clear how prosodic theories of the interface would handle the relevance of the node S in phonology. See Odden (1996: Sect. 6.2) for discussion involving the notion 'pause.'

Syntactically Unconditioned Rules

There are, in addition, a number of other external sandhi rules that apply without consideration of syntactic factors, either applying between any two words or applying just at the end of the utterance. One example of that is the rule H Tone Assignment, which assigns a H tone to the second vowel of any toneless stem, when it stands at the end of the utterance; this rule was discussed in 'Nouns' above. Similarly, Tone Copy, which spreads a penult H tone to the final vowel of the word in nouns, only applies to prepausal nouns. A third rule is Perfective Truncation, a rule that optionally deletes the final syllable *le* in a perfective verb which is not prepausal.

(38) aantélekile 'he cooked for
Mambóondo Mamboondo'
aantéleki 'he cooked for
Mambóondo Mamboondo'
baakúñwile 'they touched
Libulúle Libulule'
baakúñwi 'they touched
Libulúle Libulule'

Other such rules are discussed in Odden (1996: Sect. 6.2).

Organization of Rules

Interaction between phonological rules in Kimatuumbi can be rather complex and challenges certain theoretical assumptions regarding lexical vs. postlexical rules made in the theory of Lexical Phonology. The interaction between Glide Formation, morphosyntactically governed rules of tone-assignment in verbs, and the sandhi rule Shortening especially result in a considerable degree of opacity.

The rule Glide Formation applies cyclically, where a cyclic domain break is defined at the junction between proclitics vs. the basic word. This can be demonstrated by comparing analogous vowel sequences, differentiated as to whether the first is in a proclitic or not. One class of examples involves /CV-CV-V/ sequences morphologically distinguished as locative prefix + noun class prefix + vowel initial root, versus subject prefix + object prefix + vowel initial root. One condition on Glide Formation is that it applies obligatorily to a prevocalic high vowel that is initial – in the domain visible at that stage in the cycle – but is optional when applied to a domain-medial prevocalic high vowel.

(39) /a-lu-áandiike/ → [aluáandiike] 'he wrote it'
∼ [alwáandiike]
he-it-wrote
/pa- [lu -áanjú]/ → [palwáanjú] 'in the
at -n. class -firewood firewood'

In the case of /a-lu-áandiike/, both the subject prefix *a-* and the object prefix *-lu-* are underlyingly present at the stage where Glide Formation applies, and since *lu* is not initial in that domain, Glide Formation is optional. In contrast, in the case of /pa-[lu-áanjú], first the word [lwáanjú] is derived from /lu-áanjú/, and at that stage *lu* is initial in the cyclic domain, this Glide Formation is obligatory. Subsequently, the proclitic /pa/ is added, but this has no effect on the optionality of Glide Formation on the earlier cycle.

The sandhi rule Shortening applies both before Glide Formation (applied at the stem level) and after Glide Formation (at the word level). The consequence of this interleaving of Shortening between applications of Glide Formation is that long vowels that are created via the compensatory lengthening side effect of Glide Formation at the stem level (*akyaana*) are subject to Shortening when a modifier follows, but long vowels created via Glide Formation on the poststem cycle (*twaakyaana*) are not subject to shortening. Phrasal Shortening of long vowels created at the stem level is seen in (40).

(40) /ak-i-ana/ → [ákyaana] 'to net-hunt for
hunt-for-e.o each other'
/ak-i-ana itúʊmbIlI/ → [a- 'to net-hunt monkeys
kyana itúʊmbIlI] for each other'
hunt-for-e.o monkeys

In (41), nonshortening of long vowels created at the word level is evident.

(41) /tu-ak-i-ana itúʊmbIlI/ → [twaakyana
itúʊmbIlI]
we-hunt-for-e.o monkeys
'we net-hunt monkeys for each other'

This poses a problem for Lexical Phonology, in that the presumably postlexical rule Shortening is sandwiched between applications of the cyclic rule Glide Formations.

The rule Heavy Retraction shifts a H tone from a final syllable to a long penult, so that predicted/ u-toolé/ 'you should take' – cf. [u-teleké] – becomes [u-toóle]. But a long vowel derived via Glide Formation does not trigger tone retraction.

(42) áka 'to hunt' w-aaké 'you should hunt'
éka 'to laugh' w-eeké 'you should laugh'

Thus Glide Formation counterfeeds Heavy Retraction.

Since root-initial vowels can be underlyingly long, this results in particularly opaque alternations in (43), where Glide Formation is not necessary to bring about the long vowel triggering Retraction. In these examples, Retraction applies to the H that is expected to be on the final syllable.

(43)	áama	'to emigrate'	w-aáme	'you should emigrate'
	íimba	'to dig'	w-íimbe	'you should dig'

Thus, underlying /u-aamé/ undergoes Retraction to give *uaáme*, then Glide Formation resulting in surface *waáme*. The decision whether H tone retracts thus is based on the distinction between long vowels derived as a side effect of Glide Formation, vs. those that are underlyingly long vowels.

Opaque application of Shortening is seen in (44) where the verb is followed by an object.

(44)	/u-aamé lí/	→ [waamé lí]	'you shouldn't emigrate'
	/u-Πmbé makéne/	→ [wΠmbé makéne]	'you should dig holes'

The evidence that Shortening has actually applied in [waamé lí] is indirect, since there is no surface length alternation. The variation between [waáme] and [waamé ...] is parallel in terms of the underlyingly similar forms [ukaáte] 'you should cut' and [ukaté ...]. Thus, to explain the alternating location of H, we presume that /u-aame lí/ first undergoes Shortening and tone assignment, giving *u-amé lí* (analogous to *ukaté lí* 'you should not cut') and since in this form there is no long vowel, Heavy Retraction does not apply. Afterwards, Glide Formation applies to give [waamé lí], effectively restoring the original vowel length, this such an A → B → C derivation is a classic example of the 'Duke of York Gambit' (Pullum, 1976).

See also: Bantu Languages; Lexical Phonology and Morphology; Tone in Connected Discourse; Tone: Neurophonetics; Tone: Phonology.

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Kindaichi, Kyosuke (1882–1971)

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Kyosuke Kindaichi was born on May 5, 1882, in the city of Morioka, Japan. He achieved recognition in Japan and abroad through the study of the Ainu language and, in particular, the yukar, the oral epics of the Ainu, of which he collected many from informants at a time when the Ainu language was already moribund. He is widely considered the founder of modern Ainu studies in Japan.

Kindaichi entered the linguistics department of Tokyo Imperial University in 1904, graduating in 1907 with the dissertation *Particles in the languages of the world*. During this time, he conducted research on the Sakhalin (Karafuto) Ainu and their dialects. In 1913, Kindaichi began teaching Ainu at Tokyo Imperial University, becoming a full professor in 1941. He also accepted a post at Kokugakuin University as professor of linguistics and Japanese in 1922, becoming a professor emeritus in 1968. He continued to conduct fieldwork in Hokkaido through a network of informants. Kindaichi was intrigued by the possibility that the Ainu language might be related to the

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Native American languages, noting the polysynthetic, incorporating character of the Ainu verb, which is also found in Amerindian languages.

Several of Kindaichi's students went on to become prominent scholars of the Ainu language themselves. These included Shiro Hattori, a recognized dialectologist of both Hokkaido and Sakhalin Ainu, and Itsuhiko Kubodera, a compiler of Ainu oral literature. Kindaichi was also remarkable for encouraging Ainu people themselves to participate in and conduct research into their own language and oral histories. Among the most important of these scholars were Mashiho Chiri, the first Ainu to attend Tokyo Imperial University, with whom Kindaichi co-authored *Ainu goho gaisetsu* [Outline of Ainu grammar], and Shigeru Kayano, an Ainu anthropologist and politician.

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Besides his Ainu studies, Kindaichi was active in the Linguistic Society of Japan, first as vice president from 1938 and then as president from 1967. He held this post until his death on November 14, 1971, at the age of 89. He was also known as the father of Haruhiko Kindaichi, a respected linguist in his own right.

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Kinesics

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Introduction

The study of bodily movements, such as gestures and facial expressions, is called *kinesics* (from the Greek word *kinêsis* 'movement'). Kinesic communication is a complementary, supplementary, and at times, substitutive mode of communication to verbal (and especially vocal) language. Kinesics is a part of anthropology, psychology, and semiotics, where it is included as a topic within the general domain of nonverbal communication.

The founder of kinesics as a field of inquiry and research was the American anthropologist Ray L. Birdwhistell (1918–1994). Influenced by the views of his teacher, the great anthropologist Margaret Mead (1901–1978), and the work of David Efron (1941) in the early 1940s, Birdwhistell became interested in analyzing the way people interacted by watching films. He noticed that people seemed to transmit information unconsciously through their eye movements, facial expressions, and postures. For this reason, he came to view body language as a critical component of human interaction. His first book on the topic, *Introduction to kinesics*, was published in 1952. In it, he discussed the role of body motion and gesture in human communication.

In a series of papers and encyclopedia entries (1955, 1960, 1961, 1963, 1974, 1979), Birdwhistell defined kinesics as the study of all aspects of nonverbal communication, including gesture and touch. Today, however, some of these are studied under separate branches of semiotics (*see* **Nonverbal Communication**). Kinesic phenomena are also called 'paralanguage' within linguistics proper, indirectly

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acknowledging the crucial role that they are perceived to play in speech communication.

Birdwhistell fashioned kinesic practice on the general methods and concepts of American descriptive linguistics. By collecting and analyzing relevant data on body movements, facial expressions, gestures, and the like during social interaction Birdwhistell claimed that it is possible to write a 'kinesic grammar' in the same way that linguistics write a verbal grammar by analyzing words and sentences. As he (1970: 157) put it: "The first premise in developing a notational system for body language is to assume that all movements of the body have meaning. None are accidental." He called such movements 'kinemes' (in analogy with 'phonemes'). The kineme is the prototype for a group of movements that are not identical, "but which may be used interchangeably without affecting social meaning" (Knapp, 1978: 94–95), and thus "can be construed as having a definite organization or structure, just as language is understood in terms of its grammar" (Duncan and Fiske, 1977: xi).

Because of its foundations in linguistic structuralism, kinesics was included early on within semiotics (Sebeok *et al.*, 1964; Eco, 1968). Some see it as a term encompassing the general study of nonverbal communication (Duncan, 1969: 118; Key, 1975; Harper *et al.*, 1978: 119; Knapp, 1978: 12; Raffler-Engel, 1980: 30). Others see it as neither an autonomous field of study nor a branch of semiotics; to them, it is an approach to the study of verbal behavior (Argyle, 1975; Scherer *et al.*, 1979; Scherer and Ekman, 1982).

Birdwhistell divides the study of kinesic communication into four procedures:

1. **Prekinesics**. This involves a description of the physiology of body movements (similar in nature to phonetics, which describes the physical nature of verbal sounds). These are called 'kines' (in analogy with 'phones'), constituting the minimal elements of corporeal behavior that have a differential function in a given context.
2. **Microkinesics**. This is the level of identification of 'kinemes,' the basic differential corporeal units and their variants, called 'allokines' (in analogy with 'allophones'). To make the study of kinemes systematic and standardized, Birdwhistell developed symbols for eight body sections – head, face, trunk, shoulder, hands, legs, feet, neck – called 'kinegraphs.'
3. **Social kinesics**. This is the analysis of the meaning of kinemes within social contexts.
4. **Parakinesics**. This involves identifying the modifiers of kinemes, including motion qualifiers (intensity, range, velocity of movement) and activity modifiers (mode of an entire body in motion).

Areas of Kinesic Research

Humans convey over two-thirds of their messages through the body, producing up to 700 000 physical signs, of which 1000 are different bodily postures, 5000 are hand gestures, and 250 000 are facial expressions (Morris *et al.*, 1979). The body is, in a phrase, a primary source of communication. Studying the kinesic signs that are produced with, through, or on the body has become a central objective of semiotics. Kinesic signs can be inborn (unwitting), learned (witting), or a mixture of the two. Blinking the eyes, clearing the throat, and facial flushing are innate (inborn) kinesic signals. These are often involuntary, as are, for example, facial expressions of happiness, surprise, anger, disgust, and other basic emotions. Laughing, crying, and shrugging the shoulders are examples of mixed kinesic signals. They may originate as innate actions, but cultural rules shape their timing and use. Gestures such as a wink of the eye, a thumbs up, or a military salute, are learned kinemes. The meanings of such signs vary among different cultures. Kinesic messages can give a look and feel to a conversation remembered long after spoken words fade away. They can also be structured to lie or conceal something. For example, pressing the lips together may indicate disagreement or doubt, even if the person's verbal statements convey agreement. When verbal and kinesic statements conflict, listeners will likely believe the latter more.

The main areas of research within kinesics are eye contact, posture, touch, gesture, and facial expression. Clothing is often included within the kinesic purview of research. However, as part of 'material culture,' rather than of kinesics *per se*, the meanings of clothes are usually treated under a separate branch of semiotics (*see* **Clothing: Semiotics**).

Eye Contact

Research on eye contact in various fields, from psychology to semiotics, has found that across cultures, kines such as the length of time involved in eye contact along with the pattern of contact (looking into the eyes, looking down or up, etc.) convey what kinds of social relationship people have to each other. Some patterns appear to be universal: staring is typically interpreted as a challenge; 'making eyes' at someone is normally interpreted as flirtation; narrow eyelids communicate pensiveness, and making the eyebrows come nearer together communicates thoughtfulness; raising the eyebrows conveys surprise. However, even in these there is culture-specific variation. It has been found that Southern Europeans will tend to look more into each other's eyes during conversation than

will North Americans; in some cultures males do not look into female eyes unless they are married or members of the same family. Some patterns convey specific meanings in specific cultural contexts. For example, gazing is interpreted as indicative of sexual wonder, fascination, awe, or admiration depending on the culture; staring is perceived as sexual curiosity, boldness, insolence, or stupidity – again depending on social context and culture.

A large amount of eye communication among humans unfolds in the form of unwitting signals. It has been shown, for example, that men are sexually attracted to women with large pupils, which signal unconsciously a strong and sexually tinged interest, as well as making females look younger (Sebeok, 1994). This would explain the cosmetic vogue in central Europe during the 1920s and 1930s of women using a crystalline alkaloid eye-drop liquid derived from *belladonna* ('beautiful woman' in Italian). The women of the day bought the liquid because they believed – and correctly so, it would appear – that it would enhance facial appearance and sexual attractiveness by dilating the pupils. As the linguist Karl Bühler (1934: 28) aptly observed, such signals act like regulators, eliciting or inhibiting some action or reaction.

Posture

Posture communicates a large amount of information about people's identity, gender, class, moods, motivation, and attitudes, playing a critical role in interpersonal relationships. It can be defined as a pose or movement that can be broken down into a series of specific kinetic movements conveying certain personal and/or social meanings. As in the case of eye contact, there appear to be both universals and culture-based differences in posture kinemes, as kinesic research has found. Some 'universal' posture kinemes are:

1. Slumped posture = low spirits
2. Erect posture = high spirits, energy, and confidence
3. Leaning forward posture = open and interested behavior
4. Leaning away posture = defensive or disinterested behavior
5. Crossed arms = defensive behavior
6. Uncrossed arms = willingness to listen.

Posture is prominent as a tactic in courtship displays, which may look comical or absurd to outsiders, but which constitute crucial modes of communication at key stages in the enactment of reproductive urges to the members of a society or group. 'Sexual posing' makes sense only if the appropriate physical and social contexts are present during courtship or flirtation. While such posing may be residues of ancient animal mechanisms, as some suggest, the great diversity that is evident in courtship posing across cultures suggests that it is not a mere contemporary version of instinctual mating behavior. Rather, sexual postures are shaped in large part by human notions of gender and romance and are, therefore, constantly inclined to change (Synnot, 1993). In the human species, courtship is not only a reflex of biology, but also a product of history and tradition. It is the outcome of Nature and Culture cooperating in a type of partnership that is found nowhere else in the animal realm.

Sexual posing is part of a culture's gender code that mediates peoples' perception of which bodily parts or zones are erogenous. The semiotician Michel Foucault (1926–1984) argued persuasively that 'sins of the flesh' are hardly universal (Foucault, 1976). They must be defined culturally. The Puritans of England, for instance, saw any form of sexual contact or gazing in a marriage situation as a kind of 'necessary sin.' 'Sexual temptation' is still felt by some people to be 'sinful.' On the other hand, the many 'hedonistic' rites and practices of our own and other cultures exalt and glorify the eroticism of the human body. Obviously, what is 'obscene' behavior to some is 'natural' behavior to others. While sexual urges are based in biology, perceptions of what is or is not erotic, sinful, or obscene are ensconced in cultural traditions and habits.

Touch

Another main area of kinesic research studies the social functions and manifestations of touch. The study of touch actually constitutes its own subfield, generally called 'haptics,' although it is still considered a general category of inquiry within kinesics.

A haptic pattern that reveals how research in this area is conducted is 'hand touching,' commonly called 'handshaking.' The zoologist Desmond Morris (1969) claimed that the Western form of handshaking may have started as a way to show that neither person was holding a weapon. It thus became a 'tie sign,' because of the bond it was designed to create. Throughout the centuries, the tie sign became a symbol of equality and fairness among individuals and was used to seal agreements of all kinds. Indeed, refusing to shake someone's outstretched hand was perceived, and continues to be interpreted to this day, as a 'counter-sign' of aggressiveness or as a challenge. Predictably, this form of tactile greeting reveals a high degree of cross-cultural variation. People can squeeze the hand (as Europeans and North Americans do), shake the other's hand with both hands, shake the

hand and then pat the other's back or hug him or her, lean forward or stand straight while shaking, and so on. Haptic greeting and social contact codes are not limited, of course, to manual touch patterns. Other patterns include patting someone on the arm, shoulder, or back to indicate agreement or to compliment; linking arms to indicate companionship; putting one's arm around the shoulder to indicate friendship or intimacy; holding hands with family members or a lover to express intimacy; hugging to convey happiness at seeing a friend or a family member; and so on.

Anthropologists are unclear as to why haptic codes vary so much across cultures. The reason may have a basis in culture perceptions of the body. Some people perceive the skin to be a surface 'sheath.' Others perceive the body as a 'container' or think of themselves as 'contained' in their skin. The zones of privacy that define Self-space in these cultures, therefore, include the clothes that cover the skin. Others feel instead that the Self is located down within the body shell, resulting in a totally different perception of haptic behaviors. People in such cultures are in general more tolerant of crowds, of noise levels, of the touching of hands, of eye contact, and of body odors than most North Americans are. These perceptions are bound to affect haptic behavior that underlies the formation of cultural body codes.

One aspect of haptic behavior that is shrouded in evolutionary mystery is 'lip touching' or osculation in the human species, known, of course, more commonly as 'kissing.' When the lips of adult people touch, the kissing act is perceived normally as an erotic one. But not all kissing is erotic. Kissing other parts of the face, such as the forehead, the head, and the cheeks can be a way of showing affection to children, friends, pets, etc. Erotic kissing, however, is particularly interesting as an evolutionary and cultural phenomenon, because it seems to be a kind of mock-suckling or mock-feeding action, implying vulnerability, closeness, and sensuality. However, it is not universal. It is not common in China or Japan, for instance; and it is completely unknown in many African societies. Traditional Inuit and Laplander societies are more inclined to rub noses than to kiss to engage in sexual foreplay.

Gesture

Gesture is another main area of kinesic research, although it too, like haptic communication, tends to constitute its own autonomous subfield of investigation. Gesture can be defined simply as the use of the hands, the arms, and to a lesser extent, the head to make kinesic signs. Although there are cross-cultural similarities in gesture, substantial differences also exist both in the extent to which gesture is used and in the interpretations given to its particular uses. For example, the head gestures for 'yes' and 'no' used in the Balkans seem inverted to other Europeans. In 1979, Desmond Morris, together with several of his associates at Oxford University, examined 20 gesture forms in 40 different areas of Europe. The research team found some rather fascinating things. For instance, they discovered that many of the forms had several meanings, depending on culture – a tap on the side of the head can indicate completely opposite things, 'stupidity' or 'intelligence,' according to cultural context. They also found that most of the forms were used in many countries.

Gesture is also found in primates. Chimpanzees raise their arms in the air as a signal that they want to be groomed, they stretch out their arms to beg or invite, and they have the ability to point to things (Beaken, 1996: 51). These gestures are, evidently, purposeful and regulatory of the actions of other chimps. But the number of gestural forms of which chimpanzees are capable is limited. Human gesturing, on the other hand, is productive and varied. And it can be used as a substitute for vocal language, as is the case with the many sign languages used in communities of the hearing-impaired. It can also be employed as an alternate mode of communication, as is the case with the sign languages used by religious groups during periods of imposed silence, with the hand language used by traffic personnel, and with the hand and arm language used by conductors of orchestras.

Many semioticians and linguists consider gesture to be a more fundamental form of communication than vocal language. A pragmatic confirmation of this is obtained when one doesn't speak the language of the people of a country one is visiting. In order to communicate with the people on the street, in a hotel, or in a store, one instinctively resorts to gesture in order to get a message across or to negotiate meaning. For example, if one were to describe an automobile to someone, one would instinctively use the hands to iconically portray a steering wheel and the motion used to steer a car, accompanying this gesture, perhaps, with an imitative sound of a motor. This anecdotal scenario not only suggests that gesture is a fundamental mode of communication, but also that its essentially iconic modality makes it a much more universal, and less culture-dependent, mode of message-making than vocal language.

Gesture spans the entire range of signification of vocal language (Bremer and Roodenberg, 1991; Armstrong *et al.*, 1995). Using the index finger is the most common manifestation of deixis (indicating where things are in space and time), although any

body part that can be moved directionally (lips, nose, tongue, etc.) can also be used to point out referents in the immediate environment, to indicate directions, etc. Iconic (simulative) gestures are employed commonly to represent the shape of objects: for example, to refer to a round object people the world over tend to use both hands together moving in opposite – clockwise (the right hand) and counter-clockwise (the left hand) – directions. Such a gesture is characterizable as a kind of 'spatial drawing movement.' And indeed, if the movements of the hands during gesture are transferred by some drawing instrument onto some surface such as paper, the referent of the gesture will be transferred to the paper as a visual figure. Fingers can also be used to represent symbols (by portraying the outline of the symbol). The most common use of this kind of gesturing is in the sign languages for the hearing-impaired. Lastly, symbolic gestures are often used to stand conventionally for social functions or for carrying out interactional protocols such as greeting, affirmation, negation, etc.

Some truly fascinating research by the linguist David McNeill (1992) has shown, moreover, that gesture is a complementary communicative modality of vocal language. McNeill videotaped a large number of people as they spoke, gathering a substantial amount of data on gestural behavior during vocal communication. The gestures that accompany speech are known as 'gesticulants.' McNeill's findings suggest that gesticulants are unconscious forms that convey images that cannot be shown overtly in speech, as well as images of what the speaker is thinking about. Vocal speech and gesticulation constitute a single integrated communication system in which both cooperate to express the person's intentions and thoughts.

On the basis of his findings, McNeill was able to classify gesticulants into five main categories. First, there are 'iconic' gesticulants which, as their name suggests, bear a close resemblance to the referent or referential domain of an utterance, e.g., when describing a scene from a story in which a character bends a tree back to the ground, a speaker observed by McNeill appeared to grip something and pull it back. His gesture was, in effect, a visual icon of the action talked about, revealing both his memory image and his point of view (he could have taken the part of the character or the tree, instead).

Second, there are 'metaphoric' gesticulants. These are also pictorial, but their content is abstract, rather than strictly iconic. For example, McNeill observed a male speaker announcing that he had just seen a cartoon, simultaneously raising up his hands as if offering his listener a kind of object. He was obviously not referring to the cartoon itself, but to the 'genre' of the cartoon. His gesture created and displayed this genre as if it were an object, placing it into an act of offering to the listener. This type of gesticulant typically accompanies utterances that contain expressions such as 'presenting an idea,' 'putting forth an idea,' 'offering advice,' and so on.

Third, there are 'beat' gesticulants. These resemble the beating of musical tempo. The speaker's hand moves along with the rhythmic pulsation of speech, in the form of a simple flick of the hand or fingers up and down, or back and forth. Beats are indexes, marking the introduction of new characters, summarizing the action, introducing new themes, etc. during the utterance.

Fourth, there are 'cohesive' gesticulants. These serve to show how separate parts of an utterance are supposed to hold together. Beats emphasize sequentiality, cohesives globality. Cohesives can take iconic, metaphoric, or beat form. They unfold through a repetition of the same gesticulant form, movement, or location in the gesture space. It is the repetition that is meant to convey cohesiveness.

Fifth, there are 'deictic' gesticulants – 'deixis' is the term used to designate all kinds of pointing or indicating signs. Deictic gesticulants are aimed not at an existing physical place, but at an abstract concept that had occurred earlier in the conversation. These reveal that we perceive concepts as having a physical location in space.

McNeill's work gives us a good idea as to how gesture and language complement each other in normal discourse. As Frutiger (1989: 112) has also observed, accompanying gesture forms reveal an inner need to support what one is saying orally: "If on a beach, for example, we can hardly resist drawing with the finger on the smooth surface of the sand as a means of clarifying what we are talking about." McNeill's gesticulant categories are actually subtypes of the more generic category of gesture called an 'illustrator' by kinesics researchers. Other categories are emblems, affect displays, regulators, and adaptors:

1. **Illustrators**: As just discussed, these literally illustrate vocal utterances. Examples are the circular hand movements when talking of a circle, moving the hands far apart when talking of something large, moving both the head and hands in an upward direction when saying *Let's go up*.
2. **Emblems**: These directly translate words or phrases. Examples are the *Okay* sign, the *Come here* sign, the hitchhiking sign, waving, and obscene gestures.
3. **Affect Displays**: These communicate emotional meaning. Examples are the typical hand movements that accompany states and expressions of

happiness, surprise, fear, anger, sadness, contempt, disgust, etc.

4. **Regulators**: These monitor, maintain, or control the speech of someone else. Examples include the hand movements for *Keep going, Slow down, What else happened?*
5. **Adaptors**: These are used to satisfy some need. Examples include scratching one's head when puzzled, rubbing one's forehead when worried, and so on.

Some societies have developed complementary 'gesture languages.' These share structural and semantic features with vocal languages. One of the best-known examples is the hand language developed by the Plains people of North America as a means of communication between tribes with different vocal languages. The manual signs represent things in nature, ideas, emotions, and sensations. For example, the sign for a white person is made by drawing the fingers across the forehead, indicating a hat. Special signs exist also for each tribe and for particular rivers, mountains, and other natural features. The sensation of cold is indicated by a shivering motion of the hands in front of the body, and the same sign is used for 'winter' and for 'year,' because the Plains peoples count years in terms of winters. Slowly turning the hand, relaxed at the wrist, means vacillation, doubt, or possibility; a modification of this sign, with a quicker movement, is the question sign. The hand language is so elaborate that a detailed conversation is possible using the gestures alone (Mallery, 1972).

Gestures may also be used for sacred symbolic purposes, revealing the ancientness and thus 'mythic symbolism,' associated with hand communication. For example, in Christianity the 'sign of the cross' is a gesture that aims to recreate the central event of Christianity – the Crucifixion. In Buddhism, the gestures known as *Mudras* are used during ceremonies to represent meditation, reasoning, doctrine, protection and request, enlightenment, unification of matter, and spirit. The 'devil's hand,' with the index and little finger raised, on the other hand, belongs to the domain of superstition, symbolizing, in some cultures, a horned figure intended to ward off the evil eye and in others a sign of 'cuckoldry.'

Facial Expression

Probably inspired by general work in kinesics, in 1963, psychologist Paul Ekman established the Human Interaction Laboratory in the Department of Psychiatry at the University of California at San Francisco for the purpose of studying one particular aspect of kinesic behavior – facial expression. He was joined by Wallace V. Friesen in 1965 and Maureen O'Sullivan in 1974. Over the years, Ekman and his team have identified, for example, certain facial expressions as universal signs of specific emotions (e.g., Ekman, 1980, 1982, 1985, 2003; Ekman and Friesen, 1975). They have shown this by breaking down facial expressions into characteristic components – eyebrow position, eye shape, mouth shape, nostril size, etc. – which in various combinations determine the form and meaning of the expression. Ekman and his team have, over the years, found very little variation across cultures in the nature of the components and in their combinations. Indeed, they have shown that it is possible to write a 'grammar' of the face that shows less cross-cultural variation than do language grammars (Peck, 1987).

Conclusion

Kinesics has become an important branch of semiotics because it documents the power of nonverbal signs in regulating how people behave in certain social situations. Such signs are products of both our biological ancestry and of specific cultural histories. The sounds made by the body (sneezing, coughing, burping, etc.), the fluids that issue forth from it, the eye patterns that are used when speaking, the kinds of touching routines humans utilize during discourse, the facial expressions utilized in conveying feelings, and the kinds of gestures and gesticulations that are found throughout the world are all interpreted semiotically as signifiers of both universal and culture-specific meanings. These are the outcome of Nature and Culture cooperating in an exclusive form of partnership.

Discoveries in neuroscience have shown that nonverbal signs are produced and processed differently from words. Spoken language is processed in the cerebral cortex, a more developed area of the brain that is unique to human beings. In contrast, nonverbal cues – such as smiling, staring, and clenching the fists – are processed in lower, more primitive areas such as the limbic system. People often produce and receive nonverbal cues without conscious awareness of doing so.

Because kinesics has produced a substantial and substantive literature, it is now not uncommon to separate the various areas mentioned in this entry into separate subfields. For example, gesture is now studied separately. Similarly, the study of facial expression and touching patterns are treated as separate areas of investigation.

See also: Body Language; Clothing: Semiotics; Dance; Nonverbal Communication; Proxemics; Sign Language: Semiotic Approaches.

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Kingman Reef: Language Situation

Editorial Team

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Kinship Expressions and Terms

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All languages have expressions that can be glossed 'father,' 'wife,' 'brother-in-law,' etc., covering consanguineal, spousal, and affinal categories. However, from the beginning of serious cross-cultural study, it has been apparent that societies differ in the kinship categories used. To facilitate comparison, an 'etic grid' is necessary; namely, an open-ended universe of kin-types, such as 'father's sister,' corresponding to the denotata of the infinitely expansible possessive construction seemingly found in all languages. The minimal nuclear components are parent (Pa), child (Ch), and spouse (Sp), a combinatory algorithm (PaPaSp = parent's parent's spouse), and cross-cutting features, including sex of referent (Ch + female = daughter), sex of linking relative (male linking relative + Ch + female = man's daughter), and relative age within a generation (PaSb + senior = senior sibling). The initial linking relative (e.g., *you* in *your father*) is referred to as 'ego' or 'propositus.'

In practice, most anthropologists and linguists operate with atomic categories based on a prototypical set of flesh-and-blood nuclear family members: Fa(ther), Mo(ther), Br(other), Si(ster), So(n), Da(ughter), Wi(fe), and Hu(sband). Combinations are then of the type FaMoBrWi (father's mother's brother's wife).

This grid permits analysis of the denotational scope of each kin term and, ultimately the entire system, by identifying the complete set of kin-types onto which the term maps. Some terms, such as English *mother* and *brother*, denote unique kin-types. Others, such as English *uncle*, correspond semantically to finite sets of kin-types. However, in languages with 'classificatory' kin-term systems, each such term maps onto an unbounded set of kin-types. With such languages, a common approach is to generate the more complex kin-types from simpler ones by expansion rules that link kin-types closer to propositus, with kin-types in the denoted set farther away; doing so entails converse reduction rules that go from complex to simple types. If in a system the term for MoBrDa expands to include MoMoBrDaDa, then conversely, MoMoBrDaDa reduces terminologically to MoBrDa; they are both denoted by the same term in such a system of terms.

Kinship Systems

Ideally, one can elicit the kinship system of a previously unstudied language by sitting down with an informant for a few hours, presenting a reasonable range of kin-types (perhaps using the informant's actual kin), and recording the corresponding kin terms. A great milestone in kinship study, still widely mined for data, was Morgan's (1870) analytical compendium of term/kin-type mappings from American Indian languages based on detailed questionnaires filled out by local correspondents (Trautmann, 1987). In interdisciplinary museum expeditions, such as those led by Alfred Haddon in the South Pacific in the first decades of the 20th century, it was common to include an anthropologist who would rapidly record the 'social structure' – that is, the kinship terminology – of each tribe visited in this fashion.

The resulting systems were taken as reflecting synchronic native models of how the societies worked, with particular reference to matriliny versus partriliny and to such issues as bigamous marriage involving sibling groups. However, because kin-term systems were often mismatched with observable social practices, ethnologists inferred that the kin terms could reflect social structures from an earlier age that were preserved in linguistic formaldehyde. Evolutionary models were later dismissed in favor of synchronic interpretations, first by early functional-structuralists (e.g., Radcliffe-Brown, 1924, 1950), and later by high structuralists (Lévi-Strauss, 1949) under the influence of linguistic structuralism. In recent decades, anthropology has become heavily concerned with historical processes, which has been reflected in a revival of interest in the evolution of kinship systems (Dole, 1972).

As an example of kinship typology, consider the three male kin-types: Fa, FaBr, and MoBr. The following four groupings are attested: (1) all three terminologically distinct (Sudanese systems); (2) Fa versus {FaBr, MoBr} (Eskimo systems, as in English), emphasizing the distinction between direct and collateral lines; (3) {Fa, FaBr} versus MoBr (Iroquois systems), known technically as bifurcate merging, merging same-sex siblings; and (4) all three merged into one category (Hawaiian systems), emphasizing generation. A hypothetical fifth system with (Fa, MoBr) terminologically distinguished from FaBr is unknown. The treatment of female kin-types Mo, MoSi, and FaSi is almost always parallel within a given system type; for example, Iroquois systems distinguish {Mo, MoSi} from FaSi. Usually (but not always), parental-generation kin-types that are merged terminologically as referents are also undifferentiated as linking relatives. For example, the child of an *uncle* (whether MoBr or FaBr) is *cousin* in English.

Two initially baffling systems show the same (bifurcate merging) cuts as Iroquois among the six primary parental-generation kin-types, but skew their extensions to lower generations. Crow systems have a matrilineal skewing rule by which SiSo or (woman's) So is terminologically merged with Fa; note that (ego's) Fa and SiSo are in the same matrilineal descent group, which differs from ego's own. Omaha systems have a structurally similar patrilineal skewing rule; for example, merging MoBrDa with Mo, both of whom are in ego's Mo's patrilineal descent group.

Meaning of Kin Terms

One is naturally drawn to seek explanations for this cross-linguistic variation in the form of correlation with cross-cultural differences in social practices. However, doing so turns out to be more difficult than it seems. To begin with, there are at least four social parameters that might be considered: (1) society-wide descent groups (matrilineal or patrilineal), including binary divisions (moieties); (2) marriage rules; (3) postnuptial residence (e.g., with the father of the bride); and (4) inheritance (e.g., from father to son). Unfortunately, these social phenomena operate at different levels and are often nuanced and negotiable, rather than binaristic and rigid. Although the parameters may sometimes converge (e.g., patrilineal descent, patrilocal residence, father-to-son inheritance), there are many cases where they do not. The structural-functional interpretation of "a kinship system as a working system linking human beings together in an orderly arrangement of interactions" (Radcliffe-Brown, 1950) has been plagued by evidence that certain kin terms lump together kin-types associated with quite different behaviors and affective relations.

Yet, it seems reasonable to suppose that kin-term semantics and prevailing sociocultural practices are not unrelated. For example, the fact that Americans have unique terms for parents, but lump the siblings of these parents (and even the spouses of these siblings) together as *aunt* and *uncle*, correlates with the autonomy of the nuclear family in this society. Likewise, societies that have well-developed descent systems and, say, a formalized levirate by which orphaned children are adopted by a brother of the deceased father, are good candidates for systems with Fa = FaBr (distinct from MoBr).

The suggestive but imperfect correlations between terminology and sociocultural practices have led to deep divisions among anthropologists as to what kin terms 'mean.' At one pole are exponents of formal kinship semantics, who argue that kin terms constitute autonomous formal systems, decomposable into nuclear primitives and expansion/reduction rules as sketched above. One of the founders of this approach, Floyd Lounsbury, demonstrated that this generative model provided the first accurate analysis of Morgan's Crow- and Omaha-type data, permitting the identification of previously unsuspected parametric variants within both (1956, 1964a, 1964b). He showed that previous attempts to explain these systems using sociocultural correlations were empirically inaccurate beyond the simplest kin-types. Lounsbury's model was later extended by Harold Scheffler to Australian Aboriginal and other difficult systems (1971, 1978).

The modularity of this approach was countered by other anthropologists who argued that sociocultural contextualization was needed. The most outspoken critic, David Schneider (1968, 1984), questioned the core assumption of the formalists; that is, universal concepts of marriage and procreation (or conception) as the foundation of nuclear basic kin-types (for assessments, see Feinberg and Ottenheimer, 2001). For Schneider, kinship systems are based on subjective and therefore culture-specific concepts; for example, Americans have a distinctive notion of blood at the center of their kinship system. Schneider and others emphasized the ways different cultures recognize paternity (and even maternity), citing the widespread nonbiological uses of kinship concepts (e.g., *father* as applied to God, to George Washington, or to priests), and arguing that anthropologists must discover these concepts through sensitive participant-observation. Similar attacks on universal 'marriage' were launched by British anthropologists (Needham, 1971).

Ethnographic complications include spirit-child conception, god-parents, compadres and comadres, co-spouses, ex-spouses, adoption, step-kin, namesake relationships, formal renunciation of genealogical relationships, and tightly knit brotherhoods and sisterhoods. Recent phenomena (gay marriage, artificial insemination, test-tube babies, surrogate mothers, and cloning) add further layers of complexity.

Cognitive Semantics

Cognitive anthropologists and linguists have grappled with tensions between extralinguistic conceptual structure and lexical categories (Miller and Johnson-Laird, 1976), and have of course reexamined kinship among other domains. Prototype theory has been influential, but no clear consensus on kinship semantics has emerged.

Hirshfeld (1984) argued that a formalist model based on genealogical primitives is inconsistent with

cognitive theories of meaning. He dismissed the claim that nongenealogical uses of kin terms are (experienced by natives as) metaphorical and pointed out that the time-bound acts of insemination and childbearing fail to account for the enduring nature of kinship bonds. He suggested that normative attributions of parent-child physical resemblance play a key role.

Anna Wierzbicka's theoretical program emphasized a small number of universal lexical primitives, from which the meaning of other lexical items is derived. Addressing kinship (1992), she identified MOTHER, FATHER, HUSBAND, and WIFE as primitives. She partially accepted the argument that the two parental categories are universal, based on cross-cultural recognition of paternal as well as maternal roles in procreation.

Read (1984) argued that American kinship terminology can be modeled as a modular algebraic system independent of its linkage to concrete kin categories (such as kin-types).

Linguistic Studies

Anthropologists have long been aware of terminological reductions and shifts from referential to vocative forms of kinship, generally interpreting them as pragmatic skewings of vocatives. Linguists have now brought out much deeper language-internal complexity. There may be several coexisting subsets of nouns: referential terms (*father*), vocatives (*hey Dad!*), deceased kin (*my late uncle*), bereaved kin (*orphan*), terms for nonhumans, and dyadic derivatives (*mother*-Dyad = a mother and her child). In some languages, these subsystems have their own suppletive terms and/or make different semantic cuts. For example, English *orphan*, *widow*, and *widower* are a defective set of bereaved kin terms; some languages have additional terms with glosses like 'bereaved MoBr.' Tubatulabal (California) has a suffix roughly glossable 'last surviving X' (X = e.g., Br; Voegelin, 1935).

Broad kinship relations among two or more referents may be encoded in nonsingular pronouns. Dalabon (Australia) has two forms for each dual pronominal, as in 'they(Dual)-went,' depending on whether the two referents are 'harmonic' based primarily on generation sets (Alpher, 1982; cf. Koch, 1982 on Kaytej).

One semantic type of kinship verb is glossable 'X calls Y "mother"' (cf. *Don't "mother" me!*). Another is glossable 'X mothers Y,' where (depending on the language) X is any of Y's (classificatory) mothers, X is Y's actual (prototypical) mother, or X behaves like a mother to Y. Sometimes at least certain 'referential kin terms' are morphological verbs or relative clauses (Amith and Smith-Stark, 1994; Evans, 2000). Even in other languages, the precise semantics of such verbs as 'bear/sire (child)' clarifies the conceptual foundations of kinship.

Whenever speaker S and addressee A are both related to a referent R, there is a choice between egocentric ('my . . .') and altercentric ('your . . .') perspectives. Actual usage may be controlled by pragmatic principles, but these can be intricate (Merlan, 1982). The forced choice between the two perspectives is obviated in some Australian languages in which 'triangular' kin terms simultaneously specify S's and A's relationships to R (Laughren, 1982; Merlan, 1989).

Special registers can be associated with speech to (or in the presence of) particular kin: bawdy registers for 'joking relationships' or respectful registers used in the presence of senior affines. These registers may have extensive vocabularies, including suppletive kin terms, thereby usually making a reduced set of distinctions (Dixon, 1971). The same applies for registers associated with male initiation rites (Hale, 1982).

Kinship categories may be associated with body parts. In this case, touching the body part may replace the spoken term, in isolation, or timed to fill a 'slot' in an utterance (Heath, 1982). These kin/body associations are metonymic, alluding to stereotypical behaviors (carrying in the womb, carrying piggyback, sleeping thigh to thigh, averting one's eye). The fact that carrying in the womb is treated as just one among several bodily interactions suggests that the sharp distinction between 'genealogical/biological' and 'affective/behavioral' levels of meaning in anthropological kinship studies may be misguided.

See also: Cognitive Anthropology; Identity in Sociocultural Anthropology and Language.

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Kinyarwanda

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General Background

Kinyarwanda, the national language of Rwanda is probably, after Swahili the second largest spoken language in the Bantu group. It is a sister dialect of Kirundi, the national language of Burundi, and Giha, another dialect spoken in Tanzania. Despite the genocide that took place, taking the lives of more than 1 million Tutsi, it is spoken by perhaps more than 20 million people. Rwanda has approximately 9 million people right now, Burundi has approximately 7 million, but besides the Giha speakers there are also ethnic Banyarwanda in Southern Uganda in the Kigezi district known as Bafumbira. Other Kinyarwanda speakers are Banyamulenge in Southern Kivu, ethnic Banyarwanda in Masisi, and Rutshuro in Northern Kivu in the Democratic Republic of Congo. Kinyarwanda belongs to the interlacustrine (Great Lakes) Bantu languages.

Writing System

Although Kinyarwanda has both long vowels and short vowels as well as high tones or no tones on syllables, the official orthography does not mark

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Writing System

Although Kinyarwanda has both long vowels and short vowels as well as high tones or no tones on syllables, the official orthography does not mark

vowel length and melody. Only the context can tell the reader which word was meant. Written texts are thus ambiguous even to native speakers. Thus, the written word *gusura* can stand either for (*gusura*) 'to fart' or (*gusuura*) 'to visit', and *gutaka* can stand for either (*gutaka*) 'to scream' or (*gutaaka*) 'to decorate'; *ino* can stand for either (*ino*) 'toe' or (*inó*) 'here', *inda* can stand for (*inda*) 'stomach' or (*indá*) 'louse', *umuryango* can stand for (*umuryaango*) 'family' or (*umuryáango*) 'door', and *ikirere* can stand for (*ikireere*) 'banana leaf' or (*ikiréeré*) 'air space'. Even though the sound 'p' has been lost and is found only in onomatopoeic words and loan words, the aspirated voiceless velar fricative 'h' is spelled as 'p' after the bilabial nasal 'm', as shown in the examples *impuha* (*imhuuha*) 'rumors', *impamvu* (*imhaámvu*) 'cause/reason'. The allophones, the voiced bilabial stop 'b', which appears only after the homorganic nasal 'm', and the voiced bilabial fricative a, realized intervocalically, are also written the same way, using the voiced bilabial stop symbol 'b'. Although the language has only one liquid, both 'r' and 'l' are used in the orthography. The liquid 'r' is used in all texts and 'l' is used only in loan words that have 'l' in their spelling, such as *Libiya* 'Libya', *Alijeriya* 'Algeria', *dolari* 'dollar'.

Vowels and Consonants

Kinyarwanda has five vowels, which are either long or short and are high-toned or have no tones. The high tone can appear on either the first mora or the second mora. These vowels are the two high vowels 'i' and 'u', the midvowels 'e' and 'o', and the center low vowel 'a'. The midvowels 'e' and 'o' are not allowed in both the (pre)prefix and suffix positions. In verbs, however, these midvowels can appear in the suffix position as a result of vowel harmony if the vowel of the verb stem is a midvowel, e.g., *gukosa* 'to make mistakes', *gukosoora* 'to correct' /ku-kos-uur-a/; *kumenya* 'to know', *kumenyeesha* /ku-meny-iish-a/.

The majority of word stems have the same identical vowel in all syllables: *u-mu-biri* 'body', *u-bu-riri* 'bed, *i-ki-reenge* 'leg', *i-béere* 'breast', *u-mu-góongo* 'back', *u-mu-hoondo* 'yellow', *u-ku-guru* 'leg', *u-rutúgu* 'shoulder', *igihaánga* 'skull', *i-ki-gaanza* 'hand palm'. This observation raises the question as to whether the stem is assigned only one vowel that is copied or that spreads to other syllables.

Since Kinyarwanda has open syllables only, loan words with cluster consonants copy the vowel of the syllable on the right or a default vowel 'u' with bilabial consonants and 'i' with other consonants. As the following loan word *porogaramu* 'program' shows, both vowels 'o' and 'a' are copied on the preceding vowelless consonants and the vowel 'u' is inserted after the final consonant 'm'.

'program' /p.$ro.$g.$ra.$m.$/ > *porogaramu*

This language has both simple and complex consonants. The simple consonants, using the official orthography, are the bilabials 'p', 'b', and 'm', the interdentals 'f' and 'v', the alveolars 't', 'd', 's', 'z', and 'n'; the alveopalatals 'sh', and 'j', and the velars 'k', 'g', and 'h'. Kinyarwanda has two glides, the palatal 'y' and the bilabial 'w'. It has one liquid, 'r', which is written as 'l' in some loan words, as was pointed out earlier. The affricates are the labiodental 'pf', the alveolar 'ts', and the palatal 'c'.

The complex consonants are the prenasalized simple consonants, the palatalized consonants, the velarized consonants, the palatalized–velarized consonants, the prenasalized palatalized consonants, and the prenasalized palatalized–velarized consonants.

Prenasalized consonants are the bilabial 'mp' and 'mb'; the interdental 'mv', 'mf', and 'mpf'; the alveolar 'nt', 'nd', 'ns', 'nz', and 'nts'; the palatal 'nsh', 'nj', and 'nc'; and the velar 'nk', 'ng', and 'nshy'.

Palatalized consonants are the bilabial 'by', 'py', and 'my'; the interdental 'fy'; the alveolar 'ty', 'dy', 'sy', and 'nny'; and the velar 'cy', 'jy', and 'shy'.

The velarized consonants are the bilabial 'pw', 'bw', and 'mw'; the interdental 'fw' and 'vw'; the alveolar 'tw', 'dw', 'sw', 'zw', 'nw', 'rw', and 'tsw'; the palatal 'shw', 'jw', 'cw', and 'yw'; and the velar 'kw', 'gw', and 'hw'. Palatalized–velarized consonants are the bilabial 'byw', 'pyw', and 'myw'; the alveolars 'tyw', 'dyw', 'syw'; and the velar fricative 'shyw'. Palatalized consonants, velarized consonants, and palatalized–velarized consonants can in turn be prenasalized as shown in the following examples: 'mbyw' (prenasalized palatalized–velarized voiced bilabial), 'mvyw' (prenasalized palatalized–velarized voiced interdental, 'nshyw' prenasalized palatalized–velarized voiceless fricative velar, and 'njyw' (prenasalized palatalized–velarized voiced stop velar). The complex consonants in Kinyarwanda are discussed at great length in Kimenyi (2002) and Bizimana *et al.* (1998). It is still an open debate in phonetics and phonology as to whether these complex consonants are one with multiple articulators or a sequence of independent segments.

Tonology

Role of Tones

Tones are lexical, morphological, and syntactical. Lexical tones differentiate words that look alike segmentally as shown in (1), morphological tones play

the role that segmental morphemes are assigned in other languages as illustrated in (2), whereas syntactic tones are assigned depending on where the word bearing the tone occurs in the noun phrase, verb phrase or the sentence as shown in (3):

(1) *inda* 'stomach' <> *indá* 'louse', *ino* 'toe' <> *inó* 'here'

(2) *basoma* 'they read' <> *basomá* 'who read' <> *básoma* 'when they read'

(3) *baraaza bagakóra* 'they come and work' <> *baraaza bagakora akazi* 'they come and do the work'

In (2), the lack of tone shows the present tense, and the high tone on the second syllable shows that the verb is a relative clause, whereas the high tone on the first syllable of the verb stem shows that the verb is a temporal or conditional clause. In (3), the verb loses its high tone because it is followed by a complement.

Tone Rules

Tone rules in Kinyarwanda were thought to be complicated. However, when looked at very closely, they are very simple. There is only one lexical high tone per morpheme. Some morphemes are toneless. Noun tone patterns differ from verb tone rules. Any noun can have a lexical high tone on any syllable of the stem, except the augment and the prefix. A verb, however, even when it is polysyllabic and has multiple suffixes, can have a high tone only on the first mora of the first syllable or the first of the second syllable of the stem. Other syllables are extraprosodic. When high tones are found there, they are stray tones, since they do not participate in tone rules such as the Meeussen rule, Beat Movement, Iambic Reversal, etc. The first syllable verb high tone assignment is lexical, whereas the second syllable high tone assignment is grammatical. The prosodic domain of tone rules application of both nouns and verbs is the leftmost phonological tone and the first mora of the stem first syllable. Tone rules apply from right to left, whereas in the majority of languages whose tone rules have been studied, they apply from left to right.

Nouns can obtain a secondary and a tertiary tone. A secondary high tone is assigned on the first mora of the noun stem if the lexical high tone is at least two or more mora away from the first noun mora.

isáandukú 'box' ← /i-saandukú/, *inkókorá* 'elbow' ← /i-n-kokorá/
aug-box aug-CL9-elbow
abasásamígozí 'murderers'
/a-ba-sas-a+i-mi-gozí/
aug-sub.pr.-make bed-asp+aug-CL4-rope
inshóberamáhaánga 'idiomatic expressions'
/i-n-shober-a+a-ma-haánga/
aug-CL9-disorient-asp+aug-CL6-foreign countries

A noun can thus have only a maximum of three phonetic high tones.

What makes verb tones seem complex is the assignment of the tense–aspect–modality morphemes. Some tenses or moods erase lexical tones, thus making the whole finite verb toneless, or assign tones to toneless verb stems, making both toneless verb stems and high-toned verb stems look the same. As shown below, the verb stem *-kin-* 'play' and *-kór-* 'work/do' are neutralized, becoming toneless or both bearing a high tone in some tenses.

ntibagikora 'they do not work anymore' <> *ntibagikina* 'they do not play anymore'
baracyáakóra 'they still work' <> *baracyáakina* 'they still play'
bakoré 'they should work'<> *bakiné* 'they should play'.

The metrical domain for verb tone rules is the first mora of the first object pronoun and the first mora of the verb stem for lexical tones and the first mora of the first object pronoun and the first mora of the second syllable of the verb stem. Kinyarwanda is one of the Bantu languages that can have multiple object pronouns.

baranáhabíbamákoreeshereza ← /ba-ra-na-ha-bi-ba-mu–kór-iish-ir-ir-y-a/
they-t-also-there-it-him/her-them-do-appl-caus-appl-appl-caus-asp
'they also make them do it for him/her there'.

Phonology

Phonological Rules Affecting Vowels

Phonological rules affecting vowels are vowel deletion, vowel coalescence, gliding, vowel harmony, vowel shortening, and vowel lengthening.

When a word or morpheme that ends with a vowel is followed by another one that also starts with a vowel, the final vowel of the word or morpheme on the left is always deleted.

Vowel coalescence takes place within a word if there is a sequence of two morphemes ending with the central low vowel 'a' and starting with the high vowels 'i' and 'u', respectively: 'a + i' becomes 'e' and 'a + u' becomes 'o', e.g., *améenyo* /a-ma-íinyo/ 'teeth'.

Gliding takes place within words or clitics if in a sequence of two vowels the first one is a high vowel ('i', 'u') or a round vowel ('u', 'o'), thus becoming 'y' for the front high vowel and 'w' for round vowels, e.g., *harimó amáazi* > harim$^{w'}$áamáazi 'there is water

in it'; *i-ki-úuma* > ik^{y}úuma 'knife'; */u-bu-oónko/* > ub^{w}oónko 'brain'. Vowel harmony affects vowels in the suffix position. If the suffix vowel is high ('i', 'u') it becomes mid ('e', 'o', respectively), if the word stem vowel is a mid vowel, e.g., *gukóra* /ku-kór-a/ 'to work' > *gukóreesha* /ku-kór-iish-a/ 'to cause to work/employ/use', *kumenya* /ku-meny-a/ 'to know' > *kumenyeesha*/ku-meny-iish-a/ 'to let know/inform'. Vowels in Kinyarwanda are always short in the beginning and final positions of words. They always lengthen before prenasalized consonants and after palatalized and labio-velarized consonants (Kimenyi, 1979, 2002).

Phonological Rules Affecting Consonants

Phonological rules affecting consonants are assimilation, dissimilation, known as Dahl's Law, fricative spread, deletion, and insertion. As in other Bantu languages, reduplication is also very productive in Kinyarwanda.

Consecutive consonants acquire the same voice, manner, and place of articulation phonetic features. Nasals take the place of articulation (labial, velar, palatal, velar) of the consonant on the right. Consonants obtained through the palatalization or velarization process also agree in voice, nasality, and place of articulation with the governor consonant.

gukúbita 'to hit' > *gukúbitkwa* 'to be hit' /ku-kubit-w-a/

kudóda 'to sew' > *kudódgwa* 'to be sewed' /ku-dód-w-a/

kubóna 'to see' > *kubónnwa* 'to be seen' /ku-bón-w-a/.

If a word has a palatalized fricative in one of the syllables on the right, fricatives in preceding syllables become palatalized as well.

gusoonza /ku-soonz-a/ 'to be hungry' > *gushoonjeesha* /ku-soonz-iish-a/ 'to cause hunger'

basuuzugura /ba-suuzugur-a/ 'they despise' > *bashuujuguje* /ba-suuzugur-ye/ 'they just caused to despise'.

This phenomenon argues for the autosegmental treatment of phonological rules because as the provided examples show, these fricatives do not have to be in adjacent syllables.

Reduplication is both lexical and grammatical. Lexical reduplication consists of stems that are already reduplicated. Grammatical reduplication affects the stem. In verbs, it is very productive with verbs of movement or sound to show repetition, iterativity, or intensity.

Reduplication is achieved by either repeating the fist syllable or the whole stem.

gutuumba 'to swell' → *gututuumba* 'to start swelling'

kugeenda 'to go'/'walk' → *kugeendageenda* 'to walk around'

ukwéezi 'moon/month' → *icyéezeezí* 'moonlight'

ubusá 'nothing' → *ubusáabusá* 'very little quantity'.

Morphology

Noun Morphology

Kinyarwanda has 16 classes. Modifiers (adjectives, demonstratives, numerals, possessives) agree with the head noun by taking this class marker.

In some cases, however, the class marker has different phonetic forms depending on the grammatical category of the modifier, as illustrated in Table 1. The sentence in (2) in Table 1 shows how this type of noun class agreement works. The head noun *abagabo* (a-ba-gabo) 'men' with class 2 prefix-ba-has it copied to all modifying elements (adjectives, subject pronouns, object pronouns, etc.).

bá-no	*ba-gabo*	*ba-tatu*	*ba-gufi*,
these	men	three	short

mu-ra-bá-bon-a, ba-mez-e néezá b-óose.
you-pres-them-see-asp they-are-asp well all
'These three short men, you see them, they are all of them doing well".

Table 1 Allomorphic variation of the nominal prefix according to its function

	Noun	*Adjective*	*Object pronoun*	*Demonstive*	*Possessive*
1.	u-mu-	mu-	-mu-	u-	u-
2.	a-ba-	ba-	-ba-	ba-	ba-
3.	u-mu-	mu-	-wu-	u-	u-
4.	i-mi-	mi-	-yi-	i-	i-
5.	i-ri-	ri-	-ri-	ri-	ri-
6.	a-ma-	ma-	-ya-	a-	a-
7.	i-ki-	ki-	-ki-	ki-	ki-
8.	i-bi	bi-	-bi-	bi-	bi-
9.	i-n-	n-	-yi-	i-	i-
10.	i-n-	n-	-zi-	zi-	zi-
11.	u-ru-	ru-	-ru-	ru-	ru-
12.	a-ka-	ka-	-ka-	ka-	ka-
13.	u-tu-	tu-	-tu-	tu-	tu-
14.	u-bu-	bu-	-bu-	bu-	bu-
15.	u-ku-	ku-	-ku-	ku-	ku-
16.	a-ha-	ha-	-ha-	ha-	ha-

Note: The numbers 1–16 correspond to traditional conventional Bantu noun classification.

The Use of the Preprefix The preprefix or augment usually does not have any semantic function. Some Bantu languages such as Kiswahili do not have it. In Kinyarwanda, it is deleted, after demonstratives, in the vocative case and in onomastics (name creation). Within certain words, however, its absence marks definiteness and its presence indefiniteness.

mugaanga 'the doctor' > *umugaanga* 'a doctor'
munywáanyi 'the buddy' > *umunywáanyi* 'a buddy'
mugeenzi 'the friend' > *mugeenzi* 'a friend'
mwaarimú 'the teacher' > *umwáarimú* 'a teacher'

The absence of the preprefix bleeds tone rules and its absence feeds them. The secondary tone assignment on the first more of the noun stem takes place only if it has a preprefix.

Noun Derivation with the Prefix Kinyarwanda nouns have a small number of suffixes. The most productive one is *-kazi*, which is added to the stem to show feminine, e.g., *umunyarwaanda* 'Rwandan'<> *umunyarwaandakazi* 'female Rwandan', *umwáarimú* 'teacher' <> *umwáarimúkazi* 'female teacher'.

Derivation is productive with the preprefix that creates new words that are either metaphorically or metonymically related to the original noun as shown by the stem-ntu in the following examples: *umuuntu* 'person', *ikiintu* 'object', *ukuuntu* 'manner', *ubuuntu* 'generosity', *ahaantu* 'place'.

Verb Morphology

The simple Kinyarwanda verb form consists of the subject pronoun, the verb stem, and the aspect marker. The aspect marker is either -a(ga) (imperfective aspect) or -ye (the perfective aspect as seen below. The -aga suffix is used in past tenses only and is not used in Kirundi.

basoma (ba-som-a) 'they read';
basomaga /ba-a-som-aga/ 'they were reading';
basomye (ba-som-ye) 'they just read'.

The complex form consists of the preprefix, the subject pronoun, the tense–aspect–modality (TAM) morphemes, the object markers, the reflexive pronoun -i-, the verb stem, the lexical verb extensions, the grammatical morphemes, the aspect marker and the postsuffixes -mó, -hó, or -yó.

The preprefixes are either the morpheme nti- or ni-, negative and temporal morphemes, respectively. The TAM morphemes show time, mood or aspect. Two TAM morphemes can occur in the same slot. Kinyarwanda can have multiple object pronouns, multiple lexical verbal extensions, and multiple grammatical suffixes. Lexical extensions such as -agur-, -iir-, uur, -aang, iriz-, etc., add lexical information, such as inchoativity, iterativity, repetitivity, intensity, frequentativity, reversivity. Grammatical morphemes, such as the causative morpheme -iish-, the applicative morpheme -ir-, the comitative/reciprocal morpheme -an-, can be added to any verb stem. The following sentence serves as an example to illustrate a verb with multiple object pronouns and multiple grammatical suffixes:

Umugoré a-ra-na1-ha2-ki3-zi4-ba5-ku6-n7- som-eesh-eesh-er-er-eza
woman she-pres-also1-there2-it3-it4-them5-you6-me7-read-caus-caus-appl-appl-asp
'The woman is also making them use it to do it for me for me there'.

Lack of Adjectives Kinyarwanda has a handful of adjectives (less than 20). What is expressed by adjectives in other languages is rendered by either the possessive construction (X of Y) or the relative clause construction.

'a poor person' :	*umuuntu*	*w'úmukené*
	person	of poor
	umuuntu	*ukénnye*
	person	who-is poor

Ideophones Ideophones are common not only in Bantu languages but also in the whole Niger–Congo language family. They are different from onomatopoeias, which imitate sounds of nature. They can express different concepts that do not have anything to do with sound by using sound symbolism, short or long vowels, reduplication, triplication, or quadruplication. They can also have different grammatical functions.

umuseké *weerá de.*
dawn which-is clear (ideophone)
'a very clear dawn'
icyáayi *tsiritsiri*
tea ideophone
'a very dark coffee'.

Unclassified Categories As was pointed out earlier, Kinyarwanda has a handful of adjectives. It is the same with function words as well, namely, auxiliaries, prepositions, conjunctions, and subordinators. These are expressed by noun phrases or verb phrases. In most cases, the structure tells whether the noun or verb is the noun or the verb or a function word.

muu nsií y'{á}am{é}ez{á}
under earth of table
'under the table'

baravúgana usíibye kó batabonána.
they-talk-to-each-other you-are-absent that they-do not see each other
'they talk to each other except that they do not see each other'.

Stems of nouns, verbs, and unclassified words can have different phonetic variations, as the word for diploma shows:

diploma: *dipóroómi*, *dipóromá*, *dipóromé*, *dipóromí*, *dipóromó*, *dipóromú*, *dipóroóma*, *dipóroóme*, *dipóroómu*, *dipóroómo*, *diipóroómu*, *diipóroómo*, *diipóroóme*, *diipóroómi*, *diipóroóma*.

It is still an unsolved question for Kinyarwanda lexicographers to decide which form should be considered the main form or whether all forms should entered in the dictionary as independent lexical entries.

Syntax

Kinyarwanda, like other Bantu languages, is a SVO language. Modifiers follow head nouns. What is interesting about this language, as pointed out in Kimenyi (1980, 2002), is the existence of (a) the subject–object reversal, (b) the wh-question *in situ*, (c) the lack of relative pronouns, (d) serialization, and (e) the existence of multiple direct objects.

Object–Subject Reversal and Existential Construction

The object–subject reversal consists of interchanging the object and the subject positions, whereas the existential construction puts both the subject and the object after the verb, prefixing the verb with the locative morpheme ha-(CL16). Neither construction changes the meaning, except that focus is on the object.

Umwáana a-ra-som-a igitabo.
'The child is reading the book'.
child s/he-t-read-asp book
Igitabo ki-ra-som-a umwáana.
'The book is reading the child'.
book CL7-t-read-asp child
Ha-ra-som-a igitabo umwáana.
'It is the child who is reading the book'.
CL16-t-read-asp book child

The object–subject reversal and the existential constructions have the same function as the passive, which is shown by the suffix -w- added to the verb just before the aspect marker.

Igitabo ki-ra-som-w-a n'úumwáana.
'The book is being read by the child.'
book CL7-t-read-pass-asp by child

Wh-Question *In Situ*

In Kinyarwanda and many other Bantu languages, wh-questioning is only allowed *in situ*.

W-iit-w-a nde?
you-call-pass-asp who
'you are called who?' > 'What is your name?'

Ba-tuu-ye he?
they-live-asp where
'Where do they live?'

Lack of Relative Pronouns

Kinyarwanda does not have relative pronouns. Relative constructions are marked by a high tone on the verb stem instead.

Abáana ba-som-á ibitabo.
children they-read-asp/rel books
'The children who read books'.
Ibitabo abáana ba-som-á.
books children they-read-asp/rel
'The books that the children read'.

Serial Verb Construction

When multiple verbs precede the sentence main verb, they lose their semantic function and serve as auxiliaries or tense–aspect–modality bearers. This is illustrated by the following sentences:

Ba-a-ri	*bá-tuu-ye*	*bá-saanz-w-e*
they-t-be	they-dwell-asp	they-join-pass-asp
aux[1]	aux[2]	aux[3]
bá-jy-a	*bá-kuund-a*	*gu-pf-a*
they-go-asp	they-like-asp	to-die
aux[4]	aux[5]	aux[6]

ku-dú hamagar-a.
to-us-call-asp
V
'They usually at least called us'.

Mu-siga-ye	*mú-geend-a*	*mú-heerako*
you-stay-asp	you-walk-asp	you-start
aux[1]	aux[2]	aux[3]

mú-du-subiz-a.
from you-us-answer-asp
V
'Now you respond to us immediately'.

Multiple Direct Objects

Kinyarwanda, like many other Bantu languages, can have multiple direct objects. These objects are either inherent or structural.

Recipients or benefactives are introduced directly to the verb without any preposition with some interactive verbs (giving, showing, etc.).

Umugabo a-haa-ye abáana ibiryó
man he-give-asp children food
'The man has just given food to the children'.

Umwáarimú a-r-éerek-a abanyéeshuúri amashusho.
teacher he-t-show-asp students pictures
'The teacher is showing pictures to the students'.

Inalienable possessions can appear as direct objects without any verb extension marker.

Umugoré a-ra-kúbit-a umwáana ukuguru n'ínkoni.
woman sub.pr.-t-hit-asp child leg with stick
Umugoré a-ra-kúbit-a umwáana inkoni ku kuguru.
woman sub.pr.-t-hit-asp child stick on leg
'The woman hitting the child on the leg with a stick'.

As shown by these examples, the inalienable possession '*ukuguru*' and the instrumental '*inkoni*' can appear as either adjuncts or direct objects without any verbal extension.

Structural direct objects are obtained by deleting prepositions of adjunct objects and by adding suffixes such as -iish-, -ir-, or -an- to the verb stem.

Umugabo a-ra-andik-a ibáruwá n'íikáramú
man sub.pr.-t-write-asp letter with pen
Umugabo a-ra-andik-iish-a ikáramú ibáruwá
man sub.pr.-t-write-caus-asp pen letter
'The man is writing a letter with a pen'.

Conclusion

Kinyarwanda is a prototypical Bantu language. It has all the features that characterize this language group. Its main contributions in syntax have been about the nature and function of grammatical relations (Kimenyi, 1980) and in tonology, its contributions have been about the nature of tone, tone representations, and tone rule application (Kimenyi, 2002).

See also: Bantu Languages; Burundi: Language Situation; Congo, Democratic Republic of: Language Situation; Ideophones; Meeussen, Achille Emile (1912–1978); Phonetics of Harmony Systems; Rwanda: Language Situation; Serial Verb Constructions; Tanzania: Language Situation; Uganda: Language Situation.

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Kirghiz

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Location and Speakers

Kirghiz (**qïrγïz tili, qïrγïzča**) belongs to the Northwestern or Kipchak branch of the Turkic language family, more specifically, to its Southern or Aralo-Caspian group. Until the early 20th century, it was called Kara-Kirghiz, whereas Kazakh was referred to as Kirghiz or Kazak-Kirghiz. Kirghiz is spoken in the Kyrgyz Republic (**Qïrγïz Respublikasï**) or Kyrgyzstan (**Qïrγïzstan**) and in parts of Uzbekistan, Tajikistan, China (Xinjiang), the Russian Federation, Kazakhstan, etc. Its main area is the mountainous part of Western Turkistan, the plateaus of the western Tienshan south of Kazakhstan, and the Alay mountain south of Ferghana. The number of speakers amounts to about 3 million, in Kyrgyzstan over 2.5 million.

In spite of the existence of a modern Kirghiz standard language, Russian has remained the dominant language of higher education, administration, and so forth in the Republic. Since Kirghiz was proclaimed the official language of Kyrgyzstan in 1989, it has consolidated its position, acquiring more social functions. In 1996, Russian was made an official language, along with Kirghiz, in territories and workplaces in which Russian-speaking citizens predominate.

Origin and History

It is still unclear to what extent the Kirghiz of today are successors of the Old Kirghiz, the first Turkic people mentioned in Chinese sources and described

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Origin and History

It is still unclear to what extent the Kirghiz of today are successors of the Old Kirghiz, the first Turkic people mentioned in Chinese sources and described

there as blond and blue-eyed. This group settled on Upper Yenisey. Runiform inscriptions found on the territory of today's Tuva indicate that the first Kirghiz state was, at the beginning of the 8th century A.D., located north of the Sayan mountains. In 840 the Kirghiz ended the old steppe Uyghur empire and established their own empire, which lasted until 920. Most old Turkic groups left this region at the turn of the millennium. A few groups remained in Siberia, (e.g., the ancestors of the Kirghiz and the Altay Turks).

Some Kirghiz tribes may already have moved to the Tienshan region by the 10th century. Other tribes followed, particularly during the Mongol attacks. The Mongol expansion in the 13th century forced old Kirghiz groups to migrate to Western Turkistan and the Tienshan region.

In the following centuries, the tribes referred to as Kirghiz were gradually pushed back by Oirats and Dzungars. In the 16th century, the Kirghiz acted as an important ally of the Kazakh. In the second half of the 17th century, the Yenisey Kirghiz were forced to accept the sovereignty of the Kalmyk. At the beginning of the 18th century, the majority of the Kirghiz migrated to Tienshan. After the breakdown of the Dzungar Empire in 1758, the Kirghiz definitively settled in their present territory. In the 18th and 19th centuries, they were subjects of the Uzbek Khanate of Kokand. They came under Russian supremacy in 1867, and their territory was incorporated into the Russian Empire in 1880. Under the Russian and Soviet rule, numerous Kirghiz emigrated to China. In 1991, the Kirghiz Republic was proclaimed an independent state.

Related Languages and Language Contacts

Kirghiz is closely related to Southern Altay Turkic of South Siberia. Its modern form is also very close to Kazakh as a result of long-standing intensive contacts. Old Kirghiz, as attested to in inscriptions, was similar to Orkhon Turkic and Old Uyghur (*see* **Turkic Languages**). The language was later influenced by Mongolic and especially by Kipchak Turkic. In the 18th and 19th centuries, it was subject to some impact from the Iranicized dialects of the Uzbek area. The contacts with Russian began at the end of the 19th century. After the Kirghiz territory was conquered by the Russian empire in the second half of the 19th century, the Russian influence became predominant.

The Written Language

In the Soviet period, a Kirghiz standard language was developed on the basis of the northern dialects. Before the revolution Kirghiz had already found some limited use as a written language. A modified version of the Arabic script was introduced in 1924 but was given up in 1928 in favor of the unified Roman-based alphabet. A modified Cyrillic-based script was introduced in 1940. In the post-Soviet era, a new Roman-based alphabet was created, but it has not yet replaced the Cyrillic-based script. The Arabic script is used for the variety written in China.

Distinctive Features

Kirghiz exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation; for example, **A** = **a/e,** and **I** = **ï/i**. Hyphens are used here to indicate morpheme boundaries.

Phonological Features

Kirghiz has a rather regular vowel system, lacking the reduced vowels of Kazakh. The different orthographic vowel representations very often conceal the phonetic similarities between Kirghiz and Kazakh.

Kirghiz exhibits the typical Kipchak labialization of **g/γ**, but does not, as Kazakh, replace them by the glide **w**. As in Altay Turkic, the preceding vowel is deleted and lengthened, as in **to:-lu:** [mountain-DER] 'mountainous' (< **ta:γ-l°γ**), cf. Altay Turkic **tu:-lu:** [mountain-DER], Kazakh **taw-lï** [mountain-DER]. Kirghiz differs from Kazakh by absence of the sound changes **č** > **š** and **š** > **s**. Modern Kirghiz displays initial **ǰ-** instead of older **y-** (e.g., **ǰol** 'way'; cf. Turkish **yol**). This change occurred under the influence of Kazakh, which, however, later changed **ǰ to ž**. Kirghiz does not display the uvular **x** or the glottal **h** but replaces them by **q** or zero in loanwords (e.g., **qabar** 'message' [< **xaber**], **ar** 'each' [< **har**]). Kirghiz has, like some Siberian Turkic languages, a well-developed sound harmony. Suffixes exhibit both front vs. back harmony and rounded vs. unrounded harmony. The choice of suffix vowels is determined by features of the preceding syllable (e.g., **köl-dör-dön** [lake-PL-ABL] 'from the lakes,' **üy-lör-übüz-dö** [house-PL-POSS.1.PL-LOC] 'in our houses'). The rounded vs. unrounded harmony also affects low suffix vowels, which are rounded to **o** and **ö** after **o**, **ö**, **ü** in the preceding syllable. However, **u** in the preceding syllable is not followed by **o** (e.g., **qum-da** [sand-LOC] 'in the sand'). Rounding of low suffix vowels is also

observed in Altay Turkic, Turkmen, Bashkir, and to some extent, in Kazakh, and Noghay.

Morphophonemic alternations are found in suffixes with initial **l** and **n**, which are assimilated to **d** after voiced consonants (with some exceptions after **r** and **y**), and to **t** after voiceless consonants (e.g., **atanïn** [father-GEN] 'of the father,' **qar-dïn** [snow-GEN] 'of the snow,' **at-tïn** [horse-GEN] 'of the horse,' **alma-lar** [apple-PL] 'apples,' **kün-dör** [day-PL] 'days,' **at-tar** [horse-PL] 'horses').

Arabic and Persian loanwords have generally been adapted more strongly to the native phonological system than their counterparts in neighboring Turkic languages (e.g., **apta** 'week' [< **hafta**], **ubaqtï** 'time' [< **waqt**]).

Grammar

The Kirghiz genitive suffix **-nIn** ends in **-n**, as in languages of the Southwestern (Oghuz) branch, not in **-ŋ** as in the neighboring languages.

The suffix **-rA:K** (after consonant-final stems **-IrA:K**) is added to adjectives to express comparative degree. The superlative is expressed by means of the preposed element **eŋ** (e.g., **eŋ ǰaqšï** [SUPERL good] 'best'). The normal second-person plural form of the personal pronoun is **si-ler** [you-PL] 'you.' **Siz** is the polite form used for one addressee, and **siz-der** [you-PL] is the polite form for more than one addressee. The corresponding copula suffixes are **-slŋAr**, **-slz** and **-slz-dAr**. Most demonstrative pronouns exhibit an optional **-l** in the nominative; for example, **bu(l)** 'this.' Different degrees of closeness are marked with **bu(l)** (close referents known to the speaker), **ošo(l)** and **ušul** (more remote referents), and **tigi(l)** and **tetigil(l)** (remote referents outside the conversational setting).

Pronouns also include the reflexive **öz** and the interrogatives **emne** 'what,' **kim** 'who,' **qaysï** 'which,' and so on. A collective suffix **-O:** (with drop of stem-final vowels) is used with the numerals from 1 to 7 (e.g., **ek-ö:** [two-COLL] 'two together'). Distributives are formed with the ablative (e.g., **otuz-dan** [thirty-ABL] 'thirty each'). Approximative and multiplicative numbers can be expressed with **-dAy**, **-čA** and **-LA-GAn** (e.g., **otuz-day** [thirty-APPR], **otuz-ča** [thirty-APPR] 'about thirty,' **ǰüz-dö-gön** [hundred-MULT] 'hundreds').

As in most other Turkic languages, the third-person possessive suffix exhibits the so-called 'pronominal **n**' (e.g., dative **-n-A**, locative **-n-dA**). The past copula particle is **ele** 'was,' instead of **edi** ∼ **idi** in other Turkic languages.

The cooperative-reciprocal form in **-(I)š** is also used to indicate the third-person plural of finite verbs (e.g., **ǰaz-ïš-at** [write-PL-PAST.3] 'they write' [singular **ǰaz-at**]), **kel-iš-ti** [come-PL-PAST.3] 'they came' [singular **kel-di** [come-PAST.3.SG]). A general present tense is formed with **-A** + personal markers (e.g., **bar-a-t** [go-PRES-3.SG] 'goes'). A more focal present tense (with a narrower focus on the ongoing event) is formed with- convert + present forms of **ǰat-** 'to lie' (and three other auxiliary verbs) + personal markers (e.g., **bar-a ǰat-a-t** [go-CONV AUX-PRES-3.SG] 'is going'). The suffix **-Dlr** adds a presumptive meaning (e.g., **oyγon-γon-dur** [wake up-POSTTERMINAL-PRES.3.SG] 'has presumably waken up'). An evidential past is formed with- **(I)p-tlr**. A habitual or durative past is formed with- **čl** + personal markers (e.g., **kel-čü-büz** [come-HABIT.PAST-1.PL] 'we used to come'). Intention is expressed by **-MAK-čI** (e.g., **kel-mek-či-min** [come-INTENT-1.SG] 'I want to come'). The system of conjunctions is weakly developed, as Kirghiz has not been under strong Iranian influence.

Lexicon

The basis of the Kirghiz vocabulary consists of Kipchak Turkic elements. Similar to the languages of other nomadic groups, Kirghiz has borrowed numerous Mongolic words as a result of close contacts, especially in the Middle Ages (e.g., **dülöy**, 'deaf'; **belen**, 'ready'; **qara-**, 'to look'). Arabic and Persian words, copied via Chaghatay and Uzbek particularly into the southern dialects, constitute a sizable part of the vocabulary, covering various domains of Islamic culture (e.g., **künö**, 'sin'; **ša:r**, 'city'; **baqča**, 'garden'; **pikir**, 'thought'). The northern dialects, on which the literary language is based, are less influenced by the Islamic vocabulary.

Russian loanwords, which constitute the most recent layer in the lexicon, were introduced from the end of the 19th century on. The use of Russian words is rather dominant in informal spoken standard Kirghiz. Efforts have been made in the last decades to reduce the amount of Russian terms by creating neologisms on the basis of Turkic and Arabic–Persian lexical material or on Russian models. Neologistic suffixes include **-čIl** (e.g., **ulut-čul** [nation-DER] 'nationalist'; from **ulut**, 'nation'), **-Glč** (e.g., **uč-quč** [fly-DER] 'pilot' [from **uč-** 'to fly']).

The variety of Kirghiz spoken in Xinjiang exhibits numerous Chinese loanwords. The written language, however, is largely oriented toward the norm used in Kirghizstan.

Dialects

The Kirghiz dialects can be divided into a southern and a northern group, the latter forming the base

of the standard language. Northern dialects tend toward intervocalic voicening of **s** (e.g., **bala-zï** [child-POSS.3.SG] 'his/her child' instead of **bala-sï** [child-POSS.3.SG]), a feature typical of the South Siberian Turkic languages. The southern dialects, mainly those spoken in the Ferghana basin, show different degrees of Uzbek influence. They lack some characteristic features that separate Kirghiz from other Turkic languages. For example, the glide **w** is preserved in cases in which the standard language only exhibits a long vowel as a trace of a velar that once underwent labialization (e.g., **tow** 'mountain' instead of **to:**) The past copula particle **ede** 'was' is used instead of **ele**. The plural suffix is used in third-person plural forms of finite verb (e.g., **kel-di-ler** [come-PAST-PL.3] 'they came'), instead of **kel-iš-ti** [come-PL-PAST.3]. The 'pronominal **n**' has been lost under Southeastern Turkinc influence. There are also other changes in the nominal inflection. Words copied from Arabic and Persian via Chaghatay and Uzbek have preserved their original phonetic shape to a higher degree than in the northern dialects.

See also: Altaic Languages; China: Language Situation; Kazakh; Kazakhstan: Language Situation; Kyrgyzstan: Language Situation; Russian Federation: Language Situation; Tajikistan: Language Situation; Turkic Languages; Uzbekistan: Language Situation.

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Kiribati: Language Situation

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The Republic of Kiribati is a chain of 33 atolls and tiny coral islands straddling the equator in Micronesia in the central-western Pacific north of Fiji. The total land area is about 811 square kilometers scattered across over 5 million square kilometers of ocean.

Kiribati was initially settled over 2000 years ago by Austronesian speakers. The Kiribati remained skilled ocean voyagers, and there is evidence of regular contact with other Pacific groups. However, Kiribati remained isolated from Western influence until the arrival of whalers and missionaries during the 19th century. Formally taken under British control as the Gilbert Islands in 1877, Kiribati became independent in 1979. About one-third of its population lives in the national capital, Bairiki, on Tarawa atoll.

The country is home to one indigenous language spoken by over 97% of its approximately 100 000 inhabitants. The Kiribati language, also known as Gilbertese, is a Nuclear Micronesian language within the Oceanic branch of Austronesian. It is closely related to Ponapean, Kosraean, and Marshallese. The linguistic origin of the Micronesian grouping is not certain, but it is likely to have been in the Solomon Islands or Vanuatu. Kiribati is the most conservative Nuclear Micronesian language, which suggests (along with geography) that it was settled very early in the Austronesian spread into Micronesia.

Kiribati has two main dialects. One is associated with islands in the north of the group, and the other with those in the south. No standard variety has been adopted, but in practice the southern dialect is emerging as a standard. An additional dialect is spoken on Makin and Butaritari, and another on Nui (in Tuvalu). The entire speech community of a third dialect, Banaban, was relocated from Banaba (Ocean Island) to Rabi Island in Fiji in the 1950s. Smaller relocated iKiribati communities are found in Nauru, the Solomon Islands, Vanuatu, and elsewhere in Fiji.

The Kiribati language retains a central role in modern Kiribati. It predominates in newspapers, on the radio, and in the churches. The language also has official recognition, but takes second place to English. The national language is Kiribati, while English is the official language. The country's constitution, laws, and official government documents have both a Kiribati and an English text, but the English is

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defined as the authoritative version. Parliament may be conducted in Kiribati or English, although in practice Kiribati is normally used, mixed with specialist English terminology. Kiribati is used exclusively in education in the earliest years, giving way to English at the secondary level. A government Kiribati Language Board was established in the 1970s to standardize orthography and grammar, prepare a dictionary (yet to appear), and encourage Kiribati literature, although vernacular literature remains limited.

See also: Austronesian Languages: Overview; Language Education Policies in the Pacific; Malayo-Polynesian Languages.

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Klatt, Dennis H. (1938–1988)

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Born on March 31, 1938, Dennis Klatt carried out his undergraduate and early graduate studies in electrical engineering at Purdue University. In 1964, he completed his doctorate in the communication sciences program at the University of Michigan, with a thesis entitled 'Theories of aural physiology.' He spent most of his professional career at the Massachusetts Institute of Technology, where he was for many years a senior research scientist in the Department of Electrical Engineering and Computer Science, and in the Research Laboratory of Electronics. His activities at MIT and his role as a consultant to industry consisted of a balanced combination of fundamental research into the mechanisms of human speech production and perception and applied research leading to practical devices. He died on December 30, 1988.

Klatt's fundamental contributions to an understanding of speech processes covered a broad range of topics. His detailed experimental studies of speech timing in English led to several papers on the rules governing control of the durations of the sounds, words, and phrases that make up spoken sentences. He had a continuing interest in the problem of how speech is processed in the auditory system and central nervous system of human listeners. This speech perception research ranged from detailed experimental studies of how listeners extract information from the rapidly changing events in speech to models of the storage and access of lexical information by listeners. In his publications, he argued convincingly that the development of appropriate distance metrics is a central problem in determining whether two utterances represent two tokens of the same word or represent two different words. His contributions to the advancement of automatic speech recognition included serving on the advisory committee of a national effort in this area in the 1970s and publication of a comprehensive review of the field as it existed at that time.

The area where Klatt's work had a major impact for those working in the field of speech communication is speech synthesis. He developed a flexible computer-based synthesizer that can be used to generate sounds in basic studies of human speech perception. The software for this synthesizer was made available to research laboratories that are active in these areas, making possible new quantitative research on the processes of auditory and speech perception. The versatility of the speech synthesis system lies in its ability to generate in a natural way a variety of utterances with different amounts of nasalization, with aspiration, with different glottal characteristics, and so on. With this synthesizer as a base, Klatt developed a complete system for synthesis of speech from English orthography. This system, implemented as DECtalk, was generally acknowledged to produce the most intelligible speech of any synthesizer available at the time. He carried out a detailed study of the characteristics of the voice source, particularly for female talkers, in an effort to improve further the naturalness of the synthesizer output.

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Yuri Knorosow, a Russian ethnographer of Central America and linguist, was born on November 19, 1922 in Kharkov (the Ukrainian republic), and died in 1990 in Moscow. He graduated from Moscow University in 1948 and obtained his Ph.D. in 1955. Knorosow's most substantial contribution to scholarship is the decipherment of Mayan hieroglyphic writings, and also ancient Indian inscriptions from Mohenjo-Daro (an archeological site in Pakistan, near the Indus River) and Harappa (the site of successive cities of the Indus Valley civilization in Pakistan). Research on these Indian inscriptions revealed their correlation in grammatical structure with the Dravidian family.

Mayan inscriptions date back to the 1st century A.D., and the Mayan writing system employs 300 signs. There are four Mayan codices left in the world, and linguists have worked out a grid of syllabic glyphs in Maya as well as a significant portion of the logograms. The Mayan people wrote both logographically and phonetically, and logograms will often have phonetic complements to facilitate their correct identification.

The first attempts to decipher Maya were in the middle of the 19th century. In the middle of the 1950–1960s, Knorosow contributed greatly by making use of positional statistics, which opened up the possibility of studying Maya diachronically.

See also: Dravidian Languages; Mayan Languages.

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Japanese linguist Hideo Kobayashi, best known as the translator of *Cours de linguistique générale*, was born in Tokyo on January 5, 1903. He graduated from Tokyo Imperial University in 1927 with the thesis *Le langage de Henrik Ibsen: Essai stylistique*. When he did the translation of the *Cours*, he was only 24 years old and was already described as a rising scholar and a natural-born linguist who had mastered more than 10 modern European languages, "not to speak of Classical Greek, Latin and Sanskrit" (Kindaichi, 1928: 521).

In 1929, Kobayashi was appointed to the Faculty of Law and Literature at Keijo Imperial University, which was established in Seoul, Korea by Imperial Japan in 1924. With the end of World War II, he returned to Japan. In 1949, he was appointed Professor at Tokyo Institute of Technology. After he retired from Tokyo Tech in 1961, he served as Professor at Waseda University until his retirement in 1973.

Kobayashi's *Gengogaku genron* (Fundamentals of Linguistics) was the first translation of the *Cours*, published three years before the German translation appeared in 1931. Its title was changed to *Ippan gengogaku kōgi* (Course in General Linguistics) when it underwent the last major revision in 1972—five years before Kobayashi died. His translation, which may still be the only translation of the *Cours* in a non-Indo-European language, made the *Cours* accessible to all those capable of reading Japanese, including a large number of Korean scholars and students. The words Kobayashi coined for notions such as *synchronie* and *diachronie* have become firmly established in both Japan and Korea.

Saussure's influence in Japan has been described as "immense" (*Édition critique*, p. 369). De Mauro suggested that a factor contributing to it might have been the prior influence in Japan of E. D. Polivanov and H. E. Palmer. It was unquestionably Kobayashi, however, who had played a decisive role in the spread and penetration of the Saussurean thoughts in Japan. As early as the 1930s, more than 20 years prior to the publication of the English translation of the *Cours*, Saussure's theory of language had been met in Japan with a harsh criticism from Motoki Tokieda, a scholar in the traditional school of Japanese linguistics. Like many of his contemporaries, Tokieda had learned about Saussure's theory through Kobayashi's translation of the *Cours*, and even more importantly, by Kobayashi's own writings on linguistics, some of which had served as a kind of companion to (the Japanese version of) the *Cours* in the early days of modern linguistics in Japan. In addition to the *Cours*, Kobayashi had also translated such works as Louis Hjelmslev's *Principes de grammaire générale* and Charles Bally's *Linguistique générale et linguistique française*.

See also: De Mauro, Tullio (b. 1932); Japan: History of Linguistics; Kindaichi, Kyosuke (1882–1971); Palmer, Harold Edward (1877–1949); Saussure, Ferdinand (-Mongin) de (1857–1913); Tokieda, Motoki (1900–1967).

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Kodzu, Harushige (1908–1973)

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Harushige Kodzu was a pioneer scholar of Indo-European comparative linguistics and ancient Greek, especially its Arcadian dialect, in 20th century Japan.

Having graduated from the University of Tokyo in 1930, Kodzu left Japan for the United Kingdom to study comparative grammar from 1931 to 1934 at Oxford University under the guidance of various professors, including Frederick W. Thomas and E. Braunholtz. Upon returning to Japan, he continued his research in the graduate school of the University of Tokyo. In 1936 he married Kumiko Honma and had a daughter. The contributions of his wife and his daughter as philological assistants to his research were considerable. In 1938 he was appointed research assistant of the department of linguistics at the University of Tokyo, and lecturer in 1942. He was granted his D.Litt. in 1946 from the same university. Two years later, he was appointed associate professor of linguistics, and he was promoted to full professor in 1951. In March 1968, he retired from the university with the title of Emeritus Professor. In the following year, he was invited to become the Dean of the Faculty of Letters of Musashi University. He continued his work until his death in 1973. His major publications are listed in *Gengo Kenkyu* (the Journal of the Linguistic Society of Japan) No. 64, published in 1973, with an obituary written by his disciple Kiyozo Kazama.

In his doctoral dissertation of the ancient Greek Arcadian dialect (1946), he meticulously studied carved inscriptions and linguistic boundaries with other dialects. He carried out extensive and thorough investigations of stone inscriptions within the linguistic

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island of the Arcadian dialect, and based on his extremely detailed research concerning the boundaries with other dialects, he came to entertain misgivings about the then generally accepted theory of P. Kretchmer that the Ionians were the oldest Greek ancestors. He arrived at the conclusion that the Ionians evolved from the mixture of several races of Asia Minor.

Kodzu's attitude toward his research was extremely catholic, in that he did not confine himself only to the dimension of language; rather, his vision embraced all aspects of the classical world, which he sought to understand as a whole. In his approach to the reconstruction of prehistoric Greek languages, he took into account various legends, archeological discoveries, as well as place names, to obtain a truly comprehensive understanding.

Kodzu was a leading committee member of the Linguistic Society of Japan ever since its foundation in 1938. His contribution to classical philology in Japan is also remarkable. He worked for *Seiyo Koten Kenkyu* (Journal of Classical Studies) as one of the editors from its foundation in 1953 until his death. By translating a number of Greek classical literary works into Japanese and publishing more than 20 books concerning Indo-European linguistics or the Greek language, he planted the genuine tradition of western classical philology in Japan.

See also: Greek, Ancient; Japan: History of Linguistics; Kazama, Kiyozo (b. 1928); Latin.

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Koelle, Sigismund Wilhelm (1823–1902)

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Sigismund Wilhelm Koelle was born in Kleebronn, Württemberg, on July 14, 1823, and died on February 2, 1902, in London. Koelle was one of a handful of German missionaries from Württemburg, including J. L. Krapf and J. F. Schön, who fundamentally shaped the nascent discipline of African linguistics in the mid-19th century (*see* **Krapf, Johann Ludwig (1810–1881)**). From 1841 to 1845, Koelle studied to become a missionary in Basel, then joined the London-based Church Missionary Society. In 1847, after briefly studying Arabic in Tübingen, Koelle was sent to Freetown, Sierra Leone. While there, Koelle was employed as a linguist at the Fourah Bay Institute. The Institute, later renamed Fourah Bay College, University College of Sierra Leone, was the first place in Africa where African language research was conducted.

It was in Sierra Leone that Koelle undertook his most renowned enterprise, the *Polyglotta Africana*, a classification of over 100 West African languages, culled from a collection of about 200 (Dalby, 1970). Shortly after his arrival, Koelle began to collect data from ex-slaves, as P.E.H. Hair has noted (Hair, 1967). The terms West Atlantic, Mande, Mandingo, and Kru all derive from the *Polyglotta*; indeed, the genetic and typological classification of the Mande language family arose with Koelle's work (Wyrod, 2003). Koelle also identified nine 'South African' language groups that would today be classified as Bantu or semi-Bantu, and among which he recognized a distinct relationship (Dalby, 1970). The *Polyglotta* comprised approximately 300 words and phrases listed in the various languages – which included five dialects of Ibo, among others – and was the most complete comparative work on African languages at that time (Koelle, 1854b; Hair, 1967; Jungraithmayr and Leger, 1983). Hair has observed that Koelle's classification in the *Polyglotta* was very sophisticated, precisely locating most of the languages involved and accurately assessing their relationships to each other (Hair, 1967). The *Polyglotta* is also invaluable to historians, since many of Koelle's informants were ex-slaves and their

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accounts provide information on which groups were caught up in the slave trade and over which routes slaves were taken (Curtin and Vansina, 1964).

Koelle's brief sub-Saharan African career was prolific. He was only in Sierra Leone for five years, yet in addition to the *Polyglotta* Koelle was able to write a grammar of the Vai language, in which he also described the indigenous Vai alphabet, as well as a grammar of Kanuri (Koelle, 1851, 1854a). Koelle met with Memelu Duwalu Bukele, leader of the Vai and innovator of the Vai script, prior to compiling his grammar. In the grammar, Koelle attempted to compare Vai word roots with the roots from various European languages in order to demonstrate an affinity among their sounds; he did so in part to dispel racist claims that Africans and Europeans did not belong to the same species (Koelle, 1851; Pugach, 2001). Moreover, according to Thomas Geider, Koelle's *African native literature*, a collection of oral folktales in Kanuri, is the first full anthology of African literature ever published (Koelle, 1854a; Geider, 1997). Geider also comments that the folktales Koelle collected were the first African texts that the brothers Grimm, Jacob and Wilhelm, used in their comparative folklore studies (Geider, 1997; Grimm and Grimm, 1856).

After leaving Africa, Koelle concluded all work on sub-Saharan African languages and turned his attention to North Africa and Asia. In 1855 the Church Missionary Society sent him to Damietta, a city in Egypt, and then to Palestine and Turkey. Koelle learned Turkish and conducted research on it, though it is unclear whether he ever published these labors, and he was certainly not as well known in the West Asian language field. Still, in 1856 Koelle received the Volney prize for his overall contributions to linguistics (Jungraithmayr and Leger, 1983).

See also: Bantu Languages; Grimm, Jacob Ludwig Carl (1785–1863); Kanuri; Krapf, Johann Ludwig (1810–1881).

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Ernst Frideryk Konrad Koerner was born in 1939 in Mlewiec near Torun (Thorn), Poland. He studied English and German philology, history of art, pedagogy, philosophy, and applied linguistics at the Universities of Göttingen, Berlin, and Edinburgh, completing a B.Phil. at the Free University of Berlin in 1965 and an M.A. at the Justus Liebig University of Giessen in 1968. From there he went to Simon Fraser University in Vancouver, where in 1971 he completed his Ph.D. thesis, 'Ferdinand de Saussure: Origin and development of his linguistic theory in western studies of language: A critical evaluation of the evolution of Saussurean principles and their relevance to contemporary linguistic theories,' a revised version of which was published in 1973.

The thesis posed a number of audacious challenges to the received history of modern linguistics. The 1960s had witnessed the putting forward by prominent scholars of a series of Saussurean 'precursors,' including the sociologist Durkheim and Gabelentz, a linguist whose work lay outside the Neogrammarian mainstream in which Saussure was trained. Koerner argued that more convincing sources could be found within that mainstream itself: rather than Gabelentz, he pointed to Paul, whose 1880 *Principien der Sprachgeschichte* was regarded by the Neogrammarians as their 'bible,' and Whitney, the American linguist whom they respected and Saussure whom they revered. In the case of Durkheim, Koerner raised strong objections to the fact that his name is never cited anywhere by Saussure, insisting that a methodology that ignores the documentary record can produce 'influences' without any limit or firm basis.

These assertions would persist as themes of Koerner's work in the decades that followed, as would a number of others: the impact on 19th-century linguistics of the natural sciences, the parallels among various 'revolutions' proclaimed in modern linguistics, from Jones's 'discovery' of Indo-European linguistic affinities in 1786 to Bopp's methodological refinements of 1816, the Neogrammarian revolution of 1876, structuralism in the 1920s, and the Chomskyan revolution of the 1960s. Koerner considers the last of these particularly dubious, in view of the demonstrable continuity between Chomsky's early methodology and that of his predecessors Jakobson, Hockett, and Harris.

After completing his doctorate, Koerner occupied posts as research associate at the Universities of Texas and Indiana, then in 1973 returned to Germany to do research and teach at the University of Regensburg. In 1976 he took up the professorship of linguistics at the University of Ottawa, which he held until his retirement in 1999, when his 60th birthday was marked by three *Festschrift* publications.

Koerner's importance within modern linguistics owes as much to his organizational energies and editorial skills as to his own scholarship. In 1973 he launched *Historiographia linguistica*, the first journal devoted to the history of linguistics, and the book series *Studies in the history of the language sciences*, both with John Benjamins of Amsterdam. In 1978, he organized the first International Conference on the History of the Language Sciences at the University of Ottawa; this has subsequently become a triennial event. Koerner also helped to establish a number of national societies in the field, including the Henry Sweet Society for the History of Linguistic Ideas in the UK and the North American Association for the History of the Language Sciences.

Koerner's other editorial enterprises would have wide-ranging positive repercussions for the development of linguistics in the last decades of the 20th century. His founding in 1984 of the journal *Diachronica* would help revitalize historical linguistics at a time when it appeared to be in a terminal decline, and the series *Current issues in linguistic theory*, which he started with Benjamins (whose move from antiquarian book dealer to publisher occurred at Koerner's prompting), offered a stable, high-quality publication outlet for nonmainstream approaches to the study of language at a point when English language academic presses had begun focusing narrowly on Chomskyan generativism. Linguistics would be much less diverse a field today had it not been for these undertakings.

See also: Historical and Comparative Linguistics in the 19th Century; Historiography of Linguistics; Neogrammarians; Saussure, Ferdinand (-Mongin) de (1857–1913).

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Rokuro Kono, a member of the Japan Academy, passed away in 1998 at the age of 85, leaving a legacy of various linguistic achievements. Born in Kobe in 1912, he graduated from the department of linguistics of the University of Tokyo in 1937 and started his academic career in Seoul. After returning to Japan, he spent most of his time at Tokyo University of Education, where he raised several promising academic successors. He assumed various important posts at the Toyo Bunko and Oriental Library and Research Institute for Languages and Cultures of Asia and Africa. He was also a director at the Center for East Asian Cultural Studies for Unesco from 1979 to 1981. He was commended officially as a person of cultural merits in 1993.

His academic achievements are mainly in the following three areas: the study of the Korean language, the study of Chinese historical phonology, and grammatology.

Kono studied the development of grammar and the accentual system from 15th- and 16th-century Korean to Modern Korean. He also made remarkable achievements in the comparative study of Egyptian hieroglyphs, cuneiform characters, and Chinese characters. His interpretation concerning *zhuanzhu* (*chuan-chu*), one type of the six different patterns of development of Chinese characters, is rated highly in the academic world. Although he was a renowned expert in Oriental languages, he also amassed considerable knowledge of classical Greek, Latin, Sanskrit, and Hebrew, not to mention modern languages such as English, German (German, Standard), French, Russian, and, of course contemporary and classical Chinese.

Kono also had a unique and significant approach to the typology of language. Although his ideas concerning typology of language have not been presented in a unified body of writings, they still have had a strong influence on later generations of linguists in Japan. The typological distinctions he raised between double-branch languages, those always requiring a grammatical subject in their sentence structure, like English, and single-branch languages, those not requiring a grammatical subject, like Japanese, are very thought provoking and may contribute much to the future typology of language. His theory was probably the first unique approach to typology born from Japanese cultural and linguistic soil.

Kono was one of the chief editors of *The Sanseido encyclopaedia of linguistics* (6 vols), published from 1988 to 1996 in Japan. It contains descriptions of more than 3500 different languages of the world and about 1500 important terminologies of linguistics.

See also: Chinese; Early Historical and Comparative Studies; Japan: History of Linguistics; Japanese; Korean.

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Kordofanian Languages

T C Schadeberg

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Kordofanian is the name of an African language family. It derives its name from that of a former Islamic state with El Obeid as its center.

All 20-odd Kordofanian languages are spoken in the Nuba Mountains in the Republic of the Sudan. The total number of speakers is estimated at around 200 000. Available information about Kordofanian languages is sketchy; no Kordofanian language has been well documented and analyzed. The unity of the Kordofanian language family was first postulated by J. H. Greenberg in 1950; later (in 1963), he classified

Kono, Rokuro (1912–1998)

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Rokuro Kono, a member of the Japan Academy, passed away in 1998 at the age of 85, leaving a legacy of various linguistic achievements. Born in Kobe in 1912, he graduated from the department of linguistics of the University of Tokyo in 1937 and started his academic career in Seoul. After returning to Japan, he spent most of his time at Tokyo University of Education, where he raised several promising academic successors. He assumed various important posts at the Toyo Bunko and Oriental Library and Research Institute for Languages and Cultures of Asia and Africa. He was also a director at the Center for East Asian Cultural Studies for Unesco from 1979 to 1981. He was commended officially as a person of cultural merits in 1993.

His academic achievements are mainly in the following three areas: the study of the Korean language, the study of Chinese historical phonology, and grammatology.

Kono studied the development of grammar and the accentual system from 15th- and 16th-century Korean to Modern Korean. He also made remarkable achievements in the comparative study of Egyptian hieroglyphs, cuneiform characters, and Chinese characters. His interpretation concerning *zhuanzhu* (*chuan-chu*), one type of the six different patterns of development of Chinese characters, is rated highly in the academic world. Although he was a renowned expert in Oriental languages, he also amassed considerable knowledge of classical Greek, Latin, Sanskrit, and Hebrew, not to mention modern languages such as English, German (German, Standard), French, Russian, and, of course contemporary and classical Chinese.

Kono also had a unique and significant approach to the typology of language. Although his ideas concerning typology of language have not been presented in a unified body of writings, they still have had a strong influence on later generations of linguists in Japan. The typological distinctions he raised between double-branch languages, those always requiring a grammatical subject in their sentence structure, like English, and single-branch languages, those not requiring a grammatical subject, like Japanese, are very thought provoking and may contribute much to the future typology of language. His theory was probably the first unique approach to typology born from Japanese cultural and linguistic soil.

Kono was one of the chief editors of *The Sanseido encyclopaedia of linguistics* (6 vols), published from 1988 to 1996 in Japan. It contains descriptions of more than 3500 different languages of the world and about 1500 important terminologies of linguistics.

See also: Chinese; Early Historical and Comparative Studies; Japan: History of Linguistics; Japanese; Korean.

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Kordofanian Languages

T C Schadeberg

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Kordofanian is the name of an African language family. It derives its name from that of a former Islamic state with El Obeid as its center.

All 20-odd Kordofanian languages are spoken in the Nuba Mountains in the Republic of the Sudan. The total number of speakers is estimated at around 200 000. Available information about Kordofanian languages is sketchy; no Kordofanian language has been well documented and analyzed. The unity of the Kordofanian language family was first postulated by J. H. Greenberg in 1950; later (in 1963), he classified

Kordofanian as a primary branch of his Niger–Congo family.

There are four branches of Kordofanian, named after centrally located towns (names of individual languages are given in parentheses): Heiban (Moro, Tiro, Shirumba, Utoro, Ebang, Laru, Logol, Rere, Warnang, Ko), Talodi (Ngile, Dengebu, Tocho, Jomang, Nding, Tegem), Rashad (Tagoy and Tegali dialect clusters), and Katla (Kalak, Lomorik). Data from wordlists and short grammatical descriptions make it clear that at least the first three branches of Kordofanian have a noun class system (marked by prefixes), which may be taken as evidence for genetic relationship (i.e., common origin) with the large Niger–Congo language family. Lexical evidence for this relationship remained very limited in the early 1990s.

The nine languages of the Kadugli group (Yega, Mudo, Talla, Miri, Tolubi, Kufo, Sangali, Krongo, Talassa) are spoken by about 100 000 people living on the hills lining the southern edge of the Nuba Mountains. One of these languages has been described in a monograph (Reh, 1985). Greenberg originally classified the Kadugli languages as being part of Kordofanian, but this view has since been challenged. The Kadugli languages have systems of nominal classification that distinguish three or four genders, but any existing typological or substantial similarities with Niger–Congo are not sufficient to claim genetic relationship. It seems most likely that Kadugli belongs to the Nilo–Saharan language family – just as do all the other languages that surround Kordofanian.

See also: Niger-Congo Languages; Sudan: Language Situation.

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Korea, Democratic People's Republic of: Language Situation

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The national language of the Democratic People's Republic of Korea is Korean, spoken by approximately 23 million people. North Korea is highly homogeneous: it has no significant ethnic or linguistic minorities, and no official language besides Korean.

The standard language of North Korea, called Munhwaŏ, or 'the Cultured Language,' in order to distinguish it from the standard in South Korea. It claims to be based on the speech of the capital, P'yŏngyang, and to be "a composite of superior linguistic elements of our national language as created and cultivated by the joint efforts of all the people in the northern half of the republic, and has also developed by absorbing those fine elements of the national language as used traditionally everywhere in the south, including Seoul." The six major regional dialects of Korean are all mutually intelligible, with perhaps the exception of the Cheju Island dialect, which is now moribund, but which survives in diasporic enclaves in Japan. The most important foreign language in North Korean education appears to be English, followed by Chinese.

The literacy rate in North Korea is high, usually estimated at 93% or more. Unlike South Korea, in 1949 North Korea abolished the use of Chinese characters in the public media and, also unlike its neighbor, North Korea appears to have taught Chinese characters consistently (and in greater numbers) in the schools since at least the 1950s. Another contrast with South Korea is North Korea's ambitious, elaborate, consistent, and longstanding official attention to issues of language, such as questions of language policy, language planning, and neologisms.

There is growing concern in both North and South Korea about linguistic divergence between the official languages of the north and the south, but in official North Korean publications this is expressed through ridicule and disdain for the pollution of Korean in the south by English (and, to a lesser extent, Japanese).

See also: Korean; Korea, Republic of (South): Language Situation.

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Korea, Republic of (South): Language Situation

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The national language of the Republic of Korea is Korean, spoken by approximately 48 million people. South Korea, like North Korea, is highly homogeneous, but in the last decade some heterogeneity has been introduced in the form of foreign guest workers, mostly from South- and Southeast Asia. There is also a growing number of foreign English language instructors, primarily from Canada, the United States, and Australia. Nonetheless, South Korea has no significant ethnic or linguistic minorities, nor any official language besides Korean. However, there have been controversial calls in recent years to make English a second official language.

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Diglossia is not a feature of the South Korean language situation, but most South Koreans still learn approximately 1800 Chinese characters by the time they leave high school. These characters are often mixed in writing with the indigenous Korean script, *Han'gŭl*, in newspapers, journals, and academic writing. The question of whether to abolish the teaching and writing of Chinese characters has been an issue of debate in the South Korean educational and academic establishment for over fifty years, and it continues to be controversial.

Debates on language standardization and policy in South Korea have tended to be the business of rival academic cliques. Government policy (on, for example, orthography and romanization) as implemented by the ministries of education and culture has been inconsistent and, at times, controversial. The founding in 1991 of the National Academy of the Korean Language under the auspices of the Ministry of Culture and Sports, has already done much to rationalize South Korean language policy. At the time of writing, the National Academy of Korean Language is moving cautiously toward joint research projects with its counterpart in North Korea.

There is growing concern in both North and South Korea about linguistic divergence between the official languages of the north and the south. In South Korea this concern is accompanied by acute anxiety over the future viability of Korean under conditions of globalization that favor massive importation of English loanwords and grammatical patterns. Also noteworthy in the sociolinguistic situation in South Korea is internet language: that nation has one of the highest internet connectivity rates in the world, and computer-mediated communication is already having a visible effect on South Korean sociolinguistic life.

See also: Korean; Korea, Democratic People's Republic of: Language Situation.

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Korean

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Phonology

Basic Structures

The Korean language is a nontonal, polysyllabic, agglutinative language belonging to the Altaic family and probably closely related to the Manchu and Tungus members of that language family. The only major modern language to which Korean would appear to be related is Japanese, but the two languages, although similar in most respects grammatically, are significantly different phonologically. Korean and Japanese are therefore linguistic isolates due to the lack of sources to demonstrate the precise linguistic connections between them and with other members of the Altaic family.

Unlike Chinese, Korean lacks true tonal sounds, although it does have vowel stress. The morphological structures of Korean are extremely complex. Korean vocabulary items are built up of multiple morphemes into a highly polysyllabic composition. Like all members of the Altaic family of languages, Korean uses certain morphemes as functional markers to indicate the role of a word within the sentence, as well as mood, tense, location, and the social relationship between the speaker, listener, and the person spoken about.

Triple Consonantal Structure

The consonants of the Korean language are unusual for the triple distinction that is made between soft consonants (lenis consonants), hard, unaspirated consonants, and hard, aspirated consonants. The consonants of the lenis series are *k, n, t, l, m, p, s,* and *ch*. The hard, unaspirated consonants are *kk, tt, pp, ss,* and *tch*. The hard, aspirated consonants are *k', t', p', ch',* and *h*. (These transcriptions follow the orthographic conventions of the McCune-Reischauer System of Romanization, the standard system of scholarly transcription.) The sound of *l* becomes a strongly flapped *r* when placed in an intervowel context. Usually consonants of any of the three series of consonants are pronounced as voiceless, with the exception that the soft consonants *k, t, p,* and *ch* are pronounced *g, d, b,* and *j* when they occur between voiced sounds.

Consonantal Position

A principal phonological feature of Korean is the extreme restriction of consonant position within a given morpheme. Certain sound sequences within a morpheme are not permitted, such as *s* combined with *k*, although the reverse may occur when *k* is final in the preceding morpheme and *s* begins the succeeding morpheme. Certain consonants when in the final position in the morpheme become a strongly dentalized sound. Thus, *t, tt* fortis, unaspirated *t*, *t'* (fortis, aspired *t), s, ch,* and *ch,* and *ch'* (fortis aspirated *ch*) all are pronounced as if they were *t* when they occur in the final position.

Intermorphemic Sound Change

Sound change between syllables is an important feature of the pronunciation of Korean morphemes. This feature, also true of Japanese, is made more difficult for the reader of Korean because it is an orthographic convention that the shape of the individual syllable (morpheme) should be preserved. Although the Korean alphabet itself is highly phonetic, the orthographic convention to preserve the written appearance of the syllable means that the reader must learn a large number of standardized sound changes that occur in the intersyllable position.

Intermorphemic Sound Movement

Sound movement between syllables also occurs. When a syllable that ends in a consonant is followed by a syllable beginning with a vowel, the final consonantal sound passes over to the next syllable. This passage of sound is not represented orthographically.

Nonclustering of Initial Consonants

Clusters of consonants at the beginning of a syllable are not characteristic, there being no equivalents of English *sk, st, str, sh,* and so on.

Triple Vowel System

The vowel system of Korean is as complex as the system of consonants. There are three ranges of vowels: standard vowels (monophthongs), vowel sounds beginning with *y* (rising diphthongs), and a wide range of full diphthongs and diphthongs beginning with the sound *w*. The basic vowels of the monophthong series are pronounced similarly to the vowels of the Romance languages. The monophthongs are *a*, *ŏ, o, u*, and *ŭ*. The *y* series of rising diphthongs are *ya*, *yŏ*, *yo, yu*. The principal diphthongs number 11, although other combinations are possible. Vowels are characterized by phonemic length, which refers to an alteration in tonal height. There is evidence of an earlier stage of vowel harmony that exists as a residual characteristic in certain linguistic contexts.

Grammar and Syntax

General Features

Korean is an agglutinative language with strong elements of fusion and analytical development. The morphological development of word derivation is a well-developed feature of the grammar of the language. Nouns possess a wealth of case forms, possess the grammatical category of specification, and do not possess grammatical gender. There are forms of demonstrative pronouns that indicate varying degrees of spatial relationship.

Number

There are two types of numeral systems: the indigenous Korean system, and the Sino-Korean system that was borrowed as an entire loanword system. Along with the numeral system, there is a system of classifiers that are bound morphemes used as counting words to refer to objects, animals, or people.

Syntactical Markers

The predicatives, verbs, and adjectives of Korean do not have person, number, or gender. They do possess markers indicating social status, tense, and a sentence conclusion. There are three major bands of social status or reference that can be indicated with the special markers, each band containing within it possibilities for further refinements to indicate the precise degree of social relationship existing between the speaker, the listener, or the person spoken about. Tense markers indicate three broad classes of time: the present, the past, and the future (more properly, supposition about the occurrence of an event). Sentence conclusion markers indicate a wide range of moods and meaning, including simple declaration, interrogation, request, demand, suggestion, and reflection. In addition, there are quotative constructions that may be added to the verb to indicate the quotation of a declaration, interrogation, demand, or request. The structure of the verb is verb stem + honorific infix + tense infix + sentence conclusion marker (vs + hi + ti + scm). There is a separate lexical form of the verb that is used to place the verb in alphabetical order in dictionaries, lexicons, and word lists.

Word Order and Word Relation

Word order in sentences for both independent and dependent clauses is always in the sequence of subject, object, predicate. Modifiers, whether of the adjectival or adverbial type, are always in the preposition modifying the word to which they refer. Syntactic relations between words may be expressed by postpositional markers, particles, syntactic nouns, adverbial particles, participles, and the infinitive form of predicatives. Thus, a sentence may consist of a series of clauses, such as an extended adjectival clause modifying a noun, which contains its own subject, object, and predicative with tense and honorific markers attached.

Speech Levels and Honorifics

As a key characteristic of the use of the Korean language is an appropriate use of the system of honorifics that show deference, a sentence must take into consideration three dimensions of speech relationship: (a) the nature of the relationship between the speaker and the listener, (b) the nature of the relationship between the speaker and the person spoken about, and (c) the appropriate way to speak of or about oneself. Any complete sentence will take into account at least one of these dimensions in addition to considerations of tense and mood.

Pronouns, especially for the second person, are very seldom used, the subject of the sentence being understood from the linguistic context.

Sentence Linkage

In sentences containing two independent clauses, the two clauses are linked together through a connection marker attached to the predicative of the first clause. The predicate of the final independent clause will contain markers for honorifics, tense, mood, and sentence conclusion. Where the initial clause is dependent, the connection marker attached to the predicative will indicate the precise relationship of the dependent clause to the independent and principal clause.

Vocabulary

Lexicon

Korean vocabulary is of three types: indigenous Korean vocabulary, Sinitic vocabulary, and loanwords from European languages. Indigenous Korean vocabulary is highly polysyllabic in structure, a feature that is put to good use in sound imitation. Of the world's languages, Korean is one of the most highly onomatopoetic languages. Sinitic vocabulary consists of three subtypes: (a) uniquely Korean terms created by using Chinese characters, (b) direct loanwords from Chinese, and (c) Sino-Japanese loanwords. Sinitic vocabulary consists of terms that are in both ordinary and learned usage, and constitutes more than half of the entire Korean lexicon. European

languages, particularly English, have contributed a number of words, both to the speech of the ordinary person and to the technical speech of professional persons. French, German, Spanish, and Portuguese have also made small contributions to the vocabulary of Korean. There are, or were, a small number of pure Japanese loanwords, but most of these have fallen into disuse through a movement for the purification of the language.

Word Creation

It is still common to use Chinese characters to create new items of technical vocabulary, for example, *nokhwa-gi,* for 'videotape recorder.' Most Sinitic items of vocabulary enter the language as nouns. By attaching the verb *hada* 'to do' in the postposition of the noun, loanwords of this type may be transformed into verbs. By using one of several constructions, such verbs may then be made into adjective or adverbial constructions. By adding *ki* (carrying a sense of continuous action) or *um/m* (carrying an abstract sense) to a verb stem, a verb may be nominalized. Dictionary definitions are often given using *um/m* attached to the final verb.

Parallel Vocabulary Sets

Throughout the vocabulary of Korean, there exists a parallel set of Korean and Sino-Korean vocabulary. Mention was made earlier of the existence of two systems of counting. This feature carries throughout the entire Korean lexicon. Often, but not exclusively, Sino-Korean words are used to name objects or subjects of discourse, while Korean words have a descriptive function. On some occasions, there is no preference in the use of one or the other type of vocabulary; in other instances, it is a matter of honorific or nonhonorific usage. With regard to time, hours are given in Korean numbers, while minutes are given in Sino-Korean numbers. Again, duration of time (i.e., 'it took 1 hour to go home') is given using Korean numerals.

Notwithstanding the enormous impact that Sinitic vocabulary has had on enriching the vocabulary of the Korean language, there has been virtually no influence on the grammar of Korean, possibly because Chinese and Korean derive from two radically different language families.

The Written Language

Modern Korean may be written in one of two forms, either by using only the Korean alphabet (known as *Han'gul* in the Republic of Korea) or a mixed script of *Han'gul* and Chinese characters. In North Korea, the Korean alphabet is used exclusively. In South Korea, usage varies from context to context. A personal letter may use only the indigenous alphabet, while newspapers, textbooks, and better-quality popular books will use a large number of Chinese characters in the text. The more sophisticated and formal a piece of writing is, the more Chinese characters will be used. The Ministry of Education requires a high school graduate to have mastered between 1700 and 1800 characters, the number of characters expected to be encountered in a daily newspaper.

See also: Altaic Languages; Japanese; Korea, Democratic People's Republic of: Language Situation; Korean Lexicography; Korea, Republic of (South): Language Situation; Korean Script: History and Description.

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Korean Lexicography

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The Early Period

The unique Korean alphabet was invented in 1443. It is similar to the Roman alphabet in that it is phonetic, combining vowels and consonants. However, a substantial portion of the Korean vocabulary is based on Chinese characters. A Chinese-based Korean word has an ideographic Chinese character for each of its syllables. Thus, the Korean vocabulary is divided into Chinese-based words and native Korean words.

Shortly after the invention of the Korean alphabet, pronunciation guides that indicated the Korean sounds for Chinese characters appeared, in particular 訓蒙字會 (*Hunmongjahoe*) (1527), which was the first guide to provide both the meaning and sound of Chinese characters. The earliest known dictionaries as such, called 'word collections' (*eohuijip*), date from the late 17th century. Some of them were bilingual or multilingual, while others were mixtures of bilingual and monolingual elements. The bilingual dictionaries invariably had Chinese headwords and gave one simple Korean equivalent for each headword. The multilingual dictionaries simply added Japanese, Mongolian (Halh Mongolian), or Manchurian equivalents to those Chinese-Korean sets.

The mixed works had Chinese characters and words as the headwords, with a Korean equivalent for each headword. But in this case, this entry structure merely followed the tradition of Chinese priority, and in actuality the Chinese headwords served more like a meaning indicator for the Korean words offered as their equivalents, which were the real focus of these works. They can be considered bilingual because they use Chinese characters, and yet their monolingual character lies in the fact that a large portion of the Chinese words used are Chinese-based Korean words.

These word collections are organized according to meaning, or sometimes by the number of the brushstroke of the Chinese headwords, rather than in alphabetical order. They are called 'translation equivalents dictionaries' (*daeyeok sajeon*), because they provide a simple equivalent rather than a definition or linguistic information. Such dictionaries reflected the Chinese-centeredness of the Korean linguistic community of the time.

Modern Monolingual Dictionaries

The first published monolingual Korean dictionary in the modern sense is Moon Se Young's *Korean dictionary* (*Chosuneo sajeon*) (1938). This was the first dictionary to arrange Korean headwords alphabetically and to give definitions as well as linguistic information. Following this, several other Korean dictionaries were compiled, with increased size, many theoretical and methodological innovations, and specialized purposes.

The most notable recent developments are the publication of the *Yonsei Korean dictionary (YKD)* (1998) by Yonsei University and the *Standard Korean dictionary (SKD)* (1999) by the National Institute of the Korean Language. The YKD is the first corpus-based dictionary of Korean, with 50 000 headwords selected according to corpus frequency. Its focus is on current usage. In contrast, the SKD is the largest Korean dictionary ever produced, with 500 000 headwords, combining the entries of previous dictionaries and including archaic words. The SKD presents citations from works of literature, news, magazines, etc., and provides etymology. Currently, there are lexicography centers at Yonsei University and Korea University, where active research is underway to promote further advances in Korean lexicography.

Modern Bilingual Dictionaries

Bilingual dictionaries with Korean or non-Chinese headwords, arranged in alphabetic order, began to appear in the late 19th century. The foreign languages included French, Russian, and English. These dictionaries were written mainly by Western missionaries to Korea. In 1920 the Japanese colonial government in Korea published a Korean-Japanese dictionary.

Since the liberation of Korea in 1945, the rising importance of English has made Korean-English and English-Korean dictionaries the most prominent bilingual dictionaries in Korea. The first K-E and E-K dictionaries written for Korean learners of English were the *New life English-Korean dictionary* (*Shinseng younghan sajeon*) (1946) and its companion volume, the *New life Korean-English dictionary* (*Shinseng hanyoung sajeon*) (1947) by Ryu Hyeong Gi. Since then, numerous other authors and publishers have entered the market. Currently there are five major dictionary publishers producing and updating the five largest K-E and E-K dictionaries in Korea.

In contrast to monolingual lexicography, however, bilingual lexicography has not yet received serious theoretical and methodological attention in Korea. Bilingual dictionaries are compiled by commercial publishing companies, and their weaknesses have been widely criticized. Recently, however, there have

been some systematic reflections about seeking a new direction in Korean bilingual lexicography (Cho, 2002; Eu, 2004; Lee, 2005).

Computational Lexicography in Korean

Most of the above-mentioned recent dictionaries are available on the Internet, and some are available on CD-ROM. Going beyond a simple replica of paper dictionaries, the government-led 21st-Century Sejong Project has been building (since 1998) a large Korean lexical database to comprehensively serve the needs of Korean language–related research and developments such as natural language processing, lexicography, linguistics, education, and artificial intelligence, especially emphasizing a closer cooperation between linguists and computer scientists.

Machine translation between Korean and Japanese – languages that are very similar – has reached a fairly successful standard. For example, Internet sites where Koreans and Japanese can chat by using machine translation are growing in popularity. On the other hand, machine translation between Korean and English is still at a rather rudimentary level. There are Internet sites that search Korean phrases and sentences for their English equivalents, but their usefulness and accuracy are still quite limited.

See also: Bilingual Lexicography; Chinese Lexicography; Chinese; Corpus Lexicography; Japanese Lexicography; Korean; Lexicography: Overview.

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Kotarbiński, Tadeusz (1912–1998)

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Tadeusz Marian Kotarbiński was born on March 31, 1886, in Warsaw and died there on October 3, 1981. He studied technical subjects and architecture in Cracow, Lwów (now Lviv, Ukraine) and Darmstadt before taking up philosophy and the classics at Jan Kazimierz University in Lwów, where he earned his doctorate in 1912. He taught Greek and Latin in a Warsaw high school until 1918, when he began teaching at Warsaw University. During the interwar period he was active as a teacher and scholar, and also took part in the public debates of the time, speaking out and writing, for example, against anti-Semitism and clericalism.

During the Nazi occupation of Poland Kotarbiński took part in clandestine teaching; after the war he helped to organize the university in Łódź. He served as its first rector from 1945 to 1949, simultaneously teaching and chairing the Philosophy Department at Warsaw University. He eventually returned to Warsaw, remaining there until his death.

Kotarbiński's main areas of interest were praxiology and ethics, but he also devoted attention to formal logic, logical semantics, and the history of logic. He was the author as well of three volumes of aphoristic poetry.

Kotarbiński called his philosophical approach 'reism' (or 'concretism') and viewed its principles as "declaring war against the hypostases of linguistic origin," the faulty assumption that, for example, properties like 'roundness' or 'blueness' exist because natural languages have words for them. He drew a distinction between genuine names and apparent names. The former are names of persons or things; they include singular, general, and empty names (e.g., *Kotarbiński, philosopher, unicorn*, respectively). The latter are names of properties, relations, events, or states (*truthfulness, equality, departure, health*, respectively). Singular names, which refer to individuals or things, can serve as grammatical subjects.

Korean Script: History and Description

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History

Use of Chinese Characters in the Early Period

By the beginning of the Common Era, there were three nations in the Korean peninsula and southern Manchuria. Effective governance of the state required a writing system if only to transmit royal edicts to local administrators, yet Korea had no script of its own. Since Korea had been under the heavy cultural influence of China, it was natural that Korea borrowed Chinese writing (*hanmun* 漢文) and characters (*hancha* 漢字) and adapted them to write Korean. Three such adaptive systems are briefly described below.

Both *idu* (吏讀 clerk reading) and *hyangch'al* (鄕札), which apparently have been in use since the 6th century, are mixed transcription systems in which content words are written with Chinese characters for their meanings, while function words borrow pronunciation only. The former is called *hun* (訓 semantic) reading, and the latter, *ŭm* (音 phonetic) reading. For example, a Korean phrase *po-go* 'see-and' would be transcribed and read as follows:

Chinese writing:	見	古
Meaning in Chinese:	'see'	'old'
Pronunciation in Chinese:	[kjen]	[go]
Intended reading in Korean:	[po]	[go]
Intended meaning in Korean:	'see'	'and'

The major difference between *idu* and *hyangch'al* is that while the former maintains the Chinese word order, the word order in the latter is altered to conform more with the word order in Korean. This process was facilitated with the help of *kugyŏl* (口訣), signs of grammatical markers written between phrases in the text. These signs were highly simplified Chinese characters in *ŭm*-reading denoting affixes and grammatical markers, helping the reader in comprehending the text. For example, *go* (古), a verbal connective seen above, was simplified to ㅁ, just the bottom part; the character for topic marker *ŭn* (隱) was simplified to ㄴ, the left radical of the letter; a conditional affix *myŏn* (面) was simplified to ㄱ, just the top part of the letter, while a copula marker *i* (是) was simplified to the last stroke at the bottom, ㄱ, etc. These letter-signs were necessarily small and simplified as they had to be inserted into a small space between phrases and lines. They helped the reader construct sentential structures of Korean from Chinese writing.

These conventions of rendering Korean in Chinese were quite ill-fit. A 15th-century scholar expressed the effort as trying to fit a square pole into a round hole. The mismatch would disappear with a stroke of genius.

Invention of a Native Script: *Hangul*

Authorship and Motivation In volume 102 of *Sejong sillok* (世宗實錄 Chronicles of King Sejong), it is matter-of-factly written that "In December of the 25th year [of his reign = 1443], His Majesty personally devised ("親制") twenty-eight letters of *ŏnmun* (諺文 vernacular script)." Thus is announced one of truly great inventions in the history of mankind. Three years later in October 1446, it was officially promulgated as *Hunmin chŏng'ŭm* (訓民正音 (The Correct Sounds for the Instruction of the People). The script is now generally known as *hangul* (*han'gŭl*), meaning 'Korean writing'.

Classical Chinese phonology, which Sejong studied and had his scholars consult, divided the syllable into initials and rhymes. Sejong realized, however, that syllable-initial consonants and syllable-final consonants had equal weight as phonological units and thus could be written with the same letters. This tripartite division of the syllable isolated the syllable-nuclei and required Sejong to devise separate vowel letters. A new alphabet was thus born. The King's 28 letters, of which 17 were consonants and 11 were vowels, are given below. Note that vowel letters include diphthongs beginning with a semi-vowel [j].

Consonant letters	Vowel letters
ㄱ [k, g]	ㅏ [a]
ㅋ [k^h]	ㅑ [ja]
ㄴ [n]	ㅓ [ə] (ŏ)
ㄷ [t, d]	ㅕ [jə] (yŏ)
ㅌ [t^h]	ㅗ [o]
ㄹ [r, l]	ㅛ [jo]
ㅁ [m]	ㅜ [u]
ㅂ [p, b]	ㅠ [ju]
ㅍ [p^h]	ㅡ [ɨ] (ŭ)
ㅅ [s]	ㅣ [i]
ㅈ [tʃ, dʒ]	• [ɔ]
ㅊ [$tʃ^h$]	
ㅿ [z]	
ㅇ (zero-initial or [ɦ])	
ㆆ [ʔ]	
ㅎ [h]	
ㆁ [ŋ]	

Principles of Graphic Structure Aside from the fact that this is a truly phonemic alphabet, what is also remarkable is that Sejong devised letters in such a way

that the graphic shapes showed the internal relations among the letters. To cite a few obvious ones:

- The visual distinction between the consonantal and vocalic letters is apparent. Vowels contain long bars, vertical or horizontal, with short strokes (originally dots) stemming from them, while consonants have more complex geometric figures.
- Vowel shapes reflect vowel harmony, which was active in 15th-century Korean. Letters with side strokes (dots originally, e.g., ·ㅣ → ㅓ) upward or rightward are 'bright' (*yang* 陽) vowels, while those with downward or leftward side strokes are 'dark' (*yin* 陰) vowels.
- The 'stroke-adding' (*kahoek* 加 劃) principle is applied to derive occlusives and aspirates (*ch'oryŏ* 稍厲 a little harsh) from base consonants, as can be seen in the chart below. One can also tell at a glance that a consonant is a sibilant, as only sibilants have slanting strokes.

	Base shape	One stroke	Two strokes
Labials	ㅁ [m]	ㅂ [p]	ㅍ [p^h]
Alveolars	ㄴ [n]	ㄷ [t]	ㅌ [t^h]
Velars	ㅇ [ŋ]	ㄱ [k]	ㅋ [k^h]
Sibilants	ㅅ [s]	ㅈ [tʃ]	ㅊ [$tʃ^h$]
Glottals	ㅇ [ɦ] or Ø	ㅎ [ʔ]	ㅎ [h]
	Continuants	Occlusives	Aspirates

Origin and Sources There are three theories on the possible origin of the letter shapes.

1. A leading theory is that the forms of five basic letters were modeled after their articulatory configurations. This theory derives from a description in *Hunmin chŏng'ŭm haerye* (訓民正音解例 (Explanations and Examples of the Correct Sounds for the Instruction of the People), published in 1446 but only discovered in 1940, where it is stated that these letters 'depict outlines' (상형 象形) of speech organs. The relation between the letter forms and articulatory shapes is clear from the illustrative diagrams in Figure 1.
2. A gaining theory is that the letter forms imitated the Mongolian 'Phags-pa script. It comes from a new interpretation of a much disputed phrase in *Haerye* saying that the letter forms 'imitated *kojŏn*' (방고전 倣古篆). *Kojŏn* was initially thought to refer to 'old seal' characters, one of the stylized forms of old Chinese writing. But Ledyard (1966, 1997) argued that the character 古 (*ko/go*) referred to 蒙古 (*mongo*) or Mongolia.

   When Mongols founded the Yuan dynasty in the 13th century, Emperor Khubilai Khan felt that the new empire needed a new unified script and had a learned monk named 'Phags-pa invent a new script, which is now known as the 'Phags-pa script. There are indeed some uncanny similarities between certain 'Phags-pa and *hangul* letters. For example, from 'Phags-pa letter [g], one can derive *hangul* ㄱ by removing the dangling box, or from 'Phags-pa letter [ℓ], one can derive *hangul* ㄹ by rotating the letter 90 degrees clockwise and by straightening the middle line. These and other similarities, while not systematic, are a little too striking to relegate them to a simple accident.
3. Yet another theory has it that the letter forms derived from *kugyŏl* signs. To the extent that *kugyŏl* signs evolved from Chinese characters, one can say that this is a theory of Chinese origin. The chief proponent of this theory is W. Kim (1996). Recall that *kugyŏl* as signs of grammatical particles inserted between phrasal structures in Chinese writing came to be highly simplified and stylized, for example, 又 for 奴 (*ro*, Instrumental), ㅁ for 古 (*go*, Connective), 丿 for 底 (*dyŏ*, Inchoative), 厶 for 矣 (*ŭi*, Genitive), etc. Kim argues that these simplified *kugyŏl* letters eventually evolved into *hangul* letters, much as Japanese *katakana* letters evolved from simplified Chinese characters, e.g., カ [ka] from 加, タ [ta] from 多, セ [se] from 世, リ [ri] from 利, etc.

There have also been suggestions that the Sanskrit (Devanagari) script or the Uighur script served as a model of *Hunmin chŏng'ŭm* letters. But since these scripts were not phonemic alphabets in the strict sense, as the vowel [a] was assumed for every consonant and other vowels were marked as diacritics, it is unlikely that Sejong received the main inspiration from these alpha-syllabaries.

It is also highly unlikely that any one theory is exclusively right. King Sejong and his court scholars were well versed in phonologies and writing systems of the neighboring languages and undoubtedly consulted them as references. Sejong's innovative genius

Bilabial ㅁ [m] Alveolar ㄴ [n] Velar ㄱ [k] Sibilant ㅅ [s] Glottal ㅇ [ɦ]

Figure 1 Letterforms of base *hangul* letters and their articulatory shapes.

is not that he created something out of nothing, but rather that he created something much better in graphic structures, simplicity, and elegance than any writing system known then or now.

Post-15th Century Changes

Hangul, born in a royal crib, nevertheless took a painful and long time to grow. Not unexpectedly, it met fierce opposition in a Sino-centric world. No lesser figure than a Vice Director of the Royal Academy (Ch'oe Manli) stated in a memorial that "disregarding Chinese in favor of a vernacular script would be identifying ourselves with the barbarians." Chinese writing continued to be used until the end of the 19th century in official papers and among literati. *Hangul* survived mainly in the hands of women and commoners.

Among the original letters, ㅿ [z] and ㆆ [ʔ] became disused and lost, the former because the sound itself was lost and the latter because it was ill-fated from the beginning as a prescriptive letter to record orthodox Chinese pronunciation. ㆁ [ŋ], occurring as syllable-final only, was replaced by ㅇ, a null syllable-initial. Geminate letters, ㄲ, ㄸ, ㅆ, ㅉ, which were initially used to record voiced Chinese sounds, were also disused, but were later revived to record tense consonants, replacing the old ways of writing them, i.e., ㅅㄱ, ㅅㄷ, ㅅㅂ, ㅅㅈ. This situation resulted in much confusion, and became the source of a heated debate among Korean scholars as to whether or not these letters actually represented consonant clusters, [sk, st, sp], etc.

Vowel shift triggered the loss of the vowel ㆍ [ɔ], and the eventual decay of vowel harmony. Former diphthongs came to represent newly emerged front vowels, e.g., ㅐ [aj → æ], ㅔ [əj → e].

What was primarily a phonemic orthography at the time of *hangul*'s invention has now become a morphophonemic orthography, following the proposal for Unified Orthography in 1933 by the Korean Language Society. Thus, 새미기픈므른 /sæ.mi.ki.pʰɨn.mɨ.rɨn/, 'the water of a deep well', is now written 샘이 깊은 물은/sæm.i kipʰ.ɨn mul.ɨn/, preserving the morphemic identity (underlying form) of the lexical items and with word space. Today, *hangul* as the script of Korean is used by 70 million in both Koreas, with nearly 100% literacy thanks to *hangul*'s elegant simplicity.

Description

Inventory

King Sejong (r. 1418–1450) named his script *Hunmin chŏng'ŭm* 'Correct sounds for the instruction of people'. In the following centuries when Chinese still functioned as the official writing, it came to be known as *ŏnmun* 'a vulgar script'. Today it is generally known as *hangul* (*han'gŭl*), meaning 'a great writing' or possibly 'the Han (national) script', a coinage by the linguist Chu Sigyŏng (1886–1914). The script is called *urigŭl* 'our script' in North Korea (People's Democratic Republic of Korea).

Modern *hangul* is an alphabetic script consisting of 24 letters, 14 of which are letters for consonants and 10 are letters for vowels. Vowel letters include [j]-initial diphthongs, as can be seen in the following table. Voiced obstruents are intervocalic allophonic variants. ㄹ is [r] syllable-initially but [l] syllable-finally. ㅇ is silent syllable-initially, but is [ŋ] syllable-finally. Although the two had distinct letters, ㅇ and ㆁ, respectively, at the time the script was created, the two merged later, since [ŋ] never occurs syllable-initially in Korean. The order given below is that of dictionary entries in South Korea:

Consonant letters	Vowel letters
ㄱ [k, g]	ㅏ [a]
ㄴ [n]	ㅑ [ja]
ㄷ [t, d]	ㅓ [ə] (ŏ)
ㄹ [r, l]	ㅕ [jə] (yŏ)
ㅁ [m]	ㅗ [o]
ㅂ [p, b]	ㅛ [jo]
ㅅ [s]	ㅜ [u]
ㅇ (zero-initial or [ŋ])	ㅠ [ju]
ㅈ [tʃ, dʒ]	ㅡ [ɨ] (ŭ)
ㅊ [tʃʰ]	ㅣ [i]
ㅋ [kʰ]	
ㅌ [tʰ]	
ㅍ [pʰ]	
ㅎ [h]	

Letters for obstruent consonants may be doubled to create geminates (or tense consonants), and some vowel letters combine to form new vowels including [w]-initial diphthongs, as shown below:

Geminates	Compound vowels
ㄲ [k']	ㅐ [æ] (from ㅏ + ㅣ)
ㄸ [t']	ㅒ [jæ]
ㅃ [p']	ㅔ [e] (from ㅓ + ㅣ)
ㅆ [s']	ㅖ [je]
ㅉ [tʃ']	ㅘ [wa]
	ㅚ [œ] (from ㅗ + ㅣ)
	ㅝ [wə] (wŏ)
	ㅟ [wi]
	ㅢ [ɨj] (ŭi)
	ㅙ [wæ]
	ㅞ [we]

Thus, the total number of letters including basic and complex letters is 30, 19 of which are consonant

letters and 21 are vowel letters. A large number of vowel letters stem from the fact that glides function as part of nuclei vowels in the syllable structure of Korean (Kim and Kim, 1991). There are also the following eleven syllable-final two-consonant clusters: ㄱㅅ [ks], ㄴㅈ [ntʃ], ㄴㅎ [nh], ㄹㄱ [lk], ㄹㅁ [lm], ㄹㅂ [lp], ㄹㅅ [ls], ㄹㅌ [lt^h], ㄹㅍ [lp^h], ㄹㅎ [lh], and ㅂㅅ [ps]. No other possible combinations occur, e.g., ㄱㄷ, ㄴㄷ, ㄷㄹ, ㄹㄹ, ㅍㅍ, ㅁㅁ, ㅓㅓ, ㅏㅏ, ㅘㅘ, ㅕㅕ, ㅔㅔ, ㅚㅚ, ㅡㅡ, etc., although ㄹㄹ and ㅡㅡ, have been proposed by some linguists as letters denoting lateral ㄹㄹ [ℓ] and ㅡㅡ [jɨ], respectively, the latter glide-vowel being the pronunciation of [jə] in some dialects. No diacritic mark, even an apostrophe, is used.

General Characteristics of Script Shapes

Hangul script is quite unique in that its geometric shapes of basic letters are iconic symbols and that they reveal internal structural relations as described below.

1. Basic consonant letters depict their articulatory configurations (e.g., ㄱ depicts the tongue back raised against the velum, while ㄴ depicts the tongue tip making a contact with alveola (see **Figure 1**). Three basic vowel letters symbolize three elements, i.e., ㅣ 'a (standing) man', ㅡ 'the (flat) earth', and • (now extinct) 'the (round) heaven'.
2. Consonant and vowel shapes are distinguished from each other. The distinguishing stroke in vowels is a bar, either horizontal or vertical, by itself or with at most two short side strokes (originally dots) to the right or left of a vertical bar, or above or below a horizontal bar. Consonants have more complex geometric shapes with angled strokes.
3. In vowels, two short strokes tell that the letter represents a complex vowel [j] + V where V is the same vowel with only one side stroke, e.g., ㅑ [ja] = [j] + ㅏ [a], ㅠ [ju] = [j] + ㅜ [u], ㅐ [jæ] = [j] + ㅐ [æ], etc. [w]-glide is represented with either ㅗ [o] or ㅜ [u] before another vowel, e.g., ㅘ [wa] ([o] + [a]), ㅟ [wi] ([u] + [i]), etc.
4. In consonants, only sibilants have slanting strokes, i.e., ㅅ [s], ㅈ [tʃ], ㅊ [tʃ^h], while non-sibilants have right-angle strokes or circles, e.g., ㄱ [k], ㄷ [t], ㅂ [p], ㅁ [m], ㄹ [l], ㅇ [ŋ].
5. The so-called add-a-stroke principle yields derived sounds in a systematic way. For example, adding a stroke to a basic obstruent makes it an aspirated sound, e.g.:

   ㄱ [k] + stroke = ㅋ [k^h],
   ㄷ [t] + stroke = ㅌ [t^h],
   ㅈ [tʃ] + stroke = ㅊ [tʃ^h],

   In fact, the [j]-glide vowels ([3] above) may be regarded as having been derived from basic vowels via stroke adding.

These features are indeed quite unique and are probably not found in any other script in the world. In the Roman alphabet, for example, there is no internal relation between /p/ and /b/, /t/ and /d/, /k/ and /g/, etc. The subsegmetal features in the Korean script prompted Sampson (1985) and Kim (1988) to say that *hangul* is the only featural script in the world.

Writing Conventions

Unlike in Chinese writing where lines are vertical from right to left, contemporary Korean writing proceeds from left to right in horizontal lines as in English writing. In individual letter writing, *hangul* letters proceed from left to right and top to bottom. In addition, although *hangul* is a fully alphabetic script, it is written in syllable blocks such that one block consists minimally of an initial (onset) consonant and a nucleus vowel. It is because of this requirement that ㅇ is used as a filler letter when there is no initial consonant in the syllable. When the vowel letter is of a vertical bar, C and V are written side by side in this order, e.g., 가 /ka/ 'go'(Root). But if V consists of a horizontal bar, the V is written **below** the C, e.g., 구 /ku/ 'nine'. When there is a final (coda) consonant, this is written at the bottom of the block, regardless of whether the syllable has a vertical or a horizontal vowel, e.g., 간 /kan/ 'went', 국 /kuk/ 'soup', 한글 /han.kul/ '*hangul*', 닭 /talk/ 'chicken'.

Sizes of individual letters are slightly adjusted to fill the syllable block. Thus, ㄱ is elongated in 가 /ka/ but is flattened in 구 /ku/, and both consonants and vowels become slightly smaller when there is a coda, e.g., in 간 /kan/ or 국 /kuk/. This was a substantial problem in the age of typewriters, and some called for linearization or *karo-s'ŭgi* 'side-by-side writing', e.g., 하ㄴㄱㅡㄹ for 한글 /hankul/, but the advent of word processors quickly silenced the proponents.

Thus, *hangul* is an alphabetic script with subsegmental features but written in syllable blocks. This led Taylor (1979) to call *hangul* an alphabetic syllabary or an alpha-syllabary. This is another advantage of *hangul*. An alphabetic script makes it easier to learn, and a syllabic writing makes it easier to read. An experiment showed that a class of American college students first learning Korean read one and a half times faster in block writing than students in another class who were initially taught to write and read in linearized writing (Kim and Sohn, 1986).

Differences between North and South Korea

In North Korea, the same script is used, but is called *urigul* (*urigŭl*) 'our script', probably just to be different from its southern neighbor, just as the language is known by two different names, *p'yojunŏ* 'the standard language' in the south, but *munhwaŏ* 'the cultured language' in the north.

Both states have adopted the Unified Orthography proposed by the Korean Language Society in 1933, which is basically morphophonemic. Each state has since made minor modifications with varying details. In general the northern variety is more morphemic than the southern.

The order of the alphabet is slightly different in the two Koreas. First of all, in North Korea, ㅇ is the last consonant letter, not the 8th as in South Korea, probably because as the syllable-initial letter, it has a null phonetic value. In addition, characters consisting of two basic letters follow all single letters so that ㄲ, ㄻ, ㅱ, etc., follow ㅇ. But in South Korea, ㄲ immediately follows ㄱ, and ㄻ follows ㄷ, etc. Consonant clusters, however, are treated differently from geminates so that while the order of ㄱ, ㄲ and ㄳ as syllable-finals is as given in South Korea, it is ㄱ, ㄳ, ... ㄲ in North Korea. That is, while ㄱ is immediately followed by ㄳ, the rest of the single letters intervene between ㄳ and ㄲ. The same principle applies in the order of vowel letters in the north, that is, double-letter characters such as ㅐ, ㅔ, ㅚ follow all single basic letters, and triple-letter characters ㅙ and ㅞ follow all double-letter vowel characters. In South Korea, however, complex letters immediately follow the basic letter from which they derive, e.g., ㅐ (ㅏ + ㅣ) comes after ㅏ but before ㅑ, and ㅘ, ㅙ and ㅚ immediately follow ㅗ, in this order.

Another difference between the two Koreas is the status of Sino-Korean vocabulary and characters (*hancha*). In the north it was determined early that a socialist state had no place for *hancha* because it is the property of the elite class, and the use of *hancha* was abolished altogether. This policy may have had a political motive of facilitating mass indoctrination. In the south, there has been a gradual decline in the use of *hancha*, even as purists and pragmatists heatedly debated the fate of *hancha*. Today about 1800 characters are taught in South Korea, 900 each in middle and high schools. *Hancha* is in fact now seeing a bit of a revival, due to the emergence of China as a powerhouse and due to a recognition that Chinese characters are becoming a lingua franca in East Asia.

See also: China: Writing System; Korean.

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been some systematic reflections about seeking a new direction in Korean bilingual lexicography (Cho, 2002; Eu, 2004; Lee, 2005).

Computational Lexicography in Korean

Most of the above-mentioned recent dictionaries are available on the Internet, and some are available on CD-ROM. Going beyond a simple replica of paper dictionaries, the government-led 21st-Century Sejong Project has been building (since 1998) a large Korean lexical database to comprehensively serve the needs of Korean language–related research and developments such as natural language processing, lexicography, linguistics, education, and artificial intelligence, especially emphasizing a closer cooperation between linguists and computer scientists.

Machine translation between Korean and Japanese – languages that are very similar – has reached a fairly successful standard. For example, Internet sites where Koreans and Japanese can chat by using machine translation are growing in popularity. On the other hand, machine translation between Korean and English is still at a rather rudimentary level. There are Internet sites that search Korean phrases and sentences for their English equivalents, but their usefulness and accuracy are still quite limited.

See also: Bilingual Lexicography; Chinese Lexicography; Chinese; Corpus Lexicography; Japanese Lexicography; Korean; Lexicography: Overview.

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Kotarbiński, Tadeusz (1912–1998)

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Tadeusz Marian Kotarbiński was born on March 31, 1886, in Warsaw and died there on October 3, 1981. He studied technical subjects and architecture in Cracow, Lwów (now Lviv, Ukraine) and Darmstadt before taking up philosophy and the classics at Jan Kazimierz University in Lwów, where he earned his doctorate in 1912. He taught Greek and Latin in a Warsaw high school until 1918, when he began teaching at Warsaw University. During the interwar period he was active as a teacher and scholar, and also took part in the public debates of the time, speaking out and writing, for example, against anti-Semitism and clericalism.

During the Nazi occupation of Poland Kotarbiński took part in clandestine teaching; after the war he helped to organize the university in Łódź. He served as its first rector from 1945 to 1949, simultaneously teaching and chairing the Philosophy Department at Warsaw University. He eventually returned to Warsaw, remaining there until his death.

Kotarbiński's main areas of interest were praxiology and ethics, but he also devoted attention to formal logic, logical semantics, and the history of logic. He was the author as well of three volumes of aphoristic poetry.

Kotarbiński called his philosophical approach 'reism' (or 'concretism') and viewed its principles as "declaring war against the hypostases of linguistic origin," the faulty assumption that, for example, properties like 'roundness' or 'blueness' exist because natural languages have words for them. He drew a distinction between genuine names and apparent names. The former are names of persons or things; they include singular, general, and empty names (e.g., *Kotarbiński, philosopher, unicorn*, respectively). The latter are names of properties, relations, events, or states (*truthfulness, equality, departure, health*, respectively). Singular names, which refer to individuals or things, can serve as grammatical subjects.

General names (of people or things) can serve as predicates, or as subjects in universal sentences. Empty names have no denotation, but can be replaced by synonymous combinations of singular and general terms. An apparent name, Kotarbiński argued, can only legitimately be used if the expression in which it occurs can be translated into an expression containing only genuine names. Thus we can get away with saying *John's anger was shortlived* because we can translate it into *John was not angry for long*. Saying the former no more commits us to the existence of 'anger' than saying *Mary took umbrage at my words* commits us to the existence of 'umbrage'; indeed, all that exist are objects (including people).

Kotarbiński was one of the first philosophers to consider the possibility of a three-valued logic (before Jan Łukasiewicz or Emil Post in the 1920s). He came to this position in 1912 from consideration of the possibility of creative activity. Assuming that truth is eternal, and that a statement S affirming the existence of an object O can be true if and only if O exists, it should be impossible to create O. For until O is created, S cannot be true, therefore – by one version of the law of the excluded middle – S must be (eternally) false and therefore O's existence cannot be affirmed. Kotarbiński rejected this version of the Aristotelian principle, suggesting instead that before O is created, S is neither true nor false, but indefinite.

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Koya:ng *See:* Gondi.

Krapf, Johann Ludwig (1810–1881)

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Johann Krapf was born on February 11, 1810, in Derendingen, Württemburg, and died on November 26, 1881, in Korntal, Württemburg. One of four children, he was the son of Johann Jakob Krapf, a farmer, and Katherina Maria Braun. He attended the Osterbergschule in Tübingen, where he discovered a talent for languages, studying Greek, Latin, French, Italian, and Hebrew (Pirouet, 1999). Krapf's next step was training to become a missionary at the Basel Missionary Institute, a training he interrupted to study theology at the University of Tübingen. In 1834 Krapf returned to the mission after a five-year hiatus, in which time he had been ordained and become a parish minister.

At this point the German Krapf joined the British Church Missionary Society, and in 1837 was sent to help found a mission station in Abyssinia. After unsuccessfully trying to establish the station and being driven from the region, Krapf moved to Shoa, in southern Ethiopia, before he was ultimately forced to go even further south, to Mombasa (Miehe, 1983). During his 19 years in Africa, Krapf achieved fame in two arenas: as a writer of historical travelogues, and as a linguist who compiled grammars and biblical translations for several languages. In this second capacity, Krapf belonged to a group of German missionaries, among them S. W. Koelle and J. F. Schön, who introduced the discipline of African linguistics to Europe (*see* **Koelle, Sigismund Wilhelm (1823–1902)**).

Once in Ethiopia, Krapf quickly immersed himself in language study, learning Oromo (Galla), Amharic, and Ge'ez [Geez]. He translated the Gospels of John and Matthew into Oromo, and wrote his first grammar and dictionary. In Shoa, Krapf became embroiled in a short controversy concerning whether to print Bibles in Amharic or Ge'ez; the British and Foreign Bible Society, which published Krapf's work, argued

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for Amharic, but Krapf insisted that, because the natives of the area did not like Amharic, biblical translations should instead be printed in both Amharic and Ge'ez, with the languages side by side (Krapf, letter to the British and Foreign Bible Society, Archives of the British and Foreign Bible Society, Cambridge, August 1839). While in Ethiopia, Krapf also gathered samples of Amharic and Ge'ez handwriting, which he sent back to Europe for analysis. In 1842, his achievements in Ethiopia were recognized when his alma mater, the University of Tübingen, awarded him a doctorate for his Ethiopian work.

After Krapf left Ethiopia, he settled in Mombasa, where he lived from 1844 to 1855. Krapf lost his first wife, Rosina, and their daughter to illness during their first year in Kenya. In 1846 he was joined by Johannes Rebmann, who commonly accompanied Krapf on his journeys to the interior, and also collaborated with him on linguistic work. During their journeys, Rebmann and Krapf became the first Europeans to reach Mount Kilimanjaro (Krapf, 1858, 1860). In East Africa, Krapf studied Swahili and several related languages, including Kinika (Kirabai), the language of the Mijikenda. A nine-page biblical translation of Genesis, which Krapf completed not long after his arrival in Mombasa, was the first Swahili text printed in Roman script. In 1850 Krapf compiled a short comparative vocabulary of six East African languages, which also contained ethnographic information on the peoples who spoke them (Krapf, 1850). Krapf commented on the affinity of the six languages, and on their connection to a much larger family of languages spoken throughout sub-Saharan Africa. These were the Bantu languages, though Krapf did not name them as such; his colleague Wilhelm Bleek, Cape Colony governor Sir George Grey's librarian, was instead the first to call the language group Bantu (Frankl, 1992).

Krapf's greatest accomplishments in linguistics are undoubtedly found in his work on Swahili. Krapf was the first to compose a Swahili grammar, which was published in 1850. Frankl suggests that Krapf would have been the first to publish a Swahili dictionary, too, but white ants destroyed much of his research, delaying publication until 1882, a year after Krapf's death. In 1860 Krapf did, however, see a shorter version of his lexicon disseminated by the London Society for the Propagation of the Gospel. Thus, while Bishop Edward Steere's Swahili handbook predated Krapf's complete dictionary (Steere, 1870), Krapf was nonetheless a pioneer in the European study of Swahili (Frankl, 1992).

In 1853 Krapf left Kenya for health reasons, stopping briefly in London before settling permanently in Korntal, where he married twice more before his death in 1881. Krapf maintained his involvement with the mission from afar, advising other missionaries from his home in Germany and making several brief trips to Africa after his retirement. He was in constant communication with the British and Foreign Bible Society, and continued to translate biblical texts into Oromo and Amharic long after he had returned to Germany (Pirouet, 1999).

See also: Koelle, Sigismund Wilhelm (1823–1902); Multivalued Logics.

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Christian Gottlieb Kratzenstein was born on January 30, 1723 in Wernigerode (Germany) and died on July 7, 1795 in Copenhagen. Kratzenstein was a leading physician, physicist, and natural scientist in the 18th century. Among linguists, he is known as the inventor of a 'speaking machine.'

His father was a school teacher and burgomaster in Wernigerode, where Kratzenstein obtained an excellent education at the local grammar school. In 1742, he started his studies at the University of Halle where he published his first book: *Beweis, dass die Seele ihren Körper baue* in 1743. In this work, he discussed problems like the preformation theory, which regarded organic molecules as determinants of every new creature from the time of Adam and Eve onwards. Kratzenstein discussed the attractive force of Newton in his *Abhandlung von dem Einfluß des Mondes in die Witterungen und in den menschlichen Cörper: Wobey er zugleich zu seinen künftigen Vorlesungen einladet* (1746 and 1747), defended his own *Theoria fluxus diabetici eiusque curandi methodus more geometrice pro gradu Doctoris* (1746) and dealt with worms in the human body (*Abhandlung von der Erzeugung der Würmer im menschlichen Körper*; Kratzenstein, 1748). Most important, however, was the prize essay he sent to the Academy of Bordeaux in 1743 on *Théorie de l'élévation des vapeurs et des exhalaisons, démontrée mathématiquement, qui a remporté le prix, au jugement de l'Académie des belles lettres, sciences et arts.* (Kratzenstein, 1743b), for which he obtained a gold medal. In this treatise he showed that the effluvia (*vapeurs, Dünste*) *which rise from water are invisible air-filled bubbles*. (*These effluvia are invisible as long as being connected in quiet air. But when separated, they become invisible and reflect light according to the laws of Descartes.*) Stimulated by his professor Johann Gottlob Krüger (1715–1759), Kratzenstein wrote his *Schreiben vom Nutzen der Electricität in der Arzneywissenschaft* in 1744 (published in 1772), in which he presented electricity as an omnipotent remedy against every kind of disease. In 1746, he became a doctor of philosophy as well as a doctor of medicine at the University of Halle, where he was subsequently appointed as professor of physics. In 1748, he became a professor of mathematics and mechanics at the Academy of St Petersburg, which attracted many distinguished savants from Western Europe by that time. Kratzenstein was ordered to make mechanical instruments. He conducted experiments with microscopes and optic instruments, supervised patients suffering from diseases in the hospital of the Academy and gave lectures. He also developed new methods of navigation by inventing instruments for the measurement of longitude and latitude degrees and the polar altitude. After long struggles with Mikhail Vasilievich Lomonosov (1714–1765) and other scientists who were opposed to the multitude of foreign professors at the Academy, Kratzenstein left St Petersburg and became a professor of physics in Copenhagen. Until 1786, he gave lectures on different disciplines of the natural sciences, e.g., physics, natural history, botany, zoology, mineralogy, medicine, pharmacology, and chemistry. In 1780, Kratzenstein received the prize of the St Petersburg Academy for his work on artificial human voice. He constructed a 'speech machine' capable of imitating five vowels, which resembled to the *vox humana* register of baroque organs. Kratzenstein was the first to use the free reed and thus inspired the construction of free-reed instruments such as the glass-harmonica, the harmonica, and the accordion.

Kratzenstein was an ingenious scientist whose mechanical reconstruction of the human voice was a first attempt at the creation of artificial voice production.

See also: Lomonosov, Mikhail Vasilyevich (1711–1765).

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Krio

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The Sociohistorical Development of Krio

Krio, one of the languages spoken in Sierra Leone in West Africa, is a creole language belonging to the Atlantic group of English creoles which are restructured languages with English as the superstrate language and varying degrees of structural influences of the Niger–Congo languages in Africa. It can be further subcategorized as West African on the basis of its areal distribution and immediate linguistic affiliations.

The Domestic and Jamaican hypotheses are two competing views that have been postulated for the origins of Krio. The Domestic Hypothesis, a corollary of monogenesis, is advocated by Hancock (1986) and other creolists. It is argued that Krio is an offshoot of an English variety of creole, which coexisted with and was influenced by a Portuguese-derived pidgin in West Africa. According to Whinnom (1965), this pidgin was related to Sabir, a Romance pidgin and Mediterranean lingua franca spoken between European and non-European sailors and traders from the Middle Ages to the early 20th century. A lesser known version of the Domestic Hypothesis is based on the view stated in E. D. Jones (1956), Berry (1959), and Peterson (1969) that contact between the local inhabitants and various groups of settlers after the founding of the 'Province of Freedom' in the peninsula of Sierra Leone in the 19th century gave rise to Krio.

Sociohistorical developments in the late 18th century and the first half of the 19th century and the attendant linguistic situation around the Sierra Leone peninsula contributed significantly to the establishment and spread of present day Krio. Henry Smeathman, a botanist, who had lived for 3 years on the Banana Island near the Sierra Leone River from 1771 to 1774, proposed the area as suitable for the establishment of an agricultural settlement populated by a free community of equal blacks and whites. Smeathman died before realizing his dream, but his idea was revived by Granville Sharp, one of the philanthropists behind the campaign to repatriate and rehabilitate emancipated African ex-slaves. Following the abolition of slavery in Britain in 1787, emancipated ex-slaves in London became destitute and created a social problem for the British government. Spitzer (1974: 9) describes their destitution and the acute need for repatriation and rehabilitation of these ex-slaves who became known as the Black Poor. A group of philanthropists campaigned vigorously for the identification, purchase, and establishment of a settlement for the Black Poor. Sharp and a group of social reformers known as the The Clapham Sect pioneered the repatriation of 411 Black Poor and some English women to the peninsula of Sierra Leone in 1787.

When they arrived in Sierra Leone, Captain Thompson, who was the leader of the expedition, purchased a piece of land from King Tom, the Temne Chief. The piece of land became known as The Province of Freedom and Thompson called the first settlement Granville Town after Granville Sharp. Historians have attributed the collapse of the first settlement to problems ranging from the fact that the settlers were ill-equipped for the weather to hostilities between the settlers and the Temnes. This occasioned a dispersal of the first settlers so that by 1791 only 48 of the Black Poor remained in The Province of Freedom.

The formation of the Sierra Leone Company and the repatriation of 1131 Africans from Nova Scotia in

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Krio

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The Sociohistorical Development of Krio

Krio, one of the languages spoken in Sierra Leone in West Africa, is a creole language belonging to the Atlantic group of English creoles which are restructured languages with English as the superstrate language and varying degrees of structural influences of the Niger–Congo languages in Africa. It can be further subcategorized as West African on the basis of its areal distribution and immediate linguistic affiliations.

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March 1792 saw the revival of the settlement and the return of some of the first settlers. The Nova Scotians were ex-slaves from the American colonies who had gained their freedom by fighting on the side of the British during the American War of Independence. After the war, they were offered asylum in the British settlement in Nova Scotia. When Thomas Peters, one of the ex-slaves, complained of their ill treatment in Nova Scotia, the British government transported them free to Sierra Leone where, together with the surviving Black Poor, they began a colony they called Free Town. Lieutenant John Clarkson of the Royal Navy, who led the Nova Scotians, became the first Governor of Sierra Leone. Like Granville Town, Free Town (Freetown became the capital of Sierra Leone) also had its fair share of misfortunes. Forty of the Nova Scotians died in the first few weeks of their arrival in the colony. Furthermore, the French razed the settlement to the ground in September 1794, but the surviving settlers rebuilt it.

In 1800, 550 Maroons from Jamaica arrived in the settlement. The Maroons were descendants of slaves who were originally from the Gold Coast but had been taken to Jamaica in the West Indies. They had organized several rebellious campaigns against the British and were promised an amnesty if they surrendered. The British expelled them to Halifax in Nova Scotia but during the bitter winter of 1796–1797, they petitioned to be removed to another place and were taken to Sierra Leone. Instead of being resettled in the Banana Islands, south of the peninsula, they settled in the colony after assisting to foil an uprising in the province. The Maroon population is reported to have dwindled after a decade because some of them died from diseases and others migrated to their original home in the Gold Coast, now known as Ghana.

When the slave trade was prohibited in 1808, Freetown became a Crown Colony. From then on it served as the springboard for British legal and naval operations aimed at combating the slave trade along the West Coast of Africa. Between 1808 and 1864, slave ships were intercepted on the high seas and the redeemed Africans, referred to as Liberated Africans or Recaptives, were released initially in Freetown, and later in other British ports. The Liberated Africans never landed in the New World and, according to Spitzer (1974: 10), "were of heterogeneous ethnic origin, speaking a Babel of African languages." The last batches of settlers were from ethnic tribes in Sierra Leone and other West African countries including Ghana and Nigeria.

The languages spoken in Freetown, including a dialect of West African pidgin/creole, coexisted with English, which was the official language used in the administration of the settlement. Even if historians and creolists disagree on when an English pidgin was first used on the coast of West Africa, or on the ethnolinguistic and demographic composition of the settlement, it is argued here that all of the languages spoken in the settlement, approximately 150 according to Koelle (1854), played roles in the creolization process that produced Krio. The African languages included Temne, the language of the people who sold The Province of Freedom to the first settlers, Mende, Sherbro, Joloff, Bambara, and Kissi. The adstratal influence of settlers from Barbados on the development of Krio probably occurred later, between 1819 and 1896 when, as Berry (1959: 299) points out, convicts from Barbados and disbanded troops from the 2nd and 4th West Indian Regiments were among the early colonists in Sierra Leone from the Caribbean area.

Thus, two periods can be identified in the development of Krio: the pre-1787 period during which a variety of West African creole was spoken in the Sierra Leone estuary and the post-1787 period (between 1787 and the 1860s) during which what is Modern Krio became established out of linguistic input from West African creole, New World creoles, and West African languages. From 1787 onward, the Sierra Leonean variety of West African creole and nascent Krio later converged as a result of pressure from and prestige of the latter. The process, which involved different creole varieties and West African languages, aptly demonstrates the roles of leveling and reconstruction in the creolization model.

Krio spread from Freetown to the interior of Sierra Leone and other West African countries due to the strategic role of Sierra Leone as the base from which Britain spread its colonial administration. The British employed educated Krio and sent them as administrators to other West African colonies in the 19th century. Varieties of Krio are spoken today in the Gambia, Cameroon, Guinea, Senegal, Ghana, Nigeria, and Fernando Po, which is now known as the Island of Bioko.

'Creo' and 'Creole' have been used as variant names for Krio but Fyle and Jones (1980) and Wyse (1980) argue that 'Akiriyo,' a Yoruba term which refers to the Krio habit of paying visits after religious services is the most plausible derivation of Krio. According to Hancock (1969: 19) in the past, 'Creole' was the generic term for the settlers and their descendants, from 1787 to the second half of the 19th century, and their language. At an orthographic conference held in Freetown in April 1984, participants recommended the adoption of Krio as the official designation of the language and name of the people. Krio is today one of the national languages of Sierra

Leone. It is estimated that native speakers of Krio constitute 3% of the population of Sierra Leone and two-thirds of the rest of the population of the country use the language as a lingua franca. The native speakers inhabit mostly Freetown and the western area of the country.

Krio has not decreolized for a variety of reasons. It has been used by writers as a medium of poetry, drama, and short stories. There is a Krio–English dictionary, portions of the Bible including the New Testament have been translated into Krio and many plays performed in Sierra Leone today are written in Krio. Most importantly, Krio has enjoyed an enhanced social status as one of the official languages of Sierra Leone. It is regarded as a full-fledged Sierra Leonean language and not a corrupt bastardized version of English. Along with the other Sierra Leonean languages, it is used in television broadcasts, as well as most business and official public engagements.

Official recognition of the language also extends to education. In the past, an additive bilingual program of language shelter was widely practiced in primary schools throughout the country. Children in primary schools used to be taught to a large extent through the medium of their first language and English was slowly introduced. The program of immersion had the educational aim of enriching the experiences of the children. The indigenous languages and cultures were maintained and further developed as they interacted with English. Sierra Leone's current education policy requires the extension of the use of Krio and the other indigenous languages to secondary education and there is ongoing work to standardize these languages and produce materials for use at this level. This policy will contribute to the extension of the domains of use and the continued stability and spread of Krio as well as the other national languages.

In addition to the other reasons given above, Krio has not decreolized notwithstanding pressure from English, the lexifier language, because it carries no stigma and is an identity marker.

Some Grammatical Features of Krio

Krio uses separate morphemes to express grammatical categories. In general, the plural is marked by the particle *dɛm*, for example:

dɛm pɛn
PLURAL pen
pens
pɛn dɛm
pen PL(URAL)
pens

Whereas English plural forms can be indicated by the suffixes -s, or -es, some Krio words appear to have suffixes attached without necessarily indicating plurality. Such words were acquired from English in their present forms and can be used with reference to both singular and plural objects, for example:

machis
'match'
sus/shuz
'shoe'

The possessive is marked by the particle *in*, for example:

Patrik in buk
Patrick POSSESSIVE book
'Patrick's book'

De or *di* is the progressive marker, for example:

Idit de rait.
Edith PROGRESSIVE write.
'Edith is writing.'

In certain contexts, verbs without preverbal particles express the default past tense but the particle *bin* is the past tense marker, for example:

Banadɛt bin rait.
Bernadette PAST rait.
'Bernadette wrote.'

Go is the future marker, for example:

Lamin go rait.
Lamin FUTURE rait.
'Lamin will write.'

Dɔn is the perfective marker and it combines with *bin* to express the past perfect, for example:

Angela dɔn rait.
Angela PRESENT PERFECT write.
'Angela has written.'
Mamie bin dɔn rait.
Mamie PAST PERFECT write.
'Mamie had written.'

Blan(t) 'used to' is a habitual aspect marker and the modal markers which can cooccur in a sequence as double or multiple modals are *mɔs* 'must,' *fɔ* 'should,' *go* 'intend to, must,' and *kin* 'can, could.' Consider the following examples:

I blant rait.
She HABITUAL ASPECT write.
'She usually writes.'
A bin fɔ mɔs dɔn rait.
I PAST + MODAL + MODAL + PERFECTIVE write.
'I should (would) most certainly have written.'

Some particles are multifunctional and the different functions are determined by context. These particles include:

- *Na* can function as a locative 'in, at, to,' verbal particle 'is,' and adjectival 'that.'
- *ɔt*, a preposition 'out' also functions as verb for 'extinguish, put out.'
- *De* functions as a verb 'to be,' durative marker, and locative adverb 'there.'
- *Bin* functions as a past tense marker and aspect marker.
- *Fɔ* functions as a preposition, modal auxiliary, main verb, and complementizer or infinitive marker.
- *Go* functions as a verb and modal particle.
- *Blant* is not only a past habitual marker 'used to,' but also functions as a main verb 'belong to.'

Other grammatical features of Krio include:

- multiple negation, for example:

  Nɔ tɔk tu am no moh.
  NEGATOR talk to him NEGATOR more.
  'Do not talk to him any more (again).'

- Serial verbs in Krio have the following basic structure:

  NP_1 Aux V_1 (NP_2) V_2 . . .
  Agnɛs bin kuk rɛs gi Josɛf.
  Agnes (NP_1) bin (PAST AUXILIARY) cook (V_1) rice (NP_2) gi (V_2) Joseph.
  'Agnes cooked some rice which she gave to Joseph.'

- focus constructions involving *na* 'it-is,' for example:

  Na Mari bin kɔ'l.
  It-is Mary PAST call.
  'Mary called.'

Some Lexical Features of Krio

Many Krio words are of African origin. The main Sierra Leonean sources of the lexical items include, Mende, Temne, Sherbro, Susu, Yalunka, Limba, Kru, Vai, Fullah, and Mandingo. The other major African sources include, Yoruba, Wolof, Twi, Hausa, and Ibo. Most of the African items have multiple origins and indicate the multiple connections of the language as shown below:

Word	Sources	Meaning
banda	Mende, Kongo, Swahili	a basket made of palmetto straw or of marsh grass and sewn with palmetto, or a thatched house
bara (bala, balanji)	Bambara, Susu, Mandingo	a xylophone
bene	Wolof, Bambara, Mende	benne, sesame
fufu	Twi, Ewe, Wolof, Fon, Mende, and Hausa	mush, wheat flour made into a thin batter and cooked
nyam/ nyamnyam	Wolof, Fullah, Mbundu, Mandingo, Tshiluba, Efik, and Twi	to eat, eat up, food

Other sources of the lexicon of Krio include European languages: mainly English, Portuguese, Spanish, and French. The largest number of words in the lexicon of this creole derives from English. Between 70% and 80% of the Krio lexicon is derived from English and a lot of the words reflect an archaic usage in English. Examples include:

berin 'a funeral, a burial.' Recorded in the OED as *bering(e)*, it is either obsolete or occurs in English dialects.
titi 'girl' and *krabit* 'miserly, mean' are Scottish representations
bre/ribre 'nag' comes from northern English dialect
kɔstamɛnt 'customer' appears in the OED as an obsolete word *customance/custumaunce* in use as far back as 1386, which means 'customary practice; custom, habit, customary gathering, frequenting'
baksay 'buttocks' is a fossil of an earlier English compound *baksyde*, *backeside* meaning 'the hinder or back part, the back, the rear.'

Vulgar words highlight slang and vulgar usages but some of these words have lost their European connotations. Examples include:

pis 'urine'
switpis 'diabetes'
pisbag 'bladder'
pishol 'urethra'

Some of the Krio words represent semantic Africanisms, for instance:

bif 'meat'
fut 'leg, thigh'
met 'co-wife'

Although some Krio words are different from their English etyma, they are related to their etyma via a semantic change through inference, for instance:

bisin 'to care, be concerned about' from 'business'
drap 'arrive unexpectedly' from 'drop'
bot 'to gang up' from 'both'
ton 'penis' from 'stone'

Words derived directly from Portuguese, Spanish, and French include:

pikin 'child' (derived from Portuguese *pequenno* 'little' or Spanish *pequeño*),
bɔku 'plentiful, abundant' (derived from French '*beaucoup*'),

farinha 'flour' (derived from Portuguese but can also be traced to French *farine*)
sabi 'skill, knowledge' (derived from Portuguese *sabir* 'know' or Spanish *saber*. It also occurs in English as *savvy*)
plaba 'quarrel' (derived from Portuguese *palavra* 'words, talk,' Spanish *palabra*, Italian *parola*, French *parole*, and Latin *parabola* 'parable.')
dash 'present' (derived from Portuguese *das-me* 'give me')

Compounds

Some Krio compounds are created by juxtaposition of words of different grammatical categories. Some of the compounds are derived from English phrasal verbs for example:

fɔdɔm 'fall, fall down'
mekes 'hurry'
tayup/tringup 'tie up'

Two or three morpheme parallels in question words include:

wetin 'what'
udat 'who'
usay/wisay 'where'
ustem/wataym 'when'
wetin-du/mek-so 'why'
ɔmɔs/hɔmɔch 'how many'

Other compounds with different bases are instances of the use of metaphoric language through idiomatic calquing, for example:

Adjectives	Body parts (nouns)	Compound
big 'big'	*mɔt* 'mouth'	*bigmɔt* 'boastfulness'
gud 'good'	*bele* 'belly'	*gudbele* 'kind hearted'
big 'big'	*yay* 'eye'	*bigyay* 'greedy'

Other socially and culturally determined compounds include:

santem (sun time) 'midday'
domɔt (door mouth) 'door'
dede-hos (dead house) 'mortuary'
simun 'menstruation'

Some compounds are gender, occupation, actor, and nationality constructions, for example:

umanfɔl 'hen'
bɔy pikin 'male child'
gyal pikin 'female child'
inglishman 'Englishman'
amerikinman 'American'
ganaman 'Ghanaian'

There is also evidence of semantic calques and extensions as the forms borrowed from English gain new meaning. For example:

ɔpstyas 'the brain' (from 'upstairs')
bizi 'menstrual period' (from 'busy')
yad 'toilet' (from 'yard')
big 'older, wealthy, important'

Epenthetic vowels are inserted between consonants where clusters occur in English words, for example: *tikitul* 'kettle'

Reduplication

The following types of complete reduplication have been attested in Krio:

- intensive reduplication of adjectives, adverbs and verbs

Simplex forms	Reduplicated morphemes
tru 'true'	*trutru* 'very true'
dɛ 'there'	*dɛdɛ* 'exactly there; correct'
ay 'high'	*ayay* 'very high'
kwik 'quickly'	*kwikkwik* 'very quickly'

The following reduplicated verbs also indicate an increase in degree and/or intensity:

Simplex forms	Reduplicated morphemes
baŋ 'bang'	*baŋbaŋ* 'very loud noise'
fred 'be frightened'	*fredfred*, 'very frightened'

- iterative/repetitive/frequentative reduplication of verbs

Simplex forms	Reduplicated morphemes
aks 'ask'	*aksaks* 'repeated asking around'
chenj 'change'	*chenjchenj* 'habitually/always/ constantly changing'

- distributive reduplication of numerals

Simplex forms	Reduplicated morphemes
wan 'one'	*wanwan* 'one by one' or 'one to each'
tu 'two'	*tutu* 'two by two' or 'two to each'

- pluralizing reduplication of nouns.

- plurality bordering on uncountability, for example:

Simplex forms	Reduplicated morphemes
af 'half'	*afaf* 'bits', 'halves'
chuk 'thorn'	*chukchuk* 'thorns'

- increased mass, for example:

Simplex form	Reduplicated morpheme
chaf 'chaff'	*chafchaf* 'chaff'

Some Phonological Features of Krio

Consonants

The voiceless dental fricative /θ/ and the voiced dental fricative /ð/ are often occluded. The voiceless dental

fricative /θ/ is reduced to /t/ or in some dialects /f/, for example:

tin 'thin'
tiŋk 'think'

The voiced dental fricative /ð/ is replaced by the alveolar /d/, for example:

da 'that'
dis 'this'
dɛn 'then'

The voiceless glottal fricative /h/ is often omitted in initial positions, for example:

ol 'hold'
os 'house.'

Initial unstressed sounds are omitted in many words, for example:

gri 'agree'
mɛmba 'remember'
chenj 'exchange'
bot/bʋʋt/ 'about'

Consonant clusters involving a fricative and stop in final positions are often reduced, for example:

was was/was 'wasp'
gens 'against'
han 'hand'
fɔs 'first'
brɛs 'breast'

The stop after /l/ is often dropped and the rule appears to be the reduction of the clusters /lt/ and /ld/ to /l/ in final positions for instance:

/sɔl/ 'salt'
ol 'old'
wɔl 'world'

The /l/ before a labial consonant or a dental stop at the end of a word is deleted for example:

ɛp/hɛp 'help'
sef/sɛf 'self'

The final voiced stop /d/ in words ending in /nd/ is omitted, for example:

san 'sand'
tan 'stand'
blɛn 'blind'

Like some West African languages such as Mende and Temne, Krio has the following voiceless and voiced labiovelar coarticulated stops:

/kp/
/gb/

Krio has the following prenasalized stops:

/mb/, /nt/, /ŋg/, and /ŋk/

Consonants are palatalized and the different types are:

- nasalized palatal glide

  /ny/

- palatalized alveolars

  /dy/, /sy/, /ty/, and /zy/

- palatalized velars

  /gy/ and /ky/

The sound /v/ is realized as /b/ in certain words, for example:

ib 'heave'
oba 'over'
dreb 'drive'
koba 'cover'

The /v/ in final positions is often rendered as /f/, for example, 'move' is pronounced /muf/.

Adjacent consonants are often transposed. This is known as metathesis and examples include:

/ask/ 'ask' is pronounced /aks/
/rɪsk/ 'risk' is pronounced /riks/
/mɒsk/ 'mosque' is pronounced /mɔks/

Although this is irregular, there is evidence of rhoticism in Krio in a word like /bʁitʃ/ 'bleach' in which /l/ is realized as /r/.

Vowels and Diphthongs

Krio has seven pure vowels and the vowels lack corresponding pairs of long and short vowels. It also has three diphthongs, /ai/, /au/, and /ɔi/. Variants of these diphthongs are /ay/, /aw/, and /oy/. Vowels are introduced to replace English diphthongs for example:

/e/ replaces /eɪ/
/o/ replaces /əʊ/

Vowels are added at the end of a word. These are known as paragogic vowels. Examples include:

gladi 'glad'
dede 'dead'
arata 'rat'
lili 'little'

Suprasegmentals

Krio is a tone language whose intonation is influenced by African tonal languages. There are two tones, a

low tone / ˋ/ which is low in all positions and a high tone / ´/. The falling pitch /ˆ/ is used as a realization of the high tone. Tone is syllable-timed and each Krio word or segment has a relevant pitch pattern. Every syllable has a separate tone or relative pitch that is unrelated to stress. The pitch of syllables causes differences in meaning.

See also: Pidgins and Creoles: Overview; Sierra Leone: Language Situation.

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Kriolu *See:* Cape Verdean Creole.

Kripke, Saul (b. 1940)

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American logician and philosopher Saul Kripke was born in Omaha, Nebraska in 1940. Kripke is best known for three contributions to philosophy: he developed a semantics for modal logic and published, at an early age, completeness theorems for propositional modal logic (Kripke, 1959) and modal logic with quantification (Kripke, 1963). Reintroducing the venerable Leibnizian notion of a possible world into philosophy, he reestablished analytical metaphysics as a respectable discipline. His 1970 lectures 'Naming and necessity,' later published as a book under the same title in 1980, had an immense influence on contemporary developments in the philosophy of language.

Kripke forcefully argued, with John Stuart Mill and against Gottlob Frege, that ordinary proper names like 'Aristotle' or 'Kurt Gödel' did not refer via a mediating sense or description, but directly. According to the 'picture' Kripke favors – he refused to call his views a theory – a name 'N' refers to a bearer x when the current use of 'N' can be traced back, via a causal–communicative chain, to an initial baptism episode where 'N' is introduced in the language to refer to x. The conceptual apparatus developed in his semantics for modal logic allowed him to reintroduce the distinction between necessity and contingency (a statement is necessarily true only if it is true in all possible words; contingently true if it is true in a world *w* and false in a world *w*'), and to claim, against a wide orthodoxy, that identity statements flanked by names ('rigid designators') are necessarily true, even though they are empirical discoveries: 'Hesperus, the Morning Star, is identical with Phosphorus, the Evening Star,' is a necessary though *a posteriori* truth.

Kripke applied his semantic theories to natural kind terms ('water' or 'tiger'), claiming that the way we fix the reference of natural kind terms may or may not reveal the essential properties of the substances or species they refer to. Kripke's semantic and metaphysical theories provided a framework in which old questions could be reformulated and new questions could be asked: When is a term a natural kind term? What is necessity? What is the relation between conceivability and possibility? Are physical laws metaphysically necessary?

Philosophy of mind was another area in which his ideas gained a foothold (if an essential property of 'pain' is that it 'feels like pain,' can pains be identical with physical states or events)? Kripke also made interesting contributions to the study of the later Wittgenstein in lectures published as *Wittgenstein on rules and private language* (1982), although his work here has been faulted for being not particularly true to the historical Wittgenstein.

See also: Frege, Gottlob (1848–1925); Leibniz, Gottfried Wilhelm (1646–1716); Mill, John Stuart (1806–1873); Modal Logic; Putnam, Hilary (b. 1926).

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Kroeber, Alfred Louis (1876–1960)

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Alfred Louis Kroeber (Kröber) (1876–1960) was born in Hoboken, New Jersey, on June 11 to upper-middle-class Protestant parents of German ancestry. The family was thoroughly bilingual, with German being spoken at home. During his childhood Kroeber was introduced to Greek and Latin, which made him interested in linguistics. He attended Columbia University, majoring in English (B.A., 1896; M.A., 1897), and took his doctorate there in 1901 under Franz Boas, having presented a 28-page dissertation on 'Decorative symbolism of the Arapacho.'

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Kroeber was awarded five honorary degrees (Yale, California, Harvard, Columbia, and Chicago). In 1946 he received the Huxley Medal of the Royal Anthropological Society. Kroeber was working on a definition of culture, coming to the conclusion that culture is a product of a historical development (*Anthropology* 1948). He employed a strictly cultural approach and method of analysis while dealing with the history of ancient as well as modern societies. He was of the opinion that, due to numerous parallels between biology and cultural anthropology, cultural phenomena have biological roots ('Historical reconstruction of culture growths and organic evolution' 1931). "The basis of Kroeber's point of view may be called the natural history of culture, with strong emphasis on the humanistic features. That is, Kroeber's main endeavor was to identify the distinguishing features of each culture and to assign them to categories based on the procedures of natural history" (Steward, 1973: 25). Kroeber succeeded in identifying culture as an element of nature also, thanks to his extensive ethnographies of California Indians and their languages (*Handbook of the Indians of California*, 1925) as well as his research on the languages of the South American Indians (*Handbook of South American Indians*, Julian Steward (ed.), 1946–1959).

At the age of 24, Kroeber was offered his first professional position with the California Academy of Sciences in San Francisco. Then in 1906 he was made assistant professor at the University of California at Berkeley (associate professor in 1911 and professor in 1919). During his early years in San Francisco, he underwent several traumatic experiences, including the deaths of his wife and of Ishi, the last survivor of the Yahi-Yana and an excellent source of information concerning Native Americans whom Kroeber had transferred to San Francisco and had supported to live at the Museum. Last but not least of Kroeber's hardships was an ear infection, which resulted in permanent loss of hearing in his left ear.

In 1915–1916, taking his sabbatical year, Kroeber traveled in Europe, coming in contact with Freud's school of analysis in Vienna. Returning to California he became a successful psychoanalyst himself; however, he did not forsake anthropology and gave up psychoanalysis. During his lifetime Kroeber published a total of 460 papers, of which 70 at least partly concern linguistics.

See also: Anthropological Linguistics: Overview; Boas, Franz (1858–1942); Freud, Sigmund (1856–1939).

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Kru Languages

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Kru languages are spoken mainly in the forest areas of southwestern Ivory Coast and southern Liberia. Apart from three languages, they form a contiguous block with Kwa languages to their east, Mande languages to their north and west, and Atlantic languages to their west.

Speakers

Reliable population figures are hard to obtain, but it would seem that there are approximately 2 million people who speak one or other of the Kru languages. The three largest language groups are the Guere

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Speakers

Reliable population figures are hard to obtain, but it would seem that there are approximately 2 million people who speak one or other of the Kru languages. The three largest language groups are the Guere

complex (some 400 000 speakers), the Bete complex (approximately 350 000 people), and the Bassa (over 250 000 people).

Kru Studies

Though Sigismund W. Koelle, in 1854, included five Kru languages in his *Polyglotta Africana*, there was little study of these languages until this century. In 1905, Georges Thomann published a grammar of Neyo, but the next substantial work on Kru languages did not appear until 1966, when Gordon Innes published his *Introduction to Grebe* and a Grebe-English dictionary. Subsequently, however, research has begun into many more of the Kru languages, and the work of Marchese (1983, 1986, 1989) has been extensive.

Classification

Greenberg (1963) tentatively included Kru in his Kwa branch of Niger-Congo, but this classification has been rejected by most scholars. Some lexicostatistical studies and the presence of noun class suffixes have suggested that Kru is closer to Gur than to Kwa, though, unlike Gur and Kwa, Kru is nonserializing. More recently, the hypothesis of grouping Kru, Gur, and Adamawa-Ubangi as North Volta-Congo has found increasing acceptance (Williamson and Blench, 2000). However, since systematic lexical study is lacking and in the absence of any conclusive evidence, it seems best to regard Kru as an independent group for the time being.

The Kru languages can be divided into two main groups: eastern and western. Eastern Kru (approximately 500 000 speakers) is spoken exclusively in the Ivory Coast and contains two major subgroups, the Bete complex and the Dida complex. Bete further divides into eastern Bete, spoken in the region of Gagnoa, and western Bete, spoken in a wider area, including Soubre, Guibéroua, Issia, and Daloa. The Dida complex divides into eastern Dida, with six dialects, and western Dida, with two dialect clusters. Kwadia, Bakwe, and Wane are three other eastern Kru languages that do not belong to either the Bete or the Dida complex.

Western Kru (with more than 1 million speakers) is spoken over a considerably larger area compared to eastern Kru and extends from the Sasandra River in the Ivory Coast through southern Liberia. The major division in western Kru is between the Guere complex, Grebo complex, and Bassa. The Guere complex is located in Ivory Coast and comprises some 35 languages/dialects; these may be grouped into four groups: Nyabwa, Wobe, Guere-Krahn, and Konobo. The Grebo complex straddles the Ivory Coast and Liberia border and includes some 25 languages/dialects. In the Ivory Coast, there are two main subgroups: Tepo-Plapo and Pie. In Liberia, there are seven subgroups: Wedebo, Glebo, Jabo, Gedebo, Niaibo, Fopo, and Chedepo. In Liberia, Bassa, with some 15 dialects and some 250 000 speakers, and Klao, with two main dialects, belong to western Kru but lie outside Grebo and Guere.

Three other Kwa languages, Kuwaa, Aizi, and Semɛ, are not grouped with either eastern or western Kru. All three are separate geographically from the rest of the Kru languages. Semɛ is of particular interest since it is located in Burkina Faso, over 300 miles from the nearest Kru language and surrounded by Gur languages. Figure 1, based on work by Marchese, gives a useful summary.

Structural Features

Phonetics and Phonology

Open syllables predominate and words are usually monosyllabic or disyllabic. Vowel sequences occur as do CLV syllables (consonant-L-vowel, where L represents a syllabic l, n, or r). All Kru languages have stops at five points of articulation: bilabial, alveolar, palatal, velar, and labio-velar. A typical Kru vowel system has four front and four back vowels and a central vowel and is marked by vowel harmony with advanced and retracted sets of vowels. Within any one morpheme, only vowels of one set occur.

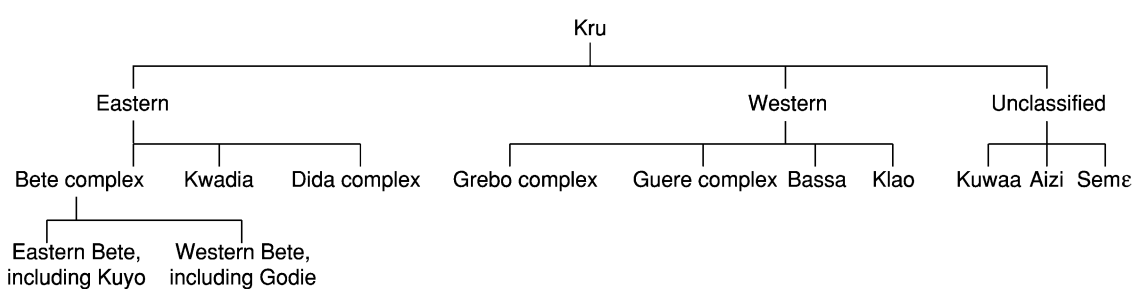

Figure 1 The Kru languages.

Some Kru languages, including Grebo and Krahn, have another type of vowel harmony, with vowels divided into three sets, A, B, and C. Vowels of any one group may cooccur in a morpheme, and vowels of adjacent sets may cooccur. So vowels from set A may occur with vowels from set B, or vowels from set B may occur with vowels from set C, but vowels from set A never cooccur with vowels from set C. Set A consists of i, u, e, and o; set B consists of ɛ, a, and ɔ; and set C consists of ɪ and ʊ.

All Kru languages are marked by three or four levels of register tone, which may carry either lexical and/or grammatical functions. Tone, for instance, may distinguish the imperfective from the perfective and the singular from the plural.

Grammar and Syntax

Kru languages have a subject-verb-object (SVO) basic word order, but when an auxiliary is present this changes to S AUX (IO) (DO) V. Kru languages are suffixing. Plurality is often indicated by an *-i* suffix. A number of Kru languages have remnants of noun class suffixes and a few have noun class concord, with agreement between the head and its modifiers. Possessives precede nouns, and body parts function as postpositions indicating direction. Genitives precede nouns, but most modifiers follow their heads.

Kru languages have a basic aspectual system with imperfective and perfective forms marked by suffixes. Progressive and perfect forms are often marked by an auxiliary and so too are conditionals and potential futures. Negation is also frequently signaled by an auxiliary or a particle, though in some languages tone and word order are involved.

See also: Ivory Coast: Language Situation; Kwa Languages; Liberia: Language Situation; Liberia: Language Situation; Mande Languages.

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Kruisinga, Etsko (1875–1944)

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Etsko Kruisinga was born in Leens, the Netherlands, on December 8, 1875, the son of a merchant. He studied Dutch and English at the University of Groningen, graduating with a *kandidaats* degree (approximately a B.A.) in Dutch philology in 1897, as English at the time had not yet been accepted as an academic degree subject in the Netherlands. After passing additional teacher training examinations (M.O. A and B), Kruisinga went on to teach English and Dutch at a number of secondary schools, until he was pensioned off for health reasons at the age of 48. In 1904, he obtained a doctorate from the University of Bonn for his dissertation on the West Somerset dialect. When the Dutch university statute was changed, enabling students to take degrees in foreign languages, Kruisinga was among the first to obtain a doctorate in English from the University of Amsterdam, in 1922.

Although recognized as a major Anglicist by his contemporaries, Kruisinga was never offered a salaried position at a Dutch university. In addition to his career as a schoolteacher, he worked as an unsalaried lecturer at the University of Utrecht from 1909–1915 and was a driving force in language-teacher training. In 1911, he was one of the founders of the Dutch Association of Modern Language Teachers (*Levende Talen*), and in 1922 he became a lecturer at a private teacher training institution in the Hague, the Modern Language Association (*Vereniging Modern Talen*), later called the School of Linguistic and Literary Studies (*School voor Taal- en Letterkunde*). Here he was appointed principal in 1931 and accepted a controversial professorship in 1936.

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Throughout his career Kruisinga published an astonishing number of articles, reviews, and books. Together with R. W. Zandvoort, in 1919 he stood at the cradle of the foremost Dutch journal for Anglicists, *English Studies*, which he edited and to which he contributed a series of articles on syntax, among other things. Kruisinga's publications range from phonetics and phonology to English cultural history and editions of literary works. His major contributions to linguistics are in the field of English syntax, notably word groups. Kruisinga's work forms a break with tradition in that he increasingly questioned the relevance of philology at a time when a historical approach was the norm. Thus, for example, in his multivolume *A grammar of present-day English*, which saw numerous later editions as *A handbook of present-day English* and covers syntax, idiom, phonetics, and historical linguistics, the volumes dedicated to syntax draw on authentic sentences from sources such as Thomas Hardy, Elizabeth Gaskell, and the *Times* of London.

In Kruisinga's view, classical languages and the historical study of English did not offer suitable tools for analyzing these samples of a living language. He favored and developed a practical framework, modeled on the language that was to be analyzed, without redundant categories dictated by philology.

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Kruszewski, Mikotag Habdank (1851–1887)

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Though Külpe also published on epistemology, logic, and ethics, he is best known as the leading figure of the Würzburg School. He had many prominent researchers among his students, notably Karl Bühler. Influenced by Machian positivism, his *Outlines of psychology* (1893) still classified psychology among natural sciences, proposing to widen experimental methods to upper mental processes (judgment, knowledge, understanding), and thus rejecting some of Wundt's main principles (such as sharing between 'immediate' and 'mediate' experience, the concept of 'psychic causality,' and the strict limitation of the experimental field).

The break-off remained on other grounds after 1896, when Külpe began his experiments on 'systematic self-observation,' according to which subjects had to solve cognitive problems but were also asked to describe the psychic processes happening within themselves. This departure from the careful experimental control over introspection advocated by Wundt was first supposed to reveal 'elements' of thinking similar to those of sensation and feeling. However, as no such elements were found, it finally brought about the inverse conclusions that thought processes could not be explained as resulting from associative connections between images alone, that objective meanings could be experienced without being embodied by specific words or symbols, and thus that imageless factors (e.g., in the form of rules) could therefore determine thought processes. Conversely, Külpe's concept of *Bewusstheit* ('awareness') emphasizes the fact that the meanings of abstract words can be discovered in consciousness even when only these words themselves are perceivable entities. Other experiments stressed the influence of predispositions to respond to stimuli in such and such manner. Külpe drew the conclusion that the process of abstraction depends not only on the material presented to sensation but also on apprehension by the subject, hence abandoning the sensationalist psychology of contents for a psychology recognizing both contents (*Gedanken*) and acts of mind (*Denken*), close to Husserl and Brentano.

See also: Bühler, Karl (1879–1963); Husserl, Edmund (1859–1938); Wundt, Wilhelm (1832–1920).

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Kumyk *See:* Turkic Languages.

Kunihiro, Tetsuya (b. 1929)

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Tetsuya Kunihiro was born in the city of Ube, Yamaguchi Prefecture, Japan, on July 23, 1929. He graduated with an M.A. in 1954 from the University of Tokyo and received his D.Litt. in 1979 from the same university. After teaching English at Hagi Senior High School in Yamaguchi Prefecture from 1954–1959, he was appointed lecturer in English linguistics at the University of Shimane in 1959 and associate professor in 1964. In 1967 he moved to the University of Ibaraki and in 1968 to the department

Though Külpe also published on epistemology, logic, and ethics, he is best known as the leading figure of the Würzburg School. He had many prominent researchers among his students, notably Karl Bühler. Influenced by Machian positivism, his *Outlines of psychology* (1893) still classified psychology among natural sciences, proposing to widen experimental methods to upper mental processes (judgment, knowledge, understanding), and thus rejecting some of Wundt's main principles (such as sharing between 'immediate' and 'mediate' experience, the concept of 'psychic causality,' and the strict limitation of the experimental field).

The break-off remained on other grounds after 1896, when Külpe began his experiments on 'systematic self-observation,' according to which subjects had to solve cognitive problems but were also asked to describe the psychic processes happening within themselves. This departure from the careful experimental control over introspection advocated by Wundt was first supposed to reveal 'elements' of thinking similar to those of sensation and feeling. However, as no such elements were found, it finally brought about the inverse conclusions that thought processes could not be explained as resulting from associative connections between images alone, that objective meanings could be experienced without being embodied by specific words or symbols, and thus that imageless factors (e.g., in the form of rules) could therefore determine thought processes. Conversely, Külpe's concept of *Bewusstheit* ('awareness') emphasizes the fact that the meanings of abstract words can be discovered in consciousness even when only these words themselves are perceivable entities. Other experiments stressed the influence of predispositions to respond to stimuli in such and such manner. Külpe drew the conclusion that the process of abstraction depends not only on the material presented to sensation but also on apprehension by the subject, hence abandoning the sensationalist psychology of contents for a psychology recognizing both contents (*Gedanken*) and acts of mind (*Denken*), close to Husserl and Brentano.

See also: Bühler, Karl (1879–1963); Husserl, Edmund (1859–1938); Wundt, Wilhelm (1832–1920).

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His main field of work is descriptive semantics, especially in the field of lexical and grammatical analysis of Japanese and English. His work on the contrastive study of Japanese and English (Kunihiro, 1967) was pioneering in this field, and he has edited five volumes on the same theme (Kunihiro, 1980). He has also compiled an excellent English–Japanese dictionary as chief editor. As a perceptive analyst of word meaning, he has produced with his colleagues, three volumes on the meaning of basic Japanese words.

By developing the theory of sememics, originated by his teacher Shiro Hattori (*see* **Hattori, Shiro (1908–1995)**), he has established his own theory and descriptive method of lexical meaning with an emphasis on the cognitive aspect and the situational context of the speech event.

See also: Hattori, Shiro (1908–1995); Japan: History of Linguistics; Japanese; Lexical Semantics: Overview.

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Kurath, Hans (1891–1992)

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Hans Kurath was born on December 13, 1891, in Villach, Austria, and died in Ann Arbor, Michigan, on January 2, 1992. Kurath came to the United States in 1907, becoming an American citizen in 1912. He was educated at the German-American Teachers Seminar in Milwaukee, Wisconsin, and the Universities of Wisconsin, Texas (A.B. 1914), and Chicago (Ph.D. 1920). Kurath taught German at the University of Texas from 1914 to 1916, and from 1917 to 1919, and taught from 1920 to 1927 at Northwestern University. In 1927 he became professor of German and linguistics at Ohio State University, and in 1930 he was named director of the Linguistic Atlas of the United States. He left Ohio State for Brown University in 1931, where he served as professor of Germanics and linguistics, as well as chair of the department of German and the division of modern languages. In 1946, he became professor of English and editor of the Middle English Dictionary (hereafter MED) at the University of Michigan. Kurath was president of the Linguistic Society of America in 1942 and directed the society's summer Linguistic Institutes from 1947 to 1950. He was the recipient of various scholarly honors; he received honorary doctorates from the University of Chicago and the University of Wisconsin at Milwaukee, as well as the University of Michigan Press Book Award in 1972 for the MED (which he shared with his successors as editor). The esteem his students and colleagues held him in is evident from the volume of papers dedicated to him (Scholler and Reidy, 1973). Kurath retired from Michigan in 1962 but remained scholarly active until his death.

Kurath had a major effect on two fields of linguistics: dialectology and lexicography. His dialect work was rigorously based on Neogrammarian ideas about sound change and resembled similar European projects in issues like choice of linguistic consultants. In addition to directing the Linguistic Atlas project, Kurath published numerous groundbreaking works in this area (e.g., Kurath [1972] and Kurath and McDavid [1961]), a number of his fieldworkers later became prominent dialectologists in their own rights, and the data collected under his direction continue to be useful to dialectologists and sociolinguists. His lexicographical work is also substantial. Ironically, given the overwhelmingly positive reception of the MED, there was some resistance to his

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Kurdish

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The Kurdish language belongs to the Iranian language family. It is spoken mainly in eastern Turkey, Syria, northern Iraq, western Iran, and Central Asia. Today there are large communities of Kurds living in the diaspora, for instance, Germany and Scandinavia. Kurdish is spoken in three main variants: Northern Kurdish, comprising Kurmanji in the west and dialects spoken from Armenia to Kazakhstan; Central Kurdish, spoken in northeastern Iraq (called Sorani) and adjacent areas in Iran (called Kordi or Mokri), as well as in Iranian Kurdistan (called Senne'i); and Southern Kurdish, spoken in Kermanshah province in western Iran (including Lakki and Lori of Posht-e Kuh). Northern and Central Kurdish developed rich literatures from the early 20th century on.

The earliest grammar and vocabulary of Kurdish were prepared by the Catholic missionary Maurizio Garzoni and published in 1787; these were used in subsequent scholarly descriptions of Kurdish. The earliest modern 20th-century studies were those of Oskar Mann and Karl Hadank. The first important post-World War II study, applying modern linguistic methods, was that of D. Neil MacKenzie (1961–1962).

Literary Kurdish in Iraq, Iran, and the former Soviet Union is written in the Arabo-Persian script, but employs a circumflex accent ^ placed above or below letters to mark non-Persian sounds: above *w* and *y* it denotes *majhul* vowels (*ō*, *ē*, contrasting with *ū* and *ī*), above *l* it denotes *ł*, and below *r* it denotes the rolled *r* as opposed to the single-flap *r*. Kurdish in the USSR was also written in the Cyrillic script, with the addition of several signs and diacritics. Kurmanji Kurdish is today written in the Latin alphabet with Turkish orthography, thus <c> = j̆, <ç> = *č*, <ş> = *š*, <j> = *ž*. In addition, a circumflex accent denotes long vowels and an umlaut on <x> denotes the voiced ɣ. In this script, <e> and <a> represent the vowels commonly transcribed as *a* [a > ɛ] and *ā* [a: > *a*:].

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The Kurdish dialects have very complex phonologies, morphologies, morphophonologies, and syntax, of which no idea can be given in a small space. Proto-Kurdish had two genders, masculine and feminine, two numbers, and two cases, direct and oblique, as well as a vocative. These are preserved in Northern Kurdish, but gradually merge into a no-gender, no-case system as one moves southward (cf. the 1st sing. personal pronoun 'I, me': NK DIR *az* ~ OBL *min*, CK *(a)min*, SK *amin*). All three groups have an indefinite suffix going back to **-ēk* 'one', while Central and Southern Kurdish have a definite suffix going back

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to *-*aka* (-*ak*). The 3rd singular enclitic pronoun is -*ī*, pl. -*yān* (cf. Persian -*eš*, -*ešān*). The 1st and 2nd plural enclitic pronouns are archaic: 1PL -*n*, 2PL -*ū* (beside -*mān* and -*tān*), which go back to Old Iranian **nah* and **wah*. The ezafe has two genders and two numbers, but is simplified according to the general tendency.

The verbal systems are of the typical modern Iranian type, with a three-stem system: present-imperfect, past, and perfect, as well as a split ergative. The present and imperfect take the prefixes NK *t-/di-*, CK *a-/da-*, SK *a-/mi-* (cf. Persian *mi-*) to express progressive tense. Present forms without a prefix or with the prefix *bi-* are subjunctive. The past tenses are ergativic, but only Northern Kurdish has the pure passive type construction (1).

(1) ta az nās kir-im
you.SING.OBL *I*.DIR *familiar* *do*.PAST-1ST.SING
'you knew me'

In Central and Southern Kurdish, where there is no case distinction, the agent is expressed by enclitic pronouns. If the verb has a preverb, the enclitic pronouns come after it (2), otherwise they come between the verb stem and the ending (3).

(2) a-t xwārd
PROG-*you*.AGT *eat*.PAST[-3SG]
'you were eating'

(3) nārd-it-īn
send.PAST-*you*.AGENT-COP.1PL
'you sent us'

Note constructions of the type in (4), where the apposition *pēwa* 'about' governs the person implicit in the copula -*īt* 'you are'; (5), where 'to' governs the pronoun implicit in the copula -*n*- 'you are'; and (6), where 'to' governs the pronoun implicit in the copula -*m*- 'I am'.

(4) xaw-im pēwa dīw-īt
dream-1SG.ENCL *about* *see*.PAST-COP.2SG
'I dreamed about you'

(5) dā-m-ī-n-ē
give.PAST-COP.1SG-*he*.ENCL.OBL-*cop*.2PL-*to*
'he gave me to you'

(6) kitēb-ek-ān-it dā-m-ē
book-DEF-PLUR-*you*.AGT *give*.PAST-COP.1SG-*to*
'you gave me the books'

In Northern Kurdish, the passive is formed with the auxiliary *hāt*-'come' + INF (7).

(7) hāt-iye girt-in
come.PERF[-3SG] *seize*.PAST.INF
'has been seized'

Central and Southern Kurdish have passive formations in present *rē*- or *yē*-, past-*rā*- or -*yā*- (*kuž-yā*- 'be killed'; *de-nūs-rē* [PROG-write.PRES-PASS.PRES. [-3SG]] 'it is being written').

Derivational nominal suffixes are common, as are a variety of types of compound. The meaning of verbs can be modified by preverbs, of which there are many, or the postverb -*ava-/-awa* (-*āw*), unique to Kurdish among Iranian dialects (*hāt-in* [come.INF] 'to come', but *hāt-in-āw* 'to come back, return'. Verbal idioms consisting of adjectives or nouns plus verbs are common, as in all Iranian languages.

See also: Armenia: Language Situation; Iranian Languages; Iran: Language Situation; Kazakhstan: Language Situation; Persian, Modern; Turkey: Language Situation.

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Kurukh

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Introduction

Kuṛux is one of the tribal languages of the Dravidian family with a population of about 1.5 million; thus it is next only to Gondi within the family in terms of number of speakers. The name of the language is spelt also as Kurukh; another name, Oraon, was also in use in earlier times. The main concentration of Kuṛux speakers is found in Chota Nagpur and Bhagalpur districts of Bihar, India; some of them live also in Madhya Pradesh (Raygarh and Sarguja districts) and Orissa (Sundargarh and Sambalpur districts). Some have migrated in recent times to the tea districts of Assam and Nepal and are known there as Dhāngar/Dhangar 'men who receive dhān "rice" as wages'. It belongs to the North Dravidian subgroup along with Malto, its closest ally, and Brahui.

Phonology

Kuṛux contains the ten-vowel system that is normally found in the Dravidian languages (see Table 1); there are also a few words with nasalized vowels, e.g., *khẽ:sõ* 'blood'. Its consonant system is presented in Table 2. The velar voiceless fricative (x) and the glottal stop (ʔ) are the peculiar features of Kuṛux phonology, e.g., *xay* 'wife', *ciʔinā* 'to give'.

Syntax

Word Classes

The following word classes may be recognized for Kuṛux: nouns (including pronouns and numerals), verbs, adjectives, adverbs (including expressives), particles, and interjections.

The class of adjectives is a small one. An adjective occurs before the noun it qualifies. Most of the nouns can function as adjectives, for example:

Table 1 Vowels of Kuṛux

	Front		*Central*		*Back*	
	Short	*Long*	*Short*	*Long*	*Short*	*Long*
High	i	ī			u	ū
Mid	e	ē			o	ōō
Low			a	ā		

mechā	partā
high, height	*mountain*

'high mountain'

The adjectives derived from the three deictic bases (see 'Pronouns') show agreement for number (but not for gender) with the noun that follows. Thus, *ā* 'that', *ī* 'this' and *ū* 'that at a greater distance' are used with a singular noun, e.g., *ā/ī/ū ālas* 'that/this/that (extra-dist.) man'. The corresponding forms used with a plural noun are *abṛā*, *ibṛā*, and *hubṛā*, e.g., *abṛā/ibṛā/hubṛā āl-ar* 'those/these/those (extra-dist.) men'. (For verbal adjectives, see 'Nonfinite Verbs').

An adverb occurs before the verb, for example:

ād	xanem	xanem	bar-ckī	raʔī
she	*again*	*again*	*come-past*	*was*

'She came frequently.'

Adverbs may be divided into those of (a) time (e.g., *cērō* 'yesterday', *innā* 'today', *nēlā* 'tomorrow'), (b) place (e.g., *mund* 'before, in front', *iyā* 'here', *ayā* 'there', *eksan* 'where'), and (c) manner (e.g., *baggī/baggū* 'much', *oṇṭā oṇṭā* 'separately, one by one', *dav/davdim* 'well').

The particle of emphasis is a good example for particles. It is *+m/im/am/em*, e.g., *nēla+m* 'tomorrow itself' (: *nēlā* 'tomorrow'), *ēn-im* 'even I', *ār-im* 'even they'.

Examples for interjections include: *haʔī* 'yes', *mal/malʔā/mallā* 'no', *anti(jē)* 'of course'.

Word Order

The favored word order in Kuṛux is S(ubject) O(bject) V(erb):

ās	eŋg-āgē	mandar	ci-c-as
he	*I-DAT*	*medicine*	*give-PAST-3M.SG*

'He gave me medicine.'

Table 2 Consonants of Kuṛux

	L	*D*	*R*	*P*	*Vel*	*G*
Stop						
VL	p	t	ṭ	c	k	ʔ
VLA	ph	th	ṭh	ch	kh	
VD	b	d	ḍ	j	g	
VA	bh	dh	ḍh	jh	gh	
Nasal	m	n			ŋ	
Fricative		s			x	h
Lateral		l				
Trill		r				
Flap			ṛ			
Semivowel	w			y		

(Abbreviations: D = dental, G = glottal, L = labial, P = palatal, R = retroflex, VD = voiced (unaspirated), VA = voiced aspirated, Vel = velar, VL = voiceless (unaspirated), VLA = voiceless aspirated.)

Gender and Number

Kuṛux shows a two-way distinction in gender but the classification differs in the singular and the plural; the feminine goes with the nonhuman in the singular but with the masculine in the plural, as illustrated by the following pronouns:

āS
'he'
ād
'she, it'
ār
'they (human)'
abṛā
'they (nonhuman)'.

Agreement

The finite verb shows agreement with the subject pronoun (or a corresponding noun in the case of the third person) by a change in the personal suffix (the final morpheme in the forms shown in Table 3). In equational sentences, the predicate noun shows agreement with the subject pronoun by taking the same personal suffixes as the finite verb (except 3rd non-m. sg./non-hum. pl. [see 'Finite Verbs']). The use of the copular verb (*tal-* 'to be') in such sentences is optional. Kuṛux partially preserves the old Dravidian feature of the absence of the copular verb:

ēn	kuṛux-an	(tal-d-an)
I	*Kuṛux-1sg*	*(be-pres-1sg)*

'I am a Kuṛux (speaker).'

ēm	kuṛux-am	(tal-d-am)
we (excl.)	*Kuṛux-1pl.excl*	*(be-pres-1pl.excl)*

'We (excl.) are Kuṛux (speakers).'

For agreement between the demonstrative adjectives and the nouns qualified with regard to number, see 'Word Classes.'

Table 3 The finite forms of ijʔ- 'to stand'

	Pronoun	*Past tense*	*Present tense*	*Future tense*
1sg.	ēn	ij-k-an	ij-d-an	ijʔ-o-n
1pl. (excl.)	ēm	ij-k-am	ij-d-am	ijʔ-o-m
1pl. (incl.)	nām	ij-k-at	ij-d-at	ijʔ-o-t
2sg.	nīn	ij-k-ay	ij-d-ay	ijʔ-o-y
2sg. (f.)		ij-k-i	ij-d-i	ijʔ-o-y
2pl.	nīm	ij-k-ar	ij-d-ar	ijʔ-o-r
3m.sg	āS	ijj-Ø-as	ij-d-as	ijʔ-o-s
3h.pl.	ār	ijj-Ø-ar	ij-n-ar	ijʔ-o-r
3non-m.sg./ non-h.pl.	abṛā	ijj-Ø-a	ijʔ-i	ijʔ-o-Ø

Noun Morphology

A nominal base is followed by the plural suffix when plurality has to be expressed; the case suffix/postposition occurs at the end. A masculine noun may take the definite suffix *-as*, e.g., *āl* 'man', *āl-as* 'a particular man'.

Plural Suffixes

The plural suffix for the human nouns is *-ar*, e.g., *āl-ar* 'men', *mukk-ar* 'women' (sg. *mukkā*). Some feminine nouns take *-guṭhi-ar*, e.g., *ālī-guṭhi-ar* 'wives'; *-guṭhi (-ar)* is also added optionally to human nouns with *-ar* plural, e.g., *āl-ar(-guṭhi(-ar))* 'men'. Kinship terms, however, take *-baggar*, e.g., *dādā-baggar* 'elder brothers'. The word *xadd-xarrā* 'children' seems to contain another plural suffix *-xarrā*. Nonhuman nouns optionally add *-guṭhī*, which in origin is a separate word meaning 'group', to form the plural, for example:

mūnd	aḍḍō(-guṭhī)
three	*ox-PL*

'three oxen'

eṇḍ	man(-guṭhī)
two	*tree-PL*

'two trees'.

Case Suffixes and Postpositions

The nominative is unmarked. When a noun is used in the vocative, *-ō/-ay(ō)* is added to it at the end; the vocative form may be preceded by *ē/ana* (but *anay* when a woman is addressed), e.g., *ē/ana urb-ay(ō)* 'O master!', *anay mukk-ay* 'O woman!'. Further, when women talk to women, *anay* is replaced by *ān/anē*, e.g., *ān xay* 'O daughter!', *anē xay-guṭhi-ar-ō* 'O daughters!'.

The accusative suffix is *-an* after a consonant and *-n* after a vowel, e.g., *āl-an* 'man (accus.)', *mukka-n* 'woman (accus.)' (: *mukkā* 'woman') but it is *-in* after the definite suffix *-as* (in masculine nouns, e.g., *āl-as-in* 'the man (accus.)', the plural *-ar* (e.g., *āl-ar-in* 'men (accus.)') and after a demonstrative pronoun that ends in a consonant, e.g., *ād-in* 'her, it (accus.)'.

The instrumental suffix is *-trī/-trū*, e.g., *āl-trī* 'by the man'.

The dative uses the postposition *+gē* (variant *+ā(gē)* after a pronoun), e.g., *āl+gē* 'to the man', *eŋg-ā(gē)* 'to me'.

The ablative suffix is *-tī* after a consonant, *-ntī* after a vowel; after the plural *-ar*, *-tī* freely varies with *-intī*, e.g., *āl-tī* 'from the man', *mukka-ntī* 'from the woman', *āl-ar-tī /āl-ar-intī* 'from the men'.

The genitive commonly uses the postposition *+gahi*, e.g., *āl + gahi* 'of the man'; it has the variant

+*hay* after a pronoun, e.g., *eŋg* + *hay* 'my'. However, nouns denoting a place take the suffix *-ntā*, e.g., *padda-ntā* 'of the village' (: *paddā* 'village').
The locative uses the postposition +*nū* (also +*nō* dialectally), e.g., *eṛpā* + *nū* 'in the house'.

Pronouns

Two important features of the pronominal system of Kuṛux are the presence of inclusive and exclusive distinction in the first person pronoun (represented also in the finite verb) and the formation of the third person pronouns on three deictic bases.
The personal pronouns are:

ēn 'I'	ēm 'we (excl.)'
	nām 'we (incl.)'
nīn 'you (sg.)'	nīm 'you (pl.)'

The third person pronouns are formed on the three deictic bases *a-/ā-* (distant), *i-/ī-* (proximate) and *hu-/hū-* (extra-distant):

Distant	Proximate	Extra-distant	
ā-s	ī-s	hū-s	'he'
ā-d	ī-d	hū-d	'she, it'
ā-r	ī-r	hū-r	'they (hum.)'
a-bṛā	i-bṛā	hu-bṛā	'they (non-hum.)'

The reflexive pronouns are *tān* (sg.) and *tām* (pl.).
There are five interrogative pronouns: *nē* 'who', *ēkā* 'who, which', *endr/endrā/ēkdā* 'what, which'. The addition of the particle +*ʔim/ʔam* to an interrogative pronoun converts it into an indefinite pronoun, e.g., *nīk*+*ʔim* 'someone'.

Numerals

Kuṛux retains the Dravidian numerals only up to 4 and the rest are borrowed from Hindi. The native numerals have also preserved a distinction between nonhuman and human (the variants given in parentheses for the human forms occur before case suffixes and postpositions).

	Nonhuman	Human
'1'	oṇḍ/oṇṭā	ort
'2'	eṇḍ/e:ṇḍ	irb (irbar-)
'3'	mūnd	nub (nubar-)
'4'	nāx	naib (naibar-)

The human numerals are generally followed by the classifier *jhan-ar* 'persons' (sg. *jhan*), for example:

nub	jhan-ar	bar-c-ar
three (h.)	*CLASSIF*	*come-PAST-H.PL.*

'Three men came.'

The counting is done in terms of 'score' for which the word is *kūrī/bīsoʔe*, *oṇḍ kūrī/bīsoʔe* 'one score', *kūrīeṇḍ* or *eṇḍ bīsoʔe* 'two score', etc. The ordinal is formed by adding *-(an)-tā* to a cardinal, e.g., *eṇḍ-(an)tā* 'second'; however, there is a special word for 'first': *mund-(an)tā*.

Verb Morphology

Female Speech

An important characteristic feature of the Kuṛux verb morphology is the use of special forms by women when they talk among themselves; some of the tense and personal suffixes in women's speech are different from those in men's speech:

(Men's speech)	nīn	ekātarā	kaʔa-d-ay
(Women's speech)	nīn	ekātarā	kaʔa-d-ī
	you (sg.)	*where*	*go-PRES-2SG*

'Where are you (sg.) going?'

Verb Bases

A verb base in Kuṛux may be simple or complex. Four types may be recognized among the complex bases:

1. Intransitives or reflexives derived from transitives by the addition of *-r-*, e.g., *kol-r-* 'to be opened' (: *kol-* 'to open'), *mūjh-r-* 'to wash one's own face' (: *mūjh-* 'to wash another's face').
2. Transitives derived from intransitives by the addition of *-aʔa-*, e.g., *maṛx-aʔa-* 'to make dirty' (: *maṛx-* 'to be dirty').
3. Causatives derived from transitives by the addition of *-tāʔa-*, e.g., *es-tāʔa-* 'to cause to break' (: *ess-*'to break').
4. Reciprocals derived by the addition of *-nakr-* to a simple verb base, e.g., *ēr-nakr-* 'to look at each other' (: *ēr-* 'to see'), *kēb-nakr-* 'to abuse one another' (: *kēb-* 'to abuse').

Finite Verbs

A finite verb has the following structure:

Verb Base + Tense Suffix + Personal Suffix

The personal suffixes are:

1st sg.	-an
1st pl. (excl.)	-am
1st pl. (incl.)	-at
2nd sg.	-ay /(female speech) -i
2nd pl.	-ar
3rd m. sg.	-as
3rd hum. pl.	-ar
3rd non-m. sg./ non-hum. pl.	-a (after past)/ -i (after present)

The vowel of all these suffixes is deleted after the future suffix *-o*. Three tenses, past (suffixes: *-k-*,*-ck-*), present (suffixes: *-d-*, *-n-*) and future (*-o-*) are there (see Table 3).

Unlike its counterpart in the sister languages, the imperative in Kuṛux has only one form without distinction between the singular and the plural. The suffix is *-ā* when men are addressed and *-ay* when women are addressed (when women speak to women, the suffix is *-ē*): *esʔ-ā/-ay/-ē* 'Break!'. A milder sort of the imperative has the suffix *-kē*, e.g., *bar-kē* 'Come (if you please)!'.

Nonfinite Verbs

The infinitive, which can also function as a noun and an adjective, has the suffix *-nā* (also *-ā* in certain constructions), e.g., *es-nā/esʔ-ā* 'to break, breaking'.

The present participle has the suffix *-nū(tī)/-num*, e.g., *es-nū(tī)/es-num* 'breaking'.

The past participle has the suffix *-ār*, e.g., *esʔ-ār* 'having broken'.

There are three types of adjectives derived from verb bases:

- The infinitive with adjectival function:

kūr-nā	amm
burning	*water*
'hot water'	

- Past adjective with the suffix *-ckā*:

ke-ckā	āl-ar
die-PAST ADJ	*man-PL*
'dead people'	

- Agent noun (see *Agent Noun*) functioning as nonpast adjective:

pāṛ-ū/ pāṛ-nā	pellō
sing-NON-PAST.ADJ	*girl*
'singing girl'	

Agent Noun

The agent noun, with the suffix *-ū* can also take the masculine and the plural suffixes, e.g., (from *esʔ-* 'to break')

isʔ-ū	'one who/which breaks'
isʔ-u-s	'a man who breaks'
isʔ-u-r	'persons who break'

Negative Verb

Kuṛux employs the verb base *mal-* 'to be not' in the present tense (with *-y-* and *-k-* as optional variants of the regular present suffixes *-d-/-n-* [see Table 3]) as the negative verb to deny the identity of the subject and the predicate noun phrases, for example:

ēn	bēl-an	mal-d-an/mal-y-an/mal-k-an
I	*king-1SG*	*not.be-PRES-1SG*
'I am not a king.'		

See also: Dravidian Languages; India: Language Situation.

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Jerzy Kuryłowicz was born in the city of Stanislau in 1895, which at that time was part of the Austro–Hungarian Empire, and is now known as Ivano–Frankivs'k in Ukraine. He studied foreign languages while he was both a secondary school student and while studying for his first university degree in Vienna. His university studies were interrupted by the outbreak of World War I, when Kuryłowicz was drafted for military service. He was injured in the war and spent some time recovering from his injuries in a Russian hospital, where he is said to have perfected his knowledge of Russian; he also became interested in language loss among aphasia patients. In 1920, he pursued graduate studies in Romance and Germanic

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philology at the Jan Kazimierz University in Lvov. At that time he also became interested in Indic studies under the tutelage of Andrzej Gawronski, and in Semitic studies with Zygmunt Smogorzewski and Mojzesz Schorr.

He completed his doctorate within three years, and thereafter traveled to Paris on a scholarship from the French government to continue his studies in Romance linguistics. In Paris he attended lectures of the eminent Indo–Europeanist, Antoine Meillet, and under Meillet's influence, Kuryłowicz shifted his main interests from Romance linguistics to comparative Indo–European. In this period, he analyzed the Cuneiform Hittite texts, and through these texts was able to confirm Saussure's 1879 postulations regarding Indo–European laryngeals. This discovery sparked further interest in the study of Indo–European phonology. For his postdoctoral studies in France, Kuryłowicz received a diploma from the *Ecole Pratique des Hautes Etudes*.

Kuryłowicz returned to Poland in 1928 to take up a professorial post at the Jan Kazimierz University of Lvov. In the 1930s, he regularly presented at scholarly linguistic conferences in Europe, and in 1931 received a Rockefeller scholarship, which took him for an academic year to Yale University in the United States. That same year, he was elected a corresponding member of the Polish Academy of Arts and Sciences, and he became a full member of the Academy in 1938. He spent World War II in Lvov during both the Soviet and Nazi occupations. After the war, Lvov became part of the USSR, and Kuryłowicz moved to the devastated city of Wrocław (Breslau before the war) in 1946, where he became a professor at the University of Wrocław. In 1948, he was appointed a professor at the Jagiellonian University in Cracow, where a chair of general linguistics was created for him. He remained in this post until his retirement in 1965.

In his first eight years in Cracow, the entire Polish educational system came under severe pressure due to Stalinization. Departments of English and other west European languages were abolished, and scholars were prohibited from maintaining contacts with or traveling to the West. Nevertheless, this period proved to be a highly productive one for Kuryłowicz. After travel restrictions were relaxed in 1956, Kuryłowicz worked to reestablish departments of English and other Western languages, and rebuilt strong links with linguists in western Europe and the United States. He received several honorary doctorates in the 1960s and 1970s and was a visiting professor at both Harvard University and the Massachusetts Institute of Technology. In 1964, he organized a symposium at the Jagiellonian University in Cracow in honor of the institution's 600th anniversary. The symposium was dedicated to the 'Notion of law in linguistics'; his own paper focused on the laws of isomorphisms. Kuryłowicz remained an active scholar until his death in 1978; he wrote 4 books in retirement and approximately 80 scholarly articles.

Kuryłowicz was a prolific scholar, and his works covered topics in Indo–European, Germanic, Romance, Semitic, and Slavic linguistics, as well as general linguistics. In his early works, he accepted principles of structural linguistics in his analysis of diachronic linguistic material, and he was an admirer of the work of the Prague linguistic circle. In 1948, he brought such a structurally oriented theory of language to Cracow, inspiring a generation of students there, and making Cracow the strongest center for linguistics in Poland. In the interwar period, Kuryłowicz made significant contributions to the study of Indo-European through his work on the Hittite texts. He published his first monograph in 1935, *Etudes indoeuropéennes* ('Indo–European studies'). After World War II, he focused on the accentuation of Indo–European languages and the issue of apophony (ablaut) in Indo–European languages. He became particularly interested in the subject of linguistic analogy in the historical development of languages, and elaborated upon what he considered to be a series of laws for linguistic analogy. In the 1960s, he gained inspiration through his contacts with Roman Jakobson and Morris Halle, who sparked his interest in the subject of inflectional categories. After his retirement, he strove to produce a definitive Indo–European grammar in cooperation with some other linguists. He produced one volume in this series, focusing on Indo–European accentuation and ablaut (1968).

See also: Halle, Morris (b. 1923); Jakobson, Roman (1896–1982); Meillit, Antoine (Paul Jules) (1866–1936); Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism.

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Kuwait: Language Situation

Editorial Team

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On the northwestern coast of the Persian Gulf, Kuwait shares borders with Iraq and Saudi Arabia. Kuwait's modern history began in the early 18th century, when several clans from the Al Aniza tribe migrated to the northern shore of the Gulf from the Najd, their famine-stricken homeland in central Arabia. Eventually, the Al Sabah emerged as the dominant clan, and its members were formally established as rulers in 1756. By the late 19th century, however, fears of growing Ottoman influence led Sheikh Mubarak Al Sabah to enter into an agreement with Great Britain, which effectively established Kuwait as an autonomous British protectorate. Under the 1899 agreement, Kuwait maintained control over its internal affairs, and Great Britain assumed responsibility for the country's security and foreign relations. By the 1960s, Kuwait enjoyed such a level of economic development that it became one of the wealthiest states on a per capita basis, and in 1961 Kuwait gained full independence from Britain. For a brief period, between 1990 and 1991, Kuwait was under Iraqi control, but the Iraqi army was defeated by United Nation forces.

The official national language of Kuwait is Standard Arabic, a modernized variety of Classical Arabic. The latter, with its archaic vocabulary, is used for religious and ceremonial purposes, whereas Standard Arabic is employed in formal situations, for education, and for official purposes and is the language of the press. In the Arabic-speaking world, only the well educated have adequate proficiency in Standard Arabic; in Kuwait, the literacy rate among men is 85.1% and among women is 81.7%. About 85% of the population uses Gulf Spoken Arabic to communicate. Mehri, a South Arabian language, is used by some 3530 Kuwaitis. In addition, English is widely spoken, and both television and radio broadcasts are often in English. There is one institution in Kuwait for all its 110 285 deaf inhabitants.

See also: Arabic.

Kwa Languages

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Kuwait: Language Situation

Editorial Team

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On the northwestern coast of the Persian Gulf, Kuwait shares borders with Iraq and Saudi Arabia. Kuwait's modern history began in the early 18th century, when several clans from the Al Aniza tribe migrated to the northern shore of the Gulf from the Najd, their famine-stricken homeland in central Arabia. Eventually, the Al Sabah emerged as the dominant clan, and its members were formally established as rulers in 1756. By the late 19th century, however, fears of growing Ottoman influence led Sheikh Mubarak Al Sabah to enter into an agreement with Great Britain, which effectively established Kuwait as an autonomous British protectorate. Under the 1899 agreement, Kuwait maintained control over its internal affairs, and Great Britain assumed responsibility for the country's security and foreign relations. By the 1960s, Kuwait enjoyed such a level of economic development that it became one of the wealthiest states on a per capita basis, and in 1961 Kuwait gained full independence from Britain. For a brief period, between 1990 and 1991, Kuwait was under Iraqi control, but the Iraqi army was defeated by United Nation forces.

The official national language of Kuwait is Standard Arabic, a modernized variety of Classical Arabic. The latter, with its archaic vocabulary, is used for religious and ceremonial purposes, whereas Standard Arabic is employed in formal situations, for education, and for official purposes and is the language of the press. In the Arabic-speaking world, only the well educated have adequate proficiency in Standard Arabic; in Kuwait, the literacy rate among men is 85.1% and among women is 81.7%. About 85% of the population uses Gulf Spoken Arabic to communicate. Mehri, a South Arabian language, is used by some 3530 Kuwaitis. In addition, English is widely spoken, and both television and radio broadcasts are often in English. There is one institution in Kuwait for all its 110 285 deaf inhabitants.

See also: Arabic.

Kwa Languages

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Constitution of the Group

The list of languages included in Kwa has varied considerably. In the 1950s, Westermann and Bryan included 10 languages of Ivory Coast that they subgrouped into the Lagoon group; Akan, including the languages more recently termed Tano; Ga-Dangme; Ewe; and most of the languages of southern Nigeria. Greenberg's 1963 classification expanded the group to include the Kru languages of Liberia in the east, the languages of the Ghana-Togo hill country that Westermann and Bryan had explicitly excluded, and the Ijaw languages of the Niger delta. This membership was maintained by Stewart in 1971, but in 1989 he eliminated the Kru languages and the Nigerian languages, keeping the Togo Mountain languages and adding a few languages hitherto unknown or unstudied. This is the membership in the most recent overview presented by Williamson and Blench (2000), which essentially has contracted back to the earliest membership plus the Lagoon and the Togo Mountain languages. The group as most recently defined, without Kru and without the Nigerian languages, is sometimes referred to as New Kwa.

Nevertheless, the Kwa languages are currently considered to be more closely related to Yoruba, Igbo, and other languages of southern Nigeria than to the rest of Niger-Congo, forming with them a branch of the Volta-Congo subgroup of Niger-Congo. However, except at the lower levels of classification such as the Tano, Potou-Tano, and Ewe-Fon (Gbe) groups, genetic relationships among these languages are quite distant. It has never been adequately demonstrated using the comparative method that Akan, Ga, Ewe, and the Togo Mountain languages are more closely related to one another than to any other languages.

The Subgroups

The (New) Kwa subgroups are distributed approximately from east to west along the coastal forest and savannah, with the majority of languages and speakers in Ghana. However, many communities have traditions of migration, and it is likely that 1500 years ago their geographical distribution was very different from today. A primary distinction has sometimes been made between the western languages with Ga-Dangme and some of the Togo Mountain languages, referred to as 'Nyo,' and Gbe and the other Togo Mountain languages, referred to as 'Left Bank' (of the Volta River). We examine the composition of the subgroups starting in the west and moving eastward.

The Lagoon languages of the Ivory Coast – Avikam and Alladian, Adjukru (Adioukru), Abidji, Abbey (Abé), Attié, and an isolated language farther west called Ega – are not particularly closely related to one another. Just east of these, the Potou-Tano group comprises at least 20 languages, including Ebrie (Ebrié) and Mbatto (Mbato) (the Potou of Potou-Tano) and the Tano group consisting of Krobu, Abure, and Eotilé (Beti) (all spoken in the Ivory Coast); Nzema, Ahanta, Anyi (Anyin), and Baule (Baoule) (spoken in the eastern Ivory Coast and western Ghana); Anufo (spoken in northeastern Ghana); Akan (with by far the most speakers, mainly in Ghana); and approximately a dozen languages making up the Guang group including Gonja, Nawuri, Nchumuru (Nchumbulu), Krachi (Krache), Nkonya, Okere (Cherepon), Larteh, Efutu, and Awutu (all spoken in Ghana from north of Akan to the sea in the south, distributed along the course of the Volta river). Because the locus of greatest differentiation is in the west, it has been suggested that the Potou-Tano languages spread from west to east. Migration traditions suggest that they also spread in the eastern area (i.e., mainly in Ghana) from north to south.

Ga-Dangme, on the other hand, consists of just two languages, Ga and Dangme (or Adangme). Now situated on the Accra Plain south east of the Tano languages and west of the Volta River, the speakers have traditions of migration from the east, possibly in conjunction with the Ewe, and from the northeast, probably from what is now the northern Republic of Benin.

The Central Togo or Togo Mountain languages comprise 14 languages spoken in Ghana, Togo, and the Republic of Benin, most of them in the hilly area on the Ghana-Togo border. An earlier name for these languages was Togo Remnant Languages, adapted from the German *Togorestsprachen*. That name reflected the possibility that their fragmented distribution on hilltops difficult to access and their generally small numbers of speakers result from these linguistic communities having fled to refuge areas at some time in the past, under pressure from expanding larger groups such as (perhaps) the Ewe and the Akan. True or not, the name is disliked by speakers and no longer used.

Heine (1968) treated the languages as a genetic family and classified them into two subgroups: the NA subgroup (Basila (Anii), Lelemi-Lefana (Lelemi), Logba, Adele, Likpe (Sekpele), Santrokofi (Sele), and Akpafu-Lolobi (Siwu)) and the KA subgroup (Avatime, Nyangbo-Tafi, Bowiri (Tuwili), Ahlo, Kposo (Akposo), Kebu (Akebou), and Animere). More recent classifications accept these two groupings, but

put them directly under Kwa; that is, they are now considered no more closely related to one another than to the other New Kwa groups, and 'Togo Mountain' or 'Central Togo languages' are merely geographical labels.

Kposo has the most speakers by a considerable margin, approximately 80 000, followed by Kebu with 17 500. (Both are spoken mainly in Togo; figures are based on Heine, 1968.) Lelemi-Lefana has approximately 15 000 speakers and Adele approximately 8000. Others have fewer: Logba reportedly has approximately 2000 speakers, and Animere was said to have fewer than 300 in the 1960s. There is evidence that one or two languages have died out in the area in the course of the past 2 centuries.

The area extending approximately 80 miles inland along the coast from the Volta eastward to the Nigerian border is dominated by the closely knit Gbe group of languages and dialects. The name is adopted from their common word for 'language'. They include Ewe, spoken in Ghana and Togo by more than 3 million people. The Ewe-speaking people have a tradition of migration from farther east but still within the Gbe area, from Nuatja and Tado in southern Togo. Gen (Gen-gbe) is the language of Lomé, the capital of Togo and a major lingua franca. Another major variety is Aja (Aja-gbe). Somewhat more distantly related are Maxi (Maxi-gbe) and Fon (Fon-gbe), the language of the old kingdom of Dahomey, which is now part of the Republic of Benin. The easternmost variety is Gun (Gun-gbe), which crosses the Nigerian border along the coast and is thought to have been spoken in the Lagos area in earlier times.

Linguistic Characteristics

In all Kwa languages, the fundamental word order is subject-verb-object. It was once thought that they typically had very simple morphology, but, although the situation varies among the different groups, this is generally not really the case. Part of the reason for this belief may have been the fact that in many of the languages tone plays an important role in morphology, with some grammatical morphemes being realized only by tone. Thus, in the following Ga sentence only the high tone on the second syllable of the pronoun *amɛ* 'they' shows that the verb is perfect and not aorist.

amɛ́-bá
'they have come'
they.PERF-come

Tone is also important in making lexical distinctions; again in Ga, we have *lá* 'blood' with high tone but *là* 'fire' with low. The number of phonemic tones ranges from the minimal two in Ga and Akan to five in Avatime. In all the languages west of the Volta, tone levels are affected by downstepping, or the lowering of all pitch levels after a low tone throughout a sentence, but many languages east of the Volta, including Ewe, do not have this.

Cross-height vowel harmony, based on the position of the tongue root, is typical of the Tano languages but not of Ga-Dangme, Gbe, or some of the Togo Mountain languages. In all (Adjukru is an exception), syllables are typically open, ending in a vowel or sometimes a syllabic consonant.

Double articulated consonants ([k͡p], less often [g͡b]) are typical of Ga-Dangme, the Togo Mountain languages, and Gbe but not of Akan and some other Potou-Tano languages. In Ga-Dangme and Gbe (and also Yoruba), but again not in the western languages, the voiceless bilabial stop /p/ did not exist until it was introduced through loanwords in the course of the 18th century. Consonant clusters either do not exist or the second consonant is limited to off-glides and /l/ or /r/ and the cluster is analyzable as being derived from a CVV or CVCV structure.

Verb systems vary, but paradigms generally express aspect features, with the perfective-imperfective distinction basic. Grammatical tense is less important, often limited to a contrast between future and nonfuture, and even that shows signs of having been grammaticized relatively recently in many languages. The expression of progressive aspect is of particular interest because the western languages differ radically in its expression from many of those spoken east of the Volta. In Tano languages and also in Ga, the progressive (like most other aspect features) is shown by a prefix, as in the following sentences in Akan (1) and Ga (2).

(1) abofra no re-di nneɛma
child the PROG-eat things
'the child is eating something'

(2) gbekɛ lɛ mii-ye nii
child the PROG-eat things
'the child is eating something'

In Ewe (3) and Dangme (4), on the other hand, it is periphrastically expressed, with an aspect verb followed by a nonfinite form of the event verb preceded by its object.

(3) Đevi a le nu ɖu-m
child the is thing eat-PROG
'the child is eating (something)'

(4) jukwɛ ɔ ŋɛ nɔ ye-e
child the is thing eat-PROG
'the child is eating (something)'

Some of the Togo Mountain languages use the periphrastic style of expression, but many do not.

In Kwa languages, the noun is followed by the adjective, article, and so on that modify it, whereas a possessor precedes the possessed noun. However, there are radical differences in nominal morphology. The Togo Mountain languages generally have several singular and plural classes expressed by prefixes; modifiers take prefixes that show agreement (concord) with the class of the noun they modify and pronouns also vary according to the class of the noun referred to. Akan and other Tano languages have several singular and plural prefixes for nouns but no class concord. Ga-Dangme, however, uses basically just one plural (no singular) suffix, whereas the Gbe languages use a phrase-final particle, as in the following example from Fon.

(5) xɔ̀ntɔ̀n yétɔ̀n wè lɛ́
friend your 2 PL
'both your friends'

Serial verb constructions, in which several verbs share one subject and sometimes object with no intervening conjunction, occur in all Kwa languages.

See also: Akan; Benin: Language Situation; Class Language; Ewe; Ghana: Language Situation; Ivory Coast: Language Situation; Migration and Language; Niger-Congo Languages; Nigeria: Language Situation; Phonetics of Harmony Systems; Tense, Mood, Aspect: Overview; Togo: Language Situation; Tone: Phonology.

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Kyrgyzstan: Language Situation

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Languages

Kyrgyzstan is a Central Asian country (capital: Bishkek, until 1990 named Frunze), bordering on China, Uzbekistan, Tajikistan, and Kazakhstan. It was annexed by Russia in the late 19th century, became a Soviet Socialist Republic in 1936, and achieved independence from the Soviet Union in 1991. Its official languages are Kirghiz and Russian.

The population is mainly concentrated to the lowlands of the Chu and Talas Valleys and the Kirghiz part of the Ferghana Valley. According to the 1999 census, the main linguistic groups among the roughly 5 million inhabitants are Kirghiz (64.9%), Uzbeks (13.8%), and Russians (12.5%). The rest is composed of speakers of numerous other languages. The seemingly weak position of the Uyghurs, who make up 1% of the population, is partly due to their tendency to refer to themselves as Uzbek.

The Ferghana Valley, located on Upper Syrdarya, is divided between Kyrgyzstan, Uzbekistan, and Tajikistan. As a result of the administrative division set up in the Stalin era, the borders of the three countries do not follow the borders of the speech communities. The valley has remained a matter of dispute between the countries. The part of the valley that belongs to Kyrgyzstan, even its main city Osh, has a predominantly Uzbek population. Many speakers of Kirghiz live on Uzbek and Tajik territories. Two enclaves in Uzbekistan and one in Tajikistan belong to Kyrgyzstan, whereas several small Uzbek enclaves exist in Kyrgyzstan. In 1992–1993, refugees from Tajikistan moved into southern Kyrgyzstan.

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Language Policy

Kirghiz was established as a standard language in the Soviet period. A written variety was created in 1923. The originally used Arabic script was abandoned for a Roman-based alphabet; a Cyrillic alphabet was adopted in 1940–1941.

In the early 1990s, Kirghiz was introduced as the official language of the independent republic. In 2001, after substantial pressure from Russia, the Russian language became the second official state language alongside Kirghiz.

In the first years of independence, a significant number of non-Kirghiz speakers left the republic. The emigration rate was highest in 1993, but decreased subsequently thanks to measures against discrimination against citizens who did not master Kirghiz. The number of Russians decreased by at least 6%. Practically all speakers of German, who had made up 1% of the population, left the country. On the other hand, the Kirghiz-speaking proportion of the population increased due to immigration from Tajikistan and Uzbekistan.

Though Russian still dominates public life in Kyrgyzstan, e.g., by being the main medium of publication (newspapers, books, etc.), the efforts to protect and promote Kirghiz have been successful. The Kirghiz generally maintain a high degree of mastery of their language. A return to a Roman-based alphabet has been discussed and planned, but not implemented so far.

See also: Kirghiz; Russian; Tajikistan: Language Situation; Uzbek; Uzbekistan: Language Situation.

Language Maps (Appendix 1): Map 107.

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Holcot, Robert (d. 1349)

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Robert Holcot (Holkot) was born near Northampton, England c. 1290. Joining the Dominican order, he arrived at Oxford and would remain there as student and then teacher from 1326–1332. Holcot may have served in the capacity of Dominican regent master at Oxford until being called to the post of clerk for Richard de Bury, Bishop of Durham. In 1343, Holcot returned to Northampton and lived in the priory there until his death of the bubonic plague in 1349.

Dominican training at the time of Robert Holcot's education would have likely included the study of logic, grammar, philosophy, and theology. His training on the differences between faith and reason would have followed the teaching of Saint Thomas Aquinas. Holcot himself was more a follower of William of Ockham than of Aquinas. In fact, although not fully agreeing with Ockham on matters of epistemology with regards to intuition and abstraction, Holcot used other fundamental principles from the teachings and writings of Ockham as a basis for his religious philosophy.

Holcot tried to reconcile the impassable differences between logic and faith. Since the principle of non-contradiction is fundamental to a logical progression of thought, it is difficult to reconcile the Christian belief that God is omnipotent within the framework of that logical progression. For instance, 'If God is omnipotent, can God create a rock so big that even God can't move it?' For Holcot, the answer was that natural laws with regard to logic and the limitations of our own human language must not apply to God. There must be, in addition to Aristotelian logic, which is applicable to the natural order, a separate logic of faith that is applicable to God.

Also problematic for the faithful Christian was the notion of future contingents with regard to divine omniscience. In other words, if God knows all things and any contingency is able to either exist or not, God cannot have foreknowledge of something that is inherently contingent. Holcot reconciled this disagreement between the logical and the theological by arguing that (simply put) if God is omniscient, the debate over whether or not he can know the nature of a future contingency is moot.

The written works of Robert Holcot include his comments on Peter Lombard's *Sentences*. Written while at Oxford, Holcot's 'Comments' on the *Sentences* are considered to be his most famous work. His *Sermo finalis*, given at the end of his tenure at Oxford, employs double entendre, or puns, to address his disapproval of his successor. Also of importance, the *Sex articuli* is both a comment on epistemology and a criticism of Holcot's contemporaries. It is possible that the *Sex articuli* was intended to appear together with his comments on the *Sentences*. Other important works include comments on Matthew,

De imputabilitate peccati (On the imputability of sin); *De stellis* (On the Stars), *Moralitates* and *Convertimini; Postilla super librum Sapientiae;* and commentaries on Proverbs, Canticle of Canticles, and Ecclesiasticus.

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Holder, William (1616–1698)

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William Holder was born in 1616 in Southwell, Nottinghamshire, England and died on January 24, 1698 in Hertford, England. Holder was a clergyman, mathematician, musician, phonetician, and speech therapist. He was the first Englishman in the 17th century to propose an explicit practical application of an advanced phonetic theory.

Holder began his studies at Pembroke Hall, Cambridge in 1633. He was elected Fellow in 1640, after his graduation. During the Civil War, he moved to Oxford, where he became a doctor of divinity at Oxford University in 1660. In 1663 he was elected to the Royal Society, which recognized his achievements in phonetics and his system of teaching the deaf and mute people. Apart from his phonetic interests, Holder also made important contributions to music theory, especially to the theory of harmony and composition.

From 1659 to 1660, he taught 10-year-old Alexander Popham, who was both deaf and mute, to speak. Holder described this experience in *Philosophical Transactions of the Royal Society* (1668), but his successful language training to Popham soon caused a public quarrel between Holder and John Wallis. Wallis, a mathematician who was a well-known instructor of deaf-mutes, taught Popham after the boy had worked with Holder. Wallis, however, credited himself alone with the successful training of Popham without mentioning Holder's merits. Holder gave his account of the dispute in his *A supplement to the philosophical transactions of July 1670, with some reflexions on Dr. John Wallis, his letter there inserted* (1678).

Holder's work with Popham had a deep impact on his phonetic theory, which he explained in his *Elements of speech: an essay of inquiry into the natural production of letters: with an appendix concerning persons deaf and dumb* (1669). The appendix was a reprint of Holder's report on his work with Popham in *Philosophical transactions*; it may be regarded as the first definitive manual of speech therapy written in England. *Elements* was a particularly valuable piece of English linguistic scholarship in the 17th century, because Holder was the first Englishman to spell out an explicit application of a thoroughly developed phonetic theory. By applying an empirical method based on inductive principles, he sought to analyze the speech act itself. Having verified his experiments, he tried to proceed to generalizations. In *Elements*, Holder proposed a classification of human sounds by referring to the manner and place of articulation. For this purpose, he developed a system of contrastive analysis. His treatise shows that he was also aware of suprasegmental phenomena, e.g., 'accent' and 'emphasis.'

In the *Appendix*, he ascribed the muteness of deaf people to hearing impairment and not to articulatory deficits. His method of teaching was similar to that of Johann Conrad Amman; both relied on the visual and haptic experience of their students as they showed them the respective position of the articulatory organs in regard to each sound. The students were also encouraged to touch their teacher's articulators. It was mainly Holder's belief in the compensatory capacities of his students' senses that inspired him to use this method.

Holder was not only a speech therapist, but also a clergyman and musician. A canon at St Paul's cathedral in 1672, he was appointed sub-dean of the Chapel Royal in 1674. Holder married the sister of Sir Christopher Wren and heavily influenced Wren's education. Both Holder and his wife were buried in St Paul's.

De imputabilitate peccati (On the imputability of sin); *De stellis* (On the Stars), *Moralitates* and *Convertimini; Postilla super librum Sapientiae;* and commentaries on Proverbs, Canticle of Canticles, and Ecclesiasticus.

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Holder owes his reputation as a phonetician and speech teacher before all to his *Elements*, which may be regarded as a milestone in the establishment of phonetics as a science.

See also: Amman, Johann Conrad (1669–1730); Phonetics: Overview; Sign Language: Communities and Cultures; Wallis, John (1616–1703).

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Holism, Semantic and Epistemic

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According to Epistemic Holism, one does not test hypotheses – individual sentences – one at a time; rather the process of testing hypotheses confronts the whole of science with reality. According to Semantic Holism, the meaning of words and sentences in a language depends on the meaning of each and every word/sentence in that language. The former is widely accepted, whereas the latter is very controversial. Both forms of holism are tied together by the idea that the meaning of sentences is given by their truth conditions.

Epistemic Holism

Scientific theories confront reality via hypotheses, and *prima facie*, hypotheses are tested one at the time. Carl Gustav Hempel (1905–1997) and Willard van Orman Quine (1908–2000) contended that this view was an oversimplification and argued for what is now known as the Duhem/Quine thesis or Epistemic Holism (EH): "Science faces the tribunal of experience not sentence by sentence but as a corporate body: the whole of science" (Quine, 1986: 620).

Science is not compartmentalized. For example, observations made by telescopes are backed by astronomy, physics, optics, and the mathematical theories used in all these theories. The argument behind EH is simple. Assume a logical empiricist's theory of meaning according to which the meaning of a sentence is given by its confirmation or verification conditions. Consider now any theoretical sentence. Such a sentence cannot be reduced to one single sentence concerning experience and connecting it directly to the world. So, it has no confirmation conditions as a single, independent item. It is connected to reality through a net of sentences, some of which get their truth conditions straight from facts with no regard for other sentences, the so-called observation sentences. It follows that a hypothesis is just a sensor of the whole science, which confronts reality and is affected as a whole through the hypothesis. Hempel (1950) wrote:

> "In order to understand 'the meaning' of a hypothesis within an empiricist language, we have to know not merely what observation sentences it entails alone or in conjunction with subsidiary hypothesis, but also what

Holder owes his reputation as a phonetician and speech teacher before all to his *Elements*, which may be regarded as a milestone in the establishment of phonetics as a science.

See also: Amman, Johann Conrad (1669–1730); Phonetics: Overview; Sign Language: Communities and Cultures; Wallis, John (1616–1703).

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> "In order to understand 'the meaning' of a hypothesis within an empiricist language, we have to know not merely what observation sentences it entails alone or in conjunction with subsidiary hypothesis, but also what

other, non observational, empirical sentences are entailed by it, and for what other hypotheses the given one would be confirmatory or disconfirmatory. In other words, the cognitive meaning of a statement in an empirical language is reflected in the totality of its logical relationships to all other statements in that language, and not to the observation sentences alone."

In that conception, there is no clear-cut distinction between changing the theory and changing the meaning of sentences. When a hypothesis is proven false, one can alter either other parts of the theory, the so-called auxiliary hypothesis, or the meaning of the sentences of the theory. EH is sometimes offered as a reason for Semantic Holism: EH and the empiricist theory of meaning lead to SH. If the meaning of a sentence is determined by its verification conditions and if they are holistic, the meaning of a sentence is also determined holistically. EH and Semantic Holism are independent views on different topics: scientific theories and language. However, they dovetail.

Semantic Holism

Although EH is sentence oriented, Semantic Holism (SH) covers both sentential and subsentential items. There are different versions of SH, but its basic tenet is that the meaning of a sentence/word is determined by, depends on, or is constituted by, its relation to *all* the sentences/words in a language.

The Argument from Compositionality and the Context Principle

SH is usually not advocated in and of itself. EH can motivate it. It can also be introduced as a consequence of two independently motivated, nonepistemic linguistic principles and a truth-based semantics. It is based on two principles:

1. *Principle of Compositionality*: The meaning of a sentence is a function of the meaning of its constituents and their syntactic relationship
2. *Context Principle:* "Only in the context of a sentence does a word have meaning" (Frege, 1978: x).

To give the meaning of a word, one must give the meaning of all sentences in which it occurs; that is, the truth conditions of all these sentences. Davidson (1967: 22) followed the argument to its obvious conclusion that "only in the context of a language does a sentence (and therefore a word) have meaning." The meaning of a word or a sentence is determined by the language to which it belongs.

SH opposes 'Semantic Atomism,' which holds that the meaning of a sentence/word is *independent* from the meaning of *all* the other sentences/words in a language. Semantic Atomism proposes either the referent of a word or an abstract entity, like a Fregean sense, as the meaning of a word. From then on, meanings can be piled up.

SH also opposes '*Semantic Molecularism*,' which holds that the meaning of a sentence/word is determined by, depends on, or is constituted by its relation to *some* of the sentences/words in a language.

Both the Principle of Compositionality (PC) and Context Principle (CP) are *a priori*, methodological principles in theoretical semantics. Semantic Holism *per se* is not methodological in nature. Following from two *a priori* principles, it is also *a priori*. It emphasizes that the words/sentences would have no meaning outside that whole and would have a different meaning in a different whole. The PC mentions syntax and applies to complex expressions. SH applies to both simple and complex, structured expressions as well. It is also very general and is not tied to a specific notion of meaning, view on human language, or program in semantics. It simply requires sentences and truth conditions, as opposed to words and referents, to be basic in semantics. SH is also a metaphysical view on language and meaning (see Fodor and Lepore, 1992). In that respect, it has no clear purchase value in theoretical or applied linguistics. On the other hand, as long as it is not incompatible with empirical research, there is no point in rejecting (or in accepting) it.

One can argue for SH in Conceptual Role Semantics (Block, 1986). That conception of semantics is grounded on the functionalist theory of the mind, which takes thought contents to be functionally defined and the meaning of sentences/words to reflect thought contents (*see* **Mentalese**).

According to Conceptual Role Semantics, the meaning of a token of a linguistic expression is constituted by its inferential properties.

In this view, SH does not follow from methodological principles, but is a plain assertion about meaning. It also concerns tokens, not types, and in that respect, it is an individualistic doctrine. This version of SH is arguably a metaphysical approach to meaning. It is also designed to fit a functionalist view of mental states. Block, the main proponent of Conceptual Role Semantic (CRS), was careful to mention that CRS is not a theory, but a framework for developing semantic theories.

Problems with Semantic Holism

SH raises vexing philosophical issues. Does SH reflect substantial properties of meaning? Does it have an ontological scope? If human languages are holistic, is being holistic an essential property of human languages? Or does SH just echo our way of capturing meaning in a theory, being an artifact produced

by our way of theorizing/knowing the semantics of natural languages? SH has *prima facie* implausible consequences for linguistics.

Learning Problem If SH is true, then one cannot learn the meaning of a lexical item without learning a whole language. It also implies that, to understand the meaning of one single word/sentence a speaker utters, one must be able to understand all words/sentences that speaker can utter. To master the meaning of one single word, one must master a whole language. That makes learning and understanding a language an 'all or nothing' affair, and it implies that learning/mastering part of a language does not make sense. Friends of holism reply that "in so far as we take the 'organic' nature of language seriously, we cannot accurately describe the first steps toward its conquest as learning part of a language; rather, it is a matter of partly learning" (Davidson, 1965: 7). Some (Dressner, 2002) have argued that this fits what we know about the psychology of language learning. Holism apparently opposes the PC – the meaning of one sentence cannot be determined in the way described by the PC because the whole language is involved. However, it is arguable that there is no problem in that quarter. The PC presupposes that the meaning of an unstructured item is determined, and a functional relation is applied to these items. Being determined by and being a function of are two different relationships. Insofar as determination is concerned, *prima facie*, both holism and the PC can be true.

Instability Problem SH also implies that, by adding terms to the language or by altering the meaning of one single word/sentence in a language, one alters the meaning of all words/sentences in that language. As a consequence, the language of a speaker changes constantly because words/sentences are introduced and/or the meaning of lexical items is altered. In addition, two speakers do not speak the same language or use expressions having the same meaning, because the meaning of the words/sentences of a speaker differs from the meaning of the words/sentences of another speaker insofar as they do not share the same vocabulary or produce the same sentences.

Disagreement Problem If two tokens of the same type differ in meaning, then speakers cannot disagree or agree, for that matter, on a sentence. The fact that you accept and that I reject 'Snow is white' does not show that we disagree on anything; the fact that we both accept the same sentence does not show that we agree on anything. The reason is the same in both cases: The tokens have different meaning in the two idiolects, and agreement or disagreement requires sameness of meaning.

SH can be escaped if truth and sentences are not treated as basic in semantic. It can also be avoided if the PC or the CP is rejected. The PC draws wide agreement. The CP is more controversial, and Atomism rejects it. SH inherits certain indeterminacy from the premises leading to it. What do 'is determined by,' 'depends on,' 'is constituted by,' and 'meaning' mean exactly in SH? These terms are not designed to be read in a mathematical way, and they remain controversial. How can sound, *a priori* methodological principles have dramatic metaphysical consequences? Those questions do not make the problem disappear, but prove how opaque it is. The Conceptual Role Semantic version of Semantic Holism can be rejected by refusing CRS.

Semantic Holism and the Philosophy of Mind

Meaning is connected to thought content. Replace the relevant words in the above principles, and you end up with the idea that thought contents have a compositional aspect and that a single thought content is determined by all of one's thought contents. Changing one belief also implies altering the web of beliefs, and hence each belief – this is the instability problem raising its head in the philosophy of mind – and to know one single thought content of a speaker, one must know all of his other thought contents. Fodor and Lepore (1992) drew attention to the fact that, if SH is true and if meaning is echoed in thought contents, then we cannot share a thought unless we share all of our thought contents, and trying to state psychological laws is a futile project, doomed from the start.

Conclusion

Wherever one looks, one finds only implausible consequences of SH. As a consequence, it never served as the basis for a detailed research program in semantics. However, it did bring the analytic philosopher one step closer to the Hermeneutic tradition. Hermeneutics is thoroughly holistic.

See also: Compositionality: Philosophical Aspects; Context Principle; Empiricism; Mentalese; Semantic Value; Thought and Language: Philosophical Aspects; Truth Conditional Semantics and Meaning; Verificationism.

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Holmes, Janet (b.1947)

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Janet Holmes was born in Liverpool on May 17, 1947. The eldest of Muriel and Robert Quirk's four children, she completed a B.A. at Leeds University and then an M.Phil. under the supervision of John Pride and John Strover. In July 1970 she moved to New Zealand to take up a lecturer (assistant professor) position in linguistics at Victoria University of Wellington. She settled there permanently, raising two sons with her husband, Tony. She played an influential role in shaping the character of the Department of Linguistics (formally instituted in 1985). In 1993, Holmes was awarded a personal chair in Linguistics, and in 1994 was elected Fellow of the Royal Society of New Zealand, an honor only rarely extended to social scientists.

Holmes has made New Zealand a dynamic center for research into sociolinguistics. Her skills at establishing collaborative ventures across universities and between the university and the business community have maintained the vitality of the field even in an era of increased competition for decreased academic funding in New Zealand. Her interests are politeness theory, language and gender, ethnicity, discourse, and New Zealand English. Her track record of gaining research funding is impressive; her research projects have not only produced many scholarly publications, but also provided invaluable training for younger scholars, many of whom have gone on to pursue academic careers of their own. Corpus-based social dialectology led by Holmes has made NZ English one of the best documented varieties in the world.

Holmes was one of the first researchers to look critically at Robin Lakoff's notion of 'women's language,' and her work (1984 forward) has highlighted the interplay between gender and other social factors such as politeness. Her work (e.g., 1986) consistently stresses the importance of going beyond assumptions of one-to-one mappings between form and function and supports this with naturally occurring data. Her focus on form–function relations includes careful attention to intonation, still often neglected. She continues to defend the practice of analyzing politeness using both qualitative and quantitative methods, in the face of postmodern challenges to this approach.

Holmes's studies of workplace interaction have ranged from the interactional function of humor, through to analyses of effective management style in medicine, manufacturing, and white collar offices. Here, too, Holmes has stressed interdisciplinarity and action-based research. She is author or editor of 12 monographs, over 180 academic articles, and more than 30 general audience articles on sociolinguistics. Many have been reprinted and translated. She is also an active reviewer for journals and monographs. She has supervised or examined 80 postgraduate theses and dissertations.

See also: Applied Linguistics in Australasia and the Pacific; Corpora in Studies of Variation; Critical Applied Linguistics; Gender; Gender and Language; Language in the Workplace: Different Approaches; Politeness; Prestige, Overt and Covert; Variation and Language: Overview.

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Holmes, Janet (b.1947)

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Janet Holmes was born in Liverpool on May 17, 1947. The eldest of Muriel and Robert Quirk's four children, she completed a B.A. at Leeds University and then an M.Phil. under the supervision of John Pride and John Strover. In July 1970 she moved to New Zealand to take up a lecturer (assistant professor) position in linguistics at Victoria University of Wellington. She settled there permanently, raising two sons with her husband, Tony. She played an influential role in shaping the character of the Department of Linguistics (formally instituted in 1985). In 1993, Holmes was awarded a personal chair in Linguistics, and in 1994 was elected Fellow of the Royal Society of New Zealand, an honor only rarely extended to social scientists.

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Holtsmark, Anne (1896–1974)

S Kürschner, Albert-Ludwigs-Universität, Freiburg im Breisgau, Germany

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On June 6, 1896, Anne Elisabeth Holtsmark was born in Oslo, Norway. She started her scientific career with university studies in Norwegian, French, and history in Oslo, where she finished her studies in 1924. From 1925 to 1926 she was lector in Hamburg, Germany. She returned to Oslo in 1926 and worked as an assistant at the University Library. In this position, she started extensive philological work including linguistics, modern literary studies, and scientific research on Old Norse manuscripts from Iceland and Norway. Her work included a considerable number of translations to New Norwegian. Anne Holtsmark became a philologist with international influence in the field of Scandinavian studies.

Holtsmark published her work on the manuscript AM 114a 4° in 1931 with the title 'En tale mot biskopene' (A speech against the bishops). Her text-critical work included new results on the potential author of this important Norwegian manuscript from the Middle Ages, which defended the Norwegian king's steps against the church. By palaeographical and linguistic contrast, Holtsmark shed doubt on earlier ideas concerning the exact date of the emergence and the author. Her methods included new advances in physical manuscript treatment: Holtsmark introduced ultraviolet wave illumination to make greased parts of the manuscript readable. By adding the manuscript in facsimile and in a diplomatory format, Anne Holtsmark made the text available to a greater public. Editing Norse manuscripts continued to be one of her main scientific fields in the future, cf. the facsimile editions of 'A Book of Miracles' (AM 645 4°), *Legendarisk Olavssaga* (The legendary Olavssaga) (DelaGardie 8 II), and the *Olav Tryggvasons saga* (AM 310 4°).

From 1931, Holtsmark was university lecturer of Old Norse philology in Oslo. From that moment on, she started university teaching parallel to her research work. Her teaching concentrated on the literature of the Nordic Middle Ages, most of all the Edda and the sagas. In 1936, Holtsmark received a doctoral degree for her work on the 'First grammatical treatise,' a manuscript from the 12th century on the Icelandic grammar of that time. Her dissertation was entitled 'En islandsk scholasticus fra det 12. århundrede' (An Icelandic scholar from the 12th century). Holtsmark offered new insights into the question of who the author of this first Nordic grammar was. Holtsmark studied the manuscript's origin using new methods: she compared the author's ideas to the Western European scientific traditions of that time, especially concentrating on France and the possible Irish influence (which she showed to be overestimated). Her conclusion on the 'First grammatical treatise' was that the grammar featured an exact description of the Old Icelandic sound system. This was carefully worked out to form an orthophonic alphabet. Holtsmark continued her work on old manuscripts from a literary and historical point of view. In addition, her research topics began to include the myths and the legends in the skald and Edda literature.

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og Minne. She wrote and edited 10 scientific monographs, including work on texts from the Middle Ages, all within her broad field of research. In addition, Anne Holtsmark wrote 120 articles for the *Kulturhistorisk leksikon for nordisk middelalder* (Culture historical lexicon for the Nordic Middle Ages). She was one of the founders of the Old Norse Dictionary Association (Gammelnorsk Ordboksverk) and the Association for Norwegian Culture Research (Forening til Norsk Kulturgransking). From 1941, Holtsmark was a member of the Norwegian Scientific Academy. She received the Royal Norwegian Order of Saint Olav and the Icelandic Falke-order for her lifetime work.

Holtsmark's main interest was the medieval language and its sources in literary texts, and she ranks among the most important Scandinavian philologists, especially for medieval studies. In her scientific work, Holtsmark maintained a broad scope, including linguistics, literature studies, and broader cultural studies. She also worked in fields combining all disciplines, and she presented results not possible without considerable knowledge of all these fields. In all of her work, Holtsmark was known to be very accurate. She based her results on a very exact text analysis, be it literary or linguistic research. For this reason, Holtsmark's work is still of great importance for current medieval research in Scandinavian Studies. Anne Holtsmark died on May 19, 1974.

See also: Norse and Icelandic; Norwegian.

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Homans, George C. (1910–1989)

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George Homans was a pioneer of sociological exchange theory. Born in Boston, in the Back Bay area, Homans was the son of a prominent physician; his mother was a member of the famous Adams clan. He attended the St Paul's School, Concord, New Hampshire, and Harvard (B.A., 1932). He became well acquainted with Pareto's work just after graduation, and took up sociological investigations as a Harvard junior fellow. His teaching career began and continued in sociology at Harvard (1939–1980), with time out during World War II to serve as a naval officer, returning to the Department of Social Relations there in 1945 until the end of his scholarly career.

Homans devoted his intellectual efforts to explaining social behavior, or, in slightly different terms, to basing social sciences on propositions from behavioral psychology. Language plays no particular overt role in his conceptualization; rather than focus on verbal communication he turned to interpersonal interaction, especially exchange. His fundamental principle is that of instrumental conditioning, or less psychologically, the social feedback loop. Accordingly, in his 1961 *Social behavior*, his first general proposition is: "If in the past the occurrence of a particular stimulus-situation has been the occasion on which a man's activity has been rewarded, then the more similar the present stimulus-situation is to the past one, the more likely he is to emit the activity, or some similar activity, now" (p. 53).

His analysis of human interaction, which can be seen as a modern version of hedonism or utilitarianism, is found implicitly in his *English villages of the 13th century* (1941). It is demonstrated explicitly, but still predominantly inductively in his *Human group* (1950), which approaches various specific face-to-face social phenomena in behavioral terms. These include the Western Electric Hawthorne Works in Chicago, an East Coast slum gang, Tikopia families, a New England village, and an electrical equipment company. These groupings allow him to point out issues in social organization, which offer paradigms for understanding society on a larger, institutional and cultural scale as well.

Homans then went on to formulate more general behavioral principles, in terms of rewarded activities, and the exchanges in which they are involved, and to

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Laboratory Phonetics

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Anyone who has seen *My Fair Lady* will recall the scene in which Henry Higgins sets Eliza Doolittle the task of pronouncing "In Hartford, Hereford, and Hampshire, hurricanes hardly ever happen" to test her dropping of [h]s where they belong and her adding them where they do not belong. Eliza is to speak this utterance into a cone attached to a tube whose other end is attached to a valve emitting a flame. Every time she pronounces an [h], the flame briefly jets out further – this only occurs when she says "[h]ever" and not when she says any of the words spelled with "h." The other part of this apparatus is a revolving cube with mirrored sides, in which the flame is reflected. Eliza becomes mesmerized by the revolving reflections and mechanically recites the sentence over and over, until the flame ignites her script.

The device depicted is apparently a 'Koenig flame manometer' (Koenig, 1872), which was widely used by phoneticians in the late 19th and early 20th centuries to measure variation in acoustic pressure from the mouth: the flame jets out further when acoustic pressure is higher. The revolving mirrored cube thus captures changes in acoustic pressure over time in the height of the reflected flame. Because the observer does not separate the successive reflections as each face of the cube turns into the plane of view, they are superimposed onto one another, creating an apparently static image of time-varying acoustic pressure. Different speech sounds produce different images, which could then be used to investigate their phonetic properties. (Ironically, this device could not be used to measure much slower changes in aerodynamic pressure, nor the increase in oral air flow that characterizes an [h].)

Another memorable scene from *My Fair Lady* is the one when Eliza first meets Henry Higgins, and he demonstrates his ability to place people in London and elsewhere in England by the nuances of their pronunciation. He also shows Eliza and the others what he's been writing down in his notebook, a phonetic transcription of her speech.

These two scenes illustrate the contrasts between 'field phonetics' and 'laboratory phonetics,' the topic of this entry. The goal of field phonetics is a **qualitative** description, which uses categorically distinct symbols to record the transcribable phonetic properties of a person's speech. To confirm the transcription, a skilled field phonetician typically imitates the speaker's utterance. If the speaker judges the imitation to be a close match, the phonetician infers that both the original utterance and the imitation were pronounced more or less identically. Both the goal and methods of laboratory phonetics are quite different. Its goal is to **quantify** the continuously varying values of the speaker's articulations, the resulting acoustics, and the listener's perceptual response, and to relate those continuous quantities to the categorical qualities that distinguish one message from another. To achieve this goal, laboratory phonetics uses instruments and experiments, rather than the careful listening and imitation of field phonetics. Yet despite the difference in principle between laboratory phonetics and field phonetics, in practice, most phonetic research combines the two, as Henry Higgins did. Indeed, it is more than fitting that the phonetic consultant to *My Fair Lady* was Peter Ladefoged, the phonetician whose work epitomized the combination of field and laboratory phonetics.

The remainder of this entry is broken into three parts. The first part discusses the instrumentation and software that are widely used in laboratory phonetics and describes the uses to which they are put. The second part lists persistent research problems and the research practices that have been developed in attempts to solve them; this list is incomplete. Finally, the third section discusses two recent important developments in laboratory phonetics: the increasing use of natural corpora, and the attempt to integrate phonetics and phonology, called 'laboratory phonology.'

Instrumentation and Software

The Koenig flame manometer was simply one of a large variety of ingenious instruments and techniques devised in the late 19th and early 20th centuries to measure phonetic properties of utterances. Among many others, the reports of Rousselot (1897–1908) and Scripture (1902) stand out as comprehensive reviews of their own and many others' instrumental investigations of virtually all aspects of the articulation, acoustics, and perception of speech sounds. In many cases, today's instruments and software are merely refinements of devices invented a century and more ago.

Aerodynamics

Speech is the transformation of energy first embodied in air flow into sound, so this review of instrumentation begins with the devices used to measure changes in the volume and pressure of the cavities containing air and air flow between these cavities, i.e., the aerodynamics of speech.

Changes in chest cavity volume are measured with either a 'plethysmograph' or transducers attached to the chest wall and abdomen. In a whole-body plethysmograph, the speaker is placed in a large airtight container and breathes in and out through a mask connected to the outside. As the speaker's chest and abdomen expand and contract, his or her body takes up more and then less room in the container, compressing and then rarefying the surrounding air. These changes in pressure directly reflect the changes in chest cavity volume. In a variant design, compressible air bulbs are attached to the speaker's chest and abdomen, and chest cavity volume is measured by the changes in air pressure inside these bulbs. An alternative means of measuring changes in chest cavity volume is to attach a magnetic field source to the back and transducers capable of measuring the strength of that field to the front of the chest and abdomen; as the chest and abdomen expand and contract, the distance between the field source and the transducer increases and decreases, and with those distance changes, the strength of the field detected by the transducer wanes and waxes.

These volume changes are all intended to change air pressure in the lungs, which in turn determines whether air flows into or out of the lungs. Speech is nearly always produced during an exhalation, when the pressure in the lungs is greater than the pressure downstream in the vocal tract. The pressure of the air in the lungs is also a measure of how much energy is available to produce sound. This pressure is usually measured in the trachea, either through a pressure transducer attached either to a wide-bore needle inserted between two tracheal rings, or via a catheter attached to a balloon swallowed into the esophagus (the esophagus shares a wall with the trachea, so as pressure rises in the trachea, distending its walls, the balloon in the esophagus is compressed). The energy embodied in the tracheal pressure is first transformed into sound when it causes the vocal folds to vibrate, producing a rapid variation in acoustic pressure just downstream. Speakers contract the lungs more rapidly when emphasizing a syllable, and the resulting increase in air pressure in the trachea increases both the rate and size of vocal fold vibration and thus the fundamental frequency and intensity of this sound source (Ohala, 1990).

Air pressure in the oral cavity is measured via a catheter inserted either into the corner of the mouth or through a nostril over the soft palate into the pharynx. The pressure transducer may be in the catheter itself or outside. Some sounds obstruct the flow of air out of the mouth more than others and cause air pressure to build up behind that obstruction. When air pressure is elevated, air flow increases through any open channel. If the increase is great enough, flow becomes turbulent, and this turbulence is audible as noise. This is the second way in which energy embodied in elevated pressure is turned into sound.

Finally, air flow out of the mouth or nostrils, or even inside the oral cavity, is measured using a 'pneumotachograph.' This device applies Poiseuille's law, which states that laminar (nonturbulent) flow between two locations in a tube is proportional to the pressure loss between those locations. In practice, a known resistance to airflow is introduced between the two locations at which pressure is measured.

Muscle Activity

The volume of the chest cavity could not be changed, nor could any other articulation be made, without contracting muscles. Because voltages change in muscles when they contract, the extent and timing of their contraction can be measured by attaching electrodes to the skin surface overlying the muscles or actually inserting the electrodes directly into the muscles. Surface electrodes capture the voltage changes in all the underlying muscle fibers, as do large electrodes inserted into the muscles themselves, but it is also possible to record from single muscle units using finer electrodes. This technique is called 'electromyography.'

Glottal Articulations

The larynx, or more specifically, the vocal folds serve as a valve controlling air flow between the lungs or

subglottal cavity and the oral or supraglottal cavity (the glottis is the space between the vocal folds through which air flows when this valve is open). As already noted, the vibration of the vocal folds is also the one of the two means whereby the energy in the air flowing out of the lungs is transformed into sound.

The position and motion of the vocal folds can be imaged directly by inserting a mirror through the mouth into the upper pharynx, or via an endoscope inserted into the mouth or through the nose into the pharynx. The motion of the vocal folds during vibration can then be captured by filming the image at high speeds. When the light source is strobed synchronously with vocal fold vibration, it is also possible to capture still images of the folds at different moments in their vibratory cycle.

'Electroglottography' (EGG) and 'photoglottography' (PGG) are two other means of measuring the position of the folds and the state of the glottis. In EGG, two electrodes are placed on either side of the thyroid cartilage at the height of the glottis and a weak current is passed between them. As the folds move apart or together, opening or closing the glottis, resistance to this current's flow increases or decreases. In PGG, a light source is placed above or below the glottis, and a phototransducer is placed on the other side. As the folds move apart or together, the amount of light passing through the glottis and falling on the transducer waxes and wanes. These two techniques complement one another. The change in resistance to current flow is greatest at the moment when the folds first make contact or separate all along their length, so EGG measures the moment when the glottis closes or starts to open most accurately. The most light falls on the phototransducer when the folds separate maximally, so PGG measures the moment of peak opening in a particular glottal articulation with the greatest precision.

All these methods are limited in what they show about the motion or position of the vocal folds: filming only shows the folds from above, and EGG and PGG only depict accurately the moments of fold contact and peak glottal opening. By permitting the folds' cross-section to be imaged, ultrasound laryngography has shown how vibration propagates from the lower to the upper edge of the folds. These limitations of all these techniques apply only to the vocal folds *in vivo*. Larynges excised from dogs have been used extensively to study the nature of vocal fold movement during vibration (Moore and Berke, 1988; Perlman and Titze, 1988; Titze *et al.*, 1997).

Finally, a number of devices have been used to measure the vertical movement of the larynx in the neck. Among them is the 'thyroumbrometer,' in which a light is shone past the profile of the neck, casting a shadow onto a two-dimensional grid of phototransducers on the other side. By recording changes over time in the amount of light falling onto the transducers, the shadow can be tracked and the height of the larynx determined from the position of the thyroid prominence.

Oral Movements and Articulatory Contact

Movements of the oral articulators – the tongue, lips, and soft palate – have been measured mechanically and by various imaging techniques. The mechanical means all involve attaching to or resting a low-mass lever on the articulator of interest and then measuring the movement of its other end when that articulator moves. In the past, the movement of the other end was measured directly using a kymograph, a device that draws a trace on paper that is proportional in size to the lever's movement. In modern use of this technique, the other end of the lever is instead attached to a strain gauge, which emits a voltage proportional to the size of the movement of the lever arm. This method is most suitable for measuring movements of the visible articulators – the lips and jaw – and has also been used successfully in recording soft palate movements (the lever is inserted through the nose and one end rests on top of the soft palate), but it is not suitable for measuring tongue movement, because this articulator's shape and position in the oral cavity change enormously from one speech sound to the next. An imaging technique has also been widely used to track the movements of the visible articulators: Infrared-emitting diodes are placed on the articulators of interest, and their positions in three dimensions are tracked by combining images from multiple cameras (Munhall and Vatikiotis-Bateson, 1998).

Filming of radiographs ('cineradiography') was the first means used to image tongue movement effectively. The tongue and any other oral articulator of interest would be painted with a barium paste to improve contrast, and the X-ray beam would be directed at the speaker from the side. The disadvantage of this technique is that the speaker is exposed to an enormous amount of ionizing radiation in a very short period of time, so only a small amount of data can be collected. Because even the radiation dose received in a short recording session is dangerous to the speaker, this technique is no longer used.

The 'X-ray microbeam' was built to replace cineradiography (Nadler *et al.,* 1987). This technique aims a very narrow beam of very high-energy X-rays at gold pellets glued to the articulators; the narrowness and high energy of the beam reduces the radiation dose received during a 10-minute recording session (48 mRad) to little more than that received during a

routine full-mouth dental X-ray examination (10 to 30 mRad). Unlike cineradiography, which provides an image of the entire surface of the tongue or any other articulator within the X-ray beam, the X-ray microbeam measures only the positions of the gold pellets, or the 'flesh points' to which they are attached. (The use of cameras to track the positions of infrared-emitting diodes also measures the positions of flesh points.) Fortunately, the tongue is hydrostatic, so the distances between pellets and the corresponding flesh points are not changed by movements of the tongue or changes in its shape.

The other widely used technique for measuring flesh points inside the vocal tract, 'electromagnetic midsagittal articulometry' (EMMA), uses small magnets instead of gold pellets (Perkell *et al.,* 1992; for comparison of the X-ray microbeam and EMMA, see Byrd *et al.,* 1999). The three-dimensional positions of these magnets is registered by an array of magnetic field transducers mounted on a cage surrounding the speaker's head. As implied by its name, EMMA only permits imaging of flesh point locations in the midsagittal (profile) plane. This is also true of the traditional X-ray and X-ray microbeam techniques, because it is too dangerous to direct the X-rays toward either the brain or the spinal cord.

The two remaining techniques, 'ultrasound' and 'magnetic resonance imaging' (MRI), do not share this limitation; they can be used to image the vocal tract in any plane. Nor are these techniques limited to tracking the locations of flesh points; like cineradiography, ultrasound and MRI both produce anatomically complete images. Each, however, is limited in other ways.

Ultrasound images are constructed from the time delay between the sound's emission and the return of its echo from a boundary, e.g., between the flesh and air at the tongue surface (Stone *et al.,* 1988, 1992; Stone and Lundberg, 1996). The delay increases, the further the tongue surface is from the sound source. Although the surface of the tongue root and body can be readily imaged, the surface of the tongue tip and blade often cannot be because there is an air pocket beneath this part of the tongue, and the sound echoes off the boundary between the floor of the mouth and this air pocket before ever reaching the tongue tip and blade.

The principal limitation with MRI is that it takes a long time to record an image. In the earliest uses of this method, the speaker had to move the articulators to their positions in the sound of interest and then hold them there for a number of seconds. Obviously, the continuous movements of connected speech could not be studied under these conditions. However, procedures have recently been developed that permit five to 10 and soon perhaps as many as 20 images to be collected per second (Demolin *et al.,* 2000; Narayanan *et al.,* 2004). In addition to these limitations, visual signal processing algorithms must be applied to these images to quantify articulator positions and movements, a challenge that does not arise in techniques that measure the positions of flesh points.

All of these techniques measure articulatory movements or positions. 'Palatography' measures the contact of the tongue with the palate. Traditionally, a dark substance, e.g., a mixture of charcoal dust and olive oil, is painted on the tongue surface, the speaker pronounces the target sound (nearly always a consonant), a mirror is inserted into the mouth, and the reflection of the palate is photographed. The dark substance rubs off on the palate or teeth in the locations wherever the tongue touched it. The result is a 'palatogram.' A 'linguogram' can be obtained by painting the palate instead and photographing the tongue surface after the speaker pronounces the target sound (see Dart, 1991, 1998 for a recent use of this traditional technique). This technique has two obvious drawbacks: only a single articulation can be measured at a time, and it is impossible to measure its trajectory.

An elaboration of this technique, 'electropalatography' (Gibbon and Nicolaidis, 1999), does away with both of these drawbacks. An artificial palate covered with a dense array of electrodes is fit to the speaker's palate. A circuit is completed whenever the speaker's tongue contacts an electrode, so the pattern and timing of electrode contacts can be used to track the tongue's contact with the palate from moment to moment in indefinitely long stretches of speech. Electropalatography is subject to two limitations: the palates must be fit individually to each speaker, so it is difficult to study more than a few speakers, and the palates do not extend back beyond the hard palate, so it is impossible to record contact made with the tongue body on the soft palate or further back.

Acoustics

The acoustic analysis of speech relies on the source-filter model of speech production (Fant, 1960). A sound source is created when the energy embodied in the flow of air through the vocal tract is transformed into sound. The first kind of sound source is the (quasi-)periodic variation in air pressure produced just above the glottis by the vibrating vocal folds in voiced sounds; trills also produce a (quasi-)periodic sound source just downstream from the vibrating soft palate, tongue tip, or lips. The second kind is the aperiodic pressure variation produced when air rushes

turbulently through a narrow channel in obstruent sounds.

The air inside the vocal tract responds to the energy in these sound sources by resonating at a number of different frequencies, which depend on the articulators' positions. Putting the articulators in one position amplifies or passes energy at some frequencies while attenuating or stopping it at others, and moving the articulators to another position changes the frequencies at which energy is passed or stopped. Because the air resonates at different frequencies depending on the positions of the articulators, positioning the articulators filters the energy in the sound source.

Before the development of digital signal-processing techniques, the principal tools for analyzing the acoustics of speech were the 'oscillograph' and the 'sound spectrograph,' which produce an 'oscillogram' and 'spectrogram,' respectively. The oscillograph is essentially a kind of kymograph, but one that measures the moment-by-moment variation in sound pressure rather than the movement of an articulator. Figure 1 is an oscillogram of the utterance 'laboratory phonetics.' Positive and negative acoustic pressures are displayed about a zero line on the vertical axis in this display, and time is displayed on the horizontal axis. This display is often referred to nowadays as a 'waveform.'

The patterns of pressure variation differ between speech sounds of different manners of articulation and phonation type. During vowels, pressure varies between larger positive and negative extremes than during most consonants; moreover, the pressure variation is periodic in vowels, as expected, given that they are produced with the vocal folds vibrating. Periodic pressure variation can also be seen during the voiced consonants [l], [b], and the two [ɹ]s in 'laboratory,' and during the [n] in 'phonetics.' In place of this periodic pressure variation, the waveform shows brief intervals of silence for the voiceless stops [t] and [k] in 'labora[t^h]ory' and 'phoneti[k]s,' respectively, and brief intervals of aperiodic pressure variation, i.e., noise, for the voiceless fricatives [f] and [s] in '[f]onetik[s].' The interval of noise following the silent interval of the [t^h] in 'labora[t^h]ory' is the aspiration indicated by the superscript '^{h}', which is characteristic of the pronunciation of voiceless stops before stressed vowels in American English. This waveform also displays another regular allophonic variant in this variety of English: the pronunciation of the /t/ in 'phone[ɾ]ics' as a tap. The tap's articulation, a very brief contact of the tongue tip to the alveolar ridge, produces the very brief attenuation of energy observable between the flanking vowels. The waveform shows that vocal fold vibration does not even falter during this consonant's pronunciation, unlike during the /t/ in 'labora[t^h]ory,' where the vocal folds stop vibrating for many milliseconds in the stop closure. Finally, pressure varies much more during the stressed first and third vowels in 'laboratory' and during the stressed second vowel in 'phonetics' than in the unstressed vowels in these words. The stressed vowels are also longer than the unstressed ones.

These observations show that waveforms can be segmented into acoustic intervals. These acoustic intervals do not correspond exactly to the transcribed segments, but nonetheless nearly all the intervals can be assigned to one of these segments – the most difficult segmentations in this example are separating the two [ɹ]s in 'laboratory' from the adjacent vowels. The size of the pressure variation distinguishes vowels

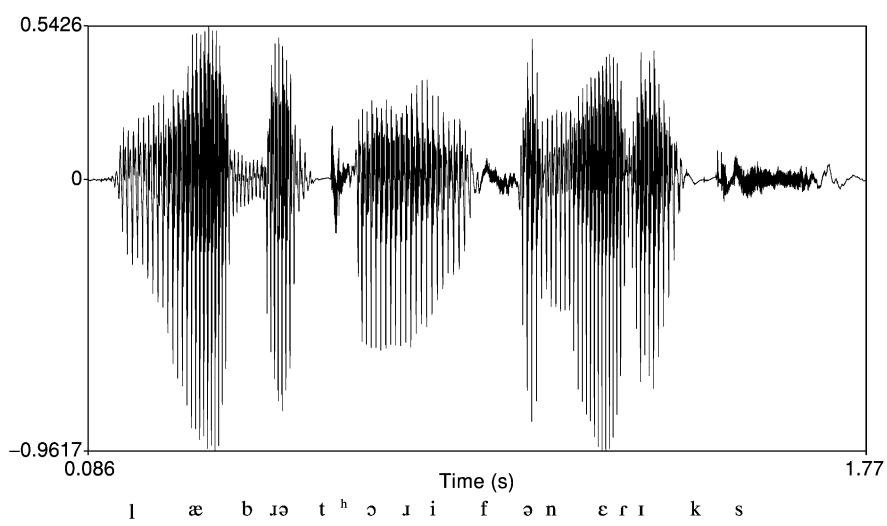

Figure 1 Waveform of the utterance 'laboratory phonetics.'

from consonants, particularly obstruents. The periodic or aperiodic nature of the pressure variation within these intervals can be used to identify their sound sources. Duration can also be measured in both vowel and consonant intervals. However, the durations of these acoustic intervals do not correspond to the durations of the articulatory movements, which begin well before the corresponding acoustic interval and end long after it. So long as the movement is occurring while the vocal tract is not completely closed or narrowly constricted, i.e., not during a stop closure or fricative constriction, then it is possible to see the acoustic effects of these movements by closely inspecting the waveform, as shown by the waveform fragment corresponding to the last three segments [ɔɹi] in 'laboratory' (Figure 2). At the points marked by the arrows, the shapes of the periods change; these changes reflect the changes in resonance frequencies brought about by moving the articulators from their positions in [ɔ] to their positions in [ɹ] and then from [ɹ] to [i].

These changes are much easier to see in a spectrogram of this utterance than the waveform (Figures 3 and 4). The spectrogram displays frequency rather than pressure on the vertical axis, against time on the horizontal axis. The darkness of the mark at a particular frequency and time in the spectrogram indicates how intense the sound is there, i.e., how strongly the air inside the vocal tract is resonating at that frequency and time. The utterance can be divided into acoustic intervals in this display, too, which correspond closely to the intervals discernable in the

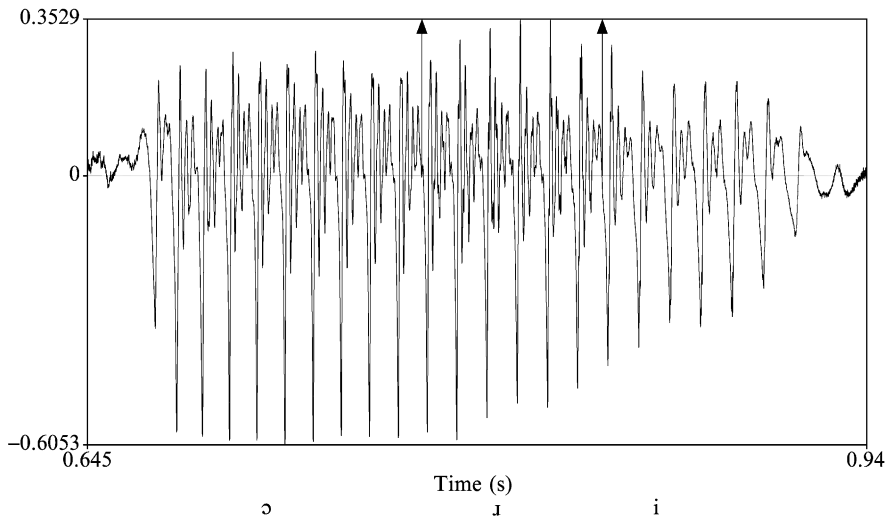

Figure 2 Waveform of the fragment [ɔɹi] from the phrase 'laboratory phonetics.' The arrows mark acoustic discontinuities that roughly correspond to the boundaries between [ɔ] and [ɹ] and between [ɹ] and [i].

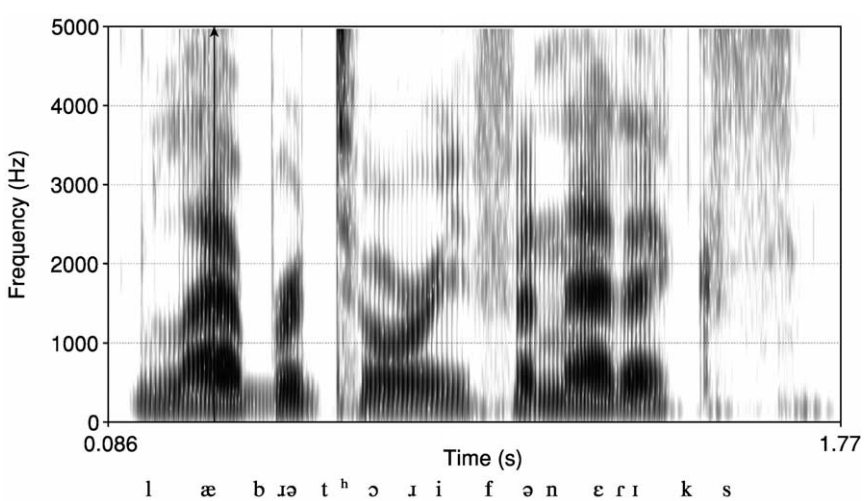

Figure 3 Spectrogram of the phrase 'laboratory phonetics,' where the analysis window is 5 ms wide. The arrow marks the center of the window for the spectrum in **Figure 5**.

waveform in Figure 1. The spectrogram shows that vowels have considerable energy spanning the range from low to high frequencies, while many consonants have much less energy; in some, e.g., the [b] in 'laboratory,' that energy does not extend above the very lowest frequencies. No energy appears, of course, at any frequency during the silent intervals corresponding to the voiceless stop closures of the [t^h] in 'labor-a[t^h]ory' and the [k] in 'phoneti[k]s.' Regular vertical striations can be seen in the intervals during which the speaker is producing a periodic sound source; each one corresponds to a single vibration of the vocal folds. Finally, time-frequency regions in which light and dark areas vary irregularly correspond to intervals of noise, when sound pressure variation is irregular, most obviously in the initial [f] and final [s] in '[f]onetik[s],' as well as the aspiration noise [^{h}] in 'laborat[^{h}]ory.'

The key piece of additional information that is provided by a spectrogram but not a waveform can be seen in the quasihorizontal dark bars visible in all the vowels and some of the consonants. These bars are called 'formants,' and they represent the ranges of frequencies within which the air in the vocal tract resonates strongly when the articulators are in a particular position. During some stretches, especially in the middle of the stressed vowels, these formants are more or less stationary, but at the edges of these stationary intervals, the formants change frequency, often quite rapidly. The stationary intervals, called 'steady-states,' are produced when the articulators are not moving much, while the intervals of formant frequency change, called 'transitions,' are produced when the articulators move from one articulatory target to another. A look at the spectrogram of the stretch corresponding to [ɔɹi]

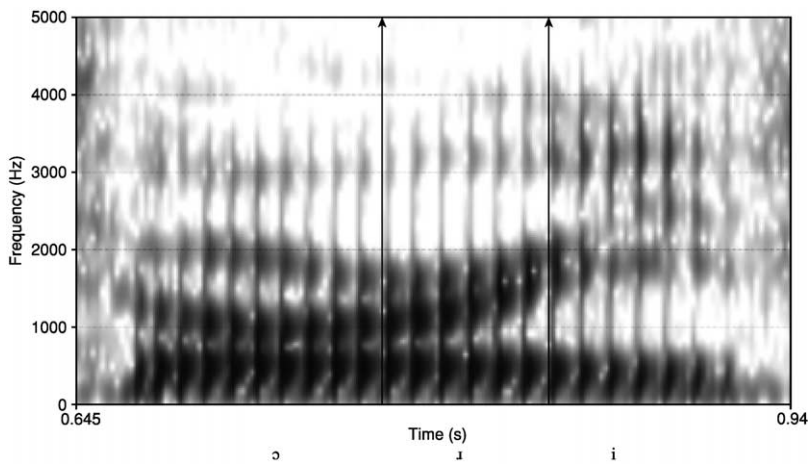

Figure 4 Waveform of the fragment [ɔɹi] from the phrase 'laboratory phonetics.' The arrows mark acoustic discontinuities that roughly correspond to the boundaries between [ɔ] and [ɹ] and between [ɹ] and [i].

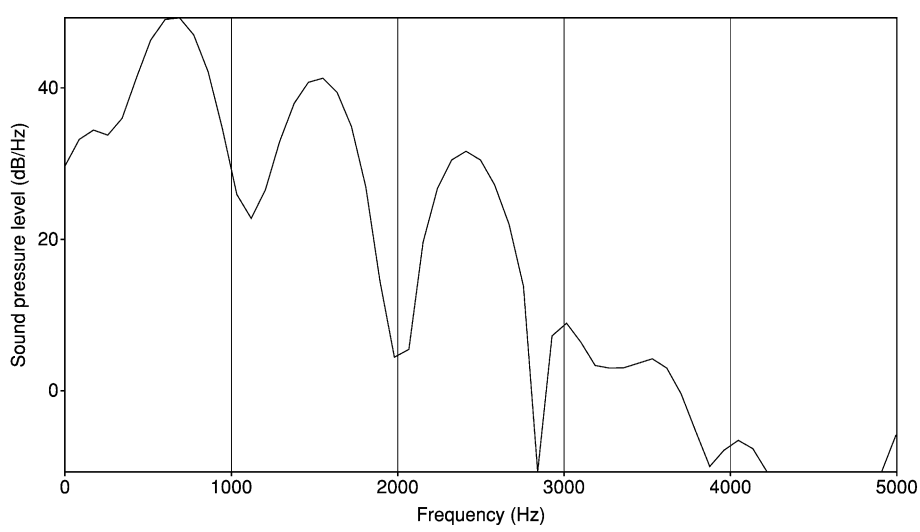

Figure 5 Spectrum of a 5-ms window centered at the arrow in **Figure 3**.

in Figure 4 shows that the formant transitions track the articulatory movements from [ɔ] to [ɹ] to [i] much more noticeably than the subtler changes in the shape of individual periods in the waveform in Figure 2.

The spectrograms in Figures 3 and 4 were produced by computing a fast-Fourier transform (FFT) of successive 5-ms windows of the utterance. A single FFT for just one 5-ms window is displayed in Figure 5. This display is called a 'spectrum,' and it plots amplitude in decibels (dB) on the vertical axis against frequency along the horizontal axis. The time when this spectrum was computed is marked in Figure 3 by an arrow; it is in the middle of the vowel [æ] in the first syllable of 'laboratory.' A comparison with the spectrogram at this moment shows that the peaks in the spectrum correspond to the formants, and the valleys correspond to the frequency ranges in which no formant can be seen.

A spectrogram in which the FFTs were calculated for successive 33.3-ms windows is shown in Figure 6. What is immediately apparent is that, compared to the original spectrogram, the boundaries between successive acoustic intervals are blurred (the vertical striations corresponding to individual cycles of vocal fold vibration have also disappeared), while at the same time the amount of energy present at each frequency is registered with much greater precision. The rule is simple: the finer the temporal resolution of the spectral analysis, the coarser the frequency resolution and vice versa.

A spectrum of the same moment in the middle of the [æ] using this longer window is displayed in Figure 7; it, too, shows the differences in energy levels at each

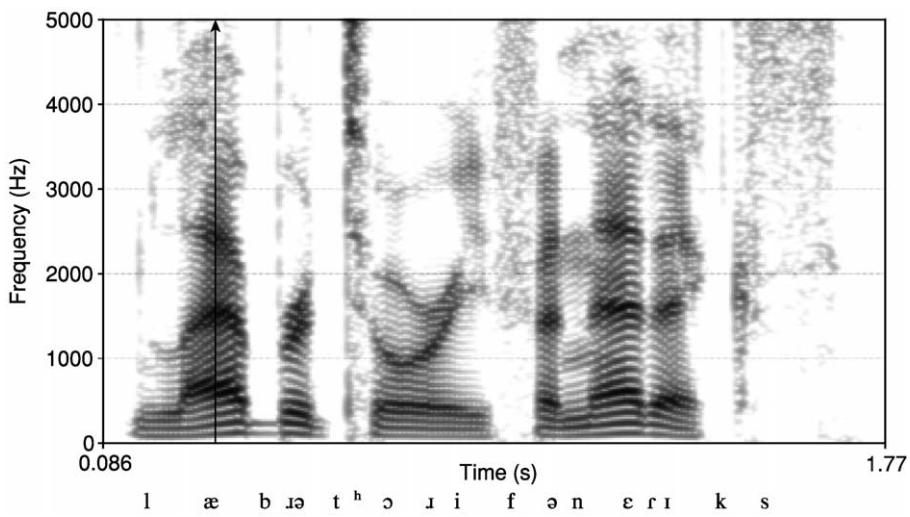

Figure 6 Spectrogram of the phrase 'laboratory phonetics' where the analysis window is 33.3 ms wide. The arrow marks the center of the window for the spectrum in **Figure 7**.

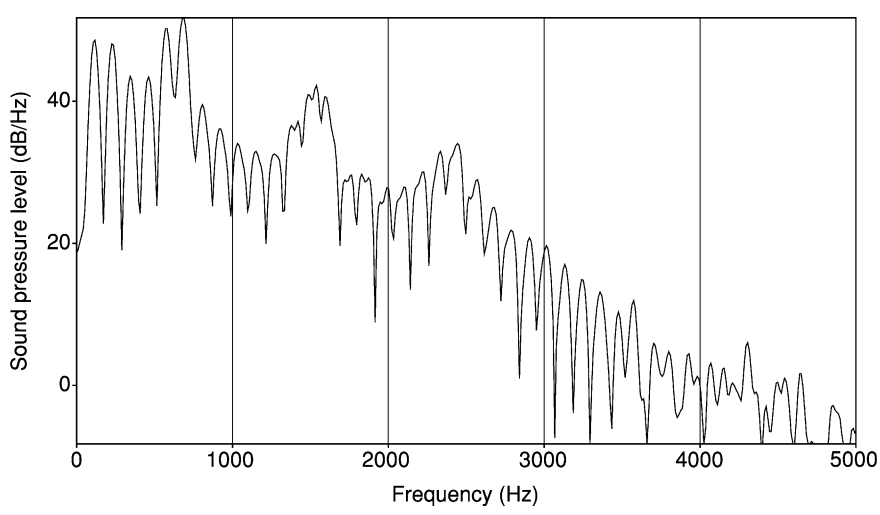

Figure 7 Spectrum of a 33.3-ms window centered at the arrow in **Figure 6**.

frequency much more precisely than did the spectrum in Figure 5. Indeed, the frequency resolution is now fine enough that the individual harmonics of the voice source are separated from one another. In the new spectrogram, the frequencies of the harmonics can be seen to rise and fall with the prosody of the utterance, peaking on the primary stressed syllables and falling to lower values elsewhere (the phrase was spoken with more or less equal prominence on both words). Even so, the coarser image of the energy distribution across frequencies can still be seen easily in the new spectrogram and spectrum. These displays make plain, then, the distinction between source and filter: the frequencies of the harmonics reflect the rise and fall in the voice source's fundamental frequency across the utterance, while their amplitudes reflect the strength of the resonant response of the air in the oral and nasal cavities at each moment in the utterance. The new spectrogram and spectrum show that a formant is produced when the resonant response of the air in the vocal tract amplifies a number of adjacent harmonics.

The spectrograms in Figures 3 and 6 correspond to what are traditionally called 'wide-' and 'narrow-band' spectrograms, so called because the wide-band spectrograms were traditionally made by measuring energy levels in successive 300-Hz-wide windows across the range of frequencies, while narrow-band spectrograms were made using a frequency window that was just 45 Hz wide. The ratio of these frequencies (6.667) is the inverse of the ratio of durations of the time windows (0.15) used in computing the spectrograms and spectra in the figures; thus, the finer the frequency resolution, the coarser the temporal resolution. Spectrograms were traditionally made using a 'spectrograph,' a device that moved filters of one or the other of these widths continuously from the bottom to the top of the frequency range of interest. The energy level within the filters at each successive frequency was transformed into a voltage, whose level determined how dark a mark was burned onto specially treated paper.

Because the harmonics of the voice's fundamental frequency (F0) are resolved in the narrow-band spectrogram, it can be used to measure how fast the vocal folds are vibrating at any moment in the utterance. But this is only one of a myriad of ways in which F0 can be measured; Hess (1983) provided a comprehensive review and evaluation of pitch extraction algorithms. The result of applying one of them – the very widely used auto-correlation method – to the utterance 'laboratory phonetics' is displayed in Figure 8. The other acoustic measure of interest is 'amplitude,' which is calculated by integrating the pressure or intensity values within successive time windows. Its time-varying values for this utterance are displayed in Figure 9.

Formant frequency values could be estimated by eye from the spectrogram in Figure 3; the wide-band spectrogram is most suitable for this purpose because it does not separate the harmonics that are amplified by the air's resonant response. However, it is often desirable to calculate these values automatically. The most widely used method for calculating them is 'linear predictive coding' (LPC) (Markel and Gray, 1976). This method predicts the next value of the signal as the weighted linear combination of some number of preceding values. The weights are chosen so that the difference between the predicted and observed signal value is as small as possible. Their values are the coefficients of a filter that would produce the observed spectrum at that moment in time when applied to a source of known characteristics – a pulse

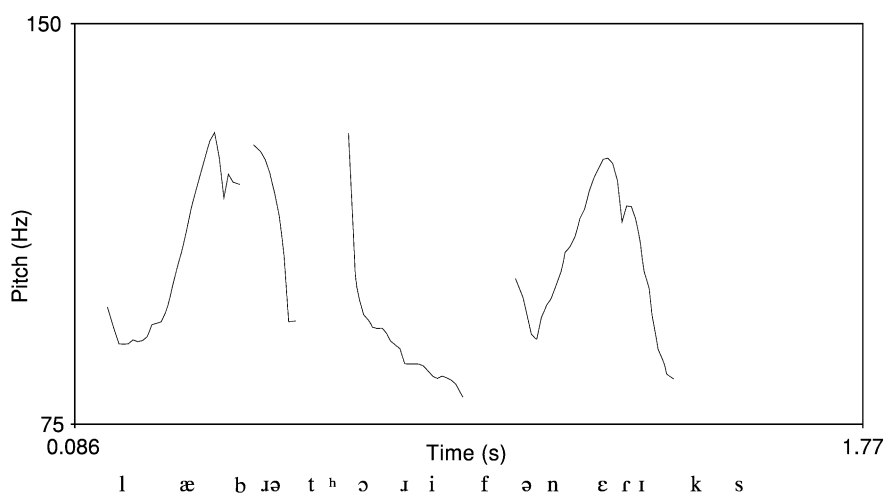

Figure 8 F0 contour of the phrase 'laboratory phonetics.'

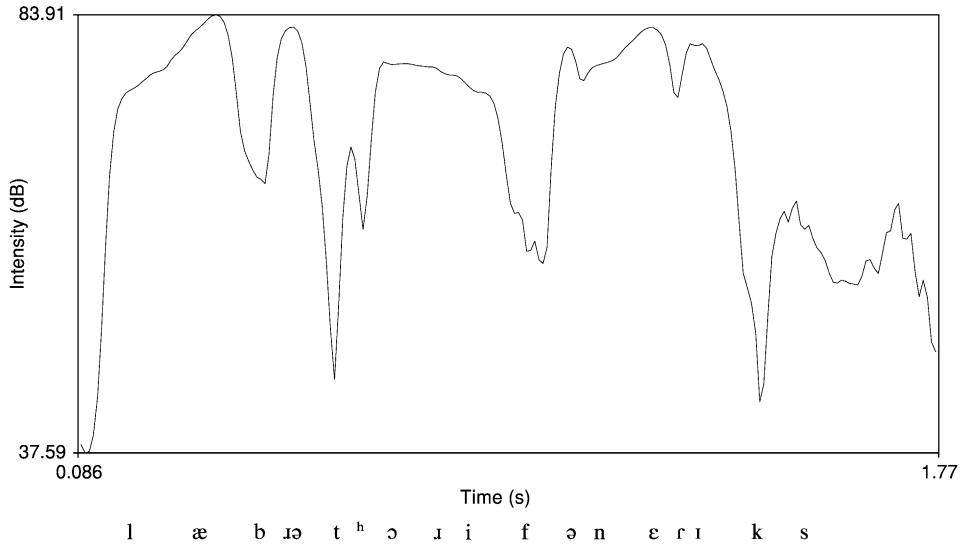

Figure 9 Amplitude contour of the phrase 'laboratory phonetics.'

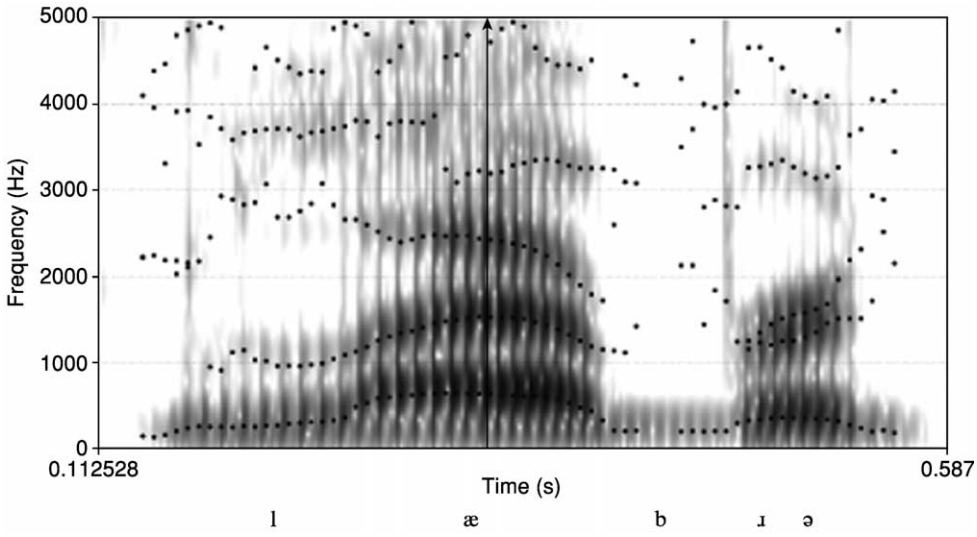

Figure 10 Spectrogram of [læɹbə] from the phrase 'laboratory phonetics' with formants tracked by linear predictive coding analysis superimposed. The arrow marks the center of the window from which the spectra in **Figures 5** and **7** were obtained.

train for periodic (voiced) stretches of the signal and broad-band noise for aperiodic (voiceless) stretches. In other words, the filter models the effects of the vocal tract's resonant response to the energy in the sound source. Because the filter is assumed to specify only the frequencies at which the resonant response amplifies energy in the source, i.e., poles, it estimates the frequencies of the peaks in the spectrum that are candidates to be formants. The number of coefficients chosen determines the number of peaks, and thus the number of formants estimated; their number should generally be greater than twice the number of peaks one wants to find. Because the next signal value is predicted from previous values, this method captures the relatively continuous change in formant frequency values. Estimates of formant frequencies using this method have been superimposed on the formants in the spectrogram of the stretch [læbɹə] from 'laboratory' in Figure 10.

Because LPC predicts the next signal value from the previous signal values, and it does so compactly by decomposing the signal into a filter and source, it is an efficient means of compressing the speech signal for transmission across a channels where a low bit-rate is desirable. For example, it is used in the Global System for Mobile Communication (GSM) standard for voice compression in mobile telephony. After the decomposed signal is transmitted, the original signal

is resynthesized by applying the filter to the source. The resynthesized rendition typically matches the original very closely. Because the signal is decomposed into filter and source characteristics, LPC resynthesis is often used to study the perceptual effects of changing the properties of one of these components while leaving the other unchanged. For example, the F0 values of the source can be changed while leaving the formant frequencies of the filter unchanged to study the perception of intonation in utterances composed of the same consonants and vowels.

Peripheral Auditory Activity

Once the acoustic signal reaches the ear, it is transduced in a series of steps from pressure variation in the air into the firing of neurons. The varying air pressure first moves the eardrum, then the middle ear bones, the inner ear fluid, the basilar membrane, and finally the hair cells sitting atop the basilar membrane. The stereocilia sticking out of the tops of the hair cells are disturbed by their movements, and that disturbance releases neurotransmitter at the synapse between the hair cells and auditory nerve neurons, causing those neurons to fire. The response to sound is then transmitted via the successive firing of neurons in brainstem nuclei, the inferior colliculus, and the thalamus, up to the auditory cortex. The specific effects of speech sounds on the mechanical stages of transduction, between movement of the eardrum and of the basilar membrane and the hair cells atop of it, have not been studied, but there have been many investigations of how the acoustic properties of speech sounds are represented in the firing patterns of neurons, particularly those in the auditory nerve (Delgutte, 1997). Because these firing patterns are measured by inserting electrodes directly into auditory nerve fibers, none of this work has been done in humans; instead, nonhuman species have been used whose auditory system's characteristics are more or less similar to that of humans, e.g., cats, chinchillas, and guinea pigs. The acoustic properties of the signal are dramatically transformed by their transduction into neuron firing in ways that could profoundly influence the perception of speech sounds, and the probable perceptual effects of these auditory transformations has been used to explain, for example, why vowels are distributed in some ways but not others in the vowel space (Lindblom, 1986) and how stops differing in voice-onset time are categorized (Kluender *et al.,* 1995; cf. Lotto and Kluender, 2002).

Central Nervous System Activity

Activity in the cortical areas of the brain has also been recorded during speech production and perception tasks using electroencephalography (EEG), magnetic encephalography (MEG), positron emission tomography (PET), and functional MRI (fMRI) (Phillips *et al.,* 2000; Phillips, 2001; Gandour *et al.,* 2002, 2003; Guenther, 2003; Guenther and Perkell, 2004). Electroencephalography records voltages at the scalp that reflect parallel currents flowing through large numbers of active neurons, while MEG records the magnetic fields generated by these current flows. The two methods have equally good temporal resolution, on the order of a millisecond or less, but they differ in the location along the cortical surface which produce the strongest signals: changes in voltage are greatest in the direction of current flow, while changes in magnetic field strength are greatest perpendicular to current flow. Electroencephalography is thus most sensitive to radial currents in the gyri, while MEG is most sensitive to such currents in the sulci. The currents that generate these fields are harder to locate in the brain with EEG than MEG, where their location can be determined within a volume equivalent to that of a cube with 5-mm sides. To keep the task of locating the currents mathematically tractable, algorithms assume that just one current is responsible for the observed fields. Because the other measurement techniques often show brain activity in multiple sites, this assumption is a gross simplification.

The other two techniques, PET and fMRI, can locate the site(s) of brain activity with much greater precision because they directly measure changes in blood supply to brain sites as their activity levels changes. As its name indicates, PET measures the emission of positrons. The positrons are emitted by radioactive tracers introduced into the blood by injection or inhalation. As the blood supply increases to a site in the brain when the neurons in that site become more active, more positrons are emitted from more active brain regions. Functional MRI also measures increases in blood flow to more active brain regions, but does so by assessing contrasts between brain sites in the extent to which the iron in hemoglobin is polarized by a strong magnetic field. Because the iron in deoxygenated hemoglobin is much more susceptible to polarization than that in oxygenated hemoglobin, such a contrast will be observed between the predominantly oxygenated blood in the arterioles on one side of a capillary bed and the predominantly deoxygenated blood in the venules on the other side. This contrast will be greater in an active brain region because the arterioles dilate to supply more oxygenated blood to more active regions. The spatial resolution of PET and fMRI is exceptionally good: differences in the numbers of positrons emitted or in magnetic contrast can be detected between volumes as small as a cube with

1 mm sides. However, temporal resolution is relatively poor because changes in blood flow take place over seconds rather than milliseconds.

Speech Synthesis

The first working speech synthesizer was built by Wolfgang von Kempelen. As described in his book, *Mechanismus der menschlichen Sprache nebst Beschreibung einer sprechenden Maschine* (1791), this mechanical device used a bellows to drive air either past an oscillating reed to simulate voiced sounds or through a shunt into the mouth chamber to simulate voiceless ones. The airflow was directed through whistles to simulate different fricative noises. Resonance frequencies were manipulated by covering the opening of the mouth or nose. After some practice, it was possible to produce quite intelligible words and even short sentences with this device.

However, the naturalness of the speech produced by this device cannot compare to that of the many instances of synthetic speech that most of us encounter regularly in the course of our daily lives, for example, when calling directory assistance, booking flights, or listening to announcements in train stations and airports. This naturalness derives only in part from the extensive use of speech synthesizers in laboratory studies of speech perception; the rest comes from a technique widely used in the construction of commercial speech synthesizers: concatenation of demisyllables. (The following account of demisyllable synthesis is greatly simplified.) Naturally produced syllables are divided into initial and final demisyllables. Initial demisyllables consist of the syllable's initial consonant(s), if any, and the transition into the vowel, and final demisyllables consist of the transition from the vowel into the syllable's final consonant(s), if any. Because the transitions between consonants and vowels contain much of the contextual variation between adjacent segments, this variation is encoded directly in the demisyllables and need not be implemented through adjustments of individual consonants and vowels. This solution to the fluent and intelligible synthesis of segment strings has permitted the developers of commercial speech synthesizers to concentrate their research efforts on the other property that bolsters naturalness and intelligibility: prosody. For this reason, demisyllable synthesis is also often used in laboratory studies of the perception of prosody.

Otherwise, most of the synthesizers used in the laboratory are of the type called 'terminal analogue' synthesizers, so called because the user directly manipulates the acoustic properties of the sound source and filter rather than the articulations that determine those acoustic properties. Early synthesizers of this type, e.g., the Pattern Playback developed by Frank Cooper at Haskins Laboratories and the OVE developed by Gunnar Fant at the Royal Institute of Technology in Stockholm, pass an electronic sound source through a filter consisting of parallel resonating circuits. The other, less commonly used method is so-called 'transmission line analogue' synthesis, in which the filter consists of a cascading series of circuits, each representing the cross-sectional area of a short section of the vocal tract. A transmission line analogue synthesizer is thus the first step toward true articulatory synthesis, in which articulators' movements and positions are simulated and their effects on the vocal tract's cross-sectional area are input to the synthesizer for transformation into resonance frequencies and bandwidths. In the last three decades, computer software has replaced electronics in both kinds of synthesizers.

Speech Recognition

If the goal of speech synthesis is to produce an utterance that sounds so natural that the listener thinks it was produced by a human rather than a machine, the goal of speech recognition is recognize the content of naturally produced speech with the same speed and skill that a human can. Successful speech recognition must overcome three very difficult challenges: different speakers' pronunciations of the same utterances differ from one another, words' pronunciations differ between contexts, and speech is often produced in the context of other speech and environmental noises. So far, no speech recognizer has successfully met all three challenges at once.

The vast majority of approaches to speech recognition use statistical pattern recognition and rely on 'hidden Markov models' (HMMs). In a Markov process, the current state depends only on previous states, and the probabilities of a transition from any previous state to the current state are fixed. The Markov model is 'hidden' when the observable states correspond to a hidden Markov process. In the application of HMMs to speech recognition, the observable states are a particular pronunciation of a word, usually encoded as a sequence of spectra, and the hidden Markov process is the speaker's intended sequence of phonemes or articulations for that word. A word is recognized based on the fixed probability that a particular observable state will occur given a particular state in the hidden model.

In principle, speech recognizers could be very useful in laboratory phonetics for explicit and precise testing of hypotheses about humans' recognition of phonemes and words. In practice, however, they have been little used for this purpose, even though phoneme and word recognition by humans is widely

acknowledged to be in part a probabilistic mapping of observable states to hidden processes, i.e., from pronunciations to stored forms. There are two reasons why such recognizers have not been used much to model humans' recognition behavior. First, phoneme and word recognition is only in part a probabilistic mapping, and there is considerable evidence that many of the hidden processes are not Markovian – they are categorical rather than probabilistic. Second, the acoustic properties that are known to influence perception are various in nature and are not easily represented as a series of spectra or any other single acoustic form.

Persistent Issues and Widely Used Experimental Techniques

In this section, a number of central problems in phonetics are described that have remained unsolved, along with the experimental techniques phoneticians have used in wrestling with them, to convey some idea of what kind of work one might see going on in present-day phonetics laboratories. The list is necessarily incomplete, but it nonetheless covers a wide range of problems.

Analysis by Synthesis

The field phonetician was described above as listening carefully to an utterance and then trying to imitate it as closely as possible. Because the phonetician knows, with some precision, how he or she pronounced the imitation, then he or she can infer that the original utterance was pronounced in the same way if the speaker accepts the imitation as accurate. A great deal of research by laboratory phoneticians uses an entirely parallel technique, called 'analysis by synthesis,' where a particular phonetic phenomenon is analyzed by attempting to synthesize it accurately. Because the workings of the synthesizer are known at least as precisely as the phonetician knows the workings of his or her vocal tract, the laboratory phonetician can also infer that the same processes produced the observed phonetic phenomenon if it is synthesized accurately. The motor theory of speech perception (Liberman *et al.*, 1967; Liberman and Mattingly, 1985, 1989) takes this approach to the point of treating it as the means that human listeners use to recognize speech sounds; they do so by simulating the articulations that would produce the acoustic properties they hear.

Another, more general use of analysis by synthesis exists in the development of quantitative models of the transformation from articulations to acoustics. The most influential of these analysis-by-synthesis models has been that developed in Fant's *An acoustic theory of speech production* (1960). Fant used radiographs of a Russian speaker pronouncing the vowels and consonants of this language to determine what the articulatory targets were for each of these sounds. The target for each sound was represented as an 'area function,' which specifies how much the oral cavity is expanded or constricted at each of a number of closely spaced locations along its length. These area functions were then put into a transmission line analogue speech synthesizer, which produced the resonance frequencies corresponding to that area function. This is analysis by synthesis, because the correctness of the articulatory configuration represented by an area function is tested by how closely the synthesizer's acoustic output matches the acoustics of the original sound. This model and its descendants (see Stevens, 1998, particularly) have since been very widely used in investigating the transformation of articulations into acoustics.

Perturbation of Articulations and Feedback

How can one begin to understand what speakers are doing when speaking fluently? Multiple articulators move continuously, tracing intricate patterns. A common answer has been to perturb the articulations in some way and observe the result. For example, bite blocks have been inserted between the teeth to remove the contribution of jaw movement to raising the tongue, and loads have been added to the lower lip to inhibit its raising toward the upper lip in closing the lips (Lindblom *et al.,* 1979; Kelso and Tuller, 1983; Abbs *et al.,* 1984). So long as the perturbation is not too extreme, speakers immediately and successfully shrug it off, i.e., they raise the tongue more independently of the jaw when the bite block prevents them from raising the jaw, and they exert more force to raise the lower lip to overcome the load and lower the upper lip more. These findings not only show what speakers' articulatory goals are but also show that they are capable of reaching those goals in more than one way, each of which is 'motor equivalent' to the others (Kelso *et al.,* 1984; Guenther, 1994). In retrospect, this outcome is unsurprising, because speakers must be capable of reaching a particular articulatory target in the context of any of the articulatory positions that can naturally precede and follow that target.

Recently, a number of studies have examined the effect of perturbing the acoustic feedback that a speaker receives about the sounds he or she has produced (Houde and Jordan, 1998; Jones and Munhall, 2002, 2003); the perturbations are introduced gradually in small, undetectable steps. Speakers adjust their pronunciations to compensate for these perturbations in feedback, just as they do to

perturbations of their articulations. A striking finding in these studies is that compensatory shifts in articulations persist for a considerable time after the perturbations cease – typically many minutes.

Invariance and Variability

Perhaps the most fundamental problem in laboratory phonetics is variability. At some level of description, both the speaker's articulatory goal in pronouncing a particular speech sound and the listener's perception of that pronunciation do not vary with context. For example, the speaker intends to pronounce the same consonant at the beginnings of the words *key* and *coo*, the voiceless velar stop /k/, and the listener perceives that speaker has done so. However, /k/'s pronunciations differ enormously between these two contexts, being far more forward on the palate before the front vowel in *key* than before the back vowel in *coo*, and the acoustics differ comparably. This example of articulatory and acoustic variability is by no means extreme, but instead typical. This example also shows that the targets speakers reach, as well as the paths their articulators follow to reach them, vary enormously if systematically as a function of a potentially very large number of flanking articulatory positions. Each of these many articulatory variants produces a corresponding acoustic variant, which the listener must somehow decode. If the speaker is trying to pronounce one of a small number of different phonemes (or distinctive feature values), which the listener is in turn trying to recognize, then this variation is a serious learning challenge to both of them. Skilled speakers have learned which combinations of articulatory movements are motor equivalent and choose the appropriate one for the current context, but how did they learn to do so? Similarly, skilled listeners have learned how context alters the intended phoneme's acoustics and adjust their criteria for evaluating those acoustics appropriately – but again, how have they learned to do so?

A number of attempts have been made to show that both articulations and acoustics are less variable than they appear. For example, when speakers pronounce vowels and consonants such as [u, ʃ] that require simultaneous articulations with the tongue and the lips, they produce less extreme lingual articulations when the labial articulation is more extreme and vice versa (Perkell *et al.,* 1993, 1998; see also Guenther *et al.,* 1999 for evidence of articulatory tradeoffs in the pronunciation of [ɹ]). This tradeoff is apparently another instance of motor equivalence, but involving entirely independent articulators. What is equivalent, moreover, is the length of the resonating cavity between the two articulations, or perhaps the acoustic product of that resonating cavity, both of which vary far less than they would if these articulations did not trade off in this way. Articulatory phonology (Browman and Goldstein, 1989, 1990, 1992) embodies a more general attempt to show that articulations are actually invariant. This theory proposes that the invariant components of utterances are not abstract feature values but instead concrete gestures that specify the location and degree of constrictions in the vocal tract. Gestures overlap with one another, so a separate component – the 'task dynamics' – is needed in the model to resolve the potentially competing demands of simultaneous gestures (Saltzman and Munhall, 1989). The actual realization of a gesture varies depending on what other gestures it overlaps with, but the gesture's presence in the utterance remains unchanged.

Acoustic invariance has been found for place of articulation in the spectral distribution of energy in the noise bursts that occur when a stop consonant is released (Stevens and Blumstein, 1978; Blumstein and Stevens, 1979, 1980) and in the relationship between the second formant's value at the onset of the transition into a vowel and its value at the vowel's steady state (Sussman *et al.,* 1991). Both measures are acoustically invariant enough that a phonetician can use them to identify the place of articulation correctly in the vast majority of tokens. However, the evidence that listeners use these acoustic invariants is weak: when the information about place of articulation in the noise burst spectra competes with that in formant transitions, which are variable with context rather than invariant, the formant transitions nearly always determine the perceived place (Walley and Carrell, 1983; Smits *et al.,* 1996a, 1996b), and the third formant must begin at a frequency specific to a particular place of articulation, if listeners are to use the relationship between the second formant's frequencies at the transition onset and vowel steady state to identify that place of articulation (Fruchter and Sussman, 1997).

Segmentation and Coarticulation

In the earlier discussion of the acoustic analysis of the phrase 'laboratory phonetics,' both the waveform and the spectrogram were divided up into a number of acoustic segments using more or less obvious visible discontinuities in the displays that corresponded to more or less dramatic acoustic discontinuities in the signal. These segments were, moreover, labeled with symbols that represent the phonemes of which the speaker's message is composed, annotated in some instances to show details of their pronunciation, e.g., the superscript ^{h} that indicates that the /t/ in 'laboratory' is aspirated. However, it is well known that the articulations that realize these phonemes

do not begin and end within the acoustic segments labeled with those symbols. Instead, they begin before (sometimes well before) those segments and end after (sometimes long after) them, i.e., they begin and end within acoustic segments that are labeled with adjacent symbols and that realize adjacent phonemes. Because the articulations of adjacent phonemes overlap or coarticulate with one another, sometimes quite extensively, it is not possible to attribute the acoustic properties of any acoustic segment to a single phoneme's pronunciation. This coarticulation and its acoustic effects are among the principal if systematic sources of the variation in speech; others are differences between speakers and differences between faster and slower speech or between hypo- and hyperarticulated speech.

Categorization and Discrimination

In the vast majority of studies of speech perception, listeners are presented with members of a continuum that differ incrementally from one extreme to another in some acoustic property that is hypothesized to distinguish one phoneme or distinctive feature value from another. The listeners' task is to assign the stimuli to one or the other of a small number of categories, which usually correspond to minimally contrasting phonemes in their native language. For example, listeners might be presented with a series of stops increasing incrementally in the onset frequency of the second formant (F2) and have to categorize them as 'b' versus 'g' (**Figure 11a**). **Figure 12a** shows typical results: listeners identify the stimuli at one end of the continuum (stimuli 0 to 1) as one category, here 'b,' and those at the other end (5 to 6) as the other, 'g,' and they cross over from hearing one category to hearing the other within a relatively narrow portion of the continuum (2 to 4). In addition to this identification task, listeners may also be presented with pairs of identical or adjacent stimuli from the continuum and asked whether they are the same or different to measure the extent to which they can discriminate stimuli that differ by a small amount in their values for the acoustic property. If the stimuli are categorized in the way they are in **Figure 12a**, then discrimination is typically poor (but unlike in the figure detectably above chance) for stimuli that are labeled the same and much better for those that are labeled differently (**Figure 12b**). Dimensions like F2 onset frequency, where the listeners' ability to discriminate two stimuli depends on the extent to which they label them differently, are described as being 'categorically' perceived.

A quite different pattern of categorization and discrimination responses is obtained for dimensions of simple nonspeech sounds, such as the frequency of a tone. When asked to categorize tones differing in frequency as having 'low' versus 'high' pitch, listeners' 'low' judgments decrease gradually rather than abruptly with frequency (**Figure 12c**), and when asked to discriminate identical or adjacent stimuli, they are more or less equally good across the range (**Figure 12d**). This pattern of results is described as 'continuous' perception.

Discrimination performance declines modestly at the high end of the continuum for continua such as the pitch of a tone because it is more difficult to distinguish sounds that differ by a fixed amount when both of their values are high than when they are both low. This effect of stimulus level on discrimination is so general that it has been codified as Weber's Law: the just noticeable difference (jnd) between two stimuli is proportional to the mean of their values for the dimension being discriminated. Discrimination is quite good for the stimulus pairs at the low end of the continuum in **Figure 12d**, because the difference in pitch between them is much greater than a jnd, but discrimination declines for pairs toward the high end, because this fixed difference gets closer and closer to the jnd. Weber's Law effects are such a general finding in discrimination tasks that failing to find then in the discrimination of categorically perceived dimensions such as F2 onset frequency is particularly surprising.

Even more surprising is the finding that F2 onset frequency is continuously rather than categorically perceived when the F2 transition is presented separately from the rest of the syllable (see the spectrograms of such stimuli in **Figure 11b**; see also Mattingly *et al.,* 1971). When presented alone, the F2 transition no longer conveys information about place of articulation; indeed, it no longer sounds like speech but instead like a nonspeech chirp or quack. This finding led to the proposal that categorical perception is a special property of humans' responses to acoustic dimensions that distinguish speech sounds from one another (Liberman *et al.,* 1967; Liberman and Mattingly, 1989). The proponents of this view are also the proponents of the motor theory of speech perception. Speech sounds are the only sounds that are perceived categorically because only they are perceived by simulating their production, and they are produced with categorically distinct and largely invariant articulations. However, nonhuman listeners perceive speech dimensions as categorically as humans do (Kuhl and Miller, 1978), and stimuli whose acoustic properties vary like analogous speech sounds but that are not recognized as speech – so-called 'nonspeech analogues' – can be perceived as categorically as speech (Pisoni, 1977; Parker *et al.,* 1986). Moreover, the articulation of particular speech sounds is

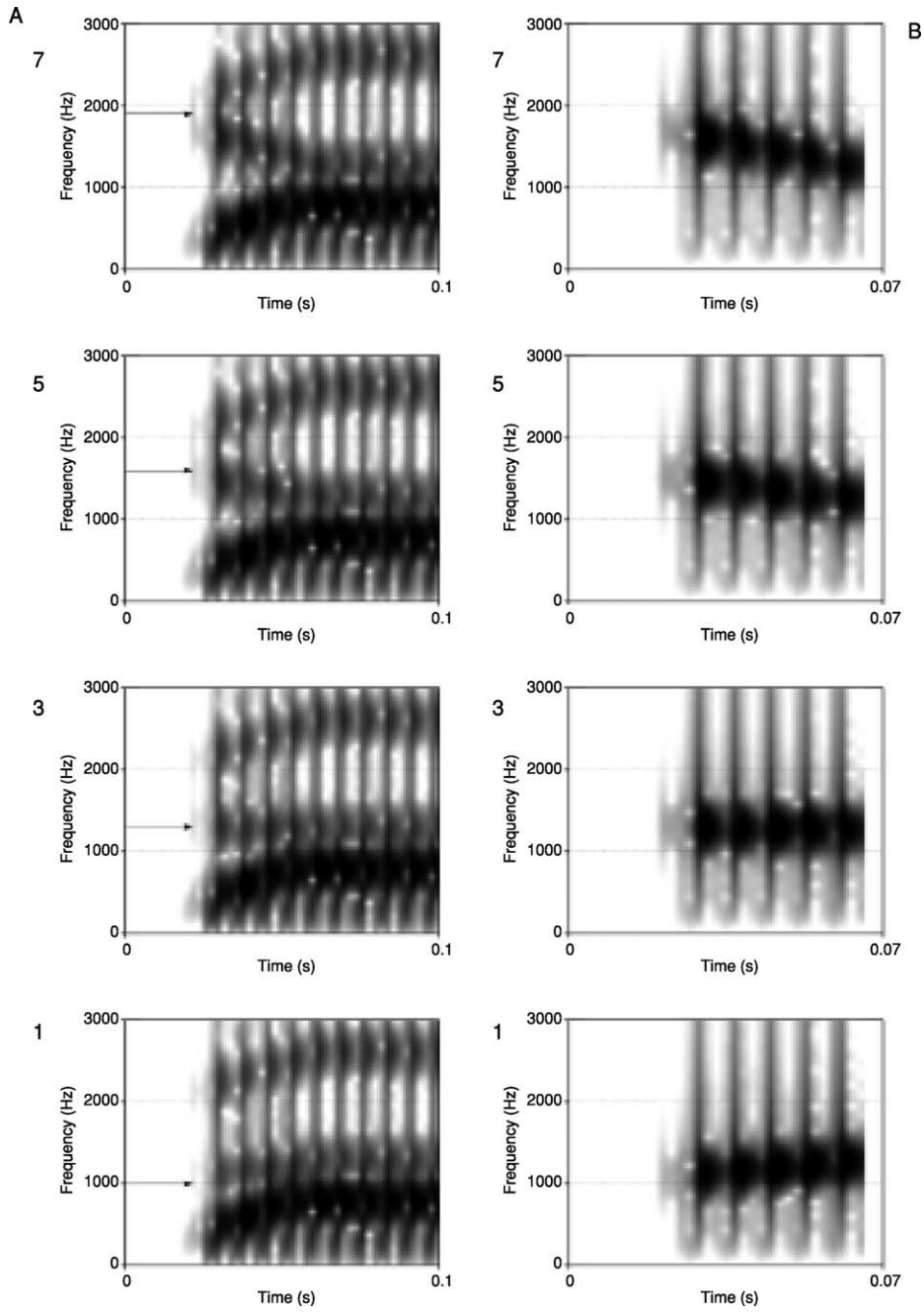

Figure 11 (A) Spectrograms of the first 100 ms of steps 1 (*bottom*), 3, 5, and 7 (*top*) in a seven-step [ba] to [ga] continuum synthesized by varying only the onset frequency of the second formant (F2). The arrows point to the onsets of F2 at 1000 (*bottom*), 1300, 1600, and 1900 Hz. (B) Spectrograms of just the F2 transitions alone.

not invariant with context, even at the level of muscle activity (MacNeilage, 1970). These findings have led others to propose that speech sounds are perceived using general auditory mechanisms rather than speech-specific ones (Diehl and Kluender, 1989).

This debate remains unresolved and now extends to evidence from studies of trading relations, i.e., the change in the perceptual value of one acoustic property by the value of another independently varied property (Repp, 1982; Parker *et al.,* 1986) and of duplex perception, i.e., simultaneous speech and non-speech percepts when the acoustic properties of a syllable are divided between the two ears (Liberman and Mattingly, 1985, 1989; Xu *et al.,* 1997; cf. Fowler and Rosenblum, 1991). The debate has also been extended theoretically with the development of the direct realist theory of speech perception (Fowler, 1986), which claims that speech sounds are perceived

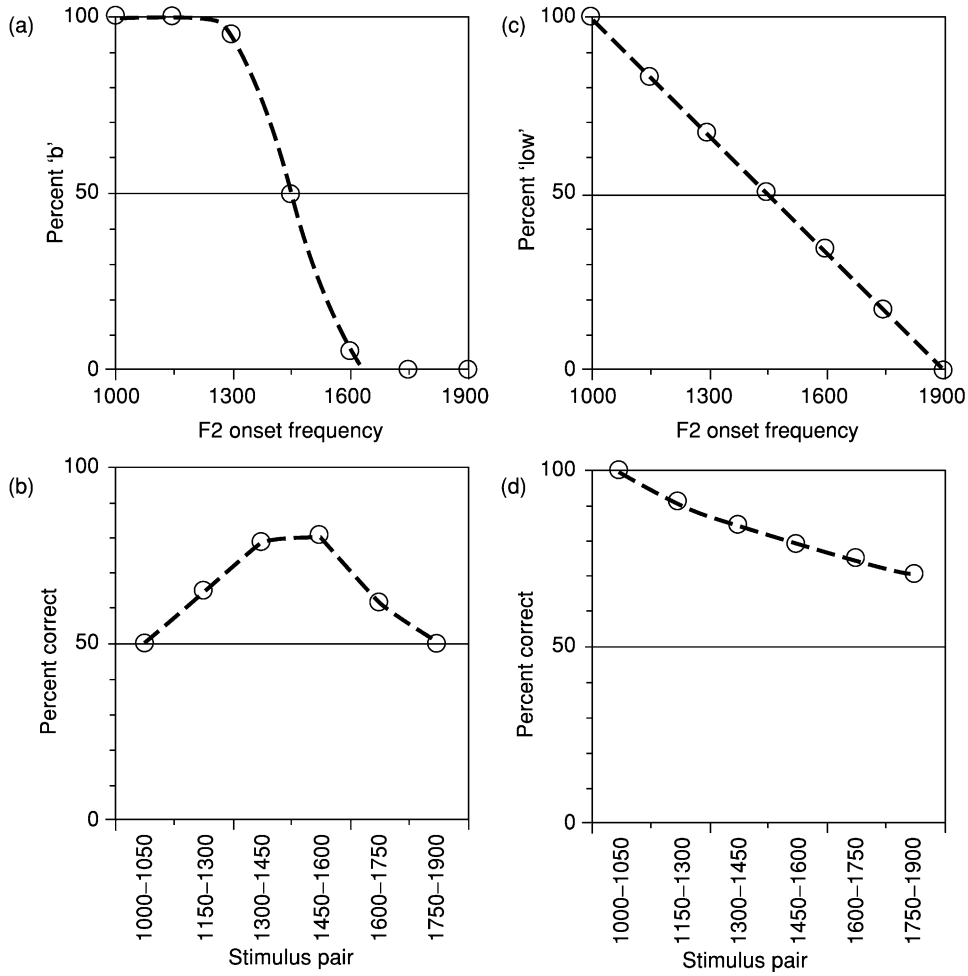

Figure 12 (a) Percent 'b' responses for categorical identification of the F2 onset continuum in **Figure 11A**, in judgments of place of articulation, and (b) percent correct in discrimination of adjacent stimuli from the continuum depicted in **Figure 11A**, – chance is 50% correct. (c) Percent 'low' responses to the frequency of a pure tone or the onset of the isolated F2 continuum depicted in **Figure 11B**, and (d) percent correct in discrimination of adjacent stimuli from the continuum depicted in **Figure 11B**. (Hypothetical data.)

no differently than other sounds – or for that matter, no differently than stimuli in other modalities: all are perceived as the events that produced them. In direct realism, speech sounds are perceived as the articulations that produce them, but unlike in the motor theory of speech perception as the actual articulations in the mouth of the speaker rather than as simulations of those articulations in the mind of the perceiver.

Phonetic Explanation and Universal Versus Language-Specific Phonetics

Many of the results of phonetic research in the laboratory have been applied very fruitfully in explaining why particular phonological patterns and sound changes recur across languages (Ohala, 1993, 1996). This application has been so fruitful because in the absence of pathology, speakers' vocal tracts and listeners' auditory apparatus work much the same way regardless of what language(s) they speak. These similarities are great enough that speakers' and listeners' phonetic behaviors are constrained in very similar ways across languages. Even so, there is also considerable evidence that speakers of different languages do not pronounce what would appear to be the same phonological categories identically, and these differences, too, may contribute to explanations of sound patterns (Keating *et al.*, 1983; Kingston and Diehl, 1994; Ladefoged and Maddieson, 1996). Until the phonetics of a much greater number of languages are thoroughly documented through careful instrumental analyses of the kinds described in this entry, it will not be possible to determine what the limits are on language-specific phonetic behavior or how far universal constraints imposed by the working of the speaking and listening apparatus extend.

Influence of Types of Linguistic Knowledge on Speech Sound Perception

Finally, in the last two decades there have been many studies of the ways in which listeners' linguistic knowledge affects their perception of speech sounds. Studies of infant listeners have shown that early in the first year of life they are capable of discriminating any sounds that a language might use to distinguish one message from another, but as they approach their first birthday, they gradually lose the ability to discriminate any sounds other than those that contrast in the ambient language (Werker and Tees, 1984; Werker and Lalonde, 1988). Infants show evidence of knowing something about the prosody of the ambient language even earlier: neonates no more than 48 hours old are capable of discriminating their mother's language (not necessarily spoken by her) from a rhythmically different language (Mehler *et al.,* 1988; Nazzi *et al.,* 1998). This ability probably arises from the neonates' having heard the rhythm of their mothers' speech transmitted through her body into the uterus, although premature neonates born as early as 7 months' gestation can also make this distinction, despite having just developed a functioning auditory apparatus (Dehaene-Lambertz, 1998). The effects of linguistic experience increasingly constrain both the speaker's ability to pronounce the sounds of another language and the listener's ability to identify them as the person matures. Even by the time a person reaches his or her fifth birthday, he or she may no longer be able to learn to pronounce or perceive the sounds of another language natively (Pallier *et al.,* 1997).

Mature listeners' perception is not only prevented from distinguishing foreign speech sounds that do not contrast in their native language, but their perception of their native language is also profoundly constrained by the kinds of knowledge they have acquired about it, of whether a particular string of sounds is a word (Ganong, 1980; Pitt and Samuel, 1993), a frequent sound sequence (Pitt and McQueen, 1998), a phonotactically legal sequence (Massaro and Cohen, 1983; Moreton, 2002), or is a word with many versus few phonologically similar neighbors (Vitevitch and Luce, 1998, 1999). The effects of this linguistic knowledge can on occasion be strong enough to produce perceptual illusions (Dupoux *et al.,* 1999) that are even reflected in the brain's earliest detectable response to speech (Dehaene-Lambertz *et al.,* 2000). There is nonetheless considerable debate among students of these effects about whether and how the initial evaluation of the incoming signal is influenced by different kinds of linguistic knowledge, with some arguing that linguistic knowledge affects processing from the outset (Elman and McClelland, 1988) and others arguing instead that linguistic knowledge only biases later decisions about what category the output of initial processing should be assigned to (Norris *et al.,* 2000; Kingston, in press).

Laboratory Speech and Synthetic Speech

Most research in laboratory phonetics uses very carefully designed materials elicited from speakers with a script to study production and equally carefully synthesized materials to study perception. Because much of this research is interested only in how a single property of the utterance is pronounced or perceived, the materials are often not even composed of words, e.g., the production or perception of voicing in intervocalic stops often uses the utterances [aba] and [apa]. Speech elicited in this way is typically very carefully articulated, and as a consequence contrasting sounds differ by large amounts in many phonetic properties. Because the phonetic differences are exhibited so extremely and profusely, this so-called 'laboratory speech' is most useful for studying how minimally contrasting sounds differ from one another. In sharp contrast, no acoustic properties other than those whose perceptual values are of interest differ in the synthetic stimuli used to study perception. This sparseness is most useful for pinpointing how an acoustic property contributes to recognizing that one category has occurred rather than another. Both laboratory speech and synthetic stimuli idealize the phonetics of an utterance and may be quite unrealistic. After all, speakers typically do not declaim their utterances with the distinctness of laboratory speech, and speech sounds in utterances that listeners typically hear differ in many acoustic properties from minimally different sounds. In an effort to study typical speech production and perception, phoneticians have begun to turn to more naturalistically pronounced speech in studying production (Docherty *et al.,* in press) and in studying perception to stimuli that differ in more than one acoustic property at a time (Kingston and Macmillan, 1995; Kingston *et al.,* 1997; Macmillan *et al.,* 1999).

Laboratory Phonology

This entry has described the problems that phoneticians study in the laboratory and the techniques and instruments they use to study them. The purpose of these studies is to discover the systematic patterns in speakers' and listeners' phonetic behavior. But, as acknowledged in the earlier discussion of speech recognition, these patterns are in large part the observable states that correspond to hidden processes, i.e., the phonological patterns of the speakers' and listeners'

language. And as also noted, the results of many studies of phonetic behavior in the laboratory have been successfully applied to explaining recurrent phonological patterns. In an effort to stimulate more investigations of the relationship or interface between phonetics and phonology, the first Laboratory Phonology Conference was held in 1987 at Ohio State University, and the ninth conference was held at the University of Illinois, Urbana-Champaign, in the summer of 2004. The proceedings from the first seven meetings have been published, and the publication of those from the eighth is imminent. As described in the introduction to the first volume (Beckman and Kingston, 1990), the purpose of the conference and proceedings is to change the research practice of both phoneticians and phonologists: to induce phoneticians to test hypotheses about phonetic behavior arising from explicit phonological analyses, and to induce phonologists to recognize that acceptance of a phonological analysis depends on experimentally confirming its predictions about phonetic behavior.

See also: Abercrombie, David (1909–1992); Delattre, Pierre (1903–1969); Evoked Potentials; Evolution of Phonetics and Phonology; Experimental and Instrumental Phonetics: History; Experimental Phonology; Fant, (Carl) Gunnar (Michael) (b. 1919); Fischer-Jørgensen, Eli (b. 1911); fMRI Studies of Language; Fry, Dennis Butler (1907–1983); Gimson, Alfred Charles (1917–1985); Helmholtz, Hermann Ludwig Ferdinand von (1821–1894); Imaging and Measurement of the Vocal Tract; Jones, Daniel (1881–1967); Kempelen, Wolfgang von (1734–1804); Klatt, Dennis H. (1938–1988); Ladefoged, Peter (b. 1925); Lehiste, Ilse (b. 1922); Magnetoencephalography; Malmberg, Bertil (1913–1994); Phonetics, Acoustic; Phonetics, Articulatory; Phonetics: Overview; Rousselot, Pierre Jean, Abbé (1846–1924); Sound Change; Speech Aerodynamics; Speech Perception; Speech Production; Speech Recognition, Audio-Visual; Speech Recognition, Automatic: History; Speech Recognition: Statistical Methods; Speech Synthesis; States of the Glottis; Sweet, Henry (1845–1912).

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Similar to several other linguists, William Labov started out in the natural sciences, as a chemist, before turning into a linguist. He studied and taught at Columbia University (1961) before becoming professor of linguistics at the University of Pennsylvania in 1970. He is considered the founder of modern sociolinguistics, initiating a paradigm of studying variation and change that has been termed 'correlative,' in that it establishes systematic correlations between social categories like class, age, sex, ethnicity, and style as independent variables, and the frequency of variants of (mostly phonological) variables as dependent variables. Apart from now widely applied concepts of variational analysis such as the 'linguistic variable' or his notion of 'style,' Labov's main early theoretical contribution may be seen in the demonstration of the structuredness of linguistic variation against the backdrop of generative disregard of performance as of less interest for the study of language. Labov is also to be credited with the first major study of urban dialects (those of New York City) and for developing a specific methodology of structured interviews of random samples of groups of speakers, which are taken to be representative both for the members of the whole group and, more implicitly, for the individual. His paradigm-setting methodology has been widely adopted for the analysis of other varieties of English and other languages. It was above all the discovery of age-based differences in the use of variants that led to insights into the micromechanisms of present-day linguistic change (Weinreich *et al.*, 1968) and was then extended into the analysis of disputed cases of historical change, such as the English Great Vowel Shift. Labov's work on variation, although focused on phonological change, was also extended into other areas, such as semantic and morphosyntactic variation. Among his major contributions to the study of diffusion patterns in linguistic change processes is the discovery that women are consistently at the forefront of changes involving social prestige, whereas men lead the way in changes motivated by 'covert prestige.'

Another focus of Labov's work concerns educational issues arising from the study of ethnic urban dialects such as African American Vernacular English, centering on grammatical differences between standard English and vernacular grammar. Labov identified

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local social group identity as a major force in explaining the absence of patterns of convergence toward the prestige standard norm. In addition, he stressed the coexistence of two equally functional but separate systems and debunked the claim that the nonstandard system was deficient in comparison to the standard system. He related the educational failure of these groups to the fact that the educational system did not take into account the difference in the systems and to the existence of a nonstandard value system that existed in opposition to that of the school, as part of local group identity. Labov attributed an even stronger effect on educational failure to the existence of negative attitudes toward nonstandard language.

Labov's more recent work continues the orientation toward urban dialectology and change as embodied in the *Atlas of North American English*, conceptualizing the pattern of phonological change observed in a notion of 'cascading' (i.e., moving in cohortal fashion from the largest city to the respective next-largest ones). The sorting out of the role of the sexes has been one of his most important contributions (cf. his extremely important article published in *Language Variation and Change*.) This attention to the role of gender in change permeates his work.

see also: English, African American Vernacular; Society and Language: Overview; Variation and Language: Overview.

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Lacan was born in Paris in 1901, studied medicine there, and gained a Ph.D. in 1932 with a thesis on paranoia. Although he was widely influential across disciplinary boundaries (by virtue of his rereading of Freud through the lens of structural linguistics), within his own scientific community he was regarded as an *enfant terrible* and excluded from national and international psychoanalytic societies. Consequently, he founded his own school of psychoanalysis (*L'École Freudienne de Paris*). Lacan worked and lived in Paris until his death in 1981.

Influenced by Claude Lévi-Strauss's structural anthropology, Lacan adopted several ideas from Ferdinand de Saussure and Roman Jakobson in his rewriting of Sigmund Freud's theory (arguing for a 'return to Freud'), the most important essays of which were published in 1966 in the *Écrits*.

His central hypothesis is that the unconscious is structured like a language, in terms of condensation (metaphor) and displacement (metonymy). He also reinterprets Saussure's conception of the linguistic sign (*signifiant* and *signifié*), arguing that there is no stable meaning, no ultimate *signifié* that the *signifiant*

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refers to. Without the existence of stable *signifiés*, the unconscious is the place of a sliding chain of *signifiants*.

Another of Lacan's well-known concepts is that of the 'mirror stage.' He suggests that the human infant is inherently fragmented and incomplete, a fact which is masked by the child's identification with its mirror image as a unified 'gestalt.' This identification process results in the formation of the self (*moi*) and causes the child's alienation from itself, the split subject. Once the child learns to use a language, it enters the Symbolic order, one of three domains of experience established by Lacan (the other two domains are the Real, where no language exists, and the Imaginary, the order of illusions). This symbolic order is regarded as the 'law' that governs the whole of man's sociocultural existence.

According to Lacan, language is also essential for any psychoanalytic exchange whose aim is to help the subject arrive at *parole pleine* ('full speech') via *parole vide* ('empty speech'), a necessary detour that enables the access of the true subject (*je*).

Although Lacan's style is very complex and idiosyncratic (and defies reading and interpretation to some extent), he had great influence, particularly on philosophy, sociology, cultural studies, and feminist theory, but also on interdisciplinary linguistic approaches such as Critical Discourse Analysis.

See also: Freud, Sigmund (1856–1939); Jakobson, Roman (1896–1982); Jakobson, Roman: Theory of the Sign; Levi-Strauss, Claude (b. 1908); Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism.

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Peter Ladefoged is the foremost phonetician of the second half of the 20th century. Trained by David Abercrombie, Ladefoged serves as a living link between a venerable tradition of British phoneticians known for articulatorily-based description and a newer generation of analysts using computers.

Born on September 17, 1925, in Sutton, England, Ladefoged received an M.A. from the University of Edinburgh in 1951, winning the Class Medal in Phonetics. Ladefoged was lecturer in phonetics at Edinburgh from 1953 to 1959, with responsibility for the Phonetics Laboratory and for teaching experimental phonetics. He received his Ph.D. from Edinburgh in 1959. From 1961 to 1962 he was a Field Fellow in the West African Languages Survey, from which he collected material for his book (1964). Ladefoged then launched an academic career at the University of California, Los Angeles (UCLA), where he established the world-famous UCLA Phonetics Laboratory and its well-regarded UCLA Working Papers in Phonetics. Ladefoged became full professor in 1965, acting as department chair from 1977 to 1980, and has been UCLA Research Linguist/Professor of Phonetics Emeritus since 1991.

After early interests in acoustic phonetics, perceptual theories of phonetics, and work on the respiratory muscles used in speech, Ladefoged collected phonetic data on West African languages and began the lifelong task of recording and analyzing speech from little-studied languages from all inhabited continents. As Fromkin (1985: xiv) wrote, he has recorded "speech from more people speaking more languages than any other phonetician has ever done." Much of Ladefoged's work has been supported by the National Science Foundation, and the data collected has often been from endangered languages.

Laver (1991: 2) has called Ladefoged's abiding contribution "the development of a descriptive phonetic theory of spoken language whose architecture rests firmly on a foundation of empirical, objective, and quantified observation." In his 1971 work, Ladefoged tried to empirically ground phonetic features and

refers to. Without the existence of stable *signifiés*, the unconscious is the place of a sliding chain of *signifiants*.

Another of Lacan's well-known concepts is that of the 'mirror stage.' He suggests that the human infant is inherently fragmented and incomplete, a fact which is masked by the child's identification with its mirror image as a unified 'gestalt.' This identification process results in the formation of the self (*moi*) and causes the child's alienation from itself, the split subject. Once the child learns to use a language, it enters the Symbolic order, one of three domains of experience established by Lacan (the other two domains are the Real, where no language exists, and the Imaginary, the order of illusions). This symbolic order is regarded as the 'law' that governs the whole of man's sociocultural existence.

According to Lacan, language is also essential for any psychoanalytic exchange whose aim is to help the subject arrive at *parole pleine* ('full speech') via *parole vide* ('empty speech'), a necessary detour that enables the access of the true subject (*je*).

Although Lacan's style is very complex and idiosyncratic (and defies reading and interpretation to some extent), he had great influence, particularly on philosophy, sociology, cultural studies, and feminist theory, but also on interdisciplinary linguistic approaches such as Critical Discourse Analysis.

See also: Freud, Sigmund (1856–1939); Jakobson, Roman (1896–1982); Jakobson, Roman: Theory of the Sign; Levi-Strauss, Claude (b. 1908); Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism.

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Ladefoged, Peter (b. 1925)

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Peter Ladefoged is the foremost phonetician of the second half of the 20th century. Trained by David Abercrombie, Ladefoged serves as a living link between a venerable tradition of British phoneticians known for articulatorily-based description and a newer generation of analysts using computers.

Born on September 17, 1925, in Sutton, England, Ladefoged received an M.A. from the University of Edinburgh in 1951, winning the Class Medal in Phonetics. Ladefoged was lecturer in phonetics at Edinburgh from 1953 to 1959, with responsibility for the Phonetics Laboratory and for teaching experimental phonetics. He received his Ph.D. from Edinburgh in 1959. From 1961 to 1962 he was a Field Fellow in the West African Languages Survey, from which he collected material for his book (1964). Ladefoged then launched an academic career at the University of California, Los Angeles (UCLA), where he established the world-famous UCLA Phonetics Laboratory and its well-regarded UCLA Working Papers in Phonetics. Ladefoged became full professor in 1965, acting as department chair from 1977 to 1980, and has been UCLA Research Linguist/Professor of Phonetics Emeritus since 1991.

After early interests in acoustic phonetics, perceptual theories of phonetics, and work on the respiratory muscles used in speech, Ladefoged collected phonetic data on West African languages and began the lifelong task of recording and analyzing speech from little-studied languages from all inhabited continents. As Fromkin (1985: xiv) wrote, he has recorded "speech from more people speaking more languages than any other phonetician has ever done." Much of Ladefoged's work has been supported by the National Science Foundation, and the data collected has often been from endangered languages.

Laver (1991: 2) has called Ladefoged's abiding contribution "the development of a descriptive phonetic theory of spoken language whose architecture rests firmly on a foundation of empirical, objective, and quantified observation." In his 1971 work, Ladefoged tried to empirically ground phonetic features and

phonetic theory in known contrasts in languages all over the world. The latest statement of this goal is the 1996 publication by Ladefoged and Maddieson.

Ladefoged is also a pedagogically effective professor. He won a Distinguished Teaching Award from UCLA in 1971, and his (1975) textbook is a classic and has trained a generation of linguists. More recent textbooks (1962 [2nd edn., 1996], 2001, 2003) incorporate new insights, techniques, and computers. In addition, Ladefoged was instrumental in making publically available a collection of sound files titled 'The Sounds of the World's Languages (now called 'UCLA Phonetic Data').'

Ladefoged has served as dissertation advisor for such prominent phoneticians as Victoria Fromkin, John Ohala, Ian Maddieson, and many others. In 1978, he served as president of the Linguistic Society of America. He was the recipient of a Gold Medal awarded at the XIIth International Congress of Phonetic Sciences in 1991, honoring his contributions to phonetics. He served as president of the International Phonetic Association and is currently an editor of its journal. Ladefoged also served as a technical consultant for George Cukor's film 'My Fair Lady,' for which he illustrated Henry Sweet's phonetic alphabet and helped equip Henry Higgins' lab.

See also: International Phonetic Association; Abercrombie, David (1909–1992); Sweet, Henry (1845–1912).

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Lado, Robert (1915–1995)

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Robert Lado was born in Florida, but his family returned to their native Spain while he was a child. When the Spanish Civil War broke out, Lado reimmigrated to the United States at age 21. He learned English while working as a sign painter, then attended college on a scholarship. Graduating with a major in English, Lado decided on a career in teaching. In graduate school he studied with University of Michigan linguist Charles C. Fries. Lado's 1950 Ph.D. thesis was on testing the proficiency of Spanish-speaking learners of English.

Lado stayed on to work with Fries as a faculty member and administrator at Michigan's English Language Institute. The ELI trained students from abroad in English as a second language, as part of a U.S. State Department–sponsored exchange program. Fries and Lado drew on midcentury American descriptive linguistics to develop language-teaching materials and techniques they called the Oral Approach. Lado created language tests and textbooks, and wrote on testing, pedagogy, and second language acquisition. His most famous publications (Lado, 1957, 1964) introduced teachers to descriptivist procedures for analyzing a language's sound system, grammar, and vocabulary. Lado argued that as a prerequisite to effective pedagogy, a teacher needs to compare the native and target languages (and cultures).

In 1960 Lado moved to Georgetown University, first as director of an ELI-like institute, later as Dean of the School of Languages and Linguistics and founder of what became Georgetown University Press. Even after retiring from full-time teaching in 1980, Lado continued his professional activities, publishing textbooks and pedagogical manuals, establishing a commercial English-language school (Lado International College), and pursuing a new research interest in teaching reading to preschoolers. Lado's

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With the eclipse of descriptive linguistics and its concept of second language learning, Lado is now best remembered as the author of *Linguistics across cultures*. In particular, he is represented as the architect of the 'Contrastive Analysis Hypothesis' – essentially the claim that wherever a learner's native and target languages differ, the learner will face difficulty and delay in acquiring the target language. Contrastive Analysis is typically presented (e.g., by Gass and Selinker, 2001) as a product of American descriptivism and Bloomfieldian behaviorism. Thomas (submitted) argues that this misconstrues the relationships of descriptivism, behaviorism, and Contrastive Analysis in Lado's (and Fries's) work: first, because Lado was not a behaviorist, and second, because his commitment to cross-linguistic comparison is not equivalent in extent or content to the Contrastive Analysis Hypothesis.

See also: Applied Linguistics: Overview and History; Fries, Charles Carpenter (1897–1967); Interlanguage; Language Teaching: History; Structuralism.

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Lahnda

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The name 'Lahnda' (Panjabi *lahiṅdā* 'western'), like the more natural feminine 'Lahndi,' is an invented blanket term without local currency used to distinguish the Indo-Aryan dialects spoken in western Panjab and the adjacent regions of Pakistan (by some 30 million speakers) from the Panjabi proper native to the central and eastern districts of the Panjab. The boundary between Lahnda and Panjabi (Shackle, 2003) is anyway an uncertain one. Many common features, e.g., retained historical geminates or the possessive marker *dā*, have been reinforced by overlapping literary traditions. Since the 1990s, however, local politicocultural movements have emphasized the distinctive character of some varieties of Lahnda, and the southern Seraiki (Ser) (Saraiki) and to a lesser extent the northern Hindko (also termed Pahari or Panjistani) are beginning to be employed as independent literary languages consciously rivaling Pakistani Panjabi (Pj). Written in the Perso-Urdu script, all three incipient standards are considerably influenced by Urdu.

Siraiki

The rather homogeneous southwestern Seraiki dialects (Shackle, 1976) are notably distinguished from Panjabi by the retention of historical aspiration and the development of four implosive phonemes /ɠ, ʄ, ɗ, ɓ/, shared with Sindhi, thus Sanskrit *baddha-* 'bound' > Pj /bə´dda/ but Ser /' ɓəddha/, Sindhi /' ɓədho/.

Distinctive Seraiki morphological features include the passive extension /-ˈi-/ and the sigmatic future, with stressed extension of transitive stems, e.g., Ser /kəˈresi/ 'will do', passive /kəˈrisi/ versus Pj /kə´rega, ˈkita ja´vega/; and a full set of suffixed pronouns, often entailing shifted stress, e.g., /ˈkita/ 'did', /ˈkitum/ 'I did', /kɪˈtose/ 'we did'. Common lexical distinctions include Ser /vəɲɲaɳ/ 'to go', future /væsi/, versus Pj /jaɳa, ja´vega/, and the Ser objective and ablative postpositions /kũ, kənũ/ versus Pj /nũ, tõ/. Typical Seraiki shibboleths appear in /əˈkhɪomɪs jo sakũ ɓəhũ jəldi vəɲɲa posi/ [*told-me-him that us- to very quick going fall-will*] 'I told him that we should have to go very early', where /əˈkhɪomɪs/ has a double suffix (/ˈakhɪa/ + 1SG /-m/ + 3SG /-s/), versus the analytic Pj /mæ̃ o´nũ akhɪa pəi sanũ bɔ´t jəldi jaɳa pə´vega/.

Hindko

Hindko is the term locally used to cover the heterogeneous northern dialects spoken in the hilly areas above the Salt Range (Shackle, 1980). These include the well-described Awankari (Aw) (Bahri, 1963) and the very different Hindko of Peshawar city (Pe). Like

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See also: Pakistan: Language Situation; Punjabi.

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Lak

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Introduction

The Lak language (*Ethnologue* code LBE) belongs to the Daghestanian branch of the Nakh-Daghestanian family and has over 200 000 speakers, mostly in the Republic of Daghestan, Russian Federation (maps of the region are available through the website 'Thesaurus Indogermanischer Text- und Sprachmaterialien (TITUS)'; see Relevant Websites, at the end of this article). The Lak self-designation is *Lak* (adjective *Lak:u*); other terms include Turkish *Beyaz lezgi* 'White Lezgian' and *Kazikumux*, after Kumux, the main aul (village) of Lakkia and the former center of a feudal state. Lak glosses started around 1600; whole texts appeared in 1734. Lak was written in the Arabic Alphabet until 1928, then in Latin until 1938, and finally in Cyrillic. Lak has five dialects; the standard language is based on Kumux.

Phonology

The Lak vowels are /a, i, u/, all of which can be distinctively pharyngealized, which results in their allophonic centralization [æˤ, eˤ, øˤ]. The Lak consonants are shown in **Table 1**. Geminate (emphatic) consonants are realized as simple unaspirated, except in prevocalic (and, for stops, noninitial) position. Consonant labialization is distinctive in some dialects, and vowel length and stress interact.

Table 1 Lak consonants

b	p	p:	p'							w		m
d	t	t:	t'	c	c:	c'	z	s	s:	r	l	n
				č	č:	č'	ž	š	š:	j		
g	k	k:	k'					x̂	x̂:			
	q	q:	q'				ǧ	x̌	x̌:			
								ħ				
	ʔ							h				

Morphology

Lak has four noun classes: I = male sentient, II = mature female sentient, III = other animate and some inanimate, and IV = inanimate and a few lower animals. Any part of speech can take class agreement markers, which are prefixed, infixed, and/or suffixed. Lak nouns have four stems, e.g., nominative (= absolutive) singular, as in *q:at:a* 'house'; oblique singular, as in *q:at-lu-*; nominative plural, as in *q:at-ri*; and oblique plural, as in *q:at-ra-*. There are more than 30 stem formants. Case endings attach agglutinatively to the oblique. The three core cases are nominative-Ø, genitive *-l*, and dative *-n*. Secondary cases include addressive/possessive *-x̂*, admotive/dative -2-*x̌:un*, ablative/involuntative/possibilitive *-š:a*, and comitative *-š:al*. A few other affixes attach to the oblique and/or nominative stems.

Lak has six oblique locational affixes (LA) to which five movement affixes (MA) can attach, forming potentially 30 local cases. Not all local cases occur in all combinations or with all substantives, but, unlike spatial postpositions (which take the genitive), local cases have nonlocational functions and cannot govern across a conjunction (abbreviations: IMP, imperative; SG, singular; NOM, nominative; GEN, genitive; EMPH, emphatic; OBL, oblique; PL, plural; INF, infinitive).

oˤwč-a	wi-l-a	dus-tura-j-n	
invite-IMP	you.SG-GEN-EMPH	friend-OBL.PL-on.LA-to.MA	
wa	malla-na-j-n	pulaw	b-uk-an
and	mullah-OBL-on.LA-to.MA	pilaf(III)	III-eat-INF

'Invite your friends and the mullah to eat pilaf'.

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d	t	tː	t'	c	cː	c'	z	s	sː	r	l	n
				č	čː	č'	ž	š	šː	j		
g	k	kː	k'					x̂	x̂ː			
	q	qː	q'				ǧ	x̌	x̌ː			
								ħ				
	ʔ							h				

Morphology

Lak has four noun classes: I = male sentient, II = mature female sentient, III = other animate and some inanimate, and IV = inanimate and a few lower animals. Any part of speech can take class agreement markers, which are prefixed, infixed, and/or suffixed. Lak nouns have four stems, e.g., nominative (= absolutive) singular, as in *qːatːa* 'house'; oblique singular, as in *qːat-lu-*; nominative plural, as in *qːat-ri*; and oblique plural, as in *qːat-ra-*. There are more than 30 stem formants. Case endings attach agglutinatively to the oblique. The three core cases are nominative-Ø, genitive *-l*, and dative *-n*. Secondary cases include addressive/possessive *-x̂*, admotive/dative -2-*x̌ːun*, ablative/involuntative/possibilitive *-šːa*, and comitative *-šːal*. A few other affixes attach to the oblique and/or nominative stems.

Lak has six oblique locational affixes (LA) to which five movement affixes (MA) can attach, forming potentially 30 local cases. Not all local cases occur in all combinations or with all substantives, but, unlike spatial postpositions (which take the genitive), local cases have nonlocational functions and cannot govern across a conjunction (abbreviations: IMP, imperative; SG, singular; NOM, nominative; GEN, genitive; EMPH, emphatic; OBL, oblique; PL, plural; INF, infinitive).

oˤwč-a	wi-l-a	dus-tura-j-n	
invite-IMP	you.SG-GEN-EMPH	friend-OBL.PL-on.LA-to.MA	
wa	malla-na-j-n	pulaw	b-uk-an
and	mullah-OBL-on.LA-to.MA	pilaf(III)	III-eat-INF

'Invite your friends and the mullah to eat pilaf'.

Lak has five sets of deictics, which also serve as third-person markers: *wa*, near the speaker, new information; *mu*, relevant to the addressee, old information; *ta*, opposite, level (older unmarked); *ga*, unmarked (older below speaker); and *k'a*, above speaker. The verb has three aspectual stems, perfective/unmarked (*buc-in* 'bring-INF'), durative in *-la-* (*buc-la-n*), and iterative in *-awa-* (*buc-awa-n*). Synthetic forms of the marked aspects occur only in the present and future. The infinitive serves as the base for the future. Past tense forms usually have a class marker infixed before the last root consonant, and an infixed negator (indicative *qːa-*, imperative *ma-*) precedes the infixed class marker. The verb has numerous synthetic and analytic paradigms marking aspect, tense, mood, and evidential, some with marking for person as well as class and number.

Syntax

Lak is basically object-verb, attributive/genitive-head; it has pragmatically conditioned free word order and a mixed ergative/accusative system. The converbs *ban* 'to do' and *x̂un* 'to become' are the most frequent markers of transitive/causative vs. intransitive, respectively. For the agent of an ordinary transitive verb, personal pronouns (first and second person) remain in the nominative; other agents take the genitive, which also functions as ergative. Case assignment and verb agreement also depend on the semantics of the verb, focus, and the pragmatic implications of the clause. Experiencers take dative; ability and accident are marked by ablative. Complement clauses trigger class III agreement. The following sentences are illustrative (a resumed morpheme interrupted by a class marker is indicated by <$>; GER, gerund; PRES, present; ABL, ablative; DAT, dative; ABS, absolutive; DUR, durative aspect; PA, perfective aspect).

ga-na-l k'ili d-a-r-x̌ː-unu
he-OBL(I)-GEN saddle(IV) IV-sell-IV-$-PAST.GER
Ø-u-r
I-be-3SG.PRES
'He has sold the saddle'.

ga-na-l k'ili d-a-r-x̌ː-unu
he-OBL(I)-GEN saddle(IV) IV-sell-IV-$-PAST.GER
d-u-r
IV-be-3SG.PRES
'Apparently he sold the saddle'.

ga-na-šːa k'ili d-a-r-x̌ː-unu
he-OBL(I)-ABL saddle(IV) IV-sell-IV-$-PAST.GER
d-u-r
IV-be-3SG.PRES
'He accidentally sold the saddle'.

ga-na-n k'ili d-ax̌ːan čːa-j
he-OBL(I)-DAT saddle(IV) IV-sell-INF want-PRES.GER
b-u-r
III-be-3SG.PRES
'He wants to sell the saddle'.

ga-na-šˑa k'ili d-ax̌ː-an
he-OBL(I)-ABL saddle (IV) IV-sell-INF
b-uˀq-la-j b-u-r
III-can-DUR-PRES.GER III-be-3SG.PRES
'He can sell the saddle'.

ni-tːi-l qːat-lu-w-un-m-aj
mother(II)-OBL-GEN house-OBL-in(LA)-toward(MA)-III-$
čːat' la-w-s-un na-j
bread(III) bring-III-$-PA.GER go-PRES.GER
b-u-r
III-be-3SG.PRES
'Mother brings bread into the house'.

ninu qːat-lu-wun-m-aj
mother(II).ABS house-OBL-in(LA)-toward(MA)-III-$
čːat' la-w-sun na-j
bread(III) bring-III-$-PA.GER go-PRES.GER
d-u-r
II-be-3SG.PRES
'Bread is brought by mother into the house'.

ninu qːat-lu-wun-n-aj
mother(II).ABS house-OBL-in(LA)-toward(MA)-II-$
čːat' la-w-sun na-j d-u-r
bread(III) bring-III-$-PA.GER go-PRES.GER II-be-3SG.PRES
'It is mother who brings bread into the house'.

See also: Caucasian Languages; Russian Federation: Language Situation.

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Lakota

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Introduction

Lakota is one of a group of closely related dialects sometimes referred to by linguists as Dakotan. These include Lakota in the west, Dakota in the east, Nakota in the north, and Nakoda in the northwest. The speakers of Lakota and Dakota were traditionally referred to in English as the Sioux, those of Nakota as the Assiniboine, and those of Nakoda as the Stoney. Lakota and Dakota are mutually intelligible. Reports differ as to how far Nakota and Nakoda are intelligible with the other two. Dakotan is part of a group of languages known as Siouan-Caddoan centered mainly on the central plains and prairies, but also represented on the eastern seaboard.

Reports on the number of speakers of Lakota range from 6000 to 20 000. Great efforts are being made to preserve the language in schools, colleges, and universities in the region and there is probably a considerable degree of partial or receptive knowledge of it.

Morphology

Major word classes of Lakota are noun, verb, adverb, postposition, demonstrative, pronoun, and conjunction. The verb in particular can be regarded as polysynthetic and noun incorporation occurs in the verb and adverb. The functions often covered by adjectives in other languages are covered in Lakota by stative verbs and adverbs.

The verb system is of the split intransitive type, where agents occur only in the Active verb class while patients occur with the Active and Stative types. These are marked in the verb by prefixes or infixes as shown below:

agent marker	patient marker
wa-'I'	ma-'me'
ya-'you'	ni-'you'
uŋ(k)-'we' ('you and I')	uŋ(k)-'us' ('you and me')
	wicʿa-'them' (animate)

composite pronoun prefix
cʿi-'I (agent)-you (patient)'

Plurality in the third and second person and inclusiveness of third persons in the first plural is marked by a suffix *-pi*. The occurrence of these markers with the two verb types is shown below:

Active verb *u* 'to come'

sing, exclusive		plur, inclusive	
wau	'I come'		
yau	'you (sing) come'	yaupi	'you (plur) come'
u	'he, she, it comes'	upi	'they (animate) come'
uŋku	'we (excl) come'	uŋkupi	'we (incl) come'

Stative verb *kʿuja* 'be ill'

sing, exclusive		plur, inclusive	
makʿuje	'I am ill'		
nikʿuje	'you (sing) are ill'	nikʿujapi	'you (plur) are ill'
kʿuje	'he is ill'	kʿujapi	'they are ill'
uŋkʿuje	'we (excl) are ill'	uŋkʿujapi	'we (incl) are ill'

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nikʿuje	'you (sing) are ill'	nikʿujapi	'you (plur) are ill'
kʿuje	'he is ill'	kʿujapi	'they are ill'
uŋkʿuje	'we (excl) are ill'	uŋkʿujapi	'we (incl) are ill'

Forms with both agent and patient prefixes, showing some infixed, are shown with the active verb *ole* 'to seek': *owicʿawale* 'I seek them', *owicʿayale* 'you (sing) seek them', *ocʿile* 'I seek you (sing)', *ocʿilepi* 'I seek you (plur)', *onile* 'he seeks you (sing)', *uŋkonilepi* 'we (incl) seek you', *omayale* 'you (sing) seek me', *uŋkoyalepi* 'you (plur) seek us (incl)'.

Nouns do not show number distinctions, but may mark a possessor as in *mi-hiŋgna* 'my husband', *ni-hiŋgna* 'your husband', *mi-cʿiŋkši* 'my son', *cʿiŋkši-tku* 'his, her son'. Other nominal prefixes may distinguish noun classes such as instruments as in *wi-cʿapʿe* 'fork', abstract concepts as in *wo-slolye* 'knowledge', time and space concepts as in *o-apʿe* 'hour', *o-makʿa* 'year', *o-napʿe* 'refuge'.

Word Derivation

Word derivation is by affixation and compounding. Adverbs are formed with a suffix *-ya*, *-yela* or *-yaŋ* from stative verbs as in *waśte* 'be good', *waśte-ya* 'well', *ska* 'be white', *ska-yela* 'whitely', *wakʿaŋ* 'be sacred', *wakʿaŋ-yaŋ* 'in a sacred manner'. Adverbs are widely used to state characteristics of objects often with the verb *haŋ/he* 'stand' as in *maȟpiya waŋ ska-yela he* 'a cloud stood whitely' meaning 'there was a white cloud', *op'osya he* 'it stood coldly and clearly' meaning 'the weather was cold and clear'. Postpositions can be formed from adverbs by a prefix *i-* as in *wiyoȟpeyata* 'in the west', *i-wiyoȟ-peyata* 'to the west of'.

A set of circumstantial stems are important in forming verbs, adverbs, wh-words and postpositions as in *tokʿeca* 'be somehow', *hecʿeca* 'be like this', *iyecʿeca* 'be like', *tokʿel* 'how', *hecʿel* 'like this', *iyecʿel* 'like, as' from a stem **-kʿecʿa/-kʿel* indicating 'quality'. Other such stems are **-haŋ* 'time', **-kʿetu* 'occurrence', **-nakeca* 'number', **-haŋkeca* '(extent', yielding among others *hehaŋ* 'then', *tohaŋ* 'when', *iyehaŋtu* 'be time for', *hecʿetu* 'happen thus', *iyecʿetu* 'happen as', *iyenakeca* 'be as many as', *iyena* 'as many as', *tonakeca* 'how many', *tohaŋyaŋ* 'how far', *iyehaŋyaŋ* 'as far as'.

Syntax

Word order is generally agent-patient-verb as in *wicʿaśa ki cʿiŋkšitku ki ole* 'the man looked for his son.' Relative clauses are marked by the use of *waŋ* 'one', *ki* 'the' and *he* 'that' as in *wicʿaśa waŋ cʿiŋkšitku ki ole ki he owale* 'I looked for the man who was looking for his son.' Sentences can be embedded in higher sentences by using *ki/k'uŋ* 'the' and by certain postpositions as in *cʿiŋkšitku ki ole ki slolwaye* 'I know that he was looking for his son', *cʿiŋkšitku tʿi ekta wau* 'I came to where his son lived'.

Nouns can be incorporated into verbs and verbs subordinated to other verbs by preposing, often also with stem truncation, as in *šuŋg-ole* 'he looked for horses', *šuŋg-manuŋ* 'he stole horses', *šuŋg-ole-mani* 'he traveled looking for horses' (*šuŋg-* ≪ *šuŋka* 'horse, dog'), *iŋyaŋg-mani* 'he traveled running' (*iŋyaŋg-* ≪ *iŋyaŋka* 'run'), *kaȟ-ši* 'ask to make' (*kaȟ-* ≪ *kaġa* 'make').

Men's and Women's Speech

These are distinguished by certain sentence-final particles of high frequency of occurrence shown below.

		male speaker	female speaker
declarative		-yelo, -welo, -kšto	-ye, -we, -kšto
interrogative		-hwo (*-he* informally)	-he
imperative	sing	-yo, -wo	-ye, -we
	plur	-po	-pe

See also: Caddoan Languages; Polysynthetic Language: Central Siberian Yupik; Siouan Languages; United States of America: Language Situation.

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Lancelot, Claude (1615–1695)

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Born in Paris, Claude Lancelot entered the Saint Nicolas seminary in 1627, received tonsure in 1628, and became a member of the clergy without being ordained a priest. He studied theology, philosophy, and the classical languages, and also learned two modern Romance languages, viz., Spanish and Italian. Attracted by the doctrine of Saint-Cyran, he became one of the 'solitaires' at Port-Royal (near Paris), where a modern type of (individualized) education of young children was set up in the form of 'small schools' (*petites écoles*).

Lancelot (whose pseudonym was Sir de Trigny) was responsible for the grammatical instruction of the young pupils of these schools, mostly noble youngsters; he wrote manuals for their use, thus publishing a wide range of grammars, all inspired by the then widespread demand of 'methodical order and progression.' In 1644, he published a 'new method' for the teaching of Latin (the fifth edition, of 1656, incorporates important changes brought about by Lancelot's discovery of the works of F. Sanctius, G. J. Vossius, and G. Scioppius), in 1655 a 'new method' for the study of Greek, and in 1660 two 'methodical' manuals for Italian and Spanish. Also in 1660, the anonymous *Grammaire générale et raisonnée* [*de Port-Royal*], appeared; its authors were the theologian and logician A. Arnauld and Lancelot. The work, which offers a didactically oriented discussion on the nature and function of language (seen as a hierarchically-structured system of signs) and the content of grammatical categories (esp. word classes and their *accidentia*), stands at the beginning of the trend of 'general (or philosophical) grammars' in modern times.

Lancelot had a practical, modernist conception of grammar teaching; he preferred to start from the native language of the pupil, and laid stress on a clear typographical presentation, the use of synoptic tables, structural progression in teaching, and intelligent classroom use of high-quality literary texts.

In 1660, the Port-Royal schools were suppressed by royal order, and Lancelot first became a private preceptor, then a Cistercian monk (in the abbey of Saint-Cyran). He was ordained subdeacon in 1673, but left the abbey in order to become a Benedictine in Quimperlé, where he died on April 15, 1695.

See also: Arnauld, Antoine (1612–1694); Sanctius, Franciscus (1523–1600).

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Landau-Kleffner Syndrome

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Landau-Kleffner syndrome (LKS), also called acquired epileptic aphasia, was first described by Landau and Kleffner in 1957. This syndrome is a rare childhood neurological disorder characterized by the sudden or gradual loss of receptive and expressive language skills and paroxysmal electroencephalographic (EEG) abnormalities. The EEG abnormalities are characterized by spikes, sharp waves, or spike–wave discharges usually recorded bilaterally and mainly over the temporoparietal (perisylvian) regions (Tuchman and Rapin, 2002). However, in 15% of cases, the epileptiform discharges are reported to be unilateral and

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See also: Arnauld, Antoine (1612–1694); Sanctius, Franciscus (1523–1600).

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Landau-Kleffner Syndrome

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Landau-Kleffner syndrome (LKS), also called acquired epileptic aphasia, was first described by Landau and Kleffner in 1957. This syndrome is a rare childhood neurological disorder characterized by the sudden or gradual loss of receptive and expressive language skills and paroxysmal electroencephalographic (EEG) abnormalities. The EEG abnormalities are characterized by spikes, sharp waves, or spike–wave discharges usually recorded bilaterally and mainly over the temporoparietal (perisylvian) regions (Tuchman and Rapin, 2002). However, in 15% of cases, the epileptiform discharges are reported to be unilateral and

show temporal lobe predominance. The major characteristic of LKS is the presence of continuous spike-and-waves EEG discharges during 85% of the slow sleep period (Hirsh *et al.*, 1990). All six children with LKS in the Lewine *et al.* (1997) study showed continuous spike-and-waves during slow sleep (CSWS). Onset of aphasia in LKS typically occurs between 3 and 9 years of age. There is sex predominance with a male:-female ratio of approximately 2:1. Although language regression is the key feature of clinically typical LKS, cognitive and behavioral dysfunctions such as motor hyperactivity, decreased attention, aggressiveness, and social withdrawal can also accompany this disorder (Pearl *et al.*, 2001).

Clinical epileptic seizures are seen in many of the affected children either before or after the onset of aphasia (Beaumanoir, 1992). Although 70–80% of patients show seizures (Hirsch *et al.*, 1990), epilepsy is not an essential criterion for the diagnosis of LKS, in contrast to the EEG abnormalities that are present in all LKS cases (Beaumanoir, 1992; Sobel *et al.*, 2000). The usual types of epilepsy observed in LKS may be simple partial motor, generalized tonic–clonic, or atypical absence seizures (Beaumanoir, 1992; Metz-Lutz *et al.*, 1999; Morrell *et al.*, 1995). Myoclonic and tonic seizures are uncommon (Deonna, 1991). In general, the seizures are easily controlled with anticonvulsive medication and, like the EEG abnormalities, remit by the end of adolescence (Beaumanoir, 1992; Hirsch *et al.*, 1990). The etiology of LKS remains unknown and may be due to diverse causes. Some cases of LKS have been associated with toxoplasmosis (Michalowicz *et al.*, 1989), inflammatory demyelinating illness (Perniola *et al.*, 1993), temporal lobe tumor (Nass *et al.*, 1993; Solomon *et al.*, 1993), and neurocysticercosis (Otero *et al.*, 1989).

There is no evidence of anatomical brain lesions. Furthermore, the results of computed tomographic scan (Guerreiro *et al.*, 1996; Hirsch *et al.*, 1990) and magnetic resonance imaging (Hirsch *et al.*, 1990) appear normal. However, single-photon-emission computed tomography and positron-emission tomography (PET) studies have shown unilateral left temporoparietal or bitemporal abnormalities as manifested by increased glucose utilization (Guerreiro *et al.*, 1996; Rintahaka *et al.*, 1995).

Linguistic Aspects

The first manifestation of the language disturbance in LKS is an apparent 'word deafness' or verbal auditory agnosia, occurring in a child with previously normal language development. In many cases, this auditory agnosia extends to familiar sounds including bells, whistles, or a ringing phone (Pearl *et al.*, 2001). Generally, it is the first symptom preceding the epileptic manifestations and expressive language dysfunction. At first, these children may appear to be deaf. However, hearing tests, such as brainstem auditory evoked responses and conventional audiologic assessment, usually reveal normal conduction of acoustic stimuli from peripheral level to the primary auditory cerebral cortex (Pearl *et al.*, 2001). Thus, some authors consider this auditory recognition impairment as a specific deficit in higher phonological decoding processes (e.g., Korkman *et al.*, 1998), and others focus on the dissociation between auditory and phonological processing (Plaza *et al.*, 2001).

The second manifestation of language dysfunction is characterized by an impaired expressive communication. There is a progressive decline in the vocabulary of the affected child accompanied by difficulties in articulation and telegraphic speech disturbances (Metz-Lutz *et al.*, 1999). The expressive language dysfunction gradually increases and leads to frank mutism (Beaumanoir, 1992; Metz-Lutz *et al.*, 1999; Morrell *et al.*, 1995; Pearl *et al.*, 2001). Paraphasias and neologisms are often observed before the complete loss of expressive language (Metz-Lutz *et al.*, 1999). Agrammatism, echolalia, anomia, and phonetic distortion have also been reported in some cases of LKS (Paquier *et al.*, 1992).

Language disturbance may fluctuate significantly during the course of LKS, with remissions and exacerbations (Lanzi *et al.*, 1994; Pearl *et al.*, 2001), but total recovery is uncommon (Santos *et al.*, 2002). Although spontaneous recovery has been reported (Santos *et al.*, 2002; Deonna *et al.*, 1989), the majority of children with LKS are left with significant language deficits (e.g., severe dyslexia, severe to moderate expressive aphasia, or global aphasia; Bishop, 1985; Deonna *et al.*, 1989). Morrell *et al.* (1995) have proposed that excessive epileptic discharge during the childhood period of language development, in children with LKS, results in functionally inappropriate synaptogenesis and then deficient synaptic pruning in the same regions subserving language function. Thus, nonfunctional synaptic contacts remain in the language cortex even after the epileptic process has disappeared, leaving residual language deficits. Older children, who have learned to read and write, may lose these abilities in the course of the disease. However, a partial retention of writing skills may suggest a better prognosis in the re-education phase (Beaumanoir, 1992).

Originally, Landau and Kleffner (1957) reported a correlation between the degree of language dysfunction and the severity of the EEG abnormalities. However, the relationship between EEG and aphasia in LKS is not clear and still controversial. Some authors

have shown considerable speech recovery in patients with the disappearance of EEG abnormalities when successfully treated with anticonvulsant medication (Lanzi *et al.*, 1994; Morrell *et al.*, 1995; Sobel *et al.*, 2000). Others have shown no association between linguistic abilities and EEG abnormalities. Improvement or worsening of aphasia occurs independently of the EEG abnormalities (Deonna, 1991). In contrast to the hypothesis initially proposed by Landau and Kleffner, Holmes and Riviello (2001) suggested that the epileptic discharges are the epiphenomena of the underlying pathology of cerebral speech areas, rather than the cause of the aphasia. Metz-Lutz *et al.* (1999) associated the persisting verbal impairments in LKS patients with a phonological short-term memory deficit. A PET study has shown less activation in the right and left superior temporal gyri of adults who recovered from LKS during a task of serial words recall (Majerus *et al.*, 2003).

Treatment and Prognosis

As most authors have emphasized, the seizure disorder and the EEG abnormalities tend to remit by the age of 12 or 13, whereas language dysfunction persists into adulthood to variable degrees (Deonna, 1991; Metz-Lutz *et al.*, 1999; Morrell *et al.*, 1995). However, case studies report variable prognosis concerning the evolution of language dysfunction in LKS children. Few children recover completely from their aphasia (Santos *et al.*, 2002), whereas others show complete absence of speech (Deonna, 1991). Nevertheless, the majority of LKS patients show partial recovery of linguistic abilities. A late outcome study investigating late auditory evoked potentials over the temporal areas previously involved by epileptic discharges has revealed a permanent dysfunction in the associative auditory cortex, characterized by a unilateral extinction on dichotic listening tests (Wioland *et al.*, 2001). To compensate for language deprivation during the active period of LKS, rehabilitation strategies, such as sign language or cued speech, are particularly encouraged (Gordon, 2004; Metz-Lutz *et al.*, 1999). These compensatory strategies provide an alternative means of communication that may facilitate recovery of speech and language.

According to Bishop (1985), an important factor negatively influencing language prognosis is the early age of onset (i.e., before the age of 5 years). Another critical factor influencing prognosis is the duration of the EEG abnormalities and the period of CSWS. As suggested by Morell *et al.* (1995), the long-term effect of the epileptiform discharges on brain cells of a cortical area results in the disruption of normal axonal pruning. Grote *et al.*'s (1999) study, in which the patients with the shortest duration of illness were most improved, provides good support for this hypothesis.

One question is how reading and spelling could be acquired by children with LKS. A recent case study of a girl (subject M.M.) followed for five years and after recovery (Plaza, 2004), focused on written language, which M.M. acquired in spite of persistent but heterogeneous phonological impairment (efficient retrieval of phonological information from long-term memory, restriction of working memory and slow processing in phonological awareness tasks). M.M. developed above-average reading and spelling skills, notably for real words, and gradually mastered pseudoword reading. However, she remained impaired in pseudoword spelling. The fact that M.M.'s performance on pseudoword tasks was poor when the stimuli were presented auditorily, and more efficient when they were presented visually, suggested that the observed phonological impairment was (1) due to a deficit at the level of cortical auditory processing, and (2) related to the temporal lobe dysfunction observed through the long-lasting right channel extinction in dichotic listening tasks.

The treatment of LKS aims at eliminating or reducing the epileptiform activity early in the course of the disease and includes anticonvulsants (Marescaux *et al.*, 1990), immunoglobulin (Mikati and Saab, 2000), and corticosteroid (Tsuru *et al.*, 2000) therapies. However, the outcome on language following pharmacological treatment remains variable and unpredictable. In the case of intractable epilepsy, multiple subpial transection surgery, a more radical and controversial therapeutic method, has met with successful results (Grote *et al.*, 1999; Morell *et al.*, 1995).

In summary, LKS provides an important model of the way in which epilepsy can affect language and cognition. This language disorder reinforces the hypothesis that focal epileptic activity occurring during a critical period of brain maturation may result in a permanent cerebral dysfunction which nevertheless can be compensated for by cognitive strategies.

See also: Aphasia Syndromes; Autism and Asperger Syndrome: A Spectrum of Disability; Developmental Relationship between Language and Cognition.

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Ronald W. Langacker was born on December 27, 1942 in Fond du Lac (Wisconsin, USA). He graduated from the University of Illinois in 1966 before moving to the University of California at San Diego, where he now occupies a chair of linguistics. At the beginning of his career he did fieldwork, notably on Luiseño and Papago (O'odham) (two Uto-Aztecan languages). The outcome was a four-volume survey on Uto-Aztecan languages for which Langacker himself wrote a general introduction and assumed editorial control. His contribution to Uto-Aztecan linguistics also includes a monograph bearing on reciprocal/reflexive predicates and their relation to passives and impersonals.

In the mid-1970s, Langacker laid the foundations of a theoretical framework called 'space grammar.' This designation was apparently motivated by the idea that linguistic facts, like vision, involve a perspective on situations from a vantage point centered on ego. This theory was notably applied to the analysis of English epistemic modals, whose order was correlated with a layered structure of conceptualizations.

The theory was renamed 'cognitive grammar' in the 1980s (for an introduction, see Langacker, 1982 and 1986). It is cognitive in several respects: (1) grammatical notions are given definitions that appeal to properties of perceptual representations, e.g., the grammatical subject and object are defined in terms of figure/ground organization of conceptualized situations; (2) linguistic structures are formed and categorized by cognitive processes that are shared by other cognitive systems. Thus, the ability to form phrase schemas rests on the capacity for abstracting commonalities from inputs instantiating any more abstract structure; since this is a psychological process, schemas of various degrees of generality may proliferate (cognitive grammar seeks no economical representation of linguistic structures); (3) linguistic representations are structured like other representations; for instance, membership in a category is not an all-or-nothing affair but a matter of degrees (typicality effects); (4) some linguistic phenomena reflect the operation of 'imagery,' i.e., the ability to form alternate construals of the same situation. Thus, ergative and accusative systems are claimed to reflect 'conceptual paths' originating from, respectively, the undergoer of a process and the initiator of an action; (5) the conceptualization of reality is based on cognitive models of the world, in particular, a naive physical theory of causal interactions.

Cognitive grammar has become a major theoretical trend within cognitive linguistics. Further, after the creation of the journal *Cognitive Linguistics* and of the International Cognitive Linguistics Association (in 1989), cognitive grammar has gained an international influence.

See also: Cognitive Grammar; Uto-Aztecan Languages.

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Language Acquisition Research Methods

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As a subdiscipline of psycholinguistics the broad aim of language acquisition research is to understand the architecture and development of the language faculty. In fulfilling this aim, child language researchers are faced with a problem pervasive in all disciplines of science: data collection relies on observation, which is indirect and theory dependent. To overcome this problem researchers use a vast array of research methodologies that provide convergent evidence for or against a current position or theory. This article surveys the types of methods that are used in the field.

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Naturalistic Speech Data

Researchers have collected naturalistic speech data from children as far back as Darwin (1877). This was done initially using diary studies, whereby researchers recorded the child's speech in a logbook. The focus was on phonological, lexical, or syntactic development. The collection of naturalistic speech data was revolutionized by the technological advances that enabled children's speech to be recorded. This was particularly the case for researchers studying phonological development, where recording enabled more accurate categorization of speech patterns. Brown's (1973) longitudinal study of three English-speaking children set the standard for the discipline. The construction of an electronic archive of children's transcribed naturalistic speech, the Child Language Data Exchange System (CHILDES; see MacWhinney, 2000), has enabled researchers from all over the world to share and use data to answer a multitude of research questions.

Naturalistic speech data has numerous advantages. In particular, longitudinal data can be useful for identifying general developmental trends. This is particularly useful for languages that have not been studied extensively (Demuth, 1996). The disadvantage of naturalistic speech data is that such data can underestimate children's knowledge, since children do not always say what they know. Furthermore, low-frequency linguistic patterns are unlikely to be recorded, since practical limitations in data collection mean that naturalistic studies record only a small percentage of children's total speech (Tomasello and Stahl, 2004). It is for these reasons that experimental data are useful for determining children's linguistic knowledge.

Experimental Approaches

Experimental approaches to the study of child language probe either children's production or comprehension. The choice to study production or comprehension depends on one's research question, as does the particular method used. Since children are generally assumed to understand more than they say (Shipley *et al.*, 1969), comprehension tasks enable researchers to test the limits of children's linguistic knowledge. On the other hand, children's productive use of language in experimental settings can potentially enable researchers to make strong claims about the abstractness of knowledge, for instance, knowledge of syntactic and phrasal categories, or discourse competence, such as when children correctly use various linguistic devices to introduce and resume reference to entities in discourse.

Production Tasks

There are numerous ways to elicit language from children in experimental settings. Since children are not aware of the linguistic target of interest, such studies must be carefully designed to restrict the range of linguistic options that children can produce. For instance, Berko's (1958) 'Wug' test investigated children's morphosyntactic knowledge by creating an appropriate sentential context. Variants of this task, which make use of novel words, are still being used in present-day research. Other researchers have been successful in eliciting various syntactic forms from children (Crain and Thornton, 1998). Such studies show that target forms can be elicited when the correct aspects of the environment are manipulated and when children are probed with questions that constrain potential answers. Syntactic priming, where children are primed with a target structure prior to being required to produce language, is another method that increases the chance that a particular structure will be produced. Another production method that is useful for investigating children's syntactic knowledge is elicited imitation. In this method, children repeat sentences spoken to them by an experimenter. Exact repetitions suggest that children are competent with the structure under investigation. Children's spontaneous changes to the test structure can provide some insights into the child's analysis and interpretation of the adult model.

A less constrained method of eliciting language from children is to collect narrative data. One particularly useful method has been to ask children to describe picture books in which a protagonist engages in an activity attractive to children. One book on which there is a substantial amount of data is Mayer's (1969) *Frog, Where Are You?* (see Berman and Slobin, 1994). Narrative data provide useful insights into children's knowledge of discourse devices, such as referent introduction and anaphora, and into the discourse bases of grammatical constructions that encode both new and old information, such as many types of complex sentences. Referential communication tasks (see Lloyd *et al.*, 1998) enable one to investigate children's communicative competence and, in particular, their understanding of conversational implicatures. This method therefore indicates children's understanding of a conversational partner's discourse knowledge.

Comprehension Tasks

Comprehension tasks provide the experimenter with a greater degree of control over the outcome of an experiment than do production tasks. This is largely because children's linguistic knowledge is inferred

from certain behaviors; for instance, their preference for one interpretation or referent over another, or their 'yes/no' judgment of the grammatical acceptability of a sentence. Since children's knowledge is inferred from their behavior, researchers must be careful to design studies with exclusionary criteria that identify children who are using non-linguistic strategies in the task, such as always providing affirmative judgments of sentences on every trial of an experiment investigating children's grammaticality judgments.

Tasks that require children to select a referent or interpretation from a set are useful because they can be used to test children's knowledge at either the lexical or the sentential level. Either pictures or real objects can be used in word learning experiments; experiments conducted at the sentential level, where a number of interpretations are provided, generally use pictures. The preferential looking and preferential listening paradigms provide alternative dependent measures; they use the continuous variables of looking or listening time to infer children's knowledge (Fernald, 1985; Golinkoff *et al.*, 1987; Jusczyk, 1997). These tasks are useful because they can be used with very young infants, since tasks demands are greatly reduced. Preferential listening (or 'head preference') is most often used to investigate children's speech perception. This technique can, for instance, probe children's sensitivity to the phonotactic regularities and phonemic contrasts of their input language. It can also be used to investigate young children's sensitivity to prosody. One disadvantage of preferential looking and listening is that they yield rather noisy individual data and therefore require one to test enough participants to ensure that stable behavioral patterns are observed.

One popular comprehension method is the act-out task, where children are provided with toy figurines that act as referents for participants in test sentences. The act-out methodology is flexible enough to be used for variety of syntactic phenomena. One disadvantage is that the task imposes considerable demands on children, who must process the test sentence and translate their interpretations onto the toy referents provided (Hamburger and Crain, 1987). This problem can be partially alleviated by providing discourse contexts to test sentences. Another set of methods that probe children's comprehension are judgment tasks. These require children to provide yes/no judgments about the acceptability of linguistic stimuli. When used with very young children, these tasks usually involve a puppet who, the child is informed, "hasn't learned to talk properly" (Lloyd and Donaldson, 1976). The child is then required to judge whether the puppet has used the correct language in a given situation. Metalinguistic tasks, such as grammaticality judgments, which are generally conducted with older children (Bialystok, 1986; Wufleck, 1993), simply require a yes/no response. These tasks enable the researcher to determine which aspects of language children find acceptable, and are particularly useful for probing syntactic knowledge.

One final set of comprehension tasks are those that yield 'on-line' reaction time data. There are many on-line techniques, but the best are those that do not require children to read. Some techniques traditionally used to test adults have been developed for use with children, such as mispronunciation detection, cross-modal priming, word monitoring (see McKee, 1996), and self-paced listening (Booth *et al.*, 2000). These 'button-pressing' techniques require children to make decisions about different aspects of language (e.g., lexical decisions, judgments, and comprehension questions). Finally, the eye-tracking technique records children's eye movements to toys or pictures as they hear a test sentence (Trueswell *et al.*, 1999). One clear advantage of on-line tasks is that they explicitly test children's parsing systems, which can in turn suggest the aspects of language that children are most sensitive to as they hear it.

Comparative Methods

Comparative studies in child language research take one of two forms: comparative studies of methods and cross-linguistic comparisons. The former are generally conducted within a given language and provide convergent evidence for the psychological reality of an observed experimental phenomenon (e.g., a comparison of naturalistic and experimental data). The latter have been used extensively in acquisition research to identify universal features of the acquisition process. This approach has been taken by Slobin *et al.* (1985, 1992, 1997). Extensive cross-linguistic data have also been collected on children's comprehension strategies (MacWhinney and Bates, 1989) and children's narrative (Berman and Slobin, 1994). Furthermore, ethnographic research investigates how socialization influences acquisition, recognizing that the child learns language in a rich social context (Ochs and Schieffelin, 1995).

Computational Approaches

Data collected from human participants enable researchers to hypothesize acquisition mechanisms and suggest potential architectural aspects of the language faculty. However, as noted previously, these phenomena are not directly observable. Computational approaches to language acquisition enable

researchers to build hypothesized architectures that are augmented by learning mechanisms and compare the output of these models to data from human participants. Since the manner in which computational models learn language is more transparent than that of the child, computational research provides valuable insights into the acquisition process. There are many different families of computational architectures. One popular computational approach in child language research has been connectionism (Rumelhardt and McClelland, 1986; Elman *et al.*, 1996), but other symbolic approaches have made equally significant contributions (Brent, 1997).

Standardized Language Tests

Standardized language tests provide population norming data from which individual children's linguistic knowledge can be estimated relative to their age. This information is useful for a number of reasons. First, many comprehensive tests can be used to diagnose language impairment. Second, standardized language tests can be used to estimate the language level of special populations so that individuals can be matched with normally developing children of the same language ability for purposes of comparison.

Which Method Is Best?

Every method has its advantages and disadvantages. In general, a researcher's choice of method depends on the research question and the age range of the children who will participate in the study. For instance, most on-line methods are unsuitable for children under the age of 3 years, who generally do not understand the requirements of the task. Conversely, preference techniques such as preferential looking and listening are generally suitable only for infants, as older children will quickly become bored with the task. Certain methods are more suitable than others for certain linguistic phenomena. For instance, if studied experimentally, children's syntactic knowledge is best investigated using techniques such as act-out, elicited imitation, or elicited production, where it is possible to manipulate the language children hear or the contexts that lead to the use of different grammatical structures. The acquisition of concrete lexical categories such as nouns is best investigated using preference methods such as picture or referent selection and preferential looking.

The choice of the method will affect the choice of statistics one uses to analyze the data. Cross-sectional designs, which test a number of different age groups, will generally require parametric or nonparametric statistics, depending on the dependent measure. It is possible to analyze longitudinal naturalistic speech data using advanced statistical techniques such as regression or time-series modeling, provided one has enough data points and the assumptions of the statistical technique are not violated. However, sometimes a research question can be answered using simple statistical conventions, such as reporting mean values for variables of interest.

Conclusion

There are numerous methods available for investigating child language acquisition. Choosing a particular method will depend on a number of factors, including the research question, the age of the children to be tested, and other practical considerations, such as expense. The range of methods available enables researchers to approach problems from a number of angles, which can serve to strengthen theoretical claims if convergent evidence is yielded using different methodologies.

See also: CHILDES Database; Cross-Linguistic Comparative Approaches to Language Acquisition.

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Language Adaptation and Modernization

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Introduction

'Language adaptation' refers to linguistic change, whether deliberate or spontaneous, whose goal is to adapt a language to the changed or changing needs of its speech community. The term is nearly synonymous with 'language modernization,' as the needs of a speech community are often a function of the times. Coulmas (1989: 1) argued that the term 'modernization' is less suitable, as it is often taken to refer to the present day. Language adaptation is a relatively new term in sociolinguistics, but the phenomenon affects all languages at all times.

The field of language adaptation and modernization largely intersects with that of language planning (*see* **Language Planning and Policy: Models**) in that a language is sometimes deliberately adapted to fulfill new roles. Natural language adaptation is spontaneous and is unconsciously undertaken by its own speech community. Intervention is necessary only when a language, previously excluded for some reason from certain domains of use, suddenly needs to be used for those functions. It is therefore desirable to distinguish between linguistic change that comes about naturally and that which is forced.

Factors Influencing (Deliberate) Language Adaptation

Dominance and Domain Exclusion

Many of the world's language communities are dominated in some way by another language community that is politically, economically, or numerically more powerful (cf. Tollefson, 1991: 14). The dominant community's language becomes the medium for the higher domains of language use (*see* **Pragmatics: Linguistic Imperialism; Power and Pragmatics**), such as government, media, education, technology, and commerce, to the exclusion of the dominated language.

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Because the dominated languages are excluded from these higher domains, their lexicons, for example, do not keep up with the development of the dominant language as new terms are coined to describe new phenomena and experiences. The need for language adaptation is often recognized when there is a change, or a push for change, in the social structures that keep the dominance relationship between language communities intact. When this happens, and the (previously) dominated language is required as a medium for the higher domains, it is often found to be inadequate in terms of technology, modes of expression, etc.

Domain exclusion also impacts upon a language's speech community on a social level. A language that is excluded from the higher domains of language use is reserved for the lower or more basic domains, i.e., the home and community environment. This means that they will not be perceived as tools for economic advancement and will consequently suffer from low status and prestige (*see* **Language Planning and Policy: Models**; **Pragmatics: Linguistic Imperialism**). The language becomes stigmatized, even in its own community, and members of the language community who seek economic advancement will seek to acquire the dominant language. If the status of a language in such a position is not improved, it may well face obsolescence.

The postcolonial experience of many African and Asian nations in the mid-to-late 20th century was a proving ground for the dominated indigenous languages. The colonial languages had almost invariably been used as media for the higher domains, to the exclusion of the indigenous languages (Phillipson, 1993: 112, Chap. 5). The demise of colonialism meant that many countries were faced with a dilemma: whether to retain the colonial language as a high-domain medium or replace it with one or more indigenous languages. Retaining the colonial language carried unpleasant connotations, but it was already developed enough to cope as the medium of a modern industrial state and was entrenched in that role (Schmied, 1991: 19). The indigenous languages, on the other hand, had been excluded from the higher domains and had neither the status nor the corpus (*see* **Language Planning and Policy: Models**) to cope with their new roles. Although the indigenous languages were often instituted as symbolic official languages, the colonial languages was retained for higher domain use in most cases (Schmied, 1991: 20). Although the dominance of colonial languages, particularly those that offer global access, is all but assured (Laitin, 1992: 181), there is a concerted effort for the functional expansion of indigenous languages.

The Transition from Oracy to Literacy

The move from oracy (*see* **Oracy Education**) to literacy (*see* **Literacy Practices in Sociocultural Perspective**) also creates a need for language adaptation. Indeed, the need for a written language where there was none before reflects a drastic change in the social structure of a community. There are (at least) two ways of fulfilling this need: the adoption of an already written language for these purposes or the adaptation of the oral language to writing. Most societies have had to face this transition at some point in their history, whether this developed naturally or was thrust upon them from outside. Thus, the written language may differ completely from that which is spoken – which, as Coulmas (1989: 13) pointed out, is to be expected as speech and writing serve different communicative functions. Moreover, writing in the initial stages of the transition from oracy to literacy is usually the domain of an elite few. However, the adaptation of an oral language to writing reflects a change in the communicative function of that language, which in modern times has spread to the rest of the society. Whereas the 'undiscovered' world coped for millennia without writing, illiteracy in present times is viewed as a scourge.

Coulmas (1989: 12) noted that literacy does not necessarily stimulate language adaptation *per se*, but serves as a tool for carrying out the process. A written language can easily be codified into a set of rules to be transmitted through education. This in turn affects the acquisition and use (particularly in the higher domains) of a language.

Attitudes and Language Maintenance

As with any language planning measure, it is the attitude of the people for whom language adaptation is to be undertaken that will determine whether or not it is successful. One crucial factor in forming a community's attitude is the degree to which the language will be useful, i.e., the domains to which a particular language gives access (Phillipson, 1993: 79, 80; Cooper, 1989: 100, Chap. 5). Loyalty to a language and culture is another factor affecting the maintenance of a language. Although the revival of Irish Gaelic (Irish) in Ireland has turned out to be little more than symbolic, it is the loyalty of the Irish to their language that led to its extensive adaptation, even though English serves all the language needs of the majority. Languages that are neutral, i.e., do not carry ethnic connotations, are more likely than others to be used as languages of wider communication. The neutrality of Swahili in East Africa led to its being extensively adopted as a national language in Kenya and an official language in Tanzania, and therefore

to the extensive expansion of its functional range (Cooper, 1989: 102).

The Process of Language Adaptation

Two Aspects of Adaptation

The process of equipping a language to deal with the realities of its speech community involves two aspects: one external to the language (involving the speech community) and one internal to the language (involving the structure of the language itself). In order for a language to be successfully adapted, that language must be widely used by its speech community in the domains concerned. This requires not only the elaboration of its lexicon, but also the boosting of its status. Adaptation and modernization through language planning are at an early stage; it is the implementation of language planning measures by a speech community that tells us whether the language has been successfully adapted or not.

Adaptation through Status Planning

A common way of boosting the status of a langauge, and facilitating its adaptation and modernization, is through functional reallocation. Thus, a language previously excluded from the higher domains is allocated to those domains (Cooper, 1989: 99, 118). These measures take time to be implemented: before a language can be properly used in a domain from which it was previously excluded, it must be developed as a medium for that domain.

After their independence from colonial rule in 1962 and 1963, respectively, Tanzania and Kenya wished to establish a national African language in place of the colonial one (Laitin, 1992: 91). Swahili was the natural choice, having few 'tribalist' associations and a long history with the liberation movements (Laitin, 1992: 91–92). In Tanzania (then called Tanganyika), Swahili was proclaimed as the language of state and public functions; shortly thereafter it became the 'major language of Parliament' and was introduced as the 'medium of instruction in all public primary schools' (Massamba, 1989: 63). Although Swahili still faces serious competition from English, its adaptation and modernization have been widely accepted.

Corpus Adaptation and Modernization

Terminology Development In order to fulfill its role as a high-domain medium, a language's corpus (lexicon and grammar) must be sufficiently developed. In cases where a language has been excluded from a domain it now wishes to occupy, its terminology and perhaps modes of expression need to be adapted to its new roles. There are various ways of adapting terminology, taking the target language system into account. It can be achieved through neologism, calquing, transliteration, and meaning extension (Alberts, 1998: 233). Alberts (1998) provided some examples of these four methods of terminology development from South African languages, adapted here in Table 1.

As can be seen from some of the examples in Table 1, terminology development must take the target language into account and we see how calquing and borrowing adapt from the sound system of one language to the other. Grammar is also an important device in language adaptation and, particularly, terminology development. Table 2 shows how new coinages in Irish were applied to existing grammatical structures. O'Baoill (1988: 116) gave the example of the creation of an Irish term for 'lithograph' and some of its derivatives. The new lexeme is a Hibernized borrowing from English, to which productive derivational morphemes are applied.

Languages also reflect their adaptation to a new or changed social order by getting rid of certain elements that tie them to the past. The reform of Turkish under Attatürk in the 1920s saw all Western Farsi (Persian) and Standard Arabic (Arabic) loan words expelled from the standard Turkish lexicon (Cooper,

Table 1 Terminology development in South African languages

Method	*Example*
Calquing: direct translation, especially of compounds	English *cellphone* > Afrikaans *selfoon*
Loan words: borrowing a word, or the sound of a word, by another language	English *cellphone* > Sotho *selula founo*, Zulu *iselula*
	English *computer* > Xhosa *ikompivuta*, Zulu *ikhomputha*
Transliteration: use of the classic stem to coin an equivalent	English *silver* > Xhosa *isilivere*, Zulu *isiliva*
Extension of meaning: use of existing words, but broadening the meaning to include more modern concepts	Zulu *bafana bafana* (reduplication) = 'the boys'; extension of meaning to the soccer team, i.e., young male competitors on the international soccer scene
Neologism: new words created from within the target language	English *unleaded petrol*, Afrikaans *ongelode petrol* (Creation of the verb *lood* 'lead,' past participle *gelode* 'leaded' from Afrikaans noun *lood* 'lead')

Table 2 An example of terminology development in Irish

English term	*English derivational morphemes*	*Standardized Irish borrowing*	*Irish derivational morphemes*
lithograph		*liteagraf*	
	-er		*-ái*
	-y		*-áiocht*

1989: 154, citing Heyd, 1954). Similarly, some sectors of the French government have tried to block the number of loan words entering into French usage (Appel and Muysken, 1993: 164).

Grammatical Development The development of a grammar to suit modern or high-domain purposes often results in a simplification of grammatical forms that are considered unwieldy, anachronistic, and unsuited to scientific and commercial discourse. Grammatical development may mean bringing the grammar of a language more into line with that of a dominant language. For example, there have been some attempts to bring the grammar of Irish more into line with that of English (Greene, 1972: 15). Developing a standard grammar for Hebrew (Modern Hebrew) from Biblical Hebrew processes, as well as innovation, in Israel spurred the creation of a multitude of new word forms. Grammar can especially be a problem in situations where there are a number of varieties of a language. In order for the language to be adapted to modern roles, it requires codification and therefore standardization (*see* **Standardization** (03048)). Thus, where more than one form is found across varieties, one must be chosen as the standard. This applies to all aspects of the corpus.

Orthography and Spelling Orthography and Spelling are two more aspects of the corpus, which are taken into account when conscious adaptation and modernization take place. Orthography refers to the script that is used to represent the spoken language, and spelling refers (roughly) to the way it is used.

When a language is selected for adaptation and modernization, an orthography needs to be selected for it. If the language has never been written before, an orthography must be created – a process known as graphization. If, however, an orthography already exists, a decision must be made as to whether this system should be retained or a new system found. This process is known as regraphization (Cooper, 1989: 125, 154). Christian missionaries graphized most of the oral languages of southern Africa in the 19th and 20th centuries. Generally, a Roman script was imposed and the spelling system of the missionaries' nationalities informed the orthography and spelling. Whereas graphization is one aspect of language adaptation, regraphization is also important. The change in orthography reflects a change in society. An early example of this was the development of the Cyrillic alphabet, so that biblical and ecclesiastical texts could be translated into Slavic languages. More recently, Turkish adopted a Roman script in place of the Persian orthography it had used before (Haugen, 1972: 170, citing Heyd, 1954). Orthography can have powerful symbolic value for a speech community. In the 1930s, the Soviet government imposed the Cyrillic script on non-Russian languages within the USSR (Mesthrie *et al.*, 2000: 391). Since the disintegration of the USSR, however, a number of these languages have had the non-Cyrillic script reinstated. Mesthrie *et al.* (2000: 391) cited the case of Moldavia: in August 1990, the Moldavians held a 'Language Festival,' celebrating the reintroduction of the Latin script. A developing adaptation process is also evident in Mandarin Chinese (Chinese) and Japanese, which are adapting to changing functions by *adding* a Roman orthography, to facilitate the learning of these languages phonetically (Crystal, 1995: 313; Sugito, 1989: 117).

Standardization and Harmonization Standardization and harmonization apply in different ways to the same phenomenon: one language, which has many distinctive varieties in the same area. In some cases, like that of Irish (O'Baoill, 1988: 111) or Swahili (Massamba, 1989: 61), the varieties are widely recognized by academics and speakers as being varieties of one language. In order for the language to be adapted to a function, it needs to be stabilized and codified, and therefore standardized, and an orthographical/terminological/grammatical form is chosen from one of the dialects and held up as the norm. Otherwise, one dialect will be chosen as the standard and all its forms held up as the norm by society as well as language planners (Cooper, 1989: 134).

Harmonization is a form of standardization, but operates across varieties that are regarded as closely related, but distinct, languages. In essence, harmonization is an attempt to build one standard language from a variety of closely related languages (and all of their respective varieties). The harmonization (also 'unification') question in South Africa was revisited in 1989 by Neville Alexander (1989: 64), who proposed the harmonization of the seven major indigenous languages into two standards:

1. Standard Nguni, comprising Xhosa, Zulu, Ndebele, and Swati;
2. Standard Sotho, comprising Southern Sotho, Northern Sotho (Pedi), and Tswana.

Table 3 Equivalent terms in Xhosa, English, and Zulu

Xhosa	*Zulu*	*English*
ifoni	*ithelefoni*	telephone
imoto	*imoto*	motor car
umbane	*ugesi*	electricity
ilayibri	*ilabhulali*	library
ikompiyuta	*ikomputha*	computer

Source: Adapted from Reader's Digest (1985) *South African multi-language dictionary*, with permission.

Harmonizing the indigenous languages of South Africa would eliminate the need to adapt and modernize every one of the seven languages that make up Sotho and Nguni. The harmonization of these languages could begin with new terminology, which can be coined as illustrated above. Table 3 illustrates similarities and differences between the Nguni languages.

The similarity between these two languages is striking and shows the close relation of the languages to each other. Differences in vocabulary and pronunciation appear minor, but are significant to their speech communities, which may be concerned that linguistic assimilation means political assimilation (Msimang, 1998: 167). Those involved in language harmonization will have to liase extensively across languages to avoid being perceived to value one variety or language group above another.

Conclusion

Language adaptation and modernization are essential to the evolution and, indeed, survival of any language. The linguistic change brought about through adaptation reflects the dynamics of the society in which it is used. The fact that intervention is sometimes necessary links the field with that of language maintenance: the adaptation of a language to fulfill modern functions is surely a mechanism for language maintenance. It ensures that a language remains valued by its own community and others.

See also: Language Development: Overview; Language Planning and Policy: Models; Literacy Practices in Sociocultural Perspective; Oracy Education; Power and Pragmatics; Pragmatics: Linguistic Imperialism; Standardization.

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Language and Dialect: Linguistic Varieties

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Max Weinreich's (unpublished) dictum that "a language is a dialect with an army and a navy" contains much truth, but it is a partial truth. Heinz Kloss (1967) agrees that the notion of 'a language' is as much a political, cultural, and historical notion as it is a purely linguistic notion, but he also points out that languages are of two main sociolinguistic types. These types are called in German *Abstandsprachen* and *Ausbausprachen*. Abstand languages can be called in English 'languages by distance.' They are linguistic varieties that are regarded as separate language by reason of their linguistic distance from all other languages. Basque is an isolate with no known relatives and is extremely distant in terms of its linguistic structures from all other languages, including its geographical neighbors. The status of Basque as a language is thus assured on purely linguistic grounds.

Ausbau languages are in English called 'languages by extention, or construction.' They are linguistic varieties that are regarded as distinct languages for political, cultural, social, and historical as well as linguistic reasons. Ausbau languages depend on cultural factors for their status because they are associated with geographical dialect continua. Polish, Slovak, and Czech are Ausbau languages which together form the West Slavic dialect continuum. They are mutually intelligible, especially Polish and Slovak, and Slovak and Czech, but they form three separate languages because there are three separate standardized norms with their own agreed-upon and accepted orthographies, shared histories, traditional literatures, widely used dictionaries, and grammar books – and their own nation states. Einar Haugen (1966) argues that because of these separate orthographies, literatures, and histories, each of these three standard varieties has the characteristic of *autonomy* – they are independent varieties with, as it were, an existence of their own.

This provides a definition of an Ausbau language as: an autonomous standardized variety together with all the nonstandard dialects from that part of the dialect continuum that are heteronomous with respect to it, i.e., dependent on it. With the term *heteronomy*, or 'dependence,' Haugen refers to facts such as that a Slovak and a Pole from opposite sides of the national frontier may be able to converse with one another readily, but one will go home and read Slovak newspapers in Slovak, while the other will go home and watch Polish television.

Autonomy and heteronomy are cultural and political phenomena, which entails that Ausbau languages are cultural and political constructs. Ausbau languages are therefore potentially temporary entities. They may become dialects, through loss of autonomy, as in the case of Scots, which was formerly a distinct language but is now widely though not universally regarded as a dialect of English. And dialects can become languages, by gaining autonomy, such as when Norwegian lost its heteronomy with respect to Danish, and Macedonian its heteronomy with respect to Bulgarian and Serbian.

See also: Accent; Dialect Chains; Endangered Languages; English: World Englishes; Haugen, Einar (1906–1994); Identity and Language; Linguistic Ethnonationalism; Nationalism and Linguistics; Politics and Language: Overview; Researching Naturally Occurring Speech; Sociolect/Social Class; Standard and Dialect Vocabulary; Subjective and Objective Measures of Variation.

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Language as an Object of Study

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> Words are the leaves of the tree of language, of which, if some fall away, a new succession takes their place.
> – Field Marshall John French

What are the properties of language that make it similar to a tree? Could language exist without words in the way a tree may exist without leaves? Could words exist without the tree of language? One way to address these and other similar questions might be to make a list of the main properties of trees. The next step might be to look systematically for identical or similar properties in human languages. This would mean that our knowledge of botany would be guiding our scientific investigation of language. As fundamental differences between trees and languages are many and easily observable, it is evident that this research program does not hold enough promise to be worth pursuing. However, this general approach illustrates an important point about the methodology of scientific research in general and linguistic investigation of language in particular: research into one poorly understood object of study proceeds on the assumption that it shares its essential properties with some other (type of) object which is already better understood. In fact, some major landmarks in the development of modern linguistics are based on four conceptions of language as an object of study: language as a social fact, language as behavior, language as a mental organ, and language as an abstract object.

Language as a Social Fact

The view of language as a social fact, as suggested by Ferdinand de Saussure (1916), marked a shift away from the predominantly historical interest in language toward the study of language as a system at the current stage of its development. Saussure believed that important insights into language could be gained if it was investigated from the point of view of its users, who typically do not know anything about its historical development. Since language use reflects the structure of language as a system of units at a particular stage of its development, language should be studied from the synchronic, rather than the diachronic, perspective. Saussure compared a given stage in the development of a language with the configuration of pieces on the chess board at a given stage of a game of chess. Just as the value of each piece is determined by its position relative to all the other pieces on the board (at a given stage of the game), a particular language at a given stage of development is a system of language units, or language signs (Saussure's term is *signe linguistique*), whose values are determined by their position in relation to all the other signs in the language system at that particular stage. And just as any change in the position of a given chess piece alters the values of all the other pieces and affects the system as a whole, the change that directly affects one language sign (potentially) affects the language system as a whole. For example, although the Serbian word 'jeftin' has the same meaning as the English word 'cheap,' it does not have the same value in the language system, because, in English, 'cheap' contrasts with 'inexpensive,' whereas in Serbian the same contrast is not lexicalized, so that it is either ignored, with 'jeftin' covering both meanings, or it is conveyed in some more elaborate way. The value of the Serbian word 'jeftin,' – its position in the language system – would change significantly if the equivalent of the English 'inexpensive' were to become lexicalized in Serbian.

In Saussure's view, language is a social fact akin to other social institutions, such as the legal system or the dress code. Although people's use of language reflects its systematic character, the structure of language as a system is not directly observable or consciously represented by its users. Saussure posited a distinction between observable linguistic behavior, what he called *parole* (speaking), and the underlying language system, what he called *langue* (language). In his view, the main task of linguistics was to discover *langue* – the language system – by investigating *parole* – language in use. Saussure's view of languages as a social fact is consistent with Émile Durkheim's sociological theory (popular at the time when Saussure was developing his ideas on language), in which social facts are characterized as representations in the 'collective mind,' rather than as material or psychological entities.

Saussure's concept of *langue* as a social fact, and as the proper object of linguistic investigation, had an unfortunate consequence. If *langue* is a system of relations between language signs, which are both external to its users and not directly observable in the manifestations of *langue* in use (because they are part of the 'collective mind'), there is no place for the category of sentence in linguistic analysis. In other words, it follows from Saussure's position that sentences are an aspect of *parole* rather than *langue*. Therefore, they are not a part of the systematic character of a language. So, although we readily produce and comprehend utterances of sentences that we have never produced or heard before and, although

we assign them meanings in a systematic way, Saussure's view of language as a social fact did not adequately accommodate this important aspect of language.

Language as Behavior

The view of language as behavior emerged in American descriptivist linguistics under the influence of positivism (in philosophy) and behaviorism (in psychology). An important methodological stance of logical positivism is that scientific research must be based either on statements that are tautologically true, such as: either P or not P, or they must be based on direct observation. The immediate consequence of this view for the scientific study of language was that all analyses and generalizations should be based strictly on the description of observable linguistic behavior. The main methodological stance of behaviorist psychology was that scientific theories could be refuted only by observable phenomena. Hence the descriptivists' view that insights into language should be firmly grounded in observable data – the products of linguistic behavior – and that they should not be informed by the researcher's introspection or the native speaker's intuition. This meant that more attention was paid to particular languages than to the universal properties of human language, as we can only have direct data from particular languages. However, although descriptivist linguists initially thought of human languages as infinitely diverse, by the 1950s their interest had shifted towards the possibility of devising a discovery procedure, a mechanism that would take a corpus of utterances as input and yield a grammar as output (Harris, 1951).

The most important theoretical tenet of behaviorism was that all human behavior could be explained in terms of stimuli and responses to stimuli without reference to mental structures and processes. This stance had two major implications for the study of language: first, language was characterized as "the totality of utterances that can be made in a speech community" (Bloomfield, 1928). Second, since meaning is not directly observable and it could not be studied without reference to intuitive, introspective judgments, it was considered not to be the proper object of linguistics. Though to a lesser extent than Saussure's conception of language as a social fact, the view of language as the product of behavior (especially in the early stages) also tended to focus on the phonological and morphological analysis of language, rather than on the less directly observable structural relations between words within sentences.

Language as a Mental Organ

The view of language as a mental organ is central to the most influential modern linguistic theory, the generative approach to language, developed by Noam Chomsky since the 1950s and his many followers (see Chomsky, 1986, 1988, 2000). Although the system of ideas that characterizes present-day generative linguistics is very complex, the basic assumptions on the nature of language are clearly established and they appear to be fundamentally commonsensical.

The idea that language is a mental organ is best illustrated by an analogy with other biologically specified properties of human beings. The development of any organism is partly determined by its genetic makeup and partly by environmental factors. For example, the onset of puberty and the height of a person are genetically determined, but they are also affected to some limited extent by external factors, such as nutrition. Given the diversity of environmental circumstances in which people grow up, and the uniformity in their physical appearance, there can be hardly any doubt as to the primacy of genetic makeup over the environment. The same observation carries over to our mental capacities. For example, numerical ability is unique to humans, who develop it in a uniform way regardless of the differences in their sociocultural and physical environments. Similarly, the design features of language, such as recursion, arbitrariness, and duality of patterning, cannot be explained as the result of environmental factors. Therefore, we should assume that both our ability to count and our linguistic ability are genetically specified. In other words, just as arms and legs are physical organs, language is a mental organ. The interaction with the environment triggers the development of language, but the environmental inputs are simply not sufficiently structured for it to be plausible to assume that language development involves the construction of more and more detailed mirror images of the external world. Other comparable capacities would include our musical ability and the ability to construct scientific theories.

If language is a mental organ, then linguistics should be seen as a discipline of psychology, ultimately biology. It should aim to discover the abstract properties of language that make it possible to answer the following questions:

1. What do we know when we know language?
2. How is knowledge of language acquired?
3. How is this knowledge of language put to use?

In this view, the knowledge of language is characterized as a (generative) grammar: a finite system of interacting rules and principles that specify (more

technically, generate) an infinite number of expressions, each of which is a structural configuration (e.g., of words into phrases and sentences) associated with a phonetic form and meaning. At the core of our ability to acquire language lie some universal innate properties of grammar, which guide the child's language development. The innate properties of grammar constrain the range of possible grammars of language and enable the child to find out which of the possible grammars is best evidenced by the linguistic behavior of those around him. This genetic endowment enables the child to go beyond the evidence presented by the data in determining the grammar. For instance, a child acquiring English figures out that 'John is too stubborn to talk to' means, roughly, 'John is so stubborn that nobody can talk to him' without explicit instruction and without being distracted by the possible analogy with utterances like 'John is too stubborn to talk to Bill,' which would be misleading. Therefore, evidence from language acquisition supports the view that the child constructs the grammar on the basis of innate mental structures that heavily constrain the range of available choices at any given stage of his linguistic development. The question of how knowledge of language is put to use is investigated by designing 'performance models' based on the mental grammar.

The research program of Chomskyan generative grammar differs in two important respects from those associated with the view of language as a social fact and the view of language as behavior. First, there is a shift of emphasis from the study of individual languages to the study of Universal Grammar (UG), where the latter is another name for language as a mental organ (in terms of the properties it identifies as the set of grammars that a human being can learn under the conditions in which language acquisition normally takes place). Second, language as an object of study is an element of the mind, which Chomsky calls Internalized language (I-language). The approaches that consider language to be a social fact or behavior and the products of behavior are concerned with the study of language as external to the minds of its speakers. In Chomsky's terms, they are concerned with the study of Externalized language (E-language). Chomsky argues that E-languages (which correspond closely to what people normally mean when they speak about English, French, German, Chinese, Swahili, etc.) are epiphenomenal. In other words, they are complex constructs resulting from the interaction of various sociopolitical and historical factors. Therefore, understood in this way, a particular language like English or French is not a proper object of scientific investigation. Although people ordinarily speak about particular languages as individual objects that exist independently of individual speakers (in utterances like 'French is the language of diplomacy.'), Chomsky insists that this shift of focus from E-language to I-language is a shift towards the commonsense view of language, because when we say that a person knows a language we usually mean that they know how to relate sound patterns with meanings in a particular systematic way.

Language as an Abstract Object

In contrast to Chomsky's mentalist conception of language, Katz (1981) presents a detailed argument to support the view of language as an abstract object. The distinctive characteristics of abstract objects are (a) that their existence is independent of the existence of the mind, and (b) that they do not occupy a position in space and time. Presumably, natural numbers, which underlie the laws of nature, would exist even if human or other intelligence did not, and they are not located at particular places and times. In the light of these observations a natural language, such as English or Japanese, might seem a poor candidate for the category of abstract object. However, Katz (1981) argues that the task of writing the grammar of a language is too stringently constrained on Chomsky's requirement "that a grammar represent a language only in the particular form that knowledge of the language takes when such knowledge is realized in the human mind or brain" (Katz, 1981: 92). Arguably, this requirement has some unwelcome implications for linguistic analysis. For example, let us say that two grammars of a given language (G1 and G2) have been written. G1 reflects the speaker-hearer's knowledge better than G2, but G2 is simpler and more elegant than G1. G1 and G2 are equivalent in all other respects. The question is: 'Is G1 to be preferred to G2, or is G2 to be preferred to G1?' In Katz's view it would be a mistake to reject G2 just because it is less psychologically plausible than G1. He points out the importance of the distinction between the knowledge of something and the object of knowledge itself. For example, natural numbers are distinct from the different ways in which they are represented in various calculators. By the same token, the speaker's knowledge of language is distinct from language itself. Chomsky (1986: 49) rejects this view with the following analogy between language and the heart as biological organs: the heart may be simply and elegantly described as a pump, disregarding what actually makes it beat as a part of the organism, but it does not follow that such a description would be superior to one which looks at the actual anatomy and physiology of the human heart.

Therefore, if G2 is simpler and more elegant than G1, but G1 is more plausible as a psychologically real description of the speaker-hearer's knowledge of their language, then it is obvious that G2 should not be preferred to G1.

Katz also challenges Chomsky's view that individual languages are not proper objects of scientific study because they are sociopolitical constructs. In his view, this is "like claiming that the concept of number is not an object of mathematics but a sociopolitical one." (1981: 79–80). Chomsky (1986: 47) rejects this objection out of hand by describing it as a "curious conclusion" (for other criticisms and a defense against them, see Katz, 1985). Although some criticisms of Katz's view of language seem very convincing, a reasonably strong case can be made in support of the conception of language as an abstract object. On the one hand, the idea that language can be seen and studied scientifically as an abstract object does not entail that it is not also a psychological object. Hence, it is far from obvious that the only interesting and useful scientific approach to the study of language is psychological (biological). In other words, the conceptions of language as a mental organ and language as an abstract object might both provide the basis for credible scientific research. Moreover, the scientific study of various physical organs, such as the human heart, can easily draw on readily available evidence of their structure. By comparison, the evidence for the analysis and description of language as a mental organ is rather scant. Thus, if an organ, e.g., the human heart, were not available for relatively direct observation, then it would be perfectly sensible to investigate it by trying to figure out the best abstract model in the hope that it would also turn out to be the one that corresponds most closely to the real thing. In fact, much work within Chomsky's generative approach in linguistics seems to proceed in this way. On the other hand, Katz (1985: 199–200) argues that theories of language grounded in individual psychology are not abstract enough to provide plausible explanations of language structure. His discussion of analytic sentences is particularly convincing. Analytic sentences, such as 'Nightmares are dreams.' and 'Flawed gems are imperfect.' are necessarily true in virtue of the semantic level of grammars. The Chomskyan approach, which characterizes the grammar in psychological terms, cannot provide an adequate account of necessary truths. 'Nightmares are dreams.' and 'Flawed gems are imperfect.' are true sentences, regardless of our psychological (biological) makeup, but, in the Chomskyan approach, these sentences have to be analyzed as necessarily true, because humans are psychologically (biologically) designed so that we cannot think of them as anything other than true statements. While this and related issues remain open for debate, there can be no doubt that Chomsky's psychological approach to language remains the most influential perspective from which it is studied within linguistics.

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Language Attitudes

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> One grievous failing of Elizabeth's was her occasional pretty and picturesque use of dialect words – those terrible marks of the beast to the truly genteel.
> Thomas Hardy (*The mayor of Casterbridge*, 1886)

> It is impossible for an Englishman to open his mouth without making some other Englishman hate or despise him.
> George Bernard Shaw (*Pygmalion*, 1912)

> The operative class, whose massacre of their mother tongue, however inhuman, could excite no astonishment.
> Thomas Hamilton (*Men and manners in America*, 1833)

Introduction

The most basic theme in modern social psychology is the importance of perception. We do not react to the world on the basis of sensory input but, rather, in terms of what we perceive that input to mean. This is the foundation of all our social constructions, of all our individual and group relationships, and it is a foundation that reflects – in ongoing fashion – our accumulated social knowledge. Perception is the filter through which sensory data are strained, and the establishment and maintenance of this filter is culturally specific and – within social groupings – individualized to a greater or lesser extent. For example, because every individual has accumulated a unique set of experiences, each set of perceptual spectacles is itself special to some extent. At the same time, there are many social perceptions that group members hold in common: at one level, we can think of these as stereotypes, at another as culture itself. At a group level, the most important feature has to do with the acceptance of shared understanding. In a great many instances, this is the only sort of understanding to which we have access, and we sometimes fall prey to the idea that **our** understanding is, in fact, the only sort possible. Nonetheless, we are aware (occasionally, at least) of the relative nature of social knowledge when we realize that others do not sort out their world in quite the same way as we do.

Perceptions operate in societies, most of which are stratified in various ways and in which – to put things bluntly – power and status are often able to translate social difference into social deficiency. Because language is one of the traditionally important social markers, it is not surprising that the study of attitudes has a central position in the social psychology of language. Nor is it surprising that the results of this study shed some light on the generalities just mentioned. It is easy, for example, to demonstrate that great variation exists in terms of people's reactions to (or evaluations of) different accents and dialects. The question, of course, is what to make of this variation.

The Basis of Judgment

Social preferences and prejudices concerning language varieties are long-standing and of continuing potency. This is because views of language correspond to views of the social status of language users; in this sense, language (or dialect or accent) provides simple labels which evoke social stereotypes that go far beyond language itself.

We can begin here by observing that even dictionary definitions of dialect and accent help to sustain the view that nonstandard language is less correct language. The *Oxford English Dictionary* (*OED*), for example, notes that dialect may be considered as "one of the subordinate forms or varieties of a language arising from local peculiarities of vocabulary, pronunciation, and idiom." This definition is implicitly held by those for whom the term 'dialect' conjures up an image of some rustic, regional speech pattern; for such people, the 'standard' variety (see below) is not really a dialect at all; rather, they consider it as the 'correct' form from which all others diverge. On accent, the *OED* is not much better; it is, we find, a mode of utterance which 'consists mainly in a prevailing quality of tone, or in a peculiar alteration of pitch, but may include mispronunciation of vowels or consonants, misplacing of stress, and misinflection of a sentence.'

But what is the basis for language attitudes and judgments? Three broad possibilities suggest themselves.

Intrinsic Difference

One possibility is that language attitudes reflect intrinsic differences across and within language varieties themselves. That is, the reason for variety A being evaluated so much more favorably than variety B is simply that A is a linguistically superior form. Although this is a view that has had considerable historical support, and while it remains common at a popular level in virtually all linguistically stratified societies, linguists have convincingly demonstrated that to see languages or dialects in terms of innate superiority or inferiority is to profoundly misunderstand the nature of human language itself:

> just as there is no linguistic reason for arguing that Gaelic is superior to Chinese, so no English dialect can be claimed to be linguistically superior or inferior to any other . . . There is no linguistic evidence whatsoever for suggesting that one dialect is more 'expressive' or 'logical' than any other, or for postulating that there are any 'primitive', 'inadequate' or 'debased' English dialects. (Trudgill, 1975: 26)

A very good demonstration of this was provided by William Labov (Labov, 1976). He studied Black English (in the United States), which makes an excellent test case for dialect validity since it had for so long been rejected by the white middle class, and since its speakers were victims of a prejudice that went well beyond language alone. If it could be shown that Black English was not some debased variety, this would go some way towards establishing linguistic integrity for all dialect varieties.

There were three strands to Labov's work. First, he justly criticized earlier studies which had elicited Black English from youngsters through interview techniques which were both unfamiliar and intimidating; these were hardly likely, he noted, to produce normal, conversational samples. Second, Labov reminded us of what casual observers had known for a very long time – the Black community is verbally rich and, like other 'oral' cultures worldwide, supports and rewards those who are particularly linguistically gifted. Third, and most important of all, Labov demonstrated the regular, rule-governed nature of Black English. Rules are of course an essential feature of language, and if it were possible to demonstrate formal grammatical regulation within Black English – not necessarily identical, of course, to regulation in other dialects – then charges of inaccuracy and sloppiness would become groundless, and it could not be dismissed as some 'approximation' to 'proper' English.

As an example, here is one of the rules Labov described for Black English, a practice called 'copula deletion.' In a sentence such as *she the first one started us off*, the *is* is not present. Does this mean that the Black speaker who uttered it is unaware of this verb form? Well, consider another sentence taken from a Black corpus: *I was small then* – here, the past tense of the verb 'to be' appears. Why should it figure in this sentence but not in the former one? Labov's work revealed the regularity governing this linguistic behavior: in contexts in which the standard variety permits verbal contraction (e.g., *they are going* can become *they're going*), Black English allows deletion (e.g., *they are going* can become *they going*). We have, therefore, a rule – slightly different from the one obtaining in the standard, but no less logical. The regularity is further evidenced by the fact that, in contexts in which the standard does not allow contraction, there is no Black English deletion: *he's as nice as he say he's* is patently incorrect according to the rules of the standard variety, which outlaws contraction in the final position. In like fashion, it is incorrect to say *he's as nice as he says he* in Black English.

The import of this sort of work is clear: there are no substandard language varieties. There are standard dialects in many languages, and so it logically follows that all others must be nonstandard – but this latter term is not pejorative in any technical linguistic sense. A standard dialect is, roughly, that spoken by educated people, and it is the form usually found in writing. Its position derives from history and from the social standing of its speakers. If York instead of London had become the center of English power, for instance, then the traditional BBC newsreader would sound quite different, and schoolteachers would be promoting another form of 'correct' English in the classroom.

Aesthetic Difference

Another possibility might be that language varieties – although not to be seen (grammatically or 'logically') in terms of 'better' or 'worse' – do actually vary in their aesthetic qualities. Perhaps, then, more favorable attitudes might attach to those varieties that sound better, or more mellifluous, or more musical. Many years ago, for instance, standard English was defended as 'one of the most subtle and most beautiful of all expressions of the human spirit' (Chapman, 1932: 562) and, a little later, Henry Wyld, a linguist at the University of Liverpool, wrote:

> If it were possible to compare systematically every vowel sound in RS [Received Standard English – i.e., what we now more usually call RP, Received Pronunciation] with the corresponding sound in a number of provincial and other dialects, assuming that the comparison could be made, as is only fair, between speakers who possessed equal qualities of voice, and the knowledge how to use it, I believe no unbiased listener would hesitate in preferring RS as the most pleasing and sonorous form, and the best suited to be the medium of poetry and oratory. (Wyld, 1934: 610)

I need hardly say that such sentiments were (and are still, of course) not restricted to those speaking in and for English. Can we put to the test, however, the belief that dialect A is more aesthetically pleasing than dialect B?

Recent studies have compared an 'inherent value' hypothesis here with an 'imposed norm' one. The former term suggests, as Wyld did, that aesthetic qualities are intrinsic, while the latter holds that

they are attached or imposed by the listener, who, in hearing a standard (for instance), considers it mellifluous because of the status of its speakers. In one investigation, Welsh adults listened to European French, educated Canadian French and working-class Canadian French voices. Asked to rate the pleasantness and prestige of the voices, the judges – who were virtually ignorant of French – did not single out any of the three varieties. Earlier studies had shown, however, a clear aesthetic preference among French speakers for European French. In another experiment, British undergraduates who knew no Greek evaluated the aesthetic quality of two Greek dialects, the Athenian and the Cretan: the former is the prestige standard form, while the latter is a nonstandard variant of generally low status. As in the French study, no significant differences between the two dialects were found. If anything, there was a slight tendency for these British students to rate the Cretan variety as more pleasant and prestigious than the Athenian (Giles *et al.*, 1974, 1979).

The important element in these demonstrations is that the judges were unaware of the social connotations possessed by the different varieties in their own speech communities. The implication is that, if one removes (experimentally) the social stereotypes usually associated with given varieties, aesthetic judgments will not be made which favor the high-status standards. Anyone who watches a film or a play in which (for example) a woman dressed as a duchess speaks with a Cockney accent can appreciate the point here: someone in the audience who had an understanding of English, but not of more subtle intralinguistic variation and convention, would miss a great deal of the comedic effect. The norms here are imposed by those in the know, and the stereotypes which link beauty, or harshness, or comedy to a particular set of sounds are unavailable to others. (None of this, I hasten to add, rules out purely individual preferences: I may think Italian is the most beautiful language, you may believe that Gaelic is unrivalled – but we can agree to differ on a matter of subjectivity.)

Social Perception

We now turn to a third possibility, which – because we have eliminated the first two – becomes the most likely: the variant evaluations found in the social laboratory and on the street reflect perceptions of the **speakers** of given varieties; any qualities – 'logical' or aesthetic – of the varieties themselves are, at best, of very secondary importance. Thus, listening to a given variety acts as a trigger or a stimulus that evokes attitudes (or prejudices, or stereotypes) about the community to which the speaker is thought to belong.

A general moral here seems to be this: when social stratification is associated with linguistic variation, the variety used by those with social clout will commonly be perceived as (grammatically, lexically, or phonologically) superior to nonstandard forms. There are two exceptions to this rule, and they occur at opposite ends of the status continuum. First, extremely high-status varieties may seem affected and generally over the top. Second, there is a 'covert prestige' possessed by working-class speech, with its positive associations of masculinity. Research has found that both working-class and middle-class males claimed to use nonstandard forms even when they did not customarily do so (Edwards, 1989; Trudgill, 1983). The actual use of such forms, by generally standard-speaking individuals, is most likely when the speaker wants to appear forceful, direct, and unambiguous. An example: a friend of mine, a middle-aged, upper-middle-class American university professor (male), was being pressed by colleagues (also male) on a departmental matter. Finally, he ended a rambling and inconclusive discussion – one that had unfolded according to the norms of standard, educated American English – by smiling broadly and saying, "Listen, boys, you **know** the' ain't no way I can do it." All-male social gatherings, as at least half the readers will know, often produce such examples.

Variation in Social Attitudes

If we reject linguistic and aesthetic arguments as the real underpinnings of variations in language (and speaker) evaluation, we have only cleared away some annoying underbrush. It is very useful to know that the basis for language evaluation rests upon social convention, but we must make more detailed inquiries about the assessment of language varieties. We come then, to language attitudes *per se*.

While many regional or class dialects are perceived unfavorably, there is more than a simple dichotomy between good (standard) and bad (nonstandard). Urban speech patterns (such as, in Britain, those of Birmingham, Glasgow, and Liverpool) are generally seen as more unpleasant than are rural varieties (Devon English, for instance). Again, the basic explanation rests upon social connotation: for many, rural areas have a charm that is absent in heavily urbanized, industrialized centers. So rural dialects, although not as prestigious as the standard, may be viewed more favorably than urban varieties (which are often tied more closely to class differences, as well) (Wilkinson, 1965; Trudgill, 1975).

Wyld (above) hinted at an important problem in the comparison of language varieties. If I wish to find out which of two dialects is the more pleasant (for example), and if I therefore record a speaker of each and have the voices judged by listeners, to what can I reasonably attribute any differential ratings that may be found? Are they due to features of the dialects themselves? Might they not also be reactions to purely individual qualities of voice – tone, pitch, rhythm, pace, and so on? A way around this difficulty was devised in the 1960s by Wallace Lambert. In his 'matched guise' method, judges evaluate a tape-recorded speaker's personality after hearing him or her read the same passage in each of two or more languages, dialects, or accents. The fact that the speaker is, for all 'guises,' the same person is not revealed to the judges (who typically do not guess this). Any variations in the judges' ratings can then be considered as reflections of their stereotyped reactions to the different language varieties, since potentially confounding individual variables are of course constant across guises (see Lambert *et al.*, 1960; Edwards, 1989).

A large number of studies have shown that evaluations of different varieties vary in nonrandom ways. Thus, standard accents and dialects usually connote high status and competence; regional, 'ethnic,' and lower-class varieties are typically associated with greater speaker integrity and attractiveness. Ellen Bouchard Ryan and her colleagues (Ryan *et al.*, 1982, 1984) have attempted to summarize the many language attitude studies by providing an "organizational framework." They suggest that there are two determinants of language perceptions: standardization and vitality. The important point about the standard here is that it is a variety whose norms have been codified and have become associated with social dominance. Vitality refers to the number and importance of functions served, and is clearly bolstered by the status which standards possess; it can also be a feature, however, of nonstandard varieties, given sufficient numbers of speakers and community support. Furthermore, two particularly salient evaluational categories account for most of the variance: social status (which is more or less equivalent to competence) and solidarity (roughly combining integrity and attractiveness) (see Edwards, 1992).

These findings are interesting for several reasons, but the single most important factor is their stereotypical nature: people are evaluated in terms of characteristics that, in a broad-brush sort of way, reflect perceptions of the group to which they are seen to belong. The implication is obvious: **individuals** – with all their personal strengths and weaknesses – are viewed in stereotypical **group** terms. Studies have suggested that at school, in the workplace, in counselor–client relations, and so on, negative stereotypes can create problems. (It is also worth remembering here that stereotyping can operate in the opposite direction, too – those with the socially 'right' attributes may have their progress unfairly expedited.)

Difference, Deficit . . . and Solidarity

In the Classroom

More than three decades ago, John Gumperz and Eduardo Hernández-Chavez made the following observation: "Regardless of overtly expressed attitudes . . . teachers are quite likely to be influenced by what they perceive as deviant speech . . . thus potentially inhibiting the students' desire to learn" (Gumperz and Hernández-Chavez, 1972: 105). Obviously, like other members of society, teachers have language attitudes, and it is not surprising to find that, on the whole, they have downgraded nonstandard varieties and, by extension, the capabilities of their speakers. Trudgill (1975: 63) noted, for example, that teachers were not averse to telling (some of) their pupils that their speech was "wrong . . . bad . . . careless . . . sloppy . . . slovenly . . . vulgar . . . gibberish." A study conducted in Nova Scotia (Edwards and McKinnon, 1987: 335) found similar teacher attitudes: one said that poor children were unable to "articulate their thoughts"; another observed that "Blacks have a slang language all their own – they will not use proper English when the opportunity arises."

Teachers' points of view are, in one sense, merely a particular illustration of a much broader relationship between linguistic variation and social attitudes. But in another sense, their beliefs are special – for the obvious reason that negative evaluations of children's speech styles may lead to real problems, in the classroom and beyond it. It is a cruel irony that socially disadvantaged children, who clearly struggle under all sorts of very real burdens, should be weighed down still more by evaluations of the inadequacies of their language – when these evaluations are typically based upon inaccurate assumptions. The negative reactions to their speech patterns do, however, reveal how hollow a purely academic sense of 'inaccurate assumptions' can be, in a world where attitudes can transform difference into deficit.

'At Home'

Given the strength and pervasiveness of language attitudes, there are strong tendencies for speakers of nonstandard varieties to accept, themselves, the

evaluations of others (the so-called minority group reaction is an example here; see Lambert *et al.*, 1960). While the sense that one's own speech is not very 'good' may be a common phenomenon, it is nonetheless a disturbing one – as the description above of the educational arena makes clear. Thus, Halliday (1968: 165) noted that

> a speaker who is made ashamed of his own language habits suffers a basic injury as a human being; to make anyone . . . feel so ashamed is as indefensible as to make him feel ashamed of the colour of his skin.

Beyond the obvious recommendations for greater linguistic awareness and sensitivity, one might also ask just why low-status speech varieties continue to exist. If they are generally considered inferior, why wouldn't speakers try to eradicate them? Why wouldn't language or dialect shift be a more popular option? Nonstandard speakers are hardly without adequate models for language alteration, after all. Nowadays, more than ever before, the ubiquity of the broadcast media means that virtually all have at least a passive awareness of standard forms (and research has shown how easy it can be for this to be translated into a more active quantity) (Edwards, 1989). Indeed, many years ago it was predicted that a leveling of variant speech styles would be the inevitable consequence of the wired world. But it seems not to have happened.

We have to bear in mind here that the solidarity function of **any** common language is powerful; even a low-prestige variety can act as a bonding agent, reinforcing group identity (see the focused discussion in Ryan, 1979). Group identity and its (linguistic and other) markers are known quantities and, in that sense, 'safe'; on the other hand, attempts to alter speech styles may be risky. Failure may lead to marginalization – a sense of not being a full member of any social group. Even success may prove too costly. A Mexican American who abandoned Spanish was labeled a *vendido* (Carranza and Ryan, 1975), a 'sell-out,' a defector to the other side. A French Canadian in analogous circumstances was a *vendu*. Cockney grandparents once told their grandchildren that, if they tried to speak in a 'la-di-da' accent, their mates would call them 'queer' (Bragg and Ellis, 1976). Whatever the current status of these well-known if somewhat dated cases, it is clear that the principle remains powerful. Finally here, nonstandard speakers may also refrain from attempting to alter their language patterns if the exercise is considered to be pointless – as it may be seen to be for those who are members of visible minority groups, for instance. If reactions to Black English are reflections of social evaluations of Black speakers, then learning and using some more standard form may be a waste of time. The social difficulties faced by Blacks occur largely because they are black, not because they do not use standard English (consider, for example, that there are many nonstandard-speaking Whites in comfortable circumstances).

Language Attitudes and Language Acquisition

One important aspect of attitude study has been its connection with the learning of second (and subsequent) languages. Positive attitudes, it is generally thought, are likely to facilitate second language acquisition, although it is realized that variations in the context and the perceived functions of the new medium are also important. Indeed, this has very much been the received wisdom, and there is a large literature on attitude and motivation in language learning. John Macnamara, however, appeared to take an opposing view, asserting that attitudes were of little importance in language learning (Macnamara, 1973). His argument is worthy of some attention here, since it leads to some finer-grained attention to language attitudes generally (see also Edwards, 1995).

Macnamara noted that necessity may overpower attitude – and this is clearly true. The adoption of English by the Irish, for instance, was a shift not generally accompanied by favorable attitudes; indeed, most historical changes in language use owe much more to socioeconomic and political pressures than they do to attitudes *per se*. But perhaps attitudes of a sort – instrumental attitudes – do play a part in language shift. A mid-19th-century Irishman may have hated English and what it represented, while still acknowledging the necessity and long-term usefulness of the language. A pragmatic or 'instrumental' motivation need not imply the deeper, 'integrative' motives so dear to the hearts of teachers keen on introducing their charges to new languages **and** new cultures. Similarly, there may be a useful distinction here between positive and favorable attitude; to remain with the Irish example, we might say that the attitudes towards the learning of English were positive and instrumental, but not necessarily favorable or integrative. (It must be acknowledged, of course, that instrumental–integrative and positive–favorable distinctions may change or disappear as language shift develops.)

Macnamara went on to contend that pupils' language-learning attitudes at school were also relatively unimportant. Language in the classroom, he said, was typically an unreal and artificial business, with communication subordinated to narrow academic

concerns that fail to engage children's interest. It is this situation, and not pupils' attitudes, that underlies the traditionally poor results of school language programs.

Now, it is undoubtedly true that a great failing in language classrooms has been the absence of realistic usage, but I do not think that this implies that attitudes are of small importance. The argument that the classroom is artificial is essentially a condemnation of approaches and practices, and does not of itself indicate that attitudes are trivial. In fact, attitudes may be of considerable importance precisely because of 'artificiality' – i.e., where a context is **not** perceived as pertinent to real life, or is **not** seen to be necessary, attitudes may make a real difference. The importance of favorable attitudes, then, may vary inversely with real linguistic necessity (Edwards, 2001).

Details and Directions

Within social psychology, 'attitude' is a disposition to react favorably or unfavorably, a disposition with three components: feelings (the affective element), thoughts (the cognitive element), and a resultant tendency to action (the behavioral element). One knows or believes something, has some emotional reaction to it, and then does something about it. Two points, however, should be made.

There is often considerable inconsistency between attitudes and actions. In a classic study, a Chinese couple (accompanied by the experimenter) toured the United States in the early 1930s. Visiting about 250 hotels and restaurants, they were refused service only once; however, when the investigator later wrote to the places visited, he found that more than 90% said they would not serve Chinese people (LaPiere, 1934). There are, of course, many possible reasons for this finding: immediate self-interest, a desire to avoid embarrassment, a difference between reactions to an ethnic group abstraction and assessments in concrete instances, and so on. But the inconsistency remains.

The other point is that there is often confusion between attitude and belief – a confusion particularly noticeable within the language attitude literature. For example, the answer to a questionnaire item such as 'Is a knowledge of French important for your children, yes or no?' reflects a belief. To gauge attitude would require further probing into respondents' feelings about the expressed belief. It would clearly be incorrect to assume that the answer 'yes' implied a favorable attitude: the informant could grudgingly accept that French was important for career success, while loathing both the language and its culture.

More attention to these distinctions – apart from simply improving accuracy – might be salutary in terms of understanding why evaluations take the forms they do. Given that unfavorable reactions to nonstandard varieties have typically been discussed in terms of status or prestige differentials, for instance, it could be useful to confirm this, from the respondents' point of view, by asking them the bases for their evaluations. Such an exercise might be of special interest since – as has been mentioned above – nonstandard varieties elicit positive ratings along some dimensions. It is surely reasonable, after all, to gather as much information as we can from the actual participants in language studies, as well as imposing more purely theoretical interpretations upon their responses (Edwards, 1995).

Language attitude study should perhaps be prepared to expand its scope. Various methodologies have produced a sizable body of evidence bearing on social perceptions, stereotypes, and language attitudes. We can now predict with some confidence what sorts of reactions are likely when people hear varieties of (for instance) Black English, Newfoundland English, Cockney, Received Pronunciation, Boston English, and many others; we can also make predictions about those 'ethnic' varieties produced by nonnative speakers of English that show the influence of the first language. We understand, at a general level, how these reactions come about, via the linguistic 'triggering' already noted, and how they reflect a set of attitudes (or beliefs) – often of stereotypical nature – that listeners have of speakers. Investigators have not, however, gone very much beyond fairly gross explanations; that is, they have typically not related speech evaluations to particular speech attributes. Thus, although hundreds of experiments have revealed negative reactions towards Black English, we have virtually no information relating specific linguistic attributes of that variety to such reactions – attributes that might include pronunciation patterns, particular grammatical constructions, or the use of dialect-specific lexical items (or, of course, any combination of these) (Edwards, 1999).

Some moves have already been made in this direction. For example, in 1982, Howard Giles and Ellen Bouchard Ryan issued a call for "more detailed linguistic and acoustic descriptions of the stimulus voices as well as examining the relative evaluative salience of these particulars for different types of listeners" (Giles and Ryan, 1982: 210). A related, although not so pointed, observation was made by Edwards, in calling for fuller probing of the reasons behind the evaluative decisions made by informants (Edwards, 1982; see also above). In general, though, social psychologists have done little in the way of

isolating linguistic and acoustic variables and relating them to evaluative judgments. Such work has simply not been their métier.

It is in linguistic research that we find descriptions of features that characterize and differentiate language varieties. In recent years, a considerable amount of work has been done here; for example, linguists (including Laver and Trudgill, 1979 – in a book on social markers that remains a valuable reference) have pointed out such phenomena as:

1. the nasality habitually associated with some (RP, for example) but not all varieties of English;
2. the wide dialectal variations in consonant pronunciation: thus, RP speakers pronounce *lock* and *loch* more or less identically, with a final /k/, but (some) Scottish pronunciations involve final /x/. Another example: in British English, pronouncing the postvocalic /r/ in words like *cart* and *mar* is inversely related to social-class status, whereas in some varieties of American English (e.g., New York English) a positive correlation exists between /r/ pronunciation and status;
3. grammatical variation: copula deletion in American Black English, for example (as we have seen, above);
4. lexical differences: some English speakers *brew* their tea, some *mash* it, some let it *steep,* some let it *set,* and so on.

If, however, linguists have been the ones to describe such variation, they have either been relatively uninterested in its relation to variations in social evaluations, or have simply assumed that the more obvious and salient linguistic markers are the triggers for differentiated ratings. Like social psychologists, linguists too have generally stuck to their lasts – although a recent and most welcome collection (Milroy and Preston, 1999) deals explicitly with linkages between linguistic features and attitudes.

Conclusions

There are many important aspects of language attitudes and their ramifications that it has not been possible to attend to in this brief overview. One has to do with the relationship between language and gender. The 'covert prestige' briefly noted above, for instance, is essentially a male phenomenon – the positive connotations of nonstandard speech are not typically found among women; indeed, where middle-class male informants may report more nonstandard usage than is actually the case, female respondents overreport standard dialect usage. A large literature suggests, generally, that women are often more linguistically conservative than are men, that they produce 'politer' and more 'correct' speech, that there are significant gender differences in lexicon and function, and so on. All of these features are influenced by, and reflected in, language attitudes (see Coates, 1993 for a good overview).

Another important area with a burgeoning literature has to do with the accommodations made by speakers in different contexts and with different interlocutors. Linguistic accommodation can take many forms but, whether it operates at or below the level of conscious awareness, its fundamental feature is the modification of speech patterns to converge with, or diverge from, those of others. Accommodation can reflect individual concerns – wanting to sound more like the boss, or intentionally departing from the usage of someone you dislike – or group ones: you may wish to emphasize your 'in-group' membership, or to solidify an ethnic or class boundary. Once again, attitudes clearly underpin practices (for an overview here, see Giles and Coupland, 1991; Robinson and Giles, 2001).

What I have tried to deal with in this article is some of the central themes in the area, some of the scaffoldings on which other aspects rest. They include the following:

1. some basic definitional and terminological matters: it is always important to be clear about terms and meanings, and especially so when – in areas such as this – the terms have broad popular connotations as well as more narrowly academic ones;
2. the bases upon which linguistic judgments are made: most people still believe that intrinsic qualities of language varieties can reasonably underpin rankings of 'better' and 'worse.' The persistence of this belief is disappointing, to say the least, especially in educational circles;
3. the manner in which linguistic difference is typically translated into linguistic deficit: it is evident that, linguistic enlightenment notwithstanding, society continues to deal rather bluntly with variation – and, if most consider a difference to be a deficit, then it becomes one;
4. the ways in which linguistically stigmatized individuals and groups come to accept the judgments made of them by 'outsiders': this is an extension of the previous point, insofar as it is a potent reflection of the power of social pressure;
5. the reasons behind the persistence of low-prestige varieties: given the potency of social pressure and prejudice, it is interesting that group solidarity, on the one hand, and fear of personal marginalization, on the other, are sufficient to maintain stigmatized varieties;

6. the evaluative dimensions and categories that seem to be employed when ranking different language varieties: the regularity with which a few basic categories (such as 'competence,' 'integrity,' and 'reliability') appear across a very wide range of studies is one of the most robust features in language study;
7. language attitudes in contexts of learning and shift: questions of how, and to what extent, attitudes and motivations are important in situations of change – or potential change – throw light upon both the attitudes and the contexts;
8. the need for greater interdisciplinarity in what are sometimes called, hopefully, the 'language sciences': a common criticism of modern social psychology involves its allegedly disembodied character – further and deeper attention to language, and language attitudes, would at once redress academic oversight and inevitably abet interdisciplinary linkages that would, in turn, reduce decontextualization.

See also: Communities of Practice; English, African American Vernacular; Ethnicity; Ethnolinguistic Vitality; Interactional Sociolinguistics; Minorities and Language; Multiculturalism and Language; Social Class and Status.

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Language Change and Cultural Change

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Human languages are inherently variable and dynamic, and their shifting shapes are constrained by diverse factors. Culture, defined as those human projects which endow the raw materials of our world – including the stuff of language – with meaning, must be among these. But to explore relationships between language change and cultural change requires appreciation of the immense complexity of cultural mediation, and linguistic analysis at a high level of detail and delicacy.

Several basic observations are required prior to developing this theme. First, 'languages' do not map isomorphically onto 'cultures.' From this obvious fact it is immediately clear that the relationship between language change and cultural change will not be straightforward. Mutually intelligible varieties of large regional and world languages are found among people involved in very diverse ways of life. Mutually intelligible varieties of Spanish are spoken by peasants in Mexico and philosophers in Madrid. Conversely, people who share very similar ways of life may speak several different languages. The Pueblo Indians of the southwest United States constitute a highly coherent and relatively homogeneous culture area, with a long history of contact and exchange among their communities, but speak at least five mutually unintelligible languages belonging to three different language families, plus one isolate. Local language ideologies work to minimize convergence among these languages (Kroskrity, 1993).

Second, resonances between language change and cultural change tend to be quite local. Linguists correctly greet global generalizations with profound suspicion. For instance, there is no universal correlation between the elaboration of sexism and gender-based discrimination in a society and the grammaticalization of gender in its language or languages. In an exceptionally careful study of this question, Chafe (2002) explored the relationship between gender roles and the grammar of gender in Northern Iroquoian. In several languages of the group, a set of masculine pronominals distinguishes singular and plural forms and subject and object case. A feminine gender pronominal has developed from an original 'nonspecific' pronoun, and in the nonsingular is not distinguished from neuter gender. Chafe argued that contrastive elaboration of masculine gender versus feminine gender pronominals, which occurred about a thousand years ago, is in resonance with the prominence given to males in many Northern Iroquoian cultural scenarios (although Northern Iroquoian societies are matrilineal). However, he noted that such male prominence is extremely common in human communities, yet most languages do not show the same kind of differential elaboration of gender marking. For this reason, he preferred to speak of a cultural 'motivation' for the pattern, rather than of a cultural 'cause.'

In the Northern Iroquoian example, the structure of the pronominal system is unlikely to be prior to, and motivating of, the prominence of male roles. Instead, male prominence motivated the elaboration of the masculine pronouns. The diverse developments of noun classification through plural marking in the Uto-Aztecan languages (Hill and Hill, 1997) provide another case of the cultural motivation of linguistic patterning, in this case a loss of elaboration. In Proto-Uto-Aztecan, reduplicated plurals marked a class of human nouns, as against other nouns pluralized with suffixes. In two descendant language groups, the O'odham or Upper Piman languages and Hopi, the marked class has been extended beyond human nouns to classify for 'protrusion' and 'intrusion.' In Tohono O'odham (a Uto-Aztecan language of Arizona), spoken in a community that observed patrilineal descent, lineage exogamy, and patrilocal residence, the marked plural class includes kinship terms for women and kin linked to ego by women, but not kinship terms for men. This resonates with local understandings, expressed in legends, that inmarrying women stand as marked outsiders to the patrilineal kin group. In contrast, in Hopi, with matrilineal descent and matrilocal residence, the only marked plural kin terms are the words for 'bride, inmarrying woman' (an outsider from the point of view of the husband's matrilineage) and 'husband, inmarrying man' (an outsider from the point of view of the wife's matrilineage). That is, the metaphor of 'outsiderness' functions in the noun classification system in the kin terms of both languages, but is greatly restricted in Hopi, consistent with the understanding there that descent through females constitutes the core social unit, the matrilineage. It seems most unlikely that patterning in the pluralization of kin terms would shape social organization, but quite reasonable that understandings of social organization would motivate the use of marked versus unmarked plural forms.

The loss in English of the distinction, otherwise nearly universal in European languages, between a polite/distant and an intimate/solidary second-person pronoun provides another example of such culturally motivated language change. Most scholars believe that the English T-pronouns, the intimate/solidary

second person forms *thou*, *thee*, *thy*, *thine* were lost in ordinary usage in the late 17th century in reaction to the linguistic practices of a dissident religious sect, the Society of Friends or Quakers. Friends, consistent with their belief in the equality of all human beings before God, refused to use the V-pronouns that signaled social distance and deference. This practice was scandalous in a society where a regard for hierarchy was hegemonic and the use of a T-pronoun could constitute insult or even illegal *lèse majesté* that might lead to imprisonment. Rather than risk being taken for a Quaker, other speakers displayed their commitment to hierarchy and propriety by generalizing the V-pronouns even to contexts that had hitherto called for the use of the T-form without any presupposition of insult or disrespect. Regardless of whether the role of Quaker innovation has been properly understood, it seems likely that cultural ambivalences and ambiguities about hierarchy in the emergence of modernity shaped the gradual loss of the T/V distinction in English, rather than that the loss of the T/V distinction motivated a reorganization of British social order.

Benjamin Whorf, often misunderstood as a linguistic determinist, outlined in his most significant paper (Whorf, 1956) a dialectical interaction between language change and cultural change that attempted to account for examples like those above. Silverstein (1976, 1979, 1996) has proposed a contemporary semiotic refinement of Whorf's ideas. He argues that general semiotic principles underlie the development of such resonances between language change and culture change. These principles produce a 'dialectic of indexicality' which drives analogical change. First, speakers project referential functions on to indexical functions and 'objectify' these. In the case of the English (and other European language) pronouns reviewed above, Silverstein suggests the following chain of analogies. The third-person pronouns exhibit apparent referential distinctions of number and gender, which are taken by speakers to refer properly to things in the world – although these 'things' achieve their 'naturalized' status, of course, precisely through linguistic practice and specifically through indexicality. But speakers come to see this indexical projection as 'reference.' By analogy, the social hierarchy distinctions of the T/V contrast in the second-person pronouns, which are technically indexical, can be taken by speakers to be referential as well. Thus to English speakers the social world came to be seen as consisting of individuals possessing an inherent property of meriting deference, parallel to inherent properties of gender, or of singularity versus plurality. Such analogical reasoning permits speakers to manage social anxieties (Inoue, 2004), by trying to bring usage rigidly into line with an understanding of the world that has precisely been projected from language in the first place. Such 'iconizing' (Gal and Irvine, 1995) projects do not always succeed in taking a language change to completion, but it is clear that the constant interplay of indexical orders (Silverstein, 1996), motivated by specific cultural anxieties and ambivalences that must be ever present in human communities, constitutes a powerful force for language change.

Among the kinds of change that can be driven by the 'dialectic of indexicality' is the formation and spread of styles and registers. An excellent example is the shift in American English in the stylistic features thought to be appropriate to the talk and text of ministers, political orators, and the like in their public roles. Cmiel (1990) has shown that an explicit ideology of egalitarianism emerging through the end of the 18th and the first half of the 19th centuries led to the development of the so-called middling style for elevated language. In the middling style ordinary vernacular words and short sentences came to be favored. This process of reshaping public language as an icon of the American egalitarian imaginary continues to develop. The grammar and lexicon of documents such as the Declaration of Independence and the U.S. Constitution strike many 21st-century Americans as forbiddingly elevated and elite. Even liturgical language has been simplified: new translations of the Christian Bible are in strikingly everyday language, and ministers of the gospel experiment with vernacular forms (as in the famous case of Cornell West, a minister and professor at Harvard University, who recorded a compact disk of raps, a genre that originated in African-American street culture). Highly placed American politicians can use quite vulgar language, even in elevated public contexts, without facing censure – indeed, such language may bring approbation. It marks them not only as ordinary people with a commitment to egalitarianism, but as plain-speaking 'straight shooters.' It is perhaps not surprising that the tendency toward 'plain speech' in public forums has reached new heights (or depths) at precisely a period when increasing political-economic inequality has made many Americans anxious about the status of egalitarianism, a continuing ultimate value in U.S. society.

Language Change and Sociocultural Evolution

The work briefly reviewed above examines very fine-grained linguistic changes motivated by ideological processes in local speech communities. However, linkages between more general tendencies of

language change and cultural change have often been proposed. Widely accepted through the early 20th century was the theory that human language exhibited a hierarchy of evolutionary grades, from 'primitive' to 'civilized,' that correlated with the grades of the theory of cultural evolution. While linguists today almost universally reject such ideas, evolutionary thinking continues to have a place in theories of the relationship between language change and culture change, and deserves brief attention.

Certain limited features of human languages may be loosely correlated with subsistence type and social complexity. These include plant and animal terminologies. For instance, Brown (1984) argued that the number of life-form terms for plants (*tree*, *bush*, *herb*, *grass*, *vine*, etc.) is correlated with increasing social complexity. Brown also suggested that cultivators have many more folk generic terms for plants than do hunter-gatherers, and also use more binomial species labels. While other studies have supported these results (e.g., Balée, 1994), they should be interpreted with caution. Balée has pointed out that the difference in the number of generics for plants between cultivators who speak Ka'apor (Urubú-Kaapor) and hunter-gatherers who speak Guajá, another Tupi-Guaraní language closely related to Ka'apor, is due partly to the fact that the Ka'apor simply have more uses for plants; they use implements made from plants to process other plants, and their sedentism permits an elaborate material culture. Furthermore, Hunn (2001) has pointed out that in Oaxaca, vernacular speakers of Spanish, an expanding world language, have far simpler repertoires of biosystematic terminology than do speakers of small local Zapotecan languages, in spite of the fact that Spanish has been spoken in the area for 500 years. Berlin and Kay (1969) held that elaboration of color terminologies was correlated with level of sociocultural evolution. But MacLaury (1991) showed in a study of Mayan-language speakers in Chiapas that the elaboration of color terminology could exhibit vast differences among speakers of a single language, and seemed to depend more on the specific life circumstances of individuals, especially on how much people were forced to engage with novelty, than on any broad correlation between language and sociocultural evolution. Thus terminological elaboration in the biosystematic and color lexicons appears to be largely correlated with the elaboration of attention and use, a matter that is not surprising in any way and that can be accounted for within Silverstein's model outlined above, without appeal to evolution theory.

The concept of natural selection, taken from Darwinian theory, has been invoked by modern linguists to account for the relationship between language change and cultural change. Hymes (1968) suggested that the current reduction of world linguistic diversity, caused by the expansion of 'world' languages at the expense of 'full' languages, results from a selective process in which world languages are better adapted to certain emerging communicative functions, and thus replace full languages. Croft (2000) and Mufwene (2001) have suggested that linguistic elements within inherently variable assemblages (which Mufwene has characterized as 'Lamarckian species') – phonetic realizations, construction types, semantic features, and the like – can be seen, like genetic alleles, as targets of natural selection. Cultural context, among other variables, yields selective pressures, and the relative frequency of particular realizations of linguistic elements will reflect these. The development of Haitian Creole (Haitian Creole French) from French has been treated within this model. During the early 'settler' period, when slaves lived intimately with their French masters on small landholdings, they acquired a version of vernacular French that, while it was a second language, was not greatly dissimilar from the French spoken by the native speakers from whom they learned it. The shift to plantation agriculture, however, swamped out these early second-language varieties of French. Increasingly large populations of newly imported African slaves had less and less access to French models. Themselves learning the language from other second-language speakers, they favored the least marked French constructions and constructions derived from African sources over the varieties used by the earlier African settlers of Haiti. This process yielded the basilectal creole varieties attested in Haiti today. Thus, the context for selection that favored basilectal structures was a cultural system: plantation agriculture, with its huge slave work forces supervised by relatively few – and interactionally remote or absent – French-speaking overseers.

Advocates of the selectionist view have neglected the complex mediations between cultural and linguistic systems that must underlie the emergence of a system such as Haitian Creole, and that are treated in the semiotic theory of Silverstein and others cited above. Constraints on the acquisition of second-language features do not consist solely of the opportunity for learners to observe native-speaker models, and such opportunity is not determined in any simple way by mode of subsistence or labor organization. Instead, these opportunities and what learners make of them are mediated by ideological systems. For instance, in the Haitian Creole case European French speakers almost certainly found that the shift toward

basilectal varieties was entirely consistent with their understanding of Africans as unintelligent and unable to master refined European speech. With such an understanding – a convenient one when the labor regime involved starving and torturing these Africans – the 'disorderly' grammar and 'impoverished' lexicon of the slaves would be merely natural, would invite no intervention, and might even be encouraged. Deviations from this 'iconization' would, in Gal and Irvine's (1995) terms, be 'erased,' and pass unnoticed or be dismissed as aberrant or suppressed as dangerous. At the same time, among Africans, basilectal varieties could become icons of their own world, symbols of resistance to and differentiation from their French-speaking oppressors. An approach restricted to the terms of the theory of natural selection does not invite investigation of the semiotic dynamic by which these ideological systems – which are well documented – resonated with the emerging basilectal structures.

The development of modern Mexicano in the state of Tlaxcala, Mexico shows clearly that simple demographic facts cannot account for language change in a contact system. Mexicano is the descendant of Tlaxcalan Nahuatl (Náhuatl Central), one of the Nahua (Aztecan) languages of the Uto-Aztecan family. Mexicano has incorporated very large amounts of Spanish loan vocabulary, across nearly every subcomponent of the lexicon from nouns for European cultural elements such as horses and chickens to discourse particles, prepositions, and derivational morphemes. The Mexicano case is the reverse of the Haitian Creole case: over a few hundred years, immigration from Europe reduced Nahua-speaking communities to islands in a Spanish-speaking sea. However, the rate of incorporation of Spanish loan elements into Mexicano cannot be correlated directly with the ratio of Nahuatl speakers to Spanish speakers. Instead, it is closely linked to genre. Spanish loan words can convey an elevated or serious tone, and so large numbers of Spanish constructions appear even in the 16th century, at a time when Nahuatl speakers were emphatically the majority in central Mexico and very few people were bilingual, in such genres as the minutes of the proceedings of town councils and notarial records such as wills. Bilinguals today can adjust the frequency of Spanish versus Nahuatl roots even in spontaneous speech. They express thereby subtle variations in stance and attitude that are associated with diverse social positions, age cohorts, and genders within a larger ideological system that contrasts nativistic Nahuatl purism and the expression of community solidarity with an ideology that, by iconization, links Spanish to the power of its first-language speakers.

Language Spread and Language Shift

Cultural mediation appears to play a role in language spread and language shift. The archaeologists Colin Renfrew and Peter Bellwood (2002) hypothesized that large multibranched language families such as Indo-European or Niger-Congo-Kordofanian almost all descend from languages spoken by primary cultivators at the time of the initial domestication of animals and cultivated plants. In contrast, small language families such as Wakashan or North Caucasian are the residue of a more linguistically diverse pre-Neolithic epoch. Renfrew and Bellwood argued that the principal mechanism of language spread throughout most of human history was not the language shift that is so obvious in the history of the last 500 years, but the expansion and spread of populations of speakers of the languages ancestral to the large families. Since demographic factors favor the increase of populations of cultivators over populations of hunter-gatherers, Renfrew and Bellwood predicted that the languages of the latter will be found only in relic zones where the Neolithic expansions of cultivator populations did not reach.

One difficulty with this very general model is that there are attested cases of ancient language shift. For instance, two of the major language families of the Americas, Athabaskan and Algonquian, are spoken largely by hunter-gatherer populations which obviously expanded without shifting to cultivation. Some of the descendant languages (such as California Athabaskan, Denaina in southwest Alaska, and the Algonquian descendant language Cree-Montagnais [Montagnais] in the Canadian subarctic) exhibit incongruent elements that must represent the influence of speakers of a substratum language who adopted the expanding Athabaskan or Algonquian variety (Kari, 1989; Golla, 2000). The Australian linguists Nicholas Evans and Patrick McConvell (Evans and McConvell, 1998; McConvell, 2001) have proposed that hunter-gatherers who survive climatic instability in continental interiors must be able to accomplish not only movements into uninhabited territories, but retreats into populated regions. The latter type of move requires the cultural capacity – Evans and McConvell call it 'charisma' – to incorporate populations thus encountered into the social, ritual, and linguistic systems of the retreating group. Such movements are attested by apparent substratum linguistic elements not only in the Americas, but in the Australian materials which Evans and McConvell originally investigated. Evans and McConvell's work suggests that a set of ideas about language must be as much a part of successful hunter-gatherer adaptations as is nature knowledge and technological capacity.

Nichols (1992) suggested that the likelihood of language shift is conditioned by human ecology. She proposed a distinction between linguistic 'accretion zones' (sometimes called 'residual zones') and linguistic 'spread zones.' The former tend to form in micro-environmentally complex coastal and montane zones, and are characterized by very large numbers of languages, large numbers of small language families, and high levels of multilingualism. Indigenous New Guinea, aboriginal California, and the Caucasus mountains are examples of accretion zones. Nichols argued that the languages of accretion zones are relatively stable and thus are likely to harbor archaic features. 'Spread zones' tend to form in continental interiors and are characterized by relatively small numbers of languages and language families, and the formation of lingua francas. Languages in spread zones are more likely to be innovative and fail to preserve archaic features. The Eurasian steppes, the Congo basin, and the North American subarctic are examples of spread zones. Language shift, to spreading languages, is much more likely in spread zones than in accretion zones. At the root of this distinction is probably the differential cultural adaptations of humans to the two different types of environment. In the intricate mesh of relatively stable micro-environments in accretion zones such as aboriginal California or the Caucasus, cultural systems that favor local differentiation and specialization, mediated by various forms of cultural exchange, tend to be associated with linguistic ideologies that favor multilingualism over language shift. Local ways of speaking become markers of privileged access to local resources, but speakers become multilingual to manage exchange relationships. In contrast, in spread zones a combination of relative environmental instability and large-scale homogeneity of human adaptive strategies may favor distribution of risk over large geographical regions. This is best accomplished on the linguistic side through the relative homogeneity of a spreading language. A dramatic example of this type is the spread of Shoshoni across the Great Basin of North America. Shoshoni language ideology favors inattention to dialect variation, this inattention being accompanied by an unusually high level of mobility of bands and family groups, and Shoshoni exhibits no clear linguistic isoglosses even though it is distributed over an extremely large area (Miller, 1970, 1971). It seems likely that this sociolinguistic picture is an old one in the community. However, language shift in accretion zones **is** attested, as with the language shift in California and coastal Alaska to California Athabaskan and Denaina respectively, with the superstratum Athabaskan communities being involved in an Evans and McConvell-type move into populated territory.

Hill (2000) proposed that different tendencies in the organization of language diversity between accretion zones and spread zones probably result from complex interactions between ecological adaptation, the social contexts of language acquisition, and language ideologies. When linguistic ideologies construct features of language as licensing access to resources, two directions in sociolinguistic stance by speakers are possible. The adoption of a 'localist' stance is exemplified by speakers of the Kokolo:di dialect of Tohono O'odham, who live in a relatively well-watered and productive region of the Sonoran desert. Their dialect is highly homogeneous and focused, and speakers are very resistant to, and self-conscious about, innovation. Speakers of the Gigimai dialect, on the other hand, who live in a region with sporadic and very low rainfall, exemplify a 'distributed' sociolinguistic stance. These speakers are relatively promiscuous adopters of all available linguistic resources. Hill suggested that localists understand their situation in relation to their language and their environment as entailing a statement like 'I have a rightful and primary claim on valuable and dependable local resources that are necessary to my well-being, and the way I speak verifies my claim.' In contrast, distributed speakers appear to believe that 'I have no rightful and primary claim on valuable and dependable local resources adequate to sustain my well-being. However, I might be able to add to my limited primary claims secondary claims on a sufficient range of a distributed inventory of resources to sustain my well-being. The way I speak verifies these secondary claims.' Even in this case of the desert-dwelling Tohono O'odham, where historically water scarcity approached and sometimes passed limits on human survivability, the contrasting sociolinguistic stances are not strictly determined by environment, but by local cultural understandings of it and by a linguistic ideology that takes certain sociolinguistic stereotypes to license insider versus outsider status, and hence rights to resources. The Tohono O'odham do not live in the same desert that a biologist or a geologist might see, but construct 'landscapes,' culturalized environments in which resources become meaningful. Furthermore, unlike the desert-dwelling Western Shoshoni described by Miller (1970, 1971), the Tohono O'odham choose to notice dialect differences, construct these as sociolinguistic stereotypes, and use them to license rights. There are, however, ecological constraints that can rule out a localist stance. Localism, with its close adherence to relatively homogeneous ways of speaking, probably requires a period of focusing within childhood peer groups,

and the local environment must provide enough in the way of relatively stable subsistence resources to permit the formation of such groups. Distributed-stance speakers of Tohono O'Odham report that water and food scarcity required their families to make frequent moves, precluding the formation of stable peer groups. Among these speakers, even siblings may speak quite differently from one another. Miller (1970, 1971) reported absence of child peer groups for the Western Shoshoni as well. Childhood peer groups, or lack thereof, are not the only dimension of social organization that may shape language spread and shift. James and Leslie Milroy (1985) showed for urban contexts that sociolinguistic 'focus,' the relative homogeneity and stability of dialects, is related to the structure of social networks, which is in turn related to local impacts of political-economic systems. Relatively dense and closed networks, where people have many different kinds of relationship with others that remain relatively stable, favor strong focusing. In contrast, open networks, in which people often form new relationships, some of these involving so-called 'weak ties' – social ties that mediate only very limited kinds of interaction, such as commercial transactions – seem to favor the rapid spread of innovation and relative heterogeneity and instability in local ways of speaking.

Esoterogeny and Exoterogeny

Thurston (1987, 1989, 1992), based on work in Melanesia, suggested that types of structural drift in language change may be associated with the localist and distributed stances outlined above. Very focused local varieties may undergo what Thurston called 'esoterogeny,' acquiring and conserving highly marked and unusual typological properties that are difficult to learn. In contrast, spreading languages are likely to be 'exoteric,' characterized at many loci of typological variation by relatively unmarked structures. An illustration of contrasting esoterogenic and exoterogenic processes of change can be drawn from the Uto-Aztecan languages. The ancestral Uto-Aztecan protolanguage seems to have had at least a distinction between an unmarked nominative and a marked accusative case on nouns, and a set of argument-encoding clitics that distinguished nominative from accusative. The descendant Nahua languages, which have spread throughout central Mexico and into Central America as far south as El Salvador and Honduras and had millions of speakers (Náhuatl in Mexico still has at least one million speakers), retain only the latter feature and lack case marking on nouns. In contrast, Cupeño, spoken within the California accretion zone and perhaps the smallest Uto-Aztecan language, marks the accusative case on nouns and their modifiers, distinguishes nominative from accusative case in a set of pronominal prefixes, has added the additional elaboration of a set of person-number clitics that distinguish an ergative agent from an absolutive subject, and distinguishes the absolutive objects of imperative verbs from accusative-marked objects of verbs in nonimperative moods.

One of the most famous examples of esoterogeny is the Amazonian language isolate Pirahã (Múra-Pirahã), spoken by about 150 people. Everett (2004b), the major contemporary scholar of the language, has commented that "the combination of a small phoneme inventory, which provides minimal contrast, complex morphology, tone and a few other features unique to Pirahã make this language very unusual and extremely difficult to learn." The unusually small inventory of segments includes some otherwise unattested allophones, such as a bilabial trill allophone of /b/ and a double-flap allophone of /g/, in which the tongue tip first flaps on the alveolar ridge and then on the lower lip as the tongue actually comes out of the mouth. The stress rules of the language involve an unprecedentedly complex interaction between rightward alignment and four distinct syllable weights, which are shaped partly by the voicing of the onset consonant rather than the weight of the nucleus (there are no coda consonants). Such 'esoteric' features are almost certainly propped up by local ideologies that have made them meaningful as identity markers. This is the case with Pirahã. In contrast with their close linguistic relatives, former speakers of Mura who now speak only Portuguese, and in spite of ample contact with Portuguese speakers over 200 years, the Pirahã are not bilingual, believing that speaking only their own language is essential to their identity as people who are 'straight' instead of 'crooked' (Everett, 2004a).

Culture and the Speed of Language Change

Historical linguists are very interested in the speed of language change, since methods of linguistic prehistory can retrieve deeper pasts when language change is slow. Thus, it would be useful to determine whether cultural factors can slow or accelerate language change. There is not time to treat this point in detail; a very useful discussion of factors that slow and accelerate cultural change itself can be found in Urban (2001). Therefore, I treat only two salient questions, the role of subsistence type and the role of media. In the case of subsistence type, it is often suggested that language change may be faster among

hunter-gatherers than in more complex societies. However, the above discussion has insisted that susceptibility to innovation is mediated by much more complex factors. The distinction between accretion zones, where speakers tend to adopt localist stances, be relatively resistant to innovation, and display tendencies toward esoterogeny when they do innovate, versus spread zones, where speakers tend to adopt distributed stances and be relatively open to innovation which is likely to be exoteric, crosscuts the distributions of hunter-gatherers and cultivators. In accretion zones are found hunter-gatherers such as the Karuk of California, but also communities of small-scale horticulturalists such as those of highland New Guinea, and even literate state-level societies as in the Caucasus mountains. Spread-zone linguistic communities also include societies at every level of sociocultural evolution. Thus, no generalization about the speed of language change that refers simply to subsistence type or level of sociocultural complexity is likely to be useful.

Another argument frequently made about the interaction between sociocultural factors and rate of language change is the idea that the adoption of certain media will slow down or speed up the rate of innovation. In the case of writing, often suggested as a factor favoring conservatism, this is almost certainly wrong. This can be shown by the well-known contrast between two Germanic languages, Icelandic and English, both spoken in highly literate societies. Icelandic is a notorious case of conservatism, with today's speakers able to understand 800-year-old texts with minimal assistance. In contrast, English of the same period is quite inaccessible to contemporary speakers, and must be studied as a foreign language, even though literacy has been quite widespread in England for nearly 500 years (Cressy, 1980). Recently developed media such as radio, television, and the Internet are often suggested as likely to favor accelerated innovation and the spread of languages spoken by early adopters of such media. The lesson of literacy, for which we have thousands of years of records in hundreds of languages, is that the interaction between media and language change is likely to be complexly mediated by ideology and by the details of local social organization and political economy.

Conclusion

The cases and controversies about the relationship between language change and cultural change reviewed above lead historical linguists to conclude that the two processes seem often to be connected. However, these connections seem to be irrevocably local and historical rather than general and evolutionary. Tendencies – such as the loose association between accretion zones, localist sociolinguistic stances, and esoterogeny versus spread zones, distributed sociolinguistic stances, and exoterogeny – can indeed be identified and are useful in pointing toward possibilities. But exceptions are common, and evolutionary accounts of local situations are likely to be unsatisfactory. Instead, the understanding of these relationships is a historical-linguistic project. Such a project requires detailed historicist untangling of the interaction between local cultural construal of resources, rights, and persons and the ways that local details of drift in language change are linked to these by language ideologies.

See also: Cultural Evolution of Language; Environment and Language; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Indexicality: Theory; Language Change, Intentional; Language Ideology; Language Maintenance and Shift; Language Spread; Media and Language: Overview; Metasemiosis and Metapragmatics; Nahuatl; Origin and Evolution of Language; Primitive Languages.

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Language Change and Language Contact

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Mainstream historical linguistics came rather late to the knowledge that language contact can, and often does, lead directly to structural linguistic changes. Leading figures expressed a firm belief in severe constraints on structural interference; Meillet, for instance, believed that grammatical loans can only occur when the source and receiving systems are very similar (Meillet, 1921: 87), and Jakobson argued that "a language accepts foreign structural elements only when they correspond to its own tendencies of development" (Jakobson, 1962 [1938]: 241). These beliefs probably arose ultimately from a conviction that the Comparative Method would be threatened

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Language Change and Language Contact

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Mainstream historical linguistics came rather late to the knowledge that language contact can, and often does, lead directly to structural linguistic changes. Leading figures expressed a firm belief in severe constraints on structural interference; Meillet, for instance, believed that grammatical loans can only occur when the source and receiving systems are very similar (Meillet, 1921: 87), and Jakobson argued that "a language accepts foreign structural elements only when they correspond to its own tendencies of development" (Jakobson, 1962 [1938]: 241). These beliefs probably arose ultimately from a conviction that the Comparative Method would be threatened

by the existence of extensive structural diffusion. It is no accident that Hugo Schuchardt, a major critic of what he saw as the Neogrammarians' intellectual rigidity in ignoring foreign interference, was the founder of pidgin/creole studies, because mixed languages like pidgins and creoles challenge the universality of the tidy family tree (see Thomason and Kaufman, 1988). In general, however, historical linguists have long tended to argue that a contact explanation for a change should be proposed only when all attempts to find a language-internal explanation have failed. Research over the past half century, starting with Weinreich's classic 1953 book *Languages in contact*, has brought about a recognition of the importance of language contact for explanations of many linguistic changes. In recent years, the trickle of monographs and even textbooks on language contact has become a flood (two of the most recent important treatments are Winford, 2003 and Clyne, 2003).

The following sections will address the general problem of how to determine, after the fact, that contact-induced change has occurred. The first section focuses on the clearest cases, those for which no one would deny the effects of contact. In the second section, less obvious cases will be considered, with conclusions on methods for establishing the existence of prior contact-induced changes. Contact-induced changes that do not involve actual interference will be considered in the third section. The concluding section will offer some comments on the prospects for predicting what kinds of contact-induced changes will occur when.

Before turning to a detailed discussion of the issues that arise in this area, we need a definition of contact-induced language change: contact is a cause of "any linguistic change that would have been less likely to occur outside a particular contact situation" (Thomason, 2001: 62). This definition covers all changes in which foreign material is transferred from one language to another, i.e., all cases of linguistic interference, but it also includes some less obvious types of change. First, some changes that occur in some cases of slow language death fall into the category of attrition – loss of linguistic material – but do not make the dying language more similar to the language that is replacing it; these are nevertheless contact-induced changes by my definition. Second, intentional linguistic changes, for instance in cases where a speech community deliberately distances its language from neighboring languages, are contact-induced but do not involve diffusion. And third, some changes occur as an indirect result of interference, typically when a borrowed morpheme sets off a chain reaction that has a snowballing effect on the receiving language's structure. Finally, the definition does not exclude contribution from internal pattern pressures in a relevant change: multiple causation is always a possibility, whether the causes are all internal or a mixture of internal and contact factors.

Contact-Induced Change: Uncontroversial Cases

A great many instances of contact-induced change will of course be accepted by all historical linguists without hesitation. The vast majority of these are changes in which morphemes are transferred from one language to another – namely, lexical borrowing and the borrowing of grammatical morphemes, both particles and affixes. No one questions whether English words such as *shah* (from Persian) and *chaise* (from French) are native or of foreign origin; similarly, no one doubts the foreign origin of English suffixes such as *-able* in words like *readable*, which has a native Germanic root, or of particles such as the Huastec (Mayan) conjunction *pero* 'but' (from Spanish). Borrowings like these arguably have no immediate structural consequences in themselves, because they do not alter native morphosyntax.

Other borrowings, however, have a clear structural effect on the receiving language. So, for example, the Indic language Bengali has borrowed the suffixes *-ra*: 'human plural' and *-gulo:, guli* 'nonhuman plural,' together with the noun-class categories they express, from Dravidian (Andronov, 1964: 124). The development of a vowel harmony rule in some dialects of Asia Minor Greek surely started with Greek suffixes added to Turkish loanwords and then spread to native Greek vocabulary. Dawkins, who reports this phenomenon, comments that "the fullness with which vowel harmony is observed clearly depends on how far the individual speaker is accustomed to talk Turkish and has the Turkish ear for these distinctions" (Dawkins, 1916: 68).

Examples of both types, with and without immediate structural effects on the receiving language, can be multiplied endlessly. The most extreme of the clear cases are mixed languages – the small set of bilingual mixed languages and the much larger set of pidgin and creole languages. For all the languages in these sets that arose abruptly (including most known bilingual mixed languages and most pidgins, but apparently fewer creoles), there is a question as to whether one can reasonably talk about language change at all: processes of language creation closely resemble processes of language change in less dramatic situations, but the end result is a new language, not a changed later form of a single language. This is not the place to try to answer this question, but mixed languages are worth mentioning here because they

enjoy a privileged position among the linguistic outcomes of contact. One might imagine (with difficulty) an argument that Asia Minor Greek just happened to develop vowel harmony, and that the development had nothing to do with Turkish influence, in spite of all the Turkish loanwords that display vowel harmony. But unlike other products of language contact, mixed languages declare their mixed origin as soon as any attempt is made to include them in an application of the Comparative Method, because they always display a striking discrepancy between one (or more) grammatical subsystems and the rest of the language. They are therefore the easiest products of language contact to detect retrospectively, provided that at least some of their source languages are still available for comparison. Pidgins and creoles usually (though not always) draw their lexicon primarily from a single language, but the grammar as a whole comes neither from that language nor from any other single language. Bilingual mixed languages differ in their make-up: Michif, a French-Cree mixture spoken mainly in Manitoba and North Dakota, has noun phrases (lexicon, phonology, morphology, and syntax) from French and the rest of the language (lexicon, phonology, morphology, and syntax) from Cree; Mednyj Aleut, once spoken on one of the Commander Islands off the far eastern coast of Russia, has Russian finite verb morphology but other grammatical components (including most of the lexicon) from Aleut; Media Lengua (Ecuador) has Spanish lexicon and Quechua grammar; and so forth.

For all these cases of contact-induced change and language creation under contact conditions, no special methodology is needed to identify the effects of language contact, always assuming that the source languages, or their relatives, are known. In other contact situations, however, the picture is less clear, and the need for rigorous methods for establishing the existence of contact-induced change is evident.

Less Obvious Contact-Induced Changes

In the borrowing situations just described, contact-induced change is signaled by the presence of foreign material incorporated into the receiving language and is therefore uncontroversial. In other cases, structural features are transferred without morphemes. In fact, this is very common in three kinds of contact situations. First, when the source language and the receiving language are very closely related, with essentially no typological distance separating them and largely shared lexicon and structural features, structural diffusion from one to the other often happens without any morphemic exchange. This is perhaps most obvious in cases of dialect borrowing, as for instance when a Standard Serbo-Croatian pattern of syncretism in plural oblique cases (genitive vs. dative/instrumental/locative) replaced the naive syncretic pattern of the Hvar dialect (genitive/locative vs. dative/instrumental), though Hvar speakers retained their own case suffixes, which differ from those of the standard dialect (Hraste, 1935: 17–25).

The second type of contact situation in which there is very often structural interference without morpheme transfer is in cases of language shift (typically substratum interference). In borrowing situations of the sorts discussed above, where morpheme transfer accompanies structural interference, nonbasic vocabulary is the earliest and the predominant linguistic effect; structural interference is likely only with increasingly intense contact involving widespread bilingualism. In sharp contrast, phonological and syntactic features predominate in shift-induced interference. The reason is that imperfect learning of a target language plays a (or the) major role in shift-induced interference and, as is typical in second-language learning, vocabulary is learned first (see Thomason and Kaufman, 1988: Chap. 3 and Thomason, 2001: 66–76 for discussion of this distinction). (Inflectional morphology tends to be least common in both types of interference, for reasons having to do with its typically tight-knit integration into the grammatical framework of a language.)

The third type of interference without morpheme transfer is (at least as far as is currently known) less common than shift-induced interference and much less common that borrowing between closely related languages. This is the convergence of structure through mutual or one-way borrowing in a highly organized intense bilingual or multilingual contact situation in which each speaker group is concerned to preserve its own heritage language – sometimes, though by no means always, with a reluctance to engage in any lexical borrowing. A small number of cases have been reported in the literature for which word-by-word or even morpheme-by-morpheme intertranslatability is claimed for the languages; unfortunately, however, few thorough detailed case studies are available for any of these situations (but see Aikhenvald, 2003 for a report on an Amazonian contact situation).

The most famous case is the village of Kupwar in India, where the Indic languages Marathi and Urdu and the Dravidian language Kannaḍa are said to have converged drastically in their structures (Gumperz and Wilson, 1971; see also Thomason and Kaufman, 1988: 86–88 for discussion). It is unclear just how drastic the convergence was in this case, given that Urdu and Marathi are related and that Dravidian and

Indic languages have been in such close contact for so long that the typological distance between the two groups has been lessened by much contact-induced change. Even so, the typological match in the Kupwar languages is striking. Of the sixteen features discussed by Gumperz and Wilson, all of them morphosyntactic, Kupwar Urdu has converged toward Kupwar Kannaḍa and/or Marathi in twelve, Kupwar Kannaḍa has converged toward Marathi in five or six, and Kupwar Marathi has converged toward Kannaḍa in four features. Among the features are gender categories, an inclusive/exclusive 'we' distinction, specific subject-verb agreement rules in several constructions, and yes/no question marking. Only one of the changes, the adoption by Kannaḍa of an Indic subordinator *ki* together with some (not all) of its syntactic features, involves a borrowed morpheme.

The difficulty with interference that does not include transferred morphemes is that those who consider contact-induced change an exotic and inherently unlikely explanation for structural change find it easier to maintain their skepticism about contact explanations in these cases. The Ethiopian Highlands, the best-known linguistic area in Africa, comprises Ethiopic Semitic languages in contact with Cushitic languages (see especially the ground-breaking work of Leslau, 1945, 1952). Semitic and Cushitic, in spite of their genetic link as coordinate branches of the Afro-Asiatic language family, are typologically quite different in many respects. Ethiopic Semitic shares a sizable number of structural features with Cushitic, in contradistinction to the rest of Semitic, and Leslau attributes these sharings to the influence of Cushitic speakers who shifted to Semitic. Although Ethiopic Semitic also has numerous Cushitic loanwords, the most striking morphosyntactic interference features employ native Semitic morphemes. The most-affected Ethiopic Semitic dialects share with Cushitic otherwise un-Semitic features such as labialized velar consonants, a distinct future tense, new morphological means of expressing the causative, negative perfect, and frequentative in verbs, noun plurals formed by reduplication of the root-final consonant, subordinate clauses expressed by nonfinite gerund constructions, and several linked word-order features – SOV sentential word order, auxiliary following the main verb, relative clauses preceding the head noun, and postpositions instead of prepositions.

The problem of establishing the existence of contact-induced change is especially acute when the changes could easily have happened through internally motivated change. When the proposed interference features are universally marked, as with the Ethiopic Semitic labialized velars, or when they belong to the most tightly organized closed grammatical subsystems, such as the causative, negative perfect, and frequentative verbal formations and the reduplicative plurals of Ethiopic Semitic, the chances of independent internal innovation are less; but when the possibilities are limited, as with basic sentential word order and linked word-order features (postpositions vs. prepositions and the like), internal motivations could easily have produced the same outcome as contact. Adopting a rigorous methodology will help in such cases. It will not always provide a definitive answer to the contact and/or-internal-causation question – many things are unknowable in historical linguistics, as in other historical sciences – but it will at least show whether a definitive answer is possible (see Thomason, 2001: 93–94).

First, it is necessary to look at the whole picture, not just a single piece of the puzzle. If one syntactic feature has diffused from language A to language B, other syntactic features and some phonological features as well will almost certainly have done so: a contact situation intense enough to permit structural interference at one structure point also permits structural interference at other points. Second, we need to identify a source language for the set of features we wish to attribute to language contact. Appeals to unidentified substrata are justifiably viewed with disapproval by historical linguists, because they do not advance our knowledge. In cases of language shift, of course, the whole point is that the shifting group's language often disappears; but if another subgroup of the speech community maintains the same language, or if there are closely related languages that can be investigated, this problem can be overcome. Third, we need to prove that language B has changed (no change, no evidence for interference); and fourth, we need to prove that the proposed interference features are old in language A (if they are innovative in A, then A is hardly likely to be the source of the features in B). A complete investigation will also consider the possibility of multiple causation and search for potential internal motivations as well.

Attempts to apply these criteria will not always be successful. The languages of the famous Pacific Northwest linguistic area of the northwestern United States and neighboring British Columbia are a case in point. They share many striking features (some of them highly marked universally): labialized dorsal consonants, velars vs. uvulars, ejectives, verb-initial sentential word order, sentence-initial negation, many suffixes but relatively few (or no) prefixes, a weak noun vs. verb distinction, the use of reduplication to mark a distributive plural, numeral classifiers, large sets of lexical suffixes (with meanings like 'long object,' 'belly,' and 'face/fire'), etc. But since all

these features must be reconstructed for all three proto-languages of the core families in the area – Salishan, Wakashan, and Chemakuan – evidence for the original source(s) of the shared features is lacking, and in fact there is no evidence for **any** diffusion involving these features. This does not of course mean that the Pacific Northwest is not in fact a linguistic area; it does mean that we cannot prove it at present, for the area as a whole. It seems extremely unlikely that all these features just happened to arise independently in the three families. But distant genetic relationship is a possibility, though solid evidence for that is also lacking, so that ancient areal diffusion is still the most likely explanation for the typological congruence.

Although sticking to a rigorous methodology sometimes precludes a firm conclusion about the linguistic results of a historical contact situation, it will help to evaluate poorly supported proposals of contact-induced change.

Contact-Induced Changes that Do Not Involve Direct Interference

As noted above, several change processes that fall under my definition of contact-induced change do not result in the diffusion of any lexical or structural features from one language to another. The first of these is connected with language death. Not all dying languages undergo the kinds of changes that are the focus of most of the literature on language death (see for example the papers in Dorian, 1989); some languages vanish without undergoing any significant changes at all, especially in rapid shift situations. But languages that lose speakers gradually very often also lose their lexical and structural resources gradually, through two quite distinct processes. First, their speakers replace native lexicon and structure through borrowing from the dominant language to which they are shifting; and second, speakers abandon native lexicon and structure without any replacements – a process known as attrition. These two processes are often responsible for the same changes, specifically when a borrowed structure is simpler, or less marked universally, than the structure it replaces in the receiving language. A detailed study of one case, a Hungarian-American community near Pittsburgh, Pennsylvania, provided very few structural examples of attrition alone (that is, examples in which the lost structures did not bring Hungarian closer to English structure); more examples of borrowing alone (closer to English but no simpler than the replaced Hungarian structures); and still more examples, though not many more, of attrition plus borrowing (closer to English and also simpler than the replaced Hungarian structures) (Fenyvesi, 1995). So, for instance, this variety of American Hungarian has reduced the inherited system of preverbs, a change that is possibly due to attrition alone but is probably best analyzed as a combination of attrition and borrowing (since English has no comparable preverb system).

Another class of contact-induced changes without interference is to be found in certain instances of intentional change. These fall into two different (though related) categories: cases in which a group deliberately alters its language to make it more different from the language(s) of neighboring groups, as a means of underlining in-group identity, and cases where a group invents a secret language in order to keep conversations from being understood by hostile outsiders. Examples of the former often involve massive distortion of the lexicon. Speakers of Lambayeque Quechua, for instance, metathesized certain vowel-consonant sequences in words because they felt that their language was too similar to their neighbors' language (Dwight Shaver, as reported by David Weber, personal communication, 1999). And in an instance of the latter type, the Lōṛīs of what is now Pakistan are reported to have invented a secret jargon, Mōkkī, by distorting their lexicon (including loanwords from Baluchi- and Brahui-speaking neighbors) by metathesis and by adding prefixes and suffixes (Bray, 1913: 139–140). This example might have only passing interest as a curiosity rather more elaborate than Pig Latin and other language games, except that Bray reports that Mōkkī is "acquired naturally and as a matter of course by Lōṛī children; . . . it is becoming a language for the home-circle . . ." (Bray, 1913: 139–140).

A somewhat different sort of language distortion for privacy purposes is reported in a number of cases from several different continents, cases in which groups deliberately simplify, or pidginize, their native language in order (as they assert) to keep outsiders from learning it. The Delaware Indians did this with their language, and although some foreigners (traders and missionaries) did not notice the distortion, others did: the Dutch missionary Michaëlius commented in 1628 that they "rather design to conceal their language from us than to properly communicate it, except in things that happen in daily trade; saying that it is sufficient for us to understand them in that" (Jameson, 1967 [1909]: 128). Similarly, a field-worker in Ethiopia reported that, after spending 7 months working diligently to learn the Hamer language, she realized that what she had actually learned was "a kind of 'Pidgin Hamer' which is used only for and by policemen, traders, and non-Hamer settlers"

(Lydall, 1976: 128). And an early missionary to the Motus in New Guinea discovered to his chagrin that – as he was informed by his young son, who spent much time with the village boys – the language he had struggled to learn was 'a simplified form' of the Motu language, because the Motus were reluctant to teach him their 'true' language (Dutton and Brown, 1977: 760–761, citing Chatterton, 1970: 95–96; the missionary was W. G. Lawes, who arrived in Port Moresby in 1874).

The third category of contact-induced change without interference requires a modifier: changes in this category do result from linguistic interference, but the structural effects are delayed, not immediate. That is, the borrowed element (these changes are typical of borrowing situations, not of shift-induced interference) does not in itself constitute structural change, but its presence triggers a series of changes that do eventually bring about significant structural change, in a kind of snowball effect. The borrowing of conjunctions into languages in which subordination was traditionally expressed by nonfinite clauses often leads to an innovative system with finite subordinate clauses. A comparable example is the change in Siberian Yupik (Eskimo) from a suffixal NP coordination pattern, with a comitative suffix added to each noun, to a coordination pattern in which the two NPs are linked by a conjunction, 'and,' borrowed from Chukchi. Menovščikov (1969: 124–130) observed three different coordination patterns that apparently marked a transition from the old to the new pattern: the old construction alone, with the comitative suffixes; a mixed construction with the suffixes and the conjunction 'and'; and an innovative construction with the conjunction alone. The development of this innovative end-stage construction was not itself due to borrowing from Chukchi, but the process that led to the current situation was set in motion by the adoption of the Chukchi conjunction.

Caution is required in the analysis of chain-reaction changes in this category: as Mark Hale has observed (personal communication 2002), in principle there is no limit to how far back one could reach into a language's history to find a borrowed element and then argue that it motivated a late change in a chain reaction. Few historical linguists would wish to argue for a Greek source for a change in (say) a modern Portuguese dialect, even if a morpheme involved in the change can ultimately be traced back to a Greek loanword in early Latin. The most convincing cases involve relatively shallow time depths, with chain reactions stretching back a few hundred years at most.

Conclusion: Can We Predict What Kinds of Contact-Induced Changes Will Occur When?

Historical linguists tend to be pessimists when it comes to predicting change. Nevertheless, we are always on the lookout for linguistic and social predictors for change, and especially for constraints on what changes are possible. In language contact, the safest prediction is completely trivial and therefore uninteresting: no language contact, no contact-induced change. More substantive predictions and constraints are hard to find. A common assumption is that contact-induced change is inevitable under conditions of intense contact, i.e., when there is very widespread bilingualism in a speech community. But even this commonsense position is not a safe assumption, because there are well-documented cases of bilingual speech communities whose members do not engage in lexical borrowing, and in some of these situations there is also no solid evidence of structural interference. Montana Salish, for example, does not in general borrow words from English (or French, the other European language that has played a prominent role in its contact history), and it has acquired no structural features from English (or French) either. There has certainly been a great deal of cultural assimilation to the dominant anglo culture over the past 150 years or so, but the words that are used to designate new items are created from native material; the word for 'automobile', to give just one of many examples, is *p'ip'úyšn*, which literally means 'it has wrinkled feet'. Moreover, this appears to be an areal feature of the U.S. Northwest, because Nez Perce and other languages of the region also tend not to borrow words from English or French. A few current Montana Salish speakers occasionally produce sentences that show some English influence, e.g., with SVO word order. But although such sentences are fully grammatical in Montana Salish, they are stylistically marked. They occur very infrequently in naturally occurring data, such as stories, and are common only for a few speakers and only under sentence-elicitation conditions. It seems risky, therefore, to suppose that contact-induced change of any sort is inevitable in intense contact.

Strenuous efforts to identify unborrowable linguistic features have also proved fruitless: all the constraints that have been proposed so far can be, and indeed have been, proved to be leaky. But even if we cannot talk safely about possibilities, we can still consider probabilities. There is strong evidence to support the claim that social factors outweigh linguistic factors in predicting the linguistic results of

contact. It is unfortunate, therefore, that our understanding of the crucial social factors remains fragmentary. The distinction outlined above, between borrowing (adopting a feature from one language into another, where the borrowers are fluent in both languages) and shift-induced interference (where imperfect learning of a target language is crucial), correlates robustly with linguistic effects: nonbasic vocabulary first and most in borrowing, with structure and basic vocabulary borrowed later if at all; phonology and syntax most prominent in shift-induced interference, with lexical transfer lagging behind or absent altogether. One implication of this distinction is that it permits an educated guess about the type of contact that was responsible for contact-induced changes in a long-vanished contact situation: if we can establish a number of structural interference features but no lexical interference, we can be almost certain that the process was shift-induced interference. (A rare exception might be borrowing by bilinguals into a language whose speakers have an explicit or implicit ban on borrowing vocabulary.)

Other social factors, most notably intensity of contact, have been mentioned above and in the literature, but the concept is distressingly vague. In borrowing situations, it has to do in part with levels of bilingualism in the speech community. In shift situations, the relative sizes of the two speech communities and the speed of the shift contribute to the level of intensity: the more shifting speakers there are relative to speakers of the target language, and the more rapid the shift, the more interference features one can expect in the target language.

Linguistic factors, though important, are easily overridden by social factors. For instance, typological distance between source language and receiving language affects the likelihood that structure will be borrowed – the more similar the systems are to begin with, the easier it is for a feature to diffuse from one to the other – but with intense enough contact, **any** feature can be transferred from any language to any other language, no matter how different the two languages are typologically.

Considerations of universal markedness also play a role, but mainly in shift situations. In borrowing situations, where the receiving-language speakers are fluent bilinguals, knowledge of the relevant structures can safely be assumed, so there is no knowledge-based barrier to borrowing. In shift situations, by contrast, markedness plays a role in the learning process: highly marked target-language features are less likely to be learned by members of the shifting group. On the other hand, when shifting speakers carry over features of their heritage language into their version of the target language, these features may be marked or not; but the unmarked first-language features are less likely than the marked ones to be adopted by original target-language speakers if the two speech communities coalesce into a single integrated speech community. That is, in such cases the original target-language speakers will adopt some, but not all, of the innovative features in the shifting group's variety of the target language; and the less marked features, being easier to learn, are more likely to survive in the eventual integrated target language.

Markedness itself is affected by various specific linguistic factors. To give just one example, one common-sense and valid proposal is that sharpness of boundaries makes affixes easier to borrow (Heath, 1978: 105; Comrie, 1981: 202–203). This leads to a prediction that affixes from flexional languages, and also from agglutinative languages where morpheme boundaries are obscured by morphophonemic alternations, will be less often borrowed than affixes from agglutinative languages with transparent transitions from one morpheme to the next in a string of stem and affixes.

Various authors have proposed borrowing scales, correlating expected (or permissible) interference features with increasing intensity of contact: the more intense the contact, the more kinds of features can be borrowed (see e.g., Moravcsik, 1978 and Thomason and Kaufman, 1988: 73ff). These scales are roughly predictive, in that they embody a claim that, for instance, stance, basic vocabulary will not be borrowed before nonbasic vocabulary, and inflectional morphology will not be borrowed before derivational morphology. Occasional exceptions to these predictions sometimes turn up, for complex social and linguistic reasons, so no borrowing scale is completely accurate. Perhaps the most common reason for out-of-scale borrowings is close typological congruence between the source and receiving languages, which can facilitate types of borrowing under less intense contact conditions than the scale predicts. Finally, different authors' borrowing scales often make different predictions; Romaine predicts, for example, that morphology will be borrowed before syntax (Romaine, 1995: 64), while Thomason and Kaufman (1988) predict the opposite borrowing order.

The conclusion, then, is that rough predictions can be made about the likelihood of different kinds and degrees of both borrowing and shift-induced interference, under varying social and linguistic conditions. Many of these predictions are for the most part borne out by the available empirical evidence, and some are strongly supported. But the possibility for exceptions

always exists, because no aspect of language change is, in the end, completely predictable.

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Language Change, Intentional

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The traditional view of linguistic change is that it is inexorable, beyond the control of the language's speakers either individually or in groups. This view has been expressed repeatedly over the past 150 years and across deep theoretical divides. Here are a few typical examples:

- It is 'not in the power of Man to produce or prevent changes in language' (Max Müller, *Lectures on the Science of Language*, 1861).
- 'Sometimes we can feel where the drift [of a language] is taking us even while we struggle against it' (Edward Sapir, *Language*, 1921: 156).
- Noam Chomsky and Morris Halle assume 'the adult's inability to modify his grammar except by the addition or elimination of a few rules' and assign the initiation of significant language change

pidgins and creoles
secret languages
social predicators of change
structural borrowing
typological distance

always exists, because no aspect of language change is, in the end, completely predictable.

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The traditional view of linguistic change is that it is inexorable, beyond the control of the language's speakers either individually or in groups. This view has been expressed repeatedly over the past 150 years and across deep theoretical divides. Here are a few typical examples:

- It is 'not in the power of Man to produce or prevent changes in language' (Max Müller, *Lectures on the Science of Language*, 1861).
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- Noam Chomsky and Morris Halle assume 'the adult's inability to modify his grammar except by the addition or elimination of a few rules' and assign the initiation of significant language change

to children's first-language acquisition (*The Sound Pattern of English*, 1968: 251).

- The 'mistake [in functionalist explanatory strategies] is considering language change to be something that speakers "do" (in any real sense, for any reason), rather than something that happens to their languages . . .' (Lass, 1997: 370).

The regularity hypothesis of sound change, given its great importance for historical linguistic methodology, may be the main reason for the traditional insistence that speakers cannot initiate and implement deliberate structural changes in their languages, because its validity rests on the assumption that sound change proceeds independently of speakers' intentions (and of grammatical context). Presumably no historical linguist would wish to deny that the vast majority of structural linguistic changes fit this picture. Nevertheless, deliberate and conscious decisions taken by speakers can be shown to be responsible for nontrivial changes in various grammatical subsystems in numerous languages. The claim that such changes are impossible is therefore wrong; and so is the related claim, common in generative studies of language change, that very young children who are engaged in first-language acquisition are the sole initiators of significant linguistic change, because very young children lack the social maturity to participate in group decisions about language change.

It must be emphasized that in this context 'linguistic change' refers to the innovation itself, not to the spread of the innovation to later generations and/or to other adult members of the speech community. It is not necessary, therefore, to argue for the ability of an adult to change the grammar s/he internalized in early childhood; all that is necessary is that the adult produces systematically innovative linguistic structures that comprise part of the input for the next generation's language acquisition. Because they are systematic and consistent, these innovative structures must somehow form part of the adult's linguistic competence; but since an adult's competence certainly includes a variety of registers and often includes diverse dialects and even separate languages, it is unnecessary to assume that intentional innovation of new structures means a replacement of early-acquired structures by the new ones. The new structures might be additions to the adult's repertoire, not replacements of earlier structures (even if the earlier structures are no longer used at all).

It is easy to find trivial examples of intentional change. The most obvious instances are lexical innovations, for example, slang terms, which have a notoriously rapid rate of turnover. In northern California college slang of ca. 1960, a synonym for *crazy* in its slang sense was *napa*, named for a well-known California mental institution in Napa Valley. In the 1990s slang spoken by inmates in the Pennsylvania state penitentiary at Pittsburgh, a synonym for *crazy* was *snoo* – from the acronym SNU of the Special Needs Unit, where mentally disturbed inmates were housed. Similar examples can be multiplied endlessly.

Other lexical changes have at least minor structural effects, such as the replacement, by most Modern English writers, of generic *he* with *he or she, s/he*, or (though not in Standard English) *they* with a singular referent. The deliberate and highly politicized nature of this change is underlined by Roger Lass (1997: 368), who defends his use of generic *he*:

> 'I can't not use it (without a conscious decision of a type not at all characteristic of "normal" change) and still be speaking "my own language." Like all normal speakers, I am burdened by the historically given.'

This raises an important question: What is 'normal change,' and is there any practical way to exclude intentional changes from its domain, or any theoretical justification for doing so? If intentional change were impossible, it would make sense to call it nonnormal; but if it were impossible, speakers would be unable to abandon generic *he* in any case. These questions cannot be addressed directly here, but it seems extremely unlikely that every intentional change will be identifiable after the fact, and it is therefore risky to assume any sharp distinction between a normal change and a nonnormal change.

Perhaps the largest group of intentional changes is to be found in processes of language planning (see, e.g., Daoust, 1997 for a survey of language planning, or any of the over 57 000 Google hits on the subject). Language academies often focus heavily on vocabulary, but some planners recommend structural changes, especially during processes of standardization. Early in the 20th century, for instance, the Estonian language reformer Johannes Aavik introduced new structures as well as new words into Estonian, and some of these were adopted by Estonian speakers as regular features of their language; one example is the replacement of phrasal suplerlatives (as in English *more handsome*) by one-word superlatives (as in English *handsomest*) (thanks to Ilse Lehiste for this example; see Saagpakk, 1982: lxxix–lxxxvii and Oksaar, 1972 for further examples).

Another prominent motivation for deliberate linguistic changes is a concern to emphasize a group's identity vis-à-vis some other group(s). (This is sometimes also a type of language planning, though it is rarely part of an official governmental effort.) The

clearest cases result directly or indirectly from language contact.

Ma'a (Mbugu), the famous mixed language of Tanzania, is spoken in a speech community in which all of its current speakers are also fluent in at least one Bantu language, Pare. Ma'a has a voiceless lateral fricative, inherited from Cushitic; Pare, like other Bantu languages of the region, has no such phoneme. Maarten Mous notes that modern Ma'a speakers insert this lateral fricative into Pare words when speaking Pare, as a means of emphasizing their differentness from Pare and the difficulty of their Ma'a language (1994: 199) – an instance of deliberate phonological change. A comparable but more dramatic example, this time of morphological rather than phonological distortion, comes from Bougainville Island, Papua New Guinea, as described by Donald Laycock (1982). As has been reported from elsewhere in New Guinea, speakers of the Uisai dialect of Buin apparently decided that their speech was too similar to that of their neighbors; without such a decision, followed by deliberate action, it is difficult or impossible to explain the change that distinguishes their dialect: all nouns that are masculine in other dialects of Buin, with all their elaborate gender agreement marking patterns throughout the sentence, are feminine in Uisai, and vice versa. This cannot have been a gradual, incremental change, and it surely was not the result of very young children's innovation.

A sociolinguistically similar example is found in Lambayeque Quechua, a variety of Quechua spoken in Peru (and, by report, in some other varieties of Quechua as well). Speakerers of Lambayeque Quechua told a visiting linguist (Dwight Shaver, as reported to David Weber, p.c.) that they felt that they spoke too much like their neighbors, so they distorted their vocabulary by reversing the order of certain vowel-consonant sequences, replacing, e.g., *yawar* with *yawra, kabalta* with *kablata*, and *-taq* with *-tqa*.

More thoroughgoing lexical distortion has been reported from widely separated localities, occasionally with significant enough results to produce (arguably) a new language. An especially striking example was reported from Baluchistan, in what is now Pakistan, in 1913 (Bray, 1913: 139–140). Sweeping changes that included such devices as metathesis and the addition of prefixes and suffixes made this language unintelligible to nonmembers of the speech community:

> 'Mōkkī, the cant of the Lōṛīs, . . . is an artificial jargon, which the Lōṛīs have mechanically invented on the basis of the language of the people among whom they live, and which they more especially employ when they want to keep their meaning to themselves . . . And yet so universally and successfully is the jargon used, that it seems doubtful whether its artificiality suffices to debar it from being classed as a language . . . it is at any rate acquired naturally and as a matter of course by Lōṛī children; it is no longer, it would seem, simply a secret patter; it is becoming a language for the home-circle . . . both Brahui and Baloch admit freely that Mōkkī is beyond them.'

With changes in the vocabulary so massive that people who had previously understood the group's language were no longer able to do so, it is difficult to classify Mōkkī simply as a changed later form of any earlier language and thus as a member of a family tree.

There are, however, clearer examples of the disruption of language transmission, understood as the transmission of a complete language, including all grammatical subsystems, from one generation to the next, with only relatively minor incremental changes. Some of these involve intentional change in the creation of bilingual mixed languages, in contact situations in which a new (sub)ethnic group arises. Bilingual mixed languages like Michif (spoken primarily in Manitoba and North Dakota) and Mednyj Aleut (once spoken on Mednyj, or Copper, Island off the far eastern coast of Russia) cannot have arisen gradually, and they almost certainly emerged at least in part through deliberate, conscious decision. Michif arose as the language of a new mixed-blood White/Algonquian population that coalesced into a separate speech community, culturally and legally distinct from both source populations. Michif consists of Cree (Algonquian) verbal lexicon and sentence structure, including Cree phonology and fully elaborated Cree morphology, combined with French noun phrases in which the lexical items, the phonology, the morphology, and the syntax are all from Canadian French (see, e.g., Bakker and Papen, 1997). There is a bit of leakage from the Cree parts into the French noun phrases – Cree demonstratives and a Cree obviative suffix – but otherwise the two components are kept quite separate. Michif must have been created by fluent bilinguals; it cannot have been created by very young children, because children learning two first languages have not been found to create such mixtures. The language's date of origin is not known precisely, but it must have arisen in a short period of time.

Mednyj Aleut is (or was – it had almost vanished at last report) the language of a mixed-blood Aleut/Russian population that arose as a result of the Russian fur-seal trade that flourished around the Aleutian Islands during much of the 19th century. The language is mostly Aleut with some Russian admixture (loanwords and perhaps also some structural borrowings), except for the finite verb morphology,

which has been imported intact from Russian (this characterization of the language as a whole is somewhat controversial; see Thomason, 1997 and references cited there for description and discussion). Like the Michif speech community, the creators of Mednyj Aleut were a mixed-blood population, resulting from unions of Russian traders and Aleut women. The mixed-bloods held a distinct economic and social position on Mednyj Island. Here too the exact date of origin is unknown, but it must have been considerably less than a hundred years, because the conditions that gave rise to it were not present before 1826, when Aleuts were first settled on the island by Russian seal fur traders, and they were no longer present much beyond 1867, when the Russian American Company vanished and most Russians therefore left the island.

The conclusion is that adults are not only capable of inventing new words and new meanings for old words and then adding the innovative forms to their language or replacing old words with new ones; and they are not only able to modify a few fairly minor grammatical rules. They are also able to implement much more elaborate changes in their language, including massive lexical distortion and massive structural change as well. In the most extreme cases – given limits on the time available for the changes and/or on the possibilities for gradual incremental change – a significant component of these changes is almost certainly deliberate, conscious decisions by the speakers who initiate the changes; in a few cases, these decisions are actually articulated by the speakers. It is likely that the most successful intentional structural changes occur in small, compact speech communities. Exceptions may be found in some instances of national language planning, including language standardization, but nothing as elaborate as the changes that produced Uisai, Mōkkī, Michif, and Mednyj Aleut is known (at least to me) from successful language-planning efforts. Except for language planning, the literature on deliberate changes is sparse. Some discussion and references to particular examples can be found in Thomason (2001, Chaps. 6 and 8 and Thomason, 1999).

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Language Change: Probabilistic Models

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Properties of a Probabilistic Model of Language Change

In many areas of linguistics it makes sense to study the mental grammar of the individual in isolation. Language change, however, cannot be understood solely as something that happens within an individual (even if individuals' grammars do change over their lifetimes), but rather must be understood as something that happens in a speech community, through the accumulation of interactions between individuals over time. Each of these interactions has a probabilistic character: which individuals will interact, which variant the speaker will produce, and how the listener's mental grammar and lexicon will be affected.

Because language change is not instantaneous at the population level, any well developed model of

which has been imported intact from Russian (this characterization of the language as a whole is somewhat controversial; see Thomason, 1997 and references cited there for description and discussion). Like the Michif speech community, the creators of Mednyj Aleut were a mixed-blood population, resulting from unions of Russian traders and Aleut women. The mixed-bloods held a distinct economic and social position on Mednyj Island. Here too the exact date of origin is unknown, but it must have been considerably less than a hundred years, because the conditions that gave rise to it were not present before 1826, when Aleuts were first settled on the island by Russian seal fur traders, and they were no longer present much beyond 1867, when the Russian American Company vanished and most Russians therefore left the island.

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Because language change is not instantaneous at the population level, any well developed model of

language change must be probabilistic at least in the sense of specifying how an individual behaves when surrounded by variation and how that behavior in turn affects the rest of the population. In the simplest model, a learner could simply adopt the grammar of the first other speaker encountered (assuming that the encounter provides enough information for the learner to identify that grammar). In that case, the model is probabilistic only in determining what type of speaker the learner encounters. But more realistic models require learning algorithms that can handle the learner's variable environment.

It can be difficult (or misleading) to try to understand how such a model will behave without being mathematically explicit about how the model works, and examining its behavior under varying conditions, whether analytically – by studying properties of equations – or through computer simulation when direct analysis is infeasible. Being explicit requires simplifying reality somewhat, and depending on researchers' interests, models are typically more realistic in one area than in others.

A model of language must specify what the internal state of an individual looks like. First, does an individual have a single grammar that produces no variation, a single grammar that produces probabilistic variation, or multiple grammars each associated with a probability of use? ('Grammar' here is used loosely to include not only a language's phonology, morphology, and syntax, but also possibly its lexicon.) Second, how is a grammar represented? Possibilities that have been proposed include a vector of parameter settings, a connectionist network, a cloud of exemplars, or a probabilistic ranking of Optimality-Theoretic constraints.

It is also vital to specify how an individual's grammar is arrived at during initial acquisition, and how it may change during adulthood; the choice of learning or update algorithm of course depends on the nature of the grammar. Once a learning algorithm is specified, it is still necessary to consider whether there is a critical period after which learning ceases, and if so how much data the learner is exposed to during that period; if there is no critical period, the model must specify how plastic the grammar remains as the individual ages.

Moving to the level of the population, the model must specify who interacts with whom. Do children learn only (or preferentially) from their parents? Do all individuals interact equally with all members of the population, or is the population structured, whether geographically or socially, so that some interactions are more likely than others? Does the listener in an interaction treat all data the same way, or is an utterance's influence a function of the speaker's (and possibly the listener's) age, the strength of the social connection between the two individuals, or even the social status of the speaker? Does the speaker's choice of utterance similarly depend on characteristics of the listener? Properties of the population itself must also be decided, such as size, nature of geographic and social structure (if any), birth and death rates, and whether these differ as functions of grammar, geographic location, or status in the social network (see Milroy, 1987 on the role of social networks in variation and change).

Probabilistic Grammars

It has been well documented that when a linguistic change is in progress, productions vary, at rates that increasingly favor the innovative variant, not just across individuals but also within individuals (see Labov, 1994, 2001; Kroch, 2001 and references therein). Weinreich *et al.* (1968) proposed to model this with **variable rules,** phonological rules that apply not obligatorily, but with a certain probability, which can change from generation to generation (see also Paolillo, 2001). Little work has been done on modeling acquisition in this framework.

Probabilistic Parameter Settings

In syntax, Kroch (1989 and subsequent work by Kroch and colleagues; see Kroch, 2001 for references) has attached probabilities to parameter settings. While change is in progress, individuals have nonzero probabilities associated with both settings of some parameters.

Learning algorithms have been proposed for parameter setting in variable environments, but these algorithms generally do not result in a variable grammar. Niyogi and Berwick (1995), for example, consider the behaviors of variants of Gibson and Wexler's (1994) Triggering Learning Algorithm when the learning environment contains speakers with different grammars; but even in the face of contradictory data, the learner chooses a single grammar. In Briscoe's approach (2000 and references therein), the learner also arrives at a single vector of parameter settings, but during learning maintains probabilities for those settings, based on both their prior probabilities (universally given) and their probabilities in light of the learning data; these probabilities determine how easily a parameter setting can be changed in response to further learning data.

Competing Grammars

Rather than having variation within a single grammar, it is also possible to imagine that speakers can maintain multiple, independent grammars, each

having some probability of use. (As a model of diglossic or bilingual competence, such multiple grammars would need to be associated with additional information about their appropriateness in different social settings.) Yang (2000) models acquisition of competing grammars in a reward-penalty scheme. When the learner encounters an utterance, a grammar is selected at random according to its current probability. If the grammar can parse the utterance, its probability is increased; otherwise, its probability is decreased.

Competing full grammars permit a wider range of variation types than grammars with probabilistic rules, parameter settings, or constraint rankings. For example, in a grammar with parameters A and B, each having possible settings 0 and 1, a speaker who maintains separate grammars could use the grammars (0,0) (A = 0 and B = 0) and (1,1), each at probability 0.5. But if the speaker associates probabilities not with grammars but with individual parameter settings, this will be impossible: if (0,0) and (1,1) are both used, then the parameter settings A = 0, A = 1, B = 0, and B = 1 all must have nonzero probabilities, so the speaker will sometimes use (0,1) and (1,0) as well. The situation is similar for variable rules and constraint rankings. It should be noted that the term 'competing grammars' is often applied to cases of a single grammar with variable parameter settings.

Probabilistic Constraint Ranking

Probabilistic ranking of Optimality-Theoretic (OT) constraints has also been applied to both phonological and syntactic change: in this version of OT, a grammar consists not of a linear ranking of constraints, but of a probability distribution over possible constraint rankings. One such model is Boersma's (1998) stochastic OT, in which each constraint is associated with a ranking value; at the time of generating an utterance, random noise is added to each ranking value, and the resulting perturbed values are used to rank the constraints linearly. In this theory, learning is accomplished by Boersma's Gradual Learning Algorithm.

Adaptive Rules

An alternative to probabilistic grammars during language change is the theory of adaptive rules (Andersen, 1973), in which each individual has a non-variable grammar. But, if that grammar represents an innovative departure from the current standard, the speaker develops a layer of rules to make her utterances conform to community norms. Such a speaker's adult utterances are just like a conservative speaker's; the difference is that the innovative speaker is 'tolerant' of the same innovation in children. These children, facing less opposition, would then develop their adaptive rules later in life – meanwhile producing utterances with the innovation, which might serve as learning data to younger learners – and in turn be even more tolerant of innovation. This process continues until the adaptive rules are used only in a special, conservative style associated with the old, and eventually the adaptive rule is eliminated entirely. This theory rests on the assumption that a child learns not just from adults' utterances, but also from adults' reactions to the child's own speech; most models do not share this assumption.

Probabilistic Categories

The probabilistic models of grammar described above rely on discrete categories, such as nouns vs. verbs, or [+high] vs. [−high] vowels. In some models of language change, however, category membership is itself probabilistic.

Exemplar-Based Models

Pierrehumbert (2002) has explored certain types of phonological change within an exemplar-based framework. In exemplar theory, tokens of encountered speech are mapped onto a similarity space with dimensions such as duration and formant values, and possibly time. Not every token is necessarily stored separately, because the similarity space is granular, or discretized into 'bins' called exemplars. When a new token is encountered, the strength of the exemplar it belongs to is augmented (this could be done either incrementally or by giving an exemplar maximum strength whenever a token is mapped to it). Countervailingly, exemplar strength decays over time. The learner forms categories – corresponding, for example, to members of the ambient language's vowel inventory – by identifying clusters of exemplars. Each category, then, is made up of many exemplars of varying strengths. In perception, a category label is attributed to an incoming stimulus according to the number of exemplars from each category that are similar to it, with a weighting in favor of stronger exemplars. In order to produce an instance of a category, an exemplar is chosen at random, but again with weighting in favor of stronger exemplars, and neighbors of the chosen exemplar contribute to the resulting production in proportion to their strengths; random noise may also be added. Lexical entries, moreover, contain weights that are applied to exemplars in production, so that one word may 'prefer' to be realized with a vowel of long duration, while another prefers short duration.

Pierrehumbert models Joan Bybee's discovery that lenitory phonological changes (those involving

gestural reduction) progress more quickly in high-frequency words. For example, English optional schwa reduction/deletion is more advanced in high-frequency words such as *every*, *camera*, *memory*, *family* than in low-frequency words such as *mammary*, *artillery*, *homily* (see Bybee, 2001 and references therein). Bybee proposes that the reason for the phenomenon is that lenition is imposed every time a word is used and the lexical entry (of the listener and/or speaker) is updated in response. Since this happens more often in high-frequency words, they change more rapidly. Crucial to this explanation is allowing lexical entries to have a high degree of phonetic concreteness: in the English schwa example, the lexical entry cannot simply be a string of phonemes, either containing or not containing a medial vowel. Rather, it must somehow contain information about the typical duration range (including zero) of the potential schwa vowel, such as through lexical weighting of schwa exemplars. Pierrehumbert's simulations, using repeated rounds of production and perception in the exemplar model with an externally imposed constant tendency representing lenition, show that change does indeed progress more rapidly in frequent words.

Pierrehumbert proposes that a phonetic change can eventually change lexical entries at the phonological level. For example, it is plausible that words like *family*, whose phonology allows schwa deletion (sonorants surround the medial vowel) are currently nonetheless represented lexically with a medial schwa, just as are words like *attitude*. But if English schwa reduction continues to progress, words like *family* will come to weight short exemplars of schwa so heavily that their schwa productions cluster around a very short (or even zero) duration, whereas the schwa productions of words like *attitude* will cluster around a longer duration. Since, in Pierrehumbert's model, learners infer phoneme-like categories from clustering, in subsequent generations the lexical entries for the two types of words will refer to different category strings.

Connectionist Models

Connectionist models of competence have also been applied to language change, by such authors as Tabor (1994) and Johansson (1997).

Tabor's model of the grammar/lexicon is associative, with no explicit parameter settings or grammatical categories. The model is a connectionist network with three layers of nodes: input, output, and hidden. Input nodes represent lexical items, and output nodes represent word behaviors, such as taking a certain type of complement. Activation of an input node flows to strongly connected hidden-layer nodes, which in turn activate strongly connected output-layer nodes; there is no direct connection between input and output nodes. Fuzzy grammatical categories, which can be conceptualized as patterns of input-node-to-hidden-node connection weight, emerge from similar distribution. Two words that would both be classified in a traditional grammar as nouns, for example, have relatively similar distributions and therefore similarly weighted connections to the hidden units. The use of this network to model language change is discussed in Constant Rate Effects and Learning Biases below.

Constant Rate Effects

When a change, such as from SOV (subject-object-verb) to SVO word order, occurs in multiple syntactic environments, such as main and subordinate clauses, we can imagine different patterns of change. If for some reason the change originates in main clauses, SVO could replace SOV fairly quickly there, and more slowly in subordinate clauses, perhaps because the change is only gradually being generalized to environments that are less similar to the original environment of the change.

An alternative, advocated by Anthony Kroch and colleagues, is that when the syntactic theory dictates that variation in multiple environments be controlled by the same parameter (such as head-complement order), historical replacement of one variant by the other should proceed at the same rate in all environments, though it may, for poorly understood reasons, begin earlier in some environments than others. This is the 'constant rate hypothesis,' and it has been argued to be borne out by numerous case studies of syntactic change (see Kroch, 2001 and references therein).

In order to test the constant rate hypothesis, 'rate of change' must be defined. Kroch uses the logistic function $P = 1/(1 + e^{-k-st})$ to model change, where P is the probability of use of the new variant, t is time, and k and s are constant parameters that determine when the change begins and how quickly it progresses (see Contacts in the Population below for derivation of this function). Algebra transforms this equation into $[\ln P/(1-P)] = k + st$; we see that the logistic transform, or logit $[\ln P/(1-P)]$ is equal to $k + st$, a linear function of t with slope (steepness) s and intercept (starting point) k. Kroch takes the slope s to be the rate of change; thus s is expected to be constant across environments.

Tabor (1994), however (see Connectionist Models, above), views constant-rate change as merely a special case of *frequency linkage*. When a word or construction's distribution changes, the input-output

relationship cannot be directly changed in response, since there are no input-to-output connections; only the input-to-hidden and hidden-to-output connection weights can change. When the hidden-to-output weights change because one word or construction shifts in distribution, any word or construction with a similar pattern of input-to-hidden connection weights is necessarily 'dragged along' in the change to some extent. That is, words and constructions undergo similar changes in distribution to the degree that their previous distributions were similar. Constant-rate cases, for Tabor, are simply extreme cases in which two constructions' initial distributions are highly similar.

Learning Biases

Why are speakers biased to adopt some linguistic innovations, so that they spread, rather than faithfully imitating whatever they encounter equally, so that new variants fail to spread? Attempts to model such bias have mostly taken one of two approaches. The first approach simply assumes that the new variant is preferred by speakers, perhaps because it carries social prestige of some kind. This approach is inspired by the sociolinguistic research into changes in progress (most phonological) of William Labov and colleagues (see Labov, 1994, 2001 and references therein; a truly Labovian model would require more than merely tagging one variant as preferred).

The second approach, which has been more extensively developed, explores cases in which one variant might have a structural advantage over another, usually because it generates fewer ambiguous utterances. (See Clark, 2004 for another approach – a processing filter that skews the data actually usable for learning.) A commonly used example is word order. Niyogi and Berwick (1995), for example, model the change from Old French verb-second (V2) word order to Modern French subject-verb-object (SVO) order. In their simulation, a grammar is represented as a vector of (non-probabilistic) binary parameter settings, and language acquisition consists of determining those settings based on input utterances. Acquisition would be easy if every utterance uniquely identified the grammar it came from, but there are many utterances that could be produced by more than one grammar. For example (to use English lexical items), the utterance 'dog bites man' is consistent with either a V2 or an SVO grammar, whereas 'suddenly bites dog man' is not consistent with SVO and 'dog suddenly bites man' is not consistent with V2. We can imagine various strategies that a learner might use in response to an ambiguous utterance such as 'dog bites man': ignore the utterance, increment the probability of every grammar consistent with the utterance, or randomly choose one grammar consistent with the utterance and augment its probability. A learner need not even recognize the ambiguity: under a Triggering-Learning approach, the learner changes grammars only if the current grammar fails to parse an incoming utterance; an ambiguous sentence will cause no change if the learner's current grammar is consistent with it.

Under all these strategies, a grammar is at a disadvantage if it produces a higher proportion of ambiguous sentences than a competing grammar does. For example, consider a population in which 20% use innovative L_1 and 80% use conservative L_2. If 80% of L_1's utterances are unambiguous, compared with 10% of L_2's, then for every 100 utterances, 16 are triggers for L_1 and only 8 are triggers for L_2 (76 are ambiguous). Although L_1 is rarer in the population, from the learner's point of view there are more utterances coming from L_1 than from L_2. L_1 will therefore inexorably encroach on L_2.

Working in the framework of Stochastic Optimality Theory, Jäger (2003) has also modeled learning bias as a source of language change. In Jäger's variant of Optimality Theory, learning data are form-meaning pairs. The learner checks whether its current grammar (probabilistically) chooses the observed meaning as optimal given the observed form, but also whether its current grammar chooses the observed form given the observed meaning. If either type of mismatch occurs, the learner adjusts constraint ranking values accordingly, as in Boersma's (1998) Gradual Learning Algorithm. Jäger simulates the behavior of this system through repeated rounds of production and learning, and finds that when one type of form is penalized by the constraint inventory more than another (regardless of ranking), the 'better' form becomes associated to the more frequent meaning. This is because if the system begins unbiased, it will tend to use the 'better' form for both meanings. If the learner's grammar picks the wrong meaning as optimal, it must demote any constraint that disfavors the observed form-meaning pair. The more frequent meaning is of course encountered more often, so the constraint against associating that meaning to the better form gets demoted more vigorously, and the frequent meaning increasingly is produced with the better form. Jäger applies this model to case-marking systems dependent on animacy; corpus data on real languages reveals pragmatically motivated asymmetries, such as that sentences in which an animate actor acts on an inanimate patient are common. Jäger is able to produce the result that zero case-marking (which he takes to be favored) tends to become associated with

the common combinations of animacy and thematic role.

Tabor (1994) approaches biases from a different angle, focusing on possible trajectories from one grammar to another. Tabor asks why English *be going to*, on its journey from meaning solely 'be traveling towards' in Old English to acting as a future auxiliary today, passed through the stages it did. *Be going to* took on new traits one after the other, rather than simultaneously increasing the frequency of all those traits: first it began to appear with verb-phrase complements (rather than exclusively location complements) but with an intentional meaning and with motion plausibly involved (as in modern *we're going to fight*), then with no motion (*he's going to say something*), then with lack of intention (*he's going to be fired*), then with non-sentient subjects (*the chair is going to break*), and finally with dummy subjects (*it's going to rain*). In Tabor's connectionist model (see Exemplar-Based Models, above), categories are represented in a continuous space, so if an item such as *be going to* moves from one category to another (by changing its input-to-hidden weights), it may pass through other categories on the way. The connection weights in the network determine what trajectories through this space are possible, and Tabor shows how a plausible model of verb categories would cause *be going to* to pass through the category of equi verbs (which take verb-phrase complements but require sentient subjects) on its way from motion verb to raising verb.

Probabilistic Aspects of Reanalysis

Reanalysis has been argued to result from frequency shifts that cause a structure to become associated with a context that admits or encourages the new analysis (e.g., Lightfoot, 1991). Others have argued, based on case studies, that reanalysis precedes the structural change (Frisch, 1994, Pintzuk, 1995); in those cases, it is unclear what triggers the reanalysis in the first place.

Fontana (1993) explores in detail a case in which one syntactic change affects a construction's environment and thus causes another syntactic change. Object pronouns in Old Spanish appeared in second position (enclitic on the first word of the clause), but in Modern Castilian Spanish they are verbal proclitics. Loss of topicalization in Old Spanish led to an increase in clauses beginning with the object pronoun; assuming that object pronouns were not able to stand on their own phonologically, these sentence-initial pronouns would have been procliticized to the following word. Another change, loss of I-to-C movement, meant that the following word was often a verb. As the pronouns appeared as proclitics on verbs more and more often, they were reanalyzed to be permitted in that position only, whether sentence-initial or not.

Although the details of the analysis depend on issues in syntactic theory, if the basic outline is right, the Spanish situation can be seen as one in which an increasing number of forms become ambiguous, being consistent with either the existing grammar or an innovative one. The learning algorithm should then predict under what conditions, if any, the innovative grammar can take over (see Learning Biases, above).

Deriving S-Shaped Change

It has long been observed that many historical developments follow an S-shaped pattern of change (see Denison, 2002 for discussion). At first, a new variant is rarely used, and its use increases slowly; in the middle period of the change, the new variant gains ground more and more quickly until the two variants' frequencies are about equal, after which point the change slows down; in the late period of the change, the older variant disappears more and more slowly and may even persist, at very low frequencies, indefinitely. An S-curve is illustrated in Figure 1.

Contacts in the Population

Many explanations involving probabilistic interactions among individuals in the speech community have been proposed for this pattern of change. One possibility, mentioned by Labov (1994: 66), is that the S shape of change simply reflects the time-course of social contacts. If we assume, for simplicity's sake, that each individual converts to the new variant on first encountering it, a change that originates in one member of a population will still take time to spread. At the first time-step, only those who interact directly with the innovator 'catch' the new variant, and its spread is slow. But as the number of speakers with the innovative variant increases, so does the number of speakers in contact with them at every time-step, so the spread accelerates, until more than half of the speech community uses the new variant, at which point the spread slows because there are fewer and fewer speakers left who do not already use the new variant.

To see this mathematically, suppose that there are n speakers in the population. Let x represent the number of speakers with the new variant at any time; $n - x$ is the number of speakers with the old variant. The number of possible pair-wise interactions between speakers that would result in conversion of a speaker from the old variant to the new is simply the number

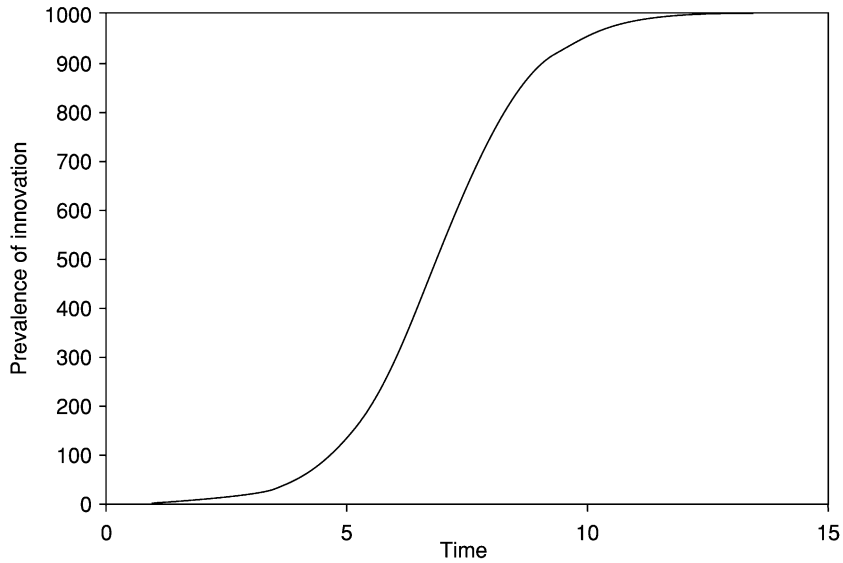

Figure 1 An S-shaped curve.

of pairs composed of one new-variant speaker and one old-variant speaker, or $x(n-x)$. But, at a given time-step, not all those interactions will take place. Let p, a number between 0 and 1, represent, for each pair of speakers, the probability that they meet at any one time-step. At each time-step, then, the increase in speakers with the new variant is $px(n-x)$. When x is small this quantity is small – change is slow. For example, with $n=100$ and $p=0.01$, when $x=1$, the number of speakers converted to the new grammar is $p(n-1)=0.99$, just under one speaker. When x reaches $n/2=50$, the rate of change reaches its maximum, $pn^2/4=25$. When the change is almost complete, $x=99$, the rate of change is again $p(n-1)=0.99$.

If we examine the proportion u $(=x/n)$ of the population that has the innovation, the rate of change at every timestep can be written $au(1-u)$, where a $(=pn^2)$ plays a role similar to p's in determining how frequent contact is. To obtain u as a function of time we must solve the differential equation $du/dt=au(1-u)$. The solution is of the form $u=1/(1+e^{-C-at})$ where C is a constant. This is the logistic function seen in Constant Rate Effects, above. Setting C so that the population starts with 1% of members having the new variant, we obtain the plot for $a=0.5$ shown in Figure 2.

An S-shaped pattern of spread is still derived if speakers' adoption of the new variant is probabilistic (e.g., each contact with the new variant only increments a speaker's use of it), or if the speech community is organized into a social network, with contacts between speakers being governed by social bonds instead of evenly distributed.

As discussed above in Learning Biases, many authors have constructed models in which the tendency of one linguistic variant to spread emerges from learning, rather than simply being imposed, and there have been simulation studies (see Niyogi, 2004 and references therein) investigating under what learning conditions the new variant spreads according to an S shape.

A Caution About Rates of Change

Some authors have cautioned that, because of stylistic conservatism, change may appear, in the written record, to be slower than it really was. Shi (1989) argues that although the rise of the aspectual particle *le* in Mandarin Chinese appears, from the written record, to take about 1000 years, it was actually much more abrupt. Shi argues is that even after the rise of *le* was completed in the spoken language, the written language contained a mix of contemporary and classical styles even within documents, so that the rate of *le* use appears artificially low. To obtain the vernacular rate of *le* use from the written record requires factoring out the rate of classical-style use. To do this, Shi tracks the frequency of the classical copula/interjective *ye*. In true classical texts, there are 8 occurrences of *ye* per 1000 characters, so Shi infers that if a text has $n \leq 8$ occurrences of *ye* per 1000 characters, the probability that a character in that text should be attributed to the classical style is n/8. When the number of *le*s is plotted per 1000 putatively non-classical characters instead of per 1000 raw characters, the change is completed in at most 200 years. When change is so abrupt, it becomes difficult to determine whether the S shape is a good fit.

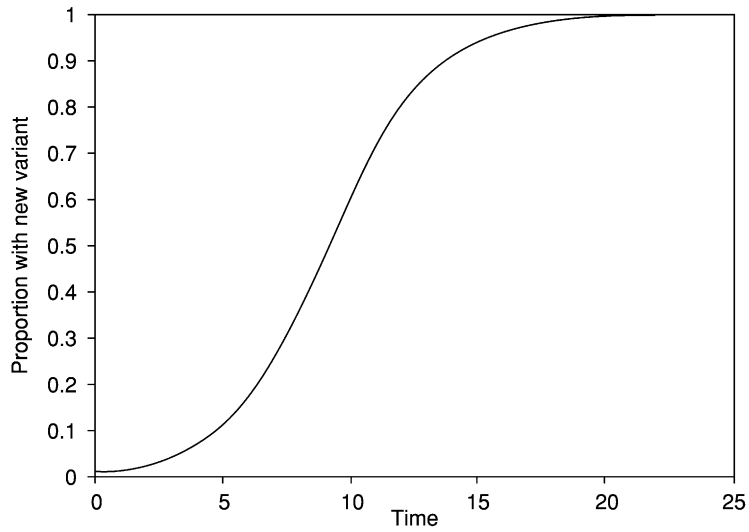

Figure 2 Logistic function.

Model Dynamics

Niyogi (forthcoming) demonstrates some unexpected properties of population-level models of language change that would be difficult to intuit. Let us consider one example that uses a cue-based learning algorithm. Cue-based learning (Dresher and Kaye, 1990) relies on the idea that certain sentences generated by a grammar could not come from any other grammar, and thus serve as unambiguous *cues* to the learner as to which grammar to choose. (On a smaller scale, a cue may also be partial, demonstrating unambiguously the setting of some parameter but being irrelevant to other aspects of the grammar.) For simplicity, assume that the learner faces a binary choice between two grammars, L_1 and L_2. Cue-based learning typically establishes one choice as the default (say L_2) by specifying that unless some minimum rate of L_1 cues is encountered, the learner will choose L_2. Varying the probability p that a speaker of L_1 produces a cue, we can see how the proportion of the population that eventually acquires L_1 (given infinite time) is affected. Niyogi finds that for small values of p, the population moves towards total L_2 use. In dynamical-systems terms, 0% L_1 use is the only stable fixed point for these low values of p – all other states will eventually move to 0% L_1 and stay there. If we examine increasing values of p, at some critical point (determined by the number of utterances in the critical period and the rate of cues that the learner requires before choosing L_1) there emerges a second stable fixed point of 100% L_1 use, as well as an unstable fixed point somewhere between 0% and 100%. That is, at higher p, a population that has little L_1 use will still move to 0% L_1 (since there are few utterances produced from L_1), but a population with more than some minimum number of L_1 speakers will now move towards 100% L_1 use and stay there; additionally, there is some intermediate proportion of L_1 use that can persist, but if the population diverges slightly from that value, it will be pulled towards 0% or 100% L_1 use. This is an example of a 'bifurcation': a small change in a parameter (here, p) results in a sudden change in the behavior of the system. Niyogi suggests that the potential for bifurcations helps address the actuation problem of Weinreich *et al.* (1968), i.e., why does a language change start?: a small change in the system, perhaps brought about by external forces such as population movements or cultural changes that change the frequency with which certain types of propositions are expressed, could lead to dramatic linguistic change. The calculations that Niyogi performs to arrive at the bifurcation result demonstrate the importance of making the model fully explicit – otherwise, its behavior cannot be seriously studied.

See also: Corpus Linguistics; Formal Models and Language Acquisition; Human Language Processing: Connectionist Models; Labov, William (b. 1927); Principles and Parameters Framework of Generative Grammar; Syntax: Optimality Theory; Weinreich, Uriel (1926–1967).

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Language Development in Blind Children

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Introduction

The study of how blind children learn to talk is interesting for two reasons. First, the more we understand the process of language acquisition in blind children, the better we can help them to progress in their development. Second, the study of blind children can help us understand the role of vision in language development and, in turn, test theories of language acquisition. To examine the effect of vision on language development, this article concentrates on children born blind (congenital blindness); it excludes children who lost vision later in development and therefore had visual experience before suffering blindness, as well as children who have residual functional vision (visually impaired children).

Given the great individual differences that exist among congenitally blind children, it is difficult to depict a typical or characteristic portrait of these children, and generalizations must be considered with caution.

Blindness affects the development of congenitally blind children in different ways, and language development is one area minimally affected by the lack of vision.

The use and knowledge of language in blind children has been a controversial topic. The first studies on this population, carried out in the 1950s, 1960s,

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Language Development in Blind Children

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Introduction

The study of how blind children learn to talk is interesting for two reasons. First, the more we understand the process of language acquisition in blind children, the better we can help them to progress in their development. Second, the study of blind children can help us understand the role of vision in language development and, in turn, test theories of language acquisition. To examine the effect of vision on language development, this article concentrates on children born blind (congenital blindness); it excludes children who lost vision later in development and therefore had visual experience before suffering blindness, as well as children who have residual functional vision (visually impaired children).

Given the great individual differences that exist among congenitally blind children, it is difficult to depict a typical or characteristic portrait of these children, and generalizations must be considered with caution.

Blindness affects the development of congenitally blind children in different ways, and language development is one area minimally affected by the lack of vision.

The use and knowledge of language in blind children has been a controversial topic. The first studies on this population, carried out in the 1950s, 1960s,

and 1970s, were not very strict in terms of the method used. Nevertheless, they were influential in the scientific community and created among specialists the belief that blind children showed difficulties, delays, and malfunctions in their language development. Only quite recently did a different view on the acquisition of language by blind children appear in the field. This was so in part because in more recent studies, researchers applied modern techniques and methods to study the acquisition of language.

Meaning

Cutsford was the first scholar to claim that the words of blind children were meaningless, because the children tended to define words (such as *blood* and *moon*) using visual terms (such as *red* and *yellow*), which are not accessible to them. To use Cutsford's expression, there exists a "verbal unreality of words." However, there are problems with Cutsford's investigation. On one hand, conscious access to the meaning of words (metalinguistic knowledge) may be different from the real meaning that children have. On the other hand, Cutsford's conception of meaning is extremely limited. The meaning of a word does not come solely from sensory experience and its conceptualization (reference). Language itself is extremely important in the creation of meaning (sense relations and grammatical meaning). In addition, children learn the meanings of words by reading adults' intentions (pragmatic meaning) in contexts of significant social interactions in which the words are used repeatedly. Although studies did not support Cutsford's claim, the idea that blind children have problems in developing a conventional meaning for words persisted in the field.

Dunlea (1989) theorized that young blind children had a limited capacity for generalizing a given word for other items in the category and used a word (*dog*) for the original referent (a dog puppet) or only few items in the category. A limited cognitive-based theory of meaning underlies this consideration. In this view, concepts have a sensorial or referential basis. Because blind children have limited access to perceptual characteristics of the external world, their concepts show a limited nonabstract character and lack generalization. However, blind people are able to form concepts that are equivalent to those formed by sighted individuals. The point in question is that blind children, and particularly young blind children, may have difficulties in using a given word for a variety of items simply because they have restricted experience and cannot use, for instance, the word *dog* for a dog that is walking unless it barks, or a verb for an action performed by another person unless the action has an audible component. In any case, this limitation does not affect the ability of blind children to form the concepts underlying meanings, but only limits their access to external information.

The learning of the meanings of words for which blind children cannot have sensorial experience is critical to understanding the complexities of the process of meaning acquisition. Unexpectedly, blind children around 4 years of age are able to comprehend that words such as *green* or *red* refer to concrete characteristics of objects that they cannot perceive, although other sighted people can, and they may ask, "What color is this?" In a similar vein, blind children can distinguish between the meanings of *see* and *look* without having had visual experience. Landau and Gleitman (1985) showed how a blind girl (Kelly) knew that for somebody to see a given object, the object had to be in the viewer's line of sight, and there had to be no barrier between the person and the object. However, Kelly used *look* with the meaning of exploring objects with her hands.

What all these indicate is that blind children can use the information provided by language itself in order to learn the meanings of words. Color terms appear in the same position as other qualifying adjectives, and children can catch these positional regularities; that is, they can draw meaning from grammatical information as they acquire experience with language.

In summary, blind children use the same words as their sighted peers and attribute similar meanings to the words, although blind children probably rely on the information provided by language to a greater extent than sighted children.

Morphology

Most researchers have agreed that with the exception of personal and possessive pronouns, the morphological development of blind children is neither delayed nor impaired, although it is different from that of sighted children.

The results obtained by Dunlea and Andersen (1992) suggest that at first young blind children use few morphemes (plural, third person of present indicative, and locative prepositions *on* and *in*) in formulaic structures and imitations. Productive use of these morphemes appears later in blind children than in sighted children. In line with their view of language acquisition, these authors related this delay to the cognitive difficulties blind children have in conceptualizing the number of entities of the external world, the spatial relationships of entities, and the agency of others. However, first uses of morphemes in formulaic and limited-scope structures (pivot

schemas, item-based constructions, for example) are also typical of young sighted children; therefore, no special explanation would be necessary to understand blind children's language. In contrast, it seems that blind children use some morphemes, such as the regular past, earlier than sighted children, while other morphemes are used at similar ages by both groups. Blind children also use over-regularizations of irregular morphemes (*goed*, *singed*) at the same ages as their sighted peers. This indicates that verbal morphemes are the result of the use of a general rule, one that is drawn thanks to the linguistic analysis of input (Pérez-Pereira and Castro, 1997), contradicting the idea that blind children show a lack of creativity in their language.

Pronouns

According to the first studies on the topic (Fraiberg and Adelson, 1973; Dunlea, 1989), the use of personal and possessive pronouns and adjectives by blind children was deficient. In these studies, blind children started to use pronouns productively very late (nearly at age four), and they produced a great proportion of reversal errors (first-person for second-person pronouns and vice versa). These studies did not offer quantitative data, making replication impossible, and relied on authors' personal appreciation of data. However, the view they offered fueled the idea that blind children resemble autistic children, who typically produce numerous reversals. More recent research (Pérez-Pereira, 1999) found that not all blind children produced reversal errors and that most of them produced few errors of this type, similarly to what sighted children do. In addition, blind children's use of personal reference terms followed a developmental pattern similar to that of sighted children: they started to produce the first pronouns in formulaic expressions before 2 years of age, and between 2 and 3 years, all of them produced a great number and variety of pronouns in flexible structures. It was also found that imitation of a previous utterance produced by the interlocutor did not seem to be a sufficient explanation of reversals, contrary to one of the most widespread hypotheses. Children's ability to shift perspective and adopt a distinctive point of view seems to be necessary for correct production of personal reference terms. In any case, difficulties with pronouns are not a general characteristic of blind children as a group.

Syntax

As for syntactic development, compared with those of sighted children, MLU (mean length of utterance) scores of blind children throughout development indicate that blind children are not delayed.

When complexity of structures has been analyzed, blind children have shown development similar to that of sighted children not only during the first steps of grammatical development but also during the acquisition of complex sentences. Blind children's first use of coordinate and subordinate sentences starts at 2;6 years of age or shortly thereafter, and at 3;6, blind children produce a great variety of complex sentences, although they are not frequent. Around 4 years of age, blind children produce all types of coordinate and subordinate sentences.

Pragmatics

Blind children use language with similar functions, and learn to perform these functions, at the same ages as sighted children. Nevertheless, some differences exist up until 4;6 years; these are connected to the adaptive strategies that blind children put into practice, and/or to their limited access to information about external reality. However, these differences disappear with time (Pérez-Pereira and Castro, 1997). The main early difference is that blind children tend to use self-oriented language, instead of externally oriented language. Therefore, compared with sighted children, they use descriptions of their own actions or their own intentions to carry out an action, or expressions of their wishes, to a greater extent than descriptions of others' actions. Blind children produce language with reference to locations of objects and actions, qualities of objects, and the description of external events less frequently than their sighted peers, which is surely due to blind children's restricted access to information of the external world. Blind children also produce a lesser proportion of verbal expressions to offer, show, or draw another's attention (socially oriented speech) than sighted children, probably because they lack the motivating factor of perceiving their interlocutors.

Young blind children use a relatively high proportion of calls or vocatives as a way of getting information about the presence and location of other people in the immediate environment as well.

Another differential characteristic of blind children is their higher use of routines and repetitions/imitations in comparison to sighted children. Learning and using whole phrases or formulas for specific contexts and activities allows blind children to participate in social interactions and shared activities with other people (Peters, 1994). This finding is related to the strategy blind children follow in their learning of language.

Like children with autism, blind children have been described as having serious difficulties in

participating in communicative conversations (Moore and McConachie, 1994, among others). However, problems of method in many of these studies led the authors to reach wrong conclusions. When analyses were performed on the basis of frequency of initiations, and not proportion of initiations relative to mothers' initiations, it was found that blind children initiated as many conversations as nonimpaired children. In addition, they produced few conversational breakdowns and took as many turns as sighted children did, indicating that blind children and sighted children show similar abilities to participate in communicative conversations (Pérez-Pereira and Conti-Ramsdem, 1999, 2001, 2005).

Input

Andersen *et al.* (1993) said that apart from the conceptual consequences of being visually deprived, blind children generally receive less appropriate linguistic input than sighted children and that the combination of these two factors gives rise to their poor linguistic development. Contrary to previous studies (Moore and McConachie, 1994), the data we have today have indicated that the mothers of blind children use language well adapted to their needs (Pérez-Pereira and Conti-Ramsden, 1999, 2001, 2004). For instance, compared with the mothers of sighted children, mothers of blind children are more insistent in their intents to initiate and continue conversations with their children. In addition, the directives that mothers of blind children use include a much greater number of descriptions of objects, their locations, and the actions to be performed by their children.

Strategies

Convergent characteristics of the language they produce suggest that blind children are inclined to use a particular strategy or style of language acquisition: the rote-learned style or Gestalt style. Blind children tend to imitate a great number of formulas and frozen phrases first associated to certain scenes (Peters, 1987, 1994). These children tend to use frozen, or unanalyzed, phrases first and analyze them later. When blind children were compared with visually impaired and sighted children at the beginning of their combinatorial speech, it was found that blind children used many more frozen phases and that productive uses of a given combination appeared later in development and were used less frequently between 21 and 25 months of age (Pérez-Pereira, 2001, 2004). First combinations of words in blind children showed a clear transition from rote-learned phrases to item-based constructions and then toward a gradual process of schematization and generalization.

Blind children relied on the use of modified and expanded imitations and self-repetitions to a greater extent than did sighted children, and all children used these as a means to analyze language.

In general, the use of imitations and repetitions allows children to produce utterances that are morphologically more complex than their spontaneous utterances (Pérez-Pereira, 1994), which indicates the progressive role that imitations and repetitions play in grammar development.

Conclusion

The adoption of an individual-differences approach helps us to better understand the peculiarities of blind children's language acquisition. Former characterizations of blind children's language as 'parroting' or 'formulaic speech' should give way to an understanding of their language that takes into account the prevalence of a rote-learned or Gestalt style as a kind of early strategy, rather than as a deficiency.

The fact that congenitally blind children eventually manage to master language that does not differ from that of sighted people is a critical test for theories of language acquisition.

See also: Formulaic Speech; Language Development: Overview; Variation in First Language Acquisition.

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Language Development of Deaf Children with Hearing Parents

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Deaf children who have deaf parents typically acquire language naturally through immersion in a sign language-rich environment. However, over 94% of deaf children are born with hearing parents and face a very different language learning situation than either hearing children or deaf children with deaf parents. These children are born into a world without language because they cannot perceive the spoken language in their environment. Initial exposure to language can occur any time from infancy through adulthood, and depends on both identification of hearing loss and placement in an appropriate intervention program. In general, intervention consists of attempting to make language accessible through one of three types of language learning environments or methodologies. First, oral interventions are designed to make spoken language accessible by use of amplification devices such as hearing aids or cochlear implants paired with intensive speech input. Until recently, for most deaf children, language skills remained very limited using this approach. However, since the 1980s, deaf children's ability to perceive speech has improved through the use of cochlear implants. These implants provide electrical stimulation directly to the endings of the auditory nerve and enable deaf children to perceive sound. While auditory input is still less rich and finely detailed than that received by hearing children, speech perception and spoken language development is typically enhanced by use of cochlear implants. A second common intervention is to communicate with both speech and sign simultaneously. The language in these simultaneous communication (SC) programs is that of the hearing culture (e.g., English, Italian, German) not that of natural sign languages like American Sign Language (ASL). For example, sign systems for English (collectively called manually coded English, or MCE) typically consist of borrowed lexical signs from ASL and invented signs that represent the functional aspects of English (e.g., articles, auxiliaries, copula, tense markers such as *-ed*, *-ing*) that are not expressed by isolated signs in ASL. These signs are then produced in English word order (Schick, 2003). Although SC programs are designed to make language 'visible' and thus fully accessible to deaf children, in reality, this rarely happens. Hearing parents and teachers vary greatly in their signing skills, and rarely sign all their

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Language Development in School-Age Children, Adolescents, and Adults

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In this article, language development beyond the preschool years is described, covering significant changes that occur in school-age children (ages 6–12 years), adolescents (ages 13–19 years), and adults (ages 20+ years). For many years, it was widely believed that language development was largely complete by the time a child entered school, at five or six years of age. More recently, however, it has become apparent that a great deal of linguistic growth occurs during the school-age years, adolescence, and well into adulthood, and that the development of language has no obvious point of completion (Nippold, 1998). This should not detract from the undeniable truth that language development in infants, toddlers, and preschool children is an amazing phenomenon, marked by rapid and salient change. By contrast, language growth beyond the preschool years is comparatively slow, subtle, and sometimes difficult to quantify. Nevertheless, later language development is an exciting area of scientific inquiry.

The differences between early and later language development are striking. For example, after steadily

progressing through the stages of cooing, babbling, and proto-words during the first year of life, infants emerge as toddlers who can make requests, call attention to themselves, and comment on the world around them using their first true words (*Hey! Doggie! Lookit!*). By their second birthday, children will have amassed a vocabulary of hundreds of different words, which they can use to express a wide variety of meanings in short simple utterances (*Billy run; Mommy buy book; Dolly pretty*), which soon will become long and complex sentences during the preschool years (ages 3–5) (Paul, 1981). By the time they reach their fifth birthday, children will be speaking intelligibly about topics beyond the 'here and now,' making few grammatical errors ("I wonder what we're going to do when we get to Grandma's house") (Leadholm and Miller, 1992), and drawing from a lexicon of over 15 000 different words. Upon entering kindergarten at age six years, children will demonstrate their linguistic prowess by engaging in extended conversations with family and friends, sharing personal anecdotes, retelling favorite bedtime stories, and convincing their parents to purchase a new kitten, scooter, or other desirable item, thereby giving the impression that language development is now complete (Nippold, 1998). Nevertheless, a great deal of language competence remains to be acquired. Factors that support and even promote the later development of language include metalinguistic, cognitive, and social development; the newly acquired ability to read; and growth in world knowledge and experience.

Lexical Development

By six years of age, most children have acquired a vocabulary of approximately 18 000 different words, many of which are the names of concrete objects (*bicycle, skates*) and common actions (*jump, catch*). At this young age, children's lexicons will also include many adjectives (*sharp, noisy*) and adverbs (*quickly, slowly*) that are used to modify a burgeoning repertoire of nouns and verbs. Most of these words will have been learned through informal spoken-language interactions with adults and other children, listening to conversations and stories, and having the opportunity to talk about events that occur in children's daily lives. Then, once children are able to read proficiently, usually by around age nine or 10 years, a new source of vocabulary learning – written language – becomes available to augment these spoken-language opportunities (Sternberg, 1987). With this newly acquired ability to consume a variety of books, magazines, and newspapers, children now gain exposure to a large number of difficult words that occur infrequently in spoken-language contexts (Cunningham and Stanovich, 1998; Nagy *et al.*, 1985; Stanovich and Cunningham, 1992). As a result, their lexicons will gradually expand during the preadolescent (ages 9–12) and adolescent (ages 13–19) years so that by early adulthood, they will understand and use at least 60 000 different words, including a large number of abstract nouns (*courage, freedom*), later-developing metalinguistic (*persuade, convince*) and metacognitive (*deduce, discover*) verbs, and other terms used to express precise meanings such as adverbs of magnitude (*decidedly, slightly*), adjectives of emotion (*delirious, effervescent*), adverbial conjuncts (*moreover, nevertheless*), and specialized terminology used in the study of academic subjects such as mathematics (*concentric, hyperbola*), biology (*monozygotic, phylogeny*), and history (*dictatorship, liberation*) (Nippold, 1998). Indeed, this capacity for acquiring new words and for expanding one's knowledge of old ones continues throughout the lifespan, particularly in individuals who are active readers, writers, speakers, and acquired who enjoy communicating with others.

Many of these new words will be acquired through metalinguistic strategies that older children, adolescents, and adults have learned to employ when reading. These include inferring the meaning of a word from the broader linguistic context in which it occurs, performing a morphological analysis of the word itself, and combining these strategies, as necessary (Nippold, 1998). For example, a general understanding of the word *dictatorship* could be inferred from reading a passage about Mussolini in a world history book. The learning process could be enhanced when the reader carefully considers the individual morphemes comprising this word, which include the lexical morpheme *dictate* 'to give orders to other people,' and the derivational morphemes *-or* 'a person who performs some action' and *-ship* 'a state of existence' to gain a more complete understanding of the word (i.e., a state of existence where one person rules with absolute power) (Nippold *et al.*, 2005a).

Metalinguistic competence is also reflected in the young person's growing ability to define increasingly difficult words using the formal 'Aristotelian' style. Frequently modeled in educational settings, this manner of explicating the meaning of a word involves stating the category to which it belongs and one or more key features, i.e., *X is a Y that Z*. By 12 years of age, most children can define concrete nouns in this way (e.g., *An* ***emu*** *is a bird that lives in Australia, is very large, but does not fly*), but it is not until late adolescence or even early adulthood that individuals can define abstract nouns in this concise, efficient, and informative manner (e.g., ***Idleness*** *is a*

state of inactivity that can include a lack of motivation or opportunity) (Nippold *et al.*, 1999). An important skill in literate language contexts such as formal lectures and reports, word definition can reveal the individual's depth and breadth of knowledge as key terminology is explained. Thus, it is not surprising that word definition is closely associated with academic achievement in children and adolescents (Nippold, 1998).

Semantic Development

An important aspect of semantics that gradually develops during the school-age years, adolescence, and adulthood is the understanding of figurative expressions such as 'metaphors' (*The bird was a flying rainbow*; *Genius is perseverance in action*), 'idioms' (*talk through one's hat; a wolf in sheep's clothing*), and 'proverbs' (*Every cloud has a silver lining; Humility often gains more than pride*). Although comprehension of these expressions begins in early childhood, the learning process continues throughout the lifespan, a situation that is evident when people are asked to interpret low-familiarity expressions that contain abstract vocabulary and are meant to convey complex thoughts.

As with new vocabulary learning, figurative expressions are learned through metalinguistic strategies. One such strategy, 'contextual abstraction,' occurs when the learner attempts to infer meaning from the larger linguistic context in which the expression is used. An additional strategy, 'metalexical analysis,' occurs when the learner performs an internal analysis of the expression to infer meaning from its individual words. Additionally, the amount of exposure an individual receives to specific expressions in meaningful communicative contexts makes a significant contribution to the learning process, thereby demonstrating the role of 'world experience.'

Metaphors

Many six-year-old children can comprehend simple perceptual metaphors such as *The bird was a flying rainbow*, expressions that refer to concrete entities that can easily be visualized (Nippold *et al.*, 1984). To accomplish this, children are able to reason by analogy to discern the relevant overlapping features between the topic (*bird*) and the vehicle (*rainbow*) of the metaphor to determine the common ground (*colorfulness*). What develops, as children grow older, is their ability to comprehend metaphors that contain complex vocabulary, that speak to human emotions, and that require a greater degree of world experience to be fully appreciated (Nippold, 1998). Examples of more difficult expressions include *Suspicion is quicksand*, *Trust is a relationship's glue*, and *Your call was a winged car*, psychological metaphors that may challenge the interpretative abilities of adolescents and young adults. When asked to interpret these sorts of metaphors, elderly adults often provide more insightful responses than younger individuals because of their extensive life experiences (Boswell, 1979).

Idioms

As with metaphors, idioms can vary widely in their degree of difficulty. Easier idioms are those that are more transparent and frequently occur in spoken and written language (Nippold and Rudzinski, 1993; Nippold *et al.*, 1996). For example, the figurative meaning of *go by the book*, to be highly compliant, is a metaphoric extension of its literal meaning, to read a document carefully. Not surprisingly, many preadolescent children readily understand this figurative expression. In contrast, more challenging idioms include those that are opaque and rarely occur in the language. For example, the figurative meaning of *go by the board*, that something has been discarded, is difficult to discern from a literal interpretation, even for many adults, particularly if they are unfamiliar with customs associated with sailing ships! Another factor that affects the ease with which idioms can be understood is the learner's ability to infer meaning from the broader linguistic context in which the expression occurs (Nippold and Martin, 1989), a skill that is related more generally to listening and reading comprehension (Nippold *et al.*, 2001). As with metaphors, older adults often provide more insightful interpretations of idioms (*take someone under one's wing*) than school-age children, adolescents, and younger adults (Nippold and Duthie, 2003).

Proverbs

Proverbs (*Scalded cats fear even cold water; Envy is destroyed by true friendship*) are expressions that capture the shared beliefs or collective wisdom of a society. For this reason, they are considered to be an important part of cultural literacy. Proverbs typically are more difficult to comprehend than metaphors and idioms because of the greater degree of world experience they require, their lower frequency of occurrence in the language, and the greater amount of verbal reasoning they entail (Nippold, 2000). Proverb learning occurs during the interplay between top-down pragmatic and bottom-up semantic processing strategies. By attending to the linguistic context in which an expression occurs, the learner gains information about why the speaker used the proverb. Then, by focusing on the individual words comprising the expression, the learner begins to draw analogies from the proverb itself to the larger context. For

example, a parent might use the proverb *scalded cats fear even cold water* to comment on her young son's refusal to try new foods, having recently experienced food poisoning. An older sibling unfamiliar with this proverb might begin to glean the metaphorical relationship that is being expressed between cats that have been scalded and the brother who was sickened, realizing that both are reacting negatively to anything related to their unfortunate experience. Thus, to understand a proverb, it is not sufficient to have knowledge of the words it contains. One also must draw analogies between items stated in the proverb and those existing in the environment, a process called 'metaphorical mapping' (Nippold *et al.*, 2000; Nippold and Haq, 1996; Nippold *et al.*, 1988).

Syntactic Development

Compared to the rapid and highly salient changes that occur during the preschool years, later syntactic development proceeds at a more modest pace, characterized by the production of increasingly longer and more complex sentences in spoken and written communication (Loban, 1976). For example, in a sample of conversational speech, a 6-year-old child will produce sentences of approximately six words in length, on average, but a 30-year-old adult will exhibit a mean sentence length of at least 10 words.

In addition, the use of sophisticated grammatical constructions and low-frequency syntactic structures gradually increases during the developmental period between 6 and 30 years (Berman and Verhoeven, 2002; Nippold *et al.*, in press; Scott, 1988; Verhoeven *et al.*, 2002). Key grammatical constructions include relative clauses (*You want to keep the ball in this area* ***that's called the fairway***), adverbial clauses (***If you get it in fewer strokes than par,*** *that's a birdie*), and nominal clauses (*There's an area beyond the fairway* ***where the grass is longer***); key low-frequency structures include noun phrase postmodification via prepositional phrase (*Birds* ***of the forest*** *build nests in diverse locations*), the passive voice (*The library* ***was established by a wealthy community member***), appositives (*Jason,* ***the student body president,*** *plays basketball*), the perfect aspect (*Amanda* ***had been working*** *all day*), compound auxiliary verbs (*We* ***might have*** *wanted to go hiking*), and nonfinite verb phrases such as participials (***Jumping into the lake,*** *Timmy held his breath*), gerunds (***Camping at the lake*** *is his favorite activity*), and infinitives (***To win the lottery*** *would be amazing*).

Although many of these syntactic devices are first employed during the preschool years, older children and adolescents are learning to use them in a more fluent and efficient manner to produce larger chunks of discourse. This includes, for example, engaging in lengthy conversations, telling and retelling favorite stories and personal anecdotes, and producing elaborate explanations of how things work. Fueling this growth in syntactic development is the individual's expanding knowledge base and increasingly complex thoughts (Nippold *et al.*, in press). When school-age children, adolescents, and adults are engaged in expository discourse (e.g., explaining how to play their favorite game or sport), they typically produce longer sentences containing greater amounts of subordination compared to when they are engaged in simple conversations about topics that have been discussed many times before (e.g., pets, siblings, or school).

Expository discourse, with its heightened emphasis on accuracy and detail in the explication of information, causes speakers to tap into their own cognitive and linguistic resources more fully than simpler types of discourse, revealing a greater degree of syntactic competence. For example, in a conversation about school, a 17-year-old girl produced a mean utterance length of 9.45 words. However, when she explained specific strategies for winning a card game, her mean utterance length grew to 13.65 words, and her use of all types of subordinate clauses increased, evident in the following utterances (From the author's files. Clause types, marked at the end of each clause, are as follows: IC = independent clause; AVC = adverbial clause; RC = relative clause; NOM = nominal clause):

(1) If you have more than one wild card [AVC], only put one down at a time [IC] until the pile that you have to pick up from [RC] is gone [AVC]. And when you're putting three cards on top [AVC] that are face up [RC], you probably want to make them like wild and high cards [IC], so you can get rid of them easier [NOM]. And if you have the same kind [AVC], keep them both there [IC] so you can get rid of them sooner [NOM].

Pragmatic Development

During the school-age years, adolescence, and into adulthood, pragmatic development is evident in a variety of communicative genres, including conversational, narrative, and persuasive discourse. Supported by growth in social and cognitive arenas, change is particularly obvious during adolescence when peer interactions become an increasingly important part of daily life, and the youth begins to reason more flexibly.

During the years between late childhood and early adulthood, the amount of time that young people spend socializing increases dramatically along with the number of hours they spend in conversation with friends, either in person or over the telephone

(Raffaelli and Duckett, 1989; Rawlins, 1992). Time spent socializing with friends provides the speaker the opportunity to practice new skills and to receive honest feedback. Conversational skills that are known to improve during the adolescent years include staying on topic, making relevant comments, interrupting appropriately, contributing novel ideas, making smooth transitions between topics, showing empathy, and entertaining the listener by telling jokes, offering amusing anecdotes, and emphasizing key points through dramatic gestures and facial expressions (Nippold, 1998, 2000).

The ability to adjust the tone and content of one's discourse also improves during these years, with adolescents and young adults showing a greater awareness of other people's thoughts, feelings, and emotions than children. This competence in perspective taking is exhibited in all realms of social communication including narrative and persuasive discourse. For example, in narrative discourse, older individuals are more likely to offer details concerning the inner thoughts, struggles, and reactions of the characters in a story, and in persuasive discourse, they are more likely to structure an argument that will appeal to the listener's values, beliefs, and priorities. Older speakers also can provide a greater number of arguments to support their own views (Nippold, 1998). At the same time, however, adolescents and adults are more likely than children to consider both sides of a controversy, and to evidence greater flexibility of thought in reaching balanced solutions (Nippold *et al.*, 2005b).

Conclusions

In recent years, later language development has become a topic of expanding international interest, with a rapidly growing number of articles, books, and conference presentations being devoted to this theme. Language development beyond the preschool years is an exciting and dynamic field of study, and one that is being fueled by the collaborative efforts of scientists around the world (Berman, 2004). In the future, it is expected that numerous crosslinguistic studies of later language development will be conducted, along with studies that closely examine languages other than English. These efforts undoubtedly will contribute substantially to the knowledge base in this area.

See also: Classroom Talk; Discourse, Narrative and Pragmatic Development; Family Speak; Figures of Speech; Influence of Literacy on Language Development; Language Development: Overview; Language Education: Vocabulary; Metaphor: Psychological Aspects; Metapragmatics.

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Language Development: Morphology

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Most studies on the acquisition of morphology focus on inflectional morphology (but see Clark, 1993 for results on compounding and derivation). Of particular interest are studies on the typical order of acquisition of morphology, as well as on individual and crosslinguistic differences and the causes underlying such variation.

In many languages, the earliest stages of language development show characteristics of 'telegraphic speech.' That is, inflectional morphemes and function words are initially absent but are gradually added on in the process of acquisition.

Studies of Morpheme Order Acquisition

Brown (1973: 271, Figure 14) provided a thorough methodological milestone for the systematic comparison of individual developmental trajectories. Brown related the acquisition of 14 carefully selected grammatical morphemes to stages of development, as defined by the mean length of utterance (MLU), and productivity, as defined by 90% of use in obligatory contexts. Upon a systematic scoring, the three English-speaking children under investigation showed a high correlation in their acquisition of the 14 morphemes. Present progressive was typically the first morpheme to become productive, followed by the prepositions *in/on*, plural and past irregular marking (Brown, 1973: 274, Table 38). Brown's results corresponded to the results from previous diary studies and experimental data (Brown, 1973: 275ff.) and inspired a wide range of comparative research.

Individual Differences

The availability of more and more data on individual developmental trajectories revealed not only that children differ in the age at which they acquire particular morphemes, but also that children show qualitatively different styles of language acquisition regarding the units they first pick up from the input sound stream. While most children initially identify stressed stems without unstressed inflectional elements, other

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Language Development of Deaf Children with Hearing Parents

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Deaf children who have deaf parents typically acquire language naturally through immersion in a sign language-rich environment. However, over 94% of deaf children are born with hearing parents and face a very different language learning situation than either hearing children or deaf children with deaf parents. These children are born into a world without language because they cannot perceive the spoken language in their environment. Initial exposure to language can occur any time from infancy through adulthood, and depends on both identification of hearing loss and placement in an appropriate intervention program. In general, intervention consists of attempting to make language accessible through one of three types of language learning environments or methodologies. First, oral interventions are designed to make spoken language accessible by use of amplification devices such as hearing aids or cochlear implants paired with intensive speech input. Until recently, for most deaf children, language skills remained very limited using this approach. However, since the 1980s, deaf children's ability to perceive speech has improved through the use of cochlear implants. These implants provide electrical stimulation directly to the endings of the auditory nerve and enable deaf children to perceive sound. While auditory input is still less rich and finely detailed than that received by hearing children, speech perception and spoken language development is typically enhanced by use of cochlear implants. A second common intervention is to communicate with both speech and sign simultaneously. The language in these simultaneous communication (SC) programs is that of the hearing culture (e.g., English, Italian, German) not that of natural sign languages like American Sign Language (ASL). For example, sign systems for English (collectively called manually coded English, or MCE) typically consist of borrowed lexical signs from ASL and invented signs that represent the functional aspects of English (e.g., articles, auxiliaries, copula, tense markers such as *-ed*, *-ing*) that are not expressed by isolated signs in ASL. These signs are then produced in English word order (Schick, 2003). Although SC programs are designed to make language 'visible' and thus fully accessible to deaf children, in reality, this rarely happens. Hearing parents and teachers vary greatly in their signing skills, and rarely sign all their

spoken words. Therefore, the degree to which signed input represents language is variable. The third type of intervention, bilingual programs, use a natural sign language (e.g., ASL) as their mode of communication and typically expose the children to spoken language solely through the written medium.

This chapter focuses on deaf children's acquisition of the language of the hearing culture, whether through oral or SC methods. In addition to variations in language input, characterizing the language development of deaf children is further complicated by the fact that different cohorts of deaf children have experienced different language learning environments (Marschark, 2001). During the last decade, universal newborn screening for hearing loss has been instituted in many countries; and deaf children are beginning to gain access to language during infancy. For any aspect of language that is subject to a critical period, these changes will result in different developmental pathways (Lederberg and Spencer, 2005; Yoshinaga-Itano *et al.*, 1998). In addition, because of earlier identification and changing government policy, the age that children can receive cochlear implants has fallen from preschool to infancy over the last 5 years. Finally, improvements in both hearing aids and cochlear implants are ongoing, resulting in different auditory experiences for different cohorts of children (Nicholas and Geers, 2005; Schauwers *et al.*, 2005).

In comparison to hearing children, deaf children's language and communication development shows three types of patterns, which will be highlighted in this review. First, some robust phenomena develop identically for deaf and hearing children. Other aspects are delayed but exhibit similar developmental pathways. In these cases, deaf children resemble younger language-matched hearing children. Finally, some aspects are qualitatively different, with characteristics that deviate from that found among hearing children.

Babbling

Hearing infants begin to produce well-formed speech-like consonant-vowel reduplicated syllables (mamama, dadadada), or canonical babbles, around 6–10 months. Canonical babbles do not appear in deaf infants' vocalizations until 12–25 months, and account for a much lower ratio of their vocalizations (Oller and Eilers, 1988). In addition, the size and diversity of the consonant inventory in deaf children's babbles is greatly reduced (Stoel-Gammon, 1988). Cochlear implantation results in the development of canonical babbling that more closely resembles that of hearing toddlers with the onset of babbling occurring after only a few months (range 1–6.5 months) of auditory experience (Schauwers *et al.*, 2005). Although delayed in terms of chronological age because cochlear implantation does not occur at birth, this is one of the few areas that rate of development seems to be accelerated in terms of hearing age (i.e., length of time since cochlear implantation).

The relation between babbling and later language development is far from clear. On the one hand, the quality of children's canonical babbles seems to be an indicator of phonological knowledge (Oller and Eilers, 1988). However, babbling may be neither predictive nor necessary for later language abilities. Wallace *et al.* (2000) found that the quality of speech in elementary school correlated with variety of consonants in vocalizations during preschool but not the amount of canonical babbles in infancy. For children with cochlear implants, accelerated onset of babbling does not necessarily result in accelerated language development.

Pragmatics

Preschool Communication

While early linguistic development is affected by deafness, early **communication** development is remarkably similar for deaf and hearing toddlers. Both deaf and hearing toddlers' engagement in coordinated joint attention with their hearing mothers begins to appear at 12 months and shows similar, dramatic increases throughout the 2nd year of life (Meadow-Orlans *et al.*, 2004; Prezbindowski *et al.*, 1998). Hearing and deaf toddlers intentionally communicate with equal frequency, communicating primarily through vocalizations (Lederberg and Everhart, 2000; Spencer, 1993). However, because of a lack of linguistic intonational markers, the pragmatic functions of deaf children's vocalizations are more difficult to interpret. Therefore, they might be expected to use gestures more frequently than hearing toddlers. However, research shows deaf and hearing toddlers use similar gestural communications at 12–22 months old (Lederberg and Everhart, 2000; Spencer, 1993). Even more surprisingly, nonlinguistic gestural communication during this early period is similar for even deaf toddlers with deaf parents, even though these children are exposed to more gestures in their linguistic environment (Schick, 2003). Thus, early gesture development seems unaffected by either hearing loss or large linguistic environmental variations.

However, as deaf children become increasingly language delayed, there are marked differences in their communication skills. By 22 months, deaf children communicate less frequently and spend less time than

hearing children in joint attention with their hearing mothers, probably because joint attention becomes enriched and extended for the hearing children as language is integrated into their attentional episodes (Prezbindowski *et al.*, 1998). Pragmatic functions are also more ambiguous and different than those of hearing children (Lederberg and Everhart, 2000; Nicholas, 2000). Deaf toddlers are more likely to direct their mothers and less likely to make statements or ask questions than hearing children. During preschool, their use of directives decreases and statements increases. However, question-asking (even through nonverbal means) remains infrequent. The pragmatic function of deaf children's early communication, especially question-asking, is related to their language abilities (both concurrent and predictive) (Lederberg and Everhart, 2000; Nicholas, 2000). For children who receive a cochlear implant, the amount their prelinguistic communication is self-initiated (i.e., not solely a response to their mothers' communication) correlates with later language development after cochlear implantation (Tait *et al.*, 2000). While nonverbal communication is sufficient to make requests and direct attention, information exchange (comments and question-asking) may depend on, and perhaps is a motivator for, language development.

Referential Communication

Older deaf children continue to show deficits in their pragmatic skills. The ways that deaf children and adolescents seek information in a standard referential communication task are immature and relatively ineffective. Jeanes *et al.* (2000) found that both oral and SC deaf students (8- to 17-year-olds) were more likely to ask for clarifications using general requests (e.g., tell me again) than specific requests (e.g., Which color is it?), the latter being the most common repair among hearing dyads. In addition, signing deaf children's responses to requests for clarification were more likely to be merely repetitions of the original communication and less likely to contain new information compared to repairs by hearing and oral deaf children. Even during adolescence, conversational repairs by deaf students were similar to young hearing children rather than their agemates.

Narratives

Deaf children in oral and SC environments (with and without cochlear implants) show deficits in their narrative skill (Crosson and Geers, 2001). Compared to age-matched hearing children, deaf children spend more time describing the setting and less time providing a resolution to the story. They are less likely to link their propositions with subordinating, coordinating, and temporal conjunctions than hearing children. Thus, their stories show less cohesion. Although poor syntactic knowledge may cause some of the problems in narrative skill, immature story development may also be due to children's lack of exposure to stories because of poor reading abilities and an education focused on basic skill development. In fact, some subgroups of deaf children do have near age-appropriate skills. Crosson and Geers (2001) found that, unlike children with poor speech perception skills, those deaf children with cochlear implants who had above average speech perception skills told stories that were similar in narrative structure (i.e., containing orientations, complicating actions, evaluations, and resolutions) and reference as hearing children. Marschark *et al.* (1994) found no differences in the causal network structure (i.e., goal-action-outcome episodes) of stories generated by hearing children and those generated by SC deaf children and adolescents from a residential school for the deaf. Both sets of deaf children may have a rich language environment that exposes them to the classic English narrative structure.

Vocabulary

Lexical Growth

Past research has shown that deaf children have small lexicons, averaging 2 standard deviations below hearing children and show a rate of acquisition of words at 40–60% of that of hearing children, even when the children are provided with consistent amplification or cochlear implants and high-quality programming (Lederberg, 2003). Some deaf children with vocabularies of over 100 words are still restricted to slow word learning, adding only a few new words to their lexicon in a month, something never observed among hearing children. Even more disturbing, in a cross-sectional study, lexicon size seemed to plateau around 12 years of age, with deaf children 13 through 20 years old remaining at an age equivalent of hearing 9-year-olds on the Peabody Picture Vocabulary Test (PPVT) (Moeller *et al.*, 1986).

Recent studies have found that children who were identified in infancy and received appropriate intervention (which sometimes included cochlear implants) experienced faster vocabulary growth than in previous research, although development was still highly variable. In a study of vocabulary development of over 200 children (none with cochlear implants) enrolled in a state-wide early intervention program, Mayne *et al.* (2000) found that deaf toddlers with no cognitive disabilities produced, on

average, about 45 words at two years of age, and 350 words at 3 years. Vocabulary development was affected by age of identification (before vs. after 6 months) and cognitive impairments, but not communication method (sign vs. speech), degree of hearing loss, gender, ethnicity, or education of caregiver. Close to age-appropriate lexical growth is possible for young deaf children. On average, lexicon size of children who were identified before 6 months and were not cognitively impaired was comparable to age-matched hearing children in the 5th to 25th percentile. On the other hand, the lexicons of children who were in the lower percentiles of deaf norms were much smaller than any observed in hearing children.

Research by Moeller (2000) indicates that age-typical vocabulary knowledge can occur for some deaf children throughout preschool. Half of 112 deaf 5-year-olds who were enrolled in early intervention programs scored within 1 standard deviation of PPVT hearing norms. Age of intervention (before and after 11 months) and family involvement were the only factors affecting lexical knowledge. While children with highly involved parents scored close to hearing norms, children with parents who were involved at a moderate or low level had standard scores ranging from 60 to 80 depending on their age of identification. Similar to Mayne *et al.*'s research (2000), communication mode did not affect lexicon size. This is likely because children were placed in language environments (oral vs. SC) according to their needs.

There is a similar range of individual differences in lexical development among children with cochlear implantation (Nicholas and Geers, 2005; Schauwers *et al.*, 2005). However, overall, children with cochlear implants experience faster vocabulary growth than children with traditional hearing aids. In addition, although the research is not unequivocal, research suggests there may be a critical period in the effectiveness of cochlear implants (Lederberg and Spencer, 2005; Nicholas and Geers, 2005). Implantation before 2 years of age appears to result in deaf children acquiring spoken words at a rate near that expected for hearing children, with rates declining as age of implantation increases.

Word-Learning Processes

Given delayed and slower vocabulary development, the development of processes used to establish meaning is remarkably resilient among deaf children. Lederberg and colleagues examined two levels of fast-mapping abilities in 100 deaf preschoolers (Lederberg *et al.*, 2000; Lederberg and Spencer, 2005). Both cross-sectional and longitudinal research indicated that children's ability to fast-map (defined as quickly learning the meaning of) new words was primarily associated with lexicon size, rather than age. Children who were in the initial stages of vocabulary development (as measured by the number of words they produced) did not fast-map words. Children with moderately sized lexicons learned to understand the meaning of new words quickly but only when the meaning of a word was made explicit by social and pragmatic cues. Finally, those children with larger lexicons were also able to infer the meaning of words by the context (i.e., that a novel word refers to a novel object). Relations between lexicon size and word learning processes were the same for children acquiring spoken or signed English, those with a cochlear implant and those without, and for children who ranged in age of exposure to accessible input from birth to 4 years of age. Age of acquisition ranged from 2 to 6 years of age. Thus, while frequently delayed, the ability to fast-map the meaning of novel words was appropriate to the children's language level.

As children develop, acquisition of new words occurs with increasing frequency through inferring the meaning from a reading context. In one study, both oral and SC deaf students were able to infer an initial meaning for novel words presented in written passages, although better readers were able to fast-map more words than poorer readers (De Villiers and Pomerantz, 1992). This suggests that if children were able to understand the semantic, contextual cues given in these passages, they were able to infer the meaning of the words. On the other hand, acquisition of the grammatical nature of the new words did not occur during the fast-mapping process. Thus, although the children could define the new words, they could not categorize the words as nouns, verbs, or adjectives; nor could they make judgments about the words' correct syntactic usages. Consistent with this finding, in an error analysis of spoken and written English samples, McAfee *et al.* (1990) found that deaf college students used mature vocabulary that was semantically correct but whose form class was incorrect (e.g., "*He tried to suicide himself*," McAfee *et al.*, 1990: 633) In addition, when attempting to describe something they did not have a word for, rather than create complex sentences using their existing lexicon, these students frequently created new word forms that showed considerable semantic creativity but again violated grammatical formation rules (e.g., "*the hang of the neck*, *a hang*, *or hangneck* for the word noose," McAfee *et al.*, 1990: 633)

Learning new words also depends on children's ability to represent or encode the phonological structure of words, and the latter may be a source of slower lexical growth. Gilbertson and Kamhi (1995) found that vocabulary knowledge, as assessed by

the PPVT, related to hard-of-hearing elementary school children's ability to quickly learn to accurately reproduce novel phonologically complex words (e.g., *shabadiffidy*). Hearing children and those hard-of-hearing children who had age-appropriate vocabulary knowledge were able to accurately produce the novel words after only four exposures. On the other hand, half of the hard-of-hearing children had much more difficulty learning, sometimes not producing the complex words correctly even after ten exposures. These latter children performed well below age norms on standardized tests of both receptive and expressive vocabulary.

Thus, slower lexical growth may occur for both exogenous and endogenous reasons. Language impoverished environments result in fewer opportunities to learn new words. In addition, while the ability to fast-map the meaning of words is resilient, deaf children's lexical growth may be hindered by difficulties with quickly learning the phonological representation of words and their syntactic properties.

Content of Lexicon

Even though deaf preschoolers are typically older than hearing children when they are acquiring their initial vocabulary, the words contained in their early lexicons (<35 words) are remarkably similar (Lederberg, 2003). Nominals or names of objects and people predominate in the 50 and 100 word lexicons of deaf and hearing children. However, nominals are relatively less important, with deaf children's lexicons containing more action, descriptive, and personal-social words than those of hearing children at the same level of lexical development.

Older deaf children also showed a delayed and different developmental sequence to their acquisition for particular lexical items (Moeller *et al.*, 1986). On the Boehm Basic Concepts Test, deaf children (6- to 18-year-olds), on average, performed below scores typical of hearing 6-year-olds. In addition, the order of difficulty of the concepts was not the same for deaf and hearing children. For the deaf children, concepts that refer to spatial, size, and perceptual attributes were relatively easy, while time concepts and pronouns were very difficult. In addition, consistent with syntactic deficits, language samples of children with and without cochlear implants are more likely to contain content words and less likely to contain function words compared to hearing children (Schauwers *et al.*, 2005).

Syntactic Development

Deaf children's syntactic development is even more delayed than their vocabulary development. For example, in a study of deaf children ranging in age from 8 to 18 years, age-equivalent scores on receptive and expressive syntax tests averaged from 4 to 6 years old according to hearing norms. In addition, scores did not increase with age (Osberger *et al.*, 1986). The nature of syntactic development is difficult to describe because surprisingly little research has focused on developmental change in deaf children's syntactic knowledge, and given the large individual differences in syntactic performance, cross-study comparisons are difficult. Instead, researchers have focused on characterizing syntactic knowledge of deaf students.

While much of the research has been atheoretical and descriptive in nature, two research reviews (Berent, 1996; De Villiers *et al.*, 1993) suggest deaf individuals' syntactic knowledge can be understood using generative grammar. Similar to hearing children, deaf children acquire lexical categories – noun, verb, adjective, prepositions (or as referred to in other linguistic accounts, thematic categories such as agent, action, patient) – before functional categories. Functional categories are the small class of morphemes that relate thematic categories with one another, specifically, the inflectional, complement, and determiner categories. Even among deaf adolescents and adults, knowledge of functional categories may be fragile or incomplete. Both reviews suggest such incomplete knowledge results in errors in morphosyntactic constructions and complex sentences.

Researchers have confirmed that deaf children acquiring oral or signed English, spoken Hebrew, Italian, and German have particular difficulty with functional aspects of language, including derivational and inflectional markers, and the determiner and auxiliary systems. Children acquiring English (including those in oral and SC environments, with and without cochlear implants; ranging in age from 5 to 20 years) frequently omit tense inflections (present, past, or present progressive) in obligatory contexts (Berent, 1996; De Villiers and Pomerantz, 1992; McAfee *et al.*, 1990; Schauwers *et al.*, in press; Schick, 2003). For instance, in several studies, oral children (6- to 13-year-olds, some with cochlear implants) omitted tense in up to two-thirds of obligatory contexts. Unlike hearing children, deaf children also rarely overgeneralized the regular past tense (-ed) to irregular verbs. Thus, rather than acquiring tense rules, deaf children may have a prolonged period of memorization of verb forms. Another common error for English-speaking and signing children is deletion of the copula in obligatory contexts and failure to supply the correct inflection when present. On the other hand, English deaf children make fewer errors with English plurals and possessives, and unlike tense errors, performance is age-related. Thus, order of

acquisition of these morphemes differs from that by hearing children.

Although all deaf children show morphosyntactic difficulties, which specific morphemes are problematic seem language-dependent. Israeli oral deaf children and German oral deaf children with cochlear implants make few errors on verb tense or noun pluralization (Szagun, 2004; Tur-Kaspa and Dromi, 1998). In fact, German children with cochlear implants performed nearly as well as hearing children in acquiring plurals and verb inflectional morphology (Szagun, 2004). On the other hand, these children made many errors in grammatical agreement. Hebrew children made errors in number and gender agreement between verbs and nouns and between adjectives and nouns (Tur-Kaspa and Dromi, 1998). For example, for the noun phrase, *tmuna levana axat* ('one white picture all feminine'), a student said *tmuna lavan exad* (using the masculine form of 'white' and 'one'). German oral children with cochlear implants also had difficulties with case and gender agreement between articles and nouns (Szagun, 2004). Italian 11- to 15-year-olds made as many errors of agreement between articles and nouns as hearing first graders (Taeschner *et al.*, 1988). Rather than marking agreement for gender and case, these adolescents frequently selected an article based on the final vowel or letter of the head noun, something never seen in hearing children (e.g., *i notti*, instead of *le notti*, *le fucile*, instead of *il fucile*). American deaf children also show problems correctly using discourse agreement rules for determiners and pronouns (De Villiers *et al.*, 1993).

Deaf children also struggle with the auxiliary system (Berent, 1996; De Villiers *et al.*, 1993). Deaf adolescents judge sentences with missing auxiliaries as grammatical. In one study, oral deaf 6- to 14-year-olds only supplied auxiliaries 30% of the time when formulating questions. Unlike hearing children, they almost never produced questions with the auxiliary in the wrong place (e.g., *Where you are going*?), suggesting that the underlying grammar is different for deaf and hearing children. On the other hand, unlike other areas of grammar, deaf college students seemed to have acquired the auxiliary system and rarely made auxiliary errors (McAfee *et al.*, 1990). Thus, while severely delayed, the auxiliary system may eventually be acquired.

Comprehension and production of complex sentences is also problematic (Berent, 1996; De Villiers *et al.*, 1993). Complement structures are frequently misunderstood and not correctly produced even by deaf adolescents. Deaf children and adolescents frequently interpret passive and relative clauses as if they adhere to subject verb object word order. Medial relative clauses are more difficult than final relative clauses and there is little improvement in performance from 6 to 18 years of age. Twenty-five percent of relative clauses produced by oral deaf children were categorized as 'deviant' (i.e., a form hearing children would never produce) (De Villiers *et al.*, 1993). These included redundancy of the resumptive pronoun (e.g., *The girl caught the soccer ball which the boy kick the ball.*), mistakes in relative pronouns (*One the baby is feeding the bird is the mother is carrying on him.*), and modification of the wrong noun phrase (*The boy empty pail who was washing the car*).

Why are these aspects of syntax so difficult for deaf individuals to acquire? Acquisition of syntax seems to depend on input from 'face-to-face' interactions, since deaf adolescents still struggle with these syntactic rules even after years of exposure to them in written materials and formal instruction. This is the case even for children who are fluent in a natural sign language and are learning English as a second language (Mayberry, 2000). In face-to-face interactions, the grammatical elements that are necessary to learn functional categories are unstressed and carry minimal semantic information (De Villiers *et al.*, 1993). Markers such as inflectional morphemes, determiners, and pronouns are less perceptually salient in the speech stream than content words. In addition to accounting for the earlier acquisition of lexical categories, perceptual salience is hypothesized to determine the relative difficulty of different morphemes (e.g., the plural *-s* is perceptually more prominent than the past tense *-ed* and is acquired earlier) (Schauwers *et al.*, 2005). Although intuitively appealing, the little developmental research that exists suggests a more complicated picture, with performance only being imperfectly predicted by perceptual salience (e.g., children acquire plural *-s* but not third person *-s*). Szagun (2004) suggests that syntactic difficulties also can arise from processing deficits in working memory. Because of auditory deprivation during early development, deaf children may find it particularly difficult to acquire elements that require processing and storing of information across elements in the sentence, such as gender and case agreements. Indeed, preliminary research suggests that implantation before age 2 is more likely to result in near normal rates of language development (including syntax) than those after 2 (Nicholas and Geers, 2005; Schauwers *et al.*, 2005). These hypotheses can be evaluated in future research through cross-linguistic analysis of relations between perceptual salience, age of implantation, and syntactic development.

Although MCE was created to make English syntax visible and thus to circumvent the perceptual problems of spoken language, it has clearly not eliminated deaf children's syntactic problems. This may be

partially because less skilled signers who are providing language models for deaf children frequently delete functional morphemes. However, even when children learn language from skilled signers, they still struggle with auxiliaries, copula, and inflectional morphology. Perceptual processes may also interfere with acquiring spoken language through a visual modality (Mayberry, 2000; Schick, 2003). Many of the invented signs that mark functional elements are difficult to visually discriminate because they require the receiver to make fine distinctions using peripheral vision. In addition, visual working memory may not be well suited to learning relations between elements when they are marked sequentially as is the case in MCE, rather than simultaneously as is done by natural sign languages (Spencer, 2004).

Summary and Conclusion

Deaf and hearing toddlers are remarkably similar in the development of joint attention, intentional communication, and the use of nonlinguistic gestures and vocalizations to communicate with others around them. However, differences in language skills are evident even during the first year, when deaf toddlers fail to produce canonical babbling and do not acquire the intonational contours of their ambient language. Although there are wide individual differences, deaf children and adolescents frequently have small lexicons and poor syntactic knowledge, especially in the areas of morphosyntax and complex sentences. Some of these deficits come from restricted input due to hearing loss and, for those in a SC environment, because others fail to use sign fluently. However, even when input becomes accessible, there may be permanent and irreversible effects from language deprivation during the early years of life. Research on early identification and intervention suggests access to language during infancy may result in qualitatively better language outcomes than after infancy. In addition, cochlear implantation before 24 months may result in better reception and expression of speech. New interventions based on knowledge of the visual needs of deaf children may also lead to better SC intervention efforts (Meadow-Orlans *et al.*, 2004). Thus, the next generation of deaf children with hearing parents may not exhibit such profound linguistic deficits. However, research on the effects of early intervention and early cochlear implantation is still emerging, so we do not know if the promise of these new developments will become a reality.

See also: Language Development: Overview; Language Education of the Deaf; Sign Language: Acquisition.

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Language Development in School-Age Children, Adolescents, and Adults

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In this article, language development beyond the preschool years is described, covering significant changes that occur in school-age children (ages 6–12 years), adolescents (ages 13–19 years), and adults (ages 20+ years). For many years, it was widely believed that language development was largely complete by the time a child entered school, at five or six years of age. More recently, however, it has become apparent that a great deal of linguistic growth occurs during the school-age years, adolescence, and well into adulthood, and that the development of language has no obvious point of completion (Nippold, 1998). This should not detract from the undeniable truth that language development in infants, toddlers, and preschool children is an amazing phenomenon, marked by rapid and salient change. By contrast, language growth beyond the preschool years is comparatively slow, subtle, and sometimes difficult to quantify. Nevertheless, later language development is an exciting area of scientific inquiry.

The differences between early and later language development are striking. For example, after steadily

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Language Development: Morphology

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Most studies on the acquisition of morphology focus on inflectional morphology (but see Clark, 1993 for results on compounding and derivation). Of particular interest are studies on the typical order of acquisition of morphology, as well as on individual and crosslinguistic differences and the causes underlying such variation.

In many languages, the earliest stages of language development show characteristics of 'telegraphic speech.' That is, inflectional morphemes and function words are initially absent but are gradually added on in the process of acquisition.

Studies of Morpheme Order Acquisition

Brown (1973: 271, Figure 14) provided a thorough methodological milestone for the systematic comparison of individual developmental trajectories. Brown related the acquisition of 14 carefully selected grammatical morphemes to stages of development, as defined by the mean length of utterance (MLU), and productivity, as defined by 90% of use in obligatory contexts. Upon a systematic scoring, the three English-speaking children under investigation showed a high correlation in their acquisition of the 14 morphemes. Present progressive was typically the first morpheme to become productive, followed by the prepositions *in/on*, plural and past irregular marking (Brown, 1973: 274, Table 38). Brown's results corresponded to the results from previous diary studies and experimental data (Brown, 1973: 275ff.) and inspired a wide range of comparative research.

Individual Differences

The availability of more and more data on individual developmental trajectories revealed not only that children differ in the age at which they acquire particular morphemes, but also that children show qualitatively different styles of language acquisition regarding the units they first pick up from the input sound stream. While most children initially identify stressed stems without unstressed inflectional elements, other

children show a tendency to use larger, unanalyzed chunks and are faithful to the prosodic contour instead. This distinction is known under dichotomies such as "referential vs. expressive" or "analytic vs. holistic" (Peters, 1995; Lieven, 1997).

However, crosslinguistic research pointed out that holistic vs. analytic processing is not merely a matter of individual style, but also much influenced by language type.

Crosslingustic Differences

English often serves as a benchmark for acquisition processes, although it is a rather atypical example for the acquisition of morphology. English has little inflectional morphology, and in most cases the morphological word consists of just the uninflected stem. In the past three decades, crosslinguistic research has demonstrated that the course of morphological acquisition critically relies on the language type. English represents an almost isolating language in which acquisition is a matter of additive complexity. The child can easily identify the stem and then acquire inflectional morphemes as additional material. In other languages with richer and more complex inflectional morphology, children first have to identify the stem and the inflectional processes that act on the stem. Thus, in many languages children first use inflected forms in an unanalyzed, formulaic way and then have to break up and reanalyze the complex form in order to build morphological paradigms (see Voeikova and Dressler, 2002 for comparative studies on paradigm building).

The acquisition of morphology is related to language type. Slobin (1973) demonstrated that agglutinative languages like Turkish with very regular form-function matches provide the fewest problems, as opposed to more irregular inflectional languages like Serbo-Croatian. In incorporating or polysynthetic languages, children virtually never start out with uninflected lexical roots. The degree to which grammatical morphemes are easily identifiable influences not only which acquisition style is most successful (Lieven, 1997), but also the age at which morphology is acquired. The more regular and semantically transparent the inflection, the earlier its acquisition. For detailed studies on the acquisition of particular morphemes in particular languages, consult the online CHILDES bibliography. Thorough surveys on a set of languages are presented in Slobin, 1985a, 1992, and 1997a.

Morphology as an Interface

Current handbooks and textbooks on language acquisition often lack a chapter on the acquisition of morphology. Studies typically focus on the syntactic function of morphology, the semantics of morphemes, or the nature of psycholinguistic processes. Consequently, the acquisition of morphology is treated in chapters on syntactic or semantic development or in sections on processing.

Morphology and Syntax

Within generative linguistics, the acquisition of morphology as such does not figure prominently. Instead, morphological categories are relevant in their function of licensing syntactic processes, for example, the projections of functional categories in the principles and parameters framework (e.g., Radford, 1995) or the merge operations associated with strong and weak features in minimalism. However, there is some debate regarding the architecture of the human language processing system concerning the question of whether words and formal structures (rules) are processed by different mechanisms (see below).

Morphology and Semantics

Space and time are well-studied semantic notions crosslinguistically. For spatial morphology (free and bound) language specific trajectories are proposed. For example, children learning Korean categorize spatial relations differently from children acquiring English, who again differ from children learning Dutch. That is, there are no universally privileged notions, and the acquisition of spatial language is now one of the strongholds for linguistic relativity, which claims that language structure influences cognitive categorization (Bowerman, 1996). For temporal reference, in contrast, there is a strong crosslinguistic tendency that early past tense marking is associated with resultative verbs (Li and Shirai, 2000). This preference is due to the distributional bias found in most input languages. Across several semantic domains, there is now accumulating evidence that children acquire language-specific notions early, without starting out with a set of possibly universal semantic distinctions first (Slobin, 1997b).

Representation and Processing

Measures of Productivity

Ever since the first systematic studies of child language, the difficulty of assessing children's underlying linguistic competence has been a methodological problem, because not everything children produce is productive, and because reaching full linguistic productivity is a gradual process. Although children's productions may appear to be correct, the use of a complex form could be unanalyzed and formulaic, or

the form might not yet encode the full semantic range of applications.

In spontaneous data, overgeneralization errors are the clearest sign of productivity. Here, children create their own regular form instead of using the irregular form (e.g., *go-ed* instead of *went*). But there are other ways of assessing (degrees of) productivity. In corpus studies, several measures can be used to define (a) first productivity and (b) degrees of mastery. The onset of productivity defines the moment when a given item is no longer used in a lexically specific, frozen, and formulaic way. Morphological contrast is used to demonstrate that the child has analyzed the complex nature of a word form. The child either starts to use a particular morpheme with *x* number of different stems or uses a particular stem with *x* different grammatical morphemes such that morphological paradigms are emerging. Full productivity is attested when the child uses the structure in the majority of appropriate contexts. Commonly, a criterion higher than 75% is used.

Experiments provide a more clear-cut way of assessing the child's morphological competence under controlled conditions. Tests that use nonceword material are one successful measure of productivity. In 1958, Jean Berko published the results of the so-called wug test. *Wug* was one of the names of fantasy animals and actions. Children had to learn these nonce words and then had to pluralize them (e.g., *wug-s*) or to form the past tense (e.g., *loodge-d*). The use of new lexical material guarantees that the child cannot retrieve a holistically stored form from memory, but instead has to inflect the new word spontaneously.

The range of productivity measures indicates that different linguistic domains or research interests require different thresholds. The reader should pay attention to the productivity criteria used when comparing the results of different studies. A survey of the average age of productivity of different morphological and syntactic structures is presented in Tomasello (2000).

Processing

From a psycholinguistic perspective, it is of interest how morphological paradigms and inflected forms are stored and processed. There is substantial work on the acquisition of regular and irregular allomorphs. The debate between the dual- and the single-mechanism model has received much attention since the mid-1980s (cf. Clahsen, 1999 and commentaries). It centers on the question of whether regular and irregular morphology is stored separately or not.

Representational approaches The dual-route model is based the idea that morphology is processed by different mechanisms and predicts that irregular forms are stored in memory in a holistic fashion, whereas regular morphology is processed by a symbolic rule such that stem and affixes are stored analytically. Overgeneralization errors are the result of memory retrieval failure: In the encoding process, the child first looks up irregular forms in the mental lexicon, but if this fails, regular morphology is applied instead.

Processing models In contrast, single-mechanism models of various kinds rely on general processing mechanisms that achieve the acquisition task without requiring specifically linguistic representations or symbolic rules. The single-mechanism model for inflection originated in connectionism (Rumelhart and McClelland, 1987; Plunkett, 1995), but similar ideas are prominent also within noncomputational models. First, Slobin (1985b) formulated a set of "operating principles," some of which were segmentation strategies to identify morphemes (e.g., "pay attention to the end of words"). Later approaches clarified the ranking and the nature of interaction of such processing strategies. The competition model (Bates and MacWhinney, 1989) is designed to handle multifactorial grammatical phenomena because it is assumed that these systems offer multiple cues (e.g., inflection plus word order) that differ in strength (perceptual salience, frequency) and validity (non-ambiguity). The stronger and the more reliable the cue, the easier the acquisition of such a cue. Research with infants has demonstrated that they are able to identify stochastic patterns even in the prelinguistic period (Aslin *et al.*, 1999).

See also: Associationism and Connectionism; CHILDES Database; Computational Approaches to Language Acquisition; Productivity; Register Variation: Core Grammar and Periphery; Syntactic Development.

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Language Development: Overview

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All over the world, children learn to talk on a roughly equivalent timetable. They do so by learning the language or languages of their environment. There is considerable debate over what cognitive, social, or specifically linguistic, innate capacities they bring to language leaning. This article begins with a brief timetable of development and then focuses in turn on the major aspects of language learning in terms of infancy, learning words, learning morphology, early grammar, later grammar, and the learning of pragmatic and metalinguistic skills. It concludes with some brief reflections on atypical development. The relevant theoretical issues are covered as they arise in each section and are considered again in the last section on learnability and constituency.

During infancy, children develop a wide range of cognitive and social skills together with a developing ability to segment the speechstream into meaningful units. They usually produce their first recognizable words somewhere between 10–18 months of age and their first multiword utterances between 14–24 months. By age 3, children are often able to produce quite long utterances and are beginning to be able to combine more than one clause into coordinate and subordinate constructions (e.g., relative clauses, cleft sentences). Between the ages of 4 to 7, there are major advances in children's ability to take the perspective of the listener into account and to produce coherent discourse and narrative sequences. These abilities, as well as the ability to reflect on language as an object of knowledge, develop throughout the school years and are much influenced by the extent of literacy or other complex language (for instance, ritual language) to which children are exposed.

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Throughout this developmental timetable, there are major individual differences in the ages at which children reach these points and, in addition, in the balance of skills that a particular child may manifest at a particular point in time. There are also individual differences in how children tackle any of these tasks. This is an important point to remember when considering theories that rely for their confirmation on a particular order of development or on a particular relationship among different skills. It is also important to remember that many children (perhaps most) grow up hearing and, to some extent at least, learning more than one language. The evidence to date is that doing so does not have a significant impact on the developmental timetable for language learning in the early years.

Overview of Development

Infancy

Children are born with the ability to discriminate their mother's voice from that of other women and to discriminate speech from nonspeech, presumably because of their experience in the womb. In the earliest months of life, they seem able to discriminate sounds produced in the languages of the world, but this ability diminishes until, by 8 to10 months, their ability to discriminate between sounds is confined to the sounds of their native language(s).

Experiments with children between 6 to 10 months of age indicate a developing sensitivity to the prosodic indicators of major phrasal units in the speechstream. Thus, 9-month-old infants prefer to listen to speech that is segmented using pauses at major clause boundaries, rather than within clauses, whereas there is no difference in listening preferences for 6-month-olds. Around 7.5 months infants also become able to identify words in the speechstream. Experiments with English-, Japanese-, and French-learning children have shown that children can discriminate words that they have heard before from those that they have not, even when the words were embedded in speech. They can also discriminate highly frequent words in their language from low-frequency words, and words that are typically learned early by children from words that are not typically learned early (Jucszyk, 1997).

Experiments with children about 10 months of age have indicated that they are sensitive to the ordering of words in their language, thus being able to discriminate normal English sentences from ones in which determiners and nouns were reversed (e.g., *kitten the*) or ones in which some grammatical morphemes were replaced by nonsense syllables. Older children (at 18 months but not at 15 months) can discriminate sentences in which the combination of auxiliary and verb was correct (*is running*) from those in which it was not (*can running*). Finally, using simple artificial languages, it has been claimed that infants between 7.5 to 17 months are able to recognize strings with the same ordering rules, but with different 'vocabulary' after a short exposure. However, it seems that this discrimination is possible only when there are patterns of repetition in the 'vocabulary items' (Gomez *et al.*, 2000).

These experiments show a clear path of development during the first 12 to 18 months of life. As children's experience with language develops, so do their segmentation, word recognition, and pattern recognition skills. These skills are obviously central to the child's ability to parse the input and to start to connect it to meaning. It is important to note that all these experiments depend on the infant's ability to discriminate one stimulus from another. They do not have to understand or use the stimuli in communication nor connect them to any meaning in the environment.

However, infants do make huge developmental strides in their cognitive and social development during the first 12 months of life. Cognitively, infants (probably from birth) have clear expectations about the ways in which objects will behave, and these expectations develop in sophistication over the first year of life. Before their first birthday, they are able to form categories of objects based both on form and, to some extent, on function (Mandler, 2000).

During the first 6 to 8 months of life, children develop the ability to interact with others, to make demands, and to resist them. At around 8 to 9 months, there is a major 'step change' as the infant starts to understand that others have intentions that may be different from their own and to incorporate this understanding of other minds into their behavior; for instance, imitating the perceived intentions of others and showing objects that they know their interactant has not seen (Carpenter *et al.*, 1998). Infants aged 12 to18 months are clearly starting to associate attention sharing, demanding, and assisting others with specific gestures that they use and, also perhaps, with systematic vocalizations. This development is highly correlated with word learning, as it seems to be the beginning of the attempt to match form to meaning.

Thus, by about age 10 to 12 months, infants are ready to put the patterns skills that they have extracted together with their communicative and meaning-inference skills. It is this combination that is the true start of human language learning.

How many of these developing abilities are unique to humans, and how many are shared with the other

great apes or primates? This is obviously a contentious issue, and researchers of different theoretical persuasions have made very different claims. Much more research remains to be done to tease apart the exact nature of the skills and their precise developmental sequence. However, a number of experiments have indicated that many of the pattern recognition skills shown by human infants may be shared by other primates. In contrast, the intention-reading and communicative skills shown by infants in the last trimester of their first year do seem uniquely human, though nonhuman primates show some precursors of these abilities, especially those few who have been reared in a 'human' environment (see Tomasello, 2003).

Early Comprehension and Production

The time when children first start to show signs of comprehension and to start producing words varies. However, because much depends on how comprehension and production are defined, it is difficult to give an exact range of variation. Comprehension of individual words such as 'No' starts very early, and children can use contextual cues to interpret the utterances of those around them without parsing much of what they hear. Although most well-controlled studies of early word learning have found that comprehension is achieved in advance of production and starts early, production is more variable, with some children producing their first words (as reported by parents) at around 10 months, whereas others might not produce more than a few recognizable words before 16 to 18 months (Fenson *et al.*, 1994). For most children, progress in comprehension and in production is highly correlated, but there are reports of some children whose comprehension outstrips their production by much more than the normal extent (Bates *et al.*, 1988).

Studies have shown that, even when infants know a word, it will take 15-month-olds much longer to process it and to look to a matching picture than it will older infants. Thus, 15-month-olds need to hear the whole word before looking to the matching picture, whereas 18- and 24-month-olds process it 150 and 300 msec faster, respectively. These two older groups shift their gaze before the word has ended, using the ongoing phonological information to discriminate the matching picture from a distractor (Fernald *et al.*, 1998). This development of automatization is clearly one of the major processes taking place between the earliest word-meaning mappings and the point where vocabulary learning develops rapidly.

The production of utterances also goes through a long process of automatization and refinement. Initially, infants' utterances can match the adult form quite closely. However, they go through a subsequent stage in which each child produces a wider range of words, most of which are reduced to a phonological 'template.' The nature of this template varies from child to child, though it always bears a phonological and segmental relationship to the particular language being learned. Children vary greatly in how accurately they can produce the phonology of their language and in how long it takes for this accuracy to develop. They may also differ early on in the extent to which they pick up on the major tunes of the language, as some children tend to produce shorter and more well-articulated utterances (for detailed summaries, see Lieven, 1997; Peters, 1997).

Some early words are highly context dependent – for example, Piaget's classic example of his daughter, Jacqueline who used *voua-ou* (wow-wow) to refer to everything that could be seen from the balcony – but it seems to be the case that children also produce relatively context-independent words from early on (e.g., *more* to request a number of items, not just food). Context dependence is similar to 'underextension' in which the child uses the word to refer to a limited set of referents. This contrasts with overextension where the word is used to refer to a wider group of referents than in the adult language (an example is the use of *Daddy* to refer to all men whom the child encounters). Much early word comprehension and production shows both characteristics and initially is not stable (see Clark, 2003).

One of the most striking aspects of very early speech is its phonological inaccuracy. Analysis makes it clear that the phonological errors that children produce are systematic. Individual children drop syllables or substitute a particular sound of their own for sounds in their language (for instance, *Puggle* for *Puddle*) while still being able to hear the difference between their own production repeated to them and the 'real' word. Children will not, in fact, accept a repetition of their version of a word as being the 'real' word. This phenomenon raises interesting issues for the relationship between comprehension and production. There is major theoretical debate, however, concerning how it should be analyzed. The debate is between a 'templatic approach,' which characterizes the process as the child assimilating words to a production template (Vihman, 1996) or an optimality theoretical approach that sees the child as seeking to resolve a set of constraints on production, such as 'faithfulness' (i.e., getting as close to the model as possible) and 'markedness' (Bernhardt and Stemberger, 1998).

A second issue is the extent to which children's communicative behavior in these early stages is already 'linguistic' in the sense of being conventionalized, context free, and combinatorial. Thus, researchers

have suggested that children's early communicative acts (e.g., showing as a precursor of declaratives and demanding as a precursor of imperatives) develop into 'protolinguistic' symbols; that is, each child uses a specific set of sounds and gestures to convey different meanings (Bates, 1976).

Learning a Vocabulary and Developing Meaning

After an often slow start, children's vocabulary grows exponentially, with new words being added at a rate of 9 to 10 words per day between the ages of 2 and 6. In industrialized and urbanized societies, children add about 3000 words per year for each year in school. Vocabulary size is related closely to the amount of Child-Directed Speech (CDS) in the early years and to various measures of family talk and schooling in the later years (Fenson *et al.*, 1994; Hart and Risley, 1995).

For children learning many languages, including English, nouns form the largest single category of words, but children also learn a wide range of words from other categories (e.g., *want, me, no, what*). The extent to which nouns predominate early on varies among children learning the same language and among children learning different languages. Young children, under certain pragmatic conditions, require only a minimal number of exposures to a novel noun and its referent to learn its meaning (called 'fast mapping'; Carey and Bartlett, 1978; Clark, 2003).

One issue concerns when children form categories of the words that they are learning. The answer to this depends, in part, on how a category is defined, but evidence suggests that a category of nouns develops relatively early in many languages; that English-speaking children can substitute the determiner *a* for *the* early (while taking many years to learn the full range of determiners and their scope); and that fully fledged categories of verb and adjective take more time to develop.

When children learn a new word, what meaning do they give it? It could be the meaning the word has in the language that they are learning or a meaning based on their cognitive categorizations of the world. For instance, children the world over might already have developed nonverbal categories of 'in-ness' and 'on-ness' during infancy, and when they learn words that express the relation between objects, they might initially match these words to these pre-existent categories. There has been considerable research on this issue, and it seems that this is not what happens. Instead, children seem to learn the word and its referent together. Thus, English-learning children use the prepositions *in* to refer to one object contained within another and *on* to refer to one object supported by another, irrespective of how tight the fit is between the objects. However, Korean-learning children use the verb *kkita* to refer to one object inside another only if the fit is tight (e.g., a cassette in a box) and for other tight fit relations between objects (e.g., one object stuck to another with Velcro). The verb *nehta* is used to refer to a loose fit, regardless of whether one object is inside another or on top of it. Children do under- and over-generalize, but they seem to do so along the lines of categorization indicated by their language (Bowerman and Choi, 2001).

How does a child know what someone is referring to when that person uses a word? In principle, the speaker could be referring to any part of the scene. This problem of reference was elucidated most clearly by the philosopher, Quine. The general answer is to suggest that children come to word learning with some already pre-given interpretative skills. One group of researchers has suggested that these skills are in the nature of innate constraints; for instance, the child initially assumes that a word applies to the whole object and that a novel word will not apply to an object for which the child already has a word (mutual exclusivity constraint; Markman *et al.*, 2003). Another group suggests that these skills derive from the pragmatics of the situation that the child already knows about. A series of experiments indicating that children pre-verbally know what is relevant to a situation and to the perspective of another and that, simply through using context, they can find the referent for a word they have never previously seen paired with the referent, suggest that the latter explanation is more likely to be correct (for this debate, see Clark, 2003; Tomasello, 2003).

Another major debate in the literature is over the status of nouns as the first category to be learned. Gentner (1982) has claimed that nouns are universally easier to learn and that they initiate the process of category learning. She argued that this occurs not only because the use of nouns tends to be very frequent in CDS but also because their reference is more transparent – to concrete, imageable objects – and children already have developed a considerable knowledge of objects and their behavior pre-verbally. In opposition to this theory, researchers have argued that children learn a range of words, not just nouns, from the beginning and that there are languages, such as Korean, in which the proportion of nouns in the lexicon does not exceed the proportion of verbs (more or less broadly defined). This issue has not been resolved: on the one hand, it *is* easier in many languages to learn many object words; on the other hand, children are also building up other categories of their language from the beginning. Developing categories

helps the child segment the other words they hear, and the relative growth of these categories depends on the characteristics of the language being learned and the way it is used in CDS.

Learning Grammar

Learning Morphology

Inflections change the grammatical meaning of words. Languages differ greatly in the amount and kind of inflectional morphology that they show. English has very little inflectional morphology (plural *–s* and past tense *–ed* are two examples). Free morphemes also mark grammatical meanings in languages. For instance, in English, *he* indicates the nominative masculine pronoun (subject argument), whereas *him* marks the accusative masculine pronoun (direct or indirect object argument). The English pronoun system shows irregularity: each pronoun in the English paradigm changes somewhat differently between nominative, accusative, and genitive (e.g., *he, him, his, we, us, our*). In addition, multiple meanings are encoded in one morpheme: number, case, and gender. Other languages encode meaning much more extensively and systematically with both inflectional and free morphemes. Inflections can mark either a local meaning (e.g., plural on a noun in English) or a relational meaning (e.g., plural on a verb to agree with the subject or object; a case marker on a noun as a function of its syntactic role). In either case, productive inflectional marking involves constituency: the ability to understand how plurality is marked on the whole noun phrase within the language being learned and how the noun phrase is coordinated with marking on the verb phrase. Thus, in some languages, determiners, adjectives, and nouns are all marked for plurality and/or case and/or gender, in others not; in some languages there is both subject and object marking on the verb and/or its auxiliaries and in others not.

Children may start by rote learning some frequent words together with their inflections while omitting nonsalient inflections (omission errors). Later, children may over-generalize and use incorrect forms (errors of commission). For instance, in English, children leave out tense markers (*It go there* for *It goes there*), over-regularize past tense marking (*goed* for *went*), and use incorrect forms (*I think her was crying for me*). In languages in which all words in a class carry an inflection, the child may initially use only one inflection and over-generalize it to all members of that class.

A central question is when children become productive with morphology. Researchers from different theoretical persuasions tend to interpret the data in predictably different ways. Those arguing for early, abstract knowledge point to the fact that children learning highly inflected languages produce words with inflectional marking from the beginning, usually accurately. Those who emphasize that the abstract representations underlying inflectional morphology are learned point to the potentially rote-learned nature of early inflectional marking and the limited range of items with which particular inflections are used.

There have been many different ways of defining productivity in naturalistic corpora: for instance, percentage provision in obligatory contexts, use of the same inflection on a number of members of the class, or use of different inflections on the same word. Inevitably, these measures yield different results, depending on how stringent the criteria are and how good the sampling is (Tomasello and Stahl, 2004). Methods are being developed that control for the range of forms in the child's lexicon and then compare the degree of productivity between the child's system at different developmental points and between the child's system and the adult's. For two children learning Spanish, a language with rich inflectional morphology on verbs, this method has shown that productivity develops even after the child can provide all the forms and that the children's range of inflectional provision on the same verbs as their parents, even when the range of inflections is controlled for, is still significantly different at age 2.6 (Aguado-Orea, 2004).

How quickly children learn the morphology of their language seems to depend on the following factors and the interaction among them: type frequency (how many different lexemes are inflected in the same way) and token frequency (the relative frequency of different surface forms) in the input; salience (can they be heard?); transparency of meaning (is the semantics accessible?); formal complexity (is one meaning or more encoded?); and the regularity and distributional consistency of the inflectional paradigm (see Slobin,1985; Peters, 1997 for summaries). In such languages as Turkish, in which suffixes are added in a consistent order and with consistent form to indicate local meaning (e.g., plural, location, possessive), children seem to be at least partially productive relatively early. Other languages present more difficulty – those in which the morphemes are: (1) portmanteau (more than one meaning is combined in one form; e.g., the nominative for 'water' in Russian is *vodá*; the dative plural form is *vodám*); (2) distributed (e.g., marked with a free form and an inflection, Serbo-Croatian locative markers); and/or (3) in complex and partial paradigms (e.g., Polish case endings).

One sure way to know that children have a productive system is to test for their ability to mark words that they have never heard before ('nonce' words). Otherwise, one can never know whether each word and its accompanying inflection have been learned from the input on a one-by-one basis. In Berko's classic 'wug test,' children are first introduced to a novel creature called *a wug*, and then another of these creatures is produced. The child is then asked, *Now we have two – ?* We know that children have productive plural morphology if they answer *wugs*.

This method can be extended to other word classes. For instance, experiments with novel verbs in English suggest that productive past tense morphology for verbs develops somewhat later than does plural morphology for nouns. Note that this is also a way of determining what type of category is represented in the child's system and its level of abstraction (for instance, action verbs only or all verbs or concrete nouns only or all nouns). Nonce experiments have not been conducted in many languages other than English, but their wider use would certainly help clarify some very complex issues in the learning of inflectional morphology. However, they are not easy to conduct with children younger than age 2, and children learning some languages may be partially productive before this age.

Because inflectional morphology can be extremely complex and children seem to demonstrate early sensitivity and productivity, it is often used as a testing ground for debates about whether children have very early abstract linguistic representations. An example is the extensive debate on past tense marking in English. Children start by producing a small number of forms (many of them irregular) and subsequently start to over-generalize the regular *–ed* marker to irregular verbs (e.g., '*runned*' rather than '*ran*'). Children concurrently use the correct form and may continue to over-regularize some forms for many years. Proponents of early abstract representations argue that, once children have learned the past tense rule, they seek to apply it to all new forms that they learn and stop doing so only when they learn the new irregular form that 'blocks' the application of the rule. This model is called the 'dual route model': one route for regulars and one for irregulars. The claim is that this learning occurs even in languages, unlike English, for which the rule is not the most frequent form (i.e., is a 'minority default' rule). Challenges to this position come from 'single-route models' that claim: (1) the developmental pattern of marking can be closely modeled in connectionist networks that have only one (not two) mechanisms (Plunkett and Juola, 1999); (2) these networks can also model the development of marking in languages in which the 'default' marking is not the most frequent; (3) detailed studies of children's marking in languages either with a 'default' (e.g., German plurals; Köpcke, 1998) or with no default (e.g., the Polish genitive; Dąbrowska, 2004) show a long process of development during which children over-generalize a variety of markers, depending on such factors as frequency and phonological similarity, before arriving at the adult system; and (4) the fact that over-generalizations continue for a long time after the child has learned the correct form does not suggest that there are two entirely separate processes involved (Maratsos, 2000).

As well as being a potential window on the nature of children's underlying syntactic abstractions, inflectional morphology can also provide a window on the development of children's underlying semantic representations. An example of this is the 'aspect before tense' debate. Here, the issue is whether children are initially sensitive only to the aspectual features of situations and their marking on verbs (e.g., punctual or durative events: *hit* vs. *singing)* or also to the temporal features (past vs. present events: *sit* vs. *sat*; Weist *et al.,* 2004). Because languages differ greatly in how these features are coded on verbs, cross-linguistic comparison of children's development has been essential in this debate. Methodological problems and the complexity and interrelatedness of the tense and aspect systems in different languages mean that we do not yet have a final answer to this issue.

Early Syntactic Development

Children's first utterances containing more than one word appear between 18 to 24 months of age. Almost all researchers agree that, in the early stages, some utterances are rote learned as a whole (e.g, *what's that?*), and others may be slot-and-frame patterns (e.g., *where's X gone?* or *more X*, where X denotes a range of referents). However, there is disagreement as to the extent of these low-scope patterns: what part they play, if any, in children's developing linguistic representations; and how utterances that are considered not to derive from them should be represented (Lieven *et al.*, 2003). For instance, when it is suggested that the child is using rules for the combination of underlying categories, the hypothesized categories can be very varied. One suggestion would be semantic categories; for instance 'agent' and 'action verb' to generate an utterance like *Lion swim*. However, a different researcher might analyze the same utterance in terms of syntactic relations, such as 'subject' and 'intransitive verb.' In the case of any particular utterance, these alternatives cannot be distinguished: A corpus of utterances (the larger, the more reliable) must be analyzed together with clear definitions of

productivity before it is possible to suggest whether the utterance is likely to have been generated productively and on the basis of what linguistic representations. As noted for morphology, naturalistic data never allow one to be completely certain that an utterance is productive.

Many of children's early utterances are missing features that are provided in adult speech: subjects are frequently omitted, as are function words (e.g., auxiliaries, complementizers, prepositions). Utterances often lack finiteness marking (e.g., no third person *–s* on main verbs in English; nonfinite for finite verbs in Dutch and German).

Children's utterances also reflect features of the input very closely. Thus, English-speaking children's early verbs are those that occur most frequently in the input, children mark verbs in accordance with the most frequent marking on those same verbs in the input, and they use verbs in the argument structures that their mothers use most frequently. In fact, whatever system one looks at, there are strong correlations with frequency in the input. This is not, however, the only factor affecting the child's use: as with phonology and semantics, complexity and salience also play a role, together with, most importantly, what the child wants to talk about.

None of these facts are in serious dispute in the literature; however, their interpretation certainly is. The major divide is between those who interpret them as indicating that the child has early abstract and, specifically, linguistic knowledge (for some researchers, innate) and those who argue that abstraction develops throughout the process of learning language. Clearly, even though children's utterances show a great deal of lexical specificity and partial marking, they could still reflect underlying abstract linguistic knowledge, limited by these four factors:

1. lexical learning of the forms of the language
2. learning the syntactic features particular to the language
3. processing constraints on production (e.g., a limit on the length of what the child can produce)
4. late biological maturation of some part of the system that underlies the abstraction.

Each of these factors is briefly considered below.

In addition, all theories need to account for the patterns of errors that children show. Those maintaining the existence of innate linguistic knowledge must answer this question: If children have innate grammar, why do they make errors that seem to reflect the lack of knowledge of fundamental linguistic systems, such as tense, agreement, and the provision of arguments? Those maintaining that abstractions are constructed must determine how the interaction between the child's current system and the input explains the pattern of errors.

In the case of (1) above, it is obvious that, whatever the underlying system, children have to learn the specific forms of their native language. The clear implication is that claims to underlying structure or the lack of it should not be made until it is established that the child is able to fully comprehend or produce the forms reflecting the hypothesized abstraction.

Within nativist linguistic approaches, one solution to the issue of how children use the hypothesized Universal Grammar (UG) to work out the syntactic particularities of their input language (2 above) is to suggest that they have to set a range of parameters as the result of hearing (a small number of) utterances. Within this literature, there are major debates on the number of parameters, whether or not they are initially set, and how many settings there can be (one, two, or more). An example is to hypothesize a 'head direction parameter' that determines how children identify the input language as being 'left' or 'right branching.' In principle, children then know how to order words across a range of phrasal structures (e.g., noun phrases, prepositional phrases, and verb phrases). Alternative constructivist accounts would suggest that children do this on the basis of the particular strings that they learn from the input, from which word-order patterns are subsequently abstracted in conjunction with the learning of word classes. This hypothesis would make it easier to account for the many instances of inconsistency of head direction in languages. The success of the Principles and Parameters approach in its own terms depends on the number of parameters being relatively small and on agreement among researchers as to how the specified settings can account for the range of relevant phenomena in language development (Fodor, 2001). At the present time, it is not clear that either of these conditions can be met.

In the case of processing constraints (3 above), there clearly are length constraints on what the child produces. Probably, the single most obvious aspect to the lay observer of children's developing language is that children's utterances get longer as they grow older. However, is this an output limitation imposed on a much fuller underlying abstract representation (Valian, 1991), or does it reflect what the child has actually learned up to this point? For instance, if children are processing the input by using already identified strings as the basis for building new strings, doing so would also yield increasingly long utterances over time (Elman *et al.*, 1997). In addition, the way in which patterns were added would mean that the distribution of marking would also change over

time. Research incorporating this type of learning mechanism has been successful at modeling children's patterns of finiteness marking not only in English but also in Dutch and Spanish (Gobet *et al.,* 2004).

An alternative linguistic nativist approach is to hypothesize that, although UG is innate, some parts of the system are on a later maturational timetable, which can account for some of the early error patterns shown by children (4 above). Two well-known accounts that use this approach are Borer and Wexler's attempt to explain the late use of full eventive passives by English-speaking children and Wexler's Agreement-Tense Omission Model (ATOM). In the first, the authors suggest that children are late with eventive passives because 'argument-linking chains' are a late biological maturation (Wexler, 2002). This theory cannot account for the fact that full passives emerge early in some languages (for instance in Sesotho; Demuth, 1992).

The ATOM model (of which the Optional Infinitive hypothesis for typically developing children and the Extended Optional Infinitive hypothesis for children with SLI are earlier versions; Wexler, 1998) predicts that, because pre-maturation children are subject to 'the unique checking constraint,' they will only be able to check either for tense or for agreement. This constraint is intended to account for patterns of incorrect finiteness marking found in young children's speech across a range of languages. One aspect of this model concerns agreement marking. Because, in the model, children can only check for either tense or agreement, a pattern of errors is predicted that, in English, sometimes results in non-nominative pronouns appearing in subject position (e.g., *me* for *I* errors or *her* for *she* errors). The only error predicted *not* to occur at levels greater than noise is the use of a non-nominative pronoun (e.g., *me, him, her, them*) with a finite verb that agrees with the subject (e.g., *Me am going, Her wants that*), because this would result from both tense and agreement having been checked. However, Pine *et al.* (2005) have shown that if agreement rates are broken down by the specific pronoun, errors with *her* in subject position and an agreeing verb occur too often to be disregarded as noise. One implication of this analysis is that it is important to analyze errors in terms of the particular form, rather than to sum across a category defined by the adult system, because the child's system may not be operating at this level of abstraction.

The other main theoretical approach to children's syntactic development argues that grammatical abstraction emerges from interaction between the input and innate learning mechanisms and that these are *not* restricted to the domain of syntax. Constructivist approaches maintain that children start by learning low-scope constructions based around specific words or morphemes. These constructions become more complex, and abstractions (for instance, of tense, agreement, subject, and transitive) build up. Initially, a child may have no understanding of the internal structure of a construction (e.g., *what's that?*), but uses it as a whole with a specific meaning. As development proceeds, functional distributional analysis based on the relation between a form and (child-identified) functions leads to representations of constructions developing internal structure. Patterns of relationships build up between constructions and their parts, in a process of increasing complexity and schematization (Table 1).

One critical aspect of this theory is that, once a slot develops in a construction, it will be paired with a meaning: thus, a 'noun phrase' slot always denotes a referent. In time, the child will learn to refer in increasingly complex ways; for instance, in English with a range of determiners and adjectives. Constituency thus develops hand in hand with the function of the constituent in the construction and becomes increasingly schematic (Dąbrowska, 2004).

Tomasello (2003) provided the most comprehensive statement of this position to date. He suggested that, rather than having to postulate innate syntactic categories or linking rules, it is possible to account for the development of abstract categories and constructions on the basis of general communicative and cognitive processes, such as intention reading, analogy making, and distributional analysis. The critical aspect of this approach is that utterances have meanings as a whole and that, for children to be able to work out

Table 1 Examples of different types of constructions and their meanings

Form	*Meaning*	*Level of abstraction*
What's that?	Requesting a name	Rote-learned
It's a <Noun>[1]	Naming <referent>	Slot-and-frame
Double object construction: <Noun> <Verb> <Noun> <Noun> *Mary gave John the ball*	Agent-Verb of transfer-Recipient-Transferred Object	Schematic

[1]<> denotes an open slot.

what role a word or inflection is playing in an utterance, they have to know, first, what the whole utterance means and then, in a process that Tomasello calls 'blame assignment,' identify the part of the meaning for which the particular form is responsible. In this approach, abstract constructions develop through analogies based on semantic similarity between the meanings of different item-based constructions; for instance, *A hits B*, *X loves Y*, *C pushes D* may give rise to the transitive construction and its syntactic roles.

Tomasello's (1992) 'verb island hypothesis' was an early example of such an approach. He claimed that children initially build up constructions around individual verbs, rather than having more general and abstract categories, such as subject, direct object, and transitive verb, from the beginning. Thus, a child who knows the verb *hit* may have a slot before the verb for the 'hitter' and one after for the 'hittee' without having the abstract representation of a transitive construction. A wide range of production experiments that test English-speaking children's ability to use novel verbs in transitive constructions supports this claim (see Tomasello, 2003). Although most children aged just over 2 years old are already using verbs they know in some two-argument constructions, the ability to demonstrate this knowledge with a verb they have never heard before develops between the ages of 2 and 3 and can be affected strongly by the experimental method employed.

The verb island hypothesis has been challenged by studies using the preferential looking paradigm. They suggest that children can discriminate between a transitive utterance that matches a scene they are looking at and one in which the argument roles are reversed at younger ages than those shown for success in production experiments. Some researchers have suggested that this indicates that children are innately equipped either with a notion of subject or with rules that link the notion of agent to subject. However, it seems difficult to argue for an innate notion of subject, because subject is not a universally identical category across languages (Croft, 2001).

Other researchers, less contentiously, suggest that children are already sensitive to the number of arguments in an utterance and their relationship to a causative scene with two actors and that this allows them to make the preferential-looking discrimination (see the debate involving Fisher and Abbot-Smith and Tomasello in *Cognition*, following Tomasello's (2000) article). Because children are sensitive pre-verbally to causation and many already know how to name people and objects by the time they take part in preferential-looking studies, this finding seems plausible – particularly because there seems to be a correlation between the child's vocabulary level and success in these tasks.

Children's avoidance of using ungrammatical transitives and intransitives in production experiments also suggests earlier sensitivity to some aspects of verb argument structure. In addition, experiments show that English-speaking children manage to use the transitive construction with a novel verb somewhat earlier when case-marked pronouns, rather than nouns, are used as arguments. It may be that languages, such as German, with relatively clear case-marking of argument roles, also assist children in schematizing these roles somewhat earlier. Pine *et al.* (1998) have argued for patterns building up not only around verbs but also around other high-frequency markers, such as *I + Verb* or *Verb + it*. Thus, the child, as well as building up a 'transitive verb' category, would, at the same time, be learning that *I* and other frequent referents in first position can be in a range of semantic roles in relation to the verb. Childers and Tomasello found supporting evidence for this suggestion (see Tomasello, 2003). Thus, more recent constructivist accounts suggest that the abstract transitive construction builds up from a number of different sources: pre-verbal knowledge of causality, the ability to match arguments in an utterance to referents in the environment, the development of other lexically specific constructions around pronouns, and high-frequency items. The combination of these factors may result in the child being able to perform correctly in some tasks using less fully specified representations than would be required for others (e.g., using a novel verb that has never been heard before in a transitive construction).

From a constructivist perspective, there is initially no necessary relation in the child's system between one construction and another; for instance, between a declarative and a *wh*-question that would be related in the adult system as would be maintained in any analysis based on one or other generativist theory of island constraints (e.g., movement, gaps or checking). However, such relationships do develop. This can be seen from children's increasing conversational flexibility as they question previously mentioned constituents, manipulate topic and focus, and, in English, expand contracted auxiliaries, insert DO-support when rephrasing a previous utterance, and so on. Many experimental studies also show that children become increasingly able to hear a nonce form in one construction (for instance, an active) and to transform it into another (a passive). For linguistic nativists, this should be a relatively automatic outcome of children's abstract linguistic representations.

However, within constructivist approaches, these relations are seen as being learned. This learning

occurs in part through the identification of the same meaning-based categories in different constructions and in part through relating the overall meanings of constructions to each other. For instance, the simple active statement, *I want a banana,* communicates something different from the cleft: *It's a banana I want*. Children's over-generalizations of constructions are explained relatively easily within this framework: For instance, when a child says *Don't giggle me* (meaning *Don't make me giggle*), she has analogized *giggle* as having causative meaning and therefore placed it into a causative transitive construction. There are, however, considerable problems both for linguistic nativists and construction-based accounts in explaining how children cut back from such over-generalizations (Bowerman, 1996; Tomasello, 2003).

Later Syntactic Development

As children's language develops, major changes occur at both clausal and sentential levels. Noun phrases and verb phrases increase in complexity: for instance, although English-speaking children use *a* and *the* early on, it may take many years before they can operate with more complex determiners and their scope (*some*, *every,* and *each*). Likewise, children may be able to use some auxiliaries (e.g., *I'm X-ing*, *Can I Y?*) and verb complement structures (e.g., *I want to play out*) from early on, but the full development of complex verb phrases takes considerable time. At the sentential level, although English-speaking children produce many questions between the ages of 2 and 3, initially most of these are with contracted copulas (*What's that?*, *Where's X?*) or contracted auxiliaries (*What's Mummy X-ing?*, *Where's Y gone?*). Some questions with subject-auxiliary inversion (*Can I X?*, *Are you Y-ing?*) also start appearing during this period, but it is not until approaching age 3 and older that children start to show considerable flexibility in the range of subjects, auxiliaries, and *wh*-words that they can use in inverted *yes/no*- and *wh*- questions. Clause coordination and subordination (e.g., complement structures, causatives, relative clauses) also develop over a considerable time period – both when these structures start to appear and when they increase in internal complexity.

In principle, it is rather difficult for linguistic nativist theories to explain this slow and somewhat patchy development of complex syntax and the accompanying errors that children make. Once the lexical forms are learned, why should children make uninversion errors (*Where she is going?*) or find some embedded relatives easier than others? Linguistic nativist explanations of children's later syntactic development all start from the claim that children could not learn the abstract basis of these constructions because the constituents involved could not be abstracted from a surface analysis of the input. Errors are accounted for in two ways: (1) they arise from the particularities of the language being learned and not from the absence of the abstract representations of Universal Grammar; or (2) children have full competence and errors arise from faulty methodologies (see O'Grady, 1997, for a detailed coverage of explanations from within a broadly UG framework). In constructivist accounts, complex constructions, such as *wh*-questions or relative clauses, begin as item-based or with simpler structures that then build toward greater complexity and schematicity (Tomasello, 2003).

Uninversion errors in English-speaking children's *wh*-questions have given rise to several different linguistic nativist accounts. For example, de Villiers has proposed that questioning arguments is easier than questioning adjuncts. An alternative account, related to the particularities of English (Santelmann *et al.,* 2002), suggested that the errors in children's inversion are explained by the fact that only main verb BE can invert (unlike in German where all main verbs can invert in questions) and DO-support is also unique. Recent constructivist accounts have explained inversion errors in terms of the relative frequency of *wh* + auxiliary combinations in the input. Thus, Rowland and Pine (2000) suggested that children are learning correct inversion from high-frequency combinations of a *wh*-word plus a specific form of the auxiliary and that uninversion errors occur when they have not yet learned the correct combination and produce a 'groping pattern' by putting together a known *wh*-word and a known declarative.

However, the overriding argument, from the linguistic nativist position, against the possibility of learning syntax is that children can deal with complex constructions that could not have been learned from the input. An example is extraction from embedded clauses in *wh*-questions: *Who do you think John likes?* In UG accounts (see, for instance, Crain and Thornton, 1998; Drozd, 2004), children operate with abstract formalisms that relate the object of the embedded clause first to the object of *you think* and from there to the position at the front of the sentence. These formalisms could not, it is argued, be learned from the sequential probabilities of strings on the surface of the input; in addition, the structures are rare to nonexistent in the input and therefore could not be learned as a whole. Whether this latter point is the case awaits much denser sampling of the input, but it should be noted that this type of extraction is not possible in German and that a much wider range of extraction occurs in Italian. This considerable cross-linguistic variation therefore requires, in UG

terms, a complex parametric account and, from the point of view of the language learner, close attention to the particularities of the language.

From a constructivist point of view, children solve these tasks by building up their knowledge of constituency and using already established form-meaning mappings to identify potential constituents in novel constructions. Thus, although children may not have had previous experience with the type of sentence in the Crain and Thornton experiments, they will already know constructions that identify the matrix *wh*-clause as a constituent asking for an act of reference, thus allowing them to attempt to identify the referent of the embedded relative. For instance, English-speaking children's early relative clauses tend not to be restricted (i.e., adding more information about a referent: *The cow that the dog bit ran away*), but presentational (i.e., introducing a topic: *That's the cow that goes there*). Presentational relatives do not involve embedding one clause within another; the main clause is usually a copula (one of the earliest constructions that English-speaking children learn), and the relative clause is not presupposed information but contains the new information to be conveyed. Diessel and Tomasello suggested that all these factors make these constructions easier to produce and also make them the basis for the development of more complex relative clause structures. Diessel (2003) has similar accounts for the development of a number of other constructions in English-speaking children's development. The idea that already existing constituents can be used to work out the meaning of a novel construction is supported by a modeling study (Morris *et al.,* 2000) in which a connectionist network was shown to generalize correctly to previously unlearned constructions on the basis of having learned a variety of simpler constructions.

Developing Pragmatic and Metalinguistic Skills

Children are immersed in communicative interaction with others from infancy, but there are many aspects that take years to develop. Coordinating reference across speaker and listener roles involves manipulating and understanding given and new information, deictic and anaphoric pronouns, temporal information, and so on. In most of the cultures studied, these skills develop initially in conversations with others, and children's attempts to narrate sequences of events start to develop slightly later. Both conversation and narrative require the ability to ground utterances and to refer to referents in ways that require complex cognitive, communicative, and linguistic skills. Children also have to learn to adjust their speech to the genre of the task (conversation, personal narrative, reporting, arguing) and to fit the social context in which they are communicating (for instance, levels of politeness and formality; Slobin *et al.,* 1996).

Conversation

Early conversations with young children typically show a great deal of scaffolding. Thus, background and setting and the identification of referents are provided by the child's interlocutor. Around the age of 2, children are more fluent participants when the conversation is highly 'scripted' around routine activities and when they can join in a multiparty conversation at moments that they choose. Between the ages of 2.6 to 3.0, the first, more subtle, discourse particles start to be used (for instance, in English, *now* and *just*), but their range and presence continue developing up to and beyond the school years. Topic continuity in terms of responding to questions and maintaining the topic over a number of turns also improves radically between the ages of 2 and 4. Clarification requests by children and children's responses to them show clear development as well: Children respond to clarification requests with more nuanced answers as they get older, and they also make more of them, though even at the age of 7, children in a referential communication task do not make clarification requests either as much or in as focused a way as is required by the task (Lloyd, 1991, cited in Tomasello, 2003). Children's rhetorical skills develop throughout the school years, with the ability to bring arguments to bear, to return to a conversational topic, and to introduce new topics in an appropriate way all taking many years to perfect.

Narrative

Children's early narratives tend to be a set of short utterances with no attempt at cohesion among them. For a child to be able to narrate an event to another who was not present requires taking into account the hearer's lack of knowledge of the timing of the event, its sequence, and the participants. This is a complex task in itself, and children also have to learn to coordinate sequences of utterances to keep track of referents and events such that, for instance, already referred-to participants are referred to in one way, and novel ones in another. Two major summaries of studies that have looked at the development of these skills within and across cultures and languages are Berman and Slobin (1994) and Hickmann (2003).

Once children start being able to produce some coordination between utterances in a narrative, they often use very repetitive devices: for instance, maintaining reference to the same referent as thematic

subject throughout the story (e.g., using *He* at the beginning of every utterance) or using *and then* at the beginning of every utterance to coordinate the action. Clearly, the development of narrative abilities is based on the development of a range of skills: Children must be able to take into account the perspective of the listener in terms of what the listener does and does not know. They must also know the linguistic devices of the language that coordinate clauses within utterances (e.g., temporal sequencing, subordination) and across utterances (e.g., the use of pronouns for anaphoric reference), and they must know how their language encodes perspectives; for instance, in English, manner of motion tends to be encoded in the verb, whereas in Spanish it tends to be encoded in adverbials.

Metalinguistic Skills

Children gradually become able to consciously reflect on language, to correct their own and others' utterances, and to notice features of language at all levels: Rhyming relationships, the explanation of metaphors and idioms, and grammaticality judgments. Karmiloff-Smith (1994) has incorporated language development and metalinguistic awareness into her general theory of the development of cognitive skills. In this approach, the early period of language learning is concerned with skill automatization: children have to learn the forms of the language and to use them relatively effortlessly. Once language becomes relatively fluent and automatic, it can become an object of reflection.

Karmiloff-Smith also discussed children's increasing awareness of the plurifunctionality of forms. She sees metacognition as going through several stages in which initially awareness is implicit and only later, as a result of 'representational redescription,' does it become available to conscious reflection.

For many children, the process of moving to conscious awareness of the forms of language and how they fit together is almost certainly aided by learning to read and write (Ravid and Tolchinsky, 2002). Miller and Weinert (1998) give a detailed cross-linguistic account of the ways in which oral and written language vary and the implications of this variation for theories of linguistic competence. For instance, they argue that many of the structures that linguists are concerned with can only be found in written texts and thus that children only learn them during the school years. Competence is, therefore, still developing, rather than being either innate or language development being 'all over by 3.0.' How rapidly these skills develop and how far children get with them are related to the complexity of the language that they hear at home and at school and to levels of literacy (Hart & Risley, 1995; Huttenlocher *et al.*, 2002).

Clearly, literacy cannot be the only way in which speakers become aware of language as an object of reflection. Pre-literate children already show some metacognitive awareness of aspects of language as indicated by Karmiloff-Smith; for instance, they can sometimes correct ungrammatical utterances in naturalistic and experimental situations. There must be many aspects of oral interactions that also afford this ability; for instance, argumentation, speech making, traditions of oral narrative, and the learning of complex ritual language are all likely to be media through which speakers and listeners come to be able to reflect on linguistic structure and its meaning. The important point is that these genres may contain much more complex language than children are likely to learn early on. Thus, language competence, often in the structures in which linguists are most interested, continues to develop over many years.

Atypical Development

Some children grow up in situations that are radically different from those in which typically developing children learn an oral language. The study of these children's atypical development often throws light on the processes involved in language learning and their inter-relationships, though caution should be exercised because one has to see the child and his or her situation as a whole. It is therefore impossible to treat these cases as controlled experiments in which only one variable is changed.

First, from the study of children who grow up from birth in a home where the language used is one of the sign languages of the world, it is clear that these children go through the normal stages of language development on the same timetable as children learning oral languages. Sign languages differ from oral languages not only in the obvious dimension of the medium but also, as a result, in the degree of simultaneity of signs and in the ways in which the face and hands are used grammatically and suprasegmentally. Thus, comparisons between the ways in which children learn the morphology, syntax, and pragmatics of oral and sign language can be extremely illuminating.

There are two groups of children whose nontypical development has been of particular interest to the study of language development: children whose language seems relatively poor by comparison with their nonverbal cognitive levels (children with SLI) and children with Williams's syndrome, whose language seems relatively advanced compared to their very low level of nonverbal cognitive development. Researchers coming from a more linguistic nativist background have claimed that these two syndromes

are evidence for an innate basis to grammatical development (compromised in SLI, preserved in Williams's syndrome) that is separate from more general cognitive development. In the case of SLI, the issue is the nature of the biological compromise. Most children with SLI have a range of problems with language, some of which may be more typical earlier and some later. Articulatory and phonological problems, together with delayed inflectional marking, are typical early problems that often resolve, leaving apparent grammar-only problems later on. There is certainly no agreement in the field that the pattern of impairment in SLI children indicates the presence of an innate module for syntax (Leonard, 1998), though some have made claims to this effect (Rice and Wexler, 1996).

In the case of Williams's syndrome, it is clear that these children also suffer from a wide range of problems with language and that none of them ever reach the language levels of age-matched, typically developing controls. Karmiloff-Smith *et al.* (2003) emphasized a developmental model for these children that suggests that, although language development is atypical from the outset, the problems that children demonstrate change with development and depend on the strategies for producing language that they have developed at earlier stages in the absence of the processes available to typically developing children. Here, too, then, there seems no clear evidence for a specific innate module for syntax.

Learnability and Constituency

The field of language acquisition has been dominated until recently by the so-called learnability issue; namely, that children cannot learn correct syntax from only positive evidence (the so-called poverty of the stimulus argument). Chomsky's various versions of a postulated innate Universal Grammar were attempts to provide these constraints, and the various nativist proposals outlined above aimed to show how these constraints explain different aspects of language development.

Several solutions have been proposed, all of which involve changing the premises of the learnability problem in one way or the other, usually to make the generation of sentences in the language probabilistic, rather than all or nothing (see MacWhinney, 2004 and commentaries). Although the leap from the higher reaches of statistical theory to the details of children's language development is rather large, this solution actually accords quite well both with constructivist approaches to language learning that emphasize the learning of the distributional probabilities in the input and to various attempts to model computationally how distributional probabilities might lead to phrasal learning (Elman *et al.*, 1997). Despite not incorporating any model of semantics, these attempts have been quite successful at detecting distributional regularities in the target language that could form one basis for the establishment of categories and of syntagmatic learning (however, see Chang, 2002).

However, language learning must go beyond the mere learning of immediately sequential probabilities between words. Simply calculating the transitional probability between one word and the next will ignore constituency and produce ungrammatical sentences. This was the basis for Chomsky's 1957 attack on the behaviorist theory of language development. Sentences involve constituents; the subject noun phrase, however long it is, agrees with the main verb, regardless of how many subordinate clauses occur in between; the relationship between an inverted question and its declarative version involves the relationship between the *wh*-word and the whole questioned constituent, independent of the length of the constituent or what occurs between it and the main verb. Thus in *The boy wearing a green hat who I saw yesterday in the park is very nice*, the subject NP (*The boy*) must agree with the main verb (*is*). The relationship between *Is the boy who is wearing a green hat nice?* and *The boy who is wearing a green hat is nice* is that the first *Is* in the question parallels the second *is* in the declarative; otherwise, we would have *Is the boy who wearing a green hat is nice?*

From a constructivist point of view, the crucial extra ingredient is that children are intention readers and meaning makers and that they learn about constituency by building up increasingly complex paradigmatic slots that connect form to meaning. Thus, a child who has heard and used literally hundreds of thousands of copula sentences of the form – *The boy's nice*; *The bus is red; They're the ones I want; They are really really good*; *The ones over there are the ones I want*; *The boy wearing a green hat is nice* – will know that *the boy wearing a green hat* refers to a particular object or person. This learned structural knowledge of constituency is then used to parse and produce the more complex embedded structures (see Lewis and Elman, 2001, for an attempt to model the learning of distance dependencies and constituency).

Conclusion

Humans have developed language and it has a biological basis. Yet, precisely what this basis is (or, more likely, bases are) still needs a great deal of precise specification. For instance, localization of language in the brains of adults is much more determined

than it is in children: Children who have early damage to the areas of the brain that subsume language in adults can learn language to normal levels and will have language represented in other parts of the brain as adults. Thus, it seems that language modularity, and the relative independence of syntax and semantics that characterizes the results of some experiments with adults, may be an outcome of development, rather than being pre-given. Chomsky's insistence on a separation between syntax and meaning, as well as the claim that syntax is essentially unlearnable and therefore that there must be an innate module for grammar, has ultimately had a negative impact on the scientific study of how children learn to talk. However, many of the issues raised by researchers working within this tradition, especially with regard to the development of more complex syntax, present challenges that have not yet been met fully by those who suggest that, whatever else is innate, syntax is learned through the application of general cognitive skills to the communicative tasks set for children by those around them.

Both positions face a number of challenges. In both, there is a need for greater specification of the processes involved so that proposals can be tested empirically. The challenge to linguistic nativists is to specify in advance the postulated performance limitations and late maturing processes precisely enough so that, rather than invoking them on an *ad hoc* basis to deal with counter-evidence, they can be used to make falsifiable predictions. In addition, these accounts often lack any notion of development: how does what a child is doing at one stage affect what happens next? Finally, because there are input effects at all levels of language acquisition, such theories tend to under-theorize the role of the input, not just in the quantity required by the child but also in the ways in which its precise characteristics are reflected in the child's system and how this interacts with any hypothesized innate knowledge.

The challenge to constructivists is to specify more precisely the ways in which the cognitive and communicative development of the child and the distributional information in the input interact to generate the patterns of learning and of errors and to test this with a wider range of languages and a wider range of input densities and conditions. There is a long way to go, even in the study of English language learning, to say nothing of other languages, in specifying the precise ways in which children expand their inventory of constructions and how they become increasingly schematic.

Children are creative communicators from the start. The question is the basis of this creativity, its scope, and how it develops.

See also: Bilingual Language Development: Early Years; Brown, Roger William (b. 1925); Bruner, Jerome (b. 1916); CHILDES Database; Chomsky, Noam (b. 1928); Cognitive Linguistics; Constituent Structure; Corpus Linguistics; Developmental Relationship between Language and Cognition; Discourse, Narrative and Pragmatic Development; Formal Models and Language Acquisition; Human Language Processing: Connectionist Models; Infancy: Sensitivity to Linguistic Form; Innate Knowledge; Langacker, Ronald (b. 1942); Language Acquisition Research Methods; Language Development in Blind Children; Language Development in Deaf Children with Hearing Parents; Language Development in School-Age Children, Adolescents, and Adults; Language Development: Morphology; Long-Distance Dependencies; Meaning: Development; Modularity of Mind and Language; Oral Traditions and Spoken Discourse; Phonological Awareness and Literacy; Pragmatics: Optimality Theory; Principles and Parameters Framework of Generative Grammar; Productivity; Quine, Willard van Orman (1908–2000); Relative Clauses; Sign Language: Acquisition; Slobin, Dan Isaac (b. 1939); Social-Cognitive Basis of Language Development; Specific Language Impairment; Syntactic Development; Syntax-Pragmatics Interface: Overview; Variation in First Language Acquisition; Williams Syndrome.

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Language Development: Pre-scientific Studies

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The scientific study of language development may be characterized as involving collection of dated observations linked to general development; the systematic study of such collections by means of type and token counts, tabulation, and so forth; and the development of explanatory accounts grounded in such collections. By the beginning of the 20th century, this sort of apparatus was well established, and works in book form such as Major (1906) and Stern and Stern (1907) presented what are undeniably scientific treatments. However, the foundation of the journal *Pedagogical Seminary* by G. Stanley Hall at Clark University in 1891 provides a more accurate boundary mark: from its foundation onward, the journal featured systematic accounts of aspects of language development.

Early Studies

Reported empirical investigation of language development can probably be dated from the Mughal Akbar the Great's isolation experiment (c. 1578) in which a large number of children were isolated at birth in his palace at Fatehpur Sikri for a period of four years and cared for by unspeaking nurses. According to the three contemporary reports of this experiment, the children did not speak, but may have vocalized. The most explicit account is given in the *Akbarnama*, a life of Akbar prepared by his minister, Sheikh Abu'l Fazl, in the form of an exquisitely illuminated manuscript. Three such manuscripts were produced in the royal workshops. One is located in the Victoria & Albert Museum in London; a second is split between the Chester Beatty Library, Dublin and the British Library; the third is dispersed, with many folios held privately. For printed versions, see Blochmann (1877–86) and Beveridge (1902–1939), who reports the outcome as: "No cry came from that house of silence, nor was any speech heard there. In spite of their four years they had no part of the talisman of speech, and nothing came out except the noise of the dumb." Similar experiments are said to have been carried out at earlier times by the Egyptian Pharaoh Psamtik I in the 7th century B.C., by Emperor Frederick II of Sicily in the 13th century, and by King James IV of Scotland in the late 15th century. However, there are good reasons to doubt the authenticity of all three. For reviews of these early experiments, see Tylor (1878: 79–81), Campbell and Grieve (1982), and Bonvillian *et al.* (1997). It is perhaps remarkable that the first attempt to study language

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development should be by means of an experiment (and of course the earlier stories also envisaged experiments), because experimentation appears fairly late in 20th century work. Akbar's experiment may be faulted, because no control group was used. Presumably, it was assumed (perhaps correctly) that a group of newborn children cared for by speaking nurses in a closed house would have spoken in such a manner as to be intelligible to Akbar's court at age four. Akbar's experiment is sufficiently interesting to merit closer examination. There is surely some scope for new insights from the three original versions of the *Akbarnama*, Blochmann's Persian text, and Beveridge's translation.

The 18th Century

The 18th century was a period of strong interest in the nature of language and in its origins. Speculation on these matters abounded among scholars because of the perceived intimate connection with the true nature of Man, and with the distinction between Man and other animals. The best-known discussions are perhaps those of Charles de Brosses (1765), James Burnett [Lord Monboddo](1773–92), Carl Linnaeus, Jean-Jacques Rousseau, and Georges-Louis LeClerc [Comte de Buffon]. Buffon's *Histoire Naturelle* was a huge project that stretched through the second half of the century. Tome 1, of 15 volumes, included his *Natural History of Man and the Animals* and was first published by the Imprimerie Royale in 1749; for accessible English versions, see Barr (1792), Kenrick (1775–76) and Smellie (1781). There is, however, very little in these various works that is grounded in actual observations of children speaking or constrained by other empirical evidence. Buffon's account of infancy (*The Natural History of Man*, *Section II*) is a notable exception and deserves to be better known. His account is filled with acute observations and shrewd opinions regarding development in the first year, and concludes with a synopsis of early language development. To give the flavor, "At twelve or fifteen months infants begin to lisp. *A* is the vowel which they articulate with most ease, as it requires nothing more than the opening of the lips, and forcing out the breath. *E* requires that the tongue should be raised, as the lips are opened, and is therefore pronounced with a degree or more trouble. *I* is attended with greater difficulty, as in the articulation of this vowel the tongue is elevated still more, and made to approach the teeth of the upper jaw. In the pronunciation of *O* the tongue must be lowered." Buffon proceeds to a least effort theory of the first articulated sounds and words, "in every language *Baba*, *Mama*, *Papa* should be the primitive articulations," anticipating the well-known proposals of Jakobson (1960) by 200 years. A subsequent section uses observations about sound substitution by children to propose a theory of consonant universals and a process of consonant differentiation, once again anticipating some of Jakobson's proposals regarding distinctive features.

A different sort of empirical enquiry was the investigation of the language abilities of apes (then very much a curiosity), and of 'wild' children. The best-known and best-reported cases were those of Marie-Angelique Memmie LeBlanc, found in 1731 near Chalons-sur-Marne, and of Victor, discovered in 1797 near Lacaune (Tarn) and eventually securely held in 1800 near Aveyron. In Mlle. Leblanc's case, the original reports were published in *Mercure de France*, (December 1731, 2983–91), and these suggested that she was speechless and about 10 years old. An account of her life, now thought to have been written by Charles-Marie de La Condamine, appeared as Hecquet (1755), with a later English version by James Burnett (1768), but a more convenient source is Tinland (1970). Mlle. Leblanc appears to have made good progress in learning language and to have been successfully socialized. The story of Victor, and the unsuccessful attempts of Jean-Marc Gaspard Itard to 'civilize' him, is well-known from many recent discussions and versions of Itard's reports. Both cases were the subject of much inconsequential contemporary debate. Tinland (2003) and Douthwaite (2002) provide useful reviews. There is much to be said for the opinion of Bory de Saint-Vincent (1822–31; cited by Tinland): "The discovery (of these savages) first causes a great stir in the newspapers, [but] they end up dying forgotten in some insane asylum. The study of this sort of cripple cannot throw the least light on the primitive state of our species; it is not by means of these exceptions that one must study Man." However, Mlle. LeBlanc is an awkward case for those who believe in a critical period for acquisition.

Finally, Tiedemann (1787) is perhaps the first diary study of development. Versions are available in French and English (Perez, 1881; Tiedemann, 1890; Murchison and Langer, 1927), but the original is hard to locate. It contains a few unsystematic observations relating to language development.

The 19th Century

Interest in developing a scientific approach to psychology gathered pace in the first half of the century, but it was not until the 1870s that scholars in Europe began to make tentative attempts to come to grips with language development. The philosophical journal *Mind* carried short descriptive accounts by Darwin

(1877), Taine (1877), and Pollock (1878). These can be conveniently found, along with Murchison and Langer (1927) and Sully (1881), in Gardner and Gardner (1975). In 1878, the French psychologist Bernard Perez produced the first general text dealing with development and including a long chapter on language development. Perez's text went through numerous revisions, and these were translated into English by Alice M. Christie beginning in 1885. New material was gathered into the language chapter (and old material discarded) between editions. For example, the second edition made considerable use of Egger (1879) and de La Calle (1881), but by the 5th edition of 1890, these sources had been replaced. Perez was shortly followed by the more impressive text of William Preyer in 1882. The second volume of Preyer's text was largely devoted to language development. Like Perez's text, Preyer's was frequently revised and translated, and both stimulated and incorporated new material between revisions, for example, Kussmaul (1874) and the extraordinary investigations of the astronomer Holden (1887). Preyer is unkind to Perez, dismissing him as one who could write that "the glance [is associated with] the magnetic effluvia of the will." However, the two texts were equally influential in stimulating new work and followed similar paths of development. Finally, although James Sully's *Studies in Childhood* lies beyond our boundary of 1891, the language chapters were based on earlier articles by Sully (1881, 1884).

See also: Burnett, James, Monboddo, Lord (1714–1799); Jakobson, Roman (1896–1982); Origin of Language Debate; Psycholinguistics: History; Rousseau, Jean-Jacques (1712–1778).

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http://www.jstor.org – Scanned-to-image versions of Darwin (1877), Holden (1877), Taine (1877) and Pollock (1878) are available here.

Language Disorders: 19th Century Studies

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Background

The study of aphasia in the 19th century forms an essential step in our understanding of the various kinds of language pathology. However, the implications for other scientific discussions going on at that time were probably even more important. The Austrian physician and anatomist Franz Joseph Gall (1757–1828) started a discussion on 'localization of mental faculties' around the beginning of the 19th century, which lasted the entire century. Classical (medieval) models localized mental functions (roughly characterized as sensation, imagination (interpretation), and memory) in three cells or ventricles. A popular 18th century view (but dating back to classical Greek views) called 'physiognomy' held that psychological characteristics can be inferred from facial features, the shape of the head in general, and the body. Gall opposed these views and argued that (1) the material substance of the brain, in particular, the cortex, forms the basis of mental functions (instead of the cavities inside), and that (2) each mental faculty has its own seat, a circumscribed area on the cortex. Gall's view of the mind, craniology, later phrenology, seems inspired by the faculty psychology of Thomas Reid rather than the classical ventricular classification of faculties or the physiognomic framework of characters. These were revolutionary claims, both for the religious and secular authorities, but also for investigators of the nervous system. Gall's views became very popular in high-society circles, and eventually the middle class as well, due particularly to the efforts of Gall's assistant, Johann Caspar Spurzheim (1776–1832), and the various phrenological societies. This lasted until 1861, when the principle of localization of function became acceptable in scientific circles. The study of the effects of lesions to various parts of the brain on language behavior produced important empirical evidence for and against this localization principle. Aphasiologists were highly aware of this additional feature of their work.

A related but separate issue forms the development of 'connectionistic models.' Before the 19th century, mental functions had been studied mostly by philosophers. It had been argued by Descartes and De la Mettrie in the 17th century that the brain could be regarded as a machine. This mechanistic approach led to the development of 'process models' of language production and comprehension in the second half of the 19th century. These models distinguished various centers representing sounds, words, or concepts, for instance, and 'pathways' of nerve fibers. A process model thus described an author's view on how a word was transformed into a (meaningful) linguistic representation and subsequently into speech or writing. Once this approach of analyzing language disorders in relation to brain lesions became fashionable, aphasiologists discussed the nature of the units and the various connections. A center was connected to one or more others, and a lesion in either a center or a pathway would result in the loss of a particular function or of the transmitting of outputs of a center.

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Language Disorders: 19th Century Studies

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Background

The study of aphasia in the 19th century forms an essential step in our understanding of the various kinds of language pathology. However, the implications for other scientific discussions going on at that time were probably even more important. The Austrian physician and anatomist Franz Joseph Gall (1757–1828) started a discussion on 'localization of mental faculties' around the beginning of the 19th century, which lasted the entire century. Classical (medieval) models localized mental functions (roughly characterized as sensation, imagination (interpretation), and memory) in three cells or ventricles. A popular 18th century view (but dating back to classical Greek views) called 'physiognomy' held that psychological characteristics can be inferred from facial features, the shape of the head in general, and the body. Gall opposed these views and argued that (1) the material substance of the brain, in particular, the cortex, forms the basis of mental functions (instead of the cavities inside), and that (2) each mental faculty has its own seat, a circumscribed area on the cortex. Gall's view of the mind, craniology, later phrenology, seems inspired by the faculty psychology of Thomas Reid rather than the classical ventricular classification of faculties or the physiognomic framework of characters. These were revolutionary claims, both for the religious and secular authorities, but also for investigators of the nervous system. Gall's views became very popular in high-society circles, and eventually the middle class as well, due particularly to the efforts of Gall's assistant, Johann Caspar Spurzheim (1776–1832), and the various phrenological societies. This lasted until 1861, when the principle of localization of function became acceptable in scientific circles. The study of the effects of lesions to various parts of the brain on language behavior produced important empirical evidence for and against this localization principle. Aphasiologists were highly aware of this additional feature of their work.

A related but separate issue forms the development of 'connectionistic models.' Before the 19th century, mental functions had been studied mostly by philosophers. It had been argued by Descartes and De la Mettrie in the 17th century that the brain could be regarded as a machine. This mechanistic approach led to the development of 'process models' of language production and comprehension in the second half of the 19th century. These models distinguished various centers representing sounds, words, or concepts, for instance, and 'pathways' of nerve fibers. A process model thus described an author's view on how a word was transformed into a (meaningful) linguistic representation and subsequently into speech or writing. Once this approach of analyzing language disorders in relation to brain lesions became fashionable, aphasiologists discussed the nature of the units and the various connections. A center was connected to one or more others, and a lesion in either a center or a pathway would result in the loss of a particular function or of the transmitting of outputs of a center.

The notion of 'connectionistic models' derives from this general way of thinking and is highly confusing to those familiar with current dynamic systems approaches, which are also sometimes referred to as 'connectionistic' (Caplan, 1987).

Localization of Speech

Many articles on language pathology up to 1865 discussed the validity of the localization principle. Jean Baptiste Bouillaud (1796–1881) had collected a large set of data on patients with speech problems. He claimed that in the majority of cases the lesion was localized in the 'anterior' part of the brain. This was in agreement with Gall's system: Gall localized the language faculty, verbal memory, right behind the eye sockets. At that time, the distinction between anterior and posterior was as precise as one could be; up to that time, the cortex had been considered irrelevant and no further description and division was required of the seemingly randomly patterned gyri and sulci. Bouillaud's repeated attempts from the 1820s to the 1850s remained unconvincing to the medical and scientific establishment.

A discussion on localization flared up in the newly founded Anthropological Society in Paris, whose members were mostly physicians. Its secretary was Pierre Paul Broca (1824–1880). In 1861 he claimed that one of his patients, who had suffered from a severe speech problem (all he could utter was the syllable 'Tan') had a lesion in the anterior part of the brain. Twenty days later, Tan died and Broca showed his brain to his colleagues, pointing out that a lesion in the anterior part of the brain leads to 'aphemia,' a disturbance in the articulation of words. Trousseau suggested using the term 'aphasia' in 1864. The case of Tan apparently was convincing; the notion that mental faculties are somehow seated in the cortex was quickly accepted by many physicians. Yet John Hughlings-Jackson (1835–1911) warned that to localize a symptom (e.g., aphasia) is not the same as to localize a function. Being educated in a completely different philosophical tradition, associationism, he could not accept the idea that a language function, in Broca's case, the articulation of speech, could be localized in a circumscribed cortical area.

Localization of Language Comprehension

One of the first clear descriptions of language comprehension problems due to a brain disorder can be found in Jacques Lordat's (1773–1870) description in 1843 of his own aphasia. Until then, language comprehension problems were usually ascribed to the deterioration of general intellect. The French physician Francois Baillarger (1809–1890) described in 1865 a woman with aphasia who had been regarded as deaf and insane, but it was soon demonstrated that neither deafness nor insanity could explain the comprehension problems. Heavily influenced by the Austrian neuroanatomist Theodor Meynert (1833–1892), Carl Wernicke (1848–1905) wrote a dissertation in 1874 claiming that speech perception is localized in a posterior part of the brain, the temporal lobe, in an area now known as Wernicke's area. Moreover, he claimed that the site for language could be conceived of as consisting of two centers that were connected to each other – one for perception and one for speech production. Lesions in either one of these centers or in the connecting pathways would result in different patterns of language pathology.

Diagrams

To illustrate his theory, Wernicke produced a drawing of a cerebral hemisphere with two circles that represented the centers for word perception and word production. The centers had connections to each other and to the cranial nerves in the brain stem. A similar 'diagram' had been proposed by Adolf Baginsky (1843–1915) in 1871 in a somewhat neglected paper. A crucial difference between these two theories was Baginsky's assumption that there was a center for concepts independent from that for (auditory or visual) word forms; Wernicke explicitly denied this and argued that the brain registers only sound and visual images. Wernicke's scheme was elaborated by Ludwig Lichtheim (1885) and is still being used today. In England, Henry Charlton Bastian had developed a similar diagram, and in France, Jean Martin Charcot developed the famous 'clock diagram.'

The general idea of representing language as a set of interconnected circles became very popular and produced lots of 'diagram makers,' as Henry Head called them in his famous monograph. Essentially, this discussion only partly dealt with **where** specific mental faculties are represented. Rather, the nature of a 'function' itself was at stake. For instance, is it necessary to presuppose that apart from a center for words (that is, for word forms), there is also a center for meaning? Adolf Kussmaul's discussion of these models in 1877 is an excellent example of how these process models could explain aphasic behavior in a functional way.

Localization of Reading and Writing

Assuming the existence of various language centers, William Ogle was one of the first to argue that apart from speech problems, brain lesions can result in

distinctive problems in writing: agraphia. In one form, patients can write, but they make errors – the order of letters is disturbed, or nonexisting words are produced. In another form, writing is no longer possible. Aphasiologists working with diagrams also examined the reading of isolated words and often noted reading problems in their patients. They often assumed a separate center for the recognition of visual words – that is, for reading. Joseph Jules Dejerine (1849–1917) contributed to our understanding of reading and writing disorders in the presence of brain lesions. In 1887, Dejerine distinguished four language centers, including a center for reading (localized in the angular gyrus) and one for writing (localized at the foot of the second frontal gyrus). He later subscribed to the claims of Wernicke and Lichtheim that deficits in writing are due to problems with 'inner speech.' In 1882, Dejerine argued that there are two forms of reading disorders: one accompanied by writing deficits and another that is a pure form of word blindness in which the patient indeed can write correctly but cannot read what he has written.

Cerebral Dominance

The discussion on localization of function concentrated on specific parts of the cerebral hemispheres that presumably subserved a specific mental function. It took several decades to convince the scientific community of the validity of this principle, but once this step was taken, it was evidently no problem to accept another principle of localization, namely, that of hemisphere asymmetry. After Broca had shown the brain of Tan to the Anthropological Society, he began to collect additional cases. These not only seemed to confirm his claims, but also pointed to a rather surprising conclusion. It appeared that only the left hemisphere was involved in speech production, at least in most individuals. From a physiological point of view, this was hard to believe: form and function go together and since the two hemispheres look similar, they should serve the same functions, like other paired organs. Yet when Broca introduced the principle of hemisphere asymmetry in 1865, it was little disputed. On the contrary, it was immediately related to hand preference, and the two phenomena were regarded as signs of 'cerebral dominance,' the notion that one hemisphere – usually the left – develops quicker and therefore becomes the dominant one.

A Linguistic Approach

The physicians quarreled among themselves about the number and nature of the language centers, but they practically always assumed that the basic language unit was the word, a noun or a verb. Ferdinand Finkelnburg was an exception, claiming in 1870 that the core problem is an 'asymbolia,' the incapacity to deal with symbols of any kind. Nobody worried about grammar until Heymann Steinthal (1871) decided to apply his views on linguistic theory to language disorders. Linguistics at that time was basically comparative linguistics: looking for the derivation of current words from older languages. Steinthal pleaded for a different approach, one we would refer to as 'psycholinguistics.' He argued that language is a means to express an idea, usually in the form of a sentence. The idea or message is 'unpacked' by psychological processes, delivering a linguistic structure, which calls for words, words with specific focus (morphology), and these are then produced as sounds. Now one could assume a number of disorders at different stages in this process of 'unpacking' resulting in disorders that are not modality-specific (input–output, auditory–visual) but are related to levels of representation: message, sentence, word, sound level. When Steinthal and his friend, the psychologist Lazarus, finally got their audience with the physicians in the Berlin academic hospital, the latter indicated that the psychologists had no idea what aphasia actually means, and they should better start visiting the clinics to become acquainted with it. Unfortunately, Steinthal's psycholinguistic approach was never taken seriously until late in the 20th century.

John Hughlings Jackson also claimed that the basic unit is not a simple word but 'the proposition.' A significant observation, but one not transformed in a testable view; at least, few physicians picked up the idea and applied it to their studies of language pathology. Unfortunately, 19th century aphasiologists remained much more interested in issues of localization than in the psycholinguistic principles underlying language behavior and language disorders.

See also: Aphasia Syndromes; Associationism and Connectionism.

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Language Disorders: 20th-Century Studies, Pre-1980

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From Localization to a Holistic Approach

The 'classical' approach, stimulated by the works of Wernicke (1874) and Lichtheim (1885), aimed at the localization of specific language centers in cortical areas: modality-dependent word input and output centers, without (Wernicke) or with (Lichtheim) a special center for (abstract) concepts. Some of Wernicke's pupils adhered to this model. Karl Kleist (1870–1962) summarized his studies of a large number of soldiers with penetrating brain wounds in his *Gehirnpathologie* in 1934. He believed that it was possible to make a precise localization of the cortical regions underlying diverse language functions. Probably the most extreme attempts to localize language function were performed by Samuel Henschen (1847–1930). In France, Jules Joseph Dejerine (1849–1917) was the most influential localizationist in the beginning of the 20th century.

At that time, opposition arose towards a simplistic, mechanistic view of language based on associations between sensory and motor representations of words. Hughlings Jackson (1835–1911) at first had been enthusiastic about Broca's claims concerning the localization of the mechanism to articulate speech. However, he soon realized that Broca's views on language differed from his own. For instance, Jackson could not accept the notion of circumscribed centers. Moreover, he believed the proposition to be the core linguistic unit that was affected, not individual words.

Pierre Marie (1853–1940), originally educated in the diagram tradition, started the 'revolution' in 1906 in France by claiming that Broca's area, the third frontal gyrus, plays no role whatsoever in language. The claim was based on contradictory evidence: patients with lesions in Broca's area and no aphasia, and patients with Broca's aphasia due to a lesion in another part of the brain. Marie argued that aphasia is the result of a lesion in the temporal lobe producing an intellectual impairment, a reduction of all knowledge and competence acquired didactically; there is only one form of aphasia, which can vary in severity. Broca's aphasia is merely aphasia with an added articulatory disorder. In 1908, the 'clash,' an extensive debate between the localizationists (headed by Dejerine), and the antilocalizationists (headed by Marie), ended in a draw.

The Swiss neurologist Constantin von Monakow (1853–1930) also rejected the notion of centers in the brain. He used the term 'language fields' instead. He also regarded the area surrounding the Sylvian fissure as important for language, but there are no strict borders: more distant areas can interact with these language areas. He convinced many of the inadequacy of a strict localization view by comparing the localization of language issue to the question of where the melody is localized in a music box.

Henry Head (1891–1940) was a great admirer of Jackson; in his book titled *Aphasia and kindred disorders of speech*, published in 1926, he severely criticized the 'diagram makers,' a nickname that proved to be very effective in disqualifying the entire localizationist approach. Like Marie, Head believed that essentially aphasia is a disorder in the formation and expression of linguistic and nonlinguistic symbols. He explicitly extended the disorder to other cognitive deficits such as problems in arithmetic. Head clinically distinguished four types of aphasic disorders: at the verbal level (word form), nominal level (meaning of

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word or sentence), syntactic level, and semantic problems, in particular nonliteral meanings of words or expressions and of intentions.

Adherents of a holistic approach not only rejected the notion of circumscribed centers, but they also stressed that language was much more than words associated to images. Meaning, in the most extended way (connecting language to attitudes, feelings, intentions, and motives), was more fundamental to them. The most famous 'holist' was probably the German neuropsychiatrist Kurt Goldstein (1989–1965). One of the last pupils of Wernicke, he became director of the Institute for Research on the After-Effects of Brain Injury in Frankfurt, a rehabilitation center for soldiers of World War I. He moved to the United States in 1935. Goldstein rejected Wernicke's view of acoustic and motor images as the basis of words as not sufficiently psychological. Language is about meaning. We are conscious of meanings, not of acoustic images, he argued. Interestingly, Goldstein, like Head, based his views on Jackson's. According to Goldstein, the loss of the 'abstract attitude' is the essential deficit in aphasia. In the 'concrete attitude,' environmental stimulation determines our thinking and actions. However, when we abstain from environmentally determined behavior, we act according to an abstract attitude. In this sense, the abstract attitude may be compared to Head's symbolic behavior; it is much wider than language in the usual meaning of the word.

Grammar and Aphasia

Within the associationistic (Wundtian) approach to language and the brain, the word was the central unit, at least for most aphasiologists. In the 'Würzburger School' (O. Külpe, K. Bühler), a different view of language processing was developed in which the whole sentence became the central unit. At the beginning of the 20th century, aphasiologists also noted that some patients had problems, not just with speech production or perception, but with speaking correctly, a phenomenon labeled 'agrammatism.'

Arnold Pick (1851–1924) claimed that agrammatism arises due to a lesion in the left temporal lobe that affects speech production processes rather than higher cognitive processes. Karl Bonhoeffer (1868–1948) regarded agrammatic speech as a consequence of a lesion in Broca's speech center that resulted in laborious speech. Karl Heilbronner (1869–1914), on the other hand, argued that agrammatism is an independent phenomenon. In addition, he claimed that severe agrammatic speech can occur in patients who do not show any deficit in comprehension and that agrammatism is a grammar problem that is only present language production, not perception. In his famous chapter, *Die agrammatischen Sprachstörungen*' (1913), Pick formulated an elaborate model of sentence production, distinguishing between a syntactic representation (*Satzschema*, sentence scheme) and word forms that are inserted in the sentence scheme. Pick noticed that in agrammatic speech the phrases that are produced are essentially intact. Therefore, what is produced is not the normal sentence but an adapted version, *Notsprache* (emergency speech), which requires less effort. Sentences are shorter and syntactically less specified. Max Isserlin (1879–1941) defended a similar position.

Kleist in 1914 introduced the notion of 'paragrammatism,' which he regarded as a different type of grammatical problem, one of word order. In his view, agrammatism is a kind of simplification of the word order in which subordinate clauses do not occur. In paragrammatism, the capacity to produce certain syntactic constructions is not lost, but the production of phrases is often interrupted or may be combined with alternative expressions.

This discussion on agrammatism was started again in the 1970s with arguments that were not too different: modality specificity, economy of speech, and deficit vs. adaptation.

Clinical Approach

Single case studies usually formed the basis of research by most aphasiologists in the first part of the 20th century. The American neurologist Theodore Weisenburg (1875–1934) and the psychologist Katharine McBride tried to solve the question of dissociation of aphasic phenomena in a 'clinical way.' They developed a large test battery and published data from large numbers of patients in their work, *Aphasia: a clinical and psychological study* (1935). To establish which errors or what level of errors is normal, they also examined healthy controls. The classification of aphasic syndromes 'emerging' from the results was as follows: primarily motoric, primarily sensory, sensory-motor, and amnestic aphasia (word-finding problems in speech production). This shift from the single case to group studies announced another debate that also dominated the neurolinguistic discussion in the final quarter of the century. Joseph Wepman (b. 1907), professor in psychology, and Hildred Schuell (b. 1907), a clinical speech pathologist, worked independently of each other in this clinical tradition and developed rehabilitation programs for aphasic patients. They also favored the holistic approach rather than the speech centers approach. Wepman developed the Language Modalities Test for Aphasia (1959), while Schuell

introduced the Minnesota Test for the Differential Diagnosis of Aphasia (1966). An important and somewhat surprising finding coming out of these group studies was that language representation in left-handers is not a mirror image of that in right-handers.

From Aphasia to Neurolinguistics

The American neurologist Norman Geschwind (1926–1984) read much of Wernicke's works during his medical training, which helped stimulate him to found the Boston University Aphasia Research Center in the early 1960s. His plea for the reintroduction of the 'disconnection approach' as a means for the study of the relation between language (functions) and the brain (centers) had a strong impact on the development of the interest in neuropsychology, in general, and aphasia, in particular. Many famous neurolinguists came to Boston for training under the supervision of Harold Goodglass (1920–2002). This renewed interest in the neuropsychology of language soon led to a shift of focus from the word (in Geschwind's approach) to the sentence level. Goodglass, and to a larger extent Alfonso Caramazza and Edgar Zurif, triggered this movement in the 1970s when they tried to translate the insights of the American linguist Noam Chomsky (b. 1928), who had dominated the linguistics scene since 1965 with his universal transformational grammar theory, to aphasic language performance. In his dissertation (1969), Harry Whitaker explicitly applied transformational grammar to the study of aphasia cases. Aphasia research finally became the interdisciplinary study it should be, combining linguistic (representation), psychological (processes), and neurological (anatomical and physiological mechanisms) models. This is expressed in the new label for aphasiology: neurolinguistics, a term widely used by the Russian neuropsychologist Alexander Luria and the French neurologist Henri Hécaen in the 1960s.

Roman Jacobson (1896–1982) had already introduced a neurolinguistic analysis of aphasic speech in the 1940s. He was Russian in origin, but from 1941 he worked as a linguist in America. He was interested in the sound structure (phonology) of languages, particularly Russian. He analyzed its evolution in children's speech and compared the changes he observed there to speech errors in aphasia. He argued that there are two fundamental dimensions along which aphasic speech can be classified: disorders of 'similarity' (replacements or selection errors) and disorders of 'contiguity,' temporal ordering problems. His work had little impact originally, but was later rediscovered and applied primarily to phonological analysis (such as that of his student Sheila Blumstein) of speech errors.

Epilepsy and Language

Neurosurgery developed significantly in the 20th century and offered important new options for treatment of patients with severe forms of epilepsy, including removal of brain tissue in which the epileptic focus was localized. To prevent interference with language processes, neurosurgeons ascertained whether the affected areas were involved in language. To that end, they applied electrical stimulation to the exposed cortex and asked patients to perform a short series of language tasks (e.g., naming, counting, sentence-picture matching). The American neurologist Wilder Penfield (1891–1976), who was trained in Germany by Otfried Foerster and worked in Montreal, Canada, described (with his collaborator, Lamar Roberts) the results of their long-lasting research in a monograph, *Speech mechanisms and the brain*, (1959). Among other things, they noted that not just the classical (Broca and Wernicke) areas, but a wider area appeared associated with language functions, including the supplementary motor area. Stimulation sometimes produced positive effects (e.g., vocalizations), and sometimes it interfered with ongoing language processes. George Ojemann followed up on this line of research and showed that stimulation of subcortical areas also affected language. The Penfield and Roberts data also indicated that language was localized in the left hemisphere in approximately 70% of the left-handers. This puzzling relationship between handedness and side of language representation was also found in studies using the WADA-technique, a procedure introduced by Juhn Wada (b. 1924) in 1949 in Japan and later applied as a diagnostic procedure in epilepsy neurosurgery when Wada collaborated with Penfield in Montreal.

Neurolinguistic Publications

The renewed interest in aphasiology in the 1960s attracted the attention of students of various disciplines. The tremendous scientific activity in this area is reflected in the sharp increase in numbers of papers, books, journals, conferences, and societies devoted to neurolinguistics. For example, the major (annual) conference devoted to aphasia, the Academy of Apahasia, was founded in 1962. Another conference, BABBLE (Body for the Advancement of Brain Behavior and Language Enterprises), started in 1976. The journal *Brain and Language* was founded by Harry Whitaker in 1974, and he was also the co-editor (with H. A. Whitaker) of a book series, *Studies in*

neurolinguistics (1976–1979). Another series of edited books on neurolinguistics started in 1973. As in the 19th century, rapid developments in the area of aphasia triggered similar developments in the study of other cognitive disorders following brain disorders.

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Language Education and Gender

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Research in language and gender as a subfield in sociolinguistics has accelerated during the last several decades largely due to the critical work and writings of feminist sociologists, anthropologists, sociolinguists, and post-structuralists (e.g., Lakoff, 1975; Philips *et al*., 1987; Coates, 1993), much in the same way as Simone de Beauvoir's seminal work *The second sex*, released in 1953, galvanized contemporary feminist movement. Emerging naturally from the interest in language and gender have been inquiries that collectively cohere around a critical analysis of the interface between language, education, and gender, which is the subject of this review.

Different from its classificatory or grammatical meaning, gender is examined here in terms of a social construct that society arbitrarily ascribes to men and women, based on their perceived roles in society. Such a framework recognizes that while the biological state of 'femaleness' and 'maleness' is, recent claims to the contrary notwithstanding (see Bergvall *et al*., 1996), stable and universal, understandings of gender are in a constant state of flux, temporal, depend on the prevailing social order, and mediate the construction of the gendered self, which in turn, shapes individual identity (Bjerrum Nielsen and Davies, 1997; Egbo, 2004).

While it is not clear how it happens, given the polemic among sex-role development theorists, researchers agree that cross-culturally, by the time children begin their formal schooling, they have developed an emotional attachment to their gender, and already act, speak, and behave according to conventional images of gender – behaviors and discourse norms that are further reified in schools (Spender, 1982; Bjerrum Nielsen and Davies, 1997).

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Language Education – Vocabulary

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What Vocabulary?

There are numerous vocabulary counting programs that change texts into frequency lists of vocabulary and show how much text is covered by frequency-ranked lists. What these counts show is that a relatively small number of words account for a very large proportion of text. The 270 function word types (176 word families), such as *one, a, the, because, in, must*, cover about 44% of the running words (tokens) found in most texts. These function words, however, make up a small proportion of the frequent words of English. Among the highly ranked items are words such as *time*, *say*, *day*. The most frequent 2000 words of English, which include most of the function words, are the essential widely used words of the language. They are important no matter what use is made of the language, and they cover a large proportion of spoken and written text. They also represent a feasible learning goal for an English course of 800 to 1000 hours.

For learners with academic purposes such as study through the medium of English in senior high school or university, the next important vocabulary learning goal is academic vocabulary. The best researched list of these words is the Academic Word List (Coxhead, 2000), which consists of 570 word families arranged into ten sublists with sublist 1 containing the most frequent widest-range items. There are well-researched tests available (Schmitt *et al.*, 2001; Nation, 2001) called the Vocabulary Levels Tests, which can be used to quickly determine which level of vocabulary learners need to focus on. The main distinction to be made when interpreting the results of the test is between the high frequency words (the first 2000 words and the Academic Word List) and the low frequency words (3000 level onward).

How Should Words Be Dealt With?

The high frequency/low frequency distinction is an important one when planning a vocabulary program. This is because from a teaching perspective these two groups of words should be dealt with in different ways. The 2000 or 2570 high frequency words deserve classroom time. This is because of their high frequency and wide occurrence. This classroom time can involve direct teaching of these words, doing activities designed to teach and practice these words, and deliberate learning of these words. Low frequency words on the other hand do not deserve classroom time. This is because there are so many of them and because of their low frequency of occurrence. When learners know the high frequency words, they need to begin learning low frequency words. However, the teacher should not be spending valuable classroom time teaching those low frequency words. Instead, the teacher should spend time teaching the four most useful strategies for dealing with these words, namely the strategies of guessing words from context clues, deliberate learning using word cards, helping memory by using word part analysis, and dictionary use.

The opportunities for teaching and learning high frequency vocabulary can be divided into four strands. The meaning-focused input strand involves opportunities for learning through listening and reading where learners are already familiar with 95–98% of the running words in the listening and reading input. The meaning-focused output strand involves opportunities for learning through speaking and writing. The language-focused learning strand involves giving deliberate attention to vocabulary learning through activities such as intensive reading, using word cards, preteaching of vocabulary before doing communicative activities, and the deliberate learning of vocabulary strategies. The fourth strand is the fluency development strand where learners do not learn new vocabulary but practice making the best use of words

they already know. Each of these four strands deserves roughly equal time, and most of the remainder of this description of the role of vocabulary in language education will focus on how each of these strands can be put into practice.

Learning Vocabulary Through Listening

The conditions needed for the meaning-focused input strand are that learners should be focused on understanding what they are listening to or reading, they should already know at least 95% of the words and phrases in the input, and thus there is a small number of unfamiliar language features that can be understood through context clues. This means that at each level of a learner's language-proficiency development there needs to be material at an appropriate language level. Thus, it is essential to use specially written or simplified material where the vocabulary level is controlled in a planned way. An enormous amount of such material already exists in English, largely in the form of graded readers. Some of these can be used for listening activities in much the same way as a story is presented in weekly or daily installments on the radio. Another important source of listening input is the teacher's classroom instructions and interaction with learners. If these are carried out using high frequency vocabulary, then they become an important opportunity for vocabulary learning.

Most graded readers are fiction, and in addition to these, it is important to have nonfiction text as input. A useful activity that suits nonfiction material and that can help vocabulary learning is information transfer (Palmer, 1982). In such activities, listening input is changed into a diagrammatic or semi-diagrammatic form such as a labeled flow diagram or a completed information table. For example, the teacher describes the journey taken by a group of people and learners mark the route on a map. Similarly, while listening to a physical description of say a flowering plant, the learners complete a four-part table by filling in the names of the parts of the plant, where the parts are located, what they are like, and what job they do.

Another important source of vocabulary learning through meaning-focused input is through conversational interaction, and this will be looked at when we look at vocabulary learning through speaking.

Learning Vocabulary Through Reading

A well-designed, well-managed extensive reading program is an effective way of building vocabulary knowledge. It is important to realize that there are various kinds of vocabulary learning going on in extensive reading, representing different strengths of knowledge. An experiment by Waring and Takaki (2003) used three different kinds of vocabulary tests for each of the target words in a graded reader – (1) a recognition test (Which of these words occurred in the text?), (2) a multiple-choice test of word meaning, and (3) a translation test. The most difficult test, the translation test, showed small amounts of learning, but the other two tests showed increasingly larger amounts of learning. Thus, extensive reading provides opportunities for various degrees of learning for different words.

A good extensive reading program has the following features (Nation and Wang, 1999). It provides plenty of interesting material where each learner can read already knowing about 98% of the running words in the text. It encourages learners to read at least one book every two weeks. It encourages learners to read at least three books at the same level before moving up to the next level. It encourages learners to deliberately learn most of the general purpose unknown vocabulary that is met in the texts. It provides opportunities for learners to talk and write about their reading, being careful not to let reporting activities have the effect of reducing the amount of time spent reading. Extensive reading programs have many beneficial effects in addition to increasing vocabulary knowledge (Elley, 1991).

Deliberate Vocabulary Learning

All research comparing deliberate, decontextualized vocabulary learning with vocabulary learning from context has found that given the same amount of time, deliberate learning always results in more learning. This, however, should not be seen as an argument against learning from context but as part of the argument in favor of having deliberate learning as a component of a well-balanced course. In this part of a course, learners should study vocabulary using word cards (small cards with the target word or phrase on one side and its first language translation on the back). Although initially this kind of learning can be done in class time, it is best if it is done largely out of class when the learners have a few minutes of free time such as when traveling on the subway, waiting for a bus, or during TV commercials. Research provides useful guidelines for such learning.

1. Use small cards, not notebooks. Using cards allows the word or phrase to be put on one side and the translation on the other, which allows retrieval to occur, that is, looking at the word and then attempting to retrieve its translation from memory. Seeing both words together does

not allow the possibility of retrieval. Using cards also allows the order of the words to be easily changed to avoid serial learning.

2. Increasingly space the repetitions. That is, go through the pack of cards once and then do something else for five or ten minutes then go through the pack again. Then wait for half an hour before going through them again. Then wait two or three hours, and so on.
3. Use memory techniques such as the keyword technique (Nation, 2001: 311–314), word part analysis, study of etymologies, and visualization with the words that are difficult to remember. Skillful use of a dictionary to find a word's frequency of occurrence, to work out the core meaning of the word, and to see its range of senses, typical uses, and various forms also helps learning.
4. Make sure that the words in a pack do not have closely related meanings, that is, that there are not pairs of opposites or synonyms, or members of a lexical set such as articles of clothing, fruit, days of the week, or numbers. Learning such related items together makes learning 50% to 100% more difficult (Nation, 2000).
5. Say the words or phrases to yourself when looking at the cards and get help with the pronunciation of difficult words. Pronounceability is a major factor affecting vocabulary learning.
6. It is good to use translations of words when learning their meanings. The first language translation is a simple, clear way of communicating the meaning of a word, and research has shown such translations to be effective. As learners' proficiency develops, they will gain more accurate and elaborated representations of meaning.

Deliberate learning should become the responsibility of each learner, but learners may need encouragement and training in applying the guidelines.

Deliberate Vocabulary Teaching

The most obvious place for direct vocabulary teaching is as part of intensive reading. Intensive reading involves the teacher and the learners working carefully through a short text looking at a range of language features and content issues relevant to the text. From a vocabulary perspective, dealing with unknown words in intensive reading can involve preteaching some words before reading the text, quickly giving the meaning of some words, ignoring some, spending a lot of time on others, using the text as an opportunity to give training in the strategies of guessing from context, word-part analysis, and dictionary use, and altering the text to get rid of some low frequency words. The decision about which of these things to do for a particular word should depend on whether it is a high frequency word or a low frequency word, its importance for the message of the text, and the nature of the word itself and its context in the text. For example, preteaching should be done with high frequency words that are important for the message of the text, and that are not easily guessed from context. Low frequency words do not deserve this kind of attention in teaching. Altering the text should be a way of getting rid of low frequency words that are not important for the message of the text.

A small amount of deliberate teaching can occur in listening activities, and this has been shown to have a positive effect on vocabulary learning (Elley, 1989). Feedback on learners' spoken and written output is yet another opportunity for deliberate vocabulary teaching.

Deliberate vocabulary teaching also includes training learners in the use of the vocabulary strategies of guessing from context, learning from word cards, word part analysis, and dictionary use. These strategies require a repeated investment of time over several months so that learners reach the stage where it is easier to use the strategy than not to use it. For the guessing strategy, this can involve focusing one by one on the types of clues that are available from the immediate context and the wider context, having learners work with the teacher, then in pairs, and finally alone, and working with time pressure to develop fluency in using the guessing strategy. These strategies deserve a lot of classroom time because they can be used to cope with thousands of low frequency words

Learning Vocabulary Through Speaking

The meaning-focused output strand of a course involves learning vocabulary through speaking and writing. One of the most powerful factors affecting vocabulary learning through speaking is negotiation of meaning. Negotiation occurs when learners deliberately explain language items as a result of a breakdown in communication. The likelihood of negotiated words being learned is high, but negotiation still only accounts for a small proportion of the words learned through spoken communication activities. Most vocabulary learning in such activities occurs through guessing from context.

The way speaking tasks are designed can have a major influence on what and how much vocabulary is learned through such tasks. Vocabulary learning is helped if the written input to the task contains the target vocabulary, if performing the task requires the

use of that vocabulary, if there are repeated opportunities in the task for the vocabulary to be used, and if the task requires the learners to use the vocabulary in at least a slightly different way from the one in which it occurred in the written input to the task. It is not difficult to design speaking tasks that meet these requirements.

Learning Vocabulary Through Writing

Communication through the Internet has increased the opportunities for learning vocabulary through writing. There is evidence that written Internet discussion can include negotiation of vocabulary.

Productive information-transfer activities where learners turn diagrammatic representations such as graphs, plans and maps, and lists into connected written text provide good opportunities for vocabulary learning. The same design features described for speaking also apply in the design of writing tasks. Other writing activities that make use of written input such as synthesizing information from several texts can also be important sources of vocabulary learning.

In general, useful writing activities will involve the use of written or spoken input in getting information to write about.

Feedback on written work may also be an effective way of expanding vocabulary knowledge and collocational knowledge (which words go with which words). This feedback can be directed toward vocabulary choice and collocations.

Fluency Development

The fourth strand of a course is its fluency development strand. The vocabulary goal of this strand is to help learners make the best use of the vocabulary that they already know. Activities that fit within this strand do not aim to teach new words but aim to strengthen and enrich knowledge of words that are already partially known. Fluency activities have the following characteristics. They involve no unknown vocabulary, grammatical features, or discourse features. There is pressure or encouragement during the activity to perform at a faster than typical speed. The activities are message focused in that the learners aim to produce or comprehend messages, and, finally, they involve a large quantity of language use. Fluency activities are needed in each of the skills of listening, speaking, reading, and writing.

At the word or phrase level, fluency activities can focus on numbers, time sequences (yesterday, tomorrow, last week), greetings, and any set that needs to be used without a great deal of thought. In such activities, the teacher says words or phrases quickly while the learners point to what is being said. Such activities can also be done productively with the teacher pointing at pictures or symbols and the learners having to quickly produce the appropriate phrase. Other more advanced fluency activities include the 4/3/2 activity (giving the same talk in a decreasing timeframe to a new listener), speed reading, and ten-minute writing where learners write each day for ten minutes concentrating on quantity of writing rather than on quality.

Monitoring and Encouraging Progress

The learning of any individual word needs to be seen as a cumulative process with both strength of knowledge and richness of knowledge of each word growing with repeated receptive and productive encounters with a word. Because there are many aspects to learning a word and many degrees of strength of knowledge, there is a wide variety of vocabulary measures available, and each one needs to be seen as a means of providing at least a slightly different view of learners' vocabulary knowledge (Read, 2000). The choice of a vocabulary test item needs to be based on a careful consideration of what kind of knowledge needs to be measured. Factors to consider when choosing a particular test format include, (1) the kind of knowledge that needs to be tested, (2) the likely strength of the knowledge (using a demanding test to test knowledge that is likely to be partial or weak will not provide a useful measure), (3) the time available and the number of items that there should be in the test, and (4) the language proficiency and test-making skills of the test makers and test markers. To reach an adequate degree of reliability, most vocabulary tests need to have at least 30 items.

Well-researched vocabulary measures include a variety of vocabulary-richness measures which look at the range of vocabulary used in a piece of writing (Malvern *et al.,* 2004), interview measures that explore knowledge of the meanings of words and their use (Nagy *et al.,* 1985; Wesche and Paribakht, 1996), multiple-choice depth measures which look at collocations and meaning components (Read, 1998), and multiple-choice, matching, and translation items which focus on word meanings.

Vocabulary testing can have a variety of goals. Because vocabulary knowledge is such a fundamental part of language proficiency, vocabulary tests have often been used for wider goals.

1. Placement in a language program. Measures such as the Vocabulary Levels Test (Schmitt *et al.,*

2001), the Eurocentres 10KA (Meara and Jones, 1990), and the vocabulary levels dictation test (Fountain and Nation, 2000) have often been used as part of a wider battery of tests to assign learners to the appropriate proficiency level group in an intensive English program.
2. Diagnosis of vocabulary strengths and weaknesses. The Vocabulary Levels Test was designed to see what levels of vocabulary learners already knew and to indicate the next level to focus on in teaching and learning.
3. Encouragement of learning. Some programs use weekly vocabulary tests to encourage learners to do deliberate vocabulary learning. These tests can involve each learner giving the teacher a list of ten of the new words they have been working on, and then the teacher writes a symbol next to each word indicating what the learner has to do with each word in the test. For example, S can mean write a sentence containing that word, C can mean write two collocations for the word, M can mean explain the meaning of the word, and so on (Smith, 1996).
4. Monitoring progress. Vocabulary tests that are focused on the learning done in a course (achievement tests) may be used to measure progress through the course.
5. Measuring proficiency. Measures of total vocabulary size, and measures of particular vocabulary levels such as the Academic Word List, may be used to see where learners are in their vocabulary growth.

Encouraging Autonomy

Like most learning, vocabulary learning will be most effective if learners take control of and responsibility for their learning. This involves knowing what to learn, knowing how to learn it, and being motivated to do this learning and to put it to use.

This is not easy to achieve, and the few studies on vocabulary in this area indicate that most learners do not take an organized approach to their learning (Moir and Nation, 2002). One way of encouraging autonomy is to introduce a negotiated syllabus where the teacher and learners share the decision making about the various aspects of the course on a continuing basis. These aspects may include what vocabulary to learn, what vocabulary activities to do in class and how much time to spend on them, what vocabulary tests to use, and what homework to set. The goals of a negotiated syllabus are to make the course as sensitive as possible to the changing needs of the learners and to get the learners to feel ownership of the course.

Principles of Vocabulary Learning and Teaching

The vocabulary component of a language course will be more effective if it is based on well-supported principles that are clearly known by both teachers and learners. A short list of such principles should include the following.

1. The sequence of vocabulary learning should move from high frequency vocabulary and special purposes vocabulary to low frequency vocabulary.
2. High frequency vocabulary and special purposes vocabulary should get attention across the four, roughly equal, strands of teaching and learning vocabulary: meaning-focused input, meaning-focused output, language-focused learning, and fluency development.
3. With low frequency vocabulary, teachers should focus on the strategies of guessing from context, learning word cards, using word parts, and using the dictionary.
4. Learning activities should be designed to encourage thoughtful processing of vocabulary through retrieval, generative use, and the use of mnemonic devices where needed.
5. Learners should be helped to take responsibility for their own vocabulary learning.

Vocabulary growth is a critical aspect of second language proficiency development, and as such it needs to be properly supported by a principled, well-thought-out component in a language course.

See also: Corpus Studies: Second Language; Lexical Acquisition; Second and Foreign Language Learning and Teaching; Second Language Listening; Second Language Reading; Second Language Speaking; Second Language Writing; Vocabulary: Second Language.

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Language Families and Linguistic Diversity

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Linguistic Diversity

'Linguistic diversity' refers to several interrelated phenomena:

1. phylogenetic (genetic, genealogical) diversity: the number of language families in a geographic area;
2. intrafamilial and intralinguistic variation: differences among the languages of a family and among the variants of a language;
3. language density: the number of languages in a geographic area;
4. typological diversity: differences among the structures which make up languages.

The focus of this article is on (1), (2) and (3) (*see also* **Variation and Language: Overview**). More conventional approaches to these topics are discussed first, then a recent alternative.

Although (4) will not be discussed further here, the relationship between phylogenetic and typological diversity should be mentioned. It is quite common for the members of a language family to be typologically similar, but there is no necessary reason why they should be so. There is, for example, considerable typological variety among the grammars of the Austronesian family, some of it the result of contact with non-Austronesian languages, but much of it the outcome of language-internal changes. Conversely, languages belonging to different language families may be typologically quite similar, either as the result of contact or as the result of independent parallel innovation.

Language Families

Definitions and Problems

A language family is conventionally defined as a set of languages that share a common ancestor. The family metaphor captures two insights: that languages are systems that are transmitted from one generation to the next (generational continuity) and that these systems change over time so that when a community of speakers divides into, say, three separate communities, the speech of each of the three will change in different ways from the others, leading eventually to mutual unintelligibility, i.e., three languages descended from a shared ancestor. The basis of the metaphor is biological evolution, where one species divides into two or more new species (McMahon, 1994: Chap. 12), even though linguists often use the term 'family tree,' which otherwise denotes trees drawn to represent human family relationships.

Identifying a language family in the first place depends on finding individual-identifying evidence (Nichols, 1996, 1997), patterned similarities between a set of languages that could not have arisen by chance and must be the outcome of shared inheritance. The Indo-European family, for example, was first definitively identified by Sir William Jones in 1786 on the basis of similarities between the verb paradigms of Sanskrit, Greek, and Latin. Recently, the Trans-New

neurolinguistics (1976–1979). Another series of edited books on neurolinguistics started in 1973. As in the 19th century, rapid developments in the area of aphasia triggered similar developments in the study of other cognitive disorders following brain disorders.

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Language Education and Gender

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Research in language and gender as a subfield in sociolinguistics has accelerated during the last several decades largely due to the critical work and writings of feminist sociologists, anthropologists, sociolinguists, and post-structuralists (e.g., Lakoff, 1975; Philips *et al*., 1987; Coates, 1993), much in the same way as Simone de Beauvoir's seminal work *The second sex*, released in 1953, galvanized contemporary feminist movement. Emerging naturally from the interest in language and gender have been inquiries that collectively cohere around a critical analysis of the interface between language, education, and gender, which is the subject of this review.

Different from its classificatory or grammatical meaning, gender is examined here in terms of a social construct that society arbitrarily ascribes to men and women, based on their perceived roles in society. Such a framework recognizes that while the biological state of 'femaleness' and 'maleness' is, recent claims to the contrary notwithstanding (see Bergvall *et al*., 1996), stable and universal, understandings of gender are in a constant state of flux, temporal, depend on the prevailing social order, and mediate the construction of the gendered self, which in turn, shapes individual identity (Bjerrum Nielsen and Davies, 1997; Egbo, 2004).

While it is not clear how it happens, given the polemic among sex-role development theorists, researchers agree that cross-culturally, by the time children begin their formal schooling, they have developed an emotional attachment to their gender, and already act, speak, and behave according to conventional images of gender – behaviors and discourse norms that are further reified in schools (Spender, 1982; Bjerrum Nielsen and Davies, 1997).

Across all educational spectrums, language as a complex technology of communication serves two diametrically opposing functions in addition to, of course, its functional uses in teaching and learning. First, it enhances linguistic and communicative competence in a Habermian sense (see Habermas, 2001), through formal and informal discursive interchange among the various actors. Second, it serves a gatekeeping function *vis à vis* the safeguarding of the privileged and highly valued cultural and linguistic capital of powerful groups in society, such as men, which enables them to preserve their dominance. Pierre Bourdieu's (1991) sociological account of the ways through which educational systems reproduce the differential power relations that exist in wider society is at once a critique of educational practices and a recognition of language as a symbolic tool for domination. However, a third and emergent view, which perhaps evolved from the postulates of critical theory and is gaining recognition among feminists and critical pedagogists, sees a more dialectical and transformative role for language in education than its hegemonizing power. There is now a widely held view among proponents of critical language practices that if schools' discourse norms contribute to the maintenance of the gender order in society, the same discursive practices also hold emancipatory possibilities which through critical interrogation and agency should, as the argument goes, lead to consequential change in wider society (Corson, 1993; Blackmore and Kenway, 1995).

Recurrent Debates about Language, Education, and Gender

In this section, I examine three recurrent themes in the ongoing debate on language, education, and gender. It should be noted from the onset that while these three strands of the debate are considered separately here for conceptual clarity, the distinctions are less discrete in practice.

Three Strands of the Debate

Beginning in the mid-1960s, one major research focus in the area of language, education, and gender, has been challenging the orthodoxy of the taken-for-granted canonical knowledge that is disseminated in schools including language practices and discourse norms. The evidence assembled from early research in the field suggested that androcentric biases in wider society had been transplanted into the classroom (Spender, 1982; Kelly, 1988; Stanworth, 1987, for example) despite the simultaneous collapse of gender differentiation in education and the emergence of the equal rights movement in the 1950s (Bjerrum Nielsen and Davies, 1997). The school curriculum reflected male world views including male linguistic register, while women's discourse norms were devalued, despite the evidence (although inconclusive in some areas) that have pointed to gender-distinctive language use and linguistic practices (Lakoff, 1975; Philips *et al.*, 1987; Tannen, 1991; McCormick, 1994). This was true of Western societies as it was true of non-Western colonial and post-colonial societies (Egbo, 2004). Also problematic was the issue of gender representations in educational texts (including narratives, drama, poetry, etc.).

The 1970s marked a turning point, however. Post-structural feminists' challenges to the prevailing orthodoxy, their engagement of dominant texts which aimed at unmasking the trajectories between knowledge and power on the one hand and discourses as sites of human struggle on the other, resulted in policies and practices that were aimed at leveling the 'discursive' field. The language of education and the classroom in particular took a seemingly inclusive turn – a metamorphosis that also shifted to some degree the language of texts and textbooks, which became less stereotyped, paternalistic, more nuanced and neutral. Far from settling the matter, however, some writers have argued that the linguistic neutrality that now pervades educational texts simply masks the continued dominance of male discourse norms under the "cloak of egalitarian educational discourse" (Bjerrum Nielsen and Davies, 1997: 126).

In contrast to the views outlined above, some researchers have expressed reservations about uncritical claims of gender bias in texts because cognitively and affectively speaking, individual engagement with text is a subjective experience (Sunderland, 2000; Swann, 2003), albeit not to the point of disinheriting one's cultural capital in the process (Balfour, 2003). With particular reference to language education, Sunderland argues compellingly that it is difficult to prove gender bias in language texts because one cannot accurately predict a reader's reaction to the text.

A second research focus has been the nature of classroom discourse and teacher-student talk. The bulk of the research on this issue converges around the following issues: pedagogical practices and classroom discourse norms tend to silence girls, teachers call on boys more often than girls, boys talk more often and initiate dialogue with teachers who act as enablers: the overwhelming majority of classroom talk is either directed at or dominated by boys (Spender, 1982; Stanworth, 1987; Graddol and Swann, 1989). With regard to classroom talk, the nexus of the various arguments is that boys'

dominance and assertiveness are extensions of the unequal power relations and exclusionary language practices in wider society in which women are positioned as the "other," while men are accorded "autonomous and varied linguistic status" (Thorne *et al.*, 1983: 9).

A third issue of interest has been the nature of gender-based teacher-student interactions. A number of classroom observations have catalogued ways in which teachers interact differentially with each gender. Boys appear to have more interactions with teachers, are called upon more often, and generally have more contact time with teachers. Teachers are also said to be more favorably disposed to boys' participation in class (Shakeshaft, 1986; Sadker and Sadker, 1986; Stanworth, 1987; Kelly, 1988).

There are, however, contradictory views that suggest that the disproportionate attention that boys receive relative to girls may be a collateral consequence of behavior-related reprimands, rather than deliberate discriminatory action on the part of teachers (Sunderland, 2000). Moreover, studies of classroom social interactions have shown that both genders do in fact sometimes engage in heterodoxical behavior (Gallas, 1998; Sheldon, 1997). For example, on the strength of the evidence from an in-depth study of her own classroom, Gallas (1998) believes that girls sometimes traverse gender borders, put up resistance, and generally act in unpredictable ways. She further argues that while stereotypes may exist, heterogeneity may be more reflective of classroom interactions than is normally assumed.

Cumulatively, and as a practical matter, however, gender-biased language practices in education can have psychosocial and material consequences for girls. While there have been significant reductions in the use of sexist language in educational settings, empirical research relating to gender and education continues to cite sex-role stereotyping and unfair language practices as some of the factors that mitigate against girls and women at all levels of schooling. Based on a review of previously assembled evidence, Corson (1993) argues that social identities are constructed through school texts and other educational materials, all of which position and define individuals in relation to knowledge and power. With particular reference to gendered language practices, he argues that: "practices and policies found in the objective discursive structures of schooling itself, help to create and reinforce disadvantages for girls and women" (Corson, 1993: 139). In the same vein, Luke (1994: 363) calls for the de-gendering of literacy activities because the sexual division of literacy "plays into the patriarchal reproduction of knowledge, competence, and, ultimately, economic structure."

In short, gendered language practices can impact the overall life chances of girls and women. In many parts of the world, access to certain kinds of language and discourse is often associated with increases in life chances which are a function of two elements – options and ligatures. *Options* are choices, while *ligatures* are bonds that individuals form through immersion in a given culture or by virtue of their social positions and roles in society (Dahrendorf, 1979). Options and ligatures are critical to the empowerment of any group, particularly those who have been historically oppressed. Cross-culturally, gendered language practices in schools are implicated in the limited options girls and women have in their respective societies.

Socio-Politico-Cultural Variations

Studies of gendered language practices and linguistic covariation in contexts other than Western societies, from where the bulk of current empirical data originates, are few and far between. However, as pointed out above, culture has significant influences on gender differentiated language uses and practices in many societies (see Philips *et al.*, 1987). Emergent knowledge from non-Western societies reaffirm prior evidence from Western contexts that gendered language practices in wider society have corresponding effects on language and discourse practices in schools (Balfour, 2003). For example, in some societies, women are not expected nor indeed allowed to speak in the public sphere, on ideological or religio-social grounds. This means that in public and quasi-public domains such as schools, girls must maintain a culture of silence. In other societies, socially sanctioned gender-typed differential treatment from teachers is the norm rather than the exception (see Kitetu and Sunderland, 2002). While such treatment may appear discriminatory at first glance, in some cultural contexts, according to Kitetu and Sunderland, differentiated gendered discourse norms in schools may be based on societal valuation of difference and the desire to protect women's interests, thus adding another layer of confusion to an already complex matter.

Challenges Ahead

Given the persistence of gender-biased language and linguistic practices in educational settings, a key question becomes what should be the future directions of research and praxis? Pathways to more empowering experiences for girls and women *vis à vis* language practices in education depend first and foremost on a critical linkage between theory and practice.

A second line of intervention should begin at teacher preparation institutions, where as part of their

curriculum novice teachers are taught the art of doing critical language and pedagogical analysis of texts based on the concept of critical discourse analysis (Fairclough, 1995). Under this arrangement, novice teachers learn ways of deconstructing and engaging the nonneutral properties of texts and discourses, seeing language instead as a dialogical interchange between social actors (Bakhtin, 1981).

Related to, but different from, the idea of forging a link between theory and practice is the issue of new research directions in the field. While a shift is already in progress, critical praxis will also depend on research that advances our understandings of the trajectories of language, education, and gender beyond the dichotomizing binary thinking that result in essentialist oversimplifications of a relationship that is far from straightforward (Swann, 2003; Sunderland, 2000; Tannen, 1996; Bergvall *et al*., 1996). There is indeed an amalgam of interacting variables (e.g., ethnicity, social class, religion, and personality) that impinge on the construction of the gendered self, which in turn influences linguistic behavior and practices in and out of the school. In effect, rigid adherence to deterministic assumptions of masculinity and femininity *vis à vis* language and discourse norms in education, may be as conceptually limiting as the unwavering adherence to the dominant male linguistic orthodoxy that sustains the gender divide in society in the first place.

See also: Classroom Talk; Discrimination and Language; Gender and Language; Gender, Sexuality and Language; Sexist Language; Variation in Pidgins and Creoles.

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Language Education for Endangered Languages

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As local communities become more aware of the potentially imminent loss of their languages, they have begun to undertake measures to foster education in them. There is currently a wide range of programs which have been adopted to arrest language loss and to help children and adults take control of learning their language. These can loosely be divided into school-based and community-based programs.

School-Based Programs

When people think of education, they naturally think of school programs, and perhaps the majority of programs for endangered languages are based in schools. In many communities the school is seen as the primary vehicle for language education. Note that this is a radical shift from the way that children first learn their primary language, within the home and within a community of speakers. It is more reminiscent of the way that children typically learn foreign languages.

Total-Immersion Programs

Total-immersion programs work well when there is a sufficient speaker base to help insure their success. These programs tend to be multifaceted, with total-immersion language instruction in the schools reinforced by the sole use of the language in the home. Thus they are often most successful when fluent speakers can be found in all generations, as the source not only of teachers in the school, but also of parents who can speak the language in the home. A common goal of total-immersion programs is complete and fluent use of the target language in all domains. In a true total-immersion program, all of the school curriculum is taught in the endangered language and the language of wider communication is often taught as a secondary subject. Bi- or multilingualism is an ultimate goal, as in general, children enrolled in such programs ultimately need full use of both the endangered language and the language of wider communication.

The Language Nest Model

The language nest model is a particular type of immersion program. It was first used in the 1980s in New Zealand for the revitalization of the Maori language and is often referred to by its Maori name, Te Kōhanga Reo. It has subsequently also become closely associated with Hawaiian language revitalization, which built its program on the Te Kōhanga Reo model but uses the Hawaiian name, Pūnana Leo. The language nests were initially created in regions where the only group of people speaking the language was, by and large, the grandparent generation; the parents and children tend to be monolingual in the language of wider communication. The language nest model takes preschool children and places them in 'nests' where the endangered language is spoken. Parents are generally expected to make the commitment to learning the language and using it in the home to reinforce what is learned at school. Historically, as each lead class graduated and went on to a higher level, first in preschool, then elementary and secondary school, new nesting classes were created so that children ultimately received all of their education in the target language.

The creation of domains of language use outside of the schools has proven to be a challenge for language nest programs, in large part because the speaker base is primarily second-language speakers who do not attain full fluency in the endangered language.

Partial-Immersion Programs

For languages with relatively few remaining speakers or with a lower level of community commitment, it is often not realistic to implement a full-fledged immersion program. Partial-immersion programs exist in many schools, where the curriculum is taught primarily in the language of wider communication and the endangered language is taught in specially focused classes. There are two basic types of partial-immersion programs. In the one, the less common, some subjects are taught in the endangered language. Such subjects are typically the culture and/or history of the people. The benefits here are that learners acquire the language in culturally appropriate settings

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using the specific lexicon. Thus a Native American class on oral traditions or crafts could be conducted in the indigenous language. In the other, the endangered language is taught as a secondary subject. The advantages to this model are obvious: it requires a smaller commitment of time and resources. Moreover, children coming to these programs often do not know the endangered language, and so need to learn it from the beginning. The primary disadvantage is that the endangered language is allotted secondary status within the schools and is taught more as a foreign language than as a primary language. Thus it does not achieve the full range of uses of the language of wider communication and cannot supplant it. Although such programs may be designed with the ultimate goal of stable bilingualism, they rarely achieve it, since they do not achieve full fluency in the endangered language.

Outside of the Schools

The dichotomy between school-based programs and others is somewhat artificial, as often two different types of programs are used in conjunction with each other. For example, many of the total-immersion school programs require the parents to learn the language and use it in the home to reinforce the work that is done in the schools. While school-based programs are almost exclusively built on Western models which require literacy in the endangered language, programs outside of the schools often dispense with literacy as too time-consuming and cumbersome for learning to communicate orally.

Community-Based Programs

Community-based programs are grassroots movements, stemming from and sustained by community leadership and commitment to language education. Such programs vary greatly in nature, but often have in common that they bring together a variety of community members for language practice. Maori communities in New Zealand organize weeklong or weekendlong immersion events for community members of all ages; people come together with the commitment to speak nothing but Maori for the time of the event. Other communities have established similar immersion events, or schedule regular meetings for language practice. These group meetings often link the practice of native crafts and traditions with language use. They have the advantage of offering options to adult learners who may not be able to attend regular classes. Beyond creating opportunities for language use and immersion, such programs organize language festivals, feature plays, songs, and poems, and actively promote the use of language in conjunction with traditional activities.

Some programs have made the decision to start teaching the endangered language to adults, not children. The rationale behind the decision is that it is the adults who will then use the language and teach it to the children, as is the norm for first-language acquisition. UNESCO, for example, advocates adult literacy first, with an emphasis on the acquisition of the practical skills needed for functioning in the modern workplace.

Master–Apprentice Program One very successful program for language groups with few remaining speakers is the master–apprentice program. Initiated in California in 1992 for teaching languages on the verge of extinction, its basic principles can be adopted to the teaching of endangered languages anywhere. The program matches an 'apprentice' learner with a 'master' of the language whose job is to teach the language by using it in everyday life. The program is based on the following principles: (1) the use of English is not permitted in interactions between master and apprentice; (2) the apprentice needs to be a full participant in determining the content of the program and assuring use of the target language; (3) oral, not written, language use is always primary in learning and communicating; (4) learning occurs not in the classroom, but in real-life situations, engaging in real-life activities (e.g., cooking, gardening, etc.); and (5) comprehension will come to the beginning language learner through the activity, in conjunction with nonverbal communication. These principles are designed to insure that language learning and instruction take place in an immersion setting that nearly replicates the 'natural' language-learning environment of children (as opposed to artificial classroom settings, for example).

Beyond the inherent incentive to learn and to teach one's language, in the Californian program a modest stipend is provided for up to 3 years of work between the master and the apprentice. After this period the graduate apprentices should be prepared to continue their education with the masters, but also to serve as teachers themselves.

Training before beginning the team work is critical. The language masters are primarily tribal elders who may not have actively used their language for many years, due to the very factors which have led to language attrition. In addition, they are not trained language teachers and many have never taught their language. Thus initial training sessions are designed to provide the opportunity for masters to become accustomed to speaking their languages again and to introduce the basic principles of language immersion

instruction, such as building and practicing vocabulary, and enforcing the importance of repetition, review, and patience in language learning. Important components of the training include getting the participants used to nonverbal communication, teaching apprentices key phrases and questions in the target language, and some cross-cultural comparison of the different ways language is used in different cultures. Despite the many linguistic and cultural differences, there is a commonality of experience which makes it very useful for all teams, from beginning to advanced, to come together for this training.

By the end of the first year, apprentices should be able to ask and answer simple questions about themselves, describe pictures, use some culture-specific language (prayers, stories, etc.), and recite a short speech prepared with the help of the master. This basic repertoire is expanded in the second year, with the goals of being able to speak in simple grammatical sentences, being able to carry on extended conversations, having increased comprehension, being able to converse on most topics, and being able to give short speeches. Finally, by the end of the third year of the program, the apprentices should be able to converse at length, use long (and presumably complicated) sentences, and develop plans for teaching the language. These goals are at once realistic and ambitious: language learning is a slow process, and the apprentice meets with the teacher only for 10 hours per week. One can predict that the learner's motivation will be very high in this program and will have a positive impact on learning. The results of the program vary among individual students depending on a range of factors, such as the overall time commitment, how much the apprentice is truly immersed in the language, and so on.

Potential Difficulties

Despite the many differences between these various educational models and the particularities of individual endangerment situations, they similarly face a number of potential difficulties. These include a lack of qualified teachers, as often speakers are elderly and untrained as teachers, while younger, trained teachers lack proficiency in the language. Lack of pedagogical materials and other basic resources (such as dictionaries) often hamper programs. At a more profound level, a lack of consensus about how the language is to be spoken and how it is to be written, with disagreements frequently centering around issues of orthography and codification, who has the right to teach it, have put an end to many potential programs. Access to the media is often difficult to impossible for endangered languages.

Legislation at local and national levels can either aid or impede endangered-language education. Policies which promote multilingualism and allocate resources to support educational programs can have favorable effects, while more monolingual policies which require testing or use of a single national language can have a negative impact which is difficult for a local community to overcome.

See also: Endangered Languages; Identity: Second Language; Language Teaching Traditions: Second Language; Minority Languages: Education; Minority Languages: Oppression; Second Language Attrition.

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Relevant Websites

http://portal.unesco.org.

Language Education for Language Revival

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Language revitalization is the targeted goal of language revival efforts. It involves a reversal of language shift where people start using a language that has been moribund or threatened by extinction, so that its vitality is gradually restored (Spolsky, 1996: 6). There is a range of contexts in which language revitalization can be studied, where conditions vary considerably, e.g., contexts of nation-states, indigenous linguistic minorities in nation-states, indigenous groups in post-colonial countries, and immigrant language groups. In all these cases, however, language revitalization involves the following defining characteristics or hallmarks:

1. Adding new sets of speakers to the language crucially involving the home domain and intergenerational transmission (Spolsky, 1996; King, 2001).
2. Adding new functions by introducing the language into new domains, where it was previously unused or relatively underused.
3. The revalorization of the language to be revived (henceforth L-[r]) by the L-[r] speakers and neo-speakers (Huss *et al*., 2003).
4. Involvement and activity on behalf of the individual and community of L-[r] speakers, and awareness that positive attitudes, action, commitment, strong acts of will, and sacrifice may be necessary to save and revitalize.

The language must gain access to domains related to socioeconomic advancement. Education is a critical domain in this respect. Huss *et al*. (2003: 4) point out that schools as well as preschools have shown themselves to be critical contexts for both language loss and revitalization. In communities where formal schooling is linked to economic advancement, without a school system in which the minority language has its proper place, all other revival efforts are likely to falter.

Whereas debate on education for language revival often centers on educational equity questions, status and institutionalization issues, and on the assessment of efficacy of varying bilingual/immersion programs, the discussion here will review specific pedagogical issues that are seen to fuel and foster language learning for language use in the speech community.

Schools and Language Revival Efforts

The debate on the role of the school in language revitalization has centered typically on schools as agents of language revival, examining the concept of language planning and language education policy (Spolsky and Shohamy, 2000) and discussing the potential of schools in the community or in national efforts to contribute to language knowledge and language use.

Fishman (1991) claims that schools have limited value in language revival in that restoration and successful survival of a threatened language essentially requires reinstating and relocating the L-[r] primarily in the home domain in parent-child transmission. Unless schools directly feed into and facilitate the reinstatement of home and family transmission, then they will always occupy a secondary role in language restoration. This does not always happen, however. It is a feature of many language revitalization movements that they overlook the crucial stage of family transmission (Fishman, 1991, Stage 6 in the Graded Intergenerational Disruption Scale) in an effort to move with undue alacrity to minority language education (May, 2001: 142).

Mindful of the shortcomings of school-based language revitalization efforts, Hornberger and King (1996: 438–439), maintain, however, that school initiatives in some contexts may promote the instruction and use of unified native languages and standardized native language literacies as well as facilitate the very kernel of the spirit of language revival. Of course, schools are also the central arena for the promotion of prescriptive norms.

Schools on their own, therefore, may be ineffective in saving threatened languages (May, 2000). Links with the speech community are critical. McCarthy (1998), for example, argues that schools must adopt a prominent position in language revitalization and maintenance efforts because schools have had destructive effects on indigenous languages in the past. Education is also the site where larger political, social, and ideological values are transmitted and reflected, the very values that fuel language revival struggle. Schools can thus become awareness-raising agents, sensitizing students to language use or lack of language use in community domains and influencing linguistic beliefs, practices, and management of the language community. Skutnabb-Kangas (2000: 570) refers to the potential of the school in this context as an agent of change. The school may also be one of the chief agents of legitimization and institutionalization

in the public domain of the L-[r] language, a counterforce of language discrimination accruing after centuries of proscription, derogation, and neglect.

Differing Contexts

Schools also operate in global and as well as in national and local contexts, involving varying standards and norms, language attitudes, multilingualism, and language prestige. Decisions on the type of program (schoolwide/immersion or targeted/one-way or two-way) (Hornberger, 1996) are best made through a process involving not just the teachers and curriculum planners, but critically involving the speech community itself. Immersion/content and language integrated learning (CLIL) and bilingual programs are often the most favored in revival contexts (e.g., Welsh: Jones, 1998; Baker, 2001; Maori: Spolsky, 1996; Benton and Benton, 2001; Irish: Coady and Ó Laoire; Slovinian in Austria: Busch, 2001; Sorbian in Germany: Elle, 2003, etc.). It cannot be suggested, however, that bilingual or immersion programs are applicable in multilingual or multicultural societies (Brann, 1981; Choudry, 2001; Benson, 2003).

Pedagogy for Language Revitalization

Despite the different contexts, common questions arise about the teaching of language in revitalization contexts. These questions focus on the optimal context and conditions for effecting revitalization, involving the type of school program, the curriculum and classroom language use and activities, the space and relationship between the L-[r] and other languages, language materials, and teacher education. Given the variety and complexity of possible contexts around the world, education policy makers and teachers need to construct the best answer to these questions in their own local contexts.

King (2001) points to one oversight in the general debate on language education for language revival: It tends to exclude reference to the specific pedagogical activities that take place in language programs. Mindful of this oversight, the remainder of this essay examines curricular and pedagogical possibilities in language revitalization programs.

Curriculum and Language Revival

One is inclined to speak about language learning programs in language revitalization contexts as if such programs were homogeneous and prone to significant variations and rates of success because of the models of teaching and learning that they comprise. King (2001) shows, for example, in the context of Quichua in the town of Saraguro in the southern highlands of Ecuador, that school-based language programs may be limited by their inappropriate pedagogical approaches, in that they remained conventional and ineffective and had limited impact in stimulating active use of the language among learners.

The contribution of sociolinguistics to language pedagogy was apparent during the last two decades of the 20th century as the focus of instruction in many L2 + FL programs broadened to include communicative competence. Communicative competence, defined as what a speaker needs to know to communicate appropriately within a particular speech community, (Saville-Troike, 1989) emerged as a basic tenet in the context of sociolinguistics and was subsequently adopted by syllabus designers and specialists in second language (L2) and foreign language (FL) instruction.

Communicative Language Teaching and L-[r]

In the final decades of the 20th century, therefore, communication in its manifold aspects has been accepted as the central tenet in language teaching (Trim, 1992).

Communicative competence and proficiency have thus become the central aim of many school-based language programs with pedagogies and language learning materials generally reflecting this central thrust of emphasis, or with the general features of communicative language teaching (CLT) being gradually absorbed into alternative or traditional methodologies. CLT, however, has particular challenges and advantages within the context of L-[r] revivalist efforts.

One challenge often bedeviling L-[r] pedagogy is the extent of native speakers. As pointed out by Little (2003) in the case of learning Irish, the number of learners of the L-[r] at any time may exceed the number of native or accustomed speakers. Pedagogical tasks thus are constrained, given the limited scope for rehearsal of interactions with native speakers. Of central concern here is the urgency or need to communicative in the L-[r] in any domain when the dominant language is perceived to be the most appropriate.

This distribution of L-[r] speaking networks may often pose, therefore, a serious problem for the learner, particularly within a communicative framework, where the relevance is wholly identified with societal use. For many schools, there is no readily identifiable speech community where such communication might be meaningful other than in communicational

transactions in the speech community. The communicative-type syllabi imply that learners, who have little or no prospect of eventually integrating into or enacting with the speech community, are asked to suspend disbelief and rehearse communicative situations, which can only be authentic or valid within the native speaker community networks inside or outside the speech community.

Second, the contraction of social contexts and domains in which the language is naturally used narrows the range of appropriate authentic materials and text-types. The absence of appropriate classroom materials is often a major obstacle.

Publishers see a limited market for developing language learning materials and resources in the L-[r], and thus teachers are forced to construct their own materials, using photocopies, drawings, and cut-out magazine clippings with superimposed handwritten captions. In doing so, they vie for students' attention and respect, especially for students who are familiar with glossy sophisticated textbooks and the high-tech learning materials of the dominant language.

Efforts in L-[r] language classrooms intent on simulating the tourist-type situations so central to communicative pedagogy of more widely used languages have worn thin with many learners (Ó Laoire, 2004). Students quickly see through the ruse and efforts to engage learners' motivation in mimicry of communicative situations, such as booking a hostel in the L-[r] in an English-speaking city, for example, or asking directions while working from a map, and have been doomed to arouse at best a benign indifference, even apathy, among the most eager learners.

However, the shift to communicative language teaching has been useful in language instruction for promoting language use in the speech community. This has positive underlying potential to foster active language use of the L-[r], in that it draws deliberate attention to domains where the language is used meaningfully in transactions and at the same time introduces the learners to new situations where the language potentially could be used. Thus, in developing receptive competences, for example, learners hear the language as it used in the speech community, or read authentic texts where printed and literacy texts are available. In developing productive competences, learners engage in role-plays to prepare for interactions with native speakers, neo-speakers, or accustomed speakers, even if such interactions might never occur. This approach is somewhat at variance with the remarkably unprogressive methods and passive activities described by King (2003).

It is not always easy, even for committed students, to communicate, or even to know how and when to communicate, with native/neo-speakers speakers of the L-[r], either inside or/and outside the speech community. Learners at this crucial integration-threshold stage often think that their command of the language is not good enough and compare their own efforts unfavorably with the standard of the target network group. Unfortunately, such learners often give up. This points to a need not only for more research into the sociolinguistic and motivational variables of integration, but also for preliminary studies of inter-language pragmatics in the case of L-[r] speakers.

Neighborhood domains and home domains in the early stages of language revival are often insufficient for the learner to sustain or to develop proficiency through use. The school alone may indeed be the only source of language learning and inter-language development, and they may never be reinforced by integration into the speech community. This is, perhaps, the greatest challenge to acquiring the L-[r] and is a strong argument for immersion or content-based language learning as being the best suited pedagogically in the context of revivalist efforts.

Different Expectations from Pedagogy

Schools on their own will not change language behavior. A complication often is the different goals, definitions, and measurements of success employed by different revivalist groups for whom aims tend to vary considerably:

1. One group may aim only for the language being taught in the schools (one type of syllabus) – once it is being taught, they are happy.
2. Another group might aim to reintroduce the language into families and thereby secure intergenerational transmission.

These two approaches would necessitate different syllabuses. The former would aim to teach the language in some de-contextualized context or for cultural reasons, whereas the latter would stress learning the language for active use and for use in the micro-domain of the family itself. This forces us to answer the question: Why is L-[r] being taught in the first place?

1. For short-term motivational fulfillment, i.e., communicating in the classroom?
2. To secure in the longer term the use of the language in the family domain and thus secure intergenerational transmission.

Both aims can coalesce pedagogically, of course. There is a difference, nonetheless, between language learning and language acquisition. Language that is

learned may be forgotten, if it is not retrieved from short-term memory, used, or activated on a regular basis. Language that is acquired is automated or automatically available. It is possible to extend and drive inter-language and fuel acquisition in the classroom if the language is used meaningfully. The communicative and purposeful use of language offers this opportunity. We need not only to give our learners practice in the language through scaffolding, but we must also create opportunities for our learners to talk meaningfully and therein process language. The more exposure to the L-[r] as in immersion/submersion CLIL programs and the more opportunities to use the language in a meaningful way, the better the chances of acquisition.

Final Considerations: Language Revitalization and Instructed Language Acquisition

This discussion suggests that real-life use of language should be reflected to a large extent in the texts and activities of the classroom. As these activities do not depend on immediate reinforcement outside the classroom, pedagogical activities can be seen as an end in themselves and reflect real peer-to-peer or teacher-to-student communication. The classroom, therefore, becomes a valid communicative situation, exploitable to a large extent as a valuable resource for instructed language acquisition (Ellis, 1990). Critical to construction of contexts of acquisition in the classroom is the concern with learning rather than teaching (Little *et al.*, 2000). In the case of acquisition of L-[r] in instructed contexts, much remains to be investigated. It is likely, however, that research in this will conform to a significant extent to the following basic findings of L2 studies to date.

It can be expected, therefore, that significant amounts of language exposure are required. Teaching the L-[r] as a subject only is unlikely to succeed. Experience from immersion programs indicates that a greater investment of hours of exposure may be necessary to achieve acquisition (King, 2001: 216). Second, learners must engage in meaningful interactions in the classroom wherein negotiation for meaning triggers interactional adjustment by native speakers (Long, 1996). The processes of acquisition as well as being contingent on modification of native speaker and comprehensible input depend equally on meaningful interaction with the target language. Finally, as well as teaching and exposing our learners to the L-[r], as teachers we need to equip them with skills in how to learn the language (and other languages) and how to seek out opportunities to use it outside the classroom. Such an approach can imbue teachers and learners alike with a new creative enthusiasm for language in general and create a language awareness that is facilitative of acquisition.

See also: Language Education for Endangered Languages.

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Language Education of the Deaf

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Deafness has always existed, and for the last 240 years, it has merited the attention of formal education. According to Samuel Johnson in 1775, the problems were already solved.

> ... in Edinburgh ... a college of the deaf and dumb, who are taught to speak .... The improvement of Mr. Braidwood's pupils is wonderful. They not only speak, write, and understand what is written but if he that speaks looks towards them and modifies his organs by distinct and full utterance, they know so well what is spoken that ... they hear with the eye (Johnson, 1775: 143–144).

In that statement, we have the whole of the mystery that has pervaded deaf education since Mr. Johnson's visit to Scotland. How is it that some deaf children appear to learn to speak, lip-read, read, and write, and the remainder, the majority, have stubbornly refused to respond to the efforts of educators? It was, and remains, a matter of schism, doctrine, and even deception concerning the methods and outcomes of the process through which deaf children pass.

One variable in the equation is hearing loss. It was not until the 1920s that hearing loss was reliably measured. Prior to that, deaf children were mixed with partially hearing children and with children who became deaf after the age when they had learned to speak. It was relatively easy to convince benefactors that a child's competence was the result of treatment in school.

A second variable is the nature of the schooling. At first, deaf children boarded at school, and later in cities they could be day pupils. By the late 1940s, there were special units set up in mainstream schools to cater to those children who were partially hearing. Latterly, on the bandwagon of civil rights and a general philosophy of integration, deaf children were placed directly in mainstream schools, sometimes alone, but supported by the provision of aids to hearing and by a visiting teacher.

A third variable is the use of hearing aids. Although widely available since the 1950s in most developed countries, they are relatively rare in developing countries. By early detection and application of hearing aids, many children deemed deaf in the past are now seen as partially hearing and are able to interact with hearing peers in a mainstream school. A more sophisticated and more effective version of hearing aid is the cochlear implant, an operation to implant a device in the inner ear to restore hearing.

A fourth variable, though insufficiently understood, is parental involvement. As with all human special

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A fourth variable, though insufficiently understood, is parental involvement. As with all human special

needs areas, the extent to which the parents show an interest, offer home tuition, and are in a position financially to support the child's special needs, tends to create greater or lesser level of achievement.

In all cases, claims are made that attention to these variables will eradicate the problem of deafness. This has gradually narrowed the problem from being defined as comprising all those with a hearing loss to those who are deaf from infancy, in the provision of special education. The deaf population has 'changed' since 1775.

Methods

In the absence of medical or technical solutions, education has sought remedies of its own. These have succeeded in polarizing the field for more than 200 years and in leaving deaf children with poor levels of achievement and language performance (Binet, 1910; Conrad, 1979; Powers *et al.,* 1998).

The German Method, in evidence in the late 18th century, emphasized the teaching of speech to the exclusion of gesture or signing. Teachers spoke to the deaf children and forbade them to sign. It became the oral method which dominated deaf education for nearly 200 years.

The French Method adapted the natural signing of deaf people to 'methodize' the sentence construction so that it might better reflect written and spoken French. Deaf children were allowed to sign to each other (something forbidden by the oral method), and their natural language communication was valued. American educational practice was greatly influenced by the French Method, and this was later to evolve into Total Communication (Denton, 1976) – a formal use of speaking, signing, and signed speech.

The British (or combined) Method, which Johnson saw, was primarily oral but used finger-spelling and allowed the children to sign out of class. By the late 19th century, this method had all but disappeared, as deaf teachers were removed by the change toward professionalization of teaching and the rise to dominance of a medically inspired, teacher training program in Manchester. For most of the 20th century, Europe used the oral method.

Natural Language of Deaf Children

However, in the 1970s, on the basis of linguistic research in the United States and Europe, sign *language* began to be described, and deaf culture began to be promoted by deaf people, by professionals, and then by hearing parents. Teachers began to teach through sign language and to create a bilingual framework.

First noted as early as 1644 in England, signed languages have now been identified and described in nearly every country in the world (Klima and Bellugi, 1979; Kyle and Woll, 1985; Schulmeister and Reinitzer, 2002 – *see* **Sign Languages of the world** (00243)). Sign languages are learned naturally in families with deaf parents (about 6% of all cases of childhood deafness). What became apparent was their complexity, flexibility, their ease of acquisition among deaf children in deaf families, and their potential for deployment in family intervention and education (Johnson *et al.,* 1989).

The Situation Today

Oral Approaches

There continues to be considerable debate on the methods for teaching deaf children. Surprisingly, perhaps, given the extent of problems reported by deaf people themselves (Lane *et al.,* 1996), oral education continues to be applied in many schools in most parts of the world. This is a function of the naturalness of native language use by the hearing educators and parents, and of the priority to normalize the child. The method has evolved from the former speech training exercises, drills, and compulsion to talk, toward a natural or aural method where emphasis is placed on hearing and communication. Watson (1998) says "... it is assumed that deaf children can utilise their hearing via hearing aids in order to develop the sounds of speech" (Watson, 1998: 72).

The system relies on early detection of hearing loss (preferably at birth) and the immediate provision of hearing aids, and then the monitoring of their use. It requires preschool programs and support systems usually found only in the developed world. It is said to require a considerable commitment from parents who have the primary responsibility to continue to provide speech experiences to the child even in the face of slow development (which is considered the norm). The advantage of the approach is that it allows a denial of deafness and assertion of the child's normality – because the primary aim is to make the child function in speech, reading, and writing as a hearing person – as Johnson originally described.

Total Communication (TC)

Typically this approach involves teachers who speak and sign simultaneously (Baker and Knight, 1998), even though the purists would argue that sign language (with its own grammatical structure) should be used alongside speaking and writing). Initially, this required the construction of artificial signs in order to

allow the precise mapping of speech – i.e., sign language was thought to be limited in vocabulary. This remains a concern for hearing educators, and often there are committees set up to devise new signs for use in TC programs. Simultaneous communication requires that the teacher is able to sign all elements of words as they are spoken. Not only is this considered to affect the signing (i.e., to make it unintelligible), it is also claimed to affect the speech production of the teacher (Hyde *et al*., 1998).

Because of the dominance of the oral approach, often deaf children arrive in TC programs later than is ideal and commonly as oral failures (this may even be claimed as a natural application of the oral approach whereby, if the children do not succeed, they still have the choice of a signing program later (Watson, 1998)). Teachers have to learn the signed *method* (although this often does not require learning of the signed *language* – only the signed speech variant).

For these reasons, TC programs in developed countries tend to have shifted toward bilingualism, which is now a major development area in deaf education worldwide.

Sign Bilingualism

Instead of concentrating solely on the child's spoken language development, bilingual approaches emphasize the early mastery of sign language, while ensuring that the child has access to the spoken, heard, and written language of the society. This usually involves parents learning to sign, the presence of deaf role models, and contact with the deaf community (Young, 1999). At school, it involves policies to ensure equality of status of the two languages, curriculum access through and assessment in sign language as well as the written language, and staff training in sign language (Pickersgill, 1998). The underpinning of the approach is the extensive literature which supports bilingual education worldwide (Cummins, 2000).

For these programs to be effective, there has to be a shift in perception of the child from 'hearing-impaired' to 'culturally deaf' and thereby different from the parents and other family members. Advanced programs exist in Sweden (Ahlgren, 1990), in Denmark (Hansen, 1990), and there are descriptions of programs in Italy (Volterra, 1990), in Holland (Knoors, 1995), in the United States (Nover and Andrews, 1998), in Russia (Komarova, 1998), in Latin America (Skliar, 1997), and in China (Calloway, 2000).

Advantages in the programs are seen to be that they offer a major break from the approaches used in deaf education for 200 years and for the first time emphasize sign language information and the cultural experience of the child, that they provide a natural language framework, and that they are theoretically sound being based on extensive work on bilingual education in the spoken language field.

Do the Methods Work?

Most proponents of these approaches tend to shift uncomfortably in the glare of research analysis, and in reality it is difficult to answer the question of effectiveness directly. A thorough review of deaf achievement by Powers, Gregory, and Thoutenhoofd (1998) found flaws in nearly all of the published research studies in this area. As with all educational research, the true results cannot be determined until many years after program implementation. Bilingual approaches are in the early stages of development. What is significant, however, is that for the first time, the deaf community is involved and deaf people are employed in preschool programs and in schools. Their native experience of learning and their knowledge of the visual world are extremely important in the education of the deaf child.

Typically, national examinations of deaf children at the end of their schooling show major problems in achievements in speech, lip-reading, and reading. However, even in oral programs, deaf children become fluent in sign language (even where there have been measures taken to prevent this). It would seem obvious that because education focuses on learning, the most effective language (i.e., sign language) should be used as a primary tool and that mastery of signed and then, spoken/written languages should be the priority.

See also: Bilingual Education; Sign Language: Interpreting; Sign Languages of the World.

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Language Education Policies in Africa

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Historical Background to Language Education Policy

Language education policies in Africa, since the 19th-century partition of the continent by Europe, have been out of kilter with the realities of its speech communities. These policies are beset with contradictory, inappropriate implementation strategies and generally give priority to former colonial languages that, after 120 years of use in formal education systems, remain little known and seldom used by approximately 80% of the people. The 10–20% (Heine, 1992) of African people who do have high levels of proficiency in one of these languages are those who occupy the upper echelons of political power, the economy, and the education systems, and they live in urban areas.

The African continent is, at the same time, richly endowed with linguistic diversity, education systems that began thousands of years ago, and numerous written scripts (e.g., Battestini, 1997), as well as many languages that have not yet been reduced to writing systems. Historiographic and contemporary accounts of the continent usually emphasize its linguistic complexity. Somewhere between 1250 and 2100 (depending on identification criteria) or 30% of the world's languages are found in Africa (Ouane, 2003).

However, most literature focuses on an apparent dearth of written languages and on the contributions of Christian missionaries and colonial administrations to literacy, writing, and education systems. The significance of pre-colonial language and educational practices, recorded in languages and scripts that are little understood in the West and North, has gone largely unrecognized. This article begins with pre-colonial systems of 'language management' (Spolsky, 2004) in order to shed light on the origins of mismatched language policy decisions and implementation plans.

Richly textured oral traditions have been significant conduits for the preservation and expansion of history, literature, and knowledge systems, as well as for their transmission from one generation to the next for thousands of years. These oral traditions were not, however, the only vehicle for language and education development. The Ancient Egyptians' use of hieroglyphics influenced many writing systems in countries further south. The *Gicandi* script of the

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Kikuyu in Kenya, the *Nsibidi* pictograms of the Efik in Nigeria, the Mende script of Sierra Leone, and the Loma script of Liberia, as well as Dogon, Bambara, and Bambum (Cameroon) scripts, show similarities to Egyptian hieroglyphics (Battestini, 1997; Ki-Zerbo, 2003). Modern Ethiopian languages, such as Amharic and Tigrinya (Tigrigna), have emerged from the ancient Ethiopic language, Giiz (Ge'ez), a south Semitic language in which the Holy Book, *Kebra nagast,* is written (Bloor and Tamrat, 1996).

Religion, particularly the spread of Islam since the 7th century A.D., played a significant role in the development of written texts. It also influenced early examples of explicit language policy. Abdulaziz (2003: 183) suggested that African converts to Islam "were expected to acquire basic literacy in Arabic" in order to recite Koranic texts. A similar process occurred with Christianity in Ethiopia where the literary use of Giiz peaked between the 7th and 13th centuries (Bloor and Tamrat, 1996). The spread of Islam led to the development of *Ajami* script, which is the use of Arabic for the transcription of other languages. In West Africa, Ajami was used in the development of scripts for Fulfulde, Mende, Wolof, Hausa, and Yoruba in Burkina Faso, Mali, Nigeria, and Senegal. It has also been used for Kiswahili and Somali in East Africa (Abdulaziz, 2003; Alidou, 2004). The early 19th-century scholar, Sheik Dan Fodio, argued that Islam in Africa took on a distinctively different form from that of the Arab world (Djian, 2004). Missionary and trading activity across the Sahel (areas south of the Sahara) led to the establishment of 'Islamo-Sudanese' centers. By the 15th century, 25 000 students were attending the Sankore university-mosque of Timbuktu (Djian, 2004).

The recent discovery of 15 000 documents, dating from the 12th to the 16th centuries in Timbuktu, is reason to revise earlier histories. The documents, which address religion, philosophy, music, astronomy, history, law, medicine, mathematics, and commerce, provide extensive evidence of literacy and formal education in this area. Although mostly written in Arabic, they include several other languages, such as Hausa, Wolof, Fulani (Fulfulde), Juula (Dyula), and Tamashek (Tamajeq) (Djian, 2004). The Tuareg had developed their own script, Tifinagh, for the Tamajeq language, which was used in Mauritania, Mali, and Niger (Alidou, 2004). Dan Fodio (1754–1817) established an Islamic library in Kano in northern Nigeria and translated Greek mathematics into Hausa, but his work and library were destroyed by British military action in 1903 (Boahen, 2003; Alidou, 2004).

Communication across the continent occurred, and continues today, via a network of smaller local languages and larger, vehicular languages (Djité, 1993). There are a few countries where communication occurs predominantly through one language; for example, in Rwanda, Burundi, Swaziland, Lesotho, Somalia, and Madagascar. For the most part, however, high levels of multilingualism were and continue to be common. Fardon and Furniss (1994) argued that the Western concept of 'lingua franca' is inadequate in the African context. The African lingua franca is not "a single language but . . . a multilayered and partially connected language chain that offers a choice of varieties and registers in the speaker's immediate environment" (Fardon and Furniss, 1994: 4). Other authors (e.g., Djité, 1993) referred to the widespread use of small local languages alongside the larger regional languages of wider communication, such as Hausa, Fulfulde, Yoruba, and Kiswahili, across much of the continent. Indigenous education systems provided access to these language chains and communicative patterns. The use of two or more languages for specific functions – the small local language in immediate neighborhoods, regional lingua francas for trade, and Arabic or Giiz for religious purposes – was therefore common.

During the second half of the 19th century, shifting power relations in Europe and the impact of industrialization resulted in political aspirations toward African territory. The Berlin Conference of 1884–1885 identified 'spheres of influence' and accelerated the appropriation or conquest of Africa. A series of treaties and occupation by force resulted in a partition that had little to do with earlier African political or linguistic boundaries (see Chumbow, 1999). By 1914, only Ethiopia and Liberia remained free of European domination. Colonization was accompanied by political, social, economic, educational, and, particularly, linguistic consequences.

Although pre-colonial education was itself elitist and excluded many through its "sacred/taboo/secret character" (Djité, personal communication, 2004), the introduction of European structures of domination undermined the foundations of African education and language management. Traditional institutions of power and social structures were appropriated or replaced and thus weakened systemically (Elaigwu and Mazrui, 2003). Military invasions and attempts at resistance interrupted formal education in the cities of West and East Africa. The colonial powers neither grasped the significance and efficacy of nor saw much benefit in maintaining existing systems (Alidou, 2004). The functional use of indigenous languages and writing systems was underestimated or deliberately suppressed. Once European languages were introduced for high-status functions, especially in education, indigenous languages simultaneously

lost value and, in many instances, were rendered invisible.

Colonial education systems were designed to cater to a small elite who would "serve European economic and political interests" (Alidou, 2004: 199). The majority, who might have previously taken advantage of indigenous education, found themselves without access to either system, and thus, the continent has for the last century witnessed large-scale under-education and failure. More than half (52.7%) of Africans are illiterate, and of the little more than 50% of school-aged children enrolled in school, the majority are unlikely to reach secondary school (Bamgbose, 2000). A significant reason for this high dropout rate is the emphasis on the educational use of languages that most children do not understand: "(M)ost African children merely pass through the school without the school passing through them" (Obanya, 1999: 123).

Colonial Period: Contradictory and Parallel Processes

The partition of Africa brought specific changes to the linguistic ecology of the continent. The French colonized most of West Africa, Algeria, Tunisia, Morocco, and Madagascar. The British took control of most of East Africa and a large portion of Southern Africa and Nigeria. Angola, Mozambique, Guinea Bissau, São Tome and Principe, and the Cape Verde islands went to Portugal, whereas Spain occupied a small part of Morocco, Western Sahara, and Equatorial Guinea. The Belgians retained control over Belgian Congo (Zaire, later the Democratic Republic of Congo), and the Italians initially managed to secure part of Somalia, Eritrea, and eventually Libya. They also took Ethiopia by military conquest for short periods between 1889–1896 and 1936–1941, after which they were displaced by Britain. The Germans occupied and controlled the areas now known as Tanzania, Cameroon, Togo, Rwanda, Burundi, and Namibia until World War I; after that, their territory was redivided among Britain, France, Belgium, and South Africa.

The Europeans brought contradictory processes affecting language policy and management. First, there was an attempt to imprint the European concept of the nation-state with a single, national language onto each African country (Bamgbose, 1994). This effort effectively rendered local languages politically invisible and fostered assimilation into the colonial language and power structures for the small (new) elite. Second, an apparent multiplication or division of languages accompanied colonization. The arbitrary partition of Africa ignored existing linguistic boundaries and cut across "linguistic frontiers" (Fardon and Furniss, 1994), thus dividing speech communities (see also Chumbow, 1999). Linguistic fragmentation also resulted from the work of missionaries who, often without sufficient linguistic expertise, produced different orthographies for closely related language varieties. They thus increased the distance among languages and possibly 'invented' languages (Makoni, 1998; Ranger, 1989). Although by 1906 missionaries in Southern Africa sought to reverse this process, it was too late (Heugh, 2003).

A third, dynamic process emerged from among the speech communities themselves in the form of pidgins (e.g., in Cameroon and Nigeria) and of Creoles, especially along the Atlantic coastal areas. The Creoles of Gambia, Cameroon, and Sierra Leone borrowed terms from English, whereas the *crioulo* of Cape Verde, São Tomé and Principe, and Guinea Bissau borrowed from Portuguese (Sow and Abdulaziz, 2003). French-influenced Creoles appeared in Mauritius and Réunion. Regional varieties of former colonial languages are also emerging in urban centers where these languages are appropriated in counter-hegemonic ways (Owino, 2002). This process has reconfigured linguistic ecologies in terms of the relationship between the local and the former colonial languages. The latter are no longer 'foreign' and are more likely *en route* to becoming languages of wider communication in modern metropolitan centers, for example, in Dakar, Maputo, and Johannesburg, they are seldom heard and used on the periphery, however, where they remain quite foreign.

Each of the colonial powers developed language policies that matched their style of administration: direct rule in the case of the French, Spanish, and Portuguese and indirect rule in the case of the Germans and British. Language education policy set in place a pattern that prioritized the use of the colonial languages as the language education target and under-emphasized local languages. For the last century, this policy and practice have been recognized by scholars as detrimental to social, economic, and educational development. Even though most countries achieved their independence during the 1960s, few have made much progress toward reprioritizing local languages in education and in practice. Gramsci (cited in Hoare and Smith, 1971) and Bourdieu (1991) provided the ideological explanations about why it is so difficult for, and not in the interests of, post-colonial governments to alter the existing 'habitus' or status quo.

To add to the complexity, some African languages have also come to displace or diminish the status and functional use of smaller indigenous languages. Arabic (Ayari, 1996), Amharic, and Kiswahili were thus used before, during, and after the colonial

period. Others, like Chichewa (in Malawi) and Setswana (in Botswana) have been used in language policies after independence to achieve the same ends. With few exceptions, though, the emphasis remains directed toward English, French, Portuguese, Spanish, and Arabic, especially in the upper echelons of education, political activity, and the economy. Unfortunately, these languages remain inaccessible to most people in those areas where they now represent the key to power. Formal education, since the late 19th century, has been exclusionary, resulting in large-scale failure (e.g., Obanya, 1999; Bamgbose, 2000; Wolff, 2000; Alidou, 2004). Because language policy apparently serves the interests of the ruling elites, rather than the proletariat, it has also become highly politicized (Mateene, 1999; Ouane, 2003).

Language Policy during the Colonial Period

Direct rule and the prioritization of the colonial languages "facilitated the policy of cultural assimilation, especially in the French, Portuguese and Spanish territories, resulting in the withdrawal from, even denial of, the authentic sources of African creative genius by the new elite" (Boahen, 2003: 238). The French, determined to establish francophone systems, forbade the use of African languages and Arabic in schools: "Literacy through the use of Ajami, Tifinagh, or any other writing system was strictly prohibited" (Alidou, 2004: 199). The 1944 French African Conference in Brazzaville (Diop *et al.,* 2003) reinforced this policy. Written resources in local languages available before colonization were put aside, and further language development in the French colonies was minimal (Abdulaziz, 2003). The concept of education became synonymous with education in French. Similar language policies that discouraged local language use were adopted in the Portuguese and Spanish colonies, although education was less of a priority in these colonies and was left in the hands of Catholic missionaries.

The Germans, Belgians, and British, preferring indirect rule, encouraged the use of indigenous languages to varying degrees. Where African languages were used in education by the British and German administrations, they were the larger, regional lingua francas, rather than the smaller local languages, and were incorporated into transition to German or English programs.

The spread of Kiswahili, which was already a language of trade in East Africa, was advanced during German occupation between 1885 and 1914. German administrators believed it would be useful as a language for governance, and missionaries were encouraged to use Kiswahili for primary education. When Britain took control of what was then Tanganyika in 1918, the use of Kiswahili medium in primary schools was continued, although English was to be used in education from secondary school onward. The British administration thus cemented a late-transition model. At independence in 1961, Tanzania became one of the very few countries to declare an African language, Kiswahili, as its national and official language. German administration left less of an imprint on Namibia where the education of African children was left to the missionaries.

The British, too, preferred indirect rule and encouraged the missionaries' use of African languages in primary schools (about 3 to 4 years, except in Tanzania), with a transition to English in the 4th to 5th year. Some authors attributed Britain's 'weak' support of indigenous languages to the policy of separate development (e.g., Kamanda, 2002), which was most evident in South Africa. Nevertheless, a positive consequence of this policy was the gradual development of orthographies, terminologies, and written texts in many African languages in former British colonies, unlike the situation in territory colonized by Southern European countries. The effects of different policies continue: it takes less time to develop written materials where there are already orthographic systems in place, even when those orthographies are contested.

Language Education Policies and Independence

Even though most countries achieved their independence in the 1960s, the colonial policies continue to the present day. The terms 'Francophone' (including the former Belgian colonies), 'Anglophone,' 'Lusophone' (Portuguese), and 'Arabophone' Africa are frequently found in the literature. They denote the linguistic sphere of influence of the more resilient elements of the 19th–20th century colonial control of Africa, as well as the spread of Arabic that predated and outlasted direct European influence. The first three terms are unsatisfactory, however, because they perpetuate the effect of colonial activity even after independence. Second, given the small percentage of people who speak French, Portuguese, and English proficiently (10–20% according to Heine, 1992; see also Roy-Campbell and Qorro, 1997 and Kamanda, 2002), the terms are misnomers. Third, there is some overlap between Francophone and Arabophone Africa, because Tunisia, Algeria, and part of Morocco were at one time under the control of the French and the French language, but are now administered through Arabic. Fourth, these terms exclude those countries that have developed their own rather different language policies, such as Ethiopia

and Somalia. Both of these countries developed language policies that are strongly oriented toward a single African language, namely Amharic and Somali, respectively.

During the colonial period, a series of educational commissions of inquiry and reports, beginning with the United Missionary Conference in Kenya in 1909 and including the 1953 UNESCO *Report on the use of the vernacular languages in education,* were undertaken. In contrast to existing language policies, each of these reports recommended the use of the mother tongue as the primary medium of education and during the better part of primary school. The recommendations of these early reports were mirrored in a later series of reports and resolutions issued by ministers of education and heads of state, such as the Organization of African Unity Language Plan of Action for Africa (OAU, 1986) and the Asmara Declaration in 2000.

Therefore, upon attaining independence, one might have anticipated a reprioritization of African languages, as well as an attempt to rediscover what worked well in education prior to colonization. Yet, with the exception of Tanzania, Guinea Bissau, South Africa, Ethiopia, Somalia, and most recently, Eritrea, African states have not paid much attention to the maintenance or extension of African languages in the school system. Surprisingly, in most of the former British territories, the colonial practice of using the local language as the medium of instruction for up to 4 years was either whittled away to 3 or fewer years or even done away with altogether, as for example in Zambia, Kenya, Uganda, Zimbabwe, and Botswana. Materials, school texts, teacher training programs in the local languages, and terminology lists relevant at levels above the third year in school fell into disuse and gradually disappeared.

Unsurprisingly, by the late 1980s, most of these countries began to identify crises in English-language levels of achievement in schools: The earlier transition to English was not achieving the desired objectives. Tripathi (1990) suggested that, 25 years after independence, English-only education had reduced the percentage of Zambians proficient in English. Yet, it has taken another 15 years for the reintroduction of mother-tongue education, albeit in a limited and early transition to English form. A protracted time lag between problem identification, policy declaration, and change of practice is fairly common. Malawi's post-independence policy of using one national language – Chichewa (Nyanja) – as the only medium of instruction for the first 4 years of education was revised in 1996 to include other local languages, yet partial implementation began only in 2004.

Little changed in the Spanish, Portuguese, and French colonies during the first decade or more of independence: most formal education continued in French, Portuguese, or Spanish. However, there were several attempts to experiment with various forms of transitional local language (mother-tongue) programs. By 1973, experimental schools were established in Niger and have continued since then to be known as "Bilingual French-National Language Schools" (Wolff, 2000). Since 1975, steps have been taken to transcribe Malian languages and develop orthographies for use in schools in the transition-to-French experimental programs (Hutchison, 1990). Mozambique, which achieved independence in 1975, implemented experimental bilingual school and adult programs (e.g., Benson, 2000; Veloso, 2002) and altered its language education policy in 1996; however, it was not until 2003 that its schools began providing limited use of local languages for 3 years of schooling. A consortium of nongovernmental organizations (NGOs) has collaborated in the Propelca project in Cameroon since 1981 to develop early mother-tongue transition programs and to experiment with a three-language model: the mother tongue, a regional Cameroonian language, and either French or English (Tadajeu and Chiatoh, 2005). The government has not, however, implemented these programs on a widespread basis.

Alidou (2004) noted that, since the 1990 World Conference on Education for All, which was held in Jomtien, there has been increased interest in experimental programs that begin with African languages. Experimental bilingual or trilingual programs that have been usually funded by aid agencies from Germany, the Netherlands, and the Nordic countries have been piloted in several African countries. Well meaning as they may be, these programs are nevertheless always framed as transitional models, with the ultimate target being an exogenous language. Therefore, although these programs attempt to revalue African languages, the process is fundamentally flawed. Models based on the transition from the local language to one of higher status, in which most teachers are not proficient and which the communities seldom hear or use in everyday activities, have already failed across the continent for 120 years (cf. Wolff, 2000; Stroud, 2002). The answer lies in other approaches.

Language policy in the Maghreb took a different course after independence. The spread of Islam from the 7th century onward across North Africa and the establishment of Koranic schools had a significant impact on linguistic practices. In addition to the diglossic situations that developed in relation to Classical (written) Arabic for religious purposes and the numerous informal and spoken varieties of

Moroccan, Tunisian, and Algerian Arabic, for example, there were also numerous varieties of Berber that pre-dated Islam. The Maghreb, including Mauritania and Libya, embarked on an arabization policy after independence. Arabization was intended to gradually dissolve the influence of French, as well as Spanish for part of Morocco and Italian in Libya. The spread of Islam, followed by francophone and then arabization policies, has had a deleterious effect on Berber languages. Although Berber-speaking communities constitute between 45% (Spolsky, 2004) and 60% (Saíb, 2001) of the population in Morocco, and between 20% (Spolsky, 2004: 135) and one-third (Bamgbose, 2000) of the population in Algeria, they have been ignored in policy provision. Even though Modern Standard Arabic has been selected for use as the written language in schools, it is also sufficiently distant from the spoken varieties to create difficulties (Daoud, 2001; Saíb, 2001). Despite political attempts to replace French in former French colonies in the Maghreb, it continues to occupy a prominent position in education, and arabization has not yet achieved dramatic improvements in education. Ayari (1996) ascribed very low levels of literacy in the Maghreb to the doule bind of diglossia and bilingual education that perpetuates the belief and reality that upward mobility is achieved only through an exogenous language.

Language Education Policies with Potential

There have been examples of language policies in Africa that have had successful academic outcomes, and these policies offer useful insights. To make best use of these examples, educators, language specialists, and political groups need to be able to separate educational from political issues.

Somalia is the only country to have achieved, since independence, the use of an African language throughout the years of school education. Government policy and commitment toward rapid implementation of this language policy led to the development of the Somali orthography, the use of Somali in the schools, and the development of educational resources in Somali between 1973 and 1986. What was required was a single-minded government-driven process which included a mass literacy campaign for approximately 2 years during the mid-1970s while other activities were interrupted. Increasing civil strife from 1987 and descent into civil war by 1991, however, has brought about a collapse in the education system, and thus the policy has been short-lived (Griefenow-Mewis, 2004).

Since independence, Ethiopia and Tanzania have each selected and used a dominant African language, Amharic and Kiswahili, respectively, as a medium of instruction throughout the primary school years, followed by the transition to English in secondary school. Although the implementation of these language policies has been accomplished, the weakness of both is that other indigenous languages have been ignored. In each case, few students have found their way into secondary school education and beyond. The response in Tanzania has been pressure to introduce English as a medium of instruction earlier (Roy-Campbell and Qorro, 1997). Ethiopia has, however, chosen to introduce other significant regional languages for the medium of instruction in primary schools beginning in 1994. Implementation has been complicated and slow, and it is too early to assess the efficacy of this alternative (Bloor and Tamrat, 1996). A similar move in Malawi to expand the use of a single national language, Chichewa, by including other local languages, alongside English, indicates a growing awareness that a monolingual African paradigm does not work well in multilingual African societies.

In South Africa and Namibia, there has been local language development and use throughout primary education. The South African government, during the first phase of apartheid (1955–1976), succeeded in training teachers, developing terminology, translating school textbooks, and establishing the mother tongue as the medium of education for 8 years of primary schooling for African pupils in South Africa and Namibia (formerly South West Africa). This was achieved with minimal expenditure: far less was spent on the education of African children than was spent on English- and Afrikaans-speaking learners. Political resistance to apartheid and the compulsory use of Afrikaans alongside English in secondary school resulted in a student uprising in Soweto in June, 1976. Thereafter, mother-tongue education was reduced to 4 years followed by a switch to English for most speakers of African languages. In 1997, a new government, having declared 11 languages as official languages in a democratic constitution, introduced further changes. Although this new language policy facilitated the greater use of African languages, the national department of education ignored it and has established, instead, an even earlier transition to English. The students who have African home languages (some 78%) switch to English after 3 years, whereas ironically, English and Afrikaans speakers continue to use their mother tongue as the medium of education as they did during the colonial and apartheid eras. The gap in educational achievement, predictably, continues to widen (Heugh, 2003).

Between 1966–1984, the first independent government of Guinea Conakry, formerly a French colony, also established mother-tongue education in eight (later reduced to six) local languages for 8 years of

schooling. This policy seems to have failed because parents and communities were not sufficiently consulted, and the process was entirely top-down, linked specifically to the autocratic leadership of Sékou Touré (Kazadi, 1991; Yerende, 2005). Political changes since 1984 resulted in a reversal of the policy to the use of French as the medium of instruction. There has been recent discussion of reintroducing limited mother-tongue education by adapting a model from Mali in which 3 years of schooling in the mother tongue is followed by a transition to French (Yerende, 2005).

The Six Year Primary Project in Ife, Nigeria, in which Yoruba was used as the medium of instruction for the 6 years of primary education, has been well documented (e.g., Bamgbose, 2000; Adegbija, 2003). The significant lesson from this longitudinal study is that use of the mother tongue as the medium of instruction does not prevent the achievement of proficiency in the language of wider communication (LWC). Rather, the extended use of the mother tongue facilitates high levels of proficiency in the other target language. This project confirms the current theories of additive bilingual education in an African setting.

The Somali, South African, and Guinean examples reveal specific issues that could inform future developments. First, where there is political will, provision of education in the mother tongue or local language development is feasible in Africa and can be implemented within a short period of time. Second, each case shows that cost is not a prohibitive factor. These achievements occurred with minimal expenditure. The third lesson, from each of these 3 countries is that if the communities have not been adequately consulted and policy implementation is linked to an undemocratic government, policy success is short-lived.

The Nigerian and South African cases provide other critical evidence. African children achieved considerable academic success during both the Six Year Yoruba program (Bamgbose, 2000) and the 8 years mother-tongue program followed by transition to English and sometimes Afrikaans (Heugh, 2003). In each case, the mother tongue was used as medium of instruction, and English was taught as a subject only, but by teachers proficient in the language. By the time students were required to switch to English, they had kept up with the academic requirements of the rest of the curriculum, and they had sufficient proficiency to switch languages. The common denominator in these examples is 6 or more years of use of the mother tongue as the medium of instruction before making a transition/switch to an exogenous language. The only examples of successful early transition models in Africa have been in the late 19th- and 20th-century mission schools and more recent private school systems that cater to the children of the elites. Submersion and early transition models that are predominantly found in Africa, which affect the majority of those who are able to attend school, fail.

Residual Effects of Colonial Policies

The experience of colonization and the education of a small African elite that was to be assimilated into the administrative apparatus effectively undermined confidence in African languages as adequate conduits of education. Pre-colonial education systems in Ethiopia and the Sahel have shown that African languages can be used as languages of education through tertiary education. Post-colonial attempts to make systemic educational use of African languages in South Africa, Somalia and Guinea-Conakry have been accompanied by repressive government and thus discontinued after political change.

For the most part, post-colonial education systems have continued colonial policies and generally underutilized African languages and knowledge systems. They have not produced satisfactory academic achievement and are characterized by very high dropout and repeater rates. A UNESCO study conducted in 2000 of literacy and numeracy levels of fourth-grade students in African countries showed consistently poor results across Africa (an average of 32% for numeracy and 25% for literacy in Nigeria; Alidou, 2004). The majority of children who enter school do not go beyond primary schooling. Colonial education and the use of colonial languages have increased social inequalities along class and gender lines (Obanya, 1999; Bamgbose, 2000; Ouane, 2003; Alidou, 2004).

Why Are the Colonial Languages Retained in Education?

One reason that the former colonial language is retained for high status functions is that it is perceived as neutral. This perception has been advanced notably in Zambia, Namibia, South Africa, and Mozambique. The existence of multiple local languages is often thought to increase the likelihood of ethnic rivalry and tensions and civil strife. However, recent examples of ethnic conflict in Somalia, Rwanda, and Burundi show that it occurs even when people speak the same language. Another argument is that the management of multilingualism is believed to be more expensive than that of monolingualism in the colonial language. However, this argument does not stand up to empirical data (Grin, 2005); the costs of not providing mother-tongue education (school failure, high dropout rates, and alienated youth)

are likely to be higher. Most authors have argued that keeping the colonial language for high-status functions without simultaneously promoting African languages is to the advantage only of the ruling elite.

Conclusion

Every year, at one conference after another, language experts identify the ill-fitting and misapplied language policies of the African continent, and they resolve to persuade governments to change course. Changes do occur, but they are too little and too slow. Programs that include more African languages will not change the current educational prognosis if they are designed merely as a transition to Arabic, Spanish, French, Portuguese, or English. Another solution needs to be found, one that requires a completely new approach to language acquisition theory and practice in Africa. The answer may lie in the language chains and informal acquisition of multilingualism that lubricate communication across the continent, rather than with governments' capacity to change and effect appropriate policy.

See also: Africa as a Linguistic Area; African Linguistics: History; Amharic; Applied Linguistics in Africa; Arabic; Bamgbose, Ayo (b. 1932); Berber; Bilingual Education; Bilingualism and Second Language Learning; Bilingualism; Cape Verdean Creole; Education in a Former Colonial Language; Education in a Multilingual Society; Egypt: Scripts, Ancient; English in the Present Day (since ca. 1900); Ethiopian Semitic Languages; French; Ge'ez; Hausa; Language Planning and Policy: Models; Language Policy in Multilingual Educational Contexts; Lingua Francas as Second Languages; Missionary Linguistics; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Pidgins and Creoles: Overview; Portuguese; Somali; Spanish; Swahili; Tadadjeu, Maurice (b. 1950); Tigrinya; Wolof; Yoruba.

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Language Education Policies in North America

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Naming the official language(s) is the most readily recognized manifestation of language policy. In North America, Canada and the United States differ markedly in this respect. The United States has no explicitly declared official language (although throughout its history, there have been attempts to amend the United States Constitution to make English the official language). In contrast, Canada has an official policy of bilingualism, with the Official Languages Act (1969) declaring French and English to be the nation's official languages. The scope of language policy extends beyond designating the official languages, however, to "the combination of official decisions and prevailing public practices related to language education and use" (McGroarty, 1997: 67). In fact, Spolsky (2004: 46) maintains, "Of all the domains for language policy, one of the most important is the school." Thus, language education policies can be viewed as a significant subset of language policy broadly defined.

This article examines the language education policies of the United States and Canada, with the official language policy of the two nations (or lack of it) as backdrop. In both countries, education is primarily within the jurisdiction of the states or provinces, rather than the federal government, but policies are, in fact, framed at multiple levels – federal, state or provincial, and local – and they are enacted through executive, legislative, and judicial actions at each of these levels. Given the large number of state and local jurisdictions represented in the two countries, this article will focus on language education policies at the federal level, with occasional reference to significant state policies.

Language Education Policies

Both Canada and the United States have diverse populations, with many languages spoken in communities around each country. In the United States, students from non-English-speaking backgrounds represent the fastest-growing segment of the student population and constituted over 10% of the K–12 public school student population in 2003 (Padolsky, 2004). These students speak over 400 languages, but nearly 80% are native Spanish speakers (Kindler, 2002). In Canada, in addition to the two official languages, communities use "11 different Aboriginal language families... and over 100 other languages actively used by immigrants and their descendants" (Burnaby, 2002). As a result, language education policies (implicit or explicit) cover at least three areas of concern:

- Medium of instruction issues
- Heritage languages development
- Learning of new languages for all students.

Policies in the United States

Broadly speaking, education policies in the United States express the following views on language:

- Although there is no official language, proficiency in (standard) English is widely recognized as necessary, desirable, and a goal of education.
- Learning languages other than English is encouraged for instrumental reasons related to national defense and economic competitiveness, with language education supported in limited ways.
- Services in languages other than English for nonnative speakers are encouraged in some educational contexts, to allow access to the educational system, but maintenance of heritage languages is not generally supported (Christian, 1999).

In general, U.S. language education policies treat *language diversity as a problem* to be addressed, whether it is diversity among residents of this country or diversity around the world among those we may need to communicate with (as opposed to viewing *languages as resources*; see Ruiz (1988) for a discussion of this contrast).

The Native American Languages Act passed in 1990 is an exception to the preceding in that it declares that U.S. policy is to "preserve, protect and promote the rights and freedom of Native Americans to use, practice, and develop Native American languages." Although this act does not represent language education policy directly, it can be used to justify learning Native American languages in schools (McCarty, 2004).

Speakers of Languages Other Than English

Language education policies related to medium of instruction and maintenance of native languages other than English has become highly salient with increasing linguistic diversity in the schools. Discussion of these policies is often contentious because of mixed attitudes toward pluralism and their overlap with many highly charged political issues such as immigration. As a result, proposals for legislation for K–12 as well as adult education that relate to this population have been hotly debated.

Federal law has never required that native languages be used as medium of instruction. Education laws since 1968 have authorized funding to help schools develop programs to assist students with limited English proficiency to learn English and succeed academically, primarily through programs that facilitate transition to an all-English curriculum. A Supreme Court decision (*Lau v. Nichols* in 1974) held that schools violate students' civil rights when they fail to provide students from a non-English-language background with special services that help them to participate more fully in public education (but medium of instruction was not specifically addressed). Since that time, the major mechanisms for language education policy have been through the courts on civil rights bases and through appropriations determining the amount and targeting of funding for states, school districts, and schools. The most recent major education law, the No Child Left Behind Act of 2002 does not enact language education policy. It explicitly makes schools responsible for the academic progress of all groups of students and requires that English language proficiency outcomes demonstrate annual progress for nonnative speakers. Although native language development is neither prohibited nor encouraged, the emphasis on performance in English and on accountability for schools and students places a premium on English-medium instruction in current policy and practice. Thus, policies on the use of languages other than English in instruction (to serve students from non-English-speaking backgrounds) have not been intentionally or specifically formulated at the federal level, but have evolved from a series of legislative, judicial, and regulatory actions.

States vary widely in their policies on medium of instruction. Since the 1960s, some have required use of native language in schools where a certain number of students speak the same language. However, several widely publicized campaigns since the mid-1990s have culminated in public votes on bilingual education (Crawford, 2004). In three cases (California, Arizona, and Massachusetts), the referendum passed and the practice of bilingual education was severely constrained. In one case (Colorado), the measure did not pass.

Learning Additional Languages

Another major domain of language education policy covers the learning of languages other than English (often termed "foreign" languages, "second" languages, or "world" languages). This domain, for example, includes the designation of high-priority languages for the country and taking actions to make sure that the needed programs for learning additional languages exist. In the United States, there has been a general policy direction of broadening the number of languages available for study, particularly among "less commonly taught" languages, through funding for university-based centers and fellowships, materials and curriculum development, and study abroad programs. Lists of "critical" languages are periodically generated for different purposes by the Departments of Education or Defense, and legislative and regulatory proposals specify particular languages for attention.

Policy support in the United States for foreign languages has been somewhat stronger in higher education than at the elementary and secondary levels, but it remains far from a mandate or requirement. Less than 10% of college students study a language, and less than 10% of those students learn a less commonly taught language (NSEP, 2003). In the 1950s, the National Defense Education Act included the goal of strengthening modern foreign language instruction, with priority given to languages judged to be needed by government, business, and industry. Later, the provisions moved to the Higher Education Act, with a focus on building capacity in the system through such mechanisms as funding for university resource centers, fellowships, undergraduate international studies and foreign language programs, business and international education programs, and international research and studies program.

Another program reflects more recent directions in federal language education policy. The National Security Education Program, established in 1991 and administered through the Department of Defense, provides funding for study-abroad opportunities for undergraduate and graduate students, with special focus on nonlanguage specialists, and for projects to improve international and language education in institutions of higher education (NSEP, 2003). NSEP emphasizes non-Western European languages and exemplifies the federal priority on expanding the range of languages being studied.

In June 2004, The National Language Conference was convened by the U.S. Department of Defense to "to identify actions that could move the United States toward a language-competent nation" (www.nlconference.org). Participants from government, military, education, and private sectors assessed the country's needs and issued a call to action to improve its language capacity. The conference took a clearly instrumental orientation toward valuing skills in languages other than English (for defense and economic competitiveness). Future policy actions related to learning languages other than English may flow from the results of this activity expressed in a white paper "recommending the initial steps toward a national language agenda" that is in preparation.

In summary, policy toward the learning of foreign languages takes a very pragmatic, instrumental approach. As concerns over national security have grown, the role of language education to address those issues has been the driving force of policy.

Policies in Canada

In Canada, the context of official bilingualism changes the policy landscape somewhat, in that both French and English are the major societal (and official) languages. As in the United States, education in Canada is governed by the provinces, so the federal government has no national level education (or language education) policy, except as related to the official languages. French and English are protected as languages of instruction for their native speakers, and they are the two languages that are taught as second languages in most schools in Canada.

Medium of Instruction

According to Cumming (2000), speakers of English or French in a context where the other official language dominates have "official minority" status (e.g., English in Quebec or French in Ontario). Federal policy guarantees children with an official minority language background (French or English) the right to elementary and secondary education in their native language. Immigrant and indigenous families who speak languages other than French or English do not have similar rights, although in some provinces, use of local community languages as the medium of instruction is allowed (Burnaby, 2002).

Speakers of Languages Other Than French and English

Language education policies for speakers of languages other than French or English are primarily set at the provincial level. As in the United States, the focus is on learning one of the official languages, with native language as medium of instruction permitted but not required. Some attention has been given to maintaining heritage languages in Canada, particularly for the indigenous (Native or First Nations) populations. Some provinces have developed programs to promote specific Native languages, including use of the languages as medium of instruction (e.g., Cree; see Burnaby, 2002). For the languages of immigrants, such as Chinese or Ukrainian, about half the provinces have curricula that include instruction in the local heritage languages, but it is primarily outside the official school day. Some exceptions, such as Ukrainian immersion programs in Manitoba and Alberta, do exist (Cumming, 2000).

Learning Additional Languages

As a result of the official language policy, French (in English-dominant communities) and English (in French-dominant communities) are the most commonly taught additional languages in Canada, from elementary through higher education. Several bilingual French–English universities exist around the country. Government estimates put the percentage of bilingual Canadians at 18%, and a plan was launched recently to increase that number, aiming to provide "new momentum for Canada's linguistic duality" (Government of Canada, 2003). This five-year Action Plan for education and other public sectors promotes the use of both official languages and sets a goal that, by 2013, half of all secondary school graduates will be bilingual (English and French). The plan is backed by increased funding to help schools and communities achieve these goals.

Language education policies with respect to other languages vary from province to province, including the age at which language study begins. Many languages are offered as school subjects, including classical and modern languages, as well as languages of immigrant and indigenous populations.

Conclusion

In summary, neither the United States nor Canada has federal-level, explicit language education policies (with the exception of attention to French and English as official languages in Canada), but a variety of legislative, funding, and regulatory actions constitute implicit policies. In underlying orientation, however, there are some differences. Despite their diffuseness, implicit U.S. language education policies share an orientation to *language as problem* and learning languages primarily for instrumental reasons. In contrast, Canada pursues some language education policies that value language as a resource, particularly in the case of French and English (evidenced by the recent strategy to increase the incidence of bilingualism) and to a lesser extent by a commitment to other heritage languages, both indigenous and immigrant.

See also: Bilingual Education; Bilingualism and Second Language Learning; Bilingualism; Canada: Language Situation; Education in a Multilingual Society; Foreign Language Teaching Policy; Language Policy in Multilingual Educational Contexts; Minorities and Language; Minority Languages: Education; Mother Tongue Education: Standard Language; Multiculturalism and Language; United States of America: Language Situation.

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Language Education Policies in South Asia

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Languages of administration and education have always been matters of concern to the state in all parts of the world. Conquests, empires, and religious proselytization have been powerful agents of the spread of classical languages such as Arabic, Chinese, Greek, Latin, Pali, Persian (Farsi), and Sanskrit and of modern languages such as English, Spanish, and Portuguese. The states of South Asia have been engaged in determining and revising their language and language-education policies since obtaining their independence from colonial rule in the mid 20th century. This is a brief sketch of the language education policies of India, Pakistan, Bangladesh, Nepal, and Sri Lanka.

Multilingualism

With more than 330 languages and 'mother tongues' in India (1991 census), 69 languages and dialects in Pakistan (Rahman, 2004a), 37 languages and dialects in Bangladesh, more than 18 languages in Nepal (Savada, 1993), and 5 languages and creoles in Sri Lanka, South Asia is home to a great many of the world's languages. Virtually all of the people of the region are at least bilingual, and many are multilingual. Even speakers of major languages, e.g., Hindi speakers in India, are fluent in a local language or dialect (e.g., Bhojpuri, Magahi, Garhwali) besides Standard Hindi. The same is true of Pakistan, where people may speak Punjabi (Panjabi) or Sindhi in addition to Urdu, and of Nepal, where although Nepali is used widely, in some regions Hindi is used as a second language.

In view of the number of languages spoken in South Asia, the entire region faces the problems of (a) determining the domains of use of each language, (b) allocating resources to all the languages to ensure their relevance to most domains of activity, and (c) forging a national identity not fractured by narrow language loyalties. The attitudes toward and perceptions of English accompanying its spread, functions, and increasing use in national and international domains throughout the area add to this already complex picture.

Language Policy

South Asia is home to four families of languages: Indo-Aryan, Dravidian, Sino-Tibetan, and

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Language Policy

South Asia is home to four families of languages: Indo-Aryan, Dravidian, Sino-Tibetan, and

Austro-Asiatic. Speakers of all these families of languages inhabit all the countries in the region except Sri Lanka. India, the largest nation of South Asia, has always been a multilingual state, exhibiting great linguistic and ethnic diversity. The constitution of India (1950) declares India a "Sovereign Socialist Secular Democratic Republic" (Preamble) and recognizes Hindi in the Devanagari Script as the Official Language of the Indian Union and English as the Associate Official Language. Its Eighth Schedule also lists a number of national languages (originally 14, later 15, and by now 22); the Eighth Schedule keeps expanding because inclusion in it bestows certain advantages on the speakers of a named language (Krishnamurti, 1995: 15).

The proposals in the *National curriculum framework for school education: 2000,* prepared by the National Council of Educational Research and Training, recommends that a mother tongue or regional language should be the first language to be studied in the first two years of schooling. In the next three years, one modern Indian language other than the mother tongue or regional language (Hindi in non-Hindi-speaking states) and English should be added. This three-language formula (a regional language, English, and Hindi in non-Hindi-speaking states; Hindi, another modern Indian language, and English in Hindi-speaking states) should continue in the first two years of secondary school. Sanskrit should be introduced as part of the curriculum in regional language or Hindi at the primary level as it has had impact on all languages of India. At the upper secondary stage, an option to study Sanskrit parallel to English or Hindi should be made available. The final decision about introducing English at the primary or early secondary level has been left to the states; all states by now have made English mandatory as a second or third language in the primary or early secondary grades.

The Islamic Republic of Pakistan has gone through several cycles of framing and promulgating a constitution. According to the constitution adopted in 1973 and modified subsequently, Urdu is the official language of Pakistan; English, however, performs the real functions of an official language. The number of languages listed for Pakistan is 69; only a handful of these have any numerical or political strength. Urdu is spoken by only 7% of the population as a first language and 70% of the population as a second language. The numerically strongest group, Punjabi speakers (44.15%), identify with Urdu, unlike Sindhi speakers, who take a great deal of pride in their language and its great literary tradition. Pashto speakers (15.42%) and Sindhi speakers (14.10%) treat their languages as markers of their respective identities (Rahman, 2004a). Both groups, however, have reconciled themselves to education in Urdu because they realize its value in increased mobility and career advancement. As Rahman observes, "the consequence of privileging Urdu strengthens ethnicity while, at the same time and paradoxically, it threatens linguistic and cultural diversity in the country" (2004a: 5).

Language played a significant role in the movement to make Bangladesh a nation separate from Pakistan. Although Bengali, or Bangla as it is called by the speakers of the language, had the largest number of speakers, Urdu was imposed as the sole official language in both West and East Pakistan. This act added to the resentment the Bengalis felt on other grounds, e.g., administrative, economic, and political. Bangla became a symbol and a cause for which the Bengali people were willing to fight, and they achieved their goal of an independent nation in 1971.

The constitution of Bangladesh (adopted in 1972; current version as amended in 1996) declares Bangla the national language of the nation and does not mention any other language. The speakers of Austro-Asiatic, Dravidian, and Sino-Tibetan languages constitute small minorities. The constitution recognizes neither their ethnic identity nor their languages; the emphasis is on strengthening a Bengali culture and identity.

The 1978 constitution of Sri Lanka designates Sinhala the official language, Tamil "also an official language," and English a link language. The constitution states that all official documents and records are to be kept in Sinhala except in the Northern and Eastern provinces, where Tamil is to be used, and that Tamil or English translations of all official document and records are to be made available upon demand. There is provision for education – including university education – in Sinhala, Tamil, or English. The emphasis in chapter 1 of the constitution is on forging 'a Sri Lankan identity, recognizing the multiethnic, multilingual and multireligious character of Sri Lankan society.' Sinhalese, as the official language, and Buddhism, as the religion, are given 'the foremost place' by the constitution.

The national and official language of Nepal, as proclaimed by the Ministry of Education and Sports, His Majesty's Government of Nepal, is Nepali in the Devanagari script. All other languages spoken in Nepal are recognized as languages of the nation. Nepal is home to two distinct groups of languages: Indo-Aryan and Tibeto-Burman. The Indo-Aryan languages with the largest number of speakers are Nepali (12 million), Maithili (2.85 million), and Bhojpuri (1.79 million); the Tibeto-Burman languages with the most speakers are Tamang (1.2 million) and

Newari (1 million). All linguistic groups acquire some competence in the official language, Nepali, through the school system. Hindi or Hindustani functions as a lingua franca in local markets. In spite of the country's linguistic, ethnic, and religious diversity, Nepalis have forged a distinct national identity.

Mediums of Instruction

In all the countries of South Asia, official policy notwithstanding, there is a great deal of variation among different regions in the type and quality of education. In India, following the provision in the constitution regarding linguistic rights, efforts have been made to provide primary education through the mother tongue (Sharma, 1985). Parents, however, prefer the regional or an official language as the medium of instruction for their children in view of the clear advantages these languages provide in terms of mobility and career choices (for a discussion of issues in language, education, and society, see Krishnamurti, 1998; Pattanayak, 1991). Accordingly, the number of languages used as mediums of instruction has varied considerably since the 1950s, and the national and official languages are flourishing as mediums of instruction. Schools that have national languages and Hindi as mediums are generally state supported; most English-medium schools are privately run, many of them by Christian missions (the convent schools), although they receive financial support from the state as long as they follow the national curriculum. Economic factors, overwhelming linguistic diversity, and Christian missionary work have led nine states and Union Territories of India to declare English their official state language (for a list, see Krishnamurti, 1995: 17).

The official language policy in Pakistan has been to encourage the learning of Arabic as the language of religion and Urdu as the medium of instruction for the entire nation in order 'to transform the Pakistani Nation into an integrated, cohesive entity.' The objective is to 'make the Qur'anic principles and Islamic practices as an integral part of curricula so that the message of the Holy Qur'an could be disseminated in the process of education as well as training' (Pakistan.gov). A majority of public schools use Urdu as the medium of instruction; Sindhi and Pashto are confined to their respective regions. However, as the state does not have adequate resources to provide universal education, private institutions are filling in the gap. The traditional madrassas, numbering 137 or fewer in 1947, had mushroomed to 10 000 by April 2002, with 1.7 million students, according to the Minister of Religious Affairs (Rahman, 2004b). Both madrassas and English-medium schools are eligible to receive government aid. Madrassas are funded and supported by private parties, donations, and religious organizations; the English-medium schools have the backing of the civil service and the armed forces. Most scientific, technical, and professional education in Pakistan follows the pattern observed in India, i.e., the medium of instruction is English.

The medium of instruction in Bangladesh is Bangla in most educational institutions; private institutions offer English-medium education to the children of the elite and Koranic education in Arabic to students of religion. Arabic is taught in all religious schools because Islam is the state religion. Members of religious minorities are exempt from learning Arabic or attending courses in religion.

The official policy in Nepal is to facilitate education through the mother tongue, and various programs are in place to implement that policy. According to the document put out by Ministry of Education and Sports (dated October 2004), Nepal will institute a national action plan in primary education between the years 2005 and 2007 that will translate a three-language policy into practice, the three languages being Nepali, a local language, and English.

The official policy in Sri Lanka is to encourage Sinhala and Tamil, the latter in its region, as mediums of education. English is not discouraged as a medium of instruction; it has been recognized as a medium for imparting higher education, as it is in India, Pakistan, and Bangladesh.

Role of English

Regardless of attitudes and perceptions, and of official policies encouraging mother tongues as mediums of instruction, demand for English education is on the rise all over South Asia, resulting in loss of this domain for other languages. For example, according to India's National Council of Educational Research and Training's Sixth All India Educational Survey (1998, based on a survey conducted in 1993–1994), the number of languages used as mediums of instruction in primary education declined from 47 in 1978 to 33, and in secondary education, from 43 in 1978 to 21.

Economic Development versus Issues of Identity

All countries of South Asia are struggling to find their niche in the global economy of the 21st century. The demands of development favor English, while the desire to preserve distinct cultural identities requires the use of national and often regional and ethnic languages in many domains of life. This is a struggle

in which the state sometimes comes to a decision that leads to political unrest, as in Sri Lanka. At other times, the state makes a decision, and the people are content to follow it, as in Nepal. In more complex multilingual situations, the state may make decisions, and the people may agitate and have the decisions modified in several ways. In India, following non-Hindi-speakers' agitations, the issue of official language was resolved by leaving English in that role for all practical purposes. Linguistic states were created for the same reason, and the list of national languages keeps expanding as more and more 'minor'-language speakers seek recognition and state support for their languages.

Trends

Except for Sri Lanka, countries in South Asia have had low rates of literacy, the lowest occurring in Bangladesh and Pakistan. The concerted efforts at providing compulsory primary education to children and spreading literacy among adult populations have produced impressive results in some countries (UNESCO Institute of Statistics 2000–2004). Female literacy is on the rise, and the numbers of schools and school-going children have grown several fold (Research, Reference, 2004; Rahman, 2004a). Literacy efforts conducted in the mother tongue or another familiar language have a much greater chance of success than those in an unfamiliar language. However, the increasing demand for English education at the primary level creates a dilemma. Providing support to multiple mother tongues and regional languages is an immense task; simultaneously imparting literacy and education in what to most school-going children is an unfamiliar language makes the task even more complex. In a global economy with increasing reliance on service-oriented occupations and emphasis on technical education for better-paying jobs, it is natural for parents – educated or not – to want English-medium education for their children.

All the countries of South Asia are attempting to make it possible to bring technology to all their peoples, irrespective of language. In several states of India, it has become possible for people in villages to log onto the Internet using their local languages to get information about water-usage patterns or marketability of their products at the highest margins of profit (www.apnic.net). Rahman (2004a, 2004c) pleads for extending 'localization' (i.e., translation of computer programs from English) to the minor languages of Pakistan. Such technical developments require considerable financial investment. Language education policies have the potential for realizing the goals of universal (technical) education; whether languages with small numbers of speakers will survive in competition with English and other major regional and official languages is difficult to predict.

See also: Bangladesh: Language Situation; Bilingual Education; Bilingualism; India: Language Situation; Language of Tertiary Education; Language Planning and Policy: Models; Language Policy in Multilingual Educational Contexts; Nepal: Language Situation; Pakistan: Language Situation; Sri Lanka: Language Situation.

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Language Education Policies in Southeast Asia

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Introduction

Contemporary Southeast Asia covers nearly 10 million square miles of mainland and island territory generally south of China, north of Australia, and east of the Indian subcontinent. From northwest to southeast, Southeast Asia comprises Burma, Thailand, Laos, Cambodia, Vietnam, Malaysia, the Philippines, Singapore, Indonesia, Brunei, and East Timor.

The 11 nations of Southeast Asia are immensely diverse linguistically. Among the approximately 550 million residents of the region can be found speakers of hundreds of native languages (Chong, Hmong, Javanese, for example), many national languages (Khmer [Central Khmer], Thai, Vietnamese, for instance), and several regional languages of wider communication (varieties of Chinese and Malay in particular). With the exception of Thailand, the countries of the region endured colonization and as a result experienced greater or lesser exposure to European languages – Dutch in Indonesia; English in the case of Brunei Darussalam, Burma, Malaysia, the Philippines, and Singapore; French for Cambodia, Laos, and Vietnam; and Portuguese in East Timor.

Despite the diversity within and among the nations of Southeast Asia, two general themes emerge in examining their language education policies. Notably, governments have used language policies in education in an attempt to forge postcolonial or contemporary identities at the national level: the valorization of one or more usually indigenous languages in education integrates with other policy initiatives intended to engender social cohesion in the multiethnic and multilingual nation-states. At the same time, all 11 nations of Southeast Asia have created a place for English in education, usually as a foreign language, for reasons that emerge in the following case studies. These brief studies describe government language education policies and, as such, do not necessarily represent the practices of private educational institutions.

Burma

Burmese is the language of textbooks and most instruction in primary, secondary, and tertiary schools in Burma. At secondary and university levels, mathematics and sciences classes are taught with English texts, though teachers generally lecture in Burmese. Instruction in non-Burmese indigenous languages is extremely unusual, though a few Mon-language schools have recently been established within the context of a separatist cease-fire agreement. All Burmese students study English as a foreign language at all levels of education. Students may select majors in many European and Asian languages at the University of Foreign Languages and other institutions. The University for National Races is the only educational institution in the country that teaches non-Burmese indigenous languages.

Contemporary education policies that support English language learning in Burma intend to renew global and international connections that were purposely severed by isolationist governments after independence (N. Cheesman, personal communication; see also Cheesman, 2003).

Thailand

The national language, Thai, serves as the medium of instruction in almost all government primary schools, secondary schools, and universities. Very recently, a few minority languages began to be taught as subjects in government schools; these languages include Chong, Lahu Shi, and Mon. All students study English as a foreign language starting in the fifth year of primary school. In university entrance examinations, English is treated as a subject with a value equal to others. In their third year of high school, students may select a third language from among Mandarin Chinese, French, German, and Japanese.

Foreign language policies supportive of English reflect the government's recognition of the value of this language for global business communication and for international education and travel (C. De'Ath, personal communication; see also Kosonen, 2003).

Laos

Lao, the national language, serves as the medium of instruction in almost all government schools. In some primary and secondary schools in minority regions, some teachers use local languages in the classroom, and some professors at some higher education institu–tions use French texts while lecturing in Lao. Students are required to study English as a foreign language in all schools beyond the primary level, and some primary schools in urban areas also teach English. Depending on the availability of teachers, students may additionally be able to study other foreign languages, among them Mandarin Chinese, French, and Japanese.

The emphasis on English as a foreign language in Laos anticipates communication with development agencies and participation in ASEAN (K. Kosonen, personal communication; see also Souvanvixay *et al.*, 2002).

Cambodia

Cambodian or Khmer (Central Khmer), the national language, serves as the medium of instruction in most primary and secondary schools, though a few bilingual initiatives (Khmer and various indigenous languages) have recently opened in primary schools in minority areas. Cambodians study either English or French as a foreign language in secondary schools in programs generally supported by development agencies; students tend to choose English over French by a two-to-one margin. Most students in public universities study in Khmer and learn English as a foreign language, though some enrolled in programs supported by the French government or the Agence Universitaire de la Francophonie receive French-medium instruction.

Cambodia's dual foreign-language policy reflects the country's participation in diverse, and sometimes competing, international networks that privilege the two languages, notably ASEAN and the Organisation Internationale de la Francophonie (see Clayton, 2002).

Vietnam

Vietnamese is the language of education in schools of all levels in Vietnam. Some minority languages, including Cham, Hmong, and Khmer (Central Khmer), are taught as subjects in some primary schools. Students choose among Mandarin Chinese, English, French, and Russian to satisfy the foreign-language requirements that begin in primary education. Not all schools offer all four foreign languages; approximately 90% offer English, with successively fewer teaching French, Mandarin Chinese, and Russian. English as a foreign language is a *de facto* requirement in secondary education, however, for students must sit for an English language test as part of their secondary school-leaving examinations.

The emphasis on English in Vietnamese schools reflects the government's desire to participate in diverse economic and political venues and organizations that use this language (G. Fry, personal communication; Pham L. H., personal communication; see also Wright, 2002).

Malaysia

In primary schools in Malaysia, students may study in Bahasa Malaysia (a variety of Malay), Mandarin Chinese, or Tamil. Until recently, Bahasa Malaysia served as the sole language of instruction in secondary schools and universities, and students studied English as a foreign language at all levels of education. In 2000, public universities began offering between 30% and 50% of their courses in English, and in 2003 mathematics and science classes began to be taught in English in primary and secondary schools. In 1999, university applicants began to be required to take the Malaysian University English Test to assess their English proficiency.

The government's recent movement toward English as the language of the global economy and global information flows reverses a trend away from this language after independence (M. Lee, personal communication; see also David and Govindasamy, 2003).

The Philippines

In primary schools, Filipino, the Tagalog-based national language, serves as the medium of instruction in all subjects except mathematics and sciences, which are taught in English. The balance shifts in secondary schools, where all subjects except Filipino language and social studies are taught in English. Most instruction at Philippine universities is also given in English, except in Philippine history and government courses, where professors teach in Filipino. All students study English as a foreign language at all levels of education. At universities, students may elect to study other foreign languages, including French, Japanese, and Spanish.

The increasing emphasis on English as a foreign and instructional language anticipates participation in regional and global venues where English serves as the language of communication, among them the overseas employment market for Filipino professionals (A. Gonzalez, personal communication; see also Hidalgo, 1998).

Singapore

English serves as the medium of instruction at all levels of government education in Singapore, with the exception of civics and morals classes in primary and some secondary schools. Students are expected to choose one of the state's other official languages – Mandarin Chinese, Malay, or Tamil – to study as a 'mother tongue language,' and they are tested on their knowledge of this subject in school-leaving examinations. Students from north Indian ethnic backgrounds may fulfill this latter requirement with Bengali, Gujarati, Hindi, Punjabi (Eastern Panjabi), or Urdu, which they study in nonformal classes organized by their respective language communities.

The choice of English as the language of instruction advances two objectives: it provides a medium for neutral, intranational communication while at the same time preparing graduates for economic and other global and international interactions (J. Tan, personal communication; see also Gopinathan *et al.*, 1998).

Indonesia

The national language, Bahasa Indonesia (Indonesian), is the language of virtually all instruction at all levels of government education in Indonesia, and this variety of Malay also provides the language for all textbooks. The national curriculum dictates that all Indonesians study English as a foreign language in secondary schools, and the school-leaving national achievement test includes a section on English language skills. Additionally, different local or regional languages such as Batak or Javanese may be taught as subjects in 'local content' classes in primary and secondary schools. In tourism-dependent regions such as Bali, English may be introduced in local content courses.

The Indonesian government emphasizes English as a foreign language as a means of facilitating involvement in international forums that use this language, notably the Association of Southeast Asian Nations (ASEAN) and the World Trade Organization (C. Bjork, personal communication; B. Leigh, personal communication; see also Kuipers, 1998).

Brunei Darussalam

In Brunei, children study in Malay until the age of eight, at which point they transfer to English-language instruction in geography, history, and mathematics classes. English serves as the language of all secondary education, except in those subjects (Malay literature or Malay Islamic monarchy for instance) that have a clearly Malay or Islamic orientation. English continues to be used virtually exclusively at the university level. English is taught as a foreign language in all the state schools, beginning in primary education. Public schools funded by the ethnic Chinese community additionally teach Mandarin Chinese as a foreign language.

The government of Brunei intends its English-as-a-foreign-language policy to prepare bilinguals capable of economic communication within the region and, particularly, with the United Kingdom (S. Upex, personal communication; see also Gunn, 1997).

East Timor

East Timor's two official languages, Portuguese and Tetum, serve as dominant media of education in government schools. At the primary level, the availablility of teaching materials makes it possible to teach both languages from the first year. In secondary schools, many teachers use readily available Portuguese books while providing classroom explanation in Tetum; some teachers continue to use Bahasa Indonesia (Indonesian), though this practice is to be phased out by 2006. A similar mix of educational media prevails in universities, where in addition some foreign lecturers give classes exclusively in Portuguese and English. Both English and Malay are taught as second languages in East Timorese high schools, with English being the more popular choice among students.

The East Timorese government expects knowledge of English to complement and supplement that of Portuguese in regional and international communication (G. Hull, personal communication; see also Appleby, 2002).

See also: Brunei Darussalam: Language Situation; Burma: Language Situation; Burmese; Cambodia: Language Situation; English in the Present Day (since ca. 1900); Indonesia: Language Situation; Khmer; Lao; Laos: Language Situation; Malay; Malaysia: Language Situation; Philippines: Language Situation; Singapore: Language Situation; Southeast Asia as a Linguistic Area; Tagalog; Thailand: Language Situation; Vietnam: Language Situation; Vietnamese.

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Language Education Policies in the Pacific

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Introduction

The Pacific region, comprising about 25 000 islands, is traditionally divided into three areas: Melanesia, Micronesia, and Polynesia. To this can be added three larger states, Australia, Indonesia, and New Zealand, which together comprise the 29 polities of the Pacific that provide the focus of this article (see Table 1).

Language Situation in the Pacific Polities

The Pacific is characterized by a wide variety of geographic and demographic features (Table 1). The largest geographic polity, Australia (some 7 million square kilometers), is 1.2 million times bigger than the smallest one, Wake Island (6.5 square kilometers). Indonesia, with about 238 million people, is the most populous polity, whereas Pitcairn Island has only 46 inhabitants. These great differences among the polities are also reflected in the diversity of the region's languages and cultures. The Pacific is

Table 1 Pacific Polities – Demographic and Geographic Information

Polity	*Population*[a]	*Area (sq. km)*	*Population age between 0–14*	*Adult Literacy Rates %*
Melanesia				
New Caledonia and Dependencies[c]	213 679	19 060	29.4%	91.0
Papua New Guinea[j]	5 420 280	462 840	38.3%	44.9
Republic of the Fiji Islands[j]	880 874	18 270	31.7%	92.9
Republic of Vanuatu[j]	202 609	12 200	34.1%	33.0
Solomon Islands[j]	523 617	28 450	42.4%	20.5
Timor-Leste (East Timor)[j]	1 019 252	15 007	37.8%	43.0
Micronesia				
Federated States of Micronesia[j]	108 155	702	37.7%	90.0
Guam[d]	166 090	549	29.8%	96.4
Northern Mariana Islands[e]	78 252	477	20.3%	99.0
Republic of the Marshall Islands[j]	57 738	181.3	38.6%	90.8
Republic of Nauru[j]	12 809	21	38.2%	99.0
Republic of Palau[j]	20 016	458	26.6%	78.0
Wake Island[d]	200[b]	6.5	NA	NA
Polynesia				
American Samoa[d]	57 902	199	36.6%	99.5
Cook Islands[f]	21 200	240	NA	100.0
French Polynesia[c]	266 339	4 167	27.5%	97.8
Kingdom of Tonga[j]	110 237	748	37.1%	95.9
Niue[f]	2 156	260	NA	NA
Norfolk Island[g]	1 841	34.6	20.2%	NA
Pitcairn Island[h]	46	47	NA	NA
Republic of Kiribati[j]	100 798	811	39.3%	92.2
Samoa[j]	177 714	2 944	28.3%	98.2
State of Hawai'i, USA	1 211 537	16 649	27.1% (under 19)	NA
Tokelau Islands[i]	1 405	10	42%	91.2
Tuvalu[j]	11 468	26	31.3%	99.5
Wallis and Futuna[c]	15 880	274	NA	95.0
Larger States				
Australia[j]	19 913 144	7 686 850	20.1%	NA
New Zealand[j]	3 993 817	268 680	21.7%	99.5
Republic of Indonesia[j]	238 452 952	1 919 440	29.4%	88.5

[a] Estimated in July 2004.
[b] No indigenous inhabitants.
[c] French territory.
[d] United States unincorporated territory.
[e] Commonwealth in political union with the U.S.
[f] Self-governing, in free association with New Zealand.
[g] Australian territory.
[h] UK territory.
[i] New Zealand territory.
[j] Independent States.

a high-density language and ethnic group region that encompasses between 20 and 30% of the world's languages, many of which are increasingly endangered.

Except for Wake Island, which has no native inhabitants, all the other polities are multilingual (see Table 2). Papua New Guinea has the largest variety of languages with about 832, but Australia, Indonesia, the Solomon Islands, and Vanuatu are polities in which 85 or more languages are used. In most polities a number of languages are used for communication purposes, but not all the dialects, pidgins, or vernaculars that exist are well documented, and the number of users of some of these language varieties may be limited to a small proportion of the total population. For instance, in New Caledonia, inhabitants use 33 Melanesian-Polynesian varieties, but only 17 of them are spoken by more than 1000 people. This complex language situation provides the conditions for lingua franca to develop for everyday communication. Although Melanesian pidgin is the common lingua franca in that region of the Pacific, for historical reasons, English is the common lingua franca across the Pacific. English has national language status in 16 of the polities and official language status in seven others, while it is the first foreign language in the rest of the Pacific (i.e., in Timor Leste (Portuguese), Indonesia (Bahasa Indonesia), French Polynesia, New Caledonia, and Wallis and Futuna). In fact, a lingua franca, rather than a vernacular, is often chosen as an official language or national language in Pacific polities, such as Bahasa Indonesian in Indonesia.

This complex multiethnic language situation creates both risks and opportunities for language planning in each polity. Subtle language planning is needed to overcome the problems such complex language situations add to economic, social, and political development as well as to everyday life. Governing authorities could impose their favored language solutions on the populace, raising the status of some languages and reducing that of others, but there are risks in doing so. Language represents the culture of its users, and being excluded from official or national status means being subjugated politically, socially, or even economically, leading to possible cultural conflicts within or across national boundaries. Hence, 'keeping balance' and making symbolic statements becomes important. Thus, Maori and English are the official languages of New Zealand, and Portuguese and Tetum, not Indonesian, were selected for official and national use when East Timor became independent.

Language-in-Education Planning in the Pacific Polities

A great diversity of educational conditions and provision exists across the polities in the Pacific. As Table 1 indicates, some polities have high school age populations – and consequent costs – with proportions of school-aged students ranging from 42.4% in Solomon Islands to 20.1% in Australia. Educational outcomes, as measured by adult literacy rates, also vary widely, particularly in Melanesia.

In a number of polities, education is linked with national development. For instance, in Fiji, education policies are formulated within the framework of national goals so that the process of education contributes also to the achievement of government's broad outcomes. However, some Pacific polity governments are unable to support full educational provision and depend to varying degrees on support from the larger states (see Table 3). One outcome of this educational dependence, language-in-education planning in Pacific polities, has a focus on English, and to a lesser extent, French, Portuguese, or Bahasa Indonesian. A number of specific reasons for educational dependence can be specified.

First, in some larger states, formal education systems have been developed locally (e.g., Australia, Indonesia, or New Zealand), but many of the others are modeled on or dependent on those of the (former) colonial powers (e.g., Kiribati on the British, American Samoa on the United States, Papua New Guinea on Australia) due to their small population and education markets. As these small Pacific polities have difficulties in developing their own teaching materials, they import them and sometimes expatriates to help with the teaching. Furthermore, educational assessments in these small polities are modeled on, if not copied from, systems in the larger states (e.g., English language assessment in the Cook Islands or the school system in Kiribati draws heavily from New Zealand). Nearly 40% of Cook Island students continue on to Form 5 to complete the New Zealand School Certificate. Although Fiji is only now developing its own assessment system, much of the Micronesia relies on U.S. standardized tests. This kind of educational dependence is funded through aid provided by larger polities, and these dependencies tend to strengthen English or other exogenous languages, such as French, at the expense of indigenous languages.

Second, the lack of higher education institutes in these small polities also has reinforced the importance of English or French in language-in-education planning. Although the University of the South Pacific

Table 2 The Language situation in the Pacific Polities

Polity	*Languages spoken*	*Role of English*	*Role of other languages*
American Samoa	English, Samoan	Official language	Samoan: official language, spoken by 90% of the population.
Australia	English, 200 migrant and 90 indigenous languages	National language	Arabic, Mandarin, French, German, Indonesian, Italian, Japanese, Modern Greek, Spanish, Korean, Russian, Thai, Vietnamese, and some Aboriginal languages are taught in schools are LOTE.
Cook Island	English, Maori, Pukapukan	National language	Maori: 6 different dialects, not all have written forms. Pukapukan: Not intelligible with other Cook Islands languages.
Timor Leste	English, Portuguese, Tetum, Indonesian	Unofficial utility language of UN, peacekeepers and aid agencies	Portuguese: official language. Tetum: national language. Indonesian: an unofficial utility.
Fiji	English, Bau Fijian, Tamil, Hindustani, Rotuman	Official language	Bau Fijian: used as the standard Fijian along with various dialects, also the traditional lingua franca among Fijians. Hindustani and Tamil: spoken by Indo–Fijians.
French Polynesia	French, Tahitian	Foreign language	French: national language. Tahitian: community language.
Guam	English, Chamorro, Japanese	National language	Chamorro: spoken by about 50% of population. Japanese: used in tourist industry.
Hawai'i	English, Hawaiian	Official language	Hawaiian: spoken on all of the inhabited islands of Hawaii, reestablished as an official language of the state in 1978.
Indonesia	Bahasa Indonesia, Javanese, Dutch, Sundanese, 400+ other languages	1st FL in secondary schools. A tertiary level 'library language'	Bahasa Indonesian: official language, major L2. Javanese: most widely spoken (40%) variety. Sundanese: 15% of the population spoken. Dutch: former colonial language.
Kiribati	English, Kiribati,	National language	Kiribati: national language spoken by 97% of the population.
Marshall Islands	English, Marshallese	Official language	Marshallese: widely spoken as a second official language.
Federated States of Micronesia	English, Chuukese, Pohnpeian, Kosrean, Yapese, Ulithian, Kapingamarangi, Woleaian, Nukuo	National language	Chuukese: also known as Trukese, the most widely spoken indigenous language, followed by Pohnpeian. Other indigenous languages: All have more than 10 000 speakers.
Nauru	English, Nauruan	National language	Nauruan: limited intergenerational transmission, still actively used in the Republic, used as a second language by the Kiribati, Tuvalu, Kosraean, and Marshallese.
New Caledonia	French, 33 Melanesian–Polynesian dialects	Foreign language. English signage in tourist-related government departments	French: national language also is the first language of 35.6% of the population. The three most popular dialects: Dehu (15 000 speakers), Wallisian (9000), New Caledonian Javanese (6750).
New Zealand	English, Maori	National language	Maori: official language. Many migrant languages.
Niue	English, Niuean	National language	Niuean: spoken by 97.4% of the population.
Norfolk Island	English, Pitcairn–Norfolk	National language	Pitcairn–Norfolk: an in-group language used to assist in the preservation of identity, second language only.
Northern Mariana Islands	English, Chamorro, Carolinian	National language	Chamorro: national language, gaining its importance, is taught at the University of Guam. Carolinian: national language, semiofficial status.
Palau	English, Palauan, Sonsoralese, Tobi, Angaur; Japanese	National language	Palauan: national language in all states except Sonsoral (where people speak Sonsoralese), Tobi (Tobi), and Angaur (Angaur, Japanese).

Continued

Table 2 Continued

Polity	*Languages spoken*	*Role of English*	*Role of other languages*
Papua New Guinea	English, Tok Pisin, Hiri Motu, 832 indigenous language	Official language	Tok Pisin: official language, main lingua franca, most frequently used language in Parliament and commerce. Hiri Motu: official language, a pidginized Motu, influenced by English, Tok Pisin, and Polynesian languages, but unintelligible to Motu speakers.
Pitcairn Island	English, Pitcairnese, Pitcairn–Norfolk	National language	Pitcairnese: mixture of an 18th-century English and Tahitian dialects used in informal conversation among the Pitcairners.
Samoa	English, Samoan	Official language	Samoan: official language, spoken by 93% of the population
Solomon Islands	English, 60 indigenous languages, 120 Melanesian Pidgins	National language	Melanesian Pidgin: popular lingua franca with no official status, rarely used in official contexts. Twelve indigenous languages have more than 10 000 speakers, largest is Kwara'ae with 33 600 speakers.
Tokelau	English, Tokelauan	National language	Tokelauan: used in the schools.
Tonga	English, Tongan	Official language	Tongan: national language.
Tuvalu	Tuvaluan, Kiribati	Foreign language	Tuvaluan: official language. Kiribati: used on the island of Nui, part of Tuvalu culture.
Vanuatu	English, French, Bislama. About 87 indigenous languages	National language	French: national language. Bislama: national language, widely used in commerce, government, and internal dealings.
Wake Island	English	National language	U.S. territory. No indigenous residents.
Wallis and Futuna	French, East Futuna, Wallisian	Foreign language	French: national language. East Futuna: used in east Wallisian and Futuna. Wallisian: used by 7500 in Wallis and Futuna

and the University of Guam meet some needs of the smaller states, most polities are dependent on educational opportunities available from Australia, New Zealand, or the United States. For example, almost all current government leaders in the FSM are graduates of U.S. colleges. Thus, learning the languages of the (former) colonial powers is important for seeking further education opportunities in the region.

Such educational dependence secures English, French, or Indonesian's dominant language status in these polities, making it more difficult for indigenous or migrant languages to find instructional space. Consequently, language-in-education planning and language education strengthen and stabilize the dominant position of exogenous languages.

Although the pressures to learn English (or French or Indonesian) are great, some of the polities are trying to take account of the evidence that shows that education in the first language, rather than in the former colonial language, has educational advantages and closely associated psychological, social, and cultural benefits. Hence, some polities use their vernacular languages for at least part of formal education. An outstanding example of this is Tonga, which has high literacy rates for both Tongan and English. In PNG, which previously emphasized only English, a grassroots nonformal education movement arose in the 1980s that insisted on the use of vernaculars for elementary education to stem the tide of massive educational failure. For most of the polities, vernacular languages are only used as a medium of instruction for the very early years of schooling (e.g., in Cook Islands, Guam, Samoa, or Indonesia) and are then replaced by English or other lingua franca, although in some (e.g., American Samoa) indigenous language and culture continues to be taught as a subject.

In the region, official languages or national languages are subjects student teachers are required to study during their training. Some Pacific polities integrate the pedagogy of official languages or national languages in their teacher training programs (e.g., Fiji, Kiribati, or Samoa); some just indicate the language proficiency requirements for these programs. In addition, it is quite common to have examination requirements, at different levels, to assess the students' language proficiency. Some polities introduce such examinations at the primary level (e.g., Cook Islands, Guam, or Indonesia), some at secondary (e.g., Fiji, Kiribati, or Solomon Islands), but most

Table 3 Language-in-Education planning in the Pacific Polities

Polity	*Education system*	*Language-in-Education planning*
American Samoa	English is taught in public elementary, middle, and high schools. All content areas are taught in English. Samoan Language is included in the K–12 curriculum.	
Australia	School education is compulsory until the age of 15. Tasmania up to 16.	Language of instruction is English. A few schools offer bilingual or non-English immersion programs. Indigenous languages may also be used in primary education in some regions. LOTE is commonly taught as a subject in public schools. Formal language planning is the work of state governments and the federal government. For example, the National Language Policy Documents by Commonwealth Government in the 1980s and 1990s.
Cook Islands	Compulsory and free from the age of 6 to 15.6 years primary and 6 years secondary. Many students continue their education in New Zealand or Fiji. Use New Zealand Qualifications Authority standard for assessment. Cook Islands Assessment Board determines curricular design. English and Maori are the compulsory subjects of the Cook Islands School Certificate Examination. English is the compulsory subject of the Six Form Certificate.	The medium of instruction in primary schools may be English or Maori, but where Maori is used, particularly in the North Group of islands, English often replaces it after the first two years of schooling. The medium of instruction in secondary schools is English.
Timor Leste	Rehabilitation of education facilities is being undertaken. High levels of illiteracy especially among women. Too few schools for large numbers of school-age children. Cost of schooling means many children, especially girls and orphans, do not attend. Not enough qualified teachers. Very large class sizes. Schools lack furniture, equipment, textbooks, and supplies.	In 1975, Indonesian became the language of the state and the medium of education. Portuguese became the language of the resistance to Indonesian rule. Tetum was strengthened through its association with the Catholic church. United Nations Peace keeping Force, international aid agency workers, and UNTAFT raise the demand for English to gain access to economic, social, and political benefits of the foreigner influx.
Fiji	Education is not currently compulsory throughout Fiji. Compulsory education was only introduced in two of the nine school districts on a trial basis. Most of the schools are communal and essentially monoracial, i.e., run by Fijian or Indo–Fijian local committees and religious organizations, though government policy is to see schools as integrated as possible. In 2004, there were 712 primary schools. Of these only 20 are actually run directly by the government. A 6-year program and 8-year program are available for primary education. Secondary education consists of a 7-year program (Form 1–7). But few of the secondary schools provide Form 7. Secondary schooling is neither free nor compulsory.	English is the main language of instruction throughout the education system, including all secondary and higher education, and is the compulsory core subject for the Fiji Junior Certificate Examination and Fiji School Leaving Certificate. Primary schools may use a vernacular language (most commonly Fijian or Hindi) for the first three years (grades 1–3), while urban schools (with more mixed enrolments) generally use English from grade 1. From grade 4 all schools are required to use English as the language of instruction, with vernacular languages being offered as subjects. Students study their mother tongue throughout primary and secondary education, and Fijian and Hindi may also be studied as part of undergraduate programs at the University of the South Pacific, up to second-year level. English plus social science is one of four streams prospective teachers can choose from their training. Since 1987 a program has been initiated to teach Hindi and Fijian cross-culturally in primary schools. English is rapidly replacing vernacular bilingualism and the use of local contact languages (Pidgin Fijian and Pidgin Hindustani) as the main means of communication, especially in urban areas. In the government, English is designated as the official language of Parliament, Fijian and Hindustani are only occasionally used in the Senate and hardly ever in the House of Representatives.
Guam	Compulsory from age 5 to 16. Every school year during the 4th quarter, students in grades 1, 3, and 5 take the SAT9 test, which includes areas of reading, language, and listening.	The Department of Education provides courses for students with first languages other than English. Students are screened based on the language spoken at home. If a second language is spoken at home, a student may be tested and enrolled in appropriate English classes.

Continued

Table 3 Continued

Polity	*Education system*	*Language-in-Education planning*
Hawai'i	Total of 279 public schools follow the U.S. system, where children attend preschool, then elementary school grades K–5, intermediate or middle school grades 6–8, high school grades 9–12. Universities cater to local students as well as those from the Pacific.	In 1987, government schools began using Hawaiian as the medium of instruction at selected sites. In 1990, the federal government of the United States adopted a policy to recognize the right of Hawaii to preserve, use, and support its indigenous language. Hawaiian is the only Native American language that is used officially by a state government.
Indonesia	Secular and Islamic education is offered at every level of the education system, 6 years primary and 6 years secondary. Since 1995, compulsory education has been extended to 9 years. Schools are supervised by the Ministry of Education and Culture (MOEC), or by the Ministry of Religious Affairs for Islamic schools. Centralized curricular design. The role of the private sector in all levels of education is substantial. Language Council coordinates language issues, particularly for new scientific and technical vocabulary development. In grade 12 of senior secondary school, there is the National Evaluation of Studies at the Final Level – Academic Senior Secondary School, which includes English and Bahasa Indonesian.	The medium of instruction is Bahasa Indonesia, as stipulated by law. The local regional language may be used during the first 3 years of primary education in parts of Indonesia that have major regional languages (e.g., Javanese, Sundanese, and Balinese). The teaching and use of Chinese is discouraged. Dutch has virtually disappeared in public schools. The compulsory study of English is usually begun at junior secondary school.
Kiribati	7 years of primary, 6 years of secondary, and 1 year of preuniversity studies (Form 7). Secondary education, which is neither free nor compulsory, offers limited places, but leads to possible entry into the University of South Pacific or other universities. Staffing consists mostly of Kiribati graduate teachers but expatriate positions have been supported by aid for many years. The Curriculum Development and Research Centre is in charge the curricular design. National Common Entrance Examination for primary students includes the test of English and Kiribati. In both the Kiribati Junior School Certification Examination and the Kiribati National Certificate Examination, English is nationally set and marked.	A rural Teaching English as a Second Language (TESL) program is continuing to expand. All lessons are in English. Admission to secondary school is based on examination – a major component of which is mastery of English. Language use in Kiribati is fairly uniform; no minority groups that might affect educational policy. English is included in the 3-year primary teacher-training program at Tarawa Teachers College.
Marshall Islands	Compulsory education for ages 6 through 14 or completion of eighth grade. A high school entrance examination is administered to all eighth graders to determine the approximately 300 students who will be admitted to the two public high schools each year.	
FSM	All FSM children are required to attend school through the grade 8 (age 5–14). Private educational facilities play an important role in the overall education system. Postsecondary, FSM students can go to the College of Micronesia, the University of Guam or other U.S. colleges.	
Nauru	Free and compulsory education, age 5–16. There are 6 infant schools, 2 primary schools, a secondary school, and a technical school; also a mission school. Scholarships are available for higher education overseas.	
New Zealand	Compulsory education is divided into primary, intermediate, and secondary schooling. Primary schools cater for children from the age of 5 (year 0 to year 6). Children in year 7 and 8 may either be in a separate intermediate school or part of a primary, secondary, or composite/area school. Secondary schools usually provide for students from year 9 to year 13. In addition to the mainstream schooling, students can choose *kure kaupapa*, Maori state-supported schools, where the teaching is in the Maori language and is based on Maori culture and values. The national curriculum is applied.	Maori could be used by Members of Parliament and used in at least one Court, the Maori Land Court. However, English/Maori diglossia has been shifting toward, English monolingualism since the end of the WW II. In 1985, primary schools that use Maori as instruction medium were established. In these schools, the whole curriculum was delivered by using Maori. There are Maori language national curriculum statements for Maori language as well as for other learning areas. Other languages have not obtained similar supports from the government.

Table 3 Continued

Polity	*Education system*	*Language-in-Education planning*
PNG	There are three levels of education administration, namely the central, provincial, and district. Nearly 3000 primary and secondary schools are there in PNG. 6 universities provide higher education in there. Language and Literacy Section in National Department of Education sets up the National Literacy and Awareness Council to improve the literary rate in the country.	English-only education had been implemented during the immediate years of PNG's independence. Since 1986, the government, with the help of overseas aid donors, has embarked on a massive reform of the English-only formal education system. The first 3 years of formal education will be in vernacular language at elementary school, run by local communities. Changes in educational policy with regard to the use of vernaculars in the formal sector began in 1991.
Pitcairn Island	There are 5 students on the island. Age from 6–15. And there is one 'school custodian and culture teacher.' No formal education system.	
Samoa	Primary schooling is compulsory. Eight years primary and 5 years secondary. Staffing is a problem in both government and mission secondary schools. Large percentage of the staff are expatriates, on contract or volunteers from the U.S. Australia, and New Zealand. Only about a third of those who have finished teacher education program remain in the country. One-quarter of teachers in Catholic secondary schools have no teaching qualifications. In the year 8 National Examination, English and Samoan are examined with papers set and marked locally. English and Samoan are compulsory subjects for the year 11 National Examination. In the Western Samoa School Certificate Examination, only English is the compulsory subject (a new assessment mechanism is under discussion).	The official medium of instruction is English, although Samoan may be used where appropriate, particularly in junior levels, to clarify difficult concepts. Samoan language has been integrated into the curriculum at all levels. The Samoan language is used for conducting proceedings in the parliament with simultaneous translation into English. English is also used in the business and commercial sectors and is widely spoken. English and Samoan languages are included in a 3-year teacher training diploma program.
Solomon Islands	Education is compulsory from the age of 6 to 15; 6 years primary education and 5 years secondary, the first 3 years of which takes place in provincial secondary schools and in community high schools. Completion of form 3 represents the end of school education for most students. Current educational practices in the country are a continuation of colonial practices, and there continues to be a divide between the better-resourced schools in the regional centers and those on the rural areas. Of all secondary teachers 29% are expatriates. Major shortages of qualified teachers in English. English is included in both the Solomon Islands Secondary Entrance Examination and Solomon Islands Form 3 Examination.	English is the sole medium of instruction despite Melanesian pidgin being the common lingua franca. English is the language of instruction in the University of South Pacific. No natural Melanesian English-speaking community having developed. Although English is only spoken by 10–15% of Solomon Islanders, it is a requirement for all midlevel or higher jobs and for upward mobility in the government or private sector. English is included in the 3-year program of secondary teacher training.
Tonga	Free education is provided for children aged between 6–14. The 6 years of primary education are compulsory. Secondary schooling is free to the age of 14 but not compulsory. Churches and other private organizations play important roles complementary to the government's role in education. There are 26 secondary schools but only the government administrates six. Secondary Entrance Examination – both English and Tongan are subjects of examination.	The kingdom has high level of literacy, particularly in the vernacular language. Written Tongan is used for religious, governmental, informational, commercial, and personal functions. English is for external relations, higher-level administration, and education. Although the educational system has encouraged the learning of English, it has maintained an emphasis on the Tongan language. Tongan is the medium of instruction in primary school, whereas English is a second language. At the secondary level, English is the medium of instruction, although teachers have the option to use Tongan in Forms 1 and 2. Both English and Tongan are core studies of secondary teacher diploma program. Advanced English language course is offered.
Tuvalu	The only secondary school for Tuvalu islanders is located at Vaitupu.	The Vaitupu dialect is the dominant and most widely spoken and is the dialect of the educated, as it was used by colonial radio broadcasters and for the former weekly Tuvalu language newspaper.

Continued

Table 3 Continued

Polity	*Education system*	*Language-in-Education planning*
Vanuatu	The years of schooling of primary, junior secondary, and senior secondary are 6, 4, and 3–4, respectively. High primary enrolment rate but low in secondary. Although there were 284 primary schools run by the government, only 58 government secondary schools (in 2000). There is a campus of the University of the South Pacific set up in the capital.	The principal languages of education are English and French, but under revised education policies, vernacular teaching is being introduced in some rural schools.

test at both levels. Although these examinations may not cover only language assessment, failure on these language examinations in some polities may mean the lost of further education opportunities (see Table 3).

Future Language Policies and Education Trends

The language and language-in-education planning situation in the Pacific both influence and are influenced by current language education policies that expand the roles of English, resulting in some common outcomes. English is increasingly being used by English-knowing and English-using bilinguals, and varieties of English are beginning to assert themselves as legitimate ways of speaking. For pragmatic reasons, English continues to strengthen in this region, with the number of first language speakers increasing as more of the elites become English-dominant bilinguals. This pragmatic use of English and its presence via the media creates a large group of English-conscious bilinguals, who can understand the language in limited contexts. Promotional policies, educational aid relationships, and practical benefits make English the language that is needed for advancement in education and white-collar employment. In urban areas English is beginning to infiltrate the home, which has been the primary domain of vernacular language use.

However, there are strong traditions of both multilingualism and using lingua francas as buffers that have allowed local languages to survive and prosper, serving as markers of identity. Will English continue to remain primarily a lingua franca with indigenous languages providing the primary source of identity, or will its increased adoption lead to the collapse of the linguistic ecology and the extinction of most indigenous languages? This situation is complicated by the development and adoption of local standardized languages as lingua franca within Pacific polities. Will this growing layer of folk plurilingualism primarily serve to strengthen the role of the first- and second-tier languages, thereby contributing to unbalanced diglossia, a shift away from the use of smaller vernacular languages, and reduced natural language variation?

Plurilingualism is likely to remain the norm in the Pacific, but the degree of linguistic variation may be significantly reduced unless proactive measures are taken. These language problems and potential solutions are bound up with broader political, cultural, and economic issues. But meeting national and international communicative needs, rather than saving languages from extinction, is likely to be the focus of language education policies and what they can deliver.

See also: Bilingual Education; Education in a Former Colonial Language; Education in a Multilingual Society; Language Education for Endangered Languages; Language Education for Language Revival; Language Education Policies in North America; Language Education Policies in South Asia; Language Education Policies in Southeast Asia; Minority Languages: Education; Mother Tongue Education: Nonstandard Language.

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Language Education Policy in China

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Introduction

Language education policy in the People's Republic of China (PRC) consists of the PRC Constitution provisions and education-oriented legislation, the PRC government's executive regulations and decrees, and the Chinese Communist Party's (CCP) policies and directives. The relationship among the three is rather complicated, but as a rule the CCP's policies and directives have been underpinning the other two and, sometimes, above them, at least as far as language education policy is concerned (see Blachford, 2004; Zhou, 2004a).

As a multinational and multilingual state (Mackerras, 1994; Ramsey, 1987), the PRC has been struggling between accommodation and integration, a struggle that has been conditioned by the CCP's ideology, the Cold War, and globalization (Dreyer, 1976; Zhou, 2001, 2003: 36–98). This has resulted in pluralistic (1949–1958), integrationist (1958–1977), and bilingual/multilingual (1978–present) stages of language education policy development. Regardless of the changes, China always faces challenges as how to implement its national policies and how to make adjustments to local conditions (Lin, 1997; Xiao, 1998; Zhou, 2004b).

The Pluralistic Stage, 1949–1957

The pluralistic stage was characterized by accommodationism, which allowed the development of independent language education policies for Chinese and minority languages.

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From the beginning, the PRC provided adequate constitutional protection of linguistic pluralism in education (Zhou, 2004a). Passed as the provisional constitution in September 1949, the Common Program (Article 53) guaranteed minority nationalities freedom to use and develop their languages and scripts (Chen, 1967: 34–45). In 1954 the Chinese National People's Congress passed the first PRC Constitution, Article 3 of which guaranteed the same freedom (Chen, 1967: 75–92).

To implement the Constitutional guarantees, the Ministry of Education made a three-point decision on minority language education in 1951 (China, 1991: 28–40):

1. In minority communities with commonly used languages, such as Mongol, Korean, Tibetan, Uygur, Kazak, etc., primary and secondary schools should use native languages as the medium of instruction for all courses;
2. Minority communities without writing systems or with imperfect ones should begin to create or reform their writing systems, and at the same time adopt Chinese or a customarily used language as the medium of instruction on a voluntary basis; and
3. Chinese should be offered only on demand and on a voluntary basis in schools in minority communities.

The national language, known as *Putonghua* (Standard Modern Chinese), became a top priority when the first national conference on script reform recommended its promotion in October 1955. In November the Ministry of Education disseminated a decree (1996: 48–55):

1. Primary, secondary, and normal schools throughout the country should gradually use Putonghua as the medium of instruction and teach students how to speak it, beginning from language classrooms and spreading to all subject classrooms; and
2. Putonghua should be used in Chinese language classes in schools in minority communities.

It was firmly supported by a CCP directive in January 1956, and in February followed by the State Council's decree that specified (China, 1996: 7–15):

1. Starting in winter 1956 Putonghua must be taught in all primary and secondary schools (excluding minority schools) throughout the country.
2. By 1960 (a) third graders and above and secondary and normal school students should be basically able to speak Putonghua; (b) primary, secondary, and normal school teachers should be able to use Putonghua as the medium of instruction; and (c) graduating secondary school and college students and young teachers should undergo extensive training if they could not speak Putonghua.
3. All military schools should use Putonghua as the medium of instruction, and so should all evening and literacy schools.
4. The Ministry of Education should hold frequent training classes for teachers and educational administrators.
5. Putonghua should be promoted among the Han people (the majority) residing in minority communities and be taught in Chinese classes in minority schools.

This decree was the basis for Chinese education policy in the 1950s and for years to come. Meanwhile, the ministry also instructed schools to use simplified Chinese characters in classrooms, textbooks, and school documents, because traditional ones were considered a hindrance to rapid literacy development (China, 1996: 56; Rohsenow, 2004).

By 1956 education policies for Chinese and minority languages still remained rather independent. But in 1957 they were about to merge as Putonghua promotion gathered steam and *Pinyin,* a Roman alphabet intended to assist Chinese script pronunciation and ultimately to replace it and with a legacy long before the PRC, was published for public discussion before its formal promulgation in 1958 (Chen, 1999: 186–189; DeFrancis, 1950; Norman, 1988: 263; Rohsenow, 2004).

The Integrationist Stage, 1958–1976

Undergoing the Great Leap Forward (1958–1960) and the Cultural Revolution (1966–1976) (see Spence, 1991:574–583 and 602–652), China at the integrationist stage aggressively promoted Chinese and frequently suppressed minority languages in minority schools, although the 1954 Constitution had always been in effect and the simplified 1975 Constitution still protected minority language rights.

When Pinyin was officially promulgated at the beginning of 1958 the Chinese government proposed that it serve as the common base for creating and reforming writing systems for minority languages, in order to facilitate cultural exchange and communication among nationalities (Seybolt and Chiang, 1979: 228–243; Zhou, 2003: 203–208). Moreover, in March 1958 the Ministry of Education requested that all primary, secondary, and normal schools, including minority ones, start teaching Pinyin in fall 1958.

At the same time, the State Nationalities Affairs Commission made six recommendations to hasten integration, four of which were directly related to language education:

1. Chinese (Putonghua) should be offered in minority primary schools (allowing the provincial and

autonomous governments to decide the starting grade).
2. Han students should also learn minority languages when studying in schools that used minority languages as the medium of instruction.
3. Chinese or other languages might be used in literacy campaigns and schools in minority communities that had not created their writing systems yet or did not need such systems.
4. Chinese or other minority scripts might be used in literacy campaigns on a voluntary basis even if a minority group had its own script.

This policy was almost consistently implemented during this period, leading to bi/multilingualism in many minority schools and communities, whereas minority language education was only occasionally encouraged. Official Putonghua promotion in schools saw some highs in the form of nationwide model demonstration conferences at which model teachers and learners exchanged their successful experiences with conference participants, but the promotion was interrupted during the Cultural Revolution.

The Bi/multilingual Stage, 1977–Present

This stage has strengthened language education legislation to consolidate the new linguistic order with Chinese as the national language and minority languages as local ones, after the revival of the PRC's early pluralistic policies in the late 1970s and early 1980s.

After the Cultural Revolution China's linguistic landscape was transformed to bi/multilingualism (Chinese and minority languages) in many minority communities and bi/multidialectalism (Putonghua, its variants, and Chinese dialects) in almost all Chinese-speaking communities (Zhou, 2003; Saillard, 2004). Language education policy had to accommodate this diversity.

In 1980, with authorization from the State Council, the Ministry of Education and State Nationalities Affairs Commission instructed that minorities could use their own languages and scripts as the medium of instruction in schools and they should master both their native languages and Chinese (China, 1991: 91–96). Two years later, in 1982, Putonghua's position as the national commonly used language was adopted in the newly amended PRC Constitution (Article 19) (China, 1999), leading to a contradiction between the constitutional freedom to use minority languages and the constitutional obligation to use the national language, a contradiction that has since been reflected in national (and local) laws on education.

The PRC autonomy law for minority communities, which was passed in 1984, states that (a) autonomous governments can specify the medium of instruction for local schools in accordance with central laws and policies (Article 36) and (b) when conditions permit schools with a predominantly minority student body should use minority languages both in textbooks and instruction but still promote national commonly used Putonghua (Article 37) (China, 1998a). Passed in 1986, the PRC compulsory education law stipulates that schools should promote national commonly used Putonghua, and minority schools may adopt commonly used minority languages and scripts as the medium of instruction (Sun and Gao, 1996: 91–93). The PRC Education Law (passed in 1995) further specifies Putonghua as the primary medium of instruction (Article 12), with a similar clause on minority language use (China, 1998b: 2):

> Chinese language and script is the primary medium of instruction for schools and other educational organizations, but those with a student body of predominantly minority origin may use native or local commonly used languages and scripts as a medium of instruction.

All schools and other educational organizations should promote national commonly used Putonghua and standardized Chinese characters in their teaching. These laws delimit the constitutional freedom of minority language use by adding 'when conditions permit' and 'commonly used.'

To use Putonghua as the primary medium of instruction meets challenges not only in minority schools but also in Chinese schools where varieties of Putonghua and Chinese dialects are spoken. To accommodate the varieties of Putonghua in Chinese and minority schools, in 1986 the State Language Commission proposed to recognize three levels of Putonghua, an unprecedented recognition of different levels of a standard language in the history of status planning (China, 1987: 25–26; Saillard, 2004). In 1994 the Ministry of Education and State Language Commission published a regulation on how to measure Putonghua levels (three levels with A and B grades in each; 1A = highest; 3B = lowest) and who should attain which level (China, 1998b: 2072–2076). Schools, teachers, and students are all regularly assessed for their Putonghua proficiency individually and collectively (China, 1998b: 396–398). From 1995 on, primary and secondary school teachers must gradually reach Levels 1 or 2 before they are assigned teaching duties. The 2001 language law (passed in 2000 and effective in 2001) has confirmed Putonghua as the primary language of instruction (Article 10), minority languages as a legally permissible medium of instruction (Articles 8 and

10), and levels of Putonghua and level requirements for teachers, legislating a long existing linguistic order in schools and in the society (China, 2001: 4–9; Rohsenow, 2004).

Conclusion

Since 1949 the PRC has provided adequate constitutional and legislative protection of linguistic diversity in education with Putonghua as the primary medium of instruction and minority languages as local ones. Minority languages are used as a (supplementary) medium of instruction from primary schools to colleges, whereas Chinese is offered as subject courses and as a medium of instruction from primary schools to colleges in minority communities.

However, the constitutional provisions meet two serious challenges in the implementation. First, the language education policy was hijacked by the CCP's political agenda from the late 1950s to the mid–1970s, and has often been delimited by central and local executive decrees and regulations (Zhou, 2004a). Second, the policy has always faced the problem of how to adjust to and successfully accommodate local multilingual and multicultural conditions (Bradley and Bradley, 2002; Hansen, 1999; Harrell, 1993; Postiglione, 1999; Zhou, 2004b).

See also: Language Policy in Multilingual Educational Contexts; Minority Languages: Education.

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Language Education Policy in Europe

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Language policy in Europe, as elsewhere, is a highly complex matter. At one end, we have the attempts of those in authority to impose patterns of behavior on those subject to that authority. Some (e.g., Ager, 2001) would confine the term *policy* to the language behavior of those in power. However, the actual use and learning of languages by individuals everywhere is subject to the influence of many interacting agents: parents, family and friends, peer groups, teachers, information and entertainment media, authors both living and dead, etc. Ultimately, it is the decisions, conscious and unconscious, made by countless individuals in response to these influences that provide the reality of language policy. Inevitably, almost all those decisions are unobserved and perhaps unobservable. We concentrate attention on decisions at a high level, affecting large numbers of individuals, but we should not lose sight of the fact that it is only to the extent that individuals act in accordance with such decisions as interpreted and relayed by intermediates that policies are effective.

In the permissive atmosphere of the pluralist democracies that characterize contemporary Europe, political decision-making is increasingly decentralized. This is somewhat paradoxical, because at the same time, society is becoming more homogeneous and more tightly knit. Individuals find themselves participating in denser and more widely cast networks of communication than ever before.

The Historical Background

The basic language pattern of Europe today is the result of the large-scale migration movements following the collapse of the Roman Empire in the 5th century A.D. and the settlement of a large part of the European Continent by speakers of Germanic and Slav dialects. During the centuries that followed, poor communication led to a broad spectrum of largely mutually unintelligible forms of speech, tolerated by the thin administrative superstratum in the loose, shifting, dynastic feudal empires of the time. By the late medieval period, communications had much improved. The emergence of urban centers and the strengthening of social, economic, and political organization, with the rise of the middle class, started a process of crystallization, accelerated by the invention of printing, the growth of mother tongue literacy, and mass education. The modern nation state, epitomized by France, has seen itself as monolingual and monocultural. *Egalité* and *fraternité* allowed no place for minority languages and cultures. Compulsory education brought mass literacy in a standardized written language, based generally on the usage of an administrative class in a capital city. In the course of the 19th and 20th centuries, the older multilingual empires disappeared, and the patchwork of independent nation states became the norm. Politically fragmented language communities unified (Italy, Germany). Within multilingual states, local dialects and minority languages came under heavy pressure and were threatened with extinction. In self-defense, language-based separatist and irredentist movements became strong.

Current Development

However, at the same time as this historical development has been reaching its culmination, further dramatic improvements in communication have made it obsolescent. While 19th century technical developments (railway travel, postal services, mass circulation books and newspapers) reinforced the internal unity of the nation state within enforceable frontiers, developments of the 20th century (air transport, continental motorway networks, electronic media) have transcended those frontiers. Industry, commerce, finance, and the expanding leisure industries are coming to be organized on an international, even global, scale. Personal mobility for vocational, educational, and private purposes now entails travel across political and linguistic boundaries on a large scale. As a result, the language policy issues confronting national authorities in Europe arise from their

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being caught as a 'piggy in the middle' between the demand from minority communities for greater autonomy on the one hand, and the pressures of globalization on the other.

In all, up to some 200 indigenous languages are currently used in Europe, though the number is indefinitely higher if the languages of recent immigrants are taken into account. They vary greatly in the number of native speakers, speakers of the language as a second or as a foreign language, and in their role and status in society. It may be useful to follow the hierarchical distinction proposed by Abram de Swaan (2001) between peripheral, central, supercentral, and hypercentral languages.

Peripheral languages, to which most of the world's languages belong, generally occupy a small geographical area, have relatively few native speakers, and are learned as a second language only by outsiders marrying into or otherwise closely connected with the community concerned. They have virtually no role in organized foreign language teaching. They are used mainly for interpersonal spoken communication and often have no standard written form. They tend not to be used in public administration, in broadcast media, or in the education system. Their speakers are more or less obliged to be bilingual, especially when they have minority status within a larger political entity. Often, bilingualism leads to diglossia, with the peripheral language increasingly confined to domestic life and community functions, often cultural or religious. Under modern conditions, they are often at the limit of viability, used more by older people than by the younger generation, and are in danger of extinction. A surprising number of peripheral languages are in this position in Europe, largely unknown to the outside world.

Central languages are generally the official or *de facto* state languages of nations large and small, each existing in a standard written form used in newspapers and normal publications, in broadcast media, in public administration, and as the medium of instruction throughout the public education system. There is usually a standard spoken form based on the practice of the educated urban middle class, especially in the capital city. There are strong pressures upon all long-term residents, perhaps a legal requirement upon applicants for citizenship, to acquire and use it as a second language. Central languages have a place in foreign language teaching, but it is often marginal.

Supercentral languages are those central languages that are also the medium of international communication for a group of central languages. They are few in number, but they have large numbers of speakers, both native and non-native. In Europe, English, French, German, Spanish, and Russian have this status, though that of Spanish is mainly extra-European. They have an established position in foreign language teaching within their respective spheres of influence.

A hypercentral language acts as the medium of international communication, not for one restricted group of central languages, but for all. Its currency is global and an aspect of globalization, which both promotes and is reinforced by it. At present, English appears to be firmly established as the sole language in this role, in Europe, as elsewhere.

Minority Languages

The languages of Europe fall fairly well into one of those four categories, though each has its special characteristics distinguishing it from the stereotypical character sketched above, especially in the case of the peripheral languages. For instance, during the rise of the nation state, the use of minority languages was discouraged, even forbidden, and the speakers oppressed, especially in the educational system. Notoriously, clappers were attached to the tongues of children caught speaking Welsh at school. In France, the ideology of the Revolution maintained that standard French was the sole national language required by the values of equality and fraternity, which excluded the very concept of minorities. This model was followed by other emerging national states such as Turkey, where the existence of the Kurdish language was officially denied for decades. Following the Spanish Civil War, the Franco regime forbade the use of Catalan, Basque, and Galician in Northern Spain as divisive. At the same time, large-scale internal migration was encouraged, so that the number of children in Catalonia entering primary school with Catalan as their home language fell to 25%. All three languages now enjoy the status of official languages alongside Spanish in the autonomous regions concerned.

However, though many minority languages were pushed to the limits of viability, few actually succumbed. Most, if not all, European states still contain significant minority language populations. Attitudes have changed dramatically. Territorial minority heritage languages are now not simply tolerated, but positively encouraged. In a number of cases, small states have achieved or retained independence, raising a less widely used language to the status of a state language, retaining some characteristics of a peripheral language but others of a central language. The mix varies. Letzeburgisch is the everyday spoken language of the indigenous population of Luxembourg. It is dialectally differentiated, and despite a brief attempt at the end of the World War II to use a

standardized form for official purposes, it has no established standard written form. French and German are used as a matter of state policy for educational and administrative purposes, primary education being conducted in German and secondary education in French. In addition, no less than 36.7% of the resident population are economic migrants from other European countries, as are 9% of residents in Germany, Austria, and Belgium, as well as 6.5% in Sweden. There are appreciable numbers of migrants from other continents in the ex-imperial countries of France (6.2%), the United Kingdom (3.5%), and The Netherlands (4.2%).

The status of minority languages and their role in public life, administration, and education varies widely. The *Universal declaration of language rights* (1998), recognized by UNESCO, makes the most far-reaching claims for the use of mother tongue throughout the educational system, in courts, and in other contacts with officialdom at all administrative levels. The European Bureau for Lesser Used Languages (EBLUL) is supported by the European Union (EU) and is mostly concerned with the protection and promotion of territorial minorities. The Council of Europe has produced the *European charter for regional and minority languages* (1992). Its provisions are mostly qualified and non-mandatory, but even so it has been signed by 28 of the 46 member states (though ratified by only 15). Those signatories do not include countries where the problems are most acute, such as the Baltic States, especially Latvia where Russification had reduced the national language to minority status, especially in major cities. While Russian continues to be widely used in daily life and in much of the education system, citizenship and employment laws have been enforced that aim to restore Latvian as the normal language in public life.

In 2001, a native speaker of Arumanian (Vlach) was found guilty by a Greek court for spreading "false information on minority languages in Greece," and of causing disorder by claiming that a number of minority languages (Arumanian, Pomek, Macedonian, Albanian, and Turkish) are spoken in Greece. The verdict was, however, overturned on appeal.

Some countries (Ireland, Finland, Switzerland, Malta, Belgium) are officially bilingual. In others (e.g., United Kingdom, Italy, Spain), bilingualism is officially established in autonomous ethnic minority regions. Again, the actual relations vary widely. In Ireland, the everyday use of Irish is restricted to a dwindling Gaeltacht area in the West. Elsewhere in Ireland, while public signs are bilingual and parents strongly support the teaching of Irish in schools, they do not wish to speak it in daily life, which is as monolingually English as it is in England. In Belgium, where historically French was displacing Dutch in urban centers, reducing it to a rural patois, Flemish nationalism has established separate language hegemonies for each region (including a small German-speaking area around Eupen). Bilingual education, in the sense of the use of another language as the medium of instruction, is illegal.

In Finland, the role of Swedish is declining, with its use confined to shrinking coastal communities and its role in education giving way to English. In Switzerland, life in the three main communities is conducted monolingually, with Rhaeto-romanisch a protected minority language within the German-speaking area. The decision by Zürich to give the teaching of English priority over that of French caused outrage. In Malta and to some extent in Cyprus, the survival of English, the ex-colonial language, has been seen as an economic benefit. In officially bilingual regions, mother-tongue-medium education is available, usually as an option, in secondary as well as in primary education. Examples are: Frisian in The Netherlands; Sami in Norway, Sweden, and Finland; Croatian, Hungarian, and Slovene in Austria; Welsh and Gaelic in the United Kingdom.

Elsewhere, particularly in the case of immigrant communities, which are not protected by the Charter, mother-tongue education may be available as a transitional measure in primary school, or it is otherwise left to private initiatives by the community concerned, usually for religious or cultural purposes. In Sweden, the right of all minority children to mother-tongue education was legally established, but proved expensive and difficult to administer to only one individual. A minimum demand from 5 pupils is now required. Most countries strongly encourage long-term residents to acquire the national language, and most adult migrants will wish to do so, except in some cases for elderly relatives and dependents (e.g., Asian women) as well as some expatriate speakers of a super-central or the hypercentral language. Many countries, including the United Kingdom, require language proficiency as a condition of citizenship. Knowledge of the minority language in other than officially bilingual countries is not widely promoted, except in some cases for social services workers dealing directly with a particular minority group. Provision of court interpreter services and essential documentation in minority languages is the normal situation.

A unique position is occupied by the Romany language, which is the heritage language of an important European community, which is, however, not territorial, because its speakers are nomadic. The language is not well-researched. It exists in a number of spoken forms and has only recently been codified as a written language. Many ethnic Roma do not speak the

language, or do so in a reduced form. Consequently, only Finland, Germany, and Austria, which are not the main centers of Roma populations, appear to make special arrangements for the teaching of Romany. However, a number of Central and Eastern European countries are now concerned to protect and promote Romany language and culture through teacher training materials development and research, and to use Romany as a medium of instruction, as yet on a small scale, in vocational and further education.

Foreign Languages

In foreign language teaching (FLT), the language hierarchy outlined above is particularly clear. In all European countries the teaching of at least one FL is compulsory during secondary education (ages 11–16), except for Ireland, where priority is given to Irish. In the great majority of countries, FLT is compulsory throughout both lower and upper secondary education (for ages 16–18). This has not been the case in the United Kingdom, where modern languages are a minority option in the more specialized sixth form curriculum. The U.K. government has made FL optional from age 14, and about 50% of state comprehensive schools have already dropped FL from the curriculum for Key Stage 4 (ages 14–16). There appears to be a strong correlation between the exercise of the option to continue and social class. In Denmark, FL is not legally required, but 98% of pupils exercise the option.

The teaching of FL in primary education (younger than 11) was discouraged during the 1970s and 1980s following the negative findings of the Burstall Report on the experiment launched in the United Kingdom by the Nuffield Foundation in the 1960s (Burstall *et al.*, 1974). Since 1990, languages in primary schools have rapidly expanded, perhaps most dramatically in Italy. In most countries, the starting age for obligatory FL is between 8 and 11 years of age and is falling. In many countries, FL exists as an option from the start of primary and even in pre-primary education (ages 3–6). U.K. policy aims to compensate for optionality after age 14 by establishing an entitlement for FL teaching in primary education (not obligatory).

The dominant position of English as the hypercentral language is shown, not only by the weaker provision of FL in the anglophone countries, but also by its predominance in FL teaching, learning, and use elsewhere. It is the first and often only FL in all non-anglophone European countries, except Belgium (Dutch and French), Luxembourg (French and German), Romania (French), and Bulgaria and the Baltic Republics (Russian). In most of these cases, special factors operate. In Hungary, Slovakia, and the Czech Republic, German and English are learned as a second language at about the same rate.

A Eurobarometer survey commissioned by the European Commission for the European Year of Languages (2001) showed that strong FL provision enjoyed broad public support. Fully 93% of parents thought it important for their children to learn other European languages, and 71% believed that all Europeans should be competent in one European language other than their mother tongue. Support for two FLs ranged between 20% and 40% except in Greece (55%), Italy (60%), and Luxembourg (80%). About 53% claimed to speak one FL, 47% their mother tongue only. As to bilinguals, 41% of European non-native speakers (70% of students) claimed a command of English. As to the supercentral languages, command of French was claimed by 19% of non-natives, German 10%, Spanish 7%. As the survey did not cover Slav-speaking countries, the position of Russian is hard to assess, particularly because its teaching became identified with the Union of Soviet Socialist Republics' hegemony and collapsed in Eastern Europe after 1990. Of the central languages, only Italian reached 2% among bilinguals.

There are indeed some who resent the dominance of English as 'linguistic imperialism,' an aspect of globalization and U.S. hegemony. This opposition was strong in France, though the role of English in the French education system is no different from that elsewhere. The small but active Esperanto lobby emphasizes its political and cultural neutrality. However, the position of English in the education systems and its role in international life form a self-reinforcing spiral, which is unlikely to change without a radical transformation of the economic, social, and political situation that has produced it.

The Role of European Organizations

The policies of the European agencies strongly favor European cultural and linguistic diversity. Both the Council of Europe and the European Union actively promote measures, particularly in education, to maintain and develop multilingualism. Since the early 1960s, the Council of Europe has provided leadership for the development of FL teaching and learning. Its long-term aims were set out in the preamble to its 1981 Recommendation (81)18 to member governments:

> – that the rich heritage of diverse languages and cultures in Europe is a valuable common resource to be protected and developed, and that a major educational effort is needed to convert that diversity from a barrier to communication into a source of mutual enrichment and understanding;

– that it is only through a better knowledge of European modern languages that it will be possible to facilitate communication and interaction among Europeans of different mother tongues in order to promote European mobility, mutual understanding and cooperation, and to overcome prejudice and discrimination;

– that member states, when adopting or developing national policies in the field of modern language learning and teaching, may achieve greater convergence at the European level by means of appropriate arrangements for ongoing cooperation and coordination of policies.

In the pursuit of these principles, the Committee of Ministers called upon member governments:

(F14) To promote the national and international collaboration of government and nongovernment institutions engaged in the development of methods of teaching and evaluation in the field of modern language learning and in the production and use of materials, including institutions engaged in the production and use of multimedia materials.

(F17) To take such steps as are necessary to complete the establishment of an effective European system of information exchange covering all aspects of language learning, teaching, and research, making full use of information technology.

Consequently, the activities of the CDCC, its Committee for Education, and its Modern Languages Section have been concerned to encourage, support, and coordinate the efforts of member governments and nongovernment institutions to improve language learning in accordance with these fundamental principles and in particular the steps that they take to implement the general measures set out in the Appendix to R(82)18:

A. General Measures

1. To ensure, as far as possible, that all sections of their populations have access to effective means of acquiring a knowledge of the languages of other member states (or of other communities within their own country) as well as the skills in the use of those languages that will enable them to satisfy their communicative needs and in particular:
   - 1.1 to deal with the business of everyday life in another country, and to help foreigners staying in their own country to do so;
   - 1.2 to exchange information and ideas with young people and adults who speak a different language and to communicate their thoughts and feelings to them;
   - 1.3 to achieve a wider and deeper understanding of the way of life and forms of thought of other peoples and of their cultural heritage.
2. To promote, encourage, and support the efforts of teachers and learners at all levels to apply in their own situation the principles of the construction of language-learning systems (as these are progressively developed within the Council of Europe's modern languages programme):
   - 2.1 by basing language teaching and learning on the needs, motivations, characteristics, and resources of learners;
   - 2.2 by defining worthwhile and realistic objectives as explicitly as possible;
   - 2.3 by developing appropriate methods and materials;
   - 2.4 by developing suitable forms and instruments for the evaluating of learning programmes.
3. To promote research and development programmes leading to the introduction, at all educational levels, of methods and materials best suited to enabling different classes and types of student to acquire a communicative proficiency appropriate to their specific needs.

Its guiding principles, that language learning is for all, is lifelong, and centers on the communicative needs of learners, now enjoy acceptance, largely due to the impact of its Threshold Level concept, first applied to English in 1974 and later updated (van Ek and Trim, 1998) and applied to about 25 European languages. By concentrating on the purposes for which a language is used for communication rather than on its formal structure, a common learning objective was established on which the many agents involved in FL teaching could agree to harmonize their efforts. The success of its practical support for language teaching and teacher training has led to the establishment of the European Modern Languages Centre in Graz, Austria, which conducts an ongoing program of applied research and teacher training workshops, with the particular aim of raising the general level of professional competence to that of acknowledged centers of excellence.

The work of the Language Policy Division of the Council of Europe in Strasbourg has focused on the diversification of language learning and on the innovative concept of *plurilingualism*, related to but distinct from multilingualism. Plurilingualism asserts that, in the course of their experience, language users gradually build up a global communicative competence to which all language learning and use has a contribution to make. Languages are not held separate in the mind. They interact and together make new learning easier and can all be drawn upon for communication as the situation requires. Learning and teaching do not have to concentrate on perfect performance in a single language, or even two, but on enlarging the overall language competence and the effectiveness of its use. This concept of plurilingualism clearly implies a radical rethinking of language pedagogy, which is still at an early stage. To

assist, the Council of Europe has developed two new instruments. The *European language portfolio* enables learners to document the whole of their language learning experience, which may or may not lead to formal qualifications. The *Common European framework of reference for languages: learning, teaching, assessment* (CEFR) provides categories for all aspects of language use and the different kinds of competence that a language user has to develop and call upon for communication. It also provides descriptors for six levels of proficiency, A1 to C2. CEFR is already widely used across the Continent, partly for teacher training (Little and Perclová, 2001), but mainly to make the level of national qualifications more transparent and comparable. The preparation of a manual of guidance was started in 2004 by an international working party. A series of national language policy profiles is also underway. Reports have been produced by authorities in Hungary, Lithuania, Norway, and Slovenia.

The engagement of the European Union in language teaching policy is more recent and different in character. Whereas the Council of Europe is an intergovernmental organization, working toward common action through consensus and recommendations, the European Union is a supranational body, able to issue directives to member states, who are the more watchful for the limits of its powers. Until the Maastricht Treaty, the authority of the EU was limited to vocational (including teacher) training. Since Maastricht, it has been able to operate in the general educational field, but only in accordance with the principle of subsidiarity. It cannot determine policy, but acts in support of member states' government action where action is best organized on a European level. The broad lines of such action were outlined in the *White paper on teaching and learning: towards the learning society* (European Commission, 1995). Action IV: "proficiency in three Community languages" gave priority to supporting the learning by all Europeans of two EU languages in addition to the mother tongue. Because the first FL is almost always English, the requirement for two FL seems designed to reduce the dominance of English. However, the Commission was obliged to accept, though it deplored, the reluctance of member governments to give wholehearted support to a compulsory second FL by inserting the words *wherever possible* into the substantive resolution of the Council of Ministers. The Eurobarometer quoted above shows that public opinion shares the reservations of governments, and it seems likely that in most EU member states, one FL, usually English, will remain the universal obligation, with second and third FLs reserved for more able students, specialists, or in clearly multilingual situations, until such time as the plurilingual approach is more widely understood and accepted.

The main instruments used by the EU to support and influence FL teaching in Europe are its funding programs. The SOCRATES Programme for education in Europe comprises a number of actions relevant to FLs. COMENIUS focuses on the first phase of education, from preschool and primary to secondary school. It is addressed to a broad range of interests: pupils, teachers and other education staff, as well as local authorities, parents' associations, and relevant nongovernment organizations—in short, all those whose decisions determine policies and their implementation. By supporting school networks and partnerships and staff training, it aims to enhance the quality of teaching, strengthen the European dimension, and promote language learning and mobility. The issues emphasized include: learning in a multicultural framework, seen as the cornerstone of European citizenship, support for disadvantaged groups, and countering underachievement. ERASMUS concerns higher education, supporting student and teacher exchanges, joint development of study programs, thematic networks among departments and faculties across Europe, and the development of a European credit transfer system. GRUNDTVIG completes the coverage of lifelong education by supporting activities designed to promote European cooperation in improving the availability, accessibility, and quality of adult education. LINGUA is directly concerned with the promotion of language teaching and learning. The Lingua Action is designed to encourage and support linguistic diversity throughout the EU, to improve the quality of language teaching and learning, and to promote access to lifelong learning opportunities appropriate to each individual's needs. The action is divided into two parts: LINGUA 1 is intended to raise citizens' awareness of the Union's multilingual wealth, to encourage people to learn languages throughout their lifetime, and to improve access to FL learning resources across Europe as well as to develop and disseminate innovative techniques and good practice in language teaching. LINGUA 2 aims to ensure that a sufficiently wide range of language learning tools is available to language learners.

Support for language learning is also forthcoming for public and/or private bodies under the EC's vocational training program LEONARDO da VINCI. In addition to international placements, exchanges, and networks for the exchange of experience and good practice, Language Competences Projects' aim is to enhance multilingual and multicultural communication in training and working environments, e.g., by developing training tools and methods for training

language examiners. The TEMPUS program, which was initiated in 1990 to respond to the needs for higher education (HE) reform in Central and Eastern European countries following the fall of the Berlin Wall, encourages structural cooperation by forming consortia joining higher education institutions in EU member states with their counterparts in a wider range of non-EU states. With varying arrangements for financing, co-financing or self-financing, the consortia implement Joint European Projects with clearly defined objectives for up to three years. TEMPUS also provides Individual Mobility Grants.

The financial resources made available under these programs are large. They are eagerly sought and have been instrumental in bringing increasing numbers of schools and university departments to see their activities in a collaborative international context. Lacking such resources, the work of the Council of Europe has had to rely on its intellectual content persuading institutions and individuals in member states that their own interests are best served by investing some part of their own resources in international projects, which is perhaps a useful discipline.

A further consequence of financial disparity has been the internal language policies of the two organizations. Since its foundation, the Council has had just two official languages, English and French. In principle, the EU accords equal status to the national languages of all its members. Strictly applied, this would mean a huge operation of interpretation and translation for every event. In practice, that apparatus is deployed for sessions of the European Parliament and a number of formal occasions. Informal meetings are usually conducted, by agreement, in English and French. The siting of major institutions in French-speaking cities means that French is generally the predominant house language, while many outside delegates and experts use English.

Conclusion

Europe is, and will remain, a region of high linguistic diversity. Language policy at all its many levels is, and will continue to be, torn between the pressures of globalization and ever more efficient means of communication on the one hand, and strong feelings of national and community identity on the other. Political decision-makers will have to assess the relative strength of each pressure in specific situations, to find solutions that avoid or at least contain conflict. Much will depend on the success of education systems in producing a well-informed citizenry, free from mistrust and xenophobia, able and willing to form good working and warm personal relations with fellow human beings with different linguistic and cultural backgrounds.

See also: Applied Linguistics in Europe; Education in a Multilingual Society; Foreign Language Teaching Policy; Immigrant Language Education; Language Policies: Policies on Language in Europe; Minority Languages: Education.

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Language Education Policy in Latin America

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Whereas language planning concerns the decisions people make about languages and their uses in society, language education policy is the means by which those decisions are implemented "in the specific contexts of schools and universities in relation to home languages" (Shohamy, 2003: 279). In Latin America, language education policy has long been the primary channel for implementing national language policy, as education through the Spanish language has been the principal means of establishing a policy of linguistic and cultural assimilation for the indigenous population. In more recent years, progressive educational reforms that promote intercultural bilingual education have been implemented in conjunction with national language policies that recognize and, in some cases, officialize indigenous languages. Language education policy thus serves as the point of contact between abstract national policy on the one hand and the lives of regular citizens on the other.

Most of Latin America is characterized by long-standing economic and cultural gaps between three societal sectors: the indigenous population (also known as Indians or originary peoples); individuals who claim mixed Spanish and indigenous heritage (often known as *mestizos*); and *blancos* (whites), who claim or are perceived as holding Spanish or European heritage. Although estimates vary widely across Latin America (see Albó, 2004, for some reasons why), there are approximately 40 million indigenous people in Latin America, who speak one or more of roughly 400 indigenous languages, constituting approximately 10% of the total population (HRDOP, 1993). Demographics and the nature of the relationships between these populations of course vary across Latin American nations. For instance, in Brazil, as many as 150 to 170 indigenous languages are spoken by approximately one-quarter of a million Indians (but who represent less than 1% of the total population of 182 million) (World Factbook, 2003a). In Argentina, estimates concerning the indigenous population range from 450,000 to 1.5 million, representing only 1 to 4% of the total population of approximately 36 million (HRDC, 2001). In Mexico, in turn, there are 62 indigenous languages spoken by approximately 10 million people (representing approximately 10% of the population) (INEGI, 2000). In Bolivia, 70% (of the total population of 8 million) are estimated to be indigenous (Albó, 1995; ETARE, 1993) and over 30 ethnolinguistic groups have been identified, the largest of which are North and South Bolivian Quechua, Central Aymara (1.6 million), Eastern and Western Guaraní (60 000) (MDH, 1995).

Yet despite these differences and with some notable exceptions (for example, during the precolonial and early colonial period in Central Mexico, a variety of Náhautl was the principal language of instruction and literacy, Francis, 2002), the dominant narrative in most of Latin America has been one of Spanish domination and long-standing inequality, with indigenous sectors suffering from limited legal rights, restricted access to education, healthcare, and other social services, and less than full participation in their countries' political and economic systems. Language education policy both reflects and reinforces these inequalities, as for many decades in many regions of Latin America, indigenous students were, at best, denied education in a language that they could comprehend and, at worst, harshly punished for speaking their home languages in the classroom.

Very broadly speaking, Latin American language education policy falls into two broad types. The first set of policies is aimed at students who are monolingual speakers of Spanish (or in Brazil, Portuguese) acquiring English (or less commonly, French or another European language) as a foreign language. In many regions, these programs tend to be designed for – and in many instances are only available to – students from middle- to upper-class backgrounds and are created as a means to enrich their educational

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Very broadly speaking, Latin American language education policy falls into two broad types. The first set of policies is aimed at students who are monolingual speakers of Spanish (or in Brazil, Portuguese) acquiring English (or less commonly, French or another European language) as a foreign language. In many regions, these programs tend to be designed for – and in many instances are only available to – students from middle- to upper-class backgrounds and are created as a means to enrich their educational

and social opportunities. Enrichment programs such as these, which promote an additive type of bilingualism, have sometimes been labeled 'elitist' bilingual education (cf. Hornberger, 1991; de Mejia, 2002). See Friedrich and Berns (2003) for a review of literature on English in South America.

The second set of language education policies, which will be the focus of the remainder of this article, is aimed at students who speak an indigenous language and who need to acquire Spanish (or Brazilian Portuguese) as a second language. Such programs are designed as vehicles for providing meaningful instruction and literacy training in the students' first language, prior to (or concomitant with) their transition to Spanish (or Portuguese). These students tend to come from economically and socially marginalized groups within the national context. Advocates of such programs argue that the use of the students' first language provides them with a greater chance of engaging with the school curriculum, developing literacy skills, and eventually, participating on more equal terms in the wider national society. Yet these programs tend to be oriented overwhelmingly toward transition to the official language of the country and hence to promote a subtractive form of bilingualism.

Both types of language education policies have received greater attention in recent decades: the former as the result of globalization and the (perceived and real) importance of English on the global stage (Gunaratne, 2003) and the latter in conjunction with greater recognition of individual human rights and the progressive political reforms in many Latin American nations (Luykx, 2000, 2004; Skutnabb-Kangas, 2000). As a result, intercultural bilingual education has become much more widely recognized; indeed, "almost every Latin American country is developing this type of program, with the government, organized social groups, or both functioning as its source" (Godenzzi, 2003: 295).

Yet despite significant policy shifts, the long-term social inequalities that many language education policies were designed to address have yet to be substantially altered in the region, in part due to the significant lag in implementation of these measures. What von Gleich observed a decade ago for Peru remains true in much of the region; that is, "the gap between even the modest legal status [for the indigenous language] and implementation is deep" (1992: 62). The major challenges to full implementation of language education policy that meaningfully uses indigenous languages in classrooms include the dearth of qualified bilingual teachers, questions of language standardization, divergent interpretations of 'bilingual' and 'intercultural,' and complications surrounding decentralization and local authority over indigenous schools (see King and Benson, 2003, for a full discussion). Each of these is briefly discussed in turn below.

A central issue in expanding the use of indigenous languages in education is the cultivation of qualified bilingual teachers (see, for instance, Abram, 1989). The lack of such teachers is not surprising considering the traditionally low status and levels of formal education associated with indigenous sectors, as well as the limited salaries earned by rural teachers in general. Even where basic training and recruitment issues are addressed, ideological forces potentially undermine the use of indigenous languages in the classroom. As Dauenhauer and Dauenhauer (1998) describe, there is often disparity between expressed ideals and actual support for indigenous languages, which, in their view, often results from deeply embedded ideologies concerning the language. For instance, indigenous teachers might sharply recall their own punishment and embarrassment for using their language in school.

A second important challenge to implementing some language education policies stems from complications with the standardization of indigenous languages and development of pedagogical materials. The example of Quichua in Ecuador is illustrative. The process of standardizing the different varieties of Quichua was formally initiated in 1981 when representatives of the different Ecuadorian varieties of Quichua agreed on a unified variety, known as Quichua Unificado. These decisions were codified in subsequent dictionaries and grammars (CONAIE, 1990; MEC, 1982), constituted a major step toward the standardization of language, and were intended to facilitate the development of Quichua materials, as well as contribute to the maintenance and even revitalization of the language. In practice, however, these aims have proved elusive. For instance, King (1999, 2000) reports that, as Quichua materials have been introduced into Quichua–Spanish bilingual communities in the southern highlands, two distinct Quichua varieties have emerged. The Quichua pedagogical materials promote the nationally standardized variety (Quichua Unificado), in contrast to what is commonly referred to as Quichua auténtico, spoken by elderly and rural dwellers. Because children and young adults studying Quichua Unificado have not mastered the phonological system or the lexicon of the local variety, they learn not only to read but to speak Quichua Unificado. Although the varieties are mutually intelligible to most, there are clashes and gaps in communication between the older and younger Quichua speakers and such tensions undermine Quichua use and exacerbate generational and social divisions.

Cases such as these have led some to question the assumption that standardization of the written form is essential to expanded use of the language. Luykx (2000, 2004), for instance, maintains that in practice the emphasis on standardization tends to shift resources away from those domains that are the indigenous language's stronghold and toward those where its disadvantage relative to Spanish is greatest, to prioritize concerns of linguists over those of most native speakers, and to link dialectal variation with status and class hierarchies. The result is that standardization tends to undermine meaningful use of indigenous languages in communities and schools. Although standardization has long been viewed as an important means to improving status and prestige (Hornberger and King, 1996; Stewart, 1968), it seems appropriate to question whether it is essential to the establishment of successful bilingual education programs.

A third issue concerns how 'bilingual' and 'intercultural' are operationalized. Not unlike early formulations of bilingual education policy in the United States (Crawford, 1999), legislation in many countries provides few specifics concerning how bilingual education is defined and how Spanish and the indigenous language(s) are balanced within and across grades. Likewise, intercultural education is also open to interpretation, despite the fact that "bilingual intercultural education" is the standard term in use in much of the region. Krainer (1996) defines intercultural education as that which affirms one's social and conceptual universe, but also permits the selective and critical appropriation of cultural elements of other groups. Haboud (unpublished) argues that interculturalism refers to relations and interactions between two separate cultures, as well as the political task of constructing an egalitarian society. However, as frequently noted, interculturalism has often been treated as an issue that is exclusive to the indigenous population (Haboud, 2000; Hornberger, 2000; Hornberger and Coronel-Molina, 2004).

A final issue relates to the delegation of authority to indigenous groups to control their own schools; in many regions, this is part of the move to decentralize and democratize government administration. In the case of the Bolivian Reform, despite the democratic aims of decentralization and popular participation, the Ministry of Education maintains a tight hold on most aspects of the transformation of traditional schools to Reform schools. One avenue for indigenous participation is through the four CEPOs (*Consejos Educativos de los Pueblos Originarios*), which were formed during the 1990s to represent Quechua, Aymara, Guaraní, and speakers of various Amazonian languages in national educational concerns. The CEPOs have been instrumental in garnering community support for bilingual intercultural education, promoting linguistic development and training of teachers and writers, and organizing the Reform-mandated school boards at the school, district, and departmental levels. However, their relationship to the Ministry of Education is undefined; their autonomous status simultaneously protects them from government politics and leaves them at the mercy of international donors for salaries and support, and the Ministry is not required to incorporate their advice (Albó, 2000; Moya, 1999).

It is also important to note that greater local control of indigenous schooling and increased numbers of indigenous teachers do not necessarily or immediately translate into substantial use of indigenous languages in the classroom. King's (2000) study of two communities in southern Ecuador suggests that although Quichua is employed regularly in schools for symbolic purposes (e.g., greetings, taking attendance), it is taught only occasionally and can in no way be considered a medium of instruction. This frequent symbolic use of Quichua in school, in contrast to its total absence prior to the reforms, obfuscates the limited academic and communicative use of the language.

As evident here, some of the shifts in language policy have been largely rhetorical as they remain without programs or funding to implement any real change. It is also true, however, that "gestures that, at first, seemed merely symbolic open new spaces of negotiation between indigenous organizations and different state sectors" (Godenzzi, 2003: 295). Indigenous groups and individuals are increasingly taking on leadership roles and administrative responsibilities in reform efforts. Many indigenous languages have written forms and are now used in literacy and basic schooling. Increasing numbers of indigenous people are becoming literate in their mother tongues or learning the mother tongues of their grandparents, and the presence of indigenous languages in a once exclusively Spanish domain confers prestige on both the languages and their users. Although the gaps between language education policy and practice remain frustratingly wide, many important small steps have been made and continued progress into this new, uncharted territory seems likely to follow.

See also: Bilingual Education; Language Planning and Policy: Models; Teaching of Minority Languages.

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Language Education Policy in Soviet Successor States

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The Soviet Legacy

From the time it was founded in 1917, the Soviet Union was a multilingual and multiethnic state. The 1989 Soviet census cites approximately 130 ethnic groups (including indigenous and immigrant populations) speaking a total of 150 languages (although linguists place the count closer to 200). Russians comprise the largest single ethnic group, constituting of a little more than 50% of the total population (or slightly more than 145 000 000) people in the 1989 census. The Russian language was used by the largest number of speakers: 81% of the population identified itself as fluent in Russian, either as a first or second language. By the time of the breakup of the Soviet Union in 1991, Russian was firmly established as the lingua franca for the entire country.

Fifteen states were created with the dissolution of the Soviet Union: the Russian Federation (Russia); the Baltic States: Estonia, Latvia, and Lithuania; three in the Caucasus: Armenia, Georgia, and Azerbaijan; five Republics in Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan; and Belarus, Moldova, and Ukraine. There is great variation among these successor states in terms of numbers of languages spoken, speaker density, levels of multilingualism, and official language policy.

Historical Background

Although its early language policies promoted the right of national languages in government and education, by the post World War II period, the Soviet-government had firmly established a language policy that favored the use of Russian over all other languages in its territory. By the late 1980s, the expansion of Russian at the expense of the titular languages caused a backlash from all regions in the USSR, resulting in the introduction of language laws in most of the Soviet Republics. The movement began in the Baltics, with the Estonian SSR on January 18, 1989; the Lithuanian SSR on January 25; and the Latvian SSR on May 5. It then spread: the Tajik SSR on July 22; the Moldovan SSR on September 1; the Kazakh SSR on September 22; the Kirghiz SSR on September 23; the Uzbek SSR on October 21, and the Ukrainian SSR on October 28; finally, in 1990, the Belorussian SSR on January 26 and the Turkmen SSR on May 24. Only four Republics failed to adopt new language laws in this time period: the Russian SFSR and all three Republics in the Caucasus (the Armenian SSR, Azerbaijan SSR, and the Georgian SSR). The latter three did not adopt such laws because they would have been redundant: the basic principles governing language use had been specified since the ratification of their new Constitutions in April 1978. The Russian SFSR did not submit a language law until October 1991, when the Soviet breakup was well under way.

Although the laws differ in many details, the key point of each was the identification of the titular language as the official state language. This was intended to foster its development and use, and to guarantee its primacy in the government and legal system, education, and the media. Most laws also give their citizens the right to use Russian, or another regional language, in these contexts. Furthermore, most required knowledge of both the state language and Russian for employees in state offices and organizations.

Almost all the language laws specified a timeframe for the transition from Russian to the newly declared State language, and all but the Kirghiz and Tajik laws provided specific deadlines. The deadlines varied from three to eight years from the initiation of each individual law. They were optimistic but unrealistic; as early as summer 1991 in the Kirghiz SSR (*see* **Kirghiz**), the official deadline was changed from April 1993 until the year 2000. Delays were

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inevitable because many national languages had not been developed for administrative, technical, and educational purposes; only Russian had been used in these domains for many decades. Moreover, ethnic Russians living in each Republic resisted these changes, and in some areas local people had ceased using the titular languages in favor of Russian.

The Russian Federation

On October 25, 1991, the Supreme Soviet of the USSR ratified the "Law of the languages of the peoples of the Russian Soviet Federated Socialist Republic." This law confirmed Russian as the official state language, leaving the status of other languages to the discretion of the individual republics. In 1993, the Russian Federation (*see* **Russian Federation: Language Situation**) reratified this law with only minor changes.

With the collapse of the Soviet Union, political reconfiguration of the territories remaining in the Russian Federation resulted in the creation of a new set of republics, many being formed from previous Autonomous Soviet Socialist Republics (e.g., the Chuvash Republic or the Republic of Tatarstan). Of the 21 Republics in the Russian Federation at the end of the 20th century, 15 had instituted language laws to grant their titular language equal official status with Russian. Three of these laws (in the Chuvash, Tuvan, and Kalmyk Republics) were passed before the downfall of the Soviet state, with the Chuvash law in October 1990, the Tuvan law in December 1990, and the Kalmyk law in January 1991. In addition, the Constitutions of these Republics include language-specific articles; in most cases they grant official status to the titular language and Russian.

At present, a number of languages have some sort of official status in the Russian Federation. Russian is the state language for the entire country. The titular languages of the Republics within the Russian Federation are: Adyge, Altai, Bashkir, Buriat, Chechen, Chuvash, Erzya, Ingush, Kabardian–Circassian, Kalmyk, Karachai–Balkar, Karelian, Khakass, Komi–Peryak and Komi–Zyrian, High and Low Mari, Moksha, Osetin, Russian, Tatar, Tuvin, Udmurt, and Yakut. In Daghestan, the functioning written languages include: Avar, Dargwa, Kumyk, Lak, Lezgi, Nogai, and Tabassaran; their status is guaranteed by the Constitution of Daghestan.

The current language policies are in some ways reminiscent of the early years of the Soviet Union, when citizens were guaranteed education in their native languages. Yet there are significant differences: whereas in the 1920s and 1930s language policy was dictated by a centralized government aiming at unified results, now, in the aftermath of the USSR, these policies are implemented more by local-level governments, within individual republics, with variation from region to region.

In Soviet times, the use of Russian was successfully promoted in Ukraine (*see* **Ukraine: Language Situation**), Belorussia, and Moldova (*see* **Moldova: Language Situation**), reinforced through the migration of ethnic Russians into each. By the time of independence, their citizenry showed preferences for a bilingual state, with some level of official status for Russian, if not on a par with the titular language.

The Baltic States

The Baltic States (Estonia, Latvia, and Lithuania) were the first Soviet Union Republics to enact their own language laws in the late Soviet period. Although the territory of the three Baltic states – Estonia, Latvia, and Lithuania – had been historically the subject of much dispute, the Baltics officially became part of the Soviet Union only in the post World War II period. Their late entry to the USSR meant that the titular languages were already fully established as languages of government and education, and were relatively well-positioned to supplant Russian at the end of the Soviet period. That said, Russian immigration into Estonia and Latvia during the Soviet era left both regions with large numbers of monolingual Russian speakers, something which has slowed transition to exclusive use of the titular languages in government and education.

Both Estonia (*see* **Estonia: Language Situation**) and Latvia (*see* **Latvia: Language Situation**) have instituted specific legislation that bolstered the titular languages and made Russian monolingualism difficult to maintain. In Estonia, a language law which took effect on April 1, 1995, required all people in Estonia to communicate with officials in Estonian only, and to pay for interpreter services if needed. Similarly in Latvia, the 1990s saw legislation which cut support to Russian-language schools and required the use of Latvian only. In Lithuania (*see* **Lithuania: Language Situation**), ethnic Russians constitute a considerably smaller percentage of the population which is, as a whole, more ethnically homogeneous. Although the situation has been calmer there, a move toward Lithuanian monolingualism is also pronounced. One area of direct relation to language use is citizenship. In Lithuania, all residents were automatically granted Lithuanian citizenship. In Estonia and Latvia, however, where nontitular minorities constitute a larger part of the population, only those people who held citizenship in 1940, and their descendants, automatically became citizens. Others are required to go through a naturalization process which

requires, among other things, proficiency in Estonian or Latvian.

Armenia and Georgia

Armenia (Armenia) and Georgia (Georgia) are somewhat distinct from the other successor states and from one another. Both Armenian and Georgian are written in their own distinctive alphabets, and these two languages are the sole examples of languages that were not required to change to the Cyrillic alphabet in the late 1930s. They have strong literary traditions and used their titular languages in education and administration continuously throughout the Soviet period, so that little transition was needed in the immediate post-Soviet years. (Georgian was in fact granted official status in the 1924 Constitution and declared a state language in 1936.) Armenia is more ethnolinguistically homogenous than Georgia and faces few challenges to the Armenian language. In Georgia, linguistic tension is found more between competing local language groups than between Georgian and Russian.

Central Asia and the Turkic States

In 1989–1990, language laws were passed in each of the five Republics of Central Asia, beginning with what is now Tajikistan (*see* **Tajikistan: Language Situation**), with Kazakhstan (*see* **Kazakhstan: Language Situation**), Kyrgyzstan (*see* **Kyrgyzstan: Language Situation**), Uzbekistan (*see* **Uzbekistan: Language Situation**), and Turkmenistan (*see* **Turkmenistan: Language Situation**) all following within a year as already mentioned. These laws differ in particulars but are all similar in instating the titular language as the official state language of each region and attempting to regulate the choice and use of language in public and official settings.

Four of the five Central Asian States (all but Tajikistan) have as their titular language a Turkic language, as does Azerbaijan. The languages of these five Turkic states were written using the Arabic script prior to their incorporation into the Soviet Union. Tajik, a southwestern Iranian (Indo-European) language, was written using the Arabic-based Persian script. In the 1920s, the Soviet government mandated the change from Arabic-based orthographies to Roman-based; this continued until the late 1930s when alphabets throughout the country (except in Armenia and Georgia) were switched to Cyrillic, with the change officially legislated in 1940. With the downfall of the USSR, these States began debating another change of alphabet. Advocates of a pan-Turkic identity promoted a Latin-based orthography to unify Turkic speakers, while others advocated a return to the Arabic-based script. (This was seen as having the potential to unite Azeri speakers in Azerbaijan with those in Iran, who have continuously used the Arabic script.) Three Turkic-speaking States ultimately adopted legislation to switch to Latin-based orthographies: Azerbaijan in 1991; and Turkmenistan and Uzbekistan in 1993, with subsequent laws specifying the rate of change and the exact nature of the alphabet to be used. The transition to the Roman alphabet has been gradual, and it is used together with Cyrillic. In both Kazakhstan and Kyrgyzstan, perhaps due to consideration of the Russian speakers in these regions, no official decision had been made to change the alphabet as of 2004. In Tajikistan, despite a 1989 decree that measures should be undertaken to facilitate learning the Arabic-based Persian script, a revised version of Cyrillic was adopted in 1998.

See also: Education in a Former Colonial Language; Education in a Multilingual Society; Estonia: Language Situation; Kazakhstan: Language Situation; Kirghiz; Kyrgyzstan: Language Situation; Language Politics; Latvia: Language Situation; Linguistic Decolonization; Linguistic Rights; Lithuania: Language Situation; Moldova: Language Situation; Russian Federation: Language Situation; Tajikistan: Language Situation; Turkmenistan: Language Situation; Ukraine: Language Situation; Uzbekistan: Language Situation.

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Language Education, Computer-Assisted

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A Definition of CALL

Computers are widely used in the teaching and learning of Modern Foreign Languages (MFL) and English for Speakers of Other Languages (ESOL) in secondary and higher education. The use of computers in teaching and learning languages encompasses many different applications. The applications tend to fall into two distinct types: (a) those that involve the use of generic software tools such as word processors, presentation software, e-mail packages, and Web browsers, and (b) those designed specifically to promote language learning. The latter type falls into the category of Computer Assisted Language Learning (CALL), which is the main focus of this article.

CALL is a term that came into favor in the early 1980s. Levy (1997: 1) provides the following succinct definition of CALL:

> Computer Assisted Language Learning (CALL) may be defined as "the search for and study of applications of the computer in language teaching and learning."

This definition is a very broad one. A more precise way of describing CALL is to say that it is an approach to language teaching and learning in which computer technology is used as an aid to the presentation, reinforcement, and assessment of material to be learned, usually including a substantial interactive element.

A Brief History of CALL

CALL's origins can be traced back to early experiments in the 1960s. Up until the late 1970s, CALL projects were confined mainly to universities, where computer programs were developed on mainframe computers. The PLATO project, initiated at the University of Illinois in 1960, is an important landmark in the early development of CALL (Marty, 1981).

Early CALL (see 'Early CALL' below) favored an approach that drew heavily on practices associated with programmed learning. This aim was reflected in the term Computer Assisted Language Instruction (CALI), which originated in the United States. The term CALI is still used, but it is often associated with a behavioristic approach to language learning that is currently out of favor.

The advent of microcomputers in the late 1970s brought computing within the range of a wider audience, resulting in a boom in the development of CALL programs and a flurry of publications in the early 1980s (Davies and Higgins, 1982, 1985; Kenning and Kenning, 1984; Last, 1984; Ahmad *et al.*, 1985). Most of the CALL programs that were produced in the early 1980s consisted of a series of drills, multiple-choice exercises, and Cloze exercises, focusing on grammar and vocabulary. These kinds of programs were out of tune with orthodox language teaching methodology, which by this time had embraced the communicative approach. There was initially a lack of imagination on the part of CALL developers, a situation that was rectified to a considerable extent by the publication of an influential seminal work by Higgins and Johns (1984), which contains numerous examples of nondrill-based approaches to CALL.

Throughout the 1980s, CALL widened its scope. An alternative term to CALL emerged in the early 1990s, namely Technology Enhanced Language Learning (TELL), which was felt to provide a more accurate description of the activities that fall broadly within the range of CALL.

A major landmark in the history of CALL was the advent of the World Wide Web, which has become the central focus of an increasing number of CALL practitioners and is discussed in more detail in the section 'Web-based CALL' below.

For further information on the history of CALL, see the History of CALL website.

CALL Typology

Various attempts have been made to produce a definitive CALL typology. Davies and Higgins (1982, 1985) distinguish between (a) programs that focus on traditional exercise types such as multiple-choice, gap-filling, free-format, reordering, and Cloze; and (b) programs such as simulations and adventures, action mazes, text manipulation, and exploratory programs. Jones and Fortescue (1987) categorize CALL programs according to those focusing on (a) grammar or vocabulary; (b) the four essential language skills of reading, writing, listening, speaking; with (c) separate categories for adventures, exploratory programs, and authoring programs.

Hardisty and Windeatt (1989) distinguish four broad categories of CALL:

1. School: traditional exercise types
2. Office: generic programs such as word processors and communications software
3. Library: concordancing programs
4. Home: games such as simulations and adventures

Warschauer (1996) looks at CALL in terms of its historical development:

1. Behavioristic CALL: The computer as tutor, serving mainly as a vehicle for delivering instructional materials to the learner.
2. Communicative CALL: With the advent of the microcomputer in the late 1970s, CALL continues to be used for skill practice, but in a non-drill format, with a greater degree of student choice, control, and interaction. This phase also includes (a) using the computer as a stimulus for discussion, writing, or critical thinking; and (b) using the computer as a tool or workhorse – examples include word processors, spelling, and grammar checkers, and concordancing programs.
3. Integrative CALL: This phase is marked by two important technological developments:
   - Multimedia personal computers (MPCs), which enabled reading, writing, speaking, and listening to be combined in a single activity, with the learner exercising a high degree of control over the path through the learning materials.
   - The Internet, which offered new opportunities for computer-mediated communication (CMC) between learners and teachers, and a wide range of activities centered on the World Wide Web.

We shall distinguish the following categories:

- Early CALL
- Communicative CALL
- Multimedia CALL
- Web-based CALL
- CALL authoring programs
- Intelligent CALL (ICALL)
- Computer Aided Assessment (CAA)
- Whole-class teaching and CALL

Early CALL

Early CALL programs – many of which fell into Warschauer's behavioristic category (Warschauer, 1996) – simply presented a series of stimuli to which the learner had to respond. In CALL programs developed for mainframe computers and early microcomputers in the 1960s and 1970s, the stimulus was usually in the form of text displayed in monochrome on a computer screen, and the only way in which the learner could respond was by entering an answer at the keyboard, either by entering a letter or number as a response in a multiple-choice exercise or by typing the answer in full as a response in a free-format exercise. Such programs consisted mainly of a sequence of repetitive drills.

The advent of the microcomputer in the late 1970s gave rise to more imaginative programs, in which text was presented in more interesting ways. Color was used to highlight grammatical features, for example, gender in French and case endings in German. Movement was used to illustrate points of syntax such as position of adjectives in French and subordinate clause word order in German. Discrete error analysis and feedback were a feature of CALL in this period, and the more sophisticated programs attempted to analyze the learner's response, pinpoint errors, and branch to help and remedial activities. A typical example of this approach is the CLEF package for learners of French, which was developed in the late 1970s and early 1980s by a consortium of Canadian universities, and is still widely used in an updated version (Figure 1).

The approach to error analysis adopted by the authors of CLEF – who were predominantly language teachers – was to anticipate common errors and build in appropriately tailored feedback. An alternative approach is the use of Artificial Intelligence (AI) techniques to parse the learner's response, which is a feature of Intelligent CALL (ICALL) – see the section 'Intelligent CALL' (ICALL) below.

Communicative Call

Within the language-teaching profession, there has always been a degree of controversy about the teacher-centered, drill-based approach to CALL. The survey conducted by Levy among CALL developers in the early 1990s indicated that the communicative approach was "the current preferred philosophy of language teaching and learning," but there was also evidence of a high degree of eclecticism, with the majority of teachers adopting two or more different approaches, including the use of drills and teaching formal grammar (Levy, 1997: 122ff.).

Prior to Levy's survey, it was evident as early as the mid-1980s that there was a discernible move away from a drill-based approach to CALL and towards a learner-centered, task-based, or explorative approach. Higgins and Johns (1984: 8–9) were among the first CALL practitioners to illustrate how the computer might adopt different roles other than that of a provider of drills, for example, the computer as an informant, with the learner asking the questions and the computer providing the answers. Jones C. (1986) questioned the role of the computer as a rival to the teacher and stressed the importance of integrating the computer into normal classroom activities, urging the teacher to apply the same methodological expertise and imagination to computer programs as they would to any other classroom aid. Jones G. (1986) and Piper (1986) illustrated how the computer might be used as a stimulus for conversation. In other words, there was a clear break with the top-down programmed learning approach to CALL that characterized its early days.

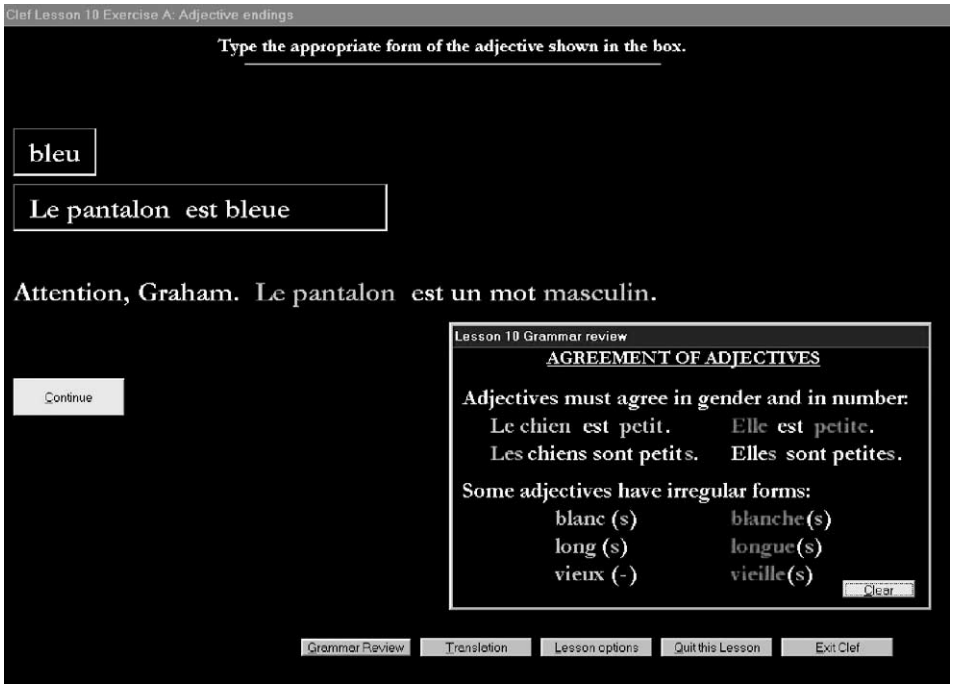

Figure 1 *CLEF* Screenshot. The screenshot is taken from the *CLEF* French grammar CD-ROM (University of Guelph/Camsoft). It shows a fill-in-the-blank exercise on the agreement of adjectives in French, where the learner has entered the incorrect answer 'bleue' (blue), the feminine form of the adjective, instead of the masculine form that is required to agree with the masculine noun 'pantalon' (trousers/pants). The discrete feedback, 'Attention, Graham. Le pantalon est un mot masculin,' points the learner in the right direction rather than giving the correct answer immediately, indicating that the learner needs to make the adjective agree with a masculine noun. The box in the lower right hand corner of the screen is a reminder of the rule about agreement and the forms that adjectives can take. This reminder can be called up by the learner at any time in the course of working on the exercises. Screenshot courtesy University of Guelph/Camsoft.

The explorative approach to CALL is also characterized by the use of concordance programs (concordancers) in the languages classroom. Concordance programs, which were originally used as literary or linguistic research tools, found a new life as tools for the language teacher and student, embodying an approach described by Johns (1991) as Data-Driven Learning (DDL). DDL was the only new approach to CALL that was described in Levy's survey as "a direct result of the attributes of the computer" (1997: 123). See also Tribble and Jones (1990), Johns and King (1991), and Rézeau (2001).

Multimedia CALL

As indicated above in the section Early CALL, computers were initially very limited in terms of the kind of stimulus that they could present to the learner. Most early computers could only offer plain text or simple line drawings. The multimedia personal computer (MPC) was a breakthrough insofar as the stimulus could now consist of any combination of text, still images, sound, and motion video. Ways in which the learner could respond to the stimulus reflected these new developments. Instead of just typing at the keyboard, the learner could point-and-click and drag-and-drop with the mouse, or speak into a microphone. Feedback also reflected the new developments in multimedia.

The earliest manifestations of multimedia CALL were made technologically possible by linking a computer with a 12-inch videodisc player. This enabled text, high-quality photographic images, and sound and video recordings to be presented in a variety of imaginative combinations. The result was the development of interactive videodiscs such as *Montevidisco* (Schneider and Bennion, 1984), *Expodisc* (Davies, 1991) and *A la rencontre de Philippe* (Fuerstenberg, 1993), all of which were designed as simulations in which the learner played a key role.

The techniques learned in the 1980s by the developers of interactive videodiscs were adapted for the integrated MPC, which incorporated a CD-ROM drive and was in widespread use by the early 1990s. The MPC is now the standard form of personal computer. CD-ROMs were used in the 1980s initially to store large quantities of text and later to store sound, still images, and motion video. By the mid-1990s, a wide range of multimedia CD-ROMs for language learners was available. Most CALL programs under development today fall into the category of multimedia CALL.

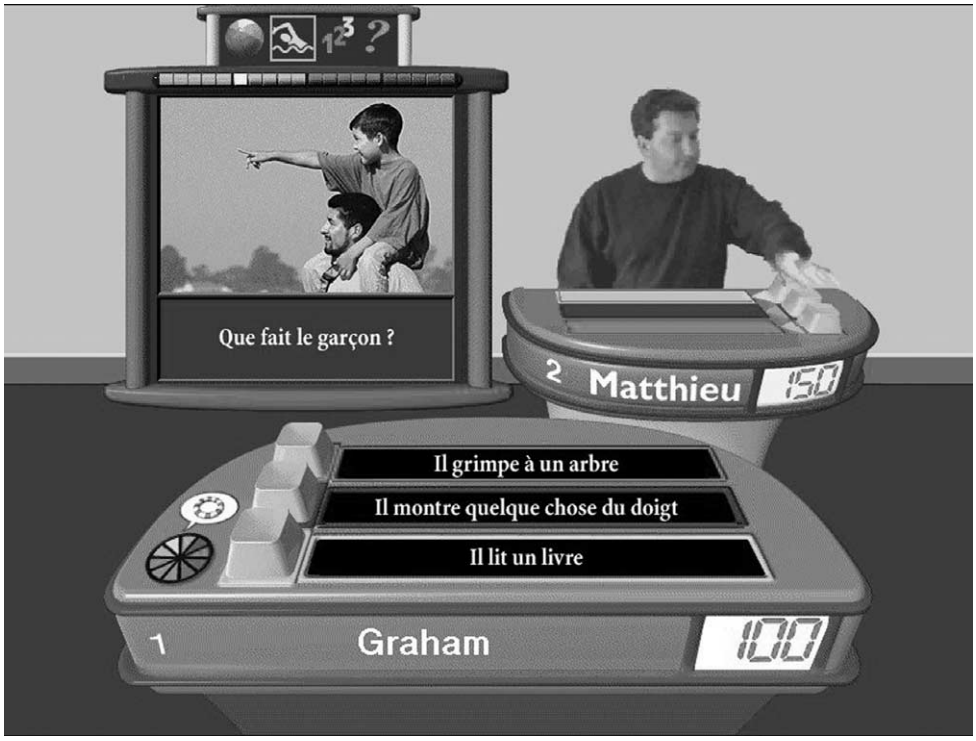

Figure 2 *World talk* Screenshot. The screenshot is taken from EuroTalk's *World talk* CD-ROM for beginners in French. It is essentially a timed multiple-choice exercise in which three alternative answers to the question below the photograph are presented, taking the form of a TV game show in which the learner has to select the correct answer before his/her opponent 'Matthieu' makes his selection. As well as appearing as text on the computer screen, the question and possible answers are read out by a native-speaker quizmaster, so that the learner can hear the French pronounced as well as reading it from the screen. 'Matthieu' is a video recording and can be seen here reaching for the selection button. Screenshot courtesy of EuroTalk, with permission.

A typical multimedia CALL program includes the presentation of sound and video, usually offering the learner the opportunity to record and playback his/her own voice. An example of a multimedia CALL of this type is EuroTalk's *World talk* program (Figure 2).

The quality of video recordings offered by CD-ROM technology has been slow to catch up with that offered by the earlier interactive videodiscs. The Digital Video Disc or Digital Versatile Disc (DVD), which is now becoming established as a storage medium for multimedia CALL programs, offers much higher quality video recordings, for example EuroTalk's *Movie talk* DVD-ROM series, which is based on authentic TV broadcasts and offers the learner to opportunity to participate in role-plays enhanced by video (Figure 3).

Surprisingly, few imaginative simulations have been developed for the MPC. The series of CD-ROMs entitled *Who is Oscar Lake?* is a notable exception. In this series, the learner is identified as the chief suspect in a diamond robbery in a foreign country and has to argue his/her innocence and determine who the real suspect is. Other multimedia programs make use of Automatic Speech Recognition (ASR) software to diagnose learners' errors, for example Auralog's *Tell me more pro* series (Figure 4).

One of the advantages of multimedia CALL is that it has helped language centers in schools and universities to offer courses that normally would not run due to staff shortages or poor take-up by students. The Critical Language Series, produced by the University of Arizona, offers a number of courses on CD-ROM in languages that are not normally taught as part of the educational curriculum (Figure 5). Similarly, EuroTalk's *Talk now* and *World talk* series offer a wide variety of languages.

Web-based CALL

In 1992, the World Wide Web was launched, reaching the general public in 1993. The Web offers enormous potential and is playing an increasingly important role in language teaching and learning. But, the Web still has some way to go before it catches up with the interactivity and speed of access offered by CD-ROMs or DVD-ROMs, especially when accessing sound and video files. There is no doubt, however, that the Web is a remarkable source of information and has opened up a new range of tasks for learners of foreign languages, e.g., Web quests,

Figure 3 *Movie talk* Screenshot. The screenshot is taken from the Spanish version of EuroTalk's *Movie talk* DVD-ROM for intermediate/advanced learners of Spanish. The DVD-ROM includes a complete episode, *Querido maestro*, from a Spanish TV detective series. The video recording is exploited in different ways, offering sophisticated exercises in which the learner participates in role-plays as well as simple vocabulary exercises like the one illustrated here, in which still images from the recording are presented and the learner has to match the word in the box with one of the six images. As in *World talk* (above), that the learner can hear the French pronounced by a native speaker as well as reading it from the screen. Screenshot courtesy of EuroTalk, with permission.

Web concordancing, and collaborative writing (Felix, 2001).

With the advent of broadband, however, many of the problems associated with the Web are being overcome, but an educational institution needs an extremely fast connection to enable multiple users to enjoy the media-rich language learning materials that are currently available. For this reason, Felix (2001: 190) advises adopting hybrid approaches to CALL, integrating CD-ROMs and the Web and running audio conferencing and video conferencing in conjunction with Web activities.

Web-based multimedia is a growing area of development area but has not yet supplanted CD-ROM or DVD technology. Many websites containing CALL materials offer more in terms of presentation rather than interaction, for example, it is not easy to record and playback one's own voice in a Web environment – a feature of CD-ROM-based multimedia CALL since the late 1980s. Nevertheless, some attractively designed multimedia websites have been produced, for example the BBC Languages website, which offers a comprehensive range of introductory and intermediate courses (Figure 6).

For further examples of what can be done in a Web environment, see LeLoup and Ponterio (2003).

CALL Authoring Programs

Generic authoring packages such as Macromedia's *Director* have been used to create a number of multimedia CALL programs. In the hands of an experienced user, they enable the speedy development of CALL materials, but they are probably too complex for most language teachers and are best suited to the template approach to authoring, as described by Gimeno and Davies (2001). Authoring programs designed specifically for CALL, however, offer a do-it-yourself approach that is within the capabilities of the average language teacher who has no knowledge of computer programming. Typical examples are authoring packages that automatically generate a set of preset activities for the learner, for example, Camsoft's *Fun with texts* and Wida Software's *The authoring suite* (Figure 7). Web authoring packages of a similar type – also offering a range of pre-set activities – are also in widespread use, for example, Hot Potatoes. For further information on CALL authoring programs, see Bangs (2001) and Bickerton *et al.* (2001).

Intelligent CALL (ICALL)

The extent to which the computer is capable of analyzing learners' errors has been a matter of

Figure 4 *Tell me more pro* Screenshot. The screenshot is taken from Auralog's *Tell me more* CD-ROM, a package that incorporates speech-recognition software. It shows a pronunciation exercise in which the learner attempts to repeat the sentence presented in the box at the top of the screen. A native speaker pronounces the sentence and a voice-print of the native speaker model is displayed in the upper of the two voice-print boxes immediately below. The learner's attempt to repeat the sentence is played back and at the same time the learner's voice-print is displayed in the lower box. The learner can attempt the sentence as many times as he/she likes until a close match is achieved. The learner's performance is also displayed in a score box at the lower right hand part of the screen. Screenshot courtesy of Auralog, with permission.

controversy since CALL began. The controversy hinges on those who favor the use of Artificial Intelligence (AI) techniques to develop Intelligent CALL (ICALL) programs, such as Underwood (1989) and Matthews (1992), and its detractors such as Last (1989). The issue of error analysis looms large in this controversy, focusing on the possibilities and limitations of computers programs in diagnosing learners' errors and appropriate feedback (Heift and Schulze, 2003).

Practitioners who come into CALL via the disciplines of computational linguistics, for example, Natural Language Processing (NLP) and Human Language Technologies (HLT), tend to be more optimistic about the potential of these disciplines than those who come into CALL via language teaching. It is clear, however, that recent advances in these areas, such as the development of parsers and speech technology software, are beginning to make a significant impact on CALL (Schulze, 2001; Schulze and Gupta, 2001).

Computer Aided Assessment and Language Learning

Computer Aided Assessment (CAA) covers a range of assessment procedures and is a rapidly developing subset of CALL. CAA refers to any instance in which some aspect of computer technology is used as part of the assessment process. CAA may include tests that take a similar form to CALL exercises, for example, tests in multiple-choice and gap-filling format, but it may also extend to using computers for onscreen marking of students' word-processed writing and using a spreadsheet or database to keep a record of students' grades.

CAA has its limitations, however. While it is particularly useful in testing knowledge of basic grammar and vocabulary and, to a limited extent, reading skills and listening skills, it has not yet had a significant impact on the assessment of speaking skills.

One of the most ambitious CAA projects undertaken in recent years is DIALANG. DIALANG is a major European Union project aimed at providing effective diagnosis of language competence in 14 EU languages. It uses online tests, including placement and self-assessment tests, as key tools in this process. DIALANG is for use by the general public and can be downloaded from the DIALANG website. Tests are available in Listening, Writing, Reading, Structures, and Vocabulary for 14 different languages:

Figure 5 *Critical language series* Screenshot. The screenshot is taken from the opening screen of the Mandarin Chinese CD-ROM that forms part of the *Critical language series* produced by the University of Arizona. It shows the titles of the first 10 lessons of the program. All the programs in the series follow the same pattern, making use of audio and video for presentation, followed by five types of exercises: multiple choice, fill-in-the-blank, audio flashcard, pronunciation, and listening dictation. Learners can record and play back their own voices and compare their pronunciation with that of the native speaker. Screenshot courtesy of University of Arizona, with permission.

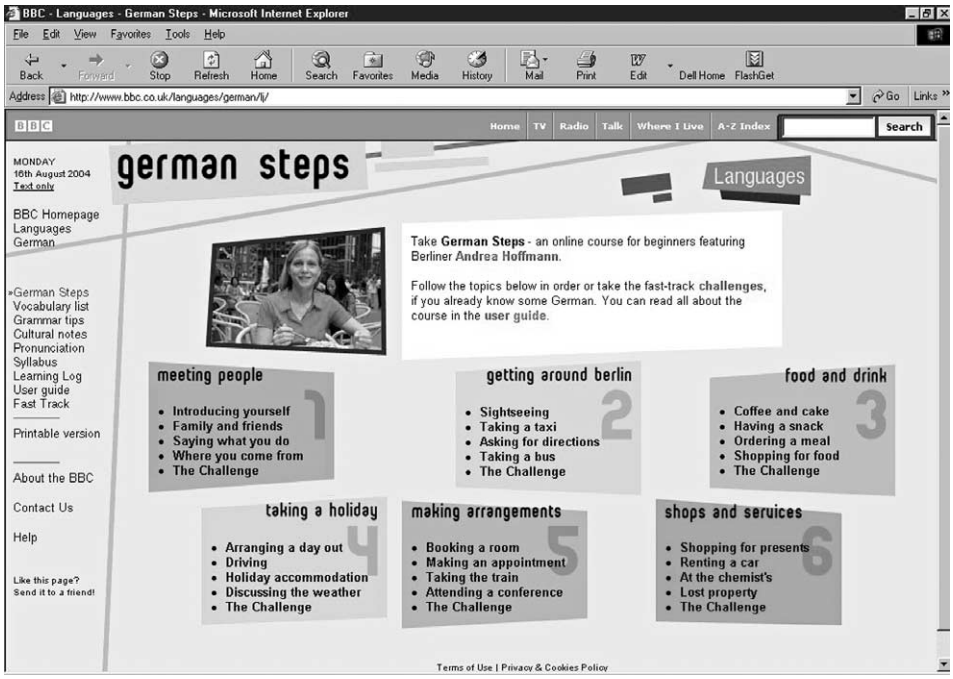

Figure 6 BBC *German steps* Screenshot. The screenshot is taken from the opening screen of the introductory *German steps* course, one of a series produced by the BBC. The screen shows the contents of the course, which consists of materials centered on typical situations that an adult learner might be confronted with on a visit to a German-speaking country. The other programs in the series follow a similar pattern. Screenshot courtesy of BBC, with permission.

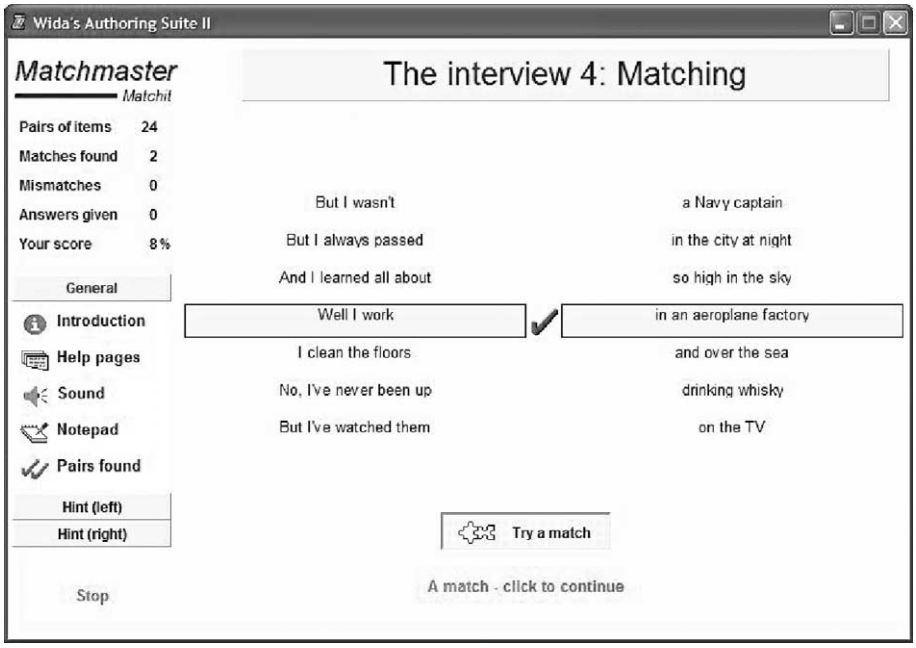

Figure 7 *The authoring suite* Screenshot. The screenshot is taken from Wida Software's *Matchmaster* program, which forms part of a larger package known as *The authoring suite*. This is a matching exercise for learners of English as a Foreign Language, in which the task is to match the beginnings and ends of sentences. *The authoring suite* enables teachers with no programming knowledge to create their own materials. Screenshot courtesy of Wida Software, with permission.

Danish, Dutch, English, Finnish, French, German, Greek, Icelandic, Irish, Italian, Norwegian, Portuguese, Spanish, and Swedish. A key feature of the DIALANG project is that its tests are closely linked to the six levels of the Council of Europe's Common European Framework of Reference for Languages.

Whole-Class Teaching and CALL

When the first computers were introduced into schools, it was usual for a teacher to bring a single computer and a large TV monitor into the classroom and teach the whole class, using the TV monitor as the focus of attention. The teacher or a student would operate the keyboard, and the class would be asked to respond to what appeared on screen. The teacher might use the computer, for example, as a stimulus for eliciting oral responses from the class. This approach worked very well with a variety of programs.

Whole-class teaching went out of favor as computers became cheaper, but it is now undergoing a revival thanks to the advent of the interactive whiteboard, a touch-sensitive projection screen that allows the teacher to control a computer by touching the whiteboard rather than using a keyboard or mouse, although these can still be used. Interactive whiteboards in combination with loudspeakers offer a wide range of activities in the languages classroom, and CALL software designed both for use in computer labs and with interactive whiteboards for whole-class teaching is now widely available, for example mdlsoft's *TaskMagic* package (Figure 8).

The Future of CALL

So, where is CALL heading? Undoubtedly, there will be an expansion of online learning, but it is more likely to supplement conventional modes of learning rather than replacing them. Language learners in particular cannot acquire certain skills, for example, conversational skills, without face-to-face contact with an experienced teacher, but new software tools facilitate synchronous and asynchronous oral computer-mediated communication and are already being used in distance-learning CALL environments.

An area of research and development currently known as Human Language Technologies (HLT) is likely to make an increasing impact on CALL. Schulze and Gupta (2001) describe the main areas of HLT that have already had an influence on CALL and which are likely to have an influence in the not--too-distant future. These areas include Natural Language Processing, Machine Translation, corpus linguistics, and speech technology. All these were once regarded as fringe areas of CALL, but they are now attracting increasing attention.

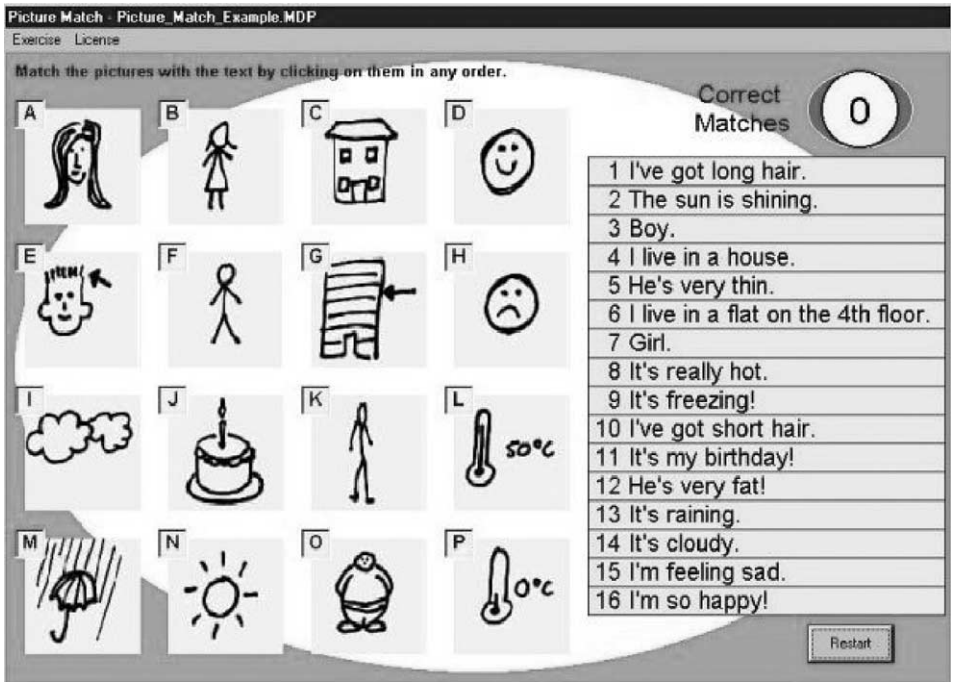

Figure 8 *TaskMagic* Screenshot. The screenshot is taken from mdlsoft's *TaskMagic* package. The aim of this exercise is to match the text in the box on the right of the screen with the pictures. *TaskMagic* is an authoring program that enables teachers with no programming knowledge to create their own materials, and it also lends itself to the creation of materials that are particularly appropriate for whole-class teaching using a computer and a projector or a computer and an interactive whiteboard. Screenshot courtesy of mdlsoft, with permission.

Professional CALL Associations

The rapid growth in the use of computers in language learning and teaching in the 1980s led to the foundation of the two leading professional associations for CALL: CALICO (USA) in 1982 and EUROCALL (Europe) in 1986, both of which continue to thrive. The longer-established professional association, IALLT (founded 1965), focused initially on language laboratories, but later widened its scope to embrace language learning technology in general. An increasing number of professional associations devoted to CALL are emerging worldwide. The established associations are grouped together under WorldCALL, which is in the process of setting itself up as an umbrella association of associations. WorldCALL held its first conference at the University of Melbourne, Australia, in 1998, and the second WorldCALL conference took place in Banff, Canada, 2003.

See also: Behaviorism: Varieties; Communicative Competence; Computational Linguistics: History; Corpus Linguistics; Human Language Technology; Interlanguage; Language Education: Teacher Preparation; Language in Computer-Mediated Communication; Machine Translation: Overview; Natural Language Processing: Overview; Parsing and Grammar Description, Corpus-Based; Teaching Technologies: Second Language.

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Relevant Websites

http://www.auralog.com/english.html – Auralog, producers of CALL Software, France.
http://www.bbc.co.uk/languages – BBC Languages, a series of Web pages for learners of foreign languages.
http://www.camsoftpartners.co.uk/clef.htm – CLEF, a software package for learners of French, produced by the University of Guelph and published in the UK by Camsoft.
http://clp.arizona.edu/cls – Critical Language Series, a CD-ROM series produced by the University of Arizona.
http://www.dialang.org – DIALANG, a diagnostic language testing project, initiated with funding from the European Union.
http://www.eurotalk.co.uk – EuroTalk, producers of CALL software, London, UK.
http://www.history-of-call.org – History of CALL, a website containing a wealth of information on the history of CALL.
http://web.uvic.ca/hrd/halfbaked/ – Hot Potatoes, a Web-authoring package produced by Half Baked Software Inc, University of Victoria, Canada.
http://www.ict4lt.org – ICT4LT (ICT for Language Teachers), a large collection of ICT training resources for language teachers.
http://llt.msu.edu – Language Learning Technology Journal (LLTJ), an on-line refereed journal.
http://www.languagepub.com – Language Publications Interactive (LPI), producers of *Who is Oscar Lake?* a language simulation on CD-ROM.
http://www.mdlsoft.co.uk – mdlsoft, producers of the *TaskMagic* package.
http://www.wida.co.uk – Wida Software, producers of *The authoring suite*.
http://www.tell.is.ritsumei.ac.jp/cocllejonline/, Kusatsu, Shiga, Japan: Ritsumeikan University, available only on-line (the

CALL-EJ journal (Japan) merged with the *On-CALL* journal (Australia) and became *CALL-EJ Online* in May 1999).

http://www.taylorandfrancisgroup.com – *CALL Journal*, London: Taylor & Francis, available on-line from Volume 11.

http://llt.msu.edu – *Language Learning Technology*, East Lansing: Michigan State University, available only on-line.

http://www.upv.es/worldcall/ – WorldCALL, an umbrella organization of professional associations for CALL.

http://www.eurocall-languages.org – EUROCALL: a European professional association for CALL; Cambridge University Press publishes the journal *ReCALL* on the association's behalf.

http://www.calico.org – CALICO: a North American professional association for CALL and publisher of the *CALICO Journal*.

http://www.iallt.org – IALLT: a North American professional association and publisher of the *IALLT Journal of Language Learning Technologies*.

Language Education: Correctness and Purism

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Definitions: Correctness and Purism

The common assumption that school constitutes one sociolinguistic domain – a domain usually dominated by the standard variety of a language – is too simplistic. School consists of various communicative situations, e.g., playtimes, conversations between teacher and pupil outside the classroom, teacher–teacher communication. On the other hand, language education in the sense of the explicit teaching of language takes place almost exclusively in the classroom. In this context, the point of reference for determining whether linguistic usage is 'correct' or not is usually, but not always, a standard variety. In societies where there is a standardized prestige variety this nearly always has a privileged position in the classroom, i.e., it is the variety which is not only used as the medium of teaching, but is also an object of teaching: in Britain or the United States, for instance, in classes devoted to English, it is the norms of Standard English which are transmitted to pupils, and the texts discussed in these classes are mainly in Standard English. Deviations (real or perceived) from this pattern tend to be seized upon by certain sectors of society and presented in a negative light, for example in the media (cf. Cameron, 1995: 101).

Purism is rooted in the notion that languages or linguistic varieties are entities which are clearly demarcated from each other and consist of closed sets of linguistic items, so that elements that do not 'belong' to that variety and which might 'contaminate' it or make it 'impure' are easily identified and can be avoided. Purism is often, but not always, directed at words or linguistic features of foreign origin (cf. Trask, 1999: 254). It can, however, also be directed against elements which are not foreign, but are nevertheless seen as undesirable; for example, purists may try to remove regional dialectal features from a standard variety or may try to discourage the use of innovations, such as *aggravate* with the meaning 'annoy' (appealing to etymology, they would argue that *aggravate* should only be used in the sense of 'to make worse'). Another target of their activities may be words or constructions from specialist registers when used outside those registers, e.g. in German technical registers, mass nouns such as *Druck* ('pressure') can form plurals, whereas this has traditionally not been the case in non-technical language. A tendency for this construction to spread to general registers has often been the subject of negative comments, e.g., in newspaper glosses. Purism is often associated with the codification, cultivation, and planning of standard languages, but this doesn't mean that purism is never directed at non-standard varieties. In German-speaking Switzerland, for example, where the local dialects enjoy a high level of prestige, but where attitudes towards Swiss Standard German are rather ambivalent, purists have been known to attack standard features borrowed into the local dialects.

Purism is a strategy employed to achieve a variety of ends. Sometimes foreign words are rejected because it is claimed that they are not comprehensible to all and could exclude sections of the population from certain discourses; at other times they are rejected solely because of their foreignness, which may be seen as detrimental to the 'character' of a particular nation as reflected in its language (cf. Townson, 1992: 80–110).

As was said above, purism is very much linked to the cultivation of a standard variety. One of the things that lends prestige to a standard variety is the belief that it can fulfill any function demanded of it by its speakers. If it is perceived as being able to fulfill certain functions only by 'borrowing' elements from other varieties, then this detracts from its status.

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Another important role ascribed to a standard variety is that it is supraregional and has a wide communicative radius: many nonstandard words or constructions are perceived as being restricted in communicative radius and it is therefore felt that they must not be allowed into the standard variety. In reality, it is often the case that the lack of intelligibility of nonstandard variants is socially constructed and not rooted in any objective linguistic distance between those variants and the standard variety. There are various instances of speakers of very similar varieties claiming that they could not understand each other, with speakers of the more prestigious varieties usually more likely to claim not to understand other varieties than *vice versa* (e.g., Wolff, 1959: 35–39).

As we have already said, language education in the classroom is closely linked with standard varieties, so the link with correctness and purism is clear. Deborah Cameron makes it explicit when she claims – for Britain – that "one of the functions that conservatives allot to grammar teaching specifically is the preservation of a 'pure' and unified standard English variety whose purity is continually threatened just because it is not native to most speakers of English" (Cameron, 1995: 110). That this is not restricted to Britain is clear when Steven Pinker, a Canadian based in the United States, lists English teachers amongst what he calls "the legislators of 'correct English'" (Pinker, 1994: 372), and Rosina Lippi-Green writes, "The primary educational goal in our schools brings together the acquisition of literacy with acceptance and acknowledgement of a Standard U.S. English" (Lippi-Green, 1997: 104).

The Appropriateness Model of Linguistic Variation

Correctness and purism come into play not only in relation to particular individual linguistic features (e.g. *ain't* vs. *haven't*, *less items* vs. *fewer items*) but also in relation to the use of different varieties in different situations or for different speech acts, e.g., for writing an essay or for making an oral presentation. There are people who believe that variation is a problem *per se*, since speakers of nonstandard varieties will always be liable to making interference mistakes when they acquire the standard variety, especially in speech. In the view of these people, the only way to acquire a 'correct' or 'pure' form of the standard (which is, of course, seen as an eminently desirable thing) is to eliminate the nonstandard varieties. In the 1970s, this was argued for Germany and it has often been argued with reference to minority languages in order to promote the learning of the majority language (the demise of the Celtic languages has often been encouraged for this reason). A more common view today, especially amongst academic linguists, is that varieties of a language differ from each other and are therefore not all equally appropriate for the same purposes and situations. This model, known as the appropriateness model, is based on the difference theory of linguistic variation. The difference theory (unlike the deficit theory) assumes the functional equivalence of all varieties of a language, whilst accepting that they are differently evaluated by society.

This model seems to offer teachers a way of responding more positively to the variation they inevitably come across every day since they don't have to pass absolute judgments of correctness or incorrectness on their pupils' usage. They can now say, "You can say that at home, but not in the classroom" rather than saying, "Don't say that, it's wrong." The difference theory and the appropriateness model have certainly had an effect on policy makers in various countries, e.g. in Germany and Britain. The Cox Report (1989) on the teaching of English in primary schools in England and Wales, commissioned by the Conservative government of the time, made the point that Standard English should not be confused with 'proper,' 'good,' or 'correct' English. This reflects the view that other varieties of English may be seen as better or more proper (i.e., more appropriate) in some situations than Standard English; the status of the latter is relativized: "The combination of the status of Standard English as a social dialect and its use for particular purposes ... poses the most sensitive problems for teachers. They have the responsibility to teach its use for those particular purposes, while being sensitive to its impact on personal and social identity" (DES, 1989: 14–15). Whilst not saying that the standard variety of English is better than other varieties, the Cox Report still puts a great deal of emphasis on Standard English (written and spoken), and on the requirement that it be used in a range of situations.

Although the appropriateness model is popular with academic linguists, it does not appeal to all policy makers, especially those of a conservative bent, since it implies that there are no absolute values and standards of correctness. Another tenet of academic linguistics – that all varieties are rule governed, even if those rules are not codified or promoted by institutions such as the media or schools – is highly suspect to some policy makers since it takes away the notion of an external authority and makes it more difficult to apply uniform rules of 'correctness' (cf. Cameron, 1995: 97–98). There is a great deal of resistance to the fact that nonstandard varieties have a 'grammar,' although it is rarely written down. This situation is not helped by the fact that there is a dearth

of systematic descriptions of nonstandard varieties of English. It is not easy, for instance, for a teacher in the United States to find out that, in Black English Vernacular (BEV), invariant *be* is not simply the equivalent of inflected *be* in Standard U.S. English, but has a more specific distribution; e.g., *He be busy right now* does mean the same thing as *He is busy right now*, but Standard U.S. English *He is busy all the time* can only be rendered as *He busy all the time* in BEV (with zero copula, but not with invariant *be*). Of course, the resistance to pluralism in the linguistic sphere is often accompanied by a resistance to pluralism in other fields, and the former is often the butt of particularly fierce criticism because it is seen as not only reflecting but positively encouraging cultural and ideological fragmentation.

Despite some opposition over the years, proponents of the appropriateness model seem to have been quite successful in influencing school curricula. For example, in Germany (where each federal state is responsible for its own curriculum), most curricula refer to the fact that pupils should be taught to use different varieties of German in an 'appropriate' fashion (cf. Davies, 2000a; Davies, 2000b; Davies, 2001). Richard Hudson also points out that the National Curriculum for English in England and Wales accepts the importance of oracy, as well as literacy. Furthermore, references to 'genre' in the curriculum reflect an acceptance that many varieties exist and are 'valid.' (cf. 'Relevent Websites'). In Wales, where Welsh, which is spoken by about 20% of the population, is compulsory in schools up to the age of 16, stress is put on the use of appropriate registers; e.g., different forms are required when creating a script for a drama and when writing an official letter (Robat Powell, Head of National Foundation for Educational Research Welsh Unit, personal correspondence).

While the appropriateness model has been widely accepted by policy makers, calls by academic linguists for a critical approach to the domain distribution of different varieties and the social evaluation underpinning it have not found the same echo. The traditional distribution of standard and nonstandard varieties across public and private domains or formal and informal ones, has, on the whole, been accepted rather than challenged within that model, with the result that the dominant position of the standard variety has hardly been affected. Research in Germany (Davies, 2000b) has shown that neither teachers nor the curricula show any enthusiasm for extending the permitted domains of nonstandard varieties. In theory at least, the privileged status of the standard language in the classroom is not questioned by the practitioners any more than by the theorists.

In Britain and the United States, there have often been perceptions that teachers are trying to replace Standard English with nonstandard varieties, or are not concerned enough about correctness. The British heir apparent, Prince Charles, is one member of the public who worries about the state of language education in British schools: "All the letters sent from my office I have to correct myself, and that is because English is taught so bloody badly [. . .]. The way schools are operating is not right. I do not believe English is being taught properly" (quoted in Cameron, 1995: 94). In California, when the Oakland School Board resolved in 1996 that language education should respect and take into account the vernacular of most of its pupils, namely Ebonics (another name for BEV), there was an extremely hostile reaction from the general public, but this was fueled by the misleading reports in the media that the schools in this district were intending to teach Ebonics and/or use it as the medium of instruction (information about this issue can be seen at the web site of the Linguistic Society of America). In reality, when nonstandard varieties are allowed into the classroom, it is usually in order to create a bridge between the home or the peer group and the classroom. The ultimate aim for most teachers is the expansion of the linguistic range of their pupils through the acquisition of the standard variety. This is reflected in the resolution of the Linguistic Society of America on the Oakland 'Ebonics' issue: "There is evidence from Sweden, the United States, and other countries that speakers of other varieties can be aided in their learning of the standard variety by pedagogical approaches which recognize the legitimacy of the other varieties of a language."

What is a Standard Variety?

So far we have used the term 'standard variety' as though it were so well known that it needed no definition; however, if the curricula use the standard variety as their point of reference then teachers have to know exactly what the standard variety is, and this may not be as self-evident as one would assume, even for a language where a standard prestige variety has been recognized for many centuries, e.g., English in Britain. Some standard varieties are highly codified: for example, the national variety of German used in Germany has a whole range of reference works in which speakers can look up rules for 'correct' use of phonology, orthography, grammar, and lexis. These works are produced by commercial publishers (the best known is Duden-Verlag, based in Mannheim) rather than by a state institution (like, for example, the *Österreichische Wörterbuch* in Austria), but are still perceived by many users as officially binding.

Indeed, up until the spelling reform a few years ago, the *Duden Rechtschreibung* (the orthography dictionary) did have the authority of the education ministries of all the federal states behind it. The various national varieties of English are not codified to this degree and the norms are more in the nature of conventions that have emerged in practice rather than codified rules (cf. Durrell, 1999: 290). In the United States, there are competing perceptions of what constitutes spoken Standard U.S. English and where it is to be found (cf. Hartley and Preston, 1999). Speakers from Michigan and California seem to be especially sure that the varieties they use represent pure, Standard U.S. English, even when there are nonstandard features in these varieties (as judged by the informants themselves) (Fought, 2002; Niedzielski and Preston, 1999). It is sometimes claimed that 'network American' is Standard U.S. English: this is a mainstream accent, based on the leveled dialects of the northern Midwest, with the most marked local features being avoided (Milroy and Milroy, 1999: 150–151).

When it comes to British English there seems to be agreement amongst linguists that it is quite difficult to describe the rules of Standard English unless one restricts oneself to the written realization only. It is accepted that the spoken variety cannot be standardized to the same degree, and that even speakers who avoid the use of locally or regionally marked nonstandard grammar and vocabulary will nearly always still have a regional accent (cf. Milroy and Milroy, 1999: 18–19). It is clear from the preceding that academic linguists conceive of Standard English as being realized in a spoken and written form, although policy makers (or even norm makers) frequently fail to draw such a distinction (cf. Lippi-Green, 1997: 107) and often see differences from writing as deviations from a written norm rather than judging them on their own terms.

A problem for teachers is that the curricula which they are expected to follow often give no clear guidance as to what is to be taught under the guise of Standard English, German, Welsh, etc. For teachers of Welsh in Wales the situation is as follows: there are "no instructions or guidelines concerning the grammatical and syntactic forms to be used, except for a book of terms where there are lists of 'technical' words classed according to subject ... Every type of Welsh is accepted at present" (Derec Stockley, Examinations Officer of the Welsh Joint Education Committee, which sets exams in Welsh as well as other subjects, quoted in Jones, 1998: 282). The lack of explicit guidelines in the curriculum is perhaps not such a problem in a country such as Germany where there is a codex (although the fact that a codex exists does not necessarily mean that the teachers are familiar with its content; cf. Davies, 2000b); in this case it is, however, potentially problematic that the codex almost exclusively contains the rules for a formal register of German (Durrell, 1999: 302–303) and makes few concessions to spoken usages, even those common amongst educated speakers in formal situations (Jäger, 1980: 376).

Even if the curricula of teacher training colleges are to accept that their trainees need to acquire knowledge of the systematic differences between the nonstandard varieties which the majority of their pupils will speak and the standard variety, the information is often simply not available, or is not particularly useful. As we saw above, not all language communities possess full descriptions of their written and spoken standard varieties, but the problem is even more acute for nonstandard varieties, and there is a pressing need for more research in order to have up-to-date and detailed descriptions of nonstandard features at all levels of language. Jenny Cheshire (1982: 53) found that teachers of English who lacked awareness of the systematic differences between Standard English and the nonstandard dialect of their pupils tended to mark inconsistently, thereby confusing the pupils. In Germany, between 1977 and 1981, a range of books presenting contrastive analyses of Standard German and regional nonstandard dialects was published (*Dialekt-Hochsprache kontrastiv*), aimed at teachers to help them to teach Standard German to their pupils. Unfortunately, these were of limited use since the analyses were based on a comparison between formal Standard German and traditional dialect, whereas most of the children, especially in urban areas, spoke an intermediate form at home (cf. Barbour, 1987).

The lack of detailed descriptions of different linguistic varieties is also a problem in the United States, where standardized language tests are often used to help determine the kind of education most appropriate to a child encountering problems at school (Milroy and Milroy, 1999: 143). If the correctness of a child's answer is measured solely against one Standard English form and if every deviation from that form is marked as wrong, regardless of whether it is part of the child's vernacular or not, then the results are going to be badly skewed and unhelpful, and may well lead to underestimation of the child's real level of linguistic skills. An example is the contrast between /f/ and /θ/ (*fin/thin*). Not all dialects of English have minimal pairs based on this distinction, so a child who speaks one of those dialects is more likely to filter out the auditory information s/he needs in order to perceive the contrast than is a child whose dialect makes a phonemic contrast between the two

sounds. This is comparable to a native speaker of Standard British English who has to practice hearing the difference between *wurde* and *würde* in German since his/her dialect doesn't have front rounded vowels. In the United States, speakers of nonstandard varieties score very much lower on language tests than do speakers of the standard variety, suggesting that there is a bias in the test material and that tests do not always allow a clear distinction to be made between children who have underdeveloped language skills and those who may not have mastered the standard variety, but who are perfectly fluent in their vernacular (Milroy and Milroy, 1999: 143).

Spoken and Written Language

As we saw above, there is often a tendency to equate the standard variety of a language with the formal written registers of that language. This may make a teacher's life easier to some extent, since the written realization of the standard variety is normally relatively fixed and invariant, and this provides an authoritative norm against which to measure a child's performance. However, if we measure children's oral performances against the norms of written language they are always going to be found wanting, even those who come from homes where a standard-like variety is spoken. Even these children have to learn the rules of written Standard English or French or German, etc.; they cannot simply write as they speak since no variety of speech is exactly the same as written language. Teachers need to be able to differentiate between errors in written work that are due to interference from regional nonstandard dialects and those that are due to interference from informal colloquial varieties. This is not an easy task: not only is it the case, as we have already seen, that spoken Standard English is not easy to define, but, as Cheshire points out, "the grammatical structure of spoken English generally is far from being well understood" (Cheshire, 1999: 129). The syntax of spoken language is very different from that of writing, and constructions that appear to be redundant or ill formed according to the norms of writing play important roles in structuring spoken discourse.

One reason why children need to learn to distinguish between the requirements of speech and writing is that the latter, since it is relatively context free, cannot tolerate as much ambiguity or vagueness as the former. Uniformity is also useful in writing since it helps to ensure that the text will be understood over a wide area and by a wide range of people. The same degree of explicitness is not necessary in speech, although teachers often act as if it were, e.g., by asking children to answer in full sentences, when this is quite unusual in normal interaction. In highly literate societies like the United States, Britain, or Germany there tends to be an assumption that clear and effective communication can only take place in a standard variety, and then in its most formal realization (usually the realization closest to writing). People often find it difficult to accept that clear and effective communication can take place in a nonstandard variety, and it is clear that, in certain situations or with certain interlocutors, communication will not be as effective in a nonstandard variety since the listeners will be so distracted by the nonprestigious form that they may not pay the necessary attention to the content of the message. However, this is related to social value judgments and is not inherently a property of the nonstandard varieties themselves; e.g., not pronouncing orthographic *h* in words like *hat* may be seen as incorrect and judged negatively in certain (influential) sectors of British society, but the same phenomenon in Spanish is part of the standard norm (*haber*, *honor*, etc.).

Multilingualism

Another major issue that is connected with correctness and/or purism is the role of languages other than the dominant or official national or state languages in the classroom. In Britain, for example, about 10% of schoolchildren speak English as an additional language (EAL). Many of these children were born in Britain or have been living here for a long time. The prevailing trend is to teach them in mainstream classrooms. Even those children who have recently moved to Britain are taught in mainstream classrooms, but they also receive some support from specialist EAL teachers. In recent years there has been increasing discussion about the necessity of integrating immigrants to Britain, and the role of language education (i.e., learning English) in this process has been hotly debated, although as yet there is no need to pass a language test before being able to obtain British citizenship. There is some pressure for classrooms to become spaces in which only English may be spoken, since there is a perception that English is not used enough in other, more private domains (see **Figure 1**). A similar movement has been obvious in the United States for some years: the U.S. English organization wants to outlaw the use of languages other than English in public domains. Superficially, such movements seem to have something in common with schools devoted to the maintenance or revitalization of minority or endangered languages; for example, in Welsh-medium schools in Wales and in French-medium schools where French is the minority language (e.g., in the Canadian province of Ontario)

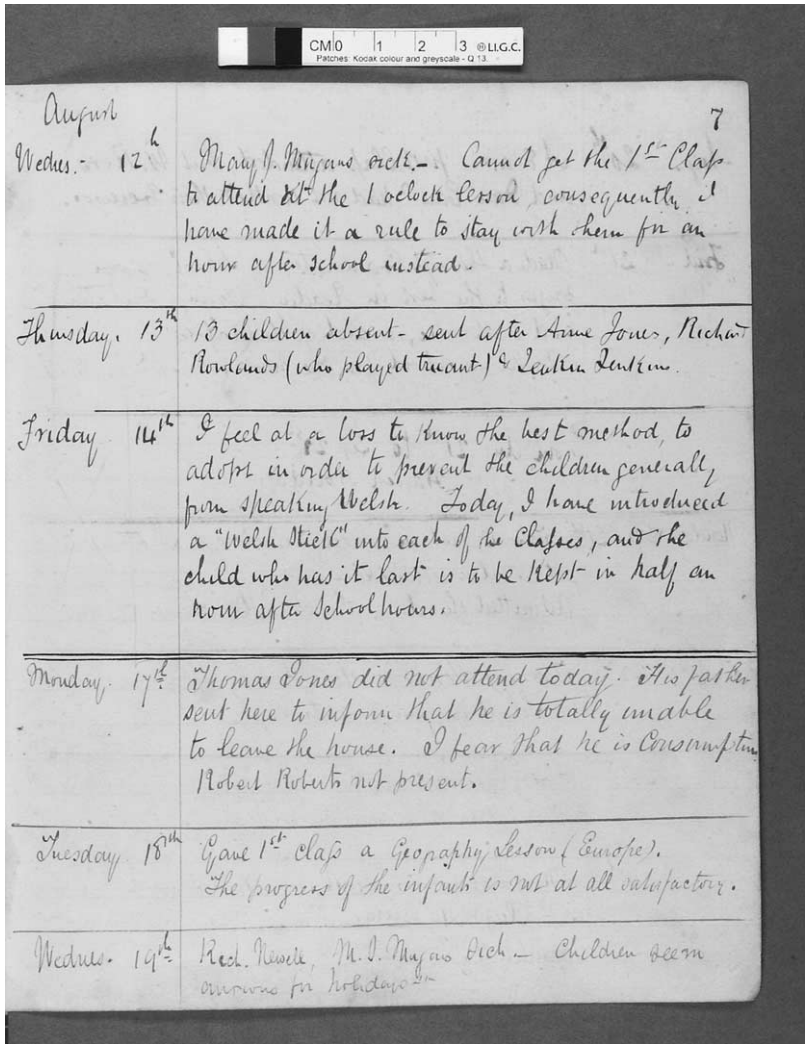

August 7

Wednes. 12th — Mary J. Mizans excd. — Cannot get the 1st Class to attend at the 1 o'clock lesson consequently I have made it a rule to stay with them for an hour after school instead.

Thursday. 13th — 13 children absent — sent after Anne Jones, Richard Rowlands (who played truant) & Jenkin Jenkins.

Friday 14th — I feel at a loss to know the best method to adopt in order to prevent the children generally from speaking Welsh. Today, I have introduced a "Welsh Stick" into each of the Classes, and the child who has it last is to be kept in half an hour after School hours.

Monday. 17th — Thomas Jones did not attend today. His father sent here to inform that he is totally unable to leave the house. I fear that he is Consumptive. Robert Roberts not present.

Tuesday 18th — Gave 1st class a Geography lesson (Europe). The progress of the infants is not at all satisfactory.

Wednes. 19th — Rect. Rescle, M. J. Mizans Sick — Children seem anxious for holidays &c.

Figure 1 This extract from log book of Towyn British School, Merionethshire, Wales 1863–1876, referring to attempts to prevent children from speaking Welsh, shows that such pressure is not new. From Meirionnydd Archives, Gwynedd Archive Service with permission.

great efforts are made to try to ensure that only Welsh or French is spoken at school. Whether the strategy is necessary in the case of English, the dominant language in Britain and the United States, is debatable.

Studies of code-switching in the classroom have thrown a great deal of light on the hierarchical relations between different languages in multilingual societies. In some societies, e.g., Malta, code-switching between English and Maltese is officially encouraged and is common in most classrooms, although the exact distribution of the languages will depend a great deal on the individual teacher (cf. Camilleri Grima, 2001). However, since there are far more teaching materials available in English than in Maltese, the already high status of English in Maltese society is reinforced in the classroom, and Maltese tends to be used for less prestigious activities, such as to create an informal atmosphere or to create warmth (Camilleri Grima, 2001). In Botswana, the official policy is that all education from the last few years of primary schooling onwards is to be in the postcolonial language, English, rather then the indigenous language Setswana (Tswana). Teachers occasionally switch between the two languages, but for pupils the only legitimate language is English (Arthur, 2001). In British classrooms, bilingual teaching assistants are sometimes employed in the early years of primary education to help minority-language students become integrated into school life; however, these assistants are rarely drawn into the main action of the classroom, but left on the margins while the main action takes place monolingually in English (Martin-Jones and Saxena, 2001).

Policy vs. Practice

Official policies as expressed in curricula and similar documents say a great deal about official views of how language education should be realized, but we cannot assume that the practitioners slavishly follow such policies. Research in Germany has shown that, even when the curricula state clearly that Standard German is always to be used as the medium of instruction, and although teachers do not explicitly question the privileged status of Standard German at school, the classroom is nonetheless not exclusively the domain of the standard. Teachers do not always insist that their pupils speak the standard unless they are performing certain tasks, such as giving oral presentations, and they often express an awareness that correcting children too often is likely to discourage them from contributing in class. There is also an awareness that some children might find it difficult to perform certain speech acts, e.g., telling a teacher about a personal problem, in the standard, unless this is their mother tongue (cf. Davies, 2000b). What is clear, however, is that the use of nonstandard varieties in the classroom is usually restricted to rather stereotypical topics such as dialect literature, or to speech events that are marginal to the 'real' business of teaching (personal conversations), or to nonacademic topics, and the dominant status of Standard German is never put in doubt. Similarly, in Malta, as we saw above, although official discourse presents both languages as equal, the reality is that Maltese is used for less prestigious speech acts than English.

See also: Assessment of First Language Proficiency; Bilingualism; Code Switching; Discrimination and Language; Duden, Konrad (1829–1911); Education in a Multilingual Society; Educational Failure; Germany: Language Situation; Identity and Language; Language Attitudes; Language Education Policies in North America; Language Education Policy in Europe; Language Education: Teacher Preparation; Language Policy in Multilingual Educational Contexts; Minorities and Language; Minority Languages: Education; Minority Languages: Oppression; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Norms and Correctness; Prestige, Overt and Covert; Society and Language: Overview; Standardization; Teaching of Minority Languages; United Kingdom: Language Situation; United States of America: Language Situation; Variation in German; Wales: Language Situation.

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Language Education: Grammar

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History

The earliest known evidence for grammar teaching dates to the early second millennium B.C. in Babylon, where scribes learned to write Sumerian and Akkadian, and to translate between the two, with the help of tablets that systematized the word-formation rules (Gragg, 1994). There is a great deal more evidence for grammar teaching from the end of the first millennium B.C. in classical Greece and in the world influenced by it, including Rome (Howatt, 1994). This is when the term *grammatiké* came into use, first for the understanding of letters (Greek *grammata*), and only later for what we call *grammar* (Robins, 1967: 13); the terminology reveals the intimate connection between the study of grammar and the teaching of writing. This was the start of the tradition of grammar teaching that persisted in Europe and the Near East through the next two millennia, and which was exported to much of the rest of the world.

In contrast, the grammatical tradition that started at about the same time (350 B.C.) in India was linked to religion rather than to the teaching of writing (Kiparsky, 1994). Here we focus on the European tradition of grammar teaching at school.

Grammar teaching was a central part of the school curriculum through the Middle Ages and beyond. At first, grammar supported the learning of Latin (as a second language), but later it was applied to the national languages such as English. In many countries, this tradition has continued uninterrupted to the present; this seems to be true, in general, of Eastern Europe and the Romance-speaking world. Like any other school subject, grammar needs renewal from the academic world, even if only through higher-level teaching of Latin or other ancient languages (including Old English); indeed, in at least some countries academic grammarians have seen schools as important users of their ideas. For example, the theoretical doyen of dependency grammar, Lucien Tesnière, arranged for his ideas to be trialed with schoolchildren (Tesnière, 1959: 4). In contrast, grammatical theorizing never had a serious place in the universities of England, and even in language learning it was in serious decline by the early 20th century, so there was no renewal, and teachers could only repeat what they themselves had learned at school. This is almost certainly one of the main reasons why grammar teaching disappeared from most schools in England from about 1930 to 1980, though it has now returned thanks to the National Literacy Strategy (Hudson and Walmsley, unpublished). School-level grammar teaching died at about the same time in other parts of the English-speaking world, and it is hard to predict future developments.

The Scope of Grammar Teaching

Grammar teaching at school always deals with the major word classes (the traditional parts of speech), but (at least in the English-speaking world) all too often it stops there. In principle, it can cover the full range of concerns that linguists call grammar; and indeed, in the absence of any other name for language structure, it can be taken even more broadly to include all aspects of language structure. In this very broad sense, therefore, school-level grammar teaching could include all the following topics:

- word classes, feeding all the other kinds of analysis
- syntax (including sentence and clause analysis)
- morphology (particularly important for English spelling)
- phonology, graphology, and spelling
- punctuation
- lexical relations (semantic and morphological relations)
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- semantics (lexical and syntactic)
- pragmatics and discourse structure

- sociolinguistics, style, and dialectology
- language change

However, syntax has always had a central place in language teaching, especially in the debate about whether grammar teaching improves writing.

Another variable in grammar teaching concerns the language to which it is applied: the pupils' mother tongue (L1) or a second or foreign language (L2). In principle, of course, it can be applied to either or both, and in an ideal world both languages will be treated in terms of the same framework of concepts and terminology. Cross-language teaching can work well or badly, according to how sophisticated the teacher's and pupils' grasp of grammar is. The recent history of the English-speaking world has seen much the same rejection of grammar teaching in L2 teaching as in L1 teaching, but the pendulum has now swung back in its favor as a result of a large body of supportive research (Norris and Ortega, 2000). However, this article will focus on L1 teaching.

A third variable in L1 teaching is whether the teaching is descriptive or prescriptive. It almost always involves teaching a standard language to learners who do not yet know it, but this can be presented descriptively as a complement to the local non-standard language – an additional language variety for use on public occasions. The reasons why linguists prefer descriptive teaching to prescriptive are not only social but also intellectual and pedagogical – prescriptive teaching is inherently dogmatic and stuffed with pseudological arguments which are a poor model for any growing intellect.

Grammar teaching could, in principle, be embedded in a much broader framework of work on language, including psycholinguistic questions about child language, speech processing, animal communication and sociological questions about how language perpetuates prejudices, power structures, and so on. This broad program would be a course in general linguistics in all but name, and it is being actively pursued under the name of Language Awareness (Hawkins, 1994).

The Aims and Methods of Grammar Teaching

Since its origins in classical Greece, the main aim of grammar teaching has been to support the learning of literacy skills – hence the etymological link with *gramma* 'written letter' and *graphein* 'to write'. However, it is important to remember that the grammar of any language is itself a complex system rather than a disconnected list of categories or facts, so even if the ultimate aim is to improve writing, the immediate aim has to be an understanding of the system of grammar itself. Merely teaching the names and definitions of the word classes by rote is unlikely to have any benefit for writing.

How is grammar supposed to improve writing? At its weakest, grammar teaching targets a prescriptive list of errors, but healthy grammar teaching encourages growth, even though this typically leads to temporary errors at growth points. Grammar teaching helps young writers to develop richer grammatical repertoires:

- by providing a metalanguage for discussion of new constructions and weaknesses in the children's writing.
- by providing a deeper understanding of how language works, including a more or less conscious awareness of the resources available for particular functions.
- by directing learners' attention to the form of what they read, in the hope that they will notice new patterns and remember them.

We shall consider below whether grammar can in fact produce these benefits.

However, the improvement of writing (and reading) is only one of the possible aims of grammar teaching. Here are some others:

- Providing a metalanguage for L2 learning, and perhaps even for explicit comparisons between L1 and L2 structures (Hawkins and Towell, 1996). This kind of cross-language comparison is one of the pillars of the Language Awareness movement mentioned earlier, but it also underlies the old idea that learning Latin was a good way to teach an English speaker to write better English.
- Teaching children, as part of a liberal education, about an important part of themselves. In this approach, grammar is taught, alongside other areas of language, on much the same basis as, say, history – something every citizen ought to know something about. This is another application of Language Awareness, mentioned above.
- Using grammar as a vehicle for teaching scientific method. A number of small-scale experiments have shown that children can learn to formulate and test hypotheses about grammar, and that even small amounts (e.g., two weeks) of this activity can produce measurable improvements in general scientific reasoning (Honda, 1994; Honda and O'Neil, 1993).

Similarly, a wide range of methods have been used for teaching grammar, ranging from didactic teaching by rote, with a question-and-answer dialogue that included 'parsing', to discovery-based learning in

which children induce grammatical generalizations from their own data. The methods used obviously depend heavily on the aims of the teaching, but even when the aim is to improve writing, there is a major choice about the timing of the grammar teaching in relation to writing activity. There are three options:

1. **Separate** teaching teaches grammar separately from writing so that topics in grammar are not related to topics in writing.
2. **Reactive** teaching teaches grammar as and when needed, an approach strongly favored under the title 'grammar in context' (Weaver, 1996). When taken literally, this approach generally means in fact that grammar is never taught because of the time needed to teach most grammatical concepts (Bullock, 1975).
3. **Proactive** teaching anticipates the needs of a class and teaches a particular point of grammar with immediate links to those needs. This has probably been the basis for all successful grammar teaching, such as the National Literacy Strategy in England (Anon, 2000). The advantage of this approach is to allow grammar teaching to have its own systematic structure (e.g., teaching about verbs before teaching about tenses) while still being closely integrated with writing.

These choices lead to further choices about methods – e.g., the choice of whether or not to teach and use sentence diagramming, and, if so, what kind of diagrams to use. These questions lead in one direction into pedagogy and in the another direction into linguistic theory.

Evaluating the Success of Grammar Teaching

Does grammar teaching work? In particular, does it improve writing and reading skills? Until recently, the received wisdom was that research had shown convincingly that it did not. The following summary is typical: "Formal grammar instruction appears to contribute nothing to the development of writing and reading skills" (Elley, 1994). It is certainly easy to find examples of grammar teaching that were unsuccessful (by any criteria), but this merely shows that grammar can be taught unsuccessfully. In contrast, there is also a great deal of solid research evidence that grammar teaching does in fact work if teachers are sufficiently well-informed about grammar and if the teaching is proactive (in the sense explained above in 3.), i.e., closely integrated with activity to which the grammatical instruction is relevant. The following examples are representative:

- The exercise known as "sentence combining" has been shown to improve writing (Mellon, 1969; O'Hare, 1973; Hillocks and Mavrognes, 1986). In this method, students combine a list of simple sentences into a single sentence, with or without explicit comment on the structures concerned. This activity combines focus on a specific aspect of grammatical form with an immediate writing activity. Its effectiveness is an important demonstration that grammar teaching does not, in fact, have to be 'in context,' in the sense of reacting to children's own writing.
- Instruction about specific aspects of spelling such as the possessive apostrophe and irregular past-tense forms produced immediate improvements in these areas, as measured by tests before and after the instruction (Bryant *et al.*, 2002, 2004; Nunes *et al.*, 1997a, 1997b). The areas of grammar chosen for these experiments are known to cause serious problems for English learners because the underlying rules are not easy to infer from examples, so it is important to know that explicit instruction can in fact help.
- Teaching about complex noun phrases helped 18-year olds to understand such phrases in reading (Chipere, 2003). The experiment was specifically designed to separate the effects of grammatical knowledge from those of working-memory differences, and showed that explicit instruction in grammar improved comprehension (as well as recall); in fact, it brought a 'low-academic-ability' group up to the same level of comprehension as a high-ability group who received no instruction.

However, it has to be admitted that the research basis for such work is disappointingly thin, and it is still not clear exactly what distinguishes successful and unsuccessful grammar teaching.

See also: Language Education: Correctness and Purism; Language Education: Language Awareness; Language Education: Teacher Preparation; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Second and Foreign Language Learning and Teaching.

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LA is generally seen as emerging in the 1970s, in the writings of Halliday (1971), and with the recom-

mendations of the Bullock Report (DES, 1975) in the United Kingdom, drawing attention to underachievement in L2s in British schools. Some more enterprising teachers were soon independently establishing local projects to increase pupils' knowledge of languages and language. Cameron (1993) refers to three types of LA program at this time: for pupils about to start L2 learning, for pupils in multilingual/multicultural classrooms, and as prelinguistics courses for pupils in higher classes. The National Council for Language in Education (NCLE) working parties (1978) and conferences (1981, 1985) brought valuable institutional support to these grassroots initiatives, and Hawkins (e.g., 1984) added an enduring theoretical framework, with proposals for LA as a 'bridge' between mother tongue L1 and L2 education, and between primary and secondary education, and also with broader social objectives, such as parenting. Further impetus came in 1989 with a British Association for Applied Linguistics Seminar on LA (an event organized to bring together language practitioners using the term for different purposes in a range of contexts), and in 1992 with the First International Conference on LA, at which the ALA and its journal *Language Awareness* were launched. ALA conferences have followed biennially at venues in the United Kingdom and overseas (to date, Canada, Ireland, Sweden, France, and Spain).

LA often has been identified with the United Kingdom, as above, but equivalent projects are increasingly found elsewhere. EU-funded projects involving networks across several countries have been particularly impressive – for example, the primary-school focused Evlang – 'l'éveil aux langues' project (Candelier, 1998). Labels used to translate LA have occasionally aroused debate, as they can carry subtle distinctions, even within a single context (e.g., Gnutzmann's [1997] list of German terms). Related English terms include *consciousness-raising* (CR) and *Knowledge about Language* (KAL). James (1996) proposes reserving CR for the identification of discrepancies between present knowledge and target knowledge, and employing LA for the metacognition of knowledge that one already possesses without previously realizing one had it. KAL has been employed in some U.K. government reports. Cameron (1993) points to the different origins of KAL and LA, and the confusion arising from assuming synonymy. These two terms in particular reflect the LA debate around the role of explicit learning and explicit knowledge in language learning.

LA is associated with discovery-focused pedagogy. Often, learners engage in small-scale investigations requiring reflection or talk about how languages work, how they are learnt, and how they themselves can best focus their own learning. Hence, the development of metalanguage (e.g., Jaworski *et al.*, 2004; Berry, 2005), awareness of strategies of learning and communication, critical evaluation of the process of language learning (e.g., Garrett and Shortall, 2002), and working toward more autonomy in learning and use (Little, 1997) also feature. Reflective approaches are extended to language teacher education (e.g., Wright and Bolitho, 1993; Walsh, 2003), and also teacher development. Hence, projects bridging 'the space between' English and Modern Foreign Language teachers have involved the teachers sharing reflections on their different perspectives and experiences (Pomphrey and Moger, 1999; Turner and Turvey, 2002).

Benefits attributed to LA are viewed across five broad and overlapping dimensions: performance, cognitive, affective, social, and power (James and Garrett, 1991). The performance dimension concerns whether knowledge gained from greater awareness of language facilitates improved language use and learning. The cognitive dimension relates LA to an 'awareness of pattern, contrast, system, units, categories, rules of language' (Donmall, 1985: 7), and to the development of an 'analytic competence' that extends beyond language learning: a role Hawkins (1984) suggests might earlier have been fulfilled by learning Latin. The affective dimension is usually considered in terms of attitudes, motivation and curiosity accruing from LA. Hawkins's proposal for LA as a bridging subject to address poor achievement is directed as much at this dimension as the performance one. The social dimension is generally seen in terms of social harmonization in contexts of language diversity, and of building better relations between ethnic groups. The power dimension aims at increased sensitivity and empowerment to counter the manipulative and oppressive use of language, and to understand and counter language ideology. LA work with its prime focus on this dimension is usually referred to as Critical LA (Fairclough, 1999). It will be clear that the success or failure of LA work, in terms of both short-term and more enduring impacts, needs to be judged on these dimensions. We now turn to consider LA in the wider social context, where the last three dimensions in particular feature strongly.

Although some LA projects in schools aim at changing attitudes toward languages and their speakers, other work has studied the broader social backdrop of attitudes and stereotypes itself. Whereas some of this survey work has drawn its data from teachers and students (e.g., Garrett *et al.*, 2003, in Wales; Lochtman *et al.*, 2004, in Brussels), other work has studied the views of nonlinguists generally, arguing (*inter alia*) '. . . the undeniable importance it has in the

language professional's interaction with the public' (Preston, 1996: 72). LA-relevant work also has focused on specific contemporary issues in which language and communication can play a crucial role, from designing teaching programs to counter physician-patient communication barriers in HIV/AIDS medical interviews (Singy and Guex, 1997), and (to extend LA to communication and discourse awareness) understanding the communication complexities of HIV/AIDS campaigns (e.g., Perloff, 2001), to attitudinal studies of ageism in communication, and of 'good communication' between generations (e.g., Williams *et al.*, 2004).

Cameron (2000) has linked this general contemporary concern with 'good communication' with processes of globalization, which is increasingly referred to in other recent LA work. Some concerns itself with the increasing mobility of large numbers of people and the impact on language choice and use, the values attached to them, and social identities, whether they are tourists (Jaworski *et al.*, 2003), or recently immigrated communities (Yelenevskaya and Fialkova, 2003, in Israel) or their children who have grown up in the new community (Jørgensen and Quist, 2001, in Denmark), or people returning to visit locations of earlier family generations (Wray *et al.*, 2003, in Wales). Other work has explored the implications of the claim that, with the weakening of traditional social distinctions of class, sex, and age under globalization, traditional language situations and notions of standard language varieties have come under attack. Kristiansen (2001), for example, finds attitudinal evidence of a splitting in two of Standard Danish, with a standard emerging for the media that differs from that valued in the educational system. But globalization also is viewed in terms of the commodification of discourse, the increasing marketization in our lives and institutions, including education, and of how our increasingly knowledge-based societies impact not only on our jobs but also on our personal relationships and identities across the lifespan. LA has a challenging role to play in such globalization processes, to better prepare us for pursuing our social identities, and for resisting organizational incursions into our everyday lives. To this end, Fairclough (1999) has argued the importance of promoting educational programs in critical discourse awareness.

See also: Bilingualism and Second Language Learning; Consciousness, Thought and Language; Discrimination and Language; Education in a Multilingual Society; Educational Linguistics; Folk Linguistics; Foreign Language Teaching Policy; Immigrant Language Education; Language Attitudes; Language Education: Correctness and Purism; Language Policy in Multilingual Educational Contexts; Language Teaching Traditions: Second Language; Migration and Language Planning; Migration and Language; Minorities and Language; Minority Languages: Education; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Motivation and Attitude in Second Language Learning; Multiculturalism and Language; Nonnative Speaker Teachers; Norms and Correctness; Politics, Ideology and Discourse; Second and Foreign Language Learning and Teaching.

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Language Education: Standards Movement

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> Accountability has become a watchword in public sector enterprises. It is one of several themes . . . that are symptomatic of the late 20th century loss of confidence in the state as a provider of services. Nowhere have demands for accountability become more strident than in education (Moore, 2001: 177).

The current drive for accountability may explain the pervasiveness and ubiquity of standards and therefore delude us into the naïve view that the standards concept is new and original. It is not. The concept of and the concern for standards have a long tradition, sometimes under different names, the most common probably being norms, but there are other familiar terms, too, such as *rules* and *conventions*. What they all indicate is that there are social goals and that there are agreed-upon ways of reaching toward those goals.

In language studies, one of the most common uses of a standard is bracketed with a language, thus Standard Language (Standard English, Standard French, and so on). What is meant here is that one (or more) dialect(s) of a language is attached to social prestige and therefore accorded official status in education, publishing, teaching foreigners, and so on. Because of its official uses, descriptions of the standard written language are likely to be readily available in published grammars, books of usage, dictionaries, and style and punctuation manuals. What are unlikely to be so readily available are manuals on how to speak the standard language.

Standards, then, are ways of behaving, like conventions, but within institutions they have more authority because they can be used as nonnegotiable goals (Elder, 2000a). Brindley places standards under the broad heading of outcome statements: these, he considers, can refer to standards themselves and to benchmarks, attainment targets, bandscales, profiles, and competencies, all of which are "broadly speaking, standards of performance against which

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learners' progress and achievement can be compared" (Brindley, 1998: 48).

In language assessment, standards have three senses. I list them here and then discuss each in turn:

1. the skills and/or knowledge required to achieve mastery and the proficiency levels leading to mastery, along with the measures that operationalize these skills and/or knowledge and the grades indicative of mastery at each level.
2. the full set of procedures followed by test constructors which provide evidence to stakeholders that the test/assessment/examination/evaluation is serious and can be trusted, demonstrating, often through a code of ethics, that the test constructors are operating professionally.
3. a shorthand way of combining (1) and (2).

Standards as the Goal

Standards as the goal, the level of performance required or explained, thus "the standard required for entry to the university is an A in English"; "English standards are rising" (Davies *et al.*, 1999: 185). Stakeholders, of course, rightly wish to know what is meant by such statements, how they are arrived at, and what the evidence is for making them. For this understanding, there are three requirements: description, measurement, and reporting. The first is that the levels of performance (the 'standards') need to be made explicit. Such description is not easy (McNamara, 1997) and in second language learning becomes less and less easy as the learner progresses. In the initial stages, we might say: you must master these 50 vocabulary items. At later stages, we say, for example: you must demonstrate understanding of texts taken from given newspapers, facility to initiate and maintain a conversation with a native-speaking peer, the capacity to write a letter of complaint, and so on. These types of achievement are more difficult to delineate and to circumscribe. And even the initial level (50 vocabulary items) may, depending on our view of language learning, be absorbed into more complex uses of those items. But the three-stage process remains: there needs to be a description of the standard or level, an explicit provision of the measure that will indicate that the level has or has not been reached, and a means of reporting that decision, through grades, scores, impressions, profiles, and so on. Description, measure, and report; these three stages are essential, although there may be blurring of stages 2 and 3, such that the report is included within the measure. Where classical objective tests such as the Test of English as a Foreign Language (TOEFL) and the International English Language Testing System (IELTS) differ from the scale approaches of the Inter-Agency Round Table (IAR), the American Council on the Teaching of Foreign Languages (ACTFL), and the International Second Language Proficiency Ratings (ISLPR) is in their unequal implementation of the three stages. The tests offer measures and reports, but may be light on the first stage, description. The scales provide description and reports but may lack a measuring instrument. Proponents of the two methods (tests and scales) do not readily accept such criticism, maintaining that, in the case of the testing approach, the description is incorporated into the test and its supporting manuals; and in the case of the scaling approach, that the scale itself (which we consider to be a description) incorporates its own measuring instrument. *Quot homines, tot sententiae*. Ideally, scales require the support of a test instrument to provide reliable assignment to a level (or band) on a scale, in other words to offer an objective cutoff rather than leave the designation of a level to the subjective judgments of the interviewer/judge/rater Davies, 1995). However, it is not only scalar systems that are open to such claims of unreliability (Leung and Teasdale, 1997): tests such as IELTS incorporate components of scalar judgments in their Speaking and Writing subtests where performance is judged by only one rater, effectively offering a scalar outcome (and lending themselves open to questions about reliability).

The move away from the objective test to the subjective scale is no doubt part of the widespread rejection in the social sciences of positivism, fueled by the sociocultural turn and concern for critical language testing. But it also has a more practical explanation. In large scale operations, common standards may be more readily acceptable if they are imposed by a scale which is open to local interpretations (much the same may be said of an international code of practice). A contemporary example of this is found in the Council of Europe's Common European Framework (CEF) of Reference for Languages: Learning, Teaching, Assessment (CEF, 2003). The CEF claims to be the "basis for a coherent and transparent structure for effective teaching/learning and assessment relevant to the needs of learners as well as society, and that can facilitate personal mobility" (CEF, 2003: ix). Building on the earlier Threshold level and the Common Reference Levels (A1-C2), "the CEF is now . . . inspiring a new generation of sets of objectives for curriculum developers . . . . This current Manual, with its emphasis on relating assessments to one another through the mediation of the CEF, is a logical complement to the developments on levels and objectives' (CEF, 2003: ix). The CEF, then, is not a measure. For measuring purposes, the CEF operates as a common

reference to which local and national assessment instruments can relate (Taylor, 2004). This makes good sense, but there is undoubtedly the danger of the tail wagging the dog: that, to enable mediation through the CEF, local systems will massage their own measures so as to secure accord with the CEF. In other words, the apparent freedom offered by the CEF to local systems could be an illusion, and, as Fulcher (2004) insists, established without proper research.

Large-scale operations such as the CEF may be manipulated unthinkingly (rather than, as we have suggested, deviously) by juggernaut-like centralizing institutions. Mitchell describes the misconceived imposition of the Attainment Targets and Level Descriptors of the United Kingdom's National Curriculum for Modern Foreign Languages, asserting that the longer-term impact of these standards "will certainly be to reduce diversity and experimentation . . . we are likely to lose the more ambitious and more experiential interpretations of communicative language teaching, which has . . . historically been found at [the] local level' (Mitchell, 2001: 174). Elder reports a similar case of inappropriate standards for LOTE (Languages other than English in Australia (Elder, 2000b). Bailey and Butler, discussing the No Child Left Behind (NCLB) program in the United States, complain that, because of recent changes to the federal law, no distinction is made between English learners and native speakers. The law now requires "the inclusion of English Language Learner students in future mandated assessment systems. The NCLB Act of 2001 increases school accountability . . ." (Bailey and Butler, 2004). Such mismatches are not wholly unlike what we have suggested as the possible CEF massaging of local measures, because in all cases what is in train is the imposition of one overall set of standards nationally, regionally, or even universally, the McDonald'sization of language standards. However, our skepticism may be misjudged and out of place, because by their very nature standards are ambitious for wider and wider acceptance. There really is little point, after all, in establishing standards just for me if they have no meaning or application to you or anyone else: similarly with standards for a class, school, city, and so on. What then is wrong about the Mitchell, the Elder, and the Bailey and Butler cases is not that they were attempts at expanding the range and distribution of standards, but that they were the wrong standards for the populations discussed.

Setting Standards

If standards, in our first sense, refer to a level of performance required or experienced, the emphasis being on the language user or test-taker, a second sense refers to a set of principles which can be used as a basis for evaluating what language testers do, such as carrying out the appropriate procedures. When a school principal maintains that his/her school is 'maintaining standards,' the implication is that achievement levels over time are constant. When an examination body such as Educational Testing Service (ETS) or the University of Cambridge Local Examinations Syndicate (UCLES) claims that they are 'maintaining standards,' what they seem to mean is that they are carrying out the appropriate procedures, such as standard-setting (Griffin, 2001). Standard-setting is a technical exercise, involving, as it does, the determining of cut-scores for a test, either for pass/fail or for each level in a band system. But it is worth remembering, as Lumley *et al.* (1994) conclude, that standard setting remains a substantially political and ethical issue: "there can be no purely technical solution to the problem of standard setting in this context" (of an English test for ESL health professionals), the decision "remains intrinsically ethical and political; no amount of technical sophistication will remove the necessity for such decisions" (Lumley *et al.,* 1994: 39). Seeking to be ethical, behaving as responsible professionals, means that examination bodies must ensure that their products are reliable and valid, that they are properly maintained and renewed over time, that appropriate research is in place, and that the needs of all stakeholders are being addressed. It seems also necessary to demonstrate publicly that their claimed standards are being maintained. Hence, the professional statements embodied in a Code of Ethics (ILTA, 2000; ALTE, 2001). Skeptics may object that language testing was professional before testers felt the need to claim a professional status in a Code of Ethics, but there is another interpretation, that just as the reach of grammar expands into the area of discourse, so we are seeing in the professionalizing and ethicalizing of language testing a wider and wider understanding of validity.

Measuring and Reporting Standards

To an extent, this is where Messick's theorizing (1989) has taken us in his attempt to provide one overall coherent framework for the description, the measurement, and the reporting of standards, and the systematic effects they have on all stakeholders. The term that has come to be associated with his

conceptualization is that of *consequential validity*, but it does seem that *impact* may be an alternative name for it. Impact studies the effects that a test has when put to use: this is more than the more frequently used term *washback*, precisely because it is concerned not with just how a test works in one situation but with its systemic influences. As such, impact can investigate fundamental issues about standards: are they the right ones for the purposes intended, are they fully and openly described, are they attached to reliable and valid measures, and is the reporting clear and precise, and does the test produce desirable outcomes in the form of more appropriate and useful teaching. What impact studies, then, can do is to enable us to reevaluate and make explicit not just the standards we promote but the very view of language that we take for granted.

See also: Foreign Language Teaching Policy; Language Education: Correctness and Purism; Mother Tongue Education: Nonstandard Language; Native Speaker; Norms and Correctness; Second and Foreign Language Learning and Teaching.

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Language Education: Teacher Preparation

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Teacher education has always been closely bound up with the certification and recognition of qualified teachers, and language teacher education shares with other subject areas a close link to structures and practices laid down by governments. But two main characteristics distinguish this field from teacher preparation in other subject areas: first, it has been an unusually international practice as foreign language teachers tend to be more closely in touch with foreign ideas than their colleagues; second, the rise of English to its current position as the main language of international communication has led to a concentration of research and theory on untypical native-speaking teachers and the requirements of one particular market. Because of this demand, teacher education has taken place outside state-supported institutions as well as inside them.

This article surveys the history and current practices in second-language teacher education, using illustrations from a range of countries to characterize what is at the beginning of the 21st century a surprisingly integrated international practice. It uses as its baseline practices in Britain, because these have provided the most widely diffused models for the organization of teacher education.

The Origins of Teacher Education

Current models of teacher education reflect the export of Western European models of education to most parts of the world. Organized training of teachers is a product of the rise of mass education in Europe from the 19th century onward, though there were earlier roots in provision by religious groups for support of teachers in their schools, and some degree of apprenticeship of a less formal kind was common before the 19th century. At first, there was an assumption that advanced education could be left to the expertise of graduates with their advanced subject knowledge, but as state education extended, the need for cadres of primary school teachers (who were drawn from those with much lower professional qualifications) resulted in the establishment of systematic provision for the training of pupil teachers.

In the period following the Industrial Revolution, the pressure to improve the education of greater and greater numbers of young people was frustrated by the shortage of competent teachers. The Lancaster System, where the older pupils taught younger ones according to a carefully designed complex procedure laid down by Joseph Lancaster (1778–1838), was perhaps the most notable example of an attempt to pull education into some kind of administrative structure. Similar systems were in use in India by the end of the 18th century, and the systems of model schools and elementary training that were associated with these provided the foundations for the greater involvement of the state toward the middle of the 19th century.

In Britain, this was largely the product of a struggle between the established church and the government for control over the training of primary and infant teachers. Although Parliament voted money to support the founding of colleges, the vast majority of the 30 training colleges established by the middle of the 19th century were associated with the church. The curriculum embraced English grammar and literature, but no foreign or classical languages. With modifications, this provided a model for training which was accelerated after the 1870 Education Act introduced the idea of compulsory education. It was only in the same period that any training for secondary teachers began to be provided, again building on fragmentary work by religious bodies. Some of this was attached to universities, and a system of state-supported, but often religious-run, training for all levels persisted until the end of the 20th century.

The Emergence of Language Teacher Education

In the British tradition, foreign languages were not part of the primary curriculum, and until the 1960s were often considered suitable only for academically able students in the grammar schools and the independent fee-paying schools of the private sector. But such schools did not always expect their teachers to have training other than the subject-knowledge provided by their degree course. It was the introduction of comprehensive schooling, with all pupils from one area going to the same secondary school and receiving a variety of subject choices that encouraged the move to teacher training for all secondary teachers.

The rise of education as an organized higher education discipline is conventionally dated from the 1950s to the 1960s, though earlier provision, particularly in the United States, offered further sources of ideas and practice. The 1960s also saw a substantial expansion of general higher education provision. Up to that time, some secondary teachers had been

trained in universities, obtaining the one-year Postgraduate Certificate of Education (PGCE) following their degrees in their specialized subject, and then obtaining teaching posts in grammar schools. Separate colleges provided certification for primary teachers and for teachers in the non-academic secondary schools (Secondary Moderns).

Thus, teacher education was being redefined and recreated through the 1960s and 1970s. Colleges concerned with primary education tended to be staffed by holders of postgraduate Master's degrees from the universities in academic disciplines related to education, so the system became increasingly integrated on the new model. The main academic studies in these education programs were history, sociology, psychology, and philosophy of education. These were to accompany the practical competence arising from experience in schools ('teaching practice') and some understanding of the curriculum and teaching materials for trainees' own particular subject. But as the 1970s turned into the 1980s and the liberal consensus crumbled, governments stressed greater accountability and demanded greater control of the curriculum. So the academic subjects tended to be squeezed out in favor of work more closely directed to the content of the curriculum, which was increasingly subject to external government control. Skills in assessment (increasingly important when greater accountability was demanded) and a greater proportion of practical teaching experience was also insisted upon. At the same time, though, practices for secondary education varied from country to country. In mainland Europe, some countries, such as France, moved away from centralized models toward greater teacher autonomy at the same time as Britain was centralizing more substantially. Briefly, in the 1990s, there was government commitment to foreign languages for all learners, but that policy was retreated from as the new century arrived. In Britain, in 2004 all teachers were expected to 'deliver' a curriculum defined by the government, the details of which kept changing as a result of pressure for improvement. Such pressures result in government-sponsored initiatives that receive special funding and concentrate on particular areas of the curriculum such as literacy or numeracy. Language teacher education within Britain has been affected by the increased external control at the same time as governments have reduced their commitment to foreign language education. Overall, in state education, teachers in 2004 had reduced autonomy compared with 20 years before, and language teacher educators, whose funding is dependent on government sources, have to fit in with the policy of the government in power.

Language Teacher Education Since the 1960s

State Education: English-Speaking Countries

The big expansion in teacher education late in the 20th century coincided with a major expansion in linguistics as a discipline. In part, the claims that Chomskyan linguistics represented a decisive break with the past chimed well with the claims that teaching was entering a new and revolutionary state of expansion and influence. For language teachers, particularly, the 1960s seemed to herald a period of influence and usefulness. In Europe, the increasing success of the European Community (later European Union (EU)) gave a new emphasis to language learning, led by the influential publications of the Council of Europe which began to appear toward the end of the 1960s. Throughout the English-speaking world, initiatives through bodies such as the United States' Peace Corps and the British Council (for example, the 1962 Aid to Commonwealth English [ACE] program), heralded an expansion of English teaching throughout much of the world. The 1960s saw the foundation of international organizations for language teachers such as Teachers of English to Speakers of Other Languages (TESOL) (1966) and International Association of Teachers of English as a Foreign Language (IATEFL) (1967), of applied linguistics associations (BAAL, the British Association for Applied Linguistics, was founded in 1967), of bodies such as CILT (Centre for Information on Language Teaching and Research, 1966) in London, following the Center for Applied Linguistics (1959) in Washington. All were directly implicated in aspects of language teacher education.

Language teacher education in the state sector typically followed the pattern of teacher education for other subjects. Initial training followed one of two main patterns, being either concurrent with the learning of the main subject to be taught, or consecutive to this. Concurrent patterns, which enabled the main subject study to be closely geared to the needs of schools, would be found in Britain in B.Ed. degrees taking four years. Subject study was accompanied by educational study and by experience teaching in a school, largely based around a block placement over a period of several weeks or even months in the same school. In contrast, the consecutive pattern had the advantage of not separating teachers from other graduates in their main subject studies. Following completion of a normal degree program, a one-year PGCE program would offer educational theory, curriculum work, and teaching practice, sometimes followed by a probationary full-time period in a school before final

certification was awarded. This pattern offered the additional advantage that, in periods of difficult teacher supply, trainees did not have to choose education courses or an education career at the beginning of their university studies.

Initial teacher education was subject to control from local or central government, for it performed two complementary functions. Not only did it provide the training in the knowledge, skills, and attitudes necessary for effective teaching, but it also provided formal certification by the recognizing authority to practice as a teacher in state education. One effect of this dual role was that there remained constant tension between the autonomy of the higher education institution and the desire to influence the procedures and contents of the courses by those who funded and provided official recognition for the certificate. For this reason, structures were constantly changing, and the organization of initial teacher education rarely lasted more than a decade without some major restructuring being imposed. For language teaching, the situation was further confused by the power of the English as a Foreign Language (EFL) model. World English teaching was a powerful influence on teacher education in most languages throughout the second half of the 20th century. This was partly because of the power of the market, with publishers offering wide ranges of materials, some of which were truly innovative, and with the funding of major projects on grammars, dictionaries, and databases in response to the profit opportunities available in the EFL sector. But government initiatives and the international demand for higher-level training did create research opportunities within universities that were less easily available in educational work for most other subject areas.

The TESOL effect in English-speaking countries thus made language teacher education untypical. Private and public sector procedures influenced each other. While training to teach might be embedded in a state system, it might also be geared toward teaching outside the country of origin. The PGCE at the University of London Institute of Education, for example, emerged from the training of colonial education officers, and never had an entirely comfortable relationship with training for second-language teaching for minority language communities in the United Kingdom, and by the 1980s was training many people for private sector language work, or for careers in the British Council directing teaching activities.

The specific ESOL (English for Speakers of Other Languages) part of the course had broadly similar contents from course to course across continents. For example, a survey of the commonest elements in TESOL methods courses in 22 North American institutions (Long, 1983) found the following (number of courses in brackets):

1. Historical overview of teaching methods (19)
2. Teaching speaking skills (18)
3. Curriculum/syllabus design (18)
4. Teaching techniques (18)
5. Innovative/unconventional teaching methods (17)
6. Materials (17)
7. Teaching writing skills (16)
8. Teaching listening skills (15)
9. Teaching reading skills (15)
10. Teaching grammar (14)
11. Language testing (12)
12. Teaching vocabulary (11)
13. Teaching culture (10)
14. Linguistics and language teaching (10).

Similar lists could be found describing the methodology component of training courses in East Africa, India, Britain, and elsewhere any time between the late 1960s and the 1990s.

Throughout this period, attempts were made to bring language teacher education generally more closely into line with the increasing wealth of research findings on language acquisition and learning. One of the few surveys to attempt to cross the lines between training for different languages, including the teaching of first languages (Brumfit, 1988) argued that primary and secondary schools should develop practices that brought all languages together in a coordinated policy for language development. But in practice, the increasing pressure of government control meant that foreign languages were marginalized rather than strengthened and the motivation to coordinate all language activity disappeared.

State Education: Other Countries

Many of the academic pioneers of language education outside Europe contributed directly to teacher education. In Japan, for example, Palmer (1922) on general principles of language teaching and Hornby (1954) on sentence patterns published significant work used on training courses; in India, West (1953) developed major new directions, building on Thorndike's American work (1932) on vocabulary and word levels. In Sudan and Uganda, Bright (Bright and MacGregor, 1970) integrated much of the earlier work and responded to contemporary developments in linguistics. Throughout what became the British Commonwealth, substantial contributions were being made to the development of language teaching theory and practice with most of the books and materials aimed at the training of teachers. But foreign language teaching throughout the 20th century was an international activity (though as the work in Japan indicates,

such activity even early in the century was not confined to the future Commonwealth). Directly and indirectly all these figures were influenced by the European Reform Movement (Passy, 1899), while later international training reflected the influence of scholars such as Fries (1952) at Michigan. In the latter part of the century, international collaboration in the Council of Europe (Trim *et al.,* 1973) was a major influence on Languages for Specific Purposes and the Communicative Movement, while figures such as the Bulgarian Lozanov (1978) were significant in the discussion of Humanistic Approaches (Stevick, 1976).

The developments under British colonial influence largely reflected the structures of British teacher education, but until independence was looming, education systems tended to be for a relatively small elite (India and Pakistan providing the main exceptions), and often, especially for language teaching at the higher levels, to rely on expatriate native speakers of English. Colleges and universities in emergent Asia and Africa trained teachers, using mostly the concurrent model but occasionally, as in Uganda and Zambia, the PGCE structure, which in those countries trained both local and expatriate teachers. The Teachers for East Africa scheme, for example, funded jointly by Britain and the United States, trained local teachers together with British and Americans at Makerere in Kampala, and also recruited already trained teachers from overseas to supply the expanding education systems of Kenya, Uganda, and Tanzania in the 1960s, the period immediately before and after independence in those countries.

In European countries, although teacher education originated in the 18th and 19th centuries, it was not until late in the 20th century that training became compulsory for all teachers in most countries. Compulsion also increased self-awareness: the end of the century saw a massive increase of empirical research on processes both of teaching and teacher education. Some procedures such as 'action research' were explicitly aimed at a training model, seeing empirical study as primarily concerned with improving good practice within the teacher's own institution. Whatever research model predominated, training now became more closely tied to empirical findings, and there was an assumption that a researching approach might be desirable for good teachers. In Hungary, The Netherlands, and Lithuania, for example, a research project is a formal part of the portfolio for initial training.

At the beginning of the 21st century, European teacher education was predominantly carried out in universities, though in France training institutions were directly affiliated with the Ministry of Education. In most countries, such a ministry was directly responsible for recognizing teacher education qualifications, though perhaps through a quasi-independent body as in the United Kingdom and Hungary. The number of languages for which a teaching qualification could be obtained exceeded ten in Austria, Bulgaria, Czech Republic, Finland, and France, but English was the main training language offered. Courses were generally between three and five years in length if they were concurrent with the undergraduate program; postgraduate courses varied from one to two years in length. In many countries, intercultural communication was taught in addition to language skill-maintenance, but a minority of countries offered neither in the training program itself and relied on the degree main subject courses for such provision. Some programs in, for example, Austria, France, and Germany provided opportunities for study abroad as part of the course. While all courses addressed language teaching methodology, with almost all of them including information technology, only about two-thirds provided explicit metalinguistic study for teachers. Assessment procedures varied widely, and might be, at least partially, by external state examination (e.g., Austria, France, Germany), by public lecture (French-speaking Belgium), by competitive examination (Romania), by separate language proficiency examinations (Austria, Hungary), by attitude and participation in the courses (Ireland, Norway, Sweden). Almost all countries included a block teaching practice (Greece and Cyprus providing exceptions), while some had official training schools attached to universities (Austria, Finland). Course content centered on communicative teaching methodology, but varying emphases on such issues as the role of the Internet, distance learning, Content and Language Integrated Learning (CLIL), and bilingual teaching ensured that distinctive national and institutional differences remained.

To give an example of a specific program, the Spanish *Certificado de Aptitud Pedagogica* (CAP) ran from October to April in the Education Institute of each university. In 1996 from October to January general theory was provided either by correspondence or by about 120 contact hours' attendance. In February and March, about 60 hours of practice in state secondary schools was provided. A short dissertation was submitted by the end of May which provided a description of the school, a detailed account of the subject grouping within which the student had taught, and a detailed account of two lessons taught.

In most countries, then, pre-service language teacher education is constrained by the structure of general teacher education but shares a strong internationally determined agenda, so that the assumptions of

communicative language teaching, for example, are, at least in principle, applied to many different languages. It is probably fair to say that language teachers are trained as teachers (who teach language), rather than as language specialists (who are teachers). At post-experience, in-service level greater concentration is possible, but the proportion of state teachers who regularly attend long advanced courses has never been high, and the best-organized in-service programs, as in Germany, have tended to concentrate on short courses.

Private Sector Provision

Private sector provision of teacher education presents a much more varied picture, for it is subject only to the discipline of the owners of private language schools. It is a fair generalization that most private language schools work with either untrained or state-trained teachers, but the international English teaching profession, particularly in the last two decades of the 20th century has worked hard to offer a clear route for qualification even among those teachers who do not have state qualifications. Private sector qualifications were generally distinguished by their concentration on language teaching skills to the exclusion of the more general education theory and background provided by state training.

A pioneer in this field was the British-based group, International House, led by its Director, John Haycraft (1926–1996). He initiated in the 1960s and 1970s an intensive short induction course for would-be teachers which integrated the processes of teaching and guidance from experienced teachers, working together in the language school, usually with volunteer students who received free extra classes. With the help of many creative teachers, he devised a distinctive style of language teaching, relying on exciting and active oral work with smaller classes than would be found in state institutions. Even state-trained teachers needed the adjustment provided by these courses as they shifted their focus to adults in smaller classes. Private language schools, many of whom ran similar courses as English language teaching expanded, fed their trainees into a national range of qualifications set up initially by the Royal Society of Arts (RSA) and later incorporated into the portfolio of the University of Cambridge Local Examinations Syndicate (UCLES), which had for years run language examinations for Commonwealth schools and for the international EFL sector. The RSA ran a part-time diploma program, the equivalent of about ten weeks full-time, which corresponded approximately to the subject-specialist part of a state PGCE. Another London-based body, Trinity College, runs a similar course, and a range of more-or-less specialized offshoots of these diplomas, for teachers of young children, for multicultural education, for non- native-speaking teachers, etc., have developed to cater to the expanding demand. In practice, the ten-week equivalent certificate has come to be recognized as the basic initial teaching qualification, though teachers who wish to progress in their careers have often moved on to university diplomas and masters courses to extend and deepen the more theoretical components of their initial training.

To illustrate the range of provision that was developing, a snapshot of the early 1980s may be helpful. At that time, courses of the initial four-week type, aimed at English native-speakers, were found in 19 centers in Britain and 3 overseas. In addition, many universities and colleges ran short summer courses of similar length.

The RSA 10-week diploma was offered at 51 centers in Britain and 41 overseas. In addition 26 centers in Britain offered the RSA Diploma for teaching English as a Second Language in the United Kingdom, aimed at settled minority language speakers. An unpredictable number of colleges of education and universities also offered a limited option in EFL as part of their conventional state education training (though these did not survive the tightening of central control over the teacher education that emerged over the following decade). An official state-supported PGCE in EFL/ESOL could be taken at universities in Aberystwyth, Bangor, Leeds, Leicester, London (both at the Institute of Education and St. Mary's College, Twickenham), Manchester, and Sheffield. Courses of this kind were all closed when the government withdrew funding in the early 1990s, but many of their graduates had careers at home and abroad weaving in and out of public and private sector institutions.

In the late 1980s, there was substantial pressure to rationalize this diversity and proliferation of courses. The term *Certificate in EFL* could embrace anything from a two-day course from an unrecognized language school to a one-year full-time course at a university. While language schools had established bodies for recognition of basic standards, this had not prevented many schools from thriving outside ARELS (Association of Recognised English Language Schools), and many attempts to establish control of teacher education qualifications failed to achieve consensus. BATQI (British Association of Teacher-Qualifying Institutions) started in 1990, but neither it nor its partial successor the British Institute of English Language Teaching successfully brought together public and private sectors into an agreed-upon framework. It has been left in effect for the Cambridge Examinations to provide the *de facto*

backbone for initial training in the private sector, with courses including Certificates and Diplomas for Teaching EFL to Adults and for Overseas Teachers of English, and the Cambridge Examination in English for Language Teachers. Initial training for ESOL is no longer available outside the private sector.

Continuing Professional Development

This article has so far concentrated on the initial training of language teachers, though reference has been made to post-experience provision when relevant. Whereas initial training has a fairly definable curriculum, with much consensus on what is required of competent teachers (in terms of classroom management, curriculum, and assessment needs, etc.), and specifically of language teachers (in methodology and materials), the position with continuing professional development is much more varied. Such provision performs a range of different functions:

1. to augment or substitute for unsatisfactory or nonexistent initial teacher education
2. to update teachers' professional knowledge by introducing developments since their initial training
3. to extend the repertoire of pedagogic skills to fields for which they were not initially trained (e.g., heading a department, organizing an IT provision, etc.)
4. to develop individuals' personal education, enabling them to make more coherent sense of their accumulated professional craft-knowledge
5. to allow opportunities for the development of specific curricula or teaching materials that are needed for a changing professional scene
6. to reward loyal and long-serving teachers with time to reflect and develop.

Some of these provisions may be combined, but it is clear that the different needs of employers and the state, of individuals for personal development, and of the teaching institution from which individuals come may sometimes conflict. Arguments for in-service provision have often centered on which of these needs justifies the expenditure of scarce funding.

In many countries, continuing professional development saw an expansion in the 1970s, as educational fashions passed rapidly from country to country, particularly within supranational bodies such as the EU. In-service provision sometimes consolidated the work of teachers' associations that had been active for years before, as in Spain. Elsewhere, provision was laid down in hope (Portugal passed a law in 1973 stating that teachers had a right to continuing professional development provided by the state, but the revolution a year later meant that such provision did not begin to appear until after 1986).

Nonetheless, whether it is to an in-school, half-day class or a local government-organized, one-day conference, a week with a government-funded advisory group, or a full year or more to complete a taught Master's program, some sort of post-experience provision is likely to be within the reach of many language teachers. With regard to short courses (up to one month long), it is worth noting that there is a thriving private-sector-based market in introductions to new and exciting methods of teaching, sometimes drawing upon recognized traditions, such as humanistic language teaching, but more often relying on adaptation of ideas derived from these and other sources by institutions (for example the Pilgrims School in Canterbury) who have made a reputation as exciting innovators.

In some countries and regions, continuing professional development has been built in to the official career progression route. A survey of provision in a number of countries published in 1994, for example, reported that in most states of the United States teachers had to accumulate 150 credits every five years in order to have their license to teach renewed. Credits could be obtained from evening courses, summer seminars, lectures, workshops offered by professional associations, or by universities.

Longer courses, and particular Master of Arts programs, require slightly more extended comment, not least because they provide an internationally recognized qualification which is widely used as a prerequisite for entry to management, teacher education, inspectorate, and higher education posts. Such courses perform different functions in different societies. Countries that provide postgraduate initial teacher education sometimes attach such training to Master's degrees, and there are currently moves in several universities in Britain for parts of the PGCE to be given M.A. degree equivalence.

Historically, though, M.A. courses in Applied Linguistics or English Language Teaching (ELT) in the English-speaking world have concentrated on the following broad areas:

1. general theory, history of linguistics, etc.
2. general issues of language description (e.g., syntax, semantics, discourse analysis, pragmatics, phonology/phonetics, writing)
3. pedagogical issues (e.g., communicative language teaching, curriculum design, assessment, languages for specific purposes, information technology and language learning, teaching materials)

4. sociolinguistics/sociology of language (e.g., sociolinguistics, language and power, English as a world language, language policy, language and gender)
5. psychology and language (e.g., psycholinguistics, first and second language acquisition and learning).

Courses addressing initial teacher education concerns may include a practicum, but many courses expect several years of prior teaching experience before they admit students to the course.

Relationship with Research, etc.

Attitudes toward research have shifted radically as teacher education has become more established. Even for academics, research in the mid-20th century often related to the foundation disciplines rather than directly to the practice of teaching. Thus philosophers, historians, and psychologists of education practiced research, but those directly concerned with teaching in classrooms were far less likely to do so. The research that directly impinged on language teaching might derive from descriptive work on grammar and vocabulary studies but it rarely addressed pedagogic procedures in detail. Partly this was a result of the limitations of available technology. Observation schedules such as Flanders Interaction Analysis were cumbersome to use and subjective until the advent of easy audio- and video-recording. But there was also developing increased dissatisfaction with the impressionistic nature of much methodological discussion. Influential textbooks such as Billows' *The Techniques of Language Teaching* (1961), as well as the practice in many institutions, reported on the ideas and hunches of successful and often inspiring teachers. Attempts to systematize the whole process appeared (Mackey, 1965), but extensive empirical studies of practice in the normal classroom had to wait until the 1970s to become widespread. Only in the last quarter of the century were practitioners able to begin the process of basing their interpretations of successful practice on evidence drawn from observations in a variety of different settings. It is fair to observe that, as science, language teaching pedagogy is still in its infancy, for there simply have not been enough studies in a wide enough range of settings for reliable comparisons to be made between practices with different types of learner, teacher, or educational setting. While it is true that both teaching and teacher education now have stronger empirical bases than in the past, there has been a failure to replicate, or even associate, local studies with those elsewhere, which has limited the effectiveness of the studies that have been produced. It will be the work on teacher thinking, on classroom practices, and on processes of teacher learning and development that will determine the structure of teacher education in the next few decades.

See also: Applied Linguistics: Overview and History; Assessment of Second Language Proficiency; Communicative Language Teaching; Culture in Language Teaching; Foreign Language Teaching Policy; Fries, Charles Carpenter (1897–1967); Hornby, Albert Sidney (1898–1978); Language Education: Standards Movement; Language Teaching Traditions: Second Language; Nonnative Speaker Teachers; Passy, Paul Edouard (1859–1940); Second and Foreign Language Learning and Teaching.

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Language Education – Vocabulary

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What Vocabulary?

There are numerous vocabulary counting programs that change texts into frequency lists of vocabulary and show how much text is covered by frequency-ranked lists. What these counts show is that a relatively small number of words account for a very large proportion of text. The 270 function word types (176 word families), such as *one, a, the, because, in, must*, cover about 44% of the running words (tokens) found in most texts. These function words, however, make up a small proportion of the frequent words of English. Among the highly ranked items are words such as *time*, *say*, *day*. The most frequent 2000 words of English, which include most of the function words, are the essential widely used words of the language. They are important no matter what use is made of the language, and they cover a large proportion of spoken and written text. They also represent a feasible learning goal for an English course of 800 to 1000 hours.

For learners with academic purposes such as study through the medium of English in senior high school or university, the next important vocabulary learning goal is academic vocabulary. The best researched list of these words is the Academic Word List (Coxhead, 2000), which consists of 570 word families arranged into ten sublists with sublist 1 containing the most frequent widest-range items. There are well-researched tests available (Schmitt *et al.*, 2001; Nation, 2001) called the Vocabulary Levels Tests, which can be used to quickly determine which level of vocabulary learners need to focus on. The main distinction to be made when interpreting the results of the test is between the high frequency words (the first 2000 words and the Academic Word List) and the low frequency words (3000 level onward).

How Should Words Be Dealt With?

The high frequency/low frequency distinction is an important one when planning a vocabulary program. This is because from a teaching perspective these two groups of words should be dealt with in different ways. The 2000 or 2570 high frequency words deserve classroom time. This is because of their high frequency and wide occurrence. This classroom time can involve direct teaching of these words, doing activities designed to teach and practice these words, and deliberate learning of these words. Low frequency words on the other hand do not deserve classroom time. This is because there are so many of them and because of their low frequency of occurrence. When learners know the high frequency words, they need to begin learning low frequency words. However, the teacher should not be spending valuable classroom time teaching those low frequency words. Instead, the teacher should spend time teaching the four most useful strategies for dealing with these words, namely the strategies of guessing words from context clues, deliberate learning using word cards, helping memory by using word part analysis, and dictionary use.

The opportunities for teaching and learning high frequency vocabulary can be divided into four strands. The meaning-focused input strand involves opportunities for learning through listening and reading where learners are already familiar with 95–98% of the running words in the listening and reading input. The meaning-focused output strand involves opportunities for learning through speaking and writing. The language-focused learning strand involves giving deliberate attention to vocabulary learning through activities such as intensive reading, using word cards, preteaching of vocabulary before doing communicative activities, and the deliberate learning of vocabulary strategies. The fourth strand is the fluency development strand where learners do not learn new vocabulary but practice making the best use of words

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Language Families and Linguistic Diversity

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Linguistic Diversity

'Linguistic diversity' refers to several interrelated phenomena:

1. phylogenetic (genetic, genealogical) diversity: the number of language families in a geographic area;
2. intrafamilial and intralinguistic variation: differences among the languages of a family and among the variants of a language;
3. language density: the number of languages in a geographic area;
4. typological diversity: differences among the structures which make up languages.

The focus of this article is on (1), (2) and (3) (*see also* **Variation and Language: Overview**). More conventional approaches to these topics are discussed first, then a recent alternative.

Although (4) will not be discussed further here, the relationship between phylogenetic and typological diversity should be mentioned. It is quite common for the members of a language family to be typologically similar, but there is no necessary reason why they should be so. There is, for example, considerable typological variety among the grammars of the Austronesian family, some of it the result of contact with non-Austronesian languages, but much of it the outcome of language-internal changes. Conversely, languages belonging to different language families may be typologically quite similar, either as the result of contact or as the result of independent parallel innovation.

Language Families

Definitions and Problems

A language family is conventionally defined as a set of languages that share a common ancestor. The family metaphor captures two insights: that languages are systems that are transmitted from one generation to the next (generational continuity) and that these systems change over time so that when a community of speakers divides into, say, three separate communities, the speech of each of the three will change in different ways from the others, leading eventually to mutual unintelligibility, i.e., three languages descended from a shared ancestor. The basis of the metaphor is biological evolution, where one species divides into two or more new species (McMahon, 1994: Chap. 12), even though linguists often use the term 'family tree,' which otherwise denotes trees drawn to represent human family relationships.

Identifying a language family in the first place depends on finding individual-identifying evidence (Nichols, 1996, 1997), patterned similarities between a set of languages that could not have arisen by chance and must be the outcome of shared inheritance. The Indo-European family, for example, was first definitively identified by Sir William Jones in 1786 on the basis of similarities between the verb paradigms of Sanskrit, Greek, and Latin. Recently, the Trans-New

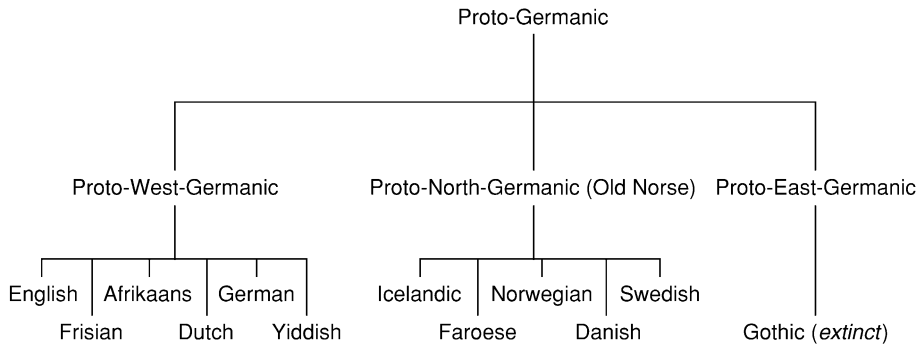

Figure 1 A conventional family tree of the Germanic languages.

Guinea family has been identified on the basis of formally similar pronouns (Ross, 2005).

Figure 1 shows a conventional family tree of the Germanic languages (*see* **Germanic Languages**) and serves as a starting point for a discussion of the family-tree model. It shows that the family concept is recursive. Thus English, Friesian, etc. form a West Germanic family. This, together with the North Germanic family and the single-member East Germanic family, forms the Germanic family. The latter, along with the Romance, Balto-Slavic, Indo-Iranian, and other, some single-member, families, is part of the Indo-European family (not shown in Figure 1).

The languages at all nodes other than the terminals in Figure 1 are reconstructed proto-languages. The changes that languages undergo are often regular enough to allow quite a safe reconstruction of their parent based on the correspondences among them, provided that the linguistic comparative method is carefully applied. Thus the reconstruction of Proto-Indo-European is reasonably secure. The reconstruction (and indeed the existence) of its hypothesized parent, Proto-Nostratic, however, is considered dubious by many linguists, as it is not based on a rigorous application of the comparative method (Nichols, 1997), the maximum reach of which is usually reckoned to be around 6000–8000 years (*see* **Long-Range Comparison: Methodological Disputes**).

The comparative method provides a means for inferring the tree structure of a large family by reconstructing the chronology of innovations relative to the protolanguage. For example, all Germanic languages reflect the so-called Germanic sound shift, a set of changes in consonants relative to the reconstructed system of Proto-Indo-European. It is inferred that this set of changes only occurred once, in Proto-Germanic, and this allows us to insert the Proto-Germanic node into the Indo-European tree (*see* **Subgrouping Methodology**).

Scholars investigating worldwide linguistic diversity need standardized phylogenetic units to work with. After Morris Swadesh devised the techniques known as lexicostatistics and glottochronology in the 1950s (Swadesh, 1972), there was a wave of optimism about the possibility of quantifying linguistic diversity. Researchers drew trees based on the percentage of putative cognates (words related through shared inheritance, e.g., English *house* and German *Haus*) in each pair of languages on Swadesh's 100- or 200-meaning list, setting percentage ranges for different levels of grouping.

For example, in work on Papuan languages two languages were deemed to be dialects of the same language if the difference between them meant no less than 70% of list items were cognate; at the other extreme lists with 5–12% cognates were attributed to the same phylum. The basic classification was into dialects, languages, subfamilies, families, stocks, and phyla. Today many scholars think such findings have little utility for historical reconstruction, as cognate pairs were often identified on the basis of similarity in form, with no attention to whether the words displayed regular correspondences determined by the comparative method, and cognacy was often not distinguished from borrowing. Wordlists could easily contain gaps and elicitation errors, skewing results. This meant that only lower-level groupings – those in any case obvious by inspection – were reliable. Swadesh assumed that basic vocabulary is replaced at a constant rate, but this assumption no longer has wide acceptance. A language that has undergone more rapid change than its sisters will appear more distantly related to them than it really is.

In her study of worldwide typological diversity, Nichols (1992: 24–25) adopted the units 'family' and 'stock.' The family she defined as a group with about the time depth of one of the older branches of Indo-European (2500–4000 years, e.g., Iranian, Balto-Slavic), recognizable by inspection when regular correspondences between word forms

and morpheme paradigms are displayed. The stock is the deepest phylogenetic node at which a protolanguage is reconstructable by the comparative method (5000–8000 years, e.g., Indo-European, Austronesian). Nichols (1997) adds the 'quasi-stock,' a grouping of stocks with promising phylogenetic markers but with no regular sound correspondences and few clear cognates. By this rubric, Afro-Asiatic, for example, is a quasi-stock. This approach lacks quantitative support, but it has the advantage that groups of languages under comparison meet the same methodological requirement.

The failure of quantitatively defined language groupings has a further consequence. The quantitative approach assumed languages to be composed of dialects, and families to be composed of languages. Since there is no quantitative distinction between a dialect and a language, linguists sometimes fall back on the assertion that dialects are mutually comprehensible, languages not. But as mutual comprehensibility is also a matter of degree, the distinction has limited objective validity, and 'lect' will be used here as a convenient cover term for both (*see* **Language and Dialect: Linguistic Varieties**). It follows that if there is no absolute distinction between the dialects of a language and the languages of a family, there is similarly no absolute distinction between a language with dialects and a family.

Complex Internal Structures

The tree structure of some large families, e.g., Indo-European and Austronesian, has been worked out in some detail. The structures of others have not. There are at least three reasons for this. Some putative families such as Afro-Asiatic are generally accepted, even though their time depth is apparently greater than 8000 years. The data reflect too much change and too much divergence to allow a thorough reconstruction of the protolanguage. Other families, such as Sino-Tibetan, have a history of frequent migrations back and forth, in the course of which lects have diversified but remained in contact, influencing each other in ways that make it very difficult to sort out borrowing from shared inheritance (LaPolla, 2001). A third reason is that the relationships among languages within many families are very complicated. In many – and perhaps most – parts of the world, the idealized model of a language family as the outcome of a community of speakers dividing into discrete daughter communities does not fit the data. Instead, a family may arise through the differentiation of an expanding community's speech into a network of lects, so that speakers of most lects can understand those of communities within a certain radius, but comprehension diminishes the further the speaker moves away from home.

Language families that arise in this way are the subject of Johannes Schmidt's (*q.v.*) wave theory, whereby innovations spread out from the center of a network like the ripples when a stone is thrown into a pond. The tree and wave models resist integration into a single model, and this has often been taken as a sign that they are in conflict with each other. This is unfortunate, as they model different phenomena. In the tree model, a community splits, and the lect of one or more of the new communities undergoes innovations that are subsequently inherited into its daughter lects. In the wave model, a community spreads, and innovations spread at different rates through the resulting network. The tree model fits large amounts of Austronesian and Uralic data rather well, while the wave model works better in other areas. However, we would like to be able to examine the history of a language family within a single framework, and the discussion below examines how lectal differentiation can be interpreted within a tree model and how the latter needs to be modified to accommodate it.

Dutch and German taken together provide a testbed. They form a network of lects covering the Netherlands and Germany (except the Friesian Islands), nearly half of Belgium, Luxembourg, two-thirds of Switzerland, Liechtenstein, and most of Austria. Until recently, this continuum extended into Alasace and into areas in northern Italy. If we for a moment ignore speakers' present-day (and often fairly recent) ability to communicate with each other in varieties of either standard Dutch or standard German, then we have a situation in which everyone readily understands nearby lects and in which there are few major boundaries between groups of lects, yet lects at greater distances from each other, especially on a north–south axis, are mutually incomprehensible. How does one split such a network up into languages in order to represent it in a family tree? Not surprisingly, attempts to do so disagree. Whatever higher-order groups are posited, each includes lects that are geographically contiguous with resemblant, mutually comprehensible lects in other higher-order groups, reflecting historical relationships that the grouping belies. A tree cannot do justice to the historical relationships. Instead, the best we can do is to redraw Figure 2, which shows the West Germanic part of Figure 1, as Figure 3. However, this avoids too much distortion by representing dialect networks very grossly. Norwegian, Danish, and Swedish similarly form a dialect network, and so does English in Britain and Ireland.

The presenting problem with the Dutch–German network is that its speakers (and most linguists)

would call its lects dialects, yet the degree of diversity across the network as a whole is intuitively greater than we expect in a single language. In other words, the network is like a (small) family made up of dialects, with no intervening level of 'language.' This problem disappears if one recognizes that the distinction between 'dialects' and 'languages' is artificial and a matter of degree of divergence. But it leaves unanswered the question of whether the Dutch–German network is more appropriately called a language or a family.

This question can be answered from two perspectives. One emanates from the line of thought above: the difference between language and family is also one of degree of diversity, and the question is an artifact of an unsubstantiated terminological distinction. But this is a little too simple if we are using 'family' recursively, because, ascending the tree, there comes a point at which the diversity within a collection of lects requires us to call it a family.

It might at a pinch be reasonable to call the Dutch–German network a language, but it would be unreasonable to call West Germanic, the next node up the tree, anything but a family, since English, Friesian, Afrikaans, Dutch–German, and Yiddish are all quite distinct from each other. Where does this distinctness reside? Partly in their degree of difference from each other and partly in the fact that they are not linked by transitional dialects. It is tempting to attribute these facts to geography, as the languages are mostly not contiguous, but the crucial factor is the strength of the social boundaries that separate speech traditions. For example, Afrikaans is spoken in South Africa, far from the Dutch lects of which it is an offshoot. Although they remain largely mutually comprehensible, their differences are striking. But if geography were the major factor, we should expect the Englishes of Britain/Ireland and North America to have diverged to a similar degree, yet they have not. After the establishment of British rule in 1795, speakers of the divergent southern African dialect of Dutch became socially isolated from their fellow-speakers in the Netherlands and a separate standard emerged.

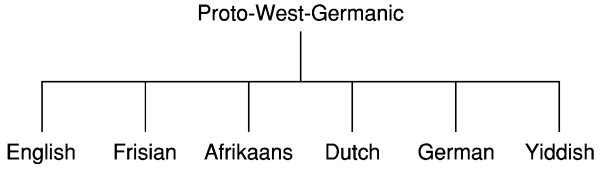

Figure 2 A conventional family tree of West Germanic.

Looking at the Dutch–German network from the perspective of social boundaries, we find that German speakers recognize dialect groupings such as Low German, Swabian, and Swiss German. Despite fuzzy boundaries, these groupings also have a reality for dialectologists, but no one would normally call them languages. One reason for this is that their social boundaries are also fuzzy, even across national borders. In this context the application of the term 'language' is as much a product of political as of linguistic history. The local lects of speakers who also speak a variety of standard German (in Germany, Switzerland, Liechtenstein, and Austria) are considered to be German dialects. The local lects of those who also speak a variety of standard Dutch (in the Netherlands and Belgium) are considered to be Dutch dialects. The linguistic repertoire of today's dialect speakers also includes their variety of the standard. In Switzerland, speakers are often diglossic in a Swiss German dialect and Swiss-flavored standard German, i.e., there is a measure of separateness between the two systems. Elsewhere, a speaker's repertoire is a continuum from a local dialect to a version of the standard, and s/he moves back and forth along the continuum according to whom s/he is speaking with. In these speakers, dialect and standard usually influence each other, with the result that the mutual comprehensibility of local lects across the Dutch–German border is being reduced as speakers accommodate to standard Dutch or standard German, and the standard languages are thereby reinforcing the social boundaries between the political entities with which they are associated.

The non-absoluteness of dialect/language and language/family distinctions is also manifest in Sinitic studies. The Sinitic network has conventionally been described as the Chinese language, comprising the Chinese dialects, but the Chinese language is comparable in diversity to the West Germanic family. This terminological situation has arisen because the Chinese language has long been coterminous with the political and social entity of China. The Chinese dialects and Chinese language are now sometimes

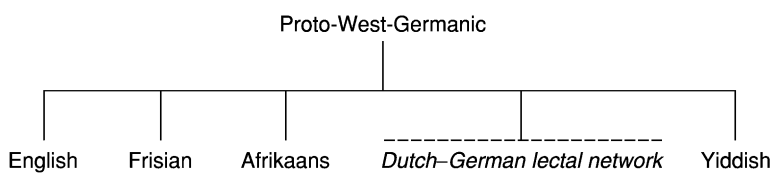

Figure 3 A revised family tree of West Germanic.

called the Sinitic languages and the Sinitic family, leaving the term 'Chinese language' to denote the standard language.

Relationships between dialect and standard and relationships among dialects are not easily rendered in a family tree diagram. Nor are situations where the historically closest sisters of a language, e.g., Afrikaans, are themselves certain dialects of another language, Dutch.

Extensive lectal networks occur in many parts of the world. New Guinea and Island Melanesia host a number, although none with the geographic extent of Dutch–German. Because their speakers' repertoire usually does not include a related standard language, the dialect/language question is not raised, but the absence of standard languages over millennia has permitted quite complex linguistic events when social boundaries have shifted. The complex history reconstructed in Figure 4 shows one area where networks have broken and later rejoined in a different configuration as the result of shifting boundaries. The basis for this reconstruction is the distribution of innovations. The Austronesian lects of New Ireland, a large island to the east of New Guinea, share certain innovations and appear at first sight to reflect the differentiation of a single lect, Proto-New-Ireland, into a lectal chain running the length of the island, then into a series of small families. But the lects of the southernmost family share other innovations with lects spoken on islands to the southeast. First, it seems, a single speech community rapidly settled New Ireland, and their speech differentiated into a chain of lects. Initially, population density was low, and social boundaries emerged between lects. The southernmost lect underwent certain innovations, and then some of its speakers sailed east and settled Nissan Island. From Nissan they established settlements on Buka Island to the south. The result was the South New Ireland/Northwest Solomonic network. Initially, frequent contact was maintained across the new network, more frequent than with other communities in New Ireland. Later on, populations increased, and the south New Ireland community resumed contact with communities to its north and was reintegrated into a New Ireland lectal network, through which innovations now passed (i.e., limited koineization occurred). Links with Nissan diminished to an annual voyage. The speech of the northwest Solomons community underwent certain innovations and became Proto-Northwest-Solomonic, then its speakers scattered through parts of Bougainville and the New Georgia group and across Choiseul and Santa Isabel to form the communities where the member lects of today's Northwest Solomonic family are spoken (Ross, 1988: 216–218, 258–259, 293–313).

Although the lects of New Ireland look as if they form a single node in the tree, the analysis of shared innovations reveals a much more complex history. A similar but more complex series of events has occurred in the history of the Fijian lects and the genesis of Proto-Polynesian (Geraghty, 1983, summarized by Ross, 1997: 227–229).

Cases such as New Ireland and Fiji raise a question of method. If, as in southern New Ireland, two sets of innovations overlap in a language or a group of languages, then they cannot both reflect a shared ancestor. One or both sets must reflect diffusion across lectal boundaries. How does one determine whether one set (or neither) reflects a shared ancestor? The answer lies in the nature of the innovations. The innovations common to the languages of southern New Ireland and the northwest Solomons entail bound morphology, which is only very rarely subject to diffusion. The innovations common to New Ireland as a whole do not, and are candidates for diffusion.

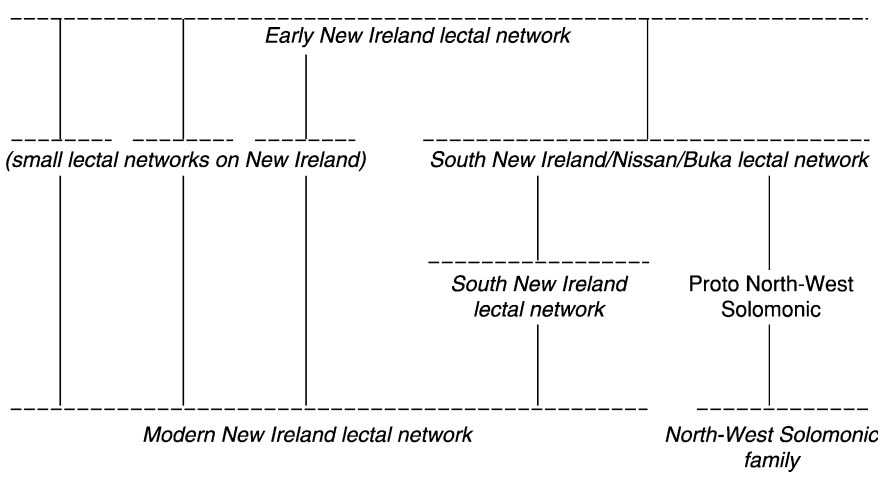

Figure 4 Network breaking and joining in New Ireland (after Ross, 1997: 230).

Mechanisms of Diversification

A family tree diagram can lull one into the false assumption that diversity occurs between lects, not within them, and that lects at terminal nodes are homogeneous. However, we know that an individual's speech varies – for example, along a continuum from local lect to standard – and that the degree to which variables are manifested differs among speakers. A speaker's choice of variables on particular occasions is in a complex relationship to her personal social network. We can distinguish between primary and secondary networks (Nettle, 1999: 67). At least in traditional societies, a person's primary network is likely to be dense, multiplex, kin-based, and enduring, whereas links in the secondary network have single functions such as trade. This distinction is a simplification, but a helpful one. Grossly, the primary network determines the features of a person's speech, while the secondary network mediates changes in those features.

Social network research shows that speakers are likely to use variables – pronunciations, words and phrases, grammatical constructions – which are used by and identify them with others in their primary network, although age and gender are also determinants (Milroy, 1987, 2001). The choice of variables on a particular occasion is also biased by the nature of that occasion and by the speech of the interlocutor. There is thus some diversity in even the smallest unit of a network, namely a speaker's primary links.

How do innovations enter a tight-knit primary network? The answer seems to be that its members typically have weak ties with outsiders through their secondary network, who in turn, because of their social roles, have weak ties with members of other primary networks, and it is these multiple-weak-tie individuals who are less subject to the norm enforcement of a primary network and act as carriers of innovation across the larger network (Milroy and Milroy, 1985).

How an innovation begins is difficult to investigate, but it seems that a speaker repeats a variant (random or deliberate) which is acquired by the speaker's children and/or copied by other speakers and selected as the marker of a social group (Weinreich *et al.*, 1968; Milroy, 1992: 170; McMahon, 1994: 251; Croft, 2000: 44–78). Among the Takia of Karkar Island (Papua New Guinea), there is a division between coastals and inlanders. Coastals distinguish the phonemes /l/ and /r/. Inlanders merge them as /l/. Every Takia adult knows about this difference. Comparative evidence shows that the innovators are the inlanders. The merger of /l/ and /r/ as inland /l/ must have occurred randomly in the speech of a single speaker, been acquired by others, selected as an inlander marker, and carried from one primary network to another by inlanders with multiple secondary links. Nettle (1999: Chaps. 2–3) finds that an innovation is unlikely to catch on without the amplification afforded by social selection.

When a speech community becomes two or three communities and contact among the new communities is reduced, their speech may diverge and new lects appear. The divergent changes are driven by social selection. The deciding factor behind divergence is the strength of social boundaries – the weakening of links between social networks so that new social identities emerge.

Some languages are far more resistant to change than others. This difference has been attributed to social network structure. Milroy and Milroy (1985) propose that when the speakers of a language form a set of overlapping tight primary networks, i.e., a tight-knit speech community, with only weak social links to other groups, the language typically changes very slowly. The paradigm case is Icelandic, little changed since early medieval Old Norse, unlike its radically transformed sisters Norwegian, Danish, and Swedish. At the opposite extreme are papuanized Austronesian languages in mainland New Guinea. Their speakers entered into symbiotic relationships with speakers of Papuan languages so that their secondary links were with Papuan speakers whose alien speech was the source of extensive innovations (Ross, 1996). However, Labov (2001: Chap. 10) offers an occupation-based interpretation of data sets like the Milroys', and there are relatively isolated communities (e.g., in Polynesia) where change has been quite fast, and apparently even tight-knit communities where speakers have exaggerated differences from their neighbors, i.e., accelerating change to maintain isolation (Anderson, 1988; Thurston, 1989; Ross, 2003).

Nettle (1999: 66–78) argues that economic (inter) dependence is the main reason for language spread. He contrasts the many small speech communities of inland New Guinea, each of them economically largely independent, with the widespread communities of the Hausa, the Fulani, and the Tuareg of on the southern edge of the Sahara, where survival requires distant economically based relationships. Hunter-gatherer pygmy groups in central Africa depend on their farmer neighbors to supplement their diet, and each group of pygmies has shifted to the language of the farming group with which it is paired. Hunter–gatherer negrito groups in the Philippines have adopted Austronesian languages from farmer neighbors (Reid, 1994). The difference between these situations and the one which led to the papua-

nization of Austronesian languages in New Guinea was probably a difference in the strength of primary network links: these links were stronger among Austronesian-speaking horticulturalists than among hunter- gatherers.

With explicable exceptions, language density is greater nearer the Equator than further away from it, perhaps because it is correlated with ecological risk: the more difficult it was to sustain human life, the larger the economic and therefore linguistic networks that came into being (Nettle, 1999: 60–66, 79–93). This economy–language pairing continues in more recent events. The expansion of European colonizers across the planet since the 15th century caused a devastating reduction in language diversity, now being intensified by the push toward economic globalization.

The Origins of Phylogenetic Diversity

The origins of the phylogenetic diversity of languages lie far back beyond knowability. Are all today's language families descended from a single 'Proto-World'? Many people have assumed so, not on linguistic evidence but on the basis of a single human origin in east Africa. The comparative method allows us to reconstruct linguistic history only as far back as about 8000 years, yet structurally modern language has probably been around for 100 000 years.

Nichols (1992: 221–230) finds a geographic patterning of morphosyntactic features in the world's languages, which, she suggests, are fossil reflexes of the original spread of languages. She traces a path from the Old World into the Pacific and rapidly south to Australia, followed by circum-Pacific and New World colonization. Those who entered the Americas across the Bering Strait were related to a circum-Pacific group, not an Old World population.

Using Nichols' stocks, Nettle (1999: 113–129) divides the world into nine regions and plots stock and language densities for each of them. Setting aside the New Guinea figures, which are significantly higher than anywhere else, he finds that stock (phylogenetic) density in Africa, Europe, and Asia is far lower than in the rest of the world. In the rest of the world there is a simple correlation: the more languages, the more stocks. This situation is claimed to reflect time depth. Over time, interaction between human populations has led through language shift to stock extinctions. On archaeological estimates, the time depth of human language in Africa is more than 100 000 years; it ranges from 60 000 to 40 000 years in Europe, Asia, Australia, and New Guinea; and is as little as 12 000 years in the Americas (although this dating is controversially recent). Nettle's stock densities are in an approximate inverse relationship to these time depths.

Bellwood (1997) argues that the Neolithic transition, i.e., the transition from foraging to agriculture, caused the expansion of some of the world's largest language families, presumably leading to increased extinctions of languages and stocks. He notes four significant cultivation events that apparently caused the expansion of languages into often large families, probably replacing their own closest relatives as well as other families in the process:

1. Wheat, barley and legumes in the Fertile Crescent by 8000 BC: Afro-Asiatic, (controversially) Indo-European, Elamo-Dravidian, Kartvelian.
2. Taro and bananas in the highlands of New Guinea by 8000 BC (Denham *et al.*, 2003): Trans-New Guinea family, limited to the New Guinea region.
3. Rice, foxtail and broomcron millet in the Yangtze and Yellow River Basins by 6000 BC: Austronesian, Tai-Kadai, Austro-Asiatic, Sino-Tibetan, Hmong-Mien.
4. Sorghum and pearl millet in sub-Saharan Africa by 2000 BC (?): Nilo-Saharan and Niger-Congo.

These events may have sharply reduced the world's phylogenetic diversity. Relics of what was there before perhaps survive in Basque in the Pyrenees, in the diversity of the language families of the Caucasus, and of parts of New Guinea and parts of the Americas (see Nichols, 1997).

In Diamond and Bellwood (2003), the Neolithic-transition hypothesis is extended across the world, but somewhat tentatively, and wisely so. Although it is probably correct for Austronesian, and no doubt elsewhere, it would be wrong to overgeneralize it. Nilo-Saharan and Niger-Congo are not necessarily phylogenetic units (Nichols, 1997). Pama-Nyungan in Australia, Uralic, and Chukchi-Kamchatkan in northern and central Eurasia, Khoisan in southern Africa, and Athabaskan and Eskimo-Aleut in northwest North America have all expanded without a Neolithic transition, although there may have been other economic reasons for their spreads. Various agricultural families have not expanded significantly: Ramu–Lower Sepik in New Guinea, Nakh-Daghestanian and Kartvelian in the Caucasus, and various families in the Americas (Campbell, 2002). The putative Indo-European agricultural expansion (Renfrew, 1987) has been called into question by Nichols (1998), who brings a cohort of arguments, linguistic, geographic and historical, for a homeland in western Central Asia around 3500 BC. This is part of a larger argument that stock densities are also heavily influenced by geographic factors (Nichols,

1997), to which Campbell (2002) would add differences in social behaviors among speech communities.

A New Evolutionary Model

Recently, an evolutionary model has been proposed in which the replicator is what Croft (2000) calls the lingueme. Its basis is a general theory of evolution applicable to change in social phenomena as well as in biology. There are three versions of the model (space compels us to ignore their differences): Nettle (1999), Croft (2000), and Enfield (2003). Croft's is the most articulated version. A lingueme is any unit of linguistic structure, be it a phoneme, a morpheme, a word or phrase, or a construction, i.e., the units which are the parameters of intra- and interspeaker variation. The linguistic counterpart of the biologist's DNA string is the utterance, a structured set of linguemes. The speaker, as the repository of grammar, corresponds to the biological organism (the interactor). As in network theory, speakers form a networked population, and language change occurs when a lingueme is propagated across the network in altered form and becomes manifest in speakers' utterances. Croft (2000: Chaps. 5–6) builds in a paradigm of possible innovation types as well.

What is new and what gives the model its integrative power is the view of the lingueme as the replicator. The language is deliberately left out of focus, recognizing that a speaker's repertoire is a structured collection of variables that do not necessarily have common geographical boundaries. The dialect vs. language vs family issue does not arise.

What is somewhat uncertain, however, is where this leaves the grammar. Enfield stresses that language learners infer "grammatical patterns" from others' behavior. The idea that a single grammar is shared by speakers or is transmitted from one generation to the next is for him a cultural illusion. Linguistic signs "are best understood as theories, constructed by individual speakers over time by a process of trial and error" (Enfield, 2003: 2–3). Sets of signs come to cohere as systems in individuals' minds, and speakers' grammars have a lot in common because of the need for coordination. Croft (2001: 29) grants that the evolutionary model implies looser grammatical organization than either the structuralist or the generative model, but attributes "a high degree of structural organisation" to the lingueme pool. He asserts that through the utterances she hears, a child inductively acquires syntactic constructions, and then from these infers a taxonomic network of constructions (Croft, 2001: 57–58).

Nettle, Croft, and Enfield all give pride of place to contact phenomena as a justification for the new model. They point out that if the replicator is the lingueme, then it does not matter whether an altered lingueme has its origin in what speakers recognize as "their own language" or "another language." The process of change is the same. Under the family tree model, a language is only allowed to have one parent, and contact phenomena, they imply, tend to be pushed under the carpet. This is true, but the emphasis on contact risks overlooking what is modeled in a family tree, namely the generational continuity of a language. Although grammar is not itself a replicator and is reconstructed by each new speaker, parents and children usually have a clear sense that they are speaking the same language. Furthermore, contact in most cases entails bilingualism, which causes the linguemes of one language to be modified under the influence of the other. The modified language is usually still recognized as the same language by the next generation, whether altered linguemes have a language-external or language-internal origin. This is so even for the papuanized Austronesian languages of New Guinea. The generational continuity depicted by a family tree is only broken when a social catastrophe occurs, as when the transportation of Melanesians to far-off plantations from the 1860s led to the rapid stabilization of Pacific Pidgin, a language with no previous existence as a system (Ross, 1997: 251–253). Language contact may have been marginalized by the family tree model, but it would be a pity if generational continuity were marginalized under the new model.

See also: Cladistics; Contact-Induced Convergence: Typology and Areality; Cultural Evolution of Language; Early Historical and Comparative Studies; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Fijian; Genetics and Language; Germanic Languages; Labov, William (b. 1927); Language and Dialect: Linguistic Varieties; Language Change and Language Contact; Language/Dialect Contact; Long-Range Comparison: Methodological Disputes; Microparametric Variation; Origin and Evolution of Language; Papua New Guinea: Language Situation; Phonemics, Taxonomic; Solomon Islands: Language Situation; Subgrouping Methodology; Variation and Language: Overview; Variation in German.

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Language Identification, Automatic

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Language identification is one of the most fundamental aspects of text analysis and processing. Before indexing a web page – or doing almost anything else – the analyst must first identify in which language the page is written. With the recent explosion in the number of written documents demanding analysis via the Web, this question has received recent research interest.

At least in theory, it is not a difficult problem. Cryptographers have known for centuries (Kahn, 1967) that some letters are more common than others, and that distribution varies between languages. A cryptographer usually starts by assuming (or guessing at) the language – an assumption to be abandoned if a solution is not forthcoming. For example, one could note that the letter 'W', although relatively uncommon in English, is almost nonexistent in French, and therefore a document containing a noticeable number of 'W's is probably not in French. Alternatively, the letter sequence ETAOINSHRDLU, representing the 12 most common letters in descending frequency (for English), has become a cliche, but it is still useful as a informal description. Any document that closely matches this sequence is probably in English, whereas any document that varies too greatly from this is probably not. This observation can be formalized using a statistical model such as a multinomial distribution over an independent letter set.

Beesley (1988), one of the first researchers in this area, identified three main 'translator approaches' used by humans without computer assistance to identify languages. One strategy lists the letters (particularly accented ones) used in a given language. A second lists common/short words (such as function words), whereas the third lists typical word endings. Beesley applied the computer to extend these lists to statistical distributions. Specifically, he compiled distributions of bigram (two-letter pairs) frequency for each of a set of languages. For a document in an unknown language, each component bigram is looked up in the appropriate distribution for each language of interest, and the probabilities are multiplied together. The language table yielding the highest overall probability is inferred to be the (unknown) language of the document. Although this technique is philosophically weak (it assumes, e.g., that document bigrams are independently distributed, whereas the effects of context on language are well-known), it still yields accurate results with a minimum of computation.

This method also lends itself well to generalizations: for example, calculating trigram (three-letter sequences) or, more generally, *n*-gram probabilities. The analysis can also be performed on word frequencies (or *n*-grams). Analysis can focus on specific words or letters as shibboleths, morphological characteristics, or even syllable characteristics. Similarly, the exact analytic framework used can vary, from the simple independent event statistics described above through dissimilarity measurements, discriminan analysis, crossentropy (or other) distances, Bayesian statistics, support vector machines, neural networks, or Markov processes (to name a few methods that have been applied).

From a theoretical perspective, language identification can be regarded as a specific instance of text categorization (Manning and Schütze, 1999), under which broad heading can be clustered other problems such as genre identification, authorship attribution, document dating, spam detection, or even in some cases theme and tone analysis. For this reason, many techniques developed for one problem (such as the techniques listed for authorship attribution in Holmes [1994]) can be applied in other areas, as shown by the work of Juola (1997, 2003). This raises the as-yet unsolved theoretical question about what kinds of information and categorization techniques are most appropriate for making the distinctions relevant for one particular subproblem.

In some regards, language identification from text is a solved problem, as researchers routinely cite successful classification rates of 99% or more. However, there are still practical considerations to be addressed. This extreme accuracy often requires 100 or more characters of test text: a small number, but still more than, for example, many newspaper headlines or cryptograms, and substantially more than a skilled human requires to make the same judgment. These methods can also have difficulty with segmentation, identifying those passages in a second language that add a certain *je ne sais quoi* to an otherwise monolingual document. These interloping phrases distort statistics and may confuse otherwise accurate methods. (Consider, e.g., the analysis of a typical legal brief, with the normal amount of 'dog-Latin' used in legal terms of art. It should be noted that the segmentation issue is not confined to language identification, as co-authorship or co-editing can pose similar problems for other text categorization tasks.) A more subtle problem with the approaches outlined is their demand for a suitable set of training data for each language under consideration; a simple implementation of a system will not usually respond 'None of the

above'. A system trained on English, German, French, and Spanish, for example, would probably identify a document in Dutch or Norwegian as being in German.

Finally, the method should be robust enough to handle realistic variation in document coding or typography. For example, the letters 'A' and 'a' are often considered identical, and some kinds of English text (e.g., newspaper headlines) are written using upper-case only. Similarly, many texts are written without using diacritical marks or similar language-specific features, often because of the limitations of the system on which they were written (e.g., a lack of eight-bit support on many text editors). More generally, the encoding of non-Latin letters (including Cyrillic and Greek) is often system dependent, and even the encoding of Latin letters with diacritical marks can be system dependent. Beesley cites as an example the decimal value 123, which can identically represent (in different 'standard' forms of EBCDIC) the octothorpe ('#') in English, 'Ñ' in Spanish, 'Æ' in Danish, 'Ã' in Continental Portuguese, and 'Õ' in Brazilian Portuguese. More seriously, the same orthographic character can often be mapped (depending on the system and processor) to different characters; the capital Œ ligature is character 0x8C in Microsoft's Code Page 1252 standard, but character 0x152 in Unicode (or standard HTML). A system cannot necessarily be expected to know the encoding used for a given document.

A similar problem occurs in the treatment of typographic or other errors. The digraph 'aa' is very rare (frequency zero in many training samples) in English but is easily produced by an 'aaccidental' doubling. A system that calculates the overall probability by multiplying individual digraph probabilities together would thus find the probability of this article (or this encyclopedia) being in English to be zero, on the basis of the forbidden digraph. With small enough test samples, this sort of error-introduced statistical distortion can be substantial.

An ideal method should be efficient enough for real-time processing, not make undue demands on system storage, be easily extensible to new languages, and be robust against the issues described above. Although such a system does not yet exist, language identification remains an active research area because of its fundamental importance as a base for other forms of automatic text processing.

As a final note, one interesting variation on language identification begins not with text but with images such as GIF files. Before an optical character recognition (OCR) system can work properly, it must apply a language model, based of course on the language in which the document is written. If this language is unknown, there is an impasse created. Researchers including Sibun, among others, have attempted to resolve this by using image features and basic character shape features, such as the presence or absence of descenders, that can be spotted using only image-processing techniques. These features can be used as events analogous to letters or words in the traditional (often *n*-gram-based) inference engines. Work has thus far largely been confined to Roman alphabets, but extension to other character sets and languages will no doubt continue, with interesting results. Automatic identification of language from handwritten documents might prove more interesting yet, but no research in this area has come to the author's attention.

At the most abstract level, there is a fundamental question that remains unresolved. Despite the accuracy obtainable by these simple statistical methods, researchers are no closer to answering questions about the fundamental differences between languages or, equivalently, how the low-level statistical features characteristically employed to the solution of language identification relate to the high-level aspects of language studied by traditional linguists. Image- and handwriting-based language identification (as well as the continuing development of identification systems for non-Latin alphabets) may be the next major challenge, in part because we have as yet no general notion of what, exactly, constitutes perceptual 'English'-ness (or other languages).

See also: Character Sets; Classification of Text, Automatic.

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Language Ideology

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Ideology and Language

Language ideology emerged as a separate field of linguistic-anthropological study in the last decades of the 20th century, combining linguistic ethnography with insights from the social-scientific study of ideology. Though the field is still very much under construction, its influence on linguistic anthropology, linguistics, discourse analysis, and sociolinguistics is considerable (Woolard, 1998).

Yet few social-scientific terms have had such complex histories of interpretation as the term 'ideology.' Nested in scholarship as well as in politics, and within scholarship in such widely diverging traditions as history, philosophy, political economy, anthropology, and linguistics, ideology has built a track record of controversy, dispute, and conflict over its meaning. As a social-scientific concept, it has at least two ancestors.

One tradition of conceptualizing ideology grew out of Marxist theory and came to identify the mediating link between material and ideational aspects of reality. In *The German ideology*, Marx and Engels presented ideology as 'false consciousness': systemically distorted perceptions of reality, more specifically of one's class position. Gramsci's *Prison notebooks* inserted ideology in the concrete struggle for political dominance and identified 'hegemony' as dominance by a particular class-bound ideology in the cultural and ideational-political field. Revolution, according to Gramsci, needed to attain hegemony as well as power in order to be successful. Later theorists such as Althusser carried the analysis of ideology further into a general sociology of power. According to Althusser, ideology was promulgated and sustained by "ideological state apparatuses": civil society institutions which 'normalized' the imaginary relationship between the subject and his/her position in the social world. To Habermas, ideology was lodged in communication distorted by power processes, and in Bourdieu's work, the conversion of hegemonic ideologies into 'normal' practices and ideas was labeled 'habitus.' In each of these developments, the Marxian conceptualization of ideology as tied to the interests of particular social groups and to processes of power and dominance was adopted and elaborated.

A second ancestor of ideology in the social sciences is the Durkheimian tradition of sociology as collective psychology. Durkheim's influence is noticeable in Marc Bloch's work on historical 'mentalities' as well as in a variety of anthropological approaches to 'world views' and 'belief systems' (as, for example, in Evans-Pritchard's work). A parallel development runs from German neo-Kantianism through Boas and Whorf. These ideational (cultural) complexes are, unlike in the Marxian tradition, neutrally defined: they are often presented as the deeper layers of culture and society, the unspoken assumptions that, as some kind of 'social cement,' turn groups of people into communities, societies, and cultures. This concept of ideology is often called the total concept, for it suggests the acceptance of ideational-cultural complexes by every member of the community. The Marxian and Durkheimian traditions of study are more or less each other's contemporaries, and both flourished in the 20th century.

Language has never been out of focus in the study of ideology, and important reflections on language and ideology emerge early in the Marx-inspired works of Bakhtin and Voloshinov, as well as somewhat later in the work of, for example, Roland

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Barthes and Raymond Williams. For Bakhtin and Voloshinov, language embodies and articulates the experience of social struggle, transition, and contest, and consequently the linguistic sign is seen as deeply ideological. Language usage displays a variety of orientations to social interests, derived from particular positions in society ('voices'). And interaction involves different voices evaluatively responding to each other's statements ('dialogue'). Thus, human communication through language displays meaningful metalevel inscriptions, adding a layer of sociopolitical, ideological meaning to the event. The works of Bakhtin and Voloshinov became one building block for the contemporary study of language ideology.

Another building block was Peircian semiotics and its emphasis on the nonreferential aspects of meaning. Importantly, the sign in Peirce's semiotics stood in a close relationship to objects in the world, and Saussurean semiotics – restricted to referential relations between signs and signified – was extended to include signification. Peirce developed a typology of signs in which he distinguished between 'icons' (signs that resemble their object), 'indexes' (signs that bear an existential relationship with their object), and 'symbols' (signs that conventionally represent an object as a member of a class of like kinds). And such signs operate in an infinitely generative way, signs generating other signs through processes of implicature, entailment, and the like (Keane, 2003). In such a way, the iconic and indexical dimensions of signs become part of the context in and on which signs operate.

This complex body of theory is brought to bear on ethnography in the work of Michael Silverstein, providing the origin of language ideology as a separate field of study. Revisiting Whorf's work on linguistic categories, Silverstein claimed that the 'world views' identified by Whorf were in fact indexically organized language-ideological complexes, and that "the indexical plane of meaningfulness properly encompasses the folk realm of rhetoric (the system of language use), how language signals derive their socially understood effects in various socially constituted situations of discourse" (Silverstein, 1979: 205). Such folk realms, he further argued, displayed "the tendency to rationalize the pragmatic system of language, in native understanding, with an ideology of language that centers on reference-and-predication" – a referential ideology of language (1979: 208). Focusing on language ideologies would allow the analysis of language to be the analysis of culture (cf. Silverstein, 1976, 2004), for precisely the indexical level of language would anchor it firmly into culture. Furthermore, language and language use could be seen as reflecting on itself, for every act of communication (pragmatics) articulates a metapragmatics in which the linguistic-ideological features operate. This metapragmatic, indexical layer of semiotic systems such as language is not neutral; it is evaluative, relational, socially positioned, invested with interests, and subject to contestation and dominance.

Whereas Silverstein's approach to language ideology is firmly embedded in the ethnographic tradition of linguistic anthropology, a more or less simultaneously developing tradition of studies focused on linguistic metatheory as ideology (Joseph and Taylor, 1990) and on popular and institutional language ideologies (Milroy and Milroy, 1985; Cameron, 1995). The sources of this other tradition are more diffuse, ranging from the history of science to variationist sociolinguistics and applied linguistics. In what follows, the focus will be on the ethnographic tradition, with an occasional foray into other bodies of work.

Ideology and/in Analysis

One of the effects of addressing language ideology is the fact that it dislodges a range of established concepts and categories and thus offers infinite opportunities for revisiting existing scholarship. I will discuss the impact of language ideologies on the following topics of inquiry: (1) central linguistic notions such as 'language' and (2) 'text'; (3) central sociolinguistic concepts such as 'speech community,' with implications for the study of language policy and (4) language change; (5) the history of linguistics.

Language

There is a longstanding concern in ethnography to investigate specific varieties of language rather than language *per se*. The reason, equally old, is that a uniformizing, singularized notion of language obscures the crucial sociolinguistic differences that occur within that language, and "it is a fallacy to equate the resources of language with the resources of (all) users" (Hymes, 1996: 213). In fact, the existence of 'language' and 'languages' – objects that are countable and have a name, such as English, Zulu, or Japanese – is a powerful language-ideological effect, the result of long historical processes of construction and elaboration of a metaphysics of mind vs. world within which the Cartesian self as sign, with the world as its object, comes into view.

In order to understand such processes, we have to start from Silverstein's referential ideology of language. Given the widespread belief in denotation as the main function of language, language itself is conceptualized as a transparent, structured, and finite system of clear (denotational) and noncontextual forms which characterizes groups of people. This we

could call an 'artifactual' view of language, a view in which language is seen as a manipulable, bounded artifact consisting of (grammatical) 'structures' with a clear function, denotation. Such a view would be expressed, for instance, in utterances such as 'I need to work a bit on my French' or 'His German needs some polishing, it is a bit rusty,' in which 'a language (name)' is metaphorically seen as an object one can obtain, possess, manufacture, and improve upon. This view, as we shall see, is a key ingredient of modernity and thus a rather recent construct, but it has become the most widespread view of language both in popular and in scientific circles. Linguistics has contributed in no small degree to the cultural construction of language in general as a stable, contextless individual mental object, and language and educational policies as well as larger nation-building programs have been deeply influenced by this ideology.

The 'language' thus artifactually conceptualized as a denotational code characterizing groups of people always takes concrete shapes. It would be qualified as a 'standard' variety; it would be strongly tied to literacy and focused on common grammatical structure and lexicon; and it would be the object of normative control, of institutional regimentation and orientation towards centers of authority (Silverstein, 1996). The 'standard' is usually perceived as 'neutral' or 'unmarked,' i.e., something the qualities of which are perceived as natural, self-evident, 'normal.' Thus, 'standard' English would often be qualified as 'accentless' English – English which cannot be characterized as to class or regional belonging – whereas in fact, obviously, such a variety would be strongly accented and solidly indexical of social, educational, or even regional and generational backgrounds (Agha, 2003). Similarly, writing in the 'standard' orthography would be unmarked ('correct'), while writing in an erratic orthography would be 'wrong' and would trigger indexicalities of sloppiness, lack of education, and so forth. 'Standard' is a particular variety of language, a register perceived as 'neutral' because of elaborate sociohistorical processes of normalization and codification (Silverstein, 1996; Blommaert, 1999a; Kroskrity, 2000a; Gal and Woolard, 2001a; see also Bourdieu, 1991; Cameron, 1995). Such processes often involve the construction and reproduction of specific codes and genres for public purposes, creating a sense of authority emanating from a center, marking particular forms of speech as emblematic of group belonging and identity, and introducing a sociopolitical evaluative stratification in language usage, with 'better' and 'worse' forms of usage (Blommaert, 2004; cf. the essays in Kroskrity, 2000b and Gal and Woolard, 2001b). Members of that group are expected to perform these codes and genres as part of their 'culture of language use,' indexing 'full' group membership and categorical belonging (Silverstein, 1996: 291).

Dislodging the notion of 'language' and identifying it as a complex of metapragmatic qualifications projected onto situated language usage has far-reaching critical import, for it shifts attention away from stable, contextless linguistic notions to deeply sociocultural, historically, and politically invested notions of language and language usage, emphasizing that the very existence of '(a) language' is a result of ideological construction and therefore involves power, authority, and control. There is no such thing as a 'neutral' real language; such a neutral notion is one metapragmatic categorization among many, though often the one that indexes power, authority, prestige, and status. Furthermore, one of the essential functions of language is ideological (metapragmatic and indexical) framing: providing contextual cues about who speaks, in what mode, on which topic, and under what circumstances. This ideological function is central to contextualization procedures (Gumperz, 2002), and it may account for much of what Hymes understood as "second linguistic relativity" (1996: 44–45): while linguistic forms may remain stable across contexts, situations, and groups of users, their indexical value may differ quite dramatically. What counts as 'good' language on one occasion may be 'bad' language on another. These insights, as we shall see, have effects on other well-established concepts.

Text

'Text,' oral (face-to-face) as well as written (circulated via inscribed artifacts), is one of the most central notions in the study of language and culture, as the product of language usage and as the central means of cultural transmission. And just like 'language,' it has often been pictured as a reified, referentially transparent, stable object, as something which provides a degree of authenticity in every stage of its existence. Within ethnography, concern for textual performance has a respectable age, and scholars have investigated the poetic patterning of oral texts – 'narrative' or 'folklore' – in attempts to uncover their deeper cultural organization and significance (Hymes, 1996).

Attention to language ideologies has had an impact on at least two aspects of the study of text. The first aspect is the ideological dimension of transmission of texts, and the second is the introduction of indexicality in the analysis of text.

The transmission of Texts As noted above, texts are often seen as stable and capable of unproblematic

transmission. Transmission of texts is often seen as crucial to any understanding of culture – as 'tradition' – and is equally crucial as an ingredient of bureaucratic and institutional practice, in courts, schools, governance, and so forth. In such a transmission, the 'original context' of the text is taken to be carried over to the new occurrence of the text, and impressions of transcontextual stability are created. In discourse analysis, terms such as 'intertextuality' denote such forms of transmission, and they are often used to identify (explicitly) recognizable traces of chunks of discourse across loci of occurrence.

As soon as we adopt a more refined view of context in which indexicality is central, processes of textual transmission become significantly more complex. Let us recall that apart from denotational meanings, texts also carry indexical, metapragmatic values which provide their anchoring into contexts. Every text in context is thus metapragmatically organized in ways that suggest, in context, particular readings or understandings. When texts are transmitted, forms may remain stable – a characteristic called 'entextualization' (Bauman and Briggs, 1990; Silverstein and Urban, 1996b) – but the metapragmatic framing of the text may change. The process by means of which discourses are successively or simultaneously decontextualized and metapragmatically recontextualized depends on such entextualization, so that the forms become a new discourse associated with a new context and accompanied by a particular metadiscourse which provides a sort of 'preferred reading' for the discourse. This new discourse has become a 'text': discourse lifted out of its interactional setting and transmitted together with new suggestion of context (cf. Bauman and Briggs, 1990: 73). Silverstein and Urban (1996b: 1) specified:

> The text idea allows the analyst of culture to extract a portion of ongoing social action – discourse or some nondiscursive but nevertheless semiotic action – from its infinitely rich, exquisitely detailed context, and draw a boundary around it, inquiring into its structure and meaning. This textual fragment of culture can then be re-embedded by asking how it relates to its 'context,' where context is understood as nonreadable surround or background (or if the context is regarded as readable, by asking how the text relates to its 'co-text').

Entextualization is part of what Silverstein and Urban call the 'natural history of discourse.' 'Original' pieces of discourse – socially, culturally, and historically situated unique events – are lifted out of their original context and transmitted into another context, by quoting or echoing them, by writing them down, by inserting them into another discourse, by using them as examples or as data for scientific analysis.

Entextualization builds further on notions of the reflexive nature of language usage (see Lucy, 1993). Through this reflexive dimension, it amends overly linear or static views of context, adding an important praxis-related dimension to text–context relationships. While talking, participants themselves mark those parts of speech that are text and those that are "instructions about how that discourse is to be approached as a text, through replication or with some form of response" (Urban, 1996: 33), e.g., by means of self-corrections, hedges, hesitations, interjections, false starts, explicit qualifications such as 'what I really mean is. . .' or 'that's not the point.'

Entextualization also connects in relevant ways to another crucial concept: representation. Insofar as representation is always a semiotic act (discursive or nondiscursive, material), and to the degree that representation always involves the 'replication' of an object, a phenomenon, or an event into other modes of existence and other moments of happening, it is a form of entextualization. Hence, representation will also involve metadiscursive qualifications commenting on the ontology or the status of the representation by pointing at distances between the object and the representation, by suggesting that object and representation are identical, or by suggesting that the representation can be treated as identical to the object. We shall see below that this has implications for the history of linguistics.

The Analysis of Texts When indexicality is adopted as one of the primary features and functions of linguistic expression, the analysis of discourse involves far more than an attempt to connect form to content. One of the most important influences from the study of language ideology has been the recognition that formal, poetic patterning in text is indexical, i.e., meaningful in itself. This has an effect on what we understand by 'context' in discourse analysis: the notion of 'contextualization' comes to stand for the generative and dialogical production and interpretation of indexical aspects of language usage (Silverstein, 1992; Gumperz, 2002). Whenever people communicate, they produce forms that fit a particular genre, carry concomitant stylistic features, and thus produce metapragmatic messages about content, direction of interpretation, situatedness in a particular event, social identities, and relationships valid in the event. Utterances are therefore packed with indexical meanings: every utterance is genred, topically organized, linguistically coded, gendered, accented, stylized, and so forth. All of these features occur simultaneously and offer dense clusters of contextualization cues, deployed dialogically in the line-by-line

development of the event (Blommaert, 2005). This is the "dialectical plenitude of indexicality" (Silverstein, 2003: 227; cf. also Goffman's [1974] 'frames within frames').

Thus, in an analysis of marital quarrels and mediation among Zinacantàn Tzotzil speakers in Mexico, John Haviland (1996) showed how the mediator used particular ethnopoetic patterns (parallelisms, refrains, repetitions) in his speech as iconic of the restoration of harmony he was attempting to accomplish. The ethnopoetic patterning here instantiated a genre in which linguistic form iconicized the whole of the event and indexed the roles and relationships produced therein. Similarly, in the analysis of a narrative produced by a refugee from Sierra Leone, Maryns and Blommaert (2001) observed how delicate shifts in (linguistic) code went hand in hand with stylistic and genre shifts, and so indexed affective and epistemic orientations to the places in which particular episodes of the narrative were set. Bundles of formal features, in other words, appeared to organize shifts in orientation towards contextual 'centers' and thus provided new semiotic subject positions, much in the sense of Goffman's changes in footing or Bakhtin's multivocality. And Hanks (1996) showed how a Mayan prayer was indexically structured in such a way as to organize a complex and sequential pattern of participation frameworks. The different structural parts of the prayer oriented towards humans, spirits, space, biographies, and shared histories, and did so in a synthetic, 'polycentric' act of communication.

In all these cases, we see how genred linguistic-narrative form is a crucial contextualizing device and how genre goes hand in hand with identities, roles, topic organization, key, epistemic and affective modes, and so on. Genre, in all of these cases, turned out to be a complex of organized ("ordered," Silverstein, 2003) indexicalities triggering sociocultural presupposable framings for the narratives. Consequently, small, hardly noticeable genre shifts – e.g., from a 'serious' conversation into a 'joke' – indexically reorganize (or reframe) the whole social event, orienting it towards other sets of meanings and expectations of behavior.

There are several implications to this, of which we can only briefly mention a handful here:

1. One implication has to do with the link between communicative-linguistic repertoires and communicative practice. It is clear that both need to be seen in close connection to one another, for certain forms of communicative practice involve the selection of specific linguistic resources from a repertoire (as, for example, the use of a regional accent when quoting someone in a bit of gossip). Thus, the range of stylistic means of speakers may be closely related to their repertoire range, and important forms of inequality may occur in this respect. This is where the study of language ideologies enters the realm of sociolinguistics.
2. Second, there are implications for conceptualizations of form–function relations. Going back to Jakobsonian poetics, we know that contrasts and equivalences, big and small, are crucial indexically. Small formal shifts, sometimes hardly salient linguistically, can have big ideological effects. The phenomenon now often called code-switching can be seen in a new light when we adopt indexicality as a feature of analysis. Often, the shift in (denotational – 'language') code occurs alongside generic and stylistic shifts, and such packages provide complex and layered indexicalities (cf. Rampton, 1995). The actual communicative deployment of code-switching and other forms of contrast and equivalence in linguistic form can be looked at anew.
3. Related to that, discourse analysis can also take a fresh look at poetic patterning in speech, for apart from formal metric organization, talk can also display an indexical rhythm and meter, as Silverstein (2004) demonstrated. Given the 'packaging' of indexicality in formal and structural bundles of features, one may take indexicality as the point of departure rather than as the outcome of formal patterning. This area of investigation awaits focused attention.

Speech community

Apart from the linguistic concepts discussed above, language ideology also dislodges some crucial sociolinguistic concepts. The concept of 'speech community' is one such; its problematic attributions of boundedness, uniformity, and homogeneity have long since been noted. Sociolinguists have long explored the occurrence and distribution of 'languages' (in the artifactual sense outlined above) in societies, and such 'languages' were often accompanied by 'speech communities' in a one-to-one relationship; more sophisticated approaches focused on the occurrence of multiple 'languages' within one 'speech community' or different 'speech communities' sharing one 'language.'

From a language-ideological perspective, two different but related phenomena are at issue. One is the allegiance of groups of people to a denotational code, an artifactual 'language' with a name. The second one is the practical alignment people display towards particular indexical complexes within a stratified system of valuation. The first kind of group would be

called 'language community,' the second one 'speech community' (Silverstein, 1998). There is an obvious relation between both, the first form of groupness being a particular (genred) instance of the second.

To start with the first kind of groupness: this is the kind of allegiance that organizes self-categorizing perceptions and statements of the kind 'I speak X' or 'I am a native speaker of X.' What happens here is an orientation to an artifactual, denotational form of language, usually called by its name (Dutch, English) and imagined as the kind of stable, immanent, clear, and bounded object referred to above. The norm for such a language is codified, and distinctions can be made as to degrees of 'correctness' or knowledge of the ('standard') language thus defined. One 'possesses' this language, and one identifies with an imagined bounded, homogeneous community of 'native speakers' of the language. Thus results an image of singular ethnolinguistic identities – 'I am a speaker of X' – as well as images of static, timeless social formations unified by the language they speak.

The second kind of groupness is more volatile. 'Speech communities' are groups of speakers displaying joint orientations towards complexes of socioculturally presupposable indexicalities which can be used to construct identities and communities. Whereas 'language communities' are ideological constructs, speech communities would be practical constructs, the result of structured social-semiotic practices which, of course, in themselves are based on language ideologies. The existence and actual range of such speech communities depend on the sharedness of indexical values. Consequently, speech communities are shot through with almost every imaginable social variable which can be semiotically indexed. Gender, class, regional background, and spatial trajectories such as migration, ethnicity, levels of education, professions, hobbies, individual biographies, generations, etc. can all be reflected in recognizable semiotic practices and lead to self- or other categorization in particular communities in ways reminiscent of Bourdieu's 'distinction' (1984). Multiple belonging is the rule, and shifts in discourse may signal shifts in orientation towards, or inclusion of, other community-identifying indexicalities.

The language community can be seen as a particular instantiation of 'speech community': a shared orientation towards centered indexicalities, targeting the artifactual language and its explicit norms, often institutionally supported and enforced by the state or other authority-bearing actors. As a point of orientation in discourse, the language community often comes as one layer over other speech community indexicalities. Whenever I teach, for instance, I will talk in Dutch, thus orienting towards a state-organized "regime of language" (Kroskrity, 2000a) which institutionally compels me to use Dutch as the medium of instruction. But the particular register and jargon I use orient towards another community: that of transnational academia in the field of language studies, and my own spoken variety of Dutch will betray my regional, gender, professional, class, and generation belongings as well. Thus we see how through the dense packaging of indexicalities multiple belongings to speech communities crystallize in everyday forms of language usage, making identity issues more a matter of particular combinations of indexical orientations than of categorical identification (Blommaert, 2005: ch. 8).

Silverstein (1998) sketches a series of important implications of these insights. One implication is that debates over 'minority languages' must be seen in a new light, realizing that terms such as 'language loss,' 'language attrition,' or 'language death' may hide a complex reality of shifting orientations of groups towards other indexical centers and thus creating new speech communities (cf. below). The same counts for code-switching, pidginization, and creolization, where the gradual coming into being of a new language community can be seen through the specter of speech communities which serve as the "context of emergence, sustenance and transformation" in the process (Silverstein, 1998: 407). In other words, we stand to gain a far more precise picture of the dynamics of 'enregistering' linguistic codes, varieties, and styles in social processes of identification.

There are other implications as well, and I will mention two important ones. First, taking language ideologies as our point of departure, we can have a new look at language policy. As mentioned above, the artifactual, denotational image of language is the one most often used in institutionalized environments; it is important to realize that this view in itself is the product of language-ideological processes, and that analyses of language policy, consequently, should aim at understanding such processes long before their implementation stage. It is the construction of the ideological image of '(a) language' itself, with the gradual emergence of 'standard' indexical categories for that 'language,' which is the key moment in language policy (cf. the essays in Blommaert, 1999a and Gal and Woolard, 2001a). Analyses based on 'languages' risk accepting the presuppositions of the policy, even when they are criticizing the implementation of the policy. This is particularly important in the context of globalization and the kind of urban multilingualism that results from it. Language policies aimed at 'integrating' new immigrant minorities are most often based on homogeneistic images of language in society, and it is precisely the indexical value of differences

between 'languages belonging here' and 'foreign languages' that provides the dynamic of disqualification and discrimination in education and bureaucracy.

A second, related, implication has to do with ethnolinguistic identity. Identifying people in terms of ethnolinguistic identity – 'I am a speaker of X' – is one of the most common components of lay, bureaucratic, and professional discourses on language in society. Yet, as we have seen, the one-to-one connection between individual speaker, language, and community is untenable. Instead, what counts as 'language' in particular environments, measured and valued against established or emergent regimes of language and in view of categorizablility within the imaginable speech communities, is the issue to be addressed when one intends to understand the relationship between language and identity. This has considerable practical and critical import, because linguistic inequality starts as soon as someone's repertoire is disqualified as 'nonlanguage' or denied the status of 'full languageness,' for instance because of the absence or partial presence of literacy skills or command of the 'standard' or prestige variety of the (artifactually conceptualized) language (cf. Heller, 1999; Jaffe, 1999; also Bourdieu, 1991). Thus, far from ethnolinguistic identity as a 'natural' attribute of humans, what we see is a dynamic of ethnolinguistic categorization, deeply embedded in macrosocial power relations and connected to issues of citizenship, belonging, and enfranchisement.

Language Change

The preceding remarks obviously have a bearing on language change. Silverstein (1979) demonstrated how certain forms of language structure may change due to ideological motivations, i.e., driven by folk understandings of language structure and language use, so that "grammatical change is of a piece with functional-structural [i.e., indexical] change" (Silverstein, 1979: 233). Using examples from English speech acts, Javanese linguistic etiquette, and continental European T/V pronominal systems, he observed how these grammatical patterns developed in the direction of a more strictly denotational system; this, in turn, changed the indexicalities of the grammatical patterns. The move towards a more denotationally transparent system, argued Silverstein, was an effect of the referential ideology of language – people believing that accurate denotation is the primary function of language, and using language accordingly (see also Errington, 1988, 1998 on Javanese).

The ideological drive behind language change was further theorized and elaborated by Irvine and Gal (2000). Focusing on the (mis)recognition of linguistic differences, Irvine and Gal identified three ideological-semiotic effects of processes by means of which language change proceeds: 'iconization,' 'fractal recursivity,' and 'erasure.' Iconization is the process by means of which linguistic features are sensed to be images of the social realities they represent. Thus, language is modeled in such a way that it is seen as iconically representing reality; that is, its indexical signs are understood to correspond to whatever they stand for. Fractal recursivity is the projection of a difference that occurs at one level or in one domain onto another level or into another domain, and erasure is the process by means of which some features of reality are made invisible. Processes of language change driven by language-ideological motivations, they argued, display these processes, either in isolation or in combination with one another.

Irvine and Gal discussed the colonial description of Senegalese languages as an example of the interaction between the three processes. Languages were isolated and projected onto monolingual ethnolinguistic groups and in the process, a geolingual image of language, people, and territory was produced – a case of iconization, graphically represented in ethnolinguistic maps of Senegal. In the process, the multilingualism that characterized many Senegalese communities was made invisible, as it was seen as an effect of earlier historical stages of conquest and colonization – a case of erasure and of fractal recursivity, for this image of multilingualism as an effect of colonialism was a projection of the European colonial impact on Senegal onto precolonial Senegalese society. The general colonial-linguistic enterprise could be seen as a case of iconicization as well: the image of Africans as 'simple' people was mirrored in suggestively 'simple' and straightforward descriptions of the sociolinguistic image of their languages.

A similar case of ideologically driven language change is that of Swahili in the former Belgian Congo. Fabian (1986) described how Swahili was introduced in the Katanga region by the Belgian colonial authorities. Two varieties were introduced: a pidginized variety used in contacts between African workers and Belgian colonial entrepreneurs and administrators, and a 'standard,' sophisticated variety offered only to a small African elite-to-be in advanced education, and tightly controlled by Belgian scholars. Note that, in Irvine and Gal's terms, these two varieties iconicized the segment of the population to which they were offered: the 'simple' pidginized variety was offered to the 'simple' workers, the sophisticated one to the 'sophisticated' elite-to-be. The result on the (socio)linguistic environment was twofold: (1) the introduction of Swahili in a region where it was previously not used, reshuffling the sociolinguistic repertoires of speakers, and (2) the development of

a local variety of Swahili bearing the traces of the pidginized colonial variety, so-called Shaba Swahili. Later, this local variety of Swahili became one of the (semi-)official languages of the independent Congo, and it is now a marker of regional identity and local nationalism – a case of fractal recursivity in which the 'naturalization' of Swahili under colonial rule was adopted by the postcolonial officials and speakers.

What these examples show is the sensitivity of language to wider historical and political-ideological forces. In Silverstein's T/V examples, the gradual rise of macrosocial ideologies of equality was a factor in linguistic development; in the cases discussed by Irvine and Gal and Fabian, colonialism was the wider context within which the construction of new artifactual languages and sociolinguistic images proceeded. They also have a wider critical and metatheoretical effect, because they allow us to revisit established traditions in pragmatics, such as politeness research or speech act theory. What such traditions accomplish is often a *post hoc* and decontextualized theorization of the dominant ideological grids that organize language usage without, however, defining these phenomena as ideological or embedded in communicative practice. Thus, often, either transcendental ('cultural') images of 'norms' are invoked, or ideological and situated processes are presented as simple reflexes of top-down power relations (Agha, 2003). We will return to this below.

The History of Linguistics

The ideological layer in language is a historical layer in which meaning is accomplished by attributing shared and ordered indexicalities to linguistic forms. This counts for folk ideologies of language as well as for specialized professional ones, and the history of the study of language is a history of the formation of ideologies of language as 'discourses of truth' in Foucault's sense: constellations of particular discourses and registers, institutional structures, and professional practices. Foucault himself offered a classic analysis of the emergence of the now dominant view of language as a separate domain of action and knowledge and a neutral, transparent tool for conveying knowledge – the artifactual view we described above (Foucault, 1973). Foucault argued that in the 16th and 17th centuries, a major shift occurred in Western thinking on language, away from a view of language as intrinsically connected to (and embodying) objects and truth. This view was replaced by a new '*épistème*' in which a neutral, instrumental, and autonomous concept of language was seen as the force that enabled the production of modern, rational knowledge.

Bauman and Briggs (2003) further developed and nuanced this thesis. Objecting to Foucault's unified conception of language in the Classical period, they emphasized conflict and hybridity as central to the imagination of language in modernity, thus creating a powerful means of creating social inequality. In Bauman and Briggs's analysis, claims to use of autonomous language become an instrument for claiming modern identities for some by excluding others: the 'folk,' those who speak 'dialects' and perform 'traditions,' the ancestors, the cultural Others. The construction of modern language ideologies has exclusionary, stratifying effects in society. Bauman and Briggs's point of departure is the work of Bacon and Locke, in which elite language is wrested from society and becomes the purified isolated, autonomous object of rationality in modernity, and opposed to 'hybrids' – mixtures of language and society – left to be spoken by the nonelite. Locke adds to this a view of governmentality: "linguistic surveillance becomes a key dimension of [Locke's] pedagogical program" (Bauman and Briggs, 2003: 43), and "tying purification to governmentality rendered language a perfect vehicle for constructing and naturalizing social inequality" (2003: 59).

Bacon and Locke thus provided the language-ideological bedrock of modernity. On that bedrock, several other views were developed, in which the rational and autonomous view of language is contrasted with and used to define modernity's Others: the people of the past, the country folk, people who live in oral cultures and perform 'tradition.' Such views of linguistic Othering were developed by antiquarians such as Aubrey, Bourne, and Brand, whose work tied common people firmly to the past by locating them in a (hybrid) linguistic space of (oral) folklore and tradition. Philologists such as Blackwell, Wood, and Lowth introduced relativism by seeing 'premodern' language as indicative of epochal change. Thus, both contemporary Others and historical Others could be opposed to modern, rational man. Blair's Ossian added a political and universalist-developmental dimension to this set of ideas, showing the path to Herder, who defined poetic (hybrid) form as the essence of national culture. In what at first glance looks as a role reversal, Herder saw poetry (i.e., folklore and tradition) as the 'purest' and most 'natural' expression of the sprit of a *Volk*. In the work of the Brothers Grimm, the rational, autonomous (Lockean) language ideology was used to identify, locate, and appraise folklore. This now more or less finished complex of ideologies was continued, elaborated, and extended in the work of two important early Americanists, Henry Rowe Schoolcraft and Franz Boas, and is thus enshrined in the emergence of American anthropology.

Bauman and Briggs sketched lines of ancestry for modern scientific philological and linguistic concepts

of language, but obviously, the story should not end there. The concrete discursive mechanisms by means of which modern linguistics dissects and produces this view of language through an empirical engagement with linguistic data remain poorly documented (but see e.g., Silverstein, 1996, 2001; essays in Joseph and Taylor, 1990).

A number of studies address linguistics in the historical regime of 'discovery' and colonialism (see Fabian, 1986; Irvine and Gal, 2000 above). This historical era offers rich materials for investigating the connection between the practical work of linguistic scholarship and the larger sociopolitical and cultural-historical schemes in which it could fit (Calvet, 1974; Errington, 2001). In the context of colonial exploration and governance, the colonial subjects' languages were powerful emblems of their inferiority, and their description and categorization consequently displayed all sorts of projections of established Western language ideologies. Rafael's (1993) study of Tagalog under early Spanish rule provided evidence of this dynamics of disqualification, specifically through the projection of Spanish ideologies of literacy onto Tagalog writing, in which we already see articulations of artifactual views of language. Irvine (2001) described how gender and family ideologies were used in the classification of African languages in the 19th century, languages being represented through metaphors of kinship and gender ('daughters,' 'mothers,' etc.), with racial overtones and with hierarchical stratigraphy as a result. Meeuwis (1999) provided an analysis of the way in which Belgian missionaries describing Congolese languages used an 'ideology of the natural' – a view in which languages needed to be established in, kept in, or restored to a 'natural' (God-given) state. This natural state, unsurprisingly, was the one then current in European state nationalisms: the Herderian 'one language–one culture–one territory' complex which defined people as intrinsically monolingual, their language as a '(pure) standard' and their territory as bounded and sociolinguistically homogeneous. These ideological templates provided much of the sociolinguistic imagination of colonial territories, and they were perpetuated in postcolonial language policies and theories of language planning (Blommaert, 1996; Errington, 2001).

The role of linguistics in nationalism has also been rather well documented. The reasons are similar to the ones given for the study of colonialism: the historical era of nation-state building projects offers a fertile basis for investigating the links that exist between particular types of linguistics and larger political-ideological projects. Theorists of nationalism such as Benedict Anderson and Ernest Gellner had already emphasized the importance of print capitalism as an instrument in such projects, but it is clear that more fundamental language-ideological processes were at work as well. Woolard (2004) found traces of early 'modern' imaginings of language as the cement of the nation in 16th-century Spanish treatises, and we have already seen how early Spanish colonizers projected an artifactual view of language onto Tagalog writing (Rafael, 1993). Bauman and Briggs (2003) emphasized the importance of linguistic works such as those of Herder and Grimm in the inception of new European nation-states, but again on a language-ideological basis acquired earlier in the works of Bacon and Locke. A vast area of research awaits attention here.

The role of linguists and other expert actors in 20th-century processes of nation building has drawn substantial attention (see the essays in Blommaert, 1999a; Parlenko and Blackledge, 2002). Bonfiglio (2002) provided a detailed analysis of how Midwestern accents became seen as 'standard' in the early 20th-century United States through the works of important codifiers of American English. Kuzar (2001) discussed the way in which Israeli linguists got inserted in different versions of Zionism, and how their positions in the specter of Zionism correlated their theoretical and methodological preferences; Jaffe (1999) gave detailed attention to the influence of linguists, writers, and translators in the construction of Corsican as a 'minority language.' And Blommaert (1999b) gave an account of the alignment of Tanzanian writers and linguists with the dominant socialist state ideology, leading to a local, strongly politicized form of linguistics and sociolinguistics.

Cultural Variability in Language Ideologies

The study of language ideology grew out of linguistic anthropology and shares the basic preoccupation in this tradition of investigating the nexus of language and culture. It does so by introducing another level of cultural structuring in language: the language-ideological, indexical metalinguistic level. This level drives the development of linguistic structure – the patterns of language change discussed earlier – and it organizes the social, political, and historical framing of language and language use. Consequently, it is a level of significant cultural variability, and some work has started addressing the different organizations of the indexical levels in languages. The outcomes of such work have often included a critique of existing

theory. I shall briefly review some examples of topics and work.

Particular attention has been given to a number of topics. There has been important innovative work on the conceptualization of space among Guugu Yimithirr (Guguyimidjir) and Tzotzil speakers, in which local ideologies of space and of the relationship between gesture and language appear to be influential (Haviland, 1993, 1998). Honorific structures and pronouns have been a topic of inquiry, both as a typical cultural-linguistic category of linguistic occurrences and as forms that display a high sensitivity towards social processes of stratification and categorization. Silverstein (e.g., 1979, 2003) gave frequent examples of pronouns and honorific language use; Errington (1988) was a major study of linguistic etiquette in Javanese; and Irvine (1998) compared honorifics in various African languages. All these authors concluded that linguistic ideologies – perceptions of referential adequacy and conventions of identification – are a factor in explaining the gradual shifts in the systems of honorifics. Such analyses lead to a powerful critique of, for example, politeness theory (as in Errington, 1998). Closely related to this are studies of ritual or ceremonial speech. Here, the performative nature of ritual is at issue, and authors investigate the connections between linguistic form (often formalized, genred speech), occasion, participants, and language ideologies. Hanks (1996) investigated the complex interplay of roles and addressees in Maya shaman prayers; Kroskrity (1998) described how the Kiva speech of the Arizona Tewa involved important language-ideological and identity features; Bauman (1996) inquired into the intricate dynamics of entextualization in Mexican religious ritual festival performances; and Robbins (2001) compared Melanesian and Western Christian ritual discourses in an attempt to arrive at a language-ideological model of ritual. More generally, the emergence and development of genres has also attracted some attention. Kulick (1992) gave detailed evidence of the way in which various genres contribute to the construction of identities in Papua New Guinea; Hill (1998) provided a vivid account of the discourse of nostalgia among Náhuatl speakers; Philips (2000) showed how courtroom discourse in Tonga iconically projects events onto society and the nation-state. Mertz (1998) discussed academic teaching in U.S. law schools as a form of metapragmatic regimentation; Spitulnik (1998a) and Urla (2001) both discussed radio broadcasting, Spitulnik in relation to the complexities of linguistic pluralism in Zambia, Urla in relation to the construction of a counterhegemonic Basque public sphere in Spain. All these authors addressed the way in which specific linguistic forms are deployed in order to attain the ideological effects, and code-switching often emerges as a powerful emblematic feature.

Another topic that has attracted attention is the dynamics of normativity in language. Silverstein's powerful paper (1996) focused on the rise of 'monoglot standard' in the United States; Agha (2003) addressed the development of Received Pronunciation in U.K. English. Errington (1998, 2000) offered perceptive remarks on the tension between the state language and local languages in Indonesia; Blommaert (1999b) described the convergence between state ideology and language practices in Tanzania; Swigart (2000) and Spitulnik (1998b) demonstrated how urban linguistic 'hybrids' such as Urban Wolof (Senegal) and Town Bemba (Zambia) are involved in processes of indexical reorienting towards a more central position in the local speech economies.

All the studies mentioned here contribute to the description of different kinds of relativity – indexical-functional relativity – and provide building blocks for comparative research in this expanding field. Meanwhile, several scholars have addressed phenomena occurring when different contextualization traditions meet, in intercultural communication and translation or in debates over linguistic rights and marginalization. A recent collection of papers in *American Anthropologist* (Mascia-Lees and Lees, 2003) brought the question of language rights into focus and argued convincingly that language rights take on a different shape when looked upon from the point of view of language ideologies (cf. also Silverstein, 1998). Haviland (2003) confronted the linguistic ideologies inscribed in U.S. courtroom practices with the complex process of indexical 'translation' that needs to be undertaken in order to adequately reconstruct the story of Mexican defendants; similar issues of indexical recentering were addressed by Blommaert (2001) in relation to the stories of African asylum seekers in Belgium.

Conceptions of language, coherence, and 'truth' appear to depend heavily on ideologically regimented forms of language use. The forms of regimentation used by, for example, bureaucracy can differ strongly from those used by lay people, even when in established parlance they share a language and live in the same country. This often has important effects of inequality, as Briggs's (1997) analysis of a Venezuelan court case illustrates. Evidently, wherever plurilingual regimes occur, linguistic resources from groups of people can be appropriated and deployed in processes of 'othering.' This happens with languages (Hill, 2001) as well as with accents and speech styles (Rampton, 2003). In the context of globalization processes resulting in heightened perceptual salience

for emblems of identity, such phenomena of indexical recentering within a stratified (unequal) regime may become the key object of theoretical and applied analysis.

Language Ideologies, Norms, and Social Dynamics

The ideological layer of language is a historical layer, as mentioned above, and the historicity of this layer provides for relatively stable trajectories and patterns of indexicality. This fundamental insight allows us to take a different look at 'norms' – an often invoked but rarely theorized linguistic and sociolinguistic notion, often presented as part of 'common knowledge,' 'competence,' or 'intuition,' and generally suggested to be a social convention that comes down on language structure and use.

One of the important contributions of the study of language ideologies is the insight that language always comes with an ideological load which provides comprehensibility through the dynamic of presupposability and inference of indexical meaning, but which also provides a sociopolitical layer of valuation on the utterances produced. Language use, in other words, is intrinsically normative, not in the sense that it always follows established rules, but in the sense that every act of communication will be subject to assessment on grounds of (often implicit) shared complexes of indexicalities – the complexes of indexicalities that provide the basis for speech communities. Norms are patterns of metapragmatic valuation that develop over time in the form of 'enregisterment,' the development of specific forms of language use that carry socially recognizable values and that invite and require continuous interactional re-enactment (Silverstein, 2003).

One way of conceptualizing these patterns of metapragmatic valuation is to start from the nonarbitrary, ordered nature of indexicality. Metapragmatic valuation has a systemic dimension, and by analogy with Foucault's 'orders of discourse' we could speak of 'orders of indexicalities': systemically reproduced indexicalities typically associated with particular genred shapes of language ('enregistered' forms of language use) (Silverstein, 1998, 2003, 2004; Agha, 2003; cf. also Briggs and Bauman, 1992). Whenever people communicate, they display orientations towards such orders of indexicalities, situating their (enregistered) language use in relation to 'norms,' and situating these norms in relation to other norms. Thus, there is always identity work involved, and the orientations towards orders of indexicality are the grassroots displays of 'groupness.' To give an example: young people communicate through orientations to peer group norms; in that way they reproduce the peer group and situate it *vis-à-vis* other peer groups and society at large, thus making the group recognizable both from the inside and from the outside – the particular peer group norms have a specific place in the orders of indexicality to which members orient (Rampton, 1995, 2003).

The systemically reproduced indexicalities are often tied to specific actors, which we can call 'centering institutions' (Silverstein, 1998: 404), often also 'central' actors reproducing the 'doxa' in a particular group. The centering function is **attributive**: it generates indexicalities to which others orient in order to be 'social,' i.e., to produce meanings that 'belong' somewhere and thus to produce categorizable identities. These attributions are emblematic: they revolve around the potential to articulate the perceived 'central values' of a group or system (the 'good' group member, the 'ideal' father/mother/child, 'God,' 'the country/nation,' 'the law,' the 'good' student, the 'ideal' intellectual, the 'real' man/woman...). And this centering almost always involves either perceptions or real processes of homogenization through contrast with other orders of indexicality: orienting towards such a center involves the real or perceived reduction of difference (adopting the enregistered form of language use) and thus the creation of recognizably 'normative' meaning. Centering is thus the semiotic shaping of specific contexts through the creation of contrasts with other contexts. It is the process that generates speech communities.

Centering actors occur at all levels of social life, ranging from the family, through small peer groups, more or less stable communities (e.g. university students, factory workers, members of a church), the state, and transnational communities, all the way to the world system. They are a central feature of what Anderson (1983) called 'imagined communities': though imagined, they trigger specific, enregistered forms of semiotic behaviors and generate groups. But it is worth underscoring that the social environment of almost any individual would by definition be **polycentric**, with a wide range of overlapping and crisscrossing centers to which orientations need to be made, and evidently with multiple 'belongings' for individuals (often understood as 'mixed' or 'hybrid' identities). Furthermore, such environments would be polycentric and **stratified**, in the sense that not every center has equal range, scope, and depth. Small peer groups are not equal to a church community or to the state, and while some centers are normative because of consent (e.g., peer groups), others generate normativity primarily through coercion (e.g., the labor environment or the state in various respects). Consequently, orders of indexicality are

obviously stratified and not all 'loads' have equal value.

Orders of indexicality provide us with a conceptual tool for capturing the moment-by-moment perceptions of stability in language use; they do not, however, suggest total stability or homogeneity because they are subject to permanent re-enactment in situated communicative practices. Agha (2003: 246) argues that, at the lowest level of social practice, norms get transferred through 'speech chains': concrete networks in which people switch communicative roles – from speaker to hearer and vice versa – and so produce a dynamics of communicability and presupposability of norms. Speech chains could be seen as emergent speech networks which display orientations to specific orders of indexicality, and whose communicative practice is the locus of language-ideological innovation. In this way, macrosocial processes can be brought down to the lowest microsociological level of practice.

See also: Anthropological Linguistics: Overview; Linguistic Anthropology.

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Language in Computer-Mediated Communication

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Before computers were networked, the terms 'language' and 'computer' only occurred together in describing programming code. In recent years, however, the Internet and related technologies have become popular and pervasive media for human communication. Since the late 1970s (e.g., Hiltz and Turoff, 1978), questions of how human language is used in these media have become important concerns for linguists, communication scholars, sociologists, and researchers from other disciplines. This article begins by describing the primary forms of computer-mediated communication (CMC), as well as the characteristics that differentiate these media from one another. It then addresses the primary issues that have dominated the discussions of computer-mediated language. A brief caveat is in order. The Internet changes so rapidly that the forms of CMC available, and the ways in they are used and by whom, evolve more quickly than print forms such as this article can accommodate. By the time this article reaches its readers, new forms may well have emerged.

Characteristics of Computer Language Media

In the simplest sense, CMC can be distinguished on the basis of whether it occurs in real-time (synchronous CMC) or whether there is a time delay between messages (asynchronous CMC). With synchronous forms, participants type messages that appear on others' screens as soon as they are sent. Readers reply instantly, leading to a rapid exchange of brief messages. Chat rooms, where multiple people gather on the basis of shared interests, are one form of synchronous CMC, as is instant messaging, which usually occurs between two people. Synchronous CMC is also found in richly visual graphical online games (including multi-player role-playing games in which people play together to achieve goals such as gaining treasure or slaying mythical monsters) and as an accompaniment to online versions of traditional games such as poker, dominoes, and backgammon. Multi-user domains, or MUDS, are textual online 'spaces' designed for functions as varied as role-playing, generalized socializing, and education. Like other synchronous forms of CMC, users of a MUD interact in real time if they are online simultaneously and are in the same 'room' or area of virtual space.

The most popular forms of CMC are asynchronous. Email, the electronic equivalent of letters, may be person-to-person, or may be group communication organized through mailing lists based on interest, family, friendship, work, or other ties. Websites are also asynchronous, with static information posted for readers. On weblogs (or 'blogs'), a writer or collective of writers posts comments on a daily or even hourly basis. Readers can often engage in discussion of those comments through hyperlinked sections that appear as second pages. Webboards, bulletin boards, and newsgroups are asynchronous forms of topical discussion in which large groups of users may gather on their own time to read and leave messages. Though the distinction based on synchronicity is common, in practice the lines between the two may blur. If people are online simultaneously and checking often, email can function in a near synchronous manner. Short message services (SMS), also known as text messaging, send very brief messages through mobile phones in exchanges that can happen quickly enough to be considered synchronous or with enough lag between turns to render them asynchronous.

Computer-mediated language can also be characterized by a set of other features that can influence interaction. These characteristics have also proven helpful for thinking about how forms of CMC differ from one another and how they compare to other forms of language use such as face-to-face communication (the usual standard for comparison in CMC research), telephone calls, and traditional letters (see the discussion of oral and written language below). In contrast to most other media forms, CMC can be either one-to-one or one-to-many. Email, instant messaging, and SMS are usually directed at single users, while mailing lists, chat rooms, and discussion boards are usually written for a broad and often semi-anonymous audience. The ability for each Internet user to communicate one-to-many is an unprecedented transformation in the landscape of communication media, which have historically limited this capacity to a small number of influential mass media producers.

Forms of computer-mediated language media also vary in the degree of interactivity, or ability to respond to messages, that they offer. Email and instant messaging are highly interactive, as messages are generally meant to invoke responses (one-to-many email as occurs on mailing lists and with spam is an exception). Websites, on the other hand, may not offer any means for readers to respond to their contents. A single form, such as the weblog, may vary in the degree of interactivity it offers depending on whether the author includes the means for readers to leave comments or reply to those comments that are left.

In strong contrast to face-to-face interaction and to a lesser extent the telephone, computer-mediated language media seem to transcend space. There are many locations where Internet access is difficult or impossible, which affects which languages are common online (more on this below). However, so long as people are online, messages exchanged across continents are indistinguishable from those sent between rooms in the same building, both in form and speed of transmission. This can create a sense of being close to one another. Since sending messages via computer is generally less expensive than using long distance telephone (let alone travel), computer mediation can greatly increase the opportunities people have to use language with those far away.

By virtue of being electronic, computer-mediated language can be stored and replicated. Although forms of CMC vary in how ephemeral they may feel, most, if not all, are replicated as they are transmitted and stored on servers and backups. Most forms of CMC can be copied and sent on to others. Even messages sent person-to-person can be retrieved and replicated for other individuals or large audiences. This was the case when all email sent at the failed corporation Enron was posted to the World Wide Web as part of court proceedings. Chat and instant messaging seem to pass as soon as they occur, yet they can be logged. However, despite the inherent replicability and storage potential of computer-mediated language, storing and archiving examples of online language use has proven to be a difficult logistical challenge that has become a source of particular concern for librarians and information scientists. Computer-mediated language sites that are present one day may be gone or transformed the next.

Some forms of online language are more hypertextual than others. In hypertextual CMC, exemplified by websites, particular words or phrases on one page are linked to other pages with more information. Clicking on the hyperlink allows users to follow up on those bits that interest them most. In contrast to more linear forms of CMC such as chat, gaming, and instant messaging, in hypertextual CMC, information is connected through multiple possible relationships, giving readers the choice of what to pursue and allowing different readers of the same text potentially very different reading experiences. Email, which was once linear, has become more hypertextual as the ability to embed clickable links within messages has become common.

Finally, CMC media differ in richness (Daft and Lengel, 1984), or the extent to which nonverbal cues are apparent. In its early days, all forms of CMC were extremely lean, as all messages were restricted to the same monochrome font in the limited ASCII character set. The ability to format messages by varying fonts and colors and embedding images and sounds has made many forms of CMC, especially websites and graphic interfaces, richer. When CMC is lean, as it often is in more text-based forms, the reduction of physical appearance cues, along with the evidence of status and attractiveness they bear, can create a kind of invisibility or anonymity. Leanness also positions language as the sole means of creating social context among interactants.

With this background, the article now turns to key issues that have dominated the research on computer-mediated language. These include the primacy of English versus other languages, comparisons between CMC and speech and writing, online playfulness, hostility, and the influence of gender on online language use. The essay concludes with a consideration of the influence online language use is likely to have on offline language.

Languages Used in Computer-Mediated Communication

Measuring the use of any particular language in online communication is challenging given the variety of forms of CMC and their varying accessibility. Efforts to ascertain language use have usually estimated the proportion of Internet users who speak a given language. English emerges as the most-used language on computer networks, although the proportion of English speakers relative to those who speak other languages on the Internet has fallen considerably since the late 1990s. The business Translate to Success has compiled data from varied surveys of Internet users to estimate that in 2004, 38.3% of Internet users spoke English. Chinese, Japanese, and Korean are also popular, constituting 11.2%, 10%, and 4.1%, respectively. The most common European languages are German (6.8%), Spanish (5.5%), Italian (3.9%), French (3.5%), Portuguese (3.1%), Russian (3%), and Dutch (2%). Only 1% of the world's Internet users speak Arabic. Fewer than 0.1% speak any African language. An effort to conduct a language census of weblogs (blogcensus.net) has resulted in the indexing of over two million blogs. More than half of these are in English, followed in dramatically smaller numbers by those in French, Portuguese, and Farsi (each of which occurred in between 10 000 and 90 000 blogs). Polish, German, Spanish, and Italian are the only other languages found in more than 10 000 blogs each.

That language use on the Internet maps so poorly onto language use in the global population reflects the wealth required to incorporate computer-technology into a populace, as well as historical and governmental constraints on the implementation of the

technology in given cultures. Furthermore, in some nations, such as India, English may be the language used to access the Internet, even if it is not the primary language spoken by the majority of its citizens. The overrepresentation of languages used in wealthy countries, especially English, has often given rise to a sentiment that the Internet represents a further colonization of poor nations by those with greater wealth, particularly the United States.

The use of a given language on the Internet is also affected by the technology itself. Until recently, online writing was restricted to the ASCII character set, which is designed exclusively for the Latin alphabet. With the advent of Unicode, people can now write with other alphabets; however, this technology is neither available to nor used by all. The result has sometimes been considered a form of "typographical imperialism" (Herring and Danet, 2004) with potential social, political, economic, and linguistic consequences. For instance, Greece has seen recent controversy surrounding what is called Greeklish, an online version of written Greek in which the Latin alphabet is used to transliterate (Koutsogiannis and Mitsihopoulou, 2004). While some Greeks, particularly the young, view this as a means of participating in the global discourse of the Internet, others view it as a threat to the integrity and history of the Greek language.

Writing, Speaking, and Hybridity

Scholars striving to describe the linguistics of CMC have often done so by comparing online interaction to face-to-face communication and writing. Although in earlier work, the comparison presupposed an erroneous assumption that all computer-mediated language was the same, other scholars have limited their comparisons to particular forms of CMC. Biber (1986), Chafe (1982), and Mulkay (1985, 1986) are among those who have compared oral and written language. In general, scholars examining diverse forms of CMC in a number of languages (particularly English, French, Swedish, and Norwegian) have found that CMC resembles both written language and oral conversation (Baron, 2000; Baron and Ling, 2003; Baym, 1996; Danet, 1997; Ferrera *et al.*, 1991; Hård af Segerstad, 2005; Herring, 2001; Ling, 2005). CMC is like writing in many ways. The text usually bears an address. Messages can be edited prior to transmission. The author and reader are usually geographically (and often temporally) separated, messages can often be read by anonymous readers who may not respond. It is not possible for interlocutors to overlap one another nor to interrupt. Context must be created through the prose so that messages are often explicit and complete. There is rarely an assumption of shared physical context. Messages are replicable and can be stored. Vocabulary, syntax, spelling, and the use of uncontracted forms may make online interaction more like writing than speech.

On the other hand, there are many ways in which online language better resembles speech. Messages are generally related to prior ones, often through turn-taking, although disrupted turn adjacency and lack of feedback can render turn-taking challenging (Herring, 2001). Messages are based in a relationship between writer and reader. There is often a history of shared referents and speech conventions (e.g., Hymes, 1986). The audience is usually able to respond and often does so quickly, resulting in reformulations of original messages. Topics change rapidly. The discourse often feels ephemeral, and often is not stored by recipients despite the capacity for storage. Furthermore, online language can be marked by colloquial and nonstandard spellings that foreground phonetic qualities (e.g., 'gotta' instead of 'have to').

Ultimately, many scholars conclude that online language is an "interactive written register" (Ferrera *et al.*, 1991), hybrid (Danet, 1997), creole (Baron, 1998), or "uncooked linguistic stew" (Baron and Ling, 2003) that blends elements of written and oral language with features that are distinctive to this medium, or at least more common online than in any other language medium. Among the most commented upon features of online writing are the use of abbreviation (e.g., TTYL for 'talk to you later'), the use of asterisks as brackets to simulate underlines, and upper case lettering to indicate emphasis. A number of deletions have also been noted, including the deletion of subject pronouns (e.g., 'gotta go now'), vowels, and punctuation. In SMS, spaces may be deleted as well, and there may not be any adjectives or adverbs (Hård af Segerstad, 2005; Ling, 2005). Messages in instant messaging, chat, and SMS are considerably shorter than those in conversation, writing, or most other forms of CMC, and in some synchronous forms of CMC such as IM, utterances may be broken up across turns.

In addition to the variety of forms of CMC, the task of identifying distinguishing characteristics of CMC is further complicated by the fact that there are so many other factors that influence language use in any medium (Baron and Ling, 2003; Baym, 1995a; Herring, 2001). As Basso (1974) has noted, written language always depends on its cultural and social contexts, functions, and the relationship between writer and reader. Each of these factors is at play in determining the linguistic form of any single instance

of computer-mediated language use. Furthermore, individuals have distinct personal styles. As seen below, gender also influences language style.

In group CMC contexts where many people hold discussion over long periods of time, group norms develop that influence language use. These may include distinctive words, such as 'whuggle,' a form of greeting documented by Cherny (1999) or 're,' a short form of 'hello again' used to greet for a second time in an Internet Relay Chat channel (Werry, 1996). In some cases, groups develop entire genres of language use distinctive or tailored to their forum, such as humorous lists of 'unasked questions' in a soap opera discussion (Baym, 1995b). Stylistic standards of formality and politeness also emerge over time within particular groups.

Playfulness in Computer-Mediated Language

Some of the distinctive linguistic features found in CMC can be attributed to a desire to save keystrokes, especially features such as deletions in synchronous interaction. However, many of the phenomena that occur in online language are better described as playful than time-saving. A number of scholars, most notably Danet (2001), have noted the playfulness of CMC. Danet (2001) argues that the play found on CMC, especially in synchronous CMC, can be traced to several influences. Interactivity and instant feedback can lead to a sense of immersion that may facilitate play. The lack of clear authorities and formal governing structure of online spaces can promote playfulness. The legacy of hacker culture with its love of wordplay, puns, irony, flippancy, and play with typography and spelling is also an influence as hackers were early adaptors of the Internet. Finally, the anonymity of many online spaces can be conducive to play since the enhanced role of language in creating an identity offers participants greater latitude than normal in presenting a self. For instance, many forms of online interaction require as a starting point that interactants choose a nickname or screen name by which they will be known.

Other reasons for the playfulness of CMC may be a desire for spontaneity or to increase the socioemotional appeal of messages in this nonverbally impoverished medium. Many of the 'errors' that make online interaction more like speech than writing can be understood as efforts to create a friendly, informal, conversational tone, which in turn gives rise to further playfulness. Following Bauman (1975), Baym (1995b) argues that online language often serves as a mode of performance that strives to entertain, to enhance the appeal of the discourse, to build identities for the performers, and to foster friendly relationships among interactants.

Among the most common forms of linguistic play in CMC are the aforementioned acronyms. Often-used acronyms including BTW (by the way), IMHO (in my humble opinion), and many others are compiled into online dictionaries posted on the Web. In particular, CMC contexts, people often develop unique playful acronyms such as PVGD, used in a soap opera discussion group to explain why the children in the fictional town of Pine Valley aged so rapidly (the GD stands for 'glandular disorder'), or YMMV for 'your mileage may vary' offered when sharing personal experience in an online discussion group for pregnant women. Creative acronyms may be used to substitute for nonverbal expressions, as in LOL for 'laughing out loud.' Language play can also be seen in the development of new words in online contexts. Spam (unwanted barrages of messages), flaming (hostility), and blogging (writing online diaries) are examples of such words that have made it out of the Internet into wider discourse. Many have noted how common humor is in online contexts (e.g., Baym, 1995b; Myers, 1987).

Online Hostility

In contrast to theories that CMC fosters a playful affiliative environment, there has long been speculation that because of its potential anonymity, or reduction of nonverbal cues, CMC would foster the use of more hostile language, or flaming. Early research (e.g., Kiesler *et al.*, 1984) argued that because the computer medium is lean, it creates an environment in which norms are suspended. As a consequence, there would be more swearing, insults, name calling, and expression of negative affect. This (error-filled) comment from a group discussion of the television show *Star Trek*, is a typical flame: "Will you stupid jerks get a real life. Everyone with half a brain or more know that a human and a Kligon can not mate. The Klingon mating procedure would kill any human (except one with a brain like you). Stay off the net stoopid!" In group interactions, such messages usually lead to what has become known as a flame war. Such flame wars follow a fairly predictable pattern in which the original flame is followed by an equally hostile retort. The hostilities escalate, drawing in more participants. Other participants then chime in urging the original participants to move the discussion off-list or to ignore the hostilities. Eventually people lose interest and the discussion dies out. Many sources on the Internet can be found describing this pattern and offering 'netiquette' tips to

prevent flame wars. Flaming is also concern in person-to-person interactions online. Fearing flaming, some organizations now require that some forms of communication, such as evaluations and reprimands, be conducted face-to-face rather than online in order to prevent inappropriate hostility.

One explanation of flaming is the reduced "social presence" (Short *et al.*, 1976) of other interactants given the leanness of the computer medium. Other scholars (Lea *et al.*, 1992) have argued that flaming cannot be explained by the medium alone, since the amount of hostility varies tremendously across online contexts. They argue instead for a normative explanation, in which some groups create contexts that encourage more argumentative styles. Flaming has also been linked to masculinity, or "the chest-thumping display of online egos" (Myers, 1987: 241).

Despite the common sense that flaming is rampant in CMC, research suggests that it is perceived as more common than it actually is. Rice and Love (1987) found in their study of an organization's computer-mediated messages that although socioemotional expression was common, only 0.2% of the messages were antagonistic. Lea *et al.* (1992) theorize that flaming may seem more common than it is because single messages may be seen by so many people and because hostile messages are so memorable. In fact, people are considerably more likely to be nice than to flame in online contexts (e.g., Preece and Ghozati, 1998).

Gender

The speculation that flaming is associated with gender is indicative of a strong focus on gender that has characterized much of the linguistic work on CMC. Early CMC rhetoric often suggested that the elimination of the nonverbal cues to gender would result in the elimination of gender from language use, with optimistic consequences ranging from women's voices being granted more status to the elimination of gender as a meaningful cultural category. In some online contexts, gender becomes a subject for linguistic play. One much-studied MUD, Lambda MOO, offers participants nine gender options for their identity, each with its own set of pronouns (Danet, 2001). In addition to male, female, and neuter, people can choose to identify as: either, Spivak, splat, plural, egotistical, royal, or 2nd person. Third person descriptions of each of these options would be he, she, it, s/he, E, e*, they, I, we, you, and per, respectively.

However, research has consistently investigated whether the differences often noted in face-to-face conversation persist in CMC and whether gender can be identified from language style. Empirical findings are mixed, but do suggest modest gender differences. In discourse analytic studies of asynchronous discussions, Herring (2001) argues that men use an adversarial style, and women a supportive/attenuated style oriented toward affiliation. Although there is more overlap than difference in the messages written by men and women, Herring asserts that at the extremes, longer messages, strong assertions of opinions, and crude language are more likely to be written by men. One MUD described by Kendall (2002) describes the aggressive style of answering questions seen often within the group as MAS for 'Male Answer Syndrome.' Men are also more likely to open and close conversations. Sexist language has also been found in CMC (e.g., Gurak, 1997). Kendall (2002), for instance, describes how women outside the group are depicted as sexual objects. When someone mentions seeing a woman, for instance, a typical response is "did you spike 'er?" (Kendall, 2002: 85).

Messages written by women are more likely to be short and to include qualifications, justifications, apologies, and expressions of support (Herring, 2001). Evidence for a female affiliative style can also be seen in the finding that women's IM closings take twice as many turns and are nearly three times as long as male closings. Women are also nearly three times more likely to begin SMS interactions with openings (Baron and Ling, 2003).

However, while Savicki *et al.* (1997) found that groups in which there were more men used more factually oriented language and calls for action, less self-disclosure, and fewer attempts at tension prevention and reduction, they did not find any gender differences in expressions of opinion, apology, questions, or even flaming. Ling (2005) finds that women's SMS messages are longer, exhibit more complex structure, and are more like writing than men's. In their statistical analysis, Savicki *et al.* (1997) report that gender had only modest explanatory power in differentiating the language style of messages.

Gender is a factor not just in message style, but also in perception of message style, with impacts on response (or nonresponse) to those messages. Herring (1996) argues that men and women differ in their perception of aggressive messages. While men are more likely to see them as evidence of freedom of speech, candor, and healthy debate, women are more likely to see them as hostile and unconstructive.

The Effect of Computer-Mediated Language on Offline Language Use

CMC offers a hybrid, playful, and occasionally confrontational style of language that closely resembles language in other media, yet has some distinguishing

characteristics. As is often the case when new language forms emerge, some develop concern that standard language is under threat. Newspaper articles have worried, for instance, that the brief exchanges of instant messaging will lead to an inability to conduct face-to-face conversations or that nonstandard spelling and punctuation will decimate grammar as we know it. Although there have been few if any studies directly addressing this phenomenon, the evidence from studies of computer-mediated language do not offer strong reasons for concern. CMC has been shown to have depended on a variety of influences, including the technology, the purpose of the interaction, the norms of the group, the communication style of the speakers' social groups offline, and the idiosyncrasies of individuals. There is no consistent standardized 'Computer Mediated Language.'

Baron and Ling's (2003) analysis suggests there are actually far fewer such deviations from standard language forms than people would expect given the attention they are paid. Furthermore, only a few of the nonstandard features of language that do occur in CMC are due to inattention or lack of awareness of standards (Herring, 2001). Most are instead deliberate choices made as language users adapt to the technical and social contexts of their interactions. The evidence thus suggests that people are aware that different situations call for different language styles, and are unlikely to lose the ability to hold face-to-face conversations, spell, or use punctuation as a result of time spent online.

See also: E-mail, Internet, Chatroom Talk: Pragmatics; Computer-Mediated Communication: Cognitive Science Approach.

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Language in the Nondominant Hemisphere

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It is generally accepted that the right hemisphere makes significant contributions to language. Despite difficulties in research methodologies and interpretation of findings, particularly in regard to subject selection and population matching, viewed collectively the research findings from studies of both normal and brain-damaged populations provide a broad, but definitive, picture of the right hemisphere's contribution to language. In contrast to that of the left hemisphere, which is responsible for what is classically considered the linguistic attributes of language (the grammar, lexical semantics, and syntax), the right hemisphere's contributions to language are less constrained but "typically layered on top of the foundation provided by the left hemisphere" (Brownell, 2000). The right hemisphere makes significant contributions in the areas of prosody, the paralinguistic feature of a language commonly known as the 'melody' of speech; semantics; nuance and nonliteral language (abstract meanings); and discourse – in other words, those aspects of language linked to successful, interactive communication. After a brief discussion of the nature and history of the research, this article provides a broad overview of the language contributions of the right hemisphere to language, with particular emphasis on prosody, lexical semantics, and discourse. Finally, some comments regarding 'commonality' and directions for further research are presented.

History of Research and Comments

Early Research Thoughts and Shift in Direction

A review of the language contributions of the right hemisphere would not be complete without historical note of the early research in brain and language that focused primarily on the left hemisphere and its specialization and dominance for language.

The framework for early research was defined largely by Paul Broca (1865), who declared the left hemisphere (LH) dominant for language based on his research with brain-damaged patients who experienced aphasia secondary to lesions in the left frontal lobe. Driven by this assertion of LH dominance for language, the quest to define language abilities neurolinguistically essentially became a 'left hemisphere task.' As a result, early research focused on localization of specific function within the dominant LH. The primary means of investigating dominance and localization of function was through clinical observations that compared differences in language disturbances between patients with extensive left and right hemisphere damage. Observations consistently indicated that patients with left hemisphere damage (LHD) presented obvious language deficits that were not observed in patients with similarly extensive right hemisphere damage (RHD). Despite this 'left bias,'

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the RH's capabilities in the area of language did not go unnoticed. For example, Karl Wernicke (1874) suggested that the right, or nondominant, hemisphere made contributions to language. He based his speculations on the recovery of language functions in the presence of LH damage, proposing that the undamaged RH was responsible for assuming the recovered language functions. Unfortunately, since the clinical observations that dominated the research did not support theories of RH involvement, research with brain-damaged populations continued to focus on language as the domain of the LH. Then, in the 1960s, the so-called 'silent' RH began to receive attention when commissurotomies allowed the two hemispheres to be studied independently. Although much of the focus of this early 'split brain' research was in the area of visual perception, attention was focused on suggestions regarding the 'isolated' RH's ability to decode simple linguistic forms in the absence of interhemispheric communication (LH input) via the corpus callosum. In addition, at approximately the same time, a study involving RHD patients conducted by Eisenson (1962) suggested RH involvement in language processing. Eisenson evaluated the recognition vocabulary and sentence processing of grammatical correctness in 65 RHD patients. Based on his subjects' performance on these tasks, Eisenson argued that RHD damaged patients were deficient in both vocabulary and sentence processing. Although the research model and procedures of this study were viewed by some as flawed, these results, along with those of the split brain studies, supported previously held theoretical assumptions and served to initiate serious research interest regarding the language contributions of the RH.

In the early 1970s, interest in the language contributions of the nondominant or right hemisphere increased dramatically. Researchers working with brain-damaged populations began to explore the nature of the RH contribution to language. The introduction of noninvasive laterality techniques (dichotic listening and visual tachistoscopy) that allowed investigators to study the contributions of each hemisphere to a variety of tasks in nonbrain-damaged populations added another dimension to the study of RH language. Occurring at approximately the same time was a new focus on language and communication within a pragmatic context and an increase in the understanding of brain–behavior relationships throughout development. Both the increased knowledge regarding development and an additional framework for studying language were also critical to the growing research interest in RH language functions. Finally, research in cognitive neurosciences pointed to apparent processing differences in the left and right hemispheres that held implications for hemispheric differences in language. Functional dichotomies (left brain–right brain), also known as 'learning styles,' were established to depict the specialized processing styles of each hemisphere. The left, or verbal, hemisphere was believed to process highly structured information in a logical, step-by-step, analytical manner using verbal symbols such as words. In contrast, the right, visual or nonverbal, hemisphere processed information in a holistic, visual spatial manner using pictures and images rather than words. Evaluating hemispheric contributions to language in terms of each hemisphere's dominant processing style strengthened arguments for a RH contribution in various language tasks associated with a particular processing style (e.g., holistic and comprehension of main idea) and added another framework for the research – one defined by processing styles.

Critical Evaluation

The research that followed the interest generated in the 1970s utilized both the methodologies and the techniques critical to our understanding of LH language functioning (the presence of damage to one or both of the hemispheres) as well as newly developed methodologies and laterality techniques (e.g., dichotic listening) that enabled the study of hemispheric specialization of language abilities in normal populations. In addition, research questions expanded as RH language contributions were studied within the frameworks of cognitive processing styles and pragmatics. The result was the development of a rich body of evidence from widely diverse populations using a number of different methods of study. This evidence not only confirmed that the RH made significant contributions to language but also shed light on the nature of the contributions.

Although the resulting 'picture' of RH language capability and contribution is generally accepted, inconsistencies in results and interpretations frequently occur. Much of this can be explained by virtue of the complex nature of the subject of study and the diverse experimental designs and varying theoretical models employed. However, despite numerous arguments pro and con regarding the 'best' method of study or population (clinical observation vs. laterality techniques; HD vs. normal or adult vs. child), it is important to remember that each study must be evaluated critically due to problems inherent in brain behavior research. For example, studies of brain-damaged populations are generally, and correctly, considered to provide the most definitive information regarding hemispheric specialization and contribution to language. However, the RH contributions to

language are defined in terms of that performance resulting from damage to either the LH or the RH. The resulting language sequelae are assumed to allow one to infer and assign RH capabilities based on the presence or absence of language behavior relative to hemispheric damage. Care to define and match the populations becomes a difficult and critical issue, particularly since localization of damage is not necessarily a consistent, stable predictor of actual performance, except, perhaps, in the case of developmental hemispherectomy (Dennis and Whitaker, 1977). Studies of RH language involving normal, non-brain-damaged populations have generally relied on laterality techniques such as dichotic listening, tachistoscopic visual presentations, sodium amytal (Wada test), regional blood flow, and, recently, sophisticated neuroimaging. These methods also deserve critical scrutiny when interpreting results. In normal, nonbrain-damaged populations, no matter what the investigative technique, it is difficult, if not impossible, to completely isolate the left and right cerebral hemispheres due to the input received via the corpus callosum. In addition, there is also strong evidence of involvement of subcortical structures in processing language, which further complicates the 'isolation' of one hemisphere from the other. Finally, a limited number of studies have examined the RH contributions to language in children diagnosed with nonverbal learning disabilities. The nonverbal learning disability (NLD) is defined primarily by significant gaps in verbal and nonverbal intellectual abilities or intelligence quotients on the Wechsler Intelligence Scale for Children, with nonverbal performance abilities (consisting of tasks primarily mediated by the RH) significantly lower than verbal abilities (tasks primarily mediated by the LH) (Rourke, 1989). These studies usually approach the task of assigning language attributes from a 'learning styles' model that tends to address the language issues in a less specific manner than does the body of research with brain-damaged populations. However, the RH language profile in the presence of NLD is strikingly similar to that found in more 'classical' methods of investigation. The difficulties in interpretation with such an approach are obvious, as are those encountered when comparing adult and child populations, a developed versus a developing language system.

In summary, despite the need for prudence regarding interpretations of research methodologies and findings, the conclusions drawn from the vast majority of studies of brain language relationships not only support the notion of the RH contribution to language but also are remarkably consistent in identifying the salient features of the contribution and the disrupted functions that arise in the presence of RH damage or related cognitive disabilities.

Right Hemisphere Language Contributions

A compilation of the data regarding language capabilities of the RH reveals a remarkably diverse range of contributions in the areas of reading comprehension; auditory comprehension; prosodic comprehension and expression; lexical semantics; the comprehension of abstract or nonliteral meanings such as metaphor, proverbs, and figurative language; the comprehension of main ideas; and the comprehension and organization of narratives and the rules of discourse. Simply considered, disruption of input from the RH produces deficits that mirror the contributions. For example, some RHD patients may present as overly literal, rambling, too focused on detail, and unable to 'make a point' (lack of main idea).

The contributions of the RH, whether defined in terms of their absence (language deficits) or performance, are evidenced across each of the four modalities of language, speaking, listening, reading, and writing. The specific contribution is made as a primarily expressive language function, a primarily receptive language function, or a contribution that has equitable dual representation in the comprehension and production of language. The impact on communicative competence varies with the degree of RHD or, in the case of NLD, the collective absence of RH language contributions in conjunction with nonverbal cognitive deficits. Consequently, the level of disruption of communicative functioning has a broad range, from subtle deficits with minor impacts on communication and learning to profound deficits such as the so-called 'language without communication' seen in Asperger's syndrome or deep dyslexia.

Prosody

Prosody, the melodic line of speech produced by variations in fundamental frequency, intensity (loudness), and duration (length), provides meaning through paralinguistic cues and serves as an organizational framework for language that also plays a major role in the language acquisition process. Within investigative models, prosodic contributions to language meaning are delineated into four distinct types based on the paralinguistic meaning conveyed: (1) linguistic or intrinsic prosody, which signals questions, statements, etc., or distinguishes meanings of words and phrases ('yellow jacket' meaning a bee

or an article of clothing); (2) affective or emotional prosody, which signals anger, pleasure, or other emotional states; (3) intellectual prosody, which signals nuances such as sarcasm; and (4) inarticulate prosody, which signals agreement through the use of 'intellectual grunts' such as 'uh huh' (Monrad-Krohn, 1947). The majority of the research in hemispheric participation in the processing of prosody has focused primarily on the first two types of prosody, linguistic and affective prosody. In general, the results of numerous studies on brain-damaged populations indicate a role for the RH in the production and comprehension of both linguistic and affective prosody, with the most marked disturbances occurring in affective prosody.

Studies of Affective Prosody

The majority of the investigations of affective prosody indicate a RH dominance for the production and comprehension of affective prosody in brain-damaged populations (Benowitz *et al.*, 1983; Code, 1987). In addition, a few studies involving the processing of affective prosody by normal subjects using dichotic listening paradigms offer further support for the RH's prosodic language capabilities because results support RH participation in processing affective prosody (e.g., Herrero and Hillix, 1990). From this evidence and that of other similar studies, a profile of affective prosodic disturbances emerges. In the presence of RHD, production or the ability to convey emotional prosody can be characterized as flat or monotonous with obvious timing disturbances, expressed as 'abnormally uniform' pauses. In contrast, the comprehension deficits of affective prosodic disturbances are expressed by both normal subjects and those with RHD as difficulty in perceiving pitch changes and a "reduced ability to discriminate and identify mood in neutral sentences and sentences with incongruent meaning and prosodic contour" (Meyers, 1999, p. 82).

Although there is strong evidence of a RH dominance for affective prosody, the level of involvement and specific nature of the contribution of the RH in the production and processing of linguistic prosody are less definitive. The results of research involving processing and production of linguistic prosody by normal subjects and RHD patients are somewhat less consistent, with a few studies suggesting bilateral involvement in processing linguistic prosody or a RH dominance for affective prosody only. The inconsistent findings and sometimes conflicting results may be due, in part, to the multiple parameters involved in conveying linguistic information through prosody – the use of tone, stress, duration, and intonation – to communicate linguistic information (Hird and Kirsner, 1993). For example, in a study involving contrastive stress, a type of linguistic prosody, (Weintraub *et al.*, 1981) found that RHD subjects performed more poorly than controls on tasks involving the production and perception of this measure of 'nonemotional' prosody. In contrast, results from studies that evaluated linguistic prosody within the parameter of pitch or tone signaling linguistic meaning at the lexical level failed to find evidence to support RH involvement. Regarding the inconsistencies, the results often appear to vary with respect to the parameter of linguistic prosody being evaluated. The exception appears to be the parameter of intonation, which seems to offer consistent evidence of RH participation (Grant and Dingwall, 1984).

Despite the inconsistencies mentioned previously, a number of studies on RHD patients have offered clear evidence of RH participation in processing linguistic prosody, with both expressive and receptive deficits occurring in the presence of damage. From these studies, a profile of prosodic deficits occurring in RHD likewise emerges. For RHD patients, deficits in the production of linguistic prosody are expressed as a difficulty modulating pitch and limited use of word stress to signal meaning in sentences. Similarly, the comprehension deficits also involve stress and pitch and difficulty discerning meaning at both the word and the sentence level based on stress patterns, difficulty discerning sentence type from prosodic contour (Weintraub *et al.*, 1981), and an insensitivity of prosodic cues (Baum and Dwivedi, 2003).

Lexical Semantics

The body of research in the area of semantics and RH processing and production is smaller and less definitive than that involving prosody. Part of the reason is due to the general difficulties encountered in studying the linguistic system of language, which determines meaning and encompasses the relationships between language, thought, and behavior. Accordingly, research findings of this complex language behavior tend to be best understood when processing and production are considered 'holistically' as dependent functions, not easily separated into production–comprehension dichotomies. At best, findings in semantic production tasks (e.g., naming and word retrieval) are inconsistent and appear to be highly task dependent, suggesting that the 'production' deficits may not be a primary deficit but, rather, one secondary to comprehension (processing) deficits (Gainotti *et al.*, 1983).

Investigations of semantic processing on both normal and brain-damaged populations indicate

qualitative differences between the two hemispheres in connotative and denotative semantic associations (Zaidel, 1985). In general, the RH appears sensitive to connotative associations – those associations that are remote and implicit and persist over time and adept at maintaining multiple meanings (Beeman, 1998). The RH is involved in semantic tasks that entail wide-ranging response sets, which include nondominant, less familiar, connotative meanings and words related by category rather than associative function (Chiarello *et al.*, 1990). In addition, a number of investigations suggest that the RH semantic processing occurs at multiple levels, and that the level of RH involvement is specific to the type of semantic information being processed and the level of association (e.g., concrete vs. abstract nouns; literal or close vs. 'loose' or distant associations) (Beeman, 1998; Seger *et al.*, 2000). Finally, in addition to semantic contributions at the word level, there is evidence of RH involvement in lexical semantics at the phrase and sentence level of interpretation in metaphor (Van Lancker and Kempler, 1987) and in nuance (Rodel *et al.*, 1992), semantic tasks that rely on 'distant' meaning relationships and the ability to resolve lexical ambiguity.

Individuals with RHD tend to be overly literal and fail to recognize 'shades' of differences in meaning at the word level (Brownell *et al.*, 1984). There is further evidence indicating that the RHD patients' tendency toward 'literalness' has disrupted semantic relationships (Chiarello and Church, 1986) and semantic processes in lexical judgment tasks involving single word semantic similarity. RHD subjects do not seem to have difficulty in comprehending the dominant meanings of single words (a LH function); however, divergent processing tasks that demand sensitivity to relationships and broad meanings present considerable difficulty relative to the degree of semantic overlap (Beeman, 1998; Brownell *et al.*, 1984; Chiarello *et al.*, 1990). Considered collectively, studies of lexical semantics in RHD subjects indicate a lack of semantic organizing principles that are critical in lexical semantic processing and performance.

Discourse and Pragmatics

RH deficits compromise complex language functions in a nonspecific manner that belies simple explanations (McDonald, 2000). This statement, although relevant to the study of language in general, is particularly true when one attempts to clarify issues regarding the RH and discourse and pragmatics. The two terms generally overlap but convey slightly different meanings depending on the author describing the terms. For the purposes of this article and in an effort to add clarity, discourse will be considered as a pragmatic function specifically concerned with cohesion and coherence (integrating meaning) and deriving the general idea from the whole message through complex and abstract linguistic interpretation. Thus defined, discourse is not limited to conversation but has various other forms – procedural, narrative, and expository (Hough and Pierce, 1993). Also, as in semantics, production and comprehension discourse capabilities are difficult to isolate and are best understood holistically, outside the usual dichotomous model of comprehension versus production.

Pragmatics can be thought of as the 'hows' of communication – how and how well we make our point. By definition, it encompasses the rules underlying conversational discourse, the function of language particular to participants, situational knowledge, the topic at hand, related 'world' knowledge or information, and social conventions. It includes both the context and the intent of a message and when applied to discourse includes additional rules to enable interactive communication (turn-taking, topic maintenance, etc.). Pragmatics integrates language functions mediated by the two hemispheres with major contributions from the RH in two areas discussed previously (prosody and semantics) and also refers to the nonverbal skills used in communication and the communication-related disturbances believed to be mediated by the RH.

Discourse deficits are the hallmark of the communication difficulties of RHD patients (Meyers, 1999). Results of numerous studies on RHD patients indicate RH involvement in discourse (integrating meaning and determining the general idea from the whole message). The characteristics of the discourse disturbances in the presence of RHD are wide ranging, with particular difficulty in the comprehension and production of narratives, generally considered the domain of the RH. In complex or lengthy narratives, the absence of a unifying theme or main idea causes particular problems in comprehension and retention. In discourse interpretation, main ideas serve to provide structure for identifying and organizing key concepts rather than the 'details' underlying those concepts, thus enhancing comprehension and recall. In support of this notion, a number of studies suggest that basic discourse form is retained within structured tasks (e.g., providing the order of a short story when given individual sentences presented in random order (Huber and Gleber, 1982), predicting story endings (Rehak *et al.*, 1992), and drawing simple inferences in short stories and interpreting sarcasm in comments in forced choice format (Kaplan *et al.*, 1990)). In contrast, it has been suggested that in RHD the comprehension of complex narratives poses particular

problems that may be related to the need for reinterpretation (Brownell *et al.*, 2000), a task that relies heavily on the identification of the main idea to define key concepts and aid recall. RHD subjects also have difficulty recognizing purpose or intent of the narrative (a skill related to comprehension of theme and main idea), drawing inferences, inferring motives in complex narratives (Wapner *et al.*, 1981), predicting outcomes in narratives without explicit cues (Rehak *et al.*, 1992), applying alternate meanings, and understanding implied and nonliteral meanings. In discourse production, RHD subjects have difficulty following conversational rules and a propensity for excessive detail with an absence of a unifying theme or idea. Similar problems occur in writing, which is also characterized by excess detail and an absence of unifying main ideas, transitions, and conclusions. Finally, with respect to pragmatic functions during conversational discourse, RHD patients have difficulty interpreting speaker intent and indirect requests and evaluating paralinguistic cues.

Concluding Comments and Directions for Research

The range of language and communication skills associated with the RH is extensive. This article has attempted to present a wide-ranging overview of the attributes of RH language capabilities identified during the past 25 years and to focus on three areas of language in which the RH role is significant: prosody, lexical semantics, and discourse and pragmatics. Although some contradictions and inconsistencies can be found when comparing studies of RH language, the presence of unique RH participation in language is generally accepted. The general profiles of contributions that emerge are strikingly similar despite differences in investigative populations (brain-damaged, normal, child, or adult) and methodologies (studying clinical manifestations of damage, normal participation in lateralization studies, or describing abilities within learning disabled populations, specifically NLD). Some confusion remains when attempting to define deficit profiles, primarily because RHD or disruption of RH language does not necessarily impact all language modalities simultaneously. For example, one may have severe deficits in reading comprehension that are not evident in the comprehension of spoken language. Furthermore, the severity of the disturbances is not systematically expressed. Severity can vary across all modalities and can range from severe to subtle dependent on the task, language system (prosody, lexical semantics, etc.), or modality. We need to strengthen our understanding of the attributes of RH language contributions and the language impacts of RHD or impaired RH language function. Valuable information can be obtained from two sources – investigative research and clinical data.

Traditional Research Models

Traditional research models have provided an extensive picture of RH language contributions in both normal and RHD populations. In-depth studies need to be performed that narrow the focus and investigate specific aspects of RH language 'abilities' or deficits (e.g., main idea vs. the broader domain of discourse), with particular attention to differences in performance across modalities. Future research should include ways to objectively define the degree of impact (subtle to profound) that the RHD or RH deficits produce relative to particular language tasks or within language domains. The confounding affects of modality and the level of functional impact of RH disturbance (subtle to profound) could then be addressed or controlled in future research and possibly clarify some of the inconsistencies across studies. Research attention should also be given to localization of function, which is poorly understood. In addition to the difficulty specifying location of function, there is evidence of involvement of subcortical structures in language production and processing. Studies that take advantage of advances in brain imaging technology should provide clarity, but currently localization of function remains unclear. Finally, a number of studies have provided evidence that the RH is capable of mediating language if the LH is damaged early in life (Dennis and Whitaker, 1977; Reilly *et al.*, 2004); however, we need to know more about the nature of the RH language contributions in developing neurological systems. Investigations should include normally developing and learning disabled (NLD) children as well as children with brain damage.

Data from Clinical Interventions

Our knowledge of the RH contributions to language can also be enhanced by carefully documenting the outcome of therapeutic interventions with RHD populations and language disordered children who exhibit language deficits generally associated with RHD. Relatively little has been published regarding the outcome of therapeutic intervention in disordered populations with RHD or 'RH language disorders.' Current knowledge regarding the contributions of the RH to language processing and production should allow the development of effective remediation models designed to address objectively defined RH deficits in a structured and systematic fashion. Documentation of the course of recovery of function in response to such intervention strategies would not only assist

in the development of more effective remediation models but also provide information that has special relevance for RH language research. Major questions need to be answered regarding the type and degree of deficit relative to prognosis and disparate responses to intervention. For example, is prognosis for recovery relative only to degree or severity of impact or also relative to particular language domains (e.g., are semantic deficits more difficult to resolve that written narrative organization)? How are prognosis and/or recovery of function related to the LH's ability to subsume a RH language function? In other words, what can we infer regarding RH abilities when recovery takes place? Where is recovery localized? These are just a few of the questions that carefully controlled investigations of recovery of function relative to remediation could address. Clearly, integrating the findings from traditional research studies and the data resulting from therapeutic intervention holds promise for addressing the many unresolved issues regarding language and the nondominant hemisphere.

See also: Anatomical Asymmetries versus Variability of Language Areas of the Brain; Laterality Across the World's Languages.

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Language in the Workplace: Different Approaches

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The selective chronology adopted in this discussion documents changes in the nature and scope of the field since its inception in the 1960s. In the early days, LSP (Language for Specific Purposes) and later ESP (English for Specific Purposes) dominated the scene and have continued to attract a steady following alongside the other vocational stream of language needs analysis. More recently, discourse analytic and ethnographic studies relying on empirical data and an ever increasing interest in intercultural business interactions (*see* **Intercultural Pragmatics and Communication**), especially negotiations and meetings, have enriched and expanded the original vocational thrust of the field.

The dynamics of change within Language of Work (LoW) over the last two decades have fundamentally and, arguably, permanently changed its nature while continuously challenging its established boundaries and traditional concerns. In the 1980s, the 'linguistic turn' caused a reappraisal of the value and possibilities afforded by internal or cross-company quantitative surveys or microanalyses of isolated text samples. Increasingly, situated pragmatic and sociolinguistic approaches to the language of work and a discursive approach to its social-psychological dimensions are opening up new prospects for multimethod research and crossdisciplinary dialogue.

Furthermore, advances in communication technology also have altered the workplace beyond recognition, affecting interpersonal and intercompany communication and have contributed to the internationalization of cultural and economic exchange, or globalization. 'Localization,' a centripetal movement contrasting globalization and its contested imposition of 'Americanization' (*see* **Linguistic Imperialism**), is leading to the rediscovery of the importance and the role of other languages and value systems and is challenging the long-established position of English as a *lingua franca* on the scene of international business.

Naturally, macrovariation in LoW research has also affected topic choice and methodological approaches at the microanalytical level. For instance, language needs analysis with its impersonal and quantitative understanding of language(s) in the workplace has been largely replaced by the systematic analysis of situated language practices conducted by scholars from a variety of disciplines and using multimethod research, increasingly in collaboration with the actual practitioners (*see* **Language in the Workplace**).

From Language to Discourse

In its early days, concern for users' needs in industry had led to the formation of a strong body of research on Language for Specific Purposes (LSP), which concentrated on the analysis and composition of practical text-types as required in the workplace (*see* **Language for specific purposes**). With the emergence of English as a *lingua franca*, English for Specific Purposes (ESP) came into existence to undertake the analysis of the linguistic features of specialist texts, at first through register analysis (*see* **Registers and language varieties in cultures**) and later through genre analysis (Dudley-Evans and St John, 1998).

The late 1980s and early 1990s witnessed the emergence within the LoW of a strong body of discourse-based scholarship, where discourse was variously understood to refer to, at one end of the spectrum, the

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situated analysis of interactional exchanges; at the other end, the ways of conceptualizing and interpreting work practices within organizations. This development has generated a number of classics, which exemplify its methodological diversity: so, for example, Drew and Heritage (1992) and Boden (1994) apply conversation analysis (*see* **Conversation Analysis**), while Firth (1995) and Ehlich and Wagner (1995) concentrate mainly on discourse analytical studies.

It is also interesting to note the terminological evolution that has accompanied discourse-based research: from Institutional Discourse (Agar, 1985), to Professional Discourse (Gunnarsson, *et al.,* 1997), which embraces legal, medical, social welfare, educational, and scientific fields (*see* **Institutional Talk**), to Business Discourse (Bargiela-Chiappini and Harris, 1997a). In both former types of discourse, one of the interactants is usually a lay person; in contrast, business discourse is seen to take place between individuals whose main activities are located within business and whose interactions are motivated by matters relating to their respective businesses.

Worth highlighting is the distinctive contribution to the LoW from North America. Management communication, technical communication, English composition, and business communication, the latter characterized by a strong vocational orientation, are all fields with a distinctive understanding of communication and language, a more recent complementary field being organizational communication (Jablin and Putman, 2001). Discussion of the potential contribution of these fields to a multidisciplinary scholarly base for the LoW has been initiated, which seeks to involve linguists and sociolinguists in Europe and beyond (Bargiela-Chiappini and Nickerson, 2001).

The LoW has recently benefited from sustained efforts by applied linguists to engage with issues of relevance in research practice (Sarangi and Candlin, 2003). Accordingly, academic researchers are called on to collaborate with practitioners in the task of formulating a joint understanding of and response to issues of communication in the workplace. In this context, sociolinguists are particularly well-equipped to tackle issues of power, politeness, and gender (Holmes and Stubbe, 2003; Mullany, 2003).

Cross-cultural and Intercultural

European migration toward the New World was responsible for a multilingual, multicultural workforce in North American and Australian work environments for decades, but detailed empirical studies of communication issues are still rare (Goldstein, 1997; Clyne, 2003). On the contrary, the dominant importance of trade exchange with Japan explains the steady growth of contrastive studies of (American and Australian) English and Japanese such as Miller (2000) and Yamada (1997). Intercultural business communication research in Europe has traditionally relied on Scandinavian scholarship (e.g., Neumann, 1997, Grindsted, 1997).

In one of the earliest studies of Italian and British business discourse, Bargiela-Chiappini and Harris (1997a) look at the pragma-linguistic choices of managers in the two countries but also examine the influence of cultural preferences on multiparty business meetings and on management praxis. Evidence from further empirical research suggests that a reappraisal is necessary of the role of 'culture' in business interactions (Bargiela-Chiappini and Nickerson, 2003). A possible way forward is the construct of 'interculturality,' defined as the process and the condition of cultures-in-contact, thus seeking to capture both the dynamics and the inherent or generic properties of intercultural exchanges as manifested through discourse (Bargiela-Chiappini, 2004).

Developing this argument, Poncini (2004) in her analysis of intercultural meetings convincingly argues that communicative misunderstandings are often too simplistically attributed to cultural differences and that linguistic competence (in English) alone cannot account for misunderstanding. The business context, organizational roles, and individual interactional styles are equally important in realizing and maintaining successful business relationships. The role of English as a *lingua franca* and its interplay with other languages in multicultural meetings are thus both integrated within a contextualized, dynamic, sociolinguistic, analytical framework that awaits further application on the field.

Localization and Globalization

Language needs analysis promoted the use of company surveys and questionnaires to assess which and how languages were needed, and by whom (see Coleman, 1988). Interlanguage contact continues to be a distinctive feature of European business. Indeed, Vandermeeren (1999: 276) concludes on the basis of her survey of 415 European companies that "a business interaction is rarely a monolingual event."

Research in business discourse cannot ignore recent complicating socioeconomic developments such as the internationalization of business, technological advances in telecommunications, and the rise of international management teams (Nickerson, 2000). English continues to be the privileged vehicle of management ideas as well as the medium of global trade (Rogers, 1998). However, its dominant international role has been challenged by the ascendancy of

localized forms and patterns of communication that express the tension between local preferences and global choices. For instance, in Malaysian business organizations, the normative status of 'colonial' English is giving way to the emergence of the speech forms and styles of Malaysian English (Nair-Venugopal, 2000). Similarly, communication conflicts in the Argentinean subsidiary of a European company are shown to be the product of a clash between local and global organizational cultures and identities (Gimenez, 2002).

A third perspective on intercultural communication in business is one building primarily on work in politeness theory and the notion of 'face.' From a social psychological angle, it looks at intercultural encounters through the lens of 'rapport management,' defined as "the way that language is used to construct, maintain and/or threaten social relationships" (Spencer-Oatey, 2000: 12). The usefulness of taking into account the nonverbal and the relational dimensions in the analysis of multiparty intercultural business meetings lends further support to the call for multimethod, multidisciplinary research.

Future Developments

Empirical research in work settings entails issues of access and confidentiality, which often impose severe constraints on the scope and type of fieldwork. Nonetheless, interest in the Language of Work from other than applied linguistics and sociolinguists has considerably increased. In the 1990s, organizational ethnographers and organizational discourse analysts have joined the field's varied membership (Hardy *et al.,* 2004). There seems to be no end of opportunity for crossdisciplinary, crosscultural exchange and growth; this is perhaps the most exciting prospect for a field that arguably has its roots in a single language (English) and a single setting (the classroom).

See also: Conversation Analysis; Institutional Talk; Intercultural Pragmatics and Communication; Language in the Workplace: Different Approaches; Languages for Specific Purposes; Pragmatics: Linguistic Imperialism.

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Language Loyalty

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'Language loyalty' refers to efforts by a speech community to maintain its own (first or home) language in the face of real or perceived threats to its status and continued use. A language may find itself threatened by one or more other languages for a host of reasons, for example: depopulation or emigration of its speech community; mass immigration of other speech communities; or coercion (martial or economic) or voluntary language shift, often for economic reasons. Because of its close association with ethnicity, loyalty to a language very often reflects loyalty to an ethnicity or culture, of which language is perceived to be the carrier (Fishman, 1997: 331f). The effects of language loyalty vary widely, from the political token use of a language to a widespread and militant language loyalty campaign. The phenomenon of language loyalty can be observed and measured in the native environment of the language in question (e.g., Ireland, where Irish has been all but supplanted by English) or in an expatriate speech community (e.g., Spanish-speaking Mexican communities in California).

The strength of a speech community's loyalty to its language largely depends on how 'conscious' the community is of its language and/or ethnicity (Fishman, 1997: 330), and, indeed, how conscious the mainstream society is of their otherness. Moreover, as Crystal (1995: 367) points out, a language community is seldom homogenous in its attitudes toward its language. Some individuals may advocate a total shift to the majority or dominant language; some may advocate functional bilingualism, in which the first language is reserved for private, home-based functions; and still others may prefer an all-out effort to promote its own language for all functions within the home base of the speech community and beyond.

The impetus for individuals and communities to resist pressures against their home language, and to continue using and developing it, springs from a variety of sources. One of these is the size and strength of the linguistic (or ethnolinguistic) community in question. The larger, more close-knit and 'ghettoized' the community is, the more pressure will be placed on individuals within it to use its language. And, indeed, there will be more opportunity to use it than in a widely scattered, more integrated speech community. Relations between the group in question and the wider society are also important; a more influential (politically and economically) group has a far better chance of being able to maintain – and promote – its language than a less influential one does.

Language Planning and Language Loyalty

While language loyalty is not necessarily a facet of language planning, the two concepts are inextricably linked. Language loyalty is very often a response to language planning, and, perhaps less often, language loyalty is expressed through a process of language planning. Status planning reflects a desire to maintain and promote the use of a threatened language in the higher functions of language use

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(except in cases where the use of a language is deliberately supplanted by another). For example, nine indigenous languages were elevated to official status in South Africa in 1994, alongside the two pre-existing official languages, English and Afrikaans. However, English is highly dominant in this context, and there is a strong feeling among many Afrikaans speakers that Afrikaans is being deliberately supplanted by English in higher functions, particularly in the media. Corpus planning, too, is a double-edged sword: while it can be used to 'revalorize' and develop languages to make them suitable for use in higher functions (e.g., the development of the indigenous languages of South Africa for their new official status), it can also be used to strip away some part of a language's identity (Cyrillicisation of Uzbek as part of the Soviet Union's Russification programs).

Case Studies

The case studies that follow are chosen because they illustrate some very different situations in which language loyalty can be observed.

Irish: Efforts to Maintain a Language Eroded in Its Home Territory

Although Ireland and England have been involved in a contact-conflict situation for more than 800 years, English only became the language of opportunity in Ireland beginning in the mid–17th century. Previous attempts at establishing an English or Anglo-Saxon presence in Ireland had usually resulted in the Gaelicisation of the colonizers (Wardhaugh, 1988: 90). Since then, the dominance of English has been overwhelming, with the number of Irish first-language speakers dwindling to under 3% of the population. The Republic of Ireland gained independence from the United Kingdom in 1921, and in 1937 the constitution elevated Irish to the position of first official language. However, this has done little to extend the use of Irish in Ireland. A succession of revival campaigns (emphasizing loyalty to Irishness as an ethnonational identity) has met with limited success. Irish continues to fulfill token functions (first official language, offered as a subject in schools) but has very little presence in the daily life of the country as a whole. Moreover, no policies have been devised to support the 'first official language' status of Irish, and "it has taken on the iconisation of an aspiration, with no relevance for the everyday life of the country" (O'Dochartaigh, 2000). While Irish may not be the mainstream medium of communication in Ireland, its official status is becoming more and more overt: public signage is mostly bilingual, and state-sponsored radio and television stations are devoted to it.

Former Colonies in Africa: Dominated by a Minority but Powerful Language

Multilingualism is the norm in most African states. In the global context, however, this situation is starting to change under the influence of influential global languages of wider communication, such as English. People in developing countries who wish to participate on the global stage need access to these stronger languages, and this affects their loyalty to their first language. Countries emerging from colonial rule tend to opt for the former colonial language as official or 'first official' language of the country; thus, the higher functions of language use fall to, e.g., French or English. Numerous – and often not very credible – reasons are given for this. These range from the choice of a language with no tribal associations to promote national unity to the fear that the choice of an indigenous language as official language will leave the state isolated from the global scene (Webb, 1994: 194ff). A notable exception to this rule is the adoption of Swahili in Kenya (and, to a lesser extent, in other east African regions) for the higher functions.

In many developing countries with a colonial legacy, linguistic (and ethnic) diversity is perceived as a threat to the unity of the nation and to 'nation building,' and those who support ethnic languages are seen to be supporting separatism. Very little institutional support is offered to the indigenous languages, as education, media, public administration, and so forth favor only a few dominant languages (Brenzinger, 1997). The irony of this situation is that only a small segment of the population has access to the languages that serve the higher functions, while the indigenous languages remain underdeveloped as media for scientific and technical discourse. Unless substantial corpus and status planning programs are undertaken, any individual who wishes to participate in the public life of the country requires competence in the dominant languages. Thus, for many indigenous language speakers, allegiance to the wider society must come at the cost of allegiance to their home language, because the system as a whole has little allegiance to the indigenous languages of the country.

United States Immigrants: Language Maintenance Efforts in Expatriate Communities

Fishman's (1966) seminal collection of essays on language and ethnicity in the United States identifies a number of different language loyalty situations. There are a variety of immigration situations, and these affect the intensity and success of linguistic self-maintenance efforts. They can be summarized as follows:

- Immigrants who migrated to the United States for economic prosperity, and with the intention to assimilate into the culture
- Immigrants who fled a threat to their language and culture and sought to preserve it in the United States
- Immigrants who only became (self-)conscious of their ethnolinguistic identity in the United States.

There is significant overlap between the first and third categories. Those who migrated to the United States with the intention of integrating into the so-called melting-pot culture undoubtedly had few ties to their language or ethnic identity. However, having arrived in the United States without any immediate access to the mainstream language and culture, many immigrants found their ethnolinguistic identity to be an important source of stability, as a link with the old and familiar in very new surroundings. Other people and groups fled to the United States to maintain their language and culture, which were threatened in their native land – a prime example being the Ukrainian immigrants, whose home language and culture came under threat from the Russification campaign in the Soviet Union. For people in these circumstances, language maintenance is a priority (particularly for the first generation), and they actively seek out to establish a group identity. In later generations, when the ethnic consciousness is not as strong, language loyalty typically decreases somewhat and language maintenance efforts dwindle.

Conclusion: Proponents of Language Loyalty

As Fishman (1966b) points out, those who support ethnolinguistic minority maintenance in the 'supra-ethnic' age are often accused of supporting separatism and deliberately alienating themselves (and seeking to alienate others) from the mass culture. This has led to a paradoxical situation, especially in the United States. Although most historical ethnic minorities have long since abandoned their languages and most of their external cultural trappings, they still maintain a fairly high degree of ethnic self-identity (Fishman, 1966a: 29). However, there is another side to this coin, in the form of the mass immigration that continues to this day, particularly of Spanish speakers from Mexico and other parts of South America. Many among this group are functionally bilingual, and, as they edge nearer to numerical majority, are openly hostile to the U.S. *de facto* policy of English monolingualism. Pressure is mounting for the status of Spanish to be developed in affected regions, and English seems not to have the draw it used to be.

However, for relatively weak languages in the shadow of a highly dominant language, language loyalty often does not reach very far. Often, only educationalists (especially language teachers), diehard traditionalists, and linguists plug away at a language maintenance program, while the majority of actual or potential users of the language remain relatively apathetic – or express an interest in or regard for the language that is not accompanied by increased use (Fishman, 1966b: 397). A case in point here is the state of African language departments in South African universities, which have suffered a massive drop in voluntary enrollments despite the official status of nine African languages. In most cases, it seems, loyalty to a dominated language tends to be supplanted by loyalty to more materially pressing issues: economic aspirations, new identity, or even the status quo.

See also: Endangered Languages; Identity and Language; Language Maintenance and Shift; Language Planning and Policy: Models; Migration and Language; Minorities and Language; Multiculturalism and Language.

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Relevant Website

http://www-rcf.usc.edu/~cmmr/ – Website of the Center for Multilingual, Multicultural Research at the University of Southern California; includes information on language policy and language rights.

Language Maintenance and Shift

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On the whole, the extent of endangerment of the world's language diversity reflects the distribution of languages on our planet. The highest density of endangered languages seems to exist in the linguistically heterogeneous parts of the world. It happens that countries with very high numbers of languages are near the equator, such as Papua New Guinea, India, and Mexico, as well as the countries of central and western Africa.

An analysis of language endangerment globally shows that a crucial difference in language shift settings seems to be between contexts of globalization, nation-state contexts, and subnational contexts. In a substantial part of the world, namely Australia, the Americas, Europe, and Japan, minority languages are increasingly under threat as they are replaced by the official languages of nation-states. However, this does not hold true for the vast majority of endangered languages spoken elsewhere, for example on the African continent. With about one-third of the world's languages, this continent is among the most linguistically rich areas on our planet.

Language maintenance activities emerge in quite different contexts and facets. Some French and Afrikaners feel a pressing need for such supportive measures even though their languages seem not to be immediately threatened by extinction. In contrast, speakers of endangered minority languages may refuse to get involved in activities that aim to maintain or revitalize the use of their ethnic tongue. Among linguists, the stances toward language maintenance also vary considerably. Some seem to want to work toward a maintenance of the world's linguistic diversity, which implies a challenge to either human evolution or a creationist design. On the other extreme, some linguists do not see it as their duty to get professionally involved in language maintenance activities. In the following account, language maintenance activities will be discussed with merely a pragmatic focus, i.e., the options and roles for speech communities, linguists, and international bodies such as the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

Has there ever been a *Homo sapiens sapiens* protolanguage, which, some 100 000 or 200 000 years ago, started a 12 000-year-long process of diffusing into more than 100 000 languages, which have been reduced from that number to the approximately 6000 languages spoken today? Whatever possible scenario for language evolution one chooses to believe, it seems certain that our present language inventory is the remnant of a much richer pool. Furthermore, the shrinking of linguistic diversity seems to have picked up speed in the last few thousand years. This situation is of immediate concern to many linguists and numerous ethnolinguistic communities.

Terms like 'language death,' 'language murder,' 'language suicide,' and 'killer languages' evoke pictures in which languages themselves are alive or dead. Languages are portrayed by these terms either as suffering victims or as aggressive offenders, prior to any scholarly analysis. We should keep in mind that all spoken tongues are no more and no less than variations of human language. Groups of people may foster or give up an ethnic language, the latter having happened thousands of times. Communities and individuals who give up their ethnic language do not end up in total silence, unable to communicate with anyone any longer. Such language shifters usually acquire 'modern' and more 'useful' languages. Language is one – some say the most important – asset of culture and identity. But cultures as well as identities change over time. Why then do some linguists seem to think that the status quo of language usage could and should be frozen?

While scholars would do well to refrain from sentimental statements on languages of other people, they may very well respect and assist in spreading the emotional attachment of the speakers themselves to their language. Minorities and their offspring very often experience the loss of their heritage languages as traumatic. For example, as First Nations people in Canada phrase it, without an ancestral language, people are no longer able to relate to their environment or to their spiritual world. Khwe in Namibia, Bretons in France, Ainu in Japan, Frisians in the Netherlands, Mohawks in Quebec, and many other ethnolinguistic minorities feel that way and want to maintain or regain their languages. With such communities, the question arises, what can be done and by whom?

The Intangible Cultural Heritage Unit of UNESCO has been working for more than 20 years with members of endangered language communities and linguists toward establishing an Endangered Language Section. These initiatives have resulted in the formulation of the documents 'Language Vitality and Endangerment' as well as 'Recommendations to the Director General' labeled 'Action Plans' in March 2003. I will highlight some of the key issues discussed in these documents.

It seems to me that there are basic differences in the types of language endangerment in different language contact settings. While we are quite familiar with the language endangerment situation in nation-state contexts, as found for example in the Americas, Australia, and Europe, we still know little about the other parts of the world. The greatest linguistic diversity still exists in Papua New Guinea and in Africa south of the Sahara. The threat to these languages differs from that in the previously mentioned parts of the world.

Ethnolinguistic minorities from nation-state contexts, such as the First Nations people in Canada or the Amazigh in Morocco, may benefit from examining the living experience and common practice of multilingualism in most sub-Saharan African communities. The latter, in turn, must learn about the experiences of minorities in nation-states because this will be their challenge in the near future. UNESCO is playing an important role by supporting African governments in establishing language policies that might help to allow for cultural and linguistic diversity within their nation-states.

The role of UNESCO in that process is threefold. UNESCO addresses governments on their educational and cultural policies within the frame of its 'Universal Declaration on Cultural Diversity' of 2001. But UNESCO in addition requests the active involvement of linguists and speech communities to safeguard the still-existing linguistic diversity. Noriko Aikawa, director of the Intangible Heritage Section of UNESCO, stated in 2001: "UNESCO's future strategy on languages is to strengthen co-ordination between language research, policy and education programs. The results of research should be immediately incorporated into appropriate language policies, educational planning and pedagogical tools." (Aikawa, 2004: 35).

Languages Are Threatened in Different Settings

The scenarios in which the world's language diversity is threatened range from subnational settings to national contexts and finally to environments that are formed by processes associated with globalization. It is crucial, indeed, for the understanding of various aspects of language endangerment, to consider the specific contexts in which language shifts occur. In the following discussion, three different settings of language contact situations will be distinguished: the global context, the context of nation-states, and the subnational context.

Global Context

Looking at the dynamics by which languages gain speakers in the context of globalization, we find that only a few languages benefit from global merging, and these languages at present seem to be mainly English and Spanish. The international exchange of knowledge and world trade are conducted to an increasing degree in only a few world languages, and some scholars seem to expect that, given this tendency, a world culture, based on one common language, will finally emerge from these developments.

But up to now, we can state that languages have not been replaced in the context of globalization. The so-called world languages – increasingly English only – are acquired as additional and not as first languages. For example, the integration of the new European Union member states accelerates the spread of English as the European lingua franca. In the course of this process, French will further lose second language speakers, but at the same time, none of the European national languages, especially not French, will lose first language speakers to English ('After Babel,' 2004).

Nation-State Context

In the context of nation-states, governments obviously rely on the languages in which they run the countries. National majority languages are widely established and used in administration, politics, science, and education, as well as in media and literature. Such national languages may not be confined to single political-administrative territories; the same language may be in such a dominant position in several nation-states. National languages may also not cover an entire nation-state, as we see in Quebec. However, common to all these national languages is the criterion that they are instrumentalized by governments, and with that they receive official support and recognition within nation-states.

In the same context of nation-states, we often find minority languages, which are threatened and marginalized by the dominance of established national languages. Languages of this latter type are, for example, Japanese, Finnish, German (German, Standard), and Dutch. In their areas of domination they endanger minority languages such as Ainu, Saami, Sorbic, and Frisian, respectively. At the same time, various forms of English are threatening and replacing minority languages in quite a number of nation-states, such as the United States, Canada, the United Kingdom, Australia, and New Zealand. Within north African states, national Arabic varieties

are expanding – not only as a second language but also as a mother tongue – and replacing the ancestral languages of Amazigh communities.

Kiswahili (Swahili), in the Republic of Tanzania, and Setswana (Tswana), in the Republic of Botswana, are among the few African languages that are established as media of nationwide communication. Only these two sub-Saharan African languages have been described as threats to other languages in the context of the nation-state. Kiswahili threatens more than 130 other Tanzanian languages, while Setswana does the same to about 30 languages spoken in Botswana. Other African languages with a nationwide distribution, such as Kinyaruanda (Rwanda) and Kirundi (Rundi), do not threaten minority languages at all, because no minority languages exist within the national boundaries.

Subnational Contexts

Minority languages in many parts of the world, however, are threatened in subnational contexts. In sub-Saharan Africa, as just mentioned, very few African languages are established nationwide. On the national level, African governments predominantly use the imported languages of the former colonial powers, and these are the prevailing languages in national administration, in secondary and higher education, in modern literature, etc. In most African countries, the knowledge of these imported languages is still – after 40 years of independence – confined to the educated elite in the urban centers. One indication that imported, formerly colonial languages have not developed into the languages of the masses is the fact that not a single African language has so far been replaced by French and English. The only exception on the African continent seems to be the language of the Guanche on the Canary Islands, who lost their Amazigh language to Spanish after their final defeat in 1496. If we consider Afrikaans as a European language, then of course quite a number of Khoisan languages have been replaced by that Indo-European language, which is spoken exclusively on the African continent.

For that reason, language displacement in sub-Saharan Africa occurs, in by far the most cases, in subnational contexts, i.e., minority languages are generally not replaced by established national majority languages. Language shift takes place in local contact situations and for quite different reasons. For example, speakers of a minority language may shift from their language to another due to the adoption of a different religious faith. Former hunter-gatherer communities may assimilate to pastoral societies not only in the mode of production but also by taking the language of the pastoralist. Thus, African minority languages are threatened and replaced by other African languages, languages which themselves are very often minor languages within the nation-state.

Ethnolinguistic minorities in sub-Saharan Africa generally live in complex language contact situations in which they are marginalized in subnational contexts and for various reasons. The processes that may lead to the extinction of their languages are very different from those that affect minority languages in the contexts of nation-states. In the latter context, minority languages are generally threatened because they are dominated by national majority languages. In sub-Saharan Africa, in contrast, most languages of ethnolinguistic minorities have survived until today precisely because their speakers have been and are being marginalized and neglected, in other words, excluded from national developments. Of course, this should not lead us to be cynical and to conclude that it may be better to let the people suffer in order to keep their languages alive, so to speak. With continued efforts and good fortune, the sub-Saharan African nations, too, will progress further, and nation-states there will become the dominant frames of reference for minorities and their cultures. Then, policies that respect and appreciate cultural and linguistic diversity as an asset rather than an obstacle to national unity may help to foster the use of heritage languages among minority communities. This seems to be one of the most prominent fields for further activities for UNESCO and also for linguists.

Which Languages Are Endangered?

The evaluation of the state of vitality of any language is a challenging task, mainly because speech communities are complex and language use patterns within these communities are difficult to explore. In addition, poor infrastructure and rigid political conditions may not even allow for determining the number of actual speakers of a language.

In 2001, an Ad-hoc Expert Group on Endangered Languages was asked by the Intangible Cultural Heritage Unit of UNESCO to prepare a draft overview of the threat to the world's language diversity. From March 10 to 12, 2003, an International Expert Meeting on Endangered Languages was held at the UNESCO headquarters in Paris, and linguists and language planners, representatives of nongovernmental organizations, and members of endangered-language speech communities discussed the draft. Two documents, namely, 'Language Vitality and Endangerment' and recommendations to the director general (labeled 'Action Plans'), were formulated in March 2003.

Table 1 Factors for assessing endangered languages[a]

Degree of endangerment
1. Intergenerational language transmission
2. Absolute number of speakers
3. Proportion of speakers within the total population
4. Loss of existing language domains
5. Response to new domains and media
6. Material for language education and literacy
7. Governmental and institutional language attitudes and policies, including official status and use
8. Speakers' attitudes towards their own language
Urgency of documentation
9. Amount and quality of documentation

[a]UNESCO, 2003.

In the first document, nine major factors are identified to assess the language situation of endangered languages (see Table 1).

Factors 1 through 6 focus on the assessment of a language's vitality and its state of endangerment. The single most important factor is the first one, which asks for the extent of language acquisition among the children within a community. It is obvious that a language without any young speakers is seriously threatened with extinction.

Factors 1 through 5 are meant to capture the dynamics of the processes of a given language shift situation. The proportion of speakers within a community (factor 3) reveals an important aspect of language vitality: is the minority language an essential indicator for being regarded as a member of the community or not? The Arggobba in Ethiopia, for example, strongly insist on and declare their ethnic identity and origin even though their language has disappeared and it is not known whether any speakers of Arggobba still exist among the more than 60 000 Arggobba.

Loss of domains (factor 4) for an ethnic tongue may be triggered by, for example, the introduction of formal education or by new job opportunities for members of minority groups. A change in religious affiliation can also result in a shift to another mother tongue, a language that is associated with the new religion (factor 5). For example, Hausa and Dyula (Jula) spread in west Africa along with Islam. An outstanding example of the correlation between language and religious affiliation is the community of the Jeri leatherworkers, who live among the Sienare Senofo in the northern part of the Ivory Coast. The members of the Jeri community abandon their own language and adopt two different languages as new mother tongues according to their religious affiliation: "Sienare with the non-Muslim, and Manding with the Muslim Jeri" (Kastenholz, 1998: 259).

Factor 6 relates to the stage of development of a given language ('Ausbau'). Is there a community orthography? Have they agreed on a common standard form for writing the language? Do teaching and learning materials for the language exist? Is literature, such as newsletters, stories, religious texts, and so forth, published in that language?

Factor 8 assesses the speakers' attitudes toward their ethnic language, and factor 7 deals with the government's policies toward that language. And finally, factor 9 attempts to evaluate the urgency for documentation by asking for the quantity and quality of existing analyzed language data.

For minority languages in national contexts, such as in Canada, New Zealand, and Morocco, it is obvious which of the languages have to be regarded as being endangered, i.e., the First Nations languages, Maori, and Amazigh, respectively. In other contexts, all these nine factors should be taken together in surveying the overall sociolinguistic situation of a language with respect to its degree of endangerment.

What Is Actually Lost When Languages Vanish?

The preamble to UNESCO's 'Language Vitality and Endangerment' document includes the following statement:

> The extinction of each language results in the irrecoverable loss of unique cultural, historical, and ecological knowledge. Each language is a unique expression of the human experience of the world. Thus, the knowledge of any single language may be the key to answering fundamental questions of the future. Every time a language dies, we have less evidence for understanding patterns in the structure and function of human language, human prehistory, and the maintenance of the world's diverse ecosystems. Above all, speakers of these languages may experience the loss of their language as a loss of their original ethnic and cultural identity. (UNESCO, 2003: 2, with permission.)

Obviously, linguists need language data from as many languages as possible in order to reconstruct language history, set up typologies on aspects of structure, or understand concepts underlying languages. But above that, do endangered languages offer anything special to linguists?

In his article 'The endangered languages of Ethiopia: what's at stake for the linguists?' Hayward (1998) provides several examples of unusual structural phenomena that exist only in endangered Ethiopian languages. For example, an established typology of number systems had to be fundamentally revised because of linguistic forms found in

Bayso (Baiso), an endangered language spoken in the southern part of Ethiopia.

The lexicon and categories of each language are based on and reflect a certain conceptualization of the world. The human population shares more and more perceptions of the world channeled through a rapidly spreading global culture. With that, concepts diverging from the global norms are rapidly fading and appear to be the most vulnerable assets of languages. The numeral systems, spatial orientation, and taxonomies are only some of the areas that are being homogenized in this process (Brenzinger, 2003).

As a final example, even the sounds of languages may no longer be heard, which is unquestionably an essential loss, maybe not only for linguists. The bilabial click, also referred to as the 'kiss click,' had been reported by the late Oswin Köhler (personal communication) to be extinct with the death of the last speaker of a Southern Khoesan language in the early 1970s. At the same time, Anthony Traill collected language data from !Xóõ, "the last of the Southern Bushmen languages that were once spoken throughout southern Africa" (Traill, 1985: 6). With these approximately 1000 speakers of variants of !Xóõ, a unique sound of human language, the kiss click, has survived until today.

In turning to the speakers themselves, we may ask: do they suffer from any loss when they abandon their heritage language?

Lee Cronk, an American social anthropologist, has studied the change in ethnicity and culture of a former hunter-gatherer people in Kenya. This community was formerly known as Yaaku, then Mukogodo, and today they belong to the Maasai society. The community lost the former Cushitic language and adopted the Maa language. The Mukogodo took over the pastoral mode of production and along with that the culture of the Maasai.

> Mukogodo [born around the 1930s] and before were born in rock shelters, grew up speaking Yaaku, and ate honey and wild game. Younger people were born in small houses, grew up speaking Maa, and drink milk and eat meat from goat, sheep, and cattle. In the past few decades, Mukogodo have also begun attending schools, getting jobs in and outside the Mukogodo area, and even traveling to Ulaya [Europe] itself. Change has been the norm for most humanity for the past century or more, and nowhere has it been faster or more dramatic than among the Mukogodo. (Cronk, 2004: 2, with permission.)

Maasai culture has spread over a wide area of east Africa, and several hunter-gatherer communities have lost their distinct identity and language in the "homogenizing force of Maasai society and culture" (Cronk, 2004: 143). Cronk captured an experience I had while working with a Yaaku elder in 1990:

> One day while conducting an interview with an elderly Mukogodo man about the old language [Yaaku], Brenzinger played back some Yaaku phrases that the man had spoken earlier into a tape recorder. At first, the man was delighted to hear the old language, even if it was coming from a box rather than from a person. Not really understanding the principle of the tape recorder, he tried engaging it in conversation, giving the customary cheery 'Eiuwuo!' response to the recorded greeting 'Aichee!' But soon it became obvious that the tape recorder did not really know how to carry on a conversation in Yaaku. The man first became frustrated, then very angry, and finally he began to weep. (Cronk, 2004: 83, with permission.)

In 1990, only a few elders remembered fragments of the old Yaaku language, and the emotional affection for the Yaaku language, as expressed in the above story, was not shared by other community members. The young members of the community were not interested in the language of their grandparents, whom they thought of as 'primitive' cave people, even though some of them were still alive. The community had adopted the Maasai lifestyle and values in sharing the high appreciation for cattle and Maasai customs such as female circumcision, the age-set system (in which groups of men go through initiation and other stages of life together), and marriage ceremonies.

Although the Mukogodo-Maasai decided to abandon their former language and culture, many other indigenous peoples insist that linguistic (and ethnic) identity is essential and enables them to respond to the everyday challenges in their lives. The deep-rooted emotional affection of many speakers for their language has been expressed very often. The following statement is by Christine Johnson, a Tohono O'odham elder, for the American Indian Language Development Institute in June 2002.

> I speak my favourite language
> because
> that's who I am.
> We teach our children our favourite language,
> because
> we want them to know who they are. (UNESCO, 2003: 1)

There are members of various globally dominant cultures who think that the worldwide spread of one language, of course their own (together with their culture, economy, and religion), would be for the benefit of all humankind. Obviously, not everyone agrees on that. However, one also has to respect the

will of communities that decide to abandon their language and culture, as described with the former Yaaku, today's Mukogodo-Maasai.

What Could and Should Be Done?

What is the first priority when languages are threatened by extinction? Among scholars, there is hardly any argument: documentation, i.e., research on and collection of data from endangered languages, is the fundamental task for linguists working in this field.

Within ethnolinguistic communities discussions on the future of their ancestral languages are far more complex, and quite diverse opinions are expressed. Those speaking endangered languages often consider their own language as being backward and not functional for themselves and future generations. Other communities, however, experience threats to their languages as a crisis and commit themselves to language (re)vitalization activities, establishing environments, such as kindergartens, in which their languages are exclusively spoken in order to stabilize their mother languages among the young generation. An increasing number of ethnolinguistic minorities want more. Firstly, they demand control over the terms and conditions that govern the conduct of research; secondly, they claim rights on research outcomes and also want to have a say in how research results should be used and disseminated.

There is a minimal consensus among linguists on the overall importance of the preservation of language data of endangered languages. However, reactions to demands for assistance by the speech communities with which linguists work may vary widely. Such requests relate mainly to four areas, which may be regarded as essential for safeguarding endangered languages.

Language Work

Many scholars working with ethnolinguistic minorities are willing to help develop practical orthographies that can be used by community members themselves. And some scholars assist communities in the production of reading, learning, and teaching materials.

Capacity Building

Capacity building in this context may refer to the training of local language workers in reading and writing their own languages, the production of reading materials, etc. More privileged settings further allow for the training of language teachers. The formation of local, academic research centers in which speakers of endangered languages are trained to study and document their own languages is possible with quite a few ethnolinguistic minorities. And an exceptional case for the African continent is the Royal Institute for the Amazigh Culture, in which professors and researchers have worked since October 17, 2001, in a national research institute at the University of Rabat to document and develop their own threatened mother tongue, Amazigh.

Language Policy

Language policy is a highly sensitive issue in well-established democracies and even more so in countries that are still struggling to find their way to good governance. Very few linguists are actively involved in the formulation of national language policies in countries of the first kind, and none I know of in those of the second.

In the educational sector, quite a number of linguists are engaged in implementing mother tongue education programs to safeguard ancestral languages. Mother tongue education has become more popular in most parts of the world over the past 15 years, and UNESCO has been instrumental in this development through its policy statements and related activities since 1953.

Looking at endangered languages, however, we find that in many Asian and African countries, so-called mother tongue education does not refer to the ancestral languages of ethnolinguistic minorities but to the use of local, provincial, and national dominant languages as the media of instruction. Less than 10% of the approximately 2000 African languages are currently employed as media of instruction in the educational sector, with not even a single endangered language among them. Mother tongue education in many cases further cements the position of languages that spread at the expense of endangered languages. As linguists, we are obliged to support any attempt to use African languages in formal education, but with that we may involuntarily help to threaten the languages of ethnolinguistic minorities, which are not included among the media of mother tongue education. There seems to be no way out of this dilemma.

Living Conditions

Dealing with the living conditions of communities is commonly not considered to be within the assignment of linguists. Nevertheless, linguists could help to overcome problems caused by economic poverty and lack of education. For example, national HIV/AIDS awareness programs do not generally consider the often-illiterate ethnolinguistic minorities. Materials

produced for these marginalized communities require input from linguists because the concepts and contents need to be conveyed in a culturally meaningful way. Only then can these communities understand the challenge of HIV/AIDS and react to it appropriately.

Roles for Linguists and Speech Communities

Maintaining language diversity demands the involvement of linguists, language planners, and policy makers. Akira Yamamoto has been rightfully demanding for many years that 'research in endangered language communities must be reciprocal and collaborative' because only in working together with the communities are linguists able to contribute to the safeguarding of endangered languages.

Some scholars estimate that in the last 500 years at least half of the languages formerly spoken throughout the world have disappeared. They suggest that only 10% of the present day languages are safe, i.e., not threatened with extinction. To safeguard the vast number of endangered languages requires actions in quite a number of different areas, far more than the few mentioned above. The specific activities that can and should be carried out in a given research setting are determined by several factors. Each research context has its specific limitations and prospects, and these always depend heavily on communities' attitudes toward their own language and their perception of the research carried out on it. And yet, the professional and social competence of a researcher is crucial in determining what is actually possible in the collaboration between the scholar and the speech community.

Having a linguist who is a member of the community does not always keep other community members from doubting linguistic research being carried out on an endangered language. Ofelia Zepeda, a trained linguist who wrote her Ph.D. thesis on her mother tongue, describes the most critical challenges to her linguistic work, which came from her own people, the O'odham. The objections to her work came from two different angles. The few O'odham people who had received some linguistic training some years before her, instead of supporting her, created obstacles to her work.

> Interestingly it was this small group of skilled O'odham language teachers who looked at my publication critically and in their own way offered criticism. However, their criticism was often not constructive or friendly. While still other O'odham people, taking the conservative position, let me know that it was wrong to write the language and to publish it for wide dissemination. (Zepeda, 2004: 7)

Dr Zepeda published *A Papago grammar* in 1982, but the O'odham people have only now, after more than 20 years, started to acknowledge her academic and community work on her mother tongue.

Proficiency in nationally and internationally dominant languages will gain importance throughout the world and, for that reason, will continue to spread. This development does not necessarily require the sacrifice of other languages, i.e., mother tongues of ethnolinguistic minorities, because most societies have always been multilingual. However, speakers might decide to abandon a low-prestige ethnic tongue for the benefit of social mobility and career opportunities. Languages are either maintained or abandoned by their speakers. In these situations, ancestral languages can survive in the long run only if meaningful roles for them can be established in the lives of the community members. Ultimately, in order to maintain and perpetuate the world's language diversity, these speakers have to find good reasons for keeping their ancestral language alive in natural everyday communication with their offspring.

See also: Endangered Languages; Environment and Language; Ethnolinguistic Vitality; Identity and Language; Language Planning and Policy: Models; Migration and Language Planning; Mother Tongue Education: Nonstandard Language; Reversing Language Shift; Tohono O'odham.

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Language of Legal Texts

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Introduction

A legal text differs in a number of ways from ordinary spoken language. This is especially true of authoritative legal texts: those that create, modify, or terminate a legal state of affairs. Such texts are what J. L. Austin might have called written performatives. Lawyers often refer to them as operative or dispositive. Although the focus of this article is on Anglo-American law, the general nature of legal texts is remarkably similar across legal systems, although the details of their structure and use can vary considerably.

The Development of the Text

Legal transactions must originally have been performed by means of speech, often accompanied by rituals of various types. With the development of literacy, it became possible to make a record of such transactions in writing or even to transact them in

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The Development of the Text

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written form. Indeed, the writing of contracts, wills, and codes of laws was an early function of literacy in many different parts of the world.

The Evolution of Private Legal Texts

In England, the birthplace of the common law that is used throughout the English-speaking world, an early type of legal text was the will, as well as grants of land and other types of property. Throughout much of the Anglo-Saxon period, wills and grants of land were made orally, usually with witnesses present, and accompanied by some kind of ritual, such as the symbolic handing over of a clod of dirt to the purchaser or recipient. After England's conversion to Christianity, a class of literate clergymen emerged. Before long, clerics began to make written records of these wills and property transfers as memorials of the transaction, especially when the gift was made to a religious institution that had an interest in preserving evidence of the transaction in case of a future dispute.

These early texts are quite clearly evidentiary rather than performative or dispositive. The transaction was performed orally in front of witnesses. If a written document was made, it was merely evidence of that oral ceremony, not an operative or dispositive legal document in the modern sense. This is evident from the fact that, for the most part, the scribes used verbs that were in the third person and the past tense rather than the first-person present tense verbs that are commonly used performatively, as the following introductory phrase illustrates:

> HER is geswutelod an ðis gewrite hu Ælfheah
> ealdorman his cwidæ gecwæðan hæfð . . .
> 'Here in this document it is declared how the
> ealdorman Ælfheah has declared his will. . .'

In the late Anglo-Saxon period, however, there are indications of a new trend in which legal texts were no longer merely evidence of land transfers or wills. Over the centuries, it became the writing and signing of the document (or placing a seal on it) that constituted the legally operative or dispositive act. The legal transaction was now performed by means of the text. Eventually, a written text came to be considered an essential ingredient of the transaction. The final critical development in the testamentary text was the parol evidence rule, which in the case of wills prohibits the introduction of evidence of oral discussions regarding the content of the text, subject to some narrow exceptions. Thus, what the maker of the will (usually called the testator) might have said to the lawyer who drafted the will, or what he might have said to anyone else about the contents of the will, became largely irrelevant. The evolution from oral to written transaction was now complete. What mattered now was solely the written text. That text was not just the best evidence of the legal transaction. It was not just the only evidence. At this stage, the text had **become** the transaction. A will today is a specific type of legal text that is taken as the definitive expression of the testamentary intentions of its maker.

The development of English wills is a good illustration of how legal texts are introduced into a culture. In the beginning, such texts are almost always evidentiary, serving as nothing more than records of an oral transaction. Yet the text can also become authoritative, as have wills in the past few centuries. In that case, the transaction in question can only be performed by properly enacting written text.

Not all private legal transactions require authoritative written texts. Contracts are a good example. In fact, in the law of contracts we can see all three major stages in the progression from the exclusively oral to the authoritative written text. Even today, there is no requirement that a contract be in writing. A contract can be completely oral, just as in Anglo-Saxon England. It is also possible to make an oral contract that is memorialized by a written record that contains some or all of its terms. If there is a subsequent dispute about the agreement, what the parties said to one another will be crucial; the writing is simply evidence of the transaction.

Finally, the parties to a contract might decide that they want to create an authoritative text of their agreement. Lawyers call this an integrated agreement. If the parties decide to reduce the entire agreement to writing, any terms that are not included in that writing become legally irrelevant. When a court needs to decide what the agreement was between the parties, it is supposed to look only at the text itself. In other words, a text that is considered a fully integrated agreement is not just evidence of the contract, but has become the contract itself.

Public Texts

The evolution of public legal texts, including statutes and judicial opinions (called 'judgments' in England), was similar to that of private texts. Directly after the arrival of Christian missionaries in England, codes or compilations of laws began to appear, usually in the name of the king who had them written down. For the most part, the early codes did not make new law but, rather, created a record of law that already existed in people's minds or memories. Such texts, in other words, were mostly evidentiary.

Legislation, in the sense of enacting innovative rules of behavior, was rare in England until the end of the 13th century. Even then, the texts of such early

legislation were not authoritative in the modern sense; the drafting of the text of early statutes was typically done by clerks or judges after Parliament had given its assent. The text of legislation at this stage was merely evidence of a decision that Parliament had made. As a result, statutes were quite freely interpreted. Without authoritative and accurate texts, it is difficult and dangerous to focus too much on the words of the statute.

But toward the end of the 15th century, legislation in England underwent an important shift. Parliament began to enact text that had been written out beforehand. The text of statutes was no longer simply evidence of the law but began to constitute the law itself. The verbs no longer referred to what the king "hath ordained" or what Parliament "have established" but began to speak in the present tense of what the king and Parliament are enacting by means of the statute.

Statutes also illustrate another important distinction between evidentiary and authoritative texts. Earlier statutes were essentially a type of transcript or minutes written by a bureaucrat regarding a decision made by Parliament. In contrast, an authoritative text is deemed to have been written by the person or body that enacted it. Of course, in reality such texts are drafted by bureaucrats or lawyers. But courts regard the words in a modern will as those of the testator, just as they consider the legislature as being the author of a statute. This attribution of authorship is obviously a large part of the reason that legal texts of this kind are viewed as so authoritative.

The Creation of Legal Texts

The Enactment or Execution of a Text

Legal texts, especially authoritative texts, tend to be created or executed in relatively formal ways. Wills are a good example. Once a will has been drafted, the testator typically gathers with two witnesses in a room. The testator declares that this is his will and signs it in the presence of the witnesses. The witnesses, who must see the testator sign or acknowledge the will, then each sign the will. Although the rules are less strict than they once were, defects in the execution process can still be fatal. A typed will that is signed by the testator and notarized is usually not valid. An important purpose of the formalities is to help us identify this document as an authoritative legal text.

The situation is different with contracts, which as we have observed can be oral and relatively informal. Certain types of contractual transactions must be evidenced by a writing, but most need not be. Even when the provisions of an agreement are reduced to writing, the signing of the writing can occur without any particular formalities (although a handshake or drinking a glass of champagne may be customary in some situations).

The lower level of formality in contract law does have a drawback: It may be unclear whether the parties have made a contract or not. Many contract cases revolve around whether the parties made an agreement that is legally enforceable or whether they were merely involved in preliminary discussions or negotiations. In contrast, when someone has gone through the formalities of executing a will, there is little doubt that she intended to make a legally valid will.

In the area of public law, statutes – which, like wills, are highly textualized – usually are enacted with great solemnity and according to established procedures. Since the early 1400s, it has been established in England that a statute must be debated and accepted by both houses, Lords and Commons, and then receive the assent of the monarch. Most American jurisdictions have similar requirements embodied in their constitutions. Promulgation or publication may also be required. The purpose of these formal procedures is to guarantee that a piece of paper or parchment does, in fact, constitute a particular type of authoritative legal text, a statute.

What Does the Text Include?

Once a legal document has been formally executed or enacted, it would seem to be a trivial matter to determine what is part of the text and what is not. It is certainly true that the formalities of executing a text such as a statute usually make the content of the statute sufficiently clear. Only text that has gone through the formal enactment process is part of the relevant statute. Explanatory materials or reports by legislative committees are not part of the text, although they may sometimes be helpful in resolving ambiguities.

A consequence is that additions and changes to the text must be made in an equally formal manner. A legislature cannot delete a sentence in a statute by ordering the clerk to cross it out on the official copy, even if a majority votes in favor of the idea and it obtains presidential approval or royal assent. Rather, the legislature must enact a new statute, following all the requisite formalities, that declares that the previous statute is to be amended by striking out the sentence.

Formalities required for textual modification of private documents are usually somewhat less strict because they were originally enacted or executed

with fewer formalities. There are a number of exceptions, of course, such as written contracts and wills. Like a statute, a will can be modified only by a formal amendment, called a codicil, which must be executed following the same procedures as the will itself.

Whereas the legislature may be expected to know how to properly amend a statute, ordinary citizens are far less aware of the textual conventions of the law when it comes to private legal transactions. Suppose that Uncle Bob has a provision in his will giving $5000 to Alice, his favorite niece. A year before his death he crosses out '$5000' and writes above it '$10 000.' What does Alice get? In many common-law jurisdictions, the interlineation is ineffective, and Alice gets the original sum of $5000. In others, the act of crossing out the words or numbers will be effective, but the insertion of additional text (the number '$10 000') was not done with proper formalities and therefore is invalid; Alice gets nothing. Virtually no jurisdiction would give Alice the full $10 000 that Uncle Bob intended to give her. The reason, of course, is that a person cannot change an authoritative text by such informal means. To modify a will, you have to execute a new will or a codicil with all the required formalities.

In recent years, courts have tried to mitigate the harshness of these textual conventions in various ways, especially when ordinary people with no legal training were involved. Even with such reforms, however, it is clear that the textual conventions of the law are quite different from those relating to ordinary speech and writing.

Expanding the Text by Incorporation

Even though the rules relating to the formation and revision of legal texts can be quite rigid, the concept of text is in some ways surprisingly abstract. For instance, we have also seen that one way to add to the text is by means of an amendment or codicil. An interesting aspect of the process of amendment is that legally the result is that there is now one new text – even though that text is physically contained in two documents. Thus, a will executed in 1980 and a codicil executed in 1990 are considered a single text. In many jurisdictions, a principle called republication by codicil has the further effect of updating the will, so that all of the text is now considered to have been executed in 1990, even if part of it was actually written in 1980.

Another way to add to the text is by means of what is called incorporation by reference. This is a procedure that allows a document outside of the will itself to be made part of the testamentary text. Thus, if Aunt Hattie adds a clause to her will stating that she incorporates by reference a list of personal property located in her safe deposit box, the list becomes part of the text of her will.

Thus, despite the rigid rules relating to how it is created and given effect, the legal text is actually a rather abstract concept. A testator can execute a will in 1980, make a list of gifts of personal property in 1985, and execute a codicil in 1990 that makes some changes to the 1980 will and incorporates the list by reference. All of these documents, molded or integrated together, constitute a will dated 1990.

Structure and Language of Legal Texts

Structure

The most salient feature of the structure of legal texts is that they are highly formulaic or stereotypical. Some texts can be quite elaborate in terms of structure, of course, but routine legal documents tend to follow a predetermined structure that changes little over time. A statute, for instance, normally has some or all of the following elements:

- Long title

  An Act to establish a Board having the function of promoting and facilitating the use of the Welsh language . . .

- Enactment clause (sometimes omitted in printed or codified versions)

  Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in present Parliament assembled, and by the authority of the same, as follows . . .

- Substantive provisions

  (1) The Lord Chancellor may make rules as to the provision and employment of interpreters of the Welsh and English languages for the purposes of proceedings before courts in Wales.

  (2) The interpreters shall be paid, out of the same fund as the expenses of the court are payable, such remuneration in respect of their services as the Lord Chancellor may determine.

  (3) The Lord Chancellor's powers under this section shall be exercised with the consent of the Treasury.

- Exceptions or provisos

  This section shall not apply in relation to a provision which confers, or gives power to confer, a name on any body, office or place . . .

- Definitions

> In this Part of this Act "public body" means a county council, . . . district council or community council . . .

- Short title or citation

> This Act may be cited as the Welsh Language Act 1993.

Possible additional clauses, which typically come at the end of a statute, may relate to matters such as the administration of the act, enforcement, transitional provisions, repeals of earlier acts, and schedules.

Private legal documents such as contracts also tend to have a relatively fixed structure. Because there are a large number of different types of contracts, however, there are many different formulas or templates in use. Wills, as might be expected, follow a more routine structure, because they virtually all have the same purpose: the transfer of property at death, as well as some ancillary functions such as appointing an executor or a guardian for minor children. A typical will almost always bears the caption 'Last Will and Testament.' An introductory paragraph typically identifies the testator and revokes any previous wills. It is followed by bequests (gifts of property or amounts of money). Most wills begin with a list of specific bequests, followed by a gift of what is called the residue (all the rest of the estate). Additional clauses may deal with the appointment of an executor or a guardian of minor children. The will normally ends with the signature of the testator and two witnesses.

Wills and statutes are but two examples of the archaic and stereotypical structure of many legal texts. One of the main reasons for this repetitious structure and language is that the lawyers who draft these wills tend to base their work on forms that they have inherited from older lawyers or that they find in books of forms. Not just the structure but the language itself tends to be ritualistic and archaic, as shown in the next section.

Language

Legal language, broadly construed as the language of the legal profession, has been the object of numerous studies, many of which advocate reforming it to make it more understandable to the ordinary citizens whose lives and fortunes may be affected by it. Many pejorative adjectives have been used to describe the language of the law, including 'wordy,' 'unclear,' 'pompous,' and 'dull.' More specifically, the literature on legal language suggests that it differs in a number of ways from ordinary speech, including the use or overuse of technical terminology; archaic, formal, and unusual or difficult vocabulary; impersonal constructions; nominalizations, passive constructions (*the girl was injured* . . .); multiple negation; long and complex sentences; and wordiness and redundancy. Collectively, these features are often called legalese.

It is interesting to observe that when the literature refers to features of legal language, it is almost always in reference to written legal language. Recent studies of courtroom interaction or conversations between lawyers and clients reveal that the members of the legal profession normally do not speak legalese. A lawyer arguing to a jury, discussing a matter with a client, or even arguing a point of law to a judge wishes to be understood and generally employs formal but fairly ordinary standard English. Lawyers and judges inevitably use a lot of technical vocabulary, but their speech usually does not contain an inordinate amount of legalese.

In reality, many or most of the commonly mentioned characteristics of legalese are not so much features of legal language *per se* as they are features of legal texts. In fact, it is generally true that the most authoritative texts (statutes and wills) tend to have the highest percentage of legalese in them. To some extent, legalese – and thus, the language of legal texts – can be considered to be an extreme version of formal written language. Research by linguists into the differences between speech and writing has pointed out that, as a general matter, written text is more planned and speech more spontaneous. Related to this difference is that a hearer must process an utterance as it is being spoken, whereas a reader can go over a written sentence again and again until she has figured it out. Such differences are easy to exaggerate, but it certainly is true that a legal text is planned in advance, which makes it possible for sentences to be much longer, denser, and more complex than speech. Written language has also been correlated to greater occurrences of nominalized verbs and passive constructions, both of which are also considered to be features of legalese.

Although both the structure and the language of legal texts tend to remain formulaic and archaic, there is a growing movement that favors making these texts more accessible to both the public and the legal profession. Particularly in some Australian states, parliamentary drafters have experimented with the structure of statutes, adding flowcharts and examples to help readers understand the content. In various parts of the world, there has been a movement to make the language of legal texts – especially those that affect the welfare of ordinary consumers – more comprehensible. There is much still to be accomplished, however.

Interpreting Legal Text

One of the most often-observed features of legal interpretation is the tendency of many judges and lawyers to interpret legal texts in relatively literal or acontextual ways. For instance, English judges during the 18th and 19th centuries developed the Plain Meaning Rule, under which an interpreting judge was supposed to look at the text of a legal document and determine whether its meaning was 'plain,' based purely on the text contained within the four corners of the document. If so, the meaning of the document should be derived solely from the text itself, without reference to any 'extrinsic evidence' (outside sources). Thus, the meaning of a statute could not take into account statements made by legislators during debates or reports by legislative committees. Only if the meaning of the text was ambiguous could judges appeal to outside sources to help determine its meaning.

The Plain Meaning Rule held sway in England throughout the 20th century, although it has recently lost some of its force. In the United States, it came under attack by both judges and legal academics over the course of the previous century. Many courts began to look at the outside evidence to determine whether the language of a text really was as plain as it seemed. If the external evidence revealed an ambiguity, they would then consider the evidence in determining the meaning of the text. In the area of statutory interpretation, it became relatively acceptable to look at a statute's legislative history to help determine the meaning of an ambiguous word or phrase. Sometimes a judge's view of the intent of the legislature, or of the purpose the statute, might even justify going beyond what seemed to be its 'plain' meaning.

At the end of the 20th century a counterrevolution arrived in the form of what is now called 'textualism.' Its strongest advocate is Justice Antonin Scalia of the U.S. Supreme Court. Essentially, textualists urge judges to focus more on the text of a statute and less on the intentions of the legislature. In that sense, textualism could be viewed as attempting to resuscitate the Plain Meaning Rule.

Those who oppose textualism tend to place greater emphasis on the intentions of the legislature (intentionalists) or on the goal or purpose of a statute (purposivists). They often make the linguistic argument that textualism rests on a misguided or simplistic view of language. No text can have a meaning independent of the intentions of its maker. In fact, the search for meaning invariably focuses on what a speaker meant by an utterance.

It is certainly true that in ordinary spoken language, we normally aim to determine the meaning that a speaker intended to convey and use any pragmatic information that might be available to determine the speaker's communicative intentions. Whether we inevitably use the same strategy to interpret written language and, in particular, authoritative legal texts is less clear.

One important difference between spoken language and written text is that writing tends to be more permanent than speech. This is certainly true of legal texts, which on occasion remain in force for hundreds of years. Furthermore, writing tends to be more planned, whereas speech is usually relatively spontaneous. This is also true of legal drafters, who plan texts carefully in an effort to cover every base and foresee every future contingency. They will never completely succeed, of course, but the fact that they try is in itself significant.

A related difference is that a speaker is usually engaged in face-to-face contact with the hearer, whereas a writer normally is not. Consequently, it is possible for a speaker to monitor whether the hearer seems to understand – and, if not, to explain again in different words. Written legal texts usually do not allow for such subsequent explanation and elaboration. Thus, the drafter must take time to be as clear and precise as possible because he will not have a second chance to explain something. This is why legal drafters tend to be so obsessed with precision. Whether they achieve it is another issue, but judges who interpret a text assume that the drafter chose his words carefully. If a drafter of a statute uses two words that are similar in meaning, such as *residence* and *domicile*, the assumption will be that this is not free variation but that two distinct meanings were intended.

Moreover, spoken interaction often involves people who know something about one another or who can infer certain information about their interlocutor based on the situation in which they find themselves. Face-to-face interaction also allows for the communication of additional information by nonverbal means. The hearer may thus use, in addition to language, shared background information or nonverbal cues to determine the communicative intentions of the speaker. Writers must normally signal all their intentions verbally. This difference promotes a somewhat more literal interpretation of written texts. An utterance spoken to a friend might well be understood, as intended, to be a joke or ironic comment based on what the friend knows about the speaker and the speaker's tone of voice. Someone who read the same words on paper might take them more literally.

Because writing is relatively permanent, legal drafters can create texts that might have to be interpreted

many years or even centuries in the future by an unknown audience. For the most part, all that the drafters have at their disposal to accomplish this aim is the written word. In terms of background information, the main thing drafters can assume about their audience is a basic knowledge of the world and the legal system. Such texts will therefore have to be written in a highly autonomous style, in which the drafter aims to place into the text as much information as is needed to interpret it. The ideal is that a legally educated reader will be able to interpret the text without recourse to other information, even if situated thousands of miles away or many years later. Lawyers are deemed to place all relevant intentions into the text, and judges who interpret the text presume that they were successful. Critically, this ideal provides the underpinnings of the Plain Meaning Rule.

Of course, this idealization of how legal texts are created and interpreted flies in the face of what we know about human language. Language is not always clear, and there is no such thing as a fully autonomous text. Most members of the legal profession are aware of these limitations, which explains why even judges who adhere to the Plain Meaning Rule do not apply it when the text is ambiguous. Nonetheless, judges have often had an inflated notion of how the textual conventions of the profession enable judges to interpret a carefully drafted text without recourse to outside materials.

Even if the profession's textual conventions facilitate or encourage a relatively literal mode of interpretation, it does not follow that a textualist approach to interpreting legal texts is inevitable. A textual approach effectively privileges the text over authorial intent. An intentionalist approach, on the other hand, pays greater attention to the intentions of the drafter or legislature. Which approach is 'best' is ultimately a political decision that depends largely on the current view of the institutional role of lawmaker and judge. In a democratic system in which lawmakers are elected by popular vote and are deemed to express the will of the people, it makes sense for judges (who are often not elected) to carry out as best they can the evident intentions of the legislature.

Yet at times it may be more important to preserve the integrity or cohesiveness of a legal text. Criminal law is perhaps the best example. In this area, the rule of law requires that a statute clearly inform citizens of which types of conduct will subject them to punishment. It should be possible for a citizen to know, based on reading a statute, that certain conduct is prohibited. Such a citizen should not be forced to hire a lawyer to investigate whether there might be some legislative history buried in an archive that could potentially enlarge the statute's scope. The nature of the audience should also be considered. If a legal document such as a contract or will is produced by a person who is untrained in the law and who is therefore unfamiliar with its textual conventions, there is no logical reason to interpret that document in a textual way.

Ultimately, interpretation involves a symbiotic relationship between the encoder and decoder of language. To the extent that language is encoded using particular textual conventions, it should be decoded taking those conventions into account. If, on the other hand, it is encoded as ordinary language, it should be decoded as ordinary speech or writing.

Conclusion

It has long been known that the language of the legal profession is different from ordinary speech. To some extent, these differences can be accounted for by the fact that legal documents tend to be drafted in formal literary English. Many of the features of legal language are also found in the more formal written varieties of ordinary English.

Yet there are also some important ways in which legal texts are quite distinct from other writings. This results in large part from the textual conventions of the profession, which enable the creation of a text that, once properly enacted or executed, comes to be viewed as the authoritative expression of the intentions of its author. The formal creation of such texts tends to promote a relatively textual, or literal, interpretation.

The formalities surrounding the creation and interpretation of authoritative legal texts can provide a degree of certainty to their makers and users. But those same formalities, because they differ from how ordinary people tend to write and understand documents, can also frustrate the intentions of legislators, testators, and others deemed to be the authors of the text in question. In all areas of the law, there has been a tendency in recent years to draft and enact legal texts in less formal ways and to interpret them in ways that are more consistent with the intentions of their makers. With the exception of some areas of the law where the authoritative text plays a particularly important function, this trend seems likely to continue.

Less clear is the impact that new technologies will have on legal conventions relating to text. It is now possible to embed hyperlinks containing definitions or cross-references to a document. And text no longer necessarily consists of ink marks on paper. How this will change the legal conception of text is unclear, but it seems inevitable that it will.

See also: Law and Language: Overview; Performative Clauses; Speech Act Verbs.

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Language of Tertiary Education

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Languages as Medium of Tertiary-Level Teaching: Overview

Of the some 6000 languages presently spoken worldwide ('living' languages), only a small fraction serve as the medium of teaching on the tertiary level, i.e., for tertiary-level teaching. More are used for secondary-level teaching, and a still larger portion for primary-level teaching. The number of languages that are studied as teaching subjects (as opposed to medium) is even greater, with probably larger numbers on the tertiary than on the lower educational levels. The teaching subjects comprise many of the living as well as some of the 'dead' languages, if one includes teaching for small groups of linguistic experts around the world. For a language to function as a tertiary-level medium requires its sufficient modernization (*Ausbau* – cf. Kloss, 1978: 37–60), especially availability of adequate terminology and texts, which in turn depends on the language's history and its community's technical advancement, economic strength and linguistic resolution.

A reasonably reliable source (Salzman, 2002) mentions, in its extensive (though incomplete) country-by-country list of tertiary institutions, 82 languages altogether for teaching on the tertiary level, of which 39 are used in more than one country. **Table 1** lists those 13 languages that are used in three or more countries with the number of countries given in each case. None of them is the sole tertiary medium in each single one of these countries but sometimes used only for special subjects or study programs. However, no less than 41 languages, i.e., half of the entire list, appear to be the sole tertiary medium in at least one country; but figures have to be taken with caution because of the incompleteness of data. The rest, again 41 languages, function only as the co-medium, presumably only for a limited range of scholarly or scientific fields. Some of the languages excluded from may, however, be used more regularly and in more scientific or scholarly fields than some of those listed in the table.

Official Language and Medium of Teaching

All of the 82 languages functioning as the medium of teaching on the tertiary level are the official language of some country, mostly even the national official

See also: Law and Language: Overview; Performative Clauses; Speech Act Verbs.

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Official Language and Medium of Teaching

All of the 82 languages functioning as the medium of teaching on the tertiary level are the official language of some country, mostly even the national official

language. A few are only regional official languages, notably in India (Assamese, Dogri, Gujarati, Kannada, Malayalam, Marathi, Oriya, Punjabi, Sindhi, Telugu), Russia (Chuvash, Komi, Tatar, Yakut), and Spain (Basque, Catalan [also Valencian], Galician). Not all the national official languages of countries function as the tertiary-level teaching medium, not to speak of the regional official languages. Those excluded are typically the languages of small communities on the one hand, whose members are, at the same time, bilingual in the language of a larger community, e.g., not Luxemburgish (Luxemburg) or Romansch (Switzerland). Thus, the speakers of Luxemburgish or Romansch are at the same time bilingual in French or German, through which they have access to tertiary education. A somewhat different case, on the other hand, includes the indigenous national languages of former colonial countries, which play no or only a marginal role alongside the former colonial languages which remain the main tertiary teaching medium, especially in anglophone and francophone Africa (cf. Ridge, 1999), but partially also in the Arabic-speaking countries (cf. Suleiman, 1999) and some Asian countries (for Malaysia, e.g., Kaur Gill, 2002: 103–118). It seems, however, safe to assume, that all nationally or regionally official languages are subjects of teaching (at least subjects of choice) on the tertiary level of their countries.

Differences According to Disciplines and Levels of Teaching

It is a well-known fact that the number of languages for teaching natural sciences is more limited than for teaching the humanities (cf. Kloss, 1978: 46–55). Especially for graduate science courses, comprehensive teaching materials are only available in a small number of languages, while oral teaching extends to more languages. Rigorously speaking, English may even be the only 'fully equipped' language today. From a less rigorous viewpoint, the languages for which reasonably comprehensive graduate science teaching materials are available are roughly those listed in Table 1, with some of them less equipped than others (Armenian, Arabic, Turkish) and a few even better equipped than some of those included in the table (e.g., Hebrew, Hungarian, Polish, Swedish). Advanced science teaching materials can, as a rule, only be produced by language communities, or countries, who themselves play a notable role in science research and who have a tradition to do so as well as an adequately modernized language. Otherwise, they have to make do with a 'foreign' language.

Table 1 Languages used for tertiary-level teaching in three or more countries

Language	*Number of countries*
English	103
French	42
Arabic	23
Spanish	18
German	15
Russian	10
Dutch	6
Portuguese	5
Chinese	5
Japanese	3
Italian	3
Armenian	3
Turkish	3

In the humanities and, to some extent, in the social sciences, a greater number of languages are employed for tertiary-level teaching than in the natural sciences. Here it is more likely for language communities, or countries, to use their own nationally or regionally official languages for various reasons: topics seem to be more immediately relevant for their own national identity and their own language community, and a respectable level of research seems to be easier, or less costly, to achieve than in the 'hard' sciences, which is why advanced teaching can interact quite directly with their ongoing own research.

Recent Changes in the Role of English

Until a couple of decennia ago, countries such as France, Germany, Italy, and Japan offered all tertiary-level teaching, even in the natural sciences, in their own languages. This has, however, changed in recent years, with English being introduced as an additional language in all of these countries at least at some institutions and for special programs (cf. Ammon and McConnell, 2002, for European countries). It seems safe to say that nowadays all the non-English-speaking countries make at least some use of English for tertiary-level teaching, especially in the natural sciences and modern technologies but also, to a lesser extent, in the social sciences including economics. There are several reasons for this spread of English. One is intensification of global science communication that favors the use of one single language, naturally the one most widespread and used by the scientifically leading country (the United States). Most countries are eager to equip their own academics and students with skills in this language, which appear indispensable for successful global

communication (cf. Crystal, 1997). Another reason for the introduction of English-medium teaching on the tertiary level is competition on the international academic market, especially the craving for foreign students and scientists or scholars (Van Parijs, 2000). The English-speaking countries reap huge benefits from the preference of internationally mobile academics, not only in terms of money (e.g., tuition fees; cf. Kaplan, 2001) but also in terms of international connections including spread of own values and ideology. A major reason why they win the lion's share in this market is the English language, in which most academics or students have acquired skills in school and which they would like to further improve rather than acquiring skills in another foreign language. Countries such as France or Germany have reasons to believe that insistence on their own language would keep foreign academics and students out, which is why they started to introduce English for tertiary-level teaching. Their scientists and, to a lesser extent, their scholars have shifted to English as their preferred language of publication years ago (cf. Ammon, 1998).

It should be stressed that none of these countries plans to completely shift to English for tertiary-level teaching. On the contrary, official policies aim at containing English at the level of merely an additional language and at maintaining the local language as the primary teaching medium. Otherwise, fears are, foreign language studies and prestige of the local tongue would suffer. The possibility of studying in France or Germany still is considered an important motive for studying French or German as a foreign language. On the face of it, official policies try to prevent English from completely replacing the local language and becoming the sole tertiary teaching medium. These policies aim at limiting the function of English to improving the local academics' and students' skills in the language and to opening up tertiary institutions for English-speaking foreigners. Once the latter have entered, they are expected to learn the local language, too, and, in the course of time, to do part of their studies in it. As long as skills in the local language remain a requirement for successful studies, it appears worthwhile studying the language abroad, before entering the country, to avoid the burden of extra language learning alongside regular studies. Thus, negative effects of introducing English as a tertiary teaching medium on the departments of French or German abroad could perhaps be kept at bay. As much as such attempts appear in line with the country's own interests, officials are shy to rigorously insist on (for fear of being criticized of national selfishness), which is one of the reasons, among perhaps weightier others, why programs with English as the sole teaching medium tend to spread.

Problems and Attempts at Alleviation

Countries such as France, Germany, and Japan fear that the use of English as their tertiary teaching medium might accelerate decline of studies of their own language and, thus, to loose an important channel of their international relationships. They also tend to see it as a threat to their national identity, for which their own language is an important symbol. As a countermeasure they try, besides stabilizing their own language at home (cf. section 4), to establish own-language study programs abroad. Successful endeavors of this kind partially explain why languages such as French, German or Japanese function as the tertiary-teaching medium beyond the countries where they have official status. English often still remains, in fact, the preferred medium of teaching at tertiary institutes financed by non-English-speaking countries abroad, which have to be content with teaching their own language alongside English-medium studies, as, for example, at the German University in Cairo.

Whether introducing English as a tertiary-level teaching medium has, in the long run, more advantages or disadvantages for countries such as France, Germany, and Japan, is a question difficult to answer. The resulting better skills in English could very well help to break, in the long run, the often bewailed Anglo-Saxon monopoly of access to the most advanced scientific knowledge and publication channels (cf., e.g., Durand, 2001). A thorough success seems, however, only possible if the non-English-speaking countries could establish their forms of English, or 'Globalish' (cf. Ammon, 2003), as linguistically equivalent to native-speaker English. The home–school language gap (cf., e.g., MacLure, 1999) is usually less of a serious problem on tertiary than on lower educational levels, as it can be softened through preparatory language teaching at the lower levels.

Foreign Language Requirements

A final remark seems in order on foreign language requirements for tertiary-level studies. They have, or are believed to have, various functions, a particularly important one of which is providing access to the literature or culture relevant for the subject of study. Thus, students of European or of Asian history are often required to study Latin or Greek or, respectively, Chinese or Sanskrit. Also, science students worldwide are required to study English nowadays. Conversely and conspicuously, foreign language requirements

were abolished at American universities in the 1960s (controversially discussed in several contributions to *Science*, e.g., Ross and Shilling, 1966; Hartmann, 1967), although abolition was not complete: foreign language studies keep being required for certain subjects at most universities. But Ph.D.s in science including medicine can now be acquired without the knowledge of any foreign language at many American universities. This of course forces scientists of another linguistic background to use English for contacts with their American colleagues. It is, finally, the unequal power of language communities that determines language choice in science, in research as well as in teaching.

See also: Education in a Former Colonial Language; Foreign Language Teaching Policy; Language Policies: Policies on Language in Europe; Language Spread; Languages of Wider Communication; Lingua Francas as Second Languages; Pragmatics: Linguistic Imperialism; Second and Foreign Language Learning and Teaching.

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Language of Thought

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The idea that there is a language of thought amounts to the following: having a thought with a particular content is a matter of being related in a certain way to a sentence in an innately given mental language. The sentences or formulas in this language (Mentalese) are like the sentences of public natural languages (Japanese, Urdu, English, etc.) in that they have syntactic and semantic properties. That is, they are composed of constituents in particular structural configurations and their semantics is a function of the semantics of their basic elements and their syntactic structure. The grammar of Mentalese may, however, differ quite radically from the grammar of any natural language. The basic elements (concepts, perhaps) denote entities and properties in the world. The full formulas are truth-conditional, and so have truth values as determined by the way the world is, and they bear logical relations to each other, such as entailment.

The Representational Theory of Mind

The relevant notion of a thought here is that of an 'intentional' state of mind, where intentional mental states are those that have the property of being representational, that is, of being about the world. Beliefs, desires, intentions, hopes, and fears are different types of intentional mental states. They are sometimes

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called propositional attitudes, since they involve the having of an attitude to a content or proposition, for example, having the belief attitude to the 'Paris is a beautiful city' content. These intentional mental states play a central role in cognitive psychology in the explanation of human purposeful behavior. For example, it is because Madge wants to drink some Pepsi and she believes that there is some Pepsi in her refrigerator that she goes to the refrigerator and reaches inside it. On the language of thought (LoT) view, having a belief or a desire, etc., with a certain content entails being in a relation to an internally represented sentence with that content, so the explanation of Madge's refrigerator-oriented behavior will include a specification of the interaction of the sentences that represent the content of her relevant beliefs and desires.

The LoT hypothesis arises in the context of the current computational model of the mind, whereby mental processes, such as reasoning, are sequences of mental states and the transitions between states are effected computationally. Conceiving of these computations as formal/syntactic operations defined over mental representations gives a mechanical explanation for mental processes. That is, they operate on symbols in virtue of the form of the symbol, not in virtue of any semantic property of the symbol, just like the operations performed by a computer or the transitions from line to line in a logic proof. This approach to the causal explanation of mental processes is known as 'methodological solipsism' (Fodor, 1981; Lycan, 1990a). It follows that two beliefs or desires are cognitively distinct if and only if the representations of their contents are formally distinct. For example, consider the desire to meet the husband of Janet Fodor and the desire to meet the staunchest advocate of the language of thought hypothesis. These are identical in their truth-conditional content (given that the definite description in each case picks out the same individual in the world, namely Jerry Fodor). However, so far as cognitive activity is concerned, these are quite distinct types of desire, as they may each be the result of a distinct sequence of thought, and each may cause further different thoughts. Furthermore, they may issue in quite distinct behaviors: in the first case, one might telephone Janet Fodor to ask her and her husband for dinner; in the second, one might seek out conferences on the philosophy of mind. The crucial point here is that thoughts have their causal roles as a function of their formal properties. Semantic properties are respected only in so far as they are mimicked by formal properties, which, of course, they are to at least some extent, since deductive reasoning, which preserves truth, plays a major role in human thought.

Why Should Thoughts Have Syntactic Structure?

One could be an 'intentional realist,' that is, one could accept (a) that beliefs and desires really exist, (b) that they are physically instantiated in the brain, and (c) that they play a causal role in thinking and acting, without positing a **language** of thought in which the objects of attitudes are couched. What's crucial about language is constituent structure, that is, that a sentence is made up of parts and these same parts can occur in a range of different relations with each other in different sentences. So what distinguishes the LoT view from other intentionally realist views is that it entails that belief/desire states are structured states. Fodor (1975) claimed that the language of thought was implicit in the computational approach to psychological explanation since computation presupposes a medium in which to compute. However, the emergence of an alternative computational approach, connectionism (see Sterelney, 1990 for an introduction and *see* **Associationism and Connectionism**), indicates that more argument for structured thought is required, since according to connectionism the mental causes of intelligent behavior can be modeled by patterns of activation across networks of nodes and connections, involving no level of symbolic representation. One of Fodor's (1987b) arguments for syntactic thought turns on the 'productivity' and 'systematicity' of thought. The set of thoughts is potentially infinite and the ability to think any particular thought is intrinsically connected to the ability to think various other thoughts. So, for example, anyone who can form the thought 'the ruthless spy saw the desperate terrorist' can also form the thoughts 'the desperate terrorist saw the ruthless spy' and 'the desperate spy saw the terrorist,' etc. The parallel with natural language is obvious, and since the explanation for the productivity and systematicity of language is its combinatorial syntax and semantics, it is natural to assume that thought too has combinatorial structure.

The Relation between Thought and Public Language

Fodor believes that the semanticity of natural language, that is, the 'about-the-world' property of linguistic expressions, is dependent on the representationality of thought. So, the answer to the question 'How is it that the English sentence, "Paris is a beautiful city," is about Paris?' is, roughly: 'Because that sentence is a vehicle for expressing a thought about Paris.' On this view, an account of the semanticity of natural language

follows from an account of how thoughts refer to the world. For interesting ideas about this logically prior theory of 'psychosemantics,' see Fodor (1987a) and Millikan (1989).

See also: Associationism and Connectionism; Cognitive Science: Overview; Fodor, Jerry (b. 1935); Philosophy of Mind.

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Language Planning and Policy: Models

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Just as with many new fields, there continues to be disagreement over the name of this one, variously called language policy (Nesiah, 1954; Sibayan, 1974), language treatment (Neustupný, 1970), language cultivation (Prague School, 1973), language engineering (Sibayan, 1974), language planning (Haugen, 1959), and language management (Jernudd, 2001). While the last five are more or less synonymous, referring to attempts by authorities to modify language behavior, the first can refer to the customary practices in choice of language items and variety in a speech community, or to a specific decision or set of decisions to modify those practices. To avoid confusion, we will use the terms as follows. The language policy of a speech community (an undefined term, ranging in size from a family through a nation-state to a multinational grouping) consists of the commonly agreed set of choices of language items – whether sounds or words or grammar – or language varieties – whether codes or dialects or named languages – and the beliefs or ideologies associated with those choices. It can be found in language practices and beliefs or in formal policy decisions such as laws, constitutions, or regulations. Language management, planning, engineering, cultivation, and treatment are actions taken by formal authorities such as governments or other agencies or people who believe that they have authority, such as parents, teachers, or academies, to modify the language choices made by those they claim to have under their control (Spolsky, 2004). Language management itself has three components: the development of explicit language plans and policies, their implementation (by rules or laws or resource allocation), and the evaluation of results and effects (cf. Rubin and Jernudd, 1979: 2–3).

Managing Bad and Good Language

Language policy makers and analysts apply the term policy and its synonyms to a wide variety of administrative levels ranging from international organizations (Van Els, 2001) to world regions (Extra and Gorter, 2001; Kaplan and Baldauf, 2003) to countries (Grenoble, 2003; Lo Bianco and Wickert, 2001), or to single educational institutions (Karyolemou, 2002). The term has been expanded to include what is referred to as 'grass roots language policy', that is, policy originating in or influenced by the affected members of the speech community (Hornberger, 1996). Cooper (1989) shows that it can usefully be applied to a family level.

The main principles of language policy become evident even at this simplest level. In any family, there is language policy, as shown by the normal choices of language in the speech practices of the group, viz., which variety of language is addressed in practice to each member. For instance, baby talk (Ferguson, 1964) may be used with very young children, heritage

follows from an account of how thoughts refer to the world. For interesting ideas about this logically prior theory of 'psychosemantics,' see Fodor (1987a) and Millikan (1989).

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languages (Cummins, 1983) with grandparents, or community languages (Smolicz and Secombe, 1985) with outsiders. In immigrant families, there is commonly a difference in language usage between adults, older children, and younger children. There are socially determined differences concerning who usually has the right to speak and what topics and forms of language are appropriate when the family gathers. In conversations between adult caretakers and children, there are commonly efforts to manage language choice, whether by encouraging the use of one variety or by attempting to discourage bad language. Definitions of what is bad language vary socially. It may consist of presumed mistakes in grammar or pronunciation, or the use of stigmatized forms or expressions such as cursing, obscenity, blasphemy, foreignisms, or inelegancies. Often beliefs or an ideology will be quite different from practice. Immigrant parents may think that their children should use either the heritage or the new language exclusively. Such beliefs may or may not lead to successful efforts at management.

The effort to avoid bad language and teach good language is carried outside the home into other institutions, particularly the school which takes a leading role in efforts to modify the language known and used by its pupils. Because of their central role in language socialization, school teachers are most comfortable, it seems, with a standardized variety of language, with clear statements on what is right and what is wrong. They commonly share the puristic belief, that there is a 'correct' variety of language, and, *contra* King Cnut, the key belief that language management is possible. They believe that they themselves use correct language: French teachers are sure they pronounce the *l* in *il vient* and Palestinian teachers are sure they teach in Modern Standard Arabic.

Correctness, however discovered or defined, is one common criterion for good language (Guitarte and Quintero, 1974). Another is the avoidance of obscenity, sometimes institutionalized in laws and regulations at the local and national government level. The United States has federal laws against obscenity, but standards and definitions are local (Harrison and Gilbert, 2000). Blasphemy, an obvious concern of religious institutions, is unlikely to be a matter of legislation in secular nations, but remains an issue in the many states with religiously dominated constitutions such as Pakistan. Seditious language, as opposed to actual sedition and violent language ('fighting words' in the laws of some southern U.S. states) is also criminalized in some nations.

A more recent criterion for good and bad language is 'political correctness', the avoidance of chauvinist or racist language. The campaign to avoid words or expressions that stigmatize racial or religious groups or that express prejudice based on gender (assigned or constructed) is about half a century old in the West. In the United States it has led to language management efforts especially by publishers and editors who try to ban gender-biased terminology and grammar (Pauwels, 1998).

A common criterion for language management, one that moves us closer to the realm associated with national language policy, is the avoidance of expressions and words considered foreign (Annamalai, 1989). One of the inevitable effects of culture and language contact, and it is difficult to distinguish the two, is a tendency to borrow foreign words along with the new concepts and artifacts that they label. In many situations, ideological opposition to foreign borrowings is nearly as strong as opposition to the use of foreign languages (Kroskrity, 1998). In Latin America from the conquest, there was puristic opposition to the use of 'americanismos', defined as words borrowed from native languages or locally coined, and a similar anti-foreign purism now calls for laws against borrowings from English (Rajagopalan, 2002). The idea of a pure uncontaminated language is widespread (Jernudd and Shapiro, 1989). Preventing linguistic corruption was and remains a key task of the French Academy. Most national language movements hold puristic beliefs, although the particular source of contamination (French in the Dutch-speaking portion of Belgium, Arabic in Turkish, Yiddish in Hebrew, Danish and now English in Icelandic) varies. Presumably, this represents a belief in the identifying and symbolic value of language. By admitting foreign elements, 'I may be weakening my national identity'.

Three important generalizations emerge from the discussion so far. One is the tension between pragmatic communicative goals (for instance, the caretaker aims to give the child the most efficient variety of language) and symbolic and social goals (identifying the speaker with a chosen social group). A second generalization relates to the linguistic and social levels on which policy can apply: linguistically, it can refer to a single sound or word (*ain't*) or to a labeled variety of language (jargon, English); socially, it can apply to a small social group such as a family or to a higher level such as a nation state or an international federation. A third generalization is that policy is manifested in practice, in beliefs or ideology, and in management activities, and while the three aspects are intertwined, they need not be consistent.

National Language Policies

Most analyses of language policy and management are concerned with formal, governmentally backed activities at the national or regional level aimed at

controlling language knowledge and use within a country or region.

During the first phase of the study of language planning, Kloss (1969) proposed a useful distinction between what he called status planning, the determination of the status and functions of a language in a community (such as 'official' or 'national') and what he called corpus planning, the specification of the proper form a particular language should take (such as writing system or spelling or approved lexicon or grammar). Planning was considered an appropriate term in the 1960s, as one part of national development planning (Das Gupta and Ferguson, 1977).

Cooper (1989) added to these two the field of acquisition planning, the determination of which languages should be taught to those who do not speak them and how. While these three domains are conceptually distinct, in practice they overlap. Making a language variety official usually involves standardizing it, writing it down, and modernizing it. It also requires teaching it to citizens who do not know it. Foreign and domestic language policies are blended in situations like the status of French in Canada, the retention of colonial languages in Africa, and the status of trans-border languages in ethnic enclaves such as Swedish in Finland or French and Italian in Switzerland or French and German in Italy.

Corpus Planning and Management

Concern for the form of language may be discerned in the efforts of parents, teachers, and other caretakers to make sure that their charges speak clearly and use forms that are acceptable. It appears more fully developed and institutionalized in efforts to maintain the purity and correctness of sacred texts and in the educational systems that take on some responsibility for correctness. Indeed, language management agencies (Dominguez and López, 1995) are often part of a ministry of education.

More generally, in many countries, especially those where the issue of status is not salient, the largest share of language management is concerned with corpus policy, the prescription of the proper form a language should take, and the cultivation of a language to handle appropriate functions (Prague School, 1973). This can take a variety of forms. In many of the least developed countries and among some indigenous groups in developed countries, the principal corpus activity is the adoption or adaptation of a script and the promotion of literacy among its speakers (Fishman, 1977).

Another frequent goal is language purification (Neustupný, 1989). Commonly this involves an attempt to return to a sometimes fictitious primal language, purging the modern language of loan words and expressions imported from other languages (Jernudd and Shapiro, 1989). Examples are the purging of Persian and the substitution of Sanskrit-based words in Hindi, and the reverse in Urdu (R. King, 2001). Similarly, the deletion of foreign influences in German during the Nazi years and the perpetual struggle of French against Franglish (Weinstein, 1989) are of the same order. Sometimes purification is more extensive. For instance, under Atatürk, a deliberate attempt was made to simplify and modernize Turkish (G. Lewis, 1999). Older linguistic forms borrowed from Ottoman Turkish, Persian, and Arabic were replaced with elements identified with a Turkic past, and the Perso-Arabic script was converted to a Roman one. Similarly, in China the development of Putonghua was accompanied by extensive modernization of vocabulary and morphology (Coulmas, 1991). In a similar vein, the attempt to create a pan-national standard Arabic and to diffuse it throughout the Middle East and North Africa, overlaying the sometimes mutually unintelligible country dialects, has required major innovation in the writing system, grammar, and lexicon of the language (Suleiman, 2003).

Sometimes corpus activity has been directed to the revival or rejuvenation of a language that historically had become fossilized or marginalized, for instance, the attempt to support the use of Quichua in the Ecuadorian Andes (K. King, 2000). Similar management may be found in the attempts to spread the use of Celtic languages in Ireland, Scotland, Wales, Cornwall, and Brittany. In the case of Cornish, extinct for nearly two centuries, and with only medieval texts available, the decision to revive the language required a major effort to rebuild the vocabulary.

Another example showing how corpus management fosters the status of marginalized languages is the use of institutional power to promote selected languages. For instance, the status of Hebrew was transformed from a sacred and literary language in the Jewish diaspora to the recognized language for everyday use in the Jewish community in Mandatory Palestine, a development which prepared for it for its role as the official language in Israel (Spolsky and Shohamy, 1999). Classical Arabic has been used to enhance religious identity among Muslims; in the Arabic speaking countries, it is usually listed alongside religion in the constitutional definition of the state. After Indian independence, Sanskrit was listed in the Constitution as one of the official languages of India, was proposed as a medium for the transmission of news on the radio, and is now set as the medium of instruction in three universities. The new

draft constitution of Iraq moves Kurdish close to equality with Arabic. An Official Maori Language Act in New Zealand provided official status for what was considered an endangered language. Official status is not enough – Ireland and New Zealand and Valencia were able to increase the numbers who have learned Irish and Maori and Catalan by adding resources for teaching the languages, but they have not so far been able to increase the number of people actually using the language.

The converse of the policy of promoting little-used languages is the deliberate removal or downgrading of languages. The systematic suppression of the use of Tibetan in China or Kurdish in Turkey or the autochthonous languages among the American North, Central, and South American Indians are clear examples. In the same vein, but less dramatic, are the efforts by the former Soviet states (Hogan-Brun and Ramoniene, 2003; Landau and Kellner-Heinkele, 2001) to replace Russian with their titular language. While most of this policy is directed at language use – in government, the press, the media, the educational system – it also includes changes in the language itself. These changes include the purging of Russian forms and vocabulary (added during the period of Stalinist Russification) from the titular language, a search for alternative cultural and historical roots – in the case of Muslim states emphasizing Turkic origins – and the creation of neologisms both to replace Russian borrowings and to modernize the traditional language (Grenoble, 2003). In most of these nations, shifts to roman scripts had begun even before independence, but then became more pervasive. In some of the former satellite Baltic and Eastern European states, the Russian language has been stripped of its dominant position in government and the educational system.

Status Management

The status of a language variety refers to the domains and extent of its use and to its associated rankings in society. More particularly, status management usually refers to the designation of languages as official for use in the public sector and in the educational system. Most scholarly analysis of language planning and policy is concerned with status, although, as Fishman (2000) points out, status and corpus are usually intertwined. The nature of status policy depends substantially on differences in the number and types of languages spoken in a country (Lambert, 1999). Countries with a single dominant language face a different set of policy issues compared with linguistically dyadic or triadic countries – those with two or three relatively equal languages. Similarly, countries that are linguistic-mosaics, that have a large number of significant languages, have different sets of problems from monolingual and dyadic or triadic language countries.

Ideologically Monolingual Countries

Few countries are truly linguistically homogeneous – Iceland is probably the closest (Vikor, 2001) – but many countries in Western Europe, the Americas, and Asia have perceived themselves as being essentially monolingual. In Europe, this is especially striking in the face of persistent multilingualism. The recently published *Encyclopedia of the Languages of Europe* (Price, 2000) listed some 300 historical and currently used languages in Europe. Several of the countries in East Asia, too, essentially see themselves as monolingual although each contains important language minorities. In these cases, there is generally what Fishman (1969) labeled a single Great Tradition, which is associated with a single language. Generally, these countries leave the interest in the selection and standardization of the national language to the field of historical linguistics, but for those with a more recent history, there are studies looking at the first congress proclaiming the language (Fishman, 1993) and of the struggle for standardization. In linguistically homogeneous countries (Fishman, 1966a), the principal focus of language policy has been on corpus management, the cultivation and purification of the national language (for instance, Pedersen, 2003), supplemented in some countries – notably France, Germany, and Japan – by efforts to export the national language abroad (language diffusion policy) (Cooper, 1982).

Within ideologically 'linguistically homogeneous' countries, language policies that relate to linguistic minorities depend in part on the kind of minority involved.

Ethno-Linguistic Regional Minorities Long-standing, geographically concentrated minorities with a recognized history and culture receive the bulk of attention in both governmental and educational language policy, as well as in academic analysis. Examples of such minorities are the Swedish-speaking minority in Finland, the Sami in Finland, Sweden, and Russia, and the Celtic language communities in Ireland, Great Britain, and France. The dominant paradigm in European status policy and in academic analysis is the protection of such linguistic minorities against the absorptive effects of the dominant national language.

A wide variety of country and language specific case studies is now available (Dorian, 1998; Fishman, 2002; Grenoble and Whaley, 1998; Hale, 1991; Krauss, 1991). Most of them exemplify this approach. The use of terms such as 'threatened', 'dying', 'endangered' languages and at the extreme, 'language death',

and 'linguistic genocide' reflect the nature of such analyses. The intended effect of these terms is to characterize the aspirations of ethno-linguistic minorities in terms of group and individual rights. These rights are elaborated by law in many monolingual countries, as well as in covenants and resolutions enacted by international bodies: The European Charter for Minority or Regional Languages, a Framework Convention for the Protection of National Minorities, The Oslo Recommendations regarding the Linguistic Rights of National Minorities, The Hague Recommendation Regarding the Education Rights of National Minorities, and the Universal Declaration of Linguistic Rights (Ferguson, 1968; May, 2001; Nic Shuibhne, 2001). For instance, the term 'other languages' of Europe is a product of an international organization, the European Union. It refers to "all languages apart from the eleven official languages that are ignored in public and official activities of the European Union (Extra and Gorter, 2001: 1)." In practical European Union policy, with its first principle of national sovereignty, the identification of a protected linguistic minority is reserved to the founder states, which have the option to exclude any variety they label as a dialect, as Sweden in 1995 decided that the Charter applied to Sami, Tormedal Finnish, Finnish, Romani Chib, and Yiddish, but not Skanian with 1.5 million speakers, and France prefers not to recognize Occitan.

The effect of official designation of a minority language, whether within a country or internationally, can be of substantial benefit to the group, expanding its claim to educational and governmental support. Consequently, there is constant pressure to expand the list, drawing the line further down the continuum from language to dialect or giving legal identity to different types of languages. For instance, the deaf community has sought recognition of sign languages as separate minority languages, but the European Union continues to resist this. Efforts have also been made in the United States to declare Black English a minority language, and thus subject to special protection. There has been a movement to imbed the concept of language rights in a larger framework, the promotion of multilingualism for the general population, autochthonous or immigrant (Skutnabb-Kangas, 2000).

Policies toward linguistic minorities differ according to their relative size, their degree of geographic concentration, their historical roots, their extra-country linkages, the strength of their ethnic identification, and the political activism of their leadership (Paulston, 1994). The features of official language policy that vary according to these characteristics are: (a) a language's role in the education system, in particular the class and school levels in which it is used, and whether it is taught as a subject or used as a medium of instruction; (b) its role in governmental affairs – the legislature, judiciary, administrative services, the military; (c) its role in the media, particularly that portion controlled by government; (d) the possibility of using it in access to governmental and commercial institutions, and (e) its use in the workplace.

In academic analyses of minority language policy, a number of constructs have been proposed to arrange language minorities along continua of relative vitality. A widely used scale is the Graded Intergenerational Disruption Scale (Fishman, 1991) based upon a language's presence in governmental affairs, education, adult use, and intergenerational transfer. The scale also purports to advise linguistic minorities on how to advance their status and how to promote the use of the language. It ranges from the most threatened eighth stage, where any effort needs to start with 're-assembling' the language from 'vestigial users . . . socially isolated old folks' and teaching it to adults, to the highest stage, where the language is used to some extent in 'higher level educational, occupational, governmental, and media efforts' but lacks the safety of political independence. In between, there are another half dozen levels, the most significant of which are probably the sixth ('intergenerational informal oracy'), the fifth ('institutional unsupported literacy') and the fourth ('use in official lower education'). In Fishman (2001), where various scholars are asked to comment on the scale, several raise questions about the ordering of the scale: for instance, there are many cases where institutionalized literacy teaching (commonly of a religiously sanctified language) continues even without much everyday oral use.

Fishman's scale was developed to account for the process that he labeled Reversing Language Shift, an attempt by supporters of a language to re-establish or establish its status. Also named 'language revival', the process of re-establishing natural intergenerational transmission (language revitalization) or vernacular use of a literary language (revernacularization) is most clearly exemplified by Hebrew.

The success of the Celtic revivals in various countries has depended on the extent to which they are backed by political power, as in Ireland where the Celtic language, Gaelic, has become a symbol of nationhood, or in Wales, where a regional government has championed its use. However, even in countries and regions where there is strong governmental backing, only a minority of the population actually speaks the Celtic language. Other cases of revival involve territorial linguistic minorities.

Territorial Linguistic Minorities Territorial linguistic minorities also differ in the extent to which their speakers seek full political autonomy, as do the Tamils of Sri Lanka, and some of the Basques in Spain. For most groups, however, the goal is limited to the use of the minority language in governmental affairs and at various levels of the education system. For instance, in Spain in three constitutionally mandated autonomous regions, Basque, Catalan, and Galician languages are not only taught in schools, but public use of the language is actively promoted, and, because their speakers occupy their own political units within Spain, they can determine their own official language policy within their territory (Turell, 2001). By way of contrast, in France, the Basque-speaking sections bordering on Spain are not officially recognized as separate language groups, they do not comprise a separate political unit, and they cannot determine linguistic policies. In France, the promotion of the Basque language is left to voluntary initiatives. In a similar vein, the various Celtic languages represent different kinds of territorially specific language minorities with varying claims on governmental power – one result of autonomy for Wales and Scotland has been to boost the claims of Welsh and Scottish Gaelic. In New Zealand, the campaign for Maori language regeneration accompanied a series of legal claims before a Tribunal set up to remedy failures to carry out provisions of the 1840 Treaty of Waitangi, most of which sought financial reparations for lost land and hunting and fishing rights (Spolsky, 2003).

There are many other territorially-concentrated linguistic minorities elsewhere in Europe, such as the Frisians in the Netherlands who receive special treatment in support for their bilingual education but not in their dealings with government (Gorter, 2001). Special accommodation is also made for territorial linguistic enclaves whose residents are speakers of languages of neighboring countries. For instance the Swedes in the southwestern corner of Finland (Vikor, 2000), and the Germans in the contiguous border regions of Belgium (Aunger, 1993), Italy, and France are examples of transborder linguistic minorities, the former deriving recognition from historic political union and continuing territoriality.

There are a few long-established linguistic minorities that are not geographically concentrated and that typically receive less policy attention. Of these, the most notable are the Roma or Romani, who are scattered and peripheralized. In its negotiations with new candidates for membership, the European Union generally exerted considerable pressure to have these languages supported, following a principle of 'do what I say and not what I do' and not giving them the privilege accorded to foundation members of choosing which varieties to support. While the main goal of Chinese language policy has to do with developing the common language (Putonghua) and in simplifying the characters used for writing Chinese, the cultivation and preservation of minority languages has now been added as a goal (White, 1997). After most speakers of Yiddish in Europe have been killed or have emigrated, some European countries now recognize Yiddish as a minority language (Hult, 2004).

Paulston (2004) has proposed what she calls "extrinsic linguistic (or ethnic) minorities," groups such as the Russians in Baltic Republics who went from being majorities to minorities by legal measures or the moving of borders or grants of independence, but who continue to show strong language loyalty.

Aboriginals Like other territorially concentrated linguistic minorities within homogeneous states, culturally distinct autochthonous groups receive a great deal of attention both in language policy and in academic analyses. Often the languages of such groups are in a wide variety of stages of development. Hence, a primary focus of management is on alphabetization and the promotion of literacy and oracy. In most cases, the drive for language rights among aboriginal groups is tied to cultural revival and reinforcement. Linguistic groups whose members are still active speakers of their languages and who are territorially concentrated, such as the Samis in the Nordic countries (Jernsletten, 1993) and Russia, or the Quichua (K. King, 2000) in the Andean highlands of Peru, Bolivia, and Ecuador have greater success in achieving special treatment in language policy. More dispersed aboriginal groups such as the American Indians and the aboriginal tribes in Australia who are dispersed through a hundred different regions (Lo Bianco and Rhydwen, 2001), have an even greater difficulty in language maintenance – although the Navajo have had some success (McCarty, 2002; Spolsky, 2002). An exception are the Maoris in New Zealand who have had great success in cultural and linguistic revival through concentrated political agitation and through the use of Maori in Te Kohanga Reo, the preschool 'language nest' programs and the subsequent development of immersion education in elementary schools (Benton and Benton, 2001). Autochthonous minorities, although commonly suffering from political and social and economic discrimination, at least can claim that they were there first. Autochthonous languages are obviously especially endangered, for they lack other territories where they are spoken.

Immigrants Language policies are much less accommodating to the needs of immigrant groups. In fact, almost all of the international covenants supporting the rights of linguistic minorities apply only to citizens, arguing that immigrants chose to live in the country and so can reasonably be expected to make an effort to learn its language. In addition, the claim that the preservation of immigrant languages is required for maintenance of language diversity is a weak one, for their languages are usually spoken in the country from which they come. However, recently this distinction has been blurred (Hornberger, 1998). In the early years immediately after World War II during the first major flow of 'guest workers' into Europe, they were expected to go back to their home countries after a brief sojourn. Moreover, at that time, any service of their linguistic needs in education was supposed to be provided by their home countries. In addition, immigrant groups tended to be widely dispersed in cities and did not constitute a separate territorial unit. Over more recent decades, their numbers have grown immensely, particularly with Eastern Europeans migrating into Western Europe, citizens of former colonies moving to the metropolitan homeland, and a major wave of migrants from Islamic countries. As their numbers have grown, they have not tended to form separate territorial groups, although their concentration in urban areas, their numbers, and their growing political influence have come to require special educational and governmental accommodation. These may include the provision of instruction in the home language in primary schools, the translation of government documents and court proceedings into the home language, and, in some countries, support for instruction of new immigrants in the national language of the country. In spite of expressions of support for immigrants and their human rights, there has been a tendency to require proficiency in the official language for citizenship and in some cases for immigration.

The United States provides a clear example of this transformation. Over two centuries, massive waves of immigrants have been absorbed. Historically, they tended to be widely dispersed into a number of cities, where little islands would be created. Each group, however, was expected in time to merge into the general population, including the learning of English (Fishman, 1966b). After a period when immigration was restricted by legal quotas, the number of immigrants has increased rapidly. As a result, there are now 3 million children in the United States who speak at home a language other than English. They are referred to as Limited English Proficiency (LEP) children. Three-fourths of the LEP students are Hispanic, and instead of dispersing throughout the country they have become a major territorial language minority in Florida and the American southwest and West, particularly California. One result was the institution of language rights accorded territorial linguistic minorities elsewhere, including a highly institutionalized system of bilingual education in primary schools, and representation of Spanish in public life and the media (Roca, 2000). This development has given rise in some states to reverse pressure to enact legislation banning bilingual education and making English the only official language (Baron, 1990).

Dyadic or Triadic Societies

Countries that have two or three major recognized languages such as Canada, Belgium, Switzerland, Sri Lanka, and Cyprus, each with its own territory, have problems of language policy different from those facing ideologically homogeneous countries. In such countries, language management issues tend to pervade large sectors of the educational system and public life. As in linguistically homogeneous counties, some provision may be made for lesser language minorities, but the fabric of the state itself tends to be linguistically consociational involving only the primary languages. The preferred solution to any conflict is territorial: governmental and educational institutions are organized separately in the different language areas, and political power is carefully balanced between the linguistic units. An extreme example is Belgium, a country historically formed by uniting monolingual territories. After four governmental crises based on language issues between 1979 and 1990, the country was partitioned into different language regions: (a) areas that are exclusively monolingual in Dutch or French, (b) areas such as Brussels that are officially bilingual, and (c) areas that are monolingual but provide some minority language rights (Deprez and Du Plessis, 2000). Switzerland has a longer-established form of consociational linguistic territoriality, but restricts its implementation primarily to educational and governmental affairs; each of the 27 cantons is autonomous in language choice. Canada, too, was formed out of previous, distinct French and English territories. To maintain unity, it is formally bilingual, but French-speaking Quebec periodically attempts to gain independence from the other, primarily Anglophone-speaking, provinces of Canada. A series of referenda for Quebec's independence has not gained a majority of votes in Quebec, defeated by negative votes from a combination of Anglophones, aborigines, and immigrant communities. However, in Quebec province itself, the use of French in all governmental affairs, education, and public displays is mandated (Bourhis,

2001). In Anglophone Canada, an innovative policy was introduced whose intent was to disarm the Quebec separatist drive. Schools for non-francophones require their students to enroll in immersion classes to make them proficient in French. This widely watched program has been only modestly successful.

In some countries, the relationship between the ethno-linguistic groups is so contentious that the country breaks apart, as in the former Czechoslovakia and Yugoslavia (Bugarski, 2001). In post-independence Pakistan, two linguistically different sectors were separated by a thousand miles – a Bengali-speaking Eastern half and an Urdu-, Punjabi-, and Sindhi-speaking western half (Rahman, 2002). After a bitter war, the eastern sector became a separate country, Bangladesh. A two millennia-old conflict between Tamils and Sinhalese in Sri Lanka is in danger of partitioning the island into two countries, as is the conflict between the Greece- and Turkey-oriented halves of Cyprus. Sometimes in binary societies, one language group dominates the other as in the Sudan where the Arabic-speaking North dominates the lower multilingual, tribal-based south, or in Israel, officially bilingual in Hebrew and Arabic, where Arabic (though benefiting from more use in education than in many nominally Arab countries (Amara and Mar'i, 2002) is clearly dominated by Hebrew.

In dyadic nation states, then, the key management problem usually remains the resolution of competing demands for status between two languages with strong claims.

Mosaic Societies

Most countries are neither homogeneous nor dyadic nor triadic in composition. Indeed, the majority of countries in the world are made up of five or more important ethno-linguistic and territorially discrete segments. The problems of language policy, both corpus and status, in mosaic countries such as India, Indonesia, the Philippines, and most of the countries of Africa are immense and complex. Here, status and corpus are inexorably linked: a language's claim to official recognition is clearly bounded by its state of cultivation, for it is difficult to use an unwritten language in schools or an unmodernized language to teach science. In many of these countries, the overwhelming primary concern is corpus management, in particular the development of a written form of the languages, the promotion of literacy among the public, modernization by developing new terminology, the staging and duration of language instruction at the various levels of the educational system, and the preparation of teaching materials and teachers. Moreover, the solutions to status policy issues that are available in ideologically monolingual, dyadic, or triadic countries do not apply where there are many languages.

In mosaic societies, even the number of languages spoken in a country is often uncertain. Various counts have enumerated between 1000 and 2000 languages in Africa. In Nigeria alone, a variety of linguistic censuses have found 200 to 400 languages. At last count, there are 535 languages in India. In the late 19th century, Grierson counted a thousand. In all of these countries, the number of language varies immensely in part because the dividing line between languages and dialects is indistinct and political rather than linguistic.

Those who wish to develop language policy in such countries face a number of special challenges. In many of them, a single over-arching language was introduced by the former colonial power and is still used by a small elite. There were two major approaches to colonial language policy. France and Portugal (like Spain in Latin America) were consistently ruthless in requiring the metropolitan language for all government and for any education they supported. After its experience in India, Britain in other parts of the world followed what might be called a modified Oriental policy, providing initial education (at least the first two or three years and sometimes up to secondary school) in reasonably populous indigenous vernacular languages, at least those with a writing system. German and Belgian colonial policy similarly allowed a small place for vernacular languages. After the primary level, both approaches then accepted the centrality of the metropolitan language, but the British did encourage some continued cultivation of some indigenous varieties.

In the optimistic days after World War II, post-colonial political pressure was to dethrone the colonial language and nativize the choices of national languages. A number of African and Asian former colonies started to indigenize their schools. However, the initial pressure for abolishing the colonial tradition has had to be balanced against the tendency among indigenous elites in many former colonial countries to distinguish themselves by their command of the colonial language (Myers-Scotton, 1993), and increasing proportions of the population see the command of that language as the path to upward mobility. Moreover, the exclusive choice of native languages sacrifices links to modernity and international communication. As a result, the use of ex-colonial languages lingers and may be growing. For instance, while the Indian constitution prescribes that English was to be abandoned as a national language within ten years, it still remains one of the official languages. Moreover, Indians of all social

classes see the mastery of English as the avenue for upward mobility, and enrollment in English-medium private schools is growing (Dua, 1996). Similarly, in most former Francophone states in Africa, French remained the official language after independence, to be threatened most recently by globalizing English rather than by local national languages (Chumbow and Bobda, 2000).

The process of nativization, with its shift to indigenous languages, is handicapped by the number of those languages and their regional or tribal identification, with all of the status implications resulting from selection of one or a few languages and so favoring its speakers over others. Solutions adopted in a variety of countries include the creation of a fresh lingua franca, usually adopting a local dialect, often one close to the capital city, or adopting a regional language. The use of the new lingua franca is then promoted for use in the education system, in government, and in the media. One of the most striking examples is Bahasa Indonesia, developed out of Malay and now the national language (Dardjowidjojo, 1998). Malay was also the basis of Bahasa Malaysia, and the slight variant Bahasa Melayu developed in Malaysia and Brunei, but there are new pressures for English to be used there (Omar, 1998). Other cases are Tok Pisin, in Papua/New Guinea, Filipino, a variant of Tagalog, in the Philippines, and the adoption of Swahili in Tanzania and East Africa. It should be noted that in Malaysia, there has been a decision to move to English-medium instruction at all educational levels (Gill, 2002).

Many mosaic countries have chosen a language policy model which reflects one or another stage in the history of language policy in the former Soviet Union (E. Lewis, 1972). In the early Soviet period, the languages of the 15 principal language regions were declared to be of equal status. Each was declared the official language and taught in the schools in its own region. Every child had the right to be educated in his or her own language. Russian was to be *primus inter pares*. The decision to encourage and cultivate the vernaculars was based on the principle that it would be the fastest way to develop communism among illiterate peoples, and Grenoble (2003) notes that this policy did result in the rapid development of literacy. Under Stalin, with the pressure for central control, the status of the regional languages was downgraded and the spread of Russian was promoted.

India initially adopted the Soviet model. At Independence, the boundaries of the states were redrawn from the multilingual units they had been under British rule to more or less monolingual units, taking into account the major literary languages, as the political parties in the independence movement had urged. In the years immediately after independence, there was a great deal of concern in India about the balkanizing effect of this decision. To combat what were called 'fissiparous tendencies' Hindi – a Sanskritized form of Hindustani – was chosen to be the bridging national language. However, the states in southern India, whose languages belong to an entirely different family, strongly objected. As happens in many mosaic societies, the resulting compromise piled on languages in the educational system. The medium of instruction in the primary school was to be the local language, with various other languages added in secondary and higher education, serving as either media of instruction or as subjects of study. India's compromise was called the Three Language Formula – in primary school the local language would be used; in secondary school Hindi, English, and the regional language would be taught. In the Hindi area in the north, another regional or European language was to be substituted. As yet this policy has not been rigorously applied and, *de facto*, the local languages still seem dominant with English serving as the bridge language. While such compromises mitigate political difficulties in mosaic countries, the problem of governmental communication remains, particularly which languages can be used in governmental affairs. This usually requires the adoption of one or a few working languages, or allowing the use of many languages but providing a mechanism for interpretation and translation (Itagi and Singh, 2002).

The People's Republic of China essentially continued a 2000-year old tradition for Chinese languages by continuing the ideology that they were all dialects, united by their single writing system (Zhou, 2004). Language management then became a matter of finding a way to simplify the characters, supplement them with a more or less phonetic alphabet, and encourage a shift to Putonghua, the variety of Mandarin based on the Beijing dialect. For the non-Chinese languages, the initial policy was based on the Soviet model, with the development of literacy in and recognition of a manageable number of varieties, originally (as in the Soviet approach) selecting one dialect as the basis of standardization. There was, however, no effort to force them to accept the Chinese writing system, but rather acceptance of various traditional scripts or use of modified Roman or Cyrillic alphabets. At one period, there was a strong effort to assimilate these groups, too, linguistically as well as culturally, but more recently, there is an acceptance of bilingual solutions for the larger languages (Zhou, 2003).

Most African nations are afflicted with the effect of the lack of congruence between imperially established and tribal or linguistic boundaries. They generally

include many languages, many of which are spoken by large numbers in bordering states. In former French colonies, the position of French as language of government and advanced education is well established (Salhi, 2002), in spite of efforts in North Africa to establish the status of Arabic (Daoud, 2001). Portuguese, too, remains dominant in former Portuguese colonies, though in some countries Creoles are developing and becoming important (Vilela, 2002). In West Africa, Bamgbose (2000) complains, there are national language policies that do not reflect an understanding of local linguistic practices and that are seldom seriously implemented. Illiteracy rates are high; colonial language policies mainly remain in effect. In Botswana, Nyati-Ramahobo (2000) reports, the indigenous languages other than Setswana have been ignored or discouraged, and English is favored over it in government and education. Summarizing the current status in Africa, Batibo (2004) notes that only 2 countries (Egypt and Libya) have adopted indigenous languages as their official medium, 8 use an indigenous language alongside an ex-colonial language, 27 use an ex-colonial language with some symbolic secondary use of an indigenous language, and 18 have ex-colonial languages as the only official national language. In other words, 80% have failed in any efforts to establish indigenous languages as official languages. Two countries that use indigenous languages in the school system, Botswana and Tanzania, require its use by all students, whatever their mother tongue. Many are hopeful that the recognition of a number of indigenous languages in the South African constitution alongside English and Afrikaans will lead to multilingual policies (Kamwangamalu, 2000; Mesthrie, 2002), but studies are suggesting how slow the process is (Heugh, 2003).

This same problem of mosaic societies is not limited to single countries, but faces international organizations with sovereign states as members who must communicate in multilingual contexts. The Council of Europe, for instance, now has 45 member states. It has adopted French and English as its official languages of communication. The United Nations publishes its daily journal in English and French, but has six 'working languages' in which official statements may be made: Arabic, Chinese, English, French, Russian, and Spanish. If a delegation wants to communicate in another language, it must provide translators and interpreters. The European Union provides for translation and interpretation among the languages of all its members, requiring about 200 simultaneous translators for a single session if all possible language pairs are to be covered.

The issue of language policy in international organizations with their presumption of equality among the languages of member states illustrates the more general problem of the tension between status considerations in language choice and the need to make communication in multilingual contexts effective (Ammon, 2002; de Swaan, 1999; Van Els, 2001). The *de facto* primacy of English as the language of communication is not without its critics (Phillipson, 2003). Elsewhere, when the need for international communication is paramount, the trend is to use English as the common language. For instance, 85% of the citations in the world's scientific literature are published in English (Garfield and Alfred, 1990). While the multilingual capacity of the computer and the Internet has belied the prediction that only English would be used, the pressure for English appears to continue unabated. The growing predominance of English in international communication, of course, is a major handicap to speakers of other languages, and there are numerous attempts such as 'English as a Lingua Franca' or 'World English' to modify the language to make it more accessible to non-native speakers. The perennial attempts to foster the use of Esperanto serve the same purpose.

Foreign Language Teaching Policies

There is some overlap in language teaching policy between domestic and foreign languages. For instance, French is both a domestic and foreign language in Canada, as are French and English in many ex-colonial countries. However, in the main, foreign language policies are usually quite distinct from, and less developed and conflicted than, policies with respect to national language(s) and those of intra-country minorities. They also tend to be given less attention in scholarly analyses of language policy. In addition, such policies tend to be piecemeal rather than coordinated. Only a few overall national foreign language teaching policies have been adopted. The national plan for The Netherlands (van Els, 1992) is one of the few that were based upon surveys of adult use and national need. Australia's national policy statement (Lo Bianco, 1987) included policies with respect to indigenous peoples and immigrants as well as foreign languages. Comprehensive national policy in England was until recently either expressed as part of official curricula for all instruction, or is addressed by non-governmental organizations (Moys, 1998), including a new policy document developed from the 2000 Nuffield Report (Department for Education and

Skills, 2004). Foreign language policy normally relates only to the educational system, although France and Egypt try to limit the use of English outside the educational system. Within the education system, there are a number of common issues that foreign language policy must face (Bergentoft, 1994).

One basic decision concerns the proportionate role of foreign language instruction in the curriculum. In most mosaic countries, the promotion of multilingualism in intra-country languages and perhaps the colonial language leaves little time for foreign languages. The study of foreign languages is most fully developed in Western Europe, where statutory mandates usually require the study of one, and in most countries, two, foreign languages. It appears that the reason for a two-foreign-language policy is to ensure that languages other than English, which is almost always the first choice, are included. Language study may take up a substantial proportion of curricular time. In Sweden, for instance, language study may absorb 15% of total curricular time. In Luxembourg, where French, German, English, in addition to Luxemburgish, are required, the proportion of time taken up in language study is much higher.

Time spent on foreign language study is generally less in the English-speaking countries (Moys, 1998). In the United States, although some state governments which have authority over education do mandate the teaching of foreign languages, the decision on how much foreign language should be offered is usually left to individual districts and schools. All 50 states include the study of foreign languages in their secondary school curricula, although no state requires the study of foreign language in secondary school as a graduation requirement for all students, and only ten states require language study for college-bound students. Unlike other countries, in the United States students may start their language study in higher educational institutions. In 2002, there were 1.4 million students enrolled in foreign language classes in 780 colleges and universities. However, unlike other countries where students enroll in foreign language study in primary school and continue throughout secondary school, enrollments in the United States foreign language classes tend to start in secondary school or college, and drop on the average by half from one language course level to the next. In many countries there is an increasing tendency to start language study earlier and earlier in primary schools, but the practice is still uncommon in the United States. In England, where a decision was made to drop the requirement for foreign language study after the age of fourteen in comprehensive schools, and in the United States, where budgetary pressures became intense, the number of foreign language courses dropped precipitously.

Foreign language teaching policy specifies which languages are to be studied and in what order of priority. This choice is determined by government fiat in some countries. In many countries, however, school and student choices are primary. In England, and formerly in the United States, the traditional order of language selection for modern languages was French and then German. In the United States, Spanish has become the overall favorite, with French and German in steep decline. French, a language spoken in a country a short journey away, remains the favorite in England. In the other countries of Western Europe, the language chosen after English is likely to be German, followed by French and Spanish. In almost all non-English speaking countries that require foreign language study, the first language to be studied is English, selected by eighty per cent or more of the students, often starting in primary school (Bergentoft, 1994). In the United States, federal governmental support, provided during the Cold War for the teaching of Russian, now promotes the study of the languages of Asia and the Middle East at the higher education level; this support has been boosted since 9/11. Except for instruction specifically aimed at immigrants, Asian languages are seldom taught in countries outside of their home regions.

While some countries specify the method of teaching in language classrooms, in the main, the choice of style of classroom instruction is left to teachers, school districts, and textbook publishers. Indeed, the general trend is away from centralized control of language education to more localized and individual teacher decisions. There are, however, some general trends in the style of language teaching that are taking place in most countries. Particularly in Europe there has been a tendency toward the adoption of what is called communicative competence-oriented language instruction and the primacy of oracy over reading and writing skills. Moreover, the Council of Europe has been instrumental in bringing about a modernization and uniformity in language teaching in many countries. In the early 1990s, what was referred to as the Threshold Level (van Ek, 1975) was introduced by the Council of Europe. It provided specific communicative competence goals that students were expected to achieve. The Threshold Level has been adopted throughout Europe for the teaching of 20 languages, and more advanced levels have been described (Ek and Trim, 1991, 2001). The Council also provided to its members a widely adopted series of guidelines for everything from teacher training, elementary school language instruction, and language education

for vocational students. The European Union supported research throughout Europe on improvement of foreign language teaching and provided advice on general language instructional strategies to all of its member states (European Commission, 1997).

Much of the control of the nature of foreign language instruction lies with the adoption of uniform strategies for assessment. In this regard, once again the international organizations in Europe have been helpful. The Council of Europe developed a set of language assessment standards, the Common European Framework (Council of Europe, 2001) intended to promote a degree of uniformity among its members, with a goal of facilitating the growing practice of student exchanges (Scharer and North, 1992). These standards have been widely adopted throughout Europe and are influential elsewhere. In the United States the most important, indeed the only, national attempt to make uniform policy for foreign language instruction is the development of a set of standards for a substantial number of languages. Developed by a teachers' organization, the American Council on the Teaching of Foreign Languages, the ACTFL guidelines (American Council on the Teaching of Foreign Languages, 1986) has had a major effect on the modernizing of foreign language instruction throughout the United States.

In China, after the end of the Cultural Revolution and even more with the access to the World Trade Organization, there has been a centrally mandated increase in foreign language teaching, with an emphasis now on English (as opposed to an earlier emphasis on Russian) but with a wide choice of other languages. Methodology, too, is being revised, with a new concern for oral language and for humanistic approaches.

Conclusion

In summary, both the development and analysis of language policy have grown immensely in the past several decades. Earlier interest in corpus management has now been overshadowed by a surge of interest in status policy, particularly as it relates to the rights of territorial, regional, and aboriginal minorities. There has also been an increase of interest in language acquisition policy, but it still receives less attention and is almost entirely unrelated to the rest of language policy. However, anyone following the topic in the world's press can usually find two or three stories about language policy a day, and scholarly activity is burgeoning to keep up. It seems safe to predict that the study of language policy in general will continue to develop rapidly.

See also: Endangered Languages; Identity and Language; Language Ideology; Language Loyalty; Language Maintenance and Shift; Language Policy in Multilingual Educational Contexts; Linguistic Decolonization; Minorities and Language; Nationalism and Linguistics; Norms and Correctness; Politics and Language: Overview; Power and Pragmatics; Reversing Language Shift; Spelling Reform.

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Language Policies: Policies on Language in Europe

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Theoretical Framework, Terminology

Language Policies, Language Politics, Policies on Language

Questions of language politics and policy on language are always present in society, even when one is not aware of them: it is immaterial whether it is a question of international communication or conflicts to do with minority languages, new minorities and migration, gender-neutral formulations or politically correct use of language. Nevertheless, scientific interest in language policies is relatively young, and the research on language policies has not resulted in the development of any unified theory so far. Even in the area of terminology, there are many ambiguities (Labrie, 1996: 828), complicated by the fact that the

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Language Policies: Policies on Language in Europe

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Theoretical Framework, Terminology

Language Policies, Language Politics, Policies on Language

Questions of language politics and policy on language are always present in society, even when one is not aware of them: it is immaterial whether it is a question of international communication or conflicts to do with minority languages, new minorities and migration, gender-neutral formulations or politically correct use of language. Nevertheless, scientific interest in language policies is relatively young, and the research on language policies has not resulted in the development of any unified theory so far. Even in the area of terminology, there are many ambiguities (Labrie, 1996: 828), complicated by the fact that the

field, to some extent, has a different terminological structure in different languages.

The beginning of scientific reflection on language policies and politics (LPP) as an independent field was undertaken particularly in the 1960s (Ricento, 2000: 10; Labrie, 1996: 828), in publications such as Haugen (1966), Kloss (1966) or Fishman (1968), and in these the focus was initially on the aspect of language planning. Ricento (2000) distinguishes a total of three stages in the evolution of language policy and planning as an area of research: what is characteristic of early work is the interest in decolonization and state formation, the predominance of structuralism in social sciences and of pragmatism as a strategic orientation. The second phase focused – under the influence of critical sociolinguistics – on social, economic, and political effects of language contact. In the 1990s, linguistic human rights became a strategic aim; postmodern and critical theories foreground language ideologies. On the contemporary situation he comments: "whether the ecology of languages paradigm emerges as the most important conceptual framework for LPP research remains to be seen" (Ricento, 2000: 22).

In any event, the conceptualizations and theoretical approaches of different scholars are different, and the boundaries they draw between their own and related questions are fluid or dependent on their particular conceptualization. Language policy is sometimes seen, for example, as a subdivision of political linguistics (*Politische Sprachwissenschaft*; Maas, 1989). Language and politics are, at any rate, two overlapping subjects. Terms and phrases such as 'social security scroungers,' 'economic migrants,' 'ethnic cleansing' or – to cite examples from the Second Iraq War – 'intelligent weapons,' 'smart bombs,' 'collateral damage' convey a specific approach to reality and are, to some extent, consciously created for this purpose. In a sense, these are also measures of language policies.

A first approximation to a definition of language policy is as follows: language policies deal with political measures targeted at an individual language (e.g., the prohibition to use certain terms) or the relations between different languages, their social importance, function, relevance in international communication, etc. It is therefore a question of an interdisciplinary area of research, and a theory of LP (which has still to be developed) would have to embrace such disciplines as (socio)linguistics, political science, sociology and history, and jurisprudence.

On the one hand, therefore, the object area includes phenomena and measures that are directed at the internal system of a *single* language, politically rule-governed language use, and on the other hand, political phenomena in respect of the status and social functions of languages. It may involve conscious or deliberate actions, or naturally arising developments that are not consciously controlled by politics. And it also includes the level of theoretical concepts and underlying linguistic ideologies with regard to languages, questions of linguistic political theory, and language planning (language planning theory), but also questions of the concrete implementation of such concepts in practice (language planning practice; Fishman, 1994) by means of more or less conscious language-policy measures. Different languages have different conceptual structures for this area: this latter differentiation, therefore, does not exist in German, whereas in English the former is called language politics and the latter language policy or policies; this corresponds to the distinction in French between *la politique linguistique* and *une politique linguistique* (Labrie, 1996: 828–829). Labrie adds a third analytical level of *idéologie linguistique* 'linguistic ideologies,' but this usually remains implicit. The differentiation between measures for the political regulation of language use and phenomena related to the social function of languages is conceptualized in German by most authors as *Sprachpolitik* versus *Sprachenpolitik*.

A number of authors use 'language policy' to refer only to deliberate political measures (e.g., Labrie, 1996), while for other authors it is also important to deal with nondeliberate phenomena, or laissez-faire politics (Ricento, 2000). Finally, language planning (in French *planification linguistique*, but also *aménagement linguistique*, and in German *Sprachplanung*) is sometimes construed as the broader and more comprehensive area (cf., the authors listed by Labrie, 1996: 830), while others treat language policy as the superordinate level. For example, Christ (1991) or Ricento (2000), who says: "I deliberately use 'Language policy' as a superordinate term which subsumes, 'language planning.' Language policy research is concerned not only with official and unofficial acts of governmental and other institutional entities, but also with the historical and cultural events and processes that have influenced, and continue to influence, societal attitude and practices with regard to language use, acquisition and status" (Ricento, 2000: 23).

The most important question to be addressed today by researchers is, according to Ricento: "Why do individuals opt to use (or cease to use) particular languages and varieties for specified functions in different domains, and how do these choices influence – and how are they influenced by – institutional language policy decision-making (local to national and supranational)" (Ricento, 2000: 23).

The German scholar and specialist LP researcher Herbert Christ defines language policy (in the sense of German *Sprachenpolitik*) as any public influence on the communicative radius of languages: "the sum total of all those political initiatives 'from above' and 'from below,' by means of which a particular language or languages are supported in their public currency, their functioning and their dissemination. Like all policies it is subject to conflict, and must be permanently reordered through constant discussion and constant debate" (Christ, 1991: 55). This broad definition of language policy, which we subscribe to, comprises aspects such as language promotion, language maintenance, language conflicts, language wars, language enforcement, linguistic imperialism, and linguistic colonialism.

Language policy may appear in very different forms: as a consciously planned policy in relation to linguistic phenomena, resulting in laws and political measures (e.g., legislation on minorities in European states); as policy on languages that is implicit in existing laws and regulations (e.g., educational laws, curricula, consumer protection laws); as laissez-faire politics that simply let things go and intervene in cases of virulent linguistic conflict; as language policy obscurantism, which simply denies the existence of the phenomena.

Similarly, the area of language policy research in its broadest sense incorporates the phenomena that are labeled *Sprachpolitik* in German, such as politically regulated language use, or the enforcement of measures that serve to exert political control over language use. One extreme example of this was the political creed of National Socialism and its terminological justification in the form of the racist terminology that followed the Nürnberg Race Laws ('Jew,' 'Half-Jew,' German *Jude*, *Halbjude*, etc.).

Language Planning

Language planning is understood to refer to political activities that are used in an attempt to exert conscious and targeted influence on systems of social communication, to introduce desirable changes or to avoid undesirable changes. In other words, it refers to a conscious practical language policy. Here a distinction is made between two areas: corpus planning and status planning. Corpus planning is understood to refer to activities related to the quality and productivity of a language, or its corpus. This includes all measures to do with codification and the setting of norms, which serve to create, or maintain and develop, a standard language, such as questions of the written form, or the development of scientific and literary language. In connection with the development and further expansion of a language, particularly in the area of terminology, the term 'language development' is also used. 'Acquisition planning,' a term used by some scholars, is concerned with policy measures that regulate language teaching and learning.

'Status planning' is understood to refer to those activities that relate to the status of a language: language prestige, the consumer value or market value of a language in international or national communication. Particular languages are preferred in communication or given official backing in their function: for example, at the national level as the state language, official language, and so on (with regulations according to which particular languages are used in offices, schools, law courts, town name boards, and the like); or at an international level as the language of diplomacy and international treaties or as the working language in international organizations such as the United Nations or the Council of Europe.

In the context of status planning the term 'language expansion policy' is also used, and this refers to the spread of a particular language or standard as opposed to other varieties at the national level, or to the spread of a particular language as opposed to other languages at the international level. An example of the former would be the promotion in France of the dialect of the *Île de France*, the *langue d'oïl,* as the French national language, at the expense of other varieties, from the 16th century onwards. This happened in particular at the expense of the *langue d'oc*, which had been the language of a highly developed culture in the Middle Ages. Language dissemination policy, or Language promotion policy, at an international level aims primarily at promoting the status of one language with regard to other nations or the official languages of other nations. One central agency in language expansion at the national level is the school, which plays a decisive role in the spread of standard languages and national languages, but also in the suppression of minority languages and the spread of particular foreign languages rather than others. At the international level, the cultural institutes play an important role in the implementation of the external language policies or expansion policies of particular nations (e.g., United States Information Agencies/Services, British Council, Institut Français, Goethe Institut, Österreich Institut, Instituto Cervantes, Istituto Italiano) (cf., Christ and de Cillia, 2003).

The Analysis of National and International Language Policies

Traditionally, a distinction is made between national and international language policies, although of

course the boundaries between are also fluid. To analyze LP on a national level, one should investigate the following questions: What language policy and language planning measures, and what language laws are set up in relation to the role, meaning, and status of languages that are spoken by the inhabitants of a particular state (as first, second, or foreign languages)? This includes all measures that affect the standardization, dissemination, and promotion of the relevant languages, within but also beyond the territory of the state in question. The first task, therefore, would be to investigate which languages, varieties, and codes are used by the population living in the territory of a particular state. What status do the languages in question have in the particular society? What forms of bilingualism and diglossia exist, and what is the functional distribution of the individual languages in diglossic and/or multilingual situations? What language conflicts exist?

The analysis of language attitudes needs special attention, as attitudes toward languages/language varieties, language use and toward the speakers of particular languages/varieties allow extrapolations on expectations, acceptance, and efficiency concerning language policies (Garret *et al.*, 2003; *see also* **Language Attitudes**).

Another important question is the relationship between language policy and language legislation: what linguistic regulations are in existence (in the constitution, consumer protection laws, educational laws, laws controlling the media, regulations on official and legal language(s), military laws, topographical notices, etc.)? Further, there must be an investigation into whether there is a coordinated national language policy that provides for a development and implementation of the legal requirements on language according to scholarly standards, and whether there is any body that is responsible for the development of an explicit language policy (political body, panel of experts, or a similar organization). One must also ask what contradictions there are between linguistic rights guaranteed by law and language policy in practice. In principle, all political fields may be analyzed with this in mind: i.e., education and school policy (medium of instruction, minority languages and foreign languages in the curriculum), media policy, consumer policy, cultural policy, foreign policy, migration policy, and so on. Finally, it is necessary to analyze the measures implemented in a particular state on language planning: what corpus planning and status planning measures are implemented/not implemented in respect of the languages in question. Are there academies as bodies that set norms, are there dictionaries, grammars, codices for the particular languages, are there measures for terminological development (e.g., in the areas of modern technology, the Internet)? With regard to status planning, one should ask what measures are taken there to enhance or guarantee the consumer value of the particular languages on the national and international language markets?

Concerning the analysis of international language policies, a first step is the analysis of measures that have been incorporated into the foreign and cultural policy of individual states to safeguard the role of languages in international and supranational communication, i.e., as languages of regional, supraregional, and international communication, as foreign languages in other countries, as working languages in international organizations, at bilateral or multilateral international meetings, as the language of international treaties, and so on.

Beyond the analysis of the above-mentioned questions of international policies, the international status of languages is of the utmost importance. It can be characterized by means of a number of different factors. The first, of course, is the number of speakers who have a particular language as their first language. (Here Mandarin Chinese comes before Hindi, English, Spanish, Arabic, Bengali, Portuguese, Russian, Japanese, German, and French, according to Grimes (2004) or as a second language (Chinese before English, Spanish, Hindi, Russian, French, German, Portuguese, again according to Grimes (2004). No figures are given for Arabic). Other criteria are the importance of languages in politics and diplomacy (with English as national or official language in 58 countries, French 32, Spanish 22, German eight, Portuguese seven (Grimes, 2004). No figures are given for Arabic, but it presumably has this status in some 20 states.) As a working language, we find English in 16 international organizations, French in 12, Spanish in nine, Russian in five, Arabic in two and German in one organization (Ammon, 1999: 111). Further criteria are the economic importance of languages that can be expressed, for example, in their economic strength, in the Gross Social Product that members of a particular language community achieve worldwide. Here, English is ahead of Japanese, German, Spanish, and French (Ammon, 1999: 101); or their role as academic languages (in 1996, 90.7% of all publications in the natural sciences were in English, 2.1% in Russian, 1.7% in Japanese, 1.3% in French, and 1.2% in German (Ammon, 1999: 109); and as an Internet language. One source estimates the number of English web pages at 56.4%, German 7.7%, French 5.6%, Japanese 4.9%, Spanish 3.0%, and Chinese 2.4%. The statistics for languages used for searches (using the Google search engine) are as follows:

English 57%, German 12%, Japanese 7%, Spanish 6%, French 5%, and Chinese 3% (StADaF, 2003: 4).

Different sources give somewhat different figures for all these criteria, but the relationships are always more or less the same. About a dozen major languages, with 100 million or more speakers, play an important role in international language politics, English plays a dominant role as a global language in all areas, and in politics and diplomacy French, which in relation to the number of its speakers, still has great significance.

A central role in the maintenance, improvement, or protection of the status of a language at the international level belongs to the language expansion policy outlined above. Several states therefore maintain cultural institutes in many parts of the world. For instance, there are 200 US Information Agencies in 143 different countries, 160 British Council centers in 109 countries, 151 *Instituts Français* in 92 countries, 126 *Goethe Institute* in 76 countries, 90 *Istituti Italiani di Cultura* in 61 countries and 40 *Institutes Cervantes* in 20 countries (Müller, 2004: 152). France – the only nation in the world – even has an independent department within the foreign ministry that is responsible for external language policy (*Direction Générale de la Cooperation Internationale et du Développement*).

The boundaries between language dissemination policy and linguistic imperialism (Phillipson, 1992) are fluid, and this policy is justified by various ideologies such as the supposedly natural superiority of a particular language, the ideology of a neutral lingua franca (claimed, for example, for English) or the special clarity of a language (*clarté de la language française*). For French, a particular feature of all French-speaking countries (*la francophonie*) is construed discursively (and also politically and economically), and more recently the concept of plurilingualism is being promoted at an international level, since English can no longer be denied the role of **the** international lingua franca.

Trends and Tendencies in Inter/national Language Policies

Present-day developments in language policy are contradictory: on the one hand there is hegemonization and on the other hand differentiation. The figures given above show clearly that English has taken on an ever more dominant role in connection with processes of globalization and processes of political, economic, and cultural hegemonization emanating from the United States.

In the context of globalization, the competences of the nation–state are shrinking at an increasing rate. It is surrendering power to international or supranational bodies, and at the same time allowing new media technologies (Internet, satellite TV, etc.) to create new communication spaces that are less linked to territory than before. Moreover, regional supranational groups and bodies such as the European Union have also arisen together with globalization. Although language policy in the European Union is an area determined by the subsidiarity principle, which leaves relative autonomy to the individual member states, different common regulations and programs exert a considerable influence. On the other hand, cities and regions on a substate level also have gained autonomy in the shaping of their particular social and cultural policies. The process of de-centering the nation–state as a central principle of political organization also makes it necessary to rethink questions of language policy. Here, particular attention has to be given to such market-conditioned language policy players as the language learning, culture, and media industries that previously occupied a less central position (Labrie, 2003; Wright, 2004; Busch, 2004).

In a kind of counter-movement, there are attempts on the part of some states to affirm the role of the nation–state in the area of language policy, for example through strengthening the constitutional role of national languages or through the increasing requirement in European countries for immigrants to be able to demonstrate knowledge of the state language before being granted citizenship, or even the right of permanent residence.

The central role that language policy still plays in the process of affirmation of nation states or in the construction of national identities is shown in the example of former Yugoslavia, where the break-up of the federal state into individual states was accompanied by the deconstruction of the umbrella language of Serbo-Croatian and the establishment of the three languages Serbian (Serbo-Croatian), Croatian, and Bosnian as state languages in the three respective states (Bugarski, 2004). There were also processes of differentiation in language policy in the Republic of South Africa where, after the end of the racist apartheid regime, there was an upgrading of African languages and sign language. The establishment of nine African languages as official languages and a comprehensive commitment to a policy of multilingualism are viewed as a central element in the process of social transformation (Alexander, 2001). Further questions of international language policy will be discussed below, using the example of language policy in Europe.

Language Policies in Europe

Languages in Europe

Of the estimated 2500–8000 languages in the world, only a few hundred (230; Grimes, 2004) are spoken in Europe, and laws concerning languages normally distinguish between national languages, autochthonous minority languages such as Basque or Gaelic, new languages arising from immigration, such as Turkish or Arabic, and sign languages.

Among the national languages, after English and French the most important European languages are Russian (158 million speakers) and German (121 million) (Crystal, 1997: 289). Before May 1, 2004, 24% of EU citizens spoke German, 16% English, French or Italian, and 10% Spanish (Eurobarometer, 2000: 93). Of German speakers, incidentally, 96% live in Europe, compared with 47.6% of French speakers, 10.7% for English, 11.2% for Spanish, and 5.4% for Portuguese (StADaF, 2003: 4). If one includes foreign language knowledge, the following picture emerges: English is spoken by 47%, German 32%, French 26%, Italian 18%, and Spanish 14% (Eurobarometer, 2000: 94).

On the other hand, it has been estimated that in the great European metropolises, approximately one-third of the population conduct their daily lives not only in the national language, but also in a range of other languages. Twelve percent of the 370 million EU citizens use 40–60 (depending on various sources) different minority languages (Krausneker, 2003: 34).

Official Languages and Language Policies in Europe

For international and supranational communication, there are in principle two different models: the lingua franca/dominant language model, according to which a lingua franca (e.g., English, French, Esperanto) serves as a means of communication between different language communities, and a model of linguistic pluralism, or linguistic diversification, according to which as many different languages as possible are used as means of communication. In Europe, a pluralistic model of communication is pursued, at least among theoreticians, and European multilingualism is accepted as an important element in the European identity.

The basic principle for the institutional language policy in the EU was determined by the Ordinance no. 1 of April 15, 1958 (Language Charter of the EU). It stipulates that the various national languages of the member states are simultaneously "the official and working languages of the organs of the community." (There are currently 20 languages: Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Slovak, Slovenian, Spanish, and Swedish.) The ordinance refers to written documents, and also requires that "ordinances and other written documents of general validity" be published in all official languages, and that the bulletin of the community appear in all of the official languages. To implement this policy, the EU maintains language services in all the different organs (Parliament, Council, Commission, and so on) in which – before the most recent expansion on May 1, 2004 – a total of some 4000 translators and interpreters were employed (language staff make up around 12.6% of total staff). Apart from the interpreting and translation service, as further measures for the promotion of multilingualism the EU has developed special programs at three different levels: assistance in machine translation (e.g., Systran), terminology databases (e.g., EURODICAUTOM, EUTERPE), and promotional programs for language learning such as LINGUA, SOKRATES, and LEONARDO DA VINCI.

The analysis of actual communication in the EU demonstrates that the policy of multilingualism is most fully implemented at the level of the internal working languages in the European Parliament, and then in the European Court of Justice in external communication. (The internal language here is French.) In the European Council and Commission, most work and negotiation is done in English and French, and to a lesser extent in German. Here English is becoming ever more important as the internal working language at the expense of French: in 1986, for example, 58% of the Commission's primary texts were written in French, 26% in English, 11% in German and 5% in other languages. In 1997, the figures were as follows: English 45.4%, French 40.4%, German 5%, other languages 9.2% (Truchot, 2001: 27).

The translation service and its costs are often advanced as an argument in favor of a dominant language communication model, where English would be adopted as the only internal working language of the EU. On the other hand, language policy experts consider the (political) costs of monolingualism to be too high and plead for a more conscious and clearly defined EU policy of multilingualism (cf., Phillipson, 2003; de Cillia *et al.*, 2003, and the contributions documented therein.)

Language Policies in Education

A central role in European language policy is played by school language policy, since foreign language

competence is acquired first and foremost in the school system (59% of Europeans gained their knowledge of a first foreign language in their secondary school (Eurobaromètre, 2001: 23)). In the year 2000, approximately half the population throughout the EU had no foreign language knowledge at all (an average of 47% throughout the EU, while 26% of Europeans spoke two foreign languages). The most important foreign language is English (41%), ahead of French (19%), German (10%), Spanish (7%), and Italian (3%) (Eurobaromètre, 2001: 2). This has a direct relationship to the foreign languages that are taught in schools: in 1999–2000, 87% of students in secondary schools in 27 European countries were learning English, 25% French, 15% German, and 7% Spanish (European Commission *et al.*, 2002: H-17). In the new EU member states, the language teaching policy is probably diversifying more strongly than in the old member states. For example in the Czech Republic, in the 1998–1999 academic year, 390 518 pupils were learning English, 344 247 German, and 8744 French in elementary schools (age range, 6–15) (Nekvapil, 2003: 78).

Research into language policy and language learning in the last few decades has produced a series of proposals for intensifying and diversifying foreign language teaching in Europe, and have made it their objective that pupils should learn two foreign languages during their compulsory education and three in postcompulsory education. To implement a foreign language policy leading to multilingualism, specialists have proposed a whole range of measures at the levels of school organization and teaching methodology. For instance, foreign language teaching should, in general, start early; use of the foreign language as a medium of instruction should increase; curricula should be more flexible; passive multilingualism should be encouraged, and multilingualism available in classrooms should be exploited, involving the languages of both old and new minorities (see Besters-Dilger *et al.*, 2003: 282; de Cillia *et al.*, 2003: 11).

Minority Languages

The majority of Europe's legal systems recognize within the borders of particular states a number of minority languages. Which languages are recognized as minority languages, how their status is defined, and in which domains these languages may be used varies considerably from country to country and depends very much on particular political constellations. There is also a considerable fuzziness concerning terminology in the field: in some contexts, minority languages are referred to as regional languages, in others as lesser used languages or as autochthonous minority languages.

The Council of Europe's Charter for Regional or Minority Languages (Council of Europe, 1992), which came into force in 1998, is the first legally binding and individually enforceable international instrument in the field of language policy. On the subject of minority languages, the Charter marks a change of paradigms concerning the attitude toward minority languages: whereas earlier international treaties protected speakers of minority languages only through nondiscrimination clauses limiting state influence, the Charter puts the ratifying states under an obligation to give active protection and support for minority languages. In 2004, only 17 of the 45 member states of the Council of Europe had ratified the Charter. The European Union has established an Office for Regional and Lesser Used Languages, which protects the interests of speakers of minority languages within the EU.

In the 1970s, minority languages became an important topic in sociolinguistic research when, in a counter-move to the previous centralizing tendencies, regionalization was not only supported at the political level, but also by social movements that began to demand rights for minorities.

A new approach to borders in Europe, resulting from the end of the bi-polar division in the world, the process of European integration, and globalization in the world economy, have, since the 1990s, not only brought about new minority–majority configurations, but have also triggered a rethinking of language policies in the field. Since that time, greater interest has been taken in the rights of speakers and the development of nonterritorial languages, particularly Romany. Other minority languages are increasingly seen as regional languages that can function as lingua francas in cross-border situations. Frequently, such functions are not fulfilled by national standard languages, which tend to emphasize differences, but by regional dialects or vernaculars that are intelligible on both sides of a border and that are therefore undergoing a process of revival (Raasch, 2002: 205).

The interest in migrant languages began in the domain of language in education when it became obvious in Western Europe that migration could not be considered a temporary phenomenon. Early research within the multicultural paradigm was mainly concerned with language acquisition and bi- or multilingual education. For the most part, migration and mobility are no longer seen as temporary phenomena but as a consequence of the process of globalization. Research interest has shifted in recent years and

focuses more on (hybrid) youth codes, and on languages in cultural expression and in the media. Although it is claimed that linguistic diversity should be considered a resource, migrant languages remain for the moment low-status languages in most cases, and there are no linguistic rights granted to their speakers, although some of these linguistic groups are statistically more important than autochthonous minorities.

One group that is even more victimized within the EU than speakers of minority languages is users of sign languages (SL): no official document deals with the right of SL users, and no official statistics give any information about them. Deaf people are seen as disabled, whereas they consider themselves to be a linguistic/cultural minority. For example, the EUD (European Union of the Deaf), their central representative organization in Europe, regards the aspect of being handicapped rather as a lack of access to resources. The number of deaf sign language users has been estimated at nearly half a million people (Krausneker, 2003: 15). Resolutions in the European Parliament (from 1988 and 1998) for the recognition of sign languages have so far had little effect (at present sign languages are recognized in the following European countries: Denmark, Finland, France, Germany, Greece, Norway, Portugal, and Sweden). In educational policy, oral models still dominate, rather than a bilingual form of instruction that would support language acquisition.

Recent documents by the European Union and the Council of Europe have begun to question the differentiation into autochthonous and allochthonous minority languages. In this sense, the action plan promoting language learning and linguistic diversity, an EU 2004–2006 action plan (Commission of the European Communities, 2003) is now explicitly opening programs that encompass a language policy dimension (such as the above-mentioned SOCRATES Program), not only for the official languages of member states and lesser used EU languages, but also for the languages of migrants, sign languages, and the languages of the EU's most important trade partners.

See also: Arabic; Basque; Bilingual Education; Bilingualism; Discrimination and Language; Education in a Former Colonial Language; Education in a Multilingual Society; Educational Linguistics; English: World Englishes; Foreign Language Teaching Policy; French; German; Identity and Language; Immigrant Language Education; Italian; Language Attitudes; Language Education for Endangered Languages; Language Education of the Deaf; Language Education Policies in North America; Language Education Policy in Europe; Language Ideology; Language Loyalty; Language of Tertiary Education; Language Planning and Policy: Models; Language Politics; Language Spread; Law and Language: Overview; Law on Language; Lingua Francas as Second Languages; Linguistic Decolonization; Linguistic Rights; Media and Language: Overview; Migration and Language Planning; Migration and Language; Minorities and Language; Minority Languages: Oppression; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Multiculturalism and Language; Multilingualism: Pragmatic Aspects; Politics and Language: Overview; Politics of Teaching; Pragmatics: Linguistic Imperialism; Russian; Second and Foreign Language Learning and Teaching; Serbian–Croatian–Bosnian Linguistic Complex; Sign Language: Acquisition; Sign Language: Communities and Cultures; Sign Language: History of Research; Society and Language: Overview; Spanish; Standardization; Teaching of Minority Languages; Turkish.

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Language Policy in Multilingual Educational Contexts

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Global Distribution of Multilingualism

Bilingualism and multilingualism are a normal and unremarkable necessity of everyday life for the majority of the world's population. Linguists estimate that there are roughly 6800 languages in the world, but only about 200 nation-states. With more than 30 times as many languages as there are countries, bilingualism or multilingualism is present in practically every country in the world, whether it is officially recognized or not (Romaine, 1995). This means that in a broad sense multilingual educational contexts can be understood to encompass the educational practices of most countries in the world. The varied cultural and linguistic contexts existing in contemporary societies around the globe pose complex challenges for policy makers in many areas. The centrality of language to education means that policies concerning choice of which language(s) to use as the medium of instruction are essential, even if the need is not always overtly acknowledged. In addition, the need for teaching of additional languages as subjects is widely recognized as schools have a critical role to play in providing the bi- and multilingual skills that have become increasingly necessary in the modern world. In this article the terms 'bilingualism' and 'multilingualism' will be used interchangeably to refer to the routine use of two or more languages in a community (*see* **Bilingualism**).

Despite the near-universal presence of more than one language in every country, the global distribution of linguistic diversity is strikingly uneven. Papua New Guinea alone contains 13.2% of the world's languages, but only 0.1% of the world's population and 0.4% of the world's land area. The overall ratio of languages to people is only about 1 to 5000. If this ratio were repeated in the United States, there would be 50 000 languages spoken there (Nettle and Romaine, 2000). Over 70% of all the world's languages are found in just 20 nation-states, among them some of the poorest countries in the world. They include Papua New Guinea (823), Indonesia (726), Nigeria (505), India (387), Mexico (295), Cameroon (279), Australia (235), the Democratic Republic of Congo (218), Brazil (192), United States (175), the Philippines (169), Malaysia (139), Tanzania (135), Vanuatu (109), Russia (100), Vietnam (93), Laos (82), Ivory Coast (77), Ghana (79), and Solomon Islands (69). These data come from the *Ethnologue*, a database compiled by SIL International.

Need for Language Policy and Planning

The pervasive presence of some degree of multilingualism indicates a universal need for language policy and planning in order to ensure that members of different language groups within a country or other administrative unit have access to and can participate in important societal institutions such as schools, government, and media (*see* **Language Planning and Policy: Models**). Schooling is one of the most critical sites for planning because education is the primary societal institution through which legitimation for the state's dominant language is sought. Formal education is often the first point of contact children have with the world outside their own community. Speakers of languages other than the official and national languages recognized for instructional purposes are often at a disadvantage. The poor school achievement of minority group children due to discontinuities between home and school language is well documented (Corson, 1990; Tollefson, 1995; *see* **Educational Failure**).

The first sociolinguists to tackle questions of language policy and planning were concerned with the language problems of developing nations such as Malaysia and India (Fishman *et al.*, 1968). Many countries under former colonial rule designated the colonial language as their sole official language for education and government. Ivory Coast, for example, declared French as its official language. Some have in addition specified national languages which may be compulsory in education. Others such as Indonesia replaced the former colonial language with their own (*see* **Education in a Former Colonial Language**).

From the 1970s onward, scholars have been concerned with education in migration contexts, particularly in Europe, which has seen the rise of increasingly diverse populations in countries such as Portugal and Iceland, often cited as examples of monolingual nations. The illusion of linguistic homogeneity is belied by the existence of a number of minorities in both these places. Portugal has a population of about 10 000 speakers of Mirandese (Miranda do Douro) concentrated in small villages in the northeastern part of the country. Because both Portuguese and Mirandese are closely related Romance languages, Mirandese has been thought of as a dialect of Portuguese. However, in 1999 the Portuguese parliament recognized it as a regional minority language and has undertaken some steps to protect it. It is optionally taught in some local schools, and work on grammars and dictionaries is under way. Portugal also has large numbers of immigrants from its former colonies (Angola, Mozambique, Guinea-Bissau, Cape Verde,

São Tomé and Principe, East Timor, and Brazil). There may be as many as a quarter of a million 'new' immigrants (many of them illegal) from eastern Europe, especially Ukraine and Russia. Immigrants now comprise about 5% of the population, one of the highest proportions in the European Union, up from less than 2% at the turn of the 21st century. Iceland too has witnessed an influx of immigrants from Asia, especially since the 1990s, in addition to those coming from European countries. Although only around 3% of the population is non-Icelandic in origin, as many as 40 different languages may be spoken in addition to Icelandic.

An even more recent area of concern has been the notion of language rights, as individual and collective rights of persons belonging to linguistic minorities have been increasingly acknowledged in international human rights law and encoded in various legal instruments (May, 2001; Skutnabb-Kangas and Phillipson, 1994).

Components of Language Policy

Spolsky (2004: 5) distinguished three components of language policy: language practices, language beliefs or ideology, and language planning. The notion of language practices concerns the choices members of a community make among the varieties available for use. Consider, for instance, the many Haitians or Cubans who have immigrated to cities such as Miami, who may use English to varying degrees in addition to Haitian Creole French or Spanish. Or consider Saami speakers in Norway, who may know Saami (an indigenous language of northern Norway, Sweden, and Finland), Norwegian, and English to varying degrees. Language beliefs include attitudes toward and beliefs about these varieties. Until recently attitudes toward Saami have been quite negative, among both Saami and non-Saami. Majority populations often show little enthusiasm for the languages of immigrant minorities either, even when the language concerned is a world language such as Spanish (as is the case in the United States) or Arabic (the language of many immigrants in France and the Netherlands). This is due to status differences between the majority and minority populations. Distinctive food, dress, song, etc. are often accepted and allowed to be part of the mainstream, but language much less so. The idea that linguistic rights need protection has never been part of American culture, and so they have not been seen as central to U.S. courts unless allied with more fundamental rights such as educational equity, etc. (Schiffman, 1996).

Language planning includes any efforts to modify practices or beliefs by means of some form of management or intervention. It usually takes the form of a set of planned and managed interventions supported and enforced by law and implemented by official government agencies. Many countries encode language policies of one sort or another in their constitutions, laws, or other official documents. UNESCO sponsors the MOST (Management of Social Transformations) Clearing House on Linguistic Rights, designed to provide information for legislators, decision makers, researchers, and other representatives of both governmental and nongovernmental organizations. The database provides an overview of the most important international legal instruments, major nongovernmental documents, and national constitutions containing provisions relating to language and the rights of linguistic minorities, and a bibliography on linguistic rights in international human rights law (*see* **Law and Language: Overview**). In conjunction with other sources of data (Skutnabb-Kangas, 2000: 297–311), this information can be used for further sociolinguistic analysis as well as for the development of multilingual policies.

The MOST database lists 163 constitutions containing some mention of language; 22 countries either have no constitution at all or have a constitution that contains no provisions relating to language. Perhaps the most common kind of provision is to declare a language or languages as official or co-official, or as a national language. Nevertheless, fewer than 4% of the world's languages have any kind of official status in the countries where they are spoken. The fact that most languages are unwritten, not recognized officially, restricted to local community and home functions, and spoken by very small groups of people reflects the balance of power in the global linguistic marketplace. Around 100 constitutions specify one or more official or national languages with special privileges of use. Seventy-eight mention a single official or national language. The constitution of France says that "the language of the Republic shall be French."

More than 20 countries have more than one official language. India, for instance, has 19 and South Africa has 11. The constitution of Vanuatu states that the national language is Bislama, and the official languages are Bislama, English, and French. The principal languages of education, however, are English and French. India's constitution codifies a variety of provisions protecting linguistic minorities, including the right to establish and administer educational institutions of their choice, and freedom from discrimination on grounds of language. In addition to specifying Hindi as the official language, it grants rights to regional state languages and specifies which languages can be used for communication between states, and between states and the national government. Every

state is supposed to endeavor to provide adequate facilities for instruction in the mother tongue at primary level to children belonging to linguistic minority groups, and there is a provision establishing a Special Officer for Linguistic Minorities. When a language is spoken by 30% or more of the population in any state or district, it is recognized as bilingual and the relevant minority language is placed on the same footing as the regional language for use by public authorities.

In practice, no country gives official status to every single language spoken within its territory. Where language policies exist, they inevitably privilege a limited set of languages. Even where explicit policies do not exist, governments have to operate in some language(s). This means that policy is implicit even if no specific mention is made of language. Here is where an examination of practice is essential. The presence of many languages other than English in industrialized countries such as the United States and Australia often comes as a surprise because these countries have generally operated and seen themselves as largely monolingual English nations, despite the presence of a considerable number of indigenous and (im)migrant communities using other languages. The United States is a classic example of a country with no official language policy. The term 'benign neglect' is sometimes used to describe cases where a state has no codified policy specifying which languages are official. Nevertheless, when a multilingual country uses one or more languages exclusively in public schools, and in the administration of state services and activities, it is making a distinction based on language. In showing a preference for some language(s), whether designated as official or national or not, the state's decision benefits those for whom the chosen language(s) is a primary language, to the detriment or disadvantage of others who either have no or lower proficiency and are denied the benefit or privilege of using their own primary language. The only cases where immigrant and indigenous minorities receive equal treatment are in those countries where neither group is given any special status (Kymlicka and Patten, 2003).

The term '*de facto*' ('by fact') is used for policies that operate covertly, implicitly, without necessarily having any official written support in legal documents. '*De jure*' ('by law') policies are overt, explicit, officially and legally defined. Probably most majority languages dominate in many domains where they have only *de facto* and no legal status. English is the dominant *de facto* or official language in over 70 countries. French has official or co-official status in 29 countries. The majority of countries in the world operate either *de facto* or *de jure* as monolingual states in recognizing only one language for use in education. This does not always mean that no other languages are used in education, but rather that they do not have official status. Again one must look to practice in individual cases to assess the situation.

Language Policies in Nation-States

The nation-state is the most critical unit of analysis because it is the policies pursued within national boundaries that gives some languages (and their speakers) the status of majority and others that of minority language. The term 'minority' is ambiguous because it may have both numerical and social/political dimensions. It is generally a euphemism for nonelite or subordinate groups, whether they constitute a numerical majority or minority in relation to some other group that is politically and socially dominant. What is common to most minority languages from a sociopolitical perspective is the fact that their status is defined in relation to some administrative unit, which in the modern world is generally the nation-state. Mandarin Chinese, with 900 million speakers, is spoken by more people than any other language in the world. In China, it has the status of majority language, but in many other countries such as Malaysia, it is a minority language. Catalan (Catalan-Valencian-Balear) is spoken by a minority of people within Spain, but by a majority in Catalonia, where it has official recognition. A minority language in a large country may be a majority language in a smaller country. Some languages, such as the signed languages used among deaf speakers, are minority languages in all contexts (*see* **Minorities and Language**).

The linguistic heterogeneity of many countries reflects the linguistic arbitrariness of shifting political boundaries that have encapsulated distinct ethnic groups or nationalities with their own languages. All nation-states, whatever their political ideology, have persecuted minorities in the past and many continue to do so today. Many indigenous people today such as the Welsh and the Basques find themselves living in nations that they had no say in creating and are controlled by groups who do not represent their interests and in some cases actively seek to exterminate them. More than 80% of the conflicts in the world today are between nation-states and minority peoples (Clay, 1990). The Chechens, for example, lost at least one-quarter and perhaps half of their population in transit when they were deported *en masse* to Kazakhstan and Siberia in 1944. In 1957 they were allowed to return to their ancestral territory. In the face of continued Chechen rebellion to Russian appropriation of their land, economic resources, and a continued denial of civil rights, in late 1992

Russia sent tanks and troops to the north Caucasus, ostensibly as peacekeepers in an ethnic dispute.

While not all states are actively seeking the eradication of minorities within their borders, they have pursued policies designed to assimilate minorities into the mainstream or dominant culture. It was not too long ago that minority children in places such Australia, the United States, Britain, and Scandinavia were subject to physical violence in school for speaking their home language. Often the education of these children entailed removing them from their parents and their own cultural group. The Statutes of Iona in Scotland, dating from 1609, are among the early instances of legislation in present day U.K. designed to promote linguistic and cultural assimilation. The statutes had the expressed purpose of separating Highland children from their native Gaelic culture and language and educating them in English in the Lowlands, where they would not only learn the dominant language, but would do so in an alien cultural and linguistic environment where their own culture was seen as barbaric. The law required the chiefs to send their eldest child to the Lowlands to be educated until they could speak, read, and write English.

In North America native children were sent to boarding schools where their own languages were forbidden. In Canada, the federal government and churches entered into a formal partnership to run a residential school system for Indian and Inuit children as part of the assimilation policy of the Canadian government. Education in such church-run, government-funded residential schools was supposed to prepare children for life in white society by denying them their native identity. The residential school system was in operation for nearly 150 years. In some parts of Canada as many as five generations of children attended, and some communities were depopulated of children between the ages of 5 and 20. Such schooling produced a collective sense of shame about native languages and identities. It is not surprising that demands for some form of bilingual education emerge when a group feels it is being discriminated against on other grounds. In a study done of 46 linguistic minorities in 14 European countries, the clearest link to emerge between language and schooling is that a minority language which is not taught tends to decline (Allardt, 1979).

The borders of most countries are often linguistically diverse areas. Due to a variety of political and historical factors, bilinguals may be concentrated in particular geographic areas constituting regions where the use of a language other than the state language is normal. The northeastern corner of Italy shares a border with Slovenia to the east and Austria to the north. It contains a substantial population speaking either Slovenian, as well as Friulian (more closely related to Provençal than to standard Italian), or German (Standard German). Sauris is in effect a German linguistic island severed from the Austrian empire and incorporated into the Italian state. The region of Trentino-Alto Adige (Südtirol), governed by a special statute giving equal status to German (Standard German) and Italian, guarantees the right to education in the mother tongue for Germans in the province (from nursery to higher level). Italian is taught as a second language starting from the second year of the elementary cycle. Friulian is one of the largest minority languages of Italy, with over half a million speakers in the region of Friuli-Venezia-Giulia. A regional act of April 1993 provided funds for the promotion of Friulian in primary schools. Friulian is also used in some bilingual preschool education in the province of Udine. In the south and on the east coast, Greek and Albanian are spoken in some communities by descendants of refugees and mercenaries. Neither Greek nor Albanian has any official status, although the languages are taught in a small number of schools.

Although Article 6 of the Italian constitution is a clause pertaining to linguistic minorities which states that the republic protects linguistic minorities by special laws, there are discrepancies between policy and practice. Many minorities do not benefit from any special provisions. There are approximately one million speakers of Sardinian, which has no official recognition, despite the fact that Sardinia is an autonomous region governed by special statutes. Sardinian may be used in preprimary schools if needed to communicate with children. At the primary and secondary levels Sardinian has recently been introduced as a separate subject on an experimental basis.

In some countries decisions about language policy follow a 'personality' or 'territory' principle. In Switzerland territorial unilingualism exists under federal multilingualism in the country's four officially declared national languages: German, French, Italian, and Romansch. Of the 26 cantons, 22 are officially monolingual, with one of the four languages functioning as the dominant language in education. English is much preferred over the other official languages as a second language learned at school. Canada follows the personality principle for its two official languages, French and English, where sufficient numbers warrant. Quebec gives a universal right to French education, but the right to English education is limited to those with at least one parent educated in English.

Language Policy beyond the Nation-State

Many nation-states are similar to Italy in their incorporation of a number of groups with distinct languages, and their recognition of only one or a few languages for use within the education system and for other societal institutions. As the official language of Italy, Italian is also recognized beyond its national borders as an official language of the European Union (EU). Europe is perhaps unique in having such a large concentration of world languages within its borders as well as a sizable number of minority languages. From its beginning as the European Economic Community, the EU has accorded official status to each of the national languages of its member states. This means that relatively small national languages such as Danish, with roughly five million speakers, and Greek are, in principle, as official community languages on an equal footing with international languages such as French and English, a status they have nowhere else in the world. Outside the EU and its own borders, Danish has a similar status only in the Nordic Parliament, and, like Greek, it is not spoken at international gatherings. As embodied in its linguistic policy, this has meant that equality of access to the EU's institutions should not be hindered by language. In 1990 the European Parliament adopted its so-called 'principle of complete multilingualism,' which it declared to be "consistent with the respect which is owed to the dignity of all languages which reflect and express the cultures of the different peoples who make up the European community." However, from the beginning not all languages have been equal; nor in the larger sense was or could multilingualism ever be 'complete.' This resolution was adopted due to pressure in support of granting Catalan some sort of official standing in the EU's operations.

The case of Catalan is indicative of the fact that many minority languages, both indigenous and non-indigenous, are not recognized either as official or as working languages, even though some of them have larger numbers of speakers than do the national languages. Thus, Catalan with its roughly six million speakers, despite having more speakers than Danish, was not an official language because the country in which it was officially recognized, Andorra, is not a member of the EU. In the member states where it is spoken, France, Spain and Italy, it does not have official status. While denying official status to some languages like Catalan, the regulations of the EU have continually been expanded to accommodate the entrance of new member states with their national languages. In 2004 the EU expanded from 15 countries with 11 official languages to 25 countries with 20 official languages.

The EU has undertaken legislation to defend the status of certain minority language communities within its borders in the form of the European Charter for Regional and Minority Languages (1992). Although it specifies no list of actual languages, the languages concerned must belong to the European cultural tradition (which excludes 'immigrant' languages), have a territorial base (which excludes languages such as Yiddish [Western Yiddish] and Romany [Romani], used over a wide geographic area), and be a separate language identifiable as such (which excludes local dialects of the official or majority languages). The terms of reference are deliberately vague in order to leave open to each member state how to define cultural heritage and territory. The charter provides a large number of different actions that state parties can take to protect and promote historical regional and minority languages, from which states must agree to undertake at least 35. However, each state is free to name the languages which it accepts as being within the scope of the charter (Ó Riagáin, 1998). The U.K., for instance, ratified the treaty in March 2001, but did not include Manx and Cornish. Mercator Education maintains a database of information relating to the use of regional and minority languages in education.

Language planning on an even more limited regional basis clearly makes better sense for languages such as Saami, Basque, Catalan (Catalan-Valencian-Balear), and other languages cutting across national boundaries, but the EU has generally avoided taking any action which would interfere with national laws or policies concerning linguistic minorities. The result is that many languages are valued only beyond their national borders, while not being recognized for educational or other public purposes even within their own areas of concentration.

Language Policies at the International Level

The issue of language in education has been central to the mandate of UNESCO because one of its goals is to achieve universal quality primary education and a 50% increase in adult literacy by the year 2015. Established in 1945 as a special agency of the United Nations, the organization promotes international cooperation among its 190 member states and six associated members in the fields of education, science and culture. It aims to be a standard setter in forging international agreements on a variety of ethical issues. In 1953 UNESCO published an expert report

on the use of vernacular languages in education, whose recommendations are still considered to be a central reference and have been widely referred to.

Nevertheless, UNESCO's (1935: 6) much-cited axiom "that the best medium for teaching is the mother tongue of the pupil" did not lead to any widespread adoption and development of vernacular languages as media of education. Despite some encouraging developments in some countries, in most parts of the world schooling is still virtually synonymous with learning a second language. Brenzinger (1998) estimated that fewer than 10% of African languages are included in bilingual education programs, with the result that more than 1000 African languages receive no consideration in the education sector. Skutnabb-Kangas (2000) maintained that education for minorities in many parts of the world still operates in ways that contradict best practices. She estimated that fewer than 10% of the world's languages are used in education.

In 2003 UNESCO published a new position paper on languages and education reflecting the changing global context for education in a multilingual world (*see* **Education in a Multilingual Society**). The recommendations included choice of the language of instruction in multilingual contexts; the need to preserve the languages and the ethnic identities of small language groups; and the role of English as the lingua franca and the language of instruction in countries where it is not a native language. These concerns grew out of recognition of education as an important tool and reflection of cultural diversity in a rapidly changing world.

The changing character of multilingualism in the world today has manifested itself in at least two patterns. The first is that over the last few centuries in particular, some languages have shown a remarkable propensity to spread (*see* **Language Spread**). Speakers of the 10 largest languages make up about half the world's population, and this figure is increasing. The 100 largest languages account for 90% of all people, with the remaining 6000-some confined to ten percent of the world's most marginalized peoples, who have generally been on the retreat for several hundred years (*see* **Endangered Languages**). European colonization of the New World created many such language spreads, and most of the largest European languages are also widely spoken outside Europe. Today an Indo-European language, either English, French, Spanish or Portuguese, is the dominant language and culture in every country in North, Central and South America (Nettle and Romaine, 2000).

A second noteworthy trend is increasing bilingualism in a metropolitan language, particularly English, which has become the language of the 'global village.' No one knows exactly how many people speak English as a first or second language, but some estimates for the former group are 375 million; for the latter group, some figures run as high as 1.5 billion (roughly a quarter of the world's population). As the world's economy has shifted from an industrial base to one based on exchange of information, the globalizing new world order is founded on communications technology, which underlies the linking of national economies. Hence the role of language and communication is destined to play a more critical role than ever before (*see* **Languages of Wider Communication**). Because the technology facilitating these developments originated largely in the English-speaking world, English is at the leading edge of global scientific and economic development. As much as 80% of the information stored in the world's computers is in English and 90% of the world's computers connected to the Internet are located in English-speaking countries. English is now the most widely used language in publication, with over 28% of the world's books printed in English and over 60 countries publishing books in English. English is also the language of international air traffic control and the basis for Seaspeak, used in international maritime communication. Crystal (1997) estimated that 85% of international organizations use English as one of their working languages, among them the United Nations and its subsidiary organs. French is the only real rival to English in this arena and it has been continually losing ground. Virtually all major corporations advertise their products in English. English is also the language of international popular culture for today's youth.

Most people in northern European countries such as the Netherlands, Germany, and the Scandinavian countries are becoming bilingual in English at an increasingly earlier age through schooling. Soon there will be few monolinguals among their school-age populations. English has rapidly become the first preferred foreign language study at school in the European Union, with nearly 90% of students studying it. French is almost always the second most widely taught language. The teaching of one or more foreign languages in primary school has also become more widespread.

Many countries have changed their educational practices regarding the teaching of foreign languages as a response to increasing demand for English. In Iceland, for instance, English has replaced Danish as the first foreign language taught in compulsory education (i.e., primary and lower secondary) in the new national curriculum. Danish is still taught as a compulsory second language to maintain and strengthen ties and cooperation with other Nordic

countries. English instruction begins at age 10 (the fifth year of schooling) and is taught for 6 years, while Danish begins at age 12 and is taught for 4 years. During the last two years of lower secondary schooling students generally have the option of learning a third foreign language, usually German (Standard German), but Spanish and French in some cases. The national curriculum guidelines also prescribe a minimum number of hours per week of foreign language instruction. These are rather low: 16 hours per week in English over a 6 year period, 14 for Danish, and only 2 hours per week in the optional third foreign language. Foreign languages are generally not used as the medium of instruction.

In other parts of the world English has rapidly replaced other languages once widely taught as second languages. Under the Soviet regime Russian was imposed in schools throughout the former Soviet bloc. After disintegration of the Soviet Union, few countries besides Russia require students to learn it, with the result that the language is less and less used.

Meanwhile, a third trend is that immigration and migration have brought about increasing linguistic and cultural diversity in much of Europe as well as the United States and other parts of the globe (*see* **Migration and Language**). At the end of the 20th century one-third of the urban population in Europe under the age of 35 was composed of ethnic minorities, the result of widespread migration in the 1950s and 1960s when Europe experienced an acute labor shortage. Around 10% of the school age population already has a culture and language different from that of the majority of the country in which they reside (Extra and Verhoeven, 1999). London has become an increasingly diverse city with as many as 200 languages spoken in its schools as a result of the influx of overseas migrants from the Caribbean and Asia. Similarly, Melbourne, once primarily a monolingual city, now has the largest concentration of Greek speakers in the world.

At the beginning of the 20th century one in eight persons in the United States was nonwhite; by the end of the century the proportion had increased to one in four. The white population also grew more slowly than any other group in the latter half of the 20th century. From 1980 to 2000 the Hispanic population in the United States doubled. The U.S. Census 2000 revealed that persons claiming Hispanic or Latino origin have replaced African-Americans as the largest ethnic minority group. A third of California's population belongs to this minority and nearly 40% of its population claims to speak a language other than English at home (Hobbs and Stoops, 2002). The United States is now the fifth largest Hispanic country in the world. Cities such as Miami and Los Angeles are now predominantly Hispanophone, and Los Angeles has been Latinized by its continuing immigration from Mexico. In three states, California, New Mexico, and Hawaii, as well as the District of Columbia, minority populations constitute the majority.

Recognizing that issues of identity, power, and nationhood are closely linked to the use of specific languages in the classroom, UNESCO's (2003) position paper on education in multilingual contexts reaffirmed the value of mother tongues, but at the same time stressed the importance of balancing the need for local languages in learning and access to global languages through education. As far as mother tongue teaching is concerned, UNESCO advises that it should cover both teaching of and through this language for as long as possible (*see* **Mother Tongue Education: Standard Language**). Learning through a language other than one's own presents a double burden. Not only must new knowledge be mastered, but another language as well. Many minorities may be disadvantaged to begin with, coming from at-risk populations such as new immigrants, refugees, etc. (*see* **Immigrant Language Education**).

Linguistic Human Rights

The UNESCO (2003) position paper also endorsed many of the recommendations that have come out of the debate about linguistic human rights, which has emerged as an important topic in the context of the education of linguistic minorities (Varennes, 1996; Paulston, 1997; Skutnabb-Kangas, 2000). The notion of linguistic human rights is an attempt to link the debate about language rights with the relatively well-defined international legal framework in existence for human rights. That is, the concept of human rights is invoked as a means of reaching consensus on the rights of linguistic minorities to ensure social justice. These include the rights of indigenous and minority groups to education in their own language, access to the language of the larger community and that of the national education system, and international languages (see King and Schielmann, 2004). Discussion of a universal declaration of linguistic rights is taking place under the auspices of UNESCO. Such legislation aims at guaranteeing at an individual level that everybody can identify with their mother tongue(s) and have this identification accepted and respected by others, and can learn the mother tongue(s) fully, orally (when physiologically possible) and in writing. In most cases, this requires that indigenous and minority children be educated through the medium of their mother tongue(s); that they can use the mother tongue(s) in official situations (including schools);

that everybody whose mother tongue is not an official language in the country where they are resident can become bilingual (or multilingual, if they have more than one mother tongue) in the mother tongue(s) and (one of) the official language(s) (according to their own choice).

In practice, this is being achieved to some degree in some contexts, often by means of what has been called a 'three-language formula' or a '3 ± 1 language formula' in education (*see* **Education in a Multilingual Society**). In India a three-language policy means that children from non-Hindi-speaking areas study their regional language, in addition to Hindi, and English. Hindi speakers, on the other hand, study Hindi, English, and another language. In each state there is generally a large population who speak the dominant language of the neighboring state in addition to the dominant language of the state in which they reside. In Andhra Pradesh the dominant language is Telegu (Telugu), but many people speak Kannada, Marathi, and Tamil. Millions of Telegu speakers reside in the states of Karnataka, Orissa, Tamil Nadu and Maharashtra. Each state is multilingual and the linguistic majority in one state may be a minority in other states. Each state usually recognizes one official language and restricts the use of other languages to particular districts within the state. Critics of the policy contend that although it sounds fine in theory, in practice it has not been followed throughout the country.

In Luxembourg trilingualism in the national language, Luxembourgish or Lëtzebuergesch (Luxembourgeois), French, and German (spoken in the neighboring countries of Belgium, France, and Germany) is encoded in legislation which ensures that all citizens learn all three languages at school. Students begin with their everyday spoken language, Luxembourgish, in compulsory preschool education. German is added in the first year of primary education, and French from the second year of primary school onward. Over the years, however, and particularly in secondary education, French gets an ever-bigger share until it completely replaces German as the language of instruction. English is learned as a fourth compulsory language in secondary education and secondary technical education.

Kymlicka and Patten (2003: 7) claimed that one reason why there has been a general reluctance to view policies of official bilingualism as rights rather than as pragmatic accommodations is that public institutions in the most powerful Western nations, the U.K., the United States, France, and Germany, have been monolingual for a century or more with no significant movement toward challenging the hegemonic position of the majority language. Immigrants have not generally challenged the hegemony of these nations and have usually assimilated rapidly and none of these countries has faced the linguistic challenges of Belgium, Spain, Canada, or Switzerland. Language occupies a contested position when nation-states cannot ground their basis for a common identity on language, religion, or culture. Some still regard the concept of language rights as 'regressive' because they are seen as encouraging the persistence of ethnic differences, leading to conflict and divided loyalties. It is an unresolved question whether and when language shift can be required or expected in deliberative democracies (*see* **Language Maintenance and Shift**). Likewise, one can question whether it is legitimate for the state to insist that all children be schooled in the majority language of the state as the sole or main medium of instruction. National ethnic minorities have many more internationally and nationally coded rights than immigrants. The linguistic human rights movement has focused on securing a universal right to mother tongue primary education.

Typologies and Models of Multilingual Education

Bilingual education is not a modern phenomenon; it has existed in one form or another for at least 5000 years. Only recently, however, has it become an area of concern for policy makers. The term 'bilingual education' can mean different things in different contexts. If we take a commonsense approach and define it as a program where two languages are used equally as media of instruction, many so-called bilingual education programs would not count as such (*see* **Bilingual Education**). Moreover, the 'same' educational policy can lead to different outcomes, depending on differences in the input variables.

Typologies of bilingual education range from those which distinguish two basic types (Edwards, 1984) to Mackey's (1972) 90-cell typology. In her discussion of these many typologies each with somewhat different terminologies, Hornberger (1991) showed how the same terms are often confusingly used for different types of educational programs and conversely, different terms refer to the same type. So-called transitional bilingual education, for example, is also referred to as compensatory or assimilation bilingualism. Sometimes a distinction is made between immersion and submersion, and often the additional term 'structured immersion' is used for a program that has more in common with submersion than immersion. Like submersion, it is a program of monolingual majority language instruction for minority language speakers with little or no use of the pupils' first language. A so-called maintenance program does not necessarily

foster maintenance. Sometimes the term refers to a program's goal, e.g., the maintenance of a minority language, while in other cases, it refers to the structure of a program, e.g., the curricular maintenance of a minority language as a medium of instruction.

Hornberger proposed her own framework, which distinguishes between bilingual education models and program types. Models are defined in terms of their goals with respect to language, culture and society, and program types in terms of characteristics relating to student population, teachers, and program structure. This led her to recognize three types of models, transitional, maintenance, and enrichment, each of which may be implemented via a wide range of program types. Like Hornberger, Skutnabb-Kangas (2000) recognized three general types: immersion, submersion, and maintenance. If the educational aim of a bilingual program is the enrichment of majority children, an immersion program is chosen and the children are taught through the medium of a second language. The type of program chosen will typically, though not always, have different consequences. In practice, the situation in individual countries is complex and often several different options are available for different kinds of children, depending on a variety of circumstances, varying from place to place.

Immersion

Immersion programs first began in Montreal in 1965 to teach French to English-speaking students. Although there are many variants of the model, in most cases the students come from the same home language background, and the curriculum typically involves two or more languages as the medium of instruction. One of these is usually the student's home language, and the other a second or foreign language, with at least 50% of the curriculum being taught through the second or foreign language. The Canadian model can be thought of as leading to 'additive bilingualism' because the aim is to produce a high level of proficiency in both languages. Results have shown that immersion students consistently display normal levels of academic development in their first language while acquiring high levels of proficiency in the second language (*see* **Bilingualism and Second Language Learning**). Full benefits of immersion emerge after about 5 or 6 years of continuous participation. Early immersion programs tend to achieve better results, but late immersion programs can also be successful (Johnson and Swain, 1997; Cenoz and Genesee, 1998).

After the success of the French immersion programs, similar immersion models of various types have become widely used around the world to promote indigenous and minority languages (*see* **Language Education for Language Revival**). Some programs are total immersion, such as the Hawaiian program, which uses Hawaiian as the language across the curriculum. English is introduced as a subject from the fifth grade (around age 10) for 1 hour a day. Most of the students attending are English speakers and are learning Hawaiian as a second language. The immersion model contrasts with more conventional language teaching as a subject for a limited number of hours with fewer opportunities for high levels of academic or informal engagement with the language in use. In immersion there may be little if any focus on language learning *per se* in the form of direct teaching of grammar and vocabulary. Language is acquired through the meaningful interaction required to learn academic content in various subjects. Other variants of the model may rely on bilingual immersion combined with a third language taught as a subject. In parts of the Basque country Basque and Spanish are used for instruction during primary education, and English is taught as a subject beginning in kindergarten.

In other cases, however, total immersion programs have been used as a tool to assimilate linguistic minorities into dominant languages. Minority children are put into majority language classes (with or without some additional teaching of the second language). Some researchers have called such programs 'submersion' or 'subtractive bilingualism' since the second language gradually undermines proficiency in the first because the development of the child's first language is disrupted and incomplete. In the United States some children have received assimilationist treatment (with or without special instruction in English as a second language), while others have had the opportunity to participate in bilingual programs along with majority children who were being exposed to the first language of the minority group in an enrichment scheme. The types of programs offered to particular groups depend very much on the relationship between them and the government.

Transitional Bilingual Education

Bilingual education was given a legal footing in the United States by the Bilingual Education Act of 1968. Aimed at children with 'limited proficiency in English,' it provided funds for instruction in the mother tongue only as an aid to allow the children to proceed as rapidly as possible into ordinary mainstream classes in the majority language. From the beginning there was conflict over the degree of emphasis to be given to native language instruction.

The model of bilingual education prescribed by the federal government, however, was opposed in its aim and principles to the kind of enrichment goals underlying Canadian immersion. Although it provided opportunities for schools to set up bilingual education programs, it did not place individual schools under any legal obligation to do so. Moreover, there was no intention or provision to maintain the students' home language. Instead of receiving equal instruction in both languages as they would in a maintenance program, the students would be given increasingly less instruction in their native language until they finally left the program.

Litigation brought to the courts on behalf of various groups of minority students led in some cases to court-mandated bilingual education programs. In Lau vs. Nichols a class action suit was brought against the San Francisco Unified School District by Chinese public school students in 1970. It was argued that no special programs were available to meet the linguistic needs of these students. As a consequence, they were prevented from deriving benefit from instruction in English and were not receiving equal treatment. The plaintiffs made their appeal not on linguistic grounds, but on the basis of the Civil Rights Act of 1964, which states that "no person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving Federal financial assistance" (Teitelbaum and Hiller, 1977: 6). In their case against the school board, the plaintiffs requested a program of bilingual education. Although the case was lost, the Supreme Court overturned the decision of the federal district court in 1974. It concluded that "the Chinese-speaking minority receives fewer benefits than the English-speaking majority from respondents' school system which denies them a meaningful opportunity to participate in the educational program – all earmarks of discrimination banned by the regulations" (Teitelbaum and Hiller, 1977: 8). This was a landmark decision because it meant that for the first time in the United States the language rights of non-English speakers were recognized as a civil right. It was one of the few language cases ever to reach the Supreme Court, and its ruling made schools rather than parents or children responsible for remedying the children's limited knowledge of English.

In its decision the Supreme Court did not press for any specific remedy. It pointed out only two possibilities: namely, teaching English to the students or teaching them in Chinese. They requested only that the school board rectify the situation of inequality of educational opportunity. The remedy taken by the San Francisco school board was to set up a bilingual education program for Chinese, Filipino, and Spanish language groups, who made up over 80% of the students with little or no English. Teaching in English as a second language was offered to all other minority groups. The Lau decision led to other cases. It also encouraged expansion of the services and eligibility provided through the Bilingual Education Act, and many states passed bills mandating bilingual education. The Lau decision was also instrumental in setting up policy guidelines at the federal level that would allow the U.S. Office of Education to decide whether a school district was in compliance with the Civil Rights Act and the Lau case. A document referred to as the 'Lau Remedies' directed school boards to identify students with a primary or home language other than English and to assess their proficiency in English and the home language. Elementary school students were to be taught in their dominant language until they were able to benefit from instruction entirely in English. The U.S. Congress made the Lau decision an explicit part of the Equal Educational Opportunities Act (1974). Further mandates for bilingual instruction followed from lawsuits by Latino parents.

The sixth (and final) version of the Bilingual Education Act reauthorized by Congress in 1994 endorsed for the first time the goal of developing native language skills alongside its traditional focus on English language acquisition for limited-English-proficient children. Meanwhile, under the Clinton administration (1993–2001) two-way or dual immersion programs were promoted; these grew more than tenfold between 1987 and 2001. These were aimed at integrating majority and minority children in a program of content and literacy instruction in two languages.

In the late 1990s, however, the tables turned dramatically when a lawsuit was filed on behalf of Latino parents who claimed that state policies mandating Spanish instruction discriminated against their children (Carbajal *et al.* vs. Albuquerque Public Schools, 1999). This case attempted to portray bilingual education as a violation of civil rights rather than an entitlement. In California a conservative software millionaire named Ron Unz spearheaded a movement named English for the Children, portraying itself as a group committed to securing the right to instruction in English for immigrants. Under this proposal children with limited English proficiency were to be 'mainstreamed' as soon as possible into regular classrooms. After voters in three states (California in 1998, Arizona in 2000, and Massachusetts in 2002) voted against bilingual education, programs were dismantled, and have been under

attack in others. This outcome meant that most of the bilingual education programs enrolling 43% of the English language learners in the United States would be replaced with intensive English immersion.

Ironically, one of the reasons why many people have viewed bilingual education so negatively is due to the fear that it aims to maintain languages, and by implication cultures, other than English. Even at the peak of their existence, bilingual programs reached only a minority of children for whom they could have been beneficial. Voters appeared to be largely ignorant of the rationale behind such programs as well as their aims and outcomes. Crawford's (2004) analysis suggested that the public had a mistaken view that bilingual education was a diversion from acquiring English rather than a means to that end. It was the idea of maintaining languages other than English which the public was against. While foreign language instruction in the world's major languages in mainstream schools has been seen as valuable, both economically and culturally, bilingual education for minority students has been equated with poverty and loyalties to nonmainstream culture which threaten the cohesiveness of the state. Voters were also misled by the use of the term 'English immersion,' which suggested an intensive English program tailored to the needs of children learning English.

In addition, various opponents of bilingual education have formed a powerful lobby backed by considerable sums of money. The English-only movement formed in 1983, operating under the name U.S. English, has been campaigning in favor of a constitutional amendment to make English the official language of the United States, and for similar legislation at state level. The organization also seeks to repeal laws mandating multilingual ballots and voting materials. Twenty-seven states have enacted some form of official legislation. The group has seen programs that accommodate immigrants in their native languages as a kind of 'linguistic welfare' system that lowers the incentive to learn English and restricts them to low-skilled, low-paying jobs.

In 2002 the Congress effectively repealed the Bilingual Education Act when it passed the 'No Child Left Behind Act.' References to bilingualism have been removed from various federal agencies to reflect the shift away from bilingual education to concentration on the acquisition of English. The Office of Bilingual and Minority Affairs at the U.S. Department of Education was renamed the Office of English Language Acquisition, Language Enhancement and Academic Achievement for Limited English Proficient Students. The National Clearing House for Bilingual Education has been renamed the National Clearing House for English Language Acquisition and Language Instruction Education Programs.

As in the case of immersion programs aimed at enrichment, research supports the pedagogic effectiveness of bilingual education programs. Students in bilingual programs have typically performed at least as well on English reading tests as students in all-English programs (Corson, 2001; Crawford, 2004). Much of the concern over acquisition of English masks the fear many middle-class whites have of losing their majority status. Although proponents of U.S. English attempt to legitimize the organization's existence as a way of breaking down supposed language barriers and facilitating minority access to the material and other benefits of mainstream America, the irony is that most ethnic minorities do not actually want a self-contained ethnic group where no English would be spoken. Nor, however, do they want to assimilate linguistically or culturally. A majority want to maintain their ethnicity and language while also being American. An unfounded fear of diversity itself and thinly disguised racism lies behind the backlash against bilingual education in the United States, and in Europe, where earlier policies of providing home language instruction to the children of migrant workers have been rescinded or drastically curtailed.

Despite propaganda from U.S. English to the contrary, there were actually 4.5 times as many non-English speakers recorded in the U.S. census when immigration reached its highest level than in the 1990 census. The assimilative forces that absorbed those immigrants and their languages are even more powerful today. Although the number of non-English speakers is increasing, so too is the rate of shift to English. Languages other than English are the ones under threat. Spanish is fast approaching a two-generation pattern of language shift rather than the three-generation model typical of immigrant groups in the past. Without the replenishing effects of continuing immigration, Spanish would scarcely be viable in the United States over the long term (Veltman, 1983, 1988).

Weak Linkages between Language Policy and Planning

Despite evidence of growing rather than decreasing diversity in many education systems, in some countries the trend has been toward not recognition of the need for policy and planning but the imposition of ever more centralized provision and greater intolerance of diversity. There are important differences between 'tolerance rights' and 'promotion rights.'

Most democracies provide for freedom of government interference in private language use, but many are reluctant to make legal provision for promotion of languages in the public sector other than the dominant language(s).

In addition, weak linkages between policy and planning render many existing policies ineffective (Romaine, 2002). Many language policy statements are often reactive *ad hoc* declarations lacking a planning element. Eritrea's 1995 decision **not** to recognize an official language is a grand declaration with no linkage between policy and planning. Thus, President Isayas Afewerki (Brenzinger, 1998: 94):

> When we come to the question of language as a means of instruction in schools, our principle is that the child should use its mother tongue or a language chosen by its parents in the early years of its education, irrespective of the level of development of the language. Our policy is clear and we cannot enter into bargaining. Everyone is free to learn in the language he or she prefers, and no one is going to be coerced into using this or that 'official' language.

Policies cannot be implemented unless those with the duty to implement them are provided with the necessary resources. Policies cannot be effective unless they are tied to a plan for monitoring of compliance and application of sanctions where they are not implemented.

See also: Bilingual Education; Bilingualism and Second Language Learning; Bilingualism; Education in a Former Colonial Language; Education in a Multilingual Society; Education in a Multilingual Society; Educational Failure; Endangered Languages; Immigrant Language Education; Language Education for Language Revival; Language Maintenance and Shift; Language Planning and Policy: Models; Language Spread; Languages of Wider Communication; Law and Language: Overview; Migration and Language; Minorities and Language; Mother Tongue Education: Standard Language.

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Language Politics

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Language politics (LPt) is actual political activity with respect to language and can be distinguished from *language policy* (LPc), i.e., the conception and planning of such activity; but both are, as a rule, closely intertwined (Spolsky, 2004; Ozolins, 1996). LPt's typical agents are state politicians, but they can be members of any polity (institution or community) – for example, a family, a religious community, a town, a nongovernmental organization, or an international organization. Objectives of LPt can vary greatly depending on interests and motives – e.g., 'purifying' one's own national language of foreign loans to shape it into a more adequate symbol of national identity, or spreading the language within the state or beyond in order to more efficiently exert power. LPt has to reckon with existing language rights and may result in new language rights (Paulston, 1997) (*see* **Linguistic Rights; Linguistic Decolonization**).

Internal LPt regulates language within the polity, while *external* LPt aims beyond it. For the state, the former is part of interior politics, the latter of exterior politics. Internal LPt can be directed at language structure (*language corpus politics*, LCPt) or language status and function (*language status politics*, LSPt). Typical aims of LCPt are graphization (introducing or regulating script and orthography); standardization, including codification (selection and codification of norms of spelling, pronunciation, vocabulary, grammar, and style or texts); 'purification' (eliminating foreign loans); and modernization (developing modern terminology). Typical aims of LSPt are spreading the norm of a standard variety and, in the case of multilingual communities, allocating languages to certain regions (McRae, 1975) or domains and functions – for example, official (Laitin, 1992), educational (medium or subject of teaching on various educational levels; Lo Bianco, 1987), religious (Landau and Kellner-Heinkele, 2001), the media, or the military (Ager, 1996; Schiffman, 1996). Politics of language promotion, language maintenance, or language revival can comprise

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http://www.mercator-education.org – Mercator Education.
http://www.unesco.org – MOST Clearing House.
http://www.us-english.org – U.S. English.

Language Politics

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Language politics (LPt) is actual political activity with respect to language and can be distinguished from *language policy* (LPc), i.e., the conception and planning of such activity; but both are, as a rule, closely intertwined (Spolsky, 2004; Ozolins, 1996). LPt's typical agents are state politicians, but they can be members of any polity (institution or community) – for example, a family, a religious community, a town, a nongovernmental organization, or an international organization. Objectives of LPt can vary greatly depending on interests and motives – e.g., 'purifying' one's own national language of foreign loans to shape it into a more adequate symbol of national identity, or spreading the language within the state or beyond in order to more efficiently exert power. LPt has to reckon with existing language rights and may result in new language rights (Paulston, 1997) (*see* **Linguistic Rights; Linguistic Decolonization**).

Internal LPt regulates language within the polity, while *external* LPt aims beyond it. For the state, the former is part of interior politics, the latter of exterior politics. Internal LPt can be directed at language structure (*language corpus politics*, LCPt) or language status and function (*language status politics*, LSPt). Typical aims of LCPt are graphization (introducing or regulating script and orthography); standardization, including codification (selection and codification of norms of spelling, pronunciation, vocabulary, grammar, and style or texts); 'purification' (eliminating foreign loans); and modernization (developing modern terminology). Typical aims of LSPt are spreading the norm of a standard variety and, in the case of multilingual communities, allocating languages to certain regions (McRae, 1975) or domains and functions – for example, official (Laitin, 1992), educational (medium or subject of teaching on various educational levels; Lo Bianco, 1987), religious (Landau and Kellner-Heinkele, 2001), the media, or the military (Ager, 1996; Schiffman, 1996). Politics of language promotion, language maintenance, or language revival can comprise

LCPt, such as constructing or reconstructing vocabulary, as well as LSPt, such as encouraging use in the family or institutionalization in school (Ó Riagáin, 1997) (*see* **Applying Pragmatics**).

External LPt is mainly LSPt or, more specifically, *language spread politics*. Examples of global consequences occurred during colonialism (Phillipson, 1992) (*see* **Linguistic Imperialism**). Today virtually all the larger language communities, or their major states, endeavor to allocate their languages in international organizations (e.g., the Arab countries in the UN in 1973, France and Germany in the EU; Ammon, 2003, 2004) or in the school curricula of other countries (Ammon and Kleineidam, 1992, 1994; Ricento, 2001; Haarmann, 2005).

See also: Applying Pragmatics; Endangered Languages; Identity and Language; Language Maintenance and Shift; Language Planning and Policy: Models; Language Policies: Policies on Language in Europe; Language Policy in Multilingual Educational Contexts; Languages of Wider Communication; Law and Language: Overview; Law on Language; Linguistic Decolonization; Linguistic Rights; Media and Language: Overview; Politics and Language: Overview; Pragmatics: Linguistic Imperialism; Radio: Language; Reversing Language Shift; Society and Language: Overview; Standardization; Teaching of Minority Languages; Television: Language.

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Language Processing: Statistical Methods

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It is not a new idea to analyze language by counting things and uncovering statistical regularities in the results. Ancient applications include code-breaking and literary analysis, while the late 19th and early 20th century brought statistical approaches to language-related design problems in telegraphy and stenography. Researchers in the fields of computational linguistics, language technology, and natural language processing can expect to encounter statistical methods and probabilistic thinking on a daily basis. The key enabling factors for natural language processing were the arrival of the digital computer and the availability of automatic data processing. There is nevertheless a body of striking empirical work that predates the ready availability of computers, including Mosteller and Wallace (1984) on authorship attribution in the *Federalist papers* and Kučera and Francis (1967), who pioneered the design and creation of large-scale data resources for language analysis.

The focus of this article is on the statistical methods that have been developed for processing language by computer, but it is worth beginning with a detour that addresses two well-known objections. One is

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Jonathan Swift's satirical account of stochastic text generation in the academy at Lagado.

> [...] bits of Wood were covered on every Square with Paper pasted on them, and on these Papers were written all the Words of their Language, in their several Moods, Tenses, and Declensions, but without any Order. The Professor then desired me to observe, for he was going to set his Engine at Work. The Pupils at his Command took each of them hold of an Iron Handle, whereof there were fourty fixed round the Edges of the Frame, and giving them a sudden turn, the whole Disposition of the Words was entirely changed. He then commanded six and thirty of the Lads to read the several Lines softly as they appeared upon the Frame; and where they found three or four Words together that might make part of a Sentence, they dictated to the four remaining Boys who were Scribes. This Work was repeated three or four Times, and at every turn the Engine was so contrived that the Words shifted into new Places, as the Square bits of Wood moved upside down. (Swift, *Gulliver's travels,* chapter 5)

Swift's intent is to present as self-evidently absurd the notion that anything of literary value could be produced by such a process. This is satire and makes no scientific claim, but language technologists may nevertheless find more of scientific interest than Swift would have expected. Exactly how are the "Moods, Tenses, and Declensions" encoded? Why does the machine have 40 iron handles rather than just one? Are the words produced always drawn from the same probability distribution, or does the machine have a number of distinct internal states, so that sometimes one word is more likely, sometimes another? In spite of the satirical intent, interesting scientific issues are raised.

A second objection is made explicit in Noam Chomsky's discussion of statistics, which is more measured and subtle than Swift's satire.

> (1) Colorless green ideas sleep furiously
> (2) Furiously sleep green ideas colorless
> ... It is fair to assume that neither sentence (1) nor sentence (2) (nor indeed any part of these sentences) has ever occurred in English discourse. Hence, in any statistical model for grammaticalness, these sentences will be ruled out on identical grounds. (Chomsky, 1957: 16)

Chomsky's goal in making this argument was to contrast the statistical approach with his own preferred methodology, which relied primarily on introspection about the grammatical acceptability of sentences found or imagined by the linguist.

Chomsky presumably reached his conclusion because he was operating with a rather narrower notion of 'possible statistical model' than do most statistical linguists. For example, it is perfectly possible to construct a statistical model that sees not individual words but broad word classes. Simplifying somewhat, such a model might assign probabilities to (1) and (2) by treating them as if they were instead (3) and (4), respectively.

> (3) Adjective Adjective Noun Verb Adverb
> (4) Adverb Verb Noun Adjective Adjective

Under this scenario it is very much to be expected that (4) will receive a lower probability than (3), because it is so rare to see pairs of adjectives occurring at the end of an English sentence. Chomsky was not wholly averse to statistics and explicitly acknowledged that statistical methods can and should be used to model the use of language, but he did deny their usefulness as tools for explicating syntactic structure. The cited passage, and similar passages elsewhere in Chomsky's work, are a large part of the reason why most theoretical linguists have tended to avoid statistics. In spite of the scientific intent, much of the impact of Chomsky's discussion comes from the satirical bite of its rhetoric, rather than from the technical correctness of the arguments presented.

More detail on the relationship between statistics and linguistics is given by Abney (1996), Pereira (2000), and Bod *et al.* (2004).

For purposes of language technology, it is moot whether theoretical linguists accept statistical methods, since it is very clear that these methods can contribute to the creation of useful and instructive linguistic artifacts that carry out such tasks as part-of-speech assignment and word-sense disambiguation. The balance of this article gives an introduction to some of the concepts and techniques used.

Probability

'Probability' is the standard means for rational reasoning about uncertainty. In probability theory, a key concept is the 'event.' Examples of events include these:

- A coin is tossed and comes down heads.
- The result of the spin of a roulette wheel is 19.
- Two dice are rolled, and the sum of the results is 7.
- Two contiguous words are selected from Conan Doyle's 'A case of identity' and they turn out to be *Sherlock* and *Holmes*, respectively.

We can describe the situations above in terms of an event x and its probability $P(x)$.

- x: A coin is tossed and comes down heads. $P(x) = 0.5$ for a fair coin that comes down heads half the time.

- x: The result of the spin of a roulette wheel is 19. $P(x) = 1/38$ for a fair roulette wheel with 38 slots.
- x: Two dice are rolled, and the sum of the results is 7. $P(x) = 6/36 = 1/6$ for fair dice.
- x: Two contiguous words are selected from Conan Doyle's 'A case of identity' and they turn out to be *Sherlock* and *Holmes*, respectively. $P(x) = 7/7051$ because there are 7051 pairs of two contiguous words in the story, and exactly 7 of them are *Sherlock Holmes*.

These probabilities are obtained either by counting possibilities (for the coin or the dice) or by counting occurrences of events (as in the Conan Doyle example). By definition, a fair coin is one that makes the two possible outcomes equally likely. A fair die is one that gives a probability of 1/6 to each of the six possible outcomes. Therefore there are 36 equally likely outcomes to a roll of two dice, of which exactly six (1 and 6; 2 and 5; 3 and 4; 4 and 3; 5 and 2; 6 and 1) add up to the required number. The probability calculus supports this kind of reasoning by explaining how the probability of the compound event of rolling 7 is related to those of the simpler components of that event. Just as logic is a method for reasoning about the truth or falsity of propositions, so the probability calculus is a method for reasoning about uncertainty. The rules of logical inference remain the same regardless of the nature of the premises. In the same way, the rules of probabilistic inference remain the same regardless of the origin of the initial probability estimates.

Random Variables and Bayes's Rule

We have already presented an informal argument that links the probability of the event 'two dice are thrown and the total is 7' to the probabilities of the different possible outcomes of rolling the dice. A more formal presentation would be the following. Define two random variables R, G (corresponding to a red and a green die, respectively). Both R and G can take on any of the values 1, 2, 3, 4, 5, 6. We notate the probability of rolling a 1 with the green die as $P(1)$ and the probability of rolling a 3 with the green die and a 4 with the red die as $P(3, 4)$. The latter is referred to as a 'joint probability' because it consists of two component events.

Under the assumption that the two random variables involved in a joint event are independent, the probability of the joint event is obtained by multiplying the probability of the components. Thus

$$P(3, 4) = P(3) \times P(4)$$

In assuming that the dice are fair, we are stipulating that all of the $6 \times 6 = 36$ outcomes are equally likely. Since there are exactly six ways in which 7 can be rolled, it follows that $P(7) = 1/6$.

Thus far we have dealt with joint probabilities and their simple components, but many of the most important probabilities in natural language processing are conditional. A 'conditional probability' is one where attention is focused on a particular subset of the space of possible events. In the Conan Doyle story, as in English generally, it turns out that some words are extremely predictable from preceding context. The conditional probability focuses only on those cases where the first word is *Sherlock* and asks about the proportion of these cases where the next is *Holmes*. In fact, every time that the word *Sherlock* appears, the next word is *Holmes*. We notate this as:

$$P(\text{Holmes}_{n+1}|\text{Sherlock}_n) = 1$$

using Sherlock_n to denote the event that the nth word is *Sherlock* and Holmes_{n+1} to denote the event that the $n + 1$th word is *Holmes*. The vertical bar signals the conditioning of the probability and is read as 'given.' Notice in Table 1 that $P(\text{Sherlock}_n|\text{Holmes}_{n+1})$ is not the same thing. *Sherlock* occurs seven times only, always followed by *Holmes*, whereas *Holmes* occurs 46 times, as shown in the table. Therefore $P(\text{Sherlock}_n|\text{Holmes}_{n+1}) = 7/46$.

An important property of conditional probability is that it participates in the chain rule, which states that

$$P(A,B) = P(A) \times P(B|A) = P(B) \times P(A|B)$$

For the running example:

$$\begin{aligned} &P(\text{Holmes}_{n+1}, \text{Sherlock}_n) \\ &\quad = P(\text{Sherlock}_n) \times P(\text{Holmes}_{n+1}|\text{Sherlock}_n) \\ &\quad = P(\text{Holmes}_{n+1}) \times P(\text{Sherlock}_n|\text{Holmes}_{n+1}) \end{aligned}$$

Given that $P(\text{Holmes}) = 46/7051$ and $P(\text{Sherlock}) = 7/7051$, the reader will be able to verify that the two apparently different decompositions of the joint event lead to $P(\text{Sherlock, Holmes}) = 7/7051$.

Table 1 Occurrences of *Holmes* in 'A case of identity'

Combination		*No. of occurrences*
Mr	Holmes	14
Sherlock	Holmes	7
Windibank	Holmes	1
and	Holmes	1
at	Holmes	1
crushed	Holmes	1
remarked	Holmes	2
said	Holmes	18
while	Holmes	1

This equivalence is of more than academic interest in natural language processing, because it establishes a relationship between $P(A|B)$ and $P(B|A)$.

$$P(B|A) = \frac{P(B) \times P(A|B)}{P(A)}$$

This relationship is known as 'Bayes's rule.' In natural language processing it is very common for A to be an 'observation' such as a word, whereas B is a 'hidden variable,' such as the part-of-speech tag for that word. The usefulness of the rule for natural language processing comes from the following facts:

- In many applications it suffices to find the value of B that maximizes $P(B|A)$, and the probability itself is just a means to this end. For purposes of maximization, we can simply drop $P(A)$ because it is a constant. When determining a part of speech, given a word, we do not care how probable the word itself is.
- It is often easier to collect the data and justify the assumptions that would be needed to form a sensible estimate of $P(B)$ and $P(A|B)$ than it would be for $P(B|A)$.

In beginning to talk of estimates, we are moving from probability to statistics, which is the topic of the next subsection.

Statistics

Imagine repeatedly tossing a coin and keeping track of heads and tails. It is reasonable to suppose that the successive trials are unaffected by the outcome of previous trials. It is also reasonable to expect that, over time, an unbiased coin will give approximately equal numbers of heads and tails. It is also true that, for a biased coin, the ratio between heads and tails will eventually settle down to some stable value that depends on how much material has been shaved off the edge of the coin by the person who biased it. In other words, given enough data we stand a good chance of obtaining a stable estimate of the true underlying value of the coin's bias. The same is true of language: if we see a large-enough training corpus, we will be in a position to estimate the underlying parameters of various different statistical models that we might assume to have generated that corpus.

For the Conan Doyle story, sensible probabilities can be obtained by counting the number of times that the relevant words occur in sequence. Although this process gives complete information about the specifics of 'A case of identity,' corpus researchers are typically interested in moving from the specific to more general hypotheses. For example, they may wish to make claims about the patterns of word occurrence in all Sherlock Holmes stories, in the whole of Conan Doyle, in Victorian and Edwardian literature, or in written English. Such claims rely not only on correct use of probability but also on scientific judgments about the extent to which small samples from some process can be regarded as representative of the process as a whole. The mathematics and science behind these judgments are at the heart of the field of statistics. Taken together, probability and statistics provide recipes for collecting data that one hopes will be representative, reducing that data to informative summaries and reasoning about the results. A good introduction to probability and statistics is DeGroot (1986).

Information Theory 'Information theory,' the mathematics of telegraphy, is central to statistical language modeling. It makes the idea of 'quantity of information' precise. This enables meaningful comparisons between different natural language processing systems.

Imagine watching a sequence of symbols go past on a ticker-tape. You have seen the symbols w_1 to w_{i-1} and you are waiting for w_i to arrive. You ask yourself the following question: *How much information will I gain when I see w_i?* Another way to express the same thing is: *How predictable is w_i from its context?* Each time we see a symbol we are more surprised or less surprised, depending on which symbol turns up. Large information gain goes with extreme surprise. If you can reliably predict the next symbol from context, you will not be surprised, and the information gain will be low. The average information gain is called 'entropy.' The entropy will be lowest when you can usually predict the next symbol with good reliability and highest when you often cannot. The amount of information gained when we see a w that has probability $P(w)$ turns out to be the logarithm of the probability (notated '$\log P(w)$'). If logarithms are taken to base 2, information is denominated in 'bits,' but if natural logarithms are used, the information is denominated in 'nats.'

A good statistical model of language is one that provides reliable predictions. It therefore tends to minimize entropy. The model that we have just described is a 'word-level language model.' Such a model would be useful for a speech recognition system that wishes to constrain its search for the next word by focusing attention on those that are likely to follow the words it has already recognized.

Cross-Entropy In the previous section we developed the idea that entropy is a measure of the average information gain from seeing the next symbol of a

ticker-tape. Now we imagine that we are still watching a ticker tape, whose behavior is still controlled by some probability distribution, but that we have imperfect knowledge of the true probabilities. Call the true probability model P and our imperfect knowledge of it P_M. When we see w we assess our information gain as log $P_M(w)$, not as the correct log $P(w)$. The average information gain that we assess in this situation is called the 'cross-entropy' of the signal. It is defined in terms of the imperfect model P_M as well as the true model P. It is a remarkable and important fact that the cross-entropy with respect to any incorrect probabilistic model is greater than the entropy with respect to the correct model.

This fact is important because it provides us with a justification for using cross-entropy as a tool for evaluating models. The search for a good model can be organized in the following way:

- Initialize the model with random (or nearly random) parameters.
- Measure the cross-entropy.
- Alter the model slightly (maybe improve it).
- Measure again, accepting the new model if the cross-entropy has improved.
- Repeatedly alter the model until it is good enough.

If we can guarantee that the alterations to the model will improve cross-entropy, so much the better, but even if some of the changes worsen the cross-entropy, the search may eventually yield good models.

Statistical Modeling

Linguistic phenomena are complex and involve much fine detail. In principle, given sufficient data, it would be possible to build accurate statistical models of such phenomena. Unfortunately, we never have sufficient data, a difficulty that is referred to as the 'sparse data problem.' It is counterintuitive but true that even millions of words of training data can be insufficient. Therefore we are driven to compromise, choosing to build relatively simple models that capture some but not all of the detail. The advantage of such models is that they can be trained on feasibly available data, the corresponding disadvantage being that they miss some of the potentially useful and interesting regularities that we would like to find.

Engineers and statisticians have a standard approach to this problem. The mathematics of this approach is straightforward, but its application to any particular modeling problem requires considerable insight and good judgment if it is to lead to effective solutions.

The easy part is the following: we begin by describing the situation that we wish to model as a collection of random variables. In the case of a word-level language model, we might note that the ith word w_i can often be predicted from its predecessors $w_1 \ldots w_{i-1}$. Using the chain rule, we obtain the following exact expression for the probability of a string as a product of simpler terms:

$$P(w_1 \ldots w_n) = P(w_1) \times P(w_2|w_1) \times P(w_3|w_1, w_2) \ldots \times P(w_n|w_1 \ldots w_{n-1})$$

or, using product notation

$$P(w_1 \ldots w_n) = P(w_1) \prod_{i=2}^{n} P(w_i|w_1 \ldots w_{i-1})$$

Unfortunately, while the first few terms of this series are simple, the later terms involve probabilities that are conditioned on large amounts of prior context. If a sentence is 20 words long, the prediction of the 20th word will be conditioned on the preceding 19 words. It is very unlikely that this precise sequence of words will have occurred in the training data, so the model will have no basis for making a prediction. Even if the sequence has occurred, it is unlikely to have occurred often enough and with a broad enough range of different continuations for the predictions to be reliable. For example, if the sequence of 19 words has been seen exactly once in the training data, the model will have seen only one word after it and will predict that word with absolute certainty, excluding all others. Clearly the model has not seen enough data to warrant such certainty.

The general prescription for dealing with such situations is to adopt independence assumptions. This is done by ignoring some of the dependencies between the conditioning context and the variable whose value we are attempting to predict. Of course, we wish to keep the most important dependencies and drop the unimportant ones. For a word-level language model, it is plausible that the most important influence comes from the immediately preceding word, so we can adjust the model to neglect all dependencies that occur at a longer range than this. That is, we write:

$$\mathrm{P}(w_1 \ldots w_n) \approx \mathrm{P}(w_1) \times \mathrm{P}(w_2|w_1) \times \mathrm{P}(w_3|w_2) \ldots \times \mathrm{P}(w_n|w_{n-1})$$

or, using product notation:

$$P(w_1 \ldots w_n) \approx P(w_1) \prod_{i=2}^{n} P(w_i|w_{i-1})$$

This greatly reduces the amount of data that must be stored. Where we previously needed to keep track of the successors of every contiguous subsequence of the training data, we can now get away with recording only the statistics about single words

and their possible successors. This alone makes the difference between feasibility and infeasibility. In addition, the chances of having enough training data to collect reliable statistics are greatly increased. The general strategy of simplifying probabilistic models by dropping the less important conditioning information is frequently very effective, but judgment is needed to decide how to identify that less important information and how to formulate a model that strikes the appropriate balance between feasibility and detailed predictive power. For the word-level language model, it turns out that the model outlined above (termed a 'bigram' model, because it needs only statistics over two-word sequences) is an effective compromise. A 'trigram' model (one that uses three-word sequences) is even better and is widely used in speech recognition.

As we saw in the previous paragraph, restrictive independence assumptions can reduce the impact of the sparse data problem by reducing the number of bins into which the limited amount of training data needs to be sorted. However, it can still happen that the finiteness of the training data cause problems. Specifically, in the case of the word-level language model, when we attempt to use it to predict new sentences, it may encounter a bigram that it has never seen. Unadjusted, the model would give any sentence containing such a bigram a probability of zero, regardless of what else is going on in the sentence. This is usually not what is required: one wants to be able to make some kind of discrimination between such sentences, so realistic models involve 'smoothing.' The idea is to slightly **discount** the evidence from the training corpus, so that unexpected events can be given some minimal probability. One simple way to do this is to form a smoothed model by averaging together the bigram language model with an extremely noncommittal model, such as the one that says that all words are equally likely to occur. This latter is the 'uniform' model. Since one does trust the bigram language model to some extent, and one wants the result to be informative, one will give the bigram model greater weight in the averaging process than the uniform model. Although sentences with zero-frequency bigrams will still get low probabilities, these will not be zero. Other, more complex, smoothing schemes are described in chapter 6 of Manning and Schütze (1999). Another approach to the sparse data problem is to use a model of language based on parts of speech, as suggested in the earlier discussion of Chomsky. Once again, an option is to average together the more robust parts-of-speech language model with the more delicate word-based language model to yield a combined model that is both reasonably robust and reasonably delicate.

Machine Learning for Natural Language Processing

Given the availability of large-scale language data, it becomes possible to apply standard algorithms from artificial intelligence and data mining. The most relevant sub-field of artificial intelligence is called 'machine learning.' Since this activity is now so widespread in natural language processing, it is useful to review a few standard concepts from the machine learning literature that are taken as read in the application of machine learning to natural language processing.

Machine learning algorithms come in two main flavors. The first type is 'supervised.' These algorithms learn from pairs of a predictive context x and a known correct answer y. For example, the algorithm designed to disambiguate the senses of words might be shown a large number of contexts in which the word *line* occurs with the different senses listed below, which are selected from the WordNet electronic database (Fellbaum, 1998).

1. *line* – (a mark that is long relative to its width)
2. *line* – (text consisting of a row of words written across a page or computer)
3. *line* – (a conductor for transmitting electrical or optical signals or electric power)

It is likely that the dominant sense in geometry textbooks is the first, that the second sense is frequent in editorial instructions to authors, and that the third is well-represented in telephone repair manuals. In any event, the supervised learning paradigm assumes that some expert has marked up instances of *line* with the appropriate sense. The business of the supervised learner is to learn the relationship between visible clues in the surrounding text and the correct answers. Methods for doing this are referred to as 'classifiers.' Many classifiers are used in natural language processing, including the 'Naive Bayes classifier,' which often performs well in spite of making extremely bold independence assumptions, and 'decision-tree classifiers,' which work by designing a structured series of questions to ask about clues that might or might not be present in the predictive context. For example, a decision tree trying to disambiguate *line* might begin by asking whether the word *angle* appears in the predictive context. If the answer is *yes,* it might conclude that we are probably dealing with the first sense. But if not, it might proceed to ask whether the word *transmission* is present, and so on. Algorithms exist for constructing decision trees directly from annotated corpora, without recourse to human intervention.

The second type of machine-learning algorithm used in natural language processing is the 'unsupervised' algorithm. In this setting we do not assume that correct answers are available, and instead try to solve the problem of grouping the predictive contexts x into coherent groups. Methods for doing this are usually referred to as 'clustering algorithms.' An effective clustering algorithm might group together all the samples collected from geometry textbooks, but further processing would be needed to recognize that the instances of *line* in these samples are predominantly of the first of the WordNet senses listed. Such algorithms are useful when working with unannotated corpora, but the groups that they form are sometimes difficult to interpret and criteria for success are not as obvious as in the case of supervised algorithms. Manning and Schütze (1999) cover both supervised and unsupervised word-sense disambiguation in chapter 8 of their textbook.

Modeling of Sequences

Our discussion of word-level language models has touched on one of the key distinguishing features of natural language processing as an application area for machine learning. The crucial aspect of these models was that the desired output was not a single word but a sequence of interrelated words. This section describes statistical approaches to one problem that has this character: the assignment of parts of speech. The discussion is necessarily brief, but is intended to indicate the nature of the particular challenge that is posed by the task of predicting structured outputs.

The structured prediction task we consider is 'part-of-speech tagging' (*see* **Part-of-Speech Tagging**). In this task the goal is to assign part-of- speech labels to words of a running text. The basis for one solution to this problem is the 'hidden Markov model' (HMM). This is an enrichment of the word-based language model we saw earlier. In this model, the sequence of observable words is thought of as associated with a parallel sequence of unobserved parts of speech. Our task, since we see only the words, is to recover a best guess at the likely sequence of parts of speech. Hidden Markov models can be dramatized via a well-known 'urns and balls' metaphor. In the urns and balls model, we assume that there are N large urns in a room. Each urn contains a number of colored balls. There are M different colors, and the relative proportion of each color may differ from urn to urn. A genie randomly jumps from urn to urn, randomly choosing a ball from each of the urns that it visits. It shouts out the color of the ball, then replaces it in the urn. The observer hears the shouts but cannot see where the genie is and does not know which urn the genie is currently in. If one knows the contents of the urns, there are good algorithms that allow a listener aware only of the genie's shouts to form a rational best guess about the sequence of urns that the genie is most likely to have visited.

This metaphor can be adapted to the part-of-speech assignment problem. Each urn is identified with a single part of speech. There may be one urn for nouns, another for verbs, another for prepositions. Instead of colored balls, the urns contain words. Among the contents of the urn for verbs will be words like *devour, react,* and *solve,* which are unambiguously verbs. They will be present in the urn in proportion to the frequency with which they occur in the language. Similarly, unambiguous nouns such as *door* and *penguin* will be present only in the noun urn. A listener who hears any of the aforementioned words can be sure from which urn the genie drew that word.

But words with part-of-speech ambiguities afford no such certainty. If the genie shouts out *line,* which is ambiguous between noun and verb, the best that the listener can do is to take account of the conditional probabilities $P(\text{line}|\text{noun})$ and $P(\text{line}|\text{verb})$ to form a best guess. These probabilities are called 'emission' probabilities and are relevant to the competition between noun and verb as ways for explaining the presence of the word *line*.

With luck, the listener may also have noticed that the previous word was *the* and that the urn for articles is very far from the urn for verbs but quite close to the urn for nouns, making it unlikely that the genie will have just jumped all the way from article to verb, but relatively likely that it has jumped from article to noun. This fact about the layout of the room could be encoded in the form of 'transition probabilities' – $P(\text{noun}|\text{article})$ and $P(\text{verb}|\text{article})$ – which tell us which part of speech is likely to follow which. The algorithms that allow a best guess about the sequence of jumps taken by the genie also produce a coherent best guess at the likely sequence of parts of speech that goes with a sequence of words. Remarkably, it also turns out that statistical models for the part-of-speech assignment problem can be learned in unsupervised fashion from unannotated text by using a variant of the scheme for reducing cross-entropy that was outlined earlier.

More details of the training and use of HMMs are given by Huang *et al.* (1990). This monograph focuses mainly on speech recognition, but the same algorithms apply to the part-of-speech assignment problem. The treatment of HMMs (sequential structure) has a parallel for probabilistic context-free grammars (tree structure). This cannot be covered

here but is dealt with in detail in chapter 12 of Jurafsky and Martin (2000). The same theoretical possibilities in terms of training from data and recovery of a best guess are available even for these more complex structures.

It is tempting to suppose that Swift's literary engine was a primitive part-of-speech tagger, that the 40 iron handles controlled the choice of appropriate urns, that the "Tenses, Moods, and Declensions" were encoded into the parts of speech corresponding to the urns, and that the chance of producing semi-coherent English text from it was greater than Gulliver was able to appreciate. Literary merit is another matter.

Conclusion

Statistical processing of language is a well-established subfield of language science, drawing on linguistics, computer science, and engineering. For extended introductions to the field, see Manning and Schütze (1999) and Jurafsky and Martin (2000), two textbooks that do a good job of representing the breadth of the field. The increasing availability of language samples in electronic form opens many possibilities for both language technology and theoretical investigation. These samples include carefully curated collections that have been annotated by expert linguists, larger but more lightly curated collections that have been annotated by semiautomatic means, and huge bodies of uncurated text culled from the World Wide Web. It is clear that all these are potentially useful sources of linguistic knowledge, but it is less clear how these sources might be used for maximum scientific and technological benefit.

See also: Classification of Text, Automatic; Corpora; Corpus Linguistics; Natural Language Processing: Overview; Parsing: Statistical Methods; Part-of-Speech Tagging; Part-of-Speech Tagging; Text Mining; Treebanks and Tagsets; WordNet(s).

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Language Socialization

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Introduction

Language socialization is the process whereby a child or other novice develops communicative competence through interactions with older and/or more experienced persons. Language socialization researchers seek to understand how novices learn to use language in the culturally specific ways that enable them to participate competently in the social life of a particular community. Another, equally important goal of language socialization research is to understand the broader sociocultural contexts within which this developmental process occurs, from local to global levels of analysis.

Origins

The language socialization research paradigm was initially formulated in the early 1980s by Elinor Ochs and Bambi Schieffelin (Ochs and Schieffelin, 1984; Schieffelin and Ochs, 1986a, 1986b). At that time, a significant body of research on language acquisition already existed, as did another on socialization

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(sometimes referred to as enculturation). But the two had developed quite separately from one another. Language acquisition research, rooted in developmental psychology and psycholinguistics, tended to treat language acquisition as a rather self-contained individual developmental process, largely ignoring the sociocultural contexts within which it occurs; conclusions drawn from studies conducted in mainstream North American and European settings were assumed to be universally valid. Meanwhile socialization research, rooted in anthropology and sociology, was conducted in a variety of ethnographic settings worldwide, but gave little attention to the central role of language as the primary medium through which socialization occurs. Working in collaboration with researchers from several disciplinary backgrounds (including linguistic anthropology, developmental psychology, sociolinguistics, applied linguistics, and education), Schieffelin and Ochs sought to combine the strengths of both of these established bodies of research and to bridge the gap between them.

Axioms and Aims

As this synthetic approach suggests, a central assumption in language socialization research is that the acquisition of language is inseparable from the acquisition of other kinds of cultural knowledge and practices. This is perhaps nowhere more clearly seen than in interactions between young children and their caregivers, which were the main focus of the earliest language socialization studies (Schieffelin and Ochs, 1986a, 1986b). As a young child is acquiring language, she or he is simultaneously developing a repertoire of social skills and a culturally specific world view. In learning how to use the language(s) of their community, children also learn how to think, how to comport themselves, even how to feel in particular situations and how to express (or otherwise manage) those feelings. As a developmental process, then, language acquisition is far more than a matter of learning to produce grammatically well-formed utterances. It is also a matter of learning how to use language in socially and pragmatically appropriate, locally intelligible ways, and as a means of engaging with others in culturally meaningful activities. Over the course of time, this makes it possible for the child to engage with others in an increasingly broad range of social contexts, and to assume increasingly complex roles and identities. (To varying degrees, these assumptions are shared by researchers in allied fields such as developmental psychology and developmental pragmatics; see Bloom [1998] and Bugental and Goodnow [1998] for useful overviews, and see Blum-Kulka and Snow [2002] for a recent collection of case studies.)

Language socialization research is thus concerned with the microgenesis of communicative competence (Schieffelin and Ochs, 1996), which comprises but also goes well beyond linguistic competence in the generativist sense. Communicative competence also comprises the practical knowledge, much of it prediscursive (if not preconscious), that one must have in order to use language as a social tool, to engage in talk as a social activity, and to coconstruct meaningful interactive contexts with others. Language socialization research is thus concerned with all of the knowledge, orientations, and practices that make it possible for an individual to function as – and, crucially, to be regarded by others as – a competent member of (or participant in) a particular community, however broadly or narrowly defined.

Examples of Key Insights and Areas of Investigation

Since the initial formulation of the language socialization research paradigm in the early 1980s, language socialization studies have been conducted in a broad range of settings worldwide. These studies have provided the empirical foundations for various kinds of comparative insights, which in turn have given rise to new theoretical developments and productive new areas of thematic focus as the paradigm has continued to develop.

Nonuniversality of Baby Talk

In their pioneering comparison of language socialization practices among members of three groups – white middle-class Americans, Kaluli (of Papua New Guinea), and Samoans – Ochs and Schieffelin (1984) found important culturally based differences in several areas. One such difference concerns baby talk – the simplified, stylized register that caregivers in some groups (e.g., white middle-class Americans) use with infants and young children. Previously, language acquisition researchers had assumed, based on studies conducted in mainstream North American and European contexts, that baby talk is universal (i.e., used by caregivers in all societies), and that this ostensibly accommodative way of speaking facilitates the child's acquisition of language. Ochs and Schieffelin found that not only do Samoans and Kaluli never use baby talk; they rarely address preverbal children at all, and do not treat them as conversational partners. Even so, young Kaluli and Samoan children are immersed in a richly verbal environment from the earliest days of their lives. Ochs and Schieffelin found that they

acquire language at more or less the same age, and at the same developmental rate, as children in Western societies.

Differing Cultural Understandings of Human Development

Ochs and Schieffelin also found that the preverbal child's abilities and tendencies are conceptualized quite differently from one group to another, and that the professed goals of language socialization practices differ accordingly. The egalitarian Kaluli regard preverbal children as 'soft' and helpless, based on not just their lack of physical abilities, but also their inability to use language as a social tool, i.e., as a means of getting what they need or want from others (Schieffelin, 1990). For the Kaluli, a primary goal of socialization is to 'harden' children, which is largely a matter of helping them learn to use 'hard' (adult-like, socially effective) language. (From a Kaluli perspective, the use of baby talk would be antithetical to this goal.) Samoans, in contrast, regard preverbal infants as willful, defiant, and antisocial; among their foremost concerns is that children learn their place in hierarchical Samoan society, and that they learn to act and speak accordingly (Ochs, 1988). Age is an important dimension of social stratification in Samoa, so in this regard young children are near the bottom of the hierarchy. They must learn to adapt themselves to social situations, as they cannot expect their elders to accommodate them (such as by using deliberately simplified language). The first words attributed to children in these two societies reflect these differing cultural conceptions of the nature of the child: Kaluli believe that a child's first meaningful utterances will be the words for *mother* and *breast*, while Samoans expect to hear a defiant *(Eat) shit!* (Ochs and Schieffelin, 1984).

Influence of Local Social Norms on Children's Acquisition and Production of Specific Linguistic Forms

Language socialization researchers have demonstrated that specific aspects of culture and social organization such as those just described can influence children's acquisition of language in quite specific ways at the level of linguistic form. A striking example is Platt's (1986) study of Samoan children's acquisition of the deictic verbs *sau* 'to come' and *'aumai* 'to bring/give.' Young children frequently hear both verbs used as imperatives in everyday contexts, and *sau* is the less semantically complex of the two. Based on this information alone, the expectation would be that children would begin using *sau* productively earlier than they would begin using *'aumai*. But as noted above, young Samoan children occupy a low position in an age-stratified social hierarchy. Very rarely is it appropriate for them to tell anyone to come – it is the prerogative of higher-status persons in Samoan society to remain stationary and to have lower-ranking persons come to them. Young children are expected and encouraged to appeal to higher-status persons to give them things (such as food), however. Thus the number of persons toward whom a young child can appropriately use the imperative *give* is far greater than the number of persons whom the child can tell or ask to *come*. Young children's much more frequent use of *'aumai* 'give' can be taken as evidence that they learn the social norms that organize and constrain the use of these two verbs at the same time as they learn the linguistic forms.

Differing Social Functions of Specific Verbal Practices across Cultures and Social Groups

Language socialization researchers have found that the same basic type of practice or activity may serve different functions in different communities, even in the same society. A good example is verbal teasing. Teasing may be used as a means of social control, i.e., to shame a child and thereby discourage him or her from engaging in a particular behavior (perhaps as an alternative to corporal punishment or some other form of coercive physical intervention, which may be dispreferred); to toughen the child by teaching him or her how to deal with others' affronts, and how to be self-assertive in return; or as a form of interactive play that provides a basis for a child and an adult to engage each other verbally without need or expectation of exchanging substantive information (Schieffelin and Ochs, 1986b). Examples such as this reveal the potential of language socialization research to reveal both universal and culturally specific aspects of socialization practices, and of communicative practices more generally.

Delimiting Universals of Communicative Practice

Ways of dealing with unintelligibility provide another such example and may offer insight into a universal aspect of communicative practice. Schieffelin and Ochs (1996) propose a universal set of possible responses to unintelligibility, first making a distinction between speaker-rooted unintelligibility (in which the speaker perceives his or her own utterance to be unintelligible to an interlocutor) and addressee-rooted unintelligibility (in which the speaker perceives an interlocutor's utterance to be unintelligible). In each case, they assert, four basic responses are available to speakers everywhere. But in different communities, one response may be preferred over the other three; or two or three may be regarded as more or less equally valid options while another is strongly dispreferred.

In the case of addressee-rooted unintelligibility, the four universal options are:

1. ignore unintelligibility;
2. display nonunderstanding;
3. verbally guess at what interlocutor might be saying;
4. negatively sanction interlocutor's unintelligibility (e.g., by teasing or shaming).

Schieffelin and Ochs observe that among Kaluli and Samoans, option #3 is least preferred – quite unlike in mainstream American society. Looking beyond these three groups, one might reasonably surmise that in East Asian societies such as Japan and Korea, where the social dynamics of honorification are pervasive and subtle, empathetic and intuitive styles of interaction are strongly preferred, and there is much concern with face (one's own as well as that of one's interlocutor), option #4 would be dispreferred in most situations; whereas #1, #2, and #3 would all be more preferred, but to differing degrees under different social circumstances (e.g., #3 is much more likely to be used in casual conversation with a peer than in a workplace exchange with one's supervisor).

Language Practices at Home and in School

Certain themes addressed in early language socialization research have been carried forward and taken in new directions in subsequent years. Heath's (1983) comparative study of language use in two working-class communities in the USA (one black, one white) and the implications for children's rates of success in school has had enduring influence. Heath's work continues to inform recent studies that examine various kinds of continuities and disjunctures between children's home environments and the classroom. The dinner table conversations of white middle-class American families (Ochs *et al.*, 1989, 1992), for example, have been shown to foster specific types of problem-solving orientations and to encourage children to display skills that are expected and rewarded in the classroom. In other settings, cultural disjunctures between home and school lead to poor educational outcomes (Watson-Gegeo, 1992). Research on children from immigrant and other nonmainstream communities in the USA suggests that when classroom activities and modes of interaction draw on communicative practices and participant structures that are familiar to these children, their levels of participation and academic achievement improve significantly (Gutiérrez *et al.*, 2001). Heath's influence can also be traced to other recent studies that focus on the role of narrative in language socialization. Baquedano-López (2001), for example, examines how narrative practices serve as a resource for the socialization of a transnational Mexican identity in a Catholic parish in Los Angeles; and Capps and Ochs (1995) consider the central role that narratives of personal experience play in the discursive construction, and quite possibly the social reproduction, of agoraphobia.

The Development of Subjectivities

A central theme of virtually all language socialization studies is the development of locally intelligible subjectivities, or ways of being in the social world (Kulick and Schieffelin, 2004). This is clearly seen, for example, in Clancy's (1999) study of how affective states and verbal expressions of affect are negotiated between Japanese mothers and their young children; in Schieffelin's (1990) examination of how Kaluli mothers cultivate sibling relationships among their children such that elder sisters will 'feel sorry for,' and always be willing to give to, their younger brothers; and in Fader's (2001) study of how Hasidic Jews in New York City use literacy practices in socializing girls' gender and ethnic identities – also an important means by which symbolic boundaries separating the Hasidim from other groups (including other Jewish groups) are maintained. As these examples suggest, virtually all aspects of subjectivity, including affect, morality, and desires, are shaped in culturally specific ways – and in accordance with cultural preferences, by and large – through language socialization. But in an interesting and productive reorientation of this perspective, Kulick and Schieffelin (2004) urge language socialization researchers to consider 'bad subjects' – those individuals in every community who persistently display culturally dispreferred traits and/or engage in nonnormative, deviant behaviors. As Kulick and Schieffelin point out, "the focus on expected and predictable outcomes is a weakness if there is not also an examination of cases in which socialization doesn't occur, or where it occurs in ways that are not expected or desired" (Kulick and Schieffelin, 2004: 355). Language socialization research must account for reproduction as well as "why socializing messages to behave and feel in particular ways may also produce their own inversion" (Kulick and Schieffelin, 2004: 356).

Languages and Cultures in Contact

As noted previously, recent language socialization studies explore the ways in which locally situated interactions articulate with macro-level social processes, such as cultural revitalization movements and postcolonial nation-building. Many of these studies have been conducted in settings characterized by sustained contact between languages and cultures, such as occurs in postcolonial, creole, diasporic, urban, and border communities (Baquedano-López, 2001; Fader,

2001; Garrett, 2005; Kulick, 1992; Moore, 2004; Paugh, 2005). These studies investigate the ways in which language socialization processes unfold in linguistically and socioculturally heterogeneous settings characterized by bilingualism and multilingualism, code-switching, language shift, and other contact-induced linguistic and sociocultural phenomena. The coexistence of two or more codes within a particular community, whatever the sociohistorical circumstances that have brought them into contact, is rarely a neutral or unproblematic state of affairs. It tends to be a focal point of discursive elaboration and social conflict, with complex linkages to other, equally contested issues that play out on multiple levels, from the household to the state. As they are socialized to use language, children are also socialized into knowledge of these intimately related issues, and of preferred and dispreferred ways of dealing with them, from their earliest years.

Dynamics of Language Shift

In some contact settings, language socialization practices may be an important mechanism of language shift – a point made vividly by Kulick's (1992) study of rapid shift in a small village in Papua New Guinea. Building on Kulick's work – which shows that local cultural and ideological factors may be of greater importance in accounting for language shift than the macrosociological (e.g., political and economic) factors that are more commonly invoked – more recent studies have shown language shift to be a contingent, nonlinear phenomenon in which language socialization practices play a crucial but often subtle mediating role. Paugh (in press) shows that young children in the Caribbean island of Dominica are encouraged by their parents and other adults to acquire English, which is contributing to language shift away from the local Afro-French creole. But in later years, as children spend increasing amounts of time interacting with peers beyond the supervision (and earshot) of adults, they increasingly use the creole in their play as a way of enacting adult roles and activities. Although ultimately it may not prevent language shift from running its course, at present such pretend play seems to provide older children with opportunities to develop some degree of proficiency in the creole. In his investigation of a quite similar situation in the Caribbean island of St. Lucia, Garrett (2005) examines code-specific genres as the basis for socialization activities in which adults encourage young children to be verbally self-assertive. Cursing, insulting, and other locally valued self-assertive ways of speaking conventionally require use of the historically stigmatized Afro-French creole language that many St. Lucian caregivers (much like their counterparts in Dominica) otherwise discourage children from using. The persistence of socialization routines in which adults playfully urge children to use the creole in self-assertive ways favors the maintenance of such code-specific genres, which in turn may be having a retarding or dampening effect on language shift.

The Persistence of Everyday Practices

These and other recent studies suggest that a language socialization approach can yield a more nuanced account of ongoing changes and shifts in local communicative practice than can larger-scale, quantitatively oriented studies that are less attentive to situated interactions (particularly those occurring at the critical juncture between generations). In a case where language shift is already quite far along, for example, a language socialization approach may reveal that culturally specific ways of using language persist in speakers' use of the 'new' code. In her study of a Navajo community, Field (2001) demonstrates that although today's bilingual caregivers often speak English to children, they continue to socialize traditional Navajo values of autonomy, self-determinacy, and respect through the use of a triadic participant structure in issuing directives. Based on this observation, Field (2001: 249–250) proposes that "certain aspects of language use may be more conservative, or more resistant to change, than code." She goes on to assert, "[I]t is exactly those aspects of a speech community's interaction that are tacitly taken for granted that are also the most basic, pervasive, and resistant to change. Furthermore, they are maintained through the most mundane routines and forms of everyday communicative practice – which also happen to be the preferred context for research on language socialization."

Essential Features of Language Socialization Research

In whatever setting a particular study is conducted, and whatever specific linguistic and sociocultural phenomena are the focus of the investigation, four key features are essential to language socialization research. These four features reflect the paradigm's interdisciplinary origins as well as its commitment to taking a maximally holistic perspective on the relationships among language, culture, and society.

1. **Longitudinal study design.** Language socialization researchers closely track developmental changes in individual subjects by periodically recording their participation in naturally occurring socialization interactions and activities over a developmentally significant span of time. In order for such tracking to be feasible, a language socialization study

usually focuses on a relatively small number of children or novices – typically three to six, or a single small cohort (if the study is conducted in a school or other institutional setting). Qualitative depth of analysis is emphasized over quantitative breadth. Data in the form of naturalistic audio and/or audio-video recordings of the focal children or novices interacting with caregivers and other community members are collected at regular intervals (e.g., monthly), usually over the course of a year or more of sustained fieldwork. Some researchers revisit their field sites periodically over several years or even decades (e.g., Schieffelin, 1996) in order to keep up with individual and community development over longer spans of time.

2. **Field-based collection and analysis of a substantial corpus of naturalistic audio or audio-video data.** Regular, periodic data collection as described above gives rise to a large corpus of recordings; a year-long study typically yields 75–100 hours. A corpus of this size strikes a balance between ethnographic and longitudinal adequacy and practical manageability. But collection of the recordings is only a first step; in order for them to serve as a meaningful data set, the researcher must transcribe and annotate them while in the field. This is accomplished with the aid of local consultants, usually members of the community in which the research is being conducted (such as older relatives of the focal children). For language socialization researchers, this one-on-one collaboration with local consultants is indispensable. In addition to assisting with the most basic aspects of transcription (such as clarifying specific words and phrases captured in the recordings), consultants can bring to the researcher's attention layers of meaning that would otherwise escape his or her notice or understanding. Collaborative transcription also provides ongoing opportunities for the researcher to benefit from consultants' native-speaker intuitions about the use of particular linguistic forms and variants, and their perspectives on many other aspects of local social life.
3. **A holistic, theoretically informed ethnographic perspective.** This is achieved in part through sustained fieldwork and a commitment to ethnographic methods (including participant observation), and in part through familiarity with current theoretical issues and debates concerning such methods. Both depth and breadth of ethnographic observation are important in language socialization research. In addition to tracking individuals over the course of time (as described above), the researcher must observe and record in a broad variety of contexts in order to understand how different social settings may influence those individuals' language usage and modes of participation. Doing so allows the researcher to observe and record a broad range of persons as well; in effect, tracking a particular focal subject across contexts provides access to an entire social network, and often to a broad cross-section of the community that includes fictive kin, peers, neighbors, etc. Although most recorded data are collected during everyday activities, the researcher must be attentive as well to exceptional events (i.e., those that occur rarely or unpredictably) and to periodic activities such as those associated with agricultural, political, and ritual cycles. The systematic collection of recorded data that is central to any language socialization study may be supplemented by surveys, interviews, elicitation sessions, or other methods, depending upon the kinds of data that are needed in order to address the study's central research questions. Whatever complementary methods are chosen, the researcher should have a thorough understanding of the theoretical issues in which they are based.
4. **Attention to both micro and macro levels of analysis, and to linkages between them.** This can be considered part of the ethnographic perspective outlined above, but is important enough to merit consideration in its own right. Language socialization research is not just a matter of producing detailed ethnographic accounts of individual developmental processes and the local contexts in which they occur. An overarching goal is to understand how such individual developmental processes relate to larger sociocultural and historical processes. As they analyze their recordings and other microethnographic data, language socialization researchers are constantly on the lookout for patterns and principles that may also be discernible at macro levels of analysis. Likewise, when they make macroethnographic observations, they consider various ways in which the patterns or principles identified may be writ small in their recorded data. Ultimately, the language socialization paradigm is comparative in perspective, recognizing that while some aspects of language socialization are universal, others vary considerably from one sociocultural setting (or historical period) to another. Attention to micro–macro connections is an important means by which researchers are able to distinguish between the universal and the culturally specific, and to consider the relationships between them.

In recent years, some researchers who have claimed to be doing language socialization research have

largely if not completely ignored one or more of these four essential areas. (See Kulick and Schieffelin [2004] and Watson-Gegeo and Nielsen [2003] for recent comments on language socialization research design and methodology.) A short-term study that offers no longitudinal observations, a study based solely on questionnaires and interviews, or one that makes use of naturalistic recordings but is not ethnographic in any meaningful sense simply does not constitute language socialization research. (Such a study may yield interesting data and may contribute meaningfully to other research paradigms, of course.)

That said, the language socialization paradigm is sufficiently flexible to comprise a broad range of studies that place varying degrees of emphasis on the four features outlined above. Since the paradigm's initial formulation, certain trends have emerged in language socialization research that reflect broader trends in the social sciences. Most early language socialization studies were conducted in small-scale non-Western communities and focused primarily on microethnographic levels of analysis. These studies yielded classic ethnographic descriptions of these communities as well as fine-grained, strongly longitudinal accounts of how individual developmental processes unfold within them. More recent studies, many of them conducted in Western societies and in various kinds of socioculturally and sociolinguistically heterogeneous settings, have tended to emphasize the ways in which individuals and local communities are implicated in macro-level processes such as those associated with globalization phenomena, and the ways in which everyday practices of individuals shape and are shaped by those processes (Garrett and Baquedano-López, 2002). Similarly, language socialization studies conducted by researchers of different disciplinary backgrounds show certain broad differences in orientation, such as whether they place greater emphasis on ethnographic topics and issues of social theory, or on grammatical development and the functions and distribution of specific linguistic forms and structures (Ochs and Schieffelin, 1995).

Language Socialization across the Lifespan

Language socialization is always a reciprocal, dialectical process in which the learner, regardless of age or level of experience, is much more than a passive recipient of input. The child or novice plays an active role in coconstructing every interaction in which she or he participates, however limited that participation might be; even a preverbal infant must be regarded as an emergent participant (de León, 1998), who, while being socialized himself or herself, is in various ways socializing others into such roles as mother, father, and elder sibling. Novices can often be observed to resist socialization, or to steer socializing interactions in new, sometimes unexpected directions. Older children may even assume the role of expert *vis-à-vis* their elders, as when a school-age child introduces his or her parents to a new technology (e.g., computers), or when adult immigrants with limited proficiency in the language of the host society rely on their bilingual children to assist them in dealing with persons and institutions outside the household.

Although the majority of studies conducted thus far have focused on young children, others, particularly in recent years, have focused on language socialization later in the life cycle: in middle childhood, adolescence, and adulthood. As this suggests, language socialization researchers consider socialization to be a lifelong process. Even those who study young children avoid treating child development as unilinear progression toward a static, monolithic adult status. Likewise, in studies of older children and adolescents, it is not assumed that they are gradually taking on pre-existing adult roles and identities; on the contrary, they can often be observed, particularly within their peer groups, to contest and renegotiate the tropes and discourses of identity (including gender and racial/ethnic stereotypes) that circulate among adults in their communities and in society at large.

Entry into adult status, however locally defined, is by no means the end of socialization. Adults continue to be socialized into new roles, statuses, identities, and practices, many of which involve new ways of using language. Adults may find it necessary or desirable to master new registers or styles associated with changes in their vocational or professional lives, or with new avocations or other activities that broaden their social horizons and involve participation in new communities of practice. Similarly, emigration, religious conversion, and other significant life changes may make it necessary or desirable for adults to master new codes and/or new discursive genres, which may involve either spoken or written forms of language (Schieffelin, 1996).

Reproduction and Continuity

For language socialization researchers, close analyses of individuals' participation in naturally occurring interactions are not ends in themselves, but provide empirical points of entry into larger issues of sociocultural reproduction and transformation. Among the most significant contributions of language socialization research is the insight that it yields into the everyday life of a community – the mundane activities and interactions in which ordinary individuals

participate on a daily basis, constituting the warp and weft of social life. As linguistic anthropologists have long recognized, a community's norms, values, ideologies, patterns of social organization, and cultural preferences of various kinds are inscribed in – and to a great extent, constituted by – everyday communicative practices and social interactions. For language socialization researchers, this means that it is possible to investigate the ways in which everyday exchanges such as those between a young child and his or her primary caregiver relate to other domains of social structure and cultural meaning such as cosmological belief systems, kinship, and patterns of exchange and reciprocity.

The cultural knowledge that guides an individual's participation in mundane social interactions tends to be difficult for the anthropologist or other investigator to tap into because it is implicit, common-sense knowledge that is seldom reflected upon or articulated. But even adults or experts for whom it is second nature realize that it does not just come naturally to the child or novice. Virtually all socialization activities (even those that do not involve explicit teaching) are routinized to some degree, so as to provide the child or novice with opportunities to engage in more or less predictable, schematically structured interactions with caregivers, teachers, or other more experienced persons. Socialization activities are thus contexts in which the background knowledge that adults or experts draw upon during the course of everyday activities tends to be discursively formulated and explicitly articulated for the benefit of children or novices. To be sure, the routinized, explicit qualities of socialization activities also make them a prime analytic focus for the investigator seeking to understand the underlying cultural principles that organize day-to-day social life in the community as a whole.

Transformation and Change

Language socialization research is not merely a matter of accounting for linguistic and cultural reproduction and continuity, however. Language socialization researchers recognize that everyday communicative practices are finely guided by preferences, orientations, and dispositions that are social in origin and culturally specific in nature. But at the same time, they are creatively and strategically deployed by individuals whose particular configurations of interests, intentions, and goals are uniquely their own. Language socialization research therefore highlights the open-ended, negotiated, sometimes contested nature of everyday life, and recognizes that the most ordinary activities may be sites of innovation and far-reaching change.

Languages themselves change over time, and language is a crucial medium through which virtually any aspect of culture may be contested, resisted, renegotiated, and ultimately transformed. Recognizing this, language socialization researchers regard both language and culture as fundamentally emergent, dynamic, open-ended domains that partake of all of the ebbs and flows of social life. A corollary of this is that any given language or culture greatly exceeds the capacities (cognitive, practical, and otherwise) of any individual speaker or social actor; every individual's access, therefore, is necessarily partial (Schieffelin, 1990). This partiality is contingent on specific configurations of social variables (gender, birth order, class, ethnicity, etc.) that in turn shape, and are shaped by, the individual's lived experiences. The variation among individuals that inevitably results – even among children in the same household, or students in the same classroom cohort – is a primordial source of social dynamics, which over the course of time give rise to innovation and change in language and culture alike.

Toward a Relational, Nonlinear Perspective on Human Development

Language socialization researchers therefore avoid conceptualizing human development as a matter of individuals acquiring pre-existent bodies of cultural knowledge, linguistic forms, etc., that are static and bounded. Rather, language and culture, and individuals' acquisition thereof, are conceptualized in relational terms, emphasizing their symbolically mediated, coconstructed, dynamically emergent qualities (Kramsch, 2002).

This is not to say that the heuristic value of established notions of system and structure are spurned in favor of a radical antiformalism. In practical terms, the processes with which language socialization research is centrally concerned can hardly be described and analyzed without reference to some such notions (e.g., grammar, code, speech community), nor without due regard for the demonstrable formal and structural properties that make them coherent units of analysis. The challenge is to avoid unduly reifying such systems and structures: to avoid treating them as self-contained, autonomous entities that somehow exist apart from the historically particular social worlds and lived experiences out of which they emerge, and by virtue of which they can be discerned, labeled, and posited as units of analysis in the first place. The grammar of a given language, for example, is better regarded as a **precipitate of** or **distillation** from the ongoing flow and flux of communicative

practice (at a specific historical moment in the social lives of actual speakers) than as an abstract, timeless **basis for** or **prerequisite of** communicative practice (by hypothetical speakers within an idealized, homogeneous community).

Similar concerns inform language socialization researchers' nonteleological perspectives on the outcomes of socialization (Kramsch, 2002). Individual development is recognized to be variable, contingent, nonlinear, and ultimately open-ended. Differing degrees and types of developmental progress and multiple kinds of successful outcomes are recognized – even when the arena of investigation is a classroom or other institutional context in which the participants themselves differentiate success and failure in much starker terms.

The relational tensions that language socialization researchers seek to explore are well captured by Bourdieu's notion of 'habitus' (Bourdieu, 1977; Bourdieu and Wacquant, 1992). Habitus can be defined as an integrated set of durable, embodied dispositions which predispose the individual to act and react in ways that are more or less specifiable, more or less predictable, but ultimately open-ended and underdetermined. Habitus is the emergent outcome of numerous densely intersecting factors – virtually all of them mediated and substantially influenced by culture – ranging from gender and class status to the particulars of individual life experience. An individual's habitus predisposes him or her to perceive, think, and act in semi-routinized ways, and to regard certain conditions in the world around him or her as normal. But habitus does not rigidly determine that individual's behavior; it is open-ended, allowing for creativity, improvisation, and innovation.

A defining characteristic of habitus is that it is inculcated, i.e., socialized; the dispositions to which Bourdieu refers are said to be acquired largely through socialization, particularly during the early years of the lifespan. Bourdieu's work says very little about how socialization actually comes about, however. Language socialization research strives to fill this gap in our knowledge of human development by means of empirically grounded studies, and in so doing, to contribute to understandings of the multiplex relationships among language, society, and culture.

See also: Anthropological Linguistics: Overview; Bilingual Language Development: Early Years; Communicative Competence; Communities of Practice; Cross-Linguistic Comparative Approaches to Language Acquisition; Early Socialization and Language; Identity in Sociocultural Anthropology and Language; Language Acquisition Research Methods; Language Change and Cultural Change; Language Development: Overview; Language Ideology; Linguistic Anthropology; Social Aspects of Pragmatics; Socialization; Speech and Language Community.

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Language Spread

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The term 'language spread' alternates in the literature with such other terms as 'language expansion,' 'language dispersal,' and 'language diffusion' in reference to the fact that a language acquires more speakers who use it as a vernacular or as a lingua franca. The process may or may not be a concomitant of geographical expansion due, for instance, to trade or to the colonization of other territories by its speakers. A critical factor is its adoption by another group, not the demographic increase of the original population. This explanation applies as much to the fact that English has been gaining more and more speakers around the world as to the fact that it gradually acquired more and more speakers among the Celts in the British Isles, having originated between the 6th and 7th centuries as the language of the Germanic invaders. It is also as true of the spread of Latin from Rome to the surrounding areas, in Italy, in the 4th century B.C. as of its dispersal in the Roman Empire, where it transformed into the Romance languages. It likewise applies to the gradual Romanization of the Romance countries, at the expense of the more indigenous Celtic languages, as well as to the dispersal of some of the Romance languages (French, Portuguese, and Spanish) around the world and their transformation in some places (e.g., the Caribbean and Indian Ocean former plantation settlement colonies) into vernaculars now disfranchised as Creoles. The evolution is just as true of Swahili too, in East Africa, bearing in mind that it was so named by the Arab traders in the 7th century in association with the coastal populations who spoke related Bantu languages from Kenya to Mozambique. They used its

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Zanzibari variety as a trade language while penetrating the African interior, an example that the European colonizers (the Germans, the English, and the Belgians) would follow in adopting it in the East African region (from the coast to eastern Congo) for communication with the masses of the populations.

The causes of language spread are diverse, although they boil down to population contact, obviously under a variety of interactional conditions. We do not know some of the significant reasons, though linguists must figure out some way of articulating 'costs' and 'benefits' to those who adopt it. Power and prestige have often been invoked as the reason. This factor applies in the case of Latin in the Roman Empire, where the local nobilities were first to adopt it, in order to partake in the Roman rule of their own territories. However, the fact that the Roman elite in the eastern Roman Empire preferred a more prestigious Greek language did not favor the latter for long. There was no linguistic Hellenization process comparable to the Latinization of southwestern continental Europe.

It is not clear either why the Arabs and, later, the Europeans adopted indigenous languages, instead of imposing their own (as in most settlement colonies) to communicate with the indigenous populations in, respectively their trade and their exploitation colonies. One can invoke courtesy to local populations they traded with in the case of the Arabs, but the emergence of pidgins based on European languages on the West African coast and in the Pacific shows that early on, before the exploitation colonization of these regions, the Europeans preferred to use their own languages. Even the latter generalization is not so accurate, because trade pidgins in the Americas were based on Native American languages, while European languages were being adopted as vernaculars in the settlement colonies. Trade with Native Americans produced new varieties such as Delaware Pidgin in the New Netherland, the Mobilian Jargon (Mobilian) in the southeastern United States, and Lingua Geral (Nhengatu) in Brazil; whereas plantation settlement colonies produced creoles such as Haitian (Haitian Creole French), Jamaican (Creole English), and Papiamentu and other colonies produced noncreole varieties such as American English, Québécois French, and Popular Brazilian Portuguese.

Noteworthy also is the fact that European languages have been retained as official languages in former European exploitation colonies of Africa and Asia, in part because the selection of an indigenous lingua franca for the same function is feared to arouse political problems of national unity versus ethnic identities and economic problems having to do with the development of tools for teaching it in school. Another reason seems to lie simply in a legacy of the colonial period, viz., the association of the European language with power and prestige. This accounts for why European languages continue to function as official languages in practically monolingual countries such as Rwanda, Burundi, and Botswana. Ability to communicate with the outside world has often been invoked as an important reason, though it is a dubious one even in these days when globalization raises fears of (continued) economic marginalization of economically less developed nations.

Language spread has its structural costs. The prevailing language typically undergoes a Pyrrhic victory, changing into a new variety within the new community, regardless of whether it is acknowledged as the same language or a different one. Regardless of whether Latin can be claimed to still be alive and spoken in various places around the world, its new forms are identified by different names, e.g., French, Spanish, Portuguese, Haitian Creole, Papiamentu, or Cape Verdian Criolou (Kabuverdianu). The reasons for these name changes are as political as they are structural. In some cases, metropolitan speakers deny that particular colonial varieties are still the same language. Most significant is the fact that populations appropriating a foreign language influence its evolution with features from their substrate languages.

The case of English is particularly interesting to discuss, because its origins have received less attention than they deserve, though they should inspire research on the beginnings of other (major) languages. The original Germanic populations that colonized England in the 5th century (viz., the Jutes, the Angles, the Saxons) brought no English language with them. They spoke Germanic languages that may even not have been mutually intelligible. (One of them may be related to the present Jutlandish dialect of Danish.) While it can be argued that none of these languages prevailed, or maybe that it was the language of the Angles (who have bequeathed their names to both the language and the territory now identified as *England*) that did, Old English appears to have emerged from contacts primarily from these immigrants' languages. Successive transformations of the latter into varieties called Middle and Modern English, and later into, concurrently, indigenized Englishes (e.g., Indian and West African English), pidgin English (e.g., Nigerian Pidgin English [Nigerian Pidgin] and Tok Pisin in Papua New Guinea), and creole English (e.g., Jamaican and Hawaiian [Hawai'i Creole English] Creole English) all reflect structural changes that the language has undergone at different stages of its evolution under the influence of other languages it came in contact with.

An important question remains whether different heuristic approaches are needed (as is the dominant trend in the linguistics literature to date) to account for this differential evolution of a language. Both Bantu and Indo-European languages seem to have spread and diversified due to influence from languages spoken by the populations that their speakers colonized, although the contact histories are far from reflecting the oversimplified scenarios suggested by the cladograms or Stammbaums traditionally used to illustrate genetic ties among languages. The diversification of Arabic can likewise be associated with substrate influence as a factor bearing on the evolution of language spreading among new populations.

It must also be borne in mind that languages do not move about on their own, nor do they compete directly with each other, contrary to what is suggested by the growing literature on language endangerment and loss, in which languages are misportrayed as warring with and killing each other. As a matter of fact languages typically spread faster in times of peace, when individuals from separate ethnic groups or nationalities are more likely to interact with each other. Languages are analogous to parasitic species in biology; their lives depend largely on the social practices of their hosts and makers, i.e., their speakers. Moreover, critical agents in their spread need not be their native speakers.

Recent colonial and postcolonial history suggests that nonnative speakers participate in the process too. The literature on indigenized Englishes makes it quite obvious that English has spread significantly after the independence of Great Britain's former exploitation colonies and its adoption as those colonies' official language, with the language being taught more and more by nonnative speakers. Where teachers are native speakers, such as in the West Indian former plantation settlement colonies, they do not speak the metropolitan varieties of the United Kingdom and North America and therefore contribute to the ongoing diversification of the common language of the former British Empire. A large proportion of teachers of English in several other countries that since then have adopted it as an international language come from the same territories where English is nonmetropolitan. Note that even in places where English functions as a native vernacular of the majority, several immigrants learn English naturalistically more from other nonnative speakers, with whom they socialize more regularly, than from native speakers. *Mutatis mutandis*, this evolutionary pattern applies to other European colonial languages of the last half-millennium.

A reexamination of the history of the Roman Empire also suggests an important contribution of nonnative speakers to the spread and divergence of Vulgar Latin into the diverse Romance languages. In addition to the fact that Latin spread among the masses of the former colonies mostly after the Romans had left their western empire, a significant proportion of model speakers of Vulgar Latin during the Roman rule consisted of legionaries who served as mercenaries or had been recruited from the local populations and were nonnative speakers. It can be conjectured that similar evolutions took place under similar conditions of colonial or imperial expansion, factoring in the role of interpreters in the establishment of initial intergroup communication.

How interpreters learned the foreign language, if it was not spoken by a neighboring group, deserves investigating and certainly more attention than their role has received. Recent European colonial history shows that they played an important role in China, on the West African coast, and in Hawaii, leading to the development of pidgin varieties of European languages. It is not the interpreters as linguistic experts who created these pidgin varieties. It is the masses of the local populations, who, as trade with Europeans increased, would interact directly with Europeans using a language that they definitely commanded less well than the interpreters. (The proportion of the latter decreased as the trade expanded.) The contributions of Europeans in responding in foreigner talk or, in some cases, speaking the European trade language no better than the natives (e.g., French or Dutch traders using Portuguese on the West African coast) should not be underestimated.

Much of the literature has underscored the role of schools and the media in the spread of languages. Indeed this factor cannot be underrated in modern societies, in which all sorts of techniques have been developed for efficient language teaching. However, we must recall that spoken languages antedate written ones and even before the invention of writing systems languages used to spread too. To date there are also many societies which have large proportions of their populations which are multilingual but functionally illiterate. They have learned languages other than their native ones simply through interactions with the latter's speakers and by oral communication, without the mediation of schools. As a matter of fact, even in predominantly literate societies, an important factor in language spread is that learners must have other individuals with whom they can practice the language. Media without active interaction provide only passive knowledge of the relevant language. European languages have continued to spread in former exploitation colonies thanks largely to former colonial auxiliaries who at the wake of independence became the new political leaders and continued to use

the colonial language in their official functions and the school system. The association of these languages with indigenous populations and specific local ethnographic functions within the new nation-states, as opposed to their former association with foreign colonial rule, enhanced their usefulness to the masses of the population. Many of the features now characterized as substrate in extra-European varieties reflect that cumulative mutual reinforcement of new communicative habits within the local populations. The local or national media only reinforce them.

The view of language spread presented here underscores the important role of language contact as a factor affecting language spread. It bears significantly on how we must deal with language diversification in genetic linguistics and historical dialectology. It questions the 'asexual,' monoparental tradition of the comparative method and the summary of its findings in Stammbaums without factoring in the influences that various languages have exerted on each other's evolution, leading sometimes to the formation of 'linguistic areas.'

See also: Endangered Languages; English: World Englishes; Language Change and Language Contact; Language Maintenance and Shift; Languages of Wider Communication; Migration and Language; Pidgins and Creoles: Overview.

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Language Surveys

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This article discusses the wording of language questions in national censuses and language surveys and what they reveal about the assumptions of governments and other agencies. There is a small and not easily accessible literature on this topic. While most of the material has been contributed by demographers, some crucial entries have been produced by linguists with an interest in the quantitative aspects of such issues as language contact, bilingualism, language shift, and maintenance. The first part of this discussion deals with the modal question types, their meaning and interpretation, and some aspects of data quality. That discussion shows a strong emphasis on the situation in Canada, in part because the best sources are there. Nevertheless, there are some examples from other countries, without any claim of completeness. The second part of this article is a brief discussion of language surveys that are designed to solicit information about the language characteristics of individuals.

Language Questions in Censuses

Language questions in censuses have been asked in many countries for a long time. According to Arel, the first instances were in Belgium and Switzerland (2002), though no years were given in that source. Information obtained from the Swiss Bureau of Federal Statistics shows 1860 as the earliest appearance of a question on language. The earliest Belgian census to contain a language question was in 1846. Arel provided a broader historical overview and an interesting discussion of the international debates on the utility of census questions on language, ethnicity, and nationality.

For most countries, the inclusion of language questions in censuses is mandated in order to administer particular policies, such as providing information

the colonial language in their official functions and the school system. The association of these languages with indigenous populations and specific local ethnographic functions within the new nation-states, as opposed to their former association with foreign colonial rule, enhanced their usefulness to the masses of the population. Many of the features now characterized as substrate in extra-European varieties reflect that cumulative mutual reinforcement of new communicative habits within the local populations. The local or national media only reinforce them.

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For most countries, the inclusion of language questions in censuses is mandated in order to administer particular policies, such as providing information

about national elections (for the United States, see Jiu, 1999 and Crawford, 2002) or access to public primary or secondary education in a minority language or for special education in an official language. (For Canada, see Martel, 1991. For the United States, see Crawford, 2002; Stevens, 1999). It should be recognized that language questions in censuses are not designed to measure fine-grained linguistic features. In addition, there are several general methodological problems. Data such as these are collected either in interviews between a census employee (the enumerator) and a respondent, or else they are self-completed written questionnaires. The latter method has become the most common one in most developed countries, though electronic media may eventually become the method of choice. Completion of the census over the internet has already been possible in, among other countries, Switzerland, Spain, and Singapore; in 2006 Canada can be added to that list. Census enumerators are not thoroughly trained in interviewing techniques, and in many cases the self-response modes provide the respondent with only minimal instructions, at best. Another complication is that census data collection methods generally involve responses given by one household member "on behalf of" the other members (the so-called proxy response). Finally, censuses are rather expensive tools for collecting any social data, including linguistic information. Regardless of the data collection mode selected, the instrument is, by necessity, rather brief. It is rare to find more than one question about language in a census, let alone the wide array of questions necessary for a researcher to get a clear picture of the prevalence of bilingualism or the fluency of different population groups in a particular language. In summary, language questions in censuses should be considered only as indicators of underlying linguistic concepts. The fact that they all involve verbal responses by members of the public implies that such indicators may have less than perfect validity and reliability.

In defense of these data, it should be noted that the few studies aimed at validating such self-response data have, overall, shown that validity tends to be satisfactory (on the condition that the social situation is conducive to unbiased responding) and that reliability likewise is within the acceptable range. Linguists' arguments against using census data are therefore not tenable, as long as these reservations are kept in mind. Obviously, finer-grained linguistic issues (e.g., about size of lexicon, or spoken accent, or the use of proper grammar) cannot be addressed with these simple indicators, but they are suitable for the broader applications for which these questions are mandated. As with most data collected for social research and/or policy, the motto should be '*caveat emptor!*'

Over the past eighty years or so, several authors have written articles on this topic. This paper may be seen as an update on those earlier publications (see, for example, Kloss, 1929; Lieberson, 1966, 1969; de Vries, 1985, 1990, 2004, to mention only a few).

Types of Questions

Census questions on language may be grouped into three categories.

Mother Tongue The usual operational definition of questions regarding the mother tongue is 'the language learned in earliest childhood.' Such questions are assumed to indicate the linguistic origins of a person. In the case of minority language education in Canada (essentially, French outside Quebec, English in Quebec), the mother tongue of one of the parents determines the eligibility of a child to obtain publicly funded education in the regional minority language. Similarly, in Finland, the mother tongue composition of the population of a municipality or province determines whether or not public services are provided in the minority language (usually Swedish). It should be noted that several countries have deviant specifications. In the censuses of Switzerland from 1860 until 1980, for example, the question wording, in each of the official languages of the country, refers to a "main language," despite being labeled as a "mother tongue" question. The Indian census of 2001 literally asked for the language spoken to the respondent by his or her mother. The most recent Canadian version specifies "the language first learned at home in childhood and still understood." It should be noted that the final specification in the Canadian definition allows for a person to have lost his or her mother tongue. Among immigrants to Canada, such a possibility is not really far-fetched. The Canadian census instructions tell persons who are no longer able to understand the first language learned to supply the next language, that is, the language they acquired next.

Bondarskaya (1993), in a general discussion of Russian census data on nationality, claimed that "information on ethnic origin, mother tongue and religious denomination was gathered only during the first five censuses, the first conducted in 1719, and the fifth in 1795." The reference to a census as early as 1719 is somewhat unusual, since the general demographic literature does not refer to such early censuses in Russia. However, it is indisputable that the Soviet empire did conduct many censuses, beginning in 1920. Many of those did contain a question on mother tongue. The annotations in the appendix to

Bondarskaya's paper made it clear that these questions were generally not proper mother tongue questions. In 1920 the question referred to the "language spoken by the family of the respondent (or by the mother in multilingual families)." In 1926 the mother tongue was defined as "the language in which the respondent is most fluent or usually speaks." The most recent censuses discussed by Bondarskaya (those of 1970, 1979, and 1989) had consistent definitions of the mother tongue: "the language considered as native by the respondent himself is given as the mother tongue. If the respondent has difficulty in deciding on his mother tongue, the language in which the respondent is most fluent or which he usually speaks in the family should be given as his mother tongue" (1993). Note the contrast with the Canadian case, where respondents are asked to report the "next language learned" if they no longer understand the first one acquired, and to select the earlier one of two (or more) if they acquired more than one language in early childhood. In the Canadian censuses, the issue of fluency only emerges for those respondents who not only acquired two languages in early childhood but who, in addition, cannot (or will not) determine which one was acquired first.

Main Language Questions of addressing a respondent's main language, or some functional equivalent, address the issue of **use**. In contrast to the mother tongue type of questions (which refers to a person's past) questions of the main language pertain to the present. Some versions ask for the language(s) spoken most often in a specific domain, such as the respondent's home (Canada), work or school (the censuses for Switzerland in 1990 and 2000). I am not sure whether any country is currently using the "main language" indicator as an instrument for public policy. Until the language question was changed, the classification of administrative units in Finland (municipalities, provinces) was based on a main language classification (Finnäs, 1986).

The Canadian census question in this category asked, "What language does this person speak most often at home?" Pre-coded response categories were English and French. Other languages were captured as "Other (specify)" with a write-in box. Researchers interested in trend analyses on data such as these should be aware that question wording as well as response categories changed several times since the first appearance of this question in 1971.

Ability to Speak Designated (Official) Languages Another type of questions addresses the ability to speak the official languages of a country (English or French in Canada) or a region (Welsh in Wales, Gaelic in parts of Scotland). They address **capacity**, rather than history or current use. Their function is to assess whether there is a sufficiently large number of persons able, or unable, to speak an official language, to warrant public services in a (regional) minority language. Both the United States and Australia asked a question regarding a person's ability to speak English (Crawford, 2002; Clyne, 1991). The Canadian question in this category asked, "Can this person speak English or French well enough to conduct a conversation?" The response categories were: English only; French only; both English and French; neither English nor French.

Bondarskaya's discussion informs us that the most recent three Soviet censuses asked, in addition to the mother tongue question, whether the respondent is able to speak "any other language of the U.S.S.R." (1993). In fact, the question appears to refer to fluency. Note the restriction to the languages of the Soviet Union. If a respondent wrote in more than one of these languages, only the first one mentioned was processed; subsequent responses were ignored. Note also that this question did not pertain to fluency in other languages of wider circulation, such as English, French, or German.

Ability to Speak Other Languages, Not an Official Language Similar to the questions on "ability in official languages," another type of question refers, in its strictest form, to **capacity**, although several question wordings stray into the **current use** territory, as with the Canadian census questions from 1991 on the ability to speak non-official languages. The question in the Canadian census of 2001 was a follow-up question to the one on home language, in which a person was asked: "Does this person speak any other languages on a regular basis at home?" The response categories were: *No; Yes, English; Yes, French; Yes, other – specify.* The layout of the questionnaire did not allow for multiple responses, though such a situation would not have been impossible.

Del Pinal and Lapham (1993) discussed the U.S. census question on language for 1990. This was a three-part question, beginning with "Does this person speak a language other than English at home?" with response categories *Yes* or *No*. The instructions indicate that *Yes* should be marked if the respondent "sometimes or always" speaks a language other than English at home. For those who answered *yes*, there were two follow-up questions. First, "What is this language?" with a write-in option (examples given are Chinese, Italian, Spanish, Vietnamese). If the person speaks more than one non-English language at home, the one spoken most often should be recorded; if the person cannot determine which language is

spoken more often, the one first learned by the person should be included. Census processing obviously ignored any mention beyond the first one. Note that for some, but not all, respondents, the language other than English would be identical with the mother tongue. The second follow-up question for those who do speak another language at home asked for their self-reported fluency in English: "How well does this person speak English?" The response categories were: *Very well; Well; Not well; Not at all.*

Del Pinal and Lapham's figure 7 (1993) summarized the various census questions related to ethnicity. The question on non-English language was asked in the censuses of 1890, 1910 through 1930, and 1980 through 1990. In the last two of those censuses the question was only asked in the long form, administered only to a sample of the residential population. The censuses of 1910 through 1940, as well as 1960 and 1970, also asked for the mother tongue of the respondent and his/her foreign-born parents.

As Stevens points out, the discontinuity in question wordings, response categories, and general methodology renders any longitudinal comparisons of these data virtually impossible. Various censuses shifted between an emphasis on the use of languages other than English and a person's fluency in English. "The outcome is an insurmountable barrier to comparison across the censuses in which only a question on non-English language usage was asked and those in which only a question on English proficiency was included" (Stevens, 1999).

General Comments It should be noted that each one of the varieties of language questions has its shortcomings. For Canada we know, for example, that multiple responses to the questions on mother tongue and home language have been given, despite the fact that such multiple responses have always been strongly discouraged by the census designers. This issue is not a new one, nor is it apparently limited to Canada. Lieberson, in his analysis of the measurement of bilingualism, commented: "censuses seem to never recognize that a respondent could have more than one mother tongue" (1969).

Each one of these language questions is subject to potential political or social pressures. It may, for example, be expedient for members of a particular language community to understate their ability to speak the language of the linguistic or political majority. This did occur, for example, in Estonia in 1979, when the number of respondents claiming fluency in Russian declined substantially from that reported in 1970 (Arel, 2002). Another case of invalid responses as a consequence of political pressures occurred in Belgium in the 1947 census, especially in Brussels and its Flemish-speaking suburbs. Since at that time many Flemish-speaking parents were keen on sending their children to a French-speaking school, many of them declared that their main language was French (Arel, 2002). It should be recognized that the potential for deliberate sabotage of the census for political or ideological reasons is not restricted to respondents. As Khubchandani pointed out: "various governments make intentional distortions in taking the censuses of their populations, such as applying varying (inclusive/exclusive) criteria in the grouping of mother tongues into umbrella-like 'languages' or isolating them into distinct entities, as perceived by dominant agencies or pressure groups in a region" (1995).

Methodological Aspects

There is a voluminous literature pertaining to the quality of census data. In general, errors in demographic data are classified into seven broad categories (discussed by Brackstone, 1977).

1. Coverage Errors: A coverage error occur when a person (or, for that matter, anything we want to count) either is not counted (exclusion or undercoverage) or is counted more than once (overcoverage). Another manifestation of overcoverage occurs when someone is counted but should not have been (for example, temporary residents or foreign laborers on work permits). While in most developed societies overall errors of coverage amount to only a small percentage of the total population, differential errors of coverage may have a somewhat larger impact: it may happen that some members of a specific language community are (substantially) more likely to be missed in a census than others, or else have chosen to boycott the census for political or ideological reasons. For example, the 1996 Canadian technical report on coverage showed that net undercoverage (the difference between over- and undercoverage) amounted to 2.18% for persons with English as mother tongue, 1.67% for persons with French as mother tongue, but 5.17% for respondents with mother tongues other than English or French. A reasonable guess is that many of these missing respondents were recent immigrants with limited or no knowledge of the official languages of the country (English or French); however the report does not supply further information on this (Statistics Canada, 1999). At the time of this writing, the technical report on coverage for the 2001 census was not available.
2. Non-Response Errors: A non-response error occurs when a person has been counted, but has not provided responses to all of the questions

which were asked. In survey analysis, these situations are usually classified as "missing data." Below I discuss in greater detail the prevalence of non-response errors and their treatment in the Canadian census of 2001.

3. Response Errors or "Errors of Content": A third type of error is what we call "errors of content." These involve cases where a person or an event has been counted, but where one or more aspects have been measured incorrectly. For example, a person might have responded with the answer "French" to a question on mother tongue, while the correct response was "English." It could also mean that a respondent did not give any answer to a question (a non-response). Finally, there are situations in which respondents provide multiple answers to questions for which only one reply was requested. In such a situation, a person provides a response that is incorrect. An additional cause of response error is due to an interviewer or enumerator misunderstanding a response, thus misrecording what may have been a correct answer.
4. Coding Errors: Censuses, as well as other self-report methodologies, usually involve a stage in which verbal responses are coded, that is, placed into one of a previously defined set of categories. In census processing this occurs whenever responses are given as open-ended answers (e.g., when a respondent has a mother tongue that is not given on the list of provided languages). Typically this involves a prespecified category – "other, not elsewhere specified" – followed by a "please specify" stimulus. Such responses require coding that until recently was performed by humans. The more recent substitution of computer processing has not necessarily eliminated coding error.
5. Data Capture Error: The processing of large volumes of data involves a variety of mechanical processes used to transform the initial responses (usually written forms on paper) into a medium that can be further processed by computers prior to further editing and tabulation.
6. Editing and Imputation Errors: In most cases, census and survey data are subjected to a variety of checks for consistency, non-response error, etc. In many countries such edits and imputations are performed by computers, following a set of rules in which particular inconsistencies are defined and procedures for the resolving them are programmed. There is now a small literature on situations where edit and imputation procedures have, in fact, produced new errors (e.g., by resolving particular inconsistencies in erroneous ways).
7. Sampling Errors: Sampling errors are more common in surveys (which always involve samples), but they also occur in censuses that use more than one form and administer one or more of these alternative forms to a sample of the population. The most common occurrence is where census questionnaires are produced in a long and a short form. The latter is usually given to a small sample of private households – for example, in the 2001 census of population for Canada, 20% of private households were given the long form, while the remaining 80% received the (much shorter) short form. Such sampling has been used in the censuses of almost all developed societies. Whenever samples are taken, the possibility arises that the selected sample is not perfectly representative of the total population. In cases such as these there is a slight possibility that the data provided in the sample differ from those pertaining to the entire population. In the Canadian census data, the question on mother tongue is contained in the short form (due to legal requirements) while the remaining language questions (language spoken most often at home; ability to speak the official languages; ability to speak other, non-official languages; language spoken most often at work) are only asked in the long form. This latter group of questions is therefore subject to sampling variation as well as to the other types of errors.

A Detailed Discussion of the Canadian Experience, 2001

Statistics Canada regularly produces a series of technical reports pertaining to selected characteristics measured in the preceding censuses of population. The report *Languages* was released in early 2004 (Statistics Canada, 2004). While there is insufficient space here to cover the entire report, it is important enough to include a fairly detailed summary of it. Included are, first of all, the exact question phrasings used in the census. In 2001 only the question on mother tongue was asked in the short form: "What is the language that this person first learned at home in childhood and still understands?" The long form contained five questions:

13. Can this person speak English or French well enough to conduct a conversation?
14. What language(s), other than English or French, can this person speak well enough to conduct a conversation? (Up to three responses were accommodated by the census questionnaire)

15a). What language does this person speak most often at home?

15b). Does this person speak any other languages on a regular basis at home? [Possible responses to this question, other than "No," were: English; French; Other – specify]

16. What is the language that this person first learned in early childhood and still understands?

48a). In this job, what language did this person use most often?

48b). Did this person use any other languages on a regular basis in this job?

[These latter questions were only asked of persons 15 or older].

The processing of the 2001 Canadian census data involved many steps that are not necessary to delineate here. Since many of the responses to the census questions required a respondent to write an answer in a specific place, there was a process by which these write-in responses were coded into computer-readable categories. Most of these responses were converted by an automated process (called "automated coding"), while the remaining responses were coded manually.

Following this coding phase, data were subjected to a process called "edit and imputation," in which missing responses were imputed by a set of complex rules; inconsistent responses were, as much as possible, resolved by a similar set of rules. These two processes dealt with such situations as non-languages such as "Baby" or "Canadian," neither of which are, of course, proper languages, and with pseudo-languages such as "Scandinavian" or "Swiss." I will not dwell on the exact procedures followed in these editing stages. The report gives some overall percentages of the cases affected by these processes. The data on knowledge of official languages show that 96.49% of the responses did not require any editing or imputation. There was a non-response rate of 1.15%; a further 0.67% involved multiple responses; and a further 0.47% had inconsistencies between the response to the question on official languages and those on mother tongue and home language. A further 1.23% was classified as "not applicable."

The 2001 census data on language showed a higher non-response rate for the question on mother tongue than did its two immediate predecessors; for the short form, 2.58% was missing, while the corresponding percentage for the long form was 1.40%. However, there was a wide variation in the non-response rates for the different provinces and territories, from 1.46% for Newfoundland and Labrador (linguistically the most homogeneous province) to a maximum of 4.19% for the Yukon Territory (which has a sizeable population with aboriginal origins).

A second aspect of data quality for the mother tongue question regards multiple responses. The question is phrased very clearly to allow for a single response; moreover, the instructions to respondents stipulate that under certain conditions (e.g., the respondent's having learned more than one language in early childhood) the respondent is to select a specific response (such as "the language you learned first"). However, there was a nontrivial proportion of respondents who either did not want to choose or were unable to choose between two or more languages as their mother tongue. In 2001 that proportion was 4.16% on the short form, 1.29% on the long form. Historically the two forms have had different proportions of multiple responses, with the long form always having the smaller proportion. As with the non-response, there was a wide variation between provinces and territories, with the lowest percentage of multiple responses for Newfoundland and Labrador (0.40% for the short form) and the highest percentage for Ontario (4.88% for the short form). Ontario is the province with the highest proportion of recent immigrants.

The other questions in the 2001 census were subjected to equivalent processes. They, too, had errors of content. The "knowledge of official languages" question had a non-response rate of 1.18% (with the highest territorial rate for the Yukon), while the "knowledge of non-official languages" question had a non-response rate of 2.73% (maximum again for Yukon at 6.91%). Multiple responses to these questions were substantially less common than they were to the question on mother tongue: 0.48% for the former, 0.49% for the latter. It should be recognized that the questions on language knowledge were less inviting to multiple responses than was the one on mother tongue.

Finally, the question on home language was phrased as a two-part question. Part A asked "what language does this person speak **most often** at home?" Part B asked: "Does this person speak any other languages **on a regular basis** at home?" We may be somewhat concerned about the reliability of the "on a regular basis" aspect of this question, but the editing procedures cannot tell us to what extent that clause confused respondents. Overall, the non-response rates for part A were 1.40%; for part B, 2.70%. For both of these parts, the non-response was lowest in Newfoundland and Labrador, and highest in the Yukon Territory. Multiple responses to part A were highest for Ontario (2.10%) and lowest for Newfoundland and Labrador. The same pattern was observed for part B, though at a much lower level (only 0.32% overall).

The 2001 census introduced a new language question that addressed the language used at work. Since this was new, there is no earlier information with which to judge the quality of the data. The question was only asked of respondents 15 years and over, and the structure of this question was similar to the one on

the language spoken most often at home. Part A had a national non-response rate of 3.93% and a multiple-response rate of 2.20%. Part B had a non-response rate of 1.56% and a multiple-response rate of 1.90%. In some contrast to the prior questions, the language at work data by province showed the highest error rates for Nunavut (the territory with an Aboriginal majority), Quebec, and New Brunswick. It is not immediately obvious why these provincial patterns differ so markedly from the other ones. This report also contains some interesting information pertaining to the reliability of the census data on language, though strictly on the "language at work" variable. The Quebec government has been concerned with the language choices made by immigrants and in-migrants to Quebec. In order to inform itself about these issues, several studies have been conducted. The report mentions those by Monnier, on the language choices of immigrant workers, and by Beland, on language use in public settings in Quebec. While for both of these studies we can only make aggregate comparisons, it is satisfying to note that the differences between these studies on the one hand, and the 2001 census on the other, are rather small.

Other census bureaus appear to have devoted considerably less effort to the assessment of data quality (at least with respect to the data on language) than has the Canadian census organization. However, with some digging, a few documents may be unearthed that shed some light on these aspects of validity and reliability. I have a report on the Catalan census data for 1991 (Capellades and Olivares, 1995), a short report on the 2001 South African census, and a working paper from the U.S. census bureau dealing with the reliability of the 1980 census data on language (Kominski, 1989). In all of these cases, overall measures of data quality were satisfactory.

General Comments

In addition to the specific categorization of errors discussed above, we should address the more general issue of information quality. In virtually all of the social sciences, these issues are categorized as reliability and validity. We define the former as the extent to which "a particular technique, applied repeatedly to the same object, yields the same result each time." (Babbie and Benaquisto, 2002). The latter can be defined as "the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration" (Babbie and Benaquisto, 2002). Functional equivalents of these definitions are readily found in undergraduate textbooks in any of the social sciences.

By reliability we refer to the extent to which the item we are measuring is measured accurately. In contrast to validity (see below), reliability is strictly a measurement issue. Language questions in censuses and surveys are reliable to the extent that, for example, subsequent measures yield identical results. We do have some evidence of the reliability of census language questions through post-censual surveys in which questions already asked in the census questionnaire are asked again. Responses are reliable to the degree that the two measures give identical results. An early analysis of the reliability of Canadian census data was conducted by Fellegi (1964). The evidence from the Canadian post-enumeration surveys suggests that such questions, at least in Canada, are quite reliable. Brackstone discussed a possible measure of reliability (estimated standard errors) and reported values obtained for the 1971 census (Brackstone, 1978). As he pointed out, such standard errors only address errors that can be classified as random. Systematic errors (bias) are not estimated by standard errors. The 2001 census of South Africa also measured reliability by means of repeated measures. The reliability for these data is given as a consistency percentage: the percentage of respondents who provided consistent (i.e., identical) responses to the same question at two different times.

By validity, we refer to the degree to which the item we are measuring (the indicator) correctly measures the underlying concept. For example, if we were interested in the fluency with which a respondent speaks a given language, we could just ask a question along the line of "how well do you speak X?," with response categories of: Very well, Well, Poorly, Not at all. (Remember that this was the wording of the U.S. census of 2000 in the question regarding fluency in English for persons who speak a language other than English at home). In contrast to reliability, validity is more than just a measurement issue; it also involves underlying theory. We do have some examples of the establishment of the validity of census language questions. Fishman and Terry (1966), in the study of Puerto Ricans in the United States, asked simple self-report questions on bilingualism and other linguistic features; they followed up these measures with finer-grained questions on the underlying linguistic features. Their findings suggest that, at least for the Puerto Ricans they studied, self-report questions on such issues as bilingualism have relatively high validity. Lamy (1978) also conducted a small study in relation to the Canadian census question pertaining to the respondent's ability to conduct a conversation in English and/or French. His method was quite similar to that of Fishman and Terry: on the one hand, the census question on the respondent's ability to speak the official languages was asked. On the other hand, a variety of fluency measures

were administered to assess the degree to which the self-report question validly measured the underlying concept. Here, too, the conclusion was that the self-report questions had adequate validity. We should keep in mind that both of these studies were conducted in situations in which language was not an extremely sensitive political or cultural topic – it stands to reason that the validity and reliability of such data would be of much lower value in situations where language is an element in the struggle for political or social rights. Therefore, one ought to be wary of the Belgian census data of 1947 (see Levy, 1960 for a detailed discussion of this issue).

Surveys

It is impossible within the restrictions of this article to provide sufficient coverage of the availability of language questions in surveys. Obviously, all surveys contain linguistic information, albeit of the most trivial kind. Surveys, like censuses, are self-report instruments, whether the mode of data collection is aural (structured interviews, in person, or by telephone) or written (questionnaires completed with pencil or pen or internet surveys completed by keystrokes). As such, all of these instruments involve the use of at least one language, both in the stimulus (the asking of questions) and the response. In multilingual countries such as Canada, it is therefore useful for an analyst to know in which language the interview was conducted or the questionnaire written. Given the pitfalls of translation, it would also be useful to know in which language the initial instrument was designed. Unfortunately, in many such instances that basic information is unavailable.

However, there are surveys specifically designed to elicit linguistic information from a sample of respondents. Even to enumerate these goes beyond the scope of this article, so I will limit myself to discussing some surveys for which the primary topic was linguistic in some form. In the context of Euromosaic, many surveys were conducted on linguistic minorities in the member states of the European Union. Since these surveys date to 1994, the data pertain only to a proper subset of linguistic minorities in the 15 members of the European Union at the time.

Regrettably, the data collected in most of these surveys are of extremely limited validity, for several reasons. First, the samples are quite small. The reports I have examined indicate a typical sample size of about 300 respondents. While such small totals do allow for reasonably reliable marginal frequencies, any cross-tabulation (such as language fluency by age group) suffers from the problem that cell frequencies are too small for any statistical inference. If the standard errors reported by Brackstone for the 1971 Canadian census data on language are a reasonable guide, frequencies of 100 would have standard errors of about 20. Statistical inference would in such cases report a 95% confidence interval from about 80 to about 120. Smaller frequencies would have proportionally larger standard errors and would therefore be even less reliable.

However, the larger problem lies in the sample design. As far as I can tell, none of the samples was drawn as a probabilistic sample. As such, no statistical inference is possible, nor is any meaningful comparison between surveys possible. Given the observation that for many regional linguistic minorities in the European Union, there simply are no reliable data, it is quite regrettable that the designers of the data collection, as well as the funding organization, spent a lot of time and financial resources on the collection of data that, as it stands, have limited scientific value. (For more information on the Euromosaic project, as well as reports on separate surveys, see Relevant Websites, below.) Not all of the reports are available in English; several are available in French and/or Catalan.

Courbage (1998) discussed the availability of information on languages in official surveys (that is, those carried out by national statistical agencies, rather than by private or academic survey centers) of about 37 European countries. For many of those (e.g., Iceland, Portugal) such surveys would not be very useful, since they essentially contain only one language community. However, in several of the countries in which two or more language communities have coexisted for some time, apparently no official-survey data on language are available. In the list of 37 countries for which information was supplied, only 9 had conducted national surveys containing questions on language (Courbage, 1998): Portugal, Switzerland, Finland, Russia, Romania, Hungary, Latvia, Estonia, France, Poland, Lithuania, and Luxembourg (note: the last three countries did conduct surveys, but not on a national scale).

There is a fairly extensive collection of social surveys containing language questions for the countries of the European Union: the Eurobarometer surveys which have been carried out since 1973 (in the nine countries then comprising the European Community). Many of these surveys do contain information about language use, mother tongue, or the knowledge of specific languages. While the Eurobarometer surveys are based on probabilistic samples, most of them do not deal with linguistic topics; their utility for the analysis of sociolinguistic topics such as language acquisition, maintenance, or shift is limited.

(For the Eurobarometer surveys website, see Relevant Websites, below.)

Conclusion

In such a brief overview of the prevalence of language questions in censuses and surveys, there is undoubtedly some information about data quality that has not been uncovered. In fact, there is no single source in which we can locate all of the censuses containing at least one language question. The United Nations' demographic yearbooks, which periodically provide summaries of this information, have turned out to be seriously deficient (see de Vries, 2004 for details). Researchers interested in the demographic study of languages are, for now, left to their own devices. The situation is even worse regarding linguistic surveys. Other than the extensive annual surveys cited above, it is virtually impossible to mention all of the available surveys with high linguistic content for any one country, let alone for all countries in the world.

See also: Language Attitudes; Language Planning and Policy: Models; Language Processing: Statistical Methods; Migration and Language Planning; Native Speaker.

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Relevant Websites

http://www.uoc.es/euromosaic/index.html – Euromosaic website.
http://www.gesis.org/en/data_service/eurobarometer – Eurobarometer website.

Language Teaching Traditions: Second Language

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Introduction

Learning a language in addition to one's first, or native, language has its roots in prehistory, when tribes encountered other tribes whose language differed from their own and a need to communicate arose, perhaps to exchange goods, form alliances, or ask directions. With no written records on which to rely, we can only conjecture as to how that learning happened. However, it would not be unreasonable to assume that it occurred in much the same way as uninstructed (sometimes called 'informal' or 'natural') language acquisition happens today, given similar communicative needs. Instructed (or 'formal') second language learning, however, has a long and varied tradition that may or may not have been based on communicative necessity, depending on the particular historical context in which it occurred Traditions in language teaching reflect a mix of earlier, established techniques combined with innovative influences justified by contemporary ideas in philosophy, religion, and later, psychology, in addition to cultural norms and values. A fascinating aspect of language teaching is that particular themes continued to recur throughout its history, down to the present day.

The following overview of language teaching traditions traces their history from classical Greece and Rome to the 20th century. The perspective is Western European based on the role of Latin and, to a lesser extent, Greek in the curriculum. This is not to suggest that other, non-Western traditions do not contribute to our understanding of historical practice. For example, the oral tradition associated with non-Western educational approaches can provide important insights into second-language teaching and learning. Unfortunately, research on the teaching of second languages within and from the non-Western perspective – as opposed to the teaching of Western languages in the non-Western context – is an area that remains largely unexplored in academic research. Reagan (1996) provides a general overview of non-Western educational traditions, including the teaching of first, but not second, languages.

Early Greek Education

Greeks during the 6th century B.C. held two conflicting views of education in the schools of Athens and in those of Sparta. Although the Athenian model formed the basis for the Western tradition, it is nonetheless interesting to review the Spartan model to see which aspects were shared between the two.

Schools in Sparta

Sparta was a military state established in the 8th century B.C. The Spartan citizen lived for the welfare of the state, of which he was the property, and individuals had no importance apart from the state.

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Schools in Sparta

Sparta was a military state established in the 8th century B.C. The Spartan citizen lived for the welfare of the state, of which he was the property, and individuals had no importance apart from the state.

Contact with foreigners was discouraged; in fact, free travel outside the state was prohibited. The aim of education was to develop character, not intellectual capacity, and thus to create obedient, courageous, disciplined citizens who were physically fit and loyal to the state. Girls received no formal education; they learned at home the ideals of the state and of homemaking. They also studied gymnastics to enhance physical fitness, essential for healthy reproduction. Boys became wards of the state at age 6 years, when they left their family homes and moved into military barracks in units of 64 peers. They would not live in a home situation again until marriage at age 30 years. A state official, the *paidonomous*, supervised education, with the aid of assistants who conducted the actual training. At age 18 years, young men became cadets, at which time they began a 2-year period of training in military strategy and tactics, followed by a 10-year obligatory military conscription. On successful completion of service, men were granted full citizenship.

The Spartan curriculum consisted of extreme physical training, sports, and military drill, motivated by competitiveness and harsh discipline. Training in literature was limited to accounts of military heroism. Language teaching, first or second, was not part of the curriculum. In fact, the adjective 'laconic' derives from the geographical name Laconia, of which Sparta was capital, to describe the terseness of speech for which its citizens were famous.

Schools in Athens

In contrast to education in Sparta, the aim of education in wealthy and cultured Athens, victorious in the Persian War (479 B.C.), was to produce a well-balanced individual, intelligent and of strong moral character. Although the state supervised and regulated elementary education, it did not financially support it. Each school was independent and privately operated by a teacher. Education was not compulsory. On the other hand, a 2-year period of military training, *ephebia*, beginning at age 18, was mandatory. Only sons of free citizens were educated; girls received their education at home from their mothers. From ages 7 to 14, boys studied reading, writing, music, and gymnastics, with different teachers for each subject. Reading instruction began with learning the alphabet. Children sang an alphabet song and formed the letters with their bodies while the rest of the class guessed the letters and words.

All teachers were male, and each pupil was accompanied by a *paedagogos*, a male slave who served the mixed functions of nurse, chaperon, and tutor throughout the school day. The elementary school teacher was among the lowest-status occupations in Athens. Itinerant teachers provided instruction beyond the elementary school, offering curricula dependent on their interests and expertise: grammar, composition, rhetoric, literature, music, mathematics, astronomy, or physics. When military training became voluntary, it was replaced by higher education in philosophy, rhetoric, and science, offered through private academies.

Plato and the Academy

A military hero from an aristocratic and wealthy family, at age 20, Plato became a student of Socrates, studying with him for almost 8 years until he witnessed his teacher's trial and conviction in 399 B.C. Disillusioned with Athenian democracy, Plato left Athens, only to return in 387 B.C. and purchase a recreation grove dedicated to the god Academus, wherein he opened a school, the Academy. Plato charged no tuition, relying on the donations of wealthier students to support the enterprise. Both men and women were welcome to study at the Academy. However, only advanced students – those who had already studied geometry – were accepted. The teaching method was lecture-based, with some elements of Socratic dialogue. The curriculum included higher mathematics, astronomy, music, literature, law, history, and philosophy. Plato's epistemology (theory of the nature of knowledge) viewed knowledge as a recalling of ideas that are innate in the soul. He believed that man does not arrive at truth through the senses or by experience. Instead, he must turn inward, looking inside himself. In this way, he can arrive at innate truths through reason. 'Education,' literally 'to draw out of' derives from the idea that learning is the recollection, or remembering, of what is already known and that exists within.

Plato's philosophy, translated into education theory, held that all children should be educated to the limits of their abilities, and that the state, rather than the family, should provide that education. The aim of education was to produce individuals (rulers, warriors, workers, and civil servants) who were oriented to their role in society and whose characters were disciplined to control their animal appetites; that is, to subordinate their senses to reason. Until ephebia at age 18 years, education was devoted to the study of mathematics, literature, poetry, and music. Plato recommended that elementary-level learning be as close to play as possible and that higher levels of learning develop students' critical thinking skills and their ability to use abstract reasoning.

Aristotle and the Lyceum

Aristotle became the most famous of Plato's students in the Academy. At age 41 years, he became tutor to

Alexander, son of King Philip of Macedon, who would later become known as Alexander the Great. At age 50 years, Aristotle returned to Athens and, following in the footsteps of his famous teacher, purchased property and opened a school. The property, dedicated to Apollo Lyceus, provided the name for the school, the Lyceum. The Lyceum became known for its work in natural sciences and was the site of the first zoo and botanical gardens in the Western world. Aristotle's keen observations of nature – honed over the years by examining samples of animal and vegetable life brought back from Alexander's conquests – became the world's chief source of scientific knowledge for the next 1000 years. Aristotle's teaching style consisted of a morning walk through the gardens with his regular students, during which they exchanged and discussed ideas. School became known as 'peripatetic,' or 'walking about.' After eating lunch with his students, Aristotle gave public lectures on politics, literature, and philosophy. The students organized themselves and performed the administrative duties of the Lyceum. All students were expected to engage in historical or scientific research, much of which formed the basis for Aristotle's propositions.

Like Plato, Aristotle believed that man is a rational animal: an animal because he possesses a body with physical needs and appetites, and rational because he has a soul. Unlike his teacher, who held that man is born with preformed ideas, Aristotle proposed that man is born devoid of knowledge, a *tabula rasa* ('blank slate') and that he formulates ideas as a result of contact with material objects. Whereas Plato would have defined learning as 'education,' learning for Aristotle was a matter of instruction ('to put into'): a process of putting knowledge into an empty, but receptive, mind.

The aim of education under Aristotle was to produce a good man; that is, to change a man who is not good by nature to one who controls his animal activities through reason. Both his intellectual and his physical abilities should be developed to their fullest potential. Women were viewed as inferior to men, and their proper functions, as wives and procreators, were fulfilled in the home through training in the domestic arts and gymnastics. Even among men, education was aristocratic; that is, limited to the sons of citizens. The curriculum was not to serve any vocational function, as such activities were the provenance of slaves. Reading, writing, mathematics, natural science, physical education, and humanities (rhetoric, grammar, poetry, politics, and philosophy) formed the curriculum. Because man learns from nature, by habit, and by reason, the teacher's function consisted of organizing the material in a logical manner. Repetitive drill was used to reinforce what was understood by reason, and correct habit formation was essential in the learning process.

The opposing ideas of Plato and Aristotle, in simplified terms of 'education' versus 'instruction,' or of innate knowledge as opposed to knowledge derived from experience, had a profound influence on Western education, including traditions of language teaching. Twenty-first century debates surrounding the extent to which language acquisition is a function of innate human faculties or a result of environmental factors continue to capture the attention of linguists and to influence teaching practice.

Roman Education

In the Roman Republic (508–146 B.C.), education took place at home. Mothers or older relatives tutored young children. Strict obedience was valued. Children were expected to acquire an elementary knowledge of reading and writing. Instruction, whether in literacy or in the trades and professions, was through apprenticeship; that is, through example and imitation. Education was largely vocational, not erudite.

The Roman conquest of Macedonia and Greece (201–146 B.C.) had a powerful influence on Roman society and education. The acquisition of the new territory brought thousands of well-educated Greeks to serve as slaves in Roman households, where they became the teachers of Roman youth. Greek language, culture, and philosophy, including principles of education, spread. The Greek language was so commonly used among educated people that one could address the Roman senate in Greek and be understood. The inclusion of jokes and plays on Greek words in Roman theater provide evidence that even lower classes of Roman society were familiar with the language. By the beginning of the 3rd century B.C., Greek was the language of prestige and culture among educated and upper–social class Romans, existing alongside Latin in a bilingual society.

Considered more practical in orientation than the Greeks, the Romans viewed education as a means to an end: It conferred prestige, but more important, it led to higher status and, thus, to better marriage prospects and more opportunities for advancement.

The system of formal education in Rome in the first century B.C. was divided into four levels. The first, or elementary, level the *Ludus* (meaning 'games' or 'play'), enrolled children from ages 7 to 12. In it, the *magister* ('teacher') taught reading, writing, and arithmetic. Despite its name, the Ludus was infamous for its harsh discipline, and teaching was primarily by rote. Children depended on memory to learn. Elementary schools were open to children of all free

families, boys and girls alike. In this sense, Roman education was more public than the Greek. (Girls' public education, however, ended at this level.) Romans debated the advantages of public versus private school for their children, and upper-class families employed private tutors for their children. The second level of formal schooling was the Grammar School, enrolling students ages 12 to 16. 'Grammar,' from the Greek *grammatike* ('letter'), was the art or technique of writing, not the compendium of rules that the term implies today. The students who attended Grammar School did not typically come out of the Ludus. Rather, they were students who had been privately instructed at home for their elementary education. Both Latin and Greek grammar schools were available, and students could attend one or the other, or both. It is important, from a language learning perspective, to remember that the grammar schools used Latin or Greek as both the content of the curriculum and the medium of instruction, in what we would consider today an immersion-type setting. Young people who attended them would have already been at least functionally competent in the language, having learned to understand, speak, and probably read it at home from a private tutor. The teacher, or 'grammarian,' taught grammar (composition) by means of literature, primarily through lecture. Lecture (literally, 'reading') consisted of the teacher's reading aloud of literary texts and providing comments. The texts provided both the content of the lesson and the form that students were to imitate. Students took notes and memorized lectures. From ages 16–20 years, students attended the School of Rhetoric, where they learned how to use language effectively through the continued study of grammar, argument, and speech (or oratory, literally 'pleading from the mouth'). The chief purpose of the school of rhetoric was to train students to be successful public speakers. The last and highest level of schooling was the University. Two universities were established in the early years of the Roman Empire: one in Athens and the other in Rhodes, both Greek-language institutions. In addition to higher learning, attending the university would have been a study abroad experience. Students who attended the university could be anywhere from 21 to 45 years old. The principal subject was philosophy, but other subjects included law, mathematics, medicine, architecture, and rhetoric. The well-educated Roman was bilingual in Latin and Greek.

Quintilian

One of the most well-known and influential educators in Rome was Quintilian (35–96 A.D.). After training in rhetoric and pursuing a career in law and politics, he was appointed the first state professorship of rhetoric in Rome. Quintilian authored the *Institutio Oratoria* ('Education of the Orator'), a 12-volume series that covered wide-ranging topics in education from preschool to advice for the practicing orator. His advice was that of a distinguished politician and orator regarding the education of boys from upper-class families who were destined to become future leaders. From that perspective, the primary objective of education was to train students to be effective and persuasive public speakers who would then be good public servants. Self-discipline, moral integrity, and social conscience were highly valued attributes. In an age that lacked print media, an esteemed man who could sway public opinion with his oratorical skills held incomparable value for the state. A command of spoken language in conjunction with a background in its literature, history, poetry, music, and philosophy was the mark of a well-educated citizen.

Many of Quintilian's educational principles would be recognized in modern guidelines for practice. Among other things, he advocated that curricular content must be appropriate to the child's ability level (a better predictor for success than age alone); individual differences, both intellectual and physical, among students must be taken into account, with aptitude being an important factor in determining success; a system of rewards to promote learning is more effective than one of punishment; learning cannot be forced, rather, interest, motivation, and persistence are better served through a pleasurable instructional experience; content should be relevant to contemporary situations, and activities should deal with the practical application of that knowledge; and public education is more beneficial than private for the development of social skills.

With regard to language learning in particular, Quintilian suggested that spelling should reflect pronunciation and that games should be used to encourage learning. He advocated the use of wooden blocks in the shape of letters as a way for young children to learn the alphabet and spelling. Above all, he maintained that earlier is better, especially where language is concerned. He recommended that children learn Greek first and Latin second, as the latter would be learned anyway in the context of daily life. Because he believed that learning derives from instruction, he warned that care must be taken to expose children only to excellent and accurate models of language use, both with regard to their caregivers and to the texts they read. Errors, once inscribed on the wax tablet that was the metaphor for the child's mind (Aristotle's *tabula rasa*), were considered difficult, if not impossible, to erase.

Latin Grammars

Aelius Donatus (4th century A.D.) and Caesariensis Priscianus (end of the 5th to the early 6th century A.D.) were Roman grammarians who wrote Latin grammars. Donatus's short grammar, *Ars minor*, was so widely used that any elementary grammar book became known as a 'donat.' It presented the parts of speech in a question and answer format ("What is a noun? A part of speech that signifies by its case a person or thing specifically or generally.") Examples from literature illustrated forms and correct usage. It also contained lists of commonly made errors (alongside the correct forms) and figures of speech. Donatus referred to students' errors as 'barbarisms,' and it is likely that many of them were incorrect spellings based on language they had learned only from dictation, in addition to influences from Vulgar Latin (i.e., the language commonly spoken by the people), which was quite different both from the classical, literary language that students learned in school and from non-Latin dialects. Priscian's grammar, *Institutiones grammaticae*, meant to follow the *Ars minor*, was an 18-book treatise on all aspects of Latin grammar, phonology, morphology, and syntax, filled with quotations from Latin authors. For many students, the examples from Priscian's grammar constituted their only exposure to Latin literature.

The curriculum that Rome had adopted from Greece, namely, grammar, rhetoric, dialectics, mathematics, astronomy, music, and philosophy, remained unchanged for centuries throughout Western Europe. It was a system of education founded on the study of language and designed for students who were already functionally proficient in the language – Greek or Latin – before they began to study it formally.

Education in the Medieval Age

When Germanic tribes invaded, fractured, and conquered the Roman Empire, many of them accepted the culture of Rome and Greece, including Christianity. As a consequence, the Roman church emerged as a dominant influence in Western Europe. The aim of education changed from the development of the educated citizen to the preparation of a man of God, in anticipation of the afterlife. The focus of education turned away from the practical affairs of the world, from sense experience, from physical education, and from external reality. Truth was viewed as absolute: it was not discovered through experimentation but delivered through faith, and it was found only within the Church. Because pupils were inclined toward evil, as a result of original sin, they had to be disciplined and undergo physical punishment to control their evil inclinations.

The spread of Christianity created a conflict between Christian theology and ancient philosophy in education. Liberal thinkers wanted to maintain what was beautiful from the ancient authors, preserving their culture in a Christian form. Theologians were ambivalent in their attitude toward Latin and Latin authors. On the one hand, the Bible and church services were in Latin, so all clergy needed to learn the language. On the other hand, Latin literature, which had served as the model and the method for language teaching, was pagan and a source of possible moral corruption. Because of this, the classical authors were no longer considered appropriate content, especially for young people. Scripture and the writings of the early Church fathers replaced them as models for learning Latin.

Three types of schools predominated during the Middle Ages: the catechetical school, the cathedral school, and the monastic school. Catechetical schools provided an elementary level of education consisting of fundamental doctrines of faith. They were designed for catechumens, that is, possible converts to Christianity, and they provided only what was essential in Latin; namely, the memorization of prayers and scripture passages. The monastic schools, in contrast, trained boys to become monks. They retained the Roman curriculum of the seven liberal arts, divided into the trivium – grammar, rhetoric, and dialectics, or logical argumentation – and the quadrivium – arithmetic, music, geometry, and astronomy. The cathedral schools prepared clergy and sought to provide advanced knowledge of scripture, doctrine, and ritual. This instruction was combined with the study of grammar, rhetoric, literature, geometry, history, and philosophy. Boys who did not intend to become either priests or monks but who wanted a general education attended either the cathedral or monastic schools, where they studied the liberal arts as 'externs.'

Monks were members of a religious order, or community, who vowed dedication to lives of chastity, obedience, poverty, farming, and teaching. They were workers, not contemplatives. The curriculum of the monastic schools, therefore, stressed practical skills. Latin, too, was learned for utilitarian purposes: reading and singing to participate fully in the ritual activities of the church, writing to copy manuscripts (but not necessarily to understand them), rhetoric to be able to teach and preach effectively, and arithmetic to calculate the dates of Easter.

An early church figure, Jerome (340–420 A.D.), having completed a classical education in Rome

and then studied theology, asceticism, Hebrew, and scripture, translated the Bible from Hebrew and Greek into Latin. This was the first Latin bible, known as the Vulgate. It became the official version of scripture for eight centuries. Jerome also founded a monastery and a monastic school in Bethlehem. In a letter dated 403 A.D., he offered advice to a mother on how to raise her infant daughter, much of which can be traced to Quintilian. Jerome stressed the importance of good models and advocated early play with alphabet blocks. He warned against allowing errors to occur and suggested that to ensure accuracy from the very beginning, the mother should guide her daughter's hand as she wrote on a wax tablet or traced letters carved in a board, "so that her efforts confined within these limits may keep to the lines traced out for her and not stray outside of these" (Ulich, 1954: 165). Errors are to be strictly avoided, as "An unused jar long retains the taste and smell of that with which it is first filled" (166). Jerome also advised that the girl learn both Greek and Latin from the very beginning to avoid a non-native-like accent: "For, if the tender lips are not from the first shaped to this, the tongue is spoiled by a foreign accent and its native speech debased by alien elements" (167). Finally, he suggested that the ideal solution would be to send the girl to a monastery.

Another early Church father, Augustine, in his *Confessions*, provided an account of his language-learning experience. He claimed that language developed out of a need to communicate and that he learned his native language by associating sounds and gestures with objects. He then collected these 'signs' and used them to convey his own meanings and desires. Augustine did not know Greek before he went to school and suffered because of it, causing him to hate the language: "The difficulty of learning a strange language did sprinkle as it were with gall all the pleasures of those fabulous narrations. For I understood not a word of it, yet they vehemently pressed me and with most cruel threats and punishments to make me understand it." He compared that experience to learning his first language, without fear or torment, but simply by listening to people talk to him and attempting to convey his own meanings, concluding that "a free curiosity hath more force in children's learning of languages, than a frightful enforcement can have" (147). By his own admission, Augustine loved classical Latin literature, but he criticized the amount of time and effort spent on it and particularly disliked grammar: "men care more to observe the rules of grammar than the laws of God" (149).

The Rise of Universities

Moslem influence during the 11th and 12th centuries, with access to Greek texts in translation, stimulated renewed interest in classical learning. Scholars traveled to Spain and southern Italy to peruse the tremendous libraries that the Arabs had built. In addition, the growth of cities provoked a need for professional training in law and medicine. The university had its informal beginnings where teachers and students came together to learn and debate, much as they had done in Plato's Academy. For their own protection from interference by secular or Church authorities, teachers and students found it necessary to incorporate themselves; hence, the term 'universitas' (guild or corporation). The University of Bologna was the earliest – established in 1088 – and specialized in law; the University of Salerno specialized in medicine, and the University of Paris specialized in the arts.

At the university, one could attain three levels of degrees: the bachelor of arts, the master's, and the doctor's (from the Latin *docere* 'to teach'). The bachelor of arts degree entitled one to continue for a higher degree. The master's and doctor's were earned through the defense of a thesis, demonstrating one's scholarship. The curriculum for the bachelor's degree remained the seven liberal arts. Because of a continued lack of books in the Medieval period, the method of instruction was still by lecture, delivered by either a master's or doctor's candidate who read something he had written and provided commentary. There was no minimum age for attending the university, and it was not unusual for students to be as young as 12 years old.

As in earlier times, a thorough knowledge of Latin was essential for the successful completion of studies at the bachelor's level and a prerequisite for more advanced study. By this point in time, however, Latin was no longer any student's first language. So, to ensure that students would acquire proficiency in Latin, not only for conducting research and writing but also as a means of spoken communication, students were required to use Latin as all times, in and out of class, even in the 'colleges' (student residences): "It has been decreed that the speaking of Latin shall be strictly observed in all the colleges and lodgings, not only by the simple students but also by the bachelors, according to the statutes, . . . on penalty of a certain fine to be imposed" (Seybolt, 1921: 72). Students were encouraged to report their peers who didn't speak Latin outside of class. In fact, some students were appointed language spies, called 'wolves,' who recorded the names of students who used the vernacular (their native language) instead of Latin. The

students whose names appeared on the lists were summoned and fined.

For conventional and religious purposes during the Medieval Age, Latin remained the language of school even as it became further and further removed from students' linguistic reality outside the classroom. Students did not possess a functional command of Latin; it was a not used by the vast majority of people in the wider community. Latin was a foreign language. Most students did not use it readily and had to be forced to speak it.

Revival of Classical Studies

With the rediscovery of classical authors, there was a renewed enthusiasm for the *studia humanitatis*; that is, the classical Latin education including literature and history. The proponents of the new learning, the humanists, advocated more than just the correction of manuscripts: They proposed a revival of classical learning and culture. They sought to institute Latin as the language of wider communication, much the way that English is used today. The school curriculum, then, continued to be devoted to the liberal arts, but with the insistence that texts of the ancient authors form the content of the curriculum. Students would, once again, learn language in conjunction with content, through exposure to excellent models, and not as a system of abstract rules. The most prominent educators of the day – Vittorino da Feltre, Guarino Guarini, Desiderius Erasmus – exhorted that learning should be pleasant, that harsh discipline was unnecessary and counterproductive, and that errors are artifacts of a developing grammatical system and not a sign of linguistic or moral decay. New attention was paid to the surroundings and comfort of the pupils, as evidenced by Vittorino da Feltre's delightful boarding school, the *Casa Giocosa* (the Playful House), where children learned Latin and Greek in an Italian countryside villa while enjoying fresh air, simply prepared food, and lots of physical exercise and outdoor games. Erasmus, the Dutch humanist, not one to mince words, put it boldly when he wrote in his treatise *On the right method of instruction*,

> I have no patience with the stupidity of the average teacher of grammar who wastes precious years in hammering rules into children's heads. For it is not by learning rules that we acquire the power of speaking a language, but by daily intercourse with those accustomed to express themselves with exactness and refinement, and by the copious reading of the best authors" (Woodward, 1921: 163–164).

Rise of the Vernacular Languages

The humanists' best efforts notwithstanding, they failed in their quest to establish Latin as the universal language. A combination of economic, religious, political, and scientific developments worked against them. As nations formed across the European continent, national languages solidified national identities. Increasing criticism of the abusive power of the Catholic Church stigmatized the use of Latin by association. Although Latin prevailed for a while longer as the language of scholarship and international relationships, it began to lose ground as the vernacular languages grew increasingly powerful. Scientific discoveries began to be published in the vernacular. Galileo published his treatise on planetary movements in Italian, not Latin. The rise of a middle class of merchants and bankers legitimized the vernaculars as media of communication. Parents needed to be convinced of the value of having their children devote so much time and effort to learning Latin. Perhaps the event that had the most significant effect on the language teaching was one of the greatest inventions of all time: the printing press, which allowed for the mass production of books. For the first time, students had easy and relatively inexpensive access to texts. They no longer needed to commit everything to memory or to laboriously copy reams of commentary and lecture notes. Moreover, it wasn't long before the Latin texts were readily available in translation, either interlinear or in side-by-side columns. Such innovation had the obvious effect of eliminating the need for students to struggle through the Latin text to understand its meaning. They could simply read it in their native language.

In addition to his condemnation of the excesses of the Catholic Church, Martin Luther was also a proponent of widespread literacy education. He advocated free elementary education for all children in Germany so that they would be able to read the Bible and thereby attain salvation. Philip Melanchthon functioned as Luther's mouthpiece for educational reform. On the basis of his observations in schools, Melanchthon proposed a three-level system. The plan remained basically humanist, with the innovation that children should first be taught (level 1) in the vernacular before proceeding to the Latin grammar school (level 2) and the conventional course of study, followed by the university (level 3). The rules and regulations that Melanchthon outlined, however, suggest anything but a golden age for learning: those for the university students prohibit a long list of weapons that students were not to bring to their classes, along

with curfews for evenings in the pubs and recommendations to students on how to organize their time effectively.

In England, Sir Thomas Elyot authored the first book on education written and printed in English language, the *Boke named the Governour* (1531). While still advocating the learning of Latin, he argued that English could be used just as well as Latin for scholarly purposes. The Spanish scholar and humanist Juan Luis Vivès (1492–1540) held that language is a living entity, not a static one, and that its use defines its grammar. He proposed that Latin should also be treated as a living language and not simply in imitation of Cicero. Vivès also advocated the use of the vernacular in teaching boys, even though he wrote his treatise in Latin. However, Pietro Bembo (1470–1547), in Italy, not only urged the use of the vernacular but wrote in Italian to praise the Italian language. Bembo was instrumental in establishing as the literary standard the Florentine dialect found in the literary masterpieces by Dante, Petrarch, and Boccaccio.

The Jesuits

The Catholic Church responded to its critics by calling the Council of Trent (1555) to initiate reforms from within. Its program (the Counter Reformation) depended on the education of clergy and laity. Ignatius of Loyola (1491–1556) founded the Society of Jesus, the Jesuits, using a military model: Members would be soldiers who fought for the cause of religion. The Jesuit system of education, although criticized for its elitism, has enjoyed tremendous prestige and esteem since its founding in 1540. The graduate of a Jesuit school was expected to think clearly and logically, express himself eloquently and effectively in speech and in writing, and possess erudition. The *Ratio studiorum* ('Plan of Studies') was the Jesuits' exhaustive description of their educational model. Again, it was a liberal arts curriculum, based on and devoted to the study of Latin. In the lower grammar school, students spent almost 25 hours per week on the study of Latin. Ignatius himself advocated the learning of Latin through literary texts, with Latin as both the medium and the content of instruction. Students were admonished to use Latin at all times. The use of the vernacular was strictly limited, allowed only for the purpose of learning to deliver sermons in it when necessary. Extensive teacher training, rigorous organization, and a carefully prescribed curriculum were hallmarks of the Jesuit system. Despite a lengthy and highly supervised period of training, the least prestigious position was held by the teacher of grammar.

Toward the Modern Era

The esteem with which the Jesuit system was held provided impetus for the Protestants to design a educational system that could compete with it. In opposition to the elitist nature of the Jesuits, the educational reforms proposed by Johannes Comenius included public education for all, regardless of aptitude or intelligence: "a sieve, if you continually pour water through it, grows cleaner and cleaner, although it cannot retain liquid" (Comenius, 1657: 67). A renewed emphasis on observation, experimentation, and reasoning within the scientific paradigm of the day was realized in Comenius's curriculum by a focus on direct experience and learning through the senses. He advocated that pupils study things before words and that teachers organize materials into a natural order, by presenting ideas incrementally, beginning with the known and gradually introducing the unknown, and by recycling material at increasing levels of complexity throughout the curriculum (what he referred to as "the concentric method"). He was also strongly in favor of repetition, explicit error correction, and accuracy from the very beginning: "the first attempt at imitation should be as accurate as possible, that not the smallest deviation form the model be made. . . . For whatever comes first is, as it were, the foundation of that which follows. If the foundation be firm, a solid edifice can be constructed upon it, but it be weak this is impossible" (Comenius, 1657: 199–200). Although his treatise, *The Great Didactic* (1657) contains many contradictory statements, Comenius's textbooks were his claim to international fame. His major contribution to education is his pioneering use of illustrations as an integral, not merely decorative, element in language textbooks. He, too, advocated elementary instruction in the vernacular school, followed by the Latin school.

Even the most ardent proponents of vernacular education, although advocating education for all, restricted it to the elementary level. Thus they ensured rudimentary vernacular literacy and religious education for the common people. Secondary schools (gymnasia, grammar schools, lycée, academies) were still based on the Latin model and remained the intellectual territory of the elite: boys from well-to-do families who could afford to sent them off to school to be trained in the liberal arts.

Vernacular education at the elementary level predominated in the 17th and 18th centuries, whereas the commonest type of secondary school remained the traditional Latin school. The 'naturalistic' movement in education reflected the major philosophical points of Romanticism and naturalism; namely, an emphasis on emotion as opposed to reason, an intense

interest in nature and intuition, and the belief that the closer man remains to his natural state, the more authentic he is. Rousseau (1712–1778) authored a treatise on education in novel form, *Èmile*, in which he proposed that man is by nature good, but becomes spoiled by the restraints of society and formal education. This position was in direct opposition to the notion that man is born evil and must be saved by God's grace. In line with his philosophical position, Rousseau recommended the elimination of schools altogether.

Êmile, however, influenced the ideas of Johann Basedow (1723–1790) in Germany, who established an experimental laboratory school, the *Philanthropium*. His methodology abolished rote memorization, advocating instead the use of games and a natural, immersion-type approach to teach language, even Latin: "They [the youngsters] played the 'Command' game. You see, it is this way: first, they all stand in a row like soldiers, and Herr Wolke [the teacher] is the officer who commands in Latin, and they must do everything he orders. For instance, when he says *claudite oculos*, they close their eyes tightly: or, *circumspicite*, they peer around in all directions" (Cole, 1965: 429–430) Basedow's curriculum emphasized the importance of the vernacular as the language of instruction and led, ultimately, to the elimination of the Latin grammar schools.

The Lesson of Tradition

When the connection between language and content was severed, Latin became a subject in the curriculum, like science or music, rather than its foundation. Moreover, as it no longer functioned as a means of communication – other than to read ancient texts that were readily available in translation – it served no utilitarian purpose and so could be abandoned for the sake of including more practical subjects in the curriculum. The learning of language for a practical purpose presupposes certain social and economic conditions; for example, international politics, evangelization, commerce, travel, and globalization. In the 20th century, 'living' modern languages replaced Latin in the curriculum, but interestingly, although the language changed, the teaching methodology did not. The legacy that the teaching of Latin left on the early–20th-century curriculum was one of a system of abstract grammatical rules and translation, despite centuries of reformers' advice to the contrary.

In an attempt to create successful classroom conditions for language learning, educators returned, perhaps unknowingly, to the last, most confident era of language teaching – the ideal method – in the tradition of Comenius and the Jesuits. Many methods were introduced: The Silent Way, Suggestopedia, Community Language Learning, and the Berlitz Method. Audiolingualism, a language teaching method popular in the United States in the 1960s, promised to produce competent second-language users through the use of pattern practice, with lots of repetition and absolute accuracy from the beginning. The presentation of language was so rigorously prescribed that learners were not allowed to make mistakes or form bad habits. Touted as a 'scientific' method–based partially on principles of behaviorism in psychology – it prompted schools to make huge investments in language learning laboratories, where students donned headphones, listening and repeating what they heard on tapes. Needless to say, the method did not produce the results it had promised. Unfortunately, it did produce a generation of learners who were convinced that they were incapable of learning language and a cadre of school administrators who were reluctant to invest in future language learning schemes.

The communicative language teaching movement that became popular in the 1970s emerged in opposition to the grammar translation practice of teaching Latin, behaviorist approaches, and any rigidly prescribed method. Proponents of the approach argue that learners acquire language through the interpretation, expression, and negotiation of meaning, rather than through the study of grammatical rules, translation, or mimicry. Others propose immersion education or content-based instruction to maintain the connection between language and content, in a way similar to the bilingual system in early Rome. Others seek to recover the humanist tradition and the centrality of literature in language teaching. Those who take a fully vocational approach suggest curricula designed to teach Language for Special Purposes. Rhetoric and argumentation have resurfaced in Language for Academic Purposes courses.

Consonant with a society that values scientific over humanistic endeavors, some applied linguists look for a scientific orientation to language learning. Such approaches place a renewed emphasis on providing learners with models, in the form of 'input.' Research continues to investigate the extent to which earlier is better, especially with regard to the acquisition of native-like pronunciation. Other linguists take a more philosophical approach and seek to discover universal truths about language and its acquisition, fueling the debate about whether language derives from innate faculties of the human mind or environmental factors.

Language teachers, having never heard of Quintilian, Jerome, or Vittorino da Feltre, readily embrace the role of affect in language learning to explain why

it is important to create an environment that is conducive to learning. They consult language teaching manuals that suggest the use of concrete objects, body movements, and illustrations to convey meaning and to support language development. They include authentic texts in the curriculum to provide models of real language use, although the glossing of text may take the form of hyperlinked text, rather than interlinear translation.

Whether, when, and how to deal with learner's errors remains a concern, as well as how to focus learners' attention on form, without losing sight of meaning. How much and what kind of grammar instruction might enhance learning is still under discussion.

Language teaching tradition reveals that true innovations may be rare, but when confronted with the necessity of implementing instruction that leads to successful language learning, the voice of tradition still echoes in contemporary practice.

See also: Communicative Language Teaching; Interlanguage; Romance Languages.

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Language Teaching: History

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Introduction

The essence of language is communicative activity occasioned by human contact. While social groups remained small and mobile, speech was the most effective medium through which communication could take place, and the acquisition of spoken language became a 'natural' feature of infant development with similar mental processes available for later reuse if required. Five or six thousand years ago, however, human history took a new turn with the emergence of large and permanent settlements in the great river civilizations of the ancient world including Mesopotamia, Egypt, and northern China. In these and similar instances the imposition of social discipline on large populations entailed the creation of durable sign systems to buttress the ephemeral convenience of speech. Visible symbols were etched, painted, or otherwise inscribed on stone, clay, and other long-lasting substances to create permanent texts from epics to inventories. But writing is not a 'natural' process which can be acquired through contact. It has to be taught and learned.

The writing skills trained in the early scribal schools moved beyond their immediate utilitarian function of recording and preserving factual

it is important to create an environment that is conducive to learning. They consult language teaching manuals that suggest the use of concrete objects, body movements, and illustrations to convey meaning and to support language development. They include authentic texts in the curriculum to provide models of real language use, although the glossing of text may take the form of hyperlinked text, rather than interlinear translation.

Whether, when, and how to deal with learner's errors remains a concern, as well as how to focus learners' attention on form, without losing sight of meaning. How much and what kind of grammar instruction might enhance learning is still under discussion.

Language teaching tradition reveals that true innovations may be rare, but when confronted with the necessity of implementing instruction that leads to successful language learning, the voice of tradition still echoes in contemporary practice.

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Language Teaching: History

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Introduction

The essence of language is communicative activity occasioned by human contact. While social groups remained small and mobile, speech was the most effective medium through which communication could take place, and the acquisition of spoken language became a 'natural' feature of infant development with similar mental processes available for later reuse if required. Five or six thousand years ago, however, human history took a new turn with the emergence of large and permanent settlements in the great river civilizations of the ancient world including Mesopotamia, Egypt, and northern China. In these and similar instances the imposition of social discipline on large populations entailed the creation of durable sign systems to buttress the ephemeral convenience of speech. Visible symbols were etched, painted, or otherwise inscribed on stone, clay, and other long-lasting substances to create permanent texts from epics to inventories. But writing is not a 'natural' process which can be acquired through contact. It has to be taught and learned.

The writing skills trained in the early scribal schools moved beyond their immediate utilitarian function of recording and preserving factual

information in lists and other records. New traditions of text creation grew up giving some of the languages or dialects in which they were written a special 'classical' status, which endured long after the communities which spoke them had died out, making them languages that had to be taught and learned consciously rather than acquired through personal spoken contact. The first of these classical languages was Sumerian, which, like Latin at a later date, was assimilated into neighboring cultures where the need for a prestigious literary language could not be met locally. In other cases, however, languages developed classical varieties of their own by preserving highly valued texts and protecting the language in which they were written from the effects of change wrought by colloquial speech. In the process, they created diglossic situations maintained through educational practices for centuries. Classical Chinese is a well-known example, so also are Sanskrit in India, and Arabic which, since the 7th century C.E., as the classical language of the Koranic texts has coexisted with a growing number of local varieties of colloquial Arabic in the Middle East and North Africa. Such classical varieties can of course be 'spoken' in the sense of consciously 'performed,' and like Latin they may even form the basis for a lingua franca, but they lack native speakers and therefore have to be taught to each new generation, often as a rite of passage into an educated elite.

By contrast, the teaching of 'ordinary' foreign languages for utilitarian purposes was not considered a proper use of expensive resources when they could be 'picked up' through direct contact. In Europe, for instance, Latin was the only language admitted to schools and universities for well over a millennium after it ceased to be a living tongue. It was not until the spread of printing technology after the mid-15th century that any serious demand for a reading knowledge of vernacular languages grew up along with the grammars, dictionaries, and other devices through which they could be taught and learned. Despite this increase in status, the teaching of so-called 'modern' languages did not find easy acceptance in the schools – in part because of opposition by the classicists, but also because it was not easy to find permanent teachers (most were peripatetic native speakers, i.e., temporarily resident foreigners).

Not until the 19th century did modern 'contact technologies' start to emerge which totally transformed the system of world communication and hence the teaching of languages. First was the expansion of steam-driven transport headed by railways that enabled an unprecedented number of speakers of different languages to meet face-to-face, and steamships that clamped the bonds of centralized European control ever more tightly on a growing number of colonial territories around the planet. Next came telecommunications which performed much the same functions without anyone having to move from their offices and culminated in 1901 with Marconi sending his first Morse-coded radio message ('SOS') from England to Newfoundland. More were to follow, the technologies of sound recording (1877 onward) being particularly important in the present context, until the new age of the microcomputer which *inter alia* offers facilities that have to some extent redressed the balance in favor of writing (e-mail, fax, etc.) and raised again the possibility of instant translation.

Utilitarian principles of education have become the norm and with them a reasonably secure place for the teaching of foreign languages. However, the emergence of a 'world community' on the back of mass air transport has increased the demand for a small number of 'superlanguages' with a global status, led by English. The future of many smaller languages has become increasingly precarious, but whether they can be saved through deliberate teaching–learning strategies without a growing native-speaker base is doubtful.

The Ancient World

As noted above, the first instance of organized language instruction in history was the training given in the scribal schools of the ancient world, starting in the cities of Sumer (southern Mesopotamia) and Egypt about 5000 years ago. In neither case was literacy widely distributed among the population at large; it was seen as a specific set of skills shared by qualified craftsmen who had been specially trained for the job. Scribal training was long and demanding (it included the preparation of writing materials for instance), but it was much sought after, and scribes belonged to an envied elite, a few of whom graduated to powerful positions in administrative or priestly castes.

Their geographic proximity suggests that the (slightly) earlier Sumerian work may have influenced the Egyptians. The two systems had some similarities, but technology was not one of them: Sumerian signs were incised with a wedge-shaped ('cuneiform') stylus into tablets of soft clay which were allowed to harden, whereas the Egyptian hieroglyphs and their cursive variants were inscribed on flat surfaces such as papyrus with a brush (later a pen). However, as communication systems they both started by devising pictographic images to represent words whose referents were easy to draw such as *man, woman, tree, sun*, etc. (rather like modern foreign language textbooks). These were later supplemented by more abstract ideographic symbols, but there came a point

when pictures of any kind were impossible (in writing proper names, for instance), and, more generally, there was the crucial problem of inventing new signs. A set of systematic procedures was needed that could generate a readable sign from any spoken word.

At this point, Sumerian and Egyptian diverged; in the former, syllables played an important phonological role whereas the latter was a Semitic language in which words could be written down without specifying the vowels because they were predictable from their consonantal context. Despite its linguistic inappropriacy, Sumerian cuneiform was adapted for use by neighboring Semitic languages about 2500 B.C.E., rendering the system even more difficult to teach and learn. At the same time, the prestige of Sumerian as the original written language turned it into the world's first classical language with a literature, mainly of religious texts, which was studied in the Near East for about a thousand years after the spoken language died out.

The influence of the Egyptian system was even more significant than cuneiform. It was adapted for use by other Semitic languages in the area, and in the case of at least one variant used by the Phoenicians and others living in what is present-day Lebanon the signs came to represent individual consonants rather than sequences, thus creating the first alphabet. The consequent lightening of the learning load was a crucial factor in the success of its subsequent dissemination, including in particular its adoption by the Greeks some time between 1000 and 800 B.C.E. (See British Museum (1990) for articles on above topics.)

At the other end of the learning scale from alphabets are logographic orthographies consisting of large numbers of distinctive signs ('characters'), each representing an individual word. The most famous example is Chinese, the world's longest surviving writing system, which has been in continuous use since the second millennium B.C.E. Despite its drawbacks, it is still intact and regarded as a defining feature of Chinese identity. One reason for this longevity is linguistic: logographic characters suit a key feature of Chinese, namely the dominance of monosyllabic words with no internal structure. The second and more important reason is cultural. In its classical form, the written language came to provide a unifying force in Chinese national life which helped to counteract the disunity of a large number of increasingly diverse spoken dialects. Classical Chinese grew from the decision to maintain the language used in the texts of Confucius (551–479 B.C.E.) as emblematic of a high written culture sustained by a formidable system of competitive written examinations which controlled entry into the rarified circles of imperial administration. The classical language retained its power in this way until the foundation of the Republic in 1911 when moves were made to replace it with a new standard based on the northern (Beijing) dialect known since the 1949 revolution as *putonghuà* ('common language'). A new alphabetic orthography called *pinyin* has had only limited success, however, since its introduction in the 1950s.

Literacy did not make much progress in the ancient world, possibly because the early nonalphabetic systems were too difficult for most people to learn, encouraging the growth of exclusive scribal monopolies that came to exercise considerable political and religious control. As an everyday skill, it was undoubtedly useful for listing, labeling, and the like (Linear B, an early Greek orthography deciphered in the 1950s to much public acclaim, turned out to have been used for little else). There was also a demand from the rich and powerful for monumental inscriptions to commemorate triumphs of various kinds, but as far as most people were concerned, reading had little interest. Communication and fun were well enough supplied by spoken language – there was no need for a replacement.

The Classical World

Greece: c. 800–100 B.C.E.

Some time in the early centuries of the first millennium B.C.E., the Greeks made their second and successful attempt to acquire a system of writing by adapting the consonantal alphabet they saw being used by the Phoenician traders of the Levant. They immediately seized on the advantage of having a small number of signs to learn, but realized that for Greek they would need to represent vowels and they used otherwise superfluous Phoenician signs for this purpose.

Nobody knows exactly when or where this transaction took place, but it is generally agreed that by 800 B.C.E. the Greeks had an alphabet, and the relative ease with which it could be learned helped it to make an impact in different parts of the country. Greece did not suffer from the restrictive practices of an intolerant priestly caste or other forms of scribal protectionism (Goody, 1987). In fact, it was uniquely Greek that an early priority for the new technology should have been to provide a written version of the Homeric epics which were already familiar in their oral storytelling guise. The resulting text (completed about 700 B.C.E.) effectively defined Greek identity for the future and functioned as the indispensable foundation for a groundbreaking approach to education.

As Athens moved toward the democracy for which it was to be famous in the 5th century, a system of education was essential to prepare the future rulers

(i.e., all freeborn males) to participate fully as responsible citizens and to recognize that citizenship brought duties as well as privileges. If 'ordinary' men were to take part in the governance of the city and the dispensation of justice, the people had the right to expect from them a maturity of thought and expression made evident through the effective control of spoken language in the public arena.

The learning of eloquence began in the schools whose prime responsibility was the teaching of grammar, i.e., correct spoken and written Greek, to older children. Later, as young adults, they undertook advanced training in rhetoric and dialectic (the logical structure of argument), building up the three-part curriculum that, as the 'trivium,' was to underpin schooling in medieval Europe. This intellectual continuity also owed much to the writings of Aristotle (specifically on rhetoric and dialectic, for which he devised the syllogistic structure).

For the Greeks, learning grammar meant studying their own language (they rejected foreign languages as mere 'bar-bar' ('barbarian') noises), and it was not an analytic process of taking sentences to pieces. It was rather an investigation of the way language was used by writers of repute: 'grammar is the practical study of the normal usages of poets and prose writers' as Dionysius Thrax (c. 170–190 B.C.E.), a teacher of Greek as a foreign language in Alexandria, said in his *Tekhne grammatike* ('The art of grammar,' c. 100 B.C.E., Kemp, 1986: 346).

The basic pedagogical strategy was mimetic, i.e., the absorption by memorization of substantial amounts of text as the basis for the production of appropriately elevated discourse. The first task was, therefore, as Thrax put it, to develop 'skill in reading (aloud) with due attention to prosodic features' (Kemp, 1986), a priority which was less strange than it would be today (our preference for silent reading derives from medieval monasticism). But there was also a practical reason, namely the correct identification of words and longer syntactic units in texts which were written in *scriptura continua*, i.e., without word separation, (Coulmas, 1999: 455–456). Try, for example, the following English sentence; it should prove helpful to read it aloud using appropriate rhythm and intonation ('prosodic features'):

> 'onereasonformemorizationistobuildupapermanent-mentalstoreoftexts' (Coulmas, 1999: 25).

To make things even more difficult, Greek texts were sometimes written in lines running left-to-right and right-to-left alternately (so-called *boustrophedon*: lit. 'ox-turning').

Teaching grammar from texts rather than from rules ('inductively' rather than 'deductively,' to use more recent terms) reflected the lack of analytic grammars, a priority which needed to be revised when Alexander's acquisition of an empire in the Near East created a demand for Greek as a foreign language. Dionysius Thrax's *Tekhne grammatike,* already referred to above, contains an account of the famous eight 'parts of speech,' and it has been called the world's first pedagogical grammar, but there is some doubt about the historical status of this feature of the book (Kemp, 1986; Law and Sluiter, 1995/1998; Robins, 1997). With so many texts lost in whole or in part, all we know for sure is that the direction of change at this time was toward a greater concern for the teaching of linguistic form, and that this trend continued under the Romans for whom Greek was a second language which every educated Roman was expected to learn.

Rome: c. 100 B.C.E.–400 C.E.

By the time of Dionysius Thrax, the Romans were in full control of Greece itself and were moving to take over the entire Hellenistic world in the Near East (an aim consolidated by their victory over Cleopatra at Actium in 31 B.C.E.). In a gesture of tribute unprecedented among conquerors, the Romans adopted Greek culture as their own and consciously modeled themselves on their predecessors. As a result, education in Rome was a bilingual system in which precedence was given to the study of a foreign language, a pattern repeated later with Latin in Europe, but in a more extreme form. There was in consequence a demand for grammars of both languages, and many were produced though few have survived, and even fewer are complete.

In the present context, the most influential surviving document from the Roman period is the 12-volume *Institutio oratoria* ('Education of an orator') by Quintilian (Marcus Fabius Quintilianus, c. 35–100 C.E.), the leading rhetorician of his time. The book deals in detail with the making of an orator from early childhood onward. Concern for good language, Quintilian argued, began in the home and parents should take care to bring children up speaking Latin correctly and well. Learning Greek was the first major priority, though the time devoted to it should not be excessive. Acquiring it from a native speaker at home before starting school gave children a clear advantage, and educated Greek slaves were regularly purchased for this purpose, often with their freedom guaranteed when the family no longer needed their services.

Formal schooling, a privilege open only to boys, typically began about the age of seven. The first task was learning to read and write (Quintilian was insistent on the value of an elegant and well-practiced hand). Practice was also the key to accurate and fluent reading following the 'method of syllables,' i.e., 'sounding out' syllables of increasing length and building them into words, an approach which remained the norm in Europe until quite recent times. Once basic literacy skills had been acquired, the child (now aged about twelve) was ready to leave his so-called *literator* and enroll with a *grammaticus* who taught him Greek and Latin grammar.

The aims of language education in Rome followed the Greek example, namely the development of effective skills in public speaking based on the correct use of language strengthened by a detailed knowledge of the great writers. As with the Greeks, much of the training took the form of the memorization and recitation of substantial amounts of text. The main difference, however, was the need to learn Greek as a foreign language, a task which entailed the formal analysis of sentences, i.e., the eight 'parts of speech,' which are discussed in some detail in Quintilian I.

After leaving school, the young adult could continue his education with a *rhetor* such as Quintilian himself whose principal objective was to train him how to speak effectively in contexts such as the law courts or the Senate house (the Romans did not share the Greek interest in disputation, so dialectic was less popular). The teaching methods were based on the study of models (Cicero, etc.) followed by specially constructed improvisation exercises. All the emphasis was on simple but well-delivered rhetoric and the avoidance of self-indulgent oratorical ornamentation.

Among the few language teaching texts that have survived are portions of *De lingua latina* ('On the Latin language') written around 45 B.C.E. by Marcus Terentius Varro (116–27 B.C.E) and a pedagogical grammar of Greek from the 2nd century C.E. written by Apollonius Dyscolus. It has a syntactic slant which it seems influenced Priscian the great Latin grammarian of the 6th century (see below).

Eventually, just as the empire was about to collapse, there appeared what must be the most famous textbook in language teaching history: the two-volume *Ars grammatica* ('The art of grammar') by Aelius Donatus, a teacher of Latin in Rome about 350 C.E. (Law, 2003: 4.6). The first volume, the elementary *Ars minor* ('Shorter grammar'), became synonymous with 'teaching grammar' for more than a thousand years. It is short and discusses each of the eight 'parts of speech' in turn following a catechistical design ('What is a noun?' 'It is a part of speech which has case . . .' etc.) plus a few rather sparse examples. The more advanced *Ars maior* ('Longer grammar') also covers pronunciation and takes up specific problem issues. The question-and-answer format of the *minor* allowed the teacher to test ('hear') what had been learned in a systematic manner. A typical school classroom contained all the pupils regardless of level, which meant that they had to work on their own until summoned by the teacher who repeated the questions in the book. The consequences of error were usually unpleasant, and the best way of avoiding painful failure was by rote memorization, with or without understanding.

Donatus, it should be said, was the last representative of imperial Latin and by a curious coincidence he became the teacher of St Jerome (c. 342–420 C.E.) whose translation of the Bible (the so-called 'Vulgate') became the first major work in the patristic Latin which replaced it and came to dominate the educated culture of the Middle Ages.

The Medieval World

The adoption of Christianity as the official religion of the Roman Empire in the 4th century C.E. provided Western Europe with an intellectual coherence and a common language that sustained it during the waves of (often violent) change between 400 and 600 C.E. which swept the ancient world into history. Not only did Latin itself survive, albeit in a modified form suited to its new patristic role, but it spawned a set of vernacular dialects influenced by contributions from incomer languages such as Frankish. Only in the province of Britannia (which excluded the Celtic lands) was the imperial language replaced entirely by the speech of the Germanic tribes that over-ran it after the withdrawal of the legions. Although the influence of Latinate Rome returned eventually (596 C.E.), the linguistic 'distance' between Latin and both Celtic and Anglo-Saxon gave teachers from the British Isles (sometimes called 'insular' scholars) a special insight into many of the problems faced by elementary learners.

The history of language and education in the Middle Ages can be divided into three broadly defined phases. The first (c. 400–800 C.E.) was a postimperial period which, despite political instability, saw the establishment of a monastic system that gave the church a place of refuge and nurture for a variety of purposes including schooling. This process was complete by the time of Alcuin and Charlemagne in the late 8th century.

Phase two (800–1200 C.E.), between Charlemagne and the so-called '12th-century renaissance,' was notable for two developments. The first was the transition to a more secular society during which education

left the monasteries and began to put down roots in the towns and cities. The second was the growth of new professional studies, but always with Latin as the medium of instruction, which reinforced its unifying role across the continent. Eventually, specialist centers emerged, the so-called 'universities,' the first of which were founded in Bologna, Paris, and Oxford about 1200.

During the third phase (1200–1500), the universities (particularly Paris) encouraged a revival of interest in the ideas of Aristotle stimulated by new translations of his work into Latin. Their impact on linguistic studies focused on the relationship between language and the outside world, which was expressed through various 'modes' of meaning (*modi significandi*, see Law, 2003: chapter 8). Eventually, however, this excessively cerebral scholasticism provoked a new humanism which *inter alia* stimulated a more extensive use of vernacular languages, most controversially in the translation of the scriptures. It might have been expected that this passion for 'real life' would reduce the importance of Latin or even extinguish it altogether. However, the opposite happened: the medieval world disintegrated, but the Latin language rediscovered its classical roots and became the leading force for the study of (pagan) literature.

Phase 1: From Donatus to Alcuin (c. 400–800 C.E.)

At a time when the single most stable cultural feature of medieval Europe was the Latin language, learning it was both an achievement in itself and the gateway to further advancement (in fact, to be literate (*literatus*) meant to be able to read Latin).

We have already noted the appearance of Donatus's *Ars grammatica* about 350 C.E. The analytic approach it adopted underlined the shift of pedagogical priorities from literature to language which was characteristic of the postimperial approach to the teaching of Latin as a foreign language. A century and a half after Donatus, this trend was amplified in the work of Priscian, a teacher of Latin from North Africa who worked in Constantinople about 500 C.E. (see Law, 2003: 4.10). His students were mainly speakers of Greek, and their learning priorities were reflected in the design of his 18-volume study, *Institutiones grammaticae* ('the teaching of grammar'). Most of the work deals at length with accidence, but it ends with two books devoted to syntax. Initially, it was too detailed to gain widespread popularity, but, after winning the support of scholars during the so-called 'Carolingian renaissance' in the 8th century, it was accepted as a key work for advanced learners (McKitterick, 1994).

Grammar was not just a 'useful subject,' however. It was the foundation of the so-called 'liberal arts' curriculum which, as we have seen, had its roots in classical times but which was now systematized into a two-stage framework of seven subjects starting with the language-based 'trivium' (grammar, rhetoric, and dialectic) followed by the more advanced number-based 'quadrivium' (arithmetic, geometry, astronomy, and music). Apart from grammar and elementary arithmetic, most of these subjects were beyond the scope of the schools, but they eventually formed the basis for the work of the universities (12th century onward). The intellectual groundwork for the approach was laid by St Augustine about 400 C.E. and expanded by scholars such as Boethius (c. 475–524 C.E.), who devised the term 'quadrivium,' and Cassiodorus (c. 490 to c. 580 C.E.), an early leader of the monastic movement whose *Institutiones* (c. 550) set out the curriculum in some detail. A little later came St Isidore of Seville (560 to 636 C.E.) who devoted the first three books of his 20-volume *Etymologiae* to an account of the seven arts.

The culmination of this first phase of medieval language education came with the work of an Englishman, Alcuin of York (c. 737 to 804 C.E.). In 781, he was hired by Charlemagne as a special educational advisor and based in a monastery in Tours where he founded a school. Alcuin's writings covered all three subjects of the trivium (his work on grammar contributed to the renewed interest in Priscian, for instance), but like many in the early church he had a special interest in dialectic. Dialectical reasoning encouraged the exploration of links between logic and theology, for instance, whereas rhetoric was less relevant in an ecclesiastical context that favoured disputation, ritual, and prayer rather than extempore preaching.

Phase 2: Latin and the Vernacular Languages (800–1200 C.E.)

After the time of Charlemagne, there were two parallel linguistic processes at work which ultimately defined the scope of the school curriculum in early modern Europe. The first was the expansion and diversification of the role of Latin as education became part of a wider and more secular community. Schools for children were only one instance; there were also specialized centers for adult students which provided professional studies in subjects such as law, medicine, and administration. From the late 12th century onward, these centers formed loosely structured societies of teachers and students called 'universities' (*universitas societas*) which attracted customers from many different countries. Latin was therefore needed both as a medium of instruction across a broadening curriculum and as a spoken lingua franca in a polyglot community.

The second strand of change was the new maturity of the vernaculars, their defining moment being the appearance of major literary texts, some of which, like the Homeric epics of old, had their origins in oral storytelling. Among the earliest were *Beowulf* (Old English) and the *Chanson de Roland* (Old French), both committed to writing before 1000 C.E., and they were followed by works in other languages, culminating in Dante's *Divina Commedia* (1307–1321). But these were still early days: the vernaculars did not yet offer a serious educational alternative to Latin. There were, however, a few examples of Latin grammars written in the students' mother tongue, including one in Old English by Aelfric, Abbot of Eynsham (c. 955 to c. 1020) who also composed a bilingual glossary for learners, and a famous *Colloquium* (dialogue) with an interlinear translation to help the teacher (pupils did not normally possess personal copies of texts). For the most part the teaching of Latin followed the well-trodden paths of Donatus and Priscian, but there was an interesting pedagogical novelty in the shape of grammars in verse, including the widely used *Doctrinale* of Alexander of Villedieu (c. 1200).

So far as learning the vernaculars themselves was concerned, it was assumed that they would be acquired through spoken contact as and when they were needed, and any teaching would be informal. Eventually, a few self-study manuals (*manières de langage*, Lambley, 1920) started to appear, but most international travellers had to get by in some form of Latin or invent a private lingua franca of their own.

Phase 3: The Later Middle Ages (1200–1500)

Intellectual endeavor in the later Middle Ages took a special interest in exploring the relationship between rationality as represented in, for instance, the newly 'discovered' works of Aristotle and spirituality as manifest in Christian theology. The result was a complex system of categories which drew attention to links between ways of understanding (*modi intelligendi*) and means of expression (*modi significandi*). Important though the *modistae,* as they were called, were in higher educational circles, their work had little direct influence on the teaching of Latin except perhaps at a very advanced stage.

Eventually, however, the rarified atmosphere of modistic theory reinforced the view that the study of language had turned into a formalistic and abstract cul-de-sac. There was therefore an urgent need to replace the 'artificial' patristic Latin of the church with the 'genuine article' derived from the great classical authors, pagan though they may have been, and by the 14th century the search was on for copies of neglected texts, conducted by scholars such as Petrarch (1304–1374) and Boccaccio (1313–1375).

At the same time there was a growing interest in learning classical languages other than Latin, including both Greek and those of the Near East, Arabic and Hebrew. A major step forward was a beginners' book for Greek called *Erotemata* ('Questions') in a question-and-answer format based on Donatus (Law, 2003: 223–227). Later, Western teachers started to visit Constantinople in order to acquire Greek at first hand, and after the fall of the city to Islam in 1453, native speaker refugees fled to the West.

The pedagogical implications of these changes were far-reaching. Grammar remained the foundation discipline in the schools, but the shift away from the medieval concern with dialectic was accompanied by a broader, text-based interest in classical literature which reinstated the importance of rhetoric. Initially, change was slow, partly because of the familiar problems of textual copying, but, with the arrival of printing in the mid-15th century, texts of every kind started to circulate in increasing numbers, facilitating a range of choices which had not been available before.

The Early Modern World

So far as language teaching in schools is concerned, the early modern period brought little structural change until the late 18th century. Even in Protestant countries where the rejection of Latin represented a major change of church practice, it continued to dominate the school curriculum, with the occasional addition of Greek, and modern languages were ignored if not deliberately excluded. As we have seen, there were two major reasons for the survival of the classics, apart from inertia: first, there was the use of Latin in the universities, and second, the influence of Renaissance humanism which encouraged the reading of classical literature. In this connection we should note that the newly created printing industry freed the reading community from the editorial priorities of the scriptoria. By the 1550s, the output of classical literary texts had far outstripped that of formerly dominant religious works (Febvre and Martin, 1984: 264; Eisenstein, 1993).

Printing also facilitated the production of grammars and other works (dialogue manuals, glossaries, etc.) designed to help adult learners to cope with an increasingly polyglot world of 'national' languages. The most impressive was John Palsgrave's grammar of French, *Lesclarcissement de la langue francoyse* (1530), but there were many more modest contributions including James Bellot's *English Schoolmaster* (1580), the first manual expressly designed to teach

English as a second language. The customers were Huguenot refugees in London, some of whom opened schools to teach French to English children (Lambley, 1920; Howatt, 2004).

For most children, however, 'school' meant 'Latin,' and 'Latin' continued to mean 'grammar,' though in England there was at last a replacement for Donatus. Known informally as 'Lily' (after one of the authors) or the 'Royal Grammar' because its adoption was made mandatory by royal proclamation (1540), it was called *A short introduction of grammar* and consisted of an introductory account in English of the parts of speech (by John Colet) followed by a syntax in Latin (by William Lily). For more fortunate students, however, Latin instruction sometimes included the study of literary texts, and the best-known pedagogical account came from Roger Ascham (1515–1568) in his *Schoolmaster*, published posthumously in 1570. Ascham had moved in high royal circles and his book was designed for the education of the courtly elite who wanted to develop a good literary style and elegance of expression. It became famous for a teaching method known as 'double translation' in which the learner translated the Latin text into his mother tongue and, after carefully comparing the two texts, the original Latin one was removed and he had to recreate it from his English translation. An important feature of this technique was the insight it provided into the workings of the mother tongue at a time when the formal study of the vernacular was unknown.

Life for the average early modern grammar school pupil (aged between 8 and 14) was as dreary and painful as it had ever been: nothing but the memorization of grammar rules with no sign of humanism in any sense of the term. '[I had] miserably lost the sweetest spring-time of life … on scholastic trifles,' complained the great educationist Jan Amos Comenius (1590–1670) in 1636 in his *Great Didactic* (Sadler, 1969: 6). This sentiment was echoed later in the century (1693) by John Locke (1632–1704) who described the child as 'chained to an oar, seven, eight or ten of the best years of his life to get a language or two [which could] be learnt almost in playing' (*Some thoughts concerning education,* 1693, cf. Axtell, 1968: 254).

Both men suggested radical reforms which had some impact among more enlightened teachers. Comenius for instance attempted to construct a graded set of textbooks designed to provide a coherent curriculum suited to the growing child (taking him 'from the known to the unknown'), but the only text to find much success was his famous illustrated book for beginners called *Orbis Pictus* (1658). Locke suggested a 'natural' approach to teaching foreign languages, including Latin, by conversational methods ('talking it into children'), but his proposals were really aimed at well-to-do families who could afford to hire private tutors rather than use the moribund grammar school system. In the second half of the century, advanced educational opinion influenced by Jean-Jacques Rousseau's *Emile* (1762) even called for the abolition of *all* language teaching to preadolescent children (including mother-tongue literacy), claiming that it encouraged a form of empty verbalism which caused positive harm by obstructing the child's direct experience of the natural world. These ideas were too extreme for Enlightenment Europe, but they proved attractive to more romantic 19th-century reformers such as Pestalozzi (1746–1827) and Froebel (1782–1852).

Outside the schools printing transformed the fortunes of the vernacular languages in at least two fundamental ways apart from the obvious expansion of the number and range of available texts, (see Eisenstein, 1993). First of all it encouraged the processes of standardization, which were already in progress for sociocultural reasons, making it possible eventually for the vernaculars to be taught alongside (or instead of) Latin in school. Spelling was the obvious first target, but the process spread to all aspects of language. Some of the major European languages, e.g., French and Italian, were taken over by national 'academies' which issued directives on grammatical correctness and stylistic propriety. Others such as English avoided this fate but developed a standardized form through public support for 'authoritative' texts, including Samuel Johnson's *Dictionary of the English language* (1755), Robert Lowth's anonymous *Short introduction to English grammar* (1762), and John Walker's *Critical pronouncing dictionary* (1791).

Second, there was an increased interest in learning foreign languages, particularly for reading purposes. Initially, grammars of minority languages such as English were in Latin (e.g., John Wallis (1653) and Christopher Cooper (1685), both called *Grammatica linguae anglicanae*), but locally produced bilingual works grew in number during the 18th century. Because there were few teachers of modern languages (they all taught Latin), there was a market for 'compendious' self-study manuals which contained everything: a grammar, including guidance on spelling and pronunciation, dialogues and reading texts, glossaries, practical tourist information, and so on. The need for examples of spoken language (dialogues such as 'at the inn,' etc.) stemmed from an expansion of international travel which had become safer by 1750, if not more comfortable, and increasing numbers, mainly of wealthy Britons, set out on the so-called Grand Tour to Italy by way of France. Because

the Tour could take months or even years to complete, learning a modicum of French and/or Italian was essential.

Working through a language manual was possible for well-educated gentlemen who were familiar with grammar from school, but it was too demanding for most children who needed a graded course of instruction. Eventually, in 1783, J. V. Meidinger published *Praktische französische Grammatik* to teach French to speakers of German. It offered a new method which was much better suited to beginners: the grammar was divided into digestible amounts and presented in a step-by-step fashion along with short bilingual lists of new words. In addition, there were exercises consisting of sentences to translate into and out of the foreign language. This design, which eventually became the norm both for school textbooks and adult self-study manuals, is known to us as the 'grammar-translation method,' but this was a label invented by its detractors in the late 19th century. Modern languages were ready at last to enter the world's classrooms.

The 19th Century

As noted in the Introduction, the 19th century was a period of technological innovation with far-reaching consequences for international communications (transport, mail, telegraph, telephone, etc.) and so for the teaching and learning of languages. Adult learners adjusted to the new situation, but it took a long time for the practicalities of real life to have any serious impact on secondary school language classrooms which continued to be dominated by grammar, literature, and 'the exams.'

Within Europe, for instance, mobility on the railways increased the likelihood of face-to-face contact with foreign language communities and hence a growing need to learn how to speak their languages. Outside Europe, there were two main developments. The first was the growth of European colonialism which tightened its stranglehold with the development of fast modern steamships. In the British Empire (outside India which was a special case), there were attempts by the colonial authorities to provide a limited amount of organized schooling on the model of elementary education at home.

English was normally the medium of instruction but attempts to teach it 'as a foreign language' were out of the question. The only model was the grammar-translation method, and there were no grammars or dictionaries. Schooling began with 'Reading' and 'Writing' and not 'English,' which was a fourth-year subject that included 'parts of speech' and 'literature' just as it did in London. Schools were also run by missionary societies, particularly after the end of the infamous slave trade, and many broke new ground by providing orthographies for their pupils' mother tongues in order to prepare materials for the teaching of reading, but they did little else.

Second, there was a steady increase in the importance of the United States, particularly later in the century when it became the destination for large-scale emigration, which created new needs for English, both among those who went to America and those who stayed behind but wanted to visit their families. As a new immigrant from Germany himself, Maximilian Berlitz (1852–1921) was among the first to realize that such students needed completely different teaching methods to help them to speak a foreign language, and he founded his first language school in Providence, Rhode Island, in 1878 to meet this need.

The 19th century was also a time of intellectual exploration, with a new interest in applying the aims and methods of the sciences to the study of human affairs including language and its history. The science of phonetics was an early manifestation of this interest, and its impact on language teaching from c. 1880 onward was considerable.

Despite all these new needs and opportunities in the outside world, formal education took little notice. New moves in elementary education created improved levels of literacy, but there was no role for languages other than the mother tongue. Foreign languages were for the elite only, and Latin, despite losing its utilitarian role in the universities, maintained its position as a high-prestige subject with massive snob appeal. Modern languages by contrast had to fight for recognition, and the only way they could achieve this was by aping the classics and teaching grammar, translation, and worthy literature. It was not until the last two decades of the century that anybody took the spoken language seriously.

The Grammar–Translation Method

As we saw above, the so-called 'grammar–translation method' had been developed by Meidinger with school pupils in mind, and his approach was widely imitated, e.g., by J. G. C. Fick (1763–1821) who wrote the first course in English for speakers of German in 1793, and by Karl Ploetz (1819–1881), the best-known language textbook writer in continental Europe. By the mid-1800s grammar–translation had become the standard secondary-school method for both modern and classical languages, and it was particularly well-suited to the priorities of written examinations. It was also adopted by the growing adult market which developed a new 'series' approach to textbook publishing. An author devised a 'template'

(which he called his 'method') and then adapted it to an unlimited number of different languages. The best-known examples were Franz Ahn (1796–1865) whose 'new, practical, and easy' method first appeared in 1834, and, a year later, the even more famous H. G. Ollendorff (1803–1865) who promised to teach a new language in six months. Their customers were for the most part self-improving adults often with a practical need for a foreign language, but schoolteachers regarded the books as 'too easy,' and they strongly disapproved of making 'keys' available to check the exercises.

When the grammar–translation method started, it lived up to its aim of simplifying language teaching by presenting one or two new grammar rules plus a short vocabulary list in each lesson and following them with translation exercises ('exercises' were a novel development).

Unfortunately, the simplicity of the early courses was not maintained as the century wore on. The impact of exams with their 'unseen' translations packed with tricky linguistic minutiae encouraged teachers to include 'everything' in case it 'turned up,' and the textbooks followed suit. The reputation of the method was seriously damaged as the grammar rules became more complex, the lists of 'exceptions' longer, the vocabulary more esoteric, and the exercises sillier, e.g., 'The pen of my aunt is in the garden of the Dutchman' (parodied over many years).

Inadequacies of this kind prompted many individuals to put forward new ideas for reform (see Howatt, 2004: chapter 13 and Howatt and Smith, 2000). Among the best-known were Claude Marcel's (1793–1876) proposal for a 'reading first' approach in *Language as a means of mental culture* (1853) and an interesting but rather limited suggestion by François Gouin (1831–1896) that language lessons should be organized around a 'series,' i.e., a piece of sequential behavior such as opening the window (*L'art d'enseigner et d'étudier les langues* ('The art of teaching and studying languages') (1880). None of these 'bright ideas' made much headway. What was needed was a new methodology which was well-grounded in theory and sensible in practice, and one appeared in the form of the so-called Reform Movement (see Howatt and Smith, 2002).

The Reform of Language Teaching

The key feature of the Reform Movement, which began in the early 1880s, was the historic decision to give spoken language educational precedence over literature. Signs of change began to appear as phonetics gained greater acceptance in the academic world and younger language teachers saw it as a practical starting-point for pedagogical reform. This early link with linguistics was fostered by leaders of the Movement across Europe. In Germany, for instance, there was Wilhelm Viëtor (1850–1918) whose pseudonymous pamphlet *Der Sprachunterricht muss umkehren!* ('Language teaching must change direction completely!') started the ball rolling in 1882, in Denmark Otto Jespersen (1860–1943) who provided the best account of the classroom implications of the Movement in *How to teach a foreign language* (1904), in France Paul Passy (1859–1940) one of the founders of the International Phonetic Association (a lasting monument to the success of the Movement), and in Britain, Henry Sweet (1845–1912) whose *Practical Study of Languages* (1899) became an applied linguistic classic.

The reformers also insisted on two further classroom principles: the use of sensible connected texts (no more silly sentences), and the 'inductive' teaching of grammar by drawing it out of a close study of the texts. In addition, bilingual words lists were rejected, and translation, particularly into the foreign language, was to be avoided as far as possible. It is important to realize that the Movement appealed to secondary-school teachers, i.e., nonnative speakers of the languages they were teaching, but phonetics provided the help they needed to put speech first.

The translation issue came to dominate a similar but less academic new approach called the 'direct method,' which was popularized, but not invented, by Maximilian Berlitz in his schools in America and later in Europe (see Howatt and Smith, 2000: V). The Berlitz schools were intended mainly for adults with limited practical needs. They set out to develop a conversational approach which was enhanced by the presence of a native speaker teacher who did not know the students' mother tongue, and if he did, he was required to deny it. The 'don't translate' motto became the trademark of the method and virtually all the classwork was oral. If there was a theory behind this, it was a rather simplified version of the view that acquiring a second language was essentially the same as acquiring the first – hence the need for conversation, the absence of grammar and translation, and a delayed start to reading and writing.

The 20th Century

During the 20th century, education around the world was transformed, and language teaching along with it, as schooling in basic literacy became universal in principle if not always in fact. More generally, education ceased to be preoccupied with the grooming of an elite and shifted permanently to a utilitarian philosophy in which the curriculum was judged in terms

of its relevance to the perceived and potential needs of the whole community. The classics were largely replaced in school by major foreign or second languages and, given the structure of the world order that emerged after 1945, it was inevitable that English would become the first choice in many if not all instances. The following account inevitably reflects this bias.

The Growth of English Language Teaching (ELT)

As the language of the British Empire, English had spread around the globe in the previous three centuries, but in colonial schools it was still perceived as a 'quasimother tongue,' and until the 1920s teachers used methods and materials originally designed for elementary schools in the United Kingdom. Provision, never generous, was supplemented by missionary schools of various denominations which devoted their energies to teaching literacy in the local mother tongues. In Europe by contrast, English had taken its place in the secondary schools as a foreign language alongside French and/or German, and it had been at the cutting edge of the 'applied linguistic' reforms initiated by the Reform Movement, particularly in the teaching of pronunciation. It was, however, only in the adult sector that the purely utilitarian objectives of Berlitz and his imitators were followed in direct-method conversation classes.

These two strands of 'reform' and the 'direct method' came together in the work of Harold E. Palmer (1877–1949) who taught English along Berlitz lines in Belgium from 1902 until the German invasion in 1914. He was then forced to return to London where he renewed an earlier contact with Daniel Jones (1881–1967) who had since become the head of the Phonetics Department at London University and was about to publish his famous *English pronouncing dictionary* (1917). The two worked together for nearly seven years (1915–22), during which time Palmer published a series of books, including *The scientific study and teaching of languages* (1917) and *The principles of language-study* (1921), which established a new approach to practical language pedagogy called the Oral Method, combining his classroom experience with the insights of modern phonetics (see Smith, 2003: II).

After 1918, a significant straw in the postwar wind was the decision of the Japanese government to reform English teaching in order to promote greater spoken fluency. They approached Palmer who accepted a position as a special advisor starting in 1922. The following year he was appointed as the Director of an Institute for Research in English Teaching (IRET) (1923–1936), where through both research and materials development, he helped to create a specialized profession which came to be known as 'English language teaching' (ELT) after the founding of a journal of that name in 1946 under the editorship of a close Tokyo colleague, A. S. Hornby (see Howatt, 2004).

A second interwar development was the emergence of 'English as a second language' (later, ESL) to refer to educational contexts (initially colonial) where the language played a significant role in the learner's environment. The phrase was first used in a research project in Bengal (modern Bangladesh) in the early 1920s which investigated the notion that reading was a more useful teaching objective than speaking in countries such as India. The key argument in the project report (1926) by the director Michael West (1888–1973) was that education should be bilingual, i.e., the mother tongue should come first, but an international language such as English had a useful 'secondary' role to play, particularly in science and technology. This view grew in influence and after decolonization in the 1950s and 1960s it became the norm in countries where English was retained alongside the national language(s). 'Second language' was also used in 'English-speaking countries' such as the United States, the United Kingdom, etc., to characterize the role of English among members of minority language communities.

West's report also contained practical suggestions for teaching materials that stressed the importance of vocabulary control, extending a research theme that was also present in the work of Palmer and others in Britain and America. In 1936, the investigation culminated in a so-called 'general service list' of the 2000 most useful words for reading materials in ELT (not published until 1953). There was also an ambitious attempt by C. K. Ogden (1889–1957) to create an 'alternative language' called Basic English (1930) by using only 850 words of ordinary English. It made a useful contribution to wartime teaching, but its long-term appeal was limited (see Howatt, 2004; Smith, 2003: V).

The third and final thread in the development of ELT was the rising demand for English as a foreign language (EFL) in the United Kingdom itself during the 1930s, mainly from refugees from war-threatened Europe. After 1945, there was a pause until the1960s when TEFL began to grow fast.

Out of these influences postwar ELT developed a recognizable approach of its own which stressed the importance of carefully graded texts containing the new grammar patterns, a limited vocabulary of frequent items and an oral method which presented the new items in 'situations' that made the meaning clear without having to translate too much. It was

assumed that, with minor modifications, the same course could be used successfully by all learners. In this it was influenced by ideas in linguistics and psychology (see below), which came to be called 'applied linguistics' in the United States in 1948. When these disciplines changed direction in the 1960s, language teaching followed suit.

Language Teaching and Applied Linguistics

In the Reform Movement we saw the first attempt to apply ideas from the new linguistic and behavioral sciences, a trend that continued to grow as the academic study of these subjects took root, particularly in the United States where a strong theoretical foundation was laid down between the wars. The chief linguistic characteristic was the collection and description of data, particularly of Amerindian languages, while psychology focused on basic learning processes such as habit formation. Together they created a 'structural' tradition that had a direct impact on language teaching during and after World War II.

In 1943, for instance, the United States launched a large project called the Army Specialized Training Program (ASTP, see Angiolillo, 1947) to train spoken foreign language skills. Following the new ideas, they created a drill-based methodology designed to habitualize linguistic structures, or 'speech patterns.' When adapted into mainstream language teaching by Charles C. Fries (1887–1967) at the English Language Institute at Michigan, it became known as the Oral, later Structural, Approach (Fries, 1945). The term 'applied linguistics' was coined in 1948 and with it classroom techniques such as 'pattern practice,' which were well-suited to the technology of the language laboratory, that became popular in the early 1960s. With the new technology 'structural' methods became known as 'audiolingual.'

During the 1960s, applied linguistics shifted its attention from 'microlinguistic' matters such as identifying phonological and grammatical patterns to a broader concern with the way language is acquired and how it is used in social contexts. Language acquisition was a key issue with the generativist school of linguistics associated in particular with the work of Noam Chomsky from 1957 onward and in particular his controversial claim that human beings are innately endowed with the capacity to acquire language, the obvious question in the present context being whether this process can work more than once. By the 1980s, there was a substantial body of theory and research into 'second language acquisition' (SLA), which influenced language teaching by emphasizing the importance of natural language use in, for instance, comprehension (Krashen, 1985) and problem solving (Prabhu, 1987). The latter proved influential in stimulating interest in 'task-based learning' in the 1990s.

Alongside psycholinguistics grew the development of sociolinguistics which aimed to account systematically for language variation, in particular the relationship between the standard (written) language as taught in the schools and the dialectal variability of everyday speech in the outside community. This concern was reflected in a shift in foreign language pedagogy away from formal linguistic patterning to the functional uses of language in everyday social life. Out of this grew the dominant teaching methodology of the late 20th century: 'communicative language teaching.'

Communicative Language Teaching (CLT)

The starting point for CLT is the use of language in communication – who uses it, how, when, etc. – and the way that these variables are reflected in the linguistic choices people make when they talk, write, etc. An influential contribution to the early discussion of this issue was a series of lectures by the philosopher J. L. Austin (1911–1960) published as *How to do things with words* (1962) in which he proposed that utterances should be regarded as 'speech acts' (suggestions, requests, questions, etc.) which controlled the development of social discourse. When these new functional categories were added to more traditional semantic notions (location, duration, etc.) in the 'notional–functional approach,' they provided an extra dimension to language teaching which was generally welcomed (Wilkins, 1976).

The best-known instance of CLT in this framework was an international project called the Threshold Level funded by the Council of Europe (1971 onward). The aim was to define the functional minimum competence that a learner should have, and to allow for cross-linguistic comparisons ('how do you make a request in English/ French/ Spanish . . . ?' etc.). Beyond the 'threshold,' however, learners had specific personal purposes for their learning which needed a rather different pedagogical approach.

Teaching English, and other languages, for specific purposes (ESP) was the second major strand in CLT, (Widdowson, 1978). Many adult students had pressing linguistic needs in their jobs, university studies, businesses, holidays, etc., and the communicative approach offered techniques for providing course materials and teaching programs. These included: authentic texts for reading and listening comprehension, activities to practice language in use rather than linguistic form, role-play and improvisation to provide experience of spoken interaction, and the

detailed study of specific genres and text-types suited to particular professional interests. 'Team teaching' linking subject specialists and language teachers was another common feature of ESP.

Conclusion

The growing dominance of utilitarian objectives in foreign language teaching has been evident since the late 19th century and is unlikely to change in the foreseeable future. Meanwhile, more cultural aims remain the concern of a diminishing specialist minority. However, if computer-based technologies of instantaneous translation are successful, some of the demands of everyday communication could be devolved to gadgetry, which would allow broader educational purposes to play a more central role in the teaching of languages.

See also: Applied Linguistics: Overview and History; Class Language; Dionysius Thrax and Hellenistic Language Scholarship; Foreign Language Teaching Policy; Interlanguage; Language Acquisition Research Methods; Lingua Francas as Second Languages; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Pedagogical Grammars: Second Language; Rhetoric: History; Speech Acts; Standardization; Vernacular.

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Language, Visual Cognition and Motor Action

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Introduction

From the beginning of the cognitive revolution, thinking about cognition has been dominated by the computer metaphor of mind. Cognition is conceptualized in terms of software that stores, retrieves, and manipulates abstract, amodal, arbitrary symbols (e.g., Pylyshyn, 1984; Turing, 1950). In principle, this software can be instantiated in a number of media, such as the human brain or a computer system. The assumption that the 'software' of cognition could be studied independently of the 'hardware' has had a marked impact on the field. Whereas before the cognitive revolution systems of perception and action held a central place in explaining human behavior, after the cognitive revolution these systems became irrelevant to the study of cognition. If cognition could be implemented and studied on a computer, then the fact that humans have sense organs and effectors is unimportant.

This 'disembodied' conceptualization of cognition has recently come under fire in the constituent disciplines of cognitive science, such as artificial intelligence (e.g., Brooks, 1991; Pfeifer and Scheier, 2000), philosophy (Clark, 1997; Newton, 1996; Prinz, 2001), cognitive psychology (e.g., Barsalou, 1999; Glenberg, 1997), cognitive neuroscience (Damasio, 1999; Pulvermüller, 1999), and linguistics (Langacker, 1987; Talmy, 1988). Theoretical arguments and empirical data have been adduced suggesting that cognition is grounded in perception and action. According to this 'embodied' view, perception, action, and cognition are closely intertwined. Here, we consider the implications of this view for language processing.

The embodied view of cognition conceptualizes language comprehension as the mental simulation of the state of affairs that is being described. These simulations are thought to involve the reactivation of patterns of brain activation that were recorded during the comprehender's interaction with the world (Barsalou, 1999; Damasio, 1999). These experiential traces (Zwaan, 2004) are not abstract, amodal, and arbitrary mental representations but, rather, are sensorimotor in kind. There is an increasing amount of evidence for the use of sensorimotor representations in language processing. This evidence is reviewed below.

Perceptual Processes and Representations in Language Comprehension

Researchers in cognitive linguistics have long argued that linguistic meaning is rooted in perceptual processes (e.g., Lakoff, 1987; Langacker, 1987). Consider a sentence such as, 'The cord runs from my laptop to the cable modem.' This sentence conveys a visual scan path from the laptop to the modem. The alternative wording, 'The cord runs to the cable modem from my laptop' sounds odd because it conveys an interrupted scan path, followed by another one (see Langacker, 2005, for a discussion). Consider also the sentence, 'The book is on my desk in my office on the fourth floor of the Longmire building.' Several variants of this sentence can be constructed that are all equally grammatical. One example is, 'The book is in the Longmire building on the fourth floor in my office on my desk.' However, some variants are awkward. 'The book is in the Longmire building on my desk on the fourth floor in my office,' sounds awkward because it does not convey a linear zooming-in or zooming-out process.

Brain-imaging studies have provided evidence that the processing of words engages the cortical and subcortical structures that are active when the words' referents are perceived. When subjects name words referring to actions associated with objects, brain areas just anterior to areas active during motion perception are activated, and when words referring to colors are processed, sites just anterior to areas active during color perception are activated (see Martin and Chao, 2001, for a review). Also, negative emotion words engage the amygdala, which is active when negative emotions are being experienced (Isenberg *et al.*, 2000). This evidence is consistent with the idea that words activate memory traces of perceptual experiences regarding the words' referents.

Behavioral evidence has provided further evidence that language and perception are closely intertwined. Subjects tend to make horizontal eye movements when listening to narratives describing horizontal motion and vertical eye movements when listening to narratives describing vertical motion (Spivey and Geng, 2001). Readers routinely activate the shape and orientation of objects described in sentences (Stanfield and Zwaan, 2001; Zwaan *et al.*, 2002). For example, on reading 'He saw the egg in the carton,' people name a picture of a whole egg more quickly than they do a picture of a broken egg, whereas the reverse is true on reading 'He saw the egg in the frying pan.' There also is evidence that visual primes

affect subsequent language processing (Boroditksy, 2000) and that visual displays presented concurrently with linguistic input may create interference (Fincher-Kiefer, 2000).

To summarize, linguistic analyses, brain-imaging studies, and behavioral experiments all converge on the conclusion that there is a close connection between language and perceptual processes. The argument can be made that meaning arises in part out of the perceptual simulations of the referential situation rather than out of the manipulation of abstract, arbitrary, amodal symbols (Barsalou, 1999; Glenberg, 1997; Pecher and Zwaan, 2005; Zwaan, 2004). The qualification 'in part' is important, because meaning does not just arise out of the language-mediated activation of perceptual representations and processes. Consider the sentence, 'John pounded the nail into the wall.' If the embodied view is correct, understanding this sentence involves not only the visual representation of a horizontal nail (Stanfield and Zwaan, 2001) but also an activation of motor representations and processes involved in pounding nails. In other words, the hypothesis is that meaning arises out of the simulation of actions in addition to the simulation of perceptions.

Motor Representations and Processes in Language Processing

Evidence for the claim that motor representations play a role in language processing can be drawn from three main sources: behavioral studies on adult language comprehenders, neuroscience, and studies of language acquisition.

Klatzky, Pellegrino, McCloskey, and Doherty (1989) describe one of the earliest experiments to show a relationship between motor activity and language comprehension. In their experiments, participants were asked to strike poses, such as raising their arm to eye level and pinching their index finger and thumb together. When holding these poses, the participants responded to sentences such as, 'Aim a dart.' Klatzky *et al.* (1989) report that participants were faster to respond when the action described in the sentence was consonant with the posture they were currently holding. Glenberg and Kaschak (2002) provide further evidence for the role of motor activity in sentence processing. When reading sentences that described action toward the body (e.g., 'Sam gave you a pen') or away from the body (e.g., 'You gave Sam a pen'), participants were asked to decide if the sentences were sensible. Half of the time, a 'Yes' response required making an arm movement toward the body; the other half of the time, a 'Yes' response required making an arm movement away from the body. Participants were faster to respond when the action described in the sentence was consonant with the action required to make a response. Most important, the participants' direction of response interacted with the direction of the action in the sentence not only for concrete actions (e.g., giving someone a pen) but also for actions that are abstract or metaphorical (e.g., the metaphorical transfer of information in, 'John told you a story').

Additional support for the role of motor representations in language processing comes from work in neuroscience. Pulvermüller (1999) reviews a body of research showing that perceptual and motoric representations underlie the processing of words. For example, processing words denoting actions or instruments (e.g., a hammer) appears to engage neural regions known to be involved in the planning and execution of actions (Grafton *et al.*, 1997; Martin *et al.*, 1996).

That perceptual and motor traces are recruited to build mental simulations of the events described in the language is congruent with research in cognitive development (e.g., Piaget, 1954) and language acquisition (e.g., Landau and Gleitman, 1985; Goldberg, 1998). One of Piaget's seminal contributions to the field of cognitive development was the discovery that the abstract thinking (or, formal operations) of adult cognition has its roots in children's understanding of literal, concrete events. For example, children may learn about abstractions such as 'causation' by observing how movements of their body effects change in the external environment (Meltzoff and Moore, 1997). Concepts such as 'equality' may be learned via experiences such as counting the number of marbles placed in two bowls.

Studies of language acquisition (e.g., Bailey, 1997; Landau and Gleitman, 1985) suggest that children's early acquisition of verb meanings (and, their acquisition of subcategorization preferences for verbs) relies on knowledge of the action that the verb describes. The relationship between action and verb meaning likely arises because the verbs are produced and understood in the context of particular actions (e.g., 'give' is likely to be accompanied by an arm movement to transfer an object from one person to another). Once a child understands what it means to 'give' in terms of literal actions (e.g., extending one's arm to give an object to someone), they can begin to understand metaphorical actions (e.g., transfer of information, as in telling someone a story) in terms of those literal actions (see Glenberg and Kaschak, 2002, for a discussion). Thus, the use of perceptual and motoric information in language comprehension that has been detailed

in psychology and cognitive linguistics may be, in part, a vestige of the processes involved in cognitive development and language acquisition.

Limitations of the Current Research, and Future Directions

Although there are theoretical arguments and an increasing amount of evidence in support of an embodied view of language comprehension, there are major hurdles to be taken. We identify three areas in need of further development.

First, as yet there is no coherent theory that specifies how perceptual and motor processes are integrated during perception. A key factor to consider in this regard is perspective (MacWhinney, 2005). For example, when we read, 'John stirred his coffee,' do we simply activate a dynamic visual representation of the coffee and the cup, of the hand stirring it, or perhaps of both? This is a matter of overt and covert 'visual' attention. However, an equally important question is whether we take the perspective of John or that of an observer. In the first case, we also would activate the corresponding motor representations of stirring a fluid in a cup with a spoon. In the observer perspective, we also might activate motor representations – given that viewing actions activates areas in the premotor cortex that overlap with areas active during self-performed actions (Rizzolatti and Arbib, 1998) – but presumably in a less elaborate fashion. We may further ask whether other sensory experiences are triggered by the sentence, such as the smell, taste, and temperature of coffee. An important challenge will be to identify the role of linguistic cues in perspective activation. Another important challenge will be to examine how background knowledge influences perspective taking. Conceivably, comprehenders are more likely to adopt agentive or observer-like perspectives depending on the extent to which they can recruit relevant experiences for each.

A second area in which theoretical development and data are needed is in the treatment of abstract concepts. It has been hypothesized that our knowledge of abstract concepts, such as 'justice' and 'slander,' is grounded in perception and action by way of metaphorical extension (Lakoff, 1987). For example, it has been suggested that applying the adjective 'warm' to an abstract notion such as relationships is grounded in the physical experience of warmth a child feels when she is being held by a parent. However, it is doubtful that this is sufficient. People have many direct experiences with abstract concepts, such as 'justice,' and without these, the metaphor would have not-ing to map onto (Barsalou and Wiemer-Hastings, 2005). Instead, Barsalou and Wiemer-Hastings suggest that abstract and concrete concepts are similar in that both involve situational context, but that they differ in which elements of the situational context are activated.

A third area in which theory development and data are needed concerns the operation of sensorimotor representations in complex linguistic situations. Currently, evidence in support of the embodied position is drawn from studies of the processing of single words and sentences. This leads to a simple and straightforward view regarding how and when sensorimotor representations are used in language comprehension. This simple view is probably inadequate to account for the role of this information in naturally occurring contexts of language use, such as having conversations and arguments, or reading stories. It will be important to examine what happens to sensorimotor representations in language processing tasks that are more representative of the way that language is used in our daily lives.

In conclusion, there is mounting evidence that language comprehension is best understood from an embodied perspective rather than from a disembodied perspective. Sensorimotor representations are clearly active during language comprehension. These findings notwithstanding, several challenges lie ahead for theories of embodied language processing.

See also: Cognitive Linguistics; Developmental Relationship between Language and Cognition; fMRI Studies of Language.

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Language/Dialect Contact

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Introduction

The emergence of sociolinguistic approaches to dialectology in the 1960s represented a sharp break with the traditions of the discipline. Previously, dialect studies had largely focused on the collection of the most conservative speech forms in the community – research attention was largely directed toward rural areas, toward older people, toward men, and toward those with socially and geographically restricted lifepaths (Chambers and Trudgill, 1998). The studies which followed deliberately shifted attention away from such conservative language users to consider the urban, the young as well as the old, women as well as men, different ethnic groups and people of differing social statuses – the classic case is Labov's (1966) research in New York. They demonstrated, to highlight just a few of the very important contributions of this new approach, the orderly heterogeneity of language variation, and methods enabling us to examine language change as it was actually happening, as well as to spot the locus of change in the

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community. These early and groundbreaking studies, however, were based solely on the analysis of natives to those communities, excluding migrants who made up often large proportions of the population, particularly of urban centers. Labov, for example, excluded well over 50% of New York residents from his sample on the grounds of nonnativeness (see Kerswill, 1993, for a discussion of this). This was, however, common practice in social dialectological studies for at least the first 20 years of the discipline.

This nativeness issue is important for two reasons. First, one could perhaps question the validity of dialect descriptions that exclude nonnatives in highly mobile communities such as large metropolitan cities. Second, and perhaps more fundamentally, excluding nonnatives can mask the very origins of some linguistic changes that are underway in the community. Horvath (1985), for instance, who did *not* exclude Italians and Greeks from her study of the English of Australia's largest city, Sydney, found that it was indeed these groups that were leading certain linguistic changes affecting the whole city. Furthermore, Fox (2005), studying the English dialects of adolescents in Tower Hamlets, an 'East End' suburb of London and supposedly the home of its 'Cockney' dialect, found that a number of the linguistic changes underway in that part of London are being led by the now majority Bangladeshi immigrant community and are spreading to the speech of White (especially) male adolescents there. A failure to consider the recently arrived immigrant group and a concentration on 'native' White adolescents alone would have projected almost unexplainable patterns of variation which represent a very clear and quite sudden break from the 'Cockney' dialect that preceded in this part of London. It appears, then, as if urban sociolinguistics was still analyzing rather idealized, 'tidied up' communities, and that this began to be seen as problematic for an all-embracing conception of the way varieties were evolving, given the levels of mobility, contact, and social heterogeneity that were being (or had been) witnessed in many locales around the world.

Dialect Contact and Koineization

Peter Trudgill's (1986) book *Dialects in contact* provided the impetus not just for research on the outcomes of rather radical contact between different dialects (such as colonial migrations) but also for a reconfiguration and reanalysis of dialect change more generally in the light of speaker mobility. Trudgill's basic argument was that if (usually convergent) linguistic accommodation occurs between speakers of different dialects over a sustained period of time (as it would in contexts, for example, of colonialism, urbanization, and migration), the accommodated forms can gradually become permanent features of the speakers' dialects. When children acquire language in a context of widespread accommodation among the adult community (much of which, it has to be said, is not necessarily particularly successful or accurate or complete), they develop an L1 that comprises a collection of accommodated forms and continue the accommodation themselves, passing on the converged norms to their own children, who eventually crystallize a focused dialect in the originally highly diffuse and heterogeneous speech community. Trudgill began to address the following questions: Given the different proportions of dialects which went into the original mix, what sort of new dialect emerges from the contact? What processes work on the mixture of dialects in order to focus that new variety? What determines the outcome? Research on dialect contact over the past 30 years points to four main processes which, together, are labeled *koineization* (see also Siegel, 1985).

'Leveling' is the term used for the eradication of marked (socially or in its typological sense) or minority linguistic forms in the dialect melting pot that follows population movement and has been shown to be the dominant force accounting for the structures of new dialects. A number of studies have convincingly shown that forms which were brought by a majority of speakers almost always survive to form part of the structure of the new dialect. Andrea Sudbury's pioneering study of the English of the Falkland Islands (FIE) (2000), for example, showed dramatic degrees of leveling between the input stage (mostly varieties of English from southwest England and Scotland, but also from other parts of Southern England) and present-day FIE. Gone (or almost gone), for example, are: rhoticity, initial fricative devoicing, periphrastic *do,* the velar fricative /x/, the /w–ʍ/ distinction, Scottish vowel length, double modals, the distinctive southwestern pronoun system and so on (see Sudbury, 2000: 202–206 for more details).

Our ability, of course, to highlight leveling as a dominant koineization process relies quite crucially on us having detailed and explicit knowledge both of the structures of the dialects in the input and of the demographics of their users. Kuo's (2005) study of the development of Taiwanese Mandarin (TM) (Chinese, Mandarin), which has formed over the half century since the flight of Chinese Nationalists from the Mainland after the Chinese Civil War (1945–1949), reminds us of the importance of understanding who brought which dialects to the mix. The previous literature on TM had suggested strongly that this new variety was different from Standard Beijing

Mandarin because of the second language acquisition failures of the non-Mandarin speaking population of Taiwan (mostly speakers of Southern Min (Chinese, Min Nan)) who were forced to learn and speak Mandarin after the Nationalists arrived from the Mainland. They pointed to the fact, for example, that while Standard Beijing Mandarin had four retroflex consonants in its inventory, Southern Min had none, and so, when learning Mandarin, the Southern Min speakers merged the retroflexes with corresponding nonretroflex consonants, and diffused the nonretroflex consonants to the children of original mainlanders. Through a very careful analysis both of the structure of Chinese dialects in the middle of the 20th century, and census information on the regional origins of the migrant mainlander population, Kuo demonstrated that while retroflexes were common in central Beijing, they were rarely found elsewhere in China, and were in a tiny minority of the migrant population to Taiwan. She argued, therefore, that the lack of retroflexes in TM was a simple result of them not having been brought to Taiwan in sufficient numbers in the first place, and that the few that were brought were swiftly leveled away (see also Britain, 2001).

'Simplification' refers to the process that leads to the new dialect being more regular, having fewer categories (such as gender, case, honorifics) and, for example, fewer person/number inflections than the dialects in the original mix. It is neatly exemplified by the many new varieties of Hindi/Bhojpuri which developed as a result of the migration of indentured laborers from the Indian subcontinent to work on colonial plantations in, for example, Fiji, Mauritius, South Africa, Trinidad, and Guyana (e.g., Barz and Siegel, 1988). Gambhir (1981: 259), for example, compared the number-, gender- and person-sensitive present tense system in Indian varieties of Bhojpuri (with over two dozen morphemes) with that of Guyanese Bhojpuri which has just two.

'Interdialect' forms are variants which did not exist in the input varieties, but have developed as a result of the acquisition of imperfectly accommodated forms. Usually they are forms intermediate between two or more of the input variants. In the Fens of Eastern England – koineized as a result of in-migration of southeastern and northwestern dialect speakers following marshland reclamation from the 17th century onward – contact between southern [ʌ] and northern [ʊ] variants of the vowel in words such as 'cup' and 'bun' has resulted in the gradual emergence of an interdialectal, phonetically intermediate [ʏ] form (see Britain, 2002).

Following 'reallocation' more than one variant survives from the dialect mix, but each survivor is reassigned to serve new functions. Khamkhong (2004), investigating new dialect formation in Ban Khlong Sathon (BKS), a small settlement in northeastern Thailand that was established in the 1970s and attracted migrants from across the country, found that reallocation accounted for the distribution of the Thai negators *bor* and *mai*. *Mai* is the negator used in Central (and Standard) Thai (spoken to the west of BKS), and *bor* the form used in the Isan (Thai, Northeastern) dialect of Thai spoken to the north and east of BKS, and these forms were preserved by the original migrants. Khamkhong's analysis of the grandchildren of the original migrants, however, found both forms being used, but each reallocated according to topic, with *bor* being used most and when discussing informal everyday topics, and *mai* reserved for discussions about more formal topics, such as lessons at school, health issues, and the local council.

Three Contexts of Contact

For the remainder of this article I discuss three major contexts in which linguistic varieties come into contact – 'new dialect formation,' the consequence of the mixture of distinct dialects in new speech communities, such as in colonial contexts, or as a result of labor movements, New Town formation, land reclamation, or urbanization; 'second dialect acquisition,' the ability (or otherwise) of migrants to acquire a second dialect of their own language; and the 'geographical diffusion of linguistic innovations.' The literature to date has tended to treat these as three distinct areas of enquiry, but I will attempt here to demonstrate that, in fact, the outcomes of each show remarkable similarities because all three have dialect contact at their core.

New Dialect Formation

It is the development of new dialects following large scale population movements that has provoked most research in the dialect contact literature (see, for example, Gambhir, 1981; Trudgill, 1986, 2004; Barz and Siegel, 1988; Britain, 1997; Sudbury, 2000; Kerswill, 2002; Kuo, 2005) and from which the assessment of the likely outcomes of contact – leveling, simplification, interdialect formation, and reallocation – has been derived. More recently, researchers have been looking in more detail at the likely order in which these expected outcomes develop following mass migrations.

Perhaps the most detailed investigation of new dialect formation has come from research on the origins of New Zealand English (Trudgill, 2004). At the disposal of the researchers was a large set of recordings

made in the 1940s of mostly elderly New Zealanders who represented the first New Zealand-born generation of Anglophones following the mass migrations from Britain and Ireland in the mid–19th century. Trudgill proposed three stages by which a mixture of dialects, over time, crystallizes into a more focused, less diffuse variety.

Stage 1: Rudimentary Leveling This stage occurs, he claimed, among adults at the very earliest points of contact between the speakers in the mix – in the case of New Zealand English at the various "assembly points in the British Isles, on the long boat journey out, and early on in the new location" (2004: 89). An example of such leveling is the absence in the New Zealand recordings of the merger of /v/ and /w/ into /w/ (e.g., [wɪlɪdʒ] for 'village') that was a receding characteristic of some dialects of the south of England in the mid–19th century.

Stage 2: Extreme Variability Children born shortly after arrival in a new speech community (such as Anglophone New Zealand in the mid to late 19th century) are faced with the task of focusing an L1 without a clear target. Trudgill claimed that in such circumstances children draw more on their parents' and other adult varieties than is usually the case, and the consequence of this, in a dialect mixture situation, is that they often use new and unusual combinations of features that derive from a wide range of dialects, and they often differ from each other quite radically too (see Trudgill, 2004: 103–105, for some examples of individual combinations). He also provided evidence of ongoing leveling, this time of forms which survived the journey, but not in sufficient numbers to be transmitted to the next generation.

Stage 3: Focusing through Deterministic Leveling This is the final stage, the stage at which a new, stable, relatively uniform variety emerges. It is at this point, with many of the minor 'competitors' already leveled away at an earlier stage, that certain forms finally win out. Trudgill claimed that, in almost every case, majority or unmarked forms win, and, perhaps controversially, that prestige, stigma and identity play no role in that determination. It is also at this point that reallocation may take place.

Second Dialect Acquisition

A more recent concern in dialect contact studies has been the factors that shape the ability of migrants to acquire a second dialect of their own language (or languages, as we shall see below). In contexts such as these, a speaker's dialect enters into contact with those of their newly adopted community. A number of common threads have emerged from the small amount of research on this topic to date. First, as might be expected from the research on second language acquisition, age of arrival in the community is crucial. Both Chambers (1992), investigating the acquisition of the English of Oxfordshire in England by Canadian children, and Watts (2000), looking at the acquisition of Cheshire English by American children, found that, on the whole, the younger the child on arrival in the new community, the more successful the acquisition of the second dialect. By contrast, Foreman (2003: 264), examining the acquisition of Australian English by North American adults, found that "the majority of the subjects did not acquire any phonetic or phonological aspects of AusE to an auditorily noticeable extent." While it is true that some studies have found some adjustments by adults in such settings, overall the finding of an inverse relationship between age of arrival and ease of acquisition is quite robust.

Second, it has been found that migrants acquire the new lexicon more quickly than the new phonology. Chambers (1992: 680) found, for example, that the group of Canadian migrant children he studied acquired over 50% of the examined lexical forms (such as using 'trousers' instead of 'pants,' 'nappy' instead of 'diaper,' etc.), but only a quarter of the phonological forms studied in their first two years in the nonnative speech community. Further evidence for this pattern comes from work investigating the acquisition of a second dialect of a second language. Laurie Chou (1997) investigated the extent to which Taiwanese were able to shift from the American English they had been taught in Taiwan to British English when working in England. She found that after three years in England her 30 subjects had acquired, on average, 78% of the 'British' forms from the British/American lexical pairs she investigated, but had /r/ deletion (in words such as 'car,' 'port' etc.) in 64% of tokens (compared with 41% among a control group of Taiwanese in Taiwan – suggesting a deletion rate of just 23% after three years).

Third, Chambers provided convincing evidence that 'simple' rules (i.e., dependent on automatic exceptionless distinctions) are more quickly and successfully adopted by second dialect acquirers than 'complex' ones (i.e. distinctions with exceptions, variant forms, and/or abstract linguistic conditioning, phonological splits, new phonemes, etc.) (Chambers, 1992: 682). He compared the acquisition of a voiceless British English intersonorant /t/ (a simple, exceptionless change from a Canadian English voiced [d]) with that of the COT–CAUGHT split – a lexically-diffused, phonologically complex characteristic of southern British English. While one 9-year-old

Canadian child in Oxfordshire acquired both features over 90% of the time, older children acquired the former, simple rule on average in around 45% of possible places, but the latter complex rule on less than one occasion in ten. In an investigation of the acquisition of three such 'complex' rules of Kuwaiti Arabic (Arabic, Gulf Spoken) by Egyptians, Al-Dashti found that female Egyptians acquired the local Kuwaiti [j] form of the variable (dʒ) and the [g] form of (q) but were unsuccessful in acquiring the [ð] form of (ð) (Al-Dashti, 1998), suggesting that some 'complex' rules are harder to acquire than others. Kerswill (1996: 200) proposed a cline of acquisition difficulty from vocabulary at the 'easy to acquire' end to lexically unpredictable phonological rules at the 'difficult to acquire' end as a way of classifying linguistic constraints on acquisition in a more fine-grained way.

Another, perhaps obviously significant, factor in acquisition success has been length of exposure to the target dialect. Chambers (1992), Al-Dashti (1998), Watts (2000), and Foreman (2003), for example, all showed that longer exposure leads to more successful acquisition. Further research is required on other social factors that may influence the acquisition process. Al-Dashti (1998) found significant gender differences in acquisition, with, in both cases, women proving to be better acquirers than men. Foreman's (2003) study of Americans in Australia emphasized the role of social identity in acquisition rates, claiming that 'feeling Australian' and engaging in mostly Australian and few American social network ties contributed to acquisition success. And Phili (2003) demonstrated that, if there are strong motivations to retain affiliation with their original communities, speakers appear to be able to resist shifting at all to new linguistic norms. She investigated speakers from Famagusta in Cyprus who were forced to leave their homes following the Turkish invasion of the north of the island, and who subsequently settled well away from their town of origin in Limassol. She found few differences between the speech of the migrants, thirty years after leaving Famagusta, and that of people still living in villages within the Famagustan dialect area (but on the Greek side of the divide).

Studies both of adults and children acquiring second dialects have provided evidence of interdialect formation. Watts (2000) showed that a majority of the American children, faced with the Cheshire English [ʊ] realization of the vowel in words such as 'cup' and 'mug' produced a vowel that was phonetically halfway between it and an American English [ʌ].

Evidence from the rather small second dialect acquisition literature also suggests, therefore, that contact processes are at work – 'simple' as opposed to 'complex' forms survive, suggesting leveling and simplification, with adult accommodation being less successful and complete than child accommodation, and occasionally instances of interdialect forms emerging.

The Geographical Diffusion of Linguistic Innovations

The spread of new linguistic variants from one place to another appears to operate in one of three different ways.

Wave-Model Diffusion Perhaps the most iconic model of the geographical spread of innovations and the simplest, since it depends solely on the friction of distance, is the 'wave' or contagion diffusion model whereby innovations, over time, radiate out from a central point, reaching nearby locations before those more distant. Trudgill, for example, in a discussion of the diffusion of changes from London to East Anglia in England, suggests that the slow, unsalient, and phonetically gradual diffusion of fronter realizations of /ʌ/ ('cup' [kʋp – kạp]) is spreading in a wave-like way (1986: 51–53).

Urban Hierarchy Diffusion A much more common finding is an urban hierarchical effect, with innovations descending down a hierarchy of metropolis to city to town to village. One such example is highlighted by Kerswill's (2003: 235–236) investigations of the diffusion of labiodental variants of /θ ð/ in Britain. He showed that [f v], having diffused, he claims, from London, have reached the cities of Bristol, Derby, and Norwich *before* the nearer but smaller towns of Romsey and Wisbech (see also Chambers and Trudgill, 1998; Hernández Campoy, 2003). The usual explanation for the hierarchical model is that, while the distance between the diffusing center and the receiving location plays some role, interaction between urban centers in modern societies is likely to be greater and, therefore, a more frequent and effective conduit for the transmission of new forms than between urban and rural. Transportation networks tend to link urban with urban, and economic and consumption infrastructures tend to be based in and oriented toward urban centers, with the ensuing consequences for employment, commuting, and leisure patterns, and these feed the hierarchical nature of diffusion.

In research on the vocalization of /l/ in Australian English, Horvath and Horvath (1997) showed that a combination of the contagion and urban hierarchy models can help explain the diffusion of some changes. They found, quite unexpectedly, that rather

than being most prevalent in the larger cities of Sydney and Melbourne, /l/ vocalization was most vigorous in "the most slowly growing parts of the older core" (1997: 120) of the country, the South Australian centers of Adelaide and Mount Gambier. They propose a 'cultural hearth model' whereby an innovation gains a foothold in both town and country in one particular region before diffusing to other regions.

Contrahierarchical Diffusion Only very occasionally, innovations diffuse against the urban hierarchy. Trudgill (1986) described how a number of smoothing processes found in rural north Norfolk in eastern England were diffusing southward to urban centers in the county of Suffolk. Hence, 'power' was undergoing change from /pɑuə/ to /pɑ:/, 'do it' from /dʉ:əʔ/ to /dɜ:ʔ/ and 'sure' from /ʃʉ:ə/ to /ʃɜ:/, etc.

The literature to date has not, broadly speaking, fully taken on board the consequences of seeing innovation diffusion as dialect contact – the contest between an incoming form and a local form – nor fully appreciated the problems with the approaches sociolinguists currently adopt with respect to diffusion, approaches which were abandoned in the human geographic literature over a quarter of a century ago (see Gregory, 1985, and for a sociolinguistic consideration of his arguments, Britain, 2002, 2005). Much of the literature, for example, assumes that, in diffusing spatially, the innovative form totally levels away the formerly used variants in its path, and that nonadoption of the innovation is a "passive state where the friction of distance applies a brake to innovation" (Gregory, 1985: 319). Furthermore, sociolinguistic models have concentrated on how the innovation spatially spreads almost to the exclusion of examining:

1. what happens to the innovation en route (Are the linguistic constraints on the use of the variant the same? Is the innovation evaluated in the same way in its heartland as it is in its new destination?); or
2. the social embedding of its promoters and receivers; or
3. the structural incongruities of the innovation and the traditional form it is attempting to eradicate.

In an investigation of the success (or otherwise) of a number of innovations spreading from London and the South-East of England to the Fens in the northwest of East Anglia, I showed (Britain, 2005) that, while some new forms were spreading successfully (all of which are notably less 'marked' than the forms they were replacing – e.g., the vocalization of /l/, the labiodentalization of prevocalic /r/, the fronting of /θ ð/ to [f v]), other 'innovations' were resisted (e.g., the fronting of /ʌ/). Furthermore, yet other innovations were only partly adopted, with the outcomes of the contact between old and new demonstrating reallocation or interdialect formation. In the East of the Fens, for example, the fronting of /ou/ (common in many dialects of English around the world) was only found in a historically defined subset of relevant lexical items – those deriving from Middle English **ou** (e.g., 'rows,' 'grown,' 'mown') – and was much less advanced in those words deriving from ME **o:** (e.g., 'rose,' 'groan,' 'moan'). How long this resistance to the innovation will last is questionable, but nevertheless the study shows that diffusion can lead to outcomes other than surrender by the local form (see also Trudgill, 1986; Britain, 2002). Hence we can see that innovation diffusion can be conceptualized in terms of the processes typical of contact – when an innovation meets a local form, koineization can occur (the mixture of variants tends to be 'resolved' in some way), and the outcomes can be leveling (one form wins over another) or reallocation/interdialect formation.

See also: Chinese; Dialect Chains; Falkland Islands: Language Situation; Language and Dialect: Linguistic Varieties; Pidgins and Creoles: Overview; Sociolect/Social Class; Sociophonetics; Spatial Variation (Geolinguistics); Spoken Discourse: Diachronic Aspects; Variation and Language: Overview.

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Language: Mathematical Complexity

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Basic Concepts

Let f: $\mathbb{N} \rightarrow \mathbb{N}$ be a function from natural numbers to natural numbers. Informally, an algorithm $\mathcal{A}$ has (time) complexity f if, given any input of size n, $\mathcal{A}$ will terminate after at most $f(n)$ steps. The subject of Complexity Theory is the mathematical study of the complexity of algorithms. This article explains the rudiments of Complexity Theory and outlines its application to the analysis of natural language.

Our first task is to make precise the concepts of 'algorithm,' 'size,' and 'step' mentioned in the previous paragraph. In the strictest sense, an *algorithm* is a deterministic Turing machine. Recall in this context that a *Turing machine* over a (finite) alphabet Σ comprises an infinite *tape* divided into discrete cells (or *squares*), a *head* that scans this tape one square at a time, and a finite table of *instructions*. Each instruction directs the head to write a symbol of Σ to the scanned square and then to move left or right, conditional on the current contents of the square and the current *machine state*. The number of possible machine states is finite, and the current machine state is updated, as each instruction is processed, according

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to that instruction. Computation proceeds as long as some instruction can be executed; if a point is reached where no instruction can be executed, computation terminates. A Turing machine is *deterministic* if, at any point in its computation, exactly one instruction may be executed. Thus, for a deterministic Turing machine $\mathcal{A}$, the entire course of the computation is determined by the string of symbols initially written on the tape.

If Σ is a finite alphabet of symbols, it is customary to denote the set of finite strings over Σ by Σ^*. Let $\mathcal{A}$ be a deterministic Turing machine over some finite alphabet Σ; we say that $\mathcal{A}$ *computes* the partial function F: $\Sigma^* \to \Sigma^*$ defined as follows: if $w \in \Sigma^*$ is written on the tape and the Turing machine run, then $F(w)$ is the string left on the tape when the computation terminates. (We take $F(w)$ to be undefined if the computation does not terminate.) The *size* of an input string w is simply its length and the *steps* of computation are simply the basic instructions as specified in $\mathcal{A}$'s instruction table. Thus, we can make precise the informal definition of algorithmic complexity with which we started: a deterministic Turing Machine $\mathcal{A}$ has time complexity f if, given any input string of size n, $\mathcal{A}$ will terminate after at most $f(n)$ steps. Of course, $\mathcal{A}$ will not in general take the same number of steps for all inputs of size n; the function $f(n)$ is thus an *upper bound* on running time. This kind of complexity measure – known as *worst-case* complexity – is the most common measure employed in Complexity Theory.

In measuring the complexity of an algorithm, our primary concern is with *asymptotic* behavior. Thus, it is considered significant whether an algorithm has complexity n^2 or 2^n, or even whether it is has complexity n^2 or n^3, but not whether it has complexity n^2 or $300\,n^2$. The motivation here is that linear factors can always be mitigated by running the algorithm on faster hardware. For this reason, the following terminology has become current. For any function, f: $\mathbb{N} \to \mathbb{N}$, we write $O(f(n))$ for the set of functions

$$\{t : \mathbb{N} \to \mathbb{N} \mid \exists\, c, m \in \mathbb{N} \textit{ such that } \forall n > m, t(n) \leq cf(n)\}.$$

That is, $O(f(n))$ is the set of functions from natural numbers to natural numbers that are eventually dominated by some fixed multiple of f. An algorithm $\mathcal{A}$ is then said to have (time) complexity $O(f(n))$ if it has (time) complexity t for some $t \in O(f(n))$. Beware: this an *asymptotic* measure. If one algorithm $\mathcal{A}$ has complexity $O(n^2)$, and another algorithm $\mathcal{A}'$ complexity $O(2^n)$, that does ***not*** mean that $\mathcal{A}$ need run faster than $\mathcal{A}'$ in practice; it merely means that, if the size of the inputs can increase without limit, a point will be reached at which $\mathcal{A}'$ takes longer than $\mathcal{A}$.

Thus far, we have discussed the complexity of *algorithms*, but often what is of interest is the complexity of the *functions* that those algorithms compute. And this notion too can be reconstructed using the apparatus introduced above. Let Σ be a finite alphabet, let F: $\Sigma^* \to \Sigma^*$ be a function from strings over Σ to strings over Σ, and let f: $\mathbb{N} \to \mathbb{N}$ be a function from natural numbers to natural numbers. Then we say that F has (time) complexity $O(f)$ if there exists a deterministic Turing machine $\mathcal{A}$ computing F such that $\mathcal{A}$ has time complexity $O(f)$. More generally, if $\boldsymbol{f}$ is a set of functions from natural numbers to natural numbers, we say that F is in $(\boldsymbol{f})$-**TIME** if there exists a Turing machine $\mathcal{A}$ computing F that terminates in a number of steps bounded by some function in $\boldsymbol{f}$. Consider, for instance, the set

$$\mathbf{P} = \{p(n) \mid p(n) \text{ a polynomial}\},$$

giving us the complexity class **PTIME**. To say that a function F is in **PTIME** – or simply, 'is polynomial' – is to say that it can be computed by a deterministic Turing machine guaranteed to halt in a number of steps bounded by some polynomial function of the size of the input. Other salient sets of functions are

$$\mathbf{EXP} = \left\{2^{p(n)} | p(n) \text{ a polynomial}\right\}$$
$$\mathbf{2\text{-}EXP} = \left\{2^{2^{p(n)}} | p(n) \text{ a polynomial}\right\},$$

and so on. These give us, respectively, the computational complexity classes **EXPTIME**, **2-EXPTIME**, and so on. The union of the complexity classes K-**EXPTIME** for all $K \in \mathbb{N}$ is called the class of *elementary* functions. Functions F lying outside this class are called *nonelementary*. Finally, we note that, for a given function F: $\Sigma^* \to \Sigma^*$, it is not necessarily the case that there ***is*** a Turing machine that computes F at all. Such functions are said to be *noncomputable*.

Of particular interest in Complexity Theory are functions F: $\Sigma^* \to \{0,1\}$. Such functions are known as *decision problems*. (The intuition is that $F(w) = 1$ represents the answer 'yes' for a given input w, and $F(w) = 0$ represents the answer 'no'.) The following important notions relate specifically to decision problems. Let $\mathcal{A}$ be a Turing machine (not necessarily deterministic) and F: $\Sigma^* \to \{0,1\}$ a decision problem. We say that $\mathcal{A}$ *nondeterministically computes* F if, for all input strings $w \in \Sigma^*$, we have $F(w) = 1$ if and only if there exists a run of $\mathcal{A}$ that terminates with 1 written on the tape. Finally, let $\boldsymbol{f}$ be a set of functions from natural numbers to natural numbers. We say that the decision problem F is in the class $\mathbf{N}(\boldsymbol{f})$-**TIME** if F is nondeterministically computed by a Turing machine that terminates in time bounded by a function in $\boldsymbol{f}$.

As with the deterministic case, an important special case is the set **P**, giving us the complexity class **NPTIME** (or simply **NP**, as it is traditionally called). Similarly, we have the complexity classes **NEXPTIME**, **2-NEXPTIME**, and so on. Note the asymmetry in the definition of nondeterministic computation: if $F(w) = 1$, then a Turing machine nondeterministically computing F must have at least one run on input w terminating with output 1; if $F(w) = 0$, by contrast, no such run exists. For this reason, we sometimes need to speak about the complementary complexity classes **Co-NP**, **Co-NEXPTIME** etc.; a decision problem F is said to be in the class **Co-NP** if the decision problem F defined by $\overline{F}(n) = 1 - F(n)$ is in **NP**, and so on.

Just as we can count the *steps* involved in a run of some Turing machine, so too can we count the number of *tape squares* that it accesses. Again, we typically specify an upper bound on this number as a function of the size of the input. These complexity measures lead to classes **PSPACE**, **EXPSPACE**, etc., defined analogously as for **PTIME**, **EXPTIME**, etc. It is not necessary to talk about nondeterministic space-complexity classes, since they can be shown to coincide with their deterministic counterparts. In fact, the complexity classes mentioned above satisfy the inclusions:

$$\begin{aligned}\textbf{PTIME} \subseteq \textbf{NP} \subseteq \textbf{PSPACE} \subseteq \textbf{EXPTIME} \subseteq \\ \textbf{NEXPTIME} \subseteq \textbf{EXPSPACE} \subseteq \\ \textbf{2-EXPTIME} \subseteq \ldots \quad (1)\end{aligned}$$

The inclusions **PTIME** $\subset$ **EXPTIME** $\subset$ **2-EXPTIME** ... are strict: there are problems in **EXPTIME** that are not in **PTIME**, problems in **2-EXPTIME** that are not in **EXPTIME**, and so on. Whether the other inclusions in (1) are strict is a fundamental unsolved problem.

There is one final topic to cover before we apply these ideas to natural language. Suppose that F and F' are decision problems, with the following property: there is a function r: $\Sigma^* \to \Sigma^*$, which can be computed in polynomial time, such that, for all strings w, $F(r(w)) = F'(w)$. In such a case, we say that F' is (polynomially) *reducible to F*. If F' is (polynomially) reducible to F, any method for solving the problem F automatically yields a method for solving the problem F': first apply the function r to translate any given instance of F' to a corresponding instance of F and then apply the method for solving F. The time taken to solve F' in this way is no greater than the time taken to solve F' plus some polynomially bounded number of steps for the translation. Suppose now that it is possible to establish a result of the following form concerning a decision problem F: for all problems F' in some complexity class, F' is polynomially reducible to F. We then say that F is **hard** for the complexity class in question. Thus, for example, a problem to which any problem in the class **NP** can be polynomially reduced is said to be **NP**-hard, and so on. Intuitively, a decision problem is hard for a complexity class if it is at least as difficult to solve as any problem in that complexity class. Of particular interest are those problems that are simultaneously in some complexity class and hard for that class. Such problems are said to be *complete* for the class in question. Thus, problems can be **NP**-complete, **PSPACE**-complete, **EXPTIME**-complete, etc.

The theoretical framework presented thus far has employed the standard – though somewhat austere – view of an algorithm as a Turing machine operating on strings of symbols taken from a finite alphabet. In practice, however, when analyzing the complexity of a specific algorithm or function, a more relaxed concept of algorithm and a richer collection of data types are employed. There is no one 'correct' notion of basic operation here, but the fundamental principle is that basic operations should be executable in an amount of time that is, for the purposes at hand, bounded by a constant. Thus, for example, in problems where all the integers encountered are likely to remain small, it may be reasonable to regard the addition of two integers as a basic operation, since doing so gives a good estimate of actual running time. Similar remarks apply to measuring the size of the various data structures constituting the inputs of an algorithm.

Sometimes, the size of an input is best represented by more than one parameter, especially if that input is a tuple of data structures. The O-notation introduced above is extended to cover this case in the obvious way. For example, let f: $\mathbb{N}^2 \to \mathbb{N}$ be a function from pairs of natural numbers to natural numbers. We write $O(f(m,n))$ for the set of functions

$$\{t : \mathbb{N}^2 \to |\exists c, l \in \mathbb{N} \text{ such that } \forall n, m > l, t(m,n) \leq cf(m,n)\}.$$

An algorithm is then said to have (time) complexity $O(f(m,n))$ if its running time for any input of size m, n is bounded by some function $t(m,n) \in O(f(m,n))$.

For a comprehensive introduction to Turing machines and Complexity Theory, we recommend Papadimitriou (1994).

Recognizing Sentences

Let us see how the ideas sketched in the previous section can be applied to problems in linguistics. We begin with the recognition problem for context-free

grammars. Formally, a *context-free grammar* (CFG) is a quadruple $G = \langle N, V, S, P \rangle$, where N is a set of *nonterminals* (typically, category labels such as S, NP, VP, etc.), V is a set of terminals (typically, words such as *every*, *boy*, *loves*, etc.), S is a distinguished *start symbol* in N (for example, the category S) and P is a list of *productions* for rewriting nonterminals (such as, S → NP VP, NP → Det N, etc.). A CFG *accepts* the string of terminals w if some sequence of productions can be found that rewrites the start symbol S to w. (For a detailed discussion, see, e.g., Hopcroft and Ullman, 1979: 77 ff.) The *language of G*, denoted $L(G)$, is the set of strings accepted by G. The recognition problem for CFGs is: given a CFG G and a string w, is w a member of $L(G)$?

For simplicity, we assume that G is in Chomsky normal form; that is, all productions in G are of the forms $X \rightarrow YZ$ or $X \rightarrow a$, where X, Y, and Z are nonterminals and a is a terminal. (This restriction does not reduce the expressive power of the formalism.) Under this assumption, the algorithm of Figure 1 solves the CFG recognition problem for the grammar $G = \langle N, V, S, P \rangle$, and string $w = w[0]\ldots w[n-1]$. This algorithm is generally known as the CYK algorithm after its discoverers, Cocke, Younger, and Kasami (see, e.g., Younger, 1967). The basic idea is to maintain an array M (usually called a *chart*) such that $M[i][j]$ stores the grammatical categories that G can assign to the substring $w[i]\ldots w[j-1]$. The loops in lines 2–6 record the possible categories of each word (i.e., each 1-element substring) of w, and the loops in lines 7–16 record the possible categories of successively longer substrings of w.

Let us suppose that the individual instructions in Figure 1 denote basic operations. The complexity of this algorithm is then easily seen to be $O(mn^3)$, where m is the number of productions in G, and n is the length of w. Hence, the general recognition problem for CFGs has complexity $O(mn^3)$; moreover, for every fixed CFG G, the problem of determining whether a string w is in $L(G)$ has complexity $O(n^3)$. We note in passing that our choice of basic operations in this analysis is not entirely innocent. For example, the tests in line 11 read from a list of up to m elements, and the instruction in line 12 writes to such a list. In practice, however, these operations are so fast that it is reasonable to pretend that they are performed in constant time.

```
1 begin cyk(G, w)
2   for i = 0 to n–1
3   for each A → a ∈ P
4    if w[i] = a then add A to M[i][i+1]
5    endfor
6  endfor
7  for i = 0 to n–1
8   for j = i + 2 to n
9    for each A → BC ∈ P
10     for k = i + 1 to j–1
11      if  B ∈ M[i][k] and C ∈ M[k][j] then
12      add A to M[i][j]
13     endfor
14    endfor
15   endfor
16 endfor
17 if S ∈ M[0][n] then return 1
18 else return 0
19 end cyk
```

Figure 1 The CYK algorithm.

Of course, CFGs are not the only way of describing languages. One illustrative alternative is provided by the linguistic formalism known as *Lambek grammar*. The reader is referred to Carpenter (1998) for details; we content ourselves with an informal explanation here. The *Lambek calculus* is a logical system allowing the derivation of various *sequents* involving *category expressions*. For example, Figure 2 shows a derivation of the sequent NP (NP\S)/NP NP → S. Each step in this derivation must be licensed by one of a small collection of rules of inference. Intuitively, a category expression X/Y describes a string that, when a string of category Y is placed to its *right*, will result in a string of category X; similarly, $Y\backslash X$ describes a string that, when a string of category Y is placed to its *left*, will result in a string of category X. Under this interpretation, a sequent $X_0 \ldots, X_{n-1} \rightarrow X$ has the meaning: 'Any string of items of categories $X_0 \ldots X_{n-1}$ is of category X.' Now, a *Lambek grammar G* is a finite list of pairs of the form (v, C), where v is a vocabulary item and C is a category expression. We say that the grammar G *accepts* the string $w = w[0] \ldots w[n-1]$ just in case there exist $C_0 \ldots, C_{n-1}$ such that: (i) $(w[i], C_i) \in G$ for each i $(0 \leq i < n)$ and (ii) the sequent $C_0 \ldots C_{n-1} \rightarrow S$ can be derived in the Lambek calculus. (Again, S is a distinguished start symbol.) Suppose, for example, G contains the pairs (*John*, NP), (*Mary*, NP) and (*loves* (NP\S)/NP). Since NP (NP\S)/NP NP → S is a derivable sequent, it follows that G accepts the sentence *John loves Mary*. The *language of G*, denoted $L(G)$, is the set of strings accepted by G. The recognition problem for Lambek grammars is as follows: given a Lambek grammar G and a string w, is w a member of $L(G)$?

Since the category expressions in a Lambek grammar may be complex, a reasonable measure of the size

$$\dfrac{\dfrac{\dfrac{S \rightarrow S}{NP \rightarrow NP} \quad \dfrac{}{NP\ (NP\backslash S) \rightarrow S}}{NP\ (NP/S)\ /\ NP\ \ NP \rightarrow S}}$$

Figure 2 A derivation in the Lambek calculus.

m of G is in this case the total number of atomic symbols involved in a complete listing of G. Thus, we may reasonably take the total size of the input to the recognition problem to be $m+n$, where n is the length of w. On this measure of input size, it follows from the cut-elimination theorem for the Lambek calculus (Lambek, (1958)) that the recognition problem for Lambek grammars is in the complexity class **NP**. Furthermore, it has been conjectured that this problem is **NP**-hard. If so, it may well be that, unlike the recognition problem for CFGs, no polynomial-time algorithm exists to solve it.

It is known (Pentus, 1993, 1997) that the class of languages recognized by Lambek grammars is identical to the class of languages recognized by context-free grammars. Yet, as we have seen, the recognition problem for CFGs is $O(mn^3)$. This illustrates that the complexity of the recognition problem for a particular grammar formalism cannot be read off in any simple way from its expressive power: CFGs and Lambek grammars have the same expressive power, but their recognition problems may have different complexity. Of course, the expressive equivalence of CFGs and Lambek grammars does tell us that, for a *fixed* Lambek grammar G, the complexity of determining whether a given string (of length n) is in $L(G)$ is $O(n^3)$. (Just get a CFG recognizing the same language as G and use the CYK algorithm!)

These cautionary remarks notwithstanding, commonly encountered grammar formalisms with higher expressive power do tend, unsurprisingly, to exhibit higher recognition complexity. A well-known example is provided by the class of *tree adjoining grammars* (TAGs). A comprehensive introduction to TAGs can be found in Abeillé and Rambow (2000: Chap. 1). But very roughly, a TAG is a finite set of 'local' trees that can be combined into larger trees to license sentences, much as CFGs combine productions (which can equally be thought of as local trees) into phrase structures. The essentially new element in TAGs is the operation of *adjunction*, in which a local tree may be 'spliced' into an existing tree. This leads to an increase in recognition capacity: there exist languages that are recognized by some TAG, but not by any CFG. It also apparently leads to an increase in recognition complexity: the best known parsing algorithms for TAGs have time complexity $O(n^6)$, where n is the length of the input string (Schabes, 1994).

Moving up the expressiveness hierarchy, a *context-sensitive grammar* (CSG) is a set of productions $\alpha \rightarrow \beta$, where α and β are strings of symbols such that $|\alpha| \leq |\beta|$. These productions are interpreted as rewrite rules, in much the same way as productions of a CFG. For comparison, note that, in a CFG, all productions have the form $A \rightarrow \beta$, where A is a nonterminal. Indeed, if we assume (which we may without essential loss of expressive power) that productions in CFGs have nonempty right-hand sides, the condition $|\alpha| \leq |\beta|$ is then trivially satisfied, whence CFGs are a special case of CSGs. The *language* $L(G)$ *of* a CSG G is defined analogously to the context-free case. It turns out that the problem of deciding whether, for a given context-sensitive grammar G and a given string w, w is in $L(G)$ is **PSPACE**-complete. (In fact, it is possible to find a *fixed* context-sensitive grammar G for which the problem of determining whether a given string w is in $L(G)$ is PSPACE-complete.) For a formal definition of context-sensitive grammar and a proof of this complexity result, see Hopcroft and Ullman (1979: 223, 347 ff.).

All the grammar formalisms examined thus far have precise formal definitions, which makes for a clear-cut (though often nontrivial) complexity analysis. However, many mainstream grammar formalisms that aspire to describe natural languages are much less rigidly defined (and indeed much more liable to periodic revision); consequently, it is harder to provide definitive results about computational complexity. Transformational grammar, as outlined in the *Aspects* theory of Chomsky (1965), provides a case in point. Let us take a transformational grammar to consist of two components: a context-free grammar generating a collection of phrase-structure trees – so-called *deep structures* – and a collection of *transformations* that map these deep structures to other phrase-structure trees – so-called *surface structures*. The movement principles in question are too complex for a useful discussion here. The *language of* a transformational grammar G, denoted $L(G)$, can then be defined as the set of strings w such that w is the string of leaves of some surface structure obtained in this way. Analyzing a version of Chomsky's *Aspects* theory, Peters and Ritchie (1973) demonstrated the existence of transformational grammars that can recognize nonrecursive sets. That is to say, the recognition problem for transformational grammars (thus understood) is not even computable. More recent analyses of grammar formalisms in the transformational tradition paint a picture of lower complexity, however. Thus, Berwick and Weinberg (1984: 125 ff.) analyze the complexity of *Government-Binding Grammars*, a formalization of the approach taken in Chomsky (1981), and showed that the recognition problem for such grammars is in PSPACE.

Recent trends in linguistics – particularly within the transformational tradition – have shown a preference for specifying grammars not in terms of generative mechanisms, but rather, in terms of constraints to which sentence structures are required to conform. On this view of grammar, a string w is grammatical

just in case it has a structure that satisfies those constraints. How can we determine the complexity of the recognition problem when grammars are presented in this way? The answer is to employ a formal language: this formal language must be powerful enough to express the constraints constituting the grammar in question, and yet not so powerful that working with it leads to undecidable problems. *Model theoretic syntax* (Rogers, 2003) is a grammar formalism employing this strategy. To understand how it works, we must first rehearse some ideas from formal logic.

Weak monadic second-order logic (wMSO) employs a formal language containing two sorts of variables: those ranging over objects (as in ordinary first-order logic) and those ranging over *finite sets* of objects. For present purposes, we may assume that the 'objects' in question are nodes in a tree that describes the phrase structure of some sentence. We confine ourselves to a language containing binary atomic formulas of the forms $x \in X$, $x \lhd_1 y$ and $x \lhd_2 y$, and unary atomic formulas of the forms $np(x)$, $vp(x)$, etc., where np, vp, etc., form a finite collection of labels. Consider a tree in which each node is tagged with one of these labels. Then the above atomic formulas may be interpreted as follows: $x \in X$ means that node x is a member of the set of nodes X; $x \lhd_1 y$ means that node x is the left sister of node y; $x \lhd_2 y$ means that node x is the mother of node y; $np(x)$ means that x is tagged with the label np; and so on. Formulas are built up from atomic formulas using Boolean connectives and quantifiers (over both sorts of variables) in the normal way. The semantics given above then determine, for a given closed formula and a given labeled tree, whether that formula is true in that labeled tree.

On this view, we can think of a grammar G as a closed formula of weak monadic second-order logic. The set of trees recognized by G is simply the set of trees in which G is true; the language $L(G)$ recognized by G can then be defined as the set of strings w such that w is the string of leaves of some tree recognized by G. The appeal of this approach is twofold. First, wMSO can express many relationships dear to linguists' hearts. For example, it is straightforward to write down a formula $\phi_c(x, y)$, which is satisfied by nodes x and y in a tree just in case x C-commands y. Second, despite its high expressive power, this language is decidable. That is, given any closed formula ϕ, we can effectively determine whether there is a labeled tree in which it is true. (This follows from Rabin's theorem on the decidability of the monadic second-order theory of two successor functions.) It follows that, given any grammar G and any string w, we can effectively determine whether $w \in L(G)$. As might be expected for such a general approach, the complexity of such model theoretic grammars is relatively high. In fact, the problem of deciding satisfiability in this logic is nonelementary. (See Börger *et al.*, 1997: 315 ff., for an accessible treatment.) This complexity result implies that this way of defining grammars is not expressive enough to capture the transformational grammars analyzed by Peters and Ritchie. However, more recent theories in the same tradition may be amenable to formalization within this framework. For example, Rogers (2003) noted that some principles of Rizzi's theory of *Relativized Minimality* (Rizzi, 1990) can be expressed using formulas of the language sketched above.

Recovering Meaning

Most grammars are more than a means of defining a set of acceptable sentences: they also assign one or more levels of structure to those sentences that they do accept. The question then arises as to the computational complexity of recovering that structure.

Consider, for example, context-free grammars. Let G be a CFG. If $w \in L(G)$, then G assigns to w one or more phrase structures representing the derivation of w by the productions of G. It is easy to construct a CFG G for which there exists a sequence $\{w_n\}$ of strings accepted by G, such that the length of w_n is bounded above by some polynomial function of n while the number of phrase structures that G assigns to w_n is bounded below by an exponential function of n. That is, the number of parses produced by a CFG G can grow exponentially. Nevertheless, the CYK algorithm of **Figure 1** shows that the set of phrase structures assigned to any sentence by G may always be compactly represented; moreover, that compact representation may be constructed in time $O(mn^3)$. To see this, note that the chart M in this algorithm specifies every category that G assigns to every substring of w. It is easy to modify the data structures stored in the entries of M so that the elements of $M[i, j]$ are not simply category labels, but rather category labels with pointers to entries in $M[i, k]$ and $M[k, j]$ indicating their daughters. The result will be an acyclic directed graph that can be expanded into a complete list of all the parse trees assigned to w by G in the obvious way. (Trivially, listing all these trees will in general take exponential time.)

Arguably, determining the syntactic structure of a sentence is of little value unless we can use that structure to recover the sentence's meaning. The notion of meaning in general is too vague to admit of immediate formal analysis. However, we might sensibly

begin with the more specific problem of recovering, at least for certain fragments of natural languages, *logical form*, in the sense of producing translations such as the following:

Every boy loves some girl who admires him.

$$\forall x(\text{boy}(x) \rightarrow \exists y(\text{girl}(y) \wedge \text{admire}(y,x) \wedge \text{love}(x,y))) \quad (2)$$

Context-free grammars (and indeed the other grammar formalisms mentioned above) can be modified to yield such logical forms. Approaches vary, but one commonly employed technique is to associate with each vocabulary item an expression of higher-order logic representing its meaning and to associate with each production a prescription for combining the meanings of its daughters. This approach is, more or less, that championed by Montague (1974); for an accessible modern treatment, including an explanation of the relevant principles of higher-order logic, see, for example, Heim and Kratzer (1998). The question now arises: what is the computational complexity of recovering logical forms in this way?

The answer depends on how exactly logical forms are allowed to be represented. If the underlying grammar G is a CFG, then the CYK algorithm can again be modified to produce, in polynomial time, a compact representation of all meanings that G assigns to a given string w, just as for parse trees. However, these representations will not, in the parlance of higher-order logic, be 'β-reduced.' That is, in order to produce ordinary logical translations such as (2), we need to compute the normal forms for the expressions of higher-order logic that our parser yields. And this problem is known to be nonelementary (Statman, 1979). It follows that semantically annotated CFGs can be written for which the problem of computing normalized translations is also nonelementary. In practice, however, the normalization of semantic representations produced by semantically annotated CFGs never constitutes a bottleneck; for most grammars in this form that one is likely to write, computing the semantics entails no essential change in computational complexity. At present, however, there is no systematic formal analysis that can be used to underpin this claim.

Working with Meanings

Finally, even when sentences have been parsed and meanings recovered, the question arises as to the complexity of *using* these sentences. The uses to which language is put are too varied for this problem to admit of any immediate formal analysis. However, we might sensibly begin with the following, more specific problem: given a grammar describing a fragment of natural language, what is the complexity of determining valid entailments involving sentences of that fragment?

A familiar example should help motivate this problem. Consider the set of all English sentences subsumed by the following six schemata, where A and B are any common (count) nouns and S is any proper noun:

Every A is a B.	No A is a B.
Some A is a B.	Some A is not a B.
S is a B.	S is not a B.

Since all sentences in this fragment use the copula to relate two terms, let us call the fragment *Cop*. Cop is, of course, just the language of the Syllogistic. Since the set of sentence types in Cop is finite, the translation from its sentences to first-order formulas representing their logical forms certainly takes only polynomial time. Let e be a sentence in Cop, and let E be a set of such sentences. Let us say that E *entails* e just in case the logical translations of E entail the logical translation of e (in the usual sense of first-order logic). Then we ask: what is the complexity of determining, given E and e, whether E entails e? It is easy to show using standard techniques in logic that this problem is in fact $O(n^2)$, where n is the total number of words in $E \cup \{e\}$.

Now suppose we add relative clauses to Cop, generating such sentences as, for example,

Every philosopher who is not a stoic is a cynic.

Let us call this larger fragment *Cop + Rel*. It is simple to specify Cop + Rel in terms of a grammar belonging to any of the grammar formalisms discussed above. Furthermore, by equipping the grammar in question with a semantics, as discussed in the previous section, we obtain a (polynomial-time) algorithm translating sentences of Cop + Rel into first-order logic, thus defining a notion of entailment exactly as for the fragment Cop. Again we ask: what is the complexity of the entailment problem for Cop + Rel? The answer this time is that it is **Co-NP**-complete. Thus, relative clauses may increase the complexity of determining entailments. Now suppose that we add constructions involving transitive verbs to Cop + Rel, generating sentences such as, for example:

No philosopher who despises some stoic admires every cynic.

Call the resulting fragment *Cop + Rel + TV*. What is the complexity of determining validity now? This

time, it has increased: the validity problem for Cop + Rel + TV is **EXPTIME**-complete.

Likewise, suppose that we add constructions involving ditransitive verbs to Cop + Rel + TV, generating sentences such as, for example,

> No philosopher who despises some stoic recommends every cynic to every skeptic.

Call the resulting fragment *Cop + Rel + TV + DTV*. The validity problem for Cop + Rel + TV + DTV, it transpires, is **Co-NEXPTIME**-complete. Alternatively, suppose we add anaphora to Cop + Rel + TV, thus giving us the ability to recover sentence (2) above. Here, the situation is more complex, because of the need to deal with anaphoric ambiguities. However, it can be shown that, if anaphors are required to take as antecedents the closest possible noun phrase (consistent with the normal rules of binding theory), the result is a fragment in which the validity problem is **Co-NEXPTIME**-complete. Relaxing this restriction results in a fragment for which the validity problem is undecidable.

To be sure, determining entailments between sentences is a rather specialized, not to say abstruse, activity, far removed from the cut-and-thrust of everyday language use. However, the analysis sketched above illustrates some of the broader issues that arise in connection with the computational complexity of natural language. For there is surely more to human beings' considerable linguistic prowess than their ability to recognize membership in sets of strings. Technical details can be found in Pratt-Hartmann (2004).

See also: Chomsky, Noam (b. 1928); Montague, Richard (1931–1971); Montague Semantics.

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Language: Semiotics

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Introduction

To discuss the semiotics of language entails a consideration of both of these terms. The person most consider to be one of the founders of semiotics, Charles Sanders Peirce (1839–1914), defined semiotics as 'the doctrine of signs.' Simply stated, a sign is something that stands for something else. The Greek philosopher, Aristotle (384–322 B.C.E.), provided a tripartite theory of signs. A sign thus has a physical dimension (a physical object), a referent (what the sign refers to), and an interpretant (what the sign means). Greek physicians, who were the first to discuss signs, used the notion of sign to refer to symptomatology. Certain physical signs stood for particular ailments (redness and swelling might signify a venomous animal bite).

For Sebeok (1994: 17–41), there are six types of signs: signals (the discharge of a pistol to start a race), symptoms (physical signs such as bruises), icons (images, diagrams, metaphors), indexes (weather cock, photograph), symbols (culturally determined meanings accorded to objects, e.g., a cross), and names (how we label ourselves and our physical world). In this article, we discuss several of these sign types as they relate to language.

Language refers to verbal communication. In this sense, it is distinct from nonverbal forms of communication such as kinesics (significant body movement), proxemics (personal space), paralanguage (vocal modification), and codes (Braille and the Morse code). Language thus enjoys a privileged place because it is species unique (*Homo sapiens*).

When we speak of the semiotics of language, we must consider its status with relation to semiotics. Language is a subdomain of semiotics because it is a form of communication. In this article, we look at language as a code that allows us to represent our physical world via linguistic signs (the sounds, words, and syntax of specific languages, and their corresponding written versions) to refer to external reality. What we encode in language reflects what is symbolically significant in a particular culture. Sometimes this symbolization is direct and obvious, i.e., we devise words to express these culturally significant concepts. In other cases, its more subtle meanings are encoded in other ways, e.g., words to indicate social relationships or word order to specify new versus presupposed information.

Language is ubiquitous. All of our daily activity involves language. We use language in all of our interpersonal relationships, the messages that we send to others electronically or in written form, the books that we read, the lyrics of the music we listen to, the advertising that bombards us continually, are but a few examples. Language is the mechanism that encodes culture, the sum total of a group's belief systems, values, and creative activity and it transmits this knowledge intergenerationally.

In this article, we discuss the following aspects of language:

1. A definition and discussion of the notion of language;
2. Linguistic theory;
3. The origination and loss of language(s);
4. Language change, or how language changes through time and space;
5. Pragmatics, or how language is used in different contexts;
6. Neurolinguistics, or the relation of the brain to language;
7. Language games, or the way we play with language;
8. The language of names;
9. The language of advertising.

What Is Language?

What is language? The answer to this fundamental question is not simple. A definition that professors of linguistics often use is the following one: language is an arbitrary system of vocal (or visual) symbols used by the members of a speech community for the purpose of communication. This definition consists of six elements that merit commentary here.

Language is arbitrary because the sounds and forms that different languages use to refer to objects, concepts, and activities are vastly different among the estimated 6000 languages of the world. The relationship of a word and the object or concept to which it refers is thus almost always arbitrary. Although arbitrary in its form–meaning relationship, language is subject to constraints. These controls include limits on the possible type and number of meaningful sounds permissible in a language (20–44 distinctive sounds appear to be the limit). Likewise, word order has limits, and there appear to be six possibilities. The formation of words is also subject to regulation in terms of permissible prefixes, suffixes, and infixes. Second, language is systematic because it employs a few basic rules to create an infinite number of possible combinations, e.g., the phonology (sounds), morphology (word formation rules), syntax (rules that determine the order and arrangement of words within

a sentence), lexicon (the vocabulary of a language), and semantics (the meanings of words in isolation and in context) to formulate meaningful interaction. Third, language is generally vocal, although certain languages used by the deaf (American Sign Language) employ visual cues. Fourth, language is symbolic because its sounds or visual emblems stand for ideas and concepts that reflect the organization of the external world. Fifth, the members of a speech community use a particular language to express their culture, i.e., its thoughts, ideas, and emotions. This community may be local, e.g., the immigrants from another country who retain their first language in order to maintain their identity. Alternatively, the community may be international, e.g., the worldwide community of speakers of Spanish, Italian, or English. Finally, the speech community uses a language to express its feelings, beliefs, and emotions to other speakers of the language.

It should be noted that there is a use of the word 'language' that is applied to certain creative activities. We often speak of the language of film, the language of art, the language of architecture, the language of music, and so forth. This usage is metaphoric because it means that artists employ certain conventions that may be equated with the grammatical rules of a language, i.e., rules for combining the elements of a particular artistic craft into meaningful compositions that may be interpreted by others.

Design Features of Language

Charles F. Hockett (1914–2000) set out to define and differentiate human language and animal communication. In his article on linguistic universals (Hockett, 1963: 8–13), Hockett specifies a set of 16 "design features" for comparing communication systems across species. The latter essay was an expansion of an earlier one in *Scientific American* (Hockett, 1960: 90) in which Hockett originally proposed thirteen design features. These design features provide an excellent overview of the basic elements of language. Table 1 illustrates this typology.

Table 1 Design features of language

Design feature	*Characteristics*
1. Auditory–vocal channel	This feature means that language is an oral–aural set of process rather than a visual, tactile, gustatory, or olfactory procedure.
2. Broadcast transmission and directional reception	This feature means that a verbal signal may be heard within the limits of the ear's ability to detect sound and determine its source.
3. Rapid fading (transitoriness)	This feature means that sounds are temporary and do not last.
4. Interchangeability	This feature means users of a language can duplicate any message they are capable of understanding.
5. Total feedback	This feature means that users of a language can reflect upon what they hear.
6. Specialization	This feature means that the sound waves of a language have the specific purpose of communicating meaning.
7. Semanticity	This feature means that linguistic components carry meaning because they have a systematic reference to objects in the world.
8. Arbitrariness	This feature means that the relationship of the referent and the sound employed to refer to it are independent.
9. Discreteness	This feature means that the sound system of a language consists of a small set of the possible sounds available to it and that these sounds have a pattern of meaningful oppositions, e.g., the consonants /s/, /z/ which are differentiated solely by voicing in the English language.
10. Displacement	This feature means that language may refer to circumstances that are temporally or geographically remote.
11. Openness/ Productivity	This feature means that languages use a finite set of elements (sounds, words, syntax) to create an infinite set of linguistic possibilities.
12. Traditional transmission	This feature means that language is transmitted in a given culture from one generation to another through accepted principles of teaching and learning.
13. Duality of patterning	This feature means that verbal sounds bear no meaning until they combine in a systematic way with other sounds to form meaningful linguistic components such as words and sentences that convey significance in a particular culture.
14. Prevarication	This features means that messages may be false or logically meaningless.
15. Reflexiveness	This feature refers to metalanguage, the ability to comment on language as an entity.
16. Learnability	This feature means that the speaker of one language may acquire another one.

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Language and Gender

Sex is a biological category, while gender is a social construct based on sex. Men and women are biologically distinct but gender differences such as dress, behavior, and language are culturally acquired distinctions. What is masculine or feminine in one culture may not be so in another. A fundamental question related to language and gender is whether or not men and women speak differently. In fact, the language of men and women does differ. The way in which it differs falls into several domains. Robin Lakoff's *Language and women's place* (1975) is the groundbreaking study that called attention to differences between men and women's speech habits and the effect that these differences had in terms of power. In the years since its publication, however, several of its claims have been revised based on subsequent empirical research. Various studies show that men and women differ in their conversational styles. Jenny Coates (b. 1942) makes a number of observations about gender differences based on her own research and that of others (Coates, 1993: 138–139). First, context determines speech usage. All-female discourse and all-male discourse is quite different from male–female communication. In male–female conversations, men tend to interrupt women more often. Women employ minimal responses to show support for the speaker and women use hedges (linguistic forms such as *sort of* and *perhaps*). Men, on the other hand, talk more, swear more, and use more commands and imperatives. To be sure, factors such as social status and power affect speech patterns and usage.

Animals and Language

Another issue that merits discussion in this article is whether or not animals other than *Homo sapiens* possess the faculty of language. In his discussion of animal versus human communication, Hockett (1960: 93–95) shows that there are significant differences. A number of psychologists who work with gorillas and chimpanzees argue that these primates can acquire language, in this instance, a form of sign language or artificially created languages. Some of the noteworthy experiments include those listed in Table 2.

Despite claims of communicating with primates via a modified form of human sign language, Sebeok (1981) demonstrates quite persuasively that the animals involved in such experiments are not using language, but rather they are simply responding to subtle cues encoded by the trainer. The most famous claim of interspecies communication is Clever Hans, an Arab stallion from Russia purchased by a man identified as Wilhelm von Osten in 1900. The horse received its name because of a reputed ability to perform mathematical operations as well as an ability to read and to spell. In reality, the horse simply responded to cues from the trainer. The expression 'Clever Hans effect' means that animals behave in certain ways that make it appear to their human captors that they are engaged in language-like functions (Sebeok, 1981: 162–167). Animal–human communication is at best, as Sebeok argues persuasively, conditioned response and not true human linguistic interaction. It should be noted here that Sebeok (1963) coined the neologism 'zoosemiotics' to refer to animal communication. This refers to the sensory signs that animals use to communicate specific messages to other species and to their own species concerning reproduction, territoriality, danger, and so forth.

Semiotics Versus Linguistics

Thomas A. Sebeok (1920–2001) raises an important and sometimes controversial question when he discusses the relationship of semiotics (the study of signs and their uses in representation) and linguistics (the study of language and its usage in culture). Are they coordinate interdisciplines, or is one subordinate to the other? (Sebeok, 1994: 105). Sebeok notes that most would respond that semiotics and linguistics are coequal or that semiotics is subordinate to linguistics. In his carefully crafted response, Sebeok (1994: 106–107) argues that, in fact, linguistics is the subordinate interdiscipline because semiotics deals with the communication of any messages (verbal and nonverbal), while linguistics is concerned only with verbal communication in human languages.

Table 2 Primates and their trainers

Primate	*Trainer*
1. Washoe (chimpanzee)	R. Allen Gardner (b. 1930) and Beatrice T. Gardner (1933–1995)
2. Sarah (chimpanzee)	David Premack (b. 1925)
3. Lana, Sherman, and Austin (chimpanzees)	Duane Rumbaugh (b. 1929) and Emily Sue Savage-Rumbaugh (b. 1946)
4. Koko (gorilla)	Francine Patterson (b. 1947)
5. Nim Chimpsky (chimpanzee)	Herbert S. Terrace (b. 1936)

Linguistic Theory

Linguistic theory has become an important topic for discussion since the 19th century. Because linguistics is considered to be a science, it requires a theoretical apparatus to explain how language functions. It is important to understand the notion of theory. A theory is a hypothesis designed to explain natural phenomena after we observe and describe the basic facts, in this instance, linguistic facts. A credible theory must have the following traits: (1) It must be testable; (2) it must be able to predict; (3) it must be simple; and (4) it must be comprehensive. Though these aspects of theory seem relatively simple, they are difficult to achieve, especially for something as complex as human language.

In the 20th century, linguistic theory received its greatest support from Noam Chomsky (b. 1928), the MIT professor of linguistics. His earliest monograph, *Syntactic structures* (1957) deals with linguistic theory as it relates to syntax. Chomsky envisioned the grammar of a language as a theory of language. Prior to Chomsky's assertion, linguistics was considered to be scientific in the sense of being an accurate description of an observed language. Linguistics is intended to be objective and not prescriptive, i.e., it does not make judgments about how people use their language. Its primary goal is to describe accurately what people say. Chomsky's contribution to linguistic theory goes beyond observation and description to an explanation of language. Chomsky (1965: 4) makes a distinction between competence, the innate ability to produce the sentences of a language and performance, the actual use of language in concrete situations. Chomsky focuses on competence in his theory, while previous linguists focused on performance. He also argues that language is an innate capacity of all humans.

Philosophical Foundations of Linguistics

A review of linguistic research in the 20th century shows that there are two philosophical approaches. First, there is empiricism, the view that we acquire our knowledge of the world through experience, or through the senses. The second is rationalism, the notion that we are born with certain basic knowledge. Throughout the last century, there has been an alternation between these two philosophies. At the beginning of the century, Leonard Bloomfield (1887–1949) published *Introduction to the study of language* (1914), which espoused a rationalistic view of language that Bloomfield called a mentalist viewpoint. Two decades later, under the influence of the behaviorist psychologist, Albert Weiss (1879–1931), Bloomfield completely revised his linguistic perspective to one that he called a mechanistic approach, or an empiricist one in *Language* (1933). This position held sway for nearly a quarter of a century and it finds its most complete articulation in *Verbal behavior* (1957) by the behavioral psychologist, B. F. Skinner (1904–1990). Noam Chomsky faulted every aspect of behaviorist analysis of language, especially its focus on external rather than internal features in his critique of Skinner's book in the journal *Language* (1957, 35:26–58). The debate centered on an empiricist versus a rationalist account of first-language acquisition. Chomsky's approach prevailed because he was able to account for a wide array of linguistic phenomena that previous theories could not explain.

After another quarter century, one of Chomsky's antagonists, George Lakoff (b. 1941) and his colleague Mark Johnson (b. 1949), proposed a novel approach to linguistic theory in *Metaphors we live by* (Lakoff and Johnson, 1980). This empiricist analysis of language research argues that we acquire and use language by interacting with our environment and this interaction is reflected in our language. Its most complete articulation appears in Lakoff's *Fire, women, and dangerous things: what categories reveal about the mind* (Lakoff, 1987), and Ronald W. Langacker's (b. 1942) *Concept, image, and symbol: the cognitive basis of grammar* (Langacker, 2002).

The Origination of Language(s)

In this section, we discuss three ways in which language may arise. The first deals with the species-specific evolutionary development of language. The second addresses contact vernaculars, languages that develop as the result of the contact of two different cultures, e.g., during periods of colonization. The third refers to the creation of languages by individuals to achieve a specific purpose. Finally, we address language death or the loss of a language for various reasons.

Glottogenetics, the science devoted to the study of the origins of language, has come in and out of favor over the years. Because of the plethora of studies on this topic in the 19th century, the Linguistic Society of Paris banned further discussion of it in 1866. Nearly a half century later, in 1911, the Philological Society of London did the same. Nevertheless, in the last quarter of the 20th century, a renaissance of interest in the origin of language took place, as evidenced by the work of Derek Bickerton (b. 1926) *The roots of language* (Bickerton, 1981), and Philip Lieberman (b. 1934) *On the origins of language* (Lieberman, 1975).

Danesi (b. 1946) outlines some of the most common glottogenetic theories of language origination (Danesi, 1993: 5–29). There are at least seven hypotheses:

1. traditional;
2. Otto Jespersen's (1860–1943) enumeration including his own theory;
3. echoic theories;
4. gestural theories;
5. pragmo-communicative theories;
6. scientific approaches;
7. genetics.

Traditional theories about the origination of language include sporadic crude and bizarre experiments designed to determine the first, or earliest human language. These experiments involved the isolation of children from all linguistic contact. Prominent among those who sponsored such cruel trials were Egyptian King Psamtik (663–610 B.C.E.), The Holy Roman Emperor Frederik II (1194–1250), and James IV of Scotland (1473–1513).

Conventional theories of language origins, those that have existed for the longest time, include Otto Jespersen's discussion of four theories (1922: 412–442). First, there is the *bow-wow* hypothesis, which states that speech arose from imitation of natural sounds. Second, the *pooh-pooh* hypothesis, which argues that speech originated from instinctual grunts of pain and pleasure. Third, the *ding-dong* hypothesis, which states speech came about from instinctive oral responses. Fourth, the *ye-he-ho* hypothesis, which asserts that there was a basic need for pre-humans to communicate with their own kind. Jespersen himself offers his own theory, namely, that speech results from the expression of love, play, and affective feelings that developed into song and related forms.

Echoic theories of the origination of speech involve the efforts of pre-humans to imitate the surrounding sounds of these primitive creatures. Certain research into sound symbolism, or onomatopoeia, suggests that there may be shared imitative sounds. Gestural theories argue that the use of gestures, especially the hands, or visual symbolism may account for the origin of language. Pragmo-communicative theories of language origination refer to the development and use of language as necessary to function in society. Scientific approaches to glottogenetics include work by Morris Swadesh (1909–1967) and others who suggested a single source language for the world's languages. Evidence includes scientific principles to reconstruct a proto-language. The comparison of different languages seeks to determine commonalties in the world's languages.

More recently, an evolutionary approach to language origination has become prominent. This approach, represented by Philip Lieberman (1975), argues that language is a mechanism of growth and change that allowed the brain to develop in ways that would enhance survival. Lieberman argues that the development and adaptation of language in the human species are a result of brain structure that allowed humans to generate abstract concepts. The genetic approach to language development is closely associated with Noam Chomsky (b. 1928), who believes that language is a kind of physical organ with grammatical parameters that determine the form of a language.

Pidgins and Creoles

We are able to determine with great accuracy the birth of pidgins and creoles (see McMahon, 1994: 253–283 for a useful discussion). It is necessary to define these terms first. Pidgins are contact languages. They often result from the contact of colonial powers with indigenous populations in their quest to expand their territory. Thus, many pidgins are to be found in Africa, the Caribbean, and Asia. Pidgins result from the contact, most often, of European nations with other nations. In this sense, a pidgin is not the first language of either the conqueror or the conquered. Pidgins represent an effort at some sort of basic communication on the part of both groups. Pidgins are restricted in their usage, e.g., for certain functions such as commerce or trade. Pidgins simplify and restructure two existing languages to create a new language system. The theories about the origin of pidgins are numerous. They include the following basic hypotheses (McMahon, 1994: 255–257):

1. a common nautical language;
2. independent but analogous development;
3. substrate hypothesis, i.e., pidgins combine colonialist vocabulary with indigenous grammar;
4. the monogenetic hypothesis, i.e., all pidgins derive from Sabir a 15th-century Portuguese pidgin;
5. baby-foreigner talk hypothesis, i.e., pidgins represent a simplification of the two languages in contact.

Some linguistic features of pidgins are the following: simple, reduced phonology, reduced vocabulary, no inflectional morphology, and fixed word order.

Creoles, on the other hand, are quite different. First, they represent a highly developed and sophisticated linguistic system with native speakers. Their phonology, morphology, syntax, and lexicon have all of the characteristics of ethnic languages. In this sense, creoles are distinct from pidgins. They still

have a relatively simple phonology but their vocabulary is rich. They have an array of inflectional affixes to indicate plural formation and verb tenses. Furthermore, their syntax is more elaborate and they have embedded sentences and variable word order. Subsequently, they spawn grammars, dictionaries, and creative literature. Some examples of creole languages are the following:

1. Creole Tok Pisin, which means 'speech business' is one of the official languages of Papua, New Guinea and is an admixture of English, Melanesian languages, and German;
2. Haitian Creole, a combination of French and African languages;
3. Hawaiian Creole, a combination of English, Hawaiian, and various Asian languages.

The study of word origins is known as etymology.

Pidgins and creoles are important examples of the origination of new languages that are both accessible to researchers and provide insights into how language first developed. Furthermore, they offer concrete cases of language change in progress. Bickerton, whose work on the origins of language was mentioned above, uses data from pidgins and creoles to support his linguistic bioprogram hypothesis, i.e., all people possess an innate syntax and semantics component.

Planned Languages

Just as we can document the emergence of pidgins and creole languages, we can do the same for created languages, often to the very year of their inception, A planned language is one that is deliberately created by an individual for a specific purpose. At least 900 language schemes have been devised since the 16th century. Umberto Eco (b. 1932) writes about planned languages in *The Search for the perfect language* (Eco, 1995). In that volume, Eco discusses four types of languages:

1. the rediscovery of languages (Hebrew);
2. the reconstruction of languages (Indo-European);
3. languages constructed by individuals including *a priori*, and *a posteriori* languages;
4. so-called magic languages (secret languages endowed with properties of mysticism).

There are essentially two basic types of planned languages. First, there are *a priori* languages, those that are composed entirely of invented elements not found in any existent language. Several examples of this type of language exist. One is Timerio invented in 1921 by a Berlin architect named Tiemer who used a numerical scheme for his *a priori* language. Thus, in Timerio, 1-80-17 means "I love you."

A second general category of invented language is called *a posteriori*. These languages draw upon the grammar, vocabulary, and syntax of natural languages. The best exemplar of this type of planned language is Esperanto, which merits some discussion here because it is the only successful language of its kind. Esperanto is the invention of Dr L. L. Zamenhof (1859–1917), a Polish physician. As a Jew, he suffered at the hands of anti-Semites during his childhood. As a result of his negative experiences, he concluded that a universal auxiliary language would enhance communication and reduce animosity. In fact, his language had two purposes. The first is value-oriented, i.e., contributing to world peace, justice, and the brotherhood of humanity. The other is its norm-orientation, i.e., the use of the language for commerce, travel, and international conferences. The Esperanto language took its name from the pseudonym adopted by Zamenhof to protect his identity. It means "one who hopes." Its vocabulary derives from Romance, Slavic, and Germanic languages. Esperanto has 16 basic rules in its grammar. It uses many prefixes, infixes, and suffixes to create new words from its basic core vocabulary. The language is the only successful created language and it has a rich literature (original works and translations of the most important literary works from ethnic languages). The current number of Esperanto speakers worldwide is estimated to be between 120,000 and 2 million, depending upon the method of calculation. No other planned language has achieved this degree of success.

The following brief selection is from the poem entitled 'La Espero' ('hope') written in 1890 by Zamenhof (Table 3), and considered to the Esperanto anthem. My English translation appears next to it.

Language Death

While glottogenetics is concerned with the origination of language, at the other end of this continuum, the phenomenon of language death has become a matter of growing ecological concern. Wallace F. Chafe (b. 1927) was among the first to

Table 3 The Esperanto anthem 'La Espero' '*Hope*'

La Espero	Hope
En la mondon venis nova sento,	*A new feeling came into the world,*
Tra la mondo iras forta voko;	*A strong voice sounds through the world;*
Per flugiloj de facila vento	*On wings of a slight wind*
Nun de loko flugu gi al loko	*May it now fly from place to place.*

comment on the eventual loss of numerous indigenous languages in North America (Chafe, 1962).

The sociolinguist, Tove Skutnabb-Kangas (b. 1940) addresses the issue of language death in great detail. She (Skutnabb-Kangas, 2000: 46–50) presents a state-of-the-art assessment of the status of endangered world languages today. She cites Michael Krauss (b. 1934) who proposes three categories of languages (Krauss, 1992: 5–7):

1. moribund, which are languages that children no longer acquire;
2. endangered, which are languages that will likely not be learned by children in this century;
3. safe, which do not belong to the first two categories.

David Crystal (b. 1941) poses the question (Crystal 2000: 26–67): "Why should we care about language loss?" He provides five reasons for preserving languages:

1. they express ethnic identity;
2. they preserve history, especially in oral cultures;
3. they contribute to our knowledge of the world;
4. they are interesting expressions of humanity;
5. they contribute to diversity.

Among Crystal's (2000) recommendations for the preservation of endangered languages are the following:

1. increase the prestige of endangered languages in the superordinate community;
2. ensure their presence and use in education;
3. enhance their power in the community;
4. ensure that speakers of endangered languages are literate in that language;
5. use electronic technology for their dissemination.

The reasons for language death are varied. One reason may be a shift from an indigenous language to a recently introduced one, e.g., by a colonialist power, and it makes sense to acquire the new language for practical purposes. In this situation, there is likely to be a period of sustained bilingualism. Second, there may be sudden death. MacMahon (b. 1964) (1994: 286) notes the example of the loss of the indigenous languages Lenca and Cacaopera in El Salvador in 1932 when Indians were murdered and the use of either language represented mortal danger to the survivors. McMahon (1994: 287–291) also discusses language suicide that involves two related languages, one prestigious and the other not. This process is sometimes labeled decreolization. A classic example is the competition of English with Guayanese Creole in the western hemisphere. A third example is language murder. Nancy Dorian (b. 1936) has researched East Sutherland Scottish Gaelic, which is rapidly losing its battle for survival to English (McMahon, 1994: 294–303).

The loss of language means the loss of an entire culture, or at least the loss of that culture as an ongoing source of creativity and inventiveness though cultural vestiges such as literature and art will survive. Language death occurs for a variety of reasons. It may be a deliberate act of a national government in order to promote unity and solidarity and to exterminate dissidents of a minority group who may seek autonomy or independence, e.g., Francisco Franco's (1892–1975) suppression of regional languages in Spain (1939–1975).

Language Change

We are all aware of language change when we travel. The English of Boston, London, Melbourne, and Calcutta are quite distinct. When we take survey courses in English literature, we see different forms of English in Beowulf, Romeo and Juliet, and a modern novel.

Language is not static. It changes from place to place and generation to generation. Spatial language change involves synchronic linguistics, i.e., changes in contemporary language. Historical change is diachronic change, i.e., language changes over time. Ferdinand de Saussure (1957–1913) added to our knowledge of language change by establishing the distinction between diachronic and synchronic language analysis.

There have been many efforts to explain language change. In the 19th century, German linguists proposed linguistic laws to explain diachronic language change. Rasmus Rask (1787–1832), for example, first proposed a law of sound correspondences in Indo-European. Subsequently known as Grimm's law after Jakob Grimm (1785–1863), this set of sound correspondences specifies how certain consonants appeared in modern Germanic languages such as English, Dutch, and Swedish. Although Grimm's law explained many changes, it had exceptions. The Danish linguist, Karl Verner (1846–1896) was able to find the generalization to Grimm's law to make it exceptionless. This approach to language change was labeled comparative grammar by the German scholar Friedrich Schlegel (1772–1829).

André Martinet (1909–1999) suggested a tension between the speaker and the hearer as a factor in language change, i.e., the speaker wants to expend minimal effort in articulation while the hearer seeks maximum differentiation. In *The sound pattern of English* (Chomsky and Halle, 1968), Noam Chomsky and Morris Halle (b. 1923) argue that language

change is grammar change, i.e., there are changes in the grammar of a language that account for phonological change. These grammatical changes may involve rule addition. These authors provide evidence of this type of change in English, especially the Great English Vowel Shift occurred because of rule addition.

In the past four decades, sociolinguists, those who study the use of language in various social contexts, have added to our knowledge of language change. The approach of the sociolinguist is to look at socioeconomic factors to try to explain language change. Factors that come into play include prestige of a language register, educational background, group identity, interethnic contact and influence, to name but a few (McMahon, 1994: 225–252).

Pragmatics

Levinson (b. 1947) points out that the modern usage of the term 'pragmatics' derives from Charles Morris' (1903–1979) work (Morris, 1938) on semiotics (Levinson, 1983: 1). Levinson (1983: 5) goes on to note that it is difficult to provide a succinct yet comprehensive definition of the term 'pragmatics.' Levinson (1983: 9, emphasis in original) provides the following definition of pragmatics that is a useful one: "Pragmatics is the study of those relations between language and context that are **grammaticalized**, or encoded in the structure of a language."

In simple terms, pragmatics is the subdomain of linguistics that examines how language is used in specific social contexts. Our parents are usually responsible for teaching us pragmatics and they often do so when they direct us to use certain words and phraseology in particular situations, e.g., when we should address people by their first name, or by their last name with an appropriate title (Mr, Mrs, Miss, Ms, Doctor, Reverend, and so forth). This particular form of pragmatics is labeled politeness. Politeness is often encoded in languages of the world. When you study the Romance languages, for example, you learn that there two ways of expressing the English word 'you' (English had two ways also 'you' and 'thou,' which still exist in Amish English). In French, there are the forms '*tu*' and '*vous*'; in Spanish there are the forms '*tú*' and '*usted*'; and in Italian '*tu*' and '*Lei*.' These familiar and polite forms use different verb forms and this is a very difficult concept for Anglophones to acquire, especially when they are acquiring a second language.

When we want someone to do something for us, we use different forms of language to achieve our objectives. There is a hierarchy of linguistic forms that represents the social or official status of the speaker and hearer. These formal differences correspond to a scale politeness (Brown and Levinson, 1987) that conforms to social power structures. Thus, there is a direct correlation between linguistic form and power status. The scale of directness moves from most direct to most subtle with a series of intermediate points along this scale. First, there are direct commands or imperatives that coincide with a superordinate–subordinate status. Examples of this linguistic context would include police and military personnel who use the familiar imperative to make the hearer comply with a certain command, e.g., *stop*! or *halt*! Second, are performatives, e.g., *I'm asking you to move that chair.* Third, there are obligation statements, e.g., *you'll have to move that chair.* Fourth, there are suggestions, e.g., *why not move that chair.* Fifth, there are hints, e.g., *the chair is still there*. Finally, there are mild hints, e.g., *we don't want too much furniture in this room*. Table 4 illustrates such a scale in which the first is most direct and the last is least direct.

Imperatives, which are the most direct requests, have a certain linguistic form, i.e., a verb with no subject, e.g., *move!* Milder requests take the form of statements, e.g., *there is more space in the living room* (request that someone move). Likewise, questions may also be requests, e.g., *where's the salt?* (meaning, 'please pass the salt'). In *Toward a linguistic theory of speech acts* (Sadock, 1974), Jerrold Sadock (b. 1942) calls the latter whimperatives because they frequently uses a *wh*-question (what?, where?, why?, and so forth) word in their formulation.

Jenny Thomas (b. 1948) points out that when we acquire a second language, we often fail to learn certain pragmatic strategies such as the appropriate forms of politeness in the target language that she calls pragmatic failure (1983: 99). This means that although we may have total command of the phonology (the study of the sound system of a

Table 4 Scale of politeness for requests

Most direct	→	→	→	→	*Least direct*
Direct command (imperative) 1	Performative statement 2	Obligation statement 3	Suggestion 4	Hint 5	Mild Hint 6

language) and syntax (the study of the order and arrangement of the words of a language) of the second language, we may not know which forms to use in the appropriate contexts, with the result that we project an image of an abrupt or impolite person. Even the most fluent person may be unsuccessful if he or she ignores these subtle pragmatic rules of politeness.

Neurolinguistics

Neurolinguistics is the study of the relationship of the brain to language. The brain orchestrates the complex operations involved in comprehending and producing language. When it suffers damage (brain attacks or strokes, Alzheimer's disease, and other maladies), it fails to direct orderly speech operations. This results in failed comprehension by the speaker and it also means that the hearer will not be able to understand the messages sent by a speaker with a neurolinguistic affliction.

As we noted previously, physicians are semioticians. Their task in diagnosis is to decode what outward symptoms stand for. A physical symptom signifies something other than itself. In medicine, this semiotic tradition goes back to the ancient Greeks. Hippocrates (460–377 B.C.E.) provided the first definition of a symptom, and Galen (139–199 C.E.) followed this tradition. Physicians examine superficial signs to arrive at a diagnosis. In fact, the classical Latin symptoms of disease included the following:

1. *rubor* 'redness';
2. *dolor* 'pain';
3. *fervor* 'fever';
4. *tumor* 'swelling.'

These symptoms may correspond to a variety of maladies including allergies, infections, and broken bones, to name but a few possibilities. Symptomatology remains an important part of the medical curriculum today. It exemplifies semiotics perfectly because the symptom stands for something else. A precise determination of what symptoms stand for is a physician's daily task.

Speech pathology is that branch of medicine that seeks to provide clinicians with an exact set of correspondences of symptoms or signs to specific physical malady. In *Linguistic encounters with language handicap* (Crystal, 1984), David Crystal discusses the need for more work on symptomatology in the domain of speech pathology. In particular, Crystal notes the need for good transcription of speech dysfunction and standardized typologies of these maladies.

Aphasia (Greek 'no speech'), is partial or total inability to produce meaningful speech. It is occasioned by damage to specific areas of the brain. Specific parts of the brain control speech functions. One is Broca's area, which controls the musculature of thethroat and mouth for speaking. This area was named for the French scientist Pierre-Paul Broca (1824–1880) who found a correlation between aphasia and damage to a specific area of the brain, reported in a paper published in 1861. Broca's aphasia has several manifestations: limited word use, frequent pauses, short sentences, and nonfluent speech. In 1874, 13 years later, the German scientist, Carl Wernicke (1848–1904) published a paper that linked a specific type of speech disorder to damage in the area now called Wernicke's area. Wernicke's area controls speech comprehension. In simple terms, its manifestations include the loss of comprehension of spoken language, the inability to write, the loss of silent reading comprehension, and the distortion of speech.

When people lose the ability to produce or comprehend speech, they are unable to communicate appropriately with their family, friends, and associates. Such speech disfluencies affect social interactions and they need to be addressed clinically.

Language Games

Language games constitute an important part of human behavior. Children engage in them and they are a meaningful part of first-language acquisition, while adults enjoy them for their entertainment and creative value. Language puzzles are enormously popular and they may be found in magazines dedicated to this activity such as *Games* or as regular features in serious journals such as *Scientific American*. Puzzles may be nonverbal or verbal. Mathematical problems and logical problems are nonverbal though they may be presented in story form to make them easier to comprehend verbally. Our interest here is verbal puzzles, games that you can play with language. We provide several examples of such games here (see Danesi, 2002 for further discussion). Language games provide amusement and develop linguistic skills for those who create them or play them. An excellent language exercise is to try to create your own language games.

Riddles

A riddle is a statement or a question intended to puzzle the hearer. The classic riddle is the Riddle of the Sphinx, believed to be the oldest known puzzle. The Sphinx was an ancient mythological monster.

This beast lurked near the entrance of the city of Thebes and, under penalty of death, required of those who wished to enter that they answer the following riddle: "What has four feet in the morning, two at noon, and three at twilight?" The answer, of course, is man, because he crawls on all fours as a child, walks upright as an adult, and uses a cane in later life. Books of riddles abound and riddling is a favorite activity of children.

Palindromes

Palindromes are phrases or sentences that may be read the same forward and backward. They have a long history, and the originator of this form of linguistic amusement is reputed to be Sotades, a poet from Alexandria in the 3rd century B.C.E. The classic example of this type of word game is "A man, a plan, a canal – Panama."

Anagrams

An anagram (Greek for reversed letters) is a language game in which the letters of an existing word are rearranged to create an entirely new word (spit → tips) or a rearrangement of the letters of an existing word or phrase to create a new phrase or sentence. With respect to the second type of anagram, it is common to use the name of a well-known figure to create a phrase or sentence that captures the essence of that person. The rearrangement of the title of a well-known piece of literature may encapsulate its content. Two examples of this type of language game come from Bergeson's (1973: 77, 81) book *Palindromes and anagrams*: the title of Jules Verne's (1828–1905) famous novel *Twenty thousand leagues under the sea* → "Huge water tale stuns. End had you tense" and William Shakespeare (1564–1616) → "I ask me, has Will a peer?"

Word Ladders

Word ladders, sometimes called *doublets* or *word ping-pong*, involve the change of a single letter of a word by changing one letter to create an entirely new word. Figure 1 is a simple example of this type of language game (each letter change appears in boldface type).

STI**L**L
ST**A**LL
STAL**K**
STAL**E**
STA**K**E
S**N**AKE

Figure 1 Word ladder (word doublet, word ping-pong).

Word Squares

Word squares are words of equal length that read the same vertically and horizontally. The longer the word, the more challenging is the task. Figure 2 is a typical example of this type of language game.

Crossword Puzzles

Arthur Wynne (1862–1945), a journalist for the *New York World*, is credited with the invention of the now ubiquitous crossword puzzle, although he called it a word cross. His first puzzle appeared in that paper on December 21, 1913. The best known enigmatologist is Will Shortz (b. 1952), successor to Eugene T. Maleska (1916–1993), who is responsible for the prestigious *New York Times* crossword puzzle.

The crossword puzzle consists of a set of clues that may be thematic and that can be quite challenging. In fact, there is an annual crossword puzzle contest. The reader must write the appropriate word either vertically or horizontally. The simple crossword puzzle in Figure 3 illustrates this type of word game. The clues relate to linguistics and language and the answers can be found in this article.

Lipograms and Univocalics

A lipogram is a language game in which the author writes a creative work by deliberately omitting a particular letter (lipogram) of the alphabet or by using a single vowel (univocalics). The Greek poet Lasus (538 B.C.E.-?) is perhaps the first author to write in this fashion. He wrote two poems, an ode to the Centaurs (Greek mythological animal with head and arms of a man and the trunk of a horse) and another work to the Ceres (goddess of agriculture) in which the letter *s* was deliberately omitted. Many other writers have imitated this practice.

Oulipo, alternatively written as *OuLiPo* (abbreviation of the French *Ouvroir de Littérature Potentielle* 'work of potential literature'), is a group of creative writers in France who seek to write distinctive creative works subject to various constraints and regulations (Motte, 1998). The origin of this group may be traced to a meeting of diverse professionals who convened at Cerisy-la-Salle for a colloquium on the work of the French author Raymond Queneau (1903–1976) in September 1960. One intriguing example of their literary tradition is the novel *La disparition* (Perec, 1969) written by George Perec (1936–1982). What makes this literary work so interesting is the

MET
EKE
TEN

Figure 2 Word square.

fact that the author wrote the novel (300 pages long) without using the vowel *e*. Furthermore, Gilbert Adair (b. 1944) translated the original French work into English as *A void* (Adair, 1995), again without using the letter *e*. In his review of the English translation in *Time* magazine (Gray, 1995: 74), Paul Gray (b. 1930) did not use the letter *e*. The following passage of Gilbert Adair's English translation of Perec's novel (Adair, 1995: 3) illustrates this technique.

> Incurably insomniac, Anton Vowl turns on a light. According to his watch it's only 12.20. With a loud and languorous sigh Vowl sits up, stuffs a pillow at his back, draws his quilt up around his chin, picks up his whodunit and idly scans a paragraph or two. . . .

Names

The study of names is called onomastics. Names are one of the most significant aspects of language. In order to refer to people, objects, concepts, and places, they must have a name. Names pervade our linguistic existence. We use names to label and categorize the world around us.

Personal Names

Personal names include family names, or surnames, and given names (first names and middle names). Names give us identity and it is an important ritual worldwide. Surnames denote lineage, while given names provide us with personality and individuality.

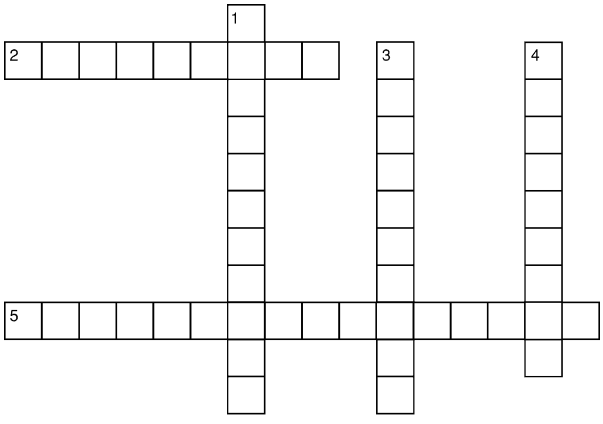

Across

2 Study of signs
5 Study of language and the brain

Down

1 Study of language
3 Study of names
4 Study of meaning

Figure 3 Linguistic crossword puzzle.

Given names often reflect name fads, i.e., certain names are popular during certain eras and may fall out of favor during others. The popularity of certain names often reflects those of well-known personalities of a particular time, most often entertainers (film stars, singers, and so forth). Parents often seek to give their children names that do not deviate from perceived social norms of a particular era so that their children are not burdened by unpleasant teasing from their peers. The U.S. Social Security Administration provides a comprehensive listing of given names that dates to 1880. We have provided a list of the most popular male and female given names for both 1900 and 2003 in Table 5. Although these names represent a single country, similar lists may be found for other nations as well.

Name Changes

Name changes represent another aspect of onomastics. The reasons for changing one's name are varied. People may not like their given name, especially if it is unpopular or somehow perceived to be aesthetically displeasing. A family name may have an unpleasant connotation, e.g., Hogg, Hitler, Stalin, and so forth. Entertainers may have names that are difficult to pronounce or spell. Furthermore, they seek a name that is easy to remember and that has some positive connotation, e.g., Issur Danielovich Demsky (Kirk Douglas [b. 1916]), or Francis Gumm (Judy Garland [1922–1969]). A third reason for such changes may be for criminal ends, e.g., to defraud someone of money, or for the purpose of avoiding identification and detection. A name change is a significant semiotic act because it alters our personal and public identity.

Language of Oppression

The language of oppression involves the naming and labeling of groups in distorted and negative ways so that the dominant and oppressing group may have control over the oppressed one. Haig Bosmajian (b. 1929) notes that the power to name one's foe means that you can define it (Bosmajian, 1974: 5–6). This linguistic power transfers self-definition from the oppressed group to the oppressor, often with severe consequences.

Language may be used to express prejudice and discrimination. It may encode prejudice (negative attitudes based on erroneous information about a particular group), or discrimination (acts intended to cause harm to a group, e.g., failure to hire, or even to eliminate an entire group of people as was the case with The Holocaust).

Table 5 Most popular male and female given names in the United States

Boys' names (1900)	*Girls' names (1900)*	*Boys' names (2003)*	*Girls' names (2003)*
1. John	1. Mary	1. Jacob	1. Emily
2. William	2. Helen	2. Michael	2. Emma
3. James	3. Anna	3. Joshua	3. Madison
4. George	4. Margaret	4. Matthew	4. Hannah
5. Charles	5. Ruth	5. Andrew	5. Olivia
6. Joseph	6. Elizabeth	6. Joseph	6. Abigail
7. Frank	7. Marie	7. Ethan	7. Alexis
8. Henry	8. Rose	8. Daniel	8. Ashley
9. Robert	9. Florence	9. Christopher	9. Elizabeth
10. Harry	10. Bertha	10. Anthony	10. Samantha

Frequently, words to describe these acts become part of the language long after the behavior associated with them have occurred. In the past 40 years, at least two terms that refer to categories of long-standing prejudice and discrimination, sexism, and ageism, have entered the English language and now appear as dictionary entries.

The language of American Indian derision, and the language to disparage the disabled are other domains in the language of oppression. The derisive language aimed at minority groups often reflects the behavior or the appearance of the targeted group. The linguistic terms to deride these groups, often metonymic (the use of the part for the whole) in nature, serve to focus on some superficial aspect the oppressed group's appearance such as skin color. These metonyms may also allude to cultural habits such as clothing, eating habits, or some other equally unimportant external custom of the group.

Bosmajian (1974) notes that legal language often encodes prejudice and discrimination. In fact, officially promulgated laws provide strong evidence for the language of oppression, as evidenced by anti-Semitic legislation and official decrees in Nazi Germany, sexist language in U.S. laws, and the racist Jim Crow laws of the post Civil War in the United States, and U.S. court cases that excluded Native Americans from civil rights in the United States.

The Language of Advertising

Danesi (2000: 6) defines advertising as "[t]he making of public announcements designed to promote the sale of specific commodities or services." Advertising has a long history, and it can be traced to ancient times. This form of commercial publicity was at first oral. Prior to the invention of the printing press, people proclaimed their wares in public by shouting. Once relatively inexpensive paper reproduction became available, printed advertising became ubiquitous. Advertising as a formal corporate service first appeared in the 19th century. Volney P. Palmer (1799–1864) started the first agency in 1841. At the end of the 19th century, advertising was a full-time business. At that time, branding of products was the most important task. This changed in the 20th century when companies sought not only to identify their products but also to persuade the public to buy their products and services. Danesi (2000: 7) points out that advertising is now "a dominant form of social discourse."

Advertising thus involves the use of language to advocate, promote, persuade, engage, and interact with potential customers. Advertisers accomplish this task with language as well as other means. We shall examine this process now. Prior to discussing language *per se*, it is necessary to consider how advertisers achieve their goal of convincing the public to pay attention to their product, and then, to buy it. We receive information about our external world through our five senses (hearing, sight, smell, taste, and touch). In its earliest form, much of advertising involved a combination of textual and visual materials. In the 20th century, this process became more sophisticated. Advertisements for perfumes and colognes included magazine inserts that allowed people to smell the product. Likewise, certain popup advertisements provided a three-dimensional component to advertising. It has become impossible to escape advertising in the 21st century. It is literally everywhere. In the print media, it may be found in the traditional places such as magazines, newspapers, flyers, and so forth. In the broadcast media, it appears in television, radio, and film. Product placement, the subtle or not so subtle insertion of certain well-known products in films and television programming, means that advertising is ubiquitous.

Roland Barthes (1915–1980) specifies two types of messages encoded in advertising, the quintessential semiotic text (Barthes, 1964). These are the linguistic message and the visual image. The latter involves the

visual depiction of the product or service and a second, implied or unstated connotation, i.e., what the product means to the consumer. Tobacco advertising has been quite effective in delivering this hidden, coded message. Forty years ago, the Marlboro man depicted a virile cowboy who personified masculine virility. By association, using this product would bestow on the user these same qualities. More recently, tobacco products have evoked a notion of coolness (the image of a person who is popular and who engages in peer-approved activities) to effect the connotative message. In fact, certain messages involving a hip-hop lifestyle are directed at inner-city youth in an effort to recruit young adults to use these products.

Our interest here is the use of language to promote products and services. As noted above, advertising encodes overt and covert messages to the consumer. At the superficial level, advertising tells the public what the product or service will do: clean, provide easily consumable food, and so forth. At the covert level, advertising evokes popular myths. If we use a product, it will make us resemble, or perhaps become, certain archetypal figures who signify virility, femininity, and so forth. The models and the actors convey this image to the consumer. The verbal messages (including warnings) tell us one thing, while the visual messages implicit messages convey other more significant ones about lifestyle.

Truth in Advertising

Representing a product or service is now subject to some minimal requirements of truthfulness. Most countries have governmental agencies that exert some minimum standards of honesty for product and service promotion. While overt lying is thus not permitted, compliance with legal regulations often involves the skillful use of language and visual accommodation to meet legal requirements. We now know that certain products may be harmful. Smoking cigarettes, for example, may cause death from a variety of diseases, including cancer. When first required to place warning labels on their product, cigarette companies simply placed somewhat ambiguous statements on the packages. Subsequently, these warnings became more specific and prominent as legislation became more demanding.

The warnings and disclaimers in advertising are often hidden through various media artifacts. In print media, they appear in small print at the bottom of a colorful and appealing pictorial presentation. In non-print media, they appear as white, verbal text against a light background for a moment at the end of announcement or in a rapid hyper-speech enumeration at the end of the main message, thus making it difficult to comprehend.

Producers of alcoholic beverages now seek to avoid lawsuits by inserting language about responsible drinking unobtrusively into their advertisements. Advertisements for pharmaceutical products do the same by mentioning sometimes long lists of side effects (sometimes including death) in their product announcements.

Product Names

A trade name is very important. Adrian Room (b. 1933) specifies six criteria for product names (Room, 1982: 15–16):

1. visual comprehension (easy to read);
2. easy to pronounce in most languages;
3. avoidance of unacceptable or absurd meanings;
4. positive references;
5. ease of recall;
6. conformity to legal requirements for official registration.

Trade names fall into three basic groups. The first is the personal name, i.e., the name of the founder of a company, e.g., *Sears*®. The second is a name that represents some special feature of the product, e.g., *Sunkist*® or *Safeway*®. The last is the arbitrary name, i.e., one with no obvious reference, e.g., *Exxon*®.

Other factors go into trade names. Spelling, for example, is important. Certain consonants are preferred, e.g., X (*Xerox*®) and K (*Kodak*®). X is a letter that corresponds to several sounds [z] and [ks]. Other letters, L, M, N, have syllabic value and thus they convey more than one sound. Morphology, of the formation of words, is an important part of product designation. Pharmaceutical products tend to end in suffixes such as *-ine* (*Listerine*®, *Dramamine*®) or *-in* (aspirin). The semantics, or meaning of a product or service name, is also quite important. A product name may involve snob appeal, e.g., *Lord and Taylor*®. Trade names may identify the function of the product or service, e.g., *Chem-Lawn*®.

Car names encode hierarchies that usually correspond to price ranges and status, e.g., *Chevrolet*®, *Pontiac*®, *Buick*®, and *Cadillac*®. Within a given car line, there exist hierarchies also (make, line, model). *Chevrolet*® thus has various subdivisions including *Aveo*®, *Cavalier*®, *Malibu*®, and *Impala*® within its standard line. In his classic sociological class, *The status seekers* (Packard, 1959: 313), Vance Packard (1914–1996) noted that "the automobile makers built up a status hierarchy for automobiles that was well understood by the public."

Concluding Remarks

Language is an evolutionary mechanism that *Homo sapiens* developed to enhance survival. It is a multifunctional tool that allows us to interact as social beings with other people in our daily lives. Various technologies have allowed us to encode language in order to record past events and to refer to previous events and the circumstances that surround them. Written language thus preserves our past. Modern technology also allows virtually instantaneous contact with other people globally.

What is important about language is the fact that it encodes cultural content in various, often subtle ways. Our choice of words and specific grammatical forms represent our perceptions of the world. Our linguistic interactions and usage reveal us to the world. Most of Erving Goffman's (1922–1982) research deals with communication and language, either directly or indirectly (*Behavior in public places*, 1963). He makes the point that all of our social intercourse revolves around language, or even occasionally, on the lack of it, i.e., silence. When we use language, we encode significant amounts of collateral information about ourselves and our beliefs in indirect ways. Likewise, when we decode linguistic messages, we interpret a great deal about the message through word choice and grammatical form. The form of the message sometimes provides more information than its content.

See also: Figurative Language: Semiotics; Language Change and Cultural Change; Pidgins and Creoles: Overview; Pragmatics: Overview.

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Languages for Specific Purposes

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Defining the Object

The object of study for the branch of applied linguistics that is covered by the heading 'Languages for Specific Purposes' is multi-faceted. The many facets are a consequence of the fact that this discipline looks at (in principle all) aspects of actual communication in specialized discursive domains. To say that discursive domains are specialized means that it is possible to become a specialist in the domain, through education, training, or experience. This definition covers primarily professional areas, but also nonprofessional areas like hobbies. The fact that not a focused part of the human linguistic competence, but the totality of aspects involved in communication in the described settings is the potential object of study, gives studies into the field a very wide range. However, two main poles may be isolated in the landscape of LSP research, around and between which different approaches and projects are located:

- One pole sees LSP as supplementary language skills that are applied when producing texts in specialized situational settings in order to realize specific purposes. The basic assumption is that language is generally used in the texts according to the ordinary rules known to all language users (Language for General Purposes, LGP), but the ways words are connected and the words are specialized. This approach is generally meant by the English term used to designate the object of study, viz., 'Language for Specific Purposes.' The concept centrally behind this term is closely connected to language teaching for professional purposes, where speakers of, e.g., English as a foreign or second language have to learn (additionally) how to use language in areas where they are going to work. In other words, scholars tending to this pole concentrate upon the specific linguistic differences between language used in different settings.
- The other pole is more closely connected to the concept of specialized meaning. The center of this pole is the concept meant by the German term *Fachsprache*, i.e., domain or subject specific language. This concept lays more weight upon the specialized meanings constituting a domain and upon the relations between these meanings and the linguistic choices conventionally made by the agents of the domain. In other words, the view of the scholars tending to this pole is more global, they are rather looking at the language of a domain as a general reflex of the domain and the specialized meanings constituting the domain. This latter view is more discourse oriented in its approach to its object.

The two poles describe two original, fairly different approaches to this object: the first mentioned approach, concentrating upon text production in specialized situational settings, is connected to language teaching, especially to teaching a foreign or second language in connection with vocational training, university studies, etc. A major interest in this approach is to create knowledge about the specific needs to be covered in such specialized language classrooms, in order to make this kind of language teaching as efficient as possible. The study of domain specific language use comes in handy as a linguistic basis for such specialized courses. This kind of language teaching is mostly connected to learning English. For one thing, this occurrence is due to the fact that a number of countries with multiple national

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- One pole sees LSP as supplementary language skills that are applied when producing texts in specialized situational settings in order to realize specific purposes. The basic assumption is that language is generally used in the texts according to the ordinary rules known to all language users (Language for General Purposes, LGP), but the ways words are connected and the words are specialized. This approach is generally meant by the English term used to designate the object of study, viz., 'Language for Specific Purposes.' The concept centrally behind this term is closely connected to language teaching for professional purposes, where speakers of, e.g., English as a foreign or second language have to learn (additionally) how to use language in areas where they are going to work. In other words, scholars tending to this pole concentrate upon the specific linguistic differences between language used in different settings.
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languages (often former British colonies like India or Malaysia) use or have until recently used English as a common language, for example, in administrative and judicial settings. Here, there is a strong need for specialized teaching. Secondly, the position English has especially in the scientific world as *the* lingua franca of international contacts and publications means that there is a strong everyday need among students and scholars from all over the world to acquire specific and specialized English language skills. Consequently, this approach has been followed mainly by scholars working in the field of teaching English to adults with specialized professional or academic needs. Due to the distribution of English in the world described above, the approach is not limited to Britain or the United States, but is widely spread in all parts of the world, although predominantly connected to the teaching of English.

The second mentioned approach, the one focusing more on the specialized meanings, has a different root. It grew out of a general interest in sociology and dialectology and was an extension of former studies of different population groups' ways of living through studies of their discourse. Thus, the original interest was wider in its scope. This study lead to an early interest in global models of communication in specialized settings, combining text internal and text external factors in the descriptions and focusing upon global explanations including and combining discoursal features, relevant knowledge, and social backgrounds rather than just finding specialized elements of the discourse. Germany and Austria were the two countries where this kind of study of specialized discourse was first developed, but also the Scandinavian countries have a tradition for investigating specialized discourse from this perspective.

It is important to say that modern LSP research is normally not placed at any one of the two poles, but rather at some place on the continuum between them. And furthermore there is no 1:1 relation between countries and approaches. Just as an example, recent work by Bazerman (1995) and by Swales (1998) is highly discourse analytic in its approach and thus more broadly interested in global features of the specialized discourse.

Basic Distinctions: Relations between Communicators

In their essence, all approaches to the study of domain related discourse are sociological in their basic assumptions. This tenet is reflected in the fact that degree of specialization of a text and, connected to that, the relation between senders and receivers in a communicative situation concerning their respective levels of expertise is traditionally seen as a crucial factor when setting up models for describing specialized communication. The basic assumption lying behind such models is that the characteristics of the participants in the communication and the purposes pursued by them are main determiners of the way texts are written. Many different stratified classifications of the relevant communicative settings have been proposed. The following tripartite stratification gives a fairly good overall picture of the factors underlying the different proposals:

- Scientific discourse: This kind of specialized discourse is characterized by the fact that both senders and receivers are experts (expert–to–expert–communication). Texts show a high degree of abstraction and a considerable amount of often standardized terminology. These characteristics are seen as consequences of the purpose of communication in such settings, viz., to develop and refine the general knowledge of a domain. Furthermore, the high prestige connected to such discourse and its highly public character means that, apart from aspects of necessary precision, stylistic features play a very important role.
- Practically oriented discourse: Here, too, we find communication where both senders and receivers are experts (expert–to–expert–communication). But in this type of discourse, the experts are not working on developing or refining the general scientific knowledge of a domain. Instead, they are solving practical problems in their daily work and use communicative devices relevant for these purposes. As an example, the difference between the two levels in the stratification is the difference between chemical scientists writing learned articles for scientific journals and chemical scientists working in the laboratory, running their experiments and collecting the data. In the first setting, the purpose is to textually present and develop new knowledge in the field in a public environment (scientific discourse); in the second setting, the purpose of the communication is to solve practical problems occurring in the daily work (practically oriented discourse). The second setting tends to be more informal and to show only the degree of, e.g., terminological specialization in its oral or written texts that is necessary for coping. Aspects of necessary precision play a major role here, although also in this stratum the sociological aspect of showing by way of the applied language that the communicative party belongs to the relevant peer group should not be neglected.
- Discourse of popular science and domain-oriented didactics: The sender-receiver relations are here always asymmetric (i.e., sender has a higher degree of relevant knowledge than the receiver(s)).

Two prototypical cases are communication between experts and consumers (e.g., in manuals) and between experts and novices (e.g., in textbooks). The purpose of this kind of communication is to convey structured knowledge of the domain to receivers who lack this knowledge, but need it for (often) practical purposes. A third prototypical case is the communication of domain-specific knowledge in magazines for popular science. This kind of communication is slightly different from the two cases first mentioned, as it is characterized by a very important element of entertainment, whereas, e.g., manuals and textbooks are more directed toward actually enhancing the receivers' knowledge in practically relevant areas. Although texts of all three prototypical kinds show lots of similarities due to the fact that sender-receiver relations are always asymmetric, they also show important differences, mainly due to the last-mentioned difference.

Traditional Approaches

In order to describe the very complex object of study, that is text from specialized domains in all their aspects, LSP linguistics has included a wide variety of disciplines and approaches from the general toolbox of linguists, see Figure 1.

In the following list, we outline some of the central approaches of LSP linguistics and relate them to the above model.

- Terminology and lexicography: A very central area of LSP linguistics and historically the first area of studies of special domain language to be developed in large scale is terminology. Traditionally, terminology has concentrated upon standardizing the use of words (lexis) and the denomination of concepts, in order to shape languages for specific purposes, so that they are optimal for scientific or professional communication. Recently, terminology has expanded toward other areas like organization, representation and handling of information and knowledge, thus contributing to the development of systems and databases for storing knowledge. Consequently, the interface between knowledge stored in words and knowledge stored in other semiotic systems is of major importance for modern terminological research. Especially technical domains have been the object of terminological studies. Another area connected to lexis and to the manageable representation of words and meanings from specialized discourse is lexicography. The main purpose of this branch of LSP linguistics is to create a sound basis for the production of specialist dictionaries that are highly functional for dictionary users. Consequently, research in this area concentrates on the user and his/her needs and the functions of dictionaries that may be deducted from such studies. Studies from this perspective have been performed in many domains, among them especially the areas of science, law, and administration, where there is a substantial need for translational tools. Finally, it is relevant to mention that research in these fields have treated in some detail the question of the importance of cultural context for the term systems of a domain. A general distinction is made between culture-dependent and culture-independent domains. A prototypical example of a culture-dependent domain is the domain of law. Term systems in

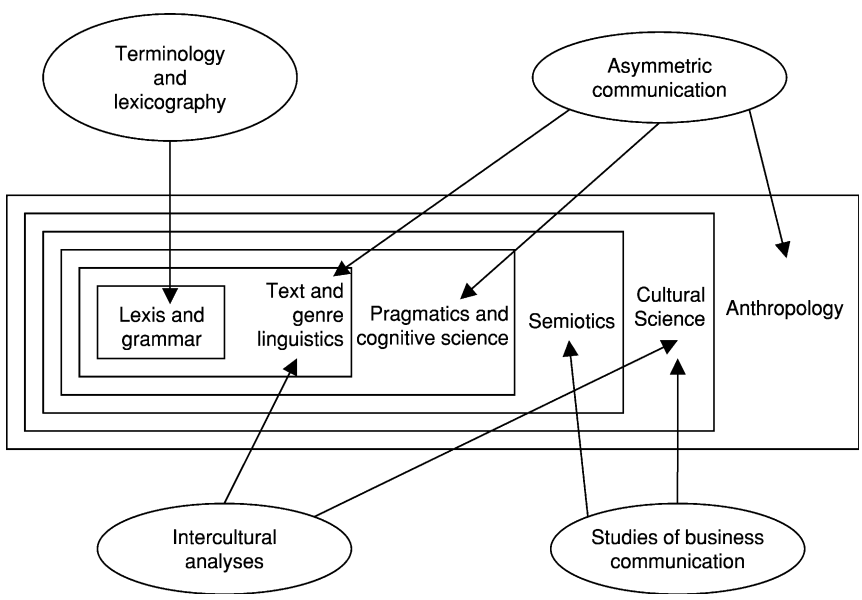

Figure 1 Linguistic disciplines with special importance for LSP linguistics.

this kind of domain are basically different across national cultures, as each nation has developed their own legal system. Consequently, legal terms from different cultures in principle do not mean the same (at least as long as no standardization has taken place). A prototypical example of a culture-independent domain is the field of electricity. In this domain, the degree of overlap between term systems from different national cultures is very much higher than in the culture-dependent domains.

- Intercultural analyses (genre analysis, register analysis, conversational analysis): The wish to develop LSP linguistics toward a more global description of discourse in specialized settings led directly to a focusing on the text as the central object of study. And in this connection, the concepts of genre and of registers have acquired paramount importance. This emphasis is due to the fact that both concepts as descriptive tools are highly oriented toward describing the influence of communicative purposes (genre) and situational settings (genre, register) on texts. Thus, to a large extent, the development of genre and register linguistics has been driven by the interest in developing descriptive tools for LSP research. Concrete studies have concentrated upon conventional characteristics of domain specific genres like research articles, legal judgments, statutes, company brochures, or scientific journals. Especially in a continental European context such studies have been performed as contrastive text and genre analyses across different cultures, thus generating results with special relevance for translators of these specialized genres. Domains with special interest have been the areas of law, medicine, and areas of (technical) science. An area where much work was produced especially in the 1990s was the area of scientific communication, and the applied perspective was the intercultural. This stress was, to a large degree, due to the fact that in these years the development toward English as lingua franca in scientific contexts was speeded up decisively. This development made it especially interesting to investigate whether in scientific contexts the national culture or the (international) discipline is the most influential concerning textual and stylistic choices in text production. An intermediary position was defended by scholars, claiming that academic writing is not influenced by national styles as such, but that it is possible to isolate four different styles, connected to different scientific cultures. No decisive evidence has been found for any of the positions, but the discussion showed different influences at different textual levels. And recently the instruments developed for this type of intercultural pragmatic studies of texts are used also in projects investigating the influence of English textual conventions on texts from different domains (like business communication) originally written in other languages. The intercultural perspective is also relevant for oral communication and has especially been investigated using conversational analysis in a number of cases. The question of differences in ways of negotiating, of showing disagreement, or in solving problems in professional settings has attracted special interest. Finally, it is important to state, that the criterion 'culture-dependent vs. culture-independent domain' is hardly relevant in this perspective, as opposed to what we saw when looking at the perspectives of terminology and lexicography: Also genres from culture-independent domains may differ considerably across national cultures.
- Asymmetric communication: As mentioned above, asymmetric discourse (i.e., communicative situations in which sender and receiver have different levels of knowledge concerning the domain of the communication) is an important part of the object of study of LSP linguistics. And this part of the object has been intensely investigated over the last 20–30 years, applying especially research instruments from text and genre linguistics, pragmatics and cognitive science, but also some instruments from anthropology, like conversational analysis. Studies are geographically concentrated around Europe and North America. The reason could be that the problem of asymmetry in knowledge relations and consequently in (abusable) power relations has been a central issue in the general discussion in these Western societies. Frequent objects of study have been doctor-patient communication, and communication in court and in other administrative settings, but also the area of technical writing (writing efficient technical documents). Research in this area has had a strong element of prescription, of not just registering characteristics of the object of study, but explicitly of contributing to better and more equal communication also in asymmetric settings.
- Studies of Business Communication: The way we have described the object of study of LSP linguistics until now, focus has been on communicative settings that are characterized mainly by their topic, by the object of communication. However, a specific branch of LSP linguistics defines its object of study more on the basis of situational elements and on the basis of the actions performed in specific texts, viz., the study of Business Communication. What makes this discourse domain specific is the fact that it is always tightly connected to the professional purposes of companies or organizations, including such areas as marketing and public relations. Typical objects of study are the internal and the external business communication within and between companies and the

management of these communicative processes. In this connection, instruments from cultural science are often applied in order to describe differences and similarities between senders and receivers from different national or international cultures. And as multimodality plays a major role in texts from these areas of communication, also the instruments from semiotics have been included and used for analyses within this sub discipline of LSP linguistics.

Recent Trends for the Development of the Discipline

In these years the recent trend in the discipline is that three areas are gradually coming into focus, thus supplementing or strengthening (some of) the perspectives and approaches already described above: cognition, semiotics, and the area of document design. The latter areas are already represented in the discipline as it looks today (cf. above), but it is likely that they will receive more attention in the future. Multi-modality is becoming a characteristic feature not only of texts from business communication, but also of texts from many other fields of specialized communication, as the importance of different media and the requirements concerning layout and entertainment are growing. So semiotics will become a necessary perspective when investigating such texts, too. And document design (connected, among other things, to the area of technical writing) has also a good future in a world, in which the amount of information is immense and the time to be allocated for reading limited. The prescriptive tradition of technical writing, intending to judge the efficiency of texts and not just collect data about the text and its coming to life, will gradually gain more importance also in fields where it has not yet been introduced, like in the areas of legal and administrative communication. And finally, there is a growing interest within the field of terminology as well as within other subfields of the discipline to focus not only upon textual or linguistic issues, but to pay more attention to the cognitive activities underlying communication in specialized settings. The expansion requires the inclusion of more instruments from the area of empirical cognitive linguistics, but is just a consequential next step in a development already running. An interesting consequence of paying more attention to this subject is that it may shift focus from superindividual aspects of communication like conventions, group language, etc. (i.e., more sociologically oriented aspects) to individual aspects like personal knowledge resources, mental processes, and learning styles. Thus, where the two prospective trends mentioned first constitute merely a profiling of the discipline within the directions in which it has been developing for the last 20 years, this last mentioned shift of attention may lead to a major paradigm shift in the discipline.

See also: Cognitive Linguistics; Communities of Practice; Conversation Analysis; Conversational Analytic Approaches to Culture; Critical Discourse Analysis; Dictionaries; Education in a Former Colonial Language; Education in a Multilingual Society; Foreign Language Teaching Policy; Formulaic Language; Functionalist Theories of Language; Genre and Genre Analysis; Human Language Processing: Connectionist Models; Human Language Processing: Symbolic Models; Institutional Talk; Language of Legal Texts; Language of Tertiary Education; Legal Genres; Legal Translation; Legal-Professional Language in Jury Trial; Lexicography: Overview; Medical Discourse and Academic Genres; Medical Discourse: Doctor–Patient Communication; Modularity of Mind and Language; Shared Knowledge; Sociolect/Social Class; Standardization; Stylistics: Pragmatic Approaches; Technical Translation; Terminology, Term Banks and Termbases for Translation; Text and Text Analysis; Visual Semiotics.

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Languages for Specific Purposes: Pedagogy

A Johns

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The principal tenet of specific purposes language teaching (LSP) is that of 'specificity': each pedagogical situation and each group of learners is considered to be new and different. Ideally, a unique curriculum and collection of classroom activities is designed for each group of students and teachers in every new context. No single approach, no new or old orthodoxy, is appropriate for all pedagogical situations. Thus, central to LSP pedagogy must be the determination of the unique characteristics of each teaching/learning situation, and the exploitation of these characteristics for development of syllabuses, of classroom activities, and of evaluation and assessment.

Good LSP curricula and teaching require skills, research techniques and sensitivities that are not necessarily characteristic of 'general' language classrooms; for in LSP, the authentic world must be brought to the students, and they must learn to interact with the language as it is spoken and written in target situations. Thus, LSP teachers and curriculum designers are much more accountable than 'general' language teachers. They must be more flexible and willing to negotiate with both experts in the target situation and with the students, who are often quite familiar with the target language situation.

Specific Features of Pedagogical Contexts

Several aspects of the 'specificity' focus required in LSP are critical to curriculum development and pedagogy. First is the role of the target language in the situation in which it will be taught, i.e., the sociolinguistic context. The broadest interpretation of this principle is that an LSP course in a foreign language situation will have to be taught differently from one in a second language situation. English for Academic Purposes (EAP) in China, for example, will have considerably different objectives and classroom activities than EAP in the United States, UK, or another English-speaking country. LSPS also differ in terms of client populations and target-language features. Immigrant workers in second language situations often study the languages of the workplace (also called 'vocational languages'). In a foreign-language context, LSPS tend to be concentrated in academic or international areas, the latter of which include professional languages for negotiation and trade and the languages of the air and sea.

Related considerations include the history and politics of a target language in a pedagogical context. In North Africa, for example, the history of the competition between French and English and the political

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implications for studying each language influence LSP situations in public secondary schools and universities. Since most languages of wider communication have been the tongues of colonial powers or of privileged classes, the LSP curriculum is often considered to be political and is often scrutinized for cultural and political content by government officials.

The nature of the students within a specified context is also a prime consideration. Their proficiencies and their experiences with the target language as well as their first language experiences and backgrounds are central to educational planning. For instance, professionals in business, engineering and the sciences already conversant with the languages of their professions in L1 should experience a considerably different curriculum from beginning students whose understanding of domain-specific language is limited. Students who can read and write proficiently in their first languages will be enrolled in courses quite unlike those for students who are semiilliterate.

Students and professionals enter an LSP program with theories of how language is learned, e.g., including memorization, reading aloud, or drilling. These theories must also be considered in the development of teaching plans. Related to the learners' theories of language learning are their perceptions of the student/teacher role relationship. Some learners feel that the teacher is 'the boss' and should therefore be in sole control when it comes to determining what should be taught and how it should be presented. Other learners are comfortable with more consultative classroom organization, such as that found in collaborative learning, Whole Language Teaching and many communicative teaching environments.

There is a long history in LSP of examining students' needs and expectations; these are central considerations in LSP curriculum development. They can be divided into three categories: cultural–educational, personal and individual, and academic/occupational. Some LSP practitioners argue that the personal and individual factors should be the primary focus of LSP teaching, that one must start with students' present needs and interests, taking into account their anxieties and differences in learning styles, and emphasizing the pedagogical appropriateness of activities for specified learners. Others argue that with professionals and advanced academic students, in particular, academic and occupational goals, often long-term, should be the primary considerations.

Additional concerns entail the preparation, theories and proficiencies of teachers within a given pedagogical context. Teachers who have been educated in linguistics or language teaching pedagogy are often able to cope with a syllabus that is much more demanding than teachers who have been prepared in literature or another field – or who have had little preparation. Many teachers, especially in a foreign-language context, follow a single theory of language teaching such as Grammar–Translation or 'intensive reading.' Others have heard about certain methodologies and practices such as 'communicative language teaching,' but do not understand the principles and theories on which these approaches are based. Plans for LSP teaching curricula must consider teachers' backgrounds and theories; otherwise, the teachers may attempt to defeat the purposes of the curriculum designers.

In addition, there are many LSP teachers in the world whose proficiency in the target language is quite limited. Again, the choice of syllabus and language activities will have to be adapted for the language skills of the teachers, as well as for the students in the program.

Like students, teachers have visions of student/teacher role relationships. They, too, can believe that teachers are obligated to take the sole responsibility for classroom decision-making and learning. For these reasons, teachers must be an integral part of LSP curriculum development and training. If they do not accept the aims of a more learner-centered LSP program, for example, there may be conflicts between curriculum design intentions and classroom outcomes.

Another issue regarding teacher preparation and attitudes is unique to LSP: because all LSP teaching targets specific purposes settings and languages, many teachers are uncomfortable with their teaching assignments. In English for Specific Purposes (ESP), for example, the majority of the curricula deal with science and technology; however, most ESP (and LSP) teachers have been educated in the humanities. Some experts believe that the teachers' fears can be overcome when they realize that their job is to teach about language and not about content. However, others are concerned that teachers who do not understand the concepts, methods and aims of the specific purpose community (for example, of science) may become estranged and return to what they know, for example, the teaching of 'general' English from an easy-to-follow textbook.

Besides taking the various actors (i.e., teachers, students, politicians) within the pedagogical context into account, the LSP curriculum designers and instructors must study the nature of the oral and written language for which students are being prepared, and the role of the discourse identified in the sociocultural contexts in which students will be working or studying. Here, authenticity is the key to appropriate LSP pedagogy. There are differences of opinion as to the meaning of authenticity; however, in much of the world, the term refers to real, unmodified oral and

written discourse taken from the context in which students will be using the target language. In order to understand the authentic nature of discourses, or genres, pedagogies must link the language produced with the communities in which it functions. The real-world role of a text or discourse and its purpose and audience must be integral to an understanding of LSP curricula.

Because of the specificity of LSP teaching, new curricula and approaches must be constantly developed. Thus, good LSP pedagogy varies widely from country to country, from professional and occupational to academic life, and, within a specific area, from school to school and class to class. However, no approach can be isolated from other language teaching or from second language acquisition research. It must be acknowledged that there are trends in LSP teaching, influenced principally by 'general' teaching methodologies, by technology, and by language processing and learning theories. It will be the purpose of the remainder of this discussion to identify and discuss some of these trends.

Current Trends

Learner-Centered Approaches

As was mentioned previously, attention to the nature of learners is central to modern LSP teaching, as it is to much of 'general' language instruction. In its most extreme form, a learner-centered approach is based upon the principle that learning is totally determined by the nature and will of the students (Hutchinson and Waters, 1987). When discussing learner-centered pedagogies, it is essential to examine the issues of learner prior knowledge, language processing, and conceptions of tasks that influence classroom practices.

Exploiting learners' prior knowledge and experience is central to an understanding of a learner-centered pedagogy. Work in schema theory, based upon the connectionist view of language acquisition, has assisted teachers in developing pedagogies that draw upon students' knowledge of the content of the lesson (content schemata) and of the structure of the authentic discourses (formal schemata) (Carrell, 1983). When preparing for a language activity, students are given questions and activities that draw upon their often extensive first language schemata and experiences with the world, thus motivating interest and promoting familiarity with the demands of the task.

Learners also come to the classroom with specific styles for approaching learning, i.e., "cognitive, affective and physiological traits that are relatively stable indicators of how learners perceive, interact with and respond to the learning environment" (Reid, 1987: 87). Some researchers focus upon perceptual styles or learning channels: the visual, auditory, kinesthetic and tactile. Others are interested in ability to deal with ambiguity, noting that learners may be convergent, i.e., seeking closure or resolution (a style encouraged by math and sciences) or divergent, those who enjoy evaluation, criticism, and problem-solving (often students from the humanities and social sciences). Learners also have preferences for classroom organization, e.g., many of the learners in LSP contexts are field-independent, i.e., they would prefer to complete a project alone rather than in a group. In addition to styles, strategies for completing tasks are considered in a learner-centered curriculum. One of the most complete and well-developed systems of strategies appears in publications by Chamot and O'Malley (1986: 17). In their scheme, strategies can be divided into these categories:

> Metacognitive strategies: including executive processes for learning, monitoring one's comprehension and production, and evaluating how one has achieved an objective.
>
> Cognitive strategies, in which the learner interacts with the material to be learned by manipulating it mentally or physically.
>
> Social–affective strategies, in which the learner either interacts with another person in order to assist learning, or uses some kind of affective control to assist learning.

Closely related to the issue of strategies is that of language processing. From the 1980s, interest in the relationship between first and second language processing has grown, both in reading and in writing. Of particular interest are the studies of process transfer by second-language writers in specific purpose situations. For example, St John (1987) discovered that Spanish scientists writing in English were able to draw extensively from their prior knowledge of content and research article form. They were therefore able to concentrate upon their principal concerns: precise language and the development of specific article sections. These and others' insights into the processing of written texts have led to curricula that prepare LSP students for reading and writing by assisting them in activating the appropriate schemata, in drafting texts and revising, and in helping them to consider audience and purpose as they comprehend and produce text.

In learner-centered approaches, course design and teaching often become negotiated, dynamic processes, since needs, expectations, and student resources vary with each group and within a single course sequence. This does not mean that students are in total

control, by any means. However, it does suggest that LSP teachers must take into account student learning styles, strategies and language processing approaches. And, since research indicates that students benefit from expanding their strategies repertoire and from developing a metacognitive awareness of their text processing, LSP teachers should assist students in becoming more flexible and more aware of their own learning styles and approaches.

Genre-Based Approaches

Whereas some curricula begin with the nature of the learners and are designed to expand upon learner strategies and metacognition, others are sensitive to the discourse community in which the learners will be functioning, e.g., an international business, an academic department, a tourist agency, or a factory. In these genre-based curricula, the discourses from the target speech community are studied, preferably by the students themselves, in terms of text roles in the target context; for the structure, styles and purposes of discourses are defined by the communities in which they operate (see Swales, 1990).

A discourse community is a group of likeminded people with common goals and shared ways of looking at the world. Members communicate with one another through a variety of genres that serve the community's purposes, e.g., faxes, e-mail, newsletters, research articles, reports, and memos. Though discourse communities may produce the majority of genres in a single language (e.g., English) in many of the sciences, members may share values and aims that are realized in a number of different languages.

In genre-based approaches, students are immediately exposed to exemplars of genres written in the target language from within identified discourse communities. Through instruction or induction, students identify the purposes, macrostructures and linguistic features of these genres and relate their findings to the purposes of the genres within the discourse communities.

How is this done in classroom practice? One example may suffice. In academic purposes settings, students (or teachers) can act as ethnographers, interviewing experts and collecting realia from the target setting. If the community is a group of international agronomists, for example, students interview practicing agronomists to identify those genres that are central to the community, e.g., academic articles, dissertations, and newsletters. They compare various exemplars for a number of elements, e.g., macrostructure, grammar, lexicon, and metadiscoursal features. The discourses they have analyzed then become the texts for the LSP class, as students attempt to produce their own versions and to compare them with the texts by experts. Thus, in a genre-based class, the sequence of activities is (a) expert interviews, (b) collection of genres, (c) genre analysis, (d) preliminary conclusions about genres' purposes and features, (e) student genre production, and (f) evaluation by experts.

Task-Based Approaches

'Task' is – and probably will remain – ill-defined in the literature, yet the concept has become increasingly important to LSP, for it meets criterial demands and can be suitable for either a learner-centered or a genre-based approach. In learner-centered curricula, tasks are seen either as learner actions or as learner representations of tasks. 'Doing' or action tasks are related in a manner much like the behavioral objectives of the 1950s: 'Learners will use Wh-questions in controlled drills,' or 'Learners will identify the main points of a text.' Though dated, these 'doing' tasks continue to provide structure and guidance for many curricula. A more current expansion on the 'doing' concept comes from the Notional–Functional language teaching advocates. For them, 'doing' can be divided into three categories: an action sequence, a notional–functional description, and a list of teaching points. An action sequence might be 'A person arrives at a party'; the description, 'Meeting strangers, introductions, first names,' and the teaching points would be "I'm Mohamed. She's Maria. I would like you to meet my wife" (Corbel, 1985: 78).

A learner-centered task definition of the early 1990s, 'task representation,' originates in the writing process literature. In this realization, the manner in which the learners mentally represent a task which they are given is central to learner success or failure. Thus, if learners misconstrue the audience or context for a writing task, they will find it difficult to produce an acceptable written product. Likewise, if the learners misread a text because their mental representation is not consistent with that of the text writer, their comprehension will not be complete.

Others speak of abilities rather than actions as central to task completion. They list as objectives phrases such as the following: 'Students will develop the ability to assimilate new concepts and information associated with a specific subject,' 'They will be able to use linguistic resources to perform *x* task,' or 'They will understand particular modes of inquiry within a community.'

As can be seen from the last of the two definitions discussed, 'task' has become an important term both to learner processing studies and to understanding the demands of the target discourse community and its

genres. Doyle (1979) has developed an appealing, global definition to guide pedagogues:

> The term 'task' focuses attention on three aspects of students' work: (a) the products (or genres) students are to formulate, (b) the operations that are to be used to generate the product, i.e., the process, and (c) and the givens, the resources available to students in accomplishing the tasks (Doyle, 1979: 163).

These are some of the definitions of task that are influencing LSP teaching and curriculum development. Because of the plethora of definitions and because there is no agreement upon task difficulty or breakdown of tasks into mini-moves, introducing and sequencing of tasks in a curriculum is problematic. Nonetheless, task-based approaches, considered more authentic and holistic than national/functional or other alternatives, have been embraced by key figures in the LSP movement.

Technological Influences

New definitions of literacy have begun to appear in the literature which will have a major impact in the twenty-first century upon the understanding of LSP teachers' roles and instructional aims. The computer is both widely available and can be used for many different purposes, including word processing. Because of this, it has become a necessary literacy tool in the lives of many LSP students, whatever their academic or professional/vocational goals. Thus, computer literacy, involving word processing and, in some cases, programming, is a fundamental aim in many LSP courses. Car mechanics must not only find the mechanical problems, but they must input the exact terms to cue an appropriate output. Businesspeople must read and exploit printouts, access bulletin boards, and make use of networks to communicate with their colleagues worldwide.

The technological demands of LSP settings include as basic a skill as typing and advanced skills in communication and programming. To meet these demands adequately, many LSP settings are computer labs in which students network to collaborate or peer review their writing, or use the computers to communicate with members of worldwide discourse communities.

Evaluation of Curriculum and Teaching

In LSP, evaluation leads to change. The inadequate LSP curriculum is one that is overwritten or inflexible; the appropriate curriculum provides for change and input by all of those involved in its success. Because the curriculum must be specific to students' needs and their target discourse communities, teachers and students continually review the goals and purposes of their courses. Students are given opportunities to reflect upon the value of a particular classroom activity or text, in terms of their own learning styles and processes and their understanding of program goals. They can be asked, for example, whether they understood the purposes of what was being taught, whether they already know how to do an activity, whether an activity provided appropriate variety or focus, whether it assisted them in gaining understanding of the tasks they must perform, and whether they believe that they could transfer the task or use the texts in real world settings.

Teachers can also keep reflective evaluations, journals of what went well and what did not. They might ask themselves some of the following questions as they are involved in curricular revision: 'Were the needs assessments accurate and complete?' 'Were the needs assessments accurate and complete?' What do we still need to find out about students or about the target community?' 'Are the materials, methods, and activities appropriate to the newest assessment of student needs?' 'What changes should be made?' 'Are resources for teachers and students appropriate?' 'Where can we get additional resources?' 'Are learner strategies adequate?' 'What alternative strategies should we be encouraging?' 'Do learners attend regularly, apply themselves, and practice outside of class?' 'If not, why not?'

Student Assessment

Student assessment is another issue that is central to the success of a curriculum, especially in ESP programs, which are highly accountable. Though testing is an area of LSP that has been generally neglected, much can be done to demonstrate student abilities and knowledge. One important area of assessment, especially in learner-centered curricula, is of self. Several types of self-assessment measures are suggested in the literature, depending upon the goals of the assessment process. There are, for example, selfassessments of writing or reading, in which students are asked to reflect upon the success of their approaches to particular texts. There are attitude and motivational assessments as well. Peer assessment is also central to the learning process; students can be asked to consider criteria for discourses, then to evaluate the written or spoken work of their colleagues.

More traditional tests are for placement, proficiency and achievement, all of which are somewhat suspect within the LSP community. There are a number of reasons for these suspicions, the principal ones

being that it is very difficult to test students on the real-world tasks that they will be performing in discourse communities for these tasks are very complex and task-graders are generally not target community experts. Nonetheless, tests do exist, principally because it is necessary to demonstrate student progress to clients and administrators. Perhaps the best-known and most universal LSP examinations are for English: the American TOEFL which is designed to predict general academic success, and the British Council ELTS modular test, in which various forms are available for students in a number of academic disciplines (e.g., physical, social, medical sciences).

Because specific purpose language teaching requires specific purpose testing, however, the best assessments take place at the local level. One promising area of assessment comes from the Portfolio Movement, an important contribution to the teaching of writing. Student portfolios, developed over time, contain student- and teacher-selected exemplars of work that is central to course objectives. Throughout the course, students reflect upon their portfolio entries, another method for self-assessment and evaluation of growth. One example of portfolio for general academic purposes students is this: through questionnaires and interviews with subject specialists, students and faculty determine the generic tasks that appear to cross disciplines and therefore to be required in some form by all the faculty, e.g., evaluative summaries, note-taking, critical responses to readings, and analysis of data. Then throughout the LSP course, students complete these tasks and select and reflect upon task examples in their portfolios. Teachers evaluate these tasks using specific, task-based criteria. When the term is over, the students have evidence for the academic faculty of their ability to perform the generic tasks assigned.

Conclusion

Hutchinson and Waters, in their influential work (1987), speak of ESP (and LSP) as chance-taking approaches, the 'Wild West of ELT.' They also claim that LSP is the most demanding of language-teaching experiences for everyone involved. Because there are no orthodoxies as guides, teachers are faced with evolving curricular challenges. Because the teacher is obligated to prepare the students for the real world, there are new realms of knowledge and skills that must be dealt with and individuals from target discourse communities (e.g., subject specialists) who must be consulted.

Though this article has touched upon some current trends in LSP, there are many LSP courses throughout the world that do not reflect these trends. In many foreign language settings, such as in China and Japan and in parts of Latin America, there continues to be a strong emphasis upon analysis of microfeatures of texts without concern for the discourse communities in which the texts are written. Pedagogies result that are more typical of the 1960s than of the late 20th century (Swales, 1985). In many parts of the world, learner-centered methodologies are not deemed appropriate, either by the political/educational leadership or by the students. Though the understanding of technology is vital in many areas of the developed world (e.g., in the European Community), its use has barely touched other regions. In some learning contexts, subject or professional specialists are easily accessible. In others, teachers with an LSP mandate are working in relative isolation.

Nonetheless, the ideal of LSP remains: a pedagogy must consider student styles, strategies, expectations and needs seriously. It must consider, as well, the target language use contexts, in order to develop a syllabus and teaching practices that are specific to a new learning situation.

See also: Languages for Specific Purposes.

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Languages of Wider Communication

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Languages used to facilitate cross-linguistic communication among speakers of different languages brought together by processes of migration, trade, or travel, stretch back to the beginnings of recorded history. Some had extensive reach – covering much of the world then tied together by existing trade routes, such as the Silk Road, a loose network that linked the Mediterranean and East Asia – such as Soghdian (a language still spoken in present-day Tajikistan), and, at a later date, Persian (Foltz, 2000). But no language down to the past century could claim large numbers of speakers across the globe. For instance, while Latin served as a lingua franca in Europe for centuries, it had effectively no presence throughout Asia and Africa. One of the hallmarks of the most recent stage of *globalization* has been that the development of such a world language has become for the first time a possibility, and that English appears to have already attained that status or to be well on the way to doing so. Perhaps because the phenomenon is so comparatively new, while languages serving large expanses that formerly made up large segments of the world market, such as Persian or Latin, have been around so long, terms such as *world language* and *international language* – even at times *language of wider communication* – have tended to be employed, if not exactly interchangeably, then without clear demarcation. In their precise meanings, a *world language* must by its nature encompass the entire globe, while a language can be said to be *international* if it serves clusters of nations. For its part, a *language of wider communication* signifies one that provides a mutually intelligible medium for speakers in multilingual societies.

World Language

A *world language* is not simply the most widely spoken language in the world, or the one that is the official language in the greatest number of nations. To merit such classification, a language must have achieved a position of global preeminence in another key respect: its existence must have become a practical necessity to fill a wide range of functions brought to the fore by processes of globalization. The development of world language, then, does not represent the culmination of a linguistic process at all; it comes into being as the concomitant of larger historical trajectories, powerful forces that condition communication needs around the world. For most of the history of the world, there has been only the most remote contact between peoples in distant parts of the world. While a world market loosely existed from ancient times, the limitations of transportation and communication technology determined supranational regional zones as the largest effective units for which a lingua franca such as Persian, Arabic, or Chinese constituted a practical necessity. The need for a world language is not felt so long as communication is largely limited to bilateral relations between nations or take place in regional settings in which a particular international language such as Arabic or Spanish suits the purpose. World language requires a

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stage at which every point, or virtually every point, in the world is thrown into relation with every other, when global communications has become virtually instantaneous, and the trip from any place in the world to any other has been reduced to hours rather than weeks or months. It requires a structure of world trade that is truly multilateral – rather than one that transports goods and services within definite imperially defined channels only (as was the case during colonialism in Asia and Africa).

Such international relations throw together persons from many nations from diverse regions of the world into regular contact, and make ease of communication among them an economic imperative, requiring a recognized common linguistic medium, a world language (*see* **Intercultural Pragmatics and Communication**). Finding its basis primarily in the economic realm, world language also more and more penetrates technological, scientific, intellectual, political, and even the cultural realm, as the need for translation raises a barrier to the rapidity with which information is disseminated in the digital age. In such a case, the continued spread of a world language finds a strong impetus not only in political economy, as global trade represents an increasing share of the total, but through intellectual and cultural motives, too, as people around the globe are induced to learn it to further their wide-ranging objectives (*see* **Motivation and Attitude in Second Language Learning**).

On the other hand, a world language need not be widely spoken in every nation of the world, nor must most people in the world speak it, any more than earlier regional lingua francas such as Latin in Europe or Persian along the routes of the Silk Road were universally understood in the supranational political geographies they served. Yet, at a minimum, it would be reasonable to expect such a language to be widely spoken on every continent, to have an ever-growing number of speakers in every nation, and to have emerged as the single most important language of global commerce.

The world language would not necessarily have the most mother tongue speakers, a distinction that currently belongs to Chinese, with its 874 million speakers (Grimes, 1996). On the contrary, one of the salient characteristics of a world language, like that of a supranational lingua franca like Latin or Persian in an earlier epoch, is that the majority of its users would be non-mother tongue speakers, bilinguals for whom it represents a second language. For them, a world language serves global, as opposed to purely local, functions. It is an entry-point into global relations, and one that need not usurp or even threaten the entrenched uses of the other language(s) they speak.

Is English a World Language?

Most estimates place the total number of English speakers globally at between 500 million and 1 billion, the difference consisting mainly in how proficiency in the language is defined. The best indication of the status of English as a world language is provided by the number of people around the world who feel compelled to gain at least some knowledge of the language, irrespective of their level of ultimate attainment. For it is the motivation of hundreds of millions across the globe to learn English that gives the measure of the degree to which it has become the world language, there being no comparable phenomenon associated with any other language. The rise of English is also demonstrated by the increasing frequency with which it is being incorporated into school curricula (*see* **Language Policy in Multilingual Educational Contexts**), not only in "second language contexts" (such as India and South Africa) where it serves as a *language of wider communication* on the national scale (see below), but even in foreign language contexts (including China and Europe), though this distinction is somewhat losing its usefulness for the description of English. The entrenchment of English in the school curriculum in diverse societies throughout the world will tend to produce a greater proportion of English users globally over time.

While the nature of a world language seems to preclude the need for more than one, the possibility cannot be ruled out that another language of equal, or even greater importance, could emerge, either joining or replacing English in its position of preeminence. As Graddol (2004) has argued, rapid shifts in demography together with a restructuring of linguistic space by modern telecommunications may produce profound effects on language use by the middle of the 21st century, perhaps redefining how we think of languages (local, national, regional), and simultaneously transforming the notion of world language.

Development of World Language

There have been two primary paradigms employed to account for the linguistic effects of globalization that would give rise to a world language: modernization and linguistic imperialism. Modernization describes the spread of industrial production, technology, finance, and trade, the burgeoning of the middle class, and the birth of a consumer culture, among nations that were previously 'underdeveloped'. From this standpoint, the increasing use of a common language throughout the world simply represents the natural concomitant of the march of progress. In marked contrast, linguistic imperialism

finds in the spread of certain languages to the exclusion of others the exercise of Western, ultimately imperialist, hegemony, the extension into the cultural and linguistic realm of the political and economic control that the 'Center' has exercised over the colonial and neocolonial periphery for centuries. Both explanations take for granted that globalization, including the spread of English, represents an essentially Western-driven process, one of which the rest of the world catches up to or is incorporated into European/North American society, rather than a multi-polar process driven by no central hegemony. Brutt-Griffler (2002) shows, rather, the development of English into or toward the status of a world language to be considerably more complex, a process that includes numerous forces, economic, political, cultural, and intellectual, underlying globalization, combined with the active agency of its new speakers around the globe choosing to learn the language.

World Language and Language Contact

The development of a *world language* – as one spoken primarily by non-mother tongue speakers – should produce effects on the other languages of the world and on the world language itself. As a language of bilinguals, it is thrown into contact with languages throughout the world, leading to processes of language change. Certainly the spread of English has exerted an effect on other languages via language contact. This process ranges from the incorporation of English words into languages as diverse as German and Japanese, to the emergence of mixed varieties of other languages and English, for example, chiHarare, a mixture of Shona and English spoken in Zimbabwe.

At the same time, other languages have in turn exerted an influence on English. For English itself, entering a phase of the history of the language known as the World English phase, in which non-mother tongue speakers have proliferated until, as noted above, they now exceed the number of its mother tongue users, has produced highly noticeable changes. World English – the phase of the history of the language in which it functions as a world language (Brutt-Griffler, 2002) – has spawned *World Englishes*, often called non-native varieties of the language (Kachru, 1986) spoken in nations throughout Africa and Asia (see also World Englishes). It is contested whether there is any global standard of World English, and if so, what that standard might be. But it is clear that the growing number of speakers of new varieties of World Englishes increases their potential to exert a greater impact on international usage of the language.

Linguistic, Political, and Social Consequences of World Language

The implications of the development of a world language have been significant, ranging from concerns over its alleged connection to a loss of linguistic diversity, to questions of access to high-level proficiency in a language that often confers power and privilege to its speakers, to the use of such a language to transcend ethnic identity and traditional gender roles, to questions of the meaningfulness of the paradigm of nativeness within a language of primarily non-mother tongue users (*see* **Identity: Second Language; Nonnative Speaker Teachers**). Though all of these questions are important, none has received the attention that has been devoted to the fear that the global spread of English represents a causal factor in the endangerment of languages. Graddol (2004) notes, "Many believe English will become the world language to the exclusion of all others." It has been strongly suggested that in Africa, for instance, the spread of English "is leading to the top-down displacement of numerous other tongues" (Nettle and Romaine, 2000: 144), a contention that has been challenged by others (Mufwene, 2001, 2002). Indeed, if such were the case, we would expect to find gains in the number of native speakers of English in Africa proportionate to the loss of those of disappearing languages, something the statistics do not appear to support. Rather, as Brutt-Griffler (2002) has argued, the spread of English as a world language produces not monolingual English speakers but bilinguals (see also Bilingualism and Second Language Learning). Graddol (2004) remarks, "English will indeed play a crucial role in shaping the new world linguistic order, but its major impact will be in creating new generations of bilingual and multilingual speakers across the world."

As English is learned in many multilingual contexts at an earlier age and reinforced by exposure gained through various media, new and old (Berns and de Bot, 2004), the distinction between native and non-native speakers of the language may be increasingly blurred, as fluency in it may be used as an 'exit visa' from ethnic identity and traditional gender roles (Mazrui, 2004). The continued growth of English as a world language will prompt ever-greater concerns about access to the language for all members of society, and not simply for those who can afford to buy it, and about the economic and intellectual advantages knowledge of such a world language can confer.

International Language

Though the rapid growth of the world language over the last century has taken attention away from other

international languages, a large number continue to play a vital role in the modern world, as they have for at least past millennia and will continue to do for the foreseeable future. International languages are most typically associated with the facilitating of international communication – a function that in past centuries Latin, Persian, Greek, Sanskrit, Turkish, and French all played – and the linking of diasporas across wide geographical expanses. In the modern world, however, particularly with the emergence of a world language, their primary role seems to be developing into the maintenance of supranational economic, cultural, and, within certain limitations, ethnic zones (set off by the use of, for example, Arabic, Swahili, Chinese, Spanish, Portuguese, or French). In some cases, such as Arabic or German, these represent a lack of correspondence between ethnolinguistic identity and national boundaries, as Arabs are dispersed over more than twenty nations on two continents and German is given official or special status in eight European nations. In other cases, such as French, its existence as an *international language* reflects a colonial legacy, in which most of the thirty-four nations in which French has a special status are former African or Caribbean colonies of France (see Table 1) – nations in which generally most people do not speak French as a mother tongue. A variation of this imperial case is illustrated by languages such as Spanish, which though introduced into the Americas as an imperial language, is now the mother tongue of the majority of people in more than twenty nations in the Americas, which now dominate the Spanish-speaking world. And in yet other cases, such as Swahili, an international language may constitute the expression of emerging postcolonial nationalism that plays out in a supranational context – in this case East Africa. Though Swahili is not originally indigenous to the region and has not been the mother tongue of the vast majority of its peoples, it has at least begun to take on that function for increasing numbers. Another group of international languages, of which the largest is Chinese, are more nearly expressions of a diaspora.

Table 1 Number of nations in which international languages are given some official status

1. English	63
2. French	34
3. Spanish	23
4. Arabic	23*
5. German	8
6. Portuguese	7

Ammon, 1994, p. 1726; *Crystal, 1997a, p. 359.

The categories listed above need not be mutually exclusive. For instance, Portuguese is the official language in five African nations, though it is not for the most part the mother tongue of the majority of the peoples in those nations, and yet, like Spanish in the Americas, has become the mother tongue of the majority of the largest lusophone nation, Brazil. French itself, like German, is spoken in several European nations – as well as by a diaspora population in Canada. Russian has spread to neighboring countries partly as an imperial language learned as a second language by peoples incorporated into the Russian empire and partly via a large Russian-speaking diaspora in those nations. In other cases, like Kurdish, the language can be called international, as it crosses national borders, but only because the Kurds have been denied nationhood by the three more powerful states in whose territory their would-be homeland lies. This also brings out a significant distinction between *international* and *world*, because international is based on the original construction of the *national*, world is not.

Major International Languages: A Statistical Picture

The major international languages can be distinguished through an examination of some key statistics, such as those in Tables 1 to 4, which show the number of nations in which official status is accorded to particular languages (see Table 1), and which show the number of mother tongue speakers (see Table 2), total speakers (see Table 3), and second language speakers of selected languages (see Table 4). Tables 5 through 7 provide proportions of print publications in different languages in the sciences (see Table 5 and Table 6) and humanities (see Table 7) and Table 8 shows the percentage of web pages on the Internet (see Table 8). Statistics by themselves can be revealing, but they only tell part of the story. For example, it

Table 2 Number of mother tongue speakers of 10 languages, in millions

1. Chinese	874
2. Hindi	366
3. Spanish	358
4. English	341
5. Bengali	207
6. Arabic	202*
7. Portuguese	176
8. Russian	167
9. German	100
10. French	77

World Almanac, 1999, p. 700; *Grimes, 1996.

Table 3 Total number of speakers of 11 languages, in millions

1. Chinese	1052
2. English	700+*
3. Hindi	487
4. Spanish	417
5. Russian	277
6. Bengali	211
7. Arabic	202
8. Portuguese	191
9. Indonesian	170
10. French	128
11. German	128

World Almanac, 1999, p. 700; *approximate lower estimate, Crystal, 1997b, p. 61.

Table 4 Numbers of second language speakers of 10 languages, in millions

1. English	300+*
2. Mandarin Chinese	188
3. Indonesian	140
4. Hindi	120
5. Russian	110
6. Spanish	59
7. French	51
8. Tagalog	40
9. Urdu	40
10. German	28

World Almanac, 1999, p. 700; *Crystal, 1997b, p. 54.

Table 5 Languages of articles indexed by *Chemical Abstracts* by year, in percent

	1978	*1998*
English	62.3	82.5
Chinese	0.3	5.9
Japanese	4.7	4.5
Russian	19.5	3.1
German	5.0	1.6
French	2.4	0.5
Polish	1.1	0.3
Other	4.7	1.6

Jean Laponce, 2003, p. 60.

Table 6 Percentage of languages used in natural science publications, 1980 to 1996

	1980	*1984*	*1988*	*1992*	*1996*
English	74.6	77.1	80.5	87.2	90.7
Russian	10.8	9.2	6.9	3.9	2.1
Japanese	2.3	2.5	2.1	2.3	1.7
French	3.1	2.4	2.4	1.6	1.3
German	3.5	3.3	2.9	1.6	1.2

Ammon, 1998, p. 152.

is clear that English has no rival as an international language, strengthening its claim as the world language. French, sometimes said to be a challenger, or a "big language" (Graddol, 1997), clearly does not stand out as having the same importance on a global scale, as shown by its placement as a distant sixth as a language of publishing in Chemistry, the discipline for which the most accurate statistics are available (82.5% for English, 0.5% for French, see Table 5), or fourth and second. Respectively, in the natural sciences (90.7% to 1.3%, Table 6) and the humanities (82.5% to 5.9%, Table 7) as compiled by Ammon (1998). French also ranks only fifth in number of web pages (68.4% to 3.0%, Table 8). And while French is second to English in the number of nations in which it is an officially recognized language (63 to 34, Table 1), when we examine total numbers of second language users (Table 4), we find that French, with some 50 million estimated users, ranks not only behind English (300 million+), but also Chinese (188 million), Indonesian (140 million), Hindi (120 million), and Russian (110 million). While such numbers, however, give a very approximate measure of significance as a *language of wider communication* (see below), it does not necessarily reveal much about a language's international significance. For instance, Indonesian and Hindi are mainly confined to the national borders of Indonesia and India, while French second language speakers lie mainly outside of that nation, as the number of nations in which French serves as an official medium (34) demonstrates, as compared to that of Indonesia and Hindi (1 in each case). Taking the statistics as a whole, however, we can conclude that French is an internationally significant language within the former French colonial world, but, as the statistics on scientific publishing demonstrate, it is not a language commonly chosen when the goal is to reach a world audience.

In the same manner, the contention that German represents a major international language as demonstrated by its official status in 8 nations (Ammon, 1994), placing it behind only English, French, Spanish, and Arabic, and ahead of Portuguese, looks quite different upon further analysis. Because all of those nations lie in a concentrated portion of Europe, and given estimates of only some 28 million second language speakers, it would be more accurate to describe German as a regionally important language in central Europe, of the same type, but not on the same scale, as Arabic (official in 22 nations and with more than twice the number of speakers).

The acceptance of a language as official also reflects neocolonialism in politics that may obscure

Table 7 Percentage of languages used in humanities publications, 1978 to 1995

	1978	*1982*	*1986*	*1990*	*1995*
English	69.1	69.9	70.6	71.7	82.5
French	6.6	5.9	5.9	5.9	5.9
German	5.2	6.0	5.4	5.7	4.1
Spanish	3.6	3.6	4.0	3.8	2.2

Ammon, 1998, p. 167.

both actual distributions of language users and their increasing importance globally. For example, while European languages are often official in former colonial settings, other languages do not receive similar endorsement. Thus, while German, though spoken by only 1.5% of the population of Belgium, has official status there, Turkish is not recognized as such in Germany, though its speakers make up 2.4% of the population, and though it is recognized as such in Bulgaria. There are some 15 million Turkish speakers outside of Turkey, not far behind the total of 17.5 million German speakers outside the main German-speaking nations of Germany and Austria.

Functions of International Languages

If we were to conceive the functions of an international language to include linking diasporas to mother countries, most of the world's larger languages could be said to be international in an age of increasing transnational migrations. International languages as such rather serve more institutional functions. They generally confer a sense of political affinity among groups of nations, whether, as in the case of Arab nations and Spanish-speaking American nations, as a sort of proto-nationalism, or, as in the case of France and Belgium and their former colonies, something more along the lines of a sphere of influence with colonial or neocolonial overtones. They may also facilitate the creation of a common market, whether institutionalized or more informal, particularly but by no means exclusively in the area of cultural productions, such as the Spanish-language film and music industry in Latin America. International languages allow global telecommunications giants to beam information in television signals via satellite to large international audiences – as for instance the Arabic station Al-Jazeera. Finally, they facilitate educational ties between nations sharing a common language.

Impact of English as a World Language on the Functions and Usage of International Languages

While international languages retain their importance in linking language groups across national and continental boundaries, they seem to be losing importance where the goal is to communicate with a global audience. There is thus a pronounced trend toward English as the medium for the publication of scientific research (Tables 5, 6, and 7). Table 6 shows that of the articles indexed by *Chemical Abstracts* the percentage in English increased from 62.3% in 1978 to 82.5% in 1998, while the proportion in every other language except Chinese fell. The two languages that followed English in 1978 experienced particularly dramatic declines thereafter, Russian (19.5% to 3.1%) and German (5.0% to 1.6%), while French fell off from 2.4% to just 0.5%. Ammon's (1998) figures (Table 7) demonstrate the same trend the natural sciences as a whole. English shows similar dominance on the Internet (Table 8). In 2000, 68.4% of web pages were in English, with only Japanese (5.9%) and German (5.8%) registering more than 5%, followed by Chinese (3.9%), French (3.0%) and Spanish (2.4%) above the 2% level (Maurais, 2003).

Table 8 Percentage of web pages by language in 2000

English	68.4
Japanese	5.9
German	5.8
Chinese	3.9
French	3.0
Spanish	2.4
Russian	1.9
Italian	1.6
Portuguese	1.4
Korean	1.3
Other	4.6

Jacques Maurais, 2003, p. 22.

Languages of Wider Communication

A language of wider communication, also known as a *lingua franca*, provides a mutually intelligible medium for speakers in multilingual societies, to some extent replicating on the intra-national scale the function of world (or international) language(s) on the global scale – although world and international languages are languages of wider communication in the broadest sense of the term. There are three major categories of languages of wider communication:

- international languages which may not be indigenous to the region, such as English, French, or Portuguese in Africa, or alternatively may be indigenous, as in the case of Swahili in East Africa and Hausa in West Africa; English as a language of wider communication in Europe (Seidlhofer and Jenkins, 2003) represents something of an intermediate case, because English is indigenous to a

portion of the region but not in continental Europe where it plays its specific role;

- languages of indigenous origin that have come to fill the role of national (or regional) languages, though they are not the mother tongues of the majority of the people, for example, Bahasa Indonesia (Indonesia), Tagalog (Philippines), or Hindi (parts of India);
- languages of local and recent origin that have arisen at least in part specifically to fill the function of a language of wider communication; often called *urban vernaculars*, they are mixed languages containing elements of local languages, and sometimes international languages such as English or French; Isicamtho (South Africa), chiHarare (Zimbabwe), and Town Bemba (Zambia) number among them.

When English or French functions in this capacity, it tends to be referred to as a *second language*, to signal that it provides many speakers of a given nation with a medium in which to communicate when confronted with nationals outside the speaker's language group. In such cases, the second language may or may not be given official status, but it is generally adopted for a wide range of societal functions: economic, political, and cultural. In the second case, the languages are always official, and are also designated as national, as they are held to embody the national aspirations of the people, as may also be the case with an international language such as Swahili that is indigenous to the region. In the case of *urban vernaculars*, they are seldom given institutional recognition of any kind, and in many cases have only begun to be distinguished as languages in their own right. In the highly fluid circumstances in which they arise, they may even become transformed into the mother tongues of at least a portion of their speakers and may also be making their way into the classroom (Childs, 1997).

When a language is spoken in only one or a few countries as a second language by many of its speakers, that constitutes evidence that it functions as a language of wider communication (*see* **Lingua Francas as Second Languages**). Two such languages are Swahili, which according to some estimates has as few as 5 million mother tongue speakers and 30 million second language users, and Bahasa Indonesia, with some 17 to 30 million native speakers as compared to 140 million non-mother tongue users. Ten major languages of wider communication, with estimates of their number of second language speakers, are given in Table 4.

Functions of Languages of Wider Communication

Languages of wider communication (*lwc*) fill different functions, from the overtly political and institutional characteristic of top-down statist language planning agendas to bottom-up processes that may even go unnoticed by policymakers. When designated as official or national languages, *lwcs* can be used to promote nationalism in multi-ethnic societies, and may be associated with particular political forces or ideological aims – a role that may be as divisive as it is unifying. Hindi in India, for example, is widely associated with Hindu nationalism and viewed with suspicion, if not hostility, by large sections of the population. At the other extreme, the *lwc*s that have arisen in urban African contexts have been the spontaneous products of the mixtures within them of large numbers of speakers of various – and often closely related and mutually intelligible – languages. Closely connected, as Mufwene (2004) has pointed out, to the encroachment of urbanization on "the function of most indigenous languages as markers of ethnic identity," these languages may be used to deemphasize ethnic identity or to signal urban identity. Despite the latter connotation, or perhaps indeed because of it, such mixed languages, including South Africa's Isicamtho, chiHarare in Zimbabwe, Lingala in Congo, Town Bemba in Zambia, and Wolof in Senegal, appear to be spreading apace to rural areas, too. Because they are largely confined to non-elites, such *lwc*s, though probably the fastest-growing languages in many places, have so far received little, if any, official recognition.

See also: Bilingualism; English: World Englishes; Ethnolinguistic Vitality; Identity and Language; Identity: Second Language; Intercultural Pragmatics and Communication; Language Adaptation and Modernization; Language Change and Cultural Change; Language Maintenance and Shift; Language Planning and Policy: Models; Language Policies: Policies on Language in Europe; Language Policy in Multilingual Educational Contexts; Language Spread; Lingua Francas as Second Languages; Literacy Practices in Sociocultural Perspective; Migration and Language; Minorities and Language; Motivation and Attitude in Second Language Learning; Multiculturalism and Language; Multilingualism: Pragmatic Aspects; Native Speaker; Nonnative Speaker Teachers; Sociolinguistic Crossing; Sociolinguistics and Political Economy.

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Langue d'oc *See:* Occitan.

Lao

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Number of Speakers and Genetic Relationship

Lao belongs to the southwestern subgroup of the Tai language family. It is the national language of Laos and the first language of approximately 70% of the population of 5.4 million. There is considerable regional variation in dialects but the Vientiane dialect is regarded as standard Lao and serves as a lingua franca for the country's many ethnic minorities. Lao dialects are spoken by a further 12–15 million people in northeast Thailand, and there are sizeable overseas Lao communities in both France and the United States.

Lao bears many very close similarities to Thai and, because of Thailand's economic and cultural dominance, most Lao people understand spoken Thai. Thai radio and television broadcasts, Thai pop songs, videos of Thai movies, and foreign movies dubbed in Thai are all popular in Laos; many educated Lao people also can read Thai. Thais, however, have more difficulty understanding Lao, partly through limited exposure to the language, and partly through a lack of desire to understand it, as they regard Lao as a language of low prestige.

Phonology and Grammar

Lao is a tonal language. Standard Lao has six tones: low, mid, high, rising, high falling, and low-falling. The vowel and consonant systems closely resemble those of standard Thai; notable difference are the existence of an

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initial /ɲ/ and the absence of /r/ in spoken Lao. Grammatically, too, there are close similarities to Thai: word order is *subject-verb-object*, nouns and verbs are not inflected, the pronominal system is complex and capable of conveying subtle degrees of relative status and intimacy. 'Classifiers' or 'count words' are used in noun phrases involving numbers.

Words of purely Lao origin are often monosyllabic. Sanskrit and Pali borrowings are numerous, and where they coexist with an indigenous Lao word they reflect a more formal or literary style. Other sources of loan words are Thai, Chinese, and Cambodian, although with Thai and Lao sharing many common basic words, the extent of Lao borrowing can be overestimated; many relatively recently coined Thai words have, however, been consciously absorbed into Lao. Despite the country's former colonial status, French loan words are relatively few.

Sample of Lao with Translation

khôy	dày	hùucák	káp
1st pers. pron.	to get to	to know (s.one)	with
láaw	jūu	hóoŋhian	
3rd pers. pron.	location marker	school	

'I got to know her at school'

Recent History

When the boundaries of present-day Laos were drawn up in 1893 under the terms of a Franco-Siamese treaty, the Lao-speaking population was divided in two, the majority paradoxically being in northeast Thailand. The French brought in Vietnamese to carry out much of the administration of their colony, and with French the medium for what little postprimary education existed, the Lao language suffered a loss of prestige, even among many of its own speakers. The decline of French influence and the rise of nationalism in the aftermath of World War II helped to improve the status of Lao. Although the communist government, which came to power in 1975, has Lao-ized the education system, introduced adult literacy programmes and attempted to teach Lao to the country's ethnic minorities, literacy rates remain low.

See also: Laos: Language Situation; Southeast Asia as a Linguistic Area; Tai Languages; Thailand: Language Situation.

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Laos: Language Situation

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The Lao People's Democratic Republic (Laos) is home to languages from at least four different 'genetic' groups: Tai (southwestern and northern branches), Mon-Khmer (Bahnaric, Katuic, Vietic, Khmuic, and Palaungic branches), Hmong-Mien (Hmongic and Mienic branches), and Tibeto-Burman (Lolo-Burmese branch). The precise number of languages spoken in the country is not known, due mainly to a lack of empirical data. Estimates vary between around 70 and around 120 distinct languages (Ethnologue 2004 lists 82). For a country of its size (smaller than the United Kingdom) and population (less than 5 million), Laos features a very high degree of linguistic diversity in global terms. This diversity is greatest in the country's hill and mountain areas, which account for some 70% of the land mass. Flatter stretches of land along rivers (especially along the Mekong River) are dominated by speakers of Lao.

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Historical Background

Mon-Khmer languages appear to have been spoken in Laos longer than languages of other families. They show greater geographical spread and greater internal diversity. This is particularly apparent among languages of the Vietic, Katuic, and Bahnaric subgroups spoken throughout upland areas of the country's south. Many of these languages are near extinction, with very few remaining speakers (e.g., Thémarou, with only a couple of dozen speakers). Other languages, while small, are still being learned by children (e.g., Tariang (Talieng) with about 4000 speakers), although none show the vibrancy of the northern Mon-Khmer language Kmhmu (Khmu), with some 300 000 speakers throughout northern Laos. Tai languages such as Lao have their origins in southwest migrations of Tai speakers from southwestern China, beginning some 2000 years ago (Enfield, 2003: 47–50). Like their modern descendents, these incoming Tai speakers were in search of flat riverside land ideal for their trademark 'ditch-dike' system of wet-rice cultivation. The success of Tai languages and their speakers is attested to by their present dominance of the region, with Lao the official national language of Laos (Enfield, 1999), spoken as a first language by around half the population (more than two million people). (There are also approximately 20 million residents of northeast Thailand whose native dialects are closely related to Lao.) Hmong-Mien speakers are the newest arrivals in Laos, descended from migrants coming southwards from China within the last 200 years (Culas and Michaud, 2004).

Language Contact, Sociolinguistics, Multilingualism

Laos's high degree of linguistic diversity results in intensive language contact in most parts of the country. Upland peoples maintain structured social relations across ethnicities and language backgrounds, and are normally multilingual (Bradley, 2003). By contrast, lowland-dwelling people of Lao ethnicity tend to be monolingual. Some minority languages serve as contact languages within restricted upland areas. For example, Ngkriang (Ngeq) is used in interaction among several Katuic ethnic groups in isolated Kalum district, Sekong province.

Lao is the official language of administration, education, and major economic activity, and hence all minority communities have regular contact with Lao. Minority men are often more skilled than women and children in speaking Lao due to greater contact with the language, for example, during military service. Official promotion of Lao as a national language is served in part by the development of Lao language media and education, but this is slow thanks to the country's very weak infrastructure. Authorities widely encourage (and occasionally force) migration by minority peoples from upland areas to more accessible lowlands, ostensibly to ease the burden of social development in this poor nation. Internal migration is widespread, and in many cases this accelerates the process of attrition and loss of minority languages, due to division of already fragile speech communities and their resettlement together with speakers of other languages, in closer contact with the Lao-speaking world. The result is a widespread and rapid shift to Lao.

The two most prominent and vibrant minority languages of Laos are Hmong and Kmhmu, both spoken by large populations, mainly in northern Laos. Hmong speakers in particular show no signs of abandoning their language in favor of Lao. Hmong has a roman orthography that is taught unofficially and is in widespread use in Hmong society (e.g., in advertising, development, private correspondence, etc.). This contravenes the Lao government's official stipulation that no minority language is to be written in any orthography other than the Indic-based Lao script.

International languages with a significant presence in Laos include Thai and Vietnamese. Laos's longest borders are with Thailand to the west and Vietnam to the east. Lowland communities along the Mekong River are in intensive contact with Thai via electronic media, as well as through seasonal migration of Lao workers to Thailand. Thai and Lao are essentially dialects, making Thai especially accessible to Lao speakers. Vietnamese is less widely spoken as a second language (despite large urban communities of expatriate Vietnamese in the lowlands), but is used for economic purposes by many minority peoples living along the Vietnamese border. Through the colonial period of 1893 to 1954 (Evans, 2002), French was widely used in national education and administration. The use of French as an international language has since steadily diminished in favor of English.

Linguistic Research and Reference Materials

Comparatively little scientific research has been conducted on the languages of Laos. Descriptive studies of Lao include traditional European-style grammars (e.g., Hospitalier, 1937; Royal Lao Government, 1972; Reinhorn, 1980), dictionaries (Kerr, 1972; Reinhorn, 1970; Rehbein and Sayaseng, 2000), pedagogical materials (e.g., Yates and Sayasithsena, 1970;

Hoshino and Marcus, 1981), and work of a more technical linguistic nature (e.g., Roffe, 1946; Morev *et al.,* 1972; Crisfield, 1978; Wayland, 1996; Osatananda, 1997; Enfield, 2003, 2005). Available research on minority languages includes dictionaries (e.g., Lindell *et al.,* 1994; Preisig *et al.,* 1994 [Kmhmu]; Ferlus, 1999 [Nhaheun]), text collections (e.g., Costello and IRLCS, 1993 [Katu]), grammatical descriptions (e.g., Jacq, in press [Jruq]; Enfield, 2004 [Kri]), comparative word lists (e.g., Kingsada and Shintani, 1999; Wright, 2003), and historical-coparative work (e.g., Diffloth, 1982; Peiros, 1996; Sidwell, 2000; L-Thongkhum, 2002). Field research on languages of Laos is hampered not only by difficulties of transport and communications but also by severe restrictions imposed by the socialist government on research in the social sciences.

See also: Language Change and Language Contact; Lao; Mon-Khmer Languages; Multilingualism: Pragmatic Aspects; Standardization; Tai Languages.

Language Maps (Appendix 1): Maps 105, 106.

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Laotian *See:* Lao.

Lascaris, Jean (Laskaris, Janus) (ca. 1445–1534)

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Jean Lascaris was a distinguished Byzantine scholar who, along with other Byzantine scholars, greatly influenced mainly Western European but also Eastern European thought by reintroducing original Byzantine scholarship to the mainstream of academic activity after the fall of Constantinople in 1453. He is usually described as the younger brother of Constantine Lascaris.

Jean Lascaris first came to Venice under the patronage of the Cardinal Bessarion, who sent him to Padua to study Latin. He then took refuge in Florence under the patronage of Lorenzo de Medici. Lascaris developed a series of activities to promote Hellenistic scholarship. He lectured on ancient Greeks, such as the orator Demosthenes, the historian Thucydides, the dramatist Sophocles, as well as on literary works. Twice he traveled to Greece to acquire many original Greek manuscripts. Representing Lorenzo de Medici, he negotiated with Sultan Bayezid II for the acquisition of those manuscripts. In the 1490s, the press of Lorenzo Alopa began to work with and for Lascaris in Florence. Following the expulsions of Medicis from Florence in 1495, King Charles VIII of France invited Lascaris to Paris, where he taught Greek. He held various public offices and served as the ambassador in Venice (1503–1508). Then he became a member of the New Academy of Aldus Manutius. It has been suggested that Lascaris was a friend of and influenced Manutius, but there is no acknowledgement. In 1515, Lascaris accepted the invitation of Pope Leo X to direct the Greek Academy of Rome. Francis I of France employed Lascaris with Bude to move the Blois library to Fontainbleau, creating the Royal Library, which later was to become the National Library.

Lascaris either wrote or edited a number of works and, most importantly, a number of *editiones principes,* such as *Anthologia epigrammatum graecorum cura Joannis Lascaris* (1494), *Didymi Alexandrini scholia in Iliadem* (1517), *Homericarum quaestionum liber* (1518, Porphyrius of Tyre), and *De veris Graecarum literarum formis ac causis apud antiques* (1556). The introduction of Byzantine scholarship through original Greek language became relevant to the debates of the defense of the vernacular languages first in Italy, with Alessandro Citolini (*La Lettera d'Alessandro Citolini in difesa de la lingua volgare*, 1540) and Sperone Speroni (*Dialogo delle lingue,* 1542). The latter, in an imaginary debate in which P. Bembo confronts L. Bonamico on the use of Latin, includes another dialogue opposing P. Pomponazzi and Lascaris on the value of various languages and dialects (cf., Padley, 1988: 63–64).

The works of Constantine and Jean Lascaris as well the Byzantine works circulating in Western Europe affected Eastern European thought, particularly through the Orthodox Brotherhood Schools first in Ukraine and later among the East Slavs. The Lviv Dormition Brotherhood (established in 1463) became the model for other similar schools and disseminated humanist Greek traditions through its schools and presses. The Lviv Brotherhood published *Adelphotes*, the first Greek grammar, in 1591. Greek grammatical thinking left a mark on many of the subsequent grammars, both Greek and vernacular.

See also: Language Planning and Policy: Models.

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Lasch, Agathe (1879–1942)

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Prevented by her gender and her Jewish religion from becoming an academic librarian, Agathe Lasch, born in Berlin on July 4, 1879, instead qualified as a teacher in 1898 and worked in Berlin and Halle until 1906, when, at the age of 27, she passed her *Abitur*, which would permit her to study at a university. Although women were admitted to Prussian universities at that time, in practice this depended on each professor's discretion, and the distinguished Berlin medievalist Gustav Roethe would not countenance them in his lectures or seminars. With Berlin thus closed to her Lasch studied first under the Halle phonetician and dialectologist Otto Bremer and then at Heidelberg, where in 1909 she took her doctorate under Wilhelm Braune with a thesis on the supplanting of Low German (Plattdeutsch) by High German (German, Standard) in Berlin in the 16th century (Lasch, 1910). Glowingly reviewed by Edward Schröder (*Niederdeutsches Jahrbuch 26* (1910), 151–154), her study of the linguistic interaction of the chanceries of the Brandenburg rulers with other institutions and groupings of writers would serve as an authoritative model for the investigation of linguistic development in other towns.

From 1910 to 1916 she taught German at Bryn Mawr College in Pennsylvania. Although she enjoyed her work there, once the United States was about to enter the European war, she felt that as someone who admitted to being passionate about only two things, German philology and Germany (Hartau, 2002: 11), her place was at home. Thus, in 1916 she returned to Germany to work with Conrad Borchling on a dictionary of Hamburg German. When the University of Hamburg was formally established in 1919 she was appointed *Privatdozentin*, and in 1923 she became the first woman there to be awarded the title of Professor. From 1926 to 1934 she had special responsibility for Low German. After Hitler's accession to power in 1933, the National Socialists demanded the removal of Jews from office. Despite the intervention of colleagues in Sweden and Hamburg, Lasch was forced to retire in 1934. This development, though devastating, was not unexpected. She had saved some money, and in 1937 she moved to Berlin to live with her sisters. Jews were banned from public libraries; her own library was confiscated and her pension payments ceased. Her attempts to find employment abroad came to nothing: the German government prevented her from accepting invitations she received from Dorpat in 1939 and later from Oslo. On August 12, 1942 she was arrested, deported to the '*Reichsjudenghetto*' at Riga and was never seen again. The books she was preparing, including a study of the language of Lübeck city clerks and a history of Low German, never appeared.

Lasch's lasting memorial is her work on Middle Low German. Her *Mittelniederdeutsche Grammatik* (1914), prepared at Bryn Mawr, represented a considerable broadening of her earlier studies on Berlin, covering the Low German dialects from the 13th to the 17th centuries, the heyday of the Hanseatic League. Of her *Mittelniederdeutsches Handwörterbuch* she published the first fascicles, covering A–E, between 1928 and 1934. The *Hamburgisches Wörterbuch*, begun in 1917, started appearing under the editorship of J. Meier and D. Möhn in 1985 and is expected to reach completion sometime after 2010. Lasch was particularly interested in the language of Berlin: her 1910 dissertation was followed by *Berlinisch* (1928). Her focus was on the history of the Low German language in its cultural and political context. Thanks to her, Low German studies have come to be recognized as a distinct field of enquiry, and but for her pioneering work it is unlikely that Low German would have qualified for inclusion in the European Charter for Regional and Minority Languages (1998).

Her fate resulted in an outpouring of commemorative essays soon after the war (Borchling, 1946; Korlén, 1947; Jaatinen, 1947) and again on her centenary (Peters and Sodmann, 1979; Meier, 1980). For an assessment of her work in the broader context of Jewish scholarship, see Maas (1992) and Hass-Zumkehr (2001). In 1971 a street was named after her in Hamburg ('Agathe-Lasch-Weg'), and in 1991 a triennial Agathe Lasch Prize for promising scholars was established.

See also: German; Germanic Languages.

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Lasswell, Harold Dwight (1902–1978)

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Harold Dwight Lasswell (1902–1978), American sociologist, political philosopher, social psychologist, and psychoanalyst, was born on Friday the 13th, in Donnellson, Illinois. He was the son of a humble Presbyterian minister and a schoolteacher. From the very beginning, Lasswell was intensely engaged in the social matters of his times. During his school years he was an editor of the school newspaper and a pupil actively involved in school life. When he was 16, he received a scholarship to attend the prestigious University of Chicago. He graduated from there in 1922, and, in 1926, he received his Ph.D. Lasswell then attended the London School of Economics and also studied in Geneva, Paris, and Berlin, where he first had the opportunity to study psychoanalysis for sociopolitical purposes. For the next eight years he taught at the University of Chicago as a professor of social sciences. He was also a professor at Milikan University and at Columbia University, but soon after that, in 1938, Lasswell left Chicago to teach at Yale University. In 1946 he became a professor of law and political sciences and, in 1952, became a full professor of political sciences at Yale. During WW II Lasswell was a director of War Communication Research at the Library of Congress in Washington. He also taught at the John Jay College of the City of New York and was a consultant for various departments of the federal government. During 1955–1956, he was the president of the American Association of Political Sciences. In 1963 Lasswell retired from Yale University.

On the one hand, Lasswell, as a political philosopher and theoretician, was highly interested in the mechanisms that rule the contemporary political scene. On the other hand, as a social psychologist Lasswell desired to investigate the ethics and the sociocultural factors that profoundly influence those mechanisms.

Lasswell's activity as a political theoretician brought about a formulation of an assumption that politics in general is a broader concept than just a simple field of human to human relationships. He wanted to prove that the notion of politics had a more complex nature that should be investigated from the psychoanalytic angle. He created the methodological basis for the study of contemporary politics which covers the activity of humankind on many levels. At the end of the 1920s and into the early 1930s, Lasswell became an orthodox follower of Freud's ideas concerning psychoanalytical psychology, and he applied those ideas to his political science research. Later, when the concept of psychoanalysis

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Lasswell's activity as a political theoretician brought about a formulation of an assumption that politics in general is a broader concept than just a simple field of human to human relationships. He wanted to prove that the notion of politics had a more complex nature that should be investigated from the psychoanalytic angle. He created the methodological basis for the study of contemporary politics which covers the activity of humankind on many levels. At the end of the 1920s and into the early 1930s, Lasswell became an orthodox follower of Freud's ideas concerning psychoanalytical psychology, and he applied those ideas to his political science research. Later, when the concept of psychoanalysis

was no longer fully efficient as far as its application to political research was concerned, Lasswell turned to investigating the theoretical basis of democracy and the means that should be taken to uphold it.

Lasswell's academic and scientific works can be separated into two distinct periods, early and late. In the first period, during the 1930s and 1940s, Lasswell was convinced that innate logic is fully functional only when accompanied by ethic values which an individual acquires during his or her upbringing. He also claimed that according to the Freudian concept of natural instincts (e.g., Oedipal's complex), personal motives for the sociopolitical activity of politicians are shaped by their moral values, learned in childhood. In one of his first books, *Psychopathology and politics*, he explains the complexity of the socioethic processes which shape the mental stability of a fully conscious *homo politicus*. Such an individual is a unique combination of motivations and certain interpersonal skills, which, to a very great extent, influences his or her political orientation. In his research, Lasswell pays particular attention to the concept of political propaganda and the credibility of politicians as actors on the political scene. In his famous 'Models of communication,' Lasswell explains how that message, as a basic ingredient of propaganda, goes:

> *Who (says) What (to) Whom (in) What Channel (with) What Effect*

'**Who**' is the side controlling the message transfer in the media, '**says what**' is the true subject matter of the transmitted message, '**to whom**' is the receiver of the final message, '**in what channel**' stands for the means applied to transmit the message, and '**with what effect**' is the impression that the entire message transmission makes on the text receiver. For Lasswell, propaganda is a technique of modeling people's activity and shaping the attitudes of social groups toward particular political issues. Lasswell views politics as a ruthless and hermetic system of a mutual dependency of individuals who should remain loyal to the system itself. The manipulation of symbols for political purposes is, according to Lasswell, immoral from the general assumption. In the 1930s and early 1940s, Lasswell's studies of the issue of personality and politics contributed greatly to behavioral science. However, in his works from the late 1940s, there was a gradual change in Lasswell's interests.

In the second period of his scientific and public activity (the early 1950s), Lasswell was a political scientist who laid the foundation of the American theoretical cultural neopsychoanalytical theory. In *World revolutionary elites studies in coerci* (published in 1965), Lasswell elaborates his definition of elites. He claims that there are three distinct basic needs of contemporary society, which political elites must satisfy in order to uphold their real political power: prestige, income(s), and the feeling of security for fellow citizens. According to a neo-Freudian concept of the ego-psychology (the self-sense system of a person), only political scientists possess the precise instruments to monitor the political tensions within an investigated social or ethnic group, to help the elites in sustaining the political system. The experts in political sciences should take responsibility for making the political system comprehensible and transparent to voters, and universal for the ruling elites. Lasswell's approach toward politics radically changed at the end of the 1950s and into the 1960s, when he started to promote the concept of politics directed at an individual. For Lasswell, a mentally and morally sane man is the basic element of a sane community. He claimed that contemporary societies needed, e.g., 'political psychiatrists' who would prevent war and global conflicts. According to Lasswell, political stability from a global perspective resulted from the bipolar system of balancing power between the USSR and the United States.

Lasswell was also deeply interested in the concept of democratic systems. In short, he explained that democracy is the effect of global stability. On the one hand, Lasswell was of the opinion that democracy is a political system that did not satisfy the needs of individuals, but rather the community as a whole. On the other hand, he thought that political crusades that were aimed at changing the general structure of a political system brought no results unless the individuals gained economic stability. Lasswell believed that in times when traditional ethic values were diminishing, and the threat of nuclear conflict was becoming more and more real, people gradually changed their attitude toward moral issues which were the permanent cornerstones of democracy.

In his research, Laswell applied only theoretical psychoanalysis. He never practiced as a clinical specialist; therefore, his research could be treated as an incomplete or a unilateral description of human personality functioning in real politics. It is vital to highlight that Lasswell does not criticize the idea of politics, or political ideas, but the manner in which politics is served to the average voter, citizen, and human.

See also: Media and Language: Overview.

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Latacz, Joachim (b. 1934)

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Latent Semantic Analysis

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Introduction

Latent semantic analysis (LSA) is a technique for creating vector-based representations of texts that are claimed to capture their semantic content. The primary function of LSA is to compute the similarity of text pairs by comparing their vector representations. This relatively simple similarity metric has been situated within a psychological theory of text meaning and has been shown to closely match human capabilities on a variety of tasks.

This article follows the developmental path of LSA, describing its historical context, showing how it computes and uses its vector representations, and then giving examples of the theoretical and empirical support for LSA and its current research directions.

How LSA Works

LSA (originally known as latent semantic indexing) was developed for the task of information retrieval, that is, selecting from a large database of documents a few relevant documents that match a given query. Previous approaches to this task included keyword matching, weighted keyword matching, and vector-based representations based on the occurrence of words in documents. LSA extends the vector-based approach by using singular value decomposition (SVD) to reconfigure the data. The details of this process are described following, but the intuition is that there is a set of underlying latent variables that spans the meanings that can be expressed in a particular language. These variables are assumed to be independent (and therefore orthogonal in the vector space). SVD is a matrix algebra technique that essentially reorients and ranks the dimensions in a vector space.

Because the dimensions in a vector space computed by SVD are ordered from most to least significant, if some of the less-significant dimensions are ignored, the reduced representation is guaranteed to be the best possible for that dimensionality. In LSA, the typical assumption is that only the top 300 or so dimensions (out of tens or even hundreds of thousands) are useful for capturing the meaning of texts. By basing the representations on a reduced number of dimensions, words that generally occur in similar contexts have similar vectors and will, therefore, get a high similarity rating. The discarded dimensions are assumed to be the product of noise, random associations, or some other nonessential factor.

That LSA performed information retrieval better than its rival approaches is not especially surprising. What is more surprising is how well it models human behavior on a variety of linguistic tasks. Before describing these, however, the LSA technique is described in more detail.

Although there are some variations, the most common steps are these:

- Collect a large set of (domain-relevant) text and separate it into 'documents.' For most applications, each paragraph is treated as a separate document based on the intuition that the information within a paragraph tends to be coherent and related.
- Next, create a co-occurrence matrix of documents and terms. The cell in this matrix corresponding to document x and term y contains the number of times y occurs in x. A term is defined as a word that occurs in more than one document, and no stemming or other morphological analysis is performed to try to combine different forms of the same word.

If there are m terms and n documents, this matrix can be viewed as giving a representation that has an m-dimensional vector for each document, and an n-dimensional vector for each term.

- The values in each cell may be weighted to reduce the effect of common words that occur through the corpus. A common weighting method is 'log entropy,' based on information theory, which multiplies the value by its information gain.
- SVD is invoked with a parameter k, which specifies the desired number of dimensions. (In principle, the SVD would be computed with all the dimensions to create three matrices that, when multiplied together, would produce the original data, but due to the amount of memory that this would require, this is not feasible. Instead, the currently used algorithms are optimized for dealing with sparse data spaces and compute only the most significant k dimensions of the matrices.)

The result of the preceding processing is three matrices. One has a k-dimensional vector for each document, one has a k-dimensional vector for each term in the corpus, and one has the k singular values. The first two matrices define two different vector spaces that are also different from the space defined by the original matrix. The singular values can be used to transform a vector from one space to the other. The use of these matrices depends on the application.

For information retrieval, the document vectors contain the LSA representation of each document. A query is turned into a 'pseudodoc' in the document vector space by combining the vectors for the terms in the query and dividing by the singular values. Vectors are typically compared by computing the cosine between them. (Some applications use other distance metrics.) The closest vectors from the document vector space correspond to the documents that are closest in meaning to the query (according to LSA).

In most other applications, the original documents are only used for training, that is, creating the semantic space. To compare new texts, the term vectors are combined as described earlier. Here, no manipulation with the singular values is required because the vectors are compared in the term space.

For more details about the mathematical foundations of LSA, see Golub and Van Loan (1989) and Hu *et al.* (2005). For more details about the creation of LSA spaces, see Deerwester *et al.* (1990) and Quesada (2005a).

Support for LSA

Support for LSA might be said to stem from the time of World War II when Wittgenstein wrote (what was later translated as):

> . . . for a large class of cases – though not for all – in which we employ the word "meaning" it can be defined as thus, the meaning of the word is its use in language. (Wittgenstein, 1958: 20)

A large number of psychological studies have taken Wittgenstein's words to heart and shown that LSA's behavior is closely matched with that of humans, for example:

- LSA acquires words at a similar pace to human children, sometimes exceeding the number of words to which it is exposed (see Landauer and Dumais, 1997).
- LSA's knowledge of synonyms is as good as that of second-language English speakers as evidenced by scores on the Test of English as a Foreign Language (TOEFL, see Landauer *et al.*, 1997).
- LSA can tell students what they should read next to help them learn (see Rehder *et al.*, 1998).
- LSA can even interpret metaphors such as, "My lawyer is a shark" (see Kintsch, 2001).

For textual applications, LSA has another benefit besides its high correlation with human behavior. When compared with the traditional labor-intensive approach to natural language processing – developing a grammar, a lexicon, a semantic representation, and the processing engine needed to combine them – developing an LSA-based representation is quite simple. It also has the advantage of graceful degradation. If it doesn't know a word, LSA simply ignores it and bases its representation on the other words. This has led researchers to use LSA for a variety of applications, including

- Intelligent tutoring systems that allow students to enter unconstrained natural language replies to questions (see Graesser *et al.*, 2000 and Wiemer-Hastings *et al.*, 2004)
- Grading psychology essays by comparing them to pregraded essays (see Foltz, 1996)
- Evaluating summaries of documents to help teach summarization skills (Summary Street, described at http://colit.org/)
- Helping students learn to properly integrate and cite material from multiple documents (see Britt, 2005)
- Evaluating airplane landings in a flight simulator (see Quesada, 2005b).

The only applicability constraints for LSA are that the task is text based, it can be framed in terms of computing the similarity of texts, and there is an available training corpus. The tutoring systems, for example, compare a student's answer for a question to a set of expected answers. If the student's response is close enough to a good answer, then the system gives positive feedback and moves on to the next question. If the student's answer matches an expected bad answer, then the system steers the student back on track.

Issues

The research issues facing the LSA community range from the practical to the philosophical. One basic question addresses the size and substance of the training corpus. Many effective LSA applications have been developed using relatively small corpora. In one of the successful applications mentioned earlier, LSA was trained on a corpus of only a couple hundred kilobytes with 2000 word types, 30 000 word tokens, and 325 documents. In contrast, researchers at the University of Colorado have reported that they have trained LSA on a corpus containing 750 000 word types, 550 million word tokens, and 3.6 million documents.

Unfortunately, there is little hard evidence on what the ideal size of an LSA corpus might be. The current data suggests that adding extra texts is unlikely to reduce performance, so a basic rule of thumb is, the more the better.

The obvious follow-up question is, 'What kinds of text should be included in an LSA corpus?' The

common wisdom holds that the corpus should consist of texts that are relevant to the particular target task. The domain can define a sublanguage where words are interpreted in consistent ways. Furthermore, a primary concern is to achieve sufficient coverage of the words that will be encountered in the course of running the application. A domain-specific corpus will have a higher percentage of relevant words and will thus not waste its representational power on words that will not be seen by the application.

One critical objection that is raised against the LSA approach is that not only does it ignore the syntactic structure of sentences, it also even ignores word order. In other words, LSA treats a text as a bag of words. In practice, LSA does well with longer passages of words (defined by Rehder, 1998, as more than 200 words), where syntactic details may be 'washed out,' and it also does well with single words (the TOEFL test, for example), but it does not do well on single sentences as shown by Wiemer-Hastings *et al.* (1999). A variety of approaches have attempted to deal with this, including surface parsing of sentences so that the components can be compared separately with LSA and using string edit theory to infer structural relations (see Wiemer-Hastings and Zipitria, 2001; Kanejiya *et al.*, 2003; Dennis, 2005).

Another notable gap in LSA's competence is negations, either because they are omitted from the LSA training via a stop words list or simply because their widespread use throughout a corpus renders them representationally depleted. Although no satisfactory approach yet exists for dealing with negations, a possibility would be to treat them as an essentially syntactic component that can processed as described earlier.

A more fundamental question about LSA is what its dimensions mean. Because they represent latent variables, there is no clear definition. As shown by Hu *et al.* (2003), there is a high correlation between the first dimension and the frequency of occurrence of the words in the corpus. Beyond that, there are no clear answers. There is also considerable debate as to what extent LSA captures first-order co-occurrence or higher-order co-occurrence. Recent evidence from Denhière *et al.* (2005) shows that although second-order effects do occur, large changes in the similarity measure between two words can be seen when a document is added to a training corpus in which both words occur (first-order co-occurrence).

LSA's utility and correspondence with human behavior have made it a popular technique for psycholinguistic research and text processing. The issues described here (along with others, for example, 'Is LSA at all psychologically plausible?') will keep researchers busy for years to come. A collection edited by McNamara *et al.* (2005) provides considerably more detail about the current practice and research on LSA.

See also: Computational Approaches to Language Acquisition; Computational Language Systems: Architectures; Computer-Mediated Communication: Cognitive Science Approach; Content Teaching and Learning and Language; Corpus Linguistics; Discourse Parsing, Automatic; Document Retrieval, Automatic; Human Language Processing: Connectionist Models; Human Language Processing: Symbolic Models; Human Reasoning and Language Interpretation; Information Theory; Language Processing: Statistical Methods; Lexical Acquisition; Natural Language Processing: Overview; Natural Language Understanding, Automatic; Rational Analysis and Language Processing; Semantics in Psychology; Summarization of Text, Automatic; Symbolic Computational Linguistics: Overview; Text Mining.

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Laterality Across the World's Languages

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The left cerebral hemisphere is superior to the right for many aspects of speech processing and reading. This overall left-hemisphere dominance is ubiquitous across the world's languages. However, as laterality research has expanded to include a wider variety of languages, we have learned that subtle characteristics of hemispheric asymmetry that were once treated as universal may, instead, depend on specific characteristics of a language. This seems to be particularly true for what has been termed the qualitative nature of processing printed material. With this in mind, this review highlights both the overall consistency and the variability in laterality across the world's languages. Although the review is, of necessity, illustrative rather than exhaustive, it will serve to demonstrate the importance of cross-linguistic laterality studies and to suggest factors that contribute to variability. After a brief review of laterality for identifying speech sounds, we provide a somewhat more extensive review of laterality for identifying printed words and nonwords. In each case, studies using English are reviewed first to provide a context in which to understand studies with other languages.

Processing Speech Sounds

There is a good deal of converging evidence of left-hemisphere superiority for most aspects of speech processing. Though most of the evidence comes from studies of English, laterality for speech processing has been examined across a sufficient variety of languages to demonstrate the generality of left-hemisphere superiority and to suggest a few critical factors that underlie such laterality.

English

Studies of patients with unilateral brain damage, behavioral laterality studies, functional brain imaging studies, and studies using a variety of other techniques all indicate left-hemisphere superiority for identifying acoustically presented words and nonwords. For example, in a behavioral technique known as dichotic listening, two similar but different sounds (e.g., */ba/* and */da/* or */bad/* and */dad/*) are presented simultaneously, one to each ear. Because input pathways from each ear project predominantly to the contralateral cerebral cortex, better identification of the stimuli from one ear is taken to reflect superior processing in the contralateral cerebral hemisphere. For English speakers processing English speech sounds, there are remarkably consistent indications of a right-ear (that is, left-hemisphere) advantage for most people.

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Right-ear advantages have been reported for nonwords as well as for words and for a variety of speech sounds including stop consonants, nasals, and vowels (for review, see Hellige, 1993). Recent neuroimaging studies indicate bilateral activation in the region of the superior temporal gyrus, though the amount of activation appears asymmetric. Activation of additional regions depends on the specific task being performed (for review, see Hickok and Poeppel, 2004).

Though there is consistent evidence for a left-hemisphere advantage in identifying which speech sounds have been presented, there are strong indications of a right-hemisphere advantage for identifying such things as the emotional tone conveyed by a word or short sequence of words or for other forms of speech prosody. In fact, within the same dichotic listening study, simultaneous right-ear (left-hemisphere) and left-ear (right-hemisphere) advantages have been shown for identifying word content and emotional tone, respectively (Bryden and MacRae, 1989; Grimshaw *et al.*, 2003).

An important area for additional investigation concerns the extent to which effects like those just noted are related to language or to the perception of emotion, per se, or whether they are related to more general hemispheric asymmetry for processing different aspects of acoustic signals. For example, information about the identification of many spoken phonemes in English is conveyed by rapid changes in the acoustic signal over brief periods of time, a type of acoustic change for which the left hemisphere is hypothesized to be well-adapted, whether the stimuli are linguistic or not. In contrast, information about emotional tone of voice is conveyed by much slower modulations of the acoustic signal over longer periods of time, a type of acoustic change for which the right hemisphere is hypothesized to be well adapted (e.g., Bryden and MacRae, 1989; Grimshaw *et al.*, 2003; Hellige, 1993).

Other Languages

Laterality studies using a variety of the same techniques that have been used with English demonstrate similar effects across other languages. This includes a variety of European languages as well as languages that, unlike English, use pitch for lexical purposes (e.g., Mandarin Chinese, Thai, and Vietnamese). It is interesting that, in those languages for which phonemic and lexical discriminations are made on the basis of pitch, the left-hemisphere advantage extends to pitch discriminations presented in the context of linguistic discrimination. This stands in contrast to studies of native English speakers in which there is no consistent left-hemisphere dominance (and even some indication of right-hemisphere dominance) for pitch discrimination. Such results do not necessarily argue against the notion that some of the hemispheric asymmetry for speech perception is related to a more general hemispheric asymmetry for processing different types of acoustic information. However, they indicate that, in addition to this, laterality for a specific acoustic property also depends on that property's relevance for making linguistic discrimination in the language being tested.

Processing Printed Words and Nonwords

The left hemisphere is superior to the right for most aspects of processing written or printed words and nonwords. As is the case for speech processing, there are several types of converging evidence, including studies of patients with unilateral brain damage, behavioral laterality studies, and studies of localized brain activity. The greatest amount of evidence again comes from studies of English, though there are now at least some studies in a great many other languages. Though left-hemisphere superiority for certain aspects of processing is widespread, there are interesting exceptions related to specific characteristics of individual languages. As illustrated by the following brief review, variability across languages is especially noteworthy with respect to what have been termed qualitative aspects of processing.

English

A brief review of laterality studies using English provides a context in which to consider laterality across other languages. A great many studies of patients with unilateral brain damage indicate that processing printed words and nonwords is more likely and more severe when the left hemisphere is damaged than when it is not. Furthermore, neuroimaging studies of brain-damaged patients as well as neurologically normal individuals provide evidence of greater left-hemisphere activation during processing of printed words and nonwords in English (e.g., Pugh *et al.*, 1997, 2001; Cohen *et al.*, 2000; Polk *et al.*, 2002; Mechelli *et al.*, 2003; Price *et al.*, 2003). However, specific cerebral activation patterns differ for various components of reading and may include semantic, phonological, and orthographic networks (Pugh *et al.*, 1997, 2001). For instance, silent reading of words, nonwords, letter strings, and psuedowords in English leads to greater activation in left hemisphere, as compared to in the right hemisphere, mainly in the left inferior frontal gyrus, left anterior insula, frontal operculum, left temporoparietal junction, left inferior occipital gryus, and posterior portion of left inferior

temporal area (e.g., Rumsey *et al.*, 1997; Cohen *et al.*, 2000; McCandliss *et al.*, 2003). In addition, nouns and object names in English activate the posterior regions of occipitotemporal and occipital areas, whereas verbs and action names activate the prefrontal and frontal temporal regions (Pulvermuller *et al.*, 1999). Furthermore, the pattern and strength of activation in these areas may depend on the particular properties of different languages that share the same alphabet system. For example, reading of words and nonwords in Italian, an orthographically shallow language compared to English, leads to greater activation in the left superior temporal region as compared to the homologous region in the right hemisphere, whereas reading in English shows greater activation in left frontal and posterior inferior temporal regions (Paulesu *et al.*, 2000).

Converging evidence of functional left-hemisphere superiority also comes from a variety of behavioral studies, including studies that flash visual material very briefly to the left or right of an observer's point of eye fixation. This technique is based on the fact that each visual half-field projects directly to the contralateral brain hemisphere, so that under appropriate conditions, an advantage for one visual field or the other is a reflection of an advantage for one hemisphere or the other. A great many studies in English demonstrate a right visual field (RVF) or left-hemisphere advantage for such things as identifying printed words and nonwords (for review, see Hellige, 1993) or for indicating whether or not a string of printed letters spells a word (a lexical decision task; for examples, see Iacobani and Zaidel, 1996).

In addition to demonstrations of left-hemisphere superiority, there is evidence that printed material may be processed in qualitatively different ways by the left and right brain hemispheres. For example, it has been suggested that the right hemisphere tends to process the letters within a word or even within a pronounceable nonword in a relatively slow, sequential manner, whereas the left hemisphere tends to process the letters within the string in a more holistic or parallel manner. For example, some patients with left-hemisphere injury, whose reading is thought to depend more on the intact right hemisphere, read words laboriously, in a letter-by-letter manner (e.g., Reuter-Lorenz and Baynes, 1992). In addition, in a variety of visual half-field experiments that require word naming or lexical decision, there are word-length effects when stimuli are projected to the left visual field (LVF) or right hemisphere but not when stimuli are projected to the RVF or left hemisphere. That is, in LVF/right hemisphere trials, reaction time and errors increase as word length increases, consistent with the suggestion of slower, serial processing. Interestingly, when words are presented in unusual formats (e.g., the letters are arranged vertically, the letters are misaligned or of mixed case), word-length effects of the same magnitude have been reported for both LVF/right hemisphere and RVF/left hemisphere trials (Young and Ellis, 1985; Lindell *et al.*, 2002). Thus, the ability of the left hemisphere to process printed words in a more parallel manner may be restricted to stimulus arrangements that are typical of English.

Converging evidence for qualitative differences on LVF and RVF trials also comes from studies that required observers to identify consonant-vowel-consonant (CVC) nonword letter sequences (e.g., 'dag'). Across many such studies, there is a robust RVF/left hemisphere advantage for this task. In addition, distinctively different error patterns are obtained on LVF and RVF trials. On LVF trials, the third letter is missed more often than the first letter, just as one would expect if the letters were being processed in a relatively slow, sequential manner. On RVF trials, this difference between first and third letter errors is reduced and may even be eliminated if the letters are arranged in the typical horizontal manner. It has been suggested that this reflects the special ability of the left hemisphere to treat the CVC stimulus as a single pronounceable unit rather than as a simple collection of individual letters (for examples and review, see Hellige and Marks, 2001; Marks and Hellige, 1999, 2003). Thus, examination of these qualitative error patterns may shed light on the manner in which processing depends on characteristics that differ across the world's languages. In fact, as the subsequent review demonstrates, qualitative aspects of processing seem to be quite a bit more variable than the more prevalent quantitative advantage for the left hemisphere.

Much research with European languages produces laterality patterns very similar to the patterns reported for English and, consequently, will not be reviewed here. Instead, we focus on selected languages whose laterality patterns differ in interesting ways from those found with English. To help set a context for understanding the laterality effects, each of the following language-specific sections begins with a brief overview of the characteristics of printed text in that language and is followed by a summary of what is known about laterality for processing that text. Following these sections, we suggest some general factors that may be related to variability across languages in both quantitative and qualitative aspects of laterality.

The proto-Semitic system that gave rise to Hebrew, Arabic, Farsi, Urdu, and Sanskrit consisted mainly of consonants; the markings of vowels and their pronunciations was made optional. These scripts continue to

have several common features, including the fact that the modern versions of each typically omit vowel markings and the fact that all except Sanskrit are scanned from right to left. Of course, each of these languages also has its own unique morphology as well as other characteristics that may influence laterality. With these things in mind, the next several sections review laterality for Hebrew, Arabic, Farsi, and Urdu.

Hebrew

Written Hebrew words are produced when semantic roots are embedded with vocalic indications and syllabic prefixes or suffixes. Written Hebrew consists of a string of consonants, in the sense that there are no separate characters to designate vowels. Instead, four of the consonantal letters are also used to designate vowels, creating a good deal of ambiguity. A 'pointed' form of text uses diacritical marks to identify correct vowel pronunciation and location. This form has perfect grapheme-to-phoneme correspondence so that words can be easily pronounced. The typical modern form of Hebrew text is 'unpointed,' omitting the diacritical marks, producing a deep orthography and many homographs (words that are spelled the same but pronounced differently). This is generally thought to lead to a lexical reading strategy, in which an entire word is processed before phonological information is extracted postlexically (Bentin *et al.*, 1984; Share, 2003). Just as in English, processing of printed Hebrew text is disrupted more by left-hemisphere damage than by right-hemisphere damage. At the same time, more subtle differences in dyslexic symptoms are almost certainly related to specific characteristics of Hebrew. For example, studies of surface dyslexia in Hebrew speakers show that the patients are able to read nonwords and other phonological transformations when the material is presented in pointed form but are unable to read unpointed Hebrew (Birnboim, 1995). Whereas in English surface dyslexics have difficulty with irregular (exception) words (Marshall and Newcombe, 1973; Patterson, 1981; Coltheart *et al.*, 1983) most of the errors made in Hebrew are attributable to misreading of the vowels, leading to a very selective type of peripheral dyslexia. The specific function impaired in these patients is the ability to locate the position of a vowel within a word while letter identification itself is intact (Friedman and Gvion, 2001).

In behavioral studies of Hebrew, there is a robust RVF/left hemisphere advantage for naming printed words and nonwords as well as for making lexical decisions (Faust *et al.*, 1993; Babkoff *et al.*, 1997; Lavidor *et al.*, 2002). Thus, quantitative aspects of laterality are very similar to those found with English. However, qualitative aspects of laterality are sometimes quite different. For example, experiments investigating word-length effects in Hebrew have produced mixed results. Similar to English, some studies show word length has an effect only on LVF/right hemisphere trials in Hebrew during lateralized lexical decision tasks (Lavidor *et al.*, 2002). However, other studies, using similar methodology, show length effects in both visual fields (Koriat, 1985; Lavidor *et al.*, 2001), and studies of other types indicate the opposite result from English (Nazir *et al.*, 2004). In addition, in studies that required identification of CVC nonword stimuli, the visual field difference in qualitative error pattern was opposite that reported for similar studies English, at least when the letters were presented vertically. That is, there were more third-letter errors than first-letter errors on RVF/left hemisphere trials, and this difference was reduced on LVF/right hemisphere trials (Eviatar, 1999). It is important to keep in mind the fact that even though this qualitative aspect of laterality was reversed for the two languages, there were equally robust RVF/left hemisphere accuracy advantages in both. In considering the qualitative differences between Hebrew and English, Eviatar (1999) suggests that relevant factors may include the difference in scanning direction as well as the possibility that the morphology of unvoweled (unpointed) Hebrew (which was used in her study) is such that the entire stimulus may have to be scanned because letters of the root are dispersed across entire words. From this perspective it is interesting that there was no visual field difference in qualitative error patterns when the Hebrew nonwords were presented with the letters arranged in the more typical horizontal manner.

Arabic

In Arabic, Farsi and Urdu letters are connected in script-like fashion to form words or pronounceable nonwords. This means that each letter may be represented by two to four distinct allographs, depending on its position in word-initial, word-medial, word-final, or isolation. For Arabic, 22 of 28 letters in the alphabet have four shapes each (word initial, medial, final, and when they come after an unconnecting letter). Six other letters have two shapes each (Ibrahim *et al.*, 2002). Arabic has two forms: literary Arabic, which is taught in schools as the standard script for reading and writing, and modern Arabic, which is the native language of Arabs. Although the two forms of Arabic share orthographic properties, they are phonologically and syntactically different. More specifically, certain vowels exist in modern Arabic but are considered illegal in literary Arabic. Other

differences include usage of different word order constraints in sentence structure, employing different plural markings and insertion rules for function words (Bentin and Ibrahim, 1996). Arabic orthography, similar to Hebrew, has two forms, one in which the vowels are marked, and another in which they are not marked. As in Hebrew, if all the vowels are marked, above or below the letters in a word, literary Arabic is phonologically transparent. If the vowel marks are not included, the orthography becomes opaque (Bentin and Ibrahim, 1996). However, unlike Hebrew, the four letters that designate long vowels in Arabic do not also function as consonants, and inclusion of them in a word helps the pronunciation. Modern Arabic does not include the vowel markings, but the letters designating the vowels are never omitted, and their locations within a word indicate the location of the vowels. The number and location of the dots on a similar-looking letter can change the grapheme it represents. For example, the Arabic letters representing /*t*/ and /*n*/ can become /*th*/ and /*b*/ by changing the number and location of the dots.

Although there is not much research on language disorders involving Arabic speakers, a case study of an Arabic/French bilingual reports symptoms of deep dyslexia in both languages after damage to the left perisylvian region. However, the type of errors made was different in each language. For instance, more semantic errors occurred during picture naming and reading aloud in French than in Arabic. In contrast, there were more translation errors during reading in Arabic (e.g., the Arabic word for 'glasses' was read as the French word for 'glasses'; Beland and Mimouni, 2001).

Laterality research involving the normal Arabic-speaking population is also quite sparse. Studies of letter recognition and letter matching show that Arabic orthography is more difficult than Hebrew orthography, and the pattern of errors is such that Arabic speakers have most difficulty when Arabic letters are presented to the LVF/right hemisphere (Eviatar *et al.*, 2004). In a study using vertical presentation of Arabic CVC stimuli, Arabic–Hebrew bilinguals showed a robust RVF/left hemisphere advantage and a visual field difference in error pattern that was similar to that shown when Hebrew speakers identified Hebrew CVC stimuli. That is, the extent to which the third letter was missed more often than the first letter was larger on RVF/left hemisphere trials than on LVF/right hemisphere trials, just the opposite of English. In addition, averaged across both visual fields, the difference between third-letter and first-letter errors was larger for Arabic than for English or Hebrew. Perhaps the greater orthographic complexity of Arabic combined with the unfamiliar vertical orientation led to more sequential processing being used in both visual fields. Further studies would be useful to examine these possibilities and others.

Farsi

Written Farsi adopted the Nastaliq script in about 1500 A.D. (Hanaway and Spooner, 1995). Nastaliq contains the Arabic characteristics of dots identifying different graphemes and of joining different letters to form a word. Farsi has six vowels, three of which are represented by letters in the word. The other three are represented by vowel markings placed above (two) and below (one) the letters. These marks are used only for beginning readers (similar to literary Arabic and pointed Hebrew), as adults read text without these markings. However, the three letters designating the vowels are never omitted. Whereas stimuli with a fixed letter marking a vowel are linguistically transparent, stimuli with no vowel markings are linguistically opaque. In Farsi, the transparent words are read by using a phonological, nonlexical route, and the opaque words are read by using a lexical route (Baluch and Besner, 1991, 2001).

In one of the only laterality studies using Farsi, Melamed and Zaidel (1993) presented Farsi and English to Farsi–English bilinguals during naming and lexical decision tasks in a visual half-field paradigm. The results revealed a language by visual field interaction, showing the typical RVF/left hemisphere advantage in accuracy and reaction time during naming and lexical decision tasks in English, but no such advantage during naming and lexical decision tasks in Farsi. The authors suggest that the absence of a RVF/LH advantage may indicate greater involvement of the right hemisphere in processing written Farsi, perhaps because of its visual or orthographic complexity or because it is typically scanned from right to left. In any case, the absence of an RVF/LH advantage is sufficiently unusual among the world's alphabetic written languages to warrant replication and extension.

Urdu

Like Arabic and Farsi, Urdu is scanned from right to left, and an important difference from English stems from its orthographic property that clusters of letters together do not make a word (or even a pronounceable nonword) unless they are connected in script-like fashion. Unlike English, there are no distinctions between upper and lower cases in Urdu, but a letter's image may change when it is joined in script with other letters. Designated vowels (a, e, i, o, and u) can be in any position within a word or pronounceable nonword. In some literary and religious texts, vowel markings are used to accentuate spoken vowels. In

everyday Urdu, like Hebrew, Arabic, and Farsi, vowel markings are not used. Urdu self-teaching books designate each unit of sound to one letter. Native speakers employ this letter-by-letter reading strategy as an initial learning technique when they learn Urdu formally. Once basic Urdu is learned, and the patterns of words are understood, this letter-by-letter strategy is abandoned for a more global word-reading technique.

In a series of visual half-field studies, Urdu–English bilinguals were asked to identify sequences of three Urdu letters that were either joined together so as to make Urdu words or pronounceable nonwords or separated so as to be spontaneously processed as individual letters (M. M. Adamson and J. B. Hellige, unpublished data). For both joined and separated words and non-words, there was a RVF/left hemisphere advantage similar to that reported for many other languages. Overall, the third letter was missed more often than the first letter, and this difference was larger for separated letter sequences than for joined letter sequences. This indicates that Urdu letters are processed in a slower, more sequential manner when they are separated than when they are joined to make a word or pronounceable nonword. Visual field differences in the pattern of errors were similar to those found for Hebrew and Arabic and opposite that found for English. Specifically, the tendency for there to be more third-letter errors than first-letter errors was larger on RVF/left hemisphere trials than on LVF/right hemisphere trials. The laterality patterns were identical for words and nonwords, indicating that the effects occur at a prelexical stage of processing (for similar arguments regarding effects in English, see Lindell *et al.*, 2002). The laterality patterns were also similar for joined and separated versions of the stimuli, which may not be surprising in view of the fact that both versions are made up of the same letters, written in the same direction and in the same sequence.

Japanese

The Japanese language system consists of two different types of script: *Kanji*, a logographic form borrowed from Chinese characters, and varieties of the syllabic form of *Kana*, mainly, *Hiragana* and *Katakana*. A Japanese sentence is written by combining all three of these scripts to form different classes of words (Wydell, 2003). Japanese *Kana* has a direct one-to-one relationship between its orthographic representation and its pronunciation. Because of this direct link between phonology and orthography, children learn the *Kana* script very quickly in school (Wydell, 2003). Japanese *Kanji*, however, is taught at junior or high school level. The most striking difference between *Kanji* and *Kana* is that *Kana* depends on the phonological system for its correct pronunciation, and *Kanji* is more dependent on the visual spatial system for correct processing. This is because each *Kanji* character is made up of a morphological element that has no phoneme component or correspondence; that is, a *Kanji* character does not map directly onto any particular phoneme (Wydell, 1998).

Case studies of brain-damaged patients describe the symptoms of phonological alexia in *Kana* and *Kanji* as the inability to read nonwords in both scripts (Patterson *et al.*, 1996; Sasanuma *et al.*, 1996), though it has been suggested that the two scripts use somewhat different neural networks. It is often extremely difficult to compare neuroimaging studies across languages because of differences in various aspects of protocol, including the choice of specific experimental and baseline task demands. Despite these difficulties, a number of studies now indicate that processing of both *Kana* and *Kanji* generally activate the same cortical areas as each other and as are activated in similar studies using English. At the same time, and despite the activation of overlapping cortical regions, it appears that processing *Kanji* involves heavier visual orthographic demands and uses a lexical-semantic system through a more ventral route, involving the inferior occipital, fusiform, and posterior inferior temporal gyri, whereas *Kana* is processed in a more phonetic manner through a more dorsal route, involving temporoparital areas (for elaboration and review, see Thuy *et al.*, 2004).

Behavioral studies using the visual half-field technique have sometimes reported a RVF/left hemisphere advantage for identifying *Kana* words and nonwords, but a LVF/right hemisphere advantage for identifying *Kanji* words and nonwords (Hatta, 1977; Sasanama *et al.*, 1977), leading some to conclude that the left and right hemispheres are superior for processing *Kana* and *Kanji*, respectively (e.g., Coltheart, 1980). It has been suggested that it is the visual complexity of *Kanji* stimuli that leads to more dependence on right-hemisphere processing, with right-hemisphere dominance for visuospatial processing outweighing any left-hemisphere superiority for other stages of processing involved in stimulus identification. In contrast to English, there may not be any laterality effects for lexical decision tasks for *Kanji* (Hatta, 1981), though there is a RVF/LH advantage for lexical decision tasks for *Katakana* and *Hiragana* (Yoshizaki, 2001). A RVF/LH advantage for *Kanji* emerges, however, if the task requires a more semantic judgment (Hatta, 1981).

In a visual half-field field study that required native speakers of Japanese to identify three-letter *Kana* nonwords presented vertically, Hellige and Yamauchi

(1999) found a robust RVF/left hemisphere advantage. Although there were more third-letter errors than first-letter errors, consistent with sequential processing of the letters, this was equally true for both LVF and RVF trials. Hellige and Yamauchi suggest that this may stem from the way in which *Kana* maps on to pronunciation. Specifically, a word or nonword made up of *Kana* characters is pronounced exactly as it is spelled: letter by letter. That is, there is no emergent or unitary pronunciation, as there is in English (D-A-G is pronounced *daeg*), and consequently, less reason for the specialized language mechanisms of the left hemisphere to process the letter sequence in a more holistic way. In addition, *Kana* is most typically scanned from top to bottom, which is quite different from the languages discussed earlier, and this may contribute to the lack of visual field differences in qualitative error patterns.

Chinese

Chinese is a nonalphabetic language with deep orthography (DeFrancis, 1989). Chinese builds its single graphic units from independent strokes, making compound units by incorporating the graphic units in different ways; mainly, left and right, top and bottom, and inside and outside (Perfetti *et al.*, 2002). The main phonetic unit of Chinese Mandarin is a syllable that is further divided into two segments, initial and final. The main script unit is a monosyllabic character representing units of meaning (morphemes). About 90% of Chinese characters (referred to as morphemic) are compound characters having both a semantic and a sound component (Zhu, 1987). Therefore, only 10% of Chinese characters (referred to as pictorial) are exclusively pictographic. The number of strokes in a character can change its phonological or semantic properties (Ho, 2003). Unlike English, recent studies show that reading Chinese involves orthographic-semantic-phonological access at both the word and character levels (Zhang and Perfetti, 1993; Kuo *et al.*, 2001, 2003; Bates *et al.*, 2003). In addition, each character has a phonetic value, but its tone depends on the location within a word, which can then change the meaning (Ho, 2003). In contrast to Chinese, *pinyin* is a completely syllabic script considered to be alphabetic and was created in the 1970s to introduce English words in the mainstream Chinese language. The distinction between *pinyin* and Chinese is similar to the distinction between Japanese *Kana* and *Kanji* and provides interesting opportunities for comparison that are only beginning to be exploited.

Neuroimaging studies indicate that both Chinese and *pinyin* characters activate the same general cortical areas as each other and as are activated in other languages. However, relative activation in some regions differs for these two forms. It has been suggested that activity in some of these regions (e.g., the inferior parietal area for *pinyin* and the fusiform gyrus for Chinese characters) may be associated with reading via assembled phonology (*pinyin*) versus addressed whole-script (Chinese character) procedures (Chen *et al.*, 2002). A variety of additional neuroimaging studies requiring individuals to perform a number of different tasks with Chinese characters is generally consistent with the conclusion that the left inferior frontal gyrus, the left temporoparietal region, and the left temporal-occipital junction are involved in orthographic-to-phonological translation for Chinese, as well as for a number of other languages (e.g., Lee *et al.*, 2004). At the same time, there is some indication that a region within the left middle frontal cortex may be activated in phonological processing of written Chinese but not in processing of most alphabetic languages and that the right hemisphere is heavily involved in reading aloud of Chinese logographs, which also differs from alphabetic languages (e.g., Tan *et al.*, 2001). And the different activation patters found for nouns and verbs in English does not extend to Chinese (e.g., Li *et al.*, 2004). Thus, like alphabetic languages, greater left-hemisphere activation in a number of areas is generally obtained during processing characters and words in Chinese. But, somewhat like Japanese *Kanji*, the subtle differences in neuronal activity echo the differences embedded in the linguistic and visually complex properties of Chinese that make it different from alphabetic languages (for additional neuroimaging studies using a variety of tasks, see Chee *et al.*, 2000; Gandour *et al.*, 2003; Kuo *et al.*, 2003, 2004).

Similar to Japanese *Kanji*, visual half-field studies of Chinese involving normal Chinese speakers reveal a LVF/right hemisphere advantage in word naming and no visual field advantage in a lexical decision task (Tzeng *et al.*, 1979), with this being the case for both pictorial and morphemic Chinese characters (Tzeng *et al.*, 1978; but see Rastatter *et al.*, 1989). As with Japanese *Kanji*, however, a RVF/left hemisphere advantage is found for Chinese when deeper phonological or semantic processing tasks are used (e.g., Leong *et al.*, 1985). In contrast to English, there may not be any word length by visual field advantage for processing Chinese characters, though such an interaction has been reported when the Chinese characters to be identified were embedded in foreign words of different lengths (e.g., Fang, 1994, 1997, 2003) Thus, some aspects of processing Chinese characters and words are qualitatively different from processing English and other languages that more readily show word length by visual field interactions.

General Observations

The foregoing review indicates that there is widespread left-hemisphere superiority for processing printed words and nonwords. This is true for many of the world's languages, and for at least certain aspects of orthographic to phonological mapping, left-hemisphere dominance seems nearly universal. At the same time, printed languages differ in many ways, and there is clear evidence that those differences affect certain aspects of laterality. As examples, consider possible effects related to visual complexity and scanning direction.

One way in which languages differ is in terms of the level of visual complexity represented in printed characters. The right hemisphere is hypothesized to be superior to the left in processing complex visual information outside the language domain. Thus, it would not be surprising to find that the right hemisphere makes a greater contribution to processing texts as they become more visually complex. From this perspective, it may be understandable that the RVF/left hemisphere advantage so typical of letter and word identification in English does not extend to character and word identification in visually complex texts like Japanese *Kanji* and Chinese.

Languages also differ in the direction in which printed material is typically scanned, and this may well have consequences for such things as behavioral measures of laterality. To be sure, RVF/left hemisphere advantages have been reported for left-to-right languages (like English), for right-to-left languages (like Hebrew, Arabic, and Urdu), and for top-to-bottom languages (like Japanese *Kana*). Thus, an overall left-hemisphere advantage for such things as word naming seems sufficiently robust to overcome any effects of scanning direction. However, more subtle qualitative performance differences between LVF/right hemisphere and RVF/left hemisphere trials are more variable across languages and are more likely to be influenced by such things as scanning direction. Consider, for example, the finding reviewed earlier that visual field differences in qualitative error patterns obtained during CVC identification are opposite for English (a left-to-right language) and Hebrew, Arabic, and Urdu (all right-to-left language), and that the qualitative visual field difference is not present at all for Japanese *Kana* (primarily a top-to-bottom language). Of course, we cannot be certain that scanning direction is the only relevant factor in determining these qualitative differences, but the association is nonetheless interesting. In fact, such effects of scanning direction are consistent with a recent model of letter-position encoding that specifies how the habitual scanning direction of a language can produce asymmetric activation patterns across a string of letters and thereby lead to visual field differences in word length and error pattern (Whitney, 2001; Whitney and Lavidor, 2004).

Concluding Comments

In reviews of laterality for language-related processing, it is common to focus on studies that ask native speakers of English to engage in a variety of tasks using English. It is often tempting to generalize the results for English and reach conclusions about laterality for language more generally. Though much has been learned in this way and many of the results obtained with English do, in fact, generalize to many other languages, this review indicates that there are important exceptions, especially in qualitative aspects of processing. Understanding both the generality and the variability in laterality across the world's languages is essential to refining our theories about the brain mechanisms that underlie our ability to understand the spoken and the written word.

See also: Anatomical Asymmetries versus Variability of Language Areas of the Brain; Language in the Nondominant Hemisphere.

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Latin

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History and Affiliations

Latin is an Indo-European language of western central Italy, recorded from about 500 B.C. in the immediate area of Rome, related closely to the poorly attested Faliscan dialect and more distantly to Osco-Umbrian and Venetic. Lexical influences from neighboring languages (Italic dialects, the unrelated Etruscan language, and above all Greek) are visible in Latin from the earliest period. With the rise of Rome, Latin spread throughout Italy and into the provinces of the Roman Empire. It became the spoken language in western continental Europe, displacing the indigenous languages; its spoken varieties developed into the modern Romance languages. A more or less standard version of written Latin remained in use in administration, law, education, and the Church, and in due course spread throughout Europe as Medieval Latin. The status of Latin as a common medium of learned communication began to wane only with the rise of English as a world language in modern times.

Varieties

The dialect of Rome became the dominant form of Latin from an early period, with variations from it being regarded as rustic. Written Latin was standardized by the first century B.C. and remained broadly uniform thereafter, concealing changes and diversification in the spoken idiom; nevertheless a range of literary, technical, or colloquial registers can be distinguished in the surviving texts, and the occurrence of nonstandard written forms can provide evidence for spoken developments. The term *Vulgar Latin* is used to refer to any variety that departs significantly from classical norms. There is no good ground for regarding later written forms – Christian, Medieval, Renaissance, or Modern Latin – as essentially different varieties of the language: despite differences, often quite wide, in orthography, lexicon, style, and pronunciation, they all reflect the same basic linguistic structure and a common if diverse literary tradition. The following approximate periods may be recognized for convenience: Early Latin, to the 2nd century B.C.; Classical Latin, divided into Republican, and Augustan ('Golden'), and Early Imperial ('Silver'), until the 2nd century A.D.; Late Latin (i.e., the Latin of Late Antiquity), 3rd to 6th century A.D.; Medieval Latin, from the 7th to the 13th century A.D., including two high points of Latin culture, the Carolingian period (9th century) and the 12th-century renaissance. The term *Neo-Latin* embraces Renaissance Latin (14th to 15th centuries), the scholarly and scientific Latin of the early modern period, and modern uses of the language.

Script

The Latin alphabet, the basis of current Western European alphabets, was derived from a form of Greek script introduced into Italy by colonists from Euboea. In its classical form, it contains all the letters that are still used in Modern English except for J, U, and W; V (the U shape developed later) was used for the vowel /u/ and the semivowel /w/; I was used for the vowel /i/ and the semivowel /j/. Y and Z, originally absent from Latin, were imported for use in Greek borrowings. The capital letters, used for inscriptions, have retained their classical form more or less unchanged. Originating in Roman cursive, a variety of handwritten styles evolved from late antiquity onward and ultimately gave rise to modern lowercase letters.

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Phonology

Sound/Spelling Relationship

The Classical Latin alphabet represents the sounds of the language quite well, except for its failure to distinguish the semivowels (as we now distinguish, e.g., *voluit* 'he wanted' from *volvit* 'he rolls'). Phonemic doubling of consonants was usually but not invariably indicated. In the classical period, vowel length was shown sometimes by doubling the vowel, more often by means of the *apex*, a diacritic resembling the acute accent. In Latin as conventionally printed, vowel length is not regularly indicated; so, for example, *canis* can represent either *cănĭs* 'dog' or *cānīs* 'grey hair (dative-ablative)'.

A number of sounds initially caused spelling difficulties: (a) Classical Latin had a series of nasal vowels, represented (consistently with etymology) by vowel + *m* finally and vowel + *n* medially; (b) a vowel sound midway between /i/ and /u/ was found in words such as *optumus/-imus* 'best' and other superlatives, and *lubens/libens* 'willing'; (c) there was no separate symbol for the velar nasal (see note *c* under the following consonant table).

Consonants

The consonantal inventory of Latin may be set out as follows:

	Labio-velar	*Velar*	*Dental*	*Labial*
Voiceless stop	/k^w/ <qu>	/k/[a] <c>/ <k>	/t/	/p/
Voiced stop	/g^w/ <gu>[b]	/g/	/d/	/b/
Nasal		/ŋ/ <n>/ <g>[c]	/n/	/m/
Fricative	glottal: /h/	alveolar: /s/		labiodental: /f/
Liquid		rolled/ flapped: /r/ lateral: /l/[d]		
Semivowel		palatal: /j/ <i>		labial: /w/ <u>/<v>[e]

[a]The original sound was /k/, but the Romance and Medieval palatal realization before front vowels may already have started to develop in antiquity.

[b]Occurs only medially after a nasal or liquid as in *languidus* 'languid', *urgueo* 'press'.

[c]Occurs only medially, (a) as the outcome of /n/ before a velar, or (b) as the outcome of /c/ or /g/ before a nasal; written in the first case as <n>, as in *tango* 'touch', and in the second as <g> as in *dignus* 'worthy' (< **dec-nos*, cf. *dec-ens* 'decent'). The combination /ŋn/ <gn> later underwent a further sound change to palatal /ñ/, found, for example, in Italian.

[d]Represented by both 'clear' and 'dark' (velarized) allophones, as shown by the effect on neighboring vowels.

[e]The sound /w/ later changed to /β/ or /v/; spelling variations indicate that this took place (under Greek influence?) in Italy and the East possibly as early as the first century A.D., and in the western provinces at a later period.

Vowels

Classical Latin had a symmetrical five-way vowel system with phonemic distinction between long, short, and nasalized vowels: e.g., *puellă* 'girl' (nominative): *puellā* /-a:/ (ablative): *puellam* /-ã/ (accusative). Early Latin had a range of inherited diphthongs, which were considerably simplified by the Classical period; further leveling took place in varieties of the spoken language (*au* > /o:/, *ae* > open /ę:/, *oe* > /e:/), giving rise to confusion in spelling. In Romance, the classical vowel system was remodeled: nasalization and phonemic vowel length disappeared, while changes in vowel quality led to merger of short /i/ with long /e:/, and of short /u/ with long /o:/.

Accent and Prosody

Classical and post-Classical Latin has a largely predictable stress accent: the accent falls on a long penultimate, but on the antepenultimate if the penultimate is short. (A short syllable is an open syllable containing a short vowel; all other syllables, except for a few doubtful cases, are long.) This had apparently replaced an earlier initial stress accent, which is postulated to account for the regular vowel weakening that took place in early Latin in non-initial syllables, e.g., *pro* 'before' + *habeo* 'hold' > *prohibeo* 'forbid'. The usually clear distinctions of syllabic quantity made it possible for quantitative meters borrowed from Greek to replace the native 'Saturnian' verse form. Stress accent plays no formal part in Classical Latin verse, although there is an interaction between quantitative rhythm and word accent, which both creates some metrical restrictions and allows for considerable poetic subtlety. Stressed rhythms were reintroduced in Late and Medieval Latin.

Morphology

Inflection

Latin is an inflected language retaining a number of features of the parent Indo-European, but with considerable innovation, especially in the verbal paradigm.

Nouns are inflected for number and case. There are two numbers, singular and plural, and five regular cases: nominative, accusative, genitive, dative, and ablative. Nouns are traditionally grouped in five declensions: the first and second declensions continue the IE O/A stems, the third and fourth continue the IE stems in consonants and semivowels, and the fifth is a Latin innovation of mixed origin. A separate vocative is found only in the second declension and in borrowed Greek names. A locative case exists in place

names and in a few common nouns, such as *domi* 'at home' from *domus* 'home'. Nouns are assigned to one of three gender categories – masculine, feminine, and neuter – on the basis partly of sense and partly of form, so that on the whole there are fewer unpredictable or illogical assignments of gender than in many other languages.

Adjectives, both as attributes and as complements, agree with nouns in gender, number, and case; they broadly follow the same patterns of declension as nouns. There are no articles, but there is a rich pronominal system including four demonstratives (*is* 'the one mentioned', *hic* 'this', *iste* 'that of yours', *ille* 'that over there') and a distinction between specified and nonspecified indefinite pronouns (*quidam* 'someone in particular', *aliquis* 'someone or other').

Verbs are inflected according to the person and number of the subject. Subject pronouns are regularly dropped (*amamus* 'we love'). There are two sets of personal endings, indicating voice: active *-o/-m -s -t -mus -tis -nt*, passive *-r -ris/-re -tur -mur -mini -ntur*; and one other set of endings peculiar to the perfect active. Verbs are classified in four conjugations according to stem vowel. The principal parts of a Latin verb, from which all other forms can be derived, are the first person singular present indicative active (normally listed in the dictionary, e.g., *dico* 'I say'), the present infinitive active (e.g., *dicere* 'to say'), the first person singular perfect active (e.g., *dixi* 'I said'), and the past participle passive (e.g., *dictum* 'said'). The stems of the present and perfect are combined transparently with tense markers to form two further indicative tenses and two subjunctive from each stem, e.g., *procedeba-m* 'I was proceeding' (imperfect indicative), *praedix-era-tis* 'you had predicted' (pluperfect indicative), *mane-re-mus* 'we would be staying' (imperfect subjunctive), *decipi-a-mini* 'you would be deceived' (present subjunctive passive). There are two imperatives, one used for immediate commands (*exi!* 'get out!'), the other for instructions (*bene misceto* 'mix well'). The perfect tenses of the passive are formed periphrastically: the past participle is combined with an appropriate (present-stem) form of *esse* 'be', e.g., *occisa est* 'she has been killed'.

A restricted class of verbs (generally known as 'deponents': fossilized remnants of the old middle voice) take passive morphology although their meaning is active and can be transitive: e.g., *philosophor* 'I philosophize'; *vereor* (transitive) 'I fear'. Intransitive active verbs (including a class of verbs that take a dative object) have no passive, except third-person singular forms used impersonally, e.g., *venio* 'I arrive'; *venitur* 'people arrive' (cf. the impersonal passive in the Celtic languages). Genuinely irregular verbs are few (*sum* 'be', *possum* 'can', *volo* 'want', and some others). The greatest difficulty in Latin verbal morphology is the often unpredictable formation of the perfect stem.

The verb has two infinitives, present (*dicere* 'to say') and perfect (*dixisse* 'to have said'); other verbal nouns (gerunds, supines) supply case forms for the infinitive. There are three participles, present active (*dicens* 'saying'), past passive (*dictum* 'said'), and future active (*dicturus* 'about to say'), and a verbal adjective (the gerundive), which is future passive in meaning and often denotes obligation (*faciendum est* 'it is to be done').

Derivational Morphology

Latin has a productive system of derivational morphology, much of which is familiar through derivatives in modern languages, e.g., prepositional prefixes such as *ex-* 'out', *circum-* 'round'; other prefixes such as *in-* 'not', *re-* 'back', nominal suffixes such as *-tio(n)-* (process) and *-tor* and *-trix* (male and female agents), and adjectival suffixes such as *-bilis* (*inextricabilis* 'inextricable'), *-anus* (*Christianus* 'Christian'), *-arius* (*piscarius* 'to do with fish'). Adjectives form adverbs (in *-e*, *-o*, or *-ter*), comparatives in *-ior*, and superlatives in *-issimus*. At first, Latin was resistant to some kinds of derivation; for example, compound nouns or adjectives were relatively unusual, occurring mostly in high style (*solivagus* 'wandering alone') or as comic colloquialisms (*caldicerebrius* 'hot-headed'). From the classical period onward, the need to express new ideas led to a large expansion of the classical lexicon both by derivation and by borrowing.

Syntax

Word Order

Because Latin encodes basic grammatical relations by means of inflection, there is considerable freedom in word order. Either a topic or an emphasized predicate may be placed first in a sentence, and variations of logical emphasis are also common at phrase level. Classical Latin preserves the Indo-European phenomenon known as Wackernagel's Law, i.e., the first stressed position in a sentence or clause is followed by an unstressed position which often contains, in order of precedence, (a) sentence connectives, (b) weak pronouns, (c) unstressed verbs. The phenomenon of hyperbaton, or discontinuity in the noun phrase, is a particular feature of Latin as it is of Classical Greek: its effect is often to

throw particular focus on to the first element of the noun phrase, e.g.:

bonos	*habemus*	*consules*
good-MASC.ACC.PL.	we-have	consuls-ACC.PL.
+ Focus		
'we have *good* consuls'		

Because of inflection, the absence of articles, and the flexibility of word order, Latin is capable of considerable compression, hence the lapidary style favored in inscriptions, proverbs, and epigrams.

Complex Sentence Structure

Subordination is much favored in varieties of literary Latin; Classical Roman writers influenced by the Greek periodic style made full use of the available syntactical resources, e.g., the inflected relative pronoun enabling any nominal constituent to be relativized, and the free use of the accusative-infinitive construction to create continuous indirect speech (*oratio obliqua*), as well as paratactic devices such as apposition, parallelism, ellipsis, and chiasmus. Means were found to compensate for the lack of certain features (e.g., the past participle active) which had made for flexibility in Greek, and the rich tense system is fully exploited in classical narrative prose. Late and Medieval Latin usage often blurs the distinctions of tense and mood found in Classical Latin; the conjunction *quod* 'that' gains ground at the expense of the accusative-infinitive, the active present participle becomes more frequent, and the periphrastic constructions characteristic of the Romance verbal conjugation begin to appear.

See also: Greek, Ancient; Indo–European Languages; Latin Lexicography; Romance Languages.

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Latin Lexicography

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Ancient and Medieval Lexicography

Roman contact with the Greek world and familiarity with Greek scholarship led to the creation of bilingual Greek–Latin and Latin–Greek word lists and dictionaries for practical and educational uses in the classical period. Monolingual Latin lexicography can be seen in the few works that have survived, e.g., that of Nonius, a grammarian of the 3rd and 4th centuries, and Isidor, bishop of Seville (7th century), in the tenth book of his encyclopedia *Etymologiae*. Verrius Flaccus' work, *De verborum significatu,* is preserved in an abridged version by Festus and was further shortened by Paulus Diaconus. Furthermore, glossaries, mostly anonymous, served educational purposes, explaining difficult words in literature. One of the most important collections is the *Liber glossarium* (8th century). In early medieval times this served as input for two important works, Papias' *Elementarium* (11th century) and Osbern of Gloucester's *Derivationes* (12th century). These two were the precursors of late medieval lexicography as manifested in the *Liber derivationum* by Hugutio and the *Catholicon* by Johannes Januensis.

Modern Latin Lexicography

During the Renaissance much lexicography was devoted to explaining Latin terms in the various vernacular languages of Europe. Two major monolingual Latin lexicographic works appeared. The *Dictionarium* (1502) by Ambrosius Calepinus, the Augustinian monk of Bergamo, was innovative in that the etymology was seen as secondary to the explanation of meanings. Even more importantly, examples of the uses of words are given. Calepinus made a second edition, and after his death his dictionary was revised and reprinted many times. In Paris, Robertus Stephanus (Robert Estianne)'s plan to produce a new edition of Calepinus resulted in a totally new dictionary in 1531, the *Dictionarium seu Latinae linguae thesaurus*, based on Calepinus and on citations from literature. The French glosses were removed in the revised edition (1536) to make room for a huge amount of additional Latin material. This led to the first compendious Latin monolingual dictionary, which remained the authority until the late 18th century.

A new era of Latin lexicography was inaugurated by Egidio Forcellini's *Totius latinitatis lexicon* (1771), which offers a huge collection of materials. An innovative contribution was the internal structure of the entries: Forcellini distinguished strictly between different meanings by exhibiting the relation between the core meaning and the derived meanings of a word (e.g., figurative usage). This dictionary, which also takes account of inscriptions, was abridged and revised by many scholars and was the basis for most 19th-century dictionaries. The abridgment by Wilhelm Freund (1834–1835) served as foundation for the dictionary by E. A. Andrews (1850), which in turn was revised and reedited by Charlton T. Lewis and Charles L. Short (1879).

The project *Thesaurus linguae Latinae (TLL)*, now hosted by the Bavarian Academy of Sciences in Munich, is compiling a scholarly dictionary that covers all of existing Latin literature from the beginnings until 600 A.D. The first fascicle was published in 1900; by 2004, the word *propositio* had been reached. P. G. W. Glare's *Oxford Latin dictionary* (1968–1975) is the most extensive and complete dictionary available today. It includes literary, epigraphic, and other sources. Still valuable is K.-E. Georges' *Ausführliches lateinisch-deutsches Handwörterbuch* (revised by H. Georges, 2 vol., 1913–1918, reprinted in 1988). The Perseus Project at Tufts University is an online dictionary with English metalanguage based on Lewis and Short.

Medieval Latin

A largely neglected area of Latin scholarship, medieval Latin was first treated by Du Cange's *Glossarium mediae et infimae latinitatis* (1678), which covers the period from 800 to 1200 and is still used as a reference for later Latin. The project *Das mittellateinische Wörterbuch*, hosted at the Bavarian Academy of Sciences, covers the whole vocabulary of medieval Latin (even words that occurred already in antiquity). It covers the period from 600 A.D. (where the *TLL* stops) until 1280. The definitions are given in German. By 2004 the work had reached the word *dominum*.

Etymological dictionaries

The two most authoritative etymological dictionaries of Latin are the *Dictionnaire étymologique de la langue latine* (1932, fourth edition 1959) by Alfred Ernout and Antoine Meillet and the *Lateinisches*

etymologisches Wörterbuch by Alois Walde (1906), revised by Johann B. Hofmann (third edition 1954–1956).

See also: Computational Lexicons and Dictionaries; Corpora; Du Cange, Charles du Fresne, Sieur (1610–1688); Encyclopédie; Etymology; Greek Lexicography, Classical; Latin; Lexicography: Overview; Stephanus, Robertus (ca. 1503–1559); Thesauruses.

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Latvia: Language Situation

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Latvia [Latvija] is one of the three Baltic states. Its territory covers about 64 000 km^2. It has approximately 2 309 000 inhabitants. The Republic of Latvia was founded in 1918; its independence was renewed in 1991. In March 2004 it joined NATO, and as of May 1, 2004, it is a full member of the European Union.

Around 3000 B.C., the Finno-Ugric Livs settled there. During the first half of the next millennia, the ancient Baltic tribes arrived. The formation of the common Latvian language began during the 10th to 12th centuries A.D., when German crusaders conquered the territory. In the 16th century, the Livonian nation collapsed and today's Latvian territory fell into the hands of the Polish-Lithuanian Commonwealth until the Polish-Swedish War. After the Great Northern War (1700–1721) today's Latvian territory became part of the Russian Empire. In 1918, Latvia declared its independence. On June 17, 1940, Latvia was occupied by the Soviet Army. Latvia was again recognized as an independent state on August 21, 1991.

The ethnic composition in Latvia is as follows: 58.7% Latvians, 28.8% Russians, 3.9% Belorussians, 2.6% Ukrainians. 2.5% Poles, 1.4% Lithuanians, 0.4% Jews, 0.3% Roma, 0.2% Germans, 1.2% others (2004 Civil Data Register).

The Latvian language belongs to the Baltic group of the Indo-European family of languages. It is spoken by approximately 1.55 million people in Latvia and abroad as the first language and by approximately 500 000 people in Latvia as the second language. Typologically, Latvian is an inflectional language. The first written texts in Latvian appeared in the 16th century.

The Latvian language is the official language in the Republic of Latvia. The Law on the State Language (1999) is in force now. Ethnic minorities have the right to preserve and develop their language and their identity. The state finances primary education in eight languages.

The Liv language has a particular status of the only autochthonous minority language. Though about 170 people consider themselves Livs today, there are only five native speakers left.

The Russian language is the native language for 665 000 Russians, due to Russification processes for 72.8% Belorussians, 67.8% Ukrainians, and 57.7% Poles in Latvia. The first Russian settlers came to Latvia during 16th and 17th centuries. In 1935, 8.8% of the population in Latvia were Russian; during the Soviet period the number of Russians increased more than four times. Russian now is the language of tuition for 30% of all students. Apart from the publications brought from Russia, 70 local newspapers are on offer. Several TV channels and radio stations broadcast in Russian.

The Polish language was widespread in the eastern part of Latvia, yet today its role has diminished. Of the 60 000 Latvian Poles, only 11 500 recognize it as their native language. There are six Polish schools in Latvia. The Belorussian language is known by 36 000 Latvian residents, yet it is rarely used at home. There is one Belorussian school in Riga with about 100 students. Ukrainians mainly entered Latvia after World War II. The Ukrainian secondary school has about 300 students. Small Estonian, Lithuanian, and German communities have active cultural lives. Romany in Latvia has a particular dialect. A language primer and various books have been published in it.

See also: Estonia: Language Situation; Lithuania: Language Situation.

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Latvian

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Latvian (*latviešu valoda*), with some 1.5 million speakers in the Republic of Latvia, is one of two present-day Indo-European Baltic languages, the other being the structurally more conservative Lithuanian. The Latvian standard language is based on the central Latvian dialect (*vidus dialekts*), which is further divided (from west to east) into Couronian, Zemgalian, and Vidzeme varieties. The central dialect, together with Tamian in northwestern Couronia and along the northeastern coast of the Bay of Riga, is known as Low Latvian. High Latvian (Selonian and Latgalian, the latter with an independent literary tradition), is found in the eastern third of the country.

The traditional view of the origin of Latvian is that it represents a synthesis of the language of the early Latgalians (known from the 13th century on simply as *Letti*, that is, Letts or Latvians) and neighboring closely related Baltic dialects, now extinct, among them Zemgalian (along the Lielupe river), Couronian (in southwestern Latvia), and Selonian (along the middle Daugava). The influence of these Baltic substrata, together with that of Balto-Finnic and Slavic neighbors, accounts in large part for the marked

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dialectal diversity of Latvian within a relatively small territory.

The beginnings of a Latvian literary tradition date to the Reformation. The first published book in Latvian is a 1585 translation of a Catholic catechism; this was soon followed by other religious texts, chiefly translations. The language of these early texts is to varying degrees influenced by the German speech of the authors, especially in syntax. Efforts to establish a national standard language were begun in the mid-19th century; the Latvian traditional folksongs (*dainas*) served as an important source of norms for the standard language. A milestone in the codification and description of modern Latvian was the appearance of Jan Endzelin's (Jānis Endzelīns) *Lettische grammatik* (1922) and the four-volume *Latviešu valodas vārdnīca* [*Dictionary of Latvian*] (1923–32), begun by Karl Mühlenbach (Kārlis Mīlenbahs) and completed by Jan Endzelin.

The Latvian vowel phonemes include /i, u, ɛ, æ, a/ (spelled *i, u, e, e, a*) and their long counterparts /iː, uː, ɛː, æː, aː/ (spelled *ī, ū, ē, ē, ā*). In addition, a long and short *o* are found in borrowed words. The vowels /ɛ/ and /æ/ (and /ɛː/ and /æː/) are represented in writing by a single *e* (*ē*), reflecting the fact that they are derived from a single source, Baltic *e* (**ē*). Originally conditioned by the nature of the following vowel, they now function as separate phonemes. Functioning as long vowels are the diphthongs [i͡ɐ, u͡ɐ] (written *ie, o*), which result from Common Baltic **ei* and **ō*: *dìevs* 'God' (**deiu̯-*), *nò* 'from' (**nō*), and from tautosyllabic sequences *en* and *an*: *pìeci* [pi͡ɐt͡si] 'five,' *ròka* [ru͡ɐka] 'hand' (Li. *penkì, rankà*). In final syllables Baltic long vowels are shortened and short *e* and *a* are lost: La. *vìlks* 'wolf': Li. *vilkas*.

Among the consonants of Latvian, the obstruents reflect a voiced:voiceless opposition, with regressive voicing assimilation (*atbilde* ['adbilde] 'answer,' *labs* [laps] 'good'); unlike Lithuanian, word-final consonants in final position are not devoiced: *kad* [kad] 'when.' Latvian lacks the feature of palatalization found in Lithuanian, but distinguishes a series of palatal consonants: *ķ* [c], *ģ* [ɟ], *ņ* [ɲ], *ļ* [ʎ]; *ķ* and *ģ* are found mainly in borrowed words. Characteristic of the Latvian consonant system is the development of *t͡s*, *d͡z* from Baltic *k, g* before a front vowel: *cits* 'other' (Li. *kìtas*), *dzìmt* 'to be born' (Li. *gimti*). The Baltic reflexes of the IE palatovelars have merged in Latvian with *s* and *z*: *sìmts* 'hundred' (Li. *šimtas*) < IE **ḱm̥tó-*, *zeme* 'earth' (Li. *žemė*) < IE **d^{h}ǵ^{h}em-*. Secondary palatals *ʃ, ʒ* (orthographically *š, ž*) have arisen in turn from the sequences **si̯*, **ti̯* (>*ʃ*) and **zi̯*, **di̯* (>*ʒ*) before a back vowel: *šũt* 'to sew' (<**si̯ūt-*).

With a few exceptions, Latvian has initial stress. The standard language distinguishes three phonemic tones (marked only in linguistic texts) on long vowels and diphthongs: level [˜] and broken [ˆ], both representing Baltic acute tone; and falling [`], representing Baltic circumflex: *mît* 'to tread,' *mît* 'to change (arch.),' *mìt* 'resides.' Only the central Latvian Vidzeme dialect around Valmiera still distinguishes all three such tones; remaining dialects oppose only two (outside of High Latvian, broken and falling tone typically merge as either falling or broken tone).

The Latvian noun distinguishes masculine and feminine gender, each with three declensional patterns. Within declensional paradigms, five cases are distinguished morphologically: nominative, genitive, dative, accusative, and locative, in both the singular and plural. Adjectives, which occur in both definite and indefinite forms, agree with the noun in number, gender, and case.

The Latvian verb distinguishes present, past, and future tenses, and has a system of relative tenses formed with *būt* 'to be' and the past active participle. The verb has three conjugational types (only two of which are productive), each with a number of subtypes. The 1 sg. present and past forms coalesce in many instances where the stems are not distinguished by root vowel gradation. Like Lithuanian, singular and plural are not distinguished morphologically in the third person.

Peculiar to Latvian, from a Baltic perspective, is the syntactic construction *man ir* 'to-me is' for 'I have' (Li. *aš turiù*) and the use of the debitive (expressing obligation), formed with the particle *jā-* and the 3rd person present, with a dative subject: *man jābrauc* ("to-me must-go") 'I must go.' Like Lithuanian, Latvian uses a preposed adnominal genitive: *latviešu valoda* ("of-Latvians language" = 'Latvian language').

The lexicon has been rather strongly influenced by neighboring Baltic Finnic languages, chiefly Livonian: interrogative particle *vài* (Liv. *või*), *mãja* 'house' (Est. *maja*); and also by German: Middle Low German during the Hanseatic period and New High German thereafter (*brīvs* 'free': MLG *vrī, ùn* 'and': MLG *un*, *briĩles* 'eyeglasses' NHG *die Brille*). Nevertheless, Latvian preserves a number of Indo-European archaisms not found elsewhere in Baltic: *asins* 'blood,' *agrs* 'early.'

See also: Balto-Slavic Languages; Latvia: Language Situation; Latvian Lexicography; Lithuanian.

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Latvian Lexicography

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Latvian lexicography has been and remains primarily bilingual. This has been historically determined by the dominance of one or another country in the region – so that dictionaries accommodated to the situation accordingly. It is usual to date Latvian lexicography from 1638, when G. Mancelius's *Lettus* was published, containing about 6000 German-Latvian entries. There were also two multilingual dictionaries published in the same century: a Polish-Latin-Latvian work by Elger (1683) and a German-Latin-Polish-Latvian one by Dressel (1688). The following two centuries saw the same pattern – although the dictionaries increased in size and quality, they were made by non-Latvians. The situation changed in the middle of the 19th century, when after the national 'awakening' Latvian linguists took hold of lexicography. The new dictionaries were purged of German and Russian loanwords, and they came closer to spoken language yet also became more prescriptive, the Waldemahr (1872), with 50 000 entries. The dictionary scene up to 1900 was thoroughly researched by Zemzare (1961).

The iconic Latvian dictionary of the 20th century is the four-volume work by Muehlenbach and Endzelins, published in 1923, with supplements appearing in 1932 and 1946. It contains a wealth of Latvian word-stock, though purged of later loanwords. The dictionary contains roughly 120 000 entries in the new orthography with explanations (in German), etymologies, stress patterns, citations, and examples and, despite the passage of time and several shortcomings, it is still viewed as the 'proper' source of Latvian lexis.

The beginning of the 20th century saw an expansion of bilingual dictionaries in the new contact languages – English and French – as well as a strong emphasis on dictionaries of foreign words. The Soviet period produced the first extensive monolingual explanatory dictionary of literary Latvian (*Latviešu literārās valodas vārdnīca*) in eight volumes, which, however, suffers from a lack of colloquial language and is affected by ideological constraints. A one-volume desk dictionary (25 000 entries) of standard Latvian, *Latviešu valodas vārdnīca*, was published in 1987 and has been reprinted several times.

Bilingual lexicography in Latvian is fairly advanced, with relatively big new dictionaries covering not only the traditional contact languages such as English, Russian, and German, but adding Estonian, Italian, Lithuanian, Polish, Spanish, and in the 1990s also Scandinavian and some Eastern languages. The last decade has seen the creation of new Latvian-English (Veisbergs, 2003), English-Latvian (2004), and French-Latvian (Auziņa, 2001) dictionaries as well as older German-Latvian and Russian-Latvian dictionaries reprinted and updated.

Among other important contemporary lexicographical sources one should mention dictionaries of etymology (Karulis, 1992), foreign words (Baldunčiks, 1999), idioms (Laua *et al.*, 1996), dialects, spelling, pronunciation, toponyms, abbreviations, numerous terminology dictionaries, and foreign name-spelling dictionaries (Latvian uses transcription for rendering foreign proper nouns).

Electronic Resources

Latvian lexicography suffers from the lack of a proper corpus. Other electronic tools are fairly well developed. A combination of various bilingual dictionaries is available from Tilde, and some of Tilde's resources are available on the Internet. An up-to-date and comprehensive Latvian explanatory dictionary with electronic access is being slowly built. Other portals include Valsts Valoda, the state language commission, and Valsts Valodas Aģentūra, the state language agency.

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Generally Latvian lexicography today bears a somewhat random character, but of late the descriptive approach seems to have prevailed.

See also: Bilingual Lexicography; German; Latvian; Lexicography: Overview; Phraseology; Russian; Terminology and Terminological Databases.

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Law and Language: Overview

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Introduction

Interest in legal language is not a modern phenomenon, although extensive research into it began to appear only in the latter part of the 20th century. Earlier comments on the language of law were exclusively critical of the style, vocabulary, and structure of legal texts, especially legislative language. We find the French philosopher Baron de Montesquieu in his *De l'Esprit des Lois* (1748) arguing for a simple legal language, to be understood by all readers in the same way, and furthermore to be understood by people even of mediocre understanding ("*de mediocre entendement*"). The 19th century English utilitarian, Jeremy Bentham, also proposed that legislation should be written in a language understood by laypersons. "Clearness in respect of its language" was one of the seven properties, Bentham argued, "a body of law . . . must be possessed of."

These comments show that there was a problem felt by leading thinkers concerning the language of the law. Both Montesquieu and Bentham related to legislation, but their criticism may be equally directed to other legal documents. Furthermore, legal language and legal institutions have been the target of criticism in literature. Charles Dickens' description of the English Chancery Court in his novel *Bleak House* – the time it takes for the judges to decide a case, the language which no one understands, etc., – is well known.

In the early days of modern linguistics, before it had become an established discipline, we do find studies on the law and its language. Several members of the pre-World War II Prague Linguistic Circle addressed problems of legal language. The language of legislators was examined from a functional perspective, with the focus on the educational level of readers of legislative texts, which implies that many people who are affected by the law are not able to read the texts in which the law is written. Another facet of the work of Prague linguists was in the field of vocabulary; observations were made on the careful use of words in legal texts which have inexact meanings in everyday discourse.

Academic lawyers had also dealt with legal language, and published articles, and even textbooks on the drafting of legislation and other documents. These tend to be prescriptive from a lawyer's point of view, and are not outwardly critical of the structural complexities found in legal texts. An exception is the seminal work of David Mellinkoff (Mellinkoff, 1963),

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Language of the Law. In his book, Mellinkoff, a lawyer, is highly critical of the obtuse language lawyers employ in their documents.

Fields of Research

This section introduces the various fields of research that have grown over the past 30 years or so. Reference will also be made to the various articles that appear in this encyclopedia that relate to current research into those fields of law and language.

Linguistic interest in the language of the law was perhaps initiated by David Crystal and Derek Davy in their book on *Investigating English style* (Crystal and Davy, 1969). In this work, the authors examine a number of registers of English, including the legal register. In the chapter on legal language, they deal with the language of contracts, pointing out the style of legal draftsmen who have developed an intricate and syntactically complex style, in order, on the one hand, to prevent misunderstanding, and on the other, to cover all what the clients want to say and not to depend on extrinsic evidence for the interpretation of the document. They draw attention especially to (1) the conditional structure of the legal sentence; (2) the placing of modifiers immediately adjacent to the phrase or word to be modified; (3) the use of nonfinite clauses as postmodifiers; and (4) the lack of explicit connection between the sentences of a document with its accompanying repetition of lexical items and the accompanying sparing use of pronouns. Following Crystal and Davy's book came a spate of work on legal language, especially the language of legal documents. A great deal of this work has been in the fields of grammar, especially syntax, and lexis. Much of the research was produced by Scandinavian scholars (e.g., Gustafsson, 1975), and several of the papers in the special issue of *Text* (1984) were devoted to the language of legal documents (*see* **Language of Legal Texts**) deals directly with written legal language, while other articles have a bearing on this register (*see* **Law on Language**).

In the United States, interest in the law and language came initially more from a sociological and anthropological than a linguistic perspective. One may also cite work on the language of Barotse jurisprudence, Yakan litigation, and Shawnee laws, among others. The type of doubletalk and gobbledygook used by government during the Vietnam War and especially during the Watergate affair also led to many researchers putting the focus on the language of administration and of law. Only in the early 1970s were sociolinguists introduced to this area of research. Brenda Danet's overview of language in the legal process, which appeared in the *Law and Society Review* in 1980, served as a stimulus to further and broader research in the areas of law and speech. Interest in oral communication in Western legal cultures grew, too, with the development of more efficient recording equipment, which allowed a more accurate record of spoken legal proceedings, thus allowing linguists and conversational analysts to tackle courtroom discourse. A conference was held in 1985 at Georgetown University on spoken legal discourse, e.g., witness questioning, depositions, jury instructions and interpretation; many of the papers presented were published by Levi and Graffam Walker (1990). Another research field in the area of law and spoken language addresses lawyer–layperson communication. This involves dialogue not only in the courtroom but also in the lawyer's office when the lawyer speaks to his/her client.

It can be seen that this distinction between written and spoken legal language is one that pervades research into legal language. Taxonomies of types of legal language have been set up. Within the mode of written legal language, not only are documents such as legislation and contracts examined, but also legal textbooks and law reports. Spoken legal language may be subcategorized into courtroom discourse and out-of-court discourse, and each of these subcategories may be further subdivided; see a description of genres in general (*see* **Legal Genres**).

Against the background of growing interest in spoken legal language, the study of written legal language may seem to have reached its peak in the 1980s; further work on legislative texts, on contracts, and on wills has been carried out not so much from a structural point of view, but more from a discourse and pragmatic perspective. Legal texts, especially written legal documents, have been analyzed as discourse. Moreover, pragmatics has been extended to speech in legal proceedings, for example the adjacency pair of question/answer in witness testimony, and formulaic language in texts such as the witness's oath. This type of spoken legal language has been, and is still being, extensively studied within a sociolinguistic framework, in which pragmatics has found an important niche. The reader is directed to the articles on legal pragmatics and on definitions and rules in legal language.

At the same time as these developments, another field opened up, a field that has emerged from time to time since Montesquieu and Bentham, but has not until recently attracted the attention of scholars in linguistics and sociolinguistics – the problem of the readability and comprehensibility not only of legal texts but, principally, of spoken legal discourse. The Charrows (1979) conducted a psycholinguistic study of jury instructions, pointing out the low level of

understanding of many jurors, who may have to make fateful decisions concerning matters they do not grasp. Many of the attempts to improve the style of legal documents, to make them comprehensible to the layperson, derive from work on language structure. This research and accompanying public agitation eventually led to the support by U.S. President Carter for plain language in legal documents that directly affect the public, e.g., insurance policies. Many legal firms, especially but not only in the English-speaking world, have adopted plain English in their document writing as company policy (*see* **Jury Instructions**).

The right of silence of the accused, especially in the Anglo–American legal context, has been studied both in terms of its pragmatics, with attempts made to answer the question what the accused means by his or her silence during police investigation, and also in terms of comprehensibility, establishing it as a field of research associated with plain language. Not only has the Miranda warning (in the United States) been under scrutiny as far as comprehensibility is concerned, but in the wake of changes in the text setting out the accused's right of silence carried out in the United Kingdom, linguists have investigated whether the average suspect with a below-average IQ may understand what is being read out to him or her, and what s/he is reading.

Apart from suspects who may not understand what is being said to them by authoritative figures (e.g., police and lawyers), there are other disadvantaged groups who face a linguistic battle in the course of legal proceedings. Litigants and suspects who do not speak, or who have an inadequate knowledge of, the language used in the courts are in many jurisdictions entitled to an interpreter. The various problems arising from interpretation and the rights of the interpreter and the interpreted are discussed in **Court Interpreting**, while other disadvantaged groups, for example aborigines in Australia, which has attracted much research recently, is dealt with in **Interviewing and Examining Vulnerable Witnesses**.

The employment of linguists as expert witnesses in the courtroom has grown over the last two decades or so. The expertise work requested tends to be in the field of voice and writing identification. Much of the research on language in the courtroom is now included in this field of studies. The associated field of intellectual property rights and their violation is an area of current research discussed in **Plagiarism**.

We also find groups of philosophers, linguists, and academic lawyers who examine law and language from a semiotic point of view. The French semiotician Andre Greimas wrote with linguist Eric Landowski a seminal work on legal discourse (1966), followed by further work from a Greimasian perspective by Bernard Jackson (1984). Semiotic research into legal language has also appeared from a Peircian standpoint, and from the Italian analytical school of jurisprudence. A discussion of police/citizen encounters from a semiotic point of view is found in **Legal Semiotics** and **Police Questioning**.

The development of legal language has been studied, especially within the European area. Despite a distinction that needs to be made between common law (Anglo–American) law countries and countries whose legal systems are what is termed continental, developed from the Justinian code to the Napoleonic code and beyond, the language of the law in both systems has much in common. This may be seen, too, in a comparative approach in non-European systems. Furthermore, studies have been carried out on the influence of the law on 'normal' language itself, as may be seen in **Law on Language**.

There remain a number of less prominent areas in which research has been carried out on the law and language. For example, within the model of Roman Jakobson's functions of language, the poetic function of the language of the law has been examined in terms of rhythm, alliteration, parallel structures, and the extensive use of metaphor.

See also: Conversation Analysis; Court Interpreting; Interviewing and Examining Vulnerable Witnesses; Jury Instructions; Language of Legal Texts; Law on Language; Legal Genres; Legal Semiotics; Plagiarism; Police Questioning; Prague School; Silence; Understanding Spoken Discourse.

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Law on Language

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Contributions of the History of English Civilization and Its Influence on Language and Discourses

The exploration of modes of communication in Great Britain permits a better understanding of the mechanisms by which legal order has been integrated into everyday language. The English judicial system has evolved since the 13th century under the influence of the customs of the different ethnic groups that have populated the island. Sir Francis Bacon noted the multicultural aspect of the Laws of England, the contents of which were the result of a compromise between the natural order of things and tribal or clannish values and the desire to homogenize through organized constraints.

The current language system is the result of an organization of meanings and terms from different cultures and traditions imported by invaders. They contributed to the impression and development of oral language and the transmission of orders and knowledge. What is the influence of the various ethnic groups that have contributed to the emergence of the nation?

The Celts, Anglo-Saxons, and Scandinavians participated in the historical construction of the linguistic dialectic between law and language in England. By successive invasions, they transposed their traditions through the development of rules for social life. At that time, customary practices were systematically built because illiteracy was virtually universal: "It is true, indeed, that, in the profound ignorance of letters which formerly overspread the whole western world, all laws were entirely traditional, for this plain reason, that the nations among which they prevailed had but little idea of writing" (Blackstone in Mellinkoff, 1963: 158).

This "plain reason" had fundamental consequences for the creation of an English legal order, which over the centuries came to be based on customs because of the need to articulate the practices and beliefs associated with each ethnic group; the purported objective of such a move was the creation of national unity. Writing was rare, but where it existed, it acquired a supreme value through its solemnity; the Magna Carta of 1215 is a good example, for it established, in English law, the mechanism of the predominantly customary parliamentary system that existed at the time. King Charles I received the ultimate punishment in 1649 for attempting to defy Parliament and trying to modify the Presbyterian religious custom.

The Celts

The influence of the Celts, who practiced human sacrifice and vengeance, bestowed a precise, very complex customary law through their elaborate system of sanctions. The lawyers were artisans of a repetitive oral tradition: "The joint memory of the ancients, the transmission from one ear to another, the chanting of the poets" (Powell, 1985: 159).

Sacred centers (*omphalos*) assured the unity between customs – beliefs and the expression of common language. Notably, the Celts were at the origin of 'legal procedures.' Even if justice was individual, it was rendered by an assembly, meeting as a jury. Resolving conflicts by arbitration resulted in making the law more fluid.

The Justinian Institutes

The Justinian Institutes were the source of judicial language carried by the Romans into the towns they occupied. These were the only hearths of latinization (Walter, 1994: 366) in an environment dominated by the Celtic spirit. The contributions were substantial, as the Latin society imposed the tradition of writing by the intermediary of the clergy, by which the

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imprint of Christianity on the discourse was complete. These written acts made knowledge accessible even with a limited level of literacy. A transformation of the transmission of knowledge and its fixture by written documents can be observed in the numerous royal edicts issued. However, this mutation only concerned an elite. From then on, Latin terms carried both religious and legal meaning. For example, on *Coelesti* and *Inferi*:

> Christianity gave a new meaning to both words. Hell became a place of torment, inhabited by devils, oath-breakers, and other condemned souls. And it was now understood that a good man might live forever in heaven. This shift of emphasis put considerably more wallop into the oath and a deed or will drawn by a literate clergyman who often threatened hell-fire and damnation for those who tried to upset the transfers (Mellinkoff, 1963: 63).

In Latin terminology, for example, the word *cell* (latin: *cella*, Old French: *celle*) meant both a cell in a convent or monastery but would also come to mean a prison.

The Anglo-Saxons

The Anglo-Saxons founded their rules of community life on the principles of family vengeance and redress: *the Wergeld* (compensation). The law of Ethelbert of Kent concerning the social and matrimonial system is an excellent example. The laws enforceable in Kent in effect transposed the Germanic order to protect women, widows, and slaves. On the other hand, they treated murder and theft very harshly (Stenton, 1968 : 97–98).

The legacy of Old English (Mellinkoff, 1963: 46–47), permitting the creation of words by composition, has come down to modern English, and is still used today:

- boc — book, charter, deed
- bocland — land governed by the charter
- folcland — land not governed by the special terms of a charter, but by folk custom
- wer — a man (sometimes also used to mean wergild)
- wergild — man compensation
- wergildpeof — a thief whose criminality had been ended by the payment of his wergild

In modern texts, the terms *hereafter, herein, hereof, herewith* are occasionally found. This historical contribution of Anglo-Saxon adds to the common language by making the terms more precise or even distorting them.

It is one of the first steps towards the creation of a specialized language giving birth to specially adapted expressions. (Gény, 1922, T.3: 460.)

The Normans

The Norman influence reveals the catalyzing effect of written Latin then in use in France. It became one of the principal instruments of diffusion of English law, notably in the elaboration of rules of law and charters. William the Conqueror helped perpetuate the use of Latin because he had understood the limitations of Old English and Old French for expressing Norman judicial ideas (Holdsworth, 1923: 44). Latin was the language *par excellence* of the medieval age (Woodbine, 1943: 411). The concept of Law Latin is described in no uncertain terms: "It is 'barbarous,' 'corrupt,' 'mutilated,' 'dog latin,' and in an Irish version 'bog Latin.' The calmest definition is Webster's: the kind of Low Latin, containing Latinized English and old French words, used in English law" (Mellinkoff, 1963: 73).

William the Conqueror adapted Norman judicial institutions to England, separating the ecclesiastical courts from the secular, but also continuing to use clergymen in judicial posts, thereby perpetuating the use of Latin. He affirmed the compromise in 1086 when he called a grand assembly at Salisbury to: "... cement the union between the indigenous and Norman elements [and to] give the structure an unchallengeable judicial foundation" (Andrieu-Guitrancourt, 1978: 278).

While the English were establishing a power to regulate the life of society, the French were also attempting to unify their judicial practices under French customs. The procedure was the same as that on the other side of the Channel. The '*decretale*' of Innocent III in 1202 addressed to Lothaire, Canon of Paris, posed the problem of Parisian customs (*Coutume de Paris*) directly and incisively. He referred to this custom as a part of the law in France (*quia tamen juxta, consuetudinen approbatam, que pro lege servatur, in partibus gallicanis.*) A great number of other 13th century charters relating to it were issued as law in 1212 by Simon de Montfort to the people of Albigeois and other neighboring regions (charters following the Treaty of Franc-Aleu of 1637).

It is also noticeable that insularity did not drive England to draft original rules parallel to the expression of a multiethnic population. The construction of a derived specialized language is the consequence of a complex maturation of Norman and foreign customs. It results in a common law highlighted by the clergy who integrated Canon law as well as Roman law into it.

The Setting of 'Open Texture'

An 'open texture' (MacCormick, 1978) leads to various possibilities of interpretation within space and time. Indeed, the interpretation of the law is currently made in light of its principal sources, which are statutory law and judicial precedents. The written word is of supreme authority, but is integrated in the English logic of interpretive reasoning. In contrast to countries based on written law where the concept does not allow any transformation, its use in England is flexible. This flexibility is proof that the capacity of the legislative discourse, which is situated – by Act – outside of time and space, can become a living reality. Butler (1997: 25) defines its sense when she affirms that the language "remains alive when it refuses to 'encapsulate' or 'capture' the events and lives it describes." This doctrine is aimed at and authorizes the interpretation of discourse. The two elements that shape the decision are the power of deformation of concepts associated with vague outlines in discourse. Their use by the legislator is not accidental: it is the culmination of a premeditated act whose purpose is to simplify the formulation of written law. Indeterminacy is characteristic of the application of judicial precedents:

> In language the words which present themselves, and are employed in the character of names, are, some of them, names of real entities, others, names of fictitious entities; and to one or other of these classes may all words which are employed in the character of names be referred (Bentham in Tait, 1843: 448–449).

Indeterminacy can also be noticed in the gender, the words, the sense accorded to concepts, and the interpretations in time and space. It reveals the specific identity of its legal and linguistic communities: what is the approach of this interpretation?

Fluidity of Meaning: Cause or Consequence of Judicial Vagueness?

In law, vagueness is understood to be the remnant of doubt in the legal text, outside of the clear meaning flowing from its pronouncement. Plurality in meaning is advantageous since the possibility of more messages implies a larger set to select from.

> But now I employ the expression 'Legal Fiction' to signify any assumption which conceals, or affects to conceal, the fact that a rule of law has undergone alteration, its letter remaining unchanged, its operation being modified... The fact is [...] that the law has been wholly changed; the fiction is that it remains what it always was (Sumner Maine, 1963/1861: 25–26).

This fiction, this voluntary lack of real frontiers between the semiotic logic and the multiplicity of the fields of application leads to instability in discourse between scientific communities. But these 'neighborhood' conflicts are considered beneficial to legal language because of the important role left for interpretation. The English philosopher, John Heron (1989), confronts the sense of this collaboration:

> This construing of what is immediately presented as a spatio-temporal whole that transcends what is immediately presented, is not only a means of experiential knowing, it is also a fundamental kind of practical knowledge – knowing how to orientate oneself in space and time, knowing how to construe presentations or appearance in terms of spatial and temporal 'reality.'

This space for creative liberty is not the result of a misunderstanding or of a lack of completion. It is based on the semantic contents of the text, which by its organization, inserts it into a general body of reflection: the doctrine of indeterminacy. This particular form, for example, places the judge in a relatively open space for decisions; it offers him the possibility to integrate exterior elements into the legal domain within prescriptive arguments. Indeterminacy transforms the partially hermetic reading of the judge who applies the law, in judgments, into a flexible interpretation – *ratio decidendi.*

This doctrine produces social identity but is also a source of cohesion between the individuals of the same scientific community. Bachelier reminds us that "the richness of a scientific concept is measured by its power of deformation" (Grawitz, 1993: 1). This flexibility of concept becomes a living reality, "a kind of **personification** ... as if the law were a living creature" (Bentham in Tait, 1843: 399). The rigid prescriptive frame delimits a content of which the sense varies according to the interpretation of the user.

Theoretical Intepretation The theoretical interpretation of the author's thoughts and his/her productions permits the discernment of several essential elements that condition the tenor of the messages. There is no perfect accord between the thought of the author and his/her production. The deformation operates from the relationship of factual or written elements, which serve to support his/her thoughts. The ambiguity comes out of the personal work and goes on to contribute to the specificity in the identity of the discourse. The elements of shift in meaning are therefore either in the semantic support between constant or variable meaning, or in a time-space that does not correspond to that of the emission of the message. The networking of the listed constraints makes sense and leads to the determination of rigid and fragile elements (i.e., fuzzy sets in the language of the

law that can impair the whole understanding of a sentence). It may be pointed out that writing down the rule is the product of a semantic reflection in which textual organization also takes on sense.

Metacognition The metacognition of the interpreter is important because of the effects of perception of ambiguity integrated in the author's discourse. To that cultural appreciation is added the special knowledge of the reader who has been trained in legal logic. Flavell (1987: 21–30) underlines the effect of doubt, which is present in the cognitive activities that one does not know how to interpret or explain, and in which the construction of knowledge is proportional to the metacognitive implication of the subject.

Application of Ambiguity The application of ambiguity in the judicial act is realized in the form of a readjustment including the user's reasoning through a descriptive process. These contributions are characterized by the emission of procedural rules, drafted in part from law reports conditioned by the rules of precedent. The resulting process provides a compromise between the social parameters introduced and the decision reached. Its aim is to be in a continuum of the legal thought of the time: "Any instance of interpretation always involves a choice and a motive, an element of the 'play of meanings' which denies that there can ever be a single 'correct' or valid interpretation (Goodrich, 1986: 138)."

This handling of meaning and words is the prime feature of the functioning mode of the English legal system. The contribution of specialized linguistics allows the evaluation of the level of logic and fluidity that impregnate the frames of statutory law and precedents, that is of the drafters, readers, and interpreters of the law. This creation of linguistic tools is a challenge to the objectivity of the rules. Some writers mention the limitations made necessary by the fact that realities of social life only become judicial realities thanks to the concepts and decision making capable of providing the necessary meaning. The decision making outside the context of the rule interferes with the legal order but allows the extension of meaning, which can be re-used in other circumstances. This plural reality of linguistics can be noticed in the thinking of Sherry (1996: 134): "The globalization of culture means that we all live in 'translated' worlds that the spaces of knowledge we inhabit assemble ideas and styles of multiple origins, that transnational communications and frequent migrations make every cultural site a crossroads and a meeting place."

Gény (1922: 79–80) completed his notion of fluidity by a more global approach:

> The things of the world submitted to duration are in a constant flux and as the object of a continuous flow in such a way as there is no fixed nature but essences perpetually changing and observing at the same time that the faculties of man do not operate according to a law of schematical dissociation, they operate in a perpetual concert which does not allow to insulate them from one another. The 'new philosophy' energetically criticizes as means of knowledge, the 'discursive process' which leisurely deform reality (like the steps of a stairway which would be substituted to a slow slope), even the pure concepts which only grasp things by fragments and represents them like still and solid moulds incapable of expressing their essential variety and fluidity.

This brief analysis can be summarized by the fact that fluidity is a place of contact, a place of interference, and a mode of cultural production, 'a translated culture' as part of the processes by which newness enters the world (Wagner, 1999).

Indeterminacy in Legal Language

As an illustration, the current language runs on a path of information by means of expression neutral and accessible to everybody. Specialized languages run on the same path but add specialized elements to the current meaning. It, in turn, creates a dynamic of comprehension, a metalanguage only accessible to the initiated. The question is to examine the origin of the specialized term and its semantic transformation.

In the domain specific to legal expression, the linguist works at confronting the conceptual word within the current relationship and the application being construed by the powers that be. He or she then attempts to explain the mechanisms that condition the understanding of meanings both internal and external to the British scientific community. The distortion of meaning of this affected language is particularly perceptible by the other inhabitants of the European continent.

So, the question of reassigning meaning to words and playing with words will continue to be the core issue in legal adjudication, since any word may be subject to interpretation as it was with the case of 'tomatoes' in 1893 (*Nixen v. Hedden*) where the U.S. Supreme Court had to decide whether they were fruit or vegetables. The Court rejected the botanical truth that the tomato is in fact a big berry, and deferred to the culinary vernacular of vegetable to describe it.

As a consequence, statutory wording is not a closed system but an open texture where relative

indeterminacy is used to interpret statutes (Wagner, 2005). "Parliament often uses general words intentionally in the belief that judges are the most adept in filling in the details" (Freeman, 1994: 193).

Indeterminacy will only cease when one momentary experience (i.e., a case in court) is considered. It will then turn into a contextualized determinacy. "Because the meaning of language is inherently contextual, we have declined to deem a statute 'ambiguous', for purposes of lenity merely because it was possible to articulate a construction more narrow than that urged by the Government" (Solan, 2004: 79).

Involuntary Intent of Promoting Ambiguity The language contains several microsystems, which merit examination. Here, the difficulty of interpreting 'and' and 'or' is a well-known phenomenon in law. In a statute, these two terms can be interchangeable from the time that a legislative intention exists (Solan, 1993: 45). Quirk (1986: 934) in the same vein, adds "*or* tends to replace *and* in contexts which we have called non assertive, and more generally in subordinate positions in the sentence." Solan explained that an error in writing by the overuse of the terms 'and' and 'or' allows to invert them. In effect, they are considered by lawyers to be very vague, therefore too general. Their usage as indeterminate notions reflects the legal terminology. In this way, the weak interpretive use of the connector forces the court to take the necessary measures to arrive at the legislative intention. Mellinkoff (1965: 56) said the same thing: "Legal writings continue to spew contradictions joined by a habitual *and/or*."

This controversy is very important to the use of this type of expression. Can it then be considered as an encouragement of mental laziness? Anyone knowing the difference between 'and' and 'or' can take a contract or a law and substitute one or the other term to reach a greater clarification of the law or legal decision.

The term 'and' is used to avoid a construction which, by the use of 'or' only, excludes the combination of several alternatives. 'And' takes the place of an addition, after several connected alternatives, simply by 'any combination thereof.' It takes the place of 'or' and in keeping the same meaning in statutes: 'and any combination thereof' or 'or any combination thereof.' By this, 'and/or' is completely ambiguous. But the courts will accept it without difficulty as a contribution to legal English: "The high failure rate of legal papers that depend on *and/or* for anything of importance should have long since eliminated it from the legal vocabulary. Yet it persists, and is widely used in legal and ordinary writings" (Mellinkoff, 1965: 55).

'Promoted' Indeterminacy Overtly 'promoted' indeterminacy in statutory law was emphasized by U.K. legislators on the use of gender-neutral, gender free language in order to avoid designating grammatical gender and leave doors open to judges' construction. The English Interpretation Act 1978 provides that:

"words importing the masculine gender include the feminine";
"words importing the feminine gender include the masculine," and
"words in the singular include the plural and words in the plural include the singular" (Wagner, 1999).

Even modality has been construed by judges as shown below:

> It is admitted that the words 'every member . . . shall inform' the directors does create an obligation but it is argued by the defendants that the words 'the directors . . . will take the shares' imports in some way the idea of an option or choice or volition on the part of the directors having regard to the inherent difference (not always observed) in the English language between the words 'shall' and 'will.' I appreciate the force of that argument, but I cannot accept it. In this context, while the word 'shall' clearly imports compulsion and obligation, the word 'will' indicates as it seems to me a resultant prospective eventuality, in which the member has to sell his shares and the directors have to buy them, each being under an obligation to bring that eventuality into effect (*Rayfield v Hands* [1958] 2 All ER 194 at 196, per Vaisey J).

> We must endeavour to construe the words, so that "shall and may" [in an agreement for arbitration] may both stand. "Shall and may" will both stand, by our holding them to be imperative. (*Crump v Adney* (1833) 1 Cr & M 355 at 361, per Lord Lyndhurst CB.)

> The words shall and may in general acts of parliament, or in private constitutions, are to be construed imperatively. (*A-G v Lock* (1744) 3 Atk 164 at 166, per Lord Hardwicke LC.)

This deliberate intention to promote indeterminacy is also visible when using adjectives or adverbs that could lead to an interpretive process from the judge. Following the examination of distinctive statutes in various countries, it can be noticed that using such words allows focus on intentional possibilities of interpretation. As an example, under the English Judicial Trustees Act 1896, s.3(1), plurality in interpretation is suggested when the drafters inserted adverbs such as 'reasonably' or 'honestly,' which

convey an emotional content. Indeed, both adverbs are vectors of perception of the universe, and from one case to another interpretation can easily fluctuate. Another example is to be found under the proviso of the Australian Criminal Law Amendment Act 1922, s.2, where it is provided that there is a "reasonable cause to believe that a girl is of or above the age of 16 years." How do we determine this reasonable cause? Only a specific case can give an answer to the question.

The Canadian Landlord and Tenant (Rent Control) Act 1949, s.3 (1) (b) deals with the 'reasonable price' to be charged. Here, the evaluation of 'reasonable price' is highly dependent on the context. In other words, indeterminacy is a medium of communication permitting the nondetermination of the constituent words. Words lack effective referents. They are idle, they are not connected with a 'living reality' but with statutes, and their determination will be provided only when exemplified.

Even the simplest words ('person' and 'night' in this case) can have an abundance of meanings in the light of distinctive Acts, for example:

- In the Statute of Frauds Amendment Act 1828, it is provided that 'person' includes a 'corporation.'
- Under the Interpretation Act 1978, Sch.1, 'person' includes a body of persons corporate or unincorporated.
- In the light of Railway Clauses Consolidation Act 1845 (c.20), s.20 'person' includes a limited company.
- What time shall be considered 'night': provided always that for the purposes of this Act the night shall be considered and is hereby declared to commence at the expiration of the first hour of sunset and to conclude at the beginning of the last hour before sunrise (Night Poaching Act 1828, s.12)
- 'Night' "Means the time between half an hour after sunset and half an hour before sunrise" (Highways Act 1980, s.329(1)).

Hypercodification of Legal Language

Hypercodification is one of the characteristics of modern societies, which want to embrace the multiple facets of social life by speech or writing. One of the defining features of modern societies is their embrace of plural writing and speaking systems, a trend that is mirrored in the diversity of social life in general. It is a quest of meaning, the modalities of which seem to pervert the spirit. The exploration of this state of facts does not limit itself to its legal signification but circles the subject in its linguistic expression. This overabundance of modeling systems disturbs the conditions of emission, reception, and meaning of the messages.

The semiotic approach is one of the unavoidable modalities where investigating is carried out by the analysis of the practices of the legal community, notably in its system of values and behavior.

The hypercodification, which is very important in English Law, is part of the message. It can be understood as a means, a mode of expression showing that the legal culture is being communicated. The understanding of the phenomenon results from the exceptional conditioning of the discourse by historical heritage, the multiform contributions being the result of the mixing of cultures and customs of a multiethnic nation. Besides, the external interference has led to the amplification of legal productions and processes. Culler (1981) describes the mechanisms, which have resulted in the inflation of the legal system by the internal interrelations between written and symbolic languages.

Linguistic Territory

The linguistic territory has, in its organization, multiple forms of actions on law by the effects of symbolization, codification, normalization, and even standardization of the language. All of the operations undertaken are intended to simplify the structure of writing and make it more comprehensible. The main idea is to limit the length as well as the complexity of phrases. To achieve this simplification, several techniques have been elaborated. The stated goal is to put into practice a codification that is relatively stable, simple to understand and capable of being added to. In effect, the realization puts in place the means which, under the pretext of simplification, contribute to the complication of the original sense of the text.

Legal Identity

Legal identity is under constant reconstruction. In reality, this reconstruction is a legal one, which adds to the already existing foundation. This new formulation leads to modifications in the discourse by means of textual contributions, which create more inconveniences than advantages. The encoding entails an overabundance of codification. Its interpretations become more and more complex over time. They create an insidious rigidity of legal language. The consistency of discourse is dependent upon its comprehension; so as it is meant first of all for initiates, people outside of the community cannot understand it. The heritage of the Common Law is rich in concepts, in particular meanings, which hold true

only for England and Wales. To show how the law has become a medium, a vehicle, in the same way as the common language, of a highly codified and specialized language, it is necessary to explore its terminological construction. This necessity results from structured collective procedures by systems of abbreviation and terms of variable content. Hypercodification is so highly visible in legal language and the understanding of legal language varies within space and time.

A Tool of Socialization

The language of the law as a tool of socialization and factor of identity generates subproductions, which add new rules by its willingness to adapt in time and space to the English population.

The conveyed message traps legal language by the implication of networks and persons in which specific codes are structured in socio-autonomous systems. One example among others is in English medical law (The Human Fertilisation and Embryology Act 1990), in the case of surrogate mothers, where the adoptive mother is called the 'genetic mother.' In society, the mother who delivers the child is by definition the genetic mother.

Conclusion

Law is, by definition, the codification of modes of expression in a given society. However, its use is distinctive owing to the circumstances in space and time in which users apply or modify it. The shift in meaning between the product and its expression has been analyzed showing how the language of the law can be multifaceted.

See also: Law and Language: Overview; Legal Genres.

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Le Roux, Pierre (1874–1975)

P-Y Lambert

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Born in 1874 in Plouëc (Côtes du Nord), Pierre Le Roux was a native speaker of the Breton language. He went to the University of Rennes, where he had Joseph Loth (*see* **Loth, Joseph (1847–1934)**) and Georges Dottin as his professors. His first work was a phonetic description of consonant mutations in his own dialect (Pleubian), a study published in 1896. With the help of a scholarship (Fondation Thiers), he came to Paris in 1898, and attended the lectures of the Celticists Gaidoz and D'Arbois de Jubainville. He succeeded Joseph Loth as teacher of Celtic in Rennes University in 1910.

For his thesis, he wrote a historical description of the Breton verb (1930), which qualified him as Professor. This book is an invaluable description of all the paradigms of the verb, from a historical and comparative point of view. It has never been replaced either in respect to the extensiveness of its sources or the accuracy of his analyses. For many of his interpretations (and particularly for the description of the verbs meaning 'to be'), Pierre Le Roux was inspired by two great precursors: Emile Ernault and François Vallée.

At the university, Pierre Le Roux started his dialectological investigations (1911–1913, resumed after the war in 1920–1921). He used to travel on his bicycle across Brittany, sometimes with cumbersome recording instruments. His results were published as a Linguistic Atlas of the Breton-speaking part of Brittany (the first fascicle was published in 1924, the 6th in 1963 with the help of Canon Falc'hun (*see* **Falc'hun, Francois (1909–1991)**). The questionnaire included more than 1200 questions, but only 680 maps have been published. He prepared the questionnaire in Rennes with the help of young Breton-speaking soldiers from different parts of Brittany. He had to limit himself to 78 places of inquiry, a rather loose network compared with the number of Breton-speaking communities (600 parishes).

This Linguistic Atlas recorded forms from dialects that are now extinct, for example, those of Bourg-de-Batz, Belle-Ile, and some places east of Vannes. The informant was chosen very carefully, with an investigation of the birthplace of parents and spouse. In some cases, however, Pierre Le Roux was obliged to rely on the hasty answers of people he was necessarily in touch with: tenants of inns and public houses. All in all, the documents gathered by Pierre Le Roux are an extraordinary witness to the Breton language spoken during the period. Even in the places where Breton is still spoken, it is certainly impoverished in its phonetics, lexicon, morphology, and syntax. The Linguistic Atlas inspired several new investigations into Breton dialectology and phonetics, particularly by François Falc'hun, who studied on this basis the linguistic geography of Brittany, and by Pierre Trépos, whose thesis on the morphology of the plural relied also on the data of the Linguistic Atlas.

Soon after becoming Dean of the Faculty of Arts at Rennes in 1944, Pierre Le Roux retired and lived quietly for the rest of his life; he died a centenarian in 1975. Among his publications were also some editions of older manuscripts (Breton songs of the Penguern collection).

See also: Breton; Celtic; Dialect Atlases; Falc'hun, Francois (1909–1991); Loth, Joseph (1847–1934).

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Learners' Dictionaries

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The monolingual learners' dictionary (MLD) – a type of dictionary designed specifically to meet the needs of non-native language learners – is above all an English phenomenon or, even more specifically, a British one. This is not to deny that there have been significant contributions in other languages and traditions. For example, Larousse's *Dictionnaire du français langue étrangère* (1987) was an interesting and in many ways innovative addition to the MLD canon. But it failed to establish a durable parallel thread to complement developments in English pedagogical lexicography. More recently, new learners' dictionaries have appeared for a number of European languages, including: Langenscheidt's *Großwörterbuch Deutsch als Fremdsprache* (1993), the Vox *Diccionario para la Enseñanza de la Lengua Española* (1997), Van Dale's *Pocketwoordenboek nederlands als tweede taal* (2003), and Nathan's *Dictionnaire de didactique du français langue étrangère et seconde* (2003). To a significant degree, however, these have tended to adopt the main features of the dominant British model. In the Anglophone world, meanwhile, several American publishers have entered the fray – with books such as *The American Heritage English as a Second Language Dictionary* (Houghton Mifflin, 1998) and *Random House Webster's dictionary of American English* (1997) – but their efforts have for the most part been highly conservative and have contributed little of interest to the field. On the theoretical front, our understanding of the lexicon has been greatly advanced by work in French, notably in the elaboration of lexicon grammars by Maurice Gross and his colleagues (*see* **Lexicon Grammars**). Nevertheless, the most powerful impetus in the development of MLDs has been – and remains – the practical challenge of providing language learners with the resources to meet their twin communicative needs: 'receptive' understanding and 'productive' use of a second language.

The foundations of the MLD were laid down in the 1920s and 1930s by a handful of British academics, including Harold Palmer, Michael West, and A. S. Hornby, whose theoretical interests in syntax, phraseology, and what would later be called collocation were motivated above all by their work in English language teaching. The story of the modern English learners' dictionary begins in 1935, with the publication of West's *New Method English Dictionary* (*NMED*), a fairly slim volume covering around 18 000 headwords. But it was Hornby's larger *Idiomatic and Syntactic English dictionary* of 1942 that was to prove the more enduring model – evolving as it did into the *Oxford Advanced Learner's Dictionary* (*OALD*, now in its seventh edition), which formed the template for most subsequent, major English dictionaries for advanced learners. Over 60 years on – despite a highly competitive market that has delivered an impressive series of innovations – Hornby's blueprint survives substantially intact. Numerous publishers have entered the field (and with over a billion people learning English worldwide, this is hardly surprising), and have experimented with a wide range of general and specialized learners' dictionaries for all levels of proficiency. The advanced-level MLD, however, remains the dominant format. Since the 1970s, Hornby's dictionary has been joined by several other U.K.-based contenders: the *Longman Dictionary of Contemporary English* (*LDOCE*, 1978), the *Collins COBUILD English Language Dictionary* (*COBUILD*, 1987), the *Cambridge International Dictionary of English* (*CIDE*, 1995), and the *Macmillan English Dictionary for Advanced Learners* (*MED*, 2002). Yet amid all this diversification, the trend is toward ever closer convergence in both form and content. Quite major upheavals (notably the publication by Collins of the first *COBUILD* dictionary in 1987) have been assimilated into an increasingly homogeneous model, as last year's innovation becomes this year's standard feature. Though experts will perceive numerous differences among the main players, what the average user sees is a set of very similar dictionaries that share a great many core features. To give a single (and fairly superficial) example of this convergent trend, the fourth edition of the large *COBUILD* dictionary (2003) has added the term 'advanced learner's dictionary' to its title (along with the MLDs produced by Oxford and Cambridge), has shrunk its (originally larger) format to 'standard MLD' size, and has, for the first time, included illustrations – thus bringing itself more closely into line with the other main dictionaries of this type.

Main Features of the MLD: A Summary

The features that have become a standard part of the MLD are summarized here, and the most important of these will be elaborated in the next section.

In terms of the dictionary's receptive function (helping users understand vocabulary items they have encountered):

- definitions are written in simple language, typically using a controlled 'defining vocabulary' of basic words;
- phraseology gets special attention: the MLD generally goes further than other types of dictionary in explaining the meanings not only of individual words but also of multiword expressions of every type;
- aids to navigation are provided (in the form of reduced definitions, appearing as 'signposts' or in menus) in order to minimize the known problems involved in locating the 'right' information.

In terms of the dictionary's productive function (helping users to make appropriate lexical choices and then use the chosen item 'correctly' and idiomatically):

- syntactic information provides users with a full account of the valence patterns that a given word or meaning enters into;
- example sentences are used extensively to show typical contexts of use and provide reliable models for production;
- considerable attention is paid to sociolinguistic features such as register, regional variety, and speaker attitude;
- usage notes provide supplementary guidance, e.g., facilitating lexical choices by disambiguating sets of close synonyms or warning against known sources of grammatical error.

In More Detail

Definitions

Here, three features distinguish the MLD from other dictionaries:

1. The use of a controlled 'defining vocabulary' (DV), enabling (perhaps a better word would be 'forcing') lexicographers to explain meanings through a limited list of basic, high-frequency words. From the beginning, a simplified defining language was one of the central features of the learners' dictionary. Three of the early pioneers in this field, Harold Palmer, A. S. Hornby, and Michael West, had a special interest in the notion of 'vocabulary control,' which arose – as Cowie (1999: 15) points out – "from a simple pedagogical need: to reduce the effort required to learn a foreign language by identifying those (relatively few) words which carried the main burden of communication." The process became more formalized when Longman – drawing on West (1953) – introduced a 2000-word DV in the first edition of the *Longman Dictionary of Contemporary English* (*LDOCE*) (1978). This approach was gradually emulated, so that at the time of writing four of the five major advanced MLDs employ a DV limited to 2000–3000 common words.
2. A preference for natural language: the past 15 years or so have seen a marked shift away from the formal, compressed, and often idiomatic language of traditional lexicography, toward a user-friendly style that conforms more closely to 'normal' prose (see esp. Rundell, 1998: 332–334). The following comparisons make the point:

NMED, 1935	**pain:** suffering of body or mind
*OALD*6, 2000	**pain: 1.** the feelings that you have in your body when you have been hurt or when you are ill **2.** mental or emotional suffering
*OALD*3, 1974	**aggressive:** quarrelsome; disposed to attack
*LDOCE*4, 2003	**aggressive:** behaving in an angry or threatening way, as if you want to attack someone

3. 'Full-sentence' defining: one of the major innovations in *COBUILD* (1987) was to abandon the 'substitutable' definition of traditional lexicography in favor of a defining sentence which includes the headword itself in its typical lexico-syntactic context. (The genesis and rationale of this approach is explained in Hanks, 1987, and discussed further in Sinclair, 2004.) To illustrate the difference this can make, a conventional definition might explain the phrasal verb *lay up* as 'to cause sb to stay in bed, not be able to work etc.' (*OALD*4, 1989). But in the *COBUILD* version ('If someone is **laid up** with an illness, the illness makes it necessary for them to stay in bed': *COBUILD*4, 2003), the structure of the definition matches the passive form in which this verb usually appears, while the prepositional phrase that typically accompanies it is fully integrated into the explanation. Though the *COBUILD* dictionaries are unique in employing this defining style in all cases, the full-sentence definition has an established place in the repertoire of definition types available to compilers in most of the English MLDs.

Syntax

Since Harold Palmer introduced his system of 'verb patterns' in 1938, descriptions of syntactic behavior have been a core feature of the MLD. Earlier MLDs were characterized by the use of elaborate coding schemas which, though descriptively powerful, were difficult to learn and mutually incompatible. Palmer's system was taken up and refined in *OALD*, while

LDOCE (1978) introduced an entirely different (but equally complex) approach based on alphanumeric codes. More recently, the emphasis has shifted toward a simpler, surface-grammar model which – while sacrificing some of the delicacy of earlier systems – assumes very little grammatical knowledge on the part of users. Compare the following accounts of the syntactic properties of the verb *recall*:

*OALD*3, 1974	[VP6A, C, 8,9,10, 19C] bring back to the mind; recollect: *I don't recall his name/face/meeting him/where I met him.*
LDOCE, 1978	[Wv6; T1,4,5,6a,b] to remember: *I can't recall his face/seeing him/that he came/where he lives/how to do it.*
MED, 2002	[I/T] to remember something: *Twenty years later, he could still recall the event.* ♦ +(**that**) *I seem to recall that you said you would do that yesterday.* ♦ +**who/where/why etc.** *Stephen frowned, trying to recall what had happened.* ♦ **recall doing sth** *I don't recall seeing the document.*

The economy of the older systems allows them to encode every *possible* pattern for a given meaning, regardless of its frequency: thus, the *OALD*3 code VP19C indicates the construction V+noun/pronoun/possessive+gerund (*I don't recall you saying that*), but – tellingly – the pattern is not exemplified. And in fact, corpus data shows it to be extremely rare, with just five occurrences in the 5500 or so instances of the verb *recall* on the British National Corpus (BNC). (Conversely, the simple V+gerund pattern – encoded as VP6C in *OALD*3 – appears over 150 times in the BNC.) The current approach – exemplified here by *MED* but equally likely to be found in other MLDs – emphasizes what is typical over what is possible, and uses corpus-derived examples to complement the user-friendly patterning information. And as with most other features of these dictionaries, there is now a fairly high degree of convergence among the various MLDs in their approach to describing syntax.

Examples

Dictionaries for native speakers (especially historical dictionaries) have generally used citations for purposes of illustration and attestation. By contrast, the examples in learners' dictionaries have always had a consciously pedagogical function. In the earlier MLDs, there was little emphasis on replicating actual performance: rather, examples tended toward the formulaic, often taking the form of short noun phrases or infinitive statements ('*inordinate desire*,' '*a football fixture*,' '*to instil knowledge*': all *NMED*, 1935), or merging several patterns into a single 'sentence' (see examples above, under 'Syntax'). The current range of MLDs, however, favor fuller and more natural examples taken from a corpus (or at least closely reflecting what the corpus shows). For a while (following the publication of *COBUILD* in 1987 and the advent of corpus data), there appeared to be a philosophical split between those who used 'made-up' examples and those who advocated the use of unmodified corpus lines (see e.g., Laufer, 1992; Potter, 1998). This debate had some mileage at a time when the use and availability of corpora was still limited, but it is no longer really relevant. (It also, very misleadingly, encouraged the perception that the main value of a corpus was as a source of dictionary examples.) Now that all serious MLDs use corpus data as their primary source of linguistic evidence, methodological differences among the various editorial units, in terms of how examples are chosen for the dictionary, have become fairly minimal.

The Impact of Corpora

Learners' dictionaries have introduced many innovations which have subsequently influenced other areas of lexicography. By far the most important of these, it goes without saying, is the systematic use of corpus data as the primary basis of dictionary text. Pioneered by John Sinclair and his colleagues in Birmingham, corpus lexicography burst upon the world in the form of the first *COBUILD* dictionary (1987), and the methodology was quickly taken up by other dictionary developers of all types. For those working at the coal face, the change in working practices has been almost total. As far as dictionary content goes, improvements in quality (above all in the area of semantic analysis) have been very significant. Corpus data has also enabled lexicographers to provide categories of information which were simply not available before. Notable examples are the explicit indicators of word frequency which now appear in most advanced MLDs (see e.g., Kilgarriff, 1997), and the lists of typical collocates shown first in *MED* (2002) and already becoming a standard feature (Kilgarriff and Rundell, 2002). These are enormous changes by any standards, and the longer-term impact of the corpus revolution (in terms of its challenges to existing linguistic assumptions and categories) is still far from clear. Yet despite all this, the MLD remains recognizably the same object as it was before the arrival of corpora.

Signs of Change

We are now, however, seeing signs that this durable paradigm is beginning to break down. New technology – supplying vastly improved linguistic data, and at the same opening up new media for delivering reference materials to users – has created conditions which threaten the well-established MLD model but at the same time present extraordinary opportunities for producing better dictionaries and for customizing them to more effectively meet the needs of users.

The advanced MLD has always been a global product: a general-purpose dictionary intended for learners from widely different linguistic and cultural backgrounds. It now seems unlikely that this format will survive indefinitely. Already we see some erosion of this position with the publication of country-specific editions, which offer anything from minor levels of customization – such as a Chinese or Japanese introduction with user guides in the 'local' language – to full-scale 'bilingualization,' with L1 equivalents supplied for each sense and translations of the example sentences. This trend looks set to intensify, given the possibilities offered by electronic media, and the global MLD might in future become just one among many types of learners' dictionary.

For most of its lifetime, the MLD appeared only in the form of a printed book, but learners' dictionaries are now routinely available on CD-ROM and handheld devices, and many also have an online presence. This is a rapidly changing scenario, and exactly how it will play out is anybody's guess. There will probably always be a demand – in some parts of the world at least – for printed dictionaries, but it is safe to assume that some form of electronic platform will become the primary delivery medium for the MLD in its most important markets. The possibilities here are only just beginning to be exploited. Most electronic dictionaries have replicated the content and structure of their printed originals, simply adding friendly interfaces and increasingly smart search functionality. But the next generation is now emerging – a good example being the CD-ROM version of *LDOCE*4 (2003), which gives users access to a 'hinterland' of additional examples and corpus citations for almost every word and phrase. Links between dictionary and corpus are just one of the possible ways in which the MLD will develop from here, and we may look back on the first decade of the new millennium as the point at which the one-size-fits-all MLD began to diversify into a range of more specialized reference resources.

See also: Computers in Lexicography; Corpus Lexicography; Definition; Hornby, Albert Sidney (1898–1978); Lexicography: Overview; Lexicon Grammars; Palmer, Harold Edward (1877–1949); Second and Foreign Language Learning and Teaching; Valency Grammar.

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Learning Sign Language as a Second Language

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Sign languages are natural languages. This means that sign languages are often learned as second languages, just like spoken languages. Unlike spoken languages, however, sign languages are expressed with the hands, arms, and face and understood through the eyes. This means there are two kinds of second sign language learning: unimodal second language learning, where a person knows two or more sign languages, and bimodal second language learning, where a person knows one or more sign languages and one or more spoken languages. An important question, then, is whether the sensory-modality of the first and second languages changes what we know about second language learning over the life span. Another important question is whether and how the age of first language learning affects the ultimate outcome of second language learning. Clearly several factors in the second language must be considered in any account of second language learning of sign languages, sensorimotor modality, the temporal order of the first and second language learning, and the ages when the first and second languages are learned. Here we focus first on second language (L2) learning when the first language (L1) learning begins in early childhood. We consider both simultaneous and sequential L1 and L2 learning. Next we consider L2 learning in the case where L1 learning begins after early childhood.

Learning Two Languages in Infancy

Babies whose parents use a sign language with them in infancy often learn two languages simultaneously. One kind of L2 learning is by hearing babies whose deaf parents use a sign language with them. They typically acquire both a sign language and a spoken language. This is an example of bimodal bilingualism. The ages when these babies reach their early language milestones – such as the appearance of the first word, the first 50 words, and the first word combinations – are similar to those of babies learning two spoken languages and babies learning only one language, signed or spoken (Petitto *et al.*, 2001). The early vocabularies of babies acquiring both a signed and a spoken language are semantically similar across the two languages, although the specific vocabulary items are not identical. Fewer than a third of the vocabulary items the child knows in each language are translation equivalents, similar to children acquiring two spoken languages. The vocabulary sizes of babies learning a signed and a spoken language simultaneously are similar to those of babies learning only one spoken language, especially when the lexical items of the two languages are considered together, as is the case for babies learning two spoken languages (Holowka *et al.*, 2002; Pearson *et al.*, 1993).

Babies who are deaf and whose parents use a sign language with them from birth often learn an L2 at the same time. The L2 may be another sign language, but unfortunately little is known about bilingualism in the visual modality. More is known about bimodal bilingualism. For example, when learning both SLN (Sign Language of the Netherlands) and Dutch, one deaf baby was observed to begin learning vocabulary in SLN. The child then used the sign vocabulary to help learn Dutch vocabulary items up to 36 months. In an intermediate stage, the child both signed and spoke vocabulary items. The child eventually separated the vocabularies of the two languages and either expressed signs without speaking or spoke words without signing. Around the same age, the child showed an awareness that the word order patterns of SLN and Dutch are not the same (Hoiting, 1998).

Learning Two Languages Sequentially

Adults and adolescents frequently learn sign languages as second languages. Hearing adults may learn sign languages for professional reasons. Teachers, interpreters, therapists, and researchers working with

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Learning Two Languages Sequentially

Adults and adolescents frequently learn sign languages as second languages. Hearing adults may learn sign languages for professional reasons. Teachers, interpreters, therapists, and researchers working with

children and adults who are deaf often learn sign language in university courses designed for them. The first stage of adult L2 learning of sign languages is characterized by a marked reliance on the perceived iconic features of signs. Beginning signers use iconicity as a mnemonic aid to remember new vocabulary items for both sign expression and recognition (Campbell *et al.*, 1992). Beginning sign learners often want to know the mimetic 'reason' for every sign form. Although sign languages are rooted in manual gesture, they are not iconic by nature. To the contrary, all sign languages have phonological structure, that is, meaningless articulatory units that combine to make the words of the language. Research shows that signers manipulate the phonological structure of sign languages during language comprehension and expression, just as phonological structure is a basic part of listening to and speaking a spoken language.

A key difference between adult L2 learning and infant learning of sign languages is that iconicity plays no role in infants' vocabulary learning. Moreover, iconicity plays no role in the human mind's comprehension of sign language for both L2 and L1 signers who are highly proficient. Beginning signers may recruit what they already know that is close in nature to sign language, namely in gesture and pantomime. This may help beginning signers learn how to position their fingers, hands, and arms in making signs and serve as a means to remember the meanings of the signs they are seeing for the first time. The strategy may be analogous to beginning speakers of a second language using the sound patterns of their native language to help themselves remember the sound patterns of a new spoken L2 they are learning. Clearly L2 learners abandon this strategy once they learn the phonological structure of the sign language.

Beyond vocabulary learning, L2 learners of sign languages must also master morphology and syntax. One problem for L2 learners is that the syntax and morphology of natural sign languages are not always taught in sign language courses. Many courses primarily teach the frozen lexicon of sign languages, excluding classifier constructions, along with finger spelling. This teaching method inadvertently encourages beginning L2 learners to express sign language vocabulary using the word order patterns of their spoken L1. The result is a kind of pidgin where L2 content words (vocabulary for people, actions, internal states, and objects) are signed according to the word order of the L1 and devoid of the morphology and syntax of any language.

Adults and adolescents who are deaf and who acquired an L1 in early childhood often learn sign languages as second languages. For example, L1 learners of a sign language may later learn some other sign language as an L2, an example of bilingualism in the visual modality. This is common where sign languages are in close geographical proximity, as is the case for LSQ (Langue des signes québeçoise) and ASL (American Sign Language) in Canada. Another possible example of bilingualism in the visual modality is the L2 sign language learning by deaf adults and adolescents who are proficient in a spoken L1, which is often in a read and lip-read form. These L2 learners are more likely to immerse themselves in Deaf communities than hearing L2 learners of sign languages and for this reason are more likely to achieve higher levels of ultimate proficiency than their hearing L2 peers.

Another type of sequential L2 learning of sign languages is found in educational projects that teach BSL (British Sign Language) or ASL (American Sign Language) to kindergarten and elementary school children as a second language (Daniels, 2003). Other programs teach sign languages to hearing elementary school children to enhance their reading and spatial cognitive skills. Yet other programs use signs with hearing children who are delayed in their spoken language development, such as children with autism or Down syndrome. The sign learning in the latter instances is more properly considered L1 rather than L2 learning, however.

Delayed L1 Learning and L2 Learning

The common definition of L2 learning is the learning of a second language simultaneously with, or subsequent to, learning a first language. Although L1 learning in early childhood is the norm for babies born with normal hearing, because they are immersed in spoken language, it is not the norm for babies born deaf. A minority learn sign language from birth because their parents use a sign language with them, as discussed earlier in this article. However, the majority of babies born deaf are isolated not only from the languages spoken around them but also from sign languages if their parents do not sign with them. Even after the initial diagnosis of hearing loss and onset of intervention services for the deaf child, sign languages are often withheld from them in the belief that doing so encourages deaf babies to learn to speak. Note that this is contrary to the popular trend in North America of teaching signs to hearing toddlers because it reduces frustration for the parent and child (Goodwyn *et al.*, 2000), and to the clinical case reports of deaf babies making faster progress learning spoken words after they have learned a sign lexicon. The important point to remember is that sign language learning for many deaf children and

adolescents is not L2 learning but is in reality L1 learning begun at an abnormally late age, i.e., after early childhood.

Learning an L1 for the first time after early childhood has a plethora of negative effects on adult language comprehension. For example, the ability to comprehend and remember sign language sentences and stories declines as the age of L1 sign language learning increases. This is apparent in the kinds of lexical mistakes that delayed L1 learners make when engaged in sign language comprehension and production tasks. They often make phonological errors, producing lexical items that are real signs but with forms that violate the semantic and syntactic framework of the sentence they are reproducing (see **Figure 1**). By contrast, L1 learners who learned sign language from birth, or shortly thereafter, make few lexical errors, and the ones they do make maintain the syntactic and semantic frame of the sentence they are reproducing. Delayed L1 learners also show a reduced ability to comprehend sign language.

The effects of delayed L1 learning are also apparent on grammatical knowledge of sign language. For example, delayed L1 learners are more likely to delete grammatical inflections from signs when producing sign language sentences, whereas early L1 learners either inflect signs or express the same meanings in separate lexical units. Highly delayed L1 learners have been observed to perform at near chance levels on grammatical tasks in sign language.

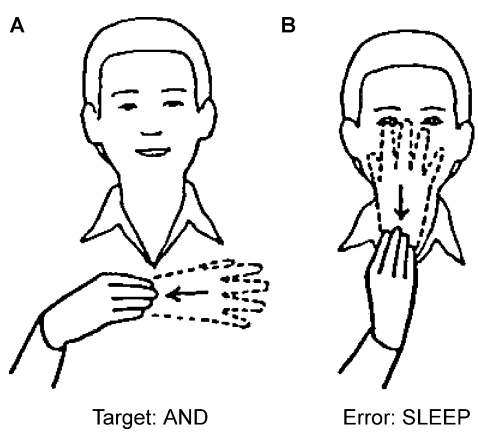

Figure 1 Panel A shows the sign AND in the ASL sentence 'I ate too much turkey AND potato,' which was the target sentence. Panel B shows the phonologically based substitution error, which resulted in the sentence 'I ate too much turkey SLEEP potato.' Note that the target and error differ in only one phonological parameter: place of articulation. (From Mayberry R 1996. 'The importance of childhood to language acquisition.' In Goodman J C & Nusbaum J C (eds.) *The development of speech perception*, p. 68. Cambridge: MIT Press. Illustration by Betty Raskin © R. Mayberry, with permission.)

By contrast, early L1 learners of sign languages tend to be grammatically accurate.

Delayed L1 learning not only affects the ultimate proficiency with which the L1 can be understood and expressed but also affects the ultimate outcome of L2 learning crossmodally. Early L1 learners of sign languages often show near-native levels of L2 proficiency. For example, people who were born deaf and acquired a sign language early in life often show high levels of L2 learning of spoken languages in read and lip-read forms. By contrast, people who were born deaf and did not experience a fully perceptible language until after early childhood, i.e., delayed L1 learners, typically show low levels of L2 spoken language proficiency in read and lip-read forms. In other words, there is a strong relationship between the age when the L1 is learned and the L2 outcome, independent of the sensorimotor modalities of the languages. Although the linguistic, cognitive, or neural reasons that early L1 learning is necessary for L2 learning to be successful are not understood at present, it is clear that any discussion of L2 learning of sign languages requires consideration of the age when the L1 learning begins.

We return now to the two questions posed at the beginning of this article. First, does the sensorimotor modality of the first and second languages change what we know about how second languages are learned over the life span? The second question is how the age of first language learning affects the ultimate outcome of second language learning. Much of what we know about second language learning of sign languages suggests that there are few differences between second language learning of sign languages and of spoken languages, as has been previously found for infant L1 learning of sign languages compared with spoken languages. One exception appears to be the initial iconic strategy that adult second language learners of sign languages use to begin to parse and remember the phonological forms of signs. The second crucial difference is the age when individuals born deaf first experience a fully perceptible language. It appears that the timing of first language learning during the life span sets the course for all subsequent language learning regardless of the sensorimotor modality of the language learning.

See also: Bilingual Language Development: Early Years; Disorders of Sign Language; Iconicity: Sign Language; Language Development in Deaf Children with Hearing Parents; Language Development: Overview; Language Education of the Deaf; Modality Issues in Signed and Spoken Language; Sign Language: Acquisition; Sign Language: Interpreting; Sign Language: Overview.

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Lebanon: Language Situation

Editorial Team

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Recorded history in Lebanon goes back almost 5000 years to the times of the Phoenician seafaring traders. Arabic was introduced into Lebanon with the Arab conquest in 634–636 A.D. Since the Middle Ages, Lebanon has acquired a reputation for comparatively tolerant politics and has become home to a number of smaller religious and ethnic groups of the area.

After the end of the Ottoman Empire, Lebanon was under French mandate from 1920 until it gained independence in 1943. From 1975 until 1991, the country suffered from a civil war, which also involved the neighboring countries, Israel and Syria, and the Palestinian Liberation Organization. Since the end of the civil war, the political system has addressed the representation of the interests of different ethnic and religious groups – including Sunni and Shia Muslims, Druze, and various Christian sects – in the country.

The official language of Lebanon is Arabic, which is also the native language of the large majority of its 3.7 million inhabitants. As in other countries of the Arab world, there are two types of Arabic in Lebanon in a diglossic relation: Modern Standard Arabic, which is used in formal contexts, in the media, and in writing, and Levantine Arabic (South Levantine Spoken Arabic) dialects, which are used for spoken and everyday communication. The adult literacy rate in 1990 was 80.3%.

In addition to Arabic, about 234 600 Lebanese (or 6% of the population) speak Armenian, for which an active printing and publishing industry exists. Aramaic (Assyrian and Chaldean Neo-Aramaic) is only used as a religious language in Lebanon, although it is still found as a spoken language in neighboring Syria.

Because of Lebanon's long tradition as a center for international trading and commerce, French and, more recently, English enjoy a high status in Lebanon and are comparatively widely known. Contact with foreign languages is reinforced through large Lebanese communities living abroad, especially in France, the United States, and South America.

See also: Arabic; Armenian; Syria: Language Situation.

Legal Genres

V K Bhatia, City University of Hong Kong, Hong Kong

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"*Cognito verborum prior est, cognito rerum postior est*," said Erasmus. If the knowledge of law is more 'potent,' the knowledge of language is 'prior.' Language undoubtedly plays an important role in the construction, interpretation, negotiation, and implementation of legal justice. It is through a variety of legal genres that an attempt is made to create and maintain a model world of rights and obligations, permissions and prohibitions. In principle, this model world is designed to be consistent with the vision that individual states or nations have of the society they wish to create; however, in practice, it is often constrained by the socio-political realities of individual national cultures. In order to regulate the real world of human behavior whenever it is viewed as inconsistent with the model world, these rules and regulations are judiciously interpreted and applied through a system of courts to negotiate and invariably enforce desired behavior. The so-called model world is thus created by imposing rights and obligations, permissions and prohibitions through legislation, and this, in most Western democratic systems, is seen as the will of the elected representatives of the people in the parliament. However, Bhatia (1993: 102) points out:

> As legal draftsmen are well aware of the age-old human capacity to wriggle out of obligations and to stretch rights to unexpected limits, in order to guard against such eventualities, they attempt to define their model world of obligations and rights, permissions and prohibitions as precisely, clearly and unambiguously as linguistic resources permit. Another factor that further complicates their task is the fact that they deal with a universe of human behavior, which is unrestricted, in the sense that it is impossible to predict exactly what may happen within it. Nevertheless, they attempt to refer to every conceivable contingency within their model world and this gives their writing its second key characteristic of being all-inclusive.

This view of law and legal justice gives legislation the status of primary legal genre, which is essentially written "with mathematical precision, the object (though not always attained) being, in effect, to provide a complete answer to virtually every question that can arise' (Sir Charles Davis, quoted in Renton,

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This view of law and legal justice gives legislation the status of primary legal genre, which is essentially written "with mathematical precision, the object (though not always attained) being, in effect, to provide a complete answer to virtually every question that can arise' (Sir Charles Davis, quoted in Renton,

1975). It is hardly surprising that this legal genre has its own unique integrity and identity, often characterized by its use of a number of lexico-grammatical and discoursal resources that are rarely used in any other disciplinary or professional genre. As documented in Bhatia (1982, 1993), this genre is characterized by the use of a complex array of qualifications, often strategically positioned at syntactic points where they are unlikely to attract any ambiguous or unintended interpretation. The *Renton committee report* (1975) also emphasizes this aspect of legislative genre:

> Ordinary language relies upon the good offices of the reader to fill in omissions and give the sense intended to words or expressions capable of more than one meaning. It can afford to do this. In legal writing, on the other hand, not least in statutory writing, a primary objective is certainty of legal effect . . . Parliament seeks to leave as little as possible to inference and to use words which are capable of one meaning only.

The use of qualifying expressions is thus a pervasive phenomenon in legislation. They are more central to the rhetorical structure of legislative sentences and thus form the basis of the underlying 'cognitive structuring' (Bhatia, 1982). They seem to provide the essential flesh to the main proposition in the legislative provision, without which it will be like a mere skeleton of relatively modest legal significance. Qualifications thus form an important part of the linguistic repertoire of the legal draftsman. This may also be due to the fact that qualifications, particularly (complex) prepositional phrases and various subordinate clauses, are syntactically highly mobile, and the legal draftsman tends to take full advantage of their mobility to insert them at various syntactic positions to achieve the desired level of precision and unambiguity.

Precision, especially as a function of adequate specification of legal intentions, is achieved through the use of a variety of legal qualifications (Bhatia, 1982), some of which are used to describe the case(s) to which a particular legislative provision applies. Others are used to impose conditions on the application and implications of the provision, in particular when it comes to the resolution of potential or real conflicts between different legislative acts (see Bhatia, 1982 for details). Qualifications thus form the basis of the underlying cognitive structuring in legislative sentences. They seem to provide the basis for legal specification as emphasized by Caldwell, an experienced parliamentary council in the United Kingdom:

> . . . if you extract the bare bones . . . what you end up with is a proposition which is so untrue because qualifications actually negative it all . . . it's so far from the truth . . . it's like saying all red-headed people are to be executed on Monday, but when you actually read all the qualifications, you find that only one per cent of them are . . . (qtd. in Bhatia, 1982)

To illustrate this aspect of legislative provision, let me consider the following example:

> If in the course of winding up a company it appears that any person who has taken part in the formation or promotion of the company, or any past or present officer or liquidator or receiver of the company, has misapplied or retained or become liable or accountable for any money or property of the company, or been guilty of any misfeasance or breach of duty in relation to the company which is actionable at the suit of the company, the court may, on the application of the Official Receiver, or of the liquidator, or of any creditor or contributor, examine into the conduct of the promoter, officer, liquidator or receiver, and compel him to repay or restore the money or property or any part thereof respectively with interest at such rates the court thinks just, or to contribute such sum to the assets of the company by way of compensation in respect of the misapplication, retainer, misfeasance, or breach of trust as the court thinks just. (Hong Kong SAR, 1997: Companies Ordinance (Section 276))

If we ignore the qualifications in this provision, we find the court being assigned unlimited powers to "examine into the conduct of the promoter, officer, liquidator or receiver, and compel him to repay or restore the money or property or any part thereof . . . to the assets of the company." However, the moment we take into account all the qualifications that have been positioned at various syntactic points, we notice that the court's powers are not so widely applicable. Firstly, the court can take action only when a specific number of conditions meet within the context of a case description, that is, the winding up of a company; and then there are numerous conditions on its application, such as the involvement and participation of specific descriptions of people in the formation or promotion of the company; also, their actions must be disadvantageous to the company. If all these conditions are met, then the court can exercise the power to examine into the conduct of these persons and compel them to compensate the company. What seemed an unlimited power to the court without the qualifications turns out to be a rather modest authority to examine the conduct of a few officials of the company under specific conditions. Such is the role and function of qualifications in the legislative genre.

Precision is also achieved through the use of nominalized expressions, which is often achieved by converting verbal expressions into nominalizations, as underlined in the following example from the *Wills act* from the Republic of Singapore:

> No obliteration, interlineation or other alteration made in any will after the execution thereof shall be valid or have effect except so far as the words or effect of the will before such alteration shall not be apparent, unless such alteration shall be executed in like manner as hereinbefore is required for the execution of the will; but the will, with such alteration as part thereof, shall be deemed to be duly executed if the signature of the testator and the subscription of the witnesses be made in the margin or on some other part of the will opposite or near to such alteration or at the foot or end of or opposite to a memorandum referring to such alteration and written at the end or some other part of the will. (Government of Singapore, 1970: Section 16 (underlining added))

As each rule of law is essentially encoded in a single-sentence legislative provision, it often contains repetitions of actions and concepts. For the sake of avoiding any potential ambiguity of reference, nominalizations are seen as a useful syntactic resource to facilitate precision in such rhetorical contexts.

Precision and clarity are also achieved through the use of "complex prepositional phrases" (Quirk *et al.*, 1982: 302), such as *in pursuance of*, *in accordance with*, *by virtue of*, *for the purpose of*, and several other combinations of preposition-noun-preposition (P-N-P). Legal draftsmen are particularly suspicious of simple prepositions, as they find them potentially ambiguous in meaning, and hence often go for complex prepositions, many of which are rarely used in any other variety of professional discourse.

In addition to precision and unambiguity, legislative genre is notorious for being all-inclusive as well. This quality of all-inclusiveness is often achieved through the use of what is referred to as binomials and multinomials, as illustrated in the following example from the U.K. *Litter Act* of 1958:

> If any person throws down, drops or otherwise deposits in, into or from any place in the open air to which the public are entitled or permitted to have access without payment, and leaves, any thing whatsoever in such circumstances as to cause, contribute to, or tend to lead to, the defacement by litter of any place in the open air, then, unless that depositing and leaving was authorised by law or was done with the consent of the owner, occupier or other person or authority having the control of the place in or into which that thing was deposited, he shall be guilty of an offence and be liable on summary conviction to a fine not exceeding ten pounds; and for the purpose of this subsection any covered place open to the air on at least one side and available for public use shall be treated as being a place in the open air. (*Litter Act,* 1958 (underlining added))

This short paragraph is interesting in two rather different ways. Through the use of multinomials (Gustafsson, 1984) such as *throws down, drops or otherwise deposits*, *in, into or from*, *entitled or permitted*, *to cause, contribute to, or tend to lead*, the draftsman makes it possible for anyone to be guilty of littering at least in 72 different ways. The use of multinomials brings not only precision but also all-inclusiveness in the specification of legal scope. The other device that makes such a construction interesting is the use of all-inclusive expressions of a different kind, such as '*any thing whatsoever,*' '*otherwise* deposits,' and '*any* covered place.' Although these expressions are often viewed as indicators of vagueness and hence lacking in precision in a traditional sense, they bring all-inclusiveness of a different kind to the provision. The legislative genre thus appears to be extremely versatile, using not only precision and all-inclusiveness, but also vagueness and indeterminacy for the required specification of legal intentions.

Legislative genre is also unique in yet another way, that is, it has a typical cognitive structuring that can be characterized by the following rhetorical structure:

> If X, then Y shall do Z.

where X is the description of the case to which the provision applies; Y is the legal subject who is given the power or authority to act, or is prohibited from acting in one way or the other; and Z is the legal action that is either permitted, authorized, or prohibited. This can be illustrated by the following example.

> If *a police officer fails to follow the proper procedures stated in this section 1 above*, (X)
> then *the person affected by this failure* (Y)
> shall *apply to the court for the protection of his interests.* (Z)

Legislative genre thus has a 2-part rhetorical structure consisting of a case description and the legislative provisionary action, which include both the legal subject and the legal action. This form of rhetorical structuring linking case description to specific legislative action also makes an interesting link with the other set of legal genres such as judgments and cases, which are viewed as applications of legislative intentions to interpret and change, wherever necessary, the real world in line with the ideal world as envisioned through legislative procedures. These secondary genres are also seen as illustrations of professional reasoning and use of appropriate authorities either in favor of or against a particular judicial decision. Often these decisions are used as precedents in common-law jurisdictions and hence acquire the status of legal authorities, just like the legislative provisions. As Bhatia (1993: 175) points out:

> Legal cases and legislation are complementary to each other. If cases, on the one hand, attempt to interpret legal provisions in terms of the facts of the world, legislative provisions, on the other hand, are attempts to

account for the unlimited facts of the world in terms of legal relations.

In order to fully understand the nature and function of argumentation in legal cases, it is important to understand the relationship between different forms of legal discourse, such as the legal judgment and legislative provision, on the one hand, and the facts and events of the real world and the legal intentions and sociopolitical values and constraints as part of the model world, on the other. The two sets of relationships are mediated through legal reasoning and precedence within a particular legal framework, without which it is impossible to construe application and interpretation of legislation, including rules, statutes, regulations, and ordinances.

There is also an interesting parallel between legislation and judgments as instances of legal genres. Legislation consists of two main rhetorical moves, that is, case description and the legal action; similarly, a law case typically begins with the establishing of facts and ends with a judgment that invariably indicates the kind of legal action imposed by the decision of the court. Often there is also an attempt to derive what in legal language is called *ratio decidendi,* which is a kind of formulation of legal principle that becomes a precedent for subsequent cases of similar description. These unprecedented parallels between the two genres are not purely coincidental. The judgment is the result of a logical argument based on evidence presented in the court and argued and interpreted in the light of rules and regulations as well as precedents from earlier judgments. This can be represented as shown in Figure 1.

Judgments and cases are thus the written records of negotiation of justice, which can be viewed as attempts to enforce legislative intentions to bring the real world closer to the model world. A law case is essentially an abridged version of a judgment of a particular judge or a bench based on the actual negotiation of justice in a court of law. Judgments are public documents and are taken as records of court proceedings intended for use as precedents for subsequent judgments, especially in common-law jurisdictions. Cases are used in academic settings to demonstrate the nature and logic of judicial reasoning in the negotiation of justice. As indicated in Bhatia (1993: 118):

> Legal cases are used in the law classroom, the lawyer's office and in the courtroom as well. They are essential tools used in the law classroom to train students in the skills of legal reasoning, argumentation and decision-making. Cases represent the complexity of relationship between the facts of the world outside, on the one hand, and the model world of rights and obligations, permissions and prohibitions, on the other.

Language is used precisely, clearly, and unambiguously in legislation as well as in judgments; however, in legislation every effort is made to make it all-inclusive as well, whereas in judgments an attempt is made to interpret all-inclusiveness in the light of the specific facts of the case. The relationship between the two genres thus is one of construction of principles and application of such principles. The following brief example of a case cited in Bhatia (1993: 120) will illustrate this relationship:

> Roles v. Nathan (1963) I W.L.R. 1117
> Two chimney-sweeps were killed by carbon monoxide emitting from the ventilation system of the boiler on which they were working. They had chosen to ignore a prior warning of this danger. The Court of Appeal held that the defendants were liable, for, in the words of Lord Denning M. R., "When a householder calls in a specialist to deal with a defective installation on his premises, he can reasonably expect the specialist to appreciate and guard against the dangers arising from the defect." (Bradbury, 1984: 107)

As argued in Bhatia (1993), rhetorical structure for legal cases often includes four moves: case identification, case description (establishing facts), argument, and judgment (which may often include *ratio decidendi*) (see Table 1).

It is interesting to note that legal cases in their most abbreviated forms will essentially include the case description and the legal action applicable to such a description of legally material facts. This essential 2-part rhetorical structure is remarkably similar to the one in the legislative genre. Even when analyzing *ratio decidendi*, we still find a similar 2-part rhetorical structure (see Table 2).

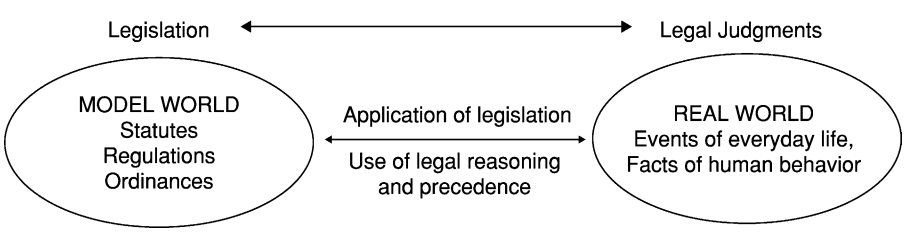

Figure 1 Intertextual relations in legal genres.

There is another parallel genre related to written judgment, and that is the negotiation of justice in the courtroom, mediated through the spoken mode. Widely familiar as courtroom interaction, this represents a legal genre embedded in a formalized professional legal setting and is employed to negotiate and maintain social relations through the questioning of witnesses. Although the main participants are the counsel, the witnesses, the jury, and the judge, the major part of interaction involves the examination and cross-examination of witnesses by the two counsels to bring to light the facts of the case, that is, to identify and establish the legally material facts of the case, which are crucial to the description of the case in question. The outcome of questioning as part of the direct and cross-examination thus is as much a function of the contributions made by these two participants, that is the counsels and the witnesses, the verbal strategies employed by them, and the degree of credibility established by them as it is of the supposed facts of the case. Facts therefore are not simply an objective phenomenon in this setting. They are constructed as a result of the questioning. However, it is interesting to note that the courtroom questioning strategies are primarily employed to win cases, not to help the jury and the judge to discover and establish facts. Counsels thus do not present facts as they might be, but they do so as they want the court to see them. This brings in the role of language and control, over not only what the counsel says but also over what the witnesses might say.

All of this interaction takes place in a very formal organizational context, where forms of behavior, turn taking, participant roles, questioning and responding strategies, and even the content of questions and responses are all tightly controlled by the conventions established and enforced by the courts. The conventions are meant to ensure that courtroom examination of witnesses is carried out in formal language strictly enforcing not only turn taking but also the type of speaking that is allowed. The counsels, for instance, are only allowed to ask questions that are specific, answerable, and designed to elicit the evidence or statements of facts related to the case; and the witnesses, for their part, are required to answer these questions appropriately and truthfully, often with a 'yes' or 'no.' The counsel who is not engaged in questioning at a particular time is allowed to make objections where he feels that inappropriate evidence is being offered or rules being violated, but the judge decides whether the objections are valid or not.

By definition there are two participants, the prosecution v. the defense, and in the end, one wins and the other loses. Although the jury and the judge often make the decision, they cannot actively participate in the court proceedings. Just like any other 2-party interaction, the courtroom examination of witnesses gives counsels more liberty to talk, interrupt, control resumption of talk, and introduce new topics. In addition, they even are allowed to a large extent to control the responses of the witnesses. Witnesses tend to acknowledge this kind of control by copying the question in their answers. If they are not able to control the witnesses' responses, they tend to destroy the witnesses' credibility by showing contempt for them. However, clever witnesses can sometimes make attempts to minimize the effects of such attempts. All this can be perceived as a game being played almost entirely by the counsels, who are the primary players. Witnesses know relatively little about the procedures of the court, including their own contributions, especially as to how these are interpreted, what effect their contributions will have on the jury or the judge, or on the outcome of the trial (Bhatia, 1997). This is well illustrated by the following example of an account of courtroom interaction from Allen and Guy (1989), provided by Worthington through personal communication in 1984:

Table 1

Roles v. Nathan (1963) I W.L.R. 1117	*Case identification*
Two chimney-sweeps were killed by carbon monoxide emitting from the ventilation system of the boiler on which they were working. They had chosen to ignore a prior warning of this danger.	Case description
The Court of Appeal held that the defendants were liable, for, in the words of Lord Denning M. R., *"When a householder calls in a specialist to deal with a defective installation on his premises, he can reasonably expect the specialist to appreciate and guard against the dangers arising from the defect."*	**Legal action** *(ratio decidenti)*

Table 2

When a householder calls in a specialist to deal with a defective installation on his premises, **he can reasonably expect the specialist to appreciate and guard against the dangers arising from the defect.**	Case description **Legal action**

> An off-duty policeman in a store had shot and killed an intruder. Investigation had shown a set of burglar tools at the back of the store. The prosecutor was trying to show that there was no ground for presuming criminal intent, and that this was cold-blooded murder. The victim's wife was testifying for the prosection. Here she is being cross-examined by the defense.
>
> *Defense Lawyer: Could you tell the court and the jury what your husband's occupation was?*
> *Wife: He was a burglar.*
>
> This supported the defense's contention of criminal intent, and secured acquittal for the policeman. (Worthington, 1984, personal communication)

If only the wife had been slightly more familiar with the conventions of the courtroom examination, the task of the defense lawyer would not have been that easy. Another illustration of unfamiliarity with legal conventions and ignorance of legal knowledge on the part of witnesses in courtroom examination comes from the following supposedly made-up interaction (source unknown) between the witness (W), counsel (C), and judge (J):

> *W: That dirty double-crosser John deceived me.*
> *C: Your honor, I object.*
> *J: Objection sustained. Now try to tell the court exactly what happened.*
> *W: He double-crossed me, the dirty lying rat.*
> *C: Your honor, I object.*
> *J: Objection sustained. Will the witness try to stick to the fact?*
> *W: But I am telling you the fact, your honor. He did double-cross me.*

The nature and degree of control in the use of language in this derived unequal interaction in the courtroom is also confirmed in the advice that Wellman (1997) seems to have for specialists in cross-examination:

> In all your cross-examination, never lose control of the witness; confine his answers to the exact questions you ask. He will try to dodge direct answers, or if forced to answer directly, will attempt a qualification or explanation which will rob his answer of the benefit to you. (Wellman, 1997)

Conclusions

Genres are products of disciplinary cultures and as such they are constructed, interpreted, and exploited to achieve disciplinary objectives. From the foregoing discussion of the nature and function of legal genres, it is obvious that the most central concern in legal writing is the specification of legal intentions in a clear, precise, unambiguous, and all-inclusive manner, and that the legislative genre is the most central and dominant form of such expression. The other legal genres, such as judgments and cases in the written mode, and courtroom interaction (direct and cross-examination) in the spoken mode, may be viewed as derived genres, the main purpose of which is to negotiate, document, and report judicial processes and decisions, which are based on appropriate interpretations of legislative intentions. Since these derived genres, whether in spoken or written mode, are often based on interpretations of explicit and precise legislative intentions, they are likewise characterized by precise, clear, and unambiguous expressions of certainty in legal effect. This is also signaled in a complex and often dynamic interplay of 'intertextuality' and 'interdiscursivity' (Bhatia, 2004) in the construction of these derived genres.

There are two more sets of legal genres that form the complete 'system' of legal genres, the target genres and the enabling academic genres (Bazerman, 1994). The target genres are once again based on the interdiscursive formations of legislative and judicial expressions, and therefore share the same concerns of clarity, precision, unambiguity, and all-inclusiveness, leading to certainty of legal effect. These include a range of professional genres such as property conveyance documents, contracts, and agreements, including insurance documents, court case documents, and affidavits of various kinds. These are both the products as well as the instruments of legal practice. We also find a range of academic legal genres that are used to train legal professionals within the academy as well as at the interface between the academy and the professional practice, which include textbooks, legal problems, moots, examination essays, legal memoranda, critical essays, problem-solving essays, pleadings, and so forth. To sum up, I have proposed legislative provisions as the primary legal genres, which forms the basis and essence of all legal conceptualizations and practices. I then proposed a set of secondary genres, such as judgments and cases, which are the written reports of judicial processes and negotiations of legal justice; their counterparts in spoken form are courtroom interactions, which include several genres, as well as direct and cross-examinations in the courts of law. The second category of derived genres I have termed target genres, which again share a number of linguistic as well as legal characteristics with the other legal genres. Finally, I identified a set of enabling genres far richer in intertextuality and interdiscursivity than most of the primary or secondary (derived as well as target) genres. These are largely confined to the academic settings used for training and educational purposes. The main purpose of these pedagogic genres is to explain and interpret the model world of rights and obligations, permissions and prohibitions in the context of the real world that we live in,

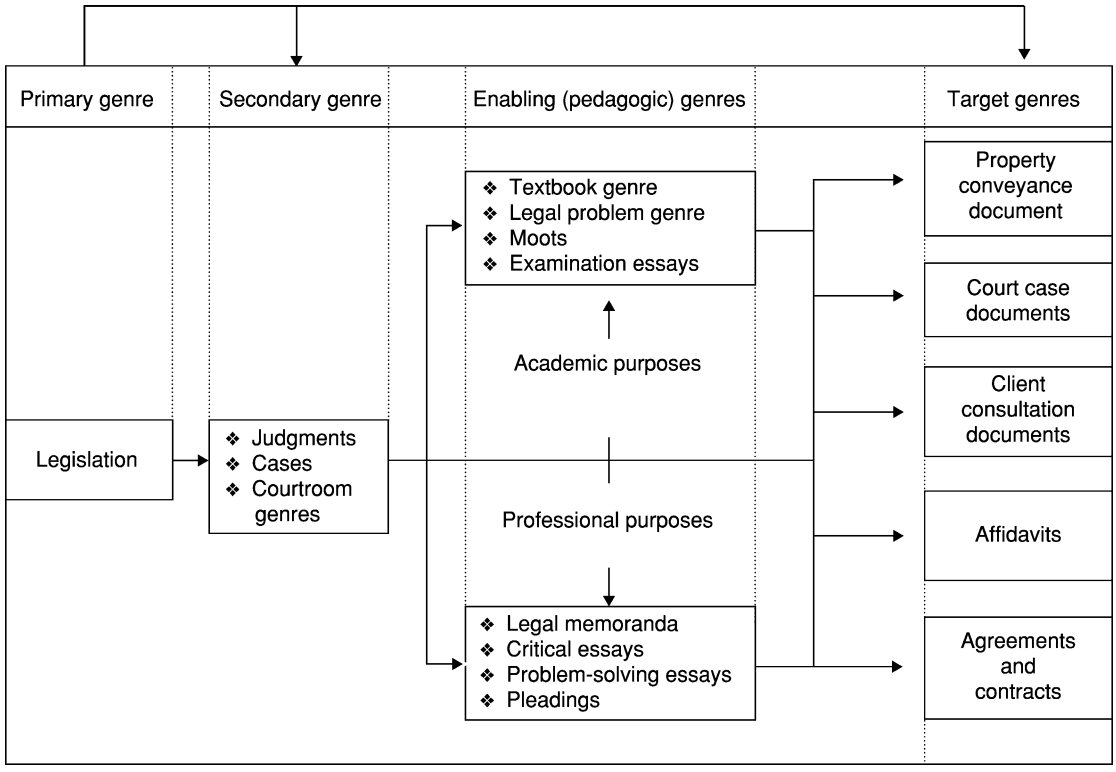

Figure 2 Genre systems in law.

to train legal professionals to be able to participate in legal practice, and to handle various primary as well as secondary genres. The complete system of legal genres can be summed up as shown in Figure 2.

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See also: Law and Language: Overview; Language of Legal Texts.

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Legal Language: History

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This article makes visible the history of legal language through examples taken from various European tongues, some of them major, some minor. A few references are also made to non-European tongues. Because legal terminology always reflects the conceptual system of the law, it is impossible to avoid entirely dealing with the history of legal systems. The following presentation concentrates on modern history (to the present), but some examples date back to the period of archaic law and to Roman and Medieval times. In order to treat logically the complex and heterogeneous materials in the field, the article is divided into three parts: (1) the rivalry between major legal languages, (2) legal language and linguistic interaction, and (3) the intelligibility of legal language. Many interesting aspects (e.g., the transition from oral language to written language in law) are found elsewhere (*see* **Language of Legal Texts**).

Rivalry between Legal Languages

Language is power, and legal language, used by state administration and by law courts, is an instrument of power *par excellence*. This is why all strong rulers have aimed at spreading their own tongue into internal and international legal use. The Romans succeeded very well in spreading Latin, and the dominance of legal Latin continued in Europe throughout the Middle Ages, mostly due to the administrative needs of the Catholic Church. After the displacement of Latin in legal activities at the beginning of modern times, a struggle between modern legal languages begun.

Legal Latin and the Vernaculars

The Medieval Dominance of Latin The great common denominator of all European legal cultures is Roman law and its language, Latin, used in law irrespective of the language of the people. After the collapse of the Western Empire, this was first visible in the former eastern parts of the Roman Empire. The early Byzantine Emperors used Latin in their administration, and the great codification of Roman law of Emperor Justinian, later called *Corpus juris civilis*, was essentially edited in Latin. In the course of time, the Byzantine administration and law became entirely Greek even though Latin loan words remained in legal use.

It is easy to understand that Latin was quite quickly given up in the Byzantine Empire because it had to compete with an older cultural language, Greek, that had a status comparable, if not superior, to Latin. In contrast, in the regions of the defunct Western Empire there were, in the beginning, no written languages based on the vernaculars. Even much later, after the creation of new written languages, the authority and the use value of Latin was still overwhelming. Latin was the original language of Roman law, researched in every university and directly or indirectly applied by the courts of many countries. Simultaneously, Latin was needed in administrative matters crossing linguistic borders. Latin was particularly the language of the central administration of the Catholic Church, used in its legal order, canon law, which was largely based on Roman law. It is worth noticing that Latin was also one of the old languages of the common law of England, in spite of the native origin of this law. But the dominance of Latin was not absolute in the Middle Ages. On the coasts of the Baltic Sea, for instance, it has to compete with Low German in legal activities.

Switch over to National Languages Generally speaking, the switch from Latin to the national languages of the various countries was very slow in the field of law. This switch was especially slow among academic jurists. In many European countries, the 17th and the 18th centuries were still part of the golden age of legal literature in Latin, and important legal works in Latin were published even later. This was in part due to the rules of the universities.

In the field of international legal affairs, Latin was the language of negotiations and treaties until the 17th century, when French started to replace it. This replacement was due to the strengthening of France as a great power in relation to the Holy German Empire and to the Pope, both having usurped Latin as their language. There was much resistance (by the German Empire and other countries) to the use of French in diplomacy and international law: Giving up Latin meant at the same time giving up the principle of linguistic neutrality and equality in the relations between states.

In the field of internal legal matters, the records and decisions of law courts, administrative authorities, and notaries were often drawn up in Latin in the Middle Ages, and, in some countries, they still were at the beginning of the modern era. This also applied to statutes. Differences between individual countries were, it is true, considerable. In some countries, the vernaculars were used in addition to or instead of Latin. In the royal law courts of France, for instance,

French had already become the language of the proceedings at the end of the Middle Ages.

In central Europe, but also in other regions, particularly in Italy, the position of Latin as the language of legal activities was strong until the 18th and 19th centuries. This was due to Humanism, to the reception of Roman law, and to academic traditions. If canon law is not taken into account, Latin was used in practical legal activities for the longest time (until the middle of the 19th century) in certain parts of the Austrian Empire: in Croatia, Hungary, and southern Poland (Galicia). In Hungary and Poland, it was a safeguard against the Germanization of these regions and, in Croatia, paradoxically, against the Magyarization of the country.

Today, Latin still is the authentic language of the legal system of the Catholic Church, canon law. The jurisdictions of this Church used only Latin until 1917; the vernaculars were then introduced into ecclesiastic legal matters. Even though the *Codex juris canonici* (1983) now in force also exists in the vernaculars, the sole Latin text of this codification is legally binding.

Rivalry between Vernaculars (Modern Legal Languages)

Rivalry within State Boundaries After the displacement of Latin, the rulers of the new national states aimed at stabilizing their superiority in relation to local power centers by different means, among others by the use of a single language. France is a good example of this. French, originally a Romance dialect of Île-de-France, was made the official language of the kingdom by a number of royal ordinances at the end of the 15th century and the beginning of the 16th century. In addition to eliminating Latin, these ordinances, among other things, put an end to the use of Occitan (Languedocien) in the courts of law of the Midi. In addition to language legislation, the founding of new high courts had a key role in turning the recently conquered territories of the kingdom French. Modern examples are numerous, for example, the use of legal Russian in the Soviet Union.

Sometimes there have been – and still are – cases of bitter rivalry between two variants of a same language in legal activities. Greece, in particular, is worth mentioning. The official language, and consequently also the legal language, of this country was, from the 19th century until the fall of the military junta (1974), Katharevusa, a variant of Modern Greek that conserves important elements of the classical language. Attempts (also in law) to replace this variant with Demotic Greek, which is closer to today's spoken language, were made from the beginning of the 20th century. They succeeded only in the 1980s after a period of approximately 10 years of bitter language struggle. In Norway, a similar competition between two language variants (one, Bokmål, based on Danish, a cognate language; the other, Nynorsk, based on West Norwegian dialects) has been going on for over 100 years.

International Rivalry In the modern era, European legal languages began to spread to other continents due to colonial expansion. This was particularly the case of both the Americas, where Spanish, Portuguese, French, and English were used in legal activities. Changes in the possession of colonies, for example, in Quebec, caused different sorts of rivalry. An important part of the struggle between great legal languages has always taken place in the field of international relations: diplomacy and treaties between states. In this field, the rivalry between French and English over the past few centuries has been of global importance. After having gained the position of the leading great power in the 17th century, France spread its language into many fields, particularly into international relations. After Latin, the French language dominated this field for a long time.

This dominance started to break down during the second half of the 18th century and more clearly in the beginning of the 19th century, after the defeat of Napoleon Bonaparte. However, the position of French as an international language of diplomacy and treaties did not become really threatened until much later, in the 20th century, due to the explosive increase in the use of English in this field.

The 20th century may be characterized in international legal activities as a period of transition from monolingual French dominance to the bilingual use of French and English and more recently to the monolingual English dominance. Originally, French was the leading working language of the European Communities (now the European Union); today both French and English (and, less frequently, German) are used as working languages in the institutions and organs of the European Union. The Court of Justice excepted (French is the sole language of internal working of the court), some of these bodies use mostly English, and this tendency is strengthening.

Legal Language and Linguistic Interaction

Interaction between Legal Language and Common Parlance

The Two-Way Traffic between Legal and Common Vocabulary After social or political changes in different times, new vernaculars have been brought into public use. It has then been necessary to create legal languages based on these vernaculars, for example,

the creation of the Romance legal languages in the Middle Ages. Later examples are numerous. In Finland, Swedish was the sole official language of the country until the second half of the 19th century. When Finnish also gained official status in Finland at the end of that century, legal Finnish had to be created: a great number of common parlance words were given exact legal definitions, which made possible their technical use in law. Even more recently, democratization processes have resulted to the creation new legal languages. The best example, perhaps, is the Republic of South Africa where there now are 11 official languages, most of them African (Zulu, Xhosa, Sesotho (Sotho), etc.) used in administrative and judicial matters. A great deal of time has lately been spent on developing administrative and legal terminology for these African languages.

As well, the creation of a new legal language has often been an important factor in establishing the written language of the country, in general. This is clearly shown by the development of written French at the end of the Middle Ages. A high court, *Parlement de Paris*, originating from the King's Council, started its activities as a judicial organ in the middle of the 13th century. It worked in French from the very beginning, constantly creating new words for its purposes. Gradually, a great number of these words were transferred to the written language of other fields and also to common parlance. Some orthographic practices of French are also derived from the old judicial language. In this way, the language of law has played an important cultural role in many countries.

Conservatism and Radicalism in the History of Legal Language Having been established, legal language has normally been conservative: Its development has been slower that that of the written language in general. Therefore, the legal language, especially legal terminology, sometimes is almost a language museum. This is clearly demonstrated by legal English. The situation in Greece (mentioned previously), on the other hand, shows that the language used in legal activities may be brought closer to the common parlance if the distance between written and spoken language grows too much.

Occasionally conservatism, the typical feature of the language of law, has changed into a radical reformation of legal terminology. This has happened in connection with social crises and revolutions. For example, during the French Revolution, the old legal terminology expressing feudalism was replaced by terms expressing the values of the bourgeoisie. Another good example of this kind of radical change in terminology occurred during the first years of the Soviet state, when the terminology of legal Russian was entirely reformed because the Bolshevik leadership felt that it was not in harmony with the new spirit of the time. For instance, the term *prestuplenie* 'crime' was replaced by the expression *sotsialno opasnoe deistvie* 'socially dangerous activity'. However, this change was only temporary. Later, legal Russian again became more conservative and numerous prerevolutionary terms were restored, and, during the last decades of the Soviet *régime*, Russian legal linguists emphasized that the language of law must be stable and that no linguistic experiments should be allowed in statutory texts.

Interaction between Legal Languages

The Transfer of Legal Expressions from Latin to Modern Languages During the long transition period from legal Latin to modern legal languages, much of the Latin legal vocabulary was borrowed by these languages. In the Romance languages and in English, Latin words were often adopted with minor orthographic changes. In other languages (German, the Scandinavian languages, the Slavic languages, etc.), loan translations were more common. Everywhere, many loaned senses of Latin words were taken into the modern languages. In addition to these borrowings, a great number of direct Latin citations continued to be used in modern legal languages. During the first centuries of the transition, these citations were so common that legal texts often were a hybrid language in which Latin and the modern tongue alternated. This is visible even today. According to one author, Latin terms and maxims belong to the "beloved folklore" of the lawyers.

Borrowings between Modern Legal Languages Latin has not been the sole source of legal loan words. The French language has also been particularly important during several epochs. Because French was from the 13th century until the end of the 14th century (and also partly into the 15th century and even until the 18th century), one of the languages of law in England, a huge number of French words were transferred into the English legal vocabulary (most being ultimately derived from Latin). Similarly, after the rise of France to the position of the dominant great power in Europe in the 17th century, several legal languages adopted many of the French terms from public and private international law. Many of these were direct citations: *lettres de créance*, *renvoi*, *ordre public,* and so on. In the very recent history, a new wave of French lexical influence is perceivable in the activities of the European Union. For instance, the term *acquis communautaire* has been adopted in all the languages of the member states, either in the form

of a direct citation, of a loan word, or of a neologism based on the French expression.

The end of the 19th century was the golden age of German legal science, having great influence all over Europe, even in North America. Due to this influence, a number of German citations and loan translations related to the activity of different schools of legal science, among other things, spread into international use: *Begriffsjurisprudenz, Pandektenrecht,* translations of *Rechtsgeschäft,* and so on.

In the 19th and 20th centuries, English became the most important language of international commerce and commercial law, also used by non-Anglophone contract parties. Much of the English terminology for commercial law was borrowed by other languages. During the past few decades, the same phenomenon can be seen in other modern fields of law, due to the influence of American legal institutions in all countries.

Borrowings between European and Non-European Legal Languages Borrowings between European and non-European legal languages had already appeared in antiquity. With the spread of Christianity, loan words from Hebrew were transferred into European legal languages. Later on, some words of Arabic origin were adopted into these languages, for example, *avarie* and *douane* in French (through Italian). In the opposite direction, the influence of Greco-Roman legal thinking on the formation of early Islamic legal concepts, although disputed, is probable.

In the modern era, European legal languages have strongly influenced a great number of non-European legal languages. The tongues of the colonial powers (Dutch, English, French, Portuguese, and Spanish) were regularly used in the administration of their possessions in the Americas, Africa, and Asia and in the legal proceedings there. When these possessions became independent states and their legal languages were created and developed, the terms expressing European legal concepts were direct citations, words of foreign origin, or loan translations from European languages. In Indonesia, for instance, numerous Malay (Indonesian) law terms were created on the basis of legal Dutch: *kasasi* 'cassation, annulment', *eksekusi* 'enforcement', and so on.

Lexical borrowing from non-European legal languages into European legal languages has happened less frequently in recent history. However, loan words are frequent in cases in which European legal languages are used in non-European context, for example, in legal texts in which Islamic law is described or applied in English or French. Indian treatises of Islamic law are teeming with terms such as *hiba, khula,* and *mutwalli*. The same can be said about North African treatises in French.

Borrowing of Style Features between Legal Languages Many stylistic features in European legal languages are derived from the style of Medieval Latin documents, often drawn up by the administration (the judiciary included) of the Catholic Church. Indeed, the importance of papal curia in the development of coherent administrative Latin in the Middle Ages was crucial. Its language strongly influenced secular chanceries, courts, notaries, and other organs all over Europe. The language of the administration and the judiciary of the Catholic Church was highly developed. It was by far technically superior to the language of secular organs. Therefore, it became a paragon to be imitated by these organs. Some of the stylistic features of Medieval legal language have persisted for a very long time, for example, the use of long and complicated sentences. Language specialists have to fight against this stylistic feature even today.

In certain respects, the styles of the European legal cultures have grown in different directions, due to divergences in legal history. It is particularly striking that there are, in various countries, large differences in the drawing up of legal documents. The best example is the decisions of high jurisdictions: the style of these decisions (structure, references to other texts, length of sentences, formulation of votes, etc.) is strictly bound by the tradition of the particular country.

The Intelligibility of Legal Language

The Tradition of Obscurity

Throughout history, legal language has been difficult to understand. This is self-evident when a language totally foreign to the population has been used, and it is also clear when legal language has been spiced with a great number of words of foreign origin. But, in addition, lawyers have traditionally used complex expressions and sentences in their documents due to the rituality and technical refinement of the law.

Use of Foreign Languages and Terms of Foreign Origin In all times, languages not known by the local population have been used in law and administration because of the interests of the central power, which was frequently multiethnic. Simultaneously, the use of such languages has been supported by the growth of legal professionalism. The Medieval lawyers had a corporative interest in acquiring and holding the monopoly on knowledge in legal matters. This was guaranteed by their use of languages incomprehensible to ordinary people.

As already pointed out, the most important cipher throughout Western legal history has been Latin. In the Middle Ages, legal proceedings were often carried on in Latin even when the accused was ignorant of this language, and even later, in early modern times, court decisions were sometimes written in Latin. Hence, the application of the law was incomprehensible to ordinary people – and, due to this, impressive and frightening. In addition to Latin, other foreign tongues were used as well. In Medieval England, law French was one of the legal languages, and, to take a more recent example, the judiciary of Finland used only Swedish until the second half of the 19th century. Even after the transition to using the language of ordinary people in administrative and judiciary matters (and even today, this has not happened everywhere), the intelligibility of legal language has been – and still is – hindered by legal terms derived from foreign languages, especially from those that were used in earlier periods (Latin, law French, etc).

Rituality and Technical Refinement The maintenance of the authority of the state has always been one of the major functions of the law. In this purpose, the state has throughout the history emphasized the sacredness of the law, and often connected it with magical elements. Ritual language has been used (e.g., in oaths) to strengthen this effect. Even today, this is clearly discernible in legal English: repetitions and binary expressions are typical of this language, making legal texts complicated and often difficult to understand.

In more developed societies, the complexity of legal language was increased by the birth of the legal profession and the growth of the technicality of the law, connected with the demands of exactitude and legal safety. The development of the Latin notary institution, first in Italy and then in other countries, in the beginning of the 2nd millennium had this kind of effect. The legal documents drawn up (in Latin) by notaries were more technical and complicated than earlier documents. In England, common law grew as case law. The development of this kind of law required subtle distinctions between different cases, that is, between their facts and circumstances. The conceptual system of common law therefore became very complicated. This system, again, required a complex terminology, and within this framework each term had to be interpreted in a narrow way. Simultaneously, the completeness of common law, as finely built case law, presupposed that detailed situation combinations were taken into account in all legal texts. As a consequence, common-law statutes and contracts have always been – and still are – very complicated and verbose.

The Growth of the Concern for the Quality of Legal Language

All the phenomena mentioned so far – the strengthening of the authority of the law by using language rituals, the complexity of the law due to its growing technicality, and the use of terminology of foreign origin – have made legal language difficult to understand even when it has coincided with the tongue of the people. Therefore, demands for simplifying legal language have been made throughout the ages.

However, the first serious measures to create plain legal language were only taken during the Enlightenment (18th century). This took place mostly in the German language area. The famous Prussian codification of 1794, *Allgemeines Landrecht für die preussischen Staaten*, is a major monument of the plain language planning of the epoch. This codification aimed at stylistic clarity. It also avoided words of foreign origin: Such words are much less frequent in the *Allgemeines Landrecht* than in earlier Prussian statutes. The concern for the quality of legal language in the Enlightenment was down-to-earth but prejudiced. In Hungary (then a part of the Austrian Empire), for instance, an intelligibility test was in use: Statutory drafts were shown to an ordinary subject, unhesitatingly called *buta ember* 'stupid man', in order to see how much of them he could understand. These Enlightenment ideas became important in other parts of Europe (e.g., Russian) as well.

The ideology of the Enlightenment died in Europe at the beginning of the 19th century. This was also visible in the language of law. Germany is an illustrative example. It is true that in this country more and more words of foreign origin were eliminated from the legal language, partly due to the ideology of German nationalism. However, statutes were no longer written for ordinary citizens but, rather, for legal professionals. The great codification of the end of the 19th century, *Bürgerliches Gesetzbuch* (1900), still in force, is in appearance written in clear German (it includes very few words of foreign origin), but its terminology gives expression to a very complicated conceptual system. Furthermore, the legal rules in this codification are often formulated in an abstract way that makes them hard to understand.

After the Enlightenment, legal language seems to have become obscure everywhere (although in different ways). It is therefore understandable that a new concern for the quality of this language has grown up at the present time.

See also: Language of Legal Texts; Language Politics; Latin; Law and Language: Overview; Legal Translation; Pragmatics: Linguistic Imperialism.

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Legal Pragmatics

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A discussion of the intersection of two crucial domains of human activity, language and law, requires an interdisciplinary approach, which is the underlying assumption of this article and one of the main tenets of pragmatics, the study of language in use. The language of the law is not only notorious for its lexical and syntactic complexity, which has given rise to criticism (e.g., Mellinkoff, 1963; Danet, 1980, 1985; Lakoff, 1990), but it also has certain pragmatic peculiarities. The present study on legal pragmatics will provide a pragmaticist's account of legal issues rather than a lawyer's view of the linguistic problems he or she faces. Since the direction of fit is from language to law and not from law to language, the assumption is that the aim of legal pragmatics is to construct an interface between the two domains by searching for pragmatic peculiarities in the language of the law. Thus, this article will investigate the instantiations of selected pragmatic concepts in the language of the law. The starting point of my analysis consists of a few observations on the topic made by others before.

1. The turn-taking system used in court is similar to that of other institutional settings (e.g., classrooms or chaired meetings) in that it is more rigid and less flexible than the one operating in everyday face-to-face conversation (Levinson, 1983: 301).
2. The institutionalized character of the court is reflected in formulaic, if slightly archaic and stilted language (Lakoff, 1990: 94).
3. According to Danet (1985: 276), legal discourse is concerned with "the nature, functions and consequences of language use in negotiation of social order." Despite its formulaic character, legal language employs a wide range of registers. It can represent various styles, ranging from frozen through formal and consultative to casual.
4. Verbal interaction in court exemplifies various questioning strategies, which lend themselves to a pragmalinguistic analysis, since "courtroom discourse is unilateral in that barristers enjoy a one-sided topic control of discourse" (Luchjenbroers, 1997: 477). This control is a sign of power, a socio-pragmatic concept discussed in the section 'Power vs. Solidarity' below.
5. Kurzon (1995) emphasized the role of silence in trial proceedings, and his more recent analysis (Kurzon, 2001) addressed the politeness of the judges. He claims that in formal language politeness may be

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taken for granted and is therefore automatically present (it may in fact be presupposed).

Pragmatic Concepts in the Language of the Law

The main issue addressed here is the extent to which the language of the law lends itself to a pragmatic analysis, e.g., whether typical pragmatic notions can be found in this type of discourse. My hypothesis is that the language of the law shares most of the pragmatic properties of colloquial language. These are presupposition, deixis, implicature, speech acts, and power vs. solidarity.

Presupposition

The notion comes in different guises, such as: semantic, pragmatic, and lexical presupposition, but the most widely recognized distinction runs along the semantics-pragmatics line. Thus, semantic presupposition is a relation between two propositions, such that the presupposing proposition can be denied, whereas the presupposed one is immune to negation, i.e., it is always true. Among the so-called presupposition triggers are a variety of lexical items and syntactic constructions, e.g., Levinson (1983: 181ff) lists more than 30 such items. Take factive verbs like 'regret,' which presuppose the truth of their complements, e.g., in

(1) I (don't) regret that it's raining.

Here the truth of the complement sentence (i.e., that it is raining) cannot be denied, regardless of whether the verb in the main clause is negated or not. In contrast, pragmatic presupposition is a relation between two utterances whose truth/factuality is taken for granted in a given context due to the mutual knowledge of the speaker and the addressee(s). For instance, if I ask a secretary in my department 'Is the professor in?' the question would normally presuppose that there is only one professor in our immediate context, i.e., an instance of existential presupposition related to definite descriptions. However, in this case, both I and the secretary know that only one of the many professors in the department, viz. the boss, is referred to with the definite NP 'the professor,' rather than with 'Prof. Brown.'

As can be expected, questions with presuppositions permeate interrogations. Recall the proverbial:

(2) When are you going to stop beating your wife?

Commenting on such questions, Shuy (1998: 15) showed that they are particularly useful in the case of suspects whose guilt is uncertain. It turns out that questions with presuppositions intimidate the suspects who might think that the interrogators already know the facts that they do not.

In her analysis of the role of questions in Supreme Court trials, Luchjenbroers (1997: 482), following Danet (1980: 521ff), defined questions in terms of the degree of factuality of the potential answers, ranging from open-ended questions of 'high' fact value, through *wh*-questions, to restrictive 'yes/no' questions of 'low' fact value. Predictably, the counsel have least control over witness replies with the open-ended questions and maximal control with 'yes/no' questions. The latter are also called leading questions, where the interrogators provide the facts of a testimony and the witnesses either confirm or deny them. The counsel have control over the witness, since they do not only know the answer that they expect to hear, but also gear their questions accordingly. Thus, the answer to the counsel's leading question is presupposed as in the following examples of the most frequent forms which leading questions can take: declaratives, accusatory 'yes/no' questions, and alternative questions, cf. (3a), (3b), and (3c), respectively (notice the use of 'some' which, in contradistinction to 'any,' obviously presupposes the truth of the utterance):

(3a) You had some alcohol?
(3b) Did you have some alcohol?
(3c) Did you or didn't you have some alcohol?

(Luchjenbroers, 1997: 482).

Deixis

Another pragmatic concept of relevance here is deixis, which can be defined as the expression of spatiotemporal relations in language by means of 'indexicals' (pronouns and adverbs that indicate three transient notions: the participant roles, the place, and the time of the utterance, labeled person, place, time deixis, respectively), as in the classical example:

(4) I am here now.

This pragmatic spatiotemporal domain is relevant to an analysis of legal language, especially to court trial discourse, because there consecutive instances of deictic anchoring reflect the spatiotemporal relations between the actual event, its spoken testimony by the witness/defendant, its written records, and possibly its later reception by potential readers.

Since one of the purposes of a court examination is to determine the identity of various persons involved in a case, and the exact location and time of the event, all three major deictic categories are realized in what is called "factuality of persons, place and time,"

(Kryk-Kastovsky, 2002: 254ff). The category of person is grammaticalized in natural language by means of personal pronouns 'I,' 'you,' 'he/she' referring to the speaker, the addressee, and the third party, respectively. Consequently, personal pronouns used in court trial discourse should reflect the interpersonal relationships between different participants of the trial. Stygall (1994: 180) presented an insightful proposal that personal pronouns should be redistributed in two categories, placing the referent either in the trial world or in the abstract world of the legal universe. Thus, 'you' is ambiguous between two uses: it is deictic when it refers to the addressee(s) and nondeictic in its generic use. Singular pronouns like 'I,' 'he,' 'she' are obviously deictic, whereas 'it' can either be deictic (when it points to an entity), or nondeictic, i.e., when used as dummy subject. On the one hand, this observation contradicts the traditional view that while 'I' and 'you' are unambiguous in everyday discourse, the third person ('he'/'she'/'it')stands for the entities outside the discourse situation, and thus is often called 'a nonperson.' On the other hand, Stygall's stand correctly reflects one of the possible approaches to court trial discourse, i.e., that its structure consists of textual layers. In his study of old court trial records, Koch suggested three textual layers in which the dialogue going on in court can be embedded: legal framework of questioning, report of a statement, and a dialogue rendered as a quotation (Koch, 1999: 406ff).

In addition to the major deictic categories, scholars have also distinguished discourse, emotional, and social deixis. These can be labeled 'marginal deictic uses,' since as opposed to person, place, and time deixis, they are not obligatory occurrences determined by the very nature of language, but are totally dependent on the speaker's choices. Thus, discourse deixis points to a (proceeding or following) portion of the text/discourse, emotional deixis employs demonstratives to mark a personal attitude towards a given entity, and social deixis concerns the use of forms of address as markers of social distance, cf. (5a), (5b), and (5c), respectively (court trial transcripts from Shuy, 1998, emphasis mine):

(5a) Q: What stuff did you tell him that's true?
A: That I ain't did **that,** that I knew her for a long time.

(5b) A: Then when I got to school, **this** boy told me about what happened.

(5c) I have known **Ms. Lockhart** for about 2 years. Sometime I call her **Ms. Lillie**.
(Shuy, 1998: 164ff).

As we have seen, deixis is not only one of the major properties of spoken language (more than 90% of human utterances contain deictics), but for obvious reasons, it is even more pervasive in the language of the law.

Implicature

The Gricean idea of 'what is meant but not said' is undeniably relevant to the language of the law, where actual meanings have to be inferred from examinations, witness depositions, and other forms of judicial discourse. As Mey (1993: 99) stated, implicature is a regularity that cannot be captured in a simple syntactic or semantic rule, but by some conversational principle. One of the best-known examples of implicature comes from Levinson (1983: 97):

(6) A: Can you tell me the time?
B: Well, the milkman has come.

where A has to infer the answer (e.g., that the milkman always comes around 6 A.M., hence the time has to be about 6 A.M.).

In the context of a court trial the process of inferencing and the resulting notion of implicature might constitute useful tools both for the interrogators in asking questions and for the interrogated in providing or evading answers. Atkinson and Drew (1979) analyzed court trial discourse in conversational-analytic terms and have shown that, in contradistinction to conversation, which is more loosely organized (the turns are not prelocated), court examination involves question-and-answer sequences. Since the turns in court trial discourse are prelocated in one direction only (i.e., from the interrogators to the interrogated), any pauses in the examination of witnesses or defendants have an inferentially implicative character, i.e., after the witnesses and defendants provide their answers, the next turn reverts to counsel who self-select. Inferences also work on a more elusive, psychological side of the court trial discourse, since any utterance can be a basis for moral inferences made about the speaker by the hearer(s) (Atkinson and Drew, 1979: 68). Compare these observations to the role of perlocutions in everyday discourse as opposed to the perlocutions that occur in court trials and often carry moral and social obligations (Kryk-Kastovsky, 2002: 236ff).

Inferencing can also be employed to discover what Harris (1994, emphasis original) called ideological propositions in courtroom interaction, such as:

(7) This court is a **reasonable** court – trying to do **justice** to both sides in some disputes?

As Harris (1994: 161ff) rightly pointed out, the concepts of a court based on reason and exercising justice are ideological assumptions that underlie the judicial system by definition and are therefore often

quoted by public figures as the basic principles securing the credibility of the legal system and political democracy in general. Therefore, by challenging the justness of the court, the statement starts an ideological dispute and thus implicates an oppositional view of reality. Finally, as demonstrated by Shuy (2004: 11ff), the counsel can use inferencing analysis (which involves the working out of implicatures) in order to solve ambiguities occurring in depositions or recorded data.

Speech Acts

Speech acts are utterances whereby by saying something the speaker performs certain acts, which are called performatives, as opposed to constatives, i.e., mere statements. The distinction was introduced by Austin (1962) and elaborated on by Searle (1969), who distinguished between five classes of performative utterances: representatives, directives, commissives, expressives, and declarations. In his later work, Searle (1975) emphasized the crucial role that performatives (especially declarations) play in legal language, whereas Danet gives priority to directives since "Within the facultative-regulative functions of law they are the most prominent in legislation that imposes obligations," (Danet, 1980: 458).

Speech acts are among the pragmatic concepts that most frequently occur in legal language, since according to Hencher, "[s]peech act theory and the law are made of much the same stuff. Pragmatic concepts such as authority, verifiability, and obligation are basic to both" (Hencher, 1980: 254). The crucial role of speech acts in the language of the law has also been shown in Jori (1994), Maley (1994), and Stygall (1994). Legal discourse is, by definition, permeated with performatives used by the speakers to perform legal acts. This evidence has been demonstrated by Danet, who claims that representatives, which commit the speaker to the truth of a proposition, can express a strong or a weak commitment, e.g., actions of testifying or swearing vs. asserting or claiming, respectively. Since according to Austin law is a set of commands, even more important to the legal language are directives, future-oriented speech acts intended to change the current state of affairs by making someone to perform some action, e.g., subpoenas, jury instructions, or appeals. Commissives, as the name suggests, commit the speaker to a future action, which includes any kind of contract, whether a business contract, a marriage, or a will. Expressives are supposed to cover cases of the convicted persons, asked before the sentence is announced whether they have anything (personal) to say. This moment is when they have the last opportunity to apologize, excuse themselves, and deplore their crime. Finally, declarations produce a fit between the words and the world, a change that comes about because of the speaker's utterance, as in the classic

(8) I declare the meeting closed. (Danet, 1980: 458ff)

It must be noted, however, that the position of formulaic expressions in legal language goes far beyond single speech acts, like swearing in a witness, requesting information, or warning the suspect of his/her constitutional rights, as in the case of Miranda Rights:

1. The suspect has a right to remain silent and he need not answer any questions;
2. If he does answer questions, his answers can be used as evidence against him.
3. He has a right to consult with a lawyer and if he cannot afford hiring a lawyer, one will be provided for him without cost. (Shuy, 1998: 52)

These speech acts are also part of a larger speech event. Such an event can be analyzed not only in linguistic terms, but also in terms of nonverbal context (e.g., spatial positioning and alignment in the courtroom) that can provide information concerning the social organization of discourse (Philips, 1986). Moreover, the physical characteristics of the courtroom emanate the atmosphere of power exercised by the interrogators (Lakoff, 1990: 91ff; Maley, 1994: 32ff). And it is the notion of power that this article will now address.

Power vs. Solidarity

Power in the Courtroom The distinction between power vs. solidarity introduced by Brown and Gilman (1960), was later been taken up by various theories of politeness, especially by Brown and Levinson (1987). The interplay between power and solidarity is apparent in the context of the courtroom where the interrogators exercise their power on the interrogated. The asymmetrical relation was particularly acute in the past, e.g., in early modern England, when judges could use their power by verbally abusing the witnesses and the defendants. For instance, the infamous Judge Jeffreys addressed the interrogated with invectives like 'blockhead' or 'vile wretch' (Kryk-Kastovsky, 2002: 253). The change in the politeness system to the effect that both social inferiors and social superiors receive the polite forms of address has also had repercussions in the judicial jargon, so that nowadays the distance between the interrogators and the interrogated is much more subtle. While the obnoxious behavior of judges is no longer possible nowadays, some more innocuous ways of indicating

the distance can be detected. On the extralinguistic side, it is the spatial organization of the courtroom that creates distance between the interrogators and the interrogated both due to the superior position of the judge (Lakoff, 1990: 87ff) and the role of the counsel who "reduce the witness to a function of a puppet" (Luchjenbroers, 1997: 480). On the linguistic side, the distinction between power and solidarity can be exemplified by the use of the appropriate forms of address and bythe presence vs. absence of the legal jargon in the speech of the insiders and outsiders of the courtroom, respectively. Moreover, the power contrast can also be detected in the verbal behavior of men and women. As noticed by O'Barr (1982), who follows Lakoff (1975), women's speech is much more tentative and less convincing due to the use of hedges, (super)polite forms, tag questions, speaking in italics, empty adjectives, hypercorrect grammar and pronunciation, lack of a sense of humor, etc. On the basis of these characteristics, O'Barr makes the distinction between powerful vs. powerless speech and shows that although women use powerless speech more often than men, the two categories are not necessarily to be assigned to the two sexes, but rather they reflect the social position of the speaker (the less powerful the speaker's social position, the less powerful his/her language). The transcripts quoted by the author convincingly demonstrate that powerful language is much more effective in courtroom discourse than powerless language. Consider the following quotation from O'Barr (1982: 65ff), where the emphasized words and expressions are clear instances of powerless language (emphasis mine):

(9) Q: State whether or not, Mrs. A, you were acquainted with or knew the late Mrs. X.
A: **Quite well.**
Q: What was the nature of your acquaintance with her?
A: **Well**, we were, **uh, very** close friends. **Uh**, she was even **sort of** like a mother to me.

As stated above, one of the manifestations of power and solidarity are forms of address, and this is what our discussion will now turn to.

Forms of Address Legal language as a conservative register has preserved many of the old address forms. Even in countries like the United States, where addressing others with first names is quite common, the language used in court is characterized by a high level of formality. Thus, the judge can be addressed as 'Your Honor,' 'The court,' or much less formally as 'Judge Smith' (although here some restrictions apply). In addressing the judge directly, the traditional formula 'May it please the court' is used. Lawyers are addressed and referred to as 'Counsel,' and members of the jury are addressed with the names of their social roles, e.g., 'Juror Number One' (depending on the assigned seat). Interestingly, the same formal register holds true for the interrogated, who are referred to as 'the witness' and 'the defendant' (Lakoff, 1990: 93). Although analogous situations hold in other languages with regard to referring to the participants of a court trial discourse, crosslinguistic variation applies to the ways a suspect/defendant/convict is referred to in the media. While in English, he is invariably referred to as 'Mr Brown,' in German the first and second name, without the honorific 'Herr,' are employed ('Harald Braun'), and in Polish merely the second name, again without the honorific, is used ('Kowalski'). It might be insightful to look into the (historical and sociocultural) reasons why loss of honorifics is the case in the two languages that have much more elaborate address systems than English. After all, German and Polish employ the T/V distinction (grammaticalized as *du/Sie* and *ty/Pan-i*, respectively), so that the use of honorifics is subject to strict sociopragmatic principles.

The Structure of Courtroom Discourse

In the following section, this article will examine to what extent courtroom discourse can be considered an approximation to everyday speech. As shown above, legal language contains all the major (socio)-pragmatic categories present in everyday communication. Therefore, it might be reasonable to assume that the parallel also holds on the discourse-analytic level; in other words, that the organization of courtroom discourse does not markedly differ from everyday discourse.

Guidelines for Courtroom Discourse Participants

Intuitively, one of the major characteristics of court trial discourse should be its effectiveness in achieving discoursal goals. Such effective courtroom tactics can be found in trial practice manuals addressed to what O'Barr (1982) calls "legal tacticians." Just to quote a few selected speech characteristics recommended by the authors of such manuals:

1. Overly talkative witnesses are not persuasive.
2. Narrative answers are more persuasive than fragmented ones.
3. Exaggeration weakens a witness's testimony, etc.

As can be expected, lawyers are also given advice as to effective verbal behavior (O'Barr, 1982: 32ff):

1. Make effective use of variations in questions format to get the most favorable responses for your

client. Interestingly, O'Barr notes that lawyers are often warned against asking questions to which they do not know the answers (i.e., they should resort to leading questions, cf. the section Presupposition above).

2. Another recommendation pertinent to this analysis is to vary the styles of questioning depending on the different kinds of witnesses (men vs. women, the elderly, children, etc.), a differentiation one might dub sociopragmatic, cf. the remarks on powerful vs. powerless speech in the section Power vs. Solidarity above.
3. Finally, a piece of advice that reminds a (text) linguist of a cohesion device, i.e., repetition is useful for emphasis, but it should be used with care.

With these guidelines in mind, let us now have a look at the main differences between two types of discourse of interest here, court examination and everyday conversation.

Court Examination vs. Conversation

At a first glance, court trial discourse looks analogous to any other discourse. However, Atkinson and Drew (1979) warn the non-initiates against hasty generalizations by showing to what extent court examinations can be compared to everyday interaction. First, if we consider the structural characteristics of conversation outlined by Sacks *et al.* (1974), i.e., turn-taking, turn allocation, transition-relevance places (TRPs), repairs, etc., predictably, everyday conversation is much more loosely organized than court trial discourse, so that in a conversation the turns are (relatively) spontaneous and the number of participants may vary. Second, while in court the distribution of power relations is obvious, in everyday conversation any power relations between its participants are not demonstrated overtly due to the different social setting of this type of discourse, which would imply that the Politeness Principle is observed. Third, although questions and answers often occur in a conversation, they are not a norm, whereas the verbal exchange in a court examination consists solely of question-and-answer pairs (Atkinson and Drew, 1979: 61ff). Moreover, in court examinations turn order is fixed and so is the type of turn contributed by each speaker. As Stygall rightly pointed out, turns and TRPs are controlled by the interrogators, whereas repairs and self-repairs, instigated by the questioning process, come from the interrogated (1994: 117ff). Indeed, the relation between the representatives of the two social roles is asymmetric in that only the interrogators have the right to ask questions, and the turns of the interrogated necessarily constitute (preferably adequate) answers to these questions. In other words, the turns in court examination, unlike in a conversation, are pre-allocated, or to use the terminology of Sacks *et al.* (1974), only one party (the interrogators) self-selects.

A unique property that differentiates court trial discourse from everyday conversation is what is called 'legal metacomments' (Kryk-Kastovsky, 2002: 248ff). These comprise the interrogators' comments on whatever is going on in court and are an instantiation of the metacommunicative function of language. Legal metacomments easily lend themselves to a pragmatic analysis due to their peculiar characteristics, in a way comparable to discourse deixis in everyday conversation. Thus, legal metacomments either refer (anaphorically) to a portion of previous discourse, or (exophorically) to a situation outside the actual discourse situation, cf. (10) and (11), respectively. In (10), the metalinguistic use of the verb 'say' takes the utterance outside the actual situation-of-utterance and gives it a special discourse function (i.e., that of a leading question), whereas in (11) the question is commented on by the judge as leading the witness, i.e., its discourse function is also changed from a simple 'yes/no' question to a leading question:

(10) So you say you actually ran away on Friday night? (Johnson, 2004: 105)

(11) Q: All right. Now the car the man was driving, was it a brown, a brown 1972 Chevrolet Nova?
OPPOSITION LAWYER: Objection.
JUDGE: Sustained, leading the witness. (O'Barr, 1982: 142)

The Language of the Law – At the Crossroads of Sociopragmatics, Discourse Analysis, and Intercultural Communication

It follows from the discussion above that (legal) pragmatics does not suffice to explain the intricate interface of language and the law. One of the reasons is that the relation between the two disciplines cannot be reduced to a simple combination of a few pragmatic concepts that occur in courtroom discourse; it calls for a multidisciplinary approach. Apart from pragmatics proper, a broader approach is necessary. First, the relations between the participants of court trial discourse call for a sociopragmatic explanation in terms of power and solidarity and the role which these concepts play in polite behavior, in the use of forms of address, etc. Second, an analysis of the structure and organization of courtroom discourse should be conducted within the conversation-analytic

and/or discourse-analytic frameworks to provide a comparison between the verbal exchanges in the courtroom and everyday conversation. Finally, on a more global level, a crosslinguistic and intercultural investigation might be in order to juxtapose the intricacies of the use of legal language in various cultural-linguistic communities. Not only would such as investigation reveal the differences between the Anglo-Saxon and European judicial systems, but also the various organizational peculiarities that result from these differences. Since in Great Britain and the United States the trial procedure is adversarial, whereas in most other countries it is inquisitorial, the following consequences ensue. In adversarial systems, the jury (consisting of lay persons) plays a crucial role in the trial proceedings. While the judge presides, the jury is presented the evidence from both the prosecution and the defense, and decides which side sounds more convincing. The inquisitorial trial procedure is much more rigid in that professional judges listen to the evidence presented by a state-appointed attorney and deliver a verdict. This style puts the defendant at a disadvantage, especially if his/her side is not fully represented. The markedly different roles played by professionals and laymen in both legal systems have serious repercussions for the entire organization of the trial procedures and the chances of the defendants (Lakoff, 1990: 86). Finally, it might also be useful to look at the organization of court trial discourse in countries outside Europe and North America and study different legal traditions, e.g., the court trial procedures in China deeply rooted in Chinese culture based on Confucianism, cf. e.g. Gao (2003).

See also: Interviewing and Examining Vulnerable Witnesses; Law and Language: Overview; Law on Language; Legal Genres.

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Legal Semiotics

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Introduction

As the principal agents of social control, the police are the most visible, accessible, and available representatives of the criminal law (Black, 1980). They, by virtue of their uniform, badge, gun, and other occupational accouterments display palpable coercive power (Niederhoffer, 1967). And as the primary gatekeepers of the justice system, they determine which cases – persons – enter the criminal justice system; to that end they exercise a considerable amount of discretion (Black, 2005). Prior scholars have maintained that the decision to apply the law in police–citizen encounters is axiomatically linked to the demeanor of the citizens involved (Lundmann, 1994). In other words, the likelihood of receiving tickets, being arrested, and having other official – and unofficial – sanctions applied has been demonstrated to be contingent upon citizens' attitude and comportment toward the police.

Police–citizen encounters are, by definition, asymmetrical since the police possess the brute capacity to threaten, harm, and coerce the clients of their service into compliance; at the same time, the encounters are tinged with a veneer of sociality in that the bulk of police work involves a fundamentally interactive process. That is, the essence of police work entails explaining, requesting, directing, and counseling citizens, victims, witnesses, and suspects to get them to do something (Mastrofski *et al*., 2000). Yet, despite the communicative nature of police–citizen encounters, researchers have not been able to agree on the constitutive elements of disrespectful behavior; this highlights one of the major limitations of existing police scholarship: there has yet to be a principled and rigorous empirical expatiation of the communicative – intersubjective – nature of police work.

How a police officer communicates with citizens and colleagues has been regarded as the paragon of police professionalism (Muir, 1977). In a very obvious way, language is the vehicle through which knowledge, intention, and meaning is transmitted; furthermore, that the police use language to persuade and dissuade citizens from certain courses of action points to its assumed, yet empirically unexplored, rhetorical function. From this standpoint, aside from the obvious capacity to exercise coercion, a theoretically warranted question it generates is how that awesome power is embodied in a much more mundane form of social action.

This article, rather than assuming *prima facie* the capacity of the police to threaten, hurt, and kill the very purveyors of that power, demonstrates how that awesome power is interactionally, structurally, and socially enacted, exercised, and contested in the semiotic details of police–citizen interactions. How is the interaction between the police and the public made meaningful during the interaction? How do the contours of police ideology, authority, and identity extend to the realm of communicative interaction, and how might they be enacted and sustained during such moments? Does the coercive power of the police manifest itself even in something as prosaic as talk and other signaling systems? This article examines how the encounter between the police and the public is semiotically organized.

Instantiating the Interaction: The Semiotic Summons

As other police scholars have already noted, the work that the police do begins in two ways: citizen-initiated or police-initiated (Wilson, 1968). The talk between the police and citizens also begins in a similar way: either citizens contact the police or the police initiate their contacts with the citizens. Citizens contact the police to request help for troubles and problems they witness or experience (Whalen and Zimmerman, 1990; Zimmerman, 1992), and they do so through emergency call numbers, such as 911 in the United States. The request for assistance is then symbolically encoded into organizationally relevant codes and assigned to the police (Manning, 1988).

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When the talk between the police and citizens is police-initiated, more salient differences – and

controversies – emerge. Self-generated police activity such as suspicious person stops, traffic stops, and vehicle searches intrude into the lives of citizens: it hinders free movement and contradicts principles of democracy (Skolnick and Fyfe, 1993). Moreover, these types of activities usually involve members of the minority; hence, they are fraught with controversy (Radelet, 1977; Spitzer, 1999). A good example of a police initiated encounter is the traffic or vehicle stop – for driving through a red light, running a stop sign, speeding, driving with broken taillight etc.

In traffic stops, the police initiate the encounter, thus hailing another to interact, by activating their sirens, horns, and flashing lights. Those nonverbal signs constitute a visual and aural – semiotic – summons. To appreciate the pragmatic force of such a summons, it must be noted that police–citizen encounters are different from other mundane interactions in a rudimentary way. First, police–citizen encounters are bureaucratic and institutional occasions for talk; hence, different from ordinary conversations that unfold over a dinner table or over coffee in that the structures of talk are preallocated as a function of institutionality (Atkinson and Drew, 1979; Drew and Heritage, 1992). Yet, despite this difference, institutional encounters draw their communicative intelligibility from a mundanely recurring and locally organized site of sociality (Schegloff, 1999).

Research has shown that in one of the most banal and recurring sites of social interaction – opening sequences in 500 ordinary telephone calls – talk is interactionally ordered and sequentially organized (Schegloff, 1968). That is, telephone openings are marked by several core sequences: the ringing of the telephone constitutes a summons, beckoning the called party to answer, thus establishing a means of communication, and forming the summons/answer sequence. Next, the identification/recognition sequence is accomplished through the greeting sequence. And it is after the how-are-you sequence that the reason for the call is introduced. That burden – introducing the first topic – canonically belongs to the caller (Schegloff, 1968).

According to Whalen and Zimmerman (1987), the opening sequences in emergency call centers – whose business is related to the context of law enforcement – are structurally and sequentially different from openings in ordinary conversations and other institutional discourses. Calls to emergency services, such as fire, police, and paramedics, are socially organized into the following core components: (1) prebeginning, (2) opening/identification/acknowledgment sequence, (3) request, (4) interrogative series, (5) response, (6) close (Whalen and Zimmerman, 1987; Whalen *et al.*, 1988; Zimmerman, 1992).

Prebeginnings refer to the – unobservable – physical act of picking up a phone and dialing the other party's number (911), "thereby summoning another to interact" (Whalen and Zimmerman, 1987: 180). In such institutional contexts, the callers generally remain anonymous; consequently, the task of self-identification falls to the institution, and it is categorical. A key point of difference between openings in ordinary telephone conversations and emergency calls for assistance then involves the reduction of opening sequences: "Reduction plays an important role in achieving an institutionally constrained focus to the talk, for it routinely locates the first topic slot to the callers in their first turn, which is the second turn of the call" (Whalen and Zimmerman, 1987: 175). In ordinary talk, the caller or the called party may introduce the topic through preemptive moves; however, Whalen and Zimmerman (1987) and Zimmerman (1992) find that the callers' first turn is the environment where topics are initiated in calls to emergency centers.

Whalen and Zimmerman note that when citizens call emergency services it begins with a categorical identification by the dispatcher (e.g., Mid-City Emergency, nine-one-one emergency). Calls to emergency centers have been chosen as a point of departure because they are genealogically related to the law enforcement context of this paper (for other institutional discourses see Clayman and Heritage, 2002). First, the structural organization of institutional communication is derived from the structures found in ordinary talk; that is, institutional talk is modified and adapted from ordinary talk to meet the contextual and situational exigencies of talk at work (see Drew and Heritage, 1992). This difference is exemplified in calls to emergency centers; scholars such as Don Zimmerman, Marilyn Whalen, and Jack Whalen have demonstrated how calls to emergency centers are different from ordinary conversations (e.g., telephone calls); furthermore, their work parallels the research that semioticians have done on the police communication systems (Manning, 1988). The missing component of this body of research is what happens after the police are dispatched to a call, when they encounter the citizens – how do the police go about settling and managing their assignments?

The identities in calls to emergency centers are organized such that the call-taker (dispatcher) chooses identification-oriented recognition over recognition-oriented response to the telephone summons. When citizens call emergency services for exigent problems or pressing troubles they may have experienced or witnessed, the format of talk is constrained in such a way that the business of the

institution is built into the structure of the talk itself (i.e., institution speaks first). Thus, following the first sequence, citizens make a request for service (police, fire, paramedics), state the reason for the call (e.g., somebody just vandalized my car); or the request and categorical self-identification component of the call is collapsed into the opening first turn (e.g., nine-one-one, what is your emergency?). Just as callers to emergency centers initiate contact for assistance, the police, much like callers to emergency centers, initiate contact with motorists concerning a particular problematic relevancy – what the traffic stop is about.

If activation of sirens, flashing lights, and horns constitutes an identification-oriented summons – identifying the police *qua* police by virtue of their flashing lights – then the answering of that summons is the act of pulling over. Motorists, however, do not respond to the summons in equal ways; they do so in ways that shape their moral identity and the contours of the interaction. Let me provide some concrete examples from my research. Patrol officers who are assigned to traffic enforcement (i.e., speeding infractions) 'set up' their radars to catch the speeding drivers at streets where traffic offenses are known to occur with regularity. Once motorists are 'clocked' on the radar, the officer must start from inertia and frantically catch up to the speeding car before 'lighting em' up' (activating the sirens). And it is during this 'preinteraction' phase, between inertia and activation of sirens, and prior to any verbal contact, that motorists' demeanor and moral character – and outcome – are conveyed to the police.

For example, some motorists do not pull over right away. In fact, they make a series of turns at the closest intersection in an attempt to 'lose' the pursuing officer. Some succeed. Some motorists stop in the middle of the road, without pulling over to the shoulder, putting themselves, passing motorists, and the officer in danger. Some motorists speed up and attempt to run and instantiate a pursuit. Some motorists do not speed, but they do not pull over either. They lazily cruise to their homes, pull into the garage, park the car, and walk toward their backdoor, erroneously believing that they are immune from the summons book once inside the confines of their castle. Thus, through the different ways that motorists acknowledge and give recognition to the police as the police, prior to any conversational interaction, they convey to officers their attitude toward the police, as a 'governable' or an 'asshole' (van Maanen, 1978).

If this prebeginning determines, to a significant degree, the legal identities of motorists and colors the moral contours of the interaction, then a similar process also marks the lenient outcomes of these encounters. The research for this project was conducted in five different law enforcement agencies in two states, all with a distinct orientation toward the community, organizational values and norms, and size; and as part of the research, ride-alongs were supplemented with audio recordings of 50 traffic stops in those geographically different agencies. In the data, the police cited the motorists in 58% (29) of the cases, and released the drivers with a mere warning in 40% (20) of the cases; one driver was arrested. Some officers turned off their tape recorders when they decided they were going to release the speeding motorists (they thought the researcher would find them 'uninteresting'). Consequently, detailed notes had to be written at a later time. Consider the following field note of such an encounter:

> (Southern City Police Traffic Stop #16)
>
> As Officer H and I were sitting in the squad car, a white crown Victoria was clocked going over 50 miles per hour in a 30 miles per hour zone. The officer immediately turned on his lights and went after the car. As he began to close in on the speeding vehicle, the officer said to the researcher, "That looks a squad car doesn't it? I mean look at all the antennas it's got growing out of the car." When the speeding car came to a stop, the driver immediately got out; and as he was doing so, a sidearm and a (Southern) state police trooper's badge was visible on his belt. Moreover, it turned out that the state trooper was an acquaintance of the host officer. They briefly talked about family and work, and the state trooper mimicked an apologetic motorist in a sarcastic way: "I'm sorry for speeding officer." Then Officer H said good bye and let the speeding trooper go.

In this traffic stop, a city cop in a marked squad car pulls over a speeding, unmarked state police vehicle. Yet, despite the expansive authority of the state police over city police, the trooper obeys the summons to interact by pulling over. That is, the state trooper, by pulling over, acknowledges and gives recognition to the categorical and absolute authority of the city police as police, thus sustaining the legitimacy and authority of the police.

But notice that the seeds of clemency are recognized before the speeding motorist even completes the act of pulling over. Officer H recognizes the speeding car as a potential 'kinsman' in blue. ("That looks a squad car doesn't it? I mean look at all the antennas it's got growing out of the car.") Police officers do not, generally, as a matter of professional courtesy, ticket other police (this courtesy is extended to doctors, prosecutors, judges, and clergy). Thus, the speeding state trooper's act of obeisance to the local authority is mutually ratified and acknowledged as such in the semiotic moments of the traffic stop. Moreover, the trooper steps out of his car, and in the process, reveals

his sidearm and badge, thus signifying his identity as the police.

It turns out that the speeding motorist is the benefactor of leniency in two ways, as a kinsman in blue and a personal acquaintance. Even when a cop pulls over another cop, traffic stops begin with a prebeginning where the officer activates the squad's lights to initiate the interaction. In the excerpt above, the interaction that begins as an identification-oriented sequence is transformed into a recognition-oriented one after the host cop recognizes the law violator in a categorical (fellow cop) and social way (acquaintance). The point worth reiterating is that even other police officers follow the interactional order of traffic stops, and the accusatorial force of the semiotic summons, thus becoming collaborators in the productions of their legal and moral identities in the prebeginnings of the institutional encounter (Shon, 2005).

The semiotic nature of police–citizen encounters, and the summons, is further supported when the opening sequences of the conversations between the police and the public are examined. For instance, Chicago police officers are instructed in the training academy to pull the vehicle over, walk up to the vehicle, and initiate traffic stops with a self-introduction such as "Hi, how you doing tonight. My name is Officer X of the Chicago Police Department. May I see your driver's license and proof of insurance please?" Once motorists provide the officer with necessary documents, officers are taught to ask, "Do you know why I stopped you?" The rationale, according to the instructors at the training academy, is that this question "opens communication between citizens and the police." As one patrol officer related to me, "Some people have a good reason for breaking traffic laws." What is noteworthy is that police officers in actual stops or on mass mediated programs about police work (e.g., *COPS*) rarely make such formal and categorical self-introductions.

COPS is a reality television program about police work. The show employs no actors; the participants are all real police officers who go about responding to calls for service. And as the first of its kind to blend reality programming and policing, in a compressed format and distinct series of vignettes, it purports to provide viewers with an intimate peek into the mundane and fantastic aspects of routine police work.

The Institutionality of Presence and Absence

It is possible to attribute the absence of formal and categorical self-introductions in police work to the size of a department and its locale. However, rather than explaining its presence and absence exogenously, there is a sociosemiotic way to account for such a phenomenon. That is, the police rely on the visual and symbolic accouterments of the uniform and the patrol car to convey their institutional affiliation. In other words, they are oriented toward culturally normative recognitional identification rather than identification-oriented recognition. As one patrol officer snidely remarked to me, "What, they can't see the flashing lights and my badge and my gun and tell who I am? I'm the police." The semiotic summons initializes the encounter, which is then followed by the bureaucratic request to see a driver's license in the officer's first turn. Not all patrol officers, however, 'close' the introduction slot. This observation can be further strengthened from the following traffic stop data from *COPS*:

(*COPS* data: "You got an attitude")

3 PO1: Turn it off
4 D: Huh?
5 PO1: TURN IT OFF
6 Can I see yo hands ( ) who's car?
7 D: Mine
8 PO1: Step on out
9 Hands on the car
10 You have a license or ID?
11 D: Yea I got ID
12 PO1: Slide back back back of the car right here
13 D: (mumble) Hey uhh
14 PO2: Hey what's up? That's what up ah-ight? first of all you don't have
15 a driver's license so you're not supposed to be driving a car
16 that's the first thing. I don't care whether you bought the car or
17 not the law says for you to operate this car you have to
18 have a valid driver's license. Now you have an attitude
19 you got a taillight out

This episode of *COPS* takes place in Philadelphia. Two patrol officers make a traffic stop after witnessing a car driving at high speeds; in addition, the car does not have visible license plates. After they activate the sirens and pull the car over, both officers approach the car and open the encounter in line 3. There is a lot of action taking place in this encounter. It should be noted, however, that these Philadelphia officers, much like Chicago officers, do not make formal self-introductions. They do not say, "Good evening. My name is Officer X of Philadelphia Police Department. May I see your driver's license and registration please?" Contrast the way the big city traffic stop is opened with a police department in a much smaller city:

(Southern City Police Traffic Stop #9)
PO: Hello. Can I see your driver's license please?
Good evening ma'am, my name is officer X with the Southern City Police Department. The reason I'm stopping
you is you are doing 42 in a 30. Is there any medical emergency you're in a hurry for?
D: (shakes her head)

In this traffic stop the officer does begin the interaction in a way that is characteristic of bureaucratic institutions: he introduces himself (my name is officer X) and categorically identifies his institutional affiliation (with the Southern City Police Department). This officer from the Southern City Police Department was assigned to the Traffic Division: his entire shift was spent making traffic stops for speeding. Other beat officers during the author's ride-alongs did not open the encounter (self-identification) in this way, although some did. There may be other reasons why this particular officer begins the encounter the way he does (small city police, traffic specialist, politeness); but the key point is that it **is** markedly different from the ones shown thus far.

That is because the summons/answer sequence and the identification/recognition sequence found in ordinary talk are reduced to one in traffic stops. The absence of formal and categorical identification of an officer's institutional affiliation is the norm from which other deviations occur – formal identification slots have to opened from a number of structural possibilities. By virtue of their uniforms, squad cars with flashing lights, and other occupational accouterments, the task of verbal self-introduction and categorical identification are not necessary since they are semiotically conveyed. The semiotic summons already identifies the 'caller' as the police. Thus, in a traffic stop, the summons/answer sequence and identification/recognition sequence – first semiotic turn – are compressed into a visual and aural communicative sequence, thus further reducing the opening sequences noted in prior work.

Conclusion

Police–citizen encounters are asymmetrical in an obvious way: as representatives of the criminal law, the police are anointed by the state with the capacity to exercise coercive (lethal) force over citizens to bring about compliance to their directives. To that end, they are shrouded in symbolism, given the necessary tools, and project vestiges of brute power. It would be too presumptuous, however, to believe that the asymmetry between the police and the public rests solely on the possession of this awesome power. The police do have the authority to stop citizens and motorists, interrogate them, and impede their movements, but they also have the power to control the structural patterns of communication. As shown here, the police bring that symbolic and bureaucratic power to life by semiotically summoning citizens to interact.

In the summons/answer sequence Schegloff formulated, the failure to answer a summons incurs only a morally accountable sanction. That is, if someone or something (telephone ring) calls and beckons interaction in a social encounter, it can be refused at a moral expense. However, when the police summon citizens to interact and that summons is ignored, the accountability they face is not only moral but also legal. They can be sternly commanded to do so; the police can physically grab citizens and force them to interact, and should they physically resist, the police can use pain compliance holds and strikes to make them interact. As Skolnick and Fyfe (1993) posit, however, the police need not use those types of methods; their mere presence – uniform, identity – sometimes, deters crime and forces citizens to change their behaviors.

This article has reviewed the summons/answer sequence in social and institutional encounters. A key finding in prior research is that ordinary summons sequences are reduced to meet the institutional and structural exigencies and constraints that bureaucracies face. It has shown how the summons sequence is further reduced and adapted to meet the situational relevancies of police work. That the police routinely rely on the uniform to convey their categorical, self-introductions alludes to another way their presence is semiotically marked (Shon, 1998). As shown here, the semiotic summons is the first step in giving that awesome power of the police a concrete face and an audible voice in the opening moments of traffic stops (Shon, 2003a, 2003b, 2003c).

There is tremendous diversity in the way motorists react to the wail of sirens and lights; and precisely because the presence of the police evokes a different range of responses, from hostility and fear to anger and rage, they have been conceptualized as 'Rorschach-in-uniform.' That motorists are being legally and semiotically summoned already carries the pragmatic sting of an accusation. That is to say, they are directly accused – with sirens, flashing lights, and horns – regarding some problematic relevancy, without a ratified knowledge of what that might be. Of course, this is not to say that motorists who are generally pulled over have no idea as to why they are being stopped: the manner in which the accusation is made is direct, but the accusation itself is indirect because it has yet to be announced, and ratified, in the opening moments.

Niederhoffer (1967: 1) observed long ago that the policeman is "clothed in a mantle of symbolism that stimulates fantasy and projection." The police are often baffled by the attitudes and behaviors citizens show them; they do not understand why citizens "stiffen with compulsive rage or anxiety at the sight of a patrol car"; for that matter, the uniform. For instance, in an informal gathering with police officers, one patrolman related how he had pulled over a motorist to warn her about low tire pressure, only to be greeted with severe indignation. Or as Baker (1985) notes, a highway patrolman offers a ride to a hitchhiker on Christmas Eve, only to be violently cursed at and attacked. Why would such seemingly friendly gestures engender such hostile responses?

It is tempting at this point to offer a reductionist and simple psychological explanation for motorists' apparently bizarre behavior. Thus, we could say that motorists and citizens who act out toward the police are not the models of mental health, that they are paranoid, crazy, antisocial, and have a deep-seated hatred of the police. We could even offer a historical explanation and claim that some motorists react belligerently toward the police because they have been systematically harassed and mistreated by the police. Or a contextual explanation and conjecture could be offered: the motorist is having a bad day, and is acting out toward the cop.

And it is tempting to stop here; but if the phenomenon is examined sociosemiotically, the act of being summoned, pulled over, covertly interrogated, and having the problem announced as part of the opening sequences of a traffic stop, then the analysis can be salvaged from inward-looking psychology by grounding analysis in observable, demonstrable, and empirical action that subjects engage in. The summons instantiates the bureaucratic power of the police through the wail of sirens and flashing lights, thus beckoning motorists to interact, but why motorists have been summoned to interact is not yet made relevant until a later turn. Thus, motorists are signaled as to the indeterminate nature of the problem without a ratified knowledge of the problematic relevancy: they are indirectly accused in a direct manner:

> "As you are driving down the highway, suddenly there are flashing lights in the rearview mirror and the whoop of a siren in your ears. A small dose of adrenaline surges into your blood stream. Your heart beats faster; your palms sweat. You feel guilty whether you've consciously done something or not" (Baker, 1985: 246).

Thus when motorists and citizens act belligerently to officers' apparently friendly and concerned overtures – telling citizens about a tire dangerously low on air; offering a ride to a hitchhiker on Christmas Eve – their reaction seems to point the finger at the squad car, flashing lights, officer, and his or her uniform. If a sociosemiotic explanation of traffic stops is adopted, a citizen's violent reaction is a reaction to the direct and blatant manner of accusation – the summons – not the uniform.

See also: Anthropological Linguistics: Overview; Applied Forensic Linguistics; Gesture: Sociocultural Analysis; Interactionism; Legal Semiotics; Police Questioning.

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Legal Translation

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Although translations of legal documents are among the oldest and most important in the world, legal translation has long been neglected in translation studies. Thanks to recent impulses from comparative law and legal linguistics, a growing number of scholars and practitioners have been attracted to this interdisciplinary field, making legal translation one of the most vital areas of contemporary translation. In our age of globalization, translation plays a major role as a means of communication in national, supranational, and international law. The volume of legal translation in international organizations has increased significantly as a result of the modern trend of adopting treaties, conventions, and model laws in more than one language. International relations, international trade, and even international dispute resolution are more dependent on translation than ever before, as is the European Union, whose legislation is currently drafted in 20 official languages, all texts being equally authentic. At the national level, the number of plurilingual countries and regions that translate their national laws and administer justice in two or more official languages is on the rise, as is the number of countries that translate their legislation and other legal documents for information purposes.

Why Is Legal Translation Special?

In keeping with Sager's definition of specific-purpose texts, a legal text can be regarded as a communicative occurrence between specialists intended to serve a particular function (Sager *et al.*, 1980: 210) (*see* **Languages for Specific Purposes**). Although it is their function that distinguishes legal texts from other specific-purpose texts, linguists initially failed to recognize that sources of law, such as codes, statutes and regulations, and treaties and conventions are primarily prescriptive, as are contracts. Such texts are normative instruments that prescribe commands and prohibitions, grant permissions and powers, or create obligations and rights (Cornu, 2000: 268) (*see* **Definition/Rules in Legal Language**). Judicial decisions and documents used to carry on judicial and administrative proceedings, such as actions, pleadings, briefs, appeals, requests, etc., are primarily descriptive but usually contain prescriptive parts as well (*see* **Language of Legal Texts**). These two groups of texts constitute the main bulk of legal translation.

While lawyers agree that legal translation is a dual operation consisting of both "legal and interlingual transfer," in their opinion, the main operation is legal in nature (Sacco, 1990: 34). Legal texts require a special type of translation basically because the translations also produce legal effects and many have the force of law just like the original(s). Above all, skilled translators must possess considerable legal and language competence "to understand not only what the words mean and what a sentence means, but also what legal effect it is supposed to have, and how to achieve that legal effect in the other language" (Schroth, 1986: 56). Unlike other areas of specialized translation, the success of a legal translation is measured by its interpretation and application in

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practice, especially by courts of law. Accuracy is thus essential, and as much attention must be paid to the content as to the intention and all possible interpretations and misinterpretations of the text. Translators must understand the source text but not interpret it in the legal sense. In particular, they must avoid value judgments, taking care to convey what *is said* in the source text, not what they believe it *ought to say*.

Contrary to texts of the exact sciences, legal texts do not have a single agreed meaning independent of local context but usually derive their meaning from a particular national legal system. This system is referred to as the *source* legal system, while the *target* legal system is the system to which the recipients of the target text belong. According to lawyers, the difficulty of a translation depends primarily on the degree to which the source and target legal systems are related and secondarily on the similarity of the source and target languages (cf. Berteloot, 1999: 103). In this sense, the difficulty of a translation increases when the legal systems belong to families with considerably different legal traditions and their languages are not related.

Sometimes it occurs that the source and target legal systems are identical, thus greatly facilitating the translation process, mainly because both texts derive their meaning from the same conceptual system. This is the case in plurilingual states with one legal system, such as Switzerland, Belgium, and Finland, as opposed to plurilingual states and regions with different legal systems or a mixed legal system (e.g., Canada, India, Sri Lanka, Israel, South Africa and recently China, in Hong Kong and Macau). Although European law is regarded as an independent legal system, 'Euroterms' and concepts are in a state of flux, causing confusion for translators who must distinguish between European and national institutions and concepts (Schübel-Pfister, 2004: 115). Despite increased efforts to unify law at the international level, the number of standardized concepts in international law is still small.

Conceptual Incongruity of Legal Systems

Lawyers often describe legal translation as a form of *transposition juridique* (Tallon, 1995: 342); by no means, however, is it a mere mechanical process of transcoding terminology from one legal system into another. On the contrary, the conceptual incongruity of legal systems poses the greatest challenge to legal translators, making it extremely difficult and sometimes impossible to find an adequate equivalent in the target legal system for a given term in the source legal system (*see* **Law and Language: Overview**). As in Hjelmslev's analysis of terminological incongruity in ordinary languages, it can be shown that the boundaries between the meanings of legal concepts are incongruent even in closely related legal systems, such as the continental civil law systems. For example, the concept of décision in French law corresponds with two, more specific concepts in German law (*Entscheidung* and *Beschluss*) and three in Dutch law (*Beschikking*, *Besluit*, *Beslissing*). Even etymological equivalents that constitute the common core of all legal systems, such as *dettes* and *debts* or *contrat* and *contract*, are not identical at the conceptual level. Moreover, within the same language, it occurs that the same term designates different concepts in different legal systems or, conversely, the same concept is designated by different terms in different jurisdictions. In addition, all legal systems contain a number of 'untranslatable' system-bound terms designating concepts peculiar to their own legal reality.

Not surprisingly, the majority of studies on legal translation deal with terminological problems. Early studies by lawyers focused on using methods of comparative law (especially the functional approach) to identify and compare the corresponding concepts of different legal systems. Hence, the terms designating such concepts are called functional equivalents (Šarčević, 1989: 278). Using functional equivalents is considered the "ideal method of translation" (Weston, 1991: 23). Frequently, however, they are only partially equivalent, or no functional equivalent exists in the target legal system, thus forcing translators to resort to linguistic means. As a result of recent interaction between lawyers and linguists, conceptual analysis is now being used to measure the degree of equivalence of the corresponding concepts of different legal systems; legal criteria have been established to determine the adequacy of functional equivalents; methods of lexical expansion and contraction are used to compensate for the incongruity of functional equivalents; and a catalogue of linguistic equivalents has been proposed to translate system-bound terms (literal equivalents, descriptive paraphrases, borrowings, naturalizations, and other neologisms).

Attempts to Provide a Systematic Approach to Legal Translation

The popularity of legal translation has been accompanied by a sharp increase in the number of scholarly publications by both lawyers and linguists, most of which focus on specific terminological issues, languages, legal systems, or text types. Only recently have there been attempts to establish general principles of legal translation. Aware of the inadequacies of general translation theories, specialists in legal

linguistics have attempted to analyze the phases of the translation process (Gémar, 1995) and propose a theoretical framework for legal translation based on both legal and linguistic criteria (Šarčević, 2000). Recent emphasis on the textual aspects of legal translation (syntactical, pragmatic, and stylistic) has shown that the quality of translations can be improved without compromising reliability.

For centuries literal translation was the only acceptable translation procedure for all legal texts, especially legislation (*see* **Approaches to Translation, Linguistic**). For the purpose of preserving the letter of the law, translators adhered to the principle of fidelity to the source text by reconstructing the form and substance of the original text as closely as possible. In fact, the dominance of literal translation was not seriously challenged until the 20th century when dissident translators began to demand equal language rights for lesser-used official languages. Accused of heresy by his critics, Rossel defended his liberal translation of the German text of the Swiss Civil Code into French (1907) by insisting that the francophone population of Switzerland had the right to have their code written in 'natural' French. In the 1960s, demands for equal treatment of the French language at the federal level in Canada triggered the so-called silent revolution in Quebec, emancipating translators by encouraging them to convey the sense of the original in a new text written in the genius of the target language. In the late 1970s, the Canadians went a step further by introducing new methods of bilingual drafting, the most common of which is co-drafting, a form of simultaneous text production that goes beyond translation.

While translators of Canadian federal legislation are encouraged to strive not so much for verbal and grammatical parallelism as for linguistic purity within the confines of legal equivalence (Beaupré, 1986: 179), the extent of the translator's freedom to produce a new text in the genius of the target language is controversial in other jurisdictions and for certain text types, mainly out of fear that the translator will scuttle the intent of the original. For example, translators of Swiss legislation are advised not to alter the length of sentences to avoid imposing their own interpretation. Similarly, translators of instruments of international law are instructed to give priority to formal concordance and to refrain from clarifying any ambiguities. Moreover, numerous legal instruments are institutional texts and as such are subject to a varying degree of standardization. Strict observance of standard form and formulae is required particularly in translations of documents of the European Union.

From the above, it follows that text type does play a role in determining translation strategy; however, there is no given strategy for translating a specific text type, such as legislation or judgments, even when the *skopos* (purpose) of the translation is the same (*see* **Functional Approaches to Translation: Skopos Theory**). Unlike other areas of translation, the *skopos* of a legal translation is often predetermined by its status, i.e., whether it is non-authoritative or authoritative. Whereas non-authoritative translations are intended for information purposes only, authoritative translations are legally binding instruments. In both cases, however, the selection of a translation strategy depends primarily on legal factors of the specific communication situation: which source and target legal systems are involved, how many, which drafting techniques and rules of interpretation are commonly used in those systems, etc.

Redefining the Goal of Legal Translation

The future of legal translation is bright, and there are valid arguments to elevate its status to an independent discipline in translation studies. A symbolic step in this direction could be taken by redefining the goal of legal translation. In the tradition of specific-purpose translation, it has long been accepted that the primary task of the legal translator is to achieve semantic equivalence (*see* **Translational Equivalence**). While this aim is in keeping with the presumption that a translation has the same meaning as the original(s), lawyers are the first to admit that legal translation is at best approximation, thus reducing the presumption of equal meaning to a fiction. Whereas it is not always possible to achieve semantic equivalence, translators are expected to produce texts that lead to the same legal effects in practice. Moreover, these are presumed to be the *intended* legal effects. Emphasizing the pragmatic aspects of legal translation (*see* **Legal Pragmatics**), it can be said that the translator's task is to put language into action to achieve the intended legal effects, i.e., to achieve legal equivalence. Although legal equivalence has far-reaching implications, it can essentially be regarded as a synthesis of content, intent, and legal effect, with the main emphasis on the latter.

In a receiver-oriented approach to legal translation, the test of legal equivalence is how the text is interpreted and applied by the courts. For example, the authoritative translations of a given instrument may be deemed legally equivalent if they are interpreted and applied uniformly by the courts. In this sense, the ultimate goal of legal translation is to produce a text that will promote the uniform interpretation and application of the single instrument, as it is called. Achieving this goal is not easy, however, it is hoped that greater interaction between lawyers and linguists

will lead to new and better methods of overcoming the legal and linguistic barriers of legal translation, making it a more effective means of communication in our global world.

See also: Approaches to Translation, Linguistic; Definition/Rules in Legal Language; Functional Approaches to Translation: Skopos Theory; Language of Legal Texts; Languages for Specific Purposes; Law and Language: Overview; Legal Pragmatics; Translational Equivalence.

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Legal–Professional Language in Jury Trial

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The study of legal–professional language in jury trial is concerned with how trial lawyers and judges use language in the context of legal cases tried by jury. While some code switching occurs between legal English and Standard English, brought on by frequent changes in topic and audience, it is often difficult to distinguish these linguistic varieties within the context of jury trial. Legal professionals often produce their own hybrid variety of language, a 'legal-lay discourse' (Heffer, 2005), which is neither truly legal in its lexis and syntax, nor typical of everyday

will lead to new and better methods of overcoming the legal and linguistic barriers of legal translation, making it a more effective means of communication in our global world.

See also: Approaches to Translation, Linguistic; Definition/Rules in Legal Language; Functional Approaches to Translation: Skopos Theory; Language of Legal Texts; Languages for Specific Purposes; Law and Language: Overview; Legal Pragmatics; Translational Equivalence.

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Legal–Professional Language in Jury Trial

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The study of legal–professional language in jury trial is concerned with how trial lawyers and judges use language in the context of legal cases tried by jury. While some code switching occurs between legal English and Standard English, brought on by frequent changes in topic and audience, it is often difficult to distinguish these linguistic varieties within the context of jury trial. Legal professionals often produce their own hybrid variety of language, a 'legal-lay discourse' (Heffer, 2005), which is neither truly legal in its lexis and syntax, nor typical of everyday

English. This discourse can partly be explained in terms of strategic tensions resulting from the need to persuade a lay jury to act in certain ways, but from within a highly constrained legal framework. Crucially, then, it is the complexity of the jury trial context which determines the complex nature of language use observable in court.

This entry will sketch out some of the key features of that complex context and consider how they influence the nature of the language used. It will also attempt to show how variation in context across legal jurisdictions can result in quite distinct linguistic preferences.

The Narrative Context and Opening Statements

At the heart of all cases tried by jury is a story of wrongdoing. That story needs to be presented by the prosecution or plaintiff to the jurors and will then be deconstructed by the defense, who might also present alternative stories. In addition to this 'natural' narrative context are lawyers' understandings of the process of jury decision-making. Lawyers have long understood the power of a good story, and this folk theory has recently found some support from psychological research into jury decision-making. Narrative coherence, for example, has been claimed to be more crucial to jurors than evidential weight (Bennett and Feldman, 1981), while a narrative form of presentation has been shown to enhance recall of story elements (Mandler, 1984). Both folk theory and science have fed into the advice of advocacy manuals (e.g., Evans, 1993), which now enthusiastically encourage narrative forms of presentation, and there is some empirical evidence that lawyers, particularly prosecution lawyers, do indeed follow narrative principles. In terms of the macro-organization of their cases, counsel will often try to ensure that their first witness is the one who can tell the story as completely as possible (e.g., a good eyewitness) and then subsequent witnesses will provide support for various elements of that story (e.g., forensic evidence). Counsel will often structure their examination-in-chief of the key 'storytelling' witnesses following a schema of natural narrative, such as 'setting-episode,' in which the scene is set and then the episode is recounted chronologically. Finally, lawyers are concerned not only with, as Jackson (1995) puts it, the 'story *in* the trial' (the story of wrongdoing) but also the 'story *of* the trial' (the events of the trial itself, including the impression made by witnesses and counsel).

The most crucial point of the trial for narrative presentation is the opening statement, for this will be the jury's initial exposure to the prosecution's story (and, in the U.S., that of the defense). Opening statements in most jurisdictions are supposed to be informative rather than persuasive, to provide an outline of the story and the legal issues rather than argue the case. They are potentially highly influential, though, since they construct a cognitive filter through which jurors will then view the subsequent evidence (Moore, 1989). The opening outline provides the core or master narrative while 'satellite narratives fill out, elaborate, and extend the narrative through the information gathered during the examination of witnesses' (Snedaker, 1991: 134).

The following is an abridged and anonymized version of the outline summary from a dangerous driving case, annotated to show how the structure conforms to a schema of natural narrative (Labov, 1972):

> *Orientation*
> [*When?*] At about 2:00 in the morning of November 16 last [*Who?*] four off-duty policemen [*What?*] were driving along in a white Toyota Corona [*Where?*] from the Ludley direction to the Bedley direction.
> *Complicating Action* (What happened then?)
> As they came up to [the Busby] bends, the car behind them came up close and (. . .) went out into the oncoming lane, over the double white lines and overtook.
> *Evaluation* (So what?)
> Those bends are a number of sharp and, in some cases, blind bends, and they have got double white lines in the middle of the road which, as you know, means you must not overtake there.
> *Resolution* (What finally happened?)
> The car continued (. . .) until it disappeared out of sight round the next blind left-hand bend.

Despite conforming to a natural narrative schema, there are a number of features in the complete narrative which mark it out as distinctive to trial narrative. In the first place, there is an apparent overspecification of orientational information. While the Orientation sentence above would be perfectly adequate for a newspaper narrative, here it is both preceded and followed with circumstantial detail such as the precise designation of the road, the names of all the passengers in the car, and a detailed description of the road. A second feature is the frequent blending of orientation and evaluation:

> As they were driving along – it is a single carriage road, a country lane; an 'A' road, but in the countryside with hedgerows either side, no streetlights – they become aware of a car coming up behind them fast.

Here the barrister is not so much providing descriptive background as suspending the narration to stress

the evaluative point he is making: that it was dangerous to overtake.

This suggests a third feature of trial narrative: a distinctive use of evaluation. In Labov's model of narrative, evaluation functions as both a primary and secondary structure. As a primary structure, Evaluation in trial narrative explicitly indicates the probative value of a piece of evidence, the 'Point' (Harris, 2001). This is indicated in several sections of the outline and then summed up in an evaluative Coda:

> The prosecution would say that is an obvious piece of dangerous driving.

As a secondary structure, evaluation appears throughout the narrative and tends to function in a more holistic fashion, gradually building up an impression that will influence the jury as much affectively as cognitively, as in the following lexical chain suggesting danger:

> no streetlights . . . fast . . . sharp . . . blind . . . close . . . in the middle of the night . . . obviously . . . cannot see

At this level of impression creation, the strategic choice of words can help prime the jury into viewing the events and participants in a given way, as Cotterill demonstrates in a detailed corpus linguistic analysis of lexical choices made in the opening statements of the O. J. Simpson criminal trial (2003: 68–83).

Narrative, then, is clearly central to case construction. Yet to a nonlegal observer, the evidential phase of a run-of-the-mill trial can appear quite unlike narrative. Although advocacy manuals insist that the aim in witness examination is for "the story to be told naturally, spontaneously and conversationally [thus] enhancing trust in the witness" (Stone, 1995: 95), in practice, extended witness narratives of any length are extremely rare. Much of the explanation for this discrepancy between the 'deep' narrative structure of cases and the superficial nonnarrativeness of trial genres can be found in the legal context of jury trial.

The Legal Context and Submissions

Language in jury trial is profoundly affected by both the law itself and by the mindset and customs of legal professionals. The substantive law both restricts the types of stories of wrongdoing that can be told in court and determines which elements of those narratives are legally relevant. The 'matters in issue' for legal professionals often differ from those considered relevant by lay participants, so that the narratives of lay litigants in small claims courts are often construed as legally inadequate (O'Barr and Conley, 1982). The narratives constructed by lawyers in court must fit the categories determined by the law and, in a criminal case, the legal elements of the indictment. This involves the lawyer controlling quite closely the direction a witness narrative takes and making sure that the 'materially relevant' evidential Points are being made. The narration is also constrained by rules of evidence. For example, lawyers must make sure the witness does not speculate or relate what others have said (hearsay).

There is also, though, a deeper level at which the legal context influences the language of legal professionals. As with most institutional discourse, lawyers and judges are heavily influenced by their professional training. Law students are trained to 'think like lawyers', and this is often different from lay ways of thinking (Mertz, 1996). Cases are viewed, for example, in terms of legal rules and principles and are effectively transformed from complex narratives of human vicissitudes to exemplars of decontextualized case categories.

Such legal reasoning is demonstrated in advocates' legal submissions to judges. In the English context, these are delivered orally in open court but in the absence of the jury. In the following extract from a submission, the barrister is attempting to persuade the judge of the legal correctness of dismissing one of the counts against the defendant, suggesting effectively that that particular legal story should not be told in court:

> To deal with the other matter, it is a question of dangerous driving in Count 1 of the indictment. Your Honor, I make a submission of no case in respect of that, and I do it for this reason: (. . .) one has, in dangerous driving cases, really two different types of circumstance in which dangerous driving can arise. One presents an objective test; one a subjective test. Of course, the offense is driving which falls far below the standard of the ordinary, prudent, and competent motorist. So, one has the 'far below' aspect. The second point is that the driving must be dangerous. Danger is defined as there being a danger that there would be (and the Statute uses the words 'would be') injury to the person, or substantial damage to property . . .

While researchers have tended to focus on advocates' attempts to influence the jury, counsel are equally concerned to convince the judge. More than 40% of English jury trials end in an acquittal ordered or directed by the judge, so this legal line of persuasion is potentially fruitful. It is also quite unlike that used on the jury. Here, the events of the trial are relevant only as an instantiation of a class of similar events which have been abstracted from time and place ('in dangerous driving cases'). Rather than a sequence of

causally related actions, the propositions are presented through existential processes in the timeless present ('it is,' 'one has'). Hypotheses are formulated and then tested ('one presents an objective test; one a subjective test'), and there is considerable reliance on definition ('Danger is defined as there being . . .') and on the precise wording of authoritative written texts ('the Statute uses the words "would be"'). In producing such discourse, the advocate is demonstrating his skills of legal argumentation to his professional superior, and although the submission in this case fails, he is praised by the judge for its construction – "very clearly made, if I may say so."

The Adversarial Context and Objection Sequences

While the deep structure of the trial might be determined by narrative and the law, the surface structure is more akin to classical debate. In a criminal trial, the prosecution sets forth its Proposition motion (that the defendant is guilty of certain crimes) in the Indictment. They then introduce the Argument For conviction in the Opening statement. This argument is developed through their own witnesses. Then the Defense presents the Argument Against conviction through its witnesses. Finally, Prosecution and Defense produce Perorations for and against the motion in their Closing Arguments. In addition to this overall adversarial structure, trial procedure allows for stories presented in court to be challenged at three other levels. First, the 'tellability' of the story itself can be challenged through legal submissions, as in the submission for no case above. Second, the satellite narratives of the witnesses can be challenged through **crossexamination**. Finally, opposing counsel can object at any point to the examiner's line of questioning.

While the highly adversarial nature of jury trial discourse is indisputable, the extent to which it is manifested before the jury varies considerably across jurisdictions. This is particularly evident in the handling of objections in U.S. vs. English courts. In U.S. courts, objections are both frequent and formulaic. Although admittedly an extreme case, the O. J. Simpson criminal trial contained more than 16 000 objection sequences (Cotterill, 2003: 95). Perhaps due to this frequency of use, a **sublanguage** has developed for performing objections, as illustrated in this example from the O. J. trial (2003: 95):

> Q: And Miss Mazzola was under the impression that you had left the Rockingham scene earlier than 5:20, wasn't she?
> Mr. Goldberg: Calls for speculation.
> The Court: Overruled.

Opposing counsel often initiate the objection with the legal performative 'Objection.' This is followed by an obligatory indication of the evidentiary cause for the objection, generally taken from a finite set of legal categories. Finally, the judge allows or disallows the objection using the terms 'Sustained' or 'Overruled.'

In contrast, objection sequences are quite rare in English jury trials. Judges can and do intervene directly to object to or redirect a line of questioning. Furthermore, objections are perceived by barristers to be disfavored both by judges (for interrupting the flow of the examination) and jurors (for concealing information from them). When objections are made, then, they tend to be much less formulaic and more deferential:

> Mr. Spurs: If she said to us she hit the car, can you explain why that might be?
> Mr. Rider: No, your Honor. With the greatest of respect, this lady cannot explain why anybody else said something.
> The Recorder:* That must be right. (* A part-time judge)

The contrasting form and frequency of objection sequences is indicative of a general difference in approach to adversariality in the two jurisdictions, which might be characterized as 'cooperative' and 'aggressive.' In the cooperative mode, English barristers are confined to their tables when they speak, dress in the same manner, and tend to resolve disagreements privately rather than make public objections. Jurors are imposed by the court rather than selected adversarially, and the defense does not present a counter opening statement. Judges take a more active role in ensuring that proceedings are civil and flow smoothly and then assist the jury by summarizing the evidence before deliberation. Research with mock jurors suggests that the more cooperative English trial procedures allow better recall of trial evidence and lead to a perception that the trial was more civil and fairer than American trials (Collett and Kovera, 2003). On the other hand, there is a greater risk of both nonverbal and verbal influence from the more powerful judge.

The Persuasive Context and Closing Arguments

Clearly, the central goal of trial lawyers is to persuade the jury and judge of their case. This persuasion process, then, occurs throughout the trial, either overtly or covertly. In opening statements, counsel persuade in part through their construction of narrative. In witness examination, they exploit the asymmetrical speaking rights and clear power differential to put across their case to the jury fairly covertly. This is

achieved both through the strategic use of questions and through a wide range of other pragmatic strategies designed to enhance or diminish the credibility of the witness ('person targeted') or influence the perception of the targeted events themselves ('idea targeted') (Gibbons, 2003: 112). These include, among others, the strategic use of silence and interruption, presupposition in the question, reformulation of the witness's answer in a more negative light, and the use of address forms and personal pronouns to create solidarity or distance.

The closing argument, though, is the phase of the trial where the persuasion process is most overt and most adversarial. Although we are lacking clear empirical evidence of its effect on the jury, trial lawyers tend to attribute great importance to the speech and to see it as their main performance event in the trial (Walter, 1988). Here advocates recount the story of the trial as well as the story in the trial. As elsewhere in the trial, persuasion in closing arguments can occur at all linguistic levels, from subtle phonetic features, through lexical and grammatical choice, to higher levels of discourse organization.

Equally important in the persuasion process is the integration of the verbal and the visual. Advocacy manuals stress the importance of visual evidence during witness examination, in the form of realia, photographs, maps, and diagrams which illustrate and bring to life the witness's account. In one of the closing arguments of the O. J. Simpson criminal trial, the prosecutor famously constructed a jigsaw puzzle which made up a picture of the 'murderer.' Even without sophisticated visual aids, though, advocates can integrate the verbal and visual through metaphor. Defense lawyers often talk of the *picture* or *impression* created by the evidence. Cotterill (2003: 208–217) shows how the prosecution and defense in the O. J. trial both use the 'jigsaw puzzle' metaphor to argue their respective cases. While the jigsaw is visually effective, it does have the weakness that there are always missing pieces of evidence. Consequently, Marcia Clark attempts to persuade the jury that those pieces are peripheral to the central picture (Cotterill, 2003: 216–217):

> In order to get the picture, to know what a jigsaw puzzle is depicting, if you're missing a couple of pieces of the sky, you still have the picture. You know, for example, it shows a house and, you know, and a dog and a kid in the yard and that sort of thing, you can see the picture. You miss a couple of pieces of the sky sometimes, you do lose those pieces, no big deal. You've got the picture ... you've got all the necessary pieces of the puzzle ...

On the other hand, the defense note that 'the prosecution took a photograph or picture of O. J. Simpson first, then they took the pieces apart' (Cotterill, 2003: 218), essentially accusing the prosecution of finding the evidence to fit the picture.

The jury's impression of counsel, protagonists in the story of the trial, can be an important part of the persuasion process. Consequently, impression management is an important rhetorical strategy, as Hobbs (2003) shows in an analysis of a U.S. prosecutor's rebuttal argument (one delivered after the defense closing in some U.S. jurisdictions). However, it is wrong to think that trial lawyers focus solely on the narrative aspects of the trial in their closings. They also attempt to bridge the gap between storytelling and the legal categories to which the jury will have to fit the evidence. Indeed, there is some empirical evidence to suggest that 'legal-expository' closing arguments, in which legal elements are outlined along with the evidence that supports or fails to support those elements, might be more effective for both plaintiffs and defendants in civil jury trials than narratively organized closings (Spiecker and Worthington, 2003).

The Pedagogic Context and Summing-up

This last point suggests a context to jury trial which is generally overlooked: its pedagogic aspect. When jurors come to their task, they might have little understanding of the law, trial procedure, or the forensic sciences. If they are to perform their task well, they will have to learn a great deal in a short time. While examining counsel are expected to get across technical concepts as clearly as possible, judges appear to lack the same obligation to communicate legal concepts and procedures effectively. Jury instructions are infamous for their complex and often archaic legal language which, in many U.S. jurisdictions, has to be read out verbatim.

Even where judges are permitted some linguistic discretion, they will not always accommodate the lay participants. In a detailed study of the taking of guilty pleas, Philips (1998) distinguished two types of judges: 'procedure-oriented' and 'record-oriented.' While the former will tailor the plea-taking procedure to the perceived due process needs of the particular defendant, the latter are concerned to standardize that procedure so that they will not be overturned at appeal. The result is that defendants are less likely to understand their rights. Similarly, Heffer (2002) found that English judges, given a model of the burden and standard of proof instructions in relatively plain English, will either accommodate even more to lay language or will revert back to a more legal wording. The same phenomenon can be observed at an

institutional level: higher tribunals in many U.S. states appear to focus more on issues of standardization, while the English Court of Appeal is more apt to allow judges to tailor the jury instruction process to the needs of the lay jury.

The tension between legal standardization and effective communication can also be seen in the different approaches to the summing-up of evidence. Most U.S. state jurisdictions do not allow judges to review or comment on the evidence. This ensures consistency and eliminates the danger of judicial bias influencing the jury's decision, one of the main criticisms of the English summing-up (Robertshaw, 1998). On the other hand, jurors are given no help in the difficult task of applying the law to the evidence. In discussing a 'strong' Tasmanian rape case that led to a hung jury, Henning notes that:

> . . . in the foreign and weighty circumstances of a criminal trial, it can be easy for lay people with little experience of trials to misjudge or misestimate the significance of particular matters, to lose sight of the wood for the trees (Henning, 1999: 212–213).

He thus stresses the need to guide the jury to 'a proper evaluation of the evidence,' using organizational and rhetorical techniques appropriate to such guidance. Currently, when judges do make explicit comments on the evidence, they tend to hedge and disclaim to such an extent that it is often difficult to extract the evaluative point. The language of judicial comments is arguably unique, particularly in the way that judges disclaim their comments through the forms *you may think* and *it is a matter for you* (Heffer, 2005) and raises the question as to how such a unique form of discourse is received by jurors. However, in considering the possible effect of the linguistic strategies adopted by judges, it is impossible to separate that language from the nature of the evidence and the case. Where a case hinges on one officer's uncorroborated identification of the defendant, a comment on reliability, however hedged, is likely to be influential:

> I am certainly not going to suggest to you that because Constable Bowles is an experienced policeman that he is any more reliable than you or I or anybody else necessarily in identifying people. That would be a big mistake. What I do suggest is this. That one should take into account the fact that this was not a chance meeting between people who did not expect to meet each other. He was wholly interested in that car. That is, as I say, the only reason why he was there. So, it is a matter for you, but you may think that that is something that may cause his identification to be the more reliable. However, as I say, that is entirely a matter for you to assess.

Here the explicit comment on reliability is preceded by a number of clear evaluations supporting that comment: 'experienced policeman,' 'not a chance meeting,' 'wholly interested,' 'the only reason.' It is doubtful, then, whether the heavy disclamation in the last two sentences makes the comment any less influential.

There is a fine line, then, between guiding a jury to a reasoned evaluation of the evidence and influencing them unfairly. Yet to pretend there is no responsibility for guidance is to ignore the real difficulty of the jury's task.

The Moral Context and Sentencing

While judges are constrained in the nature of their comments during the evidential phase and the summing-up, they are quite free to express moral judgment and epistemic certainty in the act of sentencing. In Early Modern trials, it was not uncommon for the prosecutor to produce extremely negative characterizations of the defendant, as in this outburst from the Lord Chief Justice in the trial of Lady Lisle (Helsinki Corpus of Historical Texts):

> LCJ: Thou art a strange, prevaricating, shuffling, sniveling, lying rascal.

Analyzed according to the systemic–functional framework of JUDGEMENT, a semantic resource 'for construing moral evaluations of behavior' (Martin, 2000), this one comment reveals a full range of negative evaluations of social esteem and sanction:

> LCJ: Thou art a **strange** [– normality], **prevaricating** [– reliability], **shuffling** [– reliability/capacity], **sniveling** [– capacity], **lying** [– veracity] **rascal** [– propriety].

However, evidentiary rules now prevent cross-examiners from being so blunt, with the result that legal-professional judgment of others' behavior is construed lexically only rarely during most stages of the trial (Heffer, 2005). The nearest equivalent to the above that can be found in a modern corpus of crossexaminations is a negative suggestion that the defendant is lying again:

> Q. It is a lie that you are just telling this jury today, is it not, another lie?

On the other hand, it is still common in the act of sentencing for the judge to spell out the full extent of a defendant's moral impropriety:

> Your record as far as sexual offenses are concerned is **quite appalling**. Indeed, in this case on the last occasion when you appeared in front of me, I said, and I still think and believe, that your conduct was verging on the **satanic**. In relation to counts 8, 9, and 10, the rape, buggery, and false imprisonment, you behaved **quite atrociously**. You are an **evil** man and you are a **wicked** man.

Such moral outbursts do in fact serve a legal purpose because severity of punishment is linked to the "relative moral wickedness of different offenders" (Hart, 1962: 37). It is the lexical inscription of extreme moral wickedness (*quite appalling* [sexual offenses record]; *satanic* [conduct]; [behaving] *quite atrociously*; *evil* [man]; *wicked* [man]), which justifies institutionally and socially the life sentence handed down to the convicted.

There is a danger, though, in expressing moral or epistemic certainty in this way. Solan notes the tendency of appeals court judges, mindful of the severe consequences to the parties that their decisions will have, "to issue pronouncements as though there were no alternative" (1993: 13). Just as such judges will make out that their decisions are based on inviolable legal principle, so some lower court judges will tend to suggest, once the verdict is in, that the evidence presented before the court was incontrovertible. In sentencing six suspected IRA terrorists of the murder of 21 people in two pub bombings in Birmingham, United Kingdom, in 1974, the judge pronounced "You stand convicted on each of twenty-one counts, *on the clearest and most overwhelming evidence I have ever heard*." Given that the convictions of the Birmingham Six were finally quashed in 1991 after it had been proven that the evidence against them had been very weak indeed, one has to ask whether the evidence in the original trial really appeared so 'overwhelming' or whether the judge felt compelled to justify an essentially unsafe verdict.

Conclusion

While the bulk of research on the language of jury trial has focused on the interactional dynamics of witness examination and the legal wording of jury instructions, this entry has attempted to show that the field encompasses much more than this, and that there are rich veins open for future research. The complex context of jury trial makes it a fascinating site for linguistic analysis, but research in this area also has clear applications for both improving legal professional communication and reforming the jury trial system.

See also: Jury Instructions; Witness Examination.

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Ilse Lehiste was born on January 31, 1922 in Tallinn, Estonia. The Baltic countries suffered heavily in World War II, undergoing multiple occupation: accordingly, her first postgraduate degree was undertaken in Germany. She received her Doctorate of Philosophy at the University of Hamburg in 1948, having specialized in English and Old Norse philology and writing on Old Norse sources in the works of William Morris. She lectured at that institution until 1949, when she emigrated to the USA.

Having conducted a large part of her professional life in Estonian, Russian, and German, the young Ilse then launched into lecturing in English: she became an associate professor of Germanic Philology at Kansas Wesleyan in 1950. In 1951, she moved to Michigan, where she worked as Associate Professor of Languages at Detroit Institute of Technology. Six years later, she made a smaller move to Ann Arbor, where she became a research associate and graduate student in the Communication Sciences Laboratory of the University of Michigan. She received her Ph.D. in Linguistics in 1959. While at Michigan, she worked with Gordon Peterson who was head of the laboratory, and several of her early publications were done in collaboration with him. Her history of experimental investigation of suprasegmental aspects of spoken language dates from this time, as revealed by publications in the early 1960s on the acoustic–phonetic realization of juncture, stress, accent, intonation, and quantity. These works set the tone of much subsequent phonetic research by herself and others.

In 1963, Lehiste was appointed as Associate Professor at the Ohio State University in Columbus, becoming a full professor two years later. Through her success in obtaining research grants, she improved the Ohio State phonetics laboratory and in the years following supervised the research of many graduate students, a number of whom are, in the early 1990s, active in phonetic teaching and research in the USA and elsewhere. Though research was (and is) her activity of choice, she did not ignore teaching, specializing in courses in acoustic and articulatory phonetics and historical linguistics. Two of her books, *Readings in Acoustic Phonetics* (1967) and *Principles and Methods for Historical Linguistics* (1979, with Robert Jeffers) reflect these interests.

Her work in acoustic phonetics, while wide-ranging, has centered around investigating the salience of suprasegmental cues in spoken language, especially temporal ones. (It is probably no coincidence that she is a native speaker of a language with three degrees of phonemic length in both consonants and vowels and with related phonotactic restrictions.) Several experiments have dealt with changes in temporal structure when a linguistic unit is used in higher-order constructions, for example what happens temporally to a stem morph when it is embedded in longer and longer words (*stick, sticky, stickier*); what are the temporal cues for word boundaries (*why choose* versus *white shoes*); and what are the phonetic cues for disambiguation of grammatical structure (*lighthouse keeper* versus *light housekeeper*). The interrelation of timing and fundamental frequency as cues has also been a consistent theme, as typified by her experiments with Serbo–Croatian short and long tones. Her search for temporal units of speech production has provided fuel for the lively debate on the role of syllables, feet, and morae in phonological theory. Despite her interest in speech production, the majority of her investigations have been in speech and language perception. Her emphasis on the acoustic aspects of speech is based on the theory that the salient articulatory properties of spoken language can be recovered from the acoustic signal.

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She is a member of over 20 learned societies and was president of the Linguistic Society of America in 1980. Her many honors include Honorary Doctorates from the University of Essex in 1977, from Lund University in 1982, and from Tartu University in 1989. She is a Fellow of the American Academy of Arts and Sciences.

Ilse Lehiste has, throughout her career, collected data in order to contribute to linguistic theory. Her interests lie not only in how speech is produced and perceived, but in what facts about speech can tell about the cognitive representation of language. Her attitude may be best deduced from a quotation from *Suprasegmentals*: 'A phonologist ignores phonetics at his own peril.'

In 1994, she won the Alumnae Athena Award from the University of Michigan; in 1998, she was elected as Foreign Member of the Finnish Academy of Science and Letters; and in 1999, she was awarded an Honorary Doctor of Humane Letters from Ohio State University. She was awarded the Order of the White Star, 3rd Class, by the Republic of Estonia in 2001; in 2002 she won the Medal for Scientific Achievement from the International Speech Communication Association; and in 2003 she won the Kay Elemetrics Award from the International Society of Phonetic Sciences. She gave the keynote address at the 2002 International Conference on Spoken Language Processing in Denver, Colorado; an invited paper at the 2004 International Conference: Speech Prosody, in Nara City, Japan (on 'Prosody in speech and singing'); and an invited paper at the 2004 International Symposium on Tonal Aspects of Languages in Beijing ('Bisyllabicity and tone').

See also: Experimental and Instrumental Phonetics: History; Phonetics, Acoustic; Phonetics, Articulatory; Prosodic Aspects of Speech and Language.

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Lehmann, Winfred Philipp (b. 1916)

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Winfred Philipp Lehmann was born on June 23, 1916, near Surprise, Nebraska, the son of a Lutheran minister. He spent his early childhood in a German-speaking community until 1919, when his family moved to an English-speaking parish. He attended Northwestern Academy High School in Wisconsin from 1928 to 1932, when he entered Northwestern College in Watertown, Wisconsin, where he studied liberal arts and comparative philology (B.A. 1936). Graduate studies in Germanic linguistics followed from 1937 to 1941 at the University of Wisconsin (Madison). There he studied with Einar Haugen, Roe-Merrill Heffner, Alexander Hohlfeld, Alfred Senn, and William Freeman Twaddell. He received his M.A. from the university in 1938 and his Ph.D. in 1941. In 1940, he married Ruth Preston Lehmann (née Miller), a professor of English at the University of Texas who specialized in Old English and Old Irish. She died in 2000.

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See also: Experimental and Instrumental Phonetics: History; Phonetics, Acoustic; Phonetics, Articulatory; Prosodic Aspects of Speech and Language.

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From 1942 to 1946, Lehmann served in the American Army Signal Corps. In 1943, he became instructor and officer-in-charge at the Japanese Language School in Arlington, Virginia. In 1946, he joined the German faculty at Washington University in St Louis, leaving in 1949 to take up an associate professorship in Germanic languages at the University of Texas (Austin). In 1952, Lehmann was promoted to full professor, and from 1966 until his retirement in 1986 he also served as professor of linguistics. An able administrator, he chaired the department of Germanic languages from 1957 to 1964, and in 1961 became the director of the Linguistics Research Center. He was appointed Ashbel Smith Professor of Germanic Languages from 1963 to 1983, chaired the linguistics department from 1966 to 1972, and was Temple Centennial Professor in the Humanities from 1983 to 1986. He was well known for his good teaching, and his visiting professorships included the University of Marburg, Germany (1964); the University of Illinois, Urbana (Collitz Professor, 1968); and the State University of New York, Oswego (1976).

Lehmann has held numerous offices and received many honors. He was director of the Georgetown English Language Program in Ankara, Turkey (1955–1956); was named corresponding fellow of the Institute for German Language in Mannheim (1969); and in 1975 was made a member of the Royal Danish Academy of Sciences. In 1974, he served as chair of the linguistic delegation, and in 1981 as cochair of the Commission on Humanities and Social Sciences, to the People's Republic of China. From 1974 to 1978, Lehmann acted as chairman of the board of trustees for the Center for Applied Linguistics in Washington, DC. From 1979 to 1986, he acted as a member of the Advisory Board of the Guggenheim Memorial Foundation, and from 1972 to 1986 as secretary of the board of directors of the American Council of Learned Societies. He has held numerous fellowships, including a Fulbright (1950–1951) to Norway and a Guggenheim (1972–1973). He is a fellow of the American Association for the Advancement of Science (since 1963); received the Brothers-Grimm-Prize (Marburg 1974); holds honorary doctorates from the State University of New York, Binghamton (1985), and from the University of Wisconsin (1995); and in 1987 was awarded the Order of Merit (Commander's Cross) of the Federal Republic of Germany and the *Pro bene meritis* Award at the University of Texas.

Lehmann is a member of numerous scholarly societies, among them the Linguistics Society of America (president, 1973), Modern Language Association (president, 1987), South-Central Modern Language Association (president, 1982), Association for Computational Linguistics (president, 1964), and Linguistic Association of the Southwest (president, 1975).

His research interests center around Indo–European linguistics – particularly reconstruction, as well as the phonology and syntax of Proto-Indo-European. Originally trained in structural linguistics, Lehmann has broadened his interests to include general linguistics and the history and development of American linguistics. In the historical Germanic field, he traced the development of the Germanic verse form and investigated Gothic etymology (with H.-J. J. Hewitt, 1986) and Middle High German vocabulary (especially Walther von der Vogelweide, with R.-M. Heffner, 1940). Together with his wife Ruth Lehmann, he authored an introduction to Old Irish and to Biblical Hebrew (with E. Raizen and H.-J. J. Hewitt, 1999). Lehmann has also done a great deal to further the teaching of German in the English-speaking world, including contributing to a widely used textbook for beginning German (with H. Rehder and G. Schulz-Behrend, 1962). He has published in English, German, and Russian.

Lehmann's numerous publications include *Historical linguistics* (1962), *Descriptive linguistics* (1972), *Theoretical bases of Indo-European linguistics* (1993), *Pre-Indo-European* (2002), as well as many edited collections, essays, and reviews in scholarly journals. He was honored by *Festschriften* in 1977, 1992, and 1999. His biographies appear in *Who's Who in the World*, *Who's Who in America*, *Who's Who in Science and Engineering*, *Who's Who in American Education*, *Who is Who in the South and Southwest*, *Wer ist Was in der Sprachwissenschaft*, and *Internationales Germanistenlexikon (1800–1950)*.

See also: Haugen, Einar (1906–1994); Logic and Language: Philosophical Aspects; Origin of Language Debate.

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Leibniz, Gottfried Wilhelm (1646–1716)

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Gottfried Wilhelm Leibniz (**Figure 1**) was a German philosopher (the designer of one of the great systems of philosophy), mathematician (co-inventor, independently of Isaac Newton, of differential and integral calculus), logician, scientist, diplomat, librarian, lawyer, historian, and linguist. He is often described as the last universal genius: a thinker whose range extended to all that was known in his day.

He was born in Leipzig, Germany, on June 1, 1646, of Slavic descent, the son of Frederick Leibniz, a jurisconsult and professor of moral philosophy at the University of Leipzig, and of Catherine Schmuck, the daughter of a doctor and professor of law. In 1600, the emperor Rodolf conferred on his great-uncle, a fighting captain in Hungary, a title of nobility and the arms Leibniz bore. His father died before he was 6 years old, and his mother took care of his education. By the time he was 12, he had taught himself to read Latin easily, and had begun Greek with the great library he had inherited from his father. Intellectually precocious, he entered the University of Leipzig at the age of 15 as a law student, obtaining his baccalaureate in 1663. Before he was 20, he had mastered the ordinary textbooks on mathematics, philosophy, theology, and law. In 1666, the University of Leipzig declined to confer the degree of doctor of law upon him, because of his youth, and he went instead to the University of Altdorf (near Nuremberg), where his dissertation gained him not only the doctorate, but the offer of a professorship. An essay written on the study of law was dedicated to the Elector of Mainz, and led to his appointment by the elector, from which he was subsequently promoted to the diplomatic service.

Figure 1 Gottfried Wilhelm Leibniz.

In the latter capacity, Leibniz drew up a scheme proposing to offer German cooperation. In 1672, Leibnitz went to Paris on the invitation of the French government to explain the details of the scheme, but nothing came of it. At Paris (until 1676), he met the French philosophers Malebranche and Arnauld and studied Pascal's mathematical works; he also met the astronomer and mathematician Huygens and their conversation led Leibnitz to study geometry, which he described as opening a new world to him, although he had already written tracts on various minor points in mathematics, the most important being a paper on combinations written in 1668, and built a working model of an arithmetical calculating machine (the basis of his election to the Royal Society in 1673). This was the first mechanical calculator capable of multiplication and division (improving Pascal's first calculating machine, capable of addition and subtraction). He also developed the modern form of the binary numeral system used in the digital computer.

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Along with Newton, Leibniz is credited with inventing infinitesimal calculus in the 1670s (a mathematical foundation of modern science and engineering) and is given particular credit for his development of the integral and the product rule. Although there is some question of original authorship, at the end of the 18th century, the prevalent opinion – except the French philosopher Fontenelle – was against Leibnitz. Based on his many published and unpublished papers, today the majority of writers tend to think it more likely that the inventions were independent. He introduced several notations used in calculus to this day, for instance the integral sign representing an elongated *S* from the Latin word *summa* and the *d* used for differentials from the Latin word *differentia*. Leibniz is also credited with the term 'function' (1694), which he used to describe a quantity related to a curve; such as a curve's slope or a specific point of said curve.

In 1673, the Elector of Mainz died, and Leibnitz entered the service of the Brunswick family. In 1676 he again visited London, and then moved to Hannover, where, until his death, he occupied the well-paid post of librarian in the ducal library. His memoranda on the various political, historical, and theological questions concerning the Hanoverian family and dynasty of 40 years (1673–1713) form a valuable contribution to the history of that time.

He was fascinated by the application of technology to the solution of both practical and theoretical problems, the method he used to work on the hydraulic press, windmills, lamps, submarines, clocks, carriages, water pumps, and so on. As a physicist, he made advances in mechanics, specifically the theory of momentum.

He also made contributions to linguistics, history, esthetics, and political theory.

He dedicated much of his work to the systematic organization of existing knowledge across the disciplines: he worked to establish major libraries and organize scientific societies (in Berlin and Vienna). In 1700, the German Academy of Sciences of Berlin was created on his advice, and he drew up the first body of statutes for it; he was also named foreign member of the French Academy of Sciences in Paris. In 1714, on George I's ascension to the throne of England, Leibniz was thrown aside; he was forbidden to come to England, and the last 2 years of his life were spent in neglect. He died on November 14, 1716, in Hannover. His contributions on a vast array of subjects are found scattered in obscure journals, in hundreds of correspondences (with the leading intellectual and political figures of his era), and in a huge collection of unpublished manuscripts, the majority of which are preserved in the Lower Saxony State Library in Hannover.

Leibniz occupies at least as large a place in the history of philosophy as he does in the history of mathematics. Throughout his life, he hoped that his work on philosophy (as well as his work as a diplomat) would form the basis of a theology capable of reuniting the Church, divided since the Reformation in the 16th Century. Similarly, he was willing to engage with, and borrow ideas from, the materialists as well as the Cartesians, the Aristotelians as well as the most modern scientists. Leibniz is known among philosophers for his wide range of thought on fundamental philosophical ideas and principles, including truth, necessary and contingent truths, possible worlds, the principle of sufficient reason (i.e., that nothing occurs without a reason), the principle of pre-established harmony (i.e., that God constructed the universe in such a way that corresponding mental and physical events occur simultaneously), and the principle of noncontradiction (i.e., that any proposition from which a contradiction can be derived is false). Leibniz's view that ours is the best of all possible worlds has been vigorously debated. Voltaire, after being attracted in *Zadig*, parodied Leibniz's solution in his other famous novel *Candide*.

His philosophical contribution to metaphysics is based on the *Monadologia*, which introduces 'monads' as 'substantial forms of being,' which are akin to spiritual atoms, eternal, indecomposable, individual, following their own laws, not interacting ('windowless') but each reflecting the whole universe in pre-established harmony. The notion of a monad solves the problem of the interaction of mind and matter that arises in Descartes' system, as well as the individuation that seems problematic in Spinoza's system, which represents individual creatures as mere accidental modifications of the one and only substance. During this period in philosophy, innate ideas tended to be opposed to the thorough-going empiricism of Locke. Like Descartes before him – and for many of the same reasons – Leibniz found it necessary to posit the existence of innate ideas. Leibniz's most extensive discussion of innate ideas, not surprisingly, is in the *Nouveaux essais sur l'entendement humain* (1705), the most important source for Leibniz's philosophy of language, a polemical writing directed against Locke's *An essay concerning human understanding*. Now, at the metaphysical level, since monads have no 'windows,' it must be the case that all ideas are innate. That is to say, an idea in every monad/soul is just another property of that

monad, which happens according to an entirely internal explanation represented by the complete concept. But at the phenomenal level, it is certainly the case that many ideas are represented as arriving through my senses. In general, at least any relation in space or time will appear in this way. For Leibniz, the location of an object is not a property of an independent space, but a property of the located object itself – and also of every other object relative to it. It is also worth pointing out that Leibniz (and after him Kant) continued a long tradition of philosophizing about space and time from the point of view of space – as if the two were always in a strict analogy. Space and time are not in themselves real, are not substances, are ideal. Space and time are just ways (metaphysically illegitimate ways) of perceiving certain virtual relations between substances. They are 'phenomena.'

On comparative philology and linguistics, Leibniz's inquiries into the origin and the development of languages were connected with his interest in the history of the peoples and nations of Europe. He held that an original language could not be found among the languages that were known (the only exception being Chinese) and proposed etymological principles, so that they would be used in historical linguistics, and criticized what he considered to be etymologically unsound reasoning.

Leibniz had a lifelong interest in and pursuit of the idea that the principles of reasoning could be reduced to a formal symbolic system, an algebra or calculus of thought, in which controversy would be settled by calculations.

In Leibniz's time, several proposals for the construction of an artificial 'universal language' existed. Two goals to be achieved by putting such a language into practice were first to overcome language barriers, and second to have a language that was more efficient and easier to learn than existing ones. Furthermore, these artificial languages were meant to incorporate an accurate representation of knowledge, so that learning the language would entail acquiring knowledge of the world of nature. Before putting forward his project for a *Characteristica Universalis*, Leibniz had studied both Dalgarno's and Wilkins's work very carefully. Although he rightly emphasized that the language he envisaged differed fundamentally from the languages constructed by his English precursors, he made use of their work in executing his own plans. He took the Aristotelian categories as a starting point just as Dalgarno and Wilkins had done, but he proposed a thorough revision of this theory, giving more prominence to combinatorial principles than to classificatory ones. Like the other proposals, its starting point was to be an analysis of concepts, backing up the nominal definitions of the signs of the language. His innovation was that the concepts would be coded as numbers. Reasoning could then be reduced to *Calculus Ratiocinator* (numerical calculation). Leibniz's rational grammar project, which was aimed at explicating the semantics of natural language expressions so as to determine their logical structure, deserves to be further explored. Some scholars now suggest that Leibniz should be regarded as one of the first thinkers to envision something like the idea of artificial intelligence. It is clear that Leibniz, like contemporary cognitive scientists, saw an intimate connection between the form and content of language and the operations of the mind. He believed that such a language would perfectly mirror the processes of intelligible human reasoning. This view of Leibniz's led him to formulate a plan for a universal language, an artificial language composed of symbols, which would stand for concepts or ideas, and logical rules for their valid manipulation. Leibniz's writings about this project (which, it should be noted, he never got the chance to actualize) reveal significant insights into his understanding of the nature of human reasoning. This understanding, it turns out, is not that different from contemporary conceptions of the mind, as many of his discussions bear considerable relevance to discussions in the cognitive sciences.

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Lejeune, Michel (1907–2000)

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Michel Lejeune, born in Paris in 1907, was educated in Classics in the École Normale Supérieure, and soon joined the seminars of Joseph-Jean-Baptiste-Marie Vendryes and other comparativists in the École Pratique des Hautes Études. Received as *agrégé de grammaire*, he later became a lecturer in Greek and Latin philology at Poitiers University, and then a professor at Bordeaux University (from 1937 on), where he was later chosen as the dean of the faculty of arts. Elected as *directeur d'études* in the École Pratique des Hautes Études (in Indo-European Comparative Grammar), he came back to Paris. He acted as the director for Human Sciences in the C.N.R.S. (French Research Foundation) from 1955 to 1963. He entered the Académie des Inscriptions et Belles-Lettres in 1963. Leader of the French comparativists, he left a prolific and important amount of studies (some 20 books and 300 articles).

His scientific interests ranged from ancient Greek and Mycenean to Celtiberian, from Etruscan to Phrygian, with a clear preference for Italic and ancient Celtic dialects. Attracted by the epigraphical difficulties, he was led to edit texts in minor Indo-European dialects, which had been previously discarded as undecipherable or unusable for comparative purposes. His work brought to light some Indo-European dialects, which were previously misunderstood, either in their phonetic composition or in their dialectal affinities, such as Lepontic and Venetic.

His first publications dealt with ancient Greek dialects: as a thesis, he wrote a linguistic analysis of Delphic manumission texts. His teaching of Greek led him to publish a small handbook on Greek accentuation, and then an important phonetic history of Greek, with both comparative and dialectal analysis (1947; a revised edition, incorporating Mycenean sources, was published in 1972). Associated with the discoveries of Ventris and Chadwick from the start, he made a substantial contribution to the progress of Mycenean studies, with more than 50 articles (reprinted in *Mémoires de philologie mycénienne*, 3 vols, 1958–1973). This type of study, associating epigraphy and linguistics, appealed very much to his analytical mind: facts had to be carefully and rationally identified, through methodical classification and comparison; but also new facts were available that could invalidate established theories.

He applied the same careful method to other epigraphies: Celtiberian, on which he published a monograph in 1956, Lepontic and Cisalpine Gaulish (1971), Venetic (1974), Gallo-Greek (1985) etc. A linguistic problem he frequently dealt with was anthroponymy: a precise classification of names can result in important information on family structures. For the sake of clarity he invented such terms as 'idionyms' (for simple individual names) and 'gamonyms' (the reference to the spouse, in Venetic).

His conception of epigraphical study included a thorough understanding of the script, as well as a clear analysis of the linguistic data. All his epigraphical studies provide an important contribution to the history of writing. Reused alphabets, and particularly the use of the Greek alphabet for non-Greek languages, were a constant interest in his scientific research: these offered him the opportunity of a new phonological analysis, searching for the analysis made by the inventors of these alphabets. He published important epigraphic corpora for three of these languages, Phrygian, South Oscan (Osco-Greek), and South Gaulish (Gallo-Greek).

See also: Greek, Ancient.

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Lenneberg, Eric H. (1921–1975)

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Eric Heinz Lenneberg (Figure 1) was born in 1921 in Düsseldorf, Germany. His father was a physician. He moved to Brazil in 1933, when Hitler came to power, where he stayed until 1945, before settling in the United States. He graduated from Harvard in 1955 (in psychology and language) before turning to neurology during his postgraduate years as a fellow of the Russell Sage Foundation. His career can be divided into three periods: from 1953 to 1960–1962, his interest was directed toward the linguistic categorization of color and its cognitive consequences. From 1962 to 1965, he turned to the study of language acquisition. After this date, he scaled up the scope of his investigations and embarked on the more ambitious project of describing the biological determinants of language. Most of Lenneberg's ideas are compiled in the groundbreaking book he published in 1967, his *Biological foundations of language*. His academic career was spent at Cornell University. He died in New York in 1975.

One of Lenneberg's initial motivations was the desire to test empirically the Sapir-Whorf hypothesis of a correspondence (or even a causal dependence) between linguistic structures and cognitive representations. In collaboration with Roger Brown, he chose a domain that he believed to be amenable to experimentation: colors. A number of experiments on color categorization were conducted, showing that recognition of a color was positively related to an index called *codability*, which in fact measured the degree to which subjects agreed in naming a given color. At the time, his nominalist inclinations were witnessed by the fact that he neglected the influence of perceptual discriminability, thus attributing to codability the bulk of the facilitation effect. He was also preoccupied with intercultural comparison, and, in collaboration with the anthropologist John Milton Roberts, he extended his research on colors to Zuni classification (the Zunis are an Indian tribe on the New Mexico-Arizona border). As for English-speaking subjects, recognition was found to be correlated with linguistic discriminations. The stability of colors perceived as focal across subjects and cultures (which was also observed by Eleanor Heider-Rosch during the time of Lenneberg) led him, among other arguments, to adopt a perspective which he described as *Neo-Kantian*. In this perspective, concepts (including linguistic concepts) reflect the structure that orders "impinging physical stimuli in a predetermined and species-specific way" (Lenneberg, 1962: 105). This move was in line with the nativist ideas on language that he was to propose shortly after. Lenneberg's experiments, with their emphasis on terms referring to perceptual qualities, set the agenda for much subsequent work on the linguistic relativity of cognitive representations (Lucy, 1992).

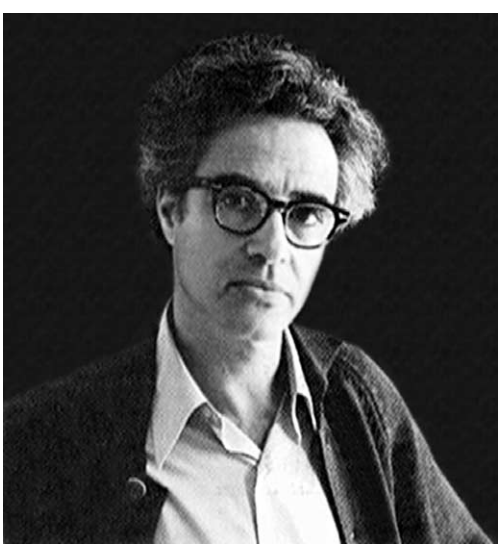

Figure 1 Eric Heinz Lenneberg (1921–1975).

His work at the Children's Hospital Medical Center in Boston gave Lenneberg the opportunity to explore another facet of the relation between biology and language, namely the relation of language development to cerebral maturation. His observations led him to the conclusion that the compelling force that drives language acquisition is internal and biological; a minimal exposure is needed, of course, and this exposure must occur before a critical age, between 2 and the early teens. This conclusion, for which he argues at length in his main opus of 1967, is widely known today as the Critical Period Hypothesis. Lenneberg's arguments are based on the pattern of recovery from aphasic disturbances or sudden deafness in children. They also rest on the fact that hearing children born to deaf parents do not even suffer a delay in the course of language development, provided they have been minimally exposed to language before this critical age. Particularly striking for Lenneberg was the fact that the maturation of the brain reaches an asymptote concomitantly with this critical age. However, he was cautious not to postulate a direct causal relationship between the maturation of the brain and the course of language development. He merely suggested that the maturation of the brain would set limits on what can be learned.

As for the cerebral localization of speech functions, Lenneberg's stance seems to be that of a skeptic with holistic proclivities. Obviously, he was much impressed by the observations of Penfield and Roberts, who were initiating the technique of electrostimulation to map the language areas of the brain. Penfield and Roberts had shown the point-like, disseminated character of the areas where electrical stimulation interferes with speech. Such results led Lenneberg to reject any strict localization of language, beyond a left–right asymmetry and an anterior–posterior polarization, respectively, of motor and sensory aspects of language.

In his 1967 book, Lenneberg also reiterates Lashley's arguments for the need of central regulatory mechanisms involved in the coordination of complex movements. In particular, Lenneberg shows that sequential association of nervous signals can in no way account for the production of speech (which parallels Chomsky's contemporary attack on sequential models of grammar). Although speech production is centrally regulated, Lenneberg also claims that it must adjust to a fixed rhythmic pattern providing temporal slots for the sequencing of phonemes. This last point appears quite important: in the eyes of Lenneberg, the specificity of language resides to a certain extent in its timing mechanisms.

Lenneberg's ideas are often considered to be supportive of the Chomskyan language organ, or language acquisition device. It is unclear whether Lenneberg regarded language as a very specialized skill with a specific substrate. But it can be said that language was for him a species-specific capacity, whose development was internally driven, given a minimal amount of exposure. In this respect, he does offer support for the language organ hypothesis.

See also: Aphasia Syndromes; Chomsky, Noam (b. 1928); Whorf, Benjamin Lee (1897–1941).

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Leont'ev, Aleksei Alekseevich (1936–2004)

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Aleksei Alekseevich Leont'ev (also spelled Leontiev and Leontyev) was born on January 14, 1936, in Moscow, and died in Moscow on August 12, 2004. He received a Ph.D. in linguistics in 1968 and in psychology in 1975. He was a winner of the Lomonosov Prize, a member of the Russian Academy of Education (1992), an honorary president of the L. S. Vygotsky Psycholinguistic Society (from 1991), a professor in the psychology department at M.V. Lomonosov Moscow State University (from 1998), an author and a supervisor of the educational program 'Shkola 2100' (from 1996), and a member of many councils and editorial boards of international and Russian journals.

After graduating from M. V. Lomonosov Moscow State University with a B.A. in German language (1958), Leont'ev worked in the Linguistic Institute of the Academy of Science USSR, where he conducted research in linguistics (his dissertations were entitled ('General linguistic views of I. A. Baudouin de Courtenay') and ('The theoretical problems of the speech act psycholinguistic modeling') and later in psychology ('The psychology of speech')). Leont'ev's areas of interest were general psychology, the psychology of speech, psycholinguistics, methods of teaching native and foreign languages, general linguistics, the history of linguistics, ethnography, and poetics.

Leont'ev was the son of the famous Russian psychologist A. N. Leont'ev, who was a student of L. S. Vygotsky. Leont'ev continued his father's research in psychology and became one of the founders of the Russian psychological school, which was based on the theoretical works of L. S. Vygotsky, A. N. Leont'ev, A. R. Lurija, and the linguistic tradition developed by L. V. Shcherba. Leont'ev was opposed to the Behaviorist theory and considered speech not to be a passive succession of vocal reactions, but a dynamic and purposeful vocal activity. He stressed the active nature of speech processes and pointed out that speech was strongly conditioned by social factors.

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Leont'ev is the author of some 600 publications, which have both theoretical and practical value. His works have been translated into 30 different languages. His research was notable for using information from different fields of the humanities and applying this knowledge to other areas (for example, his work 'Rech v kriminalistike i sudebnoi psixologii' (Leont'ev *et al.*, 1977). Leont'ev gave the first detailed description of the Papuan languages and Tok Pisin in Russian linguistics. He was also the first publisher of many works written by I. A. Baudouin de Courtenay, E. D. Polivanov, L. P. Jakubinsky, L. S. Vygotsky, and A. N. Leont'ev.

See also: Psycholinguistics: Overview.

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Lepsius, Carl Richard (1810–1884)

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Karl Richard Lepsius, also known as Richard Lepsius, was born on December 23, 1810, in Naumburg, Thuringia, and died on July 10, 1884, in Berlin. His parents were Carl Peter Lepsius and Friederike Gläser. Lepsius was to distinguish himself as both a philologist and an archaeologist, and in that sense he followed in the footsteps of his father, a financial procurer who had founded the Thuringia-Saxon Archaeological Society. Lepsius demonstrated linguistic talent as early as *Gymnasium*, where he wrote a class theme on the significance of Sanskrit to comparative philology. He went to university in Leipzig, Göttingen, and Berlin, where he continued to study philology and archaeology, subjects that he considered so closely related that he had difficulty choosing which to pursue. In Göttingen Lepsius became acquainted with philologist and folklorist Jacob Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**) and his brother Wilhelm, while in Berlin he worked with comparative philologist Franz Bopp (*see* **Bopp, Franz (1791–1867)**) and theologian Friedrich Schleiermacher. From Berlin Lepsius proceeded to Paris, where he studied the works of Jean-François Champollion, the first scholar to decipher the Rosetta stone (*see* **Champollion, Jean-Francois (1790–1832)**). Lepsius researched hieroglyphics, too, and in 1837 demonstrated that the letters of its pictographic alphabet were polysyllabic. While Lepsius was an expert philologist, he was also an historian and Egyptologist, and he became professor of Egyptology in Berlin in 1842. From Berlin Lepsius led an archaeological expedition to Nubia and

He researched different problems in communication, and for the first time in Russian psychology presented a monographic work ('Psixologiia obshcheniia') devoted to the psychological theory of speech (1974). He also worked on problems of speech influence in commercials and newspapers in the former USSR. Leont'ev was interested in associative experiments and published one of the first dictionaries of associative norms in a language (1977). Leont'ev was concerned with problems of language planning, education, and teaching Russian as a foreign language. He was one of the founders and a leader of the group that created the interregional public organization that helped develop and introduce a new educational program, 'Shkola 2100,' in Russia and parts of the former Soviet Union in 1999. This program is primarily concerned with the work of kindergartens and middle schools and is expected to run for 10 years (till 2010).

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See also: Psycholinguistics: Overview.

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Lepsius, Carl Richard (1810–1884)

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Karl Richard Lepsius, also known as Richard Lepsius, was born on December 23, 1810, in Naumburg, Thuringia, and died on July 10, 1884, in Berlin. His parents were Carl Peter Lepsius and Friederike Gläser. Lepsius was to distinguish himself as both a philologist and an archaeologist, and in that sense he followed in the footsteps of his father, a financial procurer who had founded the Thuringia-Saxon Archaeological Society. Lepsius demonstrated linguistic talent as early as *Gymnasium*, where he wrote a class theme on the significance of Sanskrit to comparative philology. He went to university in Leipzig, Göttingen, and Berlin, where he continued to study philology and archaeology, subjects that he considered so closely related that he had difficulty choosing which to pursue. In Göttingen Lepsius became acquainted with philologist and folklorist Jacob Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**) and his brother Wilhelm, while in Berlin he worked with comparative philologist Franz Bopp (*see* **Bopp, Franz (1791–1867)**) and theologian Friedrich Schleiermacher. From Berlin Lepsius proceeded to Paris, where he studied the works of Jean-François Champollion, the first scholar to decipher the Rosetta stone (*see* **Champollion, Jean-Francois (1790–1832)**). Lepsius researched hieroglyphics, too, and in 1837 demonstrated that the letters of its pictographic alphabet were polysyllabic. While Lepsius was an expert philologist, he was also an historian and Egyptologist, and he became professor of Egyptology in Berlin in 1842. From Berlin Lepsius led an archaeological expedition to Nubia and

Egypt that was funded by the Prussian state. Much of Lepsius's expedition was devoted to transcribing and interpreting Egyptian inscriptions. He wrote up and published the results of the expedition in the 12-volume *Denkmäler aus Ägypten und Äthiopien* (Lepsius, 1849–1856). Lepsius also brought myriad objects back for Berlin's Archaeological Museum, where he became curator and director in 1855.

At the request of the Church Missionary Society in London, Lepsius compiled a standard phonetic alphabet for linguistic transcription in 1855 (Lepsius, 1855, 1863). He transcribed 120 languages using the system he had developed, which became a fundamental tool for missionaries throughout Africa and beyond. Scholars such as Bantu expert Carl Meinhof applied his system to their work, as did missionaries such as Johannes Raum when he transcribed the East African Chagga language (Meinhof, 1899, 1910; Raum, 1909) (*see* **Meinhof, Carl Friedrich Michael (1857–1944)**). In 1864, Rhenish Society Missionary director Friedrich Fabri commented that his Society was consulting with Lepsius about the transcription of Southwest African languages (Fabri, letter to the British and Foreign Bible Society, Archives of the British and Foreign Bible Society, July 1864); and in 1867, J. L. Krapf went further, saying that most missionaries, Protestant and Catholic alike, were using Lepsius's orthography in their translations (Krapf, letter to the British and Foreign Bible Society, Archives of the British and Foreign Bible Society, April 1867). Later linguists and ethnologists deemed the system impractical, and it was ultimately superseded by the orthography that Diedrich Westermann and Ida Ward developed in the 1930s (Westermann and Ward, 1933; Mackert, 1999) (*see* **Westermann, Diedrich Hermann (1875–1956)**).

Late in his career, Lepsius published a book on Nubian grammar, which included an introduction about the people and languages of Africa (Lepsius, 1880). In this grammar, Lepsius attempted to classify the people and languages of the continent, and argued that the languages of Nubia were formed from a mixture of Bantu and Hamitic languages. Unlike Carl Meinhof, who stressed the primacy of light-skinned, culturally superior 'Hamites' from Europe or central Asia in the shaping of African languages, Lepsius declared that the oldest languages in Africa were first spoken by peoples living south of the equator. Like Meinhof, however, Lepsius believed that grammatical characteristics were more reliable for purposes of classification than were lexical ones, as grammatical features tended to remain more constant (Jungraithmayr, 1983).

Lepsius maintained missionary connections throughout his life, and was a devout Protestant who, shortly before his death in 1884, translated the Gospel of Saint Mark into Nubian. He had originally translated this Gospel for his Nubian grammar, in which it was included (Lepsius, 1880).

See also: Africa as a Linguistic Area; Bopp, Franz (1791–1867); Champollion, Jean-Francois (1790–1832); Grimm, Jacob Ludwig Carl (1785–1863); Krapf, Johann Ludwig (1810–1881); Meinhof, Carl Friedrich Michael (1857–1944); Sanskrit; Westermann, Diedrich Hermann (1875–1956).

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Leskien, August (1840–1916)

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August Leskien was born on July 8, 1840 in Kiel, a city in the northern part of Germany. He completed high school in 1860 and began university studies in his home town with the classical scholar Georg Curtius (*see* **Curtius, Georg (1820–1885)**). When Curtius left for Leipzig in 1862, Leskien went along. Apart from classical philology, he specialized in comparative philology. While still a student, he traveled to eastern European countries, where he became fascinated with southern Slavic languages. During semester breaks, he acquainted himself with Lower Sorbian by regularly visiting farmers in Spreewald in the Brandenburg province. In 1864, he obtained his doctorate and also passed the *Staatsexamen,* thus qualifying for teaching high school. For two years he taught Latin and Greek at the Thomas-Schule in Leipzig until, in 1866, he went to Jena to continue his academic studies under August Schleicher (*see* **Schleicher, August (1821–1868)**), with special emphasis on Baltic and Slavic languages. He received his final degree, *venia legendi* or habilitation, the formal initiation into the profession of a university teacher, in the field of comparative philology from the University of Göttingen in 1867 with the thesis *Futur und Aorist bei Homer.* He taught at Göttingen for two years, then accepted an appointment as associate professor *(Extra-Ordinarius)* in Jena, where he succeeded Schleicher. A year later, in 1870, he transferred to Leipzig as *Extra-Ordinarius* for Slavic philology. He became full professor *(Ordinarius)* there in 1876. During the following years, he declined numerous invitations from other German universities and preferred to stay in Leipzig, where he died on September 20, 1916.

Leskien occupied a special place in the Neogrammarian movement, which emerged around 1875. Directly or indirectly, he exerted a decisive influence on all principal participants in that he initiated the formation of the new philological methodology. When he published his *Declination im Slavisch-Litauischen und Germanischen* in 1876 (Leskien, 1876), he formally laid down the ground rules for what had already been practiced for quite some time by a large number of his friends and students: all historical language changes must either be reduced to the exceptionless operation of sound laws or be identified as the results of analogy. Leskien spoke for all Neogrammarians when he asserted that discarding the regularity principle would amount to admitting that language changes cannot be scientifically investigated at all.

Like all other Neogrammarians, Leskien was above all an extraordinarily productive scholar. At his time he was undisputed leader in his field of specialization, the Baltic–Slavic languages, and remained so for several generations, especially in the field of phonology. His work on syntax, amply documented as truly significant by his academic lectures held during the last years of his life, did not reach the stage of completion.

Leskien devoted most of his scholarly activities to the linguistic investigation of languages, but he was deeply interested also in all cultural aspects of language. His numerous publications on folk songs, fairy tales, and related literary topics, mostly dealing with Baltic and Slavic languages, were widely accepted as equal in quality to his linguistic works.

Leskien was quick in recognizing and acknowledging great talent in his own country as well as elsewhere. His speedy translation of William Dwight Whitney's (*see* **Whitney, William Dwight (1827–1894)**) *Life and growth of language* into German, only one year after its English original had appeared in 1875, is just one of many possible illustrations (Leskien, 1876).

Leskien's widely acknowledged achievements left their imprint not only on Baltic and Slavic studies, but also on historical and comparative linguistics in general. His works remain stimulating, and in some respects, indispensable.

See also: Balto-Slavic Languages; Curtius, Georg (1820–1885); Neogrammarians; Schleicher, August (1821–1868); Whitney, William Dwight (1827–1894).

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Lesotho: Language Situation

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Lesotho, located in southern Africa, is completely surrounded by South Africa. The country covers an area of 30 355 km^2 and has a population of 1.8 million, based on 2003 United Nation estimates. Sesotho (or Southern Sotho) is the major language spoken in Lesotho; according to the *Ethnologue* (Grimes, 2003), the number of speakers is estimated to be 1.49 million people, which is approximately 85% of the population. This makes up about 37.5% of the total Sesotho-speaking population of southern Africa. Sesotho-speaking peoples have been in southern Africa since around 1400, after moving to this area from central parts of the continent. The Basotho nation emerged from the merger of a number of small Southern Sotho-speaking clans that King Moshoeshoe moved into the highlands of central South Africa at the beginning of the 19th century. Sesotho was the language of the Basotho people even before they settled in the region that is the current Lesotho, because the fleeing Nguni people that merged into the Basotho society were required to learn Sesotho. Sesotho was also the only official language of Lesotho up until its annexation by the British in 1868, at which time English was given official status. With independence in 1966, both Sesotho and English were made official languages by legislation. Today, Sesotho, with the majority of speakers, remains the national and official first language, with English as the official second language.

Despite being the official second language, English is quite prominent as the language of government, commerce, education, and the judicial system. In education, Sesotho is used as a medium of instruction from the ages of 6 to 9 years, after which it is taught as a subject in secondary school and may also be studied at the national university. Sesotho is also one of the earliest written African languages, with the first texts by French missionaries dating back to 1833. As a result, it currently boasts an extensive literature.

In addition to Sesotho and English, a few Nguni languages, particularly Zulu and Xhosa, are also spoken. This is not surprising, since apart from a large Southern Sotho-speaking area to the west and north of Lesotho, there are Zulu- and Xhosa-speaking peoples of South Africa to the east and south, respectively. Afrikaans is also spoken to some extent, in addition to various Indian and European languages.

Sesotho is classified in the Niger-Congo Bantu language phylum and is part of Guthrie's (1948) Zone S languages. Sesotho has some affinities with Tswana and Northern Sotho, which are spoken further north of Lesotho, although it must be noted that despite what the nomenclature may suggest, Northern Sotho (also called Sepedi) is linguistically closer to Tswana than it is to Sesotho (Southern Sotho).

See also: Bantu Languages; Niger-Congo Languages; South Africa: Language Situation; Southern Bantu Languages.

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See also: Bantu Languages; Niger-Congo Languages; South Africa: Language Situation; Southern Bantu Languages.

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Levels of Adequacy, Observational, Descriptive, Explanatory

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Background Assumptions

Chomsky's earliest work (1957, 1959) stated the logical problem of language acquisition, or the poverty of the stimulus argument: the idea that given finite linguistic input, the speaker acquires the potential for infinite linguistic output. Furthermore, imperfect input arising from performance errors does not result in imperfect knowledge. According to Chomsky, it follows that the principles of grammar are underdetermined by the input, or primary linguistic data (PLD), and therefore the speaker must bring some innate linguistic knowledge or competence to the process of language acquisition. The idea that linguistic knowledge arises from "drawing out what is innate in the mind" (Chomsky, 1965: 51) is known by philosophers as the rationalist view, and contrasts with the empiricist view, which holds that linguistic knowledge is constructed on the basis of experience and is independent of any specialized cognitive system. The empiricist view is evident, for example, in the usage-based model of language acquisition favoured in cognitive linguistics (Langacker, 2000).

The model of the initial state of the innate language faculty posited by Chomsky is known as Universal Grammar and assumes a modular model of mind (see Chomsky, 1986: 13, 1986: 150; Fodor, 1983, 2000), according to which the language faculty represents an encapsulated system of specialized knowledge that equips the child for the acquisition of language. In developing this mentalist theory of language, Chomsky asserted that the only revealing object of linguistic study, given the objective of characterizing competence, is the system of linguistic knowledge in the mind of the idealized individual speaker. This system of internalized linguistic knowledge is known as I-language (Chomsky, 1986: 19–56) and generates the expressions uttered by the speaker. The theory of this system is referred to as the grammar, hence the term 'generative grammar.' From this perspective, the externalized language of the speech community (E-language) is merely epiphenomenal, in the sense that it arises as the output of individual I-languages. It is I-language that underlies the native speaker's intuitions concerning grammaticality. Central to this model is the grammatical transformation or displacement operation, which links two positions in a structure: the (thematic) position in which an expression is interpreted, and the position to which that expression has 'moved' in order to satisfy other grammatical requirements. For example, in (1), the fronted question word *who* is interpreted as the object of the verb *saw*; its thematic position is indicated by the underscore.

(1) Who did Lily say George saw_ yesterday?

Levels of Adequacy

Since Chomsky's early work (see, for example, 1965: 24–37), levels of adequacy have played a central role in the design of the generative model of language, which aims to characterize the linguistic knowledge or competence that underlies the individual speaker's I-language. According to Chomsky, an adequate theory of language must meet three criteria. The weakest of these criteria is observational adequacy, which is likely to be (at least partially) met by any grammar of any language. However, descriptive adequacy and explanatory adequacy are more stringent criteria that must be met by 'a genuine theory of human language' (Chomsky, 2000: 7). The three levels of adequacy can be summarized as follows.

Observational adequacy: The grammar of a particular language specifies which sentences are and are not well formed in that language. A grammar that is observationally adequate might contain statements such as 'This sentence is (un)grammatical in English' or 'These strings of words are sentences in English; these strings of words are not'. For example, an observationally adequate grammar of English would distinguish between (2a) and (2b), grammatical sentences, and (2c), an ungrammatical string.

(2a) Lily loves him
(2b) Lily loves herself
(2c) *Lily loves himself

Descriptive adequacy: The grammar of a particular language specifies which sentences are and are not well formed in that language *and* accounts for the speaker's intuitions concerning grammaticality by accurately modeling the tacit knowledge that underlies the (un)grammaticality of those strings and by describing their properties in terms of principles of language. A grammar that attains descriptive adequacy might contain statements such as 'This sentence is grammatical in English, and contains elements ABC, which stand in structural configurations PQR, and are governed by principles XYZ'. For example, a descriptively adequate grammar of English would account for the (un)grammaticality of the examples in (2) in terms of principles governing the distribution of pronouns like *him*, *himself*, and *herself* across the language as a whole. In Binding Theory (Chomsky,

1986: 164–184), these principles are stated in terms of coreference and locality. *Lily* can be coreferential with *herself*, since both expressions are third person, singular, and feminine; *Lily* is therefore a potential binder for *herself*, but not for *himself*, which explains why (2b) is grammatical while (2c) is not. Furthermore, reflexive pronouns like *herself* need to be bound locally: compare (2b) with (3a), where brackets indicate an embedded clause. In contrast, pronouns like *him* do not tolerate local binding. This explains why (2a) is grammatical (*Lily* cannot bind *him*), and why (3b) is only grammatical if *her* is not coreferential with *Lily*.

(3a) *Lily said [herself was hungry]
(3b) Lily loves her

Explanatory adequacy: The grammar provides a descriptively adequate account of each individual language *and* explains how knowledge of language is acquired via the interaction of the input (PLD) and the innate endowment (UG). A grammar that attains explanatory adequacy might contain statements such as 'This sentence is grammatical in English, and contains elements ABC, which stand in structural configurations PQR, and are governed by principles XYZ. These principles are represented as follows in UG and activated by exposure to PLD of the following kind...'. For example, an explanatorily adequate model of grammar would represent the binding principles described earlier in terms that are sufficiently general to account for the distribution of pronouns in all human languages, and sufficiently simple and economical to plausibly account for the acquisition of this knowledge on the part of the child, given exposure to everyday spoken language. In Binding Theory, the statement of principles capturing the distribution of both types of pronoun in (2) and (3) in terms of a single local binding domain represents an attempt to meet these objectives: while reflexive pronouns like *herself* must be bound within this domain, pronouns like *him* must not be bound within this domain.

Grammar of a Language versus a Theory of Language

As the previous section indicates, it is important to distinguish between a grammar of a particular language and a theory of human language (see Radford, 1988: 28–30). While the latter may be described as the ultimate objective of modern linguistic theory, it cannot be achieved in isolation from the former. In other words, a theory of human language that attains explanatory adequacy must contain the basis for a descriptively adequate account of each particular language. It has often been observed that there is a tension between the two objectives of descriptive and explanatory adequacy (see Chomsky, 1986: 51–52, 2000: 7, 2002: 31). While descriptive adequacy requires a large set of complex, intricate, and detailed statements in order to account for particular languages, explanatory adequacy requires a finite set of universal statements that can represent Universal Grammar in terms that are psychologically plausible. In particular, the goal of explanatory adequacy requires a small set of statements that are maximally general (in order to apply cross-linguistically) and maximally simple and economical (in order to account for the rapid and effortless acquisition of language, as well as for its creativity and the intuitions of its speakers). For example, as explained earlier, the principles of binding theory must account not only for speaker intuitions concerning grammaticality ('example [2c] is not a possible sentence in English') but also for speaker intuitions concerning possible interpretations of grammatical sentences ('in example [3b], *Lily* and *her* do not refer to the same person').

Role in the Development of the Model

We can trace a number of key developments in the Chomskyan model that represent attempts to resolve this tension between the objectives of descriptive and explanatory adequacy. For example, the move away from sets of constructions and construction-specific transformational rules to the single generalized transformational rule Move-alpha (Chomsky, 1980) represented a move toward explanatory adequacy. The development of the Principles and Parameters approach (Chomsky, 1981) also brought generative grammar closer to resolving the tension between the requirements of descriptive and explanatory adequacy, by positing the existence of a universal set of principles that account for Universal Grammar, together with a finite set of options or parameters that account for cross-linguistic variation.

Recent Developments

More recently, the development of the Minimalist Program (Chomsky, 1995) also represented a move toward the objective of explanatory adequacy, by reducing the grammar to two basic operations: 'Merge' (structure building) and 'Move' (displacement). Indeed, Chomsky argued that the Principles and Parameters approach was so successful in resolving the tension between the objectives of descriptive and explanatory adequacy that the Minimalist research agenda could go a step further. "In principle, then, we can seek a level of explanation deeper than

explanatory adequacy, asking not only *what* the properties of language are, but *why* they are that way" (Chomsky, 2001: 2). In pursuing this question, the Minimalist Program seeks to reexamine the principles of Universal Grammar from the perspective of questions about the design of the language system itself, rather than focusing primarily upon the design of the theory of language.

See also: Chomsky, Noam (b. 1928); Generative Grammar; Linguistics as a Science; Minimalism; Principles and Parameters Framework of Generative Grammar.

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Lévi-Strauss, Claude (b. 1908)

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Having graduated in law from the Paris Law Faculty and in philosophy from the Sorbonne in 1931, Lévi-Strauss visited Brazil in 1934. During a short spell teaching at the University of São Paulo he took the opportunity to do some fieldwork amongst Brazilian Indians. He returned to Brazil for another field trip in 1938–1939. He left France after the German occupation and went to New York where he taught at the New School for Social Research and met Roman Jakobson (*see* **Jakobson, Roman (1896–1982)**) whose work on phonology was to be one of his main intellectual inspirations. After the War he returned to Paris and held a post at the Musée de l'Homme and in 1950 became *directeur d'études* at the École Pratiques des Hautes Études. In 1959 the Chair of Social Anthropology was created for him at the Collège de France. In 1973 he became a member of the Académie Française. (He continues to publish at the time of writing, 1991.)

Lévi-Strauss is credited with creating the intellectual movement called 'structuralism.' The massive, technical, *Les Structures élémentaires de la parenté* was published in 1949 but perhaps nothing would have come of structuralism had Lévi-Strauss not published *Tristes tropiques* in 1955. This was a personal account of his travels, written in a readable, but sophisticated style, and it became a best-seller. That set the stage for the publication of *Anthropologie structurale* (*Structural anthropology*) in 1958 (a collection of essays written in the 1940s and 1950s). The popularity of the previous work guaranteed intense interest in this one. A new intellectual fashion had arrived. Structuralism replaced 'existentialism,' and Lévi-Strauss challenged Sartre's dominance as the star of Parisian intellectual life.

Lévi-Strauss declared that his three 'intellectual mistresses' were geology, psychoanalysis, and Marxism, the common idea being that in each of these enquiries what appears to be the case on the surface is determined by hidden (unconscious) structures, laws, or determinants. Among his other sources of inspiration were cybernetics, music, and above all linguistics.

The original structuralist charter is set out in Chapter 2 of *Structural anthropology*, originally

explanatory adequacy, asking not only *what* the properties of language are, but *why* they are that way" (Chomsky, 2001: 2). In pursuing this question, the Minimalist Program seeks to reexamine the principles of Universal Grammar from the perspective of questions about the design of the language system itself, rather than focusing primarily upon the design of the theory of language.

See also: Chomsky, Noam (b. 1928); Generative Grammar; Linguistics as a Science; Minimalism; Principles and Parameters Framework of Generative Grammar.

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Lévi-Strauss, Claude (b. 1908)

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The guiding idea behind Lévi-Strauss's work was to find fundamental structures behind the bewildering disparateness of phenomena. *Elementary structures* was an attempt to show that a huge array of kinship systems could be seen to be based on two simple structural forms: restricted exchange and generalized exchange. From *Totemism* onward the search is more explicitly for fundamental structures '*of the mind*,' the idea being that by an examination of the structure of various 'objects of thought' (classifications, myths, designs) one can discover something of the structure of the mind that created them. Just as phonology had shown that language can be reduced to those 'distinctive features' expressed as binary distinctions (tense/lax, grave/acute), so the logic of primitive classification and 'mythologic' can be reduced to endless structures of binary oppositions (wet/dry, honey/tobacco, raw/cooked).

While Lévi-Strauss emphasizes his profound concern with linguistics, Chomsky's generative grammar passed him by. ('Transformation,' a key term in structuralism, is taken from D'Arcy Wentworth Thompson's *On growth and form*, 1917, a classic in zoology, and has nothing to do with transformational grammar.) Ironically, a short passage in Chomsky's *Language and mind* provides an illuminating, terse, 'no nonsense' critique of Lévi-Strauss's use of linguistic models. (The work on classification, says Chomsky, reduces to the conclusion "that humans classify, if they perform any mental acts at all.") Linguistics has long left Lévi-Strauss behind. Structuralism, as a fashion, also looks rather dated, but because of the engrossing nature of the material Lévi-Strauss deals with (myths, masks, exotic names and habits) his writing is still found intriguing, and he is still revered as one of the leading *intellectuels* of France.

See also: Anthropological Linguistics: Overview; Jakobson, Roman (1896–1982); Linguistic Anthropology; Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism in Anthropology; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Levita, Elijah (1469–1549)

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Elijah Levita (1469–1549) is known in Jewish scholarship as Eliyyāhū Bāḥūr, an outstanding Hebrew and Aramaic grammarian and lexicographer, Rabbinic scholar, and Yiddish writer. A native of Neustadt, near Nuremberg, Germany, he lived mostly in Italy (Padua, Venice, and Rome) and died in Venice.

Levita's main achievement was the instruction of Christian scholars in Jewish linguistic teachings. Some of his pupils were his patrons, in whose homes he resided for long time. Among his disciples were

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Levita's main achievement was the instruction of Christian scholars in Jewish linguistic teachings. Some of his pupils were his patrons, in whose homes he resided for long time. Among his disciples were

scholars who became the leading Hebrew linguists of the 16th century, such as Sebastian Münster, Paulus Fagius, Jean de Campen (Campensis), Andreas Maes, Guillaume Postel, Johann Albrecht Widmanstetter (Widmanstadius), Georges de Selves, and Cardinal Egidio di Viterbo, with whom Levita stayed for 13 years.

Levita, who wrote in Hebrew, published many Hebrew grammar works, Hebrew and Aramaic dictionaries, and masoretic treatises. The most important in chronological order are: his edition of Moses Qimhi's short grammar *Mahălakh Šĕvīlē ha-Da'at* ('Course of paths to the knowledge') with his own commentary (Pesaro, 1508), his notes ('Nimmūqīm') on David Qimhi's grammar *Séfer ha Mikhlōl*, ('Book of perfection') and dictionary *Sēfer ha Šŏrāšīm* ('Book of roots'), published only partially in his editions of David Qimhi's works.

Two of his own grammatical treatises were first printed in Rome in 1518–1519 and almost simultaneously translated into Latin by his pupil Sebastian Münster. These were *Sēfer ha-Harkāvāh* ('The book of construction,' Rome, 1518) and *Sēfer ha Baḥūr* ('The book of the chosen,' Rome, 1518); while the third one, *Lu'aḥ bĕ-diqdūq ha-Pe'ālīm wehabinyānīm* ('The tables of the grammar of the verbs and the formations') remained unpublished. The first one of these books analyzed foreign and compound words in the bible, and the morphology of the noun and the verb; the second was a more general book on Hebrew that was retitled, starting with its second edition as (Isny, 1542) *Diqdūq Eliyyāhu ha-Lēwī* ('Eliyyāhū ha-Lēwī's grammar'). His minor work, *Pirqē Eliyyāhū* ('Elija's chapters,' Pesaro, 1520) dealt with Hebrew consonants and vowels; in the 2nd edition (Venice, 1546), there were additions regarding nouns' templates (*mishqālim*) and the auxiliary letters used in construction of the noun (roughly coincide with affixes).

Levita devoted at least two of his works to masoretic research, *Māsōret ha-Māsōret* ('The tradition of the Māsōrāh,' Venice, 1538), in which he explained the symbols and the terminology of the ancient transmission of the biblical text and *Ṭūv Ṭa'am* ('The correctness of the accent'), where he attempted to formulate rules for use of accents in the bible.

Levita went beyond the study of biblical Hebrew, an unprecedented move compared to previous linguistic tradition. His lexicographic work *Tishbī* ('The Tishbite') listed words selected from the Talmud and other rabbinic sources; his *Mĕturgĕmān* ('The interpreter,' Isny, 1541), analyzed the Aramaic lexics of the *Targūmīm* (Aramaic versions of the Hebrew bible). The last is still instrumental for Aramaic research; his *Sēfer ha-zikhrōnōt* ('Book of the mentions') was reportedly the first concordance to the bible (still in manuscripts).

Levita's pioneer work on Old Western Yiddish, or Judeo–German language, *Shĕmōt dĕvārīm* ('Names of things,' Isny, 1542) was the first Yiddish–Hebrew dictionary.

Levita is largely responsible for the development of the linguistic study of Hebrew in Europe, falling in line with David Qimḥi's teachings, which Levita adopted as a model for his research.

See also: Aramaic and Syriac; Hebrew, Biblical and Jewish; Yiddish.

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Lévy-Bruhl, Lucien (1857–1939)

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Lucien Lévy-Bruhl was born in Paris, France, on April 10, 1857. There he attended the École normale supérieure, receiving a broad education in philosophy, music, natural science, and clinical psychology, before graduating in 1879. After earning a doctorate in philosophy at University of Paris, in 1896 Lévy-Bruhl accepted a professorship at Sorbonne's Department of Modern Philosophy, where he later served as chair, starting in 1904.

A chance encounter with Chinese philosophy early in his career first prompted him to explore non-Western modes of thought, beginning an intellectual adventure that he continued until his death in 1939. Lévy-Bruhl saw the emerging literature on non-Western societies – though virtually unknown to previous generations of philosophers – as a promising testing ground for exploring the scope of human thought. Based on his extensive readings of the many ethnographic reports available at the time, Lévy-Bruhl began to build a second career as an anthropologist, later helping to found the Institute of Ethnology at the Sorbonne in 1925, with noted anthropologists Paul Rivet and Marcel Mauss. Yet after a falling-out with the eminent sociologist Émile Durkheim, Lévy-Bruhl left the Sorbonne in 1927, never to return. For the next decade, he continued his research on non-Western thought processes while delivering a series of popular though controversial lectures at Harvard, Berkeley, Columbia, and Johns Hopkins, to name a just few of the great universities where he presented his ideas. Lévy-Bruhl died in Paris on March 13, 1939, heartbroken about the coming war.

Lévy-Bruhl is best known for his bold speculations on cognition in preliterate societies, something he initially characterized as "primitive mentality" or even "prelogical thought," before uncovering similar trends in Western societies. As a student of Greek philosophy, Lévy-Bruhl was struck by what he characterized as non-Aristotelian nature of the thought processes found in such widespread phenomena as magical practices and totemism, or the belief in unseen spiritual forces. For none of these phenomena could be directly verified with the senses, nor were they generally amenable to logical proof or contradiction. When a magical spell failed to produce its result, another unseen force was blamed. When a family claimed descent from an animal or a plant, the premise was accepted through the force of tradition and emotional attachment, not empiricism or reason. Lévy-Bruhl's awareness that all humans apply logical principles to some endeavors, such as economics, only brought the absence of so-called rational thought into greater relief, where it lay dormant.

Bent on illustrating the lesser development of non-Western societies, Lévy-Bruhl quickly uncovered evidence of 'primitive mentality' in the sphere of language, which he reported in his first major work, *How natives think*, first published in 1910. Most notably, Lévy-Bruhl stumbled on reports that numerals are limited in some languages, often with numbers going no higher than two, three, or four. Yet, to his credit, Lévy-Bruhl was quick to note that the absence of higher numerals does not preclude the possibility of counting, which he regarded as a human universal, available to all through addition, multiplication, or tallies, even where the set of numbers is small. He simply argued that numbers remained undeveloped where there is little use for counting, with language following the mental habits, though not the potential ability, of the speakers.

Upon discovering that some languages have special grammatical markers for just two, three, or four objects, Lévy-Bruhl claimed these languages failed to develop the far more abstract category of the plural that is common in the West. Instead, he claimed those languages cling to the more 'concrete' concepts of the dual, trial, or quintal where an exact number must be specified. He made a similar argument about classifier languages, arguing that a concrete shape must always be stated, at the expense of developing a more 'abstract' concept of number, apart from the

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Bent on illustrating the lesser development of non-Western societies, Lévy-Bruhl quickly uncovered evidence of 'primitive mentality' in the sphere of language, which he reported in his first major work, *How natives think*, first published in 1910. Most notably, Lévy-Bruhl stumbled on reports that numerals are limited in some languages, often with numbers going no higher than two, three, or four. Yet, to his credit, Lévy-Bruhl was quick to note that the absence of higher numerals does not preclude the possibility of counting, which he regarded as a human universal, available to all through addition, multiplication, or tallies, even where the set of numbers is small. He simply argued that numbers remained undeveloped where there is little use for counting, with language following the mental habits, though not the potential ability, of the speakers.

Upon discovering that some languages have special grammatical markers for just two, three, or four objects, Lévy-Bruhl claimed these languages failed to develop the far more abstract category of the plural that is common in the West. Instead, he claimed those languages cling to the more 'concrete' concepts of the dual, trial, or quintal where an exact number must be specified. He made a similar argument about classifier languages, arguing that a concrete shape must always be stated, at the expense of developing a more 'abstract' concept of number, apart from the

actual objects being counted. Of course, his Boasian contemporaries in the United States argued that ranking languages is a futile endeavor, like comparing apples and oranges, because all languages are complex in some areas and less so in others. At the other extreme, Benjamin Lee Whorf took cases like classifiers or the grammatical dual as evidence of great cognitive sophistication on the linguistic plane.

Surveying the literature on the languages of North America, Lévy-Bruhl encountered several detailed accounts of polysynthetic tongues, which he described as "pictorial" because of the high number of grammatical affixes that must modify the stem. Again, rather than portraying these languages as sophisticated, he charged the speakers of polysynthetic languages with requiring the painstaking specification of so many 'concrete' categories, indicating, for instance, the shape of an object as it moves through space, its precise directional bearing, or its placement at an exact moment in the near or distant future. At the same time, Lévy-Bruhl noted that many languages have a profusion of words for individual species, often far exceeding the common terms available in European tongues while lacking a detailed series of generic categories for general classes of plants and animals. Again, instead of crediting indigenous languages with sophistication in some areas, Lévy-Bruhl selectively focused on the area in which a language appeared to be deficient from the perspective of English or French. By the same token, English, French, or German could also be regarded as equally deficient, with a paucity of grammatical affixes or precise names for the many animal species found remote parts of the world!

Late in his life, Lévy-Bruhl eventually answered his critics, acknowledging that similar processes were at work in Western societies, a revelation that came only with the posthumous publication of his private notebooks in 1949. For even such a cherished doctrine as the Holy Trinity to some extent defies rational thought, with its assertion that one God is simultaneously present in three species as the Father, the Son, and the Holy Spirit. Like the concept of the totem, the proposition is beyond empirical proof and must be accepted on faith, emotion, and tradition, or not at all. Similarly, magical thinking was prevalent until recently, and though it is mostly gone, luck and prayer survive. No longer able to maintain the sharp distinction between Western and non-Western societies, Lévy-Bruhl recognized two streams of thought found in all societies, one 'rational' and another one 'prelogical' or 'mystical.' By collapsing the two-way split between the Western and non-Western worlds, he paved the way for his intellectual successor, Claude Levi-Strauss, who continued to explore the scope of human thought, though with emphasis on purely universal process, manifest in various ways across a range of societies.

See also: Historiography of Linguistics; Linguistic Anthropology; Primitive Languages; Psycholinguistics: Overview; Variation in Native Languages of North America.

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Lewis, Henry (1889–1968)

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As one of the first generation of professors of Welsh at the University of Wales, Henry Lewis, like his colleagues, was called upon to prepare editions of and commentaries on a wide range of texts as well as writing numerous lexicographical notes, but from the early years of his career he made the study of Welsh syntax and comparative grammar the cornerstones of his own pioneering research. He became the foremost Welsh comparativist and grammarian of the first half of the 20th century.

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Born on August 21, 1889 in Ynystawe in the Swansea Valley in Glamorganshire, south Wales, Henry Lewis was educated at his local county school at Ystalyfera, where he received a sound classical education and was fortunate in also having a scholarly and inspiring Welsh teacher who attracted him to Welsh studies. In 1907 he entered the University College of South Wales at Cardiff, where he studied under Thomas Powel, taking his degree in Welsh in 1910. Lewis gained his research degree in 1913 for work on the Welsh translations of Geoffrey of Monmouth's *Historia Regum Britanniae,* and he also spent a period at Jesus College, Oxford, with Sir John Rhys, professor of Celtic; though he did not take a degree, one can assume that Rhys would have broadened his outlook toward the wider field of Celtic studies. Following a period of school teaching and war service, Lewis was appointed assistant lecturer in Welsh at Cardiff, where he remained from 1918 to 1921. The university college of Swansea, another constituent college of the University of Wales, was opened in 1920; the following year Henry Lewis took up his post as the first professor of Welsh. He was to remain there until his retirement in 1954. He died on January 14, 1968.

At Swansea, Lewis had the responsibility of establishing a university department from scratch and teaching a full initial degree program with the help of one, sometimes two, lecturers. He was also actively involved in the broader Welsh cultural scene as a member of official bodies and institutions and as a popular extramural teacher, educationalist, and convinced Congregationalist. These activities and the different facets of his teaching are reflected in the range of his publications, from Early Modern Welsh translations and renaissance prose, to editions of 18th and 19th century minor classics and school and church texts. One of Lewis's main contributions, however, was his editions of medieval prose and poetry. His studies of *cywyddwyr*, poets of the 15th and 16th centuries, especially in a joint work, *Cywyddau Iolo Goch ac eraill* (The *cywyddau* of Iolo Goch and others, 1925, 1937) helped to establish modern scholarly editorial conventions for this body of verse. More innovative was his work on the poets of the Welsh princes of the 12th and 13th centuries; his *Hen gerddi crefyddol* (Old religious verse, 1931) was the first modern edition of any of the poems of these poets, and his annotations helped to lay the foundations for later studies of metrics, style, and lexicon.

In 1942 Lewis returned to the subject of his early research. *Brut Dingestow* is an edition of a single manuscript translation of Geoffrey of Monmouth. His analysis of some of the grammatical features of this 13th century text, the culmination of work begun in other editions of medieval prose texts, *Chwedleu seith doethon Rufein* (The seven sages of Rome, 1924) and *Delw y byd, Imago mundi* (with Paul Diveres, 1928), is an extended, though never intended as a comprehensive, grammar of Middle Welsh. His *Elfen Ladin yn yr iaith Gymraeg* (The Latin element in Welsh, 1943) remains a useful handbook for plotting the phonological changes from British to Welsh, while his deep knowledge of British Celtic languages enabled him to make a significant contribution in the examination of their phonology and morphology in the revised English edition of Holger Pedersen's *Vergleichende Grammatik der Keltischen Sprachen* (*A concise comparative Celtic grammar*, 1937; Russian translation in 1954, with Lewis's further corrections and a supplement in 1961). Lewis had begun to publish grammars of Middle Breton and Middle Cornish in 1922 and 1923 (revised editions in 1935, 1946; new edition with J. R. F. Piette in 1966; German editions in 1990), and there is no doubt that it was he who paved the way for these languages to become an integral part of Celtic linguistics in Wales and beyond. Lewis's other major, and probably more important, achievement in Welsh scholarship was to make syntactical analysis central to Welsh linguistics. His work on Old Welsh syntax, prepositions, the syntax of the verb and of relative clauses, and especially his description and proposed history of the syntax of the unmarked noun-initial sentence, set out in his 1942 British Academy Lecture, 'The sentence in Welsh,' have been very influential (though it has to be said that this thesis has been criticized in recent years). Lewis was an inspiring teacher, some of whose students have become leading Welsh grammarians; he was a fluent communicator, and his *Datblygiad yr iaith Gymraeg* (The development of the Welsh language, 1931, revised in 1946, German edition in 1989), written for non-academic readers, is still a scholarly, readable account of language development.

See also: Breton; Celtic; Cornish; Pedersen, Holger (1867–1953).

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Lexeme–Morpheme Based Morphology

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Introduction

Lexeme–Morpheme Based Morphology is a complete set of lexeme-based morphological theories and hypotheses including the following:

1. The Separation Hypothesis, that lexical and inflectional derivation are distinct from affixation (phonological realization);
2. The Universal Grammatical Function Theory, whereby the functions of inflectional and lexical derivation are one and the same;
3. The Base Rule Hypothesis, that universal functions must originate in a base component if we are to explain both lexical and syntactic (inflectional) derivation (Botha, 1988);
4. Stephen Anderson's General Theory of Affixation (Anderson, 1992), which, as extended recently by Anderson, predicts the placement of all affixes and clitics;
5. The Defective Adjective Hypothesis, which claims that adpositions are adjectival pronouns in a class with case endings and hence grammatical morphemes rather than lexemes.
6. A morphological performance theory, which includes: a theory of lexical stock expansion processes; a theory of normal speech errors; a theory of pathological speech errors (morphological agrammatism).

The LMBM lexicon is exclusively the domain of lexemes, which are defined specifically as noun, verb, and adjective stems and the lexical categories that define them (number, gender, transitivity, and so on). All other meaningful material must belong to the closed set of closed categories of grammar and are handled by 'morphology' in the general sense (derivation plus affixation). LMBM, then, distinguishes itself from other lexeme-based theories in that it maintains a pristine distinction between lexemes and grammatical morphemes and consequently predicts this distinction at every level of language and speech.

Lexemes and Morphemes

Lexeme-Morpheme Based Morphology (LMBM) is a variant of what Aronoff (1994) refers to as a 'lexeme-base' morphological theory. Lexeme-base morphology assumes that only the lexeme is a true linguistic sign, where 'lexeme' is defined exclusively and explicitly as any and all noun, verb, and adjective stems. The effects of lexical and inflectional

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derivation on the lexeme do not affect its status as a sign at all. These processes, it follows, must involve elements other than linguistic signs.

Lexical (derivational) and inflectional morphemes hence must represent different types of linguistic elements. The fundamental claim distinguishing LMBM from other morphological frameworks is its rigid distinction of lexemes and (grammatical) morphemes; hence its name, 'Lexeme–Morpheme Based Morphology.' Beard (1988, 1995) argues that grammatical morphemes differ from lexemes in the following ways:

1. lexemes belong to open classes; morphemes belong to closed classes.
2. lexemes do not allow zero or empty forms; morphemes do.
3. lexemes have extragrammatical referents; morphemes have grammatical functions.
4. lexemes may undergo lexical derivation; morphemes may not.
5. lexemes are not paradigmatic; morphemes are.

The Separation Hypothesis

If lexemes are noun, verb, and adjective stems, and if they are the only objects stored in the lexicon, it is natural to ask what determines or generates grammatical morphemes. Grammatical morphemes are the output of purely phonological operations independent of the semantic (grammatical) operations they mark ('realize'). This conclusion is the Separation Hypothesis.

The Separation Hypothesis splits all derivation, lexical and inflectional alike, into three processes: lexical (L-) derivation, inflectional (I-) derivation, and morphological spelling. Derivation involves operations on abstract lexical and inflectional category functions such as [+Plural, -Singular], [+Past, -Present], [+1st], and the like. Spelling is the purely phonological realization of the morphological categories of any base lexeme that has undergone such derivation. Its function is to distinguish stems that have undergone derivation from those that have not. If the derivation is inflectional, the marker may be attached to the lexical stem or assigned independently to a structural position in syntax in ways which syntax alone cannot predict. For example, [+Definite] singular nouns in Swedish are suffixed, but [-Definite] singular nouns are marked by the same morpheme in a free position, e.g., *en katt* 'a cat' vs. *katt-en* 'the cat.' Hence, the LMBM lexicon contains neither bound nor free grammatical morphemes – both are the responsibility of morphological spelling.

'Morphemes'

What, then, are 'morphemes' under this hypothesis? Bound morphemes include affixes and other modifications of the phonological representation of a lexeme, such as reduplication and (Semitic) revoweling, the spelling out of articles, auxiliaries, adpositions – any expression associated with a grammatical category or relation rather than a semantic one.

Under LMBM, L-derivation takes place in the lexicon. Here, lexemes with new lexical meanings are formed from underived lexemes. Inflectional derivation, following the arguments of Matthews (1972), Anderson (1992), and Aronoff (1994), takes place in syntax. Both these derivational types are phonologically realized by an autonomous morphological spelling component located after all syntactic rules but before any phonological rules operate.

Unlike free morphemes, then, bound morphemes are phonological modifications (only) of the phonological representations of lexemes, which mark the fact that the lexeme has undergone lexical or inflectional derivation (the Empty Morpheme Entailment). Neither type of morpheme has any meaning, and thus morphemes attribute no meaning to the stems to which they attach. All meaning is accounted for by the derivation rules. This immediately explains empty and zero morphemes. Empty morphemes represent affixation without derivation; zero morphemes are derivations without affixation. Morphological asymmetry, the many-to-one and one-to-many mappings of morphological forms to function, is also explained by Separation.

Free morphemes, on the other hand, may require syntactic positions, since they are ostensibly subject to movement and also often belong to paradigms. I have in mind now such morphemes as free adpositions, auxiliaries, conjunctions, and pronouns. All but conjunctions are themselves subject to inflection. Pronouns such as *which* and *who*, as well as free auxiliaries, seem to move from one syntactic position to another in some languages. However, even the positions of auxiliaries and pronouns usually conform to Anderson's General Theory of Affixation, which LMBM also assumes. Moreover, movement may simply be the phonological realization of grammatical morphemes in positions other than that in which the morphological features determining such realization appear (Beard, 1995).

Lexical Derivation

Derivation rules operate in the lexicon (L-derivation) and in syntax (I-derivation). The illusion of a direct relation between the sound and meaning of affixes is the result of two facts. First, derivation rules and

realization rules operate on the same lexeme during the generation of a derived word. This means that affixation will correspond to the modified features in the stem. (The original features of the stem will also be modified, neutralized, so that they will not trigger affixation.)

The order of affixes generally, but not always, follows that of the features in the base. The assumption of sign base morphology (Saussure, 1916) results from the fact that the default procedure for the MS (spelling) component is to realize features in the order in which it encounters them. However, feature order is often irrelevant, as in the case of affixes, which can precede or follow some other affix, and cumulative exponents, which realize two or more features simultaneously.

Beard (1988, 1995) describes four types of L-derivation: transpositions, functional derivation, feature switches, and expressive derivation. Transposition simply changes the lexical class (category) of a lexeme, e.g., N to V, A to N. Functional derivations add a semantic(ally interpretable) category function, such as Subject, Object, Locus, Manner, to the featural inventory of the base lexeme. Lexical switches modify the value of inherent lexical features such as Gender, Number, and Paradigm Class. Finally, expressive derivations, such as Diminutive and Augmentative, reflect the speaker's attitude in ways still not clearly understood.

The Subjective (Agentive) nominalization, e.g., 'bake : baker,' is a familiar L-derivation. It invokes three of the four L-derivation types, a functional derivation illustrated in Figures 1–3, a transposition, whose output is as seen in Figure 3, and a featural switch, whose output is illustrated in Figure 4.

Figure 1 is a simplified illustration of the underlying form of an NP with a relative clause, the origin of all nominalizations under LMBM. The problem is that for all the structure, only one phonologically realizable lexeme has been inserted. The lexicon has two options: remove the structure and nominalize the verb, or fill in the structure with lexical categories it knows and controls (Gender, Number, and Noun Class).

If the lexicon chooses the former tack, the superfluous structure marked in Figure 1 is eliminated (Figure 2). The result is a single V incorrectly positioned under an NP. When this occurs, the lexicon's job is to transpose the illegal category to the legal one, i.e., provide the verb with nominal category functions (Figure 3). Figure 3 also shows the effects of the feature switches, which sets the functional features added by the transpositions. The output of this series of processes is then submitted to morphological spelling (the MS-module), similar to 'Spellout' in related models. Of course, the lexical description of the verb *bake*, {BAKE}, is preserved in the derivation and will continue to determine government and binding properties.

This set of assumptions accounts for the following facts. Languages with L-derivation have exactly two ways of expressing the same notion using identical lexemes: one lexical (bak-er), the other syntactic (someone who bakes). The same functions (Subject, Object, Instrument, Location) found among Case relations also determine functional L-derivations. Although there are two types of derivations, lexical and inflectional, only one spelling component realizes the results of both.

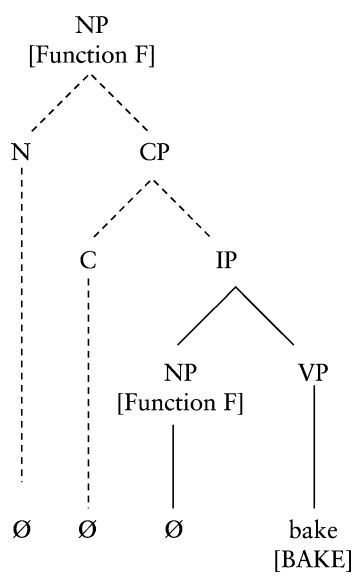

Figure 1 A functional derivation.

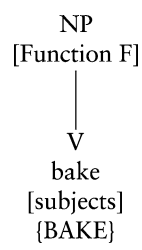

Figure 2 Input to a transposition.

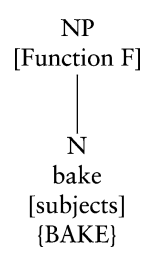

Figure 3 Output of a transposition.

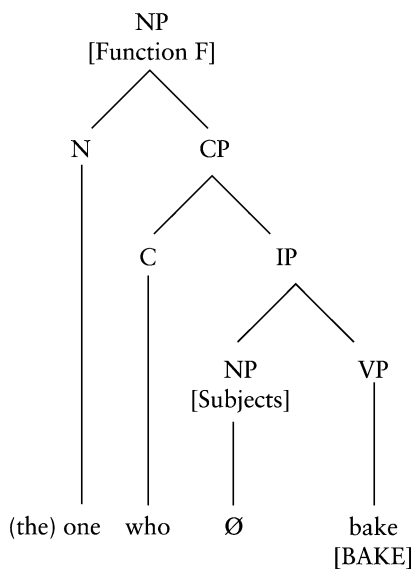

Figure 4 Output of a featural switch.

Now that we have followed a lexical derivation, let us examine an inflectional one operating on the same underlying form as in Figure 1.

Inflectional Derivation

If the lexicon decides not to operate on a structure such as that in Figure 1 above and does not collapse all that structure into a single word, it must license all the nodes that pass through it for syntax; that is, it must assure that all NPs are headed by acceptable Ns, all VPs by Vs, all APs by As. This is apparently the role of pronominals. Pronominals are also tightly constrained by LMBM: categorically, they may contain only those lexical categories determined by the lexicon, the inflectional categories found in syntax. No other type of semantic or grammatical category may be found in a pronominal (proadjective, pronoun, proverb). That is, for example, pronouns may be completely described in terms of Number, Gender, Lexical Category, etc. However, the processes of transposition and feature switching provide precisely the categories demanded by the empty nodes in Figure 1, and these categories are necessary and sufficient conditions on the semantic interpretations of pronominals.

If no L-derivation applies to the example in Figure 1, it will be provided with the lexical categories of Gender, Noun Class, and Number from the lexicon. (Animacy is derivable from Natural Gender; see Beard, 1995.) If no L-derivation applies to the example in Figure 1, these pure lexical categories, along with the inflectional categories of the Subject NP, will be raised to C by wh-movement, and the output of (1) from syntax will be, roughly, the structure illustrated in Figure 4.

Syntactic structures like the example in Figure 4, as well as lexically derived structures as in Figure 3, are then subjected to the phonological realization rules of the morphological spelling or MS component. LMBM postulates only one integrated MS component for both lexical and inflectional derivations. Pronouns such as *one*, *he*, *she*, *it*, being grammatical morphemes, will be phonologically realized by the same MS component that inserts affixes.

Morphological Spelling (Realization)

Morphological spelling (MS) comprises the phonological realization rules of morphology. These are rules that determine the modification of lexical stems, if any, conditioned by the presence of derivational features. The MS module can read any features of a lexeme but can modify only the phonological (P) representation. It must contain a short-term memory component that can hold several features before writing to the P-representation of the lexeme. This accounts for the fact that a single affix can represent several grammatical features. MS memory will have to collect the features [+Active], [+Indicative], [+1st], and [+Singular] before it can attach the /o/ to the Latin stem *am-* in order to generate *amo* 'I love.' This same capacity allows the MS component to reorder affixes, such as in Turkish *gelir-ler-se* and *gelir-se-ler*, both of which mean 'if they come.'

Realizations of the pronoun *one*, i.e., *someone, anyone, the one(s)*, result from accumulations of lexical features like [± Masculine], [± Plural] with syntactic features like [± Specific] and [± Definite] inserted into empty nodes that are not allowed by English grammar. The MS-module interprets both the lexical and inflectional features of the ultimate nodes and realizes them as pronouns, i.e., *the one/someone who bake-s*.

Lexeme representations obviously comprise a phonological, a grammatical, and a semantic representation. The MS-module must be able to read all three representations but can modify only P, given its purely phonological nature. In fact, this is the function of morphology, which is the interface between the lexicon and syntax, on the one hand, and the phonological or sign output, on the other.

Conclusion

This brief introduction to LMBM has outlined the basic assumptions about (1) the lexicon, (2) lexical derivation rules, (3) inflectional derivation rules, and (4) morphological realization. The full theory is available in Beard (1995). Beard (1981, 1987)

provides a general theory of morphological performance that distinguishes most types of extragrammatical derivational processes from those determined by grammar.

See also: Affixation; A-Morphous Morphology; Morphology: Overview.

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Lexical Acquisition

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Introduction

Lexical acquisition is the production or augmentation of a lexicon for a natural language processing (NLP) system. The resultant lexicon is a resource like a computerized dictionary or thesaurus but in a format for machines rather than people. The entries in a lexicon are lexemes, and the information acquired for these includes the forms, meanings, collocations, and associated statistics.

Acquisition is vital for NLP because the performance of any system that processes text or speech is dependent on its knowledge of the vocabulary of the language being processed. As well as an extensive grasp of the vocabulary, a system needs a means to cope when it encounters a word that it has not seen before. Because of the requirements of an application, there may be a case for limiting a system to the words appropriate within a specific domain. However, even in a specific domain, everyday words will be used and there will be additional domain-specific terminology. It is possible, and sometimes appropriate, to build a system that can run using only a small vocabulary. However, it is nevertheless necessary to acquire appropriate forms and meanings of the lexemes for the given domain. The lexical information required is not explicitly listed in any available resource, and getting humans to provide it is extremely costly. For this reason lexical acquisition is frequently referred to as the bottleneck for NLP. In order to produce lexicons for deployable NLP systems, lexical acquisition must be automated.

There are significant differences between the requirements of a lexicon intended for a computer system and the contents of a dictionary or thesaurus written for humans. Machine-readable dictionaries and thesauruses (MRDs and MRTs) have been designed for online use by humans. If the information contained were sufficient then one could permit a NLP system to use them directly, or after some simple reformatting. However, while it was hoped that machine-readable resources produced by humans for humans would be a viable means of populating lexicons, it is now widely recognized that this method will not work. The resources are prone to omissions, errors, and inconsistencies. Furthermore, the lexicographers producing these resources rely on the fact that users have an adequate grasp of the language, knowledge of the world, and basic intelligence to understand the definitions supplied and fill in any gaps. For example, a human user can look up unknown words in definitions and determine the meaning of these words given the context in the definition. A computer is not predisposed to determining the meaning from definitions, e.g., given the definition of *pipette* as *a slender tube for measuring or transferring*

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small quantities of liquid, a computer may need to look up the meaning of *tube*, and would then be faced with the ambiguity that *tube* can mean *metro* as well as *hollow object*.

In addition to the errors, omissions and problems of format, NLP systems require information that is simply not present in a dictionary because humans do not need it. A prime example of this deficiency is frequency information. Frequency information permits systems to concentrate effort on the more likely analyses or utterances. This evidence is important since a great many interpretations are possible for most utterances, and most information can be said in more than one way. The majority of NLP systems rely on statistical processing that requires probability estimates obtained from frequency data. Not only do lexicons require frequency data, but they need to be tailored to the domain of the application. Man-made resources are typically general purpose.

For these reasons, most acquisition is now performed automatically from corpora, comprising large collections of real life text or speech samples. The corpus is chosen with regard to the intended domain of the application. Man-made resources are still often used in hybrid systems that collect the frequency data from the corpora but with recourse to the entities provided in the MRDs. There are also cases where acquisition is performed semi-automatically, with human lexicographers guiding the acquisition process or correcting the output.

Resources

Machine-Readable Dictionaries

Dictionaries contain entries for words that are broken down into the various meanings, or senses, of the word. These meanings are supplied with definitions and part-of-speech information, i.e., whether this use of the word is a noun, verb, adjective, or adverb. Other information is also sometimes available, for example the various morphological forms of the word, its phonological realization and information on syntactic behavior. Some dictionaries also include a subject code or domain label, for example, the *Longman Dictionary of Contemporary English* (LDOCE) (Proctor, 1978), or the *Oxford Dictionary of English* (Soanes and Stevenson, 2003). LDOCE also provides information on the semantic class of the arguments of verbs (for the subject, direct object, and indirect object grammatical slots).

Machine-Readable Thesauruses

Entries in thesauruses provide words with similar meanings. The most widely used MRT is WordNet (Fellbaum, 1998) not just because of the wealth of information, particularly semantic, but also because of its free availability. WordNet is an online thesaurus, organized by semantic relations rather than alphabetically. Words are classified by their part-of-speech (noun, verb, adjective, and adverb). They are then subdivided into small classes called 'synsets' where members are near synonyms of each other. These synsets are then linked together by semantic relationships such as hyponymy (nouns and verbs), meronymy (nouns), antonymy (adjectives), and entailment (verbs). Figure 1 illustrates some of these relationships.

Similar resources are available in other languages, for example, a number of WordNets are being distributed in other languages, notably European languages. There are also dictionaries in other languages organized by semantic relationships, for example, EDR (NICT, 2002).

Corpora

Corpora range in the amount of linguistic annotation provided. Some occur in raw form, as archives of text or spoken language. Some are 'balanced' with a mix of texts selected from a range of genres and domains, for example, the British National Corpus (Leech, 1992). This corpus also includes part-of-speech annotations for every word form. Other annotations are sometimes available, for example the Penn Treebank II (Marcus, 1995) includes syntactic analyses that have been hand-corrected from the output of an automatic parser. SemCor (Landes *et al.*, 1998) is a 220 000-word corpus that has been manually annotated with WordNet sense tags.

Acquisition from labeled data (supervised acquisition) is often more accurate than acquisition from raw text (unsupervised acquisition). However, annotations are costly to create and are not always available for a particular language or text type. Unsupervised systems are useful when there is no labeled data to learn from. The lack of annotation for corpora is compensated in part by the size of the corpora available.

Multilingual Resources

As well as monolingual dictionaries and corpora, there are also some multilingual resources available. These resources are potentially extremely useful since the redundancies and different forms in one language can help resolve ambiguities in another. CELEX (Baayen *et al.*, 1995) contains databases for English, Dutch, and German that includes syntactic, morphological, phonological, and orthographic information.

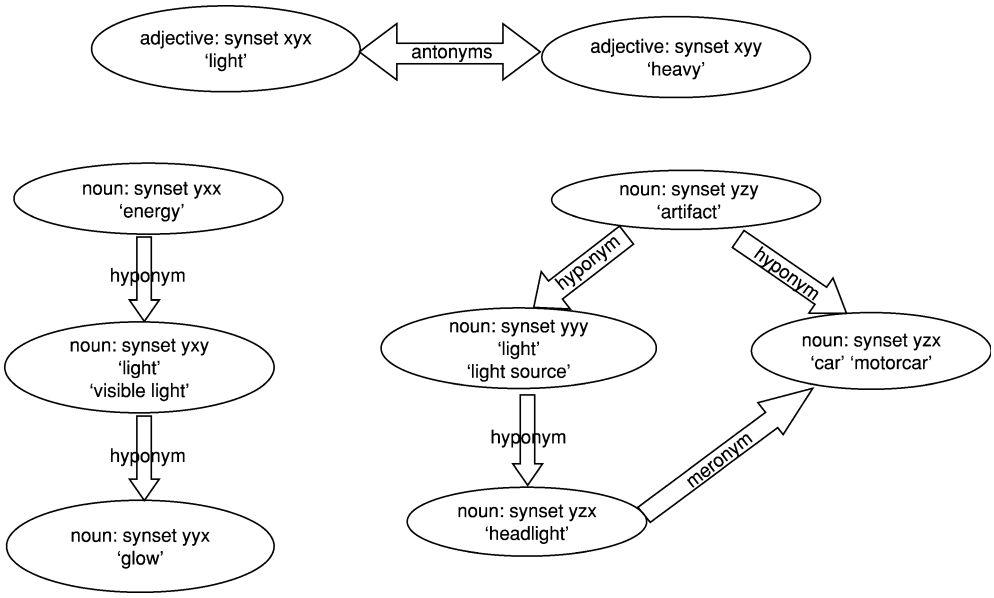

Figure 1 Some semantic relationships in WordNet.

Other multilingual dictionaries and thesauruses often have links between words with the same meaning in different languages. Multilingual corpora include both parallel corpora, where the data in one language has been translated into another, and comparable corpora where essentially the same content, such as news events, has been collected from different sources.

Automatic Techniques

There are a wide variety of techniques used for lexical acquisition, and the appropriate solution will depend on the information sought and the resources available. The simplest approach is to look up information directly in an existing MRD. For many types of information this approach is not possible because the information is not present or complete. Furthermore, it is quite possible that a usage of an existing word will not be listed in a MRD.

Alternatively, a system can be built to learn the information from data, referred to as training data, usually obtained from corpora. An extremely simple method is to apply pattern-matching techniques to the training data. This method has yielded success for some types of information, notably 'is-a' semantic relations between nouns. So, for example using the pattern, 'X is a type of Y' → X is-a Y and the text, *A dog is a type of animal*, a system can be made to infer dog is-a animal.

The majority of approaches use some form of statistics. There are straightforward applications of textbook statistics, e.g., the chi-square or *t*-test, to frequency counts of word co-occurrences. A significant problem for all statistical approaches is that the frequency distributions of linguistic phenomena are skewed so that a minority of forms or meanings takes up the majority of instances in a corpus. This inequity means that systems need to cope with the problem of data sparseness, and that for a great many forms it is hard to get good frequency estimates.

There are more complicated methods that incorporate statistical estimates. There are techniques that use concepts from information-theory. For example, Lin (1998) proposed a measure of similarity that takes into account the shared contexts of words.

Machine-learning techniques, which may also involve a statistical component, induce lexical information from examples. The examples can be labeled (supervised training) or unlabeled (unsupervised). In supervised approaches, often referred to as memory-based learning, stored examples can be simply compared to a new candidate, and the closest fitting neighbor is used to obtain a label for the new candidate. Alternatively, instead of simply storing the examples, a system can generalize from the examples and find a decision tree that best partitions the examples according to the labels. Unsupervised learning is frequently performed by clustering entities according to features, e.g., words according to the contexts in which they occur.

For example, the verbs in Table 1 might be clustered into three groups according to the frequency of their direct objects.

Table 1 Clustering verbs by the frequency of their direct objects

	Verbs							
Direct objects	*eat*	*consume*	*devour*	*construct*	*build*	*begin*	*start*	*commence*
house	2	1	0	31	72	21	10	1
bridge	0	3	1	52	93	17	9	2
school	0	1	0	49	38	20	15	5
soup	8	5	4	0	0	4	3	0
chicken	11	7	14	0	1	0	0	0
meal	35	11	23	1	2	16	13	3
cake	21	7	16	0	0	2	1	0
meeting	0	0	0	0	1	35	27	11
show	0	0	0	0	0	45	75	8

The Entries and Acquired Information

The entries stored in a lexicon are referred to as lexemes. They are listed with lexical information depending on the needs of the application that the system is being produced for. For example, a spelling checker may only require orthographic information to render the lexeme into word forms that can occur in text. Additional lexical information is often needed by applications including pronunciation; part-of-speech; morphology; syntax, argument structure; preferences; semantics; pragmatics; and multiwords.

Pronunciation

The phonetic realization of a word is needed by systems that recognize or produce speech rather than text. Word-specific pronunciation can be learned automatically from examples. This possibility has been demonstrated for Dutch (Daelemans and Durieux, 2000). In this memory-based approach, the examples to teach the system were constructed by aligning the letters of a word and its context to the phonemes. Pronunciations of new words are acquired by comparing the input letter sequence to stored examples. The approach could be applied to a language other than Dutch, provided that a grapheme-phoneme alignment is possible for that language. In other work, stress has also been acquired automatically using memory-based learning techniques (Daelemans *et al*., 1994).

Part-of-Speech

The part-of-speech of a given word is important for morphological, syntactic, and semantic analysis. Indeed, since a given word may belong to different parts-of-speech, frequency information is often required in order to arrive at the most likely part-of-speech for a word in a given sentence. This information is typically obtained using a labeled corpus, but the possible parts-of-speech for a word can also be induced using frequency information of other words in the context (Finch and Chater, 1994).

While acquisition of part-of-speech is required for all words, further information on morphology, syntax, and semantics is usually acquired for nouns, verbs, adjectives, and adverbs only. These are open-class words that change meaning and behavior depending on the domain and with time. The set of open class words increases, whereas closed-class words are a restricted set for which most of the information can be obtained in one go and does not change radically.

Morphology

The word forms that a lexeme can take are important for NLP systems. The variety of forms is due to inflections (to indicate number, gender, tense, etc., for example, *eat* versus *ate*) and derivations (from a different part-of-speech, for example, *central centralize*). While word forms are explicit in corpus data, acquisition is not straightforward because of both unseen and ambiguous forms. It is quite common for a given form to serve several functions (syncretism). For example, one cannot distinguish between the past tense and past participle forms of many English verbs, e.g., *I jumped* versus *I have jumped*. There are also cases where word forms of the same lexeme bear no morphological relationship e.g., *go* and *went*. Morphologically related words can be found using a combination of string edit measures, which measure the changes required to turn one string into another, and word co-occurrence statistics designed to capture semantic similarity. Neural networks, a method useful for detecting patterns in data, have been used for learning roots and suffixes from input data. Furthermore, the stems, suffixes, and families (or signatures) of suffixes of a language can

all be learned from corpora, for example, using methods from information theory that strive for the best compromise between a compact model and a good explanation of the data (Goldsmith, 2001).

Syntax, Argument Structure, and Preferences

The syntactic structures that a word can occur in are important for understanding utterances and ensuring grammatical output. There is a good deal of work on the argument structure of verbs since these play a key role relating the phrases within sentences and verbs have the most complex syntactic constructions. The correct arguments of a verb are more easily identified in a sentence when the parser knows the types of construction (subcategorization frames) possible for a verb. For example, information that *give* can take both a single object and a double object construction allows both the following interpretations:

(1) 'She gave (the dog) (bones).' i.e., the dog gets the bones
'She gave (the dog bones).' i.e., some unidentified entity gets dog bones

Subcategorization information is acquired with rudimentary syntactic analysis (without subcategorization frame information) and statistical filters that reduce the impact of noise in the analysis. Subcategorization acquisition has included basic sets of frames (Brent, 1993), as well as more detailed sets (Briscoe and Carroll, 1997) and languages other than English.

As well as argument structure, the semantic classes of arguments are acquired. For example, the direct objects of the verb *eat* are typically types of food. These are referred to as selectional restrictions, implying hard and fast constraints, or preferences. Preferences are usually acquired as a set of semantic classes, each with a score representing the strength of the preference for that class, as illustrated in Table 2.

Many systems have followed the approach of Resnik (1998) and used corpus counts collected over WordNet. However semantic classes induced from corpus data (see below) can also be used for representation.

Given both subcategorization frames and selectional preferences, alternative ways of expressing the verbs underlying arguments can be identified. For example, the alternation:

(2) 'The boy broke the window.' ↔ 'The window broke.'

can be observed by detecting the subcategorization frames for the verb *break* and observing the similarity between the preferences for words that occupy the object slot in the first variant with those in the subject slot in the alternate form. These are known as diathesis alternations and are important because they are a link between the syntax and semantics of the verb. Verbs sharing diathesis patterns typically also share semantic characteristics (Levin, 1993).

Table 2 Selectional preferences for the direct object slot of the verb *start*

Semantic class	*Preference score*	*Example direct objects*
time period	0.1	week, day
communication	0.08	speech, yelling
activity	0.2	construction, war, migration
entity	0.14	car, meal

As well as detecting diathesis patterns directly, researchers have demonstrated that syntactic and semantic features can be used to cluster verbs into classes relevant to these alternations. Merlo and Stevenson (2001) have a method where manually selected and linguistically motivated features are used for classifying verbs into three classes relating to a selection of alternations using a supervised decision tree machine learning algorithm. Subsequent work has shown that a multilingual approach can facilitate acquisition using features available in another language to help make distinctions in the target language.

Semantics

The meanings of words are required for some applications. For example, given the query, *Who employs Mr. Smith* and the sentence, *Mr. Smith works for Hydro-Systems*, lexical knowledge of the relationship between *employ* and *work* can be used to ensure an appropriate answer. Words can have more than one meaning, and this multiplicity may also need taking into account. For example, a question such as *Who is on the board?* would not want responses concerning planks of wood. One problem with including word meanings in lexicons is that the set of possible meanings is vast. When defining the meanings of a word it is possible to arrive at an extremely fine-grained classification with many different senses that are related, though subtly different in some way. For example, the verb *break* has 59 senses in WordNet version 2.0.

Having a fine-grained sense inventory is not always beneficial for NLP, since distinguishing these meanings in text is not easy even for human annotators. There is typically a large skew in the frequency distribution of senses so that one or two senses of a word are much more predominant than the others. This emphasis is particularly the case when dealing with

language in a given domain. As a consequence, much acquisition of other information, such as subcategorization, has assumed a predominant sense for a word and not differentiated information by sense.

Rather than use a man-made resource for lexical meaning, many have exploited the fact that semantically similar words tend to occur in similar contexts. These are distributional approaches that attempt to find similar words given input data such as that in Table 1. The data can be clustered to give distinct classes, e.g., (*begin*, *commence*), (*eat*, *consume*, *devour*), and (*construct*, *build*). Or, instead of explicitly creating classes, a target word can simply be listed with a specified number of 'nearest neighbor' words as an acquired thesaurus, e.g., *eat*: *consume devour*, etc.

These lists of nearest neighbors are produced to avoid losing information during the clustering process. The neighbors are associated with the distributional similarity scores used for ordering them. Nearest neighbors or induced classes can be used by an NLP system to provide evidence when there is not enough data for a related word and to cope with the fact that things can be said in different ways, depending on subtle nuances.

As well as finding related words, different senses of the same word can be found from the data by either (i) clustering the nearest neighbors of a word (Pantel and Lin, 2002) according to the contexts that these neighbors occur in or (ii) clustering the contexts of individual tokens of the word (Schütze, 1998).

Another approach to determining the meanings of words from data is to use parallel corpora and define senses where a word in one language is realized by more than one word in another language (Resnik and Yarowsky, 2000). This technique can be done with more than two languages, and with languages that are more distantly related since the ambiguities are more likely to differ. The sense inventory produced by this strategy will be relevant for translation between those languages. This approach contrasts with using a predefined sense inventory such as WordNet, where the senses may be too fine-grained and never reflect ambiguities that actually give rise to problems for an application such as machine translation.

As an alternative to identifying senses in text, there are also approaches that discover patterns of use within a generative lexicon framework (Pustejovsky, 1995) rather than assuming distinct senses. Pustejovsky and Hanks (2004) propose a semi-automatic method using selectional preference patterns identified by hand.

Current work on acquisition of lexical semantics focuses on relationships between linguistic units. Model-theoretic semantics where linguistic units are related to entities in the world have not received much attention. Though recently there has been work on acquisition of lexical semantics from non-linguistic data (Barzilay *et al.*, 2003).

Pragmatics

One way of conveying the user's intent in an utterance is the choice of words. This choice can reflect stylistic preferences such as formality and attitude, for example, knowing whether to use *demand*, *stipulate*, *request*, or *ask* in a given utterance. Such information is particularly important for generation, but could also be useful for a system trying to detect sentiment. It is not obvious how to identify the nuances of meaning of near-synonyms from raw data. Work has been done however extracting this sort of information from MRDs (Inkpen and Hirst, 2001). Work on sentiment detection identifies words that are subjective, and those that indicate a positive or negative sentiment by partitioning good and bad reviews. Though sentiment detection is not focused on contrasting the meanings of semantically related words, e.g., *brave* versus *foolhardy*, it might benefit from such information.

Multiwords

Lexemes can have more than one word stem, for example, *post office*. These are referred to as 'multiwords' and are phrases where the meaning is not compositional, that is, the meaning of the phrase is not simply a sum of the meaning of component words. Multiwords are important for interpretation and for production of natural sounding text. There are a variety of multiword types including idioms, specific constructions such as phrasal verbs and collocations, i.e., words which occur together by convention (Sag *et al.*, 2002).

Acquisition of multiwords is typically done using a combination of a statistical association measure and a linguistic filter (Smadja, 1993). Another approach is to search for potential candidates with syntactic analysis and statistics, and then look for signs of non-compositionality. This approach can be done by finding a lack of combinations of component words with substitutions from the same semantic class in a corpus. For example, we find *red herring* in corpus data but not usually *yellow herring*. Both WordNet and acquired thesauruses can be used to define the semantic classes. Non-compositionality has also been detected using distributional approaches to demonstrate that the semantics of the multiword has very different characteristics to that anticipated, given the component words.

Updating the Lexicon

Most lexical acquisition systems have been designed to extract lexical knowledge from resources in advance and subsequently deploy the lexicon within a NLP system. However, due to data sparseness, the creative way in which language is used, and the very nature of open-class words, there will inevitably be linguistic forms and meanings that have not been acquired beforehand. A method is required for handling new phenomena as they occur.

One updating task is the detection of words that are not already in the lexicon. This process must filter misspellings and non-real words, for example codes, from lists of candidates. Genuine words can be identified by examining the letter combinations and ensuring that these would produce regular sounding words for the given language. This process is performed using frequency data collected over character sequences from a given corpus (Park, 2002).

When obtaining estimates for unseen word forms, for example, morphological forms, it might seem appropriate to take an average over forms observed in a training corpus. However, Baayen and Sproat (1996) demonstrate that care should be taken since frequent forms behave differently to infrequent forms. They recommend using estimates from forms that have occurred only once, rather than an average over all forms in the training corpus.

As well as finding new words, there are also methods aimed at learning lexical information on the fly. Part-of-speech information is obtained using morphological information. Morphological information can also be used to identify the basic semantic category of a word, alongside other information, such as collocations. A chief motivation for thesaurus acquisition and clustering is that these will help with prediction of unseen behavior for members within a given class. There are also systems that place new word forms into a predefined inventory, such as WordNet.

Evaluation

The output of lexical acquisition systems must be evaluated. There are two main ways in which this evaluation can be done. Firstly, the performance of the lexicon on a task can be measured. A task-based evaluation is appropriate when there is a specific task that the lexicon is being designed for, however a ready-made 'plug and play' application is not always available. Acquired lexical information have often been evaluated on sub-tasks, so for example, selectional preferences have been evaluated on their performance at determining whether a given prepositional phrase should be attached to the preceding verb or noun phrase. For example, given the sentence *The boy hit the man with a stick*, the preference of *hit with a stick* is contrasted with the preference for *man with a stick*.

The second method is evaluation of the quality and coverage of the lexical entries. Evaluating the entries is often done by consulting a man-made resource referred to as a 'gold standard.' The obvious problem with using such a resource, or even a combination of several resources, is that there will be rare forms in the gold standard that are simply not attested in the corpus data used for training. Likewise the very need for lexical acquisition means that there will be legitimate information that is omitted from a gold standard. For this reason, evaluation is also performed by examining a manually annotated sample of text input to the acquisition process to verify that what is acquired does indeed reflect what is attested in the corpus, and also the adequacy of any acquired frequency estimates. Human experts can also perform a manual verification of the acquired information. This approach is used to identify the errors in the output rather than to prove that all information available in the input was successfully extracted. There are further problems when there is no widely agreed upon classification, as is the case when acquiring semantic classes, or no precise definition of the phenomena being acquired, for example, in the case of multiword acquisition. These problems show up in a lack of agreement between human judges. For example, if asked to determine the multiwords in:

(3) 'They ate the chocolate cake in the wendy house.'

human judges might unanimously decide that *wendy house* is a multiword, but will potentially have more trouble with *chocolate cake* since the interpretation is more standard.

Future Directions

Currently, acquisition focuses on coverage and accuracy of extracted information. There are issues of organization and representation that received attention when lexicons were manually constructed. Expressive representations with inheritance of features capture generalizations and avoid unnecessary repetition while handling exceptions. Acquisition from corpora currently focuses on acquiring one type of information as a flat list, perhaps ordered by frequency, alphabetically or arbitrarily. While issues of representation have been seen as important in the semi-automatic construction of some lexicons from machine readable resources (Copestake, 1992), there

has been little done on acquiring structured information from corpora. One reason that lexical acquisition from corpora has not used more complex representations is due to the widespread use of statistics and absence of a formal model for storing probability estimates in an inheritance framework. If such a framework were developed, acquisition of information into more complex representations might help in identifying cross-lingual generalizations and establishing correlations between different types of linguistic information, for example, linking a semantic class with syntactic behavior.

With the increasing variety of information required, lexical acquisition continues to play a crucial role within NLP. The importance is emphasized by many large-scale projects focusing on specific aspects of lexical acquisition, e.g., the Multiword Expression Project and MEANING. The process of acquisition has been greatly enhanced by vast quantities of data available in corpora, along with statistical techniques to derive the information from the data and the increasing computational power available. In recent years, new resources have proved useful, e.g., comparable corpora in different languages and the World Wide Web. In the future, further resources could be exploited. Speech or image processing might provide the prosody and visual cues that humans use when acquiring vocabulary. Dialogue systems might provide feedback when acquisition has gone wrong.

See also: Antonymy and Incompatibility; Computational Lexicons and Dictionaries; Corpora; Hyponymy and Hyperonymy; Lexeme-Morpheme-Based Morphology; Lexical Semantics: Overview; Lexicography: Overview; Lexicon: Structure; Machine Translation: Overview; Meronymy; Natural Language Processing: Overview; Syntactic Features and Feature Structures; WordNet(s).

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http://www.lsi.upc.es/nrigau/meaning/meaning.html – The MEANING project.

Lexical Conceptual Structure

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Introduction

The lexical conceptual structure (LCS) or simply the conceptual structure (CS) is an autonomous level of grammar in conceptual semantics (Jackendoff, 1983, 1990, 1997, 2002), in which the semantic interpretation of a linguistic expression is explicitly represented. Jackendoff's (1983) original conception is to posit a level of mental representation in which *thought* is couched (cf. the *language of thought* in Fodor, 1975). CS is a relay station between language and peripheral systems such as vision, hearing, smell, taste, kinesthesia, etc. Without this level, we would have difficulty in describing what we see and hear.

There are two ways to view CS in formalizing a linguistic theory. One is to view CS as a nonlinguistic system that serves as an interface between meaning and nonlinguistic modalities. Then, we need another level of representation for meaning (cf. Chomsky's [1981, 1995] LF); and CS is related to the linguistic meaning by pragmatics as shown in **Figure 1**. This is the view of Katz and Fodor (1963), Jackendoff (1972), Katz (1980), and Bierwisch and Schreuder (1992). The alternative conception is to view CS as the semantic structure. The linguistic meaning as well as nonlinguistic information compatible with sensory and motor inputs is directly represented in CS. CS is related with other linguistic levels such as syntax and phonology by correspondence rules, and therefore CS is part of the lexical information (*hence called* LCS) as shown in **Figure 2**. This is the current view of conceptual semantics.

One argument that supports the latter view comes from generic judgment sentences. In the standard view of linguistic meaning, judgments of superordination, subordination, synonymy, entailment, etc., are *linguistic*. We judge that 'bird' and 'chicken' make a superordinate-subordinate pair; that in some dialects 'cellar' and 'basement' are synonymous; and that 'Max is a chicken' entails 'Max is a bird.' Linguistic judgments of this sort are formalized in theories such as meaning postulates (Fodor, 1975) and semantic networks (Collins and Quillian, 1969).

Jackendoff (1983) points out one problem in formalizing these judgments from a purely linguistic perspective: judgments of superordination and subordination, for instance, are directly related to judgments of generic categorization sentences such as 'A chicken is a bird.' The judgment about generic categorization is, however, not entirely linguistic or semantic, in that it behaves creatively enough to include ambiguous cases such as (1) below.

(1a) A piano is a percussion instrument.
(1b) An australopithecine was a human.
(1c) Washoe (the chimp)'s sign system is a language.
(1d) An abortion is a murder.
(Jackendoff, 1983: 102)

We make generic categorization judgments about (1) not on the basis of meaning postulates or semantic networks but on the basis of our factual, often

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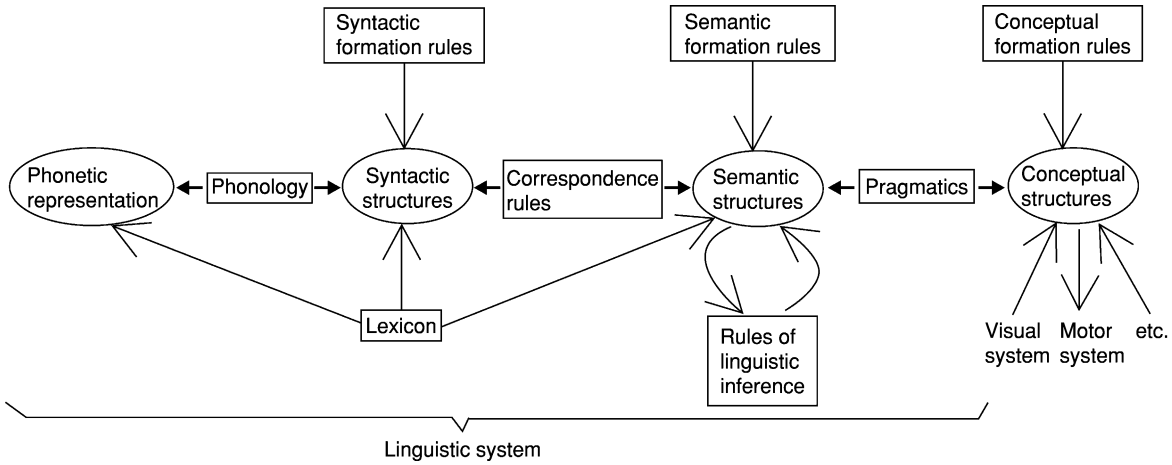

Figure 1 CS as a nonlinguistic system (adapted from Jackendoff R (1983). *Semantics and cognition*. Cambridge, MA: MIT Press, 20, with permission).

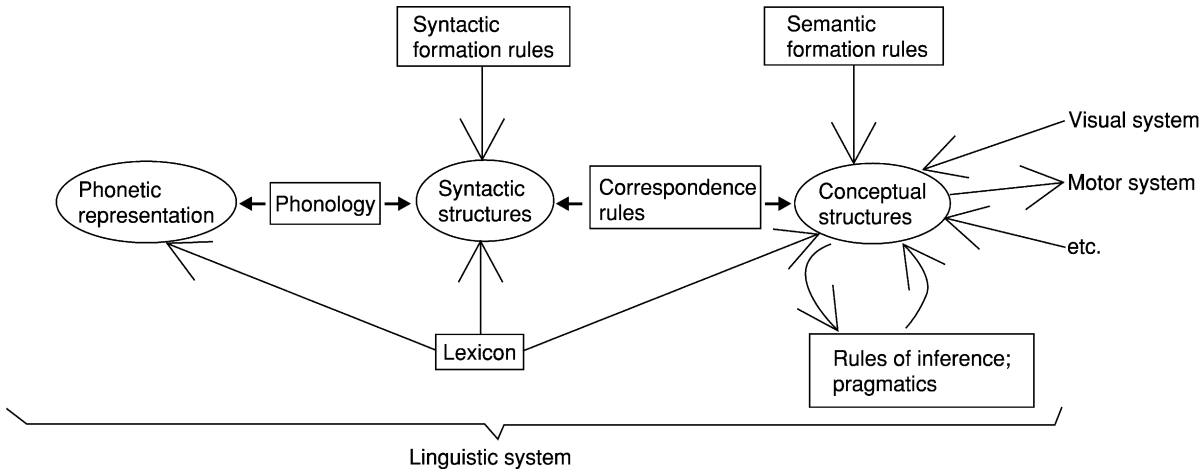

Figure 2 CS as part of the linguistic system (adapted from Jackendoff R (1983). *Semantics and cognition*. Cambridge, MA: MIT Press, 21, with permission).

political, world knowledge. For instance, our judgment about (1d) is influenced by our political position, religion, and knowledge about biology. This is analogous to Labov's (1973) dubious 'cup-bowl' judgment, which obviously resorts to nonlinguistic encyclopedic knowledge as well as the linguistic type system. CS is, by definition, the level that represents encyclopedic knowledge as part of our thought. Hence, we should refer to CS to make generic categorization judgments about (1).

Jackendoff's (1983) puzzle is summarized, as follows. We make judgments of semantic properties such as superordination and subordination at the level of semantic structure. We make generic categorization judgments at the level of CS as shown by (1). If the semantic structure were separated from CS, we would fail to catch the obvious generalization between the superordinate-subordinate judgment and the generic categorization judgment. If, by contrast, CS were the semantic structure, we would have no trouble in accounting for the intuitive identity between the two judgments. Therefore, CS is the semantic structure. For more arguments to support the view that CS is the semantic structure, see Jackendoff (1983: Ch. 6).

Overview of Conceptual Semantics

Autonomy of Semantics

A central assumption in conceptual semantics is the autonomy of semantics. In Chomsky's view of language, syntax makes an autonomous level of grammar, whereas phonology and semantics merely serve as interpretive components (PF and LF). Jackendoff (1997) criticizes this view as *syntactocentric*, and

provides convincing arguments to support his thesis that phonology and semantics as well as syntax make autonomous levels of grammar.

We find numerous pieces of evidence for the autonomy of semantics in the literature of both psycholinguistics and theoretical linguistics. Zurif and Blumstein's (1978) pioneering work shows that Wernicke's area is the center of semantic knowledge in the brain in comparison with Zurif, Caramazza and Myerson's (1972) previous finding that Broca's area is the center of syntactic knowledge. Swinney's (1979) classical work on lexical semantic priming shows that lexical semantics is independent of the grammatical contexts like the movement chain in a sentence. Piñango, Zurif, and Jackendoff (1999) report more workload for the online processing of aspectual coercion sentences (e.g., *John jumped for two hours*) than for the processing of syntactically equivalent noncoerced sentences (e.g., *John jumped from the stage*).

Semantic categories are not in one-to-one correspondence with syntactic categories. For instance, all physical object concepts correspond to nouns, but not all nouns express physical object concepts; e.g., *earthquake* and *concert* express event concepts. All verbs express event/state concepts, but not all event/state concepts are expressed by verbs; e.g., *earthquake* and *concert* are nouns.

Contrary to Chomsky's (1981) theta criterion, we have plenty of data that shows mismatch between syntactic functions and thematic roles. For instance, the semantic interpretation of *buy* necessarily encodes both the transfer of money from the buyer to the seller and the transfer of the purchased entity from the seller to the buyer. Among the three semantic arguments, i.e., the buyer, the seller, and the purchased object, only the buyer and the purchased entity are syntactic arguments (e.g., *John bought the book*). The seller is syntactically expressed as an adjunct (e.g., *John bought the book from Jill*). Moreover, the buyer plays the source role of money and the target role of the purchased entity simultaneously; the seller plays the source role of the purchased entity and the target role of money simultaneously. In short, the buyer and the seller have multiple theta roles even though each of them corresponds to one and only one syntactic entity.

A simple semantic distinction often corresponds to many syntactic devices. For instance, telicity is expressed by such various syntactic devices as choice of verb (2a), choice of preposition (2b), choice of adverbial (2c), choice of determiner in the subject NP (2d) and in the object NP (2e), and choice of prepositional object (2f) (Jackendoff, 1997: 35).

(2a)	John *destroyed* the cart (in/*for an hour).	→ Telic
	John *pushed* the cart (for/*in an hour).	→ Atelic
(2b)	John ran *to* the station (in/*for an hour).	→ Telic
	John ran *toward* the station (for/*in an hour).	→ Atelic
(2c)	The light flashed *once* (in/*for an hour).	→ Telic
	The light flashed *constantly* (for/*in an hour).	→ Atelic
(2d)	*Four people* died (in/*for two days).	→ Telic
	People died (for/*in two days)	→ Atelic
(2e)	John ate *lots of peanuts* (in/*for an hour)	→ Telic
	John ate *peanuts* (for/*in an hour).	→ Atelic
(2f)	John crashed into *three walls* (in/*for an hour)	→ Telic
	John crashed into *walls* (for/*in an hour)	→ Atelic

To sum up, the mapping between syntax and semantics is not one-to-one; rather, it is one-to-many, many-to-one, or at best many-to-many. The mapping problem is not easy to explain in the syntactocentric architecture of language. The overall difficulty in treating semantics merely as an interpretive component of grammar along with a similar difficulty treating phonology as an interpretive component (cf. Jackendoff, 1997: Ch. 2) leads Jackendoff to propose a tripartite architecture of language, in which phonology, syntax, and semantics are all independent levels of grammar licensed by phonological formations rules, syntactic formation rules, and conceptual/semantic formation rules respectively, and interfaced by correspondence rules between each pair of modules, as shown in Figure 3.

Lexical Conceptual Structure

Conceptual semantics assumes striking similarities for the organization of CS with the structural organization of syntax. As syntax makes use of syntactic categories, namely syntactic parts of speech like nouns, adjectives, prepositions, verbs, etc., semantics makes use of semantic categories or semantic parts of speech such as Thing, Property, Place, Path, Event, State, etc. As syntactic categories are motivated by each category member's behavioral properties in syntax, semantic or ontological categories are motivated by each category member's behavioral properties in meaning.

Syntactic categories are combined by syntactic phrase-structure structure rules into larger syntactic expressions; likewise, semantic categories are combined by semantic phrase-structure rules into larger semantic expressions. The syntactic representation is structurally organized, so we can define dominance or government relations among syntactic constituents; likewise, the semantic representation is structurally organized, so we can define grammatically significant hierarchical relations among semantic constituents. Various syntactic phrase-structure rules can be generalized into a rule schema called X-bar syntax (Jackendoff, 1977); likewise, various semantic

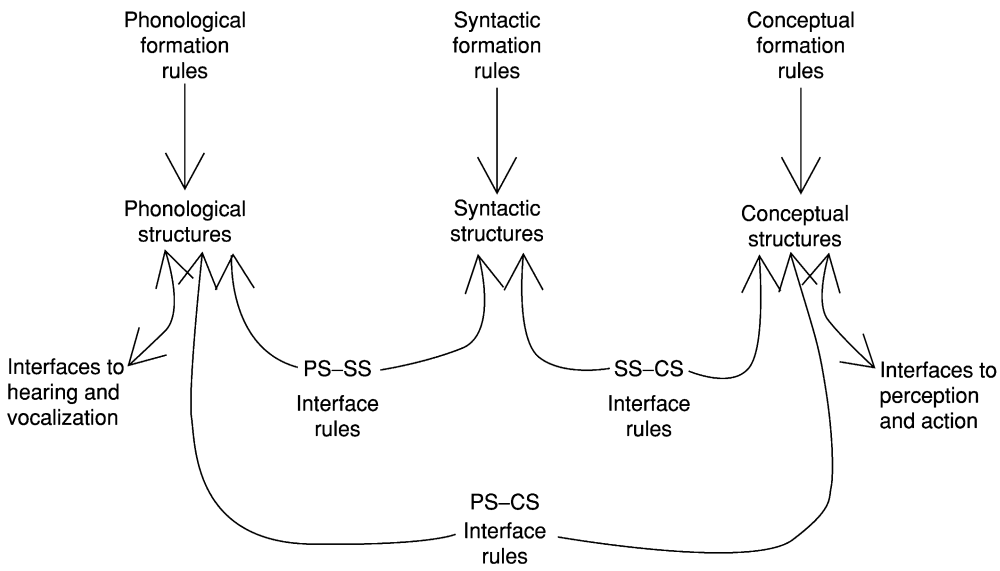

Figure 3 The tripartite parallel architecture (reproduced from Jackendoff R (2002). *Foundations of language: brain, meaning, grammar, evolution.* Oxford: Oxford University Press).

phrase-structure rules can be generalized into a rule schema called X-bar semantics (Jackendoff, 1987b).

Ontological Categories Ontological categories are first motivated by our cognitive layouts. To mention some from the vast psychology literature, Piaget's developmental theory of *object permanence* shows that infants must recognize objects as a whole, and develop a sense of permanent existence of the objects in question when they are not visible to the infants. Researchers in language acquisition have identified many innate constraints on language learning like reference principle, object bias, whole object principle, shape bias, and so on (cf. Berko Gleason, 1997). For instance, children rely on the assumption that words refer to objects, actions, and attributes in the environments by reference principle. Wertheimer's (1912) classical experiment on *apparent movement* reveals that humans are equipped with an innate tendency to perceive the change of location as movement from one position to the other; the apparent movement experiment renders support for the expansion of the event category into function argument structures like $[_{Event}$ GO $([_{Thing}], [_{Path}])]$.

Ontological categories also have numerous linguistic motivations. Pragmatic anaphora (exophora) provides one such motivation. In order to understand the sentence in (3), the hearer might have to pick out the referent of *that* among several entities in the visual field. If the hearer did not have object concepts to organize the visible entities, (s)he could not pick out the proper referent of the pragmatic anaphora *that*. The object concept involved in the semantic interpretation of (3) motivates the ontological category Thing.

(3) I bought *that* last night.

The category Thing proves useful in interpreting many other grammatical structures. It provides the basis of interpreting the Wh-variable in (4a); it supports the notion of identity in *the same* construction in (4b); and it supports the notion of quantification as shown in (4c).

(4a) *What* did you buy last night?
(4b) John bought *the same thing* as Jill.
(4c) John bought *something/everything that Jack bought*.

Likewise, we find different sorts of pragmatic anaphora that motivate ontological categories like Place (5a), Direction (5b), Action (5c), Event (5d), Manner (5e), and Amount (5f).

(5a) Your book was *here/there*.
(5b) They went *there* yesterday.
(5c) Can he do *this/that*?
(5d) *It* happened this morning.
(5e) Bill shuffled a deck of cards *this* way.
(5f) The man I met yesterday was *this* tall.

These ontological categories provide innate bases for interpreting Wh-variables, the identity construction, and the quantification, as shown in (6)–(8).

(6a) *Where* was my book?
(6b) *Where* did they go yesterday?
(6c) *What* can he do?

(6d) *What* happened this morning?
(6e) *How* did Bill shuffle a deck of cards?
(6f) *How* tall was the man you met yesterday?

(7a) John put the book on *the same place* as Bill.
(7b) John went *the same way* as Bill.
(7c) John did *the same thing* as Bill.
(7d) *The same thing* happened yesterday as happened this morning.
(7e) John shuffled a deck of cards *the same way* as Bill.
(7f) John is *as tall as* the man I met yesterday.

(8a) John put the book at *some place that Bill put it*.
(8b) John went *somewhere that Bill went*.
(8c) John did *something Bill did*.
(8d) *Something that happened this morning* will happen again.
(8e) John will shuffle cards in *some way that Bill did*.
(8f) (no parallel for amounts)

For more about justifying ontological categories, see Jackendoff (1983: Ch. 3).

Conceptual Formation Rules Basic ontological categories are expanded into more complex expressions using function-argument structural descriptions. (9) shows such expansions of some ontological categories.

(9a) EVENT → [$_{\text{Event}}$ GO (THING, PATH)]
(9b) EVENT → [$_{\text{Event}}$ STAY (THING, PLACE)]
(9c) EVENT → [$_{\text{Event}}$ CAUSE (THING or EVENT, EVENT)]
(9d) EVENT → [$_{\text{Event}}$ INCH (STATE)]
(9e) STATE → [$_{\text{State}}$ BE (THING, PLACE)]
(9f) PLACE → [$_{\text{Place}}$ PLACE-FUNCTION (THING)]
(9g) PATH → [$_{\text{Path}}$ PATH-FUNCTION (THING)]

The function-argument expansion is exactly parallel with rewriting rules in syntax (e.g., S → NP VP; NP → Det (AP)* N; VP → V NP PP), and hence can be regarded as semantic phrase-structure rules. The semantic phrase-structure rules in (9) allow recursion such as syntactic phrase-structure rules: an Event category can be embedded in another Event category as shown in (9c). We also can define hierarchical relations among conceptual categories in terms of the depth of embedding as we define syntactic dominance or government in terms of the depth of embedding in syntactic structures. The depth of embedding in CS plays a significant role in explaining such various grammatical phenomena as subject selection, case, binding, control, etc. See Culicover and Jackendoff (2005) for more about these issues.

Place functions in (9f) may include IN, ON, TOP-OF, BOTTOM-OF, etc. Path functions in (9g) may include TO, FROM, TOWARD, VIA, etc. Conceptual semantics is a parsimonious theory, in that it makes use of only a handful of functions as conceptual primitives. All functions should be motivated on strict empirical grounds. This is exactly parallel with using only a handful of syntactic categories motivated on strict empirical grounds. Syntactic phrase-structure rules do not refer to unlimited number of syntactic categories. Syntactic categories such as noun, adjective, preposition, verb, etc. are syntactic primitives, and they are motivated by each category member's behavioral properties in syntax. Likewise, semantic phrase-structure rules refer to a restricted set of semantic or conceptual primitives that are empirically motivated by general properties of meaning.

Functions such as GO, BE, and STAY are empirically motivated in various semantic fields. They are the bases for interpreting spatial sentences in (10).

(10a) GO: The train traveled from Boston to Chicago.
(10b) BE: The statue stands on Cambridge common.
(10c) STAY: John remained in China.

These functions also support the interpretation of possession sentences in (11).

(11a) GO: John gave the book to Bill.
(11b) BE: John had no money.
(11c) STAY: The library kept several volumes of the Korean medieval literature.

Interpreting ascription sentences also require GO, BE, and STAY, as shown in (12).

(12a) GO: The light turned from yellow to red.
(12b) BE: The stew seemed distasteful.
(12c) STAY: The aluminum stayed hard.

One interesting consequence of having GO, BE, and STAY in both spatial and nonspatial semantic fields is that we can explain how we use the same verb for different semantic fields.

(13a) The professor turned into a driveway.	(Spatial)
(13b) The professor turned into a pumpkin.	(Ascription)
(14a) The bus goes to Paris.	(Spatial)
(14b) The inheritance went to Bill.	(Possession)
(15a) John is in China.	(Spatial)
(15b) John is a doctor.	(Ascription)
(16a) John kept the CD in his pocket.	(Spatial)
(16b) John kept the CD.	(Possession)
(17a) The professor remained in the driveway.	(Spatial)
(17b) The professor remained a pumpkin.	(Ascription)

In (13), the verb *turn* is used in both spatial and ascription sentences with the GO meaning. How do we use the same verb for two different semantic fields? Do we have to assume two different lexical entries for *turn*? Conceptual semantics does not pay anything to explain this puzzle. We do not need two different lexical entries for *turn* to explain the spatial and ascription meanings. We just posit the event function GO for the lexical semantic description or LCS for *turn* in (13). Both spatial and ascription meanings follow form the LCS for *turn*, since the function GO is in principle motivated by both spatial and ascription sentences. We can provide similar accounts for all the data in (14)–(17). For more about the general overview of conceptual semantics, see Jackendoff (1983, 1987a, 1990, 2002).

X-bar Semantics

Generative linguists in the 1950s and 1960s succeeded in showing the systematic nature of language with a handful of syntactic phrase-structure rules. But they were not sure how the phrase-structure rules got into language learners' minds within a relatively short period of time; it was a learnability problem. X-bar syntax (Chomsky, 1970; Jackendoff, 1977) opened a doorway to the puzzle. Children do not have to be born with dozens of syntactic categories; children are born with one syntactic category, namely, category X. Children do not have to learn dozens of totally unrelated syntactic phrase-structure rules separately; all seemingly different syntactic phrase-structure rules share a fundamental pattern, namely, X-bar syntax.

Jackendoff (1987b, 1990), who was a central figure in developing X-bar syntax in the 1970s, has completed his X-bar theory by proposing X-bar semantics. We have so far observed that CS is exactly parallel with the syntactic structure. Conceptual categories are structurally organized into CS by virtue of semantic phrase-structure rules, as syntactic categories are structurally organized into syntactic structure by virtue of syntactic phrase structure rules. (18) is the basic formation of X-bar syntax.

(18a) XP → Spec X'
(18b) X' → X Comp
(18c) X → [± N, ± V]

Now that CS has all parallel properties with the syntactic structure, all semantic phrase-structure rules are generalized into X-bar semantics along the same line with X-bar syntax as shown in (19).

$$(19)\quad [\text{Entity}] \rightarrow \begin{bmatrix} \text{Event Thing Place} \ldots \\ \text{Token Type} \\ \text{F}(< \text{Entity}_1, < \text{Entity}_2, < \text{Entity}_3 >>> \end{bmatrix}$$

(19) provides not only the function-argument structural generalization for all the semantic phrase-structure rules but also shows how major syntactic constituents correspond to major conceptual categories. That is, the linking between syntax and semantics can be formalized as (20) and (21).

(20) XP corresponds to [Entity]

$$(21)\quad \begin{bmatrix} \text{X}_0 \\ ___ < \text{YP} < \text{ZP} >> \end{bmatrix} \underset{\text{to}}{\text{corresponds}} \begin{bmatrix} \text{Entity} \\ \text{F}(\text{E}_1, < \text{E}_2, < \text{E}_3 >>) \end{bmatrix}$$

where YP corresponds to E_2, ZP corresponds to E_3, and the subject (if there is one) corresponds to E_1.

To sum up, the obvious similarity between (18) and (19) enables us to account for the tedious linking problem without any extra cost.

General Constraints on Semantic Theories

Jackendoff (1983) suggests six general requirements that any semantic theory should fulfill: expressiveness, compositionality, universality, semantic properties, the grammatical constraint, and the cognitive constraint.

First, a semantic theory must be observationally adequate; it must be expressive enough to describe most, if not all, semantic distinctions in a natural language. Conceptual semantics has expressive power, in that most semantic distinctions in a natural language can be represented by CS with a handful of conceptual categories plus conceptual formation rules. What is better is that the expressive power has improved since the original conception of the theory. For instance, Jackendoff (1990: Ch. 7) introduced the action tier into the theory to represent the actor/patient relation aside from motion and location. In (22a), *John* is the source of the *ball* and the actor of the throwing event simultaneously; the *ball* is a moving object, the theme, and an affected entity, the patient, simultaneously. It is quite common for one syntactic entity to bear double theta roles contra Chomsky's (1981) theta criterion; conceptual semantics captures this by representing the motion/location event in the thematic tier (22b), and the actor/patient relation in the action tier (22c).

(22a) John threw the ball.
Source Goal
Actor Patient
(22b) [$_{\text{Event}}$ CAUSE ([JOHN], [$_{\text{Event}}$ GO([BALL], [$_{\text{Path}}$ TO([. . .])])])]
(22c) [AFF([JOHN], [BALL])]

The action tier not only explains the fine semantic distinction in language but also plays a central role in such grammatical phenomena as linking and case. Besides the action tier, Jackendoff (1991) introduced

an elaborate feature system into CS to account for the semantics of parts and boundaries; Csuri (1996) introduced the referential tier into CS that describes the definiteness of expressions; Jackendoff (2002) introduced the lambda extraction and the topic/focus tier into CS. All these and many other innovations make the theory expressive enough to account for significant portion of natural language semantics.

The second constraint on a semantic theory is compositionality: an adequate semantic theory must show how the meanings of parts are composed into the meaning of a larger expression. Conceptual semantics is compositional, in that it shows how combinatorial rules of grammar compose the meanings of ontological categories into the CS of a larger expression.

The third requirement is universality: an adequate semantic theory must provide cross-linguistically relevant semantic descriptions. Conceptual semantics is not a theory of meaning for any particular language. It is a universal theory of meaning; numerous cross-linguistic studies have been conducted with the conceptual semantic formalism. See Jun (2003), for instance, for a review of many conceptual semantic studies on the argument linking and case in languages such as Korean, Japanese, Hindi, Urdu, English, Old English, French, etc.

The fourth requirement is semantic properties: an adequate semantic theory should be able to explain many semantic properties of language like synonymy, anomaly, presupposition, and so on. That is, any semantic theory must explicate the valid inference of expressions. CS provides a direct solution to this problem in many ways. The type/token distinction is directly expressed in CS, and explains most semantic distinctions made by the semantic type system. By decomposing verbs such as *kill* into *[CAUSE ([THING], [NOT-ALIVE ([THING])])]*, conceptual semantics explains how *John killed Bill* entails *Bill is dead*. For more about semantic properties, see Jackendoff (1983, 1990, 2002).

The fifth requirement is the grammatical constraint: if other things were equal, a semantic theory that explains otherwise arbitrary generalizations about the lexicon and the syntax would be highly preferable. Conceptual semantics is a theory of meaning that shows how a handful of conceptual primitives organize the vast domain of lexical semantics. Conceptual semantics also explains how semantic entities are mapped onto syntactic entities in a principled manner. For instance, the linking principle in conceptual semantics states that the least embedded argument in the CS is mapped onto the least embedded syntactic argument, namely the subject. In (22b & c), [JOHN] is the least embedded argument in both the action and thematic tiers; this explains why [JOHN] instead of [BALL] is mapped onto the subject of (22a). Jun (2003) is a conceptual semantic work on case; Culicover and Jackendoff (2005) offer conceptual semantic treatments of binding, control, and many other syntax-related phenomena. In short, conceptual semantics is an interface theory between syntax and semantics. The theory has a desirable consequence for the learnability problem, too. Language learners cannot acquire language solely by syntax or solely by semantics. As Levin (1993) demonstrates, a number of syntactic regularities are predicted by semantic properties of predicates. Conceptual semantics makes a number of predictions about syntax in terms of CS. Chomsky's explanatory adequacy is a requirement for the learnability problem; conceptual semantics is thus a theory that aims to achieve the highest goal of a linguistic theory.

The final requirement on a semantic theory is the cognitive constraint: a semantic theory should address interface problems between language and other peripheral systems like vision, hearing, smell, taste, kinesthesia, etc. Conceptual semantics fulfills this requirement, as CS is by definition a level of mental representation at which both linguistic and nonlinguistic modalities converge. Jackendoff (1987c) focuses on the interface problem, and shows, for instance, how the visual representation is formally compatible with the linguistic representation based on Marr's (1982) theory of visual perception.

Comparison with Other Works

Bierwisch and Schreuder's (B&S; 1992) work is another influential theory that makes explicit use of the term *conceptual structure*. Conceptual semantics shares two important assumptions with B&S, but there are crucial distinctions between the two theories. First, B&S also assume a separate level of conceptual structure. Their conception of CS is similar to Jackendoff's conception of CS in that CS is a representational system of message structure where non-linguistic factual/encyclopedic information is expressed. B&S, however, assume that CS strictly belongs to a nonlinguistic modality, and that the linguistic meaning is represented in another level called *semantic form* (SF). As a result, SF, but not CS, is the object of lexical semantics, and hence LCS does not make much sense in this theory. In the first section of this article, we discussed two possible views of CS; B&S take the former view of CS, whereas Jackendoff advocates the latter view.

Second, SF in B&S's theory is compositional as CS in conceptual semantics. B&S's lexical decomposition relies on two sorts of elements: constants such as DO,

MOVE, FIN, LOC, etc., and variables such as x, y, z. Constants and variables are composed into a larger expression in terms of formal logic. (23a) illustrates B&S's SF for *enter*; (23b) is the CS for the same word in Jackendoff's theory.

(23a) [y DO [MOVE y] : FIN [y LOC IN x]]
(23b) [$_{\text{Event}}$ GO ([$_{\text{Thing}}$], [$_{\text{Path}}$ TO ([$_{\text{Place}}$ IN ([$_{\text{Thing}}$])])])]

One reason B&S maintain a purely nonlinguistic CS as well as a separate SF is that factual or encyclopedic knowledge does not seem to make much grammatical contribution to language. To B&S, there is a clear boundary where the *semantic* and the *encyclopedic* diverge.

Pustejovsky's (1995) generative lexicon (GL) theory is interesting in this regard. GL also assumes lexical decomposition. Pustejovsky's lexical decomposition makes use of factual or encyclopedic knowledge in a rigorous formalism called the *qualia* structure. The qualia structure of *book*, for instance, expresses such factual knowledge as the origin of *book* as *write(x, y)* in the Agentive quale, where *x* is a writer (i.e., *human(x)*), and *y* is a book (i.e., *book(y)*). The qualia structure also expresses the use of the word in the Telic quale; hence, the lexical semantic structure for *book* includes such factual knowledge as *read(w, y)*, where *w* is a reader (i.e., *human(w)*), and *y* is a book.

The factual or encyclopedic knowledge is not only expressed in formal linguistic representations but also plays a crucial role in explaining a significant portion of linguistic phenomena. We interpret (24) as either *Chomsky began writing a book* or *Chomsky began reading a book*. Pustejovsky suggests generative devices like type coercion and co-composition to explain the two readings of (24) in a formal theory; i.e., *writing* or *reading* is part of the qualia structure of *book*, and, hence, the two readings of (24) are predicted by formal principles of lexical semantics.

(24) Chomsky began a book.

It is far beyond the scope of this article to discuss the GL theory in detail. But the success of the GL theory for a vast range of empirical data shows that the boundary between *semantic* and *encyclopedic* or between *linguistic* and *nonlinguistic* is not so clear as B&S assume in their distinction between CS and SF.

Suggested Readings

For a quick overview of conceptual semantics with one paper, see Jackendoff (1987a). For foundational issues of conceptual semantics, see Jackendoff (1983). For an overview of language and other cognitive capacities from a broad perspective, see Jackendoff (1987c). Jackendoff (1990) offers a comprehensive picture of conceptual semantics. Jackendoff (1997) is a bit technical, but it is important to set up the parallel architecture of language. For syntactic issues of conceptual semantics, see Jun (2003) and Culicover and Jackendoff (2005).

See also: Agrammatism II: Linguistic Approaches; Anaphora, Cataphora, Exophora, Logophoricity; Anatomical Asymmetries versus Variability of Language Areas of the Brain; Constants and Variables; Lexicon, Generative; Formal Models and Language Acquisition; Hyponymy and Hyperonymy; Meaning Postulates; Semantic Primitives; X-Bar Theory.

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Lexical Conditions

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In many schools of linguistics it is assumed that each sentence *S* in a natural language has a so-called *semantic analysis* (SA), a syntactic structure representing *S* in such a way that the meaning of *S* can be read off its SA in a regular way. The SA of a sentence *S* is distinct from its *surface structure* (SS), which corresponds directly with the way *S* is to be pronounced. Each language has a set of rules, its grammar **G**, defining the relationship between the SAs and the SSs of its sentences. The SA of a sentence *S* is often also called its *logical form*, because the SA exhibits not only the predicate-argument structure of *S* and its embedded clauses if *S* has any, but also the logically correct position of tense, quantifiers, negation, modalities, and other possible operators – besides all the meaningful lexical items of the corresponding SS. SAs are thus analytical as regards their structure, not as regards their lexical items. The lexical items of SSs are in place in SAs: in principle, SAs provide an analysis that goes as far as the lexical items and stops there. SAs do not specify lexical meanings.

Lexical meanings are normally specified in dictionaries, but dictionaries do so from an SS point of view. However, linguistic theories assuming an SA-level of representation for sentences require that lexical meanings be specified at SA-level. The difference is that, at SA-level, lexical items are allowed to occur only in predicate positions. A surface sentence like (1a) is represented at SA-level as (1b), written as the linear formula (1c) and read intuitively as (1d):

(1a) The farmer was not working on the land.
(1b)

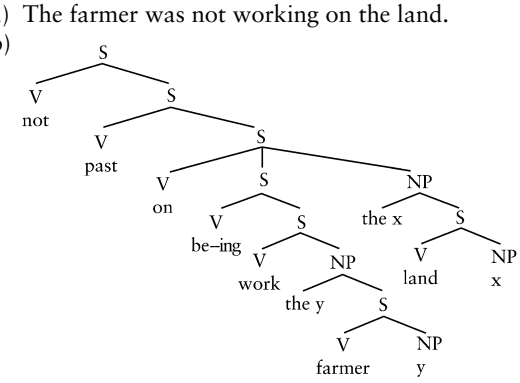

(1c) S[V[not] S[V[past] S[V[on] S[V[be] S[V[work] NP[the y S[V[farmer] NP[y]]]]] NP[the x S[V[land] NP[x]]]]]]
(1d) It is not so that in the past on the land the farmer was working.

The items *not*, *past*, *on*, *be–ing*, *work*, *farmer*, and *land* are all labeled 'V', which makes them predicates in (1b). In (1a), however, *farmer* is a noun, the past tense is incorporated into the finite verb form *was*, *not* is usually considered an adverb, *working* is a present participle in the paradigm of the verb *work*, *on* is a preposition, and *land* is again a noun.

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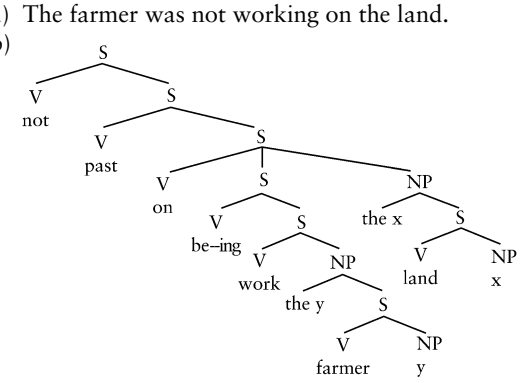

(1c) S[V[not] S[V[past] S[V[on] S[V[be] S[V[work] NP[the y S[V[farmer] NP[y]]]]] NP[the x S[V[land] NP[x]]]]]]
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The items *not*, *past*, *on*, *be–ing*, *work*, *farmer*, and *land* are all labeled 'V', which makes them predicates in (1b). In (1a), however, *farmer* is a noun, the past tense is incorporated into the finite verb form *was*, *not* is usually considered an adverb, *working* is a present participle in the paradigm of the verb *work*, *on* is a preposition, and *land* is again a noun.

Because predicates express properties, the question is what property the predicates at issue assign to what kind of objects. *Not* assigns the property of being false to the proposition in its scope. (Finnish and cognate languages use verbs for the negation: 'John *nots* working' for 'John does not work.') *Past* places its proposition in a given past time. *On* says that the farmer's being at work is on the land. (Some American Indian languages say 'the farmer's working *on-s* the land,' with *on* as a verb.) *Be–ing* stretches the farmer's working out over a period of time. *Farmer* and *land* assign the property of being a farmer, or land, to the values of their variables. Thus, despite differences in surface categories, all lexical words can be regarded as predicates at SA level.

Analyzing all lexical meanings as predicate meanings has the advantage of a uniform format of lexical specification for all lexical items. The format is that of a definition of *satisfaction conditions* or *lexical conditions*. The lexical conditions of an *n*-ary predicate P^n define the property assigned by P^n. They are the conditions that must be fulfilled by any object (or *n*- tuple of objects) *o* for *o* to deserve P^n, in the sense that when P^n is applied to *o*, a true proposition results. Thus, for example, the conditions that determine whether a sentence like *This animal is a dog* is true are the lexical conditions associated with the predicate *dog*, applied to whatever object is referred to by the definite term *this animal*. Only if that object fulfills the conditions that are necessary for doghood is the sentence true. Generally, the *extension* $[[P^n]]$ of the predicate P^n is the set of *n*- tuples of world objects *o* that fulfill the conditions set for P^n. Or:

(1) $[[P^n]] = \{<o_1, \ldots, o_n> \mid \ldots \text{(lexical conditions)} \ldots\}$

It is important to note that the lexical conditions thus specified do not, generally, exhaust the meaning of a predicate, even though lexical conditions can be formulated with great subtlety. Meanings often have *vague* boundaries, which makes the formulation of lexical conditions difficult. Words are often *polysemous* in that they have different but related meanings, such as the word *chest*, which applies either to a box meant for storage or to the part of a human body that is enclosed by the ribs. Polysemy often leads to homonymy or near homonymy (again with vague boundaries), as in the case of *table* (piece of furniture, slab of stone with symbols on it, or well-ordered list of data) or *leaf* (of a tree or of a book). Moreover, there is often *dynamic filtering* in word meanings, as in *The office is on fire* versus *The office has a day off*. In the former, the term *the office* denotes a building, in the latter a group of employees. The difference is caused by the nature of the predicate: *be on fire* requires a combustible object, whereas *have a day off* requires humans under a statute imposing duties, but how to integrate such possible referential differences into the format shown in (1) is unknown (and largely undiscussed in the literature). Then there is *object dependency*, as with verbs of cutting: one *cuts* the grass, one's hair or nails, one's finger, and the meat (though cutting one's finger is very different from cutting the meat); one *trims* the hedge and the dog, and sometimes one's hair also; one *tailors* a suit (German: *schneiden*); one *gelds* a horse (French: *couper*), etc. It is such phenomena that make it hard to use the format shown in (1) for the practical purposes of dictionaries.

In one respect, the format of (1) can be refined. Presuppositions are naturally accounted for by making a distinction between two kinds of lexical conditions, *preconditions* and *update conditions* (*see* **Presupposition**). Presuppositions are derivable from the preconditions of SA-predicates (see Fillmore, 1971; Seuren, 1985: 266–313). Consider the predicate *be divorced*. For someone to be divorced, they must have been married first. Or the predicate *be back*: for someone to be back, they must have been away first. The conditions of having been married first or having been away first are the preconditions of these predicates. The condition that the marriage has been dissolved, or that the person in question is no longer away, is the update condition.

When a precondition is not fulfilled, the sentence suffers from presupposition failure, a condition that, according to some (in particular Strawson, 1950), leads to a lack of truth value and according to others (Blau, 1978; Seuren, 1985), to a third truth value, strong or 'radical' falsity. If an update condition is not fulfilled, the sentence is simply, or minimally, false. In presupposition theory, the lexical conditions of a predicate P^n can thus be presented in the following general format:

(2) $[[P^n]] = \{<o1, \ldots, on> : \ldots \text{(preconditions)} \ldots \mid \ldots \text{(update conditions)} \ldots\}$

This format is exemplified in, for example, the following specification for *be divorced*:

(3) $[[\text{be divorced}^1]] = \{ o : o \text{ was married} \mid o\text{'s marriage has been legally dissolved} \}$

Or: 'the extension of the predicate *be divorced* is the set of entities *o* such that *o* (precondition) was married, and (update condition) *o*'s marriage has been legally dissolved'.

See also: Discourse Domain; Discourse Semantics; Multivalued Logics; Presupposition.

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Lexical Fields

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Introduction

Lexical fields have an immediate intuitive appeal. The reference to one or two examples like the field of verbs of motion *walk*, *run*, *skip*, ... or the field of adjectives of emotion *happy, angry, disappointed*, ... normally is enough to give the feeling that one knows what we are talking about. A widespread curiosity about words also helps, not the least in the context of being a parent and trying to collect the child's first words. At the same time, one cannot help noticing that textbooks very rarely go beyond the mere mentioning of lexical fields in form of a few examples, plus perhaps some critical remarks about the apparent lack of rigor around the concept. In other words, the intuitive strength of the concept may go together with some theoretical vagueness. Nonetheless, what remains at this stage is the widespread appeal of the concept and undoubtedly successful application of the concept in several disciplines:

- Lexicology, Semantics and Cognitive Linguistics. Lexical fields are a useful tool for holistic approaches about lexical meaning, structures of the vocabulary and mental lexicon as well as issues around categorization.
- Lexicography. The codification of the vocabulary of a language can be done in several different formats, and the organization of entries around lexical fields is one of them and leads to specialized dictionaries.
- Psycholinguistics. Lexical fields are employed in connection with word memory tests, explorations on language acquisition and language loss.
- Anthropology. Lexical fields are a useful tool in fieldwork on the language and culture of societies. This remains a major area in the context of globalization and 'Global' English, and the concern about endangered languages.
- Medical Neuroscience and Clinical Linguistics. Lexical fields are used for the investigation of different forms of aphasia.

In addition to the term 'lexical field,' there are other terms in use, such as 'word field' and 'semantic field'; but we shall confine ourselves to lexical field, which provides greater flexibility, because, in contrast to word field, it implies that the relevant groupings involve lexical elements and these are not necessarily confined to words. At least in theory idioms can be contemplated as possible members of such groupings. We also prefer lexical to semantic because the relevant groupings are parts of the lexicon, and its elements will consist of a form level as well as of a content level.

Background

Lexical fields contribute to structuring the lexicon and to exploration of lexical meaning. Although the lexical meaning of any member of the lexicon must be seen as a holistic entity, this does not preclude its conception as something internally structured. This structure must make provision for phenomena such as monosemy and polysemy; and, for each individual sense, phenomena such as prototypicality, stereotypes, and family resemblances need to be incorporated. In addition, the outer boundaries of the lexical meaning/senses of any member of the lexicon will be established by finding its unique position in the content plane of the lexicon. This happens in contradistinction to other similar lexical meanings along the paradigmatic dimension and in connection with other different, but compatible lexical meanings along the syntagmatic dimension. The paradigmatic dimension is mainly captured by membership in the same lexical fields and by means of sense relations, but also partly by associations. The syntagmatic dimension is mainly captured by collocations, but also partly by associations.

Whichever structure one adopts for the lexical meaning, it cannot be a static one. One has to take

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Whichever structure one adopts for the lexical meaning, it cannot be a static one. One has to take

into account the dynamics of the lexicon, which expresses itself at the synchronic level in form of variation and at the diachronic level in form of change. Such a fascinating complexity of the lexicon of any natural language allows for many different ways of ordering the lexicon, and any particular way of doing so can only capture certain aspects of such a complex system of systems. In a sense, lexical fields themselves have to find their own unique position in the vast field of all possible orderings of the lexicon, and will, in any case, only be able to catch one particular type of ordering. Therefore, stretching and extending the concept beyond its established conception will have to be looked at carefully and may not be the right way forward, especially when we have other concepts such as word families and frames.

The Concept of Lexical Field

Any concept of lexical fields will try to capture the following basic ideas and principles:

- Fields have a position somewhere between the individual lexical element and the whole lexicon, i.e., fields build relevant parts of the lexicon and make a contribution to the structuring of the lexicon.
- Fields and individual words have in common that they are part of the lexicon. Fields and the lexicon have in common that they are constituted from words.
- Fields are (higher level) signs and therefore comprise a form level as well as a content level.
- Each element of the field receives its position in contradistinction and interconnection with other elements of the field. In other words, fields help to establish the senses of individual elements and therefore have to be seen as part of a semasiological approach.
- Each lexical field deals with a particular conceptual domain and therefore can be seen as part of an onomasiological approach.

With regard to the form level of a lexical field, lexical fields are particular paradigmatic groupings within the lexicon, i.e., their elements belong in each case to the same parts of speech. Although examples of lexical fields can be found for any part of speech, the most useful ones in terms of size and structures are found for nouns, verbs, and adjectives. Apart from possible problems with classification in terms of parts of speech, this does not preclude idioms as special lexical elements from being members of lexical fields. Because there are other groupings such as word families and frames that allow links between members from different parts of speech, there is no problem in keeping lexical fields to elements of one and the same part of speech. The fact that we see lexical fields as 'particular' paradigmatic groupings will have to do with the way that the form level is linked to the content level.

If it is true that each lexical field is meant to deal with a particular conceptual domain, then all members of a lexical field will have to relate to this particular domain and therefore will all be similar in terms of their senses. The domain will normally be labeled by a specific term such as 'body part,' 'fruit,' 'transfer,' 'temperature,' etc., and this allows us to talk of 'the lexical field of body part nouns,' 'the lexical field of nouns of fruit,' 'the lexical field of verbs of transfer,' 'the lexical field of adjectives of temperature,' etc. The term that captures the domain provides the semantic framework for the lexical field and each member of this specific field must have a sense that is compatible with the meaning of the domain term, i.e., has an identical to or a more specific sense than the meaning of the term. This way a lexical field also constitutes a special onomasiological grouping, namely all members belong to the same part of speech. This may well mean that the field does not have a member whose sense is identical with the meaning of the domain term. For instance, in the field of English adjectives of temperature, we do not have an adjective that would match the meaning of the noun 'temperature.'

The membership of a lexical field structures the given domain and one needs some tools to describe the particular structure. The resulting description should guarantee the unique position in some kind of semantic space for each member of the lexical field. It is wise to apply a combination of dimensions and sense relations.

The idea is to attach a finite number of dimensions to the field. Each dimension is meant to provide a partition of the whole set. The resulting sets are therefore disjoint with each other and the name of each set normally reflects a necessary part of the relevant sense of the element. In other words, a paraphrase of the relevant sense of the element would normally involve the partition name. It has to be stressed that the idea of such a name is similar, but not identical, to traditional features of a componential analysis and that we are talking metalinguistically of a partition of the set of elements, not of anything out there in reality. For instance, take the trivial paradigm P = {*Venus, morning star, evening star*}. All three nouns refer to the same entity: Venus. In line with Frege's thoughts we could establish a dimension 'Time of occurrence in the sky.' This dimension

would divide the paradigm into three sets: S1 = {*morning star*}, S2 = {*evening star*}, S3 = {*Venus*} with the corresponding names N1 = 'the brightest star in the morning sky,' N2 = 'the brightest star in the evening sky,' N3 = 'neutral.' Furthermore, there is no claim to the effect that the sum of all names of all sets of which a particular element is member of would constitute its sense in respect to the given domain. Also, paraphrases may vary accounts for the dynamic element of any description and therefore one cannot necessarily expect a unique set of dimensions for the description of the lexical field. This does not constitute a weakness of the notion but reflects an important phenomenon of natural language in general. Guiding principles for the choice amongst possible candidates are: (1) those dimensions are preferable that result in sets with several members, and (2) those dimensions are preferable that result in cross-classification.

The familiar tool of sense relations can act as a complement to the tool of dimensions. As far as lexical fields are concerned, the hyponymy-relation and the incompatibility-relation tend to be the most useful ones. The analysis of the field is successful and complete when the net of links by means of these sense relations, always relative to the given domain, plus the relevant names constitute a unique position for each member of the field. An obvious exception is the case of synonyms with regard to the given domain.

The interplay between dimensions and sense relations in forming the semantic space helps in several ways. It frees us from the often difficult task of expressing the unique position by means of an explicit link to necessary parts of the sense, whereas sense relations can often make a valuable contribution by means of more implicit links. The reliance on sense relations also allows an elegant solution to the supposedly thorny problem of completeness for lexical fields. How can you decide whether a particular element should be a member of the field or not? There is an obvious answer in terms of the sense relations: completeness is achieved once one has closure in terms of the sense relations relative to the given domain.

Earlier on, we stressed that the senses of a lexical element will be defined through paradigmatic and syntagmatic links. In other words, it must be accepted that lexical fields as paradigmatic groupings can in most cases only make a partial contribution to the senses of their members. This again is an acknowledgment of the richness of the lexicon of any natural language rather than the admission of a weakness in the concept of lexical field.

Relevance of Lexical Fields

In the 1930s, Jost Trier as the true founder of lexical field theory evoked for lexical fields the idea of a mosaic within the content plane. This idea was discredited in the 1960s and 1970s because of its unfortunate link with Aristotelian/structuralist ideas of categories. As soon as this link was shown not to be a necessary one and lexical fields were taken to be groupings of the kind described here, the old idea of a mosaic could gain new strength again. In this context, lexical field theory can make the legitimate claim to be a forerunner of Cognitive Linguistics.

Many syntactic and semantic theories and concepts come and go. Against this pattern, lexical field theory and the concept of lexical field has proven to be remarkably stable. What is urgently needed is the will to engage in more practical descriptions of vast lexical fields across several languages, because such information would provide useful data for typological comparisons across different languages and cultures.

Lexical fields are also witness to the fact that natural languages exist and change as a result of dynamic (field) forces. It goes without saying that any linguistic theory worthy of its name must take account of such changes and therefore cannot afford to ignore the concept of lexical field.

See also: Antonymy and Incompatibility; Cognitive Semantics; Componential Analysis; Hyponymy and Hyperonymy; Language Education: Vocabulary; Lexical Conceptual Structure; Lexical Semantics: Overview; Lexicology; Onomasiology and Lexical Variation; Structuralism; Trier, Jost (1894–1970).

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Lexical Functional Grammar

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LFG's Syntactic Structures

Lexical Functional Grammar (LFG) is a theory of the structure of language and how different aspects of linguistic structure are related. As the name implies, the theory is lexical; the lexicon is richly structured, with lexical relations rather than transformations or operations on phrase structure trees as a means of capturing linguistic generalizations. It is also functional; grammatical functions such as subject and object are primitives of the theory, not defined in terms of phrase structure configuration or semantic roles.

LFG assumes that two syntactic levels are important in the analysis of linguistic structure. F(unctional)-structure represents abstract grammatical functions such as subject and object as well as abstract features such as tense and case. Another level, c(onstituent)-structure, represents the concrete phrasal expression of these relations, governed by language-particular constraints on word order and phrase structure. This duality of syntactic representation is motivated by the different natures of these two structures both within and across languages. Languages vary greatly in word order and phrasal structure, and the theory of constituent structure allows for this variation within certain universally defined parameters. In contrast, all languages share the same functional vocabulary. According to LFG's theory of functional structure, the abstract syntactic structure of every language is organized in terms of subject, object, and other grammatical functions, most of which are familiar from traditional grammatical work.

Regularities in the relation between c-structure and f-structure are captured by functions relating parts of one structure to parts of the other. For example, the subject phrase in the c-structure tree is related to the subject f-structure by means of a function that relates nodes of the c-structure tree to parts of the f-structure for a sentence. Relations among c-structure, f-structure, and other linguistic levels have also been explored and defined in terms of functional mappings from subparts of one structure to the corresponding subparts of other structures.

The overall formal structure and basic linguistic assumptions of the theory have changed very little since its development in the late 1970s by Joan Bresnan, a linguist trained at the Massachusetts Institute of Technology, and Ronald M. Kaplan, a psycholinguist and computational linguist trained at Harvard University. Bresnan (1982) is a collection of influential early papers in LFG; recent works providing an overview or introduction to LFG include Dalrymple *et al.* (1995), Bresnan (2001), Dalrymple (2001), Falk (2001), and Kroeger (2004).

Constituent Structure

Languages vary greatly in the basic phrasal expression of even simple sentences. Basic word order can be verb-initial (Malagasy), verb-final (Japanese), or verb-medial (English). Word order correlates with grammatical function in some languages, such as

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English, in which the subject and other arguments appear in particular phrase structure positions. In other languages, word order is more free, and grammatical functions are identified by case marking or agreement rather than phrasal configuration; in many languages, there is no specific phrasal position where the subject or object must always appear. Requirements for phrasal groupings also differ across languages. In English, for example, a noun and any adjectives that modify it must appear together and form a phrasal unit. In many other languages, including Latin, this is not necessary and a noun can be separated from its modifying adjectives in the sentence. LFG's constituent structure represents word order and phrasal constituenthood.

Constituent Structure Representation

Like many other linguistic theories, LFG represents word order and phrasal groupings by means of phrase structure trees, also called constituent structures (*see* **Constituent Structure**) or c-structures. The c-structure for an English sentence such as *David is sleeping* is:

(1) David is sleeping.

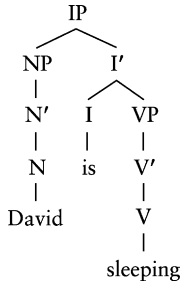

C-structure trees contain two sorts of categories. Categories such as N (noun) and V (verb), familiar from traditional grammatical analysis, are called lexical categories. Most LFG analyses assume at least the lexical categories N (noun), A (adjective), V (verb), Adv (adverb), and P (preposition), although more or fewer categories may be relevant for a particular language. Most languages also make use of a set of functional categories, including I (for Inflection), C (for Complementizer), and D (for Determiner). Functional categories play an organizing role in the syntax and are either associated with closed-class categories such as complementizers or are filled with subtypes of particular lexical categories.

Constituent structure is organized according to X-bar theory (*see* **X-Bar Theory**), which assumes that phrases are internally headed and therefore endocentric; a phrase and its head have the same category but a different bar level. For example, the basic lexical category N is the head of the single-bar-level category N′ ('N-bar'), which in turn is the head of the two-bar-level category N″ ('N-double-bar'). Similarly, the basic functional category I is the head of I′, which heads I″. Many LFG analyses assume that N″ and I″ are maximal phrases, meaning that there is no category N‴ or I‴ for the double-bar-level category to head. Thus, as maximal phrases, the categories N″ and I″ are usually written as NP (noun phrase) and IP (the category assigned to a sentence such as *David is sleeping*). Nonprojecting categories are also assumed (Toivonen, 2003); these are lexical categories that are not heads of phrases but appear on their own, adjoined to heads. For example, verbal particles (words corresponding to the particle *up* in a sentence such as *I woke up the baby*) in some Germanic languages are nonprojecting words, typically prepositions, adjoined to the verb.

Not all phrases are endocentric. LFG assumes a single exocentric, nonheaded category, the category S, which does not obey the constraints of X-bar theory. Not all languages make use of this phrase; it plays no role in the syntax of English, for example. In languages that make use of this phrase, it behaves as a maximal phrase, but it has no c-structure head and it can dominate phrases of any category or bar level.

A phrase can dominate other constituents in addition to its head. LFG does not require phrase structure trees to be binary branching, and so there can be more than two daughters of any node in a c-structure tree. The nonhead daughter of a maximal phrase is called its specifier, and the nonhead sisters of a lexical category are its complements. This is shown schematically in (2).

(2)

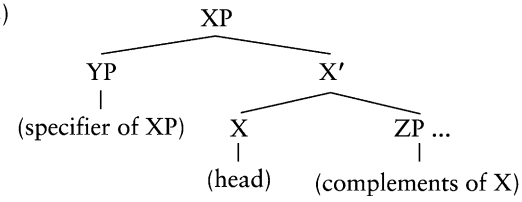

As shown in (1), a verbal category, often an auxiliary, appears in I. The complement of I is either VP, as in (1), or, in languages that make use of it, the exocentric category S. Not all languages make use of the functional category C and the phrases it heads, C′ and CP. When a language makes use of this category, complementizers or verbs can appear in C, and the complement of C is IP or S. The functional category D, filled by a determiner, is also often assumed; the complement of D is NP. In the following, we do not assume DP, which means that the category of a phrase such as *the boy* is NP. However, there is no general agreement of the status of such phrases in LFG. According to some analyses, *the boy* is a DP rather than an NP in at least some languages.

Unlike many theories, LFG assumes that daughters of all phrasal categories are optional. In particular, the head of a maximal phrase need not appear. In many languages, for example, tensed verbs appear in I (King, 1995; Sells, 2001). A Swedish sentence such as (3), with a tensed verb and no nontensed verbs, has a VP that does not contain a V.

(3) Anna såg boken
Anna saw book.DEF
'Anna saw the book.'

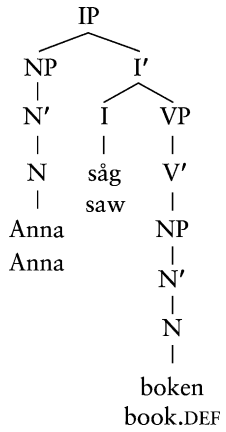

Nonhead daughters are also only optionally present. In Japanese and other so-called 'prodrop' languages, a verb can appear with no overt arguments. If no overt arguments of a verb are present, the c-structure tree contains only the verb:

(4) koware-ta
break-PAST
'[it/something] broke.'

C-structure does not contain subparts of words or unpronounced features, nor does it contain null pronominals in prodrop languages such as Japanese. Rather, it reflects the structure and grouping of the full syntactic units – the words and phrases – in the sentence.

Phrase Structure Rules

LFG draws a strong distinction between the formal objects of the theory – constituent structure trees and functional structures – and the constraints or descriptions involving those objects. C-structure trees are constrained by phrase structure rules, which license local tree configurations. The phrase structure rule in (5a) licenses the c-structure in (5b):

(5a) IP → NP I′

(5b)

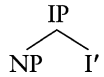

The right-hand side of an LFG phrase structure rule is a regular expression, allowing for disjunction, optionality, and arbitrary repetition of a node or sequence of nodes. The V and NP daughters in the rule in (6) are optional, and the Kleene star (*) annotation on the PP indicates that a sequence of zero or more PP constituents may appear.

(6) V′ → (V) (NP) PP*

Functional Structure

Syntactic analyses in traditional grammatical descriptions are stated in terms of abstract syntactic functions such as subject, object, and complement. These functions are represented at LFG's functional structure. F-structure represents abstract grammatical functions such as subject and object, as well as features such as tense, case, person, and number.

Grammatical Functions and Their Representation

In a sentence such as *David devoured a sandwich, David* is the subject and *a sandwich* is the object. This information is represented by an attribute-value structure, the f-structure, in which the value of the SUBJ feature is the f-structure for the subject and the value of the OBJ feature is the f-structure for the object.

(7) David devoured a sandwich.

$$\begin{bmatrix} \text{PRED} & \text{'DEVOUR}\langle\text{SUBJ, OBJ}\rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'DAVID'} \end{bmatrix} \\ \text{OBJ'} & \begin{bmatrix} \text{SPEC} & \text{A} \\ \text{PRED} & \text{'SANDWICH'} \end{bmatrix} \end{bmatrix}$$

For clarity, many of the features and values in this f-structure have been omitted, a practice often followed in LFG presentations. The full f-structure contains tense, aspect, person, number, and other functional features.

Every content word in a sentence contributes a value for the feature PRED. These values are called semantic forms. In the functional structure, semantic forms are surrounded by single quotes: the semantic form contributed by the word *David* is 'DAVID.'

An important property of semantic forms is that they are uniquely instantiated for each instance of their use, reflecting the unique semantic contribution of each word within the sentence. This is occasionally

indicated by associating a unique numerical identifier with each instance of a semantic form, as in (8):

(8) David devoured a sandwich.

$$\begin{bmatrix} \text{PRED} & \text{`DEVOUR}_{37}\langle\text{SUBJ,OBJ}\rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`DAVID}_{42}\text{'} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{SPEC} & \text{A} \\ \text{PRED} & \text{`SANDWICH}_{14}\text{'} \end{bmatrix} \end{bmatrix}$$

In (8), the particular occurrence of the semantic form for the word *David* as it is used in this sentence is represented as 'DAVID$_{42}$.' Another use of *David* will be associated with a different unique identifier, perhaps 'DAVID$_{73}$.' Representing semantic forms with explicit numerical identifiers clearly shows that each word makes a unique contribution to the f-structure. However, the identifiers also add unnecessary clutter to the f-structure and, therefore, are usually not displayed.

A verb or other predicate generally requires a particular set of arguments: for example, the verb *devoured* requires a subject (SUBJ) and an object (OBJ). These arguments are said to be governed by the predicate; equivalently, the predicate is said to subcategorize for its arguments. The semantic form contributed by a verb or other predicate contains information about the arguments it governs. As shown in (8), the governed arguments appear in angled brackets: 'DEVOUR⟨SUBJ,OBJ⟩.'

The LFG requirements of completeness and coherence ensure that all and only the grammatical functions governed by a predicate are found in the structure of a grammatically acceptable sentence. For example, the unacceptability of example (9) shows that the verb *devoured* cannot appear without an OBJ:

(9) *David devoured.

This sentence violates the principle of completeness, according to which every grammatical function governed by a predicate must be filled. Here, the OBJ is not present, and the sentence is incomplete.

Furthermore, *devour* cannot appear with other functions than the grammatical functions SUBJ and OBJ that it governs. Example (10) shows that it cannot appear with a sentential complement in addition to its object:

(10) *David devoured a sandwich that it was raining.

This sentence violates the principle of coherence, according to which only the grammatical functions that are governed by a predicate can appear. Because the sentence contains a grammatical function that the verb *devour* does not govern, it is incoherent.

Table 1 Governable grammatical functions

SUBJ	Subject
OBJ	Object
COMP	Sentential or closed (nonpredicative) infinitival complement
XCOMP	An open (predicative) complement, often infinitival, whose SUBJ function is externally controlled
OBJ$_\theta$	A family of secondary OBJ functions associated with a particular, language-specific set of thematic roles; in English, only OBJ$_{\text{THEME}}$ is allowed, while other languages allow more than one thematically restricted secondary object
OBL$_\theta$	A family of thematically restricted oblique functions such as OBL$_{\text{GOAL}}$ or OBL$_{\text{AGENT}}$, often corresponding to adpositional phrases at c-structure

The grammatical functions that a predicate can govern are called governable grammatical functions. The inventory of universally available governable grammatical functions is given in Table 1. Languages differ as to which of these functions are relevant, but in many languages, including English, all of these functions are used.

Not all phrases fill argument positions of a predicate. Modifying adjunct phrases are not required by a predicate and hence are not governable. In (11), the phrase *yesterday* bears the nongovernable grammatical function ADJ (unct):

(11) David devoured a sandwich yesterday.

There are two nongovernable grammatical functions. The function ADJ is the grammatical function of modifiers such as *in the park, with a hammer*, and *yesterday*. The function XADJ is the grammatical function of open predicative adjuncts whose subject is externally controlled; as with the governable grammatical function XCOMP, the X in the name of the function indicates that it is an open function whose SUBJ is supplied externally. The phrase filling the XADJ role is in boldface in (12).

(12a) **Having opened the window**, David took a deep breath.
(12b) David ate the celery **naked**.
(12c) David ate the celery **raw**.

In (12a) and (12b), the open adjunct XADJ is controlled by the subject of the main clause: It is David who opened the window, and it is David who is naked. In (12c), the XADJ is controlled by the object: It is the celery that is raw.

Unlike governable grammatical functions, more than one adjunct function can appear in a sentence:

(13) David devoured a sandwich **at noon yesterday**.

Because the ADJ function can be multiply filled, its value is a set of f-structures:

(14) David devoured a sandwich at noon yesterday.

$$\begin{bmatrix} \text{PRED} & \text{'DEVOUR}\ \langle \text{SUBJ,OBJ} \rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'DAVID'} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{SPEC} & \text{A} \\ \text{PRED} & \text{'SANDWICH'} \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{matrix} \begin{bmatrix} \text{PRED} & \text{'YESTERDAY'} \end{bmatrix} \\ \begin{bmatrix} \text{PRED} & \text{'AT}\ \langle \text{OBJ} \rangle\text{'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'NOON'} \end{bmatrix} \end{bmatrix} \end{matrix} \right\} \end{bmatrix}$$

The same is true of XADJ; more than one XADJ phrase can appear in a single sentence:

(15) **Having opened the window**, David ate the celery **naked**.

Hence, the value of the XADJ feature is also a set of f-structures.

The f-structures that have been presented so far have included only a subset of their functional features. In fact, it is common in LFG literature to display only those features that are relevant to the analysis under discussion because a full representation is often too unwieldy. A full f-structure for these sentences contains at least the features and values listed in Table 2 and probably other language-specific features and values as well. The values given in this chart are the ones that are most often assumed, but some authors have argued for a different representation of the values of some features. For example, Dalrymple and Kaplan (2000) argue for a set-based representation of the PERS and GEND features to allow for an account of feature resolution in coordination and of the CASE feature to allow for case indeterminacy. Some studies assume a PCASE feature whose value specifies the grammatical function of its phrase. In more recent work, Nordlinger (1998) provided a theory of constructive case, according to which a case marked phrase places constraints on its f-structure environment that determine its grammatical function in the sentence. This treatment supplants the traditional treatment of obliques in terms of the PCASE feature.

Table 2 f-Structure features

	Feature	*Value*
Person	PERS	1, 2, 3
Gender	GEND	MASC, FEM, . . .
Number	NUM	SG, DUAL, PL, . . .
Case	CASE	NOM, ACC, . . .
Surface form	FORM	Surface word form
Verb form	VFORM	PASTPART, PRESPART, . . .
Complementizer form	COMPFORM	Surface form of complementizer: THAT, WHETHER, . . .
Tense	TENSE	PRES, PAST, . . .
Aspect	ASPECT	F-structure representing complex description of sentential aspect; sometimes abbreviated, e.g., PRES.IMPERFECT
Pronoun type	PRONTYPE	REL, WH, PERS, . . .

Functional Descriptions

As with c-structures, we draw a sharp distinction between f-structures and their descriptions. The set of f-structure constraints associated with the analysis of some sentence is called a functional description or f-description.

To refer to the value of a feature, say, TENSE, in some f-structure, we use an expression like the following:

(16) $(f\ \text{TENSE})$

This expression refers to the value of the TENSE feature in the f-structure f. If we want to specify the value of that feature, we use an expression such as:

(17) $(f\ \text{TENSE}) = \text{PAST}$

This **defining equation** specifies that the feature TENSE in the f-structure f has the value PAST.

We can also specify that an feature has a particular f-structure as its value. The expression in (18) specifies that the value of the SUBJ feature in f is the f-structure g:

(18) $(f\ \text{SUBJ}) = g$

Some features take as their value a set of functional structures. For example, because any number of adjuncts can appear in a sentence, the value of the feature ADJ is a set. We can specify that an f-structure h is a member of the ADJ set with the following constraint, using the set-membership symbol $\in$:

(19) $h \in (f\ \text{ADJ})$

The constraints discussed so far are called defining constraints because they define the required properties of a functional structure. An abbreviated f-description for a sentence such as *David sneezed* is:

(20) $(f\ \text{PRED}) = \text{'SNEEZE}\langle\text{SUBJ}\rangle\text{'}$
$(f\ \text{TENSE}) = \text{PAST}$
$(f\ \text{SUBJ}) = g$
$(g\ \text{PRED}) = \text{'DAVID'}$

This f-description holds of the following f-structure, where the f-structures are annotated with the names used in the f-description (20):

(21) David sneezed

$$f\colon \begin{bmatrix} \text{PRED} & \text{'SNEEZE}\langle\text{SUBJ}\rangle\text{'} \\ \text{TENSE} & \text{PAST} \\ \text{SUBJ} & g\colon \begin{bmatrix} \text{PRED} & \text{'DAVID'} \end{bmatrix} \end{bmatrix}$$

Notice, however, that the f-description also holds of the f-structure in (22), which also contains all the attributes and values that are mentioned in the f-description in (20):

(22)
$$f\colon \begin{bmatrix} \text{PRED} & \text{'SNEEZE}\langle\text{SUBJ}\rangle\text{'} \\ \text{TENSE} & \text{PAST} \\ \text{SUBJ} & g\colon \begin{bmatrix} \text{PRED} & \text{'DAVID'} \\ \text{PERS} & 3 \end{bmatrix} \\ \text{ADJ} & \left\{ \begin{matrix} \begin{bmatrix} \text{PRED} & \text{'YESTERDAY'} \end{bmatrix} \\ \begin{bmatrix} \text{PRED} & \text{'AT}\langle\text{OBJ}\rangle\text{'} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'NOON'} \end{bmatrix} \end{bmatrix} \end{matrix} \right\} \end{bmatrix}$$

However, the f-structure in (22) is not the minimal or smallest solution to the f-description in (20) because it contains additional attributes and values that do not appear in the f-description. We require the f-structure solution for a particular f-description to be the minimal solution to the f-description: no additional attributes or values that are not mentioned in the f-description are included. Thus, the correct solution to the f-description in (20) is the f-structure in (21), not the larger one in (22). Formally, the solution to an f-description is the most general f-structure that satisfies the f-description, which subsumes all other (larger) f-structures that satisfy the f-description.

In addition to the defining constraints just described, LFG also allows elements of the f-description to check the properties of the minimal solution to the defining equations. The expression in (23) is a constraining equation, distinguished from a defining equation by the *c* subscript on the equals sign in the expression:

(23) $(f\ \text{SUBJ NUM}) =_c \text{SG}$

When this expression appears, the f-structure *f* that is the minimal solution to the defining equations must contain the feature SUBJ whose value has an feature NUM with value SG. The constraining equation in (23) does not hold of the f-structure in (21) because in that f-structure the value of the NUM feature has been left unspecified and the SUBJ of *f* does not have a NUM feature with value SG.

In contrast, the functional description in (24a) for the sentence *David sneezes* has a well-formed solution, the f-structure in (24b):

(24a) $(f\ \text{PRED}) = \text{'SNEEZE}\langle\text{SUBJ}\rangle\text{'}$
$(f\ \text{TENSE}) = \text{PRES}$
$(f\ \text{SUBJ}) = g$
$(g\ \text{PRED}) = \text{'DAVID'}$
$(g\ \text{NUM}) = \text{SG}$
$(f\ \text{SUBJ NUM}) =_c \text{SG}$

(24b)
$$f\colon \begin{bmatrix} \text{PRED} & \text{'SNEEZE}\langle\text{SUBJ}\rangle\text{'} \\ \text{TENSE} & \text{PRES} \\ \text{SUBJ} & g\colon \begin{bmatrix} \text{PRED} & \text{'DAVID'} \\ \text{NUM} & \text{SG} \end{bmatrix} \end{bmatrix}$$

Here, the value SG for the NUM feature for *g* is specified in the second-to-last line of the functional description. Thus, the f-structure in (24b) satisfies the defining constraints given in the first five lines of (24a). Moreover, it satisfies the constraining equation given in the last line of (24a).

We can also place other requirements on the minimal solution to the defining equations in some f-description. The expression in (25a) requires *f* not to have the value PRESENT for the feature TENSE, which can happen if *f* has no TENSE feature or if *f* has a TENSE feature with some value other than PRESENT. When it appears in a functional description, the expression in (25b) is an existential constraint, requiring *f* to contain the feature TENSE, but not requiring any particular value for this feature. We can also use a negative existential constraint to require an f-structure not to contain an feature, as in (25c), which requires *f* not to contain the feature TENSE with any value whatsoever.

(25a) Negative equation: $(f\ \text{TENSE}) \neq \text{PRESENT}$
(25b) Existential constraint: $(f\ \text{TENSE})$
(25c) Negative existential constraint: $\neg(f\ \text{TENSE})$

Functional descriptions can also be stated in terms of the Boolean operations of conjunction, disjunction, and negation. In the f-descriptions just given, we implicitly assume that the constraints in the f-description are interpreted conjunctively; if an f-description contains more than one requirement, each requirement must hold. LFG also allows disjunctions and negations of sets of requirements. For example, a verb like *sneeze* contributes the following f-description:

(26) sneeze
$$\begin{aligned} &(f\ \text{PRED}) = \text{'SNEEZE}\langle\text{SUBJ}\rangle\text{'} \\ &\{(f\ \text{VFORM}) = \text{BASE} \mid \\ &\ (f\ \text{TENSE}) = \text{PRES} \\ &\ \neg\{(f\ \text{SUBJ PERS}) = 3 \\ &\qquad (f\ \text{SUBJ NUM}) = \text{SG}\}\} \end{aligned}$$

Disjunction is indicated by curly brackets, with the alternatives separated by a vertical bar |. Negation for a set of requirements is represented by prefixing ¬, and the scope of negation is indicated by curly brackets.

This lexical entry allows two possibilities. The first is for the base form of the verb, in which the value of the VFORM feature is BASE. For the second possibility, the value of the feature TENSE is PRES for present tense, and a third-person singular subject is disallowed by negating the possibility for the PERS feature to have value 3 when the NUM feature has value SG.

The Constituent Structure–Functional Structure Relation

There are clear crosslinguistic regularities relating constituent structure positions to grammatical functions. In particular, phrases and their heads are required to correspond to the same f-structure, and specifier and complement positions are associated with particular grammatical functions. Such generalizations constrain the relation between c-structure positions and the f-structure positions they are associated with.

Structural Correspondences

To express these generalizations formally, relating nodes in the c-structure tree and the f-structures they correspond to, we can define a function called ϕ (*phi*) that relates nodes of the c-structure tree to parts of the f-structure for a sentence. In (27), the ϕ function from the NP node to the f-structure it corresponds to is represented by an arrow and labeled ϕ.

(27) David sneezed

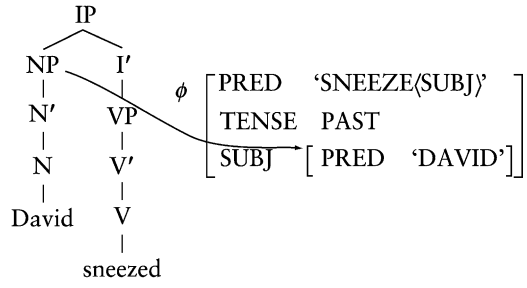

Each node of the c-structure tree corresponds to some part of the f-structure. As shown in (28), more than one c-structure node can correspond to the same f-structure (the ϕ function is many to one):

(28)

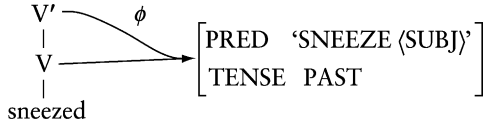

Further, there can be f-structures that have no corresponding c-structure node (the ϕ function is into). Example (29) shows the c-structure and f-structure for a sentence of Japanese, a prodrop language in which the verb optionally specifies functional information about its subject. When there is no overt subject phrase in the sentence, the information specified by the verb supplies the SUBJ value for the sentence. In (29), because there is no overt subject, all of the information about the subject comes from specifications on the verb, and there is no c-structure node corresponding to the SUBJ f-structure.

(29) koware-ta
break-PAST
'[it/something] broke'

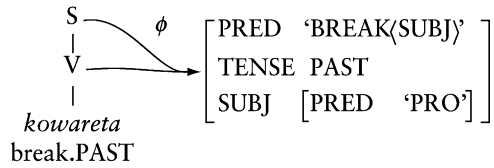

Constituent Structure–Functional Structure Correspondences

The ϕ function is important in stating universally valid relations between c-structure positions and the functional roles associated with them. For example, a phrase and its head always correspond to the same f-structure. Furthermore, the complement of a functional category is an f-structure cohead; the functional head and its complement correspond to the same f-structure. This is shown in (30), where the functional category IP, its heads I′ and I, and its complement VP map to the same f-structure.

(30) David is yawning.

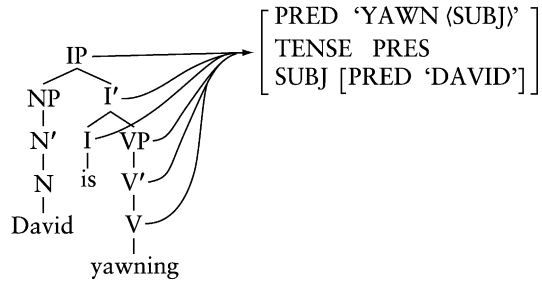

The specifier position of the functional categories IP and CP is filled by a phrase bearing a grammaticized discourse function: SUBJ, TOPIC, or FOCUS. Within these limits, languages can differ as to the particular grammaticized discourse function allowed in each of these positions. In English, as we have seen, the specifier position of IP is filled by the SUBJ.

(31) David yawned.

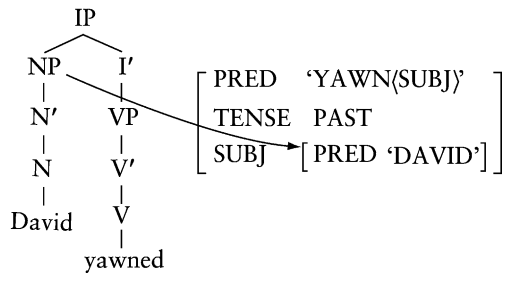

In Finnish, the specifier of IP is associated with the TOPIC function, and the specifier of CP is associated with FOCUS.

(32) Mikolta Anna sai kukkia.
Mikko Anna got flowers.
'From Mikko, Anna got flowers.'

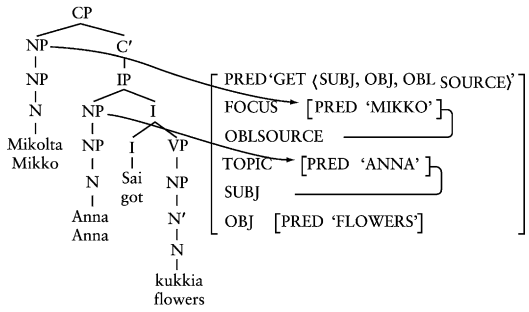

When a f-structure contains a FOCUS or TOPIC function, the Extended Coherence Condition requires it to be integrated into the f-structure by either anaphorically or functionally binding another f-structure in the sentence. Here, the FOCUS also bears the $\text{OBL}_{\text{SOURCE}}$ function, and the TOPIC is also the SUBJ; these relations involve functional binding because the same f-structure fills both functions. In a sentence such as *Bill, I like him*, the f-structure for *Bill* anaphorically binds the f-structure *him*; the two phrases *Bill* and *him* are syntactically independent and each phrase has its own f-structure, but the anaphoric relation between the two satisfies the Extended Coherence Condition.

The complements of a lexical category bear nondiscourse grammatical functions, that is, any grammatical function other than SUBJ, FOCUS, or TOPIC. In (33), the complements of V are associated with the grammatical functions OBJ and $\text{OBJ}_{\text{THEME}}$.

(33) David gave Chris a book.

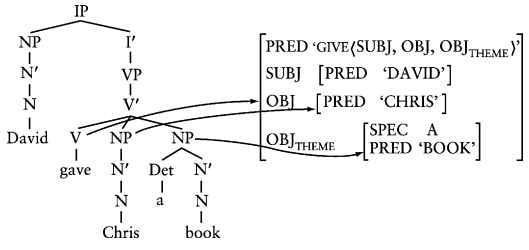

Constraining the Constituent Structure–Functional Structure Relation

In describing the relation between c-structure and f-structure, we use the following symbols for the f-structure corresponding to the current node in a phrase structure rule and the f-structure of its mother node:

- the f-structure of the immediately dominating node: ↑
- the f-structure of the current c-structure node: ↓

We can use these symbols to annotate the V′ phrase structure rule with f-structure correspondence constraints.

(34) V′ ⟶ V
↑ = ↓
mother's f-structure = self's f-structure

This annotated rule licenses the configuration in (35). In the c-structure, the V′ node dominates the V node, as the phrase structure rules require. The V′ and V nodes correspond to the same f-structure, as the annotations on the V node require.

(35) V′ → [ ]
|
V

In the rule shown in (36), the V and the V′ node correspond to the same f-structure, as specified by the ↑ = ↓ annotation on the V node. The annotation on the NP node requires the f-structure ↓ corresponding to the NP to be the value of the OBJ value in the f-structure ↑ for the mother node.

(36) V′ ⟶ V NP
↑ = ↓ (↑ OBJ) =↓

The rule in (36) licenses the following configuration:

(37) V′ → [OBJ → [ ]]
V NP

We can use the same formal vocabulary in the specifications of lexical entries. The lexical entry for the verb *sneezed* is shown in (38). It specifies that the c-structure category of *sneezed* is V, and also specifies constraints on the f-structure ↑ of the preterminal V node that dominates the terminal node *sneezed*:

(38) sneezed V (↑ PRED) = 'SNEEZE⟨SUBJ⟩'
(↑ TENSE) = PAST

This lexical entry licenses the c-structure–f-structure configuration in (39).

(39) V → [PRED 'SNEEZE⟨SUBJ⟩'
TENSE PAST]
|
sneezed

Syntax and Semantics

Several recent research strands in LFG have explored the relation of constituent and functional structure

to other linguistic levels. Among these are the theory of the relation between argument structure and syntax, and the 'glue' approach to the interface between syntax and semantics.

Mapping Theory and Argument Linking

Mapping theory explores correlations between the semantic roles of the arguments of a verb and their syntactic functions. If a language assigns the syntactic function SUBJ to the agent argument of an active verb such as *kick*, for example, it invariably assigns SUBJ to the agent argument of semantically similar verbs such as *hit*.

Early formulations of the rules of mapping theory proposed rules relating specific thematic roles to specific grammatical functions, for example, that the thematic role of AGENT is always realized as SUBJ. Later work proposed more general rules relating thematic roles to classes of grammatical functions rather than specific functions. It is most often assumed that grammatical functions are crossclassified with the features ±R and ±O. Several versions of mapping theory have been proposed (Bresnan and Kanerva, 1989; Bresnan and Zaenen, 1990; Bresnan, 2001); in the following, we describe the theory of Bresnan and Zaenen (1990).

The feature ±R distinguishes unrestricted (−R) grammatical functions from restricted (+R) functions. ions. The grammatical functions SUBJ and OBJ are classified as unrestricted, meaning that they can be filled by an argument bearing any thematic role. These contrast with restricted grammatical functions such as obliques or thematically restricted objects, which must be filled by arguments with particular thematic roles; for example, the $\text{OBL}_{\text{SOURCE}}$ function must be filled by an argument bearing the thematic role SOURCE and the thematically restricted object function $\text{OBJ}_{\text{THEME}}$ is filled by a THEME argument.

The feature ±O distinguishes objective (+O) grammatical functions from nonobjective (−O) functions. The unrestricted OBJ function and the restricted OBJ_θ functions are objective, whereas the SUBJ and the oblique functions are nonobjective.

These features crossclassify the grammatical functions as in Table 3. These features are used to state rules of intrinsic classification of particular thematic roles. Such rules constrain the relation between thematic roles and the classes of grammatical functions that these features delineate. For example, arguments bearing the AGENT role are classified as intrinsically nonobjective (−O), either SUBJ or $\text{OBL}_{\text{AGENT}}$. Arguments bearing the THEME role are disjunctively classified, either as intrinsically unrestricted (−R), bearing the SUBJ or OBJ function, or as intrinsically objective (+O), filling the OBJ or $\text{OBJ}_{\text{THEME}}$ function.

Table 3 Classification of grammatical functions

	−R	*+R*
−O	SUBJ	OBL_θ
+O	OBJ	OBJ_θ

In addition to these intrinsic classifications, default mapping rules classify the arguments of a predicate according to their relative position on the thematic hierarchy (Bresnan and Kanerva, 1989):

(40) AGENT > BENEFACTIVE > RECIPIENT/EXPERIENCER > INSTRUMENT > THEME/PATIENT > LOCATIVE

One of the default mapping rules requires the argument of a predicate that is highest on the thematic hierarchy to be classified as unrestricted (−R). For example, if a verb requires an AGENT argument and a PATIENT argument, the AGENT argument thematically outranks the PATIENT argument and, thus, the AGENT argument is classified as unrestricted.

For a predicate with an AGENT and a PATIENT argument, such as *kick*, this has the result in (41) (Bresnan and Kanerva, 1989).

(41)

	kick ⟨ AGENT	PATIENT ⟩
	|	|
intrinsic:	[−0]	[−R]
defaults:	[−R]	
	SUBJ	SUBJ/OBJ
Final classification:	SUBJ	OBJ

For simplicity, we consider only the intrinsically unrestricted classification of the PATIENT argument, leaving aside the option of considering the PATIENT an intrinsically objective function. The AGENT argument is classified as intrinsically nonobjective. The default rules add the unrestricted classification to the thematically highest argument, the AGENT. Because the AGENT is classified as [−O, −R], it is the SUBJ. The unrestricted classification of the PATIENT argument allows it to bear either the SUBJ or the OBJ role, but because the AGENT is assigned the SUBJ role, the PATIENT must be realized as OBJ. Thus, the argument classification rules, together with well-formedness conditions such as the Subject Condition requiring each verbal predicate to have a subject, constrain the mapping between argument roles and grammatical functions.

Glue: The Syntax–Semantics Interface

LFG assumes that the syntactic level that is primarily involved in semantic composition is the functional structure. That is, functional relations such as SUBJ

and OBJ rather than c-structure tree configurations are primarily responsible for determining how the meanings of the parts of a sentence combine to produce the full meaning of the sentence.

The dominant theory of the syntax–semantics interface in LFG is called the glue approach (Dalrymple, 1999, 2001), a theory of how syntax guides the process of semantic composition. The glue approach assumes that each part of the f-structure corresponds to a semantic resource associated with a meaning and that the meaning of an f-structure is obtained by assembling the meanings of its parts according to a set of instructions specifying how the semantic resources can combine. These assembly instructions are provided as a set of logical premises in the 'glue language' of linear logic, and the derivation of a meaning for a sentence corresponds to a logical deduction.

The deduction is performed on the basis of logical premises contributed by the words in the sentence (and possibly by syntactic constructions). Linear logic, a resource-based logic, is used to state requirements on how the meanings of the parts of a sentence can be combined to form the meaning of the sentence as a whole. Linear logic is different from classical logic in that it does not admit rules that allow for premises to be discarded or used more than once in a deduction. Premises in a linear logic deduction are, then, resources that must be accounted for in the course of a deduction; this nicely models the semantic contribution of the words in a sentence, which must contribute exactly once to the meaning of the sentence and may not be ignored or used more than once. A sentence such as *David knocked twice* cannot mean simply *David knocked*; the meaning of *twice* cannot be ignored. It also cannot mean the same thing as *David knocked twice twice*; the meaning of a word in a sentence cannot be used multiple times in forming the meaning of the sentence.

The syntactic structures for the sentence *David yawned*, together with the desired semantic result, are displayed in (42).

(42) David yawned.

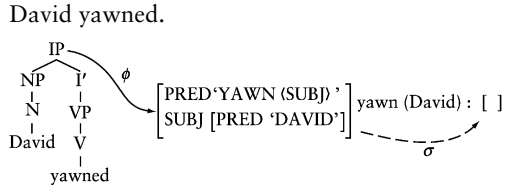

The semantic structure for the sentence is related to its f-structure by the correspondence function σ, represented as a dotted line. This result is obtained on the basis of the following lexical information, associated with the verb *yawned*:

(43) $\lambda X.yawn(X)$: $(\uparrow \text{SUBJ})_\sigma \multimap \uparrow_\sigma$

This formula is called a meaning constructor. It pairs the meaning for *yawned*, the one-place predicate $\lambda X.yawn(X)$, with the linear logic formula $(\uparrow \text{SUBJ})_\sigma \multimap \uparrow_\sigma$. In this formula, the connective $\multimap$ is the *linear implication* symbol of linear logic. This symbol expresses a meaning similar to *if* . . . *then*, in this case, stating that if a semantic resource $(\uparrow \text{SUBJ})_\sigma$ representing the meaning of the subject is available, then a semantic resource $\uparrow_\sigma$ representing the meaning of the sentence can be produced. Unlike the implication operator of classical logic, the linear implication operator $\multimap$ carries with it a requirement for consumption and production of semantic resources; the formula $(\uparrow \text{SUBJ})_\sigma \multimap \uparrow_\sigma$ indicates that if a semantic resource $(\uparrow \text{SUBJ})_\sigma$ is found, it is *consumed* and the semantic resource $\uparrow_\sigma$ is produced.

We also assume that a name such as *David* contributes a semantic resource, its semantic structure. In an example like *David yawned*, this resource is consumed by the verb *yawned*, which requires a resource for its SUBJ to produce a resource for the sentence. This accords with the intuition that the verb in a sentence must obtain a meaning for its arguments in order for a meaning for the sentence to be available.

The f-structure for the sentence *David yawned*, together with the instantiated meaning constructors contributed by *David* and *yawned*, is given in (44).

(44)
$$y: \begin{bmatrix} \text{PRED} & \text{'YAWN}\langle\text{SUBJ}\rangle\text{'} \\ \text{SUBJ} & \text{d: } \begin{bmatrix} \text{PRED} & \text{'DAVID'} \end{bmatrix} \end{bmatrix}$$

$$[\text{David}] \qquad David \ : \ d_\sigma$$

$$[\text{yawn}] \qquad \lambda X.yawn(X) \ : \ d_\sigma \multimap y_\sigma$$

The left-hand side of the meaning constructor labeled [**David**] is the proper noun meaning *David*, and the left-hand side of the meaning constructor labeled [**yawn**] is the meaning of the intransitive verb *yawned*, the one-place predicate $\lambda X.yawn(X)$.

We must also provide rules for how the right-hand (glue) side of each of the meaning constructors in (44) relates to the left-hand (meaning) side in a meaning deduction. For simple, nonimplicational meaning constructors such as [**David**] in (44), the meaning on the left-hand side is the meaning of the semantic structure on the right-hand side. For meaning constructors that contain the linear implication operator $\multimap$, such as [**yawn**], *modus ponens* on the glue side corresponds to function application on the meaning side:

(45)
$$\frac{\begin{array}{c} X \ : \ f_\sigma \\ P \ : \ f_\sigma \multimap g_\sigma \end{array}}{P(X) \ : \ g_\sigma}$$

With these correspondences between linear logic formulas and meanings, we perform the following series of reasoning steps:

(46)	*David*: d_σ	The meaning *David* is associated with the SUBJ semantic structure d_σ.
	$\lambda X.yawn(X)$: d_σ—o y_σ	On the glue side, if we find a semantic resource for the SUBJ d_σ, we consume that resource and produce a semantic resource for the full sentence y_σ. On the meaning side, we apply the function $\lambda X.yawn(X)$ to the meaning associated with d_σ.
	yawn (*David*): y_σ	We have produced a semantic structure for the full sentence y_σ, associated with the meaning *yawn*(*David*).

By using the function application rule and the meaning constructors for *David* and *yawned*, we deduce the meaning *yawn* (*David*) for the sentence *David yawned*, as desired.

Glue analyses of quantification, intensional verbs, modification, coordination, and other phenomena have been explored (Dalrymple, 1999). A particular challenge for the glue approach is found in cases in which there are apparently too many or too few meaning resources to produce the correct meaning for a sentence; such cases are explored within the glue framework by Asudeh (2004).

Preferences and Parsing

From its inception, work on LFG has been informed by computational and psycholinguistic concerns. Recent research has combined LFG's syntactic assumptions with an optimality–theoretic approach in an exploration of OT-LFG (*see* **Pragmatics: Optimality Theory; Optimality-Theoretic Lexical-Functional Grammar**). Other work combines LFG with Data-Oriented Parsing, a new view of language processing and acquisition. There have also been significant developments in parsing and generating with LFG grammars and grammars in related formalisms.

Data-Oriented Parsing and Lexical Functional Grammar

The framework of Data-Oriented Parsing (DOP), developed primarily by Rens Bod and his colleagues, represents a new view of the productivity of language and how it can be acquired on the basis of a finite amount of data. DOP views language acquisition as the analysis of a pool of linguistic structures that are presented to the language learner. The learner breaks up these structures into all of their component pieces, from the largest pieces to the smallest units, and new utterances are assembled from these pieces. The likelihood of assigning a particular analysis to a new sentence depends on the frequency of occurrence of its component parts, both large and small, in the original pool of structures.

LFG-DOP (Bod and Kaplan, 1998) specializes the general DOP theory to LFG assumptions about linguistic structures and the relations between them. LFG-DOP assumes that the body of linguistic evidence that a language learner is presented with consists of well-formed c-structure–f-structure pairs. On this view, language acquisition consists in determining the relevant component parts of these structures and then combining these parts to produce new c-structure–f-structure pairs for novel sentences.

Parsing

Several breakthroughs have been made in the parsing of large computational LFG grammars. Maxwell and Kaplan (1991) examined the problem of processing disjunctive specifications of constraints, which are computationally very difficult to process. In the worst case, processing disjunctive constraints is exponentially difficult. However, this worst-case scenario assumes that every disjunctive constraint can interact significantly with every other constraint. In practice, such interactions are found only very rarely. An ambiguity in the syntactic properties of the SUBJ of a sentence rarely correlates with ambiguities in the OBJ or other arguments. This insight is the basis of Maxwell and Kaplan's algorithm, which works by turning a set of disjunctively specified constraints into a set of contexted, conjunctively specified constraints, in which the context of a constraint indicates where the constraint is relevant. Solving these contexted constraints turns out to be very efficient for linguistically motivated sets of constraints, in which only local interactions among disjunctions tend to occur.

Maxwell and Kaplan (1993, 1996) explored the issue of c-structure processing and its relation to

solving f-structural constraints. It has long been known that constituent structure parsing – determining the phrase structure trees for a given sentence – is very fast in comparison to solving the equations that determine the f-structure for the sentence. For this reason, an important task in designing algorithms for linguistic processing of different kinds of structures such as the c-structure and the f-structure is to optimize the interactions between these computationally very different tasks. Previous research often assumed that the most efficient approach would be to interleave the construction of the phrase structure tree with the solution of f-structure constraints. Maxwell and Kaplan (1993) explored and compared a number of different methods for combining phrase structure processing with constraint solving; they showed that in certain situations, interleaving the two processes can actually give very bad results. Subsequently, Maxwell and Kaplan (1996) showed that if phrase structure parsing and f-structural constraint solving are combined in the right way, parsing can be very fast. In fact, if the grammar that results from combining phrase structure and functional constraints happens to be context-free equivalent, the algorithm for computing the c-structure and f-structure operates in cubic time, the same as for pure phrase structure parsing.

Generation

Generation is the inverse of parsing. Whereas the parsing problem is to determine the c-structure and f-structure that correspond to a particular sentence, work on generation in LFG assumes that the generation task is to determine which sentences correspond to a specified f-structure, given a particular grammar. Based on these assumptions, several interesting theoretical results have been attained. Of particular importance is the work of Kaplan and Wedekind (2000), who showed that if we are given an LFG grammar and an *acyclic* f-structure (that is, an f-structure that does not contain a reference to another f-structure that contains it), the set of strings that corresponds to that f-structure according to the grammar is a *context-free language*. Kaplan and Wedekind also provided a method for constructing the context-free grammar for that set of strings by a process of specialization of the full grammar that we are given. This result leads to a new way of thinking about generation; opens the way to new, more efficient generation algorithms; and clarifies a number of formal and mathematical issues relating to LFG parsing and generation.

Wedekind and Kaplan (1996) explored issues in ambiguity-preserving generation, in which a set of f-structures rather than a single f-structure is considered, and the sentences of interest are those that correspond to **all** of the f-structures under consideration. The potential practical advantages of ambiguity-preserving generation are clear. Consider, for example, a scenario involving translation from English to German. We first parse the input English sentence, producing several f-structures if the English sentence is ambiguous. For instance, the English sentence *Hans saw the man with the telescope* is ambiguous: It means either that the man had the telescope or that Hans used the telescope to see the man. The best translation for this sentence would be a German sentence that is ambiguous in exactly the same way as the English sentence, if such a German sentence exists. In the case at hand, we would like to produce the German sentence *Hans sah den Mann mit dem Fernrohr*, which has exactly the same two meanings as the English input. To do this, we map the English f-structures for the input sentence to the set of corresponding German f-structures; our goal is then to generate the German sentence *Hans sah den Mann mit dem Fernrohr*, which corresponds to each of these f-structures. This approach is linguistically appealing, but mathematically potentially problematic. Wedekind and Kaplan (1996) showed that determining whether there is a single sentence that corresponds to each member of a set of f-structures is in general undecidable for an arbitrary (possibly linguistically unreasonable) LFG grammar. This means that there are grammars that can be written within the formal parameters of LFG, even though these grammars may not encode the properties of any actual or potential human language, and, for these grammars, there are sets of f-structures for which it is impossible to determine whether there is any sentence that corresponds to those f-structures. This result is important in understanding the formal limits of ambiguity-preserving generation.

See also: Constituent Structure; Declarative Models of Syntax; Grammatical Relations and Arc-Pair Grammar; Optimality-Theoretic Lexical-Functional Grammar; Pragmatics: Optimality Theory; Syntactic Features and Feature Structures; Unification, Classical and Default; X-Bar Theory.

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Lexical Phonology and Morphology

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Lexical and Postlexical Phonology

The term 'lexical phonology' is used for two different but related purposes. First, it refers to the range of phonological processes or constraints in a language that pertain to the domain of the word. In this use, it is a synonym of 'word phonology,' and stands in opposition to the term 'postlexical phonology' or 'phrasal phonology.' With the latter term we denote the processes or constraints that apply across the board, not only within the domain of the word, but also across word boundaries in the domain of larger constituents such as phrases. The distinction between these two domains of phonology can be illustrated by means of the following example. In Dutch, obstruents

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(stops and fricatives) are always voiceless at the end of a syllable (a generalization referred to as final devoicing). This constraint is part of word phonology, as illustrated by the following minimal pair:

vind-er [vɪn.dər] 'finder'
vind er [vɪn.tər] 'find her'

The first example is a noun ending in the suffix *-er* derived from the verb *vind* 'to find'. Final devoicing is not applicable here since the stem-final /d/ is syllabified as an onset (syllable boundaries in phonetic forms are indicated by dots). In the second example the clitic pronoun *er* /ər/ 'her' forms one prosodic word with the preceding verb. However, the /d/ is realized as [t], showing that it must have been in coda position at the presyntactic level, before this word was combined with the clitic pronoun. This shows that final devoicing is a constraint that is part of the word phonology of Dutch, whereas the syllabification of the verb and the following clitic as one prosodic word belongs to the domain of phrasal (postlexical) phonology. As this example illustrates, rules of word phonology must apply before phrasal phonology. Another example of this distinction is that Dutch simplex and derived words do not have geminate consonants. The past tense form *eette* /e:t-tə/ of the verb *eet* 'to eat', with the past tense suffix *-te*, for instance, is realized as [e:tə]. Hence, there is an obligatory rule of degemination as part of the word phonology of Dutch. Across word boundaries, however, geminate consonants do occur, but they may be reduced to one consonant in casual or fast speech. Thus, the same process may function as an obligatory rule at the level of word phonology, and as an optional rule in phrasal phonology.

The term 'lexical phonology' is also used to denote a particular theory about the interaction between morphology and phonology, in which the distinction between word phonology and phrasal phonology discussed above plays an important role. This theory will be discussed in the next section.

Lexical Phonology and Morphology

Lexical phonology is a theory about the interface between phonology and morphology developed by Paul Kiparsky (1982, 1985) and a number of other phonologists. The basic issue is to what extent and how the morphological structure of words determines their phonetic realization. Lexical phonology may be qualified as a set of related but independent hypotheses about the morphology–phonology interface (see Booij, 2000 for a detailed survey).

The basic claim of lexical phonology is that morphology and the rules of word phonology apply in tandem. Given a word with its underlying phonological form, the relevant rules of word phonology are applied to that word. You may then apply a morphological rule to that word in its derived phonological form. This creates a new domain of application for the rules of word phonology. Thus, we derive the lexical phonetic forms of words. These words will subsequently be combined into phrases and larger constituents by the rules of syntax. Postlexical phonology is accounted for by a component of postlexical phonology that applies after syntax. Thus, the organization of the grammar is proposed as in Figure 1.

Suppose we want to compute the phonetic form of the 1.sg. form of the Dutch verb *vind* /vɪnd/ 'to find', which is *vind* [vɪnt]. The stem for *vind* is first fed into morphology, which has no phonological effect since there is no overt morphological ending for 1.sg. verbs. The form is then syllabified, as one syllable (vɪnd). To this form, the rule of final devoicing applies, resulting in the form [vɪnt]. This is the form that is fed into syntax. At the postlexical level, this form may undergo further phonological rules such as assimilation.

We do not have to label the rule of final devoicing explicitly as a lexical rule. Instead, we might assume the principle 'apply a rule when possible.' Thus, the rules of syllabification will apply to a word. Subsequently, the presence of syllable structure will trigger application of the rule of final devoicing to voiced obstruents in syllable-final position.

When we derive the deverbal noun *vinder* with the phonetic form [vɪn.dər] we might proceed as

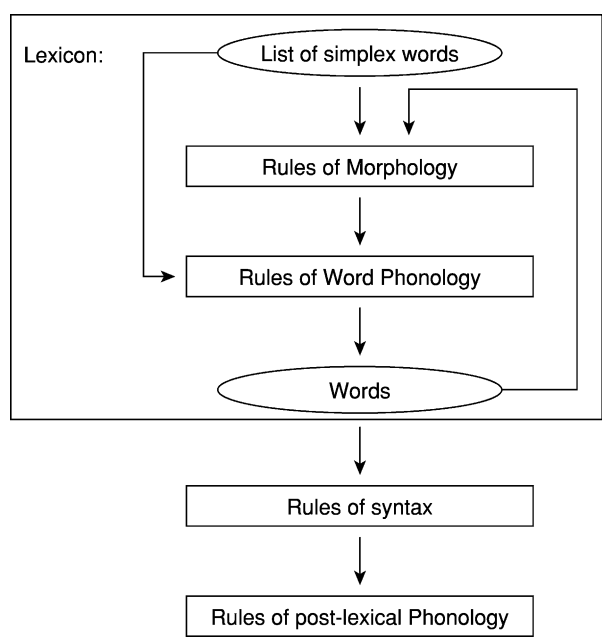

Figure 1 Lexical phonology.

follows. On the assumption that stems do not trigger the application of phonological rules, the stem *vind* is fed into morphology, where the noun *vinder* is created. Subsequently, this word will be syllabified as *vin.der*. The /d/ is now in onset position and hence it will not be devoiced, as required. This word is then, with this computed phonological form, available for lexical insertion into syntactic structure.

The theory of lexical phonology in its original form claimed that word phonological rules may apply cyclically, in an outward fashion. The concept of cyclic rule application originates from Chomsky and Halle (1968) (usually referred to as *SPE*), which proposed to apply the stress rules of English in a cyclic fashion. For example, the stress patterns of the word *condensation* in the (deverbal) interpretation 'the act of condensing' and of the similar word *compensation* are derived in two steps. On the first cycle, main stress is assigned to their verbal stems *con**dense*** and ***com**pensate* respectively, which results in main stress on the second and first syllable respectively. The addition of the suffix *-ation* creates a second domain of application of the English main stress rule, with main stress on the first vowel of *-ation*. There is also some degree of stress on the word-initial syllables of these words. These words differ, however, in the phonetic realization of the second vowel. The second, unstressed vowel of *compensation*, which is unstressed on both cycles, is realized as a schwa, whereas the second vowel of *condensation* is pronounced as a full vowel [ɛ] since it still has some degree of stress, a reflex of the stress pattern of its verbal stem *condense*. The difference in phonetic realization of the second vowel of these words thus reflects their derivational history (Chomsky and Halle, 1968: 116).

Whereas in *SPE* cyclic application of the English stress rules is stipulated, in lexical phonology this manner of application follows from the organization of the grammar as outlined above, since the derived phonological forms of words can be fed back into the morphological component. Therefore, it has been proposed that the rules of lexical phonology apply as soon as possible, hence cyclically. An additional advantage of this theory is that it predicts that morphological operations can be dependent on derived phonological properties of words. An example of this kind of dependence is that the English suffix *-al* can only be attached to verbs that bear main stress on their final syllable; hence the difference between *try–trial* versus *organize–*organizal* (the only exception to this constraint is *bury–burial*). If stress can be computed by rule in a cyclic fashion, the grammar will first assign stress to the verbal stems, and subsequently, the word formation rule for *-al* can be applied to verbal stems provided with the required stress pattern.

This proposal raises a number of issues. First, stress is a property of syllables. Hence, if stress is cyclic, syllabification must be applied in a cyclic fashion as well. Affixation may, however, affect the syllabification of the stem. In particular, stem-final consonants will be syllabified as codas, but syllabified as onsets when a vowel-initial suffix is attached to that stem, as in *find–fin.der*. Cyclic syllabification thus implies some form of resyllabification of the stem on the next cycle. Secondly, it has become clear that certain phonological rules should not apply cyclically. This is, for example, the case for the Dutch rule of final devoicing, which should not apply to the stem of the deverbal noun *vind-er* discussed above because otherwise the wrong phonetic form [vɪn.tər] is predicted. Therefore, Booij and Rubach (1987) proposed a refinement of the model of lexical phonology, and introduced a third level, a category of presyntactic word-level rules (also called postcyclic rules) that apply after the set of cyclic phonological rules, but still within the lexicon. Hence, we get three levels of application of phonological rules:

1. Cyclic phonological rules (interacting with word formation)
2. Word-level phonological rules
3. Postlexical phonological rules.

A related hypothesis is that cyclic rules are subject to the condition that they apply in derived environments only. This means that they can only apply in a context created by the application of a previous phonological or morphological operation (see Booij, 2000 for detailed discussion). Furthermore, it has been hypothesized that lexical rules are structure preserving; that is, they only introduce phonological segments that also occur in the underlying forms of words.

In some varieties of lexical phonology one also finds the hypothesis of level ordering. This hypothesis claims that the morphological processes of a language may be organized in two or more levels or strata, each with their own set of phonological rules applying to the complex words created at that level. For English, for instance, it has been proposed that there are two levels. Level 1 is the level of nonnative suffixation, which triggers the application of a specific set of phonological rules such as the main stress rule. Level 2 is the level for stress-neutral (native derivational and inflectional) suffixes. At this level, the main stress rule no longer applies, thus accounting for the stress-neutrality of these suffixes. This level-ordering

hypothesis also predicts that stress-neutral suffixes are peripheral to those that influence the stress patterns of words, such as the stress-bearing nonnative (Romance) suffixes of English. For instance, in the complex noun *contrastiveness* the stress-shifting suffix *-ive* precedes the stress-neutral suffix *-ness*. The level-ordering hypothesis for English is discussed and criticized in detail by Fabb (1988) and Plag (1999), and defended in Giegerich (1999).

Constraint-Based Phonology

To what extent do the insights of lexical phonology carry over to constraint-based phonological theories such as optimality theory (OT)? An important insight of lexical phonology is that morphological structure may determine the domain of application of phonological constraints. This insight has been carried over to OT in the subtheory of alignment (McCarthy and Prince, 1994). In this approach, the boundaries of prosodic constituents such as syllables and prosodic words must be aligned as much as possible with morphological boundaries. Thus, morphological boundaries codetermine the boundaries of prosodic constituents, and hence indirectly the domain of application of phonological rules. The effects of cyclic application of phonological rules within complex words in rule-based frameworks might be obtained by making use of output–output identity constraints that refer to the phonetic form of morphologically related words or word forms (Benua, 2000).

The distinction between word phonology and phrase phonology can be carried over to OT in the form of derivational optimality theory (DOT), as advocated in Booij (1997), Rubach (2000), and Ito and Mester (2001). This means that the evaluation of the candidate phonetic forms of words takes place in two steps, first at the word level, and subsequently at the postlexical level. Thus a restricted form of derivation is maintained. This approach can account for the difference in phonetic form between *vinder* and *vind er* mentioned above.

See also: Generative Phonology; Morphotactics; Rule Ordering and Derivation in Phonology.

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Lexical Semantics: Overview

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Word Knowledge

Semantic interpretation requires access to knowledge about words. The lexicon of a grammar must provide a systematic and efficient way of encoding the information associated with words in a language. Lexical semantics is the study of what words mean and how they structure these meanings. This article examines word meaning from two different perspectives: the information required for composition in the syntax and the knowledge needed for semantic interpretation. The lexicon is not merely a collection of words with their associated phonetic, orthographic, and semantic forms. Rather, lexical entries are structured objects that participate in larger operations and compositions, both enabling syntactic environments and acting as signatures to semantic entailments and implicatures in the context of larger discourse.

There are four basic questions in modeling the semantic content and structure of the lexicon: (1) What semantic information goes into a lexical entry? (2) How do lexical entries relate semantically to one another? (3) How is this information exploited compositionally by the grammar? and (4) How is this information available to semantic interpretation generally? This article focuses on the first two.

The lexicon and lexical semantics have traditionally been viewed as the most passive modules of language, acting in the service of the more dynamic components of the grammar. This view has its origins in the generative tradition (Chomsky, 1955) and has been an integral part of the notion of the lexicon ever since. While the *aspects* model of selectional features (Chomsky, 1965) restricted the relation of selection to that between lexical items, work by McCawley (1968) and Jackendoff (1972) showed that selectional restrictions must be available to computations at the level of derived semantic representation rather than at deep structure. Subsequent work by Bresnan (1982), Gazdar *et al*. (1985), and Pollard and Sag (1994) extended the range of phenomena that can be handled by the projection and exploitation of lexically derived information in the grammar.

With the convergence of several areas in linguistics (lexical semantics, computational lexicons, and type theories) several models for the determination of selection have emerged that put even more compostional power in the lexicon, making explicit reference to the paradigmatic systems that allow for grammatical constructions to be partially determined by selection. Examples of this approach are generative lexicon theory (Bouillon and Busa, 2001; Pustejovsky, 1995) and construction grammar (Goldberg, 1995; Jackendoff, 1997, 2002). These developments have helped to characterize the approaches to lexical design in terms of a hierarchy of semantic expressiveness. There are at least three such classes of lexical description: *sense enumerative lexicons*, where lexical items have a single type and meaning, and ambiguity is treated by multiple listings of words; *polymorphic lexicons*, where lexical items are active objects, contributing to the determination of meaning in context, under well-defined constraints; and *unrestricted sense lexicons*, where the meanings of lexical items are determined mostly by context and conventional use. Clearly, the most promising direction seems to be a careful and formal elucidation of the *polymorphic lexicons*, and this will form the basis of the subsequent discussion of both the structure and the content of lexical entries.

Historical Overview

The study of word meaning has occupied philosophers for centuries, beginning at least with Aristotle's theory of meaning. Locke, Hume, and Reid all paid particular attention to the meanings of words, but not until the 19th century did the rise of philological and psychological investigations of word meaning occur, with Bréal (1897), Erdmann (1900), Trier (1931), Stern (1931/1968), and others focused on word connotation, semantic drift, and word associations in the mental lexicon as well as in social contexts.

Interestingly, Russell, Frege, and other early analytic philosophers were not interested in language as a linguistic phenomenon but simply as the medium through which judgments can be formed and expressed. Hence, there is little regard for the relations between senses of words, when not affecting the nature of judgment, for example, within intensional contexts. Nineteenth-century semanticists and semasiologists, on the other hand, viewed polysemy as the life force of human language. Bréal, for example, considered it to be a necessary creative component of language and argued that this phenomenon better than most in semantics illustrates the cognitive and conceptualizing force of the human species.

Even with their obvious enthusiasm, semasiology produced no lasting legacy to the study of lexical semantics. In fact, there was no systematic research into lexical meaning until structural linguists extended the relational techniques of Saussure (1916/1983) and elaborated the framework of componential analysis for language meaning (Jakobson, 1970).

The idea behind componential analysis is the reduction of a word's meaning into its ultimate contrastive elements. These contrastive elements are structured in a matrix, allowing for dimensional analysis and generalizations to be made about lexical sets occupying the cells in the matrix.

This technique developed into a general framework for linguistic description called distinctive feature analysis (Jakobson and Halle, 1956). This is essentially the inspiration for Katz and Fodor's 1963 theory of lexical semantics within transformational grammar. In this theory, usually referred to as 'markerese,' a lexical entry in the language consists of grammatical and semantic markers and a special feature called a '*semantic distinguisher*.' In Weinreich (1972) and much subsequent discussion, it was demonstrated that this model is far too impoverished to characterize the compositional mechanisms inherent in language. In the late 1960s and early 1970s, alternative models of word meaning emerged (Fillmore, 1965; Gruber, 1965; Jackendoff, 1972; Lakoff, 1965) that respected the relational structure of sentence meaning while encoding the named semantic functions in lexical entries. In Dowty (1979), a model theoretic interpretation of the decompositional techniques of Lakoff, McCawley, and Ross was developed.

Recently, the role of lexical–syntactic mapping has become more evident, particularly with the growing concern over projection from lexical semantic form, the problem of verbal alternations and polyvalency, and the phenomenon of polysemy.

Ambiguity and Polysemy

Given the compactness of a lexicon relative to the number of objects and relations in the world, and the concepts we have for them, lexical ambiguity is inevitable. Add to this the cultural, historical, and linguistic blending that contributes to the meanings of our lexical items, and ambiguity can appear arbitrary as well. Hence, '*homonymy*' – where one lexical form has many meanings – is to be expected in a language. Examples of homonyms are illustrated in the following sentences:

(1a) Mary walked along the bank of the river.
(1b) Bank of America is the largest bank in the city.

(2a) Drop me a line when you are in Boston.
(2b) We built a fence along the property line.

(3a) First we leave the gate, then we taxi down the runway.
(3b) John saw the taxi on the street.

(4a) The judge asked the defendant to approach the bar.
(4b) The defendant was in the pub at the bar.

Weinreich (1964) calls such lexical distinctions '*contrastive ambiguity*,' where it is clear that the senses associated with the lexical item are unrelated. For this reason, it is generally assumed that homonyms are represented as separate lexical entries within the organization of the lexicon. This accords with a view of lexical organization that has been termed a '*sense enumeration lexicon*' (cf. Pustejovsky, 1995). That is, a lexicon is *sense enumerative* when every word ω that has multiple senses stores these senses as separate lexical entries.

This model becomes difficult to maintain, however, when we consider the phenomenon known as '*polysemy*.' Polysemy is the relationship that exists between different senses of a word that are related in some logical manner rather than arbitrarily, as in the previous examples. We can distinguish three broad types of polysemy, each presenting a novel set of challenges to lexical semantics and linguistic theory.

a. Deep semantic typing: single argument polymorphism
b. Syntactic alternations: multiple argument polymorphism
c. Dot objects: lexical reference to objects that have multiple facets

The first class refers mainly to functors allowing a range of syntactic variation in a single argument. For example, aspectual verbs (*begin* and *finish*), perception verbs (*see, hear*), and most propositional attitude verbs (*know, believe*) subcategorize for multiple syntactic forms in complement position, as illustrated in (6):

(5a) Mary began to read the novel.
(5b) Mary began reading the novel.
(5c) Mary began the novel.

(6a) Bill saw John leave.
(6b) Bill saw John leaving.
(6c) Bill saw John.

(7a) Mary believes that John told the truth.
(7b) Mary believes what John said.
(7c) Mary believes John's story.

What these and many other cases of multiple selection share is that the underlying relation between the verb and each of its complements is essentially identical. For example, in (7), the complement to the verb *believe* in all three sentences is a proposition; in (5), what is begun in each sentence is an event of some sort; and in (6), the object of the perception is (arguably) an event in each case. This has led some linguists to argue for semantic selection (cf. Chomsky, 1986; Grimshaw, 1979) and others to argue for structured

selectional inheritance (Godard and Jayez, 1993). In fact, these perspectives are not that distant from one another (cf. Pustejovsky, 1995): in either view, there is an explicit lexical association between syntactic forms that is formally modeled by the grammar.

The second type of polysemy (syntactic alternations) involves verbal forms taking arguments in alternating constructions, the so-called '*verbal alternations*' (cf. Levin, 1993). These are true instances of polysemy because there is a logical (typically *causal*) relation between the two senses of the verb. As a result, the lexicon must either relate the senses through lexical rules (such as in head-driven phrase structure grammar (HPSG) treatments; cf. Pollard and Sag, 1994) or assume that there is one lexical form that has multiple syntactic realizations (cf. Pustejovsky and Busa, 1995).

(8a) The window opened suddenly.
(8b) Mary opened the window suddenly.

(9a) Bill began his lecture on time.
(9b) The lecture began on time.

(10a) The milk spilled onto the table.
(10b) Mary spilled the milk onto the table.

The final form of polysemy reviewed here is encountered mostly in nominals and has been termed '*regular polysemy*' (cf. Apresjan, 1973) and '*logical polysemy*' (cf. Pustejovsky, 1991) in the literature; it is illustrated in the following sentences:

(11a) Mary carried the book home.
(11b) Mary doesn't agree with the book.

(12a) Mary has her lunch in her backpack.
(12b) Lunch was longer today than it was yesterday.

(13a) The flight lasted 3 hours.
(13b) The flight landed on time in Los Angeles.

Notice that in each of the pairs, the same nominal form is assuming different semantic interpretations relative to its selective context. For example, in (11a) the noun *book* refers to a physical object, whereas in (11b) it refers to the informational content. In (12a), *lunch* refers to the physical manifestation of the food, whereas in (12b) it refers to the eating event. Finally, in (13a) *flight* refers to the flying event, whereas in (13b) it refers to the plane. This phenomenon of polysemy is one of the most challenging in the area and has stimulated much research Bouillon, 1997; Bouillon and Busa, 2001. In order to understand how each of these cases of polysemy can be handled, we must first familiarize ourselves with the structure of individual lexical entries.

Lexical Relations

Another important aspect of lexical semantics is the study of how words are semantically related to one another. Four classes of lexical relations, in particular, are important to recognize: synonymy, antonymy, hyponymy, and meronymy.

Synonymy is generally taken to be a relation between words rather than concepts. One fairly standard definition states that two expressions are synonymous if substituting one for the other in all contexts does not change the truth value of the sentence where the substitution is made (cf. Cruse, 1986, 2004; Lyons, 1977). A somewhat weaker definition makes reference to the substitution relative to a specific context. For example, in the context of carpentry, *plank* and *board* might be considered synonyms, but not necessarily in other domains (cf. Miller *et al.*, 1990). The relation of antonymy is characterized in terms of semantic opposition and, like synonymy, is properly defined over pairs of lexical items rather than concepts. Examples of antonymy are *rise/fall*, *heavy/light*, *fast/slow*, and *long/short* (cf. Cruse, 1986; Miller, 1991). It is interesting to observe that co-occurrence data illustrate that synonyms do not necessarily share the same antonyms. For example, *rise* and *ascend* as well as *fall* and *descend* are similar in meaning, yet neither *fall/ascend* nor *rise/descend* are antonym pairs. For further details see Miller *et al.* (1990).

The most studied relation in the lexical semantic community is hyponymy, the taxonomic relationship between words, as defined in WordNet (Fellbaum, 1998) and other semantic networks. For example, specifying *car* as a hyponym of *vehicle* is equivalent to saying that *vehicle* is a superconcept of the concept *car* or that the set *car* is a subset of those individuals denoted by the set *vehicle*.

One of the most difficult lexical relations to define and treat formally is that of meronymy, the relation of parts to the whole. The relation is familiar from knowledge representation languages with predicates or slot-names such as 'part-of' and 'made-of.' For treatments of this relation in lexical semantics, see Miller *et al.* (1990) and Cruse (1986).

The Semantics of a Lexical Entry

It is generally assumed that there are four components to a lexical item: phonological, orthographic, syntactic, and semantic information. Here, we focus first on syntactic features and then on what semantic information must be encoded in an individual lexical entry.

There are two types of syntactic knowledge associated with a lexical item: its *category* and its *subcategory*. The former includes traditional classifications of both the major categories, such as noun, verb, adjective, adverb, and preposition, as well as the minor categories, such as adverbs, conjunctions, quantifier elements, and determiners. Knowledge of the subcategory of a lexical item is typically information that differentiates categories into distinct, distributional classes. This sort of information may be usefully separated into two types, *contextual features* and *inherent features*. The former are features that may be defined in terms of the contexts in which a given lexical entry may occur. Subcategorization information marks the local syntactic context for a word. It is this information that ensures that the verb *devour*, for example, is always transitive in English, requiring a direct object; the lexical entry encodes this requirement with a subcategorization feature specifying that a noun phrase (NP) appear to its right. Another type of context encoding is collocational information, where patterns that are not fully productive in the grammar can be tagged. For example, the adjective *heavy* as applied to *drinker* and *smoker* is collocational and not freely productive in the language (Mel'čuk, 1988). '*Inherent features*' on the other hand, are properties of lexical entries that are not easily reduced to a contextual definition but, rather, refer to the ontological typing of an entity. These include such features as count/mass (e.g., *pebble* vs. *water*), abstract, animate, human, physical, and so on.

Lexical items can be systematically grouped according to their syntactic and semantic behavior in the language. For this reason, there have been two major traditions of word clustering, corresponding to this distinction. Broadly speaking, for those concerned mainly with grammatical behavior, the most salient aspect of a lexical item is its *argument structure*; for those focusing on a word's entailment properties, the most important aspect is its *semantic class*. In this section, these two approaches are examined and it is shown how their concerns can be integrated into a common lexical representation.

Lexical Semantic Classifications

Conventional approaches to lexicon design and lexicography have been relatively informal with regard to forming taxonomic structures for the word senses in the language. For example, the top concepts in WordNet (Miller *et al.*, 1990) illustrate how words are characterized by local clusterings of semantic properties. As with many ontologies, however, it is difficult to discern a coherent global structure for the resulting classification beyond a weak descriptive labeling of words into extensionally defined sets.

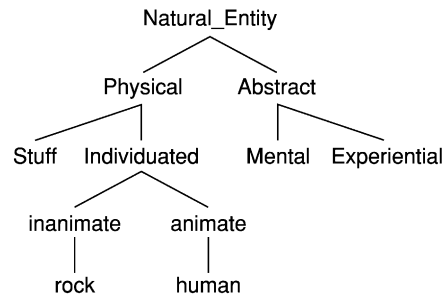

Figure 1 Type structures.

One of the most common ways to organize lexical knowledge is by means of type or feature inheritance mechanisms (Carpenter, 1992; Copestake and Briscoe, 1992; Evans and Gazdar, 1990; Pollard and Sag, 1994). Furthermore, Briscoe *et al.* (1993) described a rich system of types for allowing default mechanisms into lexical type descriptions. Similarly, type structures, such as that shown in Figure 1, can express the inheritance of syntactic and semantic features, as well as the relationship between syntactic classes and alternations (cf. Alsina, 1992; Davis, 1996; Koenig and Davis, 1999; Sanfilippo, 1993) and other relations (cf. Pustejovsky, 2001; Pustejovsky and Boguraev, 1993).

In the remainder of this section, we first examine the approach to characterizing the weak constraints imposed on a lexical item associated with its arguments. Then, we examine attempts to model lexical behavior by means of internal constraints imposed on the predicate. Finally, it is shown how, in some respects, these are very similar enterprises and both sets of constraints may be necessary to model lexical behavior.

Argument Structure

Once the base syntactic and semantic typing for a lexical item has been specified, its subcategorization and selectional information must be encoded in some form. There are two major techniques for representing this type of knowledge:

1. Associate 'named roles' with the arguments to the lexical item (Fillmore, 1985; Gruber, 1965; Jackendoff, 1972).
2. Associate a logical decomposition with the lexical item; meanings of arguments are determined by how the structural properties of the representation are interpreted (cf. Hale and Keyser, 1993; Jackendoff, 1983; Levin and Rappaport, 1995).

One influential way of encoding selectional behavior has been the theory of *thematic relations* (cf. Gruber, 1976; Jackendoff, 1972). Thematic relations are now generally defined as partial semantic functions of the event being denoted by the verb or noun, and they behave according to a predefined calculus of roles relations (e.g., Dowty, 1989). For example, semantic roles such as agent, theme, and goal can be used to partially determine the meaning of a predicate when they are associated with the grammatical arguments to a verb.

(14a) **put** <AGENT, THEME, LOCATION>
(14b) **borrow** <RECIPIENT, THEME, SOURCE>

Thematic roles can be ordered relative to each other in terms of an implicational hierarchy. For example, there is considerable use of a universal subject hierarchy such as is shown in the following (cf. Comrie, 1981; Fillmore, 1968):

(15) AGENT > RECIPIENT/BENEFACTIVE > THEME/PATIENT > INSTRUMENT > LOCATION>

Many linguists have questioned the general explanatory coverage of thematic roles, however, and have have chosen alternative methods for capturing the generalizations they promised. Dowty (1991) suggested that theta-role generalizations are best captured by entailments associated with the predicate. A theta-role can then be seen as the set of predicate entailments that are properties of a particular argument to the verb. Characteristic entailments might be thought of as prototype roles, or proto-roles; this allows for degrees or shades of meaning associated with the arguments to a predicate. Others have opted for a more semantically neutral set of labels to assign to the parameters of a relation, whether it is realized as a verb, noun, or adjective. For example, the theory of argument structure as developed by Williams (1981), Grimshaw (1990), and others can be seen as a move toward a more minimalist description of semantic differentiation in the verb's list of parameters. The argument structure for a word can be seen as the simplest specification of its semantics, indicating the number and type of parameters associated with the lexical item as a predicate. For example, the verb *die* can be represented as a predicate taking one argument, *kill* as taking two arguments, where as the verb *give* takes three arguments:

(16a) **die** (x)
(16b) **kill** (x,y)
(16c) **give** (x,y,z)

What originally began as the simple listing of the parameters or arguments associated with a predicate has developed into a sophisticated view of the way arguments are mapped onto syntactic expressions. Williams's (1981) distinction between *external* (the underlined arguments above) and *internal* arguments and Grimshaw's proposal for a hierarchically structured representation (cf. Grimshaw, 1990) provide us with the basic syntax for one aspect of a word's meaning. Similar remarks hold for the argument list structure in HPSG (Pollard and Sag, 1994) and Lexical Functional Grammar (Bresnan, 1994).

The interaction of a structured argument list and a rich system of types, such as that presented previously, provides a mechanism for semantic selection through inheritance. Consider, for instance, the sentence pairs in (17):

(17a) The man/the rock fell.
(17b) The man/*the rock died.

Now consider how the selectional distinction for a feature such as animacy is modeled so as to explain the selectional constraints of predicates. For the purpose of illustration, the arguments of a verb will be identified as being typed from the system shown previously.

(18a) λx: physical[**fall**($\underline{x}$)]
(18b) λx: animate[**die**($\underline{x}$)]

In the sentences in (17), it is clear how rocks cannot die and men can, but it is still not obvious how this judgment is computed, given what we would assume are the types associated with the nouns *rock* and *man*, respectively. What accomplishes this computation is a rule of subtyping, Θ, that allows the type associated with the noun *man* (i.e., 'human') to also be accepted as the type 'animate,' which is what the predicate *die* requires of its argument as stated in (18b) (cf. Carpenter, 1992).

(19) Θ [*human* $\sqsubseteq$ *animate*]: *human* $\rightarrow$ *animate*

The rule Θ, applies since the concept 'human' is subtyped under 'animate' in the type hierarchy. Parallel considerations rule out the noun *rock* as a legitimate argument to *die* since it is not subtyped under 'animate.' Hence, one of the concerns given previously for how syntactic processes can systematically keep track of which 'selectional features' are entailed and which are not is partially addressed by such lattice traversal rules as the one presented here.

Event Structure and Lexical Decomposition

The second approach to lexical specification mentioned previously is to define constraints internally to the predicate. Traditionally, this has been known as 'lexical decomposition.' In this section, we review

the motivations for decomposition in linguistic theory and the proposals for encoding lexical knowledge as structured objects. We then relate this to the way in which verbs can be decomposed in terms of eventualities (Tenny and Pustejovsky, 2000).

Since the 1960s, lexical semanticists have attempted to formally model the semantic relations between lexical items such as between the adjective *dead* and the verbs *die* and *kill* (cf. Lakoff, 1965; McCawley, 1968) in the following sentences:

(20a) John killed Bill.
(20b) Bill died.
(20c) Bill is dead.

Assuming the underlying form for a verb such as *kill* directly encodes the stative predicate in (20c) and the relation of causation, generative semanticists posited representations such as (21):

(21) (CAUSE (x, (BECOME (NOT (ALIVE y))))

Here the predicate CAUSE is represented as a relation between an individual causer *x* and an expression involving a change of state in the argument *y*. Carter (1976) proposes a representation quite similar, shown here for the causative verb *darken*:

(22) (x CAUSE ((y BE DARK) CHANGE))

Although there is an intuition that the cause relation involves a causer and an event, neither Lakoff nor Carter make this commitment explicitly. In fact, it has taken several decades for Davidson's (1967) observations regarding the role of events in the determination of verb meaning to find their way convincingly into the major linguistic frameworks. A new synthesis has emerged that attempts to model verb meanings as complex predicative structures with rich event structures (cf. Hale and Keyser, 1993; Parsons, 1990; Pustejovsky, 1991). This research has developed the idea that the meaning of a verb can be analyzed into a structured representation of the event that the verb designates, and it has furthermore contributed to the realization that verbs may have complex, internal event structures. Recent work has converged on the view that complex events are structured into an inner and an outer event, where the outer event is associated with causation and agency, and the inner event is associated with telicity (completion) and change of state (cf. Tenny and Pustejovsky, 2000).

Jackendoff (1990) developed an extensive system of what he calls '*conceptual representations*,' which parallel the syntactic representations of sentences of natural language. These employ a set of canonical predicates, including CAUSE, GO, TO, and ON, and canonical elements, including Thing, Path, and Event. These approaches represent verb meaning by decomposing the predicate into more basic predicates. This work owes obvious debt to the innovative work within generative semantics, as illustrated by McCawley's (1968) analysis of the verb *kill*. Recent versions of lexical representations inspired by generative semantics can be seen in the lexical relational structures of Hale and Keyser (1993), where syntactic tree structures are employed to capture the same elements of causation and change of state as in the representations of Carter, Levin and Rapoport, Jackendoff, and Dowty. The work of Levin and Rappaport, building on Jackendoff's lexical conceptual structures, has been influential in further articulating the internal structure of verb meanings (Levin and Rappaport, 1995).

Pustejovsky (1991) extended the decompositional approach presented in Dowty (1979) by explicitly reifying the events and subevents in the predicative expressions. Unlike Dowty's treatment of lexical semantics, where the decompositional calculus builds on propositional or predicative units (as discussed previously) a 'syntax of event structure' makes explicit reference to quantified events as part of the word meaning. Pustejovsky further introduced a tree structure to represent the temporal ordering and dominance constraints on an event and its subevents. For example, a predicate such as *build* is associated with a complex event such as the following (cf. also Moens and Steedman, 1988):

(23) $[_{transition}[e_1\text{:PROCESS}]\ [e_2\text{:STATE}]]$

The process consists of the building activity itself, whereas the state represents the result of there being the object built. Grimshaw (1990) adopted this theory in her work on argument structure, where complex events such as *break* are given a similar representation. In such structures, the process consists of what *x* does to cause the breaking, and the state is the resultant state of the broken item. The process corresponds to the outer causing event as discussed previously, and the state corresponds in part to the inner change of state event. Both Pustejovsky and Grimshaw differ from the previous authors in assuming a specific level of representation for event structure, distinct from the representation of other lexical properties. Furthermore, they follow Higginbotham (1985) in adopting an explicit reference to the event place in the verbal semantics.

Rappaport and Levin (2001) adopted a large component of the event structure model for their analysis of the resultative construction in English. Event decomposition has also been employed for properties of adjectival selection, the interpretation of compounds, and stage and individual-level predication.

Qualia Structure

Thus far, we have focused on the lexical semantics of verb entries. All of the major categories, however, are encoded with syntactic and semantic feature structures that determine their constructional behavior and subsequent meaning at logical form. In generative lexicon theory (Pustejovsky, 1995), it is assumed that word meaning is structured on the basis of four generative factors, or '*qualia roles*', that capture how humans understand objects and relations in the world and provide the minimal explanation for the linguistic behavior of lexical items (these are inspired in large part by Moravcsik's (1975, 1990) interpretation of Aristotelian *aitia*). These are the formal role, the basic category that distinguishes the object within a larger domain; the constitutive role, the relation between an object and its constituent parts; the telic role, its purpose and function; and the agentive role, factors involved in the object's origin or 'coming into being.' Qualia structure is at the core of the generative properties of the lexicon since it provides a general strategy for creating new types. For example, consider the properties of nouns such as *rock* and *chair*. These nouns can be distinguished on the basis of semantic criteria that classify them in terms of general categories such as *natural_kind, artifact_object*. Although very useful, this is not sufficient to discriminate semantic types in a way that also accounts for their grammatical behavior. A crucial distinction between *rock* and *chair* concerns the properties that differentiate *natural_kinds* from *artifacts*: Functionality plays a crucial role in the process of individuation of artifacts but not of natural kinds. This is reflected in grammatical behavior, whereby 'a good chair' or 'enjoy the chair' are well-formed expressions reflecting the specific purpose for which an artifact is designed, but 'good rock' or 'enjoy a rock' are semantically ill formed since for *rock* the functionality (i.e., telic) is undefined. Exceptions exist when new concepts are referred to, such as when the object is construed relative to a specific activity, as in 'The climber enjoyed that rock'; *rock* takes on a new meaning by virtue of having telicity associated with it, and this is accomplished by integration with the semantics of the subject NP. Although *chair* and *rock* are both *physical_object*, they differ in their mode of coming into being (i.e., agentive): artifacts are man-made, *rocks* develop in nature. Similarly, a concept such as *food* or *cookie* has a physical manifestation or denotation, but also a functional grounding, pertaining to the relation of 'eating.' These apparently contradictory aspects of a category are orthogonally represented by the qualia structure for that concept, which provides a coherent structuring for different dimensions of meaning.

See also: Compositionality: Semantic Aspects; Lexicon, Generative; Semantics of Prosody; Syntax-Semantics Interface.

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Lexicalization

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Lexicalization – A Variable Concept

The term lexicalization is used with a broad range of related but distinct meanings within linguistics. One very basic meaning of the word pertains specifically to conceptualization. Concepts, which are expressed by a lexical form, may be described as 'lexicalized.' A lexicalized concept could be juxtaposed to a concept that is not lexicalized, for example, in a comparison of languages (cf. Lyons, 1977: 235; Talmy, 1985). The concept 'the succession of one day and one night' is thus lexicalized as *døgn* in Norwegian (and Danish), but has no lexical equivalent in English.

New concepts that are given lexical form become part of the lexicon of a language and the process of establishing a new unit in any specific lexicon is commonly referred to as lexicalization. All new words and meanings may thus potentially be lexicalized and the term is often activated in discussions of the integration of loan words, the development of new meanings, and the establishing of idioms as lexical units. Most important in this respect is the concept's relevance to regular word-formation processes, which is discussed below.

Another use of lexicalization indicates a contrast to grammaticalization. Lehmann (1989) compares the two concepts by defining them as processes that move signs in different directions across the border between lexicon and grammar. Moreno Cabrera (1998), on the other hand, defines the relationship between the phenomena as complementary; grammaticalization involves metaphorical abstraction processes, whereas lexicalization has to do with metonymical concretion. Grammaticalization viewed in this light represents a well-developed field of linguistic research, whereas lexicalization thus conceived does not. Hopper and Traugott (1993: 49) briefly refer to lexicalization as the rare "process whereby a nonlexical form such as *up* becomes a fully referential lexical item," thus evoking the difference between grammatical and lexical words.

Finally, a fairly common use of lexicalization refers to the process when morphosyntactic, syntactic, or pragmatic means of conveying information are taken over by lexical forms. One example is Moore (1988), who demonstrates how productive morphosyntactic categories are lexicalized word by word in a situation of language obsolescence; another is Bybee (1985: 18), who refers to examples where once productive causatives or present-tense morphemes are reanalyzed as lexical forms.

Lexicalization and the Lexicon

In broad terms, lexicalization has to do with including new items in the lexicon. Therefore, one's conceptualization of the lexicon is a prerequisite for the use one makes of the term lexicalization. Pawley (1986) makes a point of contrasting the then-dominant structuralist or generative notion of the lexicon with that implied by lexicographers and 'lay lexicographers.'

Since 1986, linguistics has undergone a major shift in the relative amount of interest paid to the lexicon. The 'lexicographers' lexicon' that Pawley pointed to can much more easily be harmonized with the new host of usage-based theories, with cognitive linguistics being the most elaborated framework (cf. Langacker, 1987, 1991, 2000). Here, the mental lexicon is seen as the primary locus of the human language capacity, the network is a metaphor much used to describe its organization, and the distinction between productive rules and stored units is to a large degree erased.

Lexicalization is thus dependent on theories of the lexicon. Lexicalization used within generative theories such as the Lexicalist approach during the 1970s (cf. Bauer, 1988) or within Lexical Morphology during the 1980s evokes a host of theoretical assumptions that cannot easily be compared to those evoked by linguists working within usage-based theories (cf., for example, Svanlund, 2002).

Lexicalization and Word Formation

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Another use of lexicalization indicates a contrast to grammaticalization. Lehmann (1989) compares the two concepts by defining them as processes that move signs in different directions across the border between lexicon and grammar. Moreno Cabrera (1998), on the other hand, defines the relationship between the phenomena as complementary; grammaticalization involves metaphorical abstraction processes, whereas lexicalization has to do with metonymical concretion. Grammaticalization viewed in this light represents a well-developed field of linguistic research, whereas lexicalization thus conceived does not. Hopper and Traugott (1993: 49) briefly refer to lexicalization as the rare "process whereby a nonlexical form such as *up* becomes a fully referential lexical item," thus evoking the difference between grammatical and lexical words.

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Lexicalization and Word Formation

It is only in relation to regular word formation that lexicalization has been the focus of major research on

a broader basis. Here, Lipka (1977), Bauer (1983), Bakken (1998), and Svanlund (2002) will be used as the major points of orientation. A long-recognized problem when specifying word-formation rules is that they are not easily formulated on the basis of a corpus of established words. Productive word-formation rules produce new complex words, but having come into existence, these words 'step out' of the word-formation grammar. They develop according to other principles and it is these 'other principles' that lexicalization research has focused on.

Lexicalization as Conventionalization

The starting point for the lexicalization of complex words is the nonce formation (Bauer, 1983: 45; Bakken, 1998; Morita, 1995). For a new word form to be established in a socially or mentally defined lexicon, a conventional connection needs to be established between the concept and the new word form; the word must be established as a conventional sign. Lipka (1977: 155) refers to this conventional connection of form and meaning by the term *Hypostasierung* and sees it as the immediate **cause** of the lexicalization process proper as he defines it. Bauer (1983) refers to the phenomenon as 'institutionalization' and, like Lipka, keeps institutionalized and lexicalized words apart. In Bakken (1998), conventionalization is the preferred term for the process of establishing a new unit in the lexicon and, more importantly, conventionalization is seen as the first phase of a gradual lexicalization process, thus making lexicalization a gradient quality of a complex word. Bakken (1998) is inspired by Cognitive Linguistics, where entrenchment is the term translating into conventionalization. Usage is seen as the sanctioning factor that enhances the degree of conventionalization and thus lexicalization. Svanlund (2002) also works within the framework of Cognitive Linguistics, but wants to reserve the term lexicalization for the establishing process. Where other accounts seek to relate the semantics of the complex word to the conventionalization process, Svanlund argues that no logical connection can be established between the degree of conventionalization and the semantics of the complex word. (See Lexicalization as an Aspect of Meaning below.)

Lexicalization as Irregularity

If the lexicon is defined negatively in relation to grammar as Bloomfield (1933) does, it is simply a place where linguistic units are stored rather than generated by rule. A natural consequence of this view of the lexicon is to define lexicalization as a concomitant of irregularity. Bauer (1983) is the most explicit representative of this approach. Since one must accept that nonce formations are produced by word-formation rules, the irregularity of a complex word must occur after the word formation.

It has often been noted that complex words tend to develop in unpredictable directions once they have come into existence. These developments are of different kinds, and Bauer (1983) refers to them as "types of lexicalization," distinguishing between syntactic, semantic, morphological, and phonological lexicalization. Semantic lexicalization (referred to as *idiomatization* by Lipka, 1977) has occurred when, for example, a compound has developed a meaning that is unpredictable given the meanings of its parts. Phonological lexicalization has to do with phonotactic developments blurring the original make-up of the word and morphological lexicalization characterizes complex words with unpredictable inflection. Bauer gives a nuanced discussion of the reasons for the irregularities and is careful to note that whereas some of the discrepancies between the thus lexicalized words and the productive rules are caused by word-internal developments, some are indeed caused by changes in the grammar at large or even changes in the material word (pertains to word meanings). In Bakken (1998: 61–124), it is argued that the lexicalization process essentially is a semantic process, whereby the originally complex word loses its compositional meaning and gradually becomes an arbitrary sign. The occurrence of formal idiosyncracies is seen as secondary, since they allegedly have non-compositionality as a prerequisite.

More importantly, Bakken (1998: 28–35) questions the sharp distinction between regular and irregular word formation, in line with Cognitive Linguistics, and argues that motivation rather than predictability must be the evaluating measure for the description of complex words. It is essentially the theory of the lexicon that is at stake, but the consequences for lexicalization models are obvious. This line of reasoning is followed up by Svanlund (2002) and it is demonstrated how particularly problematic the notion of semantic lexicalization is (see below).

Lexicalization as an Aspect of Meaning

When a complex word is labeled as lexicalized on semantic grounds, the most common measure has been unpredictability. The Norwegian word *barsel* was originally a compound consisting of the elements *barn* ('child') and *øl* ('beer'). It used to refer to the party given on the occasion of a childbirth. It now refers to the confinement itself. This straightforward example would logically be referred to as semantic lexicalization by Bauer, on the grounds that the meaning of the whole is not (any longer) predicted by the

meaning of its parts. However, the whole notion of compositionality is a problematic concept and Svanlund (2002) raises the question of whether any complex word at any time is truly compositional and predictable in meaning. He shows how polysemy, metaphor, and the number of possible relations between elements undermine any naive idea of predictability. On this basis, he presents an alternative model of analyzing the meanings of complex words. The key word here is motivation and one of his main claims is that the model is as applicable to nonce words as to well-established ones, thus demonstrating how the semantics of a complex word is independent of its conventionalization.

Bakken (in press), on the other hand, seeks to justify the connection between conventionalization and word meaning. She concedes that the meaning of complex words can be more or less motivated like Svanlund claims and that a linguist could apply Svanlund's model to both nonce words and well-established words. However, she insists that the importance does not lie not in the conscious analysis of meaning elements, but in the salience of these elements for the language user. Conventionalization enhances automation, and it is in this respect that the non-compositionality of words, i.e., their meaning, could be interpreted as being relevant to the lexicalization process.

See also: Cognitive Linguistics; Grammaticalization; Lexical Phonology and Morphology; Lexical Semantics: Overview; Lexicon: Structure; Metaphors, Grammatical; Polysemy and Homonymy; Word Formation.

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Lexicase

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Introduction

Lexicase is a type of European-style dependency/valency grammar, which evolved out of American-style generative transformational grammar. It is a monostratal syntactic theory, which claims that the information for well-structured sentences is implied in each lexical item (or 'word') as its features. Thus, the grammar, such as morphological and syntactic mechanisms and semantic relations, are all described as features carried by lexical items. The assignment of three different types of cases, namely case relations, case forms, and the macrorole actor, is considered to be a prominent part of the grammar (thus the name *lexi-case*).

The theory was developed by Stanley Starosta at the University of Hawai'i, where it has been applied in the study of some 40 languages, mainly Pacific and Asian languages, and English, with some limited work on Greek, Swahili, and Native American languages. In Lexicase, the sentences are analyzed as spoken/written, that is, without going through hypothetical levels, such as 'underlying structures' and 'movements.' This enables the direct comparison of syntactic structures of different languages. Lexicase has also been applied in some morphosyntactic (historical) comparisons, mainly of Austronesian languages, as well as computational language processing.

Regent-Dependent Relationship and Grammatical Description

Being a version of Dependency Grammar, elements constituting sentences are analyzed pair-wise as a sum of regent (or 'head') and dependent relations. A regent carries features that specify what kind of dependents it must take, it may take, and it cannot take. These include syntactic properties and word order, as well as morphological and semantic characteristics of the dependent. When all the regents in a sentence have dependents to meet all such features, then this sentence is well-formed and 'grammatical.'

How this operates with actual language data is illustrated here with a few English *to* prepositional phrases. The locative preposition *to* carries features such as the following: (1) it has to take a noun as its dependent; (2) its dependent noun has to be accusative; (3) its dependent noun has to be locational, and (4) it must be followed by a dependent noun, thus specifying the word category of the dependent, the form of the dependent, the semantic nature of the dependent, and the relative word order between the dependent and itself. In Lexicase formalism, the features that a word carries are listed under each form, as shown in (1). The symbol '?' indicates that whatever follows this symbol is required as a dependent by this form; the feature '@ndex' indicates the respective position of this particular form in a sentence. Both of these symbols are variable and are replaced with appropriate position numbers once an actual sentence or phrase is formed.

(1) *to*

@ndex	... position index of this word
P	... lexical category of this word
? [N]	... required feature of the dependent (a Noun) (i)
? $\begin{bmatrix} \text{N} \\ \text{Acc} \end{bmatrix}$	... required feature of the dependent (an Accusative noun) (ii)
? $\begin{bmatrix} \text{N} \\ \text{loc} \end{bmatrix}$	... required feature of the dependent (a noun indicating location) (iii)
@< ?[N]	... required feature of the dependent (follows the form *to*) (iv)

The phrases *to her* and *to Amsterdam* are both well-structured, since both *her* and *Amsterdam* in these phrases satisfy all the features required by its regent. They are shown in (2), where the variables ('?' and '@') are replaced with appropriate position numbers.

(2a)

to	*her*
1ndex	2ndex
P	N
2 [N]	Acc
2 $\begin{bmatrix} \text{N} \\ \text{Acc} \end{bmatrix}$	loc
2 $\begin{bmatrix} \text{N} \\ \text{loc} \end{bmatrix}$	
1 < 2[N]	

(2b)

to	*Amsterdam*
1ndex	2ndex
P	N
2 [N]	loc
2 $\begin{bmatrix} \text{N} \\ \text{Acc} \end{bmatrix}$	
2 $\begin{bmatrix} \text{N} \\ \text{loc} \end{bmatrix}$	
1 < 2[N]	

On the other hand, in the phrases **to she* and **Amsterdam to*, in each case one of the required features is not satisfied, as indicated with the symbol '*' in (3); the former violating the case requirement and the latter violating the word order requirement. Both are ungrammatical.

(3a)

**to*	*she*
1ndex	2ndex
P	N
2 [N]	Nom
*2 $\begin{bmatrix} \text{N} \\ \text{Acc} \end{bmatrix}$	
1 < 2[N]	

(3b)

**Amsterdam*	*to*
1ndex	2ndex
N	P
1 [N]	
1 $\begin{bmatrix} \text{N} \\ \text{Acc} \end{bmatrix}$	
*2 < 1[N]	

It should be noted that only the relevant features of each word are listed here in (1) through (3), and words are considered to actually carry a far greater number of grammatical features. In Lexicase, the sum of such features of words constituting a sentence determines whether the whole sentence is well-formed, thus the expression 'the grammar comes from the lexicon.'

Word Categories

One of the basic features that words carry is their category, or 'part of speech.' Word categories are determined by their syntactic distribution. For example, if a form occurs as a dependent of and only of a noun, always occurring at the outer edge of an NP (on either side), and if it never occurs as an immediate dependent of a pronoun, then it is analyzed as a Determiner. The eight recognized word categories, namely, Noun (N), Verb (V), Determiner (Det), Adjective (Adj), Adverb (Adv), Pre/Postposition (P), Conjunction (Conj), and Sentence Particle (Sprt), and the regent-dependent relationship among these categories, summarized in Table 1, are considered to be cross-linguistic features. It should be noted that various 'functions' that each word may carry are considered to be separate features from the word category, and are language-specific. For example, a Determiner, defined as above, may carry functions such as indicating a case form, marking definiteness or gender, etc., depending on the language.

Because word categories are determined based on their syntactic distribution, multiple homophones are assumed in a Lexicase grammar. For example, the word 'look' in a sentence *Let's have a look*. with a Determiner preceding it would be analyzed as a noun, while the same form in the phrase *Look at me*. would be analyzed as a verb. The two forms $look_1$ and $look_2$ are analyzed as different lexical items that have a derivational relationship with each other.

An example of a well-formed English sentence 'The man saw a big dog.' is shown in (4) with word category analysis. Elements indicated with parentheses are optional, so that in this example ?([Adj]) means that an Adjective optionally occurs with the form *man*. Therefore, even when the variable '?' is not fulfilled it does not affect the well-formedness of the sentence. Thus, optional features, including word order flexibility, are also considered to be a part of the grammatical information carried by each word.

(4)	The	man	saw	a	big	dog.	
	1ndex	2ndex	3ndex	4ndex	5ndex	6ndex	. . . position index of each word
	Det	N	V	Det	Adj	N	. . . word category of each word
		1[Det]	6[N]			4[Det]	. . . dependent required by each word
		?([Adj])	2[N]			5([Adj])	. . . dependent required by each word

Three Cases – Case Relations, Case Forms, and the Macrorole

In a Lexicase grammar, nouns are considered to carry three different 'cases,' namely, case relations, case forms, and the macrorole. The assignment of these different types of cases enables various language-internal and cross-linguistic grammatical generalizations to be captured, especially generalizations shared by both ergative and accusative types of languages. In a sentence, every noun carries a case relation (or, the feature +prdc [predicate], which is considered to grammatically commute with case relations) and a case form, while only one noun in a clause carries the macrorole.

Table 1 Word categories and dependency relations

	Verb	*Noun*	*Pre/post-position*	*Adverb*	*Adjective*	*Determiner*	*Conjunction*	*Sentence particle*
Verb	+	+	+	+	−	−	+	+
Noun	+	+	+	−	+	+	+	+
Pre/post position	+	+	+	−	−	−	+	+
Adverb	−	−	−	−	+	−	−	−
Adjective	−	−	−	+	−	−	−	−
Determiner	−	−	−	−	−	−	−	−
Conjunction	+	+	+	+	+	−	+	−
Sentence particle	−	−	−	−	−	−	−	−

Each column indicates whether the word category indicated in the top row (shown in italics) can be a dependent of the word category indicated in the left column (shown in bold). The symbol '+' indicates that it can, and the symbol '−' indicates that it cannot.

There are five case relations:

1. Patient (PAT)
2. Agent (AGT)
3. Locus (LOC)
4. Means (MNS)
5. Correspondent (COR)

Among these, PAT is required by every verb (including all intransitive verbs) as its complement (*Andrew* in (5), *John* in (6) and (7)), while AGT is required by every transitive verb as its additional complement (*Mary* in (6)).

Case forms refer to any morphological and/or syntactic configurations that characterize a set of nouns in a sentence. The number of case forms that occur in a language may differ depending on each specific language. The major case forms are labeled as follows:

- Nominative (Nom): The case form that indicates both the [PAT] of intransitive sentences and either the [PAT] or the [AGT] of transitive sentences. This case form is shared by all languages. Note that by definition this covers also what is often referred to as 'absolutive.'
- Accusative (Acc): The case form that marks the [PAT] of transitive sentences in an accusative language.
- Ergative (Erg): The case form that only marks the [AGT] of a transitive clause. However, if the form also marks instruments, it is labeled as Instrumental (Ins), and if it marks adnominal possessors, it is labeled as Genitive (Gen).

Unlike case relations and case forms, which are assigned to every occurring Noun, there is only one macrorole in a sentence, 'actor' ([actr]), which is assigned to the same noun as the [AGT] of a transitive clause or the [PAT] of an intransitive clause.

Roughly speaking, the notion [PAT] corresponds to the thematic roles patient and theme in Case Grammar, and the theta role patient in Government and Binding theory. The Nominative case form roughly corresponds to what is often referred to as the '(grammatical) subject,' and the notion [actr] to what is often referred to as the 'logical subject.' Some sentence examples with three cases indicated are shown in (5) through (7). The case form of the word *Mary* in (6) cannot be determined from the form of the word itself, but is determined by its immediate postverbal word order and by the potential alternation with an accusative pronoun *she*.

(5)	He	ran.	
	N	V	. . . word category
	Nom	-trns	. . . case form (N), transitivity (V)
	PAT		. . . case relation
	actr		. . . macrorole

(6)	Mary	hit	him.	
	N	V	N	. . .word category
	Nom	+trns	Acc	. . . case form (N), transitivity (V)
	AGT		PAT	. . . case relation
	actr			. . . macrorole

(7)	He	was	hit	by	her.	
	N	V	V	P	N	. . . word category
	Nom	-trns	+adjc		Acc	. . . case form (N), transitivity (V)
	PAT					. . . case relation
	actr					. . . macrorole

The description of certain grammatical characteristics, including the actancy system (whether a language is ergative or accusative), agreement patterns, and patterns of control are described using these three cases. For example, an ergative system is defined in Lexicase as one where the [PAT] of both transitive and intransitive sentences is marked by the same case form, while an accusative system is one where the [actr] of both transitive and intransitive sentences is marked by the same case form.

The Application of Rules in Lexicase Grammar

Word categories and case types are the basic features that are employed to analyze and describe sentences. However, various rule types are employed to capture generalizations within the language and to enable cross-linguistic generalizations to be made.

For example, Redundancy Rules (RRs) and Subcategorization Rules (SRs) are implicational statements about relations between features. The former simply states that if a word carries one or more particular features, it will also contain certain other features. For example, if a word carries the feature [+prnn] (pronominal), then it must carry the feature [N] (Noun). The latter is the reverse of the former. For example, if a word carries the feature [N], then it may be subcategorized into either [+prnn] (pronominal) or [-prnn] (nonpronominal). Subcategorization Rules also contain what can be referred to as 'Inflectional Subcategorization Rules,' which break up stems into paradigms of inflected forms. For example, if a word is [-prnn] (nonpronominal, which implies that it is a subcategory of a Noun), it is inflected into [±plrl] (plural or nonplural).

Linking Rules (LRs) copy the index of the dependent word onto the regent matrix as the value of one of its contextual features (the replacement of the symbols '?' in the regent with the numbers that fill the symbols '@' in (2) and (3)). Chaining Rules are also used to copy indices from items in higher or lower domains to satisfy contextual features in cases

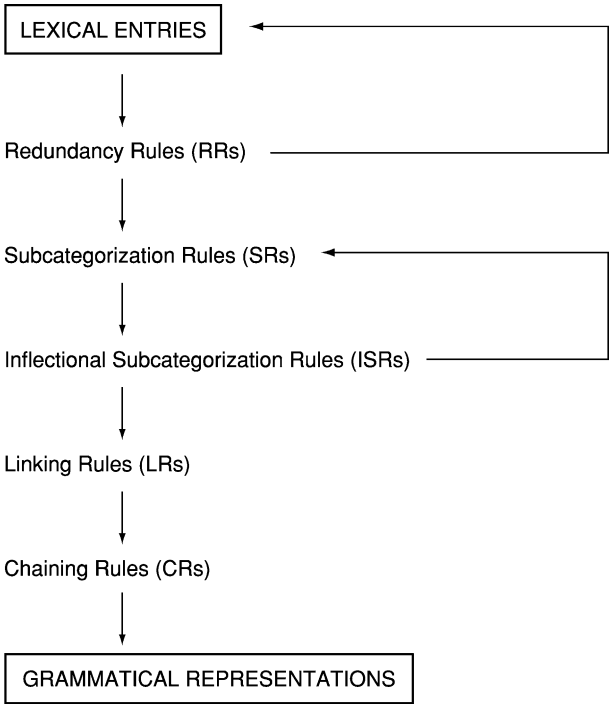

Figure 1 Relationship among lexicase rules.

where the dependency relationship is between words in different dependency domains. Chaining Rules (CRs) include the index mapping related to infinitival complementation ('control') and displacement ('wh-movement').

In addition, there are Derivational Rules (DRs), which state analogical relationships among subsets of lexical entries and are used to account for the active-passive relationship, and 'raising' to subject and object, etc.; Morphological Rules (MRs), which specify morphological marking of inflectional features; and Inflectional Redundancy Rules (IRRs), which specify agreement relationship and word order patterns. The relationship among these rules is shown in Figure 1.

See also: Case; Dependency Grammar; Role and Reference Grammar; Thematic Structure.

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Lexicography: Overview

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Introduction

Lexicography is the art or craft of writing dictionaries. In contrast to lexicology (*see* **Lexicology**), which is the theoretical study of words, their use, and their meaning, lexicography is a practical activity that involves compiling an inventory of the words in a language (or some particular subset of them) and saying something about each of them. Lexicographers were described by Trench (1858) as "the inventory clerks of language." Their primary duty is to collect an inventory of all the words in the language (or a selected subset), and to say something about each of them. There are many different kinds of dictionaries, giving many different kinds of information about words. The main ones are: (1) scholarly dictionaries of record; (2) practical dictionaries for everyday use; (3) pedagogical dictionaries; (4) dictionaries of linguistic phenomena such as slang or idioms; and (5) special-subject dictionaries. All the foregoing kinds are monolingual. To these we must add: (6) bilingual dictionaries; (7) onomasiological dictionaries (thesauruses, synonym dictionaries); and (8) term banks. There are also hybrid dictionaries, for example, monolingual dictionaries for second-language learners with marginal glosses in a relevant foreign language.

Four issues of general principle that must be considered for all serious types of dictionaries in any language are: (1) breadth, not depth; (2) consistency; (3) descriptive versus prescriptive approach to the language; and (4) historical versus synchronic approach. The third of these, in particular, is controversial: there are many circumstances in which a dictionary, rightly or wrongly, is expected to play a prescriptive role in a language.

General procedures for many kinds of lexicography include collecting, 'tokenizing,' and 'lemmatizing' words. Having established a draft word list, the lexicographer must decide what to say about each word. This includes decisions about (1) orthography of both the headword and inflected forms; (2) guidance on pronunciations; (3) word-class classification (part of speech); (4) definition writing; (5) examples; (6) phraseology; (7) disputed points of usage; and (8) etymology and word histories.

Brief History of Lexicography

Lexicography had its beginnings in the ancient civilizations of the Middle East (*see* **Bilingual Lexicography**) and ancient Chinese civilization (*see* **Chinese Lexicography**). In ancient Greece there were already dictionaries in the fifth century B.C. These were compiled to explain words used by Homer and other writers from the Archaic period, which had become rare or obsolete by the Classical period. Classical Greek lexicography was exclusively monolingual until quite a late period (*see* **Greek Lexicography, Classical**). It was left to the Romans to introduce bilingual lexicography (Latin → Greek, Greek → Latin), from the first century B.C. onward.

In many of the languages of Europe, the origins of lexicography can be traced back to interlinear glosses in medieval manuscripts (*see*, for example, **English Lexicography**, **German Lexicography**). Monks noted the vernacular equivalents of unfamiliar Latin words on the manuscript as an aid to understanding the text. In some monasteries, the glosses were subsequently collected and arranged roughly in alphabetical order in a separate manuscript. The development of European dictionaries as we understand them today, however, had to await the invention of printing technology in Germany by Johannes Gutenberg in 1450. Printed dictionaries became practical tools that could be mass-produced by the hundreds and thousands, enabling identical information about words to be disseminated extremely rapidly throughout a community. A major milestone in the development of European lexicography was the publication in Paris in 1531 of the *Dictionarium, seu Latinae linguae thesaurus* by the great Renaissance scholar and printer Robert Estienne (Robertus Stephanus). In 1538 he followed this with a Latin–French dictionary and in 1539 a French–Latin dictionary. These magnificent works remained unchallenged as authorities for over two hundred years and were the source of innumerable derivatives and revisions. Bilingual dictionaries played a major part in the revival of learning (Latin and Greek) during the Renaissance and an equally important part, first in the spread of Italian and French culture into northern Europe, and subsequently in the interplay of languages that was characteristic of Europe from the 15th century to the late 20th century, at which time, once again, an international lingua franca (English this time, not Latin) was to emerge. European dictionaries of the 15th and 16th centuries were of two kinds: those that played a role in the learning of Latin and those that were

designed to explain the words of one vernacular in terms of another. Many of these early printed dictionaries displayed great energy, learning, and sophistication, although an examination of them also provides a reminder of the important part played by the linguistic philosophy of the Enlightenment (17th and 18th centuries) in developing lexicographical standards of accuracy and consistency. Sixteenth-century dictionaries were full of information, but much of it was anecdotal and discursive. Balance and consistency were not among the lexicographical virtues of Renaissance dictionaries. Multilingual dictionaries were also popular during the Renaissance; valiant attempts were made to represent the meaning of words in one language by equivalents in several others. Only gradually did people come to realize how difficult it is to represent one language in terms of another. Languages do not map easily onto one another, and trying to map three or more languages onto each other is an impossibility, except in the case of superficial equivalents such as terms for artifacts in a technology that is shared by many linguistic cultures.

During the 18th century, large dictionaries were compiled in all the languages of Europe that were not the tongue of an oppressed minority. Academies were established with the aim of preserving the purity of vernacular languages (*see* **Academies: Dictionaries and Standards**). Great advances were made in data collection. (The aim was to collect and define all the words of a language, not just the 'hard words.') Scientific standards of definition writing were pursued. Some 18th-century lexicographers made strenuous efforts to implement the 'substitution principle,' a notion that can be traced back to Leibniz's dictum that two things are the same if the one can be substituted for the other without affecting the truth value (*salva veritate*). The idea was – and is – that a definition should be substitutable in any context for the word being defined (the *definiendum*). The substitution principle, coupled with unthinking reductionism (according to which every sense of every word is defined as an independent linguistic entity, rather than as part of a phraseological whole) is responsible for some of the convolutions still to be found in present-day dictionaries, for example in the definitions of English reciprocal verbs:

> **meet** (sense 2): to come into or be in conjunction or contact with (something or someone else or each other).

This definition may be convoluted, but at least it is an attempt to capture the reciprocal syntactic potential of the verb, as in examples 1–5 below. Some other English dictionaries present these as separate senses, while others ignore the syntax completely or indicate only 'transitive' and 'intransitive.'

1. John met Sally.
2. Sally met John.
3. John and Sally met.
4. John and Sally met each other.
5. John and Sally met with each other.

Eighteenth-century dictionaries saw their role not only as recorders of the words of a language, but also as reinforcers of 'correct' usage, to warn against barbarisms. Thus, Johnson (1755) included citations from "the best authorities" to show how English words are used, and included comments on words that he disapproved of (e.g., "**clever**: a low word"). During the 19th century, a shift from such prescriptive attitudes to scientific descriptive principles occurred in many important European lexicography projects.

The proposal by Sir William Jones in 1786 that Sanskrit, Greek, Latin, and other languages were "sprung from some common source which, perhaps, no longer exists" had a profound effect on scholarly lexicography. Although the American lexicographer Noah Webster (*see* **American Lexicography**) rejected the Indo-European hypothesis, preferring to believe that English words were derived from 'Chaldee,' scholarly lexicography in Europe throughout the 19th century devoted much energy to discovering the Indo-European roots of everyday words and establishing cognate relationships among words in different languages. Etymology, which in the 18th century had been a matter of wild guesswork, became a painstaking scientific discipline and came to dominate lexicography (*see* **Etymology**). The task of the scholarly lexicographer in all the leading languages of Europe was seen partially, if not primarily, as a historical one: not only to define the meaning of words but also to trace their origins. In 1864 Webster's successor Noah Porter and his etymologist C. A. F. Mahn quietly dropped 'Chaldee' and brought the leading American English dictionary into line with the rest of Western scholarship.

The establishment of lexicography as a scholarly discipline on historical principles led to the establishment of scholarly dictionaries of record for many languages. Also in the 19th and 20th centuries, large scholarly dictionaries of ancient and medieval languages began to be compiled, presenting a detailed account of the recorded vocabulary of major languages at earlier historical periods. Some of these great scholarly projects continued for many decades. The culmination of historical and in particular

Indo-European lexicographical scholarship is still being worked out. In 1949 Carl Darling Buck published *A dictionary of selected synonyms in the principal Indo-European languages*. At the University of Leiden, a major project is currently underway with the goal of creating an Indo-European etymological database on the Internet and, eventually, compiling a new Indo-European etymological dictionary, designed to supersede Julius Pokorny's *Indogermanisches etymologisches Wörterbuch* (1959).

In the 20th century another school of lexicography grew up, the purpose of which was to explain the meaning and use of words in the contemporary language, relegating etymology and obsolete senses to a subsidiary role. Historical principles were superseded in these dictionaries by synchronic principles, more suitable for practical everyday works. The first work to make this distinction explicitly was Funk and Wagnall's *Standard dictionary of the English language* (1893). Some but not all American dictionaries followed Funk and Wagnall's lead, for example the *American College dictionary* (1949), its successor the *Random House dictionary* (1964), and the *American Heritage dictionary* (1969). Others, including the Merriam-Webster dictionaries, clung to the more traditional historical principles. Among British and Australian one-volume dictionaries, it is now standard to follow synchronic principles rather than historical principles. One-volume dictionaries of the English language (both historical and synchronic) characteristically focus on explaining meaning, with comparatively few examples. In other languages, for example German and Greek, the focus of one-volume dictionaries is often very much more on phraseology and usage, with many more examples of usage than are found in one-volume English dictionaries and comparatively less space devoted to definitions. In Russia, dictionary compilation was associated with important developments in linguistic theory (*see* **Russian Lexicography**), for example the meaning = text theory of Mel'čuk (*see* **Mel'čuk, Igor Aleksandrovic (b.1932)**).

Beginning in the late 1980s, lexicography began to respond to the opportunities offered by computer technology, in particular the use of computers to collect and process evidence of word use on a very large scale (*see* **Corpus Lexicography**).

Typology of Dictionaries

There are innumerable works calling themselves 'dictionaries' in almost every language in the world that has a literature. Indeed, modern lexicography also plays a major part in recording the vocabulary of and establishing written norms for languages that do **not** have a literature. These works are extremely heterogeneous: some of them have nothing in common other than the word 'dictionary' in the title. Others are clearly members of the same family of reference works. A typology of dictionaries may be attempted, identifying the following types: scholarly dictionaries of record, practical dictionaries for everyday use, pedagogical dictionaries, dictionaries of slang and/or idioms, special-subject dictionaries – all of which are monolingual and explanatory in nature – along with bilingual dictionaries, onomasiological dictionaries, and term banks. In addition, there are various less frequent classes, for example hybrid works such as monolingual dictionaries for second-language learners with marginal glosses in a relevant foreign language.

Scholarly Dictionaries of Record

The 19th and 20th centuries saw an explosion of scholarly lexicographical activity. Every language in the world that has an established literary tradition now has (or will soon have) a major dictionary of record, recording the vocabulary of the language and usually but not always organized on historical principles, with plentiful citations illustrating usage and supporting the definitions. Classic examples of great historical dictionaries are the *Oxford English dictionary* (OED) (discussed in **English Lexicography**), the *Trésor de la langue française* (*see* **French Lexicography**), and the *Deutsches Wörterbuch* of the brothers Grimm (*see* **German Lexicography**).

The present encyclopedia includes articles on the history and current state of the art of lexicography in all the world's major languages. There are also articles on major areas of historical lexicographical scholarship (*see* **Old English Dictionaries**, **Middle English Dictionaries**, and **Old French Dictionaries**). In other cases, historical dictionaries are surveyed in the relevant national articles (*see*, for example, **Dutch and Flemish Lexicography**, **German Lexicography**).

As a subgroup of the category of scholarly dictionaries, dictionaries of etymology and word history should also be mentioned. These range from popular works such as Chantrell's very readable *Oxford dictionary of word histories* (2002) and Picoche's *Dictionnaire étymologique du français* (1992) to larger works of scholarship such as Kluge's *Etymologisches Wörterbuch der deutschen Sprache* (1st edn., 1883; 24th edn., 2002), the Dutch *Etymologisch*

woordenboek by P. van Veen and N. van der Sijs (1997), V. Machek's *Etymologický slovník jazyka Ceského* (1997), and Pokorny's *Indogermanisches etymologisches Wörterbuch* (1959).

Practical Dictionaries for Everyday Use

Despite the high cost of compiling a dictionary, most languages offer a range of choices of one-volume dictionaries, varying greatly in size and scope. In size, they range from small pocket books giving simple definitions by synonym and spelling dictionaries listing only word forms (together with occasional comments on points of orthographical difficulty), to large and ambitious works that give detailed information about many aspects of word meaning and word use, as well as facts about the world, such as famous people and places or the distribution and habitat of a plant or its New Latin name. The emphasis in practical dictionaries nowadays is often on presenting a wealth of complex facts about words in a way that is as accessible as possible for users. Lexicographers of an earlier generation appear to have been less concerned with user-friendliness. For example, the first edition of the *Concise Oxford dictionary* (1911) seems very dense and hard to use when compared with the 10th edition (1999), where a great deal of careful planning went into the page design and layout, as well as the selection of information. The compilers of such dictionaries are faced with choices at each step of the work, to which the answer is not always obvious. For example, should a practical dictionary record rare and obsolete words? Some dictionary publishers take the view that this is the *raison d'être* of a practical dictionary. No user, it is argued, will look up a very ordinary, familiar word, so as little space as possible should be wasted on such words. The likelihood that a word will be unfamiliar and therefore looked up in a dictionary (if encountered by a reader in some text) increases with its rarity, until the point is reached where the word is so rare that no one will ever encounter it. Another decision concerns the presentation of grammatical information. Facts about such matters as complementation patterns, countability, and selectional preferences are the linguist's stock in trade, but the practical lexicographer has to bear in mind that many ordinary users are not trained linguists and (especially in the English-speaking world) may actually be hostile to grammar. A judgment must be made whether anything at all should be said about each grammatical point concerning each word, and, if the answer is yes, how to present it. Often, exemplification, on the basis of which a user can make analogies, is considered to be a more effective explanatory technique than an abstract metalanguage.

Pedagogical Dictionaries

There are two main kinds of pedagogical dictionaries: those compiled for foreign learners of a language and those compiled for schoolchildren who are native speakers. Dictionaries for foreign learners are often formidable works of scholarship, with a much greater emphasis on syntax and usage than is usual in dictionaries for native speakers (*see* **Learners' Dictionaries**). Here, the pedagogical lexicographer has to decide whether the emphasis should be on helping the user to 'encode' or 'decode' the language. Many foreign learners use dictionaries to help with language encoding – i.e., to write naturally and idiomatically in the foreign language. A dictionary designed for encoding use typically has a smaller word list and many more examples of usage than one for decoding use. An encoding dictionary rigorously eschews eccentric or fanciful usage and is sensitive to selectional preferences.

Dictionaries for schoolchildren are often nothing more than simplified versions of small dictionaries for adults. However, there are also some fine examples of dictionaries that take their pedagogical function seriously, not only explaining the meanings of words in suitable terms and focusing on 'hard words' but also presenting facts about grammar selected for the appropriate age group (*see*, for example, **English Lexicography**).

Dictionaries of Slang, Idioms, Etc.

Good slang dictionaries (*see* **Slang Dictionaries, English**) in many ways resemble the great scholarly dictionaries. Great efforts are made to collect citations from a vast variety of sources, many of them ephemeral, and a selection of the citations is presented in the dictionary itself, often with bibliographical information. The definitions and examples in slang dictionaries are of the greatest importance, because (unlike general dictionaries) many of the headwords will be quite unfamiliar to users.

Dictionaries of idioms (*see* **Idiom Dictionaries**) are more often aimed at foreign learners than at native speakers. They are classified here with slang dictionaries, because their aim is to collect and explain a specific subset of the vocabulary, rather than the whole language. The same is true of dictionaries of phrasal verbs.

There are several other kinds of dictionary that focus on subsets of the vocabulary of a language,

for example dictionaries of loanwords such as the *Dictionary of European Anglicisms* (2001).

Special-Subject Dictionaries

The number of subjects of which dictionaries have been made is vast, ranging from huge dictionaries of medicine and law to quite small dictionaries of particular sports or games. Typically, special-subject dictionaries differ from general dictionaries in that they give more detailed and discursive encyclopedic information about each term, rather than merely a definition, while at the same time including little or no linguistic information. The focus is on objects and concepts, rather than on usage and linguistic behavior.

Bilingual Dictionaries

Bilingual dictionaries are typically practical tools for interlingual communication and learning, rather than scholarly studies (*see* **Bilingual Lexicography** and **Dictionaries**).

Onomasiological Lexicography

A distinction can be made between semasiological and onomasiological dictionaries. Semasiological dictionaries consist of an alphabetical list leading the user from the word to its meaning(s), which is the principle characteristic of the dictionary types discussed up to now in this article. By contrast, the idea behind an onomasiological dictionary is to help the user to find the appropriate word for a particular meaning or concept. Various techniques are used in the attempt to achieve this aim. The classic example of an onomasiological dictionary is Roget's Thesaurus, in which words are arranged in hierarchies under more general terms (**hypernyms**, also called **superordinates**). Thus, the terms *sofa* and *settee* may be found listed under *furniture* (*see* **Thesauruses**). Another techinique is to provide lists of synonyms and antonyms for a headword, in the hope that one of them may be the term that the user is looking for. An example of an onomasiological dictionary that helps users to discriminate between near synonyms is McArthur's *Longman lexicon* (1981).

Another kind of onomasiological lexicography is the compilation of terminological databases (*see* **Terminology and Terminological Databases**). In a world of increasingly complex engineering and technology in a multilingual environment, vast on-line terminological databases serve vital needs for standardization of teminology for many specialist communities.

Dictionaries of Rare and Endangered Languages

The need for a lexical inventory is also felt by languages that have no large literary tradition. A great deal of lexicographical work is currently being done on rare and endangered languages. Lexicographical tools for field linguists to use in compiling dictionaries and corpora of rare languages are available, for example, SIL's Toolbox. The motivation for such dictionaries is various: sometimes, the lexicographer is trying to establish a written standard for a language that previously was not written down. Sometimes, in the case of severely endangered languages, the motivation is simply to record the lexicon and phraseology of the language before it is lost forever. Much more often, however, the motivation for such a dictionary allies scholarship to practical needs: providing access for speakers of a rare language to the wider world and to modern facilities, markets, and technology, plus the more traditional motivation of providing missionaries with a tool to help them to do good works, translate the Bible, and preach the word of God to speakers of a minority language. Such dictionaries are inevitably bilingual, with varying degrees of emphasis on the source language and the target language, depending on the local circumstances. Simpson (1993) discussed the objectives and methods for dictionaries of Australian Aboriginal languages. The target language of such dictionaries is typically English, although in certain geographical locations it may be Russian, Spanish, or Portuguese (*see* **Bilingual Lexicography**; **Endangered Languages** for further discussion).

Principles of Lexicography

The needs, problems, and opportunities presented by the lexicon of each language differ, and where appropriate these are discussed in the articles devoted to the lexicography of each language. Four general issues of principle, applicable to most or all types of dictionary in most or all languages, may be discerned. These are: (1) breadth, not depth; (2) consistency; (3) descriptive versus prescriptive approach to the language; and (4) historical versus synchronic approach.

Breadth, Not Depth

Unlike other kinds of scholarship, lexicography generally aims at breadth rather than depth. A dictionary does not say everything that could possibly be said about a particular word or linguistic phenomenon.

Instead, it tries to present a reasonably comprehensive inventory of the vocabulary and to state just those facts that are most salient or most relevant about each word. This inventory may be a list of all the words of the language that are in common use, all the words that a learner needs to know, all the words relevant to a particular subject, or all the words ever used in the literary record of a particular language. But as far as the entries themselves are concerned, it is necessary for dictionaries to idealize – and often simplify – word meaning and word use. To attempt to account in detail for all possible uses of words would be to attempt the impossible, for usage is open-ended and shades of meaning are determined by context. Furthermore, if a dictionary presents too much information about a particular word, there is a danger that the user may not be able to see the woods for the trees. There are principled as well as practical reasons for dictionaries to be economical with space.

Consistency

Having collected the inventory, the lexicographer must say something about everything in it and must aim at consistency of coverage and presentation or wording. The user of a dictionary is entitled to expect that all differences in the presentation represent some differences in the language, i.e., stylistic variation for its own sake is avoided. For this reason, unlike other kinds of writers, lexicographers aim to repeat the same forms of words (in definitions and etymologies) wherever possible, so that only real differences in meaning or use are reflected in the wording. It is no good saying "of or pertaining to X" at one entry and "relating to Y" at another entry, if "of or pertaining to" and "relating to" are intended to convey the same message. More seriously, consistency of coverage is always the goal in modern dictionaries. Allied to this is the principle of 'consistency of sets': the selection of entries and the definitions of a set of related items should be worded, as far as possible, consistently. A modern dictionary will include entries for all chemical elements, even rare ones, on the principle of consistency of sets. On the other hand, it would be quite impossible to include entries for all possible chemical compounds, so some additional principle – e.g., common usage – must be invoked. Computer technology is a great help here: it enables the chief editor of a new dictionary to divide up the work by topic rather than in alphabetical order and to assign the work to relevant specialists, so that, for example, the chemistry editor can make a reasonable selection of terms denoting compounds; the medical editor can define all the bones of the body, all the organs, all the physiological processes, all the diseases; and so on in accordance with a systematic policy, without being hampered by the need to work in alphabetical order (or to use cumbersome card indexes), as was the case before computer text processing became commonplace.

Consistency of treatment is all very well, but there is also a danger that consistency may become a false god, forcing the members of a lexicographical team to distort subtle linguistic differences in the name of consistency. The lexicographical apparatus available to the members of a lexicographic team must be powerful enough to reflect subtle differences in linguistic facts, and team members must know how to use it. For example, in an English dictionary, for the sake of economy of space, the word *lexicographical* may be listed as a rare variant of *lexicographic*. No separate entry is necessary. But the same treatment certainly cannot be accorded to *historical* and *historic* or *economical* and *economic*. So much is obvious. However, other cases may be more difficult to decide. What, for example, is to be done about *evangelistical*? Should it be treated simply as a rare variant of *evangelistic*, or is there a subtle difference of meaning, requiring separate entry? Careful scrutiny of the evidence is required, rather than application of a rule by rote in the name of 'consistency.'

Descriptive or Prescriptive?

Most modern lexicographers agree that their job is to describe the language, not to legislate about right and wrong. Those few who have, from time to time, set themselves up as pundits and pontificators have had remarkably little success in halting the endless process of language change. Some changes in language may be a matter for regret, while others may be welcome. However, the lexicographer can only hope to describe what is going on in the language, not to change it. This is a very different principle from the principles that motivated 17th- and 18th-century European lexicographers, for example, the Académie Française (*see* **Academies: Dictionaries and Standards**). The lexicographers of the Enlightenment had explicit goals to 'fix' the language, to set standards of correct usage, and to combat any decline in those standards.

It fell to Samuel Johnson to abandon his original commission to 'fix' the English language and to draw attention to the impossibility of such a goal:

> When we see men grow old and die at a certain time one after another, from century to century, we laugh at the elixir that promises to prolong life to a thousand years;

> and with equal justice may the lexicographer be derided, who being able to produce no example of a nation that has preserved their words and phrases from mutability, shall imagine that his dictionary can embalm his language, and secure it from corruption or decay. . . . With this hope, however, academies have been instituted, to guard the avenues of their language, to retain fugitives, and repulse intruders; but their vigilance and activity have hitherto been vain; sounds are too volatile and subtle for legal restraint; to enchain syllables, and to lash the wind, are equally the undertakings of pride, unwilling to measure its desires by its strength. (*English dictionary, 1755, Preface*)

Nevertheless, no matter how vehemently the lexicographer may agree with Johnson and protest, with Clarence Barnhart in the General Introduction to the *American College dictionary* (1949), that "it is not the function of the dictionary-maker to tell you how to speak, any more than it is the function of the mapmaker to move rivers or rearrange mountains or fill in lakes," it must be acknowledged that many users will inevitably treat a dictionary as if it were a prescriptive tool, looking to it for guidance on good usage. As Jess Stein wrote in the preface to the first edition of the *Random House dictionary* (1966):

> Since language is a social institution, the lexicographer must give the user an adequate indication of the attitudes of society toward particular words or expression, whether he regards those attitudes as linguistically sound or not.

Various expedients have been devised to deal with this problem, of which the most successful is to comment explicitly on disputed points of usage, discussing the evidence in a usage note (see later section on 'The Internal Structure of Dictionary Entries').

Historical Principles or Synchronic Description?

As a general rule, scholarly dictionaries of record are compiled on historical principles – that is to say, they first record the etymology of each word in the language (*see* **Etymology**), then define the earliest sense of the word, and then go on to outline the word's semantic and grammatical development from that point on. Large dictionaries of record also give archaic and obsolete spellings. Because languages are unstable, i.e., word forms, conventions of usage, and meanings change over time, many entries in the great scholarly dictionaries of literary languages start with a sense that is now obsolete. Current senses are sometimes buried in the middle of an article or near the end. To take a simple example, the word *camera* in English is now used almost exclusively to denote an apparatus for taking photographs, but formerly it meant 'a small room' (the sense of the Latin word that was taken into English in the 17th century) or 'a legislative chamber' and, more specifically, 'the treasury department of the papal curia.' Placing these three senses first in the entry for the English word *camera* raises interesting theoretical questions about the nature of literal word meaning. The methodology of historical principles is elaborated in Burchfield (1989).

'Synchronic principles' – placement of the modern meaning of each word first – may seem to be no more than a matter of common sense. But in many cases it turns out not to be easy to decide what is 'the modern meaning.' For example, it is not clear whether the 'modern meaning' of the English word *oasis* is (1) a haven of calm in a big city or other hectic place or situation, or (2) a fertile spot in a desert. (1) seems to be at least as common as (2). For practical purposes, it might be thought desirable to place (1) first, since few English speakers live in a desert. Appeals to etymology are often made, but if etymology were a good guide to the literal meaning of modern words, then the first meaning of *camera* would be 'a small room' and the first meaning of *dope* would be 'a thick varnish.' To decide which meaning to place first, the synchronic lexicographer needs to take a principled view about what counts as literal meaning and to balance the (sometimes conflicting) claims of frequency, etymology, concrete versus abstract, cognitive plausibility, and other factors. Synchronic principles are sometimes expressed in terms of 'arranging senses in order of frequency,' but in fact this is never done. The best that a synchronic lexicographer can do is to start with a sense that has a reasonable claim to be literal and currently common and then to arrange the other senses in some sort of coherent order thereafter. Dictionary entries have a discourse structure of their own. Different senses of a word are not merely mutually exclusive alternatives. Rather, the entry for a polysemous word is to be read as a whole, in which senses (2) and (3) are influenced by and draw on what has been stated at sense (1). Thus, it is easier to explain and understand reference to an *oasis* of calm in a big city if it can be read as a secondary sense, a conventionalized metaphor exploiting a primary definition that describes an oasis as a tranquil green location in a desert.

Lexicographical Procedures

Collecting the Evidence

As already mentioned, it is now widely accepted that the central part of the lexicographer's task is to

compile an inventory, collecting evidence for words and showing how they are actually used.

The traditional method of collecting evidence for a dictionary is to set up a reading program, i.e., for readers to read books or journals and to transcribe citations for interesting words onto small slips of paper, which are then stored in a filing cabinet before being examined as evidence for a possible definition, in some cases many years after the slip was first collected. This methodology is extraordinarily slow, expensive, and labor-intensive; nevertheless, it has been the methodology that has supported most of the great historical dictionary projects of European languages. All this is now changing with the increasing emphasis on collecting electronic text archives. These can be processed computationally, providing a concordance for **all** uses of a word in all the texts that are accessible in electronic form. Before long, it will be possible for historical lexicographers to see how the usage of great writers of the past compared with the everyday conventional usage of their day, insofar as ordinary nonliterary texts from the relevant period survive and have been put into machine-readable form. This may be expected to lead to new developments in historical lexicography.

Large practical dictionaries often place considerable store on explaining technical terms and technical senses of words in science and technology, medicine, law, economics, business, sports, and so on. For such dictionaries, specialized reading programs with a focus on textbooks and manuals in various disciplines are sometimes set up.

The growth of electronic corpora since the mid–1980s has had a profound effect on the collection of lexicographical evidence (*see* **Corpus Linguistics, Corpus Lexicography, Corpus Approaches to Idiom**). A modern corpus containing hundreds of millions of words of text, with a good concordance program, can provide instant access to more evidence than any lexicographer could possibly use, showing how each ordinary word is ordinarily used in the language. Statistical tools such as the Sketch Engine (*see* **Computers in Lexicography**) help the lexicographer to decide which word associations or collocations are important and which can be safely ignored. In addition to this, the Internet itself can now be used as a corpus, providing evidence for unusual as well as normal uses of words, on the basis of billions of pages of electronic text (see Grefenstette and Kilgarriff, 2003; Church and Mercer, 1993). As mentioned above, these techniques are equally applicable to historical dictionaries, provided that the relevant texts are available and accessible in machine-readable form.

Identifying Words: Tokenization, Lemmatization

Once words have been identified, their usage and meaning can be studied. But what is a word? To readers of English, Spanish, or French, it seems obvious that a word is a string of letters bounded by a space or a punctuation mark. It is easy to overlook how reliant on an artificial cultural convention this notion of word boundaries is. Establishing word boundaries is a problem for computational language processing in German and many other languages written alphabetically, not to mention languages such as Chinese and Japanese, which have other writing systems. Two examples of the problem may be given from German. On the one hand, German prints as a single 'word' some items that in English require at least four 'words' – for example, *Binnenschifffahrtsstraßenverkehrsordnung* 'inland waterways traffic regulation.' On the other hand, certain verbs in German are 'separable,' i.e., they contain a particle that is separated from the root verb in finite contexts, e.g., *abfahren* 'drive away' is found in finite contexts such as *Er fuhr langsam ab* 'he drove slowly away'; thus a single 'word' is printed as two 'words' at opposite ends of the sentence. Such conventions present interesting challenges for tagging, sorting, and grouping lexicographical evidence. Whereas a concordancing program for English can rely on spaces and punctuations marks as indicators of word boundaries and simple string matches for finding different inflected forms of a word, for German it is absolutely necessary to pre-process a corpus by 'lemmatizing' it, i.e., by identifying all the inflected and separated forms of each word and grouping them together, also identifying boundaries between bound morphemes, i.e., word boundaries that are not represented in written texts by a space.

There are at least four different senses of the word *word*. To avoid confusion, the term is often avoided altogether in technical writing about language, being replaced with more specific terms. The four main competing senses of *word* are:

1. (synonym: *type*) A unique spelling form considered as an abstract category; a particular string of letters, without any reference to the meaning of the string. A type is always just a single type, no matter how often it is used or how many senses it may have.
2. (synonym: *token*) Any one occurrence of a type in a text. The text *the cat sat on the mat* contains six tokens, but only five types, because there are two tokens of the type *the*.
3. (synonym: *lemma*) A further abstract category, consisting of all the different inflected forms of a

word type grouped together under a single heading. Thus, the English verb lemma *take* consists of five types: *take, takes, taking, took, taken*. In highly inflected languages such as Czech, 30 or 40 different types may be grouped together as inflected forms of a single lemma.

4. (synonym: *lexical item*) A minimal meaning-bearing unit of language. In this sense, *word* overlaps with 'bound morphemes' such as *un-* and *pre-* on the one hand and with 'multiword expressions' such as *gas burner* and *air cushion vehicle* on the other hand.

Dictionaries typically record (3) and (4), grouping words into lemmas and also recording bound morphemes, together with a selection of multiword expressions (*see* **Word**).

Multiword Expressions

The number of multiword expressions in a language is unimaginably vast. They could not possibly all go into a dictionary, even one that was unconstrained by the physical limitations of printed books. Nevertheless, some multiword expressions receive entries in dictionaries. These are selected on semantic grounds, not on the basis of frequency, i.e., a dictionary entry is made when the meaning is not recoverable from analysis of the parts. There is no point in putting a frequent collocation into a dictionary if it is perfectly obvious what it means, i.e., if the normal relationship of modifier + noun applies, no matter how frequent the expression may be. The purpose of including a multiword expression in a dictionary is to explain something that needs to be explained. Having said that, it must be acknowledged that there are many multiword expressions with special meanings that are ignored by dictionaries. For example, in English, *forest* and *wood* are synonyms, so it ought to follow that *forest fire* and *wood fire* are synonyms. But they are not. A *forest fire* occurs only in the wild – it is dangerous and out of control; a *wood fire* implies deliberately burning wood in a hearth, under human control, to generate heat. Innumerable similar examples could be cited. Multiword expressions remain a challenge for lexicography. Can a lexicographical project correct the reductionist expectations that would equate *wood fire* with *forest fire*, and if so, how can it be done?

Names in Dictionaries

The traditional criterion for distinguishing names from words is not entirely satisfactory. Common sense suggests that the name 'Samuel Courtauld' denotes a single individual. But in fact there are (or have been) several Samuel Courtaulds in the history of the world, only one of whom founded the *Courtauld Institute of Art* in London. Is *Courtauld* a word of English?

And then what about all the other Samuel Courtaulds? The term *Courtauld* has no particular semantic function; instead, it has a series of denotations, separately picking out all the individuals who bear and bore this surname. Is *Courtauld* a word of English? It is undeniably a type in a corpus. And then, what about the names of all the billions of other people, past and present, in the rest of the world, whether English-speaking or not? There is no difficulty in regarding them as types, because a type is just a processing notion, without reference to meaning. But it would be absurd to call them 'words of English' or put them in a dictionary. However, lexicons for computer use are a different matter. Some of these lexicons contain very large lists of conventional names as an aid to 'named entity recognition.'

Some writers consider that the lexicon is a "cultural system of reference," a criterion that would justify including in a dictionary names that have collective cultural reference, such as *London, Washington, Shakespeare,* and *Courtauld*. Many larger dictionaries such as the *American Heritage dictionary* and the *New Oxford dictionary of English* (NODE) include names that are part of the cultural reference system. Other dictionaries do not, with occasionally bizarre results, for example when *Jesus* gets an entry as an oath (a general word of the language), but not as the name of the founder of the Christian religion. In dictionaries that make this distinction, *English* gets in (presumably, it is a word), but *England* does not (it is a name).

Names of products raise other problems. The term *Mars Bar* is generally considered a name rather than a word, but why? It clearly denotes a class of entities, has a plural inflection, and behaves in other respects like an ordinary English count noun. Yet it is neglected by dictionaries. This may be regarded as a triumph for common sense but not for systematicity. As a type (or rather, a collocation of two types), *Mars Bar* qualifies for entry in large electronic lexicons for natural language processing, since one cannot process English effectively by computer without being able to process *Mars Bar*. And for many applications, knowing that a Mars Bar is candy and not a steel girder is important knowledge, of just the kind that needs to be encapsulated in a computational lexicon.

Bilingual dictionaries, too, include names, but typically only place names for which different language equivalents exist, for example German *München*/ English *Munich*. There is, however, an increasing

fashion in the modern world to use the local form of place names, so that, for example, *Leghorn* (the former English name for *Livorno*) or *Ratisbon* (*Regensburg*) must be labeled as archaic if they are included in a dictionary at all.

Foreign Borrowings

Languages and cultures borrow from one another. For example, speakers and writers freely use French, German, Italian, Spanish, and other expressions in an English-speaking context. The converse is even more true: English is the source of very many foreign borrowings in all the languages of the world. This raises problems for the inventorist.

Is *tete-a-tete* an English word? There are at least three uses of it as a perfectly normal word of English in the British National Corpus. The French form (*tête-à-tête*) is, of course, spelled with accents, but in English it can equally well be written without accents. Many similar examples could be given.

Expletives

Are the English expletives *er, um, oh, unh-huh, phwoah,* etc., words? Should they be in a dictionary? (The same question applies to expletives in any language.) They occur as types in careful transcriptions of spoken English. To that extent, they may be regarded as words, and indeed, nowadays they often make an appearance in dictionaries.

Technical Terminology

Are the coinages of chemists words of English, e.g., *2,3,7,8-tetrachlorodibenzoparadioxin*? Most dictionaries take the view that highly artificial domain-specific terminology of this kind should be classified quite separately from the general vocabulary. Such terms are not words at all, it is said – no more than are the symbols used by logicians and mathematicians.

The problem of terminology is not restricted to the sciences. Sports, too, for example, have an increasingly rich and rarefied range of domain-specific terms. To take an example from cricket: should *silly mid-off* be classified as a 'word'? It makes perfectly good sense in a cricketing context, but is not part of general English. The term has a space in it, which in English normally counts as a boundary between types, but as we have already seen, this is not an infallible guide to identification of word types for a dictionary. Some tokenizers treat the hyphen, too, as a boundary between types, which would make this expression three types. There is no sense (except etymologically) in which it counts as a head noun (*mid-off)* modified by the adjective *silly*. Such an analysis would be a further example of misplaced syntactic reductionism.

Many other examples could be given of the difficulties of processing the evidence of words in text to produce the abstraction that is a dictionary headword list. The fact that there are traditional solutions to such problems, many of them unchallenged, should not blind us to their existence. In this age of computational text processing, lexicographers may need to revisit their most basic assumptions about what a word is.

The Internal Structure of Dictionary Entries

Once the evidence has been collected and organized into alphabetical order or some other order, the lexicographer must start writing the entry. In practice, especially in dictionaries involving large teams of lexicographers, the two components of the work go hand in hand. There is considerable overlap. Collection of evidence – especially evidence for new and 'trendy' words beloved of publishers' marketing departments – normally continues until the last possible moment before publication.

Dictionaries are among the most highly structured texts known to humans. They consist of hundreds of thousands of little bits of information, carefully pieced together in an ordered pattern. An entry in a large dictionary typically contains at least the following information types: orthography, pronunciation, grammar, definitions, examples of its use, phraseology, prescriptive comments and usage notes, and a word history.

Orthography

The single most common use of practical dictionaries in English and other languages is to check spelling. English spelling, though eccentric, is settled (with very few exceptions) and inflections are few, so it would be easy for an English lexicographer to overlook the amount of work that goes into deciding on orthography in other languages, for example, Irish Gaelic, for which a complete new orthography was developed for the language in the 20th century, or German, which undergoes periodic bouts of spelling reform. In non-European languages it is sometimes necessary for a lexicographer to make a principled decision about which dialect should be represented as the lexicographical standard or how many variants should be shown. Great historical dictionaries, such

as the OED, typically list the variant spellings that were in use at different periods in history.

The orthography of inflected forms, too, must be represented. Again, English is at an advantage in that it has comparatively few inflections and those that exist are mostly regular. It is no great burden to list the inflected forms of the few strong verbs that exist and other irregular forms. In German, plurals of all countable nouns and inflected forms of strong verbs must be indicated. In highly inflected languages such as Czech, inflections can generally be represented by reference to tables of declensions and conjugations. However, there are often variants and irregularities, all of which must be represented somehow. The lexicographer must also decide systematically which inflected forms must be represented and which can safely be ignored (either because they are regular or because they are rare or obsolete).

Pronunciation

Many dictionaries offer a guide to pronunciation of the headwords (and in some languages also of inflected forms), especially dictionaries of languages such as English, where the relationship between orthography and phonetics is not entirely regular. If it is decided to represent the pronunciation of words independently of their orthography, there are two major questions that the lexicographer must address: which accent to represent, and which transcription system to use. A question that is of great importance but that does not arise in relation to dictionaries is whether the representation should be of the word as it is normally pronounced in coherent speech or whether it should be a 'reading-list pronunciation.' Dictionaries deal with words in isolation, so they can only offer a reading-list pronunciation, which is a kind of abstract idealization.

Electronic dictionaries can, in principle, offer a choice between a written transcription and an audio representation. As long ago as 1969, *Webster's New World dictionary* pioneered the practice of accompanying the printed text of a dictionary with an audio representation of the pronunciation of words. Other dictionary publishers have followed suit from time to time, and now several have taken advantage of the potential of electronic technology in this respect. The audio representation may be taken from a list of words read by a human being, a text-to-speech synthesis, or both. In either case, a decision has to be made about which accent should be represented. As electronic dictionaries in hypertext form become better established, it may be expected that more detailed lexicographical attention can be given to the pronunciation of words in different accents.

Which accent to represent? This is a tricky question. The dictionary must either choose one accent as being standard and representative, or it must attempt a representation of several different standards, which can sometimes be done by using symbols that have an 'archetypal' value, i.e., each symbol can have a different value for each different accent. Of course, this only works insofar as the relationship between accents is regular; otherwise, alternative transcriptions must be offered.

Even in languages where one accent is generally recognized as standard, problems can arise. For British English, the representation of pronunciation is usually in a standard accent, which Daniel Jones called 'received pronunciation' (RP), defining it in the 1926 edition of his *English pronouncing dictionary* as the accent of English "which is the everyday speech of families of Southern English persons whose menfolk have been educated at the great public boarding schools." Thus, it is not only a regional accent but also a class accent. At that time, and for many years thereafter, English learners and many non-RP speakers aimed at RP in formal contexts, with varying degrees of success. In the intervening 80 years, however, since Jones wrote those words, RP itself has changed, although guides to English pronunciation, by and large, have not. In the *Oxford dictionary of English pronunciation* (ODEP, 2001), Clive Upton commented that the accent represented by Jones's model had become "the possession of a small minority restricted in terms of age, class, and region." The ODEP offered "a younger, unmarked RP." The differences are mainly in terms of vowel quality. The ODEP also offered guidance on American pronunciation. Upton's co-author, William Kretzschmar, commented that "English in the United States has no obvious standard spoken model" but that there was a "trend among educated speakers, especially those of the younger generation, toward limitation of the use of marked regional features while speaking in formal settings." As far as Australian English is concerned, the *Macquarie dictionary* offers a transcription of English words in a standard Australian accent, and several other dictionaries of national varieties of English likewise offer a representation of a local standard accent. Languages that have a rich variety of dialect pronunciations, no one of which can be regarded as standard, tend to avoid giving guidance in dictionaries on pronunciation of words, since to do so risks raising more problems than it solves.

Which transcription system to use? The obvious scholarly choice for many dictionaries is the International Phonetic Alphabet (IPA) (*see* **International Phonetic Association** and **Phonetic Transcription: Analysis**). This, however, has its disadvantages. The symbols of IPA have an absolute value, so that even a broad transcription is accent-specific. Moreover, since accents change over time, an IPA transcription becomes out of date more rapidly than the alternative (a spelling-rewrite system). Perhaps these are among the reasons why almost all American English dictionaries prefer a spelling-rewrite system (borrowing only the schwa symbol, /ə/, from IPA).

Grammar

The presentation of grammar in dictionaries (as distinct from part-of-speech labels) is, for English at least, a controversial subject. There are many things that must be included – e.g., that the verb *put* requires not only a direct object, but also an adverbial of place – but the public are said to be resistant to too much grammar. Inclusion of detailed grammatical information about word usage is not a popular selling point. There are two ways in which dictionaries deal with this problem. One, adopted by NODE in 1998, is to make a stringently considered selection of necessary grammatical statements and to present them in unabbreviated English words and phrases such as "with adverbial of place." The second is to devise a notational system that refers to an appendix on syntactic patterns of word use. The first edition of *Longmans' dictionary of contemporary English* (LDOCE, 1978) devised such a system. It is very detailed and has the merit of taking up very little space, but it is not self-explanatory and only the most hardened seekers of grammatical truth seek out the appendixes and unpack all the grammatical information relevant to each word.

Definitions

In the English-speaking world, definition writing is often seen as the central part of the lexicographical task. The project leader of a large lexicographic project keeps a set of compilers' instructions and tries to ensure that all members of the team are writing in roughly the same style and in a consistent way. Some of the principal issues in definition writing are discussed elsewhere in this encyclopedia (*see* **Definition**). A dictionary that sets out to record the whole vocabulary of a language must devise separate styles for explaining function words and for discourse organizers, sentence adverbs, and other 'pragmaticky' expressions, as well as many kinds of nonlexical information, such as the New Latin terms for species of plants and animals or the formulae of chemical compounds.

Examples of Words in Use

For many European dictionaries, the selection of examples of usage is seen as a central activity. By contrast, exemplifying usage is a neglected aspect of some older one-volume English dictionaries.

In scholarly historical dictionaries such as OED, examples of words in use are cited from literature, with date, author, and other bibliographical details. It is this, and not only the size of the word list itself or the richness of definition, that contributes principally to the multivolume bulk of such dictionaries.

One-volume dictionaries make a selection of examples, showing how different senses of words are ordinarily used. Nowadays, with the easy availability of machine-readable corpus evidence, such examples are usually chosen from authentic texts rather than invented by the lexicographer, but still careful selection is needed to avoid the risk of giving examples that are taken from eccentric or high-flown literary usage. Despite the efforts of linguists in recent decades, selectional preferences are still not well understood (let alone well described), so prudence dictates that the lexicographer should use authentic examples rather than invented ones. Many learners' dictionaries and textbooks of the 1970s contain examples of usage concocted by the writers which (presumably unconsciously) violate selectional preferences. On the other hand, authenticity alone is not enough: authentic texts are full of colorful and eccentric language. The lexicographer who wishes to help a user encode the language is under an obligation to choose examples that show words in their most central and typical usage. One might almost say that such examples should be chosen for their dullness.

Phraseology

Brief mention must also be made of phraseology in dictionaries. Entire dictionaries are devoted to idioms and idiomatic expressions (*see* **Idiom Dictionaries**). Common idioms are also explained in general dictionaries, typically at the end of the entry for one of the key words in the idiom. Bilingual dictionaries give a great deal of information about phraseological equivalents in different languages, seeking to help the user overcome the problem that many expressions cannot be translated word for word.

Large monolingual dictionaries of some European languages, such as German and modern Greek, devote more space to listing common phraseology, showing how words are used, than to explanations of meaning.

Prescriptive Comments and Usage Notes

As stated above, users often expect guidance from a dictionary on matters of 'correct' and 'incorrect' usage, paying no heed to the lexicographers' protestations that their task is merely descriptive. Some prescriptive works do exist, for example, H. W. Fowler's *Modern English usage* (1926), revised and updated by R. W. Burchfield in 1983, which is much admired for its robust and sometimes humorous advice on various aspects of English style. Perennially popular, too, are more basic practical works, such as the *Oxford guide to style* (2002) (a successor to *Hart's rules for compositors and readers at the Oxford University Press*) and Judith Butcher's *Copy-editing: the Cambridge handbook for editors, authors, and publishers,* which concern themselves with such matters as hyphenation, punctuation, italicization of foreign words and phrases, and consistency of spelling.

Large practical dictionaries deal with the problem of the demands of ordinary users for prescriptive instructions about word usage either by ignoring them or by including a commentary on controversial issues, such as the use (in English) of split infinitives, competing pairs such as *disinterested* versus *uninterested*, and the use of taboo words. These comments may be no more substantial than register labels such as 'slang' or 'taboo' (*see* **Register: Dictionaries**), or they may be fairly substantial essays. NODE made a concerted attempt in its longer usage notes to bring corpus evidence to bear, comparing what writers actually write with what the pundits say they ought to write. The *American Heritage dictionary* contains usage notes, edited by Geoffrey Nunberg, in which the opinions of a panel of pundits (173 of them in the 1992 edition) are summarized on different issues, e.g., whether it is correct to use *impact* as a verb:

> "... 84 percent of the Usage Panel disapproves of the construction *to impact on*, as in the phrase *social pathologies, common in the inner city, that impact on such a community*; and fully 95 percent disapproves of the use of *impact* as a transitive verb in the sentence *Companies have used disposable techniques that have a potential for impacting our health*..."

Word Histories

Bilingual dictionaries and dictionaries for foreign learners do not normally say anything about etymologies, word histories, or obsolete senses. However, most larger dictionaries for native speakers see it as an essential part of the lexicographical task to explain not only the meaning but also the history and semantic development of each word, or at least of the main root words. The meaning of a word can often be illuminated by knowledge of its etymology, for example, that the English verb *concatenate* is ultimately derived from the Latin noun *catena* 'chain' or that the modern German verb *leisten* (a word for which there is no English equivalent, the translation varying according to context: *Gehorsam leisten* is 'to obey,' *Hilfe leisten* is 'to help,' *Arbeit leisten* is 'to do work,' *ein Eid leisten* is 'to swear an oath') is derived from an ancient Germanic verb meaning 'to follow in the footsteps (of a feudal superior).' Etymologies tell a culturally unifying story about the interactions between languages and cultures. In a hybrid language such as English, even something as simple as an indication that a word is of Germanic or Latin origin, as the case may be, is illuminating information included in many small dictionaries, including dictionaries for schoolchildren.

A dictionary on historical principles places the etymologies first in the explanations, immediately following the headword and pronunciation. Etymologies in great scholarly dictionaries such as the third edition of OED, now in progress, can be quite extensive and amount almost to scholarly articles in their own right.

Practical dictionaries on synchronic principles take a slightly different view of word histories. First, there is more emphasis on semantic development; second, there is less emphasis on morphological development; and third, information about important obsolete senses (which in a dictionary on historical principles usually appears first among the definitions) may be placed in the etymology or 'word history.'

A primary concern of dictionaries on historical principles is with dating. Many practical synchronic dictionaries of English give information about the earliest date at which a word was recorded in the language. Since this can rarely be done with absolute precision, the date is generally given in terms of a spread of dates; *Collins* gives the century in which the word was first recorded, relying largely on the historical evidence of OED; the *Random House dictionary of the English language* (2nd edn., 1987) generally indicates the decade (or some other spread of years) in which the word was first recorded and seems to be similarly indebted to OED.

The Future of Lexicography

The Challenge of Corpus Evidence

The inventory of the words of well-known languages like English, Spanish, French, Italian, Russian, and German is well established (within certain conventional limits). Increasingly sophisticated efforts have been devoted to recording the words of these

languages for over three centuries. They are widely spoken and have a vast literature, and the main task of the lexicographer has traditionally been to record new words, new phrases, and new senses of words as they develop. In other words, the task of the lexicographer is (or was) to maintain an existing dictionary, adding to the existing text new words and new senses as they arise. This is still the case in the United States. However, this comfortable conservative notion has been shaken somewhat since the mid–1980s with the development of large machine-readable corpora of languages (*see* **Corpus Linguistics**). Fashionable linguistic theories of the 1970s and 1980s required a language to consist of a 'lexicon' (a fixed inventory of lexical items) and a 'grammar' (a fixed set of rules), but corpus analysis has shown that the lexicon consists not only of a large number of regular words, but also of an unbounded number of words that have occurred only once, even in very large corpora, and that may never occur again – words such as *giraffishness,* which occurred once in an Associated Press news item for 1988 and has never been seen since – while even quite common words are sometimes used in a way that is not satisfactorily accounted for by received grammatical rules and 'selectional restrictions' (a term that must be contrasted with 'selectional preferences'). In other words, the lexicon itself is dynamic. New words are coined all the time, both by recombination of existing morphemes and by productive use of the phonological system of the language. Moreover, the meaning of a word (in particular, the everyday words of a language, as opposed to technical terms such as *mammal*, which have scientifically stipulated definitions) is to a large extent dependent on the context in which it is used. For example, the verb *treat* denotes attitude or behavior if it is used with an adverbial of manner, but is more likely to denote a medical procedure if there is no adverbial. The sentence "I hazarded various Stuartesque destinations like Florida, Bali, Crete, and Western Turkey" (British National Corpus) can only be explained as a dynamic exploitation of a normal use of the verb *hazard*, involving the use of ellipsis ("I hazarded *a guess at* various Stuartesque destinations . . ."). In addition, the word *Stuartesque* is not regular in English; it must be explained in terms of the personal name *Stuart* and the bound morpheme *–esque*. Corpora offer many such challenges to lexicographers; on the other hand, they can equally well be used as a pool in which to fish for examples that support existing hypotheses.

Monolingual lexicography is only just beginning to come to terms with the challenge of corpus evidence. English dictionaries that have devised corpus-driven procedures for the description of the lexicon from the outset are *Cobuild* (1st edn., 1987), the *Cambridge international dictionary of English* (1995), NODE (1998), and the *Macmillan English dictionary* (2002). Older established dictionaries, including OALD (the *Oxford Advanced Learner's dictionary*) and LDOCE, have revised their entries systematically in the light of corpus evidence but have not radically revised their theoretical foundations. All except NODE are dictionaries for foreign learners of English. There are other dictionaries whose publishers claim or imply a corpus connection, even though the text remains virtually unchanged from earlier editions, compiled before electronic corpora were available. In other languages, the situation is similar. For example, the *Duden* dictionaries contain some recent updates of entries that appear to be beholden to the evidence of the corpus of the Institut für deutsche Sprache, but a systematic new corpus-based analysis of the German lexicon has still to appear. Ironically, it is dictionaries of languages with smaller populations, such as Irish Gaelic and Korean, that seem to be taking the lead in exploiting the new opportunities afforded by corpora.

Online Lexical Resources

The Internet is tailor-made for lexicographical projects. The constraints of the printed page (two-dimensional, limited space, printed in expensive multivolume format, etc.) do not apply, although this opens the door to possible faults, such as prolixity and excessive ingenuity.

At the present time, however, these faults are not a major preoccupation. Online dictionaries have not yet taken full advantage in any language of the potential of computer technology. This may in part be due to the great expense of setting up something such as a hypertext dictionary for a whole language and the lack of a clear business model. The economics of dictionary publishing in book form, though sometimes nerve-wracking, have the merit of being well understood. The economics of online publishing are as yet somewhat unstable: they have not yet had a chance to stand the test of time. A well-known and universally admired traditional project such as the OED succeeded in attracting online subscriptions from major institutional libraries to help finance the preparation of its third edition, but such funding is less likely to be forthcoming for a more radical, innovative project. The situation is further complicated by the fact that the funding agencies that can normally be expected to fund radical and innovative research projects are shy of infrastructure projects such as

dictionaries and even more reluctant to fund new editions of existing resources.

Major academic research projects on the lexicon in recent years, such as WordNet and FrameNet, point the way to what is possible, but they are only a beginning. A full multimedia account of the lexicon of any language in hypertext form is at present no more than a pipe dream.

Information Sources, Conferences, and Associations

The leading journals for lexicography are *The International Journal of Lexicography,* published quarterly, and *Dictionaries: The Journal of the Dictionary Society of North America,* published annually. The former contains articles not only in English but also in French and German. It takes a global view of lexicography, with articles on dictionaries of all languages, although the chief focus is, not surprisingly, on dictionaries of the major European languages – monolingual and bilingual, synchronic and diachronic, pedagogical and encyclopedic.

Conferences and workshops on lexicography are regularly organized by lexicography associations in every continent in the world. Chief among these are Euralex (biennial conferences since 1983 plus other workshops), Australex (biennial conferences since 1990), Afrilex (annual conferences since 1996 plus other workshops; *see* **African Lexicography**), Asialex (biennial conferences since 1997), and the Dictionary Society of North America (annual conferences since 1975). A regular conference on computational lexicography, Complex, has been hosted each year since 1992 by the Linguistics Institute of the Hungarian Academy of Sciences in Budapest.

A seminal conference was held as long ago as June 1972 under the auspices of the New York Academy of Sciences, the proceedings of which appeared in 1973, edited by McDavid and Duckert and including papers by Bolinger, Zgusta, McIntosh, Quirk, Burchfield, Lakoff, McCawley, Malkiel, Quine, Urdang, and others. Although the title of the collection is *Lexicography in English,* some of the papers touch on issues that are of general relevance to lexicography in all languages.

Reliable and informative discussions of lexicography as a discipline include those by Landau (2001), Jackson (2002), and Svensen (1993), and the papers collected by Hartmann (2003). An important reference work is a massive three-volume collection of essays on all major aspects of lexicography, edited by Hausmann *et al.* (1989–1991). A survey of the terminology of the field is Hartmann and James (1998). Other important contributions were made by Zgusta (1971, 1988).

See also: Academies: Dictionaries and Standards; African Lexicography; American Lexicography; Bilingual Lexicography; Chinese Lexicography; Computational Lexicons and Dictionaries; Computational Lexicons and Dictionaries; Computers in Lexicography; Corpus Linguistics; Corpus Lexicography; Definition; Dictionaries and Encyclopedias: Relationship; Dictionaries; Dutch and Flemish Lexicography; English Lexicography; Etymology; French Lexicography; German Lexicography; Greek Lexicography, Classical; Idiom Dictionaries; International Phonetic Association; Jones, William, Sir (1746–1794); Learners' Dictionaries; Lexicology; Middle English Dictionaries; Old English Dictionaries; Old French Dictionaries; Phonetic Transcription: Analysis; Register: Dictionaries; Slang Dictionaries, English; Terminology and Terminological Databases; Thesauruses; also articles on lexicography in particular languages, under the name of the relevant language.

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Relevant Websites

http://www.indo-european.nl/ – Website of the Indo-European Etymological Dictionary, a research project at the University of Leiden.
http://www.sil.org/computing/toolbox/ – The Field Linguist's Toolbox, produced by SIL International.

Lexicology

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Introduction: The Scope of Lexicology

Lexicology is 'the study of the *lexicon* or *lexis* (specified as the vocabulary or total stock of words of a language)' (Lipka, 1992: 1). For English-speaking linguists familiar with teaching and research in the subject in France and Germany, there is a 'classical' as well as an 'evolved' view of what is meant by the term. The classical view is brought home by examining the contents of standard textbooks written in Germany for university students of English. The title of one of the best known is *Englische Lexikologie*, with the subtitle *Einführung in Wordbildung und lexikalische Semantik* ('Introduction to word formation and lexical semantics'), which highlights its central elements (Hansen *et al*., 1992). And the handbook does indeed deal in successive major sections with word formation (broken down into 'compounding' 'derivation' [including 'zero-derivation'], 'reduplication' and 'blends') and lexical semantics, in which one major subsection deals with 'relations within words' (including 'homonymy' and 'polysemy,' and 'metonymy' and 'metaphor') and another with 'paradigmatic semantic relations between words' (including 'antonymy' and 'hyponymy'), which are in Britain often referred to as sense relations (Lyons, 1977). Matching for the most part this view of what a lexicology textbook should contain is Tournier's broad, masterly work (Tournier, 1985), with major chapters devoted to derivation, compounding, and conversion (and thus to word formation), and also to *metasémie* (or meaning change), which features several of the themes that, in the German work, are subsumed under lexical semantics. There are of course differences of detail between the two works.

Interestingly, there are no parallels in Britain for textbooks dealing with the lexicon in quite the way I have just described. Further, the term 'lexicology' has not until comparatively recently been used in linguistics textbooks published in Britain or defined in many 'desk-sized' dictionaries (not, for example, in the *Concise Oxford dictionary* until the eighth edition of 1990). Moreover, in British practice the two main topics that are given prominence by both Tournier and Hansen *et al*. are hived off into separate volumes: word formation to Bauer (1983), lexical semantics to Cruse (1986).

However, in many areas where British lexicologists work in close collaboration with colleagues from various European countries, the term of choice is almost universally 'lexicology' (rather than 'lexical semantics'). In the proceedings of recent congresses of the European Association for Lexicography, for instance, we find section headings such as 'Computational Lexicography and Lexicology' and 'Reports on Lexicographical and Lexicological Projects' where the coupling of related areas of professional concern is underpinned by the formal relatedness of the terms (Braasch and Povlsen, 2002a). There are of course other linkages of form and meaning that help to explain a growing preference. In addition to the connection to lexicography, lexicology is related in form to a number of terms (phonology, morphology, phraseology) denoting other levels of linguistic analysis. Then again, the term has been broader in its application than lexical semantics, having, with

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Introduction: The Scope of Lexicology

Lexicology is 'the study of the *lexicon* or *lexis* (specified as the vocabulary or total stock of words of a language)' (Lipka, 1992: 1). For English-speaking linguists familiar with teaching and research in the subject in France and Germany, there is a 'classical' as well as an 'evolved' view of what is meant by the term. The classical view is brought home by examining the contents of standard textbooks written in Germany for university students of English. The title of one of the best known is *Englische Lexikologie*, with the subtitle *Einführung in Wordbildung und lexikalische Semantik* ('Introduction to word formation and lexical semantics'), which highlights its central elements (Hansen *et al*., 1992). And the handbook does indeed deal in successive major sections with word formation (broken down into 'compounding' 'derivation' [including 'zero-derivation'], 'reduplication' and 'blends') and lexical semantics, in which one major subsection deals with 'relations within words' (including 'homonymy' and 'polysemy,' and 'metonymy' and 'metaphor') and another with 'paradigmatic semantic relations between words' (including 'antonymy' and 'hyponymy'), which are in Britain often referred to as sense relations (Lyons, 1977). Matching for the most part this view of what a lexicology textbook should contain is Tournier's broad, masterly work (Tournier, 1985), with major chapters devoted to derivation, compounding, and conversion (and thus to word formation), and also to *metasémie* (or meaning change), which features several of the themes that, in the German work, are subsumed under lexical semantics. There are of course differences of detail between the two works.

Interestingly, there are no parallels in Britain for textbooks dealing with the lexicon in quite the way I have just described. Further, the term 'lexicology' has not until comparatively recently been used in linguistics textbooks published in Britain or defined in many 'desk-sized' dictionaries (not, for example, in the *Concise Oxford dictionary* until the eighth edition of 1990). Moreover, in British practice the two main topics that are given prominence by both Tournier and Hansen *et al*. are hived off into separate volumes: word formation to Bauer (1983), lexical semantics to Cruse (1986).

However, in many areas where British lexicologists work in close collaboration with colleagues from various European countries, the term of choice is almost universally 'lexicology' (rather than 'lexical semantics'). In the proceedings of recent congresses of the European Association for Lexicography, for instance, we find section headings such as 'Computational Lexicography and Lexicology' and 'Reports on Lexicographical and Lexicological Projects' where the coupling of related areas of professional concern is underpinned by the formal relatedness of the terms (Braasch and Povlsen, 2002a). There are of course other linkages of form and meaning that help to explain a growing preference. In addition to the connection to lexicography, lexicology is related in form to a number of terms (phonology, morphology, phraseology) denoting other levels of linguistic analysis. Then again, the term has been broader in its application than lexical semantics, having, with

suitable modification, referred to diachronic lexical studies (hence 'historical lexicology'; cf. Ullmann, 1957: 39) and contrastive lexical studies (hence 'contrastive lexicology'; cf. Van Roey, 1990).

A number of major topics from outside the traditional core are currently subsumed under the heading 'lexicology.' This brings me to my reference earlier to an 'evolved' view. One cannot avoid noticing a greater breadth of coverage in the latest edition of what is probably the best-known German textbook (Lipka, 2002). Not only do we find the topics treated that we have come to take for granted in such a text – homonymy vs. polysemy, lexical fields and hierarchies, and lexical rules and semantic processes – but there are other themes that fall outside its traditional limits, including corpus linguistics and cognitive linguistics – both to be considered below – while there is extensive discussion in Lipka's Introduction of 'the expanding field.'

This article attempts to reflect this greater diversity of themes. Polysemy and homonymy in the first section belong to the traditional core of the subject (Cowie, 1994). The second section is devoted to cognitive approaches to the analysis of metaphor based on the work of Lakoff and to a project in the 'syntagmatics of metaphor' that draws extensively on very large text corpora. The final section is taken up with an approach to lexical description – 'frame semantics' – that brings together syntactic and semantic levels of description in a rigorous and systematic way.

Polysemy and Homonymy

Though polysemy and homonymy are long-established concepts in lexicology, they continue to excite discussion among linguists (e.g., Cowie, 2001; Ravin and Leacock, 2000). The concepts themselves and the relationship between them are of crucial importance to lexicographers, since they require sound criteria to determine whether different occurrences of a given word represent different senses and, if different, how different. As we shall see, approaches to meeting this need which lay emphasis on the contrastive lexical environments of such occurrences (their differing collocability) have much to offer, especially as evidence is now available from immensely large text corpora (Hanks, 2004a).

Polysemy and homonymy can be defined in general terms as follows. When a given word form (i.e., in the written language, any sequence of letters bounded on either side by a space) realizes two or more related though separate meanings of the same lexical item, we have polysemy. (Compare: $thick_a$ 'having density'; $thick_b$ 'with a large number of units close together'.) When, however, the word form functions as the realization in speech or writing of more than one lexical item, we have homonymy. (Compare: $meal_1$ 'flour'; $meal_2$ 'repast'.)

Though the phenomena are often linked, polysemy is more widespread than homonymy, and of much greater significance. Homonymy may come about through the chance convergence of two distinct forms ($meal_1$ coming from Old English *melo* and $meal_2$ from Old English *mæl*). Polysemy, however, is typically the result of lexical creativity and is crucial for the functioning of a language as an efficient semiotic system (Lyons, 1977: 567; Lipka, 1992: 136). It is also true that the distinction between homonymy and polysemy is not the simple dichotomy that is sometimes believed, but is in the nature of a scale or cline. This becomes unarguable once it is accepted that every case of polysemy involves relatedness as well as difference of meaning (Cowie, 2001). As recent studies have shown, however, there is still a tendency to emphasize the latter at the expense of the former (Ravin and Leacock, 2000b).

Three major issues need to be addressed in treating this opposition. First, we need to take account of the phenomenon of 'modulation,' or 'contextual variation,' of a single sense (Cruse, 1986). It is sometimes claimed, rather loosely, that the sense of a (polysemous) item is determined by its context. Such claims, however, fail to distinguish between the unrestricted, and often ephemeral, 'shaping' of a word by its context and the more familiar variation attributable to context, which is the activation by different contexts of existing and possibly well-established senses of polysemous words. An example of a meaning difference attributable to modulation – but where there is only one sense – appears below (cf. Moon, 1987):

> He took the cigarette out of his mouth [the opening].
> She had a wide and smiling mouth [the lips].

The second issue that needs to be considered is whether, when attempting to identify polysemy or homonymy, we need to take account of more than one criterion (for checklists, see Lipka, 1986; Cowie, 2001). A further, related, issue is whether we should give prominence to semantic rather than formal criteria. To begin with the question of multiple criteria, it seems vital, given the nature of polysemy as a scalar phenomenon, to refer in each case to two or more criteria. If one takes two or more occurrences of the same word form, and finds that they have similar distributions at a number of descriptive levels – syntactic, morphological, collocational – then the assumption is that they will be close in meaning and

at the most remote point from homonymy. Consider, with this in mind, the following senses of the noun *tour*, noting especially the possible conversion of the noun – in one or more senses – to a verb, and any other characteristic derivatives (Cowie, 2001: 46).

a. tour (holidays)	tour (v), tourist, tourism
b. tour (visit, inspection)	tour (v)
c. tour (military)	tour (v)
d. tour (artistic)	tour (v)
e. tour (sporting)	tour (v), tourist

We can see that in terms of conversion ('zero derivation') the various senses are alike, while as regards derivation proper, only the first stands out from the others (note also the compounds *package tour* and *tour operator*). By contrast, near-homonymy will be indicated when, for a given set of criteria, one finds wide distributional differences. Such is the case with three senses of the adjective *sheer*, where the synonyms are sharply distinct and the pattern with *sheerness* is only fully acceptable in the first sense:

sheer_a ('very steep')	= perpendicular (cf. the sheerness of the rock face)
sheer_b ('absolute')	= unmitigated (cf. *the sheerness of his folly)
sheer_c ('so fine as to be transparent')	= diaphanous (cf. ?the sheerness of her tights)

As for giving priority to semantic criteria, we should take account of the view of Cruse (1986, 2000) on how polysemy should be defined, while noting its limitations. Cruse favors semantic (or 'direct' tests), which he describes as more successful and reliable for diagnostic purposes. One such test depends on the fact that separate senses of an item cannot be brought into play in the same sentence without oddness. Consider for example this sentence, where activating two senses of *expired* at the same time gives rise to zeugma: ?*John and his driving license expired last Tuesday.* Nevertheless, the meanings of different lexical items differ quite widely as to the degree of oddness that is revealed when they are brought into play. In this sentence, for instance, where senses of *tour* are (again) involved, no oddness is involved: *The England cricketers and the Royal Ballet were both touring South Africa*. Yet this is only to be expected if the senses of a polysemous word are – in differing degrees – related as well as separate. More positively, one could conclude that, while no better in this respect than grammatical tests, semantic tests **do** provide evidence of the scalar nature of polysemy.

Metaphor and the Differentiation of Meanings

As many entries in ordinary dictionaries confirm, metaphor is one of the commonest means by which new meanings develop from existing senses. The prevalence of metaphor more generally, as an integral part of the structure of the lexicon, has been highlighted in the field of cognitive semantics and in particular in the work of Lakoff and Johnson (1980) and Lakoff (1987). Lakoff and Johnson argued that we can point to a number of very general concepts whose metaphorical structuring is reflected in the phrasal lexicon of the language (1980: 52), and they gave weight to their hypothesis by showing that particular metaphors, such as 'ideas are cutting instruments,' are manifested by a cluster of specific phrases:

> That's an *incisive* idea. That *cuts right to the heart of* the matter . . . He has a *razor* wit. He had a *keen* mind. (Lakoff and Johnson, 1980: 48).

It is worth noting that elsewhere the authors pointed out that a particular set of phrases 'structured by a single metaphorical concept' ('life is a gambling game') are 'phrasal lexical items' (or, to use a common equivalent, multiword units). Such examples reinforce the point made earlier, that metaphorical concepts are characteristically realized by expressions from the **phrasal** lexicon (Lakoff and Johnson, 1980: 51).

The link between Lakoff and Johnson's hypothesis and phraseology has been seized on by a number of linguists. Referring to a collocational database enriched by having had 'lexical functions' assigned to each of the 70 000 pairs of collocations it contains, Fontenelle noticed that other metaphors are commonly used in the language (Fontenelle, 1994: 275; and for lexical functions cf. Mel'chuk and Zholkovsky, 1984; Fontenelle, 1997). He considered the following examples from the database (introduced by the function 'Mult,' expressing 'a group or set of something'):

Mult (arrow)	=	cloud, rain, shower, storm
Mult (bullet)	=	rain
Mult (missile)	=	storm
Mult (stone)	=	shower

Arrow, *bullet* and so on are projectiles aimed at a target. But as Fontenelle explained, these terms are used in collocation with words pertaining to meteorological phenomena, enabling us to posit the existence of the metaphor 'a projectile is a meteorological phenomenon.'

The approach to the definition of metaphor followed by Patrick Hanks must be viewed as part of his much broader theory of norms and exploitations, developed as a response to the pervasiveness in language use of what he has called "stereotypical syntagmatic patterns" (Hanks, 2004a). What the term points to is repetitive use (abundantly illustrated by Hanks), relative fixity, and preference for the form in question over plausible alternatives (well illustrated by native speakers preferring *a storm of protest* to *a torrent of protest*). Such examples as *a storm of protest* and *a torrent of abuse* represent the 'norm.' As Hanks explains, 'some uses are stereotypical; others exploit stereotypes, typically for rhetorical effect' (2004b: 246), and he goes on to develop the point by suggesting that whereas stereotyped phrases and idioms are 'norms,' innovative adaptations – often based on existing phrases, as in *the vultures are circling* vs. *the lawyers are circling* – are 'exploitations.' Clearly, dead metaphors will figure in the first category and freshly minted metaphors in the second.

The treatment of metaphor provided by Hanks is detailed and often illuminating. It is clear, first, that we must recognize 'degrees' of metaphoricity, in the sense that neither, one, or both of the constituents of a phrase may be metaphorical:

a. The lowest point on the scale is represented by *storms blow*, *storms abate*, where there are arguably two literal elements and 'a reductionist interpretation is appropriate' (Hanks, 2004b: 256).
b. We come next to cases where *storm* is literal but the associated verb is figurative: *storms brew* and *rage*; *storms batter*, *lash*, and *ravage*. Such combinations are so common that 'it is easy to overlook the metaphorical status of the verb' (Hanks, 2004b: 256). It is worth noting, too, that in treatments influenced by 'classical' Russian theory, *storm* would be said to 'shape' the figurative senses of *batter*, *lash*, etc. (cf. Cowie, 1999).
c. In the third type, *storm* is metaphorical, as in *a political storm*, *a storm of protest*.
d. At the final stage we find idioms, such as *a storm in a teacup*.

There is a particularly interesting comment on *storm* (i.e., as a conventional metaphor) as the direct object of a causative verb. The causative may be literal, as witness *cause*, *create* and possibly *raise*. But '*storm* in this sense is found as the direct object of both literal and metaphorical causative verbs' (Hanks, 2004b: 259). In the latter case, we have mixed metaphors: *spark a storm* (*of protest*, etc.), *whip up a storm*. The mixed metaphor effect is perhaps caused by *spark* (say), which acts originally as a collocate of *explosion*, later carrying over the appropriate features to *storm* (for 'oblique' metaphors, see Cowie, 2004).

Finally, and still on the subject of conventional metaphors, Hanks made two observations that only access to extensive data could make possible. In causative *brew up a storm*, *whip up a storm*, etc., the noun is almost certainly metaphorical. In inchoative *a storm is brewing up*, by contrast, the noun could be either. Other contrastive comments are prompted by *a storm of* something, where the final noun is almost always a conventional metaphor and negative: *a storm of protest*, *a storm of criticism*, etc. Less common are positive reactions, such as *a storm of applause*.

Frame Semantics

Considerable interest is currently being shown by lexicologists and specialists in lexicography and natural language processing in frame semantics, an approach to the study of lexical meaning based on work by Charles Fillmore and his associates. A particular strength of the theory is that it brings together syntactic and semantic levels of analysis in a rigorous and systematic way. But of particular significance is the contribution that the theory makes to the analysis of words, and thus to lexicography. As Atkins, Fillmore and Johnson pointed out, experienced lexicographers will use various clues to identify differences in the meaning of a word when examining citations in which it appears. In the case of the verb *argue*, for example, the indicators of difference will include different synonyms (*quarrel* in one case, *reason* in another) and contrastive sets of prepositions: 'in the quarrelling sense, you argue *with* someone, *about* something, while in the reasoning sense you argue *for* or *against* something, or *that* something should be done' (Atkins *et al.*, 2003: 253).

By making implicit use, as here, of various kinds of linguistic information, the practical lexicographer can make considerable progress towards identifying or separating senses. However, if recognized explicitly, the information can lead to deeper understanding. One kind of information has to do with the syntactic contexts in which *argue* occurs; the other concerns the meanings of the prepositions (*with*, *for*, and so on) which function as its complements. Beyond that awareness is the recognition that we need a theory that links the meanings of words very explicitly to the syntactic contexts in which those words are used, and to the semantic properties of those contexts. In frame semantics, this requires a further step, which is to recognize that 'word meanings must be described in

relation to *semantic frames* – schematic representations of the conceptual structures and patterns of beliefs, practices, institutions, images, etc. that provide a foundation for meaningful interaction in a speech community' (Fillmore *et al.*, 2003: 235).

Those working on semantic frames have an associated computational lexicography project, FrameNet, which extracts information about the related semantic and syntactic properties of English words from large text corpora, and analyzes the meanings of words "by directly appealing to the frames that underlie their meanings and studying the syntactic properties of words by asking how their semantic properties are given syntactic form" (Fillmore *et al.*, 2003: 235). In this way are the grammatical and semantic features of *argue*, presented informally earlier on, given more rigorous and systematic shape.

The notion of valence – at the grammatical level, the requirement that a word combines with particular phrases in a sentence – plays an important part in the theory. However, in FrameNet, information about valence must be stated in semantic as well as syntactic terms. That is, the semantic roles that syntactic elements such as subject or object play with reference to the meaning of the word must be fully accounted for.

In FrameNet, 'the semantic valence properties of a word are expressed in terms of the kinds of entities that can participate in frames of the kind evoked by the word' (Fillmore *et al.*, 2003: 237). These roles are called frame elements (FEs). FEs must be taken to include not only the human participants – aggressors, victims, etc. – but conditions and objects relevant to the central concepts of the frame. In the semantics of the key term *risk* – the subject of a detailed study by Fillmore and Atkins (1992) – such elements include uncertainty about the future (the frame element 'chance') and a potential unwelcome development (the frame element 'harm'). According to the study, these two FEs alone make up the core of our understanding of several other items within the field, including *peril*, *danger*, *venture*, and *hazard*.

Semantic frame theory offers a number of opportunities to lexicologists and lexicographers in treating the vocabulary of risk and other semantic domains (Cowie, 2002). First is the fact that the model brings together frame elements and syntactic functions, so that the one-to-two (or one-to-many) relations that often hold between FEs and lexicosyntactic structures are clearly demonstrated.

To illustrate this point, we can see, just below, that the frame element 'aggressor' is common to both examples. This perception leads us to bring together – as semantically related – two contrasting structures incorporating the noun *threat*, in which 'aggressor' is realized first as a grammatical subject and second as a prepositional phrase introduced by *from* (Cowie, 2002: 327):

1. AGGRESSOR {the dolphins} were
   a threat
   VALUED OBJECT {to the local fishing industry}
2. an imagined threat
   AGGRESSOR {from the few remaining
   ex-revolutionaries}

A further way in which frame semantics can benefit lexical description is that is enables us to take a set of supposed synonyms and to use the theory to elucidate crucial differences of meaning and distribution – and incidentally show up the inadequacies of definitions in several current dictionaries. This has been demonstrated in Atkins's analysis of the verbs of seeing (1994). Comparing approaches to defining the verbs *behold*, *descry*, *notice*, *spot*, and *spy* in two mother tongue dictionaries, she notes how the verbs are defined in terms of each other. She is also aware that recourse to corpus data alone, rich though it may be, does not enable one to identify the tiny shifts of sense which divide one verb from another (Cowie, 1999).

Atkins's approach, in the case of the verbs *see*, *behold*, *catch sight of*, *spot*, *spy* is to recognize a 'perception frame,' whose chief elements include a 'passive' rather than an 'active experiencer' (since seeing, unlike looking, does not include an element of volition), a 'percept' (or object perceived) and a 'judgment,' which refers to the opinion which the experiencer forms of the percept as a result of seeing, etc. In the first example below, the judgment being made is comparative, while in the second example it is in the nature of an inference:

He looked to me like a yellow budgerigar.
(judgment–simile)
Peter looks relaxed. (judgment–inference)

As we can see from these examples, the relationship between semantic frame elements and grammatical functions is often far from straightforward. In the first example above, the experiencer is realized as the prepositional phrase *to me*; in a sentence such as *Mary saw the duck*, the experiencer is *Mary*, the subject of the perception verb *see* (Atkins, 1994: 5).

The work described briefly here forms part of a continuing descriptive project, of considerable scope and ambition, whose results are already proving invaluable to lexicographers and computational linguists.

See also: Collocations; Corpus Approaches to Idiom; Fillmore, Charles J. (b. 1929); Frame Semantics; Lexicon

Grammars; Mel'čuk, Igor Aleksandrovic (b.1932); Phraseology; Russian Lexicography.

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Lexicon Grammars

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History

The term '*lexique-grammar*' (lexicon-grammar) was introduced by Maurice Gross in 1984, but its basic principles were established already in the 1950s by Zellig Harris. However, despite the linguistic insights revealed by Harris's transformational methods, Harris has never tried his method on more than a handful of examples. The large-scale implementation of Harris's ideas was the merit of Gross, his student at the University of Pennsylvania. After returning to Paris in the late 1960s, Gross founded a research laboratory, LADL (*Laboratoire d'Automatique Documentaire et Linguistique*), where he and his team began to build a very large empirically based inventory of a lexicon-grammar of French.

In 1975, Gross published *Méthodes en syntaxe,* which lays the foundations for the methodology of lexicon-grammars. *Méthodes* also contains a complete and systematic description of French verbs that select for sentential complements. Two additional publications (Boons *et al.*, 1976; Guillet and Leclère, 1992) describe simple verbs without sentential complements. A large class of verb–complement combinations could not be characterized in terms of selectional restrictions. They are described by M. Gross (1981). Several lexicon-grammars about support verb constructions followed: Vivès (1983), Giry-Schneider (1987), and G. Gross (1988). Another focus of intense research was fixed expressions (M. Gross, 1982). Finally, lexicon-grammars have also been applied to other lexical forms: adjectives (Meunier, 1981), adverbs (M. Gross, 1990), and compound nouns (G. Gross, 1990).

Lexicon-grammars have been applied to the study of languages as diverse as Arabic, Chinese, English, French, German, Greek, Italian, Japanese, and Korean. Since 1981, RELEX, the international network of research on lexicon-grammars, organizes annual conferences devoted to lexis and grammar.

At the very basis of lexicon-grammars are the morphological DELA lexicons (DELA is an acronym for Electronic Dictionary of the LADL), which serve as index keys to the lexicon-grammars. DELA consists of several sublexicons: a lexicon of simple forms, containing 90 000 lemmas with complete morphological information, a lexicon containing phonemic information, and a lexicon of compound nouns with about 100 000 entries. The DELA lexicon format has been applied to English, Italian, German, Greek, Norwegian, Portuguese, and Spanish.

Maurice Gross's death slowed the momentum of lexicon-grammar development. A special issue of *Linguisticae Investigationes* in his honor, with more than 50 contributions, shows, however, that research in lexicon-grammar is still active (Leclère *et al.*, 2004).

Goals and Assumptions of Lexicon-Grammar

The goal of lexicon-grammar is to give a precise and complete description of the senses and usages of lexical units in elementary sentences on the basis of distributional and transformational methods (M. Gross, 1990: 39).

The lexicon-grammar approach is built upon the following important assumptions:

- The minimal context of linguistic description is the elementary sentence, i.e., a verb with only its essential complements (or strictly subcategorized complements in the terminology of generative grammar), and not the word. As a consequence, lexicon-grammars make no strict separation between lexicon and grammar.
- The transformational description in lexicon-grammar is based on Z. H. Harris's theoretical framework. Since Harris's transformations preserve the meaning of elementary sentences, lexicon-grammar describes meanings and not merely constructions.
- The approach is empirical since the syntactic behavior of lexical units is believed to be too idiosyncratic to be described with general rules. Rather than proceeding from a theory, Maurice Gross insists on a systematic description of the syntactic behavior of all or at least a large number of lexical elements of a language before deriving general rules (M. Gross, 1975: 46).

The Elementary Sentence

An elementary sentence consists of a predicative lexical unit and its essential complements. In accordance with valence theory, essential complements cannot be added freely to predicative lexical forms. In the case of verbs, the elementary sentences are of the form *P*:= *N0 V W*, where N0 is the subject, V the verb, and *W* an arbitrary sequence of verb complements. Lexicon-grammar claims that the form of an elementary sentence cannot be determined *a priori* but has to be discovered empirically for each lexical unit "since tests for characterizing essential complements

are highly lexical and tend to apply more to individual verbs or small groups rather than to broad classes" (M. Gross, 1996).

The main principle of lexicon-grammar is that the elementary sentence is taken as the minimal unit for the study of meaning and syntax, for several reasons. First, sentential idioms such as *Max took the bull by the horns* constitute elementary units of meaning. Likewise, noncompositional expressions such as compound nouns show that words are not always the minimal unit of meaning. Further, predicative lexical elements can only be fully described in their elementary sentence context, which is more than a description of verb–argument structure. Indeed, a fine-grained analysis reveals that more syntactic properties than is commonly assumed depend on the verb. For example, determiners or adjectives are mostly described as being constrained by their noun. However, in (1) and (2) they are shown to be verb-specific (M. Gross, 1993):

(1) Bob wants some beer * Bob loves some beer (quantifier reading)

(2) Bob is building a future mansion = Bob is building a mansion

Bob is eating a future cake ≠ Bob is eating a cake

Current linguistic models share the view that grammar and lexicon interact. However, this assumption was remarkable in a period when the overwhelming majority of linguists strictly separated lexical and grammatical levels. In contrast to this traditional point of view, lexicon-grammars assume that lexical units always carry grammatical information and, vice versa, what is traditionally described by grammars depends very much on lexical variability.

Transformations

Transformational rules in lexicon-grammar are based on Harris's theoretical framework (e.g., Harris, 1957, 1964). Unlike the transformational rules of early generative grammar, rejected by Gross because of the problematic status of their constituents (M. Gross, 1978), Harris's transformations operate on what generative grammar would call surface structure, i.e., on sequences of word classes (constructions) and their distributions (k-occurrences).

Constructions are sequences of elementary classes (noun, verb, adjective, article, preposition, conjunction, adverb) and morphemes (i.e., affixes). K-occurrences define the paradigmatic set of acceptable lexical units of sequences of elementary classes. For example, the k-occurrence of all adjectives occurring with the noun *property* in an adjective–noun sequence is determined by the set {*legal*, *small*, *common*, *immovable* . . .}, which is different from the entire class of all adjectives (**sallow property*, **yellow property*).

Two or more constructions are transformations of one another if they:

a. share the same set of elementary classes (affixes, auxiliaries, or promorphemes such as pronouns are not considered),
b. have the same k-occurrence, and
c. have the same broad distribution, i.e., occur in the same sentence environment.

Harris's transformations are equivalence classes if the homonyms of lexical units are distinguished. If homonyms are not distinguished, transformations are neither symmetric nor transitive. For example, the passive transformation in *The wreck was seen by the seashore* cannot be reversed because of the homonymy of the *by* construction (Harris, 1957: 395). Transformations thus preserve meaning, as summarized by Harris (1957: 395): "That many sentences which are transforms of each other have more or less the same meaning except for different external grammatical status . . . is an immediate impression. This is not surprising, since meaning correlates closely with the range of occurrence, and transformations maintain the same occurrence range."

One consequence of (c) is that while Harris's transformations operate on sentences, they generally do not allow transformations between sentences and noun phrases. For example, for the sentence *King John attacks the city*, Harris (Harris, 1964) formulates the relation of nominalization in (3) rather than (4), as suggested by early versions of generative grammar:

(3) King John launches an attack against the city

(4) the attack of the city by King John

This relation of nominalization led to the notion of support verb, a type of construction where the selectional constraints are not between the verb and the complements, but between the predicative noun and its complement. Again, this is justified by a transformational approach. Consider for example (5), a sentence that has the same surface structure as (3). However, the two constructions differ with respect to extraposition. Here, the double analysis holds for support verb constructions (7a), whereas it is not acceptable for the distributional verbs in (7b).

(5) King John criticizes an attack against the city

(6a) It is an attack against the city that King John launches

(6b) It is an attack against the city that King John criticizes

Table 1 Sample of the class 36DT, the class of transfer verbs. N0, N1 and N2 denote subject, direct and indirect object. Transformations are listed under P.A.

NO				*N1*						*Prép*		*N2*							*P.A.*			
N0 =: Nhum	*N0 =: V-n*	*N2 bénéficiaire*	36DT	*N1 =: Nhum*	*N0 V N0pc*	*N1 =: N-hum*	*N1 =: V-n*	*N1 =: Dnum N*	*N1 =: coup*	*Prép =: à*	*Prép =: de*	*N2 =: N-hum*	*Ppv =: lui*	*Ppv =: y*	*N2 =: V-n*	*N2 =: Npl obl*	*N1 est Vpp*	*N1 =: Nabst*	*N0 V N1 Dnum N*	*N0 V N2 (de N1)*	*N0 V N1 Loc N*	*N0 V N1 à N2 Advp*	
+	–	+	abandonner	–	–	+	–	+	–	+	–	–	+	–	–	–	–	+	–	–	–	–	Max a abandonné ses biens à Marie
+	–	+	abouler	–	–	+	–	+	–	+	–	–	–	–	–	–	–	–	–	–	–	–	Max aboule du fric à Ida
+	–	–	accepter	–	–	+	–	+	–	–	+	–	–	–	–	–	–	+	–	–	–	–	Max a accepté un lit de Marie
+	–	+	accorder	+	+	+	–	+	–	+	–	+	+	–	–	–	–	+	–	–	–	–	Paul accorde un prêt
+	–	–	acheter	–	–	+	+	–	–	+	–	–	–	–	–	–	–	+	+	–	–	+	Max a acheté un lit à Luc
+	–	–	acquérir	–	–	+	+	–	–	–	+	+	+	–	–	–	–	+	+	–	–	+	Paul a acquis ce tableau au marchand
+	–	+	acquitter	–	–	+	–	+	–	+	–	–	–	–	–	–	+	–	–	–	–	–	Jean a acquitté cette somme à Max
+	–	+	adjoindre	+	–	–	+	–	–	+	–	+	+	–	–	–	–	–	–	–	–	–	Luc a adjoint un collaborateur à Eva
+	+	+	adjuger	–	–	+	–	–	+	+	–	–	+	–	–	–	+	+	+	–	–	+	Max a adjugé le prix à Paula
+	+	+	administrer	–	–	+	–	–	+	+	–	+	+	–	–	–	–	+	–	–	+	–	Max a administré une (drogue+claque) à Marie
+	–	+	adresser	+	–	+	–	+	+	+	–	+	+	+	+	–	+	+	–	–	–	–	Paul a adressé un paquet à Jacques

(7a) It is an attack that King John launches against the city
(7b) *It is an attack that King John criticizes against the city

Constructing Lexicon-Grammars

The main motivation for constructing a lexicon-grammar is to determine systematically the rules of a language and their range of application. This process is illustrated here for verbs, but it works similarly for other predicative elements. The description of verbs and the selection of distributional and transformational properties were carried out by the linguists in Gross's team in an interdependent process. For two sentences with a given verb, it had to be determined whether the sentences had the same meaning or whether they could be related by transformations. Or, if the meaning was different, the goal was to find a transformation that was acceptable for one but not the other. For example, the different meanings of the morphological verb *arroser* ('to water') in the two following sentences can be demonstrated by the following reciprocal transformation:

(8) Luc arrose la plante avec un arrosoir = *Luc et l'arrosoir arrosent la plante
'Luc waters the plant with a can' = '*Luc and the can water the plant'

(9) Luc arrose la nouvelle année avec ses amis = Luc et ses amis arrosent la nouvelle année
'Luc toasts (lit.: waters) the New Year with his friend' = 'Luc and his friends toast the New Year'

Another goal is to mark all the syntactic properties for each verbal entry, i.e., the elementary sentence of the form subject-verb-essential complements. Judgments of acceptability are binary: an entry does or does not have a certain property. In order to correct the shortcomings of introspection that underestimate the actual production of forms (M. Gross, 1975), as a rule of thumb, dubious syntactic properties were marked as acceptable (M. Gross, 1996). Even though lexicon-grammars were constructed long before large electronic corpora were available for collecting attested data, this procedure has been criticized as leading to biased judgments and the acceptance of far too many properties (Busse, 1980).

Results and Discussion

More than 30 years of systematic description by a team of linguists have resulted in a huge lexicon grammar of French elementary sentences based on predicative lexical units. It consists of:

- 12 000 verbs organized according to 500 properties (stored as 15 000 verbal entries)
- 44 000 entries of fixed sentences
- 50 000 support verb constructions
- 7000 frozen adverbs (e.g., *back and forth*).

These units are stored in matrices where each line is an entry and each column corresponds to either a distributional or a transformational property. The cells are populated by a '+' if the property holds for the entry or a '−' if it does not. Since there is considerable redundancy in these matrices, entries are grouped together in submatrices, called classes, if they have similar syntactic properties. A sample of the matrix-representation is given in Table 1. A detailed description of the organization of French lexicon-grammar as well as the statistical distribution of all constructions can be found in Leclère (2002).

A comparison of all the lines of the matrix revealed that only a few verbs share the same set of constructions. This finding can be seen as an *a posteriori* justification of the lexicon grammar's methodology: "every verb has to be described on an individual basis" (M. Gross, 1996).

Lexicon-grammars separate meanings by applying the theoretical framework of Harris, but they have nothing to say on how the different entries are related. For example, the literal meaning and metaphorical uses of entries such as (8) and (9) can be separated by differences in form but they are unrelated. Laporte comments this as "the price to be paid for an essential epistemological feature: the model is designed so that it can be confronted with reality through a set of sufficiently reproducible experimental processes, which includes acceptability judgment, differential acceptability, paraphrase judgment, ambiguity judgment, and a few others, all applied to sentences" (Laporte, 2004).

See also: Computers in Lexicography; Constituent Structure; Corpus Lexicography; French Lexicography; French; Gross, Maurice (1934–2001); Harris, Zellig S. (1909–1992); Lexicology; Lexicon, Generative; Phraseology; Valency Grammar.

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Lexicon, Generative

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Introduction

Generative Lexicon (GL) introduces a knowledge representation framework that offers a rich and expressive vocabulary for lexical information. The motivations for this are twofold. Overall, GL is concerned with explaining the creative use of language; we consider the lexicon to be the key repository holding much of the information underlying this phenomenon. More specifically, however, it is the notion of a constantly evolving lexicon that GL attempts to emulate; this is in contrast to currently prevalent views of static lexicon design, where the set of contexts licensing the use of words is determined in advance, and there are no formal mechanisms offered for expanding this set.

One of the most difficult problems facing theoretical and computational semantics is defining the representational interface between linguistic and nonlinguistic knowledge. GL was initially developed as a theoretical framework for encoding selectional knowledge in natural language. This in turn required making some changes in the formal rules of representation and composition. Perhaps the most controversial aspect of GL has been the manner in which lexically encoded knowledge is exploited in the construction of interpretations for linguistic utterances. Following standard assumptions in GL, the computational resources available to a lexical item consist of the following four levels:

(1a) Lexical typing structure: giving an explicit type for a word positioned within a type system for the language;
(1b) Argument structure: specifying the number and nature of the arguments to a predicate;
(1c) Event structure: defining the event type of the expression and any subeventual structure it may have with subevents;
(1d) Qualia structure: a structural differentiation of the predicative force for a lexical item.

The qualia structure, inspired by Moravcsik's (1975) interpretation of the *aitia* of Aristotle, are defined as the modes of explanation associated with a word or phrase in the language, and are defined as follows (Pustejovsky, 1991):

(2a) Formal: the basic category of which distinguishes the meaning of a word within a larger domain;
(2b) Constitutive: the relation between an object and its constituent parts;

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(2a) Formal: the basic category of which distinguishes the meaning of a word within a larger domain;
(2b) Constitutive: the relation between an object and its constituent parts;

(2c) Telic: the purpose or function of the object, if there is one;
(2d) Agentive: the factors involved in the object's origins or 'coming into being.'

Conventional interpretations of the GL semantic representation have been as feature structures (cf. Bouillon, 1993; Pustejovsky, 1995). The feature representation shown below gives the basic template of argument and event variables, and the specification of the qualia structure.

$$\begin{bmatrix} \alpha & \\ \text{ARGSTR} = & \begin{bmatrix} \text{ARG1} = x \\ \ldots \end{bmatrix} \\ \text{EVENTSTR} = & \begin{bmatrix} \text{E1} = e^1 \\ \ldots \end{bmatrix} \\ \text{QUALIA} = & \begin{bmatrix} \text{CONST} = \textbf{what } x \textbf{ is made of} \\ \text{FORMAL} = \textbf{what } x \textbf{ is} \\ \text{TELIC} = \textbf{function of } x \\ \text{AGENTIVE} = \textbf{how } x \textbf{ came into being} \end{bmatrix} \end{bmatrix}$$

Traditional Lexical Representations

The traditional organization of lexicons in both theoretical linguistics and natural language processing systems assumes that word meaning can be exhaustively defined by an enumerable set of senses per word. Lexicons, to date, generally tend to follow this organization. As a result, whenever natural language interpretation tasks face the problem of lexical ambiguity, a particular approach to disambiguation is warranted. The system attempts to select the most appropriate 'definition' available under the lexical entry for any given word; the selection process is driven by matching sense characterizations against contextual factors. One disadvantage of such a design follows from the need to specify, ahead of time, the contexts in which a word might appear; failure to do so results in incomplete coverage. Furthermore, dictionaries and lexicons currently are of a distinctly static nature: the division into separate word senses not only precludes permeability; it also fails to account for the creative use of words in novel contexts.

GL attempts to overcome these problems, both in terms of the expressiveness of notation and the kinds of interpretive operations the theory is capable of supporting. Rather than taking a 'snapshot' of language at any moment of time and freezing it into lists of word sense specifications, the model of the lexicon proposed here does not preclude extensibility: it is open-ended in nature and accounts for the novel, creative uses of words in a variety of contexts by positing procedures for generating semantic expressions for words on the basis of particular contexts.

Adopting such a model presents a number of benefits. From the point of view of a language user, a rich and expressive lexicon can explain aspects of learnability. From the point of view of linguistic theory, it can offer improvements in robustness of coverage. Such benefits stem from the fact that the model offers a scheme for explicitly encoding lexical knowledge at several levels of generalization. In particular, by making lexical ambiguity resolution an integral part of a uniform semantic analysis procedure, the problem is rephrased in terms of dynamic interpretation of a word in context; this is in contrast to current frameworks which select among a static, predetermined set of word senses, and do so separately from constructing semantic representations for larger text units.

There are several methodological motivations for importing tools developed for the computational representation and manipulation of knowledge into the study of word meaning, or lexical semantics. Generic knowledge representation (KR) mechanisms, such as inheritance structures or rule bases, can – and have been – used for encoding linguistic information. However, not much attention has been paid to the notion of what exactly constitutes such linguistic information. Traditionally, the application area of knowledge representation formalisms has been the domain of general world knowledge. By shifting the focus to a level below that of words (or lexical concepts) one is able to abstract the notion of lexical meaning away from world knowledge, as well as from other semantic influences such as discourse and pragmatic factors. Such a process of abstraction is an essential prerequisite for the principled creation of lexical entries.

Although GL makes judicious use of knowledge representation (KR) tools to enrich the semantics of lexical expressions, it preserves a felicitous partitioning of the information space. Keeping lexical meaning separate from other linguistic factors, as well as from general world knowledge, is a methodologically sound principle; nonetheless, GL maintains that all of these should be referenced by a lexical entry. In essence, such capabilities are the base components of a generative language whose domain is that of lexical knowledge. The interpretive aspect of this language embodies a set of principles for richer composition of components of word meaning. As illustrated later in this entry, semantic expressions for word meaning in context are constructed by a fixed number of generative devices (cf. Pustejovsky, 1991). Such devices operate on a core set of senses (with greater internal structure than hitherto assumed); through composition, an extended set of word senses is obtained when individual lexical items are considered jointly with others in larger phrases. The language

presented below thus becomes an expressive tool for capturing lexical knowledge, without presupposing finite sense enumeration.

The Nature of Polysemy

One of the most pervasive phenomena in natural language is that of systematic ambiguity, or polysemy. This problem confronts language learners and natural language processing systems alike. The notion of context enforcing a certain reading of a word, traditionally viewed as selecting for a particular word sense, is central both to global lexical design (the issue of breaking a word into word senses) and local composition of individual sense definitions. However, current lexicons reflect a particularly 'static' approach to dealing with this problem: the numbers of and distinctions between senses within an entry are 'frozen' into a fixed grammar's lexicon. Furthermore, definitions hardly make **any** provisions for the notion that boundaries between word senses may shift with context – not to mention that no lexicon really accounts for any of a range of lexical transfer phenomena.

There are serious problems with positing a fixed number of 'bounded' word senses for lexical items. In a framework that assumes a partitioning of the space of possible uses of a word into word senses, the problem becomes that of selecting, on the basis of various contextual factors (typically subsumed by, but not necessarily limited to, the notion of selectional restrictions), the word sense closest to the use of the word in the given text. As far as a language user is concerned, the question is that of 'fuzzy matching' of contexts; as far as a text analysis system is concerned, this reduces to a search within a finite space of possibilities.

This approach fails on several accounts, both in terms of what information is made available in a lexicon for driving the disambiguation process, and how a sense selection procedure makes use of this information. Typically, external contextual factors alone are not sufficient for precise selection of a word sense; additionally, often the lexical entry does not provide enough reliable pointers to critically discriminate between word senses. In the case of automated sense selection, the search process becomes computationally undesirable, particularly when it has to account for longer phrases made up of individually ambiguous words. Finally, and most importantly, the assumption that an exhaustive listing can be assigned to the different uses of a word lacks the explanatory power necessary for making generalizations and/or predictions about how words used in a novel way can be reconciled with their currently existing lexical definitions.

To illustrate this last point, consider the ambiguity and context-dependence of adjectives such as *fast* and *slow*, where the meaning of the predicate varies depending on the noun being modified. Sentences (3a)–(3e) show the range of meanings associated with the adjective *fast*. Typically, a lexicon requires an enumeration of different senses for such words, to account for this ambiguity:

(3a) The island authorities sent out a <u>fast</u> little government <u>boat</u> to welcome us:
Ambiguous between a boat driven quickly/one that is inherently fast.

(3b) a <u>fast typist:</u>

a person who performs the act of typing quickly.

(3c) Rackets is a <u>fast game</u>:
the motions involved in the game are rapid and swift.

(3d) a <u>fast book</u>:
one that can be read in a short time.

(3e) My friend is a <u>fast driver</u> and a constant worry to her cautious husband:
one who drives quickly.

These examples involve at least four distinct word senses for the word *fast*, (WordNet 2.0 has ten senses for the adjectival reading of *fast*.):

fast (1): moving quickly;
fast (2): performing some act quickly;
fast (3): doing something requiring a short space of time;
fast (4): involving rapid motion.

In an operational lexicon, word senses would be further annotated with selectional restrictions: for instance, fast (1) may be predicated by the object belonging to a class of movable entities, and fast (3) may relate the action 'that takes a little time' – e.g., reading, in the case of (4) below – to the object being modified. Upon closer analysis, each occurrence of *fast* above predicates in a slightly different way. In fact, any finite enumeration of word senses will not account for creative applications of this adjective in the language. For example, consider the two phrases *fast freeway* and *fast garage*. The adjective *fast* in the phrase *a fast freeway* refers to the ability of vehicles on the freeway to sustain high speed, while in *fast garage* it refers to the length of time needed for a repair. As novel uses of *fast*, we are clearly looking at new senses that are not covered by the enumeration given above.

Part of GL's argument for a different organization of the lexicon is based on a claim that the boundaries between the word senses in the analysis of *fast* above are too rigid. Still, even if we assume that enumeration is adequate as a descriptive mechanism, it is not

always obvious how to select the correct word sense in any given context: consider the systematic ambiguity of verbs like *bake* (discussed by Atkins *et al.*, 1988), which require discrimination with respect to change-of-state versus create readings, depending on the context (see sentences [4a] and [4b], respectively).

(4a) *John baked the potatoes.*
(4b) *Mary baked a cake.*

The problem here is that there is too much overlap in the 'core' semantic components of the different readings (Jackendoff (1985) correctly points out, however, that deriving one core meaning for all homographs of a word form may not be possible, a view not inconsistent with that proposed here.); hence, it is not possible to guarantee correct word sense selection on the basis of selectional restrictions alone. Another problem with this approach is that it lacks any appropriate or natural level of abstraction.

As these examples clearly demonstrate, partial overlaps of core and peripheral components of different word meanings make the traditional notion of word sense, as implemented in current dictionaries, inadequate. Within this approach, the only feasible solution would be to employ a richer set of semantic distinctions for the selection of complements than is conventionally provided by the mechanism of selectional restrictions.

It is equally arbitrary to create separate word senses for a lexical item just because it can participate in several subcategorization forms; yet this has been the only approach open to computational lexicons that are based on a fixed number of features and senses. A striking example of this is provided by verbs such as *believe* and *forget*. The sentences in (5a)–(5b) show that the syntactic realization of the verb's object complement determines how the phrase is interpreted semantically. The *that-complement*, for example, in (5a) exhibits a property called factivity (Kiparsky and Kiparsky, 1971), where the object proposition is assumed to be a fact regardless of what modality the whole sentence carries. Sentence (5d) contains a 'concealed question' complement (Grimshaw, 1979), so called because the phrase can be paraphrased as a question. These different interpretations are usually encoded as separate senses of the verb, with distinct lexical entries.

(5a) Mary <u>forgot that</u> she left the light on at home.
(a factive reading)
(5b) Mary <u>forgot to</u> leave the light on for the delivery man.
(a nonfactive reading)
(5c) I almost <u>forgot where</u> we're going.
(an embedded question)
(5d) She always <u>forgets the password</u> to her account.
(a concealed question)
(5e) He leaves, <u>forgets his umbrella</u>, comes back to get it . . .
(ellipsed nonfactive)

These distinctions could be easily accounted for by simply positing separate word senses for each syntactic type, but this misses the obvious relatedness between the different syntactic contexts of *forget*. Moreover, the general 'core' sense of the verb *forget*, which deontically relates a mental attitude with a proposition or event, is lost between the separate senses of the verb. GL, on the other hand, posits one definition for *forget* which can, by suitable composition with the different complement types, generate all the allowable readings (cf. Pustejovsky, 1995).

Levels of Lexical Meaning

The richer structure for the lexical entry proposed in GL takes to an extreme the established notions of predicate-argument structure, primitive decomposition and conceptual organization; these can be seen as determining the space of possible interpretations that a word may have. That is, rather than committing to an enumeration of a predetermined number of different word senses, a lexical entry for a word now encodes a range of representative aspects of lexical meaning. For an isolated word, these meaning components simply define the semantic boundaries appropriate to its use. When embedded in the context of other words, however, mutually compatible roles in the lexical decompositions of each word become more prominent, thus forcing a specific interpretation of individual words within a specific phrase. It is important to realize that this is a generative process, which goes well beyond the simple matching of features. In fact, this approach requires, in addition to a flexible notation for expressing semantic generalizations at the lexical level, a mechanism for composing these individual entries on the phrasal level.

The emphasis of our analysis of the distinctions in lexical meaning is on studying and defining the role that **all** lexical types play in contributing to the overall meaning of a phrase. Crucial to the processes of semantic interpretation that the lexicon is targeted for is the notion of compositionality, necessarily different from the more conventional pairing of verbs as functions and nouns as arguments. If the semantic load in the lexicon is entirely spread among the verb entries, as many existing lexicons assume, differences like those exemplified above can only be accounted for by treating *bake, forget*, and so forth as polysemous verbs. If, on the other hand, elaborate lexical meanings of verbs and adjectives could be made sensitive to

components of equally elaborate decompositions of nouns, the notion of spreading the semantic load evenly across the lexicon becomes the key organizing principle in expressing the knowledge necessary for disambiguation.

To be able to express the lexical distinctions required for analyzing the examples in the last section, it is necessary to go beyond viewing lexical decomposition as based only on a predetermined set of primitives; rather, what is needed is to be able to specify, by means of sets of predicates, different levels or perspectives of lexical representation, and to be able to compose these predicates via a fixed number of generative devices. The 'static' definition of a word provides its literal meaning; it is only through the suitable composition of appropriately highlighted projections of words that we generate new meanings in context.

In order to address these phenomena and inadequacies mentioned above, Generative Lexicon argues that a theory of computational lexical semantics must make reference to the four levels of representations mentioned above:

1. **Lexical Typing Structure**. This determines the ways in which a word is related to other words in a structured type system (i.e., *inheritance*. In addition to providing information about the organization of a lexical knowledge base, this level of word meaning provides an explicit link to general world (commonsense) knowledge.
2. **Argument Structure**. This encodes the conventional mapping from a word to a function, and relates the syntactic realization of a word to the number and type of arguments that are identified at the level of syntax and made use of at the level of semantics (Grimshaw, 1991);
3. **Event Structure**. This identifies the particular event type for a verb or a phrase. There are essentially three components to this structure: the primitive event type – state (**S**), process (**P**), or transition (**T**); the focus of the event; and the rules for event composition (cf. Moens and Steedman, 1988; Pustejovsky, 1991b).
4. **Qualia Structure**. This defines the essential attributes of objects, events, and relations, associated with a lexical item. By positing separate components (see below) in what is, in essence, an argument structure for nominals, nouns are elevated from the status of being passive arguments to active functions (cf. Moravcsik, 1975; Pustejovsky, 1991a). We can view the fillers in qualia structure as prototypical predicates and relations associated with this word.

A set of generative devices connects the four levels, providing for the compositional interpretation of words in context. These devices include subselection, type coercion, and cocomposition. In this article, we will focus on the qualia structure and type coercion, an operation that captures the semantic relatedness between syntactically distinct expressions. As an operation on types within a λ-calculus, type coercion can be seen as transforming a fixed semantic language into one with changeable (polymorphic) types. Argument, event, and qualia types must conform to the well-formedness conditions defined by the type system and the lexical inheritance structure when undergoing operations of semantic composition. Lexical items are strongly typed yet are provided with mechanisms for fitting to novel typed environments by means of type coercion over a richer notion of types.

Qualia Structure

Qualia structure is a system of relations that characterizes the semantics of a lexical item, very much like the argument structure of a verb (Pustejovsky). To illustrate the de scriptive power of qualia structure, the semantics of nominals will be the focus here. In effect, the qualia structure of a noun determines its meaning in much the same way as the typing of arguments to a verb determines its meaning. The elements that make up a qualia structure include familiar notions such as container, space, surface, figure, or artifact. One way to model the qualia structure is as a set of constraints on types (cf. Copestake and Briscoe, 1992; Pustejovsky and Boguraev, 1993). The operations in the compositional semantics make reference to the types within this system. The qualia structure along with the other representational devices (event structure and argument structure) can be seen as providing the building blocks for possible object types. Figure 1 illustrates a type hierarchy fragment for knowledge about objects, encoding qualia structure information. In Figure 1, the term `nomrqs` refers to a 'relativized qualia structure' a type of generic information structure for entities (cf. Calzolari, 1992 for discussion). Further, `ind.obj` represents 'individuated object.'

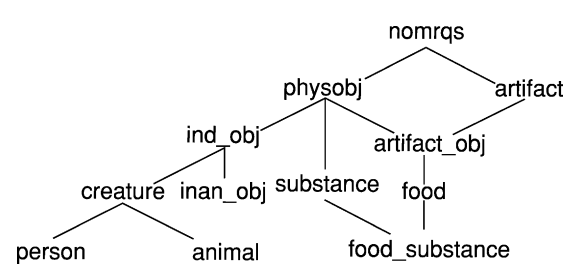

Figure 1 Type hierarchy fragment.

The tangled type hierarchy above shows how qualia can be unified to create more complex concepts out of simple ones. Following Pustejovsky (2001, 2005), we can distinguish the domain of individuals into three ranks or levels of type:

(6a) Natural Types: Natural kind concepts consisting of reference only to Formal and Const qualia roles;
(6b) Functional Types: Concepts integrating reference to purpose or function.
(6c) Complex Types: Concepts integrating reference to a relation between types.

For example, a simple natural physical object (7), can be given a function (i.e., a Telic role), and transformed into a functional type, as in (8).

(7) $\begin{bmatrix} \textbf{physobj (x)} \\ \text{FORMAL} = \textbf{physform (x)} \end{bmatrix}$

(8) $\begin{bmatrix} \textbf{artifact_obj(x)} \\ \text{FORMAL} = \textbf{physform (x)} \\ \text{TELIC} = \textbf{Pred (E,y,x)} \end{bmatrix}$

Functional types in language behave differently from naturals, as they carry more information with them regarding their use and purpose. For example, the noun *sandwich* contains information of the 'eating activity' as a constraint on its *Telic* value, due to its position in the type structure; that is, **eat(P,w,x)** denotes a process, **P**, between an individual **w** and the physical object **x**.

(9) $\begin{bmatrix} \textbf{sandwich(x)} \\ \text{CONST} = \{\textbf{bread,...}\} \\ \text{FORMAL} = \textbf{physobj}(\text{x}) \\ \text{TELIC} = \textbf{eat (P,w,x)} \\ \text{AGENTIVE} = \textbf{artifact (x)} \end{bmatrix}$

From qualia structures such as these, it now becomes clear how a sentence such as *Mary finished her sandwich* receives the default interpretation it does; namely, that of Mary eating the sandwich. This is an example of *type coercion*, and the semantic compositional rules in the grammar must make reference to values such as qualia structure, if such interpretations are to be constructed on-line and dynamically.

Coercion and Compositionality

Type coercion is an operation in the grammar ensuring that the selectional requirements on an argument to a predicate are in fact satisfied by the argument in the compositional process. The rules of coercion presuppose a typed ontology such as that outlined above. By allowing lexical items to coerce their arguments, we obviate the enumeration of multiple entries for different senses of a word. We define coercion as follows (Pustejovsky, 1995):

(10) **Type Coercion:** a semantic operation that converts an argument to the type that is expected by a function, where it would otherwise result in a type error.

The notion that a predicate can specify a particular target type for its argument is a very useful one, and intuitively explains the different syntactic argument forms for the verbs below. In sentences (11) and (12), noun phrases and verb phrases appear in the same argument position, somehow satisfying the type required by the verbs *enjoy* and *begin*. In sentences (13) and (14), noun phrases of very different semantic classes appear as subject of the verbs *kill* and *wake*.

(11a) Mary enjoyed <u>the movie</u>.
(11b) Mary enjoyed <u>watching the movie</u>.

(12a) Mary began <u>a book</u>.
(12b) Mary began <u>reading a book</u>.
(12c) Mary began <u>to read a book</u>

(13a) <u>John</u> killed Mary.
(13b) <u>The gun</u> killed Mary.
(13c) <u>The bullet</u> killed Mary.

(14a) <u>The cup of coffee</u> woke John up.
(14b) <u>Mary</u> woke John up.
(14c) <u>John's drinking the cup of coffee</u> woke him up.

If we analyze the different syntactic occurrences of the above verbs as separate lexical entries, following the sense enumeration theory outlined in previous sections, we are unable to capture the underlying relatedness between these entries; namely, that no matter what the syntactic form of their arguments, the verbs seem to be interpreting all the phrases as events of some sort. It is exactly this type of complement selection that type coercion allows in the compositional process.

Complex Types in Language

One of the more unique aspects of the representational mechanisms of GL is the data structure known as a complex type (or dot object), introduced to explain several phenomena involving the selection of conflicting types in syntax. There are well-known cases of container-containee and figure-ground ambiguities, where a single word may refer to two aspects of an object's meaning (cf. Apresjan, 1973; Wilks, 1975; Lakoff, 1987; Pustejovsky and Anick, 1988). The words *window, door, fireplace*, and *room* can be used to refer to the physical object itself or the space associated with it:

(15a) They walked through the door.
(15b) She will paint the door red.

(16a) Black smoke filled the fireplace.
(16b) The fireplace is covered with soot.

In addition to figure-ground and container-containee alternations, there are many other cases in natural language where two or more aspects of a concept are denoted by a single lexicalization. As with nouns such as *door*, the nouns *book* and *exam* denote two contradictory types; books are both physical form and informational in nature; exams are both events and informational.

(17a) Mary doesn't believe the book.
(17b) John bought his book from Mary.
(17c) The police burnt a controversial book.

(18a) John thought the exam was confusing.
(18b) The exam lasted more than two hours this morning.

What is interesting about the above pairs is that the two senses of these nouns are related to one another in a specific way. The apparently contradictory nature of the two senses for each pair actually reveals a deeper structure relating these senses, something that is called a dot object. For each pair, there is a relation that connects the senses, represented as a Cartesian product of the two semantic types. There must exist a relation *R* that relates the elements of the pairing, and this relation must be part of the definition of the semantics for the dot object to be well-formed. For nouns such as *book*, *disk*, and *record*, the relation *R* is a species of 'containment,' and shares grammatical behavior with other container-like concepts. For example, we speak of information **in** a book, articles **in** the newspaper, as well as songs **on** a disc. This containment relation is encoded directly into the semantics of a concept such as *book* – i.e., *hold*(*x, y*) – as the formal quale value. For other dot object nominals such as *prize*, *sonata*, and *lunch*, different relations will structure the types in the Cartesian product, as we see below. The lexical structure for *book* as a dot object can be represented as in (19).

(19)
$$\begin{bmatrix} \textbf{book} & \\ \text{ARGSTR} = & \begin{bmatrix} \text{ARG1} = \text{y: information} \\ \text{ARG2} = \text{x: phys-obj} \end{bmatrix} \\ \text{QUALIA} = & \begin{bmatrix} \text{FORM} = \text{hold (x,y,)} \\ \text{TELIC} = \text{read (e,w, x.y)} \\ \text{AGENT} = \text{write (é, v, x.y)} \end{bmatrix} \end{bmatrix}$$

Nouns such as *sonata*, *lunch*, and *appointment*, on the other hand, are structured by entirely different relations.

Recent Developments in Generative Lexicon

As the theory has matured, many of the analytic devices and the linguistic methodology of Generative Lexicon have been extended and applied to languages and phenomena well beyond the original scope of the theory. Cocomposition has been applied to a number of phenomena, particularly light verb constructions, with a fair amount of success, in Korean and Japanese (Lee *et al.*, 2003). Qualia structure has proved to be an expressive representational device and has been adopted by adherents of many other grammatical frameworks. For example, Jensen and Vikner (1994) and Borschev and Partee (2001) both appeal to qualia structure in the interpretation of the genitive relation in NPs, while many working on the interpretation of noun compounds have developed qualia-based strategies for interpretation of noun–noun relations (Johnston and Busa, 1996, 1997; Lehner, 2003; Jackendoff, 2003). Van Valin (2005) has adopted qualia roles within several aspects of RRG analyses, where nominal semantics have required finer grained representations.

Perhaps one of the biggest developments within the theory in recent years has been the integration of type coercion into a general theory of the mechanisms of selection in grammar (Pustejovsky, 2002, 2005). On this view, there are three mechanisms that account for all local syntagmatic and paradigmatic behavior in the grammar: pure selection, type exploitation, and type coercion.

The challenges posed by Generative Lexicon to linguistic theory are quite direct and simple: semantic interpretation is as creative and generative as syntax if not more so. But the process operates under serious constraints and inherently restrictive mechanisms. It is GL's goal to uncover these mechanisms in order to model the expressive semantic power of language.

See also: Argument Structure; Compositionality: Semantic Aspects; Computational Lexicons and Dictionaries; Lexical Conceptual Structure; Lexical Semantics: Overview; Lexicon: Structure; Syntax-Semantics Interface; Thematic Structure.

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Lexicon: Structure

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A lexicon is a bin for storing listemes, language expressions whose meaning is not determinable from the meanings (if any) of their constituent forms and that, therefore, a language user must memorize as a combination of form and meaning. The way that a lexicon is organized depends on what it is designed to do.

1. The traditional Indo-European desktop dictionary is organized into alphabetically ordered entries in order to maximize look-up efficiency for the literate user.
2. *Kitab al-Ayn*, the Arabic dictionary of Al Khalil Ben Ahmad, has a phonetically based listing, beginning with velars and ending with bilabials (Kniffka, 1994).
3. A grammar that requires random lexical entry according to morphological class needs to access a lexicon through the morphosyntactic category of the lexicon entry.
4. The hearer accesses the mental lexicon from the phonological or graphological form of the entry.
5. The speaker accesses the mental lexicon through the meaning. However, slips of the tongue suggest that access presents a choice among several activated forms, from among which the inappropriate ones need to be inhibited (Aitchison, 2003: 220).
6. Someone producing an alliteration (e.g., *around the rugged rocks the ragged rascal ran*) needs to access the onsets to phonological forms.
7. Someone looking for a rhyme needs to be able to access entries via the endings of the phonological form.
8. The meaning of one word can remind us of another with a similar or contrary meaning; this suggests that meanings in the lexicon must be organized into a network of relations similar to those in a thesaurus.

Summing up, a lexicon must be accessible from three directions – form, morphosyntax, and meaning – none of which is intrinsically prior.

Formal specifications include graphological specification such as alternative spellings, hyphenation location, and use of uppercase. The phonological specification includes information on alternative pronunciations, syllable weight and structure, and the relative pitch and/or tone of the various syllables.

Morphosyntactic specifications include morphological and syntactic properties such as the inherent morphosyntactic (lexical) category of the item. Traditionally, the nouns *helicopter* and *move* and the semantically related verbs *helicopter* and *move* are all different listemes; yet, despite their different syntactic properties and concomitant meaning differences, the transitive verb *move* and the intransitive verb *move* traditionally share the same polysemous dictionary entry under different subheadings. The *COBUILD English dictionary* lists all forms of a listeme; for example, for *clear* it has *clearer, clearest, clears, clearing, cleared* (not divided between Adj and V listemes). Derived words are either generated from the listeme by morphological rules (e.g., Adv *clearly* from Adj *clear*) or else listed as distinct listemes. Should dictionaries list just morphemes or every word form, including inflected forms, or something in between? For various views see Butterworth (1983), Flores d'Arcais and Jarvella (1983), Altman (1990), Altman and Shillcock (1993), Allan (2001), and Aitchison (2003). Regularities need to be signaled, for example, the declension and gender of Latin nouns and the conjugation of verbs. So, too, must irregularities be signaled, for example, the past tense of English strong verbs, and constraints on range such as an object NP can interrupt the V + vPrt of some phrasal verbs (*run* NP *down*; 'denigrate NP') but not others (*put* *NP *up with*; 'endure NP').

Semantic specifications identify the senses of a listeme based on the salient characteristics of its typical denotatum (*see* **Stereotype Semantics**). The form of the semantic specification depends on the preferred metalanguage (*see* **Metalanguage versus Object Language; Cognitive Semantics; Dynamic Semantics; Frame Semantics; Lexicon, Generative; Lexical Conceptual Structure; Natural Semantic Metalanguage**). Boguraev and Briscoe (1989: 5) add encyclopedic knowledge to the list of semantic specifications, and many lexicographers would agree that a lexicon should also be a cultural index; thus, the *Collins English dictionary* (Hanks, 1998), *New Oxford dictionary of English* (Pearsall, 1998), and *Collins English dictionary* (Butterfield, 2003) list encyclopedic information about bearers of certain proper names (on the networked relationship between lexicon and encyclopedia, *see* **Dictionaries and Encyclopedias: Relationship**).

Bauer (1983: 196) proposed a category of 'stylistic specifications' to distinguish among *piss, piddle*, and *micturate* to reflect the kind of metalinguistic information found in traditional desktop dictionary tags such as 'colloquial,' 'slang,' 'derogatory,' 'medicine,' and 'zoology.' Such metalinguistic information is more appropriate to the encyclopedia entry directly

connected with every lexicon entry. The encyclopedia will also supply etymological information, which is not essential to the proper use of the listemes, and an account of the connotations (*see* **Connotation**) of listemes, which is.

Bauer also suggested a signaling of 'related lexemes' such as that *edible* is related to *eat*. This should be identified through the semantic specification, which will differentiate the sense of *edible* from *eatable* (cf. Lehrer, 1990: 210). Contraries and antonyms are linked to a listeme via its semantic field (*see* **Lexical Fields**). Metalanguage terms used in semantic specifications are often semantically identical with object language listemes; for example, Pustejovsky (1995: 101) specified *book* as a "physical object" that "holds" "information" created by someone who "write[s]" it and whose function is to be "read." Certainly, there is a relation among *book*, *write*, and *read* that needs to be accounted for either in the semantic specification or the associated encyclopedia entry. Used in the morphosyntactic specifications, such category terms as *noun, verb*, *adjective*, and *feminine* are part of the metalanguage, not the object language. But they also appear in the lexicon as expressions in the object language. Suppose that the sense 'typically names a person, place, thing or abstract entity' has an address in the lexicon (this is explained later). Next, suppose that in the lexicon of English, one form at this address is *noun*; in the lexicon of French, one form at this address is *nom*; and in the lexicon of Greek, it is *όνομα*. Suppose that in the lexicon of the metalanguage there is a form N at this same address. This move simply reflects the well-known and widely accepted fact that there are translation (near) equivalences between the object language and metalanguage, just as there are between different natural languages. The lexicon is used in string matching among formal specifications, such as retrieving all listemes beginning with /d/ or those rhyming with *cord*. Similarly, a search of the morphosyntactic specification of every entry is the best way to compile a list of all nouns in the lexicon. And the semantic specification of a listeme will locate it within its semantic field and relate it to superordinate items, contraries, antonyms, and the like. Many of these relations are not primarily lexical but arise from the relationships characteristic of the denotatum of a listeme; for example, because a cat is perceived to be a kind of animal, the listeme *animal* is semantically superordinate to the listeme *cat*. Any two listemes may be connected through their formal, morphosyntactic, and/or semantic specifications in the lexicon and through the stylistic or etymological properties identified in the encyclopedia.

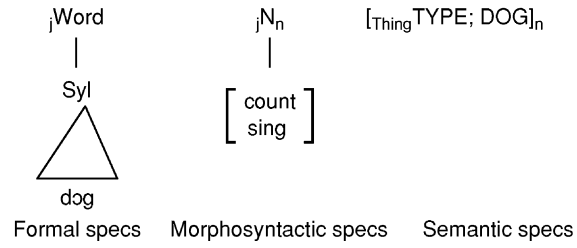

Figure 1 Jackendoff-style lexicon entry for *dog*.

Lyons (1977: 516) suggested that each lexicon entry be assigned a random number that serves as its address for access through any of the three modes. This proposal is very similar to one in Jackendoff (1995; 1997: 89), which "licence[s] the correspondence of certain (near-) terminal symbols of syntactic structure with phonological and conceptual structures" (*see* **Lexical Conceptual Structure**). Jackendoff proposed that a lexicon entry has the three parts, as shown in Figure 1, where they are tagged with our specification types.

In Jackendoff's theory, the morphosyntactic specification is the linchpin that is co-indexed $_j$ with the formal specification on the left-hand side and the subscript $_n$ of the semantic specifications on the right. This seems correct. If we ask someone the meaning of the word *fly* (which is many ways ambiguous), two possible answers are 'travel though the air' (V) and 'cloth cover for an opening' (N). Similarly, the word *dog* means 'canine animal' (N) and 'follow dog-like' (V). The word *canine* means 'a member of the dog family' (N) and 'pertaining to the dog family' (Adj). The difference between such pairs is indicated by the combination of formal and morphosyntactic specification – which corresponds to Jackendoff's subscript $_j$ in Figure 1. This distinguishing factor is exactly the reason that a traditional desktop dictionary identifies the morphosyntactic category immediately after identifying the form of a listeme. Example (1) shows how much morphosyntax contributes to meaning.

(1) the toves gimbled in the wabe

In this example, *toves* is clearly a plural noun and therefore denotes more than one entity, *gimbled* is the past tense of a verb and so denotes some act or state of the toves, and *wabe* is a noun – and, because it falls within the scope of the preposition *in*, *wabe* identifies a place or time. Thus, the morphosyntactic specification of these words gives us some meaning to work on, as suggested by Jackendoff's subscript $_n$ in Figure 1. In addition, the form distinguishes between the nouns *tove* and *wabe*.

For the speaker, the main function of the lexicon is to find a form to express the intended meaning – but

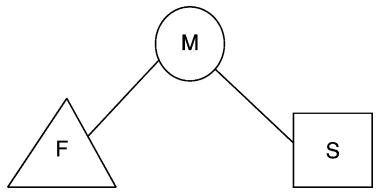

Figure 2 Networked components of an entry in the hypothetical lexicon. F, formal specs; M, morphosyntactic specs; S, semantic specs.

not just a form; it should also find its morphosyntactic category, which is often at least partly determined by the content. For instance, a reference to a thing will usually require using a noun; a reference to an event will usually require a verb. Except when parroting a phrase, it is impossible when speaking a language to use a form without assigning it a morphosyntactic specification. It is impossible to assign a morphosyntactic specification to a meaning without also assigning it a form (the appropriate form for a zero morph is, of course, null). Someone who asks *what's the word that means 'get back at'?* may not be able to retrieve the form *retaliate*, but the intended meaning is conveyed using the forms of other lexemes. In terms of Figure 1, the speaker goes from the subscript $_n$ on the semantic specification to the morphosyntactic specification $_jN_n$ that links to the formal specification through the $_j$ subscript. For the hearer, the main function of the lexicon is to attach meaning to forms that normally occur within syntactic structures, so it is a matter of finding a semantic specification for something that is both formally and morphosyntactically specified. In terms of Figure 1, the hearer goes from $_j$ to $_n$.

Jackendoff's subscripts correspond to connection points for bidirectional lines in a network as in Figure 2, which shows that their sequence with respect to the formal specifications (F), morphosyntactic specifications (M), and semantic specifications (S) is a convention without substance; that is, $_fF = F_f$ and so forth. Suppose there are the grossly oversimplified components in Table 1. The formal and semantic addresses are randomly selected numbers, tagged with $_f$ and $_s$, respectively.

Table 1 ignores (1) the fact that the semantic specifications must somehow reflect the facts that a dog is an animal, a living thing, and a physical object and (2) the need to identify the kind of countable and uncountable environments in which a noun can conventionally occur; the thematic structure, valency, or frame of a verb; and the gradability of an adjective. In Figure 3, which represents a part of this network of relations, the question of how the graphological and phonological forms should be correlated is not accounted for.

Table 1 Partial entries for *dog* and *canine*[a]

F	*M*	*S*
$_{f8899}$*dog*	$_{f8899}$N$_{s0017}$	**dog**$'_{s0017}$
	$_{f8899}$V$_{s3214}$	**follow_like_a**$__{s}$0017$'_{s3214}$
$_{f7656}$*canine*	$_{f7656}$N$_{s7439}$	**conical_pointed_tooth**$'_{s7439}$
	$_{f7656}$Adj$_{s1227}$	**pertaining_to_a**$__{s}$0017$'_{s1227}$

[a]F, formal specs; M, morphosyntactic specs; S, semantic specs.

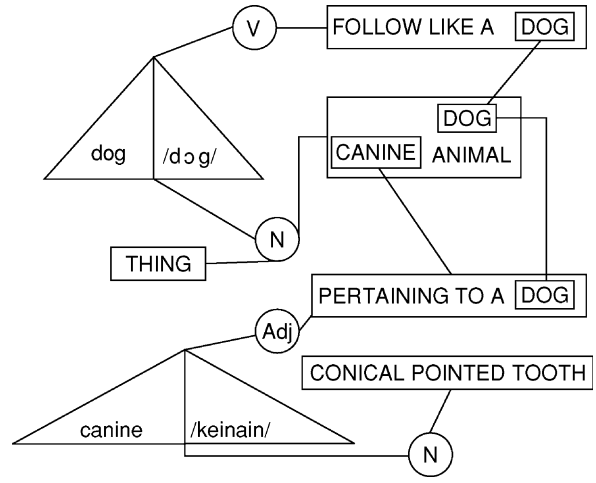

Figure 3 Part of the network for the lexicon entries for *dog* (N and V) and *canine* (N and Adj).

The form of a lexicon entry is a co-indexed tripartite network in which the indices correspond to bidirectional connectors between the components of a lexicon entry, as shown in Figure 2. Each of the formal, morphosyntactic and semantic specifications is also linked with the encyclopedia (*see* **Dictionaries and Encyclopedias: Relationship**). Such connectors model cognitive pathways that presumably have a neurological basis and could be empirically disconfirmed (e.g., by studies of aphasics). There is evidence for a spreading activation along pathways within the mental lexicon that leads to selection among partial matches between meaning and form for the appropriate listeme (Altman, 1990; Levelt, 1993; Aitchison, 2003). There is, of course, nothing to be gained by rewriting desktop dictionaries in terms of networks if they are going to be consulted in the same way human beings have consulted them in the past.

See also: Cognitive Semantics; Connotation; Dictionaries and Encyclopedias: Relationship; Dynamic Semantics; Formal Semantics; Frame Semantics; Lexical Conceptual Structure; Lexical Fields; Lexicon, Generative; Metalanguage versus Object Language; Natural Semantic Metalanguage; Polysemy and Homonymy; Semantics in Psychology; Speech Errors: Psycholinguistic Approach; Stereotype Semantics; Word Recognition, Written.

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Lhuyd, Edward (ca. 1660–1709)

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The first Celtic scholar in the modern sense, Edward Lhuyd was familiar with all the insular Celtic vernaculars, and it was his systematic analyses of the phonological relationships between them and continental Celtic that justified the use of the term 'Celtic' as a linguistic category. More generally, the theory and methodology that underpin his study of language relationships are significant contributions to European comparative philology.

Edward Lhuyd (or Lhwyd, the Welsh form of his family name Lloyd, which he adopted about 1690), the illegitimate son of Edward Lloyd, last squire of the bankrupt estate of Llanforda, Oswestry, Shropshire, England, and of Bridget Pryse, daughter of a cadet branch of the influential Pryse family of Gogerddan, Cardiganshire, Wales, was born about 1660 and raised in Shropshire where he lived with his father at Llanforda. The Lloyds were an old Oswestry family who had been patrons of poets and harpists and who had played their part in local administration, but none of these activities survived the English Civil Wars (1642–1646, 1650–1651). Edward Lloyd, in spite of his reputation as being both reckless and dissolute, is an interesting example of 17th-century scientific culture. He was an enterprising horticulturalist, carried out his own chemical experiments, and was patron to an experienced professional gardener and field botanist, Edward Morgan. Relationships between father and son were often strained, but Lhuyd regarded the aging Morgan as one of his tutors, and there is no doubt that he took an interest in his father's experiments. Following his father's death, Lhuyd went to Jesus College, Oxford, in 1682 to begin his training in law, but practical botany and related field work, which he had already undertaken in north Wales and around Oswestry, and chemical and other experiments at Llanforda led him to the recently established Ashmolean Museum and to the meetings of the Oxford Philosophical Society. Robert Plot, professor of chemistry and Keeper of the Museum, was sufficiently impressed by the young man's skills and ideas to appoint him as an assistant at the Ashmolean, where, in turn, he became Keeper in 1691. Lhuyd threw himself into the work of the museum – cataloguing library accessions, seeking out new samples to enrich the fossil collections (his catalogue of British 'formed stones' appeared in 1699), and developing his knowledge of flora habitats, especially the Alpine plants of Snowdonia, north Wales, where he discovered *Lloydia serotina*, the

Ælfric (fl. 987–1010)

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Recognized as the greatest Old English prose stylist, Ælfric is also the author of the first grammar in English. In 987 he went as master of novices to the monastery of Cernel (modern Cerne Abbas, Dorset), already in orders, and thus he was at least 30 years of age. He had been a pupil of the reforming Bishop Æthelwold in the school at Winchester. With his contemporary Wulfstan, Archbishop of York (obit. 1023), he was one of the two most prominent literary figures of the Benedictine Reform. His production of the *Catholic Homilies* belongs to the period 990–995, that of the *Lives of Saints* was no later than 998, and he became the first Abbot of Eynsham, near Oxford, in 1005.

His work in language education includes the grammar, a glossary, and the *Colloquy on the Occupations*. The first of these works is the *Excerptiones de arte grammatica anglice*, designed to introduce junior students to the Latin grammar. It is based on the *Excerptiones de Prisciano*, a Latin treatise of the 9th century, compiled from the 6th century *Institutiones grammaticae* of Priscian, and like it concentrates on Latin syllabification, graphology, phonology, parts of speech, and morphology. The *Glossary* is a compilation of Latin vocables with Old English glosses. The *Colloquy* is an imaginary Latin dialogue between a master and his pupils, who represent themselves as having various occupational roles, the ploughman, the huntsman, the fisherman, and so forth. Each describes the habits and rigors of the occupation, sometimes sympathetically.

Ælfric's other extant works include the *Catholic Homilies*; the *Lives of Saints*; a *De temporibus anni*; and a collection of letters, most notably one to the bishop of Sherborne, Wulfsige, and two to Archbishop Wulfstan, designed as expert responses to theological questions. His prose is remarkably lucid in comparison with that of some authors of the period. Parts of his work are rendered in a heightened style that has been called *rhythmic prose*, which in its metrical regularity shares some of the characteristics of Old English verse but is distinct from it. His work has long been taken as the exemplar of the Late West Saxon historical and regional dialect.

The *Catholic Homilies* were produced in two series that together comprise alternate English sermons for Sundays and saints' days. Like the grammar, however, they are based on a Latin exemplar, the late 8th century *Homiliary* of Paul the Deacon, which was created for reading in the monastic offices. The *Lives of Saints* are English versions of lives and martyrdoms for saints celebrated in the monastic liturgy, mainly taken from a 9th century Latin collection. The *De temporibus anni* inculcates the chronology necessary for the calculation of the Easter date.

See also: Christianity and Language in the Middle Ages; Christianity, Catholic; English, Old English; Grammar, Early Medieval; Language Education: Grammar; Language Education: Vocabulary; Language Teaching: History; Latin Lexicography; Latin; Learners' Dictionaries; Priscianus Caesariensis (d. ca. 530); Roman *Ars Grammatica*; Traditional Grammar.

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Affixation

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Definition

An affix is a bound morph that (1) is not a root and (2) is a constituent of a word rather than of a phrase or sentence. Some examples that follow illustrate the implications of (1) and (2). The next section surveys the kinds of affixation that occur, and the last sections discuss theoretical issues.

In most complex words, identifying a root (or roots, if the word is a compound) presents little difficulty. For example, in the words *misfortunes* and *premeditated*, the roots are clearly *fortune* and

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Edward Lhuyd (or Lhwyd, the Welsh form of his family name Lloyd, which he adopted about 1690), the illegitimate son of Edward Lloyd, last squire of the bankrupt estate of Llanforda, Oswestry, Shropshire, England, and of Bridget Pryse, daughter of a cadet branch of the influential Pryse family of Gogerddan, Cardiganshire, Wales, was born about 1660 and raised in Shropshire where he lived with his father at Llanforda. The Lloyds were an old Oswestry family who had been patrons of poets and harpists and who had played their part in local administration, but none of these activities survived the English Civil Wars (1642–1646, 1650–1651). Edward Lloyd, in spite of his reputation as being both reckless and dissolute, is an interesting example of 17th-century scientific culture. He was an enterprising horticulturalist, carried out his own chemical experiments, and was patron to an experienced professional gardener and field botanist, Edward Morgan. Relationships between father and son were often strained, but Lhuyd regarded the aging Morgan as one of his tutors, and there is no doubt that he took an interest in his father's experiments. Following his father's death, Lhuyd went to Jesus College, Oxford, in 1682 to begin his training in law, but practical botany and related field work, which he had already undertaken in north Wales and around Oswestry, and chemical and other experiments at Llanforda led him to the recently established Ashmolean Museum and to the meetings of the Oxford Philosophical Society. Robert Plot, professor of chemistry and Keeper of the Museum, was sufficiently impressed by the young man's skills and ideas to appoint him as an assistant at the Ashmolean, where, in turn, he became Keeper in 1691. Lhuyd threw himself into the work of the museum – cataloguing library accessions, seeking out new samples to enrich the fossil collections (his catalogue of British 'formed stones' appeared in 1699), and developing his knowledge of flora habitats, especially the Alpine plants of Snowdonia, north Wales, where he discovered *Lloydia serotina*, the

'Snowdon lily,' sometime before 1696. Typical of his time, Lhuyd did not draw lines of demarcation between disciplines; he was as interested in antiquities, onomastics, and languages as in paleontology and botany, seeing them all as aspects of history, natural and human. These interests were brought together in 1693 when he was invited to revise the entries on the Welsh counties in Edmund Gibson's new English edition of Camden's *Britannia* (1695). The field work Lhuyd undertook whetted his appetite, and he welcomed an invitation by 'some gentlemen in Glamorganshire' to write a 'British Dictionary, Historical and Geographical . . . and a Natural History of Wales.' He seized the opportunity to undertake an extended tour of 'Celtic Britain' (Wales, the Scottish Highlands, Ireland, Cornwall, and Brittany) from 1697 to 1701 to gather material for an ambitious series of books bearing the general title *Archaeologia Britannica*. The invitation was not fortuitous, as Lhuyd's broadening interests in antiquities and language as a tool for historians were well known. He had already collaborated with John Ray in the latter's *Collection of English words not generally used* (1691) in a discussion on the similarities between some north-country English dialect words and Welsh, a discussion that reveals Lhuyd's familiarity with current linguistic thinking and questions of language contact. He began learning Irish about this time, and linguistic queries were increasingly being put to him. Lhuyd's tour with his four assistants produced a remarkable collection of raw data – samples of flora and fauna, descriptions of parishes, antiquities and customs, collections of literary manuscripts and transcripts, dictionaries and wordlists, and transcriptions of spoken vernacular material. Lhuyd analyzed much of the linguistic data on his return to Oxford in 1701 and in 1707 saw the publication of *Glossography*, volume I of *Archaeologia Britannica*, the only part to appear. He died two years later, in 1709.

The underlying theme of Lhuyd's project was historical, one of his aims being to present a 'Clearer Notion of the first Planters of the Three Kingdoms [Wales was subsumed within the crown of England] and a better understanding of our Ancient Names of Persons and Places.' The language of place-name elements and naming compounds would indicate the peoples responsible for their creation, and knowledge of the 'original' languages of Britain, their inscriptions, and early literatures was a necessary skill for the historian. *Glossography*, therefore, contained grammars of Irish, Breton, and Cornish (Welsh was already catered for) together with dictionaries of Breton, Welsh, and Irish (Lhuyd's Cornish dictionary was set aside in the expectation that another was being prepared, but it remains in manuscript). But even more important than language skills was the recognition that the key to the history lay in the vocabulary of these languages; an analysis of the phonology of words in the cognate 'original' languages would reveal their affinities while borrowings were an indicator of contacts between their speakers. Etymology was already an accepted tool of historical linguistics, but without a rational framework to categorize sound changes, it was prone to deteriorate into meaningless comparisons of superficially similar words in any two or three languages. Lhuyd's major contribution was to reduce the arbitrary element in etymology by formulating criteria for examining and recognizing regular phonetic correspondence and determining what languages might bear valid comparison. These criteria he set out in the opening chapter of *Glossography*, 'Comparative Etymology, or Remarks on the Alteration of Letters.' His guidelines for etymology are reasoned, e.g., identity of signification, declensions, and conjugations are proper to individual languages, old or obsolete words may be found in modern dialects, the words to be compared should be the oldest and most simple, the obvious and necessary. Lhuyd argued that languages develop from a parent by changes in the sense of words, by an accidental transposition of sounds or syllables, by the addition or loss of syllables, by the use of different prefixes or suffixes, by mispronunciation, and by borrowings; and he then worked through a host of examples according to a number of 'observations' summarized under 10 headings, including seven classes of phonetic change. Lhuyd's reasoned analysis of *permutatio litterarum* allowed him to define better than ever before the relationship of Irish, Welsh, and 'Gaulish.' Most of Lhuyd's criteria for language change were phonological; he realized that different orthographical conventions in the various languages could mislead the etymologist. He devised his own phonetic alphabet, a 'general alphabet' to facilitate genuine comparison between languages. In this, as in his methodology of comparative linguistics, Edward Lhuyd was a pioneering forerunner of the Celtic studies and linguistic scholarship of the 19th century.

See also: Breton; Cornish.

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Li Fang-Kuei (1902–1989)

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Fang-Kuei Li was one of the foremost scholars of Thai and Sino-Tibetan studies and a major contributor to Amerind studies. Born in China, he was one of the early scholars sent to the United States to study. He had developed an interest in language while learning English, Latin, and German as part of his studies in China, and so he decided to study linguistics in the United States. In 1924, he went to the University of Michigan at Ann Arbor, receiving his B.A. 2 years later, then moved to the University of Chicago, where he received his M.A. and Ph.D., studying with Edward Sapir, Leonard Bloomfield, and Carl Darling Buck.

Sapir had the greatest influence on Li. From Sapir he learned phonetics, field methods, and about the languages of Native Americans. Sapir also encouraged Li to read articles on East and Southeast Asian languages. It was Sapir's influence that led Li to take up Thai, Sino-Tibetan and Amerind linguistics. In 1927, Sapir took Li to California to do field work. At first they worked together, but then Sapir sent Li off on his own to work on the Mattole language. There were only two Mattole Indians left at that time, and Li's notes, which he later used as the basis of his Ph.D. dissertation, are the only record of that language.

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After returning to North America in 1929, Li spent 3 months living on an island in the middle of the McKenzie River north of the Arctic Circle doing fieldwork on the Hare language.

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Li married Ying Hsu in 1932 and later had three children, Lindy, Peter, and Annie.

In 1933, Li went to Thailand to learn Classical Thai, then went to Guangxi to study the Tai languages there. This led to some of his major contributions. Li returned to the United States in 1937 to be a visiting professor at Yale for 2 years, then spent the war years in southwest China, the years 1943–1946 as a visiting professor at the relocated Yanjing University in Chengdu. In 1946, he returned again to the United States, accepting visiting professorships at Harvard, for 2 years, and Yale, for 1 year. In 1949, Li accepted a job at the University of Washington in Seattle and stayed there until he retired in 1969, then accepted an appointment at the University of Hawaii at Manoa, where he stayed until 1974, retiring a second time. Though he retired from teaching, Li continued doing research and publishing. In all he authored nine books and over 100 articles.

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Liberia: Language Situation

Editorial Team

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Liberia, one of Africa's oldest republics, has a population of 3 390 635 (July 2004 estimate) over an area of 111 370 sq km. It is located in western Africa, bordering the North Atlantic Ocean, between Ivory Coast and Sierra Leone in a terrain that consists of mostly flat to rolling coastal plains, rising to rolling plateau and low mountains in the northeast. It shares land borders with Guinea (563 km), Ivory Coast (716 km), and Sierra Leone (306 km).

Table 1 Number of speakers according to language

Group	*Language*	*Number of speakers (1991 est.)*
Mel	Gola	99 300
	Kisi	115 000
Mande	Bandi	70 000
	Dan	200 000
	Kpelle	487 400
	Loma	141 800
	Mano	185 000
	Manya	45 400
	Mende	1970
	Vai	89 500
Kru	Bassa	347 600
	Dewoin	8100
	Gbii	5600
	Glaro-Twabo	3900
	Grebo dialects	193 200
	Klao	184 000
	Krahn dialects	47 800
	Kuwaa	12 800
	Sapo	31 600
	Tajuasohn	9600

Although Liberia was founded by freed American slaves, 95% of the population is now composed of indigenous Africans of the ethnic groups Kpelle, Bassa, Gio, Kru, Grebo, Mano, Krahn, Gola, Gbandi, Loma, Kisi, Vai, Dei, Bella, Mandingo, and Mende. The descendants of slaves only make up the remaining 5% of the population, equally divided between the Americo-Liberians (descendants of American slaves) and the Congo People (descendants of Caribbean slaves).

The official language is English, although only 20% of the population speak it. Most Liberians speak one or more of the 29 African languages spoken in the country, a few of which are written and are used in correspondence. All languages of Liberia are Niger-Congo languages, and they belong to one of three groups within that family: Mande, Kru, or Mel (**Table 1**).

Literacy rates have shown great improvement in the last decade, with a total adult literacy of 57.5% in 2003 compared to 25% in 1989. Of this, 73.3% are men and 41.6% women.

See also: Kru Languages; Mande Languages; Niger-Congo Languages.

Language Maps (Appendix 1): Map 18.

See also: Bloomfield, Leonard (1887–1949); Sapir, Edward (1884–1939); Sino-Tibetan Languages; Tai Languages.

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Language Maps (Appendix 1): Map 18.

Libya: Language Situation

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The Great Socialist People's Libyan Arab Jamahiriya (i.e., 'state ruled by the masses') is a country of 1.77 million square kilometers on the southern Mediterranean coast, in North Africa. More than 90% of the country is desert or semi-desert, and the majority of the population live along the 1750-kilometer-long coastal strip. Libya borders on Tunisia and Algeria in the west, Chad and Niger in the south, and Egypt and Sudan in the west.

The sole official language of Libya is Arabic, and this is also the first language of the large majority of the 5.5 million Libyans. Like many countries in the Arab-speaking world, Libya is in a diglossic situation, in which Modern Standard Arabic (Arabic, Standard), which is used only as a second language, is used in education, in the media, for writing, and in some formal situations, while different Libyan dialects of Arabic are used for daily communication. In the south and in the west of the country, Berber-speaking communities are found, including 140 000 speakers of Nafusi in western Libya and 25 000 Tuaregs, speaking Hoggar and Ghat dialects of Tamahaq (Tamahaq, Tahaggart) (or Tamasheq). Ghadamès, Awjilah, and Sawknah are smaller Berber languages, and the last two may be extinct.

The language of education is Arabic, and literacy in Arabic has significantly increased during the last decade, from 68.1% in 1990 to 81.7% in 2002. However, there is an imbalance between literacy of females (70.7%) and males (91.8%). English is the most widely taught foreign language and is used as a language of instruction in some parts of tertiary education.

Italian, the language of the former colonial power, while still used in business, plays no part in the wider public life, government, or the education system, partly as a result of a strong Arabization program following the revolution in 1969, during which legal decrees ensured that street signs, shop windows, signboards, traffic signs, etc., were written in Arabic.

The media in Libya use Arabic in print and broadcasting. An international edition of *Al-Fajir al-Jadid* is published fortnightly in English, and the external radio service Voice of Africa broadcasts in Arabic, English, and French.

See also: Arabic; Berber.

Language Maps (Appendix 1): Map 7.

Liechtenstein: Language Situation

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The tiny Principality of Liechtenstein is sandwiched between Austria to the east and Switzerland to the west. The official language of Liechtenstein is German, and it is in fact the only country in the world where German is the only official language. Liechtenstein is in a diglossic situation: while the official language is standard German – including the 1998 spelling reform to which Liechtenstein is party – the spoken language is an Alemannic dialect of German, similar to the German spoken in Switzerland. There is some dialectal variation, and in particular the dialect of Triesenberg stands apart as a distinct conservative variety of Walser Alemannic, whose speakers came to Liechtenstein around 1300 from the western Swiss canton of Wallis.

In addition to the local variety of German, a number of other languages are spoken by foreign residents who comprise more than one-third of the total population (34% of 34 294 in 2003). The majority of foreign residents are from other German-speaking countries, from Switzerland (10.8% of the total population), Austria (5.9%), and Germany (3.4%), and also from Italy (3.3%), countries of the former Republic of Yugoslavia (3.3%), and Turkey (2.6%).

The language of education is German, while Latin, French, English, and Spanish are offered as foreign languages in schools. There are two German-language newspapers, the *Liechtensteiner Vaterland* and the *Liechtensteiner Volksblatt*, and a

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The tiny Principality of Liechtenstein is sandwiched between Austria to the east and Switzerland to the west. The official language of Liechtenstein is German, and it is in fact the only country in the world where German is the only official language. Liechtenstein is in a diglossic situation: while the official language is standard German – including the 1998 spelling reform to which Liechtenstein is party – the spoken language is an Alemannic dialect of German, similar to the German spoken in Switzerland. There is some dialectal variation, and in particular the dialect of Triesenberg stands apart as a distinct conservative variety of Walser Alemannic, whose speakers came to Liechtenstein around 1300 from the western Swiss canton of Wallis.

In addition to the local variety of German, a number of other languages are spoken by foreign residents who comprise more than one-third of the total population (34% of 34 294 in 2003). The majority of foreign residents are from other German-speaking countries, from Switzerland (10.8% of the total population), Austria (5.9%), and Germany (3.4%), and also from Italy (3.3%), countries of the former Republic of Yugoslavia (3.3%), and Turkey (2.6%).

The language of education is German, while Latin, French, English, and Spanish are offered as foreign languages in schools. There are two German-language newspapers, the *Liechtensteiner Vaterland* and the *Liechtensteiner Volksblatt*, and a

radio provider, but most media, and all TV, come from outside Liechtenstein.

See also: German; Switzerland: Language Situation.

Language Maps (Appendix 1): Map 140.

Bibliography

Stricker H, Banzer T & Hilbe H (1999). *Liechtensteiner Namenbuch* (6 vols). Vaduz: Historischer Verein für das Fürstentum Liechtenstein.

Lillovet *See:* Salishan Languages.

Limits of Language

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One thing that language (to the sense of which notion we will return in a moment) obviously does well is express things. In particular, it can be used to express information, often of a very complex kind. It might therefore be wondered whether there are limits to this: is there any kind of information that cannot be expressed in language (Alston, 1956)? It is not uncommon to hear it said that there is of course such information: one cannot express the taste of a peach, or the color red. But obviously one ***can*** express such things. The color red is – what else? – red. What is usually meant by inexpressibility claims, say, about redness, is that there is nothing that can be said in words that will conjure up the mental image of red for someone who has never experienced this before. Maybe so. But to identify meaning with such images, though a natural enough view, is hardly tenable. As the 20th-century Austrian philosopher Ludwig Wittgenstein pointed out in the *Philosophical investigations* (Wittgenstein, 1953), there are many words and phrases that conjure up no such images; and if a person is able to use a word correctly in the company of others, what mental images they are experiencing, if, indeed, any at all, is quite immaterial. Their words are meaningful, and so convey their information, in the usual way. (Private images are irrelevant to public meaning.)

It is sometimes claimed that representations such as pictures, maps, and diagrams can convey information that cannot be captured verbally. No doubt they can often express information more effectively, but it is hard to find examples of information expressible only in this way (especially once one has jettisoned the view that mental imagery has any intrinsic connection with meaning). And, in any case, it is natural enough to think of representations of this kind as languages. It seems profitless (to me, anyway) to dispute over whether or not such things *really* are a language. They share with verbal language at least this: they are structured forms of representation that can be used to convey information of a kind that may never have been expressed before. If, therefore, we are looking for information that cannot be represented, we will have to look elsewhere.

It is presumably uncontentious that relative to most – maybe all – systems of representations there will be information that cannot be expressed. Thus, a medieval monk did not have the conceptual resources to speak about microchips and quantum fields. It can still, of course, be represented by some other system – maybe the old one augmented by the appropriate concepts. Similarly, relative to any abstract system of representations, there are likely to be things that can be represented, but that, because of their computational complexity, outstrip the resources available to a human brain, and so are inaccessible. These things could become accessible with the help of a different form of representation, however. (Thus, the multiplication of numbers using Roman numerals is computationally much harder than multiplication using Arabic numerals.) The interesting question is whether there is information that is not just unrepresentable because of contingent constraints of this kind but whether there is information that is essentially so. If there is, it is unlikely that this will be demonstrable without appeal to some substantial metaphysical views.

One such view concerns the nature of God. In certain kinds of Christian theology, God is taken to

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be so different in kind from anything that humans can conceive of that no human concepts can be correctly applied to Him. Because all language deploys only such concepts, the true nature of God cannot be expressed in language (Alston, 1998).

The claim that the nature of God is ineffable is sometimes buttressed by other considerations, especially in the Neo-Platonist tradition. God, it is claimed, is the ground of all beings. That is, He is that which creates and sustains all beings. As such, He is not Himself a being: not a *this* rather than a *that*. His nature cannot, therefore, be communicated in words: to say anything about Him would be to say that He is a this, rather than a that, and so treat Him simply as another being.

The thought that beings have a ground of this kind is not restricted to Christianity but seems to be a perennial one. It is found in Neo-Platonism (Christian and non-Christian), in which the One plays this role (O'Meara, 1993); it is found in Hinduism, in which Brahman plays this role; it is found in Taoism, in which the Tao plays this role (Lau, 1982); it is found in the writings of the 20th-century German philosopher Martin Heidegger, in which Being (*Sein*) plays this role (Krell, 1977).

A closely related, but different, view is that there is a fundamental or ultimate reality such that the reality that we perceive or conceive is obtained by the imposition of a conceptual grid thereupon. To say what it is like, in itself, is therefore impossible, as anything said about it will deploy our conceptual grid, which is simply a superposition. Again, the existence of such a reality seems a perennial thought. It is the role played by chora (χωρα) in Plato's *Timaeus;* it is the role played by ultimate reality (emptiness, **śūnyatā**) in various branches of Mahayana Buddhism, especially Yogacara (Williams, 1998). Indeed, when Taoism and Indian Mahayana fused to give Chan (Zen), this theme merged with the previous one. Fundamental reality (Buddha nature) can be appreciated only via a direct experience. It is a simple 'thusness' or 'suchness,' beyond all words (Kasulis, 1989).

In some ways, the views of the 18th-century German philosopher Immanuel Kant, as expressed in his *Critique of pure reason* (Kemp Smith, 1923) are similar. For Kant, the empirical world is not independent of us but is partly constituted by our mental concepts. These include the forms of space and time. More particularly for present concerns, these include the logical categories that we apply when we make judgments (such as *all/some, is/is not*). These categories, moreover, depend for their applicability on temporal criteria. Reason forces us, however, to think (about) reality as it is in itself, independent of our mental constructions 'things in themselves' (*dinge an sich*). And because such things are outside time, there is no way that we can apply our categories to them, and so make judgments about them. Thus, although we are forced to recognize the existence of such a reality, there is nothing that can be said about it.

About a century and a half later, but for quite different reasons, Wittgenstein ended up in a similar situation when he wrote the *Tractatus logico-philosophicus* (Pears and McGuinness, 1961). For Wittgenstein, reality is constituted by certain states of affairs; these are composed of objects configured in certain ways. Language, on the other side of the fence, is constituted by propositions; these are composed of names configured in certain ways. A proposition represents a state of affairs if the names in it correspond to the objects in the state, and the configuration of names in the proposition is isomorphic to (has the same form as) the configuration of objects in the state. (This is the so-called picture theory. Wittgenstein is reputed to have been provoked into it by noting how the icons in a scale-representation work.)

It is a consequence of this view that any situation that is not a configuration of objects cannot be expressed in a proposition. Indeed, attempts to do so will produce semantic nonsense. Such situations cannot, therefore, be described. An irony of this is that Wittgenstein's theory itself requires him to talk, not just of objects but also of propositions, configurations, form; and for various reasons these cannot be objects. (For example, propositions can be asserted or denied; objects cannot. And the form of a state of affairs is not one of the objects in it: it is the way that those objects are structured together.) His own theory is therefore an attempt to do the impossible. This triggers the spectacular dénouement to the *Tractatus,* in which Wittgenstein pronounces his own theory to be nonsense.

The final considerations that I will mention that drive toward things inexpressible concern the infinite, as it is understood in modern logic and mathematics (Moore, 1985). According to this, there are different sizes of infinity. The smallest of these, *countable infinity,* is the size of the natural numbers (0, 1, 2, . . .). Because the totality of objects (or even of numbers) is larger than this, so will be the totality of facts about them. (For each object, for example, it is either finite or infinite.) But any language (at least of the kind that is humanly usable) can be shown to have only countably many sentences. There will therefore be many facts that cannot be expressed.

Of course, for all that this shows, each of these facts could be expressed by some richer language; for example, one obtained by adding another name. But there is more to it than this. To say something

about an object, one has to refer to it; to do this, one has to be able to single it out in some way; and the totality of all objects is so rich that it will contain objects that are entirely indiscriminable from each other by our finite cognitive resources, and so that cannot be singled out. (Points in a continuum, for example, may be so close as to be indistinguishable by any cognitive mechanism.) There is much, therefore, that will be inexpressible.

As we have now seen, there is a wide variety of metaphysical views that deliver the conclusion that there are things that are ineffable. Evaluating these views goes well beyond anything possible here. I will conclude with a brief discussion of a structural feature of (discussions of) the ineffable.

As is probably clear, theories that claim that certain things are inexpressible have a tendency to say just such things. Thus, Christians say much about God, Buddhists say much about emptiness, Heidegger says much about Being, Kant says much about *dinge an sich,* and Wittgenstein says much about the relation between language and reality. What is one to say about this?

The only thing one can say is that these claims are either literally false or meaningless. The second move is made by Wittgenstein in the *Tractatus*. The first move is more common: all one can do is *deny* any claim made about the object in question. One finds this move in Christian negative theology (Braine, 1998) and some versions of Hinduism, for example, the Advaita Vedānta of Śankara (Sengaku Mayeda, 1992). Kant struggles with a version of this view when he distinguishes between a legitimate negative notion of *ding an sich* and an illegitimate positive one.

This cannot be the whole story, however, as each position does appear to endorse various claims about the ineffable. How are these to be understood? The most common move is to suggest that one has to understand such assertions as metaphorical, analogical, or in some other nonliteral way. So understood, they can 'point to' the ineffable, although not express it. In Christian theology, this move is made by the 11th-century theologian St. Anselm; similar claims also can be found in the Zen tradition; and Heidegger uses the notion of writing under erasure ('is') in an attempt to indicate that his words are not to be taken literally.

There is something very unsatisfactory about this, though. One thing that each tradition gives is a set of reasons as to why the thing in question cannot be described: God is beyond categorization; the ground of being is not itself a being; ultimate reality has no features; categories cannot be applied to things outside time; propositions and form are not objects. If one does not understand these claims as literally true, then the very ground for supposing the things in question to be inexpressible falls away. (If 'Juliet is the sun' is not to be taken literally, there is no reason to suppose that she is made of hydrogen and helium.)

Indeed, at the very heart of the view that language has limits is a fundamental paradox (Priest, 1995). To claim that language has limits is to claim that there are things that cannot be talked about; but to say this is exactly to talk about them. The paradox manifests itself in a precise form in some of the paradoxes of self-reference in modern logic. There are many ordinal numbers that cannot be referred to. So there is a least such. But 'the least number that cannot be referred to' refers to that number – Köning's paradox. For skeptics about sizes of infinity, there is even a finite version of this. There is only a finite number of names (i.e., proper names or definite descriptions) with less than (say) 100 letters (in English); there is therefore a finite number of (natural) numbers that can be referred to by names of this kind. So there will be numbers that cannot be referred to in this way. 'The least number that cannot be referred to with less than 100 letters' (which has less than 100 letters) refers to one of these – Berry's paradox. Various responses to these paradoxes have been proposed in modern logic, but none that is either generally accepted or unproblematic.

One reaction to the fundamental paradox is to reject the notion of the limits of language altogether: there is nothing that it is beyond the ability of language to express. But any theory according to which there are limits to language – including, it would seem, contemporary logic – would appear to be stuck with this contradiction.

See also: Language of Thought; Thought and Language: Philosophical Aspects.

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Linearity/Syntagmatics

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There is a group of concepts usually referred to in modern linguistics using the terms linearity and syntagmatics. These concepts are rooted in the beginning of grammatical reflection in classical antiquity, but they emerged explicitly as topics central to linguistic theory with the spread of Saussure's ideas at the beginning of the 20th century. This article discusses linearity and syntagmatics under three headings: (1) in Saussure's *Course in general linguistics*, (2) in syntactic theory, and (3) in the history of grammar.

Linearity and Syntagmatics in Saussure

In Saussure's *Cours de linguistique générale* (Saussure, 1916/1972), there are three areas that refer explicitly to our topic: (1) the linear nature of the signifier, (2) syntagmatic relations, and (3) syntax. These are briefly examined here, giving quotations from Saussure's *Course in general linguistics*, using the English translation by Wade Baskin (Saussure, 1959), which is more literal than in the freer and more sophisticated, but also more eccentric, translation by Roy Harris (Saussure, 1983).

Concerning the first question, the linear character of the signifier, the *Course* (Saussure, 1959: 70) states (Part 1: General principles; Chap. I: Nature of the linguistic sign; Sec. 3, Principle II: The linear nature of the signifier):

> The signifier, being auditory, is unfolded solely in time from which it gets the following characteristics: (a) it represents a span, and (b) the span is measurable in a single dimension; it is a line.

The *Course* adds that, although this principle is obvious, "apparently linguists have always neglected to state it, doubtless because they found it too simple; nevertheless it is fundamental, and its consequences are incalculable." The link between linearity and the time dimension was familiar to Saussure's contemporaries and was repeatedly taken up later in the 20th century. One of the best-known discussions is offered by the valued philosopher of science Hans Reichenbach (1957, 109–110), who stressed the basic difference between time, which is one dimensional, and space, which is, at least at the level of our senses, three dimensional. It would, of course, be desirable to clarify the relation between the single temporal dimension of speech sounds succeeding one another and the single spatial dimension of symbols written one after the other along a line. On the other hand, if the spoken message is inevitably produced and perceived through time, the written message may be perceived as a simultaneous whole, a Gestalt in which different parts are linked by spatial and not temporal relationships.

Concerning syntagmatics, the *Course* states (Part 2: Synchronic linguistics; Chap. 5: Syntagmatic and associative relations; Sec. 2: Syntagmatic relations) that the notion syntagm applies "not only to words but also to groups of words, to complex units of all lengths and types (compounds, derivatives, phrases, whole sentences)." (Saussure, 1959: 124). And later:

> An objection might be raised at this point. The sentence is the ideal type of syntagm. But it belongs to speaking [*elle appartient à la parole*], not to language [*non à la langue*] [. . .] Does it not follow that the syntagm belongs to speaking? I do not think so. Speaking is characterized by freedom of combinations; one must therefore ask whether or not all syntagms are equally free. (Saussure, 1959: 124).

This is followed by a discussion of expressions belonging to *la langue* rather than *la parole*, ending, however, with the caveat (Saussure, 1959: 124–125):

> we must realize that in the syntagm there is no clear-cut boundary between the language fact [*le fait de langue*], which is a sign of collective usage, and the fact that belongs to speaking [*le fait de parole*] and depends on individual freedom.

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Concerning syntax, the *Course* mentions (Part 2: Synchronic linguistics; Chap. 7: Grammar and its subdivisions; Sec. 1: Definitions: traditional divisions) "the interchange of simple words and phrases within the same language" (Saussure, 1959: 136), for example, *considérer* and *prendre en considération* or *se venger de* and *tirer vengeance de,* which can replace one another.

> Functionally, therefore, the lexical and the syntactical may blend. There is basically no distinction between any word that is not a simple, irreducible unit and a phrase, which is a syntactical fact. The arrangement of the subunits of the word obeys the same fundamental principles as the arrangement of groups of words in phrases. (Saussure, 1959: 136–137)

Later, the *Course* states (Sec. 2: *Rational divisions;* Saussure, 1959: 136–137) that

> syntax (i.e., theory of word groupings, according to the most common definition) goes back to the theory of syntagms [*rentre dans la syntagmatique*], for the groupings always suppose at least two units distributed in space. Not every syntagmatic fact is classed as syntactical, but every syntactical fact belongs to the syntagmatic class [*tous les faits de syntaxe appartiennent à la syntagmatique*].

Earlier on (at the beginning of Chap. 5; Saussure, 1959: 123), the editors of the *Course* had stressed in a footnote: "It is scarcely necessary to point out that the study of *syntagms* is not to be confused with syntax. Syntax is only one part of the study of syntagms."

The paradoxical and contradictory way that these three aspects of Saussurean linguistics (linearity, syntagmatics, and syntax) are treated in the *Course* cannot fail to strike the observer. On the one hand, their importance is explicitly stressed; on the other, they are largely disregarded in the book. Even the relations among these three concepts are presented in a confusing and unclear way that has caused many interpreters of Saussure's ideas to disagree about how they should be properly clarified or to reject some of these assumptions and proposals once their meaning has been established. (See in particular Jakobson's 1939 comments in a lecture given in Copenhagen on the simultaneity of distinctive features, published in Jakobson, 1962: 304–305; Godel, 1957; Engler, 1974; Wunderli, 1981; Amacker, 1995; Lo Cascio, 1995.) The dichotomy between syntagmatic and associative relations has often caused misunderstandings. It is presented as an opposition between *in praesentia* vs. *in absentia* relations, that is, relations between items that are all present in the same syntagm (they are linked by syntagmatic relations) versus relations between items of which only one is present and that is linked to other, absent items by associative (or paradigmatic, as they are generally called, following Hjelmslev, 1961) relations. This constitutes a paradigm, to use Saussure's (1959: 126–127) term:

> Whereas a syntagm immediately suggests an order of succession and a fixed number of elements, terms in an associative family occur neither in fixed numbers nor in a definite order [. . .]. A particular word is like the center of a constellation; it is the point of convergence of an indefinite number of coordinated terms [. . .]. But of the two characteristics of the associative series – indeterminate order and indefinite number – only the first can always be verified; the second may fail to meet the test. This happens in the case of inflectional paradigms, which are typical of associative groupings. Latin *dominus, domini, domino*, etc., is obviously an associative group formed around a common element, the noun theme *domin-*, but the series is not indefinite as in the case of *enseignement, changement*, etc.; the number of cases is definite. Against this, the words have no fixed order of succession, and it is by a purely arbitrary act that the grammarian groups them in one way rather than another.

As a matter of fact, depending on the school tradition, the Latin paradigm is given as *dominus, domini,* and so on or as *dominus, dominum,* and so on.

Linearity and Syntax

One of the most striking features of linguistic theory during the last 50 years is the change from a Saussurean to a Chomskyan perspective. Syntax had a vital part in bringing about this change and, in turn, acquired a different complexion in this process. Chomskyan syntax clearly belongs to *langue* rather than *parole* and resides in the individual's competence rather than being a social fact, to use Saussure's notions. For Chomsky, it was part of i-language and not of e-language.

The traditional view of the spoken chain, or of sentences consisting of strings of words following one another, is obviously misleading. A sentence, spoken or written, consists of constituents, variously called phrases, syntagms, or word groups. Since at least the 18th century, word groups (Graffi, 2001: 136), not individual words, were traditionally considered the building blocks of syntax, that is, to be the basic units entering into grammatical relations with other units or having certain functions, such as subject or object.

A central insight in Chomskyan syntax (Chomsky, 1957) is that grammatical functions (or relations), such as subject and object, are defined, not in terms of meaning (thematic roles or theta roles, such as Agent, Patient etc.), or of the communicative

dynamism of the message (the theme, or topic of which a person is speaking, and the rheme, or comment about it), but in configurational terms, on the basis of the position that a category symbol, such as Noun Phrase (NP), occupies within the tree representing the syntactic structure of the sentence: The subject is the NP that is directly dominated by the node Sentence (S), and the object is the NP that is directly dominated by the node Verb Phrase (VP).

Trees are configurations studied by the branch of topology called graph theory, based on the work of the great Swiss mathematician Leonhard Euler (1707–1783). Traditionally, a sentence was seen as a string of symbols following one another in time or along a single line (hence the expressions linearity and linear word order). But trees, which were introduced into many different disciplines from the beginning of the 19th century, suggested a different image, with branches departing from nodes, and allowed a different graphic representation of syntactic structure, such as that of the phrase markers adopted by generative linguistics.

A tree can be equivalently represented by a string in which category symbols are enclosed in brackets. For the sentence *John hit the boy*, the phrase marker of the tree diagram illustrating the structure of the sentence may appear as the following string:

$[_{S}[_{NP}[_{N}$ John $]_{N}]_{NP}$ $[_{VP}[_{V}$ hit$]_{V}$ $[_{NP}[_{Det}$ the $]_{Det}[_{N}$boy $]_{N}]_{NP}]_{VP}]_{S}$

But this representation is only apparently linear. In fact, the labeled brackets (like the tree) convey the crucial information, not available from the linear word order, that *John*, because it is directly dominated by S, is the subject and that *the boy*, because it is directly dominated by VP, is the object. The sentence is **more** than a string of words. It has a syntactic structure. More information is conveyed by the tree (or the equivalent series of self-embedded brackets) than by the linear order of words following one another along one single dimension, temporal in spoken discourse and spatial in written transcription. (For the formal properties of grammars see Luce *et al.,* 1963; for discussions of linearity in generative grammar, see Vincent, 1979; Corver and van Riemsdijk, 1994; Karimi, 2003.)

Linearity in the History of Grammar

The contrast between the central importance of syntax in Chomskyan linguistics and its modest and peripheral position in a Saussurean perspective should not suggest that syntax is a young discipline with only a few decades of life. In fact, the opposite is true – and the attempts to identify the abstract, invisible structure of grammatical relations or functions behind the superficial, visible layer of word order offer important insights into the history of grammatical notions.

It has been suggested that syntax in the modern sense is a medieval creation (Robins, 1980). In Greek and Roman classical culture, subject, predicate, and object (*hupokeimenon/subiectum, kategoroumenon/praedicatum, antikeimenon/obiectum*) were notions belonging to logic. It was only in medieval times that the grammatical notions of *suppositum* and *appositum* for subject and predicate (i.e., verb, or verb + object) were introduced with Petrus Helias and the French schools of the 12th century (Black, 2001: 70–71, 92–93) As for the terms 'subject' and 'predicate,' and their equivalents in modern European languages, they have a complex and varied history that needs to be studied in detail. One of the major experts in medieval logic, L. M. de Rijk (1980: 230), noted that "word order was viewed as the rendez-vous of grammar and ontology" and pointed out (Rijk, 1967) the curious attempts made by medieval logicians to read referential distinctions into different word orders, in particular the position of a noun before (*a parte ante*) or after the verb (*a parte post*), so that *crudas carnes comedi* 'raw meat I ate' is true even if the meat was well cooked when I ate it because the construction *a parte ante* suggests that it was raw earlier, when I bought it. This does not apply to *comedi crudas carnes* 'I ate raw meat' because the construction *a parte post* requires, for the statement to be true, that the meat was still raw when I ate it (Buridanus, 1977: 59, 67–68; 2001, 877, 886–887).

This is not, of course, the way in which Latin grammar works. But even the humanist who contemptuosly criticized the barbaric Latin of medieval logicians like Buridan, acknowledged that different word orders could correspond to different meanings, for instance in *bibas priusquam edas* 'drink before you eat' versus *edas priusquam bibas* 'eat before you drink.'

It is worth remembering that, unexpectedly for modern readers, classical and Renaissance grammars of Greek and Latin found it difficult to explain accusative and infinitive structures, in which both the subject and the object of an infinitive surface as accusatives. The most important ancient syntactician, the Alexandrian grammarian Apollonius Dyscolus (1981: 185–186), stressed the ambiguity in the *Iliad* (Book 5: 118) of *dos de t'em' andra helein*, which could mean 'grant that I may kill the man' or 'grant that the man may kill me.' The famous Renaissance grammarian Thomas Linacre (1524: Fo.51r) deplored the difficulty of constructions such as *Chremetem percussisse Demeam*, in which the subject and the object are

both in the accusative and we have to decide whether Chremes hit Demea or vice versa. Linacre (1524: Fo.78v, Fo. LXXVIIr) also contrasted *volo discere* 'I want to learn' and *volo te discere* 'I want you to learn' and explained that a Hellenism is introduced when we read of Catullus's *phaselus* 'vessel' that it *ait fuisse navium celerrimus* 'says it was the fastest of ships,' with a nominative instead of an accusative. Similarly Sanctius (Francisco Sánchez) in his *Minerva* (Sanctius, 1587: 134v) alleged that *cupio esse dives* 'I want to be rich,' with *dives* in the nominative, is the Greek-style expression, whereas (according to him) the Latin expression should be *cupio esse divitem*.

Linacre (1524: Fo. 50r) distinguished two kinds (*genera*) of construction, the *iustum* 'normal' and the *figuratum* 'figurative.' They differ mainly in word order. And it is striking that some of the most insightful discussions of syntax in the Italian Renaissance are offered by treatises not of grammar but of rhetoric (Lepschy, 2004). This contrast between normal and figurative constructions finds its place within the complex history, which still waits to be properly illustrated, of the distinction between natural and artificial order (*ordo naturalis* and *ordo artificialis*) (Scaglione, 1972; Weijers, 1994: 59–82; Black, 2001: 281; Rizzo, 2002: 198). In the tradition of Latin school teaching, we meet the expression *ordo constructionis*, *ordo verborum*, or just *ordo*. This term, now largely forgotten, has its own entry in the *Oxford English Dictionary*: "In old Latin School-books (*ordo verborum*). The arrangement of words required in translating into English." The *ordo* changed the Latin word order (*ordo artificialis*), preserving the original Latin forms but rearranging them according to English syntax (*ordo naturalis*), and, in doing so, provided the reader with the (syntactic, if not lexical) meaning of the passage. This process throws light, from an unexpected angle, on the distinction, mentioned at the beginning, between linear word order and syntactic structure.

See also: Chomsky, Noam (b. 1928); Configurationality; Grammar, Early Medieval; Graph Theory; Paradigm versus Syntagm; Peter Helias (12th Century A.D.); Relations and Functions; Rhetoric: History; Sanctius, Franciscus (1523–1600); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics; Syntactic Constructions; Word Order and Linearization.

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Lingua Francas as Second Languages

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In 1953, UNESCO defined a lingua franca as "a language which is used habitually by people whose mother tongues are different in order to facilitate communication between them." Although a number of attempts were made to introduce an engineered lingua franca, such as Esperanto, to achieve such a facilitation for worldwide communication, the languages used as lingua francas today are largely natural languages. Some of these languages are, or were, used worldwide, notably English. Others, such as Arabic, French, Spanish, and Russian, are employed for international communication in a particular geographic area. Thus, Arabic serves as a lingua franca in the states of the Maghreb and the Middle East, Spanish is the major lingua franca of Central and South America, and Russian linguistically united the Soviet Union. In addition, there are languages that are used as intranational lingua francas only. Afrikaans, for instance, is used in large parts of South Africa and Namibia to allow for communication among speakers who do not share another language. Similarly, Modern Chinese is employed for communication across the individual speech communities in the People's Republic of China. In addition, of course, numerous other languages serve groups of different sizes as lingua francas (Languages of Wider Communication).

All of the lingua francas mentioned above have native speaker speech communities. However, they are second languages for the majority of their users, and this has implications both for the individual who uses more than one language as well as for those societies in which several languages coexist. This article considers both the multilingual societies in which lingua francas are used and the bilingual individual using the language. The first part covers aspects such as multilingualism, diglossia, and language shift, and their effects on education and language policy. In the second part, the use of a lingua franca will be discussed as a case of language contact, which involves transfer, borrowing, and code-switching, nativization processes, and similarities with learner languages. The later sections are devoted to a description of lingua franca communication at the international level and a review of approaches toward lingua francas from within the field of foreign language teaching. The article closes with a brief look into current research trends.

Lingua Francas and Multilingual Societies

Lingua francas are used for different purposes. Communication among speakers of mutually unintelligible languages occurs across countries as well as within them. This section will examine lingua francas used for intranational, intraregional, and international communication. It draws on data available for

Table 1 Second language speakers of individual lingua francas

Language used as lingua franca	*Number of L2 speakers in millions*
Afrikaans	appr. 3.7
Arabic, Standard	no estimates available
Chinese, Mandarin	278
English	167
French	51
Russian	110
Spanish	59

All figures are taken from the Ethnologue at www.ethnologue.org.

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Afrikaans, Standard Arabic, Mandarin Chinese, English, French, Russian, and Spanish. Table 1 presents the figures which have been estimated for the numbers of second language users of these languages.

When a language has come to be used as a lingua franca, it is frequently assigned the status of a national or official language of individual countries as documented in Table 2. More detailed descriptions of the linguistic situation and the status of the lingua francas in these countries are available from the Ethnologue (Ethnologue) or from Baker and Prys Jones (1998).

Table 1 and Table 2 indicate that lingua francas are used in different contexts: several languages, such as Arabic, English, French, and Spanish have achieved a special status within a large number of individual countries. Others, such as Afrikaans, Chinese, and Russian, have high numbers of second language users but are used in few countries. The following subchapters provide an overview of the diverse scenarios in which a lingua franca may be encountered, followed by a discussion of the implications its use has at the societal level.

Scenarios of Lingua Franca Usage

Spanish in the Americas and French in Africa As a result of colonization, both Spanish and French are used on a worldwide scale, but they mainly serve restricted geographical areas. Spanish as a lingua franca is mainly used in the Americas, from California as far as Feuerland. Here, Spanish is spoken by a total of approximately 330 million people (cf. Noll, 2001). Most of the second language speakers of Spanish in this area are descendants of Native Americans. However, Native American languages, such as Aravak, Caribe, Nahautl, Maya, Chibcha, Quechua, Arimara, Mapuche, and Guaraní, continue to play a prominent role only in Mexico, Guatemala, the Andes, and Paraguay. In other countries, the majority of their inhabitants have shifted to Spanish as their first language. Cuba and the Dominican Republic have predominantly Black populations. Here, Spanish speakers are mainly descendants of the formerly enslaved African peoples and the European colonizers.

The francophone world covers large parts of Europe, America, and Africa. French has the status of a lingua franca in many sub-saharan countries, such as the Ivory Coast, countries in the Indian Ocean, the states of the Maghreb, Andorra, Luxemburg, the Aosta Valley, Vanuatu, Lebanon, etc. (cf. Kleineidam, 1992). More than half of all francophones live in Africa. But different from the case with Spanish in Latin America, French is not spoken by the vast majority of these countries' inhabitants. In fact, French is often accessible only to a middle class elite. However, Kleineidam (1992) documents that figures for second language speakers of French have been steadily rising between 1980 and 2000 in Africa: there was an increase of 267% in sub-Saharan Africa and of 160% in the Maghreb states.

Arabic is used inside as well as across more than twenty countries, mainly located in the Middle East and northern Africa. In these countries, Modern Standard Arabic fulfills the function of an official language, as the medium of education and administration, and for all written communication. In addition, all Muslim states are unified through the literary and written standard provided by Classical Arabic, the language of the Islamic religion and of the Qur'ān (cf. Youssi, 1995).

Intranational Lingua Francas: Afrikaans, Russian, and Chinese Whenever the political frontiers of a nation were drawn regardless of ethnolinguistic realities, the country is frequently inhabited by speakers of diverse languages. Such multilingual states often decide on one particular language for intranational communication across their different speech

Table 2 Lingua francas enjoying a special status

Language (L)	*Number of countries in which L is spoken*	*Number of countries in which L is a national language*	*Number of countries in which L is an official language*	*Number of countries in which L enjoys a special status*
Afrikaans	10	–	1	4
Arabic, Standard	25	19	2	2
Chinese, Mandarin	16	2	–	5
English	105	48	28	10
French	54	7	24	4
German				
Russian	31	–	1	2
Spanish	44	19	1	4

communities. This is – or was – the case, for example, in China, the former Soviet Union, and South Africa.

In China, which officially recognizes 56 nationalities and 125 minority languages (cf. e.g., Sun, 2001 cited in Poa and LaPolla, forthcoming), Mandarin Chinese – also called Modern Standard Chinese or *pǔtōnghuà* – is the sole official language. It was formally defined and standardized after World War II and became the medium of instruction in schools, the working language for government and administration, and the language of the media (cf. Chen, 1999: 27). Stern measures to implement Modern Standard Chinese were never adopted in mainland China. Rather, migration of people across the empire has been encouraged, if not enforced, by the government. As a result, bilingualism in Mandarin Chinese and a local variety is the norm in large parts of China today. In 1984, 50% of the whole nation had a speaking proficiency in Modern Standard Chinese, and 90% had a comprehension proficiency in the language.

Strategies were similar in the former Soviet Union, which contained peoples speaking more than 130 different languages, but where the government never installed Russian as the national language. Instead, Russian was introduced as a compulsory school subject and promoted as a key to being a full Soviet citizen, based on the "Marxist principle that at some time in the future all ethnic groups will fuse into one" (Comrie, 1981: 37). Social planners supported migration of Russians into remote regions of the state, producing multilingual communities and mixed marriages, mostly with Russian as the dominant language. In 1979, a total of 61.2 million speakers of Russian as an additional language lived in the Soviet states, and the federation was characterized by frequent instances of bilingualism, such as Estonian-Russian, Armenian-Russian, etc. (cf. Haarmann, 1985).

A language that has been vigorously enforced as an intranational lingua franca is Afrikaans. Afrikaans was designated as the national language when the Afrikaner Nationalist Party came into power in 1948. Partly in response to the former aggressive anglicization policy effected by the British, Afrikaans was promoted and made the compulsory language of instruction in all Black schools in 1957. Following the abolition of the apartheid policy, Afrikaans is now one of eleven official languages, but due to its background it still is a major lingua franca in South Africa and parts of Namibia. The language has been a lingua franca from when it developed in a sustained situation of language contact between the indigenous Khoekhoe, Dutch settlers, and slaves (cf. McCormick, 2002). It is spoken widely in large parts of South Africa, both as a first and as a second language, by speakers from a variety of ethnicities.

Global Lingua Francas: English Among the different lingua francas which exist around the world, English is the language which has gained the status of a global language. It is used for worldwide communication across nations and individuals, who speak mutually unintelligible languages, but it also serves as an intranational lingua franca in a large number of countries which had previously been colonized by the British (cf. Table 2).

The dominance of English at the international level has sometimes been discussed as linguistic imperialism. Phillipson and Skutnabb-Kangas (2001: 573) argue that "a Western-dominated globalization agenda is being implemented by the transnational corporations, the World Bank, the IMF, and the World Trade Organization." The status of English is strengthened through these global alliances but also through organizations that operate at a regional level. Moreover, increased global mobility, migration, and modern media help the spread of English today. As a result, English has gained enormous prestige, and mastering the language is associated with access to the global market. Crystal (1997) estimates that approximately 1000 million people speak English as a second language today, albeit at different levels of competence.

Societal Effects of Lingua Franca Usage

Languages used as intranational lingua francas frequently have the status of a national or official language and are used for governmental and administrative affairs. Raising the status of one of several languages spoken in a country eventually results in the language being more prestigious and associated with professional success and upward social mobility. These often diglossic situations have an impact on education and may eventually cause language shift.

Diglossia Frequently, the two or more languages used within one nation coexist in a diglossic situation (Fishman, 1980): One language is used for 'high' functions, i.e., in formal interactions such as official discourse, in church and schools, and especially in written communication. The other language is used for so-called 'low' functions: informal, mundane, mainly oral interactions. As a result, the high language is often held to be more logical and aesthetic, associated with literary heritage, and it is also the one which is acquired through formal education. For example, Modern Standard Arabic is used in most formal contexts in the Maghreb states, and a colloquial variety of Arabic, or Berber in the case of for example Morocco, is used in informal, oral situations. In Paraguay, where Spanish and Guaraní are the two official languages, Spanish performs the high functions.

Educational Issues The prestige of a lingua franca performing high functions in a country may also influence language policy, and there may be parental or societal demand that the lingua franca be used as the medium of instruction in schools or taught at the expense of other languages. Such is the case for example in South Africa, where English is now increasingly used as a medium of instruction in schools where neither the pupils nor the teachers speak English as their mother tongue. However, designating a lingua franca as the sole or major medium of instruction may have severe consequences for pupils' social, cognitive, and academic development. Desai (2003) documents that Xhosa children who receive their primary school education through English do not only fail to acquire English effectively, but that they also do not develop proficiency, especially in reading comprehension, in their mother tongue. Also, using the lingua franca may exclude those sections of the population who do not have access to it from socioeconomic advancement. In some cases, the language used as lingua franca may be completely inaccessible to certain groups of society, yielding a bilingual or multilingual elite. For example, several rural areas of China are still without electricity, and access to schools is also limited in some cases, so that as a result citizens have no opportunity to acquire *pǔtōnghuà* through the media or in school.

Even if the lingua franca is not used intranationally, such as English in Germany, individuals may prefer to study this language rather than another foreign language if it is more prestigious and required for the more attractive professions. In fact, Europe today witnesses an enormous increase in English language learning, often to the detriment of multilingualism.

Language Shift When proficiency in the lingua franca is a prerequisite to professional and social achievement, language shift is also likely to occur, i.e., bilingual communities will tend to give up their original mother tongue and gradually, usually over three generations, acquire a new language. In South Africa, Indians gradually shifted to English (cf. Mesthrie, 1992), and at present, Blacks increasingly raise their children in English instead of Afrikaans, because English seems to guarantee upward societal movement (cf. McCormick, 2002). Haarmann (1992: 111) points out that following a phase of unbalanced bilingualism with Russian as the dominant language, "by 1979 about 16.3 million non-Russians (such as Ukrainians, Latvians, Georgians) had shifted to Russian as their first language." And in China, the Qiang have been undergoing language shift to the dominant *pǔtōnghuà* due to a lack of literature, media, and education in Qiang and the rapid increase in Chinese-Qiang bilingualism. The process of language shift is, however, not always completed. The Black community in Cape Town, South Africa, on which McCormick (2002) reports, uses English in education and at the workplace. However, the individuals in this community still enact their identities in a mixed Afrikaans-English code.

Lingua Francas and the Multilingual Individual

The wide range of social contexts in which lingua francas are used is reflected in the heterogeneity of the forms which languages assume when they are used as lingua francas. Depending on the presence and status of the lingua franca in a particular country, speakers acquire and use the language differently. Speakers living in nations that utilize a lingua franca for intranational purposes frequently acquire a nativized variety of the lingua franca. But in countries where the lingua franca does not enjoy a particular official status and where it is mainly acquired for communication with interlocutors from abroad, the model has usually been either British English (in Europe) or the American Standard variety (e.g., in Japan). Interestingly, Korea has adopted a strategy of teaching a variety called Codified Korean English.

Furthermore, the environment in which a lingua franca is acquired varies considerably. Lingua francas are usually taught as second languages in institutional settings. But they are also present in everyday life: in official documents, on television and on the radio, in advertisements etc. These different options for contact with the lingua franca yield diverging opportunities for either instructed or informal acquisition of the language.

Formal and Natural Acquisition of Lingua Francas

In many cases, a lingua franca is learned in an institutionalized context. This is the case whenever the language is not used intranationally. For example, English is a subject in Germany, Italy, Turkey, Japan, and many other countries. If a language is used as an intranational lingua franca, it is often still acquired in an institutionalized context. Thus, mother tongue speakers of Xhosa or Zulu in South Africa learn English from primary school onward. At the same time, however, the lingua franca is usually used in several public domains, especially in the media, and speakers may simultaneously acquire it naturally so that formal instruction and natural acquisition supplement each other. This is the case for example in China, where Modern Standard Chinese is not only taught and used as the medium of instruction in

schools, but is also the language of access to modern media. Radio and television exposes even very young children to Modern Standard Chinese, which thus becomes part of their local context.

But despite the availability of formal instruction in the languages used as lingua francas, for a large number of their speakers, especially for those who do *not* have access to formal education, acquisition through uninstructed channels is frequently their sole option. They pick up the language in everyday interaction with either native or nonnative speakers, and learning results from direct participation and observation. Although such informal settings potentially create rich language learning environments with a vast array of communicative events, they also leave the learner with the task of constructing the correct rules from the input they receive.

Acquiring the lingua franca in contexts such as the workplace, and without additional instructed learning, may produce errors that remain uncorrected so that nontarget forms eventually become fixed and fossilize. As a result, the speakers achieve a variety of levels of competence, and large numbers will only be able to master a basilectal form of the lingua franca. This is the case in the following sequence, which has been observed with a South African Xhosa speaker who acquired English mainly through interaction with other nonnative speakers.

> my child is in Johannesburg but he's working sometimes wor – not working. I don't know\ another one's three, three years here. and then uh, lady's has got as a house, in Khayelitsha. working in factory to sewing, everything. oh sorry. and another, the lastborn, my lastborn, is in working, he's passed his standard ten last of last year. but he's working now. it's better but eh. all the children is got a problem. because it is not help her parents. you know/

A similar situation characterizes parts of Latin and South America. Lipski (1994: 143) points out, that in Latin America "radio is often the only means of communication for vast rural areas, and for large segments of the population who suffer partial or total illiteracy." Radio stations in these areas provide a medium for adult education and Spanish language classes for the indigenous communities. However, the model that speakers encounter on the radio is heterogeneous in that most broadcasters do not receive training due to a lack of financial resources.

Nativized and Interlanguage Forms of Lingua Francas

When the lingua franca is regularly used for intranational communication, it frequently develops into a nativized form. Transfers from the speakers' mother tongues, which occur at the different linguistic levels, eventually stabilize, and the language is adapted to a new sociocultural context, a process which affects both cultural and formal dimensions. This is most apparent in the lexicon of these varieties. For example, speakers of English in Nigeria have coined the expression *head-tie* to denote a piece of cloth worn around the head by the women in the country. For English, the individual indigenized varieties spoken throughout the world have been thoroughly documented in a vast number of publications, e.g., by McArthur (2002) and especially in the papers published from within the International Corpus of English (ICE) project. With regard to Spanish, sociolinguistic research on Latin America has established that "Latin American Spanish exhibits numerous supraregional characteristics, and a well-defined if unofficial prestige norm valid across two continents" (Lipski, 1994: 149). Instead of being an imitation of Castilian, the Latin American prestige form "is a set of common denominators in which regionally or ethnically marked items do not appear" (Lipski, 1994: 149).

If learning the lingua franca takes place in the classroom context only, speakers' productions frequently display structures and strategies that differ from both the mother tongue and the second language. These interlanguages are approximative, transitional systems, which reflect the developmental stage of the individual learner. They are both unstable and variable, and they are furthermore characterized by communication strategies, employed to compensate for deficits in the second language. For example, paraphrases are used to express lexical concepts for which the interlanguage does not yet contain a specific lexical item. Also, pauses occur frequently between and also within turns, possibly because learners pause to solve production problems. But long pauses that occur between turns may also result from the speakers' reliance on pauses as turn-taking-signals, which implies that they don't sufficiently recognize and produce other turn-taking-signals. Learners have also been shown to display a low variation in ritual speech acts, which seems to be a further classroom- or textbook-induced characteristic. Pöll (1998: 108) documents that speakers of French as a lingua franca in sub-Saharan Africa frequently produce utterances in which individual structures of the French language have been simplified (e.g., *dans* is used as the sole locative preposition in Senegal). Also, concord rules may be violated, as is the case in *les filles ne fait plus ça* (observed in Cameroon).

Linguistic Processes in Lingua Francas Productions

Individuals using a language as a lingua franca by definition command more than one language. As a result of such language contact, the speech of bilinguals using interlanguage varieties as well as nativized forms of individual languages is commonly characterized by borrowing, transfer, code switching, and code mixing.

Borrowing and transfer In present-day Bolivian Spanish, contact with the diverse Native American languages is reflected in the form of lexical borrowings from the indigenous languages Aymara, Chiquitana, Guaraní, and Quechua. For example *apallar* 'to harvest' (cf. Lipski, 1994: 194) or-*cosa!*, an exclamation meaning 'very good, excellent,' have both been copied into Bolivian Spanish. In the diglossic context of Paraguay, borrowing from Guaraní is particularly noticeable. Items for flora, fauna, food, etc., are often of Guaraní origin. For example, *mitaí* is used for 'child' instead of *niño/niña*.

Also, the lingua francas display evidence of transfer in that structures of the indigenous languages influence the speakers' productions in the lingua franca. In Peru, Spanish reflects transfer from Quechua in that the clitic pronoun system has been morphologically simplified, and Quechua word order and tenses have been retained in Spanish (cf. Klee, 1996). Transfer does not, however, radically change the syntactic structure of Spanish. Rather "speakers of Andean Spanish have found a way to maintain the word order patterns and evidential system of Quechua in a manner that is compatible with the pragmatic use and structure of Spanish" (Klee, 1996: 89).

Code Switching and Code Mixing Lingua franca speakers have also been found to mix the indigenous language and the lingua franca into a hybrid consisting of words and phrases of both languages (code mixing). The intrasentential use of two languages seems to be a universally accounted phenomenon in the productions of second language speakers in multilingual settings.

> *ka fa izy edy izany*/ça semble lourd quand c'est en malgache/vous voyez (Babault, 2001: 137; Malegasy in italics).

> Estamos haciendo pruebas, y *tlamis tikisaske* recreo *iwa tlamis tikalakiske oksepa, tlamis* de nuevo vamos a estudiar (MacSwann, 1999: 136; Nahuatl in italics).

But code switching may also occur intersententially, i.e., speakers also change codes between utterances within one speech event. Often, especially in diglossic situations, this is done for stylistic purposes, or due to alterations in the formality of the speech event. The following excerpt taken from McCormick (2002: 168) demonstrates a switch from English to Afrikaans, which does not usually serve formal functions in the community she studied. When speaker 1 becomes uncertain about the date of the next meeting, speakers switch into Afrikaans for a more informal discussion. The conversation changes back to English when the formal reading of the minutes is resumed (Afrikaans in italics).

Speaker 1: The matter could only be entertained when our next AGM elections would be held the chairman closed the meeting and told the members that on Wednesday ninth
Speaker 2: seventeen
Speaker 3: sixteenth
Speaker 4: *laas week was die sestien en die week tevore was die laaste* meeting
Speaker 5: *nee man hy praat van die sestiende* sixteenth May
Speaker 1: (resumes reading the minutes) The chairman closed the meeting and told the members that on Wednesday sixteenth May nineteen eighty four there would be no meeting

McCormick also documents that code switching and code mixing may evolve into a mixed language, which can develop into a marker of identity.

International Lingua Franca Interactions

At the international level, interaction in a lingua franca often implies communication between speakers of different varieties of the lingua franca: indigenized forms and nonnative or learner varieties potentially meet, and as a result interactions in a lingua franca are highly heterogeneous. Lingua franca communication (LFC) implies interaction between various linguistic and cultural systems. Consequently, LFC has been approached from different perspectives: some authors have discussed LFC as a particular type of intercultural communication, whereas others have placed their emphasis on aspects related to interlanguage communication (cf. Meierkord and Knapp, 2002 for a more comprehensive overview).

As a form of intercultural communication, LFC has been conceived as interaction between participants from different cultures or discourse systems. Based on the assumption that speakers in LFC would not share a sufficient amount of shared signs and their conventionalized representations to allow them to

interpret each others' utterances successfully, LFC has often been approached as being potentially problematic. Participants in LFC have been assumed to misinterpret silences, tone of voice, expressions for speech act functions, etc. Several scholars have assumed that interferences from the individual mother tongue will result in more frequent and also more complex problems, if speakers need to resort to a language neither of them speaks as her/his mother tongue. Such interferences may occur "in the types of communicative events that learners expect to occur in a given situation, the manner of their participation in them, the specific types of acts they perform and the ways they realize them, the ways topics are nominated and developed, and the way discourse is regulated" (Ellis, 1994: 187). In fact, early studies carried out in the learner languages paradigm, such as Schwarz (1980) and Varonis and Gass (1985), who investigated the negotiation of meaning between non-native speakers of English with different linguistic backgrounds, discovered such problematic issues.

A number of studies describe the formal properties which English assumes in lingua franca communication. The vast bulk of these studies concentrates on the discourse level. Firth (1996) challenges the above view and argues that participants in lingua franca interactions strive to make interaction 'normal' in the sense that misunderstandings tend to be negotiated following a 'let it pass' attitude. Speakers seem to accept that understanding may be impaired to a certain extent, and they allow for a certain amount of opacity to make the interaction less vulnerable. However, others have documented frequent instances of misunderstanding in the data they elicited (cf. the papers in Knapp and Meierkord, 2002) and have even held that mutual understanding in LFC is a myth (House, 1999).

Descriptive studies investigating the other linguistic levels are still scarce. Meierkord (2004) presents analyses of the syntax in interactions across international Englishes, which reveal an overwhelming similarity of the lingua franca productions with those commonly found in native speaker varieties of English. Particular features, which have been documented for New Englishes or learner varieties, also occur but are infrequent. On the whole, the interactions are characterized by processes of leveling and regularization.

Lingua Francas and Second Language Teaching

The status which English enjoys as a global lingua franca and the variability of the forms which English today assumes have also concerned scholars in the field of English language teaching. The issue had been at the center of discussions in the 1980s, and it has recently gained renewed attention. In the early papers addressing the need for a reorientation of English language teaching, authors suggested that most learners of English would employ the language mainly for communication with other nonnative speakers. Against this assumption, they argued that basing foreign language teaching on a native-speaker model was doubtful and problematic, because it did not sufficiently prepare learners for using the foreign language as a lingua franca. Hüllen (1982: 87) concludes that "[...] the linguistic norms – grammatical, lexical, but also those of pronunciation – will have to change. It is also certain that new means of linguistic politeness and agreed-upon roles in communication will arise." Like him, other authors concentrated on the sociopragmatics of English for international communication and on the negotiation of meaning, both based on the assumption that crosscultural differences in these areas are likely to cause problematic interaction.

A number of authors have also attempted to model a form of English that would be easier to learn than the ones based on the native speaker varieties, yet be communicatively adequate. Ogden's (1933) *Basic English* is one of the earliest proposals for such a variety. It combines a restricted set of grammatical rules with a lexicon of approximately 850 words. Quirk (1985) proposed *Nuclear English*, a form of English characterized by, among other things, a reduction of homosemy, of the complexity of for example restrictive relative clauses and of the system of modal verbs.

Many other authors did not perceive a need to design a particular variety of English as an international lingua franca. For example, Smith (1984) and Crystal (1997) assume that English will develop without the active intervention of linguistic engineers. Smith (1984: 55) assumes that the term *English as an International Language* refers to the different *uses* of the language only, that individual users will employ a number of different forms of English, e.g., nativized varieties, and that participants using English as a lingua franca will need to cope with the resulting heterogeneity. Crystal (1997: 136 ff.) proposes that a form which he calls *World Standard Spoken English* would arise, a form that would coexist with other varieties. Crystal conceives this form of English as characterized by "careful pronunciation, conventional grammar, and standard vocabulary" (Crystal, 1997: 137) and as a variety which "takes the form, for example, of consciously avoiding a phrase that you know is not likely to be understood outside your own country" (Crystal, 137 ff.).

But on the contrary, Burger (2000: 10ff.) attempts to embrace current research findings and proposes the following: a revision of the native speaker as a model

for English language teaching, an acceptance of hybrid learner varieties, a dominance of communicativity over correctness, an increased coverage of second language varieties of English, an inclusion of nonnative varieties in listening training, stressing intelligibility of pronunciation over native speaker acceptance, the training of negotiation of meaning, and activities to raise intercultural awareness.

Outlook: Current Research Trends

Scholars have started to investigate lingua francas from a corpus linguistic perspective. Jenkins (2000) searched her corpus of genuine lingua franca English conversations for instances of native and nonnative speaker pronunciation leading to unintelligibility and misunderstanding. Based on her findings, she argues that a number of sounds, suprasegmentals, and articulatory settings could be modified in comparison to the British or General American English model. In her proposal of what she calls the *Lingua Franca Core*, for example, /θ/ and /ð/ could easily be replaced by /t/ and /d/ or /s/ and /z/ without impeding intelligibility. Similarly, the dark /l/ might be substituted by /ʊ/.

A number of projects that aim at the compilation of corpora of LFC are under way. At the universities of Berne, Basle, and Fribourg, Watts, Allerton, and Trudgill, respectively, look into what they have labeled *Pan Swiss English*, a form of nonnative English emerging among native speakers of Swiss German, French, and Italian in Switzerland. In Austria, Seidlhofer has initiated the compilation of a corpus of *English as a lingua franca* at the University of Vienna (Seidlhofer, 2004; http://www.univie.ac.at/voice/). Mauranen collects data for *English as an academic lingua franca* at the University of Tampere. A slightly different perspective is offered by Meierkord, who relates the findings yielded by the analyses of her corpus of *English as a lingua franca in South Africa* to identity construction in contemporary South African society.

See also: Bilingualism and Second Language Learning; English: World Englishes; Languages of Wider Communication; Nonnative Speaker Teachers; Third Language Acquisition.

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Linguistic Anthropology

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Linguistic anthropology is the study of language **in** culture and society. The field analyzes linguistic practices as culturally significant **actions** that constitute social life. The situated use of language is exemplary of the meaning-making process that shapes a social worlds saturated with contrasting values and contested interests, with opposed political positions and identities, with variable access to institutions, resources and power. Linguistic anthropology examines the role of social interaction – and the semiotic processes on which it relies – in making, mediating and authorizing those contrasts and differences. Aspects of context enter into this process through linguistic form itself, as form signals speaker alignments and cultural presuppositions that are called into play during social interaction. Presuppositions invoked during interaction can draw on any cultural realm: categories of contrasting identities, folk ontologies, notions of truth, space, time, cosmological order, and morality. Such presuppositions are invariably linked to language ideologies, that is, culturally specific conceptions about language and its role in social life.

Recent research on language-in-context has resulted in new definitions of the field's fundamental concepts: 'language' 'metalanguage' 'discourse' 'context' 'event' and 'text.' Metalanguage is crucial because it makes possible the reflexivity that is a necessary feature of verbal interaction. Reflexivity has methodological as well as theoretical implications. Speakers' categories of speech, events and personae are reflexive in that they create frames of interpretation for social interaction and are not necessarily uniform within any group. They are indispensable starting points for empirical investigation of talk. Such categories provide perspectival views on interaction and contrast with the linguists' own perspectives and direct observations. Scholarly discourses and debates about language are of theoretical interest as well. Like the metadiscursive categories about language and interaction of ordinary speakers, expert debates also create frames of interpretation; they participate in cultural systems, and often legitimate relations of power.

In concert with some poststructuralist philosophies, yet in quite different ways, linguistic anthropology analyzes linguistic practices not only as the instruments of social life, but rather as the **ground** on which social and cultural conflicts are fought. A key issue has been the creation of cultural authority through communication. As a result, current research in linguistic anthropology has considerable significance in the study of political and economic formations, scientific and religious enterprises, as well as in the more traditional study of group boundaries and social identities. Contemporary linguistic anthropology provides the semiotic concepts necessary to understand how social institutions – including "language" and linguistic structure – are reproduced, authorized, and continually transformed.

Terms and Turfs

The label 'linguistic anthropology' was coined in the late 19th century by scholars at the American Bureau of Indian Affairs who collected folkloric material among native Americans. Its current use in the United

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States dates from the early 1960s, when 'linguistic anthropology' became a cover term for the study of language in social life and conversely for the study of social context in shaping linguistic structure and use. Two commitments have remained central to the field, and link it distinctively to anthropology: First, ethnography is its indispensable methodology, though augmented by elicitation, interview and audiovisual technologies. Second, linguistic form and function are studied within a cross-cultural, comparative framework, with attention to human universals along with historical, regional, and power-laden sociocultural differences.

A set of other hybrid labels emerged at roughly the same time, also proposing to study language in social, cultural and psychological terms. Scholars from a number of disciplines came together under labels such as: sociolinguistics (later split into interactional and variationist), ethnography of communication, linguistic stylistics, linguistic pragmatics, psycholinguistics, ethnomethodology, ethnolinguistics, conversation analysis, discourse analysis, interactional analysis, sociology of language, and anthropology of language, among others. Some of these terms became alternate designations within linguistic anthropology (e.g. ethnography of communication, interactional sociolinguistics), others have come to mark differences of emphasis (e.g. discourse analysis, pragmatics). Still others, like variationist sociolinguistics and conversation analysis, have developed characteristic methodologies, remaining closely aligned with their disciplines of origin – linguistics and sociology respectively.

The intellectual excitement and energy evidenced by the proliferation of terms, conferences, and edited volumes in the 1960s was an ironic response to the establishment of separate departments of linguistics in American universities in the post-WWII period. These departments provided institutional backing for the formalist study of language as an autonomous phenomenon, putting aside concerns with the contexts of language. They thereby indirectly re-invigorated such contextual questions in other institutional venues. Only psycholinguistics was directly spurred by generative grammar, which legitimated cognitive questions in the face of the reigning behaviorism. The new contextual fields were surely also encouraged by more funding for cybernetics and 'communication research,' which became policy sciences during the Cold War.

Within anthropology, the new labels joined the much older term 'anthropological linguistics,' which was closely tied to fieldwork-based typological research on native North America languages as established by Franz Boas in the early 20th century. Those who now adopt the label of anthropological linguistics are oriented to linguistics departments, to descriptive work in the structuralist tradition or to historical reconstruction of language and verbal art in unwritten languages. Those identifying as linguistic anthropologists orient to anthropology departments and to language and speech as cultural practice. Many individual scholars are active in both kinds of research. Differences of emphasis notwithstanding, linguistic anthropology and anthropological linguistics have been used interchangeably as labels in textbooks and encyclopedias. The Boasian tradition gives linguistic anthropology significant institutional recognition, intellectual influence and prestige within the discipline of anthropology.

In the hybrid fields of the 1960s, practitioners held themselves accountable to different departmental audiences (linguistics, sociology, anthropology), resulting in different emphases and preferred topics. Collections of articles in the last few decades, however, have usually included scholars from several disciplines, all writing on a single theme. The roster of substantive topics has included: the linguistic marking of social relations and identities; conversational interaction and other speech genres; political processes mediated by speech such as decision-making and dispute settlement; language and nation; multilingualism, linguistic variation and multidialectalism; standardization and literacy; national language policy; narrative, performance, verbal art and ritual; the emergence, circulation and desuetude of languages, linguistic varieties, registers and styles; the acquisition of cultural competence through language; the relation of cognition to linguistic categories as coded in grammars and lexicons; the mechanisms of language change. The last half century has also brought new issues such as the globalization of languages and the effect of novel communicative technologies.

Roots and Shoots

Linguistic anthropology is often called an interdisciplinary field. But considered as an intellectual (rather than a departmental or institutional) endeavor it is rather a set of lineages or kinship lines that are read and invoked for inspiration and legitimation. As in all segmentary lineage organization, naming one's ancestors is also a means of forming alliances and oppositions in today's controversies. (What the field would analyze as the relation of narrated and narrative event.) This very brief recitation of family ties is not a history of linguistic anthropology but an overview of a usable past on which current practitioners rely.

The turn of the 20th century is the conventional starting point, especially the work of Franz Boas,

Edward Sapir and their students. They collected textual materials to document peoples whose cultures were rapidly changing under brutal colonial pressure. These scholars were inspired by the previous century's German tradition that considered language as a historical guide to the customs and values of a group. Starting with Boas's studies of verbal art and folklore, poetics has played a continuing role, strengthened by contacts with parallel interests among Prague School linguists. Contact with avatars of European dialectology of the 19th and 20th centuries helped raise concerns about regional distributions of forms, definitions of languages, standardization, dialect boundaries and historical change. A francophone line of structuralist linguistics starting with Saussure, through Benveniste, is perhaps best characterized as the immediate source for the autonomous linguistics that has been linguistic anthropology's intellectual foil. In this respect, at least, American structuralists from Bloomfield to Harris to Chomsky have been the heirs of Saussure. For linguistic anthropology, by contrast, Saussure's project is significant as part of a broader understanding of sign phenomena.

The other sources of sign theory were the Americans C. S. Peirce and to a lesser extent the more behaviorist Charles Morris. The significance of Peirce's semiotics for linguistics was emphasized by Roman Jakobson, himself a central node in a kin network that connected American structuralism to Prague School functionalism and Russian formalism while also helping to bring the work of Bakhtin's decidedly anti-formalist Russian school of poetics and literary studies of the 1920s and 30s to international attention. Literary studies have repeatedly been 'captured' as relatives by linguistic anthropology, or vice versa, as in the mid-century dramatism of Kenneth Burke, the semiotic readings of Roland Barthes, or the writings of Raymond Williams and other neo-marxist critics. There were also the quasi-literary interests of Malinowski in language function and 'context of situation,' not taken up by British social anthropologists but rather by functional linguists and later in the century within anthropology by Gregory Bateson.

Philosophies of language have also been significant interlocutors for linguistic anthropology. Austin's ordinary language philosophy was particularly important as it side-stepped the Fregean concern with truth conditionality. This was followed by Searle and Grice on speech acts and implicatures, and in a different line by Wittgenstein on language games. A later and contrary branch of this lineage is represented by Hilary Putnam and Saul Kripke on the indexicality of reference. Finally, linguistic anthropology rightly claims important kin connections with phenomenologists such as Husserl who inspired sociologists from Schutz, to Goffman to Garfinkel, though these doubtless also saw themselves as descendants of G. H. Mead, himself very likely a reader of Peirce.

Relying on all these sources, linguistic anthropology was consolidated in the 1960s through two intellectual strategies familiar from the history of science: The first was a bid to constitute an 'object' of analysis that had not before been the focus of research. Most broadly stated, this object was the process of face-to-face interaction. One can rephrase the argument this way: the primary datum for all the ethnographic and language-based disciplines is the contingent stream of eventful talk in everyday life, along with its concomitant non-verbal signaling systems. Each disciplinary enterprise abstracts from this in a principled manner. What is not within its focus becomes an obstacle to research and is bracketed or theoretically discounted. For instance, Saussure was quite explicit that a synchronic linguistics should (for the moment) ignore what he defined as 'external' though admittedly important facts, instead studying structural relationships of contrast and opposition he defined as 'internal' to language. In a parallel way, the sociocultural anthropology of the 1960s treated language as a vehicle for recounting cultural content, thereby excluding from study the situation in which the telling occurred.

This first project has had considerably success. Linguistic anthropology abstracted something new from that accessible stream of verbal activity, finding systematicity where others had found only noise: Goffman's "neglected situation;" "naturally occurring talk" and 'conversation' as defined by Schegloff and Sacks; the "speech event" and its functions, as defined by Jakobson; studies of performance genres by Hymes, Friedrich, Albert, and Ervin-Tripp; Barth's notion of interactions as boundaries; Austin and Searle's "speech acts," and the organization of "social meaning" that Gumperz and Labov found in linguistic variation and codeswitching. Goffman declared the relative analytical independence of an "interactional order" governed by a separate set of principles not directly related to larger social structures. There ensued a period of description, typologizing, and cross cultural comparison.

The second, more radical intellectual project was a double-edged critique, targeting both linguistics and social science as then constituted. Hymes's dictum was a classic performative, disguised as mere description: "... whereas the first half of the century was distinguished by a drive for the autonomy of language as an object of study and a focus upon description of structure, the second half was distinguished by a concern for the integration of language in sociocultural context ...." (1964: 11). This project continues

to inspire theory and research. It has produced detailed criticisms of mainstream linguistics, sociology and anthropology.

In the argument with generative linguistics, linguistic anthropology retained much of structuralist analysis, but rejected the asocial definition of language. What had been peripheralized became central in a series of changes in focus. Linguistic anthropology emphasized multilingual, stratified speech communities instead of the ideal hearer/speaker; performance instead of linguistic competence; linguistic repertoire and speech act instead of abstract grammar and sentence; speech acts and speech events instead of the disembodied sentence. As sources of evidence, contextually located and tape-recorded interaction replaced intuitions about grammaticality. Some of this dovetailed with European initiatives to study sentence level phenomena through their cohesion into larger units. In mainstream American linguistics, however, the subjects taken up by linguistic anthropology were relegated to subfields such as pragmatics and sociolinguistics.

In sociology, it was methods and epistemology that were attacked by language-centered approaches. Study of interaction highlighted the situatedness of all sociological descriptions, indeed the unavoidable role of the interviewer in shaping the answers that made up a sociological report. This insight about the 'reactivity' of measurement was recognized as important, but was so corrosive to sociological business-as-usual that it was isolated as the workings of a 'micro-order,' to be studied separately from the institutional, organizational and demographic issues that occupied the mainstream of sociology. Without theories of how micro and macro were linked, there was a continuing side-lining of language as subject matter, and the trivialization of interactional process as merely the enactment of patterns determined elsewhere, the faithful reflection of supposedly more powerful 'macro' forces.

The role of linguistic anthropology within anthropology was more complicated. The position of language was significantly transformed in the 1980s in two ways. First, through a redefinition of culture. Rather than a symbolic or cognitive phenomenon (the two previous approaches) culture came to be seen as a set of embodied practices within institutions; practices that, in certain conjunctures, could change the institutions themselves. 'Language' was often invoked as a powerful means of constructing reality. Ethnographies of speaking that analyzed race, gender, ethnic conflict or dispute settlement fit well into practice theories such as those inspired by Bourdieu, by Birmingham cultural studies, colonial studies and Gramscian notions. But even when recognized as important, linguistic practice was rarely analyzed in any detail.

Simultaneously, a second enterprise was also launched, related to language but largely independent of linguistic anthropology. Under the influence of literary studies, anthropology mounted a reflexive critique of the poetics and rhetoric of anthropology's own prose genres, especially ethnographic monographs. Anthropologists joined continental theorists such as Foucault and Derrida in unpacking and undermining the idea of objective knowledge. Metadiscourse, texts, their materiality, their authorization, their ability to 'objectify' and devalue others, all took center stage in sociocultural anthropology. But these concerns were often separated from the classic ethnographic and comparative goals of the discipline. For linguistic anthropology, the poststructuralist philosophers' discussions of discourse, rhetoric and poetics as shapers of 'truth' and subjectivity rang familiar tunes – if in unfamiliar keys. As a result, they provoked spirited responses. This critical engagement was guided by the internal logic of linguistic anthropology itself during intensive discussions in the 1980s and 1990s. The debates with poststructuralism encouraged a synthesis within linguistic anthropology that was aimed at developing a processual, event-based, political economy of texts in social life, and a semiotic perspective on culture.

The overall project of linguistic anthropology remains the reshaping of linguistic theory from an interactionalist and culturalist perspective, and the revamping of anthropological investigations of meaning and action from the perspective of a semiotically grounded understanding of language, culture and social institutions. Within these broad aims, the last twenty years have brought substantial revisions in theoretical concepts.

Concepts and Controversies

The orienting concepts discussed here are not strictly separable; there are overlaps and echoes among them. Each section traces continuities with earlier formulations, discusses points of recent controversy and consensus, and then outlines briefly the implications of current approaches in linguistic anthropology for both linguistic and anthropological theory.

Indexicality, Metalanguage, Materiality

The multifunctionality of language was a pillar of 1960s linguistic anthropology. Jakobson (1960) enumerated emotive, poetic, metalinguistic, phatic and conative (action) functions. These operate simultaneously. Depending on the nature and goal of interaction, some are highlighted more than others. Yet

linguistic anthropologists observed that in many cultural contexts experts and laypeople alike privileged referentiality, believing that the naming of things in the world and predication about them was the pre-eminent role of language. Early linguistic anthropology proposed the category of 'social meaning' to designate what is communicated through a disparate set of formal linguistic devices in which picking out a referent is only secondarily involved, or absent altogether. These included Labovian phonological markers of class or regional identity, speech levels, grammatical alternates specific to males vs. females, avoidance registers, and codeswitching between languages and dialects.

The conceptual unity of these phenomena has been clarified through more concentrated attention to the non-referential, metalinguistic and poetic functions of language. This has been done through a foundational critique of structural linguistics, fortified by a culturalist reading of Peircean semiotics.

The structuralist tradition of grammatical analysis, no less than western common-sense, implicitly relies on the assumption of a stable referentiality for linguistic units. Saussure created a semiotics in which signs link a concept (signified) with a sound image (signifier) in systems of value-creating contrast. But he left unanalyzed the circumstances under which signs would be instantiated. His form of structuralism is able to explicate the workings of grammar as a system of oppositions, sequences and substitutions. But severing an abstract system of types (*langue*) from their tokens in contexts-of-use (*parole*) had serious limitations. Most importantly, it could not analyze what Jakobson called 'shifters:' linguistic phenomena whose referential value is not entirely fixed within an abstract system, but relies in part on features of the situation in which they are used. There is no type-level stability in the reference of 'I,' it varies with the instance of utterance, always identifying the speaker of the moment. More generally, not only reference but also the interpretations of speech acts, implicatures and presuppositions are necessarily linked to events of speech.

Thus, speech as social action is not adequately described as the 'putting to use' of a separately analyzed grammar. On the contrary, grammar is full of devices – deictics, tense, mood, evidentials – that gain their interpretation only in part from type-level contrasts, and in part as tokens of use in specific contexts. These phenomena make an autonomous grammar impossible in principle: to describe them fully one needs pragmatics. That is, the speech event in which they occur must be analyzed in ethnographic detail and systematically linked to linguistic form.

To do so, Jakobson drew on C. S. Peirce's triadic semiotic theory in which a sign is linked to an object for an interpretant. Indexical signs, for Peirce, stand for their objects by virtue of a culturally noticed, real-world contiguity. In contrast to symbols, defined by Peirce as signs that stand for their objects by virtue of a general law, indexes simply point to their objects; they signal through a co-existence between the sign and the objects and speech events of its occurrence. In these terms, shifters are partially indexical, partially symbolic. As Silverstein (1976) argued, the linguistic phenomena earlier identified as having "social meaning" (e.g. phonological variants, codeswitches) are non-referential indexes, relying for their interpretation on their continguity (indexicality) with contextual features of the speech event in which they occur. That is how a phonological variant can signal the social relations of the speakers in an event, their relation to the topic of talk and/or the nature of the event itself. Non-referential indexes can be placed on a continuum with shifters. Indeed, the philosophical work of Putnam and Kripke showed that any act of reference necessarily has an indexical component. Referential indexes (shifters) and non-referential indexes have two further significant properties. They need some metadiscursive frame in which to be interpreted (see next section). And they can be either presupposing or creative. If presupposing, then their use signals that some aspect of the context is taken for granted as existent; if creative/entailing, then the use of the form itself brings into social relevance (into apparent 'existence') the objects or categories with which the form is culturally associated.

By linking shifters and non-referential indexes, a Peircean analysis provides a conceptual unity to social indexicals and thus to what used to be called 'social meaning,' thereby clinching the case against an autonomous grammar. It also provides conceptual materials for an alternative theory of linguistic structure. Classic empirical studies of indexicals include Errington's work on speech levels in Java; Silverstein's re-analyses of Labovian phonologoical variables and of T/V pronoun usage in the history of English; Irvine on Wolof registers; Ochs on indexicals of gender and stance in language socialization; Duranti and Agha on honorifics; and Haviland on Australian avoidance register. Brown and Levinson handled politeness phenomena, which are also of this kind, with a decidedly different approach.

The presumption that referentiality and propositionality are the pre-eminent functions of language is part of an ancient western ideology. Not as old, but still powerful is the related idea that metalanguage and poetic forms are mere ornaments to reference. Because language has so often served as a model of culture, these widespread assumptions have implications for anthropological theory. For instance,

Levi-Strauss borrowed from structural linguistics the idea of distinctive features; ethnoscience borrowed generative grammar's idea that there are rules of competence. Interpretive anthropology borrowed from philology the notion of text. In each of these otherwise different cases, it was the referential capacity of language that served as the model for culture. Culture, like grammar, was seen as organized symbolic content that could be extracted from the real-time social action and historical positioning in which it was created. This taken-for-granted move of decontextualization reproduced the Cartesian assumption of a chasm between world and word. Accordingly, approaches in anthropology that emphasized practice, political economy and materiality were assumed to be opposed to those concerned with meaning, representation and ideation.

In contrast, a linguistic anthropology that places indexicality and speech-as-action at the center of attention provides a different synergy with sociocultural anthropology. Propositionality, however significant, is recognized as a feature peculiar to language. It is least like the rest of culture. Instead, the indexical aspects of linguistic practices, as interpreted by metadiscourses, are among the best examples of cultural meaning-making. Indexical signs are not only linguistic; they are also gestural, visual and sartorial, among other modalities. They are not 'reflections' of some other, more (or less) important reality. Rather, they are constitutive of the real-time creation of social-material reality through interaction. Peircean semiotics, with its tripartite emphasis on the **object**, as mediated by the sign and interpretant, insists on the materiality of communication, and conversely on the semiotic organization of material practices.

Context and Contextualization

Speech events were a fundamental unit of early linguistic anthropology. Studies focused on their constituent features (e.g. speaker, hearer, topic), social functions and cross-cultural typologies (e.g. Gumperz and Hymes, 1972; Bauman and Sherzer, 1974). In the last few decades, the structural description of speech events has been transformed into a more flexible concern with the 'context' of discourse and performance, bringing several important changes in the understanding of context. Good overviews of these issues are offered by Bauman and Briggs (1990), and Duranti and Goodwin (1992). The notion of 'context' as a set of social, spatial and physical features surrounding talk was commonsensical but inadequate. It implied the possibility of infinite regress in the number of features; it neglected the perspective from which context was viewed; and it assumed a firm divide between talk and context. The problem of infinite regress arose from the effort of the analyst to list exhaustively the factors that might affect the nature and form of the talk. In order to choose which of the many features are relevant, one must address the question of perspective. Features defined from the point of view of the analyst are useless for understanding social process; it is the selective attention by participants to aspects of the social surround that analysts ought to be describing.

Conversation analysts such as Schegloff, Sacks, Jefferson, Heritage, Charles and Marjorie Goodwin took as an axiom the importance of discerning what participants orient to on a moment-by-moment basis in the local management of sequential talk. Participants need not share perspective among themselves any more than they do with the analyst. They might well have to negotiate a definition of the situation. Context then becomes a joint accomplishment. Infinite regress is avoided because it is the participants who together signal when 'enough is enough,' or defeat each others' attempts to include more (or less) of the surround. Such signaling is not necessarily propositional speech, yet is certainly communicative. Talk itself signals the frames for its own interpretation, supplying the cues for what is to be taken as its own context. There is no firm divide between a strip of talk, its co-text (linguistic context) and its sociocultural context.

It is not context, then, that is of interest, but contextualization: how participants attend to on-going discourse, conveying their assessments, evaluations, presuppositions as well as predictions about the definition of the activity that is occurring, the event-specific roles of the participants, the intentions of speakers, the direction the activity is likely to take, as well as unexpected switches in all of these. This process relies on culture-specific folk theories about social actors, intentions, events and goals, while recreating those very categories in the process of communication. These theories are not necessarily shared. What Putnam observed about the lexicon is equally apt here: in any group there is likely to be a division of linguistic labor and of the expertise it requires. In addition to local knowledge, contextualization relies on the universal metacommunicative capacity of language, and on the universal ability of speakers to attend to and respond to metamessages about the relationship of talk to its surround.

The several concepts that have been crafted for the analysis of this metacommunicative process differ in certain respects, but bear a family resemblance. Lucy (1993) provides a good review of these. Bateson proposed 'framing' to denote metamessaging that signals some activity to be play or not-play. This is

common even among many non-human animal species. Chafe and Fillmore made linguistic use of this formulation. Goffman (1979) extended it with his notion of the footing or stance taken in an interaction, and the participant roles or role fragments – such as 'author' 'animator' 'principal' of an utterance – that are thereby evoked. Philips described participant structures, and Cicourel proposed the notion of schema for related phenomena. Gumperz (1982) introduced contextualization cue to name the many kinds of linguistic signals (e.g. prosody, codeswitching) from which one infers what kind of activity is in effect. Silverstein (1993) distinguished between metasemantics, by which speakers define the meanings of words, and metapragmatics. Metapragmatic discourse is explicit commentary or evaluation of language use (e.g. that some event was gossip). Metapragmatic function, by contrast, is implicit signaling to suggest which cultural frame or activity is in effect. Bakhtin (1981) and Voloshinov proposed literary analysis of reported speech and voicing as metacommunicative devices that present the perspective of one speaker on the speech of another. Bauman (1986) showed that performance is itself reflexive: the speaker assumes responsibility for speaking well, thereby drawing attention to the code and poetic forms through which speech genres are created and thus expectations about them are signaled.

A crucial aspect of framing or voicing is the possibility that frames can be embedded in other frames; they can be transposed and projected both forward and backward in time. Furthermore, speakers create interactional tropes, treating interlocutors and events 'as though they were someone/something else,' thereby achieving novel communicative and social effects. As part of such effects, voices can be reported in quotation or in various forms of indirect discourse. Social interaction is thus an endless lamination of narrated events and the narrative events within which the stories are told. For linguistics this implies a complexity in patterns of pronouns, tense, evidentials, discourse markers and anaphora that signal such embeddings of frames. These cannot be handled without theorizing indexical phenomena. For sociocultural anthropology the embedding of frames and their interpenetration during narratives and conversation allows analysts to understand processes such as the relationality of personhood and the fragmentation of selves, as well as subject formation, role-distance, and the cultural conceptualization of what counts as authenticity. It is a small example of the reality-constructing processes involved in reported speech that the speech reported need never have happened, or not in the way reported. Yet the report – culturally framed as, say, gossip, journalism, court testimony, or oracle – can have far-reaching consequences in shaping subsequent social relations.

Framing and the propositional content of talk always occur simultaneously. Metamessages allow the analyst to track participants' interactional moves in an encounter. These moves (the interactional text) include the open-ended set of acts that can be done with words: promises, teases, threats, and the unnamed, more general alignment or antagonism among speakers. These acts are accomplished in part by small observable behaviors such as sequencing, body position, and conversational repair. But they are just as importantly accomplished by the ways in which the names for objects and actions that are the subject matter of talk are selected from the many equally accurate denotational labels available. As Schegloff (1971) pointed out for the limited case of place-names, how one formulates a label is always relative to a particular event of talk, that is, indexical. Selection of a term that picks out a referent involves a delicate (and not always conscious or aware) negotiation of social relationships, assumptions about participants' levels and types of knowledge, hence their identities and social location. In turn, the use of one rather than another referring expression is creative/performative. The difference between 'dine' 'take a repast' 'chow down' or 'put on the old nosebag' is not only a matter of lexical register. Each claims a speaker identity, positions speakers with respect to each other, with respect to the event, the referent, and to the cultural discourses indexed by the labels selected. Framing and the indexicality of reference together accomplish contextualization: the moment-by-moment means through which interaction creates and transforms social relations.

Text and Entextualization

There is an irony in the effort of linguistic anthropology to discern how participants contextualize stretches of discourse. For scholars themselves spend most of their time ripping snippets of discourse out of context in order to translate, transcribe and analyze them. The process of decontextualization is a key (reflexive) step in social science methodology. Yet the examples of transposition, reporting the speech of others, and embedded frames discussed earlier show that decontextualization is just as familiar from everyday life. It is the flip side of contextualization. This is what Bakhtin evocatively characterized as our mouths being full of other people's words. It has been a focus of analysis in linguistic anthropology for the last two decades.

Close analysis of the process requires a distinction between 'text' and 'discourse.' 'Text' is any

objectified unit of discourse that is lifted from its interactional setting. 'Entextualization' is the process of transforming a stretch of discourse into such a unit of text, undoing its indexical grounding by detaching it from its co-text and surroundings, yet taking some trace of its earlier context with it to another setting which is thereby changed and which reciprocally transforms the text itself. Certain formal properties can enhance the likelihood of entextualization. For instance, poetic features of cohesion, or genre conventions can signal a boundary to an interaction, therefore a chunking of text. But any stretch of discourse can enter into interdiscursive relations by which it seems to be recalled, repeated or echoed in further discourse. It can be picked out and seemingly frozen as text, to be involved in further intertextual relations that link it to previous and subsequent versions of text. Interdiscursive and intertextual links create the impression that text fragments 'circulate' across texts, events and among speakers.

The linguistic means of entextualization are the same metadiscursive signals that are essential for contextualization: devices of framing, cueing, metapragmatic discourses and functions. For the purposes of linguistic analysis, it is necessary to study the transformations that discourse undergoes as it is entextualized and then (re)contextualized. Footing or genre might change, as might indexical grounding (as signaled by changes in deictics of person, space and time). The function of the text might also change (e.g. from everyday act to ritualized tradition). New forms, functions and meanings may be emergent in the newly re-contextualized text. And there are questions of access, power and inequality involved in the social arrangements that constrain what sorts of persons and statuses can entextualize in what institutional settings. Processes widely analyzed under other names – translation, codeswitching, glossing, among others – are amenable to further scrutiny in these terms. Furthermore, by cultural definition, some texts are more or less accessible for de- and recontextualization.

The anthropological implications of this line of work extend in at least three directions. First, such analysis can reveal how the social magic of authority – political, legal, epistemic – is created in and across interactions. The relationship between narrated event and the story-telling event in which it occurs is a delicate nexus at which to 'calibrate' voicing through the projected relations of teller to tale, to audience, to source, and to previous and subsequent events and tellings (Silverstein, 1993). Through metapragmatic framing, speakers can construe the interactive event that is recounted as being distinct from the on-going event of talk (reportative calibration), or as the same event (reflexive calibration), or as emanating from some other epistemic realm such as the sacred, the universal, or mythic (nomic calibration). Within specific institutional settings, these calibrations create different sorts of authority: claims to knowledge, or claims to (and the social effect of) speaking as/for the people, the ancestors, the gods, or the laws of science. Contests over the metapragmatic framing of sources for statements can create (and destroy) the authority of texts and hence the power of speakers. As Silverstein and Urban (1996) note, a significant part of politics is the struggle to entextualize authoritatively. Linguistic practices, then, are the very grounds of politics, not the medium, description or reflection of them. This includes the assignment of responsibility and blame, credibility and doubt. Hill and Irvine (1993) show that across widely different cultural settings, such attributions are managed through metapragmatic devices such as reported speech and the distribution of voices across participant roles.

Second, the processes of entextualization and links among texts (intertextuality) allow a deeper understanding of temporality, spatiality and social connectedness. Despite the undeniably linear, sequential ordering of speech, there is no single 'now' in interaction. Any utterance is weighted with the earlier source from which it can be heard to have originated, and the implicit future recounting in which it might participate. The interdiscursive links among interactional contexts can be extended and projected without temporal limit (Irvine, 1996). Even within a single narration there are often layered successions of retellings which, embedded in each other, can make traditionalization visible as a temporal process. Similarly, study of intertextuality can highlight systematic relations among events in spatial extension, inviting scholars to rethink the relation of face-to-face interaction and what used to be called 'larger social structures.' This will require further theorization of the various kinds of linkages between interactions. For instance, we need to know how circulation – a shorthand term for intertextual links, echoes, repetitions – has differential 'reach' across interactions that are distinguished according to their degrees and types of instutionalization, geographical range, political economic consequentiality, form of mediation as broadcast, print, or face-to-face talk. The phenomenon of translation (linguistic, cultural) deserves considerably more attention in these terms, as it too is a form of multiply layered intertextuality.

Finally, there are methodological implications of this perspective on text. Social science research always involves reflexive language. Jakobson remarked that there could be no linguistics without metalanguage,

as scholars have to ask for glosses, acceptability judgments and paraphrases. The reactivity of fieldwork became an issue for sociocultural anthropologists of the 1980s, (just as it had for sociologists in the 1960s) when they noted that fieldwork is 'dialogic.' It is not the positivistic observation of an object by a subject but an encounter between two subjects – the informant and the anthropologist – with different relevances, values, and different sets of ultimate audiences in mind. Much of the subsequent critical commentary focused on issues of objectification in ethnographic writing. Less attention was paid to the fieldwork encounter itself as dialogic and mutually objectifying. Like any interaction, fieldwork and interview are always susceptible to the confusion of mismatched or even incommensurable metapragmatic signals among interactants that Gumperz called 'cross-talk,' and that is made worse by power differentials. This is less a problem specific to anthropological research than an insight about the nature of human interaction. As Mannheim and Tedlock (1995) have remarked, the people anthropologists study have been 'objectifying' each other well before the arrival of the fieldworker. The task is to specify what kinds of objectification and incommensurability in metacommunication are operating, and how.

Language Ideologies

Language ideologies are cultural conceptions about language, its nature, structure and use, and about the place of communicative behavior in social life. Useful definitions and exemplary studies are presented in Woolard and Schieffelin (1994) and Schieffelin *et al.* (1998). Ideas about speech and language are common in all social groups and are as culturally diverse as linguistic practices themselves. In the linguistic anthropology of the 1960s the study of language attitudes and native models of politeness, language variation, honorifics and appropriateness were grist for cross-cultural typologies and comparisons. These research themes, along with others detailed below, are unified under the rubric of language ideology.

The term 'ideology,' though polysemous, most often evokes ideas connected to politics and power. Such concerns have a long pedigree in linguistic anthropology. Boas as public intellectual brought anthropological and linguistic evidence to bear against racist science and anti-immigration policies. Overtly political concerns about inequality and race were also present in the 1960s, for instance in the debates among Bernstein, Hymes, Gumperz, Kay and Labov on the existence, value, and consequences of 'restricted codes' in working class and Black speech. Current controversies that have strong political implications include the increasingly global hegemony of English, the linguistic mediation of inequality, the future of endangered languages, and the stigmatization of multilingualism and of certain accents and dialects. What is different today is scholars' reflexive analysis of communicative processes in their own work and in large scale politics.

Language ideologies always include metapragmatics, that is, local suppositions about the relation of speech forms to speakers' identities and their social situations. But language ideologies are never only about language. They include whatever other conceptual systems are taken to be relevant to language by the speakers and institutions under study. In the analysis of language ideology, as in the study of metapragmatics, there is a split between those approaches privileging explicit, propositional content, and others that focus on implicit ideological patterns inscribed in linguistic, institutional, ritual and other material practices. Language ideologies are never unitary and so the study of ideology commits the theorist to a perspectival approach. As Woolard has emphasized, one must ask: whose ideology is at issue and in what practices and institutions is it sited. There are likely to be contradictions among ideologies. For instance, Bateson's notion of the double bind consists of two contradictory ideological (meta) messages, delivered in different modalities simultaneously. There is also likely to be contestation among ideologies evident at different social locations. Nor are ideologies likely to be shared within social groups in a world characterized by linguistic divisions of labor. In a single population, language ideologies inscribed in the practices of schooling can conflict with or override those evident in families, friendship networks or other institutions, raising questions about the relative authority of different ideologies.

Early discussions of 'linguistic ideology' emphasized the tendency of explicit ideological statements to rationalize and thereby distort linguistic practices. Boas and Bloomfield saw speakers' models of their own speech as obstacles to genuine linguistic analysis. More recently, scholars have noted that there is no access to linguistic materials except through the filter of metalinguistic assumptions – whether these are the assumptions of speakers and/or of analysts. Current use of the term 'language ideology' considers such filters not as regrettable distortions but as part of the perspectival nature of ideologies, their necessary partialness and partiality. This includes the perspective of linguists. Language ideologies are grounded in social position and experience, in moral and political stances. But they are not an automatic reflex of these. Rather, ideology mediates between social position and linguistic practice in diverse domains. Students of language

socialization (Ochs and Schieffelin, 1994) have shown that children do not simply learn linguistic skills. Rather, local ideologies mediate between talk itself and assumptions about the proper relationship between childhood, talk and forms of mothering. Similarly, in the study of literacy, Collins finds that language ideologies add their own contributions as interpretive filters, defining who can be expected to read and write in what way and for what purpose, thereby contributing to the creation of many distinct forms of literacy. The linkage between linguistic practices and categories of identity is also mediated by language ideologies. How are maleness and femaleness indexed in speech? When such indexes appear in interaction, other dimensions of social life – such as the expression of desire, sexual activity, typified emotions, rank and social position – are entailed, in part on the basis of local cultural images of masculinity and femininity (Cameron and Kulick, 2003).

By viewing language ideology as an inescapably perspectival lens on social interaction, linguistic anthropology engages in debate with neo-Marxist lineages of ideology-critique. Some studies in linguistic anthropology have marshaled evidence from language use to challenge social theorists' proposals about the workings of symbolic domination and cultural hegemony. Other work has reconsidered influential formulations about ideology by Bourdieu, Foucault, Althusser, Žižek and others to reveal their unexamined assumptions about language and semiosis. Social theorists of ideology often and unreflectively rely on implicit linguistic models that, because they seem commonsensical or self-evident, help to make their theories more persuasive. Most generally, ideologies that present themselves as concerning language can work as displacements or coded stories about political, religious or scientific systems; ideologies that seem to be about religion, political theory, human subjectivity or science are often implicit entailments of language ideologies, or the precipitates of widespread linguistic practices. The term 'displacement' can be further analyzed here as a form of voicing. However, to recast a language debate as a coded dispute about religion, aesthetics, morality or politics is not, in itself, an explanation. Rather, the goal of analysis in studies of language ideology is to show **how** such a displacement works in semiotic terms, how it is instantiated in practices, and how it legitimates, justifies or mediates action in quite other areas of social life. Conversely, a particular definition of language may itself be made more credible by its connection to other, non-linguistic, sociopolitical concerns and especially to their supporting institutions.

Ethnolinguistic nationalism provides a familiar example. Over several centuries, European philosophical and political practice did the ideological work of making the connection between the cultural categories of 'language' and 'nation' appear a necessary, natural and self-evident one, united as much in everyday political practice as in scholarly arguments. This occurred in part through the establishment of a science of language that defined a bounded and unified object of study ('language') as a natural entity, out there to be discovered. The ideologically constructed unity of language-and-culture in a populace was seen as the ultimate source of political authority: those who spoke one language constituted a 'people' whose united voice would replace the authority of imperial rule. By this logic, any group claiming to speak the same language could use that fact as proof of its nationhood and thus justification for a state of its own. A somewhat different example of authority through language ideology is the political theory of the 'public sphere' as guarantor of democratic politics. According to European notions of a public sphere, as dissected by Habermas, the worth of a speaker's argument is judged not by speakers' social status. Ideally, democratic citizens make anonymous contributions to policy debate and to critiques of the state. It is the form and rationality of their contributions, not their identities, that is supposed to guarantee the fairness of a democratic polity. From the perspective of this theory of democracy, it is evident that a model of ideal linguistic interaction underpins the semblance of impartiality and hence the legitimacy of democratic process (Gal and Woolard, 2001).

It is not only politics that is legitimated by images of language and social life. Bauman's study of Quakers and Keane's more recent report on Christian missionizing both suggest that the relations envisioned between speakers and listeners within these religious communities implied forms of interiority and intentionality that became models for various forms of Christian belief. Other forms of belief are also underwritten by understandings about language in social life. For instance, Shapin's historical account of 17th century science shows that polite conversation among gentlemen was the model that, when transferred to gentlemanly interaction at the Royal Society, created the credibility and assumed replicability of early scientific experimentation. In these examples, linguistic ideologies underpin social institutions, providing the supposedly self-evident background that authorizes new social forms.

Language ideologies are cultural frames. As such they have their own histories, which are instantiated and circulated in specific institutions and genres of speech and writing such as the etiquette book, instruction in oratory or realist novel. Another such genre in the west is linguistic philosophy. Its analyses

are supposedly universal, yet very much rooted in the history of European cultural understandings about language. While the notion of 'intentionality' of the speaker is a key term in western philosophy of language, comparative study shows this to be but one historically specific version of an interiority-centered language ideology. As Duranti and Rosaldo have shown, in many social groups outside of Europe, inferences about speakers' intentionality are not decisive or indispensable in the interpretation of speech acts. Bauman and Briggs's study of the western philosophical tradition focuses mainly on Herder and Locke, tracing the historical conditions out of which emerged the regimentation of linguistic practices that would subsequently count as examples of 'folklore' on the one hand, and 'objective speech' on the other. Another such genre is linguistics analysis itself, especially as it has intersected with colonial projects. Historical studies show how language ideologies fit into fields of debate with which they are contemporaneous, and that concern other, diverse matters: the nature of human difference and inequality, competition among scholarly disciplines, or the competence and vision of a particular monarch's ruling group.

Differentiation: Registers, Communities, Variation and Change

Speech community, linguistic repertoire, variation, register and style are among the foundational concepts of linguistic anthropology. Adopted from earlier frameworks of research, they were redefined by the work of the 1960s. In the last twenty years they have been transformed once again in light of the notions of indexicality and metapragmatics/ideology. In any social group, images linking typical persons to typical activities and typical linguistic practices draw on culturally salient and elaborated principles of differentiation (e.g. presupposed notions of caste or occupation, folk theories of gender and personhood) that are often perceived by participants as necessary and inherent distinctions. These ideological principles – axes of differentiation – mediate between social and linguistic characteristics and orient the practices and relations of interactants. Speech communities and language communities are emergent effects built out of such axes of differentiation.

Linguistic variation often appears to speakers (and to analysts) as a reflection or diagram of social differentiation. A famous example is the finding by Labov and his students that phonological variables correlate with situational style and the socioeconomic status of speakers. The analytical task is to specify the ideological – or more precisely the semiotic – processes by which these correlations arise and become significant. Why and how do particular chunks of linguistic material coalesce into recognizable and nameable ways of speaking (registers) that gain significance as signs of particular populations, activities, settings, and are heard as appropriate to certain events. Furthermore, how is it that in any interaction, the expected correlations can be subverted or transposed, thereby signaling quite unexpected messages?

The extension of a Peircean theory of signs has been productive in approaching these issues. Linguistic features that form co-occurring clusters or registers are indexical of (point to) categories of speakers who regularly use them, or to situations and activity types in which the features regularly occur. But not all real-world co-occurrences form indexical signals. The co-occurrences must be noticed and formulated within some cultural or ideological system. To make such linkages and render them meaningful for speakers often requires extensive discursive efforts and the effects of media circulation. Another means of establishing meaningful indexicalities is through ritual and institutionalization. When both the ways of speaking and the people or activities are typified, schematized and conceptually linked, the result is a system of registers that evokes a system of stereotypes. Formulations of referents in minute-to-minute interaction rely on these associations. Registers often include not only linguistic material but also other signaling systems such as clothing, demeanor and gesture. Linguistic-forms-in-use that are thus ideologized as distinctive and implicating distinctive kinds of people can always be resignified, further ideologized (or misrecognized) as emblematic of other social, political, or moral characteristics in what Silverstein has dubbed multiple orders of indexicality.

Another of Peirce's sign relations – iconicity – is key in differentiation, according to Irvine and Gal (2000). Peirce distinguished between indexes that point to their objects and icons that share the qualities of their objects, for some interpretant (e.g. a theory or ideology). In sociolinguistic differentiation, there is always a *set* of contrasting indexes pointing to contrasting objects in a relation that Peirce would call diagrammatic iconicity. Furthermore, the indexical links between linguistic signs and speakers, characteristics or events are understood not simply as a cooccurence but a sharing of quality. When an index is thus perceived as an icon, the resulting sign is a Peircean 'rheme.' Essentialization is in part constructed semiotically, through the perception that the sign and the object are iconically linked. A system of such contrasts, salient at one level or scale can be projected, in a fractally recursive manner, onto other scales of social and linguistic relation, either broader or

narrower. This allows for the proliferation of the same or similar difference at greater and smaller scales. Social or linguistic aspects of the sociolinguistic scene that do not fit such systems of stereotypes are semiotically erased. That is, they are ignored, backgrounded and sometimes physically eliminated.

When a system of such indexical signals is the basis of social interaction, then participants can have fairly strong expectations about communication. Even if the participants do not share what is usually called a single language, they recognize the kinds of speech that signals different sorts of people and activities, and a speech community can be said to exist. Note the similarity to the Prague School's notion of *Sprechbund*. Since precolonial times, networks of exchange, commerce, travel and exploration have been creating speech communities that are diverse in social function, stability and extent. It is important to make an analytical distinction. Speech communities consist of people who can interpret each others pragmatic, indexical signals to varying degrees. Language communities are groups of people bearing loyalty to norms of denotational system. Usually the denotational form receives a name – English, Swahili, Taiap – and is imagined as bounded and separate from other comparable units. Language communities emerge as cultural system in the context of heterogeneous speech communities when difference in denotational practice is ideologized as significant. Thus contact and interaction – not isolation – produce distinct language communities.

Language communities, although always characterized by loyalty to code, are nevertheless culturally distinct. Sometimes a single person's speech is recognized as exemplary and aesthetically pleasing. In other cases the form of speech used in a certain setting or event (kiva, longhouse, oratory) is considered the model worthy of emulation. More common in the world today is the language community that is linked to a state system and oriented not to beauty but to standardized forms of correctness, monitored by language academies, school systems and grammar books. Named languages do not simply exist in the world. Through institutions they are constantly being made and reconstructed, their boundaries policed and defended. In the process of consolidation, standard languages often become gate-keeping devices in national labor markets, providing speakers who control them with increased access to jobs and other resources (Bourdieu, 1981). But the value of standard languages does not derive from such direct market activity; rather their market value depends on semiotic processes of differentiation.

Speakers who are incorporated into colonial empires through bureaucracy, trade, or conquest, but do not speak the language of the state, come to see their own linguistic practices through the eyes of the powerful center. Therefore, they come to see themselves relationally, as peripheral. For such populations, the switch in perspective produces novel self-understandings as 'minority' 'local' or 'indigenous.' In states organized as democratic and multicultural, legitimating one's indigeneity or minority standing requires at least partial adoption of the state's standardizing ideology. Whatever their own ideologies about linguistic practice, such populations must often produce a denotational code different enough from others to count as a 'language' of their own. For many decades, such 'local' languages were the special province of anthropological linguists, whose descriptions deliberately erased – as inauthentic – the contact languages and multilingualism that tied indigenous speakers to their neighbors and colonial rulers. Part of the problem is that Euro-American linguists' notion of language as morpho-syntax-with-sound pattern is often at odds with local definitions that focus on lexical co-locations, place names, prosodical features and textual organization. These differences acquire increased significance when indigenous languages are considered endangered. The question of what merits documentation becomes a highly consequential matter, argued by scholars, by courts, and among members of the language community. As Hill and others have shown, whatever counts as linguistic knowledge in indigenous communities often endows its owner with authority and access to local resources. The position of Euro-American linguists as experts and arbiters in these matters is rife with moral contradictions that have been a focus of professional writing in recent years.

The exploration of metapragmatics and language ideology has produced new approaches to language change. Change is often the unintended consequence of people attending to linguistic structures through the prism of their own language ideologies, limited as these are by cognitive contraints on awareness and sociopolitical framings of what is significant. Increasing linguistic differentiation occurs through patterns of schismogenesis among interacting speakers, or conversely through simultaneous use of genetically different denotational codes in codeswitching (Heller, 1988). Codeswitching itself become the focus of loyalty, thereby producing a new language community. Other processes of differentiation result in language obsolescence, or contrariwise in language revival and the creation of 'heritage' languages for diasporic populations (Dorian, 1989). Also common is the commodification of language or linguistic practice for touristic purposes and the concomitant 'ethnicization' of local denotational codes when they

co-exist with a standardized state language. In this process there are often structural changes in the local language that mark it as iconic of the group with which it is identified. Ideologies of 'modernity/tradition' 'male/female,' 'purity/dirt,' and presuppositions about typified emotional states, notions of self, and quite local political issues, all can mediate between the socioeconomic situations of speakers and the forms of language change they experience (Gal and Irvine, 1995). Ideological framings of difference penetrate significantly into grammar.

A semiotic analysis of differentiation has implications for the study of processes beyond linguistic practices. The tendency for nationalisms to recursively evoke internal divisions of the populace into foreign-natives vs. native-natives is well explained by the semiotics of differentiation. In colonial and imperial circumstances, details of cultural practices have been interpreted as evidence of the relative 'humanness' of conquered populations in contrast to conquerors. Projections of this kind are not presupposing indexes of existing features, but creative (performative) acts that bring into interactional relevance the very iconic similarities they seem to be merely describing. In yet another form of differentiation, speakers adopt the Goffmanian 'figures' of others. That is, they take on, for varying periods of time, the registers, objects and activities seen as iconic of others in acts of Bakhtinian mimicry, quotation, parody and/or admiring emulation. By attending to the semiotics of differentiation linguists study the dynamics of heteroglossic social orders.

Language and Thought

Whether and how grammatical categories influence habitual thought and 'perceptions of reality' are among the oldest concerns of anthropological linguistics/linguistic anthropology. They were first raised for European science by colonial exploration and contact with languages whose grammatical structures seemed exotic in relation to the patterns familiar from study of geographically more proximate populations. In one way or another such differences worried Boas, Sapir, and Whorf, and well before them inspired Humboldt, Herder and Condillac. The issue has continued to draw scholarly interest throughout the 20th century.

If one were to consider the social power to be gained from the ability to define social 'reality' – as in Gramsci's cultural hegemony, Foucault's discourse, Bourdieu's doxa – then this set of questions would parallel those raised in the rest of linguistic anthropology. Characteristically, however, studies of linguistic relativity have taken a narrower view of linguistic practices, and have considered neither power nor a socially located and mediating ideology. Positing a more direct relation between language and thought, they have studied psychological and cognitive processes in themselves. There is currently a reversal in this trend, however, bringing studies of linguistic relativity closer to the issues of identity formation, politics, conflict and social differentiation that characterize the rest of linguistic anthropology. Recent work suggests that issues of translation, register and interaction will become as important in studies of linguistic relativity as they are increasingly becoming in other areas of linguistic anthropology. Two reviews provide excellent guides to the state of research and its disputed history: Hill and Mannheim (1992) and Gumperz and Levinson (1996). It will suffice here to note some areas of consensus among scholars, before taking up three contested issues to give a sense of the debates and the way terms such as language and thought have been redefined.

These matters are agreed: First, linguistic relativity (or the so-called Sapir-Whorf hypothesis) is not a hypothesis to be 'tested' but an axiom or starting point for research. Grammatical categories, to the extent that they are obligatory or habitual and relatively inaccessible to speakers' consciousness form a privileged location for reproducing cultural and social categories because they constrain the ontology taken for granted by speakers. There is no assumption about the coherence of entire 'world views' in this as in any other corners of anthropology. Second, although evidence of universals in human cognition has been thought to undermine a search for language-specific cognitive phenomena, all researchers acknowledge both. The interesting questions concern the relative strength, nature, sequence and role of universals vs. cultural-linguistic specificities and what those specificities might be. Third, it follows that Whorfian effects exist. This is hardly surprising given the discussions above about creative indexicality and projections. Finally, research priorities have shifted during the 20th century. Due in part to the Chomskyan 'rationalist' program in linguistics, the cognitive turn in psychology, and the empirical results of Berlin and Kay's (1969) research on color terminology, universals took center stage in the 1970s. Currently, there is a renewed interest in Whorfian effects from a number of different perspectives.

Turning now to contested issues, the first concerns the category 'grammar.' Whorf proposed that languages differ in the grammatical **analogies** they make. By handling substantively different lexicon within the same grammatical frame, they invite speakers to treat the otherwise different items in a similar way. Thus, English treats days, years and months not as cyclical

events but with the same grammatical devices as ordinary object nouns. English speakers expect – by unconscious analogy – to count time in the same way as they count tables. They ask about the substance out of which days are made, on the analogy of wood as the substance out of which tables are made. Hence the objectification of time as a substance. Such analogies are unquestioned background assumptions. They become apparent to analysts if one analogy system is compared to another that provides different hidden parallels. Careful methodology is fundamental here: when two systems are compared, neither can be taken as the standard or metalanguage for the other.

Some theorists suggest that the privileging of morphosyntax and its effect on semantic categories is misplaced, in a world of multilingualism. Friedrich proposed instead that the tropic or 'poetic' aspects of language, inflected by ethnopoetics, will differ most across cultures. (This echoes cognitive linguists' claims that habitual metaphors structure thought.) Similarly, if the poetic form of narration changes during language shift, there is a loss of a distinct cultural pattern for organizing experience. Others counter that narrative organization signals merely a difference in the way that experience is packaged for the purpose of talk, and is not necessarily reflective of cognition. This formulation runs into trouble, however, if people must use obligatory linguistic categories to encode experience in order to plan for future recountings.

A second set of arguments starts from experimental or cognitive psychology and the presumptive priority of universal cognitive processes. For some, linguistic relativity is not an issue because they assume language and cognition to be isomorphic, with thought as 'inner speech.' Linguistic relativity is also irrelevant for domains assumed to be unmediated by language: physical, musical or craft skills that are thought to be coded in somatic schema. Theories about universals of thought derive also from the Kantian tradition that takes categories of time, space and cause as the fundamental grounds of human reasoning. For many domains, there are also likely to be universal constraints imposed by the nature of the domain itself, and the specialized anatomical and neurophysiological adaptations of humans to a concrete world: wavelength for color; gravity in the case of space. Even in the realm of language there might be universals of structure or lexical organization. What does linguistic specificity add to such universals? Levinson suggests that in the case of space and possibly many other domains, linguistic relativity is still powerfully involved. Universals substantially *underdetermine* the possibilities of conceptual solutions to describing spatial arrangements.

A third controversy takes up Hymes's early suggestion that there is a linguistic relativity of language use as much as of linguistic structure. Populations differ in the genres and events they recognize. Interpretations that participants derive from utterances are always dependent on sociocultural context. Thus, the fit between language and thought is mediated by habitual practice; social interaction and cultural beliefs (ideologies) about the everyday world. For instance, deictics of space are found in all languages. Nevertheless, as Hanks argues, they encode culturally specific information, and they map social and experiential fields, not objective spaces. Thus, cultural schema of several kinds mediate between the use of a deictic term and its proper interpretation. Furthermore, these frames and schema are not always equally available to all speakers in a community. A linguistic division of labor is often evident, as is the consequent necessity to negotiate meanings between interactants. Clearly, this brings to the study of linguistic relativity questions of indexicality, entextualization and ideology. For the study of linguistic relativity the implications are significant: There might be as much variation between speakers in their access to alternate perspectives and theories as there is across 'cultures.' Furthermore, distinguishing between 'language' 'culture' and 'thought' is at best a rough methodological tactic. The object of investigation for linguistic anthropology, in current practice, is exactly 'culture' as a process that is simultaneously semiotic, interactional and linguistic.

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Linguistic Decolonization

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Linguistic decolonization describes both the actions taken in postcolonial contexts to undo the social, political, and cultural effects of the dominance of colonial languages and a philosophical challenge to the Western language ideologies that underpinned the colonial project and that have persisted in the postcolonial period. A wide view of 'colonization' includes not only the classic cases of Western expansionism but also 'internal colonialism' involving indigenous and minority populations within the nation-state (*see* **Minorities and Language**). We can speak of linguistic decolonization in a multitude of contexts, ranging from new state formation in Africa and Asia and the former republics of the Soviet Union to indigenous language planning in the Pacific, North and South America, to minority language movements in Western Europe. Given this vast scope, no pretense will be made here to cover all possible contexts and the vast literature in language planning and postcolonial studies; rather the aim is to outline some of the common features and challenges of documented processes of linguistic decolonization and what they have to say about language ideologies and policies in general (*see* **Linguistic Rights**).

Linguistic decolonization always takes place within a nationalist project: either as an element of new nation-building, or as an effort to legitimate languages and identities that were unrecognized or actively suppressed under colonialism. Linguistic decolonization projects have thus been preoccupied with redressing linguistic inequality and cultural oppression in the public sphere, particularly in education and in official/governmental life, by replacing

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all or part of the colonial language's public functions with one or more local, indigenous, or minority languages.

Projects of linguistic decolonization are thus profoundly shaped by dominant ideologies of language and nationalist ideologies about how language is related to cultural and political identities. These ideologies include the central premises that languages are 'natural' and clearly bounded entities that map onto equally natural human boundaries; that there is an essential or primordial link between a single language (conceived of as the 'mother tongue') and a single/unitary identity (either personal or collective).

A combination of social, ideological, and pragmatic issues complicate the process of linguistic decolonization and its goals of democratization and cultural legitimation for previously colonized groups. On the practical level, in postcolonial contexts it is rare that linguistic decolonizers have access to all the material and political resources needed to replace the status and functions of the colonial language in all domains. It is also the case that both local and global political economies of language are resistant to challenges to those powerful, former colonial languages. This is because those languages often still constitute social and political capital at the local level, where they can be used by local elites to legitimate their social positions.

Second, those languages (particularly English) have currency in new, global markets, motivating postcolonial social actors to embrace dominant language education in search of economic mobility despite the cultural value of schooling in the minority or indigenous language.

It is also the case that when minority or indigenous languages are 'developed' in the image of the colonial languages they replace, language planning efforts (normalization, officialization, standardization, codification) have the potential to create new forms of linguistic hierarchy. First of all, language planning policies may favor particular languages or dialects and thus their speakers. In some cases, those hierarchies are accepted by the population, to the benefit of particular speakers. In other cases, this political dimension of language policy ends up creating a permanent crisis of legitimacy that prevents postcolonial language planners from reaching any consensus. More generally, the introduction of minority or indigenous languages in the spheres of literacy and education inevitably creates a divide between 'good/pure' and 'bad/mixed' codes and validates new forms of expert linguistic knowledge owned by a minority.

With respect to linguistic purism in postcolonial contexts, two points can be made. First, it is an outcome of dominant ideologies of authoritative language (*see* **Power and Pragmatics**). Second, as a result of contact with the dominant language, both the form and use of the dominated language are inevitably 'mixed' and therefore stigmatized, once 'high' forms of that language are introduced. The issue of linguistic purism highlights the difficulty of resisting or challenging the single language/single identity premise of the nationalist project. At the political level, agents of linguistic decolonization are often forced to legitimate noncolonial languages in dominant terms because those terms are imposed by powerful gatekeepers. In addition, there is the question of the 'colonized mentality': the fact that the validity of dominant ideologies of language, including the denigration of nondominant languages, has often been internalized by the general population. Postcolonial linguistic agents are often faced with a double-bind: if they use the colonial language, they are seen as traitors to their cultural/ethnic group; if they use the dominated language, their voice has a more limited power and reach (*see* **Pragmatics: Linguistic Imperialism**).

Truly radical linguistic decolonization projects would thus have to challenge the fundamental premises of dominant linguistic and cultural ideologies and practices. These radical forms of resistance involve the legitimation of plural or hybrid linguistic forms, practices, and identities, including the appropriation and reworking of colonial languages. This kind of linguistic decolonization is rare in the public sphere, although it can be seen in some indigenous education projects and is more noticeable in domains of artistic, creative linguistic practice.

See also: Language Adaptation and Modernization; Language Development: Overview; Minorities and Language; Minority Languages: Education; Nationalism and Linguistics; Power and Pragmatics; Pragmatics: Linguistic Imperialism; Standardization.

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Linguistic Ethnonationalism

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The scholarly treatment of linguistic ethnonationalism is intimately linked to the question of the origins of the nation. A main division in scholarship on nationalism, between those who conceive the nation as an entirely modern phenomenon and those who trace its roots further back in time, has also resulted in contrasting positions regarding the role of language and linguistic practice in the rise of the nation. In the European context, proponents of the latter position have tended to treat linguistic difference as one of the principal markers of preexisting 'ethnic' difference that later developed into full-fledged nationhood in the 18th and 19th centuries. Anthony Smith (1989), for example, described awareness of linguistic boundaries and of sharing a vernacular language with emerging literary traditions as one of the features of 'ethnic cores' established in the premodern period, which provided a base for modern nationalism later on. Josep Llobera has argued that in the case of the territories later developing into England, France, Germany, Italy, and Spain, a sense of nationhood, even if restricted to a small part of the population and varying in salience among those territories, was already in place in the late Middle Ages. These early notions of nationhood also rested in part on the sharing of what were identified as common vernacular languages (Llobera, 1994). In contrast, modernists such as Benedict Anderson and Ernest Gellner categorically reject continuities between premodern forms of political identification and modern nationhood, nor have they treated premodern apprehensions of linguistic difference as significant for the constitution of modern nations. Instead, for them the importance of language and linguistic practice in the creation of modern nationhood lies above all in their integrative functions in processes of vernacular standardization and mass communication through print, a line of inquiry initially associated with Karl Deutsch (1953). There is little doubt that a concept of the nation existed in parts of Europe before the 18th century, as for example in the case of Spain, where in the early 17th century nationhood was already explicitly linked to the concept of a distinct vernacular language (Woolard, 2004). However, both modernists and those insisting on medieval or early modern origins of the nation tend to agree that nationalism as a political ideology demanding a form of popular sovereignty rather than a dynastic polity cannot be traced further back than the 18th century, and this also

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applies to forms of nationalism drawing on perceptions of linguistic difference as a justification for popular sovereignty.

The first comprehensive formulation of linguistic ethnonationalism is commonly traced to Herder's critique of Kant's transcendental philosophy of subjectivity. According to Herder (1968), intellectual production and human subjectivity are not to be understood as based on a putatively universal pure reason but as grounded in and created out of particular linguistic traditions, which constitute humankind as a plurality of 'peoples.' Accordingly, the status of a group as a 'people' with a claim to nationhood is upheld by cultural difference, which is inseparably linked to a particular linguistic tradition. The 'spirit' of a nationalized 'people' is thus both expressed and shaped through cultural creativity necessarily bound to the use of a certain language. Herder claimed that language is not a transparent medium of cultural production, but argued that the particular characteristics of a linguistic variety or linguistic tradition have a profoundly shaping impact on the cultural life of a 'people.' Thus, according to Herder, language necessarily mediates cultural traditions not in constituting a neutral means of expressing them and conveying them to others, but in the sense of playing a productive role in cultural life and leaving an indelible imprint of its particularities on everything it cocreates and mediates.

This formulation has been extremely influential in the formation of German nationalism and other nationalisms of central and eastern Europe, and continues to inspire nationalist ideologues in a wide range of locations today. However, it is precisely the inevitability of the link suggested by Herder between a particular linguistic tradition and a particular sense of nationhood, which has the effect of naturalizing language-based nationhood, that has been widely rejected among scholars of nationalism, even by those insisting on premodern origins of the nation. Instead, the way apprehensions of linguistic difference have constituted and legitimized claims to nationhood has been shown to be a historically contingent process and subject to dynamic cultural construction and contestation. However, scholars have differed considerably in how much latitude they have assigned to such processes of construction. Another important division in approaches to linguistic ethnonationalism is between those emphasizing politicized images of linguistic belonging and difference as creative forces in the rise of nationalism since the 18th century versus those authors privileging the role of language in nationalism in its functional roles in modern systems of mass communication.

'Modernist' Theories of Language and Nationalism

Ernest Gellner's and Benedict Anderson's approaches to nationalism tend to stress the latter, 'modernist' position. For Gellner (1983), the emergence of the nation is a product of industrialization in the modern world. In order for industrial civilization to be possible, the multitude of local cultural and linguistic particularities characteristic of agrarian societies has to be superseded by large-scale cultural and linguistic uniformization. In particular, the spread of modern standardized vernacular languages protected by state-sponsored educational systems is described by Gellner as functionally necessary for the workings of industrialization. Nationalism emerges as a new ideology serving an integrative function for the larger social aggregates formed by industrial processes of production as well as vernacular literacy and mass communication, which crucially underpin them. Thus, nations are modern inventions, and can only arise under conditions of industrialization, while the cultural contents of nationalisms and the kind of standardized languages they are based on are ultimately arbitrary. Benedict Anderson depicted a related scenario in explaining the rise of nationalism, in which language also plays a central role (Anderson, 1991). Anderson shifted the focus from industrialization to print capitalism in arguing that the circulation of books, newspapers, and pamphlets in vernacular languages in Europe and its settler colonies in the Americas since the early modern period led to the creation of 'imagined communities' of nations transcending face-to-face interaction in new circuits of mass mediated communication. Thus, nations are essentially conceived as reading publics separated from each other by the use of different print vernaculars.

The association of ethnolinguistic nationalism with the relative decline of sacred languages and the rise of standardized vernaculars is a common theme in these approaches, postulating a close relationship between language and nationalism while explaining the latter as the result of a transformation of patterns of mass communication under conditions of capitalism or industrialization. In this context, both Anderson and Gellner tended to treat the spread of standardized vernaculars more as a matter of functional and administrative convenience rather than a political process driven at least in part by ideologies of linguistic difference. In Anderson's view, language is important because print languages function as channels of communication regimenting access to and exclusion from the national community, while constituting a shared medium through which ideas of the nation can be disseminated. Both Anderson and Gellner

tended to downplay how linguistic ethnonationalism privileges language as an ideological site where the imagination of the nation is produced and boundaries of national communities are conceived and formulated. The ways in which language, especially standardized vernacular language, emerges as an ideological prism through which membership of such communities is defined and justified are not just confined to the communicative separation of different reading publics or social aggregates of industrialism due to vernacular linguistic difference. Also, vernacular standardization has often been not only a matter of administrative convenience but also an eminently political process, mediating membership in and exclusion from national communities. Anderson, for example, described the rise of standard French and English as relatively unplanned and driven by 'pragmatic' reasons (1991: 40–42), also stating that in 19th-century France and England, "for quite extraneous reasons, there happened to be, by mid-century, a relatively high coincidence of language-of-state and language of the population" (1991: 78). However, the political and military events behind such coincidence need also to be addressed in an understanding of linguistic ethnonationalism. As the work of Eugen Weber shows, a highly ideologized state-driven process of linguistic unification and suppression of regional languages was still ongoing in late 19th-century France, as "the Third Republic found a France in which French was a foreign language to half its citizens" (Weber, 1976: 70). That is, the spread of standardized vernaculars was also furthered through coercion against those now deemed minorities or foreigners in a national community conceived through the lens of political representations of linguistic difference. Thus, Anderson's important work on the rise of the nation as a consequence of new forms of mass mediated communication needs to be complemented with a stronger emphasis on politically charged ideas of linguistic differentiation as motivating forces in the construction of new national communities.

Linguistic Anthropological Approaches

The relationship between linguistic practice and senses of nationhood has been conceived in different terms in linguistic anthropology. Dell Hymes and John Gumperz argued in the 1960s that the use of a linguistic variety as a shared medium of communication does not necessarily turn those sharing a linguistic code into a community or ethnic unit. This tradition of skepticism regarding integrationist approaches assigning shared standardized vernaculars a key role in the formation of modern nations puts contemporary linguistic anthropology at odds with the revival of the assumption in contemporary theories of nationalism that 'shared language' results in the creation of groupness.

Instead, linguistic anthropologists have emphasized the importance of ideological mediation in establishing a link between language and nationality. In a research paradigm of 'language ideology' (Silverstein, 1979; Woolard and Schieffelin, 1994) linguistic anthropologists have described how such politically charged ideas about language and its users have resulted in the projection of national communities (Gal, 1993; Silverstein, 1996; Schieffelin *et al.*, 1998; Errington, 2000). While concurring with the 'modernist' approach to nationalism in treating nations as dynamically constructed cultural phenomena of relatively recent origin, they also extend this perspective to the construction of languages and linguistic communities. Linguistic varieties and linguistic communities are not simply present 'on the ground' ready to be made use of by modern systems of mass communication to generate a sense of shared nationhood, they are frequently themselves the outcome of scholarly and administrative construction informed by nationalist ideologies (Gal, 1995). That is, linguistic anthropologists have insisted that vernacular standardization is a political process, which is often the result of the rise of the nation rather than merely its precondition.

Urla's study of Basque linguistic ethnonationalism is a case in point, not only showing that linguistic standardization of Basque was in part motivated by an emerging Basque nationalism, but also that a focus on Basque became central to Basque nationalism precisely because many of those considered members of a Basque nation turned out to have little knowledge of it. The sense of a language being 'threatened' can thus emerge as a catalyst for linguistic ethnonationalism, and the language portrayed as an emblem of the nation may not always be the language employed in the systems of mass communication used for national mobilization and the creation of a national public (Urla, 1988, 1993).

The latter point is especially important in assessing approaches to linguistic ethnonationalism proposed by political scientists explaining it as a reaction to blocked social mobility and political exclusion due to imposed linguistic barriers in state institutions, as Inglehart and Woodward (1972) did for the 19th-century Austro-Hungarian monarchy and, more recently, DeVotta (2004) did for Sri Lanka. According to this interpretation, linguistic ethnonationalism arises when members of a group sharing a vernacular language, often a minority or otherwise subordinate group within a state, face discrimination when the state they live in imposes another linguistic variety

as the sole medium of education and administration. As a counterreaction, influential members of the group start to agitate for a separate nation-state whose institutions would function in their vernacular. The new nation-state to be created would thus provide the opportunities for social mobility that are denied by the institutions of the state that members of such a minority have so far lived in. However, this model does little to account for frequently widespread bi- or multilingualism among linguistic minorities, nor for those scenarios where knowledge of and especially literacy skills in the dominant language of state are more common among members of a minority than corresponding skills in the minority language promoted as the emblem of a new nation. As Urla wrote about the origins of Basque linguistic ethnonationalism in the late 19th century, "when Sabino Arana y Goiri, the son of a Bilbao industrialist and founder of the PNV (Partido Nacionalista Vasca, Basque Nationalist Party), declared Euskera to be one of the defining features of the Basque nation, the first thing he had to do was to learn it himself" (Urla, 1993: 822). The Basque case exemplifies such a situation where bilingual and in many instances predominantly Spanish-using members of a Basque middle class did not face linguistic exclusion in a previously Spanish-only system of education and administration. It also does little to explain why, as in the Basque and the Austro- Hungarian cases, precisely those multilingual urban intellectuals with a full command of the dominant language of state were the initiators of separatist linguistic ethnonationalisms rather than the monolingual rural populations who were often portrayed as exemplary members of the new nations to be created.

In other words, linguistic ethnonationalism needs to be taken seriously on its own terms, as the imagination and construction of communities through images of language and linguistic difference. It thus has to be understood as a politically creative force in its own right and as a form of regulating social life, and not be treated as the epiphenomenon of an essentially nonlinguistic political process of competition over scarce resources and state power. Also, the national boundaries thus created through ideologies of language cannot always be reduced to the boundaries between different reading publics, which, according to Anderson, rest on the "fatality of human linguistic diversity" (Anderson, 1991: 43). It is important to realize that linguistic ethnonationalism as a social and political force has frequently reshaped regimes of linguistic diversity by mapping social and political differentiation on perceived linguistic differences in novel ways. For some scholars, this circumstance has been nowhere more clearly illustrated than in European attempts at linguistic description and reorganization in the colonial world.

The Colonial Context and the Worldwide Spread of Linguistic Ethnonationalism

An important question in assessing the global spread of Herderian ideologies of linguistic ethnonationalism is whether the thesis of the modularity of nationalism generally postulated by Anderson (1991: 4) can also be extended to linguistic ethnonationalism. As such, the question of linguistic ethnonationalism in colonial and postcolonial contexts is bound up with wider debates about whether colonial and postcolonial nationalism exhibits irreducible differences from the European–American and European nationalisms that were its first historical instances, as, for example, suggested by Partha Chatterjee (1993). European colonial governments as well as other European nonstate actors active in the colonial world, such as missionary societies, embarked on extensive projects of identifying, describing, classifying, and standardizing vernacular languages of their subject populations, which frequently led to large-scale transformations of the linguistic and political situation in colonies (see also Errington, 2001). One of the main ways in which such colonially induced transformations came about was the introduction of new ideas of linking social to perceived linguistic differentiation. In particular, the Herderian principle of linguistic ethnicity, according to which a population is constituted as an ethnic group by virtue of sharing a common vernacular language, informed such linguistic classificatory work and language construction in the colonies. A second assumption derived from the European trajectory of linguistic ethnonationalism also had a large impact on the colonial reorganization of linguistic landscapes: the idea that a vernacular linguistic tradition necessarily has a standard form. Wherever this standard was not readily discernible, the task was to find and identify the 'real' standard form of vernacular varieties, which inevitably resulted in language construction. Colonial India provides a good example of how both these tendencies set off political processes whose outcomes did not always conform to the intentions of the colonizers. For example, the search for a 'language of command' for northern and central India by scholars of Fort William College in Calcutta led them on a search for the 'real Hindustani,' knowledge of which was expected to facilitate the rule and administration of large parts of India. Undeterred by the initial puzzlement of their Indian subjects, whose visions of linguistic differentiation were largely dominated by an opposition of standardized sacred (Sanskrit, Arabic) and imperial (Persian [Farsi])

languages on one hand, and largely unstandardized local vernacular varieties on the other, colonial scholars and administrators constructed a standard Hindustani. They thus contributed to the emergence of the Hindi–Urdu conflict, the partition of India, and the creation of Modern Standard Hindi as a national language of India later on (Cohn, 1985; Lelyveld, 1993). In India, the introduction of the Herderian principle of linguistic ethnicity through the colonial mapping of vernacular languages was institutionalized as an alternative to previously established modes of conceiving linguistic differentiation above all in terms of links between ranked endogamous descent groups (*jati*) and linguistic varieties in eminently local contexts (Washbrook, 1991). This also turned out to have important consequences for postcolonial politics. Linguistic ethnicity in the end provided the basis for political claims for distinct 'homelands' for users of particular standardized linguistic varieties, which resulted in a reorganization of federal states along assumed vernacular linguistic lines in postcolonial India.

One of the ironies of the global spread of linguistic ethnonationalism is also that in many instances this new political principle originated in colonial attempts at linguistic classification and language construction, which were intended to facilitate and legitimate colonial rule, only to provide a platform for the emergence of anticolonial nationalisms later on. The colonial creation of a standard Malay, for example, not only provided a unified administrative language for a large and populous archipelago with great linguistic diversity, it also facilitated the emergence of an anticolonial public among local elites, who subsequently used the new language, now labeled Indonesian, against their Dutch colonizers, turning it into a key emblem of a newly imagined Indonesian nation whose citizens were expected to become users of the language (Errington, 2000).

Related processes were at work in colonial Africa, where the construction of standardized vernaculars for missionary or administrative purposes often led colonial administrators to assign populations distinct 'ethnic' or 'tribal' identities on the basis of such newly defined linguistic affiliations. These practices had important political consequences once such classifications became established and accepted by large numbers of those subjected to such colonial mapping of social and political difference (Harries, 1988; Irvine, 1993; Meeuvis, 1999). Linguistic anthropologists have seen in these colonial policies particularly illustrative instances of the creative power of linguistic ideologies, where politically charged images of language and linguistic differentiation motivated the creation of new social aggregates with claims to ethnic and national identities (Irvine and Gal, 2000).

Nevertheless, it would be inadequate to speak of a simple imposition of European assumptions of linguistic ethnicity and linguistic ethnonationalism by colonial actors on colonized populations, since the outcome of colonial vernacular language standardization and language construction often resulted in cultural forms profoundly different from European understandings of linguistic ethnonationalism. Sumathi Ramaswamy's study of Tamil language-focused nationalism provides a vivid analysis of how colonial perspectives interacted with local visions of language and group identities in unforeseen ways (Ramaswamy, 1997). In taking up European characterizations and comparative analyses of Tamil, Tamil activists linked the Herderian idea of linguistic ethnicity to established notions of devotional practice. They thus arrived at a vision of the Tamil language as a female deity, *Tamiltay*, and Tamils as a family of faithful children determined to protect a language simultaneously conceived as deity and mother. Ramaswamy has argued that this colonial and postcolonial form of linguistic ethnonationalism should better be understood as 'language devotionalism.' The Tamil scenario provides a compelling case for reexamining and refining Anderson's thesis of the modularity of nationalism and its language-based aspects. Ramaswamy's work suggests that the spread of nationalism in the colonial and postcolonial worlds should be conceptualized as the result of complex articulations of European understandings of nationality and linguistic belonging with precolonial traditions of establishing links between linguistic practice and social identifications rather than a directly modular adoption of European forms of belonging.

Contemporary Movements of Language Renewal and Linguistic Ethnonationalism

Linguists have recently voiced concern about the increasing loss of linguistic diversity in the contemporary world, seeking to mobilize public opinion in Western countries in favor of supporting the continued use of those languages with often smaller numbers of users undergoing language shift. In doing so, they have often drawn on discourses of biodiversity, literally describing these languages as 'endangered' species which need to be saved from extinction. Another theme in professional discourses of 'endangered' languages is cosmopolitan concerns about the necessity to prevent the loss of intellectual production, feared by many as a consequence of the eventual demise of many lesser-used languages, which

would benefit humanity in its entirety. However, actual investigation of the social and political contexts of more successful instances of reversing language shift shows that such cosmopolitan views about the necessity to preserve knowledge for 'humanity' or the benefits of linguistic diversity portrayed as equivalent to those of biodiversity have played only minor roles. Instead, language activists have often rallied in favor of continued use of a language in response to perceived threats to positively valued forms of groupness, often cast in ethnic or national terms. Thus, such movements for reversing language shift have frequently drawn on the Herderian theme of a necessary link between a particular linguistic tradition and the constitution of a population as an ethnic group with the ethnonationalist claims often implied in a politics of recognition.

Furthermore, such contemporary language renewal movements also represent an interesting parallel to earlier scenarios of linguistic ethnonationalism in their extensive use of mass-mediated communication, now also in its electronic and digital forms (Eisenlohr, 2004). First, for example, in digitally recording linguistic practice in an 'endangered' language for purposes of documentation and instruction, language activists and linguists also engage in the production and archiving of electronic artifacts in a way that recalls earlier modern forms of storing and displaying the heritage of a 'people,' such as the museum and the archive (Silverstein, 2003). Such techniques of collecting and curating have in turn been closely linked to the history of the rise of nationalism, the display and archiving of 'traditional' objects and art forms being one of the ways of producing the imagined community of the nation (Anderson, 1991). In creating and selecting documented linguistic material for use in projects of language revitalization, language activists and supporting linguists often define the linguistic 'tradition' of the people who are interested in the renewal of a language they identify as 'theirs.' They thus play a key role in constructing boundaries of communities through representations of linguistic difference in a manner recalling the roles played by lexicographers, folklorists, and grammarians in 19th-century European nationalism (Anderson, 1991, Hobsbawm, 1990).

Second, in their attempts to create mass-mediated publics for users of lesser-used languages, language activists have often sought to promote the use of such varieties by replicating the creation of new forms of community and political solidarity often associated with the circulation of mass-mediated discourse in a shared vernacular. On the other hand, it is not just that new electronic practices of mass mediation are ways of disseminating and circulating discourse differently, but also, in the eyes of its consumers, mediated discourse is often invested with particular qualities since such practices of mass mediation are frequently associated with notions of modernity and sophistication. Language activists frequently draw on such evaluations of electronically mass-mediated discourse by seeking to transform valuations of a lesser-used language by using it on television, radio, CD-ROM, DVD, and the Internet. Thus, the use of languages to be revitalized in electronic media is not only aimed at the creation of new publics but also at changing images of the language among its users through a demonstration that the linguistic variety and its users are indeed part of a modern world.

Nevertheless, the example of language activism on behalf of lesser-used languages shows that linguistic ethnonationalism can also focus on 'heritage' or 'ancestral' languages, which are only rarely used in everyday interaction or in practices of literacy, as is for example the case among several Native American groups in the United States and Canada. Such scenarios, not infrequently found among users of a language in advanced stages of language shift, demonstrate that given the appropriate ideological background, the particular linguistic variety adopted as an emblem of ethnonationality need not always be related to those varieties used either in vernacular practice or in mass mediation of discourse.

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Linguistic Features

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When attempting to model and to understand the complexity of natural language, linguists typically have recourse to features. At the simplest level, features are used to factor out common properties. We can recognize a feature NUMBER, with the value 'plural,' as present in forms like *books, loaves, men, oxen*. Using a feature captures the idea that the plural items are in some sense the same (for example, for agreement purposes, since all take *these* rather than *this*) even though number is realized differently. Other examples include TENSE (present, past, etc.) and PERSON (1st, 2nd, 3rd). Features show consistency across entities, and to some extent across languages. They have proved invaluable for analysis and description, and have a major role in contemporary linguistics, from the most abstract theorizing to the most applied computational work. Our examples have been of morphosyntactic features. Features may also be phonological (specifying, for example, the height or backness of a vowel), morphological (specifying the inflectional class of an item), syntactic (for syntactic categories such as V or N) or semantic (such as ANIMACY).

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In subsequent years, features have taken on an even greater role, yet conceptualization has lagged behind. The notion of default has been employed widely in linguistics, but with varying interpretations (distinguished in formal terms in Fraser and Corbett, 1997). In Lexical Functional Grammar and Head-Driven Phrase Structure Grammar, work on unification is central to the use of features. In Government and Binding Theory and Minimalism, the notion of checking performs a similar but significantly different role (see, for example, Chomsky, 2000). Even though the theoretical machinery available has been extended by the introduction of typed feature structures (see Carpenter, 1992), we still lack a convincing account for some basic phenomena. However, there are encouraging moves to bring formal accuracy together with a range of interesting data, to bring us closer to an adequate theory of linguistic features.

Acknowledgment

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See also: Case; Feature Organization; Gender; Number; Tense.

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Linguistic Habitus

I Gogolin

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Pierre Bourdieu's (1981) concept of habitus denotes a modality, which enables the individual to act routinely as well as creatively and innovatively. Central to Bourdieu's theory is the attempt to describe the dynamic relationships between the structural conditions of an individual existence, the individual's activities as a product of socialization under these conditions and the open-ended yet strictly limited capacity of the individual for action. In the process of socialization (*see* **Socialization**), a system of permanent dispositions is created in the individual, including sensitivity as one prerequisite for personal development. This system of dispositions and sensitivity is a necessary precondition for successful social activity.

Bourdieu emphasizes a circularity between 'structure,' 'habitus,' and 'practice.' Habitus functions as an awareness-matrix, an action-matrix, and a

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Bourdieu emphasizes a circularity between 'structure,' 'habitus,' and 'practice.' Habitus functions as an awareness-matrix, an action-matrix, and a

thought-matrix for the individual; however, it does not alone determine behavior. A habitus is acquired under a certain set of social conditions, which Bourdieu calls 'objective structures.' To these belong the existential requirements, which characterize and define a social class. A habitus therefore is generated and regenerated by the specific objective structures of a class, and at the same time define and redefine, generate and regenerate the lifestyle and practice of its members. Bourdieu describes this circularity as follows: habitus function as "structured structures, which are suitable to function and work as structuring structures" (Bourdieu, 1979: 167). Implicit in a habitus is a tendency toward self-stabilization – despite the fact that socialization is not completed until death. New experiences are integrated in a habitus that leads to its constantly changing form while remaining relatively stable.

The term 'linguistic habitus' thus refers to the set of dispositions in the field of language: to a person's notion of linguistic 'normality' and of 'good' language, to a society's notion of 'proper' ways of language behavior, of 'legitimate' language variations and practice. The term does not describe language as a means of communication in a narrow sense, but refers primarily to the symbolic relations and signs by which language becomes a medium of power. Gogolin (1994) defines the monolingual habitus, which is common to the classical European nation states as an example of a linguistic habitus. In the process of their foundation in the 18th and 19th century, the basic and deep-seated belief was created that monolingualism is the universal norm for an individual and for a society (cf. Hobsbawm, 1990). This idea was disseminated and traditionalized by institutions of the nation-state: jurisprudence, military forces, political, and administrative bodies. Probably most influential for the creation and dissemination of these fundamental elements of the concept of nation-state were the modern state school systems, which were established simultaneously to the foundation of the nation-state as such. Linguistic homogenization was the main motive for the development of public education systems. The establishment of one national language and of a monolingual national society was (and often still is) seen as essential for the success of the nation-state, especially at the economic level.

In reality, hardly any nation in the world ever had a monolingual population. In most countries – especially in the Australasian, Asian, and African world, but also in Europe – people speak more than one, often many languages (*see* **Bilingualism**). Despite this reality, the deep-seated belief in monolingualism as natural in a society governs individual and public opinions towards language and language practice. In the cases of European nation-states, this preference becomes obvious in connection with immigration. Roughly one-third of the people under the age of 35 years in the member states of the European Unity are migrants, speaking other languages than the national language(s) of the respective state (*see* **Migration and Language**). For example, in the year 2000, more than 350 languages were spoken by children in London schools. Nevertheless, the European state school systems act as if they had monolingual populations. The teaching is centered on the 'legitimate' language of the state or the area, that is to say the national language or the official language of the region. The other languages are rarely taught at schools; children stay illiterate in their second or third language they live in. Consequently, they are unable to develop their other languages towards the most elaborated state (*see* **Bilingual Education**). By these mechanisms, the hierarchy and power relations between languages become stabilized. Those who have no or less access to the legitimate language are at risk of being excluded from participation and equal success in a society.

The linguistic habitus is the governing mechanism of these processes. The notion of linguistic normality was traditionalized in history, despite multilingualism. There is no collective remembrance of these historical events; the fact that this notion once was created and implemented explicitly has disappeared from collective memory. According to Bourdieu's theory, a habitus functions the better, the less conscious its owner is about it.

A variation of the monolingual habitus seems to be at work in multilingual nation-states as well, due to the fact that there is usually one selected language of power. This choice may not be a national language. In colonial or postcolonial situations especially, the language of power very often is not a national language, which by constitution has legitimate status. Instead, it is the language, which guarantees survival and success in the linguistic market – mainly the language of the former colonists. Whereas in Europe, the standard national languages are usually considered the legitimate variant, in colonial situations symbolic power is linked to the languages of the former oppressors (cf. Goke-Pariola, 1993). The linguistic habitus ensures the relative stability of these situations, and thus contributes to the durability of societies of marked disparities in power between different social groups.

See also: Bilingualism; Bilingual Education; Migration and Language; Socialization.

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Linguistic Influence

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No Language Is an Island

All languages borrow lexical and grammatical features from each other, and down through the ages, English has borrowed intensely from a host of other languages, dead (such as Latin and Greek) or alive (e.g., Italian, French, and German). French loanwords now constitute one-third of the lexical inventory of English, a fact that has led to the epithet 'a semi-Romance language' (McArthur, 2002: 135).

Although English today is better known as a linguistic donor than a receiver, English keeps adopting and adapting foreign words, many of which are later re-exported to other speech communities. As a case in point, several exotic late-20th-century food terms, e.g., *taco* and *tortilla* (originally from Spanish) and *sushi* (from Japanese) have reached European kitchens and dictionaries after stopovers in America or Britain. This phenomenon is an obvious parallel to relay translation – as one finds in, for instance, the interpreting services of EU bodies – where language contacts between minor languages are typically mediated by a more dominant language, most often English or French.

In the following section, we will look at some of the mechanics of linguistic influence in general, providing a backdrop for a more elaborate discussion of the English influence on other languages, by far the most conspicuous and wide-ranging type of linguistic influence found today.

Borrowing from Other Languages: Blessing or Curse?

One question that immediately springs to mind when discussing linguistic influence is how such influence comes about. What does it take to export language features, or – viewed from the receiving end – why and how are loans introduced in a language?

In answer to these questions, I will cite two experts in historical linguistics, Lars-Erik Hedlund and Birgitta Hene. In their book *Lånord i svenskan* (Hedlund and Hene, 1992: 70), they establish the following taxonomy of the *raisons d'être* of lexical innovation through borrowing (all terms are translated by me), summarized in **Table 1.**

In contrast to this descriptive and quite complex model, a prescriptive, somewhat simplistic view distinguishes between loans that are needed and loans that are superfluous. As concluded in a pioneering Danish work on Anglicisms (Sørensen, 1973: 131):

Table 1 The reasons behind lexical borrowing

Background	*Motivation*	*Function*
A. Voids in the language	1. Name new phenomenon	Verbalization
	2. Generalize/specify	Verbalization
	3. Express oneself in neutral terms	Information
	4. Express a value statement	Expressiveness
	5. Create certain associations	Persuasion
	6. Add humorous effect	Entertainment
	7. Avoid sounding repetitive	Rhetorical appeal
	8. Obtain a more handy expression	Ease
	9. Express personal or group identity	Psychosocial marker
B. Voids in the sender/receiver	1. Compensate personal lexical voids	Creating a message
	2. Compensate presupposed voids in the audience	Getting the message across
C. Foreign-language original	1. Represent a foreign culture in translation	All above functions

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One question that immediately springs to mind when discussing linguistic influence is how such influence comes about. What does it take to export language features, or – viewed from the receiving end – why and how are loans introduced in a language?

In answer to these questions, I will cite two experts in historical linguistics, Lars-Erik Hedlund and Birgitta Hene. In their book *Lånord i svenskan* (Hedlund and Hene, 1992: 70), they establish the following taxonomy of the *raisons d'être* of lexical innovation through borrowing (all terms are translated by me), summarized in Table 1.

In contrast to this descriptive and quite complex model, a prescriptive, somewhat simplistic view distinguishes between loans that are needed and loans that are superfluous. As concluded in a pioneering Danish work on Anglicisms (Sørensen, 1973: 131):

Table 1 The reasons behind lexical borrowing

Background	*Motivation*	*Function*
A. Voids in the language	1. Name new phenomenon	Verbalization
	2. Generalize/specify	Verbalization
	3. Express oneself in neutral terms	Information
	4. Express a value statement	Expressiveness
	5. Create certain associations	Persuasion
	6. Add humorous effect	Entertainment
	7. Avoid sounding repetitive	Rhetorical appeal
	8. Obtain a more handy expression	Ease
	9. Express personal or group identity	Psychosocial marker
B. Voids in the sender/receiver	1. Compensate personal lexical voids	Creating a message
	2. Compensate presupposed voids in the audience	Getting the message across
C. Foreign-language original	1. Represent a foreign culture in translation	All above functions

> As legitimate loans we may accept those words and phrases which serve a sensible purpose, i.e. those that primarily fulfil an informative function. As opposed to this, one should be wary of loans suggested for prestige purposes. [my translation]

However, even superfluous, prestige-driven loans tend to carve semantic niches for themselves (Gottlieb, 2004), and, moreover, it is not easy to judge which motivation(s) may be at play in the borrowing process.

In a recent discussion on German loanwords in English – high-register items such as *Zeitgeist* and *Sprachgefühl* – American-based lexicographer A. J. Meier bridges the need-or-prestige dichotomy with these words:

> The line between need and prestige, however, can be somewhat obscure, given the tendency for foreign words to belong to a more "educated register." Indeed, I would submit that, by virtue of its foreignness, a word attains greater saliency and thus, to some extent, is imbued with greater expressive power, a power concordant with both need and prestige. (Meier, 2000: 169)

As any discussion concerning linguistic borrowing is bound to involve notions of cultural and linguistic power, the debate tends to become emotionally heated. Internationally, the public debate oscillates between the following statements and claims (Table 2).

Still, despite the arguments against borrowing – nowadays typically from English – most speech communities continue doing so with increasing speed; even in self-protective societies such as Iceland, purist measures have a limited effect. Foreign words travel without passports, and as in politics, power is in the hands of laymen, not experts.

The Semantic Functions of Borrowings

Having gained ground, borrowings fall into the following semantic categories:

Table 2 Standard arguments for and against linguistic borrowing

For borrowing	*Against borrowing*
Facilitates learning of donor language	Impedes reading of national classics
Shortens distance between languages and cultures	Increases distance between generations and social groups
Provides expressive enrichment	Leads to linguistic impoverishment
Makes translation simpler	Kills the fascination with foreign languages and cultures
Fights chauvinism and provincialism	Paves the way for foreign cultural dominance

1. Additions. Borrowed expressions refer to new phenomena in the world outside the speech communities adopting them: in many Germanic languages, the Anglicism *AIDS* (or *aids*) came with the disease, so to speak. France managed with a loan translation of the four lexical elements (Acquired Immuno-Deficiency Syndrome), thus coming up with *SIDA*.
2. Replacements. Anglicisms and other-isms often pop up in situations where the entities they refer to already exist in the domestic language: in these years, Danish *sceneskræk* (a direct translation of the English 'stage fright') is gaining ground at the expense of *lampefeber* (from German *Lampenfieber)*. This replacement of a Germanism by an Anglicism is typical of the recent development in minor Germanic speech communities; ironically, in this case the two German components are both found in English ('lamp' + 'fever'), whereas the English-inspired elements *scene* and *skræk* were originally borrowed from French (*scène*) and German (*Schreck*), respectively.
3. Differentiators. Finally, by wedging themselves in, some borrowings may contribute to semantic differentiation: as *rollemodel* (from English 'role model') is now establishing itself in contemporary Danish usage, the existing term *forbillede* (after German *Vorbild*), seems to be acquiring a strictly metaphorical meaning. In other words, part of the semantic range of *forbillede* (that referring to persons) is presently being taken over by *rollemodel*, which can be attested by Danish corpus data. However, a borrowing of this sort, which in the beginning covers only a sub-sense of a domestic word, may one day take over the entire semantic field of that word. In that event, a differentiator turns into (or turns out to be) a replacement. In the case of *rollemodel* in Danish, this is not the case – yet.

Influence from English

For more than a century, English has been immensely successful in influencing languages worldwide. Still, English possesses very few features that fill existing semantic voids in other languages. Naturally, many concepts and products were introduced by English-speaking countries, companies, and individuals. But the fact that, for instance, many Japanese and European brands and product names are English – even names for domestic-market goods – shows that, in certain domains at least, an anglophone ring adds to the value of things.

The English influence is generated by three interconnected factors:

1. Most opinion leaders worldwide are dependent on English as a second language, both for personal communication and for information gathering, and even children in a number of officially non-English-speaking countries rely heavily on their command of English when surfing the Internet, listening to rap and rock songs, and watching TV series and films (whether subtitled or not).
2. English is unrivaled as a cover-all language: it is usually the first language in which new technology, trends, and lifestyles are presented internationally, and a language increasingly used worldwide as a lingua franca, even when no native speakers of English are present. In virtually every country on the planet, English is now the first foreign language taught in school. Within the last two decades, Russian, French, Spanish, and German have all lost the status of primary foreign language outside the nations and regions in which they are officially spoken.
3. An increasing part of the media input in the modern world consists of texts translated or in some other way derived from English sources. In great parts of the world, most films, TV series, computer games and novels are anglophone imports, all of this having a major impact on the national languages (Gottlieb, 1999, 2001).

National and regional languages are not just influenced by English, but in academic and business communication, they have *de facto* lost several domains. Today, in a number of countries, the credo 'certain things are best expressed in English' not only is heard among blasé cosmopolitans, but also is often uttered by government officials and businessmen, even by school children.

The Notion of Anglicism: Establishing a New Paradigm

In the various national debates concerning contemporary English-language influence, emotions often replace empirical facts, as ill-defined concepts are used for polemical effect. Below I will suggest a neutral terminology, including a typology to embrace all types of linguistic influence, with English as the influential language, and with Anglicism as a key concept. However, before defining this term, two related key concepts will be addressed:

1. English. In today's language-political discussions, 'English' rarely refers to England, not even to Britain. The central reference here is, not surprisingly, the United States. In most speech communities, 'influence from English' means (linguistic) influence from the United States, the dominant anglophone nation. Since the breakthrough of sound film in Hollywood in the late 1920s, Britain has played second fiddle in the spread of Anglo-Saxon values and linguistic features, although in most European countries most teachers of English still try to emulate a British, i.e., RP, accent in their daily work.
2. Loan words. First, thousands of Anglicisms are not direct loanwords, but belong to one of the many other categories of Anglicism (see the typology below). Second – as goes for all borrowings – Anglicisms are not loans to be paid or handed back to the donor language at a later stage. Instead, they can be seen as either 'stolen goods' or rather as the fertile offspring of other speech communities' planting of English seeds. The foreign soil is also the reason why, quite often, when working into English, the best translation of an Anglicism is not the same expression in English.

Traditionally, scholars have defined an Anglicism as "a word borrowed from the English language which is adapted with respect to the linguistic system of the receptor language and integrated into it" (Sicherl, 1999: 12). This definition should be praised for emphasizing that, once borrowed, loans – if they manage to survive – may remain forever with the borrowing language and may in that process change pronunciation, spelling, meaning, etc.

However, two serious objections to this type of definition can be raised:

1. It is too narrow. It only looks at the most conspicuous elements of language: the individual lexical items. Morphological, syntactic, and other features are ignored.
2. It expresses a naive integrational paradigm, which is no longer generally valid, that of stable domestic language structures which eventually digest and integrate all (English) loans. What happens between English and other languages today points to a paradigm of systemic influence. In an increasing number of speech communities, especially Germanic ones, English linguistic features – even grammatical ones – are now adopted, rather than adapted. And even in exotic speech communities under the spell of English, the common practice of code-shifting overrules potential gaps in language systems that would prevent direct transfer of English language features and norms.

What is, then, a reasonable definition of Anglicism? In order to cover the entire spectrum of present-day influence from English, the notion of Anglicism should be defined as 'any individual or

systemic language feature adapted or adopted from English, or inspired or boosted by English models, used in intralingual communication in a language other than English.'

Based on this definition, the taxonomy in Tables 4–6 encompasses all linguistic phenomena caused by English influence. As illustrated in Table 3, the taxonomy rests on a two-by-two categorization based on two distinctive features:

1. The distinction found in the Anglicism definition above, between, on the one hand, items that are either adopted (i.e., retained, and thus obviously of English heritage) or adapted (i.e., camouflaged or literally translated into the recipient language) and items that are inspired or numerically boosted by English language phenomena.
2. The distinction between microlanguage items (including morphemes, phonemes, lexemes, phraseology, and syntax), and macrolanguage ones (phenomena found at clause, sentence, or text level).

The reason why my categorization has yielded a tripartite taxonomy – and not four main categories – is the following: I have not included reactive macrolanguage Anglicisms, a potential category that is almost impossible to operationalize, as it is hard to determine whether a given sentence or text (type) is inspired by English or not.

In Tables 4, 5, and 6, each subcategory is exemplified, and the English trigger behind each example is given, something that is especially needed when dealing with reactive Anglicisms, which by definition hide their English ancestry to native speakers and foreign observers alike.

Some of the terms used in the taxonomy are well established and universally agreed upon – e.g., semantic loans and morphosyntactic calques – while others are new (sentence-internal vs. sentence-shaped shifts, for instance). Finally, there are terms that are debated, yet too established to deserve being discarded altogether: 'borrowing' and 'loan' are thus preferred to the neologism 'import word,' although this term reflects the true nature of linguistic influence.

Table 3 Key parameters in categorizing Anglicisms

	Subclause items	*Clause, sentence, and text items*
Adapted or adopted from English	Active Anglicisms	Code-shifts
Inspired or boosted by English models	Reactive Anglicisms	[not included in present model]

Anglicisms and Acceptability

In addition to the structural classification presented in Tables 4, 5 and 6, a language–political categorization can be applied to Anglicisms, as not all of them reach acceptance by (all) language users in the affected speech community. At any given time, depending on a number of factors – the type of Anglicism, a particular item's (lack of) prestige, its usage history, etc. – individual items can be ranked as follows, in decreasing order of acceptability:

1. Integrated items (not intuitively identified as English loans, accepted by all): French *flanelle* < English *flannel*, probably from Welsh *gwlanen*
2. Naturalized items (identified as English loans and commonly accepted): Romanian *interviu* < English *interview;* Hungarian *marketing* (= English)

Table 4 Active Anglicisms

Category	*Type*	*Examples*	*English trigger*
Overt lexical borrowings	Single-word unit	*branding* (Danish)	'branding'
	Multi-word unit	*Learning by Doing* (German)	'learning by doing'
	Sub-word unit	*-minded* (Norwegian)	'-minded'
Covert lexical borrowings	Single-word unit	*keks* (Slovene)	'cakes'
	Multi-word unit	*Stop en halv!* (Danish) [literally 'stop one half']	'Stop and haul!'
Loan translations	Compound substitute	*involtino primavera* (Italian)	'spring roll'
	Multi-word substitute	*tað er at siga* (Faroese)	'that is to say'
Hybrids	Partial loan translation	*Computerkunst* (German)	'computer art'
Pseudoanglicisms	Archaism	*butterfly* (Danish)	'butterfly tie' (= bow tie)
	Semantic change	*overhead* (Norwegian) (= slide, OHP transparency)	'overhead'
	Contamination	*after-ski* (Swedish)	'after' + 'ski' (English: 'apres-ski')
	Morphological change	*fit for fight* (Swedish)	'fighting fit'
	Jocular derivation	*webmoster* (Danish) [literally 'web auntie']	'webmaster'

3. Implants (English-sounding, accepted by certain user groups only): Finnish *benchmarking* (= English); Danish *hænge ud* < English *hang out*
4. Interfering items (often inaccurate solutions, including mistranslations): (Danish *militære barakker* < *(military) barracks*; correct term: *kaserne*, originally from French *caserne* via German *Kaserne*).

Extending the natural metaphors used in the four terms above, one could say that these four categories represent not only a cline in terms of acceptability, but also a Darwinist race for survival, with many Anglicisms beginning their life as interfering items, which – as in the above example – may mislead the unsuspecting reader: in Danish, *barakker* are poorly built one-story houses. Some new, interfering Anglicisms, which in written sources are often printed in quotation marks or italics, reach the implant stage, and out of these only a few become naturalized, or end up as fully integrated items.

With respect to idiomaticity, the watershed goes between types 2 and 3 above. To most language users, items of types 3 and 4 are seen as foreign or unwanted.

When Linguistic Influence Leads to Language Death

It is not the intention here to warn against foreign-language influence, a primary source of renewal and growth of any language, including English. On the other hand, as with drugs and other substances, what is found stimulating in small doses may kill in large quantities, and language death is indeed an issue here. In northern Europe, English has all but wiped out several Gaelic languages – with Welsh presently fighting its way back from near-extinction – and it certainly has exterminated the Norse language spoken in the Orkneys until a few hundred years ago.

Today, more than military invasions or political power, the media are instrumental factors behind the

Table 5 Reactive Anglicisms

Category	*Type*	*Anglicism*	*Standard*	*Trigger*
Semantic loans	Extensions	*lernen* (German)	*wissen* (= know)	'learn'
	Reversions	*overhøre* (Danish)	*høre* (= hear) [overhøre = ignore]	'overhear'
	Limitations	*morgen* (Danish)	*nat* (0–5 A.M.) *morgen* (5–9 A.M.) *formiddag* (9–12 A.M.)	'morning'
Orthographic loans	Changed spelling	*literatur* (Danish)	*litteratur*	'literature'
	Changed punctuation	*Den erfarne amerikanske senator, Joseph Biden, har en anden udlægning.* (Danish)	*Den erfarne amerikanske senator Joseph Biden har en anden udlægning.*	'. . . American senator, Joseph Biden, has . . .'
Phonetic loans	Phonetic changes	*unik* pronounced as [you'nik] (Danish)	[oo'nik]	'unique'
	Prosodic changes	falling intonation in exclamations (Brazilian Portuguese)	slightly rising intonation	Standard American intonational pattern
Morphosyntactic calques	Inflections	autobahn*s* (Danish)	plural *–er*	-s
	Phraseology	*Hier sind Sie.* (German)	*Bitte sehr.*	'Here you are.'
	Constructions	Es *un* maestro de escuela (Spanish)	Es maestro de escuela	'He's **a** teacher'
	Word order	*Dog, han vil ikke* . . . (Danish)	*Han vil dog ikke* . . .	'However, he will not . . .'
	Valency	*Ring en ekspert* (Danish)	*Ring til en ekspert / Tilkald en ekspert*	'Call an expert'
	Prepositional choices	*ud af vandet* (Danish)	*op af vandet* [op = up]	'out of the water'
Translationese	Favorized cognates	*còpia* (Catalan) [. . . of a book]	*exemplar*	'copy'
	Default equivalents	*anlända* (Swedish)	*komma*	'arrive'

continuing triumphs of English on the world map. And as people add English to their personal repertoire of languages, Anglicisms are adapted and adopted into their local vernaculars, whether spoken by hundreds of millions, as Chinese or Portuguese, or only by hundreds of thousands, as Icelandic and Faroese. Whether local languages lose domains in the process or even end up losing all their speakers is decided by their users, not by native speakers of English or anglophone institutions.

Taking Denmark as a typical example of a speech community under English influence, the most important agents in the ongoing anglification are the national media, especially those whose texts are based on anglophone sources. Responding to a seminal Danish study on the impact of English (summarized in Preisler, 2003) – in which influence from above, i.e., the educational system and the business world, is amplified by influence from below, e.g., U.S.-inspired youth subcultures – the doyen of Danish Anglicism research, Knud Sørensen, points out that in his view "the most important impact of English might be termed *influence from the middle,* i.e. the influence exerted by the press" (Sørensen, 2003: 354).

Ironically, a large part of the media-generated Anglicisms are not deliberately created for effect; strict deadlines simply do not go well with idiomaticity when you are juggling with two languages. In Sørensen's terms, "a journalist who works with an English-language source at his elbow will often be tempted to take the line of least resistance and make a rough translation of an English idiom, sometimes forgetting whether it will make sense to his Danish readers" (Sørensen, 2003: 349).

With an all-pervasive issue such as the English influence on cognate languages, we easily find ourselves in a chicken-and-egg situation. Whether we argue that the media merely reflect the linguistic realities of youthful customers and audiences – the position taken by Preisler – or that the media play a more proactive role in the continuing anglification of other languages – Sørensen's point – does not make much difference. The fact remains that the English influence comes from everywhere, is felt by everyone, and has effects everywhere in the given domestic language, with Danish as a case in point.

As Danish dialects are dying out – at a rate still matched by few other European languages – we may soon advance to a situation where Danish itself becomes a dialect, shared by future bilinguals from the Danish Isles. Just like Danish speakers of the Southern Jutland dialect *sønderjysk* used to switch off Standard Danish when meeting old friends in urban Denmark, Danes reading English paperbacks, watching American films and using English at work may in the future switch off English when they spend time with family and friends, in what may be the only domain of Danish not yielding to English: the intimate sphere. Today, Danes who master English – and who accept a modicum of English influence on Danish – are comparable to those who, 100 hundred years ago, were ahead of their peers in adopting Standard Danish as a prestigious alternative to their traditional dialects, now nearly extinct (Hjarvard, 2004).

Table 6 Code-shifts

Category	*Example*	*Pragmatic context*
Tags	, *okay?*	Standard oral interpersonal assurance formula
Sentence-internal shifts	. . . *en person som under press kan* 'blow the cover sky high!'	Lines from a (Norwegian) novel
Bilingual wordplay	'De Frygtløse' – *'The Muuhvie'* (Danish title for the American animated movie [featuring cows] 'Home on the Range,' 2004)	Common linguistic device in commercial punchlines and political slogans in semibilingual speech communities
Sentence-shaped shifts	*Way to go, girl!*	The final words in a (Danish) music review
Total shifts	'*Visit the World's Biggest LEGO Shop*' (Website for Danish toy company only in English)	Addressing locals and foreigners through English-only communication.
Domain losses	*'Layout construction: a case study in algorithm engineering'*	Title of an academic research paper written by four (Danish) scientists. (In some countries up to 90% domain losses in computer games, scientific papers, pop lyrics, and certain business documents; more moderate losses in domains such as advertisements, commercial brands and film titles.)

Metaphors We Drown By: Forever Flooded by Anglicisms?

The debate on Anglicisms is international and goes back more than 100 hundred years to the days when millions of Europeans fled their countries hoping for a better future in English-speaking North America and Australia. This wave of poor emigrants coincided with the heyday of the British Empire around the turn of the 20th century. And that was the time when the first critical voices were raised in the apparently never-ending debate on English linguistic influence abroad. Especially in Germany, the impact was strongly felt at an early stage (Dunger, 1899). Even the flood metaphor, portraying the exposed language as a victim of some natural disaster, seems to be a veteran term: referring to the period before 1914, a later observer noted that "the flooding of German life and the German language with English had reached such an extent that the whole situation for Germany appeared almost threatening" (Stiven, 1936: 101, cited in Viereck, 1986: 110).

Also in France, a country renowned for its linguistic conservatism, oceanic terms have been used for what happened to the national vernacular in the late 20th century. According to one German linguist:

> Purism has sterilized the language. The French are desperately afraid of coining new words. This linguistic Malthusianism is ultimately responsible for the fact that thousands of foreign words flood into the gap which has to be filled somehow. (Hausmann, 1986: 87).

This textbook case of German *Schadenfreude* demonstrates that in a modern world, what seemed to be difficult already before WW1 is now impossible: English cannot be kept back. Instead, bilingualism could be the answer, paired with an increased awareness of everything that pertains to (one's own) language and culture.

Still, waves are always washed away by other waves, and "many loans seem to be part of trends and waves that make a lot of noise, but are relatively soon forgotten" (Graedler, 2002: 79). What is crucial here, however, is that these recurrent phenomena – short-lived or not – are always English; neither Europe's most spoken mother tongues (Russian and German) nor the only billion+ language worldwide (Mandarin Chinese) seem likely to compete with English in this respect.

When it comes to successful export of linguistic features, the only near-future rival to English may be Arabic, representing an Islamic culture that is now the only vocal challenge to Anglo-Saxon globalization, and thus a language with an enormous potential for covert prestige in the eyes of non-anglophone subcultural and linguistically trend-setting groups the world over. So far, apart from a few 'tasty' words such as *kebab* and *shawarma,* recent European loans from Arabic tend to represent notions related to religion and politics, words that often acquire sinister connotations in the process: *fatwa, ayatollah, mullah, imam, sharia, ramadan, intifada, sunna, burka*, and *jihad*.

The Development of Anglicisms

As we have seen, influence from English may take many forms and create many different types of linguistic offspring. An example of how differently English loans may develop over time is found in Hong Kong Chinese and Japanese, respectively (Chan and Kwok, 1986; Ishiwata, 1986). In Chinese as spoken in Hong Kong, the situation prior to the integration of the ex-English crown colony was typically as follows:

> Some loanwords may enjoy a brief popularity and are gradually replaced by terms which are more meaningful. [...] Take the example of 'laser'. It entered the Chinese lexicon as [lœy se]; today it is being replaced by the descriptive [gik gwoŋ] or 'piercing ray' (Chan and Kwok, 1986: 415).

Expressed in structural terms, what happens with the 'laser' type Anglicisms in Hong Kong Chinese is that what was launched as an incomprehensible phonetic loan (an overt lexical borrowing) ended up as an all-Chinese neologism, immediately comprehensible to the speaker. Of course, this is not a unique Asian phenomenon; in several languages, not only loan translations offer themselves as successors to pioneering English-sounding terms: quite often the original Anglicisms yield to expressions that cannot by any standards be termed Anglicisms.

In Japan, the opposite tendency seems to have been at work for more than a century. Whereas prior to the Meiji restoration in 1869, Japanese coined its own translations of (scientific) terms of English origin, "it has become more and more common to adopt the western terms as they are without any attempt at translation" (Ishiwata, 1986: 459).

As indicated earlier, this is exactly the situation in several European speech communities today. While, for instance 50 years ago, in German the Greco-English compound 'television' became *Fernsehen*, decades later 'telefax' was taken over as *Telefax*. Along the same lines, in Denmark cinema 'thrillers' were baptized *gysere* (a literal translation of the term) as this genre was introduced to Danish cinema audiences in the early 1930s, but today's Danish DVD

patrons exclusively use the term 'thriller'. In the passing years, the word 'gyser' has increasingly been used metaphorically: in recent press reportage, the term typically refers to sporting events, political elections, and the like. This wedging in of a new term (ironically, in this case, the original English term) allows the existing word to take on a new meaning, or at least new connotations. If the old term is not lost in the process, we have a case of language enrichment.

Dictionaries on –isms: Testimonies of Linguistic Influence

Given the historical and present importance of borrowings, a vast number of general foreign-word dictionaries have been compiled. Yet dictionaries attesting the influence of languages such as French, German, and Russian are sorely missing, and largely nonexistent, a fact that is lamented by one of Europe's leading names in contact linguistics in his chapter entitled 'Wanted? Dictionaries of Gallicisms, Germanisms and neo-classic diction' (Görlach, 2003: 124–162). Anglicism dictionaries, however, seem to flourish, as documented in a comprehensive bibliography comprising dictionaries and other publications on Anglicisms (Görlach, ed., 2002). Still, as long as national lexicographical definitions and resources vary considerably, one cannot conclude from dictionary data on Anglicisms to linguistic realities concerning their relative numbers – nor their frequencies – in a given set of languages, as shown in a study comparing Anglicism dictionaries from four Germanic speech communities (Gottlieb, 2002).

The Introduction of Anglicisms

Anglicisms may be introduced through either personal or impersonal contacts between an anglophone source and a non-anglophone target.

Personal Contacts

The first wave of Anglicisms in the speech communities surrounding Britain was found in the 18th century. Mediated by sailors, English nautical terms were introduced overseas. Today, most of these loans are integrated in the borrowing languages, and in Denmark nobody except etymologists realizes that words such as *kutter* (fishing vessel) and *splejse*, meaning 'sharing expenses between friends' (from 'splicing' ropes) are English loanwords. When this influence from below was first felt outside Britain, the ruling classes abroad began mediating English influence from above in adopting English terms and habits, including everything from *gentleman* and *gin* to *tennis* and *golf*.

Outside Europe, colonial elites picked up English, and since then the English influence has been felt in national and local languages throughout what is now termed the Commonwealth nations. In similar fashion, non-English-speaking countries in the American hemisphere – the Philippines, for instance – were heavily influenced by American English long before the Second World War.

Even today, in most of the world's non-anglophone speech communities, personal contacts constitute an important channel through which English language features are introduced. A poignant example is found in the influential foreign-based reporters often operating in English even when based in an area where English is not the national language, e.g., the Middle East.

Yet since the 1940s at least, most Anglicisms result from impersonal contacts. They are introduced in target languages – directly or via intermediary languages – through literature and the mass media, as discussed in the following sections.

Impersonal Contacts

Today the media play a more decisive role in language change than do personal contacts; the latter nowadays tend to stimulate foreign-language skills rather than influence the native tongues of those involved.

Original Products: Direct English Input A major dividing line within the impersonal contacts category runs between translated and original (or nontranslated) entities. Most of the original products are nonverbal, though as symbols of Anglo-American lifestyle, they have a major impact on the language in the cultures in question. Original nonverbal products include clothes, food, media technology, etc. Among the verbal products presently consumed untranslated in non-anglophone speech communities, not least by the young, are rock songs, video games, printed fiction, CNN-type news coverage, and Internet communication in English, phenomena contributing to the possible future loss of domains for the domestic languages.

Translated Products: Anglicisms Every Minute This subcategory covers books, technical documentation, films, DVDs, and TV programs, often comprising a major part of the total consumption in non-anglophone countries. In Denmark, some 40% of what people read – TV subtitles included – is translated from English (Gottlieb, 1997: 148–153).

All over the world, the audiovisual, or polysemiotic, media – television, video, DVD, and film – are instrumental in introducing language change. The

first study to focus on Anglicisms on the screen (Sajavaara, 1991) highlighted the role of TV subtitles in the ongoing English influence on Finnish, a language which does not belong to the Indo-European language family.

In Spain, one of Europe's major dubbing countries, critical observers have long talked about "the effect that English is having on the Spanish speaker at home as a result of the vast quantities of badly translated material flooding the spheres of journalism, radio, television, and advertising" (Lorenzo, 1996: 18, quoting A. Gooch: *Spanish and the onslaught of the Anglicism*).

A phenomenon often mentioned in this context are the all-pervading morphosyntactic calques (cf. Table 5). Certain types of calque are more representative of dubbing, in which the translated lines should fit the rhythm of the original dialogue, often leading to unidiomatic and English-sounding versions (Herbst, 1994 on German dubbing, Gottlieb, 2001 on dubbing in Denmark). Other types have become almost second-nature to subtitling from English, in which viewers hear – and very often understand – the actors' original lines. An often-cited example of this is the transfer of the English 'question plus affirmative answer' sequence in dialogue situations where many other languages use the opposite pattern to express the same verbal exchange. In subtitling, the idea of viewers hearing a *yes*, but reading a *nej* ('no') seems to terrify most translators.

Even in dubbing countries, the transfer of such questions-cum-answers seems to be a problem. In order to avoid Anglicisms, the Catalan Televisío de Catalunya dubbing stylebook (1997: 62) urges translators to render the lines

– Because you didn't want to be a witness, right?
– Yes.

as

– Perquè vostè no volia fer di testimoni, oi?
– No.

As in subtitling, the idiomatic solution often sounds wrong, by English standards, which may prevail if morphosyntactic calques continue to appear as frequently as now.

That such calques and other reactive Anglicisms are indeed common in contemporary (film and TV) translations, both in dubbed and in subtitled versions, is documented in a study (Gottlieb, 1999) looking at unintegrated and unidiomatic Anglicisms in the subtitles of two American films broadcast by Danish public-service TV. These two films contained an average of 0.43 and 0.57 unassimilated Anglicism tokens per minute, respectively.

In a follow-up study comparing the dubbed and subtitled video versions of three American family films (Gottlieb, 2001), the subtitled versions displayed Anglicism densities of 0.50, 0.57, and 0.73 tokens per minute, while the dubbed versions contained more than twice as many Anglicisms: 1.04, 1.77, and 1.85 tokens per minute, respectively. In conclusion, both screen translation methods seem to play a very active role in the anglification of the target languages involved.

Within the realm of books and other monosemiotic media, there is a scarcity of empirical work comparing Anglicisms in translations and original texts. However, a major Swedish study comparing the vocabulary in 27 novels translated from English with 29 native Swedish novels found a general tendency toward translationese, with many default equivalents (cf. Table 5), thus confirming common knowledge among translation scholars and critics: "Many English words seem to trigger a standard translation in Swedish although the Swedish translation differs stylistically from the English original." (Gellerstam, 1986: 91).

Anglification Beyond Words

Not only translated texts – which make up a significant part of present-day mass communication in any minor speech community – reveal that non-anglophone language systems are currently being anglified. Also original discourse may tell of English influence, as the personae we create in fiction and the world view we express in nonfictional genres often emulate British and American models. In several speech communities, lexis, phraseology, semantics, syntax, and morphology are in a state of flux; some established domestic words resembling their English synonyms obtain boosted frequencies (cf. the favorized cognates subcategory in Table 5), and even the phonemic system is undergoing changes, with English phonemes getting a foothold in standard pronunciation.

In quantitative terms, Anglicisms may not seem so conspicuous in European languages today. Yet a considerable part of the present growth and development of Western languages is triggered by English. In Danish, for instance, the vocabulary is being reshuffled, and not only are more than half of all new words inspired by English (Gottlieb, 2004: 49), but these loans – typically nouns – tend to carry significant semantic weight: "Those are the words that are instrumental in creating our world view, [...] and this means that to an increasing extent we let another culture with its language govern our reality" (Jarvad, 1995: 135; my translation).

In the same vein, Finnish linguist Paavo Pulkkinen notices that since World War II, the number of new

semantic loans in Finnish has increased at a higher rate than the number of loan translations. He suggests that the reason for this shift (from active to reactive Anglicisms) is that "numerous Finns have recently begun thinking partly along Anglo-American lines" (Pulkkinen, 1989: 92; my translation).

Clearly, the notion of Anglicism has major implications nationally as well as internationally. With English as a modern lingua franca, the more cross-national communication, the more Anglicisms in the world's languages, the more easily people will understand each other.

In turn, this may imply that real English is changed in the process. Especially in Europe, non-native speakers of English sometimes understand each other better if their English contains shared un-English syntactic or semantic features transferred from their individual languages. Imagine for instance a Frenchman and a German successfully using the word 'eventually' in the same non-native way. Even outside Europe, such shortcuts may make sense: in Japanese, the word *barakku* means the same as the Danish *barak,* as opposed to the meaning of *barracks* in English.

However, the danger remains that the world is reconceptualized in Anglo-American terms. But again, in a politically and economically lopsided world – with anglophone cultures setting the agenda more than ever – getting rid of Anglicisms in defense of linguistic purity would only be possible with draconian measures. Paradoxically, in modern society the steady anglification of domestic languages may prove to be a litmus test of their viability. Although loss of domains is an immanent risk to national languages, in our day and age, a pure language is a fossilized one.

See also: Bilingualism; Dubbing; Language Attitudes; Language Policies: Policies on Language in Europe; Lexicography: Overview; Neologisms; Subtitling.

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Linguistic Paradigms

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The word *paradigm* has garnered much attention since Kuhn's (1962) influential treatment of scientific revolution with respect to paradigm shifts. 'Paradigm' there refers to a broad frame of reference for scientific conceptualization and investigation, following from a set of shared assumptions about what the world is like. In the linguistic context, however, 'paradigm' is primarily used as a morphological term that refers to an organized space of potential words or word-forms related to a common base element.

The most commonly encountered instance of the linguistic paradigm is a systematically collected array of inflectionally related word-forms. Such an array is laid out in the form of a table (see **Table 1**), and columns and rows within the table are defined by contrasting values of inflectional features (*see* **Design Features of Language**).

There is a long-standing tradition of presentation of word-forms in paradigms in both descriptive and teaching grammars, where systematic elicitation or presentation guides the design of visual representation. It is not the case, however, that all approaches to morphological description agree on the adequacy of the notion of paradigm for theory construction.

Linguistic morphological theory can proceed from one fundamental assumption about the basic units of the lexicon. The decision whether to adopt a morpheme-based or a lexeme-based conceptualization of morphology's most relevant level of description determines the relevance (or irrelevance) of the paradigm as a descriptive tool.

In a morpheme-based theory of morphology, the grammar describes the assembly of complex morphological objects out of minimal meaningful forms, i.e., morphemes. In a morpheme-based theory, inflected word-forms are not integrally related to one another; they simply contain a greater or lesser number of morphemes in common. The paradigm, therefore, is a merely descriptive conceit – it is epiphenomenal, and not part of the grammar proper. For this reason, morpheme-based theories make no special prediction about the relative relatedness of inflected words containing the same lexical stem versus those containing the same inflectional affix.

In a lexeme-based theory, by contrast, the lexicon is organized according to abstract word-like units, or lexemes, and inflectionally related word-forms are related in the lexicon via their dependence on a unique lexeme. In a lexeme-based theory, therefore,

Table 1 Paradigm of the Latin adjective *bonus* 'good'

	Masculine		*Feminine*		*Neuter*	
	Singular	*Plural*	*Singular*	*Plural*	*Singular*	*Plural*
Nominative	*bonus*	*bonī*	*bona*	*bonae*	*bonum*	*bona*
Genitive	*bonī*	*bonōrum*	*bonae*	*bonārum*	*bonī*	*bonōrum*
Dative	*bonō*	*bonīs*	*bonae*	*bonīs*	*bonō*	*bonīs*
Accusative	*bonum*	*bonōs*	*bonam*	*bonās*	*bonum*	*bona*
Ablative	*bonō*	*bonīs*	*bonā*	*bonīs*	*bonō*	*bonīs*

The paradigm is defined with respect to the inflectional features 'Gender,' 'Number,' and 'Case.'

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The paradigm is defined with respect to the inflectional features 'Gender,' 'Number,' and 'Case.'

the paradigm is not merely convenient for description; it is an organizing principle of the inflectional component of grammar, and the cells of the paradigm contain forms that instantiate the lexeme as suitably modified morphologically for use in particular grammatical contexts. The prediction may follow from this that the inflectional forms of a single lexeme are related in a special way, and this may be borne out in, for example, reaction times in a psycholinguistic priming task.

The traditional typological characterization of languages as isolating, fusional, or agglutinating (a division that is both descriptively nonexhaustive and an oversimplification for almost any given individual language) may bear on the apparent utility of the paradigm on even a descriptive level. For example, a highly agglutinating language, such as Turkish, has very few co-occurrence restrictions on inflectional morphology, and so it has a paradigm that is potentially quite complex (see Table 2).

On the other hand, a highly isolating language such as (Mandarin) Chinese makes most of its grammatical contrasts by introducing discrete function words (adpositions, auxiliaries, etc.,) and distinct syntactic constructions. In other words, there is little inflectional morphology in Mandarin, and so there is little motivation for an abstract lexeme separate from the surface word, and the notion of the paradigm is therefore rendered otiose.

Since isolating languages have no inflectional morphological paradigms to speak of, the question may arise as to the possibility of morphological analogy in such languages, that is, of so-called 'paradigm-leveling,' in which synchronically irregular forms are remade on analogy with inflectionally related, regular word-forms. Proponents of the Lexical Diffusion school of language change, many of whom work principally with Chinese data, dismiss out of hand the possibility of analogical influence in cases of irregular change. Analogy as a linguistic strategy has never been limited to inflectional paradigms, so although it is a fair step to set aside considerations of paradigm leveling in Chinese, it does not necessarily follow that analogy is not applicable in Chinese linguistic change.

The paradigm thus seems most useful for the presentation of languages with considerable inflectional morphology, but at the same time, with limits on the number of features that may be realized on any given word-form. This best describes fusional languages, and it is perhaps not surprising that the paradigm is especially common in the history of linguistic description of Indo-European languages, many of which can be characterized as fusional, or else minimally agglutinative.

The above descriptive difficulties associated with Turkish and Mandarin point to two further theoretical issues:

1. Do speakers store full paradigms of word-forms in their heads and select words from this set, no matter how many forms this entails (cf. Odden, 1981 on the potential for literally trillions of grammatically distinct verb forms for each and every Shona verb), or do the contrastive features define the paradigm space, and general morphological rules allow for the computation of inflected word-forms?
2. Is the only sensible use of the paradigm to be found in a traditional morphology with the word-form as the upper limit? Might one rather extend 'grammatically related' into the realm of collocations of content and function words, i.e., periphrastic expressions?

Both of these questions are open and active in linguistic research, although the traditional conceptualization of morphology (as the formation of words and the study of their constituent parts and/or relationships) has militated against multiword units within paradigms.

It is only in the context of a paradigm that one may refer to a *defective paradigm*, i.e., the situation in which a lexeme lacks a particular inflected

Table 2 A fragment of the morphological paradigm for Turkish *deniz* 'ocean'

	'X'	*'to X'*	*'of X'*	*'in X'*	*'from X'*
Singular	deniz	denize	denizin	denizde	denizden
Plural	denizler	denizlere	denizlerin	denizlerde	denizlerden
Diminutive sg.	denizcik	denizcike	denizcikin	denizcikde	denizcikden
Diminutive pl.	denizcikler	denizciklere	denizciklerin	denizciklerde	denizciklerden
'my X'	denizim	denizime	denizimin	denizimde	denizimden
'your (sg.) X'	denizin	denizine	denizinin	denizinde	denizinden
'our X'	denizimiz	denizimize	denizimizin	denizimizde	denizimizden
'your (pl.) X'	deniziniz	denizinize	denizinizin	denizinizde	denizinizden
'my Xs (pl.)'	denizlerim	denizlerime	denizlerimin	denizlerimde	denizlerimden
'our Xs (pl.)'	denizlerimiz	denizlerimize	denizlerimizin	denizlerimizde	denizlerimizden

word-form when it would be expected, all else being equal, to possess such a word-form. In English, an example is in the paradigm of the verb STRIVE, which for most speakers lacks a past/passive participle, or at least there is a significant lack of consensus on what it should be: ?*striven*, ?*strove*, ?*strived*. Any of these may be generated by a more or less productive rule of English verb morphology (cf. DRIVE vs. DIVE vs. THRIVE), and as such, the hesitation to choose a form with certainty indicates a (perhaps accidental) gap in the paradigm. A full discussion of gaps is beyond the scope of this article, but it should be pointed out that whole classes of lexemes may lack a particular form or set of forms for semantic or pragmatic reasons or for reasons of pure historical accident. In either case, the result is a paradigm that may be seen as defective with respect to the inflectional paradigms of other, comparable lexemes in the language in question.

As a final consideration, there may be in some cases a motivation for the addition of derivationally related words to the discussion of paradigms. That is, one may speak of regular derivation as operating within the space of a derivational paradigm, with different base words and their derivatives standing in comparable relations to their counterparts in other derivational paradigms. For example, *sing* > *song* > *singer* is analogous to *shoot* > *shot* > *shooter* within an abstract paradigm {Action} > {Result} > {Agent}. Discussion of derivation in paradigmatic terms is somewhat problematic, given that each lexeme in turn licenses an inflectional paradigm of its own. Although there exists considerable discussion of a formal compartmentalization of derivation and inflection (the so-called 'split-morphology hypothesis'), there are numerous languages in which a strict sequencing of inflectional markings outside of derivational ones is not respected. In such cases, therefore, paradigmatic intermingling may be more clearly motivated.

See also: Design Features of Language.

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Linguistic Reality

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Linguistic reality is that portion or aspect of reality that linguistics seeks to understand and explain, and in virtue of which true linguistic claims are true. Linguistics is the scientific study of language, its units, nature, and structure. To see what the units, nature, and structure of language are, we should look to what linguists say. A reasonable place to begin is *An encyclopedia of language*. It reveals that in addition to languages and language users, phonetics cuts up linguistic reality into vowels, consonants, syllables, words, and sound segments, the human vocal tract and its parts (the tongue has five), among other things (*see* **Phonetic Pedagogy**). Phonology is also concerned with sounds, but organizes them in terms of phonemes, allophones, alternations, utterances, phonological representations, underlying forms, syllables, words, stress-groups, feet, and tone groups (*see* **Phonology: Overview**). In grammar, morphology describes morphemes, roots, affixes, and so forth, and syntax analyzes sentences, semantic representations, LF representations, among other things (*see* **Grammar**). Semantics studies signs, their meanings, their sense relations, propositions, etc. Pragmatics deals with speech acts, speaker meanings, sentence meanings, implicatures, presuppositions, etc. Lexicography investigates nouns, verbs, words, their stems, definitions, forms, pronunciations, origin.

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Why Those Objects?

What is the linguist's justification for positing, or recognizing, vowels and consonants, phonemes, morphemes, words, sentences and so on? A general though unhelpful answer is that countenancing such objects produces theories that have a great deal of classificatory, explanatory, and predictive power. The more specific question 'but why posit phonemes?' must be justified within phonology by comparing a theory with phonemes to one without, as must the more specific question of why [b] and [p] are phonemes of English. Why certain noises are enshrined as dictionary entries needs to be justified within lexicographical methodology, rather than, say, within philosophy. The point is that the justification is to be found within linguistic theory, and in most cases within a particular subdiscipline, since subdisciplines have different assumptions. (Phonetics and phonology approach the sound signal differently and hence parse it in terms of different units. Lexicography might give credence to the thesis that all linguistic objects have instances, since each of the million or so words recognized by the *O.E.D.* have been uttered or inscribed by someone at some time. But grammar might not; there are more, perhaps infinitely many more, sentences than will ever be used.) Assuming there is sufficient internal justification for recognizing the existence of the above-mentioned objects, we may now ask the following question.

What Are They?

What, for example, is that quintessential linguistic object an expression? For that matter, what is a language? One answer to the former would be that an expression is anything that is a noun, verb, adjective, etc., or a sequence of such things built up by means of the grammatical rules. But that merely raises the question of what these other things are. Obviously, nouns and verbs are for the most part **words**, but what are words? Are they physical objects, particular events, abstract objects, kinds, classes, or mental entities? (Parallel questions may be asked of languages: are they social practices, abstract objects, classes of expressions, or psychological products of the language faculty? While it is beyond the scope of this short encyclopedia article to address the more complicated question about language, it is worth noting that the proposed answers mirror those given below on what a word is.)

Types and Tokens

Before such questions can be tackled, we have to disambiguate the word 'word,' which could mean either 'word type' or 'word token.' There is only one definite article in English, the word 'the' – the word type – but there are millions of the's on pages in the Library of Congress and the lips of members of Congress – the word tokens (*see* **Type versus Token**). Word tokens are particulars; they might be composed of ink, sounds, or smoke signals. They have a unique spatiotemporal location, unlike types. Types are unique but capable of more than one instantiation or representation, unlike their tokens. A good indicator that there are both types and tokens is the different counting procedures associated with the same word. When it is said that an educated person's vocabulary is upward of 10 000 words, that there are exactly 26 letters of the English alphabet, or that English has 18 cardinal vowels, types are being counted, since the numbers would exceed a million if we were counting tokens. As the examples suggest, not only words but also vowels, phonemes, letters, utterances, sentences, and most of the rest of the linguistic objects found in our survey come in types and tokens.

Which sorts of objects, then, does linguistics explicitly refer to and quantify over – types or tokens? Types – although linguistics is an empirical science based on empirical data, applicable to particulars – tokens – in the causal realm. Yet to ensure generality in an economical format, most of the references and quantifications that appear in linguistic theory involve types and their relationships to each other. Expressions, for example, may be composed of words, and words composed of syllables, and syllables of phonemes, and phonemes of features – all of which are types. (This might be thought puzzling; how can an expression such as 'Pease porridge hot, pease porridge cold' be six words long, if there are only four words, each of them unique, of which it might be composed? For a resolution of this puzzle, (*see* **Type versus Token**). Linguistics, in other words, is awash in references to and quantifications over types, including words. Our original question then becomes the following one.

What Are Word Types?

It should be clear that word types (hereafter: words) are not particular physical objects/events, but it remains to be seen whether they are abstract objects, kinds, classes, or mental entities – or perhaps whether they do not exist at all.

Even among word **types**, there are several sorts of words. Yet one of the lexicographer's uses of the word 'word' stands out. A rough characterization of this sort is *the sort of thing that merits a dictionary entry.* (*Rough*, because some entries in the dictionary, e.g.,

il-, *-ile*, and *metric system* are not words, and some words, e.g., place names and other proper names, do not get a dictionary entry.) To fix our thoughts on what an account must explain, let us consider the word *color*, or *colour*. According to the *O.E.D.*, the noun *color* is from early modern English, is pronounced [kʊˈlər] has two 'modern current or most usual spellings' [colour, color]; 18 earlier spellings [collor, collour, coloure, colowr colowre, colur colure, cooler, couler, coullor, coullour, coolore, coulor, coulore, coulour, culler, cullor, cullour]; and 18 different senses – divided into four branches – with numerous subsenses. The verb *color* is a different word, but with the same pronunciation and spellings (*O.E.D.*, vol. 2: 636–639). *Webster's* assures us that the word *schedule* has four current pronunciations: ['ske-(,)jü(ə)l], ['ske-jəl] (US), ['she-jəl] (Can.) and ['she-(,)dyü(ə)l] (Eng.) (*O.E.D.*, vol. 2: 1044). Thus, a word can be written or spoken; it can have more than one correct spelling, more than one correct spelling at the same time, more than one sense at the same time, the same correct spelling and pronunciation as a different word; and lastly, a word may have more than one correct pronunciation at a given time. These linguistic facts have to be accommodated by any account of words.

Realism

Probably the most popular account of words is given by platonic realism: words are abstract objects – acausal objects, like numbers, that have no spatiotemporal location. As can be seen from the preceding paragraph, they are very abstract entities indeed, for there is no relatively simple property, like spelling or pronunciation or meaning, that all tokens of the word *color* have in common; not even all their written tokens have the same correct spelling. (Indeed, the realist may argue that that is one of the primary justifications for positing word types – being a token of the word *color* might be the only glue that binds the considerable variety of space-time particulars together). This should discourage the misconception that realism is committed to a platonic 'form' (the spelling, say) that all instances resemble the way a cookie resembles a cookie cutter (although the old view lives on in the fact that spellings are called 'forms' of the word). Family resemblance in the standard cases is the most that might be hoped for, but intentionality and context are such important factors in determining what type a token is a type of, that even resemblance can fail in nonstandard cases. (It should be noted, if it is not already clear from the foregoing, that a physical object that is a token of a type is not one **intrinsically** – merely by being a certain sequence of shaped ink marks, say. It is only a token relative to a type, a language, and perhaps an orientation. Moreover, it may need to have been produced with a certain intention and in accordance with certain conventions.)

Platonic realism, whether of words or any other abstract objects, must face a serious epistemological challenge, namely, to explain how it is that spatiotemporal creatures such as ourselves can have knowledge of these abstract things if we cannot causally interact with them. Admittedly, we do causally interact with word tokens, but if the tokens are as diverse as was emphasized above, how do we arrive at the properties of the type at all? There are various realist responses to this problem (responses that are not necessarily mutually exclusive). One is to appeal to intuition. Another is to claim that just as maps represent a city, so tokens represent their types, thus reducing the problem to one of characterizing representation. Another is to reject platonic realism altogether in favor of Aristotelian realism. This involves dropping the claim that words have no spatiotemporal location, and claiming instead that they have many such locations; each type is 'in' each of its tokens. Such a position suggests that there could not be an uninstantiated type. While plausible for words, it is not plausible for sentences. A third response is to claim that words are kinds, just as species are, thus reducing the problem of how we arrive at knowledge of types to one of induction.

Conceptualism

As the terms 'platonic' and 'Aristotelian realism' suggest, we have run into the old philosophical problem of universals in virtue of the fact that types have instances. Not surprisingly, the same camps are in evidence here. The traditional opponents of universals/abstract objects were the conceptualists and the nominalists. The conceptualists argued that there are no general things such as *man*; there are only general *ideas* – that is, ideas that apply to more than one thing. Applied to words, the thesis would be that words are not abstract objects 'out there,' but objects in the mind. Their existence then, would be contingent on having been thought of. While this contingency may have a good deal to recommend it in the case of linguistic items, by itself conceptualism is just a stopgap measure. For ideas also appear to come in types and tokens (as evidenced by the fact that two people sometimes have the same idea). So either the conceptualist is proposing that word types are idea types – which would be a species of realism – or she is proposing that there are no types, only mental particulars in particular persons, which is a species of nominalism.

Nominalism

The problem for those hostile to universals and abstract objects is to account for our apparent theoretical commitment to types, which are clearly not spatiotemporal particulars. Traditional nominalists argued (as their name implies) that there are no general things, there are only general words, which apply to more than one thing. But this too is not a solution to the current problem, presupposing as it does that there are word types – types are the problem.

Class nominalists have proposed that a word type is just the class, or set, of its tokens. But this is unsatisfactory because, first, classes are abstract objects too, so it is hard to see how this is really a form of nominalism about abstract objects. And second, classes are ill-suited for the job, since classes have their membership and their cardinality necessarily, but how many tokens a word has is a contingent matter. (One less token would not annihilate the word.)

Initially more promising is the nominalistic claim that talk of types is harmless because it is unnecessary – it is just shorthand for talk of tokens. *The mountain lion is a mammal* is easily translated as 'every mountain lion is a mammal.' So to refer to the noun *color*, say, we need only refer instead to all its tokens. One problem is how to do this. We can't say 'every token of the noun "color"... ,' because 'color' refers to a type. And 'every noun "color"...' does not seem grammatical, a fact that is even more apparent if we consider sentences (e.g., 'every "the cat is on the mat"...'). Even if we could, truths will convert to falsehoods (using the 'every'-conversion). The noun *color* is pronounced [kɒ'lər], but particular inscriptions of it are not audible at all. So the question is how we might identify these tokens grammatically but without referring to the noun *color* itself and still say something true and (in some appropriate sense) equivalent. The idea seems to be that the type must embody certain similar features that all and only its tokens have. This is a beguiling idea, until one tries to find such a feature, or features, amid the large variety of its tokens – even the well-formed tokens. Consider *color* and *schedule* again. They demonstrate that neither same spelling, same sense, nor same pronunciation prevail. As the preeminent nominalist Goodman observed, "Similarity, ever ready to solve philosophical problems and overcome obstacles, is a pretender, an impostor, a quack .... Similarity does not pick out inscriptions that are 'tokens of a common type' .... Only our addiction to similarity deludes us into accepting similarity as the basis for grouping inscriptions into the several letters, words, and so forth" (Goodman, 1972: 437–438).

Further undermining the reductive approach being considered is that each of the possible defining features mentioned (e.g., spelling, pronunciation) involve reference to types: letter types in the spellings, phoneme types in the pronunciation. (Types are defined in terms of each other.) These too would have to be analyzed away in terms of quantifications over particulars. If, as a last resort, one were to specify a massive disjunction that avoided all references to types, one that captured each and every token of the noun *color*, one would capture tokens of other words, too. Paraphrasing quantifications over word types would be extraordinarily difficult. The moral is that whatever word types are, they are indispensable.

See also: Grammar; Phonetic Pedagogy; Phonology: Overview; Type versus Token.

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Linguistic Rights

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Central Concepts

All the rights that individuals, groups, organizations, and states have in relation to languages (their own or others) are linguistic rights or language rights (LRs). Languages may similarly have rights. Strictly speaking, only binding rights (coded in laws or regulations of various kinds) count. In most cases, these also include a duty-holder who has to see to it that the rights can be enjoyed. A state or a regional authority can, for instance, have the duty to organize education through the medium of a certain language for certain individuals or groups in a specific place. In addition to rights proper, there are many nonbinding recommendations, declarations, and other nice intentions and wishes about LRs.

An individual in a specific country may have the right to use her or his mother tongue in various contexts, for instance in dealing with authorities, local, regional, or state-wide, orally or in writing or both; the authorities do not necessarily need to reply in the same language. The mother tongue is often for legal purposes defined in a strict way, as the first language that a person learned, and still speaks, and with which s/he identifies. A definition often used in situations where forced assimilation of indigenous peoples has made the older generation speak the dominant language to their children, is sometimes much less strict: a mother tongue, with LRs connected to it, is defined as a language which is, or has been, the first language of the individual her-/himself, or of (one of) the parents or grandparents.

Often, it depends on how many individuals there are in a country (area, region, municipality, etc.) whether individuals (speakers or signers) belonging to that group have any LRs; the group has to have a certain size. Two of the most important European LRs documents, from the Council of Europe, use group size as a criterion, but do not in any way define it: The European Charter on Regional or Minority Languages, and the Framework Convention on the Protection of National Minorities, both in force since 1998, use formulations such as "*in substantial numbers*" or "*pupils who so wish in a number considered sufficient*" or "*if the number of users of a regional or minority language justifies it*." (See the latest news about these documents and their ratifications at the Council of Europe. The treaty numbers are 148 and 158).

If an individual can use the right to all mother tongue medium services anywhere in her or his country, we speak of a principle of personality. Usually, only members of large groups with excellent protection have this kind of right, which in most cases is restricted to the dominant language speakers in a country. Often, such speakers are not even aware of how precious these rights are, and how unusual it is to possess such rights for any of the world's linguistic minorities (or even some linguistic majorities: e.g., in several African countries, the old colonial languages still have more rights than the indigenous African languages have). If LRs are connected to a specific region, such as is the case in Switzerland, where German-speakers can use their language in official contexts only in certain cantons, while French, Italian, or Romansch-speakers can use their respective languages only in certain other cantons (where German speakers do not have the right to use German), we speak of a principle of territoriality. That means in practice that if Italian-speaking Swiss parents want their children to be educated through the medium of Italian, they have to live in the only canton (Tessin) where this is a right.

Many international organizations and most states have language policies that spell out the official languages of the organization or state and, by implication, the LRs of the people, groups, and states dealing with, and working within, that entity. The United Nations has six official languages, the Council of

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Europe only two (English and French). The European Union has several times increased the number of its official languages, such that after its latest expansion, in May 2004, the Union now has 20 official languages; all official documents have to be made available in all of them. Many organizations also have working languages; their number may be more restricted. A number of states have only one official (or state) language; most have two or more (English is *an* official language in more than 70 states; see Skutnabb-Kangas, 2000). South Africa has 11 official languages, India 22. In addition, many states specify one or several national, additional, link, or national heritage languages in their constitutions; in most cases, these have fewer rights than the official languages have (see de Varennes, 1996).

Linguistic Human Rights (LHRs)

The very recent and still somewhat unclear concept of Linguistic Human Rights (LHRs) combines language rights (LRs) with human rights (HRs). LHRs are those (and only those) LRs which, first, are necessary to satisfy people's basic needs (including the need to live a dignified life), and which, second, therefore are so basic, so fundamental that no state (or individual or group) is supposed to violate them. Some basic rights prohibit discrimination on the basis of language (negative rights); others ensure equal treatment to language groups (positive rights). There are many LRs which are not LHRs. It would, for instance, be nice if everybody could, even in civil court cases, have a judge and witnesses who speak (or sign) this person's language, regardless of how few users the language has. Today, it is mostly in criminal cases only that one has a linguistic HUMAN right to be informed of the charge against oneself in a language one understands (i.e., not necessarily the mother tongue); in all other contexts, people may or may not have a LANGUAGE right, depending on the country and language; in the best cases, interpreters paid for by the state are used. Likewise, it would be nice if the following demands were to be met:

> All language communities are entitled to have at their disposal all the human and material resources necessary to ensure that their language is present to the extent they desire at all levels of education within their territory: properly trained teachers, appropriate teaching methods, textbooks, finance, buildings and equipment, traditional and innovative technology.

But such demands are completely unrealistic and cannot be considered part of LHRs. (They come from Article 25 of the 1996 Draft Universal Declaration of Linguistic Rights.) At this moment, only a few dozen language communities in the world have these kinds of rights; this has to be seen against the background of the fact that there are some 6500 to 7000 spoken languages (and perhaps an equal number of sign languages) in the world (see Ethnologue; see Skutnabb-Kangas, 2000, Chapter 1, for the unreliability of the statistics).

Two kinds of interest in LHRs can be distinguished. One is "the expressive interest in language as a marker of identity," the other an "instrumental interest in language as a means of communication" (Rubio-Marín, 2003: 56). The expressive (or noninstrumental) language rights "aim at ensuring a person's capacity to enjoy a secure linguistic environment in her/his mother tongue and a linguistic group's fair chance of cultural self-reproduction" (Rubio-Marín, 2003: 56). It is only these rights that Rubio-Marín calls "language rights in a strict sense" (Rubio-Marín, 2003: 56); in other words, these could be seen as LHRs. The instrumental language rights "aim at ensuring that language is not an obstacle to the effective enjoyment of rights with a linguistic dimension, to the meaningful participation in public institutions and democratic process, and to the enjoyment of social and economic opportunities that require linguistic skills" (Rubio-Marín, 2003: 56). So far, it is not at all clear what should and what should not be considered LHRs, witness the lively ongoing debates about the topic.

Language is one of the four most important human characteristics (among many others that are also listed in human rights instruments) on the basis of which discrimination is never allowed (the others are gender, 'race,' and religion). Still, language often disappears in the educational paragraphs of binding HRs instruments. One example: the paragraph on education (§ 26) of the Universal Declaration of Human Rights (1948) does not refer to language at all. Educational linguistic human rights, especially the right to mother tongue medium education, are among the most important rights for any minority. Without them, a minority whose children attend school, usually cannot reproduce itself as a minority: it cannot integrate with the majority, but is forced to assimilate to it.

Binding educational clauses of human rights instruments have more opt-outs, modifications, alternatives, etc., than other Articles of such instruments have. One example is the UN Declaration on the Rights of Persons Belonging to National or Ethnic, Religious and Linguistic Minorities in 1992 (emphases added: '*obligating*' and positive measures in *italics*, '**opt-outs**' in **bold**):

A. States *shall protect* the existence and the national or ethnic, cultural, religious, and linguistic identity of minorities within their respective territories, and *shall encourage* conditions for the *promotion* of that identity.
B. States *shall adopt* **appropriate** legislative *and other* measures *to achieve those ends*.

. . .

4.3. States **should** take **appropriate** measures so that, **wherever possible**, persons belonging to minorities have **adequate** opportunities to learn their mother tongue **or** to have instruction in their mother tongue.

The Council of Europe's *Framework Convention for the Protection of National Minorities* and *The European Charter for Regional or Minority Languages*, both in force since 1998, also have many of these modifications, alternatives, and opt-outs. The Framework Convention's education Article reads as follows (emphasis added):

> In areas inhabited by persons belonging to national minorities traditionally or in substantial numbers, **if there is sufficient demand**, the parties shall **endeavor** to ensure, **as far as possible** and **within the framework of their education systems**, that persons belonging to those minorities have **adequate** opportunities for being taught in the minority language **or** for receiving instruction in this language.

The opt-outs and alternatives ('claw-backs') in the *Charter* and the *Convention* permit reluctant states to meet the requirements in a minimalist way, something they can legitimize by claiming that a provision was not 'possible' or 'appropriate,' or that numbers were not 'sufficient' or did not 'justify' a provision, or that it 'allowed' the minority to organize teaching of their language as a subject, but at their own cost.

Without binding educational linguistic human rights, most minorities have to accept 'subtractive' education through the medium of a dominant/majority language. In subtractive language learning, a new (dominant/majority) language is learned at the cost of the mother tongue, which is displaced, leading to diglossia and often to the replacement of the mother tongue. Diglossia means a situation with functional differentiation of languages, e.g., one at home and in the neighborhood, another for use at school and with authorities.

Assimilationist, subtractive education of indigenous and minority children is genocidal; it fits two of the five definitions of genocide in the *UN International Convention on the Prevention and Punishment of the Crime of Genocide* (E793, 1948):

Article II(e): "forcibly transferring children of the group to another group," and
Article II(b): "*causing serious bodily or* ***mental*** *harm to members of the group*"(emphasis added; see Skutnabb-Kangas, 2000 for details).

The human rights system should protect people in the globalization process, rather than give market forces free range. Human rights, especially economic and social rights, are, according to human rights lawyer Katarina Tomasevski (1996: 104), supposed to act as *correctives to the free market*. She claims that "The purpose of international human rights law is . . . to overrule the law of supply and demand and remove pricetags from people and from necessities for their survival." These necessities for survival thus include not only basic food and housing (which would come under economic and social rights), but also basics for the sustenance of a dignified life, including basic civil, political, *and cultural* rights. It should, therefore, be in accordance with the spirit of human rights to grant people full linguistic human rights.

See also: Endangered Languages; Intercultural Pragmatics and Communication; Linguistic Decolonization; Pragmatics: Linguistic Imperialism; Social Aspects of Pragmatics.

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Relevant Websites

http://conventions.coe.int – Council of Europe.
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http://www.linguistic-declaration.org – Draft Universal Declaration of Linguistic Rights.

Linguistic Terminology

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> A precise terminology is a *conditio sine qua non* if one wants to understand grammatical facts.... (Jespersen, 1924: 315)

The terminology of a discipline consists of a set of concepts structuring the field, together with the labels associated with the concepts. Linguistic terminology is the terminology we use to describe the object 'language.' The study of linguistic terminology thus lies on the one hand at the intersection between terminology research in general (terminology science, terminology management, history of terminology, terminographical recording, etc.), and the study of language, or linguistics, on the other – linguistics being, as Firth remarked, nothing other than language turned back on itself.

As objects of description, natural languages are unique in that, so far as we know, they all contain within themselves the resources they need to refer to themselves and to the ways in which they are used (Lyons, 1980: 293). Native speakers have the means to talk about their own language, speech, failures in communication, etc., as objects of discourse, and this ability appears to be a skill that children acquire as part of the natural process of language acquisition (Gombert, 1997). Seen from this perspective, any linguist wanting to provide a comprehensive account of the syntax and semantics, and even the pragmatics, of 'a language,' must also provide an account of its metalinguistic terms and uses.

In discourse about the object 'language,' terminology needs to be distinguished both from the metalinguistic discourse of which it is a subpart, and from the (partly overlapping) 'nomenclature' (names for concepts): a nomenclature can be a list of names, whereas a terminology is a set of systems and subsystems of names.

Interest in the metalinguistic functions of language in the Anglo-Saxon world has mainly concentrated on such things as type-token relations, token reflexivity, and the study of propositions (such as the truth conditions of sentences like 'This sentence is false'). But metalinguistic uses of natural languages pervade much more extensive areas of everyday discourse. The boundary between the use of a natural language as a metalanguage for everyday purposes and its use for technical descriptive or theoretical purposes is not always easily drawn. This can be illustrated in simple, everyday terms: What is the meaning of 'word' in 'English has a vocabulary of half-a-million words,' or in 'This dictionary contains 55 000 words'?

From a terminological point of view, the English lexicon contains different kinds of words (or, preferably, 'lexemes'): lexemes whose function is almost entirely restricted to their technical use ('adjective,' 'infinitive,' 'deixis'), lexemes that have both a technical sense and a less-well-defined everyday sense ('word,' 'voice,' 'gender'), and the vast majority of other lexemes, which do not form part of the linguistic terminology.

The problems arise with the first two categories, and it is this that distinguishes the terminology of linguistics from terminologies in the natural sciences. In the more mature natural sciences, terminology has kept pace with scientific developments, and it is based on widespread agreement as to the nature and status of the concepts concerned. Such agreement does not exist in linguistics. (For example, how many parts of speech are there? Should they be called 'form classes,' 'word classes,' or even 'lexeme classes'? How many tenses does English have?) The evidence suggests that terminological agreement in linguistics is becoming less rather than more likely. Linguistic terminology thus faces three major problem areas: the categories underlying the terminology, the terms themselves, and the proliferation of terms, leading to the 'translation problem.'

Attempts to deal with these problems have followed two major routes: normative or descriptive. Those taking the normative route seek to change the terminology either radically (Barnes, Fries) or by tinkering with it (Sonnenschein, Jespersen). Those taking the descriptive route write dictionaries of linguistic terminology (Nash, Gibbon).

Between about 1885 and 1950, the simplification and harmonization of terminology was a topic of particular interest to linguists worldwide. With the foundation of the Birmingham Grammatical Society in 1885, Sonnenschein initiated a campaign to simplify and harmonize the terminologies of the main foreign languages taught in schools. The most significant outcome of this movement was the publication of the *Parallel grammar series* – a set of textbooks that ultimately comprised more than 25 volumes covering eight languages. The success of this series helped to stimulate similar work in other countries, which Sonnenschein tried to coordinate on an international scale. These efforts culminated in the publication of schemes of terminology for France (1910), England and Wales (1911), and the United States (1913) (Walmsley, 2001). Terminology became one of the main themes at the Sixth International

Congress of Linguists, Paris, 1948, and was also one of Fries' targets (1952). Nevertheless, none of the normative proposals seems to have enjoyed significant success.

The argument against the traditional Latinate terminology is that it invites the grammarian to press his or her description of a language into categories to which it is not suited. There is no *a priori* reason why the terminology should work like this. In principle, four strategies are available to us: we can invent new terms but apply them to the conventional categories; we can retain the conventional nomenclature but establish new categories; we can postulate new categories and devise a new terminology to go with them; or we can stick with the conventional categories and the old nomenclature. (This last option would be one way of viewing what we think of as 'traditional grammar.')

To first address the problem of the categories (as opposed to their labels), the evidence shows that adopting the traditional categories of Latin grammar did indeed have a decisive influence on the history of English grammaticography. Levin described as a "fallacy . . . discussing the grammar of English on the basis of preconceptions derived from the grammar of another language (say Latin)" (Levin, 1960: 262). Following Levin, Crystal complained, "Often a grammarian would take over and work within a traditional frame of reference assuming that it was satisfactory for his purposes . . . a more conscious awareness of linguistic principles would have shown that it was not; . . . the best example . . . [of this is] . . . the attempt to describe modern languages as if they were variants of Latin" (Crystal, 1971: 69).

Despite such admonitions, concepts not appropriate to – or even non-existent in – present-day English continue to be taught in introductory textbooks and teaching grammars, among them voice, case, a future tense, and subjunctive mood. As long ago as 1922, McKerrow, for instance, wrote, "if we were now starting for the first time to construct a grammar of modern English, without knowledge of or reference to the classics, it might never occur to us to postulate a passive voice at all" (McKerrow, 1922: 163; cf. Andersen, 1991). It is sometimes claimed that English nouns have 'only' two cases and that some pronouns have a distinctive form when used as objects (an 'objective,' i.e., accusative, form). Of the latter, Sweet wrote: "the so-called accusative of the personal pronoun is functionally not a case at all . . . The real difference between 'I' and 'me' is that 'I' is an inseparable prefix used to form finite verbs, while 'me' is an independent or absolute pronoun, which can be used without a verb to follow" (Sweet, 1875–1876: 495; cf. Hudson, 1995).

The limitations of the traditional core of terminology also mean that categories that could – or should – be recognized in English go unlabeled, or even unidentified. If we set up a table of the modal verbs (*can, could, may, might, must, shall, should, will, would*), for instance, we find that traditionally we have names for some syntagms (*will go*, 'future'; *should go,* 'subjunctive'), but not for others. "Why should the combinations *would go* and *would have gone* have special terms rather than *might go* and *might have gone*, or *dared go*, etc.? The only reason is that these forms serve to translate simple tense-forms of certain other languages" (Jespersen, 1924: 281).

Observations such as these would seem to justify the Structuralists' criticisms of earlier grammarians. Nevertheless, the evidence shows that earlier grammarians, far from being the ill-informed, complacent practitioners pictured by Crystal *et al.*, were well aware of the difficulties inherent in changing the categories and the nomenclature: "there is probably no language so different from the English as the Latin is . . ." (Ward, 1767: iv); "if an English Grammar were to be made for the sole Purposes of those who propose to learn, and to use no Language but the English only, it might be put into a different Form from that of the Grammars of the learned Languages" (Ward, 1767: vii). The problem Ward saw was that to the extent that we set up categories and terminologies outside the Latin tradition, we create difficulties in cross-linguistic comparison. And it was this cross-linguistic comparability that earlier grammarians exploited when they first began to teach Latin through the medium of English in the 14th century (Walmsley, 2004). Since much of the teaching was done through translation, it is not surprising that pupils were taught to discover in English exactly those categories that already existed in Latin. And when the first grammar of English to be written in English – William Bullokar's – appeared about two centuries later (Turner, 1980), again, it was not ignorance that induced the author to model his description so closely on Latin; rather, it was his desire to prove that English, too, could be ". . .'a perfect ruled tongue, / conferable to grammar art / as any ruled long'. English [was] as orderly and subjectable to grammatical rules as any language that has been the object of prolonged teaching" (Robins, 1994: 21).

Concerning the names for the concepts, grammarians have been criticized for "obscuring the grammatical requirements of English by discussing facts of English form in the vocabulary designed to codify Greek and Latin" (Dinneen, 1967: 170) – in other words, for using Latinate labels for the concepts. Again, earlier grammarians were not unaware of the problem: "It has been asserted . . . that in order to

produce a complete Grammar of our language, we should imitate the Latin in the formation of our Cases, Moods, and Tenses; whilst others … affirm that the English tongue has no similitude whatever with the Latin in this respect, and therefore they are for preventing our making use of the common technical terms usually employed in Grammars of our language" (Goldsmith, in Wiseman's *Complete English Grammar*, 1764: Preface; quoted in Michael, 1970: 502–503).

The difficulty lies in finding appropriate alternative terms. This has not prevented reformers from proposing 'native' English alternatives to terms of Latin origin. Barnes (1878), for instance, included a list of native alternatives for more than 350 Latinate words, including terms for grammar. But it is difficult to see what advantage a native terminology brings, if coupled to the traditional categorial framework.

The most radical attempt to break out of the system was that of Fries (1952). On the basis of strictly distributional criteria, he postulated four major parts of speech and 15 classes of function words, which he labeled 1–4 and A–O, respectively. Fries warned against equating his word classes with those of traditional grammar: "The reader, familiar with the conventional grammar, will probably attempt … to equate these class numbers with the usual names, 'nouns,' 'verbs,' 'adjectives,' and 'adverbs' … If he does, he will certainly find increasing difficulty in the following chapters" (Fries, 1952: 87; cf. Fries, 1952: 2). Fries's scheme, however, did not succeed in replacing the old Latinate terms – testimony to the robustness of the traditional terminology.

The third and final problem area concerns the proliferation of linguistic terminologies. The 20th century saw an unprecedented increase in the number of grammatical theories. The interested customer could choose from about 50 or 60 theories of grammar. These theories frequently draw the boundaries between themselves and neighboring theories in part at least by means of their terminology. Here, as elsewhere, it is not simply a question of choosing a new label for the same concept: if a term has a place in a different system, it becomes a different concept. 'Subject' does not mean the same thing in a system in which it is a primitive as it does in a system in which it is a derived category, as is the case in Government-(and)-Binding (GB) theory.

The proliferation of grammar theories leads to an apparent paradox: if each theory has its own terminology – either introducing new terms or redefining old ones – how is it that linguists of different persuasions can communicate with one another? The language of any specific theory can be viewed as a sort of sub-metalanguage. Linguists recognize when a colleague is 'speaking GPSG,' for instance, and informal translations are not infrequently provided to make the theory comprehensible to linguists of other schools. For example, 'To put the same thing in HPSG terms …' or 'In Cognitive Grammar terms, this would be … .' For understanding to take place, linguists must be as familiar as possible with both theories, and specifically with the points of difference between them. When the adherent of one theory speaks to one of a different persuasion, the hearer needs to make ongoing adjustments – that is, make a sort of mental translation – to the running text, to take account of the differences.

The current core of traditional linguistic terminology is defective insofar as it perpetuates the description of categories not attested in the languages being described and makes other categories invisible or difficult to identify. It does not reflect the individuality of specific languages, nor is it flexible in the sense of being easy to modify. It does, though, offer a coherent system as a basis for comparing languages, and "what is generally referred to as 'traditional grammar' … is much richer and more diverse than is often suggested in the cursory references made to it by many modern handbooks of linguistics" (Lyons, 1968: 3). In this function, the core terms act rather like empty shells or cases into which the particular sub-metalinguistic meanings for individual theories can be inserted. Further terms are added as the theory requires. From a different perspective, the lack of flexibility reveals itself as a remarkable robustness, both synchronically and through time. Provided that certain conditions are met, the terminology permits communication across theories and across languages (typology). Similarly, it facilitates accessibility to linguistic theories and descriptions over a long period of western cultural history. Its core of traditional terms is thus part of the glue that holds the discipline of linguistics together: without this common terminological core, the discipline would fragment into a myriad of mutually unintelligible metalanguages.

See also: Bullokar, William (c. 1531–1609); Case; Firth, John Rupert (1890–1960); Fries, Charles Carpenter (1897–1967); Jespersen, Otto (1860–1943); Lyons, John, Sir (b. 1932); Sonnenschein, Edward Adolf (1851–1929); Sweet, Henry (1845–1912); Traditional Grammar.

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Linguistic Theory in the Later Middle Ages

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Beginning in the late 11th century, language study was divided between pedagogical grammar, instructing nonnative speakers in Latin literacy and speaking, and theoretical (speculative) grammar, which explored the causes of imposition, modes of signification, and the relations between language, concepts, and reality. Linguistic theory was developed in commentaries on Aristotle and Priscian and treatises on universal grammar. More than Alcuin and other Carolingian grammarians, late medieval 'higher grammar' expanded logical approaches to language and grammar by making greater use of Priscian's *Institutiones grammaticae* (cf. 500) and newly available Aristotle texts (*Metaphysics, Sophistical Refutations*) along with the 'old logic' (*De interpretatione, Categories*, *Topics*).

Late medieval linguistic theory combined ancient logical and grammatical approaches to language, with Latin as the exemplar. Both Aristotelian logic and Roman grammar maintained a theory of the arbitrary linguistic sign. Aristotle defined language from the point of view of the perceiver, and *De interpretatione* (with Boethius' commentary) became a base text: "Spoken sounds are symbols of affections in the soul, and written marks [are] symbols of spoken sounds . . . Speech is signifying sound, whose parts signify separately as words but not as propositions . . ."; *De interpretatione*, 16a). Aristotle's conceptualist theory of language was fundamental to late medieval linguistic theory. Priscian defined word classes (*partes*) and construction (*oratio*) from the point of view of the speaker: "[Construction is] the comprehension of words in their most appropriate arrangement, with letters combined to form syllables, syllables combined to form words, and words combined to form sentences" (*Inst. gram.*, 17.3). Unlike pedagogical grammarians, Aristotle and Priscian

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Late medieval linguistic theory combined ancient logical and grammatical approaches to language, with Latin as the exemplar. Both Aristotelian logic and Roman grammar maintained a theory of the arbitrary linguistic sign. Aristotle defined language from the point of view of the perceiver, and *De interpretatione* (with Boethius' commentary) became a base text: "Spoken sounds are symbols of affections in the soul, and written marks [are] symbols of spoken sounds . . . Speech is signifying sound, whose parts signify separately as words but not as propositions . . ."; *De interpretatione*, 16a). Aristotle's conceptualist theory of language was fundamental to late medieval linguistic theory. Priscian defined word classes (*partes*) and construction (*oratio*) from the point of view of the speaker: "[Construction is] the comprehension of words in their most appropriate arrangement, with letters combined to form syllables, syllables combined to form words, and words combined to form sentences" (*Inst. gram.*, 17.3). Unlike pedagogical grammarians, Aristotle and Priscian

interrogated grammatical metalanguage and criteria for defining linguistic forms.

In the 12th century, William of Conches, Peter Helias, and the anonymous author of the *Glosulae* wrote commentaries on Priscian focusing on the definitions of word classes, syntactic structures, and the relation between sentence meaning (sense) and reference. These Paris-based precursors of the *modistae*, or speculative grammarians, focused on modes of signifying (*modi significandi*), including verbal (grammatical) and extraverbal (semantic) features, to reframe traditional word class definitions. Two decades earlier, Abelard had challenged Aristotelian realism by arguing that modes of signifying and Aristotle's categories (motion, rest, quantity, etc.) were features not of reality but of how language describes reality (*Logica* 116.35–117.2). William and Peter Helias took a different approach. In *Summa super Priscianum* (1140), Helias used the modes of signifying to account for the ontological 'causes' of the parts of speech. Nouns signify substance subsisting in matter and also signify the combination of matter and form. After the original (arbitrary) imposition of nouns to signify substance, people 'enlarged' speech when they used nouns to signify things 'as if' they are substances, 'in the mode of substance (*modo substantiae*) . . . without tense, in a common or proper or almost common or proper manner' (Helias, 1993: 120–21). Verbs signify that which acts or is acted on or semantic primitives 'in the mode of' acting or being acted on, with tense markers (Helias, 1993: 196). Participles share features of nouns and verbs: they signify acting or being acted on through time, but they also deploy the mode of signifying the actor (*agentus*) or the one acted on (*patius*) and thus display nominal signification (Helias, 1993: 449).

In the 13th and 14th centuries, theoretical grammarians known as *modistae*, based in Paris, Bologne, and Erfurt, systematized this reanalysis of the *modi significandi*, parts of speech, and syntactic relations into a complex theory of language and grammar. Like William of Conches and Roger Bacon, *modistae* such as Michel de Marbais (fl. 1240–1290), Boethius of Dacia (fl. 1265–1280), Martin of Dacia (d. 1304), Thomas of Erfurt (fl. 1300), and Siger de Courtrai (d. 1341) argued that grammar was properly concerned with underlying structures common to all languages. Universal grammar is a speculative (theoretical) science that treats the parts of speech as aspects of syntax and procedures for combining words into grammatical sentences (congruity, government) that correspond in some respect to the nature of reality. Unlike pedagogic grammar, the *modistae* used both *auctores* and made-up Latin sentences to illustrate grammaticality. The *modistae* accepted that language is a set of arbitrary signs signifying mental concepts directly and reality only indirectly. They produced a coherent theory of language that systematically linked word class properties with the properties of mental concepts and then with the properties of universals standing behind material instantiations. They took as given the first imposition of names on reality (things, qualities, action); second imposition designates words according to forms and functions in sentences (grammatical difference). Following Aristotle and Porphyry, the *modistae* argued that such impositions could be necessary or arbitrary, depending on the degree of realist correspondence between words and things.

Many speculative grammar treatises and commentaries retain the organization of Priscian's Latin grammar, with sections on orthography (*vox*, *littera, syllaba*), etymology (*partes orationis*), syntax, and prosody, but they add another level to grammatical explanation by exploring the modes of signifying, the causes or rationales for differentiating word classes, and the bases for how each linguistic category relates to mental and external reality. As theoreticians, the *modistae* and their critics were most interested in universal grammar and syntax. Although less concerned with linguistic sound (phonology), some *modistae*, following Aristotle, stated that speech is materially percussed, disturbed air, which is moved by the soul (seat of intellect) using the vocal tract as an instrument. Some speculative grammarians took note of different Latin and vernacular pronunciations or the physiology of articulation (based on Arabic commentaries on Aristotle).

Modistic linguistic theory related word classes to reality and to principles of syntax. The properties of things as they exist (*modi essendi*) are perceived by the intellect and conceptualized as *modi intelligendi*. These perceptions and concepts are reflected in the structures of Latin grammar and expressed in speech through the *modi significandi*, whose formal elements constitute an arbitrary sign system. Spoken words unite voice and meaning (*dictiones*) as signs of concepts. The correspondence of the structure of grammar to the nature of thought and reality can be represented as follows:

THING (*res*) in the world	Properties of the thing (*modi essendi*, 'modes of being')
CONCEPT (*res intellecta*) in the mind	Properties of the concept (*modi intelligendi*, 'modes of understanding')
SIGNIFIED (*res significata*) in the word	Properties of the signified (*modi significandi*, 'modes of signifying')

(from Law, 175)

Because the *modi significandi* directly signify mental concepts and not things themselves, the intellect can also form words that do not correspond to external reality and can attribute to them morphological features of the appropriate word class's modes of signifying (e.g., nouns *chimaera, nullus*).

Modistic syntactic theory was built around the theory of constructions. Every part of speech is ordered to be combinable with others to form a construction. Following Aristotle, the *modistae* argued that every construction is comprised of a subject and a predicate (in contemporary linguistics, NP and VP). Earlier, Helias had distinguished utterance congruity (*congrua voce*) from conceptual congruity (*congrua sensu*) (Helias, 1993: 832). In the 13th century, Boethius of Dacia, contradicting Priscian, argued that impersonal expressions (*fulminat* 'it lightens') are similar to intransitive expressions (*currit*, 'she runs'). Both constructions are imperfectly realized on the level of utterance (*vox*) yet conceptually complete (*secundum intellectum*) because the grammatical subjects are understood (Boethius of Dacia, *Modi*, q. 11, ad. 2, 46–48).

Congruity and *regimen* (government) are the principal features of modistic syntactic theory. Helias defined *regimen* in syntactic terms, while he used *congruitas* in both syntactic and semantic contexts. Congruity demands that (1) two or more words related syntactically agree with the appropriate morphology (gender, number, case, etc.) required by their syntactic functions, or (2) the words convey a conceivable (but not necessarily true) meaning, or (3) both. Thus, constructions can be perfect grammatically and incomplete in sense, or vice versa. Ovid's expression *Turba ruunt* ('the crowd run') illustrates how a sentence can be congruent in sense but not grammatically. *Regimen* determines that one word will 'force' another word to be included in the utterance with a certain case or form in order to complete (perfect) the construction. *Socrates accusat* is a congruent construction in that the subject and verb agree grammatically, but the sentence does not generate a perfect sense because the *regens*, *accusat*, is a transitive verb and determines an object for the perfected construction (see Helias, 1993: 835, 1051).

The *modistae* distinguished at least two grammatical levels for each part of speech, structured by several modes of signifying. The essential *modi significandi* constitute words' being, while accidental modes constitute their inflection. Essential modes are subdivided into general (common to several parts of speech) and specific (particular to an individual part). Nouns and pronouns have in common some modes of signifying in that they "signify by the mode of habit and quietness [stability and permanence]"; verbs and participles "signify by the mode of motion and becoming" (*Sophismata*, I, 43?). At the next level of essential signification, nouns are distinct from pronouns in that nouns deploy 'the mode of determinate apprehension' (qualifying and defining substance); pronouns deploy the 'mode of indeterminate apprehension' (Simon of Dacia, Martin of Dacia). And so forth. The accidental modes of signifying correspond generally to the traditional accidents of Roman grammar. Most accidents establish how an individual part can be used in a construction (*respectivi*, syntactic inflections), but some parts' accidents mark grammatically how the word relates to the modes of being of the things signified (*absoluta*, semantic features such as that the noun *nullus* rather than a verb signifies 'nothing' as a substance) (Thomas of Erfurt, *Gram. spec.*, 150).

The *modistae* developed a strong syntactic theory of transitivity and voice, based on *dependens* (dependency). Every construction has at least one dependent that can have one of two modes of signifying: either the dependent goes to the first constructible or to an element that in turn goes to the first constructible (subject), or the dependent does not go to the first constructible (Martin of Dacia, *Modi signif*, ss. 203–211, 90–94). The theory of transitivity and syntactic firsts and seconds suggests how the *modistae* mostly adopt vernacular and ecclesiastical Latin's SVO word order as *ordo naturalis* ('natural order'), in contrast to *ordo artificialis* ('artificial order,' often inverted word order). The first mode is the principle of an intransitive, the second of a transitive construction. The *modistae*'s use of the terms *transitivus* and *intransitivus*, very different from Priscian's, is based on Aristotle's account of action. In a transitive construction, the action passes into an (direct) object); in an intransitive construction, the action is immanent in the subject. As moderate realists, the *modistae* argued that verbs' grammatical inflections (*currit* = 3rd per. sing. pres.) mark potential action which, depending on the sentence, can either be drawn from the verb and transferred to another constructible or remain immanent in the verb. Thus in the sentence *Socrates legit librum* ('Socrates reads a book'), the relation between the first (subject) noun and the verb is a *constructio intransitiva,* whereas the relation between the verb and the second (object) noun is a *constructio transitiva* in that the action of reading is passed from Socrates to the book (Thomas of Erfurt, *Gram. spec.*, cc. 47–48).

Transitivity and dependency were also key to modistic phrase structure, as the last example sentence indicates. In the sentence *homo albus currit bene* ('the white man runs well'), the adjective and verb depend immediately on the subject noun, while the adverb depends immediately on the verb, which

draws it back to the subject noun. The adjective and the adverb are 'determinants' of the syntactic elements to which they are attached, as marked by inflection or position. The noun phrase *homo albus* is analyzed as an 'intransitive construction of persons' (*constructio intransitivus personarum*), while *homo currit* is analyzed as an 'intransitive construction of acts' (*constructio intransitivus actuum*). According to Radulpus Brito (*Quaestiones super Priscianum minorem*, q. 24) and others, only the latter sort of constructions form propositions. The clause *Si Socrates currit* ('If Socrates runs') is a dependent because the conjunction creates an expectation in the listener that more will follow (Thomas of Erfurt, *Gram. spec.*, c. 54). In modistic theory, the conjunction *si*'s syntactic function is governed by elements outside the dependent clause in which the conjunction occurs. Thus the *modistae* derived the logical structure of propositions from underlying grammar. They did not restrict dependency and transitivity to the level of word class or morphology, but rather argued they are fundamental to construction itself. However, not all *modistae* agreed that every type of word (e.g., conjunction) had a dependency feature that must be closed or perfected in a sentence.

The *modistae* worked out a coherent, sophisticated grammatical theory that exceeded Priscian's largely morphological analysis and established new metalanguage for descriptive parsing and theory of language. Their syntactic theory distinguished surface from underlying structures, material utterance from grammatical congruity and conceptual meaning, form from function, and linear from logical word order. Thus, the *modistae* developed a theory of grammar that increasingly emphasized the autonomy and interrelation of formal, verbal features at the level of both word and sentence. However, some modistic linguistic theory as well as intentionalist critics of the *modistae* relied on the apprehensions of users (speakers, writers, listeners, readers) to complete the sense of an utterance according to internal grammatical rules, constructions of possible meaning, or discursive contexts. *Turba ruunt* might be ungrammatical (lacking subject-verb agreement), but the sense of a crowd as a collective entity makes the sentence comprehensible. *Aqua, aqua* ('Water, water!') might be 'imperfect,' even 'ungrammatical,' but when shouted by someone whose house is afire, the utterance is understandable and effective.

See also: Aristotle and the Stoics on Language; *De Dicto* versus *De Re*; Language of Thought; Logic and Language: Philosophical Aspects; Marbais, Michel de (fl. 1255); Martin of Dacia (d. 1304); Peter Helias (12th Century A.D.); Philosophy of Language, Medieval; Priscianus Caesariensis (d. ca. 530); Realism and Antirealism; Roman *Ars Grammatica*; Siger de Courtrai (d. 1341); Thomas of Erfurt (fl. 1300); William of Conches (ca. 1080–1154); Word Classes/Parts of Speech: Overview.

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Linguistic Universals, Chomskyan

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One of the key assumptions of the Chomskyan approach to the study of language is the existence of Universal Grammar, that is, as Chomsky (1976: 29) puts it, a set of principles, rules, or conditions that are elements or properties of all human languages. In fact, as is pointed out by Jackendoff (2002: Ch. 4), the notion of Universal Grammar is used in the literature in three distinct, albeit related, senses. First (for example, in Chomsky, 1965) Universal Grammar has been used to refer to a set of features that all languages have in common. These features can be regarded as universals of language proper, and they are of two types: features pertaining to the types of rules and constraints that have to be present in the grammar, such as phrasal formation rules, derivation rules, and constraints thereon; and features pertaining to the material that provides the basic building blocks of linguistic structure, such as phonological distinctive features in phonology, or parts of speech and the notion of syntactic tree in syntax. In Chomsky (1965) these two feature types are indicated as formal and substantive universals respectively.

The other two senses of the notion of Universal Grammar specifically pertain to the way in which speakers acquire their language. Universal Grammar is also used (for example, in Chomsky, 1972) to refer to the initial state of the mind of a language learner that makes language acquisition possible. This initial state involves knowledge of the complete range of possible human grammars, from which the language learner selects a target grammar in response to the linguistic data to which he or she is exposed. Finally, in its most common sense, Universal Grammar is taken to correspond to the initial state of the mind of a language learner along with the machinery (which Chomsky calls Language Acquisition Device) that makes it possible for the speaker to move from the initial state to the final target grammar.

The notion of Universal Grammar, in its various senses, implies that there are two universal aspects of human language. On the one hand, there is a set of features common to all languages. On the other hand, there is a universal mechanism that makes language acquisition possible. This mechanism crucially involves knowledge of the range of possible grammars, including the features common to all languages, as well as the machinery that allows the language learner to select the target grammar.

The latest versions of generative theory, Principles and Parameters and Minimalism (Chomsky, 1981; Chomsky, 1995), assume that Universal Grammar, intended as the initial state of the mind of the language learner along with the Language Acquisition Device, includes specification of a number of universal principles, each associated with an open value parameter. Individual parameters may have different values in different languages, which are triggered by the linguistic input to which the language learner is exposed. Interaction between the universal principles, the open value parameters, and the input that triggers specific values of these parameters makes it possible for the learner to acquire the target grammar.

The inventory of principles and parameters that are taken to be part of Universal Grammar has evolved over the decades, and different authors take different views. While some authors (e.g., Baker, 2001) have rather elaborate lists of principles and parameters, there has been a general tendency (exemplified, for instance, by Chomsky, 1995 and Jackendoff, 2002) to reduce the inventory of elements posited in Universal Grammar as much as possible, in order to posit the smallest set of elements that can still account for the data.

A classical example of an open value parameter is provided by the so-called head parameter. The head parameter is associated with X-bar theory (Chomsky,

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A classical example of an open value parameter is provided by the so-called head parameter. The head parameter is associated with X-bar theory (Chomsky,

1981), a theory of syntax that assumes a universal principle whereby a phrase always contains a head of the same lexical category (a noun, verb, or preposition) along with possible complements. The head parameter distinguishes between languages in which complements follow the head, as in the English example in (1), and languages in which complements precede the head, as in the Japanese example in (2).

(1) *eat an apple*

(2) Japanese
ringo-o tabe-ru
apple-ACC eat-NONPAST
'eat an apple' (Fukui, 1995: 329)

Depending on the external linguistic input he or she receives, the language learner selects the value 'head-initial' or 'head-final' for the target language. In this way, the universal principle that all phrases contain a head along with possible complements interacts in the learning process with the input about the value of the head parameter in the target language, yielding the correct grammar for the target language.

This model is meant to simultaneously account for universals of language and the actual diversity of languages, as revealed by cross-linguistic investigation. Universals of language are found in the principles and open value parameters that are part of Universal Grammar, while the range of possible values for each parameter determines actual cross-linguistic variation. A similar model is proposed in Optimality Theory (see, e.g., Prince and Smolensky, 1993), where cross-linguistic variation is accounted for by postulating different rankings of a number of universal principles in different languages.

Insofar as it postulates a set of properties common to all languages, and a model to account for actual cross-linguistic variation, the Chomskyan approach is close to the other major approach to linguistic universals, the Greenbergian approach (*see* **Linguistic Universals, Greenbergian**). However, the Chomskyan approach displays a number of distinguishing features.

A major distinguishing feature of the Chomskyan approach involves the status attributed to linguistic universals in terms of mental representation. In the Greenbergian approach, universals are properties holding for all (or a statistically significant part of) human languages, but the theory has no implication as to whether or not these properties are part of a speaker's mental representation of his or her language. In the Chomskyan approach, on the other hand, universals (including both universal principles and open value parameters) have psychological reality, that is, it is assumed that they have specific representations in the human mind. This is a consequence of the explanatory value attributed to universals in this approach. In the Chomskyan perspective, the very reason to postulate linguistic universals in the first place is the need to account for the rapidity and uniformity of language learning. This argument is traditionally known as the 'poverty of the stimulus' argument. It is argued that the primary linguistic data available to the language learner is largely insufficient to construct the target grammar. Therefore, language acquisition would be impossible if the language learner were not endowed with an initial prespecification of the brain specifying the form of the grammar of a possible human language. This prespecification takes the form of the universal principles and parameters that represent the bulk of Universal Grammar. These principles and parameters are ultimately thought to be innate.

Thus, Universal Grammar is basically regarded as an innate toolkit humans are equipped with that makes language acquisition possible. This has two important consequences for the nature of linguistic universals in the Chomskyan theory. First, universals have explanatory value in the theory, in that it is basically assumed that the reason why languages are the way they are is because they reflect a set of universal principles represented in the speaker's mind. This is an example of internal explanation, in that the grammatical organization of human languages is accounted for in terms of a set of principles internal to the grammar itself, which have psychological reality. The recourse to internal explanation is traditionally regarded as one of the most distinguishing features of the Chomskyan approach to linguistic universals, as opposed to other approaches such as the Greenbergian approach or functionalist approaches in general, which account for linguistic universals in terms of principles external to the grammatical system itself and ultimately rooted in semantics, pragmatics, and language use. It should however be noted that, as is observed by Newmeyer (1998: 104–105), linguistic universals in the Chomskyan approach are ultimately motivated in terms of innateness, and innateness is also external to the grammatical system as such.

The other consequence of the toolkit nature of Universal Grammar is that the mental representation of linguistic universals includes a number of options that are not actually implemented in the grammar of individual languages. Since it is assumed that the language learner cannot construct the target grammar on the basis of the external input and that any learner can learn any language, it follows that the whole range of possible options for a grammar must be prespecified in the learner's mind, even if not all of those options will actually be realized in the target grammar. As a result, it may be assumed that a particular mechanism ascribed to Universal Grammar

is indeed a universal of language even if it is not manifested in individual languages. For example, the fact that some languages are head-initial does not mean that the value 'head-final' is not specified in the mind of speakers of those languages; it just means that this option is not implemented in the grammar of the relevant languages.

This brings us to another major distinguishing feature of the Chomskyan approach: Universals are motivated in terms of theory-internal criteria rather than empirical cross-linguistic investigation. In the Greenbergian approach, universals are data-driven, and they are established based on large language samples. In the Chomskyan approach, on the other hand, universals are primarily established on the basis of theory-internal considerations. The rationale behind this approach is that if it can be demonstrated that a property of a single language cannot be learned, that property has to be part of the innate endowment of the language learner, and therefore it is universal. Arguments for the innate, and therefore universal, status of a particular principle usually include the fact that the principle is so abstract or complex that it couldn't be learned inductively, the fact that the principle appears at an extremely early stage of child development, and the fact that the principle cannot plausibly be attributed to any aspect of the external input received by the language learner (Newmeyer, 1998: 85).

A consequence of the theory-driven status of language universals in the Chomskyan approach is that universals are established on the basis of in-depth investigation of individual languages rather than cross-linguistic comparison as such. The Principles and Parameters version of generative grammar has indeed pointed out the necessity of cross-linguistic comparison (see, e.g., Chomsky, 1995). Other generative theories, such as Lexical-Functional Grammar (Bresnan, 2001), Auto-Lexical Syntax (Sadock, 1991), and Role and Reference Grammar (Van Valin and LaPolla, 1997) have also developed a machinery designed to account for the wide variety of syntactic phenomena found across languages. As is observed by Hawkins (1988: 87–88), however, emphasis still lies on theory in the Principles and Parameters paradigm, so that first a theory is formulated, usually on the basis of a well-known language such as English, and then it is tested and refined by looking at whatever languages seem appropriate. This is in contrast to the Greenbergian approach, where universals are descriptions of statistical tendencies revealed by cross-linguistic investigation.

See also: Chomsky, Noam (b. 1928); Formalism/Formalist Linguistics; Grammar; Levels of Adequacy, Observational, Descriptive, Explanatory; Linguistic Universals, Greenbergian; Principles and Parameters Framework of Generative Grammar; Variation and Formal Theories of Language: HPSG.

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Linguistic Universals, Greenbergian

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The major assumption underlying the Greenbergian, or typological, approach to the study of language, and the so-called functional-typological approach that originated from it (Croft, 2003: Ch. 1), is that the structural variation displayed by the world's languages is ordered and can be described in terms of linguistic universals, that is, a set of constraints or restrictive principles having universal validity (Greenberg 1963/1966; Greenberg *et al.*, 1978). These constraints are of two types. On the one hand are constraints stating that all languages behave in the same way with respect to the distribution of single features, such as the presence or absence of vowels. These constraints state that the relevant feature is either universally present or universally absent in the world's languages, leaving no room for variation. These constraints go under the name of 'unrestricted universals' and are comparable to the universal principles postulated in the Chomskyan approach (*see* **Linguistic Universals, Chomskyan**). A classical example of an unrestricted universal is the statement that all languages have vowels (see, e.g., Croft, 2003: 52).

On the other hand are constraints concerning the correlation between different features. These constraints state that all languages that exhibit a feature A also exhibit a feature B. For instance, languages having nasal vowels also have corresponding oral vowels (Croft, 2003: 54). Of course, since the relevant feature need not be present in a language, these constraints cannot be regarded as universal in the sense stated above: languages do not display uniformity with respect to the relevant features. For instance, there may be languages with both oral and nasal vowels, or languages with oral vowels only. However, the restrictive principle excludes the existence of languages with nasal vowels but no corresponding oral vowels. In this case, the restrictive principle describes a pattern of variation. Languages behave in different ways with respect to the distribution of the relevant features, but their variation must obey the limits set by the restrictive principle. What is universal in this case, then, is the fact that languages have to conform to the same pattern. However, the pattern itself allows a certain amount of variation.

This second type of language universals goes under the name of 'implicational universals.' Implicational universals state a dependency between logically independent grammatical parameters. As such, they may be seen as an application of propositional logic to typology. A standard implicational universal of the form A → B covers four logically possible types: A & B, ~A & B, ~A & ~B, and A & ~B. Of these, the former three types are allowed by the implication, while the fourth is excluded.

Any dependency relation between logically independent grammatical parameters may thus be described by means of an implication formulated in such a way that the allowed types correspond to the actually attested ones and the prohibited ones are actually unattested. For example, cross-linguistic investigation shows that if relative clauses (Rel) precede the noun (N) in a language, then demonstratives (Dem) also precede the noun. This pattern covers three actually occurring types, RelN & DemN, NRel & NDem, NRel & DemN, and an unattested one, RelN & NDem. This is schematized in Table 1 (+ = attested; − = unattested).

The distribution of attested and unattested combinations in this case makes it possible to draw the implication 'RelN → DemN,' which predicts the occurrence of the attested types and excludes the unattested one, just as in Table 1.

In the last decades, typological research has accumulated a considerable body of evidence for implicational universals in phonology and morphosyntax, concerning, for example, word order, alignment patterns, parts of speech, animacy, and grammatical relations (see standard textbooks in typology such as Comrie, 1989 or Croft, 2003 for detailed treatment of these issues and relevant literature). In particular, individual implications turn out to be combinable in chains, or hierarchies, of the form:

(1) A → B & B → C & . . .

In implicational hierarchies, the consequence of each implication is the antecedent of the following one. In current typological practice, these implicational hierarchies are indicated in the form

(2) . . . C > B > A

The predictive power of implicational hierarchies is very high. If any term involved in the hierarchy is present, then all the terms to the left of it on the chain must be present. This allows for multiple predictions based on a single assumption. On the other

Table 1 Implicational universals: order of noun, demonstrative, and relative clause

	DemN	*NDem*
RelN	+	−
NRel	+	+

(Croft, 2003: 54).

hand, if any term involved in the hierarchy is absent, then all the terms to the right of it on the chain must be absent, too. This excludes a large number of language types, and the more implications involved in the chain, the more language types excluded. This is why typological research has focused on the individuation of cross-linguistic hierarchies, such as the Accessibility Hierarchy for relativization (Keenan and Comrie, 1977), the hierarchies for number, animacy, and grammatical relations (these are described in detail in Croft, 2003: Ch. 5), as well as Givón's Binding Hierarchy for complementation (Givón, 1980).

In contrast to the Chomskyan approach, in which linguistic universals have psychological reality and are in themselves explanatory principles motivating language structure, typological universals are primarily meant as generalizations resulting from empirical cross-linguistic investigation that describe statistically significant distributions of particular phenomena (see on this point Newmeyer, 1998: Ch. 6; Newmeyer, 2004). This has a number of important consequences. First, cross-linguistic comparison plays a crucial role in typological research, because universals can only be established through cross-linguistic comparison and must be established on the basis of statistically relevant patterns. As a result, considerable attention has been devoted to issues such as sampling methods, the statistical significance of individual putative universals (see, e.g., Dryer, 1992; and Rijkhoff and Bakker, 1998), and criteria to consistently identify the phenomena under investigation from one language to the other (Croft, 2003: Ch. 1).

The patterns described by language universals are in themselves in need of explanation. In the typological approach, universals are usually accounted for in terms of functional factors, that is, semantic, pragmatic, processing, or frequency factors. These explanations are usually regarded as external explanations, as opposed to the explanations usually invoked within the generative paradigm, which are internal to the grammatical system. Unlike language universals as such, at least some of the functional principles invoked in the typological approach are taken to have psychological reality (see, among others, Croft, 2001).

An example of functional explanation is provided by the various processing and frequency factors that have been proposed for what is perhaps the best-known typological hierarchy, Keenan and Comrie's (1977) Accessibility Hierarchy for relativization:

(3) Subject > Direct object > Indirect Object > Oblique > Genitive > Object of comparison

This hierarchy states that if a language can form relative clauses on any syntactic role on the hierarchy, then it can form relative clauses on all syntactic roles to the left. Keenan and Comrie's original explanation for this hierarchy is grounded on psychological ease of comprehension. The lower a role is on the Accessibility Hierarchy, the harder it is to understand relative clauses formed on that role. The underlying assumption is that if the speakers of a language are able to process relative clauses formed on a more difficult role, they are able to process relative clauses formed on less difficult roles. A similar analysis has been proposed by Hawkins (1994).

On the other hand, Fox (1987) accounts for the Accessibility Hierarchy in discourse rather than psychological/processing terms. Relying on a corpus of spoken English data, she claims that the roles that are actually most accessible to relativization are intransitive subject and direct object. This is because the primary discourse function of relative clauses is to situate the referent that is being introduced as a relevant part of the ongoing discourse. This is typically done by means of relative clauses formed on subjects of intransitive verbs or direct objects. So this type of relative clause is the most frequent relative clause type at the discourse level, and this accounts for why the relevant syntactic roles are more accessible to relativization.

Other implicational patterns have been explained in semantic (rather than processing or frequency) terms. For example, cross-linguistic investigation shows that if inalienable possession is expressed by constructions involving a certain distance between morphemes, then alienable possession will be expressed by constructions involving at least the same distance between morphemes. Haiman (1983, 1985) accounts for this pattern in terms of an iconic principle, whereby greater closeness between particular concepts (as manifested in the relationship between possessor and possessum in inalienable possession) is reflected by greater formal closeness between the linguistic elements expressing these concepts.

In some cases, it has been suggested that the explanation for a particular implicational pattern is diachronic and that functional principles only play an indirect role. For example, a bidirectional implication (logical equivalence) exists such that if a language has prepositions, then it has noun-genitive order, and if it has postpositions, then it has genitive-noun order (see, among others, Croft, 2003: 58). This can be accounted for in terms of Hawkins's (1983) principle of Cross-Category Harmony (which is ultimately motivated in terms of processing ease). Nouns and adposition belong to the same category, in that they are heads of their phrases, so the correlation between the order of adpositional constructions and the order of genitival constructions reflects a general principle

whereby modifiers are always located on the same side of the head. Bybee (1988) argues, however, that the correlation is actually motivated in diachronic terms: adpositional constructions typically originate from genitival constructions, and they maintain the order of genitival constructions. In this case, Bybee argues, functional principles may be invoked to account for why adpositional constructions develop from genitival constructions in the first place, but no functional principle can actually be invoked to account for the word order correlations between the two constructions.

It should finally be observed that a widespread assumption in the typological approach is that the various language types allowed by implicational universals reflect different functional principles, and the competition between the various functional principles determines cross-linguistic variation (Du Bois, 1985). For example, an implicational pattern exists such that if the singular is expressed by a certain number of morphemes, then the plural will be expressed by at least as many morphemes. This is usually explained in terms of an economic principle, whereby the singular is the most frequent category at the discourse level and therefore need not be expressed overtly. One such explanation accounts for the existence of languages in which the singular is zero-marked and the plural is marked overtly. However, the implicational pattern also allows for languages in which both singular and plural are expressed overtly. These languages reflect an iconic principle whereby all aspects of conceptual structure (in this case, the values 'singular' and 'plural') are expressed overtly (Croft, 2003). The implicational pattern allows for both language types, but the two language types reflect competing functional principles, each prevailing in different languages. The competition between the different principles is what determines cross-linguistic variation, as described by the implicational pattern itself.

See also: Linguistic Universals, Chomskyan.

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Linguistics as a Science

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A common description of linguistics is that it is the 'scientific study of language.' This might seem to be a loose or metaphorical use since the subject matter of linguistics is quite different from what are often thought of as the 'hard' sciences such as physics or chemistry. But linguists are engaged in a process of inquiry that aims to discover facts about the world we live in, and so their work shares important properties of other sciences. Some work in linguistics (e.g., acoustic phonetics) resembles the 'hard' sciences in

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History of Linguistics: Discipline of Linguistics

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Introduction

Language makes us human.

Whatever we do, language is central to our lives, and the use of language underpins the study of every other discipline. Understanding language gives us insight into ourselves and a tool for the investigation of the rest of the universe. Martians and dolphins, bonobos and bees, may be just as intelligent, cute, adept at social organization, and morally worthwhile, but they don't share our language, they don't speak 'human'. Linguistics, the scientific study of language, seeks to describe and explain this human faculty. It is concerned with three things: discovering precisely what it means to 'know a language'; providing techniques for describing this knowledge; and explaining why our knowledge takes the form it does.

These concerns may seem too obvious to need discussing, but the complexity of our knowledge of language becomes strikingly apparent when we see someone lose their language after they have had a stroke, or when we observe an infant who has yet to acquire the faculty that we deploy so easily. To understand these three concerns, we need a theory, and that is what linguistics provides.

The Meaning of 'Language'

That linguistics is 'the scientific study of language' has become a cliché, but what it means to be 'scientific' may not always be obvious, and what people mean when they use the word 'language' varies from occasion to occasion. Consideration of what is involved in being scientific is deferred until later in the essay, for now it suffices to observe that only a few aspects of language have been illuminated by theoretical (scientific) linguistics, so there are many areas where it has little, if anything, helpful to say. The situation is akin to that in biology, viewed as the science of living things. Despite their importance to us, biology has nothing to say about the definition of pets; similarly, despite their relevance to us, linguistics has nothing to say about the definition of dialects.

In everyday usage, 'language' is used differently, depending on whether it is construed as a property of the individual, of society, of the species, or as an autonomous entity in the world. Linguists working in the tradition of 'generative' grammar, the framework that has dominated linguistics for the last 50 years, argue that an 'individual' approach to language is logically prior to any other, but in principle we have the possible domains shown in (1), each suggesting different kinds of questions:

(1) Language and the Individual
Language and the Brain
Language and Society
Language and the Species
Language and Literature
Language and the World

Looking at 'Language and the Individual', the central question raised is 'what constitutes our "knowledge of language"?' What properties or attributes does one have to have to be correctly described

as a speaker of English, or Burmese, or any other 'natural language' – the term linguists use to refer to languages naturally acquired and spoken by humans, as opposed to the 'artificial' languages of logic or computing? An extension of this question is how and where knowledge of language is represented in the brain, and what mechanisms need to be postulated to enable us to account for our use of this knowledge. Neurolinguistics is an area of remarkable growth, supported by technological advances in imaging.

Under 'Language and Society', sociolinguists raise questions such as 'What are the social variants (class, age, gender, power) that determine, or correlate with, the use of particular forms of the language?' A woman might use some pronunciations or grammatical constructions with statistically significantly greater frequency than a man of the same age, or a female of a different generation. For the world's multilingual majority, social considerations may even determine which language is used in specific situations. A Swiss from Graubünden might use Romansh at home, Swiss German at work, and High German at a conference.

Looking at 'Language and the Species', we might be preoccupied with the puzzle that all human children learn their first language with seeming effortlessness, while the young of other species, however intelligent, show minimal such ability. Linguists, and researchers in related fields, investigate not only whether this claim to uniqueness is indeed true but, if it is, how the faculty evolved.

When we turn to the relation between Language and Literature, we confront several issues: 'What is literary form?'; that is, what are the linguistic properties that make something a novel or a novella, a sonnet or an epic? How are literary effects achieved? What are the linguistic characteristics of a particular style?

Looking at 'Language and the World' raises issues of three different kinds. First, how does language relates to things outside the head? That the word 'London' refers to the capital of the United Kingdom is innocuous enough as an informal claim, but it raises interesting, and vexed, philosophical questions. The debate revolves around the status of language as a property of an individual, rather than as an entity with independent existence. This 'external' notion of language is presupposed by those who write irate letters to the press, inveighing against split infinitives, and lamenting the fact that our language is becoming degenerate, either because of the sloppiness of modern youth, the pernicious influence of text messaging, or the role of multiculturalism. The third issue is in many ways the most obvious and the most puzzling: Why are there so many languages? Why does 'human' have so many dialects?

Knowledge of Language

The generativist claim that study of the individual's knowledge of language must be the first or exclusive focus of a scientific linguistics is controversial; that it is a possible, indeed necessary, focus is not seriously in doubt. This individualistic claim implies that linguistics is a branch of psychology, ultimately biology, rather than, say, of sociology. This is not to deny that there are interesting domains of knowledge that take the social conditions of language use as their central focus; it is rather to claim that there is a psychological enterprise which looks at one branch of human cognition and which lends itself to rigorous investigation and, moreover, that it is logically prior to looking at the exploitation of this knowledge in society. This focus on knowledge is highlighted in the claim that the subject of linguistics is 'I-language', rather than 'E-language', where the 'I' stand for *i*nternal to a particular *i*ndividual, and 'E' stands for *e*xternal (to the mind of the individual). A corollary of this orientation is that the descriptions that linguists devise are said to be 'psychologically real', where this is not a claim about psychological experimentation or the kind of evidence used in formulating particular linguistic hypotheses, but is simply the claim that we are investigating the human mind and that current theory is the closest approximation to the truth that we have.

The mind is ultimately a product of the brain (and other systems), and evidence about the mental can sometimes be gleaned from studies of the neural. In general, however, linguists remain agnostic about the details of the relation between the mind and the brain (frequently referring simply to the 'mind/brain'). That is, we devise theories of a sub-part of human knowledge, but whether that knowledge is localized in the temporal lobe of the left hemisphere, or is distributed throughout the brain, or whatever, is less important. This is not because of lack of interest, but simply because – at present – theories of neural structure are too embryonic to cast much light on linguistic generalizations. Different languages allow different word orders, so that Japanese puts the verb at the end of the sentence and English puts it in the middle. Linguistic theory must provide the means for describing and ultimately explaining this fact, but at present we have no inkling of how the difference between a Japanese and an English speaker might be neurally implemented, so the neurological structure of (this bit of) the language faculty is still a closed book.

What do you have to know to count as a 'speaker' of a language? If you say you speak English, it implies that you understand English, too. The point may

seem trivial, but knowledge of language is neutral between speaking and hearing; both activities draw on the same fund of knowledge. There is no known illness or accident which leaves you able to speak only English and understand only Portuguese, for instance. This is not to deny that you may be better at talking than listening; or that you may suffer brain damage that leaves you unable to speak while you remain perfectly able to understand. A particularly poignant example of this is provided by Bauby's autobiographical account of 'locked-in' syndrome, where a stroke left the author speechless, but with his language and his ability to understand intact. In normal, non-pathological, cases, however, your ability to *utter* (2a):

(2a) Giraffes have long necks
(2b) Giraffes have necks long

involves the same ability that enables you to *understand* (2a), and also to judge that someone who mistakenly says (2b) has got it wrong. The implication of this observation is that the primary focus of linguistics is on characterizing this neutral knowledge, rather than the mechanisms of speaking, hearing, and judging that are parasitic on it. In other words, linguistics is (largely) about one form of cognition, and only secondarily about the deployment of that cognitive ability. In the standard terminology, this is known as the 'competence-performance' distinction. Your knowledge of language (your competence) underlies your ability to speak, to understand, and to give judgements of well- or ill-formedness (your performance). You may be knocked unconscious and be temporarily unable to speak or understand, but your knowledge typically remains intact – you have competence with no ability for performance. The converse situation, in which you could perform in the absence of any competence, does not occur, though it may characterize the 'linguistic' capabilities of the average parrot, which may be able to utter entertaining sentences of what sounds like English, but presumably without the knowledge of English grammar that underlies our abilities.

To count as a speaker of English, you need first to know a large number of words: not just nouns, verbs, and adjectives – words such as *cat* and *go* and *pretty*, whose meaning is relatively transparent, but items such as *the, under,* and *however*, whose meaning and use are less easy to specify. Of course, not everyone has the same vocabulary: I may know technical terms in linguistics that you are ignorant of, and you may be familiar with words pertaining to reggae or arachnology that I don't know, but if either of us were ignorant of words such as *mother* or *and*, people might be justifiably reluctant to classify us as speakers of English.

In addition to knowing the words of a language, you need to know what to do with those words – you need to know the grammar. Our knowledge of language falls into two compartments – the vocabulary (or 'lexicon') and the 'computations' we can carry out using that vocabulary. This computational system, comprising syntax and morphology, is surprisingly complex, and enables us to produce baroque examples such as Chomsky's (1995: 88) *Who do you wonder whether John said solved the problem?* Such sentences are of marginal acceptability and citing them may strain the tolerance of outsiders, but this marginal status may itself provide crucial evidence for or against some theoretical claim concerning our knowledge. Henceforth, I shall assume that you and I have the same I-language, abstracting away from differences in vocabulary and grammar. Fortunately, it's enough for the present purposes to look at the more basic, but nonetheless rich and surprising, knowledge we have of words as simple as *be* and *the*. Consider the examples that follow, which illustrate a wide range of things you know, even if you weren't previously aware of knowing them. It's self-evident that *is* and *have* mean different things, as shown in (3), but sometimes they seem to be used interchangeably as in (4):

(3a) Tom is a problem
(3b) Tom has a problem

(4a) Tim is yet to win the Booker prize
(4b) Tim has yet to win the Booker prize

How is it that something as basic as *is* can sometimes get the same interpretation as *has* and sometimes a different one? Or consider the so-called definite article (*the*), which is often said to mark the distinction between entities which are already familiar and those which are new, as in (5a) and (5b) respectively:

(5a) My friend likes the penguins
(5b) My friend likes penguins

But this characterization is not adequate to account for the rather macabre effects found in the newspaper report in (6b) beside the relatively unexceptionable (6a):

(6a) The woman had lived with the dead man for two years
(6b) The woman had lived with a dead man for two years

Still less can it account for the fact that on occasion the presence or absence of *the* seems to indicate the difference between subject and object, as in (7):

(7a) This man is in charge of my brother
(7b) This man is in the charge of my brother

In (7a) *this man* has control of *my brother*; in (7b) *my brother* has control of *this man*. So what does *the* really mean? Does it even make sense to ask such a question?

Take a more complex example: the word *last* is multiply ambiguous: apart from its use as a noun or a verb, it can function as an adjective meaning either 'final' or 'previous', as illustrated in (8):

(8a) This is your last chance
(8b) Your last example surprised me

This ambiguity can result in dialogues which have strikingly different interpretations, as in the alternatives in (9):

(9) Q "What were you doing in Paris?"
A1 "Oh, I was collecting material for my last book"
A2 "Oh, I'm collecting material for my last book"

Answer 1 is itself ambiguous, with either meaning possible for *last* (though 'previous' is the more easily accessible); Answer 2 has only the interpretation that the book under discussion is planned to be the final one I write. The difference must be attributable to the contrast between the past and the present tense, as that is the only way the sentences differ, but it's not obvious why sentences should be ambiguous or not depending on the tense they contain.

Linguists thrive on such ambiguity, as it regularly provides evidence for structural differences that may not be otherwise apparent. A simple example is provided by the inscrutable notice outside our local school, given in (10):

(10) This school accepts girls and boys under six

Whether the school accepts girls of any age but only small boys, or no children over six is indeterminate without more information. As we shall see under the section 'Describing Knowledge of Language,' (10) has two quite different syntactic structures corresponding to the two meanings. Similarly the fact that (11) has a number of different interpretations can give us clues as to how to analyze the various possibilities:

(11) My son has grown another foot

If my son has become taller, the example is parallel to (12a); if he is a freak or a remarkably successful gardener, there are other possibilities, as shown in (12b) and (12c), suggesting that *another foot* in (11) may be correctly analyzed either as a measure phrase or as a direct object:

(12a) He has grown by another foot
(12b) He has grown a third foot
(12c) Another foot has been grown (in this flowerpot)

Such differences of interpretation make the complexity of our knowledge apparent, but unambiguous examples can be just as illuminating and can simultaneously provide evidence against the traditional philosophical claim that meaning can be adequately treated in terms of truth. Thus, we know that (13):

(13) My first wife gave me this watch

suggests rather strongly that I have been married more than once, but I can utter it truthfully despite having been married only once: my only wife is presumably my first wife. The example is misleading, not false, and so implies that there is much more to meaning than mere truth. As shown by Chomsky's (1957) famous *Colorless green ideas sleep furiously,* structure and meaning (syntax and semantics) can dissociate, so we also know that, despite being initially plausible and syntactically unexceptionable, (14) is meaningless:

(14) More people have visited Moscow than I have

All the preceding examples illustrate both our knowledge of vocabulary and how it interacts with (syntactic) structure. The responsibility of linguistics is to describe the full range of such facts, not just for English, but for all human languages. Then, in virtue of its scientific pretensions, it has to (attempt to) explain why these facts rather than any others are the ones that occur – again both in English and in other languages. To do justice to the richness of what we know, it is necessary to distinguish not just the lexicon and the computational system, but to differentiate among syntax, semantics, morphology, phonology and phonetics, and to relate this knowledge to pragmatics – how we interpret utterances in context.

Take our knowledge of morphology, the internal structure of words. We know that *thick, thicker, thickest,* and *thicken* are all words of English, but that there is no *thinnen* to accompany *thin, thinner, thinnest*. We know that *thick* relates to *thicken* and that *rich* relates to *enrich*, whereas *richen* is slightly odd, and *enthick* is impossible. This knowledge can't just be a result of our never having heard *thinnen* or *enthick* before, you may never have heard *texted* before, as in "I've just texted an urgent message to Fred", but you know that that **is** possible. As linguists, we may also know that some languages, such as Vietnamese, have almost no morphology: words in this language have none of the internal structure characteristic of affix-rich items such as *indecisiveness* or *rearranged*. On the other hand, some (polysynthetic) languages, such as Inuktitut (Eskimo) or

Mohawk pile one affix on top of another so that words are often strikingly complex, and correspond to whole sentences in English. Baker (2001: 87) gives the Mohawk example in (15) with the meaning "He made the thing that one puts on one's body ugly for her":

(15) Washakotya'tawitsherahetkvhta'se'

Our knowledge of phonology, the sound structure of language, is equally rich. We know that *past, spat,* and *stap* are possible words of English, indeed they all exist; that *stip* and *stup* are also possible words, even though they happen not to exist; but that *satp, ptas* and *tpas* are not even possible words. Apart from knowing the segmental make-up of words, we also have knowledge of 'supra-segmentals': that *photograph* is stressed on the first syllable, *photographer* on the second, and *photographic* on the third. Two points need to be made: first, we 'know' this in the sense that we produce the correct pronunciations on demand, and we recognize that deviations from these pronunciations are slips of the tongue or foreigners' mistakes; that is, knowledge of language need not be immediately available to conscious introspection. Second, the characterization in terms of 'first', 'second', and 'third' syllable is actually not the correct theoretical characterization of our knowledge. As we shall see below, rules of grammar (including phonology) cannot count.

We know more. In an example such as (5a) above, *My friend likes the penguins*, we have to account for the pronunciation of *the* before the initial 'p' of *penguins*: a pronunciation rather different from that of the same lexical item *the* when it occurs before a vowel, as in *My friend likes the otters*. Knowledge of this kind is supplemented by phonetic knowledge which is even harder to bring to consciousness: that the 't' in *photographer* is aspirated, but the 't' in *photograph* is not; that the 'r' in *grime* is voiced, but that in *prime* it is slightly devoiced; that the vowel is longer in *wed* than in *wet*. Such facts belong to the domain of phonetics, the field that deals with the sound properties of language in general, rather than the sound structure of a particular language.

Our phonological knowledge is not self-contained, but may interact in complex ways with our knowledge of the rest of the grammar. We know that (16a) has an alternative pronunciation of the kind given in (16b), where *is* is 'contracted' to*'s*, but that (17a) cannot be matched by the impossible (17b) (impossible is indicated by the asterisk), despite the apparent similarity of the examples:

(16a) The prime minister is a war criminal
(16b) The prime minister's a war criminal

(17a) The president is a war criminal and the prime minister is too
(17b) *The president is a war criminal and the prime minister's too

An understanding of such asymmetries requires investigation of the relation between syntactic and phonological processes, and relies on an analysis of empty categories: entities that have syntactic and semantic properties but are silent.

In addition to phonology and morphology, we need to account for the (semantic) fact that sentences have meaning. The examples in (18) exploit most of the same words but their meanings are radically different:

(18a) My friend likes the penguins
(18b) The penguins like my friend
(18c) My friend doesn't like the penguins

Moreover, the semantics is 'compositional' – except for idioms, the meaning of a sentence is a function of the meaning of its parts, and their syntactic configuration. The meaning difference between (18a) and (18b) is dependent on which item is subject and which object, notions that can be defined syntactically. In fact, life is a little more complicated than that, as the semantic interpretation of 'subject' is not uniform, and we need to advert to 'thematic relations' involving ideas of agentivity and patienthood, as shown by the minimal pair in (19):

(19a) John undertook the surgery reluctantly
(19b) John underwent the surgery reluctantly

John is the subject in both sentences, but is the agent (the surgeon) in the former, and the patient (in both senses) in the latter. These relations are internal to a single sentence, but we also need to relate (the meanings of) different sentences. There are two possibilities: relations which depend on the meaning of individual words, and relations which are purely sentential in that they are independent of such lexical relations. An example of the former is illustrated by (20):

(20a) Mozart persuaded da Ponte to write a libretto
(20b) Da Ponte intended to write something

where (20b) follows, by virtue of the meaning of *persuade* from (20a). An example of the latter is provided by pairs such as (21a) and (21b), where the truth of (21a) guarantees the truth of (21b):

(21a) Torture is immoral and should be illegal
(21b) Torture is immoral

In the next section, I will outline some of the descriptive mechanisms exploited by (generative) linguistics; then I will try to show how we can approach an explanation for at least some phenomena, looking at

a range of examples from English and elsewhere, and use this extension to substantiate the claim that linguistics is a science. Throughout, I shall concentrate on **syntax**. Phonology and phonetics, morphology, and semantics are rich disciplines in their own right, each with a massive literature, but the essence of the analysis of sentences is their **syntactic structure**. And life is finite.

Describing Knowledge of Language

Sentences have structure of various kinds. Returning to the example, *My friend likes the penguins*, we need to describe it in different ways at several distinct 'levels of representation': phonological, semantic, and syntactic. Thus, it can be pronounced in a variety of ways – with stress on *friend* or on *penguins*, for instance, with concomitant differences of interpretation. Restricting attention to the syntax, it is intuitively clear that *my* and *friend,* and *the* and *penguins* 'go together' in a way that *friend* and *likes,* and *likes* and *the* do not. Each initial word of *My friend* and *the penguins* enables us to pick out some individual or individuals in the world, whereas *friend likes* and *likes the* have no such function within them. This intuition is accounted for in terms of 'constituency' represented by means of a simplified tree diagram of the kind in (22):

(22)

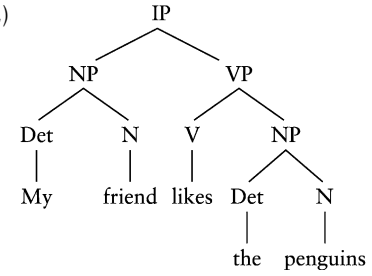

The top of the tree (IP) indicates that the whole sequence "*My friend likes the penguins*" is an 'I(nflection) P(hrase)'{it used to be called 'Sentence', but the terminology has changed to reflect changes in our understanding}. The IP 'branches' into an NP and a VP, where 'NP' means 'Noun Phrase', that is a sequence consisting of a Noun (N) and something else, and 'VP' stands for 'Verb Phrase', that is a sequence consisting of a Verb (V) and something else, here in this instance another Noun Phase. The verb is the (present-tense) form *likes*, and the two Noun Phrases each consist of a Noun (here the singular *friend* and the plural *penguins*) preceded by a 'Det(erminer)', respectively *my* and *the*. Each of 'IP', 'NP', 'VP', 'N', etc., are referred to as 'nodes' in the tree; IP, NP, and VP, etc., are said to 'dominate' everything below them, and to 'immediately dominate' everything immediately below them. So VP dominates all of V, NP, Det, N, *the,* and *penguins*, but immediately dominates only V and NP, which are known as 'sisters'. Once one has got used to the jargon, the advantages of such an analysis are many: it simultaneously shows the linear sequence of items – the order they come in – and the relationships among the component parts: so *the* and *penguins* are more closely related, by virtue of being NPs, than are *likes* and *the* which do not form a 'constituent' of any kind. A constituent is defined as any sequence of items that can be traced exhaustively to a single node in the tree: *likes* and *the* can be traced back to VP (and indeed IP), but these nodes dominate other material, too (*penguins*, for instance) so *likes the*, like *friend likes,* are not constituents.

We now have an explicit way of characterizing the example *This school accepts girls and boys under six*. The two interpretations of the object, *girls and boys under six,* can be represented with different constituent structure as in (23):

(23a) [girls] and [boys under six]
(23b) [girls and boys] [under six]

where the brackets mark the constituents, and indicate that the 'scope' of *under six* is respectively either just *boys* (23a) or includes *girls and boys* (23b).

In addition to this syntactic constituent structure, there is morphological structure to deal with: the fact that *penguins* is plural is marked by the addition of the suffix *–s* to the base *penguin*, and the opposite order (with *s-* prefixed to *penguin* to give *spenguin*) is impossible (in English). Investigating the full range of such facts in the world's languages is a matter of intensive research, and addresses the same immediate task of accounting for how it is that native speakers can have the intuitions and make the judgements of well- and ill-formedness that they do.

This last point bears elaborating. One of the surprising facts about our linguistic ability is that it extends to knowing what is impossible as well as what is possible: we have intuitions of ill-formedness or 'negative knowledge'. I have already traded on this fact in assuming that, even though you had probably never heard either example before, you would agree that *Giraffes have necks long* is wrong, whereas *I've just texted an urgent message to Fred* is acceptable. The point can be generalized: the fact that one can recognize mistakes and distinguish them from new but well-formed creations is evidence for the rule-governed nature of the language faculty. Mistakes presuppose norms, or rules. It is also noteworthy that there are 'impossible' mistakes: some logically possible errors just don't happen, even though one might expect them to. Consider an example from

language acquisition and the task of the child in working out how questions and statements of the kind in (24) are related:

(24a) The children are playing truant
(24b) Are the children playing truant?

There are all sorts of hypotheses children might entertain: move the auxiliary (*are*), move the third word, permute the first and second constituents, and so on. The kinds of mistake that children do make, however, show that their hypotheses overlap with these in interesting ways. First, they sometimes make mistakes of a kind for which there is no obvious pattern in the input, even though they may be theoretically well motivated: examples such as the 'auxiliary copying' in (25):

(25a) Is the steam is hot?
(25b) Are the children are playing truant?

Second, they never try out any hypothesis that would involve them in counting: their attempts always range over modifications of linguistic structure, never of mathematical structure. It seems that all rules in all languages are what is called 'structure-dependent' – they depend on notions such as constituent, Noun Phrase, and so on, but **not** 'third word'. Moreover, children seem not to need to learn this fact – it is a principle that guides their language acquisition from the start: it is innate. Claims of innateness have been unnecessarily controversial in modern linguistics. No one doubts that humans are innately (genetically) different from cats, chimpanzees, and dolphins, and that this difference underlies our ability to acquire language. Equally, no one doubts that humans acquire different languages depending on the environment they are brought up in: if children are brought up in Turkey rather than Greece, they learn Turkish rather than Greek. It is obvious that both nature and nurture have a crucial role to play. Where controversy is justified, and where empirically different claims can be tested, is in the detail of what needs to be ascribed to the child's 'initial state', of what precisely is innate and what has to be acquired on the basis of experience. Explaining structure-dependence is an area where innateness has been repeatedly (and controversially) defended with a form of argument based on the 'poverty of the stimulus' – the idea that we end up knowing things that it is impossible, or at least implausible, to think that we could find in the input. Consider examples more complex than those above, such as (26):

(26a) The children who were naughty are playing truant
(26b) Are the children who were naughty playing truant?

If 'moving the third word' or 'moving the (first) auxiliary' were really the correct way of characterizing the relation in (24) one would expect to find example mistakes like that in (27):

(27a) Who the children were naughty are playing truant?
(27b) Were the children who naughty are playing truant?

Such mistakes simply do not occur. Of course, it is always (usefully) dangerous to say that something does not happen: it may happen in the next utterance one comes across. But this means that the claim is eminently falsifiable (see below), and can anyway be checked by looking for relevant counterexamples in the literature. A nice example of this kind is provided by Neeleman and Weerman's (1997) account of acquisitional differences between Dutch and English. They predicted that Dutch children should, and English children should not, produce sentences with an adverb intervening between a verb and its object, as in (28):

(28) I will eat quickly the yoghourt

They ransacked the largest international corpus of child data in checking their predictions, and happily found no exceptions.

Formalizing our knowledge of language demands a complex toolkit, only a tiny fraction of which has been given here, but such formalization is a necessary prerequisite to finding explanations, to assimilating linguistics to the scientific enterprise. Given the tools developed here, we can make general hypotheses about the nature of language and begin to test them on a wider range of data from English and elsewhere.

Explanation in Language

Examples involving structure-dependence enable one to address the demand for explanation in addition to description. Let's pursue the issue by looking at the occurrence of items such as *any, ever,* or *anything* in English (so-called 'Negative Polarity Items'). At a descriptive level, it is sufficient simply to contrast possible and impossible sentences of the sort seen in (29a) and (29b), where those in (29a) are fully acceptable but those in (29b) are ungrammatical, or infelicitous, or just wrong:

(29a) John ate something/ some salad
(29b) *John ate anything/ any salad

But *why* is there this contrast? The example in (30) shows that *any(thing)* can occur happily enough in negative statements, but it occurs unhappily in positive statements:

(30) John didn't eat anything/ any salad

Looking at such negative examples, the generalization seems to be that *any(thing)* needs to occur with (be 'licensed by') a negator. But such an account is inadequate in two different ways: first, (31) shows that it is not just negators that are relevant, but a variety of elements behave in a similar fashion. This class includes questions, conditionals, and other items that there is no space to characterize:

(31a) Did John eaten anything/ any salad?
(31b) If John ate anything/ any salad, I'd be amazed
(31c) Everyone who has any sense has left already
(31d) John denied having eaten any of the cakes

Second, even if we restrict ourselves to negatives, it still seems that life is more complicated than we might wish – (32a) is unsurprisingly fine but, despite being negative, (32b) is unacceptable and none of (32c) to (32e) is acceptable:

(32a) Something/ some spider bit him in the leg
(32b) *Anything/ any spider didn't bite him in the leg
(32c) *Anything is annoying me
(32d) *Anything isn't annoying me
(32e) *John denied any of the accusations

That is, our first approximation that *any* needs to be licensed by a negative fails in both directions – some sentences with negatives do not allow *any*; some sentences without a negative do allow *any*. The next obvious assumption might be that *any(thing)* has to be **preceded** by a negator of some kind (*not* or *n't* here), but (33) shows that this hypothesis is inadequate: it works for (33a) and (33b) but not for (33c) or (33d) – where *nothing* is another negator:

(33a) The fact that he has come won't change anything
(33b) Nothing will change anything
(33c) *The fact that he hasn't come will change anything
(33d) *That nothing has happened will change anything

The examples in (33a) to (33d) suggest another possibility: perhaps the negator has to be in the same clause as the item (*any*) being licensed? In (33a), the negator and *anything* are in the same clause (compare "*This won't change anything*"), whereas in (33c) and (33d), the negator is in a different clause. We are getting closer, but (34) shows that this is still inadequate as an explanation, as here the negator and *anything* are blatantly in different clauses, but the result is well-formed.

(34) I don't think he has eaten anything

The claim that the negative (or other item) must be in the same clause as *any* fails: some sentences have the negative in a different clause and are nonetheless grammatical; some have the negative in the same clause and are ungrammatical. The correct explanation necessitates an appeal to the notion of 'c-command,' a relation between 'nodes' in a tree. To make this comprehensible and plausible, we need to introduce a little more of the technical machinery of generative grammar.

The representation of sentence structure in terms of trees of the kind shown in (22) can obviously be extended to show the structure of (29a), as shown in (35), where the only novel feature is the uncontroversial claim that *some* is a kind of Determiner:

(35)

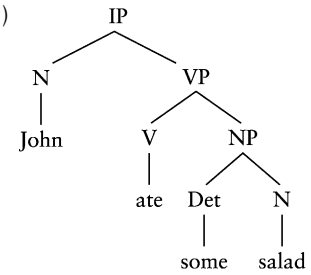

More complex sentences require more complex configurations. Thus, the salient property of an example such as (33a) '*The fact that he has come won't change anything*' is that the subject is not just a noun or noun phrase, but a noun phrase containing another sentence '*he has come*'. To a first approximation it would have the (simplified) form given in (36), and the ungrammatical example in (33c) **The fact that he hasn't come will change anything* would be characterized by the tree given in (37):

(36)

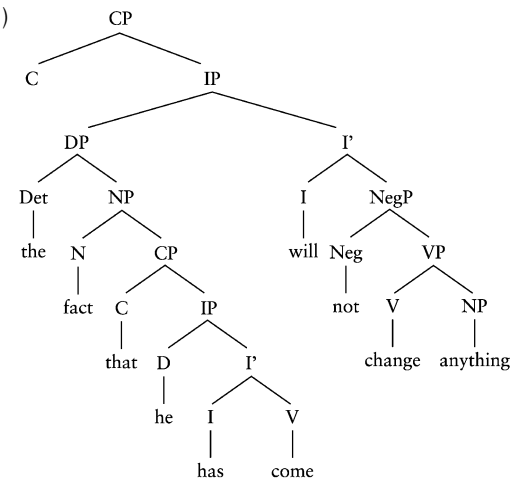

Some of the details of the tree have been included for the sake of those who are already familiar with syntax. So the Complementizer Phrase (CP), optionally headed by a Complementizer such as *that*, and the I' (a constituent intermediate in size between a sentence (IP) and an Inflection element like *will*) are there for

the *cognoscenti*. But two things in these trees are important for everyone: first, that they contain a constituent Neg(ation), itself a subpart of a Neg-P(hrase); and second, that it makes sense to talk of one item being higher in the tree than another. That is, in (36), the 'Neg' is higher in the tree than *anything*, whereas in (37) the 'Neg' is lower in the tree than *anything*.

(37)

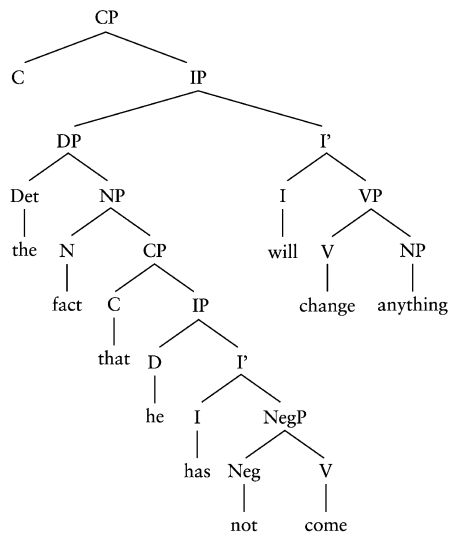

To make this account rigorous, we need to define exactly what is meant by 'higher' and 'lower', and that is what is meant by 'c-command': a node A in a tree c-commands another node B if and only if the first branching node dominating A also dominates B. In (36), Neg c-commands *anything* because the first branching node above Neg (i.e., NegP) also dominates the NP *anything*; in (37), Neg does **not** c-command the word *anything* because the first branching node above Neg (again NegP) does **not** dominate *anything*.

It may seem as if we are using a sledgehammer to crack a nut, but the beauty of the analysis is that c-command is not just an arbitrary condition introduced to account for a narrow range of data in English. Rather it extends in two directions: it is a major and essential ingredient in the explanation first of a range of other phenomena in English; and second to a wide range of phenomena in other languages, indeed in all languages: **c-command is universal**.

Before illustrating other uses of c-command, note that if it is universal, we would like an explanation for how that is possible. The obvious answer is that it is innate, part of the faculty of language that differentiates humans from other organisms and explains why all kids but no kittens acquire language. If correct, certain implications follow immediately: c-command is not a condition that children acquiring their first language need to learn, rather (like structure-dependence) it acts as a constraint that determines the kind of hypotheses they can come up with in mastering their first language.

Let us look at one generalization of the usefulness of c-command in English: its use in 'binding theory', the part of linguistics that deals with the distribution of pronouns and reflexives. It is a commonplace that reflexive pronouns such as *myself, yourself, himself,* and so on, have to agree (or 'be compatible') with their antecedent – the entity they refer back to, so the examples in (38) are fine, but those in (39) are ungrammatical:

(38a) I admire myself
(38b) The judge admires himself
(38c) The waitress might flatter herself

(39a) *I admire yourself
(39b) *He admires herself
(39c) *The waitress flattered ourselves

There are all sorts of other interesting complications with reflexives: if there are two possible antecedents, the sentence is ambiguous, so in (40) *herself* can refer to either *the nurse* or *the woman*:

(40) The nurse showed the woman some documents about herself

but this is true only if the two potential antecedents are in the same clause as the reflexive: (41) is unambiguous, and *herself* can refer only to *the princess*, because *the queen* is in a different clause:

(41) The queen said the princess had disgraced herself

Neither of these extra considerations accounts for why (42a) is unambiguous and (42b) is simply ungrammatical:

(42a) The mother of the princess has disgraced herself
(42b) *The brother of the princess has disgraced herself

The question is why *herself* in (42) can't refer back to *the princess*, but only to the *mother* or the *brother*, resulting in the judgements indicated. The answer is that the antecedent of the reflexive must not only be compatible and in the same clause, but must also c-command it. The structure of possessives such as *the princess's mother* or *the mother of the princess* is a matter of contention, but what is not in dispute is that *princess* is lower in the tree than *mother* or *brother* and hence does not c-command the reflexive: compare the trees in (43a) and (43b) for (38c) and (42a):

(43a)

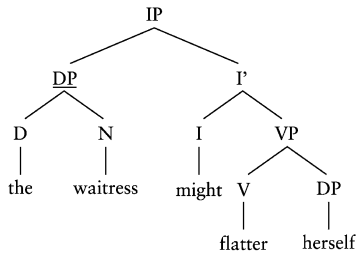

(43b)

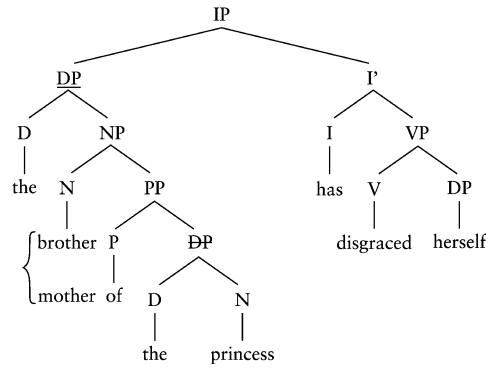

In both trees, the underlined DP (*The waitress* in (43a), *The brother/mother of the princess* in (43b)) c-commands *herself,* but the crossed-out DP *The princess* in (43b) does not c-command *herself* so cannot act as its antecedent.

C-command is pervasive in the syntax of English, not just in accounting for polarity items and reflexives. More strikingly, it is pervasive in the syntax of every other human language. Consider (Cantonese) Chinese. Cantonese has a rich selection of sentence-final particles with a wide range of meanings from conveying a feeling of intimacy to indicating which element in the preceding sequence is the focus. In English, we can indicate this focus by means of stress, giving rise to the kind of difference in (44a) and (44b):

(44a) John only **watches** football (he doesn't play it)
(44b) John only watches **football** (not cricket)

It's even possible, with suitable pause and stress, to have (45b) with the same interpretation as (45a):

(45a) Only **John** watches football (not Bill)
(45b) **John** only, watches football (not Bill)

Just as in English, Cantonese uses stress to identify the intended focus from the set of possible foci, and the operator *zaa3* (*only*) then associates with this intended focus, as in (46), which can have the various interpretations shown in (47):

(46) Billy tai zukkau zaa3
Billy watch football zaa3

(47a) Only **Billy** watches football (not Peter)
(47b) Billy only **watches** football (he doesn't play it)
(47c) Billy only watches **football** (not cricket)

There is good evidence (see Law, 2004) that *zaa3* occurs in some C position of the sentence, and hence c-commands everything preceding it in the example in (46): see the tree in (48), (C is arguably final in Cantonese, not initial as it is in English):

(48)

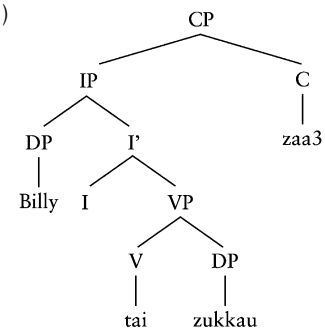

But to talk simply in terms of linear precedence or word order is inadequate. Cantonese also has a process of topicalization whereby a constituent – e.g., *zukkau* ('football') – can be moved to the front of the sentence, where it is attached even higher in the tree than *zaa3*, and marked with *le1* (the 1 indicates a high level tone). This is shown in (49a), with a range of putative translations in (49b) to (49d). Crucially, as indicated by #, (49d) is **not** a possible interpretation of the Cantonese sentence.

(49a) zukkau-le1, Billy tai t zaa3
(49b) Football, only Billy watches
(49c) Football, Billy only watches
(49d) #Only football does Billy watch

Why this should be so is indicated in the tree in (50), where *zukkau* is not c-commanded by *zaa3*: (The 't', for 'trace' in (48a) and (49a) indicates where the topicalized constituent *zukkau* moved from).

(50)

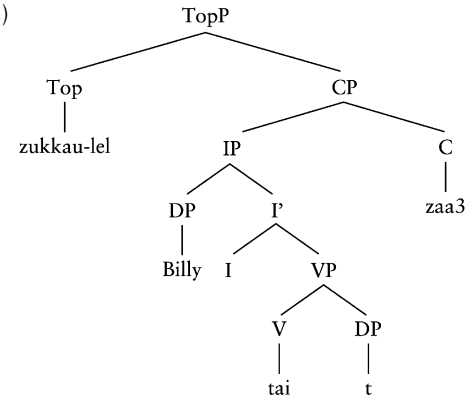

Because *zaa3* does not c-command *zukkau,* the attempted interpretation in (49d) is simply impossible. The examples are extremely simple, indeed extremely oversimplified, but the moral is clear: the same abstract syntactic condition (c-command)

operates in Chinese just as it does in English, and in every other language.

It is worth emphasizing that successful explanations for one class of data are good to the extent that they generalize to phenomena for which they were not devised. C-command was not invented to account for Chinese, but the fact that it automatically accommodates quite subtle data in that language lends support to a theory that incorporates it. The point can be illustrated more widely. Every time one draws a tree of the kind illustrated above, one makes predictions about the well-formedness of a host of other sentences. It is striking that the trees in (36) and (37) exhibit a defining property of human language – its recursive power. That is, the possibility of including one sentence inside another sentence, potentially without limit, gives rise to the infinite expressive power of natural language syntax.

Linguistics as a 'Science'

Making testable predictions of this kind is one of the hallmarks of science, and we can now elaborate on the claim that linguistics is 'scientific'. For any discipline to be scientific it must satisfy (at least) the conditions in (51):

(51a) It must seek **explanation**
(51b) It must pursue **universals**
(51c) This will necessarily involve **idealization** which may well give rise to a tension between commonsense and science
(51d) Most crucially, it will make **falsifiable predictions**

The scientific enterprise is a search for explanatory laws or principles. That is, linguists – like physicists or molecular biologist – seek not only data, but also data that can be used as **evidence** for some theoretical claim. Consider again the analysis of reflexives. Early work in linguistics of the sort best exemplified by the work of Bloomfield (1935) provided detailed exemplification of a wide range of reflexive constructions from a variety of languages, but stopped short of trying to explain their distribution. One of the achievements of generative grammar has been precisely to explain – in terms of 'binding theory' – why reflexive pronouns have the distribution they do. To elaborate a little on the discussion given already under the 'Explanation in Language' section, the appearance of a reflexive pronoun is determined by principle A of binding theory which says that a reflexive must be 'bound' in some domain. As we saw, this means that it must have an antecedent which also meets a number of other conditions. Principle A is in contrast with Principle B, which determines the distribution of 'ordinary' pronouns. That is, between them the principles account for the range of facts discussed above as well as for the contrast between *John admires him* and *John admires himself*; why one can construe *John* and *him* as referring to the same person in (52b) but not in (52a), even though the latter seems to include the former as a proper subpart, and a host of other facts:

(52a) John expects to see him
(52b) I wonder who John expects to see him

Evidence for – or against – the claims of binding theory, or any part of the theoretical edifice, can be drawn from a wide variety of domains: the distribution of words in sentences; the acquisition of their first language by children, and of second and subsequent languages by both children and adults; the historical change of language over time; the processing of language – be it production or perception – in normal and abnormal circumstances; the problems that arise in pathology, as a result of language disturbance caused by a stroke or a tumor, and so on. In every case, explanation calls for concentration on those data that can provide evidence: the data themselves are trivial until embedded in a theory that can produce testable hypotheses.

A concomitant of this search for explanation is that the generalizations made must carry over in relevant ways to all languages, not just to English or Latin or Chinese. That is, the quest for laws entails that any science must pursue *universals*, even if that means narrowing the domain of inquiry. This position has two implications: first, that the same principles should apply to Dutch and Hindi and Chinese – so 'all languages' is to be construed literally; but second, that the domain of application of these principles may not be superficially obvious. To take the second observation first, it is well-known that there are so-called 'emphatic' reflexives, as illustrated in (53a) and (53b), which raise difficulties for any simple analysis of reflexivization in general:

(53a) John himself came
(53b) John came himself

These 'reflexives', so labeled because they include the morpheme {*self*}, have somewhat different properties from 'real' reflexives: for instance, they don't have any thematic role, (*came* takes only one argument – you can't 'come somebody else'), but simply emphasize the importance of the one role mentioned. On the other hand, they clearly do obey some of the same constraints as ordinary reflexives, as witness the peculiarity of the examples in (54):

(54a) *The boy came herself

(54b) *The boy's mother himself came

This duality suggests that it might be necessary – as a temporary measure – to limit the domain of binding theory to arguments taking a thematic role, leaving the emphatic examples to be accommodated later after further research. The situation is parallel to the development of a scientific theory of motion. For Aristotle, all motion fell within the ambit of his theory of movement, even the movement of flowers growing. Galileo was able to provide a unified account of terrestrial and heavenly motion by restricting attention to mechanical motion and excluding biological growth. This should not be viewed as a retreat to a position where whatever you say turns out to be true, simply because you have excluded those areas where what you say is false. Rather it is an attempt to define an area where we can begin to understand the complexity of the real world by focusing on phenomena that are comprehensible.

This narrowing is of two kinds: first, one can simply ignore data which fall outside the generalization one is attempting to explain; second, there is scientific idealization – the pretence that things are simpler than they really are. This is justified because such simplification enables one to approach an understanding of the abstract principles which underlie complex phenomena. Such idealization in linguistics was first made explicit in Chomsky's distinction between competence and performance and his claim that "linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech-community." We all know that real speech communities are not homogeneous, but the force of the idealization is that the heterogeneity that does exist is not a necessary component in an adequate characterization of our knowledge of language or how we come by that knowledge. Consider in this latter respect the simplifying assumption – the striking idealization – that first language acquisition is 'instantaneous'. It is obvious that children take a considerable time to master the intricacies of their first language. Given how complex the knowledge they end up with is, it may still be justifiable to talk of the surprising speed with which they reach this mastery, but it is **not** by any stretch of the imagination 'instantaneous'. So what is the force of the assumption? Consider the acquisition of negation.

Most, perhaps all, children go through a stage in which they produce negative sentences with the negative marker (*no* or *not* in English) in peripheral position in the sentence – i.e., first or last – as in (55a) and (55b), heard from two different two-year-olds:

(55a) No computer on
(55b) Computer on no

The context made it clear in each case that the force of the utterance was an order not to turn the computer on. Superficially, it looks as if the two children have different grammatical systems (though they were equally proficient at understanding adult instructions, suggesting that their grammar was more sophisticated than might appear). What is relevant here, however, is the fact that – as far as is known – both children will end up with the same grammatical knowledge of English negation. That is, the different stages they go through in their acquisition of the details of the grammar has no effect on the knowledge they end up with – their adult competence. This claim may, of course, be false. It might turn out that adults who uttered (55a) as children have different grammars from those who uttered (55b) as children. It's possible, but there is no evidence to that effect, and the idealization to instantaneity is accordingly justified. If one of the things we wish to explain is how humans can progress from a stage in which they are apparently language-less to a stage of adult knowledge, it is advantageous to be able to abstract away from the different paths they may take in acquiring that knowledge. The idealization also simplifies the account of the initial state of the language faculty: what needs to be attributed to the mental make-up of human infants to explain the fact that they do, while infant chimps do not, acquire language.

Idealization of this kind is in turn likely to involve a tension between commonsense and science. The claim of instantaneous language acquisition seems blatantly silly until one considers more carefully what it means. Consider a second example, again from first language acquisition. Children regularly mispronounce the words they are learning, sometimes with surprising results, as in the case of the puzzle puzzle. When he was about two and a half, my son – like many children – used to pronounce *puddle* as 'puggle' ([pʌgəl]). He was perfectly consistent, and used to pronounce words of a comparable kind with the same kind of deformation: so *bottle* became 'bockle', *pedal* became 'peggle', and so on. The obvious explanation for this behavior was that, for reasons of motor control, he was unable to pronounce *puddle*. But at the same time as he made this mispronunciation, he was also making 'mistakes' with words such as *zoo*, pronounced as 'do', *lazy*, pronounced as 'lady', and so on. The result was striking: although he pronounced *puddle* as 'puggle', he consistently pronounced *puzzle* as 'puddle' ([pʌdəl]), so the reason for the former 'mistake' could clearly not be that he was incapable of the appropriate motor control. He could pronounce 'puddle', but only as his version of *puzzle* not for *puddle*. So the commonsense explanation of the phenomenon was wrong. An

obvious alternative explanation was that he couldn't hear the difference, but that hypothesis wasn't much more plausible either, as his pronunciations of the two words were consistently different, indicating that he must be able to perceive the contrast. So the second 'obvious' commonsense explanation was equally problematic. The correct explanation was provided by Marcy Macken, who demonstrated that there was a perceptual problem, but not between *puzzle* and *puddle*, but rather between *puddle* and *puggle*. Of course, *puggle* is not a word of English, so I had failed to observe relevant examples. Words like *riddle* and *wriggle* provide a straightforward minimal pair, but they had not been in my son's vocabulary. Fortunately, Macken observed that other examples made the case as well as the (missing) minimal pair did. Words such as *pickle* were intermittently pronounced 'pittle' ([pit?l]) suggesting that there was indeed perceptual confusion. The puzzle puzzle could only be solved when the difference between a variety of other examples was simultaneously taken into account.

I have gone on about this example at such length because it illustrates the beauty of being (potentially) wrong. The most crucial part of the scientific enterprise is that it makes testable (or 'refutable' or 'falsifiable') predictions. Because my son regularly distinguished *puddle* and *puzzle*, and similar examples, I had claimed explicitly that he had no perceptual problem. Macken showed that I was wrong and, on the basis of my own data, showed how I was wrong, leading to an improvement in our general understanding of language acquisition, and the language faculty more generally. Such falsifiability is pervasive in linguistics as in all the sciences, and suggests that many, perhaps all, our hypotheses and principles will be in need of revision when we get a better understanding of what is going on. It follows that binding theory, which I have appealed to above, is probably wrong, and will need replacing by some more sophisticated theory in due course. Again this is to be welcomed, though we must simultaneously guard against the danger of 'naive falsificationism'. There are always going to be contrary data that one's current theory cannot explain. This is not a reason for simply jettisoning the theory and whatever insights it may provide, but a point of departure for refinement and extension. A clear example is provided by the theory of parametric variation, and the striking revision of his earlier work in Chomsky's current Minimalist Program (1995).

I have suggested that, like all principles of grammar, binding theory should be universal. But there are problems. Even though (virtually) all languages have reflexives, their distribution is subject to slightly different conditions in different languages. Consider again the contrast between (40), *The nurse showed the woman some documents about herself,* and (41), *The queen said the princess had disgraced herself*, where the former is ambiguous but the latter is unambiguous. The contrast was attributed to the fact that (in English) the antecedent of a reflexive must be in the same clause. So far so good, but if one takes equivalent examples in Chinese, it turns out that the equivalent of (40) is unambiguous, and the equivalent of (41) is ambiguous. The theory would appear to have been refuted: a prediction was made, it was tested, and found to be false. But simply giving up the theory would be defeatist, and it would also mean giving up the explanation for the data it does account for.

The solution is interesting: the universality of binding theory (and likewise for other subtheories of the grammar) is maintained, but some latitude is allowed in the definitions involved – they are 'parametrized', as the jargon has it. In this case, all reflexives have to have an antecedent, but language learners have to choose (on the basis of the data they are exposed to) among several other options: whether they are learning a language in which that antecedent has to appear in the same clause or in some other well-defined domain; whether the antecedent has to be a subject or can bear other grammatical relations, and others. In Chinese, the antecedent of a reflexive must be a subject, so (40) is unambiguous; on the other hand, that antecedent does not have to be in the same clause, so (41) is ambiguous. If you are worried that this is too simple a get-out, an analogy with incest may be helpful: all cultures appear to have an incest taboo forbidding sexual relations between relatives (for instance, fathers and their daughters). The taboo is universal. But how that taboo is instantiated is culture-specific: for example, some groups allow cousins to marry, others do not. The situation with regard to language and language-learning is somewhat more complex than the cultural example, because there are many more choices to be made. The acquisitional task is more complex than it would have been if all languages were exactly like English, but it is not as severe as one might fear. The idea is that the full range of parametric choices in language is available to the child prior to experience – they are in some sense innate – and the child's task reduces to choosing from a set of language structures options it already 'knows.'

Beyond Language: Pragmatics and the Language of Thought

We have looked at a wide range of examples illustrating some of our knowledge of phonology, morphology, semantics, and (mainly) syntax, but we also have

knowledge that goes beyond words and sentences. Consider (56a) and (56b): as a remark about Fred, (56a) is fine, with stress on *bats* as indicated by the bold print, but as a reply to the question in (56b) it is anomalous:

(56a) Fred has written a book about **bats**
(56b) Who has written a book about bats?

Such discoursal knowledge must be distinguished both from syntactic knowledge of the kind that tells us that (57) is ungrammatical:

(57) Fred has written about **bats** a book

and from real world knowledge of the kind that prompts our scepticism about (58a) and (58b):

(58a) Bananas have legs
(58b) Your saucer is being aggressive again

Someone who utters (56a) in response to (56b) probably needs remedial English lessons; someone who utters either of the sentences (58a) or (58b) is either a linguist or in need of psychiatric help.

This brings us into the realm of pragmatics, our interpretation of utterances in context, and to the relation of language to thought. The examples in (58a) and (58b) are felt to be odd not because of our linguistic knowledge – you get the same effect whatever language you translate them into – but because we know that the world isn't like that. It is our encyclopedic knowledge that tells us this, not knowledge of our language (English). However, when we interpret someone's utterances in some context, we habitually use both our knowledge of English (or whatever other language we are using) and our encyclopedic knowledge. Suppose you hear (3a) *Tom is a problem*. Your knowledge of English vocabulary and grammar provides you with a meaning for the sentence, but it doesn't tell you enough to act. Is your interlocutor looking for sympathy, asking you to do something about it, hoping for a denial? Any or all of these may be what you decide is the case on a particular occasion, but you carry out this construal on the basis of your knowledge of the speaker, of Tom, of your past exchanges with both of them, and so on, indefinitely. The core notion involved is what is 'relevant', an idea that has been made explicit in Relevance Theory, an important extension of linguistics. We are now beyond the language faculty and can hand over responsibility to other disciplines; but one final question needs to be addressed: What is language for?

There are two standard answers: for thought and for communication. Both answers are true, but both need a little hedging. First, we can obviously communicate without using language by means of coughs, sniffs, gestures, and so on. But language is far more subtle than any other system known: conveying specific negative or conditional propositions by means of gestures or sniffing is not obviously possible. Innumerable other creatures have complex communication systems, but none of them, as far as we know, have anything with the recursive power of human syntax (see Sperber and Wilson, 1995; Hauser *et al.*, 2002). Second, the system we use to think with must have a great deal in common with the natural languages we speak, but it is not identical to them. The language of thought can include elements that natural languages cannot – visual images, for instance; and natural languages have properties that would be unnecessary, or even unhelpful, in the language of thought – pronouns, for instance. If I tell you that *she is beautiful*, it's of no use to you storing that in memory as 'she' is beautiful; it has to be stored with a name or some other description replacing *she*. Nonetheless, language has a central role in each of these domains, linking perception and articulation on the one hand to thought processes on the other. This means that the output of our language faculty must be 'legible' to these other systems. Language acts as a code linking representations of sound to representations of meaning. These representations must then be in a form that makes it possible for the sensorimotor apparatus to convert them into pronunciations and percepts, and for the conceptual system to use them for thinking, especially inference.

So, linguistics provides an account of each of syntax, phonology, morphology, and semantics, and how they relate to each other; pragmatics then tells us how such purely linguistic representations relate to the language of thought – the medium in which we think and carry out inferencing. This relation underlies our ability to interpret the world and the people in it, but the linguistic component is only the first step on the journey. We normally take someone who utters 'torture is immoral' to *believe* that torture is immoral, and we expect to be able to predict (at least some of) their actions on the basis of this. But people may lie, and about that linguistics has nothing to say.

See also: Data and Evidence; Language of Thought; Linguistic Anthropology; Phonetics: Overview; Phonology: Overview; Pragmatics: Overview; Principles and Parameters Framework of Generative Grammar; Psycholinguistics: History; Syntax-Semantics Interface.

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History of Linguistics in Central and South America

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Spanish and Portuguese missionaries dedicated themselves to the study of non-Indo-European languages, resulting in the publication of a great number of works in or about the Amerindian languages. Although missionaries based and structured their works in agreement with the traditional Greco-Latin grammatical framework, they were forced by the linguistic facts to search for unconventional solutions in their descriptions, which never had been studied before in Europe. There is no doubt that their approaches were in many cases original and creative on all subdisciplines of grammar: phonology; orthography (the rendering of sounds never heard or written before); morphology–morphosyntax (their model predated ours, not yet elaborated, used to describe phenomena such as agglutination, incorporation, different word structure, processes of derivation, and composition in typologically different languages); syntax (e.g., topicalization, ergativity, different word order, the dichotomy active and nonactive, incorporation); and lexicography – another challenge for the missionaries and an important tool for the translation of religious texts.

Missionary works are important sources for other subdisciplines of linguistics, such as sociolinguistics (language variety, language change, standardization), pragmatics, translation theories, cultural anthropology; for reasons of space these will not be treated in this article. Descriptive linguistics always requires an underlying theoretical framework and reflects the linguistic thinking of the period in question. Interest in

whereby modifiers are always located on the same side of the head. Bybee (1988) argues, however, that the correlation is actually motivated in diachronic terms: adpositional constructions typically originate from genitival constructions, and they maintain the order of genitival constructions. In this case, Bybee argues, functional principles may be invoked to account for why adpositional constructions develop from genitival constructions in the first place, but no functional principle can actually be invoked to account for the word order correlations between the two constructions.

It should finally be observed that a widespread assumption in the typological approach is that the various language types allowed by implicational universals reflect different functional principles, and the competition between the various functional principles determines cross-linguistic variation (Du Bois, 1985). For example, an implicational pattern exists such that if the singular is expressed by a certain number of morphemes, then the plural will be expressed by at least as many morphemes. This is usually explained in terms of an economic principle, whereby the singular is the most frequent category at the discourse level and therefore need not be expressed overtly. One such explanation accounts for the existence of languages in which the singular is zero-marked and the plural is marked overtly. However, the implicational pattern also allows for languages in which both singular and plural are expressed overtly. These languages reflect an iconic principle whereby all aspects of conceptual structure (in this case, the values 'singular' and 'plural') are expressed overtly (Croft, 2003). The implicational pattern allows for both language types, but the two language types reflect competing functional principles, each prevailing in different languages. The competition between the different principles is what determines cross-linguistic variation, as described by the implicational pattern itself.

See also: Linguistic Universals, Chomskyan.

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Linguistics as a Science

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A common description of linguistics is that it is the 'scientific study of language.' This might seem to be a loose or metaphorical use since the subject matter of linguistics is quite different from what are often thought of as the 'hard' sciences such as physics or chemistry. But linguists are engaged in a process of inquiry that aims to discover facts about the world we live in, and so their work shares important properties of other sciences. Some work in linguistics (e.g., acoustic phonetics) resembles the 'hard' sciences in

that it studies physical phenomena in the world. Like psychology, linguistics faces specific issues associated with the fact that its subject matter involves properties of humans, namely, linguistic knowledge and behavior. This article considers some views on what it means to say that a discipline is scientific, what it means to investigate language scientifically, and some different scientific approaches adopted by linguists.

What Is a Science?

The general, popular assumption about what constitutes a science is still probably one based on 'inductivism,' or logical positivism, which was the dominant view of science at the start of the 20th century. In this view, scientists must begin by making sure that they are as objective as possible and simply observe relevant data without prejudging it. They must also make every effort to ensure that they do not themselves affect the data that they are studying. After objectively observing the data, generalizations will emerge and from these generalizations, laws can be derived.

Suppose, for example, that we go to the Antarctic and observe penguins. After a certain number of observations, we might notice that we have never seen a penguin fly. On the other hand, we have seen many penguins swim. So we wonder whether these facts might be the basis of generalizations. We continue to observe and every penguin we observe swims but none of them fly, so we do generalize and come up with the hypotheses that:

(1) No penguins can fly
(2) All penguins can swim

These hypotheses can then be tested by further observation. We might also devise specific tests. For example, we might encourage penguins into the air to see whether any of them attempt to fly. Or we might put penguins in water to make sure each of them can swim. Hypotheses (1) and (2) will hold as long as every penguin we observe swims but fails to fly. If repeated tests confirm the hypotheses, then they will be established as verified conclusions.

This approach seems intuitive and clear to most people, but there are serious problems with it. Adapting a diagram from Chalmers (1999: 54), we can represent this way of approaching science as in Figure 1.

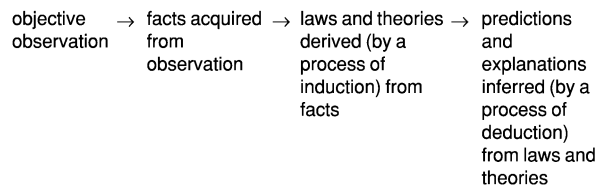

Figure 1 Inductivist model of science (based on Chalmers, 1999: 54).

Perhaps the most fundamental problem with this model is that the derivation of laws and theories is based on induction, which means that they can never be guaranteed to be true. To see this, we need to look at what is involved in induction.

Induction is a process whereby general conclusions are derived based on evidence provided by specific observations in the past. If I go to the same bar often enough and order the same drink, say, a pint of stout, every time, it is possible that the bartender will conclude that I will want a pint of stout every time I come into the bar. If he is keen to make sure I am happy, he might even start pouring my stout as soon as he sees me arrive.

The problem, of course, is that there is nothing to stop me deciding one day to have something different for a change. If I do order a different drink one day, say a glass of lemonade, then the bartender will have wasted his time, and possibly his stout. In other words, conclusions that have been derived through a process of induction are not secure. By contrast, deductive conclusions are guaranteed to be true as long as the premises on which they are based are true. Here are possible steps in the bartender's inductive reasoning process:

(3a) Billy ordered a pint of stout when he came into the bar on Monday.
(3b) Billy ordered a pint of stout when he came into the bar on Tuesday.
(3c) Billy ordered a pint of stout when he came into the bar on Wednesday.
(3d) Therefore, Billy will order a pint of stout every time he comes into the bar.

And here are two examples of deductive inferences:

(4a) Billy will order a pint of stout every time he comes into the bar.
(4b) Therefore, Billy will order a pint of stout when he comes into the bar on Thursday.

(5a) Billy is drinking stout
(5b) All stouts are alcoholic drinks.
(5c) Therefore, Billy is drinking an alcoholic drink.

While (3a–c) could be true and (3d) still turn out to be false, there is no way that (4a) could be true and (4b) false, or that (5a–b) could be true and (5c) false.

The unreliability of inductive inferences is a serious problem for the inductivist approach to science, since it means that no conclusion can ever be safely asserted to be true. You never know for sure that the next penguin you look at won't be able to fly, or whether the next penguin you look at will indeed be able to swim. This means not only that we can't be sure of

our conclusions but also that we can never be sure that our scientific endeavors have resulted in any progress. It is always possible that we have just moved from one false hypothesis to another, since we have not been lucky enough to come across the data that would demonstrate our mistake.

Another problem with this view of scientific inquiry is that it is not possible to observe phenomena objectively without first making some assumptions about what might be relevant. Suppose, for example, that I decide I am interested in how children acquire their first language. How will I know which things to observe? Should I begin by observing the speech of the children themselves? Or the speech of other children around them? Or the speech of grownups around them? Or other kinds of behavior exhibited by the children themselves? Or other kinds of behavior exhibited by other children? Or other kinds of behavior exhibited by grownups around them? Or the extent to which they see or hear television? Or their diet? There are countless possibilities and we cannot begin carefully observing data without first guessing which particular data might be relevant. In the same way, hypotheses about whether penguins can fly or swim arise because someone asks the question whether they can. A scientist following the inductivist model might just as easily have decided to look at the penguins' color, their physical behavior, how they mate, how many of them are ever together in one group, and so on. The hypotheses about their status as flightless swimmers will only arise if it is assumed that it might be relevant in this context. Not only does the inductivist model of science mean we can never be sure we've made any progress, we also don't have any clear rationale for deciding on our first steps in investigating a particular phenomenon.

These were acknowledged problems for the traditional, inductivist model of science. But no superior model was available until the philosopher Karl Popper (1972, 1979) suggested a new way of thinking about science. He pointed out that, even though we can never be sure an assumption is true, we can demonstrate a conclusion to be false. If I order a glass of lemonade even once, then we know that it's not true that I only ever order stout. If we see just one penguin that can fly, then we know for certain that not all penguins are flightless. He pointed out that falsifying a hypothesis counts as progress, not only because it removes an error from a theory but also because it usually leads to a new, improved hypothesis. Suppose, for example, that we discover a flying penguin. We will not simply reject our initial hypothesis that all penguins are flightless and start again from scratch. Instead, we will wonder what the difference is between those penguins that fly and those

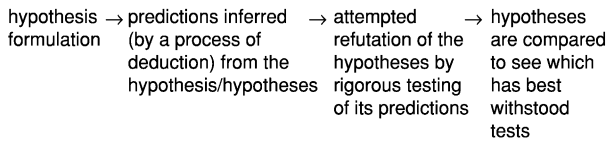

Figure 2 Popperian (falsificationist) model of science.

that don't. We might, for example, discover that there is a particular penguin species that can fly and come up with a new hypothesis to reflect that.

Another important point Popper made was that the source of hypotheses is much less important than whether they make clear predictions and so can be tested to see if they are false. Newton's theory of gravity, for example, clearly predicts that any object we drop will fall towards the earth. Other things being equal, we know that a floating or rising object will demonstrate that the hypothesis is false. By contrast, if your horoscope claims that 'someone is thinking of you,' it is clearly impossible to show that this is not so. Therefore, this is not a falsifiable, and so not a scientific, claim.

Popper's approach suggests that observation does not need to be the first step in a process of scientific inquiry. Instead, hypotheses can, and indeed must, precede observation. Hypotheses may arise because of objective observation, because of some subjective prejudice, because we dream them, or from any source at all. What is important is that we can test them and so attempt to make progress in our understanding. Popper's view of how science progresses can be represented diagrammatically, as in Figure 2.

The foundations of science, in this view, are not based on objectivity and the notion that observation precedes hypothesis formulation. Instead, what is important is that our hypotheses are clearly formulated and testable. Since we can never verify a hypothesis, we aim instead to develop the best hypotheses we can, and this is evaluated in terms of clarity and falsifiability. Because of the prominence it gives to hypothesis formation and to deductive inferences, Popper's vision of science is also known as the 'hypothetico-deductive' model.

Naturally, there are a number of alternative visions. Imre Lakatos (1970) developed a more sophisticated falsificationist model based on considering the nature of scientific research programs rather than isolated hypotheses, or sets of hypotheses. Thomas Kuhn (1970) suggested a sociological model, in which he described science in terms of paradigms. In Kuhn's view, a scientist proceeds first by learning a current paradigm. He then solves 'puzzles' using the tools available within the paradigm. Sometimes, puzzles are not solvable within the existing paradigm. If this continues, a crisis occurs that eventually leads to

a 'revolution' in which the existing paradigm is discarded and a new paradigm takes its place. One important feature of Kuhn's approach is that its sociological nature means that it does not provide a means of distinguishing between scientific and non-scientific statements other than in terms of what is accepted by the relevant group of scientists. A more radical position is taken by Paul Feyerabend (1975, 1978), who claims that the notion of a reliable scientific methodology is an illusion and that scientists have failed to demonstrate that their findings have more value than any other kinds of 'wisdom.'

Whichever philosophy of science is assumed, work in linguistics fits the model as well as any other science. Linguists do not all agree about the nature of their scientific endeavor, but the majority of linguists do see linguistics as a science; and Popper's views on what constitutes scientific activity have been influential in linguistics, just as they have been in other disciplines. (For an introduction to the philosophy of science, see Chalmers, 1999).

The Scientific Study of Language

As Yngve points out, "the origins of linguistic theory can be recognized in Plato and Aristotle, but most clearly in the early Stoics from about 300 to 150 B.C.' (Yngve, 1996: 14). Modern **scientific** linguistics began to develop in the early 19th century in the work of scholars such as Rasmus Rask, Jacob Grimm, Franz Bopp, and Wilhelm von Humboldt. Rask (1830) referred to Linnaeus and Newton in proposing that language was a natural object that should be studied scientifically. The main focus at this time was on the comparative method, looking at similarities among different languages and using this evidence to reconstruct the ancestors of languages. (For a fuller account of the history of linguistics, see Robins, 1990.) The notion that linguistics is a science has continued since then, while assumptions about what makes linguistics scientific have changed. Perhaps the most significant developments have been the work of Ferdinand de Saussure (1972, 1983), which is usually seen as the starting point of modern linguistics; the development of a rigorous notion of linguistics as a science by Leonard Bloomfield (1926, 1933, 1970) and his American contemporaries in the first half of the 20th century; and the overturning of Bloomfield's approach by the work of Noam Chomsky (1957, 1965). In linguistics today, there are a wide range of approaches, methodologies, and notions of what is scientific, but the Chomskyan approach remains the dominant one.

Saussure's ideas established the notion that linguistics could be 'synchronic' (concerned with a particular language at a particular point in time) as well as 'diachronic' (looking at how a language has developed over time). Saussure's work had considerable influence in the development of structuralist approaches in linguistics and beyond. One particularly significant structuralist approach was that of Bloomfield and his followers in the first half of the 20th century, who developed a much more detailed view of linguistics as a science. As Robins (1990: 208) puts it, "Bloomfield was rigorously scientific, in the light of his own, mechanist, interpretation of science, concentrating on methodology and on formal analysis." It was important for Bloomfield that linguistics should be seen as a scientific enterprise, and his view of what it meant to be scientific was an empiricist one, based on behaviorist psychology. A scientific approach was an empirical study based on objective observation of facts that would lead the scientist to discover facts about languages. It was vital to avoid subjectivity. This meant avoiding hypotheses that did not emerge from objective observation, and it also meant denying the existence of the mind or of mental phenomena. This was because the data alone, considered objectively, did not justify the assumption that mental phenomena really existed. For behaviorists, all behavior could be explained in terms of external stimuli and the reflexes that they caused. Even very complex behavior, such as linguistic behavior, could be understood in terms of complex responses to stimuli. Perhaps the main concern of linguistics was to record facts about particular languages. This was given urgency by the fact that many native American languages were threatened with extinction. It was important that they should be recorded before they were lost forever. Linguists developed a number of 'discovery procedures' that could be used to scientifically (i.e., objectively) work out facts about the languages being studied.

Chomsky's approach explicitly rejected at least the following assumptions of the Bloomfieldian approach:

- That observation should precede hypotheses
- That the ultimate aim of linguistics was to describe
- That languages were to be understood as collections of utterances (phenomena external to the mind)
- That linguistics should not presuppose the existence of mental phenomena.

Chomsky argued instead that:

- The main aim of linguistics was to construct theories of language and languages
- The ultimate aim of linguistics was to explain language and languages

- That language should be understood as a mental phenomenon (and languages as mental phenomena)
- That there was strong evidence for the existence of the human mind and a cognitive system of knowledge of language.

In general, the key notion in Chomsky's work was that there was convincing evidence for the existence of mental structures underlying human language. This evidence came from the linguistic intuitions of speakers. These included intuitions about what is and is not possible in languages they know. A famous example is the contrast between *eager to please* and *easy to please* illustrated in (6)–(7):

(6a) John is easy to please
(6b) It is easy to please John

(7a) John is eager to please
(7b) *It is eager to please John

(The asterisk is used here to indicate that most speakers judge (7b) to be unacceptable. It is also used sometimes to indicate the theoretical claim that (7b) is not grammatical in English).

Speakers of English agree that (6a) and (6b) are both acceptable and have similar meanings. Although there is no logical reason for ruling out (7b) and it is easy to see what it would mean by analogy to (6a), speakers agree that (7b) is not an acceptable utterance. This can be explained by the assumption that a cognitive system of knowledge, a grammar, licenses (6a), (6b), and (7a) but rules out (7b).

Using examples like this, Chomsky argued for the existence of mental grammars ('competence') that underlay actual human linguistic behavior ('performance'). In Chomsky's (1986: 15–51) terms, linguistics should move from the study of 'E-language,' or 'externalized language,' to the study of 'I-language,' or 'internalized language.' This approach revolutionized linguistics, was a major influence on the so-called 'cognitive revolution' that reestablished the mind as a focus of study in psychology, and led to the establishment of the discipline of cognitive science. So what is the scientific methodology of Chomskyan linguistics like? To a large extent, it follows the Popperian model represented in **Figure 2**.

The focus of linguistics is very much on coming up with clearly stated, testable hypotheses, testing them, and constantly updating hypotheses based on how they respond to testing.

However, things are not as straightforward as this. It is not always the case that we have a theory that copes with all of the data until we come across problematic data and we then replace that theory with a new theory. Instead, we compare theories and stick with the theory that we think is the 'best so far' in that it copes best with the relevant data. Most theories do not deal with all of the existing data, and we are usually aware of problems with some data. When this happens, linguists do not reject the theory that cannot cope with the difficult data. Rather, they note the difficulty and continue with their research program until they either find a way to deal with it within the existing theory or until a new theory is formulated that deals with this data and is preferable to the existing theory when looked at overall.

In some cases, data is difficult to interpret. It may be, for example, that speakers are divided over whether a particular form is acceptable. This may correlate with nonlinguistic facts about the group of subjects, such as age (e.g., speakers over a certain age make one judgment while younger speakers make another), class, gender, or geographical location. If so, then the variation in the data can be explained based on these correlations, e.g., as a dialect difference or as a difference in the language of different age groups (which could be an example of a language change in progress). In some cases, though, there may be no obvious correlation with nonlinguistic features of the subjects, i.e., the numbers of speakers who make the different assumptions about the status of a particular form might be comparable in all groups, whether divided by age, class, gender, or geography. When this happens, linguists may 'let the grammar decide'; in other words, they may decide that whatever their existing grammatical theory predicts about the form in question is correct.

In evaluating theories, Chomsky (1986, 2000) has proposed that we can consider three 'levels of adequacy' that our theories should aim to meet: observational, descriptive, and explanatory adequacy. A theory is observationally adequate if it describes correctly which forms are grammatical. It is descriptively adequate if it also characterizes knowledge that speakers have about those forms. It is explanatorily adequate if it provides an explanation for why the intuitions of speakers are as they are.

It is important to note that, in the Chomskyan view, a linguist's grammar is a theory about the competence of one or more speakers. So to say that a particular expression is 'grammatical' is to make a theoretical claim about the unconscious system of knowledge that speakers have about their language. This is one reason why linguists need to be careful when asking speakers for their judgments on particular utterances. Asking whether a particular form is grammatical may lead to confusion or may generate responses that reflect nonlinguistic (or metalinguistic) assumptions about the relative social status of different forms. So it is often better to ask questions like "Does this sound

like a likely utterance to you?" or "Could you imagine someone saying this?"

All sciences involve idealisations. A physicist studying the effects of gravity, for example, wants to observe what a feather and a ball would do if dropped in identical atmospheres and if they were not shaped in such a way that the feather is affected to a greater extent by air resistance than the ball. Similarly, Chomsky points out that the object of study for linguistics is an idealized linguistic system:

> Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance. (Chomsky, 1965: 3)

This quote has sometimes been misunderstood. Chomsky is not claiming that such a speaker-listener exists. Instead he is saying that linguistics is not concerned with those nonlinguistic properties that lead to different individuals performing differently when making judgments about their language or using it (i.e., with 'performance'). So linguists are studying an object that does not exist as a physical entity. No two speakers share exactly the same language, since all speakers have acquired their language in slightly different circumstances. However, the scientific study of language requires that we abstract away from the differences to find out about the underlying language faculty. This raises a number of methodological issues. Chomsky (1980: 189–192) makes an analogy between investigation of human language and investigation of thermonuclear reactions taking place inside the sun. It is not possible to set up a laboratory inside the sun and look directly at what is there. Similarly, we cannot view linguistic competence directly. However, we can observe light and heat emanating from the sun and make inferences based on this evidence about what is happening inside the center of the sun. Similarly, we can look at the performance of speakers of a language, including their 'metalinguistic performance' (Birdsong, 1989; Schütze, 1996), when asked to make judgments and make inferences about the system of competence that is involved in determining that performance.

In the Popperian spirit, linguistics should make no assumptions in advance about which data will be relevant in studying language, nor about what methods should be used in studying it. What is important is that hypotheses are clearly stated, testable, and tested. In practice, though, there has also always been a tendency for particular linguists to continue to use the same kinds of methods and data, so that certain groups are referred to in those terms, e.g., as 'corpus linguists' or 'intuitionists.' Much of the work of Chomsky and his followers has been based on evidence from the intuitions of speakers, gathered by personal introspection (i.e., the researcher's own intuitions) interview or questionnaire. But there is no reason in advance to rule out the relevance of other data, whether from corpora, psycholinguistic experiments, or other sources. There are constant debates about the reliability of particular kinds of data and methods for acquiring and interpreting it. Corpus data has been judged problematic because the precise data depends on the accident of who says or writes what at a particular time. Unusual but relevant data is unlikely to appear. The use of intuitions has been questioned because of the risk of subjectivity and the dependence on researchers gathering and interpreting them with enough care. And so on. But the vital thing is that the relevance of particular data is explicitly discussed and justified. As with all sciences, linguists will choose to pay particular attention to some data and to ignore other data based on the hypotheses they have adopted about what will be relevant. But the important question should always be whether the data can be shown to shed light on the particular hypothesis being investigated.

Not all linguists are theoretical linguists. Descriptive linguists aim only to describe languages, not to explain them. A descriptive grammar will aim to make clear what forms exist in a particular language. Any descriptive grammar will have to make idealisations since, as mentioned above, it is not clear that any two speakers will ever have internalized exactly the same system. Where a large percentage of a language group agree on a particular form, it is fairly easy for the descriptive linguist to write a grammar in agreement with the majority view. In other cases, it may be much harder to decide which option to adopt. The Bloomfieldian American Structuralists who preceded Chomsky were mainly concerned with describing languages. They developed efficient methods for determining facts about languages and provided a wealth of data that theoretical linguists can use in testing their hypotheses. Descriptive linguistics continues to provide useful data with a range of practical as well as theoretical applications.

Not all linguists use falsificationist, or 'hypothetico-deductive,' methods. Conversation analysts, for example, avoid idealisations and use inductive methods to arrive at their conclusions. Conversation analysis has its foundations in ethnomethodology, a branch of sociology that grew out of dissatisfaction with the methods of sociology in the 1960s and 1970s. Research in conversation analysis is qualitative rather

than quantitative and avoids early hypothesis formation. One rationale for this is that conversation is complex behavior, and explanations of it will presuppose an understanding of that complexity that cannot be justified until we find out more about the detail of what goes on in conversations. Harvey Sacks (1995), one of the originators of conversation analysis, explicitly states that he views his work as behaviorist and that this approach has much in common with the behaviorist methodology adopted by Bloomfield and the American Structuralists in the early 20th century.

One motivation for using inductivist methods is when research is qualitative rather than quantitative. Lazaraton (2002: 33) suggests that the following features can be seen to distinguish qualitative and quantitative research:

Qualitative Research	**Quantitative Research**
naturalistic	controlled
observational	experimental
subjective	objective
descriptive	inferential
process-oriented	outcome-oriented
valid	reliable
holistic	particularistic
ungeneralizable single case analysis	generalizable aggregate analysis

(Lazaraton, 2002: 33)

Qualitative research is appropriate when the aim is to discover the attitudes and experiences of speakers and the motivations and processes behind events, rather than simply counting the number of times a particular event occurs. This is not to suggest that there is a necessary link between particular types of research (e.g., quantitative or qualitative) and particular models of science (e.g., inductivist or falsificationist); neither quantitative nor qualitative research are necessarily incompatible with any particular model of science.

Not everyone agrees that linguistics is an empirical science. Some reasons for this view stem from the use of intuitions as data. Itkonen (1974), for example, suggested that the reliance on intuitions means that the claims of linguists cannot be falsified. He suggests that the occurrence of an utterance such as **girl the came in* does not falsify the claim that definite articles in English precede nouns in a noun phrase, since this utterance is 'incorrect' and the claim is about 'correct' utterances and sentences. Given this, he suggests that linguistics is different from natural sciences, in which, for example, the discovery of a piece of metal that does not expand when heated would be enough to falsify the claim that all metals expand when heated. Yngve (1996) suggests that the 'ancient semiotic-grammatical foundations' of linguistics are not compatible with modern science. As a result, he suggests putting these foundations aside and replacing them with "new foundations that are fully consonant with modern science as practiced in the more highly developed sciences of physics, chemistry and biology" (Yngve, 1996: 309). Yngve's proposal can be seen as an attempt to reconceptualize linguistics as a 'hard' science. This raises the questions of whether all of the phenomena that have been studied by linguists can fit into this new model and whether the discipline retains its interest if they do not.

For most linguists, however, linguistics is by definition scientific. While much work in linguistics can be understood in some form of Popperian, or post-Popperian, terms, there is nevertheless a wide range of views on the exact nature of the scientific study involved.

See also: Chomsky, Noam (b. 1928); Data and Evidence; Idealization; Language as an Object of Study; Levels of Adequacy, Observational, Descriptive, Explanatory; Linguistics: Approaches; Structuralism.

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Linguistics as a University Subject: Early History, in America

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In the 1860s, William Dwight Whitney (1827–1894), professor of Sanskrit and instructor of modern languages at Yale College, became increasingly concerned that students in American higher education were beginning work in comparative philology without an understanding of 'the grand truths and principles which underlie and give significance to their work' (Whitney, 1867: viii). Whitney then wrote the book that became the most important linguistics text in 19th-century America, *Language and the study of language: twelve lectures on the principles of linguistic science* (1867). Many of his idea's on the nature of human language remain central to modern linguistics – the primacy of speech over writing, the arbitrary connection between sound and meaning, the universality and ease of language acquisition by children. But the central topics of 19th-century German linguistics – genetic and typological classification and the causes of language change – formed the core of his text and of the graduate program in philology that he established at Yale in 1869, one of the earliest graduate programs in any field in the United States.

At the turn of the 19th to the 20th century, Franz Boas (1858–1942) held one of the few professorships in anthropology in all of North America, at Columbia University in New York City. Boas considered linguistic study of Native American languages to be one of the core curricular areas for graduate studies in anthropology. He used his own field notes from languages on the Northwest Coast to demonstrate linguistic analysis in the classroom, and following experience there, students specializing in linguistics conducted work in the field. The *Handbook of American Indian Languages* (Boas, 1911) provided both the model of linguistic analysis to be followed in dissertations and their chief venue of publication.

Largely synchronic and focused on Native American languages, the path of Boasian linguistic education was different from that of the historical studies fostered by Whitney within the German historical paradigm. Under Whitney, students sought a foundation in classical languages, in older forms of modern languages, and, for research purposes, in the European languages of scholarship, along with such general knowledge of language as was provided in Whitney's textbook. They were then equipped for historical linguistic work. Under Boas, there were courses in ethnography, in physical anthropology, in statistics, and courses demonstrating the analysis of American Indian languages, which prepared students for independent field work and linguistic analysis.

No matter which of these traditions was emphasized in the early decades of the 20th century, there were no autonomous university departments of linguistics. Rather, the few linguistics programs that came into existence were assembled from faculty already appointed in other departments. For example, when Yale University announced a new department of linguistics in 1931, the only person to hold the title of professor of linguistics was Edgar H. Sturtevant

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(1875–1952). He and all other faculty were jointly appointed with other departments, including anthropology, classical languages and literatures, English, Germanics, and Semitic and Biblical languages and literatures. Yale initially offered only the Ph.D. in linguistics; a Master's degree became available in 1943–1944. Instruction remained entirely at the graduate level, a pattern for most linguistics programs until the later decades of the 20th century. Yale did not teach an undergraduate linguistics course until 1947–1948 and did not grant its first undergraduate degree in linguistics until late in the 1960s (Wells, c. 1975: 18 n. 6).

Even before the establishment of a linguistics department at Yale, however, linguistics in some form was taught in nearly every major American university. One of the first projects undertaken by the Linguistic Society of America (LSA), following its founding in 1924, was the 'Survey of Linguistic Studies: Opportunities for Advanced Work in the United States' (Kent and Sturtevant, 1926). All but one of the 26 universities surveyed (those belonging to the Association of American Universities) listed 'courses bearing upon linguistic science' in catalogues and bulletins for the 1926–1927 academic year. Seven institutions had particularly strong offerings, each with 15 or more affiliated faculty members teaching upward of 30 courses: University of California (Berkeley), University of Chicago, Columbia University, Harvard University, University of Michigan, University of Pennsylvania, and Yale University. Twenty-five schools had language (nonliterary) courses in modern and older languages, but the leading programs also offered coursework in general linguistics, general phonetics, comparative Indo-European, and the analysis of American Indian languages.

In 1928, under the direction of Sturtevant, the LSA began holding an annual summer Linguistic Institute, meant to serve both graduate students in linguistics and senior scholars wishing a collegial environment in which to discuss and share research. At the first Institute, 45 people registered for courses, including four members of the faculty. Courses offered at the early Institutes represented the historical interests of the majority of LSA members, with most classes devoted to older languages, their historical development and comparison. In 1928, for example, 31 of the 37 courses were historical. But Sturtevant insisted on also scheduling courses that were not historically oriented – experimental phonetics, methods of analyzing unwritten languages, description of contemporary American English, and fieldwork on the dialects of the United States and Canada. As the Institutes became better known and increasingly prestigious, the offering of such courses spread into university programs. Thirty-five years later, at the 1963 Institute, 37 courses were distributed over four main areas, three synchronic, one diachronic; 220 people registered (1964, *LSA Bulletin 37*: 20). At every Institute, the most well-attended course was 'An Introduction to Linguistic Science.' In 1937 and 1938, the course was especially popular with faculty members as well as students when it was taught by Edward Sapir (1884–1939) and Leonard Bloomfield (1887–1949), respectively.

Bloomfield did more than any other American linguist to shape the teaching of linguistics at American universities in the second quarter of the 20th century. His textbook *Language* (1933) came to dominate the field, and the first two-thirds of it, focused on synchronic analysis, constituted the foundation for American structural linguistics, the paradigm that increasingly displaced more traditional diachronic work as the main orientation of American linguistics. The genius of the text was that it presented historical topics fully and clearly, while at the same time Bloomfield gave priority to a systematic exposition of synchronic descriptive analysis. *Language* was the preeminent textbook in American linguistics well into the 1950s.

In 1941, a "considerable body of linguists assumed the role of active language teachers and attempted wholeheartedly to apply the findings of their science to the practical problems of language teaching" (Moulton, 1961: 82). Many linguists, including Whitney and Bloomfield, had taught languages in college and university and even written grammars and language textbooks for the well-known European languages, but the outbreak of World War II in 1939 directed attention to the need for materials and speakers of languages until then unfamiliar in the American education system. The American Council of Learned Societies in 1941 established the Intensive Language Program (ILP) which employed linguists, mostly recent doctoral recipients with experience in the analysis of American Indian languages, to develop teaching materials based on linguistic analysis. Using these materials, often while they were still in development, linguists established intensive college courses in such languages as Swahili, Hausa, Fanti, Arabic, Chinese, Japanese, and Thai. By the summer of 1942, the ILP was prepared to offer 56 courses in 26 languages at 18 universities. Approximately 700 students enrolled, some of them linguistics majors seeking knowledge of languages distinct from their native English. Over the next two decades, it became common to find linguistics programs requiring their students to gain exposure to such languages.

During World War II, the United States' armed forces adopted the ILP, and linguists were recruited

to prepare language training materials for the military. One result from this concentrated period of pedagogical concern was a close association between linguistics and the less commonly taught languages, not only in research and publication, but also within the administrative structure, and thus the programs, at some universities. A second, related result was the incorporation into linguistics programs of an area commonly referred to as applied linguistics, which concerned the application of linguistic principles to language teaching. Linguistics students now had yet another area of specialization available to them.

Bloomfield's textbook was supplemented in the 1940s by workbooks prepared for phonemics by Kenneth Pike (1912–2000) and for morphology by Eugene Nida (b. 1914). Both contained problems drawn from a wide range of languages and were initially used in training sessions for Christian missionary linguists at the Summer Institute of Linguistics (SIL). From its informal beginning in 1934 with just two students, SIL went on to train hundreds of students each summer in techniques for linguistic field work on undocumented languages (see Robbins, 1977). The texts by Pike and Nida also were adopted at secular colleges and universities for classes on the analysis of linguistic data.

During this period of American descriptivism, from the 1940s until the early 1960s, problem-solving was a key component of the linguistics curriculum, where it prepared students for field research. A good example of descriptivist training was at the University of California, Berkeley, which formalized its linguistics program in the early 1950s, and in 1952 established the Survey of California Indian Languages, directed by Mary R. Haas (1910–1996). The Survey was "funded to allow students to do fieldwork, to write dissertations, and, aided by the University's publication policies, to publish accounts of these Indian languages" (Emeneau, 1997: 618).

The 1950s brought to maturity the American descriptivist approach to linguistics, sometimes referred to as American structuralism. Two widely adopted textbooks appeared, one by Henry A. Gleason, Jr. (b. 1917), the other by Charles F. Hockett (1916–2000). Gleason's *An introduction to descriptive linguistics* (1955) dealt solely with synchronic topics and was accompanied by a workbook of problems. Hockett in *A course in modern linguistics* (1958) followed the pattern of Bloomfield's *Language*, with the first two-thirds of the book devoted to synchronic analysis, the last third to language change, historical reconstruction, and the comparative method. The texts reflected the orientation of mid-century American linguistics with core chapters on articulatory phonetics, American structural phonemics, and morphology. Neither work contained a chapter on semantics, and discussion of syntax was limited. Just a few years later syntax became a major topic in American linguistics with the growing prominence of generative grammar.

Veterans' education benefits led to dramatic increases in undergraduate and then graduate matriculation in the decade following World War II. Linguistics gained students and visibility within the academic world, and a number of institutions formalized their linguistics programs into departments or created new programs. When the United States Congress passed the National Defense Education Act of 1958 (NDEA), the field benefited under provisions that strengthened both science and foreign languages in higher education. Especially important were graduate fellowships under Title IV of the act, which not only provided three years of support to students but also three years of supplementary stipends to the program in which they enrolled. In 1963, five years after the passage of the NDEA, there were in the United States at least 17 departments of linguistics, 14 interdepartmental programs, and 43 other departments offering linguistic coursework; 882 students were enrolled for advanced degrees in linguistics, and 20 institutions offered the baccalaureate degree in linguistics (Newmeyer, 1986: 45–46). Coincidentally, the impetus to graduate study in linguistics provided by the NDEA came just as generative grammar was rising in challenge to the American descriptivist tradition, and the emergence of an exciting new theoretical approach invigorated linguistics as a university subject in America.

See also: Anthropological Linguistics: Overview; Applied Linguistics in North America; Bloomfield, Leonard (1887–1949); Boas, Franz (1858–1942); Historical and Comparative Linguistics in the 19th Century; Hockett, Charles Francis (1916–2000); Linguistic Anthropology; Missionary Linguistics; Nida, Eugene Albert (b. 1914); Pike, Kenneth Lee (1912–2000); Sturtevant, Edgar Howard (1875–1952); Whitney, William Dwight (1827–1894).

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Linguistics as a University Subject: Early History, in Europe

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Pinning down the history of the subject of linguistics is complicated by the fact that it is hard to know where to draw the line between linguistics, its subdisciplines and other disciplines. Is the study of specific languages for their own sake and/or in order to understand their literature to count as linguistics? Is there a difference between the teaching and research of classical languages and modern languages? Notably, Morpurgo-Davies has claimed that a German professor of Sanskrit in the 19th century usually had much in common with professors of comparative linguistics (Morpurgo-Davies, 1998: 8). Furthermore, some departments of phonetics later became departments of linguistics (e.g., at Uppsala University, Sweden), so how should we treat them in a history of linguistics as a university subject?

Scholars have been interested in linguistic topics for thousands of years. Still there has been talk about an institutionalization of linguistics during the 19th century (e.g., Morpurgo-Davies, 1998: 3; Hovdhaugen *et al*., 2000: 507). However, in many countries it took much longer for the first chairs in general linguistics to appear. In Scandinavia, for instance, general linguistics has been seen as "closely tied to structuralism" and in some countries even more so to generative grammar (Hovdhaugen *et al*., 2000: 507).

Nevertheless, even before the first chairs in general linguistics appeared, there were chairs established in Comparative Linguistics/Philology, Phonetics, and chairs partly devoted to Linguistics. Moreover, there were already chairs in Latin, Greek, and Oriental languages, usually meaning Hebrew primarily, at most universities during the 17th century. In the 19th century universities started to establish chairs in comparative linguistics, in modern languages, and finally in phonetics and general linguistics.

This must be seen in relation to the more general changes at the universities during the 19th century, the introduction of research alongside teaching and the specialization that replaced academic careers from one professorship to the next all the way up to theology (see e.g., Morpurgo-Davies, 1998: 10).

Germany and the Friedrich-Wilhelm-University in Berlin (today called the Humboldt University), has been recognized as the center for the important changes carried out at universities during the early 19th century. Wilhelm von Humboldt's (1767–1835) idea was that universities had to combine research and teaching. Professors should spend equal amounts of time on both and "teaching should be linked to research" (Hovdhaugen *et al*., 2000: 134). In addition, one should be required to specialize in one field rather than having the possibility of advancing through the various subjects (Hovdhaugen *et al*., 2000: 134–135).

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The first university position in linguistics was created for Franz Bopp (1791–1867), who became

extraordinary professor of *Orientalische Literatur und allgemeine Sprachkunde* in 1821 and was made ordinary professor in 1825 (Morpurgo-Davies, 1998: 7; Killy & Vierhaus, 1998). Notably, linguistics was only part of his duties. Within 100 years all German universities had one or more positions in linguistics, although this usually meant comparative linguistics (Morpurgo-Davies, 1998: 7, with reference to Wackernagel, 1904: 206).

Before the 19th century, linguistics and language study was a gentlemanly pastime. However, with the expansion of higher education institutions things were changing, making it possible to make a living as an academic specialized in a linguistic subject around the end of the 19th century (Morpurgo-Davies, 1998: 7).

> Nothing was left to the dilettantes and amateurs; science and learning became a profession—a development which in retrospect has perhaps turned out to be not altogether a good thing. (Aarsleff, 1983: 180–181)

> In contrast to the previous centuries, the increased power and prestige of the universities led to a concentration of almost all aspects of linguistic research of any significance in the universities. [. . .] The role played by amateur linguists and other institutions such as academies became more marginal, [. . .] (Hovdhaugen *et al.*, 2000: 135)

Still, it is clear that many of the famous linguists from the 19th century did not hold posts in the subject: Johan Nicolai Madvig (1804–1886) was Danish Secretary of Culture (cf. Hovdhaugen *et al.*, 2000), Rasmus Rask (1787–1832) served as professor of literature, as a librarian, and later finally became professor of Oriental languages (Hovdhaugen *et al.*, 2000: 159), Jacob (1785–1863) and Wilhelm (1786–1859) Grimm worked as ministerial secretaries, librarians, and as professors and librarians at Göttingen after which they taught in Berlin (cf Seuren, 1998: 82), and Humboldt was a minister of the Prussian government. Between 1500 and 1800, linguistic work such as grammars, dictionaries, and historical studies was primarily done by teachers, clergymen, administrators, and not by university professors and lecturers (cf. Hovdhaugen *et al.*, 2000: 26).

During the 17th and 18th centuries, it became common in Scandinavia to hire (although often without pay) people from abroad as language masters, at first primarily to teach French (Hovdhaugen *et al.*, 2000: 27). It was only in the 19th century that universities began to appoint lecturers and professors in modern languages.

It is important to remember that the changes in linguistics during the 19th century were not only due to the interest in the subject itself, but also to the size, importance, and number of the higher education institutions. For instance, Sanderson (1975: 1) has said that British higher education "was never more radically reshaped." At the beginning of the 19th century, England and Wales only had two institutions for higher education: the universities of Oxford and Cambridge (Morpurgo-Davies, 1998: 4) and still before the second world war the only "established posts in linguistics were specialist chairs of Comparative Philology at Oxford, Cambridge and a few other universities and of Phonetics at University College London" (Brown and Law, 2002: vii). That is if we count only comparative philology, linguistics and phonetics, while excluding posts in specific languages.

In addition, it is important to note that at the beginning of the 19th century, the establishment of chairs in the linguistic subjects still did not guarantee the chance to research this subject, since the chairs were still primarily teaching chairs:

> [Friedrich August Rosen] was in 1828 invited to fill the chair of Oriental languages in the London University [. . .] where he taught elementary lessons in Hindustani, Arabic, Persian, and Sanskrit for sixteen hours a week at a guaranteed salary of one hundred pounds a year. (Aarsleff, 1983: 177)

It was not until the end of the war, in 1944, that the first British chair in General Linguistics was set up and J. R. Firth (1890–1960) was elected to it (School of Oriental and African Studies, Department of Phonetics and Linguistics) (Brown and Law, 2002: vii). Oxford and Cambridge were much later establishing departments and chairs in Linguistics, Oxford getting its first chair in Linguistics in 1976 (Roy Harris), Cambridge's first Professor of Linguistics being Peter Matthews who took up this post in 1980 (Matthews, 2002: 207). The University of Edinburgh was, however, earlier in establishing their first chair in Linguistics. There was a department and chair for English Language and General Linguistics between the years 1948–1964. And when the department was split in two (in 1964) a new chair was established for General Linguistics. Interestingly, the new department of General Linguistics did not teach undergraduates in the first years, but instead only had a Postgraduate Diploma and some research students (Asher, 2002: 35; Lyons, 2002: 181).

After the expansion during the 1960s and 1970s, the British universities unfortunately started to experience grant cuts that affected many small linguistics departments, which had to close down or merge with other departments during the 1980s (Lyons, 2002: 189). In recent years, this trend has repeated itself with the decision being taken in 2003 to close down the Durham Department of Linguistics and English

language, followed in May 2004 by the proposed closure of the School of Language, Linguistics and Translation Studies at the University of East Anglia by 2007.

In France all universities were closed as a result of the French revolution and it was not until the 1880s that French universities made a proper come back (Morpurgo-Davies, 1998: 5). Still France had a tradition of studies of oriental languages, including Sanskrit, which as in Germany was in some ways a forerunner of linguistics (Morpurgo-Davies, 1998: 9). Morpurgo-Davies believes (with reference to Auroux, 1983: 253, 1984: 304ff) that linguistics in France really started to establish itself during the late 1860s when Michel Bréal (1832–1915) became professor of comparative grammar, the Société Linguistique de Paris was founded, and the École Pratique des Hautes Études was created (Morpurgo-Davies, 1998: 9).

The situation in Italy was, according to Morpurgo-Davies, very different from that in France, although, like elsewhere, the first chairs in Sanskrit came before the chairs in linguistics (1998: 9). The main difference was that in Italy the new kingdom (1861) made it official policy to encourage "the establishment of new chairs of Sanskrit and of Comparative Linguistics" and so by the 1870s Turin, Florence, Bologna, Pisa, Naples, Rome, and Milan all had chairs in these subjects and Italy was thereby ahead of both France and England (Morpurgo-Davies, 1998: 9–10).

It is important to note that of course a subject is not only taught if there is a professor in it, nor is the creation of a chair or even a lectureship the first sign of interest in the subject. Hovdhaugen *et al.* (2000: 165) mention that even though the Scandinavian universities only hired professors in comparative linguistics from the 1870s, the subject was taught already in the 1840s. Similarly, there have been different ways of making general linguistics part of the education students received. In many parts of Europe, it was introduced through comparative linguistics and Sanskrit. As an example of how it could otherwise be introduced, modern general linguistics started to appear in Sweden during the 1940s when the *Språkvetenskapliga Sällskapet i Uppsala* (the Linguistic Society in Uppsala) arranged a series of

Table 1 Some of the first chairs in linguistics and general linguistics in Europe

Country	*University*	*First professor*	*Subject*	*Year*
Germany	University of Berlin	Franz Bopp (1791–1867)	Oriental Literature & General Linguistics (extraordinary)	1821
Germany	University of Berlin	Franz Bopp (1791–1867)	Oriental Literature & General Linguistics (ordinary)	1825
Germany	University of Halle	August Friedrich Pott (1802–1887)	General Linguistics (ordinary)	1838
Germany	University of Berlin	Heymann Steinthal (1823–1899)	General Linguistics (extraordinary)	1862
France	École d'Anthropologie	Abel Hovelacque (1843–1896)	Linguistic Anthropology	1867
Norway	University of Oslo	Alf Sommerfelt (1892–1965)	General Linguistics	1931
England	School of Oriental and African Studies	John Rupert Firth (1890–1960)	General Linguistics	1944
Scotland	University of Edinburgh	Angus McIntosh (b. 1914)	English Language and General Linguistics	1948
Scotland	University of Edinburgh	John Lyons (b. 1932)	General Linguistics	1964
Norway	University of Trondheim	Olov Næs (1901–1984)	General Linguistics	1964
Sweden	University of Umeå	Karl-Hampus Dahlstedt (1917–1996)	General Linguistics	1965
Finland	University of Helsinki	Kalevi Wiik (b. 1932)	General Linguistics	1966
Sweden	University of Stockholm	Karl-Hampus Dahlstedt (1917–1996)	General Linguistics	1967
Sweden	University of Lund	Bertil Malmberg (1913–1994)	General Linguistics	1969
Denmark	University of Copenhagen	Jørgen Rischel (b. 1934)	General Linguistics	1976
England	University of Oxford	Roy Harris (b. 1931)	General Linguistics	1976
England	University of Sussex	John Lyons (b. 1932)	Linguistics	1976
Finland	University of Turku	Fred Karlsson (b. 1946)	General Linguistics	1978
England	University of Cambridge	Peter Matthews (b. 1934)	General Linguistics	1980
Norway	University of Bergen	Helge (Julius Jakhelln) Dyvik (b. 1947)	General Linguistics	1983
Sweden	University of Gothenburg	Jens Allwood (b. 1947)	General Linguistics	1983 1986
Finland	University of Joensuu	Jussi Niemi (b. 1950)	General Linguistics	1991
Sweden	Uppsala University	Åke Viberg (b. 1945)	Linguistics	2001

introductory lectures on the subject (Hovdhaugen *et al.*, 2000: 333). A few years later it was introduced more formally at Uppsala University through phonetics, in which courses started during the 1950s (Hovdhaugen, 2000: 333). In Gothenburg, there were seminars in the language departments that were organized by the professors of Scandinavian languages, Natanael Beckman (1868–1946) and Hjalmar Lindroth (1878–1947), where one discussed issues in general linguistics at least from the 1930s. In Lund linguistics was primarily introduced from Copenhagen, but there was also a French scholar, Pierre Naert (1916–1971), who taught Saussure to his students of Scandinavian languages between 1939 and 1962 (Hovdhaugen *et al.*, 2000: 334). So by various means, linguistics became a university subject, starting during the 19th century but becoming more firmly established as general linguistics during the 20th century (see Table 1).

See also: Historical and Comparative Linguistics in the 19th Century; Language Teaching: History; Modern Linguistics: 1800 to the Present Day; Scandinavia: History of Linguistics.

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Linguistics: Approaches

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Introduction

Linguistics is the study of language, and there are many different kinds of linguistics, some mutually compatible, some in competition. This diversity of approaches to linguistics is possible because language does not present itself to investigation as a coherent and well-defined field of enquiry that is clearly distinct from other areas of investigation. Instead, language is best imagined as a landscape through which it is possible to take various journeys, its horizons redefined by each approach.

Most approaches to linguistics agree on a few basic facts about language. The first is the fact of linguistic form. While the status of linguistic form is in dispute (as I show below), it is clear that linguistic events such as utterances or inscriptions must be understood as manifestations of linguistic types. Thus utterances must be understood as tokens of combinations of words, even though it may be impossible to isolate a 'word' in the actual stream of sound. The words belonging to classes (such as 'Noun') are made by selecting sounds from an inventory of sounds (phonemes of the language) and so on; in all cases, language must be understood as drawing on inventories of types and combining those types in regular ways: a word of the type 'Article' precedes a word of the type 'Noun' in English (within the Noun Phrase). These regularities, another idealization away from the crude data, involve rules or generalizations or constraints.

No account of language can ignore the fact that language is ordered and regular, based on an inventory of types and rules of combination that together constitute linguistic form. The second fact accepted by all approaches to linguistics is that form relates to

introductory lectures on the subject (Hovdhaugen *et al.*, 2000: 333). A few years later it was introduced more formally at Uppsala University through phonetics, in which courses started during the 1950s (Hovdhaugen, 2000: 333). In Gothenburg, there were seminars in the language departments that were organized by the professors of Scandinavian languages, Natanael Beckman (1868–1946) and Hjalmar Lindroth (1878–1947), where one discussed issues in general linguistics at least from the 1930s. In Lund linguistics was primarily introduced from Copenhagen, but there was also a French scholar, Pierre Naert (1916–1971), who taught Saussure to his students of Scandinavian languages between 1939 and 1962 (Hovdhaugen *et al.*, 2000: 334). So by various means, linguistics became a university subject, starting during the 19th century but becoming more firmly established as general linguistics during the 20th century (see **Table 1**).

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Introduction

Linguistics is the study of language, and there are many different kinds of linguistics, some mutually compatible, some in competition. This diversity of approaches to linguistics is possible because language does not present itself to investigation as a coherent and well-defined field of enquiry that is clearly distinct from other areas of investigation. Instead, language is best imagined as a landscape through which it is possible to take various journeys, its horizons redefined by each approach.

Most approaches to linguistics agree on a few basic facts about language. The first is the fact of linguistic form. While the status of linguistic form is in dispute (as I show below), it is clear that linguistic events such as utterances or inscriptions must be understood as manifestations of linguistic types. Thus utterances must be understood as tokens of combinations of words, even though it may be impossible to isolate a 'word' in the actual stream of sound. The words belonging to classes (such as 'Noun') are made by selecting sounds from an inventory of sounds (phonemes of the language) and so on; in all cases, language must be understood as drawing on inventories of types and combining those types in regular ways: a word of the type 'Article' precedes a word of the type 'Noun' in English (within the Noun Phrase). These regularities, another idealization away from the crude data, involve rules or generalizations or constraints.

No account of language can ignore the fact that language is ordered and regular, based on an inventory of types and rules of combination that together constitute linguistic form. The second fact accepted by all approaches to linguistics is that form relates to

meaning. A central function of language is to enable communication, and the organization of linguistic forms has some relation to the organization of meaning. This view – in some form – is shared by many approaches to linguistics: meaning is structured, and the structure of form has some relation to the structure of meaning.

The Status of Linguistic Form

One of the issues that divide approaches to linguistics relates to the 'autonomy' of linguistic form, in a number of senses. One view, expressed from the margins of linguistics or from outside linguistic theory, is that linguists' discoveries of linguistic form are actually determined by their experience of writing (e.g., the notion of the phoneme is a reimagining of the alphabetic letter), and hence that linguistic form is an artifact of a particular moment in the history of work on language. A second view is that form is entirely determined by function; in its crudest form this is the traditional grammar notion that a word is of the class Noun if it is 'a naming word'; more sophisticated accounts might see the class of a word as fully determined by the function of the word relative to other words in the sentence. A third view sees form as autonomous; thus it is a fact about a word that it is a Noun, this having the same determinate relation to the word as its sound structure or core meaning. While it may have other characteristics as a consequence of being in this word class, including function relative to other words or distinctive phonological characteristics (e.g., stress patterns in English), these functions do not determine its status and are in effect implied by its word class rather than presupposed by it.

Of these three views, the first is an antilinguistic approach to linguistics, the second a strongly functionalist approach, and the third, a strongly formalist approach. Within the formalist approach, one of the issues that arise is which forms are primitives and which are compound or derived forms; for example, some approaches treat Noun as a primitive class, while others see it as derived from features, so that a Noun is a composite of two primitive features, +N and -V (while Verb would be -N +V, Adjective would be -N -V., etc.). The most important early discussion of whether forms are primitives is Halle's argument that there is no coherent notion of the phoneme as a primitive of sound structure; it is instead a composite entity built from the phonological features.

Underlying the discussion of the autonomy of linguistic form is the question of whether any kinds of linguistic forms are specific to language or are also found in other domains. A key text is Chomsky's *Syntactic structures* (1957). He begins his book by discussing generic kinds of forms, as expressed by rules that rewrite a symbol as a string of symbols (phrase-structure rules); simple rules of this kind could, in principle, be found in domains (including cognitive domains) outside language. But he shows that this simple kind of rule is inadequate for understanding language and that a new kind of rule – a transformational rule – must also be used. A transformational rule takes a complex linguistic representation (a tree structure) and changes it into another tree structure, and is specific to language; transformational rules crucially do not operate on unstructured strings of symbols (e.g., no rule simply inverts the sequence of a string of symbols) but instead operate on more complex structural representations. Later developments in transformational grammar showed that transformations were subject to various constraints (such as the Complex Noun-Phrase Constraint, which prevented a rule simultaneously accessing something inside and outside a complex Noun Phrase); these constraints again were specific to linguistic form. While it has occasionally been argued that transformational rules are found outside language (e.g., in music), it is likely that this kind of rule, which transforms one complex representation into another, is specific to language. These questions are particularly interesting because the existence of some kinds of forms specific to language would support that language is processed in the mind by modes of cognitive organization specific to language.

A basic idea in linguistics is that linguistic form exists to provide formal choices that have functional (semantic or communicative) consequences. For Saussure, a sign such as the word 'tree' is a pairing of choices from two distinct systems: (1) the sound system, where the choices produce the three-sound sequence that make up the spoken word and (2) the meaning system, where the meaning of 'tree' is chosen from a range of possible meanings. The pairing of sound and meaning is thus a matter of choosing from different inventories. Choice is a dominating principle in Saussurean linguistics and, later, in structuralism, including the nonlinguistic structuralism found in the work of Roland Barthes such as *The fashion system*.

Systemic functional grammar is one of the major approaches to linguistics in which the notion of choice has been fundamental. Each 'system' in systemic functional grammar presents ranges of options to choose from when communicating, and the theory investigates the functions expressed by making these choices. This approach has enabled systemic functional grammar to pioneer work in certain areas of linguistic description, some of which (such as

Halliday's early work on thematic roles) have been absorbed into other linguistic theories. In particular, systemicists are interested in the choices among 'cohesive devices' in discourse, the devices – conceived of as choices from a range of options presented by the system – explicitly guiding the hearer or reader in understanding how sentences are related.

Systemicists have developed an account of 'register,' the set of linguistic features associated with specific genres of verbal behavior (formal interview, informal letter, etc.), where the term 'register' itself is another way of saying 'range of options from which to choose.' In addition, systemic functional grammar has a deep interest in stylistic analysis, in which formal choices have functional significance in expressing complexities and nuances of meaning and fit well with 'close-reading' approaches in mainstream literary criticism.

Another fundamental idea, shared to some extent by all approaches, is that linguistic form is the mediation between a thought and an utterance; that is, that linguistic form enables the expression of meaning in sound (and writing). Chomsky's 'minimalist enquiries' begin by re-examining this basic idea. From his earliest work onward, Chomsky's approach to linguistics has always been to ask what the simplest kind of language might be, and then to ask why actual human languages are not this simple.

Thus, as described above, *Syntactic structures* establishes that sentences of a natural language cannot be generated just by rules (phrase-structure rules) of a certain low level of complexity, but require a more complex kind of rule, one that in turn requires a whole theory of linguistic representations which can be subject to transformation.

'Why aren't sound and meaning fully aligned?' is a recently formulated minimalist question; the answer is that organizations of the sentence as meaning are not isomorphic with large-scale organizations of the sentence as sound. In Chomsky's always-provocative terminology, the question is why language is 'imperfect.' Consider, for example, the Noun Phrase that expresses the thing eaten in 'John ate the cheese'; here this unit of meaning is after the verb, but it is before the verb in 'the cheese was eaten' and the word 'what' (which substitutes for it, i.e., 'the cheese') is at the beginning of the sentence in 'what did John eat?' Perhaps the unit of meaning does not always stay in the same place because some other principle, possibly involving the informational structuring of the utterance, forces it to move. Chomsky sees this as an 'imperfection,' and seeks to explain why moving the unit is a necessary compromise among the various demands placed on linguistic form by the requirement that speech expresses meaning.

Rationalist and Empiricist Approaches and the Status of Data

A major division in approaches to linguistics pits rationalists against empiricists, as their attitudes towards data exemplify. The key figure for rationalist approaches is Noam Chomsky. Most kinds of linguistics before Chomsky were empiricist approaches (as in the work of Bloomfield), and Chomsky defined his linguistics in opposition to those. Data always present a problem for linguistics, because it must always be idealized; two slightly different utterances of the same word must be understood by linguistic theory as two tokens of the same type. Without this idealization, there would be nothing to say about language.

Approaches differ in the kinds of idealizations they adopt. Chomsky famously and substantially idealized so that the rules in *Syntactic structures* generate an (infinite) set of sentences corresponding to the set of sentences accepted as grammatical by an idealized user of the language, having separated out all contextual and behavioral factors. The rules describe what someone knows to be grammatical (his or her 'competence'), not what that person actually says.

Since this rationalist approach to linguistics aims to describe a person's knowledge of language, not his or her linguistic behavior, there are some significant consequences for the status of data. First, data must be sifted into the relevant and the irrelevant (for this particular purpose); data irrelevant for theoretical syntax might of course be relevant in a different kind of linguistics. It is never clear in advance whether data will be relevant or irrelevant. For example, in *Syntactic structures* Chomsky demonstrates that transformational rules can explain the various configurations of modal, auxiliary, and main verbs in an English sentence; on the other hand, it's also possible, since a finite and small number of such possible configurations exist, that they could actually just be learned as fixed sequences with no rule involved. There is no guarantee in advance that either approach will be correct.

The second major consequence of a rationalist approach to data is that the frequency of any particular kind of data is ignored, both in the sense that in Chomskyan linguistics 'variability of rules' is generally ignored (see discussion below) and in the sense that statistically very rare data may nevertheless have a key theoretical role. Thus, in the early 1980s the rare 'parasitic gap constructions' were first discussed; an example is the grammatical sentence 'Which books did you put on the shelves without reading?' where the phrase 'which books' matches not one but

two gaps in the sentence (after 'put' and after 'reading'), one of which is called parasitic. Sentences like this are unlikely to turn up in a corpus, and there are no descriptions of them before this time; nevertheless, such sentences played a major role in helping us understand fundamental aspects of the workings of sentence structure.

The third major consequence for data under a rationalist approach is that these data are invented in order to test the predictions of the theory (i.e., invented and then tested against speakers' judgments), rather than gathered and used in constructing a theory. Rationalist approaches to linguistics must assume that the theory will guide the interpretation of the data.

In contrast, empiricist approaches treat theories as constructs that emerge from data. These data may be gathered into a corpus. A fundamental concern is to develop a methodology for gathering, annotating, and understanding the data. Note that rationalist approaches to linguistics do not have this commitment to a methodology, and one of Chomsky's aims in *Syntactic structures* was to wrest American linguistics from the heavily method-oriented approach associated with the structural linguistics of the 1930s and 1940s.

One advantage of the empiricist approach is its inherent ability, more so than a rationalist approach, to guarantee a result in the sense of a description or annotation of linguistic data. An empiricist approach can be conceptualized as a plan of action, with steps to be followed using clearly specified methods in order to process a collection of data into an account. Because an empiricist approach is supported by agreed methodologies, it can be used to gather and organize large amounts of data, and it is sometimes favored in language work when large amounts of information must be gathered before that information (e.g., from 'endangered languages') becomes unavailable.

This kind of empiricist approach also favors the social over the cognitive, because what is gathered is what people say or write, rather than what they know. It has been argued (for example, by Ken Hale) that a rationalist approach, despite its associated risks, is nevertheless best even for endangered languages, because we should be interested in these speakers' knowledge of their language, not just in their utterances.

While approaches to linguistics agree on the existence of linguistic form, they disagree on how inclusive such a theory of linguistic form should be. One area of disagreement is language statistics. As with any collection of data, linguistic data can be subjected to statistical analysis and this statistical analysis can be described in terms of linguistic rules.

It is a fact that some linguistic rules are 'variable' for an individual speaker or for a speech community (the term 'variable rule' comes from Labov); an example would be 't-glottaling' in British English or the 'r-drop' in some varieties of American English. T-glottaling is the use of a phonetic glottal stop where there is a phonemic /t/ in a word like *bottle* and that can be understood as a consequence of applying a rule changing /t/ to the glottal. Data gathered for a particular individual will show that the rule is used at some times and not at others, and that these data could be described by attaching a percentage to that rule for that individual (for that data) to indicate how frequently the rule is actually applied in a particular context. The percentage might differ with the social context; for most speakers, t-glottaling is more likely in more informal contexts, and this information could be appended as a statistic to the rule.

The issue dividing approaches to linguistics is whether a way of relating that percentage to the rule can be built into the theory and the representations it permits. The decision depends in part on whether the theory aspires to the holistic or the modular. Holistic theories attempt to incorporate as much explanation of language as possible within a single, connected theoretical model, e.g., Systemic Functional Grammar. Such theories tend to be functionalist and tend not to allow for significant autonomy of form; the holism here claims an explanatory link among various different aspects of language.

Modular theories, on the other hand, are theories that divide language into different subfields – each with its own theoretical account – where there may be limited or no relation among the theories. Modular theories, of which generative grammars are a good example, place considerable emphasis on the autonomy of linguistic form. While generative linguistics on the whole is not interested in statistical facts, Optimality Theory (which has emerged from generative linguistics) is interested; it has had a consistent interest in statistical facts, and various ways have been suggested of incorporating statistical facts into the ranking of constraints.

The distinction between rationalist and empiricist approaches is sometimes entangled in a rhetoric of 'realism' or 'naturalism.' The terms 'natural' or 'real/realistic' may be used to valorize certain kinds of (usually empiricist) linguistic theory; hence there is talk of 'natural phonology,' 'psychological realism,' or 'real language.' The underlying assumption in each case is that how linguistics proceeds should be subject to some external constraint on theory-formation, but that is in conflict with the basic principle of rationalist approaches that no theory is guaranteed by some external constraint to be right or successful.

Most commonly, external constraints are drawn from computer science or from psychology, but sometimes a demand is heard that linguistic theory should be constrained by a particular audience's need to understand it. In each case, these demands are driven by practical anxieties, usually fundamentally financial: Can the theory be used to develop working software? Can it serve psychology? Will the general public understand it sufficiently to want to support it? Will the linguistics department survive the next round of university cost-cutting?

The Production of Form

All approaches to linguistics agree there is linguistic form. As I have suggested above, these approaches differ on which forms are considered fundamental; for example, are phonemes a fundamental kind of form, or are they a construct based on phonetic features that themselves are the fundamental kinds of forms? They also differ in how linguistic form is generated. What kinds of rules build form? What are the constraints on the operation or output of those rules? Much of the debate in this area has been conducted within kinds of linguistics that refer to themselves as 'generative' and trace their intellectual ancestry back to *Syntactic structures*, a book that is a key discussion of the role of rules in language.

In early generative linguistics, there were just rules. These were phrase-structure rules that built a representation called a tree structure, which terminated in a string of words that made up a grammatical sentence, and there were transformational rules that changed one tree structure into another. Within a few years, it was noted that transformational rules were subject to constraints, and these were explored fully by J. R. Ross, who in 1967 wrote one of the most influential Ph.D. dissertations in linguistics, 'Constraints on Variables in Syntax' (published as *Infinite Syntax!*, 1986). Ross (1967) showed that the possibility of changing one tree structure into another was prevented if the transformational rule needed to relate two positions, one of which was in an 'island' (a relationally defined subarea within a tree structure, such as a sentence inside a noun phrase). This meant that in addition to rules that generated form, there were also constraints on the rules.

The balance between rules and constraints – both in terms of number of rules as opposed to constraints, and complexity of rules as opposed to complexity of constraints – has changed over the course of generative linguistics and is different in different approaches. For example, by the early 1980s, transformational rules were as simple as the rule 'move something' (technically formulated as 'move alpha'), while the constraints on this simple rule were quite extensive and complex.

In addition to constraints on rules, another kind of constraint was introduced: a constraint (or 'filter') on the output of the rules. The best known filter in generative syntax of the 1970s was the 'that-trace' filter; this stated that a transformational or other rule could not have as its output a sentence in which the subordinating conjunction **that** was followed by a 'trace' (an empty subject). Thus the sentence 'Who did you say that left?' is ungrammatical because **that** is followed by an empty subject.

Given the possibility of having rules, constraints on rules, and constraints on outputs, some theories have attempted to dispense with one of these elements. In the syntactic theory of the early 1980s called 'government-binding theory,' the terms government and binding did not describe rules but were best understood as expressing constraints on relationships among parts of the tree structure; the role of rules was minimized. In Optimality Theory, both in syntax and in phonology, the role of form-generating rules is minimized, and there are no form-changing rules (such as transformational rules); instead, the burden of explanation is carried by constraints on output.

Optimality Theory, which has been dominant in approaches to sound structure, participates in a key debate about order. In Optimality Theory, constraints are ordered (the term 'ranked' is used) in the sense that an output may violate a constraint and yet be preferred to an output that violates another constraint, because one constraint is ordered above the other. However, this order is fundamentally different from that of the generative phonology that dominated phonology before Optimality Theory, and Optimality Theory now challenges it. In this generative phonology, rules are themselves ordered, such that the input of one rule is determined by the output of the preceding rule. Rule ordering is also the basis of the phonological cycle, where a sequence of rules is applied to a word, then morphological rules are applied (e.g., it is suffixed), and then the same sequence of phonological rules is applied again from the beginning.

The 'Landscape' of Language and its Division into Fields of Linguistic Inquiry

As we have seen, approaches to linguistics can disagree on what aspects of language are open to theoretical description. Alternatively, these approaches may agree on what should be described but dispute the subfield most suited to describing it. Linguistic theory is conventionally divided into distinct but related subfields. For sound structure there is a distinction between

phonetics (itself potentially distinguished into acoustic and articulatory phonetics) and phonology; phonetics deals with the mediated manifestations of sound, while phonology deals with the knowledge of (representations of) sound. Here a 'border dispute' involves the distinctness of phonetics and phonology and whether the same kinds of description – e.g., the same kinds of articulatory feature – can be used explanatorily in both phonetics and phonology.

The distinct status of morphology is another area for dispute. In some theoretical frameworks, morphology and phonology are closely intertwined (e.g., lexical phonology and morphology), and thus questions arise about the similarity between morphological and phonological processes. Some morphological processes, such as reduplication (where part of a word is copied to build a larger word), raise difficult problems for phonology. However, morphology is also syntactically relevant, and it is possible that the internal structure of words – the domain of traditional morphology – can in some cases be opened up to syntactic rules. Reorganizing subkinds of linguistics relative to one another can create very productive ways for approaches to linguistics to develop and change.

Another border under dispute is that between the syntax and the pragmatics. This can involve matters of information structure, as well as problematic areas of the syntax such as apposition and conjunction, where there may be pragmatic explanations for apparently syntactic processes. Does the organization of discourse require its own subfield ('discourse analysis') or can it be entirely incorporated under the field of pragmatics? Could a theory of discourse analysis better explain coreference than the syntax?

In his recent work, Chomsky argues that some phenomena previously understood as syntactic are better understood as phonetic – explained as part of the 'phonetic form' of the sentence rather than its syntactic form. Here, for example, an interesting issue is whether the linear order of syntactic elements (such as words) can be entirely explained by some nonsyntactic principle such as the phonetics, on the basis that syntax is the study of hierarchy and phonetics the study of sequence.

Approaches to linguistics can thus differ according to the linguistic material that experts think they can explain under their own subfield. But it is also possible for approaches to different kinds of data to share similar ways of theorizing, a fact that has interesting implications for the organizations of different kinds of linguistic cognition corresponding with these theories. The most significant interplay among domains is seen in generative phonology and generative syntax. At times these have been very close – and at other times very different – in their approaches, raising the question as to whether there are good reasons for thinking that phonology and syntax are fundamentally alike or fundamentally different.

A historical connection, now broken, was in the idea of the 'cycle,' where a linguistic object (such as a word including several suffixes or a sentence including several subordinate clauses) was built in stages; at each stage, the full set of rules was run through in sequence, starting again from the beginning at the next stage. For a period, it seemed that both words and sentences could be understood as constructed 'cyclically' in this way. While the basic notions of this cycle still survive in some forms and in some types of linguistics, few would now argue for the cycle as a point of similarity between the two theories.

Another rich collection of interconnections involves the notion of the 'feature,' an idea that also jumped from linguistics to Claude Lévi-Strauss's anthropology in the 1940s. Form understood as a set of features – each valued as + or − (such that two features can build four derived forms) – has not only been central to generative phonology, but also borrowed as an idea for (1) syntactic categories (e.g., the category of noun is a derived form based on the features +N −V), (2) semantic categories (e.g., 'agent'), and (3) in lexical semantics (where meanings are considered composites of underlying 'meaning features').

More recently, the principles of Optimality Theory, which have been widely used in phonology, have been borrowed to explain syntactic phenomena. Thus, one characteristic of approaches to linguistics is a willingness to borrow ideas from other domains. When the same idea works in different linguistic domains, this promises to tell us something fundamental about the organization of linguistic form.

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Literacy Practices in Sociocultural Perspective

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Introduction

This article discusses some of the things meant or intended when researchers refer to 'literacy practices.' One meaning is that the researchers will treat literacy as an event in which the (arti)facts of inscription cannot be separated from persons, settings, and other communicative modalities. In addition to this descriptive aim, the term also usually signifies a theoretical ambition. Across multiple disciplines of social inquiry, reflecting the legacy of thinkers such as Sahlins, Williams, Foucault, Giddens, and Bourdieu, the term 'practice' has come to signify a range of theories and frameworks that grapple with the interplay of structure and construction, history and agency (Ortner, 1984). Although a literacy event may be as personal and fleeting as jotting down a list or glancing at an advertisement, literacy understood as the making or interpreting of inscriptions has a history of many millennia, and is closely associated with long-term and large-scale enterprises, such as cities and states, armies and schools, extensive markets and world religions. Relating the personal to the large-scale, the fleeting to the enduring, subject to structure, is thus a challenge confronting the study of literacy practices.

The term 'New Literacy Studies' (NLS) denotes a broad framework, drawing together various critical approaches within the field of literacy studies, consciously built upon the notion of literacy as a **practice**, rather than, say, a psychological skill or abstract social property. Within the NLS framework, literacy practices have been explicitly discussed as entailing a twofold research intention: (a) to build upon the notion of literacy as a communicative event, itself derived from the anthropological ethnographies of communication paradigm, but also (b) to push analysis beyond events to the ideological framing and institutional contextualizing that gives particular events their broader significance (Street, 1993). In this effort, NLS work has drawn particular inspiration from the ground-breaking research of Shirley Heath on literacy events, and it has used the anthropological notion of 'cultural model' to explore relations between consciousness and institutions. It has also, however, been informed by European and English traditions of critical discourse analysis, which call for the study of language as a social practice, an approach to language/society informed by Marxian analyses of ideology and hegemony and Foucault's arguments about discourse, knowledge, and power (Rogers, 2003).

In what follows, I first discuss work in the latter 'New Literacies' (NLS) framework, then indicate amplifications and framings suggested by sociocultural perspectives drawn from anthropology and linguistic anthropology (LA), arguing that the differing approaches only partly overlap. The article concludes by addressing contemporary literacy problems in the US and the complementary strengths and weaknesses of the two approaches (NLS and LA) in thinking about those problems as well as in providing frameworks for more general understandings of the phenomena of literacy and practice. It goes without saying, an article of this scope will unavoidably be schematic, citing only directly relevant work, leaving much that is worthwhile unmentioned and treating as settled much that deserves further argument.

Literacy Practices in the New Literacy Studies

As noted above, within the NLS approach, priority is given to studying literacy events, the situated doings that involve acts of reading, writing, or both. Highly influential early work was that of Heath (1983), who showed that in home, school, workplace, or church, what was a issue was not a binary contrast between literacy and orality, but rather the socially situated and culturally mediated events – whether reading a bedtime story or reading the mail, filling in a job application or composing a prayer for a church service. Participating in such events, people not only decoded or encoded text but were socialized into and enacted particular views of what reading or writing might be, who took what roles in such events,

with one's viewpoint. He claimed that philosophy is the theory of science, the subject of which is the study of human cognition. Thus, he supplemented his researches with psychological evidence and data now referred to as semantic. Twardowski divided the cognitive psychical phenomena into **representations** and **statements**; the former into **images** and **conceptions**. According to this distinction, representation is not an element of a statement, but a necessary condition of it (idiogenetic theory of statements). For example, the conception of a rectangle consists of an image of some plain geometric figure that the agent complements with another two characteristics: rectangular and equilateral.

Apart from investigating purely scientific problems, Twardowski cultivated a rule of clear speaking according to his saying, 'the one who speaks unclearly, thinks unclearly,' in which he always called for proofs of every statement and avoided speculations. Later, his students formed the Warsaw-Lvov School of Philosophy, and, since they followed Twardowski's ideas, it was a school of analytic philosophy. Twardowski died on February 12, 1938 in Lvov.

See also: Kotarbinski, Tadeusz (1912–1998); Kuryowicz, Jerzy (1895–1978).

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20th-Century Linguistics: Overview of Trends

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Introduction

Two theoretical trends can be considered as hallmarks of 20th-century linguistics: structural linguistics and generative grammar. They almost equally divide this epoch: structural linguistics (or, shortly, structuralism) flourished between the 1910s and the 1950s, generative grammar from the 1950s. Structuralism was not a unitary theory, but rather a galaxy of schools sharing some principles; furthermore, some important differences distinguish European structuralist schools from the American one. Generative grammar, instead, originated as a unitary theory, which subsequently divided into different schools and which stimulated several alternatives from scholars not accepting it.

Both structural linguistics and generative grammar also had an impact outside linguistics: between the 1950s and 1970s (especially in France), the former became the model for all humanities, hence a 'structural' anthropology, a 'structural' sociology, etc., were developed. Generative grammar, in its turn, was seen as one of the initial steps of the so-called cognitive revolution. Neither of these extensions was free of problems: in many cases, concepts of structural linguistics were applied to other fields with some illegitimate modifications, and the debate on what 'cognitive' really means has not yet come to a solution. All this, however, does not lessen the outstanding role of both structuralism and generative grammar within 20th-century linguistics and within 20th-century thought in general. This article will therefore focus almost exclusively on these two theoretical trends: even sociolinguistics will be dealt with rather as an alternative to generative grammar rather

than in its applied aspects (language policy, etc.). Also other fields, such as language teaching, experimental phonetics, and so on, will not be presented in this overview: this does not mean that they have not reached important results during the 20th century.

20th-Century Linguistics vs. 19th-Century Linguistics: Continuities and Breakthroughs

It is a widely held opinion that the 19th century has been 'the century of comparative and historical linguistics' and the 20th century that of 'general' or 'theoretical' linguistics. Such an opinion is certainly not ungrounded, but it needs some qualifications. Indeed, historical linguistics in the modern sense originated in the 19th century and experienced an astonishingly fast development: in the course of about 80 years, the whole structure of historical-comparative grammar of Indo–European languages reached its final form. Later discoveries (e.g., of languages like Hittite or Mycenaean Greek) added some new data, but the overall architecture built by the Neogrammarians nevertheless remained valid, and it is still today the frame of reference for any historical linguist working in the domain of comparative grammar of Indo–European languages. However, historical-comparative grammar was not the only subject investigated by 19th-century linguists; as a matter of fact, many of them dealt with topics that one would certainly label, today, 'general linguistics.' This phrase may refer to somewhat different research perspectives, as, e.g., (1) speculation on language in general, hence also on language change (and investigation of the principles of historical linguistics plainly enters into this kind of research), and (2) all kind of linguistics that is not historical ('synchronic,' or 'panchronic' in Saussure's terms). Both kinds of general linguistics were practiced during the 19th century. W. von Humboldt (1767–1835) was not an isolated exception: his speculations on the nature of language and his typological classification of languages were developed by several of his followers, such as Heymann Steinthal (1823–1899), Georg von der Gabelentz (1840–1893), and Franz Misteli (1841–1903). But also the first generations of comparative linguists had the study of language in general as their first goal. For example, Franz Bopp (1791–1867) reconstructed Proto-Indoeuropean verbal forms according to a scheme of verb phrase, which is heavily influenced from Port-Royal views. Even August Schleicher's (1821–1868) views about language and language change belong to 'general linguistics' in the former of the senses alluded to earlier. The debate of the 1880s, about the 'sound laws' (*Lautgesetze*), possibly marks the highest point of this kind of general linguistics: shortly after conclusion of such debate, it gradually became less and less important. A 'paradigm' in the Kuhnian sense has developed: the majority of scholars consider only a given set of problems as 'scientific,' namely those of a historical kind. This paradigm is general labeled as the 'Neogrammarian' one: but it cannot be forgotten that many of the Neogrammarians also dealt with topics of general linguistics in both senses quoted earlier. The often labeled 'Neogrammarian Bible,' namely Hermann Paul's (1846–1921) *Prinzipien der Sprachgeschichte* (I ed. 1880; V and last ed. 1920), deals with topics both of historical linguistics and of general linguistics. For example, Paul defined some oppositions that seem to foreshadow some Saussurean dichotomies (see next section) – that of 'descriptive grammar' vs. 'historical grammar' (which could be held to correspond to that between synchronic and diachronic linguistics), or that of 'individual linguistic activity' vs. 'linguistic usage,' which could be considered analogous to that of *parole* vs. *langue*. Similar distinctions were also introduced by Gabelentz in his *Sprachwissenschaft* (I ed. 1891; II ed. 1901), where three meanings of the term *language* (*Sprache*) are distinguished: (a) 'discourse' (*Rede*); (b) 'a totality of expressive means for any thought'; and (c) 'linguistic capacity' (*Sprachvermögen*), i.e., "a faculty innate to all peoples of expressing thought by means of language." Sense (a) could be made to correspond to Saussure's *parole*, sense (b) to *langue*, and sense (c) to *faculté de langage*. Even if it is quite probable that Saussure knew both Paul's and Gabelentz's work, such correspondences are more seeming than real, as will be seen in the next section. The fact cannot be overlooked, however, that such matters typically belong to general linguistics. As can be seen from their life dates, neither Gabelentz nor Paul were much older than Ferdinand de Saussure (1857–1913): why, then, are they normally presented in histories of 19th-century linguistics, whereas Saussure is considered as the 'father' of 20th-century linguistics? This is mainly due to the fact that Saussure and his followers dealt with more or less the same stuff, but in a different perspective. Summarizing so far, one could say that topics in general linguistics show a continuity between the 19th and 20th centuries, but the way of looking at them shows a definite breakthrough.

Ferdinand de Saussure

As is well known, Saussure's *Cours de linguistique générale* (Saussure, 1922) was not directly written by him, but it was compiled by two former students,

Charles Bally (1865–1947) and Albert Sechehaye (1870–1946), on the basis of the notes from class lectures given by Saussure in the academic years 1906–7, 1908–9, and 1910–11 at the University of Geneva. It is perhaps lesser known that neither Bally nor Sechehaye attended any of these lectures: they simply reworked and systematized the notes that others had passed to them. As a result, their reconstruction is often considered not quite faithful to the authentic Saussurean thought, especially after detailed studies of the handwritten notes by Godel (1957) and their edition by Engler (1967–74). Tullio De Mauro's very detailed and insightful commentary on the *Cours* (published since 1972 together with Saussure's original text) stresses many points of Saussure's original thinking that were more or less modified by the editors. Today the exact knowledge of Saussure's ideas cannot be gained without the support of De Mauro's commentary and/or the attentive reading of Engler's edition. Nevertheless, because only the Bally–Sechehaye edition was available until the 1960s, this text actually influenced the immediately subsequent linguists. Hence, reference will be made in what follows almost exclusively to the Bally–Sechehaye edition.

Saussure's linguistic views are standardly epitomized by his so-called dichotomies: (1) *langue* vs. *parole*; (2) synchrony vs. diachrony; (3) signifier vs. signified (*signifiant* ~ *signifié*); and (4) associative vs. syntagmatic relations. (1) opposes the social aspect of language, the code shared by a speaking community (*langue*), to the individual speech act (*parole*); (2) opposes the state of a language at a given moment of its history to its change during the time; (3) defines the 'two sides of the linguistic sign,' namely the 'acoustic image' and the 'concept'; and (4) opposes the relation between elements in succession, such as *teach* + *ing* in *teaching*, to that between elements alternative to each other: e.g., *teaching* as alternative to *learning*, or *studying*, etc. All these dichotomies were surely attested in 19th-century linguistics: that of the social vs. the individual aspect of language was already sketched among others by Paul and Gabelentz (see previous section; it must be added that Saussure also hinted at the notion of *faculté de langage*, language faculty, which shows analogies with Gabelentz's *Sprachvermögen*); the synchrony/diachrony opposition could have a foreshadowing in Paul's distinction between 'descriptive grammar' and 'historical grammar'; the idea that the linguistic sign is two sided, in the sense that the meaning is not external, but internal to it, could be traced back even to the Stoics; and also the existence of two kind of relations in language could already be found, e.g., in some of Paul's pages. Two features, however, strongly differentiate Saussure from his predecessors: (1) a systemic approach, and (2) a strong tendency to define the basic concepts of linguistics without anchoring them to other disciplines, such as sociology, psychology, etc. Saussure's key notion is that of language (*langue*) as a 'system of signs,' each of which has no intrinsic value, but whose value is determined solely by their relationships with the other members of the system ("*dans la langue, il n'y a que des différences*"; Saussure, 1922: 166; original emphasis). This sign system is the code shared by all members of a linguistic community, and its only root lies in this common sharing, because linguistic signs do not have any intrinsic value. Linguistics is a part of a more general science called semiology, namely "*une science qui étudie la vie des signes au sein de la vie sociale*" (Saussure, 1922: 33; original emphasis). *Langue* is therefore a social notion because of its character of semiological code: *parole* is the use by the individual of this general code. Because linguistic signs have no foundation in external reality, but are purely differential entities, they can change across the time; this is the reason for the distinction between synchrony and diachrony. In Saussure's view, however, system exists only in synchrony, at a given moment of time; diachrony does not concern systems, but only isolated elements. A linguistic change is therefore isolated and fortuitous; only when a given sign is changed, a new system is formed, because the relations between signs are different from earlier. Finally, associative and syntagmatic relations are synchronic, because they are essentially systematic.

Saussure's view of language paved the way to what was later called structural linguistics. Even if neither 'structure' nor 'structural' (but just *système*) occur throughout Saussure's text in a technical sense, the systemic approach to language and the definition of linguistic notions and categories on a purely linguistic basis (i.e., without reference to psychological categories, and so on) became the starting points of structural linguistics.

Saussurean Trends in Europe

Geneva School

The editors of Saussure's *Cours*, namely Bally and Sechehaye, were only weakly influenced by the systemic and autonomous approach to language developed in that book. This may seem paradoxical, but it has to be kept in mind that both Bally and Sechehaye had completed their linguistic formation before Saussure's lectures in general linguistics. Among Saussurean notions, Bally especially deepened the *langue/parole* opposition. According to him, *langue* preexists *parole* from a *static* point of view. This relationship, however, is reversed from the

genetic point of view, because *parole* preceded *langue* in the genesis of language (see, e.g., Bally, 1965). Sechehaye was concerned with problems of general linguistics and its relationships with psychology and sociology since his first book (Sechehaye, 1908); in subsequent years he analyzed some fundamental problems of syntax, such as the notion of sentence. These analyses are insightful, but essentially extraneous to the structuralist trend. A stronger structuralist approach characterizes the work of Bally's pupil, Henri Frei (1899–1980); he revisited Saussure's ideas on syntagmatic and paradigmatic relationships, on the one hand, while on the other hand he confronted other descriptions of syntactic structure, mainly those of Bloomfield and of the American structuralist school (see later discussion).

Prague School

The so-called Prague School was formed by a group of linguists belonging to the 'Prague linguistic circle,' founded in 1926 by the Czech anglicist Vilém Mathesius (1882–1945). Members of this circle were, among others, the Russian scholars Serge Karcevskij (1884–1955), Roman Jakobson (1896–1982), and Nikolaj S. Trubeckoj (1890–1938). Prague School dealt with a variety of topics, from English syntax to literary criticism; however, it is especially known for its critical development of Saussurean notions expounded in the theses presented to the first International Congress of Linguists ('Prague Theses,' 1928) and for the contributions of some of its members to phonology (especially Trubeckoj and Jakobson). Among the most influential statements contained in Prague Theses, the following two can be quoted: (1) language is a functional system, whose goal is communication; and (2) the synchrony/diachrony dichotomy is not so neat as Saussure presented it: on the one hand, no linguistic state can be considered as totally independent from evolution and change; on the other, phonetic change is not blind and unsystematic as Saussure assumed, but it must be considered in the framework of the sound system that underpins it.

The most important Prague work on phonology is surely Trubeckoj's posthumous and unfinished *Principles of phonology* (Trubeckoj, 1939). Phonology was defined by Trubeckoj as "the science of sounds of *langue*," whereas phonetics is "the science of sounds of *parole*." The key notion of phonology is phoneme. Phoneme (the phonological unit) is opposed to sound (the phonetic one): the former is abstract, the latter is concrete and 'realizes' the phoneme. When two sounds occur in exactly the same positions and cannot be changed without a change in the meaning of the words, they are different realizations of the same phoneme ('rule 2' of Trubeckoj, 1939): e.g., English [t], [p], and [k] realize three different phonemes, /t/, /p/, and /k/ because they distinguish, among others, the three words *tin*, *pin,* and *kin*. Two sounds may be different and nevertheless belong to the same phoneme: for example, English [t], [p], and [k] in the preceding examples are produced with an extra puff of air, but this puff of air does not occur, e.g., in *spin*. These two sounds do not distinguish any meaning: they are variants of the same phoneme. Phoneme inventories differ from language to language: sounds that realize the same phoneme in a language may be realizations of different phonemes in other languages. For example, aspirated stops are variants of the same phoneme in English, but they realize a phoneme of its own in Hindi.

Since the late 1940s, Jakobson remarked that phonemes are not the 'smallest distinctive units,' but they are actually constituted by even smaller entities, the distinctive features. For example, /d/ differs from /n/ (cf. *dine* vs. *nine*) because of the feature 'nasality'; and it differs from /t/ (cf. *do* vs. *to*) because of the feature 'tensedness.' During the 1950s, Jakobson, together with Morris Halle (b. 1923) further worked out his theory: any phoneme of any language is analyzed as containing or not containing a given feature from a universally fixed set of 12 (later 14) features, whose values are + or −; (binary value, hence the label of binarism given to the theory). For example, English /t/ would have the following features: [-vocalic], [+consonantal], [-compact], [-grave], [-nasal], [+tense], [-continuous] (for the meaning of these terms, see Jakobson and Halle, 1956). Both consonants and vowels are defined on the basis of the same features, and all languages have only this inventory of features at their disposal (but some languages exploit only some of them). Jakobson's binarism was adopted (with some modifications) also by generative phonology (see discussion under Generative Phonology Section).

Copenhagen School

The most well-known linguists of the 'Copenhagen school' are Viggo Brøndal (1887–1942) and Louis Hjelmslev (1899–1965). Both scholars vigorously maintained the structuralist point of view and their Saussurean heritage. Nevertheless, their approach to language in general and to syntax in particular shows many differences; whereas Brøndal considered *language* to be based on logic, Hjelmslev's program was to give *linguistics* a logical basis, in the sense of the 'logic of science,' which was being developed in the 1930s by the neopositivistic philosophers.

In his most important book, Hjelmslev (1943) aimed at constructing a deductive theory of language that he dubbed glossematics. Such a theory should be based on purely linguistic notions ('immanent linguistics') and should follow rigorous methodological standards (it has to be "self-consistent, exhaustive and as simple as possible"). Hjelmslev assigned special importance to Saussure's statement that "language (*langue*) is form, not substance." He therefore distinguished form and substance both on the phonological and on the syntactico-semantic level (expression plane and content plane respectively, in his terms). On the expression plane, a continuous stretch of sound can be differently articulated, according to the different phonemic inventories: e.g., where English distinguishes three nasal phonemes (/m/, /n/ and /ŋ/), Italian only distinguishes two (/m/ and /n/). On the content plane, the same continuum can be differently subdivided: e.g., English divides the color spectrum from green to brown in four sections (*green*, *blue*, *gray*, *brown*), whereas Welsh divides it in three (*gwyrdd*, *glas*, *llwyd*). Both planes are analyzable, according to Hjelmslev, into smallest units, which are limited in number, that he called figuræ: expression figuræ are phonemes, content figuræ are semantic units from which larger semantic units can be constructed (e.g., *man* would be formed by the content figuræ 'human,' 'male,' 'adult'). Content figuræ and expression figuræ are not in one-to-one correspondence: this is the reason why two planes are postulated (otherwise, such a postulation would be superfluous and the theory would violate the simplicity requirement). Any structure that has an expression plane and a content plane is named by Hjelmselv a semiotic, whereas structures with one plane only are 'symbolic systems.' Each plane can in its turn be constituted by a semiotic, and so on.

Structural Linguistics in France: Benveniste, Martinet

Émile Benveniste (1902–1976) combined his experience in the field of historical-comparative grammar of Indo–European languages with a particular skillfulness in the analysis of linguistic facts. He was surely well acquainted with the patterns of investigation worked out by European and American structuralism, but he resorted to them only to a limited extent. Somewhat paradoxically, this allowed him to sketch some analytical proposals that are sometimes superior to those of the structuralists. Among such proposals (see Benveniste, 1966), the most well known are his remarks on Saussure's notion of arbitrariness of linguistic sign and those concerning the definition and classification of grammatical persons and of pronouns, which parallel the investigations about performative utterances developed by Austin more or less during the same years (cf. Pragmatics section).

André Martinet (1908–1999) was in the 1930s, a foreign member of Prague linguistic circle; he consistently developed that 'functional view' of language explicitly stressed by the Prague theses (see Prague School section). Natural languages, in Martinet's view, have three features in common: (a) their communicative function, (b) their use of vocal utterances (i.e., natural language is essentially and primarily a vocal phenomenon, and only derivatively a written one), and (c) the double articulation, i.e., a first articulation into significant units ('monemes,' a term borrowed from Frei, but with a somewhat different sense, to replace 'morpheme'), which are in their turn articulated into distinctive units ('phonemes'). One of the most interesting instantiations of Martinet's functionalism is his investigations of diachronic phonology (cf. Martinet, 1955); the 'economy' of sound changes is the effect of the balance of two opposed tendencies, the 'minimal effort' (which tends to lessen sound differences) and 'communicative efficiency' (which tends to multiply them).

Other European Scholars (Guillaume, Tesnière, London School)

The scholars presented in this section, however, certainly influenced by Saussurean thought and hence ascribable to the structuralist trend, nevertheless remained somewhat aside from the debate that developed about the basic tenets of structural linguistics, especially between the two World Wars. This fact occurred also because the most significant works of some of them (e.g., Guillaume and Tesnière) were only posthumously published (see Guillaume, 1971–1990; Tesnière, 1966).

The writings of the French linguist Gustave Guillaume (1883–1960) are often difficult to read and interpret, especially because of the dark philosophical style that shows many influences. That by Henri Bergson (1859–1941) is especially significant in Guillaume's analysis of concept of 'time' (which he does not clearly distinguish from that of 'tense'). Among the several topics dealt with by Guillaume, one can quote his opposition between what is a formal expression in language ('psychosemiotics') and what is expressed by it ('psychosystematics'); only what has a morphophonological representation of its own can be called semiotic. Guillaume also proposed to replace Saussure's terminological pair *langue/parole* with *langue/discours* (speech). Speech necessarily presupposes language: their relationship

can be expressed in terms of the pair 'power' (language) vs. 'effect' (speech).

Lucien Tesnière's (1893–1954) work is especially important for its contribution to syntax. The seminal notion of Tesnière's syntax was that of valency. Tesnière compared the verb to "a kind of hooked atom" that can exert its power of attraction on a smaller or bigger number of 'participant roles' (*actants*). Besides participant roles, the sentence may also contain some 'circumstantial roles' (*circonstants*), which express the conditions of place, time, manner, etc., in which the process described by the verb takes place. Participant roles are obligatory; circumstantial roles are optional. The number of participant roles varies according to the verb class to which the verb belongs, so we have several verb classes according to their 'valency sets.' If Guillaume's linguistic thought did not exert any special influence on subsequent scholars, Tesnière's lies at the origin of several of the most important developments in syntax during the second half of 20th century (cf. Functionalist Schools section).

Among the linguists of the 'London school,' Daniel Jones (1881–1967) and John R. Firth (1890–1960) especially have to be cited. Jones was a phonetician deeply involved in practical questions (such as, for example, the assessment of the principles of phonetic transcription), but he also faced theoretical questions, such as the definition of phoneme. In contrast with the more abstract view held by Trubeckoj (cf. Prague School section), who defined phoneme on an exclusively linguistic basis, Jones opted for a 'physical' definition of phoneme as "family of sounds related in character no member of which occurs in the same phonetic context of any other member." Jones also rejected Trubeckoj's sharp opposition between phonetics and phonology.

Firth's view of language is characterized by the key role it assigned to the notion of context. He defined 'meaning' as 'function in context': not only words and sentences, but even phonetic units have meaning. Firth's contextual approach was especially fruitful in phonology. In his view, phonology cannot be limited to the segmentation and classification of sounds and phonemes ('paradigmatic units'), but must take into account also prosodic, 'syntagmatic' units such as the syllable (hence the name of 'prosodic phonology' given to Firth's theory). It is therefore necessary to study syllabic structure in terms of general sound classes, such as C(onsonant) and V(owel), and of their respective positions. Firth also maintained that grammar (i.e., syntax and morphology) and phonology are interdependent, anticipating in this way positions that will be later held in generative phonology (cf. Generative Phonology section).

Among Firth's students, one may cite R. H. Robins (1921–2000), especially for his historical researches on classical and medieval linguistics, and M. A. K. Halliday (b. 1925), whose 'Systemic Functional Grammar' (see Functionalist Schools section), worked out since the 1960s in successively revised versions, had several important applications in many fields, as artificial intelligence, discourse analysis, or language education.

American Linguistics from 1920s through 1960s

Sapir and His Heritage

American linguistics began to show peculiar features, different from those of European linguistics, from the beginning of 20th century. At that time, mainly because of the influence of the anthropologist Franz Boas (1859–1942), American linguists oriented a lot of their research to the study of Amerindian languages. Because such languages were devoid of written tradition, these scholars were automatically led to adopt a synchronic point of view. Furthermore, given the difficulty of applying the notions of Western grammar to such languages, attempts had to be made at describing them in purely formal ways: this led to the development of 'distributional' and 'classificatory' methods, i.e., based on the observation of pure occurrences of forms.

Edward Sapir (1884–1939) was himself an anthropologist and a linguist at the same time and devoted much of his research to Amerindian languages. His theoretical ideas are expressed in his book *Language* (Sapir, 1921), and in several papers posthumously collected (Sapir, 1949). According to Sapir, language is an 'overlaid function' from a physiological point of view, because it is a psychological and symbolic phenomenon. Hence, a purely physiological view of speech sounds, as was typical of late 19th-century experimental phonetics, is untenable: e.g., English *wh*-sound as in *when*, *where*, etc., is physiologically identical with the sound produced blowing out a candle, but the two sounds are essentially different, because only the linguistic *wh*- is 'placed' in a system that is composed "of a definitely limited number of sounds." In this way, Sapir arrived at a psychological conception of phonemes and variants.

Sapir's classification of grammatical concepts, on which his new approach to language typology is based, also deserves special mention. He classified them into two main groups: concepts that express 'material content' and 'relational' concepts. Each of both groups is further subdivided into two groups: so one obtains 'basic concepts' (1a), 'derivational

concepts' (1b), 'concrete relational concepts' (2a), and 'pure relational concepts' (2b). Concepts (1a) and (1b) are mainly semantically (or ontologically) based; they are 'objects,' 'actions,' 'qualities' (1a) and their derivations (1b). Gender and number belong to the group (2a), whereas grammatical relations (subject, object, attribute, etc.) belong to pure relational concepts (2b). The possible combinations of the four groups of concepts brings about Sapir's classification of languages into four 'conceptual types.' Type (A) languages only contain concepts (1a) and (2b); those of type (B), concepts (1a), (1b) and (2b); those of type (C), concepts (1a), (2a) and (2b); those of type (D), all four kinds of concepts.

Among Sapir's followers the important contribution of Morris Swadesh (1909–1967) to phonemics (a term that corresponds to the European 'phonology') is to be noted. The most well-known heritage of Sapir's thought is, however, the so-called Sapir–Whorf hypothesis, so called after his name and that of his follower, the nonprofessional linguist Benjamin L. Whorf (1897–1941). According to the theory, our vision of the world is heavily conditioned by our language. This hypothesis is today rejected, especially by those linguists, as generative grammarians, who maintain that cross-linguistic differences are actually more apparent than real. On the other hand, generative grammarians have often reevaluated Sapir's work against Bloomfield's, because of its psychologistic (or mentalistic) approach strongly avoided by the latter.

Bloomfield

Leonard Bloomfield's (1887–1949) behavioristic approach (see especially chap. 2 of Bloomfield, 1933) essentially consists of describing language as a chain of stimuli and responses (S-r-s-R): a speech event takes place when a nonlinguistic stimulus (S; e.g., hunger) produces a linguistic response (r) in the speaker (*give me something to eat!*) and such a response in its turn induces a linguistic stimulus (s) in the hearer, which has as a consequence the hearer's nonlinguistic response (R; e.g., providing food).

Bloomfield's major contribution to linguistics certainly does not lie in this crudely mechanistic view of language function, but instead in the working out of some analytical tools, particularly in the domains of morphology and syntax. The most influential of such tools is the so-called Immediate Constituent (IC) Analysis (see Bloomfield, 1933: chap. 13). In the classical example *Poor John ran away*, the immediate constituents are *Poor John* and *ran away*. The analysis goes on by partitioning *poor John* into *poor* and *John*, and *ran away* into *ran* and *away*. Furthermore, *away* is also analyzed into *a-* and *way*: the principle of immediate constituent analysis applies to morphology exactly in the same way as to syntax. IC analysis was subsequently deepened and formalized, not only by 'post-Bloomfieldian' linguists, but also within generative grammar.

Post-Bloomfieldian Structuralism

Linguists most directly influenced by Bloomfield's thought and analytical techniques especially developed the operational and distributional features of his conception of language. One of the most typical examples of this methodological trend was the so-called prohibition of mixing levels: phonological analysis must precede grammatical analysis and must not assume any part of the latter.

Among post-Bloomfieldian scholars, the following can be quoted, according to the different linguistic domains: concerning phonology, William F. Twaddell (1906–1982), Bernard Bloch (1907–1965), and George L. Trager (1906–1992); concerning morphology and syntax, besides Bloch and Trager, Eugene Nida (b. 1914); a very important intervention in the domain of IC-analysis is due to Rulon S. Wells (b. 1919); possibly, the leader of the group can be considered Charles F. Hockett (1916–2000), who dealt with all such different fields and also worked on theoretical problems, especially in polemics with generative grammar. The most original and influential among American structuralists is, however, Zellig S. Harris (1909–1992): in the1940s, he was engaged in the deepening and the formalization of Bloomfield's analytical techniques (see especially Harris, 1951); in the early 1950s, he worked out the notion of transformation. In Harris's framework, a transformation is seen as an equivalence relation between two different sentence-forms: e.g., *Casals play the cello* and *The cello is played by Casals*, or *he met us* and *his meeting us* are 'transforms' of each other. The notion of transformation (with important modifications) was to become a cornerstone of generative grammar, especially in its first phases (see later discussion).

Tagmemics and Stratificational Grammar

Tagmemics is the name given to the linguistic theory worked out by Kenneth L. Pike (1912–2000) and his associates and students. It combines both Bloomfield's and Sapir's insights, but it trespasses the boundaries of American structuralism in many respects. The Bloomfieldian side of tagmemics lies in its analytical techniques, which resume, deepen, and modify Bloomfield's. On the other hand, Pike's approach to language is decidedly and explicitly Sapirean:

language is seen as a cultural phenomenon, strictly tied to other cultural manifestations of human life.

Stratificational grammar was developed by Sydney M. Lamb (b. 1929) beginning in the late 1950s. It combines a post-Bloomfieldian approach with some European perspectives, mainly Hjelmslev's glossematics and Halliday's Systemic Functional Grammar. The number of assumed strata varies from two to six, according to the different versions of the theory. Mostly, four strata are assumed: semotactics, lexotactics, morphotactics, and phonotactics. Stratificational grammar aims at giving an account of all kind of linguistic processes, i.e., concerning both competence and performance (see later discussion): it shows, therefore, a 'cognitive' approach that sharply differentiates it from classical post-Bloomfieldian theories and makes it closer to generative grammar, although it is very distant from this latter theory both in the assumed principles and on many technical aspects.

The Beginnings of Typological Linguistics

Language typology was an important field in 19th-century linguistics, but was rather overlooked during the first half of 20th century, because Sapir's work on the topic remained an isolated exception. Things began to radically change in the 1960s, especially stimulated by the work of Joseph H. Greenberg (1915–2001). In Greenberg's perspective (see Greenberg, 1966), a close link is assumed between typology on the one hand and universals on the other. Language universals are no longer exclusively conceived as features that every language *must* possess: to such universals, named by Greenberg 'unrestricted' universals, also implicational universals and statistical correlations have to be added. The most well known instances of implicational universals concern the linear ordering of elements. Greenberg assumed as the bases of his language classification three possible choices: (1) whether a language has prepositions or postpositions ('prepositional' vs. 'postpositional' languages). (2) The position of the verb (V) with respect to the subject (S) and to the object (O). Of the six theoretically possible positions, only three normally occur: VSO, SVO, and SOV. (3) The order of the adjective with respect to the noun it modifies: A (=AN) vs. N (=NA). Such choices are systematically correlated with each other in an implicational way: this implication can be exceptionless or only statistically significant. An instance of the first case is the statement that if a language shows VSO order, it is *always* prepositional (Greenberg's Universal 3). On the other hand, Greenberg's universal 4 is an example of 'statistical correlation': if a language has a normal SOV order, it is postpositional "with overwhelmingly more than chance frequency." Greenberg's insights caused a tremendous development of typological studies, as will be seen in the Typological Linguistics section.

The Birth and Rise of Generative Grammar

The Origins of Generative Grammar

Generative Grammar (GG) is the label for the linguistic theory developed by the American scholar Noam Chomsky (b. 1928) and his followers; a GG, in Chomsky's own word, is "a system of rules that in some explicit and well-defined way assigns structural descriptions to sentences" (Chomsky, 1965: 8). Chomsky was a student of Harris (cf. previous section), but he early adopted a 'mentalistic' approach to the problems of language and knowledge, highly polemical against the behavioristic one, typical of Bloomfieldian and post-Bloomfieldian linguistics.

The first systematic version of Chomsky's theory appeared in print in a booklet called *Syntactic Structures* (Chomsky, 1957), which was partly an abstract of a much more voluminous work written in the years 1955–56 and published only 20 years later, with some modifications. The main features shown in this book with respect to the tradition of American structural linguistics were the following ones: (1) the goal of linguistic description is no more seen in the analysis of a given corpus, but in the accounting for the intuitions of the native speaker of a given language (well-formedness of sentences, synonymy, etc.). (2) A sharp distinction is traced between linguistic theory on the one hand and grammar on the other. (3) IC-analysis typical of American structuralism (see previous discussion) is formalized in a system of rules called Phrase-structure (PS) grammar. (4) PS-grammar is shown not able to adequately account for all sentences of any natural language. For example, it cannot account for the intuitive relation that any English speaker recognizes between two sentences such as *Mary gave a book to John* and *John was given a book by Mary*, or between the latter and *Who was given a book by Mary?* To account for such kind of relations, it is necessary to postulate a further level of rules, called transformations. This notion was borrowed from Harris, but it is rather differently conceived. Whereas, for Harris, it is a relation between *sentences*, for Chomsky it is a relation between *structures*. This means that the input of a transformation is a sentence in Harris' framework, whereas in Chomsky's one it is an abstract structure often rather remote from the actual sentence that it underlies. The importance given to the notion of transformation in the early phase of GG had the effect that Chomsky's

theory was initially known as transformational grammar rather than as generative grammar (actually, the use of the latter label was rather unsystematic at that time).

The Standard Theory

In the decade 1955–1965, the model of grammar described in the previous section was modified by Chomsky himself and by some of his early associates, such as Charles J. Fillmore (b. 1929), Jerrold J. Katz (1932–2002), Edward S. Klima (b. 1931), Robert B. Lees (1922–1996), and Paul M. Postal (b. 1936). The result of such changes was the so-called (by Chomsky himself) standard theory, presented in Chomsky (1965). The overall structure of the standard model is the following one: PS-rules and lexical insertion rules generate the deep structure both of simple and of complex sentences. The application of transformational rules to deep structure produces surface structures. PS-rules, lexical rules, and transformations form the syntactic component of grammar; deep structures are interpreted by the semantic component, giving the semantic representation of sentences; and surface structures are interpreted by the phonological component, giving the phonetic representation.

In Chomsky (1965), also the 'mentalistic' interpretation of linguistic theory, explicitly defined as 'part of theoretical psychology,' was maintained and argued for in detail. Chomsky opposed competence, defined as "the speaker–hearer's knowledge of his language," to performance, which is defined as "the actual use of language in concrete situations." The linguist has to discover "the underlying system of rules" (i.e., the competence) "from the data of performance" (Chomsky, 1965: 4). A grammar that correctly describes the competence of a native speaker of a given language is said to be descriptively adequate. A linguistic theory is said to be explanatorily adequate if it "succeeds in selecting a descriptively adequate grammar on the basis of primary linguistic data" (Chomsky, 1965: 25). The task of linguistic theory, then, becomes that of accounting for the properties of the LAD (Language Acquisition Device), i.e., the device that allows the child to construct a grammar from among a set of possible alternatives.

Generative Phonology

Generative phonology was discussed in several essays since the late 1950s and found its systematic presentation in Chomsky and Halle (1968). The starting point of generative phonology is that phonology is 'not-autonomous' from syntax: some phonological processes depend on morphological and syntactic structure. For example, the falling stress contour of *blackboard* is opposed to the rising one of *black board* because the former is a compound, hence belongs to the syntactic category N, whereas the latter is a Noun Phrase. Therefore the rules of assignment of stress contour must refer to syntactic surface structure (cf. Chomsky-Halle, 1968: chap. 2.1.). This is the reason why the phonological component is said to 'interpret' the syntactic component (see previous section). This strict interrelation assumed between the phonological and the syntactic level is quite contrary to the prohibition of mixing levels typical of post-Bloomfieldian structuralism (cf. section on this topic; Pike had already criticized this principle). Generative phonology considered the autonomous approach as a basic flaw of structuralistic phonology, both European and American, labeled 'autonomous phonemics': the notion itself of phoneme as conceived in such frameworks was rejected. Generative phonologists, on the one hand, took advantage from some difficulties in assigning which variants to which phonemes that had already been remarked upon within structuralistic phonology; on the other hand, they maintained that the assumption of an autonomous phonemic level often produces a loss of significant generalizations (the classical case was that of voicing of Russian obstruents, brought forward by Halle). Hence, generative phonology does not assume a phonemic level, but only a phonological representation and a phonetic representation. The former representation is derived from syntactic surface structure by means of readjustment rules; the latter is derived from the phonological representation by means of phonological rules, which apply in a given order. Both phonological and phonetic representations are strings of word and morpheme boundaries and of feature matrices. In such matrices, columns are segments, and rows indicate the value of features. Features of generative phonology only partly overlap with Jakobson's ones (see section on Prague School): their number is higher (about two dozen vs. 12 or 14), and they are mainly defined on an articulatory rather than on an acoustic basis. Features are 'by definition' binary at the level of phonological representation, whereas they are not necessarily binary at the phonetic one. An essential part of generative phonology is the so-called theory of markedness (developing, but also essentially modifying, insights of Prague phonology): features, segments and rules are not on the same plane, but some of them are more natural in the sense that they are more frequent, are acquired by the child earlier than others, etc. This greater or lesser naturalness is accounted for in terms of unmarkedness vs. markedness of the concerned entities and rules.

Since the 1970s, alternative approaches to the strictly segmental or linear model of Chomsky–Halle (1968) have been developed. For example, feature values and segments were no more seen as necessarily in one-to-one correspondence, but it was assumed that in some cases a single feature can extend over more than one segment, and, vice versa, a single segment can subsequently take two opposite values of the same feature (autosegmental phonology). It was also assumed that the domain of application of phonological rules is not only determined by the syntactic surface structure and readjustment rules, but also that the phonological representation has a hierarchic structure of its own, not necessarily coinciding with the syntactic one (prosodic phonology).

The Impact of Generative Grammar

Generative grammar (or, more exactly, generative syntax) aroused great interest among linguists shortly after the publication of Chomsky (1957). This interest became still greater in the subsequent decade, especially after the appearance of Chomsky (1965) and also reached logicians and philosophers of language. Generative tenets were not accepted by everybody: quite the contrary, many of them were sharply criticized. However, the large majority of linguists felt obliged to take a position on them. The following tenets were especially the focus of discussion: (1) The mentalistic view of linguistics (cf. The Standard Theory), which was later called cognitive. (2) The assumption that linguistic theory has to deal with 'an ideal speaker–hearer,' within a 'homogeneous linguistic community': i.e., the social and communicative aspects of language do not influence its structure. (3) The notion of Universal Grammar (UG), resuscitated by Chomsky (1965) with explicit reference to the tradition of *grammaire générale* starting with Port-Royal. From the early 1970s, UG essentially came to mean what he had earlier dubbed the 'language acquisition device' (LAD; cf. The Standard Theory): it was assumed to be universal since it would be shared by all human beings. (4) The postulation of two different levels of representation (deep and surface structure).

It is therefore possible to investigate the development of linguistic trends grown from the last 1960s according to the position they took with respect to the previously listed generative tenets. (1) Chomsky's cognitive view of linguistics was actually opposite the main structuralist trends, both in Europe and America, which conceived linguistics as an autonomous field. This new view was rejected, or at least dismissed as irrelevant, by some strictly formal approaches, such as Relational Grammar (see later discussion). It was, however, shared by the majority of trends during the last decades of 20th century, but often in a rather different way from Chomsky's. Indeed, although Chomsky simply assumed that to do linguistics *is* to do 'theoretical psychology,' many scholars maintained that linguistic explanations have to be traced back to more general psychological or cognitive factors, or, at least, they must be supported by independent psychological evidence. (2) Chomsky's low evaluation of social and communicative aspects of language contrasted with many earlier linguistic trends, even of the structuralist kind: e.g., Prague school defined language as a 'means of communication.' The view of language as a social phenomenon had been maintained at least since Meillet and it was strongly reaffirmed by scholars such as Uriel Weinreich (1926–1967) as an explicit rejection of Chomsky's views. Other opposition came from the pragmatic approaches to linguistic analysis that were developing within the philosophical tradition. More or less explicitly, all such trends opposed a 'social–communicative' view of language to the 'cognitive' one. (3) A revival of interest in the problem of linguistic universals had been already shown by researches such as Greenberg's; Chomsky's notion of UG clearly developed such interest in an unprecedented way. However, Chomsky's version of UG was not accepted by anybody: the different approaches to language universals were strictly linked with the different views of linguistics as a cognitive science and of relationships between language on the one side and social and communicative phenomena on the other. (4) Also the question of levels of representation was often linked to the problems of linguistic universals: several scholars equated 'deep structure' with UG, and 'surface structure' with cross-linguistic variation. These interpretations were misled, because both 'deep' and 'surface' structure had a specific technical value within a theoretical framework (see, e.g., Chomsky, 1975: 82). Nevertheless, they exerted a not negligible impact even on trends that were very distant from the Chomskyan one. Many of the debates between the different generative schools concentrated on the question if a distinction between whether a 'deep' and 'surface' structure is really necessary and on the nature of the 'deep' level.

In the following sections, trends stemming from generative grammar are distinguished from trends alternative to it. Such a distinction only refers to historical roots: the former trends were worked out by linguists originally (i.e., at the epoch of the standard theory) belonging to the generative group, the latter by scholars outside it. Nevertheless, several trends of the former group eventually became wholly alternative to the generative model.

Trends Stemming from Generative Grammar

Generative Semantics and Its Heritage

Generative Semantics (GS) was worked out between the 1960s and 1970s by scholars such as George Lakoff (b. 1941), James D. McCawley (1938–1999), Paul M. Postal (b. 1936) and John R. Ross (b. 1938). It was sharply opposed to the Extended Standard Theory (EST) by Chomsky and some of his followers. Both approaches shared a realistic view of linguistics and a multilevel approach to syntax, but their way of implementing such ideas was totally different. In their first works, generative semanticists rejected some basic assumptions of the standard theory: according to them, (a) deep structure was a useless concept, and (b) linguistic description must be semantically based. This semantic basis was sought in the reduction of linguistic categories to logical and/or psychological categories: semantic representation should be made to coincide with natural logic. In later works, it was assumed that semantic representation also includes typical semantic and pragmatic categories, such as focus or presupposition.

From the early 1970s, the leading ideas that had characterized the followers of GS were gradually abandoned, and each generative semanticist followed his own way. Lakoff first tried to work out a 'fuzzy' grammar, according to which grammatical categories are not discrete, but form a continuum from the noun at one end to the verb at the other. McCawley moved toward an empirical and somewhat skeptical approach to syntax: contrary to EST, McCawley kept on rejecting any theory of language acquisition that did not take into account general cognitive properties. From this point of view, Cognitive Grammar by Ronald W. Langacker (b. 1942) and his associates could be considered as a legitimate heir to Generative Semantics.

From the middle 1970s, two linguists formerly belonging to the GS group, David M. Perlmutter (b. 1938) and Paul M. Postal, developed a theory called Relational Grammar (RG). RG completely abandoned the notion of transformation as an operation on hierarchically and linearly ordered phrase markers. It also explicitly rejected any aim at being 'psychologically real.' RG takes grammatical relations as primitives and represents clause structure as an unordered set of constituents that bear grammatical relations to each other. Grammatical relations may change from one level ('stratum,' in RG terminology) to another. Strata are not connected by means of transformations, but of Relational Networks, which show which different grammatical relations the constituents bear at different levels.

Fillmore's Case Grammar was often associated to GS, but it is essentially independent from it, even if both approaches wholly replaced the standard notion of deep structure. In Fillmore's view, the 'basic structure' of the sentence consists of the verb and an array of case relationships (see Fillmore, 1968). By 'case,' Fillmore does not mean a morphological category, but an 'underlying syntactic–semantic relationship.' The elements of the basic sentence structure are unordered.

'One-Level' Approaches to Syntax

Generative Semantics pushed the distance between 'deep' and 'surface' structure to its extreme, by identifying deep structure with semantic representation. RG preserved a multilevel approach to syntax. From the middle 1970s, other linguistic trends originated that took the opposite path, giving up the distinction between deep and surface structure and assuming a single level of syntactic representation. The first systematic proposals in this direction are due to Michael K. Brame (b. 1944). The most successful of such 'one-level' approaches were, however, LFG (Lexical–Functional Grammar) and GPSG (Generalized Phrase Structure Grammar). LFG was initiated by Joan Bresnan (b. 1945), a former Chomsky graduate student, and GPSG by a British scholar, Gerald Gazdar (b. 1945), who was later joined in his research program by other British and American linguists. On the one hand, GPSG and LFG share several assumptions: e.g., both avoid transformations and resort to other techniques to solve problems that standard theory dealt with in transformational terms. On the other hand, they originated from and developed with rather different goals and concerns. LFG's original goal was the search for a 'realistic' grammar. GPSG was worked out mainly on the basis of formal concerns and had no special interest in building a 'psychologically real' grammar.

From EST to the 'Minimalist Program'

The syntactic theory worked out by Chomsky and his closest associates in the period from the late sixties until now had as its primary goal that of implementing the notion of Universal Grammar: the development of an adequate model of UG was seen as the proper goal of the cognitive view of language. This theory was called, during the 1970s, Extended Standard Theory (EST); in the 1980s, Principles and Parameters Theory (P&P) or 'Government-Binding Theory' (GB-Theory); from the early 1990s, the Minimalist Program (MP). Three works of Chomsky's could be considered the landmarks of each of these three phases: Chomsky (1973) for EST; Chomsky (1981) for P&P; and Chomsky (1995) for MP.

EST's main concern was the definition of restrictions on the functioning and on the format of syntactic rules. The first, decisive, step in this direction was the system of conditions on transformations of Chomsky (1973). More or less in the same period, Joseph E. Emonds (b. 1940) and Ray S. Jackendoff (b. 1945) formulated some important constraints on the format of transformational rules (Emonds) and phrase structure rules (Jackendoff). The great abstractness of all such conditions was assumed to be the proof that they could not possibly have been taught by adults or inductively discovered by the child. They were assumed to belong to Universal Grammar, namely the 'innate biological system' that is "invariant about humans" (Chomsky, 1975: 29). The innateness hypothesis, of course, contrasts with the actual cross-linguistic diversity. The Principles and Parameters approach was the first real effort made within the Chomskyan program to provide a systematic account of cross-linguistic differences. The universal features of language were dubbed principles, and the dimensions along which languages can vary, parameters. For example, the fact that a sentence in any language must have a subject would be a principle: but in some languages (e.g., Italian, Spanish, etc., as opposed to English, French, etc.) the subject may be 'null,' i.e., not phonetically realized. This option is called the 'null-subject-parameter': it has 'positive value' in Italian or Spanish, 'negative value' in English and French. Although principles are innate, the values of parameters are to be fixed on the basis of experience. 'Principles and Parameters' approach stimulated an amount of research much larger than anything previously done within any other framework connected with generative grammar. In particular, the notion of parameter stimulated cross-linguistic investigation of several languages.

Chomsky, however, was more interested in the depth than in the breadth of explanation (in a sense, more to explanatory adequacy than to descriptive adequacy) and since the early 1990s developed the 'Minimalist Program.' The leading criterion of MP can be considered that of economy, namely resorting to the least possible number of entities and of levels of representation. Therefore, MP disposed of the levels of 'deep' and 'surface structure' and assumed Phonetic Form (PF) and Logical Form (LF) as the only levels of representation. Nevertheless, MP cannot be equated with 'one-level' approaches discussed in the preceding section. In fact, also this last version of Chomskyan generative syntax essentially assumes a very abstract relation between the phonetic and the semantic side of language: PF and LF are related by the computational system, i.e., a transformational apparatus. One of the main goals of MP is just to show *why* transformations exist: *prima facie*, they would seem to be antieconomical. The answer is that they exist to replace uninterpretable features, which are also antieconomical: by so doing, both imperfections erase each other. Natural language is therefore a perfectly economical system, and from this point of view, Chomsky maintains, it is very rare among other biological systems.

Trends Alternative to Generative Grammar

Functionalist Schools

The common feature of functionalism is the assumption that language structure is conditioned by its function as a means of communication. This approach was already taken by some structuralist scholars, such as Martinet, and especially the founder of Prague school, V. Mathesius, who distinguished between the formal (i.e., the grammatical) and the actual (i.e., the communicative) partition of the sentence. Mathesius's insights were taken over by Prague linguists of the subsequent generation, such as František Daneš (b. 1919) and Jan Firbas (1921–2000), who coined the term Functional Sentence Perspective to mean Mathesius's actual partition.

From the 1960s, the most significant functionalist schools developed as an explicit alternative to the formal paradigm of generative grammar: Functional Generative Description (FGD), mainly worked out by Petr Sgall (b. 1926) and his associates, which represents a further stage of Prague School linguistics; Simon Dik's (1940–1995) Functional Grammar (FG) and Halliday's Systemic Functional Grammar (SFG). FGD proponents did not reject generative grammar as a whole, but maintained that it was too partial as an approach to language; on the other hand, they considered exclusively pragmatic approaches to be partial as well.

Despite their differences, all these functionalist schools share an important common core, the main points of which are the adoption of (a) Functional Sentence Perspective, and (b) a kind of Tesnière's valency grammar, in its original form or mediated through Fillmore's Case Grammar. Hence, their fundamental problem was to work out a device to explain the relationship between the system of Tesnière's roles (or Fillmore's 'deep cases') and the grammatical and communicative organization of the sentence.

Typological Linguistics

Typological linguistics since the early 1970s, mainly developed as an attempt to explain word order

correlations stated by Greenberg (see the section titled 'The Beginnings of Typological Linguistics'), and it gradually replaced purely syntactic explanations with semantically and pragmatically based ones. It is therefore independent from generative grammar both in its origins and in its achievements. However, some insights stemming from generative grammar influenced typological studies, especially in the 1970s. For example, Winfred P. Lehmann (b. 1916) started from a syntactic model analogous to that of Fillmore's Case Grammar. He assumed an unordered 'underlying structure,' to be converted into a linearly ordered one by a rule with phrase-structure format: therefrom VO-languages vs. OV-languages would result (cf. Lehmann, 1973).

The most significant development of Greenberg's proposals about word order universals is due to John A. Hawkins (b. 1947), who showed that cases that appear as exceptions in Greenberg's treatment are actually not exceptions, if Greenberg's universals are reformulated in a 'complex' form. An example of such reformulation would be the following: "if a language is SOV, then, if it has AN order, it has also GN order" (cf. Hawkins, 1983: 64).

Two other key notions developed in the framework of typological linguistics, especially by Edward S. Keenan (b. 1937) and Bernard Comrie (b. 1947), are continuum and prototype: categories are no more defined, as in generative grammar, in terms of possessing or not possessing a given property, but as clusters of properties. If all such properties occur, the concerned category is 'prototypical'; the deviations from the prototype are distributed along a 'continuum.'

Sociolinguistics

The label 'sociolinguistics' was firstly used in 1952 by the American Haver C. Currie (1908–1993), but it became widespread from about the late 1960s. In the last decades, this label ended in indicating a variety of researches, both of theoretical and applied kind, from 'ethnography of speaking' to 'language policy.' Between the 1960s and the 1970s, however, a sociolinguistic trend presented itself as an alternative approach to generative grammar.

The leader of this trend undoubtedly was William Labov (b. 1927), to whom the notion of variable rule is due. Variable rules have the format of PS-rules of generative grammar (more exactly, of *context-sensitive* PS-rules): their application or nonapplication, however, is not *categorical*, but it is conditioned by some probability factors, both of linguistic and extralinguistic (i.e., social, stylistic, regional) kind. By resorting to the device of variable rules, Labov was able to account for the different realizations of the same grammatical phenomenon across different social groups (a paradigmatic case was that of the contraction vs. deletion of the copula *be* in white vs. black American English speakers; see Labov, 1969).

The status of variable rules became a topic of intensive discussion. Do they belong to competence or to performance? Labov initially assumed that they are part of competence, but he eventually (in the 1970s) rejected the usefulness of such distinction. On the other hand, a radical revision of Chomsky's notion of competence had been proposed in 1968 by Dell Hymes (b. 1927), who replaced it by that of communicative competence, which indicates the speaker's ability to use language according to the different social and contextual situations. It can be remarked that, since the EST period, also Chomsky referred to a 'pragmatic competence' interacting with the grammatical one. Hence, the problem is whether grammatical competence is independent or not from 'pragmatic' or 'communicative' competence: Chomsky's answer was affirmative, whereas that of sociolinguistics and pragmaticists, negative.

Pragmatics

From the 1960s, pragmatics presented itself as an alternative to the Chomskyan view of language as a cognitive capacity fully independent from its use. Indeed, the roots of pragmatics lay earlier than generative grammar: the term had been created in 1938 by the philosopher Charles W. Morris (1901–1979) and the research field had as its initiators, between the 1950s and the 1960s, two British philosophers of language, John L. Austin (1911–1960) and H. Paul Grice (1913–1988) (neither of whom, however, used the word *pragmatics*). Austin maintained that speech is action (cf. Austin, 1962). The primary evidence for this is given by the utterances called performative by Austin, such as *I promise you to come*, by means of which I am not only *saying* something, but also *doing* it. Performative utterances are a kind of illocutionary act: examples of illocutionary acts are question, order, etc. According to Austin, a speech act, besides the illocutionary act, consists of the locutionary act (the uttering of given words and phrases) and the perlocutionary act (the intended effect of the speech act on the hearer). This classification of speech acts was partly revised by John R. Searle (b. 1932).

The original motivation of Grice's 'logic of the conversation' (which dates back to essays from the 1950s, eventually collected in Grice, 1989) was to show that there is no real divergence between the meaning of symbols such as $\sim$, $\forall$, $\exists$, etc., of formal logic and their counterparts *not*, *all*, *some*, etc., in natural language: the apparent differences of meaning are due to certain principles governing conversation, the conversational maxims. If I utter a sentence such

as *Some students passed the examination*, I am undoubtedly saying the truth, even if *every* student did in fact pass the examination, but the hearer normally interprets it as meaning that only some students, and not all of them, passed the examination. This is due to the fact that I have violated the 'maxim of quantity': "make your contribution as informative as is required" (cf. Grice, 1989: 26). From my violation, the hearer has drawn the conversational implicature that only some students, and not all, passed the examination.

The analysis of speech acts and of logic of conversation are still today at the center of interest of pragmaticists. The interest in conversation also made pragmatics include a good deal of text linguistics, which originally started as a project to extend formal techniques of generative kind to units larger than sentences. In recent decades, text linguistics seems to have been replaced by the more empirical and informal conversational analysis, initiated by sociologists such as Harvey Sacks (1935–1975) or Harold Garfinkel (b. 1929), but later adopted by pragmatics-oriented linguists.

See also: Phoneme; Autosegmental Phonology; Benveniste, Emile (1902–1976); Bloomfield, Leonard (1887–1949); Case Grammar; Chomsky, Noam (b. 1928); Cognitive Grammar; Cognitive Science: Overview; Distinctive Features; Firth, John Rupert (1890–1960); Functionalist Theories of Language; Generative Grammar; Generative Phonology; Generative Semantics; Halle, Morris (b. 1923); Halliday, Michael A. K. (b. 1925); Harris, Zellig S. (1909–1992); Hockett, Charles Francis (1916–2000); Jakobson, Roman (1896–1982); Labov, William (b. 1927); Lexical Functional Grammar; Martinet, André (1908–1999); Minimalism; Nida, Eugene Albert (b. 1914); Phonemics, Taxonomic; Prague School; Principles and Parameters Framework of Generative Grammar; Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Structuralism; Structuralist Phonology: Prague School; Systemic Theory; Tagmemics; Tesniere, Lucien Valerius (1893–1954); Trager, George L. (1906–1992); Transformational Grammar: Evolution; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Valency Grammar.

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Two-Dimensional Semantics

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When we ask whether a sentence is true or false, we are always asking with respect to a particular world. We are typically concerned about a sentence's truth value in the actual world, but we sometimes consider its truth value in other possible worlds as well. Thus the evaluation of any sentence is world-dependent in the sense that whether it is true (in a world) depends on the facts about that world. Context-sensitive sentences are also world-dependent in another quite different sense – what they mean depends on facts about the context, or world, in which they are used. For instance, *it's cold here* uttered in Pakistan means that it is cold in Pakistan, and when uttered in New Jersey means that it is cold in New Jersey. Two-dimensional semantics uses a formal apparatus from two-dimensional modal logic to characterize these two kinds of world-dependence. The two-dimensional framework has been applied to a variety of problems in semantics (indexicals and demonstratives and their interaction with modal operators), pragmatics (presupposition), and philosophy (accounts of the *a priori/a posteriori* distinction and the psychological/functional roles of thought). All of these applications depend on various assumptions, which are not implicit in two-dimensional modal logic, and many of which are controversial.

Modal logic allows that expressions may have different extensions in different possible worlds. For instance, it allows that the objects that satisfy a predicate in one world may differ from those that satisfy it in another. In one-dimensional modal logic, the rule that determines each expression's extension in every world, called its intension, is represented as a function from possible worlds into extensions. The intension of a predicate F, for instance, is a function that takes a possible world onto the set of individuals that satisfy F in that world, and the intension of a singular term *t* is a function taking possible worlds to single individuals. Two-dimensional modal logic allows that a single expression may be associated with different one-dimensional intensions in different contexts, or worlds, of use. So it associates a two-dimensional intension with each expression, which is a function from possible worlds to one-dimensional intensions, or equivalently a function from ordered pairs of possible worlds into extensions (see Segerberg, 1973; Aqvist, 1973; van Fraassen, 1977 for expositions of a two-dimensional modal semantics for formal languages).

Since a two-dimensional intension takes pairs of possible worlds onto extensions, it has the resources to represent the two different kinds of world-dependence mentioned above. One of the worlds supplies the contextual elements needed to interpret context-sensitive expressions, and the other world supplies the context of evaluation. I will call the entity that plays the former role the world of occurrence, and the entity that plays the latter role the world of evaluation, although no terminology is standard.

Two-dimensional intensions can be represented in a matrix such as **Figure 1**, which gives a two-dimensional intension for a single expression, *s*. In the leftmost column of **Figure 1**, w^1, w^2, and w^3 represent possible worlds considered as worlds of occurrence. In the top row, these same three worlds are considered as worlds of evaluation. Suppose that *s* is the sentence *I am in San Francisco*. In w^1, Ann is the speaker of this sentence and Ann is in San Francisco. She is also in San Francisco in w^3, but not in w^2. In w^2, Beth is the speaker, but she is in London in all three worlds. In w^3, Carl is the speaker, and Carl is in San Francisco in all three worlds. The cells of this matrix are filled in with truth values, since this is the appropriate extension for sentences. The row corresponding to w^1 tells us the truth value, in w^1, w^2, and w^3, of the sentence *s*, considered as occurring in w^1. In w^1, Ann utters this sentence, so it is true just in the case where Ann is in San Francisco. Accordingly, this occurrence is true in w^1 and w^3, but false in w^2, as the matrix indicates. Similarly, the row

s	w^1	w^2	w^3
w^1	T	F	T
w^2	F	F	F
w^3	T	T	T

Figure 1 Two-dimensional matrix.

Kenstowicz M (ed.) (2001). *Ken Hale: a life in language*. Cambridge, MA: MIT Press.
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Ross J R (1986). *Infinite syntax!* Norwood, NJ: Ablex.

Literacy Practices in Sociocultural Perspective

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Introduction

This article discusses some of the things meant or intended when researchers refer to 'literacy practices.' One meaning is that the researchers will treat literacy as an event in which the (arti)facts of inscription cannot be separated from persons, settings, and other communicative modalities. In addition to this descriptive aim, the term also usually signifies a theoretical ambition. Across multiple disciplines of social inquiry, reflecting the legacy of thinkers such as Sahlins, Williams, Foucault, Giddens, and Bourdieu, the term 'practice' has come to signify a range of theories and frameworks that grapple with the interplay of structure and construction, history and agency (Ortner, 1984). Although a literacy event may be as personal and fleeting as jotting down a list or glancing at an advertisement, literacy understood as the making or interpreting of inscriptions has a history of many millennia, and is closely associated with long-term and large-scale enterprises, such as cities and states, armies and schools, extensive markets and world religions. Relating the personal to the large-scale, the fleeting to the enduring, subject to structure, is thus a challenge confronting the study of literacy practices.

The term 'New Literacy Studies' (NLS) denotes a broad framework, drawing together various critical approaches within the field of literacy studies, consciously built upon the notion of literacy as a **practice**, rather than, say, a psychological skill or abstract social property. Within the NLS framework, literacy practices have been explicitly discussed as entailing a twofold research intention: (a) to build upon the notion of literacy as a communicative event, itself derived from the anthropological ethnographies of communication paradigm, but also (b) to push analysis beyond events to the ideological framing and institutional contextualizing that gives particular events their broader significance (Street, 1993). In this effort, NLS work has drawn particular inspiration from the ground-breaking research of Shirley Heath on literacy events, and it has used the anthropological notion of 'cultural model' to explore relations between consciousness and institutions. It has also, however, been informed by European and English traditions of critical discourse analysis, which call for the study of language as a social practice, an approach to language/society informed by Marxian analyses of ideology and hegemony and Foucault's arguments about discourse, knowledge, and power (Rogers, 2003).

In what follows, I first discuss work in the latter 'New Literacies' (NLS) framework, then indicate amplifications and framings suggested by sociocultural perspectives drawn from anthropology and linguistic anthropology (LA), arguing that the differing approaches only partly overlap. The article concludes by addressing contemporary literacy problems in the US and the complementary strengths and weaknesses of the two approaches (NLS and LA) in thinking about those problems as well as in providing frameworks for more general understandings of the phenomena of literacy and practice. It goes without saying, an article of this scope will unavoidably be schematic, citing only directly relevant work, leaving much that is worthwhile unmentioned and treating as settled much that deserves further argument.

Literacy Practices in the New Literacy Studies

As noted above, within the NLS approach, priority is given to studying literacy events, the situated doings that involve acts of reading, writing, or both. Highly influential early work was that of Heath (1983), who showed that in home, school, workplace, or church, what was a issue was not a binary contrast between literacy and orality, but rather the socially situated and culturally mediated events – whether reading a bedtime story or reading the mail, filling in a job application or composing a prayer for a church service. Participating in such events, people not only decoded or encoded text but were socialized into and enacted particular views of what reading or writing might be, who took what roles in such events,

and how they were part of larger-purpose endeavors: bringing up children, going to school, getting and keeping a job, expressing faith. In calling attention to the fact that acts of inscription and interpretation were part of a more general communicative economy, Heath's studies were part of a more general inquiry, also undertaken by historians and literary scholars, into the relations between orality and literacy (see Gee, 1996, for one review).

With the breaching of boundaries between written text and spoken event, the question of context is sharply raised, or in a more specific analytic idiom, the issue of indexicality is posed. Shuman (1986), in an in-depth study of working-class girls' "fight stories," emphasized that the right or authority to provide an account (that is, to be or not be talking behind someone's back, itself grounds for an altercation) depended on particularities of relationship and situation, not on the communicative modality of speaking or writing *per se*. Drawing upon work by Garfinkel and Sacks, she noted that "all utterances are indexical . . . [that is,] all utterances have multiple possible meanings and any particular meaning is **an understanding of context** (Shuman, 1986: 119, emphasis added)." Arguing that the principle of indexicality extended to inscribed utterances, she argued that "The recognition of indexicality admits the possibility of multiple interpretations of text (Shuman, 1986: 120)." The theoretical recognition of indexicality, and the practical possibility of multiple interpretations of text, means that there can in principle be no strict line between text, context, and interpretation. The point is not simply that multiple interpretations are possible, which is true but uninteresting in itself. Rather, it is that which interpretations gain authority is a matter of social dynamics, involving actors and institution-based understandings, as well as inscriptions.

The second aspect of the NLS understanding of literacy practices is that practices necessarily involve a cognitive-ideological dimension – of cultural models and implicit theories regarding what counts as reading or writing. One of the more systematic treatments of literacy models, Bialostok (2002), analyzes interviews with a set of middle-class parents, arguing for a "white middle class model of reading," in which the reading of prose (fiction or non-fiction) in books is given near-exclusionary status. In Bialostok's analysis, the statements that interviewees make, such as "Reading is part of me" or "I can easily gorge down a novel a day," are expressions of metaphors which **indirectly index** a cultural model in which reading is a proxy for morality (Bialostok, 2002: 351). In this model, reading is recurrently talked about as a moral act of worthy consumption, and a series of interesting metaphors are attached to this textual consumption. Book reading is sustenance, it fills readers up; indeed, they can 'devour' or even 'binge' on books. Reading books is a fitting part of the good person: "Books fit in with my life," says one respondent; "Reading is something that's just part of me," says another (Bialostok, 2002: 356). The person who doesn't read (books) is often characterized as "missing a lot of things" (Bialostok, 2002: 357). Book reading produces economic well-being: "Books have enriched our children's lives" says one respondent. But its lack points to poverty: "It's just so sad when a child doesn't have any books or isn't read to. They have such impoverished lives," says another interviewee (Bialostok, 2002: 359). As Bialostok argues, this is not just a matter of variation in culturally specific conception of reading, coherent and articulated through interlocking images, and anchored in the institution of the middle class family. It is also that this is the model or theory of reading promoted by the child-rearing professions of the contemporary US and, in particular, the school. It is a model that recognizes and gives legitimacy to certain class-associated literacy practices, while ignoring or derogating acts rooted in other systems of value (see also Heath (1983)).

An important point about positing what we might call an ideological level of models and implicit theories that are part of literacy practices is that, as with language ideologies more broadly, such conceptions and theories mediate between real-time micro-interactional events, and institutional orders, that is, perduring social classifications, organizational forms, and activity types. In his ethnography of literacy on the Pacific atoll of Nukulaelae (Tuvalu), Besnier (1995) shows that letter writing gains its full significance within a configuration linguistic, cultural, and social features that include Nukulaelae lexical and grammatical categories of affect, norms for face-to-face conversation, norms for gender-based emotional expression, and extensive labor out-migration. Most pertinent to our current theme, Besnier shows that the strong evangelical religion practiced on the island provides weekly enactments, through sermons, of gendered personhood and authority.

In Besnier's account, Nukulaelae sermons feature a blending of literate and oral resources: sermons are written beforehand, but preaching styles draw on other ritual genres as well as biblical passages. For many Nukulaelae, sermons are key events in which religious authority and a public search for truth is performed, displayed, and claimed. The sermon is part of a more general fundamentalist epistemology: " . . . Scriptures are the ultimate arbiter of truth. If they abide by the authority of God and the Bible, humans

can gain access to the unambiguous truth that is otherwise beyond their reach (Besnier, 1995: 141)." This pursuit of truth is done by individuals evoking and commenting upon the sacred scripture in written sermons: "[the composition and performance of which] centralize an individualistic sense of personhood and the search for the truth (Besnier, 1995: 138)." But the sermon is part of – that is, it reflects, expresses, and reproduces – an institutional hierarchy of gender and knowledge: though women as well as men may preach, only men can write a sermon.

That conceptions of reading or writing include assumptions about categories of person appropriate to a given activity is, of course, not surprising. The exclusion of women from Koranic or Talmudic scholarship is well known; enlightenment intellectuals in Europe and Colonial North America assumed that Blacks, whether free or enslaved, were incapable of writing; and in pre-Revolutionary America, it was normative that the virtuous woman should read, but not "take up the pen," especially for public expression (Warner, 1990). Such ideological framing of literacy events, combining cultural classification (e.g., male/female, white/black) and institutional site (e.g., the school, the pulpit, the press), shows that concepts of literacy practice must extend beyond the observable event.

Literacy Practices in Sociocultural Perspective

The New Literacy Studies has been largely an undertaking of educators, anthropologists, and sociolinguists who have successfully critiqued earlier claims about literacy as a context-independent "technology of the intellect" and called into question many school-based and official definitions of literacy (Street, 1984; Gee, 1996). As a research program it has, however, been less successful in areas germane to a sociocultural perspective on literacy practices. These areas include the following: (a) registering the consequences of the artifactualization of language wrought by inscription and the technical-institutional distribution of such text-artifacts, (b) analyzing the ideological range that accompanies literacy endeavors in comparative, global perspective, and (c) attending to institutional and social structural influences on literacy practices outside contemporary Western states and school systems. I address each of these themes below.

Artifactualized Language

One undeniable aspect of inscription is that it turns language into a thing, it renders some element of language (words, syllables, phonemes) into an artifact, into marks made in some medium (clay, papyrus, paper, acetate). These artifacts can, in turn, become input for procedures of accumulation and distribution of varying scale. Despite the untenability of Jack Goody's general conception of literacy, one value of his extensive research is his emphasis on procedures of accumulation and distribution of text-artifacts as essential processes in the evolution of social complexity. In what is otherwise a critical assessment of Goody's 1986 monograph, *The logic of writing and the organization of society*, Collins and Blot (2003: 20) have written:

> A general virtue of *LWOS* is that it provides constant reminders of the semiotic dimensions of social complexity. An endless keeping of lists seems to accompany social undertakings of any significant scale: censuses of population undertaken by states and lists of priest-officiants maintained by temples are prime examples. Bookkeeping emerged early as a primary function: if not *the* primary function of inscription in Mesopotamia, and it figured in subsequent temple, palace, and merchant economies in the Ancient Near East.

As if in complement to Goody's *The logic of writing and the organization of society*, Olson (1994) developed an extended inquiry into philosophies and practices of reading in the intellectual traditions of Western Europe. He argues that a written textual representation is important because as an artifactualizing of language, it suggests **a** model of language. This model inclines users to become (a) aware of the dimensions of language represented (say, letters or words) and (b) troubled by what is **not** represented, that is, by what is left unsaid. In Olson's account, an historical confluence of ideological, institutional, and technological developments in Western Europe results in a general model of reading-faithful-to-the-text, which arose out of medieval and early modern religious debates, was given substantive diffusion by the development of universities, printing and print-capitalism, and entered into debates in 16th- and 17th-century science about how to best read the *Book of nature*. As articulated by Francis Bacon and other early modern philosopher-scientists, the model of reading became part of a doctrine of truth based on precise records, in "unadorned style," in experimental and other natural scientific inquiry. This concern for realistic, replicable representations of the natural world, in turn, gave impetus to developments in various representational media which flourished in the 17th–19th centuries: portrait painting, map-making, and botanical drawing. These representation media themselves became print artifacts, mechanically reproduced, extensively distributed, and mediating far-flung engagements in a world being transformed by capitalism and colonialism.

What is often called 'the print revolution' was a central element in the production and distribution of artifactualized language. Historians of print (Eisenstein, 1968) have described the cultures of print emerging along with the new technology developed by Gutenberg in Germany in the 1450s, and they have described the very rapid spread of both production sites and book artifacts. As noted in Crosby's (1997) suggestive analysis of the role of measurement and representation in European science and technology: "By 1478 they were printing in London, Cracow, Budapest, Palermo, Valencia, and a number of cities in between. By the next century millions of books had been printed (Crosby, 1997: 231)."

The widespread diffusion of print artifacts, and especially books and newspapers, gave rise to new ways of viewing language, space, and time, encouraging, in turn, new ways of imagining both collectivities and individual nature. For Eisenstein, what she called "the uneven rise of reading publics" led to new forms of individual development. She argues that with the spread of books, lives became more procedure-bound as individuals and groups began "going by the book" (Eisenstein, 1968: 39). Such "going by the book" was a textual ethos and practice characterizing a "'middle class' secular puritan" ethos found in Protestant Europe and North America, in which domestic handbooks, marriage guides, and etiquette rule books were paramount in the conduct and judgment of lives. Eisenstein suggests that the new literate individualization also contributed to the envisioning of and identifying with new collectivities, in particular, the nation-state.

This line of argument has been influentially developed by Anderson (1991), who argues that wide dissemination of newspapers and novels provided textual materials for imagining new spatial and temporal orders, for which the language-codifying nation-state was both instrument and outcome. A more historically and culturally nuanced account of such processes is provided in Warner's (1990) analysis of letters, literacy, and political categories in late colonial and early national U.S. history. In his account, foundational concepts such as 'citizen' are linked to social divisions – such as those between men and women, whites and blacks – and to particular textual practices, such as collecting personal libraries, practicing journalism, and selling an 'American literature.'

We now live of course in an era not of ascendant nationalism but of globalization, wrought not by printing press but by computing machines and their communicative infrastructure. Space considerations do not permit much discussion, but there has been considerable interest, debate, and writing about this most recent development in the production and distribution of text-artifacts. We need not need enter the debates of whether the digital technologies are revolutionary newcomers, or merely new communicative modalities interacting with older modes, whether they herald an era of dystopian or utopian postliteracy (Warschauer, 1999). But we should note that with digital as with alphabetic literacy, artifactualized language provides ways of mediating communication, channeled through existing and emerging institutional forms, typically with official inducements for appropriate use and sanctions of inappropriate use, and typically also accompanied by an underground of subversive, wayward practices.

Sociocultural Practices of Language Use Associated with Inscription and Artifact Circulation

In the preceding section I focused upon the artifactualizing of language brought about by inscription, some of the major developments in the production and distribution of such artifactualized language, and some of the historical, institutional, and psychological developments associated with these communicative economies. These latter include the rise of states and general religions, the development of science, nationalism, and the rule- (or book-) bound self. It is ethnocentric and crudely techno-deterministic to argue, as some have, that the alphabet, *qua script*, causes modern science. I agree with Brandt (2001), however, that the many students of literacy practices have gone too far in denying a technical dimension to literacy, giving short shrift to technical–institutional interactions and political economic dynamics in the history of literacy.

This concern registered, it is also important to stress that there are always cultural variations in the way literate resources are taken up and put to use. Indeed, to its credit, the NLS framework has always stressed such variation. Given its concern to critique official, dominant understandings, it has not, however, brought out the playful, subversive uses of literacy; such transgressive uses often highlight the cultural shaping of literacy practice.

Burke's (1988) 'The uses of literacy in Early Modern Italy' gives a picture of literacy practices in a flourishing mercantile city state. Not surprisingly, we learn that in the 16th-century city state of Florence there was a robust notarial culture in which merchants kept extensive accounts and engaged in voluminous correspondence as they tracked expenditures and profits over far-flung trade networks. Also not surprisingly, we learn of secular, sacred, and patriarchal efforts at regulation: the Florentine state pioneered the use of written passes in order to regulate

subjects' travel; the Church issued tickets that were collected at communion, part of a record book registering attendance and nonattendance; and literate Florentine males proposed what Burke calls a "rule of female illiteracy (Burke, 1988: 38)." This latter prohibition on who should read and write seems to have been caused by a familiar patriarchal plight: fear of wayward female sexuality, more particularly, that literate wives and daughters might get up to no good by trafficking in love letters. The state, for its part, feared unauthorized reading of its correspondence and pioneered the use of ciphers for encrypting correspondence. The Counter Reformation Church was troubled by both literacy and **il**literacy. Literates were problematic because they might read heretical works, such as those being busily produced and disseminated by Protestant printers to the north. Illiterates, on the other hand, were worrisome because they were fond of and susceptible to superstition and magic. And the illiterate majority of early modern Florence had access to **written** magic: spells, incantations, and medical cures that used alphabetic sequences (such as *abracadabra*), printed and otherwise inscribed on cards, amulets, and other objects, in order to evoke and control the supernatural.

There is a small but interesting body of research showing that in colonial and postcolonial settings, hybrid forms of spiritual practice involve non-Western peoples appropriating the idea of supernatural powers of sacred text. This is the case among the Mende of Sierra Leone, who make spells and talismans with fragments of Classical Arabic (Koranic) script (Bledsoe and Robey, 1993); it is also the case with the Gapun villagers of Papua New Guinea, who manipulate Biblical text in search of the material benefits promised by Cargo religion (Kulick and Stroud, 1993). Basso's (1990) description of an indigenous Apache writing system reports the case of Silas John, a mission-raised Apache who in early adulthood experienced visions in which God apparently imparted knowledge of 62 prayers and a system for writing them down. The writing system was novel in form, drawing upon both English orthography and Apache sand-painting designs. After his visions, Silas John became the prophet of a neotraditionalist religious movement, gathering a select band of twelve disciples, to whom he taught his system of writing. He and his followers then used the writing system to record prayers and other instructions for use in rituals. In short, Silas John drew upon the idea of the power of **divine writing**, creating a written code, knowledge of which was necessary to successful performance of ceremonies. A traditional practice of rites was continued, but only through the agency of new literates, readers who controlled access to the divine through their manipulation of esoteric script. A case strikingly similar to this one, and roughly contemporaneous, is that of the Aladura movement in colonial Nigeria during the 1920s. It also involved a prophet, Oshitelu, who also received prayers in a vision, along with a writing system for recording them. Oshitelu's writing system was distinct from English orthography, in which this prophet had also been schooled, and thus was accessible only to the specially trained (Probst, 1993).

In a recent study of practices of magical writing in Highland Ecuador, Wogan (2004) describes how the villagers of Salasaca attribute life-threatening power to acts of writing and erasure. Wogan argues that many practices of magical writing are a mirror-image of the Ecuadorian state's concern to record all indigenous peoples in its Civil Registry. In a campaign advertising the need to register new births, the slogan *Si el niño no está inscrito, es como si no existiera* ("If a child is not registered, it's as if he doesn't exist") is proclaimed on posters and television (Wogan, 2004: 52). Conversely, Salasacans attribute life-threatening power to placement of a name in the book of San Gonzalo, a local saint. Hence the mirror-image: if a child's name is not registered in one book, the Civil Registry, it is "as if" he or she does not exist; if a name of a person is placed in another book, that of San Gonzalo, that person is in mortal danger, until they have their name removed (which erasure eliminates the supernatural threat).

Ideologies of Language and Literacy

As should be apparent from the foregoing discussion of religious and magical literacy practices, the existence of text-artifacts and their use in specific local settings is often overlain with a strong evaluative dimension, that is, an ideological layering. The view that a letter, a word, or a name or a passage in a book gives access to supernatural beings and powers is a belief, an idea about language, and an element in a framework for relating practices with language artifacts to concerns at once worldly and otherworldly. The idea that some given language or form of language has special powers is widespread, and the so-called world religions are well-known for their linguistic orthodoxies. I will illustrate two cases. For Muslims, Classical Arabic is the only language in which the holy Koran may appropriately appear; for Roman Catholics, until recent decades, Latin was the only correct language for the liturgical service. Aspects of this religious belief in the divine nature of specific languages clearly recurs in the nationalist equation of "a (n artifactualized and print-disseminated) language and a people," an equation of essentialized language and political-cultural

community, which has informed political struggles and education policy throughout the world (Anderson, 1991; Bauman and Briggs, 2003).

Sometimes the focus of ideological reasoning is not language *per se* but the particular script in which the divine is both evoked and represented. This is apparent in the Apache and Nigerian cases described by Basso and Probst. Such cases in turn reflect a more general state of affairs: that orthographies (systems of inscription) are never neutral phenomena. They are instead often the object of sharp controversy over the best (i.e., the most authentic or scientific) way to represent a given language. The varied conflicts and their constituencies, sites, and orthography-ideas are discussed in research on language revitalization movements in Europe, South Asia, and the Americas (see, for example, the papers in Fenigson, 2003).

In a more abstract fashion, thinking about literacy has incorporated specific assumptions about orthographic development and social evolution. Goody and Olson, for example, put forth claims about an "alpabetic mind" as part of arguments about the supposed superiority of alphabetic over other writing systems. Such claims were quickly refuted by anthropologists and comparative psychologists (see Street, 1984, for a general review), but they reflect an old legacy in Enlightenment thinking about literacy and society. Rousseau, in his writing on the social contract, posited an equivalence between kinds of inscription and stages of society. The scheme went like this (see discussion in Collins and Blot, 2003: 166–167):

- Savagery (non-state societies) = Picture writing
- Barbarism (non-Western Asiatic states) = Hieroglyphic writing
- Civil Man (Western states and empires) = Alphabetic writing

This evolutionary hierarchy recapitulates other now-discredited hierarchies of culture, thought, and language, but with a focus on orthography rather than grammatical form.

In yet other cases, it is neither a given language or script that is central to the ideologizing of literacy practices, rather it is the encounter between a superposed world language/religion and local beliefs about both language and the supernatural, resulting in novel construals of uses of artifact-language. This is the situation reported by Kulick and Stroud (1993), in which Gapun villagers apply pre-existing theories of hidden meaning in language to their readings the Christian Bible, as they seek passages which will unlock the secrets of Cargo wealth. Such an encounter is also the object of Pulis' (1999) study of Rastafarian citing-up, a reading practice which emphasizes playing with the **sound** of scripture in order to tap meanings hidden by the literal or denotational meanings of the text. In some cases, the holy language can be used for other supernatural purposes, which are organized in accordance with local practices. In Bledsoe and Robey's discussion of Mende, ritual specialists substitute "Muslim magic" for indigenous magic and sorcery: "A *moriman* uses his command over Arabic writing, which is widely regarded as the literal word of God, to obtain God's assistance. He evokes a verse's power by writing it on paper, rolled into a tight wad and tied with string or inserted in a small amulet pouch (Bledsoe and Robey, 1993: 118)." Note in this case the condensation of talismanic power and artifactualized language: the verse, written in "the literal word[s] of God," is compacted into a tight wad and inserted into an amulet pouch.

A theme explicitly discussed in Wogan's work on magical writing is that occult uses of literacy are often in counterpoint to the official organization of literate practices in the service of state functions. For the Ecuadorian state, the practice of registering people and land is part and parcel of being a modern society. Salasacan magic writing is, of course, viewed as a premodern superstition, albeit one that shares a belief in the life-defining efficacy of writing in books. The general point here – that literacy practices are intertwined conceptions of modernity – has been widely discussed. An early and highly controversial claim by Goody was that (Western) literate traditions were causal forces in the creation of modern, democratic forms of government; this was echoed in Olson's early general statements about literacy and modern science. Their claims were effectively criticized, but as an ideological assumption, as separate from what we might call historical understanding, the equation of literacy with modernity in the West is widespread and pervasive (see Street, 1984; Collins and Blot, 2003: Chaps. 2 and 4, for critical discussions).

The pertinent question, of course, is what is meant by 'literacy' or 'modernity.' Some recent linguistic anthropological work provides a nuanced approach to the issues. In *Voices of modernity: language ideologies and the politics of inequality*, Bauman and Briggs (2003) discuss the way in which major philosophical works, developing a conception of modern versus traditional society, depended on a highly selective viewing of language. A case in point is provided by John Locke's essays on the foundations of knowledge and forms of government. In both kinds of essay, Locke treats language as a purely literal-referential communicative device, stripped of its interactional or contextual dimensions. (His view of language is thus like overly generalized conceptions of literacy, common enough in the 20th century, which equate an

undifferentiated literacy with a singular modernity.) As Bauman and Briggs show, there are many intellectual traditions, ranging from Classical Empiricism through Antiquarianism, Folklore, and Boasian Anthropology, which have differently stipulated what is essential to 'language,' while giving priority to specific **entextualizations** of language, as part of their projects of establishing boundaries between the modern and the pre-modern.

Reporting from a very different part of the world, and treating a more modest historical scope, Schieffelin (2000) also grapples with the issue of literacy and modernity. In her article she analyzes how the Kaluli of highlands Papua New Guinea have responded to Christian missionary activity and the variety of literacy practices attendant upon such activity. Analyzing missionary grammars (structural linguistic descriptions) and literacy primers, she shows how descriptive and prescriptive documents systematically skew the form of Kaluli language like importing Anglophone notions of literacy and encouraging reading and writing activities of a church-appropriate type. Kaluli literates, for their part, bring a local slant to interaction and interpretation. They read in groups, rather than in isolation, and they interpret written language as speech, in accordance with Kaluli beliefs about what is primary: talk rather than text. These local appropriations notwithstanding, Kaluli of the 1980s, after some 50 years of missionary activity, have adopted a modern ideology of authoritative truth: it resides **in the written text**. The blending of imported categories of description and practice with indigenous ones is part of a local modernity that Schieffelin deftly characterizes. But the Kaluli are nonetheless drawn into what she calls "colonial and missionary intrusions . . . premised on the principle of asymmetry: domination, control, and conversion . . ." (Schieffelin, 2000: 321).

One general lesson from this work is that in thinking about literacy ideologies and long-term developments, such as the emergence of modernity, it is wise to seek out variation in and dialogic exchanges between the so-called modern and non-modern. It is also important to be aware of the frequent connection between literacy practices and forms of power and authority, to which we now give our attention.

Institutions, Language, and Social Structure

Investigating ideologies of literacy and of language more generally can help in understanding literacy practices as doubly-articulated phenomena, that is, as enacted in events while also informed by ideological overlays. Efforts to understand the relation between empirical events and abstract entities such as models must, however, also attend to literacy institutions and their authority with respect to language, language use, and social differentiation. Religion and education are two well-known examples of such institutions.

As Goody (1986) and numerous others have noted, the spread of ancient civilizations, with their city states, extensive taxation, and conscript armies, typically also featured priestly castes and temple complexes, which were distinguished by their knowledge and control of an esoteric literacy dividing elites from masses. World religions are also famously "religions of the Book" and struggles to control the book – its script, language, or interpretation – are struggles through which knowledge becomes power and power knowledge.

Even in relatively modern times, the elite concern to regulate mass forms of literacy is evident. One of the first known national literacy campaigns, in 17th century Sweden, also featured national literacy tests. A country with high literacy rates and surprising gender equality in those rates, Sweden's literacy campaign featured household instruction and religious oversight: parish supervision and compulsory testing to ensure not just reading but orthodox, Protestant reading (Gee, 1996: 32–34). Besnier's close analysis of Nukulaelae church services brings out the way in which religious **institutions are enacted**, how categories of person, and knowledge, and text are combined in communicative events: e.g., the sermon. In such events, differences between the kinds of person are presumed, displayed, and thus reproduced: for example, between the Christian and un-Christian; and between men who write and women who read. A limiting case of sorts is suggested by dissenting, hybrid religious movements. The examples of Silas John and Oshitelu show that a prophet, his writing, and chosen readers, can mobilize charismatic authority, in claiming and performing divine access through scriptal practices, without substantive institutionalization of offices, personnel, or resources. An important point revealed in all these cases, as in those discussed by Schieffelin (2000) and Wogan (2004), is that something significant occurs with the locating of authority, truth and correctness **in text**. Epistemologies and ontologies shift as well as what we might call social technologies of language. Artifactualized language is subject to different dynamics of accumulation and distribution than non-artifactualized language, with different potentials for ideological articulation and institutional consolidation.

Ever since Socrates's voice was transmuted into Plato's writings, the school as well has been a paradigmatic literacy institution. Since the time of the Greek and Roman empires, the *scola* has been the primary site for drawing boundaries between the idealized uniformity and consistency of civilized

language and the hybridizing variety of barbarian tongues. It is a familiar story that nationalism feeds upon and promulgates the standardizing of language, a political impulse toward centralization and control given great efficacy by the institutions and agents of the nation-state and the colonial regime, accompanied, to be sure, by local interpretations and reworkings (see Gee, 1996; and Street, 1984 and 1993, for discussion of general mechanisms and cases from national, colonial, and postcolonial settings). There is considerable historical and ethnographic work showing that schooled literacy is a particular institutional regulation of appropriate practices of reading and writing in correct forms of language, a mode of contemporary power which is also inextricably connected to dynamics of subjectivity and identity formation (see Collins and Blot, 2003, Chaps. 4 and 5, for discussion and extensive bibliography).

That schooled literacy in the United States, for example, reflects and helps reproduce patterns of race and class inequality is both a familiar claim and the proverbial tough nut to crack. The undeniable persistence of racialized class inequality in literacy attainment has fueled an ongoing sense of a literacy crisis in late 20th and early 21st century America, yet neither side in the acrimonious reading wars of the last decade have much compelling evidence that their pedagogical proposals to improve school literacy achievement will do that, let alone lessen general economic inequalities. The current plight is well characterized in Rogers' (2003) ethnographic and critical discursive analysis of the panacea of family literacy, which focuses on one African-American family's multigenerational struggles with schools, Special Education referrals, and the damaged identities that result from literacy failure. Rogers, an ardent believer in the value of literacy and education, nonetheless writes:

> . . . research in New Literacy Studies has demonstrated that parents of working-class and minority children do value education and school and are involved with their children's education. I want to suggest that **it is precisely because of this belief and involvement that working-class and minority families' efforts are thwarted within the institution** (Rogers, 2003: 144, emphasis added).

One way of thinking about valuing education and encountering failure in school and the workplace, a way of moving beyond the current political opportunism of reading reform, is suggested by Brandt's (2001) historical analysis of literacy traditions and practices in 20th-century America. Drawing on Bourdieu's writings about social fields and her own historical material, Brandt argues for the concept of bold sponsors of literacy, providing more dynamic accounts of social institutions – of family, church, school, and the workplace – and their intertwined role in promoting and regulating literacy practices.

Taking Stock: New Literacy Studies, Linguistic Anthropology and Indexical Analysis

In the preceding I have discussed the New Literacy Studies' formulation of literacy practices and some of the empirical work developing this conception. Interwoven with and as complement to that discussion, I have drawn on research on the history and anthropology of literacy, seeing this especially as part of a general sociocultural perspective on literacy practices. I have emphasized the artifactualization of language, uses of artifactualized language, especially in the domain of religion and the occult, the ideological articulations of such uses, and the significance of literacy institutions and their authority in order to discuss analytic and substantive issues relevant for understanding literacy practices understood as sociocultural phenomena. These are issues which are mentioned in various NLS works; indeed it is a truism of NLS work that literacy is ideological, but on my reading these issues are not given sufficient theoretical attention or empirical priority **in their inter-relation**.

One way of approaching this argument is to note, again, that most work on literacy practices posits a two-way relation: between events and models. Within linguistic anthropology, the subfield of anthropology that takes language analysis as central to a more general project of sociocultural inquiry, much work on language function and ideology has either been explicitly cast as practice (e.g., Hanks, 1996) or has developed via theory and analysis of indexicals (e.g., Ochs, 1996; Silverstein, 1985). On my reading, this work shares a fundamental assumption: that overcoming the dichotomy of the linguistic/social requires analysis of a three-way relation: between language **form** (system), language **use** (acts, events), and language **evaluation** (an ideological or reflexive aspect of social process and communicative conduct).

There is now a small but growing body of work which uses analysis of indexicality to investigate the sociocultural processes in which literacy practices are situated and to which they contribute. I have discussed this briefly above, with regard to Bialostok's work on models of reading and Shuman's discussion of talk–text interactions among working-class adolescents. Two general points may be made regarding this work and indexicality more generally. First, analysis of indexicals entails a commitment to systematic investigation of language–context relations, with healthy concern for interpretive complexities. Second, it requires as well an awareness that many

language–context indexical relations are indirectly related to – they **indirectly index** – other sociocultural constructs and processes, which are themselves essential to the larger analysis. Briefly put, I think that indexical analysis offers a promising entrée to the interplay between microanalytic language use (events) and macroanalytic sociocultural constructs (including models). Let me turn to some examples. Silverstein (1996) is an influential discussion of the indexical underpinnings of language standardization in the contemporary USA, linking such standardization to general semiotic-economic processes, such as commodification, and ideologizing strategies, such as naturalization. More recent explorations of indexical dimensions of literacy and learning include attention to long-term interactional development of student identities; the indexing of unspoken models of appropriate literacy; the interplay of heterogeneous voices, pedagogical innovation, and globalized discourses of learning; and the assembly of knowledge and identity in dispersed, digitally mediated work settings (see studies in Wortham and Rymes, 2002). Blommaert (2005) provides a series of illustrative cases and analyses of literacy practices within orders of indexicality – authoritative frames for reading and writing events – which organize postcolonial and diasporic encounters between Africans and Europeans. Collins and Slembrouck (2004) develop a related line of inquiry via a case study of the reading practices encountered in situations of dense, migration-based multilingualism.

Conclusion

I have concluded with a brief discussion of work using indexical analysis to investigate literacy practices because it shares with research in the NLS framework a concern to grasp the simultaneous, ongoing interplay between the microphenomena of everyday life and the macrophenomena of institutional orders, unequal resources, and accumulated power and authority. But the work on indexicality holds more closely to what I take to be an important insight from linguistic anthropology: that understanding communicative practices, in our case, literacy practices seen as total social facts, requires attention to language form, use, and evaluation. Such a three-way analytic can lead from situated communicative doings to longer-term structuring processes, while remaining attentive to cultural dynamics. I think the foregoing discussion of religion, magic and literacy practices illustrates some of the issues involved.

It must be borne in mind, however, that concern with literacy practices is not just an effort to better understand literacy, though it is that. The concept emerged along with the New Literacy Studies, which were themselves an effort to consolidate a critique against earlier models of literacy, in the academy and officialdom more generally, which privileged Western literate traditions and minds over other traditions and minds. In their concern to uncover and demonstrate the logics underlying mundane practices by the economically, politically, and culturally disfavored, NLS practitioners share with anthropologists a number of philosophical, analytical, and substantive concerns, and they share also, I would suggest, an ethical commitment to anthropology as cultural critique. In the urgency of their normative stance, they may focus overly much on legacy of the school in shaping literacy practices (an indictment in which I would place myself in earlier textual manifestations), and in widening this focus, sociocultural perspectives are invaluable. But in their normative stance, NLS practitioners also remind academic anthropology that knowledge matters – in struggles as well as deliberations. Let this article be a contribution to and encouragement of continuing exchanges, on the common ground of literacy practices, between critical anthropology and new literacy studies.

See also: Influence of Literacy on Language Development; Politics, Ideology and Discourse; Reading and Multiliteracy; Religion and Literacy; Writing and Cognition.

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Literary Pragmatics

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The efforts to relate the study of literary texts to the science of language have mainly taken two directions. In an earlier, quantitative approach, the emphasis was on how to characterize a text, based on the occurrence of certain elements (substantives, adjectives, and so on). The methods employed were mainly statistic. Later approaches focused on the qualitative aspect: how to account for certain characteristics (grammatical constructions, literary tropes, etc.) thought to be specific for types of text or, more generally, how to characterize a stretch of text in relation to what used to be called 'extralinguistic' purposes: persuading, arguing, questioning, etc. – matters that used to be taken care of in the discipline called rhetoric (*see* **Rhetoric, Classical**).

When talking about literary pragmatics, it is important to realize that pragmatics was not developed from inside linguistics but, rather, originated in related fields, such as philosophy, sociology, and the theory of interaction. The linguists were initially alerted to pragmatics through the aporias that arose within their strictly limited field of view (*see* **Pragmatics: Overview**). Similarly, literary studies did not 'discover' pragmatics by themselves; the approaches to the study of texts as related to the human users were developed simultaneously by philosophers, literary theoreticians, and pragmaticists. The purpose of these endeavors was to make sense of the fact that language does not always obey the strictures of the grammarians; indeed, the linguistic structure of a text has, in many cases, very little to do with the effects of a text, with what it 'does,' or with how a text is produced and consumed by the users.

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Applying the definition of pragmatics as "the study of the use of language in human communication, as

determined by the conditions of society" (Mey, 2001: 6) to the case of literary communication, we may say that literary pragmatics is concerned with the user's role in the societal production and consumption of texts.

The Linguistics of Texts

Early approaches to literary pragmatics (what used to be called 'text linguistics') took their point of departure in certain concepts that had been developed in linguistics mainly in order to cope with the needs of grammatical description. A text was thought of as a hierarchically structured complex of sentences, just as the sentence itself was considered a hierarchically structured unit of 'phrases' (noun phrases, verb phrases, etc.). A 'text grammar' was proposed in parallel to the sentential grammar developed by Chomsky and his school (see, e.g., van Dijk, 1972).

Later efforts were spurred on by the achievements of philosophers and pragmaticists such as Austin and Searle, who developed a theory of 'speech acts' – that is, utterances that did something in addition to being merely 'uttered': the 'illocutionary' vs. the simple 'locutionary' aspect (*see* **Speech Acts**).

The idea that utterances had a 'performative' and not just a 'constative' value (originally due to Austin, 1962) gave rise to a classification of speech acts into categories such as assertions, questions, orders, and apologies. Following on this, some suggested that we could look at a text as a gigantic 'macro-speech act' that had under it all sorts of individual acts, each expressed in some hierarchically ordered, linguistically recognizable form. This approach mostly failed, on several counts. First, it was not easy to explain what exactly the relationships were between the different acts making up the text. There was also the problem of the hierarchical constraints, which seemed unnatural, given the essentially linear, and often unpredictable, nature of textual 'speech acting.' However, the idea that sentences may be conjoined in deeper ways than just being strung together on the surface ('concatenated' in Chomskyan parlance) had taken hold. Similarly, the notion that language 'performed,' did something, led to the valuable discovery that certain sentences were 'doable' or 'speakable,' and others were not (Banfield, 1982).

Perhaps the most important insight into the nature of human language use as 'doing things with words' (Austin, 1962) was due, again, not to a linguist but to a philosopher, H. Paul Grice, who took the ideas developed by both Austin and Searle (1969) several steps further. In order to explain the regularity of human conversations and their mostly successful outcomes, Grice (1989: 26–31) postulated the principle of cooperation, stipulating that every person's contribution to a conversation should be commensurate to its purpose (including the aims and motives of the participants) (*see* **Cooperative Principle** and **Grice, Herbert Paul (1913–1988)**). Grice further suggested four conversational maxims regulating our cooperative handling of conversational information: making it sufficient (the maxim of 'quantity'), true ('quality'), relevant ('relation'), and orderly ('manner'). Any infringement of these maxims should be interpreted (assuming the general idea of conversation as cooperation) as implying an additional meaning: Breaking ('flouting') a maxim imparts a message that although not explicitly mentioned, nevertheless is understood. Grice's famous example is that of a professor writing a recommendation for a student, consisting of a statement as to the student's attendance in class and his correct English spelling – clearly irrelevant matters in the context – and thus implying that there must be a reason for the professor's unwillingness to cooperate, viz. that the student does not deserve a 'real' recommendation (Grice, 1989: 30) (*see* **Maxims and Flouting**).

Grice's notion of 'implicature,' as it is called, is of the utmost importance with regard to explaining how authors and readers go about 'cocreating' the literary work, as discussed later (*see* **Implicature**). It has often been remarked that the essence of art, visual or literary, is in the way we omit things, rather than saying them outright or representing them pictorially. When a queen utters that she is not amused, we understand perfectly well what she is, and we hide to escape her wrath. When God asks Cain, 'Where is Abel thy brother?' Cain realizes (since God of course knows exactly where Abel is and who killed him) that this implies the question, 'Why did you do this to your brother?' However, Cain refuses to cooperate in this conversation and tries to deny the implicature that he should have been 'his brother's keeper.' But in the next sentence, having 'answered' God's question with the pseudo-cooperative utterance 'I know not,' he shows that he indeed has gotten the implied message: 'Am I my brother's keeper?' (Gen. 4:9).

In the following sections, I briefly indicate the particular instances in which pragmatics meets with various linguistic and literary approaches, as they are dealt with in the remainder of this article.

The problems of text production and consumption are discussed first. Next, a brief discussion is provided of a concept that has gained increasing attention in the discussions during the past few decades: interactivity, understood as the active (specifically Gricean) collaboration between reader and author. Such a collaboration involves more than plain interaction, however: the relationship between the active partners is

'dialectic,' which means that neither the author nor the reader can claim exclusive possession of, or authority over, the text. Following this, I characterize this relationship as a 'cocreative' one: a text is not the exclusive work of the individual author but always presupposes the active collaboration of an audience, the readers. How this cocreation is orchestrated technically is the subject of the following sections, in which first some classical linguistic techniques of 'signposting' are discussed, and then the important pragmatic concept of 'voice' is introduced as that which brings the text to life. In particular, the 'point of view' embodied in the voice of a character helps us find our way through the textual maze; this 'vocalization' relies not only on signposting by means of linguistic devices but also on the techniques of cooperation and implicature (including flouting) that were mentioned previously. When the proper conditions for use of these techniques are not met, we may experience a phenomenon that I have termed 'voice clashing': voices speaking out of order, either by an author's fiat or (more often) by authorial negligence. The final section wraps up the discussion by stressing the human engagement that is the necessary condition for successful text work.

Production and Consumption

The following is a common model of production and consumption in our society: a producer delivers a product to the market, and the consumer pays the market price, acquires the product, and starts consuming it. After the transaction is concluded, producer and consumer part ways, never to meet again unless in special cases (foreseen by the laws regulating trade in our society), such as inferior product quality or unsatisfactory handling of the financial aspects of the purchase. This relationship is purely linear and unidirectional; the deal, once consummated, cannot be reversed (barring special cases such as return or repossession of the product).

One may be tempted to apply this simple model to the production and consumption of literary works: The author is the producer of some literary text, whereas the reader is a consumer who happens to be 'in the market' for a particular literary product. Once the book is bought, the reader is free to do whatever he or she wants to do with it: take it home and place it on the shelf in the living room, possibly read it, or maybe even throw it in the trash – or at somebody, literally or metaphorically.

In reality, things happen not quite like that. Buying a book is not like acquiring a piece of kitchenware or furniture. One does not just bring a book back from the bookstore: one takes home an author, inviting him or her into the privacy of one's quarters. The author, on the other hand, does not just make a living, producing reams of printed paper (granted, there are those that do), but has a message for the reader as a person. This is, eventually, why books are bought and sold: not because they are indispensable for our material existence, but because they represent a personal communication from an author to a potential readership – a communication that, in order to be successful, will have to follow certain rules.

Authors and Readers

The process of writing has been likened to a technique of seduction: a writer takes the readers by their hands, separates them from the drudgery of everyday life, and introduces them to a new world, of which the writer is the creator and main 'authority' (Mey, 1994: 162, 2000: 109). The readers will have to accept this seductive move and follow the author into the labyrinth of the latter's choice in order to participate properly in the literary exercise. The readers take the narrative relay out of the hands of the author: 'The author is dead, long live the reader,' to vary Barthes (1977).

Marie-Laure Ryan (2001) envisioned this reader participation along a twofold dimension: that of interactivity (in which the reader manipulates the text) and that of immersion (where the reader seamlessly identifies him- or herself with the text). In immersion mode, the reader is not just a spectator on the virtual scene: The 'role of the reader' is that of an "active participant in the process of creating the fictional space" (Mey, 1994: 155). As discussed later, the immersed reader is a 'voice' in the text; he or she is not only 'present at the creation' of the text but also to some extent its 'creator' (Barthes, 1977).

In literary texts in particular, the success of the story depends not only on the author but also to a high degree on the reader. In the process of creating the text, the reader is created anew, reborn in the text's image. This interactivity does not just happen on the level of the text: it involves a deeper layer, that of the self. What is created is not only the fictional space but also the reader in it, 'lector in fabula.' 'This book changed my life' is therefore not just a trite expression we employ to register an exceptional reading experience; such changes happen whenever we consume texts (including nonliterary genres, such as scientific and commercial prose, legal texts, etc., and 'texts' in a wider understanding of the term – theatrical and movie productions, the visual arts, and so on; Mey, 1994: 155). Updating our view on texts, we may even include here the virtual realities of the computerized world and its texts, as discussed by authors such as Gorayska and Mey (1996), Ryan (2001), and others.

Text Dialectics

A dialectic situation of interaction occurs when the interacting parties influence each other in such a way that the outcome of what one party does is determining for the other's ability to operate.

In language use, the pragmatics of interaction determines the game, whose very name is dialectics. When speaking or writing, we are always engaged in some communication (informing our partner about some event, apologizing for inflicted injuries or insults, promising services, telling a story, etc.). In this activity, we crucially depend on the other's presence and cooperation not only for the legitimacy of our speech acts but also for their very viability. Conversely, our interactors depend crucially on who we think they are and on whether they think of us as good partners in interaction. (After all, one can only tell a story properly to listeners whose interests one shares or imagines one does). The way we see ourselves and our partners, and how they see themselves and us, is essential to this dialectic process. The following section details how such representations come about and are managed.

Cocreativity

Pragmatically speaking, a text is the result of what Bakhtin (1994: 107) called "the meeting of two subjects." The life of the text "always develops *on the boundary between two consciousnesses, two subjects*" (Bakhtin, 1994: 106; italics in original) the two consciousnesses being the author's and the reader's. The author is by definition conscious of his or her role in creating the world of letters, the 'fictional space,' mentioned previously. However, the reader's consciousness is just as essential in cocreating this fictional universe. For Bakhtin, the reader is the (co-)creator of the text: It is in the dialogue between author and reader that the text, as a dialectic creation, emerges (*see* **Bakhtin, Mikhail Mikhailovich (1895–1975)**).

How do author and reader, these two 'consciousnesses,' navigate the fictional space? For a reader, it is not enough to identify with the author passively; the reader must consciously adopt the cocreator role, as it is assigned by the textual dialectics. Conversely, the author must consciously alert the reader to the signposts and other 'indexes' placed in the fictional space to enable the navigation process.

In some older novels, mainly those written in the 18th and 19th centuries, the author often appears on the scene in person, apostrophizing the reader and telling him or her what to do, what to feel, what not to object to, which 'disbeliefs to willfully suspend,' and so on. The 19th-century British writer Anthony Trollope was a master of this 'persuasion-cum-connivance,' as when he told the readership that he was unable to expatiate more on certain characters of his story: the publisher, a Mr Longman, would not allow him a fourth volume, so he had to finish the third and last of the Barchester novels at page 477 – and, well, since we are already at page 396 . . . ("Oh, that Mr Longman would allow me a fourth!" Trollope, 1857/1994: 306). The curious and eagerly co-creative reader hurries to the last page of the novel to find that its number is indeed '477,' just as the author had predicted. We cannot exclude the possibility that the reader may feel a bit taken in: the cocreative is morphing into the gullible.

Cases such as these are the exception, and readers will normally do no more than smile at discovering their complicity in what is commonly understood as an authorial prank. In other cases, the cocreativity that is needed to make the cocreative enterprise succeed, although less obvious, is (perhaps for that reason) considerably more effective. Notorious instances of successful 'reader deception' are found in the Argentine writer Julio Cortázar's work, as in the novella 'Historia con migalas' ('A story of spiders'; 1985). Here, the author consciously leads the reader down a 'garden path' of narration, along which the two female protagonists by default are assumed to be a male–female couple. Only in the story's very last sentence do they literally remove their morphological protection, along with their seductive veils (see Mey, 1992; the trick is pulled off successfully only in the Spanish original).

In the Cortázar story, reader seduction (involving the cocreation of a manipulated consciousness) is achieved without the reader's awareness – a typical requirement of certain literary genres, such as the joke or, as in this case, the garden path story. In other (more normal?) cases, readers are guided through the fictional labyrinth by certain indications as to where the narrative 'thread' is leading them, which readerly pitfalls they have to avoid, where to proceed with caution or alternatively with boldness, and so on.

Signposting

In the Cortázar story, the reader is led astray by the (mis)use of linguistic means. It is as if the author had changed or removed the usual road signs – a technique one could call 'deceptive signposting.' The question is what are these signposting techniques, and how are they normally used to bring coherence to a text when no garden paths or jokes are involved?

First, we have the time-honored concepts of 'deixis,' such as when articles and (personal) pronouns are employed to 'point to' a particular character. In particular, in anaphora, the relative pronoun is used to 'point back' (or, in cataphora, 'forward') to a

character or object that is already mentioned, or is going to be mentioned, in the story. The common concept covering these phenomena is called '(phoric) reference' (*see* **Deixis and Anaphora: Pragmatic Approaches**).

In addition, we have means to indicate the time and place relations that are of importance in order to establish and promote the flow of the story. Time adverbs such as 'today' and place adverbs such as 'abroad' tell us when, and where, the story is taking place. Also, we have sentence adverbs that give a particular flavor to a larger stretch of discourse, sometimes even an entire paragraph (e.g., 'regularly,' 'unfortunately,' and 'clearly,' especially when placed sentence-initially) (*see* **Parentheticals**).

As was the case in the Cortázar story, much of the correct understanding of a story is imparted through the use of gender-marked items, such as 'she' vs. 'he,' or by exploiting the difference between a male and a female form of, for example, an adjective. The latter technique is not always applicable in English; in the Cortázar case, the 'dénouement' comes when the unsuspecting reader finally is confronted with an unequivocal, female adjectival form: *desnudas* 'naked' (a Spanish fem. plur. since it refers to women; in the English translation, this point gets lost and the garden path leads nowhere).

In addition to these linguistic techniques, pragmatics offers the reader a great help. There is Gricean implicature, mentioned previously; furthermore, the author has at his or her disposal various ways of representing speech or thought, either by directly quoting a character's utterance (literally putting words in his or her mouth) or by indirectly reproducing what the character is thinking to him- or herself in 'free indirect discourse,' as in the following quote from Jane Austen (1810/1947: 191): "And now – what had she done or what had she omitted to do, to merit such a change?" Here, 'she' (Catherine, the novel's heroine) is musing about her sudden change in fate (owing to the fact that, unbeknownst to her, the father of her lover has discovered that she is no rich prospect after all); however, we are never told explicitly who this 'she' is: being competent, cocreative readers, we will know.

Characters are given 'voices' that we clearly and distinctly perceive as the characters' and theirs alone. This notion (including the phenomenon of vocalization) is discussed next.

The Voices of the Text

Vocalization

'Vocalization' is a powerful way of creating and maintaining the fictional space with the willing help and indispensable assistance from the readership, and of 'orchestrating' the dialectics of cocreativity between author and reader. Taken by itself, the term may be translated as 'giving a voice,' 'making vocal' (or 'heard,' depending on the perspective). In the context of literary pragmatics, vocalization means 'giving a voice to a character in the story' – in other words, making the character speak.

We are more or less familiar with the phenomenon from the simple fact of narrative dialogue. Whenever a conversation is included in the story, we hear the voices of the characters discussing current events or other matters of interest, such as how many kinds of love there are (compare Kitty and Anna's conversation in Tolstoy's *Anna Karenina*; 1889/1962: 155), or the advantages of married life as opposed to the single gentleman officer's existence, as enthusiastically described by General Serpuchovskoy to Vronsky – how he got his hands freed when marriage lifted the 'fardeau' of everyday worries onto his shoulders (Tolstoy, 1889/1962: 350). In situations such as these, the attribution of voices is done in a straightforward manner, more or less as it happens in a play: the lines are put into the mouths of the characters, given voice through the unique assignment of a familiar role name, and are often preceded by what is called a 'parenthetical,' such as 'he said,' 'she laughed,' and 'he cried' (*see* **Parentheticals**).

Voice and Focus

Vocalization is an intricate process, inasmuch as it not only gives voice to a character in the strict sense of speaking one's part, but also affords information about the character's perspective or point of view. What the voice indicates is not just the character as such (by naming the person) but also the viewpoint from which the character sees the other characters, and indeed the world. In this wider sense, voices range over the entire fictional space they create: "Utterances belong to their speakers (or writers) only in the least interesting, purely physiological sense; but as successful communication, they always belong to (at least) two people, the speaker and his or her listener" (Morson and Emerson, 1990: 129).

Vocalization always implies 'focalization,' a focusing on the characters' placement in the literary universe (Mey, 2000: 148). In Bal's (1985: 100) words, focalization is "the relation between the elements presented and the vision through which they are presented." This vision and these relations are not open to direct inspection by the reader's naked eye in as much as they are necessarily mediated through the voice of the author; consequently, they may have trouble being focalized properly.

The Pragmatics of Voice

In the absence of obvious signposts, such as names and parentheticals attached to the 'physiological utterance' (especially when we are dealing with an unspoken thought or an 'unspeakable sentence'), we may be unsure whose voice we are hearing. This is where pragmatics comes to the rescue.

In order to be speakable, a sentence, Banfield (1982) noted, must have a 'speaking subject" – not just a sentential subject, but one authoring the utterance that is placed in a context in which certain utterances are speakable by certain persons. Successful vocalization at the author end is matched by the reader's successful revocalizing: the reader cocreates the part of the fictional universe in which the utterance is spoken and attributes the voices univocally to the focalizing characters, including the speaking subject.

When Voices Clash

Voices may sound in harmony, or they may clash. A voice that is not in accordance with what we, as readers, know about the speaking character will jar, not sound right; we do not feel it is the voice of the character (but perhaps the voice of the intrusive narrator trying to disguise him- or herself as a character or even, as in the case of Trollope, as the author). Other clashes are often referred to as 'poetic license,' such as when animals are attributed vocalizations that are not in keeping with their animal status. In *Anna Karenina*, we encounter quoted thoughts ascribed to the bird-dog Laska, who is irritated at Levin and his brother because they keep chatting while the birds fly by, one after the other, without the hunters so much as bothering to point their guns at them: '"Look how they have time to make conversation – she thought – And the birds are coming . . . . In fact, here comes one. They're going to bungle it . . ." Laska thought' (Tolstoy 1889/1962: 185).

In other cases, the reader is confused, such as when voices speak 'out of order,' having access to material that is strictly not accessible to the characters, given their background, or even false (Mey, 2000: Chap. 6). Such 'clashes' may even be caused intentionally, for example, in order to obtain a comic effect by letting characters adopt modes of speech that are not commensurate with the speech proper to the events or characters (such as when a director purposefully introduces modern colloquialisms and slang into a Shakespearian play).

Conclusion: The Role of Pragmatics

The user has been the guideline in our reflections on the ways readers and authors participate in the common endeavor of creating a literary text. The dialogue we engage in as authors and readers is a dialogue of users; the 'dialectics of dialogue' has been invoked to explain the users' cocreative roles, as authors and readers, in establishing the textual object (e.g., a story).

However, dialogue does not happen in a vacuum; it is

> a dialogue of social forces perceived not only in their static coexistence, but also as a dialogue of different times, epochs and days, a dialogue that is forever dying, living, being born: Coexistence and becoming are fused into an indissoluble, concrete *multi-speeched* [italics added] unity. (Bakhtin, 1992: 365)

The voices of the text are anchored in the plurality of discourse, in a 'multispeeched' mode; this multivocality represents the dialectic relations between different societal forces (*see* **Discourse, Foucauldian Approach**). If it is true that texts only come into existence as human texts through an actual engagement by a human user (as already stated by Roman Ingarden in 1931), then a pragmatic view of text, particularly literary text, is anchored in this user engagement. Conversely, the user is engaged only insofar as he or she is able to follow, and recreate, the text supplied by the author. Among the voices of the text, the reader, too, has one; this vocalization is subject to the same societal conditions that surround the author. The textual dialogue thus presupposes a wider context than that provided by the actual text. As we have seen, pragmatics offers a view on this wider, social context and explains how it interacts with author, texts, and readers.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Cooperative Principle; Deixis and Anaphora: Pragmatic Approaches; Discourse, Foucauldian Approach; Grice, Herbert Paul (1913–1988); Implicature; Maxims and Flouting; Parentheticals; Pragmatics: Overview; Rhetoric, Classical; Speech Acts.

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Literary Theory and Stylistics

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Stylistics and literary theory would appear to coincide neatly in a concern for the language of the given object, literature. In one model, stylistics can be seen as a hyponym to the superordinate theory of literature, that aspect of theory that explicitly deals with locating and describing the particular language of literature. Yet stylistics is often marginalized as a literary-critical approach and has not enjoyed an easy relationship with many of the dominant trends in literary theory. Indeed, the term *stylistics* has suggested to some critics a rather marginal activity having to do with the niceties of an author's style; but it clearly is much more than that. In a broad historical context, stylistics has its roots in the *elocutio* of Aristotelian rhetorical studies. Crucially surviving from the rhetorical tradition, *elocutio* dealt with the appropriateness of the expression and the relevance of its stylistic choices. Thus, it is a focus on the language of the expression in a particular way to do with *how* the text means, rather than *what* it means. Here are the roots not only of stylistics, but also of formalist and structuralist analyses of the 20th century. Literary theory, in contrast, is a broad area of investigation covering linguistic, social, cultural, political, economic, hermeneutic, empirical, and psychological issues surrounding the production and consumption of literary texts.

Before the 20th century, the notion of style was a secondary product of the analysis of grammar and rhetoric. In the 20th century, it developed from *elocutio* to encompass almost anything to do with an explicit focus on the 'language' of the (normally literary) text; that is, its particular and manifest phonological, lexical, and grammatical features. Stylistics arose partly because of the need in literary criticism to work with a set of agreed-upon and defined terms for the analysis and description of a particular kind of language, the language of literature. Such a language would not be wholly derived from the study of rhetoric (though it would take from it where it felt it was necessary) but would be built upon modern linguistic analysis. Stylistics in the main has concentrated on literary texts (despite the offshoot and somewhat tautologous sounding 'literary stylistics'), although the concept of style extends beyond the literary. With its focus on the language of the text, largely (but not exclusively) treated in a synchronic manner, stylistics has obvious affinities with a certain kind of literary criticism, particularly what came to be known as 'practical' criticism. This critical approach, growing out of the work of I. A. Richards in the 1920s, focused on the mechanics of the text, its immanent language features, and gave the pedagogy of English literature an enormous boost by freeing it from the

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contextual constraints of history and biography and treating the text on its own terms. It was thus an important precursor of Anglo-American New Criticism. The text's 'terms' were linguistic, both in detail and in use as metaphor. Stylistics is not to be confused with the New Criticism of the 1950s and 1960s, but it does share some methodological axioms, and the two approaches overlap in the 1960s.

Modern stylistic analysis really began with the work of Charles Bally (1909) and Leo Spitzer (1948) in the first half of the 20th century. Bally's *stylistique* saw literary texts as examples of particular language use, and his work prefigures later conceptions of register and mode (particularly in the work of M. A. K. Halliday and David Crystal). Bally was a pupil of Ferdinand de Saussure. Spitzer, however, saw 'style' as not so much a particular form of linguistic 'character' but as a manifestation of social or historical 'expression.' Spitzer's work is essentially the cultural interpretation of style, and he suggests another important line of stylistic investigation (be it literary or nonliterary). His work highlights an ongoing tension in stylistics between formal description of linguistic features and broader cultural, psychological, or historical or interpretative aspects of the text.

Put simply, the goal of stylistics is to describe the linguistic features of the object of analysis in such a way as to demonstrate their "functional significance for the interpretation of the text" (Wales, 2001: 438). Its relationship to literary theory is a complex one. In the 1960s, linguistics became the focus both of a certain movement in literary theory and of critical approaches that grew out of the close-reading methods of I. A. Richards and others. The way in which linguistics was used by literary theory and stylistics, however, was radically different. Stylistics in its anglicized form has tended to eschew the philosophical complexities and self-reflexive obsessions of literary theory and to use the practical methods of linguistics wherever it sees them as being relevant to a particular reading. Linguistic theory and practice is very much the handmaiden of stylistics, which eclectically draws on what are deemed appropriate terminology and discourse. The dominant linguistic theory throughout the 1960s and 1970s was undoubtedly that of Noam Chomksy and his followers, yet strikingly, stylistics almost ignored his work during this time. The Chomskyan influence is seen particularly acutely in the work of Ohmann (1964) and Levin (1962). Here, style is seen as a transformational option selected from a core form. Despite the central notion of 'transformations,' which could easily be related to notions of style (and is presented convincingly by Ohmann and Levin), Chomsky's work was seen as too abstract for the text-driven concerns of the stylistician.

Stylistics found a more sympathetic grammar in the work of M. A. K. Halliday, whose systemic grammar allowed stylisticians to link grammatical description with literary effect in a way that was more transparent than in the Chomskyan paradigm. Halliday's functional approach (Halliday called it *systemic-functional*) again uses the notion of language *choices,* but sees them determined by the uses or functions which they are seen to serve. Language is thus socially constituted and meaning cannot be formulated in isolation (in opposition to the formalist approach). Literary stylisticians approved of this view because it allowed the notion of literary 'style' to be part of a larger, sociolinguistic network. In the 1970s and 1980s, stylistics drew on a number of different methodologies and approaches, most notably the Hallidayan functional model, feminism, pragmatics, and discourse analysis, these approaches being dominant and extremely influential. Indeed the most obvious and striking development in stylistics in the last 20 years has been its recognition of the notion of 'discourse' – although this was not especially new and had a precursor in Crystal and Davy (1969). There are some parallels in literary theory in that following the radical movements of structuralism and deconstruction in the 1960s and 1970s, a more historicist approach began to be seen. This was not simply an opposition to the formalisms of, for instance, deconstructive methodologies, for the New Historicism often incorporated deconstructive practice (particularly in the work of Stephen Greenblatt). Rather, it was a widening of the linguistic context and a breaking down of barriers between literary and nonliterary writing.

Perhaps the most pervasive influence on stylistic analysis in recent years, then, has been that of discourse analysis, and there are again parallels with developments in literary theory. Discourse analysis can signal many things, from the most text-centered description of language fragments to broad, Foucaultdian speculations about power and language. Literary theory has drawn more on the work of Foucault than almost any other theorist of 'discourse,' and yet Anglo-American stylisticians remain suspicious of his writing and treat it with a degree of scepticism. What unites the Foucaultdian approach with those such as the Hallidayan, however, is a belief in the contextual nature of language and a focus on language 'beyond the sentence.' Further, there is a belief, not always made manifest, that the (discourse) stylistician should be looking at 'real' language; that is 'naturally occurring' discourse. Of course, literature provides us with a ready-made supply of 'real' discourse, although many discourse analysts reject this corpus, insisting that it is 'deviant' language.

However, the approach has been fruitful in the field of stylistics. Ronald Carter's influential collection of stylistics essays *Language and Literature* (1982) was followed by the volume *Language, Discourse and Literature: An Introductory Reader in Discourse Stylistics* (1989). The shift in focus is clearly registered in essay topics: the first volume is dominated by grammatical considerations, despite the inclusion of Deirdre Burton's influential 'Through glass darkly: through dark glasses' (a politico-stylistic analysis of Sylvia Plath's *The Bell Jar*). The latter volume draws heavily on developments in pragmatics and discourse analysis, including applications of Politeness Theory, Speech Act Theory, and Gricean pragmatics.

If we take discourse analysis in its broadest sense, then it is possible to also view stylistics, "as simply the variety of discourse analysis dealing with literary discourse" (Leech, 1983: 151). This may not lead anywhere, and rather sets stylistics adrift from other movements in linguistics. Stylisticians have tended to draw eclectically from developments in discourse analysis (as they had done from other developments in linguistics) and the related field of pragmatics. Speech Act Theory, Politeness Theory, and Critical Discourse Analysis are now the staples of stylistic approaches. Speech Act Theory has also been adopted by literary theorists with some success, though Derrida's interpretation is quite different from Searle's. Fairclough's Critical Discourse Analysis (1989) has been extremely influential in encouraging a more politically orientated approach to stylistics. Used primarily in the analysis of media texts, it has proven fruitful in some aspects of literary analysis, reflecting the challenge (or threat) posed by the spread of media and cultural studies over traditional 'English' courses. Critical Discourse Analysis in a literary context is exemplified in the work of David Birch (1989), Sara Mills (1997) and Michael Toolan (1996), among others. It has its roots in Hallidayan systemic-functional linguistics (although Hodge and Kress 1993, successfully employ a Chomskyan model for analysis) and is particularly concerned with the linguistic encoding of ideology in texts. Its main object is most naturally the language of the media, of institutions, and of government; but again, stylisticians are able to examine the ideologies evident in representations of these elements as well as taking the broader view of literature as an encoder of ideology. The integrationalist approach of Michael Toolan is influenced by the work of Roy Harris (1984 and *passim*) and rejects many of the fundamental tenets of Western linguistics while promoting a holistic view of language function. Fundamentally exciting and iconoclastic, its effect has yet to be fully registered in literary discourse analysis.

Literary theory in the second half of the 20th century was initially driven not by Chomsky or Halliday or Richards or F. R. Leavis, or even Spitzer or W. K. Wimsatt, but by the Swiss linguist Ferdinand de Saussure, whose *Cours de Linguistique Generale* (1917) exercised a profound influence on continental and Anglo-American literary criticism (and indeed criticism of other arts). Translations and reprints of the work increased dramatically through the 1950s, 1960s, and 1970s, as the *Cours* became the *sine qua non* of literary criticism. But the way in which Saussure was adopted by literary critics and cultural theorists was vastly different from the way that, say, Halliday, was adopted by the stylisticians. Saussure offered no grammatical method and only the broadest semantic theory, and so was not adopted 'practically' in the same way. What he offered literary critics and theorists was a way of conceiving meaning relations, and he did so by positing a number of crucial, and by now extremely familiar, ideas:

(i) The distinction between *la langue* and *la parole*
(ii) The essential arbitrariness of the linguistic *sign*
(iii) The arbitrary and conventional nature of the *sign*
(iv) The distinction between the *signifier* and the *signified*
(v) Language is binary and contrastive.

These five observations together revolutionized literary and cultural criticism and were thoroughly used and abused throughout the middle and latter part of the 20th century. Aberrant readings and deliberate misreadings of Saussure pushed literary theory into an extreme self-reflexive period in the 1970s. At first, Saussure's work was felt most keenly in literary structuralism, where content was bracketed off and structure became central. The literary text was seen to function like a sentence – a massive grammatical construction. Individual words (or signs) were mere fillers for essential structural functions and a sign's meaning was a result of its relation to other signs (in particular one in which it stood in binary relation to) and based on an arbitrary relation between the 'acoustic sound-image' (the signifier) and the concept associated with it (the signified). Thus, at a stroke issues of a text's 'meaning' were reduced to that of a text's structure. This fact coupled with misreadings of Saussure and extreme versions of the theory of the arbitrariness of the sign (*contra* Saussure), took criticism away from the delicate consideration of a text's aesthetic value and toward a consideration of literary practice as *sign*.

This is only one half of the story, however, for another version of structuralism took the notion

of binary and contrastive relations and utilized it to produce close and immensely detailed analyses of the meaning relations in individual texts (Riffaterre, 1966). Indeed, Riffaterre's work, particularly the essay on Baudelaire's *Les Chats*, became a model for a certain kind of structural-linguistic analysis. In this important work, many of the present-day issues and difficulties to do with the location and description of style are evident. Riffaterre draws on the Russian formalist school in his notion of literature as some form of stylistic defamiliarization, but he attacks the structuralism of Roman Jakobson and Claude Levi-Strauss for its undiscriminating location of features (which may or may not have stylistic significance). Riffaterre further is concerned with the effects of the language upon its audience.

In the early 1970s, debates about the relationship between linguistic analysis and 'traditional' literary criticism raged, particularly in the United Kingdom. The most famous of these was the Fowler-Bateson debate (1971) (see Simpson, 2004 for a reprint of this argument). Roger Fowler took it as axiomatic that language analysis was at the heart of literary criticism, while F. W. Bateson, a literary critic, suggested that literature possessed an 'ineradicable subjective core' which was simply not amenable to linguistic analysis. Essentially, this was a claim for the unique status of literary language and a swipe at so-called 'objective' methods of analysis. But for a decade in the mid-1970s to the mid-1980s, the linguistic critics held sway, and the two approaches to linguistic theory and practice outlined above came together in a peculiarly anglicized form. The work of Fowler drew on both the continental Saussurean tradition and the more pragmatic (not in the linguistic sense) and eclectic stylistic Anglo-American tradition. In works such as *Linguistics and the Novel* (Fowler, 1977) *and Linguistic Criticism* (Fowler, 1986), one will find the work of Halliday, Chomsky, and Saussure linked with the practical consideration and analysis of a range of largely canonical literary texts. Traditional areas of investigation were given a new look, with some new terminology. In Fowler's work, we find analyses of 'mind style,' of paradigmatic and syntagmatic relations, and of free indirect discourse – standard areas for later stylistic analysis. Fowler's work drew on structuralist methodologies, if somewhat eclectically, but typically avoided Barthesian excesses.

In theory, stylistics offers common ground for those perennially separate groups of literature and language specialists; but the two domains have developed from such different origins that the relationship is never clear. In 1960, Roman Jakobson famously stated that "a linguist deaf to the poetic function of language and a literary scholar indifferent to linguistic problems and unconversant with linguistic methods are equally flagrant anachronisms" (1960: 377). One could extend David Lodge's statement that "the novelist's medium is language: whatever he does, *qua* novelist, he does in and through language" (Lodge, 1966: ix) to literature as a whole. Literature is fundamentally language, and the linguist is interested in language. This language can be conceived of as fundamentally different from 'ordinary' language, or as different only to the extent that it contains a greater concentration of features already present in other forms of language. But whether the difference is seen as one of degree or one of kind, the object of analysis is still language. What could be simpler? Even with the arrival, or rather discovery, of Saussure by literary theorists, the relation between linguistics and literature was not made clearer. This is partly because linguists in the 20th century, following Humboldt and more recently Chomsky, tended to view language as an abstract system, whereas the principal domain of the literary critic was in the textual features of the text as artifact. Stylistics thus continues to see the text as the object of study, but instead of seeing it as part of a system, sees it more simply as a site where language is organized, and proceeds to utilize the methods of descriptive linguistics for a more focused and less subjective analysis of those textual features. For the stylistician, then, the text is both data (as a linguist) and artifact (as literary critic). This assumption of the literary artifact (and acceptance of it) has led to the stylistician's domain object being largely simply the literary canon. Literary stylistics does not engage much in debates about the canon (on the whole) – it accepts it as its object of study and analysis. This is because it is not a coherent theory of literature as such, but a collection of possible methodologies. As noted, stylistics often borrows from whatever methodology is prevalent in mainstream linguistics. Traffic the other way – stylistics influencing mainstream linguistics – is almost unheard of. The influence of Saussure brought literary criticism and linguistics both to treat the text synchronically (that is, without regard to time). Stylistics is still a predominantly synchronic approach which has found no parallel to the historicist developments in literary theory that have dominated since the late 1970s.

An important development in the broad field of linguistics in the late 20th and early 21st centuries is that of 'cognitive linguistics.' Cognitive Linguistics (as part of a broader 'cognitive science') is most notably associated with the work of Giles Fauconnier, George Lakoff, Ronald Langacker, Mark Turner, and Eve Sweetser, among others. Much is made of

the supposed *antiobjectivist* stance of the cognitivists, where language, thought, and conceptualization are seen to be *embodied*. Embodied experience is expressed through metaphors (hence the cognitivists' obsession with this trope), and knowledge is constituted through and by what are known as *conceptual metaphors*.

Cognitive stylistics naturally takes its lead from cognitive psychology and linguistics, having a number of key assumptions. The first is to do with the 'embodied mind,' an attempt to heal the Cartesian split between mind and body. Mental activity is 'embodied,' in that physical and cultural functioning is interwoven and finds outlets in our use of metaphors and other tropes. Humans are said to conceptualize abstract concepts in concrete terms, where modes of reasoning are grounded in our physical being. Metaphors such as 'success is up' are said to demonstrate this. However, it is too easy to take this as a given, or simple cognitive disposition. Eve Sweetser has shown that such movements from the concrete to the abstract develop over a period of time. The movement, for instance, from the following two meanings of 'see':

(i) I see the cat
(ii) I see what you mean.

shows a cognitive development in terms of historical semantic change. In its most enlightening form, particularly in the work of Sweetser, it can throw light on the development of semantic change and thus has a diachronic as well as synchronic aspect. There are some within the discipline who wish to replace the term 'stylistics' with the term 'cognitive poetics,' but, in my view, this is a dangerous move. The strength of the eclectic approach offered by stylistics is also its weakness: its restless search for new applications and new theories to galvanize the movement can also be seen as the capricious appropriation of others' work. The cognitive poetics 'revolution' shows the discipline of stylistics at its best and at its worst – sifting through the mass of theories and applications for the most appropriate for stylistic analysis and producing genuine interdisciplinary analyses or misappropriating theories and rushing too quickly to apply them to texts.

Catherine Emmott's (1997) work has made important contributions to our understanding of certain procedures of text-mapping, drawing on recent cognitive and discourse theories. Emmott avoids the pitfalls of what might be called the 'new' affective stylistics by resisting the temptation to speculate further upon the aesthetic considerations of the text. Cognitive poetics (sometimes given the term 'cognitive stylistics') has an uneasy relationship with literary theory, and indeed with traditional stylistics. We might, for instance, define 'literariness' in terms of "cognitive events triggered in the mind by linguistic stimuli" (Pilkington, 2000: 189). But how are we to locate and define those 'cognitive events' except by the description and analysis of the 'linguistic stimuli'? It is not clear how this is different from saying that the text produces a certain effect because of its relevant linguistic features. Traditional literary concerns reappear with a new metalanguage. The focus, as in other cognitive approaches, is, then, on how the text works (or how readers work the text) rather than what the texts means. The work of Stockwell (2002) and Semino and Culpeper (2002) outlines the major concerns of the 'new' stylistics and is usefully read alongside the more traditional stylistic work of Paul Simpson (2004). Jonathan Culler's (1975) notion of 'literary competence' is the main precursor here (in a literary-critical context), but there are also links to the earlier work of Stanley Fish (1970) and Wolfgang Iser (1978). The 'human mind' is the focus of critical attention; but the human mind is a troubling, elusive thing whose functions and very being have to be inferred from human actions and processes. The principal difficulty is that as the analyses of individual texts proceed, the focus on the workings of the 'human mind' is diminished. Typically, as readings become more engaged with the manifest features of the literary text, claims about the 'cognitive' aspect of the analysis are more difficult to sustain.

An alternative to the cognitivists' approach is presented in the work of David Miall (e.g., Miall and Kuiken, 1994 and passim) and others. Miall's work draws on the work of Samuel Taylor Coleridge and grows out of the theories of both Coleridge and the 20th century formalist Victor Shklovsky. Other influences include the Dutch discourse analyst Teun van Dijk. Miall's claim is that the literary text is a universe "whose laws are distinctive" (1994: 2), echoing a more traditional view of the literary artifact. Although he on occasions assumes a crude notion of what constitutes 'ordinary language,' he makes some important observations regarding the nature of the literary text. Most cognitive approaches describe a 'resource-limited' system in which cognitive structures economize comprehension by deleting irrelevant propositions, inferring relevant propositions and building macropropositions. But Miall suggests that literary texts reverse the economizing effects of schemata and other supposed cognitive features. Thus, Miall finds cognitive approaches inadequate and unable to account for the richness of literary language. At a stroke, he rejects a dominant approach and brings to the fore a traditional view of the literary artifact.

Closely allied to the burgeoning cognitive stylistics movement is the development of empirical stylistic analyses from the late 1980s. Empirical stylistics also draws on and is influenced by the growing field of corpus-based linguistic studies. It faces many of the same difficulties faced by the affective stylistics of Stanley Fish developed in the 1970s and the *receptionaesthetik* of Hans Robert Jauss of the same time. Do we account for general dispositions of an ideal reader, or do we try to account for the readings of individuals? In all cases, what is the role of stylistic analysis? In such cases, the common assumption is that nothing is 'there' in the text until a reader construes it – a seemingly trivial point which nevertheless has potentially devastating consequences for a discipline based on the close analysis of manifest linguistic features. Studies such as Steen's (1994) into readers' processing of metaphor rely on conventional interpretation of informants' responses and the sifting and evaluation of data. The corpus of literary texts is already there, as it were, as given.

After the tremendous developments and upheavals in literary theory from the 1960s to the beginning of the1980s, criticism settled to a period of prolonged historicism, whether politicized or not. The dominant strains have been in historicized analysis, postcolonial and feminist (and postfeminist) work, including psychoanalytical approaches. To be sure, criticism could not sustain its relentless self-questioning forever, and there has been a certain amount of retreat from critical neuroses and a reassessment of earlier critical and literary issues – even such hoary old-timers as authorial intention. Certainly, literary theory turned away from the kinds of linguistic concerns that had been fundamental to its development in the 1960s through to the 1980s and focused more on extending and challenging the canon and on forging closer relationships with historical methodologies. In some ways, language-study (in its broadest sense) has rarely been further from the domain of 'mainstream' literary criticism; and theoretical inputs and influences from mainstream linguistics (or out the mainstream) are rare.

In stylistics, many of its traditional concerns are still being explored, despite the proclamations of the cognitive stylisticians. In journals, one will still find work on free indirect discourse, on 'mind style,' on metaphor and metonymy, on speech acts and pragmatics, on feminist stylistics, and on transitivity. This is partly due to the fact that a certain kind of stylistics (particularly evident in British universities) is essentially a pedagogical tool, and many of these topics and approaches are still the core of stylistics and 'literary linguistics' courses both in Europe and in the United States.

Stylistics in Europe has tended to engage with the interface of linguistic and literary theory more readily than the dominant British model (which is largely conservative in its eclecticism). European work – especially from The Netherlands, Germany, and Spain – has embraced movements both in linguistics and literary theory to produce challenging and often exciting readings of texts. European stylistics has tended to incorporate issues in philosophy, both 'continental' and 'traditional,' in its approaches and analyses much more readily than its more conservative counterpart. Here we are likely to find Derrida, Wittgenstein, Russell, Said, Gadamer, Kripke, and Spivak rubbing shoulders with Halliday, Chomsky, and Leech and Leavis, Greenblatt and Harris. Stylistics and literary theory are closely related in this eclectic tradition. This is partly due to a tendency in Europe to embrace European philosophy more readily than in Great Britain and the United States and a desire to integrate the empirical and the philosophical. Thus, the 'great four' of critical theory (and related fields) who so dominated and influenced cultural analysis in the 1960s, 1970s, and 1980s – Jacques Derrida, Roland Barthes, Jacques Lacan, and Michel Foucault – were assimilated into European cultural theory readily. Coupled with a tradition of stylistic analysis (as in the work of Teun Van Dijk), this philosophical and cultural assimilation gave rise (and to a certain extent still does) fertile cross-disciplinary literary analysis.

See also: Approaches to Translation: Relevance Theory; Cognitive Linguistics; Critical Discourse Analysis; Relevance Theory; Stylistics; Stylistics, Cognitive.

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Literature and the Language of Literature

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Producing Definitions

Definitions of literature and of literary language are socially and historically variable. The history of both terms has been constituted by differently positioned readers and writers framing different answers to questions concerning an appropriate definition. In this respect, definitions of literature and of literary language should not be considered as 'ontological,' establishing an essential, timeless property of what literature or literary language is, but as 'functional' – establishing specific and variable circumstances within which texts are designated as literary, and the ends to which these texts are and can be used (cf. Fowler, 1997; Frow, 2002). It should also be remembered that the circumstances surrounding the production and reception of definitions – who makes a definition, at what time, in what place, and for whom – play a significant part in determining the currency of those definitions. As part of a linguistic encyclopedia, this article also produces definitions from within a particular context, one that tends to have institutional authority insofar as it is sanctioned by universities and school examining boards.

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Literature: A Brief History of Definitions

In one sense, the definitions of literature and literary appear straightforward; the phrase 'English literature' occurs everyday and is used often with apparent felicity. However, what kinds of texts are designated by the term 'literature' is the subject of ongoing debate. To understand what is at stake in these debates, it is useful to look at the history of the word. The following definitions are presented according to the order in which they appeared historically. However, this order should not be taken to suggest the wholesale replacement of one sense by another, as though the term 'literature' could be emptied out and replenished with meaning. Rather, many senses have remained and do remain in use, alongside other senses, complementing and conflicting with each other. The following summary derives from Williams (1983).

Literature came into English in the late 14th century in the sense of acquaintance with 'letters' or books. To 'have' literature was to be schooled in polite or human learning. For example, Henry Bradshaw, writing in 1513, spoke with contempt for "The comyn people" who "without lytterature and good informacyon Ben lyke to Brute beestes." Writing in 1605, Francis Bacon used the term to praise the learning of King James I: "There hath not beene . . . any King . . . so learned in all literature and erudition, diuine and humane." The state of being well read was here associated with the normal adjective from this period – literate. From Bacon's use of 'literature,' however, it seems that the condition of being well read was at times close to the objective noun – the books in which one was well read.

The evaluative overtones of 'literate' (and of its antonym, 'illiterate') persist to this day and are regularly implicated in definitions of literature. There remains a general agreement that reading literary texts plays an important part in literacy development and can be especially valuable in extending imaginative and intellectual development, aesthetic appreciation, and an understanding of how experiences of people in the past and present can be represented (cf. Showalter, 2002; Abbs, 2003).

The sense of literature as a kind of knowledge seems to have persisted until the late 19th century. However, the blending of senses suggested by Bacon – both knowledge of books and books themselves – indicates that a general change in meaning took place in the mid-18th century. At that time, literature emerged in a newly objective sense, designating the activity or profession of a man of letters, as well as the whole body of books and writing, the realm of letters. In his *Life of Cowley* (1779), Johnson referred to "an author whose pregnancy of imagination and elegance of language have deservedly set him high in the ranks of literature." Johnson's reference to "ranks of literature" pointed less to a hierarchy of types of writing than to levels of polite learning: "elegance of language." At the same time, 'literary' no longer remained simply synonymous with 'literate,' but extended its meaning to describe the practice and profession of writing; the concepts 'literary merit' and 'literary labor' emerged during this period.

As 'literature' came to designate a whole body of writing, so the sense of a corpus of works produced by a particular nation or in a particular period began to develop in the late 18th and early 19th centuries. The idea of a *Nationallitteratur* developed in Germany from the 1770s, whereas references to a national literature also emerged in collections of stories published during this period in France (*Les Siècles de literature française,* 1772) and Italy (*Storia della letteratura italiana*, 1772). The concept of English literature seems to have followed these European uses.

The identity and constitution of a national literature are fraught with sociocultural and political struggles. These struggles focus upon the concept of a canon, certain texts that are considered central to a tradition of literature within a culture. The existence of a canon leads to the institutionalization of texts. Certain texts are 'set' for study by examination boards, syllabus designers, and teachers teaching particular courses; in turn, these books are categorized by publishing houses as canonical or 'classic' texts, and the whole process even serves to define what is considered to be literature (cf. Hodge, 1990). There is a certain degree of truth, therefore, in the statement of Roland Barthes that "literature is what gets taught."

Indeed, the notion of a canon of great literary texts is most problematized when national curricula are being developed, and definitions of what constitutes a national heritage are inevitably foregrounded. For example, the dominance of the canon by male writers and by a version of English writing confined to native British writers has been questioned for its partiality and may in turn be connected with the powerful positions held by white Anglo-Saxon men in educational establishments, on examination boards, and in the control of national curricula. Such circularity cannot help but influence how interpretations of the constitution of a national literary heritage are shaped (cf. Eagleton, 1996; Docherty, 2002). It is also necessary to recognize that canons are not immutable. The recent admission to the canon of English literature of the writer John Clare and the corresponding relative relegation of such 18th-century writers as Gray and Collins indicate how tastes change and evaluations shift as part of a process of canon formation, with

which definitions of what literature is and what it is for are inextricably bound.

During the 19th century, the sense of a national literature developed alongside a second sense, which comprised a nexus of meanings – literature as art, as aesthetic object, and as the product of great imagination or creative genius. This nexus of meanings represents a narrowing of meaning from the earlier sense of literature – writing books and books themselves – toward specifically imaginative writing. Before this specialization of meaning, the domain of imaginative writing had principally been denoted by poetry. However, by the middle of the 17th century, this term 'poetry' was gradually confined to metrical composition. It is probable that this application of the term to verse, together with the increasing importance of prose forms such as the novel, made literature the most available general word. However, whereas poetry had designated skills of writing and speaking in the context of high imagination, literature, in its 19th-century sense, referred almost exclusively to writing.

The post-18th-century senses of 'literature' and such associated terms as 'literary' still have effective currency in academic and popular uses. Nevertheless, 'literature' is subject to constant change; it is not universally the same everywhere and is, as a category of text, eminently negotiable. Definitions of literary language are similarly protean.

Literary Language

Definitions of literary language necessarily entail theories of literature, regardless of whether these theories are explicitly announced or recognized as such. Two main camps can be identified, and these are grouped, rather loosely and at the risk of oversimplification, into what have variously been dubbed 'intrinsic,' 'formalist,' or 'inherency' models, on the one hand, and 'extrinsic,' 'functionalist,' or 'sociocultural' models, on the other (Carter, 1997, 2004). Inherency definitions are presented first not only because they are historically antecedent but also because their influence has been pervasive in the export of Russian formalism into American New Criticism and in its subsequent import into practical criticism in Britain.

Foregrounding and Defamiliarization

Formalist definitions, especially those of the Russian formalists, were predicated on a division between poetic and practical language. Russian formalists sought to isolate by rigorous scientific means the specifically literary forms and properties of texts. Because there is no exclusively literary content, they argued, poetics should concern itself with the *how,* rather than the *what*. Thus, early formalists, such as Shklovsky, Tynyanov, Eichenbaum, and Jakobson, gave special attention to the linguistic constituents of the literary medium – language – and drew on the new science of linguistics for their theoretical and descriptive apparatus. Their main theoretical position was that literary language is deviant language. It is a theory that has had considerable influence.

According to deviation theory, literariness inheres in the degrees to which language use departs or deviates from expected patterns of language and thus defamiliarizes the reader. Literary language use is therefore different because it makes strange, disturbs, and upsets a routinized 'normal' view of things and thus generates new or renewed perceptions. For example, the phrase 'a grief ago' would be poetic by virtue of its departure from semantic selection restrictions that state that only temporal nouns, such as 'week' or 'month,' can occur in such a sequence. As a result, however, grief comes to be perceived as a temporal process.

Deviation theory represents a definition of literary language that contains some interesting insights, but that on close inspection is theoretically underpowered. For example, consider the following four observations:

1. Norms are difficult to define, which in turn makes deviation difficult to measure. What is the norm? Do we not mean norms? Is the norm the standard language, the internally constituted norms created within a text, the norms of a genre, a particular writer's style, or the norms created by a school of writers within a period? If it is the norms of the standard language, then what level of language is involved? Grammar, phonology, discourse, or semantics? Because the greatest advances in 20th-century linguistics have been in grammar and phonology, formalist poetics has tended to discuss literariness, in a rather limited way, in terms of grammatical and phonological deviations.
2. What is defamiliarizing in 1912 may not be that in 1922, when readers have acquired a different set of expectations. Despite the formalists' claims for the ahistorical separateness of art and literature from other kinds of discourse, the concept of defamiliarization is predicated upon socially and historically specific reading conventions.
3. To equate deviation with literariness is to suggest that literary language cannot result from adherence to norms, which in certain literary periods was a prerequisite for the creation of patterns in literary language.
4. The distinction between literary and 'normal' or 'poetic' and 'ordinary' language can be

deconstructed by pointing out that deviation regularly occurs in such discourses as advertising, jokes, and newspaper headlines that are not institutionally connected with 'literature.'

However, the idea of literary language as language that can result in renewal or in new ways of seeing the familiar cannot be as easily discounted as some of the above observations might suggest. Still, deviation theory needs greater theoretical and linguistic precision for the definition to hold, and it needs to be considered and tested alongside complementary definitions.

Self-Referentiality

Another influential inherency definition is particularly associated with Roman Jakobson. Originally connected with the Russian formalists, Jakobson subsequently moved to the United States and in a famous paper (Jakobson, 1960) articulated a theory of poetic language that stressed the 'self-referentiality' of poetic language. In his account, literariness results when language draws attention to its own status as a sign and when consequently there is a focus on the message for its own sake. Jakobson's notion has been clearly explained by Easthope (1983):

> The poetic function gets into the syntagmatic axis something which would normally stay outside in the paradigmatic axis: It does so by operating a choice in favor of something that repeats what is already in the syntagmatic axis, thus reinforcing it.

Thus, in the examples, *I hate horrible Harry* or *I like Ike,* the verbs *hate* and *like* are selected in favor of 'loath' or 'support' because they establish a reinforcing phonoaesthetic patterning. The examples cited (the latter was Jakobson's own and is a slogan in favor of the former American President Dwight Eisenhower, whose nickname was Ike) demonstrate that poeticality can inhere in such everyday language as political advertising slogans.

Jakobson's definition is, like definitions of deviation theory, founded on an assumed distinction between 'poetic' and 'ordinary' language. According to Jakobson, in nonliterary discourse, the word is a mere vehicle for that to which it refers. In literary discourse, the word or phrase is brought into a much more active and reinforcing relationship, serving, as it were, to echo, mime, or somehow represent what is signified, as well as to refer to it. This emphasis on the representational nature of literary discourse is valuable. However, it should be pointed out that Jakobson's criteria work rather better for poetry than for prose and that he supplied no clear criteria for determining the 'clines' or degrees of poeticality or 'literariness' in his examples. Like other formalist analysts, Jakobson also placed too great a stress upon the production of effects, neglecting in the process the recognition and reception of such effects. The reader or receiver (or listener) of the message and his or her sociocultural position tended to get left out of the account.

Speech Act Theories

Accounts of literary language that attempt more boldly to underscore the role of the reader interacting in a sociocultural context with the sender of a verbal message are generally termed 'speech act theories of literature.' Speech acts are uses of language that, either directly or indirectly, commit the user or recipient to a particular 'action.' In applications of these theories to literary text study, one of the main proponents has been Richard Ohmann. Ohmann's basic proposition was that the kinds of conditions that normally attach to speech acts, such as insulting, questioning, and promising, do not obtain in a literary context. Instead we have quasi- or mimetic speech acts. As Ohmann (1971) put it:

> Since the quasispeech acts of literature are not carrying the world's business – describing, urging, contracting, etc. – the reader may well attend to them in a nonpragmatic way and thus allow them to realize their emotional potential.

The literary speech act is typically represented as a different kind of speech act. As Fish (1980) and Hillis-Miller (2001) have demonstrated, definitions of literary speech acts presuppose a distinction between two kinds of discourse: (1) 'nonliterary,' 'nonfictional,' or 'serious' discourse that in various ways hooks up with the real world, and (2) 'literary,' 'fictional,' or 'nonserious' discourse that operates with diminished responsibility to that world. The first discourse type is typically privileged and normalized by speech-act theorists and is presented as basic and prior, whereas the other is presented as derivative and dependent on 'normal' language use (cf. Fish, 1980). Hence, according to Ohmann's formulation, literary speech acts involve (on the part of the reader) a suspension of the normal pragmatic functions that words may have in order for the reader to regard them as somehow representing or displaying the actions they would normally perform. In this sense, a literary speech act brings a world into being for its readers or listeners, but beyond that does nothing.

Ohmann's theory, like inherency models, suffers from an essentialist opposition between literary and nonliterary language that is not really borne out by careful consideration. Pratt (1977), for example, has demonstrated that nonfictional, nonpragmatic,

mimetic, or disinterested playful speech acts routinely occur outside what is called literature. Hypothesizing, telling white lies, pretending, playing the devil's advocate, imagining, fantasizing, relating jokes or anecdotes, and even using illustrations to underscore a point in scholarly argument, are then, by Ohmann's definition, literary. Ohmann's theory also does not explain either the 'literary' status of certain travel writings or Orwell's essays on the Spanish Civil War (and Orwell would have been extremely perturbed if people read those essays as merely pretended speech acts). Neither does it explain why detective novels, science fiction, and popular romances that are fictional are not literary nor why the prose works of Milton or Donne, which are nonfictional, are literary.

There are limitations to the theory of speech acts. However, what work on speech-act theory has done is to pose the question of whether the literary speech act is different or whether all language can be used for literary purposes. It is a tradition that has led to the insertion of quotations marks around the word 'literary.'

Literature as Discourse

The definitions of literary language that have been considered so far tend to be intrinsic rather than extrinsic definitions; there has been a focus on 'the language itself,' rather than on the source of the definition or on the institutional or ideological context in which the definition is made.

In a sense, to describe literature as discourse is to open yet another can of wormy definitions – what is meant by 'discourse'? In a recent article, Steen (2004) explained that discourse analysis is a complex field of research in the social sciences that requires interdisciplinary and multidisciplinary cooperation among linguistics, psychology, sociology, anthropology, and poetics, to name a few. As a result, within "the linguistic view of discourse," Steen (2004: 161) explained, discourse analysts "can examine discourse as language with special attention to the encoding of a message, or as a reflection of, or stimulus for, individual cognition and action, or as a reflection of or contribution to social interaction, or as the expression of a symbol in a culture."

In an influential study of literature as discourse, Fowler (1981) analyzed literature as a particular form of social interaction. According to Fowler, a literary text is not simply a formal structure with such properties as grammaticality, cohesion, and rhetorical patterning such as parallelism, chiasmus, metaphor, and so on but is also the medium of a situated interaction with a source and a recipient:

> To treat literature as discourse is to see the text as mediating relationships between language-users: not only relationships of speech, but also of consciousness, ideology, role and class. The text ceases to be an object and becomes an action or process (Fowler, 1997: 77).

To examine literature as a social action or process, Fowler's analysis drew upon the functional analyses associated with such linguists as Michael Halliday. In this way, the linguistic structures of a literary text are explained according to the communicative purposes they serve: "Once we start looking at literature as a part of social process then texts are opened to the same kinds of causal and functional interpretations as are found in the sociology of language generally" (Fowler, 1997: 78). From this analysis, literature emerges as a sociolinguistic fact – a set of values and functions assented to (even if not consciously recognized as such) by members of a community: "The values are neither universal, though they are subject to a small range of types of historical explanation, nor stable, though they change slowly" (Fowler, 1997: 78).

Any attempt to define literature as discourse is liable to underplay both the role and the relative position of the reader *vis-à-vis* the text. However, recent research has revealed that strategies of engagement with a literary text may be described in two ways: as a cognitive and emotional process in the minds of readers, and as a socially and culturally mediated expertise with language (cf. Charlton *et al.*, 2004; Kuiken *et al.*, 2004). Reference made to discourse conventions in the following section is an attempt partly to reorient definitions of literature with respect to the operation of readers or, more specifically, reading communities that are located in particular social, political, and historical environments.

Discourse Conventions

Analyses of literature as discourse must acknowledge that the production and reception of texts take place in relation to socially negotiated conventions. Among students and critics of literature in contemporary Western culture, certain conventions form a basis of taken-for-granted 'common sense' about literature. In an educational context, for example, specific conventions underpin reading literature in what is an institutionally acceptable or 'competent' way (cf. Culler, 1975). However, it must be stressed that these competencies are 'conventional.' Whereas this article attempts to define literariness with respect to discourse conventions, it need not follow that literary discourse is always produced with such functions in mind. Furthermore, whether or not a reader *chooses* to read a text in accordance with these conventions, as a literary text as it were, is one crucial determinant

of its literariness. Gerard Steen (1994), for example, has demonstrated that by presenting a newspaper article first in its original context (as a newspaper article), and then in a 'perverse' context (as part of a novel), readers are inclined to note metaphors that are prototypically journalistic and metaphors that are distinctively literary, respectively.

The discourse conventions of a given interpretive community inform the definitions of literature that are current within that community. Stockwell (2001), for example, has noted that fiction emerges as the prototypical form of literature in much of modern literary theory. So central is the concept of the fictional that many studies of literary theory emphasize imagination and alternativity without recalling that much literature is religious, autobiographical, or political or describes real journeys, satirizes real people, or recounts real events.

The institutionally and discursively regulated forms of use to which texts are put are historically specific. However, as Tony Bennett (1990) noted, this is not the same as distinguishing between historically different forms of writing. Texts from any period can be retrospectively literarized by abstracting them from the different institutional and discursive forms regulating their initial use. In taking up these criteria, it must be emphasized that the production and reception of literary texts are historically specific, socially situated acts. Rather than designate particular linguistic features as intrinsically 'literary,' these criteria describe how features typically function as a part of contemporary literary discourse conventions.

The Literariness of Discourse

Literature may usefully be considered not only as discourse but also as a discourse that shares characteristics with other discourses. Put another way, the conventions for the production and reception of literary discourse may be considered with respect to a typology of discourses; the more a discourse conforms to these conventions, the more literary it is considered to be. Accordingly, Carter (1997) proposed a 'cline' of literariness, along which a typology of discourses may be situated as more or less 'literary.' He suggested the following criteria.

Medium Dependence

The notion of medium dependence means that, the more literary a text is, the less it will be dependent for its reading on another medium or media (see Carter, 1997 for a range of examples). This criterion is part of a tradition of attributing to literary texts the qualities of mimesis and fictionality. According to this tradition, literary texts generate a world of internal reference and rely only upon their own capacity to project. However, this is not to suggest that literary texts cannot be determined by external or social or biographical influences.

It should be borne in mind that the notion of medium independence is a particular preserve of critics and students of literature. An emphasis upon the relative medium independence of literary discourse should not detract from the ways in which readers mobilize literary texts for social and cultural purposes. Janice Radway (1989), for example, has examined criteria for 'serious fiction' that emerge among members of the Book-of-the-Month Club. Radway emphasized that, for what she called 'the General Reader,' the value of 'serious fiction' is "a function of its capacity to be used as a map which is, despite the status of its representation, a tool for enabling its reader to move about effectively in the world to which it refers." For the editors of the Book-of-the-Month Club, books in the category of 'serious fiction' function for Club members "in a way very similar to many self-help manuals, advice books, and reference volumes."

Displaced Interaction

What is conventionally regarded as a 'literary' text is likely to be one in which the context-bound interaction between author and reader is more deeply embedded or displaced. However, although a more literary discourse is likely to be characterized by medium independence and displaced interaction, literary texts continue to participate in a medium of interpersonal exchange. Whereas literary texts may not be dependent on any particular medium and interaction between author and reader is embedded or displaced, readers can and do mobilize the communicative function of texts for social and cultural goals. Robert Hodge (1990), for example, has examined how literary texts, marked by the mode of unreality, are able to express alternative or oppositional meanings that otherwise might be suppressed from the public arena.

Polysemy

A literary text conventionally will be read for polyvalent meanings and may be produced with such functions in mind (cf. Steen, 1994). One characteristic of the polysemic text is that its lexical items do not stop automatically at their first interpretation. Denotations are always potentially available for transformation into connotation; contents are never received for their own sake, but rather as a sign vehicle for something else. Polysemy is a regular feature of many discourse genres, including advertising. Several recent studies of the language of advertising, including Cook (2001), have identified such

characteristics as polysemy, which point to the literariness of this discourse genre.

Polysemy is a significant communicative function that is promoted and valued in particular contexts and that operates according to specific reading strategies. However, to claim that polyvalent meanings are promoted does not necessarily mean that any or all interpretations will be accorded equal value or will meet with equal acceptance within a given interpretive community. Moreover, in certain instances, promoting polyvalent meanings may carry a serious social significance.

Reregistration

The notion of reregistration means that no single word or stylistic feature will be barred from admission to a literary context. This is not to say that certain stylistic or lexical features are not regarded as more conventionally 'literary' than others. However, reregistration recognizes that the full, unrestricted resources of a language are open to exploitation for literary ends. As studies of novelistic discourse by the Russian theorist Mikhail Bakhtin (1984) suggested, not simply single words but also the characteristics of other discursive genres may be represented in a literary context. According to Bakhtin, the effects of reregistration, of appropriating the characteristics of another discourse as an object for representation, are often parodic or travestying. In certain instances, the parodic effects of reregistration have serious social consequences, as was illustrated in the case of the fatwa declared by members of Muslim communities against Salman Rushdie following the publication of his *Satanic verses*. In such instances, the parodic function of literary discourse may be interpreted as a threat to the monologic authority of hegemonic discourses (cf. Mufti, 1994).

Interaction of Levels: Semantic Density

A text that is perceived as resulting from the additive interaction of several superimposed codes and levels is recognized as more literary than a text in which there are fewer levels at work or in which they are present but do not interact as densely. A more literary text is typically perceived to exhibit a high degree of semantic density that results from an interactive patterning at the levels of syntax, lexis, phonology, and discourse.

Discourse Patterning

Criteria for literariness discussed so far have focused mostly on effects at the sentence level. At the suprasentential level of discourse, effects can be located that can help differentiate further degrees of literariness. Once more, these effects contribute to the semantic density of literary discourse, as patterns of clause and tense extend over a suprasentential level.

Literature and the Language of Literature: Some Conclusions

Literary language is not special or different, in that any formal feature termed 'literary' can be found in other discourses.

Yet, literary language *is* different from other language uses in that it functions differently. Some of the differences can be demarcated with reference to such criteria as medium dependence, reregistration, semantic density produced by the interaction of linguistic levels, displaced interaction, polysemy, and discourse patterning. What is prototypically literary will be a text that meets most of the above criteria. In contrast, a nonliterary text will meet none or few of these criteria; that is, it will be monosemic, medium dependent, project a direct interaction, contain no reregistration, and so on.

The worst excesses of paradox and the essentialist dichotomies of an absolute division into literary/nonliterary or fictional/nonfictional can be avoided by positing a cline of literariness along which discourses can be arranged.

The sociolinguistic and sociocultural context of the discourse is important. This article has attempted to indicate how certain of the functions of literary discourse may be mobilized by readers or even reading communities for social and cultural purposes.

Literature and literary language may best be seen as socially and historically variable terms, with differently positioned readers and writers framing different answers to questions concerning an appropriate definition.

See also: Foregrounding; Style; Stylistics.

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Literature: Empirical Studies

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Introduction

The empirical study of literature (ESL) concerns all aspects of literary communication. Using methods of the social sciences, researchers test hypotheses concerning the attitudes, and behavior of participants in processes ranging from the production of what are considered literary texts, their mediation, and their reception. One of the central aims of the field is to examine how literary communication differs from (or resembles) other forms of communication. It is an increasingly interdisciplinary domain, with literary scholars, sociologists, psycholinguists, cognitive and social psychologists, and anthropologists combining their insights and methodologies. In the past ESL has first seen scholars moving from traditional disciplines of the humanities (e.g., stylistics, narratology, literary theory) into cognitive psychology; conversely, psychologists became curious how results obtained in controlled experiments with artificial texts relate to responses to full-blown literary texts. Interdisciplinarity ideally enriches both sides of the equation, with, for instance, literary studies contributing refined taxonomies of narrative structures, and psycholinguistics contributing methodological rigor and available insights in narrative processing in joint efforts to establish characteristics of literary processing. In the early history of ESL we do not always see such fruitful interchange. Some of the work did not meet standards in either the humanities or the social sciences. However, a lot has changed.

The wide range of research traditions, as well as the many different cultural and language barriers may have hindered interdisciplinarity (Steen, 2003). However, cooperation is enhanced by the common

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The wide range of research traditions, as well as the many different cultural and language barriers may have hindered interdisciplinarity (Steen, 2003). However, cooperation is enhanced by the common

ground that researchers share. The use of empirical methods, for one, stimulates the exchange of findings. Second, most researchers agree on the epistemological foundations of their work. One basic idea of ESL may be traced back to Mukařovský's (1974) distinction between 'artefact' (the signs on the paper) and the 'aesthetic object.' For an aesthetic object to be realized, someone must read the artefact, interpret it, and evaluate it. Consequently, to understand literature means to understand readers' responses. And this requires empirical methods of investigation. Another assumption shared by most researchers in ESL is that it is possible to discover regularities in what people do with literature. Many theories in literary studies generate hypotheses about such regularities. Researchers in ESL agree that these claims need to be tested empirically.

Origins

Besides the growing awareness among literary scholars of the inherently empirical nature of some of the problems in literary studies, there are a number of other developments that have led to ESL (Andringa, 1998). One is the rise of reception aesthetics in Germany. We can distinguish two basic ideas in this movement. Both are relevant to ESL. First, in Wolfgang Iser's hermeneutic approach, literary texts are interpreted from the perspective of the reader. It is important to note that 'the reader' here is a mere construct in the mind of the interpreter, and does not necessarily have anything to do with the empirical reader. A second idea in reception aesthetics concerns research in the history of literature, which, as Hans-Robert Jauss proposed, should focus more on readers' responses. Developments in literary history are best understood, he claimed, by investigating audiences' 'horizon of expectation' (their aesthetic and other norms) and the degree to which a given text meets (or does not meet) these expectations.

It is a small step from there to doing actual empirical research. This step was not taken by reception aesthetics, however. A call for moving from readers-as-construct to empirical readers was made by the German psychologist Groeben (1977), who pointed out that many of the concepts in literary studies could easily be operationalized. In addition, he argued, this would make literary studies much more relevant to society at large. Only a few years later, Schmidt (1982) provided a theoretical basis for ESL, describing the literary system in contrast to other systems in society. He pointed out the differences in terms of communication conventions: the 'aesthetic (or non-referential) convention' in contrast to the 'fact convention' used in other discourses; the 'polyvalence convention,' the unwritten agreement between authors and readers that the text may well have more than one interpretation, as opposed to the 'monovalence convention' used in other systems.

Another ESL strand comes from France, where mainly sociologically oriented researchers investigated the influence of extraliterary factors such as economy, politics, geography, and religion. Of central importance to the sociology of literature in France and elsewhere is the work of Bourdieu (1984). His concept of the literary field describes how literary evaluation is determined by sociological factors rather than properties of the aesthetic objects. All agents (artists, critics, art consumers) strive for symbolic value (social approval, status) to obtain, in the end, economic power. Lifestyle (which includes reading behavior) is conceived here as a mean for social groups to distinguish themselves from others and to ascertain group membership.

Yet another origin of ESL can be found in psycholinguistic studies, mostly conducted in North America. A number of researchers focused on the processing of narratives, some of them looking back at the work of Bartlett. Of importance to this field of research is schema theory, schemas being memory structures abstracted from idiosyncratic experiences. A large body of research concentrates on how readers build 'situation models,' that is, cognitive representations of the events, actions, characters, themes, and authorial intentions (van Dijk and Kintsch, 1983).

Another root of ESL can be found in America's reader response movement. As a result of democratization in education (and elsewhere in society), educationalists shifted their attention from a top-down approach of teaching how to arrive at correct interpretations of literary texts to an interest in what literature meant to students personally. Important in this movement is the work by Rosenblatt (1938), who focused on the influence of literary socialization on reading. Some of the research in this field is of a psychoanalytic nature and looks at how readers search for identity themes in the literary texts they read (Holland, 1975).

Mapping the Field

The origin of the research methods applied in ESL may lead us to distinguish two general directions: the psychology and the sociology of literature. However, such labels do not adequately represent recent developments in ESL, nor the research objects themselves. As to the latter, the various agents and processes in literary communication are affected by both psychological and sociological factors. Reception research focuses on readers' aesthetic evaluation, their reading

motivation, and the effect reading has on them. Although this field is dominated by psychological approaches, the processes involved are clearly also influenced by sociological factors (e.g., the institutional context in which readers read, and readers' literary socialization). In the sociology of literature researchers seek to explain differences in reading behaviors of social groups, and how institutions such as literary criticism are governed by social factors (e.g., a desire for status or social approval). However, exclusively relying on sociological models to explain, for example, aesthetic preferences ignores too much research showing the effect of text properties.

Hence the call of some researchers for an integrated approach, which does seem to be reflected in recent developments in ESL (Andringa, 1998). With overlapping interests, different methodologies and disciplines, and differences in the precise definition of the research object, the field has become too complex for a clear-cut distinction between the psychology and sociology of literature; therefore the present overview attempts an alternative categorization. First, research pertaining to production and distribution will be introduced. This work is mainly sociological, focusing, for instance, on economic conditions for literary production and on the influence publishers have on literary communication. Here we will also discuss studies exploring the market for literature: why do some people buy literary books, while others do not? In the next section, research pertaining to reception or processing will be presented, including a description of cognitive studies of narrative processing in general, as well as of research specifically pertaining to literary narratives and other literary genres. The final section on alternative categorization gives an impression of post-processing research – studies of reader behavior after reading the text. Here we find research pertaining to canonization, reception in literary criticism, and the effects of reading literature on readers' behavior, attitudes, norms, and values.

Production and Mediation

Strong evidence shows that socioeconomic factors influence developments in literature. Janssen (2001) reviews the research concerning the social-economic conditions for authors to do their work. Central to many of these studies is the term 'gatekeepers': agents in the literary field who are involved in selection (e.g., of which texts are actually published). Examples of research subjects are: the effect of censorship on the creative process; the effect mediators have on literary production, for instance, when looking at translations of Third World literature into modern Western languages; and factors influencing authors' careers. These are important efforts that could help to understand processes studied by literary historians (e.g., canonization). One example is presented in Peterson (1985). He shows how factors like copyright, technology, industry structure, and market affected the rise and decline of one particular genre, the short story in the United States.

Psychological studies of production processes seem somewhat underrepresented. Much work, it seems, still needs to be done to examine processes of literary creativity (Simonton, 1984). Research often involves self reports of writers. Other research compares creative and less creative persons to determine the factors that covary with creativity, both in personality (e.g., willingness to delay a decision, tolerance for uncertainty), and in biology. Under this subheading we could also place quantitative (rather than psychoanalytic) studies concerning the relation between, on the one hand, authors' personalities and events in their lives, and, on the other hand, the stylistic aspects of their texts (Janssen, 2001).

Distribution research concerns the factors that determine what books people buy or borrow from the library. Most studies focus on social-economic factors in reading behavior, the lion's share being inspired by Bourdieu's (1984) theoretical framework. In his view, aesthetic preferences have a social function. Like other lifestyle components, they are ways to affirm group membership. In understanding the dynamics of the literary field, researchers look at status: the more status agents have accumulated, the more their evaluation will be considered legitimate and the more influence they will have on canonization. Also, in striving to obtain status, agents deny their interest in economic capital. Only this will result in symbolic capital, which will, in turn, lead to economic capital. These ideas have had a strong impact on what is called the institutional approach in ESL, which looks at the role of publishers, literary criticism, and literary education on aspects of literary communication (Griswold, Jansen, and van Rees, 1999).

Recent studies present a more complex picture of reading audiences than Bourdieu's distinction theory predicts. Peterson's (1992) account of cultural stratification reveals there is no empirical evidence for a clear distinction between elite and nonelite culture consumption patterns. Instead, we see is an 'omnivore' audience that is involved in a wide range of cultural activities (including the elite arts), while a mainly low-educational 'univore' audience appreciates only a few nonelitist cultural activities. Other research shows that reading behavior can indeed be predicted by readers' social networks, but also by their cultural competence, personality, behavioral beliefs about the rewards of reading literature,

norms related to literary reading, and the promotion of reading by parents, schools, etc. (Griswold, Jansen, and van Rees, 1999).

Historical Readers An important subcategory of production and distribution research concerns the behavior of historical readers. These studies allow us to put current changes in reading audiences into perspective. Moreover, the history of reading may contribute to the contexualization of literary history. Literary history seems incomplete without knowledge of who the readers of the literary texts were, for whom the texts were written, what their expectations were, and how aesthetic norms changed through time and how such change affected reception. Research in this field is sometimes based on systematic content analysis of newspaper or magazine reviews. Some studies are based on sales records. One has to be careful interpreting these often incomplete data. Also, the data do not show whether the books were actually read. Taking these drawbacks into account, some interesting studies have been carried out about production and distribution in the past. For example, Kloek and Mijnhardt (1993) show that the so-called reading revolution in the 18th century is probably nothing more than a myth.

Reception

Under the heading of reception we will briefly review research on the processing of narratives in general and literary texts in particular, focusing on studies pertaining to processes that occur during and directly after reading.

An impressive body of cognitive research on discourse processing contributes to our understanding of how narratives are processed (e.g., Emmott, 1997). Of course, not all narratives belong to the group of texts referred to as literature, and not all literature is written in the form of narratives. Nevertheless, research results have been successfully applied in literary studies (for instance in cognitive stylistics, Semino and Culpeper, 2002). Central in many studies is schema theory, which proposes that schemata are essential to narrative comprehension processes and recall. These insights have proven to be useful in understanding, for instance, the role of genres in literary processing.

Other relevant examples of research issues are: the processing and accessibility in memory of information about characters; how readers keep track of speakers, of who said what, and who knows what; the causal inferences that readers make during reading; the conditions under which predictive inferences are made; inferences concerning the 'aboutness' or the theme of the text; the gender of the author; his or her intentions (e.g., Magliano, Baggett, and Graesser, 1996; Louwerse and van Peer, 2002). Cognitive psychology dominates this line of research. However, a growing number of studies investigates the role of affect (e.g., the effect of empathy on narrative comprehension; factors generating participatory responses (e.g., Gerrig, 1993).

Important for ESL is the relation of findings in narrative processing research to the processing of literary texts. Many of the studies mentioned above focus on factors that facilitate comprehension, causal sequence reconstruction, understanding character goals, etc. van den Broek, Rohleder, and Narváez (1996), for example, proposed a model for "successful reading of literary texts" that suggests that much depends on the construction of a coherent mental representation. This emphasis may lead researchers to ignore what is possibly typical for processing literature, namely those aspects that **obstruct** readers' understanding (*see* **Foregrounding**). Neither, of course, do the narrative models take response to poetry into account. Nevertheless, as Van den Broek *et al.*, suggested, the research does seem a useful starting point to examine **deviations** of literary narratives from more accommodating ones, thus discovering where literary processing differs from processing of other discourses.

One complaint concerning the studies referred to above is that they often look at seemingly insignificant 'miniature' hypotheses. Consequently, the results seem to be irrelevant to the bigger issues that would grant ESL more relevance within the humanities (Ibsch, 1996). Zwaan (1993) is arguably an exemplary study for ESL in the sense that he informs debates central to literary studies. His findings point out that readers process literary texts in a different way than other text genres. Thinking that they are presented with a literary text, readers read more slowly and remember more of the surface structure. This complies with what some literary theorists predict (e.g., Shklovsky, Jakobson).

Studies in narrative processing may not always seem of direct relevance to a better understanding of literary communication, but it should be noted that this is often not even the primary interest of the researchers, let alone that they claim to have solved the riddles of literary studies. Cognitive stylistics, however, explicitly aims at examining (literary) style and the effects it has on readers (e.g., Semino and Culpeper, 2002). While only a decade ago it may still have been feasible to summarize developments in this field, it is now not even possible to enumerate all the subjects of interest. Here we will therefore only look at a few examples. One is the field of metaphor research, especially those studies that pay attention

to the specific role of metaphors in literature (e.g., Steen, 1994; Hoorn, 1997). A second field pertains to the effect of foregrounding, a term used to describe where literary style deviates from daily language (e.g., see, for more empirical studies, **Foregrounding**). A third group of studies examines the effect of sound on reader response. Two approaches can be distinguished here: first, those studies that focus directly on readers' responses to sounds, either relative to context or not; second, studies based on computer-assisted content analysis (see, for a discussion, Miall, 2001).

A fourth group of studies, the lion's share of cognitive stylistics, can be labeled as psychonarratology, a term coined by Bortolussi and Dixon (2003). Methods of cognitive psychology are applied here to test empirical assumptions of narratology, the text-oriented study of narratives. Examples of research subjects are: the effect of narrative structure on feelings of surprise, suspense, and curiosity (Brewer and Lichtenstein, 1982; Vorderer, 1996); the effect of narrative perspective (Van Peer and Chatman, 2001); the processing of information about story characters; and how findings of social cognition research apply to perception of characters (Bortolussi and Dixon, 2003).

Differences in Reader Response A central question in reception research is (or rather, should be) 'How do differences in response to literature come about?' Are there general patterns or regularities in what moves readers, for instance, to feel sympathy for fictional characters? This is mainly the domain of psychology. Miall and Kuiken (1995) produced a Literary Response Questionnaire (LRQ) that was shown to be a useful instrument to differentiate between readers' attitudes toward literature. Studies under this subheading pertain to developmental differences, gender differences, and differences between expert and novice readers. In this last group, some studies reveal similarity in responses to textual features; others find that aesthetic norms and interpretation strategies depend on readers' literary competence. To make research findings in this domain more comparable, future research should more carefully describe 'reading experience' or 'literary competence' on the one hand, and text features on the other hand. Some research focuses on cross-cultural differences. Generally these studies show mixed results: some do find differences between readers from different cultures, but the majority point to similarities.

An important research tradition that may help understand differences in aesthetic evaluation can be found in experimental aesthetics (Berlyne, 1974). Berlyne's influential theory about the processing of aesthetic information conceptualizes art objects as psychological stimuli, some more complex, novel, or ambitious than others. The theory proposes that the more complex the stimulus, the more capacity is required from the perceiver (or reader) to process the stimulus. Exploring the relation between stimulus properties and aesthetic pleasure, the theory suggests an inversed U-curve (and in itself an instantiation of the Wundt-curve): appreciation will increase with increasing complexity, but only up to a certain point; after that optimum, appreciation will decline. Research in this field is often experimental. It sometimes involves physiological measures (of arousal), the interpretation of which is not always unambiguous. However, the results have been replicated under many different circumstances, using a wide variety of measures and stimuli.

Post-processing

Post-processing research mainly pertains to literary criticism, but also to the effects that reading literature has on the reader. The first category is dominated by the institutional approach. Some researchers look at the social dynamics in literary criticism to examine how consensus is reached over the value of literary texts. Findings suggest that that the relative status of critics affects their power over this evaluation process (Griswold, Jansen, and van Rees, 1999).

The second category mainly consists of psychological and educational studies. Researchers concentrated on the effects on norms, values, attitudes, and empathic ability (Hakemulder, 2000). Most of these studies do show effects, but few allow claims about the specific effects of literary communication. Some studies focus on literary education and its effect on literary socialization, on reading behavior at a later age, and on attitudinal effects of different educational approaches to literary education.

Current Trends and Debates

One of the important trends in the relatively short history of ESL is a shift from theoretical concerns (e.g., reflection on the epistemological foundations of the new discipline) to a predominantly research-driven approach, a development toward normal science in the Kuhnian sense (Steen, 2003). ESL has met with strong criticism from traditional hermeneutics, mainly focused on the superficiality of some of the research questions and the lack of external validity of laboratory experiments, but also fed by an indifference among scholars toward empirical validation and toward (naive) readers' interpretations of complex literary texts (e.g., Sternberg, 2003).

Some of these objections were also raised within ESL itself, and some important efforts have been made to remedy these problems. For example, more and more studies work with literary texts rather than experimenter generated ones, which has resulted in an increase in external validity. Careful manipulation of literary texts can sometimes compensate for the resulting loss of control. It may be advisable to conduct an evaluation of this method, after some time has passed, to see whether it is not systematically the manipulated version that has less effect (e.g., on aesthetic pleasure) than the originals.

One problem with much of the available research in ESL is that the population under investigation is rather limited (often undergraduate psychology students at some American university). However, some look at other age groups, and others take a cross-cultural perspective on response to literature. This will eventually result in greater generalizability of the findings.

ESL has seen a shift from radical standpoints (e.g., Schmidt's radical constructivism) to more integrated models (e.g., Bortolussi and Dixon, 2003). One single approach clearly cannot explain all the phenomena in literary communication, and therefore researchers need to take many factors into account to generate more comprehensive models. Accounting for institutions, or more generally the context in which people read, is essential when explaining literary evaluation. However, psychological research focusing on the effects of text properties leaves no room for one-sided absolutism.

Another development in ESL is a growing attention to the role of emotions in the reception of literary texts (Radway, 1984; Nell, 1988; Frijda and Schram, 1994). This seems to go hand in hand with the use of qualitative research methods. To assess spontaneous imagery and emotional responses, some researchers prefer free response, self report, and think aloud procedures rather than measures such as response time and closed questionnaires (e.g., Andringa, 2004).

A trend we can detect in ESL is that more and more researchers do not look at literary communication in isolation anymore, but put it in a wider context of media communication. Konijn and Hoorn (2005), for instance, have developed a model for perceiving and experiencing fictional characters for both readers and spectators of movies. This is also reflected in the work of such researchers as Vorderer (1996) and Schreier (Schreier, Knobloch, and Wieler, 1998).

ESL has seen boosts in its development every time researchers of different disciplines are brought together in joint projects, be it for conferences of the International Society for Empirical Studies of Literature and Media (Internationale Gesellschaft für Empirische Literaturwissenschaft, IGEL), or of the Poetics and Linguistics Association (PALA), book publications, or thematic issues of journals such as *Poetics* and *SPIEL*. Hopefully the future will see more of these fusions of literary studies and the social sciences.

See also: Discourse Processing; Emotion: Stylistic Approaches; Foregrounding; Humor in Language; Ingarden, Roman (1893–1970); Literary Pragmatics; Literary Theory and Stylistics; Literature and the Language of Literature; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Narrative: Cognitive Approaches; Reading Processes in Adults; Reading Processes in Children; Schema Theory: Stylistic Applications; Shklovsky, Viktor Borisovich (1893–1984); Stylistics; Stylistics, Cognitive; Thematics.

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Lithuania: Language Situation

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The Republic of Lithuania is located on the eastern coast of the Baltic Sea. Lithuania borders Latvia, Belarus, Poland, and the Kaliningrad district of the Russian Federation. The country covers 65 300 km^2. Lithuania has a population of 3.48 million, of whom 66.9% reside in urban areas. According to the 2001 census, Lithuania consists of 115 ethnicities: Lithuanians make up 83.5%, Poles 6.7%, Russians 6.3%, and the others make up the remaining 3.5% of the population.

Lithuanian is the only state language used in all spheres of life. Its status as a state language is legitimized by the constitution of the Republic of Lithuania. Its public use is regulated by the Law on the State Language, adopted in 1995. Lithuanian is the mother tongue of the majority of the Lithuanian population. It is used as a second language by 356 000 non-Lithuanians, most of whom reside in the southeastern Lithuania and a few cities.

Lithuanian is one of the two Baltic languages of the Indo-European family (the other being Latvian). It is one of the oldest living Indo-European languages, and has retained many archaic linguistic features also characteristic of Latin and Sanskrit. The Lithuanian

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alphabet has the Latin alphabet as its basis. It consists of 32 letters, some of which have certain diacritical marks to indicate special sounds. Lithuanian is an inflectional language. The noun has seven cases, and the verb has a particularly complex system of inflections. The stress is free.

Standard Lithuanian is about 100 years old, which makes it a relatively young language. It is used in all spheres of public life, education, and the media. In informal and semiformal contexts, regional and urban dialects are used. Two major dialects are distinguished: Aukštaičių (the Highlanders') and Žemaičių (the Lowlanders'). Standard Lithuanian was formed on the basis of the Western Highlanders' dialect.

Russian is widely known in Lithuania: 60% of the Lithuanian population use it as a second language. In Soviet times, before the restoration of independence in 1990, asymmetrical bilingualism was dominant: most Lithuanians could speak Russian, whereas most Russian speakers could not speak Lithuanian. Russian is the mother tongue of 89.2% of Russians. Many Belarusians, Ukrainians, Jews, Poles, and others also consider it as their mother tongue. At present, many Russian speakers are learning Lithuanian and becoming bilingual.

Polish is used as the mother tongue by 80% of Poles, most of whom reside in the capital, Vilnius, and its region. It is a local spoken variety different from standard Polish. A spoken variety of the Belarusian vernacular is used in rural southeastern Lithuania. Ukrainian, Tatar, Yiddish (Western Yiddish), Latvian, German (Standard German), and Romani are used as home languages.

Lithuania's major ethnic minorities have state-run schools with their ethnic language as the language of instruction and Lithuanian taught as a subject. Tertiary-level state education is offered in Lithuanian only. Ethnic minorities have TV and radio programs, newspapers, and magazines.

The most common foreign languages known by people in Lithuania are English (17%), Polish (9%), German (8%), and French (2%).

See also: Balto-Slavic Languages; Bilingualism; Lithuanian; Minorities and Language.

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Lithuanian

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Lithuanian (*Lietùvių kalbà*) is the native language of some 2.9 million speakers in the Republic of Lithuania. Together with Latvian, it forms East Baltic, the sole remaining branch of the Baltic family of Indo-European languages. There are two major dialects of Lithuanian, the more conservative and territorially greater Aukštaitic (*aukštaičių tarmė*) and the more innovating Žemaitic (*žemaičių tarmė*; Samogitian), spoken in the northwest quarter of Lithuania. The standard language is based on the speech of the southwest Aukštaitic region, bordering former East Prussia.

The Written Language

The Writing Tradition in East Prussia

Lithuanian is attested in written form from the 16th century, in three varieties of the Aukštaitic dialect; the earlier texts are chiefly translated and original religious literature. Book publication in Lithuanian began earliest in German East Prussia (which had a substantial Lithuanian population) in connection with the spread of the Reformation. The first work published in Lithuanian is a 1547 translation of a Lutheran

alphabet has the Latin alphabet as its basis. It consists of 32 letters, some of which have certain diacritical marks to indicate special sounds. Lithuanian is an inflectional language. The noun has seven cases, and the verb has a particularly complex system of inflections. The stress is free.

Standard Lithuanian is about 100 years old, which makes it a relatively young language. It is used in all spheres of public life, education, and the media. In informal and semiformal contexts, regional and urban dialects are used. Two major dialects are distinguished: Aukštaičių (the Highlanders') and Žemaičių (the Lowlanders'). Standard Lithuanian was formed on the basis of the Western Highlanders' dialect.

Russian is widely known in Lithuania: 60% of the Lithuanian population use it as a second language. In Soviet times, before the restoration of independence in 1990, asymmetrical bilingualism was dominant: most Lithuanians could speak Russian, whereas most Russian speakers could not speak Lithuanian. Russian is the mother tongue of 89.2% of Russians. Many Belarusians, Ukrainians, Jews, Poles, and others also consider it as their mother tongue. At present, many Russian speakers are learning Lithuanian and becoming bilingual.

Polish is used as the mother tongue by 80% of Poles, most of whom reside in the capital, Vilnius, and its region. It is a local spoken variety different from standard Polish. A spoken variety of the Belarusian vernacular is used in rural southeastern Lithuania. Ukrainian, Tatar, Yiddish (Western Yiddish), Latvian, German (Standard German), and Romani are used as home languages.

Lithuania's major ethnic minorities have state-run schools with their ethnic language as the language of instruction and Lithuanian taught as a subject. Tertiary-level state education is offered in Lithuanian only. Ethnic minorities have TV and radio programs, newspapers, and magazines.

The most common foreign languages known by people in Lithuania are English (17%), Polish (9%), German (8%), and French (2%).

See also: Balto-Slavic Languages; Bilingualism; Lithuanian; Minorities and Language.

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Lithuanian

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catechism by Martynas Mažvydas (Martinus Masvidius). The foreword begins with a personal appeal to the reader, *Bralei seseris imkiet mani ir skaitikiet* 'Brothers, sisters, take me and read me'. The language reflects Mažvydas's native south Žemaitic dialect, with Aukštaitic elements. Subsequent Lithuanian publications in East Prussia are written in an increasingly normalized variety of the local west Aukštaitic dialect, codified in Daniel Klein's 1653 *Grammatika Litvanica*, the first grammar of Lithuanian.

The Writing Tradition in the Grand Duchy

In the Catholic Grand Duchy of Lithuania, two writing traditions took root, one based on the East Aukštaitic dialect of the capital, Vilnius, and the other representing the Central Aukštaitic dialect of the Kedainiai area. The latter served as the medium for the earliest Lithuanian publications in the Grand Duchy, i.e., Mykalojus Daukša's 1595 translation of Jacobus Ledisma's popular Catholic catechism and his lengthy 1599 translation of Jakub Wujek's collection of sermons, the *Postilla Catholicka*. Although these were translations, the language of these works is relatively natural and had considerable influence on the later cultivation of Lithuanian. Daukša's works are also the first accented texts in Lithuanian, and as such are of particular importance for the study of the historical prosody of the language.

The National Standard Language

The increasing polonization of the Grand Duchy's nobility and educated classes led in the 18th century to a decline in the Central and East Aukštaitic writing traditions (the latter eventually disappeared). The present-day standard language has its roots in the late 19th century, and is based on the dialect of the southern West Aukštaitic region, in which the speakers are traditionally called *suvalkiečiai*. Several factors stand out in the establishment of this dialect as the national standard: the prior literary tradition of the virtually identical Aukštaitic dialect of neighboring East Prussia; the authority of the 19th-century Lithuanian grammars of A. Schleicher and F. Kurschat, which described the same Prussian Lithuanian speech; and the normative influence of late 19th- to early 20th-century newspapers such as *Aušra* (*The Dawn*) and *Varpas* (*The Bell*), which had many writers and editors (in particular Jonas Jablonskis) who came from the southwest Aukštaitic dialect area.

Phonology

Prosodic Features

Standard Lithuanian has free stress, which may alternate between a stem and ending within a grammatical paradigm, as in *dukrà* (nominative), *dùkrą* (accusative)'daughter'; *sakaũ* 'I say', and *sãko* 'he says'. There are four such stress patterns for nouns and two for verbs. Stressed long vowels and diphthongs (including sequences of vowel plus tautosyllabic resonant) distinguish two phonemic contour tones, traditionally referred to as acute (´) and circumflex (˜), as in *šáuk!* 'shoot.IMP' vs. *šaũk!* 'shout.IMP'. Short stressed vowels are marked with a grave accent (`). The tones are conventionally indicated in dictionaries and linguistic works; otherwise, they are not represented.

According to the norms of the standard language, acute tone *(tvirtaprãdė príegaidė)* is realized with a falling tonal contour, whereas circumflex tone *(tvirtagãlė príegaidė)* is level or rising. The tonal opposition is clearest on diphthongs; in the urban colloquial language, the distinction is becoming neutralized on long vowels. The phonetic realization of the two tones differs dialectally; in particular, the acute tone of northwest Žemaitic speech incorporates a glottal stop *(lauztìnė príegaidė* 'broken tone').

The Vowel System

Vowel length is distinctive in Lithuanian. The rather open short vowel phonemes /i [ɪ], u [ʊ], e [ɛ], a [a]/ (orthographically *i*, *u*, *e*, *a*) are inherited from proto-Baltic and also result from an early Lithuanian shortening of final long vowels under acute tone (compare *tà* 'this. NOM SG FIM' with Latvian *tã̃*, having the Latvian reflex of acute). In addition, a short /ɔ/ (spelled *o*) is found in words of foreign origin.

The long vowel phonemes /iː, uː, eː, oː, æː, ɑː/ (orthographically *y/i*, *ū/ų*, *ė*, *o*, *e*, *ą*) also have two sources. Inherited length is represented by the spellings *y*, *ū*, *ė*, *o [< *ā]*, as in *gývas* (**gī*-) 'alive', *bū́ti* (**bū*-) 'to be', *sė́ti* (**sē*-) 'to sow', and *brólis* (Latvian *brãlis*) 'brother', whereas *i*, *ų*, *e*, and *ą* develop from sequences of vowel plus tautosyllabic *n*, when not before a stop (where they are preserved). Original *V* + *n* sequences were first replaced by long nasalized vowels, marked in the earlier texts by a hook under the corresponding vowel graph. These vowels were eventually denasalized, although the orthography still reflects the earlier practice, as in *į̨* [iː] (< **in*) 'to, into', *siųsti* [ˈsʲũstʲɪ] (< **siuñt*-) 'to send', *tę̨sti* [ˈtʲæ̃ːstʲɪ] (< **teñs*-) 'to continue', and *žąsìs* [žɑːˈsʲɪs] (< **žañs*-) 'goose'. Both long and short *a* are fronted to /æː/ and /ɛ/, respectively, after a palatalized consonant or *j*, as in *gìlią* 'deep.ACC SG FEM' = *gìle* 'acorn.ACC SG FEM', both [ˈgʲɪlʲæ̃ː]; and *giliàs* 'deep.ACC PL FEM' = *gilès* 'acorns.ACC PL FEM', both [gʲɪˈlʲɛs].

Short *e* and *a* are automatically lengthened under stress in most nonfinal syllables to [æː] and [ɑː], with concomitant circumflex tone. This phonetic vowel length is not indicated orthographically, i.e., *ledas*

['læ̃ːdas] 'ice' and *vakaras* ['vãːkaras] 'evening' (compare Latvian *ledus* and *vakars,* having short *e* and *a*). Also included in the inventory of Lithuanian vowels are the diphthongs *ie* and *uo,* which arose from East Baltic **ę̄* (< **ei*) and **ǭ* (< **ō*). These diphthongs, which function as long vowels, begin with a high vowel and end with a lower, more central vowel (i͡ə, u͡ə), as in *dienà* (**dein-*) 'day' and dúona (**dōn-*) 'bread', phonetically [di͡ə'na] and ['du͡ə́na].

The Consonant System

Lithuanian alone among the Baltic languages preserves distinct reflexes (ʃ and ʒ) of the Indo-European palatovelars; in Latvian and Old Prussian as well as in Slavic, these have merged with *s* and *z*:, as in *šuõ* 'dog' and *žemė* 'earth' (Latvian *suns* and *zeme*). A characteristic feature of the Lithuanian consonant system is the phonemic opposition of palatalized and nonpalatalized consonants before back vowels (palatalization is automatic before front vowels). These palatalized consonants are the product of Baltic consonant + *i̯* sequences, which are still preserved in the case of labial stops in word-initial position, as in *pjáuti* ['pʲjǽutʲɪ] 'to cut' and *bjaurùs* [bʲjɛu'rʊs] 'ugly'. Earlier sequences of dental stop + *i̯* have developed into the affricates [t͡ʃʲ] and [d͡ʒʲ], orthographically *č*(*i*) and *dž*(*i*), as in *čià* (**ti̯a*) 'here' and *mẽdžias* (**medi̯as*) 'woods'. The distinctive palatalization of the remaining consonants is marked orthographically by a following *i*, as in *siū́ti* ['sʲū́ːtʲɪ] 'to sew' and *liáudis* ['lʲáudʲɪs] 'people'.

Morphosyntactic Features

The Noun

Lithuanian has preserved the Baltic stem classes and their declensional endings rather well, giving the noun a relatively archaic appearance. Six case forms are distinguished in the singular and plural (a dual is attested for certain case forms in dialects and older texts): (1) nominative (for example, in the singular, the *o*-stem *nãmas* 'house', *ā*-stem *rankà* 'hand', *i*-stem *akìs* 'eye', and *u*-stem *sūnùs* 'son'), (2) genitive (*nãmo*, *rañkos*, *akiẽs*, and *sūnaũs*), (3) dative (*nãmui*, *rañkai*, *ãkiai*, and *sū́nui*), (4) accusative (*nãmą*, *rañką*, *ãkį*, and *sū́nų*), (5) instrumental (*namù*, *rankà*, *akimì*, and *sūnumì*), and (6) locative (*namè*, *rankojè*, *akyjè*, and *sūnujè*). In addition, a special vocative form is used in the singular, as in *Jõnai!* (nominative *Jõnas* 'John') and *Birùte!* (nominative *Birùtė*).

The adnominal genitive is typically preposed, as in *tėvo nãmas* 'of-father house' ('father's house') and *lietùvių kalbà* 'of-Lithuanians language' ('Lithuanian language'). The genitive also occurs in partitive expressions, both positive, as in *miškè yrà vilkų* 'in-the-woods there-are wolves (genitive)', and negative, as in *nėrà žuviẽs* 'there-is-no fish (genitive)'. The locative case is used without a preposition, as in *Vìlniuje* 'in Vilnius'; historically this represents an inessive, the remnant of a more complex system of local cases formed with postpositions. These cases included an adessive, illative, and allative, some of which (particularly the illative) are still found dialectally.

Nouns are marked for gender (masculine and feminine) through distinctive desinences and adjectival concord, as in *gẽras tẽvas* 'good father' and *gerà mótina* 'good mother'. In an innovation shared with Latvian, proto-Baltic neuter gender was lost; neuters typically became masculine, as in *šiẽnas* 'hay' (masc.) and Old Church Slavonic *sěno* (neut.). The category of definiteness is marked within adjectives by the historical affixation of a pronominal *-i̯-* element to the indefinite form, as in indefinite *naũjas* (masc.), *naujà* (fem.) 'new' vs. definite *naujàsis* (i.e., *naujas* + *jis*) (masc.), *naujóji* (fem.).

The Verb

The Lithuanian verb marks present, past, and future tense forms. The present tense has three conjugation patterns, illustrated by *lìpti* 'to climb' (first conjugation, stem in *a*), *mylė́ti* 'to love' (second conjugation, stem in *i*), and *skaitýti* 'to read' (third conjugation, stem in *o*): 1SG (*aš*) *lipù*, *mýliu*, *skaitaũ*; 1PL (*mes*) *lìpame*, *mýlime*, *skaĩtome*; 2SG (*tu*) *lipì*, *mýli*, *skaitaĩ*; 2PL (*jūs*) *lìpate*, *mýlite*, *skaĩtote*; 3SG/PL (*jis/jie*) *lìpa*, *mýli*, *skaĩto*. The past tense has two patterns, illustrated by *lìpti* 'to climb' (stem in *o*) and *skaitýti* 'to read' (stem in *ė*): 1SG (*aš*) *lipaũ skaičiaũ*; 1PL (*mes*) *lìpome, skaĩtėme*; 2SG (*tu*) *lipaĩ, skaiteĩ*; 2PL (*jūs*) *lìpote, skaĩtėte*; and 3SG/PL (*jis/jie*) *lìpo, skaĩtė*. A frequentative past is formed by adding the suffix *-dav-* (plus *o*-stem endings) to the infinitive stem, as in *jis skaitýdavo* 'he used to read, would read' (*skaitýti* 'to read'). The future is formed by adding *-s-* and the present-tense person endings to the infinitive stem, *lìpti* 'to climb': 1SG (*aš*) *lìpsiu*, 1PL (*mes*) *lìpsime*, 2SG (*tu*) *lìpsi*, 2PL (*jūs*) *lìpsite*, and 3SG/PL (*jis, jie*) *lìps*. As the various examples demonstrate, number is not marked in the third person, a characteristic feature of Baltic.

Lithuanian shows a fondness for participles and gerunds, in both colloquial and written styles. Among the more typical participles (which decline like adjectives) are the present active (*rašą̃s*, stem *rãšant-*, infinitive *rašýti* 'to write'), past active ([*pa*]*rãšęs*, stem ([*pa*]*rãšius-*), present passive (*rãšomas*), and past passive (*parašýtas*). The past active

participle is used, together with a finite form of the verb 'to be,' to form a system of perfect tenses, as in *aš esù* (*pa*)*rãšes* (masc.)/(*pa*)*rãšiusi* (fem.) 'I have written' and *aš buvaũ* (*pa*)*rãšęs* (masc.)/(*pa*)*rãšiusi* (fem.) 'I had written'. Passive constructions are formed with the verb 'to be' and the corresponding passive participle, as in *knygà bùvo rãšoma* 'the book was being written' and *knygà bùvo parašýta* 'the book was/had been written'. The language retains a reflex of an earlier dative absolute in gerundive constructions such as *sáulei tẽkant* 'as the sun is/was rising' ('to-the-sun rising').

Lexicon

Lithuanian has long felt the lexical influence of neighboring Slavic languages. Early East Slavic borrowings into Lithuanian include *tuřgus* 'market' and *krìkštas* 'baptism' (Old Russian *tъrgъ* 'market' and *krъstъ* 'cross'). Among East Slavic borrowings from the time of the Grand Duchy are *knygà* 'book' and *blỹnas* 'pancake' (Russian *kníga* and *blin*). A significant number of Polish borrowings began to appear in Lithuanian in the 17th and 18th centuries, among them *arbatà* 'tea' and *cùkrus* 'sugar' (Polish *herbata* and *cukier*). Since the late 19th century, language reformers have succeeded in replacing many earlier borrowings with native words known from dialects and Old Lithuanian texts; for example, the native *laĩkas* 'time' was normalized in place of *čẽsas* (Russian *čas*), and *pasáulė* 'world', in place of *svíetas* (Russian *svet*). During this time, a number of neologisms took root, such as *akiniaĩ* 'eyeglasses' (*akìs* 'eye') and *mokyklà* 'school' (*mok-* 'teach, learn' + *-ykl-* 'place where').

See also: Balto-Slavic Languages; Latvian; Lithuania: Language Situation; Lithuanian Lexicography.

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The first trilingual Polish–Latin–Lithuanian dictionary was Konstantinas Sirvydas' *Dictionarium trium linguarum* (1620), and republished several times (most recently by Pirmasis, 1979). This was followed by several bidirectional Lithuanian–German dictionaries – Haack (1739) aimed at theology students and Ruigys (1747) with an input of vernacular language. The latter was in 1800 further improved by Milkus' *Littauisch–Deutsches und Deutsch–Littauisches Woerterbuch*. The living Lithuanian vernacular language was covered more fully in a trilingual explanatory dictionary by Juška (1897).

Further progress was made with a card index initiated by Kazimieras Būga, starting in 1902. The task was continued from 1930 by an editorial board under Juozas Balčikonis and continued to the present day (changing editorial policies several times) – 5 million entries, including also spoken language, dialects, and various styles. The work based on citations resulted in a 20-volume dictionary of the Lithuanian language (*Lietuvių kalbos žodynas*, 1968–2002) covering the years 1547–2001. Supplements are being compiled and an electronic version is being prepared.

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three different pairs of languages: Czech, English, German, and Lithuanian.

A typical Lithuanian dictionary is first and foremost a bilingual dictionary. The contemporary bilingual dictionary scene offers a great number of dictionaries and a great number of languages covered: apart from the traditional ones, also Japanese, Italian, Spanish, Latin (Kuzavinis, 1996), and Polish (Vaitkevičiūtė, 1979).

English–Lithuanian dictionaries started as émigré products. The most important are a large Lithuanian–English dictionary (Piesarskas, 2002) and a large two-volume English-Lithuanian dictionary (Piesarskas, 2004).

The German connection is best covered by Križinauskas (2001, 2004), French by Juškiene (1997) and Karsavina (1992).

There is a multitude of terminological dictionaries and glossaries (e.g., computing, textiles, agriculture, roads, hunting, sports, engineering, law etc.). Twenty-one terminological dictionaries were scanned and supplied with a query system, thus forming an online terminological database. These are mostly multilingual (usually Lithuanian, Russian, or English) and have unfortunately only a small circulation. Parliament has an online EUROVOC dictionary, which, as stipulated by law, collects a record of all technical terminology.

Among other sources one could also mention dictionaries of verbal associations, a dictionary of nicknames, proper names, first names, place names, hydronyms, mistakes, reverse dictionary, several dialects, accentuation, spelling and punctuation, frequency dictionary (based on a 1-million-word corpus, annotated morphologically), several contemporary dictionaries of foreign words, but no modern dictionary of etymology and no slang dictionary (a dictionary of curse words is under preparation).

Summing up, it can be said that the Lithuanian dictionary scene is vibrant and unexpectedly well developed for a small nation of 3.3 million people.

See also: Bilingualism; German; Lexicography: Overview; Lithuanian; Lithuania: Language Situation; Phraseology.

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Liu Xie (ca. 500)

Y Gu, Chinese Academy of Social Sciences, Beijing, China

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Liu Xie (ca. 465–522 A.D.) was a native of what is now Lü County, Shandong Province. Tradition says that he was a descendant of the Lord of Qi, Liu Fei, who was a son of Liu Bang, the first emperor of the Former Han dynasty (206 B.C.–25 A.D.). It is however certain that his father Liu Shang was a ranking officer in the military, but he died when Liu Xie was still young. He was reared in poverty by his mother. It was said that he was so poor that he never got married. His bachelor life was perhaps also due to his 10 years of close association with a monk, who was not only

three different pairs of languages: Czech, English, German, and Lithuanian.

A typical Lithuanian dictionary is first and foremost a bilingual dictionary. The contemporary bilingual dictionary scene offers a great number of dictionaries and a great number of languages covered: apart from the traditional ones, also Japanese, Italian, Spanish, Latin (Kuzavinis, 1996), and Polish (Vaitkevičiūtė, 1979).

English–Lithuanian dictionaries started as émigré products. The most important are a large Lithuanian–English dictionary (Piesarskas, 2002) and a large two-volume English-Lithuanian dictionary (Piesarskas, 2004).

The German connection is best covered by Križinauskas (2001, 2004), French by Juškiene (1997) and Karsavina (1992).

There is a multitude of terminological dictionaries and glossaries (e.g., computing, textiles, agriculture, roads, hunting, sports, engineering, law etc.). Twenty-one terminological dictionaries were scanned and supplied with a query system, thus forming an online terminological database. These are mostly multilingual (usually Lithuanian, Russian, or English) and have unfortunately only a small circulation. Parliament has an online EUROVOC dictionary, which, as stipulated by law, collects a record of all technical terminology.

Among other sources one could also mention dictionaries of verbal associations, a dictionary of nicknames, proper names, first names, place names, hydronyms, mistakes, reverse dictionary, several dialects, accentuation, spelling and punctuation, frequency dictionary (based on a 1-million-word corpus, annotated morphologically), several contemporary dictionaries of foreign words, but no modern dictionary of etymology and no slang dictionary (a dictionary of curse words is under preparation).

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versed in Buddhism, but also in Confucian classics. Liu Xie was said to have taken part in editing Buddhist sutras in Dinglin Monastery. He is best known for his monumental work *Wenxin diaolong* ('The literary mind and the carving of dragons').

Liu Xie completed his monumental work *Wenxin diaolong* ('The literary mind and the carving of dragons') around 501, when he was little known. Tradition reports that he carried the manuscript, waiting for Shen Yue's (441–513 A.D., the most influential literary critic of the time) cart to pass by. Eventually he succeeded. With Shen Yue's recommendation he soon established his reputation. Liu Xie was said to be a prolific writer, but only a few of his works survive.

In Chinese academic circles, *Wenxin diaolong* is a work not without controversy. The dispute is not over its academic quality, which is unanimously recognized as first class by any standards, but over its disciplinary classification. Literary critics claim that it is a milestone in literary criticism, whereas rhetoricians argue that it is primarily the first systematic treatment of rhetoric in Chinese history. The controversy is quite understandable, and actually to be expected on the grounds that rhetoric and literary criticism are intrinsically related to each other. It is argued by some that the embryonic conception of Chinese rhetoric was detectable even in oracle bone inscriptions. But it had remained fragmented for about a thousand years before Liu Xie's monumental work. From the point of view of rhetoric, he made a ground-breaking study of discourse genres, style, and many figures of speech. He also analyzed what would be labeled as issues of invention and disposition in Western rhetoric.

There is a rich literature of textual studies of the work. Present-day editions include Fan Wenlan's *Wenxi diaolong zhu*, Yang Mingzhao's *Wenxin diaolong jiaozhu*, and Zhou Zhenfu's *Wenxin diaolong zhushi*. Vincent Yu-Chung Shih's 1983 *The literary mind and the carving of dragons* is a bilingual English-Chinese version with annotations.

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Loanword Phonology

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The term 'loanword' is used for words (and sometimes phrases) borrowed from one language into another. The pronunciation of borrowed words is affected by many factors, including the nature and degree of contact between the lending and the borrowing communities (Haugen, 1950; Weinreich, 1953), the prestige of the languages in contact, the time course of borrowing, and the medium of transmission. Loanword pronunciation patterns may range from preservation of all or most features of the original (most often when borrowers are fluent in the foreign language or are members of a group of experts using specialized vocabulary) to fairly drastic alterations (when the new words become fully nativized or integrated into the borrowing language). 'Ear borrowings' tend to reflect pronunciation more faithfully than orthography (e.g., the orthographic but unpronounced 't' of 'Christmas' is not realized in Japanese [kurisumasu]), whereas 'eye borrowings' tend to reflect orthography (as in Hawaiian [hi:meni] 'hymn'). Although the pronunciation of borrowed words may be complicated by many extralinguistic factors, systematic patterns often emerge that provide potentially crucial insight into the grammar of the borrowing language as well as into deeper questions of the relationship between perception and production, the role of frequency of different structure types in the data available to language learners and users, and the extent to which the formation of a grammar is shaped by universal and possibly innate principles.

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Loan Adaptation

One of the best studied aspects of loanword phonology is the process of altering borrowed words to satisfy the borrowers' native language constraints on sounds, sound combinations, and prosodic organization of words. One obvious problem is the occurrence in foreign words of sounds that are lacking in the borrowing language. This situation frequently gives rise to the process of phoneme substitution, the replacement of foreign sounds by native language phonemes (the set of contrasting sounds that may be used to encode contrasts in meaning). Thus, borrowings from English, which employs more than 30 phonemes, into Hawaiian, with only 13 contrasting sounds, may exhibit extensive alteration; for example, both 'Katherine' and 'gasoline' emerge as [kakalina], with [r], [g], [θ], [s], [æ], and [ə] all undergoing substitution (Elbert and Pukui, 1986). A more subtle problem arises when the foreign sound does occur in the borrowing language, but only in restricted contexts. For example, in Ganda, [l] never appears following a front vowel [i] or [e], whereas [r] occurs only after front vowels. A Ganda speaker can therefore pronounce both [r] and [l], but only in specific contexts, leading to the adaptation of English 'railway' as Ganda [lerwe] (Halle and Clements, 1993).

A second motivation for the alteration of borrowed words stems from the borrowing language's phonotactics, or restrictions on combinations of sounds. The bisyllabic word 'Christmas' is realized with five syllables in Japanese ([kurisumasu]) and in Samoan ([kilisimasi]), reflecting the requirements of the borrowing languages that all or most consonants be followed by a vowel. Similarly, loss of the [r] in the Navajo pronunciation [keʃmiʃ] can be traced to the impossibility of consonant sequences at the beginning of a Navajo word or syllable (www.santas.net/howmerrychristmasissaid.htm).

Restrictions on the shape and organization of words are additional factors motivating the alteration of loanwords. Many languages adhere to a minimal word size and will augment borrowed words that fall short. For example, 'bomb' is adapted in Selayarese as [boʔoŋ] (Broselow, 1999); the change of the final [m] to [ŋ] is dictated by the impossibility of word-final [m], but the addition of a vowel and glottal stop (resulting in [boʔoŋ] rather than *[boŋ]) is motivated by the Selayarese requirement that all words must contain at least two syllables. In addition, most languages use the word as the basis for characteristic patterns of stress or pitch, and loans are often adapted to conform to these patterns. For example, whereas the most prominent stress falls on the word-initial syllable in English 'Christmas,' the major stress of Hawaiian [kalikimáka] falls on the prefinal syllable, in accord with Hawaiian principles of stress placement. In borrowing from stress-based languages into languages in which words are characterized by lexically assigned tonal or pitch patterns, the original stress pattern may be reinterpreted as a pitch-based pattern. Thus, in Cantonese a high tone is generally assigned to the syllable carrying main stress in English, falling on the initial syllable of [fasan] 'fashion' and on the final syllable of [sytka] 'cigar' (Silverman, 1992).

Linguists have traditionally looked to loanword adaptation as a probe into the particular grammars of borrowing languages as well as into the general structure of phonological grammars. In particular, the alterations of borrowed words may provide evidence for phonological rules or constraints that cannot be motivated by native language alternations because the relevant structural types simply do not occur in the native language vocabulary. For example, in analyzing Nupe (Nupe-Nupe-Tako), in which labialized consonants occur only before rounded vowels or before [a], Hyman (1970) argued that the [a] following a labialized consonant is derived from underlying [ɔ], which triggers labialization on the preceding consonant before undergoing a rule of absolute neutralization. Since [ɔ] never appears on the surface in Nupe, the support for a rule transforming [ɔ] to [a] comes from adaptation of Yoruba words such as [kɔbɔ] 'penny' as Nupe [k^{w}ab^{w}a] (with HL tone on both forms). More recently, as much phonological research has moved toward models of grammar consisting not of rules but of surface-oriented constraints, the lack of particular structures in both native and borrowed vocabulary can be seen as having the same source, a set of universal markedness constraints (Jacobs and Gussenhoven, 2000; Yip, 1993).

Problems in Loanword Phonology

Choice of Strategies for Loanword Adaptation

The motivation for changing the structure of borrowed words can often be found in the restrictions of the borrowing language, which define targets for adaptation. However, precisely because the native language often lacks forms that require repair, the native language grammar may not provide guidance in different ways of reaching that target (e.g., in choice of substitute for a foreign sound). What, then, determines borrowers' choice of repair strategy?

One possibility is that the means used to adapt loanwords is largely a function of the native language grammar (Jacobs and Gussenhoven, 2000; Paradis and LaCharité, 1997). However, it is often difficult

to explain how the data of the borrowers' native language could have led them to converge on a particular repair strategy when their native language lacks structures that require repair (Broselow, 1999; Peperkamp and Dupoux 2003). In fact, the repairs used in loanwords are sometimes different from those used for similar native vocabulary. For example, in Malayalam single voiceless stops may not occur intervocalically. In native vocabulary, an intervocalic stop becomes voiced, while in Malayalee English an intervocalic stop is realized as a voiceless geminate, as in [beekkar] 'baker' (Mohanan and Mohanan, 2003).

If the strategies for loanword adaptation are not entirely a function of the borrowing language grammar, perhaps they reflect the emergence of universal preferences for particular types of structures. For example, both Shinohara (2004) and Kenstowicz and Sohn (2001) found evidence that the preferred position for the accented syllable in words borrowed into Japanese and into North Kyungsang Korean is on a heavy prefinal syllable, a familiar pattern in stress systems of the world. Similarly, particular types of repairs might be universally preferred; for example, Fleischhacker (2001) found that in many languages that prohibit consonant sequences at the beginning of a word, a vowel is inserted in loanwords before a sequence of [s]-stop but between the two consonants otherwise (compare Egyptian Arabic [iski:] 'ski' and [bilastik] 'plastic' (Broselow, 1992) and Hindi [iskul] 'school' and [pIliz] 'please' (Singh, 1985)). Fleischhacker argued that loan adaptation is guided by a universal 'perceptual mapping' that dictates what sorts of repairs result in the greatest perceptual similarity to the original (see also Kang, 2003; Kenstowicz, 2001, 2003).

However, many cases of loanword adaptation are not obviously explainable as reflexes of universal cross-linguistic preferences. For example, it is generally assumed that in phoneme substitution, the 'closest' native language phoneme is substituted for the foreign phoneme. However, languages may choose different segments as 'closest': the [s] in 'Christmas' is replaced by [k] in Hawaiian [kalikimaki] and by [h] in Maori [kirihimete], although both languages include [k] and [h] (but not [s]) in their inventories. Languages may also choose different strategies for bringing foreign words into line with native language allophonic restrictions. In Japanese [s] and [ʃ] are in complementary distribution, with [ʃ] occurring only before [i]. The impossible sequence [ʃe] is transformed in (nativized) borrowed words by changing the consonant, as in [sepa:do] 'shepherd' (Ito and Mester, 1995a, 1995b). In Nupe, however, which has similar distribution of [s] and [ʃ], an illegal sequence is repaired by changing the vowel to [i], as in the rendering of Hausa [ʃu:gaba] (with LLH tone) 'leader' as Nupe [ʃi:gaba] (with LLM tone; Hyman, 1970). Similarly, although the insertion of vowels in the various realizations of 'Christmas' – Japanese ([kurisumasu]), Hawaiian [kalikimaki], Samoan ([kilisimasi]), and Maori [kirihimete] – is clearly motivated by the need to bring borrowed words into conformity with native language syllable structure requirements, it is not clear why the quality of the inserted vowels should differ from language to language. Nor is it clear why these languages should choose vowel insertion, whereas Navajo, for example, deletes a consonant in [keʃmiʃ]. Different borrowing languages may also choose different strategies for upholding native language word stress requirements. In Hawaiian, preferred stress patterns are implemented in borrowings by simply reassigning the main stress to the appropriate syllable of the loanword (as in [kalikimáki]), whereas speakers of Huave maintain the native language requirement that stress normally falls on the word-final syllable by deleting poststress material, so that Spanish [kardúmen] 'flock' is adapted as [kardúm] (Davidson and Noyer, 1996).

Thus, borrowers of different language backgrounds may choose different repair strategies for similar foreign structures, even when both native languages appear to provide similar options and when the grammar of the native language appears to provide no guidance in choosing among options, raising the issue of the learnability of loan adaptation pattens (Broselow, 1999; Peperkamp, 2004). The principles determining the choice of repair constitute an important research problem for linguists, with proposals ranging from the claim that all loan adaptation is a function of misperception (Peperkamp and Dupoux, 2003) to proposals making reference to various factors: perception, production, and the nature of the data available to borrowers.

Preservation of Foreign Features

A related question in loanword adaptation concerns why some features of borrowed words are changed to fit the native language constraints while others are maintained intact. Not all loanwords are fully adapted, and indeed over time the borrowing language may come to incorporate foreign structures, as in the English acceptance of [v] as an independent phoneme rather than the intervocalic reflex of [f] under the influence of French. In many languages, some sets of words retain foreign elements, resulting in what Ito and Mester (1995a, 1995b) called lexical strata: groups of words obeying distinct (but overlapping) sets of constraints. For example, in the core

vocabulary of Japanese both [si] and [ti] sequences are impossible, and these sequences in the most nativized loanwords undergo palatalization: [ʃifu:do] 'seafood' and [tʃi:m] 'team.' In a more peripheral stratum, however, only the constraint against [si] is upheld, resulting in pronunciations such as [ʃitibanku] 'Citibank.' Furthermore, nonnativized vocabulary may contain both [si] and [ti] sequences. There are no words, however, like hypothetical *[sitʃibanku], where [si] is tolerated but [ti] is not. Thus, although both structures are equally foreign to core Japanese vocabulary, one is more readily accepted in borrowed words.

The principles determining which foreign structures are more subject to preservation are yet to be understood. One family of proposals correlates the likelihood of preservation of foreign structures to the extent to which their individual articulatory components are part of the borrowing language system. Thus, Maddieson (1986) discussed evidence that a foreign phoneme is more likely to be incorporated into the borrowing language system if it fills some gap in the native language phoneme inventory; for example, [p] is more likely to be borrowed if the language already has a voiced labial stop [b] and if it has voiceless/voiced oppositions at other places of articulation ([t/d] and [k/g]). Similarly, Ussishkin and Wedel (2003) argued that medial consonant sequences are more likely to be tolerated in loanwords if the borrowing language allows word-final consonants (and therefore has consonant sequences across word boundaries). Thus, although neither Puluwat (Puluwatese) nor Tongan have consonant sequences within words, Puluwat does allow word-final consonants (and therefore consonant sequences across word boundaries), and in borrowed words, word-internal consonant sequences are much more likely to be preserved in Puluwat ([kapsajis] 'capsize') than in Tongan ([kakatisi] 'cactus'). Other factors that may be implicated include simple frequency of foreign structures and the acoustic similarities between the native and foreign structures; borrowers may identify certain foreign phonemes, for example, as variants of native language phonemes.

Although the patterns of loanword adaptation raise numerous questions, it is clear that they provide an important testing ground for hypotheses concerning how language is learned and how language is used.

See also: Experimental Phonology; Phonology: Overview; Second Language Acquisition: Phonology.

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www.geocities.com/The Tropics/shores/6794/o-onloanwords.html.

Localization

G Budin, University of Vienna, Vienna, Austria

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Defining and Distinguishing Key Terms

Localization refers to the processes of preparing and adapting products linguistically and culturally for their sale and use in a specific locale, i.e., in a language community in a country or region of the world. A 'locale' is a virtual rather than a physical location, where a group of people share certain cultural and linguistic conventions in a consistent way so that the localization industry is able to identify the locale and distinguish it from other, maybe neighboring, locales (e.g., British English vs. American English). Traditionally, the concept of localization is distinguished from the concept of internationalization, i.e., the process of designing products in a generic way so that they can be localized easily and quickly. The process of internationalization is thus a prerequisite to localization. A more comprehensive concept is that of globalization. Besides its generic socioeconomic and political meaning, the term refers to the overall strategic planning level of 'going global' with one's own products. On the operational level, it refers to the process of internationalization and subsequent localization and translation work. Due to the worldwide process of economic globalization, the demand for localization, internationalization, and translation has been growing continuously over the past decades. Translation is a core process in the localization process because it focuses on crossing borderlines between languages and cultures and because it involves the comparison of cultural specificities of different locales, language communities, countries, etc., as well as the subsequent choice of communicative means in a target language or culture to adequately express the content of text available in a source language or culture.

What Is Localized and How Is It Done?

Although localization has been successfully practiced for a long time in almost all spheres of trade and industry, the term 'localization' has been used more recently mainly in the contexts of the computer industry and of Internet- and Web-based trade. The localization of software products and of websites reflects the growing economic importance of localization in world trade. For the purpose of software localization, the program code has to be separated as nonlocalizable components from the user interface in general and from individual cultural elements to be localized in particular. While localization engineering includes the efficient use of localization tools, localization management focuses on the translation and cultural adaptation of user manuals, online help, and other types of software documentation. Website

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Who Is Active in Localization?

The complex tasks described above are increasingly carried out by localization professionals who are specifically educated and trained for such activities. The localization industry has developed professional profiles and specific roles in project teams, with best practices, success stories, quality models, and industry standards, and with professional organizations, such as the Localization Industry Standards Association (LISA), that organize symposia and workshops and that publish newsletters and standards documents. Localization has also become a topic of research activities in language engineering, translation studies, computer science, and other relevant disciplines. Courses and education programs are increasingly offered by academic institutions and by professional organizations (e.g., the Localization Research Centre at Trinity College in Dublin, Ireland). Localization service providers include small local businesses and large companies that act as global players in this competitive industry. For further reading, please consult the bibliography, which contains references to textbooks such as Bernd Esselink's guide to software localization, as well as the list of Web references.

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http://www.localisation.ie – Localisation Research Centre, Ireland; includes the *International Journal of Localisation*.

http://www.localizationworld.com – annual conference on localization.

http://www.multilingual.com – *Multilingual Computing & Technology* (journal).

http://www.xliff.orgXML – Localization Interchange File Format.

Locke, John (1632–1704)

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John Locke was born on August 28, 1632 in Wrington, Somerset, to a Puritan family. He studied at Westminster School and in Oxford, where he was appointed as a college tutor in 1661. During these years, his interest for medicine led him to the study of natural philosophy. Beginning in 1667, he served as secretary, physician, and political advisor to Lord Ashley, future Earl of Shaftesbury. He was elected a Fellow of the Royal Society. Locke came to France in 1673, after Shaftesbury's resignation as lord chancellor. There he worked on the study of philosophy, and met and read Cartesians and Gassendists. He returned to England in 1679 and became involved in politics, until his departure for Holland as a political refugee in 1683. He came back to England after the reign of James II in 1689 and spent his later years preparing his publications, the *Essay*, along with works about political theory, monetary problems, education, and theology. He died on October 28, 1704 in Oates, Essex.

His contribution to linguistics is mainly located in Book III of *An essay concerning human understanding* (1690), titled 'Of words.' The general purpose of the *Essay* was to build an empirical theory of knowledge, assuming that there were no 'innate ideas,' and that all types of 'ideas' originated from

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sensation and reflection. This lead to the distinction between names for simple ideas, and names for mixed modes and substances. The significance of simple ideas could be secured by acts of ostension toward single perception, but the significance of the latter only relies on their definition. Locke insisted that, even if this could not be improved upon, we must always remember that the meaning of words resulted from our own 'voluntary imposition.' Words were signs of our internal conceptions and stood as 'marks' for ideas. This hypothesis was not new, but Locke added that this conception might differ from one individual to the other, because the meaning of words depended entirely on personal knowledge. This was particularly significant when it came to general terms. General terms did not refer to anything but were necessary to represent abstract, general ideas. They resulted from the activity of understanding, which 'sorts' particular things together according to their similarities and 'ranks' them under general names. Consequently, the question was to know how could one be sure to transmit, by means of conventional linguistic signs, the 'determinate ideas' required for knowledge and reasoning. This analysis led Locke to diagnose 'imperfections' in the use of language, and give remedies that every careful speaker should use to avoid most of these defaults.

The idea that language may condition thoughts was further defined by Condillac. It has also been expanded upon in the field of language acquisition and the study of relationships between language and culture. Book III of the *Essay* deals mostly with the semantics of common names, but Locke also introduced, in Book IV, 21, a definition of *sémeiôtikè* as the 'doctrine of signs' and as the third kind of science, after *physica* and *practica*.

See also: Condillac, Etienne Bonnot de (1714–1780).

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Lodwick, Francis (1619–1694)

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Francis Lodwick (1619–1694) was baptized on August 8, 1619 in London, where he was also buried on January 5, 1694. Lodwick [Lodowyck] attained important achievements in the domains of universal languages and phonetics.

His father was a refugee Flemish merchant, while his mother was a descendant of French Huguenots. During his lifetime Lodwick was engaged in trade between England and the continent and was a highly influential member of the Anglo-Dutch community in London. Most details about Lodwick's life are reported in the diary of Robert Hooke (1635–1703). In 1681, Lodwick was elected a member of the Royal Society. His writings attest to his interests in different fields, e.g., economy, politics, religion, and linguistics.

His upbringing at a Protestant refugee community might have aroused his interest in linguistic issues, especially his desire to invent a universal language suitable for international communication. Lodwick was probably the first man to publish a book on a universal written character and language, *A common writing*, which appeared in 1647. Lodwick's universal language project was influenced by Francis Bacon (1561–1626) and John Wilkins (1614–1672), who advocated the creation of a universal written 'character' that should have rendered communication possible between speakers of different languages. Lodwick, in his brief *A common writing* presented a universal language that contains a collection of words. These words are represented by non-verbal characters similar to arithmetic symbols that are useable in every language. Lodwick also suggested a dictionary containing primordial words and their derivations that can be gathered by the use of standardized diacritics.

A second and more fruitful attempt at the creation of a universal character is his *The ground-work, or foundation laid, (or so intended) for the framing of a new perfect language: and an universall or common writing. And presented to the consideration of the learned, by a well-willer to learning*. In this writing, published in 1652, Lodwick gave a more sophisticated solution to the problem of universal language as he tried to lay the foundation for a perfect new language suitable for the representation of the real order of nature. He suggested a scientific nomenclature with reference to the qualities of things. The main part of the text, however, is devoted to the project of a grammar that would reduce the multiplicity of rules in natural languages. One of his most striking solutions is the introduction of a universal word-order. Lodwick's third suggestion for a universal language was published in 1686: *An essay towards an universal alphabet*. Although Lodwick's attempts to create a universal language were never realized, his writings had a deep impact on Wilkins; in his *Essay towards a real character, and a philosophical language* (1668) he acknowledged his debt to Lodwick.

Most of Lodwick's other writings, such as his earliest shorthand system for Dutch on phonetic principles, remained in manuscript form. Several manuscripts were published in the Royal Society's *Philosophical Transactions*, e.g., his scheme for a phonetic alphabet useable in every language.

Lodwick may be characterized as an original thinker and one of the leading figures of linguistic discussions in the 17th century.

See also: Bacon, Francis, Lord Verulam (1561–1626); Phonetics: Overview; Universal Language Schemes in the 17th Century; Wilkins, John (1614–1672).

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Logic and Language: Philosophical Aspects

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Introduction

Theories of meaning and methods of linguistic analysis are key items in the agenda of contemporary analytic philosophy. Philosophical interest in language gained substantial impetus from developments in logic that took place in the latter half of the nineteenth century. It was at this time that the early modern conception of logic as an informal 'art of thinking' gave way to the contemporary conception of logic as a formally rigorous, symbolic discipline involving, *inter alia*, a mathematically precise approach to deductive inference. The systems of symbolic logic that emerged in the later stages of the nineteenth century were fruitfully applied in the logical regimentation of mathematical theories – analysis and arithmetic in particular – and logical analysis became the cornerstone of a general philosophical methodology for a number of influential figures in the first half of the twentieth century. Though the operative conception of logical analysis did not in every case treat language (or 'natural language') as the proper object of investigation, close connections between logic and language were stressed by virtually every proponent of the methodology. Our aim in this entry is to discuss these connections as they appear in the work of some of the eminent precursors and purveyors of the analytic tradition.

The Mathematicization of Logic: Leibniz and Boole

Early modern philosophers were typically antipathetic to the formal approach to logic embodied in Aristotle's doctrine of the syllogism and its Scholastic variants. Among the major figures of the early modern period, Gottfried Wilhelm Leibniz (1646–1716) is distinguished both for his respect for the Aristotelian tradition in logic and for his general emphasis on the importance of formal methods. Leibniz applauded Aristotle for being "the first to write actually mathematically outside of mathematics" (1696: 465). However, it was Leibniz's own works, rather than those of Aristotle or of contemporary Aristotelians, that in the period did most to advance the conception of logic as a kind of generalized mathematics.

Leibniz's logical work consists of a number of manuscripts, unpublished in his lifetime, in which he undertakes the construction of a logical calculus. In virtually all of these works, Leibniz represents judgments and logical laws in a quasi-arithmetical or algebraic notation and he assimilates processes of inference to known methods of calculation with numbers (e.g., by substitution of equals). Leibniz's motivation for this approach stemmed from his early project of a *lingua characteristica universalis* – a symbolic language geared to the logically perspicuous representation of content in all fields of human knowledge. According to Leibniz, the content of any judgment consists in the composition of the concepts arrayed in the judgment as subject and predicate. A judgment is *true* when the predicate concept is 'contained in,' or partially constitutive of, the subject concept. For example, the truth of the judgment that all men are rational consists in the fact that the concept *rational* is contained in the concept *man*, as per the traditional definition of 'man' as 'rational animal.' (For obvious reasons, Leibniz's conception of truth posed difficulties when it came to accounting for contingently true judgments, and the task of providing an account of contingency compatible with his conception of truth was one to which Leibniz devoted considerable philosophical attention.) All complex concepts can be parsed as conjunctions of concepts of lower orders of complexity down to the level of simple concepts that cannot be further analyzed. Leibniz's various schemes for a universal characteristic were predicated on the idea that containment relations among concepts could be made arithmetically tractable given an appropriate assignment of 'characteristic numbers' to concepts. For instance, in one such scheme Leibniz proposed that the relationship between complex concepts and their simple constituents be represented in terms of the relationship between whole numbers and their prime factors, thus capturing the unique composition of any complex from its primitive components (1679, 1679/1686). In this and similar ways, Leibniz sought to provide a basis for the view that inference, and the evaluation of truth more generally, could be carried out algorithmically – that is, as a mere process of calculation – by familiar arithmetical means.

By the 1680s Leibniz had grown pessimistic about the prospect of completing the project of the universal characteristic, and he turned his energies to the more confined task of devising an abstract logical calculus. Leibniz worked on a number of different versions of his logical calculus through the 1680s and 1690s. In each case he explained how standard propositional forms could be expressed in a quasi-algebraic

notation. He also laid down logically primitive laws pertaining to his formulas (what he called 'propositions true in themselves') and abstractly specified valid inferential transformations, usually in terms of a definition of 'sameness' in conjunction with principles pertaining to the substitutability of identicals. Though Leibniz's efforts at constructing a logical calculus were hampered by his view that all judgments ultimately reduce to a simple subject-predicate form – thus excluding primitive relational judgments – his emphasis on formal explicitness and mathematically exact symbolism stands as an anticipation of the main lines of development in formal logic in the following centuries.

Leibniz's mathematical approach to logic made little impression until the late nineteenth century, when his manuscripts were finally collected and published. By that time, however, the mathematical approach had gained momentum independently, largely on the basis of the work of George Boole (1815–1864). Boole shared with Leibniz the aim of devising an algebraic means of expressing relationships among terms figuring in propositions. However, Boole differed from Leibniz in treating the extensions of concepts (or classes), rather than concepts construed as attributes or 'intensions,' as the relevant propositional constituents. In *The laws of thought* (1854), Boole presented his class logic, which he called 'the logic of primary propositions,' as the first and fundamental division of his system. In the second part of the same work, Boole adapted the calculus of classes to a special interpretation that allows for the representation of logically compound propositions, or 'secondary propositions,' thereby unifying (after a fashion) the calculus of classes with a version of modern propositional calculus.

Boole's central idea is that an algebra of logic arises as an *interpretive variant* of standard numerical algebra when the latter is modified by a single principle that is naturally suggested by the logical interpretation of the symbolism. In Boole's class logic, letters (or 'literal symbols') are interpreted as standing for classes of things determined by some common attribute, with '1' standing for the universe class and '0' standing for the null class. Multiplication, addition, and subtraction operators are treated as standing for the operations of intersection, disjoint union, and difference (or 'exception') of classes, respectively. Primary propositions are then expressed as equations with appropriately formed class terms standing on either side of the identity sign. On the basis of this class-theoretic interpretation of the symbolism, Boole maintained that the logical calculus differs from ordinary numerical algebra only with respect to the characteristically *logical* law that, for any class x,

$$xx = x \text{ (x intersect x is x)}$$

which holds generally for class theoretic intersection but which holds for numerical multiplication only for $x = 0$ and $x = 1$. Having emphasized this difference, Boole observed that the laws and transformations of numerical algebra will be identical to those of an algebra of logic when the numerical values of literal symbols in the former are restricted to 0 and 1. Boole appealed to this formal analogy between the numerical and logical algebras in justifying his approach to inference, which he presented as a process of solving sets of simultaneous equations for unknowns by standard algebraic methods.

In *The laws of thought,* Boole transformed the calculus classes into a serviceable propositional calculus by interpreting his literal symbols over 'portions of time' during which elementary propositions are true, thus adapting the notation and methods designed for dealing with class relationships to the propositional case. Boole's appeal to portions of time reflected a somewhat puzzling endeavor to assimilate or reduce propositional logic to the kind of term logic embodied in his class calculus, and the artificiality of this approach was not lost on subsequent logicians both within and without the algebraic tradition. However, peculiarities of interpretation notwithstanding, Boole can be credited with the first systematic formulation of propositional logic and a commensurate expansion of the scope of formal logic in general. Moreover, his suggestion that propositional logic, class logic, and numerical algebra (suitably restricted) arise as interpretive variants of a single algebraic system anticipates subsequent developments in abstract algebra and (perhaps only dimly) modern model-theoretic methods in logic.

The contributions of Leibniz and Boole constitute beginnings in the fruitful deployment of artificial languages in the analysis of propositional content and the systematization of deductive inference. However, despite their considerable accomplishments, neither Leibniz nor Boole can be credited with bringing logic to its current state of maturity. They produced no inroads in the logic of relations and the use of quantifiers for the expression of generality is entirely foreign to their work. These shortcomings were addressed by later logicians working in the algebraic tradition (e.g., Pierce and Schröder), but the significance of their resolution for the development of modern formal logic and its philosophical offshoots will be better appreciated if we adopt a somewhat different

perspective on the historical interplay between logic and mathematics.

Logic and Language in Frege

For the better part of his career, the philosopher-mathematician Gottlob Frege (1848–1925) devoted his energies to establishing the 'logicist' thesis that arithmetical truth and reasoning are founded upon purely logical principles. At an early stage in his efforts, Frege realized that existing systems of logic were inadequate for carrying out the analysis of content necessary for establishing arithmetic's logical character. His *Begriffsschrift* (or 'concept notation') (1879) was intendes to address this deficiency. The logical system that Frege presented in the *Begriffsschrift* and later refined in Part I of his *Grundgesetze Der Arithmetic* (1893) constitutes the greatest single contribution in formal logic since the time of Aristotle. The most distinctive aspects of Frege's logic are (1) the use of variables and quantifiers in the expression of generality; (2) the assimilation of predicates and relational expressions to mathematical expressions for functions; (3) the incorporation of both propositional logic and the logic of relations within (second-order) quantificational logic; (4) the notion of a formal system – i.e., of a system comprising a syntactically rigid language along with explicit axioms and inference rules that together determine what is to count as a *proof* in the system.

Frege's approach to generality is based on his analysis of predication in terms of function and argument. In arithmetic, a term such as $7+5$ can be viewed dividing into function and argument in different ways. For instance, it can be treated as dividing into the function $(\ )+5$ with 7 as argument, or as dividing into the function $7+(\ )$ with 5 as argument, or as dividing into the binary function $(\ )+[\ ]$ with 7 and 5 (in that order) as arguments. Frege's approach to predication assimilates the analysis of sentences to this feature of the analysis of arithmetical expressions. For example, a simple sentence such as 'John loves Mary' can be regarded as predicating the (linguistic) function '( ) loves Mary' of the singular term 'John,' or the function 'John loves ( )' of the singular term 'Mary,' or the relational function '( ) loves [ ]' of 'John' and 'Mary' (in that order). In the *Begriffsschrift,* Frege remarked that, for simple sentences like this, the analysis into function and argument makes no difference to the 'conceptual content' that the sentence expresses. However, the *possibility* of analyzing a sentence in these ways is nevertheless crucial to logic, since only on this basis do we recognize logical relationships between generalizations and their instances. Adopting a standard arithmetical practice, Frege makes use of variables as a means of expressing generality. For example, by putting the variable 'x' in the argument-place of 'Mary' in our example, we arrive at the statement 'John loves x,' which is the *Begriffsschrift* equivalent of the colloquial generalization 'John loves all things.' The inference from this generalization to 'John loves Mary' now *requires* that we regard 'Mary' as argument to the function 'John loves ( ),' since only so is 'John loves Mary' recognizable as an *instance* of the generalization. Other function-argument analyses become salient in connection with other generalizations to which the statement relates as an instance (e.g., 'x loves Mary').

In the system of the *Begriffsschrift,* the above described use of variables suffices to express generality in a limited variety of sentential contexts. However, Frege's broader treatment of generality involves a second crucial component, namely, the use of quantifiers – i.e., the variable binding operators '$\forall x$' (read: 'Every x') and '$\exists x$' (read: 'some x') – as a means of indicating the *scope* of the generality associated with a variable. (Our discussion here prescinds from the peculiarities of Frege's now obsolete notation as well as his convention of treating existential quantification in terms of universal quantification and negation – i.e., his treatment of '$\exists x \ldots$' as '$\sim\forall x\sim \ldots$'). One of the many ways in which the use of quantifiers has proven important to logic concerns the expression of multiply general statements, for which no adequate treatment existed prior to the *Begriffsschrift.* Consider, for example, the relational generalization 'Everyone loves someone.' This statement is ambiguous between the following two readings: (1) 'There is some (at least one) person that is loved by all,' and (2) 'Every person is such as to love some (at least one) person.' The use of quantifiers resolves this ambiguity by requiring that expressions of generality in multiply general statements be ordered so as to reflect scope. The first reading of the statement is expressed by the existentially quantified sentence

$$\text{`}\exists y \forall x\ xLy\text{'}$$

where the scope of universal quantifier falls *within* that of the existential quantifier. (For convenience, we assume here that the variables 'x' and 'y' are restricted to a domain of persons.) By contrast, the second reading is given by the sentence

$$\text{`}\forall x \exists y\ xLy\text{'}$$

where the universal quantifier has wide scope with respect to the existential quantifier. Since the *Begriffsschrift*'s formation rules ensure that the scope of a quantifier will be properly reflected in

any sentence in which it occurs, an ambiguous sentence such as the one we started with cannot even be *formulated* in the language. Scope considerations apply in essentially the same way to sentential operators (e.g., the negation sign '$\sim$,' and the conditional sign '$\rightarrow$') in the logic of the *Begriffsschrift*. For instance, the ambiguity of the sentence 'Every dog is not vicious' results from the fact that, as stated, the sentence does not determine the scope of the negation sign with respect to that of the universal quantifier. On one reading, the scope of the negation sign falls within that of quantifier, i.e., '$\forall x(Dx \rightarrow \sim Vx)$,' the statement thus affirming that anything that is a dog is not vicious (or, colloquially expressed: 'No dogs are vicious'). By contrast, when the statement is read as giving wide scope to the negation sign, i.e., '$\sim\forall x(Dx \rightarrow Vx)$,' it becomes the denial of the generalization that all dogs are vicious (i.e., 'It is not the case that all dogs are vicious'). As the above examples begin to suggest, Frege's technique of ordering of operators according to scope provides the basis for his incorporation of both propositional logic and the logic of relations within quantificational logic.

Frege's philosophical interest in language extended beyond his characterization the formal mechanisms of a logically perspicuous language such as the *Begriffsschrift*. In the classic paper 'On Sense and Reference' (1892), Frege presented a framework for a general theory of meaning applicable to both natural languages and formal languages. The core of the doctrine consists in the contention that any adequate account of the meaning of a linguistic expression must recognize two distinct, but related, semantic components. First, there is the expression's *reference,* i.e., its denotative relation to a *referent* (or denoted entity). Second, there is the expression's *sense,* which Frege characterized as a particular manner in which the expression's referent is cognitively presented to the language user. Frege motivated this distinction by drawing attention to sentences in which the meaning of a singular term is apparently *not* exhausted by its correlation with a referent. For example, if the meaning of a singular term were to consist only in what it refers to, then the true, but non-trivial, identity statement 'The evening star is the morning star' could not differ in meaning from the *trivially* true identity statement 'The evening star is the evening star.' Since the latter statement results from the former by substituting co-referential singular terms, any view that equates meaning with reference will necessarily fail to register any difference in meaning between the two statements. But the two sentences clearly *do* differ in meaning, since 'The evening star is the morning star' is not a trivial identity, but an informative identity – indeed, one that expresses the content of a genuine astronomical discovery – whereas 'The evening star is the evening star' is plainly trivial. Frege accounts for this by suggesting that while 'the evening star' and 'the morning star' have a common referent, they express different senses. A language user therefore grasps the common referent differently in connection with each of the two expressions, and this in turn accounts for the difference in 'cognitive value' between the two identity statements. Frege applies the notion of sense to similar effect in addressing puzzles concerning the meaning of singular terms in so-called 'intensional contexts,' for example, belief reports.

In subsequent writings, Frege extended the sense-reference distinction beyond the category of singular terms (which, on Frege's account, refer specifically to 'objects'), to *all* categories of linguistic expression, including mondadic and polyadic predicates (which refer to 'concepts' and 'relations,' respectively), and complete sentences. In the case of sentences, Frege identified as referents the two truth-values, 'the true' and 'the false,' and he characterized these as special 'logical objects.' A sentence's sense is, by contrast, the 'thought' it expresses, where the thought is understood as a compositional product of the senses of the sentence's linguistic subcomponents. As strained as this extension of the theory may appear, particularly with respect to reference, it brings to light two important features of Frege's approach to meaning. First, it reflects his insistence that the theory of reference should comprise, *inter alia,* a theory of *semantic value* – that is, a systematic account of how the semantic values of complex expressions (which, in the case of sentences, are truth-values) are determined on the basis of the semantic values of their subordinate constituents. Second, it reflects an endeavor to integrate the theory of semantic value with a plausible general account of *linguistic understanding* (as given by the theory of sense). Seen in light of these general ambitions, Frege's theory of sense and reference proposed an agenda that any comprehensive approach to the theory of meaning must in one way or another respect – a point that is amply borne out by subsequent developments in analytic philosophy of language.

Russell: Definite Descriptions and Logical Atomism

The idea that logical analysis forms the basis of a general philosophical method is central to the philosophy of Bertrand Russell (1872–1970). It is especially prominent in the works Russell produced over the first quarter of the twentieth century. In this period, Russell developed and defended the doctrine of

'logical atomism,' which grew out of his attempt to establish a version of logicism in the philosophy of mathematics, and came to encompass a wide variety of semantic, metaphysical, and epistemological ambitions. The common thread in Russell's approach to these matters consists in his emphasis on logical analysis as a method for clarifying the ontological structure of the world and the epistemological basis of our knowledge of it. As Russell put it, "the atom I wish to arrive at is the atom of logical analysis, not physical analysis" (1918: 37). Bound up with the notion of a logical atom, understood as a basic residue of logical analysis, is the notion of logical structure itself. Our aim in this section is to illuminate Russell's conception of logical structure, or 'logical form,' as it emerges in his theory of linguistic meaning and in his broader atomism.

Russell's theory of 'definite descriptions,' first articulated in his classic paper 'On denoting' (1905), paradigmatically illustrates Russell's methodological reliance on logical analysis in addressing questions about meaning. The argument of the paper involves, among other things, the defense of a principle that Russell regarded as fundamental to the account of linguistic understanding. In *The problems of philosophy*, Russell gave the following succinct statement of the principle: "Every proposition which we can understand must be composed wholly of constituents with which we are acquainted" (1910: 32). At the time of 'On denoting,' Russell meant by a 'proposition,' roughly, the state of affairs that is expressed by an indicative sentence, whether or not that state of affairs actually obtains. A proposition's 'constituents' are the real-world entities that figure in the state of affairs (or *would* figure in it, were the state of affairs to obtain). So understood, a proposition is not a linguistic entity, even in the attenuated sense of a Fregean thought. A proposition is, rather, a structured entity that comprises various nonlinguistic components of the world. What characterizes Russell's principle of acquaintance as a principle of linguistic understanding, then, is not the linguistic *nature* of propositions, but the correlativity of propositions with the indicative sentences of a language. For Russell, understanding any such sentence requires direct experiential acquaintance with the non-linguistic constituents comprised in the proposition it expresses.

In 'On denoting' Russell addressed problems that the principle of acquaintance ostensibly confronts in connection with 'denoting phrases' – i.e., phrases of the form 'some *x*,' 'every *x*,' and especially 'the *x*' (i.e., so-called 'definite descriptions'). Consider the statement: 'The author of "On denoting" was a pacifist.' Since Russell's principle requires acquaintance with a proposition's constituents as a condition for linguistic understanding, it would seem that only those personally acquainted with the author of 'On denoting' (i.e., with Russell himself) are in a position to understand the sentence. However, this highly counterintuitive consequence only arises on the assumption that the denoting phrase 'the author of "On denoting"' functions as a genuine singular term, one that singles out Russell as a *constituent* of the corresponding proposition. Russell's account of definite descriptions challenged this assumption by arguing that the characterization of definite descriptions as singular terms arises from a mistaken account of the logical form sentences containing them. According to this mistaken analysis, the sentence 'The author of "On denoting" was a pacifist' is an instance of the simple subject-predicate form *Ps*, where *s* indicates the occurrence of a singular term and *P* the occurrence of a predicate. Russell maintained that sentences containing definite descriptions have a far richer logical structure than this account would suggest. On Russell's analysis, the statement 'The author of "On denoting" was a pacifist' is not a simple subject-predicate statement but has the form, rather, of a multiply quantified statement:

$\exists x((x$ authored 'On denoting' & $\forall y\,(y$ authored 'On denoting' $\rightarrow y = x))$ & x was a pacifist)

On this analysis, the statement says: there is an *x* such that (1) *x* authored 'On denoting,' (2) for any *y*, if *y* authored 'On denoting,' then $y = x$ (this clause serving to ensure the uniqueness implied by the use of the definite article) and (3) *x* was a pacifist. So construed, the only nonlogical components of the sentence are the descriptive predicates '( ) authored "On denoting"' and '( ) was a pacifist,' with no trace remaining of the putative singular term 'the author of "On denoting"'. Therefore, beyond an implicit understanding of the mechanisms of quantification and the logical relation of identity, acquaintance with the referents of these descriptive predicates suffices for understanding the sentence. The sentence still manages to be *about* Russell since he, and he alone, satisfies the descriptive predicates (or 'propositional functions,' in Russell's terminology) contained in the sentence. However, it no longer singles out Russell as a *constituent* of the corresponding proposition, thus dispensing with the worry that the principle of acquaintance would require personal acquaintance with Russell as a condition for understanding what the sentence means.

The theory of definite descriptions vividly conveys the sense in which, for Russell, the surface grammar of natural language is inadequate as a guide to the analysis of logical form. Indeed, Russell maintained that many of the metaphysical and epistemological perplexities of traditional philosophy were a direct

result of conflating the grammatical forms of natural language sentences with logical forms of the propositions we manage to express in natural language. In this connection, it is important to recognize that, for Russell, logical form is not a purely linguistic notion. We have already taken note of the fact that Russell's early philosophy treats propositions as structured complexes that array various non-linguistic components of reality. Though Russell ultimately abandoned his early theory of propositions, he never abandoned the view that reality itself exhibits varieties of structure to which the details of a suitably perspicuous logical language must answer. In his lectures on *The philosophy of logical atomism* (1918), this view takes the form of a doctrine of 'facts,' where facts are understood as real-world complexes of individual objects and the properties and relations predicable of them. On Russell's characterization, a fact is a kind of complex that is inherently apt to determine a corresponding indicative statement as true or false – that is, true when the statement affirms the fact, and false when it denies it. The kernel of Russell's atomism consists in the view that the content of any statement (of whatever order of complexity) is ultimately analyzable in terms of the constellation of logically primitive facts that determine the statement as true or false. Russell's inventory of such facts includes 'atomic facts,' in which properties and relations are predicated of metaphysically 'simple' entities, and 'general facts,' which are facts concerning *all* or *some* of a particular category of entity. Atomic facts correspond to the atomic sentences, and general facts to the quantified sentences, of a logically regimented language. All other sentences are 'molecular' in the sense that they are compounds built up from atomic sentences and quantified sentences by the application of logical connectives such as 'not,' 'and,' 'or,' and 'if . . . then . . . .' Though molecular sentences assert neither atomic nor general facts, their truth or falsity is nevertheless *dependent upon* such facts in the sense that a molecular sentence will be determined as true or false *as a function of* the truth or falsity of its non-molecular subsentences. For example, if '*p*' and '*q*' are atomic sentences, then the disjunction '*p* or *q*' will be true just in case one or both of '*p*' and '*q*' are true, where the truth or falsity of these subsentences is determined directly by the atomic facts to which they relate.

Russell's metaphysical view of logical form – that is, his view that logical structure is an inherent characteristic of the facts that the real world ultimately comprises – is nicely expressed in a comment from his *Introduction to mathematical philosophy.* There Russell maintains that "logic is concerned with the real world just as truly as zoology, though with its more abstract and general features" (1919: 169). At least part of Russell's motivation for this 'substantive' conception of logic consists in his abiding conviction that the structure of language (or of an ideal language, at any rate) and the structure of the world must in some way coincide if there is to be any prospect of expressing our knowledge of the world by linguistic means. The task of giving a detailed account of this community of form between language and world was one that Russell wrestled with many times over, but which he ultimately left to the talents of his most gifted student, Ludwig Wittgenstein – the second great exponent of the philosophy of logical atomism.

Wittgenstein on Logic and Language

Of the figures we are discussing, arguably Wittgenstein (1889–1951) addressed the question of the relation between logic and language most extensively. His earliest major work, the *Tractatus logic-philosophicus,* devotes much attention to this problem. It is on this early work that we will focus here. In this work he praised Russell for discovering that the apparent logical form of a proposition need not be its real logical form. He supplemented Russell's view with the claim that the real form of a proposition is a picture of a state of affairs in the world.

Propositions, according to the *Tractatus,* are pictures of facts. The structure of a proposition mirrors the structure of the fact it represents. What a fact and the proposition that describes it have in common is their form. "The picture, however, cannot represent its form of representation; it shows it forth" (2.172). Here we see the important Tractarian distinction between *saying* and *showing*. The statement 'it is now raining' *says* something about the world. The statement 'it is either the case that it is now raining or it is not the case that it is now raining' *says* nothing about the world. It does, however, *show* the logical relations between facts. If something can be shown it cannot be said (4.1212). It follows that nothing concerning the logical relations between facts can be said.

According to the *Tractatus* "the world is the totality of facts, not of things" (1.1). That is to say, the world is not completely described by a list of all the objects that it contains. Rather, a complete description of the world would consist of all true sentences. Facts can either be atomic or compound, and correspondingly there are two types of propositions. Atomic facts are the most basic type of fact, and all atomic facts are independent of one another. Likewise, any possible set of atomic propositions could be true at the same time. This does not hold generally, as p and ~p (it is not the case that p) cannot both be true at the same time. Compound propositions are built up

by *truth functions* on atomic proposition. Any operator, including the logical operators (and, or, not, . . .), that takes sentences as arguments and assigns a truth value to the compound expression based only on the truth value of the arguments, is called a truth functional operator. For instance, 'or' designates a truth function with two argument places: the truth value of the sentence 'p or q' depends only on the truth value of the sentences 'p' and 'q'. On the other hand, in the sentence 'Julius Caesar conquered Gaul before Rome fell to barbarians,' '. . .. before____' designates a function that takes sentences as arguments, but it is not truth functional since we need to know more than the truth value of the arguments to determine the truth value of the compound. Wittgenstein observed that all propositions are either atomic or built up by truth functions on atomic propositions. Because of this all propositions can be expressed as a truth function on a set of atomic propositions.

Statements such as all of those of the form 'p or ~p' are tautologies: they are true no matter what the truth value of the constituents. We can know for certain that a tautology is true, but this is only because tautologies are true independently of which atomic facts turn out to be true (and because all sentences are truth functions of atomic sentences). We cannot say that the world has a certain logical structure, this can only be shown. It is tautologies that show the logical syntax of language, but tautologies say nothing. "Logical propositions describe the scaffolding of the world, or rather they present it. They 'treat' of nothing" (6.124).

Concerning sentences of natural language, Wittgenstein thought that no serious reconstruction is necessary. "In fact, all the propositions of our everyday language, just as they stand, are in perfect logical order" (5.5563). Furthermore, Wittgenstein thought that what he says about the logical structure of language must already be known by anyone who can understand the language. "If we know on purely logical grounds that there must be elementary propositions, then everyone who understands propositions in their unanalysed form must know it" (5.5562). Remember that Wittgenstein, following Russell, distinguished between the apparent logical form of a proposition and its real logical form. The logical form of natural languages is extremely complex and shrouded in conventions. "Man possesses the capacity of constructing languages, in which every sense can be expressed, without having an idea of how and what each word mean – just as one speaks without knowing how the single sounds are produced. Colloquial language is part of the human organism and is no less complicated than it. From it it is humanly impossible to gather immediately the logic of language" (4.002).

While ordinary use of natural language is in perfect logical order, philosophy arises from the abuse of natural language. Wittgenstein thinks that philosophy is nonsense because it attempts to state what cannot be said. "Most propositions and questions, that have been written about philosophical matters, are not false, but senseless" (4.003). The view that philosophy as standardly practiced is senseless, and therefore that a radically new approach to philosophy must be developed had a profound influence on a group of philosophers who held weekly meetings in Vienna – the Vienna Circle.

Carnap and the Vienna Circle

Rudolf Carnap (1891–1970) is generally regarded as the most influential member of the Vienna circle. This group (often called the logical positivists or logical empiricists) studied Wittgenstein's *Tractatus* carefully and much of what they wrote was inspired by or was a reaction to this work. Logical positivism is often thought of as being characterized by its commitment to *verificationism*. In its strictest form, verificationism is the view that the meaning of a sentence consists in the method of its verification – that is, in the epistemic conditions under which the statement would properly be acknowledged as true. In a less strict form, it is the view that the meaning of a sentence consists of what would count as evidence for or against it. There was much debate in the circle as to what form the verificationist principle should take. There was in the circle very little objection (Gödel being the notable exception) to the thesis that there are two different kinds of statements – empirical (synthetic) and logico-mathematical (analytic) statements. Concerning empirical statements, their meaning is given by what would amount to a verification (or confirmation on a less strict view) of the statement or its negation. Concerning logico-mathematical statements, the circle was much influenced by Wittgenstein's view that tautologies are *a priori* truths – truths that are knowable independently of experience because they say nothing concerning the state of the empirical world.

What Wittgenstein counted as a logical truth (a tautology) was not sufficiently broad to include all of mathematics. Since mathematical truths are not empirical assertions, members of the Vienna circle thought they should have the same status as other logical truths. Carnap undertook to broaden the definition of logical truth so as to include all mathematical statements. To do this Carnap had to answer the question of what makes something a logical truth. Carnap's answer to this question involved the adoption of a strong form of conventionalism, which he

expressed in terms of his famous 'principle of tolerance': "In logic, there are no morals. Everyone is at liberty to build up his own logic, i.e. his own form of language, as he wishes. All that is asked of him is that, if he wishes to discuss it, he must state his methods clearly, and give syntactic rules instead of philosophical arguments" (*The logical syntax of language,* §17). This principle states that logical truth is a matter of convention. Which statements are treated as belonging to the set of analytic statements is a matter of pragmatic decision, provided that the set can be clearly defined. There is, for Carnap, no logical structure of the world that is either rightly or wrongly captured by our choice of logic. Logical relationships between sentences are a matter of stipulation on our part. However, by classifying logical statements as analytic, and therefore independent of empirical circumstances, Carnap preserves the Wittgensteinian idea that logical truths say nothing about the world. Carnap later summarized his position on logico-mathematical truth by claiming that analytic statements are true in virtue of their meaning.

Carnap's principle of tolerance was inspired by the debates concerning the foundations of mathematics in the 1920s. One party in this debate were the intuitionists, who did not believe that we have grounds to assert a mathematical sentence of the form 'p or ~p,' unless we have a proof of either p or of ~p. According to classical logic, the sentence 'p or ~p' is a tautology; it therefore stands in no need of prior justification. Intuitionists, therefore needed to abandon classical logic in favor of a logic that would not count all instances of the law of the excluded middle (p or ~p) as valid. Carnap saw both classical and intuitionistic logic as well motivated, and saw nothing that could decide between the two. He therefore saw the decision of which logic to adopt as a matter of choice.

Further developments in logic amplified the differences between Carnap and Wittgenstein. Gödel's famous incompleteness theorems made use of a technique that has since become known as Gödel numbering. By Gödel numbering we assign code numbers to expressions of the language. Through this coding technique, a language capable of expressing arithmetical properties becomes a device for discussing certain syntactic properties of any language system. Carnap saw this as a refutation of Wittgenstein's idea that the logical syntax of language is inexpressible. In fact, one of the general goals of Carnap's *The logical syntax of language* was to show that it is possible to deal in a clear systematic manner with the syntactic properties of any language. Recall that for Wittgenstein, we cannot say anything concerning the logical syntax of language.

Carnap's logical tolerance led him to assert that even statements of the form $(\exists x)Px$, which assert the existence of an object with the property P, might be true by stipulation. That we could stipulate an object into existence seemed odd to many philosophers. In order to address this worry, Carnap formulated a distinction between *internal* and *external* questions of existence. In the language system of arithmetic it is provable that $(\exists x)\ (7 < x < 9)$. Relative to this language, the question of the existence of numbers is trivial. But when someone asks whether numbers exist they do not mean to be asking the questions in such a manner that it is answerable in by appeal to the standards of proof and disproof that prevail in arithmetic. Rather, they mean to ask if the numbers really exist in some absolute sense. Carnap viewed such 'external' questions as unanswerable given that they remove the questions from a context in which there are clear standards for addressing it, without embedding it in another context where there are any such standards. But the coherence of the language system that includes, for instance, the numbers does not depend on a positive answer to the external question of the existence of numbers. In this way, not only the logical structure of the world but its ontology as well becomes a matter of convention.

Quine: the Thesis of Gradualism

W. V. O. Quine (1908–2000) began his philosophical career as a self-described disciple of Carnap's. However, from his earliest interaction with Carnap, Quine questioned Carnap's strict division between analytic and synthetic sentences. This early reaction to Carnap's work grew into a major break between the two philosophers. Recall that the analytic/synthetic distinction divides sentences (respectively) into those that concern the world and are capable of being empirically confirmed, and those that are accepted by stipulation and are true in virtue of meaning. Quine thought that this difference in kind ought to be replaced with a difference of degree. This is known as the thesis of gradualism.

For Quine our knowledge forms a structure like a web. The nodes of the web are sentences and the links between nodes are entailment relations. Only at the periphery are our decisions to accept or reject sentences directly influenced by experience. Decisions over sentences closer to the center are of an increasingly 'theoretical' character, with accepted logical and mathematical statements forming the most central class. The ordering of sentences from periphery to interior is based on how willing we would be to abandon a sentence when revising our beliefs in light of new evidence. For sentences like 'this table

is red' we can easily imagine a set of experiences that would lead us to abandon it. By contrast, it is far more difficult to imagine the experiences that would lead us to abandon '$2 + 2 = 4$.' Abandoning this statement would entail a far more radical change in our overall belief system. However, for Quine, the difference is one of degree, rather than kind. No sentence, mathematical, logical or otherwise, is ultimately immune from revision in light of experience. Physics, for instance, in departing from Euclidean geometry has abandoned sentences such as 'between any two points exactly one straight line can be drawn' once believed to be on the firmest foundation.

We have seen that, for Carnap, logico-mathematical truths are not responsible to any aspect of the world. We are perfectly free to accept any set of sentences to count as analytic. The way the world is affects only the practical utility of our choices of analytic statements; it does not affect the theoretical legitimacy of those choices. (However, Carnap is far more interested in giving reconstructions of existing notions instead of constructing arbitrary systems.) For Quine, on the other hand, logical and mathematical truths are on par with highly theoretical statements of physics. It may turn out that by abandoning classical logic or altering our mathematics we will be able to formulate more simple scientific theories. Since simplicity is one of the norms of theory choice, it may be that our best scientific theory does not conform to the laws of classical logic.

Carnap's principle of tolerance suggests that logical truths are true by virtue of the meanings assigned to the logical vocabulary. Quine rejects this view and sees logical truths as subject to the same standards of acceptance as any other scientific claim. Since there are a certain sets of experiences that would lead us to reject what we now regard as a logical truth, Quine maintained that we could no longer hold, as Wittgenstein did, that logical truths are true independently of how things happen to be in the empirical world. Logical truths therefore lose their special status and become statements on par with other scientific claims. They are true because they are part of our best description of the world.

See also: Analytic Philosophy; Analytic/Synthetic, Necessary/Contingent, and a priori/a posteriori; A Priori Knowledge: Linguistic Aspects; Logical Consequence; Propositions; Semantic Value; Sense and Reference: Philosophical Aspects.

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Logical and Linguistic Notation

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Notation is a conventional written system for encoding a formal axiomatic system. Notation governs

- The rules for assignment of written symbols to elements of the axiomatic system
- The writing and interpretation rules for well-formed formulae in the axiomatic system
- The derived writing and interpretation rules for representing transformations of formulae, in accordance with the rules of deduction in the axiomatic system.

All formal systems impose notational conventions on the forms. Just as in natural language, to some extent such conventions are matters of style and politics, even defining group affiliation. Thus, notational conventions display sociolinguistic variation; alternate conventions are often in competing use, though there is usually substantial agreement on a 'classical' core notation taught to neophytes.

This article is about notational conventions in formal logic, which is (in the view of most mathematicians) that branch of mathematics (logicians, by contrast, tend to think of mathematics as a branch of logic; both metaphors are correct, in the appropriate formal axiomatic system) most concerned with many questions that arise in natural language, e.g., questions of meaning, syntax, predication, well formedness, and – for our purposes, the most important such – detailed, precise specification. Specification is the purpose of notation, both in mathematics and in science, but such precise conventions are unavoidably context sensitive. Thus, the use of logical notation is different in logic and in linguistics. Bochenski (1948; English translation 1960) is still the best short introduction to logical notation.

Almost all logical notation is modern, dating from the last century and a half. However, there is some prior work that deserves comment here, because logic, alone of all mathematical fields, was widely studied and significantly developed in the European Middle Ages.

The principal concern of medieval logicians was the syllogism. By the time of the Renaissance, there was an extensive and thorough account of syllogistic. One of its major achievements was the development of systematic names for the modes of the syllogism. These names (as conventionally grouped, *Barbara, Celarent, Darii, Ferio, Barbarix, Feraxo; Cesare, Festino, Camestres, Baroco, Camestrop, Cesarox; Darapti, Disamis, Datisi, Felapton, Bocardo, Ferison; Bramantip, Camenes, Dimaris, Fesapo, Fresison, Camenop*) constitute the first real notational convention in logic.

The names are mnemonic, designed to be chanted, like Pāṇini's rules. The three vowels in each name are the letters *A, E, I, O,* which mark the vertices of the Square of Opposition, indicating the proposition type (respectively, Universal Affirmative, Universal Negative, Existential Affirmative, and Existential Negative) of each of the three propositions of the syllogism. The letters *s, p, m,* and *c* also have specific meanings in these mnemonics, summarizing relevant logical properties of each type, thus serving the notational goal of detailed, precise specification. Syllogistic is largely of historical interest in modern logic, but its concerns, terminology, and notation continued to be used and understood until well into the development of modern logic.

In modern logic and mathematics, notation is a necessary part of a *calculus*, one of a number of special sets of formalized concepts and techniques for manipulating them. The metaphor refers to the origins of classical *calculation*, which was performed with pebbles (Lat *calculus*) on a counting table or *abacus*. This metaphor licenses notational practice with formal systems, which is to

- Encode: represent parts (hopefully, natural parts) of a quantity, concept, or truth with symbols, then
- Calculate: push those symbols around in conventionally accepted fashions, hoping thereby to
- Decode: find in the changed symbolic patterns representations of previously unknown quantities, concepts, or truths.

Calculi are an invention of the 17th century; the best known are Leibniz's integral calculus and Newton's differential calculus, which (together) are understood as the default meaning of *calculus* in modern English.

There are many calculi in modern mathematics, some of which exist in name only, such as Leibniz's putative *calculus ratiocinator.* In symbolic logic, which is the closest thing to what Leibniz called for, the two most important calculi, each with its own notational conventions, are Propositional Calculus and Predicate Calculus, both of which were originally intended straightforwardly (as the titles of their original publications show) as tools for the representation of human thought. Language did not enter into the picture at first, except as a transparent expression of thought.

Propositional Calculus

Symbolic logic, and its notation, originated in the works of George Boole (1815–1864), of which Boole (1854) is the best known. Boole's intention was to produce an algebraic account of propositions as combined via what we have come to call *Boolean* connectors, principally (logical) *and*, *or*, *not*, *equivalent*, and *implies*, which then achieved the dual status of both English words that are prominent in logical discussion and mathematically defined functors. Boole first made explicit the alternation between logical *and* and *or* enshrined in DeMorgan's Laws, comparing them (respectively) to multiplication and addition in algebra; thus he represented *x and y* as *xy*, whereas *x or y* was $x + y$; he used numbers throughout, using $1 - x$ to represent *not x*, for instance. This notational convention, and the system based on it, is often called *Boolean Algebra* (though technically it is a *complemented distributive lattice*, not an algebra). Boole's logic did not use quantifiers *per se*; instead, he dealt with the quantification inherent in syllogistic by using the traditional letters *A, E, I, O*.

Propositional calculus, the calculus of arbitrary whole propositions without regard to their predicates or arguments, uses two major notations. One, usually called 'Classical' or 'Standard,' exists in numerous individual variations and is usually the one taught to students; the other, called 'Polish,' 'Łukasiewicz,' or 'Prefix,' is standardized and in widespread use.

Classical notation for propositional calculus uses lowercase letters for propositions (traditionally *p, q, r, s*) and special symbols for their connectives. The two truth values of a proposition are usually either T and F, or 1 and 0. In ternary logics, T / F / # is more common than numeric codes, because arithmetic systems like 1 / 0 / −1 or 1 / ½ / 0 make implicit combinatorial claims.

The Classical special symbols for functors include those shown in Table 1.

In each case, the first symbol is the most widely accepted. In addition to functors, propositional logic also contains symbols for pragmatic connectives used in proofs, such as entailment, which usually uses a single arrow (→), and assertion, which uses a variety of symbols, including ⊢.

Table 1 Classical special symbols for functors

not p	¬p, -p, ∼p, p
p and q	p ∧ q, p • q, p & q, pq
p or q	p ∨ q
p is equivalent to q	p ⊃ q, p → q, p ⇒ q
p implies q	p ≡ q, p ↔ q, p ⇔ q

There are also parentheses, because grouping of formulae can introduce significant ambiguity, which is anathema in logic. In extended use, parentheses were found to be burdensome, because balancing them was a frequent source of avoidable error. To combat this, Whitehead and Russell in their monumental *Principia mathematica* (1910–13), developed a special parenthesis-free notation to augment their Classical formulae, based on using groups of 1,2,3, . . . dots to separate propositions. This version is rarely seen today.

Polish notation was developed and popularized by Jan Łukasiewicz (1878–1956) in the early 1920s as a by-product of his development of ternary logic, for which he also invented the truth table. In this notation, propositions are again represented by lowercase letters, but functors are uppercase letters placed immediately before their argument(s): *not p* is Np, *p and q* is Kpq, *p or q* is Apq, *p implies q* is Cpq, and *p is equivalent to q* is Epq. Because functors form valid propositions, these can be nested indefinitely without recourse to parentheses; for instance, DeMorgan's Laws, which are stated in classical notation as ¬ (p ∧ q) ≡ ¬ p ∨ ¬ q and ¬ (p ∨ q) ≡ ¬ p ∧ ¬ q, are stated in Polish notation respectively as EKNpqANpNq and EANpqKNpNq.

Because the prefixal position of the Polish functors is arbitrary, a postfixal variant, called *Reverse Polish Notation*, or RPN (linguists note that it should be called 'Japanese Notation,' because it acts like a standard SOV language), is equally valid and is widely used in computing circles, because it turns out to be ideally adapted to performing calculations using a pushdown stack. In RPN, DeMorgan's laws are stated as pNqKpNqNAE and pNqApNqNKE.

Modal Logic, an extension of propositional calculus into modality, introduces two more common notational symbols, ◇p for *p is possibly true* (in Polish notation Mp, for *Möglich*), and □p for *p is necessarily true* (Polish Lp, for *Logisch*). DeMorgan's Laws for modal logic (where □ is associated with ∧ and ◇ with ∨) can thus be stated ¬□p ≡ ◇¬p (Polish ENLpMNp) and ¬◇p ≡ □ ¬ p (Polish ENMpLNp).

Predicate Calculus

Quantified Predicate Calculus (both first- and second-order) was first axiomatized and used notationally by Gottlob Frege (1848–1925) in 1879, a quarter-century after Boole. In predicate calculus, the atomic proposition of propositional calculus is split into predicate and argument(s), allowing far more representation of actual natural language phenomena. To represent predication, Frege introduced the now-standard functional notation, widely used in

mathematics. In this notation, an atomic proposition *p* could now be seen to consist of a *predicate* (typically using uppercase letters) operating on *arguments* expressed by following parenthesized variables, in the same way as a mathematical function like $f(x) = x^2$; e.g., TALL (x) = *X is tall*, SEE (x, y) = *X sees Y*, and GIVE (x, y, z) = *X gives Y to Z*.

In particular, quantifiers were separated by Frege for the first time from their traditional Aristotelian *A, E, I, O* notation. Quantifiers in natural language are specialized words that often involve special syntax; normally they appear in construction with some noun, which they are said to *bind*. However, their syntax varies widely, and quantifier ambiguities are frequent.

Modern logic admits what McCawley (1993) calls "the logicians' favorite quantifiers": the *existential quantifier*, ∃x, pronounced 'for some *x*' or 'there exists an *x*,' and the *universal quantifier*, ∀x, pronounced 'for all/every/each *x*.' The *x*'s in each case are *dummy variables*; they do no more than indicate which variable in the proposition following is to be considered bound by the quantifier.

Quantifiers are rigidly controlled in the formulae in order to avoid ambiguity (and indeed to allow natural ambiguities to be explicated). They are placed before the formula containing the variable they bind, and their relative placement serves to denote the concept of *scope*, which is highly relevant to the three natural language elements represented in logic by operators (i.e., quantification, negation, and modality), all of which govern scope phenomena like Negative Polarity. Thus, the two ambiguous readings of *A boy beat every girl at tennis* are represented by (∃x) (∀y) BEAT (x, y) and (∀y) (∃x) BEAT (x, y).

Naturally, there are variations in quantifier notation as well: a formula like DeMorgan's Laws for quantifiers, which can be written ENPxφxSxNφx and ENSxφxPxNφx [Px is (∀*x*) and Sx is (∃*x*)] in Polish notation, comes out as ¬(∀x) φ(x) ≡ (∃x) ¬φ(x) and ¬(∃x) φ(x) ≡ (∀x) ¬φ(x) in Classical notation, which also admits a simple parenthesized variable (x) instead of (∀x), and also one with a circumflex (ŷ) instead of (∃y), in the appropriate position. The use of parentheses, colons, brackets, and other punctuation with quantifiers is inconsistent and follows individual style, which is usually oriented toward scope delimitation.

See also: Assertion; Cladistics; Meaning: Overview of Philosophical Theories; Negation; Number; Panini; Predication; Propositional and Predicate Logic: Linguistic Aspects; Quantifiers: Semantics; Scope and Binding: Semantic Aspects.

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Logical Consequence

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Fundamentals

Logical consequence is the relation that holds between the premises and conclusion of an argument when the conclusion *follows from* the premises, and does so for purely logical reasons. When a conclusion is a logical consequence of premises, the truth of those premises suffices to guarantee the truth of the conclusion. To clarify, we'll look at some examples.

When we reason that

(A1) Socrates is mortal

follows from

(A2) Socrates is human

and

(A3) All humans are mortal,

we need not appeal to any known facts about Socrates, about humanity, or about mortality. These specifics are irrelevant to the fact that (A1) follows from (A2) and (A3), which shows that the sense of 'following-from' involved here is the purely logical

mathematics. In this notation, an atomic proposition *p* could now be seen to consist of a *predicate* (typically using uppercase letters) operating on *arguments* expressed by following parenthesized variables, in the same way as a mathematical function like $f(x) = x^2$; e.g., TALL (x) = *X is tall*, SEE (x, y) = *X sees Y*, and GIVE (x, y, z) = *X gives Y to Z*.

In particular, quantifiers were separated by Frege for the first time from their traditional Aristotelian *A, E, I, O* notation. Quantifiers in natural language are specialized words that often involve special syntax; normally they appear in construction with some noun, which they are said to *bind*. However, their syntax varies widely, and quantifier ambiguities are frequent.

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Quantifiers are rigidly controlled in the formulae in order to avoid ambiguity (and indeed to allow natural ambiguities to be explicated). They are placed before the formula containing the variable they bind, and their relative placement serves to denote the concept of *scope*, which is highly relevant to the three natural language elements represented in logic by operators (i.e., quantification, negation, and modality), all of which govern scope phenomena like Negative Polarity. Thus, the two ambiguous readings of *A boy beat every girl at tennis* are represented by (∃x) (∀y) BEAT (x, y) and (∀y) (∃x) BEAT (x, y).

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sense. That is, (A1) is a *logical* consequence of (A2) and (A3).

By contrast, when we reason that

(B1) There are mammals in the ocean

follows from

(B2) There are dolphins in the ocean

we must appeal to facts peculiar to the nature of mammals and of dolphins. We appeal, specifically, to the fact that dolphins are mammals. In this case, although there is a sense in which (B1) 'follows from' (B2), (B1) does not follow *logically* from (B2). It follows, one might say, *biologically*, because an appeal to biological facts is needed to get from (B2) to (B1). Nevertheless, the fact that (B1) follows in this extra-logical way from (B2) is because of the relation of logical consequence. Specifically, it is because of the fact that (B1) is a logical consequence of (B2) together with

(B3) All dolphins are mammals.

That (B1) is a *logical* consequence of (B2) and (B3) can be seen by noting that it follows from them independently of the specific nature of the objects, properties, and relations mentioned in these statements.

In general, all cases of 'following from' are due, in this way, to the relation of logical consequence. If a conclusion follows from some collection of premises, this is because that conclusion is a *logical* consequence of the premises, together perhaps with various ancillary claims that are presupposed in the given context.

Logical consequence is therefore a ubiquitous relation: all of our reasoning turns on recognizing (or attempting to recognize) relations of logical consequence, and virtually all of the important connections between theories, claims, predictions, and so on, are in large part due to logical consequence. Furthermore, whenever we say that a given argument is *valid* or that it is *invalid*, or that a particular set of claims is *consistent* or *inconsistent*, we are employing the notion of logical consequence: a valid argument is one the conclusion of which is a logical consequence of its premises, whereas a consistent set of claims is a collection that has no contradiction as a logical consequence. Because the central logical notions of validity, consistency, etc., are definable in terms of logical consequence, the investigation of the nature of logical consequence is at the same time the investigation of the nature of the logical properties and relations in general.

The Formal Study of Logical Consequence

The modern investigation of logical consequence is closely connected to the discipline of *formal logic*. Formal logic is the study of formal (i.e., syntactically specified) languages, and of various philosophically and mathematically significant properties and relations definable in terms of such languages. Of particular significance for the study of logical consequence are two kinds of relations definable on the formulas of a formal language, the relations of *proof-theoretic consequence* and of *model-theoretic consequence*.

Given a formal language, a relation of proof-theoretic consequence is defined via the rigid specification of those sequences of formulas that are to count as *proofs*. Typically, the specification is given by designating specific formulas as *axioms*, and designating some *rules of inference* by means of which formulas are provable one from another. Both axioms and rules of inference are specified entirely syntactically. A proof is then a series of formulas each of which is either taken as premise, or is an axiom, or is obtained by previous formulas in the series via a rule of inference. A formula φ is a proof-theoretic consequence of a set Σ of formulas if and only if there is a proof the premises of which are among the members of Σ, and the conclusion of which is φ.

Model-theoretic consequence, by contrast, is defined in terms of a range of *interpretations* (or *models*) of the formal language in question. While the vocabulary of the language is divided into the 'logical' terms (typically, analogues of the English-language 'and,' 'or,' 'not,' 'if. . .then,' and 'for all'), the meaning of which is taken as unchanging, and the 'non-logical' terms (typically analogues of natural-language predicates and singular terms), an *interpretation* is an assignment of objects and sets of objects to the non-logical terms. In the standard case, the formulas are taken to have a truth-value (i.e., to be either true or false) on each such interpretation. A formula φ is then a model-theoretic consequence of a set Σ of formulas if and only if there is no interpretation on which each member of Σ is true while φ is false.

The connection between these defined relations and logical consequence arises when the formulas in question are taken to stand as representatives of natural-language sentences or the claims they express. Given such a representation-relationship, the relations of proof-theoretic and of model-theoretic consequence are typically designed so as to mirror, to some extent, the relation of logical consequence. Thus, the idea behind a standard design of a relation of proof-theoretic consequence is that it only count as axioms those formulas representing 'logical truths' (e.g., 'Either 5 is even or 5 is not even'), and that its rules of inference similarly mirror logical principles. In such a case, a formula φ will be a proof-theoretic

consequence of a set Σ of formulas only if the kind of ordinary sentence represented by φ is indeed a logical consequence of the ordinary sentences represented by the members of Σ. This does not ensure that the relation of proof-theoretic consequence exhausts the relation of logical consequence, for two reasons: first of all, the formal language in question may not contain representatives of all ordinary sentences; second, the proof system may not be rich enough to reflect all of the instances of logical consequence amongst even those ordinary sentences that are represented in the language. The system of proof-theoretic consequence will, however, have the virtue of being well defined and tractable. Similar remarks apply to the relation of model-theoretic consequence: in a well-designed formal language, the relation of model-theoretic consequence will mirror, in important ways, the relation of logical consequence. The intention in designing such a system is, typically, that φ will be a model-theoretic consequence of Σ if and only if the kind of ordinary sentence represented by φ is a logical consequence of those represented by the members of Σ.

Given a particular language together with its proof-theoretic and model-theoretic consequence relations, the question arises whether those relations are co-extensive: whether, that is, φ is a proof-theoretic consequence of Σ if and only if φ is a model-theoretic consequence of Σ. In some cases, the answer is 'yes,' and, in some, 'no.' Each half of the inclusion is a separate, significant issue: when every proof-theoretic consequence of each set of formulas is also a model-theoretic consequence of that set, the system is said to be *sound*, and when every model-theoretic consequence of each set of formulas is also a proof-theoretic consequence of that set, the system is said to be *complete*. The soundness of a system is typically a straightforward matter, following immediately from the design of the proof-theoretic system; completeness is typically a considerably more significant issue. The most-important system of logic, that of classical first-order logic, was proven by Kurt Gödel in 1930 to be complete; this is the celebrated 'completeness theorem for first-order logic.' First-order logic is, in various ways, the 'strongest' complete system (see Enderton, 1972).

Formal systems, i.e., formal languages together with proof-theoretic or model-theoretic consequence relations, differ from each other in a number of ways. Most important for the purposes of the study of logical consequence are the following two differences: (1) proof-theoretic relations differ over the axioms and rules of inference they include, and hence over the instances of logical consequence that they represent. Some such differences are just because the languages of some such systems are expressively weaker than others, so that principles contained in one simply cannot be expressed in the other. More interesting are differences motivated by differing views of logical consequence itself. Thus, for example 'classical' logic differs from intuitionist logic in including the principle of *excluded middle*, the principle guaranteeing the truth of all statements of the form *p-or-not-p*. As the proponent of intuitionist logic sees it, this principle is not universally accurate, and hence should not be included in a system of logic. (2) Model-theoretic relations differ in a number of small ways, including the specifics of the definition of *interpretation*, and of the definition of truth-on-an-interpretation. More important, the model-theoretic consequence relations for different systems differ when the formal languages in question are importantly structurally different. Thus, for example, standard *second-order logic* has a richer model-theoretic consequence relation than does first-order logic, and there are natural-language arguments whose second-order representation yields a conclusion that is a model-theoretic consequence of its premises, but whose first-order representation does not (see van Dalen, 2001; Shapiro, 1991).

The question of the extent to which each such system gives an accurate characterization of logical consequence is of central philosophical concern. With respect to the relations of proof-theoretic consequence, debate turns on the accuracy of specific axioms and rules of inference. With respect to relations of model-theoretic consequence, the significant debate is rather over the question of the extent to which model-theoretic consequence relations in general (or, perhaps, that relation as applied to classical first-order logic) offer an *analysis* of the ordinary, non-formal relation of logical consequence. If logical consequence is in some sense 'essentially' the relation of truth-preservation across interpretations, then model-theoretic consequence has a privileged position as simply a tidied-up version of the core relation of logical consequence. If, by contrast, the relation of truth-preservation across interpretations is simply another sometimes-accurate, sometimes-inaccurate means of representing the extension of the relation of logical consequence, then model-theoretic consequence has no immediate claim to accuracy (see Etchemendy, 1990).

General Philosophical Concerns

In addition to questions surrounding its appropriate formal representation, the investigation of logical consequence includes questions concerning the nature of the relation itself.

One important cluster of such questions concerns the relata of the relation. Here we want to know whether the items between which logical consequence holds are, say, the *sentences* of ordinary language, or the non-linguistic *propositions* expressed by such sentences, or something else altogether. Although logical consequence is perhaps most straightforwardly viewed as a relation between sentences, one reason to reject this idea is that sentences, at least when thought of as syntactic entities (strings of letters and spaces), seem the wrong kinds of things to bear that relation to one another. Because any given sentence so understood could, under different circumstances, have had a quite different meaning, and would thereby have borne different logical relationships to other sentences, it is arguable that the sentence itself is not the primary bearer of this relation but is, rather, just a means of expression of the primary bearer. This line of reasoning motivates the view of non-linguistic propositions, the kinds of things expressed by (utterances of) fully interpreted sentences, as the relata of logical consequence. The central reason for rejecting *this* proposal, though, is skepticism about the existence of such things as nonlinguistic propositions. A third option is to take the relata of the logical consequence relation to be sentences-in-use, essentially pairs of sentences and meaning-conferring practices (see Cartwright, 1987; Strawson, 1957; Quine, 1970).

The second, related collection of questions concerning logical consequence arises from the inquiry into what *makes* one thing a logical consequence of others. Here, we are looking for an explanation or an analysis of logical consequence in terms of other, more well-understood notions. One potential answer is that logical consequence is to be explained in terms of the meanings of various specific parts of our vocabulary, specifically in terms of the meanings of the 'logical' words and phrases (see above). A second, not necessarily competing, account is that logical consequence is because of the *form*, or overall grammatical structure, of the sentences and arguments in question. A third type of answer, mentioned above, is that logical consequence is best explained in terms of model-theoretic consequence. Various of the accounts of logical consequence have been criticized on grounds of circularity: to say that φ's being a logical consequence of Σ is *because of* some other relation between φ and Σ is, arguably, to say that the claim that φ is a logical consequence of Σ is itself a *logical consequence* of the purported explanans. If this charge of circularity is accurate, it is arguable that all such explanations of the nature of logical consequence will be found to be circular, with the result that this relation must be taken to be 'primitive,' not capable of reduction to anything else. Part of the debate here will turn on what one takes the nature of explanation to be, and on whether explanation requires reduction (see Quine, 1936).

In short: although it generally is agreed that some claims are logical consequences of others, there is scope for important disagreement about (a) which specific claims are in fact logical consequences of which others, (b) how to construe the notion of 'claim' involved here, and (c) how to give a correct account of the nature of the relation of logical consequence. Because of the connections between these issues and general positions in the philosophy of logic, philosophy of mathematics, and philosophy of language, one's preferred answers to the questions noted here will turn in large part on one's position with respect to a host of surrounding topics.

See also: Inference: Abduction, Induction, Deduction; Logic and Language: Philosophical Aspects; Logical Form in Linguistics; Propositions; Propositional and Predicate Logic: Linguistic Aspects.

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Logical Form in Linguistics

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To describe the logical form of some claim is to describe its logically significant properties and structure, showing its connection to other claims via what it entails and what it entails it. Given the variety of claims that philosophers have taken in an interest in, it is not surprising that there are a large number of theories of logical form. But even if there is no shortage of theories aiming at the logical form of, e.g., propositional attitude sentences or counterfactual conditionals, surprisingly little attention has been given to the prior question of **what** logical form is to begin with. Just as importantly, it is not clear what it is that is supposed to **have** a logical form in the first instance. Is it, for example, a linguistic object like a sentence, or the utterance of a sentence, or something different from both of these, such as the proposition expressed by an utterance of a sentence?

The presence of logic within the notion of logical form may make one suspicious of paying too much attention to the details of natural language. Other kinds of items seem better suited to having logical forms. For example, propositions have whatever truth conditions they have essentially, whereas sentences do not: 'snow is white' might have meant that most colorless beverages lack sodium. Further, it is a notorious fact about natural language that it contains a good deal of vagueness and context sensitivity that is hard to capture within a theory of inference. Facts like these have made philosophers wary of placing too much emphasis on natural language sentences. At the very least, one would want to purge natural language of its logically problematic features before building upon it a theory of logical form. This was precisely the reaction of Frege (1952) and Russell (1919) to the defects of natural language. For them, one needed to formulate an ideal language free from the flaws of natural language in order to spell out the content of various claims. Only then could one think about constructing theories of logical form. Frege's *Begriffschrift* formulated an ideal language in which to conduct arithmetic and overcame some of the difficulties of explaining inferences involving multiple quantifiers that beset earlier logical theories.

But even if having a logically perspicuous representation of the propositional content of an assertion makes it easier to assess how well a theory accords with what is said about, e.g., the good or the propositional attitudes, there are serious questions concerning how such representations are related to the grammatical properties of a sentence. In the hands of Frege and Russell, one simply translated, as best one could, from natural language into an ideal language. These languages were specifically designed to expedite inference, and so no question arises about their logical forms. But until the last few decades, the kinds of structures required for the purposes of detailing the inferential properties of natural language sentences were thought to be quite remote from anything one might call 'the grammar' of a language. Indeed, one way of **motivating** talk of logical form was by showing the deficiencies of theories of meaning built upon generalizations of apparent grammatical form and function.

A number of developments in the 1960s and 1970s changed this picture. A growing number of philosophers became intrigued with the idea of constructing theories of meaning for natural languages directly. The idea that such a theory could be done **systematically** stems in large part from the work of Noam Chomsky in the 1950s and 1960s, showing how rigorous theories of grammatical structure were possible. In light of the success of Chomsky's program, it was natural to wonder whether a semantic theory along the lines of his work in syntax could be constructed. The classic picture of the grammatical structure of a sentence involves a series of levels of representation, the most well known of which is the so-called 'T-model.' In this model, there are four 'levels of representation': D-structure, S-structure, LF, and then PF, or the phonological form of a sentence. Since the last item is a representation of a sentence's phonological properties, I leave it aside. Each level is related to the one before via the application of a rule or set of rules. The conception of rules has changed over the years, but the underlying idea is that syntactic structure of a sentence is built up, step by step, through a series of representations, each

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having its own properties. Diagrammatically, what we have is the following:

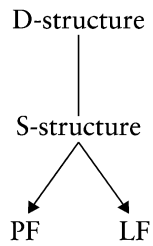

The 'S-structure' or surface structure of a sentence is what corresponds, nearly enough, to the order of expressions as heard or written. 'LF' or logical form is a syntactic representation that is derived from the S-structure via a set of transformations, just as S-structures were derived from D-structures via transformations.

Since only one level of representation seems to correspond to the overt form of a sentence, it follows that a good deal of syntactic structure remains hidden. The idea that unpronounced structure can be given a grammatical motivation is compelling. Consider the following pair of sentences:

(1) John kissed Mary

(2) Who did John kiss

The leftmost WH-phrase in (2) is intuitively related to the position of 'Mary' in (1). The grammar of English disguises this fact by requiring that unstressed WH-phrases in sentences like (2) be fronted. Were English different in this regard, the parallel would be more obvious. Interestingly, a good many languages allow for just this possibility while others require all WH-phrases to be placed at the left- periphery of a sentence. A more perspicuous representation of English would abstract from these kinds of provincial eccentricities of surface form and expose, via a logically perspicuous notation, just these parallels.

There is evidence that the grammatical structure of sentences like these in different languages is abstractly identical, i.e., that all WH-phrases are located at the edge of a clause at some level of representation. In some languages, like Russian, this is overtly true, even when there are several WH phrases in the clause. In other cases, like Chinese, there is little or no movement to the edge of the clausal periphery (see Huang, 1982). The difference between the overt forms of WH-questions then doesn't disguise just the logical or semantic structure of a sentence; it hides the grammatical structure as well. A more articulated version of (2) shows this abstract structure:

(3) Who did John kiss *t*

The key idea is that movement of a WH-phrase may occur overtly, as in English, or 'covertly,' as in some cases of French. When the WH-phrase does move, however, what we end up with is (3) The movement of the WH-phrase to its position at the left edge of the clause leaves a record in the form of a 'trace,' notated above as 't.'

Structures like (3) resemble, in a rather striking way, the kinds of representations that one finds within first-order logic, in particular with respect to the relationship between a quantificational expression and a variable that it binds. Let's look at this in more detail. It is now commonplace to use examples of scope ambiguities as evidence for the ambiguity of sentences, one to be sorted out in a semantic theory. Thus, a sentence like (4) is ambiguous depending upon whether or not one takes the quantificational phrase 'every boy' to have scope over the subject quantificational phrase 'some girl' or vice versa, i.e., (5a/b):

(4) Some girl danced with every boy

(5a) $\exists x$: girl(x) [$\forall y$: boy(y) [danced(x,y)]]
(5b) $\forall y$: boy(y) [$\exists$: girl (x) [danced (x,y)]]

The usual way of describing this difference is to say that in (5a), 'some girl' has scope over 'every boy,' while in (5b), the opposite relation holds. The scope of the quantifiers is determined by looking at the material appearing to its right, i.e., the closest formula that does not contain the expression within the first order translation.

It turns out that one can define the relevant relation in syntactic terms as well, using the properties of phrase structure. To see this, consider the core syntactic relation of c-command.

An expression α c-commands an expression β if and only if the first branching node dominating α dominates β and neither α nor β dominates the other.

What is important is that one can use this definition to say something about quantificational scope. Suppose we take quantificational expressions to move to positions from which they c-command their original position:

$[_{ZP}$ XP $[_{ZP}$ ... [... [...t_i ...]..

In this case, XP c-commands ZP and everything that is contained in the latter, including the trace of XP. Strikingly, when we look at what the structure of 1 is when this structure is explicit, we see the kind of structure required for the definition of scope:

(6) $[_S\ [_{QP}$ Some girl$]_2\ [_S\ [_{QP}$ Every boy$]_1$
$[_S\ t_2\ [_{VP}$ danced t_1]]]]

For the reading of (4) where the scopes of the quantificational NPs are inverted relative to their surface order, 'every boy' is adjoined to a position from which it c-commands both ZP and the position to which 'some girl' has been adjoined:

(7) $[_S\ [_{QP}$ Every boy$]_1\ [_S\ [_{QP}$ Some girl$]_2\ [_S\ t_2\ [_{VP}$ danced t_1 $]]]]$

Both of these movements can be given more detailed defense; see May (1977). The structures that seem to be needed for semantics and that philosophers have thought were disguised by ordinary grammar really are hidden, although not quite in the way they thought. What is hidden is more syntactic structure.

Of course, 'LF' is a *syntactic* level of representation and is not a semantic representation. This is not to suggest, however, that no gain has been made within theorizing about natural language by incorporating the LF hypothesis. For one could hold that the grammatical structures that are interpreted by the semantic theory are just those provided by a theory of grammar incorporating the LF hypothesis. There is no need to first regiment the formal structures of sentences into something to which semantic rules could then apply. What one finds in the idea of LF is the idea that natural languages already have enough structure to supply a lot of what is needed for the purposes of semantics.

Further developments within syntactic theory have made the concept of logical form more prominent. Thus, Chomsky (1995) and others have proposed that the **only** level of grammatical representation is LF, although the role of LF is likely to change, just as it has in the past (see, e.g., Lasnik, 2001). Even so, it is apparent that progress has been made in joining together two bodies of thinking about language, one rooted in traditional philosophical problems about the representation of logic and inference and the other in more recent developments coming from linguistics.

There are limits, however, to how much philosophical work a linguistic-based approach to logical form can do. Recall that one of the problems that has made many philosophers wary of paying too much attention to natural language concerned such things as the context sensitivity of certain aspects of natural language sentences. It is an open question just how to treat different kinds of context sensitivity within natural language, and whether revisions are needed to our conception of logical form in natural language in order to accommodate it. It is also true that a good number of philosophical projects targeting logical form are usually concerned with the conceptual analysis of certain notions, e.g., moral goodness, knowledge, etc. Indeed, one of the traditional roles of logical form within philosophy is to serve as scaffolding for just these sorts of projects. Doubts about the viability of conceptual analysis to one side, this is what has given weight to the claim that 'ordinary language' disguises the logically significant structure of our concepts. But if this is the role that logical form must play if it is to have a role within philosophy, then it is unclear whether the linguistic conception of logical form can wholly supplant the traditional view. The linguistic conception of logical form seemingly has little to do with the conceptual analysis. And unless conceptual analysis takes the form of a grammatical analysis, it is unlikely that one can substitute grammatical analysis for the description of the logically significant aspects of our concepts.

This is not to deny that a linguistics-based conception of logical form is an important, maybe even essential part of understanding how to think about some aspects of logic and meaning. This is particularly clear with respect to the study of quantification. But there are many questions about the nature of logical form that need to be resolved before particular view can be judged to be the most viable.

See also: Chomsky, Noam (b. 1928); Frege, Gottlob (1848–1925); Inference: Abduction, Induction, Deduction; Interpreted Logical Forms; Propositions; Quantifiers: Semantics.

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Logophoric Pronouns

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Reported discourse can be seen as a procedure of integrating a secondary text into a primary text. Traditionally, two integration strategies are distinguished: direct discourse, reproducing or pretending to reproduce another text without adjusting its orientation to the primary text and speaker (*John said, "You can't stop me"*), and indirect discourse, in which the secondary text is maximally adjusted to the primary speaker's orientation (*John affirmed that I/you/she/he could not stop him*). It should be noted that the reference of the subject of the secondary clause, the reported addressee, cannot be determined in the direct discourse example, whereas in the indirect discourse example, the third-person object pronoun may be coreferring to *John* or not. Over the last decades, attention has shifted to intermediate strategies of adjustment within reported discourse (cf. Roncador, 1988), one of which is the phenomenon of logophoricity, so named by Hagège (1974). Crosslinguistically, logophoric marking may be combined with direct discourse, as well as with indirect discourse orientation (see below). A logophoric marking device or logophor in the secondary text refers obligatorily to the reported speaker defined in the primary text. Instances with logophoric marking devices can thus be unambiguous where the English translation into indirect discourse is not:

Lobiri (Central Gur)

(1a) ʔá$_i$ sóré !ʔɔ́-!ná$_i$ ʔíné
he *say* *LOG-FUT* *come*
'he$_i$ said he$_i$ would come'

(1b) ʔá$_i$ sóré !ʔá-ná$_j$!ʔíné
he *say* *3SG-FUT* *come*
'he$_i$ said he$_j$ would come'

Major questions concerning logophoricity are: (1) How is logophoricity expressed and what are its properties? (2) What is the status of logophorically marked reported discourse? and (3) What is the origin of logophoric marking and why are its most typical occurrences found in the savannah belt south of the Sahara?

Forms and Properties of Logophoric Marking

Logophoricity is typically expressed by a special pronominal form marking coreference with a subject of a speech act verb as in (1a), whereas the use of the 'normal' third person singular subject form (1b) will indicate disjoint reference (that someone else will come). There are exceptions in that logophoric marking may be expressed by a verbal suffix, possibly derived form a pronominal form, as is the case in Gokana (Hyman and Comrie, 1981); Curnow (2002) counts this as one case of his category of verbal logophoricity.

Typological properties of logophoric marking have been formulated by, amongst others, Hyman and Comrie (1981), Roncador (1992), and Culy (1994). The following conventions and abbreviations will be used here: T_0 will denote the primary text and S_0 the primary speaker; t_l the secondary text, S_l the trigger of logophoric marking (in the most typical cases the reported speaker); LOG the logophorically marked participant in t_l. The setting permitting logophoric marking (in languages with logophors) is called 'logophoric context'.

Binding

Logophors in t_l obligatorily express coreference with a participant of the primary text T_0. There exist different interpretations concerning the properties of 'normal' anaphoric devices in t_l. In most cases the absence of logophoric marking in logophoric contexts will express disjoint reference to S_l. Some authors claim that coreference of the 'normal' pronoun to S_l may be possible, but with the sense that it is the point of view of S_0 which is expressed in t_l, whereas the presence of the LOG indicates the point of view of S_l (for discussion, see Roncador 1988: 289–295).

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It has been noted frequently that in most languages with logophoric marking, the binding domain cannot be defined syntactically (see Roncador, 2002 for textually bound logophors). Nevertheless, in some languages logophors may be syntactically bound (see Koopman and Sportiche, 1989 for a generative approach). In any case, logophoric marking will take place outside of S_0, thus distinguishing it from long-distance anaphora and reflexives.

Properties of T_0 and S_l

T_0 may introduce words, ideas, or emotional attitudes; see Culy (1994, 2002) for a scalar ranking of predicates introducing (triggering) LOG, including verbs of saying at the top and predicates expressing experiences or finality at the bottom. If there is a reported speaker in T_0, then he will be the source S_l, otherwise another subject of consciousness may also be S_l. This correlates with well-known implicata in that the agent in T_0 is more likely to trigger LOG than the experiencer (and consequently the patient), and a subject is more likely to trigger LOG than an (indirect) object, etc. For a number of Chadic languages, Frajzyngier (1985) reported the marking of not only the reported speaker in t_l, but also the reported addressee by a special form, sometimes called 'addressee pronoun/logophor'.

S_1 is also subject to a hierarchy of person and number in that a third person is more likely to trigger logophoric marking than a second and a first person, singular more likely than plural. In fact, different logophoric marking for all persons seems not to be attested, but syncretism of person is reported, e.g., in Gokana (Hyman and Comrie, 1981), though it is unusual for a first person S_1. Quite frequently, there is syncretism of third and second person in logophoric contexts:

Fɔn (Kwa)

(2a) Kofi ɖɔ **émí** gba xwe **émí-tõ** ɖayi
Kofi say:that LOG build house LOG:POSS T/A
'Kofi$_i$ said that he$_i$ had built his$_i$ house'

(2b) **à** ɖɔ **émí** gba xwe
2S say:that LOG build house
émí-tõ ɖayi
LOG:POSS T/A
'You said that you had built your house'

It is worth noting that in FOn, as in other languages with this sort of syncretism, second and third person marking are distinct outside of logophoric contexts (for discussion see Roncador, 1992). Concerning plurals, it is often not the identity of plural referents which is at issue, but a relation of inclusion in that a singular S_1 may trigger a plural LOG (see Clements, 1975 for examples in Ewe). The reverse does not seem to exist.

The Status of Logophoric Constructions within Reported Discourse

By the choice of the logophoric form as such, a logophoric construction will be distinct from direct discourse. On the other hand, as Hagège (1974) and Clements (1975) noted, logophoric constructions in many languages permit elements otherwise reserved to direct discourse, such as exclamatives, vocatives, and second and even first person elements with direct discourse orientation. It has been proposed (Roncador, 1988) to treat logophors as devices to introduce a secondary subject of consciousness as in free indirect discourse (*discours indirect libre*), also called 'represented speech and thought,' the difference being that the subject of consciousness in logophoric constructions is not just reflecting but also communicating, as shown by the occurrence of vocatives or second persons:

Mundang (Adamawa) (Hagége, 1974)

(3) à fá mò ʔī̱ ʒì nē
3S say 2S see LOG PART
'He asked (him): "Did you see me?"'

The Origin of Logophors

In cases where the logophoric device also appears in other contexts, such functions are usually more marked than the 'normal' elements expressing disjoint reference in logophoric contexts. Emphatics, nonsubject pronouns, possessive reflexives, etc., may be used as logophoric devices in appropriate contexts (for discussion, including counterexamples, see Roncador, 1992). The examples in (4) illustrate the possessive reflexive (4a) contrasting with the regular 3rd person possessive (4b). In (4c), the possessive form may be interpreted as coreferring to the reported speaker (as a logophor) or to the subject of the clause (as reflexive possessive).

Bwamu (Central Gur):

(4a) à wɛ̄ mí múú
3Sg:Sbj like Poss-Refl field
'He likes his (own) field'

(4b) à wɛ̄ pɛ̄è múú
3Sg:Sbj like 3Sg:Poss field
'He$_i$ likes his$_j$ field'

(4c) yàn̄-zɔ̀n̄ nɛ̄ mí h̰í̱ń tɔ̄n
Yanzon say LOG TAM build
mí zū̱nù
LOG/Poss-Refl house
'Yanzon$_i$ said that he$_i$ had built his$_i$ house.'

Several authors have equated logophors with long-distance reflexives (Sells, 1987; Koster and Reuland, 1991; Stirling, 1993; Huang, 2002). Although there is

some functional overlap (see Suzuki, 2002 for the Japanese reflexive *zibun*, which may be used in modern literature to represent the subject of consciousness in free indirect discourse), the main difference is that long-distance reflexives may also occur bound within a clause while logophors may not. In many cases (e.g., in Latin), long-distance reflexives have a wider function than rendering speech or thought. As Comrie (2004) noted, the property that the marked value indicates coreference finds its parallels in other reference-tracking devices such as 'prodrop,' long-distance reflexives, etc. He acknowledged nevertheless that logophoricity (proper) is a unique areal characteristic of African languages not found elsewhere. Its distribution in an area north of the rain forest from the Gulf of Guinea to the Nile valley has been discussed by, amongst others, Roncador (1992), Dimmendaal (2001), and Güldemann (2003); the latter proposed the name 'Macro-Sudan' for this language area. While Roncador suggested different origins of logophoric devices through function borrowing, Dimmendaal took the occurrence of similar forms in Niger-Congo and Nilo-Saharan (see Boyeldieu, 2004 for details in a Nilo-Saharan subgroup) as proof for the Congo-Saharan hypothesis that the two stocks had a common origin. Güldemann examined three possibilities for the development of logophors: internal development, genealogical inheritance, and language contact. He suggests a connection between logophoricity and the frequency of nondirect speech in a given language. Ameka (2004) has recently argued for a connection between logophoricity and evidential marking on the one hand and the practice of triadic communication in African societies. In the communication of a chief via a spokesperson to his audience, the intermediary will usually not use direct speech to render the words of the chief; it may be felt as presumptuous to assume the same orientation. On the other hand, the use of the 'regular' third person pronoun would put the chief on the same 'level' as other third persons. This scenario might find some corroboration in the fact that in some languages, such as Bijogo (Bidyogo) (G. Segerer, personal communication), the logophoric form might be traced to a noun denoting 'owner, master'.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Reported Speech: Pragmatic Aspects; Switch Reference.

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Lomonosov, Mikhail Vasilyevich (1711–1765)

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Mixail Vasilievich (Mikhail Vasilyevich) Lomonosov was born in 1711 in a small village of northern Russia (Kurostrov, Arkhangel'sk government). He was first educated by a local deacon and then, in 1730, joined the Slav-Greco-Latin Academy of Moscow, where he devoted himself to the comparative study of Slavonic and the Russian dialect. He turned out to be an outstanding student, and in 1735 he was accepted to the newly founded University of the Academy of Sciences and then sent to Marburg in 1736 to improve his knowledge of exact sciences. There, he was taught by Christian Wolff, whose *Principles of physics* he translated later on. He stands in good place in the pantheon of Russian scientists, even during the Soviet period, when his modest origins helped build the myth of the self-made scientist. His complete works were edited in the 1950s, including his comments and drafts, which are of invaluable help to researchers. He was interested in every field of knowledge and worked successively as Physics Assistant and Chemistry Professor before starting an outstanding academic career, thanks to the solicitude of Ivan Shulavov, the protégé of Empress Elisabeth Petrovna. He also wrote several books on physics, crystallography, and history and important works devoted to the study of language.

His Russian grammar (*Rossijskaja grammatika,* 1755), which was reedited several times, elaborates on the Slavonic grammar sketched in Zizanius or Smotrickij, but also describes new language facts. As the drafts show, he gathered a huge corpus, mainly lexical, and was influenced by the observation method of the natural sciences. Lomonosov's ultimate aim was to fight the Slavonic/Russian diglossia by providing the Russian language – which he considered as the first European language – with a grammar of usage, but he also wanted to describe a correct language that all social classes could share. Consequently, he adapted the 'three styles' theory (high, low, medium), using a fair proportion of slavonicisms and elements of the spoken or popular language. He linked syntax and rhetoric, relating clause to period, the period being for him the syntactic unit. Therefore, his grammar and his rhetoric should be read as complementary: They serve the same purpose, namely, that the literary language be not different from the spoken language.

Moreover, he developed his thought within the framework of General Grammar, shared by the European scientists of the time, which was a general philosophical conception of human language. He completed the grammatical terminology, integrating new terms; and in an important part devoted to phonetics, he strictly delimited grapheme and sound and finely described the point of articulation.

He also wrote a great number of odes and tragedies, and an epistle on the usefulness of glass (*Pis'mo o pol'ze stekla,* 1752), where he used the 'medium style' to pay homage to his protector I. I. Shuvalov, who was at the time setting up a glass factory near Saint Petersburg. Even though he will not be remembered as a prominent prose writer or poet, he will remain an encyclopedic mind who devoted his life to the Promethean task of constituting a Russian science capable of rivaling European science. His name is attached to the founding of the University of Moscow (1755), where all subject matters and disciplines had to be taught in Russian.

He died in 1765 in Saint Petersburg.

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Long-Distance Dependencies

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Basic Properties

The family of long-distance dependency constructions has been given various names in the literature. In addition to 'long-distance dependencies,' these constructions have also been called 'extraction,' 'unbounded dependencies,' '*wh* dependencies' (or '*wh* movement'), 'Ā dependencies' (or 'Ā movement'), 'syntactic binding,' 'operator movement,' and 'constituent control.' Long-distance dependency (LDD) constructions can be split into two subgroups; the constructions in Subgroup (1) are sometimes called 'strong' LDD constructions, and those in Subgroup (2) are sometimes called 'weak' constructions. Subgroup (1) (strong) constructions are exemplified by the following:

1a. *Wh* questions: Which book does the student think the teacher said the librarian put ___on the shelf?
1b. Exclamatives: What a book the student thinks the teacher said the librarian put ___ on the shelf!
1c. *Wh* relative clauses: The book [which the student thinks the teacher said the librarian put ___ on the shelf].
1d. Pseudoclefts: [What the student thinks the teacher said the librarian put ___ on the shelf] is the book.
1e. Topicalization: This book, the student thinks the teacher said the librarian put ___ on the shelf.

Subgroup (2) (weak) constructions are exemplified by the following:

2a. Non-*wh* relative clauses: The book [(that) the student thinks the teacher said the librarian put ___ on the shelf].
2b. Cleft: It is the book [that the student thinks the teacher said the librarian put ___ on the shelf].
2c. 'Tough movement': This book is easy [to think that the teacher said the librarian put ___ on the shelf].
2d. Purpose infinitive: I bought the book [for the librarian to put ___ on the shelf].

Examining an example of a strong LDD construction, such as the main clause interrogative (Subgroup (1a)), reveals the basic anatomy of these constructions. The crucial element is the underlined phrase *which book*. This phrase fulfills two distinct functions: it is both the focus of the main clause question and the object of the verb *put*. It occupies a special structural position associated with topical and focal elements (specifier of the complement phrase). The structural position normally held by the object of *put* appears to be missing. This missing position is often referred to as the 'gap,' and the fronted position is often referred to as the 'filler.' The element that appears in filler position and bears the functions associated with both filler and gap positions will be called the 'extractee' in this article.

LDD constructions, then, are filler–gap constructions. They are called long-distance (or unbounded) dependencies because there is no limit on the distance between the filler and the gap. This long-distance quality is one of the unusual features of this class of constructions; most syntactic constructions are bounded. The long-distance nature of these constructions has also led to the need to refer to parts of the constructions: the constituent containing the filler can be referred to as the 'top' of the construction, and the constituent containing the gap is the 'bottom.' The constituents in between are called the 'middle' (or 'body') of the construction. The top, middle, and bottom taken together constitute the 'path.' The extractee is said to be extracted along the path from the gap position to the filler position.

LDD constructions involve a close relation between the filler and the gap. This can be seen from the property of 'strong connectivity': syntactic requirements of the gap position (such as case marking) hold of the filler. This is hard to see in a language such as English, which has very little overt case marking, but can be clearly seen in the following example from Hebrew, wherein the topicalized noun phrase is marked with accusative case (in Hebrew, the prenominal particle *et*) because it corresponds to an object gap:

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Subgroup (2) (weak) constructions are exemplified by the following:

2a. Non-*wh* relative clauses: The book [(that) the student thinks the teacher said the librarian put ___ on the shelf].
2b. Cleft: It is the book [that the student thinks the teacher said the librarian put ___ on the shelf].
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(1) Et hasefer haze, hasafranit
ACC the.book the.this the.librarian
lo tasim ___ al hamadaf.
not will.put on the.shelf
'This book, the librarian won't put on the shelf.'

Weak LDD constructions have essentially the same structure as strong ones have. The difference, as can be seen in the Subgroup (2) examples, is that they appear to lack a filler. Nevertheless, they display all the LDD phenomena discussed in the following section.

Long-Distance Dependency Phenomena

Islands

The most discussed phenomenon in LDD is 'islands,' which are structures that an LDD path cannot cross. Many of the island constraints were originally stated and named by Ross (1967). One island constraint, the coordinate structure constraint, prohibits extraction from one conjunct of a coordinate structure:

(2a) The librarian [[put these books on the shelf] and [then took a break].
(2b) *Which books did the librarian [[put ___ on the shelf] and [then take a break]]?

(3a) The librarian put [[books] and [magazines]] on the shelf.
(3b) *What did the librarian put [___ and magazines] on the shelf?

On the other hand, 'across-the-board' (or ATB) extraction from both conjuncts is grammatical:

(4a) The librarian [[recorded these books in the catalog] and [put these books on the shelf].
(4b) Which books did the librarian [[record ___ in the catalog] and [put ___ on the shelf]]?

Another island constraint is the left branch condition, which prohibits the extraction of prehead (left) dependents in noun phrases and adjective phrases:

(5a) The librarian put [my book] on the shelf.
(5b) *Whose did the librarian put [___ book] on the shelf?

(6a) That book is [extremely interesting].
(6b) *How is that book [___ interesting]?

Elements bearing certain grammatical functions constitute islands. For example, extraction is forbidden from subjects:

(7a) [Books about wayward librarians] shocked me.
(7b) *Who did [books about ___] shock you?

Adjuncts are also islands:

(8a) I screamed [after the librarian put that book on the shelf].
(8b) *Which book did you scream [after the librarian put ___ on the shelf]?

However, some speakers find the adjunct condition to be weaker than the subject condition.

Some island constraints produce violations that can either be relatively acceptable or totally unacceptable, depending on the circumstances. One such constraint is the complex noun phrase (NP) constraint, which prohibits extraction from a clause within a noun phrase. Extraction from a complement clause (Examples (9a) and (9b)) is not as bad as extraction from a relative clause (Examples (10a) and (10b)), because the latter combines the complex NP constraint with the adjunct constraint:

(9a) I heard [a rumor [that the librarian put that book on the shelf]].
(9b) ?*Which book did you hear [a rumor [that the librarian put ___ on the shelf]]?

(10a) I saw [the librarian [who put that book on the shelf]].
(10b) *Which book did you see [the librarian [who put ___ on the shelf]]?

Another such island constraint is the *wh* island constraint, which rules out extractions from *wh* clauses (clauses introduced by *wh* elements). Extraction from nonfinite *wh* clauses (as in Examples (11a) and (11b)) is not totally unacceptable, but extraction from finite *wh* clauses (as in Examples (12a) and (12b)) is much worse:

(11a) The librarian wondered [whether to put that book on the shelf].
(11b) ?Which book did the librarian wonder [whether to put ___ on the shelf]?

(12a) I wondered [whether the librarian put that book on the shelf].
(12b) *Which book did you wonder [whether the librarian put ___ on the shelf]?

Another ungrammatical LDD involves the extraction of a subject following a complementizer; this is known as the *that*-trace effect. Extraction of a subject is grammatical in the absence of the complementizer, and extraction of nonsubjects is not sensitive to the presence of a complementizer:

(13a) I think [the librarian put the book on the shelf].
(13b) Who do you think [___ put the book on the shelf]?
(13c) What do you think [the librarian put ___ on the shelf]?

(14a) I think [that the librarian put the book on the shelf].
(14b) *Who do you think [that ___ put the book on the shelf]?

(14c) What do you think [that the librarian put ___ on the shelf]?

Pied-Piping

Sometimes the filler involves more than just the element that is being focused on or topicalized. Often this is done as a way of circumventing island constraints. So, whereas Example (15a) is ungrammatical (ruled out by the left branch condition), it is possible to front the larger NP, as in Example (15b), even though it is only the possessor of the book that is being questioned:

(15a) *Whose did the librarian put [___ book] on the shelf?
(15b) Whose book did the librarian put ___ on the shelf?

This phenomenon was dubbed 'pied-piping' by Ross (1967). Pied-piping is sometimes a stylistic option; for example, instead of extracting the object of a preposition and leaving the preposition stranded, which is grammatical but stigmatized in certain styles of English, the prepositional phrase can be pied-piped:

(16a) Which shelf did the librarian put the book [on ___]?
(16b) On [which shelf] did the librarian put the book ___ ?

Crossover

LDD constructions interact with pronominal coreference. The position (or grammatical function) of the gap influences coreferential possibilities. Roughly speaking, if the gap is structurally lower than the pronoun, coreference is impossible even though the filler position occupied by the extractee is higher:

(17a) Who$_i$ did you say ___ thinks the librarian hates him$_i$?
(17b) *Who$_i$ did you say he$_i$ thinks the librarian hates ___ ?

The ungrammaticality of Example (17b) has been named crossover because, in a transformational account, the extractee crosses over a coreferential NP. That is to say, in this example, *who* crosses over the coreferential *he*. A weaker crossover effect obtains if the pronoun is embedded:

(18a) Who$_i$ did you say ___ thinks the librarian hates [his$_i$ students]?
(18b) ?*Who$_i$ did you say [his$_i$ students] think the librarian hates ___ ?

The effect in Example (17b) is called strong crossover, and that in Example (18b) is weak crossover.

Parasitic Gaps

A phenomenon that has received much attention in the literature on LDDs since the 1980s is illustrated by the following example:

(19) Which books did the librarian put ___ on the shelf before reading ___ ?

In this sentence, there is one filler, but two gaps. The filler corresponds to both of these gaps. The existence of two gaps corresponding to a single filler is strange; more strange is that the second gap, being embedded within an adjunct, would normally be ungrammatical (because of the adjunct condition), and thus can be thought of as relying on the first gap for its existence. The second gap is said to be parasitic on the first (true) gap, and this construction is referred to as the 'parasitic gap' construction. Despite a rather large literature on parasitic gaps, many open questions remain. Even the connection with ordinary LDD constructions is called into question by the fact that parasitic gaps are possible in heavy NP shift constructions, which do not have the same properties as LDDs have:

(20) The librarian put ___ on the shelf without reading ___ first [a very expensive edition of Chomsky's classic book *Syntactic structures*].

Other non-LDD constructions in other languages, such as scrambling and object clitic constructions, have also been observed to license parasitic gaps. Culicover (2001) provided a good overview of the literature on the subject.

Path Phenomena

In some languages, clauses on the path of an LDD exhibit morphosyntactic properties that distinguish them from ordinary clauses. A survey of such cases is provided by Zaenen (1983). These include a complementizer selection in Irish, a tonal phenomenon (downstep deletion) in Kikuyu (Gikuyu), a 'stylistic' subject–verb inversion in French, and the nonuse of the pleonastic element *?það* in Icelandic. The following examples from Irish illustrate this: the normal complementizer is *goN*, but the complementizer on a path is *aL* (the capitals *N* and *L* indicate phonological nasalization or lenition of the following consonant). The complementizer *aL* is used in all and only clauses on the path.

(21) Deir siad goN síleann an t-athair
say they that thinks the father
goN bpósfaidh Síle é.
that will.marry Sheila him
'They say that the father thinks Sheila will marry him.'

(22) An fear [aL deir siad [aL shíleann
the man that say they that thinks
an t-athair [aL phósfaidh Síle ___]]].
the father that will.marry Sheila
'The man that they say the father thinks Sheila will marry.'

(23) An fear [aL shíl ___ [goN mbeadh sé ann]].
the man that said that would.be he there
'The man that said that he would be there.'

Path phenomena are important in understanding LDD constructions because they show that the middle of the construction has syntactic relevance. The relevance of the middle of the construction is not surprising. As noted earlier in this article, the long-distance nature of LDD constructions is surprising: syntax usually operates on more local domains. The necessity of a clause-by-clause (or constituent-by-constituent) theory of LDDs is therefore expected. All of the contemporary theoretical analyses discussed in the following sections have a local component to them, and are thus compatible with the existence of path phenomena.

Reconstruction Effects

Another property of LDDs is what has been referred to as reconstruction effects. Reconstruction refers to the extractee, which occupies filler position, having semantic properties that make it appear as if it is in the position of the gap. For example, note the reflexive *herself* in the following example:

(24) Which book about herself$_i$ does he think the teacher said the librarian$_i$ put ___ on the shelf?

The reflexive here is part of the filler. A reflexive (roughly) needs to have its antecedent higher in the structure and within its clause, but in this case the antecedent is lower in the structure. What makes this sentence grammatical is that the antecedent is in the correct position for the reflexive if the reflexive is seen as part of the gap. Like strong connectivity, reconstruction effects are an indication of the close relationship between the filler and gap. They suggest, as is embodied in all contemporary standard analyses of LDDs, that the extractee is associated with both filler and gap positions/functions.

Resumptive Pronouns

Many languages allow or require a pronoun in place of the gap in certain types of LDD constructions. This pronoun is called a 'resumptive pronoun.' For example, in Hebrew relative clauses, when the extractee is the object of a verb, a resumptive pronoun is optional; when the extractee is the object of a preposition, a resumptive pronoun is obligatory:

(25a) Hasefer še hasafranit sama ___
the.book that the.librarian put
al hamadaf.
on the.shelf
'The book that the librarian put on the shelf.'

(25b) Hasefer še hasafranit sama oto
the.book that the.librarian put it
al hamadaf.
on the.shelf
'The book that the librarian put (it) on the shelf.'

(26a) *Hamadaf še hasafranit sama
the.shelf that the.librarian put
al___ et hasefer.
on ACC the.book
'The shelf that the librarian put the book on.'

(26b) Hamadaf še hasafranit sama al-
the.shelf that the.librarian put on-
av et hasefer.
it ACC the.book
'The shelf that the librarian put the book on (it).'

Resumptive pronouns are usually immune from island constraints and do not normally trigger path phenomena. They may or may not display crossover effects or license parasitic gaps. Thus, although they are LDD constructions, they differ from gap-containing constructions. Often, resumptive pronouns are used as a way of circumventing island constraints. For many speakers of English, resumptive pronoun constructions, although not entirely grammatical, seem better than island violations with gaps:

(27a) *The book that I saw the librarian who put ___ on the shelf?

(27b) ??The book that I saw the librarian who put it on the shelf?

(28a) *Who did you ask whether ___ put the book on the shelf?

(28b) ??Who did you ask whether she put the book on the shelf?

The analysis of LDD constructions with resumptive pronouns is more controversial than that of LDD constructions with gaps, and will not be discussed here.

Analysis

Discussions in the following sections outline the analysis of LDDs in the major current streams of syntactic theory. The important aspects of the analyses will be covered without involving theory-internal technicalities.

Transformational Grammar

The informal description of LDDs in the preceding sections, given in terms of extraction of the extractee

from the gap position to the filler position, corresponds to the transformational analysis of these constructions. In the underlying (deep) structure, the extractee occupies the gap position, whereas in surface structure, it occupies filler position. In the earliest work in transformational grammar (such as that of Chomsky (1957)), it was taken for granted that LDD constructions were derived by transformation:

(29) Deep structure: the librarian PAST put [which book] on the shelf.
Surface structure: [which book] did the librarian put on the shelf.

The deep structure location of the extractee in the position of the gap is natural, given the fact that the extractee fulfills selectional properties of the verb and is interpreted as an argument. Subsequent development of the theory has refined this view somewhat. For example, since the introduction by Chomsky (1973) of the idea that movement leaves a trace, it has been standard to hypothesize a surface trace (*t*) in the underlying position of the extractee:

(30) [which book] did the librarian put *t* on the shelf

In some versions of the theory, this trace is co-indexed with the filler, and/or forms a syntactic object called a chain with it (see, for example, Chomsky (1981)). Since a chain is a single syntactic object, with a single set of syntactic properties, strong connectivity follows naturally in such a system. It has also been proposed (Chomsky, 1995, 2000) that movement is a copying operation, and the trace is therefore a copy of the filler: this accounts naturally for reconstruction effects, since the extractee occupies both structural positions. The trace has also been endowed with the semantic status of a variable at the level of logical form, bound by the quantifier-like *wh* operator (Chomsky, 1977). This variable, because it is semantically similar to a name, is said to have the binding-theoretic status of ordinary referential NPs. This accounts for strong crossover effects, because strong crossover involves the forbidden anaphoric binding of the variable by a pronoun (Chomsky, 1981). The filler position, being a nonargument (Ā) position, does not anaphorically bind the variable.

In the earliest transformational analyses, the extractee moved in strong constructions and deleted in weak constructions. Unlike clause-bounded rules, like passive, LDD rules were stated with a variable intended to cover an arbitrary string of constituents, thus capturing their long-distance nature. Islands were taken to be the result of constraints on the interpretation of these variables (Ross, 1967). A more uniform approach to (most) islands was developed in the form of the subjacency condition (Chomsky, 1973), which limited the distance of movement. Much subsequent work has focused on determining the exact nature of this limitation, but (roughly) the bounding nodes are a clausal node and NP. Apparently long-distance movement is taken to be derived by successive movements from specifier of complement phrase (CP) to specifier of CP:

(31) Which book$_i$ does the student think [t_i the teacher said [t_i that the librarian put t_i on the shelf]]?

Under this view, most islands follow from the lack of an appropriate intermediate landing site. (Certain other islands are the result of the empty category principle, a locality condition on the trace (Chomsky, 1981).)

The subjacency-based approach to islands made the deletion analysis of weak LDD constructions untenable. Chomsky (1977) proposed that there is a single transformational rule 'move *wh*' that is responsible for all LDDs; in weak LDD constructions, the *wh* subsequently deletes (Chomsky, 1977) or is a phonologically empty null operator (*Op*) (Chomsky, 1981):

(32) the book [*Op* (that) the student thinks [*t* the teacher said [*t* the librarian put *t* on the shelf]]]

Transformational theory has also been concerned with the motivation of *wh* movement. For example, Chomsky (1986) suggested that *wh* movement is necessary for the *wh* operator to assume the correct scope at logical form. Chomsky (1995) also attributed *wh* movement to the need to have features checked: the interrogative complementizer carries a *wh* feature that needs to be checked. Moving a *wh* element to its specifier allows the checking.

Phrase Structure Grammar

Since the class of LDD constructions is one of the types of constructions that has been generally accepted as showing that natural-language syntax cannot be described by phrase structure grammar, one of the earliest efforts in contemporary phrase structure grammar has been to show that this assumption is false. Thus the earliest work in generalized phrase structure grammar (GPSG) by Gazdar *et al.* (1984) dealt with these constructions, and the basic ideas developed in that work have been carried over into head-driven phrase structure grammar (HPSG) (Pollard and Sag, 1994).

The basic idea in the GPSG/HPSG analysis is that the constituent containing the gap has a special 'missing element' feature. Informally, this is written

using a slash: for example, a verb phrase (VP) with a missing NP belongs to the category VP/NP. As a result of this notation, the feature has come to be named SLASH. In the following sentence (Example (33)), the constituent headed by *put* is a VP/NP. The clausal constituent containing this VP/NP is S/NP, since it is missing the same NP as the VP it dominates:

(33) [$_{S}$ Which book [$_{S/NP}$ does the student [$_{VP/NP}$ think [$_{S/NP}$ the teacher [$_{VP/NP}$ said [$_{S/NP}$ the librarian [$_{VP/NP}$ put [$_{NP/NP}$ *e*] on the shelf]]]]]]]?

A category such as S/NP is S with the additional feature [SLASH ⟨NP⟩]. More precisely, the elements of the value of SLASH are not category labels, but (part of) the feature structure of the filler. As a result of this feature sharing, the same element occupies the filler and gap positions simultaneously, without movement. This accounts for strong connectivity and reconstruction effects. The SLASH feature is said to be introduced at the bottom of the construction and discharged (or bound off) at the top.

The passing of the SLASH feature up the tree has an unusual quality to it, as it appears not to based on the concept of head. In much of the GPSG/HPSG literature, SLASH is said to belong to a special class of features, called nonlocal (or foot) features, which are not constrained to percolate between heads and phrases. A different account (Bouma *et al.*, 2001; Ginzburg and Sag, 2000) proposed that the head amalgamates all the SLASH values of its dependents, so the SLASH feature on a phrase in the path is inherited from the head. This obviates the need for a special kind of feature.

In early GPSG/HPSG literature, the gap was viewed (in most cases) as an empty category (trace), as in transformational theory. However, what has become the standard view (originating in the work of Pollard and Sag (1994)) is one in which the SLASH feature originates not in a trace but rather as one of the features of the selecting head. Even in early work, traces did not appear in all LDDs: a distinction was drawn between subject extraction (which did not involve a trace) and nonsubject extraction (which did). In the work of Bouma *et al.* (2001), Sag (2001), and Ginzburg and Sag (2000), subject and nonsubject extraction (and adjunct extraction) have been unified. The issues involved here have been primarily theory-internal issues of the nature of the features involved. However, questions of similarities and differences between subject and nonsubject extraction have also been raised: proponents of the earlier view have cited differences between subject and nonsubject extraction, whereas proponents of the more recent view have cited similarities. As is generally the case in HPSG, the properties of LDD constructions are a consequence of the properties of feature structures. Island constraints are due to constraints on feature combinations. The discharge of the SLASH feature is due to the properties of feature-based constructions. The lack of a filler in weak constructions is not a problem, as the construction can bind off the SLASH feature, even without a filler.

Lexical-Functional Grammar

Lexical-functional grammar (LFG) (Kaplan and Bresnan, 1982; Bresnan, 2001) models syntax as involving parallel representations of structure (known as constituent structure, or c-structure) and function (functional structure, or f-structure). At f-structure, the multifunctionality of elements in LDD constructions is represented directly. For example, as was shown in Example (33), the functional element corresponding to the determiner phrase *which book* fills both the function of FOCUS of the main clause (the clause headed by *think*) and OBJECT of the clause headed by *put*. Such a representation differs from other theories, particularly transformational theory, in not conceptualizing LDD constructions as involving the displacement of an element from its natural position. Instead, the element has two functions, and the c-structural position that it occupies is the canonical position of one of those two functions. Strong connectivity and reconstruction effects follow, since the phenomena in question are f-structure phenomena, and the extractee has both the filler function and the gap function simultaneously. Since LDD constructions are an f-structure phenomenon, the lack of an overt c-structure filler in weak LDD constructions is not a problem.

The currently accepted view (Kaplan and Zaenen, 1989) is that the licensing of LDD constructions is purely a functional structure matter, and is not based on constituent structure properties. The licensing takes the form of a constraint schema identifying the values of two grammatical functions. The constraint schema, which represents an infinite number of specific constraints, has come to be referred to as 'functional uncertainty.' There are several reasons given for treating LDD constructions as being licensed at f-structure; for example, these constructions exhibit category mismatches:

(34a) That he might be wrong, he didn't think of.
(34b) *That he might be wrong, he didn't think.
(34c) *He didn't think of that he might be wrong.
(34d) He didn't think that he might be wrong.

Another argument is that islands are based on grammatical functions such as subject and adjunct, not on structural position. Kaplan and Zaenen (1989) gave

arguments that, in general, islands are due to functional constraints on the middle of the construction. Although Kaplan and Bresnan's (1982) original formulation hypothesized a trace in the position of the gap, this is not necessary under Kaplan and Zaenen's functional uncertainty approach: a constraint associated with the position of the filler specifies the gap function. However, an alternative to the traceless c-structure proposed by Kaplan and Zaenen has been proposed by Bresnan (1995). Bresnan licensed the multifunctionality of the extractee through bottom-up ('inside-out' in the terminology used in LFG) functional uncertainty: the licensing constraint is associated with the empty element and expresses identity with a grammaticized discourse function higher in the structure. Falk (2001) proposed that subject extraction be distinguished from nonsubject extraction: he analyzed subject extraction the way Kaplan and Zaenen did, using top-down (outside-in) licensing without trace, and nonsubject extraction using Bresnan's empty category with bottom-up (inside-out) licensing. He suggested that certain differences between subjects and nonsubjects can be accounted for in this fashion. Falk's analysis bears some resemblance to the early distinction in GPSG/HPSG between subject and nonsubject extraction.

Traces

As the descriptions of the analyses of LDD constructions in various theories demonstrate, one of the major areas of disagreement is the structural status of the gap position. Some researchers analyze all gap positions as containing an empty category (or trace), some analyze some gap positions (nonsubjects) as containing traces and other gap positions (subjects) as not containing them, and some hold that there is never an empty element in the position of the gap. To a degree, the question of the presence of traces is a theory-internal matter. In transformational theory, for example, traces are part of the general theory of movement. Conversely, for proponents of traceless accounts, the fact that traces are not overt elements makes them suspect as elements of constituent structure. Nevertheless, there have been attempts in the literature to find overt evidence for traces in LDD constructions. This suggests that at least some researchers consider the question of the existence of traces to be an empirical question. The following discussions review some of the more well-known arguments that have appeared in the literature. Ironically, although nonderivational theories tend to be more skeptical about traces than derivational theories do, it was the original proposal that movement leaves a trace that provided the initial impetus for nontransformational theories of LDD constructions. Once traces were proposed, the original argument for deep structure and movement carried less weight: as long as there was a mechanism for associating the trace with the extractee, there was no need to posit an abstract structure in which the extractee occupies the position of the gap. The trace was there to serve whatever functions the deep structure position of the extractee was intended to serve, such as fulfilling selectional properties and having the clause-internal grammatical function.

The best known argument for traces is the phenomena of *wanna* contraction. In natural speech, the sequence *want to* is normally pronounced *wanna*:

(35) I want to put the book on the shelf → I wanna put the book on the shelf.

But if there is an LDD gap between *want* and *to*, this is impossible for most speakers of English:

(36) Who do you want ___ to put the book on the shelf? ↛
*Who do you wanna put the book on the shelf?

This argument for traces was summarized by Jacobson (1982). However, other analyses of *wanna* contraction have been proposed. For example, the ability to contract can be defined in terms of subject sharing: it is possible when the subject of *want* is the same as the subject of *to*'s clause (Postal and Pullum, 1978). Alternatively, *wanna* may be a lexical item, with no contraction involved at the syntactic level (Pullum, 1997). The argument from *wanna* contraction is thus at best inconclusive.

Jacobson (1982) cited several additional arguments for traces. One of them is based on the fact that the VP following *to* can normally be ellipted, but not immediately following a gap:

(37a) The students hope to ~~put the books on the shelf~~.
(37b) *Who did you ask ___ to ~~put the books on the shelf?~~.
(37c) Who did you ask ___ not to ~~put the books on the shelf?~~.

Jacobson hypothesized that the constituent before *to* in a VP ellipsis construction must be stressed. Since trace cannot be stressed, the ellipsis is ungrammatical.

Another argument for traces has been advanced by Bresnan (1995). She argued that weak crossover effects are due to syntactic rank (defined in terms of a hierarchy of grammatical functions) and linear order. She noted that, in the following examples, syntactic rank cannot be the cause, since obliques outrank predicative (Example (38a)) and clausal (Example (38b)) complements, and different obliques have the same rank (Example (38c)):

(38a) ?*To whom$_i$ did Mary seem proud of him$_i$ ___ ?
(38b) ??Who(m)$_i$ did they explain how he$_i$ should dress to ___ ?
(38c) ?*Everyone$_i$ in the room, I talked about his$_i$ coursework with ___.

The weak crossover effects in these sentences must be due to the pronoun preceding its intended antecedent, which is possible only if there is a trace in the gap position.

Pollard and Sag (1994) cited psycholinguistic evidence against the idea that traces can be shown to be in the position where the filler is reactivated. The evidence instead seems to indicate that reactivation occurs at the position of the selecting head rather than at the position of the gap. They noted that the sentence in Example (39a), in which the selecting head (*in*) follows the heavy NP object, is difficult to process, but the sentence in Example (40b), in which the selecting head (*put*) precedes the heavy NP, is not difficult to process, despite the fact that the putative trace would follow the NP:

(39a) Which box did you put the very large and beautifully decorated wedding cake bought from the expensive bakery in ___ ?
(39b) In which box did you put the very large and beautifully decorated wedding cake bought from the expensive bakery ___ ?

The evidence for the existence of traces in LDD constructions is inconclusive at this stage. More research is needed to determine whether there is empirical evidence for them. For now, it remains a theory-internal question.

See also: Constituent Structure; Island Constraints; Relative Clauses; Transformational Grammar: Evolution.

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Long-Range Comparison: Methodological Disputes

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Introduction

How are languages shown to be related to one another? Proposals of distant linguistic kinship such as Amerind, Nostratic, Eurasiatic, and Proto-World have received much attention in recent years, although these same proposals are rejected by a majority of practicing historical linguists. This has resulted in vigorous disputes about the methods for investigating remote relationships among languages as yet not known to be related. Some enthusiasts of long-range relationships, disappointed that proposed language connections they favor have not been accepted, have at times responded bitterly, for example charging that these rejections are just "clumsy and dishonest attempts to discredit deep reconstructions" (Shevoroshkin, 1989: 7), and that "very few [critics of long-range proposals] have ever bothered to examine the evidence first-hand... To really screw up classification you almost have to have a Ph.D. in historical linguistics" (Ruhlen, 1994: viii). The strong rhetoric is not all one-sided:

> At a different level – which transcends scientific worth to such an extent that it is at the fringe of idiocy – there have in recent years been promulgated a number of far-fetched ideas concerning 'long-distance relationships', such as 'Nostratic', 'Sino-Caucasian', and 'Amerind'. (Dixon, 2002: 23)

This article explains these disputes.

Hypothesized Long-Range Relationships

The list in Table 1 of the better-known hypotheses that would group together languages that are not yet known to be related gives an idea of what is at issue. (None of the proposed genetic relationships in this list has been demonstrated yet, even though some are repeated frequently.)

Methods

Scholars agree that a successful demonstration of linguistic kinship depends on adequate methods, but disagree about what these methods are. Hence discussions of methodology assume a central role in considerations of long-range comparisons. Therefore, the methodological principles and criteria considered important for investigating proposals of distant genetic relationship are surveyed here.

In practice, the successful methods for establishing distant linguistic affinity have not been different from those used to establish any family relationship, close or distant. The comparative method has always been the primary tool. Because the methods for distant relationships are not different from those for more closely related languages, we encounter a continuum from established families (e.g., Indo-European, Finno-Ugric, Mayan, Bantu), to more distant but solidly demonstrated relationships (e.g., Uralic, Siouan-Catawban, Benue-Congo), to plausible but inconclusive hypotheses (e.g., Indo-Uralic, Proto-Australian, Macro-Mayan, Niger-Congo), to doubtful but not implausible ones (e.g., Altaic, Austro-Tai, Eskimo-Uralic, Nilo-Saharan), and on to virtually impossible proposals (e.g., Basque-SinoTibetan-NaDene, Indo-Pacific Mayan-Turkic, Miwok-Uralic, Niger-Saharan). It is difficult on the basis of standard methods to segment this continuum so that plausible proposals based on legitimate procedures fall sharply on one side, distinguished from obviously unlikely hypotheses on the other side. This leads to disagreements, even by those who profess allegiance to the same methods.

A firm understanding of methodology becomes crucial if supporters of fringe proposals can pretend to apply the same methods as those employed for more plausible ones. For this reason, careful evaluation of the evidence presented on behalf of any proposed distant linguistic relationship and of the methods employed is called for.

Throughout history, the criteria employed in both pronouncements about method and in actual practice for establishing language families consistently included evidence from three sources: basic vocabulary, grammatical evidence (especially morphological), and sound correspondences. Hoenigswald (1990: 119–120) summarized the points upon which 17th- and 18th-century linguistic scholars agreed:

> There was ... "a concept of the development of languages into dialects and of dialects into new independent languages" ... and ... "an insistence that not a few random items, but a large number of words from the **basic vocabulary** should form the basis of comparison" ... the doctrine that '**grammar**' is even more important than words; ... the idea that for an etymology to be valid the **differences in sound** – or in 'letters' – **must recur** [emphasis added, LC].
>
> These criteria figured prominently in nearly all demonstrations of language families in the past, making them important also to today's practice. The methods and criteria generally thought necessary for reliable long-range comparison are surveyed in what follows. (See Campbell, 2003; Campbell, 1997a: 206–259 for details.)

Table 1 Proposals of distant genetic relationships among languages

Altaic (Turkic, Tungusic, Mongolian, sometimes Japanese, Korean)
Amerind (uniting all Native American language families, except Eskimo-Aleut and Na-Dene)
Dene-Sino Tibetan (Athabaskan [or Na-Dene] and Sino-Tibetan)
Austric (Austro-Asiatic with Austronesian)
Austro-Tai (Japanese-Austro-Thai)
Basque-Caucasian, Basque-Sino Tibetan-NaDene
Dravidian-Uralic
Eskimo and Indo-European
Eskimo-Uralic
Eurasiatic (Indo-European, Uralic, Eskimo-Aleut, Ainu, several others)
Hokan (grouping numerous American Indian families and isolates)
Indo-European and Afroasiatic, Indo-European and Semitic
Indo-Pacific (grouping the non-Austronesian languages of the Pacific: all Papuan families, Tasmanian, languages of the Andaman Islands)
Japanese-Austronesian
Khoisan (grouping most non-Bantu African click languages, an areal grouping, not a genetic one)
Macro-Siouan (Siouan, Iroquoian, Caddoan, sometimes Yuchi)
Maya-Chipayan (Mayan, Uru-Chipayan of Bolivia)
Na-Dene (Eyak-Athabaskan, Tlinglit, Haida; Haida is highly disputed)
Niger-Kordofanian (Niger-Congo) (grouping Mande, Kru, Kwa, Benue-Congo [of which Bantu is a branch], Gur, Adamawa-Ubangi, Kordofanian, etc.)
Nilo-Saharan (most of the African languages not otherwise classified with one of Greenberg's other three African macrofamilies)
Nostratic (Indo-European, Uralic, Altaic, Kartvelian, Dravidian, Afroasiatic; some add others)
Penutian (grouping numerous American Indian families and isolates)
Proto-Australian (all Australian families)
Proto-World (uniting all the world's languages)
Ural-Altaic (Uralic and Altaic)

Lexical Comparison

Throughout history, word comparisons have been employed as evidence of language family relationship, but, given a small collection of likely-looking words, how can we determine whether they are really the residue of common origin and not due to chance or some other factor? Lexical comparisons by themselves are seldom convincing without additional support from other criteria.

Basic Vocabulary Most scholars require that basic vocabulary be part of the supporting evidence for any distant genetic relationship. Basic vocabulary is generally understood to include terms for body parts, close kinship, frequently encountered aspects of the natural world (mountain, river, cloud), and low numbers. Basic vocabulary is generally resistant to borrowing, so comparisons involving basic vocabulary items are less likely to be due to diffusion and stand a better chance of being inherited from a common ancestor than other kinds of vocabulary. Still, basic vocabulary can also be borrowed – though infrequently – so that its role as a safeguard against borrowing is not foolproof.

Glottochronology Glottochronology, now mostly abandoned, aimed at assigning dates to the split up of related languages; it has been employed in long-range comparisons. It depends on basic, relatively culture-free vocabulary, but all its basic assumptions have been challenged (including the existence of culture-free vocabulary). Most tellingly, it does not find or test distant genetic relationships, but rather it **assumes** that the languages compared are related and proceeds to attach a date based on the number of core-vocabulary words that are considered similar among the languages compared. This, then, is no method for determining whether languages are related.

Multilateral Comparison The best-known approach that relies on inspectional resemblances among words is Joseph Greenberg's 'multilateral (or mass) comparison.' It is based on "looking at … many languages across a few words" rather than "at a few languages across many words" (Greenberg, 1987: 23). The lexical similarities determined by superficial visual inspection that are shared 'across many languages' alone are taken as sufficient evidence for genetic relationship. This approach stops where others begin, at assembling lexical similarities. These inspectional resemblances must be investigated to determine why they are similar, whether the similarity is due to inheritance from a common ancestor (genetic relationship), or to borrowing, accident, onomatopoeia, sound symbolism, or nursery formations – nongenetic factors. Since multilateral comparison does not do this, its results are controversial and rejected by most mainstream historical linguists.

No technique that relies on inspectional similarities in vocabulary alone has proven adequate for establishing family relationships.

Sound Correspondences

Nearly all scholars consider regular sound correspondences strong evidence of genetic affinity. Correspondences do not necessarily involve similar sounds. The sounds that are equated in proposals of remote relationship are typically similar, often identical, although such identities are not so frequent among the daughter languages of well-established language families. The sound changes that lead to such

nonidentical correspondences often make cognate words not apparent. These true but nonobvious cognates are missed by methods that seek only superficial resemblance, for example: French *cinq*/Russian *pjatj*/Armenian *hing*/ English *five* (all derived by straightforward changes from original Indo-European **penkwe-* 'five'); French *boeuf*/English *cow* (both from Proto-Indo-European **gwou-* 'cow'). The words in these cognate sets are not visually similar, but they exhibit regular sound correspondences among the cognates.

Though extremely important and valuable, the criterion of sound correspondences can be misapplied. Sometimes regularly corresponding sounds are found in loans. By Grimm's law, real French-English cognates should exhibit the correspondence *p* : *f*, as in the cognates *père/father, pied/foot, pour/for.* However, French and English appear to correspondence *p* : *p* in cases where English has borrowed from French or Latin, as in *paternel/paternal, piédestal/pedestal, per/per.* Since English has many such loans, examples of the bogus *p* : *p* sound correspondence are not hard to find. In comparing languages not yet known to be related, we must be cautious of the problem of seeming correspondences in undetected loans. Sound correspondences in basic vocabulary help, since basic vocabulary is borrowed only infrequently.

Some nongenuine sound correspondences can come from accidentally similar words. Languages share some vocabulary by sheer accident, for example: Proto-Je **niw* 'new'/English *new*; Kaqchikel *mes* 'mess'/English *mess;* Maori *kuri* 'dog'/English *cur*; Lake Miwok *hóllu* 'hollow'/English *hollow*; Gbaya *be* 'to be'/English *be*. Other unreal sound correspondences can come from wide semantic latitude in proposed cognates, when phonetically similar but semantically disparate forms are equated. For example, if we compare Pipil (Uto-Aztecan) *teki* 'to cut'/ Finnish (Uralic) *teki* 'made', *tukat* 'spider'/*tukat* 'hairs', etc., we note a recurrence of a *t* : *t* and a *k : k* correspondence. However, the phonetic correspondences in these word pairs are accidental – it is always possible to find phonetically similar words among languages if their meanings are ignored. With too much semantic leeway among compared forms, spurious correspondences such as the Pipil-Finnish *t* : *t* and *k : k* turn up. Unfortunately, wide semantic latitude is very common in cases of long-range comparison. Additional noninherited phonetic similarities crop up when onomatopoetic, sound-symbolic, and nursery forms are compared. A set of proposed cognates involving a combination of loans, chance enhanced by semantic latitude, onomatopoeia, and such factors can exhibit false sound correspondences. For this reason, some proposed remote relationships that purportedly are based on regular sound correspondences nevertheless fail to be convincing.

Grammatical Evidence

Scholars throughout linguistic history have considered morphological evidence important for establishing language families. Many favor 'shared aberrancy' ('submerged features,' 'morphological peculiarities,' 'arbitrary associations'). For example, the Algonquian-Ritwan hypothesis, which groups Wiyot and Yurok (both of California) with the Algonquian family, was controversial, but morphological evidence such as the following comparison of Proto-Central-Algonquian (PCA) and Wiyot helped to confirm the relationship:

Proto-Central-Algonquian **ne* + **ehkw-*
= **netehkw-*'my louse'
Wiyot *du-* + *híkw* = *dutíkw* 'my louse' (Teeter, 1964: 1029)

Proto-Central-Algonquian inserts *-t* between a possessive pronominal prefix and a vowel-initial root, while Wiyot inserts *-t-* between possessive prefixes and a root beginning in *hV* (with the loss of the *h* in this process). There is no phonetic reason why *t* should be added in this environment; this is so unusual it is not likely to be shared by borrowing or accident. Inheritance from a common ancestor that had this peculiarity is more likely, and this is confirmed by other evidence in these languages. Another often repeated example of shared aberrancy is the suppletive agreement between English *good/better/best* and German *gut/besser/best*, where examples such as this are held to have probative value for showing languages are related.

Morphological correspondences of the 'shared aberrancy' type are an important source of evidence for distant genetic relationships.

Borrowing

Diffusion is a source of nongenetic similarity among languages that can complicate evidence for remote relationships. For example, the controversial 'Chibchan-Paezan' hypothesis (grouping several South American language families, part of 'Amerind') has the proposed cognate set 'axe' with words from only four of the many languages involved, but two of these are loans: Cuitlatec *navaxo* 'knife', from Spanish *navajo* 'knife, razor', and Tunebo *baxita* 'machete', from Spanish *machete* (Tunebo has nasal consonants only before nasal vowels, hence *b* substitutes for Spanish *m*) (Greenberg, 1987: 108). When two of the four pieces of evidence are borrowings, the putative 'axe' cognate must be abandoned. Examples

such as this are not uncommon in proposals of distant genetic relationship.

Semantic Constraints

It is dangerous to present phonetically similar forms with different meanings as potential evidence of remote genetic relationship, assuming semantic shifts have taken place. Of course meaning can shift, but in hypotheses of remote relationship the assumed semantic shifts cannot be documented, and the greater the semantic latitude permitted in compared forms, the easier it is to find phonetically similar forms that have no historical connection (as in the Pipil-Finnish examples, above). When semantically nonequivalent forms are compared, chance phonetic similarity is greatly increased. Within families where the languages are known to be related, etymologies are not accepted unless an explicit account of any assumed semantic changes can be provided. The problem of excessive semantic permissiveness is one of the most common and most serious in long-range comparisons, for example, sets cited for Nostratic compare forms meaning 'lip/mushroom/soft outgrowth', 'grow up/become/tree/be', for Amerind hypothesis 'excrement/night/grass', 'child/copulate/son/girl/boy/tender/bear/small'. It is for reasons such as this that these proposals of more remote linguistic relationship are disputed.

Onomatopoeia

Onomatopoetic words imitate the real-world sound associated with their meanings. They may be similar in different languages because they have independently approximated the sounds of nature, not because they share any common history. A way to reduce the sound-imitative problem is to omit from long-range comparisons any word which cross-linguistically frequently has similar imitative form, for example 'blow', 'breathe', 'suck', 'laugh', 'cough', 'sneeze', 'break/cut/chop/split', 'cricket', 'crow' (bird names in general), 'frog/toad', 'lungs', 'baby/infant', 'beat/hit/pound', 'call/shout', 'choke', 'cry', 'drip/drop', 'hiccough', 'kiss', 'shoot', 'snore', 'spit', and 'whistle'. Unfortunately, examples of onomatopoetic words are frequent in proposals of distant genetic relationships.

Nursery Forms

Nursery words (the 'mama-nana-papa-dada-caca' sort) should be avoided, since they typically share a high degree of cross-linguistic similarity that is not due to common ancestry. Nevertheless, examples of nursery words are frequent in cases of long range comparison. The words involved are typically 'mother', 'father', 'grandmother', 'grandfather', and often 'brother', 'sister', 'aunt', and 'uncle', and have shapes like *mama*, *nana*, *papa*, *baba*, *tata*, *dada*. Jakobson (1962[1960]: 542–543) explained the cross-linguistic nongenetic similarity among nursery forms. Nursery words provide no reliable support for genetic relationship.

Short Forms and Unmatched Segments

How long proposed cognates are and the number of matched sounds within them are important, since the greater the number of matching sounds in a proposed cognate set, the less likely it is that accident accounts for the similarity. Monosyllabic words (CV, VC, V) are so short that their similarity to forms in other languages could also easily be due to chance. If only one or two sounds of longer forms are matched, chance may explain the similarity. Such comparisons are not persuasive.

Chance Similarities

Chance (accident) is another possible explanation for similarities in compared languages and needs to be avoided. The potential for accidental matching increases dramatically when one leaves the realm of basic vocabulary, when one increases the pool of words from which potential cognates are sought, and when one permits the semantics of compared forms to vary even slightly (Ringe, 1992: 5).

Cases of similar but noncognate words are well-known, for example French *feu* and German *Feuer* fire', English *much* and Spanish *mucho* 'much'. The phonetic similarity in these basic vocabulary items is due to accidental convergence due to the sound changes that they have undergone, not to inheritance from any common word in the proto language. That originally distinct forms in different languages can become similar due to sound changes is not surprising, since even within a single language originally distinct words can converge due to sound changes, for example, English *lie/lie* (from Proto-Germanic **ligjan* 'to lie, lay'/**leugan* 'to tell a lie').

Sound–Meaning Isomorphism

Only comparisons which involve both sound and meaning together are permitted. Similarities in sound alone (for example, the presence of tones in compared languages) or in meaning alone (for example, grammatical gender in languages compared) are not reliable, since they can develop independently of genetic relationship, due to diffusion, accident, and typological tendencies.

Only Linguistic Evidence

Only linguistic information, no nonlinguistic consideration, is permitted as evidence of distant genetic

relationship. Shared cultural traits, mythology, folklore, technologies, and gene pools must be eliminated from arguments for linguistic relationship. The wisdom of this is seen in face of the many strange proposals based on nonlinguistic evidence. For example, some earlier African classifications proposed that Ari (Omotic) belongs to either Nilo-Saharan or Sudanic 'because the Ari people are Negroes' ('racial' evidence), that Moru and Madi belong to Sudanic because they are located in central Africa (geographical evidence), or that Fula is Hamitic because its speakers herd cattle, are Moslems (cultural evidence), and are tall and Caucasoid (physical attributes) (Fleming, 1987: 207). Clearly the language one speaks does not deterministically depend on one's cultural and biological connections.

Erroneous Morphological Analysis

Where compared words are analyzed with more than one morpheme, it is necessary to show that the segmented morphemes in fact exist in language. Unfortunately, unmotivated morphological divisions are frequent in proposals of remote relationship. Often, a morpheme boundary is inserted where none is justified, as for example, the arbitrarily segmented Tunebo 'machete' as *baxi-ta* (borrowed from Spanish *machete*, and contains no morpheme boundary). This false morphological segmentation falsely makes the Tunebo word appear more similar to the other proposed cognates, Cabecar *bak* and Andaqui *boxo-(ka)* 'axe' (Greenberg, 1987: 108).

Undetected morpheme divisions are also a problem. An example from the Amerind hypothesis compares Tzotzil *ti?il* 'hole' with Lake Miwok *talokh* 'hole', Atakapa *tol* 'anus', Totonac *tan* 'buttocks', Takelma *telkan* 'buttocks' (Greenberg, 1987: 152); however, the Tzotzil form is *ti?-il*, from *ti?* 'mouth' + *-il* 'indefinite possessive suffix', meaning 'edge, border, lips, mouth', but not 'hole'. The appropriate comparison *ti?* 'mouth' bears no particular resemblance to the other forms with which it is compared.

Spurious Forms

Another problem is that of nonexistent or erroneous 'data' from 'bookkeeping' problems and 'scribal' errors. For example, for the Mayan-MixeZoquean hypothesis (Brown and Witkowski, 1979), Mixe-Zoquean words meaning 'shell' were compared with K'iche' (Mayan) *sak'*, said to mean 'lobster', actually 'grasshopper' – a misunderstanding of Spanish *langosta*, which in Guatemala (where K'iche' is spoken) means 'grasshopper', but 'lobster' in other varieties of Spanish. A comparison of 'shell' and 'grasshopper' makes no sense. Errors of this sort can be serious; for example, in the Amerind hypothesis (Greenberg, 1987) none of the words given as Quapaw are in fact from Quapaw; all are from Biloxi and Ofo; none of the words given as Proto-Mayan are from Proto-Mayan, rather from Proto-K'ichean.

Given the disputes about proposed distant genetic relationships, these methodological principles for long-range comparison are extremely important. Research on possible distant genetic relationships that does not conform to these methodological principles and cautions will remain inconclusive.

Some Examples of Long-Range Proposals

It will be instructive to look briefly at some specific proposals to see why most mainstream historical linguists do not accept these hypotheses. (Space does not permit full evaluation, but references are given for more detail.)

Altaic

The Altaic hypothesis would group Turkic, Mongolian, and Tungusic; some versions also include Korean and Japanese. While 'Altaic' is repeated in encyclopedias, most leading 'Altaicists' have abandoned the hypothesis. The most serious problems are the extensive borrowing among the 'Altaic' languages, lack of convincing cognates, lack of basic vocabulary, extensive areal diffusion, problems with the putative sound correspondences, and reliance on typologically commonplace traits. The shared 'Altaic' traits include vowel harmony, relatively simple phoneme inventories, agglutination, suffixing, (S)OV word order (and postpositions), no verb 'to have' for possession, no articles or gender, and nonmain clauses in nonfinite (participial) constructions. However, these shared features are commonplace typological traits, and thus are not good evidence of genetic relationship because they can easily develop independently in unrelated languages. These 'Altlaic' features are also areal traits, shared by a number of languages in surrounding regions, thus perhaps due to diffusion. Similarities in the first and second person pronoun paradigms have impressed proponents of Altaic, although critics point out that pronouns are borrowed far more frequently than proponents acknowledge and pronoun patterns of the type cited for Altaic are also not unusual nor unexpected cross-linguistically. In short, the evidence for genetic relationship has not been persuasive, explaining why so many reject the 'Altaic' hypothesis. (Campbell and Poser, in press.)

Nostratic

The Nostratic hypothesis as advanced in the 1960s by Illich-Svitych would group Indo-European, Uralic,

Altaic, Kartvelian, Dravidian, and Hamito-Semitic [later Afroasiatic], though other versions of the hypothesis would include various other languages. The sheer number of languages and many proposed cognates involved might make it seem difficult to evaluate Nostratic. Nevertheless, assessment is possible. With respect to the many putative cognate sets, assessment can concentrate on those cases considered the strongest by proponents of Nostratic (those of Dolgopolsky, 1986 and Kaiser and Shevoroshkin, 1988). Campbell (1998) shows that these strongest cases do not hold up and that the weaker sets are not persuasive (see below). We can easily determine to what extent the proposed reconstructions correspond to typological expectations, whether the proposed cognates are permissive in semantic associations, and when onomatopoeia, forms too short to deny chance, nursery forms, and the like are involved.

Illich-Svitych's version of Nostratic exhibits the following methodological problems. (See Campbell, 1998, 1999 for details.)

1. Descriptive forms. Illich-Svitych is forthright in labeling 26 of his 378 forms as 'descriptive,' meaning onomatopoetic, affective, or sound-symbolic, i.e., 7% of the total. There are 16 additional onomatopoetic, affective, or sound-symbolic forms, not so labeled, or a total of approximately 11%.
2. Questionable cognates. Illich-Svitych himself indicates that 57 or the 378 sets are questionable (15%), signaled with a question mark. However, this number should be greatly increased, since in numerous forms Illich-Svitych signals problems in other ways, with slanted lines (/ /) for things not conforming to expectation, with question marks, and with upper-case letters in reconstructions to indicate uncertainties or ambiguities.
3. Sets with only two families represented. One of Illich-Svitych's criteria was that only cognate sets with representatives from at least three of the six 'Nostratic' families would be considered as supportive. Nevertheless, 134 of the 378 sets involve forms from only two families (35%), questionable by Illich-Svitychs own criteria.
4. Noncorresponding sound correspondences. Frequently, the forms presented as evidence of Nostratic do not exhibit the proposed sound correspondences, i.e., they have sounds at odds with those that would be required according to the Nostratic correspondence sets. Campbell (1998), looking mostly only at stops and only at the Indo-European and Uralic data, found 25 sets that did not follow the proposed Nostratic correspondences. There is another way in which Illich-Svitych's putative sound correspondences are not consistent with the standard comparative method. Several of the putative Nostratic sounds are not reflected by regular sound correspondences in the languages. For example, "in Kartv[elian] and Indo-European, the reflexes of Nostratic *[**]p* are found to be unstable" (Illich-Svitych, 1990: 168). Nostratic forms beginning in ***p* reveal that both the Indo-European and the Kartvelian forms arbitrarily begin with either **p* or **b*, but this is not regular sound change and is not sanctioned by the comparative method. Similarly, glottalization in Afroasiatic is said to occur "sporadically under other conditions still not clear" (Illich-Svitych, 1990: 168). In the correspondence sets, several of the languages are listed with multiple reflexes of a single Nostratic sound, but with no explanation of conditions under which the distinct reflexes might appear.
5. Short forms. Of Illich-Svitych's 378 forms, 57 (15%) involve short forms (CV, VC, C, or V), incapable of denying chance as an alternative explanation.
6. Semantically nonequivalent forms. Some 55 cases (16%) involve comparisons of forms in the different languages that are fairly distinct semantically.
7. Diffused forms. Given the history of central Eurasia, with much language contact, it is not at all surprising that some forms turn out to be borrowed. Several of the Nostratic cognates have words which have been identified by others as loans, including: 'sister-in-law', 'water', 'do', 'give', 'carry', 'lead', 'to do'/'put', 'husband's sister', to which we can add the following as probable or possible loans: 'conifer, branch, point', 'thorn'; 'poplar'; 'practice witchcraft'; 'deer'; 'vessel'; 'birch'; 'bird cherry'; 'honey', 'mead'; 'poplar'.
8. Typological problems. Nostratic as traditionally reconstructed is typologically flawed. Counter to expectations, few Nostratic roots contain two voiceless stops; glottalized stops are considerably more frequent than their plain counterparts; Nostratic affricates change to a cluster of fricative + stop in Indo-European.
9. Evaluation of the strongest lexical sets. An examination of the Nostratic sets held by proponents to be the strongest reveals serious problems with most. These include Dolgopolsky's (1986) 15 most stable lexemes. Most are questionable in one way or another according to the standard criteria for assessing proposals of remote linguistic kinship. In the Nostratic sets representing Dolgopolsky's 15 most stable glosses, four have problems with phonological correspondences; five

involve excessive semantic difference among the putative cognates; four have representatives in only two of the putative Nostratic families; two involve problems of morphological analysis; Illich-Svitych himself listed one as doubtful; and finally, one reflects the tendency to rely too heavily on Finnish when not supported by the historical evidence. All but two are challenged, and for these two the relevant forms needed for evaluation are not present. (See Campbell, 1998 for details.) These 'strong' cases are certainly not sufficiently robust to encourage faith in the proposed genetic relationship.

Once again, it is for reasons of this sort that most historical linguists reject Nostratic.

Amerind

Greenberg (1987) proposed that all Native American languages, except Na-Dene and Eskimo-Aleut languages, belong to single macro-family, Amerind, based on multilateral comparison (see above). Amerind is rejected by virtually all specialists in Native American languages and by the vast majority of historical linguists. Specialists maintain that valid methods do not at present permit reduction of Native American languages to fewer than about 150 independent language families and isolates. Amerind has been highly criticized on various grounds. There are exceedingly many errors in Greenberg's data: "the number of erroneous forms probably exceeds that of the correct forms" (Adelaar, 1989: 253). Where Greenberg stops – after assembling superficial similarities and declaring them due to common ancestry – is where other linguists begin. Since such similarities can be due to chance, borrowing, onomatopoeia, sound symbolism, nursery words (the *mama, papa, nana, dada, caca* sort), misanalysis, and much more, for a plausible proposal of remote linguistic relationship, one must attempt to eliminate all other possible explanations, leaving a shared common ancestor as the most likely. Greenberg made no attempt to eliminate these other explanations, and the similarities he amassed appear to be due mostly to accident and a combination of these other factors: "I find no evidence whatsoever that [Greenberg's] putative cognate sets . . . represent anything other than chance similarities" (Ringe, 1996: 152). In various instances, Greenberg compared arbitrary segments of words, equated words with very different meanings (for example, 'excrement/night/grass'), misidentified many languages, failed to analyze the morphology of some words and falsely analyzed that of others, neglected regular sound correspondences, failed to eliminate loanwords, and misinterpreted well-established findings. The Amerind 'etymologies' proposed are often limited to a very few languages of the many involved. (For details and examples, see Adelaar, 1989; Berman, 1992; Campbell, 1988, 1997a; Kimball, 1993; McMahon and McMahon, 1995; Poser, 1992; Rankin, 1992; Ringe, 1992, 1996). Finnish, Japanese, Basque, and other randomly chosen languages fit Greenberg's Amerind data as well as or better than any of the American Indian languages do. Greenberg's method has proven incapable of distinguishing implausible relationships from Amerind generally (Campbell, 1988; Campbell, 1997b).

In short, it is with good reason Amerind has been rejected.

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Loth, Joseph (1847–1934)

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Born in 1847 near Guéméné-sur-Scorff, Loth was a native speaker of Breton Vannetais. After he obtained his Baccalauréat in Vannes 'Grand-Séminaire,' he chose to remain a layman and became a teacher. Some time after the war of 1870, he came to Paris to resume his studies. After earning a diploma at the École des Hautes Études and writing a thesis 'ès lettres' (1884), he was given the post of Lecturer in Greek in Rennes University – where he soon became a professor (1889) and then dean of the arts faculty. In 1886 he founded a scholarly journal, *Annales de Bretagne*, and he lectured on Celtic languages from 1903 on. He succeeded D'Arbois de Jubainville as Professor of Celtic in the Collège de France (1910–1930). He was also a member of the Académie des Inscriptions et Belles-Lettres, and director of the journal *Revue Celtique* when he died in 1934 at the age of 87. His life was extremely productive; he left an important corpus of work and had a formative influence on many pupils.

At the École des Hautes Études, his thesis concerned the British (Brittonic) colonization of Brittany from the 5th to the 7th century: his general theory was mainly in agreement with the ideas of modern historians, such as Arthur de La Borderie: the Bretons were immigrants coming from Great Britain into Armorica. His diploma was a dictionary collecting all the evidence provided by Old Welsh, Old Cornish, and Old Breton glosses. Joseph Loth wanted to make known to every Breton the close kinship of their language with that of the Welsh (he himself had a Welsh wife). For that, he had to teach the history of Breton and he published a selection of Breton texts from different periods, the *Chrestomathie bretonne*. With another book on the Latin borrowings in the Brittonic dialects (1892), he became the foremost authority on the phonetic history of British Celtic.

He published a splendid translation of the Welsh prose tales, *Mabinogion* (1913), and a study of

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Loth, Joseph (1847–1934)

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Born in 1847 near Guéméné-sur-Scorff, Loth was a native speaker of Breton Vannetais. After he obtained his Baccalauréat in Vannes 'Grand-Séminaire,' he chose to remain a layman and became a teacher. Some time after the war of 1870, he came to Paris to resume his studies. After earning a diploma at the École des Hautes Études and writing a thesis 'ès lettres' (1884), he was given the post of Lecturer in Greek in Rennes University – where he soon became a professor (1889) and then dean of the arts faculty. In 1886 he founded a scholarly journal, *Annales de Bretagne*, and he lectured on Celtic languages from 1903 on. He succeeded D'Arbois de Jubainville as Professor of Celtic in the Collège de France (1910–1930). He was also a member of the Académie des Inscriptions et Belles-Lettres, and director of the journal *Revue Celtique* when he died in 1934 at the age of 87. His life was extremely productive; he left an important corpus of work and had a formative influence on many pupils.

At the École des Hautes Études, his thesis concerned the British (Brittonic) colonization of Brittany from the 5th to the 7th century: his general theory was mainly in agreement with the ideas of modern historians, such as Arthur de La Borderie: the Bretons were immigrants coming from Great Britain into Armorica. His diploma was a dictionary collecting all the evidence provided by Old Welsh, Old Cornish, and Old Breton glosses. Joseph Loth wanted to make known to every Breton the close kinship of their language with that of the Welsh (he himself had a Welsh wife). For that, he had to teach the history of Breton and he published a selection of Breton texts from different periods, the *Chrestomathie bretonne*. With another book on the Latin borrowings in the Brittonic dialects (1892), he became the foremost authority on the phonetic history of British Celtic.

He published a splendid translation of the Welsh prose tales, *Mabinogion* (1913), and a study of

Welsh metrics, particularly on the archaic poem of the Black Book of Carmarthen. He also studied aspects of Middle Welsh morphology and syntax (the use of the verbal particle *rhy*, for example). Unfortunately, his contribution to Welsh studies also includes a bitter criticism of the Welsh grammar of John Morris-Jones (Bangor), which created some resentment against him among certain scholars.

He had a sound as well as profound knowledge of the living Celtic languages, in addition to his own Bas-Vannetais dialect, specializing particularly in Celtic lexicography and etymology. This scholar of another age, though less productive than Whitley Stokes (*see* **Stokes, Whitley (1830–1909)**), gives a genuine insight into the Celtic cultures of the past: his philological studies and his etymologies were a means of reviving the past, by discovering the real meaning of older texts and recovering the lost unity of the Celtic languages. As a linguist, he felt obliged to communicate his results to the historians and the archaeologists: he thoroughly studied such semantic fields as names of cereal crops, horses, and sanctuaries. He took a great interest in the newly found Gaulish inscriptions of Coligny (1904) and La Graufesenque (1924). Towards the end of his life, alas, he was very active in defense of the fake inscriptions of Glozel.

See also: Stokes, Whitley (1830–1909).

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Louisiana Creole

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This French-lexifier creole is spoken by an estimated 10 000–20 000 persons (reliable figures are not available) residing mainly in southwestern Louisiana. Most speakers live along or near the Bayou Teche, especially in the parishes of St. Landry, St. Martin, and Lafayette, but there are also pockets of speakers in several other parishes. Although it is commonly associated with African Americans and Creoles of color, Louisiana Creole (LC) is also the first language of many European Americans. The language has long coexisted with regional varieties of French, often referred to collectively as Cajun, and it is at least in part the continued influence of these varieties that explains why LC is structurally less distant from French than are the French-lexifier creoles of the Caribbean. LC shares a number of important features with Haitian Creole (e.g., the progressive marker *ape*, the verb *gen* 'to have,' and the possessive particle *kèn/tchèn*), and some linguists maintain that LC had as its origin a creole or pre-creole language imported to Louisiana from the French colony of Saint-Domingue before it became the free republic of Haiti. However, evidence that LC's development predated the significant population migration from Saint-Domingue to Louisiana in the early 19th century casts doubt on this claim and strengthens the possibility that LC is indigenous to the region. Today, the future of LC remains uncertain, since most fluent speakers are now elderly and the language is not being passed on to younger generations.

LC varies considerably according to region, ethnic group, and social context. The linguistic situation in Louisiana is often said to form a speech continuum, with the type of LC that is furthest removed from French constituting the basilectal pole, and Cajun or, depending on the model used, Referential French constituting the acrolectal pole. Any given utterance, however, may display a greater or lesser quantity of French-like or Creole-like features, such that it may best be assigned to the broad mesolectal range lying between the two poles of the continuum.

Like the other French-lexifier creoles, LC features definite articles that are postposed to the noun (*tab-la* 'the table,' *chyen-ye* 'the dogs'); a personal pronoun system in which all of the pronouns, regardless of function, are derived from the tonic pronouns of French (1 sg. *mo* < *moi*, 2 sg. *to* < *toi*, 3 sg. *li* < *lui*, etc.); and a verbal system that shows very little inflectional morphology but relies instead on a series of markers placed before the verb to express notions of tense, mood, and aspect. The most important of these are the anterior marker *te*; the progressive

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marker *ape* (*e* in Pointe Coupee Parish); the future maker *a*, *va*, or *ale*; and the conditional marker *se*: *Ye te ka lir* 'They could read'; *Lavach-la ape kòmanse dòn dule* 'The cow is beginning to give milk'; *Vou pa kwa l a chinen?* 'Don't you think he'll win?'

See also: Endangered Languages; Language Maintenance and Shift; Language/Dialect Contact; Minorities and Language; United States of America: Language Situation; Variation in Pidgins and Creoles.

Language Maps (Appendix 1): Maps 47, 48.

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Lounsbury, Floyd Glenn (1914–1998)

W L Chafe, University of California at Santa Barbara, CA, USA

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Floyd Glenn Lounsbury was born in Stevens Point, Wisconsin on April 25, 1914 and died on May 14, 1998 in New Haven, Connecticut. He attended the University of Wisconsin at Madison, majoring in mathematics, and while still an undergraduate he was recruited by the linguist Morris Swadesh to assist in the Oneida Language and Folklore Project funded by the Works Progress Administration (WPA). The goal of that project was to teach young Oneidas to write their language, and then to ask them to record folktales told by older members of the Oneida community. When Swadesh left Wisconsin in 1939, Lounsbury became director of the project. Using an Oneida orthography that he and Swadesh had developed, he oversaw its use in the collection of a variety of Oneida texts, which not only were of value to the Oneida community but also provided Lounsbury with material for an analysis of Oneida phonology and grammar. After WPA funding ended in the summer of 1940, he entered the University of Wisconsin M.A. program and planned to submit a thesis on Oneida phonology. World War II intervened, however, and he was not awarded the M.A. until 1946.

During the war Lounsbury served in the U.S. Army Air Force in Brazil as a meteorologist. At the war's end he turned from meteorology to anthropology, enrolling as a graduate student at Yale University and completing a dissertation on Oneida verb morphology. When he received the Ph.D. in 1949 he was immediately hired by the Yale Department of Anthropology, where he taught from 1949 until his retirement in 1979. During most of that period he was affiliated with the Department of Linguistics as well. He was a Fellow of the Center for Advanced Study in the Behavioral Sciences (1963–1964), and was on two occasions a Senior Research Scholar at Dumbarton Oaks in Washington (1973–1974 and 1977–1978). He was elected to the National Academy of Sciences in 1969, the American Academy of Arts and Sciences in 1976, and the American Philosophical Society in 1987. In 1971 he received the Wilbur Cross Medal from the Yale Graduate School of Arts and Sciences, the school's highest honor to one of its alumni. He was awarded an honorary LL.D. by the University of Pennsylvania in 1987, and was chosen to deliver the Distinguished Lecture at the annual meeting of the American Anthropological Association in 1990. A full bibliography of his work is available in Chafe (1998).

Lounsbury contributed importantly to three distinct fields of research and teaching: the recording and analysis of Iroquoian languages, the study of kinship systems, and the decipherment of Mayan hieroglyphs. In all three of these areas, in addition to his own substantial contributions, he was able to set much of the agenda that was subsequently followed by other researchers, while he recruited a succession of new scholars who continued and refined his work.

The extent of Lounsbury's influence on Iroquoian linguistic scholarship is difficult to exaggerate. When his dissertation was published in 1953 under the title *Oneida verb morphology*, it became the standard on which future studies of Iroquoian languages were based. In it he described the intricate structure of Oneida verbs in a way that had never previously been done for any Iroquoian language, setting forth, for example, the entire inventory of pronominal prefixes and their alternating forms, accounting for aspectual distinctions, and illuminating numerous other areas of Iroquoian linguistic structure. He himself worked to a greater or lesser extent with most of the extant languages in that family, not only with Oneida but also extensively with Mohawk, Cayuga, Tuscarora, and Cherokee. He had a profound

marker *ape* (*e* in Pointe Coupee Parish); the future maker *a*, *va*, or *ale*; and the conditional marker *se*: *Ye te ka lir* 'They could read'; *Lavach-la ape kòmanse dòn dule* 'The cow is beginning to give milk'; *Vou pa kwa l a chinen?* 'Don't you think he'll win?'

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Although he had been trained in the tradition of American structural linguistics established by Leonard Bloomfield and others, Lounsbury had a special interest in semantics, an area that had been neglected within that tradition. He recognized the potential offered by the kinship vocabularies of diverse languages as a way of extending structuralist methods to meanings. In an elegant fashion he analyzed kinship systems in terms of semantic 'components,' showing that a small number of components and rules for their combination could account for a variety of structurally different systems. Between 1956 and 1968 he published five seminal articles on kinship analysis involving the Pawnee, Seneca, Crow, and Omaha (Omaha-Ponca) languages, the language of the Trobriand Islands, and early Latin. His writings attracted widespread attention, as linguists and anthropologists saw in them evidence that at least some areas of meaning could be as systematically analyzed as phonology and grammar. It would be irresponsible today to undertake a study of a kinship system without taking Lounsbury's work into account.

By the 1950s Lounsbury had developed an interest in Mayan hieroglyphs, and he gradually devoted more and more time to them. The nature of Mayan writing was poorly understood when he began, and he became a principal advocate of phonetic interpretation of the glyphs, establishing himself as a pioneer in Mayan decipherment. During the 1970s and 1980s his publications were instrumental in converting Mayan hieroglyph studies into a major field of research. He was able to set forth clear principles for the discovery and demonstration of the values of the glyphs, but even while the principles of phonological representation were being established and a significant selection of Mayan texts being read, he turned his attention to grammatical analysis of those texts, demonstrating the dependence of hieroglyph studies on a detailed understanding of Mayan linguistics. Most Mayan decipherment was based on the analysis of calendrical patterns of a sort that appealed to his mathematical bent. He continued to work on Mayan mathematics throughout the 1980s, extending his work to the investigation of astronomical knowledge, its calendrical structure, and cultural uses reflected in hieroglyphic texts.

After an extended period during which he devoted much of his time first to kinship and then to Mayan hieroglyphs, in the 1990s Lounsbury returned to Iroquoian research, working on, among other things, the interpretation of an important Oneida text that he had recorded earlier. In the last years of his life he continued to participate actively in conferences on both Iroquoian and Mayan topics.

See also: Iroquoian Languages; Mayan Languages; Mesoamerica: Scripts; Swadesh, Morris (1909–1967).

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Lowth, Robert (1710–1787)

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Lowth was born in Winchester on November 27, 1710. In 1722 he was admitted as a scholar at Winchester College. In 1729 Lowth entered New College, Oxford, where he was Professor of Poetry from 1741 until 1752. In 1752, Lowth married Mary Jackson. They had seven children of which only two outlived their father. In 1753, Lowth's Latin lectures were published as *De sacra poesi Hebraeorum praelectiones*. Five years later, Lowth published *The life of William of Wykeham*, a biography about the founder of Winchester College and New College. Lowth's knowledge of Hebrew led him to translate the book of Isaiah in 1778. In 1766, Lowth became Bishop of St. David's, and only a few months later Bishop of Oxford. In 1777, he was made Bishop of London, which he remained until his death.

Lowth originally wrote his grammar for his eldest son Thomas Henry (1753–1778), because he felt that there was a need for an English grammar that could prepare children for the study of Latin. *A short introduction to English grammar* contains several references to Lowth's son in the form of examples such as "Thomas's book" and "Thomas is loved by me." Lowth appears to have begun the grammar in the autumn of 1757 when his son was only 4 years old. When he told his friend, the Chancellor of the Exchequer, Henry Bilson Legge (1708–1764), about his project, Legge asked for a copy of the grammar for his own son, leading Lowth to publish his grammar. Lowth may have intended his grammar as a children's grammar, but many people considered it too difficult for young learners. Daniel Fenning (1771) admired Lowth's section on syntax in which Lowth divides the sentence into twelve types of 'phrase,' but thought that the grammar was more suitable "for Men of Letters than for Youth at school." It was probably Lowth's publisher Robert Dodsley (1703–1764), who had also been behind the publication of Johnson's *Dictionary* (1755), who decided to make Lowth's grammar available to a wider public.

See also: Johnson, Samuel (1709–1784).

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Lu Fa-yan (fl. 600 A.D.)

B-C Kwok, Hong Kong, China

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Lu Fayan is generally remembered as the compiler of the Chinese rhyme dictionary *Qieyun*. We do not know much about his life. The biography of his father Lu Shuan (ca. 539–591) is included in *Sui Shu* (The book of the Sui dynasty), in which we learn that the Lu family was native to Linzhang in northern China.

Qieyun was revised and extended by scholars of the Tang (618–907) and the Song (960–1279) dynasties, and eventually several versions were produced. Of these, *Guangyun* (dated 1007–1008) has gained greatest popularity. We generally regard the phonological system reflected in these dictionaries as Middle Chinese or Ancient Chinese.

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Lowth was born in Winchester on November 27, 1710. In 1722 he was admitted as a scholar at Winchester College. In 1729 Lowth entered New College, Oxford, where he was Professor of Poetry from 1741 until 1752. In 1752, Lowth married Mary Jackson. They had seven children of which only two outlived their father. In 1753, Lowth's Latin lectures were published as *De sacra poesi Hebraeorum praelectiones*. Five years later, Lowth published *The life of William of Wykeham*, a biography about the founder of Winchester College and New College. Lowth's knowledge of Hebrew led him to translate the book of Isaiah in 1778. In 1766, Lowth became Bishop of St. David's, and only a few months later Bishop of Oxford. In 1777, he was made Bishop of London, which he remained until his death.

Lowth originally wrote his grammar for his eldest son Thomas Henry (1753–1778), because he felt that there was a need for an English grammar that could prepare children for the study of Latin. *A short introduction to English grammar* contains several references to Lowth's son in the form of examples such as "Thomas's book" and "Thomas is loved by me." Lowth appears to have begun the grammar in the autumn of 1757 when his son was only 4 years old. When he told his friend, the Chancellor of the Exchequer, Henry Bilson Legge (1708–1764), about his project, Legge asked for a copy of the grammar for his own son, leading Lowth to publish his grammar. Lowth may have intended his grammar as a children's grammar, but many people considered it too difficult for young learners. Daniel Fenning (1771) admired Lowth's section on syntax in which Lowth divides the sentence into twelve types of 'phrase,' but thought that the grammar was more suitable "for Men of Letters than for Youth at school." It was probably Lowth's publisher Robert Dodsley (1703–1764), who had also been behind the publication of Johnson's *Dictionary* (1755), who decided to make Lowth's grammar available to a wider public.

See also: Johnson, Samuel (1709–1784).

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Lu Fa-yan (fl. 600 A.D.)

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Luoyang, respectively. The phonological systems of the dialects of these two cities were important bases for Lu to establish the framework of *Qieyun*. It is noteworthy that Lu had mentioned the names of the eight other people involved in the earlier discussions of the rhyme dictionary. Three of them came from Jinling, and the remainder from Ye, a city not far away from Luoyang. Lu also placed great importance on earlier sources. It is evident that Lu tried to integrate these materials into his system, while rhyming distinctions in any one of them were mostly maintained. Obviously, *Qieyun* is composite in nature rather than simply a rhyme dictionary based on a single dialect at a certain time. Those who wish to reconstruct the phonetic values of *Qieyun* should first identify its heterogeneous elements.

The aim of the compilation of *Qieyun*, according to the preface, was to promote poetry writing. The language embodied in the dictionary, therefore, cannot be treated as representative of real speech. Lu's main concern was with rhyming practice, not linguistic analysis of the materials he was dealing with. On the other hand, there is not even a single word telling us that Lu had an intention to establish standards of pronunciation through the compilation of the book. This point is often misinterpreted by modern scholars.

By and large, in understanding the development of Chinese languages, *Qieyun* is of paramount importance: it bridged the gap between Old Chinese and the Modern Chinese. It is Lu's contribution to better knowledge of Ancient Chinese phonology.

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Luganda

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Location and Genetic Affiliation

Luganda (Ganda), a Bantu language of Uganda, is the mother tongue of 3 015 980 speakers (a little more than 16% of the population of Uganda); with an additional 1 million second language speakers, Luganda is the most widely spoken language in Uganda. It belongs to the Narrow Bantu subgroup of the Bantu sub-branch of the Benue-Congo branch of Niger-Congo. It is classified as Zone J15 in Guthrie's classification system for Bantu.

Basic Phonology and Orthography

The Luganda orthography is essentially phonemic. The consonants and vowel phonemes are listed in **Tables 1** and **2**, respectively. IPA symbols corresponding to the

Table 1 Consonants

Consonant	*Bilabial*	*Labiodental*	*Alveolar*	*Palatal*	*Velar*	*Labiovelar*
Stops						
Voiceless	p		t	c	k	
Voiced	b		d	j [ɟ]	g	
Fricatives						
Voiceless		f	s			
Voiced		v	z			
Nasals	m		n	ny [ɲ]	ng [ŋ]	
Approximants			l[a]	y (j)		w

[a]Though [l] and [r] are allophones of the phoneme /l/, they are represented by separate letters in the orthography. The letter 'r' is used after front vowels and 'l' is used elsewhere.

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Approximants			l[a]	y (j)		w

[a]Though [l] and [r] are allophones of the phoneme /l/, they are represented by separate letters in the orthography. The letter 'r' is used after front vowels and 'l' is used elsewhere.

standard letters are shown in brackets for palatal and velar consonants. As seen in Example (1), gemination (indicated by double letters) is phonemic for both consonants (C) and vowels (V). The typical syllable is CV or CVV. The only consonant clusters allowed are NC (i.e., nasal + consonant), as in *nkola*, and for consonant plus glide, as in *mukwano* 'friendship':

(1) ogula 'we buy' oggula 'you open'
nkola 'I work' nkoola 'I weed'

Tone is phonemic. However, it is not marked in the standard orthography, and that convention is followed here except when tone is being discussed.

On the surface, there is a contrast between low (L) tone, which is unmarked, high (H) (') tone, and falling (HL) (∧) tone. There are no rising tones.

(2) ki sa ni ri zo (L L L L L) 'comb'
ku wó la (L H L) 'to become cool'
ku wólá (L H H) 'to lend money'
bi táà (L HL) 'gourds'

Basic Morphology

Luganda has rich, agglutinative morphology. The typical noun has the following structure (PP = pre-prefix; CP = class prefix):

(3) PP CP ROOT
o- mu- wala 'girl'

The 21 noun classes, each one of them marked by a prefix, are normally paired for singular and plural, as in Example (4):

(4)

	CLASS	PP	CP	STEM	
Singular:	1	o-	mu-	wala	'girl'
	7	e-	ki-	bira	'forest'
Plural:	2	a-	ba-	wala	'girls'
	8	e-	bi-	bira	'forests'

The noun class numbering system is standardized for all Bantu languages.

There is concord in a noun phrase between a noun and any dependent adjectives and determiners:

(5a) o- mu- wala o- no o- mu- nene
PP CP1 girl CP1 this PP CP1 big
'this big girl'

Table 2 Vowels

Vowel	*Front*	*Central*	*Back and round*
High	i		u
Mid	e		o
Low		a	

(5b) e- ki- bira ki- no e- ki- nene
PP CP7 girl CP7 this PP CP7 big
'this big forest'

As seen in Example (6), verbs, compared to nouns, are morphologically more complex (NEG, negation; SM, subject marker; TM, tense marker; FUT, future; OM, object marker; ES, extension suffix; APPL, applicative; FV, final vowel):

(6) te- ba- li- ki- n- deet- er- a
NEG SM TM(FUT) OM1 OM2 bring ES (APPL) FV
not they future it me bring for FV
'They will not bring it for me.'

There is also an elaborate tense/aspect system, with distinct negative and positive paradigms:

(7)

Tense/aspect	**Positive**	**Negative**
Past:	nnalaba	saalaba
Near past:	nnalabye	saalabye
Immediate past:	ndabye	sirabye
Present:	ndaba	siraba
Near future:	nnaasoma	siisome
General future:	ndiraba	siriraba

Basic Syntax

The basic word order in unmarked declarative sentences is subject-verb-object:

(8a) a- ba- wala ba- a- lab- a e- m- bwa
PP- CP2- girl CP2- PAST- see- FV PP- CP9- dog
'The girls saw the dog.'

(8b) e- m- bwa y- a- lab- a a- ba- wala
PP- CP9- dog CP9- PAST- see- FV PP- CP2- girl
'The dog saw the girls.'

Typically, the head precedes its modifier: e.g., in noun phrases, nouns precede determiners and adjectives (see Examples (5a) and (5b)).

See also: Bantu Languages; Tone: Phonology; Uganda: Language Situation.

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Luhmann, Niklas (1927–1998)

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Niklas Luhmann, founder of sociological systems theory, is known within linguistics for the central role of communication within his theory. Within Luhmann's framework, modern society becomes a complex system of communications, with communication serving as a system's basic element and a means of maintaining its distinction from its environment. For Luhmann, communication is a synthesis between information (selection from various referential meanings), utterance (selection from various intentional acts), and understanding (observations of difference between utterance and information).

Luhmann was born December 8, 1927 in Lüneburg, Germany. At age 17, he served in the Luftwaffe and was captured by Americans. After graduating from the University of Freiburg in 1949, he worked in public administration at Lüneburg Administrative Court, developing a file-card system, then at the Ministry of Education of Lower Saxony, working on war reparations. His free time was spent reading Descartes and Kant, among others. In 1960, he married Ursula von Walter, with whom he had three children. In 1961, Luhmann left public administration to study the sociology of Talcott Parsons, a leading systems theorist, at Harvard. Developing his own systems theory, Luhmann taught at Hochschule für Verwaltungswissenschaften in Speyer from 1962 to 1965, before being offered a position at the Sozialforschungsstelle of the University of Münster. In 1966, after two of his earlier works were accepted as thesis and habilitation, Luhmann earned the title of professor. He first lectured at the University of Frankfurt and was appointed full professor of sociology at the newly founded University of Bielefeld, where he served until 1993.

Luhmann, a controversial figure in sociology, particularly for his antihumanistic views, defined a system as a boundary between itself and its complex exterior, or environment. Communication enacted the boundary, by selecting and processing a finite amount of information based on meaning (*Sinn*), the unity of difference between actuality and potentiality, and thereby reducing complexity. Communication also allowed systems to continually reproduce themselves from previously selected elements via a process termed 'autopoiesis,' a term borrowed from cognitive biologists Humberto Maturana and Francisco Varela, meaning self-creation. Social systems are autopoietically closed in that their operation is not determined from the outside. Instead, environmental resources must first be appropriated before contributing to the system's reproduction. Communication based on a unique binary code (i.e., *legal/illegal*) about the system and the environment allows such contact. Social and conscious systems, which were for Luhmann distinct systems, each work according to their own code. Language, one interface between these two distinct systems, is a medium that involves verbal or nonverbal signs that regulate the difference between information and utterance via a process of symbolic generalization.

Luhmann detailed his theory in more than three dozen books, dealing with such diverse subjects as mass media, law, and love. *Social systems* (1995) was considered to be the introduction to his theory. His 2-volume magnum opus *Die Gesellschaft der Gesellschaft* appeared in 1997. Also of note was *Theorie der Gesellschaft oder sozialtechnologie. Was leistet die Systemforschung?* ('Theory of society or social technology: what does systems research accomplish?' Habermas and Luhmann, 1971), a joint publication with critical theorist Jürgen Habermas of the Frankfurt School of Sociology, of which more than 35 000 copies sold in a few years. In addition, works such as Rasch (2000) and Harrison (1995) provided introductions to Luhmann's theory.

Luhmann died November 6, 1998, but not before adding substantially to the fields of linguistics and sociology, particularly as studied in Germany, Japan, and Eastern Europe.

Luhmann is also remembered by his appearance as a character in Paul Wühr's *Das falsche Buch*, together with Ulrich Sonnemann, Johann Georg Hamann, and Richard Buckminster Fuller.

See also: Habermas, Jürgen (b. 1929).

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Luick, Karl (1865–1935)

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Karl Luick was born in Floridsdorf near Vienna in 1865. He studied English, French, and German at the University of Vienna, where he received his Ph.D. in 1888. His Habilitation (D.Litt.) followed only two years later. In 1893, he became the first Professor of English Philology at the University of Graz. He remained there until 1908, when he returned to Vienna. From 1925 to 1926 he was Rektor (President) of the University of Vienna; in 1935 he retired from his chair, dying in the same year.

Luick published widely both in linguistics and in literature, as was customary then (his bibliography in Kastovsky *et al.*, 1988 comprises 223 items). Although he also wrote a *Deutsche Lautlehre* (1904) that came out in three editions, he is best known for his diachronic work on the English language. His major works are *Untersuchungen zur englischen Lautgeschichte* (1896), *Studien zur englischen Lautgeschichte* (1903), and *Historische Grammatik der englischen Sprache* (1914–1940), of which the pages 797–1149 on consonantism were edited by Friedrich Wild and Herbert Koziol and published posthumously. Luick's historical grammar is a presentation of the history of English sounds from Indo-European times down to the 19th century. He had originally also planned volumes on the history of word forms and on the history of constructions, but these remained unwritten. As a Neogrammarian at heart, he was pleased about the regularity with which sound laws work. However, in his book of 1896, he had already begun formulating structuralist thoughts, recognizing the functional load of a linguistic element, the essence of the phoneme, and the concept of minimal pairs.

The structuralist thought of the 'sound system,' with its stress on the proximity or distance of a single sound to or from its neighboring sounds, led Luick to a reinterpretation of the English Great Vowel Shift that operated on long vowels from the 15th to the 17th century, namely, as a 'push-chain' or 'displacement' theory, as opposed to the 'drag-chain' theory advocated by Jespersen in 1909. Luick also proposed a new explanation for the lengthening of Middle English short high vowels in open syllables, according to which they were first lowered and then lengthened. It must be stressed that Luick never started from a uniform, idealized pronunciation but always took the whole spectrum of dialectal variation into consideration. In fact, he was one of the first to have done this.

See also: Jespersen, Otto (1860–1943); Paul, Hermann (1846–1921).

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Lukas, Johannes (1901–1980)

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Johannes Lukas was born on October 7, 1901, in Fischern bei Karlsbad (Karlovy Vary), Bohemia. He attended the University of Vienna, studying Egyptology and African and Oriental languages and culture, while also studying piano at the Vienna Conservatory. Among his professors was Eyptologist and Africanist Wilhelm Czermak. Lukas obtained a doctorate in African languages in 1925. After three years as assistant at the Vienna Museum für Völkerkunde (Ethnology), he spent two years as a tutor at Al-Azhar University. Here he became acquainted with many students from Central African countries, some of whom became Lukas's informants in the first scientific studies of their native languages.

In 1932–1933, as a research fellow of the International African Institute (London), Lukas conducted fieldwork on Kanuri (Saharan), and in 1937 published the seminal grammatical work on that language. After a brief stay at the School of Oriental and African Studies (SOAS) in London, he was accepted in 1934 into the Department of African Studies at the University of Hamburg. Here he taught under Africanist Carl Meinhof, while conducting his postdoctoral (Habilitation) studies and beginning to put into writing his findings on the Saharan and Chadic languages of the Lake Chad area. Lukas's linguistic studies were interrupted by his wartime service, which he spent in Berlin at the Auslands-Hochschule (Foreign University). He resumed teaching in Hamburg and in 1954 succeeded August Klingenheben as Director of the Department of African Studies (now the Institut für Afrikanisitik und Äthiopistik). He held this position until his retirement in 1970.

The languages of the Lake Chad area were Lukas's primary research interest throughout his career. An early project was to compile and analyze linguistic data collected by 19th century traveler Gustav Nachtigal. In 1936, he proposed the Chado-Hamitic (now Chadic, with some alterations) language family as a member of the Hamito-Semitic (Afroasiatic) phylum, and in 1951 he proposed the existence of the East Saharan family (now Saharan). From 1952–1973, Lukas devoted lengthy field trips to conducting the first modern linguistic studies of many languages of the Chadic and Saharan families. Among these are Kanuri (Central Kanuri) and Tubu (Tedaga), both Saharan, and the Chadic languages Bole (Bolanci), Bade, Musgu, Logone (Lagwan), Mokolo, Buduma, and Giziga (North and South). On these he wrote numerous groundbreaking descriptive and comparative works. In the 1960s, he brought particular attention to tone in African languages, a field about which much remains to be discovered. Lukas continued to study and write on African languages well after his retirement in 1970. He died on August 4, 1980, in Hamburg.

See also: Afroasiatic Languages; Chadic Languages; Meinhof, Carl Friedrich Michael (1857–1944); Nilo-Saharan Languages.

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Luo

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One of the major Nilotic (Nilo-Saharan) languages in terms of number of speakers, Luo (also known as Nilotic Kavirondo), is spoken by approximately 3.5 million people mainly in western Kenya, northern Tanzania, and eastern Uganda. Together with Acholi, Adhola, Alur, Kumam, and Lango, Luo forms the Southern Lwoo cluster within the Western Nilotic branch of Nilotic. The Luo orthography was developed at the beginning of the 20th century. There is a growing body of literature in this Nilotic language, which is also used in the educational system in Kenya.

Luo is among the few Nilotic languages that has also been studied in detail by native speakers, e.g., Okoth-Okombo (1982) and Omondi (1982). One of the pioneers of African linguistics, Archibald Tucker, also produced a grammar of Luo, published posthumously as Tucker (1994). As shown in these studies, Luo has a classical two-tone system with downdrift, downstep, as well as upstep. As is

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common in a wide range of languages ranging from Senegal to Ethiopia, it also has vowel harmony based on the position of the tongue root. Luo appears to have retained relatively few prototypical Nilotic features at the morphosyntactic level, presumably as a result of contact with Niger-Congo languages at different periods in time. One stratum, which seems to have affected all Southern Lwoo languages, appears to be due to contact with Ubanguian (Niger-Congo) languages. Another, more recent stratum resulted from intensive contact between Luo and neighboring Bantu (Niger-Congo) languages (cf. Rottland and Okoth-Okombo, 1986; Dimmendaal, 2001; and Storch, 2003).

One manifestation of the intensive lexical and structural borrowing from Bantu is the development of noun class prefixes in Luo. In addition to borrowed prefixes, one finds prefixes that developed from nominal roots, as in *dhó-lúô* 'the Luo language' (from *dhok* 'mouth'); *jà-lúô/jò-lúô* 'Luo person (sg/pl)' from *jal* (sg), *jol* (pl) 'guest, stranger'.

The common constituent order in Luo is SVO. Other members of the Lwoo cluster, such as Anywa or Päri, allow for OVS order and they inflect postverbal subjects with (ergative) case. Luo does not have case marking. Consequently, although VS order may be used in Luo to express presentative focus with intransitive predicates, the postverbal subject is not inflected for case. Compared again to Anywa and Päri, Luo has a reduced system of verbal derivation, using prepositions instead to modify the valency of verbs. On the other hand, Luo developed tense marking on the verb, parallel to neighboring Bantu languages.

See also: Kenya: Language Situation; Nilo-Saharan Languages; Uganda: Language Situation.

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Luria, Aleksandr Romanovich (1902–1977)

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Born in Kazan, Luria studied medicine and social sciences at the University of Kazan. His early interest in psychology was stimulated mainly by German neo-Kantian philosophy and philosophical hermeneutics (Dilthey) and psychoanalysis (in 1922, he founded a psychoanalytic association in Kazan), as well as by the reflexology of V. Bexterev. In 1923 he was invited to join the activities of the Institute of Psychology in Moscow. In 1924 Luria met L. S. Vygotskiĭ; he worked with him and under his decisive influence for the next 10 years, until Vygotskiĭ's death in 1934. With Vygotskiĭ, Luria took part in the founding of the so-called 'cultural-historical school' in psychology. Referring to ideas of Marxist philosophy, Vygotskiĭ and his school tried to establish objective foundations of the human mind and considered the sociocultural environment as a necessary condition of human psychic activity. The role of language in human phylogeny and ontogeny was crucial for Vygotskiĭ: Language (as a universal tool) was considered to be a main condition of human behavior and thinking. The ideas of the cultural-historical school were elaborated in a critical dialogue with the ideas of K. Bühler and J. Piaget. One of Luria's first projects was the examination of children's linguistic reactions (Luria, 1927).

In a collaborative work with Vygotskiĭ, Luria discussed the behavioral patterns of a 'primitive' mind (child, uneducated person) (Luria and Vygotskiĭ, 1930). Political repression (Luria had to abandon his fieldwork in Central Asia) and Vygotskiĭ's early death interrupted the development of cultural-historical psychology.

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Developing the view of language as a tool and regulator (Luria, 1961), he provided the first outlines of neurolinguistics (Luria, 1975). Luria combined in his neurolinguistic research the structuralist ideas of R. Jakobson and N. Troubetzkoy (paradigmatics and syntagmatics, distinctive features) and generative linguistics with the methods of neuropsychology and neurophysiology.

See also: Aphasia Syndromes; Bühler, Karl (1879–1963); Jakobson, Roman (1896–1982); Language Development: Overview; Psycholinguistics: Overview; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Vygotskii, Lev Semenovich (1896–1934).

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Luther, Martin (1483–1546)

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Evaluating Martin Luther's (**Figure 1**) role in the development of German numbers among the recurrent challenges undertaken by language historians. Among 18th- and 19th-century academics, there was a firm consensus in most quarters that Luther was indeed the 'Father of the German language.' Such a judgment was colored by confessional interests that were seen promoting the notion of Standard German as 'a Protestant language,' a label which, depending on the context, could be either praise or vilification. More recently, the issue has been gradually de-confessionalized. While the assertion of his linguistic paternity of Standard German is untenable, what and how Luther wrote still earns him a place among the most important masters of the German language. His writings – in particular his translation of the Bible – had tremendous influence on how German was spoken and written. This article will touch on three areas: (1) his vernacular literary output, most importantly his translation of the New Testament; (2) his vernacular, its sources and impact; and (3) a summary evaluation of the relation of Luther's German to contemporaneous German languages.

Luther was educated at schools in Magdeburg and Eisenbach and studied the arts at the University of Erfurt. He lectured first on moral philosophy and later on sacred scripture at the University of Wittenberg. A short list of Luther's vernacular writings includes theological treatises, biblical commentaries, sermons, polemical tracts, correspondence, hymn texts, and *Table Talk* – transcribed, revised, and published conversations between Luther and his dinner guests, distributed as devotional reading. It also includes his translations of books of the Bible. His facility in Greek and Hebrew, acquired through private study and tutorial, were commendable by the standards of the day. His translation of the New Testament occurred with the assistance of Philip Melanchton, a professor of Greek at Erfurt, and

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Figure 1 Martin Luther.

others, using Erasmus's Greek-Latin edition (1516), the so-called *textus receptus*. This German New Testament was published in 1522. Translation of the Old Testament proceeded at a slower pace. The Pentateuch was published in 1523; and the Psalter, in 1524. It was not until 1534 that Luther published an entire Bible (including a translation of the Greek Old Testament deuterocanonical literature).

Luther's interest in translating the Bible into the vernacular from the sacred languages points immediately to the scholarly movement that provided him with the tools to do just that: Renaissance humanism. This movement originated in Italy but spread to Germany in the last quarter of the 15th century. Humanism had significant impact on the study of languages, ancient and vernacular. Although many Renaissance humanists sided with Luther during the religious controversies of the 16th century, Luther himself cannot be judged a humanist. However, his efforts at translating the Bible into the vernacular, among other projects, made him their beneficiary and sometime ally inasmuch as both he and they were attracted to Hebrew and Greek. Both were also critical of the medieval Latin used in theology and of the accuracy of the Vulgate, the canonical Latin translation of the Bible in use at the time. Because the humanists had for some decades developed and encouraged the study of Greek and Hebrew (*see* **Reuchlin, Johann (1455–1522)**), Luther had the tools at his disposal to learn the languages, to critique the Vulgate itself, and to develop a new understanding of why and how to read the Bible that would be a central tenet of the Reformation in Germany. The principle that church authority and Christian truth were founded *sola scriptura,* on the Bible alone, made Holy Writ's availability through a vernacular translation not just a matter of convenience, but of life and death.

But this would be a translation into what sort of German? Luther's significance for the history of the German language rests in largest part on the German into which he translated the Bible. His education across various dialectic divides in Germany inspired him to apply a widely understandable German he could find. He began with a German from close to home, namely that used in the Meissen court of the electors of Saxony. Meissen is not far from where Luther was born and reared; the Saxon elector Frederick was among Luther's staunchest princely supporters. Nonetheless, this language could only serve as Luther's starting point in that it was a language developed by lawyers and scribes for their professional work and was thus not entirely suitable for capturing the breadth and flavor of biblical and theological expression. Luther was fortunately able to turn to the vernacular theological and mystical texts of several late medieval German writers, who, beginning with Meister Eckhart (ca. 1260–1327/28), had contributed to making the German vernacular more theologically sophisticated. None of this reliance, however, should distract one from Luther's own genius. He was a master of the German language; his own writing and translating is marked with passion and precision.

At the same time, he could not transcend all linguistic divisions in the empire: for example, into the 17th century, Luther's Bible was itself translated into Low German for Protestant populations in the north that found the Saxon tendencies of the vocabulary foreign. His translating did occasion some controversy, in part due to the day's religious disputes, but also touching upon serious questions concerning the translator's art. Accused of both clumsy literalism and tendentious paraphrasing, Luther responded to his critics in 1530 with a treatise on translating (*Ein Sendbrief vom Dolmetschen*). In it Luther argued that good scriptural translating must be inspired by faith itself. The translator must adhere to the original texts, but without depriving the vernacular of its natural cadence and melody. These principles of translation helped him explain his insertion of the word *allein* into Romans 3:28, resulting in the human person's theological justification "by faith *alone*." It also explained why in the angelic salutation (Luke 1:28) he used *Holdselige* in reference to Mary instead of *voll Gnade,* the latter being a more common German rendering at the time, but one too Latin-bound (*gratia plena*) for Luther's taste. In fact, he admitted a real

preference for the even more homely, idiomatic translation *du liebe Maria:* had the angel greeted her in German, that is what he would have said.

In determining the historical significance of Luther's Bible on the German language, one historian has recently emphasized that *what* was translated was more important than *by whom*. In the Christian West, the vernacular Bible – as no other text until very recently, read and listened to daily by members of the Christian faith – could not but have had influence on the languages in which it appeared, as for example the King James Version has had on English. Cautious recent scholars stress that much of Luther's German, however, was established by the time he used it in his translation, and other aspects of modern Standard German developed after the mid-16th century. It can be stated axiomatically that the press, becoming as it did so widely used by the forces of Protestantism and Catholicism in the sixteenth century and beyond, was the technology most responsible for the transformation of all early modern Christianity. A full exposition of printing's implications for the history of language is beyond the scope of this article. However, suffice it here to note the obvious: the printed vernacular Bible, to the extent that it fixed a popular text and allowed for its wide dissemination, provides the historian of language with a standard against which to judge the malleability and the resistance of language speakers to the standardization of their language.

In the case of the Luther Bible and the development of a standardized German, comparison between the 1522 and 1545 editions of the New Testament is particularly revealing. For example, it shows that orthography is an area of the written language on which Luther had no wide or lasting influence. This is also an area which printers themselves took to changing as they set the type and varied spelling and punctuation as they saw fit. Another kind of limit to the appropriation of Luther's German can be seen in the resistance to the unaccented terminal *e* in some German plurals and dative singulars, characteristic of the Saxon dialect and used in the Luther Bible. The so-called *Luther-e* was long resisted in the German-speaking Catholic South, where it had not been common before the Reformation and where it was resisted from the 16th-century onward for confessional reasons. Allied with the southern Germans, the Allemanic speakers in southwestern Germany and the Swiss Confederation resisted many aspects of Luther's German, but in these more Protestant regions, clearly without the confessional overtones. And today for reasons quite removed from the earlier ecclesiastical ones, the *Luther-e* is gradually disappearing from both spoken and written German everywhere.

In conclusion, Luther's influence on the development of early high German should not be underestimated. Luther had an unparalleled ear for the German language and was a vigorous author. But it should also be understood, in contradistinction to the enthusiasm for his linguistic paternity on the part of many 19th-century linguists, that most of the language characteristics of the Luther Bible had precedent before 1522. Furthermore, early high German was still to develop into the literary new high German of the 17th century and later. In this regard, Werner Besch, a distinguished historian of the German language, has suggested a simile with which to understand where Luther belongs in the pantheon of German writers: Besch uses the image of the medieval retable, in which the patron is painted modestly into the corner of a tableau filled with the artistic representation of some laudable religious event or theological truth: the subject of this painting is the vernacular Bible; the modest patron, Luther. Besch notes that that is an understanding of Luther's role in the development of the vernacular that Luther himself would surely accept.

See also: Reuchlin, Johann (1455–1522); Translation: History.

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Luxembourg: Language Situation

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The Grand Duchy of Luxembourg, a country of 2586 km^2 and with a population in 2004 of 462 690 inhabitants, is a unique case in Europe, where the totality of the indigenous population is to some extent trilingual. The languages spoken are Luxembourgish (Luxembourgeois), German, and French. Approximately 30% of the population consists of immigrants, the majority of Portuguese or Italian background. Luxembourgish is the symbol of national identity and is the only cultural feature that clearly distinguishes the citizens from those of neighboring countries. Since 1938 naturalization has been made dependent on its knowledge.

Luxembourgish is a Germanic language related to Low German (Low Saxon). To some it is a dialect and has been classified as a partially standardized language, given its restricted literary tradition, or as a neglected minority mother tongue. It includes many loanwords from German and French, lacks vocabulary and styles to handle technological concepts, and given that it is primarily an oral mode of expression, has fairly elementary syntax with few subordinate clauses and restricted tense, mood, and case variations.

It was made a compulsory subject in elementary education in 1912, with an official spelling and textbook, and was declared the national language in 1983, but its use, though widespread, is limited. French and German, together with Luxembourgish, are official languages and all three are vehicles of instruction for the whole school population at different stages of the education system.

The system is intended to bring everyone in the country to some level of trilingual proficiency. In compulsory nursery education at ages four and five, Luxembourgish is used exclusively. This is partially intended to help anchor national identity and also to integrate immigrant children. In primary school, German gradually replaces Luxembourgish. German is taught as a subject in Grade 1 of primary school and is the first language of reading and writing. By the end of primary school the transition must be made to the exclusive use of German for all subjects except language lessons in Luxembourgish and French. The third language, French, is introduced as a subject in Grade 2 of primary education. The education system operates on the principle of introducing children to schooling in the majority language, Luxembourgish, followed by a related but distinct L2 (German) as a subject, but not a medium of instruction for nonlanguage subjects, in Grade 1, prior to a gradual elimination of the L1 in favor of the L2 as medium of instruction. The L3 (French) is introduced as a subject in primary education, in preparation for its use as a medium in secondary education. Mathematics is taught entirely through French in secondary schools and depending on the orientation, French may increase as a medium for nonlanguage subjects as schooling progresses, while the use of German decreases.

This complex system results in a working knowledge of three languages for the entire population. Proficiency depends on the type of education followed, those in general education having higher proficiency in French through more contact hours with the language than those in technical or vocational education.

Luxembourgish is the language most used (but not exclusively) by all social categories for oral exchanges in private life, but in written private communication the order of preference is German, French, Luxembourgish. In the work sphere the order of preference for oral communication is Luxembourgish, French, German, but for written communication the order is French, followed by German, with no Luxembourgish. With the administration citizens have the right to use any of the three languages and the administration is expected to reply in whichever of the three is preferred by the citizen "where possible." Since the legal system operates entirely in French it is not always possible to use another language.

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See also: Education in a Multilingual Society; French; German; Language Education Policy in Europe; Luxembourgish; Multilingualism: Pragmatic Aspects.

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Luxembourgish

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In 1939, Luxembourg naturalization was made dependent on knowledge of the language. In 1984, *Lëtzebuergesch* was legally acknowledged as the national language of the Grand Duchy. Syntactically, *Lëtzebuergesch* is similar to German, although case loss has reduced the possibilities of object-verb-subject (OVS) ordering. Parataxis predominates, though hypotaxis is frequent (subject-object-verb (SOV) ordering). In morphology, nominative and accusative have fallen together, assuming accusative form. Third-person pronouns show northern /h/ (NHG = New High German): *hien*, *hatt, hinen* NHG *er*, *es*, *ihnen* 'he, it, them'. Noun plurals are most commonly in <e(n)>, though other patterns occur. There is, however, no plural in <s>. The pronouns *mir* NHG *wir* 'we' and *dir* NHG *ihr/Sie* 'you (plural and polite)' arise from false division of verbal endings. NHG *uns* 'us' appears as *äis/eis* (koine) and *ons* (Luxembourg city). Adjectival comparison is chiefly with *méi* NHG *mehr* 'more', though occasional synthetic forms occur. In compound nouns, a linking <s> is frequently present, e.g., *Plastikstut* NHG *Plastiktasche* 'plastic bag', *Autosdier* NHG *Autotür* 'car door'. Tenses comprise present (*ech gesinn* NHG *ich sehe*), perfect (*ech hu gesinn* NHG *ich habe gesehen*), and pluperfect (*ech hat gesinn* NHG *ich hatte gesehen*); the future can be periphrastic (*ech wäerd gesinn* NHG *ich werde sehen*), but is mainly a function of the present tense (*ech kommen iwwermar* NHG *ich komme übermorgen*). Some indicative (*ech gesouch* NHG *ich sah*) and subjunctive (*ech geséich* NHG *ich sähe*) preterites also occur, though these are more frequent in the north (Oesling); pluperfect subjunctives (*ech hätt gesinn* NHG *ich hätte gesehen*) occur frequently. The auxiliary verb *ginn* NHG *geben* = *werden* 'give = become' is used to form analytical conditionals (*ech géif gesinn* NHG *ich würde sehen*) and passives (*ech gouf gesinn* NHG *ich wurde gesehen* 'I was seen'). Present tense first-person singulars inflect <e(n)> (*ech sangen* NHG *ich singe*).

Consonants are in voiced/voiceless opposition, with final neutralization. The High German sound shift is incomplete (*dat* NHG *das/dass* 'that', *op* NHG *auf* 'on', *Pond* NHG *Pfund* 'pound', *Korf* NHG *Korb* 'basket', *Dall* NHG *Tal* 'valley') and intervocalic /g/ is often absent, e.g., *Won*, *Vull* NHG *Wagen*, *Vogel* 'wagon, bird'. Some velarization of dental nasals (*zéng*, *brong* NHG *zehn*, *braun* 'ten, brown') is also present, though this is stronger in the north of Luxembourg, which also has velarized plosives, e.g., *Lekt*, *néck* (koine *Leit*, *net*) NHG *Leute*, *nicht* 'people, not'. Medial and final /s/ combinations are liable to palatization (*Meeschter* NHG *Meister* 'master'), more strongly in the southwest (*Fënschter* NHG *Fenster* 'window'). Final /n/ is 'mobile' (*Eifler Regel*) and is retained only before a following vowel, /h/ or a dental (*den Dag*, but *de Mann* NHG *der/den Tag*, *der/den Mann*), or at juncture. Middle High German (MHG)

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<î, û, iu> (*îs* 'ice', *trîben* 'drive', *hûs* 'house', *liute* 'people', *hiulen* 'howl') appear as /ɛːi/ or /ɑi/ (*Äis* NHG *Eis*, *dreiwen* NHG *treiben*), /ɑːʊ/ (*Haus* NHG *Haus*), /ɑi/ or /ɑʊ/ (*Leit* NHG *Leute*, *haulen* NHG *heulen*), and <ie, uo, üe> (*brief* 'letter', *fuoz* 'foot', *vüeze* 'feet') appear as /ei/ (*Bréif* NHG *Brief*), /ou/ (*Fouss* NHG *Fuß*), /ei/ (*Féiss* NHG *Füße*). MHG <ei, ou> (*vleisch* 'flesh', *boum* 'tree') have the reflexes /eː/ (*Fleesch* NHG *Fleisch*), /aː/ (*Bam* NHG *Baum*). However, all of these examples may also be subject to allophonic variation, and shortened forms are common. A shift of West Germanic /i/ to /a/ is also a strong characteristic of the language: *Wand* NHG *Wind* 'wind'. Derounding (*Läffel*, *fënnef* NHG *Löffel*, *fünf* 'spoon, five') and lowering (*domm* NHG *dumm* 'stupid') are also found, as are elements of 'correption' (an abrupt rise and fall of vowel pitch; only vestigially present in Luxembourgish, e.g., *stäif/steif* NHG *steif* 'stiff') and 'circumflexion' (a rise and fall of vowel pitch, accompanied by up to three times normal length), e.g., *den Hals* (nom./acc.) NHG *der/den Hals* 'neck' (not circumflected); *dem Haals* (dat.) NHG *dem Hals(e)* (circumflected). Another element is the *Schwebelaut* (a lengthening of consonants), which occasionally marks a difference in meaning, e.g., *voll* (short /l/, MHG *vol*) NHG *voll* 'full', *voll* (long /lː/, MHG *volle)* NHG *voll* 'drunk'.

Sample Text

Bei äis goufe vun 1825 [uechtzénghonnertfënnefanzwanzeg] bis haut verschidde Schreifweise gebraucht, déi all hiert Guddes haten.

/bɑi ɛːis 'gɑufə fʊn 'uəxtseŋˌhɔnərtˌfənəfɑn'tsvɑntseç bɪs haʊt fɛr'ʃɪdə 'ʃrɑifvɑizə gə'brɑuxt dei ɑl hiːrt gʊdəz 'haːtən/

NHG *Bei uns wurden von achtzehnhundertfünfundzwanzig bis heute verschiedene Schreibweisen gebraucht, die alle ihr Gutes hatten.*

'In Luxembourg from 1825 up to today various spelling systems were used, which all had their good points'.

See also: Germanic Languages; Luxembourg: Language Situation.

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Samuel David Luzzato (often abbreviated as Shedal) was born in Trieste, Italy, on August 22, 1800, and died in Padua on September 30, 1865. He was educated in the best Talmudic traditions by Abraham Eliezer ha-Levi, the Chief Rabbi of Trieste. His father, himself an accomplished Talmudist, taught him Hebrew at home.

Luzzatto's precocious talents were noticed early in his childhood. At the age of 11 he undertook to write a Hebrew grammar in Italian, translated into Hebrew

<î, û, iu> (*îs* 'ice', *trîben* 'drive', *hûs* 'house', *liute* 'people', *hiulen* 'howl') appear as /ɛːi/ or /ɑi/ (*Äis* NHG *Eis*, *dreiwen* NHG *treiben*), /ɑːʊ/ (*Haus* NHG *Haus*), /ɑi/ or /ɑʊ/ (*Leit* NHG *Leute*, *haulen* NHG *heulen*), and <ie, uo, üe> (*brief* 'letter', *fuoz* 'foot', *vüeze* 'feet') appear as /ei/ (*Bréif* NHG *Brief*), /ou/ (*Fouss* NHG *Fuß*), /ei/ (*Féiss* NHG *Füße*). MHG <ei, ou> (*vleisch* 'flesh', *boum* 'tree') have the reflexes /eː/ (*Fleesch* NHG *Fleisch*), /aː/ (*Bam* NHG *Baum*). However, all of these examples may also be subject to allophonic variation, and shortened forms are common. A shift of West Germanic /i/ to /a/ is also a strong characteristic of the language: *Wand* NHG *Wind* 'wind'. Derounding (*Läffel*, *fënnef* NHG *Löffel*, *fünf* 'spoon, five') and lowering (*domm* NHG *dumm* 'stupid') are also found, as are elements of 'correption' (an abrupt rise and fall of vowel pitch; only vestigially present in Luxembourgish, e.g., *stäif/steif* NHG *steif* 'stiff') and 'circumflexion' (a rise and fall of vowel pitch, accompanied by up to three times normal length), e.g., *den Hals* (nom./acc.) NHG *der/den Hals* 'neck' (not circumflected); *dem Haals* (dat.) NHG *dem Hals(e)* (circumflected). Another element is the *Schwebelaut* (a lengthening of consonants), which occasionally marks a difference in meaning, e.g., *voll* (short /l/, MHG *vol*) NHG *voll* 'full', *voll* (long /lː/, MHG *volle)* NHG *voll* 'drunk'.

Sample Text

Bei äis goufe vun 1825 [uechtzénghonnertfënnefanzwanzeg] bis haut verschidde Schreifweise gebraucht, déi all hiert Guddes haten.

/bɑi ɛːis 'gɔufə fʊn 'uəxtseŋˌhɔnərtˌfənəfɑn'tsvɑntseç bɪs haʊt fɛr'ʃɪdə 'ʃrɑifvɑizə gə'brɑuxt dei ɑl hiːrt gʊdəz 'haːtən/

NHG *Bei uns wurden von achtzehnhundertfünfundzwanzig bis heute verschiedene Schreibweisen gebraucht, die alle ihr Gutes hatten.*

'In Luxembourg from 1825 up to today various spelling systems were used, which all had their good points'.

See also: Germanic Languages; Luxembourg: Language Situation.

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Luzzatto, Samuel David (1800–1865)

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Luzzatto's precocious talents were noticed early in his childhood. At the age of 11 he undertook to write a Hebrew grammar in Italian, translated into Hebrew

the life of Æsop, and wrote exegetical notes on the Pentateuch. After the death of his mother in 1814, Luzzato had to do household work in addition to helping his father in his work. But this did not prevent him from pursuing his intellectual and creative interests. By 1815 he had amassed a collection of 37 poems that became the basis of his poetry collection *Kinnor Na'im* (1825). He completed a full treatise on the Hebrew vowels, *Ma'amar ha-Nikkud,* in 1817, and the following year he started to write his *Torah Nidreshet*, a philosophical-theologial exposition of the Torah in 24 essays, which was translated into Italian and published in 1879 by M. Coen-Porto. In 1829 he was appointed professor at the rabbinical college of Padua.

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See also: Hebrew, Israeli; Ibn Ezra, Abraham (ca. 1089–1164); Ibn Janah (ca. 990–1050); Saadya Gaon (882–942); Semitic Languages.

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Lying, Honesty, and Promising

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Promising and asserting are both speech acts, and as such they are regulated by practical norms as well as linguistic norms (e.g., norms of etiquette). Here we shall be concerned with the **moral** norms that govern these speech acts.

Informational Theories

Many philosophers take the view that the morality of an act – its rightness or wrongness – is a function of the harms and benefits this act brings to the agent and to others. These philosophers also hold that the main way promises and assertions affect the interests of human beings is when they serve as sources of information. So, they conclude, both promises and assertions are morally significant principally because, and in so far as, they purport to offer information. Let's call this the 'informational' view of the morality of promise and assertion. On this view, morality censures an unfulfilled promise or a false assertion because these deeds can harm others by giving them false information.

We are all obliged to take due care not to lead others to form false beliefs, at least where this might be harmful to them (Scanlon, 1998: 300). This obligation means that we must not set out to deceive people by making them insincere promises or telling them things that we know to be false. But it also means that we mustn't change our minds about what we promised we were going to do (without good reason) or make an assertion without adequate evidence. Someone who accepts a promise standardly forms the expectation that the promisor will perform, and they may rely on this expectation to their detriment. Someone who believes an assertion is similarly exposed, if this assertion turns out to be false. I'll deal

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with informational theories of promising first and then move onto assertion.

Information theorists of promissory obligation fall into two categories. First, there are those (sometimes called 'expectation theorists') who argue that we are all under an obligation not to mislead others about how we shall behave in the future and that this obligation is why we ought not to make them promises that we do not fulfill (Scanlon, 1998: Chap. 7; Thomson, 1990: Chap. 12). Second, there are those who argue that we are obliged to fulfill our promises only where there is an up and running practice of fulfilling one's promises: prior to this, there is no promissory obligation. For such 'practice theorists,' promissory obligation is conventional (Hume, 1978: Book III, Part II, Section V; Anscombe, 1981; Prichard, 1968).

Practice theories differ from expectation theories in their account of how the obligation to keep a promise arises from our interest in having correct information about how other people are going to behave. According to the practice theorist, we can create expectations of performance in our audience by uttering words like "I promise" only where there is an actual practice of making such utterances true, i.e., where people have come to feel some obligation to make them true. So one can't explain the moral significance of this utterance simply by reference to the expectations it creates. Still the practice theorist agrees with the expectation theorist that we are obliged to maintain the practice of promise-making where it exists, because this practice serves our information interest and thereby aids the coordination of behavior.

Turning now to assertion, there is much controversy among philosophers of language about the extent to which language in general, and assertion in particular, involve social convention. For example, Davidson maintains that "there is no known, agreed upon, publicly recognizable convention for making assertions" (Davidson, 1984: 270), and he thinks the same is true of promising. On the other hand Fried urges that the promisor has "intentionally invoked a convention whose function it is to give grounds – moral grounds – for another to expect the promised performance" and "to abuse that confidence is like . . . lying: the abuse of a shared social institution that is intended to invoke the bonds of trust" (Fried, 1980: 16). Thus, there is a division among information theorists of the morality of assertion parallel to that between expectation and practice theorists of promissory obligation.

It has long been debated whether there is any morally significant difference between lying to someone and deceiving them in a more oblique fashion (e.g., by way of false implicatures, deliberate ambiguity, or by leaving misleading evidence around, etc.). And this debate reflects a genuine ambivalence in our everyday attitudes. Where we feel entitled to deceive others – for the sake of their health for instance – many of us are still inclined to go to the trouble of trying to avoid telling a direct lie. On the other hand, where such deception is wrong, the wrong is seldom thought to be mitigated just because a direct lie was avoided.

There is a tradition of thought, however, according to which lying is always wrong, but we are sometimes permitted to deceive in other ways (Aquinas, 1966: II-II 110 a3; MacIntyre, 1995: 309–318). But many contemporary writers have expressed doubts about whether the manner of the deception could by itself make a serious moral difference (Sidgwick, 1981: 354–355; (Williams, 2002: 100–110). An expectation theorist who maintains that the wrong of lying is only the wrong of deception will share these doubts (Scanlon, 1998: 320). On the other hand, a practice theorist of the morality of assertion may allow that, in addition to any harm he does to the person he deceives, the liar is abusing and thereby undermining a valuable social practice (Kant, 1991: 612), namely the use of language to convey information.

Noninformational Theories

Until now, we have been assuming that what makes an act, including a speech act, wrong is, some harm that it does to those it wrongs in the end. There are many moral theorists who reject this assumption, and it is open to them to propound noninformational theories of what is wrong with a lie or a broken promise. Rather than attempt a comprehensive classification of noninformational theories, I shall consider one such theory of promising and one such theory of lying, both taken from Kant.

Take promising. Kant locates the moral significance of promising not in the information interests it serves but rather in the fact that it grants the promisee a certain moral authority over the promisor: it entitles the promisee to require the promisor to perform and thus deprives the promisor of a certain moral freedom (Kant, 1996: 57–61). If I promise you a lift home, I am obliged to give you a lift unless you release me from this promise. This line of thought was central to classical theories of promissory obligation (Hobbes, 1991: Chap. 2) and has found an echo in some contemporary writing (Hart, 1967: 60). For these authors, a breach of promise wrongs the promisee, whether or not it also harms them by inducing false expectations in them, because it flouts the moral authority that the promisee has acquired over the promisor.

On this view, informational theories miss what is distinctive about promising. There are many ways of influencing people's expectations and of co-ordinating your behavior with others (Raz, 1977: 215–216). For example, one can predict that one will do something or even express a sincere intention to do something, while making it clear that one is not promising. To promise to do it is to express the intention to undertake an obligation to do it (Searle, 1969: 60), an obligation that mere expressions of intention or predictions do not bring down on the speaker, however firm or confident they may be. If I predict, on excellent evidence, that I shall be going in your direction because the police will be towing my car in that direction, I have not committed myself to making it true that I shall be going in your direction when that prediction threatens to be falsified.

Turning now to lying, Kant makes a firm distinction between wrong one does in deceiving someone and the wrong one does by lying (Kant, 1996: 182–184). One can lie without deceiving (e.g., when one knows one won't be believed) and one can deceive without lying. On deceiving someone you may wrong them but, according to Kant, when you lie, the person you wrong is yourself. The liar violates a duty to himself (though this violation need not involve harming himself). On explaining the nature of this wrong, Kant follows thinkers like Aquinas in attributing a natural teleology to speech:

> communication of one's thoughts to someone through words that yet (intentionally) contain the contrary of what the speaker thinks on the subject is an end that is directly opposed to the natural purposiveness of the speaker's capacity to communicate his thoughts (Kant, 1996: 182).

In lying, one violates a duty to oneself by abusing one's own faculties, by using oneself "as a mere means (a speaking machine)" (Kant, 1996: 183). It may be possible to capture Kant's basic idea here without reference to natural teleology or duties to self if we adopt a certain view of assertion.

One can distinguish two currently influential theories of assertion. In the first, inspired by Grice, asserting that p is a matter of uttering something with the intention of thereby getting your audience to believe that p, by means of their recognition of that very intention (Grice, 1989). If something like this statement is correct, the moral significance of an utterance *qua* assertion must lie solely in the effect it is trying to achieve, i.e., in the effect that the assertion has on the beliefs of others. In the second view of assertion, asserting that p is more like promising that p. In promising, someone intentionally undertakes an obligation to perform: undertaking such obligations is what promising consists in. Similarly to assert a certain proposition is, on this view, to intentionally undertake an obligation to ensure that one asserts only what is true (Dummett, 1973: 299–302) and, perhaps, to defend one's assertions as true, should they be challenged (Brandom, 1983). Putting oneself under such obligations is what assertion consists of.

Once the second view is in play, we can say what is wrong about lying without making reference to the effect that the lie has on others. A liar is in the wrong not because he is wronging someone but because he knows that he is taking on obligations he cannot discharge. In this way, lying differs from deception that wrongs the deceived when it harms their interests in some way. Deception is an offence against others while lying is an offence against truth. Provided morality is not solely concerned with harm, this offence may be counted as a moral wrong.

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Lyons, John, Sir (b. 1932)

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John Lyons' first degree was in classics at Cambridge (1953), where he returned in 1956 to research on the semantics of Plato's vocabulary for knowledge and understanding, supervised by W. S. Allen. Allen introduced him to Chomsky's *Syntactic structures,* which provided a technical framework in which he could formulate the structural relationships among his selected words. In 1957, he moved to a lectureship at the School of Oriental and African Studies (SOAS), where his local Ph.D. supervisor was R. H. Robins. His views on linguistics and on the philosophy of language were also strongly influenced by C. E. Bazell, then Head of Department. His thesis, published in 1963, "was probably the first work in semantics ... to be based overtly on the principles of generative grammar" (Lyons, 1995a:233).

Lyons spent a year (1960–1961) working on a machine-translation project directed by F. W. Householder at Indiana, where he could supplement his knowledge of the history of linguistics, culminating in European studies in the 19th and early 20th centuries. There he experienced the very different U.S. tradition of linguistic study in a major center for linguistics and anthropology.

After his year in the United States, Lyons lectured at Cambridge until 1964, when he was appointed to the Chair of General Linguistics in Edinburgh. Lyons, a 32-year-old professor, with a cropped American haircut, remarkable intellectual and physical energy, and a dazzling French wife, caused comment in the ancient Scottish university. An inspiring teacher, he remodeled his department and its postgraduate program, attracting a galaxy of student talent, as he did subsequently in Sussex; a remarkable number of his students went on to chairs in linguistics. Meanwhile, he wrote the two substantial books that cemented his reputation: *Introduction to theoretical linguistics* (1968) and *Semantics* (1977), and, as founding editor of the *Journal of Linguistics,* established it as a leading international journal by judicious choice of initial contributors.

In 1976, Lyons moved to a new Chair of Linguistics at the University of Sussex, where he produced a stream of publications, notably *Language, meaning and context* (1981). During this period he was involved in the British Academy, the Social Sciences Research Council, and the European Science Foundation. In 1981, appointed Pro-Vice-Chancellor at a moment when university funding was savagely reduced, he was immediately involved in planning the elimination or reduction in size of several departments, a bruising and distressing experience.

In 1984, he was elected Master of Trinity Hall, Cambridge. Within months of his return to Cambridge, cancer was diagnosed and a series of courses of chemotherapy and radiotherapy began, lasting for years. Despite the debilitating effects of the intermittently progressing disease and its treatment, the requirements of college administration, and new demands for fund raising brought about by funding reductions, Lyons brought out several papers and three books: a 3rd edition of *Chomsky* (1991a, with major revisions and a new chapter); *Natural language and universal grammar* (1991b, collected earlier papers, with copious updated notes); and *Linguistic semantics* (1995b, a more detailed and technical version of Lyons, 1981). His personal history was published in 2002. He retired in autumn of 2000.

Lyons' approach to semantics is stated clearly: "I take a very broad view of semantics: for me ... linguistic semantics is the study of all the different kinds of meaning that are systematically encoded in natural languages.... I include within linguistic semantics a good deal of what many ... would classify as pragmatics" (1981:9). In part, his eclecticism may be attributed to a rare breadth and depth of knowledge of classical linguistics, combined with 19th and 20th century European, as well as U.S., linguistic traditions, but he did not confine his reading, thinking, or research to 'linguistics' narrowly conceived. He contributed to psycholinguistic research (cf. Lyons and Wales, 1966; Lyons, 1981, 1996) and to stylistics (1980). His work is informed by anthropology, as well as by the philosophy of language and of mind. Repeatedly, he urged formal semantics to expand its interests beyond a narrow 'intellectualist' concern

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In 1976, Lyons moved to a new Chair of Linguistics at the University of Sussex, where he produced a stream of publications, notably *Language, meaning and context* (1981). During this period he was involved in the British Academy, the Social Sciences Research Council, and the European Science Foundation. In 1981, appointed Pro-Vice-Chancellor at a moment when university funding was savagely reduced, he was immediately involved in planning the elimination or reduction in size of several departments, a bruising and distressing experience.

In 1984, he was elected Master of Trinity Hall, Cambridge. Within months of his return to Cambridge, cancer was diagnosed and a series of courses of chemotherapy and radiotherapy began, lasting for years. Despite the debilitating effects of the intermittently progressing disease and its treatment, the requirements of college administration, and new demands for fund raising brought about by funding reductions, Lyons brought out several papers and three books: a 3rd edition of *Chomsky* (1991a, with major revisions and a new chapter); *Natural language and universal grammar* (1991b, collected earlier papers, with copious updated notes); and *Linguistic semantics* (1995b, a more detailed and technical version of Lyons, 1981). His personal history was published in 2002. He retired in autumn of 2000.

Lyons' approach to semantics is stated clearly: "I take a very broad view of semantics: for me ... linguistic semantics is the study of all the different kinds of meaning that are systematically encoded in natural languages.... I include within linguistic semantics a good deal of what many ... would classify as pragmatics" (1981:9). In part, his eclecticism may be attributed to a rare breadth and depth of knowledge of classical linguistics, combined with 19th and 20th century European, as well as U.S., linguistic traditions, but he did not confine his reading, thinking, or research to 'linguistics' narrowly conceived. He contributed to psycholinguistic research (cf. Lyons and Wales, 1966; Lyons, 1981, 1996) and to stylistics (1980). His work is informed by anthropology, as well as by the philosophy of language and of mind. Repeatedly, he urged formal semantics to expand its interests beyond a narrow 'intellectualist' concern

with the truth of propositions, to include the expression of subjectivity in the use of deixis, aspect, tense, and modality (and to consider not only alethic but also epistemic and deontic modality) (Lyons, 1977, 1981, 1995a,b). Benveniste's (1966) concern with the expression of subjectivity in language is consistently echoed by Lyons (1977, 1981, 1982, 1987, 1995a,b). Hence, he is conscious that features such as intonation and voice quality may systematically affect utterance meaning, expressing the speaker's subjective stance toward the content of the proposition (Lyons, 1977, 1987, 1995b). Detailed attention to deixis, particularly as the way the young child arrives at the notion of reference, permeates his work (1975, 1977, 1978, 1981, 1982, 1983, 1991, 1995b).

By virtue of his publications, his influential teaching, and his support for linguistics both nationally and internationally, Lyons held for 40 years a unique position in British linguistics. His contribution was formally recognized in 1987 when he was knighted 'for services to linguistics.'

See also: Benveniste, Emile (1902–1976); Chomsky, Noam (b. 1928); Householder, Fred W., Jr. (1913–1994); Robins, Robert Henry (1921–2000).

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M

Ma, Jianzhong (1844–1900)

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Jianzhong Ma (马建忠), born on February 9, 1845 in the present-day Jiangsu Province, was a grammarian as well as a diplomat. He attended a missionary school in Shanghai and became a polyglot in Latin, Greek, English, and French. In August 1876 he went to study in Paris, France, majoring in diplomacy and law. In March 1880 he returned to China after completing his doctorate. He worked for the State Council and was subsequently assigned several important diplomatic missions abroad. In 1885, he worked in Shanghai, attending to post-Sino-French war business. Due to policy differences with his superiors, he resigned from the civil service post and dedicated himself to academic research. He died of a fever in 1900 in Shanghai. His best known work is *Mr Ma's grammar.*

In his lifetime, Ma was a very active reformist. His ever-lasting fame, however, lies in his academic work known as *Mashi Wentong* (马氏文通) in Chinese, which can be translated as 'Mr Ma's grammar.' It is generally recognized in linguistic circles that his grammar was the first systematic treatment of Chinese grammar. Some even argue that it was the first grammar of Chinese ever written. *Mashi Wentong*, originally entitled *Wentong*, was first published in 1898 by Shanghai Commercial Press. It was an immediate success. In 1954, Zhang Xichen edited an annotated version and renamed the work *Mr Ma's grammar with commentaries;* it was published by China Publishing House. The punctuated version published by Commercial Press in 1983 bore the well-known title *Mr Ma's grammar.* The latest version was edited by Lü Shuxiang and Wang Haifen, who called their edited work *Mr Ma's grammar with a reading guide*, and was published by Shanghai Education Press in 1986.

It is now generally held that, although the Chinese grammatical phenomena had been consciously analyzed in pre-*Mr Ma's grammar eras*, the examination was sporadic and fragmented. It was *Mr Ma's grammar* that gave the first, comprehensive treatment of Chinese grammatical phenomena. The author was versed both in archaic Chinese and in classic Chinese philology. His grammar, however, was as a whole not an integration of all the previous studies with which he was familiar. Rather, he was more influenced by Western grammars than by similar works in Chinese. Some commentators argue that *Mr Ma's grammar* drew substantial insights from French grammars, such as *General and rational grammar: The Port-Royal grammar*, by Antoine Arnauld and Claude Lancelot, edited and translated by Jacques Rieux and Bernard E. Rollin, published in 1975 by Mouton. So in essence, *Mr Ma's grammar* should be regarded as a successful attempt at applying Western grammatical theories to Chinese linguistic context. The language data Ma used for illustrations were from archaic written Chinese texts. The body of work consists of 10 chapters, the bulk of which analyzes parts of speech. Words are first divided into two major classes: *shi zi* (i.e., lexical words) and *xu zi* (i.e., functional words). *Shi zi* and *xu zi* are further classified into five and four subclasses, respectively; the former are (1) noun, (2) pronoun, (3) verb, (4) static, and (5) adjective and the latter are (1) preposition, (2) connective, (3) particle, and (4) interjective.

More than 100 years have passed since *Mr Ma's grammar* first appeared, a time long enough to assess its contribution. The traditional Chinese philology (called *xiao xue*, 小学) was threefold: *wen zi* (i.e., orthography), *yin yun* (i.e., phonology), and *xun gu* (i.e., lexical semantics). There was no place for grammar. *Mr Ma's grammar* enriches the traditional philology with a fourth component. To many Chinese grammarians, it was quite revolutionary, and it even updated the traditional discipline to the level of modern linguistics. Some of its critics, on the other hand, accused its author of over-Westernizing Chinese grammar. The Western notions of parts of speech and the syntactic categories such as subject, predicate, object, etc., should be scrutinized to see if they were appropriate for Chinese. To Ma, "Every country has its own grammar, and all grammars are more or less

similar. They differ from one another in sounds and writing scripts" (1983: Introduction).

See also: Arnauld, Antoine (1612–1694); China: Language Situation; Lancelot, Claude (1615–1695); Port-Royal Tradition of Grammar.

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Macedonia: Language Situation

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Introduction

The Republic of Macedonia (*Republika Makedonija*) is bordered by Bulgaria on the east, Greece on the south, Albania on the west, and Kosovo (administered under UNSCR 1244 as of this writing, 30 October 2004) and Serbia on the north. Although efforts to create a Macedonian literary language and an independent Macedonian state date from the 19th century, it was only on August 2, 1944 that Macedonian was declared the official language of the People's Republic of Macedonia (later the Socialist Republic of Macedonia) as one of the constitutive republics of the former Yugoslavia. The Macedonian parliament adopted its own constitution, thereby declaring independence, on November 17, 1991.

Language and the Law

The original preamble of the constitution defined Macedonia as the national state of the Macedonian people (*makedonskiot narod*) with full civil equality for the Albanians, Turks, Vlahs, Roms, and other nationalities (*nacionalnosti*). On November 16, 2001, the preamble was replaced with Amendment IV, which states that the citizens of the Republic of Macedonia, the Macedonian people, as well as citizens living within its borders who are part of the Albanian, Turkish, Vlah, Serbian, Romani, Bosniac, and other peoples, constitute the Republic of Macedonia. Articles 7, 48, and 54, and Amendments V and VIII guarantee minority language rights in administration, education, culture, and the judiciary. A key difference between the articles and the amendments is that while the articles guaranteed official use of minority languages in districts with a "majority or significant number" of minority language speakers, the amendments specify a significant number as 20%.

Language and Identity

In the two post-independence Macedonian censuses (1994 and 2002), six languages were in official use: Macedonian, Albanian, Turkish, Romani, Serbian (Serbo-Croatian), and Aromanian. The translation of census documents into Romani and Aromanian in 1994 represented the first such official use of these languages anywhere. **Table 1**, compiled from figures published by the Bureau of Statistics of the Republic of Macedonia (*Zavod za Statistika Republika Makedonija*), gives the figures for declared ethnicity in 1994 and 2002 and declared mother tongue in 1994. Almost all non-Macedonians speak Macedonian as a second language.

The category *Muslim*, dating from the Yugoslav period, was used by some Slavic-speaking Muslims who considered Macedonian, Serbian, and Croatian nationalities to be Christian. With the break-up of Yugoslavia, Bosniac activists claimed all Slavic-speaking Muslims as Bosniac. The figure in the 2002 census signals an acceptance of this identity by some Macedonian-speaking Muslims. Some Macedonian speakers declared Turkish or Serbian nationality on the basis of religious feeling (Muslim and Serbian Orthodox, respectively). The distinction between Muslim as an ethnic identity and as a religious identity is illustrated by the fact that in the 1994 census, a small number declared Muslim nationality and Catholic religion. Egyptians (in Macedonian, *Egipkani* or *Gupci*) are almost all Albanian-speaking Muslims (1856) or Macedonian-speaking Christians (961) whose ethnonym is cognate with the English *Gypsy*. These are descendants of long-settled, formerly Romani-speaking populations, but members of this group claim Egyptian descent. Judezmo (Judeo-Spanish) was spoken in Macedonia until March 11,

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Table 1 Population of the Republic of Macedonia by declared nationality (1994, 2002) and mother tongue (1994)

	1994	*%*	*1994-MT*	*%*	*2002*	*%*
Macedonian	1 295 964	66.5	1 332 983	68.5	1 297 981	64.18
Albanian	441 104	22.9	431 363	22.3	509 083	25.17
Turkish	78 019	4.0	64 665	3.3	77 959	3.85
Romani	43 707	2.3	35 120	1.8	53 879	2.66
Vlah	8601	0.4	7036	0.4	9695	0.48
Serb	40 228	2.0	/	/	35 939	1.78
Muslim	15 418	0.8	*	*	–	–
Bosniac	6829	0.4	/	/	17 018	0.84
Egyptian	3080	0.2	*	*	–	–
Bulgarian	1682	0.1	1448	0.1	–	–
Greek	368	0.0	–	–	–	–
Yugoslav	595	0.0	/	/	–	–
Serbo-Croat	*	*	35 095	1.8	*	*
Other	9797	0.4	38 222	1.8	20 993	1.04
Total	1 945 932	100	1 945 932	100	2 022 547	100

* Category does not apply.
– Figure unavailable.
/ Figure pooled with 'Serbo-Croat'.

1943, when 7200 Jews were deported by the Nazis and their collaborators to the Treblinka death camp. Only 2% survived, and most of the survivors went to Israel, but a very small Jewish community was reestablished on December 26, 1944 and lives in Macedonia today.

Language in Education and the Media

Prior to 1991, as today, Albanian and Turkish had primary and secondary education, post-secondary teacher training, and academic departments at the University of Skopje. During the 1980s, support for Albanian- and Turkish-language education was curtailed, and the Albanian teachers' college was closed in 1986. In 1995, Albanian educational activists organized a controversial Albanian-language university in Tetovo. In 2001, with support from the international community, Southeast European University (SEEU) was opened in Tetovo with teaching in Albanian, Macedonian, and English. The percentage of Macedonian-speaking students rose from 1% when school began in 2001 to 26% in the fall of 2003. There are a few elementary school classes offering Romani and Aromanian.

The government-supported Albanian and Macedonian newspapers are both daily, the Turkish one is triweekly. There are private publications of various size and distribution in all of the minority languages. In 1989, only Turkish and Albanian were represented on Macedonian public television: each had 130 minutes a week. In 1991, TV programming in Romani and Aromanian was begun at 30 minutes a week. By 2000, the figures for minority-language programming on national public television (MTV 2) were 400 minutes a week for Albanian, 370 minutes a week for Turkish, and 60 minutes a week each for Romani, Aromanian, and Serbian (*Antena* No. 133, supplement to *Dnevnik*, October 27, 2000). Of 57 private local TV licenses given out in 1998 (after the passing of the Communications Act of 1997), 21 were for stations using minority languages, and of 80 private radio licenses, 26 had all or most programming in minority languages.

Macedonian in Neighboring Countries

Macedonian-speaking minorities living in neighboring countries have almost no linguistic rights. The one exception is a group of Christian Macedonian-speaking villages near Lake Prespa in southeastern Albania, which have primary education in Macedonian through grade 4. Radio programming in Macedonian is also permitted in Albania, as are cultural organizations. Macedonian activists in Greece and Bulgaria have organized cultural associations and published leaflets and newspapers, but they have been subject to government harassment.

See also: Balto-Slavic Languages; Education in a Multilingual Society; Ethnolinguistic Vitality; Identity in Sociocultural Anthropology and Language; Identity: Second Language; Language Policy in Multilingual Educational Contexts; Media and Language: Overview; Minorities and Language; Minority Languages: Education; Politics and Language: Overview; Slavic Languages; Standardization.

Language Maps (Appendix 1): Map 138.

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Introduction

Modern Macedonian (*makedonski* in Macedonian) is a South Slavic language (Slavic, Indo-European). It is not to be confused with Ancient Macedonian, an Indo-European language of uncertain (but not Slavic) affiliation, whose most famous speaker was Alexander the Great. Macedonian is closest to Bulgarian and Serbian.

Macedonian is descended from the dialects of Slavic speakers who settled in the Balkan peninsula during the 6th and 7th centuries C.E. The oldest attested Slavic language, Old Church Slavonic, was based on dialects spoken around Salonica, in what is today Greek Macedonia. As it came to be defined in the 19th century, geographic Macedonia is the region bounded by Mount Olympus, the Pindus range, Mounts Shar and Osogovo, the western Rhodopes, the lower course of the river Mesta (Greek Nestos), and the Aegean Sea. Many languages are spoken in this region, but it is the Slavic dialects to which the glossonym *Macedonian* is applied. The region was part of the Ottoman Empire from the late 15th century until 1912 and was partitioned among Greece, Serbia, and Bulgaria (with a western strip of villages going to Albania) by the Treaty of Bucharest in 1913. The modern Republic of Macedonia, in which Macedonian is the official language, corresponds roughly to the southern part of the territory ceded to Serbia plus the Strumica valley. The population is 2 022 547 (2002 census). Outside the Republic, Macedonian is spoken by ethnic minorities in Albania, Bulgaria, Greece, and Kosovo as well as by émigré communities elsewhere. Greece does not recognize the existence of its ethnic minorities, Bulgaria insists that all Macedonians are really Bulgarians, Albania refused to include questions about language and ethnicity in its last census (2001), and there has not been an uncontested statistical exercise in Kosovo since 1981, so official figures on Macedonian speakers outside the republic are unavailable; estimates range to 700 000.

History

Modern Macedonian literary activity began in the early 19th century among intellectuals attempting to write their Slavic vernacular instead of Church Slavonic. Two centers of Balkan Slavic literacy arose, one in what is now northeastern Bulgaria, the other in what is now southwestern Macedonia. In the early 19th century, all these intellectuals called their language *Bulgarian*, but a struggle emerged between those who favored northeast Bulgarian dialects and those who favored western Macedonian dialects as the basis for what would become the standard language. Northeast Bulgarian became the basis of standard Bulgarian, and Macedonian intellectuals began to work for a separate Macedonian literary language. The earliest known published statement of a separate Macedonian linguistic identity was by

Language Maps (Appendix 1): Map 138.

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Gjorgji Pulevski 1875, but evidence of the beginnings of separatism can be dated to a letter from the teacher Nikola Filipov of Bansko to the Bulgarian philologist Najden Gerov in 1848 expressing dissatisfaction with the use of eastern Bulgarian in literature and textbooks (Friedman, 2000: 183) and attacks in the Bulgarian-language press of the 1850's on works using Macedonian dialects (Friedman, 2000: 180).

The first coherent plan for a Macedonian standard language was published by Krste Misirkov in 1903. After World War I, Macedonian was treated as a dialect of Serbian in Serbia and of Bulgarian in Bulgaria and was ruthlessly suppressed in Greece. Writers began publishing Macedonian works in Serbian and Bulgarian periodicals, where such pieces were treated as dialect literature, but some linguists outside the Balkans treated Macedonian as a separate language. On August 2, 1944, Macedonian became the official language of what was then the People's Republic of Macedonia. Bulgaria recognized both the Macedonian language and its own Macedonian minority from 1946 to 1948. From 1948 to the 1960s, some Bulgarian linguists continued to recognize Macedonian as a separate Slavic language. When Macedonia declared independence from Yugoslavia in 1991, Bulgaria immediately recognized the state, but not the nationality or the language. In February 1999, the Bulgarian government officially recognized the Macedonian standard language.

Dialects

Macedonian dialects are divided by a major bundle of isoglosses running from northwest to southeast along the River Vardar, swerving southwest at the confluence of the Vardar and the Crna and continuing down the Crna and into Greece southeast of Florina (Lerin in Macedonian), then bifurcating north of Kastoria (Kostur in Macedonian) so that the remaining Macedonian-speaking villages in Greece and Albania form a transitional zone. The western region is characterized by a relatively homogeneous central area and five groups of peripheral dialects centered on towns around the western periphery. The eastern zone has six dialect groups with no regional center. Standard Macedonian is based on the west-central dialects, with elements from other dialects.

Orthography and Phonology

Macedonian is written in the Cyrillic alphabet, following the principle of one letter per sound, as in Serbian Cyrillic. Macedonian has three distinctive letters – ќ, ѓ, s – representing the voiceless and voiced dorsopalatal stops and the voiced dental affricate, respectively. Macedonian Cyrillic љ is, according to the standard (Koneski, 1967: 115), used to represent clear /l/ before consonants, before back vowels, and word-finally, where it can contrast with velar /ł/, e.g., бела [beła] 'white' F versus беља [bela] 'trouble'. The contrast is neutralized before front vowels, where only clear /l/ is prescribed. Some educated speakers pronounce љ as palatal [λ], influenced by the Serbian pronunciation of this letter and the fact that the same reflex occurs in the Skopje town dialect. Standard Macedonian has a five-vowel system (a, e, i, o, u), and most dialects outside the west-central area also have schwa, but of different origins in various regions. There is no letter to represent schwa in Macedonian Cyrillic; when it is necessary to do so, an apostrophe is prescribed. The western Macedonian dialects and the standard are characterized by fixed antepenultimate stress, e.g., *vodéničar* 'miller', *vodeníčari* 'millers', *vodeničárite* 'the millers'.

Morphology, Syntax, and Lexicon

Macedonian has masculine, feminine, and neuter genders. Aside from plurals and pronouns, the only remnants of Slavic substantival inflection in Macedonian are the masculine and feminine vocative, which are becoming obsolete; oblique forms for masculine proper names and a few kinship terms and other masculine animates, all facultative; and a quantitative plural for inanimate nouns, which is used only sporadically, except in a few common expressions. Macedonian has a three-way opposition in the postposed definite article – *-t-*'neutral', *-v-*'proximal', *-n-*'distal' – although these meanings can be based on speaker attitude as well as physical distance. The example in (1) is illustrative.

(1) raki-vče-to ќe mu go
brandy-DIM-DEF.NEUT FUT him.DAT it-ACC
dade-š na prijatel-ov od
give-2.sing.PRES to friend-DEF.MASC.PX from
naš-a-na vo frizer-ov
our-FEM.FEM.DEF.DS in freezer-DEF.MASC.PX
'Give the little [glass of] brandy to our friend here, from that [brandy] of ours, in the freezer here.'

The article attaches to the end of the first nominal in the noun phrase, i.e., not adverbs:

(2) ne mnogu po-star-i-te deca
not much COMP-old-PL-DEF.PL children
'the children that are not much older'

edna od mnogu-te naš-i zadač-i
one from many-DEF.PL our-PL problems-PL
'one of our many problems'

The Macedonian verb has both aorist/imperfect and perfective/imperfective aspectual oppositions, but imperfective aorists are now obsolete. Perfective presents and imperfects occur only after one of eight modal particles, although perfective presents can also be used in negative questions. Macedonian also developed a new perfect series using the auxiliary *ima* 'have' and an invariant neuter verbal adjective. The synthetic pasts are marked for speaker confirmation, while the descendent of the Common Slavic perfect, using the old resultative participle in *-l* (no longer a true participle, since it cannot be used attributively), is not marked for speaker confirmation and is therefore used when the speaker cannot or will not vouch for the truth of the statement, e.g., because it was reported: *Toj beše vo Moskva* 'He was in Moscow' (I saw him or accept the fact as established). *Toj bil vo Moskva* 'He was in Moscow' (I heard it but was not there myself, do not vouch for it, or do not believe it [nuance depending on context]). The verbal *l*-form is also used in the inherited Slavic pluperfect (with the auxiliary 'be' in the imperfect) and the inherited conditional (after invariant modal particle *bi*). The new pluperfect is formed with the imperfect of 'have' and the neuter verbal adjective. The new conditional uses the invariant future marker *ќe* plus the imperfect (perfective or imperfective) of the main verb. The *bi*-conditional tends to be used for hypothetical apodoses and the *ќe* conditional for irrealis.

The following are distinctively Macedonian lexical items: *saka* 'want, like, love', *bara* 'seek', *zboruva* 'speak', *zbor* 'word', *deka* 'that (relativizer)', *vaka* 'in this manner', *olku* 'this many'.

See also: Balkans as a Linguistic Area; Balto-Slavic Languages; Bulgarian; Church Slavonic; Clitics; Demonstratives; Dialect Chains; Diminutives and Augmentatives; Evidentiality in Grammar; Future Tense and Future Time Reference; Identity and Language; Language Change and Language Contact; Macedonia: Language Situation; Mood and Modality in Grammar; Old Church Slavonic; Perfectives, Imperfectives, and Progressives; Perfects, Resultatives, and Experientials; Standardization; Tense, Mood, Aspect: Overview; Tense; Word Stress.

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This article surveys the state of the art in corpus-aided translation research, teaching, and practice. The 1990s saw a surge of interest in these areas as corpora became more easily accessible, corpus linguistics established itself as a central approach to the study of language, and translation/interpreting gained prominence as core subjects in academic curricula and learned discussions.

The focus of this article is specifically on translation, and it distinguishes between descriptive (including theoretical) aspects (Descriptive Translation Studies, or DTS for short) and applied (didactic and professional) aspects (Applied Translation Studies, or ATS for short). In so doing, we follow, albeit very superficially, Holmes's (1988) general taxonomy of translation studies.

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Corpus-Based DTS

Precursors and Initiators

In the 1990s, the corpus approach came to be recognized as one of the major research paradigms in descriptive translation studies. Mona Baker (1993) argued that the discipline was at a turning point: the availability of electronic corpora made it possible to think of research directions beyond the simple comparison of an original and its translation, with its by then discredited reliance, implicit or explicit, on the notion of 'equivalence' (*see* **Approaches to Translation, Linguistic**; **Translational Equivalence**). This brought linguistic approaches to translation studies more in line with the so-called cultural turn in translation studies (*see* **Cultural, Colonialism and Gender Oriented Approaches to Translation**) (Lefevere and Bassnett, 1990).

While Baker's paper has generally been regarded as the main inspirer of the corpus-based approach, several precursors and co-founders should also be mentioned; first and foremost, Gideon Toury. Toury's (1980, 1995) target-oriented approach to translation research – which viewed translation as an act that concerns primarily the culture in which a text is translated – had important implications that were taken on by the corpus approach, namely, the downplaying of the source text as the authority against which to evaluate a translation, and the concurrent enlargment of the scope of research to include aspects of the sociocultural environment in which a text is (to be) translated. Much current research in this area seeks textual evidence of the existence of "translation norms" in Toury's sense, i.e., of those sociocultural constraints regulating the behavior of professional translators, which affect the 'acceptability' of any given translation at any given point in time.

Similarly, the search for translation universals is grounded in Toury's notion of "laws of translational behavior." One such law, the "law of growing standardization," for instance, tentatively states that "in translation, textual relations obtaining in the original are often modified [...] in favour of [more] habitual options offered by a target repertoire" (Toury, 1995: 268). Kenny (2001) investigated this hypothesis, using a corpus of original German literary texts translated into English, and reference corpora of the languages in question. She found that 'unusual,' creative collocations indeed tended to be 'normalized' in translation, i.e., in as many as 44% of cases in her corpus, more 'normal' words and expressions were chosen to translate unusual, creative ones.

On the empirical side, precursors to this body of research were Vanderauwera (1985) and Gellerstam (1986). Vanderauwera studied Dutch fiction translated into English between the late 1950s and 1980. In her corpus of around 70 novels (analyzed manually and on paper), she found evidence of normalization at different levels: translators tended to increase the fluency and coherence of their texts, making them more modern and more readable for their target audience and concealing their foreign origin.

Gellerstam (1986) used an innovative methodology involving original novels in Swedish and novels translated from English into Swedish. Corpora of this type, often referred to as 'monolingual comparable corpora,' have been very influential, as we see in the section 'Monolingual Comparable Corpora' (MCC). Gellerstam's aim was to find empirical evidence of *translationese*, i.e., that the Swedish used in translation from English was a special variety of the language heavily influenced by the English of the originals. An area in which translations are clearly influenced by the conventions of their source texts (or the genres the latter belong to) is reporting clauses, where, he found, sequences like *direct speech – subject – verb of saying – adverbial* were much more common in translated than in original Swedish fiction (cf., e.g., the English "'I'll hold it for you,' he said with insulting kindness").

The corpus-based approach to translation studies was thus largely characterized, particularly in its early days, by a target-oriented approach whereby the target text, language, and culture had priority over the corresponding source dimensions. At approximately the same time as Baker (1993), though in a separate line of research, Stig Johansson and colleagues (1994) at the University of Oslo were also creating resources and paradigms that would boost corpus research in translation considerably, with an eye toward the source as well as the target dimensions. In 1994, a research project was launched to build a bidirectional parallel corpus, i.e., a corpus consisting of originals and translations in two languages (the English Norwegian Parallel Corpus, Johansson and Hofland, 1994). While the main impetus for this project had come from contrastive linguistics, this design turned out to be also well-suited to translation studies.

DTS: Major Corpora and Research Results

In this section, we look at several approaches to corpus-based DTS and discuss the major new hypotheses and insights they have contributed to the field. For the sake of clarity, studies are grouped according to the typologies of corpus resources they employed. The reader should be aware, however, that this is no more than a useful artifice of presentation that

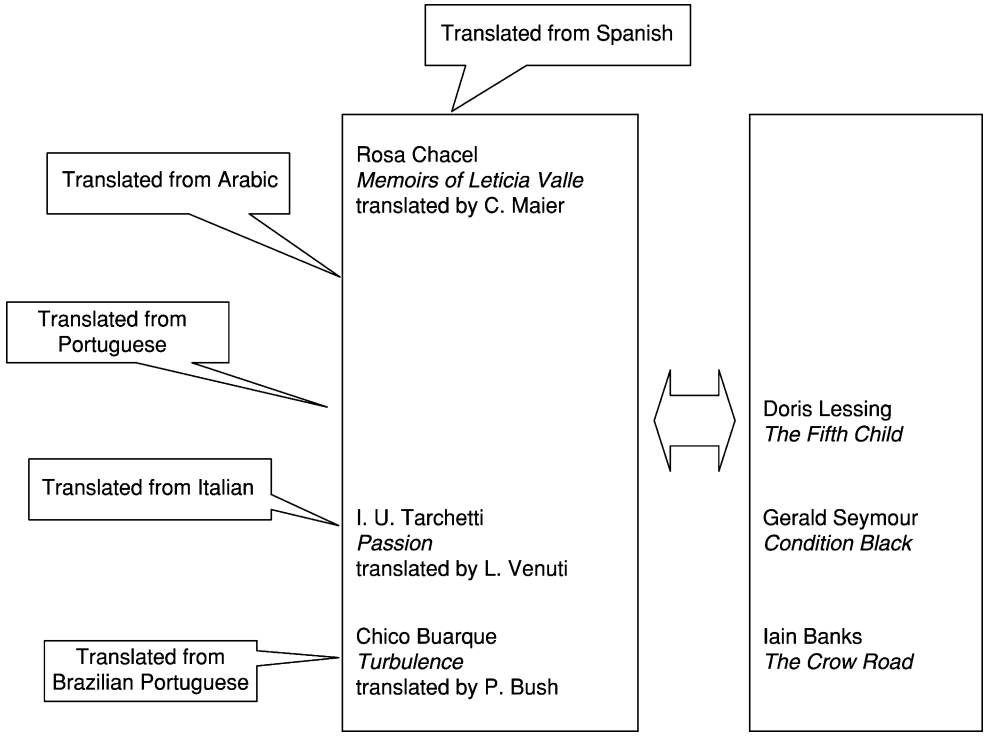

Figure 1 A selection from the English Comparable Corpus (fiction component, Laviosa, 1998).

should not hide the underlying unity of intents and goals as well as the many more or less local differences in corpus design and research methodology.

Monolingual Comparable Corpora (MCC) A monolingual comparable corpus typically consists of two subcorpora of texts in the same language. These are (ideally) similar in all regards except the conditions of production: one subcorpus contains original texts, the other translations. An example of this type of corpus is the English Comparable Corpus (Laviosa-Braithwaite, 1996), developed at UMIST (Manchester). This corpus contains two subcorpora, both in English: one of translated fiction, biographies, newspaper text, and in-flight magazines, the other of comparable original texts in these various subdomains. Figure 1 exemplifies its structure.

Somewhat counterintuitively for the reader who is used to thinking of translation research as an investigation of the relationship holding between a 'source' text (ST) in language A and its translation, or 'target' text (TT), in language B, a monolingual comparable corpus does *not* include the translations' source texts. This follows from the principle, put forward by Baker in 1995, that translation research should undergo a shift of focus, "a shift away from comparing either ST with TT or language A with language B to comparing text production *per se* with translation" (Baker, 1995: 233). The rationale for such a shift is that a comparison of originals and translations along these lines might highlight linguistic patterns in translated texts that differ from those in originals and that are unlikely to result from individual preferences, differences between two language systems, and so on.

Several studies have searched for evidence confirming pre-existing hypotheses on "universal" tendencies or "norms/laws" of translation behavior (Toury, 1995) (*see* **Translation Universals**). Others, taking a more 'corpus-driven' approach (Tognini-Bonelli, 2001), have attempted to identify patterns and to interpret them in terms of (old and) new hypotheses. In what follows, we briefly discuss work related to three such hypotheses, concerning, respectively, *simplification*, *explicitation* (or, more precisely, *explicitness*, [Schmied and Schäffler, 1996]), and (*un*)*typicality* in translation.

Translated Texts Are 'Simpler' Than Originals (Simplification Hypothesis) MCC studies in which this hypothesis – which predates corpus approaches (Blum-Kulka and Levenston, 1983) – was investigated are Laviosa-Braithwaite (1996) and Laviosa (1998). Since the direct observation of shifts between a ST and a TT is not feasible within this approach, this article identifies three features that can be easily searched for and compared across different subcorpora of the English Comparable Corpus (ECC). These

are *sentence length* (the shorter the sentences, the easier the text), *information load* (the fewer the lexical words, the easier the text), and *lexical variety* (the less varied the lexis used, the easier the text). Analyses of the fiction and newspaper subcomponents of the ECC appeared to confirm that translated texts indeed had a lower information load and lower lexical variety than comparable originals. However, while translated newspaper texts in the ECC also featured a significantly lower mean sentence length than their original counterparts, the opposite was true of fiction texts.

Translated Texts Are More 'Explicit' Than Originals (Explicitness Hypothesis) This hypothesis also predates the corpus approach (cf. Blum-Kulka, 1986, on cohesive explicitness in translation). Again making use of the ECC, Olohan and Baker (2000) and Olohan (2001) compared the frequency of (a selection of) optional syntactic elements in originals and translations, the rationale being that the optional explicitation of grammatical relations was likely to result in a more explicit text. Their results highlighted unusually high frequencies of several optional elements in translations as compared with originals. To take just one example from Olohan (2001), translated texts in this corpus clearly favored the pattern 'PROMISE + *that*' over 'PROMISE + *zero*' (*that* is present in 89 out of the total 131 cases), whereas the opposite was true of originals (89 'PROMISE + *zero*' out of the total 135 cases).

Along similar lines, Puurtinen (2004) analyzed the use of explicit clausal connectives (conjunctions, pronouns, adverbs) in a corpus of Finnish children's literature (part of the Corpus of Translated Finnish [Mauranen, 2004]). The corpus contains originals in Finnish and translations from English. It would follow from the explicitness hypothesis that translations should have had a higher frequency of these elements than comparable originals. However, this was not always the case in Puurtinen's data, and results were inconclusive.

Translated Texts Show 'Unusual' Patternings of Typical and Untypical Target Language Features with Respect to Originals ([un]typicality Hypothesis) This hypothesis differs from the previous ones in that it was first developed and investigated within the corpus approach. In this sense, it is truly corpus-driven. It consists of two complementary parts. On the one hand, it predicts that translations will contain patterns that are untypical of the target language (a claim that goes back to Gellerstam (1986) on *translationese*). On the other, it suggests that typical features of the target language that lack obvious linguistic equivalents in the source language will be underrepresented in translation. Work on this hypothesis was carried out by Mauranen (2000), Tirkkonen-Condit (2004), and Eskola (2004), using the Corpus of Translated Finnish. Mauranen (2000: 137) found that a word like *toisaalta* (meaning approximately "on the other hand"), which she described as "highly target-language specific," was much more common in originals than in translations. Similarly, Tirkkonen-Condit (2004) investigated two clitics and a set of Finnish verbs that lack obvious lexicalized equivalents in Indo-European languages. She found that all these elements were underrepresented in translation and showed unusual grammatical and collocational patternings. While those studies were situated toward the lexical end of the lexicogrammatical continuum, Eskola (2004) investigated typical and untypical syntactic structures in a narrative prose subcorpus of the Corpus of Translated Finnish. Findings from this study confirmed those from previous ones with regard to target-language-specific constructions (underrepresented and showing unusual patterning in translation) and further provided evidence of *translationese* (overrepresentation of a source-language typical structure).

Bi- and Multilingual Parallel Corpora (Including Reference Corpora) Bi- and multilingual parallel corpora are collections of originals in language A and their translations in language B (C, D, etc.). While not wholly innovative as a resource for translation research, these corpora differ from single pairs of translated texts inasmuch as (a) they are searchable by means of computerized techniques of analysis, (b) they allow the analyst to abstract away from single texts in an attempt to unveil regularities across a 'representative' body of data (e.g., German literary fiction translated into English, Kenny (2001)), and (c) they may avail themselves of reference corpora of the source and target languages in order to set their analyses against the background of general language use. The aim is, once again, to arrive at generalizations about translation strategies and translation universals/norms/laws. The parallel corpus methodology is sketched in Figure 2.

Issues that have been investigated using this methodology include *sanitization/normalization* (the hypothesis that translated texts are less creative overall than their source texts) and *explicitation/implicitation* (the hypothesis that translated texts are more/less explicit overall than their source texts).

Translated Texts Are Less 'Creative' Than Their Source Texts (Normalization/Sanitization Hypothesis) This hypothesis was investigated by Kenny in

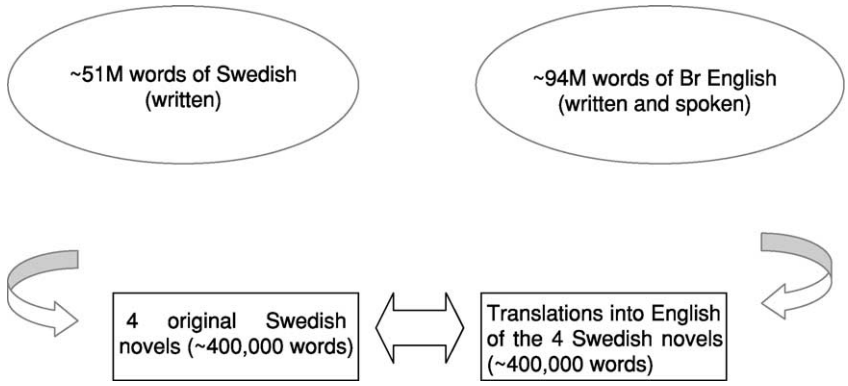

Figure 2 The parallel corpus methodology (exemplificatory data from Danielsson, 2001).

her study based on *Gepcolt*, a corpus of 14 contemporary German novels and their translations into English. Her aim was to find out whether translators "typically draw on more conventional target language resources to replace unconventional [...] lexical features in source language texts" (Kenny, 2001: 111). By isolating instances of lexical creativity in the source corpus with the help of a source-language reference corpus (the Mannheim corpora of the *Institut für deutsche Sprache*, Mannheim) and evaluating the originality of the corresponding target solutions with the help of a target-language reference corpus (the *British National Corpus*), Kenny was able to find evidence of a tendency toward normalization in translation, though she admitted that this was by no means a universal, constant feature.

Translated Texts Are More/Less 'Explicit' Than Their Source Texts (Explicitation Hypothesis) In order to investigate this hypothesis, which is complementary to the 'explicitness' hypothesis, already discussed, researchers have compared source and target texts, looking for evidence of 'explicitating shifts,' i.e., shifts leading to "a rise in the level of cohesive explicitness in the TL text" (Blum-Kulka, 1986: 19). Thus, Øverås (1998) analyzed the first 50 sentences of 20 English novel extracts and their Norwegian translations (from the English Norwegian Parallel Corpus). She looked for such shifts at different rank levels (from word level to clause level) and recorded instances of implicitation shifts, i.e., changes that would result in a more implicit text, thus disconfirming the explicitation hypothesis. This study found confirmation of the explicitation hypothesis (347 explicitating shifts), but the author pointed out that implicitation was also attested (149 implicitation shifts).

Bidirectional Corpora and Mixed Designs As can be seen from the discussion in the previous section, the insights offered by parallel corpora are often complementary to those arrived at through monolingual comparable corpora. Monolingual comparable corpora have provided a new angle from which to look at translated text. But, in the words of Toury (2004: 17), "it is one thing to say that certain regularities were found *in* translation, and something quite different – to claim that the observed regularities were there *because* it is translation." MCC cannot shed any light on the reasons behind the observed patternings. For this reason, a number of studies have taken advantage of *bidirectional*, or *reciprocal*, corpora. These corpora are basically a combination of two parallel corpora assembled according to the same design. Thus, for instance, the pioneering English Norwegian Parallel Corpus used by Øverås (1998) has the structure shown in Figure 3.

Subcomponents A-B and C-D form parallel corpora of English (ST) → Norwegian (TT) and Norwegian (ST) → English (TT), respectively. Since the two corpora were designed so as to be comparable, subcomponents A ↔ D and C ↔ B constitute monolingual comparable corpora of English (O and T) and Norwegian (O and T), respectively. Other combinations are also possible, but they are less relevant to DTS. This corpus design is of particular interest to translation research for two reasons.

First, it allows comparable studies of translation shifts to be carried out in two directions. The study by Øverås (1998) actually consisted of two parts, i.e., the analysis of the first 50 sentences of 20 English novel extracts and their Norwegian translation was complemented with an analysis of 20 Norwegian novel extracts translated into English. Øverås found that the tendency to explicitate/implicitate differed depending on the translation direction: 347 instances of explicitation and 149 instances of implicitation were attested in translation from English into Norwegian, versus 248 instances of explicitation and 76 instances of implicitation in translation from

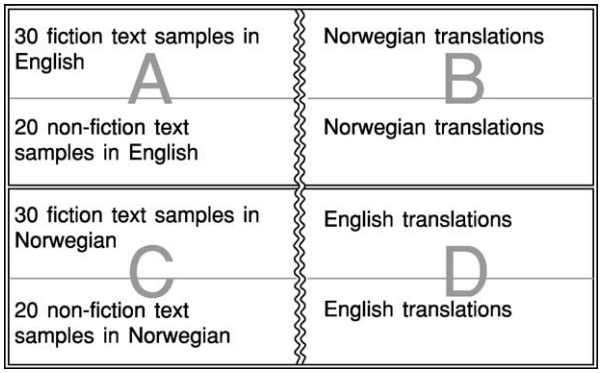

Figure 3 Structure of a bidirectional corpus (the English-Norwegian Parallel Corpus, Johansson and Hofland, 1994).

Norwegian into English (on language- and direction-specific shifts, see Teich, 2003; also the section 'Recent Developments and Ways Forward').

Second, this corpus design made it possible to check hypotheses made on the basis of MCC against the relevant source texts. Thus, for instance, Pápai (2004) studied explicitation in a small corpus of literary and technical writing that consisted of three subcomponents: (a) originals in English, (b) their translations into Hungarian, and (c) comparable Hungarian originals. Her combined analysis confirmed that explicitness/explicitation is indeed a characteristic feature both of the translation process from English into Hungarian and of the resulting translation product. A similar corpus design was adopted by Puurtinen (1998) in her study of readability and ideology in Finnish original and translated children's literature. Here, the English source texts served as a source of explanation for the unusual patternings observed in translated Finnish with respect to original Finnish.

Other bidirectional corpora currently available are, among others, *Compara* for English/Portuguese (Frankenberg-Garcia and Santos, 2003), the *English Swedish Parallel Corpus* (ESPC, Altenberg and Aijmer, 2000), and the *English German Translation Corpus* (Schmied, 2002).

Limits, Recent Developments, and Ways Forward This summary discussion of corpus-based DTS may give the reader an idea of the vitality of the field. In the 1990s, corpus studies revived interest in the linguistic approach to translation research and produced a host of hypotheses about the nature of translation that will keep researchers occupied for years to come. In more recent years, however, several studies have also pointed to a number of limits and possible pitfalls of this body of work. At the same time, more linguistically informed analyses and new research directions have also been undertaken, in an attempt to both deepen and widen the paradigm. These developments give us high hopes for the future of corpus-based DTS.

Limits A first point worth mentioning with regard to the limits of the corpus-based methodology in translation studies regards the difficulty of maximizing the comparability of the various subcomponents and at the same time ensuring that the corpus is representative of a larger, socioculturally plausible set (e.g., 'children's fiction,' 'popular science articles'). These issues apply to corpus linguistics in general but are crucial for translation research, where the variables to be taken into account when designing the corpus are often doubled with respect to monolingual corpus studies and where the corpora used are typically smaller. Bernardini and Zanettin (2004) provided a more thorough discussion of this point.

Another issue that has been the target of some criticism is the tendency for some studies to draw conclusions based solely on frequency counts of very shallow textual features that can be easily and automatically harvested. Mauranen (2002) discussed differences in the patterns of use of certain Finnish connectors in her monolingual comparable corpus, which may be interpretable in terms of a tendency for translators to adhere to local source text stimuli and/or of a complementary tendency not to adopt 'domesticating' strategies at the level of discourse. These differences are rather subtle and would escape a simple frequency count (i.e., the connectors themselves are neither under- nor over-used in translated vs. original texts but are simply used differently).

A similar criticism was voiced by Teich (2003), who pointed out that methods that rely on simple automatic counts of features (e.g., type-token ratio, ratio of grammatical to lexical words, average sentence length) essentially operate at the level of words. She suggested that "the gap between word counts and [...] explanations lying in the specific cognitive processes involved in translation, is simply too wide. Categories of intermediate levels of linguistic abstraction, such as grammatical or semantic categories, would need to be applied in corpus analysis in order to even have a chance of explanation of the variation found in translation" (Teich, 2003: 22–23).

One last criticism of this approach is possibly some overenthusiasm. Several studies that set out to provide only descriptive evidence about translation did not resist the temptation to draw conclusions not warranted by such evidence. Reflections on the

theoretical and methodological implications of this body of work have recently started to appear. These have suggested that claims about translation 'universals' may be better recast in terms of 'laws' and 'norms' (Toury, 1995) or 'memes' (Chesterman, 1997), given the very partial data on which they are by necessity based and given the difficulties of isolating variables and identifying causes for observed regularities. Toury (2004) warned against the risk of inferring universals directly from regularities that can be spotted automatically while stressing that the identification of causes for observed patterns and behaviors is a weak spot of the corpus approach.

In conclusion, it would seem that if insights into translation universals are to emerge from corpus-based research, they are likely to do so from an accumulation of local studies that are restricted in focus and that control as far as possible the explosion of variables that almost by definition characterize translation. The inclusion in the design of a parallel component is also virtually unavoidable if one is to go beyond mere hypotheses about the motivations behind observed patterns.

Recent Developments and Ways Forward Some recent studies have attempted to go beyond the research designs described in this article, constructing innovative corpus resources and testing alternative methodologies of analysis.

One promising new resource that was recently completed at the University of Oslo is a "multiple translation corpus" (Figure 4). This corpus consists of two English originals (a short story and [part of] an academic paper) and 10 translations of these STs into Norwegian. The translations were commissioned from established professionals who worked independently and handed in a draft and a polished version. The 10 translations and the relative source texts are aligned, thus making it possible to observe the range of variation and the effect of individual strategies, abstracting away from or else contrasting literary vs. technical translation.

There is no denying that the resulting product is an artificial construct that does not resemble anything that could exist in reality. This drawback is unavoidable if one wishes to analyze translations that are (a) contemporary, (b) produced independently of one another, and (c) technical as well as literary. An alternative to this design is the multitarget collection of Hans Christian Andersen's short stories and their English translations, discussed, e.g., in Malmkjær (2003). These translations, spanning more than a century, were likely to have been influenced by previous translations of the same texts. Thus, while they provide a rich source of insights about translation in a diachronic perspective, they are less than ideal when the goal is to control variables as tightly as possible in order to isolate alternative translation strategies and regularities.

Moving on from innovative corpus designs to methodologies, recent attempts have been made to combine existing approaches and/or adapting those from neighboring areas. Kujamäki (2004), for instance, combined classic elicitation tests and corpus-based studies of student translations to shed light on the likely cause of the underrepresentation of target-language-unique items in translation. Learners were asked to back-translate an English or German translation of a text, originally written in Finnish, that contained Finnish culture-specific words (referring to snowdrifts and road conditions) that are not lexicalized in English and German. When translating, the students tended to overlook these equivalents. When prompted by a cloze test in their native language, however, a majority produced them. Thus, by combining cloze tests and translation learner

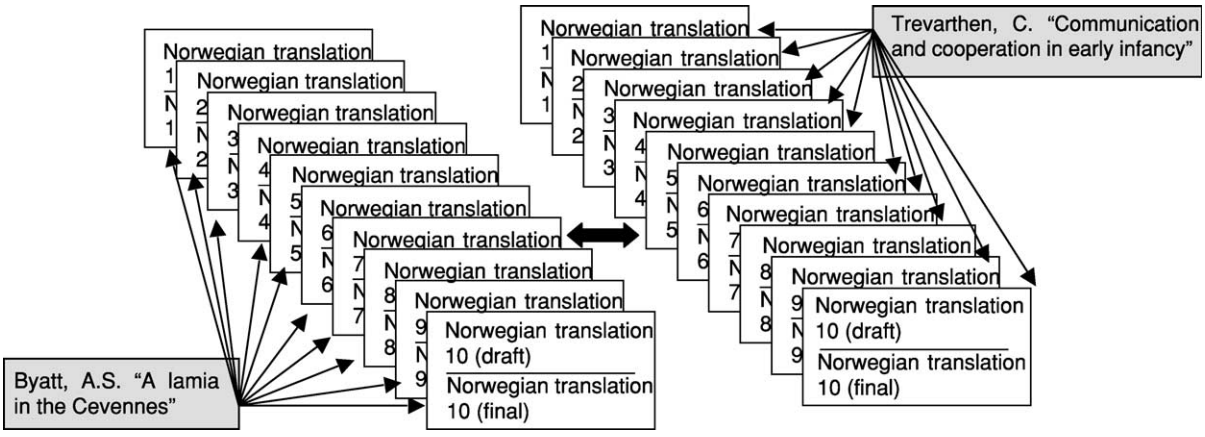

Figure 4 Structure of the Oslo multiple translation corpus (Johansson, 2003).

corpora (see the section 'Translation Learner Corpora'), Kujamäki was able to provide evidence linking Tirkkonen-Condit's unique items hypothesis (2004) and Toury's (1995) law of interference, which states in rather general terms that a target text surface form is likely to be influenced by its source text surface form.

By drawing on a rich combination of theories and practices – a model of cross-linguistic variation based on systemic-functional linguistics, a contrastive typology of the English and German grammatical systems, bilingual parallel (ST ↔ TT), monolingual comparable (O ↔ T), and bilingual comparable (SL-O ↔ TL-O) analyses of texts – Teich (2003) developed a comprehensive approach to corpus-based translation research. Her aim was to shed light on two apparently conflicting hypotheses: (a) that the source language will 'interfere' with the target text formulation (SL shining through) and (b) that a translation will tend to conform to the properties of the target language (TL normalization). The corpus used for this purpose is a bidirectional collection of German originals with their English translations, and English originals with their German translations (along the lines of the ENPC, see Figure 3). Furthermore, it is register controlled, containing only popular-scientific writing (by experts addressing nonexperts).

Teich found that both shining through and normalization could be observed in translation and that English TTs tended to have more normalization, whereas German TTs were characterized by more shining through. The reasons behind these findings were hypothesized to be related to the differences between the two language systems involved:

> Where the target language has more options in a particular grammatical system, it can afford to let the source language shine through. Where the target language has fewer options [. . .] it has to compensate; where the same compensatory means is used frequently, we encounter TL normalization. (Teich, 2003: 219)

On the methodological side, Teich concluded that an account of normalization could not be provided on the basis of an anaysis of monolingual comparable corpora alone; a contrastive analysis of original comparable texts in two or more languages and an account of their grammatical systems were necessary first steps in order to define a common ground for comparison.

Summing up, there are signs within corpus-aided DTS that the discipline is coming to terms with the complexity of its research object, taking stock of previous studies and work in related disciplines in order to develop more theoretically and methodologically sound approaches.

Corpus-Based ATS: Translation Teaching and Translation Practice

Moving on from translation theory/description to practice, in this section we survey applications of corpora to the teaching of translation (in educational settings), as well as to the practice of translation (in professional settings).

Long before the advent of electronic corpora, translators and translator trainees collected reference texts, in their source and target languages, representative of the subject area/genre of a translation task. The translators read these texts, often called 'parallel texts,' from beginning to end to familiarize themselves with a topic or to search for terms and their translations in authentic contexts of use. Nowadays, bilingual comparable corpora and 'concordancers' (search tools that display a given term or phrase in context) provide a shortcut to sidestep this laborious preparatory work. Large amounts of texts can be searched for terms, expressions, and concepts while a translation is being carried out, allowing even nonexpert translators to produce texts that are terminologically appropriate and that conform to the conventions of the target discourse community. Thanks to these new resources (and in general to the much greater availability of electronic texts), translators can accept a wider range of jobs, including translation into a foreign language (L2).

It is therefore no surprise that corpus use became popular in translator education in the 1990s, with more and more teachers requiring learners to build specialized corpora for their (technical) translation assignments and including corpus construction and use as one of the components of their translation syllabus, on a par with, say, dictionary use and documentation. There is no denying that these developments have been favored by the ease with which single teachers and learners have been able to assemble their own corpora off the Internet.

A number of other uses of corpus tools in the translation classroom have also seen the light, particularly in the area of research into translator trainees' production. Surprisingly, on the other hand, the response of the translation industry has been rather more tepid. Corpus usage has still not reached a consensus among professionals, and this is all the more puzzling if one considers the huge success of other technological aids, which in many respects are not wholly dissimilar – namely, translation memories within computer-aided translation (CAT) tools.

Details of house

Sleeps 2-5

Ground floor: entrance hall, kitchen, pantry, sitting room, dining room.

First floor: 3 bedrooms (1 double, 1 twin and 1 single), bathroom with shower.

Facilities

Fridge, coffee-maker, microwave, kettle, automatic washer, colour TV.

Bed linen and towels are provided.

Sorry no pets or smoking in the house.

Figure 5 An excerpt from a farmhouse vacation online advertisement.

Corpora in the Translation Classroom: Comparable and Parallel Designs

The types of corpora that have been used most often as tools for translation teaching follow either the 'bilingual comparable' or the 'bilingual parallel' design. To these we should add monolingual corpora of the target language, which can assist in the identification of the correct terminology and style/register for a translation. Corpora following this design, however, have a wide range of applications besides translation (e.g., text analysis and LSP teaching), for which reason this article does not specifically focus upon them (but see Figure 8 and Figure 9). As just described, bilingual comparable corpora (or 'comparable corpora' for short) are collections of 'similar' original texts in two languages (dealing with the same topic, belonging to the same genre, produced in the same period, etc.), while bilingual parallel corpora ('parallel corpora') are collections of originals and their translations. Clearly, these types of corpora have different strengths and weaknesses and there are different technical requirements for their analysis. They are accordingly discussed separately.

Comparable Corpora Let us take a concrete example. The description of a vacation farmhouse typically has, after an evocative description of the resort and its beauties, a section with details of the accommodation and the facilities on offer, often structured as a list, as in Figure 5.

Suppose we had to translate this text into Italian. While the context may suggest an interpretation, I would expect the very reduced form of the first statement ('sleeps 2–5') to be confusing for some translator trainees. This use of the verb *sleep* to mean 'have a given number of beds' is indeed attested in dictionaries and has a reasonable number of occurrences in the British National Corpus (25 for the word form *sleeps*). Yet sifting through the evidence may be time-consuming and confusing and may give little or no indication of how typical this use is of the text typology to be translated. A specialized corpus is in this case much more helpful in a learning setting. A search for *sleeps* in an automatically constructed corpus of English farmhouse vacation descriptions (about 1 million words from web pages) yields the concordance lines in Figure 6 (selection).

```
1.   Bedroom Apt. (Sleeps 2) £33.50pps EUR45.00p
2.   wo levels and sleeps 4-6 guests. On the gro
3.   nette sleeper sleeps 2 children or 1 adult.
4.   (4 en-suite), sleeps 12 + cots Maison Ramel
5.   od furniture. Sleeps (in each apartment): 1
6.   f La Fermette Sleeps 12 in 6 bedrooms with
7.   t. F(46 sqm - sleeps 2+2): Independent litt
8.   : 4 bedrooms, sleeps a maximum of 6 people
9.   ada Top house sleeps 6, Lower house sleeps
10.  . The cottage sleeps eight people and is a
11.  Findlay house sleeps 8 people in total. Th
12.  is and Lewis. Sleeps 2 people plus baby. F
13.  r couch which sleeps two persons comfortab
14.  m and Patio * Sleeps 4 Persons Max. * loca
15.  ee bathrooms, sleeps 6 (plus 2). 'La Paz'
16.  chalet which sleeps 4 (plus baby in cot).
17.  allow's Nest- Sleeps 2 plus cot Originally
18.  oom The Den - Sleeps 2/3 - self catering A
19.  brick floors, sleeps up to 10, with four b
20.  beach & golf Sleeps 2 to 7 From £250pw Pue
```

Figure 6 Selected concordance lines for *sleeps* in a corpus of farmhouse vacation description web pages.

Reading these lines, a learner may get a clearer idea of the meaning of *sleeps* in her or his text, including the fact that the word itself is at the core of a larger frame, quite frequently used in this genre, that takes the form shown in Figure 7.

Clearly, a more accurate search strategy would involve looking for other forms of the verb lemma SLEEP in this context, and we might wish to point this out to our learners. Yet the evidence available is probably enough for this rather trivial point.

We are now left with the problem of finding a contextually appropriate translation for this lexical item. A comparable corpus of Italian farmhouse vacation (*Agriturismo*) descriptions may help. While usually not providing direct translation equivalents, comparable original texts in the target language are likely to express similar notions (the number of guests a vacation house can accommodate probably being a core piece of information these texts are expected to

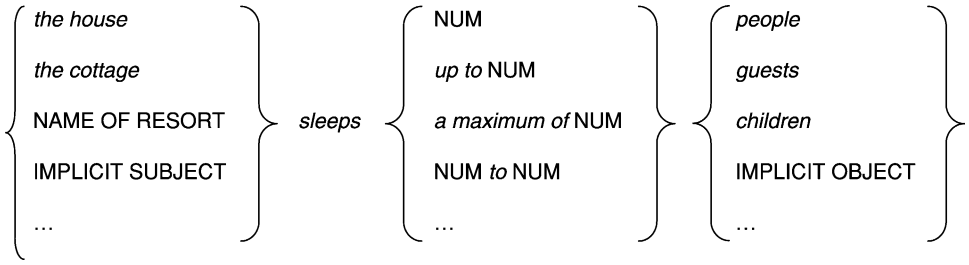

Figure 7 The *sleeps* frame.

```
1.  appartamento per 2 persone x 2 notti EUR 1
2.  era Bilocale per 2 persone da EUR 78,00 a
3.  e in Villa per 2/4 persone con vista lago
4.  Appartamento da 4 persone x 2 notti EUR 22
5.  00 Trilocale per 4 persone da EUR 100,00 a
6.  appartamento per 6 persone e "Podere Casan
7.  I DI VACANZA PER 6 PERSONE CIASCUNO,(MIN 1
8.  artamenti da 2 a 8 persone tipo di camera
9.  artamento OLIVO (4 persone) L'appartamento
10. monosoppalco 3 + 1 persone, in posizione c
11. onda, Aquitania) 3 Persone, 2 Camere da le
12. sono per 8 , 4 e 6 persone. Sono situate a
13. tevolmente per 2-7 persone. Forniti di bal
14. ad un massimo di 9 persone. Al centro dell
15. to "Cappella 2" (4 persone/ 70 mq) è situa
```

Figure 8 Selected concordance lines for '*persone*' in a corpus of *Agriturismo* web pages.

convey). In order to find out how this notion is expressed in Italian, we can start by looking for words that are likely to belong to an equivalent lexical item (a method described in detail in Tognini-Bonelli and Manca, 2002). Clearly, *house* or *cottage* would be a poor candidate in this case, as they may appear in many other patterns, and numbers are difficult to search for as a class in a raw text corpus. An alternative would be searching for an Italian equivalent for *people*, i.e., '*persone*'. The concordance lines in Figure 8 are taken from an automatically constructed corpus of Italian *Agriturismo* descriptions (about 600 000 words from web pages).

A possible equivalent for 'sleeps 2-5' might thus be hypothesized to be '*per 2-5 persone*' (literally 'for 2-5 people'). This search strategy would, however, limit our chances of discovering other expressions that are more distant from the English but possibly more current in Italian. An alternative strategy might be to search for possible equivalents of the title 'details of the house,' hypothesizing that the expression we are trying to identify would occur at a similar position in the text in both English and Italian. A search for '*dettagli*' ('details') gives no relevant results, but a search for '*caratteristiche*' ('characteristics') yields the example shown in Figure 9.

The results of a subsequent search for '*posti*' ('places') are shown in Figure 10.

We now have an alternative translation for 'sleeps 2-5', which seems more natural and certainly appears more frequently in the corpus than our first solution ('*per 2-5 persone*'), '*da 2 a 5 posti letto*' (literally 'from 2 to 5 bed places').

Comparable corpora may help trainee translators in their understanding of the meaning and structure of a source text, by drawing attention to both subject matter and genre regularities (and irregularities) across comparable exemplars (Aston, 1999); they also assist a nonexpert translator in the production of a target text that not only is factually correct but also is appropriate to the target genre conventions in terms of register and information structure (even when translating into the L2; see Zanettin (1998) on classroom activities based on comparable corpora).

Parallel Corpora As mentioned in this article, parallel corpora are, at their simplest, collections of originals in one language aligned to their translations in another. Other types of parallel corpora exist, e.g., those consisting of different translations of the same text in the same language (see the section 'Recent Developments and Ways Forward').

The process of alignment consists in the establishment of bonds between units in the texts (usually – for our purposes, at least – at the level of the sentence or of the paragraph) such that a search in one language retrieves the searched word or expression in context, as well as the corresponding unit (sentence or paragraph) in the other language. In order to use a parallel corpus, it is first necessary to align it; this can be done either manually or by using *ad hoc* software programs, some of which are freely available on the

```
1. CARATTERISTICHE DELL'AZIENDA (Agriturismo) — Altitudine: 450m —
   Ettari: 2 — Appartamenti: 3 — Camere: 6 — Totale posti: 25 —
   Tariffe: Medie
```

Figure 9 An example from the corpus.

```
1.  n. 65 camere con 129 posti letto tutte con
2.  mono-bilocali da 3/4 posti letto (a settim
3.  ey,APPARTAMENTINO (4 posti letto) cucina b
4.  rrazza sul mare, 5/6 posti letto a 10 minu
5.  Isole Cicladi: 2-4-6 posti letto in ampia
6.  o affitta bilocale 6 posti balcone vista m
7.  dipendenti, da 3 a 6 posti letto, dotati d
8.  mpia scelta tra 6000 posti letto tra alber
9.  00 metri dal mare, 8 posti letto,box ed us
10. pio parco e camere 8 posti letto Situata n
11. a valle dei TRULLI 9 posti letto mare ADRI
12. l livello del mare 9 POSTI LETTO fresca ve
13. sono essere aggiunti posti letto. Gli ospi
14. sposizione cinquanta posti letto distribui
15. ltiproprietà quattro posti letto a canazei
16. uzione, da due a sei posti letto, completa
17. niale/letti singoli) posti letto 2 Tipo di
18. se (TN), trilocale 7 posti, dal 23 al 30 a
19. otto, sei e quattro posti, dieci bagni co
20. appartamenti (per 10 posti-letto) - P: 55,
```

Figure 10 Selected concordance lines for '*posti*' in a corpus of *Agriturismo* web pages.

Web. The corpus can then be searched by means of a parallel concordancer (which may also include its own aligner).

Let us consider an example. The selected concordance lines for the word *paper* (English-Italian) in Figure 11 were obtained using the parallel concordancer ParaConc (Barlow, 1995) on a subset of a freely distributed corpus of EU Parliamentary Proceedings, which comes already aligned and is available in 11 European languages (the corpus was developed by Philip Köhn at the University of Southern California). The search for equivalents was facilitated by the software, which suggests possible candidates, but a degree of post-editing was necessary to arrive at the output shown here. The search word and its translation equivalent are underlined and boldfaced, while relevant collocates are in boldface only.

As can be seen, a parallel concordance gives fast and easy access to a range of possible equivalents for a given word or expression. By showing it in context, the concordance provides information about the more or less set phrases in which it occurs and about the collocations and colligations it forms with other words in texts. Normally, the concordance would also provide an indication of the word or expression's frequency, i.e., whether it appears a few times and/or only in a small number of texts or whether it has wider currency; for obvious reasons of space, this point cannot be exemplified in this article.

From the perspective of terminology, it is important, for instance, to make sure that 'white paper' is translated as '*libro bianco*' (literally 'white book'), the official label for this type of documents, and not as say, 'white document', which would be a more plausible candidate, since a working paper is '*un documento di lavoro*' in Italian, and a policy paper, '*un documento programmatico*'. From the perspective of register and style, it may be interesting for learners to note that the expression 'on paper' has been translated once as 'sulla carta', which is a literal translation, once with the adverb 'formalmente' (*formally*), and once with the semifixed expression 'RIMANERE lettera morta' (*REMAIN a dead letter*), depending on the context.

While evidence from parallel corpora has to be taken with a grain of salt – especially if we are not sure of the quality of the translations in the corpus and/or our learners have yet to develop the necessary critical skills – they clearly make a very useful tool. This is not only because the search for equivalents is far less complex than is the case with comparable corpora but also because they contain problem-solution pairs that are unique to the translation situation and that no comparable corpus could feature.

Pearson (2003) illustrated this point with examples of classroom exercises, using a corpus of *Scientific American* articles and French translations published in the periodical *Pour la Science*. Translating the affiliation of researchers whose work was reported on in these articles is a problem that learners have to solve and for which comparable corpora are of little assistance. A parallel corpus, on the other hand, provides numerous examples. These suggest that when translating the name of a foreign university, translators tend to opt for a name that indicates

welcomes the Commission's **White Paper on** European governa	
saluta con favore il **Libro bianco** della Commissione **sulla**	
pleased with the **reams of paper** which the Commission has	
soddisfatta della **mole di carta** prodotta dalla Commission	
on the basis of a **working paper** that is being drawn up to	
sulla base di un **documento di lavoro** in corso di elaboraz	
is very much an option **on paper**, but could well lead to m	
sulla carta è senz' altro possibile una distribuzione dei	
fighting for the right, **on paper** at least, to participate	
battono per conquistare, almeno **formalmente**, il diritto d	
clearly defined have led to the **paper**'s being closed dow	
chiusura del **giornale** obbedisca ad eventuali interessi, n	
have listed, the **policy paper** and the support it has got	
stabilite, il **documento programmatico** e il consenso creat	
moving from a **paper medium** to an electronic medium, devel	
diminuzione del **supporto cartaceo** a favore di quello elet	
It is willing to present a **working paper** on the state of	
della procedura di bilancio un **documento di lavoro** sulla	
but they are just **words on paper** unless we have effective	
ma rischia di rimanere **lettera morta** se vi sono carenze s	

Figure 11 Parallel concordance lines for the word *paper* and its Italian translations (EU Parliamentary proceedings).

where the university is, rather than its official name (e.g., 'State University of New York at Albany' becomes 'L'Université d'Albany').

Other Teaching Applications

Translation Learner Corpora The translation learner corpus, an extension of the parallel paradigm motivated by a growing interest in learner corpora (Granger *et al.*, 2002), is typically a collection of subcorpora, each of which contains multiple translations into the same language of a given text. Like multilingual parallel corpora, translation learner corpora are aligned in order to be searchable. While superficially similar, the two resources are used differently, the emphasis being, in the case of learner corpora, not so much on the observation of professional strategies as on peer-to-peer awareness-raising tasks concerning one's own translation decisions.

The example in Figure 12 is taken from a home assignment for students of translation at the School for Translators and Interpreters of the University of Bologna, Italy. The source text is an article, 'Sustainability,' from Wikipedia, the free online encyclopedia.

Translator trainees sometimes have difficulties thinking of alternative formulations after they have come up with one solution. A corpus of student translations may help in this instance, allowing them to compare their choices with those of their fellow students (and possibly of the teacher or of a professional), educating them to reformulate more and entertain different hypotheses before making a choice. From the teacher's perspective, this corpus may assist when evaluating a student's work: the relative merits of different choices can be compared, and their appropriateness can more easily be shown to be a gradient, going from optimal to unacceptable, rather than a right/wrong question. Furthermore, it may give indications of weak spots shared by large sections of a class, suggesting topics for remedial units.

This type of corpus has a number of advantages: it recycles existing material, copyright is relatively

"…the current population of the Earth, already over six billion,
is too many people for our planet to support sustainably."

sei miliardi, **costituisce una quantità troppo elevata**
constitutes a quantity too high
suggerito che questo **sia un numero troppo elevato** perc
be a number too high
più di 6 miliardi, **è troppo numerosa** per poter appli
is too numerous
miliardi (di persone), **è eccessiva** perché il nostro
is excessive
di oltre sei miliardi, **è troppo alto** per favorire la
is too high
superiore ai sei miliardi, **è eccessiva** rispetto alle
is excessive
superato i sei miliardi, **è smisurata** per permettere
is unmeasurable (extremely large)
supera i sei miliardi, **è troppo numerosa** per essere
is too numerous
più di 6 miliardi, **è troppo numerosa** per garantire
is too numerous
a sei miliardi, **è troppo eccessiva** per il nostro
is too excessive

Figure 12 Multiple student translations into Italian of the English expression 'X is too many people.'

easy to obtain, and it can be of some use in the translation classroom from early on. The corpus from which the example in Figure 12 is taken, for instance, contains, at the time of writing, only 10 translations of a single text, produced by learners as a home assignment in their first course in translation from English into Italian. Assembling such a corpus may take no more than 2 weeks, and it can then be expanded in several directions: a longitudinal component can be incorporated whereby translations by the same students are added in subsequent years; conditions can be varied, e.g., collecting exam papers on comparable texts, or home assignments on different ones; a system of annotation may also be devised, possibly including an error-tagging system (whereby errors are classified in some way and marked in the corpus, to facilitate retrieval of similar instances). Bowker and Bennison (2003) discussed translation learner corpora in detail, made suggestions about ways of automatizing the process of corpus construction, and gave examples of possible applications.

Building Corpora A number of researchers have pointed out that not only using a corpus but also building one may be a valid learning experience for future language professionals. This is both because constructing 'disposable' specialized corpora (Varantola, 2003) and managing them are perceived to be valuable professional skills in their own right and because a self-constructed corpus is easier to use and to evaluate (Aston, 1999; Maia, 2000). Varantola

(2003) discussed a series of Web-based corpus-construction activities carried out by translation students working in groups on specific projects. She pointed out that the problem was no longer text availability, as was the case before the advent of the World Wide Web, but rather "the relevance, adequacy, reliability and the analysis of this context-sensitive corpus material" (Varantola, 2003: 57). Thus, learners have to develop strategies for sifting through the texts available on the Web to find appropriate, authoritative, congruent texts (style-, register- and content-wise) with respect to a given translation task (note that a careful preliminary ST analysis is thus also required).

Professional Applications

In the previous section, corpus construction and use are introduced as activities that have both a didactic, awareness-raising value and a professionalizing function. Many translation teachers nowadays see corpus management as one of the documentation skills a professional translator requires. As mentioned in the section 'Corpus-Based ATS: Translation Teaching and Translation Practice,' this belief is only partly shared by the translation profession itself, where this still seems to be a niche activity.

In May 2004, I made a posting on the Lantra-L mailing list, that asked professional translators whether they knew or used corpora and concordancing software (I explained what I meant by these two terms) and whether they felt the Web is a more practical alternative these days. Lantra-L is one of the largest mailing lists for discussion of translation and interpreting issues, with, on average, 150 to 200 postings a day. Only five people replied. Their positions can be summarized as follows: (a) I have been using corpora (of English, German, Dutch, French, Czech) (two respondents); (b) I have been using translation memories with more advanced search facilities (one respondent); (c) I have been using corpora, though as a language teacher, not a translator (one respondent); (d) I have been using parallel texts (one respondent). In general, there was agreement that the Web, while useful, does not provide search features flexible enough for the needs of language professionals.

These findings support those of Bowker (2004), who surveyed translation-related job ads and professional association literature in Canada. She found that job ads rarely focused on the ability to use specialized translation software in the first place, and corpus use was never referred to; as for newsletters of professional associations, they tended to focus mainly on translation memories as tools for translators, with few if any references to corpora and concordancers.

In this section we briefly review several areas of relevance to the translation profession in which corpora are (or could be) playing a role.

Computer-Aided Translation (CAT) Systems
Computer-aided translation systems typically include a translation memory manager, i.e., a computer program that creates a database of aligned ST-TT unit pairs as a translation is being carried out. As new ST units are added to the work environment, the translation memory manager compares them with those available in memory and, in case of partial or total matches, presents the user with the corresponding TT unit. Completed translations can also be entered *post hoc* into the translation memory; for this purpose, the package usually includes aligners, which speed up the process of creating matches between units smaller than the text (normally sentences).

The resulting product is superficially very similar to an aligned parallel text, but as we look closer, differences appear. First, a translation memory is normally searched by a computer program, rather than the human end user. Ideally, it should contain units that correspond as closely as possible to each other, because any macroscopic differences (e.g., additions, deletions, gaps) between the ST and the TT are actually detrimental to achieving high levels of match between the two aligned versions. This is not so in parallel corpora, where these differences are meaningful. Second, each unit pair is considered in isolation from the texts to which it belongs. Units may be ordered alphabetically or chronologically, and a user can decide to import only selected units rather than whole texts. Thus, textual features that are above- or cross-sentence level (e.g., aspects of text cohesion or instances of compensation) are impossible to observe. Through parallel corpora and concordancers, on the other hand, users can typically access both one-line concordances and larger contexts (even whole texts) and move between these two levels of analysis. Third, translation memories are by their very nature 'prescriptive' tools that should include only gold standard translations, i.e., translations provided by the commissioner or agency for a specific task, typically previous versions of the same text that need to be updated. Parallel corpora, on the other hand, follow from a more 'descriptive' principle whereby it is suggested that translators may find it useful to check the strategies of fellow translators or acquaint themselves with a given topic or field. It does not follow, however, that they should necessarily adopt the solutions they find in the corpus. Parallel corpora are therefore more adaptable to different tasks, as long as the

end user is aware of their structure, contents, and limitations.

A new generation of tools currently being introduced into the market address the problem of integrating facilities for searching corpora with standard translation memory technology. These 'hybrid' tools (Bowker, 2004) combine the traditional translation memory approach to automatic search and retrieval of perfect and fuzzy matches, and the corpus searching approach. Thus, it is possible for the user to select or type in a word or phrase and retrieve for analysis the matching pairs that contain it. While the search possibilities are still rather crude, these systems would appear to go in the right direction of integrating different approaches to the reuse of existing materials. There is general agreement in the profession that translation memories are useful only for a very restricted set of tasks (basically updates of existing translations) or for very repetitive texts. While corpora take more time to compile and consult, they may be useful in a much wider range of situations, thus justifying a mixed approach.

Terminology Extraction and Management The production of glossaries and terminological databases is an integral part of the translation profession, as well as an area of inquiry and systematization for terminologists. Specialized corpora are a major source of terms, definitions, and context(s) of use, and more and more tools are being developed that assist the translator or terminologist in sifting through corpus evidence in an attempt to identify relevant terms in corpora and produce a profile for them.

In order to extract single- and multiword terms semiautomatically, many different strategies can be adopted. Here we shall limit discussion to two relatively straightforward approaches, one that relies more on statistics and word distributions, the other on linguistic principles. First, a raw-text (untagged) corpus can be searched for words or sequences that are either very frequent or more frequent than average ('average frequency' normally being defined via statistical comparisons with a reference corpus) and/or that are not function words (in the latter case a so-called stop-word list is used that removes function words from the output). A search through a corpus of press releases in the domain of computer hardware, using Wordsmith Tools Keyword facilities (Scott, 1996), and a reference corpus of EU parliamentary proceedings retrieves, among others, the 15 bigram terms in Table 1.

Table 1 Bigram terms in a corpus of hardware press releases[a]

1	HIGH-PERFORMANCE
2	DIGITAL SIGNAL
3	FAMILY OF
4	REAL-TIME
5	RANGE OF
6	PROCESSOR-BASED
7	MICROCHIP TECHNOLOGY
8	IDEAL FOR
9	CO-PROCESSORS
10	ARE AVAILABLE
11	THE CPCI
12	DEVICES ARE
13	PENTIUM III
14	SOLUTION FOR
15	EMBEDDED COMPUTING

[a]Note that in this case hyphens are treated as word separators.

The second strategy requires that the corpus be part of speech (POS) tagged (by means of an *ad hoc* software program known as a POS tagger (van Halteren, 1999)). In this case, it is possible to search for sequences of parts of speech that follow a given pattern that the terminologist has identified. A list of this type for medical English might include those in Table 2.

Once the terms have been identified in one language, their equivalents have to be found for the other. Parallel and comparable corpora may be of help, as suggested elsewhere in this article. They may also, however, assist in a further way, by facilitating the retrieval of additional information about a term, i.e., a definition and one or more examples of use. While the second step is rather straightforward, at least from the technical point of view, the first is much less so. Automatic routines that retrieve term definitions from unannotated text are not easy to devise. Pearson (2000) suggested heuristics that could facilitate the task, e.g., searching for expressions like 'is a kind of' or 'i.e.'. The corpus used also plays a role, as communication by experts addressing nonexperts might be expected to be richer in terms of definitions than communication by experts addressing other experts. Thus, for these purposes textbooks are probably a better source than research articles.

While corpora are unlikely to replace expert advice, they can go a long way in providing the knowledge required by terminologists and translators to produce databases that take into account the actual use to which terms are put and the phraseology associated with them in real texts. It is likely that more and more CAT tools will include terminology extraction tools that tag texts on the fly, retrieve terms according to user-defined term patterns, provide free-text search facilities for corpus analysis, and facilitate the integration of this information in the compilation of terminological databases.

Table 2 Examples of POS patterns corresponding to English medical terms

Pattern	*Examples*
Noun	*bradycardia, amozicillin, PSG*
Verb	*excise, obtund*
Adjective	*distal, craniofacial*
Noun-Noun	*eye movement, ear oximeter*
Noun-Noun-Noun	*coronary heart disease, oxygen desaturation index*
Noun-Preposition-Noun	*night of monitoring, effect of smoking*
Adjective-Noun	*acoustic rhynometry, circadian rhythm*

Machine Translation Applications The role of corpora in the development of machine translation systems is related only indirectly to the professional concerns of translators, for which reason it will be mentioned here only in passing. In recent years the main thrust of machine translation research has been to integrate 'example-based' and statistical methods with more mainstream, 'rule-based' methods. This new approach relies on large databases of aligned parallel text. In this regard, it follows the same recycling principles as translation memories, but it goes beyond, in the attempt to propose a novel translation rather than simply retrieve existing matching strings. At present, the idea of combining machine translation, translation memory, and corpus searching approaches via hybrid, interactive systems is considered to be one of the ways ahead in this area.

The World Wide Web Thanks to the WWW, translators today have at their fingertips a massive amount of knowledge and textual evidence that can be searched more easily than ever before. An important question to ask therefore is whether corpora are still a valid tool or whether they have become anachronistic.

The advantages of corpora over the Web used as a corpus are numerous. To mention but the first that come to mind, existing Web browsers have not been designed with linguistic applications in mind. Thus, at least for the time being, they offer very crude search facilities. For instance, the world's favorite Web browser, Google, does not distinguish certain spelling variants; therefore, one cannot search for 'thought-provoking' and 'thought provoking' as separate queries. Similarly, specifying a window within which to search for two or more words may be quite demanding. More importantly, the sheer size and diversity of the Web and its changing nature have a number of inevitable consequences. For instance, POS annotation is unlikely to ever be an option (this means, for example, that one cannot search for a given word only when it is a noun). Also, relevant examples from a given domain are typically mixed with irrelevant ones from other domains. Sifting through the evidence may become a lengthy process that one tends to dangerously end as soon as a reasonable hypothesis has formed on the basis of the first few hits returned.

The Web, however, has a series of big advantages over corpora: it is mostly free, is readily available, is familiar, is constantly updated, is very large, and requires no time to design and construct. The last point especially is no small thing when it comes to hard-pressed translators. Attempts have been made to combine the best of two worlds, i.e., either make the Web more like a corpus or speed up corpus construction by using the Web. Several 'Web as corpus' tools have been designed that facilitate linguistically oriented searches (Fletcher, 2004), while experiments have been done in an attempt to automatize as far as possible the search and download of texts from the Web (including parallel texts; Almeida *et al.*, 2002) so as to reduce the time and effort required to build a corpus, and thus hopefully encourage translators to do so.

Baroni and Bernardini (2004) described an algorithm and a suite of freely available Perl scripts that have been developed specifically with professional and trainee translators in mind. These tools (a) find keywords in a text (by comparison with a reference corpus), (b) automatically search the Web for combinations of these words, (c) download texts, (d) convert them from HTML to plain text format, (e) discard duplicates, and (f) extract single- and multiword terms from the newly constructed corpus. This procedure can be iterated as many times as required, and various parameters can be tuned by the user.

Conclusion

In this article I review three major areas at the interface between corpus linguistics and translation, namely, corpus-based approaches to (descriptive/theoretical) translation studies, to translation teaching/learning, and to translation practice. As regards translation studies, I suggest that this research methodology, with its many branches and corpus typologies, is yielding valuable insights concerning translation strategies, norms/laws, and universals. More recently, attempts have been made to go beyond somewhat simplistic early assumptions and methods, to take stock of the new data, and to reflect on their implications. Moving on to the applied perspective, I provide several examples of possible uses of corpora

(parallel, comparable, learner) in the translation classroom and point out that the activity of building a corpus may in itself make a valid exercise in text analysis and documentation. Finally, I consider the role currently played by corpus tools in the translation professions and show it to be still rather marginal, despite an obvious potential, a growing interest, and promising new applications.

See also: Approaches to Translation, Linguistic; Cultural, Colonialism and Gender Oriented Approaches to Translation; Translation Universals; Translational Equivalence.

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Machine Translation: History

J Hutchins, Norwich, UK

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Precursors and Pioneers, 1933–1954

Although we might trace the origins of ideas related to machine translation (MT) to 17th-century speculations about universal languages and mechanical dictionaries, it was not until the 20th century that the first practical suggestions could be made, in 1933 with two patents issued in France and Russia to Georges Artsrouni and Petr Trojanskij, respectively. Artsrouni's patent was for a general-purpose machine that could also function as a mechanical multilingual dictionary. Trojanskij's patent, also basically for a mechanical dictionary, went further with detailed proposals for coding and interpreting grammatical functions using 'universal' (Esperanto-based) symbols in a multilingual translation device.

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Neither of these precursors was known to Andrew Booth (a British crystallographer) and Warren Weaver

(a director at the Rockefeller Foundation) when they met in 1946 and 1947 and discussed tentative ideas for using the newly invented computers for translating natural languages. In July 1949, a memorandum by Weaver, which stimulated the start of MT research in the United States, suggested various methods based on his knowledge of cryptography, statistics, information theory, logic, and language universals (Hutchins, 1997).

In June 1952, the first MT conference was convened at MIT by Yehoshua Bar-Hillel, who had been appointed to survey the field. It was already clear that full automation of good-quality translation was a virtual impossibility and that human intervention either before or after computer processes (known from the beginning as pre- and post-editing, respectively) would be essential. Ideas were put forward for normalizing input texts and for microglossaries to reduce ambiguity problems and for some kind of syntactic structure analysis. Suggestions for future activity were proposed; in particular, Léon Dostert from Georgetown University argued for a public demonstration of the feasibility of MT.

Accordingly, he collaborated with IBM on a simple MT system demonstrated in New York on January 7, 1954, with a great deal of media attention. A carefully selected sample of Russian sentences was translated into English using a very restricted vocabulary of 250 words and just six grammar rules. Although the system had little scientific value, its output was sufficiently impressive to stimulate large-scale funding in the United States and to inspire the initiation of MT projects elsewhere, notably in the USSR.

High Expectations, 1954–1966

When MT research began, there was little help to be had from current linguistics. As a consequence, in the 1950s and 1960s, researchers tended to polarize between empirical trial-and-error approaches, often using statistical methods to discover grammatical and lexical regularities that could be applied computationally, and theoretical approaches involving fundamental linguistic research and indeed the beginnings of what was later called computational linguistics (*see* **Computational Linguistics: History**). This decade saw the beginnings of three basic approaches to MT (*see* **Machine Translation: Overview**): (1) the direct translation model, in which programming rules were developed for the translation specifically from one source language (SL) into one particular target language (TL) with a minimal amount of analysis and syntactic reorganization and in which problems of homonymy and ambiguity were simplified by providing single TL equivalents for SL words to cover most senses; (2) the interlingua model (*see* **Machine Translation: Interlingual Methods**), in which translation was into and from some kind of language-neutral representation and that involved complex syntactic and semantic analysis; and (3) the transfer model, in which SL texts were analyzed into disambiguated SL representations and then converted into equivalent TL representations, from which output text was generated.

The direct translation approach was epitomized by research by Erwin Reifler (at the University of Washington, Seattle) and by Gilbert King (at IBM). Large bilingual dictionaries were compiled for a photoscopic store (a purpose-built memory device), in which lexicographic information was used not only for selecting lexical equivalents but also for solving grammatical problems without the use of syntactic analysis. A Russian-English system was installed for the U.S. Air Force, producing translations until the early 1970s – the output was crude and barely intelligible, but appeared to satisfy basic information needs of users.

Dictionary development was also the focus of research at a number of other centers. Anthony Oettinger's group (Harvard University) compiled a massive Russian-English dictionary, both to serve as an aid for translators (a forerunner of the now-common computer-based dictionary aids) and to produce crude word-for-word translations. Sydney Lamb (at the University of California, Berkeley) concentrated on developing maximally efficient dictionary routines and a linguistic theory appropriate for MT – his theory of stratificational grammar.

The system developed at Georgetown University, for many years the largest research group in the United States, was also essentially direct translation in approach, although incorporating various levels of structure analysis: morphological, syntagmatic (noun-adjective agreement, verb government, etc.), and syntactic (subjects and predicates, clause relationships, etc.). Systems installed by Euratom in 1963 and by the U.S. Atomic Energy Commission in 1964 continued in regular use until the late 1970s. A direct translation approach similar to the Georgetown system was made at the Institute of Precision Mechanics (under D.Y. Panov), but with less practical success, primarily because of lack of adequate computer facilities.

Research on interlinguas was almost wholly theoretical. The Cambridge Language Research Unit (Margaret Masterman) investigated a prototype interlingua to produce crude (almost word-for-word) translations, which would be refined by means of the semantic networks of a thesaurus (using mathematical

lattice theory.) Silvio Ceccato (Milan University) developed an interlingua based on cognitive processes, involving the conceptual analysis of words and their possible correlations in texts – a forerunner of the neural networks of later years. Igor A. Mel'čuk (Institute of Linguistics, Moscow) worked on the linguistic foundations of an interlingua, his stratificational dependency (meaning-text) model of language (*see* **Mel'čuk, Igor Aleksandrovic (b.1932)**). Nikolaj Andreev (Leningrad State University) conceived an interlingua as composed of those features statistically most common in a large number of languages.

The transfer approach was epitomized by the research at MIT led by Victor Yngve on syntactic analysis and production, mainly for German and English. Despite Chomsky's association with the group for a short time, transformational grammar (*see* **Generative Grammar**) had little influence – indeed Chomskyan linguistics had little impact on any MT group in this period.

Apart from MIT, the most explicit concentration on syntactic issues was at Harvard (after 1959), where research focused on the predictive syntactic analyzer (originally developed at the National Bureau of Standards under Ida Rhodes), a system for the identification of permissible sequences of grammatical categories (nouns, verbs, adjectives, etc.) and the probabilistic prediction of following categories. However, the results were often unsatisfactory, caused primarily by the enforced selection at every stage of the 'most probable' prediction. (Nevertheless, an improved version, the Multiple-Path Predictive Analyzer, led later to William Woods's familiar Augmented Transition Network parser.)

Computer facilities were frequently inadequate, and much effort was devoted to improving basic hardware (paper tapes, magnetic media, access speeds, etc.) and to devising programming tools suitable for language processing (e.g., COMIT developed at MIT). Some groups were inevitably forced to concentrate on theoretical issues, particularly in Europe and the Soviet Union. For political and military reasons, nearly all U.S. research was for Russian-English translation, and most Soviet research focused on English-Russian systems, although the multilingual policy of the Soviet Union inspired research there on a much wider range of languages than elsewhere.

By the mid-1960s MT research groups had been established in many countries throughout the world, including most European countries (Hungary, Czechoslovakia, Bulgaria, Belgium, Germany, France, etc.), China, Mexico, and Japan. Many of these were short-lived; an exception was the project that begun in 1960 at Grenoble University.

Throughout this period, research on MT became an umbrella for much contemporary work in structural and formal linguistics (particularly in the Soviet Union), semiotics, logical semantics, mathematical linguistics, quantitative linguistics, and nearly all of what is now called computational linguistics and language engineering – and in the Soviet Union with close ties with cybernetics and information theory (Léon, 1997).

The ALPAC Report and Its Consequences

In the 1950s, optimism was high; developments in computing and in formal linguistics, particularly in the area of syntax, seemed to promise great improvements in quality; there were many predictions of fully automatic systems operating within a few years. However, disillusion grew as the complexity of the linguistic problems became more apparent and research seemed to face an apparently insuperable semantic barrier. In an influential survey, Bar-Hillel (1960) criticized the prevailing assumption that the goal of MT research should be the creation of fully automatic high-quality translation (FAHQT) systems producing results indistinguishable from those of human translators. He argued that it was not merely unrealistic, given the current state of linguistic knowledge and computer systems, but impossible in principle.

Although the first working systems (from IBM and Georgetown) were showing that poor-quality translations could be useful in many circumstances, there was growing disappointment at the slow development of good-quality MT. In 1964, the government sponsors of MT in the United States (mainly military and intelligence agencies) asked the National Science Foundation to set up the Automatic Language Processing Advisory Committee (ALPAC) to examine the situation. It concluded that MT was slower, less accurate, and twice as expensive as human translation and that "there is no immediate or predictable prospect of useful machine translation" (ALPAC, 1966: 32). It saw no need for further investment in MT research; instead, it recommended the development of machine aids for translators, such as automatic dictionaries, and the continued support of basic research in computational linguistics. Paradoxically, ALPAC rejected MT because it fell well short of human quality (i.e., it required post-editing) even though human translations are invariably revised before publication and even though the sponsoring bodies were primarily interested in information gathering and analysis, in which lower quality would be acceptable. The influence of ALPAC was profound, bringing virtually to an end MT research in the United States for over a

decade and indirectly bringing to an end much MT research elsewhere. As a consequence, MT was to be no longer the leading area of research in computers and natural language.

The Quiet Decade, 1967–1976

Research did not stop completely, however. Even in the United States, groups continued for a few more years at the University of Texas and at Wayne State University. But there was a change of direction. In the United States, activity had concentrated on English translations of Russian scientific and technical materials. In Canada and Europe, the needs were quite different. The Canadian government's bicultural policy created a demand for English-French (and to a lesser extent French-English) translation beyond the capacity of the translation profession. The demand was even greater within the offices of the European Community for translations of documents from and into all the EC languages.

At Montreal, research began in 1970 on a syntactic transfer system for English-French translation. The TAUM project (Traduction Automatique de l'Université de Montréal) had two major achievements: first, the Q-system formalism for manipulating linguistic strings and trees (later developed as the Prolog programming language) and, second, the Météo system designed specifically for translating the restricted vocabulary and limited syntax (sublanguage) of meteorological reports, which were publicly broadcast from 1976.

Other groups continued with essentially interlingua approaches. In the Soviet Union, Mel'čuk continued his research on a meaning-text model for application in MT. At Grenoble University, Bernard Vauquois developed a pivot language for translating Russian mathematics and physics texts into French – not, however, a full interlingua because it represented only the logical properties of syntactic relationships; there were no interlingual representations for lexical items, which were translated by a bilingual transfer mechanism. A similar model was adopted at the University of Texas (under Winfred Lehmann) in its METAL system for German and English: Sentences were analyzed into 'normal forms', that is, interlingual semantic propositional dependency structures with no interlingual lexical elements.

By the mid-1970s, however, the Grenoble and Texas groups recognized major problems with their interlingua approaches: the rigidity of the levels of analysis (failure at any one stage meant failure to produce any output at all), the inefficiency of parsers (too many partial analyses that had to be filtered out), and in particular loss of information about surface forms of SL input that might be used to guide selection of TL forms and construction of acceptable TL sentence structures. To many at the time it seemed that the less ambitious transfer approach offered better prospects.

The Revival, 1976–1989

In the decade after ALPAC, more MT systems came into operational use and attracted public attention. Most significant were the first Systran installations. Developed by Peter Toma, its oldest version is the Russian-English system at the USAF Foreign Technology Division (Dayton, Ohio) installed in 1970. The Commission of the European Communities installed its first Systran system in 1976 and now has versions for most languages of the European Community (now European Union). Over the years, the original (basically, direct translation) design has been greatly modified, with increased modularity and greater compatibility of the analysis and synthesis components of different versions, permitting cost reductions when developing new language pairs. During the 1980s and subsequently, Systran was also installed at many major companies (e.g., General Motors of Canada, Dornier, and Aérospatiale).

From the early 1980s until the mid-1990s, Systran's main commercial rival was the Logos Corporation. After experience with an English-Vietnamese system for translating aircraft manuals during the 1970s, Logos developed a successful German-English system that first appeared on the market in 1982; during the 1980s, other language pairs were also developed. Also in the 1980s a commercial METAL German-English system appeared, the research at the University of Texas University now funded by Siemens of Munich (Germany). The system was no longer interlingua-based but was now essentially a transfer-based approach. Other language pairs were later marketed for Dutch, French, and Spanish, as well as for English and German.

Research also revived in the late 1970s and early 1980s. In contrast to the focus in the late 1960s and early 1970s on interlingua approaches, this was characterized by the widespread adoption of the three-stage transfer-based approach, predominantly syntax-oriented and founded on the formalization of lexical and grammatical rules influenced by the linguistic theories of the time.

One major exemplar was the system developed at Grenoble (GETA, Groupe d'Etudes pour la Traduction Automatique), the influential Ariane system. Regarded as the paradigm of the second-generation linguistics-based transfer systems, Ariane influenced projects throughout the world in the 1980s.

Of particular note were its flexibility and modularity and its algorithms for manipulating tree representations that incorporated many different levels and types of representation (dependency, phrase structure, and logical). Similar in conception were the multilingual transfer system at Saarbrücken (called SUSY), incorporating a heterogeneity of techniques (phrase structure rules, transformational rules, case grammar and valency frames, dependency grammar, the use of statistical data, etc.), and the Mu system developed at the University of Kyoto under Makoto Nagao, where the most prominent features were the use of case grammar analysis and dependency tree representations. (In 1986, the research prototype was converted to an operational system for use by the Japanese Information Center for Science and Technology for the translation of abstracts.)

One of the best-known projects of the 1980s was the Eurotra project of the European Community, intended as an advanced multilingual transfer system for translation among all the EC languages. Like GETA-Ariane and SUSY, the design combined lexical, logico-syntactic, and semantic information in multilevel interfaces at a high degree of abstractness. No facilities for human assistance during translation processes were envisaged, and problems of the lexicon were also neglected; at the end of the 1980s with no operational system in prospect, the project ended, having, however, achieved its secondary aim of stimulating cross-national research in computational linguistics.

From the mid-1980s, there was a revival of interest in interlingua systems, motivated in part by contemporary research in artificial intelligence and cognitive linguistics. Two major projects were based in the Netherlands. The DLT (Distributed Language Translation) system in Utrecht (under Toon Witkam) was intended as a multilingual interactive system operating over computer networks, in which each terminal was to be a translating machine from and into one language only, using a modified form of Esperanto as an interlingua. The project made a significant effort in the construction of large lexical databases and proposed the use of a Bilingual Knowledge Bank from a corpus of (human) translated texts (anticipating later example-based approaches). The Rosetta project at Eindhoven (under Jan Landsbergen) explored the use of Montague grammar (*see* **Montague Semantics**) – semantic interlingual representations were derived from the interpretation of the derivation trees of syntactic representations – and the feasibility of reversible grammars for analysis and generation. Reversibility subsequently became a feature of many MT projects.

In the latter half of the 1980s, Japan witnessed a substantial increase in activity. Most of the computer companies (Fujitsu, Toshiba, Hitachi, etc.) began to invest large sums into areas that government and industry saw as fundamental to the coming fifth generation of the information society – this included MT. The research, initially greatly influenced by the Mu project at Kyoto University, showed a wide variety of approaches. Although transfer systems predominated, there were also interlingua systems, such as the PIVOT system at NEC and the Japanese-funded multilingual multinational project, with participants from China, Indonesia, Malaysia, and Thailand. There was also considerable commercial activity and most of the computer companies marketed translation software, mainly for the Japanese-English and English-Japanese markets. Many of these systems were low-level direct translation or transfer systems limited to morphological and syntactic analysis and often with little attempt made to automatically resolve lexical ambiguities. Often restricted to specific subject fields (computer science and information technology were popular choices), they relied on substantial human assistance at both the preparatory (pre-editing) and the revision (post-editing) stages.

During the 1980s, many research projects were also established in Korea, in Taiwan, in mainland China, and in Southeast Asia, particularly in Malaysia. There was also an increase in activity in the Soviet Union, where from 1976 research was concentrated at the All-Union Center for Translation in Moscow. Systems for English-Russian and German-Russian translation were developed based on the direct translation approach, but there was also work under the direction of Yurij Apres'jan, based on Mel'čuk's meaning-text model, leading to systems for French-Russian and English-Russian. Apart from this group, however, most activity in the Soviet Union focused on the production of relatively low-level operational systems, often involving the use of statistical analyses (influenced by the Speech Statistics group under Rajmund Piotrovskij at Leningrad State University).

During this period, many researchers believed that quality improvements would come from language research in the context of artificial intelligence (AI; *see* **Natural Language Understanding, Automatic**), such as the investigations by Yorick Wilks on preference semantics and semantic templates and by Roger Schank on expert systems and knowledge-based text understanding. The Japanese investment in artificial intelligence projects also had a major impact and may well have stimulated the revival of government funding in the United States. A number of projects applied

knowledge-based approaches in Japan, in Europe, and particularly in North America. In the United States, the most important was at Carnegie-Mellon University (Pittsburgh) under Jaime Carbonell and Sergei Nirenburg, which experimented with a number of knowledge-based MT systems (Nirenburg *et al.*, 1992).

For syntactic processing, there was a trend toward the adoption of unification and constraint-based formalisms (e.g., Lexical-Functional Grammar, Head-Driven Phrase Structure Grammar; Categorial Grammar, etc.). Complex multilevel representations and large sets of transformation and mapping rules were replaced by lexicalist approaches: monostratal representations, a restricted set of abstract rules, and constraints incorporated into specific lexical entries.

As far as practical use was concerned, one method of improving quality was seen to be the 'control' of vocabulary and syntax. Systems such as Systran, Logos, and METAL were in principle designed for general application, although in practice their dictionaries are adapted for particular subject domains by corporation purchasers. The Xerox Corporation went further by restricting, or controlling, input texts, so that transfer and generation was simpler and there was less need for post-editing. They have been followed by many others in subsequent years – indeed, the design of controlled languages is itself an active area of research (*see* **Controlled Languages**). There have been several companies that design controlled language systems for specific clients (e.g., LANT (later Xplanation) and ESTeam). The major example since the early 1980s has been the Smart Corporation (New York), with customers such as Citicorp, Ford, and the Canadian Department of Employment and Immigration. Restriction to particular subject areas does not necessarily mean controlled input. Special-purpose systems can be designed for particular environments, allowing for less complication in lexicons. The main examples here are the successful Spanish-English (SPANAM) and English-Spanish (ENGSPAN) systems developed during the 1970s and 1980s at the Pan American Health Organization in Washington (under Muriel Vasconcellos).

Developments since 1989

The dominant framework for MT research until the end of the 1980s was essentially based on linguistic rules for syntactic analysis, for lexical transfer, for morphology, and so forth. Since 1989, however, this dominance has been broken by the emergence of new methods and strategies loosely called corpus-based methods.

Most dramatic has been the revival of statistics-based approaches – seen as a return to the empiricism of the first decade as opposed to the rationalism of the later rule-based methods. The two sides, empiricists and rationalists, were first directly confronted at a conference in Montreal in June 1992 (TMI, 1992).

With the success of their stochastic techniques in speech recognition, a group at IBM (Yorktown Heights, New York) developed a statistical MT (SMT) model, Candide (Brown *et al.*, 1990). Its distinctive feature was that no linguistic rules were applied; statistical methods were virtually the sole means of analysis and generation. Candide was applied to the corpus of French and English texts in the reports of Canadian parliamentary debates. The first step was the alignment of SL and TL sentences and words that are potentially translation equivalents. Translation itself was achieved through a translation model (frequency statistics derived from previously aligned SL and TL words and phrases) and a language model of TL word sequences. During the 1990s, statistical methods (*see* **Language Processing: Statistical Methods**) have been the main focus of many research groups, for example, the improvement of bilingual text and word alignment techniques and statistical methods for extracting lexical and terminological data from bilingual corpora. Some have concentrated on the development of purely statistics-based systems, statistical MT (e.g., at the universities of Southern California, Aachen, and Hong Kong), and others have investigated the integration of statistical and traditional rule-based approaches (e.g., at Carnegie-Mellon University; the National Tsing-Hua University, Taiwan; and Microsoft Corporation).

The second major corpus-based approach, benefiting likewise from improved rapid access to large databanks of text corpora, has been what is known as the example-based (or memory-based) approach. Although first proposed in 1981 by Makoto Nagao, it was only toward the end of the 1980s that experiments began, initially in some Japanese groups and during the DLT project. The underlying hypothesis is that translation often involves the finding (or recalling) of analogous examples, that is, how a particular expression or similar phrase has been translated before. Example-based MT (EBMT) involves the matching of input phrases against equivalent or similar SL phrases in a corpus of parallel bilingual texts (aligned either statistically or by traditional rule-based methods), the extraction of TL equivalent or closely matching phrases (using, e.g., semantic networks or lexical frequencies), and – the most difficult process – the 're-combination' of selected TL phrases to produce fluent and grammatical output.

Example-based MT research is pursued actively at a number of Japanese and U.S. centers (Carl and Way, 2003).

Although the main innovations since 1990 have been corpus-based approaches, rule-based research has continued with projects on both transfer and interlingua systems. Examples of transfer systems are the PaTrans system for Danish/English translation of patents (based on Eurotra research) and the LMT system of Michael McCord at IBM. Interlingua-based projects are the CATALYST knowledge-based system at Carnegie-Mellon University for the Caterpillar company and the special-purpose systems (DIPLOMAT) developed for military operations, also at Carnegie-Mellon; the ULTRA system at New Mexico State University (Sergei Nirenburg); the UNITRAN system based on the linguistic theory of Principles and Parameters (*see* **Principles and Parameters Framework of Generative Grammar**) (Bonnie J. Dorr, University of Maryland); the Pangloss project, a collaborative project involving the universities of Southern California, New Mexico State, and Carnegie-Mellon; and the Universal Networking Language project at the Institute of Advanced Studies of the United Nations University (Tokyo), involving groups in some 15 countries.

Another new departure for MT research in the 1990s has been the growing interest in spoken language translation, with the challenge of combining speech recognition and the interpretation and production of conversation and dialog. The first long-standing group was established in 1986 at ATR Interpreting Telecommunications Research Laboratories (Nara, Japan), which has been developing a system for telephone registrations at international conferences and for telephone booking of hotel accommodation (Kurematsu and Morimoto, 1996). Slightly later came the JANUS project (under Alex Waibel) in a consortium of Carnegie-Mellon University, the University of Karlsruhe, and ATR. The JANUS project has also focused on travel planning, but the system is designed to be readily expandable to other domains (Levin *et al*., 2000). Both projects continue. A third shorter-lived group, by SRI (Cambridge, UK) as part of its Core Language project, investigated Swedish-English translation via quasi-logical forms (Rayner *et al*., 2000); and on a larger scale there was a fourth project, Verbmobil (directed by Wolfgang Wahlster), funded from 1993 until 2000 by the German government. Its aim was to develop a transportable aid for face-to-face English-language commercial negotiations by Germans and Japanese not speaking fluent English. Although the basic goal was not achieved, efficient methodologies for dialog and speech translation were developed and the project established top-class research groups in German universities as a valuable by-product (Wahlster, 2000).

Evaluation of MT systems emerged as a major focus of research activity, now recognized as crucial for progress in MT research itself. Since the early 1990s, there have been numerous workshops dedicated specifically to problems of evaluation (often attached to MT conferences), and in particular there has been the series of Language Resources and Evaluation Conferences (LREC). Methodologies developed by the Japan Electronic Industry Development Association (JEIDA) and the Expert Advisory Group on Language Engineering Standards (EAGLES) and for the evaluation of ARPA supported projects have been particularly influential.

The use of MT systems expanded greatly in the 1990s, particularly in commercial agencies, government services, and multinational companies, where translations are produced on a large scale, primarily of technical documentation. This was and remains the major market for the mainframe systems (Systran, Logos, METAL, and ATLAS), now usually on client-server configurations. Already in 1995, it was estimated that over 300 million words a year were being translated by such companies.

The most significant practical development for human translators has been the appearance in the early 1990s of the first translation workstations, which combine various machine aids (*see* **Machine-aided Translation, Methods**): multilingual word processing, OCR facilities, terminology management software, facilities for concordancing (facilities that translators had become familiar with in the 1980s), – and in particular translation memories. The historical origins are described in Hutchins (1998).

Although MT systems for personal computers began to be marketed in the 1980s (e.g., the systems from Weidner, Globalink, and Toshiba), there has been a great expansion since 1990. The increasing computational power and storage capacities of personal computers makes these commercial systems the equal of previous mainframe systems of the 1980s and earlier – and, in many cases, more powerful. However, there has not been a matching improvement in translation quality. Nearly all are based on older transfer-based (or even direct translation) models; few have substantial and well-founded dictionaries; and most attempt to function as general-purpose systems, although most vendors do offer specialist dictionaries. In nearly all cases, systems are sold in three basic versions: systems for large corporations (enterprise systems), usually running

on client-server configurations; systems intended for independent translators (professional systems); and systems for nontranslators (home use).

The Internet has had a major impact since the mid-1990s. First, there has been the appearance of MT software products specifically for translating Web pages and electronic mail messages. Second, beginning in the mid-1990s, many MT vendors have provided Internet-based online translation services for translation on demand – pioneered by Systran on the French Minitel network during the 1980s, by CompuServe in 1995 based on the Transcend system, and then shortly afterward by AltaVista (the Babelfish service using Systran). There are now numerous other online services, some offering post-editing by human translators (revisers), at extra cost, but in most cases presenting unrevised results. Hence, translation quality is often poor, inevitably given the colloquial nature of many source texts, but these services are undoubtedly filling a significant (and apparently widely acceptable) demand for immediate rough translations for information purposes. MT is now reaching a mass market.

Further Reading

The general history of MT is covered by Hutchins (1986), updated by Hutchins (1988, 1993). Basic sources for the early period are Locke and Booth (1955), Edmundson (1961), Booth (1967), Rozencvejg (1974), Henisz-Dostert *et al.* (1979), Bruderer (1982), and Hutchins (2000). For the 1970s and 1980s, there are good descriptions of the main systems in Nirenburg (1987), King (1987), and Slocum (1988). For systems developed during the 1990s, sources include Dorr *et al.* (1999); Somers (2003), the journal *Machine Translation*, the biennial Machine Translation Summit conferences, workshops and other conferences for MT, conferences for language resources and evaluation, computational linguistics, and the Machine Translation Archive.

See also: Chomsky, Noam (b. 1928); Computational Linguistics: History; Controlled Languages; Generative Grammar; Language Processing: Statistical Methods; Machine Translation: Interlingual Methods; Machine Translation: Overview; Machine-Aided Translation: Methods; Mel'čuk, Igor Aleksandrovic (b.1932); Montague Semantics; Natural Language Understanding, Automatic; Parsing and Grammar Description, Corpus-Based; Principles and Parameters Framework of Generative Grammar; Speech Acts and Artificial Intelligence Planning Theory.

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http://www.elra.info – Conferences on Language Resources and Evaluation.
http://www.mt-archive.info – Machine Translation Archive.

Machine Translation: Interlingual Methods

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Introduction

As described in the article on **Machine Translation: Overview**, machine translation (MT) methodologies are commonly categorized as direct, transfer, and interlingual. The methodologies differ in the depth of analysis of the source language and the extent to which they attempt to reach a language-independent representation of meaning or intent between the source and target languages. Interlingual MT typically involves the deepest analysis of the source language.

Figure 1 – the Vauquois triangle (Vauquois, 1968) – illustrates these levels of analysis. Starting with the shallowest level at the bottom, direct transfer is made at the word level. Moving upward through syntactic and semantic transfer approaches, the translation occurs on representations of the source sentence structure and meaning, respectively. Finally, at the interlingual level, the notion of transfer is replaced with a single underlying representation – the interlingua – that represents both the source and target texts simultaneously. Moving up the triangle reduces the amount of work required to traverse the gap between languages, at the cost of increasing the required amount of analysis (to convert the source input into a suitable pretransfer representation) and synthesis (to convert the posttransfer representation into the final target surface form). For example, at the base of the triangle, languages can differ significantly in word order, requiring many permutations to achieve a good translation. However, a syntactic dependency structure expressing the source text may be converted more easily into a dependency structure for the target equivalent because the grammatical relations (subject, object, modifier) may be shared despite word order differences. Going further, a semantic representation (interlingua) for the source language may totally abstract away from the syntax of the language, so that it can be used as the basis for the target language sentence without change.

Comparing the effort required to move up and down the sides of the triangle to the effort to perform transfer, interlingual MT may be more desirable in

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http://www.elra.info – Conferences on Language Resources and Evaluation.
http://www.mt-archive.info – Machine Translation Archive.

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Introduction

As described in the article on **Machine Translation: Overview**, machine translation (MT) methodologies are commonly categorized as direct, transfer, and interlingual. The methodologies differ in the depth of analysis of the source language and the extent to which they attempt to reach a language-independent representation of meaning or intent between the source and target languages. Interlingual MT typically involves the deepest analysis of the source language.

Figure 1 – the Vauquois triangle (Vauquois, 1968) – illustrates these levels of analysis. Starting with the shallowest level at the bottom, direct transfer is made at the word level. Moving upward through syntactic and semantic transfer approaches, the translation occurs on representations of the source sentence structure and meaning, respectively. Finally, at the interlingual level, the notion of transfer is replaced with a single underlying representation – the interlingua – that represents both the source and target texts simultaneously. Moving up the triangle reduces the amount of work required to traverse the gap between languages, at the cost of increasing the required amount of analysis (to convert the source input into a suitable pretransfer representation) and synthesis (to convert the posttransfer representation into the final target surface form). For example, at the base of the triangle, languages can differ significantly in word order, requiring many permutations to achieve a good translation. However, a syntactic dependency structure expressing the source text may be converted more easily into a dependency structure for the target equivalent because the grammatical relations (subject, object, modifier) may be shared despite word order differences. Going further, a semantic representation (interlingua) for the source language may totally abstract away from the syntax of the language, so that it can be used as the basis for the target language sentence without change.

Comparing the effort required to move up and down the sides of the triangle to the effort to perform transfer, interlingual MT may be more desirable in

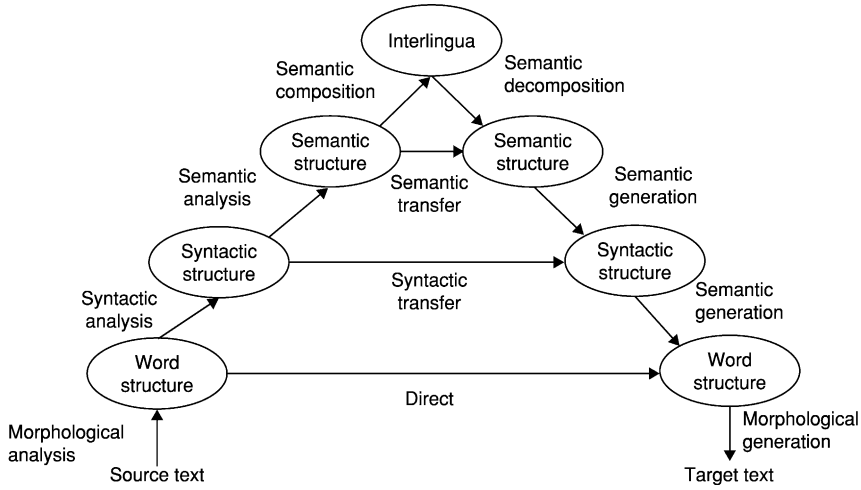

Figure 1 The Vauquois triangle for MT.

some situations than in others. Because in principle an interlingual representation of a sentence contains sufficient information to allow generation in **any** language, the more (and the more different) target languages there are, the more valuable an interlingua becomes. To translate from one source into N target languages, one needs $(1+N)$ steps using an interlingua compared to N steps of transfer (one to each target). But to translate pairwise among all the languages, one needs only $2N$ steps using an interlingua compared to about N^2 with transfer – a significant reduction for the former. In addition, since in theory it is not necessary to consider the properties of any other language during the analysis of the source language or generation of the target language, each analyzer and generator can be built independently by a monolingual development team. Each system developer only needs to be familiar with his/her language and the interlingua.

Another advantage of the interlingua approach is that interlingual representations can be used by NLP systems for other multilingual applications, such as cross-lingual information retrieval, summarization, and question answering (see Figure 2). For example, it is a basic assumption of the Semantic Web that webpages will contain not only source text but also some interlingual representations thereof, against which queries issued in other languages and translated into the interlingua can be matched, and from which various target-language versions of the webpages can be generated. In all of these applications, there is a reduction in computation over approaches that tailor the underlying representation to the idiosyncrasies of each of the input/output languages. Without an interlingual representation, all these multilingual applications require the insertion of a translation step at least once and often in two different places.

Although interlinguas are a topic of recurring interest, only one interlingual MT system has ever been made operational in a commercial setting – KANT (Nyberg and Mitamura, 2000) – and only a handful have actually been taken beyond the stage of a research prototype. Interesting research prototypes are Pangloss (Frederking *et al.*, 1994), CICC, NESPOLE!, and ChinMT (Habash *et al.*, 2003).

Interlingua Definition and Components

An interlingua is a system for representing the meanings and communicative intentions of language. It can be defined as a triple (S,N,L) where:

- S is a collection of representation symbols, often defined in an ontology, where each symbol denotes a particular aspect of meaning or intention (sometimes individually, and sometimes in concert with others according to specific rules of combination).
- N is a notation, within which symbols can be composed into meanings. The rules governing notational well-formedness reflect the compositional derivation of complex meaning out of 'atomic' symbols, an operation that is basic to the theory of the interlingua.
- L is a lexicon, namely a collection of words of a human language such as English, in which each lexical element is associated directly or indirectly with one or more symbols from S. Interlingual MT systems typically include one lexicon for each language.

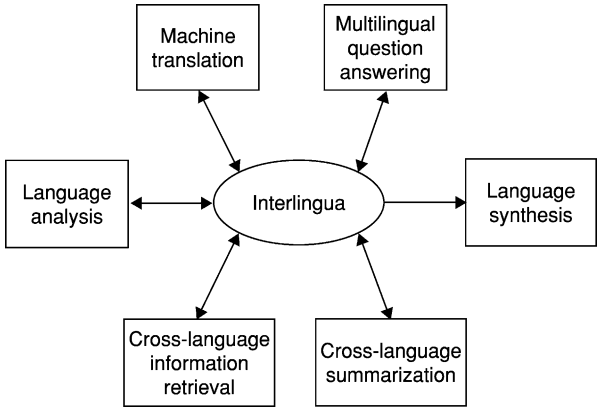

Figure 2 Use of Interlingua in multiple applications.

An interlingua instance is the representation of the meaning of a given fragment of text, such as a clause, sentence, or document. Such an instance is often written as a list of interconnected nested frame structures, where each proposition in the frame represents some atomic component of the total meaning.

Details and examples of each of these components follow.

Representation Symbols

Typically, an interlingua comprises several kinds of symbols to represent meaning. The largest set can be thought of as the conceptual primitives; rather like the open-class words in a human language, these symbols stand for specific types of objects, events, relations, qualities, etc. Other, smaller, sets of symbols are defined to represent specific fields of meaning, and usually derive from a logical theory about the nature of some phenomenon. For example, the linguistic system of tense can be related to a theory of time, and time can be represented in an interlingua according to a highly formalized subsystem (Reichenbach, 1947; Allen, 1984). Other typical subfields of meaning represent space, causality, the epistemic status of events (actual, hypothetical, desired, etc.), etc.

These symbols are often arranged as taxonomies in which each node stands for a symbol, and information stored at higher-level symbols is inherited downwards and shared by lower ones. The contents and structure of the taxonomy thereby embody, to some degree, the interlingua designer's conceptualization of the world, making the taxonomy an ontology in the classical sense. Although ontologies are as old as Aristotle and are most commonly used in artificial intelligence systems to support complex reasoning, interlingua ontologies form a distinct type: they are generally large (comprising several thousands of symbols), contain relatively little information per symbol, and what information is contained is primarily devoted to interlingua instance composition or linguistic behavior instead of to inference.

It is not uncommon for an interlingual MT system to contain both an upper-level, very general, ontology and then one or more specific domain-oriented ones. The upper ontology contains notions that are shared over all domains in common language; the lower ones encode distinct subworlds, such as finances, sports, chemistry, etc. Usually, the higher-level symbols represent conceptual and linguistic abstractions for which there are no words, and the lower-level ones more concrete meanings for which words exist in the various languages' lexicons. (For example, the Penman Upper Model contains the nodes *NonDecomposableObject* and *DecomposableObject* to separate mass and count nouns.) One advantage of domain partitioning is ambiguity avoidance: the term *bond* in the financial domain has only one meaning, and in the chemistry domain another, enabling the MT system to proceed more expeditiously in each domain.

Ontologies developed for MT include ONTOS (ONTOS, 1989), SENSUS (Knight and Luk, 1994), and Mikrokosmos/OntoSem (Nirenburg and Raskin, 2004). Ontologies developed and used for language technology applications in general include WordNet (Fellbaum, 1998), the Penman Upper Model (Bateman *et al.*, 1989), and Omega (Philpot *et al.*, 2003). Omega can be browsed using the DINO browser.

Notation

The notation is the vehicle by which the symbols' individual shades of meaning are assembled into a complex meaning. The notation is usually instantiated as a network of propositions represented as a set of nested frames, where each proposition employs the symbols of the interlingua, composed according to the specifications of the interlingua in general and of the symbols in particular.

Typically, a frame has a frame header, which may include a frame identifier, and one or more propositions, each being a relation–value pair that links the frame header to the value via the relation. Figure 3 provides an example from the KANT system, representing the meaning of *If the error persists, service is required*. The frame headers – each marked with an asterisk (*) – of the two clauses are BE-PREDICATE and QUALIFYING-EVENT. BE-PREDICATE has two arguments, an attribute and a theme. Each of these is headed by another frame, REQUIRED and SERVICE, respectively. The QUALIFYING-EVENT has a PERSIST event whose theme is ERROR.

In some sophisticated interlinguas, the notation contains separate zones for different kinds of

```
(*BE-PREDICATE
  (attribute
      (*REQUIRED
        (degree positive)))
  (mood declarative
  (predicate-role attribute)
  (punctuation period)
  (qualification
      (*QUALIFYING-EVENT
          (event
              (*PERSIST
                  (argument-class theme)
                  (mood declarative)
                  (tense present)
                  (theme
                      (*ERROR
                          (number (:OR mass singular))
                          (reference definite)))))
              (extent (*CONJ-if))
              (topic +)))
      (tense present)
      (theme
          (*SERVICE
              (number (:OR mass singular))
              (reference no-reference))))
```

Figure 3 KANT representation of *If the error persists, service is required.*

meaning (Nirenburg and Raskin, 2004); typically a zone for world semantics (the conceptual content of the text), a zone for interpersonal semantics (information in the text reflecting the writer, reader, their relationship, etc., which often affects the style of the text rather than the content), and a zone for metatextual information (medium, such as spoken or written; genre, such as telegram, letter, report, article; situation, such as anonymous posting, personal delivery, etc.).

Lexicon

An interlingua lexicon includes information about the nature and behavior of each word in the language. For example, events and actions (usually expressed as verbs) include information about their preferred arguments (agents, patients, instruments, etc.). In some interlinguas, this information may reflect the verbal predilections of one language more than another; for example, *I swim across the river* is expressed in Spanish as *I cross the river swimmingly.* Should the interlingual representation be anchored on *swim* or *cross*? The choice rests with the interlingua symbol set designer. To the degree such asymmetries in the interlingua prefer one language over another, it is said to deviate from true language neutrality. A representation system reflecting one language closely is often called shallow semantics.

Within a chosen representation system, the concepts on which events are anchored are called predicates and the participants in the event are called arguments following the formalism used in logical representations used in artificial intelligence systems. Predicate-argument structure refers to the combination of an event concept and its participants – and a given predicate is said to have a certain number of potential participants – or valency. For example, the verb *load* has a valency of 3: the person doing the loading, the item that is loaded, and the place that the item is loaded.

Table 1 Examples of semantic roles

Role	*Definition*	*Example*
AGENT	An Agent should have the features of volition (able to make a conscious choice), sentience (having perception), causation (able to bring about an effect) and independent existence (existence not resulting from the action)	**John** *broke* the vase
THEME	The Theme is causally affected, or is in a state or changes state, or is in a location or changes location, or comes into or out of existence	John *broke* **the vase**
INSTR	The Instrument has causation but no volition. Typically, an instrument appears with an agent and can be paraphrased with 'using'	John *broke* the vase **with a hammer**

Semantic roles – often called thematic roles – are by far the most common approach to representing the arguments of a predicate semantically. However, the numerous variant theories display little agreement even on terminology. A small set of examples is shown in Table 1.

A number of interlingua researchers have used semantic roles for interlingual MT (Dorr, 2001; Nyberg and Mitamura, 2000). More details are given in 'Interlinguas in Machine Translation' below.

Issues in Interlingua

The notion of interlingua appeals to many, but is a complex undertaking. In this section we examine the issues faced by designers of interlinguas and interlingual MT systems.

Problems with Representing Meaning

Probably the central problem of interlingua design is the complexity of meaning. A great deal has been written about interlinguas, but no clear methodology exists for determining exactly how one should build a true language-neutral meaning representation, if such a thing is possible at all (Hovy and Nirenburg, 1992). It is always possible to add more detail to a meaning representation, but in order to implement an

MT system, the details must end at some point. To date no adequate criteria have been found for deciding when to stop refining the meaning representation, although some preliminary attempts have been made in the NESPOLE! project (Levin *et al.*, 2003) and in the IAMTC project (see 'Interlingual Annotation of Multilingual Text Corpora' below).

A basic design choice is granularity: the number of interlingual representation primitives. The parsimonious approach, exemplified by Conceptual Dependency (Schank and Abelson, 1977), declares that a small number of primitives are enough to compositionally represent all actions. This poses a daunting problem of meaning assembly that has never been seriously attempted. In contrast, the profligate approach, called ontological promiscuity (Hobbs, 1985), essentially allows a representation symbol for every shade of meaning (and certainly one for each lexical item). This poses a problem of representing the essential relatedness of notions such as *buy* and *sell*, *come* and *go*, etc. The ideal seems to have been to aim somewhere in between, seeking conceptual depth and coverage simultaneously. Many researchers (Nirenburg and Raskin, 2004) develop a deep semantic analysis that requires extensive world knowledge; the performance of deep semantic analysis (if required) depends on the (so far unproven) feasibility of representing, collecting, and efficiently storing large amounts of world and domain knowledge. This problem consumes extensive efforts in the broader field of artificial intelligence (Lenat, 1995).

We present an example. What, principally, are the primitive concepts of the meaning representation for *eat*? Do we also need more specific primitives like 'eat-politely' and 'eat-like-a-pig'? This distinction is required to distinguish between the verbs *essen* and *fressen* in German. In general, two strategies are possible. One is to adopt arbitrarily the conceptualizations of one language, and specify the variations of all others in terms thereof; the other is to multiply out all the distinctions found in any language. In the latter case one will obtain two interlingual items representing *eat* (because of German) and two for the object *fish* (because of the distinction between *pez* and *pescado* in Spanish). The situation worsens; in Japanese translation of the verb *wear* depends on where the object is worn, e.g., *head* or *hands*.

Ontologies greatly support the profligate approach, because they allow one to concisely represent systematic relationships between groups of concepts. However, building an ontology remains a problem. For example, the WordNet-based component of the Omega ontology (Philpot *et al.*, 2003) mentioned above contains 110 000 nodes and often provides too many indistinguishable alternatives, whereas the Mikrokosmos-based component of Omega contains only 6000 concepts and does not offer all the concepts needed to represent the full meaning of a word. Thus the word *extremely* contains four concepts in WordNet-based Omega, and each sense is hard to distinguish from the others: (1) to a high degree or extent, favorably or with much respect; (2) to an extreme degree; (3) to an extreme degree, super; and (4) to an extreme degree or extent, exceedingly. On the other hand, the Mikrokosmos-based part of Omega does not contain even one concept for the word *extremely*.

Another issue raised with respect to interlinguas is that, because this representation is purportedly independent of the syntax of the source text, the target text generated reads more like a paraphrase than a strict translation. That is, the style and emphasis of the original text are lost. However, this is not so much a failure of the interlingua as its incompleteness, caused by a lack of understanding of the discourse and pragmatics required to recognize and appropriately reproduce style and emphasis. In fact, in some cases it may be an advantage to ignore the author's style. Moreover, many have argued that, outside the field of artistic texts (poetry and fiction), preservation of the syntactic form of the source text in translation is completely superfluous (Goodman and Nirenburg, 1991; Whitelock, 1989). For example, the passive voice constructions in the two languages may not convey identical meanings. Taken overall, the current state of the art seems to confirm that it is possible to produce interlinguas that are reliably adequate between language groups (e.g., Japanese and Western European) for specialized domains only.

Divergences

An important problem addressed by interlingua approaches is that of structural differences between languages – language divergences – e.g., English *fear* vs. Spanish *tener miedo de*. Some examples from Dorr (1993) are:

- Categorial divergence: the translation of words in one language into words that have different parts of speech in another language. For example, *to be jealous – tener celos* ('to have jealousy').
- Conflational divergence: the translation of two or more words in one language into one word in another language. Examples include *to kick – dar una patada* ('give a kick').
- Structural divergence: the realization of verb arguments in different syntactic configurations in different languages. For example, *to enter the house – entrar en la casa* ('enter in the house').

- Head-swapping divergence: the inversion of a structural dominance relation between two semantically equivalent words when translating from one language to another. For example, *to run in – entrar corriendo* ('enter running').
- Thematic divergence: the realization of verb arguments in syntactic configurations that reflect different thematic to syntactic mapping orders. For example, *I like grapes – me gustan uvas* ('to-me please grapes').

Many divergences are caused by differences in language typology. For example, many verb-serializing languages express the benefactive (e.g., write a letter *for me*) in a serial verb constructions (e.g., write letter *give me*). Some types of meaning are particularly susceptible to divergences. In English, sentences expressing the speech act of suggesting (*How about going* to the conference? *Why not go* to the conference?) cannot be translated literally into most other languages. Divergences are also common in expressions of modality. For example, the expression of deontic modality in *you had better go* in English can be expressed in Japanese roughly as *Itta hoo ga ii*, literally 'go(past form) way/option/alternative subj-marker good' or '(the) option (of) going (is) good.' Some authors have argued that divergences may be the norm rather than the exception (Levin and Nirenburg, 1994).

Resolution of cross-language divergences is an area where the differences in MT architecture are most crucial. Many MT approaches resolve such divergences by means of construction-specific rules that map from the predicate-argument structure of one language into that of another. The interlingua approach to MT takes advantage of the compositionality of basic units of meaning to resolve divergences. For example, the conflational divergence above is resolved by mapping English *kick* into two components, the motional component (movement of the leg) and the manner (a kicking motion) before translating into a language like Spanish.

Interlinguas in Machine Translation

A typical interlingual system is illustrated schematically in Figure 4. Each language requires an analyzer and a synthesizer. The analyzer takes as input a source language sentence and produces as output an interlingual representation of the meaning. The synthesizer takes an interlingual representation of meaning as input and produces one or more sentences with that meaning. In theory, it is not necessary to consider the properties of another language during the analysis of the source language or generation of the target language. To translate from language L_1 to L_2, L_1's analyzer produces an interlingual representation and L_2's synthesizer generates an L_2 sentence with the same meaning.

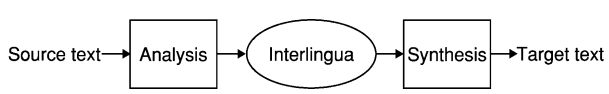

Figure 4 Interlingual MT system architecture.

Below we illustrate several representative examples of interlingual representations used by developers of interlingual MT systems.

Pangloss

The Pangloss project (Frederking *et al.*, 1994) started as an ambitious attempt to build rich interlingual expressions using humans to augment system analysis. As shown in Figure 5, the representation includes a set of frames representing semantic components (each headed by a unique identifier such as *%proposition_5*) and a separate frame with aspectual information (see *%aspect_5* at bottom) representing duration, telicity, etc. Some modifiers are treated as scalars and represented by numerical values; the phrase *active expansion* is represented in *%expand_1* with an *intensity* of 0.75 (out of 1.0). Note also that all implicit arguments (for instance, the *agent* of *%expand_1*) are explicitly included.

```
%proposition_5
   head            %pursue_1
   time            %time_5
   aspect          %aspect_5
   polarity         positive

%pursue_1
   agent           %company_4
   theme           %policy_1
   purpose         %set up_1
   means           %tie_up_2          ;coreference to %tie-up_1

  %company_4
      name         $"Sezon Group"  ;coreference to %company_3

%policy_1
   policy-type     %expand_1

%expand _1
   agent           %pursue_1.agent
   destination     %overseas
   intensity       0.75

%tie-up_2
   tie-up-partner  %company_5      ;coreference to %company_2

%aspect_5
   phase           continue
   iteration       once
   duration        prolonged
   telicity        false
```

Figure 5 Pangloss interlingual representation of *The Sezon Group will pursue an active overseas expansion policy by means of the tie-up with SAS.*

The focus of the Mikrokosmos project – more recently dubbed OntoSem (Nirenburg and Raskin, 2004) – is to produce semantically rich text-meaning representations (TMRs) of unrestricted text that can be used in a wide variety of applications, including as an interlingua for MT. These representations provide the basis for addressing some of the most difficult problems of NLP, such as disambiguation and all aspects of reference resolution, from reconstructing elliptical utterances to linking textual referents to their real-world 'anchors' in a fact repository.

TMRs (Ontosem's interlingua expressions) use a language-independent metalanguage compatible with that used to represent the underlying static knowledge resources – the ontology and ontologically-linked lexicons. A sample TMR for the input *He asked the UN to authorize the war*, is shown in Figure 6. (Capital letters indicate ontological concepts; the indices represent numbered instances of ontological concepts in the world model built up during this run of the system.) This says that the word *ask* instantiates the 69th instance of the concept REQUEST-ACTION, whose agent is HUMAN-72 (the instantiation of *he*, which was resolved as *Colin Powell* using reference resolution procedures), whose beneficiary is ORGANIZATION-71 (the instantiation of UN, which was resolved to UNITED-NATIONS using reference resolution procedures), and whose theme is ACCEPT-70 (the instantiation of *authorize*, whose theme is WAR-73 – the semantic representation of the meaning of the word *war*). One goal of recent work in the OntoSem environment has been to create TMRs for large amounts of text, populate a fact repository using a subset of information from the TMRs, and then use the fact repository as a language-independent search space for applications such as question answering and knowledge extraction.

```
REQUEST-ACTION-69
  AGENT                HUMAN-72
  THEME                ACCEPT-70
  BENEFICIARY          ORGANIZATION-71
  SOURCE-ROOT-WORD     ask
  TIME                 (<(FIND-ANCHOR-TIME))
ACCEPT-70
  THEME                WAR-73
  THEME-OF             REQUEST-ACTION-69
  SOURCE-ROOT-WORD     authorize
ORGANIZATION-71
  HAS-NAME             UNITED-NATIONS
  BENEFICIARY-OF       REQUEST-ACTION-69
  SOURCE-ROOT-WORD     UN
HUMAN-72
  HAS-NAME             COLIN POWELL
  AGENT-OF             REQUEST-ACTION-69
  SOURCE-ROOT-WORD     he ; ref. resolution has been carried out
WAR-73
  THEME-OF             ACCEPT-70
  SOURCE-ROOT-WORD     war
```

Figure 6 OntoSem interlingual representation of *He asked the UN to authorize the war.*

JapanGloss

The interlingua notation developed for the Japangloss MT system and the Nitrogen generator (Knight and Langkilde, 2000) used symbols from the SENSUS ontology (Knight and Luk, 1994), one of the precursors of Omega. In this notation, frame identifiers are symbols like *h1* and SENSUS symbols are delimited by bars; and in contrast to many other Interlinguas, modality predicates (e.g., likelihood and necessity) are represented as frame predicates, the same way other, normal, actions and events are. Thus in the example given in Figure 7, which represents *It is possible that you must eat chicken* (equivalently, *You might have to eat chicken*), *e4* is the eating by you of the chicken, which by *h2* is obligatory, which in turn by *h1* is possible.

KANT

KANT is the only interlingual MT system that has ever been made operational in a commercial setting. The KANT system (Nyberg and Mitamura, 2000) is a knowledge-based, interlingual machine translation system. KANT is designed for translation of technical documents written in Controlled English to multiple target languages (*see* **Controlled Languages**). The KANT Analyzer produces an interlingua expression for each sentence in the input document; an example appeared earlier in Figure 3. This interlingua is mapped into an appropriate target sentence by the KANT generator. For each target language there is a separate lexicon and grammar.

The KANT system was integrated with the ClearCheck document checking interface (built by Carnegie Group) and deployed in the Caterpillar document workflow during the middle 1990s. The work for Caterpillar involved development of a Caterpillar Technical English (CTE), a corresponding KANT Analyzer, and KANT Generators for French, Spanish, and German. The system delivered to Caterpillar represents the first large-scale deployment of controlled language checking integrated with machine translation. The interlingua used in the KANT system

```
(h1 / |possible<latent|
    :domain (h2/ |obligatory<necessary|
                 :domain (e4 / |eat, take in|
                             :agent you
                             :patient (cl / |poulet|)))
```

Figure 7 Japangloss interlingual representation of *It is possible that you must eat chicken* or *You might have to eat chicken.*

is based on research on the generation of additional target languages, such as Portuguese, Italian, Russian, Chinese, and Turkish.

Interlingual Systems for MT of Spoken Language

The interlingua approach to machine translation has been implemented in several demos and prototypes for translation of spoken language. MT for spoken language begins with speech recognition. The output of the speech recognizer is then passed to the source language analysis module of the MT system. In addition to the problems faced by MT for text, MT for spoken language must deal with disfluencies in speech and imperfect output from a speech recognizer. For this reason, most spoken language MT systems are restricted to task-oriented domains such as travel planning or doctor–patient interviews.

Interlinguas for spoken, task-oriented dialogue typically focus on the dialogue act that the speaker intends to accomplish with his/her utterance. Examples of dialogue acts are suggesting, accepting, and rejecting a time or price. In interlinguas for spoken language, less emphasis is placed on predicate argument structure. The emphasis on speaker intent means that the same interlingual representation will be used for sentences that have very different syntactic structures. For example, the following sentences all carry out the dialogue act of giving information about the price of a room. The concept of costing is expressed by the verb (*cost*) in the first sentence, and the subject (*price*) in the second sentence. In the third sentence, the concept of costing is implicit in the predicate nominal (*one hundred dollars*).

The room costs one hundred dollars per night.
The price of the room is one hundred dollars per night.
The room is one hundred dollars per night.

The JANUS system was the earliest spoken language MT system using an interlingua in the early 1990s (Levin *et al.*, 2000). JANUS was part of the C-STAR consortium (Consortium for Speech Translation Advanced Research), many of whose members adopted the interlingua approach for an international demo in 1999. Other interlingual speech translation systems include Enthusiast, CCLINC, NESPOLE!, Speechalator, Carnegie Mellon University's Thai speech translation system (Schultz *et al.*, 2004), and FAME.

Figure 8 provides an example from the NESPOLE! project, in which both sentences are represented by the given interlingua instance. The NESPOLE! interlingua is based on an annotated corpus of transcribed dialogues in English, German, Italian, and Japanese. It has also been applied to Chinese, Spanish, and French. Its precursor, the C-STAR interlingua, has also been applied to Korean.

Universal Networking Language

The Universal Networking Language (UNL) is a formal language designed for rendering automatic multilingual information exchange (Martins *et al.*, 2000). It is intended to be a cross-linguistic semantic representation of sentence meaning consisting of concepts (e.g., 'cat,' 'sit,' 'on,' or 'mat'), concept relations (e.g., 'agent,' 'place,' or 'object'), and concept predicates (e.g., 'past' or 'definite'). The UNL syntax supports the representation of a hypergraph whose nodes represent Universal Words and whose arcs represent Relation Labels. An example is shown in Figure 9 for the sentence *The cat sat on the mat*.

Several semantic relationships hold between universal words (synonymy, antonymy, hyponymy, hypernymy, meronymy, etc.) which compose the UNL ontology.

Lexical Conceptual Structure

Lexical Conceptual Structure (LCS) is an interlingual representation used as part of a Chinese-English Machine Translation (MT) system, called ChinMT (Habash *et al.*, 2003) that has also been used for many other MT language pairs (e.g., Spanish and Arabic) and other natural language applications (e.g., cross-language information retrieval). The LCS-based approach focuses on the types of divergences described above in 'Divergences.' Consider, for example, the case of a conflational divergence between Arabic and English:

Arabic:	ارسل الصحفي ايميلا الى محطة الجزيرة
Gloss:	'The-reporter sent email to Al-Jazeera'.
English:	The reporter emailed Al-Jazeera.

"I want to know what time the flight leaves Pittsburgh."
"What time does the flight leave Pittsburgh?"

request-information + departure
(time = (clock = question),
transportation-spec = (flight, id = yes),
orgin = name = Pittsburgh)

Figure 8 Two sentences and corresponding interlingua instance from the NESPOLE! Project.

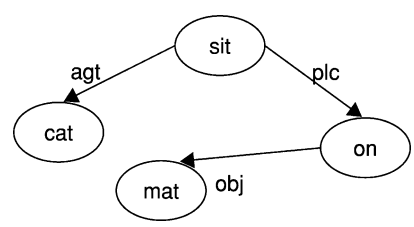

Figure 9 UNL representation of *The cat sat on the mat.*

The LCS representation for this example is shown in Figure 10, glossed as 'The reporter caused the email to go to Al-Jazeera in a sending manner.' Here, the primary components of meaning are the top-level conceptual nodes *cause* and *go*. These are taken together with their arguments, each identified by a semantic role (agent, theme, and goal), and a modifier (manner) *send + ingly*.

Approximate Interlingua

One response to the MT divergence problem (discussed in 'Divergences') is the use of an approximate interlingua (Habash *et al*., 2003). In this approach, the depth of knowledge-based systems is approximated by tapping into the richness of resources in one language (often English) and this information is used to map the source-language (SL) input to the target-language (TL) output.

The focus of the approximate-interlingua approach is to address the types of divergences covered by the LCS-based approach, but with fewer knowledge-intensive components. Thus, a key feature of an approximate interlingua is the coupling of basic argument-structure information with some, but not all, components of the LCS representation. Only the top-level primitives and semantic roles are retained. This new representation provides the basis for generating multiple sentences that are statistically pared down so that the most likely sentence is generated according to the constraints of the TL.

Consider, for example, the conflational divergence example given above ('Lexical Conceptual Structure') between Arabic to English. Figure 11 illustrates the approximate-interlingua approach to translation for this example. The top-level conceptual nodes are first checked for possible matches. Following this, unmatched thematic roles are checked for conflatability, i.e., cases where semantic roles are absorbed into other predicate positions. As long as there is a relation between the conflated argument ($EMAIL_N$) and the new predicate node ($EMAIL_V$), part-of-speech is disregarded.

```
(event cause
    (thing[agent] reporter+)
    (go loc
        thing[theme] email+)
            (path to loc
            (thing email+)
            (position at loc (thing email+) (thing[goal] aljazeera+)))
        (manner send + ingly)))
```

Figure 10 LCS representation of *The reporter emailed Al-Jazeera*.

Annotating Text with Interlingual Information

The success of corpus-based language technology over the past decade has shown the value of systems that automatically learn their processing from large collections of annotated examples. Although no one has yet created an Interlingua-annotated corpus to parallel the 1 million sentences plus syntax trees of the Penn Treebank (Kingsbury *et al*., 2002) (*see* **Treebanks and Tagsets**), several efforts to annotate important parts of an interlingua are underway. Principally, these efforts focus on verbs and their arguments. We list these and then describe one initiative – IAMTC – in more detail to illustrate the issues involved in annotation.

Semantic Annotation Initiatives

WordNet (Fellbaum, 1998) (*see* **WordNet(s)**) provides a terminology taxonomy for English containing over 100 000 terms. Several ontology-building efforts have used this resource as a starting point. Focusing on the creation of wordnets for other languages, the Global WordNet Association lists EuroWordNet, GermaNet, BalkaNet, and many others.

Term taxonomizing and ontologizing efforts include the Chinese HowNet and the Mimida multilingual semantic network.

Focusing on verbs alone, the FrameNet project (Baker *et al*., 1998) is classifying all verbs into groups according to the case roles (thematic roles) they support. The SALSA project parallels FrameNet, working on German verbs. Other FrameNet-related projects are available for Japanese and Spanish.

The PropBank project resembles FrameNet in that it focuses on verbs, but it does not employ a fixed set of case roles, preferring instead a more neutral set of labels with no overall semantics. VerbNet is an associated effort to assign FrameNet-like case roles to verbs. There is a list that combines VerbNet and FrameNet. The NomBank Project closely parallels PropBank, but focuses on nouns (such as nominalized verbs and relational nouns) with argument structure.

The Interlingual Annotation of Multilingual Text Corpora (IAMTC) project is an ambitious attempt to investigate interlingual semantics by annotating and comparing semantic phenomena across six languages. Having prepared bilingual corpora pairing English texts with corresponding text in Japanese, Spanish, Arabic, Hindi, French, and Korean, annotators are assigned to each text impairs to select semantic representation symbols from the Omega ontology

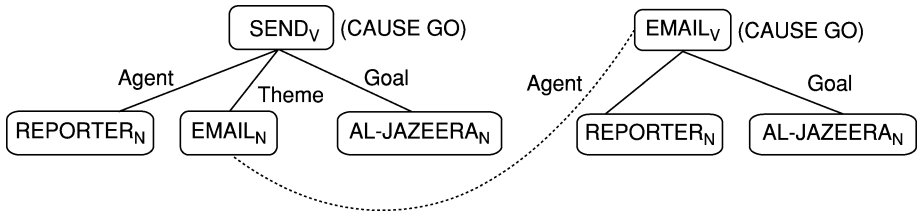

Figure 11 Approximate interlingua for English-Arabic example.

(Philpot *et al.*, 2003) for all nouns, verbs, adjectives, and adverbs. We describe this project in more detail below.

Interlingual Annotation of Multilingual Text Corpora

The IAMTC project has the following goals:

- Development of an interlingual representation framework based on a careful study of text corpora in six languages and their translations into English.
- Development of a methodology for accurately and consistently assigning such representations to texts across languages and across annotators.
- Annotation of a corpus of six multilingual parallel subcorpora, using the agreed-upon interlingual representation.
- Development of semantic annotation tools that serve to facilitate more rapid annotation of texts.
- Design of new metrics and evaluations for the interlingual representations, in order to evaluate the degree of annotator agreement and the granularity of meaning representation.

The IAMTC project is radically different from those annotation projects that have focused on morphology, syntax, or even certain types of semantic content (e.g., for word sense disambiguation). It is most similar to PropBank (Kingsbury *et al.*, 2002) and FrameNet (Baker *et al.*, 1998). However, IAMTC places an emphasis on:

1. a more abstract level of mark-up (interpretation);
2. the assignment of a well-defined meaning representation to concrete texts;
3. issues of a community-wide consistent and accurate annotation of meaning.

The data set consists of six bilingual parallel corpora. Each corpus is made up of 125 source language news articles along with three independently produced translations into English. (The source news articles for each individual language corpus are different from the source articles in the other language corpora.) The source languages are Japanese, Korean, Hindi, Arabic, French, and Spanish. Typically, each article contains between 300 and 400 words (or the equivalent) and thus each corpus has between 150 000 and 200 000 words. The Spanish, French, and Japanese corpora are based on the DARPA's 1994 MT evaluation data. The Arabic corpus is based on LDC's Multiple Translation Arabic, Part 1.

The interlingual representation comprises three levels and incorporates knowledge sources such as the Omega ontology (Philpot *et al.*, 2003) and thematic roles (Dorr, 2001). The three levels of representation are referred to as IL0, IL1, and IL2. The aim is to perform the annotation process incrementally, with each level of representation incorporating additional semantic features and removing existing syntactic ones. IL2 is intended as the interlingual level that abstracts away from (most) syntactic idiosyncrasies of the source language. IL0 and IL1 are intermediate representations that are useful stepping stones for annotating at the next level.

Issues in Interlingual Annotation

A preliminary investigation of intercoder agreement on multiple annotations shows that the more annotators learn the process, the better they become, resulting in an improvement of intercoder agreement (Mitamura *et al.*, 2004). Two assumptions may be made regarding the training of novice annotators in order to improve intercoder agreement. One is that novice annotators may make inconsistent annotations within the same text, but these may be reconciled through a process of intra-annotator consistency checking, in which annotators go over their results to find any inconsistencies within the text. Another assumption is that, if two annotators at the same site discuss their annotation results after their annotation tasks are completed, their judgments may be reconciled through a process of inter-annotator checking, in which each annotator votes, they discuss the differences, and then vote again.

From an MT perspective, issues include evaluating consistency in the use of the annotation language, given that any source text can result in multiple, different, legitimate translations (Farwell and Helmreich, 2003). Along these lines, there is the problem of annotating texts for translation without including in the annotations inferences resulting from the source text. The IAMTC effort described above is the only

initiative, to date, that addresses issues of this type in large-scale annotation of data for use in interlingual MT.

See also: Controlled Languages; Machine Translation: Overview; Treebanks and Tagsets; WordNet(s).

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Machine-Aided Translation: Methods

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Introduction

The focus of this article is on machine-aided translation (or MAT), with heavy stress on the word *aided*, and we shall begin by distinguishing MAT from machine translation (or MT) pure and simple. Both, of course, seek to automate the translation process through the use of computers, and in both humans generally have an important role to play. In MT, however, the initiative in the translation process is given over to the machine, and the aim is to automate this process completely, eliminating the human's contribution as far as possible. In MAT, on the other hand, the initiative in the translation process remains with the human translator, and the role of the machine is to assist the translator in performing certain tasks – normally, those that can be automated with a good degree of confidence and reliability. The fact that MT systems often do not succeed in automatically producing a high-quality translation – where high quality is indeed a requirement – and that a human must subsequently intervene to postedit or otherwise improve the machine's raw output should not cause us to lose sight of the fundamental distinction between MT and MAT. Whereas MT ultimately seeks to dispense with the human translator, MAT proceeds from the double recognition that, for high-quality translation at least, the contribution of a human translator is generally indispensable, and furthermore, that this situation is not likely to change for the foreseeable future. Why is this? Quite simply because high-quality translation routinely requires a level of understanding that extends well beyond the literal wording of a source text to encompass unpredictable amounts of real-world knowledge, as well as the capacity to reason over that knowledge. Despite the undeniable progress recently achieved by the new empirical methods in machine translation, such knowledge and reasoning capabilities, remain by and large, beyond the ken of today's computers. Hence, where high quality is a *sine qua non* (and not just information scanning,

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Machine Translation: Overview

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Introduction

The term *machine translation* (MT) is used to refer to any process in which a machine performs a translation operation between two ordinary human languages: the *source language* (SL) and the *target language* (TL). This is the sense that appears in the following proposition:

> Machine translation is cheaper than human translation but less reliable.

The term can also designate the product of such a process, as in:

> Reading machine translations is not very pleasant but it is a convenient way to get the gist of foreign-language Web pages.

Finally, machine translation can also refer to the study of methods and techniques that render machines capable of producing (better) translations, as in the title of the present article.

The term applies equally well to written or spoken language, but there is a tendency to prefer the terms *speech translation* or *speech-to-speech translation* for referring specifically to machine translation of spoken language.

Translation is a very effective way of helping people communicate across the linguistic barriers. Unfortunately, human translation is expensive enough that it cannot constitute a practical solution to the everyday needs of ordinary people. As the price of human translation is unlikely to fall substantially, machine translation constitutes our best hope of making translation affordable for all.

The idea of using machines to translate is very old, but it was only around 1950, with the advent of digital computers, that serious work could really start. The initial enthusiasm led many to believe that good-quality machine translation was just around the corner, but they were wrong. After some 50 years of research, we can affirm that, barring an unexpected breakthrough, machines will not be able to compete with human translators in the foreseeable future. This prediction applies not only to difficult material such as literary works, but also to all but the very simplest and repetitive texts (e.g., weather reports).

The present article explains why this is so. We start from a simplistic conception of machine translation and show where it breaks down. Then we show how computational linguists tried to fix the problems through increasingly elaborate approaches. But these more elaborate approaches turn out to raise their own additional problems.

Why Machine Translation Is a Difficult Problem

Let's assume a very naïve theory: translating between human languages is just a matter of looking up the words of the source text in a bilingual dictionary. The next 12 subsections examine the many ways that simplistic theory breaks down and show why translation requires: (a) a fine-grained understanding of the source text; (b) contextual knowledge that makes it possible to fill information gaps between the SL and the TL; and (c) a detailed knowledge of the grammar of the TL.

Segmenting Texts into Words

Before a dictionary search can be performed, the text needs to be segmented into a sequence of individual

words, but ambiguities arise about where exactly word boundaries lie. This problem is most acute in languages that do not place any whitespace between words, like Chinese. We get a good feel for the problem if we remove the spaces from an English text. The string in (1) then gives rise to several alternative segmentations:

(1) Themanywaystowelcome ...
→ The many ways to welcome ...
→ The many ways towel come ...
→ Them any ways to welcome ...
→ Them any ways towel come ...

Segmentation ambiguity is less severe in Western languages, but it still exists. For example, the English string '*in*.' can be segmented either as a single word (the abbreviation of the noun *inch*) or as two words (the preposition *in* followed by a full stop).

Since different segmentations lead to different translations (many of them gibberish), the dictionary lookup procedure needs to be supplemented with a mechanism (maybe based on grammar and semantics) that can select the one segmentation intended by the author of the text.

Dictionary Words versus Word Forms: Morphology

Ordinary dictionaries tend to abstract away from the morphological processes of inflection (*see* → *sees, seeing, saw, seen*), derivation (*convention* → *conventional, conventionalize*, etc), and composition (*twenty-story, engine-driven*) (*see* **Morphology: Overview**). As a result, many of the *word forms* that we observe in a text need to be subjected to morphological processing before they can be looked up in the dictionary.

At least in the case of morphologically-rich languages, MT systems need to incorporate morphological processing. But such processing often gives rise to *morphological ambiguity*. For example, the English form *saw* can be interpreted both as a singular noun and as the past form of a verb. The word form *repair* can belong to the basic verb *repair* with the meaning 'to fix,' but it can also be taken as a derivation on the basic verb *pair* with the meaning 'to pair again.' And the German compound *Staubecken* can be segmented either as the sequence *Stau* + *becken*, in which case it means something like 'reservoir,' or as the sequence *Staub* + *ecken*, in which case it would mean something like 'dusty corners.' These ambiguity problems are similar to those described in the subsection 'Resolving Lexical Ambiguity in the Source Language' below.

Detecting Idioms

Some dictionary words are realized as several text words. For example, in the sentence *John gave up the game*, the string *gave up* needs to be considered as encoding a single *idiomatic* lexical unit because its meaning and translation (in French, the simple word *abandoner*) cannot be predicted from the components *give* and *up* (*see* **Lexicography: Overview; Idioms**).

Moreover, the elements of some idiomatic expressions can be separated by other words, as in the following example:

(2) Some are retaining their old customs but others *gave* them *up* a long time ago.

But the same two words can also appear together without forming an idiomatic expression. Sentence (3), for example, does not contain any instance of the idiom *give up*; rather, it is the sequence *up to* that receives an idiomatic interpretation (in French, *jusqu'à*):

(3) James would give (Max) up to 100 dollars for a good copy of that book.

Thus, an MT system needs to recognize idiomatic expressions, but here too the recognition process is facing ambiguity problems.

Identifying Collocations

The meaning and appropriate translation of a given word is often closely dependent upon the words it co-occurs with, that is, on its *collocations* (*see* **Collocations**). For example, the adverb in *dead serious* and the adjective in *heavy smoker* are used to express intensification rather than to express the basic meanings of these words. Since such collocations are strongly language-dependent, MT systems need to account for them: the correct French translations are not *mort sérieux* and *fumeur lourd*, but rather *sérieux comme un pape* and *gros fumeur*.

Dealing with Unknown Words

Even when we disregard the morphological processes noted in the section 'Dictionary Words versus Word Forms: Morphology', the vocabulary of natural languages is not a closed list. We often meet new proper names in the newspaper, new common nouns in a scientific magazine, etc.

A human translator is usually able to make good guesses about the meaning of a novel word, thanks to her understanding of the context. Using various resources, she will most often be able to find a definition and an appropriate translation. In the worst case, she may have to leave the word itself untranslated but the translation of the rest of the sentence is unlikely to be much affected.

But for an MT system, unknown words are a tough challenge. They tend to jeopardize the system's ability

to understand the structure of the surrounding sentence or phrase.

Resolving Lexical Ambiguity in the Source Language

Even assuming a fixed segmentation and a fixed morphological interpretation, text words often match several different dictionary entries. One reason for this multiplicity is part-of-speech ambiguity. The English word *light*, for instance, can be used either as a noun, an adjective, or a verb, giving rise to a different translation in each case (in French, *lumière, léger*, or *allumer*). Thus an MT system needs to decide on the part-of-speech associated with each particular instance of a word.

But even when their parts of speech are known, words still exhibit *word-sense ambiguity*. Consider for example the verb *replace*; it can mean 'change for a different one' (in French, *remplacer*) or 'put back into place' (in French, *remettre en place*). In this case, the grammatical context can help determine what meaning is intended: when the verb appears with the *subcategorization frame* (that is, pattern of complements – *X replaces Y with Z*, it tends to have the first meaning:

(4) They replaced their old Subaru with a new Volvo.

However, explicit grammatical cues are not always available. Take the word *pen* for example, which can either designate a writing instrument or some kind of enclosure:

(5) Max took his nicest pen and wrote a poem for his mother.
→ Max sortit sa plus belle *plume* et écrivit un poème à sa mère.

(6) Jim placed his little brother in his pen and turned on the TV.
→ Max plaça son petit frère dans son *parc* et alluma la télé.

Nouns like *pen* do not induce any specific subcategorization frames on their environment. So, how can an MT system decide what translation is appropriate in each case?

That ambiguity of the word *pen* was used by Y. Bar-Hillel (1960) to argue against the feasibility of *fully automatic high-quality machine translation*. Linguistic knowledge (lexical, morphological, grammatical, etc.) is clearly not sufficient for choosing the right translations in examples (5) and (6). In such cases, human translators make use of their knowledge of what situations are likely in the real world: people are unlikely to place other people in a writing instrument or to use an enclosure for the purpose of writing. Since Bar-Hillel couldn't see any way to endow machines with such knowledge, he concluded that high-quality MT was impossible. As we will see, other opinions emerged later on.

Resolving Coreference Ambiguity in the Source Language

A different kind of ambiguity has to do with words like pronouns, whose interpretation is strongly dependent on that of a coreferent phrase. Consider the following example:

(7) Squirrels like peanuts. They are good for them.

The second sentence is ambiguous as to which pronoun (*they, them*) refers to which noun (*squirrels, peanuts*). Each interpretation leads to a different translation:

(8a) Les écureuils aiment les cacahuètes. Elles sont bonnes pour eux.
(8b) Les écureuils aiment les cacahuètes. Ils sont bons pour elles.

The first translation conveys the more likely interpretation: peanuts are good for squirrels. Deciding on the right interpretation and translation again hinges upon knowledge of what situations are likely in the real world: people are more likely to claim that peanuts are good for squirrels than to claim that squirrels are good for peanuts.

Structural Divergences

It is often impossible to translate a word without making adjustments to the surrounding grammatical structure, because of various types of *translation divergences* (Dorr, 1990). Consider the following examples in French/English translation:

(9) Dès son lever, Max mange un croissant.
As soon as he gets up, Max eats a croissant.

(10) Anne faillit s'étrangler.
Anne almost choked.

(11) Judy swam across the river.
Judy traversa la rivière à la nage.

The French noun phrase *son lever* needs to be translated as the clause *he gets up* because of a *lexical gap* in English: there is no noun equivalent to *lever*. The French verb *faillir* is translated by the English adverb *almost*, with the result that the main verb of the translation (*choked*) does not correspond to the main verb of the source sentence. Finally, the English manner-of-movement verb *swim* gets translated as a plain movement verb (*traverser*) plus a manner adverbial (*à la nage*).

Structural divergences are very common even between languages that are as closely related as French

and English. As a result, translation equivalences often need to be stated at the level of syntactic patterns rather than at the level of single words.

Word Insertion or Deletion

Contrary to what a naïve dictionary-based model would appear to predict, some words of the SL text can be left untranslated and some words can appear in the TL text that have no counterpart in the source.

The difference can be in 'empty' function words whose presence is required by the grammar of the SL/TL, as for example the *t-il* particle that shows up in the French interrogative:

(12) Has the president seen the results?

(13) Le président a-t-il vu les résultats?

But in other cases, the word to be inserted does carry some meaning of its own. Consider for example the translation of English nominal compounds in a language which, like French, is not so fond of compounding:

(14) oil tank → réservoir à huile

(15) steel tank → réservoir en acier

The choice between the French prepositions *à* and *en* turns out to depend on the implicit semantic relation between the two nouns. The content-to-container relation is usually marked by *à*, while the material-to-artifact relation is rather marked by *en*. Consequently, an MT system needs to figure out what semantic relation binds the terms of a nominal compound.

Another example is the difficult problem of inserting articles in Chinese-to-English translation (there are no articles in Chinese).

Language-dependent Explicitation Constraints

Languages differ a lot on *what they force their speakers to make explicit*. Consider for example the difference between languages that have a grammatical gender system (like French) and those that do not (like English). In translating sentence (16) into French, the need arises to choose between two possibilities:

(16) Jack has invited one of his students for dinner.
→ Jack a invité *un* de ses étudi*ants* à dîner.
→ Jack a invité *une* de ses étudi*antes* à dîner.

The first translation is for a male student, the second for a female student. French makes it impossible (or at least awkward) not to disclose the gender of the student. The relevant information is just not available anywhere in sentence (16). It may be available from the rest of the text, but extracting it will generally require a capability to reason on the situations being described in there.

Grammatically-marked politeness forms provide another example of explicitation constraints. For example, when a human translator translates an English dialogue into French, person A's *you* to person B will be translated as *tu* or *vous* depending on the translator's assessment of the social and personal relationship between A and B. A more extreme example will be found in the elaborate system of *honorifics* of the Japanese language.

Differences in lexical structures can also force the translator into making extra information explicit. Consider for example the problem of translating the following sentence into French:

(17) He decided to cut Milou's hair.

French has no word that means exactly the same as *hair*. Rather, it forces users to choose between *poils* (for animal hair and for human body hair) and *cheveux* (for human head hair). Again, the relevant information is not available locally and a human translator will resort to her global understanding of the situations described in the text. For example, the text might make it clear that Milou is a person but say nothing more about what kind of hair is to be cut. In that case, the translator might well choose *cheveux* on the basis of her knowledge that it is more customary for people to have their head hair than their body hair cut by other people.

Target-language Grammar

The choice of a correct TL equivalent often depends on the grammatical context of the TL. An obvious example is the fact that the translation of English determiner *the* as *la*, *le*, *les*, etc., depends on the French noun modified by that determiner. We saw a similar case in discussing the possible translations for utterance (8): in the more likely interpretation of that utterance, the pronoun *they* gets translated as *elles* because its antecedent *in the French text* is the feminine plural noun *cacahuètes*.

Another example of the importance of the grammatical context in the TL is the interdependence between the choice of the translations for a verb and for the elements that appear within its syntactic frame. For example, the English verb *know* translates into French as *connaître* or *savoir* depending on whether the direct object *in French* is a noun phrase or a clause. There are cases where both translations are possible:

(18) John knows that Mary is angry.
→ John sait que Mary est en colère.
→ John connaît la colère de Mary.

Word Order

Another obvious failure of a dictionary-only approach is that it cannot account for the necessity to place words in a different order when going to a different language. In general, ordering rules apply not to single words but rather to whole phrases based on their grammatical function (*see* **Word Order and Linearization**). For example, in German subordinate clauses, the verb needs to be placed after its object:

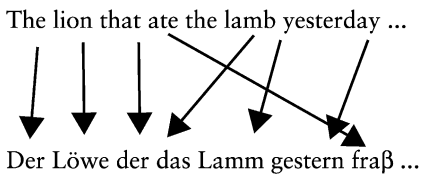

An MT system clearly needs to understand the grammatical structure of the SL and TL sentences in order to produce the correct word order.

Rule-Based Approaches: Towards More Abstraction

Rule-based approaches to MT can be characterized according to the level of abstraction at which the passage from the SL to the TL is attempted. The space of possibilities is often schematized as the 'Vauquois triangle,' illustrated in Figure 1 (Vauquois, 1968). At the bottom of the triangle stands the *direct approach* in which the TL text is produced by applying translation rules directly to the SL text. In the *transfer approach*, translation rules are applied to abstract language-dependent intermediate representations (IR) that are connected to the source/target texts through analysis/generation rules. In the *interlingua approach*, the analysis and generation processes connect the source and target text with a shared language-independent meaning representation.

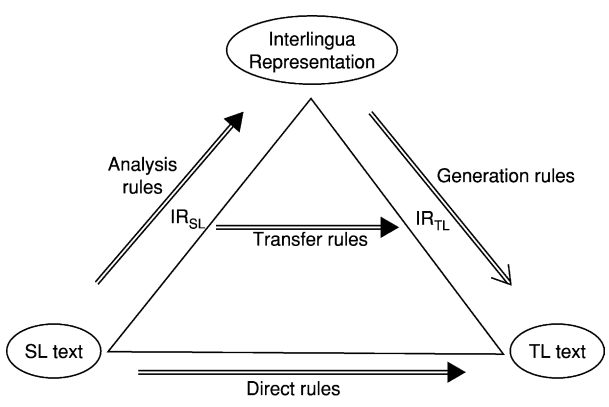

Figure 1 Vauquois triangle.

Direct Systems and Morphology-based Translation

The pure dictionary lookup approach discussed above amounts to an extreme form of the direct architecture. Even the earliest practitioners of MT realized that something more was needed. Rule-based morphological analysis was soon introduced in order to deal with inflections in morphologically rich languages. This analysis step remains a standard feature of modern MT systems, often implemented through the use of *finite-state networks*. It was also recognized from the start that additional rule systems are required: (a) for selecting among the various possible translations of each word; and (b) for reordering the words of the TL.

In early systems such as the Georgetown-IBM prototype that gave rise in 1954 to the first public MT demo MT (Garvin, 1967), the rules could only operate on a strictly local context (e.g., a three-word window). But later systems were designed to handle a more general context. In so doing, they adopted at least in part the idea of a separate analysis step, thereby blurring the distinction between direct and transfer systems (this can be traced at least as far back as (Zarechnak, 1959)). Over time, the direct approach was refined to the point where it could give rise to commercial systems such as SYSTRAN and SPANAM, that remain to this day among the best existing MT systems.

The better direct systems manage to tackle reasonably well many problems of text segmentation, morphology, idioms, lexical ambiguity, collocations, word insertion/deletion, and word order. But since they still rely on shallow and local grammatical analyses, they are unable to guarantee the grammatical coherence of their output. Moreover, in the absence of suitable semantic and pragmatic models, their treatment of ambiguities is based on various *heuristics* (that is, rules-of-thumb), including a rather massive use of phrases in the dictionary. When the heuristics break down, the target text often becomes semantically and/or pragmatically incoherent.

Transfer-based Systems

The transfer architecture was first proposed by Yngve (1957) and is illustrated in Figure 2.

There are three important ideas in this architecture:

1. SL/TL equivalences are stated at the level of abstract representations of the texts;
2. The overall process is separated into three distinct steps: (a) analysis, which builds an abstract representation of the SL text; (b) transfer, which maps that SL representation onto an equivalent

one for the TL; and (c) generation, which produces the TL sentence from the TL representation; and

3. Linguistic data (dictionaries, grammars) is separated from the algorithms (programs) that manipulate them. Rather than directly writing an *ad hoc* computer program for sentence analysis, one writes abstract (language-specific) grammar rules in a linguistically perspicuous metalanguage such as *augmented context-free grammars*, then a general-purpose (language-independent) parsing algorithm is used for applying the grammar rules to the input text.

This modular architecture facilitates the reuse of the same algorithms and the same linguistic data in a variety of different tasks.

The nature of intermediate representations is variable, but most systems use something at least as abstract as sentence-level Chomskyan syntactic tree structures. A SL sentence such as *The hungry lion saw the lamb*. might receive a representation like that of Figure 3.

Rules of *lexical transfer* and rules of *structural transfer* are then applied to this SL tree representation to derive an equivalent one for the TL. The statement of correspondences is facilitated by the fact that many of the obstacles described in the section 'Why Machine Translation Is a Difficult Problem' have been removed: word segmentation is explicit, words are morphologically analyzed and their parts of speech are made explicit, the phrasal structure is shown, etc.

Lexical transfer rules can refer to various features of the context. For example, the rules of Figure 4 translate the word *light* with reference to its part-of-speech assignment and the verb *replace* with reference to its subcategorization pattern (see discussion about sentence (4) above). It is also possible to handle many idiomatic expressions in a similar way: a subtree that matches the SL expression is mapped *en bloc* onto a semantically equivalent subtree of the TL. Structural transfer rules are used for handling grammatical differences such as word order.

The subsection 'Target-language Grammar' above noted that the statement of translation equivalences was often complicated by issues of TL grammar such as morpho-syntactic agreement. But the use of abstract intermediate representations alleviates this problem too by making it possible to state correspondences only at the level of canonical forms (e.g., THE → LE). The connection between the canonical form and its appropriate surface realization (e.g., *le, la, les, l'*) is handled by the language-specific grammar rules of the analysis and generation components.

As suggested by the Vauquois triangle, intermediate representations can be made more abstract. For example, they can be akin to the *deep structures* of Chomsky's transformational grammar and its descendants (HPSG, LFG, etc., – *see* **Head-Driven Phrase Structure Grammar; Lexical Functional Grammar**). With such an approach the two sentences of (19) will have similar deep representations in which *their old Subaru* is the *deep object*, with the result that the translation rule of Figure 4 will cover the case of the passive sentence as well:

(19) They replaced their old Subaru with a new Volvo.
Their old Subaru was replaced with a new Volvo.

Going further in the direction of a *semantic transfer*, intermediate structures can also feature a normalized lexicon. For example, synonym words can be mapped onto a unique representative of the class. Mel'čuk and Zolkovsky's (1970) *lexical functions* are sometimes used as a general framework for lexical normalization. This framework provides a treatment for some language-specific collocations (cf. the subsection 'Collocations' above). For example, the notion of 'intensification' can be represented by an abstract semantic element *Magn* common to the intermediate representations of both languages (the creation and use of such elements constitutes a small step in the direction of the language-neutral interlinguas discussed below):

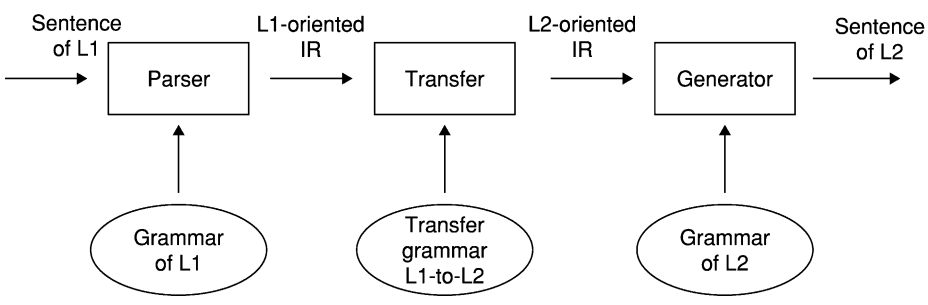

Figure 2 The transfer architecture.

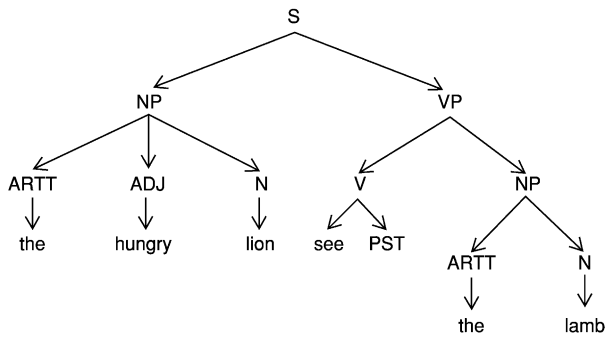

Figure 3 Syntax-based intermediate representation.

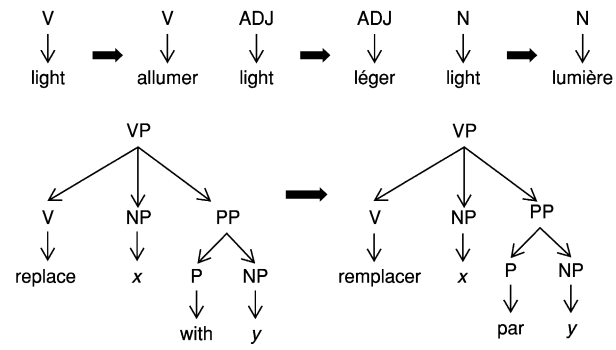

Figure 4 Lexical transfer rules.

(20) Source text: *heavy smoker*
→ English IR: Magn(smoker)
→ French IR: Magn(fumeur)
→ French text: gros fumeur

Many transfer-based systems have been developed over the years. Some classical examples are:

- ARIANE (Vauquois and Boitet, 1985)
- TAUM-AVIATION (Isabelle and Bourbeau, 1985)
- EUROTRA (Allegranza *et al.*, 1991)
- METAL (Slocum, 1987)
- LMC (McCord, 1989)

METAL and LMC have given rise to commercial systems: Lantworks for the first one and Linguatec and Websphere Translation Server for the second one.

Transfer-based systems are in principle capable of attacking many problems that are out of the reach of direct systems. However, their much more ambitious analysis and generation processes increase the risk of processing errors. As a case in point, syntactic parsing tends to get into trouble in the face of highly complex sentences, ill-formed ones, and unknown words. A failed parsing process will then result in missing or unpredictable output. Second, syntactic ambiguity tends to lead to a proliferation of alternative analyses. The following sentence pairs illustrate ambiguities with respect to adjective attachment (either to the next noun or to the rest of the noun phrase) and prepositional phrase attachment (either to the noun phrase or to the verb phrase).

(21a) He bought liquid oxygen tanks.
(21b) He bought rusted oxygen tanks.

(22a) He killed the girl with the red dress.
(22b) He killed the girl with the revolver.

Transfer-based systems are better at uncovering such ambiguities (based on syntactic processing) than at resolving them (which requires semantic and knowledge-based processing). In other words, they tend to ask more semantic questions than they have answers for. This inability may be why, in spite of their theoretical advantages, they have not thus far managed to consistently outperform advanced direct systems like SYSTRAN.

Interlingua and Knowledge-based Systems

An extensive survey of interlingual methods will be found in a companion article (*see* **Machine Translation: Interlingual Methods**). This article provides just an overview of some of the basic issues.

Language-independent Representations In MT, the term 'interlingua' is used to designate any artificial language intended to serve as a language-independent intermediate representation between SL and TL texts. An interlingua normalizes the way meanings are expressed not only within a given language (as in deep transfer systems) but also across all languages.

In the interlingual architecture, the analysis and generation components perform mappings between the source and target texts and their shared interlingua representation. Since no transfer is required, an interlingual system translates in all directions between n languages using only $2n$ components (n analyzers plus n generators). By contrast, the standard transfer architecture requires n analyzers and n generators, plus no less than $n \times (n-1)$ pair-specific transfer components. For the 20 current official languages of the European Union, such a system would require 380 different transfer components!

While this example is often invoked as a strong argument in favor of the interlingua architecture, it should be observed that in the transfer approach most pair-specific components can be eliminated by channeling all translations through one particular language-specific IR that is used as an arbitrary 'pivot.' This results in a *double-transfer approach* that we illustrate in Figure 5, for the example of French-to-German translation through an English-oriented pivot representation. This architecture only requires n analyzers, $n-1$ X-to-pivot transfer modules, $n-1$ pivot-to-Y transfer modules, and n generators.

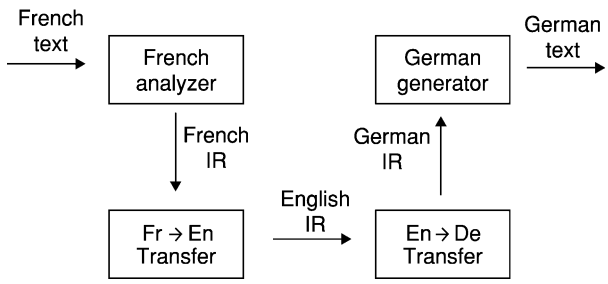

Figure 5 Double-transfer approach.

Moreover, it can be argued that these remaining $2(n-1)$ transfer modules have their hidden counterparts in any interlingua system. Each interlingua-oriented analyzer needs to perform both: (a) a source-language specific analysis such as syntactic parsing; and (b) a mapping from the SL/TL vocabulary and structures and those of the interlingua. And each interlingua-oriented generation component also has such a double structure. Consequently, it can be argued (perhaps controversially) that the double-transfer and interlingua architecture are not really different. Whether or not we use the term 'transfer' to designate a map from language-specific structures onto an artificial interlingua is mostly a terminological issue.

One potential advantage of a language-independent interlingua has to do with language-specific explicitation constraints (see the subsection 'Language-specific Explicitation Constraints' above). The language-specific representations of the double-transfer approach will lack various pieces of information that are needed for generating texts in other languages. For example, an English-oriented representation will lack information about the gender of people referred to by common names (see example (16)). Interlinguas, by contrast, are meant to make explicit any piece of semantic information that is required in at least one of the TLs.

However, summing over all language-specific requirements has at least two important drawbacks: (a) since languages often classify the same semantic objects along different axes, the consequent need for cross-classification may lead to severe inflation in the size of the required interlingua vocabulary; and (b) if an interlingua system comes to be used just for translating between a single pair of languages, a lot of its effort will be wasted on eliciting irrelevant information. The transfer approach is not susceptible to the cross-classification problem; and it can be organized so as to perform 'lazy explicitation' by linking specific explicitation operations with specific transfer modules. For example, the search for indicators of the social relationships that determine the choice between *tu* and *vous* could be triggered by the English-to-French transfer.

Another attribute that is sometimes conferred upon interlinguas is that of 'language neutrality,' but it is not entirely clear what that means. For example, given structural divergences (cf. the subsection Structural Divergences above) such as the following one between English and French:

(23) John ran across the Paris.
→ John traversa Paris à la course.

Should the interlingua opt for a third (neutral) way of expressing the same content? What would be gained by doing that? In practice, language neutrality is seldom really maintained, because interlingua designers tend to make extensive use of the vocabulary and structures of one specific language as a starting point. Since the starting language is most often English, several interlinguas have been criticized for being merely 'English with capital letters,' which makes the similarity with the double-transfer approach discussed above even more obvious.

The Knowledge-based Approach Transfer-based approaches have historically relied mostly on *linguistic* descriptions of the morphological, syntactic, and lexical structures of pairs of natural languages. The interlingua architecture, on the other hand, has often been coupled with a more *knowledge-based* approach. This approach emphasizes the representation and use of general knowledge as practiced in artificial intelligence (AI).

The previous section 'Why Machine Translation Is a Difficult Problem' discussed several examples where a translation decision involves the use of extra-linguistic knowledge (e.g., disambiguating the meaning of the word *pen* in examples (5) and (6) or determining the reference of the pronouns in example (8)). In the 1970s and 1980s, researchers in the field of artificial intelligence set out to develop formalisms that would make it possible: (a) to encode the meaning of the text in a language-independent way; (b) to encode large amounts of extra-linguistic knowledge; and (c) to reason about that knowledge in order to bring out pieces of information needed for resolving particular translation problems.

Many different representation formalisms were proposed based on semantic networks, on frames (Minsky, 1975), on various logics (Nilsson, 1991), etc. Schank (1975) introduced a language called Conceptual Dependency in which natural language verbs were analyzed in terms of a small number of conceptual primitives that would help capture some kinds of inferences. Schank and Abelson (1977) introduced an interesting abstraction called a *script*,

which is meant to capture institutionalized behavior patterns, such as the stereotyped sequence of events that is expected when eating in a restaurant: you walk in, a hostess takes you to a table where you sit, the waiter brings a menu, takes your order, etc. Now, consider the problem of translating the following sentence:

(24) He brought the check.

In isolation, the word *check* is ambiguous between: (a) a written order instructing a bank to pay money (in French, *chèque*); and (b) a slip indicating what amount is due (in French, *l'addition*). But when sentence (24) is part of a story about people eating in a restaurant and *he* is taken to refer to the waiter, meaning (b) will automatically be selected because the restaurant script creates an expectation that a waiter will be bringing a payment-requesting slip, but no expectation that he will be paying the clients.

While such knowledge-based solutions appear intuitively plausible and appealing, they have proven impossible thus far to implement on a real-life scale. Common-sense reasoning is still very poorly understood and the amount of world knowledge required to support general-purpose intelligent reasoning is staggering. As a result, the hard-core knowledge-based approach has only produced toy MT systems.

More recent work on knowledge-based MT has tended to deemphasize the general-purpose reasoning capabilities and to focus more on the organization of the natural language concepts into an interlinguistic ontology (Nirenburg and Raskin, 2004). Examples of such systems include KBMT-89 (Nirenburg, 1989) and PANGLOSS (Nirenburg, 1994).

The KANT system (Nyberg and Mitamura, 1996) is one of the rare knowledge-based systems that has been scaled up and put into real-life use. However, KANT is quite restricted because: (a) it is designed to work with controlled input; and (b) it translates from a single source language only (English), which appears to mitigate the significance of using an interlingua.

It appears safe to conclude that in rule-based MT, the trend towards more-abstract representations has not been very successful from the applications point of view. The processes needed to create such representations turn out to be difficult and error-prone enough to jeopardize the benefits of the approach.

Corpus-based Approaches

Overview

Corpus-based MT systems rely on translation rules that are learned automatically from examples of human translations. Very often these rules are statistical, for instance giving the probability that *femme* in French will translate into *woman* in English. This approach to automatic translation has become increasingly popular in recent years, especially among research systems. In a recent (2004) evaluation of MT performance conducted by the American National Institute for Standards and Technology (NIST), a large majority of the participating systems were corpus-based.

The crucial resource for corpus-based MT is a *parallel corpus*: a collection of documents that exist in both the SL and the TL, on which the system can be trained and tested. Although much less abundant than monolingual corpora, such bilingual (and even multilingual) corpora are becoming available in increasing size for an increasing number of language pairs. Notable examples of parallel corpora are the Canadian Hansard (an English/French corpus of parliamentary proceedings) and the NIST evaluation corpus (Arabic/English and Chinese/English); both are available from the Linguistic Data Consortium.

Parallel corpora typically come in the form of translated document pairs. A first step in virtually all learning approaches is *sentence alignment*, in which correspondences at the sentence level are made explicit. The output from this process is a sequence of *segment* pairs in which each half is a single sentence except in cases where no one-to-one sentence correspondence exists, as shown in Figure 6. Sentence alignment poses a chicken-and-egg problem: it is a necessary prerequisite to effective strategies for learning how to translate, but it requires some translation knowledge in order to be performed accurately. Fortunately, due to the coarse-grained nature of the problem, relatively crude methods such as comparing sentence lengths (Gale and Church, 1992) and matching similar-looking words across languages (Simard *et al.*, 1992) yield good results. Alignment accuracies vary widely across different corpora, but are frequently above 95%.

A straightforward way to translate using an aligned corpus would be to seek exact matches for source sentences, then output the corresponding translations. This exercise would guarantee a reasonable translation for any new sentence that was found verbatim in the corpus. However, for all but the shortest sentences, the odds of finding an exact match would be almost nil, even in an enormous parallel corpus (barring repeated texts, which are the basis for the *translation memories* described in the subsection 'Example-based Machine Translation'). At the other end of the spectrum from a sentence-matching approach is a word-matching strategy in which individual source words are replaced by translations inferred

I was there, along with a hundred of his friends. We were there not only to bid him goodbye but also to salute his life.	J'étais présent, ainsi qu'une centaine de ses amis pour lui dire au revoir, oui, mais aussi pour saluer sa vie.
Èmile Benoit was widely known for his folk music, his *joie de vivre*, his sense of humor and his generosity.	Le monde a connu Émile Benoit pour sa musique folklorique. Sa joie de vivre, son sens de l'humour et son grand coeur sont également ses marques de commerce.
Whether in Quebec city for the summer festival or in St. John's to be awarded an honorary doctorate, he always managed to spread his zest for living.	Qu'il ait été à Québec pour le festival d'été ou à Saint-Jean pour recevoir son doctorat honorifique, il demeurait toujours la même personne qui répandait sa joie sur tous.

Figure 6 Example of non–one-to-one sentence alignments: in the top row, two English sentences translate to a single French sentence; in the middle row, one English sentence translates to two French sentences. The bottom row illustrates a regular one-to-one correspondence.

from the training corpus. This strategy would have all the problems described in the section 'Why Machine Translation Is a Difficult Problem' above – and more – but it would also have the benefit of producing at least *some* output for any source sentence.

Real corpus-based systems are of course more sophisticated than this, but the sentence-to-word spectrum illustrates a fundamental tradeoff in their design: extracting more information from the training corpus (e.g., using sentence matching or some more refined technique) can lead to better performance, but carries the risk of placing too much emphasis on details that are specific to that corpus. This fundamental difficulty is in fact inherent in *any* attempt to learn from data, and it is known as the *bias-variance tradeoff* in the field of machine learning. It can be alleviated to some extent by using larger and more representative training materials, but even the largest available corpora encompass only a small fraction of the complete translation relation that must be learned.

Compared to the methods described in the section 'Rule-based Approaches: Towards More Abstraction' above, corpus-based methods can be broadly characterized as more robust but less precise. This characterization occurs because they tend to have simpler internal structure and because by definition they do well on frequent phenomena. In general, the result is that corpus-based systems exhibit less variation in performance across different source sentences. However, an important qualification to this often-cited robustness advantage is that it applies only within the domain of the training corpus. A system that has been trained on Canadian Hansard text will perform dismally on a corpus of car repair manuals, and vice versa. Such domain specificity is a double-edged sword: it is highly advantageous when training corpora are available for a domain of interest, often making it possible to develop an effective system with less effort than it would take to adapt a rule-based system; but when training corpora are not available, it can be a major stumbling block.

There are two main strains of corpus-based MT that are discussed in detail in the following sections. The first is example-based MT (EBMT), which uses the corpus as a source of direct translation examples. The second is statistical MT (SMT), which first derives a statistical model from the corpus, and then uses it to translate.

Example-based Machine Translation

The central idea of EBMT is to translate new texts by reusing existing translations. The longer a text segment, the less ambiguous it is and the more likely it is that its translation is directly reusable. Commercially available *translation memory systems* implement a particularly simple form of EBMT as an aid for human translators. They memorize all source/target pairs of previously translated sentences and when a (quasi) identical sentence appears in a new source text, they automatically retrieve its previous translation. But accidental sentence repetition is not so common. Therefore, translation memories are mostly helpful for texts in which there are reasons to expect sentence repetition (e.g., a new version of a previously translated document).

Since real EBMT systems try to provide translations for all sentences, their matching procedure needs to back off to progressively smaller segments (ultimately, the word or morpheme level) until a match is found. Meeting this requirement means that they must be able: (a) to align the translation examples at a subsentential level so as to extract the translation of the matched segments; and (b) to recombine the segments found in different sentences into a coherent translation.

A simple example will help convey the flavor of EBMT and of some of the problems it faces. Suppose

our system is asked to translate sentence (25), and that its database of previous translations contains the three sentences of (26):

(25) Don't leave before he sees you.

(26a) Don't leave now. → Ne pars pas maintenant.
(26b) Eat before Max arrives. → Mangez avant que Max n'arrive.
(26c) He sees you every week. → Il te voit à chaque semaine.

If the system can align: (a) *Don't leave* with *Ne pars pas*; (b) *before* with *avant que*; and (c) *He sees you* with *Il te voit*, then it can easily recombine these French segments into a mildly incorrect translation:

(27) Ne pars pas avant que Il te voit.

The remaining problems are: (a) the word *Il* should not be capitalized; (b) *que* and *il* should be fused into *qu'il*; and (c) the conjunction *avant que* calls for the subjunctive form of the verb, namely *voie*. These problems result from 'boundary friction' that shows up when assembling together fragments extracted from different contexts. Thus, the EBMT method suggested in the above example needs to be considerably refined.

There is considerable diversity among EBMT approaches, and the subsections below try to give an idea of the main trends.

Abstraction level EBMT approaches replace hand-crafted translation rules with correspondences that are automatically derived from a corpus of translation examples. The issue of the right abstraction level for such correspondences arises in the same way as in rule-based systems. Some EBMT systems, including the first EBMT proposal (Nagao, 1984) use a direct approach: the examples are stored as word strings and the source sentence is directly matched against their source side. But many other EBMT systems are more like transfer-based systems in that they perform the matching at the level of abstract syntactic structures. For example, Watanabe *et al.* (2003) store their examples as pairs of syntactic dependency trees whose nodes are explicitly aligned; sentences to be translated are then parsed and the corresponding dependency tree is matched against the source side of the examples. Intermediate approaches are sometimes used in which part-of-speech tagging and/or named-entity recognition is used as a substitute for full-fledged parsing.

Example Matching Since most input sentences will not be found as such in the example database, a procedure must be defined for decomposing them into smaller elements for which matches can be found. The nature of this procedure is closely related with the previous question of what representations are used. In the direct approach, one can try to match the various substrings of the input with those of the examples; in syntax-based approaches, one will rather match syntactic units.

Since there may be several different ways to decompose an input sentence in terms of partial database matches, some metrics must be used to select the preferred way. One interesting feature of many EBMT approaches is the use of a criterion of lexical similarity. For example, suppose the database contains the following two examples:

(28) Max broke his glass. → Max a cassé son verre.

(29) John broke his promise. → Max a rompu sa promesse.

Given the input sentence *Steve broke his vow*, a typical EBMT system would try to assess which one of *glass* and *promise* is closer to *vow*. Since *promise* is much closer, the system would choose (29) as the best translation model. Similarity is typically defined as the inverse of the distance in the word graph underlying a thesaurus (Nagao, 1984).

Translation Retrieval Once a set of examples has been chosen that covers all the segments of the input sentence well enough, the translation of each matched segment must be extracted from the examples. In order to do that, it is necessary to align the source and target material in the matching and/or nonmatching parts of the examples. To take a simplistic example, suppose the database contains example (30) and we have input sentence (31).

(30) John likes to read novels. → John aime lire des romans.

(31) Mary likes to read poetry.

The unmatched portions of the example are *John* and *novels*. If we manage to align these unmatched parts with their respective TL counterparts *John* and *des romans*, we can then extract the correspondence *X likes to read Y* → *X′ aime lire Y′*. It is not necessarily required to explicitly align *likes* with *aime* and *to read* with *lire*.

Various alignment methods are used by EBMT practitioners, ranging from dictionary-based heuristics to statistical methods comparable to those of SMT (see the subsection 'Statistical Machine Translation' below).

Offline Processing The example database can be processed offline in order to facilitate example matching and translation retrieval.

When highly abstract representations are used, the examples are most often parsed and aligned offline for efficiency reasons. But in some approaches, translation templates are also extracted in advance from the database to be applied at runtime on input sentences. Suppose now that the database contains both (30) above and (32):

(32) Susan likes to read newspapers. → Susan aime lire les journaux.

Then clearly the same logic as above can be used to extract off-line the equivalence *X likes to read Y* → *X′ aime lire Y′*.

When pushed to its extreme, this offline approach can be more or less equivalent to a transfer-based approach in which the transfer rules are produced by machine learning techniques rather than handcrafted.

Statistical Machine Translation

Statistical techniques have been considered for MT since the field's inception, motivated by early successes in cryptography (Weaver, 1955). However, modern SMT began with the work of a group at IBM in the late 1980s, described chiefly in 'The mathematics of machine translation: parameter estimation' (Brown *et al.*, 1993). This seminal article sets out a series of statistical models that have become known as the *IBM models*. These models continue to play a central role in SMT and have found many applications in other areas such as cross-language information retrieval and text summarization. The following subsections begin by looking at statistical methods with an overview of the classical IBM approach, then discuss the *phrase-based* methods that are the current state of the art, and finally touch on some future directions for the field.

The Classical IBM Approach SMT systems work by trying to find the most probable target sentence for a given source sentence (texts are typically translated sentence by sentence). Conceptually, meeting this requirement means enumerating all possible word sequences t in the TL, computing the probability $p(t|s)$ that each will be the *best* translation of the current source sentence s, and in the end generating the t that was assigned highest probability. Two problems need to be solved in order to do this: creating a *model* to give an estimate of $p(t|s)$ for an arbitrary pair of source and target sentences; and designing an effective *search procedure* to find the best target sentence according to the model.

Realistic search procedures must exploit the structure of the model in order to avoid having to test *all* possible target sentences, which is impractical. For example, the sentence-matching model outlined above lends itself to a particularly efficient search algorithm: if the source sentence is found in the corpus, output its most frequent translation; otherwise, output nothing. Effective search procedures for the IBM models are considerably more complex than this and have been an active topic of research since the models first appeared. Because these procedures are similar to those used for phrase-based models, their description is deferred to the next section.

The Source-channel Model As mentioned above, the role of the model in SMT is to estimate the probability $p(t|s)$ for any source sentence s and target sentence t. The IBM models take a *source-channel* (or *noisy-channel*) approach to modeling this distribution. In this approach, which arose in cryptography, the source text is viewed as an encoded version of an original target text, and translation as the process of *decoding* it to retrieve the original text. Decoding is performed with the aid of *two* models: $p(s|t)$, which models the *encoding* process; and $p(t)$, which models the original text prior to encoding. In SMT, these models are known as the *translation model* and the *language model* respectively. The main advantage of using two models instead of just one for $p(t|s)$ is modularity: the translation model can concentrate on the relation between s and t, and the language model on the structure of t, thus simplifying the design of $p(s|t)$ compared to a single model for $p(t|s)$. Also, a separate language model can be trained on unilingual target-language corpora, which are more abundant than parallel corpora.

In technical terms, the source-channel model corresponds to a Bayesian expansion of $p(t|s)$ into $p(s|t)\ p(t)/p(s)$. This leads to the following strategy for translation, which Brown *et al.* (1993) refer to as the *fundamental equation of statistical MT*:

$$t^* = \text{argmax}_t\ p(s|t)\ p(t) \qquad (1)$$

Here t^* is the output translation, and the *argmax* operation represents the search procedure.

The IBM translation models are described below. The language model used in the IBM work and almost all subsequent work is the trigram, originally developed for speech recognition (Jelinek *et al.*, 1992). This model calculates sentence probability as a product of word probabilities, and the probability of each word as essentially the proportion of times it was observed to follow the two preceding words in the training corpus.

Alignments The IBM translation models for $p(s|t)$ are built around the key concept of *alignments*

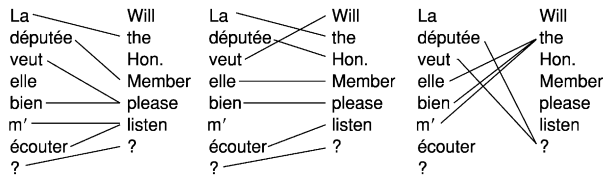

Figure 7 Alternative IBM-style word alignments for the same sentence pair, assuming French is the SL. Each French word must be accounted for with a single, possibly empty, connection; English words can have any number of connections.

(Figure 7), which are explicit connections between words in the source and target sentences. (Note that these are *word* alignments, not to be confused with the sentence alignments described earlier.) Alignments determine the probability that a model assigns to a source sentence given a target sentence, in ways that vary among the individual IBM models. For computational reasons, alignments are asymmetric: source words can have at most one connection, but target words can have any number.

Because an alignment is not an observable feature of a pair of source and target sentences, the models must assume that any alignment might have occurred, and calculate $p(s|t)$ by summing over the probabilities of all of them. (This is the same as calculating the probability of getting 3 heads in 10 coin flips by summing over the probabilities of all ways in which exactly 3 heads can occur.) In technical terms, alignments are called *hidden variables*, and they are incorporated into the overall translation probability like this:

$$p(s|t) = \sum_a p(s,a|t), \qquad (2)$$

where a is a complete alignment for s.

Parameter Estimation The fact that alignments are 'hidden' poses a problem for estimating model parameters, such as $p(arbre|tree)$, that depend on them. If alignments were explicit, we could estimate such probabilities just by counting the number of times *tree* was connected to *arbre* in the training corpus and dividing by the total number of connections to *tree*. But in the absence of observable links, how can the required probabilities be estimated?

The IBM models solve this problem with the *Expectation Maximization (EM)* algorithm (Dempster *et al.*, 1977), which relies on the trick of replacing actual counts of observed events with *expected* counts derived from the model itself. Because we do not know which valid alignment actually occurred for a given sentence pair, we assume that they all did, but weight the counts derived from each by its probability according to the model. For example, if an alignment a in which *arbre* connects to *tree* was assigned $p(a|s,t) = 0.01$, then we would increment the count of the pair *arbre/tree* by 0.01. This process is called the *expectation-step* or *E-step* of the algorithm. Once counts have been derived from all alignments in the training corpus, probabilities are obtained from them in exactly the same way as sketched above for standard counts with observed events; this process is called the *maximization-step* or *M-step*. It can be shown that if the E,M sequence is carried out iteratively, the resulting parameters will converge to values that maximize the probability of the training corpus according to the model. This property is called *maximum likelihood*, and it is a standard and effective strategy for training probabilistic models.

The IBM Models The IBM translation models for $p(s|t)$ form a sequence, numbered from 1 to 5 in order of increasing complexity and increasingly accurate modeling of the term $p(s,a|t)$ on the right-hand side of equation (2). The motivation for using a sequence of models is to facilitate training: the earlier models are easier to train, and the sequence is designed so that their parameters can be used to help train the later models. The remainder of this section briefly sketches all five models, omitting most of the technical detail from the original IBM paper.

Model 1 (Figure 7) assumes that word connections are independent of each other and *a priori* equally likely, and that the probability of an aligned source word depends only on the target word it is connected to. To visualize these assumptions, it can be helpful to think of the process for generating s and a from t: first choose a length for s, then randomly choose a connection for each position in s, and finally fill in the source word in each position by picking a translation for the connected target word. It is important to realize that it corresponds only to *one* way that t can give rise to s; to calculate $p(s|t)$, the model must take into account *all possible* ways, by summing over all alignments. This calculation turns out to be a product of individual source-word probabilities, each of which is an average over contributions $p(w_s|w_t)$ from all words w_t in the target sentence. The parameters $p(w_s|w_t)$ form a kind of probabilistic bilingual dictionary and are known collectively as the *t-table*. They are the backbone of all five IBM models.

Model 2 is very similar to model 1, but with the addition of a family of parameters that permit it to distinguish among alignments based on the geometry of their connections. The idea is that alignments having connections between words in more or less the same relative position within s and t (like the leftmost alignment in Figure 7) should be more probable than

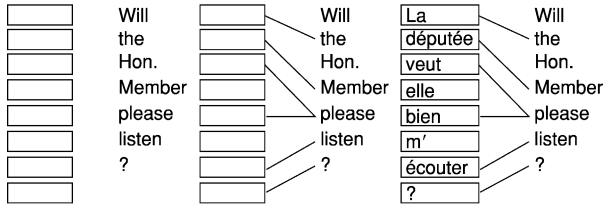

Figure 8 The model 1 generative process, assuming French is the SL: step 1 chooses a source length, step 2 chooses a connection for each source word, and step 3 fills in the source words with translations of the connected target words.

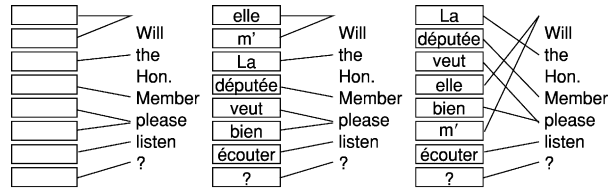

Figure 9 The model 3 generative process, assuming French is the SL: step 1 chooses a fertility for each target word, step 2 fills in the source words with translations of the connected target words, and step 3 chooses a position for each target word. The connections above the English sentence are empty ones.

those with wildly divergent connections (like the rightmost alignment in Figure 7). Model 2 calculates p(s|t) the same way as model 1, except that the contributions from target words are weighted by position parameters, so they take the form $p(w_s|w_t) \times p(i|j,I,J)$, where $p(i|j,I,J)$ is the weight assigned to a connection between target and source words in positions i and j respectively, within sentences of lengths I and J.

The final three models in the IBM sequence are considerably more complex than the first two. Model 3 (Figure 8) is based on the following generative process: first pick a number of connections for each target word according to a *fertility* distribution $p(\phi|t_i)$, where ϕ gives the number of connections; then choose a source word for each connection as usual; and finally pick a position j for each source word according to a *distortion* distribution $p(j|i,I,J)$, where I and J are target and source lengths. As distortion parameters are similar to model 2's alignment parameters, the main new feature of model 3 is fertility, which captures the propensity of target words to translate to differing numbers of source words. For example, one would expect $p(3|potato)$ to be higher than $p(2|potato)$, reflecting the fact that *potato* usually translates into *pomme de terre*. Fertilities have no connection to the actual words selected as translations, so that model 3 would be happier with *pomme pomme pomme/potato* than with *pomme de terre/potato* if $p(pomme|potato)$ were higher than the other translation probabilities involved in this expression. As there is no efficient way to calculate the expression for $p(s|t)$ in model 3, the sum over all alignments in equation (2) is approximated by a sum over a small set of high-probability alignments found heuristically with the aid of model 2.

Model 4 replaces model 3's distortion parameters with more-refined parameters intended to model the positions assigned to the sets of source words generated by each target word. These parameters treat such sets compositionally, by breaking them into individual source/target connections, which depend upon previous ones. Calculations of alignment sums for model 4 are carried out with the assistance of model 3. Model 5 is similar to model 4; it merely corrects a technical deficiency in the latter by ensuring that the final distribution $p(s|t)$ sums to 1 over all source sentences.

Translation Difficulties It is instructive to consider how the IBM models, in conjunction with a trigram language model, can cope with some of the translation difficulties catalogued in the earlier section 'Why Machine Translation Is a Difficult Problem'.

- *Morphology.* The IBM models are innocent of morphology, and have no idea, for instance, that *tree* and *trees* are more closely related than *tree* and *elephant*. The benefit of this lack of understanding is that they can learn the precise behavior of any words that occur frequently enough in the corpus, regardless of relationships hypothesized by a particular linguistic theory. The drawback is that they are completely unable to generalize along this dimension. For example, they are not able to infer that *trees* translates to *arbres* from knowledge that *tree* translates to *arbre*.
- *Idioms and other multiword relations.* The IBM models have no direct mechanism for coping with idioms, since the only explicit relations they capture are word-to-word (i.e., the t-table). Their main indirect mechanism is the fertility concept, which can encourage single target words to connect to multiple source words. Combined with distortion parameters to capture positioning of sets of source words, and the idea of summing over multiple alignments, this connection gives them a capability to model general many-to-many relations, albeit only a very weak one. The language model enhances this capability by enforcing correct ordering and potentially filling in gaps in multiword idioms.
- *Source ambiguities.* Ambiguities requiring extrasentential knowledge to resolve are out of reach for the IBM models, due to their assumption that sentences are independent units. For other types of ambiguities, the main strategy is just to choose the

most frequent translation. This choice by frequency is bolstered to some extent by potential interactions among words, such as when a source sentence containing *light* and *shine* induces a preference for *lumière* over *lèger* as the translation of *light* due to a learned association between *shine* and *lumière*. The fertility parameters and the language model can also play an indirect role in resolving source ambiguities.

- *Grammatical and word-order differences*. Distortion parameters give model 4 a crude notion of word order that essentially relies on the positions of connected source word sets to determine the relative positions of consecutive target words. Even cruder, but with potentially wider scope, model 2's alignment parameters would in theory allow it to capture gross systematic word-order differences such as between an SVO and an OVS language.

Phrase-based Translation The current state of the art in SMT is distinguished from the classical approach of the previous section mainly through the use of *phrase-based* models, which were first introduced by Och and Ney (2004). The description presented here is based on work by Koehn *et al.* (2003), who give a synthesis of Och's method and related approaches by other researchers. After describing phrase-based models, two other key techniques of modern SMT are briefly discussed, namely dynamic-programming search algorithms and minimum-error-rate training.

Koehn's model is described by the generative process shown in Figure 10. First, the source sentence is split into 'phrases,' which are really just n-grams of various lengths. Next, each source phrase is translated into exactly one target phrase. Finally, the target phrases are re-ordered and concatenated to form the output sentence.

This is a much more intuitively appealing process than the ones for the IBM models described in the previous section. The initial step of splitting the source sentence into phrases is a plausible strategy for *human* translation, in which one selects the portions of the source sentence that can be translated as independent units. For example, *look up* should be treated as a phrasal verb and translated as *chercher* in contexts like *look up a word in the dictionary*; but it can be treated compositionally as *look* followed by *up* in other contexts such as *look up into the sky*. Given this definition of splitting, IBM-style fertility parameters are unnecessary, because all phrases translate one-to-one. Furthermore, distortion parameters can be much simpler because they apply only to the reordering of phrases and not to their (fixed) contents.

Each step of the generative process corresponds to a family of parameters in the phrase-based model. By far the most important is the *phrase table*, a collection of phrase pairs (s,t), along with the probability $p(t|s)$ that s will translate into t. This is the phrase-based analog to the t-table in the IBM models. The other two kinds of parameters – ones that govern splitting and distortion – tend to be rudimentary in existing phrase models, and this article will not discuss them further.

Phrase-Pair Induction Unlike the IBM models, Koehn's phrase-based model does not have an intrinsic procedure for parameter estimation; it relies on an externally-specified phrase table. (This reliance is not the case for all phrase-based models – a notable exception is the *joint model* proposed by Marcu and Wong (2002)). The typical way to generate a phrase table is to use the IBM models, first training them on some parallel corpus and then using them to produce word alignments for every sentence pair it contains. The quality of these alignments can be improved by training models in each direction – $p(t|s)$ and $p(s|t)$ – and using heuristics to combine the alignments generated by each. Interestingly, final quality is not very sensitive to the particular IBM model used.

Once an alignment has been established for a sentence pair, the next step is to determine the phrase pairs that are consistent with it. To ensure that extracted pairs are self-contained, only those candidates with no links to words outside the pair are considered valid. Figure 11 shows a sample alignment and the resulting phrase pairs satisfying this criterion.

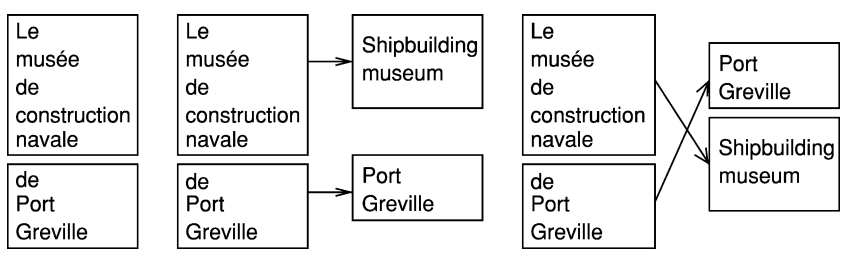

Figure 10 The generative process for phrase-based models, assuming French is the SL: step 1 splits the source sentence into phrases, step 2 selects a translation for each phrase, and step 3 reorders the translations.

A maximum phrase length is typically imposed to prevent inflating the phrase table with entries that will have very little chance of being used.

After phrase pairs have been extracted from a corpus, probability estimates are made from relative frequencies, i.e., $p(t|s) = count(s,t)/count(s)$. Because different phrase pairs are treated as completely independent *n*-grams, these estimates will generally have the undesirable property of varying widely across related pairs. Different phrase-based variants address this *smoothing* problem in different ways – the most sophisticated is Och and Ney's original *alignment template* approach, which relies on word classes – but none is entirely satisfactory.

Search Recall that the search problem in statistical translation is concerned with finding the most likely translation hypothesis according to the model. The exponential number of possible hypotheses poses a very difficult problem; (Knight, 1999) shows that, for word-replacement models like the IBM series, the problem is *NP-complete*, which roughly means that it is impossible to solve exactly in any reasonable amount of time. Heuristics must therefore be used; fortunately, experimental evidence has shown that heuristics tend to work well for this problem (Germann *et al.*, 2001).

The best current algorithms for phrase-based models are adaptations of *dynamic-programming beam search* techniques widely used in speech recognition. These algorithms maintain a large list of partial translation hypotheses, each of which is a prefix of a complete translation. Hypotheses are extended by choosing some as-yet-untranslated source phrase and appending a translation obtained from the phrase table. When all hypotheses in the list are complete translations of the source sentence, the algorithm outputs the most probable one and stops. Central to this process are two strategies used to keep the size of the hypothesis list from getting too large:

1. Hypotheses that are indistinguishable for the purposes of evaluating possible extensions are merged (the *dynamic-programming* part of the algorithm). Under typical assumptions, this equivalence property holds for any two candidates that have the same last two target words, cover the same set of source words, and whose most recently-translated source phrases end at the same point. After a merge operation, only the hypothesis with the higher probability is retained.
2. Hypotheses that have low probabilities are discarded (this is called a *beam search* strategy, because such hypotheses are considered to fall outside of a beam that illuminates only the best candidates). Unlike the merging strategy, this one is a heuristic, and thus has the potential to cause search errors. To avoid unfairly penalizing longer hypotheses, comparisons are made only among candidates that cover the same number of source words.

Another important component of search algorithms is the mechanism for assigning scores to partial hypotheses. It is crucial that these be as accurate as possible, otherwise good candidates may get pruned away during the beam search. To improve accuracy, the algorithms try to guess the best way to complete each hypothesis, using strategies such as picking the best translation for each untranslated source phrase without regard for word order.

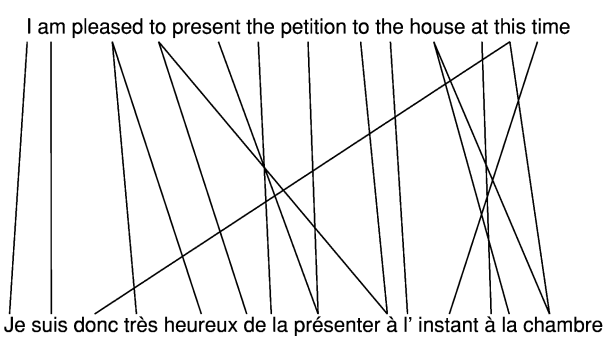

Figure 11 Extracting phrase pairs from alignments. Assuming a maximum permissible phrase length of 4, the valid phrases for the alignment shown are: *i/je*, *i am/je suis*, *am/suis*, *pleased/très heureux*, *present the petition/la présenter*, *the/la*, *the/l'*, *at/à*, *time/instant*. Notice that the phrases extracted are quite robust to alignment errors, which tend to suppress potentially good pairs rather than create bad ones.

Log-linear Models and Minimum Error-rate Training Recall that the source-channel approach combines contributions from a language model $p(t)$ and a 'backward' translation model $p(s|t)$ by multiplying them. This approach has solid theoretical motivations and is highly effective, but it is somewhat inflexible. There may be other sources of information – for example a forward translation model $p(t|s)$ – that we wish to incorporate into the overall probability calculation, but it is not obvious how this might be done.

A well-grounded probabilistic framework for incorporating arbitrary sources of information is the *log-linear* or *maximum entropy* framework, which encodes information sources as *feature functions* $f(s,t)$, and assigns them *weights* according to how valuable they are. The idea of using log-linear combinations instead of the standard source-channel combination is due to Och and Ney (2002), who showed that it could produce significantly more accurate translations, given an appropriate set of features. In

a second influential paper (2003), Och described a *minimum error-rate* strategy for choosing weights so as to directly minimize the errors in a system's output, as measured by a general MT evaluation technique such as BLEU (Papineni, 2001).

An interesting characteristic of Och's minimum error-rate training algorithm is an *n-best rescoring* step, in which relatively small sets of high-probability translation hypotheses are generated explicitly by the search procedure and then reordered by the model. This permits features that would be too expensive to use during the initial search, for instance ones based on global properties of a given source/target sentence pair.

Translation Difficulties It is somewhat difficult to precisely characterize the problems that might be encountered by a phrase-based model coupled with a minimum-error rescoring procedure, because this framework does not place strong limits on the kinds of knowledge that can be encoded as features. Also, unless the length of phrases is restricted, they can in principle handle any phenomena for which there is sufficient evidence in the training corpus. However, their capabilities in this regard will be highly sporadic and will not extend to extra-sentential phenomena like coreference ambiguity and explicitation constraints.

In practice, although the errors committed by phrase-based systems tend to cut across the spectrum of the translation difficulties listed in the previous section, we can make two general observations about their performance. First, because phrases are treated as independent *n*-grams, the model is highly subject to variations in surface form, such as morphology, changes in order, and insertions or deletions. This characteristic can lead to surprising fluctuations in which the system handles a fairly difficult example quite well, but breaks down completely on an apparently trivial variant of it. An even more pronounced effect is that phrase-based output *looks* like it has been translated in small chunks. As Figure 12 shows, it often consists of short segments that are good translations in themselves, but that lack syntactic and semantic coherence with the surrounding context.

Il n'y a pas un groupe ou un organisme qui, à lui seul, ait toutes les ressources et les moyens nécessaires pour y faire face.

It is not just one group or an agency that, at his doorstep, having all resources and well equipped to deal with it.

No single group or agency has the requisite resources to deal with these problems.

Figure 12 Sample output from a vanilla phrase-based SMT system trained on Hansard text, illustrating incoherence among phrase translations. The French source sentence is on top, the output in the middle, and the English reference sentence on the bottom.

Future Directions Due to the successes of phrase-based models, a lot of research effort in SMT is currently aimed at improving them. A major part of this effort has been concerned with attempting to remedy the fragmentary nature of phrase translations through the incorporation of syntax. To date, the most systematic attempt in this vein has been the Johns Hopkins 2003 SMT workshop (Och *et al.*, 2003), in which a minimum-error rescoring approach was used to incorporate various syntactic features. Although many sophisticated techniques were explored, none turned out to give a truly significant improvement over a baseline phrase-based system. The reasons for this failure are not entirely clear, but the limited scope for improvement offered by *n*-best lists may have played a role. Apart from syntax, other work directly aimed at improving phrase-based models includes new methods of extracting phrases – ones that improve on the rather *ad hoc* procedure sketched in the previous section – and new parameterizations for distortion.

Research less directly based on phrase models is also very active. Among other topics, it includes investigations into the use of extra-sentential context, weighted finite state transducers, new grammar formalisms, semi-supervised learning of translation relations, and learning from comparable rather than parallel corpora.

See also: Bar-Hillel, Yehoshua (1915–1975); Collocations; Corpus Approaches to Idiom; Head-Driven Phrase Structure Grammar; Idioms; Lexical Functional Grammar; Lexicography: Overview; Machine Translation: History; Machine Translation: Interlingual Methods; Morphology: Overview; Word Order and Linearization.

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Macro-Jê

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The Macro-Jê stock comprises the Jê family and a number of possibly related language families, all of which are located in Brazil. Macro-Jê is arguably one of the lesser-known language groups of South America, its very existence as a genetic unit being still "a working hypothesis" (Rodrigues, 1999: 165). According to Rodrigues (1986, 1999), whose classification is the most widely accepted among researchers working on Brazilian languages, the 'Macro-Jê hypothesis' comprises 12 different language families: Jê, Kamakã, Maxakalí, Krenák, Purí, Karirí, Yatê, Karajá, Ofayé, Boróro, Guató, and Rikbaktsa. The existence of Jê as a language family has been recognized since early classifications of South American languages (Martius, 1867). 'Jê' is a Portuguese spelling for a Northern Jê collective morpheme ([je] in Apinajé, for instance) that occurs in the names of several Jê-speaking peoples. The term 'Macro-Jê' was coined by Mason (1950), replacing earlier labels, such as 'Tapuya' and 'Tapuya-Jê.'

Comparative Evidence

Recent classifications (Rodrigues, 1986; Greenberg, 1987; Kaufman, 1994) differ as to the precise scope of Macro-Jê, although there is agreement on the inclusion of most of the families (**Table 1**). Except for Karirí (included only by Rodrigues), Greenberg and Kaufman included all the families listed above. In addition, Greenberg included Chiquitano (also included by Kaufman), Jabutí, and Otí. Given the lack of comprehensive comparative studies, the Macro-Jê status of some of these families is still an open question. Although Guató is included in the stock by all of the aforementioned classifications, a case for its inclusion has yet to be made, beyond the superficial, inconclusive evidence presented so far (Rodrigues, 1986, 1999). On the other hand, a preliminary comparison has revealed compelling evidence for the inclusion of the Jabutí family into the Macro-Jê

Table 1 The Macro-Jê Hypothesis[a]

1. **Jê**
   †Jeikó
   Northern Jê: Panará, Suyá, Kayapó, Timbíra (Parkatêjê, Pykobjê, etc.), Apinajé
   Central Jê: Xavánte, Xerénte, †Akroá-Mirim, †Xakriabá
   Southern Jê: Kaingáng, Xokléng, †Ingaín
2. **Kamakã**
   †Kamakã, †Mongoyó, †Menién, †Kotoxó, †Masakará
3. **Maxakalí**
   Maxakalí, †Pataxó, †Kapoxó, †Monoxó, †Makoní, †Malalí
4. **Krenák**
   Krenák (Botocudo, Borúm)
5. **Purí (Coroado)**
   †Coroado, †Purí, †Koropó
6. **Ofayé**
   Ofayé
7. **Rikbaktsá**
   Rikbaktsá
8. **Boróro**
   Boróro, †Umutína, †Otúke
9. **Karajá**
   Karajá (including four dialects, Southern Karajá, Northern Karajá, Javaé, and Xambioá)
10. **Karirí**
    †Kipeá, †Dzubukuá, †Pedra Branca, †Sabuyá
    (included by Rodrigues but not Greenberg or Kaufman)
11. **Jabutí**
    Djeoromitxí (Jabutí)
    Arikapú
    (included by Greenberg but not Rodrigues or Kaufman)
12. **Yatê**
    Yatê
13. **Guató**
    Guató
14. **Chiquitano**
    Chiquitano (Besiro)
    (included by Greenberg and Kaufman, but not Rodrigues)
15. **Otí**
    †Otí (Eo-Xavánte)
    (the inclusion of Otí, proposed only by Greenberg, is not substantiated by the available data)

[a]Extinct languages are indicated by †. Based on Greenberg, 1987; Rodrigues, 1986, 1999; Kaufman, 1994.

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Machine-Aided Translation: Methods

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Introduction

The focus of this article is on machine-aided translation (or MAT), with heavy stress on the word *aided*, and we shall begin by distinguishing MAT from machine translation (or MT) pure and simple. Both, of course, seek to automate the translation process through the use of computers, and in both humans generally have an important role to play. In MT, however, the initiative in the translation process is given over to the machine, and the aim is to automate this process completely, eliminating the human's contribution as far as possible. In MAT, on the other hand, the initiative in the translation process remains with the human translator, and the role of the machine is to assist the translator in performing certain tasks – normally, those that can be automated with a good degree of confidence and reliability. The fact that MT systems often do not succeed in automatically producing a high-quality translation – where high quality is indeed a requirement – and that a human must subsequently intervene to postedit or otherwise improve the machine's raw output should not cause us to lose sight of the fundamental distinction between MT and MAT. Whereas MT ultimately seeks to dispense with the human translator, MAT proceeds from the double recognition that, for high-quality translation at least, the contribution of a human translator is generally indispensable, and furthermore, that this situation is not likely to change for the foreseeable future. Why is this? Quite simply because high-quality translation routinely requires a level of understanding that extends well beyond the literal wording of a source text to encompass unpredictable amounts of real-world knowledge, as well as the capacity to reason over that knowledge. Despite the undeniable progress recently achieved by the new empirical methods in machine translation, such knowledge and reasoning capabilities, remain by and large, beyond the ken of today's computers. Hence, where high quality is a *sine qua non* (and not just information scanning,

or gisting, as it is sometimes called), there will continue to be a need for a human in the translation process, in order to compensate for the machine's limited understanding.

Before we go any further, a brief terminological digression. For the purposes of this article, *machine-aided* or *machine-assisted translation, computer-aided* or *computer-assisted translation* (CAT) are all taken to be synonymous. Another synonymous variant is *machine-aided human translation* (MAHT), which is often contrasted with human-aided machine translation (or HAMT), the latter referring to the manner in which humans are called on to pre-edit source texts or postedit the output of fully automatic MT systems.

A Little History

It is one thing to establish that humans are not about to be evicted from the translation process, at least not for the foreseeable future. But then what exactly will the human's role be in this process? Or, put another way, what is the optimal *division of labor* between man and machine in the translation process?

Yehoshua Bar-Hillel, who was the first full-time MT researcher, was also the first to demonstrate the theoretical infeasibility of fully automatic, high-quality translation – or FAHQT, as he called it – based on his famous "box in the pen" example. (See Bar-Hillel, 1960, particularly Appendix III, *see also* **Machine Translation: Overview; Bar-Hillel, Yehoshua (1915–1975)**.) Regarding the optimal division of labor alluded to earlier, Bar-Hillel felt that it would be best for the human to intervene either before or after the translation operation proper, but not during it. He recognized, however, that this was an entirely empirical question, the answer to which could change as computers became more powerful and our understanding of natural language evolved. In any case, the arguments that Bar-Hillel repeatedly advanced in the late 1950s and early 1960s largely fell on deaf ears. For the great majority of researchers working on the problem of translation automation in those years, FAHQT remained the only goal worth pursuing, and one that they were convinced could provide a practical solution to the growing demand for high-quality translation. Bar-Hillel had no problem with MT as a legitimate research goal; it was the second contention that he found wholly unrealistic. However, it was not until 1966, when the American government published its (in)famous ALPAC report, that MT researchers could finally be convinced that their projects would not help respond to the burgeoning worldwide demand for translation, and then only because government funding for MT research all but dried up (*see also* **Machine Translation: History**).

Insofar as machine-*aided* translation is concerned, it is probably true to say that it did not begin to attract researchers' attention until 1980, when Martin Kay published his seminal paper 'On the proper place of men and machines in language translation.' (*See also* **Kay, Martin (b. 1935)**.) In it, Kay refurbished Bar-Hillel's original argument, to the effect that fully automatic machine translation, although providing an invaluable research matrix within which to study the workings of human language, had very little to offer in the way of practical solutions to the urgent and growing demands being placed on the overtaxed corps of professional translators. The reason, in Kay's view, was quite simple: we cannot successfully automate what we do not fully understand. The designers and developers of fully automatic MT systems were attempting to mechanize an essentially linguistic operation (translation) at a time when the science of linguistics had not yet provided an adequate explanation of how language works.

As a concrete alternative to fully automatic MT – and this was Kay's truly original contribution – he advocated machine-aided human translation, or more precisely, a device he called the translator's amanuensis, now more commonly referred to as a translator's workstation. At the core of his workstation was a sophisticated text editor, complete with a mouse and a split-screen display, one pane being for the source text and the other for the target. (Remember that Kay was advancing this proposal in 1980, before the appearance of personal computers!) Indeed, Kay argued that a well-designed text editor is probably the single most important tool that translators can be provided with; it is certainly the workstation component they will use most intensively. In the next section of his paper, which is entitled 'Translation Aids,' Kay went on to propose a number of ancillary programs specifically designed for professional translators that could be grafted onto this text editor. For example: a shared bilingual lexicon to which users can add various levels of information; a source-text analysis program that flags terms or expressions that occur with higher than normal frequency; and a keyword-in-context program; a document retrieval program that would allow the translator to locate past texts that contain material similar to his/her current text. Many of these suggestions have since been embodied in commercial products, as we will show later. But even more important than the specific details of Kay's amanuensis (at least for our purposes) is the general philosophy of his incremental approach to MAHT. "I want to

advocate a view of the problem in which machines are gradually, almost imperceptibly, allowed to take over certain functions in the overall translation process. First, they will take over functions not essentially related to translation. Then, little by little, they will approach translation itself. The keynote will be modesty. At each stage, we will only do what we know we can do reliably. Little steps for little feet" (Kay, 1980: 226).

Before we begin to catalogue the various types of translation-support tools that have emerged since Kay first advanced his MAHT program, we should mention another historical antecedent, in the form of the large, dedicated terminology banks that first appeared in the early 1970s, such as *Eurodicautom*, which was launched by the European Commission in 1973, and *Termium*, which the Canadian government inaugurated in 1975. In both cases, the goal was to help standardize the technical terminology and official appellations used in large public administrations that were officially bilingual or, in the case of the European Commission, multilingual. In both cases as well, the professional translators in the employ of the EC or the Canadian Translation Bureau were among the first users of these computerized databases, and their particular needs had been carefully considered during the design and development phases. It therefore seems legitimate to consider these term banks as being among the earliest translation support tools.

Since the mid-1970s, both *Eurodicautom* and *Termium* have undergone numerous changes, one of the most important being that they are now accessible to users outside their host organizations. And, of course, many other term banks have since appeared, both in the public and private sectors. Among the characteristics that users most appreciate about these term banks, one is their sheer volume. Both *Eurodicautom* and *Termium*, for example, contain well over a million records, and hence many millions of terms. Another is their reliability, as their records are normally created by bona fide terminologists, following well-defined and rigorous terminological practices. At the same time, this last characteristic represents something of a limitation for working translators, because they are not usually allowed to modify or contribute to the contents of these large, centralized repositories. Moreover, the normalization and standardization of new terminology is a slow, painstaking process and not always carried to a successful conclusion. Hence, in the real world of commercial translation, it often happens that for the same concept, different clients will insist on their own specific terminology. And finally, although these term banks may be enormous, they simply cannot cover all domains with the same degree of detail, particularly in those high-tech domains where progress is now so rapid. Consequently, translators have a need for other kinds of terminological support. They need a means of recording, storing, and retrieving the results of their own terminological research and particular observations; a more flexible tool that would complement rather than rival the large centralized repositories. This is why for many years, even after the appearance of *Eurodicautom* and *Termium*, translators continued to record their terminological observations on file cards, which were sometimes printed up as domain-specific glossaries. It was only with the advent of the personal computer in the early 1980s, that it became possible to envisage automating these manually produced glossaries in ways that would be affordable, while at the same time increasing their utility and efficiency for working translators.

Terminology Management Programs

Finding the correct lexical equivalent to source-language (SL) words is clearly a necessary (though obviously an insufficient) condition for translation. Hence, it is not altogether surprising that terminology management programs, intended to meet the needs mentioned in the previous paragraph, were among the earliest specialized translation aids to appear for the new generation of personal computers. The first such commercial application was probably *Mercury/Termex* (MTX), developed under the direction of Alan Melby of Brigham Young University. MTX was a memory-resident program that ran invisibly in the background until the translator called it to the screen by hitting a hot-key combination from within the word processor. When the MTX pop-up window appeared, the translator would then type in the term to look up, and the program would display the corresponding record, if one was present in its database. Using various hot-key combinations, the translator could also insert a target-language (TL) equivalent directly into a word-processing document and, of course, edit or add new records to the terminology database. Other administrative routines were also available for sharing personal glossaries by importing, exporting, and merging term data files.

There are now a plethora of terminology management programs that offer essentially the same basic functions as MTX, some as stand-alone products, others as components of larger translator workstations (see following). What are the characteristics that translators appreciate most about such programs? One obvious benefit, common to all computer-based lexical resources, is the fact that

they allow for much easier and more flexible look-up than any printed volume or collection of file cards. Translators do not have to get up from their desk to query a term; in fact, they do not even have to remove their hands from the keyboard. Moreover, most term management programs now allow for queries, not just on the headword, but also on the content of other fields. Suppose, for example, that the user cannot remember a certain headword but knows that some other word appears elsewhere in the body of the entry. It is extremely unlikely that she would be able to find the entry in question in a bound dictionary, although this would pose no problem for a term management program that indexed the content of all its fields. And the same applies, *a fortiori*, to systems that permit searches with wildcard characters and variable word order. Moreover, most such systems allow the user to specify multiple search criteria, so that they can retrieve, for example, only those terms that belong to a particular domain, on records that were created after a given date, or by a particular person. In short, these term management programs bring to the domain of terminology many of the benefits of other types of computerized database management systems.

Another major advantage of these systems, which was only fully realized when individual PCs were linked up in a local area network, is the ease with which they allow individual users to share the results of their terminological research. Once their machines are linked, it becomes possible for one user to immediately have access to new or modified records entered in the database by another user. Of course, this raises obvious problems of database management, such as how to ensure the integrity and the coherence of the database; but none of these problems are insurmountable, and users have generally found that the advantages of sharing their terminological resources far outweigh the costs. (We will return to consider other, more advanced features of recent term management programs later.)

Other Lexical Aids

The term management programs described in the previous section are primarily intended for a translator's personal terminology, i.e., as a repository for the equivalents encountered or researched in the course of personal work. In addition to these programs, and to the bona fide term banks such as *Termium* and *Eurodicautom*, other lexical resources also form part of a translator's basic tool kit, most notably standard bilingual dictionaries. Needless to say, these too stand to benefit from the increased power and flexibility that are afforded by electronic databases. Interestingly, one of the first to realize this was Alan Melby, who also designed the first personal term management program. In the 1990s, Melby's company obtained the rights from several well-known publishers to include the contents of certain of their bilingual dictionaries within the MTX product offering. As a result, MTX was able to provide its users with two levels of lexical assistance: when a term was queried that was not in the user's personal glossary, the system would display the corresponding entry for that term in one of its standard bilingual dictionaries, albeit in MTX format. Somewhat surprisingly, it took the publishers of the best-known bilingual dictionaries some years to respond to the PC revolution and to release their own versions of their standard and still invaluable reference works.

Translators also make use of other *monolingual* lexical resources, including dictionaries, spelling checkers, and even verb conjugation programs. Although these are undeniably useful, their usefulness is certainly not limited to translators. This is why we will have little to say about them here, preferring instead to concentrate on those tools that are designed specifically for translators and that support them in the central and inherently bilingual aspect of their work.

In our discussion of the terminology management programs earlier, it was tacitly assumed that it is up to the translator to identify the terms that should be added to the system's database. In the early 1990s, some researchers (notably Justeson and Katz, 1993) proposed some surprisingly simple techniques that would allow for the *automatic* identification of candidate terms in a given text. The techniques involved were part-of-speech tagging (*see* **Part-of-Speech Tagging**), followed by the extraction of those word sequences in the tagged text that correspond to well-established term patterns (e.g., *adjective–noun–noun* in English), and finally the merging and sorting of the results in order of descending frequency. This algorithm was said to work best on long technical texts, and then only for multiword terms; furthermore, the candidate terms always had to be vetted by a human translator or terminologist. Nevertheless, the results obtained, particularly at the top of the list, very often corresponded to legitimate terms and would therefore be of value to translators who wanted to research their terminology before beginning their translation. But again, these early term extraction programs were monolingual and left the job of locating the TL equivalents of the proposed SL terms to the human translator or terminologist.

It was not long, however, before researchers moved to correct this deficiency. In 1994, Ido Dagan and Ken Church published a paper that provided the logical

extension to monolingual term extraction, in the form of a program (called *Termight*) that operated on parallel texts (i.e., texts that are mutual translations) in order to identify candidate terms along with a proposed translation. Actually, Church had been one of the pioneers in the development of automatic alignment algorithms that serve to create large bitextual corpora (i.e., parallel texts in which the translational correspondences are rendered formally explicit). In *Termight*, a word-level alignment program was used to calculate the proposed target language equivalents of the candidate terms, and according to the authors, the system was deployed with success at the AT&T Translation Services, leading to marked productivity increases in bilingual glossary construction.

In recent years, there has been much activity in this area of automated term extraction. Monolingual term extraction programs are now available for a wide range of languages, and there are even some commercial products that, like *Termight*, propose translations for the candidate terms, e.g., *TermFinder* from Xerox (now marketed by Temis) and, more recently, *Term Extract* from Trados.

Repetitions Processing

The basic idea behind repetitions processing in the context of translation is as simple as it is appealing: a translator should never have to retranslate a given SL segment if an acceptable translation has already been provided for that segment. The job of the repetitions processing program is to determine which segments in a new text have already been translated and then to provide the translator with easy access to the previous translations of those repeated segments. This is usually done in the following manner: The repetitions processor first segments a new text to be translated into basic units; these are generally sentences, but may also include headings, list elements, or the contents of each cell in a table. It then takes each source unit in turn and conducts a search for it, as a simple character string, in a reference file (or bitextual database) made up of source and target language translation pairs. If a repetition of a source unit is found, the associated target segment is retrieved from the database and shown to the translator, who may or may not decide to incorporate it into his/her translation. (Alternatively, if the repetitions processor is operating in batch mode, the translation will simply be inserted into the provisional target text, or the source sentence may be flagged in some way so that it need not be retranslated.)

This somewhat simplified description raises a number of important questions. The first concerns the nature of the repeated segments: Are they always full sentences, or other complete textual units like headings or list elements? And the second concerns the nature of the bitextual database in which the processor searches for repetitions: How exactly is it constituted? As it turns out, the two questions are interrelated. The default processing unit in almost all commercial repetitions processing systems – which are commonly called *translation memories* (TM) – is the complete sentence, because this is the unit for which it is easiest to build up large-scale databases of past translations; and the usefulness of this kind of tool is obviously correlated with the size of its databases (*see also* **Translation Memories**). Most such systems operate interactively, as follows: If no match is found for a given sentence in the text being translated, the translator must furnish the target language equivalent for it, as would normally be done. When that translation is completed and the translator moves on to the next sentence in the text, the repetitions processor links and stores the previous source- and target-language pair in its current database, so that if the source sentence is repeated later in the text, the system will be able to retrieve the associated translation. Now, suppose that later in the text, a source sentence is encountered that repeats only part of the SL-TL pair that has just been stored; say, its verb phrase, i.e., the auxiliary, the main verb and the noun phrase that serves as its direct object. The repetitions processor *might* be able to locate the repeated source sequence in its database, although even this is far from obvious. (How does one know which subsentential sequence to search for without searching for them all, thereby opening the door to a combinatorial explosion?) But even if this problem could be resolved, how would the repetitions processor know which subsegment to retrieve from the associated target sentence? Some sort of linguistic analysis would have to be performed in order to determine just what part of that TL sentence corresponds to the translation of the SL verb phrase. Unfortunately, this cannot currently be done with a high degree of precision and reliability. Current automatic alignment technology is quite accurate when it comes to linking corresponding sentences in two texts that are mutual translations; see, e.g., Véronis (2000). However, performance drops substantially when automatic alignment is attempted below the sentence level; see, e.g., the results reported in (Mihalcea and Pederson, 2003). This is another reason why all commercial repetitions processors employ the full sentence as their default processing unit: by so doing, their search and retrieval can be fully automatic. (Notice, incidentally, that there is nothing to prevent subsentential segments from being *manually* identified and stored

alongside their translation in the database; but then the problem is how to scale up.)

Given the current state of repetitions processing technology, a reasonable question to ask, therefore, is the following: How often do complete sentences reappear verbatim in general texts? Needless to say, the question does not admit of a pat answer, in the form of a simple figure that would apply across the board to all types of texts. However, from a study that we conducted on thousands of queries submitted to an online bitextual database containing 70 million words of Canadian parliamentary debates (see Macklovitch, 2000), the answer would seem to be: not very often. More precisely, what we discovered in this study was that as the queries submitted to this database (*TSrali*) lengthened, the likelihood of finding an exact match decreased proportionally; when the queries reached 14 words in length, there were no longer any exact matches or repetitions. (Similar findings are reported by Langlais and Simard, 2002, who found that less than 4% of 1260 complete sentences submitted to a much larger Hansard database were repeated verbatim.) Perhaps we tend to underestimate the degree to which natural language is creative, as Noam Chomsky argued long ago in *Syntactic structures*. Be that as it may, what these findings suggest for repetitions processing is that any system that searches for verbatim repetitions of complete sentences will be of very limited use, except on those types of texts that happen to display a high degree of repetition, such as updates, or certain types of technical manuals in which the same commands may appear over and over again. In terms of the general worldwide demand for translation, however, these surely represent only a small proportion of the texts that need to be translated.

The developers of commercial translation memory software are certainly aware of this problem and in response have attempted to extend the applicability of their systems by introducing a number of features meant to attenuate the definition of what constitutes a repetition of the same sentence. Suppose, for example, that a sentence in the text being translated matches a SL sentence in the database except for the value of a proper name or a certain numerical expression, such as a date or an amount of money. A translator would normally want to see the previous translation for this SL sentence, particularly because the named entities it contains are often left untranslated. Some translation memory systems will in fact treat the two sentences as though they were identical and may even replace the values of the named entities in the previous translation with the appropriate values from the new source sentence. Indeed, most commercial TM systems now incorporate a notion of 'fuzzy matching,' which allows them to accommodate this and other sorts of nonidentical but similar SL sentences, where the degree of similarity is expressed in terms of a numerical coefficient that the user may adjust in order to constrain the search for approximate matches. How exactly do these fuzzy matching algorithms work? It is difficult to say with certainty, because TM vendors do not generally provide a formal definition of this similarity coefficient. Hence, it is not all obvious how the results of a 70% match will differ, say, from a 74% match or an 81% match. One suspects that some notion of edit distance is being employed; but when evaluating two SL strings, the matching algorithm may also take other factors into account, such as whether the translation has been produced by an MT system or by a human, or whether the database contains multiple equivalents for the same SL segment – not to mention the opaque effects of word order differences on the similarity coefficient. Combining such diverse factors into a single percentage may appear to make things simpler for the naïve user; but the unfortunate result is that those same users are left with a vague and ill-defined understanding of a parameter that is central to the system. As (Hutchins, 2003a) remarked: "most TM systems have difficulty with fuzzy matching – either too many irrelevant examples are extracted, or too many potentially useful examples are missed" (p. 11).

Another weakness in many current TM systems, attributable to the structure of the underlying database, is that in these systems, the very notion of a document is lost. When a repetitions processor submits each successive sentence of a source document to the bitextual database, it does so blindly, as it were, without any trace of the context from which it was extracted. Moreover, the contents of the database are also stored as isolated sentences, with no indication of their place in the original document. As every translator knows, however, it is not always possible to translate a sentence in isolation; the same sentence may have to be rendered differently in different documents, or even within the same document, as Bédard (1998) convincingly argues. It is not hard to come up with examples of phenomena that are simply not amenable to translation in isolation; cross-sentence anaphora is one obvious case, but there are many others. Skeptics may argue that such problems are relatively rare, but they are missing the point. In order to evaluate a translation retrieved from memory, translators routinely need to situate that target sentence in its larger context. Current TM systems offer no straightforward way of doing this because, unlike full document archiving systems, they archive isolated sentences.

This may seem to be excessive criticism of current translation memory systems. After all, this technology is in wide use nowadays and is generally appreciated by translators and translation service managers, unlike fully automatic machine translation systems. If we have chosen to focus on some of the shortcomings of current TM systems, rather than extolling their virtues, it is mainly to highlight the fact that their applicability remains limited to a narrow range of texts that happen to exhibit a high degree of repetition: essentially, updated documents and certain types of technical manuals. In all other document types – in the vast majority of translation situations, in other words – the repetition of complete sentences is quite rare. Hence, the usefulness of repetitions processing technology is necessarily limited, at least until such time as these systems acquire the capability of handling repetition below the level of the complete sentence. See Macklovitch and Russell (2000) for further development of this argument.

Another reason for our criticism of current TM systems stems from the quasihegemony they seem to enjoy in the field of machine-aided translation. For many people, the terms *translation memory* and *computer-assisted translation* are virtually synonymous. This is regrettable, in our view, because it tends to obscure the fact that repetitions processing is just one type of translation support tool, albeit a useful one for certain kinds of repetitive documents. Nevertheless, with time, there is no doubt that we will see the emergence of many other types translation support tools, thereby relegating repetitions processors to their proper and modest place. Indeed, as we will show in the next section, there exist other ways of exploiting the very same bitextual databases on which repetitions processors are based.

Other Tools Based on Bitext

> Existing translations contain more solutions to more translation problems than any other existing resource (Isabelle *et al.*, 1993).

This assertion must have appeared quite audacious when it was first published back in 1993; but if one thinks about it for a moment, recalling the hundreds of millions of words that are translated every year, it just has to be true. The real challenge, of course, is how to render all the richness lying dormant in past translations readily and easily available to human users. Repetitions processing is one way of doing this, although it is certainly not the only way. For Pierre Isabelle and his colleagues in the machine-aided translation group at the CITI, the key to this challenge lay in what was then the novel concept of bitext, i.e., pairs of texts in which the translational correspondences have been made formally explicit. In the early 1990s, progress in automatic alignment techniques had made it possible to create enormous bitextual databases that were accurately aligned at the sentence level. The question then was: How could these be exploited to help support human translators?

One rather straightforward way of allowing translators and other users to benefit from databases of past translations is via an interactive bilingual concordancing tool, like the *TransSearch* system first developed at the CITI by Michel Simard (see Simard *et al.*, 1993). From the user's point of view, a concordancer is like a database querying system in which the queries correspond to various sorts of translation problems. Instead of asking colleagues if they've ever encountered a particular problem before and, if so, how they previously translated it, the user submits a query to the concordancer. The system responds by searching for the query in the database and displaying all the occurrences it finds, each in its full sentential context; and because this is a bitextual database, it can also display alongside each result the translation of that sentence in the target language. In that translation lies a potential solution to the original translation problem, which users may decide to recycle, as they see fit.

For our present purposes, it's interesting to note that the bitextual database that is queried via a concordancer like *TransSearch* has exactly the same structure as the databases that underlie commercial repetitions processing systems. (Indeed, some commercial TM packages also include an interactive concordancing facility that accesses the very same databases.) All that distinguishes the two is the manner in which they are queried. One way of expressing this difference is in terms of the trade-off that each effects between automation and flexibility. Repetitions processing provides a higher level of automation, because the system automatically submits each successive sentence in a new text to the bi-textual database, thereby ensuring that no repeated sentences are overlooked. As we have seen, however, this automation comes at the expense of a certain rigidity; because only complete sentences are submitted, repetitions of segments below the sentence level will often be ignored. An interactive concordancer, on the other hand, offers greater flexibility in the units that can be submitted – these may be any arbitrary sequence, from a single word up to a complete sentence, including ellipses – provided the user takes the initiative of manually selecting and submitting the appropriate queries. But regardless of whether the queries are submitted manually (as with a concordancer) or automatically (as with a repetitions processor), the important point to emphasize is that it is the database

itself, that constitutes the true translation memory. For this reason, it seems legitimate to propose a more generic or neutral definition of this term, viz., a computerized archive of past translations that is structured in such a way as to promote translation reuse. Nor is it reasonable to argue that one type of translation memory is *a priori* superior to the other, although each may lend itself better to various configurations of repetition. For texts that exhibit a high degree of full-sentence repetition, a fully automatic repetitions processor will tend to be more suitable; otherwise, an interactive concordancer will likely prove more useful to the translator.

Isabelle *et al*. (1993) contend that the notion of bitext provides the foundation for a whole new generation of translation support tools. One interesting and novel proposal they have made is for a translation checker, which they call *TransCheck*; see Macklovitch (1995) for a more detailed description of the system. As its name suggests, a translation checker is meant to be employed somewhat like a spelling or a grammar checker, to which a user will submit texts in the hope of catching typos or certain flagrant errors of grammar. The errors detected by these tools, however, are all monolingual, whereas in the case of *TransCheck*, the errors the system seeks to flag are bilingual, i.e., errors of correspondence between the source text and a draft translation in a target language. In order to do this, a translation checker must first transform the two texts into a bitext in which the correspondences between segments (generally sentences) are made explicit. Once this is done, the system can then verify those bitextual regions to ensure that they conform to certain well-known properties of an acceptable translation. The properties that are currently amenable to automatic verification tend to be rather simple and straightforward; basically, they involve formal and observable features in the two texts, rather than more abstract semantic properties. So a system like *TransCheck* will scan the generated bitext, one aligned region at a time, and verify that each contains certain obligatory equivalences while exhibiting no prohibited equivalences. An example of the obligatory sort would be the terminological equivalences provided in a client glossary or the correct transcription of various numerical expressions; and an example of the prohibited sort would be false cognates or other types of source language interference. Needless to say, such a system will overlook many veritable translation errors, and it may flag others erroneously; but then so do monolingual grammar and spelling checkers, and this doesn't prevent them from being helpful. In any case, the first commercial products offering rudimentary translation checking capabilities have just begun to appear on the market; e.g., the *ErrorSpy* system marketed by the German firm of D.O.G.

Translator's Workstations

A translator's workstation (TWS), conceived most generally, is a computer-based environment that integrates a number of distinct programs, all of which are intended to assist the human translator in various aspects of work. As we saw earlier, Martin Kay may have been the first to advance the idea of a TWS, which he called the translator's amanuensis. Alan Melby was another influential advocate of this approach; see Melby (1982). A detailed chronicle of the history of the TWS is provided by Hutchins (1998), who highlights some of the lesser-known figures who first proposed various tools that have subsequently become workstation components. The point that we want to emphasize here is that the TWS is indeed an approach, much more than it is a product, and as such it admits of numerous realizations. What all such realizations have in common, of course, is the basic tenet of machine-aided human translation, namely, that it is the human who remains at the center of the translation process. The workstation provides various support tools that are designed to make the translator more productive and ideally to relieve the translator of the more fastidious tasks involved in translation.

A brief word on this notion of integration, which is an essential feature of all TWS. As mentioned, a workstation may comprise disparate applications that were not necessarily intended to function together. Hence, a fundamental requirement of a well-designed workstation is to allow the user to shift focus effortlessly from one component to another and to transfer textual data seamlessly from one application to another. To take one simple example, the user needs to constantly consult his/her terminological glossary while drafting a target text within the word processor and, if the glossary contains the desired TL equivalents, be able to directly insert those terms into the target text with a minimum of keystrokes or mouse clicks. How this is done in practice will, of course, vary from one implementation to another; but in all workstations these kinds of ergonomic considerations are of paramount importance. Today, when almost all personal computers are equipped with operating systems that feature a graphic user interface, the difficulty being referred to here may not be obvious. However, in the first workstation development projects, like the one undertaken at the CITI in the late 1980s, the available interfaces were not nearly as user friendly, and the exchange of data between applications was often a very real problem,

due in large part to hardware memory limitations (see Macklovitch, 1989).

Recall that in the incremental approach that Kay first advocated for his translator's amanuensis, the central component was a specialized text editor; the other dedicated programs were to be gradually grafted onto this editor. Nowadays, more than two decades after Kay's original proposal, there are an impressive number of TWSs available – although not all of them call themselves as such – that offer a variety of translation support tools. Interestingly, almost all of the commercial workstation products are being marketed by the vendors of repetitions processing technology. Hence, it is not altogether surprising that in their promotional literature it is the 'translation memory' that is touted as the central, productivity-enhancing component. In actual fact, all these commercial packages include other programs that render them potentially useful to translators when they are working on texts that do not exhibit a sufficient degree of full-sentence repetition; otherwise, these packages would have limited commercial appeal. Foremost among these programs is terminology management software that allows translators to create, update, and share term glossaries. The more sophisticated commercial workstations may also include automatic alignment programs, term extraction programs that operate on the bitexts that these create from legacy translations, and programs that automatically identify terms in a source text that are found within the term glossary. One significant dividing point among the leading commercial workstations is how they interact with the major word processing packages (read MS-Word). Some TWSs do this by integrating their components directly into Word, via the addition of a toolbar menu, for example. This is said to ease the learning curve for users who are already familiar with Word, while allowing them to access its many useful ancillary features, e.g., monolingual spelling and grammar checking. Trados, which is the current market leader in commercial CAT tools, has adopted this approach, as have some of its smaller competitors, such as LogiTerm. Other workstation packages furnish their own proprietary editors, presumably because this allows them greater autonomy and perhaps better component integration; but they also provide filters to facilitate the importing and exporting of text with the major word processing packages. This is the approach adopted by Atril's Déjà-Vu and by Star group's Transit product.

These commercial workstation packages are now so widespread that one is tempted to say that they dominate the translation landscape. Currently, they all offer more or less the same range of functionalities, most of which have already been touched on in this article. However, at least two other features do deserve to be mentioned, even though (strictly speaking) they may fall outside our scope. The first are source-text analysis programs, which provide statistics on a new text to be translated, most notably the degree of sentence repetition; these statistics are meant to allow for an informed decision on the cost-effectiveness of using repetitions processing on a particular text. The second is direct access to a fully automatic machine translation program. This figured prominently in Melby's original proposal for a multilevel system of translation aids (see Melby, 1982), where full-scale MT was the third, or ultimate, level of automated assistance, just as it was in the historically related ALPS system described in Hutchins (1998). In the 1990s, several major vendors of translation memory technology sought to team up with the developers of commercial MT systems to provide what was vaunted as being the best of both worlds. In these integrated environments, so the argument went, a new input sentence for which no match was found in the translation memory could be sent off for automatic translation by the MT system, after which the translator need only postedit the machine output. (The sequencing of the two processes was significant, the underlying assumption being that past human translations are always preferable to those generated by machine.) There seems to be far less emphasis on such links to full MT systems today. Indeed, of the major CAT system vendors, SDL may be the only one that still offers this option, and even then quite discreetly. One may speculate on the reasons for this important change of strategy. No doubt it had something to do with the quality of the raw translations produced by the large rule-based MT systems that were dominant in the last decade, a level of quality that was probably judged to be insufficient for publication purposes and incompatible with the exacting requirements of professional translators. Indeed, several of those large commercial MT systems have since disappeared or are now targeting very different markets.

Conclusion

In the last few years, there has been much encouraging progress in the general field of translation automation. In terms of core technologies, the new statistical or data-driven methods have now made it possible to develop MT systems with a fraction of the human effort that was formerly required. Moreover, the quality of the translations produced by these corpus-based systems has been steadily improving, to the point that they can now rival that produced by the best rule-based systems. In terms of attitudes as well, there has been significant progress: progress in our

understanding of which types of technology are most suitable for different kinds of translation demands. The general distinction between translation for assimilation purposes versus translation for dissemination or publication purposes is now widely accepted and with it, the recognition that fully automatic MT is often not appropriate for the latter type of translation demand, at least not given the current state of the technology. This is a most welcome development. For too many years, the "all or nothing syndrome," as Alan Melby once called it – "the attitude that the machine must translate every sentence or it is not worth using a machine at all" (Melby, 1982: 215) – resulted in the misdirection of energies and resources among researchers and developers, as well as producing a high level of frustration among users, who felt that automated 'solutions' were being imposed on them that simply did not fit their needs. In the light of this inglorious history, it is altogether refreshing to read the following from someone as informed as John Hutchins: "MT systems are not suitable for use by professional translators, who do not like to have to correct the irritatingly 'naïve' mistakes made by computer programs. They prefer computer aids that are under their full control" (Hutchins, 2003b: 509).

Last but not least, it is also encouraging to see that new types of translation aids are finally being added to commercial workstations, beyond the now standard repetitions processing and glossary management programs. To illustrate with one simple example, several CAT packages now include a program that seeks to detect terms that have been translated inconsistently, i.e., not as the target equivalent specified in the term glossary. Small matter that just such a program was proposed nearly 10 years ago as part of the *TransCheck* system. What's important for working translators and revisers is that this kind of automated assistance, which will help relieve them of a particularly fastidious aspect of their work, is now becoming available. Of course, checking for terminological consistency is but one small element in the overall job of quality assurance in translation. Again, small matter! As Kay so aptly stated so many years ago, in machine-aided translation, it's little steps for little feet. After years of immobility, the good news is that the feet are finally moving, and moving, it would seem, in the right direction.

See also: Bar-Hillel, Yehoshua (1915–1975); Kay, Martin (b. 1935); Machine Translation: History; Machine Translation: Overview; Part-of-Speech Tagging; Terminology, Term Banks and Termbases for Translation; Translation Memories; Translation: Profession; Writers' Aids.

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Machine Translation: Overview

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Introduction

The term *machine translation* (MT) is used to refer to any process in which a machine performs a translation operation between two ordinary human languages: the *source language* (SL) and the *target language* (TL). This is the sense that appears in the following proposition:

> Machine translation is cheaper than human translation but less reliable.

The term can also designate the product of such a process, as in:

> Reading machine translations is not very pleasant but it is a convenient way to get the gist of foreign-language Web pages.

Finally, machine translation can also refer to the study of methods and techniques that render machines capable of producing (better) translations, as in the title of the present article.

The term applies equally well to written or spoken language, but there is a tendency to prefer the terms *speech translation* or *speech-to-speech translation* for referring specifically to machine translation of spoken language.

Translation is a very effective way of helping people communicate across the linguistic barriers. Unfortunately, human translation is expensive enough that it cannot constitute a practical solution to the everyday needs of ordinary people. As the price of human translation is unlikely to fall substantially, machine translation constitutes our best hope of making translation affordable for all.

The idea of using machines to translate is very old, but it was only around 1950, with the advent of digital computers, that serious work could really start. The initial enthusiasm led many to believe that good-quality machine translation was just around the corner, but they were wrong. After some 50 years of research, we can affirm that, barring an unexpected breakthrough, machines will not be able to compete with human translators in the foreseeable future. This prediction applies not only to difficult material such as literary works, but also to all but the very simplest and repetitive texts (e.g., weather reports).

The present article explains why this is so. We start from a simplistic conception of machine translation and show where it breaks down. Then we show how computational linguists tried to fix the problems through increasingly elaborate approaches. But these more elaborate approaches turn out to raise their own additional problems.

Why Machine Translation Is a Difficult Problem

Let's assume a very naïve theory: translating between human languages is just a matter of looking up the words of the source text in a bilingual dictionary. The next 12 subsections examine the many ways that simplistic theory breaks down and show why translation requires: (a) a fine-grained understanding of the source text; (b) contextual knowledge that makes it possible to fill information gaps between the SL and the TL; and (c) a detailed knowledge of the grammar of the TL.

Segmenting Texts into Words

Before a dictionary search can be performed, the text needs to be segmented into a sequence of individual

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Relevant Website

http://www.ldc.upenn.edu – Linguistic Data Consortium.

Macro-Jê

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The Macro-Jê stock comprises the Jê family and a number of possibly related language families, all of which are located in Brazil. Macro-Jê is arguably one of the lesser-known language groups of South America, its very existence as a genetic unit being still "a working hypothesis" (Rodrigues, 1999: 165). According to Rodrigues (1986, 1999), whose classification is the most widely accepted among researchers working on Brazilian languages, the 'Macro-Jê hypothesis' comprises 12 different language families: Jê, Kamakã, Maxakalí, Krenák, Purí, Karirí, Yatê, Karajá, Ofayé, Boróro, Guató, and Rikbaktsa. The existence of Jê as a language family has been recognized since early classifications of South American languages (Martius, 1867). 'Jê' is a Portuguese spelling for a Northern Jê collective morpheme ([je] in Apinajé, for instance) that occurs in the names of several Jê-speaking peoples. The term 'Macro-Jê' was coined by Mason (1950), replacing earlier labels, such as 'Tapuya' and 'Tapuya-Jê.'

Comparative Evidence

Recent classifications (Rodrigues, 1986; Greenberg, 1987; Kaufman, 1994) differ as to the precise scope of Macro-Jê, although there is agreement on the inclusion of most of the families (Table 1). Except for Karirí (included only by Rodrigues), Greenberg and Kaufman included all the families listed above. In addition, Greenberg included Chiquitano (also included by Kaufman), Jabutí, and Otí. Given the lack of comprehensive comparative studies, the Macro-Jê status of some of these families is still an open question. Although Guató is included in the stock by all of the aforementioned classifications, a case for its inclusion has yet to be made, beyond the superficial, inconclusive evidence presented so far (Rodrigues, 1986, 1999). On the other hand, a preliminary comparison has revealed compelling evidence for the inclusion of the Jabutí family into the Macro-Jê

Table 1 The Macro-Jê Hypothesis[a]

1. **Jê**
   †Jeikó
   Northern Jê: Panará, Suyá, Kayapó, Timbíra (Parkatêjê, Pykobjê, etc.), Apinajé
   Central Jê: Xavánte, Xerénte, †Akroá-Mirim, †Xakriabá
   Southern Jê: Kaingáng, Xokléng, †Ingaín
2. **Kamakã**
   †Kamakã, †Mongoyó, †Menién, †Kotoxó, †Masakará
3. **Maxakalí**
   Maxakalí, †Pataxó, †Kapoxó, †Monoxó, †Makoní, †Malalí
4. **Krenák**
   Krenák (Botocudo, Borúm)
5. **Purí (Coroado)**
   †Coroado, †Purí, †Koropó
6. **Ofayé**
   Ofayé
7. **Rikbaktsá**
   Rikbaktsá
8. **Boróro**
   Boróro, †Umutína, †Otúke
9. **Karajá**
   Karajá (including four dialects, Southern Karajá, Northern Karajá, Javaé, and Xambioá)
10. **Karirí**
    †Kipeá, †Dzubukuá, †Pedra Branca, †Sabuyá
    (included by Rodrigues but not Greenberg or Kaufman)
11. **Jabutí**
    Djeoromitxí (Jabutí)
    Arikapú
    (included by Greenberg but not Rodrigues or Kaufman)
12. **Yatê**
    Yatê
13. **Guató**
    Guató
14. **Chiquitano**
    Chiquitano (Besiro)
    (included by Greenberg and Kaufman, but not Rodrigues)
15. **Otí**
    †Otí (Eo-Xavánte)
    (the inclusion of Otí, proposed only by Greenberg, is not substantiated by the available data)

[a]Extinct languages are indicated by †. Based on Greenberg, 1987; Rodrigues, 1986, 1999; Kaufman, 1994.

stock (Voort and Ribeiro, 2004), thus corroborating a hypothesis suggested in the 1930s by ethnographer Curt Nimuendaju (Nimuendaju, 2000: 219–221). Greenberg's main piece of evidence for the inclusion of Chiquitano was the entire set of singular personal prefixes (Greenberg, 1987: 44), which are strikingly similar to the ones found in several Macro-Jê families; convincing lexical evidence, however, has not been presented thus far. As for Otí, a poorly documented language once spoken in southern Brazil, the meager available data do not support its inclusion in the Macro-Jê stock.

The only family-level reconstruction available is Davis (1966), for Proto-Jê. So far, lexical comparative evidence supporting the inclusion of individual families in the Macro-Jê stock has been presented for Kamakã (Loukotka, 1932), Maxakalí (Loukotka, 1931, 1939; Davis, 1968), Purí (Loukotka, 1937), Boróro (Guérios, 1939), Krenák (Loukotka, 1955; Seki, 2002), Karajá (Davis, 1968), Ofayé (Gudschinsky, 1971), Rikbaktsá (Boswood, 1973), and Jabutí (Voort and Ribeiro, 2004). In addition, some studies have shown very suggestive cases of morphological idiosyncrasies shared by Jê, Boróro, Maxakalí, Karirí, Karajá, and Ofayé (Rodrigues, 1992, 2000b). Thus, although the inclusion of many of the families into the Macro-Jê stock is being further corroborated by additional research, for others (namely Guató, Chiquitano, and Yatê) the hypothesis has yet to be systematically tested. The precise relationship among the suggested members of the stock also remains to be worked out.

Long-Range Affiliations

Greenberg (1987) suggested that Macro-Jê would be related to his Macro-Pano and Macro-Carib stocks, as part of a Jê-Pano-Carib branch of 'Amerind.' However, as Rodrigues (2000a) pointed out, Greenberg's purported evidence does not withstand careful examination. Rodrigues (1985, 2000a) proposed instead a relationship between Tupí, Carib, and Macro-Jê, noting grammatical and lexical similarities among the three language groups (especially between Carib and Tupí). Davis (1968) also mentioned a few lexical similarities between Proto-Jê and Proto-Tupí. Although the evidence presented so far suggests that Rodrigues's proposal is more plausible than Greenberg's, any hypothesis of distant genetic relationship at such a level must be considered with caution. Considering that the precise boundaries of Macro-Jê are still uncertain, much more research at the family and stock levels needs to be conducted before such long-range classifications can be proposed on solid scientific grounds.

Location

All Macro-Jê languages are spoken in Brazilian territory, although in the past Otúke (Boróro) and Ingaín (Southern Jê), both now extinct, were spoken in Bolivia and Argentina, respectively. Chiquitano, listed as a Macro-Jê language by Greenberg (1987) and Kaufman (1994), is also spoken in Bolivia, as well as in Mato Grosso, Brazil. Although the Jabutí languages and Rikbaktsá are spoken in the southern fringes of the Amazon (Rondônia and northern Mato Grosso, respectively), the overall distribution of Macro-Jê languages is typically non-Amazonian. Yatê, Krenák, and Maxakalí languages are spoken in eastern Brazil, the same having been the case of Purí, Kamakã, and Karirí (all now extinct). Central and Northern Jê tribes, as well as the Boróro and the Ofayé, traditionally occupy the savanna areas of central Brazil. The southernmost Macro-Jê languages are those belonging to the southern branch of the Jê family, spreading from São Paulo to Rio Grande do Sul. Karajá is spoken along the Araguaia River, in central Brazil. The traditional Guató territory is the Paraguay River, near the Bolivian border. Since several purported Macro-Jê languages were spoken in eastern Brazil, a number of them became extinct early on, under the impact of European colonization. Yatê is a remarkable exception, being the only surviving indigenous language in the Brazilian northeast.

Whereas Guató, Rikbaktsá, Karajá, Krenák, and Ofayé are all single-member families (Table 1), the Jê family has a relatively large number of members, for most of which a fair amount of descriptive material is now becoming available (mostly as graduate theses and dissertations in Brazilian universities). Ofayé has around a dozen speakers, although it is mistakenly listed as extinct by some sources (including earlier editions of Ethnologue). Boróro and Maxakalí are the only surviving languages of their respective families. All the languages of the Kamakã, Purí, and Karirí families are now extinct. While documentation on Kamakã and Purí languages consists only of brief wordlists, the Karirí languages Kipeá and Dzubukuá were documented in catechisms (Mamiani, 1698; Bernardo de Nantes, 1709; respectively) and, for Kipeá, a grammar (Mamiani, 1699) – the only published grammar of a non-Tupí language from colonial Brazil. Thus, among the extinct Macro-Jê families, Karirí is the only one for which detailed grammatical information is available. Many of the languages

included in the Macro-Jê stock are seriously endangered (Guató, Ofayé, Krenák, and Arikapú are especially so).

Characteristics

When compared with languages of other lowland South American families (such as Carib and Tupí-Guaraní), Macro-Jê languages typically present larger vowel inventories. For instance, Davis (1966) reconstructed, for Proto-Jê, a system of nine oral and six nasal vowels, as well as 11 consonants. Syllabic patterns are rather simple, obstruent clusters being uncommon. Stress is generally predictable. Phonologically contrastive tone oppositions occur in Yatê and Guató (Palácio, 2004). Processes such as nasal spreading and vowel harmony are generally absent. An exception is Karajá, which presents advanced tongue root vowel harmony, a rare phenomenon among South American languages (Ribeiro, 2002a). Another remarkable feature of Karajá is the existence of systematic differences between male and female speech. Female speech is more conservative, male speech being characterized, in general, by the deletion of a velar stop occurring in the corresponding female speech form (as a result of consonant deletion, vowel assimilation and fusion may also occur). This is a very productive process, applying even to loanwords (Table 2).

Most Macro-Jê languages have a relatively simple morphology. In most languages (including those of the Jabutí, Karirí, Krenák, Jê, Ofayé, and Maxakalí families), productive inflectional morphology is limited to person marking, the same paradigms being generally shared by nouns, verbs, and adpositions alike. Tense and aspect distinctions are generally conveyed by particles and auxiliaries rather than by inflections (with few apparent exceptions, such as Yatê; cf. Costa, 2004). Noun incorporation is rare, having been reported for a few Northern Jê languages, such as Panará (which also presents postposition incorporation; cf. Dourado, 2002).

Table 2 Female versus male speech distinctions in Karajá

Female speech	*Male speech*	
kɔwɔrʊ̃	*ɔwɔrʊ̃*	'wood'
dɪkarã	*dɪarã*	'I'
kɔhã	*ɔhã*	'armadillo'
kədẽra	*ədẽra*	'sand'
ruku	*ru*	'night'
bɛraku	*bero*	'river'
d̪əkɪ	*d̪ɪ*	'3rd person pronoun'
kõbəra	*õbəra*	'to buy' (from Portuguese *comprar*)
kabɛ	*abɛ*	'coffee' (from Portuguese *café*)
bẽkawa	*bẽawa*	'firearm' (from Língua Geral *mokẽãwa*)

In languages with a more robust morphology, such as Karajá, Guató, and Yatê, inflectional morphology tends to be more complex with verbs than with nouns. In Karajá, for example, the verb form includes subject-agreement, voice (transitive, passive, and antipassive), and directional markers ('thither' versus 'hither'), which can be used with evidential purposes (Ribeiro, 2002b); on the other hand, the only category for which nouns inflect is possession (as in most Macro-Jê languages).

The majority of the purported Macro-Jê languages are verb final, with postpositions instead of prepositions and possessor-possessed order in genitive constructions (the exceptions being Guató, Chiquitano, and Karirí). Macro-Jê languages seemingly lack the adjective as an independent part of speech, with adjectival meanings being expressed by nouns or descriptive verbs. Oliveira (2003) offered an in-depth discussion of the properties displayed by 'descriptives' in a particular Macro-Jê language, Apinajé, illustrating well the issues involved in determining part-of-speech membership in languages in which most inflectional properties tend to be shared by nouns, verbs, and adpositions. In attributive constructions, descriptives follow the word they modify.

Languages such as Maxakalí, Karirí, and Panará are described as being predominantly ergative. In addition, a number of Jê languages are described as presenting an ergative split of some sort. That is the case of Xokléng (Urban, 1985) and Northern Jê languages such as Kayapó (Silva and Salanova, 2000) and Apinajé. Among the latter, however, ergativity seems to be rather epiphenomenal, being found only in constructions involving nominalized verbs (such as relative clauses; cf. Oliveira, 2003). Syntactic ergativity is rarely found in Macro-Jê, with the exception of Karirí, in which all grammatical criteria (verb inflection, relativization, switch-reference, word order) point to the absolutive argument (S/O) as being the syntactic pivot (Larsen, 1984).

Further Reading

For information on the main literature on Macro-Jê languages, including an overview of their phonological and grammatical characteristics and a short list of possible Macro-Jê cognate sets, see Rodrigues (1999). Proceedings of recent conferences (the 'Encontros Macro-Jê,' which have been taking place periodically since 2001) help to provide an updated picture of Macro-Jê scholarship; the proceedings of the first

two meetings were published as Santos and Pontes (2002) and D'Angelis (2004), respectively. Population figures for all Macro-Jê groups (including those now monolingual in Portuguese) can be found in Ricardo (2001).

See also: Brazil: Language Situation; Cariban Languages; Tupian Languages.

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Macrostructure

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Macrostructures are structures that organize texts globally, just as microstructures organize them locally. Given that texts are not just concatenations of sentences, texts need to be structured both locally (connections between clauses and sentences) and globally (larger fragments of discourse, e.g., paragraphs). Syntactic rules, the meaning of the words of the sentence, and general heuristics of discourse form the microstructure of a text. These microstructures organize sets of interrelated propositional representations of the phrases, clauses, and sentences of the text. Macrorules translate these sequences of propositions into a smaller set of more general propositions by deleting propositions that are less important for the overall meaning of the text, by generalizing propositions into supersets and by constructing new text units that replace the meaning of the old set. Macrorules operate recursively, so that macrostructures that are formed by macrorules may be subject to another cycle of macrorules, further generalizing the gist of the text. Macrostructures are therefore abstract semantic descriptions of the semantic content of the text, similar to the text's global meaning and theme and providing global coherence.

The term 'macrostructure' for global principles of text organization was first proposed by Bierwisch in 1965 for narrative structures in literary texts. In 1968, Harris discussed a similar idea of global text structuring. In that same year the *Morphology of the folktale* by Vladimir Propp was translated from Russian (original 1928). Propp argued that Russian fairy tales share a particular narrative structure. Around that same time, narratologists such as Greimas (1966), Bremond (1964), Labov and Waletzky (1967), Lévi-Strauss (1960), and Todorov (1971) proposed similar narrative grammars. According to these grammars, stories are like sentences in that their narrative structures are structures analogous to syntactic structures. The development of the concept of macrostructures should be seen against the background of the developments of narrative structures.

'Macrostructures' became an established term in text linguistics after being further developed by Van Dijk (1972). Van Dijk's text linguistic approach was very much based on theoretical linguistics and Chomsky's (1957, 1965) generative-transformational grammar. Chomsky (a student of Harris) argued that sentences have a recursive capacity. Each sentence has a deep structure that is interpreted by the semantic component of the grammar. Syntactic transformations relate the deep structure to the surface structure of the sentence. Some of the elementary transformations consist of adjoining, moving, deleting, and copying constituents. Van Dijk argued that text grammars also have these deep and surface structures. The equivalent to the sentential surface structures are microstructures; the equivalent to the sentential deep structures are macrostructures. As with the sentential surface structures, microstructures have underlying rules to represent the underlying semantic representation of the sentences. As with the sentential deep structures, macrostructures have an abstract semantic character and are specified by macrosemantic rules operating on the microstructures. Although the concept of macrostructures remained the same, the direct link to sentence structures faded in later work (Van Dijk, 1977, 1980).

Around the time of Van Dijk's introduction of text grammars in (text) linguistics and poetics, Kintsch (1974) argued that cognitive psychology should not focus on isolated sentences only, but must focus on texts. Kintsch proposed that the representation of texts in memory is a network of interrelated propositions. These propositions are units of meaning roughly corresponding to phrases or clauses. A proposition consists of a predicate that modifies one or more arguments. A sentence like *The teacher explained the concept to the students* can be represented propositionally as (EXPLAIN, TEACHER, CONCEPT, STUDENT). It contains one predicate (EXPLAIN) and three arguments (TEACHER, CONCEPT, STUDENT). Arguments are generally the nouns of a clause, but can also be prepositional phrases and

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even references to other propositions. For instance, the second and third propositions in a text conjoined by the connective *or* can be represented as (OR, 2, 3).

Kintsch's psychological ideas on texts and representations of meaning in memory and Van Dijk's linguistic ideas on text grammars resulted in an impetus in research on discourse comprehension, first resulting in Kintsch and Van Dijk's (1978) influential model of text comprehension. The goal of the model is to explain coherence in text. According to the model, the aim of text comprehension is the formation of micro- and macrostructures. In the comprehension process, meaningful text units are transformed into propositions. Take, for instance, the following extract of a text and its propositional representation:

A number of interesting soccer matches between European teams took place in the early summer days of 2004.
(1) (NUMBER, MATCHES)
(2) (INTERESTING, MATCHES)
(3) (SOCCER, MATCHES)
(4) (BETWEEN, MATCHES, EUROPEAN TEAMS)
(5) (TIME: IN, MATCHES SUMMER)
(6) (EARLY, SUMMER)
(7) (TIME: IN SUMMER, 2004)

Coherence is achieved by an overlap of the arguments in these propositions. The comprehender links the arguments of propositions in order to form a coherence graph. In Figure 1, Proposition 4 is linked to Propositions 1, 2, 3, and 5 by the argument MATCHES. Similarly, Propositions 6 and 7 are linked to 5 by the argument SUMMER. Figure 1 is the representation of the microstructure of the text.

However, there are working memory constraints to linking propositions. According to the model, only a limited number of propositions can stay in one processing cycle. The processing cycle is a temporal period during which propositions are linked. Propositions that stay in multiple processing cycles, and stay longer in working memory, are more memorable. Propositions enter working memory when they are selected by a leading-edge strategy: recent propositions and/or those higher in the hierarchy. Imagine that the processing cycle could hold only four propositions. In this example, according to the leading-edge strategy, Propositions 4, 5, 7, and 3 would move on to the next processing cycle.

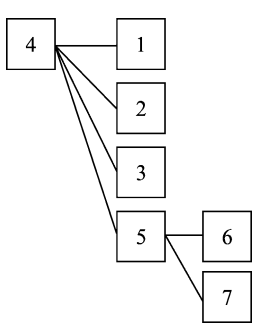

Figure 1 Example of coherence graph of text extract.

The macrorules deletion (those propositions whose deletions do not change the meaning of the text are deleted), generalization (sequences of propositions that can be replaced by supersets are generalized), and construction (sequences of propositions that can be replaced by a single proposition are constructed into a single proposition) are carried out on the microstructure to obtain the macrostructure. The above extract is too short to provide a complete analysis, but one can imagine the following macrorules being applied to the microstructure:

Deletion:
(INTERESTING, MATCHES) & (BETWEEN, MATCHES, EUROPEAN TEAMS) → (BETWEEN, MATCHES, EUROPEAN TEAMS)
Generalization:
(TIME: IN SUMMER, 2004) → (IN, 2004)
Construction:
(INTERESTING, MATCHES) & (BETWEEN, MATCHES, EUROPEAN TEAMS) → (PLAY, EUROPEAN TEAMS, SOCCER)

The long-term recall of the text is based on the propositions in the macrostructure of the text. In the above example, a macroproposition like (PLAY, EUROPEAN TEAMS, SOCCER) is a good approximation of the gist of the text, could be used as the title for the text, and is likely to be remembered best.

Microstructures and macrostructures as discussed thus far can be seen as rules and structures of text grammars. Van Dijk and Kintsch (1983) added to these abstract semantic representations of the text the flexibility and fallibility of the user, thereby moving away from the text itself to knowledge–text interaction. One of the problems with the Kintsch and Van Dijk (1978) model and related theories is that text representation is based entirely on the text. The role of the reader's knowledge and the strategies the reader uses in the comprehension process are limited. In addition to a multileveled propositional text base, Van Dijk and Kintsch argue for a situational model that incorporates the reader's interpretations – both correct and incorrect – of the text. The situational model can, for instance, explain individual differences in interpretations of texts, differences in the meaning of translations, and the fallibility and flexibility of memory. It also allows for the text being grounded. In the formation of macrostructures, sociocultural contexts (for instance, cultural

information regarding the situation and the type of interaction) play an important role. In addition to the textual macrostructures, Van Dijk and Kintsch (1983) therefore proposed pragmatic superstructures, schematic structures similar to the rhetorical structure of the text. An example of such a superstructure is a narrative schema or an argumentative schema. Knowing the superstructure of a text allows the reader to anticipate the global organization (macrostructure) of the text.

Kintsch's construction–integration model (1988, 1998) continued and extended the Kintsch and Van Dijk (1978) and Van Dijk and Kintsch (1983) process model. In the construction–integration model, the process from text to mental representation consists of two phases. In the construction phase, an approximate mental model is locally constructed based on the text and the reader's background knowledge. In the integration phase, this tentative mental model stabilizes by filtering out irrelevant and redundant information. An activation process spreads around the network of propositions, boosting strong links between propositions and dampening weak links in order to obtain a well-structured mental representation. The representation resulting from the integration process is then stored in the long-term memory. As with the Kintsch and Van Dijk (1978) and Van Dijk and Kintsch (1983) models, the distinction between microstructure and macrostructure is orthogonal to the distinction between text base and situation model. The text yields a text base. The text base is integrated with the background knowledge of the reader and yields the situation model. This means that two global features characterize the mental representation of a text: its macrostructure and the situational and world knowledge.

Various studies have shown that the macrostructure can significantly predict recall and summarization results. Those propositions that end up in the macrostructure are remembered better than propositions in the microstructure (Graesser, 1981; Kintsch and Keenan, 1973; Kintsch *et al.*, 1975; McKoon and Ratcliff, 1980; Meyer, 1975).

Because macrostructures are higher level properties of sequences of propositions, it is hard to identify linguistic manifestations of macropropositions and their macrostructures at the surface level of the text. However, some indicators of macropropositions can be identified. Titles of texts, summaries, and topical sentences, often at the beginning or end of a paragraph, generally indicate macropropositions. Furthermore, given the properties of coherence graphs, clauses that tend to be conjoined by connectives are good candidates for macropropositions, as are sentences that contain demonstratives and pronouns.

Propositional macrostructures cannot be computed automatically from the text. One of the reasons for this is that the macrorules that can be applied to the microstructure remain underspecified. Kintsch (1998, 2002) has, however, shown how macrostructures can be derived from the text computationally using latent semantic analysis. The meaning of a sentence is represented as a vector in a high-dimensional semantic space. Those vectors that relate most to the overall text (and have the highest typicality scores) can be identified as macropropositions.

See also: Coherence: Psycholinguistic Approach; Computer-Supported Writing; Discourse Processing; Latent Semantic Analysis; Narrative: Linguistic and Structural Theories; Propositions; Psycholinguistics: Overview; Reading Processes in Adults; Rhetorical Structure Theory; Speech Synthesis: Perception and Comprehension; Text and Text Analysis; Thematics.

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Madang Languages

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The Madang group, containing about 100 languages, is the largest well-defined branch of the Trans New Guinea (TNG) family, which dominates the large island of New Guinea (*see* **Trans New Guinea Languages**). The Madang subgroup occupies the central two-thirds of Madang Province in north central Papua New Guinea (see **Figure 1**). In the east the group's immediate neighbors are languages of the Finisterre–Huon branch of TNG. In the high mountain valleys to the south lie the Goroka, Chimbu–Wahgi, and Engan branches and to the west are unrelated languages, members of the Lower Sepik–Ramu family. The most important innovations defining the Madang subgroup are the replacement of the Proto-TNG independent pronouns **na* '1SG,' **ŋga* '2SG,' and **ya* ' 3SG' by Proto-Madang **ya, *na* and **nu,* respectively (Ross, 2000).

The Madang group probably broke up more than 5000 years ago, after diverging from its TNG relatives in the central highlands. This rough estimate of time depth is based chiefly on lexicostatistical agreements between languages belonging to different primary branches within Madang, which are of the order of 5–15%, lower than those between the major branches of Indo-European. The whole of Madang Province has an area smaller than the Netherlands but contains some 150 languages. Most members of the Madang group have between 500 and 2000 speakers and none has more than about 20 000. This extreme linguistic fragmentation reflects both the considerable time depth of the Madang subgroup and fact that until the colonial era political units in New Guinea seldom exceeded a few hundred people.

The first written records of Madang languages were made in the 1870s but to this day most of the languages are documented only by word lists and sketchy grammatical notes (Z'graggen, 1975b gives a history of research and Carrington, 1996 contains a near-exhaustive bibliography). The best-documented languages are probably Amele (Roberts, 1981, 1987, 1991), Kalam (Pawley, 1966, 1987, 1993; Lane, 1991; Pawley *et al*., 2000; Pawley and Bulmer, in press), and Kobon (Davies, 1980, 1981, 1985). There are detailed grammars of several other languages including Anamuxra (a.k.a. Ikundun or Anamgura) (Ingram, in press), Tauya (MacDonald, 1990) and Usan (Reesink, 1987).

Much of the published comparative work on Madang languages is due to John Z'graggen (1971, 1975a, 1975b, 1980a, 1980b, 1980c, 1980d). He posited a 'Madang–Adelbert Range subphylum' of 98 languages which corresponds closely to the Madang group as defined here, except that Kalam and Kobon (wrongly assigned by Z'graggen following Wurm, 1975 to a putative East New Guinea Highlands microphylum) are now included in Madang and Isabi is now excluded (it belongs to the Goroka subgroup of TNG).

Z'graggen also tentatively proposed an internal classification on typological and lexicostatistical grounds. Recent (and largely unpublished) comparative work using more classical subgrouping methods has led to various revisions in the subgrouping (Pawley, 1998; Pawley and Osmond, 1997; Ross, 2000). Five main branches can be distinguished based

[†]Deceased

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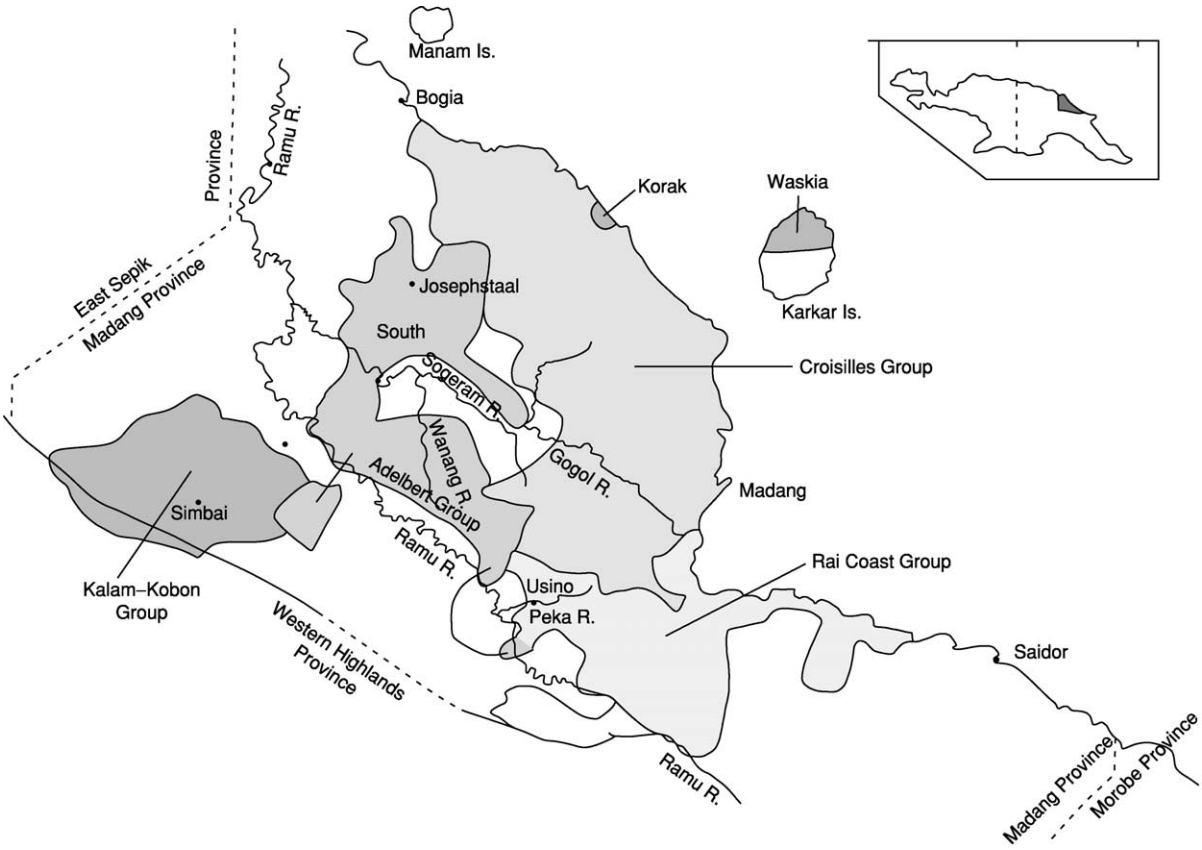

Figure 1 Location of major subgroups of the Madang group.

on innovations in the pronouns (Ross, 2000) and other criteria:

- The Rai Coast group, consisting of about 30 languages, extends along the coastal lowlands from around the mouth of the Gogol River eastwards almost to the mouth of the Mot, and in places extends inland as far south as the Ramu River.
- The Croisilles group of some 50 languages subsumes the 'Mabuso' group and most languages of the 'North Adelbert' group proposed by Z'graggen (1975). Croisilles languages occupy the central Madang coast from the Gogol River north almost as far as Bogia, and cover much of the hinterland west and north of Madang town.
- The South Adelbert group contains 14 languages. Twelve are centered in the South Adelbert Range north of the Ramu River. The other two, Gants and Faita, are spoken south of the Ramu in separate pockets in or close to the Bismarck Range.
- Waskia and Korak, spoken on Karkar Island and on the coast just west of this, form another group.
- A fifth group consists of Kalam and Kobon (each a chain of diverse dialects), spoken around the junction of the Bismark and Schrader Ranges where Madang Province meets Western Highlands Province.

Structural Characteristics of Madang Languages

Phonology

A good many Madang languages have syllables of the shape (C)V and (word finally) CVC, five vowels and between 15 and 20 consonants including series of nasals and oral and prenasalized (or voiceless and voiced) obstruents with contrasts at bilabial, apical, and velar (and often palatal) positions. Members of the South Adelbert and Kalam–Kobon groups resemble unrelated languages of the Sepik and Lower Sepik–Ramu families in making heavy use of a high central or mid central vowel which in some contexts is nonphonemic, being epenthetically inserted between consonants (Biggs, 1963; Pawley, 1966; Ingram, forthcoming).

Grammar

The preferred order of constituents in verbal clauses is SOV but OVS often occurs as a marked structure.

Adpositions follow the verb, determiners and possessors follow the noun. Case marking is generally absent or little developed. Most languages organize pronominal affixes to show a nominative–accusative/dative contrast.

Common nouns are an open class but there are several closed classes of nominal roots such as kinship terms and locatives. In Kalam and Kobon, verb roots are a small closed class of about 130 members but in most Madang languages they are more numerous and probably form an open class. Minor word classes include adjectives, adverb roots, and verbal adjuncts (see below). Many Madang languages distinguish singular, dual and plural independent pronouns in three persons. The dual and plural forms are usually distinguished by a suffix.

Morphology is chiefly suffixal. In certain Madang languages, especially in the west, nouns show considerable morphological complexity, including classifying and case-marking suffixes. In others noun morphology is simple but generally kinship nouns take bound possessor pronouns. Sentence-final verbs are typically inflected for tense-aspect-mood and for subject agreement. In some languages transitive verbs also carry a pronominal prefix or proclitic marking object agreement. Dependent verbs in nonfinal clauses are typically marked for relative tense and subject or topic identity with the final verb.

All languages make extensive use of at least one of the following kinds of complex (multiheaded) predicates: (i) in verbal adjunct constructions, a verb, usually carrying a rather general meaning such as 'make,' 'hit,' or 'go,' occurs in partnership with a noninflecting base (the adjunct), which carries more specific meaning; (ii) in serial verb constructions two or more bare verb roots occur in sequence to express a tightly integrated sequence of subevents. Kalam and Kobon allow up to eight or nine verb roots to occur in a single predicate phrase.

In constructions denoting uncontrolled bodily and mental processes (e.g., sweating, sneezing, bleeding, feeling sick) a noun denoting bodily condition is, arguably, the subject. The experiencer is generally marked by an object/dative pronoun and is the direct object.

Long chains of clauses are commonly used to report a sequence of past events that make up a single episode. Generally, little use of is made of conjunctions to show sequential, conditional, and causal relations. Instead, the main verb in each nonfinal clause carries a suffix which indicates (i) whether the event denoted by the medial verb occurs prior to or simultaneous with that of the final verb, and (ii) whether that verb has the same subject or topic as the next clause. Paragraphlike boundaries are frequently marked by head-to-tail linkage, in which the last clause of the previous sentence is repeated, to begin a new episode.

See also: Papua New Guinea: Language Situation; Papuan Languages; Trans New Guinea Languages.

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Jacob Madsen from Århus in Jutland in the West of Denmark is remembered in linguistics for his pioneering study of general phonetic principles, *De literis libri duo* of 1586. However, like several of the great general linguists of the 16th and 17th centuries, such as Bishop John Wilkins in England, his language work was subsidiary to his principal employment and responsibilities. After eight years studying in Germany, Madsen returned to Denmark in 1574 to take up the professorship of Latin at the university in Copenhagen, to which post Greek was added the following year. In 1580 he became professor of theology, and in the last two years of his life he was rector of the university. He had earlier served as university librarian as well. He left a number of philosophical works as well as linguistic works, but much of the linguistic opus is known only from its titles (*Dictionarium Latino-Danicum*, *Observationes Danicæ*, *Grammaticæ Latino-Danicæ*, *Etymologiæ*, *Syntaxis*, *De cognitione lingvæ*) since his papers were destroyed by fire in the university library in 1728. His lexical and grammatical work prefigures that of the flourishing community of scholars of Danish of the following century, which includes Peder Syv and Erik Pontoppidan.

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The importance of *De literis libri duo* in the history of linguistics is that it is the first extant attempt to deal with general, rather than language-specific, phonetics, and it also provides a useful source of information about 16th-century Danish, not least that of Jutland.

See also: Phonetics: Precursors to Modern Approaches; Ramus, Petrus (1515–1572); Wilkins, John (1614–1672).

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Madurese

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Madurese is the third most widely spoken regional language of Indonesia (after Javanese and Sundanese) and the fourth most widely spoken language in the Austronesian language family (after Malay/Indonesian, Javanese and Sundanese). There are more than 13 million speakers from the island of Madura, from neighboring islands (Kangean Archipelago, Bawean, and Sapudi Islands), and from the northern parts of East Java that were settled by immigrants from infertile Madura. Java has the largest number of Madurese speakers (more than 6 million). Stevens (1968) distinguished two main dialect groups, Maduran and Kangean. Within the Maduran group there are three subgroups: West Madurese, with Bawean and Bangkalan dialects; Central Madurese, with Pamekasan and Sampang dialects; and East Madurese, with Sumenep and Sapudi dialects. The Sumenep dialect is regarded as standard Madurese. The Madurese dialects of East Java vary according to the origins of the speakers. Madurese is a member of the Western Malayo-Polynesian subfamily, which includes the languages of western Indonesia and the Philippines. Lexicostatistically, Madurese appears to be most closely related to Malay; it is related to a somewhat lesser degree to the major languages of Java, i.e., Sundanese and Javanese (see Dyen, 1965; Nothofer, 1975). So far, however, no satisfactory qualitative evidence has been adduced that may contribute to solving the question of the relationship of Madurese to its neighboring languages. Madurese shares with Javanese, Sundanese, Balinese, and Sasak (spoken on Lombok) the existence of speech levels, which serve to indicate the social relationships of the discourse participants. Meanings, for which there are low and high forms, are mostly connected with human beings and refer above all to body parts, body actions, clothing, and personal belongings. Pronouns also have status forms. It is generally assumed that speech levels represent a Javanese innovation and that this system and its higher forms are borrowed from Javanese.

Madurese Phonology

Consonants

The Madurese consonant repertoire resembles that of other western Indonesian languages. However, Madurese has a contrast between a voiceless, voiced, and aspirated stop series. Stevens (1968) characterized these consonant series as follows: (1) voiceless stop, 'voiceless, tense stops', (2) voiced stop, 'voiced,

Table 1 Consonants in the inherited lexicon of Madurese[a]

	Labial	*Dental*	*Retroflex*	*Palatal*	*Velar*	*Glottal*
Stop						
Voiceless	*p*	*t*	*t̪*	*c*	*k*	*ʔ*
Voiced	*b*	*d*	*d̪*	*j*	*g*	
Aspirated	*b*^{h}	*d*^{h}	*d̪*^{h}	*j*^{h}	*g*^{h}	
Nasal	*m*	*n*		*ɲ*	*ŋ*	
Fricative		*s*				
Approximant	*w*	*r,l*		*y*		

[a]Based on Clynes (1995) and Davies (1999a).

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Madurese

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Madurese is the third most widely spoken regional language of Indonesia (after Javanese and Sundanese) and the fourth most widely spoken language in the Austronesian language family (after Malay/Indonesian, Javanese and Sundanese). There are more than 13 million speakers from the island of Madura, from neighboring islands (Kangean Archipelago, Bawean, and Sapudi Islands), and from the northern parts of East Java that were settled by immigrants from infertile Madura. Java has the largest number of Madurese speakers (more than 6 million). Stevens (1968) distinguished two main dialect groups, Maduran and Kangean. Within the Maduran group there are three subgroups: West Madurese, with Bawean and Bangkalan dialects; Central Madurese, with Pamekasan and Sampang dialects; and East Madurese, with Sumenep and Sapudi dialects. The Sumenep dialect is regarded as standard Madurese. The Madurese dialects of East Java vary according to the origins of the speakers. Madurese is a member of the Western Malayo-Polynesian subfamily, which includes the languages of western Indonesia and the Philippines. Lexicostatistically, Madurese appears to be most closely related to Malay; it is related to a somewhat lesser degree to the major languages of Java, i.e., Sundanese and Javanese (see Dyen, 1965; Nothofer, 1975). So far, however, no satisfactory qualitative evidence has been adduced that may contribute to solving the question of the relationship of Madurese to its neighboring languages. Madurese shares with Javanese, Sundanese, Balinese, and Sasak (spoken on Lombok) the existence of speech levels, which serve to indicate the social relationships of the discourse participants. Meanings, for which there are low and high forms, are mostly connected with human beings and refer above all to body parts, body actions, clothing, and personal belongings. Pronouns also have status forms. It is generally assumed that speech levels represent a Javanese innovation and that this system and its higher forms are borrowed from Javanese.

Madurese Phonology

Consonants

The Madurese consonant repertoire resembles that of other western Indonesian languages. However, Madurese has a contrast between a voiceless, voiced, and aspirated stop series. Stevens (1968) characterized these consonant series as follows: (1) voiceless stop, 'voiceless, tense stops', (2) voiced stop, 'voiced,

Table 1 Consonants in the inherited lexicon of Madurese[a]

	Labial	*Dental*	*Retroflex*	*Palatal*	*Velar*	*Glottal*
Stop						
Voiceless	*p*	*t*	*t̪*	*c*	*k*	*ʔ*
Voiced	*b*	*d*	*d̪*	*j*	*g*	
Aspirated	*b*^{h}	*d*^{h}	*d̪*^{h}	*j*^{h}	*g*^{h}	
Nasal	*m*	*n*		*ɲ*	*ŋ*	
Fricative		*s*				
Approximant	*w*	*r,l*		*y*		

[a]Based on Clynes (1995) and Davies (1999a).

Table 2 Vowels in the inherited lexicon of Madurese

	Front	*Central*	*Back*
High	/*i*/ ([*i*], [*e*])		/*u*/ ([*u*], [*o*])
Mid		/*ə*/ ([*ɨ*], [*ə*])	
Low		/*a*/ ([*ɒ*], [*a*])	

lax stop', and (3) aspirated stop, 'voiceless stop with indifferent tension followed by strong aspiration'. Clynes (1995) suggested that the aspirated stop should rather be described as 'lax voice' or 'whispery voiced'. Only Madurese and Javanese oral stops exhibit five places of articulation, both sharing a phonemic distinction between dental and retroflex (described by Stevens (1968) as 'alveolar stop with larger area of tongue contact than dentals') consonants. Another unusual feature of Madurese is the existence of phonemic consonant gemination. All consonants with the exception of the glottal stop also occur geminated. The consonants occurring in the inherited lexicon of Madurese are shown in Table 1 (mainly based on Clynes (1995) and Davies (1999a)).

Vowels

Madurese inherited vocabulary has four vowel phonemes, each one having two allophones, which are pairings of high and low vowels (Stevens, 1968; Clynes, 1995; Davies, 1999a). The phoneme /i/ is realized as [*i*] or [*e*], /u/ as [*u*] or [*o*], /ə/ as [*ɨ*] or [ə], and /a/ as [*ɒ*] or [*a*] (see Table 2). In order to account for vowel allophony, Stevens (1968) established the following three categories of Madurese consonants: D_H, voiced and aspirated stops; D_L, voiceless stops, nasals, and intervocalic /s/; and D_N, liquids, glides, /ʔ/, and morpheme-initial and final /s/. The low vowel allophones occur after D_L consonants, in word-initial position, and after immediately preceding low vowels. The high vowel allophones occur following D_H consonants and after immediately preceding high vowels. The D_N consonants do not affect the quality of the vowel. A vowel preceding these consonants determines the quality of the following vowel. If a vowel occurs after a word-initial D_N consonant, this vowel behaves as though it is word-initial.

Madurese vowel harmony results in verb forms with vowels that differ depending on whether they occur in a bare stem or in an active verb in which the initial consonant of the stem is replaced by a homorganic nasal (the prefix *N*- 'active'). Examples are [*məlle*] 'active.buy' vs. [*billi*] 'buy', and [*napaʔ*] 'active.arrive at' vs. [*d̪ɒpɒʔ*] 'arrive at' (Davies, 1999a).

Morphology

The major morphological processes are affixation and reduplication (see Stevens, 1968). The verbal affixes include prefixes such as *a*- ('perform action indicated by root; perform action on oneself; to own, have, or use'), *ta*- ('to do unintentionally'), *pa*- ('causative'), and *ka* ('agentless passive'). The prefix *N*- marks intransitive verbs (with a meaning such as 'agentless action; reflexive action; be like; be in location') and transitive 'active' verbs, whereas 'passive' verbs are marked by *i*-. A verbal circumfix is *ka–an* 'be affected by'. Verbal suffixes are -*a* ('future, conditional, wished for, possible'), -*ag*^{h}*i* ('treat like, use object as instrument, perform action with, perform action for, make the object be'), and -*i* ('plural, causative'). Nominal affixes include *pa*- (which derives action nouns from intransitive verbs), *paN*- ('agent, instrument, result of action'), *pa–an* ('location, agent, instrument'), and -*an* ('result of action, that which is affected by action, location of action').

There are three kinds of reduplication: reduplication of the final syllable, total reduplication, and reduplication of the first syllable. The usual meanings with verbs are 'repetition or frequency of action; no specified object or goal'; with nouns the usual meanings are 'plural; groups of objects; instrument used to perform action'.

Writing System

Madurese used to be written in a script derived from Javanese script (*hanacaraka*) that originated from the Pallava script of southern India. Today, Latin orthography is common.

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Javanese; Malay.

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Madvig, Johann Nicolai (1804–1886)

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Madvig was a Danish classical philologist and politician. After short, but intensive studies of Greek and Latin at the University of Copenhagen, he was appointed *lektor* ('reader') of classical philology there in 1828. After the completion of his doctorate on an antique commentary on Cicero, he was appointed professor of Latin in 1829 and from 1851 he was professor of classical philology, which he remained until his retirement in 1879. He was also an active politician between 1848 and 1874, and served as Minister of Cultural Affairs from 1848 to 1851, during which time he reformed the Danish educational system.

As an editor, Madvig is most well known for his activities as a text editor, especially of Cicero, and as a conjectural critic. But he also published two very successful grammars of Latin and Greek, which were translated into many languages, and throughout his life he was interested in and worked on questions of general linguistics.

Madvig maintained that no language was in itself superior to any other. To his mind, the importance of the classical languages lay in the role they played in a crucial period in the evolution of European culture, not in any intrinsic superiority of Greek or Latin. He was critical of any attempt to view language systems as reflections of the thought and ideas of the peoples who speak them, thus opposing an idea that was influential in speculative grammar as shaped by the German romantics, notably by Wilhelm von Humboldt. Instead, he focused on language as a means for communication, succinctly stating (Madvig, 1971: 157): "Die Sprache heißt der redende, verstanden sein wollende Mensch." This opinion was at odds with the view of language as an independent organism that was predominant for much of the 19th century.

As a classical philologist, he was particularly interested in syntax. He opposed the dominance of etymology in the linguistics of his time and stressed the legitimacy and the importance of a synchronic approach to language. These views brought him in conflict with the neogrammarians as can be seen from Brugmann's rather condescending review of his linguistic articles (*Literarisches Centralblatt,* 1876).

According to Madvig (1971: 86), the origin of language cannot contradict the presence and life of language, its form of existence. Thus, it can be argued that Madvig introduced uniformitarianism in linguistics, a credit that usually is given to Whitney. In general, Madvig's linguistic theories are close to Whitney's, as he discovered to his dismay on the publication of Whitney's *Language and the study of language* (London, 1867). He himself had published his linguistic papers in Danish and they remained virtually unknown until they were published in German in 1875, i.e., after Whitney's book.

See also: Whitney, William Dwight (1827–1894).

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Angelo Maffei was born on November 12, 1844 at Pinzolo in the Rendena valley of the Alps along the border between Italy and Austria. After classical studies at the gymnasium in Trent, he completed his doctorate in philosophy and doctorate in theology from the Gregorian University, Rome. After being ordained a priest he joined the Jesuit order in 1871, and taught philosophy and theology in Tyrol, Albania, and Dalmatia. In 1878 he came to India as one of the nine pioneering Jesuits to the new Mangalore mission. Maffei worked as an educationist and linguist. He died in 1899 in a remote mission station near Mangalore.

Maffei specialized in the Konkani language of Mangalore. In addition to Konkani, he learned English, Kannada, and Tulu, languages also spoken in Mangalore. In the opinion of his companions he had a flare for languages and a fantastic memory. He was learning Sanskrit, and even tried to learn Malayalam and Tamil when he was in Kerala for a short time. In 1882 Maffei published his first Konkani grammar in English. Though he went about it quite scientifically, he was aware that it was somewhat tentative, as he gave corrections and improvements at the end of the book itself. Maffei's second grammar of 1892, however, is far more compact and concise. The grammarian here was more orderly and sure about his presentation.

In 1883 Maffei published two Konkani dictionaries to help his confrères learn Konkani. The English–Konkani dictionary used the Roman alphabet with diacritics of the Lepsius system to write the Konkani words. The Konkani–English dictionary is smaller, and has the lexemes written in Kannada characters, followed by the Romanized version.

In his two grammars and two dictionaries Maffei constantly kept the Konkani learner in mind; they are targeted at the learner who knows English. For this same reason he gave information on idioms, sayings, and proverbs current among Konkani speakers. His *vade mecum* for confessors, published in 1891, contains specialized Konkani vocabulary to help priests using Konkani. Maffei's grammars and dictionaries are used even today by learners of Konkani in Karnataka state.

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Magnetoencephalography

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Magnetoencephalography (MEG) is a totally noninvasive imaging method that allows investigation of cortical dynamics in real time, offering significant advantages over functional brain imaging techniques that rely on hemodynamic measures such as positron–emission tomography and functional magnetic resonance imaging (MRI).

MEG involves the measurement of neuromagnetic signals emanating from the brain (for a detailed discussion, see Papanicolaou, 1998). Most of the magnetic activity measurable outside the head originates from the intracellular current flow associated with postsynaptic electrical events in the long apical dendrites of cortical pyramidal ells. Pyramidal neurons comprise nearly 70% of neocortical neurons, and their long dendritic processes are oriented perpendicular to the cortical surface. As electricity flows along the length of the dendrite, it forms an electric dipole: a pair of electric charges or magnetic poles of equal magnitude but opposite polarity, separated by a small distance.

An advantage of MEG over electroencephalography (and event-related potentials) is that the neuromagnetic signal penetrates the skull and tissues without significant distortion. Magnetic signals associated with bioelectrical activity are very weak, and special techniques have to be employed to discriminate them from extraneous magnetic fields (noise). The instrument used to measure the signals is called a neuromagnetometer, equipped with an array of magnetic sensors, each coupled to a special, low-noise amplifier. State-of-the-art systems are equipped with a minimum of 200 magnetic sensors arranged to cover the entire head. The neuromagnetometer is placed over a person's head, and recording takes place inside a magnetically shielded room designed to reduce extraneous magnetic fields.

During the MEG recording session, the phenomenon that exemplifies the function under investigation is repeated several times while the magnetic flux around the head is being sampled at regular intervals (typically every 4 ms for cognitive and language studies). An external stimulus is invariably presented at each instance in order to either induce the phenomenon (in the case of receptive language functions) or to act as a time cue (in the case of expressive language functions). Each segment of recorded activity, beginning a few milliseconds before and extending several hundred milliseconds after each repetition of the stimulus, is stored separately as an MEG epoch. One such epoch is stored for each magnetic sensor.

The data are filtered and averaged to enhance quality and to remove components of the recorded magnetic flux caused by extraneous sources (mechanical and biological artifacts). Averaging involves computing the magnetic flux across several epochs. The averaged magnetic response emerges as a waveform, or a time-series of magnetic flux measurements at each

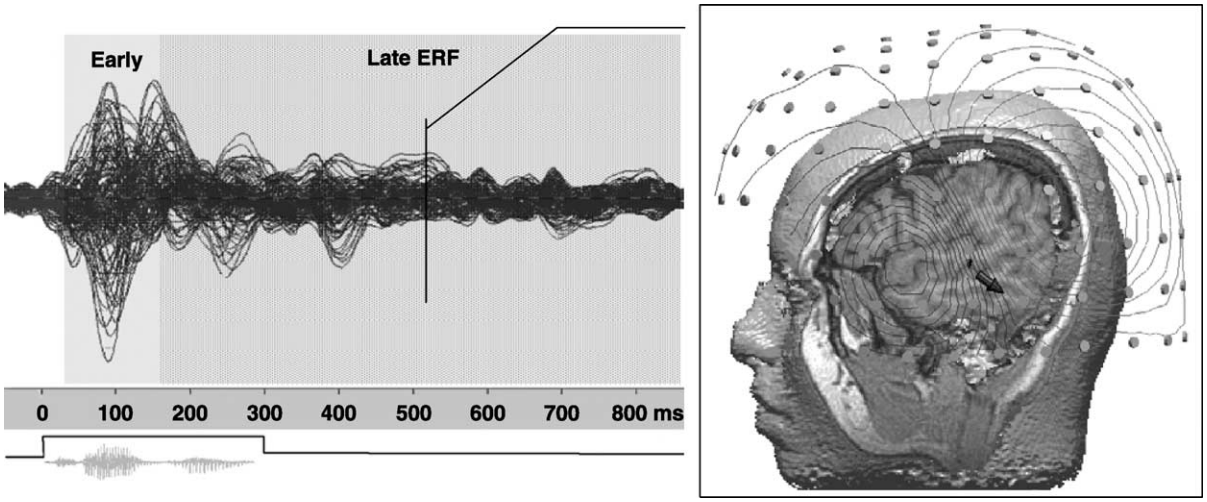

Figure 1 Left: Averaged event-related magnetic response to the spoken word 'quiet.' Stimulus onset (set at 0 ms) determines the onset of the response, which consists of an early (~50–200 ms) and a late portion (200–800 ms). Right: Surface distribution of magnetic flux in the form of a contour map measured at 500 ms after stimulus onset over the left hemisphere. Solid circles represent the array of magnetic sensors. ERF, event-related field.

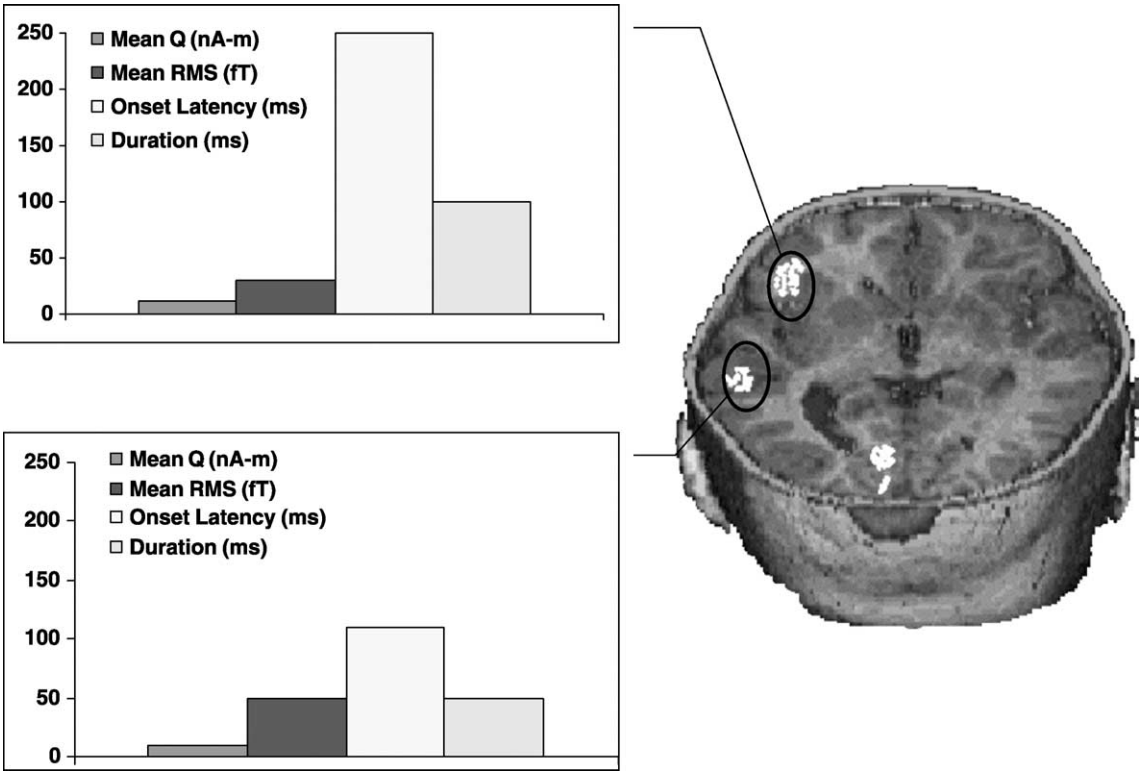

Figure 2 Right: Axial MRI slice displaying activity sources computed during a visual word recognition task. Three distinct cortical areas showed transient increases in neurophysiological activity and were successfully modeled by a series of contiguous current dipoles, one every 4 ms (small white circles). Left: Plots of four complementary measures of the underlying activity in each region. The instantaneous strength of regional activity is indexed by two measures: current moment (Q, or estimated magnitude of the electrical current produced every 4 ms by the population of neurons that showed elevated levels of activity in a given region) and global field power (RMS), which is a direct measure of the magnitude of magnetic flux produced by that electrical current. The temporal aspect of activation is also indexed by two measures: onset latency, which corresponds to the earliest time after stimulus onset when magnetic activity was reliably detected in a given region, and duration of activity, indicated by the number of consecutive 4-ms magnetic activity sources localized in that region. Although correlations among Q, RMS, and duration-of-activity measures are high, duration of activity has the highest degree of empirically established concurrent validity (see text for more details) nA-m = nanoAmperes per meter; fT = femtoTesla.

recording site around the surface of a person's head, as shown in Figure 1. The resulting averaged event-related field consists of early components (50–200 ms after stimulus onset), which correspond to activation of the sensory cortex specific to the modality of stimulus (visual or auditory), and late components (200–~800 ms after stimulus onset), which reflect activation of the association cortex or higher functions.

The surface distribution of magnetic flux at various times can be reconstructed, resulting in a contour map like the one shown on the right-hand side of Figure 1. On the basis of the surface flux distribution, the position and strength of the brain source that produced it can be estimated. This final step consists of the application of a mathematical algorithm that considers the intracranial activity sources as equivalent to electrical current dipoles (Papanicolaou, 1998). Once estimates of the coordinates of the underlying electrical source in the MEG coordinate system are made, they are registered on a set of anatomical images of the brain (from MRI) in order to identify the anatomical location of each source.

The procedures involved in reconstructing cortical activity maps based on MEG data are collectively referred to as magnetic source imaging. Activity profiles consist of a spatial (anatomical) and a temporal component, providing information about where in the brain elevated levels of neurophysiological activity take place and when this activity occurs in relation to stimulus onset. Neurophysiological activation in each brain region where magnetic activity sources are found can be described using four complementary measures (see Figure 2).

Empirical evidence demonstrates that brain activation profiles obtained with MEG represent reliable and valid representations of the brain mechanisms responsible for language functions. MEG affords unique insights into the inner workings of these mechanisms in real time, and this information is at least comparable to the data provided by traditional

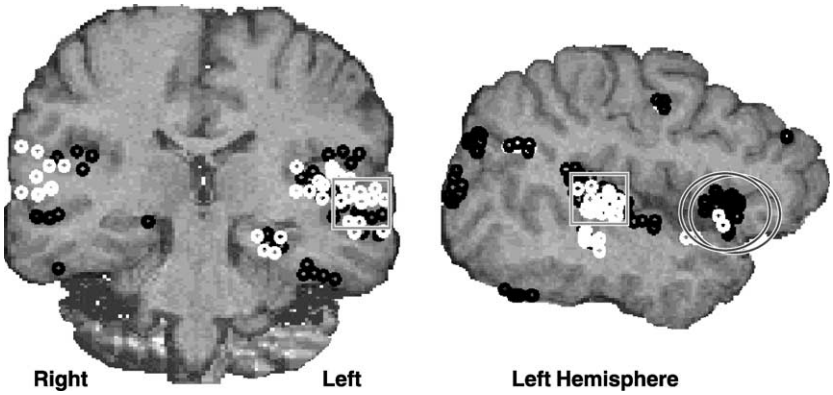

Figure 3 A coronal and a parasagittal section of a typical normal participant showing left hemisphere dominance for receptive language functions, and the location of Wernicke's area in the left hemisphere. Each white circle represents one of several temporally contiguous brain activity sources that account for the late (>200 ms after stimulus onset) portions of the brain response to words presented auditorily. Dark circles indicate the location of late magnetic activity sources obtained in response to printed words. Note the overlap of the two activation maps associated with word recognition in the vicinity of Wernicke's area (squares). Activity in Broca's area is found mainly during the (silent) reading task (ellipsoid), presumably reflecting articulatory recoding processes.

research methods in neurolinguistics, namely lesion studies, the Wada technique, and electrocortical stimulation mapping. Several studies establish the concurrent validity of MEG activation and data analysis protocols designed to examine the basic outline of the brain circuits responsible for receptive and expressive language functions.

Validity of Brain Activation Profiles

The main features of the cortical maps common to spoken and written word recognition and comprehension are shown in Figure 3. These are, first, the greater degree of activation of the left perisylvian region, attesting to the well-documented left hemisphere dominance for language in the overwhelming majority of neurologically intact individuals, both children and adults (between 90% and 95% across studies). These MEG-derived hemispheric asymmetries in the degree of regional activation are also in excellent agreement with the results of a standard invasive procedure used clinically to determine hemispheric dominance (the Wada test) in large consecutive patient series (Maestu *et al.*, 2002; Papanicolaou *et al.*, 2004). Interestingly, the closest agreement with the Wada technique is noted when measures of duration of neurophysiological activity are used. Measures of the strength of neurophysiological activity in each language-related region show hemispheric asymmetries in the same direction and approximate degree as duration but are not as good predictors of hemispheric dominance as the Wada test is (Papanicolaou *et al.*, 2004).

A second invariable feature of profiles obtained in the context of receptive language tasks is activation of the posterior portion of the superior temporal gyrus, often extending into the banks of the superior temporal sulcus and the supramarginal gyrus. This finding is in agreement with prior knowledge (and independent of functional imaging) regarding the location of Wernicke's area, specialized for high-level analysis of verbal input (Boatman *et al.*, 1995; Binder *et al.*, 2000). Activation of this region is found during both listening and reading tasks. Activation of the middle temporal gyrus and medial temporal lobe structures is observed mainly when verbal stimuli, whether auditory or visual, are meaningful (pronounceable nonwords result in significantly reduced activation of these regions). Direct tests of concurrent validity showed near perfect agreement between MEG-derived maps of language-specific activity within the dominant hemisphere and the results of direct electrocortical stimulation regarding the precise location and extent of receptive and expressive language cortex (Wernicke's and Broca's areas; Castillo *et al.*, 2001; Simos *et al.*, 1999). These results are important in demonstrating that electrical inactivation of cortical regions that reliably show increased levels of activity associated with a particular linguistic function significantly impairs that function. In addition to providing the means for external validation, this approach is generally very promising as an adjunct to any noninvasive functional imaging method but is difficult to implement mainly due to time constraints and safety considerations associated with direct cortical stimulation studies (see for instance Simos, Breier *et al.*, 2002).

Finally, performance of tasks that exemplify expressive language functions (overt or silent reading, picture naming, and word generation or fluency tasks) is invariably associated with activation in posterior prefrontal areas of the dominant hemisphere

(in the vicinity of Broca's area; Billingsley *et al.*, in press; Castillo *et al.*, 2001; Kober *et al.*, 2001; Salmelin *et al.*, 1994). Typically, activity in Wernicke's area is observed within the first 200–500 ms after stimulus onset, followed by activity in Broca's area, which in turn precedes activity in motor cortices.

Spatial Resolution

While the temporal resolution of MEG is by definition adequate for mapping the temporal course of regional activation in real time, the degree of spatial (anatomical) resolution of the technique had to be empirically established. Spatial resolution of MEG is primarily constrained by the signal-to-noise ratio of the recordings, the suitability of the activity-source model used to convert the raw data into functional images, and finally the accuracy of the coregistration of these images onto the participant's MRI of the brain. Under ideal conditions the localization accuracy for dipolar current sources is on the order of 4–5 mm (Kwon *et al.*, 2002). Under realistic conditions, the estimated spatial accuracy of MEG is only slightly worse and therefore adequate for neurolinguistic investigations, as attested by the following facts. First, intraparticipant reproducibility for the anatomical locations of the sources of both early (50–200 ms) and late (200–800 ms) components of the brain magnetic responses originating in primary and association auditory cortices, respectively, is in the millimeter range (Roberts *et al.*, 2000; Simos *et al.*, in press). This figure is well within the spatial resolution limits of invasive brain-mapping procedures, which are considered the gold standard in the field of neurolinguistics (i.e., less than 8 mm in all cases; Lesser *et al.*, 1994; Ojemann and Whitaker, 1978). Second, MEG data agree with prior knowledge regarding the intrinsic organization of primary somatosensory sensory cortex (somatotopy) (Tecchio *et al.*, 1998) motor (Beisteiner *et al.*, 2004) and primary auditory cortex (tonotopy) (Pantev *et al.*, 1995).

Functional Brain Plasticity

Accumulating evidence indicates that the brain, in the presence of lesions, especially those that have an early onset, is capable of a substantial degree and extent of functional reorganization (e.g., Haglund *et al.*, 1994). Until recently, however, hard evidence to support this claim was restricted to data from invasive studies of patients scheduled to undergo brain surgery. Corroborating evidence to support this claim has been obtained noninvasively using MEG, along with other functional imaging methods (Hertz-Pannier *et al.*, 2002), as part of a presurgical evaluation protocol for patients with intractable seizure disorder. The results indicate that the proportion of patients who are not left hemisphere dominant for language is significantly higher in the presence of a seizure disorder with left temporal lobe onset compared with patients who have space-occupying lesions in the left hemisphere, or normal controls (Pataraia *et al.*, 2004). This group of patients demonstrates a partial shift of the location of Wernicke's area within the left (dominant) hemisphere.

Temporal Resolution

As mentioned in previous paragraphs, a unique feature of MEG compared with other noninvasive functional brain imaging techniques is its temporal resolution. Several findings afford remarkable insights into the temporal dynamics of cortical activation associated with the processing of verbal stimuli.

Temporal Dynamics of Hemispheric Asymmetries for Simple Language Functions

The most pronounced and consistent hemispheric asymmetries are noted for the duration of late magnetic activity, a finding that was originally demonstrated for word recognition and semantic categorization tasks (Simos *et al.*, 1998). Smaller yet significant hemispheric asymmetries are also found in the context of simple phonetic discrimination tasks (Papanicolaou *et al.*, 2003; Eulitz *et al.*, 1995; Roberts *et al.*, 2000). Figure 4 summarizes results from two experiments demonstrating the temporal pattern of hemispheric asymmetries for the duration of activity in auditory association cortex (including Wernicke's area).

Reading and Dyslexia

Another area that has been the subject of many MEG studies is reading. While several studies have focused on the components of the brain mechanism that supports reading in fluent adult readers, others have tried to uncover distinct aberrant features of this mechanism in struggling young and older readers. The majority of studies have examined single-word processing, and only recently have investigators begun to look at words in context, as explained in more detail below. Whenever possible, integration of MEG data with the results of direct electrical interference with cortical function and correlations between MEG and individual performance data have been used to determine the nature of the task-specific operation in which a particular activated brain area is involved (Simos *et al.*, 2002).

The general outline of the activation profile specific to reading features initial bilateral activation of

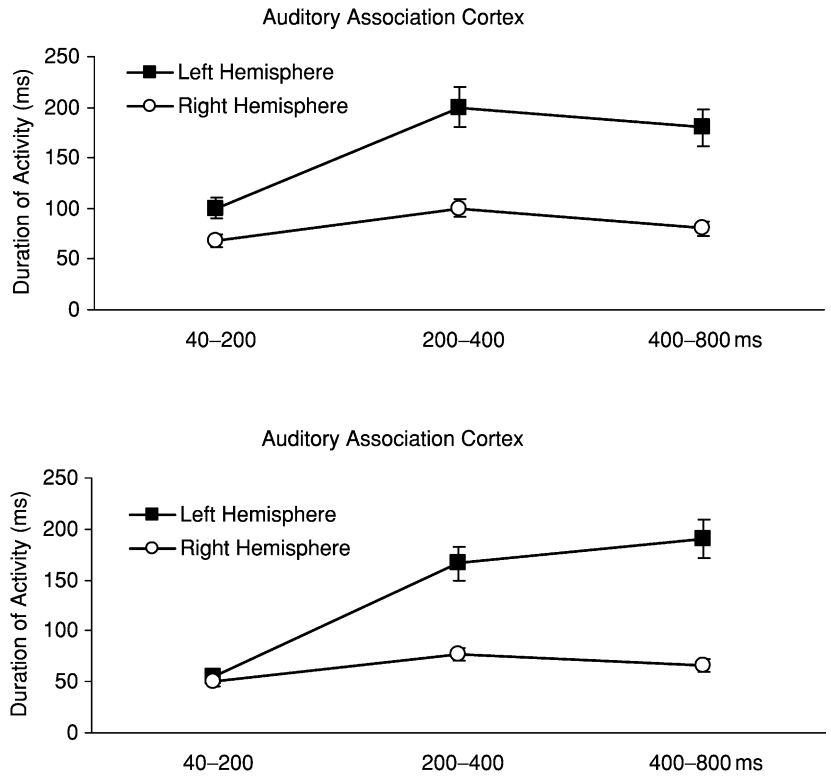

Figure 4 Time plot of hemispheric differences in the duration of neurophysiological activity in the posterior portion of the superior temporal gyrus during a phonetic discrimination task (upper panel) and a word recognition task (lower panel). (Data from Papanicolaou *et al.*, 2003 and Valaki *et al.*, 2004, respectively.)

occipital regions, followed by activity in left lateral and basal occipito–temporal cortices. This activity occurs reliably between 130 and 180 ms after stimulus onset and is stronger for regular printed material (letters, syllables, or words) than for strings of meaningless symbols of the same length (Tarkiainen *et al.*, 1999). Next, activity is noted bilaterally in the vicinity of Wernicke's area and in the middle temporal gyrus. Finally, magnetic activity sources are found near Broca's area in the inferior frontal gyrus (Simos *et al.*, 2001). While evidence regarding the role of inferior frontal cortices in reading is far from conclusive, it suggests that this area is involved in the articulatory recoding of print, i.e., analysis of printed stimuli according to their corresponding articulatory representations (Pugh *et al.*, 2000).

Reading of meaningful items (real words) entails a higher degree of activation of the left middle temporal gyrus, whereas reading meaningless but pronounceable letter strings (e.g., WOTE) is associated with reduced activation in this region and stronger activity in Wernicke's area (Wydell *et al.*, 2003). The critical role of the superior temporal gyrus for phonological decoding is supported by the finding that transient electrical interference with neural function in this region results in severe phonological processing deficits, including an inability to read pseudowords aloud (Simos *et al.*, 2002). In contrast, the ability to read real words aloud was spared in all cases.

MEG studies employing lexical decision tasks provide support for the view that the early stages of silent, rapid word recognition do not necessarily involve phonological processing or articulatory recoding. In this context, cortical activity along the banks of the superior temporal sulcus (extending into the middle temporal gyrus) precedes activity in the superior temporal gyrus and posterior–lateral frontal cortices (see Figure 5).

The studies reviewed above are important for understanding the dynamic performance of the brain circuit responsible for recognizing printed words as unique linguistic entities, a function that invariably involves lexical access. It is generally held that comprehension of word meaning, which involves access to one or more semantic representations associated with that word, takes place automatically. Few studies have studied the spatiotemporal profile of brain activity that is uniquely associated with semantic access. These studies have examined comprehension of printed words presented in syntactic context, usually words that occur at the end of sentences. Results clearly indicate that semantic access regularly takes

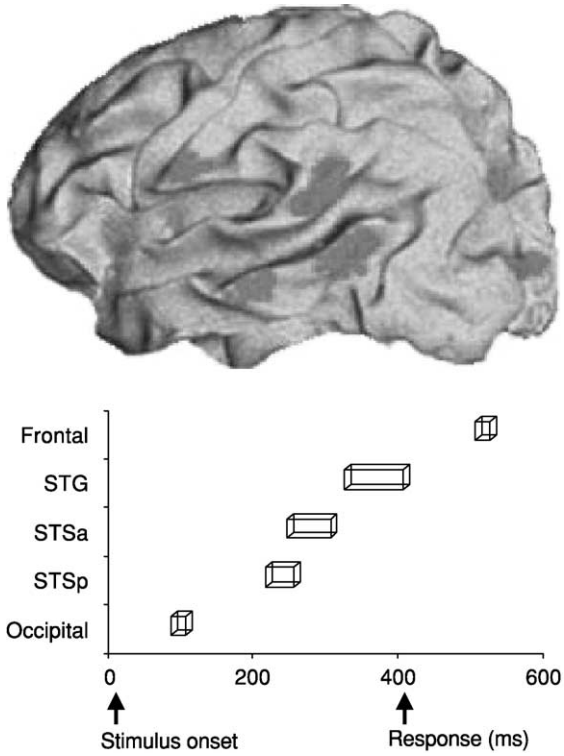

Figure 5 A representative participant's spatiotemporal activation profile in the left hemisphere, elicited in response to word targets in a lexical decision task. The timing (onset and duration) of regional neurophysiological activity in each of the five regions is shown in the graph. The onset of stimuli was at 0 ms, and the participant's mean reaction time was 480 ms (both indicated by vertical arrows on the time line). Abbreviations: Occipital, primary visual cortex; STSp, posterior superior temporal sulcus; STSa, cortex along the anterior banks of the superior temporal sulcus; STG, superior temporal gyrus; frontal, prefrontal cortex.

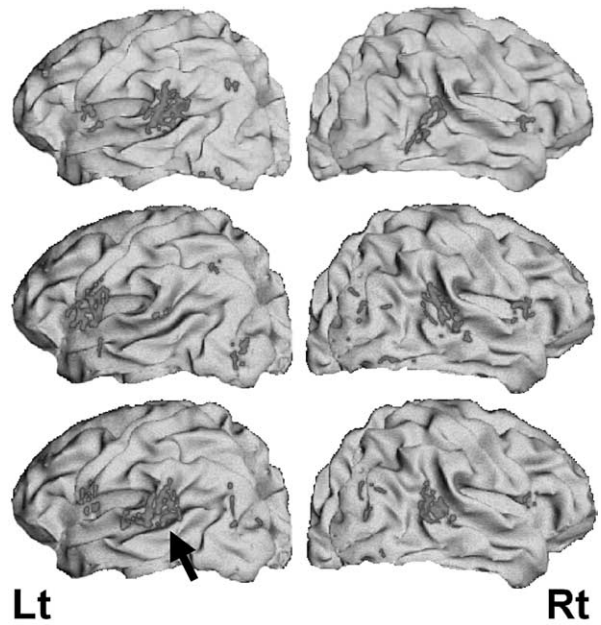

Figure 6 MEG scans from a 9-year-old boy who never experienced difficulty in learning to read (top set of images) and a poor reader (middle set of images) during performance of a printed word recognition task. Note the clear preponderance of activity sources in the vicinity of Wernicke's area in the left hemisphere (Lt) in the proficient child and in homotopic right hemisphere (Rt) in the poor reader. The poor reader also showed pronounced activity bilaterally in inferior prefrontal cortices (in the vicinity of Broca's area). Bottom panel: Activation maps from the same poor reader after successful completion of an 8-week intensive intervention program. Note the dramatic increase in Wernicke's activation associated with significant improvement in phonological decoding and word recognition ability (solid arrow).

place within the first 250 ms after stimulus onset (Helenius *et al.*, 1998; Simos *et al.*, 1997) and is marked by neurophysiological activity along the banks of the left superior temporal sulcus, in agreement with the single-word data presented above.

MEG studies have been particularly useful in the study of development. Given that the technique is much more child-friendly than any other functional brain imaging method, children as young as 5 years can be tested with very low attrition rates. An important conclusion that stems from these studies is that the essential features of the reading-specific activation profile, described in the preceding paragraph, are in place early in the course of normal development (i.e., at least as early as the end of kindergarten; Simos *et al.*, in press). Longitudinal data demonstrate, however, remarkable individual differences, even among children who eventually develop normal reading skills, suggesting that recruitment of brain areas already specialized for linguistic operations (primarily Wernicke's and Broca's areas) occurs naturally as children learn the alphabetic principle. Considerable changes take place during systematic instruction, especially in the speed of engagement of complex visual processing areas believed to play a critical role in graphemic analysis, and in the relative timing of regional activity.

In addition to establishing the normative activation profile associated with reading, distinct brain activation profiles associated with word recognition and phonological decoding have been found in children with severe reading disability. As shown on the upper and middle panels of Figure 6, these profiles consistently differentiated children diagnosed with severe reading disability from children without reading problems. The most consistent features of the individual aberrant profiles were the lack of activation of left temporo–parietal regions (mainly Wernicke's area), coupled with pronounced activation of the homotopic right hemisphere regions (Simos, Papanicolaou *et al.*, 2000; Simos, Breier *et al.*, 2000). Compensatory increase in posterior prefrontal activity is also found bilaterally. This finding supports the belief that following visual

processing of printed stimuli (complex visual processing areas), disabled readers do not use the left temporo–parietal region for phonological processing of the visual symbols but rather ineffectively employ the corresponding right hemisphere region. Increased prefrontal activity presumably reflects reliance on articulatory recoding strategies to support phonological decoding and word recognition.

Longitudinal data further suggest that the aberrant neural circuit that underlies severe reading problems in older children with dyslexia appears to be present during the early stages of reading acquisition – at a much earlier age than previously believed (Simos *et al.*, in press). Unless intensive, explicit instruction in basic reading skills is provided, this aberrant brain organization may not change. Provided with adequate intervention (i.e., intensive instruction targeting deficient component skills), the aberrant outline of the brain circuit for reading can undergo dramatic change (Simos, Fletcher *et al.*, 2002; see **Figure 6**, lower panel).

As a functional brain imaging technique, MEG has a number of highly desirable features particularly valuable in the study of the brain circuits responsible for language functions. These include millisecond temporal resolution, excellent reproducibility, test-retest reliability, and anatomical resolution. Two other properties that are often neglected in state-of-the-art applications of functional brain imaging are standard features in MEG studies. First, MEG-derived brain activation scans are always presented for individuals rather than for groups of participants, circumventing well-known problems with spatial averaging of functional images (see for instance, Fernandez *et al.*, 2003). Secondly, data acquisition and analysis protocols are empirically validated, allowing legitimate interpretation of studies aiming to elucidate neural networks involved in linguistic processing. Although whole-head MEG is a relatively new technique and the number of research centers focusing on neurolinguistic investigations is small, a considerable amount of data has accrued that confirms classical hypotheses regarding the dynamic organization of brain circuits that support language functions.

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Magyar *See:* Hungarian.

Mandarin *See:* Hokan Languages.

Malagasy

R Kikusawa, National Museum of Ethnology, Osaka, Japan

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Geographical Distribution, Dialects, and Speakers

Malagasy is the main language spoken in Madagascar (population approximately 17.5 million according to a 2004 estimate), located off the east coast of Africa. Standard Malagasy, which is based on the Merina dialect spoken in and around Antananarivo, the capital city, is one of the two official languages (along with French) in Madagascar and is used in public contexts and also for education in grade schools and high schools. There are said to be 18 ethnic groups in Madagascar and regional dialects are referred to in association with these groups. Many show phonemic as well as phonetic, lexical, and morphosyntactic features that are different from those in Standard Malagasy. Descriptions are available for some of the dialects (Tsimilaza, 1981; Thomas-Fattier, 1982; Manoro, 1983; Rabenilaina, 1983; Raharinjanahary, 1984; Beaujard, 1998); however, there are a number of others that have not yet been well studied. The Malagasy dialects are considered to form two groups, a western group and an eastern group (Dez, 1963; Gueunier, 1988), distinguished by two sets of regular sound correspondences, Western Malagasy *di* corresponds to Eastern Malagasy *li*, while Western Malagasy *tsi* corresponds to Eastern Malagasy *ti*. Figure 1 shows the boundary of the two dialect groups, as well as some regional dialect names.

Genetic Relationships

Malagasy is an Austronesian language. Its most closely related language is considered to be Ma'anyan, a language that belongs to the Barito group of the Western Malayo-Polynesian languages. This implies that the people ancestral to the present Malagasy population migrated from southeast Kalimantan on Borneo Island, where the Barito languages are spoken. This took place probably around 700 A.D., but the exact routes and the reasons for this migration are still not clear (Adelaar, 1989; Dahl, 1991). Some Austronesian features in Malagasy reflect borrowings from genetically related languages, in particular Malay and Javanese, suggesting the possibility of multiple migrations after the initial Austronesian settlement in Madagascar, and/or of continuous contact among the speakers. The language also shows traces of contact with the speakers of such languages as Arabic, Bantu languages (in particular Swahili), and Sanskrit.

Writing Systems

The first writing system introduced to Madagascar was an Arabic script. It was introduced by Muslims in the 12th century, and the people in Taimoro learned it and adapted it to their own phonology (referred to as *sorabe* 'great writing/drawing'). Currently, a Latin-based alphabetic system is used, which was introduced in 1823 by an early missionary of the London Missionary Society, David Jones.

Linguistic Features of Standard Malagasy

Phonology and Orthography

The letters used in the Malagasy languages and their phonemic properties are shown in Table 1. In Spoken Malagasy, /h/ often disappears, and word-

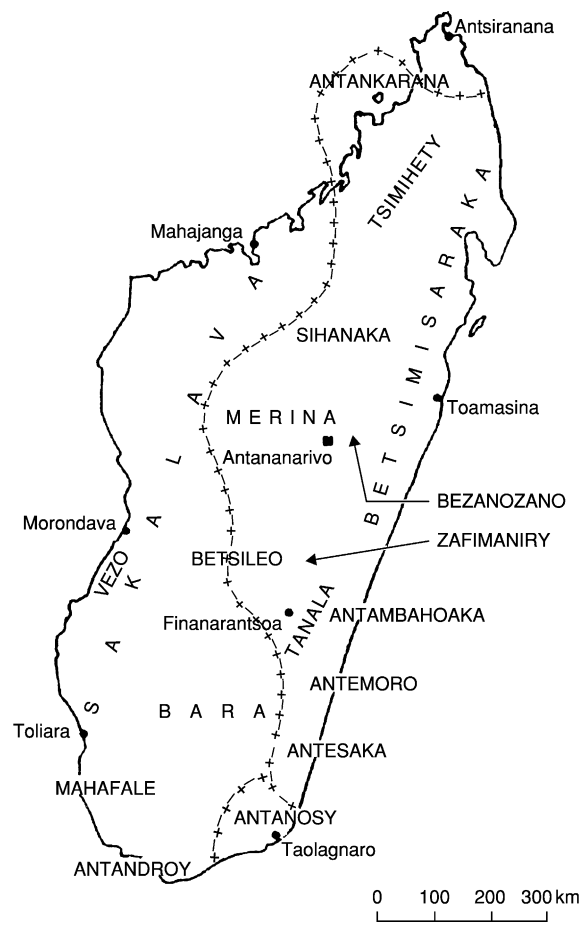

Figure 1 The names of the ethnic groups in Madagascar. The line indicates the boundary between the two dialectal groups, namely Western and Eastern Malagasy.

Table 1 The Malagasy orthography and phonemic system

Vowels

a	
i, y	[i] (The letter *y* is used at the end of a word.)
e	
o	[u]
ô	[o]

Consonants

	Nasal	*Prenasalized stop*	*Voiced*		*Voiceless*	
			Stop	*Spirant*	*Stop*	*Spirant*
Labial	*m*	*mb*	*b*	*v*	p	*f*
Dentalveolar	*n*	*nd*	*d*	*l*	*t*	
Alveolar (affiricate)		*nj* [ndz]	*j* [dz]	*z*	*ts*	*s*
Alveolar trill (or, retroflex)		*ndr* [ndr∼nr∼nɖ]	*dr* [dr∼ɖ]	*r*	*tr* [tr∼ʈ]	
Velar	*ñ* [ŋ]	*ng* [ŋg]	*g*		*k*	*h*

The phonetic property is indicated in square brackets, when it is different from the IPA orthography.

final vowels (sometimes even word-final syllables) become voiceless, or are completely lost.

One of the phonological characteristics of Malagasy is the alternation between spirants and their corresponding stops. This is commonly observed in certain word derivations (such as reduplication and some verb derivations, shown in [1]). Alternation also occurs in compounds when a word starting with a spirant consonant follows the consonant *-n*, such as a genitive marker (2b–2d). It also occurs with transitive verbs when an object is incorporated (2a, 2e). (The symbol ` in examples indicates stress.)

(1)

ROOT		DERIVED FORM	
fìto	'seven'	*impìto*	'seven times'
sòratra	'to write'	*sora**ts**òratra*	'to write repeatedly'
mihèrika	'to look back'	*miheri**k**èrika*	'to look behind oneself repeatedly'
vàntana	'to be straight'	*vantam**b**àntana*	'to be somewhat straight'
rèraka	'to be tired'	*rera**dr**èraka*	'to be somewhat tired'

(2a) *miàmbina* 'to guard (from)' + *fòdy* 'kind of bird' > *miambim-**p**òdy* 'to guard from birds'

(2b) *òrona* 'nose' + *sàka* 'cat' > *oron-**ts**àka* 'the nose of a cat'

(2c) *tràno* 'house' + *hàzo* 'wood' > *tranon-**k**àzo* 'woodshed'

(2d) *tràno* 'house' + *vàrotra* 'commerce' > *tranom-**b**àrotra* 'business association'

(2e) *lèna* 'wet (with)' + *rano* 'water' > *len-**dr**àno* 'wet with water'

Morphosyntactic Characteristics

Typologically, Malagasy is considered to be a 'pro-drop', verb-initial language that shows the major properties of head-initial languages, with modifiers following the noun and nominal arguments following the verb.

Verbs undergo various morphological derivations that are associated with different sentence structures, as shown here with verbs deriving from the root *pasaka*. In (3), the form *mipasaka* 'to burst open' (the initial consonant appearing as *n* marking the past tense in the example) appears as an intransitive verb requiring only a nominative argument.

(3) **N-ipasaka** ny ovy
PAST-*burst.open* DET *potato*
'the potatoes burst open'

In (4), with the form *manapasaka* 'to smash' (often labeled as 'active voice'), the actor is expressed with a nominative pronoun *aho* 'I,' while in (5) and (6), where the verb forms are *mopasahana* 'to smash something' and *voapasaka* 'have smashed something' (often labeled as 'passive voice'), it is expressed with a genitive pronoun *-ko* 'I (agent).'

(4) **N-anapasaka** ny ovy aho
PAST-*smash* DET *potato* *I*
'I was smashing the potatoes'

(5) **N-opasahi**-ko ny ovy
PAST-*smash-1*SG.GEN DET *potato*
'I smashed the potatoes'

(6) **Voa-pasa**-ko ny ovy
PERF-*smash-1*SG. GEN DET *potato*
'I have finished smashing the potatoes / I have inadvertently smashed the potatoes.'

The form *manapasahana* 'smash with' (often labeled as 'circumstantial') in (7) typically appears in a relative clause modifying a noun which functions as an instrument or a location.

(7) T-amin′ ny sotro no
PAST-*with* *spoon* *that*
n-anapasaha-ko ny ovy
PAST-APPLI.*smash*-1SG.GEN DET *potato*
'it was a spoon with which she was smashing the potatoes'

The alternations observed in Malagasy verb morphology, as well as the various sentence structures in which they occur, are of interest in that they correspond both typologically and historically to the 'focus' system in Philippine and Indonesian languages.

See also: Austronesian Languages: Overview.

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Malawi: Language Situation

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Lying south of Tanzania in the Great Rift Valley, wedged between Mozambique to the east and south and Zambia to the west, is the small country of Malawi. It has a landmass of 118 484 square kilometers. Of that, an area of 24 000 square kilometers is taken by a lake that dominates the country's landscape. The lake was previously known as Lake Nyasa, from which the country obtained its former name of Nyasaland. It is the third largest lake in Africa, after Victoria Nyanza (Lake Victoria) and Lake Tanganyika. Although with the change of name of the country from Nyasaland to Malawi the lake was accordingly designated Lake Malawi, political disputes relating to the proper boundaries between Malawi and its neighbors that raged in the late 1960s, led to a reluctance on the part of the government of Tanzania to acquiesce to such a designation of the lake. This renaming was viewed as tantamount to legitimizing the Malawi government's claim, under the leadership, and at the instigation, of its first president, the late Hastings Kamuzu

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Banda, that the lake as a whole belonged to Malawi. Tanzania claimed, with some justification, that part of the northern extremity of the lake was Tanzanian waters, as the boundary, as originally drawn, included a portion of the lake in Tanzanian territory. This led to the retention of the two labels for the lake, as Lake Nyasa/Lake Malawi, in some of the maps, especially where the publishers expected the maps to be sold in both countries. With altered and somewhat improved political relations between the countries, the label Lake Malawi has become established and accepted, at least provisionally.

Malawi, according to recent estimates, has a population of between 11 and 12 million. It is, by all accounts, a relatively densely populated country. The population of Malawi reflects a diversity of ethnicities that accounts for the range of languages within its borders. Malawi has a number of ethnic groups. These include the major ones, which are the Nyanja, Lomwe, Tumbuka, Yao, Tonga, and Sena, as well as some minor ones, such as the Lambya, Ngonde (Nkhonde), Nyakyusa, Nyiha, and Nsukwa/Ndali. Of these, the Nyanja have traditionally been viewed as constituting the majority group (cf. Kishindo, 1994; Matiki, 1997; Mchombo, 1998; Young, 1949). During the era of colonialism the British recognized the importance of chi-Nyanja. It was a language that could contribute to promoting understanding between them as the rulers and the local population, the ruled, for effective government and administration. As a consequence, the colonial government adopted the use of chi-Nyanja, the language spoken by the Nyanja, as the official language in some parts of the country. To facilitate the learning of the language, it was adopted as an official language by the government, with the justification that "[I]n Nyasaland ... the Nyanja speakers not only outnumber those of other areas, but their dialects have a much longer history of literary use" (Price, 1940: 129).

The adoption of Nyanja as the official language gave the impetus for it to be taught in schools. Further, knowledge of the language was required for government duties. As Hailey observed about the situation in Malawi (then Nyasaland), "Nyanja has been adopted as the official language by the government. Knowledge of it is compulsory for departmental examinations and it is intended to introduce it into all schools after two years instruction in the vernacular" (Hailey, 1938: 75). During the preindependence era, chi-Nyanja and chi-Tumbuka (the language of the Tumbuka) were used in the media and in elementary education.

The inclusion of chi-Tumbuka in the media and in elementary education rested on the recognition of its being the most widely spoken language in the northern part of Malawi. Although the Nyanja have predominated in the central and southern parts of the country, the Tumbuka have traditionally been the dominant group in the north. As noted by Leroy Vail, the Tumbuka "live as subsistence agriculturalists in Zambia and Malawi. In Zambia, they live in the eastern Province's Isoka and Lundazi Districts, while in Malawi, they are found in Chitipa, Karonga, Nkhata Bay, Rumphi, Mzimba and Kasungu Districts of the Northern and Central Regions. Their territory is about 20 000 square miles in extent, with the Luangwa River of Zambia forming their western boundary, Lake Malawi their eastern boundary, the valley of the North Rukuru River (latitude 10° S) their northern boundary, and approximately 12° 30′ S their southern limit" (Vail, 1972: xiii).

The Tumbuka language is bordered by a number of smaller Bantu languages to its north. These include the languages of the Nyiha, Lambya, Sukwa/Ndali, and the Ngonde. In Zambia, Tumbuka is neighbor to Senga and Bisa. To the south, it borders chi-Chewa, the language of the Chewa group. The Chewa are widely scattered, living in Malawi and Zambia.

Although the Chewa were regarded as a subgroup of the Nyanja, the latter also are well represented in Mozambique, with their language, chi-Chewa, considered a dialect variation of chi-Nyanja (cf. Watkins, 1937), political developments in independent Malawi led to a reversal of the roles. With the ascendancy of a nationalist Chewa to the presidency when Malawi gained independence from Britain, subsequently becoming a republic, the roles were reversed, based on basic misconceptions about the distinction between language and dialect (cf. Mchombo, 2005). It was claimed that the Chewa constituted the main group, with chi-Chewa, their language, being the main language. It was the Nyanja who constituted a subgroup of the Chewa, and hence their language, chi-Nyanja, was a dialect of chi-Chewa. Identification of the language was altered in Malawi, from chi-Nyanja to chi-Chewa, with the latter eventually accorded the status of national language (See: Nyanja). With the departure of Kamuzu Banda and altered political circumstances in Malawi, the situation is, yet again, being reversed, with a restoration of chi-Nyanja as the major language of Malawi. Part of the argumentation is that the restoration of this label chi-Nyanja for the language brings Malawi in line with its neighbors. In both Mozambique and Zambia, where the language is one of the major languages, it has always been identified by that label. Politically, the move constitutes a reduction of the dominance of the Chewa in the Malawian political and cultural fabric.

By far chi-Nyanja (henceforth Chinyanja) is the most widely spoken language in Malawi. The resources

devoted to its development and promotion as an aspect of implementation of the language policy that made Chichewa the national language contributed greatly to the enhancement of its diffusion and usage in the country. With the elevation of Chichewa to the status of national language, Chitumbuka, along with other languages, suffered great marginalization. It lost the literary activity and the presence in the mass media that it had previously enjoyed. The profile of Chitumbuka declined after the national language policy was articulated, a policy that created "a situation which resulted in bitter resentment throughout the northern region, a situation made worse by Chewa-speakers' triumphal assertions that other people of the country were cultureless because they had no language" (Vail and White, 1989 183). The language policy thus angered various sections of the population, primarily the Tumbuka, which was to influence the nature of Malawi politics thereafter (Mchombo, 1998).

Of the remaining languages, Tonga is found in an area along the shores of Lake Malawi in an enclave in Nkhata Bay District, between Tumbuka to its north and west and Nyanja to the south. More visible in Malawi than the Tonga are the Yao. They are concentrated along the southern coastline of Lake Malawi, on both the Malawi and Mozambique sides, spreading into parts of southern Malawi. They are more numerous in Mozambique, where they spread into southern Tanzania.

The Lomwe, although at some point viewed as constituting the most populous group after the Nyanja and ahead of the Yao and the Tumbuka, have normally been seen as a spill-over from Mozambique. Concentrated along the southeast border of the Malawi/Mozambique borderline, and spreading westward into areas close to the major commercial city of Blantyre, they have rarely had a profile in the country's linguistic landscape comparable to that of the other ethnic groups. In part this is because during the first census taken in independent Malawi in 1966, most of the Lomwe, fearful of the potential for ethnic isolation and possible political repercussions of that, registered as Chewas. Most spoke Chinyanja/Chichewa, except in their home areas. This contributed toward diminished visibility of their language within the country. It remains the only language of a once major group for which manuals or descriptive grammars are lacking. Even the recent move to include news broadcasts in it, along with the other major languages, has not translated into readily accessible written works in or on the language or generated increased scholarly interest in it. This author intends to have that altered and to stimulate research into this language.

The southern tip of Malawi, spreading into southern Mozambique, is the Lower Shire valley. The Shire River originates from the southern extremity of Lake Malawi. It flows through southern Malawi into Mozambique to join the Zambezi River. The Lower Shire Valley is home to the Sena. They, together with their language, chi-Sena, spread into southern Mozambique, toward the Zambezi River.

The remaining languages of Lambya, Nyakyusa, and Ngonde (Nkhonde), are minority languages spoken in the northernmost parts of the country. Also spoken in northern Malawi is Chindali or Chinsukwa. This is such a less commonly spoken language that it is virtually top on the list of endangered languages in the country. Studies of this and other minority languages are currently being undertaken by individual researchers (e.g., Robert Botne of Indiana University), as well as under the auspices of the Center for Language Studies in Malawi, affiliated with the University of Malawi. One language that has been mentioned as bordering with Chitumbuka in the west is Chinsenga. Although the language is primarily spoken in Zambia, it has some presence in Malawi, in the Malawi/Zambia border areas such as Mchinji (cf. Simango, 1995). In some linguistic surveys of east, central, and southern Africa (e.g., work done by scholars in Mozambique [NELIMO]), this language has been classified as a dialect of Chinyanja.

There is one ethnic group that is traditionally included in the listing of ethnicities in Malawi. This is the Ngoni. There is a significant percentage of the Malawi population who call themselves Ngoni. Moving in from southern Africa, the Ngoni were a conquering nation. They waged war with other ethnic groups, including the Chewa and the Tumbuka. They then settled in some of the places that they had conquered. In fact, it is noted of the Tumbuka that they were not a tribe per se. As indicated by Vail, "the Tumbuka people are historically not members of that discrete entity known commonly as a 'tribe.' This term, as generally used, has implied some sort of unity based on a common language and common cultural traits. Following from this synchronic cultural unity, it was assumed that a particular 'tribe' had a common past and an historical unity. In fact, however, the historical reality is far different, and Tumbuka history is more accurately seen when viewed as the aggregate history of individual clans" (xiv). Other historians have commented that the individual clans that constituted the Tumbuka had well-established dynasties and that they had developed their language, culture, and political and economic institutions during the period of their struggles with the Ngoni who had invaded their land (cf. Matiki, 1997; Pachai, 1973).

Thus, the Ngoni constitute a significant ethnic group that settled in Malawi. However, their language, chi-Ngoni, is not normally recognized in the linguistic map of Malawi because the Ngoni assimilated to either the Chewa in the south or the Tumbuka in the north. Although some of the culture and customs may have been preserved, such as traditional dances, initiation ceremonies marking rites of passage, and so on, the Ngoni adopted the languages spoken in their new habitat. If chi-Ngoni is used at all, it is used primarily during ceremonial occasions. In fact, when used, chi-Ngoni sounds very much a variant of such Nguni languages as Zulu, spoken in southern Africa.

Finally, very little has been said about Nyiha. This is one of the languages that borders with Tumbuka. It does not normally feature among the languages of Malawi because it is spoken primarily in Zambia and makes contact with Tumbuka there.

Language Maps (Appendix 1): Maps 21, 23.

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Malay

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Malay, a member of the Malayic language group, belongs to the subfamily of the western Malayo-Polynesian languages of the Austronesian language family. Other Malayic variants that have Proto-Malayic as their common ancestor include Minangkabau, Kerinci, Banjar, Iban, and Jakarta Malay (Adelaar, 1992). Northwestern Borneo is thought to be the homeland of the speakers of the proto-language (Adelaar, 1995; Nothofer, 1997; Collins, 1998). About 2000 years ago some of them migrated to eastern Sumatra, while others remained behind and stayed in northwestern Borneo. Some of the latter traveled south to Ketapang and then crossed over to Bangka and Belitung (Nothofer, 1997). Those remaining in the homeland area are the ancestors of speakers of Malayic Dayak languages (e.g., Iban, Selako). The Malays who sailed to Sumatra settled the island's east coast. Some moved on into the interior and to the west coast of southern Sumatra. While Middle Malay, Minangkabau, and Kerinci have inland and west coast variants as their origin, Malay itself developed from isolects spoken on the east coast. Later, Malay speakers from the southeast coast of Sumatra established Malay colonies in the Malay Peninsula. Other Malays returned to west Borneo, where they settled the coastal and riverine areas. The isolects spoken by these relatively recent migrants differ considerably from the isolects of Malays who never left Borneo. Coastal Borneo has other Malay isolects such as Sarawak Malay, Brunei Malay, Kutai Malay, and Banjjar, perhaps as a result of a clockwise settlement that originated in western Borneo (**Figure 1**).

Malay, the native language of the powerful kingdoms along the shores of the Straits of Malacca through which all traders from the west and the east

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Malay, a member of the Malayic language group, belongs to the subfamily of the western Malayo-Polynesian languages of the Austronesian language family. Other Malayic variants that have Proto-Malayic as their common ancestor include Minangkabau, Kerinci, Banjar, Iban, and Jakarta Malay (Adelaar, 1992). Northwestern Borneo is thought to be the homeland of the speakers of the proto-language (Adelaar, 1995; Nothofer, 1997; Collins, 1998). About 2000 years ago some of them migrated to eastern Sumatra, while others remained behind and stayed in northwestern Borneo. Some of the latter traveled south to Ketapang and then crossed over to Bangka and Belitung (Nothofer, 1997). Those remaining in the homeland area are the ancestors of speakers of Malayic Dayak languages (e.g., Iban, Selako). The Malays who sailed to Sumatra settled the island's east coast. Some moved on into the interior and to the west coast of southern Sumatra. While Middle Malay, Minangkabau, and Kerinci have inland and west coast variants as their origin, Malay itself developed from isolects spoken on the east coast. Later, Malay speakers from the southeast coast of Sumatra established Malay colonies in the Malay Peninsula. Other Malays returned to west Borneo, where they settled the coastal and riverine areas. The isolects spoken by these relatively recent migrants differ considerably from the isolects of Malays who never left Borneo. Coastal Borneo has other Malay isolects such as Sarawak Malay, Brunei Malay, Kutai Malay, and Banjjar, perhaps as a result of a clockwise settlement that originated in western Borneo (Figure 1).

Malay, the native language of the powerful kingdoms along the shores of the Straits of Malacca through which all traders from the west and the east

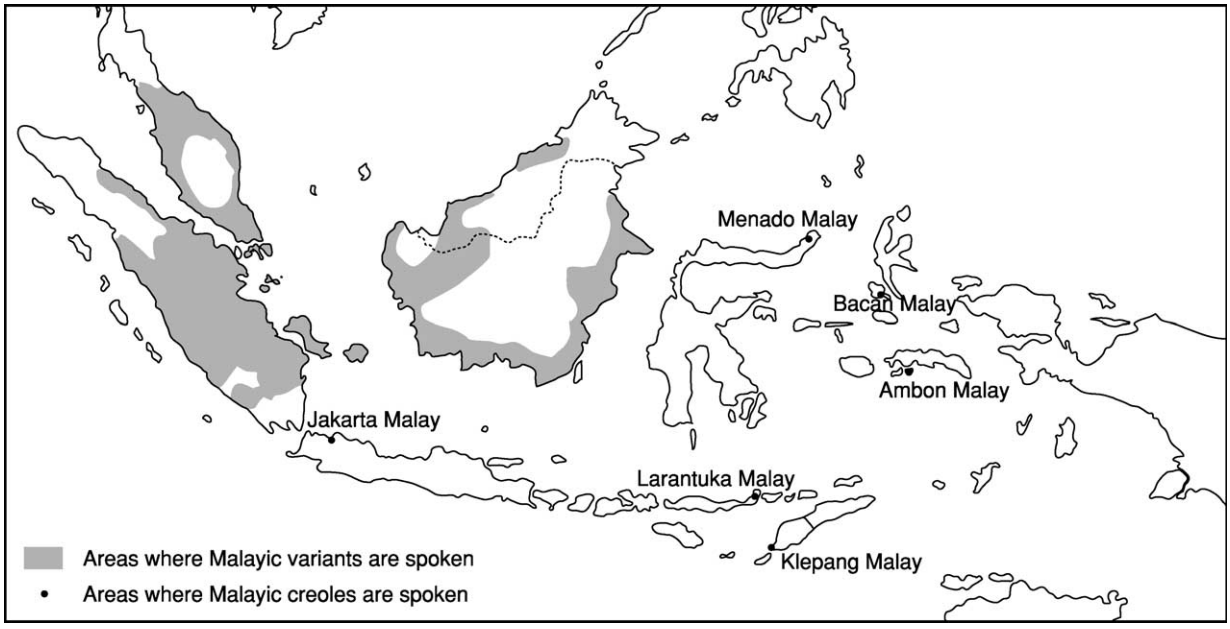

Figure 1 Map of the Malay-speaking area.

had to sail, was prone to become the means of communication of all those involved in commercial activities in the Indo-Malaysian archipelago. With the development of the spice trade, this language was carried all the way to the Moluccas and to the many other harbor towns of this archipelago. when the Portuguese arrived in the early 16th century, simplified forms of Malay had already spread east and developed into creoles replacing local languages (e.g., Kupang Malay, Ambon Malay, Larantuka Malay). On the Malay Peninsula and on the adjacent southern islands, Malay developed literary varieties at the various royal courts. The most prestigious one was the literary classical Malay of the Riau-Johore kingdom, which had its roots in the literary tradition of the earlier sultanate of Malacca (Sneddon, 2003; Prentice, 1978).

The existence of two standard varieties of Malay, namely Malaysian (called 'Bahasa Melayu' in Malaysia) and Indonesian ('Bahasa Indonesia'), is mainly the result of an agreement reached between the British and the Dutch, who in 1824 drew new boundaries of their colonial territories. The mainland part of the Malay-speaking area became part of the British realm, and Sumatra together with the offshore islands became part of the Dutch realm. The treaty divided the former Riau-Johore Sultanate into two separate entities, with Johore belonging to the British and the Riau archipelago belonging to the Dutch. Because of this political demarcation, the influential Riau-Johore variant of Malay was now spoken in two distinct territories, which were to become Malaysia and Indonesia. Since this prestigious Riau-Johore court language played a major role in the formation of the standard languages of both countries, Malaysian and Indonesian remained closely related and are dialects of one and the same language. The differences between the two are most obvious in the vocabulary. The phonological, morphological, and syntactic differences are few and not very significant. There are a considerable number of cases in which Malaysian borrowed an English word and Indonesian a Dutch word, e.g., *tayar* vs. *ban* 'tire' or *fius* vs. *sekering* 'fuse.' Other variations occur when one of the two national variants has borrowed a European word, while the other one is a retention or an innovation, e.g., Malaysian *dulang* 'tray' (retention) vs. Indonesian *baki* 'tray' (from Dutch *bakje*) or Malaysian *panggung wayang* 'cinema' (innovation) vs. Indonesian *bioskop* (from Dutch *bioscoop*). There are cases when both Malaysian and Indonesian share the some word but with minor phonetic variation, e.g., Malaysian *kerusi*, Indonesian *kursi* 'chair' (from Arabic *kursī*). In some instances the Malay word underwent different semantic changes, e.g., Malaysian *pusing* 'turn, revolve' has the meaning 'dizzy' in Indonesian. Furthermore, Malaysian has borrowed more from Arabic than Indonesian, while Indonesian has undergone considerable Javanese and Jakarta Malay influence.

In Indonesia, the establishment of Malay as the national language was not disputed; its choice was not regarded as favoring any one ethnic group, since ethnic Malays constituted no more than 10% of Indonesia's population. Furthermore, various forms of Malay had long been established throughout the

Indonesian archipelago. In Malaysia, the situation was different. When Malaysia became independent in 1957, Malay became the national langauge and one of the official languages (the other is English). Malay became the only language of education. Since Malay was more or less the exclusive property of the Malays, who made up about 50% of the population, the Chinese and Indian population of Malaysia felt at a disadvantage. A change of the language name from Bahasa Melayu to Bahasa Malaysia was one of the compromises made to comfort the non-Malay population. Later, however, the name Bahasa Melayu was reintroduced. In Malaysia, English still plays in important role and today competes with Malay as the language of instruction; in 1993, English became the language of instruction in universities. The Malaysian government argued that this was done in the interest of science and technology (Sneddon, 2003). Since 2003, secondary schools have taught mathematics and sciences in English. The introduction of English as language of education was based on the government's observation that the knowledge of English among pupils and students had deteriorated dramatically. Many Malays are worried that juxtaposing Malay and English against each other will result in a new linguistic scenario and marginalize the original national language policy.

In 1984 Malay also became the national language of Brunei Darussalam in northeast Borneo and is also called Bahasa Melayu. In this country it is the sole official language. The standard language is lexically much closer to Malaysian. In addition to Bahasa Melayu the state of Brunei also has another Malay variant (Brunei). This variant constitutes the main lingua franca in the coastal regions of Brunei (Nothofer, 1991). Brunei has an official bilingual education policy that preserves the status of Malay but recognizes the importance of English by making it the medium of instruction from the upper primary school onward in almost all subjects.

Malay is also the national language of Singapore and one of its four official languages, along with English, Mandarin Chinese, and Tamil. Malay is a minority language, spoken by not more than 15% of the population. In southern Thailand, more than a million speakers use a Malay variant, Pattani Malay.

Cooperation between Malaysia and Indonesia resulted in the spelling reform of 1972, which removed the differences in the spelling of consonants, e.g., former Malaysian *ch* and Indonesian *tj* are now spelled *c*; former Malaysian and Indonesian *dj* are now spelled *j*. The cultural pact between the countries was intensified in 1972 with the establishment of a council known as the Language Council for Indonesia and Malaysia (MBIM). Its main tasks are to create a common scientific terminology and cooperate closely on matters pertaining to language. In 1986, Brunei Darussalam officially joined as a member of the Council, which took the new name MABBIM.

Malay Phonology

The description of the Malay phonology shown here is that of Standard Malay (SM), as defined by Adelaar (1992: 3). The vowel phonemes of SM are shown in Table 1, and consonant phonemes are shown in Table 2. The consonant */r/* is realized as a velar or uvular fricative and elided word finally by speakers of the traditional Malay areas. It is an apical flap or trill outside these areas and in official Indonesian (Adelaar, 1992: 8).

Table 1 Vowel phonemes in standard Malay

	Front	*Central*	*Back*
High	*i*		*u*
Mid	*e*	*ə*	*o*
Low		*a*	

Diphthongo: *-ay, -aw.*

Malay Morphology

Malay prefixes include: *bər-* 'stative, habitual'; *məN-* 'active, agent focus'; *di-* 'passive, patient focus'; *məmpər-/dipər-* 'causative'; *tər-* 'accidental state, involuntary, agentless, sudden'; and *pəN-*, *pər-*, *pə-* 'actor of the performance, instrument with which the

Table 2 Consonant phonemes in standard Malay

	Labial	*Dental*	*Alveolar*	*Palatal*	*Velar*	*Glottal*
Voiceless stops	*p*	*t*		*c*	*k*	
Voiced stops	*b*		*d*	*j*	*g*	
Nasals	*m*		*n*	*ɲ*	*ŋ*	
Fricatives			*s*			*h*
Liquids			*l*		*r*	
Semivowels	*w*			*y*		

action is performed, someone having a quality as a characteristic.' The common Malay suffixes are: *-an* 'collectivity, similarity, object of an action, place where the action is performed, instrument with which the action is performed' *-kan* 'causative, benefactive'; and *-i* 'locative, repetitive, exhaustive.' Malay circumfixes include: *bər- -an* 'diffuse action, plurality of subject'; *kə- -an* (verbal) 'unintentional action or state, potential action'; *kə- -an* (nominal) 'nouns referring to a quality, abstract nouns, collectivity'; *pəN- -an, pər- -an* 'abstract nouns, place where the action is performed, goal or result of action.'

See also: Austronesian Languages: Overview; Brunei Darussalam: Language Situation; Indonesia: Language Situation; Javanese; Malayo-Polynesian Languages; Malaysia: Language Situation.

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Malayalam

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Language and Speakers

Malayalam, a major literary language of South India with long traditions of literature and scripts, is the main language of the state of Kerala and of the islands of Lakshadweep, which are 200–400 km off the southwest coast of India. Malayalis have migrated to different parts of India and overseas, especially to Malaysia, Singapore, the United States, Canada, the United Kingdom, and Australia. The number of Malayalam speakers in India is 31.83 million. In Kerala, 96% of the total population is composed of the religious majority (comprising Hindus, 58.1%) and the religious minorities (Muslims, 21.3%; Christians, 20.6%); these groups mostly speak Malayalam. Linguistic minorities comprise 5.2% of the population. Kerala has the highest literacy rate in India (90.6% of the population). The number of dailies and periodicals in Malayalam in 2000 was 1505 (according to the *Manorama year book* in 2004).

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Etymology and Variant Names

Malayāḷam is a combination of *mala* 'mountain' with any of the following terms: *aḷam* 'the place,' denoting 'the mountain country'; *ālam* 'depth,' representing 'the land that lies between the mountain and the deep ocean'; or *āḷ* 'man,' meaning 'mountain dweller.' The last term may convey the original meaning of *Malayāḷam*, denoting both 'the people,' depicted by word forms such as *malayāḷar*, *malayāḷi*, and *malanāṭṭukāran*, and the region or country, as in the term *malanāṭu*. Early variants include *malayālma*, *malayāyma*, and *mlayāṇma*. *Malayāḷam* may be a later variant. *Lilatilakam*, a famous 14th-century work on the grammar and language of Malayalam, mentions only *kēraḷabhāṣa* to denote the language.

Development of Literature

Malayalam flourished in Kerala amidst continuous contact and convergence with Sanskrit, Prakrit, and Pali; profusely borrowing lexical items from these languages in addition to incorporating loans from Arabic, Persian, Urdu, Syriac, Portuguese, Dutch, Hindi, and English. The early development of Malayalam was considerably influenced by Sanskrit, the language of scholarship, and Tamil, the language of administration; eventually, Malayalam evolved in written documents and literature. The Brahmin contact made profound impact in adapting several Indo–Aryan features into Malayalam. Malayalam has a recorded literary history of over eight centuries; the earliest document, the Vałappaḷḷi inscription of Rajasekhara, dates to the 9th century. The early literature developed through three different traditions: (1) the Tamil tradition of *pāṭṭu*, the classical songs depicted in the first literary work, *Ramacaritam*, (2) the Sanskrit tradition of *maṇipravāla*, a literary innovation portraying a harmonious blend of *bhāṣa* and *Samskṛita* (i.e., the native language and Sanskrit – for instance, *Vaiśikatantram*), and (3) the native tradition of producing folk songs and ballads predominantly concerning indigenous elements. *Bhasakautiliyam* is the earliest prose written in simple language. All three traditions belong to the 12th century. Modern Malayalam literature is rich in fiction, poetry, prose, drama, short stories, biographies, and literary criticism.

Writing System

The early Malayalam writing system had evolved from Vaṭṭeluttu, traceable to the Pan-Indian Brahmi script; this system continued for a long period, eventually adding symbols from Grantha script to represent Indo-Aryan loans. The writing is based on the concept of the *akṣara* 'graphic syllable,' wherein the graphic elements have to be read as units, although the individual vowels and consonants are easily recognizable. The script reformation implemented in the 1970s made a reduction of the less frequent conjunct consonants and combinations of the vowel *u* with different consonants, to make a simpler writing scheme. The orthography is largely phonemic, with separate script for each phoneme (with a few exceptions). The dental and alveolar single nasals (*n* and *n*) are depicted by the same script, as are their long counterparts. The direction of writing for several scripts is clockwise. In a few cases, the direction is clockwise plus anticlockwise or vice-versa within a single letter. Malayalam scripts bear simple to complex allographic representations. Geminated consonants and heteroelemental consonant clusters are marked differently by writing the consonants side by side, or one above the other. Additionally, there are other combinations of consonants that seldom follow regular patterns in graphemic depiction. The six consonants *m*, *n*, *ṇ*, *r*, *l*, and *ḷ* in word-final positions have separate symbols for writing.

Grammatical Tradition

Malayalam grammatical tradition commenced with the 14th-century *Lilatilakam*. The European contributions in the early 18th century were of great importance, especially Hermann Gundert's *Malayāḷabhāṣāvyākaraṇam* (1851, 1868). The 19th century saw the publication of grammatical treatises by a few native scholars, viz., George Mathan (*Malayālmayuṭe vyākaraṇam*), Kovunni Nedungadi (*Kēraḷakoumudi*; 1878), and some others, but the most widely used work was that of A. R. RajaRaja Varma, the *Kēraḷa pāṇinīyam* (1896). This was followed by L. V. Ramaswamy Iyer's profound contribution to various aspects of Malayalam linguistics in 1925. The past four decades have witnessed the production of considerable work based on modern linguistic theories and descriptive techniques applied both to various written texts belonging to different centuries, ranging from *Ramacaritam* to the 16th-century *Adhyatma Ramayanam*, and to regional, caste, communal, and tribal dialects, with the ultimate goal of preparing a historical grammar for Malayalam that is still a desideratum (much of this work can be found in the Ph.D. dissertations by scholars in the Department of Linguistics, University of Kerala).

Dialect Variation

Malayalam dialect variations are discernible with respect to phonetic, phonological, grammatical, semantic, and lexical levels and in intonation patterns along the parameters of caste, community, region, social stratum, education, occupation, style, and register. The speech forms of Travancore, Cochin, South and North Malabar, and the Lakshadweep islands show considerable differences. Among the 48 tribal languages in the hilly tracts of Kerala, many are dialects of Malayalam and a few belong to one or the other of South Dravidian languages.

The first systematic dialect survey of Malayalam was based on a single speech community, the Ezhava/Tiyas groups living throughout Kerala; the survey was completed in 1968, demarcating 12 major dialect areas (Subramoniam, 1974). This was followed by the Nair and Harijan dialect surveys. About 600 dialect maps were prepared concerning the Ezhava/Tiyas and Nair castes, along with frequency charts of the variants, showing differences with regard to 300 diagnostic lexical items. Copies of these maps are preserved in the collections of the Department of Linguistics, University of Kerala, and the International School of Dravidian Linguistics, Thiruvananthapuram, Kerala. Among several dialect variations, the occurrence of *y* in place of *ł* is commonplace, as in *pałam* > *payam* 'fruit,' but the occurrence of *t* (*ketakku* 'east') is a rare feature found in the northern part of Kasargod. Initial *v*/*b* alternation, as in *v*/*barin* 'come' and *v*/*bāppa* 'father,' is a distinct feature of Muslim speech throughout Kerala and Lakshadweep, but in Cannanore district this change is found in the speech of other castes, demonstrating the overlap of caste, communal, and regional traits. Word-final *n*/*m* alternation is a feature of the Muslim dialect of Ernad and Lakshadweep, as in *nēran*/*nēram* 'time.' Present tense markers *-anRa* and *-uṇṭa*, as in *kottanRa* 'chops' and *iṭuṇṭa* 'places,' is a peculiarity of the PaRaya speech of Kasargod; *-aṇṭa*, as in *bayaṇṭa* 'comes,' is found in the Muslim dialect of Lakshadweep.

The literary dialect is almost uniform. The language that is used in newspapers, in mass media, and in formal situations, which is largely understood by the majority of the people irrespective of caste, community, and region, is considered to be the standard variety. A standard colloquial is slowly evolving.

Genetic Affiliation

Malayalam shows affinity to Tamil, Kota, Toda, Irula, Badaga, Kodagu, Kannada, and Tulu, all of which belong to the South Dravidian branch of the Dravidian family. However, the affinity with Tamil is greater, since Malayalam emerged from Proto-Tamil–Malayalam; divergence occurred over a period of four or five centuries, from the 8th century onward, and distinct languages, separate from Tamil, were established.

Three distinctive features of Proto-Tamil–Malayalam include (1) *k-* > *c-* before front vowels, whether followed by a retroflex or not, (2) **e*, **o* > *i*, *u* before a derivative suffix beginning with *a*, and (3) the presence of the accusative suffix *-ai*. The features that distinguish Malayalam from Tamil are (1) progressive assimilation of nasal + stop > nasal + nasal except in retroflexes and labials, (2) loss of person–number–gender in finite verbs, (3) negative periphrastic construction with *illa*, and (4) prohibitive construction with infinitive + *arutu*.

Characteristic Features

Phonology

Five vowels with length contrast, *i*, *e*, *a*, *o*, and *u*, occur in the literary and spoken dialects. Two diphthongs, *ai* and *au*, occur in the literary language. An onglide *y* and *v* occur word initially in front and back vowels, respectively, in pronunciation. Vowels occur in all positions except for short *o*, word finally. The *u* is pronounced as a high back rounded vowel when it occurs initially, medially without length in the first syllable, and with length finally, whereas it is pronounced as a lower high back unrounded vowel (*samvrutookaaram*) medially except in the first syllable and without length word finally.

Single voiceless stops (except in clusters with homorganic nasals) are pronounced with voicing (with or without slight fricativization) when occurring intervocalically; voiceless stops preceded by homorganic nasals are pronounced with slight voicing. Generally, aspirated plosives lose aspiration in pronunciation. Only six consonants, *m*, *n*, *ṇ*, *r*, *l*, and *ḷ*, can occur word finally; *n* occurs medially either with length or in clusters. All other consonants can occur word initially and medially. Voiceless stops occur medially with length and in clusters, except with homorganic nasals. For consonants, length contrast occurs only medially; *r*, *s*, *ś*, *ṣ*, *h*, and *ł* do not geminate.

Morphophonemics

The sandhi rules (a systematic blend of words; Sanskrit *sandhi* 'to join') fall under two categories, internal and external, the former operating within a word and the latter operating between words; the

rules may operate in either category or in both categories (sandhis). For example, for a vowel V, the rule V1 + V2(V2) + V2(V2) operates only in close juncture: *āyi + illa > āyilla* 'did not become.' The following examples show other sandhi blends:

i e a	+	v vv	>	i e + y + a	v vv	(internal and external)
kuṭṭi	+	uṭe	>	kuṭṭiyuṭe 'child of '		
nalla	+	āḷu	>	nallayāḷu 'good person'		
tala	+	alla	>	talayalla 'head not'		
u	+	v(v)	>	u + v +	v(v)	(internal and external)
rāmu	+	um	>	rāmuvum 'Ramu also'		
kuru	+	āyi	>	kuruvāyi 'seed become'		
l/ṇ	+	n	>	ṇṇ (external)		
toḷ	+	nūRu	>	toṇṇūRu 'ninety'		
kaṇ	+	nīru	>	kaṇṇīru 'tears'		
m/n/ṇ	+ STOP		>	(homorganic nasal + stop)		
cem	+		tāmara	> centāmara 'lotus'		
pin	+		tuṇa	> pintuṇa 'support'		
peṇ	+		kuṭṭi	> peṇkuṭṭi 'girl'		

Morphology

Noun stems fall under three categories, viz., personal pronouns (first person, inclusive and exclusive), second person, and reflexives. Demonstrative base + gender number marker constitutes third-person pronouns, as in *av-an* 'he,' *avaḷ* 'she,' and *av-ar* 'they.'

Numerals consist of adjectival and case bases. Number markers are *-n* (gender singular), *-m* (gender plural), *ñān* 'I,' *nammal* 'we (inclusive),' *-tu* (non-gender-neutral singular), and *atu* 'that.' Examples of gender markers are *-n*, *-ān*, and *-an* (masculine) and *-ḷ*, *-atti*, and *-āṭṭi* (feminine). Plural suffixes are *-aḷ* and *-kaḷ*.

Nominative case has no marker; accusative uses *-e* and *-a*, dative uses *-u* and *-kku*, and instrumental uses *-aal* (in literary Malayalam; in dialects, postposition *kontu* 'with' is used). Sociative case uses *-ōṭu* and locative case uses *-il*.

Verbs do not distinguish person–number–gender. Both finite and nonfinite verbal forms consist of a verb stem followed by verbal suffixes, which take (or can take) tense markers. A few verbs do not take tense but can take negative markers (*illa* 'no,' *alla* 'not,' and *arutu* 'do not'). Verbs fall into two groups, intransitive and transitive. Some of the former are transitivized morphologically in three ways: (1) by suffixing the markers *-tt-* and *-kk-* to the intransitive verb stem (*iru* 'to sit,' *iru-tt-* 'to make to sit'; *oṭi* 'to break,' *oṭi-kk-* 'to make to break'), (2) by geminating the stem-final stops (*aaṭ-* 'to become,' *ākk-* 'to make to become'; *aaṭ-* 'to swing,' *aaṭṭ-* 'to make to swing'; *kēr-* 'to climb, *kēRR-* 'to make to climb'), and (3) stem finally (nasal + nasal > homorganic stop + homorganic stop (*uRaṅṅ-*'to sleep,' *uRakk-* 'to make to sleep'). Two causative markers, *-i-* and *-ppi-*, can occur simultaneously within a verb, as in *paRay-i-ccu* 'caused to say,' *paRay-i-ppi-ccu* 'to cause to say.'

Three-way distinctions in tense occur, i.e., present, future, and past. Examples are *-unnu* (present tense) and *-um* (future tense), as in *var-unnu* 'comes' and *var-um* 'will come.' All vowel-ending stems take link morph *-kk-* before present and future markers, as in *paṭi-kk-unnu* 'learns' and *paṭi-kk-um* 'will learn.' The verb stem *vēṇ-*is peculiar in that it takes the future tense marker-*am* (*vēṇ-am* 'will need') but does not take either the present or the past tense suffix. There are several past tense markers: the vowel ending *-i* (*pāṭi* 'sang') and nasals *-nn-*, *-ññ-*, *-ṇ-*, and *-nt-* (*iru-nnu* 'sat,' *kara-ññu* 'wept,' *tā-ṇu* 'drowned,' *no-ntu* 'pained,' and *ve -ntu* 'boiled'; only these last two verbs take the past tense *-nt-*).

Stops are *-t-*, *-ṭ-*, *-R-*, and *-c-* (*eṭu-ttu* 'took,' *kaṇ -ṭu* 'saw,' *pe-RRu* 'delivered,' and *aṭi-ccu* 'beat'). Negative suffixes are *-ātt-* before the relative participle marker *-a* (*var-ātt-a* 'that which did not come), *-āt-* before the verbal participle marker *-e* (*var -āt -e* 'having not come'), and *-a*, which freely varies with *-ā* (*vē-ṇṭa*(*a*) 'not needed'); *-ān* denotes the purposive infinitive (*paRay-ān* 'saying').

The vowel-ending stems can be used as imperatives (*paRa* '(you) tell,' *nōkku* '(you) look'), but are less polite in speech than *-ū* is (the more polite forms are *paRay-ū* and *nōkk-ū*). The optative marker is *-aṭṭe*, as in *var-aṭṭe* 'let (him) come.'

Syntax

Three major types of sentences, simple, complex, and compound, can be discerned. A simple sentence consists of the subject noun and predicate verb, as in *raaman varunnu* 'raman comes.' A nominal sentence in which both the subject and the predicate are nouns is seen in *atu maram* 'that is tree.' The finite verb *aanu* is optional. Malayalam word order is not rigid. Subject–object–verb is the usual order. A noun or noun phrase can be the subject in a sentence. A noun phrase (NP) is expandable by modifiers, the structure of which is ± possessive ± demonstrative ± numeral Adj ± Adj + NP, as in *enRe ā oru nalla peena* 'my that one good pen' 'that good pen of mine.' A noun phrase can be expanded by a relative participle, nouns, case base, and clitics, as in *ceyta kāryam* 'thing done,' *kaykāryam* 'handling the affairs,' *tankaaryam* 'one's own affair,' *kāṭṭukōli* 'jungle fowl,' and *piRRe divas am* 'next day.'

Nouns/noun phrases can form the direct or indirect object. If the direct object is an animate noun, the

accusative case suffix *-e* is added; if the direct object is an inanimate noun, the case suffix is dropped. The indirect object takes the dative case, as in *avaḷ sītaykku* (indirect object) *oru pūccaye* (direct object) *kot'uṭṭu* 'she gave a cat to Sita.' Verbs/verb phrases are expanded by verbal participles, auxiliary verbs, or adverbial clitics, as in *talayil cumaṭu veccukoṭuttu* 'placed a bundle on the head' and *patukke pooyi* 'slowly gone.'

Interrogative sentences can be formed by adding the interrogative clitic, which would yield 'yes' or 'no' types of answers (*avaḷ sītayānō* 'is she Sita?'). This can also denote doubt. After the defective verbs *illa* and *alla*, the interrogative particle *-ee* is added (*illee*, *allē*, 'is it not'). Interrogative words such as *aaru* 'who,' *eetu* 'which,' and *entu* 'what' can be added to form sentences, as in *āru paRaññu* 'who told', *ētu kāryam* 'which subject,' and *entu vēṇam* 'what (do you) want.' Negative sentences are formed either by negativizing the verb phrase by using morphological negative markers, or by negation of the sentence or verb phrase by using defective verbs such as *illa* and *alla* (*pōyi* 'went,' *pōyilla* 'did not go,' *itu pēna āṇu* 'this is pen,' *itu pēna alla* 'this is not pen,' *āhāram uṇṭu* '(there) is food,' *āhāramilla* '(there) is no food').

See also: Dravidian Languages; Kannada; Tamil; Telugu.

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Malayo–Polynesian Languages

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Introduction

The term 'Malayo–Polynesian' today denotes the largest of the ten putative primary subgroups of the Austronesian language family (Blust, 1999). Malayo–Polynesian (MP) embraces perhaps 1100 languages, while the other nine groups consist only of the surviving fourteen Formosan languages of Taiwan (*see* **Formosan Languages**). Until Father Wilhelm Schmidt invented the term 'Austronesian' in 1899, however, 'Malayo–Polynesian' denoted the whole Austronesian language family. Its German equivalent, *malayisch-polynesisch*, was first used in print by Franz Bopp in 1841 (it is often wrongly attributed to Wilhelm von Humboldt, but is not found in his writings). 'Malayo–Polynesian' was in use with this meaning in English by the 1870s, but who first used it to refer to the language family is unclear (Ross, 1996). It continued to be used as a synonym for Austronesian until the 1970s, and is occasionally still used in this sense today.

In 1977 Robert Blust showed that the primary division of Austronesian was into several subgroups of languages spoken in Taiwan and a single subgroup which he labeled 'Malayo–Polynesian' and which includes all the Austronesian languages spoken outside Taiwan: the Austronesian languages of the Philippines, Southeast Asia, Madagascar, the Indo-Malaysian archipelago, New Guinea, Island Melanesia, Micronesia, and Polynesia. This is the sense of 'Malayo–Polynesian' in the remainder of this article. Some scholars prefer the term 'Extra-Formosan' in its place. Clearly the potential for overlap between this and a discussion of Austronesian languages is great, and the reader is referred to **Austronesian Languages: Overview** for further information.

The Integrity of the Malayo–Polynesian Subgroup

How do we know that all Austronesian languages outside Taiwan belong to a single subgroup? To determine a family tree we first compare the languages of the family and reconstruct the protolanguage from which they are descended, in this case Proto Austronesian (PAn). Then we identify subgroups of languages whose members share a set of innovations relative to PAn. We infer that the innovations are shared because they have been inherited from a single interstage language. This is far more probable than

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the alternative assumption – that the innovations have occurred independently in each language that reflects them.

All Austronesian languages outside Taiwan reflect certain phonological innovations relative to PAn, and we infer that they occurred in a single interstage language which Blust named Proto Malayo-Polynesian (PMP). These innovations are enumerated here (from Blust, 1990) with minimal discussion and examples.

A. PAn *t and *C merged as PMP *t.
B. PAn *L and *n merged (with some unexplained exceptions) as PMP *n.
C. PAn *S became a glottal spirant of some kind, but did not merge with *h.

Innovation A is illustrated below, where PAn *t and PAn *C (which remain separate in the Formosan language Rukai) are merged in MP languages, exemplified by Itbayat, a language of the Batanes islands between Taiwan and Luzon:

PAn **tuLa* 'freshwater eel' (Rukai *tola*) > PMP **tuna* (Itbayat *tuna*)
PAn **pitu* 'seven' (Rukai *pito*) > PMP **pitu* (Itbayat *pitu*)
PAn **Caliŋa* 'ear' (Rukai *tsa[iŋa*) > PMP **taliŋa* (Itbayat *taliña*)
PAn **maCa* 'eye' (Rukai *matsa*) > PMP **mata* (Itbayat *mata*)

In innovation B, PAn *L and *n merged as PMP *n:

PAn **qaLup* 'hunt' (Rukai *alopo*) > PMP **qanup* (Itbayat *anup*)
PAn **wanan* 'right (hand)'(Rukai *vanan*) > PMP **wanan* (Itbayat *wanan*)

Innovation C is reflected in

PAn **duSa* 'two' (Rukai *dosa*) > PMP **duha* (Itbayat *duha*).

A major set of innovations in pronouns involved a 'politeness shift' (Blust, 1977). Just as the English plural pronoun *you*, used as a polite form of address, eventually displaced singular *thou*, so PMP underwent a set of changes in pronouns which were also related to politeness (for details see Ross, 2002: 51). No MP language reflects forms that predate the shift.

PMP added to the verbal system the prefixes **paN*-(distributive), **paR*-(durative, reciprocal) and **paka*-(aptative, potential) (Ross, 2002: 49–50). These are widely reflected in the languages of the Philippines and the western part of the Indo–Malaysian archipelago, and are preserved in fossilized form in many languages elsewhere in the MP subgroup.

History and Subgrouping

How did it come about that all Austronesian languages outside Taiwan belong to a single subgroup while perhaps nine coordinate groups are represented in Taiwan itself? The obvious answer is that PAn was spoken in Taiwan and diversified into a group of languages there. Speakers of one of these languages left Taiwan, presumably for the northern Philippines. Their language underwent the innovations noted above, becoming the language we call PMP.

Archaeological dating suggests that the culture that spoke PAn flourished in Taiwan around 3000 B.C. and that the migration to the Batanes islands or Luzon which led to the genesis of PMP occurred around 2000 B.C. The descendants of PMP speakers evidently spread, mostly south and then eastward, at an astonishing speed, colonizing the Philippines, the Indo-Malaysian archipelago, parts of coastal New Guinea, and the Bismarck Archipelago in the northwest of Island Melanesia within about 500 years, by 1500 B.C. This history is reflected in the tree diagram of the Austronesian family (see **Figure 1**). This shows some 20 to 25 groups of western MP languages, spoken in the Philippines and the western part of the Indo-Malaysian archipelago, with outliers on Hainan, in the Vietnamese highlands, on the islands along the western coast of Thailand and Myanmar, and on Madagascar (see **Figure 2**). The migration of MP speakers to Madagascar was a much later event (Adelaar, 1991). Adelaar (2004) provides a listing of western MP groups which reflects current understanding. Although there are frequent references in the literature to 'Western Malayo–Polynesian,' there was never a 'Proto Western MP,' as western MP languages as a whole share no innovations. The similarities among western MP languages, such as they are, reflect shared retentions from PMP. The fact that the tree shows so many coordinate branches reflects the rapidity with which MP speakers occupied the region. They were agricultural people – rice growers – and probably encountered little significant opposition from the small populations of hunter-gatherers who had previously occupied these territories.

There is reasonable evidence in the form of shared innovations that all MP languages in the regions labeled on the map as Central Malayo–Polynesian (CMP), South Halmahera/West New Guinea (SHWNG) and Oceanic are descended from a single language, shown on Figure 1 as Proto Central/Eastern Malayo-Polynesian (PCEMP) (Blust, 1993). However, the set of innovations that defines this grouping is not nearly as substantial as the set defining MP (see above), and we must infer that the period for which

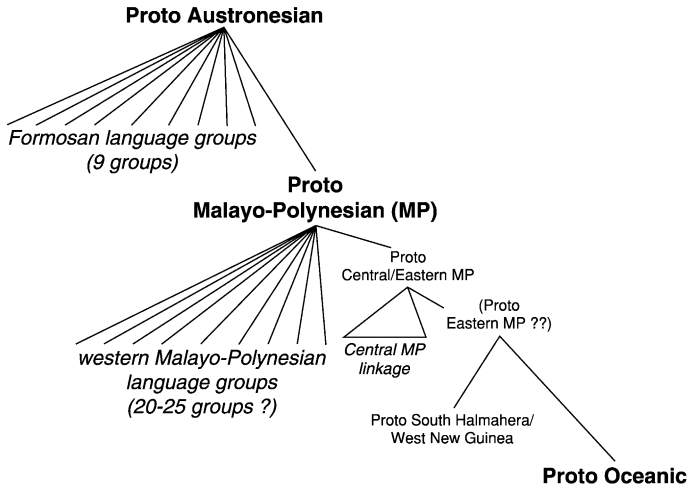

Figure 1 Austronesian family tree.

PCEMP speakers remained an integrated speech community was short. The conventionally accepted family tree of Austronesian languages (originally proposed by Blust, 1977) gives PCEMP two daughters, 'Proto CMP' and 'Proto Eastern MP.' The status of both is doubtful. There is agreement among scholars today that PCEMP diversified, apparently rapidly, into a dialect network, and that the Eastern Malayo–Polynesian languages broke away from that network, probably as the dialects of the network were achieving the status of separate languages. There is no significant evidence, however, that there was ever a discrete Proto CMP (for more details, see Ross, 1995).

The existence of Proto Eastern MP is also questionable, and it is possible that it was simply a peripheral section of the Central/Eastern MP dialect network (Ross, 1995; Adelaar, 2004). However, there is much less doubt about Proto SHWNG, the ancestor of a small group of languages in the south of Halmahera and scattered around the Bird's Head Peninsula of New Guinea, and no doubt at all about Proto Oceanic.

Proto Oceanic was the ancestor of the MP languages of New Guinea other than those belonging to SHWNG (see map) and of all the MP languages of Island Melanesia, Polynesia, and Micronesia other than Chamorro (Guam) and Palauan (Belau). The Oceanic languages share a striking set of innovations, larger than the set for Proto MP itself. These innovations were first recognised by Dempwolff (1937) in Volume 2 of his pioneering work on Austronesian (*see* **Austronesian Languages: Overview**) and have undergone various modifications since as the result of further research (Lynch *et al.*, 2002: 63–67).

The history represented by the varying strengths of the nodes in the Austronesian family tree diagram (Figure 2) shows a period of relative stability during which Proto MP developed from the speech of those who emigrated from Taiwan, followed by 500 years of extraordinary settlement activity which culminated in the arrival of MP speakers in the Bismarck Archipelago. Here there seem to have been a few more centuries of relative stability, during which Proto Oceanic developed into a language that was at least phonologically and lexically rather different from its sisters around the Bird's Head.

Why the apparent halt in settlement activity? There were perhaps two reasons. First, New Guinea was already inhabited by Papuan speaking agriculturalists (*see* **Papuan Languages**) with much greater population densities than their hunter-gatherer neighbors to the west, and there was little space for the newcomers. Second, there probably was continued settlement activity during the development of Proto Oceanic, but no further than the Solomon Islands, to the east of which there is a substantial sea gap (Pawley, 1981).

There is agreement among many linguists and archaeologists (but not all) working in Island Melanesia that Proto Oceanic was the language of the Lapita Culture, a group that produced distinctive pottery and exploded eastwards into the Pacific from about 1300 B.C. Island Melanesia (the Bismarck Archipelago, Solomon Islands, Vanuatu, New Caledonia, and Fiji), Tonga, and Samoa were all settled within a few hundred years (Kirch, 1997). A linguistic puzzle in this story is that Proto Polynesian, the Oceanic language ancestral to Tongan, Samoan, and the 40 or so languages of scattered Polynesian communities is structurally rather different from other Oceanic languages, yet there is no obvious hiatus in the archaeological record during which these differences might have developed. It is reasonably

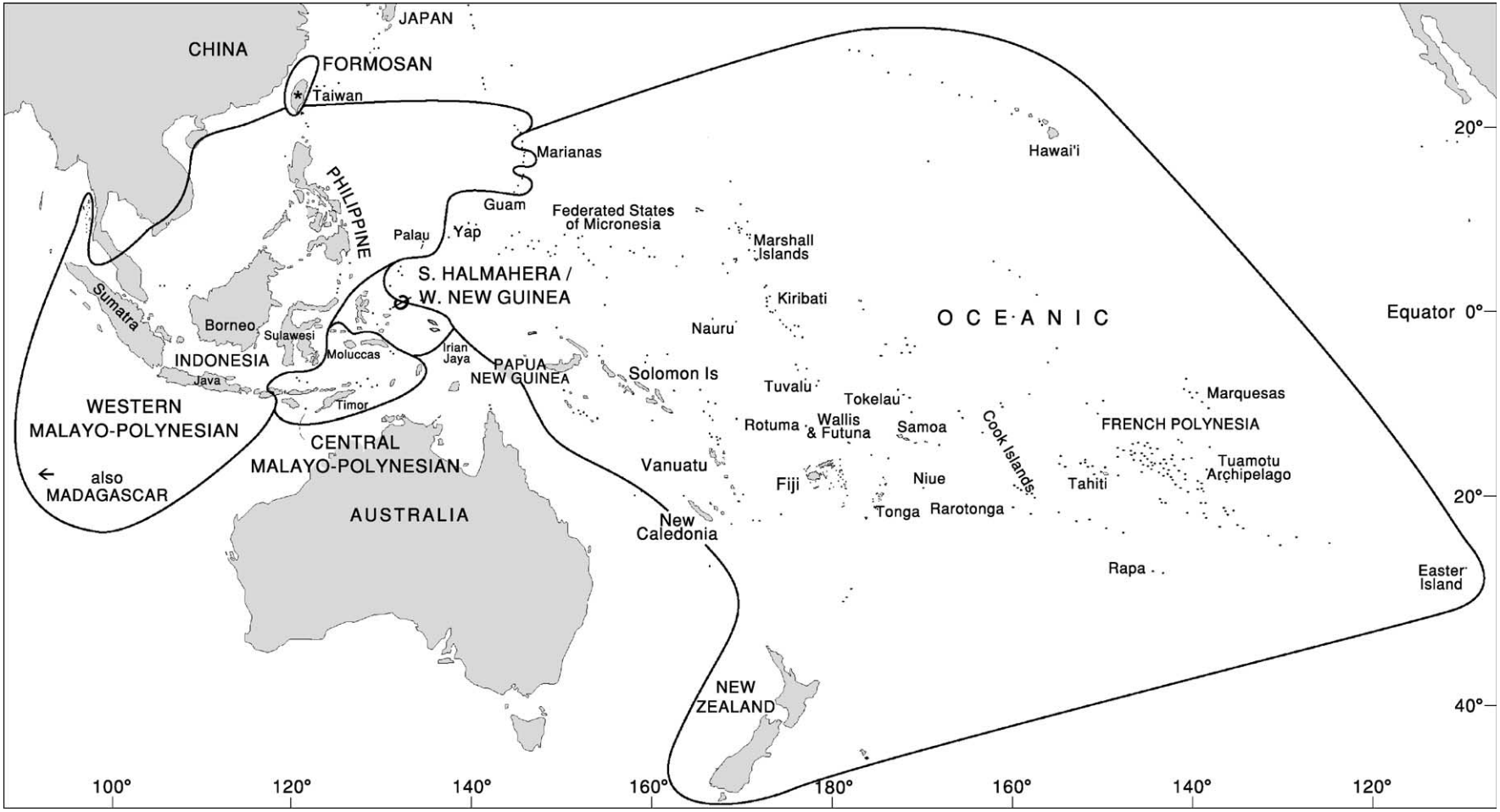

Figure 2 The Austronesian family and major Malayo–Polynesian language groups.

certain, however, that Proto Polynesian or an immediate ancestor developed in the northeastern islands of Fiji (Geraghty, 1983).

The Structures of Malayo–Polynesian Languages

MP languages show an extraordinary structural diversity. General accounts can be found in Lynch *et al.* (2002: 34–53) for Oceanic languages and Himmelmann (2004) for other MP languages. The languages of the Philippines and parts of northern Borneo, northern Sulawesi, and Madagascar largely retain the structure of PAn (*see* **Austronesian Languages: Overview; Formosan Languages**). The western MP languages of Vietnam, Hainan, and the Thailand/Myanmar islands show the influence of Mon-Khmer languages. In the western MP languages of Malaysia and western Indonesia we find a complex set of developments in which the PAn voice system is much reduced but applicatives take over much of its functional load (Ross, 2002). The CMP, SHWNG, and Oceanic languages (other than Polynesian) have a broad typological similarity, but with many variations. Most of these languages have lost all trace of voice and have subject-referencing verbal prefixes or proclitics. How this system arose from systems reflected in western MP languages is traced by Lynch *et al.* (2002: 57–63). Klamer (2002) describes CMP language structures, Ross (2004) those of non-Polynesian Oceanic languages.

Further References

The MP family is vast, and the serious enquirer will need to look beyond this article. Detailed maps of the locations of MP languages and their dialects are found in Wurm and Hattori (1981–1983), although it is not a reliable source for subgrouping. Adelaar and Himmelmann (2004) is the major reference for MP languages other than Oceanic, Lynch *et al.* (2002) for Oceanic languages. Both works also include a large collection of grammar sketches of a sample of languages. Tryon (1995) is an extensive comparative lexicon.

Associated with the historical study of MP languages, especially of Oceanic, is a solid body of work on culture history. Ross *et al.* (1998; 2003) are the first two of five volumes in which the terminologies used by Proto Oceanic speakers are reconstructed, following more piecemeal work on the lexicons of MP languages in general (Pawley and Ross, 1994) and work on MP culture history by scholars in various disciplines (Bellwood *et al.*, 1995). Pawley and Ross (1993) is a short survey mostly of MP historical linguistics and cultural history.

See also: Austronesian Languages: Overview; Formosan Languages; Malaysia: Language Situation; Papuan Languages.

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Malaysia: Language Situation

H O Asmar

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Malaysia, which consists of Peninsular Malaysia, Sabah, and Sarawak (the latter two situated on Borneo), has from the beginnings of recorded time been a multilingual region, with its indigenous population belonging to different linguistic groups. This situation has been intensified with colonialism, immigration, and the nation's language policy.

Language Policy

The national language policy of Malaysia states that Malay is the national and official language. It is written in Arabic and Roman scripts, but it is the latter that is the official writing system.

Malay is also the main medium of instruction, which means that there are other language mediums allowed in the education system of the country: Arabic (Arabic, Standard) in Islamic schools, and Mandarin (Chinese, Mandarin) and Tamil in the national-type schools (those using a language other than the national language as medium of instruction, as opposed to national schools that use Malay).

The national-type schools are required to teach Malay as a compulsory subject. All national and national-type schools are required to teach English, which has been given the status of a second language.

'Pupils' own languages' (POL), that is, mother tongues, are taught in national schools if there is a request from at least 15 pupils to form a class. The POL classes so far are for Mandarin, Tamil, and Iban. Foreign languages such as Japanese and French are taught in certain secondary schools.

The multilingual nature of the country, supported by the education system, has made Malaysians bilingual. A great majority of non-Malay Malaysians know at least two languages: their own and Malay. With English, they become trilingual. There are monolinguals among the Malays, but most are bilingual at least, with English or Arabic as their second language.

Radio Malaysia provides channels for Malay, English, Mandarin, and Tamil. The Sarawak local station broadcasts programs in Mukah Melanau (Melanau) and Iban, while the one in Sabah provides programs in Bajau Darat (Sama, Southern) and Tengara Dusun. Certain local stations in Peninsular Malaysia broadcast programs in two aboriginal-languages, Temiar and Semai. TV Malaysia has programs in Malay, English, Mandarin, and Tamil.

The policy has made Malay and English primary or high languages in the educational, social, and professional lives of the Malaysians. It has also made almost 80% of Malaysians literate in Malay.

Indigenous Languages

The indigenous languages belong to two different stocks: Austronesian and Austroasiatic.

Austronesian Languages

Malay, which is the mother tongue of about 45% of the total population of Malaysia is Austronesian. Native Malay speakers are found in Peninsular Malaysia and the coastlands of Sabah and Sarawak.

The other Austronesian languages are native to Sabah and Sarawak only. A modest estimate of the number of these languages is about 100. 'New' languages are being discovered all the time. What had previously been termed dialects may be found to be

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heterogeneous languages, and single language may turn out to be a subfamily of languages.

Based on information available, the languages of Sabah and Sarawak may be listed according to subfamilies of single languages. Most of them are known by the names of the places where they are located.

Languages of Sabah

1. *Dusun/Kadazan subfamily*: Papar, Dumpas, Bisayah (Bisaya, Sabah) Lotud, Tatana, Kuijau, Rungus, Timur, Tengah (Seko Tengah) (with the well-known dialects of Ranau, Bundu Tuhan, Penampang/Tengara, Tambunan), Keningau (Keningau Murut), Tempasu (Dusun, Tempasuk); Sugut (Dusun, Sugut).
2. *Murut subfamily*: Tagal (Tagal Murut) Tiulon, Beaufort (Dusun, Central), Timugon (Timugon Murut), Rundum (Tagal Murut), Takapan & Sook (Paluan) Nabay, Baukan.
3. *Paitan subfamily*: Lingkabau (Tombonuwo), Lobu, (Keningau Murut) Abai Sungai, Tambanua (Tombonuwo) Ulu Kinabatangan.
4. *Bajau subfamily*: Bajau Darat and Bajau Laut (Sama, Southern).
5. *Ida'an or Begahak subfamily* (also known as Orang Sungai): located in Lahad Datu, Sandakan, and Kinabatangan.
6. Suluk (Tausug) in Semporna and Kinabatangan.
7. Banggi (Baujau, West Coast) in the Banggi Island.
8. Illanun (I lanun) in Kota Belud.
9. Lun Dayeh in the western part of Sabah, bordering Sarawak.
10. Tidong (Kalabakan) in Labuk Sugut, Sandakan, and Tawau.

Languages of Sarawak

1. *Bidayuh subfamily*: Biatah, Bau, Jago (Jagol), Serian (Bukar Sadong), Lara (Lara'). Studies have indicated that Serian is itself a subgroup consisting of various languages.
2. *Melanau subfamily*: Oya–Dalat, Mukah (Melanay), Matu Daro (Daro–Matu) and Rejang (Kayan, Rejang).
3. *Kayan subfamily*: Kayan languages of Baram (Kayan, Baram), Baluy, and Belaga.
4. *Kenyah subfamily*: Upper Baram Kenyah (Kenyah, Upper Baram) (Lepo Umbo', Lepo Tan, Lio Mato, Long Jaeh, and Long Tungan), and Lower Baram Kenyah (Merawan or Berawan, and Sebop).
5. *Kelabit subfamily*: Kelabit in Bario, Lun Bawang (Lundayeh) in Limbang, Tring, and Tabun.
6. *Penan subfamily*: Penan languages and subgroups in Mulu (the Penan Melinau), Upper Baram (Penan Busang), Sungai Tubu (Punan Tubu) (Penan Tubu), Sungai Terawang (Penan Libang), Long Iman (Penan Selungo), Belaga (Punan Bah–Biau) (Penan Ba), Niah (Penan La'ong and Penan Jelalong (Penan, Western)).
7. *Iban*: mainly in the Second, Sixth, and Seventh Divisions.
8. *Narom* in Marudu.
9. *Selakau* in Lundu.
10. *Bintulu* in Bintulu.
11. *Miri* in Miri.
12. *Baketan* (Bukitan), *Ukitan* (Ukit) *Lahanan*, *Kajang* and *Kejaman* (Kajaman), which are heterogenous languages of the Rejang area.

Sabah and Sarawak languages are minor languages, each with a few thousand speakers. Malay is the lingua franca among these groups. None has a writing system of its own.

Austroasiatic Languages

The speakers of these languages are the aborigines or the *orang asli*, who are found only in Peninsular Malaysia, around the Central Range stretching from Kedah in the north to Pahang and Selangor in the south. The languages may be divided into three groups: the Northern Group (Kensiu, Kentakbong, Jehai, Mendriq [Miriq], Bateg Deq [Batak], Mintil, Bateq Nong [Batek], Che Wong [Chewong]); the Central Group (Semnam, Sabum, Lanoh Jengjeng [Lanoh], Lanoh Yir, Temiar, Semai, Jak Hut); and the Southern Group (Mah Meri [Besisi], Semoq Beri [Semaq Beri], Semelai, Temoq). Semai has about 16 000 speakers and Temiar about 10 000. The others are well below these figures.

Temiar is the *lingua franca* among the aborigines.

The aboriginal groups of Jakun, Belandas, and Temuan are speakers of Malay in various dialectal forms.

Nonindigenous Languages

The nonindigenous languages can be divided into two groups: intraregional (whose speakers are from Indonesia and the Philippines) and extraregional (the Chinese dialects, the languages of the Indian subcontinent and Sri Lanka, Arabic, Thai, and English).

Languages from Indonesia and the Philippines

These languages are not widespread: Javanese in Selangor and Johor; Achehnese (Aceh) in Kedah; Mandailing (Batak Mandailing) in Perak and Selangor, Buginese (Bugis) and Chabacano (Chavacano) in Sabah.

There are also non-Malaysian dialects of Malay which had come to settle in parts of Malaysia: the

Rawa (Rawas), Kerinci, and Minangkabau dialects of Sumatra in Perak, Selangor, and Negeri Sembilan respectively; and Cocos (Malay, Cocos Islands) and Brunei Malay (Brunei) in Sabah.

Chinese Dialects

Chinese dialects in Malaysia are: Mandarin, Hokkien (Chinese, Min Nan), Hakka (Chinese, Hakka) (Khek), Cantonese (Chinese, Yue), Teochew & Hainanese (Chinese, Min Nan), Kwongsai, Hockchiu, Henghua (Chinese, Pur-xian), and Hockchua. Except for Mandarin, all the dialects have their own speech communities. The most populous is the Hokkien group, which has about 1 000 000 speakers, followed by Cantonese and Teochew. Mandarin is acquired through school education.

Languages of India and Sri Lanka

The languages of the Indian subcontinent and Sri Lanka altogether have just over 1 000 000 speakers. Of these, Tamil has the highest number of speakers (about 80% of the total Indian population). The other languages are Malayalam, Telugu, Gujarati, Sindhi, Bengali, Urdu, and Sinhalese (Sinhala).

Arabic

The speakers of Arabic as a first language do not form a community with its own geographical location. There seem to be more second-language speakers who have acquired Arabic through Islamic schools and colleges.

Thai

Thai is native to Malaysians of Thai origin living in the northern states of Perlis Kedah and Kelantan. It is a main requirement for police, customs, and immigration officers working along the northern border.

English

English has a very small first-speaker community of Eurasians, consisting of a few thousand people. It is an important language, besides Malay, in the professions such the legal and medical professions, the financial sector, trade, and business. It is also a language of academia.

Creoles and Pidgins

The two creoles in Malaysia are located in Melaka, in Peninsular Malaysia. The first is the Malay-based Baba Malay (Malay, Baba), spoken by the Babas, that is, descendants of the first group of 15th-century Chinese immigrants. The second is the Portuguese-based Kristang (Malaccan Creole Portuguese), spoken by the descendants of the Portuguese who ruled Melaka in the 16th and 17th centuries. Both creoles have a few thousand speakers.

A Malay pidgin, known as bazaar Malay, is used in the marketplaces. There are also pidgin Chinese and pidgin Tamil, which are intracommunity 'market languages.'

See also: Malay.

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Maldives: Language Situation

Editorial Team

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The Republic of Maldives consists of a chain of islands in the Indian Ocean, south of India and west of Sri Lanka, and has a population of about 335 000. The language of the Maldives is Dhivehi (Divehi), also known as Maldivian, an Indo-European language most closely related to Sinhala. The standard form of Dhivehi is based on the speech in the capital Male, while the forms of the southern atolls are the most divergent varieties. Dhivehi is also spoken by about 5000 speakers on Minicoy in India. Dhivehi is written in its own script called Tana (tāna, Thaana), written from right to left.

Dhivehi is the national language of the Maldives and is used in all spheres of society, including public administration and government, the media, and education. The vast majority of Maldivians are Muslims, but Arabic is not widely understood, and Dhivehi plays an important role for religious purposes and instruction. Dhivehi is used both in radio and television, as well as in print media. The literacy rate (2002) is 97.2%. English is used for international communication, and in the tourist

Rawa (Rawas), Kerinci, and Minangkabau dialects of Sumatra in Perak, Selangor, and Negeri Sembilan respectively; and Cocos (Malay, Cocos Islands) and Brunei Malay (Brunei) in Sabah.

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Maldivian *See:* Dhivehi.

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Mali is a large landlocked country of the West Africa of about 1.24 million sq. km in the mid–upper valley of Niger. More than a half of the country is a sparsely inhabited desert; the great majority of the population (10.5 million in 1998) is concentrated in the Niger valley and in the South.

Three major macrofamilies of Africa – Niger-Congo, Nilo-Saharan, and Afro-Asiatic – are represented in Mali. The Niger-Congo languages belong to four families: Mande (Bamana, Maninka, Kagoro, Marka-Dafing, Xasonka, Jalunga, Soninke, Bozo, Duun, Jo, Banka, Bobo), Atlantic (Pulaar/Fulfulde), Gur (the Senufo group, Bore, Pana, Samoma) and Dogon (Tommo-so, Toro-so, Jamsay, and others), altogether about 20 languages. Afro-Asiatic languages of Mali are Hassaniya (Mauritanian Arabic, the Semitic family) and the Tamasheq language/dialect cluster (the Berber family). Songhay languages form a linguistic family of their own; in fact, their belonging to the Nilo-Saharan macrofamily is largely contested by specialists (as is the coherence of that macrofamily itself). French is the official language of the country and the main language of the education; Arabic is the language of religion for the majority of the population of the country. In the mid-1990s a liberal law on Malian languages was adopted, and today a whole set of languages have status of 'national': Bamana, Pular/Fulfulde (Fula), Songhay (Gao), Tamasheq, Soninke, Xasonka, Maninka, Senufo, Minyanka, Boore, Dogon (Toro-so), Bozo (Tieyaxo).

Bamana (Bambara is its French name, borrowed from Soninke or Pulaar) is the most widespread language of the country. It is spoken as the first language by 26% of the population of Mali, and the entire number of the speakers amounts to an estimated 80%. Being the language of the capital, Bamako, it is often considered to be the 'Malian language.' The Bamako dialect serves the point of reference for the Standard Bamana, which is spoken in the main urban centers of Mali, its area has largely increased during the period following the independence of the country (1960). Today most of Senufo, Duun, Banka, Jo, and Bozo are bilingual in Bamana, as are a considerable part of Soninke, Fulbe, Dogon, Bobo, Xasonka. Lately, certain infiltration of the Bamana language is attested even in the Songhay area. In Mali the Maninka, whose language is closely related to Bamana (especially if it is the Maninka dialect of the Manding area that is meant), tend to identify themselves with Bamana. The same can be said about the Jula of the Sikasso area (in the South).

Rural Bamana dialects, spoken on both banks of the Niger from Bamako up to the Inner Delta, are rather different from the Bamako variant, often to a degree of mutual unintelligibility. The Bamana dialect of Segu is worth special mention: even after the eclipse of the Segu Empire (18th–19th centuries), it remains somewhat prestigious.

Maninka is in fact a dialect continuum of 800 000 to 900 000 speakers in the west of Mali. Its southeast variants (the Manding Maninka) are close enough to Bamana (for instance, they share a seven-vowel system), while the northwest variants (the Kenieba Maninka) are very close to the Xasonka and have a five-vowel system. The Kita Maninka is, in many respects, an intermediary variant. Kagoro is very close to the latter (about 15 000 speakers), it is spoken by dispersed groups in a great area to the north of Niger, from Kaarta to Segu. Many people

industry, which is an important part of the economy of the Maldives.

See also: Dhivehi.

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who identify themselves as Kagoro today speak only Bamana or Soninke.

Xasonka (about 130 000 speakers in the Kayes-Bafoulabe area, in northwest Mali) is very close to the adjacent variant of Maninka; it owes its status of a separate language to the strong ethnic identity of the Xasonka people, who trace their origin to a mixture of Fulbe, Maninka, and Soninke.

The dialects of the Marka-Dafing cluster (25 000 speakers in Mali) differ from Bamana and other predominant Manding languages by their 'inverse' tones and the presence of the segmental noun article *-o* (in Bamana, this article is represented by a floating low tone). Marka-Jalan, spoken in the town of San, is close the Marka-Dafin.

The Soninke (about 700 000 speakers) area is stretched from the west to the east along the Mauritanian border. Presumably the predominant language of the ancient Wagadu (Ghana) empire, it was much more widespread in the past, and numerous Soninke loanwords are attested in various languages of the western Sudan. Soninke diaspora is represented in all larger towns of Mali, and their villages can be found sometimes far away from the compact Soninke area.

The Bozo languages are spoken by traditionally fishermen population of about 120 000 in the middle flow of Niger and its tributaries. Four languages (sometimes referred to as dialects) are usually singled out: Xainyaxo (to the east of Segu), Tieyaxo (further to the east, especially around Diafarabe), Sorogaama, or Janama (Mopti and further to the north and west), and Tiema Cewe (in the northern part of the Inner Delta of Niger). Sorogaama, the largest of the Bozo languages, is internally diverse and has six different dialects. The Tieyaxo seems to be the most prestigious among the Bozo. In the west, the Bozo are mainly bilingual in Bozo and Bamana, and in the center and east, in Bozo and Fulfulde.

Only a minor number of Bobo speakers (15 000 to 20 000) live in Mali, to the south of the Boomu area; the others live in Burkina Faso. This language is characterized by a high degree of dialectal divergence, the dialects being not mutually intelligible; of these, Tinkire, Yebe, and Bana dialects are spoken in Mali. Most of the Bobo seem to be bilingual in Bamana or Jula. The position of the Bobo language within the Mande family is uncertain; it is sometimes singled out into a separate branch. On the other hand, it shares some common features and vocabulary with geographically close Samogo languages.

Duun (70 000 speakers), Jo (9100 in Mali and Burkina Faso), and Banka (5000) languages in the Sikasso area are also known as Samogo group (together with Dzuun, Kpan, and Seeku in Burkina Faso); the great majority of their speakers seems to be bilingual in Bamana. Traditionally included into the West Mande branch, they have much in common with the East Mande languages in vocabulary and morphology, including a complicated pronoun system and more than two tone levels. Jo is the only language in the Mande family that has the grammatical opposition of feminine vs. masculine in the pronoun system.

There are some Jalunga, or Jallonke (about 10 000 speakers) settlements in the Faleya area, at the Guinean border (near the Senegalese border). This Mande language is close to Soso on the Guinean coast. The Jallonke are descendants of the ancient population of the Futa-Jallon plateau (Guinea), ousted by Fulbe during the religious wars of the 18th century. Jalunga speakers in Mali are bilingual in Bamana, and their language seems to be endangered.

The only Atlantic language represented in Mali is Pulaar (this name is reserved for the western dialects), or Fulfulde (for the central and eastern dialects), the language of Fulbe, spoken by about 1 000 000 people in this country only. Traditionally nomads and livestock breeders, Fulbe are predominantly settled today, and their settlements are scattered all over Mali. There is a Fulbe family or two in most Bamana, Maninka, or Senufo villages taking care of the cows of the entire village. The largest compact area of Fulbe is Masiina (the Inner Delta of Niger), where the central dialects are spoken (more than 900 000 speakers). Some specialists consider these dialects to be the most archaic. Another compact zone is in the northwest of Mali, near the border with Mauritania and Senegal, where about 180 000 speak a Pulaar dialect that is close to the Senegalese ones. Being culturally diverse from the agricultural population, Fulbe have a strong sense of their identity and are often reluctant to use Bamana as lingua franca (that is also related to their attachment to Islam, which is much stronger than among the Bamana). Malian Fulbe represent just a segment of a their large diaspora stretching from Senegal to Sudan and even Ethiopia.

The most important Gur language spoken in Mali is Senufo, represented by several variants in the south of the country: Mamara, or Minyanka (500 000 to 900 000 speakers), Supyire (364 000), Syenara (137 000). These variants are divergent enough to be considered different languages. A great majority of Senufo are bilingual in Bamana, the language of the culturally dominant community.

Another big Gur language in Mali is Bore (Bomu, Bobo Wulen), spoken by about 100 000 people at the Burkina border. Two minor languages, Pana (Sama)

and Samoma (Kalamse), along the Burkina border, belong to the same family.

Dogon, earlier attached to the Gur family, is today considered to be a separate language family within Niger-Congo. The Dogon family numbers more than 20 languages (usually referred to as 'dialects of Dogon'), the most important ones being Jamsay, Toro-so, Tommo-so, Donno-so, and Togo-kan. The central languages and dialects are close to each other, while smaller peripheral languages are sometimes very different, to the extent that their belonging to the Dogon language family may be called into question. Of these languages, Toro-so has been given the status of 'standard Dogon,' a decision that is not yet generally approved. Many Dogon are bilingual in Bamana and in Fulfulde, but the latter often has negative connotations.

The Songhay family is represented in eastern Mali, mainly in the Niger valley, by Koyra Chiini (the Tombuktu Songhay, about 200 000 speakers), Koyraboro Senni (the Gao Songhay, about 400 000), Humburi Senni (about 15 000 in Mali), Tadaksahak (30 000 to 40 000, nomads culturally close to Tuaregs); there are also a couple of Zarma-speaking villages at the Niger border. The Songhay area demonstrates a staunch resistance to the penetration of Bamana as the lingua franca.

The Berber branch of the Afroasiatic family is represented in Mali by the languages of Tuaregs: Tamasheq (of which there are two considerably divergent dialects, Tombuktu and Tadhaq,with about 250 000 speakers) and Tamajaq (about 190 000 at the extreme east of Mali). After continuous wars against the central government in 1980–1990s, Tuaregs are being integrated into the Malian life (at least at the political level), but the penetration of Bamana in their milieu is still very slow.

Hasaniya, or Mauritanian Arabic, is spoken by about 100 000 people at the Mauritanian border.

The language of education at all levels is French; Arabic is taught in Koranic schools and madrasas. Education in the national languages (especially in Bamana, Fulfulde, and Songhay) is increasing both in schools and in adult literacy programs, but its quality often remains inferior. Nko writing is used for Bamana and Maninka to a certain extent, although Latin writing remains largely predominant. In Masiina, Adjami (arabographic writing) is still used by elders, but it is being overshadowed by Fulfulde writing on the basis of the Latin script. The same can be said about the Tefinag script among the Tuaregs.

See also: Berber; Fulfulde; Gur Languages; Mande Languages.

Language Maps (Appendix 1): Maps 19, 20.

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Malinowski, Bronislaw Kaspar (1884–1942)

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Malinowski was born in Cracow, Poland. He was the son of a well-known Slavic philologist (Lucyan Malinowski). After a Ph.D. in physics and mathematics, he turned to anthropology, inspired, he said, by a reading of Frazer's *Golden bough*. In 1910 he arrived at the London School of Economics, and in 1914 began anthropological fieldwork in New Guinea. Between 1915 and 1918 he did two years of fieldwork on the Trobriand Islands (off Papua New Guinea). After some years teaching at the LSE he was appointed to the first Chair of Anthropology there (1927). In 1938 he went to the United States where he was appointed professor at Yale. He died in New Haven at the age of 58.

In the three great ethnographies of the Trobriand Islands (*Argonauts, Sexual life*, and *Coral gardens*), Malinowski established the tradition of intensive fieldwork, participating in the life of the society

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In the three great ethnographies of the Trobriand Islands (*Argonauts, Sexual life*, and *Coral gardens*), Malinowski established the tradition of intensive fieldwork, participating in the life of the society

being studied, emphasizing the effort to appreciate a total view of the society and to understand matters "from the natives' point of view." He constantly emphasized the importance of learning and working with the indigenous language. The vivid style of writing and the colossal amount of detail have established these ethnographies as classics. The account of the *kula* ring, a complex system of formal gift giving described in *Argonauts*, is one of the most celebrated cases in anthropology.

In terms of sociological theory, Malinowski's functionalism and his ideas about 'basic needs' are pretty banal, and are only of interest as indicating an important shift in anthropology away from questions about origins and evolution which had previously been so dominant. On the other hand, his concern with language is much more fruitful. He was proud of his ability to pick up languages quickly, and, as well as insisting on the importance of conducting field research in the native language, he shows an intense concern with the processes and details of translation (*Coral gardens*, vol. 2). He laments the lack of sound ethnolinguistic theory. Although his attempt to provide one does little with regard to phonetics, phonology, or grammar, his writing on meaning is original. In a remarkable essay (1923) appended to Ogden and Richards' *The meaning of meaning*, he coined the phrase 'phatic communion' (gossip, pleasantries, and so on) to make the point that language should not just be seen as a vehicle for thought through which to communicate ideas, but as a mode of action which, in this example, establishes personal bonds between people. Also in this essay he claims originality for the notion of 'context of situation' in an argument which prefigures Wittgenstein's 'the meaning of words lies in their use,' developed in *Philosophical investigations*.

J. R. Firth wrote: "I think it is a fair criticism to say that Malinowski's technical linguistic contribution consists of sporadic comments, immersed and perhaps lost in what is properly called his ethnographic analysis" (1957: 117). But beyond a strictly 'technical' contribution, his expertise in translating from Trobriand and his writing on meaning and translation deserve a more generous judgment.

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Born in Kiev, Malkiel received his doctorate from the Friedrich-Wilhelms Universität in Berlin in 1938, where he studied *Romanistik* under Ernst Gamillscheg. He left Germany in 1940 for the United States and joined the faculty of the University of California Berkeley in 1943, where he taught until his retirement in 1983.

Throughout his career, Malkiel was one of the leading and most prolific specialists in Romance historical linguistics. His most important work dealt with Spanish historical grammar, especially derivational morphology and etymology, the latter understood as the preparation of full-blown lexical biographies. Studies on the genesis and diffusion of a given derivational suffix were often flanked by inquiries into the history of etymologically obscure items that bear the suffix at issue. Malkiel was one of the few Romanists explicitly concerned with the theory and methodology of etymology. The need to rejuvenate Romance etymology by demonstrating how it could be integrated into ongoing research in other branches of diachronic research, especially phonology and morphology, is a constant theme in Malkiel's writings. His last book, *Etymology* (1993), is a personal overview and meditation on this field.

Malkiel also studied numerous problems in historical phonology and inflectional morphology, areas to which he made a number of significant

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methodological and analytical contributions. He advocated the concept of 'weak' sound change, i.e., a sound change that offered a relatively low degree of predictability. A key notion central to much of his diachronic research was multiple causation, the proposal that many linguistic shifts result from the interaction of several independent factors that come together to effect change. An explanatory hypothesis dear to his heart was the possible role of morphological conditions in sound change. Some sound changes may have taken as their starting point morphologically conditioned alternations, which then spread (often sporadically and unpredictably) beyond their original morphological locus. In his later years, Malkiel became fascinated by the possible role of phonosymbolism as a motivating and guiding factor in sound change. Phonosymbolism is to be understood here as the study of the intimate connection between the phonetic shape of a root morpheme and its meaning. The reader who wishes a sample of Malkiel's writings on this topic can turn to his *Edita and inedita, 1979–1988. Vol. I: diachronic problems in phonosymbolism*.

Although the overwhelming majority of his studies deal with specific issues in the history of Spanish and Portuguese, he also wrote on questions pertaining to the Romance languages as a whole, as well as on topics germane to Gallo-, Italo-, and Daco-Romance. His favorite medium for presenting the findings of his research was the monograph and the heavily documented article channeled through a learned journal or a homage volume. Starting around the mid–1960s, Malkiel placed more emphasis on the broader issues of linguistic change to be learned from the particular Romance problem under study. The symbiotic relationship between data-rich historical Romance linguistics and more theoretically oriented general linguistics is a major theme in his writings. Malkiel also wrote extensively on the history of Romance linguistics as a scholarly discipline. He was founding editor (1947) of the journal *Romance Philology*.

Collections of selected articles can be found in Malkiel (1968, 1979, 1989, 1990, 1992). An overview of his life and work can be found in Dworkin (1998, 2004).

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Malmberg, Bertil (1913–1994)

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Bertil Malmberg, professor of phonetics (1950–1969) and general linguistics (1969–1978) at the University of Lund, Sweden, was born on April 8, 1913 and died on October 8, 1994. He was an internationally well-known general linguist, phonologist, and Romanist, who also played a role in applied linguistics.

As a student, Malmberg encountered the structural movements in Europe, above all, the ideas of Ferdinand de Saussure and the Prague school with Nicolaj Trubetzkoj and Roman Jakobson. He spent several periods in Paris, where he learned experimental phonetics in the 1930s and was visiting professor of phonetics in the 1960s.

Malmberg was a pioneer in phonetics. He was quick to employ the sound spectrograph (Sonagraph) and managed to define the characteristics of the Swedish word accents manifested, e.g., in the famous minimal pair *ánden* ('the duck'): *ànden* ('the spirit'). He showed that the difference between accent one (acute) in *ánden* and accent two (grave) in *ànden* in the Southern Swedish dialect lies in the different placement of the intonation peak. Malmberg was also

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one of the first to use the equipment called Visible Speech at the Haskins laboratory in New York.

With his broad knowledge of the Romance languages, Malmberg had a wide field to which he could apply his ideas. He became a world famous Romanist, and his publications include works on and in French, Italian, and Spanish.

The sign plays a paramount role in Saussure's thinking, and Malmberg tried to include the theory of the linguistic sign under the general theory of signs (semiotics), as in *Le Langage—signe de l'human (1979)*. Malmberg often criticized the modern generative linguists for their lack of a sign concept. He did not take much interest in Chomsky and the generative school, which is also evident from his history of linguistics published in 1991, *Histoire de la linguistique: de Sumer à Saussure*.

The phonetics chair at Lund was partly motivated by the demands of language teaching, a field in which Malmberg was very active. He also started courses for speech therapists. Many of his books have been translated into several languages. The French version of his book on phonetics is a best-seller in the series *Que sais-je?*

See also: Jakobson, Roman (1896–1982); Phonetics: Overview; Phonology: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Swedish.

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Malta: Language Situation

Editorial Team

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The republic of Malta is a group of islands in the central Mediterranean Sea, about 100 km south of Sicily. The three main islands are Malta, Gozo, and Comino. With about 400 000 inhabitants, the islands have a comparatively high population density. The main economic activities are shipping and port activities, finance, manufacturing, and tourism. Malta has been inhabited since prehistoric times and was an important port of the Phoenicians and Romans. The islands were under Arab control from 870 until the Norman Conquest in 1090. From the 16th century onward, the islands were the seat of the Knights of Malta, the monastic Order of St. John, who ruled the islands until the French invaded in 1798. In 1814, the islands became a British colony and only gained independence in 1964. Since 2004, Malta is a member of the European Union.

The two official languages of Malta are English and Maltese, a South Central Semitic language of Arabic origin. Maltese is in addition the national language. Besides Standard Maltese, there are also several dialects. Maltese is predominantly used in church services and other religious, national, and cultural activities. Until recently, much written official and administrative business was conducted in English, but increasingly efforts are being made to use Maltese. Maltese is used in courts, and the Maltese text is considered as legally binding.

Both Maltese and English are used in broadcasting and for the print media. However, most television is broadcast in English or received from Italian stations in Italian. There is no explicit policy regarding the use of languages in schools, but usually both Maltese and English are used, the former mostly in spoken communication and the latter for writing.

Most Maltese are bilingual in English and Maltese to a varying degree, and code-switching and-mixing between the two languages is common.

See also: Code Switching; Maltese.

one of the first to use the equipment called Visible Speech at the Haskins laboratory in New York.

With his broad knowledge of the Romance languages, Malmberg had a wide field to which he could apply his ideas. He became a world famous Romanist, and his publications include works on and in French, Italian, and Spanish.

The sign plays a paramount role in Saussure's thinking, and Malmberg tried to include the theory of the linguistic sign under the general theory of signs (semiotics), as in *Le Langage—signe de l'human (1979)*. Malmberg often criticized the modern generative linguists for their lack of a sign concept. He did not take much interest in Chomsky and the generative school, which is also evident from his history of linguistics published in 1991, *Histoire de la linguistique: de Sumer à Saussure*.

The phonetics chair at Lund was partly motivated by the demands of language teaching, a field in which Malmberg was very active. He also started courses for speech therapists. Many of his books have been translated into several languages. The French version of his book on phonetics is a best-seller in the series *Que sais-je?*

See also: Jakobson, Roman (1896–1982); Phonetics: Overview; Phonology: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Swedish.

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Maltese

J Cremona

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Maltese is the national language of the Republic of Malta and one of its two official languages, the other being English. It is spoken by virtually all the 345 418 (1985) inhabitants (plus ca. 80 000 Maltese immigrants in Australia). Until the 1930s, its status was low, with the prestige languages being Italian and English. The first text written in Maltese, a poem, is ca. 1460 AD, but although texts appear sporadically thereafter, Maltese only began to be written systematically from about the end of the eighteenth century.

Maltese, a language of Arabic origin, shares many of the features that distinguish the modern Arabic vernaculars from literary Arabic. Maltese also displays those features that distinguish Maghrebine dialects from the rest; for example, the loss of gender distinctions in second-person-singular pronouns and verbs and the leveling of first-person markers in the imperfect to give {n … ø} for the singular and {n … u} for the plural. However, Maltese differs from most 'core' vernaculars of Arabic by having (a) adopted the Roman alphabet; (b) a phonemic system without emphatics, with fewer back consonants but more vowels; (c) virtually the whole of the vocabulary pertaining to intellectual, technical, and scientific pursuits taken from Sicilian, Italian, and English; (d) a number of conservative lexical features (e.g., *ra* 'he saw'); and (e) grammatical innovations of Romance origin (e.g., passives with *kien* 'he was' or *ġie* 'he came' as auxiliaries). These features reflect the fact that Maltese has not had Classical Arabic as an acrolect for some seven centuries. This and the fact that it is now the national language of an independent state have given Maltese the status of a distinct language.

Sample: Il-ġimgha l-oħra sibt ruħi, għall-ewwel
/il 'dʒima l 'ohra sipt 'ruːhi all 'ewwel
Last week I found myself, for the first

darba f'ħajti, f' 'lecture theatre' ta' l-Università.
'darba f 'hajti f 'lektʃœr 'tiːœtœr ta l universi'ta/
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Malukan Languages

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Some 128 languages are spoken in the geopolitical region of the Malukan islands in eastern Indonesia (see **Figure 1**). The majority of the 111 Austronesian languages of Maluku are subgrouped within the Central Malayo-Polynesian branch of Central-Eastern Malayo-Polynesian (CEMP) (Blust, 1978). A number of the Austronesian languages of north Maluku are subgrouped in the South Halmahera-West New Guinea branch of CEMP (Collins and Voorhoeve, 1983). Current information indicates that there are also 17 non-Austronesian languages spoken in Maluku (Grimes, 2000). Sixteen West Papuan phylum languages are found in the northernmost parts of Maluku, on Morotai, Ternate, Tidore, Halmahera, and nearby smaller islands. Oirata is a Trans-New Guinea phylum language of southern Kisar island, located near the north-eastern tip of East Timor.

Linguistically, Maluku is characterized by high linguistic diversity, serious endangerment, and little detailed documentation. Speaker populations have historically been much smaller than in ethnolinguistic communities in the western Austronesian region. Larger languages include Kei with 86 000 speakers and Buru with perhaps 43 000 speakers (Grimes, 1995). These numbers, however, give an overly optimistic picture of linguistic vitality. The highest documented degree of language endangerment in Indonesia is located in Maluku. A recent survey indicated that 10 languages are close to extinction and a further nine languages are seriously endangered (Florey, 2005). Centuries of contact with nonindigenous peoples through colonization and intensive trade for spices, and conversion to nonindigenous religions have all played a role in language endangerment, which is particularly severe in the central Malukan islands of Seram and Ambon. Language contact has resulted in the wide use of a number of Malay creoles throughout Maluku of which Ambonese Malay is the best known (Minde, 1997).

Maltese

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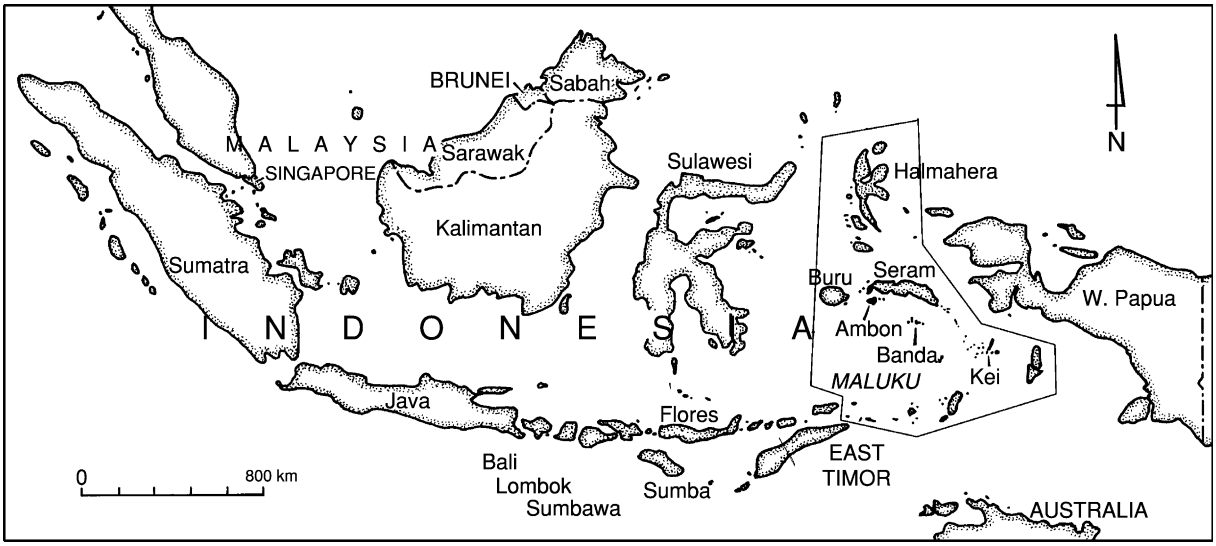

Figure 1 Map of Indonesia showing the location of the Malukan islands.

Tryon (1994: 12) suggested that Maluku is possibly the least known Austronesian area and many languages – both Austronesian and non-Austronesian – remain undescribed. The richest descriptions to date include those of Alune (Florey, 1998, 2001) and Buru (Grimes, 1991, 1995) in central Maluku, Taba (Bowden, 2001) and Tidore (Staden, 2000) in north Maluku, and Leti (Engelenhoven, 1995) in south Maluku. These descriptions provide some insights into oral genres, including origin tales, historical narratives, folktales, riddles, and incantations. Parallelism (paired correspondences at the semantic and syntactic levels) is a feature of incantations and some narrative genres. Among the special registers which have been documented are those which were associated with avoidance relationships, hunting, fishing, healing, and headhunting. In some communities, ritual language still accompanies ceremonies held to mark the passing of life stages, and ritual practices associated with agriculture, renewing inter-village alliances, and the building of ritual houses.

Comparative analysis indicates that, in central Malukan languages, the preferred word order within clauses is SVO. Actor arguments in Alune may occur as a full noun phrase, a pronoun, or a proclitic, and actor NPs and pronouns are optionally crossreferenced with a proclitic on the verb. Undergoer arguments may occur as a full noun phrase, a pronoun, or an enclitic.

Au beta-'u-ru
1SG opp.sex.sibling-1SG.POSS.INALIEN-PL

esi-tneu behe a-'eri-'e sarei
3PL-ask CMP 2SG-work-APP what
'my younger siblings they asked me: "What did you work at?"' (Alune AK: 45)

This pattern of crossreferencing is not always apparent today as the rapid language change which accompanies language endangerment is typically characterized by extensive variation both within and between speech communities.

A morphologically marked alienable–inalienable contrast has been described for a number of the languages of Central Maluku. Synchronically, this contrast is not found across all languages. In those languages in which the contrast is marked, inalienable possession denotes all items which are culturally considered to be intrinsically a part of oneself – the things which we as humans are born with, and certain physical and emotional states. Alienable possession denotes the things which we might acquire through our lives: certain relationships and objects or possessions. Inalienable possession is marked with enclitics and alienable possession with proclitics, as demonstrated in the following Haruku examples:

Au oi kura au ama-'u
1SG go with 1SG father-1SG.POSS.INALIEN
kura au ina-'u
and 1SG mother-1SG.POSS.INALIEN
'I went with my father and my mother'

Esi-kana esi-lapu-na
3PL-fetch 3PL.POSS.ALIEN-shirt-NM.PL
lalu ani reu
then.MAL 1PL return.home
'they fetched their shirts then we went home'

See also: Austronesian Languages: Overview; Endangered Languages; Indonesia: Language Situation; Malayo-Polynesian Languages; Papuan Languages.

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Mambila

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Mambila is a Bantoid language situated in the Nigeria-Cameroon borderland. Mambila is a diverse language with approximately 20 different dialects. Among its interesting characteristics is its system of four level tones, and in one lect the presence of two fricative vowels that appear to be reflexes of the so-called super-close vowels of Proto-Bantu. Several Mambila lects are endangered, with some on the verge of extinction.

Classification

Mambila has been recognized since the early 1960s as a Bantoid language. A subgrouping within Bantoid now known as Mambiloid, which includes a number of other languages in the region, was proposed a decade later, although the precise relationship between Mambiloid and the rest of Bantoid remains a matter of debate.

Mambila is the most diverse of the Mambiloid languages. It is spoken on both sides of the Nigeria-Cameroon border, on the Mambila Plateau in Nigeria, and on the western edges of the Adamawa Plateau and the Tikar Plain in Cameroon. The great majority of Mambila speakers – an estimated 90 000 of 100 000 total speakers – are in Nigeria. Mambila comprises some 20 dialects, which are divided into two clusters, referred to by their rough geographical orientation as East and West Mambila. Within each cluster there is limited mutual intelligibility among dialects, reflecting a dialect continuum; between the two clusters, mutual intelligibility does not exist, although speakers do recognize the relatedness of their languages to other languages in the region. Strictly on the basis of linguistic criteria, one might be inclined to refer to many of these dialects as distinct languages.

See also: Austronesian Languages: Overview; Endangered Languages; Indonesia: Language Situation; Malayo-Polynesian Languages; Papuan Languages.

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For this reason, the neutral term 'lect' is used in referring to individual varieties of Mambila.

The main characteristic distinguishing the two dialect clusters is a difference in morpheme structure: In East Mambila a disyllabic root structure, CVCV(C), predominates, which corresponds to a monosyllabic CVC structure in West Mambila. A number of sound correspondences also serve to distinguish the two groupings, e.g., initial /f/ and /h/ in East Mambila correspond to /p/ and /f/, respectively, in West Mambila.

Little descriptive work has been done on Mambila. The two lects that have received the greatest attention are Tungba, spoken in Nigeria, and Ba, in Cameroon. Both are West Mambila lects. The following paragraphs present a short summary of Mambila structural characteristics.

Phonology

Consonants

Across Mambila lects there is little difference among consonant systems; what differences do exist are mostly related to the historical developments described above. The Ba system, /p, b, t, d, k, g, k͡p, g͡b, m, n, ɲ, ŋ, ŋ͡m, mb, mv, nd, ndʒ, ŋg, ŋ͡mg͡b, f, v, s, h, l, j, w/, is fairly typical, both in its inventory and in the fact that /p, k͡p, g͡b, and ŋ͡mg͡b/ in those lects, where they do occur, are infrequent. Distribution of consonants within the word is skewed in Mambila, with all consonants occurring in the initial position, but typically only /p, t, k, m, n, ɲ, ŋ, l/ being found word finally.

Vowels

There is greater variation in the vowel systems of Mambila lects than for the consonants. The vowel system found in Ba, /i, e, a, ə, u, o, ɔ/ is the smallest; Tungba has only a slightly larger system, /i, e, ɛ, a, u, o, ɔ, ɑ/, but its phonetic realization is divergent, with allophonic front rounded vowels. Len, another West Mambila lect, is even more divergent, particularly with the presence of two fricative vowels, /z͡ɨ, ʊ͡ɯ/. These vowels appear to be the result of sub- or adstratal influence from the neighboring Grassfields languages, which may ultimately reflect the super-close vowels of Proto-Bantu.

Tone

Mambila is a register tone language; in West Mambila, it features four level tones that function both lexically and grammatically, and tones combine on single syllables to form a number of surface contours. Pitch realization in the Ba lect has been the subject of a number of experimental phonetic studies (Connell, 1999, 2000b, 2002). Tone in East Mambila lects has not been systematically investigated, although it is known that they have only three level tones.

Morphology

Mambila marks grammatical functions through affixation, typically suffixation. In most West Mambila dialects many of these functions are indicated only with a tonal morpheme; comparative evidence from both West and East Mambila reveals that a −CV melody is reconstructible in most cases. Despite the fact that Mambila is a Bantoid language, there is no system of nominal classification, and only traces remain of a former noun class system that reveals the heritage shared with Bantu. Pluralization is marked through means of a segmental suffix, −bV, except in Ba and other lects on the Tikar Plain, where a cognate prefix is used. There is evidence of an older means of marking plurals, and the presence of the common −bV is likely a recent development, perhaps through areal influences.

Syntax

Little can be said at this point concerning the syntax of Mambila. It has basic SVO word order, which varies to indicate narrative, focus, and other pragmatic functions. As mentioned above, tone is used to indicate a number of grammatical functions, including negation, imperatives, and discontinuous verb phrases.

Language Vitality

Since it has more than 100 000 speakers, one might expect that Mambila will remain relatively stable for the foreseeable future. However, when its internal dialect variation is considered, an average of approximately 5000 speakers exists for each lect. Many of these are spoken by considerably fewer speakers; indeed, a few Mambila lects are on the verge of extinction, while one other has just recently become extinct. Given the potential contribution that these lects could make not only to our understanding of our common linguistic heritage but also to the history and prehistory of sub-Saharan Africa, documentation of these lects must be considered a priority.

See also: Bantu Languages; Endangered Languages; Tone: Phonology.

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Manambu

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Manambu belongs to the Ndu language family, and is spoken by about 2500 people in five villages: Avatip, Yawabak, Malu, Apa:n and Yuanab (Yambon) in East Sepik Province of Papua New Guinea. Between 200 and 400 speakers live in the towns of Port Moresby, Wewak, Lae, and Madang. Most Manambu speakers are proficient in Tok Pisin, the *lingua franca* of Papua New Guinea; many know English. In terms of number of speakers, the Ndu family is the largest in the Sepik area, comprising 32% of the Sepik basin dwellers (Roscoe, 1994). It consists of at least eight languages spoken by over 100 000 people along the course of the middle Sepik River and to the north of it. Other documented languages in the family are: Abelam or Ambulas (ca. 40 000; this number includes speakers of a variety of dialects under the names of Maprik, Wosera, West Wosera, and Hanga Kundi); Boikin (ca. 30 000); Iatmul (ca. 12 000); Sawos (ca. 9000); Yelogu (ca. 200); and Ngala (ca. 130). No genetic links between Ndu and other languages of the Sepik area have been proved. The origins, protohome, and the internal classification of the Ndu languages remains a matter for debate. Manambu's closest relatives are Iatmul and Ngala. The trade relationship and marriage exchange with the Iatmul contributed to a large amount of lexical diffusion between the two groups in close contact.

Manambu is synthetic, agglutinating with some fusion, mostly suffixing, and predominantly verb-final. The phonology of Manambu is complicated, with 21 consonants, nine vowels, and contrastive stress. Nouns distinguish eight cases (subject, definite object/locative; dative/aversive; allative/instrumental; comitative; terminative 'up to the point'; and two cases referring to 'means of transport'). Three numbers (singular, dual, and plural) and two genders (feminine and masculine in the singular) are expressed via agreement on demonstratives, interrogatives, in possessive constructions, on verbs and on two adjectives ('big' and 'small'). Singular and plural numbers are marked on kinship nouns, and on a few nouns from other semantic groups. The noun 'child' has a semisuppletive form for the dual number. Associative plural is marked on kinship nouns and personal names, as in *Tanina-b*ˌ*r* 'Tanina and others.' Gender is distinguished in second and third person singular independent pronouns, and neutralized in the plural. Nouns are assigned genders according to the sex of a human referent, and to shape and size of any other referent. That is, men are assigned to the masculine, and women to the feminine gender; a large house is masculine, and a small house feminine. By semantic extension, an unusually big or bossy woman can be treated as masculine, and a squat fattish man as feminine. Personal names are a distinct subclass of nouns, with special derivational suffixes not used anywhere else in the grammar.

Verbs have a plethora of grammatical categories, covering person, number, gender, tense, numerous aspects (e.g., completive, habitual, and repetitive) and modalities including irrealis, purposive, desiderative, and conditional. A verb in the declarative mood can cross-reference the person, number, and gender of the subject. Or, if a clause contains a constituent that is more topical than the subject, this constituent can also be cross-referenced alongside the subject. The

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Verbs have a plethora of grammatical categories, covering person, number, gender, tense, numerous aspects (e.g., completive, habitual, and repetitive) and modalities including irrealis, purposive, desiderative, and conditional. A verb in the declarative mood can cross-reference the person, number, and gender of the subject. Or, if a clause contains a constituent that is more topical than the subject, this constituent can also be cross-referenced alongside the subject. The

imperative mood also marks person and number of the subject employing a different set of markers. The only fully productive prefix in the language is *a-*, the marker of second person imperative. Three suffixes expressing prohibition differ in their illocutionary force. Many of the verbal categories – including person and tense – are neutralized in negative clauses. Verb compounding is highly productive; up to three verbal roots can occur together, but the meaning of the combination is frequently unpredictable. Directionality (up, down, inside, outside) is marked both on verbs and on demonstratives. In addition, demonstratives encode six degrees of distance and visibility.

Similarly to other non-Austronesian languages of New Guinea, Manambu has extensive clause-chaining and a complex system of switch-reference, whereby a nonfinal clause is marked differently depending on whether its subject is the same, or differs, from that of the main clause. See Aikhenvald with Laki (forthcoming) for a full account of Manambu grammar, and also Aikhenvald (1998) and Allen and Hurd (1972). The relative complexity of Manambu could be partially accounted for by the substrata of languages spoken by members of neighboring tribes conquered by the Manambu as a result of inter-tribal warfare (Harrison, 1993).

Manambu culture places particular importance on ownership of personal names and various kinds of cultural knowledge. Ritualized debates among rival leaders and the clan groups they represent are, traditionally, the main political forum, and ownership of names is an oft-debated issue. A detailed study of Manambu ethnography is in Harrison (1990, 1993), which also contains a detailed analysis of the kinship system and relationships (of Siouan type). Traditional genres include mourning songs *grakudi* and foiled marriage songs *namai* (Harrison, 1982; Takendu, 1977).

Manambu is an endangered language. All the Manambu are bilingual in Tok Pisin (and some also know English). Children in the villages prefer using the local *lingua franca*, Tok Pisin, in their day-to-day interaction. A literacy program in Manambu is currently being implemented at the local school at Avatip.

See also: Gender, Grammatical; Papua New Guinea: Language Situation; Switch Reference; Tok Pisin.

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Manchu-Tungus *See:* Tungusic Languages.

Mandarin *See:* Chinese.

Mande Languages

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The Distribution of the Mande-Speaking People

Today, the Mande (or *Mandé* in French) language group consists of some 30 languages spoken in West Africa from Nigeria to Senegal by an estimated 10 million speakers. The term Mande and its variants (see Table 1) provide not only the basis for many of the names of the Northern Mande languages, but the various names accorded the language family as well. These variants are attributable to (1) minor vowel alternations (*e/i* and *a/e*), (2) the consonantal alternation (*nd/n/l*) found throughout the Mande-speaking area, and (3) the suffix *-ka(n)*, meaning 'language or dialect.'

The map of the distribution of the Mande languages (Figure 1) shows that the heaviest concentration of Mande languages is in the republics of Guinea and Mali, and adjacent areas of Senegal, Sierra Leone, Liberia, and Ivory Coast. Furthermore, these western languages are contiguous and cover larger areas than those to the east, which appear as islands in a sea of Niger-Congo languages.

The Reconstructed History of the Mande

While scholars have not reached a total consensus on how the Mande evolved, evidence from the historical, archaeological, and linguistic record suggests the following six stages.

Phase 1: The Drying of the Desert

According to McIntosh and McIntosh (1984), the Mande originally lived in a much wetter Saharan area and practiced a herding–fishing–collecting economy. Lexicostatistical evidence (Dwyer, 1989) suggests that 4000 years ago the Mande people were undifferentiated linguistically.

Around 3000 B.P. (before present), in response to the increasing lack of rainfall, one branch of Proto-Mande (the earliest form of Mande) speakers migrated southward where wetter conditions would permit their herding–fishing–collecting way of life. The other branch, known as the western branch, responded to the increasing dryness by intensifying their cultivation of cereals.

Phase 2: The Development of Agriculture

At Jenno-Jene in the upper Niger delta, archaeologists have identified a site, continuously occupied from about 2250 B.P., that exhibits a second agricultural phase. This elaboration of agriculture may well have been responsible for the diversification and the westward expansion of the Central Mande speakers. This expansion may also have been responsible for pushing the pastoral Soninke further to the north.

Phase 3: The Rise of the Sudanic Kingdoms of Ghana and Mali

At the time of the sedentarization of the Western Mande, the people of this area were engaged in extensive trans-Saharan trade with North Africa. The stimulus for the trade was the alluvial gold found in deposits along the upper Niger River, which was exchanged for Mediterranean merchandise and salt. This trade gave rise to the Soninke-speaking empires of Ghana (700–1100) and the Manding-speaking empire of Mali (800–1550) The substantial area taken up by the Western Mande can be attributed to the expansion of this empire.

Phase 4: Rice and the Development of Forest Agriculture

While research in this area is still in progress, evidence suggests that a form of upland rice in the Guinea Highlands and iron tools permitted the Mande (and Atlantic) populations living along the rainforest–savannah border to enter the forest to practice swidden agriculture. The map shows a number of Mande groups straddling this line including the Southwestern Mande, the Vai/Kono into present-day Sierra Leone and Liberia, and many of the Eastern Mande peoples into Liberia and Ivory Coast. Using oral traditions and genealogies, Person (1961) concludes that this movement into the rain forest took place in the 15th century. As these agricultural people moved into the sparsely populated rain forests, they increased the risk of malarial infections. In response to this situation, the percentages of the sickle cell trait (an adaptation to malaria) increased in these populations to the point where they are among the highest in the world (Livingstone, 1958).

Table 1 Variants of Mande

Mandi(ng)	Mandinka, Mandingo
Mande (Mandé)	Mandekan
Mende	
Mani	Manianka
Mane	
Mali	Malinke
Male	

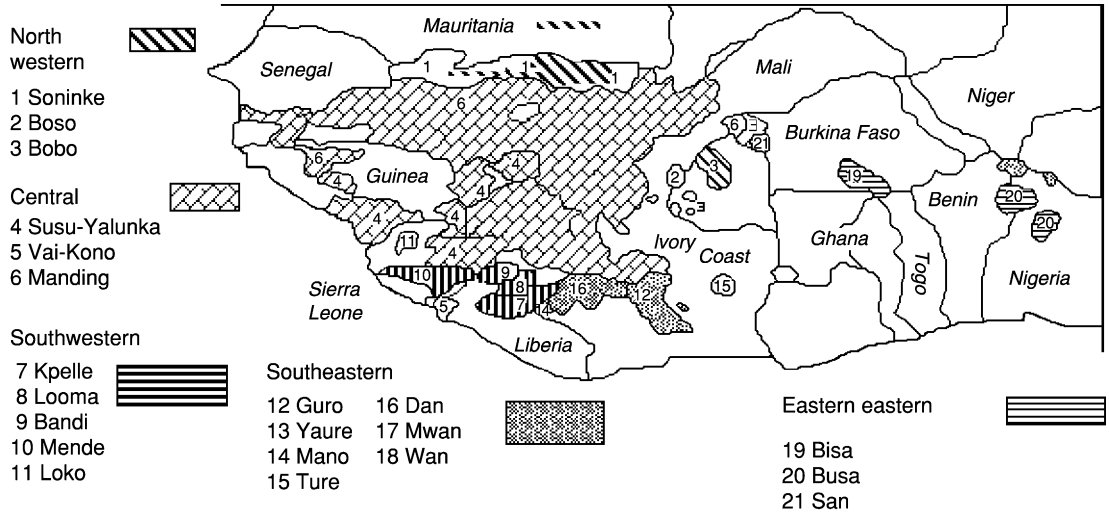

Figure 1 Map of the Mande languages.

Table 2 Linguistic evidence

4000 BP Proto Mande	cattle, bow and arrow, fish, horse, milk, war sheep/goat, dog?, okra?	
3200 BP		
Western	wine, mortar, pestle dog, oil?, chicken? hippo?, to plant?, seed?	Eastern Mande
2400 BP		
Northern Southwestern	iron, hoe, to plant corn/millet, chicken oil, seed	

Phase 5: The Arrival of the Europeans

Beginning with the Portuguese in 1455, contacts, trade, and finally settlement in this area increased, so that by 1500 permanent trading outposts and slaving operations were fully established. One effect of this development was the decreasing economic importance of the trans-Saharan trade and the decline of the Sudanic kingdoms.

The Linguistic Evidence

Following a technique developed by Ehret (1980), Table 2 shows the Proto-Mande terminology relating to economic activity (hunting, herding, and agriculture). After establishing the lexicostatistical dates, vocabulary common to all or most members of the branch are considered to be in existence at the time the branch was an undifferentiated language. Thus the terms for wine, mortar, and dog were common to the western branch but not the eastern branch, and are presumed to have been part of Western Mande before it separated into its constituent groups. This linguistic evidence is consistent with that proposed for the early phases of Mande.

The Classification of Mande Languages

Current Classification

The internal classification of Mande (see Table 3) has undergone a series of revisions, the most recent and most accurate being that done by Kastenholtz (1996). For a full classification of the Mande languages go to the Ethnologue website.

Earlier Classifications

Mande was first recognized as a related group of languages by Sigmund Koelle, who used the term Mandinga (Koelle, 1854). Shortly thereafter Heymann Steinthal (1867) introduced the term Mande (or *Mandé*). Maurice Delafosse offered the first subclassification of Mande in 1901, in which the major distinction was between Mande Tan (which is the northern group minus Susu and Yalunka) and Mande Fou, based on the words for 'ten.' Over time, the Tan/Fou categorization became increasingly suspect, but it was not until William Welmers (1958), using a lexicostatistical approach based on the Swaddesh 100-word basic vocabulary list, rejected it and produced the first version of the currently accepted system. Welmers concluded that the word *tan* was a

Table 3 Current classification

Mande 4000 BP[a]			
West Mande 3200 BP		*Eastern Mande 2400 BP*	
Central (southwestern) 3200 BP	*Northwestern 2400 BP*	*Eastern-eastern*	*Eastern southern*
South western 3000 BP	Jowulu	Bisa (Bissa)	Guro-Tura
Kpelle	Soninke-Bobo 2750 BP	Barka	Guro
Mende Looma (Loma)	Bobo	Lebir	Yaouré
Central 2100 BP	Soninke	Busa	Tura (Toura)
Susu-Yalunka		Boka (Boko)	Dan
Manding-Jogo		Bokabaru (Bokobaru)	Mano
		Busa-Bisa (Busa)	Nwa-Ben
		Tyenga (Kyenga)	Ben
		Sam (Samo)	Gban (Gogu)
		San (Samo)	Nwa (Wan)
		Sane (Samo)	Mwan

[a]The BP dates are from Dwyer (1989). Each date represents the estimated date at which the languages in the group separated, based on common percentages of basic vocabulary cognates. Thus Central Mande, for example, with its time depth of 2100 BP, is based on a common cognate percentage of 40%.

Table 4 Westermann

West Sudanic					
West Atlantic	Mande	Gur	Togo Remnant	Kwa	Benue-Cross River

Source: Westermann (1927).

Table 5 Greenberg

Niger-Kordofanian
Niger-Congo
West Atlantic
Mande
Gur
Togo Remnant
Kwa
Benue-Cross River
Kordofanian

Source: Greenberg (1963).

Table 6 Williamson

Niger-Congo
Kordofanian
Mande
Atlantic-Congo
Atlantic
North
Bijago
South
Volta-Congo
Kru
Kwa
Benue-Congo
Dogon
Adamawa-Gur-Ubangi
Ijoid?

Source: Williamson (1977).

more recent innovation in Western Mande, not the fundamental split that Delafosse had assumed, and introduced the East–West division that remains today.

Mande as a Niger-Congo Language

Since the time of Koelle, four major hypotheses concerning the placement of Mande in Niger-Congo have been offered:

- Westermann (1927) included Mande in his West Sudanic, which was very similar to Greenberg's Niger-Congo (Table 4).
- In 1963, Joseph Greenberg, using a methodology based on the mass comparison of lexical items, accepted and refined Westermann's view. He renamed West Sudanic as Niger-Congo, the name it bears now, and included it as a branch of a larger grouping, Niger-Kordofanian. Of all the Niger-Congo languages, Greenberg considered Mande the least remote (Table 5).
- Consistent with common usage, Williamson (1977) replaced Greenberg's Niger-Kordofanian with the term Niger-Congo. Williamson then placed Mande along with Atlantic Congo (the main body of Niger-Congo languages) and Kordofanian as the first three branches of Niger-Congo (Table 6).
- Also in 1977, Hans Mukarovsky proposed a substantial restructuring in which Mande and

Table 7 Mukarovsky

Sahelian			
West Sahelian [Niger-Congo minus Mande and Benue-Congo]			*[Mande-Benue-Songhai]*
West Atlantic	*West Nigritic*	*Kwa*	
Senegalian	Mel	Western Kwa	Mande
Mel	West Guinean	Eastern Kwa	Benue-Congo
West Guinean	Togo Remnant		Songhai
	Gur		
	Western Kwa		
	Eastern Kwa		

Source: Mukarovsky (1976–1977).

Benue-Congo were removed from the old Niger-Congo (renamed West Sahelian) and placed with Songhai (Songhay), previously not considered a Niger-Congo language, as branches of Sahelian (Table 7).

Although the Mukarovsky model is still seen as an interesting hypothesis, currently most scholars favor the Williamson proposal. Nevertheless, the progression from Westermann to Williamson to Mukarovsky does show an increasing awareness of Mande as a remote branch of Niger-Congo. This development has raised questions about whether Mande is actually a Niger-Congo language. Part of this suspicion is due to the fact that Mande is also unique among the Niger-Congo languages because of its lack of evidence of a noun class system, found in other Niger-Congo languages, and its almost universal subject-object-verb word order.

This led Dwyer (1998) to compare the vocabulary of Mande and samples from other Niger-Congo branches. This study shows that Mande is a lexically coherent group. By lexically coherent, I mean that the best way to explain the vocabulary basic and other is to attribute a common ancestor (Proto-Mande) to these languages. The study also found that Niger-Congo (specifically Mande, Benue-Congo (including Bantu) and the western Nigritic core) is also lexically coherent. Finally, the study concluded that of these three language groups, Mande is lexically least related. These conclusions are fully consistent with the Williamson hypothesis but not that of Mukarovsky.

Linguistic Properties

Phonology

A tentative reconstruction of the Proto-Mande consonant system (Table 8) suggests a series of labial, alveolar, velar, and labiovelar voiced and voiceless stops. Because of the eccentric, but relatively consistent bimodal patterning of the voiceless stops, Dwyer (1994) tentatively suggested the possibility of a second series of fortis voiceless stops (*t′*, *k′*, *kp′*). Interestingly, this dual series of voiceless stops is analogous to that postulated for Upper Cross by Dimmendaal (1978) and Sterk (1979) and for Volta-Congo, Stewart (1976). In addition Mande appears to have only an (*s/z*) fricative contrast and labial, alveolar, and palatal nasals along with the liquid (*l*) and the glides (*y* and *w*).

Tone

Most Mande languages have two level lexical tones (high and low), along with a falling tone, analyzed as a sequence of high followed by low, and a rising tone. Bobo (Bobo Madaré), Mano, and Kpelle have three tones and one language, Sembla (Seeku), has four. Both Kpelle and Bobo (Bobo Madaré) (Dwyer, 1994) can be shown to have independently evolved a third tone through tone splitting. This suggests that they originally had a two-tone system.

Morphosyntax

One of the most striking facts about the Mande languages is the structural unity of the group and its distinctiveness from other Niger-Congo languages. Syntactically, the Mande languages have an SOV word order with oblique objects being marked as the objects of specialized postpositions. None of the Mande languages use serial verbs. Many Mande languages distinguish between alienable and inalienable possession.

Tense and aspect are generally marked through a combination of verb suffixes and postsubject formatives. Definite articles, demonstratives, and plurals tend to follow the noun or noun + attribute while possessive pronouns precede the noun.

Research in the area of comparative morphology and syntax is beginning to emerge. Creissels (1980) charted the distribution of four verbal particles in his Mandekan dialects with the conclusion that from

Table 8 Mande consonants

	Labial	*Dental*	*Palatal*	*Velar*	*Labiovelar*
Stop	p/b	t/d		k/g	kp/gb
Fricative		s/z			
Nasal	m	n	ñ		
Liquid/Glide		1	y		w

these data no clear evolutionary sequence could be ascertained. Grégoire (1980) compared the rather unique properties of Mande relative clauses from all of its major branches: northern, southwestern, southeastern, and Bobo. Dwyer (1985) has traced the evolution of the definite articles in Northwestern Mande.

Comparative reconstruction is a far more challenging task than lexicostatistical analysis, but promises more interesting results, not only in the study of the development of the language, but also in the area of cultural history and in understanding the relationship between synchronic and diachronic rules.

Noun Classes

Typically, Niger-Congo languages have several semantically based noun classes (animate, inanimate, diminutive, augmentative, and abstract), usually marked by prefixes, both singular and plural. Languages of the Mande branch do not make use of this morphological device. One possible explanation is that the noun class system developed after Mande separated from Niger-Congo. Alternatively the system could have been part of Niger-Congo and subsequently lost in Mande. In the latter situation, one would expect some evidence in some of the Mande languages of remnants of such a noun class system. However, despite numerous attempts no evidence has turned up. For example, Dwyer (1990) examined Bobo (Bobo Madaré), which has a very complex system of plural formation requiring the positing of a number of noun classes in order to derive the correct form. However, these noun classes did not turn out to be related (semantically or morphologically) to the Niger-Congo noun classes.

A number of Mande languages have developed writing systems, including a Vai syllabary (Stewart, 1972) that has been in use continuously since the 1830s.

Resources

The Mande Studies Association (MANSA) website has several useful links to other resources in French (*Actualités de la recherche au Mali* and the *Bulletin d'Anthropologie et d'Histoire Africaines en Langue Française*) and English. Both the Summer Institute of Linguistics and Ethnologue contain descriptions of individual Mande languages and more detailed maps. The site of the Union Mandingue has posted a history of the Manding-speaking peoples. Additional sources can by found by entering the individual language names given in this article in any search engine. The most thorough bibliography can be found in Kastenholz (1988).

See also: Benin: Language Situation; Guinea: Language Situation; Ivory Coast: Language Situation; Liberia: Language Situation; Niger-Congo Languages; Nigeria: Language Situation; Senegal: Language Situation; Sierra Leone: Language Situation.

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www.swt.edu – Mande Studies Association (MANSA).

Maori

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Maori is the language of the Polynesian people who settled in New Zealand over 1000 years ago. It belongs to the Eastern Polynesian branch of the Malayo-Polynesian language family. Its current situation is typical of indigenous languages subjected to the effects of European colonization.

The early English missionaries Samuel Marsden and Thomas Kendall were instrumental in having a writing system devised for Maori. This has largely served the language well, although it failed to distinguish between long and short vowels. The dictionary produced by three generations of the Williams family remains highly significant, and W. L. Williams made a substantial contribution to the grammatical description of Maori.

In the first half of the 20th century Maori children were taught English at the expense of Maori. Influential Maori leaders advocated the use of English in Maori homes, and speaking Maori at school was often punished. By the mid-20th century Maori was rapidly dying, although small Maori-speaking communities remained in isolated rural areas. In 1951, Auckland University introduced Maori as an academic subject, which raised its status a little as did the grammatical descriptions produced by the linguist Bruce Briggs. However, the future looked bleak.

In the 1970s, a Maori political revival began (the 'Maori renaissance'). It was accompanied by serious endeavors to revitalize the language. *Kohanga reo* 'language nests' were established (preschool education centers providing education in Maori), and these were followed by Maori medium schools (*kura kaupapa Māori*), or immersion or bilingual units in mainstream schools. Small Maori radio stations were established with variable amounts of broadcasting in Maori. The Maori language became an official language of New Zealand. A Maori Language Commission was established to aid revitalization, and it has manufactured many vocabulary items from Maori elements to cater to modern needs. A Maori television channel went on the air in 2004.

Today the future of Maori is unclear. It might survive, testimony to the success of the revitalization process, but it is not yet secure. Most speakers have learned Maori as a second language, and many are 'semi-speakers.' Many teachers of Maori are not fully fluent, and the quality of the Maori taught in some Maori-medium classrooms is poor. Many children who leave *kohanga reo* speaking fluently do not use the language as teenagers. Most native speakers of Maori are over 70 years old, although there are some (particularly from the Tuhoe area, where Maori remained strong 20 years longer than elsewhere) still in the workforce. It is common to hear 'relexicalized English' – English structures where the content words and some of the grammatical words are replaced by Maori lexical items. Fluent Maori speakers often speak English to each other rather than Maori. While the latest surveys suggest that more people are speaking more Maori, there are very few who are fully conversant with the language. The last New Zealand census contained a question about use of Maori.

Such dialect differences as exist are tribally based. Most are lexical and phonological (with divergent realizations of phonemes rather than different phonological systems), and grammatical differences are not very significant.

Maori has a small phoneme inventory, with ten consonants (/p t k m ŋ r w f h/), and five vowels (/a e i o u/), each of which may be short or long.

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Orthographically, all use the obvious single roman letters except for <ng> (for /ŋ/) and <wh> (for /f/). The proper analysis of the long vowels is debatable: they may be analyzed as clusters of identical short vowels (reflected in 'double vowel' orthography), or as separate phonemes (reflected in the macron orthography, which is now official): *Maaori* vs. *Māori*. Syllables are open, and there are no consonant clusters. All pairs of short vowels can occur in clusters, but some behave as one syllable and some as two. There are also longer vowel clusters. The rhythm is based on the mora (of form (C)V, where V is short), but stress operates with a bigger unit (C)V(V). Word stress is predictable, with syllables ranked according to the nature of the vowel. All content words contain at least two morae.

Maori has virtually no inflectional morphology and very little derivational morphology, although the allomorphs of the passive suffix have raised significant linguistic interest.

The syntax is surface VSO, but the most likely underlying word order is VOS, with a rule that normally moves all but the first phrase in a complex predicate to the right of the subject. The basic unit of syntax is the phrase, which has a grammatical particle indicating the phrase function preceding the lexical material. Modifiers usually follow the lexical head. The grammatical particles include markers of tense and aspect, and prepositions that indicate noun-phrase function, and may be tense-marked. The sentence subject is the only NP without an introductory preposition. Maori does not have a copular verb, and many sentences lack overt verbs. The basic syntax is illustrated in the following:

kei	raro	ngā	pukapuka	tawhito
at-PRES	*underside*	DEF.PL	*book*	*old*
a	Hone	i		
DEF.PL.APOSS	*John*	*at*. TNSNEUTRAL		
t-ō-na	moe-nga			
DEF.SG-OPOSS-3SG	*sleep*-NOML			

'John's old books are under his bed'

ka	tope	a	Wāka	
FUT	*chop*	PERS ART	*Wāka*	
i	te	rākau	rimu	a
ACC	DEF.SG	*tree*	*rimu*	*at*.FUT
te	Rāhina			
DEF.SG	*Monday*			

'Wāka will chop down the rimu tree on Monday'

The pronoun system distinguishes singular, dual, and plural, and in the first person, inclusive and exclusive. Number is marked on determiners, not nouns (except for a handful of personal nouns), the singular usually with an initial *t-* and the plural with Ø (e.g., *tētahi* – sg, *ētahi* – pl) and there is a special determiner for proper names. There is a very complex system for the expression of ownership, including a distinction akin to alienable/inalienable (marked by *a-* vs. *o*-forms). Most lexical items can serve without morphological change in noun phrases, verb phrases, or as modifiers. In narratives, the passive is used for most event sentences, which has given rise to much debate about ergative vs. accusative syntax. A typologically unusual feature is that lexical modifiers of passive verbs take a passive suffix in agreement with the verb. The direct object is not integrated into the grammatical system of Maori in the way that would be expected if the language was originally accusative: for instance it cannot normally be relativized on directly. This is probably one remnant of a former ergative syntax.

See also: Malayo-Polynesian Languages; New Zealand: Language Situation; Number; Passives and Impersonals.

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Mapping Syntax Using Imaging: Problems and Prospects for the Study of Neurolinguistic Computation

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Noninvasive imaging techniques fall into two classes: hemodynamic (positron–emission tomography, or PET; functional magnetic resonance imaging, or fMRI) and electromagnetic (electroencephalography, magnetoencephalography). A primary thread in imaging research has been directed at identifying brain areas associated with subcomponents of linguistic competence, such as phonology (Poeppel, 1996), syntax (Stowe *et al.*, 2004), and semantics (Bookheimer, 2002). Research in this area makes extensive use of hemodynamic imaging because the impressive spatial resolution offered by such techniques (millimeter scale) lends itself naturally to functional mapping. Here we examine a set of findings that implicate Broca's area – the canonical language area – in syntactic processing and review the extent to which recent results converge in a way that is interpretable from the perspective of the language sciences. Our focus is on the experimental and conceptual issues that render results from imaging difficult to interpret. We put aside discussion of the more technical problems that confront functional imaging studies, including issues associated with the experimental design (e.g., subtraction methodology), analysis (complexity and potential arbitrariness of criteria in data analysis), and implicit assumptions about the relationship between loci of activation and cognitive systems.

The activation of Broca's area has been reported in many studies of both syntactic comprehension and production (Caplan *et al.*, 1998; Dapretto and Bookheimer, 1999; Embick *et al.*, 2000; Friederici *et al.*, 2000; Friederici, 2002; Homae *et al.*, 2002; Indefrey *et al.*, 2001; Kaan and Swaab, 2002; Kang *et al.*, 1999; Moro *et al.*, 2001; Musso *et al.*, 2003; Newman *et al.*, 2003; Ni *et al.*, 2000), from which it has been concluded that this area has a privileged status with respect to this aspect of grammar. One complicating factor is the use of different terminologies in identifying the relevant cortical regions. In particular, there are reports in terms of both Brodmann areas (i.e., BA 44/45) and in terms of gyral and sulcal anatomy (pars opercularis, pars triangularis; also F3op, F3t). Because these definitions are not coextensive, there is a potential for terminology-induced confusion. This situation is in principle capable of being remedied by making reference to standardized coordinate systems, such as the atlas of Talairach and Tournoux (1988), although this process itself is not unproblematic because of the anatomical transformations that are required for such a standardization. The identification of 'Broca's area' in such terms ranges in Talairach coordinates from $x-28$ to -55, $y-8$ to $+34$, and z 0 to $+28$ (even without including studies that take BA 47 to be part of Broca's area). It seems, then, that the great variability found in the discussion of this area precludes any straightforward biological interpretation.

Specific studies that associate Broca's area with syntax employ a number of different design types. Dapretto and Bookheimer (1999) used fMRI in a block design and presented sentences auditorily to subjects, who performed one of two tasks. In the 'syntactic' condition, the task was to judge whether two sentences – one active (*the policeman arrested the thief*) and one passive (*the thief was arrested by the policeman*) – were the same or different. In a 'semantic' condition, subjects judged 'same' for two sentences that differed by a single word (*the lawyer/attorney questioned the witness*) or (*the lawyer/driver questioned the witness*). Activation in BA 44 was reported for the comparison syntax minus semantics (as well as syntax minus rest), and activation in BA 47 for semantics minus syntax. Auditory presentation was also used in the event-related fMRI study performed by Ni *et al.* (2000). Subjects performed syntactic and semantic oddball tasks, in which a sequence of grammatical sentences contained an occasional deviant oddball (syntactic: **trees can grew*; semantic: #*trees can eat*). Activation in BA 44/45 was reported for the subtraction of semantics from syntax. The PET study of Moro *et al.* (2001) used a block design with visual presentation; the task involved silent reading and acceptability judgments on four types of Italian sentences. In addition to a baseline of Jabberwocky (*il gulco gianigevale brale*), there were three types of violation: word-order (**gulco il gianigevale brale*); morphosyntactic (**il gulco ha gianigiataquesto bralo*); and phonotactic (**il gulco gianigzlevale brale*). Activation for the syntactic and morphosyntactic conditions minus the phonotactic condition was found in left BA 45 and right BA 44/45. Kang *et al.* (1999) used an event-related design with fMRI; subjects were presented visually with phrasal stimuli containing syntactic and semantic violations. The stimuli were verb phrases like *drove cars* (the normal condition), in addition to which there were two deviant conditions: syntactically deviant **forgot made* and semantically deviant **wrote beers*. Relative to the normal condition, activation was found for both the

syntactically and semantically deviant stimuli in BA 44/45; the activation in left BA 44 was greater for syntax than for semantics.

In addition to the studies using anomaly detection/judgment outlined above, activation in Broca's area has been reported in studies of the syntax of artificial language learning (Musso *et al.*, 2003) as well as in studies of syntactic complexity (Caplan *et al.*, 1998). Musso *et al.* taught subjects artificial 'grammars' with two distinct types of rules. One type was a rule found in natural languages but not in the language of the subjects. A second type of rule involved a string manipulation of a type that is not attested in the world's languages. Subjects were asked to perform an acceptability task on visually presented sentences. Results showed increased activation in BA 45 for the first type of rule (real) in comparison with the second type of rule (unreal). Musso *et al.* concluded from these results that Broca's area is specialized for the learning of syntactically possible rules, independent of the age of the learner. Caplan *et al.* (1998) showed that syntactic complexity effects (measured in terms of processing time differences) are reflected in an increase in signal in Broca's area. They concluded that this region is specialized for the processing of certain aspects of syntactic structure.

The activation of Broca's area (defined as BA 44/45) in a number of 'syntax' studies employing distinct tasks and designs seems at first glance to confirm the claim that this area is specialized for syntax. There are two further considerations, however, that suggest that this conclusion is at best an oversimplification.

First, Broca's area has been reported to be active in a number of linguistic tasks that are not syntactic: tasks ranging from lexical tasks, for instance auditory lexical decision (Zatorre *et al.*, 1992; Poeppel *et al.*, 2004) and studies of minimal pairs in tone languages (Gandour *et al.*, 2000), to phonological/phonetic tasks, such as the discrimination of rapid phonetic transitions (Fiez *et al.*, 1995) or the processing of phoneme sequences as opposed to hummed notes (Gelfand and Bookheimer, 2003). The role of Broca's area in phonetics/phonology is reviewed in Burton (2001). The claim that Broca's area is exclusively devoted to syntax is thus incorrect, although the possibility that Broca's area might be specialized for language in some broader sense is left open.

The second consideration that complicates the view of a syntactic Broca's area is the fact that Broca's area is active in a number of entirely nonlinguistic tasks. The tasks include motor activation (Iacoboni *et al.*, 1999), motor imagery (Binkofski *et al.*, 2000; Hamzei *et al.*, 2003), and rhythmic perception (Halpern and Zatorre, 1999; Platel *et al.*, 1997). These findings constitute a challenge to the weaker position that Broca's area is specialized for language in the broad sense.

The interpretation that identifies Broca's area as responsible for syntax is informed by sources of evidence other than imaging studies: deficit-lesion studies, electrophysiological studies, clinical findings, and so on. From the imaging studies, it is clear that a simple association between Broca's area and syntax cannot be maintained. At the same time, the apparent set of contradictions generated by imaging studies cannot be surprising given a realistic view of how cognitive functions, including syntax, are computed. In linguistic domains other than syntax, for instance, a complex internal structure is clearly required for processes such as phonetic and phonological analysis, lexical analysis, and so on. Therefore the expectation that syntax should be a simplex, unstructured computation associated with a single undifferentiated cortical region is unrealistic. While it is clear that some of the computational subroutines that are essential for syntactic processing/production are computed in the inferior frontal gyrus (IFG), these are not syntax *per se*; they are subcomponents of syntax. What is required is a theory of these computations at the correct level of abstraction or granularity, a theory that seeks to associate these computations with different subparts of Broca's area. For example, two components essential to syntax are the creation of hierarchical structures and a process that linearizes these hierarchical structures. Computations of this type may be factored out of syntax in the broad sense and are perhaps associated with different subparts of the IFG. The natural assumption is that differently structured cortical areas are specialized for performing different types of computations, some of which are necessary for language but also for other cognitive functions. For instance, the activation of 'mirror neurons' in the IFG has a role in motor action/imitation, but this activation also is relevant to the linguistic domain in the context of 'forward' models of speech perception (Halle and Stevens, 1962). Some preliminary proposals making distinctions among subregions of BA 44/45 are found in Horwitz *et al.* (2003).

In conjunction with an appropriately granular theory of the computations performed in the brain, the spatial information provided by imaging has the potential to illuminate aspects of the biological foundation of language by providing the critical link between specialized cortical areas and cognitively relevant types of computations.

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See also: fMRI Studies of Language; Imaging Brain Lateralization; Syntax of Words.

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The dialects of Mapudungu(n), less deviant from one another than the dialects of English, are spoken by the Mapuche of south-central Chile and central Argentina. Current conservative estimates place the number of fluent speakers at one-third of the almost 1 000 000 ethnic Mapuche; more than 90% are in Chile, of which more than 40% are in or around Santiago and only 30% live in the traditional Mapuche territory. The main present-day dialects are (1) Mapudungun proper or Central Mapudungun, in south-central Chile, and (2) Pehuenche, to the east of the former. Further dialects such as Argentinean Ranquel and Chilean Picunche and Huilliche are either obsolescent or extinct. Other names for the language are Araucanian (from *araucanos,* the ethnonym used by the Spaniards; present-day Mapuche avoid using this term), Mapuchedungun, and (Re)chedungun. Several genetic affiliations have been proposed, not only with languages spoken in the south of the continent such as Kawésqar (Qawaskar) and Yaghan (Yámana) but also with language families as distant as Arawak, Carib, and Mayan; to date, none of these proposals has been convincingly substantiated. The first grammar dates from the early 17th century. Written texts began to appear in the early 1900s and have become more numerous only at the end of the 20th century.

The phoneme inventory is simpler than the ones found in neighboring languages: the vowels are /a, e, i, o, u, ɨ/ (where /ɨ/ <ü> is unrounded high central when stressed and close to a schwa when unstressed). The glides are palatal /j/ <y>, labiovelar /w/, and velar /ɰ / <g>. The consonants are the voiceless unaspirated noncontinuants /p, t̪<t̲>, t, ɻ<tr>, c <ch>, k/ (where /c/ is alveolopalatal) , the voiceless fricatives /f, θ <d>, s <s, sh>/, the nasals /m, n̪ <n̲>, n, ñ, ŋ <ng>/, and the liquids /l̪ <l̲>, l, ʎ <ll>, ɻ<r>/. The dental series /t̪, n̪, l̪ / contrasts with the alveolar one /t, n, l/ only in highly conservative speech; most speakers have an alveolar series only. Pehuenche has voiced fricatives [v] and [ð] instead of [f] and [θ]. Primary stress can be largely predicted from syllable structure (it tends to fall on the penultimate mora) – with some exceptions, as in a number of disyllabic adverbs whose stress is lexically assigned to the ultima. Because there is no universally accepted orthographic convention, it is not uncommon to find some variation in the literature and deviant spellings such as <z> instead of <d> (for /θ/), <g> instead of <ng> (for /ŋ/), and <(t)x> instead of <tr> (for /ʈ/) in recent texts.

Nominal morphology is simple and almost exclusively derivational; there is neither gender nor case, adjectives take the suffix *-ke* in the nonsingular, and human nouns are marked with a preposed element *pu* in the plural. Compounding is highly productive, for example,

mapu-che
land-people
'people of the land'

Personal and possessive pronouns distinguish three persons (first, second, and third) and three numbers (singular, dual, and plural). Noun classes, possessive classes, classifiers, and alienable/inalienable possession are not marked overtly.

Agglutinative and predominantly suffixing, verbs are marked for mood (indicative *-i*, subjunctive *-l* and unmarked imperative), tense (future *-a* and unmarked nonfuture), evidentiality (reportative-mirative *-rke*), polarity (negative *-la* ∼ *-no* ∼ *-ki* and unmarked affirmative), directionals (e.g., cislocative *-pa*, translocative *-pu*, andative *-me*), voice (e.g., applicatives *-ñma* and *-(le)l*, reflexive *-w*, agentless passive *-nge*, causativizer *-m*), aspectuality (e.g., habitual *-ke*, progressive/resultative *-(kü)le*, progressive *-meke*, continuative *-ka*, telicizer *-tu*, ambulative *-(k)iaw*), modality in the broad sense (e.g., ruptured implicature *-fu*, immediate action *-fem*, sudden action *-rume*), and person. Person marking is intricate and can be described as following a direct/inverse pattern in that, when more than one argument is involved, the one ranking higher in the nominal hierarchy or primary argument (first- and second-person over third-person) and proximate over obviative on chiefly pragmatic grounds) is fully marked for person and number, whereas the lower or secondary argument is either underspecified or only implied. There are also forms that do not typically occur as predicates in main clauses; they do not encode the primary argument on the verb (but, with the exception of the *lu*-form, take an external possessive marker instead), function as verbal nouns, participles, and/or gerunds and end in *-n*, *-el*, *-lu, -yüm,* or *-am*. Many suffixes are transparently related to verb roots that still occur as such in the language (e.g., *meke-* 'be busy,' *tu-* 'take,' *kiaw-* 'walk,' and *fem-* 'do so'), and root serialization is used in order to express path of motion and other categories, for example,

rüngkü-kon-
jump-enter-
'jump in'

Reduplication of the root with *-tu* or *-nge* is used for the iterative, for example,

rüngkü-rüngkü-tu-
jump-jump-PRT
'jump repeatedly'

The incorporation of complex NPs is receding in the speech of younger urban Mapuche, but is productive in the speech of older rural speakers, for example,

ngilla-kurü-kal̲-ufisha-
buy-black-wool-sheep-
'buy wool of black sheep'

On the other hand, the incorporation of simple NPs into the verbal complex is still robust, as in

katrü-kachu-
cut-grass-
'cut grass'

Adjectives, wh-words, and numerals can all take verbal morphology.

Mapudungun is head-marking at both the NP level (possession) and the clause level. Unmarked utterances tend to be verb-initial and have at most one argument NP. There are both prepositions and postpositions, and adpositional phrases tend to follow the predicate and its arguments. Almost all marked word-order patterns are attested, and all can be elicited; an interplay of direct/inverse marking and position governs the interpretation of NPs as agentive or patientive. There do not seem to exist overt topic or focus markers, but a number of particles are used in questions or as intensifiers. Clause-linkage patterns resort to the gerunds previously mentioned or show coordination (e.g., with *ka* 'and' or *welu* 'but') or juxtaposition.

Although the lexicon of Mapudungun has visibly borrowed from Quechua and Spanish, the effects of contact on the morphology do not appear to be significant. The use of the verbal suffix *-fi* as more or less matching the use of the Spanish preposition *a* with direct objects and the higher frequency of AVO sentences in present-day Mapudungun are the most prominent contact-induced phenomena in the syntax.

See also: Argentina: Language Situation; Chile: Language Situation; Incorporation.

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Marathi

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Marathi, a member of the Indo-Aryan subbranch of the Indo-Iranian branch of the Indo-European languages, is the official language of Maharashtra state of India. It is spoken by nearly 96 million people, according to the most recent census. The major dialects of Marathi are Deshi, spoken around Pune, Varhaḍi and Nagpuri, spoken around Nagpur, and Kokni in the coastal region. Marathi has been much influenced by Dravidian Kannada and Telugu spoken in the southern vicinity of Maharashtra (Bloch, 1920; Southworth, 1971).

History

Marathi is a direct descendent of Maharashtri, a prakrit language derived from Sanskrit. The earliest reference to spoken Marathi is found in *kuvalaymala* written in the 8th century by Udyotansuri . The earliest written Marathi is found in the 10th-century inscriptions at Shravan belgola. The earliest literary text is considered to be *Viveksindhu* of Mukundraja (1199 C.E.) A high literary form of Marathi appears around

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the 13th century in *Jnaneshawari*, a commentary on the *Bhagavad Gita* (Master, 1964).

Script

Modern Marathi script, called *balbodhi*, is based on the Sanskrit Devnagari script, with certain modifications. Unlike English, Devnagari is alphasyllabic. It uses certain dicritics for vowels when combined with consonants. The dicritics distinguish long and short vowels. There is a also special system to denote consonant clusters. There also is an alternative cursive script, called *modii*, which was introduced by Hemadpant around the 17th century and was used in official documents for some time.

Phonology

Traditional Marathi alphabetic chart lists 16 vowels and 36 consonants based on Sanskrit. Today, many of these alphabets are obsolete. Modern Marathi has 8 basic vowels and 34 consonants, including two semivowels. Tables 1 and 2 indicate the vocalic and consonantal charts and their respective features.

A salient feature of consonants is the distinction between affricates and palatals. The distinction is neutralized before y and i. The origin of affricates is controversial, because they are not found in Sanskrit.

Suprasegmentals

Length:

Vocalic length is mostly predictable. With the exception of ə, the last vowel of a word is long unless the vowels are followed by a combination of consonants such as *nt, tr, kt*. (iii) The length is phonemic in *i, u*.

Nasal vowels:

Use of nasal vowels as independent entities varies from speaker to speaker. They are found in certain adverbs, nouns, and plural nouns in the context of case and postpositions. They are phonemic in certain dialects.

Accent:

Marathi is said to have a stress accent. Length, pitch, and sonority play a role in determining the loudest accent. (For details, see Kelkar, 1958, 1997; Pandharipande, 1997.)

Table 1 Vowels

	Front	*Central*	*Back*
High	i		u
Mid	e		o
Mid low	ai/æ	ə	au/ɔ
Low		a	

Salient features: The qualitative difference between ə and *a* is not precise. ə can be extra short and silent. *e* and *o* occur in all positions. *æ* and ɔ are found mostly in borrowings from English.

Morphology

Both animate and inanimate nouns exhibit two numbers – singular and plural – and three genders – masculine, feminine, and neuter. Marathi is a split ergative language. The subject is marked nominative with the exception of (i) transitive verbs in the perfective, (ii) obligative subjunctive, and (iii) dative verbs (Wali, 2004). The subject is marked ergative in (i and ii) and dative in (iii). In all these constructions, the verb agrees with the unmarked nounphrase, which may be a direct object or a theme. The verb shows neutral agreement if both subject and object have overt case. A salient feature of ergative system is seen in the pronominals. The first and second person pronouns are not overtly marked for ergative case and still show an ergative agreement pattern. What is more interesting is that the second person shows agreement for both nominative object and ergative pronoun though it is marked nominative (1). (See Wali, 2004.)

(1) tu — you-NOM
səməya — lamps-NOM-3FPL
ghas-l- ya-s. — wash-PERF-3FPL-2SG

'You washed the lamps.'

Syntax

Word Order

The standard word order is subject object and verb, that is, SOV, in all constructions including the interrogatives. The order is variable with certain restrictions. Most adjectives precede and agree with the nouns. Adverbs precede the verb. Some adverbs agree with the verb.

Passivization

There are two types of passives: regular and capability. Although both are formed by adding *ja* 'go' to the verbal perfective, there is a difference. The former applies only to the transitives and allows demoted agent to be deleted. The latter operates across intransitives and transitives and does not allow the demoted agent to delete.

Subordination

The subordinate clause may be finite or nonfinite. It may precede or follow the main clause. Adverbial and relative clauses are correlative type. The latter allow deletion of head and correlative nouns and show a considerable range of word order variation (Wali, 1982). They exhibit a reduced participial form in all

Table 2 Consonants

	Labial	*Dental*	*Retroflex*	*Alveolar*	*Alveopalatal*	*Velar*	*Glottal*
Stops							
vcl.unasp	p	t	ṭ			k	
vcl.asp.	ph	th	ṭh			kh	
vcd.unasp	b	d	ḍ			g	
vcd.asp	bh	dh	ḍh			gh	
Affiricates							
vcl.unasp				c	č		
vcl.asp.					čh		
vcd.unasp.				j	ǰ		
vcd.asp.				jh	ǰh		
Nasals	m	n	ṇ				
Laterals		l	ḷ				
Trill				r			
Fricatives		s	sh				h
Semivowels		v/w			y		

Salient features: *h* is a voiceless aspirate after voiceless stops and voiced aspirate in other positions. *s* becomes retroflex before a retroflex consonant. *v* vacillates between bilabial and labiodental position. It becomes a voiced lenis labiodental spirant in the intial position.

tenses. They also show a rare pattern of multiple headed relatives. These do not allow participial reduction.

Notion of Subject

The agreement is not a criterion for a subject because of the complexity noted in morphology. It is necessary to resort to other grammatical rules such as reflexivization, participle reduction to determine the subject. Both nominative and ergative subjects undergo the same rules. However, the status of dative and passive subjects is enigmatic since they obey only some of these rules. In fact, the rule criterion leads to the conclusion that these two construction may have two subjects contrary to the traditional notion of there being a single subject in a sentence (see Wali, 2004).

See also: India: Language Situation; Indo–Aryan Languages.

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Marbais, Michel de (fl. 1255)

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Not much is known about the life of Michael of Marbais (latinized, with many variants, as Michael de Marbasio, de Brabantia, or Michael modista). His name points to the village of Marbais, north of Charleroi, province of Brabant, Belgium. Kelly (1995: x) argues that Michael may be identical with the brother Michael de Helenchines listed in 1272 in the records of the Cistercian abbey of Villers-en-Brabant, the erection of which had been encouraged in 1146 by Judith of Marbais, a town

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vcl.asp.					čh		
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roughly 3 miles to the south. Sources show that this Michael came from, or was born near, the Premonstratensian abbey of Heylissem at Opheylissem (Hampteau in French), Hélécine, now part of Orp-le-Grand in the Wallonian part of Brabant, southeast of Louvain and approximately 30 miles northeast of Villers. The Premonstratensians were close to the Cistercians in their rites and even accepted lay members.

Michael, an independent mind who had a critical look on the work of Boethius of Dacia, wrote his influential grammatical treatises as a Master in the Parisian arts faculty between 1280 and 1300. He belongs to the second generation of the so-called modists who worked on speculative grammar with its key term of *modus significandi*. His grammar is based on a highly abstract 'physical' motus-model, which considers language as a series of processes. Michael was well aware of his pioneering role in the modistic conception of linguistics as a science. Since the time of the humanists (who did not like his opinions), his name is sometimes conflated with that of Johannes Josse de Marvilla. Besides the *Summa modorum significandi* (written ca. 1285, edited by Kelly) there are his earlier *Tractatus super grammaticam* and *Quaestiones super Priscianum minorem*, both only extant in manuscripts (cf. Bursill-Hall, 1981).

See also: Martin of Dacia (d. 1304); Radulphus Brito (ca. 1275–1320); Siger de Courtrai (d. 1341); Thomas of Erfurt (fl. 1300).

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Markedness

L R Waugh and B A Lafford

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Many linguistic phenomena consist of polar opposed pairs: for example, the phonological feature unvoiced–voiced, the antonyms *long–short*, the grammatical relations singular–plural and active–passive. In such binary oppositions (contrasts), moreover, the poles are not usually mere opposites: typically there is an asymmetry, such that one pole may be more special or specialized, more focused or constrained, less general and more complex than the other. In such cases, the specialized element is said to be marked, the more general one unmarked: in the examples given above, the unmarked element is given first, the marked element second. This is related to observations such as the following: nouns are listed in the singular in dictionaries, since the plural is considered to be a special use; unvoiced [s] is more common in English than voiced [z]; the active sentence *John hit the ball* is simpler than the passive *the ball was hit by John; how long is that stick?* is normal, but *how short is that stick?* is used only under special circumstances. Markedness is correlated with the asymmetric relationship between two choices, whether in phonology, morphology, syntax, or semantics; furthermore, it is important in other areas such as historical linguistics, first/second language acquisition, stylistics, etc.

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Mark-up Languages: Speech

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Until fairly recently, the web has primarily delivered information and services using visual interfaces, on computers equipped with displays, keyboards, and pointing devices. The web revolution had largely bypassed the huge market of customers of information and services represented by the worldwide installed base of telephones for which voice input and audio output provided the primary means of interaction.

VoiceXML 2.0 [VXML2], a standard recently released by the W3C [W3C], is helping change that. Building on the market begun in 1999 by the VoiceXML Forum's VoiceXML 1.0 specification [VXML1], VoiceXML 2.0 and several complementary standards are changing the way we interact with voice services and applications by simplifying the way these services and applications are built.

VoiceXML is an XML-based [XML] language, designed to be used on the Web. As such, it inherits several key features common to all XML languages:

- It leverages existing Web protocols such as HTTP to access remote resources.
- Any tool that is able to read or write XML documents can read and write a VoiceXML document.
- Other XML documents can be embedded in VoiceXML documents and fragments; similarly, VoiceXML documents can embed other XML documents and fragments. This the case with SRGS and SSML, which are described later.

As mentioned above, VoiceXML 2.0 is one in a number of standards that the W3C Voice Browser Working Group is defining to enable the development of conversational voice applications. The specifications making up the Speech Interaction Framework are the following:

- Speech Recognition Grammar Specification 1.0 [SRGS]
- Speech Synthesis Markup Language 1.0 [SSML]
- Semantic Interpretation for Speech Recognition 1.0 [SISR]
- Call Control Markup Language 1.0 [CCXML].

This article provides a short introduction to VoiceXML, as well as SRGS, SSML, and SISR, for building conversational web applications. CCXML is an XML-based language exposing telephony and call control functionality for such applications as conference call bridges and call routing. CCXML, however, is beyond the scope of this article.

Building Conversational Applications using VoiceXML

Menu Element

Most VoiceXML dialogues are built from one of two elements. The first of these is the <menu> element. A VoiceXML menu behaves much like a collection of HTML links.

A VoiceXML menu has a <prompt>, which contains SSML content, and one or more choices, each identified by a <choice> tag. Each choice consists of a phrase indicating what the user can say, as well as a link to the next VoiceXML document to be executed.

Consider this <menu> example:

```
<vxml version = "2.0" xmlns = "http://www.w3.org/2001/
  vxml">

  <menu>
    <prompt> Say one of: <enumerate/></
  prompt>
    <choice next = "http://www.example.com/
  sports.vxml">
      Sports scores
    </choice>
    <choice next = "http://www.example.com/
  weather.vxml">
      Weather information
    </choice>
    <choice next = "#login">
      Log in
    </choice>
  </menu>

</vxml>
```

Here is one possible path through this dialogue:

Browser: Say one of: Sports scores; Weather information; Log in.
User: Sports scores

When the VoiceXML Browser recognizes that the user has spoken 'sports scores,' it fetches the VoiceXML document identified by the corresponding choice (http://www.example.com/sports.vxml) and begins executing it, presumably providing the user with sports information.

Form Element

The second dialogue element in VoiceXML is the <form> element. A VoiceXML form is very similar to an HTML form in that it typically contains one or more input fields that a user must complete. Each input field in a form has a prompt and a specification of what a user can say to fill in the field.

A sample "login" form might look like this:

```
<vxml version = "2.0" xmlns = "http://www.w3.org/
  2001/vxml">

  <form id = "login">

    <field name = "phone_number" type = "phone">
      <prompt> Please say your complete phone
      number</prompt>
    </field>

    <field name = "pin_code" type = "digits">
      <prompt> Please say your PIN code </prompt>
    </field>

    <block>
      <submit next = "http://www.example.com/
servlet/login"
        namelist = "phone_number pin_code"/>
    </block>

  </form>
</vxml>
```

When this form is executed, the dialogue flow would be:

Browser: Please say your complete phone number.
User: 800-555-1212
Browser: Please say your PIN code.
User: 1 2 3 4

As each <field> is executed, its <prompt> is played. Following the prompt, the user responds by speaking the requested information. When both fields in the form have been filled, the final block is executed. In this example, the <block> executes a submit tag, which sends the variables 'phone_number' and 'pin_code' to the 'login' servlet, in much the same way as a 'submit' button works on an HTML form. The servlet would then return a new document for the VoiceXML Browser to execute.

As mentioned above, each field specifies the set of acceptable user responses. Limiting the acceptable responses serves two purposes. First, it allows the responses to be verified and for help in the case of an invalid response to be provided locally without the delay of a round-trip over the network to the application server. Second, it is essential to achieving good speech-recognition accuracy – particularly over a relatively low-quality audio channel like a telephone – for the user input to be constrained to particular sets and patterns of words.

In the example above, the set of acceptable user inputs is specified implicitly using the 'type' attribute ("phone" and "digits" in the example) in the field element. The VoiceXML 2.0 specification defines a number of built-in types that a VoiceXML browser should optionally provide:

- boolean
- date
- digits
- currency
- number
- phone
- time

In addition to these built-in types, a VoiceXML application can specify its own input types using grammars. A grammar is essentially an enumeration in a compact form of a set of allowable phrases. The following VoiceXML fragment illustrates the use of grammars in an online voice-enabled restaurant application:

```
<form>

  <field name = "drink">
    <prompt> What would you like to drink?
      </prompt>
    <grammar mode = "voice" xml:lang = "en-US"
      version = "1.0"
      root = "drink">
      <rule id = "drink">
        <one-of>
          <item> coffee </item>
          <item> tea </item>
          <item> orange juice </item>
          <item> milk </item>
          <item> nothing </item>
        </one-of>
      </rule>
    </grammar>
  </field>

  <field name = "sandwich">
    <prompt> What sandwich would you like?
      </prompt>
    <grammar src = "sandwiches.grxml"/>
  </field>
```

```
    <block>
      <submit next = "http://www.example.com/
        servlet/getOrder"/>
    </block>

  </form>
```

Speech Recognition Grammars

The grammars in the previous example are specified using the W3C Speech Recognition Grammar Specification [SRGS] format. The first grammar is in-line, and it simply identifies a list of words and phrases ('coffee,' 'tea,' and so on) that the user may say in response to the prompt for that field. Surrounding the list of items with a <one-of> element tells the VoiceXML browser that the user can speak only one of these items at a time.

The second grammar is contained in the file "sandwiches.grxml" and is referenced via a URI:

```
<grammar mode = "voice" xml:lang = "en-US"
  version = "1.0"
  xmlns = "http://www.w3.org/2001/06/
  grammar" root = "sandwich">

  <rule id = "bread">
    <one-of>
      <item> rye </item>
      <item> white </item>
      <item> whole wheat </item>
    </one-of>
  </rule>

  <rule id = "ingredient">
    <one-of>
      <item> ham </item>
      <item> roast beef </item>
      <item> tomato </item>
      <item> lettuce </item>
      <item>
        <item> swiss </item>
        <item repeat = "0–1"> cheese </item>
      </item>
    </one-of>
  </rule>

  <rule id = "sandwich">
    <ruleref uri = "#ingredient"/>
    <item repeat = "0–">
      <item repeat = "0–1"> and </item>
      <ruleref uri = "#ingredient"/>
    </item>
    <item> on </item>
    <ruleref uri = "#bread"/>
  </rule>

</grammar>
```

This grammar consists of three rules. The first rule, named 'bread,' is just a list of bread types, similar to the 'drink' grammar, which was placed in-line in the form. It allows the user to say either 'rye' or 'white' or 'whole wheat.'

The second rule in this grammar, named 'ingredient,' is also a fairly simple list of items, but one of its items included an optional part. The last item in the rule includes a repeat attribute on the 'cheese' item, which makes 'cheese' optional. To match this rule, the user can say either 'swiss' or 'swiss cheese.'

The third rule, named 'sandwich,' specifies that a complete description of a sandwich consists of a series of rule references to the other rules defined within this grammar. It states that a 'sandwich' is made up of at least one ingredient, followed by zero or more additional ingredients optionally separated by the word 'and,' and ending finally with the word 'on' followed by the name of a bread. This rule would accept phrases such as 'ham and swiss on rye' and 'lettuce and tomato on whole wheat.'

A grammar's header is typically used to identify a single rule within the grammar as its 'root rule' via the 'root' attribute. This root rule is automatically activated when the grammar is referenced by a VoiceXML application, unless the application indicates that a different rule should be used.

The grammars in the previous examples were written in SRGS XML format. They could have also been written using SRGS Augmented BNF syntax. In addition to being a more compact, more human-readable form, grammars written in ABNF syntax are also more familiar to grammar developers.

An ABNF version of the sandwich grammar might look like this:

```
#ABNF 1.0 ISO–8859–1;

language en-US;
root $sandwich;

$ingredient = ham | roast beef | tomato | lettuce |
  swiss [ cheese ];

$bread = rye | white | whole wheat;

$sandwich = $ingredient ( [ and ] $ingredient ) <0-> on
  $bread;
```

A typical dialogue enabled by the above form and either of the grammars might be:

Browser: What would you like to drink?
User: Orange juice
Browser: What sandwich would you like?
User: Roast beef lettuce and swiss on rye

As with the previous form example, once the browser has collected the input for both fields, the final block will be executed and cause the variables 'drink' and 'sandwich' to be sent to the getOrder application for processing.

Speech Synthesis Markup Language

In each of the preceding VoiceXML examples, <prompt> tags were used to indicate text that would be synthesized by the browser and spoken to the user. The contents of each <prompt> are in Speech Synthesis Markup Language, or SSML. SSML not only allows a voice application developer to specify text to be synthesized but it also provides a means to specify prerecorded audio that should be played.

In addition, SSML has numerous parameters to control the output itself. There are parameters for controlling the output volume, the rate at which the synthesized text is spoken, what portions are emphasized, and so on.

A complete discussion of SRGS and SSML is beyond the scope of this article. For further reading, their respective specifications are a good starting point.

Use of Web Standards

As was mentioned previously, VoiceXML uses web standards, such as XML and HTTP. The power of the web lies in its ability to bring to each user a worldwide array of information and services and conversely to give each information and service provider a worldwide customer base. Thus, a distributed application model is fundamental to the web; VoiceXML builds on the same distributed model that has been so successful for visual web-based services.

The distributed web-based application model as used by VoiceXML services accessed by telephone is shown in Figure 1. The architecture for a voice application is the same as that of an HTML application. A browser, either VoiceXML or HTML, retrieves a page and then renders it for the user either audibly or visually; then the user responds, either via voice in the case of VoiceXML, or with the keyboard and mouse, in the case of HTML.

Additional Capabilities

In addition to the core capabilities described above, VoiceXML provides several more advanced features: local validation and processing, audio playback and recording, support for context-specific and tapered help, and support for reusable subdialogues.

Local processing and validation of user input are accomplished by a collection of elements that provide a more-or-less standard programming model. A 'block' element allows code to be run at any point in the process of collecting inputs. A <filled> element allows input validation code to gain control upon completion of any set of user inputs. This element is particularly useful for the mixed-initiative dialogue model, in which the user may supply inputs in any order, as described in a later section. Finally, a <script> element allows ECMAScript [ECMASCRIPT] (otherwise know as JavaScript) program fragments to be run locally at any point in the dialogue.

Playback of pre-recorded audio prompts is accomplished using the <audio> element from SSML. Recording of user messages is done with the 'record' element; the recorded audio may then be played back locally using the 'audio' element or uploaded to the server for storage, processing, or playback at a later time.

Context-specific and tapered help are provided by a system of events and event handlers. VoiceXML defines a set of events corresponding, for example, to a user request for help, a failure of the user to respond within a timeout period, or a user input that does not match an active grammar. The application may then provide in any given context, such as a form or a field, an event handler that responds appropriately to a given event for a particular context. Moreover, the help may be tapered: a count may be specified for each event handler so that a different handler is executed depending on how many times the event has occurred in that context. This feature can

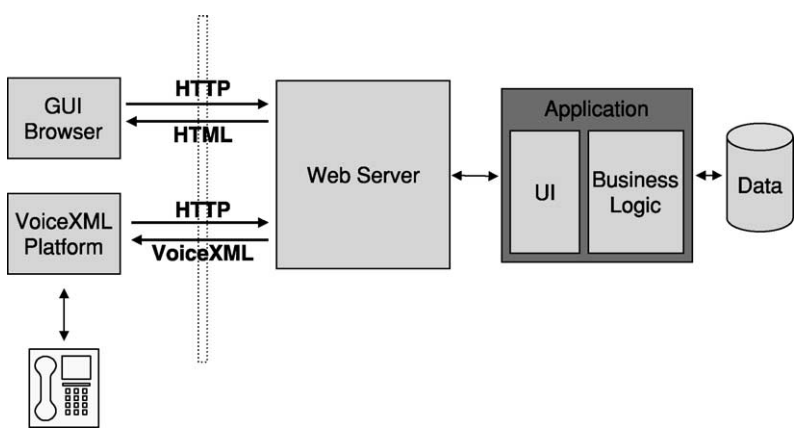

Figure 1 VoiceXML in a typical web infrastructure.

be used, for example, to provide increasingly more detailed messages each time the user asks for help.

Finally, VoiceXML provides support for subdialogues. A <subdialog> is an entire form that is executed, the result of which is used to fill in an input item in the calling form. This feature has two uses: it may be used to provide a disambiguation or confirmation dialogue for an input, and it may be used to support reusable dialogues, shared across several VoiceXML applications.

Comparison with HTML

Although VoiceXML reuses many concepts and designs from HTML, it differs in several aspects because of differences between visual and voice interactions.

An HTML document is a single unit that is fetched from a network resource specified by a URI and presented to the user all at once. In contrast, a VoiceXML document contains several dialogue units – menus or forms – that are presented sequentially. This difference occurs because the visual medium is capable of displaying a number of items in parallel, whereas the voice medium is inherently sequential.

Thus, although a given VoiceXML document may contain the same information as a corresponding HTML document, the VoiceXML document will be structured differently to reflect the sequential nature of the voice medium. So, for example, the HTML equivalent of the menu in Example 1 above might be:

```
Please select a service.
<a href = "http://www.example.com/sports.html">
  Sports scores
</a>
<a href = "http://www.example.com/
  weather.html">
  Weather information
</a>
<a next = "#login">
  Log in.
</a>
```

In HTML, there is no need to identify this menu as a unit, though for accessibility reasons it is desirable to do so: XHTML2 has an <nl> (navigation list) element for exactly this reason.

VoiceXML, in contrast, requires dialogue elements (menus and forms) to be identified as distinct units so that they may be presented one at a time to the user. Thus, although an HTML document functions in effect as a single dialogue unit, a VoiceXML document is a container of dialogue units, such as menus and forms, and each contains logic to sequence the interpreter to the next unit.

Another consequence of the sequential nature of the voice medium is the need for the markup to contain application logic for sequencing among dialogue units. This is reflected in a tighter integration of sequential logic elements into VoiceXML than in HTML. For example, VoiceXML contains markup elements for sequence control, whereas in HTML, such control is only available through the relatively more cumbersome method of scripting.

Natural Dialogue

VoiceXML as presented above provides the capability for simple 'directed' dialogues, meaning that the computer directs the conversation at each step by prompting the user for the next piece of information. Dialogues between humans, of course, do not operate on this simple model.

In a natural dialogue, each participant may at various stages take the initiative in leading the conversation. A computer-human dialogue modeled on this idea is referred to as a 'mixed-initiative' dialogue because either the computer or the human may take the initiative in leading the conversation.

The field of spoken interfaces is not nearly as mature as the field of visual interfaces, so standardizing an approach to natural dialogue is more difficult than designing a standard language for describing visual interfaces like HTML. Nevertheless, VoiceXML takes some modest steps toward allowing applications to be built that give the user some degree of control over the conversation.

In each of the forms shown above, the user was asked to supply input by speaking a value for each field of a form in sequence. The set of phrases that the user could speak in response to each field prompt was specified by a separate grammar for each field. This approach allows the user to supply one field value in sequence.

Consider a form for airline travel reservations in which the user must supply a date, a city to fly from, and a city to fly to. A directed dialogue conversation for completing such a form might proceed as follows:

Browser: Where are you traveling from?
User: New York.
Browser: Where are you traveling to?
User: Chicago.
Browser: When would you like to travel?
User: . . .

By contrast, a somewhat more natural dialogue might proceed as follows:

Browser: How can I help you?
User: I'd like to fly from New York to Chicago
Browser: When would you like to travel?
User: . . .

VoiceXML enables such dialogues by allowing input grammars to be specified at the form level, not

just at the field level, and by further annotating the rules in the grammar to identify which portion of a user's input is intended for which field in the form. This annotation is accomplished through semantic interpretation.

Consider the following VoiceXML document:

```
<vxml version = "2.0" xmlns = "http://www.w3.org/
  2001/vxml">
  <form id = "traveling">

    <grammar src = "travel.grxml" type = "application/
      srgs + xml"/>
    <initial name = "get_info">
      <prompt> How can I help you? </prompt>
      <catch event = "nomatch">
        <prompt>
          Let's try getting each field separately.
        </prompt>
        <reprompt/>
        <assign name = "get_info" expr = "true"/>
      </catch>
    </initial>

    <field name = "from_city">
      <grammar src = "travel.grxml#fromWhere"/>
      <prompt>What city are you traveling from?
        </prompt>
    </field>

    <field name = "to_city">
      <grammar src = "travel.grxml#toWhere"/>
      <prompt>What city are you traveling to?
        </prompt>
    </field>

    <block>
      <submit next = "http://www.example.com/
        servlet/flyaway"/>
    </block>

  </form>
</vxml>
```

And here is the grammar that it references:

```
<grammar mode = "voice" xml:lang = "en-US"
  version = "1.0"
  xmlns = "http://www.w3.org/2001/06/
  grammar" root = "travel">

  <rule id = "travel">
    <item repeat = "0–1"> I'd like to fly </item>
    <one-of>
      <item>
        <ruleref uri = "#fromWhere"/>
        <ruleref uri = "#toWhere"/>
        <tag>
          $.from_city = $fromWhere;
          $.to_city = $toWhere;
        </tag>
      </item>
      <item>
        <ruleref uri = "#toWhere"/>
        <ruleref uri = "#fromWhere"/>
        <tag>
          $.to_city = $toWhere;
          $.from_city = $fromWhere;
        </tag>
      </item>
    </one-of>
  </rule>

  <rule id = "fromWhere" scope = "public">
    <item>
      <item> from </item>
      <ruleref uri = "#cities"/>
      <tag> $ = $cities </tag>
    </item>
  </rule>

  <rule id = "toWhere" scope = "public">
    <item>
      <item> to </item>
      <ruleref uri = "#cities"/>
      <tag> $ = $cities </tag>
    </item>
  </rule>

  <rule id = "cities">
    <one-of>
      <item> New York </item>
      <item> Chicago </item>
      <item> San Francisco </item>
    </one-of>
  </rule>

</grammar>
```

Although the grammar looks fairly complex, it is not really so. It differs from earlier grammars only in that it now has semantic interpretation information included within it, indicated by the <tag> elements throughout.

These tag elements determine what information is returned to the VoiceXML application when a rule is matched. If the rule "fromWhere" is activated, for example, and the user speaks the phrase "from San Francisco," the tag contents say that the fromWhere rule should ignore the word "from" and only return whatever the "cities" rule returned ($ = $cities). The cities rule, of course, would have returned the phrase "San Francisco" so the "fromWhere" rule would then also return "San Francisco."

Similarly, the more complex "travel" rule says that the user can say the optional phrase "I'd like to fly" followed by a phrase matching the fromWhere rule and then a phrase matching the toWhere rule, or even the converse.

As with the simple case, upon saying something that matches the rule of the grammar, the semantic interpretation information is then processed. The travel rule's <tag> element says that when a phrase is matched, the results of the $fromWhere and $toWhere rules are to be stored in the $.from_city and $.to_city variables, respectively. This action has a

special meaning when the grammar is being used as a form-level grammar, which is the case now. In this case, the VoiceXML Browser will fill the "from_city" field with the value from $.from_city, and the "to_city" field with the value from $.to_city.

When the VoiceXML application above is executed, the VoiceXML Browser will activate the form-level grammar and then execute the initial element, which will cause the "How can I help you?" prompt to be played. At this point, the user can either say a phrase that matches the grammar, such as "I'd like to fly from San Francisco to New York," or he or she can say something that does not match the grammar. In the former case, two semantic interpretation processing elements will result in the form's two input fields being filled in, followed by the execution of the submit element within the block.

In the event the user's input does not match the active grammar, the nomatch event handler will terminate the initial element processing and collect each field's input separately.

By further extending the grammar, any number of possible user inputs could be used to fill in the field information. For example, the fromWhere and toWhere rules could be made optional in the travel rule, allowing the user to speak, 'I'd like to fly from New York' without having to include 'to Chicago.'

The ability to accept such free-form utterances is only a first step toward natural dialogue. Over time, VoiceXML will continue to evolve to incorporate more advanced features in support of natural dialogue.

See also: Speech Interface Design.

Relevant Websites

[CCXML] http://www.w3.org/TR/ccxml/
[ECMASCRIPT] http://www.ecma-international.org/publications/standards/Ecma-262.htm
[SISR] http://www.w3.org/TR/semantic-interpretation/
[SRGS] http://www.w3.org/TR/speech-grammar/
[SSML] http://www.w3.org/TR/speech-synthesis/
[VXML1] http://www.voicexml.org
[VXML2] http://www.w3.org/TR/voicexml20/
[W3C] http://www.w3.org/
[XML] http://www.w3.org/TR/REC-xml/

Mark-Up Languages: Speech, X + V

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Multimodal Interaction for Rapid Task Completion

Multimodal interaction enables rapid task completion by enhancing the bandwidth of man–machine communication (Bolt, 1980; Cohen, 1992; Cohen *et al.*, 1997). Common use cases that drive multimodal Web interaction on emerging personal information appliances including PDAs and smart phones are:

- Use visual output to efficiently convey available choices.
- Enhance small-size displays with spoken output.
- Use spoken input to collect user intent.
- Use visual interaction to disambiguate spoken intent.

See Raman (2003) for details on multimodal use cases and the associated shift in the underlying user interaction paradigm.

All of these user scenarios are motivated by the need to augment the bandwidth of man–machine communication, especially when working with mobile devices or in a hands-free, eyes-free environment. The ability to augment visual interaction with the spoken modality leads to rapid task completion, since the user is able to better express intent using a combination of modalities that best match the user's needs and abilities at any given time.

Authoring Web Content

Web content is authored using declarative markup, e.g., HTML; such content is further styled using Cascading Style Sheets (CSS) (see Lilley *et al.*, 1998; Pemberton, 2000). In this combination, HTML markup represents the content; CSS style rules specify aspects of presentation such as fonts, colors, and margin settings. CSS is also capable of specifying aural properties via Aural CSS; thus, CSS can style output with respect to the voice used when handling spoken displays (see Raman, 1997).

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The ability to accept such free-form utterances is only a first step toward natural dialogue. Over time, VoiceXML will continue to evolve to incorporate more advanced features in support of natural dialogue.

See also: Speech Interface Design.

Relevant Websites

[CCXML] http://www.w3.org/TR/ccxml/
[ECMASCRIPT] http://www.ecma-international.org/publications/standards/Ecma-262.htm
[SISR] http://www.w3.org/TR/semantic-interpretation/
[SRGS] http://www.w3.org/TR/speech-grammar/
[SSML] http://www.w3.org/TR/speech-synthesis/
[VXML1] http://www.voicexml.org
[VXML2] http://www.w3.org/TR/voicexml20/
[W3C] http://www.w3.org/
[XML] http://www.w3.org/TR/REC-xml/

Mark-Up Languages: Speech, X + V

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The move from the document-based HTML Web of the early 1990s to the application Web was enabled by the addition of event handlers to specific constructs on a page; such event handlers enabled Web authors to create content that reacts to user interaction events. The eventing model used to propagate such events and attach appropriate handlers has been standardized by the W3C in the DOM2 Events Recommendation; XML-Events 1.0 is a W3C Recommendation that defines an interoperable XML syntax for authoring such event binding (see Pixley, 2000; Hosn and Raman, 2002; Pemberton *et al.*, 2002). Thus, document-centric HTML markup can be made interactive by attaching interaction behavior in the form of appropriate event handlers.

Event handlers are responsible for producing appropriate end-user behavior in response to events they handle; a simple example of such event handling is to change a background image in response to a mouse-rollover event. Event handlers provide a powerful means of attaching interaction behavior; today, event handlers are used for a variety of purposes that range from animating Web content to validating user input. Thus, event handlers, along with the underlying markup elements to which they are attached, together implement UI components within a Web page.

A first example of integrating spoken dialogs into visual Web content to enable multimodal interaction was described in X + V (Axelsson *et al.*, 2001); X + V provides a standardized authoring metaphor for attaching voice handlers to HTML content. The effect of attaching such voice handlers is to turn Web components e.g., HTML's ⟨**input**⟩ element, from being a purely visual components into multimodal components; with the addition of voice handlers, users can interact with the resulting components via spoken as well as visual interaction. We show an example of such a speech-enabled HTML component in Figure 1; for a detailed overview of authoring multimodal applications using this design pattern (see McCobb *et al.*, 2003). This approach to multimodal authoring has been implemented on many XHTML browsers including Opera and NetFront – a screenshot of a flight reservation application running on a Sharp Zaurus is shown in Figure 2.

Thus, a voice handler that is attached to an ⟨**input**⟩ component can play a spoken prompt, activate an appropriate grammar for recognizing the user utterance, and finally, bind the recognized value to the ⟨**input**⟩ component. Next, we describe how such voice handlers can be authored in VoiceXML to bring high-quality Voice User Interaction (VUI) to the multimodal Web.

```
<form>
...
<label for="city">City:</label>
<input name="city" id="city" type="text"
  ev:event="focus"
  ev:handler="#voice_city"/>
...
</form>
```

Figure 1 A speech-enabled Web component. The component can be placed in a standard Web page to create multimodal interaction when consumed by a Web browser that implements the DOM2 Events loop. As an example, see the speech-enabled Opera browser.

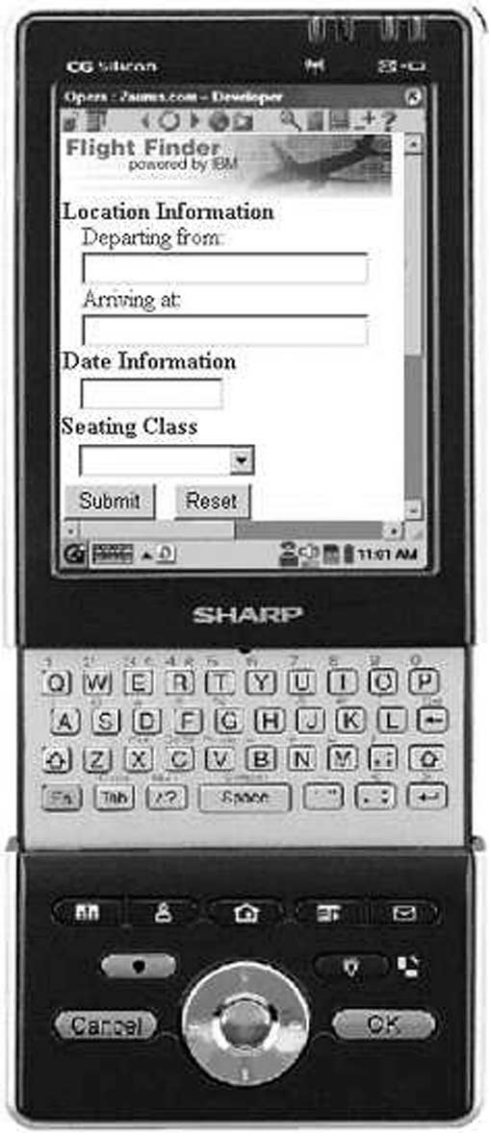

Figure 2 The multimodal flight finder enables rapid task completion by enabling the user to interact via a multiplicity of user interaction modalities (http://www2002.org/CDROM/alternate/120/).

Dialogs – Voice User Interface Components

Dialogs form the building blocks of spoken interaction and provide an ideal abstraction for speech-enabling man–machine interaction. This insight led to the design of W3C's VoiceXML 2.0 (see McGlashan, 2003) – a declarative XML-based language for authoring voice interaction. VoiceXML dialogs form the basic building blocks of VoiceXML applications and are described in Kusnitz and Lucas (2004). In brief, VoiceXML dialogs enable the application designer create voice interfaces that exhibit rich interaction by providing capabilities such as tapered prompting and simple mixed-initiative dialogs.

VoiceXML dialogs were originally designed for use in voice-only applications; their initial use was to put together VoiceXML applications to create the voice Web. The key insight in the X + V design was to observe that these same voice dialogs, when used by themselves, could become the voice components needed to turn visual Web content into rich multimodal user interfaces.

Speech-Enabling Visual Web Content

As described earlier, declarative content authored in HTML can be made interactive by binding appropriate event handlers. VoiceXML dialogs can be attached as event handlers that respond to specific user interaction events e.g., on-focus to speech-enable HTML content. Using the standardized DOM2 eventing model as expressed via markup conforming to XML-Events creates a declarative authoring framework for multimodal applications. The DOM2 eventing model exposed by standards-compliant Web browsers enables visual and voice interaction components to participate as equals in creating a resilient multimodal interface. This results in user interfaces that enable rapid task completion along with robust error correction.

Consuming Multimodal Content to Gain Ubiquitous Access

Multimodal content, once authored for the standards-compliant Web, can be deployed and consumed in a manner best suited to the end-user's needs and abilities at a given time. All modern devices incorporate a Web browser as the preferred means for delivering user interaction; as these browsers catch up with the current W3C standards, content providers can deliver a rich multimodal user experience by wiring in standard user interaction components including voice dialogs authored in VoiceXML and rich visual content authored in Scalable Vector Graphics (SVG).

Such content can be consumed on end-user devices that implement the standard DOM2 eventing framework; user interaction events can be dispatched by the browser to software modules that can execute the specified event handlers. As an example, a multimodal application might bind voice dialogs as event handlers for the various user interaction components on a page; a browser that consumes such an application can dispatch the relevant events to an implementation that can invoke these handlers. A key consequence of this design is that handlers can be run locally on a device or on the network. Thus, application authors can create multimodal content that can be deployed to a variety of devices that range from laptops to extremely thin mobile clients that rely on network resources for compute-intensive tasks.

Conclusion

Ubiquitous access brings a whole new emphasis to the 'world wide' in the World Wide Web. Multimodality is crucial for delivering on the promise of ubiquitous access from an ever-increasing range of personal information appliances. Building on well-established and mature standards leads to a vendor-neutral platform that lends itself well to innovations that make our future dreams a reality. This phenomenon has led to an explosive growth in the availability of on-line content; the coming decade will see an ever-richer set of access capabilities that enhance our ability to leverage the WWW at work and play.

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Mark-up Languages: Text

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The word 'markup' was originally used to describe annotation or other marks introduced into a manuscript, for example by a copyeditor, in order to instruct a compositor or typist how a particular passage should be printed or laid out. Underlining of various kinds might be used to indicate boldface, special symbols to indicate passages to be rearranged, omitted, or printed in a particular font, and so forth. As document production became increasingly automated, the term came to be used also to describe the special codes inserted into electronic texts to govern analogous tasks in the formatting and printing of documents. The rapid growth in the development of computer text processing systems during the 1970s also led to the development of increasingly formalized markup systems. Notable early examples of these include the GML troff system developed for the Unix operating system; the Generalized Markup Language developed by Goldfarb, Mosher, and Lorie at IBM to represent the structure of legal documents (Goldfarb, 1996); the TeX language developed specifically for the typesetting of mathematics by Donald E. Knuth (Knuth, 1984); and a document formatting system called Scribe developed by Brian Reid at Carnegie-Mellon University (Reid, 1980).

These and other systems greatly influenced the transition from *ad hoc* or proprietary systems of conventional codes to the highly influential Standard Generalized Markup Language (SGML). This ISO standard, which defined a metalanguage for the definition of specific markup vocabularies and grammars for their deployment, had an influence far beyond its original remit of simplifying production and maintenance of technical documentation.

A key feature of these early document-processing systems was the recognition that the concepts instantiated by a given document's markup might usefully relate not to its physical appearance but to its significance. This insight was seized upon by early theoreticians of markup who argued forcefully that markup should be used to encode the real structure of a document, independent of how that might be realized in some specific instance or version of it (Coombs *et al.*, 1987). It was held to be more useful (for example) to mark that a stretch of a document was a heading than to state that it should be printed in boldface and centered, not only on practical grounds deriving from the inherent reusability and plasticity of electronic documents, but also on theoretical grounds relating to the nature of text itself.

Early adopters of the SGML standard included some rather strange bedfellows, with little in common beyond a major investment in computer-held text: the U.S. Department of Defense and the American Association of Publishers, for example. In 1987, an international research project known as the Text Encoding Initiative also adopted the standard as the means of expressing a set of guidelines for those preparing machine-readable texts in literary and linguistic research (Sperberg-McQueen and Burnard, 1994). During the 1990s, the notions of markup embodied by SGML became particularly influential with the development of the World Wide Web and its associated markup languages HTML (Berners-Lee, 1992) and XML (Bray *et al.*, 1998), both of which derive from SGML. The development of the World

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Wide Web to its current pre-eminent position can be attributed partly to its reliance on a simple descriptive markup language, which, moreover, was defined independently of any of the software used to produce or process it. The transition from the limited semantics of this HTML language to the more flexible and well-designed extensible markup language XML is further demonstration of the power of the ideas originally put forward in the SGML standard. At the time of writing, XML is the de facto standard for the representation of complex textual data in almost every new system, and is also the channel of preference when data of any kind is to be communicated between systems.

If the function of markup is to describe what a text really is or is thought to be (Renear *et al.*, 1996), the process of marking up a text is essentially one of annotating its constituents with some indication of how they should be identified and interpreted, which can then be used by a subsequent user of the text, such as a piece of software displaying or analyzing it. As such it is a fundamentally linguistic and interpretive process. At a banal level, all printed texts are marked up in the sense that punctuation marks, use of capitalization, disposition of letters around the page, even the spaces between words, function as a way of helping the human reader determine where one word ends and another begins, or how to identify gross structural features such as headings, and syntactic units such as dependent clauses or sentences. Encoding a text for computer processing may simply formalize these visual signals in a more rigorous manner; more generally, however, it will enrich them by providing non-obvious annotations representing (in some sense) the results of an interpretive process, by marking up the reading of a text, rather than its visually salient features.

This tension between what are (for some) self-evident structural features of a text, and the potentially contentious interpretations or classifications of those features that others identify in them, or in their interstices, is at the heart of the whole markup enterprise, as it is (in a sense) at the heart of any other hermeneutic endeavor. One advantage of using a formal markup language such as XML is that its expressivity is precisely delimited, and can be automatically validated. XML markup has a very shallow semantics, expressing little more than labeled bracketing of content within a single hierarchy. Because the interpretation of the labels (the element names) used within an XML vocabulary does not form part of XML itself, the creator of an XML document is effectively required to define all the distinctions made within it, either explicitly or by reference to some predefined standard such as that of the TEI.

At the most primitive level, texts are composed simply of streams of encoded data (characters or bytes of data, marks on a page, graphics, etc.): these are known as entities in SGML. At a higher level of abstraction, a text is composed of representations of elements of various kinds, linguistically or functionally defined. Elements do not appear randomly within a text: coherence demands that particular types of element appear in specifiable relationship to others – they may be included within each other, linked to each other by reference, or simply presented sequentially, for example. The rules defining how elements may legally be combined in a particular class of texts is known as a document type or schema.

An XML markup language comprises a list of element names, each of which may also bear a set of named attributes, together with rules stating how element occurrences may legally be combined. A valid XML document is a single element (the root element) containing either unmarked textual data, or a mixture of other elements, each properly nested within its parent. For example, a <conversation> element might contain a series of <utterance> elements, each of which might carry a speaker attribute. Within each utterance element, individual words or phrases might also be marked, perhaps with attributes to indicate their syntactic or morphological function.

In an XML document, the start of each element occurrence is marked by a start-tag, which contains the name of the element type and also specifies any attributes applicable to the element. The end of an element occurrence is also marked explicitly by means of an end-tag. XML defines a simple invariant syntax for the representation of XML occurrences. For example:

```
<conversation>
<utterance speaker='Mutt'>My dog's got no
  nose.</utterance>
<utterance speaker='Jeff'>How does it smell?
  </utterance>
<utterance speaker='Mutt'>Terrible.</utterance>
</conversation>
```

The schema for this document would indicate that the element <conversation> may be used as the root of a document and that it must contain one or more <utterance> elements. It would also indicate that the <utterance> element may contain unmarked text and that it bears an attribute called speaker, the possible values for which might also be constrained, for example by reference to some other element (say, <person>).

It is easy to see how this markup might be further extended to include, for example, specification of word class and root form for the individual words:

```
<utterance speaker='Mutt'>
<w class='POS' root='I'>My</w>
<w class='NOUN' root='DOG'>dog</w>
<w class='AUX' root='HAVE'>'s</w>
<w class='VB' root='GET'>got</w>
...
</utterance>
```

or, without use of attributes:

```
<utterance speaker='Mutt'>
<w>
<class>POS</class>
<root>I</root>
<form>My</form>
</w>
<w>
<class>NOUN</class>
<root>DOG</root>
<form>dog</form>
</w>
...
</utterance>
```

Either of these XML representations conveys the same information as any of the various ways that the output of an automatic parser might be presented. Such systems typically associate a text form with its word class and root form (and sometimes other analytic codes as well) and produce output in an idiosyncratic format analyzable by only a limited range of software. Either XML representation, by contrast, can be processed by any XML-aware software without ambiguity; furthermore, both XML representations are functionally equivalent, and the choice between them may therefore be made on the basis of what is thought to be operationally more convenient to capture or to process.

XML markup is topologically very similar to other forms of labeled bracketing commonly used in linguistic formalisms to represent tree-structured data or data in linear form. Indeed, an XML document may be thought of as a special case of a directed acyclic graph, in which the nodes represent element occurrences and the edges define containment relations. XML can therefore also be used to represent syntactic or functional structures beyond the word level, or tree banks:

```
<utterance speaker='Mutt'>
<s><np>
<w class='POS'>My</w> <w class='N'>dog
  </w>
</np>
<vp>
<v>
<w class='HAVE'>'s</w> <w class='VB'>got
  </w>
</v>
<np>
<w class='NEG'>no</w> <w class='N'>nose
  </w>
</np>
</vp>
</s>.</utterance>
```

It is also possible to represent arbitrary links or alignments between parts of an XML structure by means of pointers. For example, in the example above, to represent that the word *it* has an anaphoric relation to the word *dog*, one could add an identifier to the latter and point to it from the former, like this:

```
<w class='POS'>My</w> <w class='N'
  xml:id='w123'>dog</w>
...
<w class='PN' ref='#w123'>it</w>
  <w class='V'>smell</w>
...
```

A frequently noted problem in this approach to the representation of full-scale linguistic analysis is that it is difficult to represent multiple analyses of the same phenomenon, if these fall foul of the requirement that the markup structure be well-nested (Barnard *et al.*, 1995). For example, in the analysis above, the price of making explicit that *'s got* functions as a single verb is that *dog's* disappears as a single orthographic unit. If one wished to add also (say) a prosodic analysis, or a discourse function analysis, the components of either of these would almost certainly not align exactly with utterance or word boundaries, nor with each other. Simple XML markup requires that one single hierarchic analysis of the text be privileged above others, and is thus not well suited to the direct representation of multitiered analyses. To overcome this problem, a number of varyingly unsatisfactory mechanisms have been proposed (DeRose, 2004), of which the most popular at present is the so-called stand off style of markup (Thompson and McKelvie, 1997), in which distinct analyses are represented by free-standing elements linked into the text by pointers. While comparatively lacking in robustness and also requiring special-purpose programming beyond the remit of standard XML software, it is claimed that such methods are sufficient to represent almost any kind of multiple analysis.

As these methods demonstrate, the scope of XML markup is not restricted to the delimiting of nested segments of text. It can also be used to represent complex analytic structures superimposed on or linked to a text, or even entirely abstract tree

structures, such as those used by some NLP systems to represent meaning, for example in a computational lexicon. Rather than regarding the analysis as an attribute of the word form, such systems regard the word form as an attribute of the analysis. There have been a number of attempts to reach a consensus on the vocabulary appropriate to describe such linguistic analyses (examples include EAGLES, ISLE), but the use of XML as a means of expressing them remains uncontentious. The approach to this problem recommended by the TEI Guidelines, also now in the process of standardization through ISO, is based on the use of the feature structure formalism (Carpenter, 1992), itself represented in XML (Lee *et al*., 2004). An XML representation of a feature structure analysis can be exchanged automatically between NLP systems without loss of information or ambiguity.

With the direct representation of meaning structures, distinct from the texts within which they are expressed or from which they are extracted, text markup seems to move into a different sphere of activity. But since all interpretations, even the abstractions within a computational lexicon, can be regarded as constituting some kind of text, perhaps this transition is neither difficult nor surprising.

See also: Computational Language Systems: Architectures.

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Relevant Website

Text Encoding Initiative Consortium. http://www.tei-c.org.

roughly 3 miles to the south. Sources show that this Michael came from, or was born near, the Premonstratensian abbey of Heylissem at Opheylissem (Hampteau in French), Hélécine, now part of Orp-le-Grand in the Wallonian part of Brabant, southeast of Louvain and approximately 30 miles northeast of Villers. The Premonstratensians were close to the Cistercians in their rites and even accepted lay members.

Michael, an independent mind who had a critical look on the work of Boethius of Dacia, wrote his influential grammatical treatises as a Master in the Parisian arts faculty between 1280 and 1300. He belongs to the second generation of the so-called modists who worked on speculative grammar with its key term of *modus significandi*. His grammar is based on a highly abstract 'physical' motus-model, which considers language as a series of processes. Michael was well aware of his pioneering role in the modistic conception of linguistics as a science. Since the time of the humanists (who did not like his opinions), his name is sometimes conflated with that of Johannes Josse de Marvilla. Besides the *Summa modorum significandi* (written ca. 1285, edited by Kelly) there are his earlier *Tractatus super grammaticam* and *Quaestiones super Priscianum minorem*, both only extant in manuscripts (cf. Bursill-Hall, 1981).

See also: Martin of Dacia (d. 1304); Radulphus Brito (ca. 1275–1320); Siger de Courtrai (d. 1341); Thomas of Erfurt (fl. 1300).

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Markedness

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Many linguistic phenomena consist of polar opposed pairs: for example, the phonological feature unvoiced–voiced, the antonyms *long–short*, the grammatical relations singular–plural and active–passive. In such binary oppositions (contrasts), moreover, the poles are not usually mere opposites: typically there is an asymmetry, such that one pole may be more special or specialized, more focused or constrained, less general and more complex than the other. In such cases, the specialized element is said to be marked, the more general one unmarked: in the examples given above, the unmarked element is given first, the marked element second. This is related to observations such as the following: nouns are listed in the singular in dictionaries, since the plural is considered to be a special use; unvoiced [s] is more common in English than voiced [z]; the active sentence *John hit the ball* is simpler than the passive *the ball was hit by John; how long is that stick?* is normal, but *how short is that stick?* is used only under special circumstances. Markedness is correlated with the asymmetric relationship between two choices, whether in phonology, morphology, syntax, or semantics; furthermore, it is important in other areas such as historical linguistics, first/second language acquisition, stylistics, etc.

Markedness in Phonology

The first discussion of markedness in modern linguistics originated in the 1930s, in the writings of the Prague School structural phonologists Nicolai S. Trubetzkoy and Roman Jakobson. The essential insight is this: sounds are differentiated by binary phonological features, for example [p] vs. [b] (− voiced vs. + voiced) and [b] vs. [m] (− nasal vs. + nasal) in which the two poles of the feature are not on equal footing with each other: one is marked (e.g., + voice, + nasal), the other unmarked.

Markedness and Phonological Systems

Trubetzkoy argued that the unmarked value of a feature is that which is found in cases of internally conditioned neutralization—in those contexts where only one member of the pair can occur and the resulting neutralization is not determined by some feature of the context. Thus, for example, Russian has voiceless–voiced pairs of consonants such as [p–b t–d s–z], but in word-final position only unvoiced [p t s] can occur; so, voicelessness is unmarked. Trubetzkoy also noted another attribute of markedness, namely frequency: in general, unmarked categories have higher text frequencies than marked; thus, unvoiced stops are more frequent than voiced, orals than nasals, etc.

Further work in phonology has expanded on this nexus of properties to formulate the general principle whereby the unmarked feature is the one with wider paradigmatic and syntagmatic distribution. The unmarked category has a greater functional load than the marked: it is used to distinguish and identify a greater number of words than the marked one. The unmarked feature can usually enter into more types of combinations, and conversely the marked feature enters into fewer combinations and specifically tends not to be combined with other marks. For example, there are usually more oral consonants than nasal ones in a language (English has [p–b t–d k–g], but only [m n ŋ]), and often there is no velar or palatal nasal even though there is both a labial and a dental one (velars and palatals are marked vs. labials and dentals). Similarly, the typical five-vowel system [a e i o u] generally combines marked frontness with unmarked unrounding vs. unmarked backness with marked rounding. That is, much of the symmetry and asymmetry which is found in phonological systems can be explained by markedness.

The unmarked term also occurs in a greater array of syntagmatic environments, that is, it has greater freedom of occurrence. If one compares the allophonic (phonetic, contextual redundant) variation of phonemes, the unmarked phoneme tends to have more allophones than the marked one: for example, in some languages, voiceless stops have both aspirated and unaspirated allophones, whereas voiced ones do not (they are unaspirated). The basic allophone of a phoneme – the most frequent one and the least prone to assimilation by neighboring sounds – is also characterized by unmarked features: for example, in some languages both voiceless and voiced consonants are members of the same phoneme, and typically in such cases the basic allophone is the voiceless one (and consequently, linguists represent the phoneme by the voiceless sound).

Markedness and Crosslinguistic Comparison

Markedness relations are revealed not only by the behavior of the categories of one particular language, but also by a crosslinguistic comparison of types of phonological systems, and in particular by language typology and universals (as originally shown by Trubetzkoy and Jakobson). Such comparison gives evidence that some traits are basic, others less basic, and that the basic traits are also often the unmarked ones. Thus, some features are found in all or nearly all languages – for example, all languages have oral vowels, dental/alveolar consonants, and Consonant–Vowel (CV) syllables – whereas others are not, for example, only some languages have nasal vowels, palatal consonants, and CVC syllables. Moreover, there are types of linguistic systems which seem to occur quite regularly, and given these types, principles of dependency can be formulated; the most important is that of asymmetric implication: the presence of *x* implies the presence of *y* but not vice versa. In many cases, *y* is unmarked, *x* is marked – for example, the presence of the marked [ɲ] or [ŋ] in a language implies the presence of [m] and [n], but not vice versa.

Such principles have led to the reworking of phonological analyses of various languages. There was a famous application to reconstruction: proto-Indo–European (PIE) had been postulated to have an obstruent system with unmarked voiceless, singly marked voiced, and doubly marked voiced aspirated stops – but this violated the implicational law just given. Some subsequent reconstructions have eliminated the voiced aspirates, and have instead posited singly marked glottalized voiceless obstruents.

Such findings have also been crucial for predicting types and orders of phonological changes: in particular, the implicational universals mean that no language can acquire a marked category unless it acquires the unmarked one before (or concurrently); and no language can lose the unmarked category without first losing the marked. Moreover, there are specific tendencies: marked categories often arise out of the unmarked ones only in particular environments – that is, they are the result of conditioned change

(e.g., contextual assimilation) – whereas unmarked categories can be the result of unconditioned change. Thus, for example, (marked) nasal vowels typically arise through assimilation of an (unmarked) oral vowel to a succeeding nasal consonant, and then subsequent loss of the nasal consonant, whereas oral vowels can arise in a variety of different ways.

Universals and typological relations, especially implicational universals, also have explanatory power for first language (L1) learning by the child and for aphasic dissolution. For example, children tend to learn first the unmarked category and only later the marked one (they go from simpler to more complex sounds and systems): for example, [t] is learned before [k]; in like fashion, aphasics lose first the marked category and only later the unmarked one. Thus, there is a strong markedness connection between language structure, the universal and implicational distribution of categories within a language and across languages, the order of acquisition by children and of its loss by aphasics, and possible types of changes.

Such observations have led some to assimilate the notion of markedness with that of normality or naturalness, most explicitly in natural phonology: marked values are assumed to be unnatural – that is, more difficult to produce (more deviation from the neutral), more difficult to perceive (with attenuation of perceptual distinctions), more difficult to learn (learned later by children), more prone to instability (more likely to be lost over time).

It should be added that for some linguists not all marks are equally weighty and some marks are assumed to be heavier than others: e.g., glottalization is a heavier mark than nasality. And for still others binary markedness relations are not suitable for nonpaired phonemes: for example, for points of articulation as in [p–t–c–k] or vowel heights as in [i–e–ɛ–æ], some have postulated degrees of markedness.

Markedness in Morphology

Although the classic proposal about markedness was made in phonology, the notion has been richly explored for all aspects of language, most notably grammar (Jakobson, 1984 and Hjelmslev, 1953, 1972). In general, grammar exhibits many of the same criteria with the same interrelations: for example, frequency of occurrence, paradigmatic distribution and asymmetry of systems, syntagmatic distribution, language universals and implicational relations, types and orders of possible changes, order of acquisition in children and of loss in aphasia, etc.

In considering the singular (unmarked) vs. plural (marked), the following types of correlations to markedness have been found. There is a tendency toward fewer subcategories of the plural: in the English pronouns the singular shows gender differences (*he*, *she*, *it*) but not the plural (*they*) (this is known as syncretism/syncretization; *see* **Syncretism**; this is also tied to the expected relationship in implicational statements: for example, gender in plural pronouns implies gender in singular pronouns but not vice versa. In other words, in the singular there is a marked/unmarked relation such that *he* is unmarked vs. *she*, whereas the plural does not participate in the masculine/feminine opposition. The distribution of singular and plural is predictable: in running text, the singular is more frequent than the plural; and there is greater freedom of occurrence (wider distribution) for the singular. For example: in English the plural is used in fewer contexts than the singular; in Korean there is optional use of the plural in favor of the singular (the plural suffix on nouns is optional, so the singular form has either singular or plural meaning in context); in Hungarian the singular form of the noun is used when a number precedes the noun (this is sometimes known as contextual neutralization); in French the masculine plural is used to stand for both feminine and masculine (when an adjective agrees with both a masculine and a feminine noun, it is put in the masculine plural). The singular is learned earlier in L1 acquisition and disappears later in aphasic disturbances.

Markedness has also been used in morphophonemics (morphonology). Thus, the allomorphy represented by *cat/cats* is unmarked vs. the marked *foot/feet* for the following reasons: in the former there is no alternation of the root whereas in the latter the root alternates; in the former the morphological relation is segmentally represented (*cats*) but in the latter it is fusional (no segmentation possible); in the former there is phonologically conditioned, regular allomorphy for the plural and in the latter nonphonologically conditioned, irregular allomorphy. In fact, there is a general assumption that regularity is unmarked and irregularity marked, because of the following:

1. if both the unmarked and marked terms have allomorphy, there is less morphological irregularity of the marked term (e.g., in German the marked dative plurals uniformly have *-n* or *-en*, while the dative singular varies with gender and declensional class);
2. diachronic and synchronic regularization/leveling in child language, in pidgins and creoles, in dialects, and in informal speech (e.g., *foots* rather than *feet*);

3. the greater number of regular forms (the vast majority of nouns take the *-s* plural and only a small minority the irregular plurals);
4. the productivity of regular forms (e.g., new nouns coming into English normally take the *-s* plural *-sputniks*);
5. in language change, the singular provides the pivotal terms for analogical reformations (e.g., in popular French, the irregular plural *chevaux* 'horses' is replaced by regular *chevals*) and in pidgins and creoles, the plural is often dropped, especially if its formation is irregular, the old singular then being the only form of the noun (a new plural could then be added later based on this neutral form).

Considerations such as these have led to the development of the theory of natural morphology in which naturalness is explicitly tied to markedness and regularity.

Grammatical systems have been described in terms of markedness. The assumption is that there is a set of features and that one term of the system is unmarked (e.g., the simple present tense of English), whereas the others are marked, some of them singly marked (e.g., the simple past), others doubly marked (the past progressive), etc. In this way, hierarchies of markedness have been established. For certain systems, some linguists have argued for a nonbinary notion of markedness, such that there is a scale from more to less marked – for example, positive, comparative, superlative in *high, higher, highest*.

Syntactic Markedness

While much of the work on grammatical markedness has focused on morphology, there has been increasing attention to syntactic markedness. One famous early application was to word order: for example, the ordering relation between S(ubject) V(erb) and O(bject). It was found that one of the orders is unmarked (basic, dominant, preferred), the other(s) marked and used for special circumstances. For example, in English, SVO (*the man hit the ball*) and AN (*the red ball*) are the unmarked orders, and in German SVO is the unmarked order in main clauses, whereas subordinate clauses favor SOV. (In German there is markedness assimilation, which has been attested also in phonology and morphology: unmarked categories tend to occur in unmarked contexts, marked categories in marked contexts.) In languages with freer word order than English, the markings can be correlated with a variety of different contextual factors: for example, in Russian, the order of words depends on what the topic is, whether a noun is to be interpreted as definite or indefinite, etc., but SOV is obligatory if it is unclear which noun is S and which O. Moreover, a universal tendency has been noted whereby, in 99 percent of the cases, the S is before O, whether or not V intervenes: for example, SVO, SOV, and VSO are all widely attested, whereas OSV, OVS, and VOS are extremely rare: that this should be so is due to the greater saliency of S over O. Moreover, there are some general correlations between different types of orders: languages with unmarked VSO order are more likely to have unmarked NA and noun-genitive (possessor) orders, and prepositions rather than postpositions. Just as for phonology, work such as this has had a profound effect on the study of PIE and of language change and typology, where the mechanisms of change over time from one unmarked word order to another have been investigated.

There has been much interest in questions of the hierarchy of elements and their use in certain syntactic contexts. For example, work in syntax which has been inspired by prototype theory in psychology has defined the unmarked subject in terms of a bundle of categories: for example, it is animate, topical, agentive, singular, definite (thus, a sentence of the general pattern *John hit some balls* is more likely to be used than one of the general form *some balls hit the headmaster*) whereas marked subjects may differ in various ways from this prototypical combination. In fact, the notion of prototype is essentially an outgrowth of the fundamental notion of markedness, since with prototypicality there is a recognition of asymmetry among exemplars of a given category: like unmarked categories, prototypes are more basic, combine more freely and productively than do nonprototypes, are more frequent and more familiar, are more salient, have more autonomy, are the best examples of a given opposition, etc. That is, prototypes resemble unmarked terms in many respects, even if they are not strictly the same: for example, both singular and plural have prototypical uses, but the singular is the prototypical number category, because it is unmarked.

The association of marked terms with lesser universality and later learning by the child has received renewed attention recently in the relation between core grammar and universal grammar (UG). According to this theory, UG, which is made up of those grammatical (especially syntactic) phenomena which are found in all languages, determines a set of possible core grammars for languages by setting parameters, each with a finite number of values. These parameters may be connected through hierarchical relations of markedness or various implicational or preferential relations. Systems that fall within core grammar constitute the unmarked phenomena while more marked

elements are found in the periphery (for example, constituent orders with S before O are unmarked, those with O before S marked; unmarked use of prepositions with an object, e.g., *he came in the room*, vs. marked use of prepositions as adverb-like elements, e.g., *he came in*). In the acquisition of grammar and syntax in the child, UG is assumed to be innate, with unmarked options for parameters being preferred and learned first, the marked periphery of the system being learned later.

Grammatical Markedness and Second Language Acquisition

Based on the findings of L1 acquisition studies, several hypotheses have been proposed regarding the role of universal grammar and markedness (either intra- or interlinguistically) in second language (L2) acquisition. Most of the studies until the early 1990s have applied markedness concepts to crosslinguistic comparisons and notions of L1–L2 transfer predicted by the Contrastive Analysis Hypothesis in the 1950s and 1960s. The resulting formulation is the Markedness Differential Hypothesis (MDH) which proposes that the degree of difficulty in L2 acquisition may be attributed to the similarities and differences in typological markedness between second and first language. It is claimed that the MDH can predict relative areas of difficulty in the target language for learners with a particular first language. Scholars working in a UG framework propose that the difference in parameter settings between L1 and L2 may have an effect on the acquisition of the target language; however, the data also appear to support the idea that linguistic universals play a primary role in the acquisition process since learners from unrelated backgrounds demonstrate the same acquisition sequence when acquiring the same target language. The intralinguistic view of the role of markedness in L2 acquisition is also based on linguistic universals, whereby the less marked core structures are acquired early, and the more marked periphery structures later.

There is also evidence for markedness as an explanation for the development of grammatical patterns in the interlanguage (intermediate stages in the acquisition of a second language) of adult learners. For instance, adult L2 learners of Spanish acquire the present tense before the past and the indicative mood before the subjunctive. It is interesting to note that, just as for children, in interlanguage the unmarked forms often substitute for the marked categories before the latter are acquired. In addition, just as for aphasia, L2 attrition studies have found a relation between order of acquisition and language loss: for instance, in learners of English, the last question-forms learned (e.g., *whose*) are the first to be unlearned.

Markedness in Semantics

Work in grammatical and lexical semantics has often revolved around componential analysis and semantic features, which have been seen to mirror phonological and grammatical features in many respects; indeed, many of the criteria discussed above have been used (e.g., frequency, breadth of distribution, and prototypicality). The most important finding in semantics is the more limited range of meaning of the marked term and wider range of the unmarked: thus, while the marked term means the presence of a certain property *A* (e.g., *woman* states the presence of the marked category female), the unmarked may mean non-*A* in its main interpretation (e.g., *man* means male) or no signal of *A* at all (e.g., *man* in the sense of human being). Such relations have been shown to be ubiquitous in grammar: for example, the past tense is marked and signals past time; the unmarked present either signals nonpast (*John is here right now, John is coming tomorrow*), or time more generally (*the earth is round*). Further examples from lexical meaning include antonyms or complementaries from a number of different conceptual domains (although not all lexical relations are binary or involve markedness): for example, *good/bad, long/short, old/young*, as well as derivational relations such as *host/hostess* (e.g., *your hosts tonight are Mr and Mrs Smith*), kinship terms such as *mother* vs. *mother-in-law* and *stepmother*, etc. The asymmetry between marked and unmarked also enters into mathematical and logical symbolism: -5 is always negative, but 5 by itself can mean either the absolute value of 5, or $+5$; in logic, 'truth-value' means the truth or falsity of a given proposition. And, in certain fixed expressions, typically the order is unmarked then marked: *good and bad, high and low*, etc.

Markedness and Isomorphism

The correlation with markedness which is perhaps the most cited is that of isomorphism (iconicity) between form and content: formal complexity generally corresponds to conceptual complexity. For example, in general, an unmarked term will tend to either have zero expression or to be simpler in form than the nonzero or more complex marked term. Some examples are: in English, the singular of the noun has no overt expression (*cat*) but the plural has *s* (*cats*); words with derivational affixes are generally unmarked vs. their nonderived counterparts (e.g., *whiteness* is marked vs. *white*); in German, the marked

front rounded vowels (indicated by an umlaut) are associated with the marked categories of nominal plural, adjectival comparative and superlative, and verbal past subjunctive (e.g., *das Buch, die Bücher* 'the book, the books,' *hart, härter, härteste* 'hard, harder, hardest,' *er hatte, er hätte* 'he had, he should have'); and, in English, an active sentence has a simpler verb form and lacks the *by*-phrase of the passive and the verb *do* is used for (marked) negative, interrogative, emphatic predicates, whereas its absence is associated with the unmarked neutral predicate.

Of course, there are exceptions to this isomorphic principle in various languages, but these are typically seen to be rarer, abnormal, unnatural, and prone to instability: many types of language change or analogy (re)introduce isomorphism. For example, in Russian, where some of the doubly marked genitive plurals have no overt suffix, but the unmarked nominative singular does, many dialects have provided a complex, overt genitive plural: *jabloko* 'apple,' nominative singular vs. *jablok*, genitive plural, but dialectal genitive plural form *jablokov*.

Mark vs. Marker, Mark vs. Feature, and Contextual Markedness

Since the 1930s when markedness was first discovered, the original insight that marked and unmarked values are imposed on properties has been conflated with other closely allied phenomena by some linguists. For example, the overt expression of a grammatical category has been called a 'mark,' 'marker,' or 'marking,' or a form is said to be 'marked for' a given category if it is overtly expressed (e.g., *cats* is 'marked for' plural). This has led to some confusion when markedness and marker do not coincide, or when claims are made as to the theoretical importance of the correlation of these two factors.

Similarly, markedness has sometimes been equated with the presence of the plus value of a particular property (feature) and unmarkedness with its absence – i.e., being marked and having a feature are conflated. In other cases, markedness has been given up altogether and features treated as purely formal diacritics, as a classificatory scheme, in which the plus and minus values are symmetrical and interchangeable in principle. Therefore, for example, [+ voiced] is assumed to be marked by definition; *mother* is [+ female], {plural} [+ more than one], transitive verbs [+___NP], *pray* [+ human subject], *in* [+ containment] – and the plus feature is either by definition marked or markedness is not at issue. This evolution was due to a variety of factors. Early on, in phonology, for example, the presence of a given property (e.g., + voice) and especially of a secondary articulation (e.g., + glottalized) seemed by definition marked and their absence unmarked because there was an additional phonetic complexity to the marked sound which was missing in the simpler, unmarked one.

Other linguists claim, however, that mark and feature must be differentiated (the minus value of a feature may be marked), that marks can vary according to the simultaneous and/or sequential context, that the presence of an entity is not the same as markedness (thus, some secondary articulations may not always be marked), and that there are many phenomena that could not be explained withoutmarkedness. Considerations such as these led to major revisions in structuralist and generative phonology, beginning in the late 1960s. The basic change was to differentiate between mark and property/feature: a given feature (e.g., [+ voiced]) may be either marked or unmarked. If the markedness value is context-sensitive, there is a case of local or contextual markedness (markedness reversal or shift). Thus, for example, [+ voiced] is marked in stops and fricatives but unmarked in vowels (in English, voiceless vowels occur infrequently and only under special conditions – e.g., in whispering). Contextual markedness is also assumed to hold for combinations of segments: for example, voicing assimilation (e.g., agreement in voicing between all the consonants of a cluster) is unmarked, whereas lack of such assimilation is marked; thus, an unvoiced consonant is marked when in combination with a voiced one. In generative phonology (see Chomsky and Halle, 1968: ch. 9), such claims led to positing two levels of representation, a more abstract one in which features have the values U(nmarked) or M(arked) (e.g., U vs. M voiced in vowels), only M values contributing to the complexity of the grammar; and a less abstract one, derived from the first by marking conventions, which define the + / − values (U voice for vowels → + voice).

Contextual markedness and the differentiation of mark from feature have also been posited for grammar and semantics. In Frisian, singular is unmarked and plural marked for many nouns, but for a small class of nouns (e.g., body parts which come in pairs, domestic animals which usually occur in herds), plural is unmarked and thus served as the basis for analogical reformation. And, to use a crosslinguistic example, the nominative was the unmarked case in Classical Latin (it is the dictionary form and also the one used for book titles, etc.); but in Old French, which had a rudimentary case system (nominative vs. oblique), the nominative was marked, being used only for subjects, whereas oblique was unmarked; thus, for example, the modern French nominal forms come from the old obliques, not the nominatives (for a different point of view, cf. Mayerthaler, 1988: 50–65).

In like fashion, it has been argued that markedness shifts are prevalent in the lexicon: whereas there are many examples showing that the unmarked sex reference in English is male (as in *man/woman*), in animal names the female *cow* and *duck* are unmarked, whereas the male *bull* and *drake* are marked.

Such claims of reversals have proven to be controversial. For some linguists, grammatical and semantic markedness values can differ across languages and through time, but not in a given language at a given time: the plus value of a feature is always marked (thus *woman* in English is 'marked for' + female) and its opposite is not a minus value, but a zero value. Markedness is thus conflated with feature and no difference is made between unmarkedness and nonparticipation in an opposition (e.g., both *he* and *they* are 'unmarked for' + female). For others, phonological markedness values can shift from one context to another, but the value of a given feature in a given context is universal – for example, unvoiced vowels are always marked and unvoiced consonants unmarked. For still others, there are universal markedness conventions and language-specific deviations from them: the marked situation will not occur often nor be stable.

Other Examples of Markedness

Because markedness is correlated with issues of frequency, regularity, normality, and so forth, marked has also come to mean strange, deviant, unexpected, unusual in a given context, that is, stylistically marked: for example, some word orders are more literary, poetic, emphatic, etc., than others (the unmarked *I trust him* vs. the stylistically marked *him I trust*). The use of the present to refer to the past (the historical present, e.g., *and just as I was about to cross the street, John comes up to me and says* . . .) is a stylistically marked usage of the unmarked term. The inappropriate use of a form may be pragmatically marked: for example, *how do you do*? is unmarked when meeting someone new but marked in the middle of a conversation with a friend. In like fashion, categories may be sociolinguistically/socioculturally marked (e.g., nonstandard vs. standard usage, special jargon vs. everyday vocabulary); certain kinds of discourses/texts are marked (e.g., legal or scientific texts, performative speech acts); breaking the norms of a discourse type is marked (e.g., in cookbooks, the convention is that the directions go from start to finish and do not jump around), and so forth.

Concluding Remarks

Some linguists believe that markedness is a hallmark of human language precisely because it is a very simple idea which explains seemingly disparate facts in a variety of domains. They see simplicity and generality on the one hand and objective and empirical specificity on the other. But there are other linguists who feel that the original definition of markedness has been stretched so far as to be an unwieldy cover term for very different phenomena, especially since its definition changes across different theoretical traditions.

What has also proven to be controversial are the various attributes of markedness which have been discussed above: those who doubt the usefulness of markedness sometimes point to the proliferation of different criteria and their seemingly indiscriminate application to different domains. Those who use markedness debate about which attributes are necessary and/or sufficient to show markedness: for example, is one criterion all-important or is there more than one; if more than one, how do they interrelate; what if the criteria give conflicting results; are the criteria weighted or causally linked; are they absolute or probabilistic; are there degrees of markedness; can markedness be used for nonbinary sets; do the same criteria hold in all areas of language; etc.?

Indeed, this last question points to another area of controversy: namely, the range of application of markedness. Some restrict its application to just phonology or syntax, or see its validity within individual languages but doubt its universal applicability, while for others it can be applied both within a language and across languages. For some linguists it is a low-level theory needing explanation, whereas for others it is one of the major conceptual and explanatory achievements of contemporary linguistics. Finally, while some see it as strictly linguistic, others argue that it is a biological phenomenon, or that it is to be correlated with the cognitive and perceptual domains of prototypicality and perception (especially the figuremarked/ground-unmarked distinction), or they point to its application to human culture and to other symbolic/semiotic systems. Indeed, for these scholars, markedness is explanatory not just for language, but also for human behavior in general. They claim that it is a characteristically human trait to conceive of phenomena as binary and asymmetrical, that is, marked and unmarked.

See also: Syncretism.

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Marketing and Semiotics: From Transaction to Relation

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Introduction

Marketing is an ambiguous domain within the scientific disciplines of economics, management science, and organizational studies (Kotler, 2003). First, marketing is mostly regarded as a functional part of every firm or organization, comparable to the administration or financial department, the production or service department, or the IT department. It is internal within a firm or company. Second, marketing is that process that connects outsiders, customers, or other companies to the firm itself. This implies that marketing is also (partly) external. Third, marketing is about the ways and processes – by texts, images, icons, and persuasion as well as deception – of selling products, services, and other activities to customers in general (Umiker-Sebeok, 1987).

The internal and partly external perspectives connect marketing to organizational issues, and the communication and transfer perspective connects marketing to psychology, management science, and communication. The ambiguity of the marketing domain returns in the relation between marketing and semiotics (Umiker-Sebeok, 1987). The organizational perspective is interesting for semiotics, because it deals with models, designs, and what Simon (1969) called 'artefacts or 'artificial structures.' And models, designs, and structures are kinds of sign or symbol systems. The psychological perspective returns in the discussion about the way products, services, and assets in general are advertised or communicated from the organization to the customer, via icons, symbols, pictures, and images (Hoytink, 2004). The characteristics of these signs are also an elementary part of semiotics.

The remainder of this article will keep this multi-interpretative domain of marketing in mind as it examines the nature of marketing and its relationship to semiotics.

To understand the role of marketing, we will first present the basic structure of a firm or company and the role of the marketing function. Then we will describe this structure as not something given, but something that develops and changes. Next, we will consider marketing as an artificial structure having special characteristics. Finally, we will take the field of semiotics and relate the various aspects of marketing that have been discussed with it.

The Firm as a Kind of Organization

Basically, a firm is a kind of organization. The essential characteristic of this kind of organization is that it is mostly working on a profit basis. As an organization, it can have many organizational forms, from a hierarchy to a clan. Many coordination mechanisms

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Marketing and Semiotics: From Transaction to Relation

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can be used, such as standardization of tasks, power, or professional expertise. In organizational literature (Daft, 2000) it is argued that an organization (or a firm) exists because of the many processes that are carried out. Sometimes the processes themselves are conceived of as independent entities (Allport, 1962). Daft (2000: 12), for example, says that "organizations are social entities that are goal directed, are designed as deliberately structured and coordinated activity systems and are linked to the external environment." Sorge (Sorge and Warner, 2001) says that two meanings of organization should be discerned: social unity (or collectiveness) and organizational properties. In more general terms, an organization can be defined as the simultaneous functionalization and coordination of human actions with regard to objective goals. In this definition, the emphasis is on actions that can be integrated in tasks that in turn are constituting elements of processes (Gazendam, 1993; Thompson, 1967).

The recurring theme in definitions of organization is 'process,' or what is more relevant here – 'marketing process.' A process is an action in its progress. A process consists of tasks that are executed by human individuals. Besides the processes, human individuals or actors are the 'building stones' within organizations. We, therefore, view an organization as a multi-actor system (Gazendam and Jorna, 1998). An organization is rooted in the individuals that are part of the organization and can think for the organization. As Sorge (2001: 7) says: "Of course, there would not be any organization behavior without human behavior." The basic ingredients of an organization are the intelligent actors. This means that there exists a nesting of (a) actors within organizations, and (b) organizations within actors. The first nesting means that an organization always consists of a collection or group of actors (Gazendam *et al.*, 2003). This makes an organization a multi-actor system. The second means that a set of actors can form an organization, but only in the sense that an actor can think of and reason about what the **other** actors can do. The other actors in turn have opinions and beliefs, that is to say, representations, about the first actor. This implies that an organization as a construct consists of the overlap and sharing of individual representations. Organizations are the result of shared representations of actors.

The multi-actor (process) view of a firm puts individuals at the center of any organization, but also nested within processes. Roughly, two kinds of processes are discerned within any organization: 'primary' and 'secondary' processes. The primary processes are related to the main goal of the organization: hospitals are for curing people, bicycle factories for producing bikes, and trains for transporting people and goods. Secondary processes are the organizational processes that make things happen, from the IT department to the accounting department. Marketing is here again difficult to position. If it is related to matching products and services with customers, it is a primary process; without customers, firms do not exist for long. If marketing is related to the organizational processes of having the services and products delivered to customers, it is a secondary process. The developments of marketing over the last 50 years show a gradual change from mostly a secondary to more of a primary process. We will come back to this development later in this article.

A vital question for understanding the essence of the concept of a firm is: what are the essentials of being in business? Organizations are complex systems with many subsystems that are highly valued by all stakeholders: finance, production, research and development, human resource management, sales, services, after-sales, call-center, and the board of directors. Being in business, however, refers only to the ability to create a match between a product or service and a customer. Without this match there is no business. All subsystems aim to contribute to create this match, but none of them is critical. In principle, every subsystem can be outsourced. An entrepreneur can hire a person to handle finance, he can hire facilities for production, and even the board of directors can be regarded as only a formal, legally required instrument. The know-how to create this match is the real core of business – making sure customers find products and services and developing services and products for customers. It is this complex process that is the reason for the existence of marketing.

Marketing can therefore be a way of thinking as well as a way of acting. Marketing can, in fact, be organized in a formal department. Because of the complexity of many matching processes in the market, most companies have comparably complex organizational structures for this specific competence of 'making things happen.'

Although the fundamentals of marketing have existed through all time (it is often argued that being a marketer is the second oldest profession in history), the development of marketing as a professional activity has developed from the beginning of the 20th century. Especially after World War II, when abundance in the Western world was rapidly growing, the professionalization of marketing took place. In the next section, this development will be outlined. In this section, the basic and widely used interpretation of a professional marketing approach will be shortly introduced.

Marketing deals with buying processes and decision-making units of customers. In the recent

past, this seemed to require complex procedures and structures for which it was far too complicated to build reliable causal models to predict and manage the outcome. Therefore, the marketing professional was merely regarded as an artist – a magician able to develop successful advertising campaigns or the guru capable of designing that one desirable product every potential customer needed to buy. The need to manage all these marketing efforts demanded the development of systematic management techniques. Until the 1990s, there was only limited success for this effort. Marketers and their managers were destined to use less powerful approaches. Widely used and known by almost everybody in the marketing field is the so-called '4P scheme' (Kotler, 2003). A sound marketing plan should address at least four essential areas:

1. **P for Product**: A detailed description should be given of the product portfolio, including assortment choices, innovation plans, and product management;
2. **P for Price**: A profound pricing strategy dealing with price listings, negotiation tactics, and discount strategies;
3. **P for Promotion**: Only customers aware of the products can potentially become buyers; therefore, advertising, free publicity, and direct mail activities should be planned carefully;
4. **P for Place**: Referring to the distribution strategy, with decisions about which channels to the customers have be used – personal selling, mail, Internet, TV sales and so on.

It will not be easy to find a marketing plan, even today, that doesn't include these four Ps. They stand like an icon that is recognized by literally everyone in the field. In the next section, recent and fundamental improvements in marketing concepts will be outlined.

Developments in Views on Business and Marketing

Development of Marketing Concepts

Although the concept of the '4Ps' of marketing has been shown to be dominant and resilient over the decades, significant changes in the marketing paradigm have been documented. We can place the most important developments in an indicative timetable (Table 1). In every decade, characteristic developments in marketing thinking and typical management instruments are outlined.

In summary, over the past four to five decades the attention of marketers shifted from the bare transaction to building relationships with customers. It is believed that these relationships will produce many transactions over a long period of time. The aim towards loyal customers, referred to as 'defensive marketing,' will yield higher margins (Reichheld and Sasser, 1990). A customer becomes a loyal customer only after a strong relationship has been built. Frequent and well-planned contacts between the organization and the customer are essential. The

Table 1 Relations between Supplier, Customer, Actor (Agent) and Shareholder over four decades[a]

Decade(s)	*Focus*	*Graphical representation*	*Typical business concepts*
1960/1970	Transaction	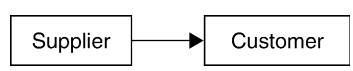	4Ps marketing concept Quality management Customer retention Budgeting approach
1980	Competition	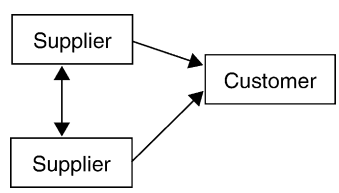	Value chain concept Strategic management Customer choice Resource allocation
1990	Shareholder	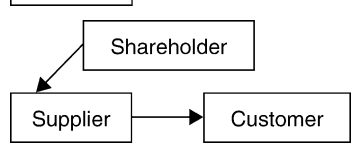	Financial value Rationalizing the business Customer loyalty Balanced Score Card
2000	Relations/Stakeholders	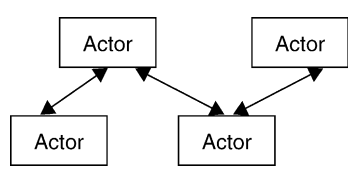	Interaction with customers Management of relations Customer experience Beyond budgeting

[a]Right arrow: directed; double arrow: interacting/competing.

organization is merely an experience to the customer; the company's value to the customer overrules the actual product value. This type of organization typically uses modern control techniques, like rolling forecasts or even the so-called 'beyond budgeting' (Waal *et al.*, 2004).

In the 1960s marketers fully focused on transaction. The match itself between product and customer was regarded the sole focus of the marketer. While from the 1990s on, there existed a 'buyer's market,' the 1960s were a typical 'seller's market.' The rise of 'quality management' (Juran and Godfrey, 1998; Crosby, 1992) is an example of the understanding that was typical for those years. High-quality products will sell themselves. The customer would choose the best product and was capable of keeping in mind from whom he bought the product. Customer retention was the only effect marketers intended to improve. Typical product-oriented advertising campaigns filled TV screens and newspaper advertisements. Control mechanisms were limited to classical budgeting techniques.

The 1980s showed important progress in marketing thinking. Due to the gigantic influence of the ideas of Michael Porter (Scott *et al.*, 1980; Porter, 1985) and Buzzell (Buzzell and Gale, 1987), marketers became aware of the fact that customers were capable of making choices. Strong emphasis was laid on competitive strength. Qualitative products needed a competitive advantage to be sold. Customers made choices, and influencing these choices was thought of as a strategic activity. Profitability was strongly related to the market share a company was able to realize. Strategic planning became more important than ever, and larger companies created formal strategic departments. Control mechanisms improved from simple budgeting into more intelligent resource allocation models.

The 1990s started in enormous abundance, everything (Western) mankind could dream of seemed to be achievable, until economic setbacks and technological frustrations did put business 'back to business' itself. A huge rationalization in management took place. Chief Executive Officers (CEOs) instituted enormous cost-cutting programs. A strong orientation to shareholder value and therefore on profitability was introduced at all levels of the organization. Control mechanisms like the Balanced Scorecard (Kaplan and Norton, 1999) clearly required the balancing of all expenses against the profitability of the company. Customer loyalty was important simply because loyal customers did improve profitability in a significant way (Reichheld and Sasser, 1990).

Specialization Areas in Marketing

Over the decades, the 4Ps became enriched by a paradigm shift from transaction to relation. The marketing field was influenced by the development of several areas of specialization. Scientists and practitioners experimented and documented these attempts quite well, and professionals realized that not all marketing efforts were alike. In stipulating these differences, new areas of marketing besides the traditional one between firm and customer were born and studied:

1. Business-to-business marketing
2. Not-for-profit-marketing
3. Marketing of services.

'Business-to-business marketing' strongly contrasts with business-to-consumer marketing. Consumer marketing deals with transactions (and relations) with the final customer, the user himself. Business marketing deals with transactions (and relations) upwards in the value chain. In business marketing, transaction processes are viewed as more rational, while consumer transactions are merely emotional. Business marketing deals with influencing decision-making processes, while consumer marketing emphasizes the impulse orientation of the consumer. As a result, in consumer marketing one typically speaks of sales management. Within business marketing, account management is the current practice. Basically, the fundamentals of marketing thinking do not differ, but the way in which they are applied is rather different (Webster, 1991).

Marketing is about earning money, and it has taken quite a bit of time for 'not-for-profit companies' such as the Red Cross, cancer foundations, or social activist organizations, to realize they also have customers. Not-for-profit companies also exist because they have the ability to have successful relationships with customers. The exchange in the transaction is different: money is given to the company in exchange for their promise to do something for a good cause – healing people, investing in fundamental medical research, or achieving other social goals. Customers have to be influenced to understand and value the mission of the organization and its well-being, although a direct benefit to the customer is often lacking. This is marketing in its very essence, and therefore has developed as a specialty (Ramaswamy, 1996; Shapiro, 1992).

'Marketing of services' is rather new, but today a 'product' is defined as "any product, service or idea that can be exchanged for another product, service or idea (preferably money)" (Pride and Ferrel, 1993; Lovelock, 1991). The difference between a product

and a service has strongly influenced marketing activities over time because a product is tangible and a service such as road-assistance contracts or a ticket to a football game is non-tangible. At the selling moment, a service only appeals to the imagination or existing representations of the customer. Service cannot be produced from stock, while products, like cars or bananas, can be produced from stock. For services, there is a strong emphasis in the sales process on creating an image for the customer. The mind, or rather the representations or images customers have, is where the marketer must contact the customer – or to put it in marketing terms – 'attack.' Again, major theories in marketing stay the same, but their applications and operationalizations are quite different, leading to a vast separate area of marketing expertise, i.e., services, as Lovelock (1991) showed.

Marketing as an Artefact

In his book *Sciences of the artificial* (1969), Simon demarcated the borders of a science of the artificial or 'artificial systems.' An artificial system is any system made by man, on purpose or not, that is designed, structured, and implemented – from city planning and countryside maintenance to television and radio programs. In fact, most systems in our everyday life are artificial. These systems can imitate the properties of natural systems without being themselves natural. Artificial systems are mostly expressed in terms of function, goal, and adjustment. We can discern simple and complex artificial systems. Simple artificial systems have a simple structure and their behavior can easily be predicted. Complex artificial systems are able to exhibit unpredictable behavior. Simple systems often are a part of complex artificial systems.

Marketing is a powerful artefact, but an artefact nonetheless. If we transfer the notion of the artificial to marketing, we can also distinguish simple and complex artificial systems. For example, it may be possible to assess the behavior of one customer for a certain marketing purpose, but doing the same for a large group of customers is extremely difficult. Customers may influence one another, customers do not have stable opinions, customers have partly contradicting opinions, and – on top of that – there is also a difference between marketing of products and of services.

The notion of artefact was also introduced by Simon to make a cross section through the 'monodisciplines.' Marketing itself does not belong to just one scientific field. It has relations with psychology, communication studies, economy, management studies, and business development, to name but a few. As a field of study, marketing is not tangible, and even for concrete products like cars or furniture, it can be positioned at the individual, the group, or the societal level: between seller and buyer, between customer and firm, and between firms mutually. As Nöth (2000) put it, marketing is by all means a form of symbolic action, or a conglomerate of symbolic actions, demarcated by the constraints of financial and legal structures. This perspective on marketing as an artefact and as a form of symbolic action brings us to the semiotic aspects of marketing. We see three relations with semiotics: (a) marketing (and firms) as semiotic structures themselves (Goodman, 1978), (b) assets, materials, goods, and services that are transferred by means of signs (Williamson, 1978) and (c) signs (brands, trademarks, or trade names) that are themselves treated as assets (Levy, 1978).

Semiotics and Marketing

Modeling marketing: Semiotics is of relevance for the modeling or designing of the processes, structures, depictions, and representations that we use in making sense of what we call a 'firm,' an 'organization,' or in more detail, a 'marketing activity.' In using labels, arrows, boxes, and connecting graphs on the one hand, and words and expressions on the other, we represent the trading and transaction activities that take place in what we call 'firms.' Two opposing positions can be discerned. First, the marketing models stand for what happens in man-made reality. This is a classical position in that the model is an adequate or true representation of marketing reality. Second, the other position states that the models create marketing activities. There is no true representation of reality – reality is created by the representation. The first can be called the 'positivist' position, and the second can be called the 'nominalist' or 'conceptualist' position. Most marketers do not look at their businesses in the second way; they mostly see them from a positivist perspective. You have something that you want to sell, and that means that you need a process that makes that happen. Models are needed to explain and predict what marketing does. However, in the last 15 years, the abundance of very sophisticated quantitative statistical techniques to assess customers and firms has increased so tremendously that often marketers do not know any longer what their models stand for. It seems that the techniques create realities. We call this relation of semiotics with marketing 'the modeling issue.'

Assets communicated by signs: The best-known relation of semiotics with marketing is the fact that every action of selling or buying has to be accompanied by texts, pictures, icons, diagrams, or gestures. The most common expressions are advertisements

(Holbrook and Hirschman, 1993; Larson *et al.*, 1991). This implies, first, an analysis at the level of pragmatics. What information in what wrapping is most effective in having my product or service sold? And should it be information, or should it be emotion, or feeling, or status? Second, there is also a semantic discussion involved here. What meaning or what sense can or should be given to certain products or services? Third, we are brought to the bottom semiotic discussion of what signs type are most effective in what setting. This ranges from icons, one-liners, and tunes to persuasive texts, humorous clips, and idols. Because marketing developed from transaction to relation, as we stated earlier, this process of communication, persuasion, advertisement, and false representation has become extremely important. Knowing a customer, connecting to a customer, and earning respect and trust from a customer require interpretation, knowledge-building, and establishing emotional contact with the customer. In this respect, modern developments in marketing are really working with semiosis (as sign interpretation and sign understanding), although we doubt whether any particular marketer will see it this way.

Signs as assets: Marketing is developing toward being an overarching field where communication, persuasion, information, deception, commercializing, and merchandising are strongly interconnected. If a firm invests a great deal of money to have its name, brand, or trademark deeply rooted in the minds of customers, the brand itself becomes of value. Logos and images are classical examples. In the perception of marketing as building a relationship with a customer instead of only selling a service or product, the relationship itself is the value of a firm. This value is not the price of the product or service, but a deeply felt representation of the customer that a firm is doing the best it can to entertain, support, and elaborate this relationship. When Shell underrated the manipulation possibilities of customers when it decided to sink the Brent Spar (a big oil storage platform) and then changed its decision, it realized that the image of Shell – its representation in the eyes of the customers – was an asset. Many other examples – from Coca-Cola changing its products to Microsoft taking viruses and spam more seriously than they had previously – can be found where a sign – the representation – is a bigger asset than the profit, turnover, or sales of the firm.

Marketing is a relatively new interdisciplinary domain in which theory development has just started. It had been basically connected to (profit) firms, but emerged in the service, governmental, and not-for-profit domains of society. Marketing has a mixed position in everyday life because, on the one hand, it communicates and informs, but on the other hand, it uses propaganda and deception. It will continue to work with signs of all kinds, but these signs will become more dynamic, more complex, and more combined in order to reach new citizens and consumers who are increasingly accustomed to working with the latest innovations in information and communications technology devices.

See also: Brands and Logos; Discourse Processing; Organizational Discourse; Organizational Discourse.

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Marketing: Semiotics

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Marketing is communication between marketers and consumers, with the purpose of directing the flow of products, services, information, ideas, and emotions from producers to consumers; it creates, satisfies, and reacts to demands, desires, and fashions of the marketplace in a process that involves the exchange of cultural, economic, and ideological values (Kotler, 1987: 3; Werner, 2004). The study of signs, meanings, and communication in the processes of marketing and the consumption of goods is a research field of applied semiotics, the 'semiotics of marketing' (*see* **Semiotics: History**).

Signs and Messages of the Marketplace

Marketing is not possible without language. The art of selling and creating involves a verbal rhetoric and a vocabulary of its own, and the word formation of brand names is a complex branch of linguistics with special relevance to marketing and economics in general (Piller, 2000). However, the marketplace is also the locus of countless nonverbal signs, whose study requires analytical tools of a general theory of signs. The gestures and facial expressions of the vendors and sales promoters are part of a nonverbal rhetoric of marketing; visual and musical messages support advertising campaigns in the media with nonverbal means; product and packaging design makes the object of exchange a material message, whose sender is the marketer and whose receiver is the consumer (Fritz, 1994; Nöth, 1998); logos and trade marks are indices both of a brand image and of corporate identities that contribute to the easy identification of the product in the multitude of goods available in the marketplace (Semprini, 1992; Gallert, 1998); and facts and myths concerning the utility and quality of the product, propagated by advertising campaigns, create a brand image that results in a complex semantics of goods (Aronoff, 1985). The marketplace is a stage of nonverbal communication, a communicative space where marketers and consumers meet to exchange goods, ideas, and values; it is everywhere in consumer societies, at home (mail, newspaper, telephone, television), in the street (machines, street vendors), at the local supermarket, the shopping mall, the industrial fair, the office, or on the World Wide Web.

Survey of Semiotic Approaches to Marketing

Semiotics, the general study of signs and sign processes, has provided analytical tools for the analysis of verbal and nonverbal processes of marketing communication. The semiotics of marketing is a branch of applied semiotics, and an interdisciplinary field of research that investigates the signs, meanings, and communicative processes involved in marketing.

General surveys and discussions of semiotic research in marketing communication are Hetzel and Marion (1995), Mick (1997), Nöth (2000: 508–509, 531), Pasquier (1999), and Werner (2004). Volumes

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Marketing: Semiotics

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with collections of articles on the topic are Umiker-Sebeok, ed. (1987), and Larsen *et al*. (1991). Monographs dedicated to the topic are Floch (1990), Semprini (1992), Pasquier (1999), and Werner (1999). Special issues of journals on semiotic approaches to marketing are *International Journal of Research in Marketing 4(1–2)* (1988), *Quaderni di ricerche semiotiche 1(2)* (1987), and *Semiotic Inquiry 8(3)* (1988).

Closely related to the semiotics of marketing are three research fields of economics, which aim to interpret the flow of goods and services from producers to consumers. This is not as a process of production and distribution to satisfy consumer needs, but as an exchange of symbols between senders and receivers: the theory of symbolic consumption (Levy, 1959, 1978), consumer aesthetics (Hirschman and Holbrook, eds., 1981), and the semiotics of consumer behavior (Holbrook and Hirschman, 1993; Lambkin *et al*., 1998).

Verbal Exchange and the Exchange of Goods

There are differences and analogies between the flow of words in a dialogue and the flow of goods from producers to consumers in return for the flow of money in the opposite direction. Words and sentences in a dialogic exchange are immaterial, whereas goods and money in economic exchange evince materiality. Furthermore, the participants in a dialogue speak one and the same language, while producers and consumers of commodities speak and reply in two 'languages,' those of goods and of money (Coulmas, 1992). Semiotic features in common are that both words and goods are signs and constitute systems of values (Nöth, 1996).

Karl Bühler discussed "the exchange of goods" as "the counterpart of sign circulation" and described goods as signs with "symbolic values" (1934: 60–61). His focus was on trademarked goods, which evince two further parallels with words: conventionality and type-token structure. The conventionality of trademarked goods guarantees the sameness of their values in marketing and consumption. A product with a trademark, just like a spoken word of a given language, is a token of a more general semiotic type, namely its brand. According to Bühler, one of the differences between verbal signs and goods is their material quality. While material sameness is decisive for the value and the identification of a trademarked product, words are relatively flexible as to their phonetic realization, since they allow for much variation in voice, tone, and articulation.

Verbal Signs, Goods as Signs, and the Marketplace as a Sign System

Karl Marx set up the following parallels between goods and language signs: "Value . . . converts every product into a social hieroglyphic. Later on, we try to decipher the hieroglyphic, to get behind the secret of our own social products; for to stamp an object of utility as a value, is just as much a social product as language" (1867: 79) (*see* **Marxist Theories of Language**).

F. de Saussure, extending the analogy between words and goods to the level of the systems, argued that linguistics and economics are both "concerned with a *system for equating things of different orders* – labor and wages in one and a signified and signifier in the other" (1915: 79). In a comparison between the value of a loaf of bread worth five francs and the value of a word in a language, Saussure concludes (1915: 115) that both goods and words are signs displaying relations of similarity and dissimilarity within the systems to which they belong (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**). Both consist of signifiers and signifieds, which are dissimilar; the loaf of bread's use value is dissimilar to its monetary *exchange value*, and a word is dissimilar to its meaning. At the same time, there are relationships of equivalence. In the system of economic objects, all goods of the same monetary exchange value are equivalent in this respect, just as verbal synonyms are equivalent to their semantic value or word categories to their syntactic value. Like the phonemes and words of a language, the goods of the marketplace form not only a system of paradigmatic relationships, which consists of their structures of equivalence, but also a system of syntagmatic relationships. The order and arrangement of food products in a supermarket or on a dinner table, the furniture in a living room, or clothes worn according to the rules of culture and fashion testify to a syntax of possible and excluded combinations of goods in everyday life.

Like words, goods are polysemic signs associated with a plurality of meanings not inherent in the goods themselves but generated in the marketplace. Products not only denote their use and exchange values, but also connote sociocultural, aesthetic, emotional, or mythical meanings (Nöth, 1998). The semiotic system of goods and services is a system of differences par excellence, since the discourse of the marketers tends to maximize the differences and minimize the similarities between the products in their attempts at making their offerings appear unique.

Self-Referential Words and Goods

Words refer to objects (their referents) just as goods refer to their practical utility and the needs they may satisfy (their *use value*). As such, both kinds of signs have reference to something else not inherent in themselves. In poetry and art, signs become self-referential when their purpose is no longer to convey a message but to communicate words as words (pure play of sounds) or visual forms as pure forms. It is a characteristic of affluent societies that the messages of the marketplace can become self-referential, too. Goods that do not satisfy needs or fulfill a practical purpose, such as gadgets or objects of fashion and luxury, are self-referential signs whose value exists only within the system created by the market. Consumers buy such goods not because they need or enjoy them, but because the market dictates their value and prescribes their purchase as a necessity.

The semiotic implications of affluent markets determined by such principles of economic self-reference have been the topic of the ideological critique of Baudrillard, which culminated in the argument that goods under such circumstances are signs whose signified is abolished in favor of a pure "play of signifiers" in which "the signifier becomes its own referent and the use value of the sign disappears to the benefit of its . . . exchange value alone. The sign no longer designates anything at all. It approaches its true structural limit which is to refer back only to other signs" (1973: 127–128). Irrespective of their use value, goods whose brand connotes nothing but status, prestige, or fashion, are signs that have become mutually exchangeable according to Baudrillard (1972: 64): "Dissociated from its use value, the object can now just as easily be a vase or a refrigerator, or, for that matter, a whoopee cushion. Properly speaking, it has no more existence than a phoneme has an absolute meaning in linguistics .... It finds meaning . . . in difference," in a "code of significations." With this ideological critique of a consumer society in which the use value of objects is no longer determined by the consumers' needs, but by the tyranny of the market and a semiotic system that produces needs which are only needs of the market itself, goods are no longer true signs, but simulations of a sign relation in which the signified is "abolished in favor of the sole profit of the play of signifiers." In the end, "the signifier becomes its own referent, and the use value of the sign disappears leaving the benefit of its commutation and exchange value alone. The sign no longer designates anything at all. It approaches its true structural limit which is to refer back only to other signs" (Baudrillard, 1973: 127–128).

See also: Marxist Theories of Language; Saussure, Ferdinand (-Mongin) de (1857–1913); Semiotics: History.

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Mark-up Languages: Speech

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Until fairly recently, the web has primarily delivered information and services using visual interfaces, on computers equipped with displays, keyboards, and pointing devices. The web revolution had largely bypassed the huge market of customers of information and services represented by the worldwide installed base of telephones for which voice input and audio output provided the primary means of interaction.

VoiceXML 2.0 [VXML2], a standard recently released by the W3C [W3C], is helping change that. Building on the market begun in 1999 by the VoiceXML Forum's VoiceXML 1.0 specification [VXML1], VoiceXML 2.0 and several complementary standards are changing the way we interact with voice services and applications by simplifying the way these services and applications are built.

VoiceXML is an XML-based [XML] language, designed to be used on the Web. As such, it inherits several key features common to all XML languages:

- It leverages existing Web protocols such as HTTP to access remote resources.
- Any tool that is able to read or write XML documents can read and write a VoiceXML document.
- Other XML documents can be embedded in VoiceXML documents and fragments; similarly, VoiceXML documents can embed other XML documents and fragments. This the case with SRGS and SSML, which are described later.

As mentioned above, VoiceXML 2.0 is one in a number of standards that the W3C Voice Browser Working Group is defining to enable the development of conversational voice applications. The specifications making up the Speech Interaction Framework are the following:

- Speech Recognition Grammar Specification 1.0 [SRGS]
- Speech Synthesis Markup Language 1.0 [SSML]
- Semantic Interpretation for Speech Recognition 1.0 [SISR]
- Call Control Markup Language 1.0 [CCXML].

This article provides a short introduction to VoiceXML, as well as SRGS, SSML, and SISR, for building conversational web applications. CCXML is an XML-based language exposing telephony and call control functionality for such applications as conference call bridges and call routing. CCXML, however, is beyond the scope of this article.

Building Conversational Applications using VoiceXML

Menu Element

Most VoiceXML dialogues are built from one of two elements. The first of these is the <menu> element. A VoiceXML menu behaves much like a collection of HTML links.

A VoiceXML menu has a <prompt>, which contains SSML content, and one or more choices, each identified by a <choice> tag. Each choice consists of a phrase indicating what the user can say, as well as a link to the next VoiceXML document to be executed.

Consider this <menu> example:

```
<vxml version = "2.0" xmlns = "http://www.w3.org/2001/
  vxml">

  <menu>
    <prompt> Say one of: <enumerate/></
  prompt>
    <choice next = "http://www.example.com/
  sports.vxml">
      Sports scores
    </choice>
    <choice next = "http://www.example.com/
  weather.vxml">
      Weather information
    </choice>
    <choice next = "#login">
      Log in
    </choice>
  </menu>

</vxml>
```

Marr, Mikolai Jakovlevich (1864–1934)

V M Du Feu

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Marr was born in Kutaisi, a small town on the Black Sea coast in Trans-Caucasia. His father was a Scotsman who died (reputedly at the age of 95) when Nikolai was eight years old; his mother was Georgian. He studied at the local grammar school, then went on to do oriental languages at St Petersburg; this included Turkic, Semitic, and Indo–Iranian. In 1891 he obtained a university appointment, and by 1912 was a member of the Academy.

His great service to Armenian and Georgian linguistics was the series of texts and accounts of research published between 1900 and 1915. His disservice – in the eyes of most linguists – lay in his attempts, especially from 1908 onward, to prove a genetic relationship between the Semitic languages and Georgian, and to group them under the term 'Japhetic.' Next he envisaged Japhetic as a stage not only in the early linguistic map around the Mediterranean, where a pre-Indo–European Pelasgian substratum had been mooted ever since the mid-19th century, but also in the ontogeny of language, and he sought 'primeval' forms in Japhetic, arriving eventually (1926) at just four syllables – *sal, ber, yon, rosh*. Human language he saw developing from these elements by stages ('stadia') which were provoked by economic changes. The notion of 'stadiality' was taken up by Stalin, and Marrism became part of Marxism in the Soviet Union in 1929. It remained the official line until Stalin's denunciation of it in 1950. By this time Marr had been dead for 16 years.

The 20 years of official Marrism led on the positive side to a great deal of work on Caucasian, Turkic, and Paleo-Asiatic languages which had hitherto been little studied and often had no written forms. The encouragement of minority languages had been part of Lenin's platform, so Marr's wide-flung interests fitted the bill. However, on the negative side, because of the strongly political nature of the official support, Marrism virtually cut Soviet linguists off from main linguistic developments in Western Europe and the United States, and even led to the 'disappearance' of some of them. Since it was also the framework of the linguistic formation of some generations of scholars, Marrism might be said to have laid the foundations of the (granted more scientific looking) Nostratic theory linking Dravidian, Hamitic, Altaic, Anatolian, Tungusian, Akkadian, etc., as providing evidence of a widespread proto-language, a notion propagated by the late Illich-Svitich in the 1970s, and supported by the eminent I. I. Ivanov in the 1980s. This current Nostratic theory may be dismissed, but its methods, *rapprochements* on the basis of very thin evidence, are very much in the negative line of Marr's work. Whatever the ultimate judgment of a history of linguistics on the work of N. J. Marr, an appreciation of the results of the dominance of Marrism between 1930 and 1950 is vital to the understanding of subsequent attitudes among many Russian and former Soviet linguists.

See also: Marxist Theories of Language.

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Marshall Islands: Language Situation

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The Republic of the Marshall Islands is a Pacific state comprising 29 atolls and five tiny islands in two parallel chains running northwest to southeast just north of the equator in Micronesia. The total land area is about 180 square kilometers (69 square miles), scattered across about 750 000 square kilometers (289 575 square miles) of ocean.

The Marshall Islands were initially settled more than 2000 years ago by Austronesian speakers. The Marshallese remained skilled ocean voyagers, and there is evidence of regular contact with other Pacific groups. However, the Marshallese remained isolated from Western influence until the arrival of whalers and missionaries during the 19th century. A German

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See also: Marxist Theories of Language.

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protectorate from 1885 until 1914, the Marshall Islands was a Japanese colony until 1944, when it was taken over by the United States until full independence in 1986. Best known as the site of U.S. nuclear testing at Bikini atoll, the Marshall Islands retains close ties with the United States, and Kwajalein atoll remains a missile testing range. Two-thirds of the population live in the national capital on Majuro atoll and on Ebeye, a shanty-covered islet housing workers at the Kwajalein range.

The country is home to one indigenous language spoken by most of its 57 000 inhabitants. Marshallese is a Nuclear Micronesian language within the Oceanic branch of Austronesian, most closely related to Ponapean (Pohnpeian), Kosraean, and Kiribati. The linguistic origin of the Micronesian grouping is not certain but is likely to have been the Solomon Islands or Vanuatu. Marshallese has two major dialects, one associated with the eastern Rātak ('sunrise') Chain, the other with the western Rälik ('sunset') Chain. Within each a few subdialects exist, particularly on Ujelang in Rälik and Mejit in Rātak. The Rātak dialect has slightly higher prestige because of early Bible translations, but a koine is emerging in Majuro and Ebeye. Despite the vast distances, dialect divergence is small and limited to phonology and lexicon. No grammatical differences have been reported. The language is also spoken by a migrant community on Nauru.

German and Japanese had negligible lasting effects on Marshallese. However, the English language and American culture have had a substantial impact on Marshallese life. Many cultural practices have been abandoned and the associated terminology largely lost, and several ritual languages are no longer used. Marshallese and English are joint official languages. Marshallese is the language of government, and a language commission was established by legislation in 1983 to preserve, develop, and encourage the use of Marshallese. However, English is favored by the elite and educated. Marshallese is the language of education at the primary level, and English is used at the secondary level.

See also: Austronesian Languages: Overview; Language Education Policies in the Pacific; Malayo-Polynesian Languages.

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The Norwegian Celtologist and Runologist Carl Marstrander studied Classical Philology and Indo-European languages at the University of Kristiania (now Oslo) until he got a scholarship to go to Ireland in 1907. From 1908 he was a research fellow in Indo-European linguistics at the University of Kristiania, and in 1910–1913 he was Professor of Celtology and Comparative Linguistics at the School of Irish Learning in Dublin. From 1913 until he retired he was professor of Celtic languages at the University of Kristiania/Oslo.

Marstrander conducted many field studies in different Celtic-speaking areas: Blasket (1907), Bretagne (1919–1922), and Manx (1929, 1932), and he led a linguistic survey of the Gaelic dialects of Scotland from 1937 on. But although he had a lively interest in the living Celtic languages, little of this material was published; his published work mostly concerns older stages of Celtic. During his time in Dublin he edited the first fascicle of the Royal Irish Academy's *Dictionary of the Irish language based mainly on old and middle Irish materials*. He also approached Celtic from a comparative Indo-European point of view, as in his work *Observations sur les presents indo-européennes à nasale infixée en celtique* (Christiania, 1924), and he worked on other Indo-European languages: in his *Caractère indo-européen de la langue Hittite* (Christiania, 1919), he was among the first Indo-Europeanists to accept Hrozný's decipherment of Hittite and the conclusion that the language was Indo-European.

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protectorate from 1885 until 1914, the Marshall Islands was a Japanese colony until 1944, when it was taken over by the United States until full independence in 1986. Best known as the site of U.S. nuclear testing at Bikini atoll, the Marshall Islands retains close ties with the United States, and Kwajalein atoll remains a missile testing range. Two-thirds of the population live in the national capital on Majuro atoll and on Ebeye, a shanty-covered islet housing workers at the Kwajalein range.

The country is home to one indigenous language spoken by most of its 57 000 inhabitants. Marshallese is a Nuclear Micronesian language within the Oceanic branch of Austronesian, most closely related to Ponapean (Pohnpeian), Kosraean, and Kiribati. The linguistic origin of the Micronesian grouping is not certain but is likely to have been the Solomon Islands or Vanuatu. Marshallese has two major dialects, one associated with the eastern Rātak ('sunrise') Chain, the other with the western Rälik ('sunset') Chain. Within each a few subdialects exist, particularly on Ujelang in Rälik and Mejit in Rātak. The Rātak dialect has slightly higher prestige because of early Bible translations, but a koine is emerging in Majuro and Ebeye. Despite the vast distances, dialect divergence is small and limited to phonology and lexicon. No grammatical differences have been reported. The language is also spoken by a migrant community on Nauru.

German and Japanese had negligible lasting effects on Marshallese. However, the English language and American culture have had a substantial impact on Marshallese life. Many cultural practices have been abandoned and the associated terminology largely lost, and several ritual languages are no longer used. Marshallese and English are joint official languages. Marshallese is the language of government, and a language commission was established by legislation in 1983 to preserve, develop, and encourage the use of Marshallese. However, English is favored by the elite and educated. Marshallese is the language of education at the primary level, and English is used at the secondary level.

See also: Austronesian Languages: Overview; Language Education Policies in the Pacific; Malayo-Polynesian Languages.

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See also: Ireland, Republic of: Language Situation; Isle of Man: Language Situation.

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Martin of Dacia (d. 1304)

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Martin of Dacia (i.e., of Denmark, also known as Martinus de Dacia or Martinus Dacus in Latin and called Morten Mogensen in Danish) is one of the founders of speculative or modistic grammar. He taught grammatical and logical subjects in the Parisian arts faculty. At Paris he also held the title of Master of Theology. In the 1270s and 1280s, perhaps even earlier, in addition to his well-known and often-cited *Modi significandi* (edited in Roos, 1961: 1–118; French translation of sections 197–270 on syntactical matters in Rosier, 1982), he composed questions (*Quaestiones*) on the so-called Old Logic (*Logica vetus*) (edited in Roos, 1961), Porphyry (Roos, 1961: 119–152), Aristotle's Categories (153–231) and Interpretation (233–263), the *Liber sex principiorum* (265–315), and Boethius' commentary on the Topics (317–327).

From 1287–1288 to 1300, he served as chancellor to Erik VI Menved, king of Denmark, who had him made canon in Roskilde, Lund, and Slesvig, and was the king's candidate for the title of bishop of Roskilde, but did not succeed. Some sources attach him to the Dominican order. He died on August 10, 1304, and was buried at Notre Dame in Paris, where he also had held a canonry. His *Modi significandi*, which he wrote in reaction to Boethius of Dacia, were commented upon by the contemporary grammarians Gentile da Cingoli (cf. Marmo, 1994: 11, n. 41) and Michel de Marbais, among others (see Roos, 1961: xvii–xxi and Pinborg: 314–316).

See also: Boethius of Dacia (fl. 1275); Marbais, Michel de (fl. 1255); Radulphus Brito (ca. 1275–1320); Siger de Courtrai (d. 1341); Thomas of Erfurt (fl. 1300).

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Samuel E. Martin received the B.A. and M.A. degrees in Oriental languages from the University of California at Berkeley, and a Ph.D. in linguistics from Yale University. His dissertation, *The phonemic status of ancient Chinese vowels* (1949), was the first of a lifetime of studies of East Asian languages. Martin began teaching at Yale University in 1950, and continued as a Yale faculty member for more than half a century, with occasional periods of research and teaching at the University of Hawaii and other universities.

Martin has an impressive and prolific publication history, which began early in his career with a series of four studies of three east Asian languages. These works, *Morphophonemics of standard colloquial Japanese* (1952), *Honorific and familiar speech in Japanese* (1952), *Readings in contemporary Korean* (1952), and *The phonemes of ancient Chinese* (1953), all reflected expertise in the major languages of Northeast Asia. They also foretold Martin's lifelong interest in both theoretical and applied east Asian linguistics.

Martin's *Essential Japanese: an introduction to the standard colloquial language* (1954) and *Basic Japanese conversation dictionary* (1959) were the first practical Japanese language resources published in English after World War II. He also produced parallel practical Korean references, as well as the *Dagur Mongolian grammar, texts, and lexicon: based on the speech of Peter Onon* (1961). These, together with many other applied Japanese and Korean linguistic studies by Martin, served as essential east Asian language-learning tools for several generations of American students.

Over the course of his scholarly career, Martin also produced several books that have become standard references for English-speaking scholars of east Asia conducting original-language research. Martin combined his own expertise with the insights of highly educated informants and discussants, matching the best works in the original languages in depth, breadth, accuracy, and linguistic insight. Analyses were developed through extensive discussions with informants, and many points never touched upon before in English were explained with thoroughness and total authenticity, with freshly generated linguistic examples.

Martin's *The Japanese language through time* (1987) was a diachronic study of the Japanese language, primarily focused on phonological and etymological issues. In addition to providing theoretical reconstructions of ancient phonemic and phonetic features, tracing their development up to the present day, Martin also related these changes to parallel morphological transformations of verb and adjective inflections, and to the development of modern regional accents. Martin also discussed the work of traditional Japanese linguistic scholars, analyzing key citations from them. The product of a decade of research, this work of close to a thousand pages remains a unique and indispensable reference for Western linguistic historians interested in the Japanese language.

Martin also produced a pair of reference grammars, designed for English-speaking researchers in Korean and Japanese, which remain unsurpassed today. His *Reference grammar of Japanese* (First edn., 1975) focused for the most part on the modern language, though many points of classical grammar were dealt with as well. *A reference grammar of Korean: a complete guide to the grammar and history of the Korean language* (1992) dealt with both modern and historical grammar, and reflected four decades of research. Each reference grammar was over a thousand pages long, with copious illustrative examples and thorough indexing.

During his half century at Yale, Professor Martin has at different times served as chair of the Department of East and South Asian Languages and Literatures, and of the Department of Linguistics, reflecting his outstanding expertise in both areas. He subsequently became professor emeritus in both departments as well.

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André Martinet (1908–1999), French linguist, studied English in Paris (taking courses from J. Vendryes and A. Meillet) and Berlin, and lectured at the École Pratique des Hautes Études. After World War II, he worked as a professor at Columbia University in New York and in 1955 at the Sorbonne.

Martinet took great advantage of the Copenhagen Circle and the Prague Circle, especially the glossemantics of Hjemslev and the principles of phonology. In collaboration with Tesnière, Vendryes, and Benveniste, he devoted a great deal of time the publication of the works of the Prague Circle. Martinet's views, referred to as functional linguistics, dealt mainly with phonology, the relation of diachronic to the synchronic, and morphology. He distinguished two types of articulation of the linguistic sign (referred to as double articulation): monemes, i.e., the units of the first articulation that have a phonetic form and meaning (and at the same time being signs), and phonemes, i.e., units of differentiating function and carrying no meaning. For example: *I have two dogs and a cat* consists of seven monemes (*I/have/two/dogs /and/a /cat*, and phonemes as *h, v, t, w, d, g, s, c, t,* etc. He sees the double articulation as a peculiar feature of human language since it allows for creation of unlimited number of words as a result of a combination of a definite number of relevant segments of sounds. Every language has its own particular articulation (both of the utterance and its form): (French) *J'ai mal à la tête* = (Italian) *Mi duole il capo* (*Je, il capo* are subjects; but *mal* is a noun, *duole* is a verb).

Martinet saw linguistics (the study of *langage*) as a non-normative science in which phonic signs are regarded as signs that ensure communication between people. Since language is a tool of communication, it plays an important role in the social interactions of the particular nations and is peculiar to them, but, at the same time, it does not mirror reality. Every language has its own separate and determined set of experiences that differentiate its nomenclature: words such as *cheval, horse, Pferd* are built of the same letters of the alphabet, but differ in the phonetic structure (accent, place and manner of articulation of particular sounds, etc.). Thus, the experience is analyzed differently in different societies and given the form of monemes. Monemes are ultimately divided into distinctive elements: phonemes. Any sign can be called linguistic as long as it is characterized by double articulation and is phonically perceptible. The presence of these features becomes the basis that differentiates linguistic signs among languages. Such observation is also seen in the arbitrariness and conventionality of utterances. Learning a foreign language, in this view, is not giving new labels to objects the learner already knows, but analyzing the content of the linguistic utterances.

Phonemes, in Martinet's view, are discreet units of language in the sense that the number of phonemes in a language is definite. Alphabetic writing of languages, being a calque of phonemic distribution, preserved the discreetness: every letter is regarded as a representative of a definite number of sets; the clearer the utterance becomes, the easier the phonemes are identified. Thus, the discreet character of a phoneme is not affected by the change of context, or any external factors.

In his research, Martinet put great emphasis on the complex problem of identification of phonemes. He claimed that in case of consonant phonemes, the difference between bilabials /p/ and /b/ is that of vocality (p (−Voice), b (+Voice)), since both sounds are articulated identically. As a result, in his terminology, b is in contrast to p, a sonorant. In this way, Martinet proved that the same phonic production can represent different phonemes and two series of phonemes constitute a correlation (e.g., corresponding p – f – t – s – ʃ – k and b – v – d – z – ʒ – g). Phonemes are regarded as the indispensable elements of the function of language.

Considering their function in sentences, Martinet divided the monemes into three groups: autonomous, which may take various places in sentences (e.g., always, today, slowly); functional, when meaning, not the place, determines its function (e.g., in, on, at); and dependent, subordinated to is place (e.g., syntactically interchangeable subject and object in *The secretary doesn't like the manager* ≈ *The manager doesn't like the secretary*).

Martinet applied this distinction to all kinds of articulatory signs, not only to linguistic ones. On the basis of the achievements of information theory, he developed the idea of the linguistic change caused by the continuous conflict between the tendency to the maximal diversification of signs to increase informativity and the tendency to save the energy required to the articulation of the sign.

Martinet's research on diachronic phonology (he was the first to introduce the issue of analyzing the entire set of phonological systems) had an effect on the formulation of the phonological chain reaction. According to this theory, the changes in the articulation of consonants that cause the identification of two

different phonemes or the diversification of two different variants of the same phonemes may lead to changes in the articulation of vowels of the same syllable. Thus, a change of language is directed at obtaining the simplest structure of its elements. Martinet called the issue the articulatory and functional economy of language. Studies of language, both synchronic and diachronic, should reveal the way the language functions, how the language transforms human experience into linguistically significant units, and how humans utilize their articulatory organs to produce different sounds.

See also: Functional Grammar: Martinet.

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Martinique: Language Situation

Editorial Team

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Officially called the Department of Martinique, this overseas territory of France is situated in the eastern Caribbean, in the Windward Islands, West Indies. The volcanic island was already inhabited by Carib Indians before Christopher Columbus landed in 1502, preceded by the Arawaks, who came to the island from South America. It was continuously settled by the French beginning in 1635 and annexed by France in 1674. The French brought in African slaves as sugar plantation workers and fought against the British in the short occupation by the latter in the early 19th century. The re-established French administration that followed this was economically based on sugar cane plantations and slavery, until the abolitionist movement brought an end to slavery in 1848. However, sugar continued to hold an important position in the economy. In 1946 Martinique became an overseas department of France. In 1958 the island opted for integrating with the mainland French community, and in 1974 it was assimilated as a region of France.

Martinique has a population of 429 510 (July 2004) and thus is considered overpopulated (its territory is 1101 sq km). The population is very diverse as a result of the mixing of different ethnic groups that inhabited it during history. Minorities include those of European, Asian Indian, Amerindian, Arab, and Chinese origin. French is the official language, but the local French-based creole or patois (Lesser Antillean Creole French) is more widely used among Martinican islanders. This creole grew out of the pidgin that early setters used to communicate with each other and shows substrate influence from African languages. The adult literacy level is 97.7%.

See also: Pidgins and Creoles: Overview.

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Martinique has a population of 429 510 (July 2004) and thus is considered overpopulated (its territory is 1101 sq km). The population is very diverse as a result of the mixing of different ethnic groups that inhabited it during history. Minorities include those of European, Asian Indian, Amerindian, Arab, and Chinese origin. French is the official language, but the local French-based creole or patois (Lesser Antillean Creole French) is more widely used among Martinican islanders. This creole grew out of the pidgin that early setters used to communicate with each other and shows substrate influence from African languages. The adult literacy level is 97.7%.

See also: Pidgins and Creoles: Overview.

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Marty, Anton (1847–1914)

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Martin Anton Maurus Marty, philosopher of language, was born as the ninth child of eleven children of a shoemaker and sacristan named Jacob J. A. Marty in Schwyz, Switzerland. His elder brother, Alois Joseph, a Benedictine, became one of the founders of the Catholic University of America.

Marty studied philosophy and theology at a Catholic seminary in Mainz, Germany, where he published a prize-winning thick thesis (about 300 pages) titled *Die Lehre des hl. Thomas über die Abstraktion der übersinnlichen Ideen aus den sinnlichen Bildern nebst Darstellung und Kritik der übrigen Erkenntnistheorien*. Scarcely 20 years old at that time, he already showed the strong influence he had received from Franz Brentano's *Von der mannigfachen Bedeutung des Seienden nach Aristoteles*. He came to be Brentano's student at Würzburg University and was greatly influenced by his mentor's empirical psychology. In 1869 he started teaching at the Catholic lyceum in Schwyz as professor of philosophy and received ordination of a higher degree.

When Brentano, a Catholic priest, left his church in protest against the promulgation of the infallibility of the popes as a dogma, Marty also retired from his church. After leaving Switzerland, he studied at Göttingen University with Hermann Lotze, a physical-anthropological philosopher, as his mentor, took his doctor's degree with a dissertation titled 'Über den Ursprung der Sprache' and was appointed professor of philosophy at a newly-established university at Czernowitz (now Chernovtsy in Ukraine) in 1875.

Owing apparently to his thesis *Die Frage nach der geschichtlichen Entwickelung des Farbensines* (1879), he was called to the German University of Prague in 1880 and devoted himself to exploring scientifically the new field of linguistic philosophy, which he regarded as an integral part of linguistics until he retired in 1913. He was appointed dean of the Department of Philosophy, Vienna University, in 1890. Though he suffered from depression in his later years, he continued to finish his lifework *Untersuchungen zur Grundlegung der allgemeinen Grammatik und Sprachphilosophie* (Vol. I, 1908).

His collected works were edited by Eisenmeier, Kostil and Kraus as *Gesammelte Schriften* (2 vols. 1916, 1920), which did not include his thesis published in book form. Otto Funke, professor at Bern University, who further developed Marty's ideas, edited Marty's unpublished works as *Nachgelassene Schriften* (Bern, 1940–1950), which include important works such as 'Über Prinzipenfragen der Sprachwissenschaft,' 'Über Wert und Methode einer beschreibenden Bedeutungslehre,' 'Von den semasiologischen Einheiten und ihren Untergruppen,' and 'Von den logisch nicht begründeten synsemantischen Zeichen.' His biography *Anton Marty: sein Leben und seine Werke* (Halle, 1916) was written by Oskar Kraus.

Marty's significance for the history of linguistics chiefly lies in his cogent argumentation against the nativistic parallelism between mind and language, which was introduced into linguistics by Wilhelm von Humboldt and reinforced by Heyman Steinthal and Wilhelm Wundt. Marty's idea concerning *innere Sprachform* was empirical-teleological. His influence was perceptively great in Japan in the 1940s, with the respect that Funke, philologist and Marty's expounder, is highly respected among English philologists there.

See also: Humboldt, Wilhelm von (1767–1835).

Marxist Theories of Language

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The hinges of a Marxist consideration concern the links binding the language to the structure of society, to models of material praxis, and to forms of ideology. An evaluation of the relationship between Marxism and the sciences of language coincides with the overall judgment expressed by many scholars on the historical experience of the so-called 'real socialism': the questions on the agenda are relevant and unavoidable, but the answers given are, on the whole, misleading or disappointing. The questions posed by Marxism as an interpretive methodology of social relationships may be worded as follows: which linguistic arguments prove that 'man is the sum of social relationships?' How are the different systems of beliefs, socially shared knowledge, cultural values, and rules of a human community continuously rebuilt in his language? How do the ideal–typical

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needs for mutual understanding and the real contingencies of differentiation and social struggle weave together in the language? These queries question all the symbolic articulations connected with the difference between manual labor and intellectual work.

Looking for a 'True' Marxism in Linguistics

What is the meaning of 'being a Marxist in linguistics?' First of all, it must be stressed that from a methodological point of view, it is not a question of applying Marxism to linguistics (Ponzio, 1989), as such an approach carries the idea of a 'will of power,' which is not acceptable for cultural practices guided by the paradigm of the search for a historical, consensual truth. Any attempt at a mere external application legitimates a defense mechanism aiming at protecting the autonomy of language science against the obtrusiveness of ideological knowledge. To adhere to a Marxist theory of the language does not mean to draw the proposals of a linguistic explanation from the dogmas of social philosophy, but to identify a route of interpenetration between the problems posed by linguistic practice (or reflection) and the possibilities of an unbiased analysis of the same at a social level, just like the one Marx carried out to explain how the capitalist economy of his time worked.

Classics' Indications

The hypothesis of a direct accessibility between Marxism and language sciences may seem surprising when one considers that the assertions concerning language are poor and fragmentary in the classical literature of Marxism. Some passages from the *German ideology* are extremely enlightening, especially those where Marx and Engels (1970) explain that language originated from the need for relationships with others, and is the matter that from the beginning 'contaminates' the spirituality of a 'real, practical conscience,' which is typical of man. Other noteworthy references can be found in the section about *Nature's dialectic*; here Engels develops Darwin's theme of the ape's humanization processes and suggests the existence of a strict connection between language and work. Of course, from an early date (Lafargue, 1894), scholars' attention was attracted by the possibility of identifying a class-prejudiced characterization both in the use of language and in the process of its historical evolution (*see* **Class Language**). This assumption does not justify in the least the absurd contraposition of a 'socialist' or 'revolutionary linguistics' to a 'capitalist' or 'reactionary one,' which would necessarily occur if Marxist theoretical and ideological principles were schematically applied in a scientific investigation of linguistic problems.

Scylla and Charybdis in Marxist Linguistics

A subtle plot of historical and political conditions led Joseph V. Stalin to denounce the fact that Mikolai J. Marr (*see* **Marr, Mikolai Jakovlevich (1864–1934)**) (the recognized spokesman of Marxist theory in linguistics until then) had incurred such an aberration in his doctrine, as he had reconciled his own monogenetic (or Japhetic) hypothesis of language with assertions about its superstructural and class-prejudiced nature. The great normalizer of the Soviet State often intervened in the linguists' debate published in *Pravda* (summer 1950), and – as an expert on Marxism, not on glottology – he presumed to outline the correct picture of a Marxist interpretation for linguistic questions. Stalin's position – which seems to be supported by common sense and is consistent with the scientific programs of Saussure's structuralism and Durkheim's sociology – turns out to be fundamentally incorrect both in its method and in substance, although it is absolutely justified by virtue of a certain sociolinguistic policy. As a matter of fact, on the one hand, the pretension to solve a scientific debate by a substantial appeal to authority appears unacceptable; on the other hand, the rebuttal of Marr's thesis is carried out with the help of trivializing arguments. However, from the point of view of the history of thought, Stalin's intervention is an affirmation and, at the same time, a denial of a Marxist theory on language. It is an affirmation because it demonstrates *de facto* that any theoretical language elaboration is bound by reasons of social and political practice. Language sciences, too, obey precise constraints deriving from the development of human relationships and draw inspiration from the ideological climate in which a society lives. Actually Stalin's concern to preserve languages conceals the 'sovietization' process imposed on the different nationalities gathered in the former USSR, and aims at defusing social conflicts. But Stalin's position patently clashes with that dimension of Marxist theory, so it necessarily adheres to a 'critical linguistics,' that is to say, a linguistics that tries to unveil the dominant mechanisms operating in communicative practices (*see* **Critical Discourse Analysis**). For a number of reasons, Stalin could not adopt such a view, and in order to avoid the problems that Marr had reasonably posed but incorrectly solved (Borbé, 1974), he takes refuge in an attitude of denial: as a language system has its own autonomous organization and is an instrument of national identification, language is not a superstructure and does not have a class character, so Marrism is not the equivalent of Marxism in linguistics. Stalin's position is not only mistaken, as he commits the 'minimalist error' (Mey, 1978) of considering language as a mere by-product of the cultural

life of a nation, but it is also responsible for putting an end to the debate on the potential of Marxism in linguistics, through its own mystification (Marcellesi and Gardin, 1974).

Language Sciences and Critique of Ideologies

If we escape both monsters of Marrism and Stalinism, are there other implemented models of interpenetration or mutual control between the social theory of Marxism and linguistic questions?

'Bakhtin's Circle'

In fact, an authentically Marxist position in the language sciences is worked out in the postrevolution decade in Russia by the so-called 'Leningrad School.' Michail M. Bakhtin (*see* **Bakhtin, Mikhail Mikhailovich (1895–1975)**), Valentin N. Voloshinov (*see* **Voloshinov, V. N. (ca. 1884/5–1936)**), and Pavel N. Medvedev tried to develop a semiotic theory of culture based on Marxist principles. Their conceptual pattern set three interpretative routes: decoding psychic processes both historically and socially; exploring the polyphonic dialogics intrinsic in a language; identifying the sociological constraints of a literary text. The Marxist relevance criterion of such an approach is the criticism of the forms of ideology and the way ideology works. In Voloshinov's opinion (1973), a Marxist conception of the problems posed by language philosophy is warranted by the need to explore the sign nature of ideological phenomena. As a result, the study of the ideologies embodied in the ethical, religious, juridical, political, and literary institutions of a society must be based on an explanation of the principles regulating their constitutive elements: i.e., signs. The identification of the ideological sphere with semiotics enables us to explain the formation of an individual conscience as a socio-ideological phenomenon; one must therefore imagine an unseizable dialectic interaction between the mind's working and the activation of sign-ideological systems (*see* **Dialogism, Bakhtinian**). The specifically psychological aspects of such an explanatory route were developed by Lev S. Vygotsky (*see* **Vygotskii, Lev Semenovich (1896–1934)**); his theory advocated that superior psychic processes (memory, language, will, etc.) are interiorizations of social interactions mediated by signs. To explain the connection between language and ideology, Voloshinov resorted to a meta-procedural strategy: he showed which ideologies are carried by linguists. Two macrotrends are therefore identified in the study of language, which appear as epistemological constants and are still in force: individualist subjectivism (from Humboldt to Croce and Vossler) and abstract objectivism (which was exemplarily represented by Saussure) (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**). Voloshinov demonstrated that the Marxist point of view calls for an analysis of the socioideological material 'molded' by verbal interaction in order to rebut both the unsubstantiality of individual creativity in linguistic expression and the narrow-mindedness of a superindividual system of rules escaping the manifold pressures of language usage.

Social Cognition and Linguistic Praxis

The debate interrupted by Stalin and the programs started by the 'Leningrad School' were reconsidered in the 1960s both by Soviet scholars who were interested in giving a historical and materialist direction to semiotic structuralism (Reznikov, 1964) and by other scholars working in the field of social criticism in the capitalist West (Cornforth, 1967). An interesting bridge between these two perspectives had been sketched in Italy by Antonio Gramsci's brilliant intuitions and was later consolidated in Poland by Adam Schaff (1967). The need for a 'Marxist linguistics' was set by the Polish philosopher in the sphere of a knowledge theory beyond the opposite extremes of mechanistic materialism and subjective idealism. According to Schaff, a Marxist theory emphasizes the role of mediating procedure that language plays between what is subjective and objective, mental and social, biological and cultural. This theory acts as a central support for a conception of man as the being who is responsible for the creation of his own cognitive and relational models. Even if some differences can be found from the point of view of inner logic as well as on the level of phylogenetic and ontogenetic acquisition, the process of 'thinking–speaking' is substantially unitary, as cognition is an effect of social praxis and communicative relations are full of cognitive contents. This dialectic unity enables us to reject both the reflex theory suggested by a naïve materialism and the theory of significant systems autonomy, proposed by some updated versions of idealism. Furthermore, Schaff's Marxist language theory aims at being immediately employed in the practical questions weighing on the decision-making ability of a human person as an actor and a maker of his or her social world. On this subject, Schaff also considers a social categorization process that emphasizes the connection between ideology and language, that is, 'thinking–speaking by stereotypes.' The resort to stereotype and to prejudice gives emphasis to the fact that as the relationship between the individual mind and reality is mediated by the sphere of meanings, the workings of the mind itself are influenced

by historical and social conditionings. Stereotypes reveal the real control that social groups have over the contents and processes of individual thought. Schaff's pragmatic point of view allowed him to give stereotypes of the sociointegrative and defense functions that make the workings of the mind compatible with the political structure of society. Similar conclusions are drawn by all those currents of sociolinguistics and pragmalinguistics that wonder about the connections between the conscience of sociality carried by the language and the limits of what the historical conditions of praxis allow human subjects to mean when they are diversified by factors such as age, sex, culture, class, degree of social control, etc. Some theories within 'social linguistics' are marked by an implicit adhesion to a Marxian inspiration, such as 'praxematics,' coming from Lafont's school or Mey's pragmatic approach. Lafont (1978) works out a linguistics focused on the 'praxeme': this is an instrument for the production of sense in speech and, at the same time, a unit of analysis in the relation between the language user and the practical social conditions that make it possible for the uses of linguistic varieties to clash. In outlining the basic question '*Whose language*?,' Mey (1985) makes a constant, critical comparison between the categories obtainable from analysis of industrial society (such as production, oppression, and manipulation) and the instruments of linguistic analysis. According to Mey, the Marxian inspiration in sociolinguistics lies in the need for a theory that can explain the intricate relationship between language as a sociocultural product and the forms of the overall reproduction of a society. The solution he proposes entrusts pragmatics, as the theory of linguistic use, with the task of explaining the various 'wording' possibilities connected with the clashing nature of groups, with different approaches to knowledge and with different power distributions.

Sign Systems and Social Reproduction

The principles of historical–dialectical materialism imply that language is interpreted by abstractions that are in turn determined by the sum of practices regulating man's 'organic exchange' with nature, bearing in mind the often distorted representations imposed by the historical limits within which man is obliged to live his social relationships (Erckenbrecht, 1973). The Marxist idea of language aims at specifying the features of the production of sense carried out by man in the present circumstances of his history and, therefore, at identifying the role of sign systems within the process of 'social reproduction' as a whole. This category indicates the totality of techniques and procedures through which human groups perpetuate their presence in the world. In this perspective, Ferruccio Rossi-Landi's tentatively investigated connection between language and work is justified (1983). At first sight, Rossi-Landi seems to exaggerate when he applies the Marxian labor theory of value to the field of language and to other nonverbal forms of human communication. Indeed, the most important thing is the epistemological and methodological indication of the need for passing from the surface level of exchange and/or the sign market to the underlying level of social labor that is implicit in cultural signification and communication processes. This change of focus makes it possible to criticize the dichotomy traditionally accepted by linguists (out of common sense) between the 'system' and 'use' of the language, both in its classical version of Saussure's opposition between 'langue' and 'parole,' and in its neoclassical version of Chomsky's opposition between 'competence' and 'performance.' The adherence to these two categories enables linguists to exorcize the fetish of an explanatory autonomy, by confining the pertinence of Marxism to the illustration of the social function of a language. By the contrast, in Rossi-Landi's view, those abstractions are useful only if they are rooted in the ground of 'common speaking,' which defines historically the linguistic *a priori* of the human being. The philosophical methodology of 'common speaking,' which was later generalized in a semiotic methodology of 'common semiosis' by Rossi-Landi, achieves the Marxist theory target of unveiling the ideological consistency of the 'logosphere' and clarifies the mediating role that sign systems play between the economic basis and the super structures of society.

What Shall We Do?

The Marxist perspective, however narrow it may appear, binds those who study linguistic problems to historical–dialectical materialism and obliges them to consider the connections between linguistic theory and the theory of praxis as being relevant. This double bond results in the urgent need to explore the linguistic signs' ideological texture. But for the linguist, the adherence to such an explanatory route entails the commitment to carry out his own language investigations according to an emancipatory project concerning the potentials of human beings. To be a Marxist in linguistics means to adopt an intrinsically debunking perspective of the relationships of social control that are formed and/or expressed in the language. Of course, it is not necessary to be a Marxist to work out a critical and emancipatory linguistics, but the opposite is true: it is necessary to take a critical attitude to be authentically Marxist in linguistics. Marxism

aims at putting a sort of 'metasemiotics,' meant as a critical theory of ideologies, at the basis of the language sciences. This perspective is shared by those (such as the late Pierre Bourdiese) who try to use Marxian categories (class, commodity, labor, surplus value, alienation) in the analysis of the relations of linguistic reproduction in society, and by those who take only a critical stance from Marxism, thinking that this is enough to perfect the technical solutions provided by linguistic knowledge. Both 'revolutionaries' and 'reformers' share the same desire to look for a small red petal in the white cup of reflexation on language.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Class Language; Critical Discourse Analysis; Dialogism, Bakhtinian; Marr, Mikolai Jakovlevich (1864–1934); Pragmatics: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Voloshinov, V. N. (ca. 1884/5–1936); Vygotskii, Lev Semenovich (1896–1934).

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Mass Expressions

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By 'mass expressions' one usually means expressions formed with so-called mass nouns, words like *water, rice, poetry,* and *garbage*, which differ morphologically and syntactically from count nouns, like *book, apple, chair,* and *house,* in that they do not have both a singular and a plural form and differ in the possible combinations with numerals, determiners, and adjectives. In particular, mass nouns do not admit combination with numerals, with the indefinite singular article, and with a range of quantifiers: **a water, *both rice, *five poetry, *many garbage, *several music*. Count nouns, on the other hand, do not combine well with certain quantifying adjectives, such as English *much* and *little*; Spanish *mucho* and *poco*; or Danish *meget* and *lidt*, which combine only with mass nouns. In contrast with count nouns, mass nouns allow the formation of determinerless singular noun phrases: *There's furniture in this room* versus **Theres chair in this room*. Such bare NPs are often called 'mass terms' and include phrases like *imported furniture, eau de cologne, mousse au chocolat, orange juice from Brazil*, and *refined pure Cuban cane sugar.*

The count/mass distinction is found in many languages but is not universal and has different manifestations in different languages. The Hopi language has been mentioned by Whorf (1939) as a language that has no mass nouns, and several Asian languages, such as Chinese (Mandarin Chinese) and Japanese, do not mark the count/mass distinction and have been claimed to have only mass nouns (Sharvy, 1978). Also, what is described by a count noun in one language may be described by a mass noun in another; e.g., English *fruit* is a count noun, whereas Dutch *fruit* is a mass noun (*a fruit* can be translated either as *een stuk fruit* (*a piece of fruit*) or as *een vrucht*. In English, by far the majority of mass nouns aremorphologically and syntactically singular; a minority of mass nouns are syntactically plural. A plural example is *measles*: it would be funny to ask **How many measles have you got* (except maybe in a conversation between two doctors, as a way of referring to measles patients). In other languages, plural mass nouns are quite frequent – e.g., in Swahili the word for *water* is

aims at putting a sort of 'metasemiotics,' meant as a critical theory of ideologies, at the basis of the language sciences. This perspective is shared by those (such as the late Pierre Bourdiese) who try to use Marxian categories (class, commodity, labor, surplus value, alienation) in the analysis of the relations of linguistic reproduction in society, and by those who take only a critical stance from Marxism, thinking that this is enough to perfect the technical solutions provided by linguistic knowledge. Both 'revolutionaries' and 'reformers' share the same desire to look for a small red petal in the white cup of reflexation on language.

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By 'mass expressions' one usually means expressions formed with so-called mass nouns, words like *water, rice, poetry,* and *garbage*, which differ morphologically and syntactically from count nouns, like *book, apple, chair,* and *house,* in that they do not have both a singular and a plural form and differ in the possible combinations with numerals, determiners, and adjectives. In particular, mass nouns do not admit combination with numerals, with the indefinite singular article, and with a range of quantifiers: **a water, *both rice, *five poetry, *many garbage, *several music*. Count nouns, on the other hand, do not combine well with certain quantifying adjectives, such as English *much* and *little*; Spanish *mucho* and *poco*; or Danish *meget* and *lidt*, which combine only with mass nouns. In contrast with count nouns, mass nouns allow the formation of determinerless singular noun phrases: *There's furniture in this room* versus **Theres chair in this room*. Such bare NPs are often called 'mass terms' and include phrases like *imported furniture, eau de cologne, mousse au chocolat, orange juice from Brazil*, and *refined pure Cuban cane sugar.*

The count/mass distinction is found in many languages but is not universal and has different manifestations in different languages. The Hopi language has been mentioned by Whorf (1939) as a language that has no mass nouns, and several Asian languages, such as Chinese (Mandarin Chinese) and Japanese, do not mark the count/mass distinction and have been claimed to have only mass nouns (Sharvy, 1978). Also, what is described by a count noun in one language may be described by a mass noun in another; e.g., English *fruit* is a count noun, whereas Dutch *fruit* is a mass noun (*a fruit* can be translated either as *een stuk fruit* (*a piece of fruit*) or as *een vrucht*. In English, by far the majority of mass nouns aremorphologically and syntactically singular; a minority of mass nouns are syntactically plural. A plural example is *measles*: it would be funny to ask **How many measles have you got* (except maybe in a conversation between two doctors, as a way of referring to measles patients). In other languages, plural mass nouns are quite frequent – e.g., in Swahili the word for *water* is

the plural mass noun *maji*; in Italian the many pasta varieties are syntactically plural, as they are when imported in other languages. One should, for example, say *How much spaghetti do you want* rather than **How many spaghetti do you want*, just as in Italian (*Quanto spaghetti…*; **Quanti spaghetti…*). A morphologically remarkable phenomenon in Dutch is the formation of diminutive forms of mass nouns to refer to portions with certain properties of the stuff that the mass noun refers to. For example, the mass nouns *snoep* (candy), *drop* (licorice), *chocola* (chocolate), *plastic*, *papier* (paper), and *brood* (bread) have the diminutive forms *snoepje, dropje, chocolaatje, plasticje, papiertje,* and *broodje*, which are count nouns referring to particular types of physically well-defined pieces of candy, licorice, chocolate, plastic, paper, and bread, respectively. The interesting point is that diminutive forms of mass nouns differ systematically from those of count nouns in that diminutive count nouns, as opposed to mass noun diminutives, invariably refer to small exemplars in the set of objects denoted by the count noun. For example, *appeltje* and *boekje* refer to small apples and little books, but the diminutive form of a mass noun, like *broodje* or *plasticje*, refer not to a small piece of bread or plastic but to specific pieces, like a roll and a folder for storing papers.

While the count/mass distinction as just outlined may seem intuitively clear, it is difficult to make the distinction precise, especially to make it sufficiently precise for incorporation in a formal grammar. For example, while *apple* may seem a clear example of a count noun, it is possible to say things like *Don't put too much apple in the salad*, using *apple* as a mass noun. David Lewis has invented a hypothetical device to show that every count noun can be used as as a mass noun. This device, the Universal Grinder, can take as input any objects, denoted by a count noun, like apples, books, or crocodiles; it grinds these and spits out the stuff that the objects are made of: apple-stuff, book-stuff, crocodile-stuff. This machine could be said to turn *apples* into *apple, books* into *book*, and *crocodiles* into *crocodile* (Lewis, 1983). One can also imagine a device that works in the other direction. This device, which we might call the Universal Packer, takes as input a continuous stream of any stuff that a mass term *M* may refer to, and outputs packages containing amounts of *M* that are appropriate in a given context. This device illustrates that one can in general construct a count use of a mass noun by finding a context in which the stuff that the mass noun normally refers to comes in certain standard portions, like cups of coffee in a restaurant, where it is quite common to speak of *two coffees*.

These considerations show that virtually every count noun can be used as a mass noun and *vice versa*. We should therefore not classify nouns as count or mass but instead view the count/mass distinction to be one of different ways of using nouns, or perhaps not even as a syntactic or morphological distinction but as a semantic one. Intuitively, the fundamental difference between a mass noun like *applesauce* and a count noun like *apple* is that there is a clear notion of what is one apple, but there's no clear notion of what is one applesauce. In the words of Jespersen (1924): "There are many words which do not call up the idea of some definite thing with a certain shape or precise limits. I call these *mass words*." Or as Quine (1960) put it: "Inherent in the meaning of a count noun, like 'apple' is what counts as one apple and what as another….such terms possess built-in modes of dividing their reference,…while mass nouns do not divide their reference." A common way of expressing this is that count nouns 'individuate' their reference, while mass nouns do not.

The non-individuating way of referring that is characteristic of mass nouns closely relates to the phenomenon that mass nouns can be used to refer to each of several objects as well as to the whole formed by these objects. For example, in a situation where there are several puddles of water on the floor, the term *water* in the sentence *Please mop up the water on the floor* may refer to the individual puddles as well as to the totality of all the water formed by the puddles. This phenomenon is known as 'cumulative reference': "Any sum of parts that are water is water" (Quine, 1960). Similarly, suppose one is served a bowl of rice; when one has eaten half of *the rice in the bowl*, what remains would also be called *rice in the bowl*. In general, for a mass noun *M*, any part of something that is *M* is again *M*. This phenomenon is called 'distributive reference.' The term 'homogeneous reference' has been used both as being synonymous with distributive reference and as denoting the combination of cumulative and distributive reference.

The property of distributive reference has been a matter of discussion among linguists and philosophers. Quine (1960) has rejected the idea that every part of something to which a mass noun may refer, may also be referred to by the noun. He notes that "there are parts of water, sugar, furniture too small to count as water, sugar furniture," since the parts of an H_2O molecule are not water, the legs of a chair are not furniture, and the parts of a grain of sugar would perhaps not be called sugar. Instead, he posits the 'Minimal Parts Hypothesis,' which says that for each mass noun *M*, there is a specific minimal size

that parts of its referent may have in order to count as *M*. There is not much support for this position, however; semanticists generally agree that mass terms should be treated as referring homogeneously, in spite of the fact that their referents in the physical world may have minimal parts. In the standard formalization of count noun meanings, the intuition that count nouns individuate their reference is captured by construing the extension of a count noun as the set of all individuals that correspond to the built-in individuation of its reference. So *apple* refers to the set of all apples. Since a mass noun does not individuate its reference, this leads to the question what kind of things mass nouns denote. Many authors on mass terms believe that the answer to this question requires something else than sets. Quine (1960), Burge (1972), Moravcsik (1973), Ojeda (1993), and several others proposed to make use of mereology, a theory of non-atomic part-whole structures that has been developed as an alternative to set theory (Lesniewski, 1929; Leonard and Goodman, 1940); Bunt (1979, 1985) proposed to use part-whole structures called 'ensembles,' defined in an extension of standard set theory called 'ensemble theory' (see also Lewis, 1991); Parsons (1970) proposed an altogether different notion of 'substances.'

The idea that mass terms do not individuate their references explains why they cannot be combined with numerals: one wouldn't know what to count, so the numerical information would make no sense, and neither would quantifiers, like *several, many, both*, that presuppose countability. As mass terms do not refer to well-delineated objects, it would also be strange to apply adjectives describing properties like shape, size, or weight to mass nouns. This is confirmed by the fact that it is strange to speak of **small wine, *square water*, or **heavy sugar*. (And *heavy water* cannot be used to refer to water that is heavy, but only to refer to the substance deuterium oxide (D_2O), formed by oxygen and the hydrogen isotope deuterium, of atomic weight 2.) It has therefore been suggested that a distinction be made between count and mass adjectives, depending on whether the adjectives share with mass nouns the property of referring homogeneously (Bunt, 1980; cf. Moravcsik). For instance, *square* refers neither cumulatively nor distributively, since the whole formed by two square objects is in general not square, nor are the parts of a square object; *heavy* refers cumulatively but not distributively; and *small* refers distributively but not cumulatively.

Ter Meulen (1980) suggested a count/mass distinction among verbs, depending on whether a verb refers distributively – that is, whether it denotes events that have sub-events that could be described using the same verb. Performance verbs, like *write* and *reach*, would be count verbs, whereas activity verbs, such as *travel* and *think*, would be mass verbs. Syntactic phenomena that support this distinction are that it is strange to say that **Harry was reaching the airport for an hour* while it is fine to say that *Harry was traveling to the airport for an hour*, and, relating to the use of mass terms as direct objects, it is strange to say that **Alice was writing a letter for an hour* but there's nothing wrong with *Alice was writing letters for an hour*.

It may be noted that some of the above observations on mass nouns do not really apply to *all* mass nouns. There is a subclass of mass nouns that do in fact individuate their references; examples in English are *furniture, cattle, clothing, footwear, luggage*. Using Quine's terminology, inherent in the meaning of *furniture* is what counts as *one piece of furniture*. This may explain why such nouns can be modified by adjectives that do not refer homogeneously, as in *small furniture, heavy furniture*. Quantification for these nouns is also different from that for other mass nouns. Whereas *All the water in this area is clean* says that every water part that you can take in this area is clean, *All the cattle in this area have been vaccinated* clearly applies only to animals, not to arbitrary cattle parts. A related morphological phenomenon is that mass nouns of this kind in Dutch do not admit a diminutive form (for example, **meubilairtje, *veetje, *kledinkje, *schoeiseltje, *bagagetje*) – which makes sense, since in these cases the mass noun itself already denotes individuals of the kind that the diminutive form would otherwise denote. Moreover, whereas mass nouns in general have syntactically much in common with plural count nouns, the ones in this particular subclass are semantically no different from count nouns. It has therefore been suggested they be assigned to a separate category, called 'collective' mass nouns (Bunt, 1985).

Mass terms are a challenge to the formal linguist, not only because it is difficult to pin down the count/mass distinction on morphological and syntactic grounds but also because they call for a logical representation of the intuitions about non-individuating reference in such a way that sentences involving mass expressions are systematically assigned correct semantic interpretations through the application of a set of rules in a formal grammar.

Concerning the first part of this challenge, Pelletier and Schubert (1995) have argued that the count/mass distinction can be formalized in two ways: in terms of *occurrences* of nouns and as different *senses* of nouns. An occurrence approach characterizes the use of a noun syntactically as 'count' or 'mass.' An

implementation in a formal grammar would typically assign features 'count' and 'mass' to occurrences of nouns and certain other expressions. By contrast, a sense approach considers all nouns to be just nouns, avoiding any 'count' or 'mass' labeling, and interprets a noun occurring in a certain syntactic ('mass' or 'count') context in its 'mass' or in its 'count' sense. Since virtually every noun can be used either way, the main virtue of an occurrence approach is not to assess the syntactic well-formedness of expressions but rather to characterize the syntactic environments that force one interpretation of the noun or the other. For instance, characterizing the quantifier *much* as 'mass,' we can force the occurrence of *apple* in *not too much apple* to be interpreted as apple-stuff, rather than individual apples. Some authors have suggested that finer distinctions be made among nouns than count/mass (or count/mass/collective), depending on the noun's syntactic preferences for occurring in certain syntactic environments. According to the "noun countability preferences" of Allan (1980), Bond *et al*. (1994) distinguish, besides pure count and mass nouns, among plural-only nouns (like *scissors, pants*), easily convertible count nouns (like *cake, stone*), and easily convertible mass nouns (like *beer, coffee*). This may be of practical use, e.g., in machine translation (Baldwin and Bond, 2003) or in language learning (Nagata *et al*., 2005).

Concerning the second, semantic part of the challenge, Link (1983) and Landman (1991) have suggested that the models for a model-theoretic semantics of natural language should include a non-atomic Boolean algebra (or, more specifically, a join semi-lattice) supporting part-whole structures without minimal parts as semantic interpretations of mass terms. Such a structured model can be used to assign logically adequate interpretations to sentences with mass terms – i.e., interpretations that have the desired logical properties (such as rendering *Water is water* necessarily true, and supporting inferences like *This puddle is water, Water is transparent*, therefore *This puddle is transparent,* but not supporting the inference *Water is scarce here*, *This is a puddle here*, therefore *This puddle is scarce here*).

The fundamental question of what kind of thing a mass noun denotes is not answered in these formal approaches, other than to say that mass terms have denotations figuring in a non-atomic part-whole structure (which would be formally correct only for noncollective mass terms). The use of mereological wholes for these denotations, which many language philosophers have embraced, does provide non-atomic part-whole structures but has the drawbacks that mereology is an alternative to set theory and that mereological concepts as such do not fit in set-theoretical frameworks. In this respect, the use of ensemble theory, which formalizes atomic, non-atomic, and partly atomic part-whole structures within an extension of standard set theory, offers better possibilities for an elegant, integrated treatment of the semantics of mass expressions (cf. Lewis, 1991).

See also: Articles, Definite and Indefinite; Diminutives and Augmentatives; Nouns; Numerals; Quantifiers: Semantics.

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Mass Nouns, Count Nouns, and Non-count Nouns: Philosophical Aspects

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Linguists often distinguish 'count nouns' (CNs) and 'non-count nouns' (NCNs) (designated as 'count+' and 'count' nouns, respectively). The distinction, though hardly simple, is both exhaustive and entirely natural. In philosophical writings, by contrast, it is more usual to posit a dichotomy of 'count nouns' and 'mass nouns' (MNs) – a dichotomy that is very commonly (and however vaguely) supposed to be of metaphysical or ontological significance. But this dichotomy, unlike that of CNs and NCNs, is deeply problematic; here, in consequence, I speak only of a **supposed** dichotomy of CNs and MNs, and by the same token, of a **putative** category of MNs.

Plural Count Nouns and Non-count Nouns

There is a certain kinship between NCNs and plural CNs, a kinship that has in recent years attracted some attention; see e.g., Schein (1994). What is less widely appreciated is the basis of this kinship in the actual semantic status of NCNs. Laycock (1998) urged that since CNs, or their occurrences, are semantically **either** singular or plural, to be non-count is simply to be **neither** singular nor plural. Non-count nouns are then semantically non-singular, and it is this that underlies their kinship with the plural (plural nouns themselves, it is evident, are non-singular). But being non-plural, the non-count form is never, unlike that of many plural sentences, reducible to the canonical singular form. The relationships between the semantics of CNs and NCNs may thus be simply represented in **Table 1** (Laycock, 1998). The inclusion of a contrast between 'clothes' and 'clothing' alongside that between 'apples' and 'water' serves to emphasize the point that the singular/non-singular contrasts in general (and not simply the singular/plural contrasts) are first and foremost **semantic** as opposed to **metaphysical** or ontic contrasts (it being assumed that the 'clothes'/'clothing' contrast itself is purely a semantic one).

Non-count nouns are to be classed as semantically non-singular, simply by virtue of being non-count.

Table 1 Semantics of count nouns versus non-count nouns

	1. **Singular** ('one')	2. **Non-singular** ('not-one')
3. **Plural** ('many')	– – –	'things' 'apples' 'clothes'
4. **Non-plural** ('not-many')	'thing' 'apple' 'piece of clothing'	'stuff' 'water' 'clothing'

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And given this, both quantification and denoting that involve such nouns also must be semantically non-singular. In the case of quantification, the non-singularity of NCNs is reflected in their obvious non-acceptance of singular quantifiers – in the fact that we may speak (as with plural nouns) of ***all*** *water,* ***some*** *water,* and ***more*** *water* but not in the singular of ***a*** *water,* ***each*** *water,* or ***one*** *water. Any, all,* and *some* interact with NCNs much as with essentially plural nouns; and *All* ***n V*** *made of polyester* and *The* ***n*** *in the warehouse* ***V*** *made of polyester* are related in essentially the same way, whether ***n*** is replaced by *clothes* and ***V*** by *are*, or ***n*** is replaced by *clothing* and ***V*** by *is*. The implications of the non-singularity of NCNs for the semantics of sentences containing definite descriptions and referential expressions are complex and extend beyond the remit of these brief remarks. However, the relatively common **mereological** interpretations of non-count reference take it to be semantically singular, designating individual 'parcels of stuff' or 'quantities' (see e.g., Bunt, 1985), and the non-singularity of NCNs is evidently not consistent with approaches of this type. Indeed, difficulties with the singularity assumption have been noted precisely in relation to Russell's theory of singular descriptions, which maintains, as he puts it, that ***the*** "in the singular" involves **uniqueness** (Russell, 1956: 176); see e.g., Montague (1973) and Laycock (1975).

The Concept 'Mass Noun' and Its Supposed Criterion

Turning now to so-called MNs, perhaps the first use of an expression of the MN genre occurs in Jespersen (1924), who wrote of 'mass words,' contrasting these with what he called 'countables' or 'thing words.' And the thought that such words had a distinct metaphysical significance received the following expression in his work:

> There are a great many words which do not call up the idea of some definite thing with a certain shape or precise limits. I call these 'mass-words'; they may be either material, in which case they denote some substance in itself independent of form, such as … water, butter, gas, air, etc., or else immaterial, such as … success, tact, commonsense, and … satisfaction, admiration, refinement, from verbs, or … restlessness, justice, safety, constancy, from adjectives. (Jespersen, 1924: 198)

Subsequent writers typically differ from Jespersen in treating the domain of 'mass words' as one of **concrete** nouns exclusively; but insofar as these latter nouns are concerned, Jespersen's approach would seem to represent the norm. Thus if the question is raised, of what semantic element constitutes the putative MNs as a distinct category of concrete nouns, the answer tends to be that it is precisely some such element of 'form-independence' – an absence of 'criteria of distinctness' (Hacker, 1980) or of a 'boundary-drawing,' 'individuating,' 'form-specifying,' or 'reference-dividing' component in their meaning (Quine, 1960; Chappell, 1971; Talmy, 1978; Langacker, 1987; Jackendoff, 1991; Kleiber, 1997).

In this regard, Quine nicely represented the common view. To learn a "full-fledged general term" like 'apple' it is not enough, so he remarks, to learn "how much of what goes on counts as apple": "we must learn how much counts as **an** apple, and how much as another. Such terms possess built-in modes … of dividing their reference" (1960: 91). So-called 'mass terms,' in contrast, do not thus divide their reference. Water, Quine wrote, "is scattered in discrete pools and glassfuls… still it is just 'pool,' 'glassful,' and 'object,' not 'water'… that divide their reference" (1960: 91). If such a noun is used to individuate a full-fledged, 'substantial' object, it needs an individuating adjunct. There is no learning "how much counts as **some** water and how much counts as some **more**"; there is no such distinction to learn. Whereas any sum of parts that are each an apple is not another apple, this lack of a boundary-drawing element confers upon the putative MNs what Quine called "the semantical property of referring cumulatively": "any sum of parts which are water is water," as he puts it. I shall call this widely accepted criterion for distinguishing the putative category of MNs from CNs, in whichever of the various equivalent forms it is fleshed out, the 'no built-in reference-division' (no-RD) criterion. The key assumption that underlies the supposed dichotomy of CNs and MNs is, then, that possible borderline cases apart, there **is** a specific and more or less determinate category of concrete nouns that answers to the no-RD criterion – the putative category of MNs, to be precise.

Now, whereas the range of nouns that are categorized as MNs varies significantly from one writer to another, all the nouns that are thus categorized are in fact (and must be) NCNs. But here my concern is not with the nouns themselves; it is just with the putative **category**, as determined by the no-RD criterion, to which they are said to belong. And insofar as the use of the term 'MN' rests on this criterion, the contrast of CNs and MNs is quite fundamentally misconceived; the reality is that no such category as that of MNs exists. There are, on the contrary, two semantically distinct categories of nouns that answer to the no-RD criterion – concrete NCNs and concrete plural CNs (a fact that, given the common non-singularity of these two categories, is not altogether surprising).

An Illusory Criterion

Although the kinship of the putative MNs with concrete plural CNs is commonly remarked, it is less often noted that the no-RD criterion itself applies identically to the plural nouns. Thus, for instance, although we learn "how much counts as **an** apple, and how much as another," there is no learning "how much counts as **some** apples, and how much as **more** apples" – there is no such distinction to learn. Although the singular *apple* applies to just one apple at a time, *apples* sets no limits on the count of apples. It is not the meaning content of the plural noun itself that sets whatever limits there may be; it is contingencies of context, including acts of demonstration – for example, ***these** apples* – that demarcate the subject matter of a discourse. *Apples* provides no criteria of distinctness or boundaries for what it collectively applies to – it does not, *qua* plural, carve what it applies to 'at the joints.' To play the role of designating full-fledged objects, each of which is apples, *apples,* much like *water,* needs an individuating adjunct ('heap of _____', 'bag of _____,' or the like). Thus, if water may be characterized as 'form-indifferent', then apples, too, collectively, may be so characterized. Much as the water in a glass might be spilled or dispersed and survive, so, too, might the apples in a bag. And so far as Quine's 'cumulative reference' is concerned, whereas any sum of parts each of which is **an** apple will not be **another** apple, any sum of parts that are **apples** will simply be more **apples**.

The appearance of a dichotomy between CNs and the putative MNs then arises purely and simply because the chosen occurrences of CNs are **singular** exclusively – plural nouns are nowhere in the picture – and once plural occurrences of CNs are factored in, the supposed dichotomy with CNs disappears. Insofar as the no-RD criterion is conceived as definitional of the distinctive status of some putative 'metaphysically interesting' class of nouns, this putative category of nouns is ill-defined or ill-conceived, and talk of such a category is best abandoned. The only categories that are to be legitimately contrasted with CNs are those of NCNs as such and of the various subcategories of NCNs. And although metaphysically interesting distinctions between CNs and some sub-groups of NCNs certainly do exist, such distinctions have nothing to do with the spurious category of MNs. They are not, that is, a function of the no-RD criterion, obtaining as they do between various groups of nouns, **all of which** satisfy that criterion. (It is then hardly surprising that what is supposed to count as an MN varies significantly from one sponsor of the concept to another: the no-RD criterion does zero work, and it is rather individual metaphysical intuitions that actually determine whether a given NCN is to be assigned to the putative category or not.) What the no-RD criterion reflects is simply the contrast between CNs in the singular, and non-singular nouns altogether generally, whether NCNs or plural CNs. But the central contrast in this domain is rather one between distinct forms of non-singularity – the plural, and the non-count – and as such, to repeat, this contrast is purely a semantic one.

The point retains its relevance at the formal level of the contrast between 'stuff' and 'things' themselves. These words are formally NCNs and CNs, respectively; but whereas the contrast of stuff and things is not infrequently treated by sponsors of the 'MN' category as if it were a metaphysical distinction, the fact is that 'stuff' may be and is applied to **things** without restriction ('the stuff in the basement' may just denote a pile of pots and pans, garden tools, old chairs, and bicycles).

The Non-metaphysical Goods

We are left, then, with an essentially semantic contrast between concrete CNs and NCNs. And what this semantic contrast embodies are distinct modalities for the determination and specification of amount or quantity. Count nouns embody one such modality – trivially, that of counting through the use of natural number-related words – *one horse, so many things, too few clothes, a dozen eggs, a single professor,* etc.; and in this intuitive sense, counting is applicable to the denotata of CNs **exclusively**. Non-count nouns, by contrast, involve a form of what is naturally called 'measurement': *so much cotton, too much stuff, so little water, five tons of clothing,* etc. And although the denotata of NCNs may be **only** measured and not also counted, measurement as such is applicable to the denotata of both NCNs and CNs alike. We may, for instance, speak both of *75 ccs of water* and *75 ccs of poppy seeds*, both of *5.5 kilos of clothing* and *5.5 kilos of apples*. Furthermore, it seems clear that in contrast with counting, **any** real number can in principle be assigned to the measure of an amount of something. The concept of weight, for instance, is such that it is intelligible to assign a weight of n kilos (where n represents an integer), or of $n \times \pi$ kilos, to a quantity of snow (or rice, apples, clothing, underwear, water, etc.).

Intuitively, then, counting may be described as the determination of 'discrete' or 'discontinuous' quantity and measuring the determination of 'continuous' quantity. Of the two, discrete quantity seems privileged: there is exactly one non-relative way of determining the quantity of, say, eggs in a carton, which is

precisely to count them. But there is no such unique way of determining, say, the quantity of cotton in a warehouse; this might be done, e.g., by volume, or by weight, or indeed by counting the number of bales; and these different measures cannot be expected to be correlated in any uniquely determinate way.

The contrast of discrete and continuous quantity is not directly ontological – it is not a matter of whether something consists of discrete 'bits' (visible or otherwise) or not. We may count planets, eggs, or horses to determine their number; we may weigh apples, snow, or clothing to determine their amount. The non-ontic nature of the contrast is perhaps especially striking in the juxtaposition of such words as the CN *clothes* (or, e.g., *boots and shoes*) and its cognate collective NCN *clothing* (or *footwear*). Although *clothing* represents continuous quantity and *clothes* discrete quantity, to say that **there is** clothing here or there is to say no more than that **there are** clothes here or there. In this respect, there is good sense in the remark of Quine: "The contrast lies in the terms and not in the stuff they name ... 'shoe' ... and 'footwear' range over exactly the same scattered stuff" (1960: 91).

The contrast 'lies in the terms': although there are **units** of clothing, furniture, etc. (individual pieces of clothing, pieces of furniture, etc.) – indeed, while collective nouns like *clothing* and *furniture* might be said to be ontologically **equivalent** to cognate CNs – such NCNs are no less **semantically** non-count than non-collective nouns like *water* and *mashed potato*. Thus, although there is a straightforward sense to talk of the smallest **number** of clothes – a single item of clothing – there is no good sense to talk of the smallest **amount** of clothing – is one woolen winter coat the same amount of clothing as a single nylon stocking? In absolute terms, I've suggested, talk of amounts in relation to the denotata of NCNs (collective or otherwise) is simply ill-defined; and relative to some particular dimension such as weight or volume, there is no semantic rationale for specifying minimum amounts.

But although not directly ontological, the contrast of discrete and continuous quantity involves the **possibility** of certain ontic contrasts. Counting truistically involves discrete units; and although what is measured may consist of discrete units, measurement as such does not require it, and there are ontic category-differences **within** the semantic category of NCNs. Thus, contrast the two groups of NCNs (a) *furniture, footwear,* and *clothing,* and (b) *rubble, sand,* and *snow,* with what may be called the 'pure' NCNs of group (c): *mashed potato, wine,* and *water.* The collective nouns of group (a) may be said to be 'object-involving,' in that they are semantically 'atomic' – there are units of furniture, footwear, and clothing that are not divisible into smaller units of furniture, footwear, and clothing. It is part of the **meaning** of such an NCN that like a typical CN, it ranges over discrete pieces, units, or elements of what the NCN denotes; indeed the very **identity** of some furniture is not to be distinguished from that of some pieces of furniture. For this reason, the identity of the denotata of group (a) nouns is independent of the identity of the materials of which those denotata are composed; some furniture can survive some loss of constituent materials – wood, cloth, stuffing, etc. – and remain the same (arguably, indeed, it is conceivable that all of the materials of some furniture could be replaced over time while the furniture retains its identity). But the same can hardly be said of the nouns in groups (b) and (c).

Now group (b), though not thus atomic, are object-involving in that they may be said to be 'semantically particulate': it is part of their meaning that what these words denote consists of discrete grains, flakes, bits, etc. – the difference being that the identity of some sand (snow, rubble, etc.) is **not** dependent on that of certain particular grains, flakes, or bits; it may be further crushed or pulverized and yet remain the same. In contrast with groups (a) and (b), however, no such object-involving concepts enter into the meanings of the group (c) terms. Whereas, for instance, to say that there is furniture or clothing in some region is to say that there are constituent pieces or units of furniture or clothing in that region, to say that there is wine or mashed potato in some region is not to say that there are objects that can be characterized as 'pieces' or 'units' of wine or mashed potato in that region. In the nature of the case, there is here no comparable notion of a constituent piece or unit.

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Identity and Sameness: Philosophical Aspects; Interpreted Logical Forms; Logic and Language: Philosophical Aspects; Logical Form in Linguistics; Reference: Philosophical Theories.

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Masterman, Margaret (1910–1986)

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Masterman was a pioneer in computational linguistics. Her ideas and proposals in research on artificial intelligence and machine translation were far ahead of her time and made a significant contribution to this field.

Born in London in 1910, she was educated at Hamilton House, Tunbridge Wells, the Institute Brittanique in Paris, and Newnham College. At Cambridge she studied modern and medieval languages and also philosophy as a student of Wittgenstein. Married to Richard Bevan Braithwaite, professor of moral philosophy at Cambridge University, she published under her maiden name Masterman and became a lecturer in the moral sciences faculty on philosophy and languages in 1959. In addition to her profound research on machine translation, Masterman also published various novels and plays, established a society for women graduates and academics (known as the 'Dining Group') in 1950, and became involved in the publication of the journal *Theoria to Theory*, first published in 1966. Furthermore, she was a fellow founder of Lucy Cavendish College in Cambridge. She died in 1986 in Cambridge, at the age of 75.

Masterman's research reflects the intellectual stimulus of two persons in particular: while her empirical examination of language function can be traced back to the ideas of Wittgenstein, the rather formal theories she considered in language processing show the strong influence of her husband, the eminent logician and philosopher of science, Richard Braithwaite.

Her major contribution to the field of artificial intelligence and machine translation developed as part of the work of the Cambridge Language Research Unit (CLRU). As the director of that unit, she was primarily interested in semantic problems of machine translation and proposed the use of a *thesaurus* (a structured conceptual semantic classification of vocabulary) as a powerful tool for word sense disambiguation in language processing programs. In the same vein as Francis Bacon, Thomas Hobbes, John Wilkins, and other such authors of a universal language in the 17th century, Masterman believed that an adequate theory of the structure of thesauri would make explicit certain underlying structures of the semantic relations in a natural language, so that semantic primitives would emerge naturally. For some years Masterman explored the so-called lattice theory

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as the underlying formal structure of thesauri and linked this to the notion of a fan as representing the ways in which the senses of words spread out indefinitely into the future. She regarded structures such as lattices, which are applicable to mathematical techniques, as genuine structures and contrasted them with systems, which she saw as formal notations without any mathematical content.

Much of Masterman's research effort was expended on the building of interlingual dictionaries and the establishment of the interlingual semantic components themselves. In 1961 she proposed a list of 100 primitive classifiers, such as *folk*, *stuff*, *thing*, *do*, and *be*, and organized them into a lattice, so that her group defined a conceptual dictionary of 15 000 entries.

Inspired by her CLRU colleague M. A. K. Halliday and his idea that syntactic theory was fundamentally semantic or pragmatic, in later research Masterman investigated basic message structures and described a machine translation model that was grounded in her notion of semantic squares. The basic unit of a semantic square is a coupling of phrases with two stress points, in such a way that the phrases in language A form an analogy with the phrases in language B. It was assumed that a patterning of semantic contrasts, reiterations, and recapitulations appears to underlie argument and paragraph structures and transcends specific language structures. This relationship between stress, reiteration, and semantic information structures remained a focal point of Masterman's further academic research.

Masterman's idea of using the word heads of a thesaurus as a set of semantic primitives for semantic coding and analysis does have a strong correlation with what became well-tested information retrieval techniques.

The continual intellectual stimulus she gave to the research at CLRU inspired many of her colleagues and students, such as Martin Kay, Karen Sparck Jones, Yorick Wilks, and Roger Needham, who became major figures in natural language processing, information retrieval, and computing.

See also: Bacon, Francis, Lord Verulam (1561–1626); Halliday, Michael A. K. (b. 1925); Kay, Martin (b. 1935); Sparck Jones, Karen (b. 1935); Wilkins, John (1614–1672); Wilks, Yorick.

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Matagalpa *See:* Misumalpan.

Mathesius, Vilem (1882–1945)

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Vilem Mathesius (1882–1945) was a Czech linguist and the founder and president of the Prague Linguistics Circle. Mathesius specialized in Germanic and Romance studies at Charles University in Prague and later became that university's first professor of 'Anglistics.' He wrote widely on topics in English philology and linguistics, but also on more general topics in linguistic theory. His 1911 paper *On the potentiality of the phenomena of language* was an early classic of European structuralism and echoed some of the ideas expressed in Ferdinand de Saussure's *Course in general linguistics*, in particular the distinction between the synchronic and the diachronic study of language, and that between language and speech.

Mathesius left a considerable body of work on literature and poetics, but his main linguistic interests were in functional syntax and onomatology. He championed the Functional Sentence Perspective (FSP) approach to syntax, which focused on the information structure of sentences rather than phrase structure *per se*. FSP proposes that each sentence consists of a 'theme,' the given or known information, and a 'rheme,' or what is said about the theme. (Other terms for essentially the same concepts are 'topic' and 'comment,' or 'given' and 'new.') In free-word-order languages like Czech, the division of a sentence into a subject and a predicate fails to account for noncanonical arrangements of the words, where almost any order is possible. FSP is intended to account for word-order phenomena by relating it to information structure. The FSP approach has never enjoyed much popularity among linguists who specialize in fixed-word-order languages like English, but it still enjoys wide appeal among Slavic linguists, because the free word order of the Slavic languages seems to lend itself to an FSP perspective.

Although Mathesius himself made several important contributions to linguistics, he will probably be best remembered as the founder of the Prague Linguistic Circle. The Circle started as a monthly gathering of linguists in Prague, who dined together and then heard an invited paper by a prominent colleague. Topics ranged from grammatical theory to psycholinguistics, and engaged central European linguists in discussions of the leading ideas of the time. But the Circle acquired a whole new significance with the arrival of two brilliant Russian émigrés, Nikolai Trubetzkoy and Roman Jakobson. Trubetzkoy and Jakobson were primarily phonologists (although, as is well known, Jakobson's interests in matters of language were almost without boundaries). It was Trubetzkoy and Jakobson's phonological theories, focusing on distinctive features and phonological universals, that left their stamp on the Prague Linguistic Circle and gave rise to the notion of the 'Prague School' as one of the most important schools of European structuralism. Mathesius was the founder of the Prague Linguistic Circle and remained its president until his death in 1945, but it is ironic that his own interests are little associated with the general impression of what the Prague School contributed to our understanding of language.

See also: Jakobson, Roman (1896–1982); Prague School; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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After studying decorative art and obtaining his *licence* in modern philology and a certificate in Arabic, Matoré embarked on a career as a teacher of French, and later as a literary scholar and a linguist. In the late 1930s, he taught French in Lithuania, where he was arrested by the Soviet secret police. He escaped, was arrested in 1942 by the Gestapo, but released in 1943. Upon his return to France, he started preparing his Ph.D. under the direction of Charles Bruneau. Having obtained his Ph.D. (1946), he became professor first in Besançon (1947–1952), then at the Sorbonne university, where he directed the French civilization curriculum, organizing pedagogical training sessions for teachers of French. He directed several doctoral dissertations at the Sorbonne and at Paris-Nanterre, and continued his teaching well after his retirement in 1979.

As a literary scholar, Matoré was a specialist of modern French literature (17th to early 20th century), dedicating himself to text edition and text commentary (works of Molière, l'abbé Prévost, Théophile Gautier, Honoré de Balzac, and Marcel Proust). He was also an excellent connoisseur of modern art and a music lover, wrote insightful essays on the connection between music, painting, and literature (1973, 1979), and on the representation of space (1962), and produced a film on abstract painting. A specialist of teaching French as a foreign language, he was involved in the elaboration of the *français fondamental*, a basic vocabulary for didactic purposes. As a linguist, he is especially known for his contribution to French lexicology, as a historian (1968) but primarily as a methodological innovator. His thesis (published in 1951) was a study of the French lexicon around 1830, both at a general sociocultural level (as distilled from contemporary newspapers, popular press, etc.) and as specifically reflected in the prose writings of Théophile Gautier (whose vocabulary is thematically analyzed). The methodology adopted in the thesis reflects Matoré's view of lexicological research: it starts from the political, social, economic, and cultural events and innovations that underlie the structure and the changes of the lexicon (apparent from a number of *mots-témoins*, 'witness words,' neologisms that are the embodiment of societal changes), which can be structured in thematic fields around a number of *mots-clés* 'key-words') governing the hierarchical structure of the lexicon (however, the sociocultural frame constructed by the author is not inductively arrived at, and as such the structural 'reconstruction' has an *a priori* and subjective ring). Matoré presented a systematic account of his views in his 1953 book on method in lexicology, where he defines lexicology as a sociological discipline, the specificity of which lies in its word-based orientation: society is explained through its vocabulary. Matoré relegates atomistic word study to what he calls 'lexicography' and concentrates in his 'lexicology' on conceptual or thematic fields, corresponding to the 'world view' of (French) society at a particular period. His last major book publications (1985, 1988) offer a wide-ranging application of his methodology to the vocabulary of French medieval and 16th-century society. Matoré's stand is a structuralist one, but an externalist and not a 'language-internal' (or immanent) one: the structure of the vocabulary of a society at a given time can only be grasped and explained by tracing the interconnection of the lexical system with extra-linguistic data. Such a view implies that linguistic signs, while being arbitrary in their material constitution, are motivated in their content by sociocultural facts.

See also: Bruneau, Charles (1883–1969); French Lexicography.

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Katsumi Matsumoto was born in Nagano, Japan on October 25, 1929. He graduated with a B.A. from the department of linguistics at the University of Tokyo in 1953, and an M.A. from the graduate school there in 1956. He was trained in classical philology and Indo-European comparative linguistics under Harushige Kodzu, late professor of linguistics (*see* **Kodzu, Harushige (1908–1973)**). He was appointed lecturer in linguistics at the University of Kanazawa in 1956, associate professor in 1964, and professor of linguistics in 1975. He studied under W. S. Allen and John Chadwick as a visiting scholar at the University of Cambridge from 1977–1978. He was professor of general linguistics at the University of Tsukuba from 1983 to 1993. Matsumoto was chief editor of *Gengo Kenkyu* from 1983 to 1985 and Japan's representative at the General Assembly of CIPL in 1987. He served as president of the Linguistic Society of Japan from 1991 to 1994.

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See also: Contact-Induced Convergence: Typology and Areality; Greek, Ancient; Japanese; Kodzu, Harushige (1908–1973); Linguistic Universals, Greenbergian.

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Mauritania: Language Situation

Editorial Team

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Mauritania is a North African state bordering the North Atlantic Ocean, between Senegal and Western Sahara. It has a total area of 1 030 700 sq km and it borders with Algeria (463 km), Mali (2237 km), Senegal (813 km), and Western Sahara (1561 km). Mauritania became independent from France in 1960, and despite the legalization of opposition parties through a new constitution approved in 1991, it essentially remains a one-party state.

The total population of 2 998 563 (July 2004 est.) consists of a majority of Arab-Berber ethnic groups (also called Maur or Moors) who continue to experience ethnic tensions with the black minority population.

Hassaniya Arabic, with 2.2 million speakers (66% of the population), acts as the official language, but the Niger-Congo languages Fula (Pulaar) (150 000), Soninke (30 000), and Wolof (10 000) are also spoken and recognized, with Arabic, as official languages

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that are used in, for example, state radio service broadcasts. Other languages spoken include Bambara and French. Zenaga, a Berber language that is highly endangered, with only a couple of hundred Bedouin speakers recorded in 1998. Fula, Soninke, and Wolof are spoken in the south of the country, on the border with Senegal, where all three languages are spoken as well.

Adult literacy of persons aged 15 and over is 41.7% for the total population, divided into 51.8% males and 31.9% females, based on a 2003 estimate. Youth literacy is by comparison higher at 49.6%.

See also: Berber; Niger-Congo Languages.

Mauritius: Language Situation

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Linguistic Environment

The Republic of Mauritius contains the islands of Mauritius, Rodrigues, Saint Brandon (itself the name of a group of islands, occasionally referred to as the Cargados Carajos), and Agalega. The people of Saint Brandon and Agalega number only a few hundred, of which many are Mauritians on short-term postings, leaving only Rodrigues and the island of Mauritius as centers of population. The Central Statistical Office of Mauritius estimates the total resident population of the island of Mauritius in mid-2003 to have been 1 186 363 (Central Statistical Office, 2004), with a further 36 448 for Rodrigues. Since the linguistic environments of Rodrigues and the island of Mauritius are quite distinct, the following remarks are restricted to the latter.

With a total land area equivalent to the English county of East Sussex, Mauritius is densely populated; it also represents an extraordinarily multiethnic and multilingual community. Appel and Muysken (1987: 22) succintly summarize the complexity of the Mauritian linguistic situation by pointing out that "over 10 languages have sizable groups of speakers. Most of these are associated with particular ethnic groups, often descendants of migrants from South Asia, and in addition there is the colonial language, French (to some extent sharing this status with English). In between there is Creole [Morisyen], which on the one hand is the ethnic language of a particular group, and on the other hand functions as a lingua franca."

Of all the languages attested in Mauritius, it is the French-based Creole that has attracted the lion's share of linguistic investigation. But if the last three decades have witnessed a steady output of research into Mauritian Creole (Baker, 1972; Chaudenson, 1979; Baker and Corne, 1982; Muysken and Smith, 1986; Adone, 1994), little by comparison has been produced on languages not considered indigenous to Mauritius. This includes the languages that the Mauritian government describes as 'ancestral languages' (ALs), in that they are officially designated as languages spoken by the ancestors of present-day Mauritians at the time of migration to Mauritius. Often, however, such official designation represents political expedience rather than linguistic fact. For example, while Mandarin is the only form of Chinese taught in Mauritian schools, it is not a dialect that would have been spoken by Chinese migrants to Mauritius. The same political fiction notoriously obtains between Hindi and Bhojpuri, the latter having served as a lingua franca for the majority of Mauritians of north Indian origin, and now on the decline, in no small part due to pressure from Hindi, a language perceived as having much higher cultural status (Ramyead, 1985).

The highly competitive nature of the Mauritian labor market means that great emphasis is placed on study and on examination success; the role of languages in the educational system has invariably become a key political issue and one with a strong ethnic dimension. The Constitution of Mauritius (Section 31(2), subsection 3, point 4) divides the population into Hindu, Muslim, and Sino–Mauritian communities, with the catch-all term 'General Population' encompassing the remainder. Many Mauritians from the 'General Population' believe that children of Indian and Chinese origin are unfairly favored by a school system that offers Hindi, Urdu, Marathi, Telugu, Tamil, and Mandarin as optional school subjects (Additional ALs include Urdu and, somewhat disingenuously, Arabic). The removal of ALs from the school syllabus is resisted, in that Mauritians in favour of the teaching of ALs view any such move as indicative of the promotion of the European languages within the educational system and outright demotion of Asian

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languages. Given the existence of an economically powerful Franco–Mauritian community with which the use of French is principally associated, any move to reduce the role of the ALs in schools would invariably be seen as socioeconomically and ethnically motivated as well as socioculturally oppressive.

Current Languages

English is the *de facto* official language of Mauritius; it is not constitutionally enshrined as such. The use of French has been maintained by Franco–Mauritians and cultivated by Mauritians from traditionally non-Francophone backgrounds, to the point where it is an 'unofficial official language' alongside English. That is not to say that the domains of use for the two languages are identical: With French as with the ALs, an association exists between language, culture, and ethnicity. Baker (1972) refers to a historical resentment between Franco–Mauritian and Indo–Mauritian communities, in which the use French became emblematic of Franco–Mauritian socioeconomic and political paramountcy. The use of French rather than the more egalitarian lingua franca, Creole, tends still to be restricted to particular aspects of commerce, such as the banking sector and shops selling luxury goods, or when engaging in high culture. English, on the other hand, is strongly associated with business, technology, government, and administration, and not with a particular ethnic community; unlike French, its use in cultural activities would appear to be negligible (Biltoo, 2004).

Data presented by Sambasiva Rao and Sharma (1989) indicate 22 languages as currently spoken in Mauritius but, in adhering closely to census data and including extraterritorial languages returned by a few dozen Mauritian respondents (such as Russian and Italian), this somewhat overstates the multilingual situation. A more realistic enumeration is to be found in Stein (1982), who lists 13 languages. Importantly, Stein does not distinguish individual varieties of Chinese, includes Kutchi and Sindhi, and makes no mention of Arabic. On the basis that Mauritian censuses have in the past returned a number in excess of 1000 for both Hakka [Chinese, Hakka] and – more problematically – 'Chinese,' a more balanced approach would be to separate 'Chinese' into Hakka and Mandarin, disregarding Cantonese. It is doubtful whether Cantonese, Kutchi and Sindhi should be counted as current languages, given the small numbers of speakers indicated in census reports; as for Arabic, it is clear that this is a language reserved for religious practice rather than everyday communication. The list of current languages, even with the excisions suggested above, is nevertheless impressive for a nation with the population and land mass of Mauritius: Bhojpuri, Creole, English, French, Gujarati, Hakka, Hindi, Mandarin, Marathi, Tamil, Telugu, and Urdu.

See also: Chinese; Gujarati; Hindi; Marathi; Pidgins and Creoles: Overview; Réunion: Language Situation; Tamil; Telugu; Urdu.

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Maxims and Flouting

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Maxims and *flouting* are two closely interrelated terms central to the Oxford language philosopher H. Paul Grice's famous theory of the Cooperative Principle, which first emerged in the William James lectures that Grice delivered at Harvard University in 1967 (*see* **Cooperative Principle; Grice, Herbert Paul (1913–1988)**.) Grice's project was to try to reduce the number of meanings for lexical items ("Grice's razor" [Davis, 1998: 20]), and he did this by postulating a new, separate type of non-semantic meaning that he called *implicature*, a type of meaning that is not semantically coded but arises in conversational context (*see* **Implicature**).

The generation of implicature is crucially connected to the workings of an overall *Cooperative Principle* and a set of conversational *maxims*.

The Cooperative Principle

Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged (Grice, 1989).

The Maxims

Quantity

1. Make your contribution as informative as is required.
2. Do not make your contribution more informative than is required.

Quality

1. Do not say what you believe to be false.
2. Do not say that for which you lack adequate evidence.

Relation

1. Be relevant.

Manner

1. Avoid obscurity of expression.
2. Avoid ambiguity.
3. Be brief.
4. Be orderly.

These maxims may either be observed or breached, and in both cases implicatures may arise. The maxims can be contravened in a number of different ways, but crucial importance was allotted to the *blatant*, *intentional* contravention of one (or more of the) maxim(s), or *flouting*. On spotting such a blatant breach, the hearer – who will always retain his or her belief that the speaker is being cooperative – will immediately begin a search for an additional or alternative meaning for the utterance, one that *observes* the maxim(s) in question and thus follows the Cooperative Principle. The result of such a search is the implicature. Consider the following example:

A: Are you going to Anna's party?
B: Well, Anna's got this new boyfriend now.

B's reply here clearly breaches Grice's maxim of Relation (the only truly relevant answers to A's question would be *yes* or *no*). According to the theory, spotting this breach would set off a reasoning process in A, along the following lines:

1. B has said that *Anna's got this new boyfriend now.*
2. This utterance breaches the maxim of Relation.
3. I have, nevertheless, no reason to believe that B does not intend to observe the Cooperative Principle and the maxims.
4. B could not be doing this unless what he really wanted to convey was something different from what he literally says.
5. On the basis of the available context (e.g., that B really liked Anna's old boyfriend), what B really wanted to convey was, *no* (*I am not going to Anna's party*) (a *relevant* reply, i.e., one that is not in breach of the maxim of Relation).

Note how this example illustrates the context-dependency of implicatures. If the context assumed in 5 were *B really* disliked *Anna's old boyfriend*, the interpretation (implicature) would be the opposite, namely, *yes* (*I am going to Anna's party*). (*see* **Context, Communicative**.)

What Is a Maxim?

The concept of maxim is a crucial notion within the theory of the Cooperative Principle. Grice's own characterization of the entity is many-faceted. First of all, he was unambiguous on the point that the maxims are descriptive rather than prescriptive. Our rational nature, according to Grice, leads to the observable situation that the maxims are observed (more often than not). That is, he never meant that the maxims *should always* be observed, one of several common

misunderstandings which has marred the field of Gricean pragmatics since its beginning (Thomas, 1995: 56).

Another noteworthy aspect of Grice's characterization of his maxims is that just because they are seen to have a basis in human rationality, they are not therefore to be considered innate. Furthermore, he was also attracted to the idea of maxims as *general interactional principles* governing both non-verbal and verbal behavior. Finally, the proposed set of maxims was seen as *expandable*: "There are, of course, all sorts of other maxims (aesthetic, social, or moral in character), such as 'Be polite,' that are also normally observed by participants in talk exchanges, and these may also generate . . . implicatures" (Grice, 1989: 28).

In the post-Gricean literature, there are roughly three main approaches to maxims. The first tries to tighten the association between the maxims and human rationality. The main representative of this approach, Asa Kasher, does this by postulating principles of rationality from which Grice's maxims are seen to derive (Kasher, 1976). The second, more influential approach, alienates itself most strongly from Grice's original formulation: here, the maxims are redefined as innate, linguistic rules that are always observed and that will produce the same implicatures irrespective of context (e.g., Atlas and Levinson, 1981; Horn, 1984). This formalist, cognitivist approach, in its quest to 'purge' the Gricean scheme, often ends up reducing the number of proposed maxims, a trend that culminated in the theory of relevance proposed by Sperber and Wilson in 1986, in which all the maxims were collapsed into one, cognitive, Principle of Relevance. This is in stark contrast to a completely opposite trend, found in the third approach to maxims, the social pragmatics approach. Geoffrey Leech (1983), adopting Grice's view of maxims as learned entities, ends up adding a large number of maxims to Grice's scheme.

The main drawback of the formalist, cognitivist approach is clear: they see maxims as rules that are in principle always followed, and hence this kind of theory cannot account for that which is observed when some such entity as a maxim is *breached* (e.g., flouted), namely, the emergence of a layer of underlying meaning (implicature). Support for this observation has come from a perhaps unusual angle: research in Artificial Intelligence has shown that, in order for computers to communicate efficiently with human beings, they need to observe all the Gricean maxims at all times. If they do not, the human communicator will invariably read more into the computer's utterance than the devisers of the program intended (Bernsen *et al.,* 1996).

The main criticism of the social pragmatic approach has revolved around their uncritical, *ad hoc* proliferation of maxims (see, e.g., Brown and Levinson, 1987). A weakness of *all* approaches, including the social pragmatics approach, is the widespread belief that there must be an ultimate, fixed set of universal maxims where each can be classified and labeled individually. This despite the fact that the universality of maxims was drawn strongly into question as early as the mid-1970s, in Elinor Keenan's (1976) famous study of a Malagasy community, in which the influence of an informativity maxim (Quantity) was shown to be absent in certain speech situations. Unfortunately, rather than drawing attention to the eclectic sociocultural reality of Gricean maxims and other such entities, Keenan's work was applauded as a refutation of Grice's claims by those who believe that universality is the only valid stamp of approval for maxims.

The varied appearance of maxims around the world makes likely the hypothesis that one cannot ever hope to be able to enumerate and label every single maxim – the list of entities that can be flouted to produce implicature is probably open-ended. This, of course, calls for a detailed and succinct definition of the notion, to stand guard at the door, controlling which new maxims get in. A simple solution would be to adopt a functional definition such as that proposed by François Recanati (1987: 133), to the effect that a maxim is an entity that can be flouted to produce implicature (see also Levinson's 'general principle' [1983: 132]). The success of such a definition would, however, depend on whether or not one has reached a satisfactory understanding of the notion of *flouting*.

Flouting: Past, Present, and Future

As was noted in the first section of this article, flouting is the blatant breach of one of the maxims. Because all hearers embody faith in the speaker's inherent intention to be cooperative (i.e., to observe the maxims [at some level]), a seeming breach will trigger a reasoning process whereby the hearer will try to come up with a meaning for the utterance that *turns it into* an act of observing the given maxim(s) (an implicature).

There are several problems with this model. First of all, it is unlikely that it is the hearer's belief in the speaker's cooperativity that is the reason behind the former's quest to retrieve an implicature. This is especially the case if one chooses to include politeness maxims into the scheme: if a politeness maxim is breached, the implicature is hardly ever more polite than the act itself (consider, e.g., the act of turning

away when one should have greeted somebody, in order to implicate, for instance, that one considers that person to have done something despicable). Another serious problem is that the reasoning process the hearer is supposed to go through is psychologically implausible. And finally, the end product of this process, the implicature, is presented as an entity that is easily circumscribed (a fully fledged proposition), whereas real life might prove to be far less ordered, with several half-formed, semi-verbalized hypotheses as outcome.

Despite these problems, which are clearly in need of serious attention, there has been a curious neglect of the notion of flouting in post-Gricean theory-building. The interest from empirical researchers has, by contrast, been tremendous. The notion is used as an analytical tool in a large array of studies in a multitude of extra-pragmatic and semi-pragmatic fields such as, e.g., literary criticism (e.g., Bollobás, 1981), humor studies (e.g., Attardo, 1990), or gender studies (Rundquist, 1992). Such widespread application clearly confirms the theoretical value of the notion. However, as very few have felt the need to make any significant amendments to the theory (apart from the occasional addition of a 'new maxim'), the problems remain.

In the theoretical literature, it is mainly the strong focus on observance (largely because of a reluctance to deal with the troublesome notion of context) that has obscured the need to deal with the notion of flouting. The discussion above related the formalist approach with their definition of maxims as context-independent rules that are always to be observed. Another trend manifests itself by interpreting every observed breach of a maxim not as a breach, but as the observance of an invented, 'opposite' maxim (e.g., a breach of Be brief would be seen as an observation of 'Be wordy') (see, e.g., Joshi, 1982).

A particularly serious form of neglect is, of course, outright rejection, as in Sperber and Wilson's highly influential, and heavily criticized, Relevance Theory (1995). (*see* **Relevance Theory**.) Maxims, as envisaged by Grice, are afforded no place in a theory of indirectness, and the notion of flouting leading to implicature is replaced by the idea that implicature should be arrived at by a continued search for relevance, when the literal interpretation yields none. The problem for Relevance Theory is, of course, empirical evidence such as that mentioned in the previous section (Bernsen *et al.,* 1996), which shows without a shadow of a doubt that maxims (or something like them) *are* involved and that breaching them *does* have the effect of stimulating the interpretation of indirect meaning. In addition, there are interesting indications that Grice may have stumbled on to something that is in reality part of an even larger scheme than he envisaged. In experimental social psychology, it has long been noted that 'unusual events' are sociocognitive triggers for a search for an 'explanation' (the 'expectancy principle' [Weiner, 1985: 81]). The breach of a maxim, being the departure from a norm, is also in this sense an 'unusual event,' and the search for an implicature has much in common with the description of the search for an 'explanation.' If this connection is viable, it holds great promise for the further development of Grice's model of flouting.

Conclusion

All in all, Grice himself offered merely 20 or so pages on the topic of maxims and flouting. Subsequent research offers much food for thought, but no viable theory has emerged that exploits the full potential of Grice's eminent point of departure. This does not mean that it is an impossible task to arrive at such a theory, but it would probably require a considerable reorientation of focus, possibly toward the sociocultural significance of both maxims and flouting.

See also: Cooperative Principle; Grice, Herbert Paul (1913–1988); Implicature; Intercultural Pragmatics and Communication; Irony; Neo-Gricean Pragmatics; Neo-Gricean Pragmatics; Relevance Theory.

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Mayenowa, Maria Renata (1910–1988)

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Maria Renata Mayenowa (née Gurewicz) was born on June 2, 1910, in Belostok, Russia (from 1919 Białystok, Poland) and died on May 7, 1988, in Warsaw. She studied Polish language and literature at Stefan Batory University in Wilno, graduating in 1932. After teaching for four years in a Jewish high school she returned to the university, earning her doctorate in May 1939. She worked as a teaching assistant at the university (after 1939 the Vilnius University in Soviet Lithuania) until the Nazi invasion of 1941. She survived the occupation in hiding in northern Lithuania.

After working as a librarian in the Białystok City Library in 1945, she spent the next five years in Prague, where her husband, Józef Mayen, was press-attaché at the Polish Embassy. In 1948 she was one of the cofounders of the Institute for Literary Studies of the Polish Academy of Sciences (IBL PAN); she served as deputy director of IBL from 1957 to 1968. She held the rank of professor at the academy and at Warsaw University from 1954 until 1968, when she was dismissed as a result of the 'anti-Zionist' campaign of that year. She remained active, however, as a scholar, editor, and organizer of scholarly activity to her very last days.

The main focus of Mayenowa's individual publications was a linguistically informed stylistics and poetics, summed up in her 1974 handbook *Theoretical Poetics: Questions of Language* (in Polish; second, enlarged and revised edition 1979), which she characterized as dealing with the question of "what in verbal messages (especially those belonging to literature) is determined by their linguistic character." (p. 5) Stylistics and poetics were also at the center of her work as editor and translator, which resulted in collective volumes with titles like *Tekst, język, poetyka* (Text, language, poetics); *Semantyka tekstu i języka* (The semantics of text and language); *Tekst i język: problemy semantyczne* (Text and language: semantic problems); *O spójności tekstu* (On textual coherence), as well as annotated collections of translations of French, Czech, and Russian works on stylistics. Several of the volumes were the result of the symposia that she organized in Warsaw; they brought together linguists and literary scholars from Poland, Czechoslovakia, and the Soviet Union, as well as Western scholars, and served as an important medium of international intellectual communication.

Mayenowa initiated and played an active editorial role in the dictionary of 16th-century Polish, which has reached volume 31 (volume 1 appeared in 1966), and she was similarly responsible for a series of editions of Polish literary texts, the *Library of Polish writers,* covering works from the middle ages to the 17th century with extensive explanatory lexicographic and grammatical apparatus. Through such editorial and organizational work, and through her formal and informal didactic activity (including the weekly colloquia that she held at her Warsaw apartment), Mayenowa trained and inspired a whole pleiad of younger scholars, including the Polish-born Australian semanticist Anna Wierzbicka, the Lublin linguist and folklorist Jerzy Bartmiński, the Warsaw lexicologist Zygmunt Saloni, and the late medievalist and versologist from Wrocław University, Jerzy Woronczak.

See also: Lexicography: Overview; Poetry: Stylistic Aspects; Stylistics.

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Mayan Languages

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The Mayan language family traditionally stretched from what is now northern El Salvador and Honduras, through Guatemala and Belize, and up to the southern states of Mexico, including Chiapas, Quintana Roo, Campeche, Yucatán, and part of La Huasteca. Today the family is more dispersed due to out-migration. Large colonies of Mayan speakers can be found in Los Angeles and other California communities, Arizona, Texas, and Florida. Most linguistic descriptions recognize 31 Mayan languages, including the extinct Chikomulselteko (Chicomuceltec). Most historical linguists posit the Maya homeland as the Cuchumatán peaks of Guatemala, the area with the greatest linguistic diversity today (Kaufman, 1976; Campbell, 1977; Fox, 1978; Campbell and Kaufman, 1983, 1985). The model of diversification correlates phonological, morphological, and syntactic changes with a least-moves model of out-migration, seeking confirmation in the archaeological method. Based on these reconstructions, Proto-Maya, the mother language from which the modern diversity springs, would have been spoken approximately 41 000 years ago. People began to migrate outward, sharing innovations as they moved.

The family eventually split into four divisions. (Note that many of the names of Mayan languages have a variety of spellings. These spellings reflect not only the writing traditions of various authors (English, Hispanic, Mayan), but also their political orientation. In Guatemala, particularly, Mayans have fought for and won official recognition of their own orthographies. In Chiapas, Mayan educators have also elected non-Spanish-based spelling systems. In Yucatán, however, a long tradition of literacy in Maya Yucateco has militated against changing orthographies. The spellings used in this article reflect the local practice.)

1. Wasteko, composed today only of Wasteko (Huasteco).
2. Yucatecan, composed of Maya Yucateco (Yucatán Maya), Mopan (Mopán Maya), Itzaj (Itzá), and Lakantun (Lacandán).
3. Western Division, broken into two branches: Ch'olan and Q'anjob'alan. The Ch'olan branch in turn has two subgroups, Ch'olan Proper, consisting of Chontal, Ch'ol, and Ch'orti' (Chortí), and Tzeltalan, consisting of Tzotzil and Tzeltal. The Q'anjob'al branch has two subgroups, Chujean, consisting of Tojolab'al and Chuj, and Q'anjob'alan Proper, consisting of Q'anjob'al (Eastern Kanjobal), Akateko (Western Kanjobal), Popti' (formerly Jakalteko (Jacalteco)), and Mocho' (Mochó).
4. Eastern Division, which is subdivided into the Mamean and K'iche'an subgroups. The Mamean branch is broken into Mam Proper, consisting of Mam and Teko (also called Tektiteko (Tectiteco)), and Ixilan, which includes Ixil (Nebaj Ixil) and Awakateko (Aguacateco). The K'iche'an branch includes the outliers Uspanteko (Uspanteco) and Q'eqchi' (Kekchí) and two major subdivisions, K'iche'an Proper, consisting of K'iche' (Quiché), Achi', Kaqchikel (Central Cakchiquel), Tz'utujiil (Tzutujil), Sakapulteko (Sacapulteco), and Sipakapense (Sipacapense), and Poqom, consisting of Poqomchi' (Pocomchí) and Poqomam (Pocomam).

Within subgroups there is a high degree of mutually intelligibility and multilingualism (particularly

Table 1 Population figures

Language	*Etnic count, 2002*	*Speaker count, 2002*	*Tzian (1994)*	*Ajpopab'achi', 1998*	*Ministry of Education, 2003*
K'iche'	1 270 953	890 596	1 842 115	647 624	922 378
Q'eqchi'	852 012	716 101	711 523	473 749	726 723
Mam	617 171	477 717	1 094 926	345 548	519 664
Kaqchikel	832 968	444 954	1 002 790	343 038	475 889
Q'anjob'al	159 030	139 830	205 670	75 155	99 211
Poqomchi'	114 423	92 941	259 168	94 714	69 716
Ixil	95 315	95 315	130 773	47 902	69 137
Achi	105 992	82 640	n/a	15 617	51 593
Tz'utujiil	78 498	63 237	156 333	57 080	47 669
Chuj	64 438	59 048	85 002	50 000	38 253
Popti'	47 024	34 038	83 814	39 635	38 350
Akateko	39 370	16 562	39 826	40 991	5572
Ch'orti'	46 833	11 734	74 600	27 097	9105
Poqomam	42 009	11 273	127 206	46 515	9548
Awakateko	11 068	9613	34 476	18 572	16 272
Sakapulteko	9763	6973	42 204	3 033	3940
Sipakapense	10 652	5687	5944	4 409	6344
Uspanteko	7494	3971	21 399	12 402	1231
Mopan	2891	2456	13 077	8500	468
Itzaj	1983	1094	1783	650	123
Teko	2077	1144	4755	4895	1241
Chalchiteko	n/a	n/a	n/a	n/a	n/a

Table 2 Mexican population figures

Language	*Government census figures, 2000*[a]	*Summer Institute in Linguistics*
Tzeltal, K'op	547 000	300 000 (1993)
Tzotzil, B'atzil K'op	514 000	225 000 (1990)
Mocho	500	>1000 (1993)
Lakantun, Hach T'an	130	
Tojolab'al, Tojowinik Otik	74 000	
Chontal	72 000	
Ch'ol	274 000	
Yucateco	1 490 000	

[a]The Mexican census also lists the numbers of speakers of 'Guatemalan' languages now resident in Mexico: Chuj 3900, Jakateko (Popti', Ab'xab'al) 1300, Q'eqchi' 1700, K'iche' 640, Kaqchikel 610, Ixil 310, Awakateko 60, Teko 50.

evident in market contexts), which blurs language and dialect boundaries. Often the divisions between language groups are determined more by political divisions and historical identities than by isoglosses. Rivalry between families in Aguacatán brought about the splintering of Awakateko, spawning a new 'language,' Chalchiteko, which won official recognition in Guatemala in 2003. Likewise, historic autonomy and a tradition of armed and political conflict between Q'umarkaaj (the K'iche' capital) and Rab'inal (the Achi' center) have created localized identities, which override mutual intelligibility in determining the language boundaries between the two groups. Residents of San Miguel Acatán and San Rafael La Independencia have traditionally considered themselves Q'anjob'al speakers, but the official recognition of Akateko as a language, with its own representation in the Academy of Mayan Languages of Guatemala, has served to accentuate linguistic differences and has discouraged use of educational materials, more widely available in Q'anjob'al. On the other hand, Mam, one of the four largest Guatemalan Mayan languages, and Chuj, spoken in northwestern Guatemala, both have deep internal dialectal splits. Dialects may differ in more that 20% of their core vocabulary, undergo different syntactic processes, and allow different sentential word orders, yet these languages maintain a shared identity.

Estimates of number of speakers are also highly political. Despite official rhetoric praising the ethnic richness of their countries, both Guatemala and Mexico have traditionally promoted assimilation to a national identity that is indigenous only ancestrally. (Also, El Salvador does not recognize any modern Maya as traditional ethnicities, although it does again host Mayan populations displaced by the genocidal

Table 3 Sample verbs in Kaqchikel

First-person plural	*Gloss*	*Second-person plural*	*Gloss*
xojwa'	'we ate'	xixwa'	'y'all ate'
x*ix*qaq'etej	'we hugged y'all'	x*oj*iq'etej	'y'all hugged us'

Table 4 Sample positionals in Mam

State	*Gloss*	*Intransitive*	*Gloss*	*Transitive*	*Gloss*
wa'li	'standing'	wa'ee	's/he stands'	twa'b'in	's/he stood her/him up'
xhjewli	'twisted'	xhjewee'	'it twists'	txhjewb'in	'she/he twists it'

war in Guatemala, 1960–1995. Honduran populations until recently were counted as Spanish speaking, although in the north there were ethnically Ch'orti' peoples; in the 2001, some Honduran rural schools began limited bilingual education, although without materials.) Leopoldo Tzian (1994) points out that official governmental censuses in Guatemala consistently underestimate the number of Mayas compared to surveys done by linguists, by international development agencies, and by health workers. Table 1 gives population figures for Guatemala: official census figures for the Mayan population (note the difference between ethnically identified Maya and those who speak their mother tongue), Tzian's data, the figures of AJPOPAB'CHI' (the Commission for the Officialization of the Indigenous Languages of Guatemala), and those of the Ministry of Education Survey for 2003. Table 2 contains population figures for Mexico, showing the official government figures (Instituto Nacional de Estadística, Geografía e Informática, 2000) and those of the Summer Institute in Linguistics (published 2004) with the date of the survey in parentheses. The first label under the rubric 'language' gives the traditional name for the language/ethnic group, used in most academic publications and in official documents prior to 2000, the second is the indigenous autodenomination.

Grammatical Characteristics

The Mayan Languages share many important characteristics, among these are ergativity, positionals, directional particles, and noun and numeral classifiers. These categories are developed in different ways in the various languages.

Ergativity

Ergative languages mark the relationship between the verb and its arguments with inflections that treat the subjects of intransitives and objects of transitive verbs as one category (marked by absolutive pronouns) and the subjects of transitives and possessors of nouns as a separate category (marked by ergative pronouns). Most of the Mayan languages show this system, with variations in subparts of the grammar, in which a nominative–accusative agreement pattern (like that Indo-European languages) surfaces. Such systems are referred to as split-ergative. Ch'orti' has a split-ergative system, with the change being triggered by subordination. In addition, Ch'orti' has a third pronominal set, which serves as prefixed subject markers of incompletive intransitive verbs. Table 3 shows sample verbs in Kaqchikel with subject pronouns in bold type and object pronouns in italics. Note the homology of intransitive subjects and transitive objects.

Positionals

Positionals are a special word class in Mayan languages, so-called because many denote positions such as 'standing,' 'lying prone,' and 'stuck crosswise in an opening.' However, some simply name conditions or states, such as 'wet,' 'naked,' and 'round.' Words that belong to this class have special derivational characteristics. The roots are inflected to form two or three types of nonverbal predicates (adjectives), intransitive verbs, and transitive verbs. Table 4 shows examples from Mam.

Some languages form reduplicated adjectives from the positional roots, for example, in Chuj *nhojanhojan* 'walk fluffily, like a shaggy sheep' and *linganlingan* 'be hanging.' Kaqchikel (Table 5), Tz'utujiil, and K'iche' copy the vowel of the root and the first consonant and then add a suffix for singular or plural agreement to form adjectives from positional roots.

Directional Particles

These particles, usually variants of intransitive verbs of motion, serve as a complement to main verbs. They may indicate actual movement of the actor or action, or they may add aspectual information. In Mam, transitive verbs almost always cooccur with a

Table 5 Reduplicated adjectives in Kaqchikel

State	*Gloss*	*Adjective*	*Gloss*
setesïk	'round, singular'	setesäq	'round, plural'
kotokïk	'crooked, singular'	kotokäq	'crooked'

Table 6 Poqomam directionals

Directional	*Gloss*	*Intransitive verb*	*Gloss*	*Phrasal use*	*Gloss*
ala	'out'	-il-	'leave'	xa'ila ala	'we go out, we leave'
aka	'in'	-ok-	'enter'	xah'oka aka	'we go in, we enter'
koon	'stay'	-kahn-	'stay, remain'	xahkahna koon	'we stay here'
pa	'thither'	-pan-	'arrive there'	xahpana pa	'we arrive there'
qa	'down'	-qaj-	'descend'	xahqaja qa	'we go down, we descend'

Table 7 Noun classifiers in Popti'

Classifer	*Objects in the class*	*Classifier*	*Objects in the class*
komam	Male supernaturals, diseases	komi'	Female supernaturals
ya'	Adult person	ho'	Young men
xo'	Young women	naj	Male, unknown, not respected
ix	Female, unknown, not respected	unin	Human baby
no'	Animals (other than the dog)	metx	Dog
te'	General plants and their products	ixim	Grains
tx'al	Cotton or synthetic thread	tx'anh	Fiber, string
q'ap	Cloth	tx'otx'	Earth, earthenware
ch'en	Metal, rock, mineral	atz'am	Salt
ha'	Water, liquid	q'a'	Fire

directional complement (see Table 6 for examples in Poqomam). Verb phrases in Yucatec, however, now rely on conjunction rather than complementation.

Noun Classifiers

These particles precede the nouns they modify and ascribe some property, social or material, to the noun. In the Q'anjob'alan group, noun classifiers are highly exploited by the grammar. They serve as definite articles and as pronouns. (See Table 7 for examples in Popti.') In the neighboring Mamean languages, the system is more attenuated. In K'iche'an languages, classifiers are used more as titles before names than as classifiers. In Yucatec, only morphological vestiges appear in names for a few plants and animals.

Numeral Classifiers

These may be of two types of numerical classifiers: suffixal, marking what kind of entity is being counted (Table 8), and independent, showing how the object counted is measured (Table 9). The suffixal type distinguishes three classes in Q'anjob'alan languages: people, animals, and other. Other Mayan languages have only trace suffixes, sometimes invariant in form.

Vocabulary

Mayan languages have borrowed words from many languages, including Nahuatl (Náhautl) (*masat* 'deer,' *tinamït* 'town,' in Kaqchikel), Spanish (*mexa* 'table,' *kaxtilanh winakhin* 'I'm a Spaniard, cock's crow,' in Chuj), and English (*tab'ana' klik pa ruwi' ruk'in ri maws* 'click on it with the mouse,' in Kaqchikel). They have also lent many words, for example, English *hurricane* < Kaqchikel *juraqän* '(lit.) one leg' and Spanish *makuy* < *majkuy* 'an herb.' New words are constantly developed with the contact of cultures and the implementation of new educational curricula. In Guatemala, the Academia de las Lenguas Mayas de Guatemala, an semi-autonomous branch of the government, is authorized to promote and develop the national languages. In Mexico, the federal government provides bilingual educational support and is supplemented by the efforts of the Academia de La Lengua Maya in Yucatán, Campeche, and Quintana Roo and by Sna Tz'ib'alom, the independent writers' cooperative in Chiapas.

Table 8 Popti' numeral classifier suffixes

Number root	*Gloss*	*Root with suffix*	*Gloss*
kanh-	'four'	kanhwanh	'four people'
waj-	'six'	wajk'onh	'six animals'
b'alunh-	'nine'	b'alunhe'	'nine things'

Table 9 Te'utujiil measure words[a]

Measure	*Gloss*	*Number root*		*Combined form*	*Gloss*
mooq'	'fistful'	ox-	'three'	oxmooq'	'three fistfuls'
quum	'sip'	kaj-	'four'	kajquum	'four sips'
tz'uur	'drop'	juu-	'one'	juutz'uur	'one drop'
seel	'slice, layer'	ka'-	'two'	ka'seel	'two slices'
peer	'plane surface'	waq-	'six'	waqpeer tz'alam	'six planed boards'
raab'	'long, cylindrical'	wuq-	'seven'	wuqraab' kolo'	'seven ropes'

[a]Note that the measure word or classifier serves as the base. The number is prefixed in an abbreviated combinatorial form.

See also: Bilingual Education; Communities of Practice; Ergativity; Guatemala: Language Situation; Language Education Policy in Latin America; Mesoamerica: Scripts; Mexico: Language Situation; Protolanguage.

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Relevant Website

http://www.sil.org – Ethnologue.

Mayotte: Language Situation

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Mayotte is the easternmost of the four islands that form the Comorian archipelago halfway between the east African coast and the northern tip of Madagascar. Actually Mayotte consists of two islands, Grande Terre and Petite Terre, inhabited by more than 100 000 people.

In the referendum for independence in 1974, the majority on Mayotte voted for staying with France. Therefore, when the other three Comorian islands, Grande Comore (Ngazija/Shingazija), Mohéli (Mwali), and Anjouan (Ndzwani/Shindzwani), became independent in 1975, Mayotte remained a French overseas territory with the status of a *collectivité territoriale*. Despite many resolutions by the United Nations and the Organization of African Unity demanding a unified, independent Comorian

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Maria Renata Mayenowa (née Gurewicz) was born on June 2, 1910, in Belostok, Russia (from 1919 Białystok, Poland) and died on May 7, 1988, in Warsaw. She studied Polish language and literature at Stefan Batory University in Wilno, graduating in 1932. After teaching for four years in a Jewish high school she returned to the university, earning her doctorate in May 1939. She worked as a teaching assistant at the university (after 1939 the Vilnius University in Soviet Lithuania) until the Nazi invasion of 1941. She survived the occupation in hiding in northern Lithuania.

After working as a librarian in the Białystok City Library in 1945, she spent the next five years in Prague, where her husband, Józef Mayen, was press-attaché at the Polish Embassy. In 1948 she was one of the cofounders of the Institute for Literary Studies of the Polish Academy of Sciences (IBL PAN); she served as deputy director of IBL from 1957 to 1968. She held the rank of professor at the academy and at Warsaw University from 1954 until 1968, when she was dismissed as a result of the 'anti-Zionist' campaign of that year. She remained active, however, as a scholar, editor, and organizer of scholarly activity to her very last days.

The main focus of Mayenowa's individual publications was a linguistically informed stylistics and poetics, summed up in her 1974 handbook *Theoretical Poetics: Questions of Language* (in Polish; second, enlarged and revised edition 1979), which she characterized as dealing with the question of "what in verbal messages (especially those belonging to literature) is determined by their linguistic character." (p. 5) Stylistics and poetics were also at the center of her work as editor and translator, which resulted in collective volumes with titles like *Tekst, język, poetyka* (Text, language, poetics); *Semantyka tekstu i języka* (The semantics of text and language); *Tekst i język: problemy semantyczne* (Text and language: semantic problems); *O spójności tekstu* (On textual coherence), as well as annotated collections of translations of French, Czech, and Russian works on stylistics. Several of the volumes were the result of the symposia that she organized in Warsaw; they brought together linguists and literary scholars from Poland, Czechoslovakia, and the Soviet Union, as well as Western scholars, and served as an important medium of international intellectual communication.

Mayenowa initiated and played an active editorial role in the dictionary of 16th-century Polish, which has reached volume 31 (volume 1 appeared in 1966), and she was similarly responsible for a series of editions of Polish literary texts, the *Library of Polish writers,* covering works from the middle ages to the 17th century with extensive explanatory lexicographic and grammatical apparatus. Through such editorial and organizational work, and through her formal and informal didactic activity (including the weekly colloquia that she held at her Warsaw apartment), Mayenowa trained and inspired a whole pleiad of younger scholars, including the Polish-born Australian semanticist Anna Wierzbicka, the Lublin linguist and folklorist Jerzy Bartmiński, the Warsaw lexicologist Zygmunt Saloni, and the late medievalist and versologist from Wrocław University, Jerzy Woronczak.

See also: Lexicography: Overview; Poetry: Stylistic Aspects; Stylistics.

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Mayan Languages

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The Mayan language family traditionally stretched from what is now northern El Salvador and Honduras, through Guatemala and Belize, and up to the southern states of Mexico, including Chiapas, Quintana Roo, Campeche, Yucatán, and part of La Huasteca. Today the family is more dispersed due to out-migration. Large colonies of Mayan speakers can be found in Los Angeles and other California communities, Arizona, Texas, and Florida. Most linguistic descriptions recognize 31 Mayan languages, including the extinct Chikomulselteko (Chicomuceltec). Most historical linguists posit the Maya homeland as the Cuchumatán peaks of Guatemala, the area with the greatest linguistic diversity today (Kaufman, 1976; Campbell, 1977; Fox, 1978; Campbell and Kaufman, 1983, 1985). The model of diversification correlates phonological, morphological, and syntactic changes with a least-moves model of out-migration, seeking confirmation in the archaeological method. Based on these reconstructions, Proto-Maya, the mother language from which the modern diversity springs, would have been spoken approximately 41 000 years ago. People began to migrate outward, sharing innovations as they moved.

The family eventually split into four divisions. (Note that many of the names of Mayan languages have a variety of spellings. These spellings reflect not only the writing traditions of various authors (English, Hispanic, Mayan), but also their political orientation. In Guatemala, particularly, Mayans have fought for and won official recognition of their own orthographies. In Chiapas, Mayan educators have also elected non-Spanish-based spelling systems. In Yucatán, however, a long tradition of literacy in Maya Yucateco has militated against changing orthographies. The spellings used in this article reflect the local practice.)

1. Wasteko, composed today only of Wasteko (Huasteco).
2. Yucatecan, composed of Maya Yucateco (Yucatán Maya), Mopan (Mopán Maya), Itzaj (Itzá), and Lakantun (Lacandán).
3. Western Division, broken into two branches: Ch'olan and Q'anjob'alan. The Ch'olan branch in turn has two subgroups, Ch'olan Proper, consisting of Chontal, Ch'ol, and Ch'orti' (Chortí), and Tzeltalan, consisting of Tzotzil and Tzeltal. The Q'anjob'al branch has two subgroups, Chujean, consisting of Tojolab'al and Chuj, and Q'anjob'alan Proper, consisting of Q'anjob'al (Eastern Kanjobal), Akateko (Western Kanjobal), Popti' (formerly Jakalteko (Jacalteco)), and Mocho' (Mochó).
4. Eastern Division, which is subdivided into the Mamean and K'iche'an subgroups. The Mamean branch is broken into Mam Proper, consisting of Mam and Teko (also called Tektiteko (Tectiteco)), and Ixilan, which includes Ixil (Nebaj Ixil) and Awakateko (Aguacateco). The K'iche'an branch includes the outliers Uspanteko (Uspanteco) and Q'eqchi' (Kekchí) and two major subdivisions, K'iche'an Proper, consisting of K'iche' (Quiché), Achi', Kaqchikel (Central Cakchiquel), Tz'utujiil (Tzutujil), Sakapulteko (Sacapulteco), and Sipakapense (Sipacapense), and Poqom, consisting of Poqomchi' (Pocomchí) and Poqomam (Pocomam).

Within subgroups there is a high degree of mutually intelligibility and multilingualism (particularly

Table 8 Popti' numeral classifier suffixes

Number root	*Gloss*	*Root with suffix*	*Gloss*
kanh-	'four'	kanhwanh	'four people'
waj-	'six'	wajk'onh	'six animals'
b'alunh-	'nine'	b'alunhe'	'nine things'

Table 9 Te'utujiil measure words[a]

Measure	*Gloss*	*Number root*		*Combined form*	*Gloss*
mooq'	'fistful'	ox-	'three'	oxmooq'	'three fistfuls'
quum	'sip'	kaj-	'four'	kajquum	'four sips'
tz'uur	'drop'	juu-	'one'	juutz'uur	'one drop'
seel	'slice, layer'	ka'-	'two'	ka'seel	'two slices'
peer	'plane surface'	waq-	'six'	waqpeer tz'alam	'six planed boards'
raab'	'long, cylindrical'	wuq-	'seven'	wuqraab' kolo'	'seven ropes'

[a]Note that the measure word or classifier serves as the base. The number is prefixed in an abbreviated combinatorial form.

See also: Bilingual Education; Communities of Practice; Ergativity; Guatemala: Language Situation; Language Education Policy in Latin America; Mesoamerica: Scripts; Mexico: Language Situation; Protolanguage.

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Relevant Website

http://www.sil.org – Ethnologue.

Mayotte: Language Situation

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Mayotte is the easternmost of the four islands that form the Comorian archipelago halfway between the east African coast and the northern tip of Madagascar. Actually Mayotte consists of two islands, Grande Terre and Petite Terre, inhabited by more than 100 000 people.

In the referendum for independence in 1974, the majority on Mayotte voted for staying with France. Therefore, when the other three Comorian islands, Grande Comore (Ngazija/Shingazija), Mohéli (Mwali), and Anjouan (Ndzwani/Shindzwani), became independent in 1975, Mayotte remained a French overseas territory with the status of a *collectivité territoriale*. Despite many resolutions by the United Nations and the Organization of African Unity demanding a unified, independent Comorian

archipelago, the political split still exists. In 2002 Mayotte received the increased status of a *collectivité départementale*. Because of financial support from France, the economic and social conditions on Mayotte are better than on the independent islands of the archipelago.

While the three other islands are linguistically very homogeneous, with one Comorian dialect per island, the situation on Mayotte is quite different. Although most people also use a form of Comorian as first language, there are two groups with other idioms. In the biggest town, Mamoudzou, and on Petite Terre, we find people of French or Creole origin who speak French as their first language. French is also the official language of Mayotte, and because its education system is better and more efficient than that of the other islands, the knowledge of French is generally more profound.

Mainly in the western and southern part of Mayotte, a Sakalava (Bushi) dialect of Malagasy, the national language of Madagascar, is spoken in some towns and villages. These people are descendants of immigrants from Madagascar who arrived on Mayotte in the 19th century. They were culturally assimilated to a large extent but retained their original language.

The most widespread Comorian dialect on Mayotte is Shimaore, which shows greater regional differences than the other dialects do. The 'purest' Shimaore is spoken in the west and south of the island, whereas in the northeast many immigrants from Anjouan have affected the language spoken there. Generally, Shimaore and Shindzwani from Anjouan are the two Comorian dialects that are linguistically closest to one another (phonologically, lexically, and morphologically).

In the west and south of Mayotte are also two small enclaves (with two settlements each) where mainly descendants of immigrants from Grande Comore live. Parts of their language, such as verbal morphology, have preserved the Shingazija character while others, like lexicon or nominal morphology, have been clearly influenced by the surrounding Shimaore. Today their language is so different from the other dialects that it must be regarded as an independent dialect within Comorian. I have named it Shikombani after the main settlement. Linguistically its position on the continuum of Comorian dialects is in the middle between Shingazija on the one hand and Shindzwani/Shimaore on the other hand, sharing this position with Shimwali, the dialect on Moheli.

See also: Bantu Languages; Comoros: Language Situation; Malagasy; Swahili.

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Mayrhofer, Manfred (b. 1926)

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Manfred Mayrhofer, one of the most eminent Indo–European and Indo–Iranian scholars of our time, was born on September 26, 1926 in Linz (Austria). After completing his secondary education in 1944 and being held as a prisoner of war for several months, he matriculated at the University of Graz, studying German language and literature in the winter term of 1945–1946. He soon turned, however, to Indo–European comparative grammar and to Indo–Iranian and Semitic studies. Later, he admitted being an autodidact of those fields in many respects. In 1949, he obtained his doctorate, and two years later he qualified as a lecturer in Indo–European linguistics and Indo–Iranian philology. In 1953, he was offered a position at the University of Würzburg, where he continued to teach as a lecturer and finally was appointed full professor of comparative linguistics in 1958. After a 4-year interlude as professor of comparative Indo–European linguistics and Indo–Iranian studies at the University of the Saarland in Saarbrücken, from 1962 to 1966, he went back to his native Austria and was appointed to the chair of

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See also: Bantu Languages; Comoros: Language Situation; Malagasy; Swahili.

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general and Indo–European linguistics at the University of Vienna, which had a worldwide reputation from the time of Friedrich Müller and Paul Kretschmer. Since his retirement in 1988, he has lived as a professor emeritus in Vienna. He is a member of more than a dozen academies of sciences and was particularly active in the Austrian Academy of Sciences, not only as a member of the Committee from 1970 to 1982.

Mayrhofer is the author of a large number of manuals, dictionaries, other monographs, articles, and reviews (for a full bibliography up to 1995, see Schmitt, 1979–1996), not only in the field of Indo–Iranian linguistics and onomastics, but also general Indo–European studies and the history of this discipline. He is one of the most prolific linguists of our time, and in an autobiographical sketch (1991) he characterized himself as an enthusiastic writer of manuals (*begeisterter Handbuch-Schreiber*).

Mayrhofer's *magnum opus*, and actually his lifework, is the etymological dictionary of Old Indo–Aryan; more exactly, his two etymological dictionaries of this language. Beginning during his student days, he gathered material for such a piece of work, the publication of which began when he reached the age of 25. It was finally completed in four volumes in 1980. As the publication went on, the conception of the *Kurzgefaßtes etymologisches Wörterbuch des Altindischen/A Concise Etymological Sanskrit Dictionary* (1956–1980), which originally had been planned as a rather succinct outline, changed radically, and the dictionary became more and more detailed and informative. As a result of decades of practical experience and of thorough considerations about writing an etymological dictionary of such a richly attested language, Mayrhofer began, immediately after the completion, to work out an entirely novel successor work, the *Etymologisches Wörterbuch des Altindoarischen* (1992–2001). This book had nothing in common with its predecessor but its author and subject matter. Here, he introduced into etymological research of Old Indo–Aryan a sharp differentiation between the words attested already in (more ancient) Vedic literature, and those of the younger language, (Sanskrit proper) documented not earlier than the two great epics for the first time. Those two layers of the vocabulary differ to a large extent in the principal sources of the words themselves, for the older, already Vedic part of the lexicon mainly consists of inherited words (going back to Indo–Iranian and Indo–European). Among the words that appear for the first time only in later centuries, there is a great number of loan words borrowed from either the Middle Indo–Aryan vernaculars (Prakrits), or from non-Aryan languages. As a supplement to this dictionary, in a sense anyway, Mayrhofer most recently published a monographic study on the personal names attested in the Rig-Veda, to which were added the names of the poets of the Rig-Vedic hymns (2003). With this, he drew attention to a long-neglected field, which would deserve intensive efforts by future scholars.

He did other work in the field of Indo–Aryan linguistic history, beginning with the linguistic remains of the early Indo–Aryans in the 2nd millennium Ancient Near East (1966). Likewise, he also treated problems of the alleged Dravidian and Austro-Asiatic substratum influences in the Old Indo–Aryan lexical stock, which he viewed recently, however, in a more and more skeptical way.

The first major contribution of Mayrhofer's in the field of the Old Iranian languages was the etymological glossary, which he contributed to the 1958 Spanish and, together with the morphological section, to the later German versions of the *Handbuch des Altpersischen* (Brandenstein and Mayrhofer, 1964), which his teacher Wilhelm Brandenstein had begun. This glossary was a milestone, insofar as it was the first Old Persian dictionary to also contain the vocabulary attested (outside the royal inscriptions themselves) in the so-called collateral tradition of Elamite, Aramaic, and other non-Iranian sources. By that and by several subsequent reports on current research, he got more and more involved in anthroponomastic studies, which in Old Iranian are of crucial importance for etymological reasons.

In 1973, he published a most careful interim analysis of the (mostly Old Iranian) personal names attested in the Elamite cuneiform tablets excavated in Persepolis and belonging, for the most part, to the heyday of the Achaemenid Empire under Darius I (and more exactly to the years 509–494 B.C.). Previously, in 1969, Mayrhofer had initiated the *Iranisches Personennamenbuch* as a large-scale project of the Austrian Academy of Sciences. Someday it will replace Ferdinand Justi's age-old *Iranisches Namenbuch* (1895), which over the course of time became somewhat obsolete, owing to the enormous increase in linguistically Iranian onomastic material. He himself prepared the first volume (after which several others followed, and many more will follow in the future), treating the names attested in the Avesta and in the Old Persian inscriptions (Mayrhofer, 1977–1979).

After having taken over the editorship of the *Indogermanische Grammatik*, founded by Jerzy Kuryłowicz, Mayrhofer prepared a systematic account of the phonology of the Indo–European proto-language (1986), which took into consideration all the particulars and subtleties of the laryngeal theory as well. This book became his most important

contribution to Indo–European studies in general. Moreover, a rather characteristic feature of his research is that he also has a keen interest in problems of the history of Indo–European studies in the 19th and 20th centuries. He once dealt with the question of how reconstructing the Proto-Indo–European phonological system left step-by-step the original Sanskrit-like notation (Mayrhofer, 1983), and two years before that he had investigated the reception of Ferdinand de Saussure's seminal ideas and theories by today's Indo–Europeanists (Mayrhofer, 1981).

Mayrhofer's writings stand out for their admirable acquaintance with all the relevant specialist literature and for their careful and balanced judgment. They clearly show that he is capable of presenting even the most complicated matters and theories with didactic skill and in a clear, concise, and quite agreeable linguistic form.

See also: Benfey, Theodor (1809–1881); Kuryłowicz, Jerzy (1895–1978); Müller, Friedrich Max (1823–1900); Saussure, Ferdinand (-Mongin) de (1857–1913).

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McCawley, James (1938–1999)

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One of the truly great figures of 20th-century linguistics, most famous as the champion of generative semantics, and a genuine libertarian/anarchist original, James Quillan McCawley Jr., was born in Glasgow, Scotland, on March 31, 1938, as the first child of James Quillan McCawley, a businessman, and Dr. Monica Bateman McCawley, a physician and surgeon. The family emigrated to the United States during World War II; first James Sr. went to Toronto and then to New York with his two brothers, finally settling in Chicago after the war when he was joined by his wife and children. James Jr., (later, on becoming a U.S. citizen, he changed his name to James David McCawley, jettisoning the Jr.) was soon recognized as a very bright student, skipping several grades while attending parochial grade schools and St Mel's High School. In his teenage years, he displayed an interest in and also started learning languages (so that during his linguistic career he was able to draw on a dozen or so languages).

In 1954, at the age of 16, he entered the University of Chicago and progressed rapidly towards the graduate school, where he received an M.S. in mathematics in 1958. Many years later he would say that it was for no particularly good reason that he went for mathematics, and in fact he was increasingly turned off by mathematics. He soon discovered linguistics through a course taught by Eric Hamp. He accepted a Fulbright fellowship to study mathematics and logic at the Westfälische Wilhelms University in Münster,

contribution to Indo–European studies in general. Moreover, a rather characteristic feature of his research is that he also has a keen interest in problems of the history of Indo–European studies in the 19th and 20th centuries. He once dealt with the question of how reconstructing the Proto-Indo–European phonological system left step-by-step the original Sanskrit-like notation (Mayrhofer, 1983), and two years before that he had investigated the reception of Ferdinand de Saussure's seminal ideas and theories by today's Indo–Europeanists (Mayrhofer, 1981).

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McCawley, James (1938–1999)

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One of the truly great figures of 20th-century linguistics, most famous as the champion of generative semantics, and a genuine libertarian/anarchist original, James Quillan McCawley Jr., was born in Glasgow, Scotland, on March 31, 1938, as the first child of James Quillan McCawley, a businessman, and Dr. Monica Bateman McCawley, a physician and surgeon. The family emigrated to the United States during World War II; first James Sr. went to Toronto and then to New York with his two brothers, finally settling in Chicago after the war when he was joined by his wife and children. James Jr., (later, on becoming a U.S. citizen, he changed his name to James David McCawley, jettisoning the Jr.) was soon recognized as a very bright student, skipping several grades while attending parochial grade schools and St Mel's High School. In his teenage years, he displayed an interest in and also started learning languages (so that during his linguistic career he was able to draw on a dozen or so languages).

In 1954, at the age of 16, he entered the University of Chicago and progressed rapidly towards the graduate school, where he received an M.S. in mathematics in 1958. Many years later he would say that it was for no particularly good reason that he went for mathematics, and in fact he was increasingly turned off by mathematics. He soon discovered linguistics through a course taught by Eric Hamp. He accepted a Fulbright fellowship to study mathematics and logic at the Westfälische Wilhelms University in Münster,

Germany in 1959 and 1960, but instead of doing mathematics, he started taking all kinds of language courses there. This continued on his return to Chicago, where he fell in love with Japanese. He learned about the new graduate program in linguistics being started at the Massachussets Institute of Technology (MIT) and applied for it, spending three years in the first Ph.D. class there. He worked as a research assistant at MIT's Mechanical Translation Group from 1962 to 1963, leaving to study Japanese at Seton Hall in 1963 and to do research at the IBM Watson Center in Yorktown Heights in 1964. His Ph.D. dissertation on the accentual system of modern standard Japanese, submitted in 1965, was supervised by Noam Chomsky. He returned in 1964 to the University of Chicago as an assistant professor of linguistics, where he spent the remainder of his career, except for numerous travels as visiting professor. He was tenured in 1969 as an associate professor and was promoted to full professor in 1970. He married linguist Noriko Akatsuka in 1971, their marriage ending in an amicable divorce in 1978. He died on April 10, 1999.

McCawley's general philosophy may be said to be characterized by consistency across epistemology (science) and praxeology (politics, economics, and ethics), vision being matched by sensitivity to empirical details and data. Although McCawley is chiefly known as a syntactician and semanticist, he clearly resists such ready-made classificatory labels as he was also a phonologist, morphologist, lexicologist, logician, epistemologist, and pragmaticist (besides being a passionate musicologist and a culinary artist).

He first became widely known with his 1968 paper, where he proposed what can be seen in retrospect as a first draft of generative semantics. This movement suited him very well because it was compatible with his background in mathematics and logic, and its arguments were data-driven. He characterized his approach as a revisionist version of transformational grammar, centering on some ideas of transformational grammar that he considered to be fruitful, such as constituency, multiple syntactic strata, and the cyclic principle.

McCawley clearly disagreed with generative linguists regarding the autonomy of linguistics, especially syntax. For him it was impossible to do any syntax without crossing area and disciplinary boundaries. In his framework, syntactic phenomena constituted primarily dependent variables, to be explained as epiphenomena caused by interactions of such independent variables as semantics and pragmatics, as well as morphology and the lexicon. In a very important paper, entitled *An un-syntax*, McCawley claimed that "much of what has been thought of as syntax is largely a reflection of other things, such as morphology, logic, production strategies, and principles of cooperation" (1981b: 168). This insight actually epitomized all of his work.

He kept revising his model incrementally, adding more and more rules and thus extending its reach to accommodate more and more phenomena, until it reached its zenith in *The syntactic phenomena of English* (1988, 2nd edn., 1998), a reference full of details about English grammar that have always wanted more attention from linguists. Along with his logic book (*Everything that linguists have always wanted to know about logic* (*but were ashamed to ask;*) 1981a, 2nd edn., 1993), this was no doubt among his most enduring contributions to the pool of classical linguistic literature. They were eclectic references that synthesize the most significant findings by himself and other linguists about semantics, syntax, pragmatics, and the philosophy of language during his career. Both books were constructive proof that generative grammar can be used to produce sane descriptive statements about language.

See also: Chinese; Chomsky, Noam (b. 1928); Constituent Structure; Information Theory; Generative Grammar; Generative Semantics; Japanese; Modularity; Transformational Grammar: Evolution.

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McDavid, Raven I., Jr (1911–1984)

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Raven Ioor McDavid, Jr. was born in Greenville, South Carolina, in 1911. In 1931 he graduated from Greenville's Furman University. In graduate school at Duke University he specialized in Milton, receiving his Ph.D. in 1935 with a dissertation on Milton as a political thinker. The following year McDavid taught at a military college in Charleston. In 1937 he participated in the Second Linguistic Institute, taught by famous scholars in the field such as Leonard Bloomfield, Edward Sapir, Hans Kurath, and Bernard Bloch; the latter discovered in McDavid an aptitude for phonetics. Here he was also introduced to H. L. Mencken's *American language*. The Linguistic Institute was the strongest impetus to McDavid's career. He began to study American English as it was then spoken, an activity only interrupted during the World War II years, when he was called upon to do war-related work. He then studied Burmese and also worked on a dictionary of spoken Chinese.

From 1945 to 1950 McDavid conducted over 500 interviews for the *Linguistic atlas* project at Kurath's request – first on the Atlantic seaboard and then in the north central states. These investigations, which he had begun as early as 1941, led to his life's work of linguistic geography. In 1952 McDavid finally found a regular teaching position at Western Reserve, and in 1957 he went to the University of Chicago, where he became full professor of English and linguistics in 1964, a position he occupied until his retirement in 1978.

Mencken's *American language* was instrumental in changing McDavid's interest from literature to language. In 1963 he published a one-volume abridged edition of this influential book with annotations and modifications reflecting developments after 1948.

McDavid is best known for his work in linguistic geography, both regional and social. The first major outcome of his work in this field was *The pronunciation of English in the Atlantic states* (1961), written together with Kurath. Moreover, McDavid was editor-in-chief of a number of American regional linguistic atlases. Lexicography, an interest of McDavid's dating back to his dictionary work during the war years, attracted his attention again later in his career. Among other areas, he investigated the prepublication criticism of the controversial *Webster's third*.

McDavid was no doubt the leading researcher in American English speech patterns. He made a significant contribution not only to traditional dialectology, but also to the study of social variation. Without him, variationists could not have made their advances.

See also: Bloch, Bernard (1907–1965); Bloomfield, Leonard (1887–1949); Kurath, Hans (1891–1992); Sapir, Edward (1884–1939).

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McLuhan, Marshall (b. 1911)

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Herbert Marshall McLuhan, a professor at the University of Toronto for most of his active life, was born July 21, 1911, in Edmonton, Alberta. After his college years in Canada, he entered the University of Cambridge for higher studies in English. At an early stage, McLuhan found himself absorbed in James Joyce, Giambattista Vico, and G. K. Chesterton. At Cambridge, he studied and worked closely with I. A. Richards, author of *Practical criticism,* and, with C. K. Ogden, of *The meaning of meaning*. McLuhan was also deeply interested in William Blake's work. He converted to Roman Catholicism in 1937, later emphasizing the connection between his readings in religion and his media study (Gordon, 1997: 75).

Marshall McLuhan achieved distinction as a critic and analyst of the media. His aim on leaving Cambridge after the completion of his studies has been described as 'the training of perception,' an activity compatible with Cambridge criticism in general.

McLuhan saw media (e.g., phonetic writing, radio) as extensions of the human body and the nervous system, an idea originating in the work of his friend Harold Innis (Gordon, 1997: 148), to which he was much indebted. From Innis too came the idea that print creates nationalism.

The slogan 'the medium is the message' is universally associated with McLuhan. Its meaning has been much expounded and debated. In a letter to David Segal, McLuhan wrote: "Major insight on 'medium is the message' is this: each new technology, be it house, or wheel, or radio, creates a new human environment" (1964). Here it is notable that McLuhan thought of language as mankind's first technology. He was concerned with the question, 'How can we escape the inevitable changes that new technologies bring?' Before escape, the changes have to be understood. Commentators list some 10 different ways in which media have an impact on the human being and the environment.

McLuhan classified media like TV and radio into two groups, 'hot' and 'cool.' Hot media are 'high definition,' meaning they are loaded with information, leaving little for the user to do, and include radio, print, and movies, in contrast to cool media like telephone, speech, and TV respectively. He expressed the 'laws of media' as a tetrad. For example, e-mail (1) **extends** writing, (2) **renders obsolete** long-distance phone calls, (3) **retrieves** the telegram (gives it a new, intensified form) and (4) **reverses into dialogue** when writers are online together (Gordon, 1997: 341).

McLuhan's literary training aided his richly metaphoric thinking about media. Among linguists, he read Saussure and Whorf closely. It is debated whether his reading of the former is more correct than Jacques Derrida's postmodern one. Since the 1990s, critical works on McLuhan have appeared. An early challenging and dismissive work is Jonathan Miller's *McLuhan*.

See also: Ogden, Charles Kay (1889–1957); Richards, Ivor Armstrong (1893–1979); Saussure, Ferdinand (-Mongin) de (1857–1913); Whorf, Benjamin Lee (1897–1941).

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Mead, George Herbert (1863–1931)

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George Herbert Mead was a leading figure in American pragmatic philosophy, along with William James, Charles Sanders Peirce, and John Dewey. Mead never published a finished version of his theories, and his ideas and lectures were gathered together by students in several posthumous publications, including *The philosophy of the present* (1932), *Mind, self, and society* (1934), *Movements of thought in the nineteenth century* (1936), *The philosophy of the act* (1938), *George Herbert Mead on social psychology* (1956), *Mead: selected writings* (1962), and *The individual and the social self: the unpublished work of George Herbert Mead* (1982). These works have figured centrally in the American school of sociology called symbolic interactionism.

The son of a New England clergyman and a mother who would later become president of Mt. Holyoke College, Mead graduated from Oberlin College in 1883. From 1887 to 1888, he did graduate work in philosophy and psychology at Harvard University, studying under William James (he lived in the James's house and tutored their children), Josiah Royce, and George Herbert Palmer. From 1888 to 1891, Mead studied in Berlin and Leipzig, where he came into contact with Wihelm Wundt's work on linguistics and physiological psychology and met G. Stanley Hall, who had studied with Wundt. On October 1, 1891, in Berlin, Mead married Helen Castle of the rich landowning Castle family of Honolulu, Castle and Cooke. In the same year, Mead returned to the United States (without a Ph.D.) and took a position in the philosophy department at the University of Michigan, where John Dewey, James Tufts, and Charles Horton Cooley were teaching.

Mead followed Dewey to the University of Chicago in 1891, where he remained until his death on April 26, 1931. With Dewey, Angell, and Tufts, he played a major part in the formation of what he called the Chicago School of philosophy. Mead taught a variety of courses at Chicago, including Social Psychology, Movements of Thought in the Nineteenth Century, the Philosophy of Eminent Scientists, French Philosophy, Aristotle, Hume, Hegel, Leibniz, German Romanticism, Ethics Problems in the Theory of Relativity, and Whitehead. Mead's course in social psychology was a major influence on Chicago-trained sociologists, including Ellsworth Faris, Robert Park, and Ernest Burgess. After he died, this course was taken over by Herbert Blumer, who would, in 1937, coin the phrase 'symbolic interaction' to describe Mead's unique approach to social psychology.

Five terms were central to Mead's social psychology: gesture, symbol, self, mind, and act. Mead developed a theory of mind and self that did not regard these phenomena as antecedents to society and social behavior. He argued that the self arises out of the human's ability to use language in a way that permits the perspective of the other to be entered into. The self consists of two parts, the 'I' and the 'me.' The 'I' is the subjective source of action, of the impulse to act in a situation. The 'me' consists of the attitudes of the other who is taken into account as the 'I' thinks and acts. The self is a social process involving constant symbolic interaction between the 'I' and the 'me' phases of experience. The self emerges through three stages of development called the play, the game, and the generalized other phases. In each phase, the person is better able to take the collective attitudes of the other toward their action in a concrete situation. Mind is a social process. It involves the use of gestures and symbols that call out in the person meanings that are shared with others. A triadic process structures the conferral of meaning on a thing: a gesture signifies action to another, it signifies what the person making the gesture plans to do, and it signifies what the person making the joint action that is to occur for both parties in the situation plans to do.

Human experience is not a continuous flow but is organized in terms of social acts. Acts have three phrases. Acts arise out of problematic situations in which ongoing activity is blocked. Phase one is the perception of the problematic situation (e.g., 'I am hungry'). Phase two is the manipulation phase. The person moves to resolve the problematic situation by acting on an object (e.g., preparing a meal). Phase three is consummation. The act is brought to completion (e.g., eating the meal). In each phase of the act, different phases of the self (the 'I' and the 'me') are experienced.

Mead argued that the "supreme test of any present-philosophy ... must be found in its interpretation of experimental science" (*Philosophy of the act*, 1938: 505). By experimental science, he meant several things, including modern physics (as reworked by Whitehead), Darwinian naturalism, and Dewey's instrumentalism (as given in Dewey's *Essays in experimental logic*). Mead argued that a scientist must have a clearly formulated problem, or hypothesis, and a clear method of determining if a hypothesis is

confirmed or disconfirmed. The scientist works through the three phases of the act in the resolution of a scientific problem. Scientists must have a procedure that does not allow them to enter into the situation in advance of experimental inquiry. Mead's pragmatism, or scientific method, was a version of Dewey's instrumentalism.

Mead remains a central figure in contemporary social theory and social psychology. His work has influenced the theories of Jürgen Habermas, Anthony Giddens, and Anselm Straus, for example. Mead's works are still topics of empirical investigation and philosophical and theoretical controversy (Blumer and Miller, 2004).

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Meaning Postulates

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Carnap (1956: 225) proposed that meaning postulates are relative to a purpose, for instance:

> Suppose [a man constructing a system] wishes the predicates '*Bl*' and '*R*' to correspond to the words 'black' and 'raven'. While the meaning of 'black' is fairly clear, that of 'raven' is rather vague in the everyday language. There is no point for him to make an elaborate study, based either on introspection or on statistical investigation of common usage, in order to find out whether 'raven' always or mostly entails 'black.' It is rather his task to make up his mind whether he wishes the predicates '*R*' and '*Bl*' of his system to be used in such a way that the first logically entails the second. If so, he has to add the postulate
>
> (P_2) '$(x)\ (Rx \supset Bl\ x)$'
>
> to the system, otherwise not.

Given P_2 nothing can be a raven that is not black. If the system is a semantic metalanguage for English, then (according to Carnap) it is analytically true that (x[raven′(x) → black′(x)] (to use a different, but equivalent formulation). One may dispute the choice of example (*to be raven-haired* is to have black hair, but an observed raven may be albino); yet the method for introducing nonlogical vocabulary into formal semantics seems appropriate. For instance it is generally agreed that something like (1) and (2) are valid:

(1) $\forall x \forall y[\text{kill}'(x,y) \rightarrow \text{cause}'(x,(\text{become}'(\neg(\text{alive}'(y)))))]$

(2) $\forall x[\lambda x[\text{bull}'(y) \wedge \text{animal}'(y)](x) \rightarrow \text{male}'(x)]$

The predicates kill′, cause′, bull′, etc. are nonlogical vocabulary treated as semantic primitives.

The stipulation of meaning postulates for any given language is problematic. There is no consensus over what constitute the set of semantic primitives for any language. There is the problem of correspondence between the metalanguage and the object language (e.g., between kill′ and *kill*). There is often a problem determining which the necessary semantic relations are and which are the contingent ones. For instance, one might question how the figurative killing of fires or conversations can be accommodated with (1). (2) is valid for papal bulls, male calves, male elephants, male whales, male seals, and male alligators; but how is it to be extended to incorporate the default reference to an adult bovine?

Fodor (1998) and elsewhere has argued against meaning postulates (which he supported in Fodor *et al*., 1975). In part his argument is that lexical meanings are not compositional for words like *kill* and *bull*. But there is no reason to insist that the right-hand side of the arrow in either (1) or (2) represents part of the semantic composition of the left-hand side. It simply shows a valid relation between structures containing some semantic primitives. Fodor also adopted Quine's (1953) objections to analyticity and claims that no principled distinction can be drawn between meaning postulates and encyclopedic knowledge. Determining what is semantic and what encyclopedic is a knotty problem we cannot resolve here (see Allan, 2001 for a discussion). Horsey (2000) marshals several arguments against Fodor's position. Meaning postulates remain a useful device for semantics.

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(2) $\forall x[\lambda x[\text{bull}'(y) \wedge \text{animal}'(y)](x) \rightarrow \text{male}'(x)]$

The predicates kill′, cause′, bull′, etc. are nonlogical vocabulary treated as semantic primitives.

The stipulation of meaning postulates for any given language is problematic. There is no consensus over what constitute the set of semantic primitives for any language. There is the problem of correspondence between the metalanguage and the object language (e.g., between kill′ and *kill*). There is often a problem determining which the necessary semantic relations are and which are the contingent ones. For instance, one might question how the figurative killing of fires or conversations can be accommodated with (1). (2) is valid for papal bulls, male calves, male elephants, male whales, male seals, and male alligators; but how is it to be extended to incorporate the default reference to an adult bovine?

Fodor (1998) and elsewhere has argued against meaning postulates (which he supported in Fodor *et al*., 1975). In part his argument is that lexical meanings are not compositional for words like *kill* and *bull*. But there is no reason to insist that the right-hand side of the arrow in either (1) or (2) represents part of the semantic composition of the left-hand side. It simply shows a valid relation between structures containing some semantic primitives. Fodor also adopted Quine's (1953) objections to analyticity and claims that no principled distinction can be drawn between meaning postulates and encyclopedic knowledge. Determining what is semantic and what encyclopedic is a knotty problem we cannot resolve here (see Allan, 2001 for a discussion). Horsey (2000) marshals several arguments against Fodor's position. Meaning postulates remain a useful device for semantics.

See also: Formal Semantics; Ideophones; Metalanguage versus Object Language; Semantic Primitives.

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Meaning, Procedural and Conceptual

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The distinction between procedural and conceptual meaning resulted from the attempt to reanalyze Grice's (1989) notion of conventional implicature in relevance theoretic terms, or, more generally, from the attempt to provide a cognitive reanalysis of the distinction drawn between truth conditional and non-truth conditional meaning (see Grice, 1989; *see* **Grice, Herbert Paul (1913–1988); Implicature**). However, soon after its introduction (Blakemore, 1987), it was shown that the relevance theoretic distinction was not coextensive with the distinction between truth conditional and nontruth conditional meaning, and thus represented a departure from the approach to semantics that underlies Grice's notion of conventional implicature. While there is a range of phenomena that can be analyzed in terms of the conceptual–procedural distinction, the emphasis in pragmatics has mostly centered on its application to the analysis of so-called 'discourse markers' (*see* **Discourse Markers**). It has to be said, however, that the term *procedural* is not always used in the same way, and that the distinction between conceptual and procedural encoding is not always drawn within a relevance theoretic framework. In argumentation theory, any expression which has an argumentative function is said to encode procedural meaning (Moeschler, 1989). According to this criterion, *because* is procedural; however, it is not procedural according to the relevance theoretic definition outlined below. Fraser (1996, 1998) has used the term *procedural* to describe the meaning of any expression with an indicating function, where *indicating* is intended in its speech act theoretic sense, in which it contrasts with *saying* or *describing*. Because the relevance theoretic distinction is not coextensive with the traditional distinction between truth conditional and nontruth conditional meaning, it is not surprising that there are expressions which are procedural according to Fraser but conceptual according to the relevance theoretic definition – e.g., *as a result*. This article will focus on the relevance theoretic distinction, showing, on the one hand, how it derives from a relevance theoretic view of linguistic semantics, and on the other, how the principle of relevance provides an explanation for the fact that languages have developed means for encoding procedures (*see* **Relevance Theory**). It will then turn to the way in which procedural encoding has been applied in the analysis of discourse markers or connectives, and the questions this type of analysis raises.

Relevance Theoretic Semantics

Grice's (1989) notion of conventional implicature was a means of maintaining a definition of *what is said* in which linguistic meaning coincides with truth conditional content. While he accepts that the suggestion carried by *therefore* in (1) is linguistically encoded, he does not wish to allow that in his "favoured sense of 'say,' one who utters (1) would have *said* that Bill's being courageous follows from his being a philosopher" (1989: 21):

(1) Bill is a philosopher and he is, therefore, brave.

Grice's solution to the problem posed by nontruth conditional linguistic meaning was to modify his definition of *what is said* so that it applied only to the performances of so-called *central* speech acts, and not to the performances of *noncentral* speech acts indicated by expressions such as *therefore* (*see* **Speech Acts; Speech Acts and Grammar**).

See also: Formal Semantics; Ideophones; Metalanguage versus Object Language; Semantic Primitives.

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However, as Sperber and Wilson (1995) and Carston (2002) have shown, the assumption that linguistic meaning coincides with the truth conditional content of the utterance cannot be justified, because the propositional content of utterances is underdetermined by their linguistic properties. While the thoughts communicated by utterances may have truth conditions, it cannot be said that linguistic form encodes thoughts. Linguistic meaning is an input to the pragmatically constrained inferential processes that use contextual information to deliver thoughts. The question for linguistic semantics, in this view, is not about the relationship between language and the world but about the relationship between linguistic form and the inferential processes that deliver thoughts (*see* **Pragmatics and Semantics**).

The distinction between conceptual and procedural encoding derives from the argument that if utterance interpretation involves the construction and inferential manipulation of propositional representations, then it is reasonable to expect two answers to this question. On the one hand, linguistic form can encode the constituents of the conceptual representations that take part in inferential computations, and on the other, it can encode information that makes particular kinds of computations salient. Consider (2a) and (2b), where (2b) could be interpreted as a contextual implication derived in an inference that has (2a) as a premise, or as a premise that has (2a) as a conclusion.

(2a) Tom will be late.
(2b) He is coming from London.

The claim that linguistic meaning can encode procedures is the claim that there are linguistic expressions e.g., – *so* or *after all* in this case – which guide the hearer to the inferential procedure that yields the intended interpretation.

Why Languages Develop Procedural Encoding

It has been argued that the fact that languages have developed expressions which constrain inferential procedures can be explained within relevance theory in terms of the communicative principle of relevance (Sperber and Wilson, 1995). According to this principle, a hearer who recognizes that a speaker has deliberately communicated with her is entitled to assume not just that the utterance is relevant enough (in terms of effects and effort) to be worth her attention, but that it is the most relevant utterance the speaker could have produced, given her interests and abilities. Because the degree of relevance is affected by the amount of processing effort required for the derivation of the intended cognitive effects, this means that the use of an expression that encodes a procedure for identifying the intended interpreted would be consistent with the speaker's aim of identifying relevance for a minimum processing cost.

Traugott and Dasher (2002) have argued that languages tend to develop procedural constraints on interpretation out of their existing conceptual resources. However, although they agree that there is a distinction between procedural and conceptual (or, as they call it, 'contentful') meaning, their account of how meaning change takes place is based on the assumptions of cognitive semantics and neo-Gricean pragmatics rather than on relevance theoretic pragmatics, and it is not clear that the distinction is drawn in the same way (*see* **Cognitive Linguistics; Neo-Gricean Pragmatics**). Moreover, their account assumes that meaning, changes results from the conventionalization of pragmatic inferences, where this is unpacked in (Gricean) terms of the conventionalization of the relation between a linguistic form and the proposition or propositions derived by inference. A relevance theoretic account would approach this process in terms of the conventionalization of an inferential routine or process.

If procedural meaning develops from existing conceptual resources, then it would not be surprising for an expression to encode both a concept and a procedure. Although it has been argued that this possibility has been ruled out in relevance theory, it is consistent with relevance theoretic assumptions, and there have been relevance theoretic analyses (e.g., Blakemore's 1987 analysis of *but*, Nicolle's 1997 and 1998 account of *be going to*, and Wilson's 2004 analysis of expressions such as *few* and *several*) where it is argued that a single form may encode two types of meaning.

The Conceptual–Procedural Distinction and Conventional Implicature

While the notion of procedural encoding was developed as a means of analyzing expressions which encode constraints on the recovery of implicit content – e.g., *therefore*, *so*, *after all* – subsequent investigation suggested that it could be extended to expressions that encode constraints on the recovery of explicit content. Some of these – mood indicators, attitudinal particles – are analyzed as encoding constraints on the inferential processes involved in the recovery of higher-level explicatures. For example, Wilson and Sperber (1993) suggest that the use of *huh* in (3) encourages the hearer to construct the

higher-level explicature in (4) (see also Wilson and Sperber, 1988; Clark, 1993):

(3) Peter's a genius, huh!

(4) The speaker of (3) doesn't think that Peter is a genius.

In this case, the equation between procedural meaning and nontruth conditional meaning is maintained, because higher-level explicatures are not regarded as contributing to truth conditional content. However, it has also been suggested that there are expressions, notably pronouns, which should be analyzed as constraints on the proposition expressed, and thus contribute to truth conditional content.

At the same time, it has been argued (Wilson and Sperber, 1993; Ifantidou-Trouki, 1993; Blakemore, 1990, 1996) that expressions such as sentence adverbials or parentheticals which, although they do not contribute to truth conditional content, must be analyzed as encoding concepts (*see* **Parentheticals**). This means that the procedural–conceptual distinction cannot be coextensive with the distinction that underlies Grice's notion of conventional implicature.

If Carston's (2002) conception of linguistic semantics is right, then the fundamental distinction must be the conceptual–procedural distinction rather than the distinction between truth conditional and nontruth conditional meaning. This means that linguistic semantics must include a means of distinguishing conceptual from procedural meaning. Within relevance theory, attention has been drawn to properties that distinguish expressions that encode procedures from those that encode concepts. First, in contrast with concepts, procedures cannot be brought to consciousness (Wilson and Sperber, 1993: 16). This explains why even native speakers find it difficult to judge whether expressions which encode procedures – e.g., *but* and *however* in English or *dakara* and *sorede* in Japanese – are synonymous without testing their intersubstitutability in all contexts. In contrast, even when the definition of a concept proves controversial, speakers can say whether two expressions encode the same concept without having to test whether they can be substituted for each other in every context. If it is difficult for native speakers to make synonymy judgments, then it is not surprising that the translation of expressions that encode procedures is notoriously difficult, particularly since languages do not necessarily conventionalize the same inferential routines. However, the translation of procedural meaning has yet to be investigated systematically.

Second, while expressions that encode concepts can be semantically complex, expressions that encode procedures cannot combine with other expressions to produce semantically complex expressions. Compare (5) with (6):

(5) In total, absolute confidence, she has been promoted.

(6) Sue likes red wine. *Totally however, Mary drinks beer.

Rouchota (1998) has shown that while expressions that have been analyzed as encoding procedures can combine in some way, they do not combine to form complex discourse markers. Compare (7) with (5):

(7) Sue fell asleep during the lecture. But after all, she had heard it all before.

Procedural Analyses of Discourse Markers

The notion of procedural encoding has been applied to the analysis of a range of nontruth conditional discourse markers in a variety of languages (e.g., Blass, 1990; Itani, 1993; Unger, 1996; Matsui, 2002; Iten, 2000; Blakemore, 2002). However, this work has suggested that the original notion is neither sufficiently fine-grained to capture the differences between closely related but nonintersubstitutable discourse markers (e.g., *but* and *however* or *dakara* and *sorede*), nor sufficiently broad to capture all the ways in which linguistic form can encode information about the inferential computations involved in the interpretation of utterances. As it is defined by Blakemore (1987), procedural encoding is linked to the three cognitive effects defined within relevance theory: contextual implication, strengthening, and elimination. In order to account for the differences between expressions such as *but* and *however*, it has been argued that the notion of procedural encoding must be broadened to include the activation of particular types of contexts. Moreover, it has been suggested that the meanings of some discourse markers (e.g., *well*) may not necessarily be linked to the activation of cognitive effects at all (see Blakemore, 2002).

Future Directions

Procedural encoding has also played a role in the analysis of the role of intonation in interpretation (see Fretheim, 2002; House, 2004). If, as Gussenhoven (2002) has argued, aspects of intonation have become grammaticalized so that certain pitch contours encode arbitrary meanings, then it is plausible that these meanings should be analyzed in terms of

instructions for interpretation. However, Wharton's (2003a, 2000b) work on natural codes suggests it may also be possible to generalize the notion of procedural meaning to accommodate phenomena that are on the borderline of language (e.g., interjections) as well as natural or paralinguistic aspects of intonation (*see* **Interjections**). Research in this area has yet to be developed, but it seems clear that the scope of procedural encoding extends beyond the analysis of the non-truth conditional discourse markers.

See also: Approaches to Translation: Relevance Theory; Cognitive Linguistics; Discourse Markers; Grice, Herbert Paul (1913–1988); Implicature; Interjections; Neo-Gricean Pragmatics; Parentheticals; Pragmatics and Semantics; Relevance Theory; Speech Acts and Grammar; Speech Acts.

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Meaning, Sense, and Reference

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Attempts to define and/or construct a theoretical account of meaning can be found throughout the arts, sciences, and humanities. Dewey and Bentley (1949: 297) contended that the word 'meaning' is "so confused that it is best never used at all." As our task is to characterize meaning from a semiotic point of view, perhaps we can limit rather than contribute to this confusion.

Consider the following scenarios:

- A college student hears her professor use an unfamiliar word and looks it up in her dictionary
- A pedestrian carrying a white cane approaches a busy intersection, pauses, and then walks into the street, whereupon the traffic yields
- A cat races to the kitchen at the sound of an electric can opener
- A doctor sees a dark area on X-ray photograph of the lung of a patient who has been coughing up blood
- An anthropologist observes that among Nestlik Native Americans, sons have a more familiar relationship with their maternal uncle than with their father
- A bicyclist rides past a dog that suddenly raises its head, arches its neck, and bares its teeth
- A husband notices that his wife has suddenly stopped showing any physical affection toward him
- A high school history teacher asks her students to analyze the St. Crispin's day speech from Shakespeare's Henry V as part of their unit on war in England
- A three-year-old child points to the picture of her absent father and says "Daddy!"
- A concert-goer unexpectedly begins to weep while listening to Barber's 'Adagio for strings'.

Within semiotics, these scenarios are often treated as having something very important in common despite their many obvious differences (context, organism, medium, etc.). In one sense, these scenarios all describe an effort after meaning, of the word, cane, sound, shadow, etc. More broadly, they are all examples of semiosis or sign action. In studying these scenarios, in ascertaining the meaning of the word, cane, sound and so forth, we must ask a series of questions: What is a sign? How are these signs organized? How are these signs related to other signs and sign systems?

Since the topic of meaning is so deeply embedded in language and linguistics in general and semiotics in particular, other entries in this encyclopedia have already implicitly or explicitly dealt with the topic. Here, we will try to particularize the meaning of meaning for semiotics by examining some of the distinctions that have been drawn in past attempts to characterize it.

Meanings of Meaning

In their classic book *Meaning of meaning,* Ogden and Richards (1956: 185–208) compiled a 'representative list' of 16 definitions of the word 'meaning,' and several more can be discerned in their full discussion. Included in their list are the familiar meanings, such as a dictionary entry, the feelings or images aroused, an intention (as in 'I **meant** no harm.'), something of significance (as in 'Religion adds **meaning** to my life.'), and so forth. To sort through these and many other definitions, it will be helpful to review some of the distinctions raised in previous philosophical analyses. Many of these accounts focus on the meaning of words and statements, that is, semantics, and one of our tasks here will be to demonstrate how semiotics enables us to look beyond language signs.

Frege (1892) is usually credited with distinguishing between meaning as sense and meaning as reference. Even in the formal language of mathematics, such a distinction seems fruitful. For example, in the equations $2 + 2 = 4$ and $3 + 1 = 4$, both $2 + 2$ and $3 + 1$ refer to the same object, 4, but in different ways. We can say that $2 + 2$ and $3 + 1$ are the same in that they refer to the object 4, but, of course, they are also different than 4 (as sums) and from each other (as two different sums). They are two expressions or senses of the same thing – there is more information contained in them than in the tautology $4 = 4$. Frege's most famous example is that the expressions 'morning star' and 'evening star' both refer to the same celestial object (the planet Venus), but in a different sense (as seen in the morning before sunrise or in the evening after sunset). Meaning as reference tells us **that** a thing is (That object in the sky there is the planet Venus) while meaning as sense tells us **what** a thing is (If there is a bright star in the sky right after sunset, it is the evening star). Meaning as reference proposes an identity, while meaning as sense proposes interpretation. According to Frege, "By means of a sign, we express [the object's] sense and designate its reference" (1892).

Other related accounts of meaning make a distinction similar to Frege's including Carnap on intension (sense) vs. extension (reference) and J. S. Mill on

connotation (sense) vs. denotation (reference). While there are subtle and sometimes not so subtle differences between these accounts and Frege's and among themselves, it is beyond our purposes here to compare them. We will use the sense/reference distinction to examine semiotic models of meaning.

Meaning and Semiotics

As stated above, the topic of meaning is embedded deeply within semiotics in general and the concept of sign in particular. Here we will briefly describe how the two major founders of semiotics, Saussure and Peirce, have dealt with meaning.

Ferdinand de Saussure and Structuralism

Saussure, it will be remembered, regarded the sign as constituted by a signifier (or sound image in the case of speech) and a signified (a concept or idea). Thus the spoken word *tree* is a language sign made up of a signifier (the 'psychological imprint of the sound') for the mental concept Tree, the signified. Saussure sometimes spoke of the relationship between signifier and signified as signification. Since the signified and signifier are both mental concepts, the sign they constitute has no necessary relationship to a reference. In fact, one of the hallmarks of Saussure's semiology is that the relationship between a sign and its object is arbitrary, established by human social convention. Thus the sign *tree* is a language sign in English solely because it has been adopted by use as such, just as the sign *arbor* has been adopted in use by French-speaking communities. Meaning is, therefore, a mentalistic concept for Saussure, arising not from the links between signs and the real objects to which they refer, but from the interplay between and relationships that arise from the action of signs. In short, meaning arises from the structure of signs.

As a linguist, Saussure naturally emphasized language signs and structures. He defined language as a "system of interdependent terms in which the value of each term results solely from the simultaneous presence of others . . ." (Saussure, 1959: 116). Language signs get their meaning within the structure as a whole, in the relationships between one sign and the others. These relationships are particularly determined by differences. Just as at the phonemic level of a language where some sounds are recognized as different and others are not (e.g., the initial sounds of *tin* and *kin* are regarded as different in English whereas those of *coal* and *call* are not), language signs also get their meaning in terms of recognized differences with other language signs. It is therefore the structure of the whole that determines meaning, not reference to independently existing objects.

It is more than just the structures of a language that determine meaning, however. In addition, a language also includes rules for distinguishing one sign from another and for relating signs to one another. These rules, called syntax, allow us to combine and recombine signs in a potentially indefinite number of ways. Without syntax, a structure of signs is static. With syntax, it is possible to manipulate signs and their structure so that new meanings are brought to light or new possibilities for a structure can be constructed. We can therefore build **possible** structures, meanings that may have no embodiment outside of our semiosis. For example, without a system of signs and syntax to manipulate them, we could not build the possible worlds of the past or the future. The past and the future do not exist in our immediate experience, but we can **construct** the past and future and act upon their meanings in language signs using syntax.

Following Saussure, a number of scholars expanded this notion beyond language signs *per se* to all manner of cultural phenomena. Work in this vein is often called structuralism (see Hawkes, 1977 for a useful summary). Many of these analyses explicitly talk of signs in terms of signifiers and signified organized into a language-like structure and organized as if they embody a grammar. So we have semiotic analyses of the 'language' of gesture, dance, clothing, cars, advertisements, professional wrestling, circus, nearly anything you can imagine. Claude Levi-Strauss (1966) dedicated his career to demonstrating that there are underlying systems of structure and meaning behind such dazzlingly varied and complex social systems as kinship patterns (as in scenario 5 above) and myth. Roland Barthes (1964) took all of culture as his domain as he mapped out systems of connotation and denotation for such objects as cars, food, and clothing. There are many other examples, of course.

One important outcome of these analyses is that once you have uncovered the underlying structure for a particular phenomenon, manipulation of the syntax can create new forms of meaning that may not have emerged already; for example, structuralist analyses of advertisements can lead to a reversal or even a mocking of the dominant structures. Mystery stories usually keep the reader in the dark about the perpetrator of the crime until the last chapter, but the television detective show Columbo was very popular, in part, because the culprit was revealed at the beginning.

Structuralist models tend to suggest there is a single meaning to a text, a notion attacked forcefully by poststructuralists such as Derrida (1984). The problem arises from the signifier–signified relationship itself. The meaning of a text cannot reside in the

text but only in the signs that represent the text. As such, the signs are only a part of the potential meanings of any text, and alternate relations lead to alternative meanings. To speak of **the** meaning of a text is nonsense; there will be as many meanings as there are contexts, potential structures of signs to interpret it. But these meanings are nonetheless related to the network of relationships mapped out by the sign system in question. The relation, as Eco (1984) showed, is one of inference, where:

> To walk, to make love, to sleep, to refrain from doing something, to give food to someone else, to eat roast beef on Friday – each is either a physical event or the absence of a physical event, or a relation between two or more physical events. However, each becomes an example of good, bad, or neutral behavior **within a given philosophical framework**. (1984: 10, emphasis his)

C. S. Peirce

Charles S. Peirce was originally drawn to the study of signs by his search for a model of meaning valid for scientific inquiry. For Peirce, hypotheses are signs, inferred from the world of experience to give meaning to aspects of that world. Imagine, for example, stumbling across some bit of experience that, in itself, is quite puzzling and surprising (e.g., scenario 7 above). Yet, if that bit of experience is treated not for its unique properties, but as an example or case or sign of some rule of experience in action (e.g., perhaps the medication she is taking for high blood pressure is reducing her libido), then it is transformed into an ordinary affair. Couple this notion with Peirce's assumption that the things of the world of experience that we claim to be true are at best only more or less plausible and therefore only meaningful hypotheses, and we can begin to understand why the concept of meaning plays such a central role in his theory, why he came to equate logic and semiotics. That signs can be both the product of and further source of inference opens semiotic inquiry in quite a different direction from the structuralist approaches described earlier, to the processes of sign use within organisms: semiosis.

A sign, according to Peirce is "something which stands to somebody for something in some respect or capacity" (2.228 – As is common in Peircean scholarship, quotes and citations will be identified by volume and paragraph number from Peirce [1931–1958]). The sign stands for something, the object, by linking it to an interpretant, an additional sign that stands for some aspect of the object. All three elements, sign, object, and interpretant, are necessary for sign process to occur and are not decomposable into dyads. Thus, Peirce's conception of the sign includes both its sense and its reference, but not as separate components. A sign is only an incomplete representation of the object or referent. Only certain aspects of the object are represented, and it is these aspects that come to define the interpretant, the sense of the sign process. Different signs may represent different aspects of the object and thereby produce different senses. Additionally, signs have aspects that are not relevant to the object (that may be characteristics of the sign as something in the world of experience, but not of the object) and that can produce additional, different interpretants. In other words, our experience of the world is mediated through signs and can never, therefore, be isomorphic with the objects of the world. In essence, we create our world of experience by creating and using signs as we interact with objects in our environment.

Meaning emerges in the action of signs, also called semiosis. The varieties of meaning that are possible are due, in large part, to the complex interplay of sign, object, and interpretant. This interplay is seen clearly in Peirce's sophisticated analysis of signs and sign process. Perhaps his most famous derivation (2.254–2.264) was to propose three trichotomies of signs (or aspects of signs). In brief, these are (1) the nature of the sign itself, (2) its relation to the object it represents, and (3) its relation to the effect it produces (i.e., to its interpretant). In the first trichotomy, the sign itself can be a quality, a single individual thing, or a general type. Peirce labeled these three sign aspects as qualisign, sinsign and legisign, respectively. The second trichotomy is perhaps the best known. A sign can represent an object by resembling it (icon), by being existentially connected to it (index), or by a general rule (symbol). The third trichotomy considers the manner in which the sign relates to its interpretant. The sign can lead to the effect of possibility (rheme), of actual fact or existence (dicent), or of formal law (argument). These trichotomies can be combined to identify additional aspects of sign process. For reasons too complicated to go into detail here, when the three trichotomies outlined above are combined, 10 classes of signs can be identified: Rhematic Iconic Qualisign, Rhematic Iconic Sinsign, Rhematic Iconic Legisign, Rhematic Indexical Sinsign, Rhematic Indexical Legisign, Rhematic Symbolic Legisign, Dicent Indexical Sinsign, Dicent Indexical Legisign, Dicent Symbolic Legisign, and Argument Symbolic Legisign. But the potential varieties of signs do not end here. Peirce estimated that many thousands of sign types could be identified (8.343) but left their identification to 'future explorers.'

What is important to note for our purposes of understanding Peirce's concept of meaning is that the distinctions raised by sign types only identify **aspects** of signs, not isolated pure categories. These

aspects emerge in the action of signs or semiosis, that is, in the quest for meaning. In the perpetual action of semiosis, only certain emphases can be noted, only certain tendencies about the force of the sign action can be identified as the process of semiosis spreads from sign to sign. Sign action is in no way limited to any single triad but spreads throughout a network of interpretants, a process characterized by Eco (1984) as unlimited semiosis. A second point is a derivative of the first. Semiosis is the action of signs, not of a person. Certainly a person is an essential element in any human semiosis, but the action involves all three elements: the sign, object, and its effect. The interpretant **could** be an action, feeling, or thought of a person (Houser, 1987), but in its most general sense, the interpretant could be **any** effect, including additional sign action – a new triad of sign, object, and interpretant. Alternatively, a new aspect of sign process could emerge in a particular context, as when, for example, the iconic aspect of a symbol (e.g., the shape of a word heretofore treated as a symbol) comes to the foreground. For Peirce, meaning is the "proper significate effect of a sign" (5.475).

Consider the following example. Suppose our student in scenario 1 above is looking up the word *ocelot* that she heard her professor use in her Biology class. In her trusty Merriam-Webster, she finds 'one of a family (*Felidae*) of feral, carnivorous, usually solitary and nocturnal mammals.' Not knowing the meaning of *Felidae*, she looks up the word to discover that the ocelot is a variety of cat. This discovery immediately links her to all of the prior knowledge, prior semiosic structures that she constructed from her experiences (feelings, thoughts, and actions) with cats. Returning to the original definition, she looks up other words she does not understand. Under *carnivorous*, she reads 'subsisting or feeding on animal tissue; rapacious.' Never having come across the word *rapacious* before, she looks it up to read 'excessively grasping or covetous; ravenous or voracious.' As she moves from word to word, from interpretant to interpretant, new meanings are attached to her original one. She is slowly developing her structure for ocelot. We can also move beyond words. Our dictionary could include a drawing of an ocelot. Her professor could mime the actions of an ocelot in stalking, crouching, and springing upon its prey. The growl could be recorded and played in the class.

It is in this spread of signs, in the potential for unlimited semiosis, that meaning is to be found. According to Peirce, "a sign is not a sign unless it translates itself into another sign in which it is more fully developed" (5.594). Interpretants become signs for additional semiosis, generating additional interpretants that link to additional objects that in turn become signs for additional semiosis. Of course, this spread does not continue indefinitely. Eventually, it must resolve itself into a set of structures with which the world as we experience it is meaningful to us. Peirce referred to this set of structures as 'beliefs.'

The concept of belief is key in Peirce's view, and he spoke of a semiosis in general and meaning is particular as a movement toward 'fixing' a belief. The converse of belief is doubt, and Peirce was very explicit in drawing the distinction between them:

> We generally know when we wish to ask a question and when we wish to pronounce a judgment, for there is a dissimilarity between the sensation of doubting and that of believing. But this is not all that distinguishes doubt from belief. There is a practical difference. Our beliefs guide our desires and shape our actions . . . Doubt is an uneasy and dissatisfied state from which we struggle to free ourselves and pass into the state of belief; while (belief) is a calm and satisfactory state which we do not wish to avoid, or to change to a belief in anything else. On the contrary, we cling tenaciously, not merely to believing, but to believing just what we do believe. (5.370–5.372)

Peirce called such doubt 'genuine doubt.' As such, it is situated in our experience, not a methodological strategy as in Descartes' use of doubt. Doubt arises when the structures we have created, our current beliefs, do not account for some experience, when the character of signs does not fit our understanding. Peirce proposed four methods of resolving doubt and fixing beliefs: tenacity, authority, *a priori*, and experiment. Briefly, tenacity is invoked whenever one holds on to beliefs in the face of doubt and asserts that the beliefs will eventually accommodate the doubtful event. We use the method of authority to fix beliefs when we accept the beliefs of authority figures like teachers or scientists. Nowhere is the method of authority more widely used, and abused, than in the field of education. The *a priori* method is invoked when our beliefs change in the context of already existing structure of beliefs, a conceptual coherence to a worldview that has served us well so far. The three methods described so far all resolve doubt by opinion, stubbornly maintained, taken from others, or reasoned from premises. The fourth method, which Peirce preferred, is the method of experiment, where one seeks to remove doubt by collecting observations, generating potential hypotheses to account for the surprising experience, and reaching a conclusion based upon the interplay of inferential processes.

Inference, in fact, is implicated in all the methods of resolving doubt. Elsewhere (e.g., 5.145) Peirce describes three modes of inference – abduction, induction, and deduction – through which observers can build and work with structures of signs:

> Deduction is the only necessary reasoning. It is the reasoning of mathematics. It starts from a hypothesis, the truth or falsity of which has nothing to do with the reasoning; and of course its conclusions are equally ideal. The ordinary use of the doctrine of chances is necessary reasoning, although it is reasoning concerning probabilities. Induction is the experimental testing of a theory. The justification of it is that, although the conclusion at any stage of the investigation may be more or less erroneous, yet the further application of the same method must correct the error. The only thing that induction accomplishes is to determine the value of a quantity. It sets out with a theory and measures the degree of concordance of that theory with fact. It can never originate any idea whatsoever. No more can deduction. All the ideas of science come to it by way of Abduction. Abduction consists in studying facts and devising a theory to explain them. Its only justification is that if we are ever to understand things at all, it must be in that way. (5.145)

In the case of the method of experiment, a surprising experience might lead us to abduce a new hypothesis and examine it deductively to see if it squares with the available facts. Suppose, for example, I held the view that individual members of a species tended to be larger in colder climates. Recent data, however, have shown that this difference was not true of fish. If I engage in abduction, I might generate the hypothesis that the original relationship applies only to mammals. If observation showed this hypothesis to be tenable, then the surprising experience would be a matter of course. Deductively, I could link my hypothesis to other varieties of animals and inductively test the consequences. Similar inferential strategies can be observed in *a priori*, authority, and even tenacity.

The validity of our beliefs is tested in accord with Peirce's pragmatic maxim:

> Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object. (5.402)

If our beliefs are adequate to account for the phenomena before us, then we are satisfied. It is doubt that drives semiosis.

One important source of doubt comes from comparing our beliefs with others. Logic is grounded in the collective nature of semiosis itself and oriented toward future activity. Peirce's understanding of community was in terms of both the present communities of practice (scientist, citizen, family member, etc.), and the 'family' of all participants, past and future as well as present, who have, are and will work on clarifying our ideas and understandings.

> Finally, as what anything really is, is what it may finally come to be known to be in the ideal state of complete information, so that reality depends on the ultimate decision of the community; so thought is what it is, only by virtue of its addressing a future thought that is in its value as thought identical with it, though more developed. In this way, the existence of thought now depends on what is to be hereafter; so that it has only a potential existence, dependent on the future thought of the community. (5.316)

In summary, Peirce argued that the subject matter of semiotics is semiosis, the action of signs in all domains of life. Semiosis is an effort after meaning. Our understanding of the world is entirely mediated by signs, and therefore to understand meaning, we must understand the nature of our signs: What is a sign? How is one sign related to another sign? What do signs reveal about the real world? What do they obscure? How are signs formed? What are the ways in which signs can stand for something else? The identification, understanding, and use of signs are fundamental parts of inquiry. In fact, the process of semiotics within inquiry was seen by Peirce to be an emergent process, and one quite explicitly linked to our cognitive natures:

> Symbols grow. They come into being by development out of other signs ... We think only in signs. These mental signs are of mixed nature; the symbol-parts of them are called concepts. If a man makes a new symbol, it is by thoughts involving concepts. So it is only out of symbols that new symbols can grow. *Omne symbolum de symbolo*. A symbol, once in being, spreads among the people. In use and in experience, its meaning grows. Such words as force, law, wealth, marriage, bear for us very different meanings from those they bore for our barbarous ancestors. (2.302)

Dictionary vs. Encyclopedia

In a seminal chapter in his *Semiotics and the philosophy of language*, Umberto Eco (1984: 46–86) further elaborated some of the issues raised above. In particular, Eco explored the question of whether the meaning of a linguistic expression could be captured in a synonymous expression or definition. As in scenario 1 above, the act of consulting a dictionary is often associated with seeking the meaning of a word or phrase. Even in the case of a nonlinguistic sign (as in the white cane of scenario 2, we often convert to linguistic sign (e.g., a *blind* man) and consult a dictionary.

We expect a dictionary to help us pinpoint meaning and disambiguate the meaning of one word from another. For example, the dictionary entry for *ram* should provide a synonymous expression or paraphrase (e.g., *adult male sheep*) as well as

similarities/differences from other words (e.g., *buck, stag, ewe, lamb, wether*). This effect is accomplished by implicit (or sometimes explicit) reference to a hierarchical structure or Porphyrian tree. The synonymous terms or definitions are usually more general or abstract entries arrayed in a tree-like structure that depicts the relationships between the word whose meaning is sought and a network of related ones. For example, to define a ram as an adult male sheep specifies a relationship between ram and sheep but also raises the issues of the definition of sheep, differences between sheep and goats, cows, horses, and so on. Such taxonomies and classifications as this one are common within scientific domains, but the question raised by Eco (1984) is whether these structures actually analyze meaning. Structures achieve their classificatory power by proposing a finite number of hierarchically ordered categories by means of which terms are located. Ram has its place in this structure, and its place is linked to higher order terms (*sheep*, *mammal*, *animal*, *living thing*) and differentiated from other terms (*goats*, *fish*, *plants*, *nonliving*) by its position in the hierarchy. In Frege's terms, such classifications seek to pinpoint the reference where the meaning of a term consists of an analysis that identifies the more abstract referents or properties to which the term in question is related. Ideally, this process should be an automatic one in which there is no ambiguity about whether the classification is correct. Indeed, a computer programmed with the requisite structures could perform our meaning analysis. In such an analysis, there is no room for interpretation!

In a brilliant series of critiques, Eco clearly demonstrated the inadequacy of the 'dictionary' approach to meaning. There is something very artificial about the terms in these hierarchical tree structures – in the languages they use and the worlds they propose. Even at a formal level, logical inconsistencies crop up in even the most 'natural' classification systems. Thus, while a ram is an adult male sheep, it is difficult to construct a classification that appropriately differentiates on all three criteria at once (e.g., is gender superordinate or subordinate to sheep?). The very notion of hierarchy seems very slippery when probed – wool can be a property of and therefore subordinate to sheep in one analysis, whereas sheep can be an instance of and hence subordinate to the category of 'wool-producing animals' in another. Most serious, however, is that the attempt to minimize interpretation ultimately fails. According to Eco (1984: 57), "either the primitives (more abstract referents) cannot be interpreted, and one cannot explain the meaning of a term, or they can and must be interpreted and one cannot limit their number."

Any act of meaning, therefore, must involve both reference **and** sense. To understand the meaning of *ram*, we must inevitably bring to bear some portion of an immense body of potentially relevant world knowledge. In most everyday uses of the word *ram*, for example, connections to generic spheres of knowledge such as animal husbandry, Greek culture, hunting, clothing manufacture, astronomy, climate, etc. are possible as are more personal connections such as living on a sheep ranch, hearing nursery stories about sheep, etc. Most actual dictionaries actually make explicit links to portions of this world knowledge and for this reason, Eco regards them as 'disguised' encyclopedias. In some very specific context, the meaning of the word *water* might be limited to the expression H_2O, but in most contexts, it would be immediately connected to possible spheres of world knowledge related to drinking, washing, sailing, extinguishing fires, and so forth. The task of a person trying to figure out the meaning of a term is, therefore, not one of establishing the referent, but contextualizing the sense in which the referent is being interpreted – in Peirce's terms by means of interpretants in a (potentially unlimited) process of semiosis.

Eco (1984) explored several metaphors to describe encyclopedic competence and settles upon the rhizome. A rhizome is a root crop, a prostrate or underground system of stems, roots, and fibers whose fruits are tubers, bulbs, and leaves. A tulip is a rhizome as is rice grass, even the familiar crab grass. The metaphor of rhizome specifically rejects the inevitability of such notions as hierarchy, order, node, kernel, or structure. The tangle of roots and tubers characteristic of rhizomes is meant to suggest a form of mind where:

- Every point can and must be connected with every other point, raising the possibility of an infinite juxtaposition
- There are no fixed points or positions, only connections (relationships)
- The structure is dynamic, constantly changing, such that if a portion of the rhizome is broken off at any point it could be reconnected at another point, leaving the original potential for juxtaposition in place
- There is no hierarchy or genealogy contained as where some points are inevitably superordinate or prior to others
- The rhizome whole has no outside or inside, but is rather an open network that can be connected with something else in all of its dimensions.

The notion of a rhizome is a difficult one to imagine, and any attempt to view it as a static picture risks minimizing its dynamic, temporal, and even

self-contradictory character. Eco (1984) labeled the rhizome as 'an inconceivable globality' to highlight the impossibility of any global, overall description of the network. Since no one (user, scientist, or philosopher) can describe the whole, we are left with 'local' descriptions, a vision of one or a few of the many potential structures derivable from the rhizome. Every local description of the network is an hypothesis, an abduction, constantly subject to falsification. To quote Eco:

> Such a notion ... does not deny the existence of structured knowledge; it only suggests that such a knowledge cannot be recognized and organized as a global system; it provides only 'local' and transitory systems of knowledge which can be contradicted by alternative and equally 'local' cultural organizations; every attempt to recognize these local organizations as unique and 'global' – ignoring their partiality – produces an **ideological** bias. (1984: 84, emphasis his)

This last statement emphasizes the point that we are not proposing the metaphor of rhizome for an individual mind making meaning, but to **minds** as distributed in social, cultural, historical, and institutional contexts. Except as a degenerate case, there is no such thing as a single mind, unconnected to other minds or to their (collective) social cultural constructions. Thinking, or whatever we choose to call the activity of mind as it makes meaning, is always dialogic, connected to another; either directly as in some communicative action or indirectly via some from of semiotic mediation – signs and/or tools appropriated from the sociocultural context. We are connected to other people individually but also collectively as in the speech communities or social languages in which we are all embedded. We are connected to the sociocultural milieu in which we operate, a milieu characterized by the tools (computers, cars, television, and so forth) and signs (language, mathematics, drawing, etc.) that we may appropriate for our thinking. Thus meaning is not an action that takes place within a mind within a body, but rather at the connections, in the interactions. But, it is worth saying again that this thinking is always 'local,' always a limited subset of the potential (unlimited) rhizomous connections that embody our meanings. Thinking is, rather, a matter of constructing and navigating a local, situated path through a rhizomous labyrinth, a process of dialogue and negotiation with and within a local sociocultural context. Although this analogy fails if pushed too far, the connectivity we have in mind is a bit like the World Wide Web. While the 'results' of a connection to WWW are experienced via an interface with one's local workstation, that experience is possible only as a result of connections with many (potentially an infinite) number of servers all over the world. The local workstation both contributes to (constructs) and is constructed by its connections. Meaning is in the connections.

Umwelt – Meaning beyond Words

Jacob von Uexküll's (1957, 1982) notion of 'Umwelt' reinforces this conception of meaning as arising out of 'local' connections, but also extends the analysis beyond language signs. In his paper titled 'The theory of meaning' (1982; originally published in 1940) von Uexküll elaborated Umwelt as the phenomenal or personal world of an organism; that is, the set of connections constructed by the organism via species-specific sensory characteristics and particular experiences in the physical world. Ticks, for example, individually and collectively, construct their Umwelt in part from their biologically determined sensitivity to butyric acid and the particular physical surroundings in which they find themselves. The tick will climb up a tree or tall grass and launch itself toward a source of butyric acid, usually a passing mammal, burrow into its skin, gorge itself with blood, drop off, lay eggs, and die. The Umwelt of the tick is not its environment, that which an observer of an organism might describe as pre-adjacent to and independent of the organism, but is, rather, that environment as selectively reconstituted and structured according to the particular species' characteristics and according to the specific needs and experiences of the individual organism. The organism and its Umwelt are indivisible – it makes no sense to speak of an organism apart from its personal world. So in this sense, all semiosis is simultaneously distributed and situated in the personal world of an individual organism. From the point of view of its inhabitants, an Umwelt is the actual world of experience; that is, an organism's particular slice of the rhizome is the 'real' world for that organism. As external observers of species and individual organisms, we can attempt to gain some understanding of these worlds, and how they influence and are influenced by the multitude of other worlds to which they are coupled.

In a delightful paper titled 'A stroll through the worlds of animals and men' (1957; originally published in 1934), von Uexküll described numerous examples of the Umwelten that organisms individually and collectively create that then serve to mediate their experience in the world. Bees, dogs, snails, flies, earthworms, and even human children and adults are among the subjects whose Umwelt he attempts to map. Of course, as von Uexküll acknowledged, analyses of an Umwelt will always be partial and incomplete in that we can not fully know the Umwelt, the

systems of meaning, of another. Indeed the same physical object often provides a quite different experience both across and within species. In a famous example, von Uexküll (1957) described the various Umwelten created by a large oak tree: a rough textured and convoluted terrain for a bug, a menacing form for a young child, a set of limbs for a nesting bird, a crop to be harvested by a woodsman, and so on. In all these cases, the environment of the tree was the same; that is, the bark, the height, the limbs were 'available' to each of the organisms, yet their experience of them, their meaning, was quite different. Objects of the world are 'meaning carriers' and our sensory-motor mechanisms are 'meaning receivers.' The coordination of meaning carriers and meaning receivers constitute a 'functional circle' out of which our Umwelt arises. Thus the fundamentals of the meaning making process are shared by all organisms.

However, the human Umwelt, dubbed the 'Lebenswelt' by von Uexküll (1957), includes not only biological and physical factors but cultural ones as well. Although both humans and animals engage in sign action, humans are unique in their ability to consciously manipulate signs, thus enabling them to construct worlds apart from nature and direct experience. The possibility for signs that are arbitrary (e.g., language signs) allows humans individually and collectively to create an infinite array of meanings and possibilities for reality through the manipulation of signs. The importance of signs in creating the Lebenswelt lies in their creative power for infinite representation and meaning-making, or unlimited semiosis as described above. Indeed, culture itself can be described as a web of signs. Culture, in this view, is not some mind-independent, pre-adjacent social reality, but rather a collective construction that is reconstructed (or more accurately co-constructed in context) by each new participant. And via these structures, we literally construct our knowledge dynamically as we interact in the world.

As an example, consider the following. In their provocative book *Metaphors we live by*, Lakoff and Johnson (1980) built a solid case that the way in which we perceive and think about a situation is a function of the metaphors (they could have as easily said sign structures) we have adopted for and use in that situation. If we take a cultural phenomenon like schooling, we can examine the dominant metaphors that define its meaning. Marshall (1988) has argued convincingly that the fundamental metaphor in many schools is 'School Is Work.' We speak of students needing to work harder on their studies, to complete their homework, to earn a grade, and so forth. Teachers are trained to manage their classes and are often held accountable in terms of their productivity. Teachers to whom this metaphor is pointed out often deny it and yet are surprised at how often they catch themselves and other educators using language consistent with the workplace metaphor.

Other metaphors are equally powerful. The notion that the 'Mind Is A Container' is very pervasive and in fact underlies much of our teacher training and instructional design and development. If the mind is a container and knowledge is an entity that can be transferred to the mind (a Conduit metaphor) to fill the void, then naturally the task of the educational system is to facilitate this process of knowledge communication. If, however, we understand the metaphorical basis of our thinking, we can raise the possibility of choosing different metaphors and thereby different meanings, and consequently different roles for educators. If we adopt the metaphor of 'School As A Community Resource,' for example, perhaps we will have our students working on authentic tasks that meet community needs (designing bicycle routes through the city; looking into water quality of local streams, etc.) through which they learn the academic content and skills deemed worthwhile. The focus now becomes not on what the students know, but the processes whereby something can become known, how we know it, and for what purpose.

So all cognition, all human process, is situated in the sense that we as meaning makers are inseparable from our Lebenswelt. Yet as human observers using signs in ways unique to our species, we can gain some awareness of the sign process itself in ourselves and in others and some limited ability to manipulate it. With the recognition that our personal world is some portion of, some selection from, infinite possibilities comes the realization that any attempt to assert our view as global inevitably introduces an ideological bias that must be justified. As we build and rebuild our Lebenswelt, we can gain some reflexive self-identity, some autonomy in determining through deliberate choice what ideological bias we will adopt in our actions and our words. In the felicitous phrase of Peirce, we become 'masters of our own meaning' (5.393). To do so, we must solve the problem of 'other minds.' We structure our interactions in the world in terms of our ideas of how **our** mind works and how **other** minds work. In other words, we are continually engaged in Umwelt research. To understand the meanings of others, we must endeavor to understand our own meanings and how they are connected. The character of any human interaction – but communication in particular – is guided by how the participants establish intersubjectivity based upon their respective conceptions of Umwelt. At its most fundamental level, communication depends upon this intersubjectivity, the raising of a distinction between one's mind

and that of others, all the while attending to their connection.

Summary

We began with the assertion that the topic of meaning is embedded deeply within semiotics in general and the concept of sign in particular. Using Frege's distinction between sense and reference as an analytical tool, we have seen how various models of semiotics have dealt with meaning. From the dazzling array of structuralist accounts of the interplay of meanings in cultural contexts by Saussure and his followers, through Peirce's brilliant integration of both sense and reference in his triadic model of sign and sign process, to the elaborations of Eco and von Uexküll of unlimited semiosis and Umwelt, we can confirm that the whole of semiosis can be seen in large part as an effort after meaning. Meaning is not a possession of an individual or a property inherent in an object, but the inevitable outcome of semiosis, the action of signs.

Returning briefly to the scenarios with which we began this entry, we have seen that even in the prototypical case of looking up the meaning of a word in a dictionary (scenario 1), one is quickly immersed in a rhizomous network of related meanings and experiences. A white cane in the hands of a pedestrian (scenario 2) can have a powerful influence on the behavior of others and in a very real sense comes to define that person in that context. Yet a whole other set of connections, different senses of the person, emerge when our pedestrian sets her cane aside and now uses her hands to drink coffee at a sidewalk cafe. These various senses must be shared by the community if they are to be acted upon. Meaning therefore is always an interactive outcome, not an inherent characteristic of either individuals or objects.

Learning certainly plays a major role in the development of meaning. The cat in scenario 3 learned over time that the sound of the can opener heralded a possible meal. Our doctor in scenario 4 must likewise learn to distinguish between suspicious and ordinary features of an X-ray in order to make a correct diagnosis. Signs do not speak for themselves, they must be interpreted! And in that interpretation, particular conceptual contexts will be brought to bear that highlight some aspects of the complex situation and obscure others. Our anthropologist might be using a structuralist model of culture (e.g., Levi-Strauss) in interpreting scenario 5, a model that stresses certain interpersonal characteristics of this culture while ignoring others. We must always be alert to the fact that meanings can change as interpretive context changes.

Meanings must be communicated if they are to make a difference. The bicyclist and the dog in scenario 6 are, in a sense, searching for a means to coordinate their behaviors, as are the husband and wife in scenario 7. This process of interpretation and coordination draws heavily upon inference, particularly abductive inference. What meaning could account for these unexpected signs that would make them sensible? Generating and testing potential meanings lies at the heart of human semiosis.

Finally, to become 'masters of our own meaning,' we must become more reflexive about the centrality of meaning in our life and how we can play a role in enriching that process. For a child to make the link between a photograph and her absent father (scenario 9) is an achievement that every parent should celebrate, because this act signifies the beginning of an awareness of the difference between a sign and its sense (interpretant) and reference (object). These humble beginnings can grow into the wonders of the hermeneutic process whereby we can come to know the worlds we have created and our role within them. In such worlds, Shakespeare and 'Adagio for strings' become possible. What other wonders await us?

See also: Denotation versus Connotation; Eco, Umberto: Theory of the Sign; Reference: Semiotic Theory; Saussure: Theory of the Sign; Semiosis.

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Meaning: Cognitive Dependency of Lexical Meaning

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It is often thought or implicitly assumed, even in circles of professional semanticists, that predicate meanings, as codified in their satisfaction conditions (*see* **Lexical Conditions**), are lexically fixed in such a way that they automatically produce truth or falsity when applied to appropriate reference objects. This assumption is unfounded. In many, perhaps most, cases, the satisfaction conditions imply an appeal to nonlinguistic knowledge, so that the truth and falsity of assertive utterances are not the product of mere linguistic compositional computation, but are code-determined by nonlinguistic knowledge, either of a general encyclopedic or of a context-bound, situational nature.

An obvious case is provided by a large class of gradable adjectival predicates, such as *expensive*, *old*, and *large*, whose applicability depends on (preferably socially recognized) standards of cost, age, and size, respectively, for the objects denoted by their subject terms. The description of such standards is not part of the description of the language concerned, but of (socially shared) knowledge.

Further obvious examples are 'possession' predicates, such as English *have*, *lack*, and *with(out)*, and whatever lexical specification is needed for genitives, datives, and possessive pronouns. These clearly require general encyclopedic knowledge for their proper interpretation. Consider the following examples:

(1a) This hotel room has a bathroom.
(1b) This student has a supervisor.

For (1a) to be true, it is necessary that there be one unique bathroom directly connected with the room in question, whose use is reserved for the occupants of that room. When the room carries a notice that its bathroom is at the end of the corridor to the right, while the same bathroom serves all the other rooms in the corridor, (1a) is false – not just misleading but false, as any judge presiding over a court case brought by a dissatisfied customer will agree. But for (1b) to be true, no such uniqueness relation is required, as one supervisor may have many students to look after. This is not a question of knowing English, but of knowing about the world as it happens to be.

The same goes for the parallel sentences:

(2a) This is a hotel room with a bathroom.
(2b) This is a student with a supervisor.

Possession predicates, therefore, must be specified in the lexicon as involving an appeal to what is normally the case regarding their term referents. They express a well-known relation of appurtenance between the kind of object referred to in subject position and the kind of object referred to in object position. The semantic description (satisfaction conditions) of *have* and other possessive predicates is thus taken to contain a parameter for 'what is well-known,' making the interpretation of this predicate in each token occurrence truth-conditionally dependent on world knowledge.

Not all possession predicates are subject to the same conditions. Possessive pronouns, for example, may express a relation of 'being responsible for' or 'taking care of,' which other possession predicates cannot express. An example is sentence (3) uttered by a gardener with regard to the flower beds he is tending:

(3) Please don't mess up my flower beds.

This sentence can be uttered appropriately without the speaker implying that the flower beds are owned by him.

Many such examples can be given. Consider the predicate *flat* said of a road, a tire, a mountain, a face, or the world. There is an overall element 'spread out, preferably horizontally, without too much in the way of protrusions or elevations,' but that in itself is insufficient to determine what 'being flat' amounts to in these cases. The full meaning comes across only if it is known what roads, tires, mountains, faces, and the world are normally thought to be like. Dictionaries,

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even the best ones, limit themselves to giving examples, hoping that the user will get the hint.

Another example is the predicate *fond of*, as in:

(4a) John is fond of his dog.
(4b) John is fond of cherries.
(4c) John is fond of mice.

In (4a), obviously, John's fondness is of a rather different nature from what is found in (4b): the fondness expressed in the one is clearly incompatible with the fondness expressed in the other. The fondness of (4c) can be either of the kind expressed in (4a) or of the kind expressed in (4b). The common element in the status assigned to the object-term referents is something like 'being the object of one's affection or of one's pleasure,' but again, such a condition is insufficient to determine full interpretation.

Cognitive dependency is an essential aspect in the description of predicate meanings. The fact that some predicate meanings contain a parameter referring to an available nonlinguistic but language-independent, cognitive knowledge base means that neither utterance-token interpretation nor sentence-type meaning is compositional in the accepted sense of being derivable by (model-theoretic) computation from the linguistic elements alone. As regards utterance-token interpretation, this is already widely accepted, owing to valuable work done in pragmatics. The noncompositionality of sentence-type meaning, defined at the level of language description, is likewise beginning to be accepted by theorists of natural language. This type-level noncompositionality does not mean, however, that the specification of the satisfaction conditions of predicates is not truth-conditional, only that standards embodied in socially accepted knowledge have become part of the truth conditions of sentences in which the predicate occurs.

In most treatises on lexicology, the term polysemy is used for phenomena such as those presented above. At the same time, however, it is widely recognized that this is, in fact, little more than a term used to give the problem a name. The problem itself lies in the psychology of concepts. One may assume that there are socially shared concepts like 'possession,' 'flatness,' and 'fondness,' but it is not known in what terms such concepts are to be defined. In a general sense, Fodor (1975, 1998) is probably right in insisting that lexical meanings are direct reflexes of concepts that have their abode in cognition but outside language. The necessary and sufficient conditions taken to define the corresponding lexical meanings cannot, according to Fodor, be formulated in natural language terms, but must be formulated in a 'language of thought,' which is categorically different from any natural language and whose terms and combinatorial properties will have to be established as a result of psychological theorizing.

It is clear, in any case, that phenomena like those shown in (1)–(4) pose a serious threat to any attempt at setting up a model-theoretic theory of lexical meaning, such as Dowty (1979): the neglect of the cognitive factor quickly becomes fatal in lexical semantics.

Context-bound or situational knowledge plays a role in the interpretation of predicates that involve a 'viewpoint' or 'perspective,' such as the pair *come* and *go*, or predicates such as *to the right (left) of*, *in front of*, and *behind*. The two versions of (5) are truth-conditionally identical, but they differ semantically in that the 'mental camera,' so to speak, has stayed in the corridor in the *went* version, but has moved along with Dick into the office in the *came* version.

(5) Dick and Harry were waiting in the corridor. Then Dick was called into the office. After five minutes, Harry [went/came] in too.

In similar manner, the sentences (6a) and (6b) may describe the same situation, but from different points of view. In (6a), schematically speaking, the viewer, the tree, and the statue are in a straight line; in (6b), it is the viewer, the tree, and the fountain that are in a straight line:

(6a) There was a statue behind the tree, and a fountain to the left of the tree.
(6b) There was a fountain behind the tree, and a statue to the right of the tree.

A further cognitive criterion for the lexical meaning of predicates, especially those denoting artifacts, seems to be the function of the objects denoted. What defines a table or a chair is not their physical shape or the material they are made of, but their socially recognized function. The same holds for a concept like 'luxury.' Laws imposing special taxation on luxury goods or luxury activities usually enumerate the goods and activities in question, making exceptions for special cases (such as frock coats for undertakers). Yet what defines luxury is not a list of goods or activities, but socially recognized function – roughly, anything relatively expensive and exceeding the necessities of life.

A peculiar example of cognitive dependency, probably based on function, is provided by the English noun *threshold* and its Standard German translation equivalent *Schwelle*. In their normal uses, they denote the ridge or sill usually found between doorposts at floor level. Yet these two words differ in their capacity for semantic extension: the elevations in roads and streets that are normally called *speed bumps* in

English are called *Schwelle* in German. Yet it is unthinkable that speed bumps should be called *thresholds* in English. The question is: why? One is inclined to think that, at some ill-understood level of interpretation, the word *threshold* implies containment within a space or a transition from one kind of space to another, perhaps as a result of its etymology (which is not fully known). *Schwelle*, by contrast, is a swelling in the ground that forms an obstacle to be got over – which is also its etymology, although, on the whole, German speakers do not realize that. The difference between the two words is not a question of the ontological properties of the objects concerned, but, apparently, of the ways they are conceived of. The role of etymology in this case is intriguing.

See also: Cognitive Semantics; Lexical Conditions; Polysemy and Homonymy.

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Meaning: Development

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How do children assign meanings to words? This task is central to the acquisition of a language: words allow for the expression of the speaker's intentions, they combine to form larger constructions, and the conventional meanings they have license their use for making references in context. Without them, there is no language. In the acquisition of meaning, children must solve the general mapping problem of how to line up word forms with word meanings. The forms are the words they hear from other (mainly adult) speakers. The meanings they must discern in part from consistencies in speaker usage in context from one occasion to the next and in part from inferences licensed by the speaker on each occasion. Possible meanings for unfamiliar words, then, are built up partly from children's conceptual representations of events and partly from the social interactions at the heart of adult-child conversation.

One critical task for children is that of working out the conventional meanings of individual words (e.g., *cup, team, friend, truth*). Yet, doing so is not enough: syntactic constructions also carry meanings that combine with the meanings contributed by the actual words used (causative constructions, as in *They broke the cup* or *The boy made the pony jump*; the locative construction, as in *She put the carving on the shelf*; the resultative construction, as in *He washed the floor clean*). However, children start mapping word meanings before they begin combining words.

Languages differ in how they lexicalize information – how they combine particular elements of meaning into words – and in the kinds of grammatical information that have to be expressed. They may package information about events differently; for example, combining motion and direction in a single word (*depart*) or not (*go + toward*), combining motion and manner (*stroll*), or not (*walk slowly*). They also differ in the grammatical distinctions made in each utterance. Some always indicate whether an activity was completed; others leave that to be inferred. Some always indicate whether the speaker is reporting from direct observation, or, for example, from the report of someone else. Some indicate whether object-properties are inherent or temporary. The grammatical distinctions that languages draw on vary, as do the ways in which they lexicalize information about objects and events. Mapping meanings onto words is not simply a matter of equating meanings with conceptual categories. Children have to select and organize conceptual information as they work out what the conventional meanings are for the words they are learning.

How do children arrive at the meanings they first assign to unfamiliar words? How do they identify their intended referents? And how do they arrive at the relations that link word meanings in different ways? The general conversational context itself serves to identify relevant information on each occasion for children trying to work out the meaning of an unfamiliar word. Adult language use presents them with critical information about how words are used, their conventional meanings, and the connections among words in particular domains.

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Conventionality and Contrast

Adult speakers observe two general pragmatic principles when they converse. First, they adhere to the conventions of the language they are speaking and in so doing make sure their addressees identify the meanings intended in their utterances. The principle of conventionality takes the following form: 'For certain meanings, there is a form that speakers expect to be used in the language community.' So if there is a conventional term that means what the speaker wishes to convey, that is the term to use. If the speaker fails to use it or uses it in an unusual way, that speaker risks being misunderstood. For conventions to be effective, conventional meanings must be given priority over any nonconventional ones. The second general principle speakers observe is that of contrast: 'Speakers take every difference in form to mark a difference in meaning.' When speakers choose a word, they do so for a reason, so any change in word choice means they are expressing a different meaning.

These two principles work hand-in-hand with the Cooperative principle in conversation and its attendant maxims of quality (be truthful), quantity (be as informative as required), relation (make your contribution relevant), and manner (avoid ambiguity; Grice, 1989). Acting in a cooperative manner demands that one observe the conventions of the language in order to be understood. At the same time, if there is no conventional term available for the meaning to be expressed, speakers can coin one, provided they do so in such a way that the addressee will be able to interpret the coinage as intended (Clark, 1993).

In Conversation

Adults talk to young children from the very start, and what they say is usually tied closely to specific objects and activities. This feature of conversation presents young infants with opportunities to discern different intentions, marked by different utterances from early on. Infants attend to adult intentions and goals as early as 12 months of age. They show this, for example, by tracking adult gaze and adult pointing toward objects (e.g., Carpenter *et al.,* 1998), so if they are also attentive to the routine words and phrases used on each type of occasion, they have a starting point for discerning rational choices among contrasting terms and gestures.

Consider the general conditions for conversational exchange: joint attention, physical co-presence, and conversational co-presence. Adults observe these conditions and indeed impose them, as they talk to very young children. They work to get 1- and 2-year-olds to attend, for instance when planning to tell them about an unfamiliar object, and only then do they talk to them about whatever object or event is visibly present (Clark, 2001). By first establishing joint attention, adults set young children up to identify and then to help add to common ground. Children can do this by ratifying offers of new words by repeating them or else indicating in some other way that they have taken up an unfamiliar term (Clark, 2003).

When adults offer unfamiliar words, they do so in the conversational context; that is, with children who are already attending to whatever is in the locus of joint attention. This feature, along with any familiar terms that are co-present in the conversation, allows children to make a preliminary mapping by identifying the intended referent, whether it is an object or an action (Tomasello, 2002). In effect, the conditions on conversation narrow down the possible meanings that young children might consider for a new term to whatever is in the current joint focus of attention.

However, adults do more in conversation. They accompany their offers of unfamiliar words with additional information about the intended referent on that occasion and about how the target word is related to other terms in the same semantic field. Among the semantic relations adults commonly offer are inclusion (*An X is a kind of Y*), meronomy or partonomy (*An X is part of Y*), possession (*X belongs to Y*), and function (*X is used for Y*; Clark and Wong, 2002). After offering one term, adults often offer others that happen to contrast in that context, so a dimensional term like *tall* may be followed up by *short, wide, narrow*, and *long* (Rogers, 1978). In fact, the meanings of words for unfamiliar actions may also be inferred in part from their co-occurrence with terms for familiar objects affected by those actions, and the meanings of words for unfamiliar objects may be inferred in part from the verbs with which the nouns in question occur (e.g., Goodman *et al.,* 1998; Bowerman, 2005). All this information offers ways for children to link new terms to any relevant words they already know. Children learn from child-directed speech about general properties of the lexicon – taxonomic relations, nonoverlapping categories within levels, opposites, overlaps in meaning (through hierarchical connections) vs. in reference, and so on.

In short, adults are the experts in providing the conventional terms used for specific meanings in the speech community. The novices, children, ask them innumerable *What's that?* questions from around age 2;0–2;6 on and treat them as reliable sources for how to talk about new things (e.g., Diesendruck and

Markson, 2001). Moreover, when young children make errors, adults frequently check up, through side sequences and embedded corrections, on what they intended to say, and so present children with the conventional forms to aim for (Chouinard and Clark, 2003).

Making Inferences

When children hear a new term for some object or activity, they can infer in context that the term probably applies to the object or activity to which they are attending. However, the information that adults often follow up with allows children to make more detailed inferences about the candidate meaning. Mention of class membership – for example, *A sparrow is a bird* – tells them that they can add the term *sparrow* to the set of terms they already know for birds, perhaps just *chicken* and *duck*. Comments on the size, characteristic song, or flight each allow further inferences about how sparrows differ from ducks and chickens.

What evidence is there that young children take in such information? In spontaneous conversations, they give evidence of attending to what adults say in several ways. First, they repeat new terms in their next conversational turn, either as single words or embedded in a larger utterance; second, they acknowledge the adult offer with forms like *yeah, uh-huh*, and *mmh*; and third, they continue to talk about the relevant semantic domain (Clark, 2004).

Children's readiness to make inferences from added information offered by adults has also been examined in word-learning experiments. In one study, children aged just 2 years old were taught words for two sets of objects (A and B) that were similar in appearance and had the same function. After teaching the first word for the first set (A), the experimenter introduced the second set of objects while saying just once, "Bs are a kind of A." He then proceeded to teach the second word, B. Children were then tested by asking them to find all the As and then all the Bs. For the first request, they typically selected As; for the second, they consistently (and correctly) picked only Bs (Clark and Grossman, 1998). In short, the one statement of an inclusion relation was enough for even young 2-year-olds to make use of it in this task. In another condition, again teaching two new words for two sets that resembled each other, children infer that there could be an inclusion relation but they have no way to tell which way it should go, so some include A in B, and some B in A.

Children rely on contrast in context to make inferences about the most probable reference for a newly introduced word. For example, if they already know what the object they are attending to is called, they are more likely to infer that a new term denotes a subordinate, a part, or some other property of it (Taylor and Gelman, 1989). This propensity was exploited directly in studies of whether children could decide in context whether a new word was intended to denote an object or an activity. Young 2-year-olds were presented with the same object doing different actions, with one action labeled with the new term, or else several objects, one labeled with the new term and all doing the same action. The children readily inferred that the new word denoted an activity in the first case and an object in the second (e.g., Tomasello, 2002).

Young children are also able to discern the intended from the accidental. When shown various actions being demonstrated, infants aged 18 months imitated intended actions (marked by utterances like '*There*') more frequently than unintended ones (signaled by utterances like '*Oops*'). By age 2, young children know to ignore errors in wording, for example, and attend only to the final formulation of what someone is saying. In one study, for example, children were taught a word for a set of objects; then the experimenter exclaimed, "Oh, I made a mistake: these aren't As, they're Bs" and proceeded to teach the word B in place of the earlier A. When tested, even children who were just 2 years old knew that they did not know what A, the first word, meant (e.g., Clark and Grossman, 1998).

All the inferences presented so far have been overt inferences about unfamiliar word meanings, made on the spot by children exposed to the new words. Yet, although adults make clear offers of new words, marking them as new by introducing them in formulaic deictic frames (e.g., *This is a* . . .), with utterance-final stress, many of the other words they use will be unfamiliar to very young children. How do children assign meanings to all those words? The answer lies in the covert use of Roger Brown's (1958) "original word game." Basically, the child notices an unfamiliar word, makes inferences in context about its probable meaning and acts on that, and then adjusts those inferences in light of the adult's responses. Consider these scenarios by way of illustration:

(a) Young child watching parent in the kitchen, with several drink containers on the counter
Mother (to older sibling): Hand me that mug, will you?
(Child, wondering what a mug is, watches sibling pick up a mug)
Mother: Thanks
(Child infers for now that *mug* denotes something that has a handle, is a solid color, and is made of ceramic)

Sometimes, the inferences that children make are informed slightly more directly by the parent's direct responses, as in (b).

(b) Young child holding two plastic animals, a cat and a dog
Father: Can you give me the spaniel?
(Child, uncertain what spaniel means, holds out the cat)
Father: No, the spaniel please.
(Child infers that *spaniel* must refer to a kind of dog rather than a kind of cat, and so hands over the plastic dog instead)

In both cases, the child makes preliminary or tentative inferences that can then be adjusted or changed in light of adult follow-up utterances, further exposures in other contexts, and additional, often explicit information about inclusion, parts, properties, or functions. Of course, inferences like these can also be made about terms for actions, relations, and states, as well as about those for objects, parts, and properties.

Pragmatics and Meaning

In the conversational exchanges considered so far, adult and child both follow the cooperative principle characterized by Grice (1989), as seen by their observation of joint attention, physical co-presence, and conversational co-presence. In addition, each participant in the exchange must add to common ground and keep account of the common ground that has been accumulated so far (H. Clark, 1996). All of this requires that speakers keep careful track of the intentions and goals being conveyed within an exchange (Tomasello, 1995; Bloom, 2000).

Infants are attentive to nonlinguistic goals very early. For example, if 14-month-olds are shown an unusual action that achieves a goal – for example, an adult bending down to touch a panel switch with her forehead – they imitate it. If 18-month-olds watch an adult try and fail to place a metal hoop on a prong, the infants will produce the action successfully, even though they have never seen it completed (Meltzoff, 1995). That is, infants infer that the adult intended to turn on the light or intended to hang up the hoop. Intentions are what is critical, Meltzoff demonstrated, not just observation of the relevant actions, because infants do not re-enact these events when the actions are performed by a mechanical hand.

In much the same way, infants attend to the words that adults use. Upon hearing a word, they infer that the speaker is referring to the entity physically present in the locus of joint attention. If instead the speaker produces a different word, they infer that the speaker is now referring to something else and therefore has a different goal in speaking. That is, each linguistic expression chosen indexes a different intention, thus exemplifying the speaker's reliance on contrast, as well as on conventionality (Clark, 1993). This recognition then licenses young children to use words to express their intentions and in this way to convey specific goals. Adult usage provides the model for how to do so within conversational exchanges.

Infants also grasp quite early that the words used to express certain meanings are fixed and conventional. For example, they know that adults who wish to refer to a squirrel use the term 'squirrel' or to refer to a sycamore tree use the term 'sycamore,' and so on. As a result, when they notice adults who fail to use 'squirrel' when looking at a squirrel, but instead use another expression, they can readily infer that the speaker must therefore mean something else. In effect, young children, just like adults, assume that if the speaker intends to talk about a squirrel, he will use the conventional term for it. If instead, he uses something else, then he must intend to convey some other meaning.

As a result, in situations where children already know terms for some of the objects they can see, they expect the adult to use a familiar term for any familiar object. If the adult instead produces an unfamiliar term, in the presence of an unfamiliar object, they will infer that he intended to refer to the object for which they do not yet have a term. So they use contrast, together with the assumption that conventional terms always take priority, to interpret the speaker's intentions on such occasions. The result is that they consistently assign unfamiliar terms to as-yet unnamed objects or actions. This pragmatic strategy for interpreting intentions and thereby making a first assignment of meaning to an unfamiliar word helps young children in many settings. Take the case of an adult looking at a single familiar object that is well known to the child. The adult, clearly talking about that object, does not use the expected conventional term. What can the child infer from that? There are two common options: (1) the unfamiliar expression denotes a superordinate or subordinate category, or (2) it denotes a part or property of the familiar object. Then, the remainder of the utterance can typically provide the child with important clues about the correct inference. For example, production of a familiar term for a known object is typically followed by a part term accompanied by a possessive pronoun (as in *his ear*), whereas such expressions as *is a kind of* or *is a* are associated with assignments to class membership in a superordinate category (Clark and Wong, 2002; Saylor and Sabbagh, 2004). Use of a verb like *looks* or *feels* (as in *it looks smooth, it feels soft*) often accompanies the introduction of property terms, and when the unfamiliar term is introduced before the

familiar one with *kind of* (*a spaniel is a kind of dog*), the child readily infers that the new term, here *spaniel*, designates a subordinate category. Finally, children as young as age 2 rely on a combination of syntax cues and physical co-presence in identifying generic noun phrases; for example, when asked something like *What noise do dogs make?* with just one dog in sight.

What these findings indicate is that even very young children are highly attentive to the locus of joint attention and to whatever is co-present physically and conversationally. When one adds in whatever linguistic knowledge children have already built up about word meanings and constructions, it becomes clear that they have an extensive base from which to make inferences about possible, plausible meanings of unfamiliar words. This holds whether the words are presented explicitly as 'new' by adult speakers or whether children simply flag them *en passant* as unfamiliar and therefore in need of having some meaning assigned.

At the same time, young children may have a much less firm grasp on the meanings of many of their words than adult speakers, and incidental or even irrelevant pragmatic factors may affect their interpretations and responses. Take the case of the Piagetian conservation task where the experimenter 'checks up' on the 5- or 6-year-old near-conserver's answer by asking, for the second time, whether the amount that has just been transferred to a new container or transformed into a different array "is still the same." Children on the verge of conserving typically change their initially correct answers from 'yes' to 'no' at this point. They do so because, pragmatically, asking the same question a second time signals that the initial answer was unsatisfactory (Siegal, 1997).

Another Approach

In another approach to the acquisition of lexical meaning, some researchers have proposed that the task is so complex for young children that they must start out with the help of some *a priori* constraints. These constraints are designed to limit the kinds of meanings children can attribute to new words. What form would these constraints take, and what evidence is there for them?

Among the constraints proposed are whole object – 'Words pick out whole objects' – and mutual exclusivity: 'Each referent is picked by just one word' (e.g., Markman, 1989). The whole object constraint predicts that young children should assume that any unfamiliar word picks out a whole object and not, for example, a part or property of that object. The mutual exclusivity constraint predicts that young children should assume that an unfamiliar word must pick out something other than whatever has a name that is already known to the child. So this constraint predicts that children will systematically reject second terms they hear apparently applied to an already labeled referent, as well as fail to learn second terms.

The predictions from these and other constraints have been tested in a variety of word-learning experiments where the target referents are objects. In fact, the whole object and mutual exclusivity constraints apply only to words for objects, so they would have infants treat all unfamiliar words as if they designated only objects and never actions, relations, or properties. How do such constraints work, as they conflict with many properties of word meanings? For example, mutual exclusivity would cause children to not learn inclusion relations in taxonomies because they would need to apply two or more terms to the same referent category in learning that an X can be called a *dog*, specifically a subtype called a *spaniel*, and that a dog is also a kind of *animal*. The whole object constraint would cause children to not learn terms for parts and properties. It would militate against children learning any terms for activities or relations.

One could propose that such constraints apply only in the early stages of acquisition, after which they are overridden. However, then one has to specify what leads to their being overridden; in other words, what the necessary and sufficient conditions are for each constraint to be dropped so children can start to learn words for activities and relations, say, from adult usage, or words for parts and properties, as well as words for objects. Under this view of meaning acquisition, children could start out observing the various constraints and then drop each one at a certain stage in development so as to be able to learn other kinds of meanings up to then blocked by the constraints. In short, children should at first ignore much of what their parents say about words and word meanings and reject second labels whenever they are offered to mark a different perspective, for example. They should also look for words only to pick out objects, mistakenly assigning any that might, in context, seem to be designating categories of actions or relations as words for objects instead.

Is this a realistic picture of development? No, because it calls for selectively ignoring or rejecting a large amount of what adults do with language as they talk about the world to their children, offer them words for objects and events in the locus of joint attention, and provide extensive commentary on parts, properties, motion, and functions associated with specific category members. The constraints approach ignores conditions imposed on conversational

exchanges, such as joint attention, and physical and conversational co-presence, and what they contribute to assigning meaning. It also conflicts with adult usage, which offers a range of perspectives on specific objects and events. A piece of fruit can be just that, *fruit*, or it can be *an apple, dessert*, or *a snack*, depending on the perspective chosen (Clark, 1997). Yet, these factors must all be taken into account in both designing and interpreting studies of meaning acquisition.

Sources of Meanings

Children draw on conceptual categories already known to them and on information offered in context, both nonlinguistic and linguistic, when they assign a first meaning to new words. Infants build up and organize conceptual categories of the objects, relations, and events they observe months before they try to use words to evoke the relevant categories. As they assign candidate meanings, they rely on these conceptual categories to connect category instances and words as they start in on language (Slobin, 1985). However, because languages differ, children learn, for purposes of talking, to attend automatically to some aspects of events and ignore others; for example, whether an action is complete or not or whether the speaker witnessed an event for herself or simply heard about it. It is therefore important to distinguish between conceptual knowledge about events and the knowledge speakers draw on when they talk about those events (Slobin, 1996).

Children try to make sense of what the adult wants. This means relying on any potentially useful source of information for interpreting and responding to adult utterances. What children know about the conceptual categories that appear to be at the focus of joint attention seems to provide initial strategies for coping when they do not yet understand all the words. The physical and conversational contexts, with joint attention, identify the relevant 'space' in which to act. This holds just as much for responding to half-grasped requests as for direct offers of unfamiliar words. Children attend to what is physically present, to any familiar words, and to any conceptual preferences. These preferences may include choosing greater amounts over lesser ones, assuming that the first event mentioned is the first to occur, and exchanging one state of affairs for another (Clark, 1997). Such coping strategies may be consistent with the conventional meanings of certain words, so children will appear to understand them when in fact they do not. The match of coping strategies and meanings offers one measure of complexity in acquisition: Matches should be simpler to acquire than cases of mismatch.

Children can draw on what they already know about objects and events, relations, and properties for their world so far. Their current knowledge about both conceptual categories and about their language at each stage offers potential meanings, in context, assignable to unfamiliar words. These preliminary meanings can be refined, added to, and reshaped by adult usage on subsequent occasions. This way, children learn more about the meanings that abut each word, the contrasts relevant in particular semantic domains, and the number of terms in a domain that have to be distinguished from one another. To succeed in this effort, children have to identify consistent word uses for specific event-, relation-, and object-types. They have to learn what the conventions are for usage in the speech community where they are growing up (e.g., Eckert, 2003).

Summary

As children learn new words, they rely on what they know so far – the conceptual and linguistic knowledge they have already built up – to assign them some meaning in context. These initial meanings draw equally on their own conceptual categories and on adult patterns of word use within the current conversational exchange. In effect, joint attention, along with what is co-present physically and conversationally, places pragmatic limits on what the meaning of an unfamiliar word is most likely to be. In addition, adults often provide further information about the referent object or action, linking the word just offered to other words for relevant properties and actions, and thereby situating the new word in relation to terms already known to the child. This framing by adults for new word meanings licenses a variety of inferences by the child about what to keep track of as relevant to each particular word meaning (Clark, 2002). Adults here are the experts and constitute both a source and resource for finding out about unfamiliar word meanings.

See also: Brown, Roger William (b. 1925); Cognitive Semantics; Context and Common Ground; Cooperative Principle; Cross-Linguistic Comparative Approaches to Language Acquisition; Developmental Relationship between Language and Cognition; Gestures: Pragmatic Aspects; Grice, Herbert Paul (1913–1988); Language Development in School-Age Children, Adolescents, and Adults; Language Development: Overview; Lexical Semantics: Overview; Lexicalization; Lexicon: Structure; Pragmatic Determinants of What Is Said; Sense and Reference: Philosophical Aspects; Slobin, Dan Isaac (b. 1939); Social Aspects of Pragmatics; Social-Cognitive Basis of Language Development; Word Formation.

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Meaning: Overview of Philosophical Theories

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The Direct Reference Theory

It is obvious that an important fact about language is that bits of it are systematically related to things in the world. 'Referential' theories of meaning hold that the meaning of an expression is a matter, somehow, of this connection.

The most immediately plausible application of this theory is to the meaning of proper names: the name 'Benedict Spinoza' is connected to the philosopher, and this fact appears to exhaust the meaning of that name. The other names – 'Benedictus de Spinoza,' 'Baruch Spinoza,' and 'Benedict d'Espinosa' – mean the same because they are connected to the same person.

But even in the case of proper names, problems arise. For example, consider proper names with nonexistent references: 'Santa Claus.' If the meaning of a proper name is constituted by nothing but its relationship to the bearer of that name, then it follows that 'Santa Claus' is meaningless; but this seems wrong, because we know perfectly well what 'Santa Claus' means, and we can use it perfectly well, meaningfully. Another example would be the two proper names applied to the planet Venus by the Ancient Greeks, who were unaware that it was the same planet that appeared sometimes in the evening sky, when they called it 'Hesperus' and sometimes in the morning sky, when they called it 'Phosphorus.' Because these two names in fact refer to one and the same object, we should count them as having exactly the same meaning. It would appear to follow that someone who knew the meaning of both names would recognize that the meaning of one was exactly the same as the meaning of the other, and therefore would be willing to apply them identically. But the Greeks, when seeing Venus in the morning sky, would apply 'Phosphorus' to it, but refuse to apply 'Hesperus.' Does it follow that they did not fully understand the meanings of those terms? That is an implausible conclusion, since these are terms of the ancient Greek language: how could the most competent speakers of that language fail to understand the meanings of two terms in that language? It looks much more plausible to say that the fact that Hesperus and Phosphorus are identical is not a consequence of the meanings of those words. So meaning is apparently not exhausted by reference. (This example and this argument were originated by Frege.)

But here is a second sort of difficulty for the reference theory. Even if it could do a plausible job of explaining the meaning of proper names, it is not at all clear what it should do with other elements of language. Proper names, after all, make up only a small part of language, and an atypical part, insofar as meaning is concerned, at that; one does not find them in most dictionaries, for example.

Consider whether this sort of approach to meaning might be extended to linguistic items other than proper names. It is a short step from there to more complex, less direct ways of referring, for example, 'the Amsterdam-born author of the *Ethics*.' If this definite description gets its meaning by its reference, then since it refers to Spinoza again, it must mean the same as those other names. But a problem immediately arises here, similar to the 'Hesperus/Phosphorus' worry. One might understand the meaning of 'Benedict Spinoza' perfectly, it seems, without knowing some facts about the philosopher, for example, that he was born in Amsterdam and wrote the *Ethics*; and, as a result, although one understood 'the Amsterdam-born author of the *Ethics*' he or she would not know that this referred to Spinoza. A similar problem arises with the 'Santa Claus' worry: 'the present king of France' is surely meaningful, although it is without reference (Russell's famous example).

Still other linguistic elements provide greater difficulty for a reference theory. How, for example, is the meaning of the predicate 'is wise,' occurring, for example, in 'Spinoza is wise,' to be explained in terms of reference? Particular wise objects exist, to be sure – Spinoza for one. But clearly it is not helpful to think that 'is wise' here gets its meaning merely by referring to Spinoza again – which would add nothing – or to some other wise person – which seems irrelevant. And what if that sentence were false (but meaningful), and Spinoza were not among the wise things: what would 'is wise' refer to then? More likely 'is wise' refers to a set of things – the wise individuals (Spinoza, Socrates, Bertrand Russell, etc.). But the sentence clearly tells us more than that Spinoza belongs to the group Spinoza, Socrates, Bertrand Russell, etc. It refers not to that group, it seems, but rather to the property that is necessary for inclusion in that group: wisdom. It is controversial whether we really need to populate our universe with strange objects such as 'properties' and 'universals'; but, in any case, even if they do exist, it's not clear that ordinary predicates refer to them. For example, 'wisdom' may be the name of a particular thing, referred to in the sentence, 'Wisdom appeals to Francine,' but it is much less clear that this thing is

referred to in the sentence 'Spinoza is wise.' A similar difficulty is posed by common nouns, e.g., 'philosopher.' It does not seem that we could explain the meaning of this element in the sentence 'Spinoza is a philosopher' by claiming reference to a particular philosopher, the class of philosophers, or philosopher-ness.

Furthermore, reference has nothing to do with grammatical structure, which one would think is an important part of the meaning of any sentence. These two sentences, 'Jane loves John' and 'John loves Jane,' make the same references (to Jane, John, and loving, perhaps) but they surely mean something very different. A sentence conveys more than a series of references. It does not merely point at Jane, John, and the property of loving; in addition, it makes the claim that Jane loves John (or vice versa).

Meaning as Truth Conditions

Perhaps a more promising way to extend the reference theory for common nouns, predicates, and other linguistic elements is to think of them as functions. Consider the analogy with arithmetic: 5, 13, −9, and so on are the names of numbers (whatever they are), but $x/3 = 9$ is a function from numbers to a 'truth value.' With '27' as the argument, its value is TRUE. With '16' as the argument, its value is FALSE. Its meaning consists in the systematic way in which it pairs arguments with truth values. Now consider the systematic way 'x is wise' relates arguments to truth values. Substitute the proper name of certain things (any of the wise things) and the value is TRUE. Substitute the proper name of other things and the value is FALSE. The systematic way in which arguments and values are related in this case (it seems) exhausts the meaning of 'is wise.' Philosophers have proposed similar ways to deal with other linguistic elements. For example, adverbs might be regarded as functions taking a predicate as 'argument' and yielding a predicate as 'value.'

This amendment in the spirit of the direct reference theory considerably extends its power and explains the function, basically in terms of reference, of various parts of language that do not by themselves refer. Partially because some of the functions in this approach have TRUE and FALSE as values, it was proposed that these truth values be considered the referents of sentences. (This move has seemed implausible to many, however: what are these things called truth values?)

In the 1930s, Alfred Tarski proposed a definition of 'truth' that some philosophers thought would be the basis of a good theory of meaning. Tarski's proposal was that what would constitute a definition of TRUE for a language *L* would be a complete list of statements giving the truth conditions for each of the sentences in *L*. So one of these statements defining truth-in-English would be '*Snow is white' is true in English if and only if snow is white*. (This may appear ludicrously trivial, because the sentence whose truth conditions are being given, and the reference to the truth condition itself, are in the same language. Of course, if you did not know what made 'Snow is white' true, this statement would not tell you. But that is not a problem with Tarski's view in particular: no statement of a theory would be informative to somebody who didn't speak the language in which the theory was stated.)

Now, when we know the truth-conditions for a sentence, then do we know its meaning? Once you know, for example, what it takes to make 'Snow is white' true, then, it seems, you know what that sentence means. And what it takes, after all, is that snow be white.

Obviously what one learns when one learns the meaning of a language cannot be the truth conditions of each sentence in the language, one at a time, because there are an infinite number of sentences. What is learned must be the meanings of a finite number of elements of sentences, and a finite variety of structures they go into. In the Tarskian view, then, the semantic theory of a language consists of a large but finite number of elements (words, perhaps), together with composition rules for putting them together into sentences and information sufficient for deriving the truth conditions for each of a potentially infinite number of sentences.

One might object that this elaborate theory could not be what people know when they know what their language means. But perhaps providing this is not the purpose of a semantic theory (or a theory of anything). Baseball players are adept at predicting the path of a ball but only rarely are familiar with Newtonian theory of falling bodies.

The idea here is attractive. If you know what sort of world would make a sentence true, then it seems that that is all it would take for you to know what that sentence means. This idea (though not particularly through Tarski's influence) was the basis of the 'logical positivist' theories of meaning and of meaningfulness. Logical positivists enjoyed pointing out that Heidegger's famous assertion "*Das Nicht nichtet*" ('The nothing nothings') was associated with no particular ways the world might be that would make it either true or false, and concluded that this statement, along with many others in metaphysics (e.g., McTaggart's assertion that time is unreal), were meaningless. But it seemed that baby and bathwater alike were being flushed down the drain. Coupled

with a rather narrow and ferocious empiricism, this criterion ruled out as meaningless a number of assertions that were clearly acceptable. What empirical truth conditions are there **now** for statements about the past, or for assertions about invisible subatomic particles? But this may be a problem more about the logical positivists' narrow empiricism than about their theory of meaning/meaningfulness. More germane here is the problem that many perfectly meaningful sentences have no truth conditions because they're neither true nor false: 'Please pass the salt,' for example.

Sense and Reference

Because of the Hesperus/Phosphorus problem mentioned above, Frege rejected the idea that the meaning of an expression is the thing it refers to. So Frege distinguished the thing to which a symbol referred (in his words, the *Bedeutung*, the 'referent' or 'nominatum') from what he counted as the meaning (the *Sinn*, usually translated as the 'sense') of the symbol, expressed by the symbol. The sense of a symbol, according to Frege, corresponded to a particular way the referent was presented. It might be called the 'way of thinking about' the referent. While his theory separated meaning from reference, nevertheless it can be considered a 'mediated reference theory': senses are ways a reference would be encountered, ways of getting to things from the words that refer to them. But it is the reference of included terms, not their sense, that determines the truth value of the sentence.

Frege's approach led him to a problem with sentences such as these:

(1) Fred said, "Venus is bright tonight."
(2) Fred believes he's seeing Venus.

Both sentences include examples of 'opaque context,' a part in the sentence in which substitution of a co-referring term can change the truth value of the sentence. In each of these sentences, substituting 'the second planet from the sun' for 'Venus' may make a true sentence false, or a false one true. In (1), an example of 'direct discourse,' if Fred's very words did not include 'the second planet from the sun,' then that substitution can make a true sentence into a false one. That substitution in (2) may result in a false sentence if Fred believes that Venus is the third planet from the sun. Frege's solution to this problem is to stipulate that in direct discourse – word-for-word quotation – the expression quoted refers to 'itself,' rather than to its usual referent (in this case, Venus). And in belief contexts and some other opaque contexts, expressions refer to their 'senses,' not to their usual referents.

But what, exactly, are these 'senses'? First, it is clear that Frege did not intend them to be the ideas anybody associates with words. Frege's 'senses' are objective: real facts of the language whose conventions associate senses with its symbols. One may have any sort of association with a bit of language, but the conventions of the language specify only certain of them as meaning-related. (Therefore, Lewis Carroll's Humpty Dumpty does not succeed in meaning 'There's a nice knock-down argument for you' with 'There's glory for you,' even though he insists "When I use a word it means just what I choose it to mean – neither more nor less.") But why not admit that in addition to the public languages there can be 'private' ones with idiosyncratic senses? More will be said about this later.

But second, neither can 'senses' be characteristics of the things referred to: for then, whatever is a sense of 'Hesperus' would be a sense of 'Phosphorus.' Furthermore, there appear to be symbols in a language that have sense but no reference: 'the present king of France' and 'Atlantis' are examples. Reference-less terms pose a problem for Frege. Should he consider them words with sense but no reference? If so, then how can they figure in sentences with a truth-value? (This is similar to the 'Santa Claus' problem.)

A promising approach seems to be to say that the sense of a term 'T' consists of those characteristics judged to be true of things that are called 'T' by competent speakers of the language. But this immediately creates a problem with proper names. If ordinary proper names have senses – associated characteristics that are the way of presenting the individual named, associated conventionally with that name by the language – then there would be corresponding definitional (hence necessary) truths about individuals referred to by proper names. But this is problematic. The sense of a name applying to one individual cannot be the sense of the name of any other individual, because senses are the way terms pick out their designata. So the characteristics associated with a name would have to constitute that individual's 'individual essence' – characteristics uniquely and necessarily true of that individual. But many philosophers have doubted that there are any such characteristics. Even if we can find characteristics that uniquely designate an individual, Kripke (1972) influentially argued that these characteristics are never necessary. Suppose, for example, that 'Aristotle' carries the sense 'Ancient Greek philosopher, student of Plato, teacher of Alexander the Great.' It would follow that this determined the referent of 'Aristotle'; so if historians discovered after all that no student of Plato's ever taught Alexander the Great, then 'Aristotle' would turn out to be a

bearer-less proper name, like 'Santa Claus.' But this is not how the proper name would work. Instead, we would just decide that Aristotle did not teach Alexander after all. Kripke argues that all sentences predicating something of a proper-named individual are contingent, so proper names do not have senses. But, of course, they are meaningful bits of language.

This problem may apply even more broadly than merely to proper names. Consider the meaning of the term 'water.' Back before anyone knew the real properties of what made water water – i.e., its chemical constitution – competent speakers applied the term to any colorless, odorless liquid. But they were sometimes wrong, because the characteristics then used to distinguish proper and improper applications of the term, although they happened to pick out water on the whole, were not the genuinely necessary and sufficient conditions for something to be water at all. In those days, then, the real sense of the word was totally unknown and unused by any competent speaker of the language.

Quine argued that Frege's senses lack what is necessary for well-behaved theoretical objects. We have no idea, for example, of their identity conditions: is the sense of this word the same as the sense of that? More about Quine will be discussed in the final section of this article.

The Idea Theory

The theories discussed so far consider what linguistic elements mean, but other classical theories have concentrated on what people mean by bits of language.

Words, Locke argued, are used as 'sensible marks' of ideas; the idea corresponding to a word is its meaning. This has a certain amount of intuitive plausibility, in that non-philosophers think of language as a way of communicating ideas that is successful when it reproduces the speaker's idea in the hearer's mind.

The 'idea theory' of meaning received its fullest expression in conjunction with British Empiricist epistemology. For the classical empiricists, our ideas were copies of sense-impressions – presumably similar to the sense experiences themselves, except dimmer. These mental representations served us as the elements of thought and provided the meanings for our words.

However, problems with this theory are obvious. For one thing, not every such association is relevant to meaning. For example, the word 'chocolate' makes me picture the little shop in Belgium where I bought an astoundingly impressive chocolate bar. But although one might want to say, in a sort of loose way, that that's what 'chocolate' means to me, it doesn't seem to be a real part of the word's meaning. Someone else could be completely competent in using that word without any mental pictures of Belgium.

Also, there are some meaningful terms that seem to be associated with no mental imagery, for example, 'compromise.' The problem of the meaning of 'unicorn' is solvable: images of a horse's shape and an antelope's horn can be mentally pasted together to provide a representation; but there are other problems. My image of my cat Tabitha might picture her facing right; but I'm to use this also to identify her as the bearer of that name when she's facing left; so the mere association of a word with an image is not enough to give that word meaning. There must also be some procedure for using that image. Common nouns ('dog') could stand for any and all dogs, whereas the meaning of 'dog' was presumably a particular image of a particular dog. More of a theoretical mechanism is needed to explain why this image stands for Fido and Rover but not for Tabitha. And other sorts of words – logical words, prepositions, conjunctions, etc. – raise problems here too: how could sensory experiences be the source of **their** meaning?

A more recent concern about the idea theory arose from the fact that the ideas that gave bits of language their meaning were private entities, whereas the meanings of a public language were presumably public. Clearly I would learn the word 'cat' by hearing you use the word in the presence of cats, but not in their absence; but according to the idea theory, I would have learned it correctly when my private image matches yours – something that is impossible for either of us to check. What we can check – identical identifications of objects as cats and non-cats – does not ensure identical private imagery and (according to the idea theory) has nothing directly to do with the meaning we invest 'cat' with anyway. Wittgenstein's 'private language argument,' deployed against the idea theory, was considered devastating by many philosophers. Very briefly put, this argument is that the meaning of a public bit of language could not be given by a supposedly necessarily private item, such as a mental representation, because this would make impossible any public check – any real check at all – on whether anyone understood the meaning of a term; and without the possibility of a check, there was no distinction between getting the meaning right and getting it wrong.

Meaning as Use

Wittgenstein's hugely influential suggestion was that we think instead of sentences as "instruments whose senses are their employments" (1953: 421). Starting in the 1930s and 1940s, philosophers began thinking

of the meaning of linguistic items as their potential for particular uses by speakers and attempting to isolate and describe a variety of things that people do with words: linguistic acts, accomplished through the use of bits of language. One clear theoretical advantage of this approach over earlier ones was its treatment of a much wider variety of linguistic function. Whereas earlier approaches tended to concentrate on information giving, now philosophers added a panoply of other uses: asking questions, giving orders, expressing approval, and so on. This clearly represented a huge improvement on the earlier narrower views, which tried to understand all the elements of language as signs – representations – of something external or internal.

Austin distinguished three kinds of things one does with language: (1) the 'locutionary act,' which is the utterance (or writing) of bits of a language; (2) the 'illocutionary act,' done by means of the locutionary act, for example, reporting, announcing, predicting, admitting, requesting, ordering, proposing, promising, congratulating, thanking; and (3) the 'perlocutionary act,' done by means of the illocutionary act, for example, bringing someone to learn x, persuading, frightening, amusing, getting someone to do x, embarrassing, boring, inspiring someone. What distinguishes illocutionary acts is that they are accomplished just as soon as the hearer hears and understands what the utterer utters. It is clear that the illocutionary act is the one of these three that is relevant to the meaning of the utterance. The performance of the act of merely uttering a sentence obviously has nothing to do with its meaning. Neither does whatever perlocutionary act is performed: you might bore someone by telling her about your trip to Cleveland or by reciting 75 verses of *The fairie queen,* but the fact that both of these acts may serve to bore the hearer does not show that they are similar in meaning. But similarity in meaning is demonstrated by the fact that two different locutionary acts serve to accomplish the same illocutionary act. For example, 'Do you have the time?' and 'What time is it, please?' perform the same illocutionary act (a polite request for the time) and are thus similar in meaning.

However, this approach does not deny that what the other theories concentrated on is a significant part of language. In Austin's classification, one part of many locutionary acts is an act of referring; when I say, "Aristotle was the student of Plato," I'm probably performing the illocutionary act of informing you, but I'm doing that by means of the locutionary act of referring to Aristotle and Plato. And clearly many linguistic acts include 'propositional content': one reports, announces, predicts, admits, requests, orders, proposes, promises, and so on, 'that p,' so it seems that inside this theory we would need an account of the way any of these linguistic acts correspond to actual or possible states of the world.

A recent influential theory from Donald Davidson responds to these needs by combining, in effect, speech act theory with Tarskian semantics. According to Davidson's proposal, the list of truth conditions for each assertion in a language provides an account of the language's semantics – at least, of the propositional content of sentences in the language: what a statement, prediction, assertion, question, etc., states, predicts, asserts, asks, etc. This explains what is shared by 'The light is turned off,' 'Turn off that light,' 'Is the light turned off?' and so on. But secondly, according to Davidson, a theory of meaning needs a 'mood indicator' – an element of the sentence that indicates the use of that sentence – e.g., as a statement, request, or question.

Quine's Skepticism

Quine's skepticism about meanings was among the most important 20th-century developments in the philosophy of language. Here is one way of approaching his position. Imagine a linguist trying to translate a tribe's language. Suppose that the tribesmen said "*gavagai*" whenever a rabbit ran past. Does '*gavagai*' mean 'lo, a rabbit!'? The evidence might as well be taken to show that '*gavagai*' asserts the presence of an undetached rabbit part, a temporal slice of a rabbit, or any one of a number of other alternatives, including even 'Am I ever hungry!' or 'There goes a hedgehog!' (if the tribesmen were interested in misleading you). Quine called this the 'indeterminacy of translation.' But, we might object, couldn't further observation and experimentation decide which of these alternatives is the right interpretation? No, argued Quine, there are always alternatives consistent with any amount of observation. But, we might reply (and this is a more basic objection), what that shows is that a linguist never has absolutely perfect evidence for a unique translation. This is by now a familiar (Quinian) point about theory: theory is always to some extent undetermined by observation. In any science, one can dream up alternative theories to the preferred theory that are equally consistent with all the evidence to date. But in those cases, isn't there a right answer – a real fact of the matter – which, unfortunately, we may never be in a **perfect** position to determine, because our evidence must always be equivocal to some extent? At least in the case of meaning, argued Quine, the answer is no, because for Quine, linguistic behavior is all there is to language, so there are no hidden facts about meaning to discover, with linguistic behavior as evidence. So

meanings are not given by ideas in the head, Fregean senses, or anything else external to this behavior.

A similar sort of position was argued for more recently by Kripke (1982). Imagine that someone – Fred – has used a word 'W' to refer to various things, A, B, and C. Now he encounters D: is that referred to by 'W'? One wants to say: if D is like A, B, and C, then Fred should go on in the same way and apply 'W' to D. But Kripke argues that there is no fact about Fred's intentions or past behavior – no fact about what he means by 'W' – that would make it correct or incorrect for him to apply 'W' to D. Neither is there, in the external world, a real sufficient (or insufficient) similarity of D to A, B, and C that make it correct (or incorrect). The only thing that would make that application correct or incorrect is what a community of speakers using that word would happen to agree on.

But does anti-realism about meaning really follow from these considerations? Suppose that Quine and Kripke are right, and all there is to language is social behavior. But maybe this does not imply that meanings are unreal. When we consider an action as social behavior, after all, we do not think of it (as Quine, in effect, did) merely as bodily movements. There are facts about the social significance of the behavior, above and beyond these movements, that give the movement its social significance. Perhaps it is these facts that would make one linguistic theory rather than another correct – that determine the meaning of the noises made by Quine's natives, and whether Fred is following the linguistic rule when he applies 'W' to D. Language is a tool we know how to use, and the real meaning of our utterances is what we know when we know how to use that tool.

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Direct Reference; Empiricism; Empty Names; Expression Meaning versus Utterance/Speaker Meaning; Ideational Theories of Meaning; Indeterminacy, Semantic; Intention and Semantics; Mood, Clause Types, and Illocutionary Force; Nominalism; Private Language Argument; Proper Names: Philosophical Aspects; Radical Interpretation, Translation and Interpretationalism; Realism and Antirealism; Reference: Philosophical Theories; Rigid Designation; Sense and Reference: Philosophical Aspects; Speech Acts; Thought and Language: Philosophical Aspects; Truth Conditional Semantics and Meaning; Use Theories of Meaning; Use versus Mention.

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Meaning: Pre-20th Century Theories

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Early Theories of Meaning

The problem of the basis on which linguistic signs mean something and can designate real objects or relations is a central subject of theories of language. The starting point of debates on this matter might be the dialog *Cratylus* by Plato (428/7–349/8), in which two opposite positions are contrasted: the conventionalist position (*thesei*), which ascribes the imposition of names to a voluntary convention between people, and the naturalist position, which supposes a natural denomination of an object depending on its properties (*physei*). Plato introduced Socrates (470/69–399) as a mediator between these two positions and presented them as complementary.

For Aristotle (384/3–322), names are *kata syntheken*: unlike the unarticulated sounds of animals, they are historically imposed. The Aristotelian concept of the sign, which corresponds to the notion of arbitrariness in later theories, implies semantic function as well as the relation between the name and the designated reality. During the following centuries, several changes brought to the fore this relation between sounds and objects and its genetic explanation and partially disregarded the question of how signs mean something. The idea that linguistic signs were not naturally motivated, but invented by voluntary imposition, found different expressions (*non natura sed ad placitum, ex arbitrio, arbitrarius, willkürlich, arbitraire, arbitrary*).

The explanation of the semantic function could then concentrate on the description of this voluntary imposition. For the medieval authors of *modi significandi* a sound (*vox*) became a word by its meaning (*ratio significandi*). The bilateral character of the linguistic sign was expressed in this context by the opposition of *significatum* and *quod significatur*, which appeared in several variations (Thomas of Erfurt, *Grammatica speculativa*, I, §3: *signum, vel significans*; Martinus de Dacia: *res designata/vox significans*).

The relation between both sides of the linguistic sign was presented as a problem by nominalist theories. The Logic of William of Ockham (1285?–1349?) was mainly based on semantic observations of expressions that have meanings. The signification, corresponding to the result of the previous formation of concepts, was differentiated into suppositions concerning the actual and contextual relation of a sentence. In this manner, the *significatio* as a potential of meaning was opposed to the *suppositio*, the actualized meaning. This consideration of meaning by the nominalists implied a higher degree of independence of meaning with regard to reality.

The doctrine of St. Augustine (354–430) led to another conception of meaning and its relation to reality. A main tenet of the Augustinian rationalist doctrine was the merely spiritual nature of all notions and of the relations between them. The denotation of a term was regarded as a mental object that could only have a representational relation to the word and could not depend on linguistic signs and their corporeal nature. The form words obtain in the different languages was regarded as arbitrary, whereas the composition of the concept was universal and did not depend on sensations. For the rationalist thinkers, the necessity of language appeared only with communication between people when the transmission of pure incorporeal notions was impossible. But linguistic signs met the necessities of communication in a very insufficient way because intuitive conceptions overwhelmed our mind, whereas their linguistic signs distracted from their content and slowed down the process of thinking. Although words had different forms in different languages, the ideas designated were neither Greek nor Latin but universal and independent of any sensual support.

This rationalist theory limited the impact of language on cognition and, in the same way, the trustworthiness of sensory cognition. But in some authors we find the opposite perspective. Let us mention the Spaniard Luis de León (1527–1591), who wanted to achieve knowledge about the nature of religious concepts by studying the denominations of Christ in the Bible. The basis of his *De los nombres de Cristo* was a semantic theory that supposed a capacity of representation of the denominated (*nombrado*) by the name (*nombre*) in cognitive processes.

By the separation of the original status of language from the development of historical languages, the validity of the biblical doctrine on the origin of language was clearly established and the possibility of reflection on arbitrary signs based on human reason was opened.

Intension and Extension in Port-Royal Logic

The Grammar (1660) and the Logic (1660) of Port-Royal took up and developed semantic concepts that exercised an important influence on the further development of semantic theories. The authors of the Port-Royal Logic, Antoine Arnauld (1612–1694) and

Pierre Nicole (1625–1695) treated the problem of the arbitrary sign in its complexity, regarding words not as natural (*signes naturels*) but as conventional signs that functioned as grounded on tradition (*signes d'institution et d'établissement*). But the establishment of a convention presupposed the existence of already formed ideas, which could be denominated by words chosen conventionally.

The primacy of thought set prerequisites for the interpretation of arbitrariness. What could be regarded as arbitrary were not ideas themselves but only the attribution of sounds to these ideas, which would exist even without them. The meanings of the linguistic signs did not appear in the moment of their conjunction with sounds but, rather, they existed as clear and reasonable ideas and were independent of their denomination. The fact that convention varied in different languages could prove easily that it had nothing to do with the nature and formation of ideas. But this conclusion, which derived from the rationalist thesis of innate ideas, was not the only restriction on the arbitrariness of signs. The authors of the Logic declared that the relation between sound and meaning was only arbitrary in the individual use of language but that it was determined by common use through communication between people.

It seems remarkable that the assignment of sounds to meanings was regarded as a relation between two mental entities. The idea of the psychological nature of both sides of the linguistic sign is obviously not a product of the beginning of the 20th century.

In the examination of meaning, Arnauld and Nicole distinguished the intension (*compréhension*) and the extension (*étendue*) of a sign. By intension they meant the totality of features that constituted an idea, none of which might be taken away without destroying the idea. Extension was defined as the totality of objects, notions, and subnotions to which an idea could refer. What determined the identity of a meaning was not its reference to different objects and notions but the intension. Although it was always possible to limit the extension of a word, leaving out a feature of its intension would make it lose its identity.

The reference point for the intensional definition of meaning was language as a product and not its use in communication. The meaning was obligatory in its features and was determined by convention, whereas the extension depended on the use of the word to denote either a whole class of objects or an individual.

The discussion of the actualization of conventional signs in use leads to another distinction in the Port-Royal Logic. Arnauld and Nicole distinguished between a proper meaning (*signification propre*) and accessory ideas (*idées accessoires*). The latter derived from the dynamic character of meaning in communication in which accessory ideas were evoked. For exampal, the sentence *you have lied* has the same principal (proper) meaning as *you know that the contrary of what you are saying is true*, but it evokes the accessory ideas of insult and contempt. Accessory ideas were not ascribed to a word by common use, but they appeared in the individual use of language. Repetition could lead to generalization of such accessory ideas and, as the result of this process, accessory ideas might be linked habitually to words, especially to synonyms. But in this case, we would have to take into account the inconsistency of such accessory ideas.

The differential function of the accessory ideas was highly estimated by the authors of Port-Royal. They even demanded to explain them in dictionaries. This assertion of distinct words with similar meanings helped to prepare dictionaries of synonyms that became popular in many European countries.

Arnauld and Nicole also discussed oppositions and proposed a classification of them. They called 'divisions' such pairs of opposites that covered the whole extension of a notional field and could be related to a hyperonym (*pair/impair* → *nombre*). In cases in which the opposites were divided by a zone of indifference, they even described the field of this zone, including the antonyms in a narrow sense (Table 1). The confusion of these two types of oppositions was regarded as harmful for logical conclusions, if a person took the negation of a term as its opposite and did not take into account the zone of indifference. For a further differentiation, Arnauld and Nicole gave the terms of opposites shown in Table 2.

The Logic of Port-Royal contained a comprehensive theory of different semantic oppositions and even attempts at a systematic description of the vocabulary.

Table 1 Opposites and zones of indifference

Opposites	*Zone of indifference*
sain/malade	indisposé, convalescent
jour/nuit	crépuscule
avarice/prodigalité	libéralité, épargne louable, générosité

Table 2 Kinds of oppositions

Name of the opposition	*Examples*
Termes relatifs	père/fils, maître/serviteur
Termes contraires	froid/chaud; sain/malade
Termes privatifs	vie/mort; vue/aveuglement
Termes contradictoires	voir/ne pas voir

The Recognition of the Historical and Cultural Nature of Meaning

The Recognition of the Genius of a Language

At the end of the 17th century, the notion of the genius of the language (*génie de la langue*) became very fashionable. It appeared in systematizations of Vaugelas's *Remarques sur la langue française* by Louis Du Truc (1668), Jean Menudier (1681), and Jean d'Aisy (1685) and was taken up by grammarians and philosophers as well.

The 'Essay concerning human understanding' (1690) by John Locke (1632–1704) gave a new answer to the question of how thought could be influenced by language. According to Locke, linguistic signs did not represent the objects of knowledge but the ideas that the human subject created. The nominalist explanation of complex ideas led to the denial of innate ideas and to the supposition of a voluntary imposition of signs on a collection of simple ideas for which there was no pattern in reality. This rendered possible an extension of the concept of arbitrariness to the composition of meaning. Language was no longer regarded as a simple expression of a universal reason but as a system that organized thought following historical and social principles.

Bernard Lamy (1640–1715), who was influenced by the Port-Royal authors but found a way to integrate their theory into the assertion of a sensual basis of human cognition, remarked on the different division of lexical areas in various languages. In his Rhetoric (*La rhétorique ou l'art de parler*, 1699), he explained the quantity and differentiation of words by the attention different peoples give to some fields of knowledge. In this way, he explained the existence of more than 30 words to denote 'camels' in Arabic as well as the fact that people who cultivated the sciences and arts had a developed and highly differentiated vocabulary. Especially in the formation of diminutive and augmentative denominations, languages differed considerably: In Italian, for example, many diminutives had developed, whereas they were absent in French.

Because languages used different points of view in the denomination of things and concepts, a word-by-word translation from one language into another was nearly completely impossible. This was an opinion that was largely shared by 18th-century authors. If a person looked at the motives for the formation of words, the differences between languages became even more obvious. Lamy used an old example for the argumentation on this subject: the words for 'window' in the Romance languages that are derived from three Latin etyma. The Spanish *ventana* (< *ventus*) emphasizes the blowing of the wind, the Portuguese *janela* (< *janua*) uses a comparison with a gate, and the French *fenêtre* (< *fenestra* < Greek *φαινειν* 'to shine') uses the transmission of light. This meant that the same word, which stood for a fundamental idea, had different significations in different languages.

The Study of Metaphors

With the positive evaluation of the cognitive force of sensation and emotional speech, the problem of metaphors became more important. César Chesneau de Du Marsais (1676–1756) dedicated a digression in his book *Des Tropes ou des différents sens dans lesquels on peut prendre un même mot dans une même langue* (1730) to the study of metaphors and idioms in various languages. He started with the difficulties of translation of lexical metaphors and the lack of assistance from dictionaries. Although it was possible to find an equivalent for the proper meaning (*sens propre*) for which the word had originally been installed, it was often impossible to translate all the figurative meanings (*sens figurés*) of words. The use of words in their metaphorical meaning was not regarded as an exception. Naming an idea by a sign that was related to an associative idea was a regular case in language. In addition, the use of words in their figurative meanings could fill the gaps in vocabulary.

The French word *voix*, for example, had, in addition to its proper meaning 'the sounds emitted by the mouth of animals, and especially by human mouth,' several figurative senses: (1) 'inner inspiration or pangs of conscience' in the sentence *le mensonge ne saurait étouffer la voix de la vérité dans le fond de nos cœurs* ('the lie will not be able to suffocate the voice of truth in the deep of our hearts'), (2) 'inner sensations' in word groups such as *la voix du sang* ('the voice of blood') and *la voix de la nature* ('the voice of nature'), and (3) 'opinion, view, judgment.' Not all of these figurative meanings of *voix* could be translated by the Latin word *vox*. In the same manner, it would not be possible to translate *porter* 'to carry' by *ferre* in the case of figurative uses such as *porter envie*, *porter la parole*, and *se porter bien*. Du Marsais criticized the usual practice in French-Latin dictionaries, which gave just a series of verbs (in the case of *porter*: *ferre*, *invidere*, *alloqui*, *valere*) without mentioning the specificity of their semantic qualities. If dictionaries continued in this way, they might arrive at the explanation of *aqua* 'water' by *feu* 'fire,' simply because the cry for help regarding a fire in Latin was *aquas aquas* and in French *au feu*. From a certain referential meaning of a word, it was not possible to infer its essential semantic property. As Du Marsais

claimed, dictionaries should first of all give the *significations propres* and then explain the figurative meanings that could not be deduced from the proper one. This explanation should be given by examples and by grouping the figurative meanings according to the given state of language. But a historical explanation of figurative meanings should also be possible because all of them developed out of the proper meaning that was regarded as the original one. The manner of such a development might differ in various languages, which would lead to a complicated picture of the relations between figurative meanings of words in two languages.

In his *Fragment sur les causes de la parole,* Du Marsais arrived at an important theoretical conclusion concerning the semantic function of words. He supposed meaning to be a systematic virtual property of language and opposed it to the realizations of words and their meanings in language use. The systematic property, called la *valeur des mots* by Du Marsais, was acquired by education and contact with other people. It corresponded to an abstraction of the different senses a word might have.

The Study of Synonymy

The study of synonymy in 17th- and 18th-century linguistics did not concern just supplying different means for the expression of the same idea but mainly differentiating the meanings of synonyms and determining the exact definition of the meaning of every single word. In addition to the theoretical interest that synonyms as a simple systematic phenomenon represented, practical needs contributed to the study of synonymy. The starting point was the doctrine of a *verbum proprium*, an appropriate word for each purpose, which should be defined by its invariable semantic properties. Defining synonyms became an aristocratic game in France in the 17th century and was disseminated throughout Europe.

The most influential work was written by Gabriel Girard (1777/8–1748) (*La Justesse de la langue française, ou les différentes significations des mots qui passent pour synonymes*, 1718; *Synonymes français, leurs significations et le choix qu'il faut en faire pour parler avec justesse*, 1736). Girard declared explicitly that the language of a certain state formed a system, despite the unsystematic character of the formation of languages. In this context, he defined the *valeur* of a word as its correct meaning, which corresponded to the current use in the language. He started from a rationalistic position and supposed that ideas were independent of language and only had to be denominated by words. The *valeur* of a word consisted in the representation of ideas that the language use had related to it, and therefore it was determined by a social convention or an explicit individual imposition.

But in the description of synonyms, Girard mainly regarded the differences of their values. Following his approach, synonyms were words that expressed a common idea but were distinctive in the expression of accessory ideas. The similarity of their meanings did not encompass the whole area of their significations. The accessory ideas gave a special and proper character to every synonym and determined its correct use in a certain situation.

The richness of a language was therefore not only determined by a multitude of words but by the distinctions between their meanings and by precision in the expression of simple and complex ideas. In Girard's system of synonyms, only the *valeur* counted, and it was described by the relations of a synonym to words with similar significations. He rejected the opinion that synonyms should only help to avoid monotony by variation in sound.

In the practical distinction of synonyms, Girard presented the similarities and distinctions of synonyms using the *genus proximum–differentia specifica* scheme of antiquity and scholasticism. He tried not to create differences that could not be observed in language use; however, in many cases he attempted to establish a logical relation between synonyms, for example, a gradation (*ordinaire, commun, vulgaire, trivial*), a purpose-means relation (*projet – dessein*), or causal relations (*réformation – réforme*).

Girard's description of complex lexical structures showed that the term *synonymy* could be used in 18th-century texts for lexical fields and their structure. The words designated as synonyms could be different in their intension and extension, showed use restrictions, or entered into various oppositions. On this basis, Girard distinguished the elements of the semantic field of intellectual qualities, establishing semantic compatibilities and determining features of meaning for every word. Apart from a substantial description of the meaning of words, Girard also supplied oppositions, such as:

esprit – bêtise
raison – folie
bon sens – sottise
jugement – étourderie
entendement – imbécilité
conception – stupidité
intelligence – incapacité
génie – ineptie

In Girard's doctrine, the value (*valeur*) of a word is a use-independent semantic property that could be

described by its relations to other words. In the use of language, it allowed different significations to be produced.

Girard's approach was widely disseminated in Europe. It was used, for example, by Johann August Eberhard (1730–1809) in his *Synonymisches Handwörterbuch der deutschen Sprache für alle, die sich in dieser Sprache richtig ausdrucken wollen* (1802). In Spain, synonymy became an important field of discussion, as expressed in works such as the *Ensayo de los synonimos* by Manuel Dendo y Avila (1756).

Condillac's and the Idéologues' Semantics

Etienne Bonnot de Condillac (1714–1780) formulated a coherent sensationalist theory of cognition by substituting for Locke's dualist explication of sensation and reflection the concept of transformed sensation (*sensation transformée*), which helped to explain even complex thought as being made up of simple sensations. The instrument allowing this transformation was language, to which Condillac attributed an important role in human thought. The signs of human language operated according to the principle of analogy, which corresponded to a motivated relation between signs of analogous content.

Instead of *signes arbitraires,* and in order to emphasize the genetic character of language, Condillac used the term *signes d'institution*, finally preferring in his Grammar (1775) the denomination *signes artificiels*. An arbitrary relation existed not only between sounds and the ideas related to them but in the composition of complex ideas. This arbitrariness was relativized by the long historical process of imposition of signs, in which a language evolved its specific shape or genius. This specificity concerned the functions of languages as analytic means and it became important in the discussions of the Ideologues of the end of the 18th century.

The linguistic ideas of the Idéologues have mainly been studied in relation to theories they took up and modified, as well as from the point of view of the continuation of their legacy by later linguistic theorists. Whether the Idéologues really were representatives of a transitional thinking that rendered possible the explication of the school grammar categories of the 19th and 20th centuries has also been discussed. They were considered, moreover, as the starting point and the background for several theoreticians, for example Wilhelm von Humboldt (1767–1835) and Ferdinand de Saussure (1857–1913), for whom language was, above all, an instrument of the articulation of thought. But the Idéologues themselves did not admit that they had much continuity with the theory of Condillac; they even stressed their independence from all previous authors. This was an expression of a break with mechanical education.

Meaning in 19th-Century Linguistics

General Evolution

In this section we do not follow the fascinating history of reflection on meaning in general and on the meaning of words in particular in the 19th century; instead, we examine some approaches to semantic description. In the 19th century, the fascination with meaning led to a sudden increase in the number of books, treatises, and pamphlets on semantic topics, in the widest sense of the term. Books on words were widely read and shaped the popular image of semantics, thereby undermining its claims as a science. Even Bréal's *Essai de sémantique* (1897) was regarded as entertaining or amusing. Conversations on etymology contributed to this general soft image of semantics in a century that is now considered the advent of historical and comparative linguistics, with a focus on the discovery of sound laws.

Nevertheless, during the 19th century semantics was a very productive field. It led to innovations and went through three phases or stages (see Nerlich, 1992: 3). During the first stage, questions about the origin of language (see the previous discussion of the proper signification, the *Grundbedeutungen,* or original meanings) were gradually replaced by the problem of a continuous evolution or transformation of language and meanings. The search for a true meaning was abandoned in favor of the search for the types, laws, or causes of semantic change. It was claimed that the meaning of a word was not given by its etymological ancestry but by its current use, and that omitting etymology was an important factor in the functioning and evolution of language. During the second stage, questions about the types and causes of semantic change were slowly replaced by reflections on the mechanism of communication, comprehension, and linguistic interaction between speakers and hearers in a particular situation or context. During the third stage, semantics merged with what we now call pragmatics; word meaning was seen as an epiphenomenon of the sentence meaning.

Even though these three stages did not emerge neatly separated, profound changes took place. Semantics shed its early historical ties to comparative philology to become more and more attached to other fields, such as psychology and sociology.

The history of semantics in the various countries did not, in any way, unfold simultaneously. There

were also major differences among influences on the development of semantics, stemming from various philosophical traditions, on the one hand, and from the various natural sciences (biology, geology, medicine, etc.), on the other. Finally, the development of semantics differed by the influence of other linguistic disciplines and fields such as rhetoric, classical philology, comparative philology, and grammar, in general, and etymology, lexicography, and phonetics, in particular.

The birth of semasiology in Germany and sematology in England almost coincided. Semasiology was brought into being by Christian Karl Reisig's (1792–1829) lectures, given in the 1820s and posthumously published in 1839; sematology was founded with the publication of Benjamin Humphrey Smart's (1786–1872) treatise on sign theory, *Outline of sematology* (1831). In Germany, the maturation process of the discipline started with the edition of Friedrich Haase's (1808–1867) lectures on semasiology in 1874, followed by the re-edition of Reisig's work from 1881 to 1890. In England, sematology matured when, in 1857, the Philological Society of London decided to embark on a huge project: the New English Dictionary.

In 1831, Smart already noted the similarity and difference between French Ideology and his sematology. Both were theories of signs, but French Ideology studied the development of ideas in isolation, whereas Smart was interested in the context and in meaning construction.

At the end of the 19th century, a group of linguists adhered strictly to the doctrine of August Schleicher (1821–1868) and regarded linguistics as a natural science and language as an evolving organism. Similar metaphors were also used by Émile Littré (1801–1881), already in 1850, and by Darmesteter (1887), although in Arsène Darmesteter's (1846–1888) case the influence of psychology on his semantic thought was soon outweighed by that of biology.

The psychological influence brought about a shift from an interest in the mere classifications of types or laws of semantic change to a search for the causes of semantic change. According to different versions of psychology, especially of *Völkerpsychologie* (psychology of people), developed by Heymann Steinthal (1823–1899) and Moritz Lazarus (1824–1903), on the one hand, and by Wilhelm Wundt (1832–1920), on the other, these causes were to be sought in different phenomena. Psychology became the midwife to the second and most successful kind of semantics, developed in France mainly by Michel Bréal (1832–1915). He too referred to Condillac and the conception of the sign put forward by the Idéologues, in order, however, to criticize those naturalists who saw language as a natural organism or studied the growth, life, and death of words. For Bréal, words as signs had no autonomous existence. They changed because they were signs of thought, which were created and used by the speakers of a language. In his lectures and articles, he argued, like William Dwight Witney (1827–1894) in the United States, against the German way of doing linguistics – the search for an *Ursprache* (original language) and the study of language as an organism. He excluded from his criticism only Franz Bopp (1791–1867), citing his work as an example of careful methodology.

Semasiology in Germany

Between 1830 and the end of the 19th century, it is possible to detect an increasing broadening of the field of semasiology, from the atomistic study of words and the rather ill-conceived classification of types of semantic changes toward the recognition of the importance of cultural and social factors and the acknowledgment of context as a factor in semantic change. The logico-historico-classificatory tradition (Reisig; Haase; and Ferdinand Heerdegen, 1845–1930) was followed by the psychological phase (Lazarus and Steinthal) and the further development of semasiology (Max Hecht, 1857–?). Another landmark was the *Völkerpsychologie* of Wundt, who made possible a psychological tradition in semasiology. At the turn of the century, the time was ripe for new ideas in semantics, whether developed in response to Wundt or independently of his work (e.g., by Hermann Paul, 1846–1921; Philipp Wegener, 1848–1916; Stücklein, 19th century; and Karl-Otto Erdmann, 1858–1931).

The Development of the Sémantique in France

For Bréal, the history of a language was not just an internal history; it was intimately linked to political, intellectual, and social history, where creation and change were at any moment our own work. In his lectures (1866–1868), he showed that the meaning or function of words could survive the alteration of form. The force countering the alterations and filling the gaps was the human mind.

Darmesteter asked himself what were the causes and laws of semantic change. The evolution of language at all its higher levels was based on what Darmesteter called, in accordance with Bréal, the disregard of etymology. What was here described as a loss of etymological adequacy was seen in *La vie des mots étudiée dans leurs sigifications* (1887) as the gain of an adequate signification for language use.

From Sematology to Significs in England

English semantics in the 19th century was not a theoretically well-established field. It consisted of two disjointed strands of thought (Nerlich, 1992: 207): sematology and semasiology. The first type of semantics was a predominantly philosophical one that emerged from thinkers such as Locke, John Horne Tooke (1736–1812), and Dugald Stewart (1753–1828), culminating in Smart. The second type was a predominantly practical one that sprang from lexicographers and etymologists such as Samuel Johnson (1709–1784), Noah Webster (1758–1843), and Charles Richardson (1775–1865), culminating in Richard Chenevix Trench (1807–1886), James Murray, and Walter William Skeat (1835–1912).

By the end of the century, Lady Victoria Welby (1837–1912) had rekindled philosophical interest in semantic questions and fostered a new approach to the problem of meaning. This approach was called significs and constituted a return to Smart's reflections on semiotics, but it lifted sematology, semasiology, and *la sémantique* onto a higher psychological, moral, and ethical plane.

Summary

To summarize this section (see Nerlich, 1992: 19), in Germany we can distinguish between two main approaches to semantics: an atomistic-historical attitude and a holistic-psychological one. In France, the historical *sémantique* sprang directly from psychological insights into language evolution. And in England, the psychological approach was marginal and the historical one dominant until the end of the century.

See also: Aristotle and the Stoics on Language; Augustine, Saint: Theory of the Sign; Bopp, Franz (1791–1867); Bréal, Michel Jules Alfred (1832–1915); Cognitive Semantics; Color Terms; Condillac, Etienne Bonnot de (1714–1780); Definition; Dictionaries and Encyclopedias: Relationship; Encyclopédie; Epistemology and Language; Etymology; Humboldt, Wilhelm von (1767–1835); Language Ideology; Lexical Fields; Locke, John (1632–1704); Metaphor: Philosophical Theories; Onomasiology and Lexical Variation; Paul, Hermann (1846–1921); Plato and His Predecessors; Port-Royal Tradition of Grammar; Reisig, Karl (1792–1829); Saussure, Ferdinand (-Mongin) de (1857–1913); Schleicher, August (1821–1868); Steinthal, Heymann (1823–1899); Synonymy; Thought and Language: Philosophical Aspects; Tooke, John Horne (1736–1812); Universal Language Schemes in the 17th Century; Whitney, William Dwight (1827–1894); Wundt, Wilhelm (1832–1920).

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Media and Language: Overview

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The mass media are generally considered to include the press, radio, and television; the Internet, although not strictly a medium, is also increasingly included. News and current affairs articles and programs, documentaries, sports news and broadcasts, radio phone-ins, advertisements, reality television, quiz shows, soap operas, websites, and so on help to organize the ways we understand our society and culture. They are often the only way we have of understanding other societies and cultures. The media's influence on everyday life is usually taken for granted. They supply accounts of reality and construct particular forms of knowledge and pleasure: they inform and educate, they sell products, they tell stories, they entertain, they connect us with others, they help form our identities, they influence trends and mobilize opinion, they circumscribe our experience in what has become a media-saturated environment.

Linguists and others working in language and communication have always been interested in the language of the media. Bell (1995: 23) gives four reasons for this: the ready availability and accessibility of media texts as sources of language data; the importance of media for evidence of language use and language attitudes in a speech community; the use the media themselves make of language; and the way the media reflect culture, politics and social life. Not surprisingly, other researchers from a range of disciplines and fields such as media studies and journalism, communication, cultural studies, sociology, education, and psychology have also been interested in how the media shape these understandings. In these fields, media are studied not just through their texts but also through the wider cultural contexts associated with industrial production processes, and through the effects they have on their audiences (for example, Watson, 1998; Curran and Gurevitch, 2000). While texts are at the center of any concern related to language and the media, the analysis and critique of production processes and audience effects are often valuable as well. This article will discuss a variety of approaches to media analysis and outline briefly some of the recent debates about the media to emphasize the usefulness of the range of critical resources that have been applied to media texts and media language.

Approaches to Media Language Analysis

Media texts have been analyzed both quantitatively and qualitatively (*see* **Media: Analysis and Methods**). Early work, especially in the United States, concentrated on content analysis. Content analysis focuses on the message and assumes that its content can be broken down into units of meaning that can be counted in a process that is designed to be objective and replicable. Much of this early work looked at the content of American newspapers, especially on subject matter categories like politics, crime, and sports. Towards the end of the 1930s, Harold Lasswell, who was interested in the relationship between propaganda and public opinion in the 'new' mass medium of radio, used content analysis to investigate political values. During World War II, the U.S. government, through the Experimental Division for the Study of War-Time Communications under Lasswell, conducted the 'World attention survey' through a content analysis of major newspapers, which was designed to investigate newspaper coverage of foreign affairs. Others investigated the propaganda output from various organizations and individuals, focusing on aspects like the 'values' expressed in political speeches or the 'tone' of the headlines. Essentially, the origins of this approach developed in the study of the content of newspapers, but then evolved to be used as a way of evaluating political messages, especially Nazi and Soviet propaganda messages during World War II and the Cold War.

Much of this research was quantitative, relying on coding aspects of content into a number of discrete categories and counting their frequency. Later content analyses applied a similar methodology to television, but just about every type of media communication has been studied. Modern content analysis is still used for news content or detecting political bias, but it has also been used to investigate topics like gender representation in advertisements, violence in children's television programs, and representations of minority groups (for example, the work of the Glasgow Media Group in the United Kingdom on the news; and the research by George Gerbner and his associates in the United States on the Cultural Indicators project).

The first edition of the *Encyclopedia of language and linguistics* included an article on media language as part of the communicative process and outlined a different and more theoretically based tradition in the study of media language. It started with semiotics (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**) to demonstrate the need to think of media language as

part of a sign system or as a process of communication with complex social and cultural influences affecting the way in which media texts are produced and understood. The article reviewed the major approaches to the study of media language, such as critical linguistics, noting its approach to ideology and power in the representation of social reality, and its agenda in unmasking the seemingly objective nature of news reports; semiotics, especially as a way of decoding both verbal and visual aspects in advertisements; and discourse analysis, again primarily of news texts, but also phone-ins, interviews, and disc jockey monologues, with an emphasis on pragmatics, speech acts, and turn-taking. It noted a shift in emphasis away from textual analysis alone towards a more audience-focused approach.

Other overviews published more recently have outlined the research trajectories in language in the media through the work of individual linguists, especially with respect to the growing influence of Critical Discourse Analysis. Bell's (1995) overview maps out the approaches made in the study of media language and discourse from, first, Critical Linguistics and then Critical Discourse Analysis (CDA). He notes the growing importance of CDA and its sociopolitical concern to reveal inequalities of power as a standard approach to media texts, outlining the contributions of Fowler through his development of Critical Linguistics to apply functional grammar to news texts; of van Dijk's using text linguistics to develop discourse analysis to apply to news story structure; of Fairclough's bringing social theory, especially the work of Foucault, to discourse analysis, and to his contribution, along with that of van Dijk, to the development of Critical Discourse Analysis with its explicit sociopolitical stance. Bell's own work links text analysis of news stories to media production processes and the role of the audience. Critical discourse analysts are interested in both details of the text itself and the broader social, political, and cultural functions of media discourse to determine other layers of meaning. Much of their work to date has been on the analysis of factual genres like news rather than fiction or advertising.

CDA has become an important approach for studying media texts, especially in European linguistics and discourse studies.

However, to argue uniformity in the CDA approach could be misleading. The use of the individuals' contributions to structure overviews of the field is instructive here. CDA is not a holistic approach, using a single theory or even a single methodology. Its foundations are derived from classical rhetoric, pragmatics, text linguistics, sociolinguistics, and applied linguistics and reflect the growing interdisciplinarity in research between the humanities and the social sciences. Ideology and power underpin applications of CDA to issues relating to gender, class, and ethnicity and also to more general discussions about media discourses relating to politics or the economy (*see* **Media, Politics, and Discourse: Interactions**). However, depending on the discipline background of the researcher, the methodologies may differ, with both large empirical studies found as well as small, focused qualitative case studies. Weiss and Wodak's (2003) volume covers some of the research practices under the umbrella of CDA, and their introduction outlines some of the critiques and debates that have evolved with it.

The dominant paradigms of media language research have tended to produce critical evaluations of the power of the media to influence and even to subordinate their audiences. As indicated above, much of the work on media language, especially in critical linguistics and critical discourse analysis, has been undertaken on the news and is concerned with uncovering its underlying ideologies. In particular, this work targets for special attention social problems like discrimination and prejudice (for example, van Dijk's 1991 work on racism). The studies undertaken in CDA are designed with an emancipatory purpose; that is, they have a sociopolitical agenda intended to shed light on issues of power and domination. Thus, it should not be surprising to see so much CDA focused on the news.

News is not considered as some neutral image of the real world but as a product of news gathering and news making. In other words, news is the end result of a number of processes, including organizational policies and preferences that set the news agenda and selection and judgments about relative importance and significance. It is thus a representational discourse made by converting the raw data from a variety of sources, including eyewitness accounts, interviews, and media releases, into stories within the context of technical constraints like production deadlines, and in accordance with the news values of the time (*see* **News Language**; **Newspeak**). News values, or the set of criteria used to determine newsworthiness and hence whether or not an item is likely to appear as news, act as a filtering mechanism or gate-keeping device for what is reported.

The study of the news has always been at the forefront of media discourse research. The constructedness and selectivity of the news and its concentration on negative events, together with its connection to powerful institutions and commercial market imperatives, have proved compelling for language researchers, especially those who are interested in critical approaches to ideology, and have stimulated

investigations into story content, underlying values, and structure, as well as studies of representations of specific issues and groups. However, media language has been studied at other levels beyond journalistic practices, media production processes, and textual analysis.

The traditional distinction between news and entertainment has transferred into analytic approaches, with linguists and discourse analysts using conventional, language-focused, empirical methods on news texts, especially on news content, news values, and ideals of objectivity. This has left theorists from other fields like sociology, cultural studies, and women's studies to supply much of the insight into the entertainment side of media output. It is from these traditions that studies about consumption, popular taste, the politics of the everyday, and notions of pleasure and resistance have been undertaken.

A major contribution here has been insights from reception studies into reading practices and how readers or audiences negotiate meaning and respond to various media texts such as soap operas and women's magazines, as well as news programs. These are questions that usually lie outside traditional language or discourse analysis. Audience research has been the mainstay of media and cultural studies research for some years now as researchers endeavor to find out how audiences make sense of media texts. Reception studies have focused on specific genres to see how different social groups (based on age, class, ethnicity, or gender) or subcultures interpret texts in different ways. Hermes (1995), for example, in her analysis of women's magazines, draws heavily on responses from women who describe the pleasure they derive from reading what is often considered a devalued genre. Fewer studies have undertaken detailed linguistic analysis to relate textual features to audience interpretation. Richardson's work (1998) on economic reporting in television news is an exception here, as she links an analysis of media discourse on the economy with an analysis of the reception of that discourse.

Studying texts with images and sounds has presented challenges to conventional discourse analysis, which has valued modes of language through speech and/or writing over visual images or music. The mass media produce multimodal texts, that is, texts that draw from language, pictures, or other graphic elements and sounds in various combinations. Considerations of the multimodal nature of media texts are difficult to incorporate in language-based media analysis. Two examples of work on multimodality in the media, linked to linguistics, are Kress and van Leeuwen's work on text layouts (1998, 2001) and Cook's work (2001) on advertisements.

Kress and van Leeuwen have pointed out how the multimodality of the media needs to be taken into account when analyzing discourse. Their (1998) semiotic analysis of newspaper front page layouts shows how conventions related to the positioning of headlines, blocks of text, and photographs produce meaning and coherence; how visual cues (size, color, contrast) produce hierarchies of meaning; and how frames like lines and spaces produce separations or connections. They emphasize the importance of layout analysis in the critical study of newspaper language. The nature of advertising also means that analysts need to take account of pictorial and musical modes, even in advertisements where language predominates (*see* **Media: Semiotics**; **Visual Semiotics**; **Barthes, Roland (1915–1980)**). Cook (2001) stresses the links between language in advertising with the other modes and urges analysts to understand the interconnections they make with each other to construct meaning. In spite of the difficulties in trying capture such multimodality, concentrating on language and ignoring the other modes is to miss much of the potential for meaning of contemporary media texts.

Current Issues

The Impact of New Media

Researchers and other commentators have continued to be interested in media language and have expanded the field to include newer forms of media, mainly through attention to computer-mediated communication (CMC) (*see* **Language in Computer-Mediated Communication**). The development of global, digital, networked communication systems and their infrastructure in the latter part of the 20th century has captured the public imagination in terms of the seemingly limitless potential to provide access to information and to facilitate interaction with others. This has been greeted with either utopian predictions of a better informed and more democratic society with greater facilities to connect and interact with others through the creation of virtual communities, or a darker view of information overload, unregulated content, personal isolation, and even loss of ability to interact face-to-face, and a 'digital divide' between those with access and those without.

New on-line technologies have transformed news through the capacity to accumulate unlimited multimodal information in a single text and to permit different routes of access and different levels of interaction. On-line news departs from the constraints of space and time associated with print and broadcast news and instead organizes vast amounts of information content as self-supporting layers with hypertext

links (Lewis, 2003). In addition, various new forms of news have emerged with webcasts, web logs, news groups, and news alert services that provide constant access to news and embedded information.

Research on language use in computer-based media is struggling to keep pace with rapid technological innovations. The impact of the Internet and related technologies on language has been discussed (often negatively) in terms of language change and effects on literacy. Crystal's (2001) linguistic perspective offers evidence of the emergence of distinctive language varieties developing in Internet-related forms of communication, including e-mail, chat groups, virtual worlds (imaginary environments for text interactions), and the World Wide Web. In each, he notes adaptations in graphology, grammar, semantics, and discourse to suit the characteristics of the technology and its uses. Rather than forecasting the demise of the written form or, more dramatically, the death of languages as the result of the impact of new technologies, Crystal argues that the Internet is providing creative possibilities and enrichment opportunities for its users.

Work related to language in the new media has included studies on topics like web pages and hypertext links, e-mail discussion lists, and Internet video conferencing, and studies on themes like multilingualism in chat sites, the dominance (or not) of English in the new media, the extent of democracy, and the division between the information-rich and information-poor (for a range of studies, see Pemberton and Shurville, 2000; Herring, 1996; Jenkins and Thorburn, 2003; Aitchison and Lewis, 2003). Language research has focused primarily on computer-mediated communication via the Internet, its relationship to face-to-face communication, and its relative anonymity, as well as textual aspects like special language features and idiosyncratic codes of conduct and etiquette (or 'netiquette'). E-mail users and Internet chat users have developed spelling shortcuts like letter homophones or acronyms as a kind of coded shorthand to speed up typing (by saving keystrokes), and even special symbols created originally from ASCII characters ('emoticons' like smiley faces) to add emotional content. These shortcuts and symbols also help to differentiate regular users from newcomers. The so-called 'netspeak' or 'netlingo' has spread beyond CMC, with similar shortcuts and symbols adopted by mobile telephone users for text messaging, and CMC jargon like 'flaming' and 'spamming' becoming more widely used and understood.

Internet communication channels like chatrooms, bulletin boards, newsgroups, complex hyperlinked websites, and electronic games need to be thought of differently from traditional media texts (*see* **Language in Computer-Mediated Communication**). Such texts are characterized by their interactivity but also by their intertextuality, as they draw on other texts and play with established conventions of form and representation (Buckingham, 2000). In addition, many new media forms with their built-in potential for interactivity make the traditional distinction between author and reader (or producer and audience) less important, as texts are cooperatively produced and meanings are created, challenged, and changed. While it may be compelling to foreground the benefits of intertextuality and interactivity in contemporary media texts, especially in terms of creativity and innovation, many texts produced in new media are just refashioned conventional texts whose interactivity is based on limited choice and pathways.

Revisiting Traditional Media

The more traditional media continue to generate research interest with new insights (*see* **Radio: Language**; **Television: Language**; **Documentary**; **News Language**; **Sports Broadcasting**). Changes to the language of the media have been noted, such as growing tendencies for a more casual, conversational style with an increasing use of colloquial vocabulary and vernacular idiom by journalists and interviewers; a greater emphasis on celebrity; stress on the personal; and a marked trend to the short, sharp, sound bite designed to be pithy and provocative, especially when edited into news reports.

In debates about declining journalistic standards, the news media across a range of countries increasingly have been criticized for not separating news from entertainment, for personalizing and sensationalizing stories, and for focusing on 'softer' or 'lighter' stories rather than concentrating on more serious issues in a process termed 'tabloidization' (for international perspectives on tabloidization, see Sparks and Tulloch, 2000). Mass-market magazine content also has become more sensationalized with a growing emphasis on celebrity coverage, gossip, scandal, and intrigue. Franklin (1997: 4) has criticized both print and broadcast journalism, commenting that "the trivial has triumphed over the weighty; the intimate relationships of celebrities from soap operas, the world of sport or the royal family are judged more 'newsworthy' than the reporting of significant issues and events of international importance."

While news and public affairs remain an important part of media output, a significant portion of television output is devoted more directly to entertainment through soap operas, dramas, talk shows, reality

television, quiz shows, sports, and lifestyle programming (*see* **Television: Language**). It is likely that the increasing global trend of the media supplying more and more of these shows is underpinning the tendency for the news to become more conversationalized and more 'tabloid,' as it too comes under market pressure to entertain and to connect more closely with ordinary values and practices.

Research has continued as well on a range of variously disenfranchised groups, including women, children, the aged, ethnic minorities, and disabled groups (*see* **Media and Marginalized Groups**), and on moral panics, not just in the traditional sense of 'muggings' and escalating urban violence (Hall *et al.,* 1978) but in a more diverse sense that includes media coverage of issues related to pornography, pedophilia, health risks, and medical negligence (*see* **Media Panics**). Research also has been conducted into media's role in language development and literacy.

These new and continuing directions in research are contributing to the growing critique of the media and how they operate. Contemporary media language is changing, especially under the influence of globalizing technologies and changes to the media industries that are affecting the way our social world is presented to us. As global media corporations operate beyond the symbolic spheres of national influences and cultures, we are seeing increasingly globalized programming and convergent technologies, but whether this will translate into a homogenized culture with a global language is not at all certain. It is more likely that improvements in technology will give us more choice about where we get our information from and how we entertain ourselves.

What is evident within the study of language in the media is a continuing trend away from just text-based and/or purely linguistic approaches, not only in order to take account of factors surrounding media texts like the production processes, the characteristics of the medium, and the circumstances of audience reception but also to look at the nature of media language itself as it changes in relation to changing industry, social pressures, and emerging technologies.

See also: Barthes, Roland (1915–1980); Critical Discourse Analysis; Documentary; Genre and Genre Analysis; Language in Computer-Mediated Communication; Media: Analysis and Methods; Media and Marginalized Groups; Media Panics; Media, Politics, and Discourse: Interactions; Media: Pragmatics; Media: Semiotics; News Language; News Language; Newspeak; Radio: Language; Saussure, Ferdinand (-Mongin) de (1857–1913); Speech Acts; Speech Community; Sports Broadcasting; Television: Language; Television: Language; Text and Text Analysis; Visual Semiotics.

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Media and Marginalized Groups

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How Do Media Marginalize Groups?

When the Nazi Party built their media outlets of print, radio, and cinema, they discovered the great benefit of producing constant propaganda about '*untermenschen*,' – the pillorying of 'lower people' on grounds of supposed racial and cultural differences – Jews, Slavs, Gypsies, Blacks, homosexuals, and people with impairments. The aim of this marginalization was to dehumanize their targets and gain public support for their exploitation of these groups, and then their extermination.

The media provide environments through which communication occurs. These environments are set within social, political, economic, and cultural parameters that reflect wider structures of power at the local, national, and international levels. 'Marginalization' is a process that reflects differentials in power and is expressed in unequal access to and representation in the media. Such marginalization can occur in any or all of the four analytical levels of the media: ownership and regulation, production and creativity, textual content, and audience consumption.

'Marginalized groups' can refer to any segment of a population with shared perceptions and experiences, who are unable to fully realize their rights as articulated in both the Human Rights and the Economic Social and Cultural Rights conventions of the United Nations. In particular, the term 'marginalized groups' refers to groups whose social or cultural characteristics generate opprobrium or hostility among other groups in society, so that their chances for a long life are significantly reduced.

This article examines the process through which marginalization occurs in the media, and gives some examples of resistance to such marginalization. Most research concentrates on the way the media relates to ethnic minorities, seeing them as the most obvious example of groups disempowered by communication structures in societies dominated by a single ethnic group, for instance, Whites in the United States, Anglo-Celts in Australia, or metropolitan Francophones in France. Studies of minorities and the media have been undertaken in most countries where there is ethnic diversity and has been a theme in the study of international communication. More recently, research on disability and the media has pointed to the significant role of stereotypes communicated by the mass media in disabling people with impairments.

Ownership

Most of the world's media are owned either by large multinational conglomerates (AOL Time Warner, Disney, General Electric, News Corporation, Viacom,

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Ownership

Most of the world's media are owned either by large multinational conglomerates (AOL Time Warner, Disney, General Electric, News Corporation, Viacom,

Sony, Bertelsmann, AT&T and Liberty Media) (Shah, 2004) or by governments. While there are many additional smaller companies operating in national and local media markets, the large corporations set the broad tone and focus for media practices, especially in liberal democratic states with market economies. Most media markets are under some sort of control by the state, ranging from the almost total control exhibited in China and Cuba, through to the almost anarchic operation of the market in some post-Communist states. However, the dominant paradigm remains an environment where the print media are privately owned, and the electronic media are either private or have some government involvement. In the United Kingdom, Australia, and Canada, the government-run electronic media have a reputation for independence, taking seriously their role as defenders of the public interest. In the United States, public broadcasting has some support from the government, but is essentially a not-for-profit sector.

These patterns of ownership play an important part in how minority groups experience the media and use them to communicate within their own boundaries and with wider societies. Commercial media need to build an audience that they can 'deliver' to their advertisers, on whom their economic viability rests. Thus, they tend to search for 'demographics' that will be most attractive to advertisers, and who can be reached most efficiently. They seek out commonalities in audiences – language, culture, economic affluence – that they can use to expand their reach. Those people who are part of the majority group, particularly if it has greater economic and social power, will tend to find their interests and worldviews reflected in the media. On the other hand, minorities who are less powerful, and poorer, are less likely to find their interests addressed. One consequence of this exclusion has been the development of media targeting minority groups in their own languages and from within their cultures.

Government media may present a more wide-ranging view, depending on whether government polices seek to facilitate minority group inclusion, and the overcoming of marginalization, or the reinforcement of existing social hierarchies. Thus, government media may contribute to the demonizing of minorities who are perceived to be enemies of the state (and indeed commercial media may collaborate in such attacks).

With the development of the Internet and new media technologies in relation to print and broadcast, many countries have seen a rapid expansion of minority media outlets targeting particular communities. Global diasporas can thus maintain links across worlds, and cultural communities can build diversity within them, though at the real cost of separating different language communities from each other.

Regulation

Most countries have some form of media regulation, where governments establish rules under which they can operate. These rules can range from prescribing who can own media (for example; forbidding foreigners; banning political opponents; preventing monopolies; encouraging cultural diversity), to censorship, such as what can be printed or broadcast or uploaded to the World Wide Web. Many systems of regulations, including the self-regulatory codes of practice adopted by some media sectors, specifically prohibit discrimination against or the vilification of minority groups. In this they mirror the UN ESC Rights convention, and its signatories' commitment to implement those rights "without discrimination of any kind as to race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status" (United Nations, 1966/1976: Article 2: 2).

The rise of racism on the Internet has become a particular focus of government attention in Europe. The European community has undertaken a series of studies through the European Monitoring Centre on Racism and Xenophobia (EUMC) that has sought to document the expansion of hate speech on the Internet, and then to develop strategies of how to resist its impact on vulnerable communities. While some countries have specific legislation under which hate speech on the Internet is a criminal offense, others have preferred to develop avenues for civil recourse or have argued that free speech rights should not be restrained on the Internet.

Indeed, the regulation of hate speech altogether has become a matter of significant controversy in many countries, especially where the issues have arisen from religious differences. Studies of anti-Semitism have shown how complex contemporary debates over the Israeli-Palestinian conflict have intensified this already emotionally charged arena, while Arab and Muslim groups in Western countries have pointed to the need for restrictions on the demonizing of Arabs and Muslims in the media.

Thus, national regulatory regimes increasingly have to respond to some of the dynamics of marginalizing, trying to balance the values of open discussion and debate with the dangers of humiliation of minority groups whose participation in society can be heavily compromised by hate speech. Regulation becomes important in terms of the process of media production, and how messages are generated and transmitted.

Production

If communication is a process through which meaning is conveyed from a point of production to a point of consumption, then meanings are first constructed by media professionals that choose elements to form into narratives. The production locus is always one of choice; the producers select from a range of possibilities and build an argument, story, or experience that they believe will move their audiences in some way. Whether it is journalism, fiction, advertising or nonfiction, television game shows, or 'reality TV,' there are creative minds building conceptions of how the audience would be moved – emotionally, viscerally, and intellectually. Communication is always about change – changing how people are before they experience it – and trusting or hoping that the desired effect will result.

Studies of newsrooms have shown how the dynamics of news reporting are influenced by the ethnic makeup of the reporters. In societies where aboriginal communities survive, research demonstrates that few aborigines are involved in media production, and their stories are underrepresented in the media. Similarly, immigrant and second-generation populations are underrepresented in news media organizations, while people with impairments are almost totally excluded. In racially diverse societies (e.g., France, the United States, the UK) this diversity, to some extent, may be reflected through the range of media, but is rarely reflected within the dominant media organizations. Despite some moves towards affirmative action, the tendency of powerful positions being held by powerful men from the dominant community remains.

These production structures have tended to reinforce existing practices and worldviews. Even where minorities exist in significant numbers in local communities, American researchers have shown that this has only marginal effect on content and employment. Where economic hierarchies mimic racial ones, the media production forms reflect both economic and racial inequalities, and, to some extent, sustain and reinforce them. Thus there may be no intentional vilification of minorities, yet their continuing marginalizationmay be a consequence of their historic exclusion and the worldviews in the organizations that control the communication system.

It requires a conscious self-awareness by media proprietors of the consequences of their actions – many of which are unintended – to begin to remedy such continuing inequities. There are many examples of managers deciding to change the organizational culture of exclusion – recruitment campaigns for minority employees, active dialogue with excluded communities, strategies to widen audience appeal by diversifying content, and the sustained selection of minority community members as expert commentators (and not just on minority affairs' issues).

Disability communities have also sought to modify stereotypes and marginalization. Some media have included people with disabilities in their normal lineup, with British broadcasting organizations in 2004 pledging their commitment to raise disabled involvement in production. However, disability remains a significant area where marginalization continues.

Some advertisers have also seen the importance of normalizing disability. In the United States and Europe, people with impairments are appearing more regularly on TV screens, and the 'access' movement, seeking to ensure the disability-friendliness of the Web, has been increasingly successful in generating and disseminating accessibility standards.

Content

Given the range and diversity of media outlets, it could be argued that every community of language or interest can find a forum for communication, particularly in larger and wealthier societies. This view carries with it a serious implication: the communication networks that enable societies to function as integrated units may be in the process of unfurling – rendering them more like places in which multiple diasporic communities cohabit in their own communication spaces.

The complexity of 'mediascapes' carry embedded within them 'ethnoscapes,' or visions of the world as perceived through the eyes of particular ethnic collectivities. Dominant media tend to sustain the views of the dominant communities, so that the content of these media tends to privilege the interests and concerns of these groups.

Studies of stereotyping of minorities – Jews, Blacks, disabled people, Muslims – have shown that these groups tend to be framed by the perspectives of able-bodied White Christians. The stereotypes tend to speak to the fears and threats these marginalized groups are felt to represent. Thus, Jews were often portrayed in Euro-American media as outsiders who carried particular cultural attributes as a group, sometimes positive, sometimes negative. In recent years, Jews have again been represented in harsher terms in Arab media. African-Americans were typically represented in the past in American media as criminals, comics, or sports people, though some have emerged into the front rank of Hollywood actors. Still, for the most part, stories about Blacks in dominant culture media neither canvas the range of Black experiences, nor explore issues relevant to

Black people in any depth or from their point of view. Such stereotypical practices have two effects: They exclude Black people from the communication community formed by specific media, and they transmit biased and limited information to other participants in those communication communities. Such miscommunication serves to further marginalize Blacks from the collective discourse of the society, and thus both reinforces their alienation and legitimates wider practices of social exclusion. In the United States, there has been a major increase in Black (and Hispanic) cable television channels, and a turning away by these audiences from 'mainstream' channels.

Over recent decades, and especially since the events of September 11, 2001, Arabs, Muslims, and other people from the Middle East and South Asia have experienced the full force of stereotype and hostility in Western media, while the media in their countries of origin have tended to emphasize the most oppressive aspects of the imperial histories of Western cultures. Many Arab and Muslim organizations have developed strategies to influence media content in Western countries, through media training of spokespeople, the development of media monitoring projects, and the use of complaints mechanisms.

Textual studies have demonstrated the processes through which discourses of marginalization are sustained. News programming, for instance, will frame stories within the context of expected protagonists and antagonists. In societies with racialized histories, the discourses mobilized in the media may tend to legitimate preexisting hierarchies of a certain race, while reinforcing prejudices against immigrants from minority backgrounds. Disability may be used as a metaphor for evil, so that fear of people with impairments is reinforced and their social exclusion intensified.

Advertising carries some of the most important content, through its constant messages about appropriate social behavior. Television has become one of the most important socialization agents for children in advanced Western societies, with children in the United States watching on average about twenty hours per week; in a year they may see up to 200 000 commercials. Children learn a great deal from this experience about race and disability, their own racial groups and others, and about what it means to be normal. Biased, negative, or minimal representation of minority groups can intensify social exclusion directed against them, and undermine their own feelings of self-worth and personal capacity.

Audience/Consumption

Meaning is realized by audiences by their working on texts. While producers propose ways that texts should be interpreted, usually privileging one interpretation, the meaning (i.e., the reinforcement or changes in perception, perspective, or behavior among audiences) is not totally determined by the intent of the authors. While meanings are individually experienced, they are socially constituted through the shared communal discourses developed over time within subcultures.

The rise of mass media during the 20th century was predicated on the creation of undifferentiated audiences, and pushed towards homogenized lifestyles expressed because of the growth of large organizations and the suburbanization of metropolises. Over the past three decades, and accelerating in this century, technological change and social diversification have undermined the reality of mass society, generating in its place a more variegated, urbanized, and older population. Most Western societies are characterized by an ageing dominant population group with low birth rates, while their minority groups tend to be younger and have higher birth rates.

These demographic changes have already seen major audience shifts for the US media and similar transformations are likely for other societies with immigrant and refugee populations. By 2050, the non-Hispanic White population of the United States will have declined to about five in ten, a decrease from about seven in ten in 2000. In the meantime, the African-American population will have risen slightly from 13 to 15%, with Asian and Pacific Islanders rising nearly 300% to one in twelve, and Hispanics growing from one in nine, to one in four. One major effect of these changes is that the child and youth media market will be dominated by minorities. Those who are currently marginalized by the mainstream will have become together almost half the population, and much more than half the youth population.

Audiences seek reinforcement from their media experiences. They look for cultural experiences that confirm their identities, and validate their expectations and desires. Where there is choice, and they experience marginalization or exclusion, they will turn towards media that satisfy their needs and address their realities. Increasingly wealthier and more educated populations are turning to the Internet for their information needs, selecting services that suit them. Internet providers talk of building user communities who both draw on the materials provided to them but also interact with other users of the same services. As communities of interest develop, communities of place become less important, and the discursive environments used can become global rather than local. Audiences for any one source become smaller, even

though demand for information and entertainment continues to expand.

US studies of children as audiences have shown that they would welcome a more diverse range of representations of people in their television viewing. Studies of minority audiences in Europe, Canada, and Australia also demonstrate their desire for a better representation of their own stories and experiences in mainstream media. Many express their frustration with the repetition of tired stereotypes and also their clear sense of the peripheral nature of their participation in society as it is expressed in dominant group media.

Alternatives

Many of these issues have been recognized by government, community, and corporate bodies; they have developed a variety of strategies that have started to remedy the exclusion and marginalization of ethnic and disabled communities. Technological change (e.g., digital broadcasting, satellite newspaper transmission, the Internet, cable television) has facilitated the development of alternative media outlets which provide opportunities for communities to hear their own voices or read their own stories (although with only minor impact outside the community boundaries).

Within the mainstream media in the United States, Canada, and the UK, there have been programs to implement affirmative action, with the active recruitment of minority staff as journalists, writers, producers, and directors. Similar approaches have recently been extended to cover people with disabilities, with a cross-Europe initiative emerging in 2003.

However, European studies have shown that the challenge continues for the media to talk 'with' rather than 'about' minorities, indicating that there is still a pressing need to enhance equal representation by giving voice to ethnic, cultural, and religious minority sources, and by involving those affected by discrimination in the media. Minority perspectives need to be covered in the mainstream media, not only on issues that concern the ethnic minorities, but also in other general news genres. Governments need to convince media professionals of the necessity to integrate immigrants' points of view in their productions more widely, and not only in productions dealing with minority issues.

The media can contribute to societal integration and cohesion, by reflecting diversity, and giving voice to groups that have something to say about issues concerning them and society as a whole, whether they are marginalized for their culture, language, disability status, or religion. The processes of marginalization occur at all levels of the media and need therefore to be addressed systematically.

See also: Discourse of National Socialism, Totalitarian; Gender and Political Discourse; Genres in Political Discourse; Identity and Language; Media: Analysis and Methods; Media Panics; Media, Politics, and Discourse: Interactions; Modes of Participation and Democratization in the Internet; News Language; Political Rhetorics of Discrimination.

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Media Panics

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Cultural panics have existed as long as culture itself. Herodotus reports that the citizens of Asia Minor panicked when rumors that their wells had been poisoned by the Greeks surfaced in the 7th century B.C.E. The rise of the mass media from the 17th century onward, however, meant that panics could be monitored, contained, and most importantly, created by the media itself. In the 20th century, the introduction of social statistics and the ever-increasing amount of scientific information available for public scrutiny encouraged moral panics over increasing crime, environmental degradation, changing social norms of gender and sexuality, and a host of health-related issues. Strikingly, these panics frequently tell us more about the structure and power of the media than they do about the issue supposedly causing panic. The model of a media panic discussed below owes much to theories of social panic and there are some limitations to seeing media interventions in social problems in these terms. After considering the elements of media panics, there is a discussion of the limits of the model.

Media panics usually start in the news. Broadsheet newspapers, television news, radio news sources, tabloids, and Internet news sources describe periodic or new phenomena as systemic disorders that are worthy of sustained audience and media attention and needing some sort of urgent intervention. As such, reports of phenomena such as crime statistics articulate to traditional news values. Most crucially, to be news it must be 'new.' However, crime is not a new phenomenon and crime statistics are analyzed periodically. The 'newness' of the statistics in combination with typical media claims that crime is 'getting worse' creates a message of a systemic social disorder. Adding to the gravity of this message, the claim that there is a 'systemic disorder' produces a contradiction between our knowledge of crime as a persistent phenomenon and the claim to its newness. To resolve this contradiction, new categories of crime or deviance are created and audiences are morally sensitized to these new forms of crime; in short, new categories are created for audiences to worry about. In addition, the media, needing to direct and hold audience attention, selectively engage events in order to show their most extraordinary, most worrisome, or otherwise unique features. Thus, violent crimes, bank robberies, and 'moral deviance' receive more news attention than white-collar crime or domestic violence. Reports of extraordinary or worrisome events are usually coupled with a generalized claim that these remarkable events 'could affect you.' This conforms to the news value that news events should be audience relevant. The contradictory messages produced by claiming both the remarkable and the everyday can lead to audience confusion, apprehension, annoyance, and alleged social and moral panic.

The structural features of a 'media panic' include a news item and statistics or narratives that support the

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Cultural panics have existed as long as culture itself. Herodotus reports that the citizens of Asia Minor panicked when rumors that their wells had been poisoned by the Greeks surfaced in the 7th century B.C.E. The rise of the mass media from the 17th century onward, however, meant that panics could be monitored, contained, and most importantly, created by the media itself. In the 20th century, the introduction of social statistics and the ever-increasing amount of scientific information available for public scrutiny encouraged moral panics over increasing crime, environmental degradation, changing social norms of gender and sexuality, and a host of health-related issues. Strikingly, these panics frequently tell us more about the structure and power of the media than they do about the issue supposedly causing panic. The model of a media panic discussed below owes much to theories of social panic and there are some limitations to seeing media interventions in social problems in these terms. After considering the elements of media panics, there is a discussion of the limits of the model.

Media panics usually start in the news. Broadsheet newspapers, television news, radio news sources, tabloids, and Internet news sources describe periodic or new phenomena as systemic disorders that are worthy of sustained audience and media attention and needing some sort of urgent intervention. As such, reports of phenomena such as crime statistics articulate to traditional news values. Most crucially, to be news it must be 'new.' However, crime is not a new phenomenon and crime statistics are analyzed periodically. The 'newness' of the statistics in combination with typical media claims that crime is 'getting worse' creates a message of a systemic social disorder. Adding to the gravity of this message, the claim that there is a 'systemic disorder' produces a contradiction between our knowledge of crime as a persistent phenomenon and the claim to its newness. To resolve this contradiction, new categories of crime or deviance are created and audiences are morally sensitized to these new forms of crime; in short, new categories are created for audiences to worry about. In addition, the media, needing to direct and hold audience attention, selectively engage events in order to show their most extraordinary, most worrisome, or otherwise unique features. Thus, violent crimes, bank robberies, and 'moral deviance' receive more news attention than white-collar crime or domestic violence. Reports of extraordinary or worrisome events are usually coupled with a generalized claim that these remarkable events 'could affect you.' This conforms to the news value that news events should be audience relevant. The contradictory messages produced by claiming both the remarkable and the everyday can lead to audience confusion, apprehension, annoyance, and alleged social and moral panic.

The structural features of a 'media panic' include a news item and statistics or narratives that support the

claim that this news item is relevant, even worthy of urgent attention, for general audiences. This news item must then be articulated to other issues of public concern or labeled extraordinary and construed as deviant and needing public scrutiny or action. The 'panic' of a media panic emerges from a series of contradictions about newness, newsworthiness, relevance, and deviance. And finally, the audience should not be left in a state of panic or anxiety. Socially sanctioned experts typically express a range of options, again, in the media, for audiences to intervene in the issue. This might include the media source exhorting audiences to 'be aware,' seek out more information,' 'call their local politician,' or even to buy a certain product to reduce confusion or panic. The ultimate intervention in media-generated panics is legislative change by political, policy, or judicial systems against social actors that have been labeled as deviant or part of the problem.

The events that cause media panic are rarely 'made up' or entirely fictional. Rather, the media directs attention to phenomena and links these phenomena with troubling public issues or labels certain social actors as 'deviant' and thus worthy of public scrutiny and intervention. The global HIV/AIDS pandemic provides a striking example. The emergence of the disease worldwide is an actual event that has killed over 14 million people. The media, drawing attention to the unknown cause of the disease and its debilitating and wasting effects, made the case that HIV/AIDS was worthy of audience attention. Coupled with statistical evidence that the death toll was rising and the disease was associated with sexual practices and drug use that the media deemed deviant, the disease received more press than other emerging pandemics such as tuberculosis. The ensuing panic was both 'moral' and media generated. Deviance was created in relation to the disease and activists and educators have had to work against this initial media-generated definition. The crucial issue is not that the HIV/AIDS pandemic is not real or serious; the issue is that the media focus attention and create worry about particular aspects of the pandemic with moral overtones. Thus, 'media panic' about HIV/AIDS sanctioned homophobia and a distrust of certain immigrant groups. The appropriate intervention, given this framing of the issue, is avoidance and suspicion of particular social groups. The significance of media panics demonstrates the power of the media in agenda setting and framing social issues.

The use of statistical and scientific evidence, as well as scientific and medical expertise, has become increasingly important to media sources and plays a larger role in media panics. Drug panics, for example, are recurrent in the media as different recreational drugs, from cocaine to ecstasy to 'chroming' (sniffing fumes from paints) are introduced to audiences and their effects are discussed by experts. While experts in the recent past have included politicians, stakeholders, religious leaders, and other 'right-minded' figures, medical or health-related issues are frequently dissected by physicians or experts with academic or professional scientific qualifications. This adds another level of media engagement with audiences. Not only do audiences need to **do** something urgently, there is also more that they need to **know**. That knowledge can also come from experts introduced in the media. In the drug panic example, concerned parents might be alerted to a new threat by a news story. This may be followed up by a news magazine program where doctors and scientists discuss the possible physiological effects of drug use and the concurrent social behaviors parents might observe in drug-taking children. In addition, there might be statistical evidence of 'at-risk' populations and experts to comment on ways of lowering that risk. There also might be experts to advise parents on the best strategies of intervention. While this all works to raise and not lower anxiety, there becomes a wide body of expert knowledge that is needed before the audience – here parents – can take action. There are contradictions here also. Experts frequently disagree on the causes and risks of social behaviors and even on the results of scientific studies. Audiences knowing more, then, becomes a difficult proposition among a range of opinions, interpretations, and ambiguities. This can further support the role of the media as audiences look for clarification or it can turn audiences away as they throw their hands up in the face of so much conflicting information. It is clear, however, that the rise of expert culture has perpetuated and supported a number of media panics.

The rise of global media systems marks an unprecedented centralization of media attention and the potential to create 'panics' in large audiences. News sources can focus mass audience attention in more precise ways and create concerns that run across national boundaries. Creating concern or 'panic' works in the media's interest as concerned audiences are consistent viewers and consistent viewers help media companies sell advertising. Panic is good for the media system; often the media will even attempt to create panic about the possibility of media panics, raising concern about the media's own ability to raise concern. Media panics are also useful for the state insofar as deviance can be defined and 'rooted out' or 'policed' by concerned members of the public, thus creating an opportunity for audiences to feel empowered even when the terms of that empowerment are defined in the media. Media panics may also reflect a

trend in dominant cultures to be concerned with their own plight. In this way, media panics are symptoms of a larger crisis of a 'risk society.' On this account, the various plague, crime, and moral downfall scenarios being circulated in media systems cause panic as a culture becomes increasingly aware of its potential for self-annihilation through nuclear war, environmental degradation, social exclusion, and pandemics of disease.

However, the model described above points out certain features of media panic and ignores others. As the issues raised are not fictional, what would proper media treatment of important social issues look like? How would they properly emerge in a way not to cause panic? The features outlined above also give the impression that media panics follow a formal road map. In actuality, they differ substantially; the origins and resolution of HIV/AIDS panics around issues of sexual orientation only bear some resemblance to the issues of class and race that motivated drug panics. Finally, the term 'moral panic' itself has been used to political ends in the media. At the end of the 1990s, sex abuse scandals within the clergy were making worldwide headlines. Members of the clergy defended themselves by accusing themedia of creating panics, thus attempting to diffuse audience attention and interest. This last feature of 'media panics,' the ability of the media to create panic and by that very act, be open to the criticism of causing undue panic, demonstrates both the power of the media to control social agendas and the power of audiences to resist and restructure media agendas.

See also: Media and Language: Overview; Media and Marginalized Groups; News Language; Television: Language.

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Media, Politics, and Discourse: Interactions

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Media texts are frequently being used as corpora in linguistic analysis, treating politics- and policy-related questions such as social inclusion and exclusion, stereotypes, and constructions of national or ethnic identities (Wodak and Busch, 2004). For instance, over 40% of the papers published in the journal *Discourse & Society* are based on media texts (Garrett and Bell, 1998: 6). There are different reasons for this: given their public nature, media texts are easily available and accessible, offering even a historic dimension through archives. Media texts can be assumed to have an impact as they address and reach multipliers or a more general large public. It can be assumed that they receive attention by their audiences, as their reception is voluntary. Media texts, as other texts in the public domain, provide discursive and linguistic resources that can be seen as authoritative voice (Bourdieu, 1982). Although also in media studies news is one of the most widely studied media forms, the connection between

trend in dominant cultures to be concerned with their own plight. In this way, media panics are symptoms of a larger crisis of a 'risk society.' On this account, the various plague, crime, and moral downfall scenarios being circulated in media systems cause panic as a culture becomes increasingly aware of its potential for self-annihilation through nuclear war, environmental degradation, social exclusion, and pandemics of disease.

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media and politics has not been sufficiently investigated (Fiske, 1987: 281), and no coherent theory that integrates media theories, political theory, and social change has been developed so far.

The first part of this article discusses the correlations between media and politics. The historical perspective on developments in Western Europe shows a change of paradigms that becomes visible in the media order, in conceptions of the public sphere, and in media theory more generally. The second part focuses on approaches to the analysis of political discourse in the media. Given that the political field and the media field both undergo a process of rapid change, a flexible framework is needed, which is not based on fixed categories such as ownership or media genre and which establishes close connection between media texts and contexts of production and reception. The article therefore foregrounds approaches developed within critical discourse analysis (CDA).

Media, Politics, and the Public Sphere

The post-World War II media order in Western Europe was characterized by a strong public service broadcasting sector that aimed at reinforcing a unified national public sphere and was therefore protected by broadcasting monopolies. While print media were differentiated according to ideological, class, regional, and language criteria and therefore reached only segments of the national public sphere, the public broadcasting service addressed the nation as a whole. The public service saw itself as a kind of classroom for the nation, which it served, represented and constituted. National broadcasting could create "a sense of unity – and of corresponding boundaries around the nation," "turn previously exclusive social events into mass experiences," and "link the national public into the private lives of citizens" (Morley, 2000: 107). Within the public service the state language was seen as a means of strengthening national identities. In the case of multilingual states, such as Switzerland or Belgium, this led to the creation of parallel systems in the respective languages within the national broadcasting order. Imagining the audience as a national community and structuring communication in a unidirectional paternalistic top-down manner also determined language practices that emphasized the cultivation of a 'pure' standard language. This became apparent not only in language practices excluding 'deviant' accents, but also in ideologically loaded metalinguistic discourses.

Early mainstream theories in media sociology were based on the political philosophy of Enlightenment and viewed the individual as an actor in fulfilling the social contract that grounds civil society. The ideal of media as the fourth realm, as an autonomous controlling institution, which faces the legislative, the executive, and the judiciary, presupposes that there is a relationship of autonomy and distance between the media and the political sector. Such approaches to media and politics tend to conceive media as an omnipotent manipulatory force or to relativize the power of media with respect to politics. In both, communication is conceived as a linear process, in which the transfer of meaning from the sender to the receiver is the central concern. Such approaches fail to locate media, individual actors, and audiences within conflicting fields of interest and power relationships, which are in turn constitutive for the formulation of subject positions (Mattelart, 1999: 94).

Habermas's discourse-based concept of the public sphere defines public sphere as the mediating institution between society and the state. Media fulfill a dual role; on the one hand they are a commodity depending on the rules of the media and the advertising market; on the other they structure social relationships. In the first phase of the constitution of bourgeois nation states, media contributed to the development of the public sphere, whereas in a later phase – because of commercialization and the intimate linkage between the state and the economy – they contributed to its erosion. Habermas's model, originally published in 1962, was based on the assumption of a single unified (national) public sphere. Critics of Habermas's model were formulated by feminist studies (e.g., Young, 1987) and later also by scholars addressing the question of minority exclusion (e.g., Morley, 2000; Husband, 2001) or language as a factor of such exclusion (Busch, 2004). Habermas (1990) himself revised his model and conceded that he had neglected the existence of counter discourses, counter publics, and counter cultures. Drawing upon Foucault's notion of discourse, he recognized that the exclusion of the 'other' is a constitutive element in the formation of the public sphere and that the formation of dominant discourses is based on mechanisms of exclusion. Nevertheless, suppressed discourses can have a transformative impact on dominant discourses.

Struggle of Discourses

In the 1960s and 1970s, various processes of differentiation transformed the media landscape. All over Europe, media became a central topic on the political agenda. The state monopoly on broadcasting as well as the commercial media trusts that gained power in the concentration process were criticized for excluding a range of social groups and deviant political positions. In other words, social movements claimed

an adequate representation within the national media systems. To achieve this aim, social movements largely had to rely on their own media such as posters, leaflets, and alternative print media to express alternative or counter opinions in public.

At the same time, public service broadcasting differentiated its programs according to different styles and tastes. Alongside the nationwide programs, specific regional programs gained in importance. On the political level, regionalization in the media corresponded to a revalorization of regional autonomy and of regional languages. The idea of cultural homogeneity conceived as masculine, white, and monolingual lost in impact, as counter discourses challenged the dominant views and hegemonic social relations.

The main challenge for the public service media stemmed from the pressure of private media enterprises. It was the opposition of public versus private that dominated media policies and finally led to the abolishment of broadcasting monopolies in Western Europe. So-called liberalization first only concerned radio, which had abandoned its function as the leading medium to television already in the 1960s. In commercial media, the information aspect became subordinated to the entertainment component.

Technology-driven media theories, which prioritize aspects of form and format over aspects of content, attribute to the medium as such the leading role in shaping and transmitting a message. This approach became popular with McLuhan's succinct formula "the medium is the message," which marks a break from concepts that ascribe a preeminent power in influencing public opinion to media, both in an educational and in a manipulative way. It neglects, however, the question of how technological developments are appropriated socially and culturally. Discourse-oriented approaches to society and politics as developed by Habermas, Foucault, or Bourdieu have a strong impact on media studies and theories. This shift of perspective emphasizes social relations and cultural factors and allows revealing hegemonies and power relationships. In this sense, media can be seen as sites of discourse struggles.

Fragmentation and Reconfiguration of Media Spaces

In the 1990s, the process of decentering the national public sphere gained in momentum. The availability of satellite and cable TV and later of the Internet has led to a further fragmentation of media audiences, a reconfiguration of media spaces and an increasing multidirectionality of communication flows. Two distinctive developments characterize the new kinds of transnational broadcasting spaces and new transnational configurations of culture: the emergence of global broadcasting regions which link populations of neighboring countries on the basis of proximity, common cultural heritage, language, or ethnic identity, and the creation of new diasporic broadcasting spaces, which gather into a single audience different national communities scattered across the world (Robins, 1997: 15–16). In the broadcasting sector, the media landscape becomes complex and manifold. In addition to the traditional national public service emerge not only the global players, but also a range of local media that themselves tend to have various translocal and transborder connections. While commercial interests are constructing a transnational space as a by-product of their primarily economic motives, nonprofit ventures seek to empower local communities, marginalized populations, and civic activists.

Media formats and genres developed by public service media change in nature. Genres and text categories that used to be separated are blurred, new genres appear (e.g., infotainment, edutainment, reality soaps). Political discourse is not confined to the information genre, but also has its impact in the entertainment sector.

This development in the media field corresponds to a decentering of the nation–state at the political level. Under the pressure of an increasingly globalized economy, the state gradually loses its central role as an organizing principle in society and delegates former core competencies, on the one hand, to institutions and expert committees on a supra-state level, and on the other, to a substate level of regions and communes as well as private bodies or NGOs (Castells, 2003). Neoliberal discourses are replacing the former vision of the welfare state. The deregulation of the media system and the weakening of state influence on the media order potentially provide the media with more space for acting in their own right.

In the current debate on the desideratum of a European public sphere, it becomes obvious that the nation state with its public arena is not withering away yet. At the same time, shortcomings already inherent to the notion of a national public sphere – exclusions and fragmentations – are becoming more accentuated. Husband (2001) draws attention to the necessity of reflecting on possible interfaces between parallel and mutually exclusive public spheres in order to guarantee some social coherence. Whereas political discourse could easily be tied to (national) discourse communities within the nation state paradigm, it seems to be becoming more multilayered now.

Approaches to the Analysis of Political Discourse in the Media

In the academic field, certain assumptions that were taken for granted within the nation–state paradigm are increasingly submitted to revision. In retrospective, media are acknowledged a central role in the formation of the modern nation–state as well as in the standardization and homogenization of national languages. Present media developments seem to also allow more space, however, for nonstandard linguistic practices, for multilinguality and multivoicedness (Busch, 2004).

The present trend in approaches to media texts can be characterized in both disciplines, in media studies as well as in linguistics, by a focus away from text-internal readings, where readers are theorized as decoders of fixed meanings, to more dynamic models, where meanings are negotiated by actively participating readers. Consequently, there is a stronger emphasis on processes of transformation of discourses, on recontextualization, and on intertextuality. Nevertheless, studies that focus on production-related transformations are still scarce. Although since Stuart Hall's (1980) influential model of decoding and encoding, the reader is attributed an active role in the constitution of meanings, studies that combine the moment of the media text and its reception are not very common.

Rapid changes within the media system and within the political order demand an analytical framework for the study of political discourse in the media that is flexible and sufficiently open. Critical discourse analysis (CDA) provides such a framework, as it combines in an interdisciplinary approach close textual analysis with the analysis of the larger social context as well as with routines of textual production and reception. CDA foregrounds a dual focus in the approach to political discourse in the media: the detailed analysis of communicative events and the order of discourses, i.e., to locate these communicative events "within the fields of social practice and in relation to the social and cultural forces which shape and transform those fields" (Fairclough, 1998: 143). This involves the analysis of texts, of discursive practices of text production, distribution, and consumption, and the analysis of social and cultural practices that frame discourse practices and texts (Fairclough, 1998: 144).

The Field of Politics and of the Media

To capture how the political and the media domain are articulated and how media discourses and political discourses are interlinked, it is useful to draw upon the notion of different fields that characterize modern society as developed by Pierre Bourdieu (1982). According to Bourdieu, the separate fields of the economy, the state, the legal system, the arts, politics or the media, etc. are each marked by their own particular form of institutionalization and by their own social and discursive practices. The political field has undergone significant changes that led to an increasing specialization and professionalization of the involved actors. Political discourse manifests itself among others in parliamentary debates, political meetings, party conferences, and public debates. A certain amount of political discourse is designed from the outset to be reported and represented in the media. This is, for example, the case for parliamentary speeches in which politicians often do not only address the assembly but also a larger general public, as they anticipate mediatization. Referring to the field of politics, Bourdieu suggests that political discourse is doubly determined, on the one hand internally within the field of professional politics and on the other externally, i.e., in relation to the people politicians represent as well as in relation to other fields, the media field being one of them.

The field of journalism and the field of the media are determined by power relations and competition between different media, which become visible through certain indicators such as the market share, the value on the advertising market, the symbolic capital of prestigious journalists. The importance of the media field in relation to other fields, such as the field of politics, is that it holds a sort of monopoly on the means of production and on large-scale distribution of information. Political discourse and action are subjected to the principle of selection exerted by journalists and the media within the logic of the journalistic field, which is in turn dominated by market competition (Bourdieu, 1996: 45ff). In order to escape possible censorship that results from the selection process in media production, political actors develop strategies of presenting their concerns in forms that are likely to become media events or stories with news value. Political actors adapt their agenda and style to the requirements of media presence (e.g., short statements, studied gestures, hairstyle) and of media formats (live debates, talk shows).

Both fields, the political and the journalistic, have in common that they are directly under the influence of the sanctions of the market and of plebiscite. According to Bourdieu (1996: 92), the linkage between the two fields amplifies the tendencies of the agents involved in the political field to act according to pressures exerted by the expectations of a mass public and reduces the autonomy of the political field. In the media field, competition between different media enterprises has

become more accentuated in the past few years. Since the fall of the state monopolies, the public service broadcasting cultures have also changed significantly. Even genres that used to be relatively stable such as the national news programs on television have experienced fundamental transformations. For instance, there seems to be an acceleration of pace, a compression of time, in which live-broadcast is given priority over in-depth investigation, and short and diversified news items are combined into a more or less connected rapid succession of news flashes.

From the perspective of CDA, the relationship between the field of politics and the field of media can be understood and analyzed as a chain of recontextualizations. Writing or speaking about any social practice is already an act of recontextualization (Caldas-Coulthard, 2003: 276). Recontextualization can involve suppression and filtering of meaning potentials, but it can also result in expanding meaning potentials by adding or elaborating upon the an earlier version of the text (Chouliaraki and Fairclough, 1999). Van Leeuwen and Wodak (1999: 96) suggest that transformations due to the recontextualization of political discourse include deletion, rearrangement (e.g., changing the order of propositions, altering emphasis), substitution (through linguistic means such as nominalization, metaphor, metonymy, synecdoche, personalization), and addition (adding new elements to the representation of social practices). In this sense, recontextualization can in turn have a transformative effect on a particular practice or create a new practice.

Linking the fields of politics and media, recontextualization takes place in two directions: media recontextualize political discourse (e.g., speeches) and politicians recontextualize political discourse derived from media (e.g., quoting media as public opinion, as the voice of the common man in the street).

In the process of recontextualization, discourses may also be transposed to a more legitimate context (e.g., from an informal context to the more formal of parliamentary speech) and thus gain in power and status. Legitimation of a text can also be gained through reference to authority, reification, moral evaluation, or through reference to "true stories from real life." Authority can be gained through reference to law, a person with recognized authority, or an institution. On the other hand, laws in democratic societies often emerge from chains of political discourses in which media have their place (Wodak, 2000).

Analyzing Media Texts

With the rapid and dramatic changes in the media sector, obvious categorizations of media with regards to their area of dissemination (national, local, international, etc.), ownership structures (public service, private), or orientation (information, entertainment, education) are becoming more and more difficult. The formerly propagated separation between information and entertainment/edification can hardly be maintained as new genre names such as infotainment or reality soap suggest. Political discourse does not only appear in news or other information programs, but also in formats formerly reserved to other fields such as talk shows. Pinning down the language of news programs or the language of political media discourse becomes more and more impossible. The following part of this article therefore presents elements for an open and flexible framework for the analysis of (political) discourse in media.

Imagining the Audience

Who is the addressee and how is the relationship with the audience structured? These are central questions in the analysis of media texts. It is in fact the structuring of the producer–audience relationship and the ways in which audiences and their expectations concerning texts are imagined that determine how a text is shaped. Genres and text categories depend on this aspect. The notion of the target audience, which encompasses a spatial (local, regional, national, global) and/or a social (social status, income, age, gender) dimension is based on rigid and reified audience categories. Research on media coverage and definitions of target audiences are instruments of marketing research and correspond to criteria established by the advertising industry. Ang (1991) demonstrates that this approach is based on a discursive construct of audience that is unable to grasp the actual relationship between media and audiences and to conceive communication processes. She distinguishes between two main orientations: audience-as-public and audience-as-market. The first is generally associated with the public service media sector in which the addressee is seen as a citizen (of a state); the relationship with the audience is paternal and aims at transmitting values, habits, and tastes. It is linked to the so-called transmission model of communication, in which the transmission of a message and the ordered transfer of meaning is the intended consequence of the communication process.

The second configuration of audience is associated with the private commercial media sector. Audiences are addressed as consumers in a double sense: as consumers of the media product and as potential consumers of the products advertised in the programs. In the attention model of communication (McQuail, 1987), communication is considered successful as

soon as attention is actually raised in audiences. The transfer of meaning plays a secondary role. The scoop, the extraordinary, and the scandal gain in importance as means of awakening attention.

In the alternative media sector, the conception of the audience is determined by the idea of an active public that participates in social action and media production. The aim is to overcome the division between producers and audiences, to move closer to a situation in which the Other is able to represent itself, in which the heterogeneity of "authentic informants" is not reduced (Atton, 2002: 9). Alternative or third-sector media are consequently closer to the ideal of representing the multivoicedness of society in all three dimensions, which Bakhtin (Todorov, 1984: 56) has described: heterology (raznorečie), i.e., the diversity of discourses, heteroglossia (raznojazyčnie), i.e., the diversity of language(s), and heterophony (raznoglossie), i.e., the diversity of individual voices.

These different basic orientations in conceiving the producer–audience relationship result in preferences for particular media formats (e.g., authoritative information-centered programs, infotainment programs, and dialogic forms such as phone-in programs) and a choice of particular linguistic practices. They also determine the way in which discourses are being shaped, reproduced and transformed. It has, for example, been observed that the public service sector, at least in some segments of its program, is becoming more market-oriented and that formats and genres developed in a certain sector are taken up – sometimes in a transformed way – by others.

Modalities and Meanings

Media communication is inherently multimodal communication: this means that language in written and spoken form is one of several modes available for expressing a potential of meanings. For instance, in print media lay-out and image are available in addition to the written word; in radio, language is present in its spoken form, alongside music and different sounds; in television all the aforementioned modes can be drawn upon in a context in which the moving image holds a central position. Similarly, in computer-mediated communication, a wide range of modes is available. "A multimodal approach assumes that the message is 'spread across' all the modes of communication. If this is so, then each mode is a partial bearer of the overall meaning of the message. All modes, speech and writing included, are then seen as always partial bearers of meaning only. This is a fundamental challenge to hitherto current notions of 'language' as a full means of making meaning" (Kress, 2002: 6).

How these modes interact is not only a question of technical availability, but rather a question of social appropriation and convention, as Kress and van Leeuwen (2001) point out in their multimodal social semiotic theory. The interplay between the different modes has undergone substantial changes in media history. Writing was considered in many cultural environments as the central mode for the transfer of canonical knowledge and authoritative discourse. This practice of the predominance of the written text influenced radio production so that practically all radio texts in the early days of the medium were produced first in written form and then read in the radio broadcast. Even in television for some time, news broadcasts were read without a transmission of the image of the speaker, as it was considered that the moving image could distract attention. Linguistic practices and text genres from established media exerted and exert a considerable influence on new media and vice versa. Gradually with television, the image has moved into a central position. This has an impact also on political discourse, where appearances and the visible *mise-en-scene* of political events is becoming more important and must be considered as part of the political discourse. Live broadcasts of TV debates between representatives of different political orientations have for instance become central events in elections. Computer-mediated communication (e.g., Internet, e-mail) as well as other forms of new communication media (e.g., mobile phone news services) are increasingly present in the political field. The conversationalization of (political) discourse in the media (Fairclough, 1995: 9–10) has already gained in momentum with the image and television; possibly the new media will contribute to accelerating this development.

Text and Context

Media production is regulated by institutional routines, and media reception by everyday practices and arrangements, both depending on available resources. The production of media texts can be seen as a series of transformations, a chain of communicative events that link sources in the public domain to the private domain of media reception (Fairclough, 1995: 48–49).

Media production also encompasses the collection and selection of raw material. At each stage in media production, earlier versions of the text are transformed and recontextualized in ways that correspond to the priorities and goals of the current stage. In a multimodal context, different modes can become separated; for example, images can be subtitled with other texts or associated with other contexts.

During the production process, journalists can revert to different kinds of source material: political speeches, interviews, items already preprocessed by news agencies, press releases, archives, other media texts, etc. Current transformations in media production can be characterized on the one hand by an increasing specialization of journalists on narrower fields of reporting (specialization on topics, geographical areas, etc.) and on the other hand by a decreasing labor division between technical and journalistic parts of production. The journalist is not only responsible for the text, but also for the lay-out, the selection of images and even parts of the technical production. Replacing the typesetter, the reader and/or the sound technician, the journalist becomes the designer of a multimodal text. At the same time, because of the economic imperative of reducing the fixed costs in media enterprises, the amount of genuine journalistic investigation decreases in favor of ready-made products such as news agency material and preproduced elements and formats. Journalistic work is becoming more and more a matter of selection than of investigation and news production. This process is encouraged by an oligopolistic owner structure and practices of cross-referencing between different media. In relation to political discourse, this means that certain topics can make sometimes even unexpected media careers and become dominant in certain media areas (Siegert, 2003).

Another aspect frequently referred to in the context of media and political discourse is the acceleration of the rhythm of news production, especially with the rise of electronic media, which has in turn an accelerating influence the political agenda. That the political field responds to rhythms of urgencies was already raised by Platon, who drew attention to the differences between the actors in the *agora*, the public space, the political arena and philosophers who obey other rhythms. No doubt political and media agendas and discourses influence each other in multiple ways. Whereas earlier theories assumed a predominance of politics over the media or vice versa, contemporary approaches foreground interdependencies and interactions between the political and the media fields.

See also: Language Politics; Media: Analysis and Methods; Media and Language: Overview; Media and Marginalized Groups; Media: Semiotics; Modes of Participation and Democratization in the Internet; News Language; Newspeak; Radio: Language; Society and Language: Overview; Television: Language; Word and Image.

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Media: Analysis and Methods

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Introduction

The media provide a vast, continuous, and increasingly varied supply of linguistic data. The analytic methods which have been used to examine and explain these data are correspondingly diverse. From the early days of terrestrial television, with limited broadcasting hours, we have moved to 24-hour, multiple-channel satellite and digital broadcasting; radio stations on FM supply a wide choice of local and national programs; the Web has provided a whole new mode of electronic communication, including new ways of accessing print journalism, as most newspapers now publish on the Internet as well as in newsprint. 'Interactive' has become the digital buzzword for 21st-century media, as audiences of all kinds, readers, listeners, viewers, are invited to participate by phoning, e-mailing, texting (SMS messaging), joining bulletin boards and internet discussion groups. The 'voice' of the public is now as much a part of media discourse as the voice of the newscaster or commentator.

How has this proliferation of communicative data been approached by discourse analysts and linguists? What kind of media texts have been the focus of analysis and what kind of questions do we ask about such texts? This article presents some of the main analytic approaches to media discourse over the last two decades, and gives a summary of the concepts and issues that have been most salient in this work. The first section concentrates on aspects of participation: work dealing with analyses of speaker roles, voices, and identity in media discourse. The second section outlines aspects of content, dealing with work which has focused on how the media construct and represent the world. The final section addresses the particular characteristics of selected media genres, summarizing those aspects of media discourse which have been considered as context specific, institutionally oriented, and, as such, analyzably different from other forms of text and talk.

Analyzing Participation in Media Discourse

A major concept within interactional sociolinguistics, based around Goffman's notion of participation frameworks and 'footing' (Goffman, 1981), is the complex relationship between speakers, hearers, and the context of utterance. Goffman challenges the 'speaker/hearer' conduit models of communication and shows how these two categories can be described in far more contextually sensitive terms.

Participation Frameworks and Footings

Linguistic analyses of media discourse have drawn heavily on Goffman's work, particularly in relation to the discourse of public participation broadcasting (talk shows, radio phone-ins, panel debates, etc.), where members of the public interact with media professionals and other institutional representatives. These programs set up particular configurations of participant roles that are institutionally determined and generically specific. So, for example, in a British TV current affairs panel debate such as the BBC's

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Question Time, the host, the members of the panel, and the audience occupy different participant roles as the program unfolds. All are 'ratified participants' in the communicative event, but the relationship between their position as speaker or hearer, addresser or addressee, is both complex and shifting. In his analysis of indirectly targeted utterances in this TV panel discussion, Levinson (1988: 221) pointed out that "having a set of participant role categories is one thing, but working out **who** stands in **which when** can be quite another, on a vastly greater plane of complexity."

A microanalytic account which addresses this complex relationship in mediated interaction is Hutchby's (1999) analysis of frame attunement and footing in talk radio phone-in call openings. Starting from Goffman's notion of 'mutually ratified participation' in situated interactions, Hutchby described how callers move from a state of 'incipient' speakership to actual speakership and topic initiation in the first three seconds of these, usually routine, opening sequences, such as the following:

> Host: Joan calling from Clapham now. Good morning.
> Caller: Good morning Brian. Erm:, I (li) I also agree that the . . . (Hutchby, 1999: 46)

He argues that the sequential organization of the call opening (i.e., host goes first, caller goes second, with a specialized distribution of turn types; see 'Media Talk as "Specialized" Speech Exchange Systems' below) is only partly how institutionality is achieved in this context. Temporality is also crucial here; Hutchby identifies the moment-by-moment shifts of footing hosts and callers move through (i.e., the greeting, 'buffer' [erm], and topic initiation) in order to effect a transition from the private sphere of the caller into the public sphere of the broadcast.

In addition to providing a set of categories and a description of the range of participant roles in a TV or radio broadcast, the analysis of participant roles and turn-taking positions in these programs enables us to examine the relationship between the institutional and the communicative context for talk. An analysis of the participation framework also enables us to examine typically who does what in those roles, i.e., the type of turns taken by each participant. As an illustration, a popular radio phone-in format will typically involve a host, a studio guest, and a caller (as well as the wider listening audience). In their institutional roles, these participants do different things: the role of the host is to mediate interaction between caller and guest, while the caller asks the questions and the guest gives the answers. However, although the caller occupies the potentially powerful role of questioner, their right of reply is not given in this context; the third-turn receipt of the answer is generally taken by the host, who may or may not offer a further turn to the caller. This third turn is a host's resource for controlling the trajectory of the talk (Thornborrow, 2002).

Participation and Identity in Public Participation Broadcasting

Often linked to the analysis of speaker roles, another analytic concept used to examine participation in media discourse is the use of the categories 'expert' and 'lay.' These terms describe the institutional and social status of participants, and have a bearing on the kind of talk that they will be invited to produce. In a discussion of the participation framework in *Kilroy*, a former British TV talk show, Livingstone and Lunt described the difference between expert and lay discourse. Talk by lay audience members is real, authentic, grounded in experience, 'hot'; while expert talk is 'cold': artificial, fragmented, and ungrounded (Livingstone and Lunt, 1994: 102). Experts speak for others, while the audience speak for themselves. Again, using Goffman's model of 'footing' to describe the relationship of a speaker to their utterance, it was claimed that a lay participant speaks from a position of 'animator, author and principal,' in their own voice, in their own words, with commitment to what they say, while experts talk as animator rather than author or principal, speaking with an institutional voice, for 'the profession' and not from personal experience or commitment.

The theme of authenticity, and what is meant by an authentic voice in media discourse, has been taken up in Thornborrow and van Leeuwen (2001). Another way of thinking about the expert/lay dichotomy in public participation broadcasting is to look at how speakers identify themselves in this context. While some participants in these programs are identified by name and by their institutional relevance to the topic at hand by the host, so-called lay participants have to do this work for themselves. Callers to radio phone-ins, and participants in talk show debates, routinely construct a relevant situated identity in relation to what they have to say:

> Caller: hello yes uh my question uh to the prime minister is on health .hh I'm a nurse in (.) a London teaching hospital and (.) my question is this [–] (Thornborrow, 2001b: 464)

This process of 'discursive grounding' provides a relevant frame for their contribution to the talk. A similar kind of action can be found in the way callers legitimize their opinions and viewpoints through a process Hutchby (2001: 495) called 'witnessing': "they bring into play claims that are – or are

assumed to be – incontrovertible, such as being a member of the category of pensioners, or having seen an event with one's own eyes."

Participation and Identity on the Net

The question of participant identity is also one that has been explored in relation to computer-mediated communication (CMC), where participation frameworks are configured differently again from broadcast radio or television media genres. It has been suggested that one of the primary features of Web-based communication is the option not to reveal aspects of one's social identity. It is possible to conceal age, gender, ethnic background, and class – the traditional sociolinguistic 'big four' variables – and construct a persona which is free from visual or spoken identity markers. The advantages of Web-based communication have been studied from the perspective of people who suffer from some kind of impediment or disability in face-to-face, or voice-to-voice, communicative situations, and for whom interaction is facilitated through the written modes of e-mail and messaging (cf. Lupton, 2002).

However, the construction of a virtual identity can clearly have negative effects when used to intentionally deceive others. In spite of the initial view that the Internet was going to release users from conventional social hierarchies and prejudices, research has shown that in CMC, people still make assumptions about who they are communicating with based on stereotypical interpretations of gendered behavior (cf. Deuel, 1996).

Analyzing Representation and Ideology in Media Discourse

Turning from participation in mediated interaction to the subject matter of media discourse, the analysis of content – particularly of print and broadcast news – was the focus of research in media studies begun in the mid-1970s by a group known as the Glasgow Media Group (1976, 1980). This concern with content as ideological representation was also taken up from a linguistic perspective in the development of a body of work known as 'critical linguistics' (cf. Kress and Hodge, 1976).

Critical Linguistics and Critical Discourse Analysis

In terms of media analysis, critical linguists began to look in detail at the linguistic structures in news reporting, particularly at the processes of grammatical and lexical selection and representation. Basing their claim on what has been described as a 'weak version' of the Sapir–Whorf hypothesis, they argued that ideological positions can to some degree be 'read off' from linguistic form. Linguistic processes such as transitivity, nominalization, and passivization realized as systematic textual choices present different ideological versions, or theories, of the world, and of events, actors, and actions in it (Fowler, 1991; Simpson, 1993).

Driven to some extent by the political context at that time (in Britain this was characterized by monetarist economics, industrial unrest, and, as in the United States, hard-line nuclear defense policies), this work was developed in order to challenge and critique the dominant ideologies of Thatcherism and Reaganism in a range of textual genres, from media news reports to political speeches and policy documents (Chilton, 1988; Fairclough, 1995). Montgomery's (1996) analysis of the news reports of the British coal miners' strike in 1983 showed how contrasting representations of what is ostensibly the same event can be produced through different selections of linguistic forms. Key theories which have been elaborated by Norman Fairclough within the field of critical discourse analysis (CDA) are 'synthetic personalization' and the 'marketization' of discourse, the 'commodification' of social institutional processes such as education, and the 'mediatization' of politics and government. With the change in the political agenda brought about by the election of a Labour government in Britain in 1997, Fairclough (2000) turned the spotlight on the language of Tony Blair's New Labour, analyzing the rhetorical construction of political spin: the control over the way politicians use language to communicate their ideas through the media.

The agenda of CDA, as it has been set out by Norman Fairclough (1995), Teun van Dijk (1988), and their colleagues across Europe over the last 10 to 15 years (Wodak and Meyer, 2002), is to provide a set of critical tools and analytic methods with which to challenge and critique ideological discourse practices. Examples of this approach as it is applied to media texts can be found in van Dijk's analysis of racist discourse in the press (1991) and in Ruth Wodak's research into attitudes towards immigration, racism, and the European Union. Gunter Kress and Theo van Leeuwen (1998) also take a critical approach to media texts in their work on the semiotics of newspaper layouts. This is an analytic approach which takes into account the organization of not just the verbal, but also the visual aspects of mediated communication, and offers a multimodal analysis of the components implicated in the production of textual meanings.

The theoretical grounding of CDA and its methods are not without critics. There can be a tendency to

overtheorize at the expense of paying close attention to empirical data, and a proliferation of technical terms that are not always clearly defined. As a methodological 'toolkit' for the analysis of media (or indeed other) texts, however, one of the clearest and most systematic accounts of the application of CDA to media texts can be found in van Dijk (1998). Here he laid out a set of analytic parameters (social functions, cognitive structures, and discursive expression and reproduction) and summarized the relationship between them, demonstrating how they can be used to unpack the ideologies which organize social attitudes and opinions in news stories.

Despite these criticisms, it is clear that what versions of discourse analysis taking a sociocritical approach to textual data can convincingly do is show the kind of underlying background assumptions and prevailing discourses which structure hegemonic social meanings in texts. As an example, Justine Coupland's work on the representation of social groups in a range of advertising texts from dating ads to face cream ads focuses on the social construction of age and identity. Coupland uses the concept of commodification of the self to analyze the discourse of dating adverts (1996) and more recently, to analyze the ideological discourse practices involved in advertising skin care products (2003), i.e., the presupposition in that ageing is problematic.

CDA has established itself as one of the principal methods for analyzing and critically evaluating the content of media discourse broadly understood, whether in spoken mode (see Fairclough, 1995, for analyses of popular television series in Britain such as *Crimewatch UK* or *Medicine Now*) or in the print media, from advertising to newspaper reporting.

Analyzing Generic Properties of Media Texts

The analysis of representational aspects of media discourse as outlined above is only part of the story. The analysis of media discourse as a particular form of **talk** has been the subject of a wide spectrum of research, which has focused on unscripted, broadcast talk. This is first and foremost 'public' talk (Scannell, 1991), since one of the most significant ways in which media talk differs from talk in many other nonmediated contexts is the fact that it is produced for an audience that is not copresent (often termed 'the overhearing audience'). Most of the major analytic work which focuses on mediated talk as interaction has been undertaken in the field of conversation analysis (CA).

Media Talk as 'Specialized' Speech Exchange Systems

From the perspective of CA, the media have provided a highly fruitful source of institutional data. Examining mediated interaction as a context for talk which has a restricted and preallocated turn-taking system, and a specialized distribution of turn types, conversation analysts have been able to describe the organization of talk in media genres such as news interviews and public participation programs on both radio and television. The turn-taking system of a news interview is "a course of interaction" (Clayman and Heritage, 2002: 13) designed to maintain the audience as addressee. Specifically, news interview openings set agendas and regulate interviewees' access to interaction, while closings are managed to limit abruptness within strict time limits. The turn-taking process involves one party asking questions (the interviewer) and the other responding to them (the interviewee); furthermore, it always falls to the interviewer to respond to an answer in third-turn receipt position, which enables them to do things such as reformulate an answer either positively, negatively, or aggressively.

This speech exchange system is very different from conversational turn taking, where there is no preallocation of speakers or specialized distribution of turns.

Issues of agenda setting, agenda shifting, and neutrality in news interviews have also been addressed by conversation analysts: for example, the design of interviewer questions, and the various strategies deployed by interviewees in answering (or not answering) the question. Clayman and Heritage pointed out that interviewers "often work to place some degree of distance between themselves and their more overtly opinionated remarks" (2002: 152) and the most usual way of doing this is by attributing that point of view to a third party, as in the following example:

> IR: .hhh People have used the phrase 'concentration camps': and the Bosnians themselves have used that phrase. Do you believe there's any justification for that at all? (Clayman and Heritage, 2002: 153)

Neutrality is jointly produced by both interviewer and interviewee, and interviewees collaborate in maintaining the neutralistic stance by not challenging third-party assertions, although as Clayman and Heritage pointed out, they generally tend to refute them. Current styles of adversarial interviewing, and the increase of debate interviews where multiple interviewees take part in the interaction, usually with the intention of providing institutional

'balance,' are now also beginning to be investigated by conversation analysts as the genre changes and evolves.

It is not only the turn sequences of questions and answers in news interviews that have been shown to be contextually specific. This is also the case in other broadcasts such radio phone-in programs, where callers can engage in various kinds of questioning activity. An example of how mediated interaction can be seen to differ from conversational interaction can be found in Hutchby's (1995) analysis of the design of advice-giving turns in a radio phone-in program. In this context again, listeners have to be maintained as ratified participants in the talk event, as well as the host, expert adviser, and callers. The advice giver manages this by moving from the particular to the general, addressing not only the current caller with the problem, but all listeners who may also have the same problem, thus making their advice relevant for not just one addressee but for their wider audience.

The design of talk for this 'overhearing audience' has been one of the central concepts in conversation-analytic approaches to media discourse, and it has also been taken up more generally by discourse analysts interested in the particular, public, nature of broadcast talk.

Media Talk as 'Performance'

Drawing on the notion that mediated communication is public talk produced for the listening and viewing audience, a body of work has emerged which analyzes media discourse as 'performance.' With specific reference to television talk shows, Tolson (2001b) examined the ways in which interaction in these programs is 'doubly articulated,' i.e., designed for its immediate recipients as well as the studio and/or viewing audience. Focusing on discourse genres such as conflict talk, argument, narrative, and therapy talk, which characterize many TV talk shows, these studies show how unscripted talk produced in such contexts is nevertheless performed for its audience. And such talk can be considered as "a form of play with pragmatic expectations of conversational practice" (Tolson, 2001a). For instance, Myers (2001) examined how a topic is made into an issue on the *Jerry Springer* show through four distinct stages: defining and representing stances, making those stances controversial, making them dramatic, then finally, making them meaningful. Wood (2001) looked at how Kilroy (former host of a British talk show of the same name) pursues an agenda through particular types of question and answer sequences which maximize conflict and enhance levels of 'televisuality.' She argued that in these shows it is not simply a case of lay speakers being given a voice in the sense that ordinary people are invited to talk about their everyday lifeworlds; rather that the talk is constructed and managed in order to produce debate and dissent – i.e., the pursuit and performance of conflict. Similarly, Thornborrow (2001b) showed how narrative discourse of lay participants is elicited and managed in order to maximize the most dramatic moments of a story for the audience, examining the role of the host as narrative dramatizer as well as narrative elicitor.

Media Discourse Genres: Some Examples

The fact that mediated communication gives rise to highly context specific genres of discourse has also been addressed by sociolinguists interested in describing forms of talk generated by broadcasting institutions, from DJ talk to sports commentary. Many of these media discourse genres have highly distinctive linguistic and pragmatic features, not only in terms of their content, but also in terms of their register, modes of address, and deictic format.

DJ Radio Talk In a seminal paper on DJ talk, following Goffman (1981), Montgomery (1986) produced a further challenge to the model of mass communication which understands the communicative event in terms of a single speaker addressing a mass audience. Basing his analysis on pragmatic concepts of deixis and speech act theory, Montgomery showed how monologic DJ talk foregrounds an interpersonal relationship between the DJ and his audience, continually shifting its mode of address between different constituencies in the listening audience. Interpersonal features of DJ talk include simulating copresence through the linguistic devices of social and spatial deixis, the use of speech acts that require responses, e.g., questions and directives, and the use of expressives, e.g., congratulation and commiseration.

Montgomery also drew on Goffman's concept of participation frameworks and footing in order to examine alignments between speaker (DJ) and an array of hearers, through a process of interpolation, e.g.:

> Okay Fleet Street
> (they're all awake now)
> I have news of a rock star (Montgomery, 1986: 437)

In this way, Radio DJs constantly realign their talk to address different segments of the audience, from the individual to the collective, but very rarely to the general mass.

Mediated Narratives Narrative discourse is pervasive in broadcasting. In addition to the fictional genres of film, drama, soap, and sitcom, contexts for

storytelling include news, documentary, TV talk shows and talk radio, broadcasting, and, most recently, reality TV. An early account of how private stories are produced as public discourse is Montgomery's study of narrative discourse on a popular British radio station. In his analysis of 'Our Tune,' a regular slot through the 1970s and 80s which featured listeners' stories of overcoming personal difficulties in their lives, Montgomery used a Labovian framework of oral narrative analysis to show how different components of the stories become adapted to this particular mediated event. The DJ becomes the 'epistolary narrator' transforming the story from its original form of a private letter to the public medium of the spoken word. Through the use of 'empathetic orientation' towards the story protagonists, and specialized evaluation clauses that Montgomery calls 'generic maxims,' the DJ reconfigures the relationship between the teller, the story, and its recipients for its new, broadcast context (Montgomery, 1991).

More recently, the design features and discourse structure of storytelling by lay participants on British and American talk shows have been examined from a range of analytical perspectives (cf. Thornborrow, 1997, 2001b; Lorenzo-Dus, 2003). Drawing on CA, as well as the pragmatics of facework, Goffman's concept of role relations, and Gidden's notion of the 'project of the self,' this work examines aspects of situated narrative form as well as its contextual function as a component of public participation broadcasting. Telling stories becomes a quasitherapeutic act, what Lorenzo Dus called 'emotional DIY,' conducted in the public domain.

Live Commentary Relaying live events to a listening or TV viewing audience has become one of the primary functions of public broadcasting. The language of radio and television commentary, from sporting events to state ceremonies, is distinctive in its form, and linguistically particularly interesting as a media discourse genre. As Stephanie Marriott (1997: 194–195) explained, the commentator is "perpetually poised on the edge of the new," and commentary constructs a shared "emergent present" between speakers and recipients. For radio, this involves a shared temporal framework, and in the case of television, also a shared spatial perspective: the visual field of the television monitor in the studio and the television screen of the viewer. This intersubjectivity between commentator and viewer is created linguistically through a high instance of deictic expressions which enforce the mutual, shared experience of the here and now, of first- and second-person pronouns which foreground the interpersonal relationship between speaker and hearer, of hedged opinions which allow for the uncertainty of the moment, and of present and present perfect tenses which locate events in the 'now' and the 'just now.' Here are some examples from a bowls match commentary, and a snooker game:

1. Well, Mervyn, if he can make contact with his own nearest blue bowl and punch out the nearest McMahon bowl, could establish a set and match winning lie – he's running after it – he rather likes it – he's thereabouts – he's got it.
2. I promise you the pressure has got to be the greatest ever.
3. Well that's worked out exceptionally well for Steve. (Marriott, 1997: 194)

'Netspeak,' E-mails, and SMS Messaging To conclude this selection of linguistic analyses of media genres, no account would be complete without a brief comment on the most recent phenomena of the electronic age of communication, the Internet and the cell phone. These media not only give rise to different participation frameworks for communication (see above) but also, it is claimed, to new forms of written language. David Crystal (2001) examined some of the changes that the new medium of the Internet has brought about, e.g., neologisms, new conventions in formatting and punctuation, and the use of graphic symbols (emoticons) as expressive and evaluative discourse markers. Crystal takes the view that language is not only changing on the Internet, but it is changing **because of** the Internet. Others are more cautious in their claims, asking whether language use on the Internet is really so different from other varieties and registers to merit a label of its own. However, a consensus seems to be developing that 'netspeak' or 'netlingo' is at the very least a form of written communication that shares some characteristics with spoken language, and these characteristics can be contextually identified and linguistically described.

E-mail communication has been described both as "letters by phone" and as "speech by other means" (Baron, 2003), capturing the difficulty of pinning down precisely what is distinctive about this form of communication. The language style is informal (but not as informal as face-to-face speech), a fast response is expected (but doesn't always get acknowledged), an e-mail is generally intended for a limited audience (but leaves a trace and can be forwarded to others without the sender's knowledge), and it is often treated as ephemeral: unedited and with the production errors left in (but it can be printed out, edited, and traced). The synchronous (real time) interaction that takes place in online chatrooms, with instant messaging, or in multiple user dialogs can be as complex as

multiparty talk: it is characterized by a high level of 'addressivity,' short turns, different conversational strands running simultaneously, and back channel support/minimal response tokens (Thurlow *et al.*, 2003) While this form of communication is immediate, sharing many features of face-to-face interaction, it nevertheless relies on the use of the keyboard. The need for interactional speed leads to the development of specialized forms such as letter homophones, acronyms, and hybrids of both, capitalization for stress and emphasis, stylized spelling, and the use of emoticons and other graphic symbols which form a code, a linguistic variety used in this specialized context, which, like all mediated interaction, is constantly evolving.

See also: Documentary; Language in Computer-Mediated Communication; Media and Language: Overview; Media and Marginalized Groups; Media Panics; News Language; Radio: Language; Sports Broadcasting; Television: Language.

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Media: Pragmatics

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Today, many, if not most, people in the world live in societies that can be described as 'mediatized societies.' A mediatized society is one in which the meaning processes, or discourses, provided by the communication media play an increasing, even overwhelming, role in the way society is economically, politically, and culturally organized, affecting the way we as individuals and groups think about everything and thus what we do in all contexts of life.

The mediatized society affects us in whatever social roles we have to fill in everyday life. As citizens, we are concerned about the organization and power relations of society; as consumers, we have to take care of our material, intellectual, and wider cultural needs; and as human beings, we have to organize our private lives as individuals, couples, or families on a daily, weekly, and yearly basis.

In all these respects, we are surrounded and affected by the sea of discursive meanings produced by the media. It is therefore mandatory for the understanding of modern society to understand the complex social meaning processes that have media at their core. This requires a 'pragmatics of media' that explores media discourses in their situational and social contexts.

Approaches to the Study of Media Discourses

It has gradually become accepted, at least in principle, that in order to understand the workings of the mediatized society it is necessary to adopt a holistic perspective of the media, according to which it is necessary to not just analyze the media texts but also to consider the production and reception processes involved in media texts, as well as the macro-social context, as interdependent objects of empirical analysis. For a number of years, these processes were conceptualized theoretically in semiotic terms as a signifying process, along the lines laid down by the so-called 'encoding/decoding' model of mass communication (Hall, 1980) (**Figure 1**).

This model implies that any study of a media genre or of the media coverage of real-world events must research, in addition to the textual aspects, the production and reception stages around the text. The

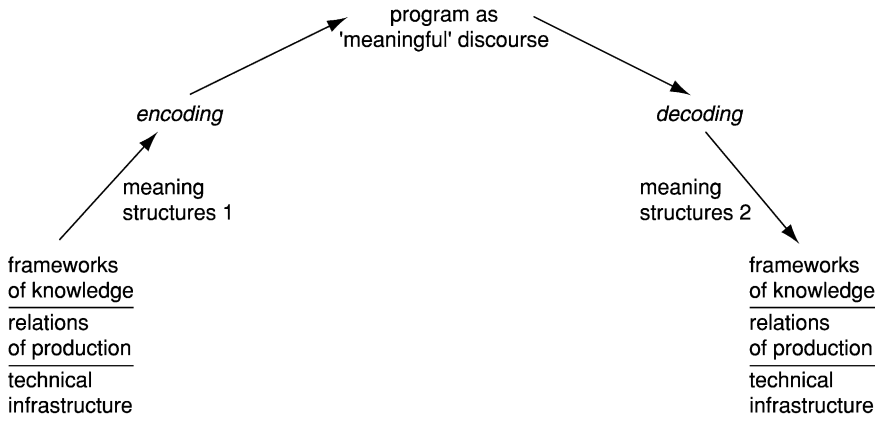

Figure 1 The encoding/decoding model. Reproduced from Hall S (1980). 'Encoding/decoding' In Hall S, Hobson D, Lowe A & Willis P (eds.) *Culture, media, language*. London: Hutchinson.

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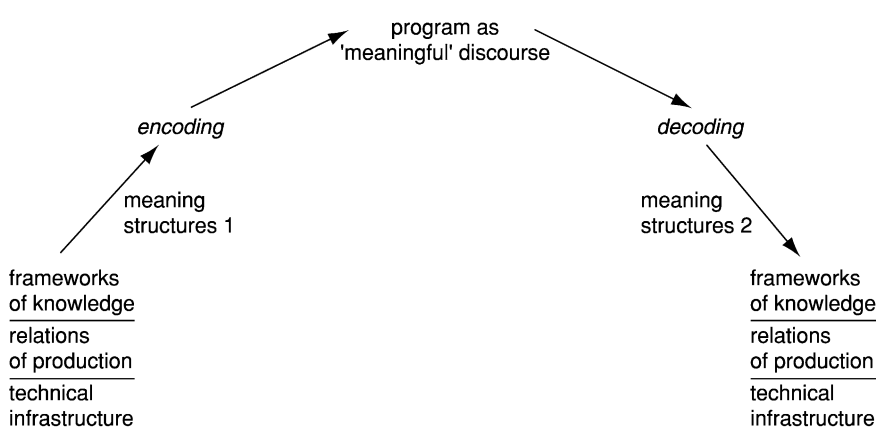

Figure 1 The encoding/decoding model. Reproduced from Hall S (1980). 'Encoding/decoding' In Hall S, Hobson D, Lowe A & Willis P (eds.) *Culture, media, language*. London: Hutchinson.

model serves to remind analysts that in analyzing a text, they are dealing not with a fixed structure of meaning, but with a volatile phenomenon resulting from the signifying codes of both the producers and the recipients of the text. Crucially, these codes need not be identical; indeed, since the codes at the disposal of any individual consist of a unique assemblage of the meanings assimilated during that person's life history, the codes of producers and receivers are in principle nonidentical. Consequently, one should expect to find multiple meanings resulting from different individuals' reading of a news bulletin, an advertisement, or a TV reality show.

On the other hand, people also belong to interpretive communities (constituted by such factors as class, ethnicity, gender, age, profession, location, etc.) in which meanings are shared to a large extent (Schrøder, 1994). Therefore, a purely textual analysis of a media text can still be justified, as long as the analytical findings are offered cautiously as potential meanings, or made on behalf of a specific interpretive community whose sign universe makes these meanings plausible.

In recent years, the term 'discourse analysis' has gained general acceptance as the way to characterize the theoretical and methodological framework, often holistic, within which analyses of media language and communication are carried out in the interdisciplinary field of media studies, cultural studies, and communication studies. For a general introduction to the most prominent distinctive approaches to discourse analysis in the social sciences and the humanities, see Jørgensen and Phillips (2002).

First-Generation Discourse Analysis: 'Critical Linguistics'

Critical linguistics developed in the 1970s as an influential school of early discourse analysis because it was able to demonstrate the close relationship between the detailed linguistic choices and the production of ideology in media texts (especially news) and, by implication, to explain how media ideology contributed to the reproduction of a social order characterized by inequality and oppression (Fowler *et al.*, 1979).

Critical linguistics adheres to an early version of linguistic constructionism, according to which the words of our language function as a conventionalized mental grid through which we perceive reality. Words constitute the reality that they designate, and when newspapers inform about social states and events they inevitably construct those very states and events.

Going one step further, critical linguistics claims that also the syntactic choices made in a text have a constraining effect on the construction of social reality. The most important of such syntactic–ideological processes are those of passivization and nominalization.

This should not be taken to mean that the verbal choices in news reports can be made by journalists at will. As mentioned previously, the formation of public opinion through the media in capitalist societies is controlled by those with economic and social power over the mass media, who will see to it that social affairs are represented in such a manner as to not jeopardize their interests and privileges. Consequently, there is a power dimension in all public communication, an ideological thrust that by its sheer omnipresence in the aggregate media landscape manages to establish the current social arrangements as natural and inevitable and to discredit alternative perspectives as being contrary to common sense.

It is the task of critical linguists to expose the ideology conveyed by the media, to demonstrate that news reports of social affairs are indeed constructed and that they systematically portray a state of affairs that is not in the best interest of the majority of the population.

It is thus the goal of detailed linguistic analysis to demonstrate how various seemingly innocent linguistic features in a text convey ideological meanings that reproduce existing unequal power relations. Through linguistic analysis of the news text, the critical linguist is able to expose "warped versions of reality" (Fowler, 1985: 68).

Drawing on Halliday's (1978) theory of functional grammar and social semiotic, innumerable publications by the core group of critical linguists through the late 1970s and the 1980s have described the specific linguistic features that "will probably repay close examination" (Fowler, 1985: 68; see Fowler *et al.*, 1979; Hodge and Kress, 1988). The 'checklist' presented in Fowler (1985) includes the following:

1. Lexical processes: Under this heading, critical linguists examine the way a text uses different lexical fields through the choice of vocabulary (including metaphors) from specific areas of experience, such as scientific vocabulary in a cosmetics ad or management jargon in a political text.
2. Transitivity designates the textual construction of reality through the description of participants and processes, as reflected in the nouns and verbs of the text. As Fowler (1985: 70) states, "Different choices of transitivity structure will add up to different worldviews."
3. Syntactic transformations: Critical linguists believe that certain syntactic transformations of sentences, particularly those labeled 'passivization' and 'nominalization,' are ideologically problematic

because they may make agency invisible and thereby obscure who did what to whom or significantly change the relative prominence of the participants.

4. Modality: Under this heading, analysts search for the different linguistic features (e.g., modal verbs and adverbs) through which speakers and writers may express their attitudes toward the events depicted by the sentences in which they occur.
5. Speech acts and turn-taking: Analysts should consider for each sentence or utterance what speech act it appears to perform and how it may build positions of power in the situation in which it is written or spoken. The analyst may also produce interesting insights about the power aspect of interpersonal interaction by examining the turn-taking patterns of different kinds of dialogic and discussion-oriented TV programs: who can speak when and about what, who can open up new topics, etc.
6. Implicature: This linguistic feature is best explained as the meaning that can be found by 'reading between the lines.' There is more to meaning than what is said, and an essential part of the meaning communicated through language is inferred by the speakers from the situational and social context.
7. Address and personal reference: Under this heading, the analyst may consider how different stylistic choices can be seen as addressing some readers rather than others (such as a Latinate vocabulary addressing the educated), how naming conventions affect the degree of formality, and how personal pronouns (*you* used with simultaneous individual and mass appeal in ads, and *we* used to include or exclude listeners from the group the speaker belongs to) may affect interpersonal relationships.

This checklist of potentially ideology-bearing features developed by 'critical linguistics' has found its way into many later forms of qualitative textual analysis of the media, including the approaches to discourse analysis discussed later.

It is not evident, however, that they are all equally useful for the production of insights about the media's signifying processes. For instance, transitivity analysis requires an immensely time-consuming scrutiny of textual details, and even when a kind of ideological pattern does emerge from the analysis (see the case analyzed in Fowler, 1985), it is usually a fairly predictable one that even a cursory glance at the text would have discovered. Therefore, especially for students with little linguistic training, transitivity analysis is usually not worth the effort.

Regarding the 'syntactic transformations' of nominalization and passivization, it is doubtful whether the claims of their mystifying effects are really warranted. In most cases, they appear to be based on erroneous assumptions about the 'nonrecoverability' of the transformed or deleted linguistic items (Trew, 1979). It seems to be equally probable that on the basis of their overall knowledge of the world, their familiarity with the media agenda and yesterday's news reports, and their general communicative competence, average newsreaders will have no difficulty in reconstructing who did what to whom, despite the agent having been deleted from the sentence through a passive construction. Interestingly, an empirical study of readers' reception of newspaper articles previously analyzed by Trew found that the syntactically constructed ideology of the articles did not determine the readers' views of the events reported. Their views depended on their identities and life histories as much as on an ideological effect attributable to the news language (Sigman and Fry, 1985).

Critical Discourse Analysis of the Media

Although clearly intellectually rooted in critical linguistics, critical discourse analysis (CDA), as developed by Norman Fairclough and others since the late 1980s, represents a significant theoretical and methodological advance toward the interdisciplinary study of media discourse (Fairclough, 1995, 2003; van Dijk, 2001; Wodak and Reisigl, 2001). Rather than concerning itself just with the media's textual reproduction of ideology, CDA sets up a comprehensive theoretical framework that relates textual features systematically to the situations in which those texts are produced and consumed and to the larger social processes of the society in question.

This theoretical framework is often described through a model of three embedded boxes (Figure 2),

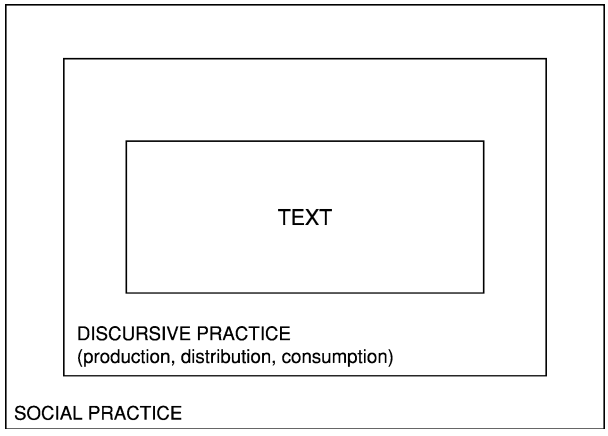

Figure 2 Dimensions of analysis in CDA. Reproduced with permission from Fairclough (1995).

each of which represents a dimension of analysis (Fairclough, 1995: 59).

'Texts' stand at the core of the model and are explored through the same forms of linguistic analysis that are used by critical linguistics, with the purpose of illuminating the way the text represents social reality and the way it portrays the identities and relations of the participants in the textual universe.

The second dimension of analysis deals with 'discourse practices' – that is, the processes through which the media text is produced in media institutions and consumed, or 'decoded,' by the audiences and users in the context of everyday life. The discourse practices are seen as mediators between texts and macrolevel 'sociocultural practices,' which constitute the third dimension of analysis. On this level, the phenomena brought to light by the other two dimensions are viewed in relation to the macrosocial processes that characterize the societal 'order of discourse' at a given point in time (*see* **Discourse, Foucauldian Approach**).

CDA, in contrast to critical linguistics, is founded on an acute awareness of the ambivalent role of media discourses in the social formation. Inscribing his model into the current debates about 'structure' versus 'agency' (Beck *et al.*, 1994; Giddens, 1984), Fairclough placed his approach within a social constructionist theory of society according to which media discourses are constituted by social practices and also are constitutive of such practices.

This means that, on the one hand, mainstream media discourses are constrained, by the economic and political frameworks within which they operate, to produce versions of reality that are on the whole supportive of the existing social order. On the other hand, the fact that the existing social order is not monolithic but characterized by diversity and ideological struggle means that the faithful representation of this very reality must also be characterized by diversity and struggle, and the outcome of such representational struggles is by no means certain to always favor the power elites. The end result of the media's discursive practices in a given area is therefore often uneasily balanced between social reproduction and social change, between convention and innovation.

For example, the macrosocial phenomenon that Fairclough terms the 'conversationalization' of public discourse in the media (i.e., the increasing occurrence of informal speech forms and colloquial expressions in television news and documentary programs) can be seen as sometimes working to support ideologically hegemonic forces because it may trivialize and simplify complex social relationships. However, conversationalization may also serve as a generator of cultural democratization because it may make complex issues easier to understand: "The communicative style of broadcasting lies at the intersection of ... democratizing, legitimizing, and marketing pressures, and its ambivalence follows from that" (Fairclough, 1995: 149).

'Intertextuality' is a key analytical concept in CDA designating a principle of textual construction and recognition encompassing several distinct processes. It is meant to cover the basic fact that any text is indebted to innumerable previous source texts and will itself potentially become a source for an infinite number of future texts. Intertextuality also includes the way a text may stylistically echo one or more well-established genres, or particular well-known texts (e.g., when a TV commercial echoes the Western genre or a specific Western film), as well as the way a text may use specific recognizable passages from other texts (e.g., when a U.S. presidential hopeful inserts into his speech a passage from the Declaration of Independence or the Bible, or when news stories rely on direct or indirect quotations of a politician's statements).

Finally, the intertextual perspective means that the analyst should search for the way the particular text may draw on different 'orders of discourse.' This is a term that Fairclough borrowed from Foucault and that he defined as "a structured configuration of genres and discourses ... associated with a given social domain" (Fairclough, 1998: 145) with clear implications for the regime of knowledge and power that rules within the particular domain. In the case of political discourse in the media, one may find that the conventional political order of discourse is intermingled with scientific and technological orders of discourse, the order of discourse of grassroots politics, the everyday order of discourse, etc. to create a new hybrid superordinate order of discourse that may herald innovative processes in the political domain.

The main limitation of CDA, which in no way invalidates its achievement as a stimulating theoretical framework for media analysis, is the lack of empirical consideration of the middle level of analysis, the discourse practices. Fairclough deliberately excludes this aspect from his own analyses, stating that "my emphasis will be upon linguistic analysis of texts...I am not concerned ... with direct analysis of production or consumption of texts" (Fairclough, 1995: 62). It is nevertheless a limitation that becomes acute if the analyst wants to discuss the sociocultural implications for audiences of the meanings found through textual analysis. Very few researchers have undertaken a fully holistic, empirical study of media discourses examining the text-mediated communicative circuit between senders and recipients. Among the exceptions are Swales and Rogers's (1995) study

of corporate mission statements and the studies of the news circuit by Gavin (1998) and Deacon *et al.* (1999).

Conversation Analysis and Discursive Psychology

A third important discourse analytical approach has been developed mainly by scholars in the field of discursive psychology (Potter and Wetherell, 1987). Among its heterogeneous ancestry, there is no doubt that the ethnomethodology/conversation analysis complex has had the most formative influence on the approach with regard to the actual procedures of analysis. It is the analytical aim of conversation analysis to explore the situational micromechanics of verbal interaction, illuminating among other things the speakers' management of turn-taking processes through adjacency pairs, the role played by silences and interruptions in the flow of interaction, the way speakers manage topic development and topic change, mechanisms for 'opening up closings,' and so on (for general introductions to conversation analysis, see Nofsinger (1991) or Have (1999)).

Like conversation analysis, discursive psychology takes its point of departure in the situational context in which language is used. However, it does so in order to explore how the micromechanics of verbal interaction affect wider cultural, political, and social processes, for instance, in the analysis of nationalism in institutional and everyday settings (Billig, 1995, chap. 5), and in order to reconceptualize the study within psychology and social psychology of topics such as attitudes, memory, and attribution (Potter and Wetherell, 1987).

The study of the mass media is not central to discourse psychology proper. However, it is clear that the approach has a lot to offer theoretically and analytically in this respect as the electronic media become increasingly dominated by programs that borrow from or replicate the verbal interaction of everyday life and as the digital interactive media open up enticing prospects of virtual communities based on verbal exchange (Hutchby, 2001) (*see* **Cognitive Technology**).

Briefly characterized, discourse psychology analyzes talk in everyday situations because it is in interpersonal encounters that an important part of social reality is constructed, as speakers position themselves and each other in situational roles according to their individual and social interests. Discourse psychology is particularly concerned with the way speakers engage in fact construction – that is, the way they attempt to establish their accounts, or 'versions,' of social events as true and factual and to undermine the factuality and truth of the versions of their interlocutors – a focus that is particularly appropriate to investigate many television news interviews and studio debate programs (Potter, 1996).

When they produce their accounts of social events, staking a claim for their version, participants are drawing on meaning resources based on interpretive repertoires, a kind of 'framework of understanding' (Potter and Wetherell, 1996: 89):

> By interpretative repertoires we mean broadly discernible clusters of terms, descriptions, and figures of speech often assembled around metaphors or vivid images. In more structuralist language we can talk of these things as systems of signification and as the building blocks used for manufacturing versions of actions, self, and social structures in talk.

In a study of the discursive construction of politics in Danish media, Phillips and Schrøder (2004) found that the media made sense of the political through six different interpretative repertoires for understanding politics in a wide sense, ranging from the parliamentary arena, through the subpolitical arena of grassroots activism, to the life–political arena of political consumption in daily life: 1. 'parliament-at-work,' offering a positive perspective on capable and active politicians; 2. 'the dirty underside of the party game,' in which politicians are seen as scheming and manipulative; 3. 'populism,' pitching sensible citizens against distant, ignorant, and arrogant politicians representing 'the system'; 4. 'grassroots activism,' in which citizens can make a difference by joining forces around single issues; 5. 'everyday politics,' where the negotiation of individual responsibility for social issues results in small-scale political action; and 6. 'politics as a meta-phenomenon,' an interpretive repertoire that constructs an outside evaluative and reflective perspective on the mechanics and limits of political institutions and agents.

The important point about such repertoires is that they are not mutually exclusive but may coexist in a particular media discourse about politics, serving different rhetorical purposes in different situational circumstances. Also, they should be seen not just as contributing to the formation of citizens' personal 'attitudes' about politics but also as generative meaning practices, which result in different conceptualizations of the possibilities and limits of political action.

As already mentioned, discourse psychology takes no particular interest in the media. However, Potter's comprehensive analysis of the situational construction of facticity is full of examples from media discourses, as he demonstrates how speakers in news programs take great pains verbally to demonstrate that they do not 'have an axe to grind,' to

voluntarily confess to having a stake in some state of affairs in order to create an impression of honesty and trustworthiness despite their stake, to claim that "facts show that . . ." something is the case, to bolster credibility by adducing the testimony of sources whose identity may be difficult to establish (e.g., when news reports draw on so-called 'community sources' for their reporting of city gang warfare), and so on.

The most interesting and systematic work on media discourses from a situational perspective of dynamic interpersonal negotiation, however, has come from scholars who view themselves as conversation analysts rather than discourse psychologists (Clayman and Heritage, 2002; Greatbatch, 1998; Heritage and Greatbatch, 1991). One growing body of work has analyzed the most interactive genre of news production, the news interview (*see* **Conversation Analysis**).

In such studies, there is not much interest in the possible ideological meanings of the sequence of utterances. Attention is focused on the interactive dynamics of the interview exchanges as their turn-taking patterns are compared with those of ordinary everyday conversation in order to illuminate the specific constraints and options that govern the situational production of such interviews within the framework of public service broadcasting.

Noting that news interviews deviate systematically from ordinary conversation in replacing the latter's question–answer–receipt pattern with a question–answer–question sequence, Heritage (1985) explained this difference by the fact that news interviews are produced for an overhearing audience. By avoiding the evaluation inherent in the third-turn 'receipt'–response characteristic of normal conversation, the interviewer declines the role of evaluating answer recipient while maintaining the neutral role of answer elicitor.

The importance of the overhearing audience also manifests itself in the frequent occurrence of so-called 'formulating' utterances, in which an interviewer (by saying to the interviewee, "So you're suggesting that . . .") may make explicit the potentially controversial implications of a politician's answer while merely appearing to rephrase what the interviewee just said. Formulations may thus also serve an important function within the institutional framework of public service broadcasting, which requires journalists to maintain impartiality and balance in the coverage of controversial matters.

A completely different type of TV interaction for an overhearing audience is analyzed by Crow (1986), who explores the conversational pragmatics of a U.S. phone-in program in which a sexologist host gives advice about sexual problems, a genre that falls between private interpersonal talk and talk explicitly designed for an overhearing audience. Montgomery (1986) offers an excellent example of the analysis of broadcast monologue as he demonstrates how radio DJ talk, in contrast to third-person-based radio news monologue, operates on the axis between first and second person pronominal address. The DJ constructs an imagined community with his or her listeners in a simulated half-dialogue in which he or she does not display the slightest sign of awkwardness that his or her initiating speech acts (e.g., greetings and questions) are not responded to by anybody. Scannell (1991) presented a diverse range of studies on different types of conversational interaction in the broadcast media (*see* **Talk Shows**).

Analyzing the Visual Aspects of Media Discourse

The visual aspects of modern media discourses have presented a difficult challenge for analysts of mediated meaning processes for many years. It is characteristic of discourse analytical approaches that they are almost exclusively focused on media language, whereas the visual dimensions of news reports in print and electronic media are at best given secondary attention.

This situation exists despite the fact that it has long since become conventional wisdom for media research that the media landscape is increasingly dominated by still and moving pictures, which carry a substantial part of the total meaning communicated in newspapers and magazines, on television, and in the new media.

When visual analysis of media pictures is attempted, the analytical tools always derive from the same two sources: Roland Barthes's operationalization of the linguistic concepts of denotation and connotation for the analysis of images, especially photographs (*see* **Barthes, Roland (1915–1980)**), and semiotician Charles S. Peirce's concepts of iconic, indexical, and symbolic signs (for a detailed analysis of news photographs, see Hall (1973) and Fiske (1990).

Barthes (1964) suggested that we distinguish between two orders of meaning in a photograph: the denotative level, which carries the innocent, factual meanings available to any observer irrespective of cultural background, and the connotative level, which carries the visual meanings that a specific culture assigns to the denotative message.

Barthes's original example presented an advertisement that denotatively pictures a string shopping bag

in which one can see some onions, a green pepper, a can of tomato sauce, and two packets of pasta; the colors are yellow and green on a red background. In the French context of Barthes's analysis, this visual message acquires the cultural meaning (connotation) of 'Italianicity,' and as a selling proposition the ad offers not just a number of unrelated products but the whole atmosphere associated with Italian cuisine. In similar fashion, other ads may offer visually based connotations such as sexuality, family happiness, scientific progress, and historical authenticity. According to Barthes, these connotative meanings will appear to the consumer as naturally given, not as ideological constructs, because they are 'grafted' onto the underlying, innocent denotative meaning. In this way, advertisers and other message senders may use connotations to convey taken-for-granted meanings that are shared within a culture without making these (ideological) meanings available for critical scrutiny.

The analytical terms borrowed from Peircean semiotics have to do with the relations between signs and the real-world objects to which they refer (Peirce, 1985). Whereas a 'symbol' is a sign whose connection with its object is purely a matter of convention (the linguistic 'word' being the obvious example), an 'icon' is a sign that is related to its referent through similarity; thus, a photograph in a news article or in an advertisement is an iconic sign of the real-world phenomenon it represents. An 'index' is a sign that signifies by existential or physical connection with its object, such as when a product advertised in a magazine ad is made visually contiguous to the paraphernalia of a desirable lifestyle, whose qualities may thereby become associated with the product.

It should be stressed that the three Peircean concepts are not to be thought of as three different kinds of sign but, rather, as three dimensions that are inherent properties of all signs in relation to their referents. A media picture of the White House is thus simultaneously an iconic representation of a particular building located in Washington, DC; an indexical representation of the government of the United States since it houses and thereby stands for its primary executive officer; and a symbolic representation of the connotative values conventionally associated with the United States and its president, be they those of the coercive global policeman or the home of freedom and democracy.

It is especially the indexical/metonymical aspects of visual signs that may carry powerful ideological implications because they seem to establish a natural connection between the sign and its referent, between the 'part' that is selected by the photographer or editor for visual representation in the news photo and the 'whole' scene that the photo supposedly represents. Thus, a metonymic photograph of a single violent incident may convey a wrong impression of a demonstration that was otherwise peaceful and orderly (*see* **Pragmatic Indexing**).

These semiotic tools have proved to be of considerable heuristic value for the analysis of media images, but it must be acknowledged that they have been unable to provide insights beyond the commonsensical. Moreover, the distinction between denotation and connotation is theoretically dubious because it is impossible within the terms of the theory to define precisely the threshold between noncultural and culturally invested meaning on which the distinction relies (Eco, 1968). Some attempts have been made in recent years to change these theoretical terms by drawing on a cognitive approach to visual perception, according to which there is no fundamental difference between the perceptual processes of making sense of real-world and pictorial visual stimuli. The first-order visual media meanings are naturally perceived by the visual sense and then enter into a process of cultural investment and interpretation according to conventionalized signifying processes (Messaris, 1997).

The challenge of developing an innovative approach to the analysis of visual discourse has been taken up by scholars who wish to take discourse analysis much further than merely extending its field of operation from linguistic to also include visual signs. They suggest that the modern media from school textbooks to the World Wide Web are increasingly producing texts that are multimodal, making use of a range of representational and communicational modes within the limits of one text (Kress and van Leeuwen, 2001).

The range of the different 'modes' of communication includes, in addition to verbal language, the visual (including graphic styles, spatial display, diagrams, pictures from line drawings, and still and moving photos), the gestural, sound, etc. and requires the building of a comprehensive 'discourse semiotic' in which all kinds of human semiosis are explored within the terms of one theoretical platform (Kress *et al.*, 1997: 258):

> Discourse analysis has, on the whole, focused on the linguistically realized text. In the multimodal approach the attempt is to understand all the representational modes which are in play in the text, in the same degree of detail and with the same methodological precision as discourse analysis is able to do with linguistic text.

The overall theoretical framework of Kress and van Leeuwen's visual discourse semiotics is strongly akin to Fairclough's three-dimensional model, whereas the analytical practice is inspired eclectically by theoretical and analytical work in linguistics, visual

semiotics, film theory, art criticism, as well as numerous predecessors in the various fields of media research, especially the analysis of advertising (Cook, 1992; Myers, 1994; Williamson, 1978).

At this stage, however, it is not evident that the multimodal approach represents the kind of genuine innovation of the analysis of visual media discourses claimed by the authors. First, irrespective of the authors' protestations to the contrary, with its indebtedness to Halliday's (1978) theory of social semiotics, the approach is based on and to some extent biased toward a linguistic conceptualization of the other modes of representation. Moreover, both some of its theoretical ground pillars and some of the analytical insights balance somewhat uneasily between the postulatory and the commonsensical, and the analytical conclusions sometimes lapse into a simplistic view of the transfer of ideology from verbal–visual text to reader.

Toward a Pragmatics of Media

This article has argued that a holistic theoretical perspective is necessary to understand the way the media communicate with citizens and consumers living in a mediatized world. One consequence of the adoption of a holistic, discourse–analytical perspective on the media is that in addition to focusing the analytical spotlight on the textual meaning processes in the media, the analyst is also invited to explore the discursive practices through which media texts are produced and received, as well as the larger sociocultural framework within which these processes take place. This requires the analyst to supplement traditional forms of critical analysis of media texts with ethnography-inspired interview-based fieldwork of, for instance, journalistic production routines and audience reception processes.

Such discourse–ethnographic work produces new textual objects of analysis in the form of qualitative interviews with media producers and audience members about the meaning processes they engage in around the media product (Lindlof, 1995). Clearly, this research agenda is no less imbued with theoretical and methodological hazards than that of traditional media language analysis, which may explain the reluctance of media discourse analysts to embark on the kind of ethnographic fieldwork that they readily acknowledge is necessary. However, the payoff in terms of explanatory power is evident in those few instances in which scholars have faced the holistic challenge and brought together insights from production, textual, and reception studies of mediated communication (Deacon *et al.*, 1999).

See also: Barthes, Roland (1915–1980); Cognitive Technology; Communication: Semiotic Approaches; Constructivism; Conversation Analysis; Critical Discourse Analysis; Eco, Umberto: Theory of the Sign; E-mail, Internet, Chatroom Talk: Pragmatics; Ethnomethodology; Factivity; Fowler, Roger (b. 1938); Halliday, Michael A. K. (b. 1925); Marketing and Semiotics: From Transaction to Relation; McLuhan, Marshall (b. 1911); Media and Language: Overview; Media, Politics, and Discourse: Interactions; Media: Semiotics; Multimodal Interaction with Computers; Nominalization; Peirce, Charles Sanders (1839–1914); Pragmatic Indexing; Radio: Language; Saussure, Ferdinand (-Mongin) de (1857–1913); Social Construction and Language; Social Semiotics; Talk Shows; Telephone Talk; Television: Language; Transitivity: Stylistic Approaches; Visual Semiotics; Word and Image.

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Media: Semiotics

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Introduction

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Media Semiotics and/or Medium in Semiotic Handbooks – A First Glimpse

Usually, a first approach to a topic is to look up it up either in printed sources or in the more recent and increasingly popular way to get information, the

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Internet. A quick Web search with the two keywords 'media' and 'semiotics' renders more than 83 000 results (almost a moderate figure compared to some 328 000 results in the case of a search for 'semiotics' alone). After a first glance, however, the number will diminish drastically, since the majority of the first some 50 entries (normally checked) refer either to the few books that have the words 'media semiotics' in the title, or to Web pages offering sort of directories with links to ever the same handful of sites. So the reader seeking for information will certainly return to more conservative sources, that is, printed material, and she/he will look up the entries in diverse dictionaries and encyclopedias, and the respective articles on medium, media studies, or media semiotics in introductory works.

Apart from the desired first information, such texts can also show whether the field in question, in our case: media semiotics, is recognized and appreciated as an individual area of semiotic research, or, more generally, whether it is present at all in the consulted texts, and how the topic is dealt with in the pertinent literature.

Unfortunately, looking for definitions of, or at least descriptive passages about, media semiotics as a distinct field of semiotic research, analyses, and theorizing will not bring much help for the inquisitive novice, since the search does not render the expected results. A switch to the search for 'medium' or 'media' is, again, not very promising. The reason for this lack of entries, however, is definitely not caused by a lack of interest of semioticians in the field covered, or, even worse, a neglect of the notion as somewhat irrelevant to semiotics. For this observation, an explanation can be offered that lies in the comparably late process of academic autonomy and independence. Like all disciplines, or even subdisciplines and paradigms, semiotics has its own set of notions, the definitions of which sometimes overlap and coincide with those found in neighboring and adjacent disciplines; in other cases, they differ extremely from those generally known. To construct a concise terminological building in its own right, semiotic dictionaries and handbooks have to concentrate on the core terms. Although the process of mediation is by definition fundamental to semiotics and thus a pivotal area of semiotic reasoning, a crucial topic of semiotic research, and despite the interest in the field and the wide-spread use of the notion, 'medium' as such is not a genuinely semiotic concept.

How is 'media semiotics' (or, more generally, medium) dealt with in some of the standard reference works published in the last two decades?

One of the handbooks to start with for an in-depth look at notions and concepts is certainly the three-volume *Encyclopedic dictionary of semiotics* (edited by the long-term editor-in-chief of the journal *Semiotica*, the late Thomas A. Sebeok, and first published in 1986). The second volume contains an article titled 'Medium.' Unfortunately, the one-and-a-half pages give no information whatsoever on medium, let alone media semiotics, since they are dealing with nothing but the notion referred to in the subtitle: 'Message.' This focus is somehow strange as there is another entry explicitly titled 'Message/Medium' that in turn discusses nothing but Marshall McLuhan's view of the 'medium/message' complementarity.

Although small in size, Vincent Colapietro's *Glossary of semiotics* (1993), is usually a good spot for a first check on notions. With regard to our subject, the reader is less successful since the book has not a single entry on medium or media, let alone on media semiotics.

The index to the first 100 volumes of *Semiotica*, published 1969–1994, offers a 'Subject Index: Scientific Fields' that, although quite detailed, does not even list the category keyword 'medium' or 'media' (1997). Looking more closely through the list of fields reveals, however, that the observation must not be read as a lack of papers on media topics: there are 2 articles subsumed under the heading 'communication,' 28 under 'cinema,' some 40 more under 'film.'

With the 1998 *Encyclopedia of semiotics* (edited by Paul Bouissac), it is quite the same at first sight: the reader will not find an individual article on medium or media. Thanks to the index, he or she can check other entries to find something on the 'ideological role of media,' on 'transformations,' 'violence,' and 'women in media.' In addition, media is generally crossreferenced to mass communication, which has an entry. Further articles are dealing with 'semiotics of advertising,' cartoons, cinema, comics, communication, computer and computer-mediated communication, film semiotics (plus additional entries on: *grande syntagmatique*, imaginary signifier, and Christian Metz), mass communication, photography, and pictorial semiotics (1998).

Like all the other volumes, the 2000 *Encyclopedic dictionary of semiotics, media and communications* (edited by Marcel Danesi) has no description of the field of media semiotics, but, of course, it includes an entry on medium that will be discussed below, since it offers a concise definition of, and approach to, the notion (2000).

Winfried Nöth's *Handbuch der Semiotik* was first published in 1985 in German; in 1990, a heavily revised English version, the *Handbook of semiotics*, appeared, which was the basis for the 2000, second German edition. The 1990 English version grouped several chapters dealing with topics usually

subsumed under 'media' under the heading 'Aesthetics and visual communication.' The second German edition features a new chapter, explicitly titled '*Mediensemiotik*.' The areas presented are: media, image, image and text, maps, comics, photography, film, and advertising. The subject index, however, enumerates several other instances where the notion media is discussed. Taking up ideas first presented in his introductory contributions to two collective volumes (Nöth, 1997, 1998), Nöth started his chapter on 'media' with some general observations on the relationship between semiotics and the media, naming both early examples of semiotic studies of media texts and several strains and ideas within semiotics adopted for media studies. He then continued with three subchapters dealing with: 'themes of media semiotics,' 'signs, medium and the media,' and 'signs, reality and hyper reality.'

So far the largest (and most recent) reference work is *Semiotik: Ein Handbuch zu den zeichentheoretischen Grundlagen von Natur und Kultur/Semiotics: a handbook on the sign-theoretic foundations of nature and culture* (referred to hence as *Semiotik/Semiotics*), edited by Roland Posner, the former President of the International Association for Semiotic Studies IASS-AIS. Due to the structure of the handbook, the central article on our topic in volume 3 has the term in question – media semiotics – only in the subtitle (and unlike 'semiotics of culture' or 'cultural semiotics,' it is not listed in the index either). However, the text on 'Semiotic aspects of mass media studies: media semiotics' (Wolf, 2003) gave a good overview on the relationship between the two adjacent, or even overlapping, fields. Starting from the history of mass media studies, Wolf continued to outline the main areas of mass media research, and recent trends. When it came to the actual relationship, he proceeded from a strong focus on Eco's theoretical models of the code, as well as the discussion of the reciprocal expectations and changing semiotic paradigms to the interconnection between semiotics and British cultural studies. The last part showed "thematic areas where integration between semiotics and mass media studies is more advanced and is required by the media under examination" (Wolf, 2003: 2932), like the "textual structures and utterance processes," or "cognitive activities of the media audience" (Wolf, 2003: 2933). Wolf ended with "open questions on the research agenda" (Wolf, 2003: 2934), which will be presented later on.

Within the same chapter of the third volume of *Semiotik/Semiotics*, presenting the relations between semiotics and individual disciplines, there is also a contribution on '*Semiotische Aspekte der Filmwissenschaft: Filmsemiotik*' ('semiotic aspects of film studies: semiotics of the cinema,' Kloepfer, 2003). Concerning 'medium' the handbook contains several articles that mention the notion even in the title. Chapter 2 of the first volume, for instance, is already titled 'Aspects of semiosis – channels, media, and codes,' and among others it features '*Technische Medien der Semiose*' ('Technical media in semiosis,' Böhme-Dürr, 1997), and 'Social media of semiosis' (Threadgold, 1997). At the end, in volume 4, which offers a chapter on selected topics of semiotics, there is also an article on '*Multimediale Kommunikation*' ('Multimedia communication'; Hess-Lüttich and Schmauks, 2004). Thanks to the detailed index of subjects the reader is able to look up some further contributions where medium or media are discussed.

Finally, as already mentioned in the very first paragraphs, there are some textbooks, introductory works, collective volumes, or chapters in more general overviews of semiotic studies that carry the formula 'media semiotics' in their title. The earliest coupling was, most probably, a German collective volume edited by Günter Bentele in 1981, titled *Semiotik und Massenmedien*. The various articles focused on different media and the analyses of media texts. Approximately a decade later, Ernest W. B. Hess-Lüttich (1990a) dealt with '*Massenmedien und Semiotik*' in the context of semiotics in the individual sciences.

A volume that focused entirely on this field was certainly *Semiotics of the media. state of the art, projects, and perspectives*, edited by Winfried Nöth (1997), which contained a large number of papers presented in Kassel at the 1995 conference on the semiotics of media.

Finally, two more introductory publications are *Media semiotics: an introduction* (Bignell, 1997) and *Understanding media semiotics* (Danesi, 2002). In the latter volume, the field is defined in a first approach in the following way:

> The primary object of media semiotics is to study how the mass media create or recycle signs for their own ends. It does so [...] by asking: (1) what something means or represents, (2) how it exemplifies its meaning, and (3) why it has the meaning that it has (Danesi, 2002: 34).

The restriction to the explicit naming of semiotics in the title, however, might exclude several publications that proceed from semiotic concepts without telling so, like, a collection of early papers from the Birmingham Centre for Contemporary Cultural Studies (Hall *et al.*, 1980). The same applies to volumes on special topics, as for instance, narrativity, edited or written by semioticians (cf. Kloepfer and Möller, 1986; Cobley, 2001).

Semiotics of the Media and/or Media Semiotics

What most semioticians seem to agree upon is the view that there is nothing like a unified media semiotic approach (cf. Bentele, 1981: 26; Hess-Lüttich, 1990a: 177; Nöth, 1997: 1); the more so since, on the one hand, media studies themselves have to be considered rather a vast field of research than a single discipline, and on the other hand, semiotics cannot be regarded as a unified single paradigm discipline either. As will be shown in several other entries (*see* **Paris School Semiotics**), the semiotic enterprise is made up of different schools and traditions, starting from the big divide between the philosophic or Peircean or American line of triadic concepts of semiosis and the linguistic or Saussurean or continental line of binary sign models. Evidently, these two and many other semiotic models and theories found their way into the study of media.

Of particular interest for both disciplines seems to be the special kind of relationship between semiotics and media studies. As will be shown below, the history of semiotic studies of media and media texts goes at least back to the 1960s, which means that semiotics has been there long before the media studies hype has commenced. Nonetheless, semiotics has not always been valued as an approach fruitful for media studies (or at least not all over the world).

Rereading the various introductory texts on media semiotics written over some two decades also reveals how the relation has changed during the last years.

Hess-Lüttich (1990a) observed a certain skeptical attitude toward semiotics among the various disciplines that share the research object 'mass media':

> Zu sehr sind die Medienforscher noch ihren jeweiligen Fachtraditionen verpflichtet und verhaftet, als daß sie die integrierende Kraft semiotischer Theorienbildung methodisch zu nutzen gelernt hätten. In Literaturwissenschaft wie Publizistik wird gegen die Semiotik zuweilen als 'Mode' polemisiert, ihre zweitausendjährige Geschichte verkennend (Hess-Lüttich, 1990a: 203).

In the mid-1990s, Nöth discussed the range in the geographical distribution of media semiotics:

> While in countries like Italy (especially under the influence of Umberto Eco), France, Spain, and Brazil, the terms 'semiotics' and 'media studies' are often almost used synonymously, in Germany and in the English speaking countries, the semiotics of the media has been considered as less central in media studies (Nöth, 1997: 6–7).

One specific area, however, deserves a separate discussion: British cultural studies that to a large degree focus on media and are rooted in semiotics. As a more general observation, it seems that in the last years semiotics has finally found its way into general media and communication studies, as university curricula, reading lists, and undergraduate text books can show.

Depending whether viewed from the side of semiotics or from that of media studies, the question which of the two is considered just an auxiliary discipline or method, and questions of dominance and subordinance are answered quite controversially. Winfried Nöth titled his contribution in the 1998 volume even '*Die Semiotik als Medienwissenschaft*' (or 'Semiotics as a media science par excellence' as he named the relation in his introduction to *Semiotics of the media* Nöth, 1997: 5), and considered semiotics to be the fundamental discipline for media studies. Accordingly, his enumeration of topics dealt with in media semiotics is by far the most comprehensive, and almost coextensive with that of semiotics in general, since it comprises themes like:

> Kommunikation, Kognition und Emotion, Mediensemiose und «Realität», Referenz und Selbstreferentialität, Wahrheit, Mythos und Ideologie, Information, «Objektivität» oder Manipulation und schliesslich auch die evolutionsgeschichtlichen Wurzeln der Zeichenproduktion und -rezeption in den Medien (Nöth, 1998: 53).

Although generally used in a synonymous way, the two different notions in the section heading could discern two fields. Analogous to the distinction between semiotics of culture and cultural semiotics, the semiotically rooted occupation with the media goes in two directions: (1) the semiotic exploration of media genres and texts (or, how semiotics can be used for the analysis of movies, ads, or newspapers, as it is sometimes stated in media studies textbooks); and (2) a semiotic theory of (mass) communication and media. Both in general recognition and in the literature, the first one is by far more present and touches each and every mass medium used, from the more traditional ones to latest electronic developments in information and communication technologies. Nevertheless, it is exactly the latter field in which the modeling and conceptual quality of semiotics is able to contribute to the further development of media studies: semiotics is not just another discipline dealing with a particular object (which in the case of semiotics is vast enough: signs and sign processes of all kinds), but it is always and at the same time a metadiscipline reflecting on concepts, paradigms, and approaches. In this sense, media semiotics is not only reflecting on media and media texts, but it is also able to offer the forum for the dialogue between media studies and semiotics and to cogitate on their relation and their tasks.

Semiotics and (Mass) Communication Processes

The relation between semiotics and both communication studies and media studies is rather intricate. In order to discuss the role of semiotic studies and models with regard to media (studies), the reflection on a common topic could be an appropriate point of departure: the communication process.

Since it is generally agreed upon that, as Jakobson has put it, "[t]he subject matter of semiotic is the communication of any messages whatever" (Jakobson, 1973: 32), semiotics and communication/media studies are neighboring disciplines that share a research object: communication (*see* **Communication: Semiotic Approaches**), although semiotics cannot be reduced to the study of communication, because it is equally concerned with signification (cf. Prieto, 1968; Mounin, 1970), or significative and cognitive processes (cf. Nöth, 1985: 235). Krampen made yet another clarification concerning the particular relation between communication and semiosis that is needful:

> A communication process in which a sender transmits second hand experiences to a receiver is a sign process **par excellence**. In this sense, models of communication processes are always models of semioses, but not **vice versa** (Krampen, 1997a).

Accordingly, reflections on communication are often present when semioticians talk about sign processes. One of these authors for whom communication is a central concept is Charles W. Morris (1946). Alongside the divide between communication and signification, Umberto Eco offers a discussion on communication in his *Trattato di semiotica generale* (1975).

Models and Concepts

The preoccupation of semiotics with communicative processes is not a recent phenomenon and can look back at least on more than one hundred years of history (if the two and a half millennia of occidental history of dealing with semiotic questions at large is not taken into account!).

Decades before Shannon and Weaver formulated their communication model with sender and receiver in 1949, Ferdinand de Saussure (1916) (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**) presented his view on the communicative situation (i.e., the speech circuit model) that, contrary to the 1940s diagram, implied already the three fundamental dimensions: the semantic dimension or the constitution of meaning, the pragmatic dimension showing sign producers in action, and the dialogic dimension of message exchange. Unfortunately, the speech circuit model was hidden within Saussure's courses on linguistics and hardly received outside this discipline. Communication studies would have started differently, if the ruling paradigm would have come from semiology. Although they have envisaged a broader application of their information–theoretic model, the two authors are not to blame for the development in the 1950s and 1960s and the resulting lack of a semantic and a pragmatic focus, since they created the model for a specific purpose and never dealt with semantic aspects of the message. The problem lies rather in those followers who eagerly took the model as a ready-made device and insufficiently adopted it for human communication. As a consequence, generations of students in communication and media studies were treated with technicistic concepts based on the short-sighted transmission model of communication.

Ferdinand de Saussure's diagram might have been the first semiotic model of communication, but it is definitely not the only one. Since semiotics is not a single-approach enterprise, but, as mentioned above, consists of several different currents, there is also more than one model of the communication process or of the sign process, of 'semiosis,' to use a more general term. (An extensive discussion of the diverse views of semiosis as well as a complex and comprehensive semiosic matrix is presented in Krampen, 1997a; cf. also Krampen, 1997b.)

Chronologically, the next diagrammatic formulation that has to be taken into consideration for the study of communication was developed by Karl Bühler (*see* **Bühler, Karl (1879–1963)**). In the 1930s, his tripartite organon model of language (1934: 28) has the sign as the center and point of intersection between three elements, the three respective functions of the sign with regard to these elements and the three correlated sign moments: the sender (*Ausdrucksfunktion* or the expressive function; symptom or index), the receiver (*Appellfunktion* or the appellative or conative function; signal), and the objects or states of affairs (*Darstellungsfunktion* or referential/representational function; symbol).

Bühler's schema has to be mentioned, although its reception was still restricted to linguistics, since it was quite influential for another concept that, in turn, has found its way into media and communication studies: Roman Jakobson's communication model (*see* **Jakobson, Roman (1896–1982)**).

Jakobson proceeded from Karl Bühler's organon model of language and extended it to a schema combining six constitutive factors of communication, which are paired with six equivalent functions (named in parentheses): addresser (emotive), message (poetic), addressee (conative), context (referential), contact (phatic), and code (metalinguistic).

Although the schema seems to be similar to the standard one-way model of communication between a sender and a receiver (in particular in the graphic presentation), there is a fundamental difference with regard to the elements due to including the context and the code. Originally conceived for verbal communication, Roman Jakobson's model of these six "factors inalienably involved" (Jakobson, 1960: 353) has been adopted for the analysis of nonverbal communicative and media processes. Looking through the publications, the application to domains as different as architecture and advertising can be found. The most recent example is the discussion of Jakobson's concepts with regard to new media and multiagent environments (Petric *et al.*, 2001). Relying on the systemic quality of Jakobson's thinking, Itamar Even-Zohar adapted the schema to the literary (poly)system (cf. Even-Zohar, 1990: 31), which could be considered to be just a special case of media systems in general.

It seems that over the years communication studies has developed a strong tendency to deal with aspects that are clearly associated with semiotics. According to Berger and Chaffee,

> communication science seeks to understand the production, processing, and effects of symbol and signal systems by developing testable theories, containing lawful generalizations, that explain phenomena associated with the production, processing, and effects (Berger and Chaffee, 1987: 17).

Despite the wording (and the concepts referred to), the way scholars in communication science intended to handle the topic is again not a qualitative one, but rather aimed at empiricist approaches delivering quantifiable results. From the side of semiotically oriented researchers, however, this attitude is described quite differently, even if they proceed from the same observation, thus preparing the ground for a sign–theoretic foundation of the study of communication processes. In his article in *Semiotik/Semiotics* on semiotic aspects of mass media studies, Mauro Wolf stated:

> Indeed, there was a strong need in communication studies to focus on the complex nature of the communicative process, and semiotics was better suited than psychology or sociology to understand this element of crucial relevance in mass communication processes (Wolf, 2003: 2930).

As already shown, what semiotics can indeed offer is a differentiated view of the communication process as sign process.

Looking through the many definitions of communication to be found in the various encyclopedias, glossaries, and textbooks, we can see that many scholars in communication studies include signs and sign production in their formulas. Accordingly, the focus on Man as a producer and recipient (or reproducer) of the message, which is necessarily and always conveyed in form of sign vehicles or signifiers or representamina or signantia (depending on the semiotic theory adopted), is no longer mistaken for a restriction since it includes per definition an antireductionist approach compared to shortsighted technicistic models. The view of communication as semiosis is not confined to only meaning-oriented considerations as opposed to society-oriented approaches, because in semiosis three moments are interconnected: the production/constitution of meaning (semantic dimension); the structure of the message (syntactic dimension); and the usage of the message including attitudes and actions resulting thereof (pragmatic dimension). The most explicit integration of social aspects can be found in Ferruccio Rossi-Landi's sociosemiotic theory of social reproduction in which communication is defined as sign exchange. For Rossi-Landi, social reproduction always comprehends "three indissoluble correlated moments": production–exchange–consumption. Exchange "is always, at the same time and constitutively, external material exchange [and] sign exchange, that is communication, including as such within it: **sign production**, **sign exchange** in the strict sense, and **sign consumption**" (Rossi-Landi, 1975: 65; cf. 1985: 38).

Different Areas of Communication

The study of communication is confronted with a vast field of quite different types of communication, or communicative situations, with quite different means of communication involved and used to convey messages and meaning.

Due to the importance of the sign system language, there can hardly be an analysis of verbal communication without semiolinguistic concepts, starting from the situation, the course of the conversation, the various registers used, or the content of the utterance.

In much the same way, a great deal of the publications on nonverbal communication is based within semiotics, like the research on 'body language' or proxemics.

As soon as we transcend the domain of communication between human beings and turn to man–machine–communication, we have to consider intricate relations and overlaps between semiotics and cognitive sciences or AI-research respectively.

With the area of mass communication, finally, we enter the diffusion zone between communication and media studies. Looking at the various subfields of mass communication research, additional connections

can be found, like the transition from research on subconscious effects to the occupation with the recipients' competence in handling mass media. From the point of view of semiotics, processes of mass communication are also semiosic processes like any other communication. When split into the partial processes involved and analyzed in detail, however, the degree of complexity appears to be much higher. Krampen distinguishes the subsequent and simultaneous phases and the various channels used, and he concludes that

> a mass communication event is a supersemiosis Σ constituting a matrix of semioses Z, modeled by semiosic matrices, with n kinds of channels [...] during m kinds of stages in the production of a mass communication event (e.g., acquitisition, editing, elaborating, sequencing or layout, sending or printing, etc.) (Krampen, 1997b: 96).

As discussed above, the question of the proportion of semiotic theories and analyses within media studies proper, or the specific relation of the two disciplines, can only be answered after a closer look at the entirety of semiotic approaches (including closely related concepts), their respective historic influence (cf. Wolf, 2003).

Notions and Concepts

Medium and Media

Even though 'medium' is not part of the set of semiotic notions proper, it is widely used also within semiotic texts and thus deserves some attention, the more so, since one of the tasks semiotics is specially apt for is the theoretic reflection and a systematic reconsideration of pivotal concepts and models in media studies, like channel or medium (cf. Wulff, 1978).

Since several different disciplines are occupied with the study of media, media texts, media institutions, etc., the notion of medium is in itself an iridescent notion. Unfortunately, the degree of usage in communication and media studies does not always correspond to that of pertinent definitions of the notion. In his entry on 'Multimedia communication' in Sebeok's *Encyclopedic dictionary of semiotics*, Hess-Lüttich thematized this problem:

> Medium's widespread usage in mass communication and psychology, in economics and cybernetics, in physics and philology, makes it difficult to agree on an integrated basis for founding a category of material transmission of social meaning (Hess-Lüttich, 1986: 574).

More often than not, apart from the general quoting of the Latin origin of the term (*medius* 'between, the middle'), the solution offered by the authors seems to be rather a description resorting to everyday experiences (and uses) of the term and the enumeration of examples than a definition *sensu stricto*. Texts that try to cope with the term 'medium' usually start from the physical meaning of the word (that is, the contact matter or physical substance), only to add in the next sentences that it is generally used for the means of communication.

An example for the contextually explicable restriction to the latter can be found in the 'Glossary' for the first Elsevier *Encyclopedia of language and linguistics* (ELL1), which names two definitions: "1 The means used in a communication, i.e., whether it is spoken, written, symbolic, color coded, etc., e.g., phonic, aural, visual medium. 2 A channel of communication as in mass media" (1994: 5144–5145). Mass media in turn are defined as "(t)he (mass produced) media (see medium 2) which seek to communicate with a mass audience, e.g., television, newspapers" (1994: 5144).

A widespread classificatory approach distinguishes between primary media (which are entirely based on the abilities of our body and function without technical equipments), secondary media (the sender uses some kind of machines), and tertiary media (both sender and receiver have to rely on technical equipment) (cf. Pross, 1972); recently, the tripartite scheme has been augmented by a quaternary type, which comprise the digital media.

Another tripartite scheme is elaborated by Marcel Danesi in his *Encyclopedic dictionary of semiotics, media and communications*. He opened the entry with general definitions: "1. any means, agency, or instrument of communication; 2. the physical means by which a sign or text is encoded (put together) and through which it is transmitted (delivered, actualized)" (Danesi, 2000: 141–142). In the added explanatory notes, he then proceeded from prewriting media for communication (oral–auditory and pictographic), and discussed the alphabet in terms of a Kuhnian paradigm shift. After briefly discussing McLuhan, and describing how each medium implicates knowledge of specific kinds of codes that the medium itself determined to be deployed, Danesi offered three more entries on three different types of medium (and the respective examples) that should be distinguished in the analysis. (1) The artifactual medium: "artifactual means or mode of encoding and decoding a message," like books, paintings, sculptures, or letters; (2) the mechanical medium: "mechanical means or mode of transmitting a message," that is, telephones, radios, television sets, computers, videos; and (3) the natural medium: "natural means or mode of encoding and decoding a message," like the voice (speech), the face (expressions), the body (gesture, posture, etc.) (Danesi, 2000: 142).

Despite such differentiated views, today the notion of medium is often used just in the plural and thus confined to denominate the means of mass communication. One of these definitions of mass media is included in the entry on mass communication of the 1998 *Encyclopedia of semiotics*, considering them to be

> channels of communication, located at the institutional and corporate levels of society that use large-scale high-technology methods to supply standardized communication products to widespread heterogeneous audiences (Fulton, 1998: 389).

In somehow wider descriptions, the concept of (mass) media includes such different instances of the communication or sign process as the channel (and thus also the physical substrate used for transmission), the entire apparatus, the sender (often in the form of an organization or institution), the codes, and the signs (and sign systems) used. According to such a multifaceted view, Karin Böhme-Dürr defines medium in her *Semiotik/Semiotics* article on technical media in the following way:

> Der Begriff 'Medium' bezieht sich [...] auf **Kommunikations**mittel, also auf die Mittel zur Weitergabe von Zeichen. Kommunikationsmittel sind zum einen technische Geräte (Instrumente, Apparate) und zum anderen Zeichenkörper (=Zeichenträger) (Böhme-Dürr, 1997: 358).

To make this somehow very general definition operational, she distinguished three clusters conforming to the various disciplines dealing with it: the concept of media as used (1) in the social sciences, (2) the natural sciences, and (3) the technological media concept (cf. Böhme-Dürr, 1997: 358).

The most differentiated classificatory grid of subconceptions is offered by Roland Posner. Proceeding from the actual use of the notion both in everyday language and in the pertinent literature, he distinguished six different uses of the notion medium based on the kind of sign processes involved: (1) the biological concept, which characterizes the sign systems according to the body organs and sense modalities involved in production, distribution, and reception of signs (eyes/visual media; ears/auditive media; nose/olfactory media; taste/gustatory media; skin/tactile media); (2) the physical concept, which characterizes the sign systems based on the chemical elements and the physical conditions; (3) the technological concept, based on the technical means and apparatuses used; (4) the sociological concept, covering social institutions that organize the biological, physical, and technical means; (5) the culture-related concept, which characterizes the sign systems according to the aims of the messages conveyed by them; and (6) the code-related concept, which characterizes the sign systems according to the rules to correlate messages and sign vehicles (Posner, 1985: 255–257). On the one hand, this plurality of concepts is only helpful when the various notions and the correlated media concepts and criteria are kept apart for the sake of precision and clarity. On the other hand, it has to be clear that the differentiation of these six media conceptions is only made for analytical reasons; with regard to the actual process, they have to be viewed together, since they appear simultaneously or consecutively, much in the same way as Krampen has defined the mass communication process as a supersemiosis.

A starting point for a truly semiotic reconsideration of the concept of the medium, however, could be a statement Charles S. Peirce made (presumably in 1905) in which he even equals sign and medium.

"A sign is plainly a species of medium of communication" (Peirce, MS 283, 125). In 1906, he goes one step further and writes: "All my notions are too narrow. Instead of 'Sign,' ought I not to say Medium?" (Peirce, MS 339). With one exception, however, this use did not become the current one. Laying stress on the specific quality of the sign as mediator between object and interpretant, the notion introduced by Max Bense and Elisabeth Walther instead of sign or representamen is *Mittel* or medium. (For her discussion of medium, cf. Walther, 1997.)

A Plethora of Neighboring Notions

'Medium' is not just in itself a multifaceted term. In the pertinent literature, it is always accompanied by several other notions that are only partly core concepts of semiotic theory. Although widely used, 'channel' is one of these notions coming from neighboring disciplines. Originating from information–theoretical texts, it has entered also the (media) semiotic discourses. The problem, however, lies not in the term as such but in a synonymous use of channel and medium (as analyzed in Wulff, 1978), which does not contribute to clarify the various elements and phases of the process. Unfortunately, since all terms in question have diverse meanings, even semioticians are sometimes not very precise in their respective use of the notions. When Thomas A. Sebeok, for instance, discussed how a source is linked with a destination, he described it as "a sort of medium, or channel, a passageway through which the two are capable of establishing and sustaining their communicative exchange" (1991: 27).

Even more complicated is the case with code (*see* **Postmodernism**) that is likewise part and parcel of the terminology in several disciplines dealing with media and communication. 'Code' is often confined

to transformation rules or the rules of correlating the elements of two different systems (the 's-codes' in Eco's terminology). Sometimes a code is regarded as a "set of substitution equations relating significata to signs or signifiers" (Watt and Watt, 1997: 408). Eventually, the term code is often used co-extensive with 'sign repertoire' or even 'sign system,' like for instance in the Jakobson model discussed above.

Although 'sign system' is a central semiotic term, the definitions vary in the different schools and currents. The widest and most fruitful conception of sign system with regard to media semiotics is offered by the Italian semiotician and philosopher Ferruccio Rossi-Landi. In his definition, a sign systems contains

> at least one code, that is the materials on which one works, and the instruments with which one works; [...] the rules to apply the latter on the former [...] the channels and the circumstances that allow communication, the senders and receivers who make use of the code (Rossi-Landi, 1985: 242).

But he goes even one step further when he writes that it

> includes also all the messages which are exchanged or can be exchanged within the universe institutionalized by the the system itself (Rossi-Landi, 1985: 242).

Fields of Media Semiotics

As indicated earlier, semiotics has turned to the study of media texts and contributed its share to their analysis at least since the 1960s. This contribution is evidenced by the remarkable amount of works in applied semiotics that can be subsumed under the heading 'media semiotics.' To establish some kind of order among the hundreds of works related to, and the various ways semioticians are dealing with, the media, two directions can be taken: to follow the usual listing of (mass) media, and to discuss some topics, media semiotics is especially interested in and apt for.

Advertising

From the very beginning, advertising was a preferred area, and the various publications show the variety of semiotic models and concepts that are used to deal with the verbal and visual messages encoded in promotional texts.

Among the most famous papers dealing with print ads is definitely Roland Barthes' (*see* **Barthes, Roland (1915–1980)**) analysis of a French magazine ad for Panzani pasta sauce (1964). Proceeding from the objects depicted (an open string bag with spaghetti packages, a tin of pasta sauce, a sachet of grated parmesan, and assorted fresh vegetables: tomatoes, onions, peppers, a mushroom etc.), he developed the levels of signs involved (fresh products, *italianità*, complete meal, still life, etc.) and the three types of messages: a linguistic, a coded iconic (symbolic), and an noncoded iconic (literal) message. Following the line Barthes opened with the title of this paper, that is 'Rhetoric of the image,' Umberto Eco adapted the classic rhetorical figures to visual texts and used them to analyze advertisements (Eco, 1968). (With regard to rhetorics, the work of the Belgian *Groupe μ* figures among the most prominent) (*see* **Rhetoric: Semiotic Approaches**).

Even though a lot of papers are rooted in the semiologic or semiolinguistic tradition, the Peircean trichotomy of icon, index, and symbol has definitely found its way into the general analytic tool set. Accordingly, the concepts are at the basis of many a publications on posters or print advertisements.

One of the best known theoreticians in the field of advertisement is Jean-Marie Floch who also worked in practice. His analyses of ad messages are based on a complex network of semiotic squares in the Greimasian tradition.

Apart from rhetoric or narrative analyses of ad messages, or those offering critical views concerning the myths and ideologies diffused through ads, there is yet another field of semiotic research and reasoning that is closely related to advertising: marketing and consumer research (cf. Umiker-Sebeok, 1987; Floch, 1990; Mick, 1997) (*see* **Marketing and Semiotics: From Transaction to Relation** and **Brands and Logos**).

Visual Semiotics

Although visual semiotics (Sonesson, 1989) cannot be reduced to media texts in the narrow sense, since works of fine art belong also to the topics investigated, it has to be included in such an overview. There are several groups of visual texts that have a long history of semiotic analysis, like photographs, cartoons, or comics (Eco, 1994) (*see* **Photography: Semiotics** and **Comics: Semiotic Approaches**). One of the classic domains of semiotic investigation are the relations between images and words (the accompanying verbal texts), be it in advertising, graffiti, popular prints, or newspapers (Schnitzer, 1994). For both areas, semiotic associations were founded many years ago: the International Association for Visual Semiotics/Association Internationale de Sémiotique Visuelle and the International Association for Word and Image Studies, respectively (*see* **Visual Semiotics**).

Film and Television Semiotics

Although sometimes film theorists have their reservations about subsuming film theory under the trendy label of media studies, film has to be considered a part of the media semiotic endeavor. Since the 1960s, a large amount of theoretical reflexion on film is based on film semiotic theories and analyses, and both central theoretical concepts and models of analysis in film and television are of semiotic origin. Accordingly, film semiotics plays an important role within applied semiotics in general.

The film semiotic discourse dates even further back than media semiotics in general, and it unfolds in several phases that are characterized by changing paradigms, thus showing that there is no such thing as a monolithic, unified film semiotics (in the same way as we should speak of 'semiotics' rather in the plural than in the singular). The plurality of film semiotic approaches, concepts, and models mirror the plurality of schools and currents that are today subsumed under the general label 'semiotics.'

At the very beginning, we find the writings of the Russian Formalists (Boris M. Ejchenbaum, Viktor B. Shklovskij, Jurij N. Tynjanov) of the 1920s, who can be considered to be film semioticians *avant la lettre*. Both in individual publications and in the programmatic collection *Poetika kino* (1927), they focused on the question of film as language (discussing a syntax – 'film sentence' – and semantics of film) and on literary, in particular poetic, features of film. The fundamental distinction between *syuzhet* ('plot') and *fabula* ('story') goes back to their writings.

During the following decades, there are a few, by now almost legendary publications, like Jan Marie Lambert Peters' thesis *De taal van den film* (1950).

The first stage of a broader semiotically based reflection on film started almost simultaneously with the first proliferation and organizational establishment of general semiotics in the middle of the 1960s (for instance, the International Association for Semiotic Studies IASS-AIS was founded after several years of preparatory conferences in 1969 in Paris). The major topic discussed in these years was the question whether film can be considered a language (in the sense of *langue* or language system) and, accordingly, be analyzed within the framework of semiolinguistic models (mostly in the Saussurean tradition). The search for the smallest units and a double articulation in the linguistic sense culminated in the well-known discussions between Eco and Pasolini at the 1965 and 1966 Pesaro film festivals. A first answer was given by Christian Metz, who considered cinema as a language without language system (cf. Metz, 1968: 65) and presented a differentiated theory of (general and particular) cinematographic codes and nonspecific codes (Metz, 1971).

A second phase (1970s and early 1980s) is characterized by a stronger orientation towards film reception and the recipients, based on (at least) two different paradigms: psychoanalytic and Marxian models in the tradition of Lacan and Althusser respectively. (With regard to the psychoanalytically inspired film semiotics, one influential publication has to be cited: Metz's *Le signifiant imaginaire* [1975].) In addition, this decade is also the period of the bloom of British film and television studies, which to a great deal focused on the sociocultural positioning of the recipient and the role it plays in her/his reception and constitution of meaning.

Finally, the film semiotic discourse in the 1980s and 1990s, the third phase, is characterized by a real plurality of approaches, concepts, and models and a proliferation of semiotic writings in film and television studies. On the one hand, film semiotic reflections (both theoretical and analytical) entered a positive exchange with several neighboring disciplines and related fields (like feminist theories as well as models rooted in narratology or discourse and text theory). Another strong field, with which general semiotics started to get in contact, is constituted by the cognitive sciences; accordingly, we can speak of the beginnings of a cognitive turn in film semiotics in these years. On the other hand, classic semiotic paradigms were taken up again and developed in new directions, like in neoformalist or semiopragmatic approaches. Part of this trend is also a reconsidering of those concepts and models from general semiotics that have so far not been adapted to film theoretic contexts. One way is to go back to the 'founding fathers,' as for instance Charles S. Peirce, and their writings that were also subject to changed readings and interpretations during the last decades. Since the 1960s, a few (film) theorists (like Peter Wollen [1969] or Gilles Deleuze [1983, 1985]) have dealt with his thought, and some of Peirce's concepts, like the trichotomy of icon–index–symbol belong to the standard terminology in film and media studies. Nevertheless, a close reading of Peirce's works will certainly bring helpful inspirations for film studies. One example of the application of Peircean semiotics to film are the works of Werner Burzlaff who examines montage and stylistic devices on the basis of the Peircean phaneroscopy (cf. 1992). But there are many more semiotic/semiophilosophic texts from the various traditions, schools, and currents that could contribute to a reflection on film. Birgit Recki (2004), for instance, presents Ernst Cassirer outside the philosophical circles to a public

interested in film studies and adopts aspects from his *Philosophie der symbolischen Formen* for her discussion of film as an artistic medium.

Digital Media/Hypertext/Computer/Internet

The most recent fields of research in media semiotics are 'new media' or 'digital media,' hypertextuality, and virtual environs/virtual reality. One of the earliest presence of this field was the 1995 conference (cf. Nöth, (ed.), 1997). Papers in this area are dealing with various topics: the fundamental questions of representation in the digital age; whether the computer can be regarded as a (semiotic) medium (Santaella, 1998; cf. Andersen *et al.*, 1993); the production and reception of hypertexts (Landow, 1994); the (narrative) structure of computer games (Wenz, 1998); or the semiotic analyses of expert systems. However, semioticians in this field are not only occupied with the analysis, but even with the sign-theoretically reflected production of multimedia applications or websites (Stockinger, 1993; Stockinger *et al.*, 1998). Both directions, semiotic theory and semiotically rooted practice, as well as their integration can be found at the annual COSIGN conference on computational semiotics for games and new media.

Topics across the Media

Apart from the fundamental questions of representation and signification with regard to media, or the particularity of the sign systems used for media semioses, there are some specific fields media semiotics has dealt with throughout the decades.

Media texts are increasingly characterized by intertextuality and intermediality, respectively, which are areas of genuinely semiotic research. The scholar most often quoted in connection with 'intertextuality' is Julia Kristeva (1967, 1980), who is credited to have coined the term in her essay "Bakhtine, le mot, le dialogue et le roman." Topics of research closely related to intertextuality are questions of reflexivity and self-awareness of/in media texts. Of particular interest is the ever increasing number of self-reflexive media texts, that is media texts dealing with, and occasionally criticizing, their own medium (institution) and its conditions and modes of production, and sometimes even reflecting on their own status as a medium text. Multimediality, on the other hand, exceeds both the question how individual texts can be related to each other, and how multimodality can be achieved in texts (cf. Hess-Lüttich and Schmauks, 2004).

Another area of semiotic analysis that touches several different media is constituted by the stories, the narrative.

Finally, semiotics is not only concerned with syntactics and semantics, with formal questions, and with the structural properties of media texts. From the very beginning of the semiotic enterprise, there was always a strong focus on the pragmatic dimension of sign processes and their role within a sociocultural context, in short: a sociosemiotic view on the topic. Given the increasing mediatization of our world and the role globalized communication and media (texts) play in our today's societies (in particular their omnipresence and the merging of telecommunication technologies and media), this feature is one that makes semiotics particularly important, also for the future. Pragmatics asks about sign work, about the production and reception (or reproduction) of texts, about the use and misuse of signs and sign systems, about the ideological implications of messages transmitted, and about the way people can be trained to handle these messages in order to resist manipulative tendencies and to learn to cooperate for a better future, as it was foreseen already by Morris (1946), or formulated more recently by Ponzio and Petrilli in their 'semioethics' (2005).

See also: Barthes, Roland (1915–1980); Brands and Logos; Bühler, Karl (1879–1963); Comics: Semiotic Approaches; Communication: Semiotic Approaches; Jakobson, Roman (1896–1982); Marketing and Semiotics: From Transaction to Relation; Paris School Semiotics; Photography: Semiotics; Postmodernism; Rhetoric: Semiotic Approaches; Saussure, Ferdinand (-Mongin) de (1857–1913); Visual Semiotics.

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Medical Communication, lingua francas

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Latin was the *lingua franca* of Western medical writing for several centuries. The roots of Western medicine lie in Greek; medical learning was transmitted in Latin translations of Greek and Arabic texts, mostly by translators whose first language was not a European vernacular but Arabic or Greek. Galen's texts became available in the 13th century in Latin commentaries, with several layers of additions. Medical texts started to be translated into vernacular languages such as French, English, German, Portuguese, and Catalan in the 14th and 15th centuries, almost simultaneously in different parts of Europe (see, e.g., Crossgrove *et al.*, 1998). Latin retained its firm position as a pan-European language of science. The situation started to change in England at the end of the 17th century, and several authors published in both

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languages (Webster, 1975: 267). Latin retained its position longer in other parts of Europe, e.g., in German-speaking countries. It is possible that journal publication in medicine from the 17th century onward played a part in nationalizing medical communication.

In the early 20th century, there were rival languages for the *lingua franca* position in science: French, German, and English. German was a very strong candidate before the Second World War. German had served as a *lingua franca* in large parts of Europe for centuries, for example, in the Baltic area since the Middle Ages, and the names of several scholarly journals and series in many fields are still in German. The situation started to change in the 1950s and 1960s in favor of English with the increasing impact of Anglo-American culture. The development has been extremely rapid in the last decade, and English prevails in medical research writing to the extent that researchers have noticed signs of register narrowing; for example, in Scandinavian languages the trend was noticed more than ten years ago (Gunnarsson and Bäcklund, 1995: 47). Practically all medical dissertations in the Nordic countries are written in English, and the same trend has been noticed in other parts of Europe. The widening circles of English in medical research writing can easily be verified by looking at the authors of recent issues of the *British Medical Journal*.

The former *lingua franca* of medicine, Latin, has not entirely lost its position. In hospital communication between medical doctors, Latin is still used in written documents in a highly conventionalized form, for example, in the Nordic countries the diagnoses are regularly given in Latin in the title line, and Latin anatomical terminology is employed. As a rule, the rest of the medical report is in the native language, for example, in Finnish or Swedish. A new feature is the use of English abbreviations and English words like sign, instead of the native word. In pharmacological use and in medical recipes, Latin abbreviations prevail; abbreviations provide an easy way out of the problem with inflectional endings as Latin is no longer taught much in schools. The trend is toward the increasing use of English.

See also: Medical Discourse: Early Genres, 14th and 15th Centuries; Medical Discourse: Developments, 16th and 17th Centuries.

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Medical Communication: Professional-Lay

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The Information Society and the Changing Status of Experts

Fifty years ago, authorities were generally more clearly defined in society than they are today. Teachers, doctors, and lawyers had undisputed expert status and as such they were highly respected and their authority was rarely questioned by the average citizen. Academic training was the exception rather than the rule and a much larger number of people were employed within the agricultural sector or within other manual sectors following a very limited period of schooling. Being practical, skillful, and able to manage were important values, whereas intellectualism, theoretical discussions, and criticism of society were not the order of the day. To a large degree, knowledge was still passed on from your elders and gained by experience. Although not academically trained, most people (men) were skilled in something often through some form of apprenticeship and areas of expertise were generally acknowledged.

Gradually, this has changed. In the 1960s, academics started challenging the authorities and their status as omniscient. They demanded the right to have a say (not only within their own fields) and this demand required information. From the 1960s on, the number of people receiving academic training

languages (Webster, 1975: 267). Latin retained its position longer in other parts of Europe, e.g., in German-speaking countries. It is possible that journal publication in medicine from the 17th century onward played a part in nationalizing medical communication.

In the early 20th century, there were rival languages for the *lingua franca* position in science: French, German, and English. German was a very strong candidate before the Second World War. German had served as a *lingua franca* in large parts of Europe for centuries, for example, in the Baltic area since the Middle Ages, and the names of several scholarly journals and series in many fields are still in German. The situation started to change in the 1950s and 1960s in favor of English with the increasing impact of Anglo-American culture. The development has been extremely rapid in the last decade, and English prevails in medical research writing to the extent that researchers have noticed signs of register narrowing; for example, in Scandinavian languages the trend was noticed more than ten years ago (Gunnarsson and Bäcklund, 1995: 47). Practically all medical dissertations in the Nordic countries are written in English, and the same trend has been noticed in other parts of Europe. The widening circles of English in medical research writing can easily be verified by looking at the authors of recent issues of the *British Medical Journal*.

The former *lingua franca* of medicine, Latin, has not entirely lost its position. In hospital communication between medical doctors, Latin is still used in written documents in a highly conventionalized form, for example, in the Nordic countries the diagnoses are regularly given in Latin in the title line, and Latin anatomical terminology is employed. As a rule, the rest of the medical report is in the native language, for example, in Finnish or Swedish. A new feature is the use of English abbreviations and English words like sign, instead of the native word. In pharmacological use and in medical recipes, Latin abbreviations prevail; abbreviations provide an easy way out of the problem with inflectional endings as Latin is no longer taught much in schools. The trend is toward the increasing use of English.

See also: Medical Discourse: Early Genres, 14th and 15th Centuries; Medical Discourse: Developments, 16th and 17th Centuries.

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Gradually, this has changed. In the 1960s, academics started challenging the authorities and their status as omniscient. They demanded the right to have a say (not only within their own fields) and this demand required information. From the 1960s on, the number of people receiving academic training

has exploded. Jobs that just a few decades ago required very little schooling cannot be had without years at college. Written material is distributed like never before, the various media provide a constant stream of information and the advent of the computer and the Internet in particular has catapulted us into the era of the information society. Many citizens and consumers today consider information their right in a democratic society, but there is also another side to the coin. Apart from the self-assured, critical, and challenging citizen, there are still many people who find it difficult to digest even fairly simple texts and who are not used to asserting themselves publicly. This group of people is at a disadvantage in the self-service information society. Authorities have been able to lower their level of personal service and have become used to handing out brochures and referring people to web pages. Furthermore, within some areas the reason for publishing huge amounts of information is not a true desire to convey information but, rather, a way to limit responsibility. That is why, for example, patient package leaflets contain long lists of extremely unlikely side effects, a measure that prevents the medical company from being taken to court on a 'should-have-told' basis.

The New Roles of Medical Experts

Society is now at a stage at which it is possible to obtain information about almost anything within a very short period of time. This has changed the way in which experts and authorities are perceived. Now that there is easy access to so much information it has become possible, and quite common, to criticize and challenge the views and decisions of experts. Within the field of medicine this has led to new roles for medical professionals and the entire medical industry (it should be noted that the contents of this section first and foremost apply to the industrialized world).

To a large degree, the medical profession is still highly respected and much authority still surrounds the health-care practitioner. Nevertheless, many patients do not accept a diagnosis as readily as they used to, they seek second opinions, read up on the matter themselves, and suggest alternatives, etc. Once they are convinced the diagnosis is right they do not always accept the treatment proposed by the doctor; they may challenge his/her views by means of the latest research available on the Internet and they may seek alternative treatment. Patients want access to their files to check what is going on. The medical industry is being met with claims of openness and information about the medicine they produce. Patients want to know about possible side effects (and to have them graded statistically) in order to decide whether to take the medicine prescribed or not. Medical experts no longer just diagnose and prescribe; they are expected to be willing and able to inform and discuss with the patient to a degree never seen before. Generally speaking, patients are more literate than ever and used to seeking and digesting new information. But even the most well-educated part of populations do, however, not possess the background knowledge of a medical expert and are linguistically speaking not part of the discourse community of medical experts. There is no doubt that patients who are used to digesting complex texts will often benefit from the information they obtain. However, many people do not possess this ability and this is problematic, because in today's society they are expected to. In earlier days, the doctor assumed complete responsibility; on the one hand, this meant that the patient was left to the mercy or competence of the individual doctor; on the other hand, it meant that the patient could leave things in the hands of fate and the doctor and did not have to carry the burden of having to be informed and being able to make informed decisions. But in the 21st century, authorities expect people to understand the technical and semitechnical language of doctors, various health campaigns on prevention and warning signals, the contents of patient package inserts (also in connection with the increasing amount of medicine sold over the counter, i.e., without any consultation), a number of informative brochures on specific ailments, their own medical files, and so on. This may be quite feasible to part of the population, but is likely to be problematic to many people.

What Is Medical Language?

Medical language is traditionally regarded as the language used by medical experts when communicating in an expert-to-expert context. It is the language of the 'specialist,' often defined as a special language as opposed to general language used by the general public in everyday situations:

> Special languages are semi-autonomous, complex semiotic systems based on and derived from general language: their use presupposes special education and is restricted to communication among specialists in the same or closely related fields. Sager *et al.* (1980: 69)

Those who master medical language have been encultured or socialized into the language. The student of medicine automatically becomes a student of medical language when attending university to become a health-care practitioner. Thus, apart from acquiring knowledge about the medical field, s/he

learns to communicate with peers using the linguistic tools appropriate in the medical context. It is a process in which books, medical journals, traineeships at hospitals, conversations with lecturers, fellow-students, doctors, etc. contribute to a gradual buildup of a specialist, medical language. When the student graduates, s/he not only possesses thorough *knowledge* of the medical field, s/he also masters the *language* of the medical discourse community.

Characteristics of Medical Language

The most obvious characteristic of medical language is its extensive use of words related to the subject matter – also referred to as 'medical jargon.' Apart from the medical jargon, medical communicators also favor a passive and impersonal style that focuses on objective, measurable phenomena rather than concrete actions. This style is attained through the use of heavy noun phrases (with nominalized actions), passive clauses, and a preference for third-person pronouns rather than first personal pronouns.

The medical jargon and the passive and impersonal style allow experts to provide precise and condensed information for other experts who are trained to perceive and consequently talk about the physical world in a rational, objective, and measurable way.

An example could be the pharmacist describing the attributes of a medicinal product in the so-called product summary – which is an official document from the pharmaceutical company that provides approving authorities with information about a particular product in order for them to authorize the marketing of the product. It gives health-care practitioners detailed information about a medicinal product as in the following extract:

> The antidepressant, antiobsessive-compulsive and antibulimic actions of fluoxetine are presumed to be linked to its inhibition of CNS neuronal uptake of serotonin. Studies at clinically relevant doses in man have demonstrated that fluoxetine blocks the uptake of serotonin into human platelets. Studies in animals also suggest that fluoxetine is a much more potent uptake inhibitor of serotonin than of norepinephrine. (http://pharma-help.com)

This example is used within a medical discourse community that is 'pure,' in the sense that the community is composed of equals or near-equals in knowledge and professional role (pharmacist to doctor). However, medical genres and medical discourse are not necessarily restricted to that of experts talking to experts. As patients, consumers, and members of society in general, nonspecialists momentarily enter the medical discourse community – not as producers but as *consumers* of medical texts such as patient package inserts for medicinal products, social marketing leaflets explaining the dangers of smoking, or when consulting GPs or pharmacists. Therefore, medical language is not restricted to the discourse community of experts but can also be found in communities in which the addresser is a professional and the addressee is a layperson.

The need for medical information accessible to people outside the professional medical domain has brought about a significant change in the premises of medical communication. The traditional symmetrical communication between equals (e.g., pharmacist to doctor) has been challenged by the demand for *asymmetrical* communication between experts and laypeople (e.g., doctors to consumers). This demand calls for recognition of a medical language at *different levels of abstraction*. If both communicators are specialists, the highest level of abstraction (i.e., 'traditional' medical language) is the obvious choice. If the communication is asymmetrical (professional-lay), the medical subject matter has to be adjusted to the knowledge of laypeople. In practice, this means that texts, which originate from an expert discourse community but serve as the basis for a consumer-oriented version, need to be 'translated' to become meaningful to nonexpert readers.

What Is Professional-Lay Medical Language?

This section deals with written communication though many features apply to oral communication as well.

Target Group

In 1859, Kierkegaard wrote about the following situations in which experts, or people who know more than others, want to convey their knowledge to other people:

> If I am to succeed in guiding another human being towards a certain goal, I have to find the place where he is and start right there [...]. In order to help somebody, I certainly have to understand more than he does, but first and foremost understand what he understands. (our translation of Kierkegaard, 1869, in Becker Jensen, 2001: 18)

Kierkegaard tells us that if you do not have this understanding it is no help that you are more knowledgeable than your target group, and he adds that:

> All true helpfulness begins with humbleness towards the person I seek to help, and this is why I have to understand that helping is not wanting to rule, but to serve. If I cannot do this, I cannot help anybody (our translation of Kierkegaard, 1869, in Becker Jensen, 2001: 18).

Kierkegaard points out two important maxims that are still valid for expert-to-layman communication: It is the level of the target group which should determine the level and style of the text, not the writer's level – otherwise the extra knowledge of the expert becomes useless to the reader. The writer must be humble and possessed of a true desire to be of assistance, i.e., should not be preoccupied with his own status and authority.

The target group in expert-to-layperson communication is often potentially the entire population and must therefore be characterized as very broad indeed, which is why the visualization of a target group may well be a very substantial problem to the writer. The expert writer is in danger of overestimating his audience because of his own extensive knowledge and may be afraid of sounding patronizing if too much is explained. An expert writer may also feel that very simple language questions his status as expert – after all, expert language signifies expertise and authority to many. All things considered, if there is a true desire to make a text understandable to all laypeople and not just half of them the safe way is to use the lowest common denominator as a yardstick. If there is a well-defined target group, the lowest common denominator within that group should be used.

Kierkegaard's two maxims should be kept in mind at an overall level, whereas the following may be of assistance at a more specific level when writing for laypeople.

Characteristics of Professional-Lay Medical Language

Incomprehensible Medical Jargon Perhaps the most defining feature of medical – or expert – language is the use of expert terms unknown to most people. For example, we may see the use of 'therapeutic indications,' 'contra-indications,' and 'interactions' in the headlines of an insert. These terms should be replaced by lay terms when possible or should be paraphrased. It should be noted that most medical jargon has Latin or Greek roots, but that the extent to which Latin medical terms have been incorporated in everyday language varies greatly from country to country. French and English have, for instance, been more receptive to Latin than German and Scandinavian languages.

False Friends False friends within an expert-to-lay context are words and expressions that are used both in everyday situations and in special contexts but in which the meaning of the words differs depending on the context in which the words are used. For example, the expression 'to administer' is the formal use of giving someone a drug. However, the expression is also used in a more informal sense in business or legal settings but with a totally different meaning. It may be very confusing to the reader if he knows the word well from other contexts but cannot make sense of it in the context in question. The use of such terms should therefore be avoided.

Inconsistent Use of Synonyms Generally, medical language is characterized by sparse use of synonyms but, when they occur, perhaps especially in expert-to-lay texts in which semiexpert terms or lay terms are used, too, the reader who does not possess the expert knowledge needed to judge whether the terms are synonyms or not may become confused when confronted with two or three different terms for the same thing. This is, for example, the case when 'lactation' and 'breastfeeding' are used interchangeably. Stylistic variation should be avoided if there is a risk of sacrificing understanding.

Long or Complicated Words or Expressions Traditionally medical expert language often makes use of officialese. Strictly speaking, this has nothing to do with medical jargon or with the advantages of expert language such as brevity and precision, rather the opposite. Still medical texts are often characterized by unnecessarily long or complicated words and expressions which make the text more difficult to digest. These superfluous words or blown up expressions should be removed and replaced with more simple ones.

Long and Complicated Sentences These are often a direct consequence of situations in which long and complicated words and expressions coupled with a too complex sentence structure result in lengthy, inflated sentences. Such sentences should be reduced by omitting superfluous words and expressions and can in many cases be split up into two or three shorter sentences.

Passive and Impersonal Style In expert communication, it is often not particularly relevant to know who the 'actor' is. Thus, instead of using the active voice, medical experts rely on a passive style making use of the passive voice and nominalization. In the passive voice, the person performing the action is deleted. This strategy may be quite useful in texts in which the actor is either unknown or simply not important, but in cases in which the patient needs to know that *s/he* is to perform some kind of action (e.g., in connection with a patient package leaflet) it is important to use the active style. The passive style makes the text impersonal and it forces the reader to take extra

mental steps as s/he converts the passive sentence into an active one in order to work out "who is doing what." For example, an impersonal expression such as "X should not be taken during the first 3 months of pregnancy" should be replaced by a more active expression "you should not take X during the first 3 months of pregnancy." Passive sentences should be turned into active voice and undue nominalizations should be avoided in favor of the more direct verbal form.

Too Much Information in One Sentence Contrary to sentences containing superfluous words, these sentences are complex because they contain too much *relevant* information. For example, "This includes previously untreated patients and patients who have previously responded to treatment with X, but whose condition has recurred." Apart from listing too much relevant information, the sentence is also complex because it is packed with heavy noun phrases. Very often, sentences become rather long and complex because the writer adds extra information to the noun by means of pre- and postmodifiers. The result is heavy noun phrases, which – when unpacked – would constitute sentences in their own right. To nonexperts, these sentences can be very difficult to unpack correctly. Such sentences should be edited by splitting them up into two or three shorter sentences.

Remnants from Translation Many medical experts are used to reading and discussing in English although it is not their native language. Modern non-English medical language is often very influenced by English lexis and even syntax. This may be a problem to non-English speaking laypeople.

Presuppositions A text that to an expert has a logical structure may not be logical to a layperson. If the writer relies on presumed (but nonexisting) background knowledge of the reader, the reader may be unable to follow the thoughts of the writer and may think that he jumps to conclusions.

Evidently, it is not realistic to completely avoid all of the above expert features. But the reason why expert language may be difficult to laypeople is the fact that these features tend to appear together in a sentence. Several studies show that they make the text less accessible to the general reader (see, e.g., Killingsworth and Gilbertson, 1992; Killingsworth and Steffens, 1989).

Length There are of course different conventions for the length of a text, but lay texts should never be longer than strictly necessary.

Print Size Information on medicine is often provided in far too small print that may discourage readers even before they have started. The print size should be reader-friendly.

Order of Information The order of information should be as logical as possible. Usually a sound strategy is to place the most important information in the beginning of the text.

Headings Well-placed, informative, and precise headings help weak readers navigate through a text. Headings should be written in clear and understandable terms and should not be too long.

Pictograms For instructional texts, pictograms may be a good solution, but the pictures or symbols should in no way be open to interpretation. This is more difficult than it sounds – a picture of a glass of water may to one reader mean that a pill should be dissolved in a glass of water, whereas to another it indicates that a glass of water should be drunk after swallowing the pill.

Conclusion

In spite of this attempt to describe the 'ideal' characteristics of professional-lay medical communication, professional-lay communication is still in its infancy and the discourse conventions are not in place. Professional-lay discourse in the medical context may best be described as a 'pseudo' discourse for the time being, in which professionals – with varying success – try to adapt their medical language to a mixed audience (potentially the entire population) whose knowledge of the subject matter and the discourse conventions of the medical field is very restricted. What we experience is a semiprofessional discourse that attempts to merge the qualities of traditional medical language with the discourse conventions of 'plain English' style guides. One could speculate about the reasons for the lack of successful professional-lay communication. No doubt many of the problems can be attributed to the enculturation of health-care practitioners into the medical domain through language that means that the *discourse* and *practice* of medicine are difficult to separate. More specifically, it has the following consequences:

- Medical experts generally lack the ability to downgrade their special language in order to accommodate a target group of nonexperts. The medical experts are experts within medicine, not within plain English communication.

- Medical experts feel less inclined to adopt a fully professional-lay discourse, as it may question their status as experts – after all, expert language signifies expertise and authority to many. They may even feel that talking medicine at a lower level of abstraction demystifies their profession and results in status loss.
- Finally, medical experts resist the professional-lay discourse for ideological reasons. Because of their scientific schooling, medical experts may regard professional-lay discourse a language for *mediation*, inappropriate for talking about medicine because the required simplification in professional-lay discourse (which promotes a personal, subjective, action-oriented style) does not meet the demands for precision, conciseness, objectification, and passivity, which is the paradigm of medical science.

Thus, instead of developing a professional-lay medical discourse, which enables experts to explain medical concepts at a lower level of abstraction, the experts resort to their habitual way of communicating (i.e., the language into which they have been socialized when acquiring their expert knowledge) in spite of the fact that their expert language is difficult to understand for 'outsiders' and therefore hampers the readability and usability of consumer-oriented medical documents.

And so, today, we face a situation in which, in spite of the fact that the medical community produces numerous documents for patients (package inserts, health leaflets, information letters prior to hospitalization, etc.), the professional-lay discourse has not been fully developed (and embraced) by the medical discourse community. Therefore, the discourse remains a hybrid between traditional medical language and consumer-oriented plain English.

See also: Jargon; Languages for Specific Purposes; Medical Communication: Linguas Francas; Socialization.

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Medical Discourse and Academic Genres

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The Scientific Medical Discourse Community

The construction of knowledge is both an individual and a social task. It is a continuous dialectical process that has been taking place for generations. This process has adopted different forms of communication, namely, oral (conferences, conversations, dialogues, remarks, among other spoken genres) and written (editorials, research articles, letters, peer reviews and referees' remarks, case studies, and even chats and e-mails).

New knowledge is drawn from the conversion of research resources derived from "how authors, editors, and reviewers together transform the raw material of manuscripts into the finished product of validated knowledge claims" (Chubin and Hackett, 1990: 95). This is usually carried out through a series of conventions that each discourse community has. While attributing to the communicative purpose the role of linking genres, tasks, and discourse community goals,

- Medical experts feel less inclined to adopt a fully professional-lay discourse, as it may question their status as experts – after all, expert language signifies expertise and authority to many. They may even feel that talking medicine at a lower level of abstraction demystifies their profession and results in status loss.
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Swales (1990: 34) brought up a conceptualization of discourse communities:

> Discourse communities are socio-rhetorical networks that form in order to work toward sets of common goals. One of the characteristics that established members of these discourse communities possess is familiarity with the particular genres that are used in the communicative furtherance of those sets of goals.

This is why he further adds that genres do not belong to individuals, but "are the properties of discourse communities."

Dialogical communication among scientists within a discourse community takes different shapes and forms. More often than not, their communication is an effort to win acceptance by their readership, particularly when controversial research is involved. In Myers's (1990: 144) words, scientific texts often represent "a negotiation of knowledge claims, not simply the communication of knowledge." This negotiation is carried out through the different genres at the disposal of a given discourse community. In addition, genres not only are established sites of social action, but also contribute to coordinate the work of groups and organizations. This social action in the science-making process is carried out through the scientific communication in a continuous exchange of information with other researchers in the same field and finally represents the acceptance of the investigation by the scientific community.

Communication among scientists and between scientists and their readership has been particularly enhanced by developments in computer science through which a web of information is distributed with no limitations in sight. "Links from electronic articles," wrote Delamothe (2002: 1477), "can pass backwards, forwards, and sideways to other articles." Delamothe further added, quoting from the *Charleston Report* (2002, 7, 1–2), that "a single document is no longer the pivot of knowledge but rather a node in a cognitive web in a system of coupled databases." The Internet potential is said to be unlimited, at least in reference to most first-world countries. Unfortunately, however, this does not hold true for third-world countries. Data show that only 2% of the world population has access to the Internet.

Written Communication

Since the 17th century, medical writing has gone through what Lang (2000) called the age of "formalized medical writing," in which a series of major steps took place: the first Western scientific journal, *Journal des Scavans*, was published in French and in English by Denis de Sallo, a member of the French *Parlement*, in 1665, antedating the *Philosophical Transactions of the Royal Society of London* by only 10 weeks. The first English medical periodical was the *Medicina Curiosa*, of which the only two issues extant appeared on June 17, 1684 and October 23, 1684. Over a century later, in 1797, the first medical journal, *The Medical Repository*, was founded in the United States. In 1812, J. C. Warren established *The New England Journal of Medicine and Surgery and the Collaterial Branches of Science*. This journal, after merging with *Medical Intelligencer*, became the weekly *Boston Medical and Surgical Journal*, which has been the official conduit of information of the American Medical Society since 1914, and, finally, in 1928 it became *The New England Journal of Medicine*. In Great Britain, the first issue of the *Provincial Medical and Surgical Journal*, considered the precursor of the *British Medical Journal* (*BMJ*), was published in 1840. A hundred year later, the American Medical Writers Association (AMWA) was established. In the 1960s, authors began to incorporate abstracts in medical journal articles and also the first edition of the *AMA Manual of Style* appeared. Pasteur introduced the methods section in the 1870s, essentially creating the IMRD (Introduction, Methods, Results, Discussion) format, also known as IMRAD (Introduction, Materials and Methods, Results And Discussion) and including TAIMRAD (Title, Abstract, Introduction, Materials and Methods, Results, And Discussion) (Maher, 1992); however, it was not until 1972 that this structure became the official standard for presenting scientific information (Standard Z39 of the American National Standards Institute). In 1979, the Uniform Requirements for Manuscripts Submitted to Biomedical Journals were published, and the structured abstract was introduced in 1987. Finally, in 1997, the Consolidated Standards for Reporting Trials Statement (the CONSORT Statement) was published.

The organization of top biomedical journals is not always well delimited and structured, resulting in dissimilar patterns. This can be attested by looking at five of the journals most widely consulted by researchers, namely, *Annals of Internal Medicine* (twice monthly), *British Medical Journal (BMJ)* (weekly), *Journal of the American Medical Association (JAMA)* (weekly), *The New England Journal of Medicine* (weekly), and *The Lancet* (weekly), all listed in *Index Medicus* and Medline. For example, most of them will include the typical original and revision articles, editorials, reports from clinical medicine, occasional notes or brief notes, book and journal reviews, and the like. In addition, some will feature special articles, such as *The New England Journal of Medicine*, in which a series of cases from the registry of the Massachusetts General Hospital is presented. Both *The Lancet* and *Annals of Internal Medicine* also offer short comments and brief communications, and the *BMJ* has

special cases based on Internet reader feedback. Of the five top medical journals mentioned, *BMJ* and *The Lancet* offer free access to their full contents, although the latter requires the user's free registration; quite a few articles are also offered in *JAMA*. Only contents (major features) and abstracts can be freely accessed in the rest of journals and sometimes a summary for patients (as in *Annals of Internal Medicine*) can be accessed. Obviously, the easier the access to these journals, the more feedback is obtained from the readership through the Internet, which makes the process one of the most innovative means of communication to and from a given medical journal.

Academic Genres in Medicine

The Importance of Worldwide Communication in the Medical Profession

Communication in medical English has been essential throughout the history of medicine (*see* **Medical Discourse: Sociohistorical Construction**). As medical science became internationally widespread, the need to keep in touch for the sake of the development of the science has become increasingly important for a number of reasons: first, as a means to complement research findings; second, to avoid the repetition of the experiments that yielded no positive results; and third, to control new diseases. These three factors are closely interconnected as the following examples illustrate: when AIDS began to spread around the world, major medical research centers had to share information, first, in order to control the disease, and, second, to create useful treatments that, frequently, were the results of complementing reports of previous investigations by other colleagues. Most likely, the SARS syndrome will again show the relevance of all these factors.

The words that doctors articulate in medical communication may be organized into various formats, but they always follow well-designed communicative written or spoken patterns. Linguists have come to label these recognizable patterns as 'academic genres' (Swales, 1990). The fact that medical professionals systematically resort to specific genres is a key factor in medical communication. A second essential element is the fact that doctors around the world basically communicate in a single language: English. This presents a series of consequences for all professionals in the field: in the first place, a reasonable level of English proficiency must be attained by doctors in order to read about new advancements in their discipline if they are to internationally publish their findings (necessary for promotional purposes in most countries). The problem is that the international use of the English language in the medical profession does not simply entail transferring one's findings into English, but also includes proceeding to adapt one's rhetoric to the features that are representative of academic English rhetoric (in its written or spoken versions).

Written and Spoken Genres

The concept of genre, as we have already mentioned, is a key term in medical communication. In fact, all medical communicative events may be classified into specific written or spoken genres (*see* **Medical Discourse: Doctor–Patient Communication**; **Medical English: Conferencing**; **Psychotherapy and Counselling**). With regard to written genres, we may highlight the following: editorials, research articles, abstracts, case reports, review articles, peer reviews, replies to these reviews, letters of acceptance/rejection of a paper, conference programs, medical popularizations, letters of application, book reviews, and letters to the editor (*see* **Medical Journals: Letters to the Editor**), to name but a few. Most of these genres are found in many other academic disciplines; however, each of them develops a set of peculiarities characteristic of the medical profession alone. The general patterns as well as some of the specific medical intricacies of several of these genres are elucidated below.

Stability through Time

Medical genres, especially written genres, have become quite stable in their form, structure, and style. This is mainly due to the fact that, as an independent scientific discipline, medicine is centuries old. This indicates that doctors have had hundreds of years to find fixed patterns – at least in certain paradigmatic genres – that adequately account for their medical findings. The Royal Society of London contributed to the development of key genres such as the research article in medicine. Nowadays, research articles in this discipline tend to follow the well-known IMRAD pattern, which has then been adopted by several other scientific disciplines. Engineering, however, and, in particular, new branches in this area, such as computer engineering, do not necessarily follow the IMRAD models.

Dynamism

The concept of genre, as defined by Swales (1990), implies that these textual patterns are subject to change and evolution. As outlined above, in medical writing there is an overall tendency toward a specific set of fairly stable patterns or genres. This, however, does not mean that the dynamic characteristic of genres is absent in medicine. Medical genres are also sensitive to changes in the outer and wider contexts surrounding the discipline. For instance, the introduction of new

technologies or, as they are currently referred to, the information and communication technologies (ICTs), have triggered a significant amount of change and transformation in the way that research is generally carried out or communicated throughout the world. The ICTs have generated the following major changes in medical communication and in medical genres:

1. The introduction of completely new generic forms (e.g., videoconferences used for lecturing via the Internet or even to carry out surgery under the supervision of a highly qualified surgeon miles away from the operating room; the use of e-mail and websites).
2. The increasing relevance of some already existing specific genres, namely, abstracts, which were used for decades before the invention of the Internet and Computer-Mediated Communication (CMC), even before computer databases. However, the Internet and, most particularly, the World Wide Web have increased the importance of abstracts exponentially as a key means of gaining access to relevant information.
3. The progressive transformation of existing genres, as in the case of conventional research articles that have seen two stages in their inclusion in the web system. Initially, academic papers were simply copies on the Internet that could be consulted or downloaded as they appeared in academic journals; however, the existence of on-line journals and the introduction of faster Internet facilities currently allow medical researchers to incorporate into their papers high-quality images, diagrams with movement, URLs with complementary information, etc. Thus, research articles are now being contemplated with a new set of elements heretofore not included in conventional written academic research articles.

Abstracts

The myriad of medical research papers published around the world today has made abstracts a tool of increasing relevance for medical professionals (*see* **Medical Discourse: Structured Abstracts**). The abstract allows a doctor or a scientist to select papers that are relevant to their everyday practice or research projects. The Internet, on-line databases, and other electronic resources have been added to the already vast research documentation available in conventional academic journals. Not only has the Web assisted researchers in locating relevant papers more quickly but, at the same time, it has also exponentially increased the number of likely to be profitable texts for readings. The medical professional, therefore, will inevitably have to read abstracts in order to be selective when choosing from such a wide array of reading material.

Consequently, the abstract has become an essential genre in medicine. However, important as abstracts are nowadays for medical advancement, it is interesting to note that they are a recent addition to the already established genres, in particular, the research and review papers, to which they are closely related. According to the Ad Hoc Working Group for Critical Appraisal of the Medical Literature (1987: 600), up until the late 1960s, abstracts were not included by most clinical journals. The next step taken by some journals was to move the summary and conclusions to the beginning of the research article, as occurred in *JAMA* and the *Canadian Medical Association Journal*, and shortly thereafter in the *BMJ*.

Editorials

Editorials are introductory articles in the initial pages of an academic journal. As opposed to research articles or case reports, editorials are subjective in their content, they are usually written by a single author, and they reflect the expertise of that person. For instance, Salager-Meyer and Alcaraz-Ariza (2003), when studying the frequency of academic criticism in four written genres of medical discourse, namely, editorials, review articles, research papers, and case reports, found that the frequency of critical statements was significantly greater in editorials than in the other three genres. We believe that the results of this study, although carried out on a corpus of Spanish medical texts in relation to the use of criticism, could also be extended to medical discourse at large. Thus, editorials are subjective, argumentative, and evaluative (in fact, it is their main communicative function). Editorials are written by expert knowledge-holders and knowledge-builders and include more critical statements than other medical genres. It is likely that only peer reviews and book reviews might incorporate a similar or greater level of direct academic criticism, though occurring to a lesser extent.

Editorials are also persuasive in their nature, since they try to convince their readership of the writer's point of view regarding their assessment of the papers being introduced or the ideas being expressed. Accordingly, editorials could be more specifically defined as introductory, persuasive, critical, and evaluative academic texts. They are opinion pieces within medical journals, analyses to evaluate previous and present work, and essays to suggest further areas of research.

Research Articles: Internal Structuring

The scientific or research article can be defined as a technical document that describes a significant experimental, theoretical, or observational extension of current knowledge or advances in the practical application of known principles. The reported findings must not only be original, that is, previously unpublished, but also valid in terms of providing sufficient and important information, and they must be published in accordance with a structure and style previously agreed on by the scientific medical community.

The Internet has introduced a whole new set of parameters in biomedical publication. Top journals in medicine have decided to go on-line with their publications, and this is the case, for instance, for the five top journals mentioned above, to name but a few. In some cases, and for some specific types of articles, journals have begun to avoid printing and, consequently, the articles in question never appear in the print journal. Newmark and Tracz (1997) predicted that, within 5 years, on-line publications would still closely resemble papers.

We believe, with Edward Huth (2000: 5), Editor Emeritus of *Annals of Internal Medicine*, that it may basically be an economic question, a question of "needs and costs in a marketplace." Electronic publishing of journals will actually supersede paper publishing, he adds, "when the new methods satisfy needs of authors and readers better than the paper medium and at a lower price." In addition, through multiple links, information about other articles from different journals is provided, a given paper or a report is cited, and readers are also invited to search for possible related articles through databases such as Medline.

As indicated above, medical papers are basically organized following the IMRAD macrostructure. This is the required macrostructure for both paper journals and on-line publications. Their mode of referencing, through the so-called Vancouver system, has been consistent since it was agreed on at a meeting of medical journal editors in Vancouver, Canada, held in 1978. Let us now examine the internal structure of each section of the IMRAD macrostructure.

Introduction

The introduction is probably the most complex section of the medical research article, but it also follows a more fixed structure than the other three sections do. It cannot be reduced to a mere expression of the author's aim in writing the paper. Rather, it should constitute the connecting link between readers and the research carried out by the authors. Through this fixed structure of the introduction, authors control their ideas and adapt them to their rhetorical aims and to the needs derived from their belonging to a specific scientific community.

The structure of the introduction is constituted by a set pattern based on three basic moves that Swales (1990) described in terms of the CARS model (Create A Research Space), later reinterpreted and applied to the whole body of the medical research article by Nwogu (1997). These three introductory moves and their 'constituent elements' are depicted in Table 1.

Materials and Methods

The methods section, or materials and methods section depending on the type of study (e.g., laboratory-based studies), basically describes the sample and its size, the subjects and criteria for inclusion or exclusion from the research, and the procedures followed in carrying it out. This section includes all the necessary details that enable readers to accurately grasp the research process, to the extent that the scientific community will be able to replicate it with the information provided. Structurally this section may include three basic moves (see Table 2): the first describes the data collection procedure (source and size of data, sample description, and selection criteria), the second describes the experimental procedure (apparatus description and experimental process), and the

Table 1 Introduction moves in the medical research article (Nwogu, 1997: 135)

Move 1:	Presenting background information:
by	(1) Reference to established knowledge in the field
	(2) Reference to main research problems
Move 2:	Reviewing related research:
by	(1) Reference to previous research
	(2) Reference to limitations of previous research
Move 3:	Presenting new research:
by	(1) Reference to research purpose
	(2) Reference to main research procedure

Table 2 Structure of the Materials and Methods section (Nwogu, 1997: 135)

Move 4:	Describing data collection procedure:
by	(1) Indicating source of data
	(2) Indicating data size
	(3) Indicating criteria for data collection
Move 5:	Describing experimental procedures:
by	(1) Identification of main research apparatus
	(2) Recounting experimental process
	(3) Indicating criteria for success
Move 6:	Describing data analysis procedures:
by	(1) Defining terminologies
	(2) Indicating process of data classification
	(3) Identifying analytical instrument/procedure
	(4) Indicating modification to instrument/procedure

Table 3 Structure of the Results section (Nwogu, 1997: 135)

Move 7:	Indicating consistent observation:
by	(1) Highlighting overall observation
	(2) Indicating specific observations
	(3) Accounting for observations made
Move 8:	Indicating nonconsistent observations

Table 4 Structure of the Discussion section (Nwogu, 1997: 135)

Move 9:	Highlighting overall research outcome
Move 10:	Explaining specific research outcomes:
by	(1) Stating a specific outcome
	(2) Interpreting the outcome
	(3) Indicating significance of the outcome
	(4) Contrasting present and previous outcomes
	(5) Indicating limitations of outcomes
Move 11:	Stating research conclusions:
by	(1) Indicating research implications
	(2) Promoting further research

third describes the data analysis procedure (definition of terminology, classification of data, analysis or modification of the instrument or the procedure, etc.).

Results

In the results section, which is the core of the research paper, the results are presented along with charts, graphs, tables, and figures, and the most important findings are underscored. Generalizations (see Table 3) are made based on the results obtained in the study and possible reasons are drawn to justify those results in view of results from other studies, termed by Nwogu (1997) as an indication of "consistent observations." It also provides possible negative results, that is, "those results which do not conform with expected outcomes in the study," so-called "nonconsistent observations" (Nwogu, 1997: 131).

Discussion

The final section, or discussion, has as its main objective the description of how these results fit in with what is already known about the topic of the study. Authors will refer back to the main purpose or hypothesis advanced in the introduction and see whether, in view of the results obtained, it can be held or not and whether it agrees with the findings of other researchers (see Table 4). This section often ends by making a generalization of the results obtained, their implications, and their possible applications, and, if an interesting but as yet unanswered question has arisen from the study, future research is usually recommended. Explanations or speculations may also be necessary to justify the possible limitations of these results.

Table 5 Structure of the RA Discussion section (Reprint from Docherty and Smith, 1999: 1224)

- Statement of principal findings
- Strengths and weaknesses of the study
- Strengths and weaknesses in relation to other studies, discussing particularly any differences in results
- Meaning of the study: possible mechanisms and implications for clinicians or policy makers
- Unanswered questions and future research

Docherty and Smith (1999) argued for a discussion section in which similar points are raised, but with particular emphasis on differences with previous research, as well as on unanswered questions throughout the author's research. They proposed the structure shown in Table 5.

This idea of speculating about the results in the discussion section of the research paper has given rise to a certain amount of polemic. To some extent, it reflects the opinion of those authors who defend a less rigid structure and favor the message itself. However, even though there is widespread acceptance of the writing conventions of a scientific community, some authors prefer – perhaps in an effort to increase their chances of publication in top medical journals – to focus more exclusively on the message itself. It is further contended that there is a tendency among authors to use excessive 'rhetoric' to speculate on the results, going in fact 'beyond data' and thus inducing polemic within the scientific community. Their advice to authors is that they should adhere more to the facts and dwell less on rhetorical devices. Skelton and Edwards (2000), however, are opposed to this restrictive view and suggested that speculation not only is desirable but, in fact, cannot be removed by imposing structural rules in medical research papers, since science is actually speculation, because there is a great deal of doubt and uncertainty. From a linguistic point of view, this is shown by the systematic use of modality in this section. These authors justified their opinion by pointing to the fact that it is in the results section where we find the data and where the statistical conventions are found to determine what is 'significant,' whereas determining how they are 'relevant' is the prerogative of the discussion section.

Case Reports

Case reports constitute a special section within certain journals; in these reports, the medical history of a single patient, usually related to an unusual pathology, is described. However, it is also true that these reports often constitute a case series about a specific and rare disease in which the medical

Table 6 Typical structure of a case report

(a) Presentation of signs and symptoms of the case in question
(b) Description of tests performed and interventions
(c) Presentation of possible diagnoses
(d) Treatment administered
(e) Outcome evaluation

histories of a number of patients may be studied and described. The aim of this type of text is basically to illustrate an aspect of the treatment prescribed and the reaction to that treatment in relation to the disease common to all the patients in the survey or in the series of case reports. Some authors (Iles, 1998) stress the importance of case reports and encourage writing them since it is one of the best ways to get started in medical writing. It has also been the source material in educational programs throughout the medical university curricula.

The structure of this genre depends on the type of case study. In some journals, they appear as a text of considerable length, in which the case report is preceded by an introduction and followed by a discussion. However, the medical literature essentially provides its information based on the structure shown in Table 6.

Iles (1998) proposed a similar structure that consists of the following sections: an introduction, and a case description, followed by a discussion and comments. This structure closely resembles the widely used problem–solution paradigm for text structure that consists of four moves, namely, situation, problem, solution, and evaluation.

The overall frequency of the case report was reduced between 1965 and 1995. This reflects the marginalization of the genre in the medical literature. The total number of case reports in the *BMJ* has gradually decreased: the January 1965 issues contained 43 case reports, between 1970 and 1990, the figures ranged between 8 and 20, and in the January 1995 issues there was only 1 case report. At the same time, the genre has been adapted to new specialized functions. The *BMJ* has introduced special sections in which case reports are selected for specific purposes under the heading 'Lesson of the week' and 'Drug points,' where the didactic purpose is emphasized and the focus is on a particular aspect, such as medication or complications. Another explanation for the decrease of case reports in printed journals is that they are being published in on-line versions.

The following is a paradigmatic example of how a case report can be used with the active participation of readers through the Internet. The *BMJ* presents a case report that involves many interested people and, at the same time, contributes to the science-making process through the subsequent dialogical communication that is produced. This journal includes interactive case reports, under the general heading of 'Clinical Review.' Sodeck *et al.* (2003) presented a three-part case report in three different issues (April 26, 2003; May 3, 2003; and May 24, 2003), in which the case was studied and a follow-up of its progression proposed. Its pedagogical implications become obvious when in the process the readers were asked several questions, thus inviting them to respond through the Internet. The questions from the first two parts produced 127 responses from readers in over 35 different countries, between April 26, 2003 and May 17, 2003. Part 3 offered an added element to this interactive case report; Peile (2003: 1136) postulated that there is more to be learned from the discussion than from the diagnosis and this occurs by focusing primarily on learning.

Review Articles

When speaking of primary and secondary research sources, review articles are considered as examples of secondary research material. They are, nonetheless, a very useful tool for researchers since they give a general view of the topic under discussion. They provide not only possible source materials, but also information on how to locate them. The starting point of review articles is the original medical literature which has already been published. Through a thorough analysis, review article authors give an overview of recent publications and developments in a given area, subarea, or very specific topic. Review articles may then be considered a state-of-the-art description and revision of a given topic.

The literature classifies review articles in three different categories:

Systematic Reviews

A systematic review can be defined as a method of locating, evaluating, and synthesizing evidence. It is subject to predefined criteria for authors, and it has been recently qualified as a "new PubMed filter" (Nahim, 2002). The criteria are usually defined by the journal itself and authors must adhere to them for publication in that given journal. They are usually covered by the set of journal instructions that are mainly referred to as identification, selection, limitation, and interpretation of the bibliographical material. In other words, they have to do with data source, for instance, conference proceedings only; data collection and analysis, in which the process of abstraction of data is described; and the method of analysis and number of variables analyzed in order to obtain the results for the review.

Nonsystematic Reviews

Nonsystematic reviews, also called narrative reviews, are not subjected to any set of pre-established criteria of selection of the materials to be reviewed. Without a rigorous criterion of analysis, however, the authors' opinion is paramount and the risk of bias in the selection of materials, as well as in the identification process, may be present. This creates the risk of producing undesired results, due mainly to the writer's possible bias in reviewing other people's work.

Meta-analytic Reviews

In meta-analytic reviews, a clear set of guidelines for reviewing results of previous studies is offered. Some authors have referred to this type of review as a series of 'analyses of analyses,' in which the review article analyzes data collected from different studies that are considered as being part of one large investigation. Its scope, therefore, is also on one topic but only in terms of analyzing the results obtained in those various studies reviewed. It is not just a simple description of results; it tries to answer the question of why some organ or some mechanism works the way it does.

Peer Reviews

Peer reviews have existed since the 17th century; however, because of their heretofore undisclosed significance, they have been an undervalued genre. For centuries, peer reviews have remained anonymous, their identity accessible only to a select group within the scientific community. This, however, is no longer the case, especially in medicine.

Peer reviews have become absolutely essential in the development of medical research. It is through these texts that decisions on what is to be published or rejected are made (*see* **Medical Writing, Revising and Editing**). High-ranking medical journals have a rejection rate of 80% and elite journals of approximately 90%. Peer reviews are the tool used for these rejections. Nevertheless, authors consider one-third of these reviews as irrelevant and 17.5% as incompetent (see *JAMA*, 1998). If this were true, relevant research is not being published for subjective reasons. *Nature* showed good sense in admitting that its peer review process has not always successfully identified significant new work, but it is not the only journal to have made 'historical misjudgments.' Campanario (2004) compiled an extensive list of rejections and criticisms of manuscripts reporting Nobel-quality breakthroughs.

Peer reviews are expected to be blunt. This is striking in the scientific community, where mitigated assertions and modalized statements characterize the rest of the genres, particularly research articles. In a peer review, on the other hand, one reads an average of only 1.51 mitigated criticisms but 6.88 blunt criticisms. This could explain why 15% of authors qualify the peer reviews they receive as 'impolite,' 73.8% as 'more or less polite,' and only 11.2% as 'very polite' (Kourilová, 1996: 9, 11).

Editors usually rely on reviewers and their comments. Most editors accept or reject a paper on the basis of peer reviews, although this is not always the case. The *BMJ*, for instance, receives over 4000 research papers per year. Approximately two-thirds of these submissions are rejected in-house by editors without consulting external peer reviewers (Schroter and Barratt, 2004). Reviewers have no specific training to carry out their task. They are given instructions only regarding what to assess. Since training programs for reviewing have yet to be implemented, the best solution thus far seems to be to select the best reviewers possible. In this respect, the best quality reviews are generally submitted by younger reviewers (in their 40s rather than in their 60s), who are likely to have a junior status in academia. To be more precise, the ideal reviewer is young, is a resident of the United States, has training in epidemiology or statistics, is a current research investigator, and takes approximately 3 h to write the report (Black *et al.*, 1998). It has also been shown that blinding reviewers as to the identity of authors decreases the rejection rate, and even more so if editors make sure that no reviewer reports on authors they may know personally (Godlee *et al.*, 1998). Additionally, if reviewers are asked to sign their reviews, rejection also decreases. Moreover, reviewers who have published extensively themselves produce better and more reliable reports. Investigating reviewers in the *BMJ*, it has been shown that editors were efficient in detecting good reviewers, taking into account what has been explained above.

It should be noted that blinding reviewers decreases the rejection rate but does not at the same time improve the quality of a review itself. Blinding seems to be a good technique to reduce bias, but further efforts need to be made to improve the reviewing process. Having reviewers sign their reports, thus making these reports public, also seems to be a good technique for, at least, putting an end to the heretofore hidden status of this genre. There is also an overall tendency to accept these techniques within the medical community at large. In 1998, approximately 50% of reviewers did not wish to sign their reports or to have their reports made public. Nowadays, in the *BMJ* only 5% of reviewers maintain this position. It is likely that important journals will start to make their reviews known via official websites (Hagan, 2003).

Two issues remain open for further study in relation to peer review in medicine: the bias against non-U.S. researchers and the role of women in the reviewing process of top journals. It has been detected that U.S. reviewers favor U.S. submissions much more that non-U.S. reviewers (Link, 1998) and that the presence of women on editorial boards of highly ranked medical journals is not proportional to their presence in medical associations nor to the number of papers published by women in those same journals (Dickersin *et al.*, 1998).

See also: Medical Discourse: Developments, 16th and 17th Centuries; Medical Discourse: Doctor–Patient Communication; Medical Discourse: Sociohistorical Construction; Medical Discourse: Structured Abstracts; Medical English: Conferencing; Medical Journals: Letters to the Editor; Medical Writing, Revising and Editing; Psychotherapy and Counselling.

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show that the expression of doubt and possibility is central to the negotiation of claims and that what counts as effective persuasion is influenced by the fact that evidence, observations, data, and flashes of insight must be shaped with due regard for the nature of reality and their acceptability to an audience.

See also: Accessibility Theory; Corpora; Corpus Studies: Second Language; Genre and Genre Analysis; Medical Discourse and Academic Genres.

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Medical Discourse, Illness Narratives

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Introduction

During the past decades, the health field has become a battlefield where alternative concepts of illness, health, and treatment compete with the dominant traditions of Western scientific medicine. New health care practices such as complementary and alternative medicine have gained status. Etiological factors have come to include 'lifestyle' factors, as in the relationship between smoking and lung cancer or the relationship between stress and certain coronary diseases. Patients have access today via the Internet to sources of information that were previously unavailable to them and can approach their physicians with more knowledge and new demands.

As part of these changes, researchers have become interested in questions having to do with the relationship between, on the one hand, the patient and his or her illness and, on the other hand, traditional scientific medicine and its concept of diseases. In this context, the study of illness narratives has gained prominent status.

Research on the forms and functions of illness narratives has expanded rapidly since the early 1980s. Its development is marked by diversity in the theoretical perspectives and methods that are brought to bear on a variety of problems.

Illness narratives is a wide field encompassing interview studies of patients' narratives of illnesses, studies of the way that narratives are used in the interaction between medical staff and patients, and clinical studies of how narratives could be used by medical professionals in encounters with patients. Another field of study that has emerged is the study of written and published illness narratives; Hawkins (1993) called these pathographies.

Theoretically, researchers have been interested in the narrative as an opportunity to study the subjective experience of illness, the way in which identity is reconstructed narratively in the face of illness, and how the institutional context affects the relationship between medical professionals and patients. This is especially interesting in terms of power and the patient's ability to make his or her voice heard in the medical encounter. Thus, researchers focus on narrative structure and coherence, as well as on the functions of narratives in various social contexts.

Two Voices

A central problem area for many studies of medicine and illness narratives is the relationship between what is called the voice of the lifeworld and the voice of medicine. These concepts were introduced by Elliot Mishler in his book *Discourse of medicine* (1984). Mishler pointed out that in the discourse of ordinary medical interviews it was possible to discern two

different attitudes to the problems that patients brought to the encounter with the medical doctor. What he called "the voice of the lifeworld" is characterized by a biographical contextualization of the events and problems of patients' lives. Problems and problematic events are taken at face value and related directly to the patient and his or her actions and experiences. In contradistinction to this, 'the voice of medicine' is characterized by a scientific and critical attitude; events and problems are removed from the biographical context and related to more general and abstract medical theories of diseases.

When these two attitudes were found in the same discourse or conversation, a conflict between the voices could be seen, instead of the voice of medicine being dominant. This struggle results in a disruption of the flow of discourse. That is, the patient tries to voice his or her view of things, whereas the medical doctor tends to ignore this while holding onto the voice of medicine. This leads to an 'objectification' of the patient and 'to a stripping away of the lifeworld contexts of patient problems.' As a result, the "form of discourse severely limits, if it does not exclude entirely, the possibility of humane medical practice" (Mishler, 1984: 128).

A similar point was raised by Arthur Frank (1995, 1997) when he argued that medicine "hails" ill people, categorizing them as patients with a certain disease and thereby placing them in a story told by medicine using medical reasoning. According to Frank, "many ill people find they cannot live the story, or just the story, that biomedicine tells of their illnesses; the need for a voice of one's own is a particularity of our times" (1997: 31).

This conflict between different attitudes toward illness-related events and experiences, i.e., the fact that patients and medical professionals view illness, health, and treatment very differently, is found at the heart of much of the research on illness and narrative. Researchers have focused on various aspects of this conflict and in the following we discuss three different strands of this research.

First, we focus on the way that ill persons use narratives as a way to understand illness and reconstruct their identity in light of the illness experience, i.e., illness narratives in the lifeworld of patients. Second, we discuss research on narratives in the encounter between the patient and medical professionals. This includes research on the use of narratives as a clinical tool, i.e., narratives in the encounter between the world of medicine and the lifeworld. Finally, we focus on the way in which medical professionals use narratives, i.e., the narratives in the medical world.

Narrative, Lifeworld, and Identity

Illness narratives, that is, stories about illness told by the ill persons themselves (as opposed to narratives about illness told by medical professionals (Hydén, 1997)), usually concern life-threatening diseases or chronic illnesses. This kind of illness commonly, perhaps always, influences the ill person's perception of self. A serious and chronic illness not only means a biographical disruption, it also means that life takes a new turn often totally unrelated to how life was before illness. According to American sociologist Kathy Charmaz (1983), chronic illness is diminishing to an individual's identity and sense of self and a fundamental consequence of illness is the experience of loss of self. This changed perception of self can primarily be described as a social interactional process that partly originates from the loss of social contacts that is inherent in illness and partly from the way that other people seem to regard ill persons and treat them.

Considering narrative as a powerful cultural resource for organizing, making sense of, and communicating experiences such as illness, the study of illness narratives becomes important for understanding phenomena such as identity and transformation of self due to illness. This holds true for oral as well as written stories and for what sometimes is called performed or enacted stories (Frank, 1997; Langellier, 2001).

Chronic illness is almost always undesired and probably beyond what a person has imagined his or her life to be. Being unexpected and unwanted, illnesses raise questions such as "why me?" and "why this?" These are questions that medicine is hardly ever able to answer in a clear, straightforward way.

In an ill person's endeavors to understand what is happening, narratives become an important resource for making sense of things. Narratives help to sort out and organize different kinds of experiences into a more comprehensible and coherent whole. Hence, it becomes possible to use narratives to connect events and experiences that did not seem to be related at the time they occurred. The connection can be used to explain illness.

Time is central to chronic illness. For one thing, it is a characteristic of a chronic illness that there is no immediate and certain cure and that such an illness thus can be part of the ill person's life for many years. Another typical feature of chronic illness is the insidious onset (Bury, 2000), which makes it difficult for medicine as well as for the ill person to know when the illness actually started. The difficulty of fixing the time of the debut has implications for issues of responsibility for illness and suffering. This

vagueness simultaneously offers the possibility of temporalizing illness and incorporating illness into the personal life story and thereby handling questions about blame and responsibility and ultimately the sense of self.

In a study concerning a medically unexplained illness – a contested illness exemplified by Chronic Fatigue Syndrome (CFS) – it was argued that the interviewees temporalized their illness in different ways. There was a discussion of what implications this had for questions about responsibility, blame, and freedom of liability (Bülow and Hydén, 2003). The analysis draws on the shadows of time concept, borrowed from literary historians (Morson, 1994). This concept involves events casting their shadows over the narrator's present. These shadows of time can come from the back (backshadowing, i.e., what one later thinks should have been foreseen), can come from the side (sideshadowing, i.e., alternative roads and ends), or can appear as a kind of vortex (i.e., when several events separated in time finally converge into illness).

The use of different time shadows (e.g., backshadowing) when telling one's illness narrative means that the ill person might blame him- or herself for not acting in a proper way in order to prevent illness or for not handling it differently. It can also mean the reverse, that the temporalization of illness might give the narrator limited or even total freedom from liability. In the study, this also became obvious in the way that interviewees used backshadowing by placing their illness back in time and simultaneously accounting for why they should not be blamed and in what way they would be seen as responsible persons. This could be achieved by making statements about an early visit to a doctor and describing the feeling of confidence in the results of medical examinations that did not indicate any disease and in the competence of the doctor who told the narrator not to worry. In so doing, the narrator presents him- or herself as a person who, even at the time he or she is describing, showed great responsibility. This way of telling the story of illness counteracts some of the questions that might be posed about possible actions to be taken.

Another way of managing illness narratively by using a medical diagnosis was shown by Lisa Capps and Elinor Ochs (1995) in an analysis of the stories told by a 34-year-old married woman about agoraphobia. The researchers showed how the woman created a master narrative "that holds for all her panic experiences, wherein anxiety is presented as an irrational response to being in an immediate activity setting" (Capps and Ochs, 1995: 80). The connection established by the narrator between the situations she finds herself in and the feeling of panic makes her think that a causal relation exists between the area in which she is not able to move and her anxiety. At the same time, she regards her own avoidance behavior as a token of being agoraphobic. Capps and Ochs demonstrated with a rigorous linguistic analysis that it was possible to interpret the panic attacks as a delayed 'no' to accommodate the situation in which panic later appears. The authors argued that the diagnostic construction provided the woman "... with a medical reason for neither accommodating nor even negotiating demands and desires imposed or promoted by others" (Capps and Ochs, 1995: 100). At the same time, she created a coherent story of her life.

Illness narratives are also important for the identity of the ill because of the way in which narratives and narrating work in gaining a new identity as a special kind of person. This transformation of identity might happen through learning to tell a new story about oneself, one's life, and the form of illness, often together with other sufferers. This emphasizes the social act of storytelling that is sometimes lost in narrative analysis. Research on self-help groups and patient associations are examples of this transformation of identity through storytelling in groups.

In her study of Alcoholics Anonymous (AA), American anthropologist Carol Cain (1991) indicated that narrating is probably the most important element for someone becoming a new member of the group. She argued that "identity reconstitution in AA takes place through reinterpretation, of self and of one's life, and that the major vehicle for this is the AA personal story." According to Cain, becoming a member of an AA group is about learning to tell a new story from prototypical narratives about life. This learning takes place by participating in collective storytelling. Within AA, there is a well-defined idea that it is the effects of drinking alcohol that constitute the problem and not the other way around. To become an AA member, one must adopt this view, which means that one must rethink the life one has lived and one's relationship to alcohol. Through what Cain called identity diffusion, the old identity is weakened. "In acquiring a new identity," she explained, "individuals must understand the identity, internalize it, and become emotionally attached to it" (1991: 218). This gives rise to stories resembling conversion stories in which the teller reinterprets his or her past in light of a turning-point experience.

Cain stated that it is the process of learning to tell his or her story with the appropriate structure that helps an AA member to understand him- or herself as an alcoholic. In this process, newcomers learn from old-timers to tell the story in the right way. Cain's

study indicated that the longer a person has been a member of AA, the more his or her story resembles the prototypical AA story. The major vehicle for the identity reconstitution process is thus the AA personal story. Such stories, which Cain described as a 'learned genre,' can be told at meetings in a formalized manner as well as being published in pamphlets and the like. By reading the stories of others and by hearing other alcoholics tell their stories at meetings, newcomers learn both the structure and the content of the prototypical AA personal story and at the same time these stories also provide a newcomer with experiences to compare with his or her own. This shows that learning to tell a new life story is something that people do together in social interactions.

Learning to tell a new story through interaction in a group such as AA shows a kind of enculturation – becoming a group member and gaining a new identity through this membership. This process partly differs from the idea of narrative as a means to articulate a voice of one's own and thereby resist a medical categorization. On the contrary, each member in an AA group adopts the collective identity of a nondrinking, recovering alcoholic by learning to tell the right story in the correct way.

Many chronic illnesses have an insidious, vague onset. This not only makes it difficult to describe at what point one's illness started, but also means that changes in the sense of self can constitute a very long process that is not always possible to follow in a single story. On the contrary, it might more often be the case that people describe changes in their sense of self and identity transformations through a series of stories. American sociologist Susan Bell has studied what she calls "DES daughters," i.e., women who were prenatally exposed to the drug diethylstilbestrol (DES), which increases their own risks of infertility, miscarriages, and vaginal and cervical cancer. In her study, Bell (1988) showed how a slow and gradual change in identity is narrated with the help of what she called linked stories. "Through linked stories, people explain how their experiences – and their interpretations of these experiences – have changed over time" (Bell, 1988: 101).

By reducing each story to its core narrative, it becomes possible to see how the several narratives, though not told in a direct sequence, are linked to one another through structure and content (Bell, 1988). Together, the multiple narratives describe a change in the attitude the woman has toward her illness. In her first story, she presents a rather distant and disinterested attitude in regard to the illness and the risk that this implies. In the second story, the consequences of being a DES daughter become obvious for the narrator. In a third narrative, she describes a political awakening and commitment that also includes an interest in other women in a similar situation. This gradual change also includes an altered view of medicine and physicians. Drawing on Mishler's (1984) voice of medicine and voice of the lifeworld, Bell demonstrated how the transformation is linked in the first two narratives to a confidence in the voice of medicine; she receives what she regards as reliable information about the illness from medical sources. In the third story, her trust in medicine has changed into a critique of medicine as the narrator criticizes the way that medicine treats the risks to which these women have been exposed. The narrator also criticizes the medical world for not providing the right information, for not preventing problems, and finally for prescribing the medication that caused the problem in the first place. According to Bell, "becoming political means balancing the voice of medicine with the voice of the lifeworld" (1988: 120).

Following Bell, Langellier (2001: 152) studied what she called "interpretive links" among the stories one woman tells about her experiences of having breast cancer. Langellier, however, emphasized "the performative struggle of identity" in these narratives by asserting that the full meaning of stories is **enacted** rather than semantic and "located in the consequences of narrative as well as its meanings" (Langellier, 2001: 175).

Narratives in the Clinical Encounter

In a study on the use of narratives in the actual encounters between patients and doctors, Clark and Mishler (1992) pointed out that narratives do not constitute a neutral instrument. Instead, there is a struggle in the encounter to determine which narrative about the patient's illness will be the dominant one – the patient's everyday narrative about the illness or the biomedical narrative about the disease.

In typical medical interviews, physicians either ignore or interrupt patients' everyday accounts of their problems. The traditional narrative presented by the medical doctor often has the form of a chronicle in which signs and symptoms are organized according to a biomedical plot but removed from the larger context of patients' lives. Patients try to restore the everyday context of their illnesses, locating symptoms within their daily experiences and observing the impact of said symptoms on how they function personally and socially. In order for the patient to be able to present these contextualized stories, a realignment of the relationship as it is typically enacted in medical interviews is required. The physicians must relinquish or at least moderate their dominance and move

toward becoming more attentive and responsive listeners, encouraging patients to tell their stories instead of imposing the medical plot of illness and cure.

In several studies, Young focused on the negotiations between various interpretative frames, for instance, between the world of medicine and the lifeworld. The patient visiting a medical doctor must relate in some way to the world of medicine (Young, 1997). Young stated that the patient can adopt at least two different strategies in relating to the medical dominance. The first strategy is – as Mishler pointed out – an attempt to break in against the voice of medicine and make the voice of the patient heard. This can be accomplished through ignoring, misunderstanding, or flouting medicine's conventions. The second strategy involves inserting a narrative enclave consisting of lifeworld experiences into the realm of medicine (Young, 1997: 33).

A case in point is Young's analysis of the encounter between a medical doctor and an elderly Jewish professor who arrived in the United States via Auschwitz in 1945 (Young, 1997, 1989). By telling stories to the doctor during the physical examination about the bodily injuries he suffered during his imprisonment in Auschwitz, it becomes possible for the elderly patient to sustain his own sense of identity – despite the fact that he is standing naked before his doctor. This narrative about his experiences in Auschwitz has the form of a narrative enclave inserted into the medical discourse. The narrative enclave is an alternate reality that makes it possible for the patient to reappear as a person in the midst of the medical world.

Several authors including Kleinman (1988) have pointed out that the illness narrative ought to have a central position in clinical medicine. He and several other researchers emphasized the importance of illness narratives as a tool by which doctors can acquire a more detailed clinical picture of the patient (Kleinman, 1988; Brody, 1987; Greenhalgh and Hurwitz, 1998). Narratives can also serve as active devices in therapeutic and clinical work.

In her work on occupational therapy, American social anthropologist Cheryl Mattingly (1994, 1998) described how health professionals try to shape a progressive course of treatments and recovery processes into a coherent plot – what she referred to as "therapeutic emplotment."

A basic problem in clinical practice is how to insert therapy in some meaningful way into patients' lives. Therapy as a clinical practice could be conceived of as a sequence of actions directed **at** the patient. This may work in certain contexts but in other contexts the clinician must work **with** the patient – especially with chronically ill patients. This means that the clinician together with the patient must give the therapeutic actions a shared and common meaning. Mattingly pointed out that this can be accomplished by the healers actively striving to shape the therapeutic events into a coherent action organized by a plot. In this sense, telling narratives in the clinical context becomes a form of social action.

Placed in a narrative context, physical dysfunctions or the daily tedium of routine rehabilitation may take on new meaning and thus become endurable. This form of therapeutic emplotment may also influence or change the patient's time horizon for the course of the illness, by establishing a link between the medical interventions and the trajectory of recovery and engendering hope of eventual cure.

Rita Charon (2001) argued for the development of a "narrative medicine," emphasizing the physician's expertise in absorbing, interpreting, and responding to patients' stories. The doctor must learn the process of close, attentive listening to the patient in order to hear the patient's narrative questions, but also to recognize that there are often no clear answers to these questions. Through attentive listening, a relationship is created that allows the physician to arrive at a diagnosis, interpret physical findings, and involve the patient in obtaining effective care.

Narratives, Medical Knowledge, and Experience

It is not only those who are sick who use narratives to understand illness and suffering; narratives are central to the medical profession as well. The case stories published by Sigmund Freud are proof of this argument. In the practical, clinical context, narratives and storytelling are also part of the creation and communication of knowledge about illness and suffering in the processes of "constructing cases" (Atkinson, 1995) and telling "doctor's stories" (Hunter, 1991). It is probably not surprising that narratives play such an essential role in medical practice, since medicine is partly based on descriptions of people's illnesses and suffering.

Medical professionals use narratives to make sense of illness in their work. In discussions between colleagues, stories seem to be crucial to creating patterns and to defining and reaching an agreement on what kind of illness one is dealing with and the best way to describe it. This means that stories are part of medical practice as well as of the creation of medical knowledge. Thus, both the study of illness narratives and narratives about illness (Hydén, 1997) function as a window into how people create an understanding of their own suffering as well as others' suffering.

In many ways, medicine is a communicative enterprise although the stories told by the patients constitute just a small part. British sociologist Paul Atkinson (1995: 90) wrote that "the cynical observer" might speculate that patients' complaints about their suffering are rather "the pretext for medical talk." Narratives become part of medical practice through such medical talk. Medical knowledge is created and re-created through a range of communicative activities – oral as well as written – between colleagues. The medical world is composed of, and exists partly through, reports, documents, clinical rounds, and conferences. It is possible to regard all these forms of collegial 'talk' from a narrative perspective since stories and storytelling are included in different ways.

In his microsociological analysis of medical collegial talk, Atkinson (1995), drawing on what Elliot Mishler (1984) called voices, identified several voices of medicine representing various, and sometimes even competing, modes of medical knowledge. These are, for instance, the voice of science, which articulates knowledge "warranted by an appeal to research such as published scientific papers" (Atkinson, 1995: 131), and the voice of the eyewitness, which represents what a physician or a student physician has seen and done in relation to a certain case. In contrast to the latter, in which "the doctor stands in a personal relation to the knowledge" (1995: 131), Atkinson described the voice of personal experience, which is, at least when expressed in narrative ways, "almost exclusively the prerogative of senior physicians" (1995: 147). Even the nature of seniority, Atkinson argues, is partly established by the right to tell this kind of story.

These different voices are used in the presentation of cases and thus become part of the stories told at clinical rounds and conferences. In accordance with the struggle between the voice of medicine and the voice of lifeworld that Mishler (1984) emphasized, Atkinson (1995) noted asymmetries between different voices of medicine. Not only are the narratives from the voice of personal experience told exclusively by senior physicians, but the voices of students and younger colleagues can be interrupted and fragmented by questions from senior physicians. Similarly, the voice of personal experience commonly includes laboratory findings and thereby also a more scientific voice of medicine.

Through Atkinson's study, the crucial role of narratives and storytelling for voicing and managing different opinions as well as domains of credibility and for the learning of medical knowledge becomes obvious.

Hunter (1991) studied how physicians use narrative forms to present cases in patient rounds, case conferences, and medical charts as modes of communicating medical knowledge to both colleagues and students. She argued that the narratives of medical doctors tend to focus on unusual or deviant instances of disease signs and processes, thus emphasizing the features of particular cases within the general framework of what is known about different types of disease and their typical forms of appearance. This narrative strategy expresses and supports a pragmatic and instrumental orientation to the treatment of patients.

Summary

Narratives and storytelling serve important purposes in creating knowledge about personal illness for clinical practice, in constructing medical knowledge, and in teaching about illness and suffering. With the help of illness narratives, the individual can explain, legitimize, and manage experiences and actions that are difficult to understand by using, for instance, a medical diagnosis as the frame of explanation. Likewise, narratives are used in collegial talk to construct cases and to deal with opposite opinions as well as various modes of medical knowledge. Through enacted or performed illness narratives, ill persons or their relatives can oppose the story that medicine tells about them by the way that they narrate their actions rather than by their experiences of illness. This means that narratives are crucial to creating a coherent story, whether it is the story of one's life or the case story of a patient that is at stake.

See also: Medical Communication: Professional–Lay; Medical Discourse: Doctor–Patient Communication; Medical Discourse: Sociohistorical Construction; Narrative and Discourse Impairments; Narrativity and Voice.

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Medical Discourse: Non-Western Cultures

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The term 'shaman' has its etymological root in the word 'saman' from a Manchurian language, meaning 'one who knows.' Originally the term was used in various areas of northern Asia and was later brought to the Americas, to the southeastern part of India, and to Australia and Africa. According to Mircea Eliade, shamanism or the socially specific role of the shaman was brought to the Americas by the first eastward waves of immigration from Asia. The origin of the shaman in America (the continent in which the role has been most studied) is well documented (see Eliade, 1974: 266; Lowie, 1934: 183–188).

The role of the shaman is not limited to individual practice. It is currently portrayed in the literature as a category of social activity with a legitimate function as a health care phenomenon. Classifications include legal aspects, health program functions, adaptation in the migration of ethnic groups, and shamanic practice in the integration of tribal peoples and their customs into the social mainstream. As such the role of the shaman has become an interdisciplinary study.

Elaborations in the area of anthropology and ethnopsychiatry have focused on therapeutic aspects and role models which include the magical or nonlocal physical aspects of shamanic activity. These include Geza Roheim (1950), Mircea Eliade (1951), Claude Lévi-Strauss (1958), Alfred Métraux (1967), George Devereux (1970), and others who treat aspects of hypnotic suggestion or trance as therapy.

Mircea Eliade: Ancient Techniques for Producing Ecstatic States

Eliade is the great classic authority on shamanism, and is recognized as such by those who wrote after him. His *magnum opus* (*Shamanism and the ancient techniques of extasis*, 1951) is the first attempt to comprehensively approach the subject from the point of view of a religious historian. His sources include works on what is described as classical shamanism in Siberia, the Americas, Indonesia, and Oceania.

Mystical experience is central to his theme, in which he emphatically rejects the proposition of

Medical Discourse: Communication Skills and Terminally Ill Patients

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Introduction

Recent years have seen a strong drive for the teaching of communication skills at undergraduate and postgraduate levels of medicine in the United Kingdom. Many studies, particularly of doctor–patient interactions, have objectively supported the need for skills training, especially as health professionals' attitudes have been changing toward patients' psychosocial needs (Fallowfield *et al.,* 1998; Royal Society of Medicine, 2000). The National Health Service, in seeking to better inform and understand patients' needs, has sought to develop a paradigm of interaction that assumes of, or imposes upon, doctors and nurses the necessary 'communication' skills (SUPPORT, 1995). Problems with communication are recognized as being not only a major source of anxiety for patients and their relatives but also a common source of complaints and litigation; about 90% of the complaints that reach the NHS Ombudsman are attributed to poor communication between the health care professional and the patient and/or his family. Within a culture of blame and litigation, and with many patients having unrealistic expectations of clinical care, the doctor can also fear accusations of culpability, even if the patient's disease has progressed beyond the bounds of clinical science.

The training and assessment of communication skills in the medical curricula has been consolidated since the General Medical Council produced its document 'Tomorrow's doctors,' which specifically outlines the core requirements of any undergraduate curriculum. At the undergraduate level, the curriculum has become increasingly crowded as medical science advances and medical students need to be familiar with a bewildering amount of rapidly advancing knowledge. Some have claimed that medical training is being compromised as a result (Williams and Lau, 2004) and that communication skills are inherent in the student upon entry to medical school, with very little cost-effective change from teaching.

This recognition of the importance of effective communication has also driven the formal assessment of consultation skills in professional examinations, often using trained actors to simulate patients in an attempt to achieve a uniform assessment standard. The drive to teach communication skills at the postgraduate level has gathered momentum in the secondary and tertiary care sectors in recent years. General practice training in the United Kingdom has incorporated communication skills training and assessment for over 20 years, yet only half of general practitioners report having had training to prepare them to communicate with the terminally ill (Barclay *et al.,* 2003).

The importance of the quality of information giving that is required to ensure that patients can make informed, competent, voluntary decisions free of coercion is now being recognized in law. In the United Kingdom, the forthcoming Mental Capacity bill focuses on the wishes of the patient, with an assumption of capacity for decision making and a rigorous requirement for objective evidence to support the view that a person is not competent to be involved in making decision about his care. The importance of effective communication and assessment of true need is nowhere more stark than when the patient requests death to be hastened or refuses consent to treatment.

In the terminally ill, the desire to shield patients from the reality of their situation and avoid causing heightened anxiety often leads to poor truth telling and nondisclosure; importantly, this has been shown to usually create even greater difficulties for patients and their relatives, as it denies them the opportunity to reorganize and adapt their lives toward realistic goals (Fallowfield, 2002). Having better understanding of the nature of this important area of communication should not only improve the quality of the patients' experience and clinical care but also improve the decision-making process, and hopefully might lead to a reduction in complaints (and possibly litigation). An additional benefit of good communication skills training may be a decrease in work-related stress, as staff often report feeling inadequately prepared to deal with patients who are dying and their families.

The Ethos of the Terminally Ill

Terminally ill patients are particularly vulnerable, often having a heightened awareness and sensitivity to those around them. They are vulnerable by dint of facing death, and they are also vulnerable precisely because of their disease (Christakis, 1999; Seale, 2000). Infection, metabolic disturbances, cerebral disturbance by metastases or ischemia, and the effect of medication can make patients confused and less able to cope with new information, thus impairing their competence.

Their families are also distressed and keen to minimize the distress experienced by the person they love

– the patient. Clinicians are in a difficult position as well. They may have spent months or years advising and taking a patient through grueling investigations, treatments, and interventions in the hope of achieving a cure or disease control. When these efforts fail, the clinician can feel a sense of personal failure, making it difficult to remain strong and supportive of the patient. Attempts to keep up a strong front are then interpreted as indifference by the patient and/or his family.

Distress in terminal illness is multifactorial, with overlap and interaction between the domains of concerns: physical, emotional, social, and spiritual. Problems intermingle, amplifying each other and enhancing the overall distress felt by the patient, to the point that the concept of Total Pain, coined by Cicely Saunders (Saunders, 2000), is experienced by those whose needs are not addressed. The physical assessment of symptoms will depend on taking a history, often in a semistructured way, examining the patient physically, and investigating further as appropriate with blood tests and so on. However, assessment of the concerns, fears, beliefs, and wishes of the patient requires a much more subtle interactional approach that depends on detecting cues, demonstrating empathy by reflecting comments in the language the patient uses, and presenting an overall nonverbal demeanor of active, engaged, and nonjudgmental listening.

In the terminally ill, patients' needs fall into the broad categories of: a decrease in functional status or activity; role change; symptoms, particularly pain; loss of control; financial burden; and conflict between wanting to know what is going on and fearing bad news. There have been studies of information giving in those with a poor prognosis, usually relating to the imparting of bad news (Kutner, 1999). These needs are broad in scope, not particularly associated with any specific patient characteristic, and therefore underline the need for careful individual assessment.

For patients with a terminal illness, the diagnostic or prognostic news received in an outpatients' clinic can be devastatingly traumatic; they are suddenly aware of what lies ahead of them, including the unavailability of cure, the uncertainties about how the illness will develop over time, the long-term and short-term side effects that any treatment regime might inflict, the impact of their situation on those they love, and the extent to which family relations might become affected, to name a few issues.

Much research about the terminally ill has focused on the perceptions of relatives, their judgments and evaluations of the care given. Remarkably little has concentrated on the needs of children and teenagers as relatives. Children have different adapting styles closely related to emotional development. Although beyond the scope of this article, the topic is in urgent need of good and sensitive research to guide clinical services.

A cancer patient's deficit in his quality of life has been defined as the relationship, in terms of a gap, between his expectations and the current reality experienced (Calman, 1985). Yet no health care professional can narrow this gap without really understanding a person's hopes, expectations, and the complex nature of their current distress. Hence, the quality of interactions of the patient with various health professionals will inevitably become a key influence on his quality of life.

Many of the communication issues explored in these studies, especially the tensions between the 'medical' and the 'social' in the delivery of bad news, communicating risk, decision making, and so forth, are important areas for future inquiry in hospice and palliative care patients.

Communication Issues Specific to the Terminally Ill

Although the quality of clinical interaction is seen as important in training professionals, the quality of interaction has not been a topic of inquiry in its own right. From a discourse/communication perspective, there is a large body of doctor–patient communication studies, but these have been mainly limited to general practice. Most health care studies in the sociolinguistic communication tradition have mainly engaged with the general practice setting, with their analyses being doctor-oriented and focusing on the structural organization of the consultation process. Very few studies deal with cancer clinics and care centers or focus on the life history of patients or their cumulative interactional experiences.

There is now widespread recognition that "the quality of clinical communication is related to positive health outcomes" (Simpson *et al.,* 1991) and that the same holds true for cancer care: "inadequate communication may cause distress for patients and their families" (Fallowfield and Jenkins, 1999; Fallowfield *et al.,* 1998).

Specific difficulties encountered in discussion with the terminally ill relate to prognosis. Before information is given, the clinician must assess how much the patient already knows, and what he expects will be the likely course of the disease and its accompanying problems. Some patients may have witnessed poor care or distressing death in others. Others may have guilt about issues in their own life, blaming themselves for the illness or viewing it as some type of retribution for past deeds. Family conflicts, varying

expectations from health care, and emotions such as anger, denial, or guilt are powerful influences on communication.

Although to the dispassionate pragmatist the situation may feel hopeless, the vast majority of patients can cope better with reality if they have something to hope for. However, such hope must be realistic – it must be the patient's own wish and arise from his aspirations rather than from the imposed values of others. An example is the patient who knows he is dying but hopes to be alive for his son's wedding. Knowing that every effort will be made to achieve that goal will instill realistic hope, which is preferable to reiterating the obvious but more pessimistic view that in reality a sudden catastrophic event such as an embolism may occur at any time, and so he should not hold out too much hope!

Quality of Information

Many studies have been concerned with information giving (Davison *et al.,* 2004; Friedrichsen and Strang, 2003; Walsh and Nelson, 2003), attempting to evaluate the patients' understanding of their situation as a proxy measure of the quality of the communication, rather than assessing the interactional data within a consultation. Such studies fail to recognize the varied competencies of those who are frail and ill, the differing individual contexts of their lives and their diseases, and that emotional factors can act as a powerful block to the patient being able to retain information, even if the clinician is normally skilled at giving information. The studies also fail to assess the information needs of the patient, often omitting assessment of the patients' perception of the issues they feel rightly concern clinicians and those they feel would be viewed as trivial by their doctor. Patients' past experiences, beliefs, and background knowledge are powerful influences that must be recognized in order for information giving to be effective and sensitive.

Accurate information is crucial to decision making. The powerful influence of the doctor cannot be underestimated – hope, concern, and realistic optimism are powerful feelings that suffuse a consultation and are absorbed by patients. By contrast, a pessimistic outlook is rapidly detected and can lead to hopelessness, despair, loss of a sense of dignity, and demoralization of the patient (Chochinov *et al.,* 2002; Kissane *et al.,* 2001).

There are two groups of studies: (1) those dealing with information the patients need/want; and (2) those addressing the quality of interaction between patients/their families and health professionals, seen as information exchange. The studies have used questionnaire and interview methods and have suggested that patients prefer interview, particularly in the home setting (Montazeri *et al.,* 1996a; Montazeri *et al.,* 1996b).

Studies of information needs of cancer patients in general (Christakis and Lamont, 2000; The *et al.,* 2000; Montazeri, 1998; Billings, 2000) confirm that most need clear information about diagnosis and treatment. According to Sell *et al.* (1993), 92% of patients required a truthful disclosure of diagnosis, but 26% of patients indicated a lack of information about prognosis. A recent large-scale questionnaire study (Jenkins *et al.,* 2001) also showed that 87% of the 2331 patients wanted all possible information concerning their illness and treatment. Gamble (1998) elicited patients' experiences and reported variations in individual patients' need for information and their perceptions of "insufficient information about the side effects of treatment."

More information *per se* is not the solution. Information must be contextualized, and its understanding depends on the prior knowledge base of the recipients, who are usually the patients and their family members. There is some evidence for variable communication with cancer patients and for their dissatisfaction (Royal Society of Medicine, 2000). Quirt *et al.* (1997) used a combination of interview and questionnaire to elicit both cancer patients' and professionals' views about the extent of the cancer, the intent of treatment, and the risks and benefits of treatment. Despite some agreement, the researchers found significant discordance between the understanding of doctors and patients of the extent of disease and intent of treatment. There was an indication that patients' lack of understanding of their condition could impair treatment decisions.

Only a few studies have engaged explicitly with prognosis and quality of life issues. Leydon *et al.* (2000) used interviews to investigate information-seeking behavior in a small study of 17 patients with a variety of cancers. They found that, as part of the coping strategy, patients may choose not to obtain further information about their condition based on 'faith,' 'hope,' and 'charity.' 'Hope,' or 'false optimism about recovery' may be seen as an overriding principle that guides patients' reluctance to talk about prognosis and its impact on their quality of life (Christakis and Lamont, 2000). Montazeri *et al.* (1998), in an interview study of 82 patients with newly diagnosed lung cancer, commented that "proper communication remains limited."

A case study by The and colleagues (2000) has looked at the whole trajectory of illness; this concentrated on patients with small cell lung cancer and the issues of collusion about prognosis and

of false optimism. However, the findings of Sell *et al.* (1993) and Jenkins *et al.* (2001) differed; these researchers found that patients and their family members may even interpret the term 'treatment' in a curative rather than palliative sense. In a follow-up study, The *et al.* (2003) explore the reasons underlying 'false optimism' and suggest how radiographic images as clinical evidence are given priority over interpretation of subjective bodily sensations as a way of coming to terms with the illness trajectory. This supports the change in clinical awareness that quality of life assessments should prioritize palliation of symptoms, psychosocial interventions, and understanding of patients' feelings more than duration of survival (Billings, 2000; Girling *et al.,* 1994).

Most of these studies overlook the interactional dimensions of what actually happens in a given clinical setting.

Quality of Interaction

For thematic analysis, we will regard Quality of Interaction as constituted in psychosocial/relational and biomedical/procedural dimensions. The longstanding distinction between doctors inhabiting "the voice of medicine" and patients inhabiting "the voice of the lifeworld" may be a useful starting point (Mishler, 1984). With older patients, social and relational issues often assume greater significance. Nurses are more likely to embrace a social/relational style when dealing with patients (Fisher, 1991). The decision on the part of doctors to focus on the biomedical dimension (e.g., treatment options such as chemotherapy and the treatment schedule) at the expense of the psychosocial/relational implications of a diagnosis is very much embedded in Western medical practice, but it is driven by the need to ensure that patients' consent to treatment is realistically informed by the choices available and the probable outcomes of each course of action.

Barton *et al.* (2005), in their study of end-of-life discussions in surgical intensive care units in the United States, identify four phases: opening, description of current status, holistic decision making, and logistics of dying. Of particular significance is the second phase, description of current status, where a shift from therapeutic to palliative care has to be accomplished discoursally. This also happens to be the phase where delivery of bad news (Buckman, 1992) has to be strategically managed (not in the diagnostic sense, though). Barton *et al.* (2005) thus complement Curtis *et al.* (2002), which is geared toward a content-based analysis of physician contributions in these end-of-life discussions.

Iedema *et al.* (2004), drawing upon data from Australian multiprofessional team meetings, focus on professional self-presentation and pay attention to the tension between the medical worldview and that of the dying patient. Studies in the UK context include the geriatric clinic (e.g., Coupland and Coupland, 1998), where the framing of family-relational issues become significant in the care of the elderly.

Styles of Involvement in Patient-Centered Palliative Care under Examination Conditions

In this section we outline a pilot study under examination conditions (Cardiff University Diploma in Palliative Medicine). We shift attention from labeling of itemized skills such as 'open questioning' or 'active listening' to an understanding of how consultations are interactionally achieved by using a discourse analytic perspective. In broad terms, discourse analysis focuses on the jointly constructed process of interaction as it pays attention to the multifunctional, context-specific nature of language use.

Styles of involvement at the communicative level are manifest at various levels of linguistic choices and interactional trajectories. At the linguistic level, degrees of involvement can be signaled through selection of pronouns, preference for active or passive agents, choice of modalization and lexicalization, and so forth. At the interactional level, features such as overlapping talk, ellipsis, other-initiated turn-completions, and perspective display sequences are indicative of conversational involvement. Our analytic focus will be on how doctor–candidates interactionally orient to their actor–patients, with particular reference to history taking and care/treatment management. We offer a distinction between 'recycling of patients' words' and 'reformulation of patients' words' and suggest that these styles elicit different accounts of patients' experiences and expectations.

The data consists of transcripts of audio-recorded sessions of simulated consultations within the Cardiff Diploma in Palliative Medicine. The analysis is carried out in two phases using the discourse analytic methodology of interactional mapping and thematic staging. In conclusion, we discuss the implications of such microanalytic analysis for validating assessment and for raising professional awareness.

We adopt a discourse/communication perspective, focusing on information exchange structures, use of rhetorical strategies, management of interactional role-relationships, and so on (Sarangi and Roberts, 1999). For current purposes, we draw upon what may be called theme-oriented discourse analysis (Roberts and Sarangi, 2005) based on interactional

mapping (Roberts and Sarangi, 2002). Of particular interest in the palliative care context is the notion of topic, i.e., how topics are navigated following a schema in patterned ways (Chafe, 2001).

Thematic Maps in Palliative Care Consultation

Theme-oriented discourse analysis draws upon a number of concepts from linguistics and social sciences. The following list, suggested by Roberts and Sarangi (2005), can be applied to the palliative care setting.

- Interactive framing: Framing is a filtering process whereby issues of concern to each communicant are either brought into their 'frame' or are discarded from the focus of the interaction (Goffman, 1974; Goffman, 1981). The priorities of each party will determine the frame and its content – for example, the doctor may be focused on physical symptoms, so that descriptors of pain and other physical changes will remain in the frame, but expressions of concern for the distress that this illness is causing to the patient's child may be discarded. By contrast, the main concern of the patient may be the child, with the awareness of physical symptoms acting as a reminder and marker of impending death and the herald to bereavement for the child. Within their shared frames there is little true overlap. When the problems are listed together, understood by both, and shared, the quality of the interaction is perceived to have improved (Roberts and Sarangi, 2003).
- Contextualization cues and inferences: These are the linguistic and prosodic features that invoke the context of each utterance to give it meaning. They channel the inferences in a particular direction by calling up the frames and affecting the footing of each moment of interaction (Gumperz, 1982; Gumperz, 1992). These features include intonation, stress, pausing, and rhythm, which tend to be used unconsciously and usually are unnoticed in their role of establishing or reinforcing social relationships. For example, the clinician encourages disclosure of a previously unsatisfactory consultation by use of 'mmm' in a nonjudgmental tone, and then follows with 'that seems to have angered you.'
- Face and face-work: In an attempt to 'save face' in an interaction, the person perceived as weaker or more vulnerable – the patient – will use politeness as a strategy to establish closeness and engage the empathy of the more powerful person – the doctor (Brown and Levinson, 1987). Thus, the patient will be hesitant to disagree with the doctor, even when in fact the doctor has failed to grasp the patient's priorities in the situation. This, is starkly seen when the doctor uses closed or rhetorical questions: 'is your pain better?' 'your pain seems better, doesn't it?'; to which the patient agrees before hesitantly adding a qualifier such as 'yes – a bit – but it still gets bad as the day goes on.'
- Social identity: Gender, social status, regional and ethnic background, and many other influences affect a person's social identity. These preexisting factors are brought to the consultation, but the way one person behaves to another will influence the social identity – the performed social identity (Erickson and Schultz, 1982) – of each during the course of the consultation. Thus, the patient who finds he comes from the same village as the doctor will feel closer and assume greater empathy than the patient who is racially different from the physician and who speaks with a very different accent. In both cases, such assumptions are reinforced or dispelled by the nature of the interaction itself, thereby increasing or decreasing the patient's sense of comfort with and confidence in the doctor. An important factor is the time that each is allowed by the other to speak – as a general rule of thumb, the doctor does well to spend about 80% of the consultation time listening and only 20% speaking, thereby affording the patient a sense of respect and encouraging the patient to disclose anxieties.
- Rhetorical devices: Rhetoric is the language used to influence or persuade, usually in a political context. However, in the consultation, such devices can be parallel syntax, repetition of lexical items, metaphor, analogy, reported speech, and lists. For example, the patient may describe various symptoms, including pain that is 'terribly sharp out the blue, makes me bend double . . . gets me down,' to which the doctor may reply 'sharp . . . like a knife' or may summarize with a list of the symptoms just reported and then check back to ensure that nothing has been omitted. This makes the patient aware that the doctor has understood the patient's agenda of problems to be attended to.
- Analysis of the consultations showed that those deemed effective by validated scoring, when used for assessment, also had specific features in discourse analysis. High scoring (effective communicator) consultations demonstrated that the doctor verbally dominated for a much shorter time (about 20% of the time); used lexical reflective statements early to encourage disclosure of problems; summarized issues demonstrating coinciding frames from the patient's concerns and the items afforded attention by the doctor; and used contextualization cues that encouraged the patient to disclose concerns.

Extract A [D = female doctor; P = female patient]

1 D: [. . .] your oncologist thought it would be good to come and see me and I just wondered what you why you were coming to see me
2 P: uhm (.) well basically it's because my hip's still giving me pain I'm getting problems with my breathlessness it seems it seems to be almost getting worse and uh walking is becoming difficult and oh I mean it's just (.) I don't know where to start really but .hh I ju – I need stronger painkillers the tylex isn't doing particularly much you know taking away the pain (it's almost making me worse) but then I get constipation and nothing else even gets rid of that (^^^^^^) even though I tried prune juice and you know the normal kind of remedy
3 D: can you tell me who started you on tylex
4 P: my GP I think yea
5 D: I see
6 P: yea it does take some of the pain away but I'm not taking them I (take probably) eight a day but it's sti:ll it's still becoming quite a strain to almost sort of get through the day and I don't know what's happening and there seems to be so much going on and I really had – when I went to Birmingham I was like *so* full of hope and everything else and then suddenly it's like no and it's just all come as a bit of a shock as well to me
7 D: so thinking about what you've just said you said it's all come as a bit of shock you wanna just tell me a bit more about that
8 P: ((crying voice)) well I thought I was gonna get treated I thought I was gonna to be okay and now just from what I can gather I'm just not going to be okay and I don't know how long I've got and what I'm doing or where I'm-I mean where I'm even going you know I just ((crying voice)) I even had hopes of going to university so ((crying voice)) (^^^^^) be realistic so we even uhm ((crying)) my my family and I were (^^^^^^) and I mean they know that I do have this pain and I know and dampen it down for them and I think they know that so they think it's probably even worse than it is =
9 D: mhm
10 P: = and (.) oh it's just ((crying voice)) I don't even like talking about it with them because they just get worried and they (can do nothing either) then there's no one to talk to and I don't know what's going on and it's just becoming really really (.) ((crying)) just stressful
11 D: (^^^^^^^^^^^)
12 P: (^^^crying voice renders words inaudible^^^)) and now my painkiller is not even doing very much for me so now I'm at a point where I'm rapidly going downhill
13 D: (^^^^^^^^^^^)
14 P: yes so it's mainly about about the painkillers really [uhm if I can have any stronger ones
15 D: [is it about the breathing as well
16 P: yea I am quite breathless just in everyday life uhm walking becomes more and more difficult uhm because of the breathlessness and I I find it very difficult to exercise you know and I've got the pain in my hip as well so to be honest
17 D: hm
18 P: I <u>never</u> exercise
19 D: okay (1.0) (^^) when (.) when did this when did they say there was no treatment
20 P: ((crying voice)) it was about a month ago a month and a half ago when I went up to Birmingham
21 D: (and then you went)
22 P: ((angry voice)) well I had two days of tests up there and then they suddenly went well no actually we don't – no we can't do anything for you because you've got problems with your lung (2.0) and up until that point I really thought ((emotional voice)) I really thought that I was going to be okay
23 D: so it was a complete shock
(2.0)
24 P: yea
25 D: what about your family
26 P: uhm (1.0) oh uhm (2.0) they know they know that I am not going to get treated they don't know how long I've got and neither do I ((emotional)) you know there's something inside me you know it's just <u>so</u>: frightening to think it's taking over my my life and my body and that its it's gonna end [it's just it's just so
27 D: [it's hard isn't it to be (^^^^^^) isn't it
(1.0)
28 P: ((crying voice)) I don't even know <u>when</u> I've got <u>no</u> idea and (^^^^^^^^^^) and uhm yeah my family do know you know they love me and they are very supportive and helpful but they are just so worried that I don't wanna worry them more
29 D: mhm
30 P: and you know they've problems of their own to deal with not <u>major</u> ones but you know they've gotta go through life and it's just
31 D: is there (^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^)
32 P: no I think it's I think it's my fault I know it's a big strain on (my) marriage ((cries)) (^^^^^^^^^^^^^^^^^^^^^^) (and for me)
33 D: have you got anybody to talk to
34 P: ((crying voice)) not really
35 D: any support?
36 P: ((crying voice)) not really no well my family <u>are</u> supportive they are I just don't like
37 D: you don't like
38 P: talking to talk to them it's not their fault it's more it's more me not wanting to say anything
39 D: mhm

Key analytic points: D seems to be following the flow of topic as P wishes to develop it; P is given adequate interactional space to cover her major concerns, ranging from coping with painkillers to frustration with the medical personnel to family

support. At crucial points D summarizes the key issues (turn 7, turn 15, turn 23). Most of the doctor's questions are derived from what the patient has said (e.g., turn 19, turn 25, turn 27, turn 33). The minimal responses throughout help the patient to reveal all her concerns, unhindered. In a sense, this flexible approach allows the doctor to get a sense of P's priorities and major concerns before responding in any definitive sense.

Let us consider a second extract from the same setting, but with rather different thematic/interactional development.

Extract B [D = female doctor; P = male patient]

1 D: I'm Dr (first name last name) and I work with the (symptom) control team that work here at the hospital and Dr Bloggs has dropped me a short note just to ask me to (^^^) see you and give us an opportunity to look at how you are at present
2 P: yeah
3 D: what would really help me if you could give me a little more background about what's been happening how you've come to where you are now
4 P: yea (^^^^^^^) yea about a year ago I uhm I was diagnosed with a cancer in the hip and uhm I get a lot of pain from that
5 D: hm
6 P: and uhm I was I had chemotherapy for six weeks a:nd I was all geared up to go for surgery (^^^^^^^^^^) a:::nd uhm I went up to Birmingham for that =
7 D: mhm
8 P: = and (.) and then on the day of the operation they went and canceled it =
9 D: right
10 P: = and uh said that I wasn't that the problem was it was probably my lungs
11 D: it must have been a big shock for you to have got all geared up for your surgery
12 P: yes that's right°it was°
13 D: and what problem were they explaining you had with your lungs?
14 P: well uhm they were sort of saying that the cancer had spread into the lung uhm (.) that was it
15 D: you'd been expecting that to be a possibility? were you warned that that might happen?
16 P: well no
17 D: hmm okay how long ago was that that you should have had your surgery? that was actually very [recent was it?
18 P: [that was about a month ago
19 D: ri:ght (0.5) okay how have things been in the month since then
20 P: uhm well not too brilliant uhm (0.3) a lot of pain uhm (1.0) and I just—I don't know what to (have) (0.5) what if (^^^^^) from that (0.5)
21 D: will you just (.) just hold on to that and let me find out just a little bit more about you that would just help me =
22 P: yea
23 D: = to to understand and how old are you now?
24 P: twenty
25 D: right and whereabouts are you living (^^^^)?
26 P: well I I live at home in XXX
27 D: right
28 P: uhm with my parents I am a student in uh in YYY uhm but I haven't been there for the last (0.3) eight months or so
29 D: hm the last year has been very much taken up with being ill (I would think
30 P: yea
31 D: yes do you have any brothers and sisters?
32 P: yea I've got one sister
33 D: and she is at home as well is she? (^^^^^^^^^^^) and how are your family been finding situation (.) have they been supportive to you or (^^^^^^^^^^^)
34 P: well they're worried sick
35 D: hm
36 P: uhm (1.0) my mother is uhm (.) supportive (^^^^) taken it in (^^^^^^)
37 D: right
38 P: and my father is (.) he does not really talk about it much (^^^^^^^^^^)
39 D: mhmm that is his way (^^^^^)
40 P: yeah I think so he doesn't really talk about it much
[Ten turns omitted]
51 D: yeah (2.0) and before you had the problem with your hip did you (^^^^^^^^^^) or (^^^^^^^)
52 P: it was a shock [5 min]
53 D: yes (2.0) oh (.) that's helpful for me to see if you have an idea of (.) to find out more about you (.) is there anything else you think would be helpful for me to know just to (^^^^^^^) bigger picture (^^^^^^^)
54 P: I just wonder (what to do next)
55 D: yea right
56 P: it's (^^^^^^^^)
57 D: yea (1.0) so shall we go back to (.) the pain which seems to be the main thing that Dr Bloggs asked me to see you about
58 P: yes
59 D: can you just give me a little bit more idea what's been happening with that
60 P: yes uhm well it's been getting worse really I'm taking all these painkillers =

Analytic points: D's style of questioning borders on hyper-questioning (see turns 11–33), which does not allow P to nominate or elaborate on what concerns him most. D's questions are partly unrelated to what P has just revealed. Some of the questions preempt the patient's experience (e.g., turn 29), expecting the patient to confirm or disconfirm. This style of questioning is very different from what we saw in Extract A. Overall, one gets the sense that here D is pursuing his own history-taking agenda, as evidenced in turn 21 ("will you just hold on to that and let me find out

just a little bit more about you"). Notice that D returns to this topic in 57 ("shall we go back to the pain"). In both extracts, patients' circumstances have been framed in the wider family context, but there are significant interactional differences across the two styles of topic involvement.

We have chosen to present the above two extracts that show contrasting styles of interactional involvement. Space does not permit us to offer a detailed discourse analysis of all aspects of the interaction, so we limit ourselves to a theme-oriented approach as suggested earlier. Having decided on the theme of involvement, we can notice that extracts A and B have different involvement patterns. Whereas in A the patient is allowed generous interactional space to narrate her concerns, extract B is characterized by a sequence of question–answer turns mainly around the doctor's agenda. Although both consultations explore the family support system, they do so very differently and give this theme differential priority in the interaction. Communication about the illness within the family setting receives due attention.

Quality of Life

Both the extracts above deal with quality of life issues, but they do so differently in interactional terms.

Quality of interaction has been given a separate emphasis from quality of life, which is affected by the quality of interaction. Quality of life is seen as functions in specific domains, with the aim of minimizing distress through attention to symptoms, psychosocial, and existential concerns.

Much of the patient disclosure relates to informing the physician of the factors that are impairing quality of life, and these factors form the basis of the areas to be addressed in the clinical management plan. The notion of 'quality of life' embraces almost everything, ranging from physical/functional and social/economic to psychological/spiritual dimensions. A useful operational definition of quality of life is 'the relation between expectation and experience' (Calman, 1984; Carr *et al.,* 2001). We assume that both life expectations and lived experiences are seen at the level of interaction. It is then possible to look for quality of life issues at the interactional plane, while allowing for individual variations. In the clinical encounter, different views of both expectations and experiences are bound to surface. We will be looking for the interplay of experience and expectation (i.e., quality of life) in terms of how past, present, and future scenarios are talked about. One research task will be to see the extent to which health professionals orientate their communication to the relation between the expectations and experiences of individual patients and how patients respond to such critical moments.

A distinction between quality-of-life outcome measures in clinical research and the management processes and communication issues that address quality of life in daily clinical practice is overdue. Given our focus on clinical practice, the following dimensions of communication need to be highlighted: identifying and prioritizing problems; facilitating communication; screening for hidden problems; facilitating shared clinical decision making; and monitoring changes or responses to treatment. We would suggest that a detailed study of quality of interaction can contribute to our understanding of quality of life measures. This is particularly relevant in the context of cancer patients, for whom quality of interaction with health professionals and family members prove critical to all aspects of personal and clinical decision making during their treatment and end-of-life care.

Concluding Remarks

In the introduction we challenged the possible contributions that language and communication research can make to health care practice. One option is what we have displayed here – collaborative interdisciplinarity (Sarangi, 2002). The other option is long-standing ethnographic involvement in the research site so as to understand the very setting and the professional roles and identities (Candlin, 2003; Clarke, 2003; Cicourel, 2003).

It does seem true that communication skills cannot be taught or researched generically by nonclinical experts alone, as they do not have a comprehensive understanding of the complexities of medical conditions and the various aims of a consultation. Although they may have specialized knowledge of language and communication, they may have little knowledge and understanding of factual clinical content, which is necessary for their analysis to be useful to practitioners. On the other hand, communication skills are usually being taught in a prescriptive and formulaic way, with no recognition of language and communication as a discipline (Sarangi, 2004). Although the quality of clinical interaction is seen as important in training professionals, the quality of interaction is not a topic of inquiry in its own right – but there is a pressing need to combine linguistic theory with clinical practice in the context of care giving.

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Medical Discourse: Developments, 16th and 17th Centuries

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Introduction

The increasing need to use the English language for the expression of specialized texts caused a heated debate in 16th and 17th century England, as the adoption of other languages (Latin, in particular) was considered to be no longer sufficient for this purpose. The two centuries taken into consideration here are very important for the development of English medical discourse, as the years 1500–1700 mark a remarkable period of increasing use of the vernacular for medical and scientific writing. Indeed, at the beginning of this period, Latin still had a dominant role. Moreover, an analysis of the combination of Latin and English in late-medieval English medical manuscripts reveals code mixing as a widely exploited discourse strategy, one that implies a century of bilingual readership (Voigts, 1996). At the end of this period, English prevailed, and the process of vernacularization can be described as largely complete by 1500, when we can find a full range of sophisticated university treatises on medicine in English in which Latin plays little or no role. Indeed, of the 238 medical books published in the years 1640–1660, 207 were in English (Webster, 1975: 267).

Epistemological and Linguistic Changes

Great epistemological and methodological developments took place in that period, in both medicine and surgery; old scholastic thinking began to be replaced by new patterns of thought and new methodologies based on observation and interpretation of physical phenomena. These developments determined the need for corresponding changes both in the ways of communicating the new discoveries attained by means of innovative procedures and apparatus and in the expressive tool to be used to describe and argue about the new phenomena observed and analyzed. The evolution of the methods adopted in the study of medicine and the development of new surgical procedures indicated a change not only in the approach to the interpretation of the issues analyzed, but also in the way in which phenomena ought to be described and opinions expressed.

Criticism was made both of how language was employed in the various processes of medical research and, in particular, of the suitability of the tool itself for an accurate, precise expression of the concepts

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Criticism was made both of how language was employed in the various processes of medical research and, in particular, of the suitability of the tool itself for an accurate, precise expression of the concepts

reported. Those specialists who intended to use the native language in the expression of medical phenomena often pointed out its deficiencies and inaccuracies. For example, Borde often inserted Latin quotations in his work "for [he] nor no man els [could] not in theyr maternall tonge expresse the whole termes of phisicke" (Borde, 1552: 38^{v}). Similarly, Christopher Langton complained of the limited number of vernacular anatomical terms:

> I can do no lesse then count the negligence of our Phisitions to be the cause of [the lack of English anatomical terms]: for yf they had written of theyr arte in theyr mother tunge, as they do in other places, why shulde we lacke englysh names more then we lacke eyther Latyn names or Greke names? and yet to saye the truthe, it is better for vs English men to haue English names, then eyther Latyn or Greke. (Langton, c. 1550: Diii^{r})

Another criticism often made by specialists was the polysemy characterizing many words, which often made texts ambiguous. The remedy suggested consisted of the coining of new terms providing a stricter delimitation of meaning. Indeed, the coining of native terms – particularly frequent in case of translation – is often explained with the motivation of greater clarity; this is the motivation provided by Andrew Borde for his translation of "obscure wordes and names into Englyshe":

> For as muche as olde, auncyent, and autentyke auctours or doctours of Phisicke in their bokes doth wryte many obscure terms, geuinge also to many and dyuerse infyrmities, darke termes, dyffycyle to vnderstande, some and mooste of all beyng Greeke wordes, some and fewe beynge Araby wordes, some beyng Latyn wordes, and some beyng Barbarus wordes. Therfore I haue translated all soche obscure wordes and names into Englyshe, that euery man openlye and apartly maye vnderstande them. (Borde, 1552: Av^{r})

Coining New Terms

The field in which the English language proved to be particularly inadequate was that of 'names of art,' that is, of the technical terms that made up the basic lexis of a subject. This lack of specialized terms often made the translation of works into English an arduous task or made it difficult for English specialists to write essays in their native tongue. In the following quotation, for example, Robert Recorde points out the difficulties encountered in choosing to write in his native tongue:

> But now as touchyng myne entent in writyng this treatise in the english. Though this cause might seme sufficient to satisfy many men that I am an englysh man, and therefore may more easely and plainly write in my natyue tonge, rather then in any other: yet vnto them that know the hardness of the mater, this answer shuld seme vnlykely: considering that it is more harder to translate into such a tonge, wherein the arte hath not ben written before, then to write in those tongues that are accustomed, and (as I might say) acquainted with the termes of the science. (Recorde, 1547; quoted in Jones, 1953: 73)

The realization that the English language was inadequate for medical purposes led to its gradual amelioration, from both a quantitative and a qualitative point of view. Specialists made great efforts to increase the number of specialized terms and improve the exactness of their meanings. Two main principles were followed in coining new terms: that of using the resources of the native tongue, either to give a specialized meaning to an existing word or to form a new one, and that of borrowing a similar term from a foreign language. In defining a new concept, the specialist sometimes employed a word already existing in the language, adding a specialized meaning to its usual one(s). However, the most frequently adopted strategy was the borrowing of terms from other languages, particularly from Latin. Indeed, Latin and Greek were endowed with large and respected specialized lexicons, as too was – although less extensively – Arabic (Standard Arabic). The choice of a loan, rather than the specialization of an existing word or the coinage of a new term, was often suggested by the fact that the concept to be referred to was already expressed in a foreign language. The availability of a term was particularly evident in the case of translation of texts. In that case, when the translator came across a word with no equivalent in the tongue into which he was translating, he was obliged to use the original word, thus enriching the lexical load of the receiving language.

The remarkable increase in the number of new medical terms is in line with the great expansion of the Early Modern English lexicon as a whole (Finkenstaedt *et al.*, 1970), with intense borrowing and neological formations in all fields. The medical sciences seem to reach their peak in the first half of the 17th century, as shown by the numbers of new words provided by Wermser (1976); see Table 1.

However, as they are mainly based on the entries reported in the *Oxford English dictionary* (*OED*), these statistical data should be treated with caution. Indeed, due to the criteria adopted by the compilers,

Table 1 Number of new medical terms

	1510–1524	*1560–1574*	*1610–1624*	*1660–1674*
Medicine, anatomy	12	46	141	84

the data used in compiling this dictionary are incomplete; moreover, many words may have been in use before the dates indicated in the *OED*, either in texts that have not survived into our times or in publications not taken into consideration by the compilers (for a discussion of this issue cf. Schäfer (1980)).

This increase in medical terminology was favored both by the large number of translations from other languages and by original works in English. At the end of many of these works, the authors added a glossary in which they defined some of the new words that they had coined or adopted. This is, for example, the case of the translation by Richard Tomlinson of Renodaeus' *Dispensatory* (1657) to which the publisher adds "A Physical Dictionary. Or, an Interpretation of such crabbed Words and Terms of art, as are derived from the Greek or Latin, in which words such as *abstersive*, *buccellation*, *caliginous*, *cardiogmos*, *circumdated* and *commaculate* are explained." These glossaries – appended to books and explaining 'hard words' excerpted from the texts they accompanied – are the forerunners of the hard word dictionaries (cf. below).

Table 2 Original medical terms and adopted terms created by changes to suffix

	Original term	*Adopted term*
Suffix dropping	*ligamentum*	*ligament*
	empiricus	*empiric*
Suffix substitution	*anatomia/anatomie, zootomia*	*anatomy, zootomy*
	assimilabilis, visibilis	*assimilable, visible*
	deligatio, embrocatio	*deligation, embrocation,*
	imminutio, remollitio	*imminution, remollition*
	narcotique	*narcotyke*
	insalubrité	*insalubrity*
	conflare/conflatus, evaporare/evaporatus,	*conflate, evaporate,*
	lymphatus, ulcerare/ulceratus	*lymphate, ulcerate*
	antidotarius	*antidotary*
	incisorius	*incisory*
	eminentia, indecentia	*eminence, indecency*
Suffix addition	*choler*	*cholerous*
	pinea	*pineal*

Lexical Borrowing

The most frequent policy adopted to increase the English medical lexicon was to take over Greek or Latin terms, sometimes without any change (e.g., *delirium, diabetes, embolus, metacarpion, parenchyma, paresis, pus, uvea, virus*). In the first use of these terms in a text written in English, the authors often added an explanation in vernacular. This is the practice commonly followed by Andrew Borde:

> *Cancer* is the latyn word. In englyshe it is named a canker the whiche is a sore the whiche doth corode & eat the flesshe corruptynge ye Arters the vaynes & the sinewes corodyng or eatynge the bone and doth putryfy & corrupt it. And then it is seldome made whole. (Borde, 1552: 28^{r})

> *Colera* is ye latyn worde. In greke it is named *Cholae*. In englysh it is named Coler, the whiche is one of the .iiii. humours. And it is hote and drye, lyenge or beyng in the stomake and is mouable. There be .v. kyndes of coler. [...] (Borde, 1552: 38^{r})

In general, however, in adopting the loan, the translator usually adapted the word he was borrowing to the morphological features of the receiving language, following the conventions in use concerning word formation. At times, their original termination was dropped (see examples in Table 2), but generally the original suffix was replaced by one commonly used in English. Thus, the suffixes *-s* and *-y* were commonly employed to naturalize foreign nouns referring to scientific branches, *-able* and *-ible* were used to render the Latin adjectival terminations *-abilis* and *-ibilis*, and *-al* and *-ous* were used to form adjectives from foreign nouns, with the suffix *-ous* also being used to adapt adjectives ending in Latin in *-us*. Latin words ending in *-atio*, *-itio*, and *-utio* were provided with the suffixes *-ation*, *-ition*, and *-ution*, the terminations *-ic(k)* and *-ity* were usually employed as adaptations of the French suffixes *-ique* and *-ité*, and *-ate* rendered the Latin endings *-are* and *-atus*; the Latin suffixes *-arius* and *-orius* were usually naturalized in the forms *-ary* and *-ory*, whereas *-ence* and *-ency* were meant as equivalents of the Latin ending *-entia*.

This process of borrowing involved the adoption of not only single words, but also of prefixes and suffixes, which were used more and more often to create new terms. For example, if we consider combining forms of classical origin such as *-ology* and *-meter*, we can see many new English words created in the 17th century including these suffixes, e.g., *pathology*, *ichthyology*, *zoology*, *osteology*, *psychology*, *micrometer*, *thermometer*.

Native and classical elements usually mixed in texts, as can be seen in Copeland's (1541) definition of *ulna*: "The arme is devided in thre great partyes. One is called vlna, the other lytel arme." Indeed, the existing native terms commonly referred to general parts (e.g., *ankle, arm, knee, shoulder, elbow, hip*) and the new terminology (mainly derived from classical sources) defined the component elements of these

general parts (e.g., *ulna, radius, humerus* as components of *arm*). Some native terms experienced a semantic transition from one referent to another, scientifically more appropriate: *womb*, for instance, passed from generalized 'stomach' to exclusively feminine 'uterus.' In some cases, two forms (general and medical) were neo-Latin; in these cases, the former was already present in the language, having been borrowed during the Middle English period, and the latter appeared in the language in the Early Modern English period; some examples of these doublets are *gender / genus, prove / probe, spice / species, palsy / paralysis*. Moreover, once a loan had been introduced, it was frequently used as a root from which further words could be formed by means of affixation. Examples include *parenchyma* > *parenchymatic*, *anatomy* > *anatomical* > *anatomically*. Some neologisms were obtained from existing words (either native or loan words themselves) by means of compounding: e.g., *lung-sick* ('sick of a pulmonary complaint'), *pine-glandule* ('pineal gland').

Although he thinks he is right in borrowing terms from other languages, the writer is aware of the difficulties of interpretation that readers might meet when they encounter the new terms. Therefore, he often tries to help in the form of a synonym when they first appear in the text; typical are cases where the author gives two expressions, a native and a foreign term, elucidating each other ('stones or testicles'). On other occasions, instead of providing a concise synonym or antonym of the new term, the author gives a full paraphrase of it or an exemplification:

> *Androtomy*, as some of the moderns call the dissection of man's body, to distinguish it from zootomy, as they name the dissection of the bodies of other animals. (Boyle, 1772: I. 68)

'Transparent' Terms

Apart from the processes of word formation seen above, the complex operation of creating new terminology sometimes adopted other criteria, based mainly on the pragmatic principle of maximum transparency, which is extremely important in specialized discourse (Gotti, 2003). In the application of this principle, the writer created terms in such a way that their form clearly reflected the concept to which it referred. An example can be taken from Golding (1587), in which the author, in need of new terms, invented transparent forms such as *fleshstrings* for muscles and *primetime* to indicate an early period of world history. These terms may seem so strange as to suggest a desire for idiosyncrasy on the part of the author. Conformity to the criterion of transparency is instead confirmed by Ralph Lever:

> Therfore (gentle reader) if thou doubt, what is ment, by any of our strange and new deuised termes, consider their partes, as they are taken by themselues alone: and the consideration of the partes, shall leade thee to the knowledge of the whole. (Lever *The Arte of Reason, Rightly Termed, Witcraft*, quoted in Jones, 1953: 129)

As we can see, these transparent terms were usually obtained by means of the juxtaposition of words already existing in the English language. This process of compounding was particularly favored by the brevity of English words; in fact, most were monosyllables and could therefore be easily linked to form compounds, which in turn were not too long. However, the recourse to this word-formation process based on native English lexemes was not very frequent, as the decoding of Latinate terms was not a real problem for the medical profession. Moreover, general use would make these new terms common and familiar to the profession as a whole:

> And althoughe perchaunce at the fyrst it may seeme somwhat obscure and harde [. . .] yet yf you doe accustomablye vse to reade them, and conferre either wyth the Apothecarie where as you doe not perfectly vnderstande the same, or elles vse the helpe of a Dictionarie, they wyll bee vnto you bothe familier and playne. (Gale, 1563: Aaaiii^{r})

Glossaries and Dictionaries

Medical terms were already included in dictionaries at an early stage. They constitute a relevant part of the lexemes contained in the 1538 edition of Thomas Elyot's Latin–English dictionary, probably facilitated by the fact that the compiler had studied medicine. Also the reviser of this dictionary, Thomas Cooper, was trained in medicine and dealt with these terms carefully not only in his revision of Elyot's dictionary published in 1548, but also in his own very successful Latin–English dictionary. The standards of these bilingual dictionaries were high and the treatment of medical terms in them was accurate.

The first monolingual dictionaries, instead, presented only a limited and unsystematic selection of medical terms among those that their compilers considered hard words, i.e., semantically obscure and difficult to understand. Indeed, the rapid development in the various scientific branches had caused a dramatic expansion of the English vocabulary and the coining of thousands of new words, which, however, were not always interpreted correctly by readers and were often re-employed wrongly. Therefore, many hard word dictionaries were compiled to present the various Latinate expressions that had appeared so abundantly in English specialized texts

of those centuries, as well as the more obscure words appearing in literary works.

The tradition of hard word dictionaries is generally considered to date back to the beginning of the 17th century. However, even before then, glossaries had been used for the explanation of hard words. In less than a century, these glossaries increased in number and size and gradually developed into separate publications exhibiting great comprehensiveness. It is not at all strange, therefore, that Robert Cawdrey's *Table Alphabeticall* (1604), which is often quoted as the first hard word dictionary, should be published during that period, as his list of hard words could be considered an expansion of those glossaries. Two other very popular hard word dictionaries are John Bullokar's *An English Expositor* (1616) and Henry Cockeram's *English Dictionarie* (1623). (For a survey of monolingual printed glossaries and dictionaries of this period cf. Schäfer (1989) and McConchie (1997).) Some of the medical terms included by Cawdrey are as follows: *adustion, confection*, *debility, entrails, epilepsis, fever, frenzy, fume, genitals, imbecility, judicial, lethargy, obstruction, ministration, ossicle, pest, sperm, tertian, vehement, ventricle*. Also, the following terms belong to the medical field, although the examination of Cawdrey's definitions does not always show a consideration of their medical senses: *antidote, catarrh, decoction, gargarize, flux, instinct, nerve, putrefy, spleen, ulcerate, vapour*. Some of these terms might not sound very innovative for those times, but the fact that they are included in this text means that – although some had been coined even a few centuries before – they had not become very popular among English speakers. These words, however, should only be considered as indicative of the popularity of the terms at that time. Indeed, it should be remembered that the words included in hard word dictionaries were not collected meticulously after a thorough examination of all the specialized texts available; instead, in the selection of his entries, the author mainly borrowed the terms that he thought suitable from the dictionaries and specialized glossaries he had come across in his unsystematic search for appropriate sources for his dictionary.

The picture that can be drawn from a reading of these works is that the medical terminology dealt with in them was involved in a process of rapid growth yet still needed some form of systematization. This impression is backed up by the existence of doublets within the dictionaries to express identical concepts. Indeed, there are often frequent cases in which two different words refer to the same human organ, e.g., *kidnies or reines*. It must be pointed out, however, that the picture offered by hard word dictionaries is more dated than the actual state of medical research at that time, as the author often made use of glossaries and dictionaries published a few decades before. Indeed, if we look at a few terms belonging to the medicine dealt with in hard word dictionaries and coined in the decades preceding their publication, we can see that many of them are not included in those works. Table 3 lists a few terms belonging to the branch of medicine, with the date of their first publication as derived from the *OED* and the *Supplement to the Oxford English dictionary* (*OEDS*); each word is followed by either a plus or a minus sign: the plus sign indicates the presence of that entry in the dictionary mentioned at the top of each column and the minus sign indicates its absence. Table 3 shows the unsystematic approach to the selection of items adopted by the compilers of hard word dictionaries.

A comparison of the distribution of the items in Table 3 shows that Bullokar's interest in medical 'termes of art' was more prominent (Bullokar himself was a physician), as is shown also by the lengthier explanations that accompany the various items:

> *Splene*, milt. (Cawdrey, 1604)
>
> *Splene*. The milte of man or beaste: which is like a long narrow tongue, lying vnder the shorte ribbes on the left side, and hath this office of nature, to purge the liuer of

Table 3 The (non-)Occurrence of some medical terms in the first three hard word dictionaries

	Cawdrey (1604)	*Bullokar (1616)*	*Cockeram (1626)*
Spleen (c. 1300)	+	+	+
Palate (1382)	–	+	–
Genitals (1382)	+	–	+
Sperm (1386)	+	+	+
Artery (1398)	–	+	+
Colon (1398)	–	–	–
Trachaea (c. 1400)	–	–	–
Uvula (c. 1400)	–	+	–
Testicle (c. 1425)	–	–	–
Embryo (1477)	–	+	+
Fracture (1525)	–	+	+
Nerve (1531)	+	+	+
Muscle (1533)	–	+	–
Abdomen (1541)	–	–	–
Cartilage (1541)	–	–	–
Cavity (1541)	–	+	–
Rectum (1541)	–	–	–
Tendon (1541)	–	–	–
Ulna (1541)	–	–	–
Cranium (1543)	–	–	–
Vulva (1548–1577)	–	–	–
Larynx (1578)	–	–	–
Pancreas (1578)	–	–	–
Scapula (1578)	–	–	–
Skeleton (1578)	–	–	–
Intestine (1597)	–	–	–
Scrotum (1597)	–	–	–

> superfluous melancholicke blood: sometime it signifieth anger or choler. (Bullokar, 1616)

> *Spleene*, The milt of man or beast. (Cockeram, 1626)

In this greater length, we may perceive a tendency toward a transition from mere verbal gloss to an encyclopedic article, which was gradually taking place in several hard word dictionaries, often making the distinction between a monolingual dictionary and an encyclopedia rather unclear. Another interesting feature of Bullokar's dictionary is his inclusion of several terms referring to medicinal plants from the new world, which he had derived from the John Frampton's *Ioyfull Newes out of the Newe Founde Worlde* (1577), a translation of the original book in Spanish by Nicolás Monardes (1574). Such terms are not only reported in Bullokar's dictionary, but they are also given substantial definitions, as shown by this quotation:

> *Sassafras*. A tree of great vertue, which growth in the Florida of the West Indies: the rinde hereof hath a sweet smell like Cinnamome. It comforteth the lyuer, and stomack, and openneth obstructions of the inward parts, being hotte and dry in the second degree. The best of the Tree is the roote, next the boughes, then the body, but the principall goodnesse of all resteth in the ryndes.

The reading of the definitions of some of the entries in Bullokar's dictionary shows that there was still a gap between the specialized terminology of other languages – particularly Latin – and the English tongue; the latter still lacked some of the termes of art that instead already existed in foreign codes. The following quotation provides a confirmation of this state of inferiority; in dealing with a medical term, Bullokar was not able to make exclusive use of English words to express his definition and had to borrow two Latin expressions to refer to the two types of meninges he was describing:

> *Meninges*. Thinne skins in which the braine is contained. There are two such skinnes: one called by Phisitians, *Dura mater*, which is the stronger of the two, and next vnto the scull. The other named *Pia mater*, is within this first, being more tender and fine, and close wrapping the braine it selfe. If any of these skinnes bee wounded, it causeth speedy death.

Syntactic and Textual Developments of Medical English

The 16th and 17th centuries also showed interesting developments in the syntactic features of medical English. Unlike the lexical field, changes took place in a nonexplicit way, as specialists were usually unaware of the syntactic modifications that they were introducing into the language by means of their writings. The new perspective that characterized their research method conflicted with the constraints of the language and forced them to adapt its rules to their expressive needs. Sentences became quite long, with very lengthy noun phrases preceding and following the verb. Moreover, the verb (often represented by forms of *to be*, often accompanied by present participles) started assuming the copular function usual in modern scientific English, where the verb merely links the very long nominal phrases coming before and after it. Each sentence was structurally simple, with few or no subordinate clauses, complying with the modern preference for coordination rather than subordination in sentence structure. Moreover, there was a large number of words referring to processes and a distinct preference for the use of nouns deriving from verbs. This linguistic preference, which is commonly referred to by the term 'grammatical metaphor' within Systemic Functional Linguistics (cf. Halliday, 1994), has become one of the salient features of scientific discourse and can be explained by the fact that verb-derived nouns reflect the parallel process whereby results are inferred from experiments and objects from their construction process (cf. Halliday and Martin, 1993). An example of this preference can be seen in the use of processes such as *inspection* and *dissection* in the following definition drawn from the manuscripts of William Harvey's lectures delivered at the Royal College of Physicians in London around 1616:

> Anatomy is that faculty which through inspection and dissection reveals the uses and actions of the parts. (Harvey, c. 1616: 22)

Indeed, the adoption of nominalized forms was becoming more and more popular as, by allowing the thematization of the actions commonly expressed by verbs and increasing the textual potentialities of those lexemes, it enabled the scientist to include more information in the same sentence and guaranteed a better flow of his discourse. Another advantage offered by the process of nominalization consists of allowing the writer to create concise noun phrases, which can be made to perform the various different syntactical functions required in specialized texts. The increase in the use of nominalization was part of a gradual tendency toward a loss of importance of the verb, compensated by a growth in importance of the noun. This change was mainly for textual reasons, as the process of nominalization promoted a better cohesion of the text by means of the recovery of the information given in the previous statement as the theme of the following sentence.

Also from the textual point of view, there is a great development in this period; the early printed works mainly consist of translations of treatises and new compositions of general guides to health and handbooks of medical instructions, often including accounts of illustrative and typical cases (Bennett, 1969). The normal mode of publication for scientific work was in a separate treatise and men of science kept abreast of the times through private manuscript correspondence. The 17th century shows a greater variety of genres, with the addition of new forms such as anatomical observations, book reviews, journal articles (Lefanu, 1937), and experimental essays (Gotti, 2000). The first English medical periodical was the *Medicina Curiosa*, of which the only two numbers extant appeared on June 17, 1684 and October 23, 1684, as part of a wide phenomenon taking place all over Europe (Garrison, 1934). After the formation of scientific societies (Rome, 1603; Paris, 1635; London, 1660; etc.), the serial publication of their *Acta* developed (cf. the issues of the *Philosophical Transactions of the Royal Society*).

The experimental essay originated in the Early Modern English period as a result of a complex process of scientific evolution, which determined the need for a new expository genre to suit the new epistemic approach of 17th century 'natural philosophers.' The innovative characteristics of this new text type derived from the great importance attributed to the experimental process in the research programs of Early Modern English men of science, who – elaborating on Francis Bacon's intuitions – shared the principle that the progress of knowledge could not be based on the servile observance of traditional theory, but should rely on the observation of natural phenomena and accurate experimental activity. Hence, there was a need for a form of expression that would offer the scientist the opportunity to report briefly experiments carried out, procedures followed, results obtained, and any personal comments. This genre was identified in the experimental essay, which became very popular also in the medical field. To appreciate the importance of the latter genre, we should consider the fact that, in the following centuries, whereas some forms of specialized writings – such as the dialogue – almost disappeared, the experimental essay survived and became an essential part of specialized literature, as the rapid diffusion of scientific journals made it an established genre commonly used by men of science. Although most of the structural parts of this textual genre originate from Early Modern English experimental essays, early essays showed more frequent use of the active form, the report of unsuccessful experiments, and less emphasis on theoretical conclusions than nowadays. Moreover, they were characterized by first-person narration, subjective point of view, and expressions of low modality (Taavitsainen, 2001).

See also: Anatomical Nomenclature: History; Lexicography: Overview; Metaphors in English, French, and Spanish Medical Written Discourse; Nominalization; Systemic Theory.

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Medical Discourse: Doctor–Patient Communication

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Introduction

A number of new developments in the research on doctor–patient communication are discussed in this paper. First, I provide a brief overview of the most important theoretical and methodological paradigms in this field. Then, I provide some examples, based *inter alia* on a qualitative empirical study in an outpatients' clinic (Lalouschek *et al.*, 1990), as well as on innovative and recent research on the expression of pain (Vodopiutz *et al.*, 2002). As doctor–patient communication takes place in different institutional settings, such as hospitals or private clinics, I also consider some features of the rules and norms governing institutional discourses (Wodak, 1996; Iedema, 2003; Sarangi and Roberts, 1999). Moreover, it is of particular importance to evaluate new work that utilizes virtual communication, in other words, the Internet. The impact of this kind of research on the medical profession and possible application of research results will also be of interest.

Doctor–Patient Communication

Communication in institutions is a major area of investigation in sociolinguistics and discourse analysis. In the domain of 'critical linguistics' (Wodak and Meyer, 2001), communicative interactions in relevant social fields need to be made transparent. Institutions incorporate such areas and manifest social structures, power allocations, hierarchies, and access to positions and information, and they define societies in their subdivisions of work. Institutions have their own value systems, which crystallize in ideologies unique to particular institutions (Mumby, 1988). It is important to make a distinction between claims and expectations explicitly uttered in accordance with a professional ideology (such as *the doctor is there for all patients in equal terms*) and implicit, latent norms and rules (such as *publications and empirical studies are more important for a clinical career than healing patients*). The contradictions in practice that arise from such norms are often concealed and legitimized with myths, in the sense of Roland Barthes (1974). 'Myth' is understood to mean a secondary semiotic system that constitutes, as it were, a second layer of reality that all participants (are obliged to) believe.

At the same time, there is an important applied aspect to institutional research that is relevant to practice: analyses of the status quo have made it possible to develop proposals for changes in communication, for example, in training programs for members of institutions or for a different approach on the part of clients (Azoulay *et al.*, 2000; Kurtz *et al.*, 1998). Sociolinguistic analysis has therefore proved to be an essential part of the investigation of institutions, since a purely sociological analysis is not capable of making transparent the details of dynamics and processes and is therefore obliged to adopt a high level of abstraction (Weick, 1985). The above-mentioned studies, carried out by medical researchers, are mostly quantitative and use content analysis or measurements of information acquired through questionnaires and interviews; these tools, however, mostly allow for self-assessment and are often oriented toward the investigators who might

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be seen as authorities. Yet the detailed microanalysis of conversations between doctors and patients in various settings provides more authentic insight into on-going interactions, misunderstandings, satisfactions, and dissatisfactions as well as insight into compliance. Nevertheless, a textbook, such as that by Kurtz *et al.* (1998), is most certainly to be viewed as a first important step to be complemented by sociolinguistic and discourse analytic proposals (Lalouschek, 2004). Thus, the discourse analytical approach has made it possible to uncover the workings of explicit and latent institutional rules and norms in every specific text and to demonstrate how power structures, gender relations, etc. are always manifest and constantly (re)-produced in interaction.

To summarize briefly the most important sociolinguistic research on institutions, we find the following picture, which indicates tendencies but does not permit simple generalizations:

- Institutions are anonymous: the names of clients, for example, are known, but the names of insiders often remain secret. Written products, such as forms, rulings, and legal texts, are mostly written in the passive voice and characterized by vagueness.
- Institutions have their own specific rituals: in many institutions historically determined linguistic forms (such as forms of address, greetings, and oaths of loyalty) that have lost their specific function have developed. These also include dress regulations, rites of initiation, etc.
- Institutions have a quasi-military character: power and hierarchy are essential components of the internal dynamic. Many linguistic actions might take on the explicit character of requirements, requests, or even commands.
- Institutions strive to reflect harmony: contradictions and conflicts are often concealed and not discussed or exposed openly; this might lead to many latent tensions that affect the interaction with colleagues or with patients in the wards.
- Institutions are usually status oriented: members of the upper classes are often treated quicker and more thoroughly than others, men better than women, nationals better than foreigners or migrants (always depending on the country of origin), and more experienced patients more efficiently than the inexperienced. Social class, gender, education, ethnicity, and so on combine in unique ways and play an important role how individuals are perceived and treated by an institution. Typically, the most important positions are occupied by powerful, white males.
- Institutions often work inefficiently: inexperienced specialists frequently occupy the most important interfaces with the general public, such as in the outpatients' clinic or in the reception area of hospitals. This means that often no decisions can be taken and problems must be referred to other experienced doctors or nurses (Coiera and Tombs, 1998). Moreover, experienced insiders in subordinate positions (such as nurses) sometimes must present their knowledge with great care so as not to constitute a threat to the more powerful specialists.

A Short Overview of Research

Research on doctor–patient communication relies mainly on two approaches: the medical–sociological approach, which is oriented toward the institutional structures, and linguistic research, which focuses on microstructural aspects of communication and interaction. Thus far, there has been little success in unifying these two aspects.

For example, Cicourel (1981), using a number of case histories, already showed the advantage of a conversation-analytical procedure as opposed to quantitative psychological categorizations. He cautions repeatedly that the structural framework must be included together with the different perspectives of the two principal protagonists – the doctor and the patient (doctors want to reach a diagnosis as swiftly as possible, whereas patients want to tell the story of their suffering; this results in conflicts of both time and interest that are sometimes difficult to resolve: 'frame conflicts') (*see* **Medical Specialty Encounters**).

In the United States and United Kingdom, research focused more and more on the analysis of individual conversation patterns, such as question–answer sequences and other adjacency pairs. Since these are often isolated from the context of the complete ongoing discourse, they may ultimately be interpreted only to a limited extent (Fisher and Groce, 1990; West, 1990; Todd, 1983). Nevertheless, relevant insights from such research, albeit from 20 years ago, must be mentioned at this point: Todd (1983) described the collision between the institutional and lay worlds as a 'frame conflict': value systems, modes of knowledge structuring, and handed-down experiences diverge. The structural result of this kind of interaction is repeated misunderstanding and conflict. Mishler (1984) has shown that research remains in "the voice of medicine" and that scientific interpretation is therefore accomplished from the viewpoint of experts, but the signals from patients are ignored. Cordella (2004) has also illustrated in her empirical

study that the 'voices' of patients are often ignored. (*see* **Doctors and Patients in Multilingual Settings**).

Erickson (1999) has carried out a particularly thorough and detailed investigation of the roles and identity conflicts of doctors that give great insight into difficult decision-making situations. Specifically, the combination of training young doctors and treating patients at the same time leads to situations of conflicting interests (see also Menz, 1991).

In German-speaking countries, research was originally dominated by medical sociology, which lacked a linguistic toolkit. The center of interest was case histories and conversations during doctors' ward visits. Bliesener's work (1982), however, on conversations during ward visits was certainly the first relevant attempt to capture a particular substructure of everyday life in a hospital from a discourse analytical viewpoint. Visits are broken down precisely into their features and phases, and the obstacles to successful patient communication are demonstrated in detail. However, the genuinely sociolinguistic aspect was overlooked: whether, for instance, women and men, old and young patients, are treated differently. Bliesener's claim is that simply devoting more time to patients does not solve the problems of obstacles to doctor–patient communication. The quality of the conversation would have to be significantly changed to permit alternative types of communication to develop.

In addition, Hein (1985) – in a then innovative pilot study on family doctors – was able to illustrate the presence of class-specific language barriers in communication with patients of different social backgrounds. The same family doctors prescribed for lower class patients suffering from sleep disorders psycho-pharmaceuticals, whereas for middle-class patients (with the same symptoms) they recommended psychotherapy, valerian drops, or autogenic training. In the first case, the doctor–patient conversation was typically short, full of closed questions, and often cynically derogatory, whereas in the second case, the conversations were twice as long, amicable, and full of anecdotes and digressions (Hein and Wodak, 1987) (*see* **Medical Discourse: Illness Narratives**). Lalouschek (1995) analyzed, in a longitudinal study, the training of psychosomatic specialists. Here, too, she found that because of a lack of self-reflection on the part of the doctor, little success was achieved. The change to a rather more therapeutic mode of conversational behavior was rarely made or made in an exaggerated fashion. Her conclusion was as follows: training must become considerably broader and more complex, and above all the results of discourse analytical research should be included. Even in these studies, however, the definition of the unit of discourse was isolated and limited. The everyday life of the institution was only partially considered. New research has now developed the more holistic approach further with the aim of applying linguistic research in training seminars for doctors (Becker-Mrotzek and Brünner, 2004).

Sociolinguistic and Ethnographic Studies: Pain, Fear, and the Everyday Life of the Hospital

All of the studies thus far mentioned with few exceptions derived from an external perspective; i.e., certain discourses were arbitrarily extracted from the life of the hospital and analyzed according to prior assumptions. The relationship to the institution and to the life of the institution is essentially lost in such a process. Because of this limited knowledge of the context, the interpretations have only little validity.

In an investigation of the outpatients' ward of a hospital in Vienna, it was the internal perspective that we were concerned with (i.e., the perspective from the viewpoint of the participants): we set out to observe, understand, and record mornings as a closed discourse unit and to then conduct conversations with both doctors and patients before and after this time (Lalouschek *et al.*, 1990). We shared, as it were, the life of this clinic for a certain time. Because of this participant observation, it was possible to discover – alongside the familiar static social variables – some meaningful new dynamic categories. The outpatients' clinic itself was perceived as an outpost – a "penal colony" in the words of one doctor – of low prestige and therefore a job for doctors in training. This means, as mentioned above, that at the most important interface with the outside world, inexperienced insiders are located instead of experienced ones. This leads to chain reactions: inexperienced doctors cannot make decisions and so senior doctors must be summoned. People must wait for them and this wastes valuable time. As a stereotypical answer to our questions, we learned that doctors have too little time and never make mistakes and that there is simply no better way. And in the everyday world, strategies had to be developed on the spot to cope individually with any problems that arose.

The discourse analysis always related to an entire morning (as a macrodiscourse); every individual conversation constituted a subdiscourse that should always be seen within the total context of the setting in the hospital and the specific morning. In what follows, I focus on a few categories used in analyzing some sample conversations between doctors, patients, and nurses.

The *occurrence of patient initiatives* (questions for information, stories, complaints, judgments) and the doctors' way of dealing with initiatives (answers, interruptions, cutting off, ignoring, and so on) demonstrate forms of exercising power on the part of the doctors as well as the voices of the patients. The quality of a frame conflict can also be captured in this way.

Every specific *discursive coping with problems* by the doctors demonstrates the assumed contradiction between explicit rules, myths, and actual events. (If doctors become aware of problems, do they deal with them or defer them? Do they turn the associated uncertainty and aggression against others? In particular, how do doctors deal with problems that are perceived by patients?)

The specific *creation of a relationship* involves basic factors in relationship management. If it proves possible to create a personal relationship, perhaps by means of 'social turns', if important politeness rituals are observed, if particular forms of address employed, and so on, does this lead to more compliance (Wodak, 1986)?

A Typical Morning

On this particular morning, a male doctor and a female doctor are working together. Both are overtired; both have been on night duty. At 9:45, the second patient enters. She is considered to be a difficult patient, because of her age (87).

1 DF2: Right we'll have to take off the gown too
P: (. . .) don't
2 DF2: Why not? – We are in the hospital you know. Right –
3 DF2: now then let's sit down her shall we?
P: /quietly/ (. . .)
4 DF2: RIGHT take off the gown please.
P: [Gown – but I've
5 DF2: [Take it off please – the gown. We've
P: got nothing under the gown.
6 DF2: got to do an ECG. Right No one's
P: (. . .) Gown
7 DF2: looking – well – it's only the doctor
8 DF2: – isn't it. He's allowed
P: [The doctor can look – but
9 DF2: to look isn't he – right let's sit down here
10 DF2: shall we. exactly
P: [Sometimes he even has to look (. . .)
11 DF2: Right – tell me, which was the broken arm?

64 DF2: She keeps wobbling around – NOW JUST LIE STILL
65 DF2: DON'T KEEP WOBBLING AROUND – OR THE ECG WON'T WORK
66 DF2: QUITE STILL – JUST RELAX OK. Good – right:
P: [All right – yes.
67 DF2: that's fine.

221 DF2: But she's sore EVERYWHERE – she's sore
222 DF2: everywhere. DOES IT HURT THERE TOO?
P: Ah: yes / sighs / (. . .)
223 DF2: Ah, not there – only the back and there it hurts,
P: [it's OK
224 DF2: right? Yes – and there?
P: It hurts there. [Well – I can feel it but
225 DF2: [not too bad.
P: it's bearable.

First, the patient is asked to take off her blouse; she is then examined; and only then comes the first question: "what problems have you had, then, with your heart?" Next we hear the patient's own account: she got herself worked up. "Old patients shouldn't get themselves worked up," says the female doctor, raising the matter of age for the first time. The social turn then comes to an abrupt end ("all right"), and there follows a closed question: "whereabouts in your stomach does it hurt?" Finally, toward the end, the patient seems cooperative. What is striking about this macrostructure is that instead of the usual questioning activities at the beginning, there are initially speech acts of demands and the consultation sequence is embedded into these.

When the patient does not want to take off her blouse, after a first indirect speech act, linked to a childish form of address such as "we have to," there is an unsatisfactory explanation. This form of address – *pluralis hospitalis* – is often employed with old people. After a structuring signal ("right"), the female doctor makes a second attempt: ("right, would you take off your blouse, please"): this is more polite but also direct, with the unmistakable character of a request (almost as command), using the more distant form of second-person address and a sociophonological switch to standard pronunciation: "take it off, please, your blouse." Finally, there is a simple explanation. The patient still quietly resists, and the next explanation follows: only the (male) doctor is there, and the particle "OK" serves as a closing signal and as reassurance. "He can look," says the patient, half-questioning, half-submitting. This is repeated by the female doctor, and again a closer relationship develops expressed in dialect and the word "OK," to which is attached a further appeal and a concluding and reassuring "OK." The old woman repeats: "he has to look sometimes," as though she was trying to convince herself. "Exactly," replies the female doctor in confirmation; she changes the subject, again with a structuring "so," and the examination begins with the first closed questioning activity. This is realized as a

further command (the fourth command in this short text) in which impatience is clearly manifest. In the following part, the female doctor yells at her, no longer able to control her annoyance, and the seventh direct request is realized in standard language. This is immediately followed by four more direct requests. For this, she later expresses regret. The closing section of the conversation is polite and calm; we find the third form of address: they are talking about the patient ("everything hurts her"). This causes a great deal of uncertainty in patients, since it is not clear who is being referred to. Only the change to quite direct questioning and a different form of address makes this switch clear: the utterance was aimed at the other doctor. The patient is now well behaved. She has adapted to the institutional frame.

The female doctor therefore oscillates, in her handling of the patient, between coming close, impatient distancing behavior, and brutal authority. This communicative behavior is, on the one hand, a kind of power display, but on the other hand it reflects her state of conflict that may be attributed to a number of factors: it was her first consultation in the presence of a tape recorder; the patient was also 'difficult,' since she is very inexperienced and causes a delay in the sequence of events. This case is therefore perceived as a disturbance, as uncooperative behavior, and the doctor does not succeed in reducing the patient's fear and establishing a reasonable relationship and trust. Explanations and information are denied precisely where they would be needed. In the end, the patient becomes completely silent. Here frame conflict and language barriers are obstacles to face-to-face communication. In the outpatients' ward, the staff is not equipped for this kind of disturbance. The examination lasted 21min.

The Rest of the Morning

After 11:00 A.M., there was a loudspeaker announcement: "Attention please: here is an announcement. The Götzendorf field ambulance will be assisting in snow clearance in the car park from 1:00 P.M. onward. All staff are requested to remove their cars to make this work easier."

Initially the content of this announcement causes laughter: "Oh God, they can't be serious. One o'clock this afternoon. We'll never get out. That'll be fun…" When the doctor gradually realizes, however, what the announcement means, she becomes menacing: "But look, but there's the training at 1 o'clock, I haven't – I think it's 3 weeks since I last went for training…Where can I put it? We'll just leave it. I can't cope any more." The doctor transfers this bad mood to the waiting patients: "They're still there waiting. How many more are there, you hear me?"

The strain apparently can no longer be tolerated, and any reasonable way of handling the situation is prevented. Here it becomes particularly clear how important it is to have a precise definition of a discourse unit and the context. Taken out of context and treated as a single sequence for investigation, the doctor's behavior could only be interpreted as uncontrolled and irrational and, in general, as unwillingness to become involved with patients. In the total context of the morning, in contrast to the first consultations, this discursive phase takes on a different value, as an example of an inability to deal with conflict and a lack of problem-solving strategies (Van Dijk, 2003; Panagl and Wodak, 2004). For this reason, the final phase of the morning becomes hectic and full of tensions, the case consultations become significantly shorter, and postconsultation discussions are completely missing. Initiatives are no longer responded to and distance is indicated.

Dealing with Pain: Gender-Specific Differences

Chest pains are a frequent cause of admission to hospitals, and they can be caused by a number of different conditions, ranging from a harmless pulled muscle to life-threatening coronary heart disease (Everts *et al.*, 1996). Despite highly developed technology in the diagnosing of coronary diseases, there remain a number of uncertainties that complicate a diagnosis. Apart from the findings of such diagnostic tools as ECG and chest X-rays, together with laboratory investigation, consultation with a patient still plays a significant role in a diagnosis. In determining the cause of chest pain, the patient's description of the pain is most relevant (*see* **Medical Discourse: Communication Skills and Terminally Ill Patients**).

Medical investigations have shown that in women a dangerous coronary condition requiring treatment more frequently goes unrecognized, and instead an erroneous diagnosis of some harmless noncoronary cause is made. A number of medical studies have shown that these differences may be traced back to different descriptions of pain (Penque *et al.*, 1998). For this reason, on the medical side, an interdisciplinary project was initiated at the interface between cardiology and discourse analysis. In this project, one of the guiding hypotheses was provided by the clinical experience: coronary conditions are more difficult to diagnose in women. Thus, are there gender-specific forms and linguistic behaviors in the description of pain?

Out of a complete corpus of 102 recorded interviews developed to elicit the most spontaneous and comprehensive descriptions of pain, a total of 24 interviews were selected according to criteria of gender, cause of illness, and age, and these were subjected to a discourse analytical investigation. Like other previous investigations, this study showed that in doctor–patient communication, gender-specific differences become salient. The linguistic differences in the description of chest pain that were discovered in the present discourse analytical investigation may possibly contribute to the fact that coronary problems are more frequently overlooked in female patients than in males and that consequently the mortality rate is higher (Vodopiutz *et al.*, 2002).

Differences were found in four different areas in particular:

- Women downgrade their pain (diminish it or talk instead about the psychosocial environment); men rate their pain highly (take it seriously, show themselves as informed and interested).
- Women regard themselves interactively as tolerant of pain (passive with respect to the pain and delegating the treatment to the institution 'hospital'); men present themselves in the interaction as dealing with their pain (active with respect to the therapy).
- Men display more strongly than women a desire for explanation of causes.
- Men describe their pains very concretely (in the sense of the definition), in that they give very full symptomatic descriptions; women, conversely, give diffuse descriptions of pain (in the sense of the definition), in that they barely focus on symptomatic aspects and frequently use markers of diffuseness and meta-communicative utterances, in which they talk of the impossibility of describing their pains precisely.

Strikingly, no age-specific differences were found. These differences have relevant implications in doctor–patient communication because the linguistic activity of men fulfills the expectations of the medical staff to a much greater extent than that of women with regard to the desired information, for doctors both need and require a symptomatic description of pain – that is, the most exact possible statement of location, intensity, and duration or frequency of the incidence of chest pain. The result of this is that patients who spontaneously pursue what they see as the relevant 'clarification of causes' and give predominantly symptomatic descriptions of pain are viewed by the doctors as more precise, informative, and cooperative. Since the major proportion of cardiologists are still men and the description of symptoms and the clinical differential diagnosis of coronary heart disease were developed predominantly with male patients, this bias is possibly inherent in the system.

Final Remarks: Information for the Informed!

Let us sum up briefly: the division between the beginning and the end of the morning in the outpatients' clinic is also manifest in the degree of emotionality. Ultimately, 'difficult' patients are accused of causing the disturbances, and so the scapegoat is outside the outpatients' clinic rather than anchored in the structure. The clients are made into an external enemy; the institution defends itself and functionalizes its contradictions both consciously and subconsciously. Only a precise context analysis, an understanding of everyday life in the institution, and a sequential analysis of the discourse make it possible to grasp what is happening, to reveal the contradictions and the use of power. Since what is not permitted is not done, myths and rationalizations are preserved, which often puts a stop to any reflection or possible change. In the second case, it becomes clear again how important the category of gender is in communication and how relevant the conscious perception, admission, and sharing of pain are. Not only must medical education give training in conversational competence, it must also include knowledge of emotions and the different socialization patterns of the two genders.

Can a face-to-face conversation with a doctor be replaced with the use of new media, such as websites, debate forums, or the Internet? Could this help overcome staff shortages? On the basis of research on Internet communication and on the websites of individual doctors and group practices, this kind of claim must be seen as unrealistic (Danet, 2001; Herring, 2001). The Internet can be sensibly used only by those who know precisely what they are looking for. Initial barriers affect both expert knowledge and language. Medical experience is also essential, because one must be able to distinguish between commonplace advice and detailed suggestions. If one is really looking for precise help, one inevitably comes up against specialized knowledge, scientific articles, mostly in English, on individual medical problems. How can a lay person deal with this? And how can one assess whether particular diagnoses and therapies are applicable to one? A real face-to-face interaction and conversation with a doctor therefore remain indispensable. On the other hand, the Internet or some other multimodal channel functioning as advisor may sometimes be helpful in finding important starting points or in giving patients the feeling that others have similar problems and thereby reducing fear

and shame. Alternatively, after an established diagnosis, it enables chatroom conversations with other 'fellow sufferers,' and this helps to reduce loneliness and fear. A precondition, however, must still be a conversation – not 'virtual' – but face to face, because the problems of each patient remain unique and must be seen in the context of the patient's everyday life. This will always require empathy, listening, and questioning skills as well as sufficient time to follow and understand the sometimes too brief or maybe too extended narratives of the patients, thus detecting the relevant points to come to an adequate diagnosis.

See also: Doctors and Patients in Multilingual Settings; Medical Discourse: Communication Skills and Terminally Ill Patients; Medical Discourse: Illness Narratives; Medical Discourse: Psychiatric Interviews; Medical Specialty Encounters; Psychotherapy and Counselling.

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Medical Discourse: Early Genres, 14th and 15th Centuries

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Western science was initiated by Greek philosophers, mathematicians, and medical persons in their search for principles of nature, including human nature, and of argument itself (Crombie, 1995: 225). Knowledge disseminated into Latin via Arabic and from Latin to western vernaculars. Latin prevailed as the language of learning in Europe until the 18th century and served as the *lingua franca* of science until much later. In the late medieval period, scientific and medical ideas were expressed mainly in Latin, but texts started to be translated into various vernaculars and the circle of learning widened. The discourse world of medicine was multilingual: Greco-Roman texts provided the model for vernacular treatises and the standard against which the evolution of vernacular scientific writing can be projected. The influence of the Latin models on vernacular languages, and on the development of vernacular genres, has often been underestimated.

Medical Discourse and the Languages of Writing

In modern linguistics, 'medical discourse' refers collectively to the communicative practices of the medical profession, both written and spoken. In the late medieval period, the medical profession consisted of heterogeneous groups of practitioners, including physicians, surgeons, barbers, midwives, itinerant specialists (e.g., bonesetters and oculists), herbalists, apothecaries, wisewomen, and others. They can be roughly divided into clerical and elite practitioners and tradespeople or ordinary practitioners; literacy was restricted mostly to the elite group. The core genres of learned Latin writing were used by a small elite of learned physicians and surgeons, and included commentaries, *compilationes* ('compilations') and encyclopedic treatises, question-and-answer guides, pedagogical dialogues, *consilia*, and *practica*; some treatises are called 'sermons,' but without further specification of the term. The Latin situation provides a starting point for the assessment of vernacular genres, although the users of vernacular texts and the genre map are somewhat different.

Readership of Vernacular Texts

Genres are important operational tools and constitute dynamic systems that undergo change and variation. Over the course of time, sociocultural needs change and genres change accordingly: old genres become adapted to new functions, new genres are created, and genres that have lost their function cease to exist. The question of audience is important. In earlier literature, language and audience were thought to correlate, so that Latin was associated with learned writing for professionals and vernacular languages were linked with more popular texts for lay audiences. Recent research has proved that this distinction does not hold, but the pattern is more complicated. For example, surviving evidence indicates that the readership of texts addressed to 'the poor' and 'unlearned' in prologues and dedications is not to be taken at face value. The real consumers can be assessed through external evidence, such as library catalogues, wills, and ownership inscriptions. According to this evidence, owners and potential readers were mostly people of high rank in society and professionals in the field of medicine. For example, French-language copies of the popular verse encyclopedia *Sidrak and Bokkus* were owned by important figures in English political life, including Simon Burley, tutor to Richard II (Burton, 1998: 1:xxxiii). Guy de Chauliac's surgical writings constitute highly learned compilations, and these texts were also translated into vernacular languages. Their distribution shows how learned knowledge disseminated throughout Europe. The Latin originals (c. 1360) were targeted at doctors of three leading faculties of medicine, Montpellier, Bologna, and Paris, and doctors and clerks of the papal court (McVaugh, 1997); thirty-three Latin manuscripts are extant. In the 15th century, Chauliac's works were translated into several vernaculars, with at least three anonymous translations in Middle English. The audiences of the vernacular versions must have been more heterogeneous, but conclusive evidence is lacking. Some of the manuscripts show no signs of wear or use at all. Rather, they seem to have been display objects, with the vernacular serving in a new function in the prestige register of scientific writing.

Transfer of Latin Genres into Vernacular Languages

In the late medieval period, there was a gradual increase in vernacular writing in various realms of knowledge, so that by the 14th and 15th centuries, texts dealing with scientific, medical, and technological subjects were becoming increasingly common in Europe (Crossgrove, 1998). By the end of the 14th century, conventionalized discourse forms had been created to present and organise knowledge in Latin; they can well be called 'genres,' as genres are defined according to the functions that they fulfil in society. Genres of Latin writing had become legitimate modes

for disseminating learning, but they developed and changed during the period in question. New writing forms and genres like *consilia* and *practica* were created, new diseases were treated, and new fields, such as astrological physic and medicinal alchemy, emerged. The process of vernacularization started in the 14th century and took place on a broad front in the multilingual context of medieval Europe in several countries roughly simultaneously. The register was new in these languages, and the means to express scientific ideas did not exist; they had to be created. Vernacular texts occupied an intermediate position between the world of learning and the more popular attitudes, between *ars* and *vulgus,* as demonstrated by the German versions of Bernard of Gordon's *Lilium medicine* (original 1305), which was also translated into Middle English, French, Castilian, Gaelic, and Hebrew (Demaitre, 1998: 88). Genre conventions of scientific writing in English writing show a great deal of fluctuation; features of vernacularization are likely to be parallel in different languages.

Traditions of Vernacular Writing

Some genres survive in written vernaculars even from earlier periods, e.g., handbooks with practical advice, recipes, prognostications, and charms are extant from late Old English. We can talk about different traditions of writing, defined as a continuing series of texts building on one another, with a great deal of intertextuality. The traditions are an underlying factor, with several genres within them. Learned translations of academic and surgical texts were new and emerged in the last quarter of the 14th century, whereas the remedy book tradition is longer and goes back to the 10th and 11th centuries in English (Voigts, 1984). Yet the aforementioned division into three traditions is not always clear. Surgical texts are easy to identify because of their subject matter, but academic writing is a difficult category because of the lack of knowledge of early authors and their audiences. Likewise, remedy books are a difficult category, as these texts also contain learned materials, which may have come to vernaculars earlier, and there are several chronological layers of influence and borrowing.

Institutional Settings of Medical Discourse

Medicine as a Discipline

The position of medicine among sciences is special because of the relationship between theory and practice; this problem occupied learned writers for centuries. Medicine was both a learned university discipline and an occupation involving technical skills. Medical education comprised both general theories and specialist doctrines, but also practical applications through apprenticeship. The development of learned genres from the 12th century onward took place within an institutional context, with the newly founded universities as centers of medical learning (Crisciani, 2000: 75–78). More practical, non-institutional writings are extant in great numbers in both Latin and in vernacular languages.

Institutionalization of Medical Education

Before the founding of universities, medicine was taught in households of noble patrons or in medical schools attached to monasteries or cathedrals. From the 11th century onward, the Latin western world began to seek out a fuller version of ancient wisdom. Italy was in the forefront of the developments in the formation of writing conventions and establishing textual traditions, with new institutions and expanding scientific horizons. The 12th century has come to be seen as the starting point for a long medical Renaissance, because intellectual traditions that, evolving over 400 years, eventually began to resolve a broad range of issues, thereby defining a new science of medicine, which grew out of a range of equally new areas of scholarly investigation (McVaugh and Siraisi, 1990: 9). The influence of the new translations from Arabic in natural philosophy and medicine started in the 12th century, e.g., Constantinian translations date from this period. The center of medical knowledge was Salerno, Italy, and the most important product of the school of Salerno was the fully developed textbook known as the *Articella*, a collection of classical medical knowledge with Arab learning (French, 2003: 72; Ottosson, 1984: 60). Universities became institutionalized in the 13th century, and there was a general agreement about the form and content of medical teaching throughout Europe. Oxford and Cambridge, like others, were monolingual in Latin and part of the pan-European educational network that paid no regard to the vernacular. Institutional developments promoted the creation of discourse forms in a more formalized direction.

During the 14th and 15th centuries, the growth of towns in Europe was rapid, and various kinds of corporations started to develop. Teachers of medicine formed masters' guilds and taught their pupils to a level of 'master,' thus controlling the continuity of the trade (French, 2003: 70). An important step toward the institutionalization and full development of medical training took place in England, with the establishment of the guilds of practicing barbers and surgeons in the late 14th century. Guilds started to record their official documents in the vernacular;

for example, the Barber-Surgeons of York gathered all kinds of useful information into their guild book from the year 1486 in English and Latin. It is likely that the medical treatises in this book were used in instruction, but otherwise, vernacular medical literature was probably non-institutional.

Latin Genres of Learning

Commentaries and Compilations

'Commentaries' and 'compilations' (*compilationes)* were at the heart of the intellectual mainstream of scholasticism. According to medieval literary theory, commentaries are distinguished from compilations by the fact that the commentator takes the responsibility for conclusions. His own materials are "annexed for the purpose of clarifying" the issues, whereas opinions are attributed to others by the compiler, who "writes the materials of others, adding but nothing of his own" (Minnis, 1979: 387; quotations from Bonaventura translated by Minnis).

Commentaries were used both for research in reconciling ancient authorities and in teaching. The twofold nature of medicine shows in them, as, in addition to the truth and meaning of the work, the commentator had to point out its usefulness (Crisciani, 2000: 79). Each discipline had a canon of authoritative texts. The commentary tradition has several layers, from Greek to Latin and Arabic, and the developments continued after the high point of the 12th century (see Minnis *et al.,* 1988). Textual transmission took the form of systematic and often heavily glossed and commented versions of ancient knowledge. Commentaries reflected the logocentric mode of scholastic science, with a reliance on axioms, i.e., statements accepted as being true, though not necessarily so. The source of knowledge was 'that someone said so,' i.e., the 'Quotative.' Reporting the opinions of various authorities was an evidential feature of scholastic texts. The layered nature of medical learning showed in the hierarchy of authorities referred to. Galen and Hippocrates were frequently mentioned in learned and specialised treatises; next in frequency came Arab authors, such as Avicenna, Rhases, Haly Abbas, and Averroes, and medieval Latin authors. General references to doctors, leeches, physicians, and masters prevailed in more popular layers of writing (Taavitsainen and Pahta, 1998: 169).

Compilationes reflect logocentric science as well. This genre was important for the dissemination of knowledge and gained wide use in its different forms in the vernacular. Compilations had a twofold didactic function. First, they provided easy access to authoritative passages and convenient ways of finding important opinions. Second, they made the authorities available to readers not able to work their way through the originals (Minnis, 1979: 402–403). The two top genres of scholasticism approached one another at the end of the medieval period, and it is often difficult to make a distinction and classify texts. Textual histories of several works, including the *Articella* components, are extremely complicated and may include several layers, with commentaries and compilations intertwined. This practice of building upon various discourse forms was probably widespread. Alongside authentic texts, pseudo-authorial texts were written by near-contemporary authors and transmitted alongside the authentic ones; in addition, to elaborate the medieval genre map further, any important text in the Middle Ages could be subject to commentary.

Encyclopedias

The techniques of compiling reached a high level of sophistication in medieval encyclopedic treatises. They had multiple uses and audiences. The *De proprietatibus rerum* of Bartholomaeus Anglicus was originally composed in Latin (c. 1245) for friars to illustrate their sermons (Seymour *et al*., 1975/1988: 11). In addition to religious matters, it included natural history and medical lore; some copies, owned by high aristocracy, had handsome illustrations of medical practice and of the universe. A large part of the work overlapped with medical literature and seems to have served as a model for vernacular writing in the following centuries. A medical encyclopedia, the *Breviarum bartolomei*, was produced toward the end of the 14th century by London priest John of Mirfield. It recorded all medical authorities of the day, plus charms and prayers, perhaps reflecting hospital use (Getz, 1998: 50).

Questions-and-Answers Literature

'Questions literature' had several layers and traits with chronological developments. Teaching methods of universities, with their oral practices, contributed to the development of learned written genres. Conventions of scientific argumentation took shape: the *lectio* influenced the commentary, and oral disputations affected the question-and-answer pattern in written discourse. Theoretical and practical experience could be combined, e.g., Taddeo Alderotti's commentary was the result of 10 years of teaching with a long professional practice (Crisciani, 2000: 79). Likewise, Guy de Chauliac combined a university career with a long experience in medical praxis. Public disputes were central in communicating knowledge orally. Their written counterpart originally derived from Aristotelian treatises on scientific problems and became conventionalized at universities

in the 13th and 14th centuries. The formula of oral disputes was very similar to that seen in the written genre, and the influences intertwined, so that the medieval commentary also contributed to the development of the questions genre (Siraisi, 2001: 144–148). The pattern was elaborate: the question was posed, considered with pros and cons, given an affirmative or a negative answer, then expanded by descriptions, definitions, and explanations as well as a review of authorities. At the end, the main argument was raised again and the problem was answered. This pattern developed a standard stock of questions and remained valid for centuries (Cadden, 1993: 114; see also Minnis *et al.*, 1988: 212). Salernitan questions were in wide circulation and found in both verse and prose collections in Latin. The sources are complicated; some can be traced to Salerno, some to Montpellier and Paris, showing Arabic and Salernitan influences, and many seem to stem from classical collections of Greek problemata (Lawn, 1979: xiv–xxiii).

Pedagogical Dialogues

'Pedagogical dialogues' also derived from classical models but had different underpinnings. They were found in Greek literature, from Socrates through Plato and Aristotle, and continued throughout history, with Boethius's *De consolatione philosophiae* as the most influential medieval text of this genre. This "schoolroom colloquy between a master and a student" (Lerer, 1985: 19) set the model for the stereotypical roles in pedagogical dialogues for centuries to come and was translated several times into vernaculars (e.g., into English in the Old, Middle, and Early Modern English periods).

Case Studies, *Consilia*, and *Practica*

In the medieval period and for centuries afterward, the core of medical instruction was based on typical cases of disease. The genres connected with case reports were *consilia* and *practica*. The genre of consilia was modeled on legal documents and originated in the 13th century. A *consilium* was a piece of medical advice on a particular case. It offered a diagnosis and suggested a therapy (French, 2003: 121). *Practica* dealt with particulars of a disease and treatment and became a university genre with growing intellectual attention; the plague literature, for example, is connected with this genre. Surgical case histories were probably influenced by Arabic models and were not used in institutional teaching.

Vernacularization of Medical Writing

The complex motivations for vernacularization have received attention recently (see Wogan-Brown *et al.*, 1999). On the one hand, the processes seem to be connected with the rise of nationalistic feelings and the desire to enhance the status of the languages (e.g., Trevisa); on the other hand, it was a commonplace to apologize for the use of the vernacular for learned purposes in prefaces of early printed books. Latin scientific and medical texts provided the model for vernacular versions. Translations covered all levels, from academic texts to miscellaneous collections of useful materials such as recipes, rules of health, and applications of astrological doctrines, and some new texts were composed as well. Because vernacular languages were not used at the highest institutional level, the practical side became enhanced in them. In general, the transmission of surgical texts in the vernacular obeys laws which were different from those applying to Latin (Jones, 1989: 88). To date, this area has not been studied in great detail.

Learned Genres in the Vernacular

The learned genres of commentaries, compilations, and questions-and-answers were institutional. In the vernacular, these genres lost their original functions, and they may have gained new applications; such new uses and functions were central for dissemination of knowledge to the wider public.

Commentaries and Compilations

There are severe problems with identification of genres in vernacular languages. A recent discovery (Tavormina, forthcoming) revealed that even classical Greek authors' texts were translated into English in the late medieval period. The vernacular texts showed characteristics of the commentary genre but did not indicate their affiliation. The contrary seems to be even more common; some texts were explicitly called 'commentaries,' or the word 'comment' occurred in the title, but in contrast to genre expectations, the text contained explications of key terms and concepts so that the discourse features of the ensuing text were not in accordance with Latin genre features of the title. A survey of manuscripts indicated as commentaries in Voigts and Kurtz (1998) revealed that translations focused on the more utilitarian kind of academic texts, such as urinoscopies. Rather than quoting authorities and reconciling their views, these texts strived at making the contents easily accessible. The role of the translator varied; some seemed to have distanced the text (Benvenutus Grassus), and some acted as editors by selecting and excerpting materials, as in the case of John Arderne's surgical texts. There was no stability, and it seems that the genre was not conventionalized in the vernacular. It is evident that the conventions of taking responsibility for

one's opinions, drawing conclusions, and conciliating conflicting views, did not hold in vernacular texts, and many of them simply listed opinions of various authorities on a topic. Chauliac's top-level academic surgical treatises and the academic encyclopedia *Of the properties of things* represented the learned end of medical writing in the vernacular, and chronological developments can be detected in their transmission. Trevisa's translation (1398–1399) represented the early phase of vernacularization, whereas Wynkyn de Worde's edition was printed around 1495 and belonged to a different phase, when vernacular writing was already established. Adaptations were made for a broader audience; for example, pictures were added to act as visual texts, and the use of Latin in the rubrics was maintained as part of the scheme (Holbrook, 1998). The scope of encyclopedic treatises was wide in the vernacular. The focus of the more popular kind was on astrological medicine and its applications. Differences are obvious: learned *compilationes* assembled *loci communes* into coherent wholes, otherwise the technique merged with normal book-making practices. It was customary to gather useful texts, which also circulated independently, into the same manuscripts in so-called 'commonplace books.' The distinguishing feature of a commonplace book was its purpose: miscellaneous items were copied for the compiler's own personal use, interest, and amusement. The best example of this genre in medicine is the commonplace book of Thomas Fayreford (see Jones, 1998), but other commonplace books also included medical materials.

Questions-and-Answers and Pedagogical Dialogues

The elaborate patterns of Latin writing were not found in the vernacular, but because questions and answers were particularly suitable for instruction, the genre was adapted to vernacular teaching. The pattern was sporadically found in medical prose of the 15th century, but more consistently only in the 16th century. In these texts, the questions were straightforward, sometimes even blunt, and the answers came from some monological treatises, e.g., from Chauliac's surgical treatises in *Guido's questions* (1579). Questions and answers were found earlier in verse than in prose. Verse provided a more elementary mode of expression in Middle English, and prose was associated with philosophy and higher learning. An interesting work combining various literary and nonliterary genres is *Sidrak and Bokkus*, which circulated widely in several vernaculars in the 14th and 15th centuries. This treatise was an encyclopedic compilation with questions and answers, a philosophical dialogue with the roles of a teacher and a learner, and a saint's legend. It was written in rhyming couplets with common stock rhyme words and thus easy to memorize. Unlike learned encyclopedias, *Sidrak and Bokkus* was not coherent, but the 362 scientific and medical questions were dispersed in the text. Its dialogue has been characterized as a "cathecism" without conflict (Burton, 1998: 1:xxvii): the pupil accepts the teacher's answers without argument or further queries. Topics of Salernitan questions were frequently dealt with in vernacular writing as well, but they survive mainly in references to the school of Salerne in late medieval English-language medical literature.

Case Reports

Narratives of the course of illness are commonly found embedded in academic and surgical treatises, e.g., Benvenutus Grassus' learned opthalmology and John Arderne's texts. Recipes in remedy books may contain occasional case reports to prove the efficacy of the cure.

Remedy Book Material: Recipes, Charms, and Prognostication

Recipes were a well-defined procedural genre, but even their transmission was extremely complicated. Recipes were found on their own and embedded within a wide range of texts. Recipes in different traditions of medical writing in Middle English show different degrees of textual standardization: in remedy books, recipes followed a standardized format, but in academic and surgical texts they were more varied. The difference can be explained by the different functions of recipes in these traditions. In learned treatises they provided illustrations of healing practices, whereas remedy books served as handbooks for quick reference. The standardized format, with explicit titles and regular structure, served practical purposes and made consultation easier (Taavitsainen, 2001).

Conclusions

Vernacularization processes are complicated and need further study. The converging development of commentaries and compilations, for example, is likely to have taken place in Latin writing as the traditions of commentary and compilation approached one another. Medieval commentators were influenced by the practice of compilations; attitudes changed as works of revered authors were noticed to include compilations as well, and compilations acquired sophistication and refinement especially in the 13th and 14th centuries (Minnis, 1979: 386–387, 413). It is no surprise that commentaries and compilations

overlap and merge in vernacular texts and that it is difficult, sometimes impossible, to distinguish between the genres. Perhaps it is not even necessary to do so.

Compilations form a broad category in the vernacular. Some thematic compilations became fused with commentaries, and at the other end the process overlapped with the type of activity found in commonplace books. In general, vernacular medical texts had a bias to instruction and practical knowledge. There was a great deal of variation between individual texts. More theoretical treatises were also found, but there were difficulties in making vernacular languages function in the new prestige register. The late medieval period was important in establishing genre conventions in vernacular writing. In the 15th century the scale of medical writing was wide: there were texts with theoretical considerations transferred from the Latin exemplars, but there were reduced adaptations and applications as well. The difference between learned and popular layers of writing was reflected in some pertinent features of scholasticism, for example, the scale of authorities quoted and the degree of specificity. It seems possible to trace the transmission of scientific ideas to various audiences with a detailed comparison of the contents and styles of writing. More definitive conclusions need more studies on the Latin background and on features of vernacular writing.

Although Latin genres of writing have not been studied in detail, the situation is improving. A major research project of revising the Thorndike and Kibre Catalogue into electronic form is forthcoming (Voigts), and recent editions of Latin medical texts provide excellent material for more detailed studies. The scope of vernacularization in different European languages is not fully known yet and new discoveries are possible. New research tools have made the task easier and new projects have been launched. The database *Scientific and medical writings in Old and Middle English: An electronic reference* (Voigts and Kurtz, 1998) and George Keiser's volume *A manual of the writings in Middle English 1050–1500: Works of science and information* (1998) are invaluable in charting the extent of English medical writing and provide a good overview of the situation around 1500 A.D. An electronic corpus Middle English Medical Texts (Taavitsainen, Pahta and Mäkinen, 2005) makes a wealth of vernacular medical texts of the period available to scholars.

See also: Medical Communication: Linguas Francas; Medical Discourse: Developments, 16th and 17th Centuries.

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Medical Discourse: Hedges

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Introduction

Hedging is the expression of tentativeness and possibility, and it is central to academic writing where statements are rarely made without subjective assessments of their reliability and the need to present unproven propositions with caution and precision. In medical writing, hedges play a critical role in gaining ratification for claims from a powerful peer group by allowing writers to present statements with appropriate accuracy, caution, and humility, expressing possibility rather than certainty and prudence rather than overconfidence. In a context where the accreditation of knowledge depends on the consensus of the research community and the need to evaluate evidence, to comment on its reliability, and to avoid potentially hostile responses, expressions such as *might, perhaps*, and *possible* can contribute to gaining the acceptance of research claims. Medical papers provide interesting and useful examples of the use of hedging in scientific discourse because they relate to matters impinging on significant issues of our lives.

In the past decade, a growing literature has demonstrated the clear pragmatic importance of hedging as a resource for expressing uncertainty, skepticism, and open-mindedness about one's propositions. Studies have revealed the significance of hedging in textbooks, scientific letters, science digests, and academic research papers (Hyland, 1998a, 1998b, 2000; Myers, 1989). Hedges have also been shown to play an major role in medical discourses by Salager-Meyer (1994), Skelton (1997), and Adams Smith (1984). These studies indicate how hedges represent a writer's *attitude* within a particular context and help negotiate the perspective from which research conclusions can be accepted. In this article, I will briefly discuss the importance and role of hedging in academic medical papers and sketch a framework for understanding the functions they perform for academic writers.

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Hedging and the Construction of Knowledge

Hedging has been a subject of interest to linguists since Lakoff (1972) first used the term to describe 'words whose job it is to make things more or less fuzzy.' Essentially, it represents an absence of certainty and is used to describe 'any linguistic item or strategy employed to indicate either a) a lack of commitment to the truth value of an accompanying proposition or b) a desire not to express that commitment categorically' (Hyland, 1998a: 1).

The importance of hedging lies in the fact that transforming claims into accredited knowledge requires reader acceptance and therefore linguistic and rhetorical means of persuasion. Academic knowledge is now generally acknowledged to be a social accomplishment, the outcome of a cultural activity constituted by agreement between a writer and a potentially skeptical discourse community. As a result, the research paper is a rhetorically sophisticated artifact, carefully crafted to display a careful balance of factual information and social interaction, set out using community-recognized and -accepted argument forms. Academic writers need to make the results of their research not only public, but also persuasive, and this involves them carefully weighing claims for the significance and plausibility of their work against the convictions and expectations of their readers. Successful academic writing, in other words, involves authors evaluating their material and acknowledging alternative views because all statements require ratification. This, at least in part, depends on the appropriate use of various rhetorical and interactive features, of which hedges are among the most important.

These examples show how hedges can modify the factual status of a proposition to suggest that it is based on imperfect reckoning rather than certainty. provide an idea of how this is often achieved.

The hedges (italicized) indicate interpretations and allow writers to convey their attitude about the truth of the statements they accompany, thereby presenting unproven claims with prudence and softening categorical assertions. More than this, however, hedges open a discursive space in which readers are able to dispute the writer's arguments and interpretations, thereby enabling writers to take a position with respect to an audience as well as to facts.

The Functions of Hedging

Although medical research scientists gain and retain their academic credibility by securing readers' acceptance of the most significant claims that their findings will support, such strong claims are risky. Few assertions in the scientific world survive for long before being replaced by those with greater explanatory efficacy and there is always the possibility that claims will contradict or challenge the beliefs of one's peers. The fact that readers are able to reject claims means they have an active and constitutive role in how writers construct them, and it is the writer's anticipation of this potential opposition that makes hedging central to academic writing.

This opposition can be divided into two types and claims must address these to stand any chance of success. First, claims must correspond with what is believed to be true in the world. Hedges here are 'content-oriented' and concern the relationship between a proposition and a representation of reality. At a further level of delicacy, we can distinguish the obligation on writers to present their claims as accurately as possible and the equally pressing need to anticipate the dangers of overstatement. Second, a proposition that could be presented categorically from an objective perspective may be explicitly hedged because of reader considerations. Thus, 'reader-oriented hedges' incorporate an awareness of interpersonal factors. It is often difficult to pin down precisely what the writer intends, as indeterminacy is a widely recognized feature of modal semantics. However, although there is inevitably some overlap, it is useful to conceptually distinguish these three broad functions to understand the roles that hedges play in academic discourse and readers' motivations for employing them (Hyland, 1998a).

First, hedges allow writers to express propositions with greater precision in areas often characterized by rapid reinterpretation. Hedging here is an important means of attesting to the degree of precision or reliability of a claim and accurately stating uncertain statements with appropriate caution. In medicine, writing is necessarily a balance of fact and evaluation as the writer tries to present information as fully, accurately, and objectively as possible. Thus, writers often say '*X may cause Y*' rather than '*X causes Y*' to specify the actual state of knowledge on the subject. Hedges here distinguish the actual from the potential, or the known from the inferential, and imply that a proposition is based on the writer's plausible reasoning rather than certain knowledge. Readers are expected to understand that the proposition is true as far as can be determined.

The second reason for using hedges concerns the writer's desire to anticipate the possible negative consequences of being proved wrong and the eventual overthrow of a claim (Hyland, 1998a; Salager-Meyer, 1994). Academic reputations are built on making novel, interesting, and plausible contributions to

knowledge, which means stating the strongest claims possible for any particular evidence. However, writers also need to protect themselves against the hazardous consequences of overstatement. Hedges here help writers avoid personal responsibility for statements in order to protect their reputations and limit the damage that may result from categorical commitments. This usage follows Lakoff in associating hedges with 'fuzziness,' but I am using the term fuzziness here not to describe connections **between propositions**, but the ways that hedges can blur the relationship **between a writer and a proposition** when referring to speculative possibilities.

One way writers achieve this is to express claims using to employ evaluative *that* structures with modal devices and non-agentive subjects (Hyland and Tse, 2005). Most commonly, this involves the use of dummy *it* (see Example 7) or 'abstract rhetors,' which attribute judgments to inanimate sources (Example 8).

In the medical sciences, writers may hedge in this way because of preliminary results, small samples, doubtful evidence, uncertain predictions, imperfect measuring techniques, and other uncertainties in the experimental process or case histories.

Finally, hedges can be 'reader-oriented' in that they contribute to the development of a writer–reader relationship, addressing the need for respect and cooperation in gaining readers' ratification of claims. Research writers must always consider both the reader's role in accrediting knowledge and the need to conform to the expectations of the medical research community concerning limits of self-assurance. Most importantly, categorical assertions leave no room for dialogue and are inherently face-threatening as they suggest that the arguments need no feedback, thus relegating the reader to a passive role. By explicitly referring to themselves as the source of the claim, often with a cognitive or discourse verb, writers are able to mark the statement as one possible position, an alternative view rather than a definitive statement of truth, and thereby indicate a personal opinion awaiting verification. Examples 10 and 11 in provide illustrations. Here, hedges appeal to readers as intelligent colleagues, capable of deciding about the issues, and indicate that statements are provisional, pending acceptance by one's peers.

Thus, we can see that hedges help protect the writer against possible wrong interpretations or faulty results, but they also allow them to demonstrate an awareness of the reader's possible alternative viewpoint, displaying the conditional nature of statements out of strategic respect for them and indicating the degree of confidence that the writer judges it prudent to attribute to statements. In sum, though there is considerable overlap in these functions, hedging looks three ways: toward the proposition, toward the writer, and toward the reader.

Extent and Distribution of Hedging

This multifunctional importance means that academic medical writing is extensively hedged. The essentially rhetorical nature of these functions, however, means that there are considerable variations in the distribution of hedges across different genres, with greater concentrations in more argumentative and persuasive types of texts. In a study of different papers in the *British Medical Journal*, for instance, Adams Smith (1984) found that editorials and review articles are more heavily hedged than research papers and medical case reports. When qualifications are omitted, the result is both greater certainty and less professional deference, reflecting a different attitude to information and readers. Thus, genres that present information as accredited knowledge, such as undergraduate textbooks (Hyland, 2000) and popular science articles (Fahnestock, 1986), contain far fewer hedged propositions. The authors of such genres do not have to persuade an expert audience of a new interpretation or anticipate the consequences of being proved wrong because most claims already have factual status.

Similarly, hedges are differently distributed across different parts of each genre, with their use especially marked in the more discursive sections. They are particularly prevalent in the introduction and discussion sections of research articles and the comment section of clinical case notes, for example (Adams Smith, 1984; Salager-Meyer, 1994). It is here that writers are seeking to establish the relevance and significance of their research and the plausibility of their interpretations and is therefore where they need to be more tentative and circumspect in their assertions. There is also evidence that the type of hedges employed differ as well, with content-oriented hedges dominating the methods and results sections and more reader-oriented forms being found in introductions and discussions (Hyland, 1998a; Salager-Mayer, 1994). These patterns allow writers to convey approximations when discussing symptoms and methods and to evaluate, interpret, and comment on the evidential status of their information in the discursive sections.

Conclusion

In this article, I have discussed some of the contextual factors that shape the ways writers say what they believe and want others to accept. I have tried to

show that the expression of doubt and possibility is central to the negotiation of claims and that what counts as effective persuasion is influenced by the fact that evidence, observations, data, and flashes of insight must be shaped with due regard for the nature of reality and their acceptability to an audience.

See also: Accessibility Theory; Corpora; Corpus Studies: Second Language; Genre and Genre Analysis; Medical Discourse and Academic Genres.

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Medical Discourse, Illness Narratives

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Introduction

During the past decades, the health field has become a battlefield where alternative concepts of illness, health, and treatment compete with the dominant traditions of Western scientific medicine. New health care practices such as complementary and alternative medicine have gained status. Etiological factors have come to include 'lifestyle' factors, as in the relationship between smoking and lung cancer or the relationship between stress and certain coronary diseases. Patients have access today via the Internet to sources of information that were previously unavailable to them and can approach their physicians with more knowledge and new demands.

As part of these changes, researchers have become interested in questions having to do with the relationship between, on the one hand, the patient and his or her illness and, on the other hand, traditional scientific medicine and its concept of diseases. In this context, the study of illness narratives has gained prominent status.

Research on the forms and functions of illness narratives has expanded rapidly since the early 1980s. Its development is marked by diversity in the theoretical perspectives and methods that are brought to bear on a variety of problems.

Illness narratives is a wide field encompassing interview studies of patients' narratives of illnesses, studies of the way that narratives are used in the interaction between medical staff and patients, and clinical studies of how narratives could be used by medical professionals in encounters with patients. Another field of study that has emerged is the study of written and published illness narratives; Hawkins (1993) called these pathographies.

Theoretically, researchers have been interested in the narrative as an opportunity to study the subjective experience of illness, the way in which identity is reconstructed narratively in the face of illness, and how the institutional context affects the relationship between medical professionals and patients. This is especially interesting in terms of power and the patient's ability to make his or her voice heard in the medical encounter. Thus, researchers focus on narrative structure and coherence, as well as on the functions of narratives in various social contexts.

Two Voices

A central problem area for many studies of medicine and illness narratives is the relationship between what is called the voice of the lifeworld and the voice of medicine. These concepts were introduced by Elliot Mishler in his book *Discourse of medicine* (1984). Mishler pointed out that in the discourse of ordinary medical interviews it was possible to discern two

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Medical Discourse: Non-Western Cultures

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The term 'shaman' has its etymological root in the word 'saman' from a Manchurian language, meaning 'one who knows.' Originally the term was used in various areas of northern Asia and was later brought to the Americas, to the southeastern part of India, and to Australia and Africa. According to Mircea Eliade, shamanism or the socially specific role of the shaman was brought to the Americas by the first eastward waves of immigration from Asia. The origin of the shaman in America (the continent in which the role has been most studied) is well documented (see Eliade, 1974: 266; Lowie, 1934: 183–188).

The role of the shaman is not limited to individual practice. It is currently portrayed in the literature as a category of social activity with a legitimate function as a health care phenomenon. Classifications include legal aspects, health program functions, adaptation in the migration of ethnic groups, and shamanic practice in the integration of tribal peoples and their customs into the social mainstream. As such the role of the shaman has become an interdisciplinary study.

Elaborations in the area of anthropology and ethnopsychiatry have focused on therapeutic aspects and role models which include the magical or nonlocal physical aspects of shamanic activity. These include Geza Roheim (1950), Mircea Eliade (1951), Claude Lévi-Strauss (1958), Alfred Métraux (1967), George Devereux (1970), and others who treat aspects of hypnotic suggestion or trance as therapy.

Mircea Eliade: Ancient Techniques for Producing Ecstatic States

Eliade is the great classic authority on shamanism, and is recognized as such by those who wrote after him. His *magnum opus* (*Shamanism and the ancient techniques of extasis*, 1951) is the first attempt to comprehensively approach the subject from the point of view of a religious historian. His sources include works on what is described as classical shamanism in Siberia, the Americas, Indonesia, and Oceania.

Mystical experience is central to his theme, in which he emphatically rejects the proposition of

such experience as neurotic, as has been held by some psychiatrists and ethnopsychiatrists. His concept of techniques for producing ecstasy is presented as being in the ancient magical tradition of the fire element and the symbol of the veil. He treats initiation into the mysteries in its various forms as well as the so-called secret societies which are concerned with such rites. The token death and resurrection of the candidate, including seclusion, the use of the funeral mask to indicate the passage of the shaman into the realms of the dead, token burial, and the descent into the nether regions called hells are also discussed. The hypnotic dream or trance and the obstacles which must be overcome to reach this state, such as the abandonment of previous lifestyles so that curative powers can be achieved, and the intonation of songs which tell of the adventures of the way into the spirit world and the spheres of the gods, are elaborated as part of shamanic experience everywhere.

Shamanic Trance

Induced suggestive states are widely employed for both lay and religious purposes in all cultures, particularly in the Native American and mestizo Latin American. The ancient Greek Dionysian mysteries and the European transition into Christianity used trance and mesmeric techniques which are still in wide use. The so called 'epidemics of possession,' such as outbreaks of demonic possession and the witch-hunts of the Middle Ages and Renaissance, are later developments.

Judeo-Christianity has a tendency to reject religious trance as pythonic and for this reason all devotees of the current autochthonous religions are condemned as superstitious in the Celto-Germanic persuasions. This condemnation extends to members of the Catholic priesthood who have shown a tendency to stray toward induced states, although some religious practitioners have been given lay recognition and are treated as sainted by various cults.

Trance is variously delineated in European languages as possession, hysteria, dissociation, altered consciousness, or elevated states, all of which may be researched as multidisciplinary anthropology.

The Deployment of Symbol in Shamanic Healing

Lévi-Strauss (1961) uses the term 'symbolic efficiency' for effects produced by shamanic therapy, such terminology being opposed by Jean Chiappino, who claims that the significance of actual physical treatment is underplayed. (Chiappino, 2003: 39). Symbolic efficiency concerns psychological effects produced at the symbolic level as an isolated holon. Trance and the shamanic song are outstanding in psychological cure and include group participation.

Contemporary anthropologists point out that there are mystical and mythical aspects in all therapeutic cure including the most scientific, and that both mysticism and the archetypal roots of myth constitute the paradigm and provide the dynamics required for all healing.

Shamanism and Neurophysiology

Insofar as objective efficiency and scientific proof are concerned, since 1975 neurophysiology has demonstrated the existence of endogenous processes that inhibit nociceptive sensitivity and produce opiate substances that inhibit pain. Endorphins secreted by the pituitary gland and by cells in the brain act on pain receptors in the entire central nervous system so that pain is reduced. The endogenous interaction between receptors is accomplished by peptones called encephalins, such as endorphin and dimorphine. Researchers conclude that there are processes that trigger receptors at a substrate level which also contribute toward inhibiting the transmission of pain information throughout the central nervous system. The human body is thus seen to be naturally equipped to reduce pain sensation.

The neurophysiologist James L. Henry of the Department of Physiology and Psychiatry at McGill University has remarked that symptoms commonly associated with such states may include the activation of endorphins, and that it seems reasonable to suppose that this interaction involves a particular mechanism with an extension or global effect within the brain. Two shamanic symptoms appear outstanding to Henry: (a) detachment or separation from the physical world, that is to say dissociation which results in euphoria or ecstasy, and (b) immunity to physical pain, even the most severe. He has found that in states of altered consciousness endorphins excreted from the pituitary gland are present in the blood. This research opens the way to a multidisciplinary approach for anthropologists, neurophysiologists, and psychiatrists.

Shamanism and Ethnopsychiatry

Geza Roheim, an outstanding ethnopsychiatrist, has concerned himself with an ontogenic theory of culture. Largely influenced by Sir James Frazer (*The Golden Bough*, 1890) and his unilineal evolutionary concepts, Roheim considers the shaman as a psychiatric pioneer: "the scientific precursors who held that the human being was capable of matching his

strength against the world" (Roheim, 1982: 80–81). He categorizes the shaman as a schizophrenic. After reviewing the case of a schizophrenic patient at Worcester State Hospital, Worcester, Massachusetts (1938–1939), he drew parallels between shamanic fantasies and hallucinations observed in Oceania and in the Yumas of California, as well as those of the Australian aborigines. He has said that the attitudes and behaviors of those concerned with magical practices are related to symptoms observed in states of neurosis. His theories of ontogenic culture are based on the effects of prolonged infancy in the human being and the trauma produced by the exaggerated dependence which is generated upon the relationship with the mother, making it impossible for the child to experience pleasure in sexual interaction. Culture then becomes a permanent search for a mother substitute because the mother archetype has not been individuated. Magical fantasy and schizophrenia are related although the former deals with an empirical world while schizophrenia deals only with substitutes.

Special emphasis is placed on oral magic, which is defined as healing through suction, and this is particularly applicable to the therapeutic work of the shaman, whom Roheim describes as one who assaults the mother's breast, the patient in this analogy being the mother, or the person who has never individuated the mother in the psyche, and the shaman being the suckling child who is the healer.

George Devereux: 'Sacred Disorder'

Devereux proposes a concentrated psychotherapy which will result in a cure rather than in mere accommodation, which is according to him the usual outcome. As an ethnologist he insists that any given culture should not accept as normal a situation which is virulently pathological. At the same time, he suggests that the Western psychiatrist should not impose his views on cultures which are not Western. Devereux is somewhat contradictory since he recommends culture-specific values while treating the shaman as a universal archetype.

'Sacred disorder' is classified as neurosis or shamanic disorder and this is likened to schizophrenia. He affirms that it is diagnostic error to classify individuals as neurotic or psychotic who because of their ethnic conditioning behave in a manner that is considered pathogenic in Western psychology. At the same time, he discusses shamanism in terms of psychopathological disorder, claiming that the shaman is severely neurotic bordering on psychotic in temporary remission, and one who is often in conflict with his own culture. He goes on to say that the shaman must himself be cured because uncured he is a social nuisance and that the only difference between a shaman and a psychotic is that the shaman's conflicts are expressed at the level of a cultural model rather than at the level of unconscious idiosyncrasy.

The curing of one shaman by another cannot be considered actual but is rather a restructuring of conflicts and symptoms according to their own convention without a conscious understanding of the nature of these conflicts and also without achieving any sort of true sublimation.

Anthropologists claim that Devereux takes an ethnocentric position because he believes that the shaman must sublimate in order to be cured (as Freud points out). The question remains as to why this Western value should be applied in a non-Western community which sustains a belief in a shaman who has been cured or indoctrinated into Western processes. Ethnological aspects in a situation where there is crosscultural exchange cease to be meaningful. Furthermore, Devereux fails to recognize the importance of the consensus of the cultural group, which has always been an anthropological consideration. The shaman cannot be limited to the mores and values of a marginal group in any given society or culture since adaptions have been made for reasons of efficiency in the protection of his own people against the constant inroads of Western value systems. Very often the non-Western group finds itself surrounded by political and economic forces which have invaded the community without its consent. This was often the case in the latter part of the 20th century in Latin American countries, where there are large unassimilated indigenous populations.

Devereux's concept of structuring mental disorder in accord with universal cultural mores is not practical since under actual conditions any cognitive apparatus employed must cover each particular ethnic difficulty. This cannot be done by resorting to the mores of an assumed metaculture. Such an *a priori* model may well bear an inadequate correlation to the actual state of knowledge with respect to human potential as it exists in the specific culture and will be biased toward a Western viewpoint. Eliade and others reject the concept that magical therapeutic events are pertinent to categories of mental disorder.

The New Shaman

It has been thought that shamanic lore is culturally specific and, since it is steeped in tradition, not affected by Western thought. This is not the case, since in the second half of the 20th century, communities which rely on the shaman had their geopolitical and cultural space invaded by large dominant cultures. Thus, in

order for the shamanic culture to prosper in the face of changes in political thought and modes of health care, the shaman has had to adopt methods of defense and to transform his role in order to harmonize with the cultural milieu propagated by the mass media.

The first transformation is in the community proper, which adopts new techniques that have been employed by other shamanic communities. The new shaman is fashion conscious and is aware of communities which speak various languages. In Venezuela, voodoo from the Afro-Caribbean and Brazil mingles with the rites employed by the priestesses of Maria Lionza. A spiritual brotherhood is inaugurated and is maintained by travel as well as through electronic media.

The shaman leaves his own community to impose his ideas and methods on other communities, including sections of the mainstream culture (which increasingly makes use of his knowledge). A feedback loop becomes established between cultures, particularly in Latin America. Thus a defense is established not only of shamanic lore but also of the traditions within the whole culture. The shaman can operate within the legal systems imposed upon medical services, which impose licensing and qualifications required for practice. In order to maintain social dignity within the body of a multiethnic and pluricultural society and to protect himself from aggression, the shaman has linked his role with organizations that support indigenous cultures at national and international levels. Such organizations acquire an ever-increasing amount of power and influence.

Cults of possession, such as that of Maria Lionza, which has been popular in Caracas since the 1970s, adopt shamanic techniques and the leaders often use the title of 'shaman.' These cults proliferate throughout Latin America and Africa, although these new aspects of shamanism have so far been studied only superficially.

The phenomenon which has come to be widely designated as possession uses trance-inducing techniques which stem from shamanic traditions. However, the various cults differ from the shamanic tradition, since the shaman uses the trance as a means of transcending himself so that he may enter the spirit world and become a medium for higher powers of inspiration. Inversely, cults of possession do not attempt to transcend but rather to bring the higher powers down or to invoke communication so that the spirit enters the body or inspires the mind of the shaman or medium.

Shamanism and the Cult of Possession

In the cult of possession, which is again a distinct form of shamanism, any manifestation of disorder is restructured so that communication is possible at a new level. Most psychiatrists consider any sort of possession to be psychopathological and related to hysteria. François Laplantine (1975: 23) defines possession as "psychosomatic conversion of an unconscious conflict into a symptom." He understands possession as a realization of a conversion which is not hysteria but its contrary: "it expels the symptom and fills the body of the entranced dancer with a social and cultural language." Because hysteria denotes a sort of suffering, he further denotes possession as "the fervent celebration of myth."

The ethnologist Louis Price-Mars considers possession to be a crisis which he terms 'teolepsia,' "a metamorphosis or normal psychological state which reproduces aspects and mannerisms of the gods within the context of a dramatic personification." Like Laplantine he insists on the distinction between religious possession as it is seen in Africa and the Americas, and possession as hysteria, which is clinical. Hysteria is a common disorder while possession implies religious rites of some sort. Possession can also be described as a semiotic sign with the signified being the spirit or the god which manifests in a ceremonial context with percussion instruments, dance, song, aromatics, tobacco smoke, candles, and other appurtenances of the sacred.

Roger Bastide: Adorcism and Exorcism, Shamanism A and Shamanism B

Bastide (1972: 72) makes the distinction between trances which occur through possession as adorcism, which is the imposition of a new soul or spirit into the person, and exorcism, which is the extraction of a spirit which is causing harm. Exorcism is a widely practiced shamanic technique (in some regions of the Americas called 'bad air exorcism') and consists of suction or a sucking action accompanied by the sounding of a sacred *maraca* or rattle made from a gourd filled with seeds or stones. Bastide describes shamanism A as adorcism, the possessive trance which transports the shaman to the spirit world to recover the soul of the patient which has been stolen by spirits. Exorcism is designated as shamanism B. The shaman (priest or medium) is capable of performing both A and B.

Bastide includes what he calls the 'savage trance' and also the 'baptized trance.' This is a distinction which reflects attitudes of the African slave when presented with shamanic practices, the traditional and the introduced. The traditional savage entered into an uncontrolled trance which was involuntary and without any kind of social projection; the baptized trance was the result of a long and arduous

training which capacitated the recipient or initiate to become socially useful in a new situation.

Classifications of the Trance

Trance can be classified either as disassociative, or as euphoric or theatrical. Disassociative trance is asocial in character and indicative of biological or cultural states which are pathological, or again may be the first indications of a tendency toward shamanic initiation.

The euphoric trance is achieved by the shaman after initiation, and permits a cultural channeling of the disassociative, enabling the practitioner to invoke the trance at will and give it a therapeutic character, which is expressed both biologically and psychologically in a socially therapeutic manner (biopsychosocial). The phenomenon is endogenous or introverted and is culturally accepted. It may be brought on with or without external stimuli such as hallucinogenic plants, tobacco rituals, incense, candles, flute music, the drum, the *maraca*, song, or prayer, and may include the employment of sacred objects such as cords, collars, crucifixes, sacred images, dolls, necklaces, capes, or gunpowder, and massage and hypnotic manipulations of various sorts. Euphoric trance is socially cultivated and is much venerated. Shamans who are in charge of these rites are highly respected and adulated with varying degrees of awe in respect of the sacred character of their office.

Nevertheless, the shaman, or *mojan* as he is called in Spanish, or the American *piache* or priestess does not always truly 'go under' or enter into the trance but, being familiar with each step of the process, is able to imitate the behavior as part of being a therapist without the patients or the faithful being aware of any guile. Such histrionics may well be classified as theatrical trances and often imitate the euphoric trance perfectly.

The transformations of the shaman are various, both in trance states and out of them, and these variations are often changed by apprentices, adepts, and priestesses, who are all aware of global changes, political and ethnic. Thus the student or the investigator should not attempt to categorize fixed shamanic practice, but rather observe the ever-changing scenario which is even now unfolding, and to note carefully one's own reactions to these new sociocultural conditions.

Western medicine, including biomedicine, has shown a tendency to deprecate traditional or natural medicine. The shaman and folk doctors are often ignored or considered as quacks who lack education and information. Some scholars, such as O. Carl Simonton, think, rather as does the neoshaman and the folk medicine practitioner, that the devotion to technology and the dogmatic principles of the medical profession have lost the sense of what it means to be human. Medical science and medical schools based upon mechanistic or material principles have become clinically impersonal, and ignore the cultivation of a *gestalt* approach. This is nothing new; Plato put it quite clearly: "So neither ought you attempt to cure the body without the soul, and this is the reason why the cure of many diseases is unknown to the physicians of Hellas, because they are ignorant of the whole, which ought to be studied also; for the part can never be well unless the whole is well" (Plato, *Charmides*, 156, 157.)

The Shaman, Myth, and the Cosmos

The shaman in all forms and manifestations is respected and highly esteemed in his own community and in other similar ones as well as in mainstream society. In some cultures the shaman is seen as the representative on earth of the Cosmic Creator and so plays the role set out in the sagas for the culture hero at the conception of the world. In trance he enacts the creation of human beings and the relations which they had with the spirit world at the beginning of time. Because the shaman has the ability to communicate with spirits or motivating forces he is able to perceive more clearly the pathogenic agents which debilitate his patients and is able to neutralize them. Patients or the faithful are led to confront the psychological dangers to which they are exposed during the sessions at which they are cured.

Shamanic societies interact through their myths with the whole region of cosmic space, where there are various heavens overarching various mountains and sacred lakes. In the Himalayas the gods of the people continue to dwell, as do the spirits they command and those of the dead. Places such as those known as the Houses of Thunder are domains in which the Sun and the Moon move in their roles as mythic heroes. In the Andes there is the home of the double rainbow, male and female, which is the symbol of the bridge across the chasms of the many cosmic spaces which yawn between the heavens and the Earth. These the shaman negotiates as he or she passes from one space to another or passes to the Houses of the Grandfathers to visit the Old People. There the first humans, who have continued to exist from the beginning of time, find their abode and thence upon occasion descend to dance with their offspring. There live their companions, the mythic animals and birds, the eagle, the anaconda, the rainbow serpent, the quetzal, and the bear.

This belief in the Old Ones is common throughout the Americas from south to north. Viewing this area

as a cosmic space, according to Eliade, fire has a primordial role, particularly in South America. However, earlier research has shown that in South America the elements of air and fire take a preponderant role in the cosmology and shamanic ritual. Fire is described as a glimmering, or as a beam or flame seen to exist within the air, the primordial element from which emerged the first gods who came to Earth. The primordial elements are of the same physical constitution as the gods, the spirits, and the enchanters with which the shaman works and whose language he has learned as part of his initiation. Through this knowledge the shaman brings rain, commands the thunder, and calms the storm. The shaman knows the sacred language because he or she has become familiar with the primordial sounds, those of nature which cannot tolerate the noises of human beings. It is for this reason that the shamans of the Andes recommend silence when walking in the highland meadows and beside the lakes.

The shamanic veil is also conceived as a cosmic element and has become the object of research, although not always mentioned as such. There is some discussion of spiritual helpers or allies with which the shamans work and which are often described as spirits of nature. The various airs, the spirits of the water, of the rivers, the spirits of the Sun and Moon and of the rainbow are all called upon. In the northern part of South America, in Colombia and Venezuela, metaphysical persons fly like eagles when they come from the realms of the spirits and like vultures when they fly from the lakes of the dead.

There is a well-defined relationship between the shaman and certain birds. In the Venezuelan Andes, this alliance this has been portrayed as a winged stone, usually of serpentine (hydrous magnesium silicate) although sometimes this symbol is worked in gold. The shaman hangs this symbol from the elbows or around the neck when dancing alone or with a group. Flight often has to do with the search for the soul of a patient, a soul that has been stolen by a spirit or by someone who has died. This search is sometimes performed as evocation, the shaman calling back the soul of the patient, which is less dangerous than the shamanic journey in its quest.

The process of drawing out or of suction, used traditionally to relieve illness in the body of the patient, and the object which is regurgitated as proof of the extraction vary in different geographical regions and from one shamanic society to another. In general these objects take the form of parasitical worms or tangles of blood-soaked hair, the object being spat into a bucket of water, since water, particularly in the Andes of Venezuela, is the principal ally of the South American shaman.

The shamanic methods for healing by means of the imagination may be summed up as trance, flight, song, imagery, hypnosis, meditation, dance, tobacco, regurgitation, and the use of hallucinogenic plants (peyote, the San Pedro cactus, ayahuasca, yopo, and fungi). The power of the symbols which are considered to be contained in these substances permits the *mojan* or shaman to intuitively hear messages from the combined body-mind-spirit, which has been disregarded by Western medicine. However, the scientific realm in the eyes of the common people has its own symbolic powers: the white lab coat and the stethoscope are seen by mediums in trance as apparatus borne by doctor spirits (particularly in the cult of Maria Lionza) which they use on their patients with cold-blooded aplomb.

Every shamanic culture maintains certain objects and rites as ideals which have the potential for conveying physical forces, and the various objects function in proportion to the amount of mental or spiritual energy invested in each symbol. In every society there is that which has potential curative power and that which does not.

In multiethnic societies such as those in Latin America, each group identifies with not just one complex of belief objects as having real authenticity, but the participation is with various beliefs and the paraphernalia pertinent to each one. There is no sense of logical or religious contradiction in respect to any participation. Seen thus, shamanism must be studied within the new sociocultural contexts to which it has had to adapt in order to survive.

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Medical Discourse: Sociohistorical Construction

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Introduction

Scientific language and discourse emerge in a cooperative and competitive struggle among scientists to create the knowledge base of their field, to establish themselves in relation to other scientists and to other professional groups, and to gain influence and control over political and socioeconomic means. In every strand of human communication, language and discourse play a role in the formation of a social and societal reality and identity. This is also true both of the formation of the different professional and vocational cultures within working and public life and of the formation of different academic cultures.

Historically, language has played a central role in the creation of different professions and academic disciplines, and it continues to play an important role in the development and maintenance of professional and institutional cultures and identities. Societal, social, and cognitive factors all make important contributions to the construction of professional cultures. Professionals try to create a space for their field within society. They try to establish themselves in contact and competition with others within their group as well as with other groups. Their knowledge base and its linguistic forms are created in a societal and social framework.

Diachronic Studies on the Development of Scientific Genres

A constructionist perspective on the emergence of scientific discourse and text genres is found in various traditions. Within the tradition of sociology of science, several studies have been devoted to analyzing the role of texts in the establishing of scientific fact. The scientific field is seen as a workplace, a laboratory, where social rules determine the establishing of facts and the rank order of the scientists. Knorr-Cetina (1981) was one of the first to describe the writing up of results as a process of tinkering with facts rather than a knowledge-guided search. Latour

Medical Discourse: Psychiatric Interviews

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Psychiatry, defined as "the branch of medicine that focuses on the diagnosis and treatment of mental illness" (Andreasen and Black, 1995: xi), examines mental disturbances that afflict the patient/client in his or her relationship with himself or herself, family and friends, and society at large. It relies on the psychiatric interview as its key diagnostic instrument given that laboratory exams do not provide evidence for psychopathologic processes. The anamnesis – a procedure through which the doctor assesses and evaluates the patient's situation – structures the psychiatric interview and its clinical interpretations (Sullivan, 1970; Shea, 1998). The purpose of the interview is to detect patterns of affect relations that may trouble the patient, to make a diagnosis, and to prescribe a treatment. The doctor has an active question-asking role: he or she follows a series of pre-established steps that make up the diagnostic exam. Such steps follow specific topics (eating habits, sleep and sleep functions, parenthood, and vocational history, among others). However, it is the quality (rather than the quantity) of the doctor's questions that qualify him or her as an expert in the patient's perspective (Shea, 1998: 35). For the patient, certain questions or issues are of great importance. Some can be captured as requests for help and attention with an implicit message 'Can this person help me? Will she listen to me?' It is not surprising, therefore, that successful interviews may often close with an acknowledgment by the patient of 'having been listened to.'

Compared with medicine in general, psychiatry derives its practice from clinical observations of patients' behavior that take place in face-to-face encounters between patient/client and therapist/doctor (Shea, 1998) where language and communication disorders are closely investigated (Andreasen, 1979). It is also based on interviews with patients' partners, relatives, and/or friends. As key components of the mental status examination, language and cognitive behaviors are routinely assessed in the interview (Andreasen and Black, 1995: 49). Thus, psychiatric definitions related to thought, language, and communicative disorders (i.e., poverty of speech, pressure of speech, distractible speech, tangentiality, incoherence) derive from the clinician's observation and experience. Also, the doctor infers the patient's thought disorders from the patient's speech as thinking cannot be observed directly (1995: 68). Such understanding assigns a prominent role to language studies in psychiatry, where researchers in linguistics can contribute to more accurate and adequate descriptions for language and cognitive disorders.

Given the absence of specific diagnostic laboratory exams (common in other medical specialties, such as oncology, heart disease, and diabetes), this field of medicine relies on the expert's interpretive practices of the patient/client's symptoms (Sullivan, 1970). As Kleinman (1988: 7) states, "a psychiatric diagnosis is an interpretation of a person's experience ... whose roots are deeply personal and physiological." Thus, interpretation may differ for professionals with different orientations (for example, a psychiatric interview performed by a neuropsychiatrist contrasts with an interview conducted by a psychoanalyst). Such differences attest to the experience of illness as a culturally shaped phenomenon mediated by language. Discourse analysis of psychiatric interviews (Ribeiro, 1994; Pinto, 2000) provides relevant information on the use of language, communication disorders, and interpretive practices.

The Psychiatric Interview as a Speech Event

A psychiatric interview is a complex institutional encounter (Sullivan, 1970; Shea, 1998). For the psychiatrist, the interview aims at gathering the patient's information to reach a diagnosis and establish a course of action for proper treatment. An agenda should be followed to address and assess topics related to why the patient has been hospitalized, the history of the illness, and its previous episodes, among other clinical concerns. It is framed as an inquiry and not as a conversation. For the patient, however, this social encounter is seen as an optimal moment to introduce topics on health and illness, where personal stories emerge, and the doctor is framed as a potential listener (Ribeiro, 2002). These differences in expectations are usually not resolved. Most often than not, the institutional discourse prevails, with its key communicative goals: to diagnose and prescribe.

Research on the clinical interview has developed mostly from anthropology, sociology, and sociolinguistics, related to concerns on communicative practices that constitute human social life. To understand the social construction of the interview, the

concepts of speech event (Hymes, 1967) and speech activity (Gumperz, 1982) seem particularly interesting: "activities, or aspect of activities, that are directly governed by rules for the use of speech" (Hymes, 1967: 19). Research in these fields has shown that participants' roles, their rights and responsibilities in the course of the interaction, expectations about ways of introducing information, and constraints on content are all based on culture-specific norms. Thus, a well-established set of cultural conventions governs this social encounter and allows both the doctor and the patient to face the interview as an acknowledged clinical practice. The sociolinguistic analysis of clinical discourse also resonates with Sullivan's (1970: ix) definition of psychiatry as "the field of the study of interpersonal relations, emphasis placed on the interaction of the participants in a social situation." He added that "the psychiatric interview is a special instance of interpersonal relations" (1970: ix). The purpose of the interview is to find out who the patient is by reviewing the course of events that he or she has gone through in order to be who he or she is.

The DSM – A Unidirectional Model for Communicative and Speech Disorders

The *diagnostic and statistical manual of mental disorders* (DSM; American Psychiatric Association, 1994), a standard classification for mental health problems, provides a widely recognized reference for the psychiatric interview. It is based on the belief that mental disorders are universal and that they have a clear course of predictable symptoms. Additionally, its definitions focus solely on the patient, seldom taking the doctor–patient interaction and relationship into consideration. For example, a definition of a disorder known as flight of ideas, "instances of behavior where the patient may shift idiosyncratically from one topic to another and where things may be said in juxtaposition that lack a meaningful relationship" (Andreasen, 1979), does not take into account complex topic negotiation processes between the two participants; it focuses rather on the immediate prior context (i.e., a sequential response to a question).

Social and clinical researchers have questioned the DSM framework. Based on crosscultural studies of mental disorders, anthropologists and psychiatrists (Kleinman, 1988; Good, 1994) claim that there are cultural variants in the expression, course, and outcome of mental disorders. Social responses to the illnesses reveal cultural differences in the way a disorder is interpreted and handled. According to this approach, "abnormality and pathology are inseparable from cultural interpretation" (Good, 1994: 35) and the standard notion of normality must be assessed within a cultural context. Language is then conceived as a fundamental tool for understanding how human beings experience mental disorders.

The Interactional Model for Communicative Studies: Implications for Psychiatry

The interactional model for communication studies (Schiffrin, 1994) brought to light aspects of communication that have implications for psychiatry. It states that both speaker and hearer play active roles in everyday face-to-face interactions, as they jointly produce meaning and discourse. The situated nature of communicative behavior (verbal, nonverbal, and paralinguistic) is also foregrounded. Everything that happens in an interactive situation displays information, regardless of the speaker's intentions, and might be interpreted accordingly. The hearer then assigns meaning based on multileveled interpretations (semantic, pragmatic, conversational) to "whatever information becomes available" (1994: 401). The goal of an interactive situation then shifts from **the** interpretation of linguistic information encoded by the speaker to **an** interpretation of situated behavior. For psychiatry, this alternative model of communication has relevant contributions. It underscores that human communication relies on both the message – what is said – and how it is encoded. Pause, hesitation, gaze, and intonation are some of the cues the psychiatrist needs to attend to in order to assign interpretations to the patient's behavior. Also, interpretations are negotiated, repaired, and changed through interaction rather than unilaterally conveyed. Coherence thus might be assessed based on the different levels of communication: semantic (attending to the message, to what is being said); conversational (focusing on the sequence of conversational moves, i.e., question/answer); pragmatic (whether certain utterances are appropriate and relevant at a certain point of the interview); and interactional (the discursive strategies used by participants in the joint construction of talk).

The interactional model of communication also calls for a balance between the institutional agenda introduced and maintained by the doctor, on the one hand, and the personal topics brought up by the patient, on the other, allowing for a more conversational encounter, where the patient can introduce narratives and the doctor can align himself or herself as a listener of stories.

Based on transcripts of audio and videotaped psychiatric interviews, Ribeiro (1994, 2002) and Pinto (2000) have systematically analyzed the discourse of doctors and patients by using both topic analysis and narrative analysis. The former has pointed to different types of topic discontinuity, which reveal psychopathological problems regarding thought

disorders (such as tangentiality); the latter discusses common phenomena in everyday conversations such as digressions, often evaluated by clinicians as a progressive deviation from the topic in relation to the information flow of an assessment interview. Ribeiro (2002) suggested that a narrative might accomplish textual and conversational coherence, when the doctor aligns himself as both a conversationalist and an inquirer, attending both to his clinical agenda and to the patient's story.

Language, Thought, and Communication Disorders

Psychiatry is driven by diagnostic procedures. The doctor must investigate each one of the patient's symptoms and search for a standard definition. Part of this work is performing an assessment of thought, language, and communication disorders, as disturbances in the use of language are displayed in several psychiatric conditions, such as mania, severe depression, organic disorders, and schizophrenia (Andreasen, 1979; Shea, 1998).

The psychiatric diagnosis investigates pathological processes that underlie the patients' mental and psychological states. It is based on phenomenology, "the empathic method for eliciting symptoms" (Sims, 1995: 5). According to Jaspers (1963), we have only indirect access – the patient's own descriptions – to what happens to a patient; these descriptions are then compared and interpreted according to our own experiences. The patient's words (conveyed through statements, queries, complaints, etc.) are, therefore, reinterpreted in light of our own understandings. Hence, the task of providing a psychiatric diagnosis is an extremely complex activity. It involves mainly the doctor's ability to unravel and understand the nature of the sufferer's experience, given the absence of laboratory exams to sustain the diagnostic hypothesis. The psychiatric diagnosis is the key reference point for understanding the patients' condition and related therapeutic procedures.

The psychopathological examination – which unfolds in the psychiatric interview – plays a key role in the psychiatric diagnosis. It assesses the patient's attitude toward the interview, that is, whether he or she is being cooperative. It investigates memory, consciousness, attention, orientation, and language and thought processes, etc. Aspects related to pressure of patient's speech, rhythm, and the use of very long pauses are classified as speech disorders. Another range of disturbances – thought disorders – relate to how thoughts are verbally expressed, how the patient connects ideas (topic development), and whether he or she expresses paranoid or delusional ideas.

According to Andreasen (1979), the term thought disorder has been largely used in psychiatry to describe a gamut of different issues regarding human cognition, which ranges from the patient's capacity to abstract from external stimuli to how he or she organizes his or her utterances in a piece of discourse, by so communicating (in)coherently. Thus, the concept of thought disorder "is not a unitary construct, but rather encompasses several different components" (Berembaum and Barch, 1995: 350).

In an attempt to distinguish the various connotations of this term, a distinction between disorders in content and form was established. Broadly speaking, the former refers to what the patient talks about (Taylor, 1981), whereas the latter is concerned with the speed and with the forms of related links between ideas, i.e., how ideas are expressed. Despite these distinctions, psychopathologists have not established a common understanding of the different phenomena labeled under thought disorders; neither do they all consider the distinction between content and form a productive one.

The category of thought disorder has been under criticism for the past 30 years for various reasons. Andreasen (1979) pointed out that the current definitions of formal thought disorder in psychiatry are based on a close and mistaken correlation between speech and thought. Those who advocate for this correlation assume that thought might be assessed through speech, disregarding the complex cognitive processes that underlie linguistic behavior. Pinto and Ribeiro (2001) added that the concept of thought has not been uniformly defined. Most definitions presented in different manuals of psychopathology are tautological, circular, and imprecise, referring to vague notions such as 'ideas,' 'associations,' and 'symbols.' As Chaika (1990: 57) aptly stated, "thought remains an undefined entity. How then can we correlate speech with a concept so nebulous as thought?"

Andreasen suggested the term "disorganized speech" instead, as it translates what can indeed be observed, that is, the patient's speech. A list of operational and empirical categories deriving from clinical experience (such as derailment, poverty of content of speech, and tangentiality) describes the most frequent disorders. It distinguishes among the different facets of thought disorder and provides critical information about the relationship among specific symptoms (Andreasen, 1979). These categories represent a clinical assessment of thought, language, and communication disorders.

Until the 1970s, specific thought disorders, such as "looseness of association" (Bleuler, 1950), were

believed to be a pathognomic symptom (symptoms that are closely associated with a certain disorder or illness) of schizophrenia. That is, based entirely on this symptom, the clinician could develop a differential diagnosis between schizophrenics and bipolar patients (manic-depressives). However, in the past 30 years, studies have shown that this symptom "might as well occur in other diagnostic groups" (Andreasen, 1979: 1325), such as in patients with bipolar disorders. Thus, today the differential diagnosis between schizophrenia and mania is based on: (1) the course of action of the mental illness (i.e., its developmental traits) and (2) its prognosis. Experimental studies were carried out to investigate patterns of disorganized speech in psychotics by psychiatrists (Taylor *et al.*, 1994) and linguists (Chaika, 1990; Rochester and Martin, 1979). To control variables, these researchers employed structured instruments to trigger and elicit linguistic behavior that could function as evidence of pre-established categories. Rochester and Martin (1979) used summaries of short narratives to investigate types of failures in the speech of schizophrenic patients. Their problematic use of cohesive ties was seen as an indication of different types of thought disorders expected to occur in psychotic patients. Chaika (1990) made an analogous study of psychotic narration that does not support the view that psychotics do not use cohesive ties competently. More recently, research based on discourse analysis has examined data collected in natural settings, focusing mostly on psychiatric interviews (Ribeiro, 1994; Pinto, 2000). These studies have shifted the analysis to the coconstruction of doctor–patient communication, where meaning is conceived as jointly produced by both participants.

Coherence in Psychiatric Interviews: Topic, Schema, and Frame

"Using language involves doing several things at once, any one of which can go wrong" (Becker, 1982: 127): one speaks, composes words and structures, refers to the world, evokes prior texts, and relates to one's audience, all at the same time. When the integration is disrupted, an unsuccessful language and interactional experience results.

In analyzing doctor–patient interactions in psychiatry, certain concepts have proved useful. First, topic – what talk is about – requires a sense of being attuned to the message. Any encounter presupposes an understanding among participants regarding when and where to initiate talk, among whom, and by means of what topics (Goffman, 1982: 34). Additionally, participants must share rules for topic introduction and development. In this way, topics present boundaries that are marked either semantically or interactionally. "A single focus of thought and visual attention, and a single flow of talk, tends to be maintained and to be legitimated as officially representative of the encounter" (1982: 34). This understanding corroborates the participants' sense of coherence. In psychotic discourse, however, some of these expectations are not met.

Psychotic talk often presents a "loss of goal directedness" (Bleuler, 1950). The speaker ceases to contribute to the sequential (or cyclic) development of topics, thus thwarting topic continuity (Pinto, 2000). Referents may be introduced with no meaningful relationship to one another. Often, the speaker goes further and further off the track. Word associations tend to be governed by rhythmic relationships (sound play) rather than by semantic and pragmatic ties (Ribeiro, 1994). To complicate matters further, both doctor and patient fail to identify each other's topics. As a result, the process of topic negotiation often breaks down, few topics are expanded, and others are recycled with no preestablished agenda.

Topic provides a natural criterion for distinguishing instances of a speaker's deviant discourse from a discourse that matches our expectations about coherence (Ribeiro, 1994; Pinto, 2000). The complex step-by-step process of topic introduction and topic development reveals the amount of effort that participants must undertake in interaction to ensure topic continuity. When doctors face inconsistencies in the patient's discourse, they may use a number of strategies to keep the communicative channel open: they constantly summon the patient to the interview, they acknowledge the patient's statements, and they address some of his or her questions (Ribeiro, 1994). In doing so, doctors are constantly reassessing their assumptions about the patient's topic of talk.

How do topics relate to knowledge schemas? Knowledge schemas are cognitive entities consisting of "participants' expectations about people, objects, events and settings in the world" (Tannen and Wallat, 1993: 60). Schiffrin (1987: 12) pointed out that the concept of topic may help us "understand the role of shared knowledge in discourse," despite its inherent difficulties. This is particularly significant in instances of pathological discourse where social norms and linguistic rules are in many ways violated. For example, in an interview with the patient in a psychotic episode, discrepant knowledge schemas on the part of the doctor and patient may result in reciprocal distancing (Ribeiro, 1994). In each case, the speaker's topic selection follows divergent expectations regarding 'what this talk needs to be about.' Whereas the doctor proposes talk exclusively as 'interview talk,' the patient proposes talk as a 'family encounter.' He

or she may project an addressee (e.g., the father or mother), while the doctor remains mostly as an unratified participant (Goffman, 1982: 34). In this context, the patient introduces personal topics that belong to prior family schemas. Frequently, the referents lack specificity (i.e., they are encoded mostly by pronouns that presuppose a high degree of topic accessibility).

In standard psychiatric interviews – such as discharge interviews – background knowledge related to the immediate needs of the communicative context is mostly shared by patient and doctor. It orients topic selection by promoting certain topics and inhibiting others. The doctor controls content; thus, talk focuses on the development of 'official topics' (i.e., identifying the patient's name, age, marital status, assessing the patient's chief complaint, present illness, and past history). The patient's role is mostly confined to addressing the doctor's topics. A joint discourse results, where speaker's and listener's roles alternate following social and institutional norms. As a consequence, it is fairly simple to identify topics in the psychiatric interview because the doctor follows a standard agenda (Sullivan, 1970); furthermore, it is usually the same participant, the doctor, who initiates topics.

Whereas topics address the question 'What is talk about?' framing establishes a metamessage as 'how this talk must be understood.' Frames capture the dynamic way participants position themselves, relate to one another, and establish multiple contexts for talk. In Bateson's ([1972] 1981: 186) terms a frame "is (or delimits) a class or set of messages (or meaningful actions)." A metamessage (an implicit message) constitutes instructions to the listener on how to understand the messages within the frame. As people speak and perform actions, they signal to one another what they believe they are doing (i.e., what speech act(s) they are performing, what activity they are engaged in) and in what way their words and gestures are to be understood.

Frames are encoded and understood linguistically, paralinguistically (i.e., intonation, pitch, rhythm), and nonverbally. Topic is a key component in defining frames and part of the definition of an interactional situation. In clinical encounters, an institutional agenda often dictates topic selection. The doctor brings a topic agenda that helps establish the major interactional contexts (i.e., frames). In the psychiatric interview, the doctor plays a very active role in introducing topically relevant questions "to make sure that he knows what he is being told" (Sullivan, 1970: 21). Even such topical talk, however, can trigger more or less subtle frameshifting: a doctor's request for information about the patient's social history may trigger a personal story and thus a personal framing and a change in participation structure.

Table 1 Excerpt of an initial sequence of a psychiatric interview

Doctor:	What is your name?
Patient:	Joana Garcia.
Doctor:	And how old are you now?
Patient	Thirty-three.

The interrelation of frame and topic has implications for coherence (Ribeiro, 1994). Speakers and hearers have multiple options for coherence, as illustrated in Table 1.

Coherence is achieved within the exchange system as the doctor and the patient follow rules for turn-taking (A/B/A/B), while alternating the speaking role. It is achieved simultaneously in the action structure, when the patient provides the expected sequence (a request for information is followed by a statement). Finally, the propositional content coheres as participants jointly refer to the ongoing topic (i.e., name and age). To make sense of the above interaction, however, one needs to attend to the situation at hand. This is the opening of a standard medical (psychiatric) interview. For a psychiatric patient, making the proper choice from different linguistic and social options has definite implications for the doctor's evaluation and diagnosis. The patient must understand and jointly construct with the doctor the frames of the psychiatric interview. When both participants share an understanding of the ongoing talk, its purposes, and ways of interaction, coherence is achieved (Ribeiro, 1994).

Narrative and Topic Coherence

The psychiatric interview, modeled after the standard medical interview, follows a Question/Answer chain format, where the doctor requests information or clarification; frequently he or she probes further for more information and expands the topic. Such speech actions result in a Q/A/Q/A sequence that structures the interview mostly as an inquiry. There are many moments, however, when the patient introduces topics related to his or her illness and thereby begins a narrative, as shown in Table 2.

Whereas the doctor structures talk as inquiry, the patient views the encounter differently. She has stories (or a life story) to tell. "Patients view the medical encounter as an opportunity to account for their life and health stories in their own terms" (Ribeiro, 2002: 199).

In interviews with a patient in a psychotic episode, such as in the example above, narrative works to

Table 2 Example of a patient's lead into a narrative as a response to a Doctors question

Patient:	I work, I study, I take courses, I do things that are out of the ordinary, sometimes I did things out there that even people with a lot of courage wouldn't do . . . do, and that's why I'm taking medication here and I'm afraid
Doctor:	For instance, what types of things do you do?

describe the patient's personal topic agenda and its complex layering of references. Narrative analysis investigates ways that a story is told in bits and pieces and through multiple contextual embeddings. These bits of information may indicate to the psychiatrist relevant information about his patient's social and family history, present illness, and chief complaint. Listening to and understanding such stories are essential to the psychiatrist, who has the task of using patients' linguistic and nonlinguistic contributions as a source to assess their mental and psychological states.

Different frameworks for analyzing narratives are used in discourse studies in psychiatry. Labov's structural/functional framework – a narrative is "a method of recapitulating a past experience by matching a verbal sequence of clauses to the sequence of events which, we infer, actually occurred" (1972: 359–360) – has been used by researchers (Ribeiro, 2000) to analyze discourse cohesion and coherence. Labov's framework presents a schematic structure: stories would often have an abstract, an orientation(s), complicating actions, an evaluation(s), a coda, and a resolution. The evaluation component is considered most relevant as it is used by the narrator to indicate the point of the story: why it is being narrated. Also, temporal order constitutes the main thread of coherence. In psychiatric interviews, however, patients' stories are often presented in a quite fragmented form and do not adhere to the temporal order principle.

For example, Ribeiro (2000) described a particularly cohesive story ('the Bozo narrative') told by a patient in a fragmented but yet still coherent discourse. Following Labov's framework (1972), the narrator presents an abstract "I was married to Bozo, Bozo the clown." Several orientation parts follow: "Beto is the Bozo, he has been named 'Bozo the clown' by people at the hospital where he works as a physical therapist." In the complicating action, the patient informs that she "has been possessed by some Beto" and that they "have been fooling around." The notion of possession (of being possessed) implies lack of control (powerlessness) as well as irrationality – both social and cognitive traits related to mental illness. A narrative schema emerges for 'Bozo the clown' (a reference to Beto and to the patient herself), who shares attributes that play on ambiguity signaling both euphoria (laugher and fun) and depression (sadness). This oscillating mood and related references are particularly interesting since the patient has a manic-depressive (bipolar) disorder.

Other research frameworks – that highlight narrative as a genre and the process of narration (Linde, 1993; Mishler, 1986) – provide ways of listening to (and analyzing) stories in clinical and research interviews. Such frameworks investigate how individuals share experiences through the telling of life stories. It also focuses on the coconstruction of participants' social and conversational identities. Storytelling is viewed as a situated discursive practice, as a way to project who we are to our addressee, according to our communicative purposes for that specific interaction. In this process, the narrator uses a wide range of linguistic forms to express purpose and intentionality. Coherence emerges from the joint construction of meaning by the participants. It is not "an absolute property of a disembodied, unsituated text" (Linde, 1993: 12).

Mishler (in press) added that narration time is not solely chronological; rather, people interpret activities according to the way they are experienced and narrated. This understanding subscribes to the relational concept of identity: human beings experience who they are along a continuum of tensions and contradictions in the many social worlds they live in. They are not progressive nor coherent. The interpretation of past events is achieved in light of how they are conceived in the very moment of narration, that is, as the story unfolds for that specific audience in a specific context. Accordingly, unfolding stories in psychiatric interviews must also be considered as situated discursive practices and viewed as context specific.

Psychiatry relies on clinical practice where the patient's sociolinguistic competence is being assessed. A successful assessment of the patient's mental state requires that the patient address the institutional topics of the psychiatric interview. Whereas some interactional processes may facilitate communication, others may inhibit it. Open-ended questions, for example, allow for the production of more spontaneous and lengthy responses, where stories may then emerge. And probing questions about the details of a narrative, for instance, might reveal specific information that would otherwise not be evaluated. Thus, the unfolding of a narrative in an interview situation constitutes an important tool for gathering relevant information so that the doctor may successfully reach a diagnosis. Moreover, listening to stories in an interview situation strongly enhances involvement between the doctor and the patient.

See also: Coherence: Psycholinguistic Approach; Discourse Processing; Frame Analysis; Identity and Language; Institutional Talk; Interactional Sociolinguistics; Narrative: Linguistic and Structural Theories; Schema Theory: Stylistic Applications; Topic and Comment.

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Medical Discourse: Sociohistorical Construction

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Introduction

Scientific language and discourse emerge in a cooperative and competitive struggle among scientists to create the knowledge base of their field, to establish themselves in relation to other scientists and to other professional groups, and to gain influence and control over political and socioeconomic means. In every strand of human communication, language and discourse play a role in the formation of a social and societal reality and identity. This is also true both of the formation of the different professional and vocational cultures within working and public life and of the formation of different academic cultures.

Historically, language has played a central role in the creation of different professions and academic disciplines, and it continues to play an important role in the development and maintenance of professional and institutional cultures and identities. Societal, social, and cognitive factors all make important contributions to the construction of professional cultures. Professionals try to create a space for their field within society. They try to establish themselves in contact and competition with others within their group as well as with other groups. Their knowledge base and its linguistic forms are created in a societal and social framework.

Diachronic Studies on the Development of Scientific Genres

A constructionist perspective on the emergence of scientific discourse and text genres is found in various traditions. Within the tradition of sociology of science, several studies have been devoted to analyzing the role of texts in the establishing of scientific fact. The scientific field is seen as a workplace, a laboratory, where social rules determine the establishing of facts and the rank order of the scientists. Knorr-Cetina (1981) was one of the first to describe the writing up of results as a process of tinkering with facts rather than a knowledge-guided search. Latour

and Woolgar (1986) described the social construction of scientific facts as an antagonistic struggle among scientists, leading to a purposeful diminishing of the results of others and a leveling up – to a generalized level – of one's own results.

Bazerman (1988) studied the rise of modern forms of scientific communication, focusing on the historical emergence of the experimental article. A social-constructivist approach in relation to written texts is also found in Bazerman and Paradis (1991), which examined the important role played by texts in profession building. Textual forms and definitions are found to impose structure on human activity and help shape versions of reality. Texts are shown to play powerful roles in staging the daily actions of individuals, and to be important factors in the rise of action. In Gunnarsson *et al.* (1997), which examined both professional written communication and spoken interaction, the central theoretical issue is how language, written genres, and spoken discourse are constructed as successive and continuous interplay between language and social realities. A sociorhetorical perspective on the scientific genre is also developed in Bhatia (1987), Swales (1990), MacDonald (1994), and Berkenkotter and Huckin (1995). The emergence of the English scientific text genres has been analyzed in several important works, including Atkinson (1999) and Valle (1999). Extensive studies have also been made into scientific written communication in other languages, e.g., German (Standard German) (Schröder, 1991) and Swedish (Gunnarsson, 1997, 1998, 2001a; Melander, 1991, Näslund, 1991). The differences between academic genres developed within different national cultures have also been analyzed from a socioconstructivist approach, e.g., Mauranen (1993).

The Construction of Professional Discourse

In this article an exemplary picture of the emergence and development of medical written discourse will be sketched. In order to understand the historical development of professional medical language and communication in its rich and varied totality, we must study the dynamic processes behind the construction of medical language.

In this dynamic process, three main layers are distinguished: one relating to **cognitive** types of activities, one to **social**, and one to **macrosocial** or **societal**. Professional culture is built up via these layers, which means that all three must be considered in order to get a full picture. Written texts as well as spoken discourse are constructed as cognitive, social, and societal activities within the different professions and branches of working life. (The term 'profession' is here used in quite a general sense, including academic as well as nonacademic discourse.)

If we begin by considering the **cognitive layer**, we find that each profession has a certain way of viewing reality, a certain way of highlighting different aspects of the world around it. Socialization into a profession means learning how to discern the relevant facts, how to view the relations between different factors. We are taught how to construct and use a grid or a lens to view reality in a professionally relevant way. Language, texts, and spoken discourse help us in this construction process. We use language in the construction of professional knowledge. Medical terminology, medical text patterns, and medical text and discourse content have developed as a means of dealing with reality in a way that is appropriate for medical purposes.

The way in which language is used is related to existing knowledge within the field and also with conceptions about what constitutes knowledge and the attitude that should be adopted to it. What is therefore important is what scientists consider they know about different sectors of reality at different periods, what knowledge they believe is relevant in this field, and how they consider data should be collected, observed, and analyzed. Attitudes and norms regarding what is professionally relevant and right are thus built into the cognitive structure.

The knowledge base of a field has a network of relations with other fields. The cognitive structure of a professional language thus reveals its dependence on and relationship toward other knowledge domains, and this knowledge-based network can vary over time. In metaphors, in terminology, in modes of reasoning, and in diagrams, the contribution of adjacent fields to the construction of professional knowledge is revealed. For example, many fields owe a debt to statistics, psychology, mathematics, sociology, physics, economics, politics, and religion, and this debt can be seen in the language that is used.

Second, regarding the **social layer**, every professional group, like other social groups, is also formed by the establishment of an internal role structure, group identity, group attitudes, and group norms. The need for a professional identity, for a professional sense of 'us-ness,' for separation from the out-group, has of course played an important role in the construction of professional group language and constantly motivates people to adapt and be socialized into professional group behavior. Socialization into a group also means establishing distance from people outside the group.

The use of medical scientific language during different periods is thus related to the type and level of the scientific community (the social group), its size, structure, degree of professionalization, degree of internationalization, degree and nature of mutual contacts, existence of publications, etc.

Third, as regards the **macrosocial** or **societal layer**, each professional group also stands in a particular relationship to the society in which it operates; it exerts certain functions and is given a certain place within that society. The members of a profession play a role in relation to other actors in society, and the professional group acts in relation to other groups. They play – or do not play – a role on the political scene, within the business world, the education system, in relation to the media, etc. And this cluster of societal functions is essential for language. It is through language that professional groups exert their societal function. If they are going to play a role on the political scene, they have to construct their communicative behavior in a way that is adequate for that purpose. Their relationship to written texts and spoken discourse and to different genres is also important. Professionals adapt to established genres, but are also involved in forming new genres.

The way in which language is used within science during different periods is linked with the relationship of the scientist and the scientific community to society in general. Factors that are important are the status of the profession and its role in society, both the status of the scientific community and to what degree and in what way it is integrated into society. The societal layer is thus related to economic and political factors. It is related to power and status patterns in the particular society, i.e., the nation-state, as well as on the global scene.

The three layers are strongly related to the emergence and continuous recreation of professional language, and they constitute a part of the construction of professional language and discourse. Historically, language is constructed in relation to all these layers. The cognitive establishment of the field takes place at the same time as the professions fight for their place in society and for the strengthening of their group in relation to other groups.

Stages in the Development of Medical Science

Medical knowledge and practice took a great step forward in the 17th and in particular in the 18th century. However, it was only gradually that it developed into a science in the modern sense. Since the 18th century, all societies have undergone radical change. Changes have also taken place within the medical scientific community:

1. Medical knowledge has grown immensely.
2. Science in general and the philosophy of science have undergone changes. Statistics and empirical methods have developed. Positivism has become the only accepted view in many sciences.
3. The medical profession has gradually become increasingly established and recognized. Today, doctors are considered highly valuable professionals, and medical scientists and medical research are considered highly important to society.
4. The medical scientific community has become much larger. The number of doctors, medical scientists and students of medicine has increased, as has the number of medical journals and conferences.

Important changes have thus taken place relating to medical science, science in general, the medical profession, and the medical-scientific community. This article will explore how language and discourse are essential elements in the construction of science, in profession building and in the shaping of the scientific community, and that academic genres play important roles in this process of constructing scientific knowledge and the role of the scientist in society, and in the growth and strengthening of the social network among scientists.

Changes as to language and text patterns will be discussed in relation to three scientific stages: the pre-establishment stage, the establishing stage, and the specialized stage. For each layer the three stages can be summarized on a developmental axis:

Cognitive layer:
- Individual findings – Accumulation of findings – Integration into theory

Social layer:
- Isolated researchers – Academic grouping – Advanced scientific community

Macrosocial/societal layer:
- Scientists function within society – Scientists function within society and academic groupings – Scientists function with the scientific community.

Scientificality in Swedish Medical Articles 1730–1985

The empirical results referred to are based on studies on Swedish medical language carried out at Uppsala University. The whole corpus analyzed comprises a total of 360 scientific and popular articles from three fields – economics, technology and medicine – and six periods (Gunnarsson, 1998). The medical

subcorpus which will be focused on here consists of 60 scientific articles, 10 from each of the six periods 1730–1799, 1800–1849, 1850–1880, 1895–1905, 1935–1945, and 1975–1985. All these articles come from scientific journals and deal with pulmonary diseases (30 articles) or skin diseases (30 articles). Our analyses have focused on four text linguistic levels: the cognitive, the pragmatic, the macrothematic and the microsemantic. We have also made analyses relating to the vocabulary and terminology (Gunnarsson, 1998).

Content and Content Structuring of the Texts

The content and content structuring of medical articles will be related to the stage reached by the domain of medical science, in terms of degree and type of scientificality, and also the role of scientists in society.

The cognitive analysis examines the content of the text in relation to five 'cognitive worlds': a scientific world, a practical world, an object world, a private world, and an external world (cf. Gunnarsson, 1992). Within each of these, two or three aspects were discerned:

World	**Aspect**
Scientific	Theory
	Classification
	Experiment
Practical	Work
	Interaction
Object	Phenomenon-focused
	Part-focused
	Whole-focused
Private	Experience
	Conditions
External	Conditions
	Measures

Each proposition in the articles was categorized in relation to **world** and **aspect**. We could thus calculate the proportions of the total number of propositions representing each world and each aspect in texts from different periods.

The analysis showed a very clear increase in the proportion of each text devoted to the scientific world, that is, to the presentation of 'theory,' 'classifications,' and 'experiment,' over the periods. On the other hand, there was a clear decrease in the role of the external world in particular, that is in the proportions of texts dealing with 'conditions' and 'measures' of a political, economic, and social nature. There was also an increase in the proportion of 'experiment/observation' within the scientific world and a decrease in the proportion of 'measures' within the external world.

The cognitive analysis also comprised an analysis of text content in relation to four time **dimensions**, 'cause,' 'phenomenon,' 'process,' and 'result,' which showed that the proportions of each text devoted to describing 'causes' and 'phenomena' have decreased over time, while the proportions devoted to 'processes' and 'results' have increased.

Another analysis focused on the macrothematic structure. The content of the medical articles was categorized in relation to four **superthemes**, 'introduction,' 'theme development,' 'discussion,' and 'conclusions.' This analysis revealed an increase as regards how much of each text is devoted to the superthemes 'introduction' and 'theme development' (that is, to a description of materials, methods, results). The proportion devoted to 'discussion' and in particular to 'conclusions,' on the other hand, had decreased.

A third analysis, which aimed at a description of the pragmatic character of the texts, e.g., the types of **illocution** present, pointed to an increase as regards 'informative' and 'explicative' illocutions and a decrease in 'expressive,' 'argumentative,' and 'directive' illocutions.

To sum up, the changes in the content and content structuring of Swedish medical articles from 1730 to 1985 show the following tendencies: more 'scientific world,' less 'external world'; more 'experiment,' fewer social, political, and economic 'measures'; more 'process' and 'results,' less 'cause' and 'phenomenon'; larger proportion of 'theme development,' smaller proportion of 'discussion' and 'conclusions'; more 'informative' and 'explicative' illocutions, fewer 'expressive' and 'directive' illocutions.

These findings relating to changes in the medical article genre point for one thing to a development of medical science. The knowledge structure of the texts appears to have changed, to include more emphasis on experiment and on process and results. There is also a trend toward a genre of a more purely descriptive character, in which the main part of the text is devoted to developing the theme, that is, to a description of the experiment, observations, etc. These are features which could be related to a positivist scientific ideal. All these results can be related to the cognitive layer of the construction of academic discourse.

These results also reveal the role played by scientists in society. In terms of text content, the proportion devoted to the external world and external measures has decreased, as has the proportion devoted to conclusions and directives. Such results can be discussed in light of the specialization and professionalization of society. Compared with earlier periods, scientists today act to a greater extent in a

discourse community of their own. Science in general and medical science in particular is accepted and highly esteemed in modern society. Considerable funding is given to medical research. The role of large-scale experiments has increased.

The discourse changes can be related to this endeavor among medical scientists to become specialists, and a profession of their own, with their own exclusive domain to deal with. A high degree of scientificality in spoken and written discourse provides prestige.

A more purely scientific genre has emerged. Scientist-writers have turned toward their own group, and the medical article genre has become a within-science genre. The popularization of medical findings is taken care of by others – trained journalists. Scientists can write for their own group, and do not have to bother about a growing distance between the lay public and the experts. The article genre has become more exclusively internal, and less concerned with reaching out to other sectors of society.

These results can also be interpreted in light of the interplay between the cognitive and societal layers. The role played by the medical profession in society interrelates with the presentation of scientific content.

Formal Organization of the Text

The formal organization of the texts and their rhetorical patterns will be related to the stage reached in the development of the medical scientific community. A strong scientific community reveals itself in firm genre conventions, that is, in more homogeneous texts, and also in explicit markings of belonging to a group.

The number and types of headings in the modern Swedish articles vary over time. The use of section headings has increased dramatically. Also the type of heading has changed. In the early periods, headings relate to the content of the article, while in the modern article they relate to its structure: 'Material,' 'Methods,' 'Results,' 'Discussion,' 'Conclusions.' The modern headings thus structure the presentation in a general scientific way, which also reflects a more homogeneous organization of the texts.

An increasing homogeneity is also found in relation to the thematic article structure (Gunnarsson, 1993). The articles from the period around 1980 (1975–1985) were clearly more homogeneous in terms of their linear text structure than earlier articles. Also the introductions in articles from different periods revealed a gradually greater homogeneity. This homogeneity can also be seen in a contrastive perspective; that is, the Swedish pattern has come to resemble that of the English scientific article, as described in Swales (1990).

Another finding relates to the information flow of the text. An analysis of the connection between content structure and graphical disposition in articles from different periods showed that each sentence has become more independent with regard to the surrounding text. It introduces a new angle, which means that it becomes less integrated with its neighboring sentences (Melander, 1993). We thus find a change toward a fact-listing or 'catalogue' style in the modern article.

This tendency toward a catalogue style can be seen as another feature reflecting firmer genre conventions. When texts are organized in a homogeneous and predictable way, there is less need to elaborate on the details. Readers know where in the text they will find different types of content. The tendency toward a more catalogue-like article could also be seen as indicating a strengthening of the scientific community. The knowledge of this community is well established among the specialist readers, and need not be elaborated on.

Other analyses reveal that the number of references per article has increased over time, and that the way of presenting them has become more homogeneous. Another tendency relates to the changed use of personal pronouns. In the articles from the 18th century, the pronoun 'I' was quite a frequent word, while it has more or less totally disappeared in the articles from the latter part of the 20th century. The pronoun 'we,' on the other hand, which was quite unusual during the first two periods, has since the middle of the 19th century had a similar rank. The author's explicit marking of article relevance has also changed over time. Here we find a shift from a societal orientation in earlier periods to a more internal orientation in the last period (Gunnarsson, 1998).

To sum up, the changes as to the formal text organization and the rhetorical patterns show the following diachronic tendencies: more headings; more homogeneous text organization; more homogeneous article introductions; more fact listing; more references; less use of the personal pronoun 'I'; more relevance marking relating to the 'group.'

The medical article has developed toward greater homogeneity – relating to the use of headings, the superthematic text structure, the rhetorical structure of introductions, etc. – which indicates a strengthening of genre conventions. The medical article has become more established as a genre, and its genre conventions have become firmer and thus more homogeneous. This strengthening of the academic article genre, however, is also a sign of a growing and stronger medical discourse community. For the

medical discourse community, as for most scientific discourse communities, writing plays an essential role as a group marker, and the establishing of firmer conventions for written text genres is part of the growth and strengthening of this community. The trend toward a more fact-listing and catalogue type of article can also be seen as a sign of a stronger discourse community, in the sense of being more homogeneous and closed. It is a well-known fact within sociolinguistics that communication within a dense group or network needs to be less explicit and elaborated than communication within one more open and less dense.

The modern habit of giving references to the works of colleagues is another sign of a strong discourse community, a discourse community with a clear group feeling. When the group is essential to its members, it becomes important to indicate one's sense of belonging and one's relationship to other group members. Problems relating to the group also become more important than those relating to the world outside the group. The modern tendency to list references, to use 'we' instead of 'I,' and to mark relevance in relation to one's own group can be viewed from this social perspective. I would suggest that these text features are part of the construction of an increasingly close-knit (dense) medical discourse community.

There is also a connection between these features and the role of medical scientists in society; that is to say, the strengthening of the professional group is paralleled by a process of gradual specialization of the professions. These features are thus also part of the construction of a role for the medical community within society. We can thus see how the social and societal layers interact. Strengthening of the internal group structure is interrelated with the underlining of a role for the group in society.

Linguistic Expressions of Evaluations

The linguistic expressions of evaluation and its variation over time will be related to the positioning of the scientist/author on the developmental axes for the three contextual dimensions. The study referred to was based on an analysis of 30 Swedish scientific medical articles from six periods. All the articles dealt with pulmonary diseases. The study, which comprised an analysis of evaluations linked to descriptions of the subjects studied, the diseases and treatments, the introduction of the author's own initiatives, and descriptions of the research and findings of others, focused on three main aspects: (1) what is being evaluated, (2) through whom the evaluation is taking place, and (3) how the evaluation is being made (Gunnarsson, 2001a).

In articles from all the periods, the object of the study and the initiatives of other researchers were evaluated. The author also referred to his own initiatives in most articles. From a diachronic perspective, however, it is more interesting to consider the second aspect; that is, through whom the evaluation is taking place (author's own voice, author through others, author through facts). A comparison of the medical texts from the 18th, 19th, and 20th centuries shows that in the earliest texts the evaluation is made by the author himself, using his own voice, whereas in later articles it is allowed to emerge indirectly via facts from others, e.g., in references to the other articles.

A change over time is also found in relation to the third aspect, how the evaluation is being made. When articles from the 18th century are compared to articles from the 20th century, we find a weakening tendency; that is, the evaluations in articles from 1730 are expressed in a more severe way. A more obvious change, however, relates to the degree of certainty. Here we find a discernible increase in the use of hedges and other expressions of caution over time (cf. Salager-Meyer, 1994).

We thus find a progressive moderation of the author's own voice in the medical articles; in other words, increasingly the focus is placed on facts. There is another clear change in the author's relationship to facts, which is revealed in an increase in the frequency of markers of epistemic modality.

These tendencies were also found in analysis of word frequencies. As mentioned earlier, there is a change in the use of the personal pronouns *jag* 'I' and *vi* 'we' in the articles over time. The occurrences of the pronoun *jag* are reduced by half between the first period (18th century) and the fourth period (1895–1905) and disappear completely during the sixth period (1975–1985). To some extent the pronoun 'I' is replaced by the pronoun 'we.' In this case, however, the increased use of 'we' is mainly explained neither by the use of reader-inclusive 'we' nor by co-authorship. It could rather be linked to the progressive phasing out of authorial identity in scientific prose.

A comparison of the frequencies of a number of markers of modality in the Swedish medical corpus revealed an increase over time. All nine markers – *torde* 'is probably,' *tyder* 'suggests,' *tycks* 'seems,' *tänkbar* 'conceivable,' *tveksam* 'doubtful,' *sannolik* 'likely,' *sannolikhet* 'likelihood,' *möjlig* 'possible,' *möjlighet* 'possibility' – revealed a linear increase in frequency over the six periods. This increasing tendency to be cautious can of course be seen as a sign of the progressive extension of medical knowledge; that is, it can be related to the author's placement on the knowledge axis. The greater the body of collective

Table 1 Text and context during three centuries

Dimension	*1700:1*	*1800:2*	*1900:3*
Cognitive	Individual findings	Accumulation of findings	Theoretical integration
Social	Isolated researchers community	Academic groupings	Developed scientific
Macrosocial	Scientists act within society	Scientists act within society and academic groupings	Scientists act within the scientific community

knowledge, the more aware authors are of its relativity. But it could also be linked to circumstances within the social group, in this case the medical community. In order to survive in a competitive society, which is what the world of medical research undeniably is, one must be careful not to lose face, and take care not to threaten the face of others. Ideas of this kind are proposed in Myers (1989). Myers claims that in order to survive in the competitive academic world, modern scientists adopt pragmatic politeness strategies, and that Brown and Levinson's concepts of 'face saving' and 'face threatening' are also relevant in the analysis of scientific texts (Brown and Levinson, 1987). Scientists tread a narrow path between the need to emphasize their own achievements on the one hand and to criticize those of their peers on the other.

It may well be that the difference in the wording results from the increased knowledge scientists now possess about illnesses and their treatment, i.e., that the difference can be linked to the cognitive dimension. Or it may result from greater awareness of the importance of politeness in a large and well-developed scientific community, i.e., the difference can be linked to the social dimension; doctors/researchers admittedly make evaluations, but they avoid expressing them subjectively and straightforwardly and choose greater objectiveness, thus showing more caution.

Lastly, the variation in linguistic expressions of evaluations will be systematically related to the three scientific stages and the three layers distinguished earlier, and articles from the 18th, 19th, and 20th centuries will be placed on developmental axes. illustrates the relationship between text and context for medical scientific articles during three centuries.

In the articles from the 18th century, we encounter a number of different individuals – the author himself, his colleagues, and his patients – and their experiences and judgments are described. The typical article is full of explicit, severe, and assured evaluations which concern the object of the study – the illness and method – and also the advocates of the method, its naïve practitioners. In the way the author writes, he places himself fairly obviously toward the left of all three contextual axes in Table 1; he treats individual findings as if they exist *per se*, he describes himself and his colleagues as isolated researchers and he seems to act within society rather than the scientific community.

In the articles from the 19th century, the typical author adopts a considerably more analytical attitude to the research of others. The author himself figures as an evaluator. He also explicitly adduces the opinions of other researchers. The evaluations are of medium severity and the author marks his doubts in different ways. The author is fair and square in the middle of the contextual axes.

In the articles from the 20th century (around 1980), the typical author does not express himself in his own voice or explicitly through others. Evaluations take the form of the presentation of facts, supported by references to other works. Summaries of the research of others form an integral part of the description of the illness/method. What characterizes this and other articles in the subcorpus from this period is above all the attitude adopted to facts. The evaluations are not few in number, but they are weak to medium, severe rather than severe, and they are presented throughout as less certain – in other words these authors should be placed to the right on the contextual axes.

Conclusions

Language constructs science in relation to the cognitive layer (the scientific content), the societal layer (scientists' role in society), and the social layer (relations within the group). This construction process has been in progress since the first doctors tried to establish themselves as medical scientists and it is still continuing. In Sweden this process began in the 17th century. However, it was not until the middle of the 18th century that Sweden became a national writing community. Before 1740, the language of the learned was Latin, but in the Era of Liberty, from the middle of the 18th century, Swedish was gradually accepted as a scientific language, and the construction of medical science and the medical scientific community was related over a long period

to the development of the Swedish medical article as a genre. This article has focused on this phase in the Swedish medical history, an account which ended in 1985.

What has taken place since then is an accelerating Anglicization of the academic writing community in Sweden. English is now used in medicine as the medium for Ph.D. theses, for conference abstracts and papers, and for articles presenting original research (Gunnarsson, 2001b). *Läkartidningen*, the Swedish medical journal, still exists, but is no longer the prime forum for presentations of new findings. The Swedish medical scientists of today choose to present their research in English in international medical journals. When they write in *Läkartidningen*, they do so with other purposes than to present original research findings. The Swedish medical scientific community has thus turned diglossic; that is, English is used for certain purposes and Swedish for others. In the Swedish medical journal, articles give overviews and present research relating to basic diseases, but this is no longer a journal for the first presentation of new research (Gunnarsson *et al.*, 1995).

A development of the kind here described is not country specific. The shift from Latin to the national language took place around the same time in most Western countries, and the modern spread of English as a scientific language is universal (Ammon, 2001). The Anglicization of the medical scientific community and the accelerating use of the Internet as a communicative tool has lead to an intensified globalization and also homogenization of science and scientific language. From a sociohistorical perspective this development is most interesting and in the future will certainly lead to important investigations.

See also: Cognitive Linguistics; Cognitive Science and Philosophy of Language; Constructivism; Evaluation in Text; Genre and Genre Analysis; Macrostructure; Pragmatics and Semantics; Society and Language: Overview; Text and Text Analysis; Text World Theory.

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Medical Discourse: Structured Abstracts

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Introduction

Since the inception of serious scientific publication in 1665, there has been a continued attempt to improve both the content and the presentation of articles. The peer review process (which dates back only to World War II and has been adopted by over two-thirds of biomedical journals) and the adoption of the IMRAD pattern (Introduction, Materials and Methods, Results, and Conclusion) in the late 1960s represent two such attempts. Numerous voices have been raised lately, however, against the peer review process and the IMRAD formula. Peer review indeed carries the recognized danger of delay, bias, and expense, yet it remains the best method of evaluating scientific work thus far and it has survived for over 300 years (Lock, 1988). As regards the IMRAD pattern, it has been named a straightjacket around the author, thus impeding creativity and personality. Yet the IMRAD pattern allows readers to answer the fundamental questions.

In the 1960s, the *Journal of the American Medical Association* took an innovative step toward improving biomedical communication by moving the summary and conclusions of articles to the beginning. The *Canadian Medical Association Journal* also adopted this abstract format. The latest major development involving abstracts in the late 1980s was the introduction of the so-called structured abstract, currently required for all medical papers reporting clinical trials. This concept has been worked out by a McMaster University team and the *Annals of Internal Medicine*. What is the motivation that lies behind such an initiative?

The Pivotal Role of Abstracts

No experienced editor believes that readers of his or her journal go through each issue article by article, word by word. Some readers probably scan the tables of contents, decide which articles, if any, merit their further attention, and scan the titles and abstracts of selected papers. Abstracts of research articles are indeed by far the most widely read parts of scientific papers. Much of the time, it is the only part that is read. According to Stephen Lock (1988), former editor of the *British Medical Journal*, in practice, most readers of scientific papers are content to read the paper's title and abstract, casting an eye over the remaining sections. The ubiquitous availability and widespread use of on-line literature search mechanisms, which provide an often untruncated abstract, have done nothing but increase this likelihood. The abstract, then, has a pivotal role not only in answering the fundamental questions readers ask themselves when reading a scientific article (What is the study's objective? What is the method used? What are the results obtained? And what are the conclusions reached?), but also in being able to stand on its own as a packet of information. As argued before, this latter function is all the more important now because many online databases and medical journals do not provide the full articles (unless one pays for them) but only the title, the authors' names, some bibliographical details, and the abstract. In view of its importance, then, the accuracy of information provided by the abstract is critical.

Some of the abstracts that accompany medical papers are adequate for these purposes, but many are not. In her study on the structure of medical abstracts, for example, Salager-Meyer (1990) found

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that 48% of them were poorly structured. Poorly structured abstracts were defined as those that did not follow the structural guidelines for abstract writing indicated in the journal's Instructions for Authors/Contributors. Among the most frequent structural flaws that Salager-Meyer and her specialist informants identified were as follows: (1) lack of a fundamental move (e.g., the objective, the methods, the results, or the conclusions of the study); (2) conceptual overlapping (e.g., presentation of partial results, statement of methods, and presentation of some more results); (3) lack of two fundamental moves (e.g., the objective or the conclusions of the study); and (4) illogical structuring (e.g., the methods move precedes the statement of purpose, or the objective of the research is presented after the results move).

Using objective criteria, other investigators (Narine *et al.*, 1991) assessed the quality of traditional or conventional abstracts of the 33 original research articles published in the *Canadian Medical Association Journal* in 1989. The mean overall score was 0.63 out of 1. Abstracts were found to be deficient in the reporting of technical descriptors of study design, study variables, and subject selection. Results were often reported without supporting data and many abstracts failed to address study limitations and recommendations for future study. This is how the concept of 'structured abstract' arose.

Definition and Objective of a Structured Abstract

The idea of a structured abstract, i.e., an abstract that describes a study using specified content headings rather than pure paragraph format, was suggested by the *Ad Hoc* Working Group for Critical Appraisal of the Medical Literature in 1987 to provide more information for articles reporting original research of medical care, to help health professionals to quickly assess the reliability and content of a clinical report, to facilitate peer review, and to aid accurate indexing and retrieval of reports from computerized databases such as MEDLINE and EMBASE.

Structured Abstract of Clinical Trials

Such abstracts concisely report key aspects of the purpose, methods, and results of a trial in a consistent way and using a standard glossary of terms (e.g., cohort, cost–benefit analysis, randomized). The structured abstract for clinical trials should mention seven key aspects by means of requisite content headings. We thus have a seven-part tabular format such as:

1. *Objective*: states the question(s) addressed in the paper;
2. *Design*: indicates the basic design of the study (blind, double-blind, randomized, cross-over, etc.);
3. *Setting*: mentions the place where the research was carried out;
4. *Patients or participants*: indicates the number of patients who were enrolled in the study, how they were selected, and how they were distributed per group;
5. *Main outcome measures*: explains the treatment and its administration route;
6. *Results*: mentions the study end-points;
7. *Conclusions*: refers to the main conclusions, including direct clinical applications.

Some medical journals, though, such as the *Lancet*, accept a four-part tabular format, but each 'move' is always clearly preceded by an explicit heading:

Background (30 words). A summary of the general topic and the purpose or hypotheses of the study.

Methods (50 words). A description of the materials (generic names of drugs and equipment should be used, unless the particular brands are crucial to the study), the methods (including the type of study design), and the subjects (important eligibility criteria, number, and selection process).

Results (100 words). A statement of the primary results of the study; the types of analysis used should be indicated, as should levels of statistical significance and confidence intervals.

Conclusions (30 words). A statement of the conclusions (the answers to the hypotheses posed at the beginning of the study). Only the conclusions that are directly supported by the evidence provided by the study should be included. Any need for further study should be indicated.

Clinical Implications (30 words). A description of what the conclusions imply for clinical practice.

Rapid adoption of structured abstracts by journals resulted in an annual doubling of reports with structured abstracts published from 1989 through 1991 appearing in MEDLINE; 15% of these were reports of clinical trials.

Structured Abstract of Review Articles

Mulrow *et al.* (1988) also proposed standardized guidelines for informative review abstracts, i.e., abstracts of review papers. The proposed structure is the following:

1. *Context* or *background*: brief statement of the state-of-the-art;
2. *Objective*: the primary objective of the review article;
3. *Data sources*: a succinct summary of data sources;

4. *Study selection and data extraction*: the number of studies selected for review, how they were selected, the type of guidelines used for extracting data, and how they were applied;
5. *Data synthesis*: the methods of data synthesis and key results;
6. *Conclusions*: key conclusions, including potential applications and research needs.

The following excerpts are taken from Mulrow's *et al.*'s (1988) paper. They give an example of an original (unstructured) abstract and of its structured equivalent:

Original Abstract

Use of digitalis for the treatment of patients with congestive heart failure and sinus rhythm remains controversial. To ascertain the proper therapeutic role of digitalis, we have critically appraised the published clinical evidence of digitalis efficacy using standardized methodologic criteria. A search of the English literature between 1960 and 1982 identified 736 articles, of which 16 specifically addressed the clinical evaluation of digitalis therapy for patients with congestive heart failure and sinus rhythm. Only two double-blind, placebo-controlled trials provided clinically useful information. One study showed that digoxin therapy could be withdrawn successfully in elderly patients with stable congestive heart failure. The other showed that patients with chronic heart failure and an S3 gallop benefited from digoxin therapy.

Structured Abstract

Purpose: To ascertain the clinical benefits of digitalis treatment in patients with chronic congestive heart failure and sinus rhythm.

Data Identification: An English-language literature search using MEDLINE (1966–1982), Index Medicus (1960–1965), and bibliographic reviews of textbooks and review articles.

Study selection: After independent review by three observers, 16 out of 736 originally identified articles were selected that specifically addressed the stated purpose.

Data extraction: Three observers independently assessed studies using explicit methodologic criteria the quality of evaluating clinical trials.

Results of data synthesis: Because of deficient selection criteria and study methods in 14 studies, therapeutic efficacy could not be adequately assessed. Two randomized, double-blind, placebo-controlled studies suggested that digitalis could be successfully withdrawn from elderly patients with stable heart failure, whereas patients with an S3 gallop might benefit from digitalis.

Conclusions: The benefits of digitalis treatment for patients with congestive heart failure and sinus rhythm are not well established. To better delineate the therapeutic benefits of digitalis, investigators must conduct more rigorously designed trials involving patients with newly diagnosed failure and varying degrees of failure.

As can be seen from the examples provided, the differences in information and organization between the original and the proposed structured abstract are apparent. The structured abstract is longer, by approximately 48%. Qualitatively speaking, structured abstracts present greater detail: the purpose is more clearly defined and the methods of identifying, selecting, and extracting information are better delineated.

Evaluation of Structured Abstracts: Their Advantages over the Nonstructured Format

Comans and Overbeke (1990), using criteria from the *Ad Hoc* Working Group, analyzed structured abstracts of original research articles published in three major medical journals: the *British Medical Journal*, the *New England Journal of Medicine*, and the *Annals of Internal Medicine*. They found that the abstracts were clearly written, but lacked information about sample selection, patients' demographics, and statistical analysis.

As a follow-up of the above studies, Tadio *et al.* (1994) set out to assess and compare the quality of a random sample of nonstructured and structured abstracts in the *British Medical Journal,* the *New England Journal of Medicine*, and the *Journal of the American Medical Association* over four selected years. The structured abstracts received significantly higher quality scores than the nonstructured abstracts, which suggests that the structured abstract is preferable to the conventional, nonstructured format in providing complete information. These authors note that the higher quality scores for structured abstracts may be a direct result of the design of structured abstracts. Indeed, the design provides a framework for the information that should be included and prompts the reader in retrieving this information.

Tadio *et al.*'s study found that the following information was reported more frequently with the structured format than with the nonstructured format: study purpose, setting, number of dropouts, interventions, study variables, appropriate numeric and statistical values, and conclusions. The authors note, however, that although the structured abstracts more consistently met the assessment criteria, they did not meet all of them. For both abstract styles,

there is room for improvement in this regard. Imperfect quality scores for structured abstracts may be the result of a lack of space allotted for abstracts in medical journals (usually limited to 250 words) and the inability of researchers to concisely summarize their research.

In the case of review articles, the advantages of a structured abstract over a conventional abstract are the following (cf. Mulrow *et al.*, 1988): First, readers can efficiently identify reviews that are relevant to their own interest and that are scientifically sound; potential sources of bias can be detected; and results and conclusions can be critically appraised by evaluating the methods of identifying, selecting, assessing, and integrating information. Second, authors are given a framework that will help them concisely organize and present the results of their investigations. A greater awareness of the vital elements of a good review article and clearer, more detailed summarizations of review articles may result.

With regard to reading comprehension, it has been shown that structured abstracts significantly improve the reading comprehension of nonnative English-speaking scientists (NNES), but only in a highly specialized context (Salager-Meyer, 1994). In other words, in a familiar context, the structure of the abstract does not have a direct bearing on reading comprehension: a conventionally structured abstract will be as well understood as a structured abstract if the concepts expressed in the abstract are familiar to the reader. Conversely, if the concepts expressed are highly specialized, then NNES will understand better and in less time a structured abstract than a nonstructured abstract.

Conclusions

All in all, then, although there have been objections (based on length and aesthetic concerns) to the structured format, because of its numerous advantages the structured format has been adopted widely in one form or another, and there is general acceptance that it is more informative than the unstructured variety. Structured abstracts improve both the quality of the paper and the reader's understanding; they result in easier recognition of relevant and valid articles, more precise and efficient computerized literature searches, and quicker, more consistent peer-review processes. Structured abstracts, moreover, unmask methodological problems that were left out in traditional abstracts.

See also: Discourse Studies: Second Language; Genre and Genre Analysis; Languages for Specific Purposes; Macrostructure; Rhetorical Structure Theory; Text and Text Analysis.

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Medical English: Conferencing

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Background

Linguists have devoted more attention to the study of written science than oral communication of research. In the medical field, this is partly because reading abilities and providing access to the literature are seen widely as priorities for medical professionals, not only for research purposes but also for clinical practice.

The topic has not been entirely neglected, however. Dubois (1980a, 1980b, 1982, 1985, 1987) published a series of articles on short biomedical presentations. These treated many aspects of conference language, from the genre and structure of biomedical talks and intonation to the use of imprecise numerical expressions.

Dubois described both linguistic and nonlinguistic aspects of short papers presented at the Federation of American Societies for Experimental Biology. Among these is a study of nontechnical arguments found in the talks. Starting from the observation that the main purpose of this discourse is to persuade a skeptical audience, she noted the "pre-speech arguments," such as the prestige of the speakers and the title and abstract of their paper, and the "speech arguments." such as the display of confidence in the delivery of the talk, presentation of self as a reliable authority on the topic, and the judicious use of a variety of styles ranging from formal to informal. Finally, there are "post-speech arguments" brought to bear during the discussion phase if the speaker is competent at answering the questions.

Apart from paper presentations, Dubois also published an article on the poster session (1985). She mentioned the reasons for the growing popularity of poster sessions and described some principles of layout and presentation of posters, designed to attract attention and present experiments as clearly and concisely as possible. Presenters stand near their poster while the other participants mill around, stopping to ask questions. This kind of session is less threatening and stressful than speaking from the podium, particularly for novices. Dubois described some typical linguistic realizations of the interchange and noted the great potential of the poster session for classroom use (see also Webber, 1986 and Shalom, 1996).

The pioneering work by Dubois did not lead to any further research until some years later, when more studies appeared, written by Shalom (1993, 1995, 1996) and Ventola (1993, 1996). Although these are mostly on conferences in other fields, they are very interesting because the characteristics described in monologues from other disciplines are often relevant to medical discourse. Shalom analyzed research process genres and participant roles in ecology and humanities conferences, describing the main characteristics of the discussion and the new genre of the poster session discussion. She noted that discussants seemed to focus on certain aspects of their research listed as 'Focus Categories.' An interesting problem in the analysis is the distinction between accepted knowledge and assumptions. At these events where data at the frontiers of research are presented, the experts may not always agree about what is "accepted knowledge." The distinction proved to be so fuzzy that they were collapsed into the one category of 'assumptions.'

The role of the Chair (Shalom, 1995) is central to chaired sessions, such as paper presentations. The Chair opens and closes the session and introduces the next speaker, so that turns are partly pre-allocated. If there is a discussion phase, the Chair opens the paper to the floor and allocates discussants, who bid for turns to ask questions. This is very different from the joint construction of conversation. The Chair operates through a series of discourse moves that may be either procedural, serving to manage the discussion and keep speakers to a rigid time schedule, or social, fostering social cohesion in the group.

Thompson (1994b) included some medical data in a study of three important aspects of cohesion in monologue: clause relations, lexico-grammatical cohesion, and intonation. These three aspects are interrelated and are drawn on by the speaker to signal the overall discourse pattern, thus aiding listeners in real-time processing of the text. The role of intonation is particularly important in spoken communication of science as it also conveys part of the meaning of the text. This partly compensates for the lack of graphic features that are present in written texts, such as text layout.

Ventola (1996) analyzed the discussion phase and the linguistic relations between paper presentations and their discussions as speech events, addressing the problem of classifying them as linked or separate speech events.

Ventola *et al.* (2002) edited a book entirely devoted to conference language, in which the chapters by Rowley-Jolivet (2002) and Webber (2002) include descriptions of medical data. The latter provides an analysis of the question and answer session. This

post-presentation discussion phase presents difficulties for both the presenter and the discussant asking the question, because the development of the interaction is unpredictable and underlying conflicts may be brought into the open. Questions expressing criticism were found in this study to be quite frequent (30% of the total), showing that the discussion phase often represents an opportunity to challenge or attack other researchers.

As noted by Rowley-Jolivet (2002), the work presented is often in a preliminary stage and may be considered an example of "science in the making." She traced the construction of scientific knowledge claims from their early stages in the laboratory to their fully fledged stage as generally accepted facts published in refereed journals. In this development, she assigned the status of proto-claim to the knowledge claims put forward in conference presentations. The same author has published a study of visuals in conferences.

Session Types

The genres of conference discourse vary considerably from one discipline to another, but most include paper presentations of research, plenary lectures, and poster sessions. Some conferences also include state-of-the-art lectures, symposium talks, workshops, current issues, round-table talks, meet-the-professor sessions, fireside panels, and luncheon panels. The conditions of production of these different types also vary considerably. Thus, for paper presentations and posters, an abstract must be submitted to the organizing committee before the meeting. It must be written according to the association's regulations and competes with other abstracts for admission. In fact, only a small percentage are accepted. Abstracts are not submitted for plenaries or symposia. Papers and symposia are followed by a discussion phase, whereas plenaries are not. This is summarized for the main session types in Table 1.

Table 1 Characteristics of main session types

Type	*Abstract*	*Discussion*	*Included in abstract book*
Plenary	No	No	Title only
Paper presentation	Yes	Yes	Yes
Poster	Yes	(Personal interaction)	Yes
Symposium	No	Yes	Title only

Papers are in some ways similar to written medical articles, studied by Adams Smith (1984), Salager Meyer (1993), and Nwogu (1997). They usually start from what is known on the topic, to position the study, and then indicate an unknown or gap before moving on to provide an explanation or solution, which is usually evaluated at the end of the text. However, oral presentations often devote less space to positioning and to the conclusions, whereas they focus more on the data presented in the slides. The speaker's claims and commitment are stated explicitly and forcefully, often using the present tense, which gives the impression of a live issue. Table 2 shows an example of the schematic moves in a paper presentation.

The plenary is different. Speakers have been invited, have submitted only the title of the lecture, and are free to follow any format of their choice. Moreover, the plenary does not have to compete for an audience as there are no concurrent sessions. The plenary is therefore likely to be given by an experienced lecturer of prestige. Lecturers will often give a chronological overview of the way the field has evolved over the years, ending with comments on the outlook for the future. They provide the emerging view of current issues. As a result of the less rigid text structure, they tend to use more overt text markers providing a clearly organized framework.

Features of Conference Language

Some speakers prefer to read from a text written out before the conference and many rehearse their talk carefully. In fact, the talks retain features of writtenness generally considered characteristic of the scientific register, such as detachment, precision, and a high occurrence of specialist terminology. However, they differ from the written article owing to the

Table 2 Schematic move analysis of a paper presentation

1	Background
2	Definition
3	Rationale
4	Gap
5	Purpose and announcement of present study
6	Hypothesis
7	Methods
8	Subjects
9	Results
10	Details of equipment
11	More results
12	Claim and stance
13	Implications for research and practice

co-presence of the interactants. This leads to more expressions of uncertainty and hence modality, including modal auxiliaries such as *might* and subjective forms of modality such as *I think* or *we are not sure*. Epistemic devices and hedging (*see* **Medical Discourse: Hedges**) are used partly for reasons of politeness, to give an impression of modesty and caution. However, they also reflect more exactly the speaker's confidence in the propositions and the reliability of the data.

Webber (2004) compared a conference abstract, a paper presentation, and a research article on the same topic. The strategies used in the three text types are affected by the purpose of the text and by the limited space and time available for the two conference genres. The conference abstract is a very condensed version of the work presented. It is submitted before the conference and, to compete with other abstracts, it tends to stress the novelty and interestingness of the study described. It focuses on the purpose and main claims of the research and hence starts immediately with a statement of the purpose. The oral presentation includes features of politeness and opening and closing frames, a part of the interactional ritual of the conference. The opening and closing frames serve to greet the audience or express thanks, such as *it is pleasure to be in this beautiful city* and *Thank you, Mr. Chairman*. In the research article, themes are longer, more complex, and less suitable for oral communication. The results and conclusion sections are longer and devote more space to comparing the results with those of other researchers and accounting for discrepancies.

Time constraints are important factors, especially in paper presentations, which are generally allotted only 10 to 15 minutes for the presentation and 5 minutes for discussion. Mastering conference skills thus presents difficulties for speakers and listeners, since much cognitively demanding information is presented in a short time and, apart from the discussion phase, listeners have no opportunity to check or ask for confirmation. This is particularly difficult for non-native speakers of English when faced with the task of understanding a range of different accents as presenters follow one after another in rapid succession, especially if the listeners have learned English in an idealized, perhaps written form.

Conclusion

Certain features are typical of oral communication of medical research. There are frequent instances of language in action, as speakers refer to the slides. As already noted by Dubois, slides are "the backbone of the speech." They are an important distinguishing element in conferences, as they not only provide the evidence on which the researchers base their argument but also aid the listener in following the content, together with intonation, lexical cohesion, and explicit signaling of the discourse organization of the text using markers such as *This talk will focus on* ... and *now let me turn just briefly to* ... Each slide generally introduces a new unit of discourse. The co-presence of participants leads speakers to use features such as narrative elements, informal language, hesitancy markers, occasional anecdotes, jokes, and references to difficulties encountered in doing the research. These are partly a result of on-the-spot decisions, may be motivated by both conscious and unconscious choices, and realize the role of equals. Most of these would not be countenanced in written articles and are edited out of the final version if it eventually is published. Features of informality are also found. Among the informal features found by Dubois in her material are imprecise numerical expressions, such as instances of hedging (*a little*, *a bit*, *around*) and ranges (*anywhere from 150 to 200*), used not only because aural processing of conference talks is difficult but also because speakers wish to highlight certain data and downplay others that they consider less important (*see also* **Medical Discourse: Hedges**).

Much of the preliminary research presented may not be published. This unpublished work is thus nipped in the bud and never reaches a wider audience. The conference may be the only opportunity to hear about this new research. Thus, novelty is one of the main characteristics of the conference. The choice of language in the titles and conference abstract is designed to try to make the contents appear newsworthy. Particularly in the many concurrent sessions there is competition to attract an audience. In addition to the competition, however, there is also a desire to create a sense of solidarity and in-group affiliation with the audience, where the speakers tend to present themselves as persons and not just researchers. Hence, we find instances of first-name familiarity and a frequent use of personalization, such as the use of the first-person singular and lexical phrases such as *in my opinion*, which lower interpersonal distance and create a sense of rapport in a situation that represents a challenge and involves risk. Webber (1997a) found many instances of conversational features, particularly in the discussion section. The discussion, however, is not a true conversation because serious business is being accomplished and it includes transactional as well as interactional work. The strategies used in different types of medical English vary in ways often characteristic of the genre that they represent. The linguistic behavior observed is partly

rule governed in the sense that members of the discourse community will expect a conventional form of discourse from participants.

The discourse is also affected in part by the participants' motives for attending these conferences. Participants wish to keep abreast of important developments in their field, but the conference is also a social occasion where people can meet the speakers and contact other researchers to exchange news and views. The coffee breaks and conference dinners are thus also important parts of the conference. All these aspects make the study of conference language complex but fascinating.

See also: Lingua Francas as Second Languages; Medical Discourse: Hedges.

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Medical Journals, Letters to the Editor

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Introduction

Among the seven genres identified in medical journals (Webber, 1994), along with research papers, review articles, editorials, book reviews, case studies, and the news section, letters to the editor are a tool offered to the community to react to other scientists' research and mainly to express personal opinions and disagreement. The experimental article, in contrast, is known as a constrained and modelized mode of written communication and was set up as a genre following J. Swales's (1990) archetypal studies. Thus, letters to the editor offer a much freer mode of expression than the classical scientific rhetoric, which is described as objective, purely referential, impersonal, and detached. They do not only offer researchers an open forum in which to give full vent to sometimes harsh criticism, but they also contribute to the validation process of new research by 'invisible colleges' (Crane, 1972). Although research papers are evaluated before being published, much of the process of evaluation comes after publication. Thus, evaluation goes on formally through their citation in other papers that undergo the same process of review and informally in letters to the editor published in medical journals (Bloch, 2003) (*see* **Medical Discourse and Academic Genres; Collocations; Discourse Domain**).

Historical Background of the Genre

Origin of These Letters

Letters can be traced back to the very beginnings of scientific writing. The first scientific publications were letters enabling scholars interested in scientific observation and experiments to exchange information. At the end of the 17th century, researchers published exclusively through correspondence printed in journals. Indeed, letters have been described as "a longstanding tradition in scientific journals written in a predominantly personal style, with use of the first person" (Webber, 1994: 258); and in most medical journals, letter publishing began in the 19th century, generally at the same time as the birth of these journals. For instance, the first letters appeared in issue 2 of *The Lancet*, on October 12, 1823, in a section entitled 'Miscellaneous.' They first appeared in 1848 in the *Transactions of the American Medical Association,* which became *The Journal of the American Association* (*JAMA*), in 1883; in the *British Medical Journal* (*BMJ*) in 1857; and in the *New England Journal of Medicine* (*NEJM*) in 1928. Letters to the editor can be considered a long-standing yet lively genre updated through time.

A Habit Inherited from the Quality Newspapers

This type of correspondence shares common features with letters published in the quality papers of the European press and can be defined as a paper or article presented as a letter, dealing with a contentious issue in a controversial tone written by a member of the public. A diachronic overview shows that over time the letters have increased in length, number, and regularity. However, the number of letters published in each issue may still vary on average from 5 to 20 letters, depending on the journal.

A Complement to Research Articles

Their *raison d'être* also evolved over the years, progressively becoming a genuine and mature genre. From mere clarifications aiming to provide further knowledge on a given research topic, they gradually became a tool for questioning previously validated research. They have grown as a complementary, and sometimes alternative or transient, strategy used to build a niche, establish a position, and defend it in the scientific community.

Characterization of the Genre

These letters are present in most medical journals. However, they do not always bear the same name. Investigating the top medical journals following the impact factor as established by the *Science Citation Index* (*SCI*) shows that the most common title used to label this genre is 'Correspondence.' It is called this, for example, in *Nature Medicine, The Lancet, The New England Journal of Medicine, The Journal of the National Cancer Institute,* and *Gastroenterology.* However, other titles can also be observed, such as 'Letters,' in *The Journal of the American Medical Association* and 'Reader's comments' in *The American Journal of Cardiology.*

Letters to the editor do not belong to the epistolary genre. They are not really letters but a way to express one's opinion or to set something straight. They often start with the characteristic head shared with the epistolary genre, 'Sir' or 'Dear Sir.' Interestingly enough, it can be observed that 'Dear Sir' typifies American journals, whereas 'Sir' is the standard form in British ones. Quite a lot of other journals publish this correspondence with the heading 'To

the Editor,' and, as in any scientific writing, communication actually builds up between a scientist and his or her community and not between two individuals.

This communication mode should, in fact, be considered as deriving from 'the open letter' genre, thus borrowing some of the polemic journalistic features, and not be viewed as life writing, characteristic of the epistolary genre.

Writing Conventions

Medical editorial boards very often provide specific guidelines for potential authors. These indicate the maximum length (between 300 and 1000 words), the deadline to react to a published article (between 1 and 6 months), and the nature of the issues that can be tackled. They can either be comment letters on what has been previously published in the journal or letters of general interest unrelated to earlier items in the journal. Letters can be modified by the editor without any prior agreement from the authors, and letter writers are generally not consulted before publication. The letter must not have been published (including on the Internet) nor be under consideration for publication elsewhere, and letters that contain unpublished data are refused by some journals. Correspondence letters are not usually peer reviewed, but the journal may invite replies from the authors of the original publication. In a few journals, it is even specified that only one table or figure is permitted and that no more than five references and five authors should be included. Authors are also required to suggest a title.

Objectives and Strategies

In the scientific community at large, scientific claim is essentially expressed by the research paper through the use of validated protocols, by the publishing of experimental findings in journals ranked according to their impact factor, and eventually through the reviewing process. Letters to the editor represent a form of contradiction *per se* of the research paper. They appear to be on the fringes of the community-validated discourse, but they may be interpreted as a dynamic process leading to discourse production as well.

Controversy generally concerns the experimental method selected, the duration of the experiment (most of the time too short for financial reasons), the number of experimental subjects (most of the time too few for the same reasons), and results too flimsy or too frail to be exploited. Indeed, they do not only occur as a reaction to the published discourse. They can also precede the publication of scientific papers because they very often relaunch new research on a given theme. This type of discourse can therefore be seen as constructive contradiction.

Authors' Objectives

The objective for an author is not merely to write a letter and let other scientists know his or her opinion about a specific topic. If this were the case, such letters would have disappeared long ago and would perhaps have been replaced by e-mails, which are currently a much more direct and rapid way to communicate. Conversely, correspondence in scientific journals does not aim to resolve private issues. The letter writers require the entire community to witness and even take part in their public debate.

The strategy of questioning can be understood as an explicit and implicit mode of criticism leveled at an established scientific fact. It is the quickest way for them to position themselves on a research theme considered to be 'hot science' on which they are also working because having a paper published takes several months at least. To submit an article, scientists must have gathered enough evidence through their results, whereas a letter will allow them to stake out their territory before all the conclusive evidence is available for publishing. It may also be the means for a researchers to highlight or rehighlight their own published research, which otherwise might be discredited or ignored due to the publication of an article that contradicts their own results.

Writing letters to the editor may appear to be an irrepressible need for some scientists because it allows them to react swiftly, personally, and sometimes contentiously to issues about which they feel strongly concerned.

A Community's Strategy

It is noteworthy that editors still grant space to correspondence in their journals even though the publishers of medical journals generally complain about the increasing size, and hence the publishing cost, of scientific journals. The editor acts as a vector, and the letters are used as tools in the general process of scientific validation; they can be considered as the aftermath of the construction of the scientific fact. Indeed, in contrast to scientific conference forums or discussion forums on the net, their journals offer permanent records of a debate. They are public, can always be consulted (either in the paper version or the online version of the journals), and can even be quoted as references in bibliographies.

Readers' Motivations

Most researchers read letters not systematically but regularly in one or several journals. It is a matter of

keeping informed about the hot issues in their fields and to learn about the contentious debates within their specialists' community. Researchers do not systematically read the correspondence section after the publication of an article they have written. This shows that they are not particularly interested in the reactions their papers may trigger or that the validation granted by the reviewers brings them enough satisfaction and confidence in their research. Skimming letters seems to be a quick and efficient means for researchers to keep up to date with the new paradigms, to hear about current controversies in their communities, and to learn about various conflicting reactions to previously published articles.

Discursive Features

Such letters reveal underlying conflicts in the community that are totally ignored or hidden in the experimental research paper. Several linguists (Hyland, 2000; Magnet and Carnet, 2001; Bloch, 2003) suggest that this major difference necessarily induces specific features in the writing.

A Chronological Approach

In the research paper, chronology is totally erased. In contrast, in letters to the editor, the authors are relatively time-conscious. Generally, the letter follows a chronological approach linked to the contentious character of the genre. It mimics more closely, in a way, the prosecution and plea process observed in courts; here, the board of editors and the scientific community at large act as jurors. Letters can thus play a role in the questioning process of the scientific community. They offer the scientist a way to react publicly, almost in real time. They can, in some cases, be a step toward publishing results in the form of an experimental paper.

A Modelized Macrostructure

A basic feature of letters to the editor is their underlying macrostructure, whose most common pattern can be described in four moves. Adapting J. Swales's famous descriptive analysis mode of the conceptual organization of the research paper (Swales, 1981), the following recurrent model can be suggested. The first move is a reminder of the contested published results. The other three reproduce the logical argumentative pattern: thesis – antithesis – synthesis. Thus, the second move aims at expressing the challenge. The third develops arguments backed by the author's own research. Finally, in the fourth move, the author urges his or her colleagues to reconsider the initial findings of the study under attack before reaching their own conclusion.

An Author-Reader Relationship

The research paper focuses on the object of the research and, hence, any form of subjectivity tends to be erased. It almost looks as if there were no subjects in charge of the experiment. On the contrary, letters to the editor are presented as a pseudodialog in which addressers speak in their own names. Addressees are supposedly the editors of the journals, but, in reality, letters are sent to the community of specialists at large. This personalized form of communication is therefore characterized by the recurrent use of the first-person pronouns *we* and, to a lesser extent, *I*; by the intensive use of the possessive *our*; and by the frequent opposition between *we* and *you*, *we* and *they,* or *we* and *he*. These are clear signs of the opposition between the scientific fact as reported in the primary article and that proposed by the authors of the letter. With this opposition, the strategy aims to weaken the credibility of the scientific fact as established by the experimental paper. This process allows the authors of these letters to prove that there is not only one established fact but at least two.

A Researcher-Centered Genre

Contrary to the primary scientific article, which aims to establish scientific facts, letters to the editor tend to be focused on the researchers themselves and their position in the community. They take into account the authors' reputation in the community, for example, and disagreement on scientific issues may disguise clashes of interests. From research papers it may look as if the sole aim of researchers is scientific progress, whereas from letters to the editor conflicts and competition become explicit. The experimental paper can therefore be described as research-centered, whereas letters to the editor tend to be researcher-centered. This is why self-mentioning and self-quoting are common practices in this genre. Moreover, it is worth noting that most of the time letters are signed by only one scientist, unlike research articles, which most of the time are the fruit of collaboration in the medical field. This change in focus influences linguistic choices and induces cultural specificities.

Linguistic Features

Specific Verbal Forms

An interesting point is the very low occurrence of passive structures in letters to the editor. Scientific discourse is generally characterized by a heavy use of the passive, especially in the 'Materials and Methods' and the 'Results' sections of papers. The reason for this is to focus on the object of the experiment, rather than on the subject, to give an objective value to the

published research. In letters to the editor, on the contrary, the emphasis is put on the choices made by the criticized authors and thereby on the authors of the letters themselves. Thus, selecting active forms to build an argument strongly reinforces the contentious mode.

The most common grammatical tense used is the simple present (approximately 50% of the cases), and this again contrasts sharply with the research article, in which 80% of the verbs are in the simple past. In letters to the editor, the simple past is used in only 35–45% of the cases to report the experiments carried out by the criticized authors or by the authors themselves. The simple present is chosen to express the reality of the article in question. It is neither the historical present nor narrative present; it refers to the established scientific fact. This peculiar use of the present tense is close to a journalistic style. It has no connection with chronological time and follows Quirk's (1997) interpretation: "The implication of the present tense seems to be that although the communication event took place in the past, its results – the information communicated – is still operative. Thus the notion that the past can remain alive in the present also explains the optional use of the present tense in sentences referring to writers and composers and their extant works."

Modality

Modals represent only 10% of the verbal structures, lower than the percentage in research articles' 'Discussion' sections, in which they represent 14% of all verbal forms (Magnet, 1992) and in which they most often have an epistemic value.

Epistemic Modality or Hedging Scientific discourse is generally used to weigh evidence and draw conclusions from data. Thus, uncertainty and doubt are necessarily present at least in the 'Discussion' section of experimental papers. This is expressed through hedges, which account for various degrees of probability (Salager-Meyer, 1994, 1995). Scientific discourse deals with the problem of what is true or false; the particular value of this modality is that it expresses the utterer's lack of certainty regarding the validation of the predicative relation.

In letters to the editor, in contrast, epistemic modality (hedging) has a low occurrence. The most frequently used modals are *should, could, may,* and *would* and to a lesser extent *can, must, will,* and *might*.

Root Modality In contrast to epistemic modals, root modals may convey a deontic meaning to indicate a form of moral advice, expressing, in fact, strong pressure from the utterer on the criticized authors. Linguistically, it thus concerns the relationship between the grammatical subject of the utterance and the predicate. Root modals are not concerned with the truthfulness of the subject-predicate relation but, rather, serve to express orders, wishes, suggestions, causality, or capacity. Indeed, the most widely accepted view is that hedging is the process whereby authors tone down their statement in order to reduce the risk of opposition, so it is understandable that, in letters to the editor, authors should express themselves instead through root modality. This type of moral advice through which the utterer exerts pressure on the criticized authors applies to objects and hence makes distancing possible. However, root modality can also bear on the animate subject, here, the criticized scientist.

(1a) "First the degree of oxidant stress **should be assessed** to choose an effective antioxidant regimen." (*The Lancet*, 2001: 631)

(1b) "Respectfully, I **must suggest** we **should** all **beware** of inaccurate invectives." (*The Lancet*, 2001: 647)

Modality of Assertion Positive assertion needs no particular marker, whereas any manipulation of the assertion calls for a specific marker. One of the most recurrent forms of manipulation in letters to the editor is contradiction, linguistically expressed through negation. The aim of the authors is to deny the original utterance or rebut its scientific relevance. Negation may be total or partial. It may apply to verbs or nouns, to the criticized research, or even to the researchers themselves.

(2) "It **makes no sense** to me that it is possible to reliably detect the so-called independent associations of individual constituents of this group, when . . ." (*AJCN*, 2000: 849)

Qualifying Modality Qualifying modality concerns judgments about the content of the predicative relation, for example, whether it is good, bad, normal, abnormal, fortunate, or unfortunate. This is essentially qualitative modality, and in letters to the editor it mostly conveys a derogatory judgment.

(3) "The method they use **does not seem to be suited** to the end results." (*The Lancet*, 2001: 553)

Adjectives and Adverbs In contrast to the depersonalized style observed in the experimental paper, giving vent to direct criticism in letters to the editor is accepted by the community. These critiques borrow from the derogatory style, illustrated by the use of

specific figures of speech. One of the common ways to belittle one's opponents is to use highly disparaging terms to qualify their work, such as *poorly, mistakenly, biased, emotive, confusing, too simplistic, old and outmoded, artificial, vague, speculative,* and *sad*.

Nouns and Verbs Letters also reveal a massive use of certain nouns and verbs that are totally absent from the research paper because these derogatory terms usually belong to the critical style and reflect strong subjectivity. Nouns such as *critique, rebuttal, borderline, reductionism,* and *blurring* and verbs such as *refute, rebut, fail to, contend, disagree, reject, challenge,* and *invalidate* are common in letters.

Negative Prefixes in Adjectives In standard English, the adjective is a linguistic tool mainly used to specify and qualify the notion expressed by the noun. In scientific discourse at large, adjectives mostly express a quantitative value, whereas in letters to the editor, an extensive use of qualitative adjectives can be observed. Interestingly enough, most of them carry a negative prefix whose aim is to weaken the arguments set out in the targeted paper. Examples of these prefixes are *in-* (*inappropriate, inaccurate, inconsistent, incomplete, intemperate, incorrect, implausible,* etc.), *un-* (*unreliable, unexpected, unproven, unsupported, unclear, unaware, unfounded, unfortunate,* etc.), *out-* (*outmoded,* etc.), *under-* (*underpowered, understated,* etc.), and *mis-* (*misleading, misused, misdirected,* etc.).

Specific Markers Specific markers are necessary to build an argument. In letters to the editor, these markers fall into four groups that all express disagreement but with different levels of intensity. These markers correspond to four discursive strategies.

- Concession. The weakest markers used to contradict somebody's opinion express concession. They are common to all forms of discourse, including the research article. The most recurrent forms present in letters to the editor are, for example, *although, however, but, yet, nevertheless, nonetheless, even if,* and *even though*. These markers are used to diminish or belittle the impact of published observations and conclusions.
- Antithesis. Authors may wish to express their opposition in a stronger way. In order to do so, they select markers such as *but, while, whereas, conversely, by contrast, in contrast, otherwise, instead, unlike,* and *opposite*. This linguistic device aims to oppose two ideas, two protocols, or two methodologies to demonstrate the superiority of the supported team.
- Rewording. Some markers are used to reformulate a previous statement and incite the criticized authors to change their minds and possibly their methods or conclusions. It is, in fact, an illustration of the pragmatics of politeness (Myers, 1989) generally observed in scientific discourse. Examples of these markers are *rather, better, more accurately,* and *in other words*.
- Doubt. The most subtle way of explicitly questioning a method is to raise doubts concerning the validity of the study. The most common words and expressions used in letters to the editor to mark this are *maybe, perhaps, probably, highly unlikely, wonder whether,* and *far from verified*.

Understatements

The use of implicit disagreement can be considered to be a less direct way to modulate contradiction. This weak contentious mode tends to express the utterer's disagreement with the work under debate through forms that invariably involve a reference back to the utterer. Examples of these forms are *we find it surprising that, therefore we strongly suggest, therefore we think, I have several comments, I showed clearly, In my opinion, we believe, we are aware,* and *we advocate doing this*.

By asserting their own results, letter writers actually contradict and criticize the results of the studies they are referring to. It can be understood as implicit criticism. This implicit mode of criticism is more frequently observed in American journals than in British ones, and it may be interpreted as a good example of the American tendency toward political correctness.

Medical Terminology

Letters to the editor, along with the other six genres in medical writing, display specific linguistic characteristics, the most salient and obvious feature of which is the strong presence of a medical nomenclature used for labeling and description. The great majority of medical terms are nouns derived from Greek or Latin roots. This recurrent presence of a highly specialized vocabulary makes the letters to the editor as difficult for the layman to understand as the research papers, which confirms that this mode of communication truly belongs to the world of scientific discourse.

(4) "The suggestion by Ozols that the dose of **carboplatin** could explain our results is implausible, because the same **carboplatin regimens** were used in the **control arm** and the **test arm**." (*The Lancet*, 2002: 2088)

Cultural Features

In spite of the common features shared with general scientific discourse, letters to the editor in Anglo-American medical journals allow their authors some freedom of speech and style, which is never found in research papers. Whereas research articles are always built in the same way, with the same apparent objectivity and neutrality, the style of the letters may vary from one journal to another, from one author to another, and even from one country to another.

Differences between American and British Letters

The tone and style used in American and British journals are often in stark contrast. In American journals, considerations of political correctness lead to the focusing of criticism on the object (the experiment or the selected methodology) and not on the subject (the research team). This attitude induces the letters' authors to use understatement and hedging through modalized forms.

In contrast, British journals abound with overtly polemical phrases, which may even be aggressive or sexist (e.g., *inappropriate, inaccurate, emotive, poorly designed, retrospective,* and *biased*). This type of overt criticism illustrates both the researcher-centered attitude previously mentioned and the lack of restraint observed in some British letters.

(5a) "I think that Sandra Simkin's report is **inappropriate**, **inaccurate**, and **emotive**." (*The Lancet*, 2001: 641)

(5b) "We are **astounded** that such **frivolous** allegations should have been made by academics from a reputable school of public health." (*The Lancet*, 2002: 1982)

Titles Borrowing Cultural References

Some letters bear a title that could never be found in a research article. These titles may conjure up a cultural background supposedly shared by the whole scientific community but that actually is familiar only to native speakers. References can be cultural and/or humorous.

Bible Quotations In some cases, English-speaking writers disguise their biting critique as cultural references by including quotations from the Bible. Even though the Bible is a universal cultural heritage, it is well known that it is more prevalent in Anglo-Saxon culture. It would therefore be difficult for a non-native speaker to understand the hint and even more so to borrow from the cultural background to express a criticism in such a way. It is through irony that a phrase borrowed from the New Testament "Ask and it shall be given you; seek and ye shall find" (Matthew VII:7; Luke XI:9) is to be interpreted as particularly disparaging toward the methodology of the scrutinized team.

(6) "**Seek and thou shalt find**
Patino *et al.* doubt the presence of endotoxin in their study cohort, although we know it to be present in the general population. Higher endotoxin levels in patients with diabetes mellitus and arterial disease may be expected and should be sought." (*AJCN*, 2000: 1054)

Literary Quotations English-speaking scientists also share a common literary heritage that they enjoy borrowing from, thus mimicking newspaper headlines. Shakespeare is, of course, a favorite, and, because some quotations now belong to universal culture, it can be assumed that they will be understood by the whole community of researchers, native and non-native speakers alike.

(7) "Acute hepatitis virus infection: **to treat or not to treat**." (*Gastroenterology,* 2004: 1219)

Neologizing The use of impish neologisms to reveal the inadequacy of a terminology commonly used in the scientific community is truly meant to ridicule their authors. For example, the use of the word *vegetarian*, considered too vague and inaccurate, is criticized. This leads the authors in (8) to all sorts of ludicrous and wild variations on the theme.This is indeed a humorous criticism of scientific popularization of terminology used by a community that usually claims a highly specialized vocabulary.

(8) "In an attempt to add more specificity in the scientific literature, various qualifying terms for **vegetarian** have been used, such as **pescovegetarian** and **lactoovovegetarian**. For one person I know who considers himself a vegetarian, an appropriate label might be **lactoovopescopoulo-steak-only-when-I-eat-out vegetarian**." (*AJCN*, 2000: 1211)

Sayings Authors sometimes borrow sayings that can be, for instance, aphorisms, as in (9a). The authors of the letter criticize their colleagues' lack of professionalism because they were unable to detect subtle changes that are likely to have dramatic health consequences. Others borrow from popular songs, as in (9b).

(9a) " '**Small is beautiful**': α-linolenic acid and eicosapentaenoic acid in man [. . .] Minor changes in dietary lipids may be most significant in thrombosis prevention." (*AJCN*, 1999: 1169)

(9b) "Mechanical circulatory support—a **long and winding road.**" (*AJCN*, 2000: 1222)

Reference to a common non-scientific cultural background characterizes the genre letters to the editor, as opposed to the research article, and may explain why letters built on such cultural references are seldom written by non-native writers. All these techniques are based on irony and humor through the use of phrases borrowed from other genres, generally out of reach for non-native speakers.

Status of the Genre: Diffusion and Scope of Letters

One of the reasons researchers still spend time writing letters to the editor is that their diffusion is much easier and faster than that of research papers. For example, 33% of the letters received by *The Lancet* are actually published, whereas only 10% of submitted articles end up being published (Mullan, 2003). The refusal of a letter is often justified by the editors as being due to their readers' lack of interest, but in fact less politically or scientifically correct reasons may also explain rejection (Behe, 2002).

For the community, a mere letter on a hot research theme in a highly ranked journal may be the first step toward questioning a well-established paradigm. Indeed, a letter may be the favored means to start open exchange with a competing team. This sort of publishing may influence the standing of some researchers in the community. However, this influence will only be effective if the authors already have a good reputation among the specialists and if their laboratory results are brought as evidence to support their point in the debate. This relational mode is deemed satisfactory and rather efficient because it enables scientists to inform, in a quick and efficient manner, more people than a mere presentation in a conference. This may allow researchers to establish a niche before submitting more substantial results for publication. Finally, it also allows some researchers to defend an experimental protocol that has been much criticized by peers.

Trends and Prospects for Letters to the Editor

Letters can be seen as a useful, and even necessary, but not self-sufficient communication tool within the scientific community. They reflect tensions in this community. Their most interesting role is to provide researchers with an outlet for frustrations, oppositions, controversies, and disagreements. Letters enable them to escape from the formal and impersonal constraints of the research article style. Above all, they may constitute a breeding ground for new research by bringing up new ideas, new paths to explore, or new prospects for future collaborations. That is why these letters still play a key role among the scientific community at large, and this also explains why numerous online scientific journals have kept a section devoted to correspondence, thus a genuine and enduring genre. However, letters to the editor usually do not represent some sort of true validation because, unlike the research paper, there is no reviewing process.

This genre does not offer an equal opportunity to the international community of researchers. It is a mode that non-native speakers find hard to master. Irony, humor, and cultural references that are difficult to tackle in a foreign language may explain why native English speakers represent the vast majority of the authors of letters to the editor in English-language journals.

See also: Collocations; Discourse Domain; Genre and Genre Analysis; Medical Discourse and Academic Genres.

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Medical Specialty Encounters

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Primary Care Medical Encounters

The majority of research in linguistics on the discourse of medicine has focused on primary care encounters, that is, routine encounters in pediatrics, family medicine, gynecology, and internal medicine that take place in offices or clinics. This research has contributed a great deal to our understanding of how the phases of a routine medical encounter are structured, how its interactional sequences are organized, and how its discourse creates and reflects a variety of dynamic contextual dimensions.

The Structure of Medical Encounters

Following Byrne and Long (1976), ten Have (1989) described the phases in the structure of a routine medical encounter as follows:

- Opening
- Complaint (discovering the reason for the visit)
- Examination (medical history and physical exam)
- Diagnosis
- Treatment or Advice
- Closing.

Each of these phases is associated with particular interactional sequences: social talk in openings and closings, although this small talk is not inconsequential; question–answer for discovering the reason for the visit and conducting the history and physical; medical assessments and explanations for diagnosis; and imperatives and instructions for treatment.

This linguistic description of the structure of a medical encounter corresponds roughly to the structure of the medical interview as described in the research and teaching literature in the field of medicine. (There is an enormous amount of research and teaching literature on the topic of medical communication in medicine itself, which I draw on but do not review systematically here. I rely heavily on Aldridge (1999) and Roter and Hall (1992) for this purpose.) Aldrich (1999), for instance, lists the following:

- Introduction
- Chief Complaint
- History
- Review of Systems and Symptoms
- Physical Examination
- Diagnosis
- Treatment Plan
- Closing.

Within the history, Aldridge identifies several areas, including history of the present illness, past medical history, family history, and socialpsychological history. Aldridge also notes that the review of systems and inventory of symptoms is typically organized by working head down as the physical examination takes place (HEENT (head, eyes, ears, neck, throat), chest, heart, abdomen, genitalia, skin and extremities, neurological), although the currently recommended practice is to organize this review by organ

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systems as a separate step in the history (skin, blood and lymph, respiratory, cardiac, vascular, gastrointestinal, urinary, reproductive, musculoskeletal, neurological, endocrine). As in most sources in the medical literature, Aldridge also recommends paying special attention to the psychosocial aspects of the interview, what he euphemistically calls "embarrassing topics," including substance abuse, alcohol use, and financial affairs.

The Organization of Interactional Sequences in the Medical Encounter

In linguistics, researchers have considered the organization of interactional sequences within different phases of the routine medical encounter in detail. In one of the most cited articles in medical communication, Beckman and Frankel (1984) found that physicians interrupt the patient's account of the reason for the visit after only 18 seconds, on average, usually truncating the patient's account of the first reason for coming to the doctor, even though the first reason mentioned is often not the patient's most important reason (Rost and Frankel, 1993). This quick interruption within the complaint phase is often critiqued as one of the problematic means by which physicians establish interactional dominance in the medical encounter, sometimes to the point of actively marginalizing the patient's topics, questions, and concerns (Roter and Hall, 1992). However, in a recent analysis of the complaint phase, Halkowski (in press) argued that the chief function of this phase in the encounter is establishing the "doctorability" of the reason for the visit: in other words, patients must legitimate their need for medical attention, what the sociologist Talcott Parsons called access to the sick role. Heritage (in press) further notes that physicians are oriented to establishing the reason for the visit with their first question and look for patients to indicate interactionally that their account is complete before they move on to the next phase of the encounter, which can happen very quickly, especially in a routine encounter. Heritage argues that the length of this phase is less important than the interactional coconstruction of the chief complaint to the satisfaction of both the physician and the patient.

In the medical literature, a distinction is made between open-ended and closed-ended questions in what is called the medical interview. Physicians most often use an open-ended question to elicit the chief complaint, a question form that allows the patient to formulate an explanatory or narrative response, as in the following examples. [For the convenience of readers from a variety of backgrounds, I present transcribed data in very broad form, regularizing spelling and punctuation for intonation, and not including all features transcribed by the original authors. Three transcription conventions that I should note here are the following: (1) contextual material in double parentheses, e.g., ((physician entering room)), (2) ellipses (. . .) to indicate deleted material from the original source, and (3) double dashes (–) to indicate a break in an utterance, e.g., (you know–).]

DOC: How have you been?
DOC: What brings you in today?
DOC: Tell me about your leg pain. What seems to be the problem?

Roter and Hall (1992) note that physicians use open-ended questions to orient themselves to the purpose of the visit and to gather information in order to begin hypothesis formation toward the differential diagnosis. Physicians then typically move to closed-ended questions for history taking, review of systems, and hypothesis testing of the differential diagnosis, as in the following examples:

DOC: Any heart problems?
DOC: Any shortness of breath?
DOC: Are your leg symptoms worse after standing for a few minutes?

Closed-ended questions are much more frequent than open-ended questions in the routine medical encounter, by a factor of 2 to 3 or more (Roter and Hall, 1992). Although the pedagogical literature on what is called "patient-centered communication" recommends more frequent use of open-ended questions, especially in the complaint phase but also in the history and physical, many physicians continue to regard closed-ended questions as the most efficient means to conduct the medical interview (Roter and Hall, 1992; Frankel and Beckman, 1993; Aldridge, 1999).

Linguists have looked at question–answer sequences in the routine medical encounter in great detail. As Ainsworth-Vaughn (2001) pointed out, questions are a powerful means of establishing and maintaining interactional dominance in an encounter: questions can establish and maintain the frame of the encounter as an asymmetrical interview in which the role of the patient is simply to answer questions posed by the physician, and the form of questions can further restrict patients' contributions, as in a series of closed-ended questions that ask for yes–no or brief answers. In West's (1984) study of 21 family care encounters, she found that 91% of the questions were asked by physicians and only 9% were asked by patients. Noting further that physicians' questions are almost always answered, whereas patients' questions are sometimes ignored in medical encounters

(98% of physicians' questions were answered, whereas only 87% of patients' questions were answered in her study), West (1984) concluded that the asymmetrical form of the medical interview is achieved in large part through the organization of question–answer sequences. Similarly, looking for question-answer sequences where patients initiate new topics, Frankel (1990) found that only 1% of such questions were posed by patients in a set of primary care encounters and argued that medical encounters show a distinct dispreference for patient-initiated questions. Other researchers have found similar patterns of physician dominance through questions and the ways that this interactional dominance establishes overarching schemas and frames as well as control of topics in the primary care encounter (Fisher and Todd, 1993). This interactional dominance in the discourse of medical encounters has been critiqued as promoting the interests and agenda of the physician within a biomedical model focused solely on disease rather than eliciting the understandings and concerns of the patient within a broader biopsychosocial model of disease as well as the experience of illness, in what the sociologist Elliot Mishler famously termed the conflict between the voice of medicine versus the voice of the lifeworld (Roter and Hall, 1992).

Recently, however, researchers have looked more closely at interactional coconstruction in question–answer and sequences in the medical encounter, describing the ways that physicians and patients coconstruct the discourse of medicine within an encounter, a coconstruction of the context that is typical of institutional encounters in general (ten Have, 1991; Maynard, 1991; Heritage, 1997). With respect to question-answer sequences in medical encounters, patients, it seems, use a variety of interactional means not only to answer the question, but also, as Stivers and Heritage (2001) put it, "answer more than the question" and thereby raise their own topics and concerns. For example, in the following exchange, the physician is in the middle of a history sequence with closed-ended questions designed to elicit yes–no answers, but the patient's answer to one question is an elaborated one:

DOC: You have your gall bladder?
. . .
PAT: Well I had a tubular pregnancy once, an' I was too afraid to even ask 'em anything about it. An' so I don't know what they did.

Stivers and Heritage argued that this expanded answer not only provides information but also signals that the patient is afraid of surgical procedures and afraid to talk about them. Boyd and Heritage (in press) noted that patients resist the implications of physicians' questions about lifestyle by answering closed-ended questions in elaborated form. In the following exchange, for example, the patient breaks away from a series of yes–no answers to provide her own characterization of her alcohol use:

DOC: D'you smoke?
PAT: Hm mm.
DOC: Alcohol use?
PAT: Hm: : moderate I'd say.

These studies show that although physicians design questions to serve their purposes in the encounter, patients design answers to serve their purposes as well.

Another phase of the primary care encounter that has received considerable attention in the linguistic literature is the delivery of diagnostic news. Heath (1992) found that although physicians design their delivery of diagnostic news with pauses and other features in order to invite patient response, patients typically respond with silence or only a minimal acknowledgment token, as in the following sequence (pauses measured in seconds and placed in parentheses):

DOC: You've got, erm (0.8) bronchitis.
PAT: Er. (4.5)
DOC: ((begins to write prescription)) I'll give you antibiotics to take for a week.

This kind of sequence is a coconstruction not only of medical authority, with patients appearing to accept the physician's diagnosis without challenge, but also of the structure of the medical encounter: with no elaboration of the topic of diagnosis, the encounter moves directly to the treatment phase. Heath noted that the coconstructed brevity of the diagnosis phase of the encounter contributes to patients receiving less than optimal amounts of information about their medical conditions, which is another of the key problems identified in research in medical communication (Roter and Hall, 1992). Heath went on to show, however, that patients have their own interactional means of disagreeing with the physician's diagnosis, but disputing a diagnosis typically takes place in a different phase of the encounter, either during the treatment recommendations or the closing. Patients dispute a diagnosis by recycling the topic, repeating symptoms, emphasizing their severity, or questioning the diagnosis. In the following sequence, for example, Heath observed that the patient initially agreed with the diagnosis that his condition (angina) is the same, and the physician began to turn to treatment management, but the patient then produced an account of the recent severity of his symptoms:

DOC: It's the same as you've had all along
real[ly isn't it [with this
PAT: [Yes [Yes it is ((soft voice))
DOC: Yeah.
PAT: Only if this last couple of months it's been a bit – whether it be due to cold weather – I don't know whether that's anything to do with it.
DOC: Can I just listen in around your heart and things right?

In this sequence, the patient achieves his apparent goal of disputing the initial diagnosis; and the physician returns to the physical examination and ultimately orders more diagnostic testing. Not all recyclings of the diagnosis are successful, however, as Heath showed in the following sequence, where the physician delivered a diagnosis and the patient disputed it by offering an account of the severity of his symptoms as the physician wrote a prescription:

DOC: I'm sure Doctor Mckay's right. I'm sure these headaches yer gettin are associated with a bit of arthritis in yer – in yer neck.
PAT: It is. ((soft voice))
. . . ((physician begins writing prescription))
PAT: It's the headaches was the thing that's got me. More than anything else – More than the devil in hell because they were gettin' more or less permanent yer know
. . .
DOC: Right well I'll tell what we'll do Mister Tarett. I'll give you . . . .

In this case, the physician did not move back to the examination phase or change his original medical assessment and diagnosis of arthritis in the neck; the patient simply received the prescription being written as part of the treatment phase of the encounter. A recent special issue of the journal *TEXT* (Beach, 2001) took up the topic of diagnosis in the routine encounter in more detail, arguing for the importance of the lay diagnosis a patient might bring to the medical encounter.

The Context of the Medical Encounter

In the research literature on the discourse of the medical encounter and on the discourse of institutional encounters in general, there is an ongoing debate about how to take account of context in an analysis (Sarangi and Roberts, 1999). The linguistic anthropologist Bronislaw Malinowski originally called attention to the context of situation, defining it ethnographically as the larger sociocultural frameworks that surround language and speech events. Through the work of Dell Hymes, John Gumperz, and other linguistic anthropologists, sociolinguists, and discourse analysts, this approach works to discover and describe the complex connections between the organization of discourse and its larger social and cultural contexts, considering discourse sequences that reflect and perform gender, ethnicity, class, and the sociopolitical power and prestige of professions and institutions (Schiffrin *et al.*, 2001). Another approach that has been influential in research on the discourse of medicine defines context ethnomethodologically as the social actions participants coconstruct locally through the turn-by-turn organization of interactional sequences. Through the work of Harold Garfinkel, Erving Goffman, Emanuel Schegloff, and other conversation analysts, this approach works to discover the local management of the social and institutional order by describing how participants themselves are observably oriented to this local context, looking closely at turn-taking, turn design, lexical choice, sequence organization, structural organization, and asymmetry and accountability in professional and institutional encounters (Heritage, 1997). Both approaches are based on the close analysis of naturally occurring data, and both approaches see context as both created and reflected in discourse, particularly in institutional encounters. Both approaches have been critiqued and debated extensively. In discourse analysis, the concept of context can seem too uncontrolled: van Dijk (1997) once noted that "there is no *a priori* limit to the scope and level of what counts as relevant context," an analytic situation Michael Silverstein questioned by asking, "When is enough enough?" In conversation analysis, the concept of context can seem too narrow: Gumperz (in Sarangi and Roberts, 1999) noted that the primary focus on what is overtly present and oriented to can miss important aspects of interpretation that are more indirect but still important to understanding and interpretation, an analytic situation that does not give a complete answer to Michael Agar's question, "What is going on here?" Silverman (in Sarangi and Roberts, 1999) characterized the difference between the approaches as an emphasis on the *how* (ethnomethodological conversation analysis) in comparison to an emphasis on the *why* (ethnographic discourse analysis). An oversimplified, but perhaps useful, way to characterize these two approaches is to note that ethnographic discourse analysis focuses on the context *of* the medical encounter, with attention to the sociocultural context of situation, whereas ethnomethodological conversation analysis focuses on the context *in* the medical encounter, with attention to the observable orientation of the participants. Many researchers agree that a mixed approach to the analysis of the medical encounter is optimal, one that combines ethnographic and ethnomethodological approaches (Sarangi and Roberts, 1999); however,

there is not space to discuss fully these sometimes competing and sometimes complementary theoretical and methodological approaches of discourse analysis and conversation analysis, although this topic is taken up in a number of the references cited earlier and in other entries in this encyclopedia (for more on the discourse of the routine medical encounter, *see* **Medical Discourse: Doctor–Patient Communication; Medical Communication: Professional–Lay; Medical Discourse: Sociohistorical Construction**; for more on discourse analysis generally, including the conflicts over context, *see* **Text and Text Analysis**).

Specialty Care Medical Encounters

The research literature reviewed earlier shows that the primary care encounter in medicine is complex at a variety of levels, from the microlevel of the organization of interactional sequences to the macrolevel of coconstructing medicine as a social institution. One aspect of medicine as a profession and institution that is largely ignored in this work, however, is the distinction between primary care and specialty care. In Western medicine, as practiced in the United States and other developed countries, physicians typically complete a residency within a specialty, some of which have a primary care focus (specialties include internal medicine, family medicine, obstetrics–gynecology, pediatrics, general surgery, orthopedic surgery, emergency medicine, psychiatry), and some physicians go on to complete a fellowship within a subspecialty that has a narrower focus (internal medicine, for example, has subspecialties in cardiology, nephrology, endocrinology, gastroenterology, urology, and hematology–oncology, and others; surgery has subspecialties in neurosurgery, thoracic surgery, urology, colorectal and more). Subspecialty care focuses on particular diseases and conditions, both acute and chronic, in hospital and clinic settings, and physicians who practice in subspecialties are called specialists. [There is a systematic terminological difference between the medical and lay language of the specialty/subspecialty system. In medicine, physicians complete a residency in a specialty (internal medicine, general surgery) and may complete a fellowship in a subspecialty (medical oncology, colorectal surgery). Within this terminology, the title of this entry should perhaps be the discourse of the subspecialty encounter. In lay language, however, subspecialists are simply called specialists, and this is a terminology that physicians use in medical encounters with patients and in informal conversations with medical staff. I thus use the latter terminology here.] Patients typically enter specialty care by illness or trauma, sometimes by means of a referral from a primary care physician upon diagnosis or suspicion of diagnosis and sometimes by means of complications in an illness or hospitalization. In many instances, entry into the specialty care system of medicine is a surprise or a shock, often unwelcome and typically disorienting (*see* **Medical Discourse: Illness Narratives**). In the institutional and professional context of health care, the line between primary care and specialty care is not an absolute one. Some conditions, such as diabetes or congestive heart failure, are managed by primary care physicians as well as specialists. The line can be contested within the profession: specialists sometimes accuse primary care physicians of not referring patients to them appropriately, and primary care physicians similarly accuse specialists of stealing their patients. Access to specialty care can be contested within institutions as well: one principle of managed care in a health maintenance organization is the restricted access to consultations with specialists, not without controversy.

Within this complicated context, the discourse of the specialty care encounter is just beginning to emerge as a focus for research in linguistics, with a research agenda that has many unanswered questions: Is there a generic structure of the specialty medical encounter? How is it similar to or different from the structure of the primary care encounter? Does the structure of a specialty medical encounter differ across specialties? How are the interactional sequences within the phases of a specialty medical encounter organized? How are these organizations of interactional sequences similar to or different from the organization of sequences in primary care encounters, institutional encounters in general, and ordinary conversation? How does the discourse of a specialty care encounter reflect the context of the medical specialty? How do physicians and patients come to coconstruct the context of a medical specialty? How does research on specialty encounters contribute to knowledge about the discourse of medicine? How does research on specialty encounters contribute to improved medical communication for physicians and patients? Although research has barely begun to consider these and other questions about the specialty medical encounter, there are interesting points of comparison to the phases and sequences of the primary care medical encounter appearing in the literature, including the reason for the visit, the medical history, the understanding of diagnosis, and the treatment discussion.

The Reason for the Visit in Specialty Care Encounters

In specialty encounters, the reason for the visit, which is typically solicited from the patient with an open-ended question in the primary care encounter, appears to be organized interactionally across a series

of encounters with a focus on building an ongoing context of combined medical–lay expertise. Working from a database of 120 medical encounters between pediatric specialists and families who have a child with a disability, Barton (1996) found that in first encounters with pediatric specialists, physicians typically present the reason for the visit to families, thereby describing the particular medical problem that their specialty will manage, as in the following sequence with a pediatric neurologist:

DOC: Now the question is – The reason why you're seeing me is because of the EEG and what should we do about it.

. . .

DOC: Now I will take a look at the EEG – you know – again – just to be sure that – you know – how much of activity – of seizure-like activity was there, because the question remains whether we should treat her or not.

MOM: Um-hmm.

In this sequence, the neurologist explains *the reason why you're seeing me* in terms of the specialty of pediatric neurology, identifying its chief diagnostic tool, *the EEG*; the chief medical problem managed by neurology, *seizure-like activity* in the brain; and the treatment options within the specialty. The mother's responses in this sequence are primarily acknowledgments of the receipt of information.

Through initial encounters where physicians pay considerable interactional attention to describing their own medical specialty as the reason for the visit, families appear to develop a sophisticated lay understanding of the institutional organization and professional domains of medical specialties in the care of their child, including the relevant diagnostic tests and the treatment options for management. In follow-up visits, both physicians and families seem to orient to this construction of medical–lay expertise by organizing the sequences of this phase of the encounter in terms of the management of the specific medical condition of the specialty. Physicians sometimes retain control of the discourse of this phase of the encounter by providing the reason for the visit themselves, as in this sequence, again from pediatric neurology:

DOC: ((entering room)) So what's been happening? His last levels were pretty good. In December it was 8.8, since they increased the dose, which is where we would like to maintain him at.

MOM: OK.

DOC: Uh – so that if he's – you know – uh – we don't have – you know – at least ah – Even if he's thinking of having a seizure, that should prevent him from having one.

MOM: We haven't seen any and school hasn't reported any of them either so –

Here the physician presents the reason for the follow-up visit as treatment management, reporting the relevant test results from her review of the chart and claiming that maintaining the current level of medication should prevent the child from having seizures. The mother seems observably oriented to management of the seizure disorder as the reason for a pediatric neurology visit, providing both observed and reported information about seizure activity. Physicians do not always retain control of this phase of the encounter, however. In the following sequence, again from pediatric neurology, it is the mother who presents the reason for the current visit in terms of the specialty:

MOM: ((after physician asks the child how he is doing)) I don't know – uh – we're not sure what's going on. Um – his Depakote levels got weird, and as they got weird, he increasingly got hyper. When – when you added the other Depakote, for about four days he – the hyper was gone again. It's starting to come back. I'm wondering if his levels are not too high.

Here the mother gives her impression of the levels of antiseizure medication first and then introduces her concern about its possible side effects. Experienced families thus routinely orient to the domain of the specialty when they initiate this phase of the encounter in follow-up visits.

It appears, then, that specialists do interactional work to orient families to the domain of the specialty in initial encounters, and then physicians and families orient to this construction of medical–lay expertise in follow-up visits. With this orientation to the domain of the specialty, the encounter can be coconstructed as problem driven in terms of the specialty, with foregrounded attention to treatment management. This joint focus on a particular problem and its course of treatment in the specialty encounter is somewhat different from the open-ended focus on the patient's chief complaint in the primary care encounter (see the recent special issue of *Research on Language and Social Interaction* (Candlin and Candlin, 2002) on expertise in a variety of health-care encounters).

It is also of note here that specialty encounters seem to have an interactional orientation toward a series of encounters in an ongoing physician–patient/family relationship. Ainsworth-Vaughn (1998) pointed out that the context of an established relationship can significantly affect the discourse of medical encounters. In comparison to the studies of primary care mentioned earlier, where patients asked few questions

(West, 1984; Frankel, 1990), Ainsworth-Vaughn's study of encounters within the specialty of medical oncology found that patients ask significantly more questions – almost 40% of the questions were asked by patients in a set of 40 encounters balanced for gender of patient and physician. Ainsworth-Vaughn argued that the context of established relationships allows both physicians and patients to claim power in the discourse of the encounter, with power defined not only as control over the emerging discourse but also as control over medical decision making. Silverman (1987) similarly noted that question–answer sequences seem to reflect the course of treatment within specialty medical care. In his study of cardiologists and parents of children with heart conditions, he found that parents ask different kinds and different numbers of questions at different points in the child's course – before treatment, after diagnostic catheterization, and after surgery. In his study of adolescents in diabetes clinics, Silverman (1993) found that physicians and patients developed a more negotiated style of interaction as the relationships become more established and physicians extend more autonomy to teenage patients in the management of their diabetes.

The Medical History in Specialty Care Encounters

In medical encounters, question–answer sequences are particularly prominent in the history phase. In the primary care encounter, the medical history typically elicits patients' own reports of their past illnesses and present symptoms. The medical history in the specialty care encounter, however, also reflects the complex and ongoing context of specialty care. Barton (2000) noted that children with disabilities are routinely seen by multiple specialists, including a developmental pediatrician, a neurologist, an orthopedist, a physiatrist, a gastroenterologist, an ENT, an ophthalmologist, and more. Families move back and forth among specialists in a complex web of referrals and visits for attention to new or ongoing medical problems and conditions, a situation that is sometimes criticized as an unfortunate fragmentation of medical care. This expanded context of care is reflected in the medical history, where families are often asked to provide accounts of their encounters with other pediatric specialists, as in the following sequence:

DOC: Who sees him, Dr. L or Dr. B?
Mom: Dr. L.
DOC: And what does Dr. L say? The last time you saw him.
MOM: His X-rays came out just fine.

The specific specialty (orthopedics) is not even mentioned here, but when asked for an account of *what does Dr. L say*, the mother answers in terms of her lay expertise, citing evidence from the primary diagnostic tool of orthopedics (*X-rays*) in order to report that the child is *just fine*. When families deliver what the physician apparently judges to be a competent account of a referral with an appropriate construct of lay expertise, like the one given, the history moves along smoothly, and parents' accounts can become the basis for decision making.

When families deliver a more problematic account of a referral in the history, however, one that does not reflect an appropriate construct of lay expertise from a medical perspective, interactional problems arise that can affect the relationship between the family and the physician as well as the medical decision making. In the following sequence with a developmental pediatrician, for example, the family is asked for an account of their child's visit with the ENT (in the following sequence, the term *stridor* refers to a harsh vibrating sound during breathing due to obstruction of the air passages):

DOC: Now, does he see the ear, nose and throat doctor still?
MOM: Um-hmm.
DOC: Who does he see?
MOM: Uh, Dr. N. Paul N.
DOC: Do they think that he may outgrow some of this stridor too, with time?
MOM: Yeah.
DOC: [OK.
DAD: [I do. I don't know what the doctors say, but I know he is. Unless there's so many kids who have the signs that he has, but he is so much like a normal child. It's just that his muscles, it's going to take time to – to develop. Right now, to me, he's at a stage that a eight month old baby would be at.
DOC: [Uh-huh.
DAD: [And see, I'm looking at it like that's going to take time. By the time he five or six, he going to be able to talk. He going to be able to crawl, he going to [be –
DOC: [At school with the right interventions, he may be able to do some of those things. We'll have to see. ((change to motherese voice)) Who's on your bib there sweetie?

In this sequence, the physician's question asking for the ENT's opinion is designed for either a brief *yes*-answer or else a longer *no*-answer with elaboration. The mother provides the optimal *yeah* answer, and the physician acknowledges it with an *OK*, but the father speaks at the same time to offer a lengthy diagnostic and prognostic description of the child. His account, however, is problematic with respect to a combined medical–lay expertise based on knowledge of and experience in the specialty medicine

system: his *I do* is not backed up either by an account of a medical visit with another specialist or an account demonstrating substantive lay expertise, because his description is in conflict with the medical prognosis for his severely impaired child. The developmentalist gives him no encouragement to continue this problematic account, providing only one minimal back-channel and then abruptly interrupting to end the father's talk by addressing the nonverbal child in the pitch and patterns of motherese. The father's account is asymmetrically received here, and his contribution is completely ignored by the physician. Later in the encounter, the father expressed considerable dissatisfaction with the visit to the Child Care Clinic, criticizing the staff for "asking the same questions," and after the encounter, the staff expressed considerable disdain for the father's perceived ignorance about the actual condition of his child. In this case, the interactional trouble contributed to the increasingly adversarial relationship between the medical staff and the family that ultimately moved to hierarchical decision making by the staff without incorporating the contributions and concerns of the family (this encounter is discussed in more detail in Barton, 1999, 2000).

The Understanding of Diagnosis in Specialty Care Encounters

As the excerpts and discussion earlier indicate, lay expertise in the domain of a medical specialty encompasses a number of aspects, including diagnosis, prognosis, and treatment management of a medical problem or condition. Understanding of diagnosis, however, is a particularly important aspect of specialty medical care, and the delivery of diagnostic news is constructed very carefully by medical professionals in specialty encounters. Maynard (1992, 2003) has worked extensively on the delivery of diagnostic news in both primary and specialty encounters. Based on fieldwork in clinics for the evaluation of developmental disabilities in children, Maynard (1992) identified the perspective-display sequence as a crucial means by which specialists create alignment to the medical view of a diagnosis. A perspective–display sequence first asks the parents for their view of the child, which, if the view is in alignment with the medical diagnosis, allows the professionals to agree with the parents on the diagnosis, as in the following sequence:

DOC: What do you see? As – as his difficulty.
MOM: Mainly his uhm – the fact that he doesn't understand everything and also the fact that his speech is very hard to understand what he's saying lot[s of time
DOC: [Right
. . .
DOC: Okay. I – you know we basically in some ways agree with you insofar as we think that Dan's main problem you know does involve you know language

A perspective–display sequence thus coimplicates agreement between the parents and the specialists on the diagnosis of the child, which interactionally constructs alignment as the basis for the rest of the encounter. Maynard noted that medical specialists sometimes have to do considerable interactional work to bring about this alignment; in the following sequence, for example, the physician reformulates the mother's description of her daughter:

MOM: . . . and I have seen no progress, from September to June. For her learning ability, she is slow.
DOC: That's what we uh also found on – on psychological testing. That she was per- not performing like a normal uh six and a half year old uh should.
MOM: Mm-hmm.
DOC: And that she was performing more uh what we call as a borderline rate of retardation.

The physician here initially agrees with the mother that *that's what we also found on psychological testing*, but he interactionally reformulates and upgrades *slow* from *not performing like a normal six and a half year old* to *what we call as a borderline rate of retardation*. Through perspective–display sequences and their elaboration and development, medical specialists work to coimplicate a problematic diagnosis that brings participants into alignment. Maynard noted that the perspective display sequence can create alignment nonproblematically or problematically, as shown in the contrasting sequences above, although he argued that it is ultimately the medical view that becomes the official diagnosis for the child.

The Treatment Discussion in Specialty Care Encounters

There has been relatively little research on the treatment phase of the medical encounter, either in primary care or in specialty care. Barton (2004) looked at treatment discussions in medical oncology encounters, describing the structure within this phase as having four parts: first, foregrounding the relevant diagnostic information; second, presenting treatment information; third, asking and answering questions; and fourth, arranging treatment logistics. Using Erving Goffman's distinction between the front-stage and back-stage of institutional encounters, Barton also noted a systematic difference in prognosis as a

topic. On the front-stage with patients and families, prognosis is an unstable topic, not always a predictable part of the treatment discussion, and a topic that is often interactionally elided and backgrounded in indirect language, as in the following sequence:

DOC: When they did the liver biopsy in March, it showed that there were multiple lesions of the liver. And that means that we can't cut it out. It has to be treated by some sort of chemotherapy to try to control it. Now, we have a number of different drugs that we use for that kind of treatment.

Here, the information on *multiple lesions of the liver*, which *means that we can't cut it out* does not explicitly state the diagnosis of widely metastasized cancer, nor the prognosis of incurable disease that will run a fatal course. Further, the treatment recommendation (*it has to be treated by some sort of chemotherapy*) ends with the euphemistic expression *to try to control it*, an expression that does not explicitly note that treatment will ultimately fail. In the back-stage talk immediately after this encounter, the physician and researcher had the following exchange:

RES: Sweet lady.
DOC: Bad disease.
RES: Because they didn't catch it before it went to the liver?
DOC: Yeah . . . . She's an older, frail lady. But she has bad disease.

On the back-stage with medical colleagues and even researchers, prognosis is a predictable topic, especially in cases of expected negative outcomes, and a topic that is foregrounded with direct language in the talk of insiders (in the back-stage discourse of medicine, the expression *bad disease* carries the implications of incurable, fatal disease). Barton suggested that the front-stage presentation of prognosis is organized to preserve hope for the patient and the family, whereas the back-stage discussion of prognosis is organized to reflect the preponderance of negative experience in medical oncology and its and its resultant frustration.

In another study of treatment discussions, Barton *et al*. (2005) looked at a set of end-of-life discussions in a surgical care unit, where the aim of the discussion is to change the goals of treatment from aggressive measures aimed at cure to palliative measures aimed at comfort. The structure of this discussion has four parts: first, openings, in which physicians as well as families coconstruct the traditional role structure of a medical encounter, with the physician in the interactional and decision-making lead; second, description of current status, in which physicians present medical information leading to a summary statement that implies that the patient's status is terminal; third, decision making, in which a holistic decision to end life support is made indirectly and inferentially; and fourth, logistics of dying in the ICU, where physicians and families discuss the details of death and dying. Barton *et al*. argue that the description of current status is actually the crucial part of the end-of-life discussion, because it is here that physicians and families, through an inferential summary statement, interactionally establish a consensus that the patient is dying, which makes it reasonable that continuing further treatment, including life support, would be futile and only prolong the patient's suffering, as in the following decision-making sequence:

FAM: The body is in shock because of the infection.
DOC: So that's where we are. I am absolutely sure that you've had discussions and discussions among yourselves and other family members . . . . What I'd like to do now would be to open up the discussion with regards to the thoughts that people have had or any unanimity or is there any unanimous opinion with regard to what you think she might want under these conditions. Have you had a chance to talk about this?
FAM: Yes. If I – I don't think she would want it.
DOC: I know I can remember she told me once, you know, she wouldn't want it, because if she felt like they cut on her once, they would continue to cut, and I don't think she would want it.
FAM: We all agree.

Here, the family's acknowledgment that *the body is in shock because of the infection* allows the physician to sum matters up again (*so that's where we are*) and then move to the frame of decision making as *what she might want under these conditions*. The family then seems to make a holistic and inferential decision to withdraw futile life support by saying that *she wouldn't want it*. Barton *et al*. note that the description of current status and the decision-making sequences use language drawn from the indirect discourse of death and dying in ordinary language (as in the family's use of the antecedentless pronoun *it*), but one of the functions of the fourth and final part of the discussion is to develop a more medical discourse of death by making specific the inferences of terminal status and the decision to withdraw life support in a combined medical–lay discourse that situates death more technically within the process of palliative care. In the earlier discussion, for example, the physician specified that *we have a protocol, a set of rules we follow to keep people so sedated that they would not feel any discomfort*.

However, in discussions where there is no interactional consensus on the patient's status, decision

making to end life support does not take place, as in this sequence:

DOC: So when someone in the – experiences all of these, um, complications of the sepsis in the face of the strong medications that we are using, um, we feel like it is important to try to touch base with the family and clarify the goals of treatment and what you imagined the goals of treating her to be.
FAM: OK.
((silence))
DOC: Does that make sense? What questions can I answer to help that make sense?
((silence))

Here, the physician sums up the patient's terminal condition as *complications of the sepsis* and tries to move to the frame of decision making, but the family member's *OK* seems to be more of an acceptance of the topic of treatment goals rather than an acknowledgment or agreement with the inference offered by the physician's summary statement. With no uptake of her summary statement or her move to decision making, the physician resorts to asking whether there are any questions. With her continued silence, however, the family member provides no interactional indication of alignment, and the discussion falters.

Future Research on Specialty Care Encounters

From the literature reviewed, it appears that the general structure of a specialty care encounter is roughly similar to the structure of a primary care encounter, with similar phases – opening, reason for the visit, history and physical, treatment discussion, and closing. The specialty encounter, however, is problem driven in terms of the domain of the specialty – the medical condition it manages with its diagnostic tools and treatment options – within a complex context of medical–lay expertise created through multiple encounters in an ongoing physician–patient relationship. In comparison to the primary care encounter, the interactional sequences within the phases appear to be organized with respect to this context of expertise in the specialty care encounter: the reason for the visit is interactionally constructed in terms of the specialty, initially by physicians and subsequently by families; the history draws on accounts of care within the specialty medical system, which displays the family's expertise in this context; and the understanding of diagnosis appears crucially important, with considerable interactional attention to creating alignment between specialists and families. Perhaps reflecting the focus on managing medical problems and conditions, the treatment discussion appears to display considerable variation across specialties, with complex internal structures for different kinds of discussions. Although research in this area is just beginning, it is based on an important question for linguistic research on the discourse of medicine: How do physicians, patients, and families coconstruct the professional and institutional discourse of specialty care?

See also: Medical Communication: Professional–Lay; Medical Discourse: Doctor–Patient Communication; Medical Discourse: Illness Narratives; Medical Discourse: Sociohistorical Construction; Text and Text Analysis.

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Relevant Website

http://www.ama-assn.org – The American Medical Association website; consult for an overview of medical specialties and subspecialties in American medicine.

Medical Writing, Revising and Editing

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Background

Medical writing, editing, and revision is an emerging field in linguistic research and a thriving field in linguistic practice. It falls between several different disciplines, linguistic as well as nonlinguistic, and enjoys the attention of both medical and linguistic communities of interest. The medical discourse communities began to take interest in the linguistic quality of papers in the late 1980s with the growing globalization of research. The international nature of the readership requires that research should be written clearly and concisely and the need for better quality in medical communication is now widely recognized and has given rise to a growing number of suggestions, checklists, and guidelines for quality improvements targeting the structure, style, and rhetoric of medical communication.

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This globalization does not imply that all researchers have equal access to publication. There is considerable cultural bias with about 95% of all papers published in English coming from the Western, particularly Anglo-American, industrialized countries (Gibbs, 1995) and a preference for U.S.-based articles in U.S.-based journals (Link, 1998).

Medical approaches to medical writing, revision, and editing center on the issues of uniformity of structure and clarity, precision and economy of language, and the need to ease non-native English speakers' access to international publication. Linguistic approaches are varied and draw on disciplines such as genre theory, functional sentence analysis, and contrastive linguistics. Genre theory, which is concerned with global linguistic patterns that have developed in a linguistic community for fulfilling specific communicative tasks in specific situations, has provided particularly useful insights into medical text genres by creating a link between purpose at various levels of discourse and the situationally appropriate choice of linguistic means with which to realize these purposes. This article focuses mainly on the genre of the medical research paper.

Medical Writing

Medical writing serves different purposes. The medical textbook, for example, covers a range of topics, whereas the traditional medical paper is more focused. Most journal articles are designed to disseminate the results of a discrete topic of inquiry. Apart from honesty in reporting the results of the study, the most important element in medical scientific writing is clarity: the reader should be told why the study was performed (introduction), what the research question is (introduction), what was done (material and method), what was found (results) and what the results mean (discussion). To enforce this presentation style – known as the IMRaD structure – medical journals require that papers are divided into text sections with uniform headings serving the above purposes. This uniform style is described in *Uniform requirements for manuscripts submitted to biomedical journals* and the Council of Biology Editors' manuals of style.

General Rules of Medical Writing

General rules of medical writing increasingly mirror the advice of a group of editors of medical journals who first met informally in Vancouver in 1978 to establish guidelines for the format of manuscripts submitted to their journals. This group is known as the Vancouver Group. The requirements were first published in 1978. The group is now known as the International Committee of Medical Journal Editors. More than 500 journals agree to use their *Uniform requirements*, the so-called Vancouver style, which are instructions to authors on how to prepare manuscripts, not to editors on publication style. So authors must also follow the instructions to authors in the journal as to what topics are suitable for that journal and what types of papers may be submitted. The journal's instructions are likely to contain requirements unique to that journal, such as the number of copies of a manuscript, acceptable language, size of articles and approved abbreviations, among others. The home page of the Mulford Library of the Medical College of Ohio provides links to instructions to authors for over 3500 journals in the health and life sciences.

Specific Rules of Medical Writing

Specific rules of medical writing are formulated by the individual professional communities, which set up guidelines to be followed for the production of particular text genres. These guidelines are sometimes based on empirical studies of the qualities and shortcomings of such genres. For example, evidence that the quality of reporting of randomized, controlled trials (RCTs) was suboptimal initiated the development of consolidated standards of RCT (CONSORT) reporting by a group of scientists and editors. The objective of CONSORT is to facilitate critical appraisal and interpretation of RCTs by providing guidance to authors about how to report their trials. A revised CONSORT statement has recently been issued with checklist items for the contents of the title, abstract, introduction, methods, results, and discussion and with accompanying flow diagrams depicting information from four stages of a trial: enrolment, intervention allocation, follow-up, and analysis. The statement is available on the Internet, and it includes text examples, for instance on the generalizability (external validity) of trial findings from which valuable linguistic information may be derived.

The case for structure in scientific papers is made not only for the macro level, but also for the micro level (i.e., what linguists would call the move or step structure). Thus, most abstracts are highly structured and certain prestigious journals advocate a specific structure even for the discussion; for instance, the *British Medical Journal* suggests that the discussion should be structured as follows:

- statement of principal findings
- strengths and weaknesses of the study
- strengths and weaknesses in relation to other studies

- meaning of the study: mechanisms and implications for clinicians and policy makers
- unanswered questions and future research.

Reviews are also expected to be written according to specific guidelines. An analysis of reviews included in the Cochrane Library, a regularly updated collection of evidence-based medicine databases, showed that a sample of Cochrane reviews had problems in terms of both structure and style. Hence, stylistic problems were encountered in 23% of 53 Cochrane reviews published during 1998. The stylistic problems included many spelling, grammatical, and typographical errors, and reviewers' comments contained statements like "seems to be an unfinished draft," "needs to be edited to be more readable and comprehensible" (Olsen, 1998). Cochrane reviews are, on average, more systematic and less biased than other systematic reviews, and the linguistic flaws have a negative effect on the validity of the scientific contents communicated.

Medical Editing

Medical editing and medical revision are two sides of the same coin. Their domains may be visualized as overlapping circles. Editing is concerned mainly with the contents of the text. The most important thing in the editing process is to check the validity, i.e., the extent to which the study suffers from bias or errors. A common error is for example to confuse no evidence of effect with evidence of no effect. Editing also seeks to answer the major weaknesses of the paper; in particular, whether the manuscript requires additional work in terms of originality and importance, adequacy of design or approach, adequacy of materials studied, accuracy of interpretation of results, statistical analysis, relevance of discussion, soundness of conclusion, appropriateness of references, tables, and figures, or clarity of presentation. A good rule is to shorten the introduction and discussion and to lengthen the methods and results. Half the manuscripts submitted to the *British Medical Journal*, for example, are rejected for lack of importance to a general medical audience, serious scientific flaws, or lack of originality.

Editing is often achieved through so-called peer reviews, which denotes a number of processes, most commonly the gathering of opinion on the quality of the paper from other experts, either in-house or external experts. The review process starts when a manuscript is received at the editorial office. There are generally two kinds of review systems: the 'board review,' where all reviewers are members of an editorial board, or 'pool reviews,' where the editorial board draws on a pool of expert reviewers. Most journals have developed their own review strategies, but generally reviewers receive review forms, instructions and occasionally associated materials like instructions to authors and sample reviews. The reviewers are usually asked to provide text comments detailing their critique and suggestions (Shea *et al.*, 2001).

Medical Revision

Text revision is used here not in the traditional sense in English of modification of the text for contents, but in a narrower sense of reviewing, editing and proofreading with a focus on the form and style of the text. Revision incorporates the checking of the macrostructure and microstructure of the text, language and style issues, and judging suitability for the target reader or client. It embraces both the monolingual editing that borders on technical editing and, where translators and language revisers are included, the checking of the target text against the source for accuracy, style, and register.

Revision ideally falls into three steps. The first step is to make sure that the manuscript is written according to the general guidelines set out in *Uniform requirements* and the specific instructions to authors on how to prepare manuscripts. It must follow the target journal's format for style. Most journals, for example, spell out numbers less than ten, unless they appear with percentages or units of time or measure, and most but not all use upper-case P for 'P values' and C for 'Chi-square,' but not all.

The second step is to revise for structure, i.e., to ascertain that the move and step structure of the text serves the purpose of the text maximally, both at the overall (macro) level and at deeper (micro) levels. This can be done first by analyzing the move structure of the text section by section, second by comparing the move structure with the prototypical move structure for the genre in question (e.g., the IMRaD structure), and, third, by revising the move structure where necessary to achieve model fit. The aim is to make sure that the 'superficial' levels of argumentation or the types of argument that lie in each section of the text are supported by the 'deep levels' of argument, viz the persuasive power of each sentence, which depends on elements such as use of active or passive, the position of adverbs and adjectives, the use of *if*-conditionals, hedges, and other forms of modality.

The third step in the revision process is to analyze the text for correctness of grammar (active/passive, subject–verb agreement, position of modifiers, dangling participles, correct use of tense), word choice (jargon, bias-free language, good verb choice), and correctness of spelling and punctuation. This stage

should also include checking all other rules of good English usage, including avoiding starting sentences with such phrases as 'it has been shown that,' 'it was found that,' 'based on the fact that' (change to 'because'), and with 'there' (as 'There has been an increase in the number of patients' [change to 'More patients are'] and 'There is evidence to suggest that those who cease smoking' [change to 'Those who cease smoking may']).

Finally, where the target text is produced in a foreign language, it is necessary to check for source language interference at levels of lexis (word level), syntax (sentence structure, sender–receiver relationship), and text (cohesion/coherence).

See also: Macrostructure; Medical Discourse: Structured Abstracts; Speech Acts; Translation of Scientific and Medical Texts.

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Medicine and Health: Inter- and Intra-professional Communication

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Introduction

This article summarizes work that addresses the ways in which the practice of medicine is changing; how these changes are affecting medical discourse, and how they point to medical discourse becoming increasingly dependent on and coconstituted by what may be seen as 'nonmedical' discourses. In reviewing this work on the changing status of medicine in contemporary societies, this article emphasizes medicine's dependence on and accountability to nonmedical professionals, such as nurses, allied health clinicians, administrators, policy makers, managers, information technology specialists, and, last but by no means least, health care 'consumers' and their caregivers. The article makes the point that medical discourse is no longer appropriately studied *in vacuo*. Although medical talk may still occur in settings where we find

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Introduction

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doctors interacting with patients or other doctors, and although medical writing still answers to the demands of disciplinary specialization, this article takes issue with analysts of discourse rendering invisible medical dependencies on other professional and nonprofessional voices and practices by constructing them as merely contextual, taken-for-granted, and therefore marginal to the analysis of medical language and discourse 'proper.'

Before setting this argument out in greater detail, let me illustrate some of these dependencies with an example. Consider the segment of medical discourse below. It is part of what is called a 'critical incident report' (CIR), a form used to report events that are judged to be 'out of order.' This segment was written by a doctor who was in charge of moving a patient from a rural to a tertiary hospital setting. The doctor wrote the report because he found that something was amiss with the way the patient had been treated by the other doctors (the patient had been intubated incorrectly) and felt that this unduly hastened the patient's death. A CIR, then, is an organizational device by means of which clinicians communicate about adverse or critical events in order to learn from such events and prevent them in the future. The headings are standard in the free text portion of the critical incident form.

> **Story**
> Patient with severe [internal] bleed. GCS 4 on admission. Intubated by doctor in Emergency Department. Left spontaneously breathing. Retrieval team arrived. Breath sounds heard within usual total assessment. Readied for transfer, paralysed for transport. Subsequent demise, presumed to be of neurological cause. Later review of CXR (not looked at by retrieval team) showed ETT in oesophagus.
> **Outcome**
> Cardiac arrest.
> **Steps Taken or Treatment Required**
> As presumed to be neurological cause, patient already elderly and moribund, aggressive resuscitation not attempted.
> **Was This Incident Preventable?**
> Yes – always check CXR when available, re-check airway if paralysing.

For those interested in medical discourse, this brief text is rich for a range of reasons. First, there is a degree of mimesis between the criticality of the event and its multiple acronyms (its abbreviated semantics) and its staccato syntax. In that sense, the CIR is reminiscent of the medical chart or the patient medical record produced in hospitals. Second, the text is a standardized 'genre,' insofar as critical incident reporting has crystallized as a particular textual construct across various types of organizations. Yet this genre is complex, as it is a curious combination of narrative fragments: *Story* (what happened), *Steps Taken* (what did you do), as well as more technical components: *Outcome* (an assessment about what this incident produced), and *Was This Incident Preventable?* (a judgment about how avoidable the event was). Genre as 'standardized meaning making ritual' has been deployed as a perspective for making sense of medical discourse, but largely only in relation to traditional constructs such as dyadic medical consultations, medical notes, monodisciplinary ward rounds, and 'case presentations.'

Yet another dimension of the text is its context. Context is commonly mentioned in analyses such as those cited above but remains little explored on the assumption that it merely enables the production of the text that is the ultimate focus of attention. From the CIR above, however, it is evident that it was the considerable contextual or **organizational** complexity that played an important role in bringing about the occurrence described and in producing the CIR in the first place. We can go further than this and conclude from the introduction of CIRs into medicine more generally that it is clinical–organizational complexity that is increasingly at the heart of medical work, to the point where all kinds of new genres and discourses are now seen to be necessary to handle these organizationally complex facets of medicine.

As one among a number of such emergent discourses in and around medicine (such as clinical guidelines, clinical benchmarks, and so on), this critical incident report provides a means to reflect on how the work performed by people in one department affects what others do elsewhere, whether clinical documentation and communication facilitate such care trajectories, how other professionals fit into them, and whether adverse events arise as a consequence of care trajectories' lack of explicit, proactive organization. The CIR as discourse phenomenon thus enables reflection on the changing nature of medicine more broadly and on how emergent medical genres and discourses now increasingly serve to foreground the integration of medicine with those alternative dimensions of patient care on which it increasingly depends: information and communication technologies; medical scientific evidence and treatment guidelines that are continually updated; patient and family preferences, concerns, and complaints; proactive interfacing of medicine with nursing and allied health practices, and so forth.

Perhaps the dearth of linguistic attention to these contextual-organizational dimensions of medicine can be explained by pointing to the intimate sociological knowledge of situated medical practice that it requires. As Cicourel noted many years ago,

> Participants of discourse or readers of a text are always engaged in selective use of the information that they can attend to. Limited capacity processing constraints imposed by a complex setting and the participants' knowledge base can sharply reduce the participants' comprehension of what is taking place. The researcher faces similar problems. We normally examine single utterances or connected discourse that run for a few lines, giving careful attention to lexical items, pronominal usage and repetition, the repetition of clauses that give referential prominence to a person, object or event, WH-cleft constructions, IT-cleft constructions, relative clauses, rhetorical questions, and the like; yet we may avoid or be unaware of information that presupposes organizational constraints and complex social relationships that can be obtained only by ethnographic field research. (Cicourel, 1982: 53)

We could say that we are interested only in the linguistic details of specific people's discourse practices and not in the multivariate complexities that professionals confront when faced with **organizing** their expert work with others. This article suggests, however, that downplaying 'organizational constraints' as pointed to by Cicourel poses not just an analytical problem, but also a political quandary. Much linguistic analysis has delineated medical discourse in such a way as to conform with and thereby reinforce medicine's own preferred self-image as an autonomous profession accountable only to itself – an image that in current circumstances is not just becoming unrepresentative of what medicine does, but also untenable in view of contemporary ethics.

It is on those grounds that this article seeks to shift the spotlight toward research that has investigated the 'conditions of possibility' of medicine; that is, the organizational and professional practices that in effect afford the execution of medicine. The article profiles a body of research that operates on the interstices of a number of disciplines (linguistics, discourse analysis, health services research, nursing research, medical sociology, and clinical ethnography) and that questions the view of medicine as 'discourse of all discourses.'

The research reviewed here challenges the closure that medicine itself imposes on what medicine is and does, and it defines its object of research in a way that exceeds the boundaries currently observed by the majority of linguistic and discourse studies of medical language. If we ask how have the linguistic sciences constituted medicine as their object to date, we could start with perusing the contents of prominent publications associated with the disciplines of linguistics and discourse analysis: *Journal of Sociolinguistics*, *Journal of Pragmatics, Discourse and Society, Discourse Studies, Text, Research on Language and Social Interaction*, as well as overview publications such as the *Handbook of linguistics, Sociolinguistics: An international handbook of the science of society*, the *Handbook of pragmatics*, the *Handbook of discourse analysis*, or more specialized collections of papers such as *The construction of professional discourse* (Gunnarson *et al.*, 1997), *Talk, work and the institutional order* (Sarangi and Roberts, 1999) and *Talk at work* (Drew and Heritage, 1992).

What confronts us in our survey is a dearth of work on health care discourse and practice generally. In addition, we notice an emphasis on doctor talk, whether with patients or about patients. Then, of course, there are specialized domains such as 'clinical linguistics,' which centers on language disorders and speech pathology; a domain of analysis concerned with medical records and clinical documentation; a field of study that targets medical scientific discourse, its metaphors, and its technicalities; and one that considers the representation of health and medicine in the public domain. The literature further reveals that there is research on **intraprofessional** or doctor–doctor communication, but considerably less that systematically addresses **interprofessional** communication (doctors talking to nurses or allied health clinicians). There is even less research that addresses more complex stakeholder configurations involving interactions between doctors and health care managers, health policy makers, special interest groups, or community representatives. Little to no research targets the practices and discourses of health organizational change.

This article problematizes these cut-off points inherent in the distinctions that the research just cited brings to bear on the study of medicine and medical practice. It does so in two ways. First, it points to evidence that modern medicine is now so complex that the distinctions just reviewed are increasingly difficult to maintain epistemologically and ontologically, and therefore analytically. Second, this article reviews work on medical discourse that has operated in the margins of existing research, by addressing the multidisciplinary, organizational, and technological dimensions of health care provision through which and thanks to which medicine is increasingly being reconfigured.

To realize these two aims, this article first presents a sketch of the complexity of 21st century Western health care by teasing out how the relationships between medicine, the other health professions, the State, the public, and policy have changed over the past 30 or so years. Second, and as presaged above, the article considers work that has begun to extend beyond established analytical parameters, in ways that do not delimit medical discourse and communication purely within the doctor–patient dyad, the

technicalities of medical notation, or the peculiarities of medical science. This alternative work approaches medicine from a more 'ecological' perspective to encompass increasingly pervasive features of medical discourse and practice, such as team communication, multidisciplinary procedure mapping and treatment execution, risk management and practice review processes, organizational coordination and management, information technology and electronic drug prescribing, test ordering, computerized patients records, and so forth.

21st Century Medicine: Social, Cultural, Political, Economic, and Organizational Complexities

For some, questions may remain about why we as linguists who are interested in the study of the languages of medicine need to concern ourselves with the ways in which medical practices have changed over the past three or four decades. Is there any basic change to the fact that individual doctors predominantly treat and communicate with individual patients and caregivers? Aren't hospitals much the same wherever we go, give or take a few new technologies and drugs, with similar medical specialties, common dress and uniform codes, analogous ward divisions and nursing populations, and related forms of administration and management? Even if there is evidence of medical subspecialization, organizational restructuring, and some task shifting between nursing and medicine, can it not be said that the same medicine – whether practiced as doctor talk or as medical writing – is still the mainstay of medical care? We can put this more assertively and say that, given the growing technological sophistication of medicine, its growing control over the boundary between life and death, and the increasingly multicultural constitution of medicine's client base, should we not set **more** store by understanding how doctors (are to) communicate with their patients and with one another and by clarifying how the discourse of medical science is unfolding?

Of course, the importance of work that has focused on illuminating the social values that underpin doctor–patient communication, medical professional communication, and historical or other aspects of medical discourse is incontestable. These initiatives are important for locating medicine as specialized practice in modern society. But part of this picture should be analytical attention paid to the changing face of medicine and to the implications of these changes for the practising doctor.

As part of illuminating the changes in medicine in contemporary society, we need not go back more than approximately 30 years. Medicine's pre-1970 history is far from irrelevant here, but suffice to say that, despite its heterogeneous origins, medicine gained a solid foothold in many industrialized and industrializing nation states in the course of the 20th century, combining science, specialized education and certification procedures, public institutionalization, and commercial investment. As a result of state support and institutionalization in the form of public hospitals, medicine was able to provide increasingly sophisticated treatments to growing numbers of people. These treatments forced up public investment and insurance, but medicine did little to manage its practices or its expenditures. Medicine's 'rise and rise' was slowed somewhat with the advent of the 1970s, when, as a consequence of the oil crisis and other socioeconomic pressures, its profligacy with public monies was gradually called into question. The close of the 20th century has seen medicine coming under further pressure due to a number of events that shook public confidence in its ability to control and maintain its members' standards of practice. Reports of serious medical failures in the United States, the United Kingdom, and Australia, in addition to findings suggesting that medical practice commonly results in approximately 10% of patients incurring injuries and deaths, raise critical questions about the trust and hope that societies have invested in doctors to act as people who practise medical science for the benefit of their patients in rational, expert, and judicious ways.

The importance of these developments for linguistics and discourse analysts lies in the change of status that medicine has had to confront over the last two to three decades in most countries. Clearly, the autonomy and status built up by medical professionals during most of the 20th century have not just begun to be questioned but also eroded. In even the most routine facets of medical practice, doctors are affected by a host of constraining influences such as guidelines, clinical pathways, policies encouraging multidisciplinary approaches to teamwork, resource utilization checks, lengthy hospital accreditation surveys, 'clinical pertinence' reviews (which focus on whether medical records are properly filled out), practice guidelines, and so on. Furthermore, analyses of medical discourse can no longer ignore the interests, involvements, or influences of alternative stakeholders, even if they are not always physically copresent in the consultation room, on the ward, or in the laboratory.

These stakeholders have made an indelible mark on the profile of medical discourse and practice, by requiring doctors to engage in 'informed consent' procedures (ensuring that patients are aware of the

implications of treatments provided); 'critical incident reporting and monitoring,' 'root cause analysis' processes, complaints commissions' inquiries, health care consumer organizations' initiatives, nursing unions' requirements for practice standardization and for nurses to increase their skills or cross-train, policy makers' and medical colleges' guidelines as to how to dispense medical services and treatments, managements' directives with regard to resource expenditure and budget cuts, patients' families' requests for extended care or special drugs, litigants' legal claims following substandard care, Internet group campaigns for the legalization of specific drugs, issue groups' objections to genetic predetermination and experimentation, pharmaceutical companies' pressure to prescribe brand-name drugs in place of their generic counterparts, and so on. In view of the impact of these phenomena on daily medical practice and the stresses that they cause for many doctors, it would be amiss for analysts interested in medical discourse to portray it as if these constraining influences remained peripheral to what doctors do and say, or without consequences for who they talk to and what they write about.

Put more succinctly, contemporary medical discourse, whether spoken by the single doctor to a single patient or produced during a critical incident review procedure, is *überhaupt* ('always already') shot through with multiple competing interests. In this day and age, medicine consults, diagnoses, and researches in a 'crowded space.' In addition to being inevitable in the modern-day hospital, medical discourse that creates a space for different disciplinary and stakeholder views is central to producing good medical outcomes. In reality and in practice, then, medicine is fast becoming one voice among a host of others, offering one set of expertise and relying on others for different and complementary views, knowledge, and insights. The question that arises at this point is whether there is research that has addressed any of the linguistic-discursive characteristics of these emergent facets of modern medicine.

Linguistic and Discourse Studies of Medicine as Crowded Space

As should now be more than evident, the view put forth in this article is that linguistic and discourse research needs to investigate medical language and communication so as to capture the 'crowded clinical spaces' in which it is enacted. This is not only crucial for doing justice to the complexity of contemporary medical discourse, it also prevents us from becoming unwitting players in the struggle over the changing definition of 'profession' in medicine and from finding ourselves on the side of a medicine that tries to defend its traditional boundaries in the face of inevitable reform (Dent, 1998).

Let us turn then to an overview of a heterogeneous body of work that confronts medical language and communication in a way that cuts across the neat confines of interactions occurring between doctors and patients or among doctors themselves. This body of work sets store by whether and how interprofessional and organizational coordination and communication are achieved, maintained, and, in some cases, enhanced. A good number of the investigations cited pay little attention to the linguistic details of medical representation, whereas in those that do, technical linguistic-interactive constructs, such as turn-taking, topicalization, hedging, and coherence, and so forth, have become subjugated to the need to answer questions about intraprofessional and interprofessional practices and processes (Cicourel, 1987: 220).

It is important to begin, then, with acknowledging that a considerable amount of work on intra- and interprofessional clinical communication has been performed in disciplines that are not concerned with producing linguistic or discourse analytical findings. This includes work of a more instrumental or solution-oriented sort as well as (critical) sociological, anthropological, and ethnographic enquiries. Such studies are important, even if judged from a linguistic perspective they provide little insight into the syntactic, semantic, and generic features of the discourse practices under description.

That said, there is a small body of work that uses discourse analytical methods for understanding and enhancing clinical–organizational communication. Especially interesting for the purposes of the present article is work that uses linguistic and discourse analyses to study multidisciplinary team meetings, with the aim of understanding the interprofessional dynamics between doctors and nurses, and how these affect care planning (Engstrom, 1986). Related findings range from the extent to which professional habitus enables or constrains cross-professional communication (Lingard *et al.*, 2002), to how professional identities appear to determine the character of work meetings, resulting in highly variable impacts of executive-level decisions (Iedema *et al.*, 1999), to how clinicians structure their communications as complex 'polylogues' (Grosjean, 2004). Also working across clinical–professional boundaries, Mellinger reported an interactive analysis of how paramedics and nurses coordinate their practices in environments filled with high levels of urgency and uncertainty (Mellinger, 1994).

Focusing specifically on the logic and complexity of doctors' practices and their relationship with clinical

documentation, Pettinari (1988) wrote an extensive study about the ways in which surgeons work and how they make notations about their work, illuminating the degrees of tacit knowledge and presumed understanding that come into play there. For her part, Hobbs has also performed some important work on elucidating the medical assumptions underpinning the technical codes and symbols of clinical notation in residents' progress notes (Hobbs, 2002). Others have addressed the work–documentation relationship, but from a sociotechnical angle, including Timmermans and Berg (1997).

The complexities of various kinds of medical treatment are described in the work by Mol (2002) and Fox (1993), both of whom use versions of discourse-based ethnography. With regard to analyses of talk by doctors as professional identities, Montgomery-Hunter (1991) studied a variety of dimensions of medical discourse, such as case presentations and medical records as 'doctors' stories,' and Jordens and Little (2004) described how doctors frequently position themselves in interview talk by enunciating a genre that is agnate to the Directive.

Surprisingly, given the enormous changes that it has undergone in recent decades, there is limited work that has addressed the relationship between doctors and managers (Griffiths and Hughes, 2000) or, more broadly, between clinicians and nonclinicians (Smith and Preston, 1996). It is these domains of investigation in particular that have least been broached by linguistic and discourse approaches, with some exceptions. Iedema *et al.* (2004) have addressed the delicate interactions occurring between clinicians and managers in a health care organization that faced hospital reform, whereas Pope *et al.* (2004) have studied the discursive tensions among policy statements, managers' views, and clinicians' uptake of the shift toward 'elective treatment only' centers. These analyses in effect contribute to redesigning the substance of the 'conversations' that currently characterize and constitute the clinical–managerial interface and to restructuring the evaluation of health care delivery based on those emerging conversations (Degeling *et al.*, 2004).

Prominent for our purposes too is research arising from within nursing. The work of Crawford *et al.* (1998) analyzes nursing discourse and offers insight into a number of facets of nursing care, including into how clinical notation relates to what is spoken about among nursing clinicians and into the socially constructed nature of clinical knowledge, its documentation, and its implications for how care is organized. Crawford and colleagues' work belong to a vibrant tradition of nursing research that applies discourse analysis as methodology for illuminating general nursing issues (Boutain, 1999; Lawson, 2002).

A thorny issue for nursing research is how the nurse–doctor relationship impacts on what the nurse does. Manias, Street, and Cheek are among some nursing researchers doing critical discourse ethnographies of nurse–doctor interactions (Manias and Street, 2001) as well as of nurse–doctor communications enacted through chart notations and the like (Cheek and Gibson, 1996). Consonant with the concerns of these investigations, there is research emerging from within the discourse analytical tradition that also deals with doctors' and nurses' talk from the perspective of what it says about how they work together as members of multidisciplinary clinical teams (Iedema *et al.*, 1999).

Finally, innovative work on engendering new clinical practices involving different professionals as well as patients is emerging from the University of Helsinki under the guidance of Yrjö Engeström (see Engeström, 2003). Engeström's work is better categorized as belonging to what he terms 'Activity Theory' than to language or discourse research, and this is not least because he uses complex video data to describe and reflect on what clinicians do with and around patients. Examples of highly innovative practices designed in this way are reported in both Yrjö and Ritva Engeström's publications, centering on creating continuity of care across health caregivers and services by involving an acute-care specialist, a general practitioner, and the patient in his/her care planning meetings (Engeström, 2003). It is studies like these that are truly beginning to reinvent relationships and services in health care systems that for too long have relied on the image of the autonomous doctor epitomized by the doctor–patient consultation. Here, new conversations such as that presaged in Degeling *et al.*'s (2004) work cited above are beginning to be proactively configured and investigated, in a move toward recognizing that the organization of doctoring is no longer a peripheral issue to contemporary health care and medicine.

Conclusion

In closing, let us return to the theme we started with. Above, we cast a brief glance at the contents of the major linguistics and discourse analysis publications, including journals, overview publications, and collected papers. It was stated that emphases in these publications were placed on how doctors communicate with patients (and vice versa) and on how medical discourse has written itself in the past or writes itself in the present. The article proceeded to argue that the orientations of medical discourse research are

out of step with the face of 21st century medicine. Only a minority of researchers have taken steps not just to contextualize the study of medical and clinical discourses and practices with emerging consumer, managerial, policy, and organizational issues in health care, but to shift the focus of description from the medical consultation (which stopped being the apotheosis of health care with the shift toward medical and information technologies) toward the multidisciplinary team and focus on the ways in which it plans, communicates, and delivers care.

This article suggested that, if medicine operates in complex social, cultural, organizational, and political environments, few of which can be relied on to 'spring spontaneously from the discourse', linguistic and discourse researchers may need to rethink the basis of their methodology as well as the focus of their approach to medicine as a disciplinary regime. With regard to methodology, we reiterate Cicourel's (1982) call for a more ethnographically informed kind of linguistic–discourse analysis. As for linguistics' focus on the discourse of medicine, I have argued that the task of a socially and organizationally aware and practice-oriented analysis is to understand and clarify the dynamics of, and the struggles that choreograph, the contexts of which its objects of investigation are part. Put differently, analysis should not fall victim to the notion that the empirics of situated language production can substitute for an analysis of social life. Particularly at a time when health care is changing on an almost daily basis and is increasingly under pressure from more and more parties claiming interest and influence, our engagement, as linguists and discourse analysts, with processes through which the new medicine is increasingly being constituted is no longer a luxury option.

Finally, several publications that combine delicate linguistic analyses with penetrating commentaries on the changing nature of medicine and health care have been cited. On that score, the present article bears witness to the fact that meaningful social engagement and linguistic delicacy are far from a zero-sum game. On the contrary, the subtext driving this article is that linguistic and discursive analysis is central to not just understanding and clarifying health professional and organizational change for ourselves as analysts, but provides a means to enable professionals to come to terms with the increasingly challenging complexities of their clinical work.

See also: Anatomical Nomenclature: History; Genre and Genre Analysis; Health and the Media; Medical Discourse: Doctor–Patient Communication; Medical Specialty Encounters; Organizational Discourse; Speech Genres in Cultural Practice.

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Medicine: Use of English

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English: Its Role as a Lingua Franca in the Techno-scientific Field of Medicine

A lingua franca is a common language serving as a regular means of communication relating to scientific, technological, and academic information between different linguistic groups in a multilingual speech community. Historically speaking, English first evolved as a lingua franca in the late 19th and early 20th centuries as a result of the British Empire, which exported its own language to all corners of the earth. In the second half of the 20th century, the American Empire replaced the British Empire throughout the world. English has reasserted itself as a medium for universal communication in an increasingly interconnected world.

English is now the dominant or official language in over 60 countries and is represented on every continent (Crystal, 1997). Moreover, English is the dominant voice in international politics, banking, the press, news agencies, broadcasting, the recording industry, motion pictures, travel, technology, knowledge management, and communications. It is the main language of the Internet, not to mention books, newspapers, airports and air traffic control, international business and academic conferences, sports, international competitions, pop music, and advertising. English has equally become the common language of international experts in a wide range of subjects, such as medicine, the natural sciences, and the social sciences. In addition to this, an estimated three-quarters of the world's mail is written in English and most of the information stored in electronic retrieval systems is in English. Consequently, English is now needed in order to adjust to the world trend of keeping pace with scientific, technological, economic, and social advances.

English as a Medium of International Communication in the Medical Sciences: Extralinguistic Factors

The rise of English as the lingua franca of science and technology in the second half of the 20th century seems to be determined by cultural and extralinguistic factors rather than by inherent linguistic characteristics. The origin of this phenomenon does not lie in any inherent stability of English for its adoption as an international language, but in the sociopolitical

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changes that, mainly due to the Anglo-American influence, have taken place after World War II. All the countries in Western Europe have been affected to a greater or lesser degree by this dominant role of the United States of America, which is related to several well-known factors, such as their military, political, economic, scientific, and technological leadership, as well as the creation of the Atlantic Alliance and the diffusion of the culture, lifestyles, and behaviors of the English-speaking world. English has equally become a prime vehicle for the transmission of information, which explains its nearly absolute dominance in most scientific fields, because not only the world's most widely cited medical journals but also most of the best contributions in science and medicine are published in English in international European or American journals. To this overall presence of English in traditional written communication systems, we must add the World Wide Web and the computer networking Internet, whose predominantly English voice has been rapidly exported from and imported into many languages. Therefore, non-English-speaking scientists, researchers, and practicing doctors have no other option but to learn English if they want to be informed of the latest developments in their fields.

As English has turned into the primary medium of international specialized publication, many non-English-speaking scientists, being aware of the relevance of medical literature in English to their work and wanting to obtain responses to it, find it more effective to publish in English than in their native language. In this respect, it is interesting to note that many nations measure the productivity of their top international scientists and scholars by the number of times their works are quoted in English-language publications with an impact factor by the Science Citation Index. The increasing tendency toward publishing the most important contributions in English and in top general-science journals, usually published in English, runs parallel to the standardization of research lines and the uniformity of writing style dictated by the editorial boards of scientific journals whose members, in a large proportion, have English as their mother tongue.

Apart from being the primary medium of scientific publication, English has likewise emerged as the main language of international gatherings of specialists and of international scientific exchanges. In fact, the high level of technical and scientific knowledge, the necessity of collaboration among several specialists in order to establish a common base for work, and the complexity of the organization of production and of services in today's society are all factors that foster the use of the same technical terms contemporaneously. This trend to increasingly use one lingua franca, and in relatively few journals for each science, favors a smoother communication between scientists and, consequently, a rapid progress in science.

The continually increasing contact between non-English-speaking scientists and the English-speaking scientific world, mainly through reading and, to a lesser extent, through writing and attending conferences, even reaches meetings of the national type and daily informal conversations between colleagues and national journals, where many English terms tend to creep in. The publishing scientists are equally given stylistic and rhetorical recommendations to write academic papers in their own native language, which follow and imitate the norms characteristic of the foreign English culture.

Despite the obvious advantages of the existence of English as a lingua franca, its achievement nevertheless runs parallel to a series of interrelated drawbacks. One of the disadvantages caused by the supremacy of English in the world of science would be that the body of medical knowledge published in other languages is not taken into account. This fact indicates ignorance of the role played by these languages in the different phases of creation, invention, and innovation, and this may lead to uniformity of thought. Also at issue is the scarce participation of non-English-speaking scientists in the editorial policies of the major internationally recognized journals.

Borrowing: Linguistic and Extralinguistic Factors

Borrowing is one of the normal neological processes that every language has at its disposal to enrich its lexis. This neological process consists of two consecutive operations. First, a speaker is put in contact with a foreign word and adopts it in his or her language. This does not mean that the adopted word is used as it is in the original language. Usually, the speaker adapts the foreign word to the phonetics of the language he or she speaks. Then comes the diffusion and establishment in the recipient language of the generally phonetically adapted loanword. Thus, the former transfer is essentially an individual act, which can be completed by the latter, diffusion and establishment, which involves collective acceptance, and results in integration.

Since all loans are neologisms, the underlying cause of borrowing, from either internal or external sources, is fundamentally the same as that of neologisms in general, i.e., the need for language, as a means of communication and expression, to take account of changes in the nonlinguistic world. But

loanwords differ from other types of neologisms in that their components or models are taken from external, and not from internal, sources. As far as the external source is concerned, drawing loanwords from any foreign language, which is traditionally known as "lexical borrowing" (Haugen, 1950; Hope, 1971), is a direct consequence of a response to the internal lexical needs of a recipient language. The extension of the frontiers of knowledge in science and technology in particular has been accompanied by the creation of a vast terminology necessary to describe the discoveries made and to express the concepts that evolved in the course of this development. As English has become the international language used in science and technology, it is not surprising that it has become the primary source for the creation of new concepts and their corresponding denominations. These new concepts tend to carry their names into the adopting languages, becoming on many occasions integral parts of their word stocks.

Every language (unless it is a dead language, such as Latin) cannot avoid interference with other countries and other cultures, especially when this language has become a lingua franca in several fields of knowledge. This is the case for English, which had been a receiving language for centuries and is now supplying other languages with the necessary English loans or Anglicisms. Sometimes the speed of development of new knowledge, which requires new words for new concepts, does not allow enough time to find a suitable translation, or it may be that laziness prevents this translation to be found. The tendency toward economy of expression and the law of least effort can also be responsible for borrowing because the borrowed element is frequently a short term that the speaker and, above all, the writer are inclined to adopt, or it is often quicker and easier to borrow the foreign terminology along with the science, behavior, or product than to mine one's own language for a suitable expression. Economy of expression is not the only purpose that prompts the use of English loanwords. Often the employment of a new and shorter term aims at precision and clarity if the recipient languages do not dispose of an unequivocal equivalent. The transfer of Anglicisms can also be accounted for by the scientists' extensive reading of English-written medical literature. Another common feature, such as the greater facility with which English produces noun compounds, equally favors the adoption of straight English loanwords. Although the borrowed terms can be rendered by means of glosses and paraphrases, the lack of specificity and economy of some of the proposed solutions may lead to the conservation of their original form. The avoidance of homonymic clash may likewise induce keeping the borrowed term unchanged, for instance, the English term *shock*, which has come into Spanish in order to avoid being identical in form and sound with the already existing Spanish word *choque*.

These linguistic factors are not solely responsible for the adoption of Anglicisms. Social and psychological pressures also enter strongly into the promotion or assurance of their acceptability. The new foreign loanwords, associated with the strongest nation in the world, i.e., the United States of America, quite naturally take on certain general attributes of prestige, as they may evoke an image of quality, efficiency, reliability, and modern living. Also important is the in-talk of certain professional groups, who may rely on a borrowed terminology to mark their status while excluding others. Usually quoted examples are the medical and legal professions. Sometimes the adoption of English loanwords is prompted by the desire for a euphemistic term to express in a less direct way concepts regarded as painful or embarrassing. Pretentiousness and snobbery can equally cause words containing grouping of letters impossible in non-English languages to have an attraction for their speakers, who may also be tempted to borrow terminologies wholesale from English either for international comprehensibility or for greater acceptance among their peers.

Medical Anglicisms: Their Presence in Non-English European Languages

Medical terminologies, at least in Western Europe, rest on a fundamentally Latin nomenclature and on neologisms built up with roots, prefixes, and suffixes drawn from Greek and Latin, especially in the fields of anatomy and physiology (Dirckx, 1983). From the Middle Ages to the recent past, Latin, German (Standard German), and French all served traditionally as international languages in the field of medicine. Traces from other European languages, such as Italian and Spanish, may be found as well. Non-European languages have contributed, although to a lesser degree, to the formation of international medical terminology. But on the whole, the current growth of this melting pot of words from different origins is mostly due to the clear supremacy of the United States of America, which, especially after World War II, has been very strong (Maher, 1986). As English has turned into the most powerful medium of medical and scientific communication in Europe, it is not surprising to find hundreds of English words whose use has become common and standard in other European languages. Even a large proportion of these English words are now commonly found in medical

dictionaries written in languages other than English, which is proof of their acceptance within non-English-speaking medical communities.

The influence exerted by medical English on other European medical languages has affected all levels of their linguistic systems, ranging from lexis and semantics to syntax and rhetorico-pragmatics, with the borrowing of vocabulary items being nevertheless by far the most common.

Lexico-semantic Level

A technical term is defined on the basis of a direct relationship with the thing signified. This is why, in the contact between two cultures and languages, technical terms generally pass from one to the other along with the things they denominate. The vast majority of the borrowed sequences reveal themselves as foreign because of their spelling pattern, which may contravene the rules of syllable structure or phonemic distribution of the recipient languages. Examples of univerbal lexical Anglicisms with geminated vowels and consonants, consonant clusters, unusual graphs, or graphs in unusual positions found in many non-English European medical terminologies would be, for instance, words such as those found in Table 1. Scores of multiverbal lexical Anglicisms with consonant groupings are listed in Table 2.

The form of a word sometimes encourages the preference for an unadapted Anglicism. Compounds that contain a noun and a particle are generally considered difficult to translate or impossible to translate adequately. This is why they can be found in various domains related to medicine (see Table 3).

The economy of expression given by the *-ing* form also makes it an extremely popular structure with specialist writers, and it is not strange to find it in a wide series of simple and compound terms, such as those found in Table 4.

Although the vast majority of graphically unassimilated Anglicisms do reveal themselves as foreign, because of either their orthographic pattern or the lack of relation between pronunciation and spelling, there are several borrowed terms the spelling of which fits perfectly into the morphological patterns of the adopting language. Among these we could include words that are seldom pointed out by inverted commas or italics (see Table 5).

In some cases, the borrowed words acquire native status by the degree of adaptation they undergo. This adaptation allows the foreign word to be adjusted to the prosodic, phonetic, or spelling norms of the borrowing language. Examples of words once considered to be foreign but fully adapted into a language such as Spanish would be the adjective *standard* and the noun *stress*, which have become *estándar* and *estrés*, respectively, in order to sustain the Spanish principle that a word should be written as it is pronounced.

The role as a donor language played by English is also especially noted in the field of abbreviations, which are simply adopted by the recipient languages. Particularly common in medical writing are the initialisms, which consist of the first letters of the words that compose a phrase and which are especially popular for the names of diseases and of diagnostic and therapeutic procedures. These initialisms are not only understood within the profession, but they are also almost invariably substituted, even in print, for the full expressions. For example, *corticotropin* is probably better known by the initialism ACTH (adrenocorticotropic hormone) than by its full native name. The same happens to other compressed forms (see Table 6).

Table 1 Lexico-semantic level

Box	Buffer	Cast	Clamp	Distress	Flash
Flush	Flutter	Insight	Linkage	Loop	Patch
Pattern	Plug	Pool	Prick	Punch	Rash
Scatter	Scratch	Shunt	Stapler	Stent	Thrill

Table 2 Lexico-semantic level

Black tongue	Breakthrough	Bulldog	Buffy-coat
Checklist	Cross-match	Feedback	Crown glass
Flint glass	End-point	Glossy skin	Heat shock protein
Half-life	Lag phase	Mismatch	Open door
Odds ratio	Setpoint	Second look	Step and shot
Stem cell	Threshold		

Table 3 Lexico-semantic level

Acting-out	Blackout	Burnout	Bypass
Check-up	Crossover	Crossing-over	Cut-off
Down-regulation	Flare-up	Follow-up	Input
Output	Run-in	Run-out	Turnover
Up-regulation	Upward creep	Washout	

Table 4 Lexico-semantic level

Banding	Binding	Capping	Case-finding	Clamping
Clapping	Clinging	Clubbing	Clumping	Coping
Counseling	Doping	Dumping	Flapping tremor	Free-standing
Hardening	Kindling	Mapping	Panning	Priming
Quenching	Scaling	Screening	Smoldering	Smoothing
Splicing	Splitting	Strapping	Stripping	Taping
Walking	Wasting			

Table 5 Lexico-semantic level

Antisense	Borderline	Clearance	Cluster	Compliance
Core	Covariance	Deviance	Helper	Hospice
Primer	Rate	Template	Variance	

Table 6 Lexico-semantic level

ATP (adenosine triphosphate)	BUN (blood urea nitrogen)
DNA (deoxyribonucleic acid)	HDL (high-density lipoprotein)
LDL (low-density lipoprotein)	MRI (magnetic resonance imaging)
PCR (polymerase chain reaction)	RNA (ribonucleic acid)
TSH (thyroid-stimulating hormone)	

Table 7 Lexico-semantic level

ACE (angiotensin-converting enzyme)
ELISA (enzyme-linked immunosorbent assay)
NEFA (nonesterified fatty acids)
PEEP (positive end-expiratory pressure)
PUFA (polyunsaturated fatty acids)
SPET (single-photon emission tomography)

Table 8 Semantic level

Buena práctica clínica 'good clinical practice'
Célula asesina 'killer cell'
Célula huésped 'host cell'
Dosis umbral 'threshold dose'
Efecto techo 'ceiling effect'
Estudio doble ciego 'double-blind study'
Línea basal 'baseline'

Another type of abbreviated form is the "acronym," i.e., an initialism that can be, and customarily is, pronounced like a word. Very common English medical acronyms include those found in Table 7.

The bulk of loanwords borrowed from English usually belong to the nominal category, whereas the adjectival category plays a very small part. Exceptions in the language of medicine, and mainly used orally, would be adjectives such as *low*, *high*, or *light*, which, on the other hand, are not technical terms but words used in both common and specialized languages. A rare case of importation of adjectives in the written form would be the expressions *slow-low* and *rapid-high*.

Worth mentioning is the fact that when an English word is taken into a foreign language, an adaptation of its meaning usually takes place. This adaptation follows a general tendency to narrowing of meaning, a fact especially obvious with items that are polysemic in the source language, and it is therefore usual for them to be borrowed from one specific context and with one meaning. The same term, together with its specific meaning in each case, may also be borrowed from other contexts and may be found in different medical branches and even in other fields outside medicine. For instance, *scaling* belongs to dermatology, odontology, and statistics, whereas *loop* has entered not only medicine but also aeronautics, computer science, and economics.

Semantic Level

Another quite frequent means of expressing new concepts in a recipient language is through semantic borrowing, which consists of applying a foreign meaning to a native word and which sometimes cannot be easily identified because a native element is involved. Two main word-formational devices can be distinguished under this type of borrowing: (1) semantic loanword, for which a native word acquires a new meaning under the influence of the corresponding English cognate, i.e., a word derived from the same, generally Latin root; and (2) loan translation or *calque*, which is the result of the translation of an English collocation into the recipient language. It is significant that many examples of semantic loanwords, once numbered among the so-called *faux-amis* or *false friends*, i.e., words that are spelled the same, or almost the same, in two different languages but have different meanings, today have become current usage in medical literature. Good cases of semantic loanwords would be those of the Spanish verb *asumir*, which has taken on the additional English meaning of 'to assume,' or of the Spanish nouns *evidencia*, which is used as the equivalent of 'sign,' 'proof,' or 'testimony' under the influence of *evidence*, and *ocurrencia*, which, along with the meanings of 'idea' and 'funny remark,' is also used in the sense of 'happening,' according to *occurrence*. Examples of Spanish calques on English expressions are shown in Table 8.

Further examples of prepositional phrases in Spanish would be the eponymous expressions, which have always been widely diffused in the language of medicine. It is sufficient to mention just a few of these expressions composed of a proper noun and a common noun (see Table 9).

Syntactic Level

Although the impact on grammatical structure is less than that suffered by lexical and semantic levels, certain syntactic Anglicisms have definitively taken root. In Spanish, one of these Anglicisms would be an increased use of the passive voice instead of the more usual reflexive. The use of the gerund with a sense of posterity and consequence or effect would

Table 9 Semantic level

Ciclo de Ross 'Ross cycle'
Enfermedad de Parkinson 'Parkinson's disease'
Ley de Allen 'Allen's law'
Prueba de Addis 'Addis test'
Reacción de Porter 'Porter's reaction'
Signo de Hoover 'Hoover's sign'
Syndrome de Cushing 'Cushing's syndrome'

Table 10 Syntactic level

Campaña anti-aborto 'anti-abortion campaign' instead of *campaña antiabortista*
Carcinoma célula pequeña 'small-cell carcinoma' instead of *carcinoma microcítico* or *carcinoma de células pequeñas*
Depresión posparto 'postpartum depression' instead of *depresión puerperal* or *depresión del posparto*
Diabetes insulina-dependiente 'insulin-dependent diabetes' instead of *diabetes dependiente de la insulina*
Estudio caso-control 'case-control study' instead of *estudio de casos y controles*
Linfoma no-Hodgkin 'non-Hodgkin's lymphoma' instead of *linfoma no hodgkiniano*
Variabilidad interanálisis 'interassay variability' instead of *variabilidad interanalítica*

be another example of syntactic Anglicism. English equally appears to have encouraged the attributive use of nouns where Spanish requires adjectives or prepositions (see Table 10).

The greater flexibility of the adverbial position in English would have also led to the placement in new positions of adverbs and adverbials in other European languages. Moreover, there seems to be an increasing tendency in the written scientific Spanish language for the word order subject–verb–object, which might be owed to the influence of English, in which this word order is virtually fixed.

It is equally interesting to note the frequent appearance of the particle *like*, which can be combined in all sorts of compounds (see Table 11). All these compounds show the influence of English at the lexical and syntactic levels. On the one hand, the adopting lexicon is enriched with one English word, and, on the other hand, the preposition is placed after the noun and not before it, as is required by syntaxes such as the Spanish one. *Like* may also be added to words of the recipient language, thereby illustrating the linguistic phenomenon called 'loan blend,' i.e., formations between loanwords and calques (see Table 12).

Likewise, the mixture of calques and lexical Anglicisms should be noted in the Spanish expressions *célula helper* 'helper cell' and *célula natural killer* 'natural killer cell,' to mention just two of the many mixed syntagms that are characteristic of specialized

Table 11 Syntactic level

Myelin-like	*Inhibin-like*	*Heparin-like*	*Insulin-like*	*ICS-like*
HLTV-III-like	*PDGF-like*	*PUU-like*	*5-HTL-like*	

Table 12 Syntactic level

Anfetamina-like 'amphetamine-like'
Colágeno-like 'collagen-like'
Eczemática-like 'eczema-like'

languages where a feeling of urgency drives scientists to coin expressions with words from different origins. Other mixed words due to English influence would be the Spanish verbs *deletear*, *mapear*, *printear*, *reportar*, and *testar*, which conserve the first component of the English verbs 'to delete,' 'to map,' 'to print,' 'to report,' and 'to test,' respectively, and add them the verbal Spanish morpheme *-(e)ar*.

Phonemic Level

Language contact situations do not bring about phonemic importation as the original English phonemes are replaced in all cases by native phonemes, which are approximately equivalent and follow the native rules governing syllable-structure and stress. For instance, *stripper* /'strīpə/, whose initial 's' plus consonant does not exist in Spanish, is pronounced /es'triper/, even when the original spelling does not undergo any change. Another word with the unmodified spelling is *screening* /'skri:nīŋ/, which is pronounced /es'krinin/. Although there is no phonemic importation, the phonemic system does undergo change in that phonemic redistribution may take place as a result of the Anglicism, as occurs with plosive consonants, which may occupy new distributional paradigms, especially in the final position.

Typographic Level

An example of typographic Anglicism would be the attachment to a noun by means of a hyphen of prefixes, such as the neoclassical *anti-* and the temporal or sequential *pre-* and *post-* (see Table 13).

The use of English inverted commas, instead of the Latin ones, or the absence of graphic accents and wrong spellings would exemplify further cases of typographic Anglicisms in Spanish (see Table 14).

Rhetorico-pragmatic Level

The extensive reading of English-written sources and of style manuals for writing academic papers, which are mostly translations of English papers, have led scientists worldwide to imitate some of the preferred English attenuating rhetorical patterns (Salager-Meyer

Table 13 Typographic level

Anti-alérgico 'anti-allergic'
Anti-núcleo 'anti-core'
Pre-núcleo 'pre-core'
Pre-test 'pre-test'
Post-test 'post-test'

Table 14 Typographic level

Catatonia 'catatonia' instead of *catatonía*
Osteitis 'osteitis' instead of *osteítis*
Colorectal 'colorectal' instead of *colorrectal*
Halucinación 'hallucination' instead of *alucinación*
Linfokina 'lymphokine' instead of *linfocina*
Hematopoiesis 'hematopoiesis' instead of *hematopoyesis*
Amfotericina 'amphotericine' instead of *anfotericina*

et al., 2003). The usual English tendency toward hedginess may be seen in Spanish in the epistemic use of modal auxiliary verbs expressing possibility, such as *puede(n)* 'can/may,' *podrían(n)* 'could/might,' in a greater use of the semi-auxiliary verb *parece(n)* 'to appear/to seem,' or in the presence of adjectives, adverbs, and nouns related to the modals (see Table 15).

The influence of English-speaking thought patterns may be equally responsible for another rhetorical strategy used abundantly today, i.e., the responsibility shifting that allows the researchers to 'defocus' the agents (researchers and readers) involved in the communication act and to focus on the information being transmitted.

The exclusive use of a correct term in the adopting languages to the detriment of possible synonyms might equally be owed to English influence. This would be the case of the Spanish verb *sugerir,* which, due to the influx of its English cognate *suggest*, has a greater frequency of occurrence than some of its synonyms, which could express in a better form the conclusion of a scientific work (see Table 16).

Table 15 Rhetorico-pragmatic level

Probabilidad 'probability'
Probable 'probable'
Probablemente 'probably'
Posibilidad 'possibility'
Posible 'possible'
Posiblemente 'possibly'
Quizás/quizá 'perhaps/maybe'

Table 16 Rhetorico-pragmatic level

Aconsejar	*Apuntar a*	*Colegir*	*Dar a entender*
Dar una opinión	*Dejar entrever*	*Demostrar*	*Denotar*
Desprenderse	*Evocar*	*Evidenciar*	*Hacer pensar*
Indicar	*Inferir*	*Insinuar*	*Mostrar*
Permitir suponer	*Poner de manifiesto*	*Poner de relieve*	*Probar*
Proponer	*Recomendar*		

Pseudo-Anglicisms

Although borrowing in a strict sense consists of the transfer into a recipient language of a word together with one of its meanings, it may be that some words acquire semantic extensions beyond their original meanings when taken in by other languages. Examples of pseudo-Anglicisms found in Spanish would be the English verb *relax*, which has turned into a noun with the senses of 'break' and 'relaxation,' and the English noun *scanner*, referring to medical computed-tomography scanning, which in its already hispanicized form *escáner* has expanded to encompass not only the meaning of *escanografía* 'scanography' but also other nonmedical applications such as the scanners used in supermarkets to read barcodes. Other pseudo-Anglicisms that must count as fully native in Spanish would be *blister* or *gating*, which have never been used in British English or American English, to refer to *blister pack* and *cardiac gating*, respectively.

A Word in Closing

Political and military might, economic power, and techno-scientific superiority seem to be the main factors that have brought about the role of English as a lingua franca. In addition, its overall presence in the content posted on the Internet and its nearly absolute dominance in scientific publications have turned English as a prime vehicle for the transmission of information. The vastly greater amount of research in English-speaking countries has equally led many European and Asian languages to be somewhat behind the times with respect to the plethora of English terminology being created every day. This is why much of this terminology has found a degree of acceptance in these recipient languages.

Although the development of English as a world language may be seen with concern because it gives the originating cultures, namely, the British Isles and the United States of America, a certain advantage, especially in the world of science, medical loanwords may nevertheless be contemplated as a reflection of the standing progress of medicine, which needs an appropriate increase in its vocabulary to provide a fluid scientific communication, not to mention the fact that many of the borrowed Anglicisms are

eventually translated into the adopting languages or assimilated to their genuine linguistic rules.

See also: English: World Englishes; Lexical Semantics: Overview; Lexicology; Lingua Francas as Second Languages; Medical Discourse: Hedges.

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Born on April 6, 1912 in Sint-Pieters-Jette, Achille Emile Meeussen studied classical philology in Leuven. He obtained his Ph.D. in 1938 with a thesis in the field of Indo-European comparative grammar (more specifically, on the criterion for ablaut phenomena). In the 1940s, he started publishing extensively on Flemish (Vlaams) dialects, Dutch, and also on African languages, a field which he then had recently discovered for himself.

In 1950, Meeussen, after spending some time at the School of Oriental and African Studies in London, became staff member of the Musée royal du Congo belge (later: Musée royal de l'Afrique centrale) in Tervuren, and in 1952 he was also appointed professor in the African Institute at the University of Leuven, where he was able to form a generation of well-trained Africanists and descriptive linguists. When the African Institute was closed, Meeussen continued his teaching at the University of Leiden (1964–77); he also taught sporadically in Lyon. He remained attached to the linguistic section of the Tervuren museum until his death on February 5, 1978.

Meeussen did fieldwork on a wide variety of Bantu languages, and initiated a comprehensive project on the comparative grammar and the reconstruction of Bantu (at present the project is continued by staff members of the Tervuren museum). He also studied African literature, music, folklore, and customs. In addition, Meeussen wrote insightful papers dealing with problems of phonology, morpho(pho)nology, and syntax, concerning Dutch (his native language), Japanese, and a number of Algonquian languages (Unami or Delaware, Cheyenne, Blackfoot, Mistassini or Inland Eastern Cree; cf. Swiggers, 1983). His most important achievements, however, are in the field of Bantu linguistics: a very impressive synchronic realization is his grammar of the Rundi language (1959); and his most important comparatist publications are his Bantu grammatical (1967) and posthumously republished lexical reconstructions (1980).

Meeussen's approach was a structuralist one, and his work represents a very coherent, systematic, and highly authentic brand of structuralism, characterized

eventually translated into the adopting languages or assimilated to their genuine linguistic rules.

See also: English: World Englishes; Lexical Semantics: Overview; Lexicology; Lingua Francas as Second Languages; Medical Discourse: Hedges.

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by methodological consciousness, and an acute sense of rigor and descriptive economy. He developed a formally based approach to Bantu tonological structures and morphosyntactic structures, anticipating aspects of autosegmental phonology (Meeussen's name is attached to a rule by which a sequence of two high tones is changed into a sequence of high + low, or by which two accents are reduced to a single accent). In later years, Meeussen used the formalist framework of generative linguistics (especially generative phonology), without subscribing to its psycholinguistic and metatheoretical claims.

See also: Bantu Languages.

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Meigret, Louis (?1500–1558)

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Louis Meigret is best known today for his *Tretté de la grammère françoeze* (1550) and his work on orthographic reform (from 1531 to his death). He was born into an important family of jurists in Lyon and pursued the typical Humanist career of translator. He translated primarily from Latin, but also from Greek and Italian, focusing on works about the art of war and the natural sciences.

Meigret's first foray into linguistic analysis came in his formulation of a new orthography for the French language. Many complained of the lack of correlation between the spoken language and the written; Meigret supplied some concrete suggestions in 1531, although these were not published until 1542.

For Meigret, the battle for an orthography in which each letter stood for one sound, and each sound was represented by only one letter was part of the greater Humanist program, in which reason rather than superstition would reign. Ironically for this dedicated scholar of Greek and Latin, reason meant abandoning real or imagined connections between the spelling of the ancient languages and the spelling of French.

The battle cry for orthographic reform appeared in *Champfleury* (1529) by the printer Geofroy Tory. In the same year Tory mentioned his intention to publish 'General Rules for the Spelling of the French Language,' but this work never appeared. An anonymous treatise on French orthography was published later in 1529, with the goal of bringing French writing back to its former 'integrity.' While the author of that treatise and Jacques Dubois thought that re-establishing the integrity of French meant reverting to Latinate forms and morphological distinctions, Meigret took a radically different tack. Meigret's orthographic reform promoted spelling based on pronunciation, rather than on derivation and etymology. He was immediately attacked by Guillaume des Autels, with whom he had an extended public debate, and then by Jacques Peletier du Mans and Théodore de Bèze. The publication in 1548 of his translation of Lucian of Samosata's *Philopseudes* (*Le menteur*) in his reformed orthography, as well as his own *Tretté de la Grammère Françoeze* in 1550, demonstrated the scientific interest and the practical failure of his reform. Readers found his system virtually impossible to decipher.

In spite of the difficulties presented by its writing system, the *Tretté de la Grammère Françoeze* is arguably the most original and most interesting work on the French language in the 16th century. It is divided into 11 books, some quite short. The first deals with the sounds of French, and the articles. The next seven are devoted to the parts of speech (noun, pronoun, verb and participle, adverb, preposition, conjunction, interjection), the last three to prosody and punctuation. Throughout, Meigret grapples with the question

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of whether reason or usage is the best guide to grammatical rules, and provides glimpses of regional and social variation in mid-16th century French.

See also: Dubois, Jacques (Sylvius) (1478–1555); French; Grammar; Greek, Modern; Italian; Latin.

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Antoine Meillet, whose teachers included Ferdinand de Saussure, Louis Havet, Victor Henry, James Darmesteter, and Michel Bréal (whom he succeeded at the Collège de France), is widely known for his contributions to the fields of comparative Indo-European linguistics, classical studies, the Slavic languages, Armenian, and general linguistics. Among his many publications, those included in the Bibliography below have gone through numerous editions and translations and stand out in terms of both their contemporaneous impact and their enduring relevance. Of perhaps greatest importance in terms of contemporary relevance is the collection of his major linguistics articles published under the title *Linguistique historique et linguistique générale* (1958; originally published as vol. 1, 1921, vol. 2, 1936). Two articles in this collection merit special attention. In his '*Comment les mots changent de sens*' (1906, 1958: 230–271) Meillet considers language to be first and foremost a social fact, and accordingly seeks social causes for semantic change. In '*L'évolution des formes grammaticales*' (1912, 1958: 130–148) Meillet coins the term "grammaticalization" (1958: 133) to describe the process whereby words, through combination and habituation, lose their principal meaning to become accessories, grammatical markers. Grammaticalization is now a central topic in linguistic research (cf., e.g., Hopper and Traugott, 1993; Ramat and Hopper, 1998).

See also: Armenian; Bréal, Michel Jules Alfred (1832–1915); Cultural and Social Dimension of Spoken Discourse; Evolution of Semantics; Evolution of Syntax; Grammaticalization; Morphologization; Saussure, Ferdinand (-Mongin) de (1857–1913).

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of whether reason or usage is the best guide to grammatical rules, and provides glimpses of regional and social variation in mid-16th century French.

See also: Dubois, Jacques (Sylvius) (1478–1555); French; Grammar; Greek, Modern; Italian; Latin.

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Meillet, Antoine (Paul Jules) (1866–1936)

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Antoine Meillet, whose teachers included Ferdinand de Saussure, Louis Havet, Victor Henry, James Darmesteter, and Michel Bréal (whom he succeeded at the Collège de France), is widely known for his contributions to the fields of comparative Indo-European linguistics, classical studies, the Slavic languages, Armenian, and general linguistics. Among his many publications, those included in the Bibliography below have gone through numerous editions and translations and stand out in terms of both their contemporaneous impact and their enduring relevance. Of perhaps greatest importance in terms of contemporary relevance is the collection of his major linguistics articles published under the title *Linguistique historique et linguistique générale* (1958; originally published as vol. 1, 1921, vol. 2, 1936). Two articles in this collection merit special attention. In his '*Comment les mots changent de sens*' (1906, 1958: 230–271) Meillet considers language to be first and foremost a social fact, and accordingly seeks social causes for semantic change. In '*L'évolution des formes grammaticales*' (1912, 1958: 130–148) Meillet coins the term "grammaticalization" (1958: 133) to describe the process whereby words, through combination and habituation, lose their principal meaning to become accessories, grammatical markers. Grammaticalization is now a central topic in linguistic research (cf., e.g., Hopper and Traugott, 1993; Ramat and Hopper, 1998).

See also: Armenian; Bréal, Michel Jules Alfred (1832–1915); Cultural and Social Dimension of Spoken Discourse; Evolution of Semantics; Evolution of Syntax; Grammaticalization; Morphologization; Saussure, Ferdinand (-Mongin) de (1857–1913).

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Meinhof, Carl Friedrich Michael (1857–1944)

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Along with Diedrich Westermann, Carl Meinhof is usually considered one of the main founders of the discipline of African linguistics – Afrikanistik – in Germany (*see* **Westermann, Diedrich Hermann (1875–1956)**). He was born on July 23, 1857, in Barzwitz, a village in the Pomeranian county of Schlawe that is now part of Poland, and died of old age on February 11, 1944, in Hamburg. He was descended from a long line of Swabian pastors, who included his father, Friedrich. His mother, Clara Giesebrecht, came from a noted intellectual family: Meinhof's grandfather, Karl Ludwig, was a poet and director of the Grauen Kloster high school in Berlin; his great-uncle Ludwig was a prominent 19th-century poet and philosopher; and his uncle Wilhelm was an historian of the Holy Roman Empire.

Meinhof was to follow both his father's and mother's families, becoming a minister and a scholar. He had 11 siblings, two of whom were among his first teachers as he began his education at home in Barzwitz. In 1868 Meinhof moved in with a relative in Halle, where he first attended Gymnasium, and in 1875 progressed to the University of Halle. Meinhof's concentration was theology, and he worked under Luther expert Julius Köstlin. After transferring to the University of Erlangen, Meinhof started to study Germanistik and to conduct linguistic research. He worked briefly but intensely with philologist Rudolf von Raumer (*see* **Raumer, Rudolf von (1815–1876)**), an author who wrote on the theories of August Schleicher (*see* **Schleicher, August (1821–1868)**) and was concerned with such issues as standard orthography, phonetic change, and language origins. Raumer was interested in demonstrating a genetic connection between Indo-European and Semitic languages (Raumer, 1863, 1876), and his theories had an undeniable impact on Meinhof, who in his later career focused on proving relationships among the Semitic, Hamitic, Bantu (Bantoid), and Nigritic language families in Africa.

Meinhof returned to religious studies in 1877, transferring yet again to the University of Greifswald, where he passed a series of theological exams in 1878 and 1879. After sitting for his examinations, Meinhof worked briefly as a high school teacher in Wolgast and Stettin, and in 1886 took a post as pastor in the small Pomeranian town of Zizow, not far from his family home in Barzwitz. All the while he continued his studies, passing more examinations, learning Assyrian, Aramaic, and Arabic, and expanding an already solid background in Hebrew. In Zizow, Meinhof also discovered his passion for Africa and chose to abandon the study of Asian languages for African ones in order to serve Germany's colonial interests (Pugach, 2001). He studied Duala and related Cameroonian languages with a Cameroonian named Njo Dibone, and began to teach these and other African languages to missionaries. He wrote several articles on Duala and related dialects that appeared in the *Zeitschrift für Afrikanische Sprachen*, and in 1899 published the *Grundriss einer Lautlehre der Bantusprachen* (*An introduction to Bantu phonology*), which soon became a standard in the field of African linguistics. The *Grundriss* offered phonological descriptions of six Bantu languages, including Swahili and Duala. The book also described an Urbantu, which Meinhof distilled from knowledge of the vocabulary, morphology, and grammar of the contemporary Bantu languages (Meinhof, 1899, 1910, 1932). The concept of Urbantu was similar to that of 'Urindogermanisch,' a term that August Schleicher had proposed to describe the parent of the Indo-European or Indo-Germanic language family (Schleicher, 1866). Meinhof also went beyond Urbantu in the *Grundriss*, providing a description of Bantu noun classes that was considered the most complete in existence until the publication of Malcolm Guthrie's work in the 1970s (*see* **Guthrie, Malcolm (1903–1872)**).

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After the publication of the *Grundriss*, Meinhof was hired to teach African languages at the Seminar für Orientalische Sprachen in Berlin. He continued his research on Bantu there and at the Hamburg

Kolonialinstitut, where he transferred in 1909. Meinhof also started to research African languages that were not Bantu, and published an article on west African Fulbe (Adamawa Fulfulde) that posited the language as a bridge between Africa's Hamitic and Nigritic languages (Meinhof, 1911). This was controversial, because Meinhof's understanding of the differences between the Hamitic and Nigritic language families was part linguistic and part racial, a fact that was not lost on linguists of the time (Schuchhardt, 1912; Sapir, 1913). Those groups that spoke Hamitic languages – a categorical designation that linguists have since dismissed – were commonly classified as racially 'superior' to the Nigritic speakers, who were said to have darker skin than the Hamites (Saunders, 1969). Nonetheless, Meinhof insisted that his work was purely linguistic and continued to publish on the Hamitic languages for much of his career, most notably in the *Sprachen der Hamiten* (*Languages of the Hamites*) (Meinhof, 1912). However, because of his racialized discussion of African languages, Meinhof's relevance waned after his death, when Joseph Greenberg demonstrated that many of his theories were false and relied more on pseudoscientific biological evidence than linguistic proof (Greenberg, 1966).

See also: Africa as a Linguistic Area; Bantu Languages; Guthrie, Malcolm (1903–1872); Proto-Bantu; Raumer, Rudolf von (1815–1876); Schleicher, August (1821–1868); Westermann, Diedrich Hermann (1875–1956).

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Meinong, Alexius (1853–1920)

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Alexius Meinong (Alexius von Meinong, Ritter von Handschuchsheim) was born July 17, 1853, in Lemberg, Austria (now L'viv, Ukraine), to a family of minor German nobility. He attended the Vienna Academic Gymnasium and enrolled in 1870 at the University of Vienna. After receiving a degree in history in 1874, he turned to the study of philosophy under positivist philosopher Franz Brentano. Meinong's first academic appointment, as *Privatdozent* (lecturer), was at the University of Vienna in 1878. In 1882 he accepted an associate professorship in philosophy at the University of Graz. He was promoted in 1889 to full professor, the position he held until his death on November 27, 1920. In 1894 he established Austria's first laboratory for experimental psychology at Graz.

Like Brentano, Meinong viewed philosophy not as a potential answer to metaphysical questions but as an empirical science. He proposed that if relationships among cognition, perception, language and reality could be clarified, then topics such as morality and ethics and emotions could be discussed in empirical terms, ultimately resulting in a synthesis of philosophical thought. To this end, Meinong developed a theory of assumptions, a theory of evidence, a theory of value, and a theory of objects (*Gegenstandstheorie*).

The first theory has to do with the nature of assumptions and the role they play in social phenomena, including communication. The theory of evidence concerns types of evidence used in reasoning and communicating: direct vs. indirect evidence, *a priori* vs. *a posteriori* evidence, and evidence for certainty vs. evidence for presumption. The theory of value involves emotional reactions associated with the existence of certain objects. The theory of objects concerns the ability to think about and describe objects that do not exist, e.g., round squares, and its ramifications for the notion of meaning: "What a speaker wants to 'say,' or, more exactly, what he wants to speak about, is not that which his words *express*, but that which they mean, and that is not the content, but the object of the idea expressed by the word" (Meinong 1899; translated in Lindenfeld 1980, 135–136).

Meinong's work, which lies at the intersection of philosophy, psychology and linguistics, was cited in contemporary and later works by Frege, Saussure and Russell. His discussion of relationships among thought, symbol and meaning have application in the fields of cognitive linguistics and formal semantics.

See also: Cognitive Linguistics; Formal Semantics; Frege, Gottlob (1848–1925); Russell, Bertrand (1872–1970); Saussure, Ferdinand (-Mongin) de (1857–1913).

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Igor A. Mel'čuk is well known for his Meaning-Text Theory, which nowadays is developing into a leading model in computational linguistics. He has also made significant contributions to morphology with the five volumes of his *Cours de Morphologie Générale* (1993–2000), and to computational lexicology with the four volumes of his *Dictionnaire explicatif et combinatoire du français contemporain. Recherches lexico-sémantiques* (1984–1999). It is notable that his main theoretical insights were already present in his early works as a pioneer of early machine translation in the Soviet Union in the 1950s, and of the design of a semantic intermediary language method for machine translation.

Mel'čuk was born in 1932 in Odessa, which was then part of the Soviet Union. He was trained in Spanish and graduated in French in 1956 at the Faculty of Philology at Moscow University. At the instigation of mathematician A. A. Ljapunov (1911–1973), who directed the Steklov Mathematical Institute of the Russian Academy of Sciences in Moscow (MIAN), he worked on an algorithm translation from French into Russian with Ol'ga Kulagina. At that time, he was participating in the seminars on machine translation organized by Viktor Jul'evic Rozencveig (1911–1998), where he met Aleksandr K. Žolkovskij (b. 1937) and Juri D. Apres'jan (b. 1930). He began a Ph.D. on Tocharian languages supervised by the comparatist Vjaceslav V. Ivanov (b. 1929), but in 1957 Ivanov and Mel'čuk were dismissed from their post at the university after having supported the Nobel Prize writer Boris L. Pasternak (1890–1960). He then got a position at the Institute of Linguistics of the Academy of Sciences in Moscow until his emigration from the U.S.S.R. in 1977. In August 1975, he wrote a letter to *The New York Times* supporting physicist Andrej Sakharov and biophysicist Sergej Kovalev, and helped the dissidents Jurij Orlov and Anatolij Scaranskij. He was thus fired from the Institute of Linguistics, became a 'social parasite,' and eventually succeeded in leaving the U.S.S.R. in May 1977. Since September 1977, he has been a lecturer at the Linguistics and Translation Department of the University of Montreal.

It was during this early period that Mel'čuk laid the foundations of his main theoretical and practical achievements: semantic synthesis and the meaning text theory with Žolkovskij, lexicography and semantics with the first drafts of the *Explanatory combinatory dictionary* with Apresjan and Žolkovskij, *Dependency syntax* with Nikolaj V. Pertsov (b. 1944), and finally his morphological work stemming from his treatment of grammatical meanings in machine translation.

As a pioneer in machine translation, the originality of Mel'čuk's work lay in his concern with synthesis and the transfer of meaning from one language to another, while most American researchers were focused on morphological and syntactical analysis. In the context of the strong Russian tradition of multilinguilism, he took the specific properties of languages into account and the constraints they impose on translation. Thus, Mel'čuk (1958) noted that word order, which was considered identical for every language, was different in Hungarian; this led him to plan an intermediary language for machine translation. This project was a semantic representation language, closely connected to Ivanov's protolanguage (Mel'čuk, 1960). It was based on a conception of languages as global systems – not separable into levels – for which a semantic theory must account. In the process of translation, grammatical meanings – a notion borrowed from Boas via Jakobson (1959) – are not identical from one language to another. Most morphosyntactical features, which are specific to each language and useful in the process of analysis, are no longer needed in the translation stage. On the contrary, what are needed are grammatical indicators of lexical meanings, used for lexical reference (i.e., tenses and modes of verbs). Therefore, the intermediary language is not designed as a grammar, but comprises both syntactic connections to stock syntactic meanings, and words in a dictionary to stock lexical meanings. Thus the intermediary language constituted a real semantic formalism resting on lexical functions and dependence grammar, which forshadowed Mel'čuk's meaning-text model. Besides, it led to the project of registrating the grammar of natural languages in dictionaries to carry out natural language generation (Mel'čuk *et al.*, 1984–1999). Mel'čuk's interest for morphology dates back from this early research too (Mel'čuk, 1993–2000). The Meaning-Text Theory was proposed by Mel'čuk and Žolkovskij (1967, 1970) as a framework for describing natural language as a multilevel correspondence between meaning and text, organized from meaning to text – that is, towards synthesis – to model the speaker's comprehension. Between meaning (the semantic level) and text (the phonetic level), there are two more levels, morphological and syntactic. Syntactic relations are represented by dependency trees (Tesnière, 1959) where nodes are

lexemes. In other words, there is no need for phrase-structure categories as syntactic information is located in the lexicon.

Currently the Meaning-Text Theory is gaining importance in several areas of formal linguistics and computational linguistics. It has been taken over by other formalisms, such as generative lexicon; since 2003, international conferences have been specifically dedicated to the developments in Meaning-Text Theory.

See also: Boas, Franz (1858–1942); Computational Lexicons and Dictionaries; Dependency Grammar; Grammatical Meaning; Jakobson, Roman (1896–1982); Lexical Semantics: Overview; Lexicography: Overview; Machine Translation: History; Machine Translation: Interlingual Methods; Semantic Primitives.

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Memes

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In his 1976 book *The selfish gene*, the British zoologist Richard Dawkins proposed a new view on the nature of evolution. His overall claim was that evolution is driven not by species, nor by individual organisms, but rather by a more basic unit, the replicator, where a replicator is "anything in the universe of which copies are made" (Dawkins, 1982). His idea is that the engine of evolution is competition between distinct replicators, with a replicator's success determined, roughly speaking, by the number of copies it gives rise to. The most obvious of Dawkins's evolutionary replicators is the gene, the basic unit of biological evolution. But one of the insights offered by Dawkins's view was that evolution, viewed as an ongoing competition between self-propagating replicators, is not restricted to biology. For humans at least (and maybe in very limited respects for some other species), culture is also evolutionary: culture, just like biology, is a matter of the competition between particular replicators. But what are these cultural replicators? What is the cultural equivalent of the gene? Dawkins labeled it the 'meme.'

What Is a Meme?

Given the parallel with biological evolution, memes are defined as the basic units of cultural evolution. But what might they look like? They are essentially pieces of information, of whatever sort, which pass

Melanchthon, Philipp (1497–1560)

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A leading humanist scholar and a reformer at the side of Martin Luther, Melanchthon drew up the Confession of Augsburg and was the author of textbooks for all disciplines known in his time, from theology to physics. For reforming the curricula of university and higher education, he was acclaimed the Praeceptor Germaniae.

Born at Bretten on February 16, 1497, Melanchthon studied under his uncle Johannes Reuchlin until 1509; at the University of Heidelberg until 1512; and at the University of Tübingen until 1514. In 1518, he was appointed professor of Greek at the University of Wittenberg, where he taught for 42 years, until his death on April 19, 1560.

As regards the language sciences, Melanchthon was recognized by Desiderius Erasmus as early as 1518 for his Greek grammar, which was followed by a Latin grammar (Melanchthon, 1834–1860, vol. 20, pp. 3–179, 193–336). In his dialectic (Melanchthon, 1834–1860, vol. 13, pp. 507–702), he combined into a new methodical unity Cicero's doxastic Topic, the Stoic notion of systema, and the Aristotelian theory of demonstration. The relation between humanist and traditional logic during the Renaissance is a central issue with respect to the impact of Melanchthon's logic. Like many humanist logicians of his time, Melanchthon took a disruptive and destructive stance against traditional treatments of logic, achieving the result of discarding the more technical aspects of medieval logic while shifting the center of attention to nondeductive inferences, good arguments (in the sense of arguments that can be counted on to win in debate), and the problematic nature of arguments' validity (Jardine, 1988). In his rhetoric (Melanchthon, 1834–1860, vol. 13, pp. 27–506), Melanchthon developed two complementary oppositions: on the one hand, that between a persuasive, eloquent mode of expression as against an arid, uninspired, and technical machinery; on the other hand, an adequate, rhetorical analysis of a text, treating it as a coherent whole as against the medieval approach, which chops a text into inarticulate little pieces, tearing it apart in order to proceed to a formal interpretation of the fourfold significance of an argument (Meerhoff, 1994).

"Prudent men have discovered through experience that nothing is more difficult than to speak clearly and distinctly about a given subject" (Melanchthon, 2000): Melanchthon's concept of an integration of philosophical grammar, dialectic, and rhetoric was in fact revolutionary, insofar as the invention becomes consciously subordinated to the philosophical claims of searching for truth (Schanze, 1983).

See also: Luther, Martin (1483–1546); Reformation, Northern European; Reuchlin, Johann (1455–1522).

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Melanesian Religions

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Melanesia is a region of the Southwest Pacific which stretches from Irian Jaya in the west through Papua New Guinea, the Solomon Islands, Vanuatu, and New Caledonia, as far east as Fiji. In 2004, its population numbered about eight million. Melanesians speak some 1200 languages, or, according to some estimates, one-quarter of the world's languages. These languages belong to two different groups, Austronesian and non-Austronesian (also called Papuan). The area is home to a number of pidgins, some based in English and others in French. There were trading languages in use in Melanesia prior to European contact,

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and plantations and missions furthered their development as lingua francas. Melanesians live in small-scale societies, some of which are patrilineal and others matrilineal. They occupy varied habitats, including coral atolls, rainforests, and high mountain valleys, and their religious traditions embody their relationships to these environments. Most Melanesians are subsistence horticulturalists who supplement a diet of tubers and green vegetables with game or fish and keep pigs for ceremonial purposes. A few are primarily hunters and gatherers, while, over the course of time since first colonial contact, some have become town-dwellers who depend on wage labor for their sustenance. A desire to maintain life-giving relationships pervades the manner in which people interact with other people, with gods and spirits, and with the environment. Fertility – in the sense of the maximization of life force – is the major focus of the traditional religions and also of the Melanesian styles of Christianity and the new religious movements that have developed in the region.

People and Spirits

Traditional Melanesian societies conceived of the cosmos as a number of linked places inhabited by communities of various kinds. For the Kewa of the New Guinea highlands, for example, the cosmos included the distant world of the sky people, forests inhabited by various kinds of spirits, settlements of ghosts reached by taking paths through the forest, and settlements of human beings. Various terms – gods or deities, culture heroes, ancestors or ghosts, land spirits – have been used by anthropologists and historians of religion to approximate the indigenous names of the nonhuman inhabitants of Melanesian worlds. In local languages, they are often designated as people – sky people, forest people, cave people, cannibal people, and so on. The spirit beings are invisible under ordinary circumstances, but they have an existence parallel to that of human beings who will be referred to as the settlement or village people. In each local world, the particular inhabitants need to be understood in relation to the others with whom they interact. Morality which is based in kin relationships and local community includes appropriate behavior toward spirits and their habitats.

Culture heroes and gods are more significant in mythology than in everyday religious practice. Culture heroes, those mythic persons who gave rise to the physical and social world, are said to have shaped mountains and planted trees and to have instituted marriage and exchange relationships. Brother heroes, such as Kilibob and Manup in the myths of the Madang area of New Guinea, typically portray contrasting ways of life and behavior. Spirits responsible for creation and regulation of the world have been designated gods in the accounts of some ethnographers. The dead dwell in a settlement separate from that of the living – under the ground, in the sea, in the sky – to which they travel after death. They may return when invited on ritual occasions or when they deem it necessary to visit the settlements of their living relatives. At death, rituals mark the transition from life in the domain of the living to life in the domain of the ghosts. Traditional mortuary customs vary from burial in the family house to exposure on platforms in the forest to burial at sea. Following colonial and missionary contact, it became usual for bodies of the dead to be buried in cemeteries or at individual burial sites. After burial, further rituals sustain and nourish the relationship between living human beings and the dead. Traditionally, there were rituals for individual ghosts and others for the ghosts collectively; some families and communities maintain these celebrations. Such rituals involve the killing of marsupials and/or pigs and the sharing of food between living and dead. They also include speeches, singing, and dancing. The presence of ghosts invited to festivals is signified by the use of masks, drums, and flutes. People appeal to their own dead relatives for assistance in times of need. When the ancestors as a group are invited to participate in ceremonies, carved figures and masks may be produced to represent them. In some communities, masks and carvings are saved in a cult house, while in others they are discarded after the ceremonies when the ancestors are said to have returned to their own settlement.

Land spirits inhabit forests, grasslands, mountains, and swamps. Some are imagined as the inhabitants of particular trees or caves; others are construed as tricksters, monsters, or ogres, at least capricious, and potentially malevolent. People perform rituals and/or observe taboos when venturing into dangerous and isolated places where spirits are said to shoot arrows of affliction into trespassers and to trip up those who disturb them. Before making a change to their environment, such as felling a tree, people will placate spirits with gifts and politely entreat them to move to another place.

Oral Traditions and Ritual

Melanesian religious traditions are transmitted in the give and take of everyday conversation and work. They are also embodied in the metaphoric processes of storytelling and ritual. Oral traditions tell of the relationship of a community to a particular landscape. Stories narrate the exploits of known people, of mythic ancestors, and of gods and culture heroes. Narratives of events that took place in particular places serve to

transmit a system of land tenure. They also point to places of power where people should perform rituals. Traditionally, songs were composed for courting, for funerals, and for other occasions in personal and communal life. Word taboo and name taboo are practiced as means of protecting relationships, and in some areas religious argots are employed, as, for example, the special languages employed during the pandanus harvest in the Southern Highlands of Papua New Guinea (Franklin, 1972; Franklin and Stefaniw, 1992).

There are rituals for weather, gardening, childraising, attracting members of the opposite sex, hunting, fishing, pig husbandry, trade, warfare, and healing. Full-time ritual officiants are rare, but a variety of healers, mediums, and other practitioners devote part of their time to ritual practice, and everyone practices some rituals. Melanesians are competent gardeners with knowledge of plants and soils and seasons, but they are dependent on the weather and are at the mercy of insect pests. They express their desires for their gardens and their commitment to the work of gardening in spells and ritual. Garden spells invite the sun and rain to visit the garden and seek to cast out insects and disease. Prohibiting sex during the growing period or expecting a couple to have sexual relations in their new garden confirms the pervasiveness of fertility in all of life and the responsibility of humans to manage powerful relationships. Taboos regulate contact with persons, animals, foods, objects, and places; some clans have a taboo against consuming an animal associated with the clan.

Rituals are employed to encourage health and well-being of humans and to send away the forces which inhibit a good life. If a person is sick, a ghost, a land spirit, or a sorcerer or witch is blamed. Healers usually combine the works of healing and sorcery. They are engaged to divine the causes of illness, to prescribe remedies, which may be herbal or ritual or a combination of the two, and to carry out sorcery and counter-sorcery.

Many Melanesian societies have practiced initiation for boys and some for girls. However, following colonial contact and missionization, traditional initiation declined. In male initiation, boys are taken away from their mothers and secluded under the direction of senior men for weeks or months. Typically, they are required to observe food taboos, are instructed in ritual behavior, are taught songs and told stories. They may undergo scarification, tattooing, and incision of the foreskin. In many societies, boys are introduced to sacred flutes or bullroarers, which men use to produce the voices of the spirits. In some areas, introduction to the male cult and first participation in warfare is what makes a boy into a man, whereas in others an elaborate system of graded initiation is followed.

Rituals for females are usually linked to first menstruation and to marriage. As with boys, there are foods that girls should eat and foods they should avoid in order to develop the appropriate gender identity. Melanesian marriage rituals, most of which involve several stages, include the exchange of valuables between the families of bride and groom. Women generally have a repertoire of rituals and taboos to ensure the health and well-being of their children, their gardens, and the pigs entrusted to their care. These may be imparted to girls in a ritual context or learned in daily life. In many parts of Melanesia, a woman is expected to avoid her husband and members of his blood line at the time of menstruation. She will not prepare food for him lest her blood contaminate it and prove polluting or weakening to him.

Ritual is important in renewing social structures. In parts of Melanesia with hereditary chiefs (e.g., Fiji, New Caledonia, and the Trobriand Islands), first fruits ceremonies celebrate the people's relationship to a particular crop such as yams and also summarize the structure of the society. Yams are eaten in turn by priest, chief, men, women, and children, and exchanges of yams take place between individuals and lineages. The pattern of eating and exchanges mirrors the pattern of the society. Similarly, in the highlands of New Guinea, where leadership is not hereditary, ritual exchange in events such as the large-scale killing of pigs and transactions of pork and shells provides opportunity for renewal of community and cosmos.

Religious Change

Oral histories suggest that prior to colonial contact, which began in some areas in the late 19th century but did not reach other areas until after World War II, considerable change occurred in Melanesian religions. For example, cults were imported from one area to another. One may speculate that events such as the arrival of pigs from Asia some 5000 to 6000 years ago and the introduction of the sweet potato from South America some 300 to 400 years ago changed both the economic and symbolic life of Melanesian communities. In the colonial period, as Melanesians were recruited for labor in mines, plantations, offices, and factories, workers came in contact with the traditions of groups that differed from their own. In this period, Christianity in a variety of denominations began to be introduced to the region. The original colonial powers in the region (Germany, Britain, France, The Netherlands) saw missions as their allies in the spread of civilization. The people of Irian Jaya experienced the Dutch and later the Indonesians as colonial masters. Christianity was introduced in the Dutch period and Islam under Indonesian rule.

From the late 19th century, Protestant and Catholic missions entered Melanesia and became heavily involved in the work of health and education. Biblical stories and Christian rituals were assumed by those to whom the first missionaries preached to work in ways similar to indigenous myth and ritual. Melanesian Christians find commonalities in the themes of indigenous myths and biblical narratives, and students in the region's theological colleges will typically write their B.Div. theses on the relationship of indigenous and biblical texts. Some understand the Christian God as a fuller revelation of an indigenous god or spirit. Various Melanesian languages were employed as mission lingua francas, among them Kate, Yabim, Dobu, Kuanua, Motu, Suau, Wedau, Toaripi, Gedaged, Gogadola, Boiken, and Kiwai (McElhanon, 1979). Missionaries and, later, members of the Summer Institute of Linguistics studied indigenous languages and translated the Bible into them. The popular newspaper *Wantok*, in Tok Pisin, which was started by Catholic missionaries, and the publications of Kristen Pres, an agency of the Lutheran Church, point to the role of the churches in promoting the written word.

Religious movements in which participants await the arrival of an abundance of goods or anticipate a social utopia, were reported following colonial contact, and from the mid-1940s came to be known as 'cargo cults,' a term which may say as much about the colonial observers as about the Melanesian cultists. The movements probably had continuity with wealth rituals and exchange activities that were part of precolonial Melanesia. Taking elements from indigenous religions and from Christianity, they sought to attain a lifestyle characterized by wealth and good relationships. While classic cargo cults have waned in Melanesia, a plethora of religious movements and new churches continue to respond to changing circumstances and to communicate desires for Melanesian forms of religion. At the beginning of the 21st century, most Melanesians were Christians, with the style of Christianity depending on the nature of local traditions and the teachings and practices of the denomination which sent missionaries to the area. The ongoing conversation of Christianity and indigenous traditions is exemplified in the work of Melanesian writers such as Esau Tuza, Bernard Narokobi, and Simeon Namunu who advocate Melanesian forms of Christianity which build on indigenous understandings (Trompf, 1987), but there are also examples of the rejection of indigenous traditions in order to follow Christian ways (Robbins, 2004).

See also: Bible Translation into Lesser-Known Languages; New Religious Movements; Papua New Guinea: Language Situation; Papuan Languages; Pidgins and Creoles: Overview; Religion and Literacy; Religion: Overview; Religious Language; Ritual and Religious Language; Taboo; Tok Pisin.

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lexemes. In other words, there is no need for phrase-structure categories as syntactic information is located in the lexicon.

Currently the Meaning-Text Theory is gaining importance in several areas of formal linguistics and computational linguistics. It has been taken over by other formalisms, such as generative lexicon; since 2003, international conferences have been specifically dedicated to the developments in Meaning-Text Theory.

See also: Boas, Franz (1858–1942); Computational Lexicons and Dictionaries; Dependency Grammar; Grammatical Meaning; Jakobson, Roman (1896–1982); Lexical Semantics: Overview; Lexicography: Overview; Machine Translation: History; Machine Translation: Interlingual Methods; Semantic Primitives.

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Memes

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In his 1976 book *The selfish gene*, the British zoologist Richard Dawkins proposed a new view on the nature of evolution. His overall claim was that evolution is driven not by species, nor by individual organisms, but rather by a more basic unit, the replicator, where a replicator is "anything in the universe of which copies are made" (Dawkins, 1982). His idea is that the engine of evolution is competition between distinct replicators, with a replicator's success determined, roughly speaking, by the number of copies it gives rise to. The most obvious of Dawkins's evolutionary replicators is the gene, the basic unit of biological evolution. But one of the insights offered by Dawkins's view was that evolution, viewed as an ongoing competition between self-propagating replicators, is not restricted to biology. For humans at least (and maybe in very limited respects for some other species), culture is also evolutionary: culture, just like biology, is a matter of the competition between particular replicators. But what are these cultural replicators? What is the cultural equivalent of the gene? Dawkins labeled it the 'meme.'

What Is a Meme?

Given the parallel with biological evolution, memes are defined as the basic units of cultural evolution. But what might they look like? They are essentially pieces of information, of whatever sort, which pass

from mind to mind via imitation. Moreover, given Dawkins's general view of evolution, they must be selfish: as Sperber (2000: 163) put it, they must stand "to be selected not because they benefit their human carriers, but because they benefit themselves." In *The selfish gene*, Dawkins suggested: "Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches" (1976: 206). Beyond these, the list of cultural elements which have been considered as memes is extensive. Dawkins (1976) himself suggested that both religious beliefs and language are memes, or rather complexes of interrelated memes. Other proposed candidates include chain letters, jokes, conspiracy theories, and sundry Internet phenomena. All of these seem, on the face of it, to propagate themselves via imitation, i.e., via the production of copies. Moreover, at least some seem clearly to do so in a way that benefits themselves, rather than their hosts. Chain letters, for instance, do not benefit those who reproduce them, and yet are highly successful replicators (see Dennett, 1990; Sperber, 2000).

How Are Memes like Genes?

This may seem on the face of it to be an unhelpful question. After all, for Dawkins, who coined the term, memes are essentially defined as the cultural equivalent of genes. From this perspective, the question we should really be asking is whether there are in fact memes in human culture. However, what I want to examine in this section is the extent to which those cultural items which have been identified as memes, either by Dawkins himself or by those who have developed memetics (the science of memes) in his wake, are genuinely similar to genes. Given the above discussion, there seem to be some clear parallels between genes and memes: in Dawkins's terms, both are replicators, i.e., both generate copies of themselves. It also seems as if the success of both in their respective replicator pools depends on similar factors. For Dawkins, two of the key factors which determine the success of a particular replicator are longevity and fecundity, i.e., how long particular copies of the replicator survive and how many copies each gives rise to. As Dawkins (1976) argued, these factors seem to determine the success of memes, in much the same way that they determine the success of genes. Moreover, just as with genes, it seems at least plausible that memes are selfish. As Dennett (1990) pointed out, there are many very successful memes which seem to be of no benefit other than to themselves: among the examples he suggested are anti-Semitism and computer viruses.

How Are Memes unlike Genes?

The above list of parallels between genes and those cultural items which have been identified as memes is certainly not complete. There are, however, some important respects in which memes seem not to be like genes. Along with longevity and fecundity, copying fidelity is a key factor in the success of genes. In other words, *ceteris paribus*, the more accurate the copies it produces, the more successful a gene will be. As Dawkins himself concedes, however, it would seem on the face of it as if copying fidelity is not such an issue for memes. Memes passed from host to host tend to undergo a high degree of variation. Consider, for instance, jokes: although we can identify a joke as the same as it passes from person to person via retelling, each retelling will differ in fundamental ways from its predecessor. Perhaps more significantly, there seems to be no memetic equivalent of the distinction between genotype and phenotype, a distinction which is fundamental to Darwinian theories of biological evolution. The idea, in very rough terms, is that the biological properties of each individual organism, i.e., its phenotype, is a function of two factors: the organism's genotype and its environment. What passes genetically from individual to individual is not the phenotype, i.e., not the specific biological properties of the parent organism, but rather the genotype: if a man accidentally loses a finger, his child will not be born with nine fingers. However, it seems that meme replication involves replication ofthe phenotype: changes in a particular copy of a meme will be transmitted to copies of that copy. Again, this list of differences between genes and memes is incomplete. Nevertheless, it suggests that maybe we should be cautious before taking the parallel between memes and genes as anything more than a useful metaphor.

The Current State of Memetics

The *meme* meme has itself been hugely successful. Although its original champions, in particular Dawkins himself and Daniel Dennett, seem to have retreated to some extent, there is no shortage of supporters to take their place. In particular, Blackmore (1999) has defended a thesis on which both the human brain and the self are products of the replication of successful memes. Given its evolutionary advantages, there seems no reason to suppose that this particular meme will not continue to flourish.

See also: Cultural Evolution of Language; Genetics and Language.

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Henry Louis Mencken was born in Baltimore, Maryland, his lifelong home, residing for all but 8 years in a brick rowhouse at 1524 Hollins Street, now maintained as a museum by the Mencken Society. He was a prodigious writer: his works amount to about 10 million words.

His only academic distinction was graduation at 16 with high honors from a public high school, the Baltimore Polytechnic Institute. He left the family's cigar factory as soon as he could and became a reporter at the *Morning Herald*. In 1906 he joined the *Baltimore Sun*, thereafter remaining connected with the *Sun* papers except from 1917 to 1920, a hiatus brought on by his pro-German sympathies in World War I. His coverage of the Scopes trial in 1925, like his coverage of national political conventions and much of his other reporting, was as much cultural criticism as journalism. From 1914 he wrote for and co-edited *Smart Set*, launched by George Jean Nathan; together they started another influential literary magazine, *American Mercury*, in 1924.

In 1919, the first edition of his long, discursive study *The American language* was published by Knopf, which would publish three more editions, with multiple printings of each, and supplements that tripled its bulk over the next 30 years. In this monumental task, Mencken was aided by a newspaper clipping service, correspondents from all over the world, and some professional scholars as well, among whom Louise Pound (1872–1958) was conspicuous.

The texture of this book is hard to describe. It mingles citations from scholarly works with all kinds of other sources. It can still be found in libraries everywhere; the full text of the second (1921) edition can even be found online. Of course, Mencken's contribution to U.S. linguistics was most significant outside the academy, as he doubtless wished it to be. Against the strength of his name, the weight of his evidence, and his matchless invective, literary and academic detractors of this and his other works were powerless. The language that he wrote of, and wrote in, lived outside the academy, just as he did. *The American language* still rewards its readers, new and old, within minutes of opening it, whether to follow a thread for a time or just to browse among the masses of material, admiring the persistence that brought it all together, enjoying the seemingly spontaneous writing, and absorbing his respect for wit, independence, and vitality, as well as his contempt for pedantry and pretense. Most significant of all, it was H. L. Mencken who first made untold numbers of readers, from 1919 onward into the future, aware of language, our language, as an object of wonder and study.

See also: American Lexicography; English in the Present Day (since ca. 1900); Pound, Louise (1872–1958).

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Ramón Menéndez Pidal was a noted authority on Spanish epic literature, a major modern historian, and dominated Spanish linguistics in the first half of the 20th century. Born on March 13, 1869 in La Coruña, he moved to Madrid with his family in 1884. He studied law and literature under Menéndez Pelayo. In 1892, he earned his doctorate in philosophy and literature from the University of Madrid with a dissertation entitled *El conde de Lucanor* and in 1895 won the prestigious Academy prize with an essay on the *Cantar de mío Cid* (published in 1908). After a year at the University of Toulouse (France), where he studied Old French and Occitan, he moved to Spain and was appointed to the Chair of Romance Philology of the University of Madrid (1899). In 1902, he became member of the Real Academia Española and was twice head, until the civil war, of the Royal Spanish Academy (1929–1939 and 1948–1968). Founding editor in 1909 and head, until the civil war, of the *Centro de Estudios Historicos*, which focused on the Spanish language until the civil war, in 1914 he also founded and directed the *Revista de Filologia española*. During the civil war, he gave a series of lectures at the universities of Toulouse and Havana, Cuba, and then at Columbia University in New York, but returned to Spain as a private scholar until his death.

He gave new life to the study of medieval Spanish poetry and chronicles with his work on the origins of the Spanish language, as well as critical editions of texts, most of them translated into English, Russian, and French.

Among his studies in medieval literature are *El romancero español* (1910) and *Poesía juglaresca y juglares* (1924), as well as several works on El Cid. Menéndez's vast and meticulous research included monographs on folklore, literary history, the stylistics of Theresa of Avila, Lope de Vega, and others, and on etymology and place names.

The sources of Menendez's linguistic ideas were the neogrammarian model. With his positivist, meticulous methodology, he introduced the idea in Spain, giving rise to modern dialectal studies, but remained largely unknown in his own land. A Galician by origin, he always emphasized the primacy of Castilian in Spain, while he stressed the native roots of Spanish culture throughout all his works, including the Basque, Gothic, and Arab. *Orígenes del español* (1926) was followed by *La España del Cid*, 2 vol. (1929).

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See also: Romance Languages; Spanish.

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Mentalese

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The Basic Hypothesis

Some theorists of mind have claimed that thought takes place in a language-like medium. They have called this language 'Mentalese.' Mentalese has a syntax, a semantics, and a morphology, though discovering these properties of the language of thought will likely require extensive empirical investigation of the mind. Obviously, mentalese does not have a phonology. It is therefore more like written public language than overt speech. And whereas public languages require a pragmatics – a theory of how the language is used by speakers – mentalese, like the machine languages of computers, does not call for one.

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Gilbert Harman (1973) offered the following argument for the existence of mentalese: logical relations hold among mental states, and these relations are essential to their role in psychological prediction and explanation. If the belief that *snow is white and grass is green* is true, then the belief that *snow is white* is true. In general, if the belief that *p & q* is true, then the belief that *p* is true. Generalizations of this sort presuppose that beliefs have sentential structure. Some beliefs are conjunctions, others disjunctions, and so on. Beliefs (as well as desires, fears, and the other propositional attitudes) are part of a language-like system.

Harman's argument fails to establish that mental states themselves have logical or sentential structure. The argument trades on the fact that belief **ascriptions** have sentential structure. We ascribe certain beliefs to subjects using sentences that are conjunctive or disjunctive, but it does not follow that the mental states so ascribed are themselves conjunctions or disjunctions, or that the relations that hold among these mental states are of the sort that hold among sentences (or propositions), that is, that they are logical relations. To assume that they are is just to assume what is at issue – that thoughts have a language-like structure. In general, one must guard against attributing to thoughts themselves properties of the representational scheme that we use to talk about them.

The hypothesis that thought occurs in a language-like medium is understood as the claim that not only beliefs but also desires and the other propositional attitudes are properly construed as relations to sentences in the inner language. To believe that the conflict in the Middle East will not be resolved is to bear a relation to an inner sentence token that means *the conflict in the Middle East will not be resolved*. To fear that the conflict in the Middle East will not be resolved is to bear a different relation to an internal sentence of the same type. The difference between the believing-relation and the fear-relation is construed as a difference in the processing that the sentence token undergoes in the brain, in other words, as a difference in its functional role. The belief is likely to cause, in certain circumstances, sincere assertions of a public language sentence meaning *the conflict in the Middle East will not be resolved*. The fear is more likely to give rise to appropriate emotional states.

What Is Mentalese Like?

The Thinker's Public Language, or a Proprietary Inner Code?

Some theorists have supposed that mentalese is just the thinker's own public language. English speakers think in English, Chinese speakers in Chinese. One might be inclined to this view by reflecting on the fact that many thoughts do not seem possible until the thinker has acquired a public language. Consider, for example, the thought that *the leech of the genoa is curled*. A subject cannot genuinely think this thought until she has acquired the concepts *leech* and *genoa*. Moreover, acquiring such concepts seems to require learning the appropriate public language terms for them, or more basic public language terms in which they can be defined. If mentalese is just the thinker's public language, then investigation of its properties is relatively straightforward. The syntax of an English speaker's mentalese is just English syntax; its semantics is just English semantics.

Jerry Fodor, in his groundbreaking 1975 book, *The language of thought*, argued that thought takes place in a proprietary inner code; moreover, this inner language has the expressive power of any public language a thinker is capable of learning. According to Fodor, the process of language learning involves hypothesis formation and testing; in particular, the hypotheses have the form of 'truth rules' for the application of the public language terms. To learn the English term 'genoa' is to learn a rule of the form "x is a genoa' is true if and only if x is P,' where P is a predicate in the proprietary inner language that is coextensive with the English predicate 'genoa.' To learn a public language is to acquire a translation manual that pairs terms in the language of thought with their public language equivalents. On pain of regress, terms in the language of thought are not themselves learned. A consequence of Fodor's view is that the concept *genoa* – and *electron*, *carburetor*, and any other concept a thinker can possess – is either innate or definable in terms of other concepts that are themselves innate. Fodor argues (Fodor, 1981) that few concepts are so definable; hence the vast majority of a thinker's concepts are innate.

Needless to say, many have found Fodor's extreme nativism unpalatable. His argument depends upon construing (public) language learning as hypothesis formation and confirmation, a process that requires an internal medium of representation, a language of thought where the hypotheses are couched. But there is nothing inevitable about explicit hypothesis formation and testing models of learning. If public language predicates were learned as a result of a causal process that is not construed as linguistic or inferential – a process sometimes known as 'triggering' – then the argument's nativist conclusion would not follow.

Whatever their views on concept-nativism, most proponents of the view that thought takes place in a linguistic medium have followed Fodor in claiming that the language of thought is an inner neural code,

distinct from any public language. Accordingly, we will hereinafter construe the 'language of thought hypothesis' (LOT) as the view that thought takes place in a proprietary inner code.

Psycho-Syntax and Psycho-Semantics

If the language of thought is indeed an inner neural code, then discovering its syntax and semantics will require extensive empirical investigation of the mind. Characterizing the syntax of mentalese will involve a specification of a finite set of primitive objects (words), and a grammar or set of formation rules that describe the ways in which complex syntactic objects (sentences) may be built out of the primitives. The individuation of syntactic types will be functionally based, adverting to the causal roles of these objects in the subject's cognitive life.

The so-called 'mental logic' research program that attempts to uncover the formal rules of inference underlying human deductive reasoning presupposes the existence of an innate syntax of thought and proposes to empirically investigate it. (See the papers in Braine and O'Brien, 1998.) Various candidate inference schemas have been offered, but no proposal is sufficiently detailed to generate empirically testable predictions regarding the underlying syntax.

A full theory of mentalese also requires a 'psycho-semantics' – an account of how internal sentences acquire their meaning. In virtue of what fact does a particular mental sentence mean *snow is white* rather than $2+2=4$? The meanings of public language sentences are fixed by public agreement, or derive in some way from the mental states of the users of these sentences, but, on pain of circularity, the sentences of mentalese must acquire their meanings in some other way. Since the 1980s, there has been a proliferation of theories, mostly by philosophers, purporting to explain how mental representation is possible. Not all of these accounts presuppose LOT, but most, if not all, are compatible with it. Typically, such theories attempt to explain the semantic properties of thought while respecting a naturalistic constraint – they attempt to specify sufficient conditions for a mental state's meaning, what it does in nonsemantic and nonintentional terms. (See Stich and Warfield, 1994 and **Representation in Language and Mind**.)

Further Arguments for LOT

Theories of Mental Processing Are Committed to LOT

Fodor (1975) reasoned that the only plausible models of mental processing are computational models, and that these require a medium of computation, that is, an inner system of representation. This argument has now been undermined by the existence of connectionist computational models. Connectionist machines are capable of performing cognitive tasks, but they lack fixed symbols over which computational operations are defined. Connectionist processes are not naturally interpretable as manipulations of internal sentences or data structures. If the mind is best characterized as a connectionist machine, or as an aggregate of such machines without an overarching executive control, then the LOT hypothesis is false.

LOT Explains Some Pervasive Features of Thought

Fodor (1987) argues that LOT provides the best, indeed, the only explanation of two pervasive features of thought. Thought is **productive**: we can think arbitrarily many thoughts. It is also **systematic**; cognitive capacities are systematically related. If a subject can think the thought *John loves Mary*, then he can think the thought *Mary loves John*. The explanation for the productivity and systematicity thought is that thoughts have a language-like structure. We can think arbitrarily many thoughts for the same reason that we can utter arbitrarily many sentences. Thoughts, like sentences, are composed of a finite base of elements put together in regular ways, according to the rules of a grammar. The systematicity of thought is also explained by LOT: systematically related thoughts contain the same basic elements but are arranged differently.

Whether the argument is successful depends on two issues: (1) whether productivity and systematicity are indeed pervasive features of thought; and (2) if they are, whether they can be accounted for without positing a language of thought.

Thoughts are assumed to be productive because they are represented, described, and attributed by public language sentences, a system which is itself productive. However, as noted above, one must be careful not to attribute to thoughts themselves properties of the representational scheme that we use to talk about them. It would be a mistake to think that temperature is infinite because the scheme used to measure it, the natural numbers, is infinite. If thoughts are understood as internal states of subjects that are, typically, effects of external conditions and causes of behavior, then it is not obvious that there are arbitrarily many of them. The size of the set of possible belief-states of human thinkers, like the size of the set of possible temperatures of objects, is a matter to be settled by empirical investigation.

Turning to systematicity, the argument falls short of establishing the existence of mentalese. In the first place, it is not clear how pervasive systematicity really is. It is not generally true that if a thinker can entertain

a proposition of the form aRb, then she can entertain bRa. One can think the thought *the boy parsed the sentence*, but not *the sentence parsed the boy*. Moreover, it is a matter of some dispute within the cognitive science community whether connectionist cognitive models, which do not posit a language of thought, might be capable of explaining the systematic relations that do hold among thoughts. (See MacDonald and MacDonald, 1995 for the classic papers on this issue, and Matthews, 1997 for further discussion).

See also: Representation in Language and Mind.

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Rudolf Meringer's lasting contribution to linguistic science is that he first called attention to the linguistic significance of slips of the tongue. In two books, *Versprechen und Verlesen* (1895, co-authored with Carl Mayer) and *Aus dem Leben der Sprache* (1908), he published extensive collections of slips, with analysis and interpretation of their genesis; the books are still useful today.

Meringer was born in Vienna in 1859, studied at the University of Vienna, and taught there until 1899, when he became Professor of Indo-European Linguistics at the University of Graz. He died in 1931. The focus of his life's work was the history of words; with others (e.g., Hans Sperber, Hermann Güntert), he founded the philological school called cultural morphology, dedicated to the proposition that the history of words cannot be understood in isolation from cultural context. The movement reacted against what Meringer and colleagues perceived as the sterile formalism of Neogrammarianism, with resulting controversy (e.g., Schuchardt, 1911). Meringer was from 1909 founding editor of the movement's journal *Wörter und Sachen* and published many articles there; he also published a textbook of Indo-European linguistics (Meringer, 1897) that went into several editions. His *Wörter und Sachen* obituary (Güntert, 1932) did not mention his speech error work.

Meringer's speech error studies and the main body of his philological work were linked by his dedication to accurate observation as a research method. The error collections were compiled at the University of Vienna early in his career. Motivated originally by Hermann Paul's (1880) observations concerning similarities between speech errors and the processes of language change, Meringer's researches led him to reject the possibility that errors might actually precipitate sound change: "Speech errors and certain kinds of sound change are not inter-dependent. but share a higher cause in the nature of the psychological language organ" (Meringer and Mayer, 1895: vii). Four major generalizations may be extracted from his speech error writings: (1) Errors are not random but are rule-governed (Meringer, 1908: 3; Meringer and Mayer, 1895: 9–10); (2) the fundamental unit of speaking is not the speech sound but the word (Meringer and Mayer, 1895: 6–7); (3) words can be divided into structural components that differ in the strength of their internal representations (Meringer and Mayer, 1895: 164); (4) all speakers produce errors in the same way (Meringer and Mayer, 1895: 10; Meringer, 1908: 6, 123). These conclusions would all be accepted by psycholinguists working in this field today. For further detail of Meringer's error interpretations, see Cutler and Fay (1978).

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See also: Paul, Hermann (1846–1921); Speech Errors as Evidence in Phonology; Speech Errors: Psycholinguistic Approach.

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Meronymy

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Meronymy (sometimes also called partonymy or the HAS-A relation) is the PART-OF relation. For example, *page*, *cover*, and *spine* are meronyms of *book* (in its physical-object sense) in that they are parts of books. The converse relation, that of whole to part, is sometimes called *holonymy*, but *meronymy* is often used to refer generally to the phenomenon of relatedness of expressions for wholes and parts. While meronymy is often mentioned, along with synonymy, antonymy, and hyponymy, in lists of semantic relations among words, lexicology have traditionally paid it less attention than the other relations, as meronymy is not so clearly a linguistic relation. This is to say that the relation is not clearly a lexical relation (relating words), nor a sense relation (relating the meanings of words), but rather is a relation among the referents that the expressions denote. For instance, while a tail is a part of a dog, 'tail' is not necessarily part of the meaning of *dog*, nor 'dog' part of the meaning of *tail*. Recent changes in approaches to meaning have resulted in more attention to meronymy, and the relation is relevant to several applied linguistic endeavors. For instance, the PART-OF relation (like the TYPE-OF relation, hyponymy) is central to the creation of dictionary definitions. Furthermore, different kinds of meronym relations are often represented in lexical knowledge databases created for Natural Language Processing projects (e.g., WordNet – see Miller, 1998). Definitions, properties, and subtypes of meronymy are discussed in turn below, followed by discussion of its treatment in contemporary linguistics. The signs < and > are used here to indicate meronymy, with the holonym on the open side of the symbol and the meronym on the pointed side – e.g., *bird>wing*, *finger<hand*.

Definition of Meronymy

Meronymy is often classed with hyponymy as an inclusion relation. It is typically defined in terms of the potential to put two expressions into a natural language frame like *An X is a part of (a) Y* or *a Y has X(s)/an X* and interpret the sentences as generically true (Cruse, 1986). So, for example, *bird>wing* passes these tests (*A wing is a part of a bird*; *A bird has a wing*) because the test frames express propositions that are considered to be generally true of birds (the existence of a few deformed birds notwithstanding). The particular test frames chosen affect what counts as meronymy to a particular theorist. For

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example, Winston *et al.* (1987) propose that meronym relations include any that can be expressed using the term 'part' or derivations from it, such as *Y is partly X*. This allows for relations such as *metal<hammer*, as in *A hammer is partly metal*, while Cruse's test frames above do not naturally allow for materials to be in meronym relations to wholes. All of these frames for testing for meronym relations assume that meronymy holds between nouns. For instance, the gerund *swallowing* is in a meronym relation to *eating* (*Swallowing is a part of eating*), but the verb forms *swallow* and *eat* are generally not said to be meronyms, since they do not fit into the diagnostic frames (*?To swallow is partly to eat; ?To swallow is a part of to eat*).

Types of Meronyms

At one level, meronyms can be divided into two types: 'necessary' and 'optional' (Lyons 1977), otherwise called 'canonical' and 'facilitative' (Cruse, 1986). An example of necessary meronymy is *eye<face*. Having an eye is a necessary condition of a well-formed face, and even if it is removed, an eye is still a face part. Optional meronymy includes examples like *cushion<chair* – there are chairs without cushions and cushions that exist independently of chairs.

In addition to necessity, Cruse (2000) identifies four other dimensions on which meronym relations may differ. Some parts are more 'integral' to their wholes than others; compare *handle<door* and *handle<spoon* – without the handle, the spoon is not much of a spoon, but a door without a handle is still a door. Similarly, some parts are more 'discrete' than others; *tastebud* is a more discrete meronym of *tongue* than *tip* is, as its boundary is clearer. For some parts we have more motivation to name them, especially if that motivation is functional – the part is useful for some purpose. So, even though a *fingertip* has a fuzzy boundary, we are motivated to identify it as a part because it is useful. Finally, meronyms differ in their congruence, in three ways. 'Range congruence' is whether or not the meronym is more or less general in its range of reference than the holonym. A relatively congruent case is *navy>admiral*, since any navy has an admiral and there are not admirals without navies, whereas *door>handle* is quite range-incongruent, as some handles are not door handles and some doors have no handle. 'Phase congruence' is whether or not the parts exist in the same time. For example, in one sense, milk can be a part of a cake, but once it is a cake, the milk might be said not to exist anymore, so *cake>milk* is phase-incongruent. Finally, 'type congruence' holds when the part and whole are of the same ontological type, for example both being substances or objects. So, *biscuit>flour* is not very type-congruent in that the whole is a countable object, whereas the part is a substance. Cruse has used these features of meronym relations to distinguish between prototypical and nonprototypical meronym relations – claiming that the most prototypical meronyms are necessary, integral, discrete, motivated, and congruent.

Others have been motivated to distinguish between PART-OF relations in order to represent such relations directly in models of lexical knowledge. For instance, a cake can have slices, flour, and icing, but each of those involves a different kind of relation to the cake – i.e., the cake **is divided into** many slices, its **ingredients** include flour, milk, eggs, butter (etc.), and it **is constructed of** cake layers, icing, and possibly other fillings and toppings. How many types of relation any particular theorist names depends in part on how broadly they define the relation in the first place (e.g., using the *partly* diagnostic frame or not). Identified types include WHOLE>SEGMENT (*year>month*), WHOLE>FUNCTIONAL COMPONENT (*computer>keyboard*), COLLECTION>MEMBER (*forest>tree, club>member*), and WHOLE>SUBSTANCE (*jar>glass*). (See Iris *et al.*, 1988, Chaffin, 1992, and Miller, 1998 for particular taxonomies.)

Winston *et al.* (1987) base their taxonomy of meronym types on three binary features, which in different combinations describe the various types of meronymy: (+/−) FUNCTIONAL, (+/−) HOMEOMEROUS, and (+/−) SEPARABLE. If a relation is [+HOMEOMEROUS], then the part is made of the same kind of thing as the whole, as for *slice<pie* (versus *crust<pie*, which is non-homeomerous, since a pie has more ingredients than a crust). Separability is whether or not the part can be removed from the whole. So, SUBSTANCE<WHOLE relations are [−SEPARABLE], but MEMBER<COLLECTION relations are [+separable]. Based on this, they identify six types of relation out of a possible eight combinations of features – no type is both [+FUNCTIONAL] and [+HOMEOMEROUS].

Other types are identified in Meaning-Text Theory (MTT; Mel'čuk, 1996), an approach rooted in the quest for machine translation. Some of these types are SOCIAL WHOLE>STAFF (e.g., *ship>crew*), ORGANIZATION>HEAD (*ship>captain*), COLLECTION>MEMBER (*fleet>ship*), and WHOLE>CULMINATION/CENTER (*joke>punchline*). MTT also allows for the combination of lexical functions (such as the above relations) to create additional relations.

Properties of Meronymy

Because of the diversity of types of PART-OF relations and because the relations seem to relate referents

rather than senses, little can be said in general about logical properties of meronymy. Unlike synonymy and antonymy, the relation is asymmetrical; that is, words are not each other's meronyms. The various types of meronymy vary in whether they are transitive or not. For example, body parts are in transitive meronymic relations, as in (1).

(1) An eye is a part of a face.
A face is a part of a body.
∴ An eye is a part of a body.

But the cases in (2) and (3) seem less transitive.

(2) Bark is part of a tree.
A tree is part of a forest.
?∴ Bark is part of a forest.

(3) The house has a door.
The door has a handle.
?∴ The house has a handle. (Lyons, 1977)

Transitivity fails in (2) because the meronym relations in the premises are of different subtypes; *bark* <*tree* is COMPONENT<WHOLE, whereas *tree*<*forest* is MEMBER<COLLECTION.

Thus, transitivity failure is sometimes used as a diagnostic tool to determine subtypes of meronymy. In (3), both of the premises seem to involve the same relation: FUNCTIONAL COMPONENT<WHOLE. In this case, transitivity failure does not seem to be because of different types of meronym in the premises. Lyons (1977) distinguishes between (1) and (3) on the basis that (1) involves necessary meronymy (an eye is definitionally a face/body part) and (3) involves optional meronymy (a handle is not necessarily a door part). Since a handle can be a functional part of many different kinds of things (doors, cups, bags, hammers), the conclusion *The house has a handle* leads one to understand that the handle is for holding or moving the house, rather than holding or moving a house part.

Meronymy in Linguistic Theory

In recent decades, semantic theories have become less concerned with logical relations among words and propositions and more focused on the interface between language and mind. Whereas formerly meronymy could be considered a part of encyclopedic (rather than definitional) knowledge, the distinction between mental lexicon and mental encyclopedia has faded to nothing in many approaches, thus meronymy has renewed importance in the modeling of lexical meaning. Cognitivist approaches to meaning eschew the distinction between definitional and encyclopedic information and embrace the notion of prototypicality in meaning – that is, that meanings are not composed of strict conditions on reference, but rather are based on notions of ideal or exemplary instances of a category. As such, meronymic relations like *cat*>*tail* can be included in the representation of the meaning of *cat*, since doing so does not entail that anything called a cat must have a tail.

Current interest in meronymy is also motivated by computational linguistic projects. For instance, the types of meronymy represented in the MTT lexicon are of particular use in text generation. These relations constitute syntagmatic as well as paradigmatic relations, in that they frequently occur in phrases such as *the punchline of the joke* and *the fleet of ships*.

See also: Hyponymy and Hyperonymy; Lexicon: Structure; Paradigm versus Syntagm; Prototype Semantics; Synonymy.

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Mesoamerica: Scripts

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Sometime between 1000 and 600 B.C., hieroglyphic writing began to appear in Mexico. It spread and developed until, by A.D. 600–800, writing could be found throughout the region of high cultures known as Mesoamerica (Mexico, Guatemala, Belize, El Salvador, and Honduras). Writing reached its peak of complexity among the lowland Maya civilization of A.D. 292–909. For most of the contributors to this encyclopedia, only the Maya system of signs would qualify as true writing, but since the other Mesoamerican scripts are usually called 'writing,' I retain that designation here. All these scripts are related to one another, but since several different language families are involved, it remains for future investigators to untangle the specific relationships.

The Motivation for Mesoamerican Writing

Some ancient civilizations – the Inca, for example – seem not to have needed writing. This raises the question of why Mesoamerica needed it. Of all the Old World civilizations, the closest analogy to Mesoamerica seems to be Egypt. In both regions, the early use of writing was to label people and places in scenes that featured rulers, conquests, and prisoner taking. In Egypt, the Narmer Palette commemorated a ruler named Narmer, his prisoners, and his conquests. In Mexico, the oldest Zapotec monument gives the name of a slain captive (Flannery and Marcus, 2003). In the later Egyptian state, the "hieroglyphic writing system was improved for purposes of high culture and display rather than for administration; but the latter no doubt also exploited such developments" (Baines, 1999). Classic Maya states also used hieroglyphic texts to extol the deeds of rulers and to legitimize their right to rule, linking them to both royal ancestors and supernatural beings (Marcus, 1992). The origins of writing in both Egypt and Mesoamerica, therefore, contrast with that in Mesopotamia, where keeping economic records seems to have been the principal motivation and where tokens, not iconography, are claimed to have been the precursors of writing.

The Nature and Variety of Mesoamerican Writing Systems

In order to distinguish Mesoamerican writing from its iconographic precursors, we can list four requirements:

1. There must be at least three glyphs, arranged in a row or column.
2. The arrangement must determine reading order.
3. The set of glyphs must show a correspondence to the spoken language.
4. As a consequence, the arrangement must follow grammatical rules.

At least five principal writing systems appeared in Mesoamerica. The earliest was the Zapotec system of the southern Mexican highlands, followed by the Isthmian system to the south and east. Then came the Maya system, which was the most capable of capturing the spoken language. Much less complex were the later Mixtec and Aztec systems of the Mexican highlands, which were still in use when Europeans arrived in the New World. In addition to these five major systems, there were localized scripts, like those seen at the ancient cities of Teotihuacán, Xochicalco, and Cacaxtla in the Mexican highlands.

The Precursors of Mesoamerican Hieroglyphic Writing

The period 1150–850 B.C. was one of flamboyant societies with hereditary rank and sumptuary goods. Many portable artifacts of that period, such as pottery and jades, bore complex iconography. One popular medium for such iconography – especially in the Basin of Mexico near present-day Mexico City – were ceramic stamps, which could be coated with paint and rolled over cloth or the human body, producing a continuous strip of decoration. More than 300 of these stamps have been recovered at the site of Tlatilco alone (Field, 1967).

Forty-five years ago, José Luis Franco (1959) drew attention to a roller stamp from Tlatilco that featured three glyphs in a row (Figure 1). That sequence of glyphs is a tantalizing precursor to writing, because

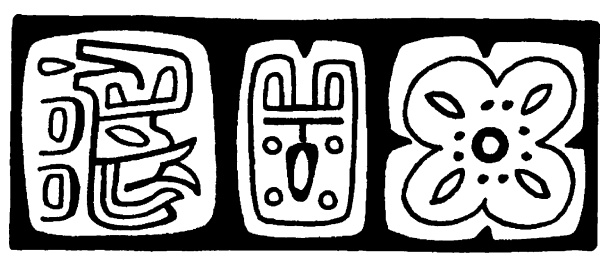

Figure 1 This ceramic roller stamp includes three signs that seem to function as logograms. The profile head at A matches depictions of Earth; B is an abstract sign for Earth and the four world directions; the sign at C went on to become the Maya glyph *k'in*, meaning Sun/Day/Time (redrawn from Franco, 1959). Signs on such roller stamps, such as this one from the early village of Tlatilco in Mexico, may be forerunners of writing.

each glyph seems to be a logogram. This trio of signs falls short of writing only because we cannot show that it is a phrase or sentence that follows the grammatical structure of a known language.

Dating to ca. 1000 B.C., this potential precursor is intriguing because roller stamps were so much more common in the central Mexican highlands than in the lowland Isthmian or Maya regions. A few Tlatilco-style roller stamps with potential glyphs (or pseudo-glyphs) were traded to highland Oaxaca by 1000 B.C. and eventually to the Gulf Coast by 500–400 B.C. (uncalibrated) (Pohl *et al.*, 2002), but nowhere were they as abundant as in the central highlands of Mexico.

Why did the people of Mesoamerica move from iconography to writing? Given some of the earliest texts (see below), we suspect that scenes and iconographic symbols proved insufficient for writing proper nouns (the names of specific leaders and elite captives) and for recording the specific date of an event. The Zapotec, who were the earliest to write pure texts, did so in the context of endemic chiefly competition. Indeed, writing was born of that competition and became a tool in later rivalries among kings.

The Earliest Glyphs Carved in Stone

At the moment, the earliest known Zapotec glyph is a day name from the 260-day calendar (described below). The day name is that of a sacrificial victim carved on a stone slab serving as the threshold for a corridor between two temple platforms at the site of San José Mogote in the Valley of Oaxaca, Mexico (Figure 2). Two glyphs between his feet give his name as 'One L' (letters of the alphabet were assigned to Zapotec glyphs by Alfonso Caso in 1928). This monument was sealed stratigraphically below two hearths with uncalibrated dates of 630 and 560 B.C. (Flannery and Marcus, 2003). The first 'pure' texts (i.e., columns of glyphs unaccompanied by scenes) were carved on Stelae 12, 13, 15, and 17 at Monte Albán in the Valley of Oaxaca ca. 500–400 B.C. (uncalibrated) (Marcus, 1983).

At roughly the same time as these stelae, Monument 13 of La Venta in the Isthmian lowlands displayed a column of three glyphs; this is not a pure text, however, since it is accompanied by the figure of a man (Figure 3). Unfortunately, we do not know what language is represented by the Monument 13 glyphs. Behind the man is an isolated footprint, probably a logogram for 'journey.' Similar footprints are

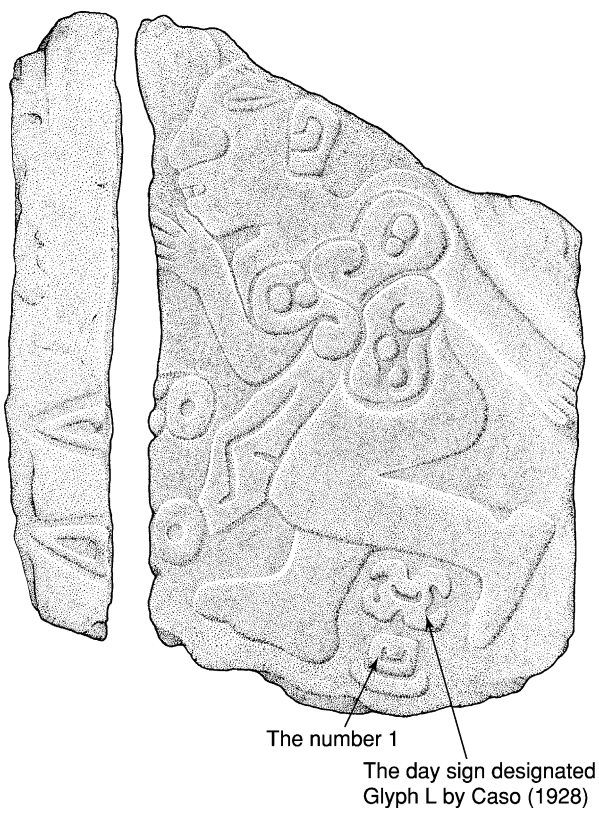

Figure 2 Monument 3, San José Mogote, Valley of Oaxaca, Mexico, shows a slain captive whose 260-day calendar name is given between his feet. This monument dates to ca. 600 B.C. (uncalibrated). Both the riser and the tread of the threshold are carved; the tread shows the naked victim with his heart removed and two stylized drops of blood (circle + triangle) flowing down the riser (adapted from Marcus, 1992).

Figure 3 Monument 13, La Venta, Mexico, shows a column of three hieroglyphs, none of which provides calendric information. The third sign, possibly a bird's head, may provide part of the man's name. The footprint behind him is probably a logogram for 'travel' (redrawn from Marcus, 1992). Based on radiocarbon samples and stratigraphy, this monument may have been carved ca. 500–400 B.C. (uncalibrated).

featured on more than 50 roller stamps from two highland sites, Tlatilco and Las Bocas (Field, 1967). Those two sites are sufficiently older than Monument 13 as to frustrate any attempt to attribute the origins of writing to the Olmec culture of the Gulf Coast.

The Link between Writing and Calendar

From its inception, Mesoamerican writing was linked to one or more calendars. Dates gave specificity to events such as birth, death, marriage, conquest, accession to the throne, building dedications, and ritual offerings. All calendars featured combinations of number + day name. The two key calendars were the 260-day ritual calendar and the 365-day secular calendar.

The Mesoamerican counting system was based on units of 20 (*vigesimal system*). From 600 B.C. to 50 B.C., those groups with writing used two elements to express numbers – a dot with the value of 1 and a bar with the value of 5. By combining dots and bars, they could express any number from 1 to 19 (Figure 4). After 50 B.C. in the Isthmian and Maya regions, positional value notation and a sign for 'zero' or 'completion' were added to the repertoire. After A.D. 900 some groups, such as the Mixtec, went over to the exclusive use of dots (thus, 13 could be expressed as 13 dots, rather than 2 bars and 3 dots).

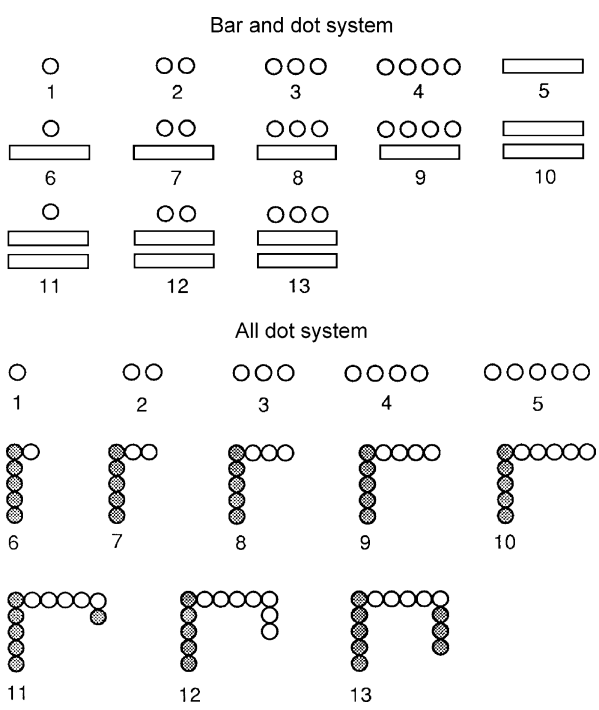

Figure 4 Two systems of numeration were used in Mesoamerica: the 'bar and dot' system (by the Zapotec, Isthmian groups, and Maya) and the 'all dot' system (by the Mixtec and sometimes by the Aztec) (redrawn from Marcus, 1992).

The Sacred Calendar The 260-day ritual calendar, which combined 13 numbers with 20 day names, was called *piye* by the Zapotec and *tonalpohualli* by the Aztec; this 260-day calendar was used by every linguistic group in Mesoamerica. That fact suggests to many scholars that the 260-day calendar had great time depth and may in fact have been used by the common ancestors of most Mesoamerican groups before their languages diverged.

The 260-day calendar had ritual functions, one of which was the naming of children after the day on which they were born. Thus, texts refer to individuals named 8 Deer, 5 Flower, 11 Crocodile, and so on. A study by Whallon (1992) of more than 2500 Mixtec names, however, suggested that parents avoided naming their children after inauspicious days by choosing the next auspicious day.

The Secular Calendar The secular calendar consisted of 18 'months' of 20 days ($18 \times 20 = 360$) + 5 extra days. This calendar was called *yza* by the Zapotec, *xihuitl* by the Aztec, *cuiya* by the Mixtec, and *haab* or *tun* by the Maya.

Combining Both Calendars When the 260-day and 365-day calendars were combined, a 52-year 'Calendar Round' of 18 980 differently designated days resulted. Each year of the Calendar Round was named after the day the year began, and that year name repeated itself every 52 years. To anchor dates more securely in time, the Isthmians developed a base date; later, the Maya used the same base date.

The 'Long Count' from a Base Date The system devised by the Isthmian and Maya cultures involved numeration by position, the mathematical concept of zero, and a base date to anchor events in time. From that base date, they calculated the number of days that had elapsed and used five units of time to do so (see Table 1).

The base date or starting point was September 8, 3114 B.C., which corresponded to the completion of 13 *Bak'tun* (13.0.0.0.0) and the beginning of *Bak'tun* 1 (1.0.0.0.0). The earliest use of this base date occurred outside the Maya region. Stone monuments

Table 1 Components of a Maya 'Long Count' date

1 cycle or *bak'tun* =	20 *k'atun* =	144 000 days (units of ca. 400 years)
1 *k'atun* =	20 *tun* =	7200 days (units of ca. 20 years)
1 *tun* =	18 *winal* =	360 days (year)
1 *winal* =	20 *k'in* =	20 days (month)
1 *k'in* =		1 day (day)

carved between 36 B.C. and A.D. 36 at Chiapa de Corzo (Mexico), Tres Zapotes (Mexico), and El Baúl (Guatemala) are among the earliest to use the base date (Marcus, 1976a). Later, the Maya elaborated temporal cycles even grander than the *bak'tun*. These cycles, some of which were used to place events far back in mythological time, included the *piktun* (20 *bak'tun*, or 8000 years), *kalab'tun* (20 *piktun*, or 160 000 years), *k'inchiltun* (20 *kalab'tun*, or 3 200 000 years), *alawtun* (20 *k'inchiltun*, or 64 million years), and even higher units.

We have spent this time on esoteric aspects of the calendar because it figures so importantly in Mesoamerica's hieroglyphic texts. We will now look at each of the five principal writing systems.

Zapotec Writing

Zapotec writing, currently the earliest, was a 'mixed' system in that it included pictograms (picture signs), logograms (word signs), and phonograms (sound signs). Although it had long been suspected that Zapotec hieroglyphic texts reflected the syntax of spoken Zapotec, it has only recently become possible to demonstrate this.

Ancient Zapotec texts provided calendrical, political, genealogical, and ritual information. The early monuments depicted people and supplied their calendar names; later texts supplied place names, gave information on ritual and political events, and displayed noble genealogies. As we have seen, by 500–400 B.C. (uncalibrated), the Zapotec had begun to carve monuments with columns of glyphs. Geographic place names made their appearance after 100 B.C., when they were used to list territories claimed along the frontier of the expanding Zapotec state. From A.D. 100 to 600, the Zapotec continued to give the names of elite captives, their hometowns, and the dates of their capture.

A major change in subject matter and format occurred after A.D. 600. The Zapotec capital, Monte Albán, was then declining in power, and its formerly subordinate towns were creating their own alliances. Nobles began to commission stone carvings to record their ties, by descent or marriage, to nobles at other sites in the Valley of Oaxaca. Much of the dynastic and ritual information was presented on a new type of monument, the *genealogical register*, whose format and content foreshadowed the later polychrome codices, or 'books,' commissioned by Mixtec rulers from A.D. 1200 to 1600 (Marcus, 1992; Smith, 1973; Urcid, 2001).

Let us now look at some details of Zapotec writing. Zapotec is a 'verb initial' language, meaning that verbs begin sentences and precede subjects. For example, the English sentence 'Lord 1 Crocodile, the first-born son, was born' would have been spoken in 16th-century Zapotec as: **was born** (*cale* or *cole*) + **firstborn** (*yobi*) + **lord** (*coqui*) + **1 Crocodile** (*quiechilla*). The word order would thus be verb + birth order + rank + day name of that lord. Sixteenth-century Spanish accounts tell us that name clauses could have included as many as five elements: (1) a rank term, such as lord (*coqui*), lady (*xonaxi*), or noble (*joana*); (2) a nickname (e.g., *Pechetào*, Great Jaguar); (3) birth-order position; (4) a 260-day calendar name; and (5) a hometown (especially for women who had married into another dynasty).

Birth-order position was indicated by ordinal numbers, depicted in Zapotec texts with fingers (or a hand with raised fingers). This is an example of the 'rebus principle.' (A well-known example in English is using a picture of an 'eye' to express the difficult-to-depict 'I.') In spoken Zapotec, the term for each finger was the same as that used for birth order. Thus *yobi* meant both 'first-born son' and 'thumb of the right hand'; *tini* meant second-born son and index finger; *texi*, third-born son and third finger; *payo*, fourth-born son and fourth finger; *yee*, fifth-born son and fifth finger. Different terms were used to indicate the birth order of daughters.

Now let us look at two clauses that illustrate Zapotec syntax and use fingers for birth order (Figure 5). The clauses of this stone, which was carved between A.D. 600 and 800 and placed in a royal tomb in the Valley of Oaxaca (Miller, 1995), include the following: date + verb (was born) + rank + subject's name + birth-order position + death + death date. Although the word order of these clauses is not common in all parts of the valley, an almost identical example can be found in a 16th-century genealogy from the district to which Suchilquitongo belongs. The discovery of such continuities will enable us to make progress in the study of the Zapotec writing system, whose decipherment is still in its infancy.

Isthmian Writing

The Isthmian script has been known since 1902, when the jade Tuxtla Statuette was found in Veracruz. This script was also known from a handful of portable objects and stone monuments, but in no case were the texts long enough to permit extensive study. All that changed in 1986 with the discovery of a stone monument at La Mojarra, Veracruz. That monument bears a text of 535 glyphs – the kind of long inscription epigraphers dream about, because the chance for decipherment increases dramatically when signs and phrases repeat themselves (Macri and Stark, 1993;

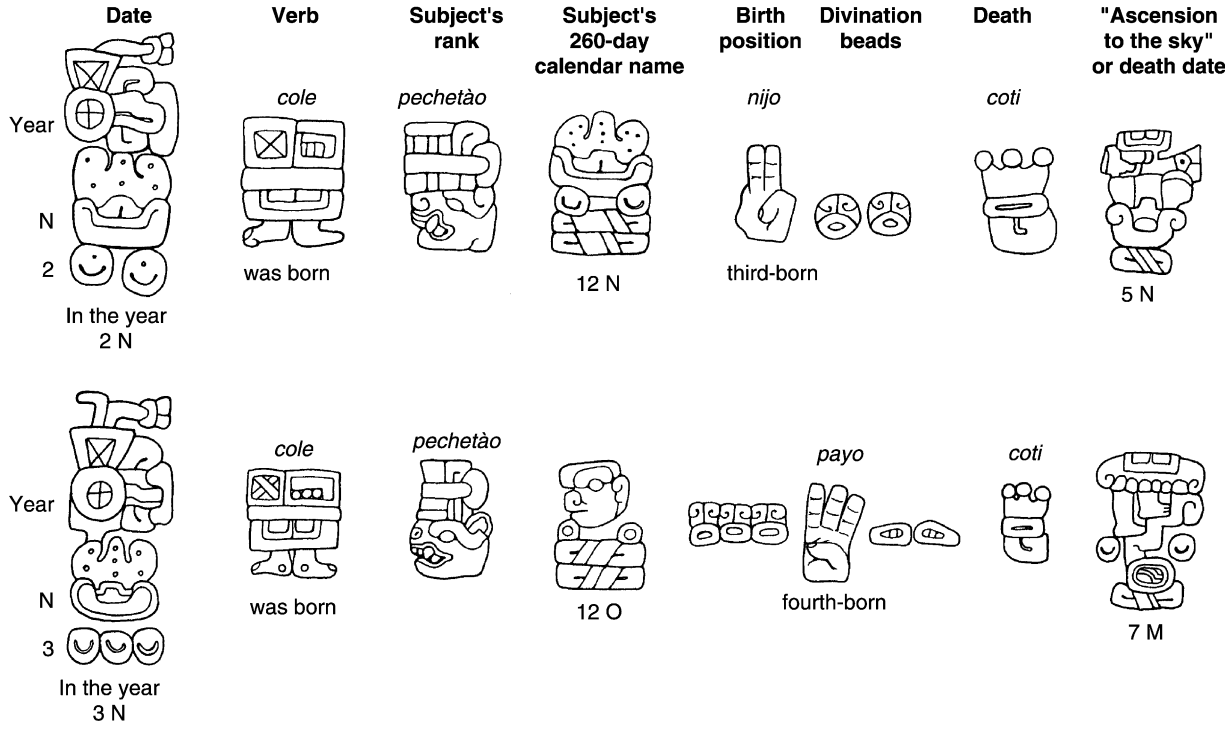

Figure 5 Two Zapotec clauses with similar syntax provide the names, as well as birth dates and death dates, for two individuals – (1) a daughter named 12 N, who was the third-born (*nijo*); and (2) a son named 12 O (12 Monkey) who was the fourth-born (*payo*). These clauses were carved on the sides of a stone that had been placed in a royal tomb at Suchilquitongo, Oaxaca, Mexico (redrawn from Miller, 1995). (The letters M, N, and O were assigned to these day-signs by Caso, 1928.)

Méluzin, 1995). Unfortunately, controversy rages over whether this text has really been translated. Two scholars have published what they believe is a translation, linking the text to the Mixe-Zoque language family (Justeson and Kaufman, 1993). Two other scholars, Houston and Coe (2003), remain unconvinced, asserting that they have plugged in Justeson and Kaufman's values to a newly discovered inscription, but "the inserted values yield a semantic mish-mash." This controversy is likely to continue into the foreseeable future.

The only part of the La Mojarra text on which all scholars seem to agree is the calendrics. The Long Count dates on the La Mojarra monument are A.D. 143 and 156, reasonably close to the A.D. 162 date incised on the Tuxtla Statuette. Although Isthmian and Maya texts used the same base date, the Isthmian Long Count dates preceded by 130 years the earliest Maya Long Count date (October 14, A.D. 292, which is recorded on Stela 29, Tikal, Guatemala).

Maya Writing

As with earlier Mesoamerican scripts, Maya texts often served as captions below people and objects in scenes. Such texts might supply (1) the names of lords and ladies at key Maya cities; (2) the exact dates of events; and (3) descriptions of actions such as prisoner taking (Figure 6), ritual offerings, bloodletting, the honoring of ancestors, and the naming of buildings. Many monuments provide dates for the birth, marriage, accession, death, and major events in the lives of ancient rulers; some texts even link these rulers to mythological forebears (Marcus, 1976b, 1992; Martin and Grube, 2000; Schele and Mathews, 1998). Painted texts on pottery sometimes provide information on the former contents and noble owner of the vessel and may even show nobles receiving visitors, as well as gifts and tribute (Reents-Budet, 1994).

Which of the 35 Mayan languages were represented by the script? More than 50 years ago, Thompson (1950) suggested that the script recorded a form of Cho'lan, a language family whose speakers extended from eastern Mexico to Honduras. Today we can be more specific and say that the inscriptions were written in an ancestral form of Ch'olti' and Ch'orti' (Chortí), the latter of which is still spoken today in Western Honduras. ('Mayan' usually refers to the language, while 'Maya' refers to the people and their civilization.)

Of all Mesoamerican writing systems, that of the Maya displayed the closest correspondence to the spoken language and the greatest degree of phoneticism. The Maya could write complete sentences,

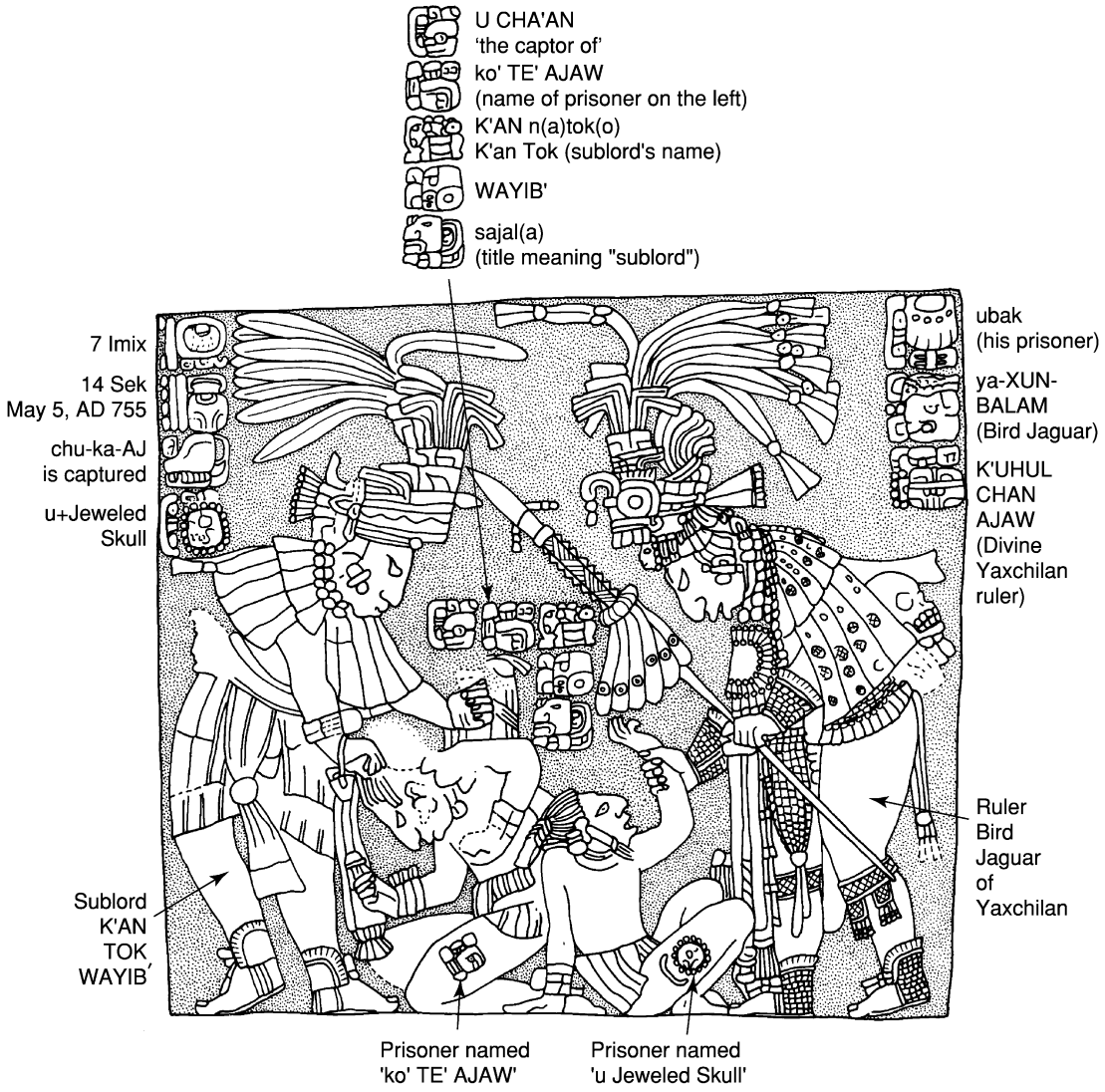

Figure 6 In A.D. 755 a ruler from the Maya capital of Yaxchilan, Mexico, is aided by a provincial ruler in the taking of prisoners. Bird Jaguar of Yaxchilan (on the right) takes a prisoner named Jeweled Skull; the subordinate lord K'an Tok Wayib' (on the far left) takes a noble prisoner named Ko' Te' Ajaw (adapted from Marcus, 1992). (Labels written in all caps refer to logograms, while labels written in lowercase refer to phonetic elements.)

using signs that represented verbs, nouns, adjectives, prepositions, and pronouns. Approximately 800 signs are known; some are considered 'main signs' and others 'affixes' (Harris and Stearns, 1997; Macri and Looper, 2003). Main signs were usually whole words or word stems (Figure 7). Affixes of various kinds (prefixes, suffixes, infixes, superfixes, or subfixes) were added to those main signs to supply adjectives, tense, possession, prepositions, and so forth.

Like Zapotec and Isthmian scripts, Maya writing was logosyllabic, but the Maya relied much more heavily on phoneticism than those two earlier scripts. Maya texts could be 50% logographic and 50% phonetic. As more of the phonetic signs are deciphered, a

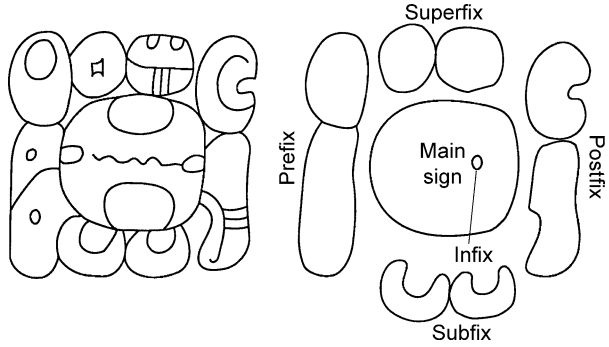

Figure 7 Example of a main sign surrounded by affixes. At left, the Palenque emblem glyph; at right, a diagram that labels all the elements seen at left (plus, the diagram shows where an infix can occur) (adapted from Marcus, 1992).

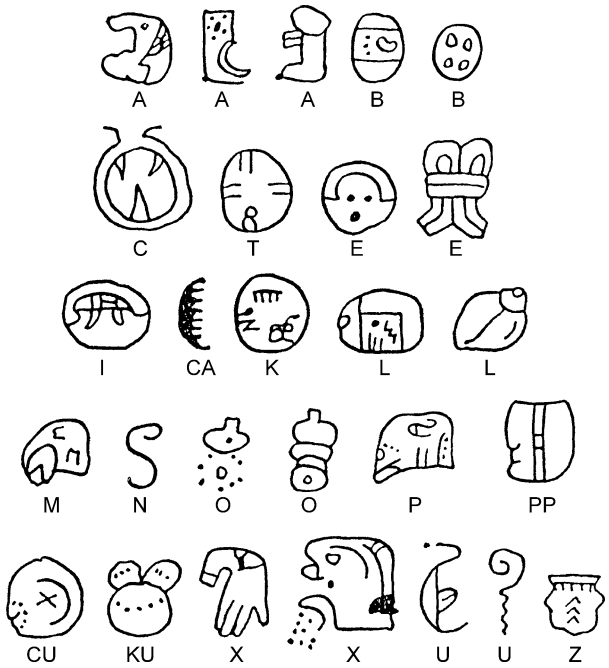

Figure 8 Maya syllabary recorded by Diego de Landa from Yukatek informants in the 16th century (redrawn from Tozzer, 1941).

syllabary, or 'grid of syllables,' is nearing completion (Montgomery, 2002). The first syllabary, considered a kind of Rosetta Stone for the region, was elicited from Yukatek Maya (the Maya of Yucatán) speakers by the Spanish friar Diego de Landa in the 16th century (Tozzer, 1941). This syllabary has helped several generations of scholars discover Mayan syllables and evidence for more phoneticism (Figure 8). Knorozov (1967), Kelley (1968), Lounsbury (1973), and others are usually credited with 'phonetic decipherment' of Mayan script, but phoneticism has a far longer history, going back to Brinton (1870), Thomas (1893), Beyer (1930), Whorf (1933), Thompson (1944), and others (Houston *et al.*, 2001). As is so often the case, Mayan decipherment was a slow process with many contributors, not a sudden breakthrough made by one individual.

In Mayan texts, logograms and syllables were often combined in the same glyph block in creative ways. For example, a main sign could be a logogram to which an affix could be attached to serve as a phonetic complement. We see this in Figure 9, where the syllable *ka* is prefixed to the logogram of a snake (*Kan*), the

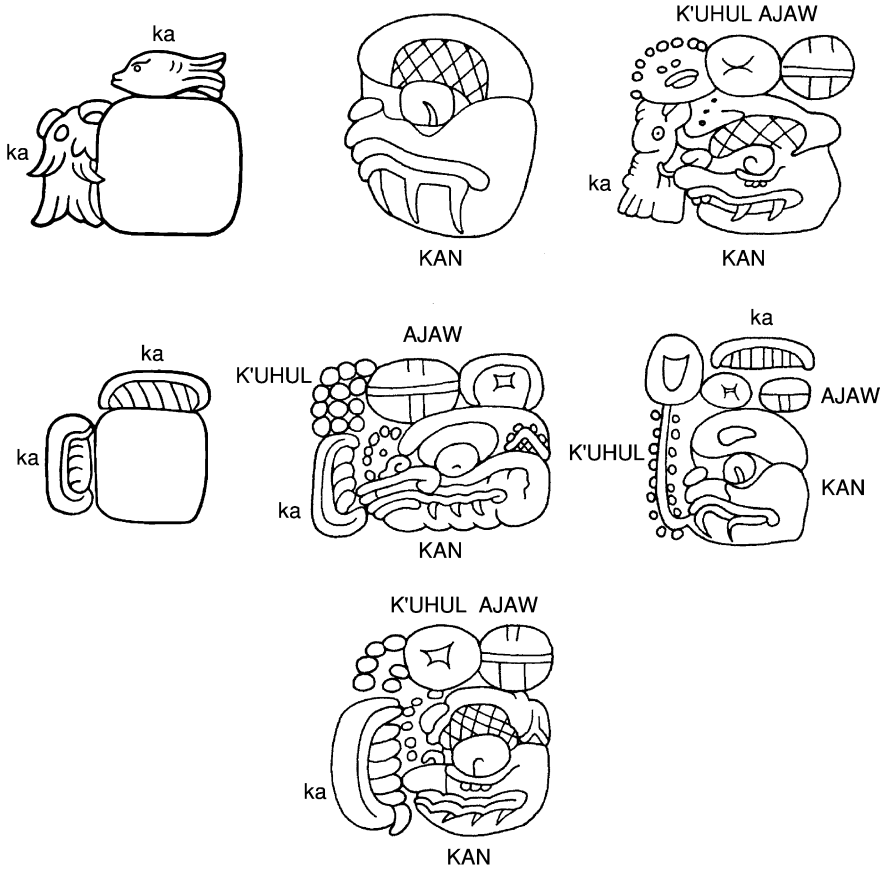

Figure 9 Various logograms and phonetic complements can be combined to express the place name '*Kan*,' the ancient name for Calakmul. The fish and comb signs – both of which supply the sound *ka* – serve to reinforce the logograms for K'UHUL KAN AJAW, 'holy ruler of Calakmul' (adapted from Marcus, 1987).

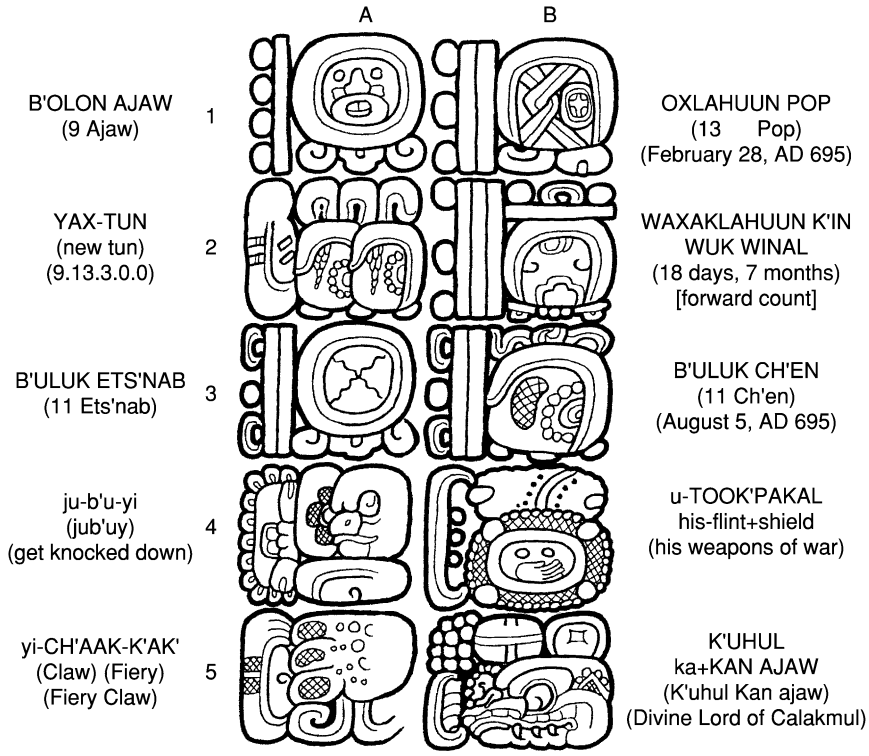

Figure 10 We can paraphrase this Maya text (recorded on a wooden lintel in Temple I at Tikal, Guatemala, and drawn by K. Clahassey and J. Klausmeyer) as follows (labels written in all caps refer to logograms, while labels written in lowercase refer to phonetic elements.): 'From February 28 (the new year) we count forward 7 ''months'' and 18 days to August 5, the defeat of Fiery Claw, divine ruler of Kan (Calakmul).'

ancient name of Calakmul. To reduce ambiguity about the main sign, *Kan*, the phonetic complement *ka* was added to provide the initial sound. The *ka* prefix could be either a fish or a comb, and it was this interchangeability of signs that has been called "the principle of substitution" (Thompson, 1944).

The reading order of most Mayan texts with multiple columns is left to right, top to bottom, often by paired columns in which glyph A1 is read, then B1, then A2, B2, then A3, B3, and so on (Figure 10). Mayan sentences, like those of the Zapotec, were 'verb initial.' Sentences were either VS (verb + subject) or VOS (verb + object + subject). Hieroglyphic signs for verbs carried affixes to indicate whether the action was incomplete (ongoing) or complete. Unlike English, Mayan languages made a distinction between pronouns associated with *intransitive* verbs and pronouns associated with *transitive* verbs. Linguists designate these sets of pronouns 'A' and 'B' – *Set A* was affixed to the subjects of transitive verbs and to possessors of nouns; *Set B* marked the subjects of intransitive verbs and the objects of transitive verbs.

Third person singular possessive – her/his/its – was expressed as '*u*' in Mayan. This sound was used so often, in fact, that 8 to 10 separate signs were created to express it, and one of those appeared in Diego de Landa's 16th-century syllabary (Figure 8). Two examples of *u* as a 'possessor of nouns' include (1) *u-baak*, which could refer either to 'his bone' or 'his captive,' and (2) *u-muknal*, 'his tomb.' In front of a word beginning with a vowel, the Maya used '*y*' rather than '*u*.' For example, 'his spouse' would be *yatan* (*y* + *atan*) and 'his house' *yotot* (*y* + *otot*) (Figure 11).

Transitive completive verbs often carried the prefix *u* and the suffix *wi*, *aw*, or *wa*; intransitive completive verbs often took the suffix *hiy*, *yi*, or *iiy*. Some intransitive verbs were given 'positional' affixes, which referred to sitting, lying down, or other positions. For example, the verb 'seated in office' usually took a suffix such as *wan* or *waniy* (Figure 12A).

Special prefixes served as gender markers or agentive nouns. For males *aj* was used to indicate 'he' or 'he of' (*aj pits*, 'he, the ballplayer'; *aj mutul*, 'he of Mutul' [Tikal]). For females *ix* was used to indicate 'she' or 'she of' (*ix mutul*, 'she of Mutul'; *ix kan ajaw*, 'Lady of Kan' [Lady of Calakmul]). Some royal women also held the important title of *kaloomte'* (ruler) or *lak'in kaloomte'* (east ruler) (Figure 12B).

Maya hieroglyphic writing on stone fell into disuse after A.D. 909. However, both in the Maya region and elsewhere, hieroglyphic writing continued to be

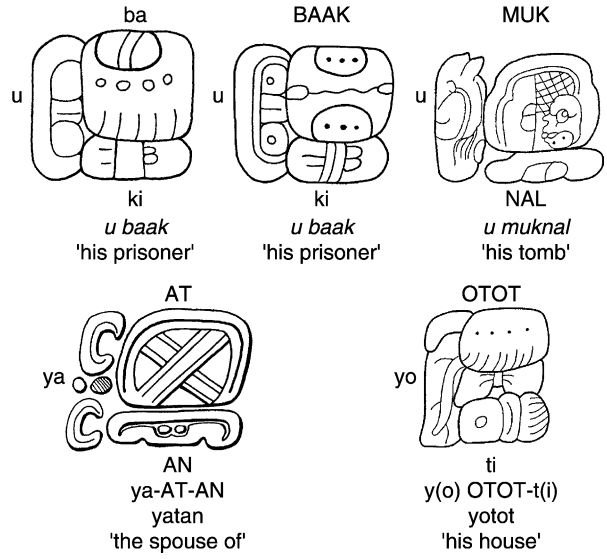

Figure 11 The prefix *u* – his/her/its – is common in Maya writing; and, before a word that begins with a vowel, *y* is used (adapted from Marcus, 1992). (Labels written in all caps refer to logograms, while labels written in lowercase refer to phonetic elements.)

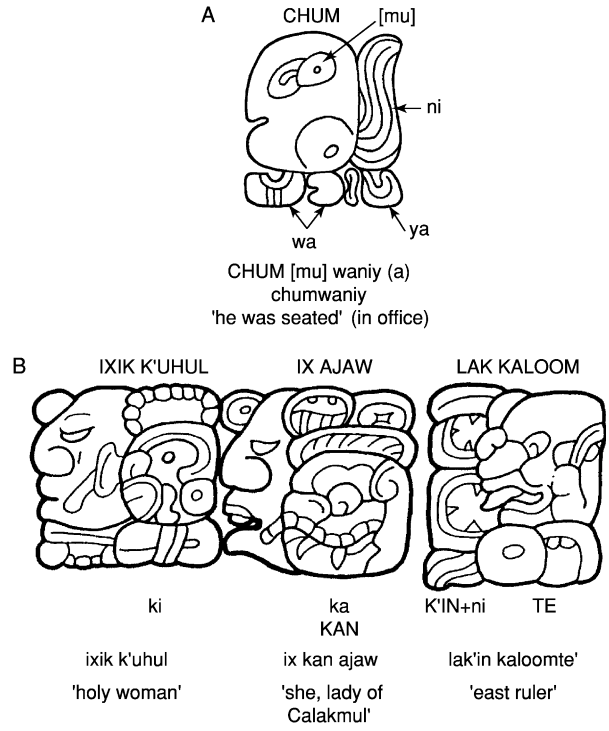

Figure 12 Examples of Maya writing that combine logograms and phonetic elements: (A) Was seated in office (adapted from Marcus, 1992); (B) Holy woman of Calakmul (adapted from Marcus, 1992). (Labels written in all caps refer to logograms, while labels written in lowercase refer to phonetic elements.)

painted in books or codices made of bark paper or deer hide sized with lime. Among those cultures relying on polychrome painted codices were the Mixtec and Aztec.

Mixtec Writing

Mixtec writing was a 'partial' system that served to label scenes. It provided the dates of events and the names of people and places, functioning much like the earlier Zapotec system. Mixtec writing relied heavily on logograms (signs standing for whole words), but there was also some use of phonetic elements, particularly in place names (Smith, 1973).

Between A.D. 1000 and 1600, a number of books painted by the Mixtec (codices Selden, Nuttall, Bodley, Colombino, and Becker) provide the histories and genealogies of Mixtec towns and their ruling dynasties. In these codices we see pictures of nobles, accompanied by short captions that supply their personal names. These names usually had two parts: (1) a name taken from the 260-day calendar, followed by (2) a nickname (e.g., 'Tiger Claw'), which distinguished that individual from others with the same calendar name.

Mixtec place signs could utilize phonetic elements. One well-known example is the sign for the town of Teozacoalco. Its Mixtec name, *Chiyo canu*, meant 'large platform.' Since the word 'large' was difficult to depict, the Mixtec used a homonym for *canu*, which also meant 'bend' or 'break.' Thus, *Chiyo canu* was depicted in painted books as a platform being bent by a small man (Figure 13A). Since Mixtec is a tonal language, one could use an easily depicted word that differed from a hard-to-depict one in tone only.

Mixtec scribes also drew upon idiomatic expressions that could be depicted. Well-known examples are (1) "there was a royal celebration of the mat" and "the royal vessel was presented to the noble," both of which referred to a royal wedding (Figure 13B); and (2) "to put an arrow into the lands of another," which referred to conquest (Figure 13C). Smith (1973) has shown that many pictorial conventions used in the codices reflected idioms and metaphors in the Mixtec language. Compared with Maya writing at its peak, Mixtec writing cannot be characterized as more than a restricted system of logographic signs, symbols, and pictorial conventions.

Aztec Writing

As in the case of the Mixtec, our principal sources of Aztec writing are painted codices, such as the *Matrícula de Tributos*, the *Tira de la Peregrinación*, and the *Borbonicus*. There are also stone monuments that were commissioned by Aztec rulers, such as the Stone of Tizoc and the Teocalli de la Guerra Sagrada, but the number and length of such inscriptions are

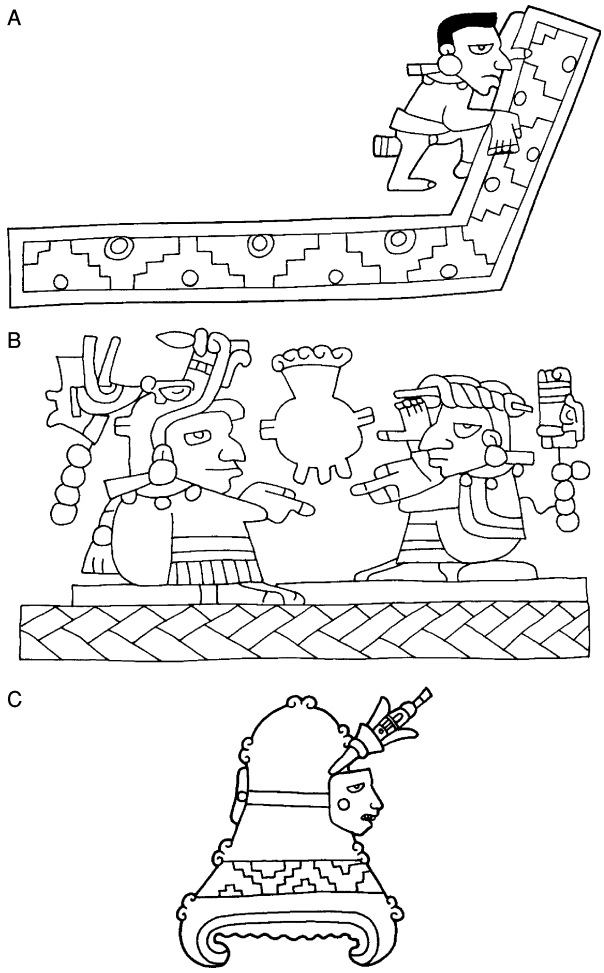

Figure 13 (A) The rebus principle is used to convey the Mixtec town *Chiyo canu*, which means both 'great platform' and 'bent platform.' Since it is easier to convey 'bent' than 'great,' the Mixtec used a man in the act of bending the platform to represent that town (redrawn from Marcus, 1992); (B) A Mixtec marriage could be conveyed by showing a bride facing a groom and/or by presenting him with a vessel of the beverage *pulque*. A lord named 4 Wind (at left) is married to a lady 5 Lizard (at right). This scene expresses the Mixtec expression for marriage, *nisiñe saha ya,* ''the royal vessel was placed before the nobleman'' (redrawn from Marcus, 1992); (C) One convention for conquest was to show a spear or arrow thrust into a hill, which corresponds to the Mixtec expression *chihi nduvua ñuhu ñaha*, ''to put an arrow into the lands of another'' (redrawn from Marcus, 1992).

limited by Maya standards (Dibble, 1971; Nicholson, 1973).

The *Matrícula de Tributos* deals with the tribute paid by each province incorporated into the Aztec Empire, but because this painted book was commissioned by the conquering Spaniards, it contains a mixture of pre-Hispanic and post-Hispanic conventions. Current evidence suggests that among all the Mesoamerican groups, only the Aztec used writing to keep province-by-province, commodity-by-commodity tribute records. The Aztec used logograms

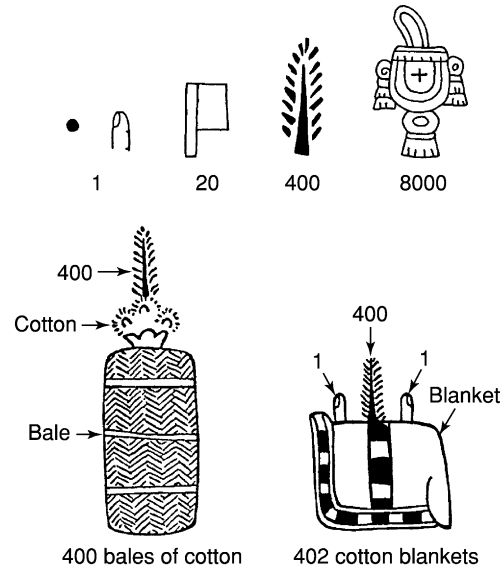

Figure 14 Aztec signs for numbers and units of tribute, as painted in the 16th century A.D. in the Basin of Mexico (redrawn from Marcus, 1992).

for different quantities of goods, using a vigesimal system like all Mesoamericans. To indicate the number 1, they used a finger or dot; for 20, a flag; for 400, an upright feather; and for 8000, a bag or pouch. These numeric logograms were attached to pictures of goods in the Aztec tribute lists. For example, to indicate '402 blankets,' the Aztec scribe used two fingers plus a feather, attaching those signs to a blanket with the desired design (Figure 14).

Aztec writing relied heavily on pictograms. For example, a mat could stand for royal authority, a flower for sacrificial blood, and a burning temple for conquest. Proper nouns showed a limited use of phonograms and phoneticism. For example, the sign for water, *atl*, was used to reinforce the initial 'a' sound of the ruler's name Ahuitzotl and the town name Acolman. Other examples include the use of the sign for tooth, *tlan(tli)*, to reinforce the final sound, *tlan*, in the town name Mazatlán ('Place of the Deer'), and the sign for flag, *pan(tli)*, to reinforce the final syllable in the town name Tochpan ('Place of the Rabbit').

Synthesis and Conclusions

Writing in Mesoamerica seems to have emerged in an era of chiefly competition, when simple scenes and iconography proved insufficient to give the names of early leaders and the specific dates of early ritual and political events. If (as some believe) the precursors of writing are to be found in the iconography of roller stamps, we must look to the central highlands of Mexico, where those artifacts appeared earliest and

in greatest numbers. By 600 B.C. (uncalibrated), there were stone monuments with a few glyphs; and by 400 B.C., the Zapotec of Oaxaca were carving columns of pure text unaccompanied by scenes. Both Zapotec and Isthmian scripts preceded the emergence of the first states, but later, during the era of the Maya state, hieroglyphic writing achieved its greatest elaboration.

The next frontier for Mesoamerican epigraphers will be to resolve the controversy over Isthmian script and to analyze other undeciphered scripts, such as that seen at Kaminaljuyú in the Guatemala highlands, at Teotihuacán and Xochicalco in central Mexico, and in the Nuiñe region of Southern Puebla (Mexico).

See also: Evolution of Syntax; Grammar; Mayan Languages; Origin and Evolution of Language; Oto-Manguean Languages; Uto-Aztecan Languages; Writing and Cognition; Zapotecan.

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Mesopotamian Cuneiform Script

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Origins: Pre- and Protocuneiform

The earliest certain written records from Mesopotamia are tablelike notations of transactions and inventories, involving such language and language-related elements as graphic representations of numerals, and then, increasingly, proper names, and terms for natural kinds and artifacts, and descriptors for scenarios (i.e., verbs). Around 5000 of these administrative documents have been discovered in the southern Mesopotamian city of Uruk, dating roughly to the last centuries of the 4th millennium B.C.E. (around 3200–3000 B.C.E.), found in the archaeological strata referred to as Uruk IV and Uruk III. Records of this kind may or may not have developed out of earlier clay objects, known as tokens, supposedly used to represent collections of transaction-related realia (Schmandt-Besserat, 1992). Although doubts have sometimes been expressed in the literature about the language of the earliest texts, it is now generally accepted that they are in Sumerian, and indeed that the cuneiform writing system itself evolved in a Sumerian language context.

Sumerian Cuneiform

The signs in the earliest tablets are clearly pictographic in nature, as illustrated in Figure 1. However, considerations of speed of execution and adaptation to the abundantly available writing material (a damp, malleable clay surface, usually about palm size, subsequently sun-dried and hardened, rarely oven-baked) favored a rapid evolution toward simplification, linearization, and finally complete abstraction of sign shapes. By the middle of the 3rd millennium, in the pre-Sargonic period, the pictographic origins of almost all sign shapes had been effectively disguised. The 'speed writing' technique, which evolved under bureaucratic pressure to produce thousands upon thousands of administrative records, involved executing each linear constituent of a given sign in a single stroke by pressing the triangular head of a stylus into the malleable clay, making a wedge-shaped ('cuneiform,' from Latin *cuneus* 'wedge') impression, followed by a variable-length tail left by the impression of the straight edge of the stylus (see a typical example in Figure 2). Subsequently, when the occasional 'cuneiform' text was produced on a nonmalleable substance such as stone or metal, for monumental, dedicatory, or similar purposes, the shape occurring naturally from the interaction of stylus and clay was painstakingly reproduced in the more refractory medium.

Another dynamic at work in the development of Mesopotamian cuneiform had to do with the systematization of the sign inventory. The earliest 'texts' were largely listlike inventories of realia (think of a spreadsheet), and as such did not need to deal with a number of the complexities of complete representation in graphic media of natural language. The earliest pictographic stage had a large, and apparently growing, inventory of largely pictographic signs – at least 800, and probably more. As other text genres were added, it became necessary to represent not only a more extensive and abstract vocabulary, but also the myriad nominal suffixes and verbal prefixes and suffixes of Sumerian. Rather than accomplish this by continuing to add to the sign inventory, the latter, on the contrary, was streamlined and gradually reduced to about 600 signs, an inventory which then remained relatively stable for the remaining two-and-a-half millennia of cuneiform writing.

This streamlining was rendered possible by two processes. First, more than one logographic (= 'word') value could be assigned to a single sign. For example, the sign conventionally designated (from one of its most frequent values) 'AN,' which originally was a picture of a star, was assigned not only the word value (logographic value) *an* 'sky,' but also, by association, *dinger* 'god.' Other logographic values were assigned to combinations of signs: thus the sign 'KA,' a picture of a head with the mouth area emphasized, was assigned by the Sumerian scribes not only the logographic value *ka* 'mouth,' but also, by association, a number of other values, including *zú* 'tooth,' dug_4 'speak,' and

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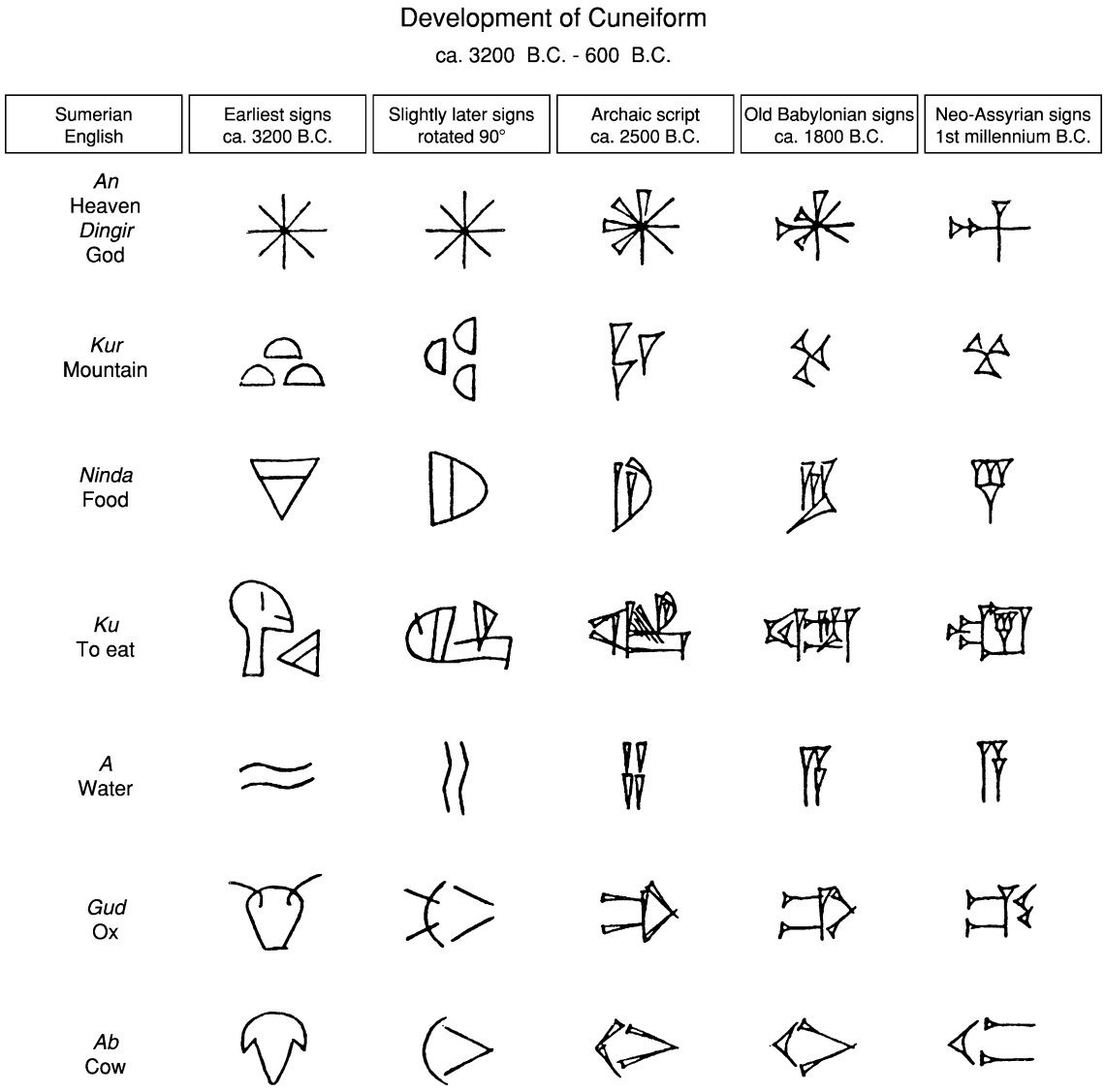

Figure 1 Development of seven cuneiform signs from early 'pictographic' through 'archaic,' Old Babylonian, and Neo-Assyrian shapes (with permission of the Oriental Institute, University of Chicago).

inim 'word'; while the sign 'NINDA' = *ninda* 'food' combined with (in this case, written within) the 'KA' 'mouth' sign was assigned the value gu_7 'eat' (see Figure 1).

The most important streamlining step, however, was the re-interpretation of one (or more) of the logographic values of a sign as a purely phonological **syllabic** value, independent of its original association with a specific lexical item (to which it often had originally a pictographic link). The signs so adapted for the most part had a V, CV, or VC value, to a much smaller extent CVC. By this means the cuneiform writing system became a syllabary. A regular grid of syllabic values gradually emerged, covering, with some gaps and a certain amount of overlap, most possible combinations of a Sumerian consonant (the inventory as presently recognized is /p, b, t, d, k, g, h, s, z, š, m, n, ŋ, l, r, w, j/) preceded or followed by each of the four recoverable Sumerian vowels, /i, e, a, u/. Among the notable gaps, for example, is the absence of a consistent distinction for C*i* vs. C*e* signs for many consonants, particularly in the velar series. A more systematic gap is that in VC signs, no distinction is made between voiced and voiceless consonants: thus there exist distinct signs *ba* vs. *pa* and *ga* vs. *ka*, but only one sign *ab* = *ap* and *ag* = *ak*.

Cuneiform signs thus reinterpreted as syllabograms could be used to express lexical items, so that, for example, the logograms *ba* 'distribute' and *al* 'hoe' could be combined as syllabograms *ba-al* to render the word for 'dig' (presumably /bal/). For rendering lexical items, however, Sumerian made only sparing

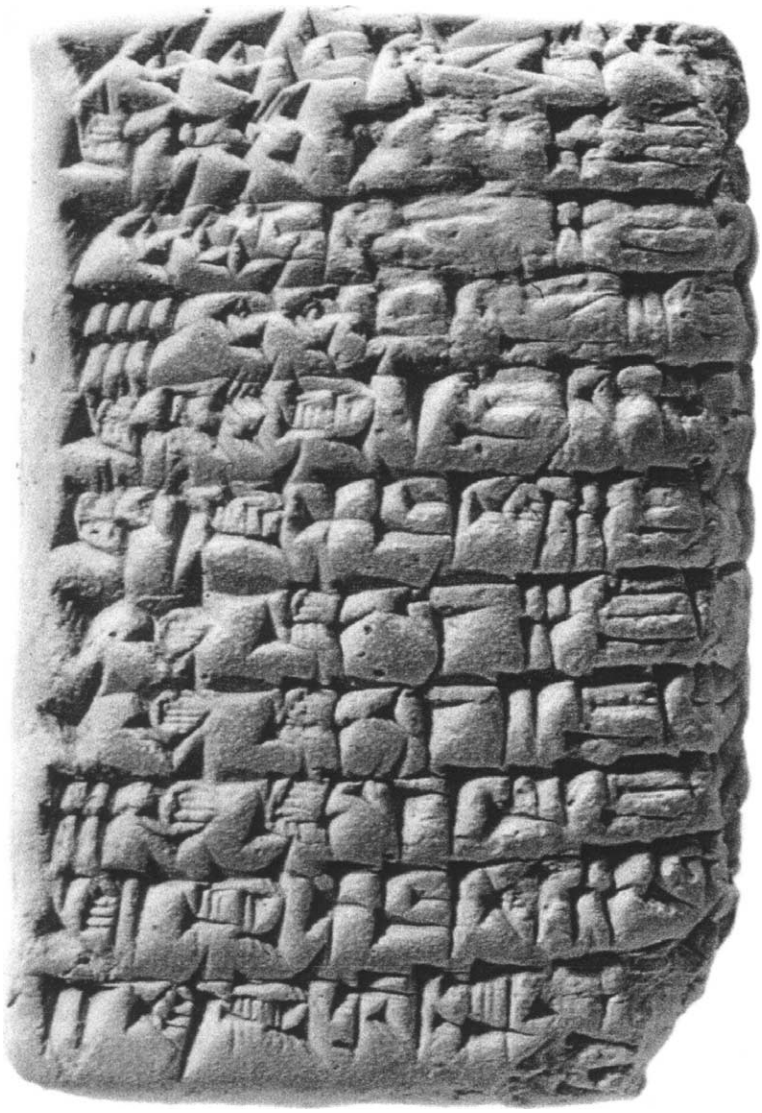

Figure 2 Cuneiform administrative text (with permission of the Oriental Institute, University of Chicago).

use of this possibility, and preferred to represent lexical items by logographic values. But syllabograms were indispensable for rendering the often complex sequences of prefixes (for the verb) and suffixes (for the verb and noun) which characterized Sumerian morphology; and the accurate representation of this morphology was clearly felt to be more necessary as the cuneiform corpus became gradually extended beyond the original listlike economic and administrative texts to other genres of texts such as hymns, proverbs, and dedicatory and commemorative inscriptions. Thus the 'KA' sign discussed above could be used to represent the sequence of genitive suffix-*(a)k* followed by locative suffix -*a* as in:

é lugal-ak-a
house king-GEN-LOC
'in the house of the king,'

which would be written *é lugal-la-ka* (where also the syllabogram *la* is used to represent the [only graphically?] geminated final /l/ of the word for 'king' plus the initial /a/ of the genitive suffix).

At first such syllabic values were introduced only selectively, to make explicit some of the most important grammatical features. Indeed, in the earliest texts, the order of the logographically used signs themselves within the ruled cases which divided a tablet was somewhat arbitrary. The written text, especially for traditional religious or literary compositions, was thus functioning as something of an *aide-mémoire* for a text with which the 'reader' was supposed to be fairly familiar. The story of the development of Sumerian cuneiform is from one point of view that of a gradually more complete written expression of a Sumerian utterance. It is important to keep in mind,

with respect to our knowledge of Sumerian grammar, that the problem of full representation in principle of a Sumerian sentence was dealt with by Mesopotamian scribes only gradually, after written versions of some texts had been in existence for several centuries; and that the fullest representation of all nominal and verbal affixes was only approached when Sumerian had already ceased to be the native language of the scribal classes.

A final use of cuneiform signs is as semantic determiners, indicating that the following (or in some cases preceding) noun belongs to a certain class. This was especially widespread among proper nouns, with certain cuneiform signs, in addition to whatever logographic or syllabic function they might have, serving as indicators that the following sign or sequence of signs was to be interpreted as a male personal name, a female personal name, a divine name, city name, country name, river name, etc. Determinatives were also used for certain classes of common nouns: plants, trees and wooden objects, pots, etc. Thus the sign whose logographic value was *ŋiš* 'tree' could also be a determinative for trees or wooden artifacts (and later could also function as an Akkadian syllabogram *-iṣ/z/s*, from the Akkadian logographic value *iṣum* 'tree, wood').

The particular complexity of the Sumerian cuneiform writing system stems from this combination of possible sign interpretations. Sumerian scribes maintained the use of logograms up to the end, and never took the step of transforming cuneiform into a purely syllabic writing system. Cuneiform remained always a mixed logographic/syllabic system, with a comparatively restricted inventory of signs (ca. 600), in which most could have one or more logographic readings; many signs, in addition, could have one (less often several) syllabic reading, and some a reading as a determinative. When this complexity (frequently referred to as polysemy) is combined with an apparently high degree of homophony (almost certainly only apparent, owing to our imperfect grasp of the phonological distinctions functioning in Sumerian), the incredulity with which early 19th-century decipherments of cuneiform were met is understandable. In this context it should be noted that the accents and subscripts assigned by modern scholarship to logographic and syllabic values have a purely diacritic function, to distinguish the transcriptions of distinct signs which would be otherwise homophonous. Thus the distinct signs presumed to have the logographic (and in some cases syllabographic) value, as near as we can determine, /e/ have been assigned transcription values e, é (or e_2), è (or e_3), e_4, e_5 ... more or less in the order in which the values were discovered.

Extension of Sumerian Cuneiform to Other Languages

From the Uruk period onwards, Sumerian culture and cultural institutions enjoyed enormous prestige throughout ancient western Asia, and were adopted and adapted to varying degrees by neighboring states and ethnic groups, but in particular by the ethnic group who gradually displaced the Sumerians in their Mesopotamian homeland – the Akkadians (and their close Semitic cousins to the west, the Eblaites).

The process of gradually reinterpreting and adapting the Sumerian cuneiform writing system to the needs of Akkadian started early in the 3rd millennium, as the necessity arose to render Akkadian proper names in Sumerian contexts. With the rise of powerful Akkadian city-states in northern Mesopotamia around 2500 B.C.E. (followed shortly by the city-state of the closely related Eblaites in northern Syria), it became necessary to use the logographic-syllabic system to render a whole repertory of Akkadian texts: monumental and administrative texts, letters, even religious and literary texts. In this adaptation, as in other subsequent ones, there was a considerable scaling down of logographic values, but never a complete elimination – the logograms used in the texts were written as though they were Sumerian, but presumably read in Akkadian. Moreover, since Sumerian literary and scholastic texts (word lists, bilingual lexical texts) continued to be used in the scribal schools, additional Sumerian logographic values were always accessible, and could be introduced at different periods or into certain genres of text, as was the case massively in certain abstruse and highly specialized genres such as medical and magical texts.

The most distinctive part of the adaptation was in the syllabary. While a few new Akkadian syllabic values were created from Akkadian equivalents of Sumerian logograms (thus: Sumerian *á* 'arm' = Akkadian *idu*, whence was derived a new Akkadian syllabic value *id* for the sign 'Á'; note also the example of *ŋiš* given above). For the most part, however, Akkadian syllabograms were created by the mapping of Sumerian syllabic values onto Akkadian near equivalents. This mapping was not entirely self-evident, even where the same or similar distinctions existed in Sumerian and Akkadian, e.g., voiced vs. voiceless stops; and it became particularly problematic for distinctions (e.g., an 'emphatic,' presumably glottalized) or segments (some pharyngeal and sibilant consonants) which did not exist in Sumerian. After an initial period in which only place of articulation was distinguished (thus, 'DA' has syllabic values *ta*, *da*, *ṭa*), a gradual, but never complete separation of values was achieved with a core syllabary usually containing about 90

signs, whose precise makeup varied from period to period and place to place. It has been estimated that for most periods of Akkadian, for most common text genres the syllabary plus the usual determinatives and logograms yields a grand total of about 200 signs in common use.

Following in the wake of Akkadian, and in one way or another influenced by the prestige and geographic reach of Mesopotamian culture, a number of other languages of ancient western Asia systematically adapted the cuneiform writing system and created more or less sizable text corpora. Principal among these are the language isolates Elamite, Hurrian, and Urartian (closely related to each other), plus the well-known Indo-European language Hittite. Common to all these adaptations is the streamlining and greater systematization of the syllabary, plus a considerable reduction in the number of logograms and determinatives.

By the middle of the 1st millennium B.C.E., cuneiform began to be seriously challenged by simpler alphabetic writing systems using other, lighter, but more expensive and more perishable materials. In Mesopotamia, Akkadian itself was gradually replaced as the spoken and then as the administrative language by Aramaic, words and phrases of which were occasionally daubed onto tablets, but which had found its means of written expression outside cuneiform. Continuing a shadow existence for certain traditional administrative and scholarly purposes, the last cuneiform tablets seem to have been drawn up as late as the 1st century C.E.

See also: Akkadian; Decipherment; Elamite; Sumerian.

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Metalanguage versus Object Language

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Human languages are the objects studied in linguistics. For that reason, the language under investigation is known as the object language. The language that a linguist uses to describe and analyze the object language is called the metalanguage. The basic requirement for a metalanguage is that it satisfactorily communicates the form, structure, and meaning of item e_{OL} – that is, any expression in the object language, whether it is a word, a phrase, or a sentence – in terms of an expression 'e_M' in the metalanguage. This short article focuses on semantic metalanguages.

Ideally, a metalanguage is a formal language, as in (2); (1) is informal.

(1) *dog* means 'canine animal'

(2) $\forall x[\mathrm{D}(x) \leftrightarrow \lambda[\mathrm{A}(y) \wedge \mathrm{C}(y)](x)]$

Dog is e_{OL} and 'canine animal' is 'e_M'; note the typographical differentiation. Example (2) makes recourse to natural language vocabulary because the D, A, and C symbolize *dog*, *animal*, and *canine*; (2) can be read 'Everything that is a dog is a member of the set of individuals that are both animal and

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canine'. Strictly, a formal language has a fully defined vocabulary and syntax. Ideally, the vocabulary is a specified set of symbols whose forms and correlated meanings are fully defined, all possible combinations of vocabulary items in the metalanguage are generated from fully specified syntactic axioms and rules of syntax, and the meanings of syntactically well-formed structures are fully specified by semantic axioms and rules for the metalanguage.

A metalanguage is, in effect, a translation of the object language (Carnap, 1937: 228); so, defining a formal metalanguage for natural language semantics requires that it have the same expressive power as a natural language. In order for the metalanguage to be understood and used by human beings, it must be communicable and, hence, translate into a natural language. If you understand neither Polish nor Swahili, there is little point in my using Swahili as a metalanguage for the semantic analysis of Polish (or vice versa); for example, my saying that *to jest pies* means 'ni mbwa' will not help you at all. Using English as a metalanguage, I would say *to jest pies* means 'it's a dog'; using English as a meta-metalanguage, I would say *to jest pies* means 'ni mbwa' (in Swahili), which means 'it's a dog.'

The advantages of a formal metalanguage are the explicit definition of primitives and standards of rigor and exactitude that tend to be ignored when using an informal metalanguage. The proper formalization of the metalanguage permits proofs of particular conclusions about semantic structure and so prevents mistaken conclusions deriving from faulty assumptions and/or inference procedures. However, none of these advantages of a formal system is necessarily unobtainable using an informal system such as a natural language metalanguage for semantics. Given two metalanguages with the same descriptive and explanatory capacities, the only way to choose between them is to be guided by gut feeling: favor the one you are happier with. A metalanguage is the product of an analyst's mind; the analyst not being God, every metalanguage is limited by the beliefs, perspectives, and purposes of its creator.

See also: Formal Semantics; Natural Semantic Metalanguage; Operators in Semantics and Typed Logics.

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Metaphor and Conceptual Blending

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'Metaphor' was defined by Aristotle (*Poetics* XXI, 1457b) as "... giving the thing a name belonging to something else, the transference being ... on the grounds of analogy." More succinctly, Quintilian (VIII, VI, 1) defined metaphor as "the artistic alteration of a word or phrase from its proper meaning to another." Traditionally, then, metaphor is defined as a 'trope,' a nonstandard meaning used for its literary effect. On this view, any cognitive significance attributed to metaphorical phenomena is of a negative character. Hobbes (*Leviathan*), for example, argued that metaphors are "... *ignes fatui*; and reasoning upon them is wandering amongst innumerable absurdities ...."

In contrast to the view of metaphor as a literary curiosity, cognitive semanticists such as Lakoff and Johnson (1980), Sweetser (1990), and Turner (1991) have argued that metaphor is a pervasive phenomenon in everyday language and, moreover, that it represents the output of a cognitive process by which we understand one domain in terms of another (*see* **Cognitive Semantics**). Cognitive linguists define metaphor as reference to one domain with vocabulary more commonly associated with another domain. Thus construed, metaphoric language is the manifestation of conceptual structure organized by a 'crossdomain mapping': a systematic set of correspondences between two domains, or conceptual categories, that results from importing

canine'. Strictly, a formal language has a fully defined vocabulary and syntax. Ideally, the vocabulary is a specified set of symbols whose forms and correlated meanings are fully defined, all possible combinations of vocabulary items in the metalanguage are generated from fully specified syntactic axioms and rules of syntax, and the meanings of syntactically well-formed structures are fully specified by semantic axioms and rules for the metalanguage.

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frames or cognitive models from one domain to another.

Conceptual Metaphor Theory

In 'conceptual metaphor theory,' metaphorical expressions are the linguistic manifestation of underlying conceptual knowledge. Whereas traditional approaches have tended to consider metaphorical uses of words and phrases on a case-by-case basis, cognitive linguists have pointed to patterns in the metaphorical uses of word meanings. For example, in (1) through (4) we see a number of examples that employ words whose literal meaning concerns the domain of vision, used metaphorically to characterize the domain of understanding. In such cases, the real topic of discussion (e.g., understanding) is known as the 'topic' or 'target' domain, while the domain characteristically associated with the vocabulary (e.g., seeing) is known as the 'vehicle' or 'source' domain.

(1) The truth is *clear*.

(2) He was *blinded* by love.

(3) His writing is *opaque*.

(4) I *see* what you mean.

In these and many such examples of this metaphoric mapping, the relationship between the domains is systematic: if seeing corresponds to understanding, then not seeing corresponds to not understanding, faulty vision corresponds to faulty understanding, and so forth. In conceptual metaphor theory, the systematic nature of the relationships between domains in the metaphor results from mapping cognitive models from one domain onto counterparts in the other. This results in a transfer of images and vocabulary from the source domain onto the target. Moreover, it also involves the projection of inferential structure so that inferences from the source domain can be translated into parallel inferences and counterparts in the target. For instance, in the SEEING domain, if someone is 'blinded' he will be unable to see. Analogously, in the KNOWING domain, if someone is 'blinded' he will be unable to apprehend certain sorts of information. For this reason, metaphor is considered a conceptual phenomenon, rather than merely a lexical one (*see* **Meaning: Cognitive Dependency of Lexical Meaning**).

Viewing metaphorical language as a manifestation of the conceptual system explains why the correspondences between elements and relations in the two domains of a metaphor are systematic rather than random. Cognitive linguists argue that the systematicity in the usage of source and target domain terminology derives from the fact that some of the logic of the source domain has been imported into the target in a way that maintains the mappings from one to the other. Consequently, there are parallels between the source and target domains, both in word meanings and in the inferences that one might draw from sentences that use those word meanings. Although the objective features of the two domains in a metaphor are often quite different, the two domains can be seen as sharing abstract similarities.

Analyses of conceptual metaphors are typically stated in terms of the domains that are associated by the metaphor. The domain of vision, for instance, is metaphorically linked with the domain of knowledge and understanding. Consequently, these utterances are said to be instances of the KNOWING IS SEEING metaphor. Alternatively, metaphors can be described in terms of the high-level mapping between the two domains, as in Seeing → Knowing (Table 1). The latter notation is especially useful when the analyst wants to outline the correspondences between the two domains.

Conceptual metaphors such as KNOWING IS SEEING make up a pervasive repertoire of patterns in language and thought. The many expressions we can remember or create that conform to the pattern have been taken as evidence that, just as the metaphoric meanings of many of these words are conventional, so too are the metaphoric mappings. Consequently, a lexical analysis of metaphor is not complete unless it refers to the underlying mapping patterns.

The idea that knowledge of metaphoric mappings constitutes part of the linguistic competence of the speaker is supported by the use of conceptual metaphors in novel, poetic language (Lakoff and Turner, 1989). For example, in *To the lighthouse*, one of Virginia Woolf's characters describes moments of insight as "illuminations, matches struck unexpectedly in the dark." Although many of the linguistic expressions in this excerpt are creative, the conceptual mappings conform to the pattern in the KNOWING IS SEEING metaphor. Just as a match affords the possibility of seeing one's surroundings for a brief period of time, a moment of insight allows one to understand something for a brief moment of time. The seer in the match scenario corresponds to the knower, and

Table 1 Example of domain mapping

Seeing		*Knowing*
Seer	→	Knower
Thing seen	→	Topic of understanding
Quality of vision	→	Quality of understanding
Visual ability	→	Intelligence

the quality of vision corresponds to the quality of understanding.

Higher-Level Mappings

In addition to KNOWING IS SEEING, cognitive linguists have identified a large number of conventionalized metaphors, such as DESIRE IS HUNGER (*sex-starved*, *sexual appetite*), HOPE IS LIGHT (*dim hopes*, *ray of hope*), or LOVE IS A JOURNEY (*we've come a long way together, their marriage is going off-track, we're just spinning our wheels*) (see Lakoff and Johnson, 1980, 1999). That is, there are many expressions about desire, hope, and love that systematically exploit vocabulary from the domains of hunger, light, and journeys, respectively. As noted earlier, the systematicity derives from the fact that the mappings between elements in the source and the target domains are typically constant from expression to expression, and that many source domain inferences map onto analogous target domain inferences.

Moreover, many conventionalized metaphors such as LOVE IS A JOURNEY can themselves be seen as instantiations of more general crossdomain mappings. LOVE IS A JOURNEY, along with A CAREER IS A JOURNEY and even LIFE IS A JOURNEY, are all instantiations of a more general mapping between long-term purposeful activities and progress along a path. Indeed, the latter is part of a very abstract mapping scheme known as the 'event structure metaphor' (Lakoff, 1993; Lakoff and Johnson, 1999). As outlined by Lakoff (1993), the event structure metaphor includes the mappings outlined as follows.

States	→	Locations
Changes	→	Movements
Causes	→	Forces
Actions	→	Intentional movements
Purposes	→	Destinations
Means	→	Paths
Problems	→	Impediments to motion

Particular metaphoric expressions such as *dead-end relationship* can thus be seen as motivated by metaphoric mappings at multiple levels of abstraction (LOVE IS A JOURNEY, LONG-TERM PURPOSEFUL ACTIVITIES ARE JOURNEYS, and the event structure metaphor).

Primary Metaphor and Experiential Grounding

One important claim in conceptual metaphor theory is that 'primary metaphors' are grounded in correlations in experience. For example, the metaphorical mapping between quantity and height (MORE IS UP) is thought to be motivated by correlations between the number of objects in a pile and its height, or the amount of liquid in a glass and the height of the fluid level. In traditional accounts dating back to Aristotle, metaphors were based on similarities between the two domains invoked in the metaphor. By contrast, Lakoff and Johnson (1980) highlighted the existence of a large number of metaphorical expressions, such as *big idea,* whose two domains have no inherent similarities, arguing instead that such metaphors are experientially motivated.

The experiential motivation of metaphors is consistent with the fact that the mapping between the domains and entities in a primary metaphor is directional. For instance, although the conceptual metaphor KNOWING IS SEEING allows us to utter an expression such as *I don't see what you're saying* to indicate the existence of a comprehension problem, it does not license *I don't understand your face* to indicate a problem with visual acuity. Directionality is thought to reflect the underlying cognitive operations in metaphor, in which an experientially basic source domain is exploited to reason about a more abstract target domain. Indeed, many entrenched metaphors involve the use of a concrete source domain to discuss an abstract target. For example, importance is expressed in terms of size (as in *big idea* or *small problem*), similarity is construed as physical proximity (as in *close* versus *disparate* philosophical *positions*), and difficulties are discussed in terms of burdens (as in *heavy responsibilities*).

Primary metaphors originate in *primary scenes* in which critical aspects of the source and target domains cooccur with one another. For example, the KNOWING IS SEEING metaphor is thought to be motivated by contexts in which visual experience brings about understanding. In fact, corpus research shows that child-directed speech contains many utterances in which both the perceptual and the cognitive meaning of *see* are simultaneously present as in (5) (Johnson, 1999).

(5) Oh, I see what you wanted.

In fact, children produce many such utterances themselves, prompting the suggestion that the meaning of words such as *see* evidences 'conflation,' as the word refers simultaneously to the visual and the cognitive experience. Learning the metaphorical meaning is not a matter of generalizing from a concrete meaning to an abstract one, but rather requires 'deconflation,' in which the child gradually dissociates and distinguishes between the two domains in the metaphor (Johnson, 1999).

Primary metaphors such as KNOWING IS SEEING are directly grounded in experience, while other metaphors are only indirectly grounded. For example, the THEORIES ARE BUILDINGS metaphor is supported by examples like (6) to (8) from Grady

(1997), in which theories are discussed with verbiage that might appropriately be applied to buildings.

(6) You have failed to buttress your arguments with sufficient facts.

(7) Recent discoveries have shaken the theory to its foundations.

(8) Their theory collapsed under the weight of scrutiny.

However, it is unlikely that many people have correlated experiences of theories and buildings. Moreover, many experientially basic aspects of our concepts of buildings are not exploited in this metaphor, as in (9) and (10) (Grady and Johnson, 2002).

(9) This theory has no windows.

(10) I examined the walls of his theory.

Instances in which source domain language (in this case pertaining to buildings) has no target domain interpretation reveal 'metaphorical gaps.' Primary metaphors, however, do not evidence these gaps, as virtually any word that is meaningful in the source domain can be metaphorically interpreted in the target domain (Grady, 1999). Consequently, Grady (1997) suggested that the THEORIES ARE BUILDINGS mappings that underlie (6) through (8) arose from a combination of two primary metaphors: ORGANIZATION IS PHYSICAL STRUCTURE and PERSISTING IS REMAINING ERECT. Unlike the proposed mapping between theories and buildings, experiential grounding of a mapping between persistence and remaining upright is quite plausible (Grady, 1999).

Conceptual Blending Theory

Much of the linguistic data accounted for by conceptual metaphor theory can also be analyzed in terms of 'conceptual blending theory' (Fauconnier and Turner, 2002). An elaboration of 'mental space theory' (described later), the conceptual blending framework (also known as 'conceptual integration' and 'blending theory') assumes many of the same claims as conceptual metaphor theory, such as the idea that metaphor is a conceptual as well as a linguistic phenomenon and that it involves the systematic projection of language, imagery, and inferential structure between domains. However, in contrast to the emphasis on conventional metaphors in conceptual metaphor theory, conceptual blending theory is intended to capture spontaneous, online processes that can yield short-lived and novel conceptualizations. Furthermore, blending theory reveals connections between the cognitive underpinnings of metaphor and a variety of other linguistic phenomena handled by mental space theory.

Mental Space Theory

Mental space theory (Fauconnier, 1994) is a theory of referential structure, a level of conceptual organization between the situation being described and the linguistic structures that describe it (Langacker, 1993). Although motivated by linguistic data, mental spaces are not specifically linguistic in nature and reflect the operation of more general cognitive processes. In this framework, words do not refer directly to entities in the world. Rather, linguistic cues prompt speakers to set up elements in a referential structure that may or may not refer to objects in the world. Created to solve semantic problems created by referential opacity (*see also* **Factivity**) and indirect reference, mental spaces can be thought of as temporary containers for relevant information about a particular domain.

A mental space contains a partial representation of the entities and relations of a particular scenario as perceived, imagined, remembered, or otherwise understood by a speaker. This representation typically includes elements to represent each of the discourse entities, and simple frames to represent the relationships that exist between them. Mental space theory deals with many philosophical problems of meaning by employing multiple spaces to represent a single sentence. Although different spaces can contain disparate information about the same elements, each individual space is internally coherent, and together they function to represent all of the relevant information. In contrast to traditional approaches to meaning construction, the bulk of the cognitive work involves tracking the mappings between spaces rather than the derivation of a logical representation of sentence meaning.

(11) Orlando Bloom is the new James Bond.

(12) Iraq is the new Vietnam, as protests return to the airwaves.

(13) The new James Bond wears jewelry everywhere he goes.

In the context of a newspaper article about the signing of British actor Orlando Bloom to play the character James Bond in an upcoming spy movie, example (11) prompts the construction of two mental spaces, one for reality and one for the movie. Element *a* represents Orlando Bloom in the reality space, while element *a'* represents James Bond in the movie space. An 'identity' mapping between *a* and *a'*

represents the fact that in this context *a* and *a'* are the same person, even though Orlando Bloom the actor may not share all of his character James Bond's qualities.

Reality		*Movie*
a	→	a'
Bloom (a)		Bond (a')

In the context of an article about the increasing involvement of musicians in antiwar protests, (12) prompts the construction of two mental spaces: one for 2004 and one for 1970. Element *w* represents the American war with Iraq in the 2004 space, whereas element *w'* represents the American war with North Vietnam in the 1970 space. The link between these two elements is not identity, but rather **analogy.** Similarly, there is an analogy link between the contextually evoked protests in the 1970 space (*p'*) and the explicitly evoked protests in the 2004 space (*p*).

2004		*1970*
w	→	w'
p	→	p'
Location (w, Iraq)		Location (w', Vietnam)

Once elements in different mental spaces are linked by a mapping, it is possible to refer to an element in one space by using language more appropriate for the other space. For example, one might utter (13) to convey Orlando Bloom's penchant for wearing necklaces. As in (11), (13) would involve the construction of two mental spaces: one for reality and one for the movie. Element *b* stands for Bloom in reality space, whereas *b'* stands for Bond in movie space, and (given that wearing jewelry is unlikely for the very macho James Bond character) the predicate wears-jewelry pertains to *b* and not *b'*. Thus, in (13), the speaker refers to *b* (Bloom), only indirectly by naming its counterpart *b'* (Bond). In mental space theory, the possibility of using a term from one space to refer to a linked element in another domain is known as the 'access principle.'

Reality		*Movie*
b	→	b'
Bloom (b)		Bond (b')
Wears-Jewelry (b)		

The access principle is in fact central to the account of metaphor in mental space theory.

(14) Paris is the heart of France.

(15) The heart of France is under attack.

On Fauconnier's (1994) account, a metaphor such as (14) is handled by setting up two mental spaces: one for the source domain (anatomy) and one for the target (geography).

Anatomy		*Geography*
Heart	→	Paris
Body	→	France

The *heart* is linked to *Paris*, and the *body* is linked to *France* by analogy mappings. Once these spaces are linked, one can refer to Paris as *the heart of France,* as in (15). Moreover, as in conceptual metaphor theory, cognitive models that detail the importance of the heart to sustaining the body are cognitively accessible to the target domain and can be mapped onto target space counterparts.

Conceptual Blending and Metaphor

Fauconnier and Turner (1998) suggested that metaphoric mappings were one manifestation of a more general integration process that crucially involved the construction of blended mental spaces. 'Blended spaces' are mental spaces that are built up online to incorporate information from different frames, as well as local contextual information. Central to conceptual blending theory is the notion of the 'conceptual integration network,' an array of mental spaces in which the processes of conceptual blending unfold (Fauconnier and Turner, 1998). These networks consist of two or more input spaces structured by information from discrete cognitive domains, a generic space that contains structure common to the inputs, and a blended space that contains selected aspects of structure from each input space along with any emergent structure that arises in the course of comprehension. Blending involves the establishment of partial mappings between cognitive models in different spaces in the network and the projection of conceptual structure from space to space.

One motivation for blending theory is the observation that metaphoric expressions often have implications that do not appear to originate in either the source or the target domain. For example, although neither butchers nor surgeons are customarily considered incompetent, a surgeon metaphorically described by his or her colleagues as a *butcher* does not have a good reputation. In blending theory, appreciating this metaphor involves establishing mappings between elements and relations in the source input of butchery and the target input of surgery. As in conceptual metaphor theory, there is a mapping between surgeon and butcher, patient and dead animal, as well as scalpel and cleaver.

However, blending theory also posits the construction of a blended space in which structures from each of these inputs can be integrated. In this example, the blended space inherits the goals of the surgeon and the means and manner of the butcher (Grady *et al.*, 1999). The inference that the surgeon is incompetent

Table 2 Example of conceptual integration network

Surgeon Input space	*Blended Space*	*Butcher Input space*	*Generic Space*
Surgeon	S/B	Butcher	Agent
Patient	P/A	Animal	Patient
Scalpel	S/C	Cleaver	Cutting instrument
Goal: Heal patient	*Goal:* Heal patient	*Goal:* Kill animal	
Means: Precise cuts	*Means:* Slashing cuts	*Means:* Slashing cuts	
	Emergent inference: Incompetent (S/B)		

arises when these structures are integrated to create a hypothetical agent with both characteristics. Behavior that is perfectly appropriate for a butcher whose goal is to slaughter an animal is appalling for the surgeon operating on a live human being. Table 2 shows the conceptual integration network for *That surgeon is a butcher*. The fact that the inference of incompetence does not originate in the source domain of butchery is further suggested by the existence of other metaphoric uses of *butcher* – such as describing a military official as *the butcher of Srebenica* – that recruit structure and imagery from the butchery domain but do not connote incompetence. Differences in the implications of the butcher metaphor in the domains of medicine and the military highlight the need for an account of their underlying conceptual origin.

Blending can also be used to explain how the target domain influences the meaning of metaphoric expressions. For example, the metaphoric idiom *digging your own grave* is used to imply that someone is unwittingly contributing to their own failure (*see* **Idioms**). While this metaphor depends on conventional metaphoric mappings between death and failure, the meaning of the metaphor in the target domain does not seem to result from a straightforward projection from the source domain of grave digging. If the target domain concerns a case where one's ill-advised stock purchases lead to financial ruin, the digger maps onto the purchaser, the digging maps onto the purchasing, and the digger's death maps onto the purchaser's financial ruin. However, note that in the realistic domain of grave-digging, there is no causal relationship between digging and the grave-digger's death. The blended space thus invokes its imagery from the source input space but obtains its causal structure from the target input (Coulson, 2001; Fauconnier and Turner, 2002).

Furthermore, unlike metaphor theory, which attempts to explain generalizations in metaphoric expressions via the conceptual mappings that motivate them, conceptual blending theory attempts to explain meaning construction operations that underlie particular metaphoric expressions. Consequently, blending theory can address the meaning construction in metaphoric expressions that do not employ conventionalized mapping schemes. For example, the italicized portion of this excerpt from an interview with philosopher Daniel Dennet involves a metaphorical blend: "There's not a thing that's magical about a computer. *One of the most brilliant things about a computer is that there's nothing up its sleeve*" (*Edge 94*, November 19, 2001). The input domains here are *computers* and *magicians*, and the blend involves a hybrid model in which the computer is a magician. However, the connection between these two domains arises purely from the cotext of this example, as there is no conventional COMPUTERS ARE MAGICIANS mapping in English.

Blending also can be used to explain how a number of different kinds of mappings can be combined to explain the meaning of a particular example such as (16) (from Grady *et al.*, 1999).

(16) With Trent Lott as the Senate Majority Leader, and Gingrich at the helm in the House, the list to the Right could destabilize the entire Ship of State.

This example involves an elaboration of the conventional Nation-as-Ship metaphor, in which the Nation's policies correspond to the ship's course, leadership corresponds to steering the ship, and policy failures correspond to deviations from the ship's course. The Nation-as-Ship metaphor is itself structured by the more abstract event structure metaphor. The source input is the domain of Ships, which projects an image of a ship on the water, as well as the concept of the helm, to the blended space. The target input is the domain of American politics, which projects particular elements, including Trent Lott and Gingrich, to the blend, where they are integrated with the sailing scenario.

Example (16) describes the ship listing to the right. However, in the realistic domain of ships, neither the presence of one individual (Trent Lott) nor the beliefs of the helmsman are likely to cause the ship to list. The logic of this metaphoric utterance comes not from the source input but rather the target input in which the Senate Majority Leader and the Speaker of the House can affect national policies and the overall political orientation of government. Furthermore, the standard association between conservatism and the right as against liberalism and the left is clearly

not based on the ship model, as it is frequently encountered in other contexts. However, because the scenario in the blend involves spatial motion, the literal notion of rightward movement is integrated with the other structure in the blend to yield a cognitive model of a ship piloted by Newt Gingrich that lists to the right.

Consequently, Fauconnier and Turner (2002) proposed that metaphoric utterances are mentally represented in networks of mental spaces known as 'integration networks.' As noted earlier, conceptual integration networks are comprised of four mental spaces. The source and target domain each structure one input space; the generic space represents abstract commonalities in the inputs; and the blended space inherits structure from its inputs as well as containing emergent structure of its own. Rather than emphasizing the extent to which metaphorical utterances instantiate entrenched mappings between source and target domains, conceptual integration networks only represent those cognitive models that are particularly relevant to the mapping supported by the utterance. While mappings in the integration network require knowledge of conceptual metaphors, such as KNOWING IS SEEING, blending theory is best suited for representing the joint influence of input domains and the origin of emergent inferences in particular metaphoric utterances.

Metaphor, Conceptual Blending, and Linguistic Theory

In part because of its origin in mental space theory, conceptual blending theory suggests that the meaning construction operations that underlie metaphoric meanings are but a subset of those involved in other sorts of indirect reference. By treating all sorts of mappings as formally identical, it is possible to understand the transfer of structure in metaphor as being fundamentally similar to the transfer of structure in nonmetaphorical instances. Thus, regardless of whether or not the information being combined originates in different domains, the integrative operations can be understood as requiring the construction of mappings between partial structures that originate in different mental spaces.

This formal identity allows for the unification of the treatment of metaphor – which principally recruits analogy mappings – with the treatment of 'counterfactuals' and 'conditionals,' conceptual blends that often recruit identity mappings. A number of researchers working within the framework of conceptual blending have addressed its implications for counterfactuals (e.g., Coulson, 2000; Fauconnier, 1997; Oakley, 1998) (*see* **Counterfactuals**). Similarly, the formal treatment of all sorts of mappings is useful in explaining the variety of complex combinations coded for by modified noun phrases. For example, blending theory has been used to explore issues of noun modification in seemingly simple cases like *red pencil* (Sweetser, 2000), more exotic cases like *land yacht* and *dolphin-safe tuna* (Turner and Fauconnier, 1995), and privative constructions such as *alleged affair* and *fake gun* (Coulson and Fauconnier, 1996) (*see* **Compositionality: Semantic Aspects**).

The most obvious application of conceptual metaphor and blending theory, however, is in lexical semantics, or the study of word meaning (*see* **Lexical Semantics: Overview**). The pervasiveness of metaphoric meanings suggests that metaphoric extension is a major factor in the emergence of new senses, and thus plays an important role in 'polysemy' (*see* **Polysemy and Homonymy**). Polysemy is the phenomenon in which a single word form has many related senses, as in *cut paper*, *cut the budget*, and *cut corners*. Because most words have an array of interrelated senses, metaphor and blending can be used to explain how these different senses can be seen as extensions and elaborations that arise as a function of different contextual circumstances.

Another productive process for creating word senses is 'metonymy,' in which words are used to refer to concepts closely related to their more customary referents (*see* **Metonymy**). For example, in (17), *Shakespeare* refers not to the man, but to the plays authored by the man. Similarly, in (18), *the White House* refers not to the building but to the people who work in the building.

(17) Kenneth loves Shakespeare.

(18) The White House never admits an error.

The interaction of metaphor and metonymy has recently emerged as a major focus of research in cognitive linguistics (see, e.g., Dirven and Poerings, 2003).

Accounts of both metaphor and metonymy are important for the study of how meanings change over time (Sweetser, 1990; Traugott and Dasher, 2001). Conceptual metaphor theory can identify conventional mapping schemes, such as the event structure metaphor, to describe patterns of semantic change, and the experiential grounding of primary metaphors might help explain why some patterns are more pervasive than others. Moreover, conceptual blending theory, with its capacity to describe the integration of general knowledge and contextual circumstances, might be used to address historical, social, and psychological causes of semantic change.

See also: Aristotle and the Stoics on Language; Cognitive Semantics; Compositionality: Semantic Aspects; Counterfactuals; Factivity; Idioms; Lexical Semantics: Overview; Meaning: Cognitive Dependency of Lexical Meaning; Metonymy; Metaphor: Philosophical Theories; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Metaphors, Grammatical; Polysemy and Homonymy; Speech.

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Metaphor: Philosophical Theories

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Metaphor and Philosophy

Rather than simply interpreting particular metaphorical expressions, philosophers of language investigate questions such as whether metaphors mean what they do in virtue of semantic content, or whether pragmatic features of expression use and context determine the meaning of metaphors. Answering such questions requires addressing fundamental issues in language and communication such as issues about the limits of literal meaning and the semantic-pragmatic distinction.

Defining Metaphor

Metaphor theorists disagree about which class of expressions constitutes the proper object of an analysis of metaphor. While most metaphor theorists favor live metaphors (metaphors that invite a multitude of interpretations), others such as George Lakoff and Mark Johnson (1980) focus on dead metaphors (metaphors with a relatively fixed meaning) and their role in structuring cognition. At the same time, some metaphor theorists adopt broader definitions while others work with narrower definitions of metaphor.

Metaphor, in its broadest sense (metaphor$_1$), includes most if not all figurative language such that the principle contrast is between metaphorical and literal language. Narrower definitions take metaphor to be only one among many other non-literal tropes. A second type of metaphor (metaphor$_2$), distinct from other non-literal tropes such as irony, metonymy, and synecdoche, is what makes us think of one thing *as* another. Since the very possibility of giving a unified account of metaphor$_1$ is remote, articulating an account of metaphor$_2$ is a more appropriate goal. However, a demarcation problem remains a challenge for any treatment of metaphor$_2$: it must be worked out what it means to say that metaphor$_2$ makes us think of one thing as another in such a way that the difference between metaphor and other non-literal tropes is illuminated.

Delineating Metaphor

The class of metaphorical expressions can be delineated by form or by function. The paradigmatic form of metaphors is the subject-predicate form *S is P*. Metaphorical expressions of this kind are the focus of, for example, John R. Searle's (1993) account of metaphor. According to Searle, a speaker utters an expression of the form *S is P* (*Juliet is the sun*) in order to convey an intended proposition (that Juliet is radiant) of the form *S is R*.

Other accounts of metaphor delineate the class of metaphorical expressions according to a specific understanding of metaphor's function to make us think of one thing as another. For example, the comparison view of metaphor is the view that metaphor functions by comparing two things (Juliet and the sun). Delineating metaphor according to this function assimilates simile to the class of metaphors.

The clear disadvantage of constructing an account of metaphor around any particular form, even paradigmatic forms, is that doing so leaves unexplained other expression forms that have a plausible claim to metaphoricity. Extended metaphors that run the length of a poem and noun-function metaphors of the form *The B of A* (*The countless gold of a merry heart*) are not easily captured by the form *S is P*. Since diverse forms can carry out the same function, functional definitions of metaphor do better at capturing non-paradigmatic forms. Functional definitions explain why we use metaphor (e.g., to compare) in a way that form alone cannot.

The Metaphorical and the Literal

Almost every metaphor theorist accepts the Deviance Thesis: metaphor is essentially nonstandard and deviates either semantically or pragmatically from ordinary literal language. The Deviance Thesis is reflected in the persistent, but challenged (Cohen, 1976), view that metaphors are either literally false or conceptually incongruous.

Deviance and Value

Historically, the deviance of metaphor has been tied to the question of the value of metaphor. Although Cicero (*De Oratore*), Quintilian (*Institutio Oratoria*), and rhetoricians celebrated the deviance of metaphor and its embellishment of language, philosophers John Locke (*Essay concerning human understanding*) and Thomas Hobbes (*Leviathan*) condemned the use of metaphor in philosophical inquiry. If the best chance at arriving at and communicating truth is afforded only by unambiguous literal language use, metaphor's deviance from the literal is therefore suspect. Jean-Jacques Rousseau (*Essay on the origin of languages*) and Friedrich Nietzsche (*On truth and falsity in their ultramoral sense*) attempted to undercut this criticism by arguing that all language is fundamentally metaphorical and championed metaphor's creative function. For a short history of philosophical thought about metaphor, see Johnson (1981) and Kittay (1987).

Deviance: Semantic or Pragmatic?

The cognitive value of metaphor is now generally conceded and metaphor's deviance is considered separately from its value. Contemporary accounts of metaphor characterize its deviance either as a violation of semantic rules or as a violation of pragmatic constraints. Various semantic theories can describe the semantic deviance of metaphor; for example, it can be described as a violation of selection restrictions or as a violation of standard meaning lines between possible worlds. Samuel R. Levin (1977) describes construal mechanisms for assigning interpretations to anomalous or deviant sentences, including the metaphors of ordinary language use and conversation. Metaphors are semantically deviant because they fall outside the class of sentences generated by normal operation of the rules of grammar. According to the metaphor *The stone died,* to be a stone in the metaphoric sense (to be a dunce) is to be similar in characteristics to a stone in the literal sense. The noun *stone* has semantic markers that might include (((Object) (Physical)) (Nonliving) (Mineral)), and the verb *die* has semantic markers that may include ((Process) ((Result) ((Cease to be) (Living)))). The verb has selection restrictions ((Human) or (Animal) or (Plant)), and it is these restrictions that are violated in *The stone died*. Construal rules that sanction the transfer of the feature (Human) to the semantic markers of *stone,* for example, allow us to derive the interpretation that the dunce died.

Jaakko Hintikka and Gabriel Sandu (1990) characterize the semantic deviance of metaphor according to possible world semantics. On this view, meanings are functions from possible worlds to classes of individuals. We can visualize this function by imagining that a notional meaning line connects the individuals, in their respective possible worlds, picked out by the function. Metaphoric meaning is a function that draws nonstandard or deviant meaning lines: they differ from literal meaning lines in that they rely exceptionally heavily in some specific respect on either qualitative or functional similarity. In *The stone died,* the speaker draws the meaning lines of *stone* on the basis of qualitative hardness and immovability.

Pragmatic accounts of metaphor are motivated by the observation that the very same expression (for example, *A storm is gathering*) can be interpreted literally in one context (said of a dark and windy sky) and yet be intended and interpreted metaphorically in another context (said of an anticipated faculty meeting). A full explanation of metaphor, then, must look beyond merely the expression itself to the context of the utterance. H. Paul Grice's theory of conversational implicature provides a pragmatic account of the deviance of metaphor. Conversational implicatures, including metaphor, arise when what is said violates conversational maxims. Grice (1975) says that metaphor violates the conversational maxim of saying only what is true, while Dan Sperber and Deirdre Wilson (1986) argue that it violates the principle of saying only what is relevant. In either case, it is noticing that what is said deviates from these maxims and principles that prompts the hearer to search for an interpretation of the utterance (*Juliet is the sun*) such that the speaker is contributing something true or relevant to the conversation (that Juliet chases away darkness).

Joseph Stern (2000) presents a dual challenge to the Deviance Thesis: unlike Levin, Stern argues that metaphor is not grammatically deviant and, in contrast to Gricean pragmatic accounts, that it is not necessary to first notice that what is said is deviant. Stern suggests that metaphor is a linguistic type representable in the grammar by the operator *Mthat*[Φ]. Like indexicals and demonstratives, metaphors have both a character and a content. The character, or meaning, of a metaphor is the linguistic function from context to content expressions; the content of a metaphor is the propositional content determined by the character (i.e., the interpretation of the metaphorical expression). For example, in an analysis of *Juliet is the sun,* in which the predicate is the metaphorical component, the character of the metaphor picks out the content of {*Mthat*['*is the sun*']}, that is, properties (nourishing, chasing away darkness, etc.) that are associated with the sun.

Stern argues that metaphor is not pragmatically deviant in the way suggested by implicature theorists, insofar as what is conveyed by a metaphor is not inferentially derived against a background of conversational maxims. Instead, the rules of grammar simultaneously make available metaphorical and literal interpretations. Stern and others (Glucksberg and Keysar, 1993; Récanati, 1995) cite evidence that the metaphorical interpretation of the sentence is processed in parallel with, and not serially to, the literal interpretation. It is not necessary to recognize first that what is said violates pragmatic constraints.

Theories of Metaphor

Conditions of Adequacy

Theories of metaphor are successful to the extent that they fulfill certain conditions of adequacy. For example, the proposal that metaphorical expressions are ambiguous fails, because it cannot explain how the meaning of the metaphorical expression depends on the literal meaning of the words used. Unlike ambiguous expressions (example, *bank*), the meaning of the words on one (literal) interpretation stay

'active' and guide the other (metaphorical) interpretation. Other desiderata include explanations of the expressive power and catachretic function of metaphor to remedy gaps in the vocabulary by using words in new ways. Accounts should make sense of the ubiquity of metaphor and explain why some metaphors fail. The more controversial features of metaphor, such as its apparent falsity and nonparaphrasability, must either be accounted for or be explained away. For further discussion of these and other conditions of adequacy, see Nogales (1999).

Aristotle

Aristotle defines metaphor as the transference of a name from genus to species, from species to genus, from species to species, or by analogy. In his influential treatment of metaphor (found in *Poetics* and in *Rhetoric*) we find the seeds of substitution, analogy, and simile theories of metaphor. Under Quintilian's substitution theory of metaphor, a new decorative name is transferred to an object in substitution for its usual plain name, though for merely rhetorical effect. Analogy theories of metaphor have been of particular interest to those interested in the predictive nature of scientific models (Hesse, 1966; Gentner, 1982). Because Aristotle thinks that the function of both simile and metaphor trades on comparison and noticing preexisting similarities, he is also credited as an early proponent of the view that metaphor is a kind of simile. The elliptical simile theory of metaphor specifies that metaphors such as *Time is a child at play* are ellipses of corresponding similes (*Time is like a child at play*). Lynne Tirrell (1991) argues that not all metaphors have corresponding similes, such as metaphors of the form *A is Ψ* (*The moon is envious*). Therefore, although metaphor theorists continue to be tempted to explain metaphor in terms of simile (Fogelin, 1988), elliptical simile theories of metaphor apparently cannot serve as general theories of metaphor.

Interaction Theories of Metaphor

Interaction theories of metaphor have a prominent place among contemporary semantic theories of metaphor. Introduced by I. A. Richards (1936) and Max Black (1962), this kind of theory proposes that instead of simply re-naming or comparing objects, two concepts or systems of associated commonplaces are simultaneously 'interactive.' In *my love is a rose*, the source (also called 'vehicle' or 'focus') *rose* projects an isomorphic set of connotations or believed commonplaces (such as fragility) upon the topic (also called 'tenor') *my love*. Eva Feder Kittay (1987) articulates this interaction in terms of semantic field theory. In this theory, the meaning of a term is a function of its relation (of affinity or contrast) to the other terms in its semantic or conceptual field. For example, the meaning of *midwife* is a function of its semantic field structured according to relations among the agent (midwife), her patient (the mother), and the result (the child). For Socrates's metaphor of teachers as midwives, interactive projection consists of restructuring the relations among the terms in topic field (*teacher*) analogously to those in the source field (*midwife*). Reconceiving the topic in this manner permits the special and controversial creativity of metaphor: metaphor goes beyond exploiting existing similarities to create new similarities or perspectives on the world (perspectival theory of metaphor). Metaphor makes us think of one thing as another because its function is to create a perspective from which we gain an understanding of that which is metaphorically portrayed.

Davidson and Metaphorical Meaning

Donald Davidson (1978) gives what is perhaps the most influential objection to any semantic treatment of metaphor. According to Davidson, the fundamental error of all semantic accounts of metaphor is to read the contents of the thoughts provoked by the metaphor into the content of the expression itself. Davidson denies that the concept of metaphorical meaning is required to explain how metaphor achieves its effect. Sharply distinguishing between what words mean and what words are used to do, Davidson argues that it is the meaning of words that is supposed to explain what can be done with words (and not, for example, the effects achieved by metaphor that explain the meaning of the metaphorical expression). It is because literal meaning and truth conditions, but not metaphorical meaning, can be assigned to sentences apart from particular contexts of use that only literal meaning has genuine explanatory power. If there is no metaphorical meaning, then theories of metaphor can tell us about the effects metaphors have on us, but they do not provide a method for decoding a special content conveyed by the metaphorical expression. See Leddy (1983) and Farrell (1987) for criticisms of Davidson's view, and Crosthwaite (1985) for a defense of Davidson's account.

See also: Approaches to Translation: Relevance Theory; Aristotle and Linguistics; Aristotle and the Stoics on Language; Character versus Content; Creativity in Language; Davidson, Donald (1917–2003); Demonstratives; Ellipsis; Expression Meaning versus Utterance/Speaker Meaning; Expressive Power of Language; Grammar; Grice, Herbert Paul (1913–1988); Hale, Kenneth L. (1934–2001); Hintikka, Jaakko (b. 1929); Implicature; Irony; Locke, John (1632–1704); Maxims and Flouting; Metaphor and Conceptual

Blending; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Metaphors, Grammatical; Aristotle and Linguistics; Metonymy; Pragmatics and Semantics; Propositions; Quintilian (ca. 30–98 A.D.); Relevance Theory; Richards, Ivor Armstrong (1893–1979); Rousseau, Jean-Jacques (1712–1778); Semantics–Pragmatics Boundary; Truth Conditional Semantics and Meaning.

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Metaphor: Psychological Aspects

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The psychological study of metaphor has had a major impact on the interdisciplinary understanding of language and thought. Thirty years ago, the topic of metaphor was mostly seen as peripheral to the major focus of research in both linguistics and psychology, because metaphor was primarily viewed as a poetic device that is not representative of how people ordinarily speak or think. But in conjunction with the emergence of cognitive linguistics in the 1970s and 1980s (*see* **Cognitive Linguistics**), psychological research has demonstrated that metaphor is ubiquitous in discourse, can often be easily understood and produced in appropriate social and linguistic contexts, and perhaps most importantly, is both a type of language use and a fundamental scheme of thought. This entry describes the empirical evidence relevant for, and the theories building on, these claims.

The Ubiquity of Metaphor in Language

Metaphor has traditionally been viewed as a distortion of both thought and language, because it involves

Blending; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Metaphors, Grammatical; Aristotle and Linguistics; Metonymy; Pragmatics and Semantics; Propositions; Quintilian (ca. 30–98 A.D.); Relevance Theory; Richards, Ivor Armstrong (1893–1979); Rousseau, Jean-Jacques (1712–1778); Semantics–Pragmatics Boundary; Truth Conditional Semantics and Meaning.

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The Ubiquity of Metaphor in Language

Metaphor has traditionally been viewed as a distortion of both thought and language, because it involves

the transfer of a name to some object to which that name does not properly belong. Speakers and writers presumably use metaphor as an ornamental feature for poetic and rhetorical purposes (e.g., to say what is difficult to state literally, to express meaning in a vivid manner), rather than to impart fundamental concepts. In each case of metaphorical language, a person aims to present some underlying analogy or similarity in the form of a condensed or elliptical simile. Thus, a metaphor of the 'A is B' form indirectly implies the speaker's intended literal meaning "A is like B in certain respects." For instance, the metaphor 'The car beetles along the road' describes the movement of the car as being like the movement of a beetle. Under this traditional view, metaphor should be infrequent in language, especially in scientific discourse, and people should have more cognitive difficulty when uttering and understanding metaphors than they do when using the equivalent literal speech.

Psychological research has shown, however, that metaphor is a major part of both spoken and written language. Various studies have attempted to quantify the frequency of metaphor use in a variety of contexts. One detailed study examined the use of metaphor in transcripts of psychotherapeutic interviews, in various essays, and in the 1960 Kennedy-Nixon presidential debates and found that people used 1.80 novel and 4.08 frozen metaphors per minute of discourse (Pollio *et al.,* 1977). If one assumes that people engage in conversation for as little as 2 hours per day, a person would utter 4.7 million novel and 21.4 million frozen metaphors over a 60-year life span! A different analysis of the metaphors produced in television debates and news commentary programs showed that speakers use one unique metaphor for every 25 words (Graesser *et al.,* 1989). These, admittedly crude, analyses clearly demonstrate that metaphor is not the special privilege of a few gifted speakers, but is ubiquitous throughout both written and spoken discourse.

However, a closer look at everyday language suggests that these empirical attempts to 'count' instances of metaphor vastly underestimate the pervasiveness of metaphor in people's ordinary speech. Typical frequency counts of metaphor do not include analysis of conventional speech that is motivated by metaphoric modes of thought. Consider the following mundane expressions that people often use in talking about verbal arguments (Lakoff and Johnson, 1980).

Your claims are indefensible.
I've never won an argument with him.
I demolished his argument.
He attacked every weak point in my argument.
His criticisms were right on target.
He shot down all of my arguments.

At first glance, none of these expressions appear to be very metaphoric, at least in the same way that an utterances such as 'The sun is the eye of heaven' might be. Yet, a closer look reveals the systematic metaphoric structuring whereby people think of arguments in terms of wars. We can actually win or lose arguments. We see the person we are arguing with as an opponent. We attack his positions, and we defend our own. We plan and use strategies. We might find certain positions undefensible, requiring us to take new lines of attack. Each of these things do not simply reflect the way we talk about arguments: we actually argue as if we were in a war. Our understanding of argument as war is active and widespread, but this concept is so deeply entrenched in our ordinary conceptual system that we tend to miss its metaphorical character.

Cognitive linguistic research has suggested that there are perhaps hundreds of conceptual metaphors, such as ARGUMENTS ARE WARS, that structure our everyday experience, and that they are found in a wide variety of conceptual domains (Gibbs and Steen, 1999; Kövecses, 2002; Lakoff and Johnson, 1999). Linguistic analyses do not typically quantify the number of verbal metaphors, and the conceptual metaphors underlying them, that may be present in any one sample of speech or text. But one psychological study of the narratives women produced when describing their experiences recovering from cancer showed that conventional metaphoric language was employed more than 6 times per minute, and that only 22 conceptual metaphors underlay the vastly different metaphoric expressions these women produced, especially in their talk of emotion (Gibbs and Franks, 2002). Conceptual metaphors seem to be ubiquitous in the ways people talk of their experiences. One question that has generated a great deal of debate within psychology is whether these instances of conventional metaphor necessarily reflect anything about the metaphorical nature of many abstract concepts.

Metaphor Understanding: The Standard View

The traditional belief that metaphor is deviant suggests that metaphors should be more difficult to interpret than literal speech. The most famous proposal along this line comes from H. Paul Grice's theory of conversational implicature (Grice, 1989) (also see Grice, H. Paul (1913–1988); *see* **Implicature**). Grice argued that the inferences needed to understand

nonliteral meaning are derived from certain general principles or maxims of conversation that participants in talk-exchange are mutually expected to observe (Grice, 1989) (*see* **Maxims and Flouting**). Among these are expectations that speakers are to be informative, truthful, relevant, and clear in what they say. When an utterance appears to violate any of these maxims, as in the case of metaphor, listeners are expected to derive an appropriate 'conversational implicature' about what the speaker intended to communicate in context, given the assumption that he or she is trying to be cooperative (*see* **Cooperative Principle**).

Grice (1989) more specifically suggested what has become known as the 'standard pragmatic model' for understanding indirect and nonliteral meanings, including metaphor. In this view, understanding metaphor is accomplished in a series of steps: (1) analyze the literal meaning of an entire expression, (2) compare this literal meaning to the context, (3) if the literal meaning is appropriate, then stop, otherwise (4) derive an alternative meaning that makes the speaker's/writer's utterance sensible in the context, given the cooperative principle. This rational account suggests, then, that metaphors are understood as conversational implicatures and should take additional time to comprehend over that needed to interpret literal speech that is appropriate to the context.

Psychological Tests of the Standard View

How accurate is the standard view as a psychological theory of metaphor understanding? First, the results of many reading-time experiments in psycholinguistics show that people do not always require additional mental effort to comprehend many kinds of figurative utterances, as compared with so-called literal speech (Gibbs, 1994, 2002). Listeners/readers often take no longer to understand the figurative interpretations of metaphor (e.g., 'billboards are warts on the landscape'), metonymy (e.g., 'The ham sandwich left without paying') (*see* **Metonymy**), sarcasm (e.g., 'You are a fine friend'), idioms (e.g., 'John popped the question to Mary'), proverbs (e.g., 'The early bird catches the worm'), and indirect speech acts (e.g., 'Would you mind lending me five dollars?' *see* **Speech Acts, Literal and Nonliteral**) than to understand equivalent literal expressions, particularly if these are seen in realistic linguistic and social contexts. Appropriate contextual information provides a pragmatic framework for people to understand metaphoric utterances without any recognition that these utterances violate conversational norms. In fact, psychological studies have specifically shown that people do not need to find a defective literal meaning before searching for a nonliteral meaning. For example, people apprehend the metaphoric meanings of simple comparison statements (e.g., 'surgeons are butchers') even when the literal meanings of these statements fit perfectly with the context (Glucksberg *et al.,* 1982). Even without a defective literal meaning to trigger a search for an alternative meaning, metaphor can be automatically interpreted.

These experimental findings from psycholinguistics are damaging to the general assumption that people understand metaphor as violations of conversational maxims. Similar psychological mechanisms appear to drive the understanding of both literal and metaphoric speech, at least insofar as early cognitive processes are concerned. Everyone agrees that people may sometimes take a good deal of time to process novel poetic metaphors, for example. Studies have shown, in fact, that conventional, or familiar, metaphors can be understood more quickly than novel expressions (Katz and Ferretti, 2001). Yet the additional time needed to understand novel metaphors is not necessarily due to a preliminary stage during which the literal meaning for an entire utterance is first analyzed and then rejected. Listeners may take longer to understand a novel expression, such as 'The night sky was filled with molten silver,' because of the difficulty in integrating the figurative meaning with the context, and not because listeners are first analyzing and then rejecting the expression's literal meaning (Schraw, 1995).

Many psychologists have gone on to argue that even if metaphor does not necessarily demand extra cognitive effort to understand, people may still analyze literal, conventional, or salient, aspects of word meaning during immediate metaphor comprehension (Blasko and Connine, 1993; Giora, 2001). Some studies, which measure the meanings activated during each part of the moment-by-moment process of linguistic understanding, suggest that comprehending familiar and novel metaphors engages different linguistic processes. Analysis of literal word meaning still precedes metaphorical meaning during novel metaphor understanding, with both types of meaning arising in parallel during familiar metaphor processing. Other studies that assessed people's speeded judgments about the sensibility of different word strings at different moments find no difference in the comprehension speed for literal and figurative strings (McElree and Nordlie, 1999). This lack of time-course differences is inconsistent with the claim that metaphoric interpretations are computed after a literal meaning has been analyzed, and suggest that literal and metaphoric interpretations are computed in parallel.

Although these research findings imply that metaphor processing is not secondary to literal understanding, psycholinguists are, again, careful to note that people may be biased toward initially interpreting the literal, or salient, meanings of metaphoric statements in cases of novel metaphor (Giora, 2001). Yet others argue that even if some linguistic meanings (e.g., literal or metaphoric) are created sooner during metaphor processing, these findings do not imply that entirely different mental processes operate to produce these different meanings (Gibbs, 2002). Different kinds of meaning may arise from a single linguistic process. The fact that scholars label one kind of meaning 'literal' and another 'metaphoric doesn't necessarily indicate that different processes operate (such as a literal processing mode and a metaphoric processing mode) as people access these meanings (either in a serial or parallel manner).

More recent theories of figurative language understanding, which are more general than metaphor theories *per se*, suggest that people may initially access a word's interpretation that can be compatible with both its literal and metaphoric meanings (Frisson and Pickering, 2001). Over time, however, people use context to home in on the word's appropriate metaphoric meaning, where the homing-in process is faster when the preceding context is strong, and slower when the preceding context is neutral. In this way, context does not operate to distinguish between different literal and metaphoric meanings, as assumed by most theories (such as in the standard model), but functions to change an underspecified, or highly general meaning, into a contextually appropriate, specific interpretation which may be metaphorical.

A different theory embraces the notion of 'constraint satisfaction' to provide a comprehensive model of the different sources of information that constrain metaphor understanding (Katz and Ferretti, 2001). Under this view, understanding a metaphoric utterance requires people to consider different linguistic (e.g., people's familiarity with words and phrases) and nonlinguistic (e.g., related to specific context) information that best fits together to make sense of what a speaker or writer is saying. These different sources of information are probabilistically evaluated, and combined to offer a most likely 'winning' meaning for a metaphor. A constraint satisfaction model may have the flexibility to account for a wide variety of metaphor processing data that seems to differ depending on the familiarity or conventionality of the expression, the context in which it is encountered, and the speaker's/writer's likely intentions in using metaphorical language.

In summary, there has been a great deal of psychological research devoted to the general question of whether metaphorical language requires additional cognitive effort to understand, compared to nonmetaphorical speech. The findings of these widely varying studies strongly imply that metaphors are not deviant and do not necessarily take more time to understand, but that more subtle factors, such as the familiarity of the expression and the context in which it is used, can shape the time-course of metaphor understanding. Many studies now situate metaphor understanding within a more comprehensive view of linguistic processing that does not posit specialized mechanisms for interpreting metaphors, even if these expressions often convey distinctive kinds of meanings (Kintsch and Bowles, 2002), and which specifically relies on cognitive mechanisms, such as suppression, that are employed widely in all aspects of language processing (Gernsbacher and Robertson, 1999).

Psychological Models of Metaphor Understanding

A great deal of research has been devoted to the specific processes involved in understanding metaphorical meaning, beyond the general question of whether metaphors are more difficult to comprehend than literal speech. These studies have explicitly examined the ways that the A, or target, and B, or vehicle, terms interact to produce metaphorical meaning. A long-standing assumption in many academic fields is that we understand metaphors by recognizing the ways that topic and vehicle terms are similar. Thus, in understanding the metaphor 'Juliet is the sun,' listeners are presumed to figure out the properties of both Juliet and the sun that are similar.

But psychological studies indicate that metaphor comprehension does not demand that the topic and vehicle terms share properties or associations (Camac and Glucksberg, 1984). This finding is supported by many studies showing that metaphors have directional meaning. If metaphorical meaning arises from the overlap of the semantic features of topic and vehicle, expressions such as 'The surgeon is a butcher' and 'The butcher is a surgeon' should have similar metaphoric meanings. But this is clearly not the case. The similarity that arises from the comparison of a topic and vehicle does not produce metaphorical meaning. Instead, similarity is created as an emergent property of understanding metaphor. Thus, many psychological studies have demonstrated that novel features emerge from metaphor comprehension that are not salient in one's separate understanding of the topic or vehicle (Gineste *et al.,* 2000). This idea is consistent with the popular, but somewhat vague, interactionist theory of metaphor (Black, 1979), which argues

that the presence of the topic stimulates a listener to select one of the vehicle's properties so as to construct a 'parallel implication complex' that may induce changes in one's understanding of both the topic and vehicle. In general, psychological studies provide strong evidence supporting the idea that metaphor cannot be reduced to rule-governed extensions or variations of the topic's and vehicle's literal meanings.

Psychologists disagree, however, about the cognitive mechanisms involved in feature emergence during metaphor understanding. The two main proposals state that metaphorical mappings between concepts from dissimilar domains can be accomplished by either comparison or categorization processes. Traditional comparison theories posit that metaphor understanding demands a mapping of low-salient features from the source domain with high-salient features of the target domain (Miller, 1979). But understanding many metaphors, such as 'Men are wolves,' seems to involve the activation of semantic features that are not typically associated with either the source or target domain until after the metaphor has been understood (Ortony, 1979). Gentner's 'structure-mapping' theory of analogy and metaphor avoids this problem by suggesting that people begin processing a metaphor by first aligning the representations of the source and target domain concepts (see Gentner *et al.,* 2001). Once these two domains are aligned, further inferences are directionally projected from the source to the target domain. Finally, new inferences arise within the target domain, reflecting relational, and not just feature-specific, aspects of the metaphor comprehension processes. Experimental evidence in support of this comparison view shows, for instance, that people infer relational, but not feature-specific, meanings when interpreting metaphors (Gentner *et al.,* 2001). For instance, when people read 'Plant stems are drinking straws,' they infer that both plants and straws convey liquid to nourish living things, and not just that both plants and straws are long and thin (i.e., object commonalities). Other research indicated that metaphors that express relational information (e.g., 'Plant stems are drinking straws') are viewed as being far more apt than those that only map object features ('Her arms were like twin swans').

An alternative view claims that metaphors are better understood via categorization processes, as class-inclusion, rather than comparison, statements (Glucksberg, 2001). For example, the statement 'Yeltsin was a walking time bomb' asserts that the former Russian President is a member of a category that is best exemplified by time bombs. Of course, time bombs can belong to several other categories, such as the weapons used by terrorists. But in the context of talking about people, time bombs best exemplify the abstract category of 'things that explode at some unpredictable time in the future and cause a lot of damage.' In this way, metaphors reflect '*ad hoc*' categories and refer at two levels: the concrete level (i.e., an explosive device) and a superordinate level (i.e., the properties of time bombs).

One implication of the class-inclusion model is that it suggests that the topics and vehicles, or target and source domains, in metaphors play different but interactive roles in metaphor comprehension. For example, the word 'snake' evokes different meanings in the phrases 'my lawyer is a snake' and 'the road was a snake.' In this way, metaphor topics provide dimensions for attribution, while vehicles provide properties to be attributed to the topic. Psychological evidence supporting this position showed that in a reading-time study, presenting people first with a topic term that is highly constrained reduces the time needed for the subsequent processing of a metaphorical statement, in contrast to when people are first presented with a less-constrained topic (Glucksberg, 2001). Furthermore, presenting people with an unambiguous vehicle primes subsequent metaphor comprehension, in contrast to what happens when they are presented with an ambiguous vehicle term. This pattern of data illustrates how the level of constraint is an important feature of metaphor topics, while the degree of ambiguity is an important characteristic of metaphor vehicles. Comparison models of metaphor understanding are unable to explain the importance of constraint and ambiguity, because they assume that metaphor comprehension always begins with an exhaustive extraction of the properties associated with both topics and vehicles. Having advance knowledge about either the topic or vehicle should presumably, then, prime metaphor processing. However, the categorization view correctly predicts that only advanced knowledge about highly constrained topics and unambiguous vehicles facilitates metaphor comprehension, a finding that is most consistent with the claim that metaphor understanding involves creating a new, *ad hoc* category and not merely comparing one's knowledge about topic and vehicle domains.

A proposal titled the 'career of metaphor' theory combines aspects of both the comparison and categorization views (Gentner and Bowdle, 2001). This theory claims that there is a shift in the mode of mappings from comparison to categorization processes as metaphors become conventionalized. For instance, novel metaphors such as 'Science is a glacier' involve base terms, such as 'glacier,' with a literal source (i.e., 'a large body of ice spreading outward over a land surface'), but no relational metaphoric sense (i.e., 'anything that progresses slowly but steadily'). People

comprehend novel metaphors as comparisons in which the target concept (e.g., 'science') must be structurally aligned with the literal base concept (e.g., 'glacier'). In some instances, the comparison process may lead to the induction of a novel metaphor category. On the other hand, conventional metaphors can be understood either by comparison or categorization processes. For example, the metaphor 'A gene is a blueprint' has two closely related senses (e.g., 'a blue and white photographic print detailing an architect's plans' and 'anything that provides a plan'). The relations between these two senses make the conventional base term polysemous (i.e., semantically related literal and metaphoric meanings). As such, conventional metaphors may be understood by matching the target concept with the literal base concept (a comparison process) or by viewing the target concept as a member of the superordinate metaphoric category named by the base term (a categorization process).

Metaphor in Thought

Most of the psychological research on metaphor has focused on how it is used and understood within language, and has assumed that metaphorical meaning is created *de novo*, and does not reflect preexisting aspects of how people ordinarily conceptualize ideas and events in terms of pervasive metaphorical schemes. But in the past 20 years, various linguists, philosophers, and psychologists have embraced the alternative possibility that metaphor is fundamental to language, thought, and experience. Cognitive linguists, for instance, claim that metaphor is not merely a figure of speech, but is a specific mental and neural mapping that influences a good deal of how people think, reason, and imagine in everyday life (Lakoff and Johnson, 1999). Evidence supporting this claim comes from linguistic research on the historical evolution of what words and expressions mean, the systematicity of conventional expressions within and across languages, novel extensions of conventional metaphors, studies on polysemous word meaning, and nonverbal behaviors such as gesture (Gibbs, 1994; Lakoff and Johnson, 1980, 1999).

However, psychologists have been critical of much of this work and its possible implications for theories about conceptual structure and metaphor understanding. First, most of the evidence for metaphorical thought, or conceptual metaphor, comes from purely linguistic analyses, and psychologists have expressed deep skepticism about these claims on both methodological and theoretical grounds, especially with regard to linguists' heavy reliance on their own linguistic intuitions (Murphy, 1996). Second, some psychologists argue that conceptual metaphor theory is unfalsifiable if the only data in its favor is the systematic grouping of metaphors linked by a common theme (Vervaeke and Kennedy, 1996). Consider again the conceptual metaphor ARGUMENT IS WAR (Lakoff and Johnson, 1980), which presumably motivates conventional expressions such as 'He attacked my argument' and 'He defended his position.' Cognitive linguistic research suggests that any expression about argument that does not fit the WAR theme is usually seen as evidence for another theme, such as WEIGHING, TESTING, or COMPARING. This implies that no linguistic statement can be brought forward as evidence against the ARGUMENT IS WAR metaphor, which makes the basic tenet of conceptual metaphor theory impossible to falsify. Finally, some psychologists argue that many conventional expressions viewed as metaphorical by cognitive linguists are really not metaphorical at all, but are treated by ordinary speakers/listeners as literal speech (Glucksberg, 2001). Simple expressions like 'He was depressed' are entirely literal, and may not be motivated by a conceptual metaphor such as SAD IS DOWN, because they only reflect something about the polysemous nature of meaning (e.g., 'depression' can be used to talk about either physical depression or emotional depression).

Psychological Studies on Conceptual Metaphor

Despite the skeptical reaction of some psychologists to the idea of metaphorical thought, or conceptual metaphor, there is a great deal of psychological evidence supporting the claim that many aspects of people's abstract concepts and reasoning processes are shaped by enduring conceptual metaphor. Studies show, for instance, that conceptual metaphors influence the ways people conceive of various abstract domains, such as emotions, minds, politics, advertising, scientific theories, the self, morality, learning, and problem-solving (Gibbs, 1994; see Steen and Gibbs, forthcoming, for reviews). Most of these studies demonstrate that providing people with a particular metaphorical construal of some domain (e.g., that EMOTIONS ARE CONTAINERS) can facilitate the way they learn new information, solve problems, and make decisions, if the newly encountered material has a similar metaphorical structure. At the same time, whereas switching from one conceptual metaphor to another may require more cognitive effort in some situations (Langston, 2002), people typically have multiple metaphorical ways of conceiving of most abstract ideas (e.g., THEORIES ARE BUILDINGS, THEORIES ARE FABRIC (Gibbs, 1994). This multiplicity of metaphorical schemes

provides another source of evidence for the idea that a good deal of ordinary thought is shaped by metaphor.

Even if people seem able to think metaphorically about various domains, many psychologists and especially many psycholinguists are skeptical about whether conceptual metaphors are normally recruited during people's ordinary comprehension of language (Glucksberg, 2001). These critics find it difficult to believe that conceptual metaphors play much of a role in how people interpret verbal metaphors such as 'Surgeons are butchers' or 'Lawyers are snakes.' To a large extent, the debate over conceptual metaphor settles into two camps: those scholars studying novel metaphors and those studying conventional language that may reflect different conceptual metaphors (e.g., 'He attacked my argument' for ARGUMENTS ARE WARS, 'Our relationship hit a dead end street' for LIFE IS A JOURNEY, and so on). Thus, different approaches to the psychology of metaphor understanding are oriented toward different types of metaphorical language. A likely possibility is that conceptual metaphor may have a strong influence on some aspects of verbal metaphor use, but not on others.

In fact, there is a large body of evidence from psychological studies, employing different methods, that clearly demonstrates that (a) people conceptualize certain topics via metaphor, (b) conceptual metaphors assist people in tacitly understanding why metaphorical words and expressions mean what they do, and (c) people access conceptual metaphors during their immediate, online production and comprehension of conventional and novel metaphors. This work includes studies investigating people's mental imagery for conventional metaphors, as in idioms and proverbs (Gibbs and O'Brien, 1990), people's context-sensitive judgments about the figurative meanings of idioms in context (Nayak and Gibbs, 1990), people's immediate processing of idioms (Gibbs *et al.,* 1997), people's responses to questions about metaphorical expressions about time (Boroditsky and Ramscar, 2002; Gentner *et al.,* 2002), readers' understanding of metaphorical time expressions (McGlone and Harding, 1998), and studies looking at the embodied foundation for conventional metaphoric language (Gibbs *et al.,* 2004).

To briefly give a few examples from these psycholinguistic experiments, studies show that people have a complex metaphorical understanding of many abstract domains, which partially motivates everyday reasoning and language use. For instance, people conceive of the domain of emotions metaphorically, based partly on their embodied experiences of emotions, such that they tacitly know that phrases like 'blow your stack' and 'flip your lid' are motivated by the conceptual metaphor of ANGER IS HEATED FLUID IN A CONTAINER. This metaphorical understanding of anger influences people's judgments about the degree to which someone experiences anger and about the best use of different metaphorical phrases in context (Nayak and Gibbs, 1990). At the same time, people's tacit knowledge of conceptual metaphors constrains the specific mental images they can form for verbal metaphors, and the specific meanings they believe these metaphors express (e.g., that 'blow your stack' means to get very angry while the person is feeling internal pressure, and the expression of the anger is unintentional and forceful) (Gibbs and O'Brien, 1990). In fact, many conventional phrases and idioms, long thought to be dead metaphors, retain much of their metaphorical meaning precisely because they continue to be linked to enduring conceptual metaphors. Finally, priming studies suggest that reading a conventional metaphorical phrase, such as 'John blew his stack,' quickly accesses the conceptual metaphor (ANGER IS HEATED FLUID IN A CONTAINER) that partly motivates why this expression has the particular metaphorical meaning it conveys (Gibbs *et al.*, 1997). Reading another expression with roughly similar metaphoric meaning, such as 'John bit her head off,' activates a different conceptual metaphor (ANGER IS ANIMAL BEHAVIOR), giving rise to the creation of these metaphorical expressions.

The debate over the role that metaphorical thought may play in a psychological theory of verbal metaphor use will likely continue. Once more, it seems inevitable that several of the different approaches to metaphor within linguistics and psychology will become part of a more comprehensive theory of metaphor. Yet it is already evident that the traditional views of metaphor as deviant, ornamental aspects of language and thought no longer are tenable and that psychological studies have provided excellent reasons to believe that metaphor is a fundamental part of the ways people speak and think.

See also: Aristotle and Linguistics; Aristotle and the Stoics on Language; Cognitive Linguistics; Cognitive Pragmatics; Cooperative Principle; Grice, Herbert Paul (1913–1988); Implicature; Maxims and Flouting; Medical Communication: Professional–Lay; Metaphor: Philosophical Theories; Metaphor: Stylistic Approaches; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Metaphors, Grammatical; Metaphor and Conceptual Blending.

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Metaphor: Stylistic Approaches

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Introduction

Stylistic approaches to metaphor used to take metaphor as one of the most important rhetorical figures of speech that could characterize a particular style. A representative illustration is provided in the classic textbook *Style in fiction*; the authors, Leech and Short (1981: 79), offered a checklist for stylistic features: metaphor is included in the section on tropes, together with metonymy, synecdoche, and other figures of speech defined by 'strange meaning' or 'semantic deviation.' In contrast, schemes, the other main group of rhetorical figures of speech, are defined by repetition of form, or 'structural parallelism,' such as chiasmus and rhyme. According to Leech and Short, schemes and tropes together constitute one of the four dimensions of style, the other three dimensions involving features of vocabulary, grammar, and text (still called cohesion and context). This stylistic angle on metaphor, representative of most mainstream positions, hence distinguished metaphor from ordinary meaning and its linguistic basis (vocabulary, grammar, and text) and treated it as a separate class of phenomena requiring special treatment.

Since the publication of *Style in fiction*, however, the perception of the relation between metaphor, style, and language has dramatically changed. Metaphor – once regarded as the rhetorical figure par excellence, being parasitic on ordinary or literal meaning, deviant, dangerous, and misleading – is now seen as one of the foundations of all language, and its use, being constitutive of meaning, is seen as normal, grounded in experience, and offering guidance to linguistic expression. The presence of metaphor as such is not necessarily indicative of any particular style, as it used to be. Instead, it is part of common, everyday language, as is attested by the many metaphorical forms (words, phrases, morphemes, and even grammatical constructions) that are entirely conventional. The publication that has been pivotal in this change of perspective, Lakoff and Johnson's *Metaphors we live by* (1980) (cf. Lakoff and Johnson, 1999), provides a wealth of examples of the ubiquity of metaphor in language, including conventional talk of *love* as 'a journey,' *argument* as 'war,' *theories* as 'buildings,' *understanding* as 'seeing,' and *life* as 'a gambling game.'

The new view holds that metaphor may still be exploited for rhetorical purposes. However, the present-day stylistician has to analyze the specifics of this exploitation against the background of the more general patterns of metaphor pervading language and its use. This means that classic studies of metaphor in literary style, such as David Lodge's *The modes of modern writing* (Lodge, 1977), are not invalidated by the new approach, since they also include the stylistic use of conventional metaphor, but their theoretical and empirical suggestions do require more extensive investigation of the relation between metaphor in style and metaphor in all language use (Steen and Gibbs, 2004). That is the direction taken by many recent stylistic approaches to metaphor. What has remained unchanged between the traditional and the contemporary views of metaphor is the awareness of metaphor's cognitive import. Aristotle, Giambattista Vico, Percy Bysshe Shelley, Friedrich Nietzsche, I. A. Richards, Max Black, and Paul Ricoeur, to name but a few of the numerous metaphor theorists over time, have all pointed to the conceptual or cognitive basis of metaphor: metaphor draws attention to similarities or correspondences between entities or domains that are fundamentally distinct. This happens in everyday talk of sports in terms of war, or lust in terms of hunger. But it also motivates the more spectacular or subtle stylistic exploitations of metaphor, as in Aristotle's discussion of Homer's comparison between old age and wheat stubble (see Mahon, 1999).

A concomitant constancy between old and new theories of metaphor is the derived attention to its social, affective, and aesthetic import as the corollary of its conceptual structure. When people are compared to lions or to mice, they are compared to animals with a higher or lower status, and this has the accompanying social effect of praising or criticizing them. In addition, when this happens perversely, it can produce irony and humor, and perhaps some admiration for the aesthetic wit of the usage, depending on the occasion and the perception of the producer's rhetorical intentions. But perfectly ordinary metaphorical expressions, such as *time is money*, also have social and affective implications, which are part and parcel of the stylistic effect of a metaphor. The mechanisms of these effects have been studied by experimental psycholinguists (e.g., Gibbs, 1994) and by conversational analysts and applied linguists (Cameron and Low, 1999). Stylistic approaches, however, are typically more focused on the functional analysis of metaphor, effects on cognition being left to the behavioral sciences.

Definition

Metaphor as a feature of style is a subclass of all metaphor in language and its use. The stylistic definition consequently has to distinguish metaphor as a stylistic device from metaphor as a more general linguistic mechanism. The stylistic definition hence approaches metaphor as one typical characteristic of a particular language variety that is relatively individual or idiosyncratic, such as the style of an individual work or author, or more generally, language user. For instance, the metaphors of politicians such as Tony Blair or George W. Bush are important ingredients of their style. But metaphor may also be characteristic of broader patterns of usage across groups of language users, including, for instance, sports reporters or songwriters. Such encompassing language varieties, or registers, are typically based in more general classes of usage that transcend individual styles. However, those manifestations of metaphor will also be considered as having a stylistic interest because of their typical role in clearly identifiable registers and genres.

As suggested previously, the difference with traditional stylistic approaches is that metaphor today is not just taken as a rhetorical device that should be opposed to ordinary vocabulary, grammar, and texture. Instead, the use of metaphor in those non-rhetorical provinces of language may also have a stylistic function. Thus, when a language user has a preference for one set of metaphors over another, both of which are completely conventional parts of the language, the preference may still be seen as a feature of that language user's style, regardless whether it is glaringly prominent or revealed only by careful scrutiny or even statistical analysis.

The new, so-called cognitive-linguistic approach to metaphor launched by Lakoff and Johnson (1980, 1999) defined metaphor as a mapping between two semantic domains. Such crossdomain mappings can motivate varying numbers of systematically related linguistic expressions of a metaphorical kind. For instance, 'love' can be metaphorically conceptualized as a natural force, and we can hence say that somebody was *swept off his feet* or *bowled over* by another person. Such conventional metaphorical expressions are part and parcel of everyday language, and they have overt stylistic implications when they are used relatively deliberately as metaphors, or when new aspects of the mapping are exploited for discursive purposes. An example may be provided by rock singer Neil Young's lines "You are like a hurricane, there's foam in your eyes, and I'm getting blown away." But less prominent patterns of usage would be equally relevant, as when people consistently use one set of metaphors for marriage as opposed to other possible sets, either in conversations or in psychotherapy (Gibbs, 1994).

The cognitive-linguistic approach to metaphor has been developed in various ways (cf. Gibbs and Steen, 1999; Dirven and Pörings, 2002), with one line of theorizing, called 'conceptual integration theory' or 'blending theory,' offering a competing model that utilizes more than two conceptual domains or spaces (Fauconnier and Turner, 2002; cf. Grady *et al.*, 1999). The cognitive-linguistic approach has also given rise to alternative models, in particular in psycholinguistics (Glucksberg, 2001). These alternative models define metaphor in different ways, mainly questioning the basic assumption that crossdomain mappings are understood by means of some form of comparison (Giora, 2001; cf. Croft and Cruse, 2004). It should also be noted that the cognitive-linguistic definition of metaphor as a crossdomain mapping in conceptual structure allows for the possibility that not all metaphor in thought is expressed by metaphor in language. Crossdomain mappings in thought may also be realized by similes, analogies, extended metaphors, megametaphors, allegories, and parables, to mention just the most well-known alternatives (Steen and Gibbs, 2004). Therefore, stylistic approaches to metaphor have to be explicit about their preference for either the linguistic, formal definition of metaphor, which takes metaphor as one specific rhetorical figure, or the more general, cognitive definition, which takes metaphor as a figure of thought, which in turn includes a whole range of rhetorical figures and even text forms.

The advantage of adopting the more encompassing definition is its capacity for contrasting the stylistic functions of these various rhetorical forms. Thus, when a crossdomain mapping is expressed as a metaphor, it may slow down or even prevent the activation of a comparative interpretation strategy, whereas its expression as a simile may facilitate such a strategy (see Gentner and Bowdle, 2001). This, in turn, may decrease or increase the recognition and hence the experienced prominence of a metaphor in style.

There is yet another complication with the definition of metaphor. It would be incorrect to suggest that all linguists (and stylisticians) have embraced the cognitive-linguistic definition of metaphor that also includes all conventionalized metaphorical meaning. For instance, Jackendoff (2002), the most important representative of the generative-grammatical approach to semantics, believed that this went too far, and abided by the more restricted definition of metaphor as the relatively deliberate rhetorical figure. This means that, in effect, that there are currently three definitions of metaphor in style:

1. The restricted rhetorical definition of metaphor as active or deliberate metaphor.
2. The broader cognitive-linguistic definition, which focuses on metaphor as a specific linguistic form, whether it is active and deliberate.
3. The most encompassing, cognitive, definition, which defines metaphor as a crossdomain mapping in conceptualization that may be realized by various rhetorical figures, of which linguistic metaphor is one that has to be contrasted with simile, analogy, and so on.

History

The cognitive-linguistic approach emphasizes the cognitive and systematic nature of metaphor and therefore highlights its ubiquity and conventionality. This is an encompassing, linguistic approach, which does not take metaphor as just a stylistic device in the rhetorical sense of the term. To many scholars, the cognitive-linguistic approach has replaced older views of metaphor, which used to limit metaphor to the rhetorical phenomenon – that is, to those metaphors that are active – thereby drawing attention to their deviance as well as to the probability that they are deliberate. The cognitive-linguistic view argues in particular that it has taken over from the conceptualization prevailing in the 1960s, of metaphor as necessarily involving grammatical deviance, research showing that many metaphorical expressions in language are not deviant but rather are the norm. Similarly, not all metaphors uncovered by the cognitive-linguistic approach require pragmatic inferencing, as was argued in the 1970s by John Searle and H. P. Grice, but may be understood with reference to conventionalized semantic mappings. The best overview of these different positions is still provided by Ortony (1993).

Another series of issues that has been important in the history of metaphor is the debate over the questions of whether metaphor is a matter of substituting a metaphorical expression for another, presumably literal one; whether it is a matter of comparison between unlike phenomena; or whether it is a matter of interaction between two distinct ideas (for an overview, see, e.g., Gibbs (1994)). Modern developments in cognitive linguistics have come to take a liberal view of the notion of correspondences in metaphor as a cross-domain mapping. This now includes both pre-existing and perceived similarity between phenomena (comparison), and interaction between conceptual structures (interaction), as is, for instance, summarized by Kövecses (2002) in his cognitive-linguistic introduction to the field. This broader view of metaphor in cognitive linguistics goes back as far as the classic position of Aristotle, who also saw metaphor as based in correspondences. At the same time, the new view re-establishes contact with the widespread structuralist views of metaphor as based in similarity, versus metonymy as based in contiguity (cf. Barcelona, 2000; Dirven and Pörings, 2002; Panther and Radden, 1999). It has led to new questions about the analysis of many metaphorical expressions. For instance, do we see time **as** money (metaphor) or do we see time **via** or **through** money (metonymy)?

A third historical issue has to do with the terminology for metaphor analysis. Cognitive linguistics and other cognitive scientific approaches of metaphor have introduced the distinction between 'source' and 'target' domains, whereby the source domain includes the knowledge of the metaphorically used concepts and words and the target domain includes the knowledge of the nonmetaphorically used concepts and words. These terms are now in competition with the traditional terminology, which calls the source domain the 'vehicle' and the target domain the 'tenor.' Yet another tradition talks about the source domain vocabulary as the metaphor 'focus,' and the target domain vocabulary is regarded as the 'frame.' Thus, in an expression such as *Time is money*, 'time' is called the tenor or a term from the target domain and 'money' is called the vehicle or a term from the source domain; 'money' is the focus, whereas 'time is . . .' is called the frame. It is not clear which terminological tradition will prevail.

Classes of Metaphor

Metaphor can exhibit many different linguistic forms. Most attention has been paid to metaphorically used words, with some attention being paid to the various word classes, such as nouns, verbs, and adjectives (e.g., Goatly, 1997; Steen, 2002; Cameron, 2003). However, metaphor is also important for the study of phraseology, exhibiting connections with idiom and with the revitalization of allegedly dead metaphor (Naciscione, 2001), and systemic-functional grammarians have performed extensive study of grammatical metaphor and its stylistic and discursive functions (Simon-Vandenbergen *et al.*, 2003).

Metaphor can also play a role in all kinds of meaning. For instance, study has been made of common source and target domains, which are typically (but certainly not exclusively) concrete and abstract, respectively. Kövecses (2002) listed as common source domains the human body, animals, machines and tools, buildings and construction, plants, games

and sports, and so on; he listed as common target domains concepts such as life, time, death, emotions, thought, society, and so on. The study of the metaphorical conceptualization and expression of emotions, in particular, has been rather detailed and advanced (Kövecses, 2000). Particular combinations of source and target domains lead to well-known classes of metaphor, such as personification, concretization, or abstraction. One very specific class of metaphor involves the crossing of sensory modalities, producing synesthesia: we conventionally talk of *loud colors* and *dark sounds,* among many other possibilities.

The functions of metaphor in discourse are also various. Ernest Rutherford's model of the atom in terms of the solar system has a descriptive and explanatory function in science, as well as a didactic function in education. Psychologists have employed various metaphorical models of the mind, ranging from steam engines to computers. But highly conventional metaphors may also function as topic management devices in conversation. And highly innovative metaphors may function as the acme of artistic pleasure (for one list of functions of metaphor, see Goatly (1997)).

Further classification of metaphors in style is possible by considering their combination with other rhetorical figures. Oxymoron and paradox often require metaphorical interpretation to resolve their logical contradiction, as in *sweet sorrow*. Hyperbole and litotes often combine with metaphor to enlarge or diminish the object of comparison, as when a boxer is called 'Hurricane' or 'Raging Bull.' This leads to a consideration of the possibility of the laudatory as opposed to the critical use of these scales of comparison, involving the addition of irony, sarcasm, and humor. Consider W. H. Auden's phrase of 'committing a social science,' a metaphorical phrase that turns social science into a crime. Similar combinations are possible of metaphor with schemes of form, involving parallelism and deviation in sound and grammar, as often happens in newspaper headlines or nicknames (think of tennis player Pete Sampras, who was called 'Pistol Pete').

Application

Metaphorical Utterances

Metaphor in style has a wide range of manifestations, including, to begin with, its striking use in specific utterances. Famous metaphorical quotations may illustrate this phenomenon, from the Bible's *The Lord is my shepherd* through Karl Marx's view of religion as *the opium of the people*, to George W. Bush's repeated use of *the axis of evil* to refer to Iran, Iraq, and North Korea. Specific metaphors may also be conventionalized parts of the language in the form of sayings, such as *Time is money* or *How time flies*. In discourse, these may be used in their regular form to conventional effect, or they may be exploited for special purposes, as when Bob Dylan writes "Time is a jet plane, it moves too fast." When used in their regular form, metaphors often serve in conversations as topic management devices, signaling that one topic is being terminated and the conversation is moving on to another.

Some sayings are not metaphorical by their linguistic structure alone; strictly speaking, rather, they turn metaphorical only when they are applied to specific situations, such as when *Blind blames the ditch* is used for an accident without any blind people or ditches. Idiomatic expressions other than sayings may also be based on metaphor, and they may also be given specific twists, in what Anita Naciscione has called 'instantial stylistic use.' Here is her example with *the course of true love never did run smooth*, from D. H. Lawrence's story *Mr Noon*:

> The course of true love is said never to run true. But never did the course of any love run so jagged as that of Joanna and Mr. Noon. The wonder is, it ever got there at all. And yet, perhaps, a jagged, twisty, waterfally, harassed stream is the most fascinating to follow [Naciscione, 2001: 74].

Another stylistic exploitation of specific metaphors involves allusion and intertextuality. A well-known example involves the title of William Faulkner's novel *The sound and the fury,* which harks back to Shakespeare's *Macbeth*:

> Life's but a walking shadow, a poor player
> That struts and frets his hour upon the stage
> And then is heard no more. It is a tale
> Told by an idiot, full of sound and fury,
> Signifying nothing [Act 5, scene 5, lines 19–28].

Faulkner's allusion to these lines in the title of his novel is immediately relevant to the interpretation of the first part of the novel, which presents a story told by a mentally retarded man. Shakespeare's famous metaphor is one version of a series of metonymically related metaphors that are all highly conventional, including *life is a play*, *life is a player*, and *life is a stage*. Consider Shakespeare's contemporary, Sir Walter Raleigh:

> What is our life? A play of passion,
> Our mirth the musicke of division,
> Our mothers wombs the tyring houses be,
> Where we are drest for this short Comedy,
> Heaven the Judicious sharpe specatator is,

> That sits and markes still who doth act amisse,
> Our graves that hide us from the searching Sun,
> Are like drawne curtaynes when the play is done,
> Thus march we playing to our latest rest,
> Onely we dye in earnest, that's no Jest [Raleigh, *What is our life* (1612)].

The metaphor underlying Raleigh's poem is metonymically related to the more famous one produced by Shakespeare, and both may be seen as variations on a conventional theme in the Renaissance. This points to a cultural basis of metaphorical themes and their conventional and stylistically charged expression.

The complicated relation between conventional metaphor from previous periods and present-day allusion and intertextuality may be demonstrated with reference to the 20th-century song by Elvis Presley, *Are you lonesome tonight?* There is a parlando part in the song that begins "Someone said that life is a stage," and then continues by telling a sad love story that is divided into acts, and ends with an empty stage. The question arises whether Elvis has picked up on Raleigh, or Shakespeare, or on some other, intermediary source; or whether *life is a stage* has become part of the folklore of the English-language speech community. That this is not an isolated coincidence is shown by the possibility of a comparable relation between Shakespeare's famous *Juliet is the sun* and the following line from a hit song by British rock band, The Cream: "you're the sun, and as you shine on me, I feel free."

Even more complex possibilities for intertextual stylistic play are suggested by potential allusions to the cognitive-linguistic or metaphorological literature. Thus, Julian Barnes, in his novel *Metroland,* had a chapter called 'Sex is travel,' which comes suspiciously close to LOVE IS A JOURNEY, the favorite example from Lakoff and Johnson's *Metaphors we live by*, which was published in the same year, 1980. The content of Barnes's chapter, however, reveals that this idea can also be interpreted as metonymic rather than metaphoric, in that sex is not similar to a journey but requires travel to the beloved.

Another, similarly innovative stylistic exploitation of a metaphor familiar from the theoretical literature is offered by Michel Faber, in his fantasy/science-fiction novel *Under the skin*. One of the characters utters the following words: "A butcher has to be a bit of a surgeon you know." This is a deliberate perversion of the directionality of a metaphor that has received a lot of attention, *this surgeon is a butcher.* However, its perversion is extremely functional in the situational context of the novel, in which people are treated like cattle and are fed and slaughtered for future consumption by a group of aliens – alien butchers of humans having indeed to be something like surgeons.

These phenomena can all be seen as forms of uptake of a specific metaphor by another language user. This may also occur in more direct and reciprocal forms of discourse, such as ongoing conversations. Interlocutors may take up metaphors on the spot, as it were, for purposes of acceptance or rejection, extension, and development, and for sincere, as opposed to perverse, exploitation. Cameron (2003), for instance, shows how students can immediately repeat and extend metaphors offered by teachers during oral expositions in classrooms.

Metaphorical Patterns

Moving away from the stylistic importance of metaphor for specific utterances, there are also more general patterns of metaphorical style, which may relate to the style of an individual language user. A number of examples may be given from the domain of literature (see Steen and Gibbs, 2004). For instance, Elena Semino has shown how the metaphorical aspects of the mind styles of two fictional characters, Bromden in Ken Kesey's *One flew over the cuckoo's nest* and Clegg in John Fowles's *The collector,* display different properties: Bromden's language uses conventional metaphor in creative ways, whereas Clegg's metaphorical language contains many idiosyncratic metaphors. Another area would be the style of a fictional narrator, such as the narrator of George Orwell's *Nineteen eighty-four*, studied by Anne-Marie Simon-Vandenbergen; the narrator uses animal, physical force, and liquid metaphors to express the lack of consciousness and liberty in a totalitarian world. Metaphorical style may also pertain to the language use of an entire work, as has been shown by Don Freeman for a number of Shakespearian plays. This suggests that the personal style of the complete works of individual authors may display specific patterns of metaphorical usage, as may be the case for heavily metaphorical writers such as Salman Rushdie, as opposed to authors who are clearly much less metaphorical, such as Ernest Hemingway. It will be self-evident that such patterns may also be found in the language of nonliterary writers or speakers, such as famous philosophers or politicians (e.g., Jäkel, 1997; Charteris-Black, 2004), but these have received much less attention.

Style can also be regarded as the language typically used for a particular class of discourse, as opposed to an individual's imprint on the structures of their language use. One of the most famous cases involving metaphor is the one of metaphysical lyrical poetry, which is characterized by the use of daring metaphorical conceits. These are identified by their

combination of a specific form, in that they are often presented as analogies or even full-blown arguments, with a particular content, which seems to force the difference between the two domains on the reader more than their fragile and often strained similarity. Here is an example from John Donne, in his poem to Mr Rowland Woodward:

> Like one who'in her third widowhood doth professe
> Her selfe a Nunne, tyed to retirednesse,
> So'affects my Muse, now, a chaste fallownesse [Donne, *To Mr Rowland Woodward* (~1635)].

It should be noted how some stylisticians might actually object to calling these lines a metaphor, since they have the form of an analogy that may also be classified as an extended nonliteral comparison. However, the presence of an underlying cross-domain mapping cannot be contested, so that these lines do count as metaphorical in the conceptual sense of the word.

A similarly famous case is constituted by imagist poetry, wherein almost arbitrary external resemblance between entities motivates metaphorical projection from source to target domain. One of the most famous examples is the following poem by Ezra Pound:

> The apparition of these faces in the crowd:
> Petals on a wet, black bough [Pound, *In a station of the metro* (1913)].

Here, too, questions may arise about the rhetorical classification of the form as a metaphor; however, its conceptual status as a cross-domain mapping is again beyond doubt.

There are also subgenres of the novel that contain characteristically specific manifestations of metaphor in their style. Hardboiled detectives, for instance, typically contain a macho private investigator who revels in producing roughshod analogies portraying women, or more generally their view of emotional situations. Philip Kerr's *Berlin noir* trilogy provides a goldmine of metaphors, such as in the following example:

> Impatient of her, I snatched her knickers down, pulling her onto the bed, where I prised her sleek, tanned thighs apart like an excited scholar opening a priceless book. For quite a while I pored over the text, turning the pages with my fingers and feasting my eyes on what I had never dreamed of possessing [Kerr, *Berlin noir* (1994)].

More generally, David Lodge, following a suggestion made by Roman Jakobson, argued that novels are characterized by the use of simile whereas poetry displays a preference for metaphor (Lodge, 1977).

Poetry and novels are just two genres that display specific patterns of use of particular classes of metaphor. Jakobson and Lodge have postulated many more relationships, and a beginning has been made with the study of the variation of metaphor across registers and domains of discourse. For instance, Kurt Feyaerts has edited a collection of articles on the relation between metaphor and the Bible (Feyaerts, 2003), Lakoff and Johnson's latest work surveys the role of metaphor in philosophy (Lakoff and Johnson, 1999), Reuven Tsur (1987) and Gerard Steen (1994) have addressed the position of metaphor in literature (cf. Steen and Gibbs, 2004), and Lynne Cameron (2003) has examined the use of metaphor in classroom discourse at primary-school age. In the collection on metaphor and thought by Ortony (1993), there is a special section on metaphor in education and another section on metaphor in science, with contributions from Thomas Kuhn and Richard Boyd, among others. Andrew Goatly (1997) has made a beginning with describing some of these relations in stylistic detail, including the distribution of diverging metaphor forms across conversations, news reports, popular science, magazine advertisements, novels, and lyric poems.

Finally, the broadest scope for a stylistic approach to metaphor may define 'style' as the overall impression of a particular language, in contrast with another language. Thus, British English and American English have different patterns of metaphorical usage, one striking feature involving the combination between metaphor and hyperbole in American English (cf. Kövecses, 2004), as may be demonstrated with reference to the frequent exaggerated use in American English of verbs such as *die* and *kill* for many mundane actions, including the light and computers. Different languages can also utilize source domains for particular target domains in very different ways. Variation of metaphor within and between languages is turning into a new area of interest for linguists and stylisticians alike (Kövecses, 2004).

See also: Applied Linguistics: Overview and History; Aristotle and Linguistics; Aristotle and the Stoics on Language; Bible; Cognitive Linguistics; Cohesion and Coherence: Linguistic Approaches; Conversation Analysis; Figures of Speech; Humor in Language; Invented Language in Literature; Irony; Metaphor and Conceptual Blending; Psycholinguistics: Overview; Rhetorical Structure Theory; Style; Metaphor: Philosophical Theories; Metaphor: Psychological Aspects; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Metaphors, Grammatical.

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Metaphors in English, French, and Spanish Medical Written Discourse

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Introduction

According to the *Concise Oxford dictionary of current English*, the term *metaphor* comes from the Greek *metaphora* and signifies 'transfer, transposition' (*meta* means 'with' or 'after,' and *phero* means 'bear' or 'carry'). Aristotle in his *Poetics* viewed metaphor as part of rhetoric and poetics. To him, it consists of naming an entity with a word pertaining to something different.

There is a significant amount of research in the field. Shibles (1971) and Van Noppen *et al*. (1985) collected the publications on metaphor. The former, an annotated bibliography and history, includes more than 3000 references, and the latter provides over 4000 titles. The increased interest in metaphor studies, particularly during the 1970s and 1980s, was due to the development of cognitive linguistics.

Metaphors are linguistic devices in both fictional and nonfictional texts, whether spoken or written. The fictional writer uses them to convey certain feelings and emotions to the prospective reader and to add originality to his writing, whereas the nonfictional writer uses metaphors in order to give names to new concepts, phenomena, or discoveries and to formulate new hypotheses. Literary metaphors are considered to be richer if they can be interpreted differently by different people, whereas scientific metaphors necessarily must convey a single precise concept.

Different Approaches to Metaphor Theory

Martín-Municio (1992) offered some of the definitions of metaphor by distinguished authors, such as Cicero, De Vendôme, Nebrija, Whately, Werner, and Dámaso Alonso, which have followed that of Aristotle through the ages. All of these definitions are based on a substitute approach, i.e., on the substitution of literal expressions for metaphorical equivalences. The comparative approach, on the other hand, sees metaphor as a condensed or elliptical simile. To some scholars, metaphor differs from simile only in the form, the latter being an explicit comparison signaled by the words 'like' or 'as.' However, the distinction is not simple and it has been a cause of discussion ever since Aristotle, who mentioned the word 'enigma' to refer to this trope because there is some kind of difficulty in its nature and meaning. In past decades, the Aristotelian concept of metaphor has been reexamined and the relevance of the distinction between metaphor and simile has been questioned.

Contemporary metaphor theory can be traced back to the American philosopher Black (1955, 1962), whose works, together with those of Richards (1936) and Ortony (1993), *inter alii*, represent the nonconstructivist approach to the study of this figure of speech (*see* **Metaphor: Philosophical Theories**). They analyze metaphors at the sentence level, as independent items, and consider them nonliteral language. In an article entitled 'Metaphor,' Black (1955) introduced the concept of 'assumptive frameworks' or systems of associated common places, to describe how dissonant statements can be explained and shared with others by means of metaphors. In *Models and metaphors* (1962), he exemplified the meaning of these tropes with a short series of expressions, such as the well-known metaphor: *Man is a wolf* (see English, 1998). He also coined the terms Focus and Frame. The former is the word bearing the metaphorical meaning and the latter is the remainder of the sentence where the word occurs. Richards (1936) was the first to use the terms Topic (or Tenor) and Vehicle of the basic structure of metaphor. This terminology is widely spread. Topic is the entity we are referring to and Vehicle is that with which we compare it. The common features constitute the foundation of the metaphor. A frequently cited example is 'muscle' (from the Latin word *musculus*, which means 'small mouse'). In this metaphor, 'muscle' is the Topic, 'small mouse' is the Vehicle, and the basis of the transfer rises from the real (or imaginary) resemblance between the small mouse and the muscle on the dissection table.

The constructivist approach can be found, among others, in Reddy (1979) and, particularly, Lakoff and Johnson (1980) and Lakoff (1992). They discarded the distinction between literal and nonliteral language and considered metaphors as phenomena of both language and thought. Lakoff and Johnson, in their famous book *Metaphors we live by*, have demonstrated how much of our conceptual system is of a metaphorical nature and how our vision of reality is manifested by the use of conventional metaphors and the creation of new ones.

With regard to current studies on metaphor in the field of applied linguistics, several tendencies have been clearly identified (see Skorcynska, 2001): the first is concerned with re-establishing a language focus in metaphor research without discarding the value of the cognitive approach; the second relates

to the increase in the number of studies where metaphor is analyzed in specialist domains. Finally, there is also a marked interest in establishing a taxonomy of description levels in the methodology employed in this field of research.

Metaphor and the Creation of Language

One of the functions of metaphor is to provide a new scientific terminology, adjusting the language to new knowledge (*see* **Metaphor and Conceptual Blending**). An essential characteristic of this figure of speech is to

Table 1 Metaphors in English, French, and Spanish medical prose that refer to anatomical forms and structures

English	*French*	*Spanish*
Architectural		
Entry *portal*	*Porte* d'entrée	*Puerta* de entrada
Arterial *wall*	*Paroi* artérielle	*Pared* arterial
Pillars of the diaphragm	*Piliers* du diaphragme	*Pilares* del diafragma
Aqueduct of the vestibule	*Aqueduc* du vestibule	*Acueducto* del vestíbulo
Vertebral *column*	*Colonne* vertébrale	*Columna* vertebral
Posterior *chamber*	*Chambre* postérieure	*Cámara* posterior
Vault of the vagina	*Dôme* vaginal	*Bóveda* de la vagina
Skin *window*	*Fenêtre* cutanée	*Ventana* cutánea
Renal *pyramid*	*Pyramide* rénale	*Pirámide* renal
Geomorphic and topographic		
Visual *field*	*Champ* visuel	*Campo* visual
Stellate cells	Cellules *etoilées*	Células *estrelladas*
Blood *stream*	*Courant* sanguin	*Torrente* circulatorio
Lumen of a duct	*Lumière* d'un vaisseau	*Luz* de un conducto
Lacrimal *lake*	*Lac* lacrymal	*Lago* lacrimal
Pyloric *antrum*	*Antre* pylorique	*Antro* pilórico
Nasal *fossa*	*Fosse* nasale	*Fosa* nasal
Cavernous bodies	Corps *caverneux*	Cuerpos *cavernosos*
Pelvic *strait*	*Détroit* pelvien	*Estrecho* de la pelvis
Ventricular *plateau*	*Plateau* ventriculaire	*Meseta* ventricular
Phytomorphic		
Bundle of His	*Faisceau* de His	*Haz* de His
Nerve *root*	*Racine* du nerve	*Raíz* nerviosa
Epithelial *bud*	*Bourgeon* épithélial	*Brote* epitelial
Myelin *sheath*	*Gaine* à myéline	*Vaina* de la mielina
Brain*stem*	*Tronc* cérébral	*Tronco* encefálico
Superior *branch*	*Rameau* supérieur	*Rama* superior
Inferior *olive*	*Olive* inférieure	*Oliva* inferior
Anthropomorphic		
Pineal *eye*	*Oeil* pinéal	*Ojo* pineal
Neck of the urinary bladder	*Col* de la vessie	*Cuello* de la vejiga urinaria
Auricles of the heart	*Oreilletes* du coeur	*Aurículas* del corazón
Head of the femur	*Tête* du fémur	*Cabeza* femoral
Vertebral *bodies*	*Corps* vertébraux	*Cuerpo* de las vértebras
Pedicle flap	Lambeau *pédiculé*	Colgajo *pediculado*
Pudendal *lips*	*Lèvres* de la vulve	*Labios* de la vulva
Zoomorphic		
Pubic *crest*	*Crête* du pubis	*Cresta* púbica
Tail of the pancreas	*Queue* du pancréas	*Cola* del páncreas
Wings of the nose	*Ailes* du nez	*Aletas* de la nariz
Cerebellar *peduncle*	*Pédoncule* cérébelleux	*Pedúnculo* cerebelar
Owl's eye cell	Cellules en *oeil de hibou*	Célula en *ojo de lechuza*
Aqueduct of *cochlea*	Aqueduc du *limaçon*	Acueducto del *caracol*
Wing cells	Cellules *ailées*	Células *aladas*
Related to domestic objects		
Basket cell	Cellules en *panier*	Célula en *cesta*
Henle *loop*	*Anse* de Henle	*Asa* de Henle
Hernial *sac*	*Sac* herniaire	*Saco* herniario
Nail *bed*	*Lit* de l'ongle	*Lecho* de la uña
Nucleus *spindle*	*Fuseau* nucléaire	*Huso* nuclear
Chest	*Cage* thoracique	*Caja* torácica
Bag of waters	*Poche* des eaux	*Bolsa* amniótica

Table 2 Metaphors in English, French, and Spanish medical prose that refer to disease and pathologic forms, structures, etc.

English	*French*	*Spanish*
Architectural		
Pyramidal fracture	Fracture *pyramidale*	Fractura *piramidal*
Gothic palate	Voûte *ogival* (du palais)	Paladar *ojival*
Tower skull	Crâne en *tour*	Cráneo en *torre*
Marrow *nailing*	*Enclouage* médullaire	*Enclavación* medular
Staircase phenomenon	Phénomène de l'*escalier*	Fenómeno de la *escalera*
Blue *dome* cyst	Kyste *voûte* blue	Quiste *abovedado* azul
Geomorphic and topographic		
Angina *lacunar*	Amigdalite *lacunaire*	Angina *lacunar*
Cavernous rale	Râle *caverneux*	Estertor *cavernoso*
Field defect	*Lacune* du *champ* visuel	Defecto en el *campo* visual
Stellate fracture	Fracture *stellaire*	Fractura *estelar*
Cascade stomach	Stomac en *cascade*	Estómago en *cascada*
Polar cataract	Cataracte *polaire*	Catarata *polar*
Rainbow symptom	Halo *coloré*	Visión *iridiscente*
Moon face	Faciès *lunaire*	Cara de *luna llena*
Erythema *iris*	Érythème *iris*	Eritema *iridiscente*
Phytomorphic		
Branching keratitis	Kératite *ramifiée*	Queratitis *ramificada*
Strawberry gallbladder	Vésicule *fraise*	Vesícula biliar en *fresa*
Greenstick fracture	Fracture en *bois vert*	Fractura en *tallo verde*
Miliary abscess	Abcés *miliare*	Absceso *miliar*
Heart-block *arborization*	Bloc d'*arborisation*	Bloqueo de *arborización*
Woody phlegmon	Phlegmon *ligneux*	Flemón *leñoso*
Raspberry tongue	Langue *framboisée*	Lengua *aframbuesada*
Orange-peel sign	Signe de la *peau d'orange*	Signo de *piel de naranja*
Anthropomorphic		
Syndrome of *crocodile tears*	S. des *larmes de crocodile*	S. de *lágrimas de cocodrilo*
Whistling rale	Râle *sibilant*	Estertor *sibilante*
Ear *cough*	Toux *auriculaire*	Tos *auricular*
Dentate fracture	Fracture *dentée*	Fractura *dentada*
Mitral *murmur*	*Soufle* mitral	*Soplo* mitral
Tremulous cataract	Cataracte *trémulante*	Catarata *trémula*
Irritable heart	Coeur *irritable*	Corazón *irritable*
Zoomorphic		
Flapping tremor	Tremblement en *battement d'ailes*	Temblor en *batir de alas*
Frog belly	Ventre de *batracien*	Vientre de *batracio*
Duck gait	Démarche en *canard*	Marcha *anserina*
Lobster-claw hand	Main en *pince de homard*	Mano en *pinza de langosta*
One-horn uterus	Utérus *unicorne*	Útero *unicorne*
Horseshoe kidney	Rein en *fer à cheval*	Riñón en *herradura*
Sponge kidney	Rein en *éponge*	Riñón en *panal*
Gallop rhythm	Bruit de *gallop*	Ritmo de *galope*
Intestinal *polyp*	*Polype* intestinal	*Pólipo* intestinal
Seal-fin deformity	Main en *nageoire de phoque*	Mano en *aleta de foca*
Related to domestic objects		
Scissors gait	Démarche en *ciseaux*	Marcha en *tijeras*
Cracked-*pot* sound	Bruit de *pot* fêlé	Ruido de *olla* rota
Hammer finger	Doigt en *marteau*	Dedo en *martillo*
Silver-fork deformity	Déformation en dos de *fourchette*	Deformidad en dorso de *tenedor*
Funnel chest	Thorax en *entonnoir*	Tórax en *embudo*
Sacculated aneurism	Aneurysme *sacculaire*	Aneurisma *sacciforme*
Pacquet liver	Foie *ficelé*	Hígado *abramantado*
Amphoric murmur	Souffle *amphorique*	Soplo *anfórico*
Food and clothes-related metaphors		
Rice bodies	Corps *riziformes*	Cuerpos *riciformes*
Caseous abscess	Abcès *caséeux*	Absceso *caseoso*
Milky urine	Urine *laiteuse*	Orina *lechosa*
Mustard gas	Gaz *moutarde*	Gas *mostaza*
Beer heart	Coeur des *buvers de bière*	Corazón de *Tubïngen*
Brandy nose	*Couperose* du nez	Acné *rosácea*

Continued

Table 2 Continued

English	*French*	*Spanish*
Milk crust	Croûte de *lait*	Costra de *leche*
Miliary acne	Acné *miliaire*	Acné *miliar*
Phrygian cap	Bonnet *phrigien*	Gorro *frigio*
Collar-button abscess	Abcès en *bouton de chemise*	Absceso en *botón de camisa*

serve as a cognitive mechanism to understand abstract concepts through common notions. The metaphorized word will have a precise meaning within a scientific field. Competing with other processes (morphological, syntactic, lexical, or stylistic), metaphor has largely contributed to enrich the language of science.

The creative power that metaphor has given to language has been stressed ever since Aristotle. In the words of Skoda, in her book *Medecine ancienne et métaphore* (1988: IX):

> *La création d'un vocabulaire scientifique est un phénomène linguistique passionnant. Témoin des origines et du développement d'une science, ce procès de dénomination se trouve indissolublement lié à la naissance et aux progrès de la pensée scientifique.*
>
> *... La métaphore ... est aussi ce qui donne vie aux lexiques spécialisés, techniques et scientifiques.*
>
> [The generation of a scientific vocabulary is a fascinating linguistic phenomenon. Having born witness to the origins and development of a science, this coinage process is found to have indissoluble ties to the beginning and progress of scientific thought.
>
> ... Metaphor ... also gives life to technical and scientific specialized lexicons.]

Classification of Medical Metaphors

Two major works have been carried out on medical metaphors. The first is Skoda's study that we referred to above. It is a philological and linguistic study of the metaphorical creation in anatomical and pathological terminology of ancient Greek. The author gathers and compares the medical metaphors in ancient and modern languages and shows metaphorical matrices in the terminology of both ancient and modern medicine. The second is Salager-Meyer's research paper (1990) on the patterns of analogy underlying medical metaphors in English, French, and Spanish.

Among the countless metaphors created by humans (see Martín-Municio, 1992), there is a certain variety of conceptual domains, which can be found in many different languages and styles and which have given rise to the following types of metaphor: anthropomorphic, zoomorphic, phytomorphic, architectural, and to a lesser extent, mythological, biblical, related to food, etc. The above-mentioned studies by Skoda and Salager-Meyer have identified similar semantic subgroups, all based on patterns of analogy. These patterns of analogy can be found in both anatomical and pathological descriptions.

Table 1 depicts examples of current medical metaphors in English, French, and Spanish that express a unitary concept in a condensed univocal way. They also show how metaphoric transfer moves from specific, familiar surroundings to less known or abstract domains. They have been taken from the revised works as well as *Elsevier's medical dictionary. English/American. French. Italian. Spanish. German* (1975) and *Stedman's (illustrated) medical dictionary* (1990).

Pathology and morbid anatomy are also a source of metaphorical creation (Skoda, 1988). Many diseases, deformities, disturbances, fractures, etc., are described as well in terms of the reality surrounding us (architecture, nature, house, objects, etc.) with which they bear some resemblance, either in shape or in some other aspect (see Table 2).

A number of *martial* metaphors have also been identified in the language of medicine, as if the immune system, for instance, were '*at war*' with bacteria and viruses, and the body had turned into a '*battlefield*.' It has 'to *fight* and *resist* infections,' 'to *attack* and *destroy* cancer cells.' There are 'blood–brain *barriers*,' '*exploratory* tests and surgery,' 'cough *maneuvers*,' '*defense* mechanisms,' 'heart *attacks*,' 'tubal *blocks*,' '*invasive* carcinomas.' A '*savage* therapy' may become necessary and procedures can be '*aggressive*' or '*invasive*.' Reflexes are '*triggered*,' 'volunteers are *recruited*,' 'patients are *enrolled* in studies,' etc.

Apart from Greek and Latin, many other languages, such as Standard Arabic (Arabic), Scandinavian, Spanish, Italian, Standard German (German), and Japanese, have contributed words to the vocabularies of the life sciences in English. French terms are more numerous than those from any other modern language. The following French metaphorical expressions appear unchanged in current medical English, whereas they are translated into Spanish in the medical literature written in this language: *sonde coudée* ('elbowed line'); *bruit de diable* ('venous hum');

Table 3 Literary, mythological, and biblical metaphors in English medical prose

Lear complex	(After a Shakespearean character)
Münchhausen syndrome	(After the protagonist of *The Adventures of Baron Münchhausen*)
Pickwick syndrome	(After a Dickens's character)
Mons *veneris*/ venereal diseases	(Have a Latin root in *Venus*, goddess of love)
Oedipus/Electra complex	(Mythological characters)
Collar of *Vulcanus*	(Mythological character)
Hermaphroditism	(After *Hermaphrodite*, son of Hermes and Aphrodite)
Morphine	(Has a Latin root in *Morpheus*, god of dreams)
Cain's complex	(Biblical character)
Diogenes's cup	(Biblical character)

Table 4 Lexicalized metaphors in English, French, and Spanish medical prose

English	*French*	*Spanish*
Clavicle ('a small key')	*Clavicule*	*Clavícula*
Ventricle ('small belly')	*Ventricule*	*Ventrículo*
Pylorus ('a gatekeeper')	*Pylore*	*Píloro*
Alveolus ('a through')	*Alvéole*	*Alvéolo*
Placenta ('a cake')	*Placenta*	*Placenta*
Jejunum ('that does not eat')	*Jejunum*	*Yeyuno*
Placebo ('I will please')	*Placebo*	*Placebo*
Thyroid ('a shield')	*Thyroïde*	*Tiroides*

cancer en cuirasse ('resembling a cuirass'); *placenta truffée* ('as if stuffed with truffles'); *cri-du-chat syndrome* ('cat's cry syndrome'); *bruit de cuir neuf* ('resembling new leather sound'); *bruit de scie* ('sawing sound'); *bruit de clapotement* ('splashing sound'); *la belle indifférence* ('an inappropriate lack of emotions').

Medical science has also drawn metaphorical references from literature, mythology, and the Bible, to name certain diseases and certain parts of human anatomy (see Table 3). These literary, mythological, and biblical metaphors can be found in French and Spanish as well.

The original figurativeness of certain expressions has nonetheless faded away in the course of time and use (see Sutton, 1993) and what we take to be literal terms of scientific description are in fact the remains of figures of speech that have become too familiar to maintain their metaphorical value, as seen in the words referred to as lexicalized or dormant metaphors shown in Table 4.

Most of the above metaphorically used words belong to the nominal group and, to a much lesser extent, to the adjectival and verbal groups. (See Salager-Meyer's (1990) study, which offers a quantitative and qualitative analysis of medical metaphors and their linguistic features in English, French, and Spanish.)

Scientific and technical lexis would certainly be poorer without the use of some metaphorical expressions. Medical vocabulary, the reviewed studies show, is not devoid of picturesque metaphorical descriptions. Some examples are as follows: in English, *hot potato voice; Mexican hat cell; anchovy sauce pus*; in French, *fissuration en anse de seau* ('bucket-handle fracture'); *muguet des nouveau-nés* ('mouth candidiasis'); *aspect de ciel étoilé* ('starry sky aspect'); and in Spanish, *meato en hocico de pescado* ('fish-mouth meatus'); *soplo en rueda de molino* ('mill wheel murmur'); *angioma del picotazo de cigüeña* ('stork bite angioma').

As so aptly stated by Salager-Meyer, few expressions are, nonetheless, as colorful as that registered in the French corpus she analyzed: "*la moisson de descellement cotyloidien va être florissante*" [the cropping of cotyledons will be exuberant].

Thus, metaphors, far from being a feature of poetry and rhetoric alone, show that they have, within specialized texts and particularly within medical literature, great capacity to use lexis not belonging to the field in question. As seen in the works of Skoda and Salager-Meyer, they play an important role in medical nomenclature.

See also: Aristotle and Linguistics; Aristotle and the Stoics on Language; Metaphor and Conceptual Blending; Metaphor: Psychological Aspects; Metaphor: Philosophical Theories; Metaphor: Stylistic Approaches; Metaphors, Grammatical; Metaphors in Political Discourse.

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Metaphors in Political Discourse

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Everyone knows that politicians use language in ways designed to persuade, and perhaps deceive, and some people would include 'metaphors' as examples of political rhetoric. It is important to be clear what is understood by the term 'metaphor.' In the first part of this article we outline the traditional understanding and then the contemporary cognitive theory of metaphor. In the second part we apply the latter to examples of political discourse, specifically discourse about political institutions, showing how a scientific understanding of metaphor can yield insights into what humans are doing when they reason about politics.

The Classical Tradition

Greek and Roman thinkers were well aware that language was integral with politics and public life in general and studied it under the rubric of 'rhetoric.' Their writings on the subject to some extent seek to explain metaphor (among many other rhetorical devices) as a phenomenon of human communicative behavior, but they were far more concerned with evaluating the persuasive or esthetic effects of metaphors with a view to advising public speakers.

Aristotle, however, has a theoretical framework. He defines metaphor as 'the application of a word that belongs to another thing' (Aristotle, 1995: 21) and discerns different types of such application. For Aristotle, then, metaphor is about the use of words, not about the nature of thought. Moreover, Aristotle thought of metaphor as something exceptional. In *Rhetoric* he is above all concerned with the emotive effects caused by metaphor and by the 'correct' choice of metaphors. He regards metaphor as special to certain forms of writing and speaking and to certain talented individuals. These ideas, repeated by classical writers such as Cicero and Quintilian, are implausible in the light of modern research on metaphor. Aristotle does note the role of metaphor in the expressing of new ideas, but others concentrated on functions such as being brief, and avoiding obscenity and eulogistic embellishment. In fact, the tendency is to reduce the prominence of metaphor and to handle it with a fair degree of suspicion.

This stance is inherited and magnified by the early modern philosopher and pivotal political theorist Thomas Hobbes (cf. Chilton, 1996). Here is Hobbes on metaphor: "Metaphors, and senseless and ambiguous words, are like *ignes fatui*; and reasoning upon them, is wandering amongst innumerable absurdities; and their end, contention, and sedition, or contempt" (*Leviathan*, chapter 5, pp. 116–7, original emphasis). In this passage it becomes clear that for Hobbes metaphor may actually be a kind of threat to the political status quo. This should at least alert us to the possibility that metaphors play a very important role in political life.

The Cognitive Theory of Metaphor

In the 1980s linguists realized that metaphor was not simply a matter of transferring a word from its 'proper' referent to some other referent, nor a special use of language confined to the literary or oratorical domains (cf. Lakoff and Johnson, 1980, 1999). The following points are essential for any serious investigation of 'metaphor in political discourse.'

First, metaphor is a cognitive, not a linguistic phenomenon. The human mind has various forms of organized knowledge. These may be innate or partly innate and elaborated by culture-relative experience. Let us call these 'domains.' Metaphor is then defined as a mapping from a source domain of this type to a target domain. The evidence suggests that many source domains tend to be based in physical, especially spatial, experience and be stored in the mind as what are often referred to as 'image schemas.' What the

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Metaphors in Political Discourse

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metaphorical mapping does is transfer structure from the source domain to a less well-specified domain.

Second, it is apparent that such metaphorical mappings account for the meanings of many ordinary words in a language as well as idiomatic expressions. Metaphors are therefore not confined to special genres. However, in political discourse, as in other types of discourse, particular words and idioms will obviously be relevant, so particular metaphors will be also. We will see that certain image schemas are an important source of political concepts, e.g., the source–path–goal schema and the container schema. An important point to be made here is that metaphors are actually an instrument for reasoning, contrary to what was asserted by Hobbes. They provide a means by which the human mind can make inferences, for if metaphors map structure from a source domain to a target domain, inferences that can be done in the source domain can (potentially) be done in the target domain.

Another methodological consideration concerns the etymology of political vocabulary. In English and some other languages many words for political phenomena derive from Latin or Greek words with different meanings. Meaning change in general is often metaphorical in the sense defined here. In the case of political words the metaphors involved can be of interest because they give some indication of how the human conceptual system operates over historical time in this domain of human life.

Finally, two caveats are in order. First, this article refers primarily to metaphor in political discourse in English. Second, it refers to the Western political tradition. Whether the points made can be generalized is a question for further research.

Metaphor and Politics

Political behavior involves using language as a form of political action and as a form of reflection on (metarepresentation of) political behavior. The two are not of course entirely separate but in what follows we shall focus on the second. What, then, are the political concepts that have a metaphorical basis?

If we make the assumption that political behavior involves both cooperation and competition, we can ask how metaphor is involved in the conceptualizing of this duo. It is clear that the relevant concepts will concern differentiation of various sorts and the relations among the parts. Relations of power will be especially significant.

The basic vocabulary of hierarchy and precedence is derived metaphorically from spatial concepts. Two of the fundamental image schemas are the front–back schema and the up–down schema, based on human anatomy, perception and cognition.

The front-back schema gives us metaphorical mappings for precedence (the word itself being etymologically metaphorical [*prae-cedere*] and related to physical ordering of individuals in procession). This is why we speak of an individual or group coming **before**, in **front** of, **ahead** of, in the **vanguard**, etc., while others **come behind**, **fall behind**, **follow**, etc. It will be noticed that these expressions contain mappings from additional image schemas. One of these is the path schema, which reflects experience of human movement. Front–back combined with path gives us the powerful concept of **leadership** and **followers**. In certain political discourses, such concepts are applied to whole groups (ethnic groups, states, regions) in expressions such as '**backward** nations'; indeed the concept of **progress** itself is etymologically derived (*pro-gressus*) from the spatial front–back and path schemas. In persuasive political discourse, orators frequently claim that their country is, or urge that it should be, **moving forward**. In fact, this schema appears to be indispensable for the meanings associated with one important strand of political discourse, namely reference to policy and future planning. Politicians and their bureaucrats thus frequently speak and write of **looking toward the future**, **taking rapid steps**, **moving on**, coming **to a crossroads**, **going in the right direction**, and so on.

In the up–down schema, **up** maps onto good, strong and powerful. Thus superior individuals or groups are not only better in some normative sense, but also possess power **over** others. These expressions are embedded in the language and enter into systematic semantic relations. Thus if someone is **over** or **above** you, you are **beneath** or **below** them; you will be **subordinate**, **inferior**, and they may **stoop**, **condescend**, and so on. This network is the basis for further concepts: a group may **rise up**, or cause an **uprising**, and an established authority may **decline**, **fall**, or **collapse**. The basic image schema of standing upright is important to the rather complex development of the concepts evoked by words such as 'estate' and 'state.'

Concepts of control and power are lexically encoded by way of the spatial up–down image schema. This can be seen from the constructions into which the relevant lexical items enter in English and other languages. For example, it is systematically the case that we say power **over**, control **over**, authority **over**, charge **over**, responsibility **over**, and so forth, rather than some other preposition. One of the key concepts of Western political philosophy from the early modern period onward is **sovereignty**. The history of this word, like that of the term 'state,' is complex, but what should be noted here is that it is also metaphorically derived according to the

up–down schema: *sovereign* > popular Latin *superanus* > Latin *super* ('on top of,' 'over').

The conceptualization of discrete groups of individuals, in many cases in discrete geographical regions, is probably a crucial component of political thinking and action. The form of such concepts is provided by the basic container image schema, which has many politically significant ramifications. The container schema captures human experience of 'inside,' 'outside' and the intermediate boundary. On the linguistic evidence, it is apparently recruited by the conceptual system to understand, reason about, and communicate about social groups. In reality collections of objects and individuals need not have determinate bounds. The container image schema, however, imposes them. Presumably it coincides with what may or may not be a basic schema, that of self and other. It is this schema that makes it possible to draw inferences such as: if A is not **in** the group, then he is **outside** it; in order to **enter** the group A must cross a boundary. As Chilton (1996) and Chilton and Lakoff (1995) argued, the container schema is fundamental to the concept and discourse of security, as well as to the modern concept of the state and the international system, where countries and regions are conceptualized as container-like entities. Two combinations with other image schemas are worth noting here. In combination with the center–periphery schema, we have political concepts of **central authority** and **remote** or **peripheral regions**. In combination with the path schema, we have what appear to be emotionally charged concepts of invasion, incursion, and the infringement of national boundaries.

In the Western political tradition certain metaphors with cultural (rather than image-schematic) sources for the state have recurred, as Peil (1983) has shown: the body politic, the ship of state, buildings, machines. The first three can be regarded as linked to the container schema, and the body schema involves basic as well as cultural knowledge. All provide rich possibilities for political inferences in the sense outlined earlier.

The body-politic metaphor is particularly entrenched. It permits the mapping of structured knowledge about the body (and its ills) onto the political domain. If the polity has a **head**, it also has its lesser parts that serve it. If the polity is a body, then it may have **disease**, which may be due to an invasive element, e.g., a **parasite**. It follows that it needs a **physician** to **cure** it, who may prescribe a **cure** such as a **purge**. As is well known, this train of thought was developed and manipulated in Nazi thinking and propaganda. Peil's other metaphors provide inferential potential that will be more or less familiar to readers. If the state is a **ship**, it may need a strong **captain** to **steer** it though **rough seas**; if it is a building it will need strong **foundations**, a **roof** to protect it, and **pillars** to hold it up; if it is a **machine**, then there are **levers** of power, the machinery has **checks** and **balances**, and it may be more or less **efficient**, or may go **out of control**.

Such examples suggest that the cognitive theory of metaphor provides a means of investigating the intricate conceptual networks that underlie discourse about political institutions. They also suggest that core features of political theory, at least in its traditional Western forms, make use of metaphors derived from a small set of image schemas. But these are hypotheses for future research.

See also: Aristotle and Linguistics; Aristotle and the Stoics on Language; Metaphor and Conceptual Blending; Metaphors, Grammatical; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphor: Philosophical Theories; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches.

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Metaphors, Grammatical

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Grammatical metaphor is a semiotic process first described in Halliday (1985/1994). It is a set of strategies for expanding the range of meanings available to speakers and writers that involves transference of a semantic function from the grammatical class that most typically realizes it to a class that typically realizes a different type of meaning. Halliday suggested that grammatical metaphor is a feature of all adult discourse. This may hold for all languages as well, because it is found in languages as diverse as English and Indigenous Australian languages. However, certain types of grammatical metaphor have become a major feature of written discourse in modern institutions, such as science, academia, and bureaucracy (Halliday and Martin, 1993; Martin and Veel, 1998), and present a serious challenge for many learners.

Halliday (1994: 340–341) first discussed three familiar types of 'rhetorical transference': 'metaphor,' in which a "word is used for something resembling that which it usually refers to"; 'metonymy,' in which a "word is used for something related to that which it usually refers to"; and 'synecdoche,' in which a "word is used for some larger whole of which that which it refers to is a part." Halliday gave the following examples of these types of transference:

metaphor	A flood of protests poured in	[*flood* exemplifies *a large quantity*]
metonymy	Keep your eye on the ball	[*eye* directs the *gaze*]
synecdoche	Let's go and have a bite	[*a bite* is part of eating *a meal*]

The term metaphor is also used as a general label for these types of verbal transference. A common view of metaphor is a transference in the usage of words. However, Halliday proposed that we look at it first from the perspective of meaning and ask "not 'how is this word used?' but 'how is this meaning expressed?'" This perspective derives from the systemic functional model of language (SFL) as stratified into three levels – of meaning, which is expressed as wording, which is expressed as sounding or lettering. More technically, discourse semantics is realized as lexicogrammar, which is realized as phonology (where the level of wording includes lexis and grammar as a unified system). This stratal model of language is diagrammed in Figure 1.

This approach privileges discourse semantic functions as a starting point for analysis of grammatical patterns rather than merely the forms of words and sentences. Therefore, from a perspective 'below,' of lexis alone, *flood* literally means 'a moving mass of water' and can be used metaphorically as 'a moving mass of feeling or rhetoric'; however, from the perspective 'above,' of discourse semantics, the meaning 'many people [protested]' may be expressed more congruently as *a large number* [of protests] or more metaphorically as *a flood* [of protests].

Here, Halliday introduced the term 'congruent' in place of 'literal' to denote a less metaphorical variant. Semantically speaking, *a large number* is a more congruent expression of the meaning 'many,' whereas *a flood* is a more metaphorical expression. This supposes a model of congruence between meaning and wording that lies at the heart of systemic functional theory (i.e., that certain types of wording have evolved to realize certain types of meaning). For example, the nominal group *many people* realizes the general semantic categories of 'person' and 'quantity,' whereas the verb *protested* realizes the semantic category 'process.' More specifically, 'person' is realized by the noun *people* and 'quantity' by the adjective *many*. These are all examples of congruence between meaning and wording: 'people' and 'things' realized as nouns, 'qualities' and 'quantities' as adjectives, and 'processes' as verbs.

There is a sense in which congruent expressions are prior to metaphorical ones on two timescales: the evolution of the language, or 'phylogenesis,' and the development of the speaker, or 'ontogenesis.' Not only in English but also probably in the spoken modes of all languages, the semantic configuration 'person' + 'quantity' + 'process' is congruently realized by the grammatical structure of a clause consisting, for example, of a nominal group with noun and

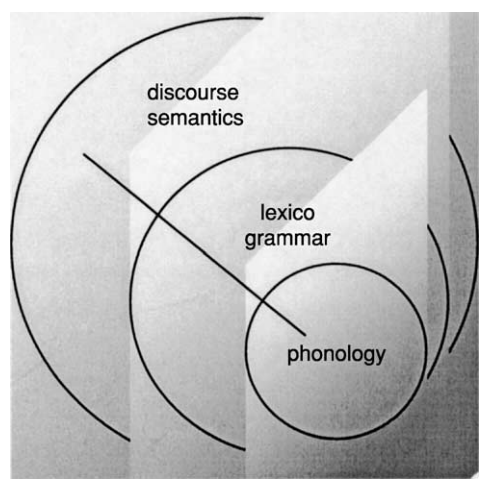

Figure 1 Stratal model of language.

adjective *many people* and a verb or verbal group *protested*. In terms of phylogenesis, this is a pattern that evolved initially in the spoken mode and appears to be common across languages and registers, whereas metaphorical variants have evolved more recently and may vary widely within and between languages. For example, the meaning 'quantity' may now be realized by a nominal group such as *a large number*, and the meaning 'process' may be realized by a noun such as *protests*. In a further step, the semantic figure 'person' + 'quantity' + 'process' can then be realized as a single nominal group *a large number of protests*, in which the people doing the protesting have disappeared. This metaphorical 'thing' can then participate in another process, such as *a large number of protests came in*.

Such a reconstrual of 'person' + 'quantity' + 'process' as though it were 'quantity' + 'thing' forms the semantic basis for the more metaphorical expression *A flood of protests poured in*, which has the effect of intensifying the quantity by means of the lexical items *flood* + *poured*. The metaphor is thus both lexical and grammatical: A semantic configuration that is more congruently realized by a clause structure *many people protested* is realized more metaphorically by a nominal group *a large number of protests*, and its elements that are more congruently realized by one lexical item *a large number* are realized more metaphorically by another lexical item *a flood*.

For several reasons, these kinds of metaphorical expression have evolved in recent centuries in the written mode of languages such as English, where they are now common. In particular, they open up the potential for expanding meanings available to writers and speakers, and they enable us to more flexibly manipulate the structures of written discourse. They are less often found in the languages of more stable cultures that have not evolved a written mode, such as Indigenous Australian languages (Rose, 2001). This does not imply any valuing of written over oral cultures, but it is a very important point to recognize for both cultural studies and language education. In the ontogenesis of English speakers, such metaphorical expressions appear as learners engage with the written mode, typically in later years of primary school (Derewianka, 2004). However, for learners from oral cultural backgrounds, they can present a major barrier for understanding and using written discourse since they reconstrue ordinary people and things acting in the world as relations between abstract entities (Martin, 1991; Rose, 1997, 1998).

On the other hand, grammatical metaphor is a feature of all adult discourse, but most commonly in its interpersonal guise. Halliday distinguished types of grammatical metaphor most generally as metaphors of 'mood' and 'modality' and metaphors of 'transitivity': the first expands the potential of language for interpersonal meanings, and the latter expands its potential for ideational meanings. These categories arise from the recognition in systemic functional theory of distinct 'metafunctions': to enact speakers' social relations (interpersonal metafunction) and to represent their experience (ideational metafunction). A third textual metafunction is to organize the interpersonal and ideational as discourse that is meaningful in context. Metafunctions are mapped on to the stratal model in Figure 2.

The following sections first outline interpersonal metaphors of mood and modality, followed by ideational metaphors of transitivity and conjunction.

Interpersonal Metaphor

Interpersonal metaphors expand the potential of a language for negotiating social relations by manipulating the congruent realizations of discourse semantic systems of exchange and appraisal. These discourse systems are realized in the grammatical systems of mood and modality, respectively.

Metaphors of Mood

Exchange systems enable speakers to demand and give either information or goods-and-services, most generally through the speech functions of question and statement (propositions) or command and offer (proposals). These speech functions are realized in the grammatical systems of mood as interrogative, declarative, or imperative clauses, exemplified in Table 1.

Thus, each of these speech functions has a congruent realization as one or another mood type. Since they frequently occur nonsemiotically by simply performing an act, offers of goods-and-services have

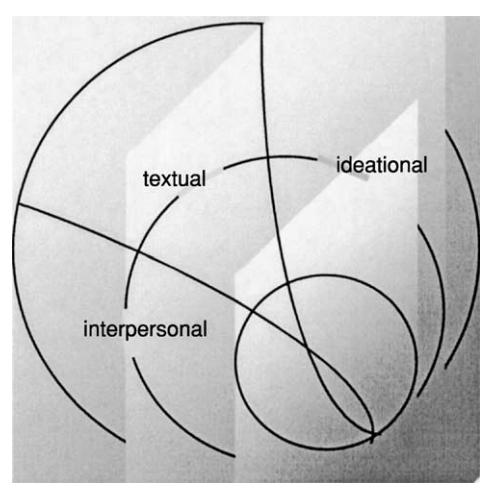

Figure 2 Metafunctions and language strata.

Table 1 Speech functions and mood

Speech function		*Mood*
Question	*Do you have a blanket?*	Interrogative
Statement	*I have a blanket.*	Declarative
Command	*Give me your blanket!*	Imperative

no particular congruent realization but may be verbalized by any mood type; for example, [interrogative] *Would you like my blanket?* [declarative] *Here's a blanket*, or [imperative] *Have my blanket!*

Now direct commands often imply, either an asymmetry of status in a relationship or a close relationship, and such implications may not be desirable in a relationship in which status and contact require more delicate negotiation. For these reasons, adult speakers often use metaphors of mood to negotiate such exchanges, with interrogative or declarative clauses in place of imperative; for example,

I would like a blanket.
May I have a blanket?
Would you mind if I had a blanket?
A blanket would be nice.

Such mood metaphors modulate obligation by reconstruing a demand for goods-and-services as though it were an exchange of information. They also enable obligation to be delicately graded from direct imperatives through modulated declaratives to apparently neutral statements or question, considerably expanding the potential for negotiating exchanges.

Metaphors of Modality

Halliday (1994: 354–363) described two general kinds of modality, one for negotiating services and the other for negotiating information. Demands for a service can be negotiated as follows:

do it	positive
you must do it	
you should do it	
you could do it	
don't do it	negative

On this scale we can say 'how obliged' you are to act. Statements that give information can be negotiated as follows:

it is	positive
it must be	
it should be	
it might be	
it isn't	negative

On this scale we can say ''how probable' a statement is. At each pole of these scales of modality is the choice of positive or negative polarity.

Each modality type is realized congruently in the English verbal group as modal auxiliary verbs ('must,' 'should,' 'might,' etc.) or modal adverbs ('certainly,' 'probably,' 'possibly,' etc.), but their potential is expanded by employing other regions of the language system. Modality can be made explicitly subjective using mental projections, or explicitly objective using projected facts, as follows:

Explicitly subjective

do it	positive
I insist you do it	
I want you to do it	
I'd like you to do it	
don't do it	negative

Explicitly objective

do it	positive
you are required to do it	
you are supposed to do it	
you are allowed to do it	
don't do it	negative

These metaphors of modality explicitly locate the source of obligation with the speaker (subjective) or away from the speaker (objective), opening up the potential for negotiating status and contact. This is a very large region of English grammar, which Halliday outlined and argued at length. Other languages have comparable systems of mood and modality (Caffarel *et al.*, 2004), although they may be realized in different ways. For example, the Australian language Pitjantjatjara grades degrees of obligation within the imperative mood system rather than as a separate system of modality. Nevertheless, it uses metaphors of mood and modality for similar interpersonal functions, as does English, as follows (from Rose, 2001):

Congruent command (imperative mood)
walangku watja-la
quickly tell-IMP
Quickly tell me!

Explicitly subjective (mental projection)
α ngayulu mukuri-nganyi β anku-ntjikitja
I desire-PRES go-to
I want to go.

Explicitly objective (relational clause)
nyuntu kunyu anku-ntjaku ngara-ngi
you it's.said go-to stand-PAST
You, its said, were expected to go.

Metaphors of mood are also equally common. The following dialogue begins with an interrogative metaphor for a proposal ('Give me a blanket!'). The listener reads the grammar congruently and simply answers with information (1b). He is surprised when the proposal is re-expressed as a direct imperative (2a) so that the demander offers to rephrase the request (3a):

(1a) katja // nyuntu blanketa kutjupa kanyi-ni
son you blanket another have-PRES
Son, do you have another blanket?
(1b) uwa ngari-nyi nyara
yes lie-PRES yonder
Yes, it's over there.

(2a) uwa -ni
give-IMP me
Give it to me!
(2b) munta
sorry
Sorry?

(3a) wiya nyuntu-mpa // nyanga-ngka -na
no your-s this-at I
tjapi-ni piruku
ask-PRES again
No it's yours. I'll ask this again

This exchange shows the tension in grammatical metaphor between the meaning of the grammatical structure and the discourse function it realizes metaphorically. Both levels of meaning inhere in the metaphor, and it is the tension between them that expands the meaning potential.

Ideational Metaphor

Ideational metaphors expand the potential of a language for construing experience by manipulating the congruent realizations of discourse semantic systems of ideation and conjunction. These discourse systems are realized in the grammatical systems of transitivity and complexity, respectively.

In languages throughout the world, human experience seems to be congruently construed as sequences of activities involving people and things, processes, places, times, and qualities (Caffarel *et al.*, 2004; Rose, 2004). Each activity is typically realized by the grammatical structure of a clause, and the other elements are realized by groups of words within the clause; for example (Tutu, 1999),

As an eighteen year old	I	met	a young man in his twenties
time	person	process	person

Each clause involves three kinds of elements:

1. A process
2. People and things that participate in the process
3. Circumstances that are associated with it in some way, such as time, place, manner, and so on.

We can call this arrangement of process, participants, and circumstances a 'figure' (after Halliday and Matthiessen, 1999; Martin and Rose, 2003). Figures are linked into activity sequences by conjunctive relations, which are congruently realized by conjunctions; for example,

It was the beginning of a beautiful relationship.
We even spoke about marriage.
Then one day he said he was going on a 'trip.'

Just as the grammatical class 'clause' realizes the semantic function 'figure,' so the grammatical class 'verb' is the typical expression of the semantic function 'process,' and the class 'noun' typically expresses the meaning of 'thing.' However, particularly in written modes of discourse, the meaning of 'process' is often re-expressed as a noun so that, for example, someone 'acting' becomes 'an action.' This does not simply replace one grammatical class with another but has the effect of reconstruing an everyday activity as though it were an abstract thing, thus creating two layers of meaning, as in metaphors in general. Such nominalizations are the most common type of ideational metaphor.

From the perspective of discourse semantics, ideational metaphor involves a transference of meaning from an element that congruently realizes it to another kind. For example, the process of *two people marrying* can also be treated as a quality, *a married man*, and as a thing, *a good marriage*. This kind of meaning transference seems so natural that it hardly comes to our attention, except when it becomes difficult to read in abstract written discourse, especially for readers who are unfamiliar with dense ideational metaphor. In modern written languages it is a powerful resource for expanding the set of meanings available for speakers and writers. Its development in English has accelerated during the past few centuries to enable expansion of the discourses of the sciences, humanities, and bureaucracies that accompanied Europe's industrialization and colonial expansions.

In general, the drift in meaning, by means of ideational metaphor, has been from reality as processes involving people and concrete things to reality as relations between abstract things (Halliday, 1998), as with the transference from *marrying* as process to *marriage* as thing. Part of the reason for this shift has to do with the greater potential for expanding the meaning of things – numbering, describing, classifying, and qualifying them. For example, the process of *marrying* can be expanded with another process, such as *marrying to forget*, or a quality, such as *marrying well*. However, *marriage* as a thing can be expanded with a whole series of potentially evaluative qualities, classes, and qualifiers, as in *an extremely short marriage to someone else*.

These are ideational metaphors of the experiential type (i.e., they are concerned with elements of figures). Ideational metaphors of the logical type are concerned with reconstruing a conjunction between figures as if it were a process or thing.

Experiential Metaphor

There are two general types of experiential metaphor: metaphors that reconstrue a process or quality as if it were a thing and metaphors that reconstrue a process, or a quality of a process, as if it were a quality of a thing.

Processes and Qualities as Things One major advantage of presenting other elements as entities is that things can be described, classified, and qualified in ways not available to other elements. This is illustrated in the following examples:

process ⟶	**thing**
begin	the beginning
relate	a beautiful relationship
marry	an extremely short marriage
travel	a trip
desiring	only one desire
reconcile	reconciliation
apply	all the important applications
violate	a gross violation
miscarry	a miscarriage of justice
penalize (punish)	the penalty (punishment)
expose and humiliate	public exposure and humiliation
perpetrate	the perpetrator
torturing	torturers

quality ⟶	**thing**
eighteen years old	an eighteen-year-old
twenty	his twenties
secure	security
painful and bitter	the pain and bitterness in me
true	truth
just	justice
honest/just . . .	integrity

As things, such metaphorical expressions can become participants in processes (e.g., *he had only one desire*) and parts of circumstances (e.g., *after my unsuccessful marriage*).

Processes and Their Qualities as Qualities of Things Processes and qualities of processes can be reconstrued as qualities of things.

process ⟶	**quality of thing**
securing	a top security structure
bubbling, living	a bubbly, vivacious man
envying	an enviable relationship
opening	open session
respecting	respectable members
regulate	regular torturers
quality of process ⟶	**quality of thing**
operating overseas	overseas operations
relate beautifully	a beautiful relationship
marry very briefly	an extremely short marriage
violate grossly	a gross violation
expose publicly	public exposure
torture regularly	regular torturers

Abstract Things Abstract concepts such as *amnesty* and *justice* make up institutional fields such as law, government, education, and so forth. They often refer to a large set of activities, and it may not be possible to unpack them into figures. However, some can be unpacked; for example, *a gross violation of human rights – defined as an abduction, killing, torture, or severe ill-treatment*. These are processes construed as things in order to be classified as *gross violations*. The whole figure may be unpacked as follows:

(a perpetrator) grossly violates human rights
(if he) abducts, kills, tortures, or severely ill-treats
(a victim)

In this example, a thing, *violation*, and its quality, *gross*, have been unpacked to a process, *violates*, and its quality, *grossly*, that also includes a 'perpetrator.' Also, the things *abduction, killing, torture, or severe ill-treatment* have been unpacked to actions that also include a 'victim,' as follows:

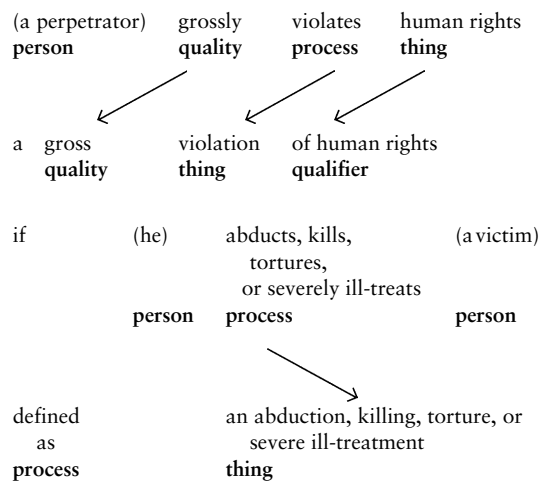

How far we go in unpacking ideational metaphor depends on our needs. For example, we could go further to analyze the abstraction *human rights*, but this would require a lot more definition.

Things and People as Parts of Activities-as-Things When processes are reconstrued as things, the people that participate in the processes are often left out, which is one reason why abstract written discourse sometimes seems so alien to our everyday experience of things going on around us. However, participants can be included when processes are reconstrued as things by presenting them as parts of activities-as-things as possessions.

Helena got married	→	Helena's marriage	→	the marriage of Helena and her lover
victims were compensated	→	victims' compensation	→	compensation for victims

In the following example, the processes of 'exposing' and 'humiliating' become things that qualify *the penalty* and are themselves qualified by their participant, *the perpetrator*:

the perpetrator	is penalized	by	publicly exposing and humiliating	him
person	**process 1**	**linker**	**process 2**	**person**

the penalty	of public exposure and humiliation	for the perpetrator
thing	**qualifier**	**qualifier**

Ideational metaphor tends to reconstrue our experience of reality as if it consisted of relations between institutional abstractions. These strategies have evolved to enable writers to generalize about social processes and to describe, classify, and evaluate them. One cost is that it may be difficult to recover who is doing what to whom; another is that this type of discourse can be very difficult to read and understand. Unpacking ideational metaphors as shown here can help to reveal how they construe reality and is one key strategy for teaching language learners how they work.

Logical Metaphor

Logical metaphor reconstrues logical relations between processes as if they were relations between elements within processes. Logical metaphor always involves experiential metaphor as well.

Conjunction as Process A common motif in abstract or technical writing is to present a consequential conjunction as a process:

such a hearing	*is likely to lead*	*to a miscarriage of justice*
participant	process	circumstance (place)

This strategy compresses a sequence of two activities into a single figure by means of experiential and logical metaphors. Experientially, the participant and circumstance represent activities ('hearing an application' and 'miscarrying justice') that are reconstrued as things (*a hearing* and *a miscarriage*). Logically, there is a relation of consequence between these activities ('if . . . then'), which is reconstrued as a process (*is likely to lead*). We can unpack such as sequence as a sequence of two figures related by conjunctions:

if such a hearing happens
then justice will be miscarried.

However, the logical metaphor of 'relation as process' incorporates more than simply consequence. First, the probability of the result is graded as ***likely*** *to lead* (in contrast to high probability *will* ***certainly lead*** or low probability *will* ***possibly*** *lead*). Second, the necessity of the consequence is also graded lexically as *lead to* (in contrast to the stronger *result in* or weaker ***associated*** with).

Therefore, one of the reasons why writers use logical metaphors for conjunctions is that they can grade their evaluation of relations between events or arguments. This is a crucial resource for reasoning in fields such as science or politics, in which it is important not to overstate causal relations until sufficient evidence has been accumulated. This function of logical metaphors is oriented to engagement of the reader.

On the other hand, logical metaphors combine with experiential metaphors to package activity sequences as manageable chunks of information. This function of logical metaphors is oriented to periodicity. For example, this figure is one step in the argument that Tutu is advancing:

The Act required that the application should be dealt with in a public hearing
unless **such a hearing was likely to lead to a miscarriage of justice**
(for instance, where witnesses were too intimidated to testify in open session).

In this sequence, a passive clause is used to start the message with *the application* and end with *a public hearing*. The *public hearing* is then the starting point for the next message (*such a hearing*), which ends with *a miscarriage of justice*. This is what is exemplified in the next step. This sequencing of information is shown as follows:

The Act required that the application should be dealt with in **a public hearing**

unless **such a hearing** was likely to lead to **a miscarriage of justice**

(**for instance,** where witnesses were too intimidated to testify in open session).

The logical metaphor (*is likely to lead*) enables the sequence of cause (*such a hearing*) and effect (*a miscarriage of justice*) to be packaged as chunks of information within a single message.

Conjunction as Circumstance Another common motif in abstract or technical writing is to present a logical relation as a circumstance:

Is	*amnesty*	*being given*	*at the cost of justice being done?*
	participant	process	circumstance (accompaniment)

The logical meaning of *at the cost of* is concessive purpose ('without'), giving the following sequence:

Is amnesty being given
without justice not being done?

Again, this strategy enables a sequence of two activities to be packaged as a single figure, with *amnesty* as one chunk of information and the circumstance as another. However, Tutu's rhetorical strategy here also includes other layers – the lexical metaphor *at the cost of* implies a balance sheet, in which income (*amnesty*) is weighed against expenditure (*justice*). So reconstruing a sequence using this metaphor adds layers of meaning to the question.

Conjunctions as Things and Qualities Conjunction can also be reconstrued as a thing or quality. The following are examples of conjunction as a thing:

conjunction ⟶	**thing**
before	the first time
then	sequel
so	reason, result, consequence
thus	conclusion
by	a means to
if	condition

The following are examples of these conjunction-as-things in discourse, and their alternative realization as a sequence:

Time
Many of those in the security forces who have come forward had previously been regarded as respectable members of their communities.
It was often **the very first time** that their communities and even sometimes their families heard . . .
Before they came forward
their communities and even sometimes their families had not heard . . .

Consequence
Conjunctions have an important role in letting us know what to expect at each step of a discourse.
This is **one reason** they tend to come at or near the start of each sentence in English.
Conjunctions let us know what to expect
so they tend to come at or near the start of each sentence in English.

Means
Amnesty didn't matter.
It was only **a means** to the truth.
The truth would come out
by amnesty being given.

Condition
The only **conditions** for gaining amnesty were:
The act for which amnesty was required should have happened between 1960 . . . and 1994
The act must have been politically motivated . . .
The applicant had to make a full disclosure . . .
The rubric of proportionality had to be observed . . .
Amnesty is gained:
if the act happened between 1960 and 1994
if the act was politically motivated
if applicant made a full disclosure
if the rubric of proportionality was observed

In each case, the logical metaphor allows other meanings to be incorporated. Logical metaphor enables 'logical things' to be numbered, described, classified, and qualified:

the **very first** time
one reason
only a means
the **only** conditions . . . 1 . . . 2 . . . 3 . . . 4

On the other hand, reconstruing conjunction as qualities means they can be used to modify things or processes:

conjunction ⟶	**quality of thing or process**
so	resulting action
by	enabling action
in fact	actual size
thus	conclusively proven
then	subsequently shown
before	previously regarded
if	conditionally approved

Here is an example of 'conjunction-as-quality':

Many of those in the security forces who have come forward had **previously been regarded** as respectable members of their communities.

This could be unpacked as follows:

Many of those in the security forces who have come forward were regarded as respectable members of their communities **before** they came forward.

How much we choose to unpack ideational metaphors in discourse analysis will depend on our purposes. We have seen two advantages of unpacking experiential and logical metaphors. One is that by paraphrasing highly metaphorical discourse in a more spoken form, we can show learners how it means what it does and also design curriculum that leads from more spoken to more written modes. Another is that we can recover participant roles and logical arguments that tend to be rendered implicit by ideational metaphor. This can be a powerful tool for critical discourse analysis, revealing implicit nuclear relations, such as agency and effect, and implicit logical relations, such as cause and effect.

See also: Aristotle and the Stoics on Language; Discourse Semantics; Ideational Theories of Meaning; Metaphor and Conceptual Blending; Metaphor: Philosophical Theories; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Metaphors in English, French, and Spanish Medical Written Discourse; Metaphors in Political Discourse; Mood and Modality in Grammar; Nominalization; Speech; Grammaticalization; Systemic Theory; Word Classes/Parts of Speech: Overview.

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Metaphysics, Substitution *Salva Veritate* and the Slingshot Argument

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Metaphysics and Language: Facts, Propositions and 'MCT Operators'

There are lots of examples of metaphysical conclusions being drawn on the basis of linguistic phenomena. Philosophers have tried to prove the metaphysical conclusion that a benevolent all-powerful God exists on the basis of claims about what 'God' means. Others have looked at tense in language and drawn conclusions about the metaphysics of time. This article presents a more technical kind of linguistically based argument, about the metaphysics of facts, propositions and modal/causal/temporal properties – an argument whose claims are especially important in the present context because of their implications for linguistic semantics.

The article is structured as follows. In this section, I first introduce two key metaphysical views: about facts and about factlike propositions. I then introduce, also in this section, some seemingly plausible hypotheses about modality, causation, and temporal order. These are the metaphysical views which will be attacked on linguistic grounds. In the next section I explain what substitutivity principles are, and survey three different kinds of substitutivity and nonsubstitutivity. Such principles clarify the linguistic phenomena that will be used to attack the metaphysical views. The first two sections essentially introduce crucial background material for the argument. In the third section, I then describe the modest means deployed in attacking the metaphysical targets: the slingshot argument. I end by noting some standard replies to this language-based argument.

I begin with facts. It seems natural enough to think of the world as not being exhausted by the objects in it. That is, to list all the objects in the world is not to say all there is to say about it: one also wants to know what properties the objects have, and what relations they stand in, etc. And to say all that, is seemingly to describe **facts**. It's also tempting to think that facts consist of complexes of ordinary, everyday objects, properties, relations, etc.; to invent a label, it is tempting to think that facts are 'world bound.' The first view that the

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The article is structured as follows. In this section, I first introduce two key metaphysical views: about facts and about factlike propositions. I then introduce, also in this section, some seemingly plausible hypotheses about modality, causation, and temporal order. These are the metaphysical views which will be attacked on linguistic grounds. In the next section I explain what substitutivity principles are, and survey three different kinds of substitutivity and nonsubstitutivity. Such principles clarify the linguistic phenomena that will be used to attack the metaphysical views. The first two sections essentially introduce crucial background material for the argument. In the third section, I then describe the modest means deployed in attacking the metaphysical targets: the slingshot argument. I end by noting some standard replies to this language-based argument.

I begin with facts. It seems natural enough to think of the world as not being exhausted by the objects in it. That is, to list all the objects in the world is not to say all there is to say about it: one also wants to know what properties the objects have, and what relations they stand in, etc. And to say all that, is seemingly to describe **facts**. It's also tempting to think that facts consist of complexes of ordinary, everyday objects, properties, relations, etc.; to invent a label, it is tempting to think that facts are 'world bound.' The first view that the

slingshot calls into question, however, is precisely that there are such world-bound facts, in the plural. Instead, the argument seeks to show that, if facts are made up of commonplace worldly things, there can be at most one 'giant' one. To be clear about the metaphysical target, it is not the very idea of facts that would have to go, for there are alternative accounts of facts which, at first glance anyway, are not threatened by the slingshot. But those accounts of facts face difficulties of their own – difficulties which world-bound facts, facts as complexes of ordinary things, are not subject to. First, as will emerge below, a rose by any other name would smell as sweet. This suggests that the fact that the rose smells sweet has the rose itself in it, not some way of linguistically describing the rose. Second, part of the point of introducing facts and the like is to see how something distinct from a sentence can serve as the sentence's meaning, hence, we can't have every linguistic change in the sentence giving rise to a different fact (or factlike thing). (Strawson, 1950 made this point early on.) Third, we want the same fact (or factlike thing) to give the meaning of sentences in different languages, which again means that a mere change in the word used ought not change the proposition denoted – otherwise 'It's raining' and 'Está lloviendo' could end up denoting different things. (I'll return to this at the end of the article.) All of these points suggest that facts are world bound. But, as we shall see, reflection upon language – and especially upon substitutivity principles – makes it hard to see how they could be.

This takes us to a related point. Positing facts often goes along with the idea that factlike things can serve as the denotations of sentences. For instance, 'Ottawa is the capital of Canada' might be taken to stand for something like the fact that Ottawa is the capital of Canada. And 'Abe Lincoln was assassinated' might be taken to denote the fact that Abe Lincoln was assassinated. Of course, it can't really be facts *per se* that are sentence denotations, because false sentences are meaningful, and they cannot stand for facts. (For example, what fact could 'Toronto is the capital of Canada' stand for, given that Toronto is not the capital? There simply is no such fact.) Still, something factlike might do the trick: sentence denotations could be taken to be propositions. But the slingshot argument, in attacking facts in the plural, equally calls into question the idea that sentences stand for factlike things: if the argument succeeds, there are no such things, facts or propositions, in the plural, that sentences could denote. Again, there can be at most one thing denoted by all true sentences. And, patently, no one thing may serve as the meaning of such diverse sentences as 'Abe Lincoln was assassinated,' 'Ottawa is the capital of Canada,' 'Russia is bigger than Uruguay,' etc.

So, one metaphysical idea is that facts are complexes built from commonplace objects, properties and relations. Another is that propositions exist independently of language, and are what sentences stand for. Each of these has been argued to fall prey to the 'slingshot.' Another metaphysical view under attack has to do with notions such as necessity, possibility, causation, and temporal order. (Call these 'MCT properties,' for modal-causal-temporal.) At first glance, it seems that whether an object has an MCT property does not depend upon what the object is called. Call this its 'first feature.' Just as the rose smells sweet under any name, the rose is **necessarily** a flower no matter what it's called; and its thorns **caused** this little cut on my hand, no matter what it's called; and it bloomed **before** July 1, no matter what it's called. MCT properties, that is, seem to be sensitive to the nature of the thing itself, not to how we speak about it. Even more obviously, just because one object has the property of being necessarily a flower, it doesn't follow that every object does. And just because something caused that cut on my hand doesn't mean that any old thing did. Similarly for temporal order: that the rose bloomed before July 1 doesn't entail that anything you wish to pick happened before July 1. Call that its 'second feature.' Curiously, the slingshot argument has been used to show that, given an added complication about logical equivalence that will be explained below, these two supposed features of MCT properties can't both apply. If we insist that not every truth is necessary, that not every event caused such-and-such, that not every event is temporally prior to so-and-so, then we must grant that whether something has an MCT property depends on what name is used for it. In this latter respect, MCT properties must be radically different from smelling sweet. (Terminological note: In what follows, I'll speak of 'operators' when I mean 'words that either modify one sentence, or connect two sentences.' Thus all of 'necessarily,' 'possibly,' 'because' and 'before' are operators in my sense. Note also that the results to be discussed do not merely apply to words that modify and connect sentences: the arguments presented could easily be extended to expressions that combine sentences with subsentences, e.g., '[$_S$ Juana died] before [$_{NP}$ the American Civil War]' combines a sentence with a noun phrase. To keep things simple, however, I will focus on operators combining or modifying sentences.)

Substitution *Salva Veritate*

I have quickly canvassed three targets of the slingshot: world-bound facts, the proposition as sentence

meaning, and the claim that MCT properties have the two features introduced just above. Eventually I will explain how technical points about substitutivity *salva veritate* – the second element in the article's title – can be used to call facts *et al.* into question. But I need to start with what substitution *salva veritate* is, the varieties of substitutional contexts (i.e., for singular terms and for sentences), constraints on such substitution, etc.

I will begin with substitutivity of singular terms. Shakespeare famously said that a rose by any other name would smell as sweet. This certainly seems right: you don't change the smell of a rose just by renaming it. We can put his point about roses less eloquently as: 'You may substitute any coreferential name for "This rose" in "This rose smells sweet" and preserve truth.' Though wordy, this also seems right, and for just the same reason: a name change doesn't yield an odor change. Nor is '—— smells sweet' an isolated example. A dog by any other name would weigh just as much, would have the same number of hairs, would have the same size ears, etc. This is substitution *salva veritate*: 'substitution while preserving truth.'

Interestingly, not all contexts are like '—— smells sweet' or '—— weighs 28lb.' Sometimes when you change the label of an object, you don't preserve the truth of the whole sentence. Consider an example adapted from W. V. O. Quine:

(1) Andre the Giant was so called because of his size

(2) André Roussimoff was so called because of his size

Sentence (1) is true: the famous wrestler adopted that name precisely because he was so big. But sentence (2) is false. Surprisingly, this is the case even though 'Andre the Giant' and 'André Roussimoff' refer to the very same person. So, unlike roses and being sweet smelling, a wrestler by any other name would not automatically be so called because of his size; if he happens to have the property of being so called because of his size under all of his names, that would be the merest coincidence.

Of course what's special and different about '—— was so called because of his size' is that it explicitly makes reference **to the name** of the person being discussed: this curious predicate applies to linguistic things, i.e., names, not (just) to the person herself. That's why you can't put in any name you like for Andre in (1): because the sentence talks about words, specifically about names. We can see this point still more clearly with quotation marks. As it happens, the city of Toronto is also known as Hog Town. These two names refer to the same place. (Toronto used to be a major center for pork processing.) Yet (3) is true, while (4) is false:

(3) 'Toronto' contains exactly three vowels

(4) 'Hog Town' contains exactly three vowels

In this case it should be no surprise that you cannot substitute coreferring names in the context '"——" contains exactly three vowels,' because this predicate is obviously about the name, not about its referent. In contrast, '—— smells sweet' does not make reference to the linguistic item employed, but is instead wholly about the flower – that's why you can substitute whatever name you like. And '—— is so called because of his size' makes reference to both the denotation and the name: it's Andre the man who is being discussed, but 'so called' makes reference to his name as well. In sum, we have contexts which don't allow substitution of coreferring names *salva veritate* (both the kind which is just about words, as in quotation mark contexts, and the kind which is about words and nonwords, as in '—— was so called'), and contexts which do allow substitution *salva veritate* (the '—— smells sweet' and '—— weighs 28lb' kind).

The excursus into substitution principles continues. I've considered one kind of thing that can be substituted, namely singular terms. And I've considered one constraint on truth-preserving substitution, namely that the predicate apply to the thing denoted, not to the words that denote. Another kind of substitution deals not with names (such as 'Andre' and 'Toronto'), but rather with sentences. In some linguistic contexts, you can preserve truth by substituting sentences that have the same truth value. This works, for instance, with 'and,' 'or,' and the other truth functional connectives familiar from classical logic. To take one example, sentence (5) is true because both of its conjuncts are true. And since (6) is true as well, sentence (7) must be true, precisely because (7) results merely from substituting the true sentence (6) in for the second conjunct of (5).

(5) Ottawa is the capital of Canada and Toronto is west of Ottawa

(6) Vancouver is west of Edmonton

(7) Ottawa is the capital of Canada and Vancouver is west of Edmonton

But many linguistic contexts don't preserve truth when one interchanges sentences that happen to have the same truth value. Take 'Just about everyone knows that ——.' Sentence (8), when embedded in this context, yields the true (9):

(8) Two plus two is four

(9) Just about everyone knows that two plus two is four

Now, sentences (6) and (8) have the same truth value: they are both true. Yet if we substitute (6) for (8), in 'Just about everyone knows that ——,' the result is (10), which is not true. Canada's geography just isn't that widely known.

(10) Just about everyone knows that Vancouver is west of Edmonton

So, unlike in the case of 'and,' we can go from the true (9) to the false (10) by substituting one true sentence for another. Thus, truth is **not** preserved under substitution, in the scope of 'Just about everyone knows that ——.' This provides an example of not being able to substitute material equivalents *salva veritate*.

One last substitution principle. There are some contexts which allow substitution of logically equivalent sentences *salva veritate*. One example is 'entails.' Any two sentences which are logically equivalent entail the same things. Thus given the truth of (11) and the logical equivalence of (12) and (13), one can derive (14) by substitution.

(11) That it's not the case that either Clinton is dead or Bush is dead entails that it's not the case that Clinton is dead

(12) It's not the case that either Clinton is dead or Bush is dead

(13) It's not the case that Clinton is dead and it's not the case that Bush is dead

(14) That it's not the case that Clinton is dead and it's not the case that Bush is dead entails that it's not the case that Clinton is dead

But not all verbs are like this. Consider words like 'know,' 'believe,' 'expect' and so on – so-called propositional attitude verbs. Not only can one not automatically substitute true-for-true sentences, while preserving the truth of the whole, one cannot even substitute a **logically equivalent** sentence while guaranteeing truth. One way to see this is to consider that there are extremely complicated, and also very simple, ways of expressing claims which are logically equivalent. Put in the simple way, a child might know that the claim is true; but put in the extremely complex way, he might not. For instance, little Billie, a five-year-old, might expect that it will snow in January. That's simple enough for a child that age. But (15) is logically equivalent to the very complex (16):

(15) It will snow in January

(16) $\{x: x = x$ & It will snow in January$\} = \{x: x = x\}$

Now, Billie might well expect the former, yet not at all expect the latter.

Since logical equivalence of sentences of the form (15) and (16) will play a key role below, let me say rather more about it. Take '$\{x: x$ is an odd number less than 27$\}$' as an example. It refers to a set – specifically, a certain set of odd numbers. For what follows, it's helpful to think of belonging to a set as involving meeting, or failing to meet, one or more conditions. For instance, an object belongs to $\{x: x$ is an odd number less than 27$\}$ if it is both an odd number, and less than 27. An object fails to belong to the set if it fails to meet either of these. Taking membership to involve meeting or failing to meet conditions, consider now the set $\{x$: Ottawa is the capital of Canada$\}$. At first glance this looks like an odd set, but the general rule still applies: an object belongs to this set if it meets the condition that Ottawa is the capital of Canada. Now, since every object meets that condition, every object belongs to that set. With this in mind, consider the first half of (16). This phrase stands for the set of xs such that x is self-identical and it will snow in January. So, there are two conditions that must be met by an object, in order for it to be in the set: the object must be self-identical, and it must be the case that it will snow in January. The first condition is trivially satisfied by every object, however. So, in a way parallel to $\{x$: Ottawa is the capital of Canada$\}$, whether an object gets into the set depends wholly upon whether it will snow in January: if it will snow in January, every object meets the two conditions for inclusion; if it will not snow in January, no object meets them. In this way, '$\{x: x = x$ & It will snow in January$\}$' comes to denote the set of all individuals, if it will snow in January. Now, the set of all individuals is also, of course, what '$\{x: x = x\}$' denotes. So the statement of their numerical identity, i.e., (16), is true if it will snow in January. On the other hand, if it won't snow in January, then '$\{x: x = x$ & It will snow in January$\}$' denotes the null set: no object satisfies the two conditions for inclusion in this set, viz., that it be self-identical and that it will snow in January. Hence, if it won't snow in January, the statement of identity between '$\{x: x = x$ & It will snow in January$\}$' and '$\{x: x = x\}$' is false: the empty set, which is what the left-hand side of the equation would denote, does not equal the set of all objects, which is what the right-hand side denotes.

In short, the two sentences (16) and 'It will snow in January' are true and false together in every circumstance. So, they are logically equivalent. Nevertheless, Little Billie, I said, may well expect that it will snow in January; but, surely, it's not the case that little Billie expects that the set whose members are such that they are self-identical and it

will snow in January is identical with the set whose members are self-identical! So, substitution of (16) for the logically equivalent (15), in the scope of 'expects that ——,' does not necessarily preserve truth. If truth is preserved, it's because of a mere coincidence, namely that the person just happens to expect both things.

So, we have sentence operators like 'and' that allow substitution *salva veritate* of merely materially equivalent sentences – i.e., of sentences which just happen to have the same truth value. And we have sentence operators like 'know' and 'expect' that don't allow that kind of substitution, and don't even allow substitution of logically equivalent sentences. This completes my explanation of substitution *salva veritate* of sentences. We also surveyed substitution of singular terms. Many contexts allow this: '—— weighs 28 lb' and '—— smells sweet.' Some do not: '—— was so called because of his size.' The next step is to put the notion of substitution *salva veritate* to work.

The Argument: The Slingshot Itself

Let's take stock. In the first section we encountered three metaphysical views. The first two involved facts and factlike propositions: that facts are made up of objects, properties, and relations, that factlike propositions exist and serve as the meanings of natural language sentences. The third involved MCT properties having two features: of applying to objects themselves, and not applying to all truths.

Given the concepts introduced above, we can now rephrase this third metaphysical view, and add a third presumption about logical equivalence:

i. Coreferential singular terms may be substituted one for another within the scope of MCT words without altering the truth of the whole sentence;
ii. Logically equivalent sentences may be substituted one for another within the scope of MCT words without altering the truth of the whole sentences.

But

iii. Sentences which are merely materially equivalent – i.e., which just happen to have the same truth value – may not be so substituted.

To introduce one last piece of terminology, this is to say that MCT words aren't hyperintensional (i.e., they meet both (i) and (ii)) but they also aren't transparent (i.e., they meet (iii)).

Before providing the language-based argument that none of these metaphysical views are really true, let's quickly recall why it matters. What is attractive about the first two metaphysical views? Why worry about giving them up? First, as stressed above, a rose by any other name would smell as sweet. Second, we can't have every linguistic change in the sentence giving rise to a different proposition. Third, and related to the second, we want the same proposition to give the meaning of sentences in different languages. And why is it attractive to say that MCT words satisfy (i)–(iii)? Well, it would seem that 'necessarily,' 'possibly,' and other modal modifiers would allow substitution fairly freely, since, as noted, they don't (seem to) apply to linguistic items. Like '—— smells sweet,' these terms seem to be entirely about things, not at all about words. It's Shakespeare's rose point once again. For example, starting with modal operators, if Andre the Giant was necessarily a human being (and it seems that he was), then André Roussimoff was necessarily a human being too: it doesn't matter what name we use for him, **he** is just as necessarily human. Similarly for causal operators: if Andre the Giant died because he had a heart attack, then André Roussimoff died because he had a heart attack. The phrase '—— died because he had a heart attack' is about the person alone, regardless of how that person is denoted. Nor, turning to the temporal 'before,' could Andre the Giant die before Clinton was president, while André Roussimoff did not. As with 'because,' 'before' just doesn't seem to work like '—— was so called because of his size' and '"——" contains exactly three vowels.' It seems to work like '—— smells sweet' and '—— weighs 28lb.' It is this kind of reasoning which supports the claim that 'necessary,' 'possibly,' 'before,' and 'because' meet condition (i): coreferring singular terms may be substituted one for another, within the scope of **these** words, without altering the truth of the whole sentence. Moreover, unlike 'know,' 'expect,' and 'believe,' logically equivalent facts are either both necessary, or both not necessary, either both possible, or both not possible, either both before a certain event, or not. Thus, MCT words meet (ii) as well. So, these operators do allow substitution of the first two kinds – they are not hyperintensional. Yet, or so it would seem, you can't substitute any old true sentence for 'Andre the Giant is human' in 'It is necessary that Andre the Giant is human': substitution of material equivalents is not sanctioned in the scope of modal modifiers. Nor can you substitute any old true sentence for 'André Roussimoff died of a heart attack' in 'André Roussimoff died of a heart attack before Clinton was president'; nor in 'Little Billie cried because André Roussimoff died of a heart attack.' So MCT words meet (iii) too. (One might sum up by saying that MCT words are a mite

promiscuous in terms of what substitutions they'll allow, but it's not a free-for-all either.)

Despite their attractiveness, however, and contrary to a once widely assumed semantics, if the slingshot argument works, MCT words either must not allow substitution of coreferring names or logically equivalent sentences, or they must allow substitution of sentences that just happen to be true together. And, despite the attractions of the metaphysical views, there can be at most one world-bound fact, and it patently cannot serve as the meaning of all sentences!

The argument, at last. As the title of this article suggests, the 'slingshot' in question is not a Y-shaped frame spanned by an elastic; it is, instead, an argument. It was dubbed 'the slingshot' by Jon Barwise and John Perry, because it "is so small, seldom encompassing more than half a page, and employs such a minimum of ammunition" (Barwise and Perry, 1981: 398). Moreover, like the eponymous Y-shaped frame, it can, despite its modest make-up, be used to attack some very significant foes.

I will present the argument in two stages. First, I will give it in the abbreviated format one often encounters in journal articles and such. Second, I will offer a more extended version of the argument.

As Barwise and Perry (1981) and Neale (1995) both note, variations on the argument, in its very brief form, seem to have been first formulated independently by Alonzo Church (1943: 299–300, 1956: 24–25) and Kurt Gödel (1944: 128–129). But I will focus on the best-known variant of the argument, that due to Donald Davidson (1967a: 19). Since his presentation of the argument is especially condensed, and has left so many readers puzzled, I will cite it in full, and then try to explain it. (NB: I have altered Davidson's numbering, and his logicomathematical notation, to bring it in line with what appears above.)

Davidson writes:

> The difficulty follows upon making two reasonable assumptions: that logically equivalent singular terms have the same reference, and that a singular term does not change its reference if a contained singular term is replaced by another with the same reference. But now suppose that '*R*' and '*S*' abbreviate any two sentences alike in truth value. Then the following four sentences have the same reference:
>
> (a) R
> (b) $\{x: x = x \ \& \ R\} = \{x: x = x\}$
> (c) $\{x: x = x \ \& \ S\} = \{x: x = x\}$
> (d) S
>
> For (a) and (b) are logically equivalent, as are (c) and (d), while (c) differs from (b) only in containing the singular term '$\{x: x = x \ \& \ S\}$' where (b) contains '$\{x: x = x \ \& \ R\}$' and these refer to the same thing if S and R are alike in truth value (Davidson, 1967a: 19).

As two generations of students can attest, this argument goes by very quickly. It is the 'slingshot' in its purest form. The first two sentences of the quotation essentially lay out, though in rather different terminology, conditions (i) and (ii) above. This is obscured by two things. First, because of the context in which he is writing, Davidson doesn't explicitly limit his claims to sentences occurring within the scope of words like 'necessarily,' 'possibly,' 'before,' and 'because.' (For a variant of the argument which is more explicitly restrictive along those lines, see Davidson, 1967b: 152–153, and also Davidson, 1969: 42.) Second, the relation between these first two sentences and conditions (i) and (ii) is obscured by the fact that Davidson is here assuming, for the sake of argument, that **sentences refer**, and hence just are a special kind of singular term; and that they refer specifically to **truth values**. Thus, when he says "a singular term does not change its reference if a contained singular term is replaced by another with the same reference," this entails (i) as a special case: the special case where the containing 'singular term' is a sentence, and the contained singular term is a name. And when he says "logically equivalent singular terms have the same reference," this yields, given his dictum about constant reference for the whole given constant reference of the parts, (ii): that logically equivalent sentences may be substituted, *salva veritate*, within larger sentences. Thus Davidson is here arguing that, despite appearances, any operator Φ, if it permits substitution of coreferential singular terms and substitution of logical equivalents within its scope, also permits substitution of sentences which are merely materially equivalent, i.e., which simply happen to share the same truth value. That is, using the terminology introduced above: if Φ is not hyperintensional, then it is transparent.

Let's now unpack this. As I reconstruct it, the slingshot argument consists of two assumptions – which together essentially say that Φ is nonhyperintensional – plus three 'lemmas' based on logical relations. The assumptions are:

A1. Substitution of **coreferential singular terms** in the scope of Φ will not change the truth value of the whole.
A2. Substitution of **logically equivalent sentences** in the scope of Φ will not change the truth value of the whole.

The first two lemmas state logical equivalences:

L1. The sentence '$\{x: x = x \ \& \ R\} = \{x: x = x\}$' is logically equivalent to 'R.'

Proof: If 'R' is true, then the left-hand side of the equation refers to the set of all individuals, because

everything is such that it is self-identical and R obtains. And that's what the right-hand side refers to as well. So, the equation as a whole is true, if 'R' itself is true. If 'R' is false, then the left-hand side of the equation refers to the empty set: if 'R' is false then nothing is such that it is self-identical and R obtains. But that's not what the right-hand side refers to: the right-hand side still refers to the set of all individuals. So, the equation as a whole is false, if 'R' is false. Thus the two sentences are logically equivalent.

L2. The sentence '$\{x\colon x = x \ \& \ S\} = \{x\colon x = x\}$' is logically equivalent to 'S.'

Proof: Same as for L1.

The third lemma establishes a coreference relation:

L3. The singular term '$\{x\colon x = x \ \& \ R\}$' is coreferential with the singular term '$\{x\colon x = x \ \& \ S\}$.'

Proof: Given that both sentences 'S' and 'R' are true, both of the singular terms in L3 refer to the set of all individuals. That is, everything is such that [it is self-identical and R]; and everything is such that [it is self-identical and S].

From the two assumptions about the nonhyperintensionality of Φ, and making use of the three lemmas about set theoretic relations, we will derive that Φ is transparent. The derivation, in effect, takes us to $\Phi(S)$ from $\Phi(R)$, for any two true sentences. This will show that mere material equivalence is, despite appearances, sufficient for substitution *salva veritate* within the scope of nonhyperintensional operators such as Φ. Thus, the general result is that if a context isn't hyperintensional, it is transparent.

The derivation runs as follows. We start with (17):

(17) $\Phi(R)$

Given A2 and L1, we can substitute '$\{x\colon x = x \ \& \ R\} = \{x\colon x = x\}$' for the logically equivalent 'R' in (17) while preserving truth. This yields:

(18) $\Phi(\{x\colon x = x \ \& \ R\} = \{x\colon x = x\})$

Given A1 and L3, we don't alter the truth value of (18) by substituting '$\{x\colon x = x \ \& \ S\}$' for the coreferential singular term '$\{x\colon x = x \ \& \ R\}$': these singular terms refer to the same set, i.e., the set of all objects, and we may thus substitute one name for the other. We may thus move from (18) to (19):

(19) $\Phi(\{x\colon x = x \ \& \ S\} = \{x\colon x = x\})$

Now, the final step in deriving $\Phi(S)$ from $\Phi(R)$ is the appeal to logical equivalence once again. Given A2 and L2, we can derive our desired target sentence (20) from (19):

(20) $\Phi(S)$

Being derivable in this way, (20)'s truth value must be the same as the original (17). The upshot is that if assumption 1 and assumption 2 are true with respect to a modifier/connective Φ (i.e., if Φ is not hyperintensional), then (20) may be derived from (17), for **any** true sentences 'R' and 'S.' Hence Φ, insofar as it's not hyperintensional, does allow substitution of material equivalents after all: it is a transparent operator.

It's worth stressing: Such a derivation can be constructed for **any** connective or modifier meeting conditions (i) and (ii): 'necessarily,' 'possibly,' 'before,' and 'because,' but also 'the fact that ——— caused little Billie to cry' and 'the sentence "It will snow in January" stands for the proposition that ———,' and so on. So, the result isn't merely about MCT properties – the third metaphysical view of the three surveyed in the first section – but includes the broader ones that there can be at most one world-bound fact, and that sentences cannot have factlike items as their denotations. Given the importance of these broader results, let us revisit the points in detail.

Aiming the Slingshot at Facts, and Factlike Things

Davidson and others have found the technical result important because they take it to show that sentences cannot stand for 'facts,' or factlike things. Or, more precisely, they cannot when facts are taken to be complexes of ordinary objects, properties, and relations. Indeed, they take it to show that such facts in the plural simply do not exist. The connection between the just-presented technical result and these broader theses is this: if there were multiple world-bound facts, and if sentences stood for them (or something like them, e.g., propositions), then expressions of the form (21) and (22) would have to meet conditions (i)–(iii). But we have just seen an argument that no expression can do this.

(21) The fact that Ottawa is the capital of Canada is different from the fact that ———

(22) 'Ottawa is the capital of Canada' stands for the proposition that ———

Here is the argument specifically against propositions, as I reconstruct it. (It should be straightforward to run the same sort of argument with respect to (21) and facts.) According to the view under consideration, which has facts/propositions containing ordinary objects and such, you don't change from one proposition to another just by changing the name of the thing described. (As noted above, there are other ways of thinking about facts, and factlike things such as propositions, but the view that facts contain

commonplace objects is the most intuitive for reasons already sketched.) Thus, changing the name only matters when the claim is actually about words, as in (1) and (3) above – and claims can't always be about words; facts and propositions are to be autonomous from sentences. These provide good reasons why facts and propositions should be world bound, which in turn entails that the context in (22) must allow substitution of coreferring singular terms. For quite similar reasons, it seems that two sentences which 'say the same thing,' but in different words, shouldn't correspond to distinct facts/propositions; hence logically equivalent sentences should, it may seem, be substitutable in (22) without altering the truth of the whole. In this way we support variants on A1 and A2, here applied to the case (22). But once we have these two premises we can derive, using the argument above, that truth is retained if we substitute any true sentence.

Let's walk through the derivation with an example, namely (23):

(23) 'Ottawa is the capital of Canada' stands for the proposition that Ottawa is the capital of Canada

Suppose (23) is true, as it surely must be if sentences stand for factlike things. Given the logical equivalence of '$\{x: x = x \ \& \ S\} = \{x: x = x\}$' with S itself, for any sentence S, by A2 it follows that:

(24) 'Ottawa is the capital of Canada' stands for the proposition that $\{x: x = x$ & Ottawa is the capital of Canada$\} = \{x: x = x\}$

Given that the singular term '$\{x: x = x \ \& \ S\}$' is coreferential with the singular term '$\{x: x = x \ \& \ R\}$,' as long as R and S are both true, we can apply this generalization to 'Ottawa is the capital of Canada' and 'André Roussimoff died of a heart attack' (both of which are true) to establish that:

(25) '$\{x: x = x$ & Ottawa is the capital of Canada$\}$' is coreferential with the singular term '$\{x: x = x$ & André Roussimoff died of a heart attack$\}$'

Now, we apply substitution of coreferring singular terms to (24). The result of substituting '$\{x: x = x$ & André Roussimoff died of a heart attack$\}$' for '$\{x: x = x$ & Ottawa is the capital of Canada$\}$' is:

(26) 'Ottawa is the capital of Canada' stands for the proposition that $\{x: x = x$ & André Roussimoff died of a heart attack$\} = \{x: x = x\}$

The final step is to note that the complex identity statement about sets is logically equivalent to 'André Roussimoff died of a heart attack.' So, using substitution of logical equivalents a second time, now applied to (26), we can derive (27):

(27) 'Ottawa is the capital of Canada' stands for the proposition that André Roussimoff died of a heart attack

In sum, given that facts and propositions are to be language independent in certain ways, '"Ottawa is the capital of Canada" stands for the proposition that ——' should not be hyperintensional. But we can use the slingshot to show that if the context in (22) is not hyperintensional, then it is transparent. That's disastrous, however, because then this sentence 'stands for' any old true proposition! One can run precisely the same argument, beginning with (21), to show that there is only one world-bound fact.

Responses to the Slingshot Argument

It seems, very much contrary to initial appearances, that modal, causal, and temporal words lack at least one of these properties:

i. Coreferential singular terms may be substituted one for another within the scope of these words without altering the truth of the whole sentence;
ii. Logically equivalent sentences may be substituted one for another within the scope of these words without altering the truth of the whole sentences;
iii. Sentences which are merely materially equivalent – i.e., which just happen to have the same truth value – may not be so substituted.

Also, because of substitution patterns like this, we seem also to be forced to give up world-bound facts and factlike propositions as the denotations of sentences. How is a metaphysician to respond?

One simply cannot give up (iii) as a condition on 'the fact that ——' and such. That's because, put in terms of an example, this would allow 'the fact Ottawa is the capital of Canada' to stand for the fact that Toronto is larger than Halifax! There are, however, at least three ways of saving MCT properties, facts, and factlike things such as propositions, in the face of the slingshot: two ways corresponding to (i) and one way corresponding to (ii). I will take them in reverse order.

First, one can reject the idea that logically equivalent sentences really do stand for a single fact, or factlike proposition. This is explicitly suggested by Barwise and Perry (1981). The proposal is that sentences with different subject matters do not stand for the same fact, even if they are true in precisely the same circumstances. Now (15) and (16), though logically equivalent, clearly have different subject matters, since only the latter talks about sets. So these sentences need not be taken to stand for the same fact. Granted, this makes facts, which are supposed to be built from ordinary elements of the world on the world-bound conception, look a bit more like the

linguistic items that stand for them: facts get individuated in terms of meaning-related criteria such as 'subject matter.' However, this need not jeopardize the distinction between sentences and their meanings. For instance, we can still insist that sentences in different languages can stand for the same fact – as long as they have the same subject matter. And we can even insist that sentences made up of coreferential words, put together in the same way, stand for the same fact. Maybe even transformed sentences can stand for the same fact, if the transformation does not alter the subject matter: e.g., 'Moe kissed Juana' might stand for the same fact as 'Juana was kissed by Moe.' One thus saves world-bound facts, and propositions, by rejecting (ii). (It's less obvious that this move allows MCT properties to have the three features we want; but explaining the ins and outs of that would take us too far afield.)

Second, one can reply to the slingshot argument by denying that (i) really applies. This 'it doesn't apply' move can be pursued in two different ways. Those who follow Frege (1892) maintain that you only have the same fact, or proposition, when not just the referent, but also the sense of the name, is the same. Famously, Frege introduced a two-level semantics, with guises-of-things occupying the level of sense, and the things themselves occupying the level of reference. Crucially for present purposes, being the same fact or proposition is supposed by Frege to require being the same at both levels. So, for example, 'Elton John lives in England' and 'Reg Dwight lives in England' don't really correspond to the same proposition, because the two names differ in sense – even though these two names do refer to the same singer. This is to say that (i) 'doesn't apply' in the sense that it's **false**: coreferring singular terms can give rise to different facts/propositions. It should be clear that making this reply forces one to give up the world-bound conception of facts and factlike things. It is now not objects themselves, but objects described one way or another, that become the components of facts and propositions. This notion of proposition, with different propositions corresponding to the same referents arranged in the same way, is safe from the slingshot. As is the associated notion of fact. For this notion of fact/proposition allows one to reject substitution of coreferential singular terms in the contexts in question – and without that, the slingshot argument cannot get going.

Many contemporary philosophers find this Fregean approach unacceptable, however, for reasons already sketched: it seems like it's the rose itself which smells sweet, not the rose under a guise; and it's the man himself who died of a heart attack; and so on. So it seems, there should be no more to facts than perfectly ordinary objects, properties and relations. Not wanting to abandon the world-bound conception of facts, their alternative response to the slingshot argument is to insist that (i), though it is true, cannot be used as the proponent of the slingshot wishes to, because things like '{x: $x = x$ & André Roussimoff died of a heart attack}' aren't really singular terms. It is in this sense that condition (i) doesn't apply. As Russell (1905) insisted, say these theorists, such expressions are complex definite descriptions whose role is quantificational, not referential: 'the set of objects such that . . .' (which is what this mathematical expression actually means), is not namelike; it is instead more like the quantifiers 'every set of objects such that . . .' and 'some set of objects such that . . ..' And condition (i) above, along with A1, which derives from (i), do not say anything about being able to substitute quantificational expressions *salva veritate*: A1 and (i) only apply to expressions whose function is to pick out an object, without describing it. Put in terms of examples, while it's quite true that 'Elton John is a singer' and 'Reg Dwight is a singer' both stand for the same fact, since these involve two genuine names for the entertainer, it nevertheless is not the case that the description-involving sentences 'The Queen of England lives in London' and 'Canada's head of state lives in London' stand for the same fact. Descriptions do not 'merely pick out the object.' Indeed, say these followers of Russell, what the sentence containing 'the Queen of England' really means is: There exists exactly one queen of England, and every queen of England lives in London. Crucially, therefore, the introduction of things like '{x: $x = x$ & André Roussimoff died of a heart attack}' takes us out of the realm of names (where [i] and A1 apply), and into the realm of descriptions (where they don't). Thus, when one appeals to A1 *et al.* – to move from (18) to (19) in the general case, and from (24) to (26) in the specific case of '"*S*" stands for the proposition that ——' – a fallacy is committed. (Neale, 1995, following Gödel, 1944, gave roughly this reply to the slingshot. Barwise and Perry, 1981 made related points.)

To summarize, then, the slingshot is an argument that deploys very modest machinery to take on several very important metaphysical views. The views include the two broad ones, that there are world-bound facts in the plural, and that what sentences stand for are factlike things, and a related more technical view about what kind of sentence-modifying and sentence-connective operators there can be. The key move in the argument is to start with an arbitrary sentence containing '*R*' and one of the problematic operators ('necessarily,' 'before,' 'because,' 'it's a fact that ——,' etc.), to create a logically equivalent sentence that has

'$\{x: x = x \ \& \ R\} = \{x: x = x\}$' in the scope of the suspect operator. This latter sentence *ipso facto* contains the singular term '$\{x: x = x \ \& \ R\}$,' which, assuming both 'R' and 'S' are true, is coreferential with '$\{x: x = x \ \& \ S\} = \{x: x = x\}$.' Hence, one can deploy the substitution of logical equivalents and the substitution of coreferring singular terms to derive another arbitrary materially equivalent sentence now containing not 'R' but 'S' in the scope of the operator. This shows that if the operator is not hyperintensional, then it's transparent. The three ways to block this argument are (a) to give up substitution *salva veritate* of logical equivalents in the scope of the operator, (b) to follow Frege, and give up substitution *salva veritate* of coreferential singular terms (and with it the world-bound conception of facts) and (c) to insist that substituting expressions of the form '$\{x: x = x \ \& \ R\} = \{x: x = x\}$' is not, in fact, a matter of substituting singular terms, since such expressions are not referential at all, but are instead quantificational expressions.

Pulling back from the details, the slingshot illustrates how careful reflection on a linguistic phenomenon can contribute to debates in metaphysics. In particular, we have taken as our example the role of various principles of substitution *salva veritate* in attacks on facts, propositions, and views about the properties of modal, causal, and temporal properties. The possible replies to the slingshot highlight still further, I think, the importance of linguistic details when discussing metaphysics.

See also: Davidson, Donald (1917–2003); Factivity; Mood, Clause Types, and Illocutionary Force; Russell, Bertrand (1872–1970); Strawson, Peter Frederick (b. 1919).

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Metapragmatics

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There are at least three senses in which it is possible to speak of metapragmatics. The first, the most general and potentially generic one, refers to the theoretical debate on pragmatics and its central concerns, its epistemological foundations, and the definition of its relevant object and scope. Metapragmatics in this sense concerns itself with the criteria of pertinence of the discipline, not to state which is the 'best' pragmatics, but to verify the consistency of the basic assumptions, the definitions of the questions to be asked, and the methods to be adopted.

The second, narrower sense, highlights the conditions that make speakers' use of language possible and effective. The task of metapragmatics in this sense is, above all, to make those conditions explicit. This kind of metapragmatics, which can be related to the problem of the universals of human communication, is transcendental in a Kantian sense inasmuch it deals with the constitutive elements of human knowledge.

The third sense is less ambitious than the other two. It is concerned with the investigation of that area of the speakers' competence that reflects judgments of appropriateness on one's own and other people's communicative behavior. In this sense, metapragmatics deals with the 'know-how' regarding the control and planning of, as well as feedback on, the ongoing interaction.

The metapragmatic level is not just *one* of the metalinguistic levels: on the contrary, it is different from them, as the knowledge it refers to concerns not 'the ability to say' but 'the ability to do' (and the ability to say what one does). The metapragmatic level represents the interface between the linguistic and the extra-linguistic: it enables the language user to relate language and world, by checking the

'$\{x: x = x \ \& \ R\} = \{x: x = x\}$' in the scope of the suspect operator. This latter sentence *ipso facto* contains the singular term '$\{x: x = x \ \& \ R\}$,' which, assuming both 'R' and 'S' are true, is coreferential with '$\{x: x = x \ \& \ S\} = \{x: x = x\}$.' Hence, one can deploy the substitution of logical equivalents and the substitution of coreferring singular terms to derive another arbitrary materially equivalent sentence now containing not 'R' but 'S' in the scope of the operator. This shows that if the operator is not hyperintensional, then it's transparent. The three ways to block this argument are (a) to give up substitution *salva veritate* of logical equivalents in the scope of the operator, (b) to follow Frege, and give up substitution *salva veritate* of coreferential singular terms (and with it the world-bound conception of facts) and (c) to insist that substituting expressions of the form '$\{x: x = x \ \& \ R\} = \{x: x = x\}$' is not, in fact, a matter of substituting singular terms, since such expressions are not referential at all, but are instead quantificational expressions.

Pulling back from the details, the slingshot illustrates how careful reflection on a linguistic phenomenon can contribute to debates in metaphysics. In particular, we have taken as our example the role of various principles of substitution *salva veritate* in attacks on facts, propositions, and views about the properties of modal, causal, and temporal properties. The possible replies to the slingshot highlight still further, I think, the importance of linguistic details when discussing metaphysics.

See also: Davidson, Donald (1917–2003); Factivity; Mood, Clause Types, and Illocutionary Force; Russell, Bertrand (1872–1970); Strawson, Peter Frederick (b. 1919).

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adequacy of utterances with regard to actual contexts. The knowledge it incorporates leaves traces on the surface of discourse.

The different meanings of the term 'metapragmatics,' with their corresponding different objects of study, have an etymological justification, as they can be linked to the different meanings of the prepositon *metá* in Classical Greek: not only 'above' but also 'beyond.' After all, the term 'metaphysics' is based on a misunderstanding: the volumes by Aristotle entitled *Metaphysics* did not transcend and justify his earlier writings on physics but, simply, because of a chance arrangement, 'came after' the ones on physics. The paradox of metapragmatics, and also its potential oxymoron, is that it 'comes after', though reflecting on, a knowledge that 'comes before' any theory.

Metapragmatics 1: The Need for Metatheoretical Reflections

Pragmatics has definitely come a long way. From being a 'wastebasket,' to use Bar-Hillel's (1971) well-known metaphor, it has become an accredited discipline with an international association, crowded conferences, textbooks, and a monthly journal. Pragmatics is undogmatic, tolerant, and does not demand acts of faith. The reverse side of this tendentially ecumenical hospitality, however, is the heterogeneity of the theoretical proposals it brings together – something that makes it all the more necessary that the theoretical standpoints and the argumentative strategies be clarified. Nevertheless, an agreement both on an (albeit minimal) definition of the field of pertinence and on the assumption of the ideological and theoretical commitments this definition entails is necessary. To achieve this goal, a metatheoretical awareness is needed. So far, these reflections have mainly been practiced on boundary issues (disciplinary and academic), especially with regard to the often disputed borders of pragmatics with semantics and sociolinguistics. Beyond defining goals – something that was appropriate in the first stages of its development – metatheoretical reflections have a right to autonomy. Clearly, any choice regarding the object of study of pragmatics, its domain and, as a consequence, the choice of the most effective descriptive categories and methods, entails a commitment to a metapragmatic view; this commitment and view, however, are most often neither foregrounded nor even made explicit. At times they are simply missing. Nevertheless, such a concern for the epistemological implications of what researchers assume pragmatics is about, is not only legitimate but also necessary, as pragmatic investigation goes beyond the boundaries of linguistics and overlaps with semiotics. Its object is not language, speech, grammar, but human communication (clearly, all these terms ask for metatheoretical definitions). Its subjects are not speakers, but people making (different types of) interactional choices; the study of the latter requires an integrated conceptual framework.

Last but not least, no justification is needed for speaking about meta*pragmatics*; rather, one should ask why one does not commonly speak about metaphonology, metasyntax, metasemantics, and so on.

Wittgenstein (1953) highlighted the constitutional fallacy of any metadiscourse that claims to be foundational, but that is actually just one more linguistic game among many others. Even so, games that consist of asking oneself where the game one is playing comes from, where it leads to, whether its rules have any sense, or if they ought to be changed, are games worth playing. Metapragmatic epistemological reflection is not necessarily transcendental. One way to escape the foundational regression consists in reflecting on how pragmatics speaks about itself, on how it represents itself, on its wording, on its key words, on its predominant metaphors. Much work is needed here. First of all, one has to avoid the risk of new forms of hypostasis (see Borutti, 1984), brought about by certain, apparently harmless, metalinguistic uses. For instance, the use of a definite noun phrase can be idealizing: the risk of an idealization exists whenever one refers to 'the speaker,' who could end up by being an hyperuranian subject, or a lunar *effet-sujet*. Hence, the obvious need for a solid empirical and context-sensitive 'anchorage.'

As noted, pragmatics is tolerant; some would even call it loose. Yet, if one looks at the literature labeled pragmatic, one is struck by the frequency of such words as 'rules,' 'maxims,' 'principles.' From the available data, one tries to infer rules and principles. One could even imagine a (superego-like) need for normalization; a need that is clearly understandable if one considers the messy nature of the object and the need to define analytical instruments with which to infer generalizable results. On the one hand, it is a fact that pragmatic mistakes are much more compromising than grammatical ones: there is nothing worse for an interactant than the *pragmatica sanctio* whereby his/her syntactically and semantically well-structured utterance is inappropriate, ineffective, unhappy, inadequate to his/her wishes and aims. On the other hand, 'normativeness' assumes that what is regulated, i.e., the basic units to which rules and regulations apply, is not controversial. But, once again, this is a matter of metatheoretical choice (see Mey, 2001: 176ff.; Verschueren, 2003).

Metapragmatics 2: On the Possibility Conditions of Action and Interaction

Communication

The second type of research that can be labeled 'metapragmatic' studies the possibility and felicity conditions of communication. Whereas in other research areas, such as text linguistics, there have been attempts to define the constitutive rules – what makes a text a text, the *quidditas*, rather than the *qualitas* of the text, identified in coherence – in pragmatics attention has mostly been given to regulative rules or principles: how to cooperate, be kind, polite, etc. In this regulative sense, traditional rhetoric, as it lists and correlates locutionary and perlocutionary strategies, is a distinguished and sophisticated precedent (*see* **Rhetoric, Classical**). One limit of rhetoric is that it ignores the action level of language, defined by Austin as the illocutionary level of a speech act, which can be taken to represent the basic unit of analysis both in conversation analysis and in pragmatic linguistics.

Normativeness, as noted, presupposes that what is normalized is clear. Nevertheless, the following questions remain open. What is constitutive of an action? What is constitutive of an interaction? What must necessarily, not optionally, hold for an action of a certain kind to be performed? What units of action are constitutive of a given interaction?

In this type of metapragmatics, for instance in research on dialogue-constitutive universals, to use Habermas's (1971) label, the metaphysical risk is particularly tangible. The same risk is encountered in the presumed identification of universal speech acts, particularly if they are transferred onto syntactic units and inflectional moods (the illocutionary acts of statements, questions, and commands as unproblematically reflecting the indicative, interrogative and imperative moods (*see* **Speech Acts and Grammar**)). The problem of identifying basic acts – whether universal or not, and whether or not associated with specific syntactic forms – is related to the problem of the conventions underlying the performance of an act. In its turn, this problem is linked with the problem of consensus: what is the consensus that allows us to define the interactional sequence *X* as *Y*? Is there a pragmatic common core allowing a cross-cultural comparison of communicative behaviors and, if so, what does it consist of?

Here, a wide and by no means uncontroversial area of research opens up. Shared metapragmatic knowledge concerns knowledge of culture-bound and group-bound action frames. Members of a given community, in a given phase of its history, are able to produce and recognize types of linguistic action, and assign, prospectively or retrospectively, an utterance 'token' to a 'type' of action, by describing *X* as *Y*. Behind this possibility of performance and recognition of linguistic action one can imagine, in a Kantian fashion, several conditions:

a. *Conditions of 'thinkability,'* i.e., conditions underlying the possibility of thinking types of actions. These conditions are registered in the lexicon, for instance, as speech act names or illocutionary force indicating devices; they deal with the 'what is,' the essence. The most famous attempt to define constitutive rules of speech acts was made by Searle (1969) (*see* **Speech Acts**). Such attempts can be related to research in Artificial Intelligence (AI) and cognitive psychology, in particular on action frames and on how global patterns are inscribed in the speakers' memory. The major difficulty met by this kind of investigation derives from the fact that there is not just one way to perform an action; neither is there a one-to-one relationship between linguistic form and action type: in short, there is no correspondence between sentence types and utterance types.

b. *Conditions of feasibility*, i.e., conditions regarding the system of aims and expectations within which the action is performed; they deal with the 'how to do,' the procedure. This kind of knowledge concerns the existence and functioning of intersubjectively recognizable strategies by which people match different kinds of action to different actual contexts. The Gricean maxims form an example of proposals made in this area, which can be related to praxeology, inasmuch as they deal with effective acting. However, further research – including cross-cultural work on politeness – has underlined that Grice's maxims are strongly ethnocentric; so, they must be reconsidered, maybe even discarded as possible candidates for the role of pragmatic universals (*see* **Maxims and Flouting**).

c. *Conditions of recognizability.* These conditions deal with questions such as 'where did you get this from,' 'what made you say this,' and so on, hence with interpretability. This question is related to the study of the different kinds of linguistic and paralinguistic means and markers (lexical, but also morphosyntactic, textual, prosodic, kinesic) available in different languages. Their conventional nature is not given once and for all, but changes over time and space. They narrow down the range of possible reasonable interpretations, on the part of the interpreters, of their partners' communicative behaviors, in abductive processes, by trial and error, through which the assignment of signification is negotiated. Obviously, the more shared knowledge the interactants have, and know they have, the more often they will leave out

the intermediate steps in their dialogues, which, as a result, will be mutually understandable by them, but not by an external observer.

From a logical point of view, the three types of conditions are arranged in a hierarchically descending sequence, while from a methodological point of view this sequence is reversed. From a 'practical' point of view, i.e., from the point of view of what is really happening in human interaction, these conditions come together, because the social actors rely and act on the three kinds of conditions simultaneously. The main problem is that of relating these three types of conditions to the conventional intersubjective practices of everyday interaction where cognitive structures and sociopsychological constraints interact. The difficulties brought about by Searle's constitutive rules, and the rules' inadequacy as micro-models of linguistic action and communicative behavior have been highlighted by Kreckel (1981) (*see* **Principles and Rules**).

Empirical-Conceptual Approach

The term 'metapragmatics' has been applied in comparative lexical research, particularly as it has centered on verbs defining linguistic actions, i.e., on speech act verbs (*see* **Speech Acts: Definition and Classification**). Such an approach, defined as 'empirical-conceptual,' starts from the assumption that an investigation of the lexical structure, of the semantics of verbs used to describe speech acts, throws light onto the nature of linguistic action (Verschueren, 1985). Such research has the advantage of bringing the often abstract reflections of classical speech act theory closer to the ways in which linguistic actions are described in individual languages. Now, given that the lexicon forms an interface between pragmatics and grammar, and that the study of the lexicon thus represents an important empirical 'anchorage,' it is still also true that mere lexical research is inherently inadequate for the analysis of interactive dynamics. It is indeed necessary, if actual interaction is not to become irrelevant, to correlate the investigation of the typologies of the verbs that people use to describe linguistic actions with the investigation of what people seem to know 'in real time,' 'live,' about the use of their own language in context. The study of the types of linguistic items (among them lexical items) must be linked to the study of the types of their underlying contextual features and criteria of appropriateness.

It also is important to clarify the level of abstraction at which one is working, so that pragmatic metalanguage is not at the same time both the *definiens* and the *definiendum*: the interiorized conceptualization of the linguist as a native speaker of a particular language should not predetermine his/her selection of the relevant features of a speech act in relation to a (presumably universal) common core.

This type of metapragmatic research has the merit of positing a methodological connection between speech act taxonomy and folk taxonomies. It is well known that languages, those powerful instruments of conceptualization, segment the external world and natural phenomena in different ways, from the color spectrum onward – a much-quoted example both in favor of, and against, the so-called Sapir-Whorf hypothesis. Unlike colors, though, linguistic actions do not exist *in natura*; they do not come before language use, nor are they separable from it. Regardless of the power of the means we are able to mobilize, a privileged extraterritorial theoretical standpoint from which to look at linguistic actions does not exist.

Metapragmatics 3: The Management of Discourse

Common Knowledge and Reflexivity

The two distinctive features here are the reference to common knowledge – both shared knowledge and folk theories – and reflexivity. Significantly, they coincide with the most resistant barriers that separate artificial intelligence from the human intellect: common sense (a notion which is epistemological, not ideological, as pointed out by Parret, 1983) and reflexivity, i.e., the human intellect's capability and transcendental possibility of thinking (and speaking) about its own thinking (*see* **Reflexivity**).

Reflexivity is also one of the most distinctive features of natural languages, marking them off from other semiotic systems precisely by this capacity of describing themselves. The complex issue of reflexivity, seen as merging with indexicality and encompassing all metapragmatic activities, has been investigated from an anthropological, cross-cultural viewpoint by Lucy (ed.) (1993). From a more restricted, linguistic viewpoint, an aspect of reflexivity can be found in the possibility that speakers have of communicating on the communication they are engaged in, by defining it and by confirming or modifying the definitions given by themselves and by their partners. Such 'editing,' along with self- or other-initiated repairs, is rooted in metapragmatic reflexivity; so are reformulations, evaluations, metadiscursive comments, and requests for explanations through which mutual understanding is negotiated. In texts and discourse, there are classes of markers – e.g., Gumperz's (1982) 'contextualization cues' – and metacommunicative

utterances whose role it is to ensure dialogue management in terms of communicative effectiveness.

When tackling a speech sequence, not only can one describe it, give it a name, but one also can judge whether it is appropriate to the situation. One can understand whether one has chosen – among adequate communicative options – the one that best fits the context; if this is not the case, one can retrace one's steps and correct oneself. One can, in an overall communicative strategy, negotiate the degree of directness, explicitness, or politeness as one goes along. One can decide whether one has said the right thing at the right time in the right way, or whether one has made a tactless remark. If the utterance was too elliptical or cryptic, ironical, or digressive in relation to a conversational topic (hence requiring adventurous inferential steps), one can ask for explanations and redefine the context and its presuppositions, thereby reshuffling the assignment of rights and duties among the partners.

All such skills are not predicated on clumsy beginners (the 'model readers,' in the sense of Eco (1979), of many textbooks and grammars) but on social actors and 'competent readers' (see Mey, 2000) who use their communicative know-how, not with awe but with pleasure. At the other end of the scale of metapragmatic awareness are gaffes and jokes. This shared metapragmatic awareness is not only linguistic but also semiotic, encyclopedic, and constitutionally intertextual. It refers to a knowledge that concerns not only language as social (culturally and historically determined) behavior but also our 'being in the world.' The problem of metapragmatic appropriateness, being close to the problem of style, lies in that dialectic relationship between expectation and surprise that is peculiar to the communicative exchange. Regarding to a given system of expectations, there will be more or less marked choices. A choice is all the more significant when it is less foreseeable (see Arndt and Janney, 1987): the more it eludes ceremony and routine, the more it communicates. In this sense, the literary text is highly informative in its non-redundancy (see Lotman, 1977). Once one is engaged in a routine, and has chosen a communicative register, the most remarkable and revealing choice will be the unexpected one, the sudden change in the linguistic, intonational, and proxemic register.

Monitoring

A considerable part of metapragmatics as discourse management can be ascribed to monitoring, to definitions of the situation furnished by the interactants as they go along. Ethnomethodologists call these definitions 'glosses,' specifying that these are not an exception but the rule in spontaneous verbal interaction. Interaction management includes a control on discourse which refers to the conditions of feasibility and interpretability mentioned in 'Metapragmatics 2' above. This monitoring can be found at a macro-level, e.g., in the allocation of conversational rights, in the kind of sequence and the thematic development of turns, or at a micro-level, in the explicit focusing of speech on speech and on its micro-organization (e.g., utterances like 'What I mean is . . . ,' or, in written texts, the heading of a paragraph). Every utterance that not only performs some kind of action but also describes it, venturing a description of 'what is happening' (which it is up to the hearer to validate), plays a monitoring role. Pragmatics started as the analysis of ritual performative utterances which do what they say and say what they do. A metapragmatic paradox is that, in everyday speech, if I want to do something, I must not say I am going to do it. In order to 'state,' for instance, I must not say 'I state that.' If I do, it means I am doing something else. In order to perform an action, I must avoid naming it. In discourse, however, there can be a syntactic and temporal displacement between an action and its description. This is what happens in the metacommunicative acts that describe a speech sequence from an illocutionary point of view (e.g., 'This was a promise, an order, a simple statement,' etc.). Because this kind of description is an important means of orienting the interaction processing, the metacommunicative acts can be referred to as 'speech control': they offer a labeling of preceding actions (anaphorically) or subsequent ones (cataphorically), and they focus on the simultaneous presence in discourse of linearity (a preceding sequence *X* can be classified as *Y*) and a depth (the speaker is both the involved participant and the observer of him/herself and of the interaction). Discourse has both a sequential and a hierarchical organization **Discourse, Foucauldian Approach**. Finally, it is worth noting that metaillocutionary qualification is often also metatextual and cohesive (e.g., 'That was a question'), but not *vice versa*.

From a (not only) terminological point of view, 'metapragmatic' is a hyperonym in relation both to 'metatextual' (comprising those mechanisms which enable one to signpost one's way through the text, e.g., textual deixis) and to 'metaillocutionary' (comprising those mechanisms that make explicit the kind of illocutionary act, e.g., as metacommunicative acts). Finally, if 'metacommunication' is meant as something more limited and more precise than as defined by Watzlawick *et al.* (1967), for instance, if one takes it as qualifying a global communicative modality (e.g., 'I was only joking'), then it falls within the range of metapragmatics.

Applying Metapragmatics

Conflicts have their origins in different definitions of the same situation. As Watzlawick *et al*. state, "The ability to metacommunicate appropriately is not only the *conditio sine qua non* of successful communication, but is intimately linked with the enormous problem of the awareness of self and others" (1967: 53).

Like philosophy and anthropology, metapragmatics has 'therapeutic' potential. At any level, both theoretical and everyday, whenever a social group or a speaker look critically at themselves, maybe making corrections, adjustments or clarifying comments on their discourse, the dangerous identification between Self and *the* point of view is broken, and the road opens up to the legitimization of other points of view. The 'meta-' determines that space in which the other's perspective can be accepted. Moreover, metapragmatic awareness enables the speaker not to adhere to the established sociocommunicative roles and routines so closely as to be totally absorbed by them. Metapragmatics specializes in the control of the argumentative conditions and strategies, lending itself easily to becoming a critical instrument of fundamental importance in digging up and highlighting the underlying presuppositions as well as the different kinds of the unsaid. It is clearly helpful in, for example, first language acquisition (see, among others, Gombert, 1993; Bernicot and Laval, 1996) and second language learning, in the cross-cultural comparison of the ways in which a linguistic and social group represents and recognizes itself (see, among others, Blum-Kulka, 1992), in the analysis and discussion of any, more or less openly authoritarian and unidirectional, discourse (see, among others, Jacquemet, 1992). Metapragmatic competence is potentially subversive, such as when it enables the hearer to verify that the preparatory conditions of appropriateness of a speech act are fulfilled (as an example, imagine a patient saying 'Why are you doing this?' to his/her doctor).

Metapragmatic knowledge is a crucial step toward an ecology of communication.

Conclusions

The possible meanings of metapragmatics mentioned at the outset are not mutually exclusive; on the contrary, they can be related to, and even be integrated with, each other. For example, if one chooses to stress metapragmatics in sense 3 (see 'Metapragmatics 3') rather than in senses 1 or 2, this is a theoretical choice (see 'Metapragmatics 1'). One can even claim that the only non-transcendental way of legitimizing metapragmatics (relevant for sense 1) is one that records and analyzes specific communicative practices in socially and historically determined contexts. Its not being indifferent to individual languages is a major requirement for a non-metaphysical metapragmatics. Another requirement is that of not being indifferent to the ways in which people express their knowledge, e.g., by feedback on and adjustments to, what they are doing communicatively, thus building up the interpretation which is the result of the cross-inferential work on the part of all the participants involved. A systematic account of this knowledge is a difficult interdisciplinary enterprise, which cannot be merely introspective. While pragmatics has experienced, there is the risk of replacing a metaphysics of introspection with a metaphysics of empirical data, in an excessive fragmentation of the research work and its findings that leaves no room for any significant generalization.

One possible theoretical choice and one that in the present, extremely varied and lively state of the debate, can only be a partial choice, consists in denying the existence of any clear-cut division between 'scientific' metapragmatic knowledge and the metapragmatic knowledge of the users of a language, and instead, assuming there exists a *continuum*, at a smaller or greater distance from the object, viz.: the use of the language.

The basic assumption which is relevant to the first sense of metapragmatics as metatheoretical reflection, could then be to hold that in pragmatics, there are different degrees of explicitness in, but no differences in nature between, folk and scientific theories. The metapragmatic paradox is that the traditional metatheoretical top-down control is valid only if it is kept down to earth.

High-sounding transcendencies are replaced by inevitably partial analyses of what is constitutive of the communicative practices in which one is involved, of the ways in which awareness of self and of others comes out, not just in order to speak about the world, but to change it, and oneself, through discourse. The program of metapragmatics (its Manifesto) might be the (meta-)pragmatic sentence that Socrates (had he not been forced by the tyrants to drink the hemlock) would have added to his motto 'I know I don't know': 'I don't know enough that I do know.'

See also: Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Discourse Anaphora; Ethnomethodology; Grice, Herbert Paul (1913–1988); Hyponymy and Hyperonymy; Intonation; Literary Pragmatics; Markedness; Mitigation; Mood and Modality in Grammar;

Neo-Gricean Pragmatics; Performative Clauses; Politeness; Pragmatic Presupposition; Pragmatics: Overview; Proxemics; Reflexivity; Rules and Principles; Shared Knowledge; Speech Acts and Artificial Intelligence Planning Theory; Speech Acts.

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Metasemiosis and Metapragmatics

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Metasemiotics

The empirical study of metasemiotics derives from the general semiotic framework proposed by Charles Sanders Peirce, who endeavored to explore the foundations of knowledge in a manner not unrelated to Kant's exploration in *The Critique of Pure Reason*. But Peirce viewed our ability, as humans, to make contact with an external reality as the result of complex layered sign processes. He developed a hierarchy of signs, based upon a series of trichotomies – the most often-quoted of which has been that of the icon, index, symbol. Within each trichotomy, one component is closest to experience, another closest to knowledge, with the third term standing between them. Thus, icons are closest to experience and symbols to knowledge.

Neo-Gricean Pragmatics; Performative Clauses; Politeness; Pragmatic Presupposition; Pragmatics: Overview; Proxemics; Reflexivity; Rules and Principles; Shared Knowledge; Speech Acts and Artificial Intelligence Planning Theory; Speech Acts.

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The relevance of the Peircean hierarchy to metasemiotics is that signs closer to the side of knowledge depend on those closer to the side of experience in a chain-like fashion. Thus, a symbol, where the relationship between a sign vehicle and its meaning is based on a learned rule (as in the relationship between a word and its meaning in language), is closest to the side of knowledge. However, it cannot be understood as having anything to do with experience unless it is related to indices – where the sign vehicle is connected to its object or meaning by spatio-temporal contiguity. An index is closer to the side of experience than a symbol – since the index involves the perception of contiguities in space and time – but it in turn depends upon icons, where the icon involves recognition of similarities rather than contiguities. Hence, symbols depend on indices, which in turn depend on icons.

Can one say that these relationships of 'depending on' that connect symbols to indices to icons in a chain of semiosis are forms of 'aboutness' or representation analogous to the relationship between a metalanguage and object language? The parallel is not exact, since the metalanguage–object language connection involves fully explicit or conscious focus on the object signs, and this cannot be said of the semiotic chain just mentioned. However, the Peircean chain of semiosis does involve something resembling metasign–sign relationships. Consciousness of the object sign is at one end of the chain, with the earlier layers progressively less accessible to consciousness, albeit presumably closer to experience. While consciousness and knowledge are not, from this perspective, identical – knowledge can be implicit or operational – consciousness is associated with the form of knowledge that is maximally distant from experience. In any case, metasemiotic research, in recent decades, has included metasign–sign relationships that are not of the explicitly representational sort.

The Peircean semiotic framework, as utilized to analyze speech and linguistic communication more generally, was taken up most explicitly by Roman Jakobson (1960). In his formulation of the six types of sign function operative in language, Jakobson includes the metalinguistic function, where the focus of the message is on the code, that is, on the very representational relationship of the object-language signs to their referents. This most closely parallels the accepted metalanguage–object language distinction, and is clearly metasemiotic. However, of the other functions, the poetic function – where the focus of the message is on the message itself – is also metasemiotic in the present sense, even though the connection between the metasign (the poetic form of the message) and the sign (the message) is not a matter of explicit reference. Jakobson points out the converse functional relationships of the two types of metasemiosis.

Some of the other functions of language should perhaps be regarded as implicitly metasemiotic as well, for example, the expressive and conative functions, where the focus of the message is the speaker, in the former case, and the addressee, in the latter. To be regarded as metasemiotic, the focus on the speaker would have to be on the individual person as speaker, that is, as engaged in a speech act, rather than, say, as a person in general. Similarly, in the case of the conative function, the focus of the message would be on the addressee as addressee, that is, as intended recipient of the message.

Because of the difficulty of analyzing metasign–sign relationships that are not based on explicit reference, one direction that metasemiotic studies have taken is towards referential aspects of language that are about speech. The ethnography of speaking, associated with the founding work of Dell Hymes (1974), took as one of its central objects of investigation the ethnographically describable components of languages that refer to the act of speaking itself. In English, for example, one can study the deployment of verbs of speaking: *to say*, *to question*, *to pronounce*, *to repeat*, and so forth.

But other empirical researchers have felt limited by confining investigation just to explicit portions of a linguistic code that refer to speaking. Erving Goffman developed what would become a major line of research on framing. The frame tells one how to interpret what is going on in a specific communicative situation. Thus, we distinguish the interpretation of speech as used within a theatrical play from seemingly identical speech used in an everyday context, an observation also made by Gregory Bateson (1972), who refers to the flow of signs of such framing as (generally unconscious) metacommunication. (Bateson was interested in the implications of this for psychiatric work, among other areas.) Frames, like theatrical plays, also permit rekeyings. For example, the rehearsal of a play can be understood as distinct from the play itself, and also distinct from a rehearsal that occurs within the performance of a play. From the point of view of general metasemiotics, it is important that the metasigns that instruct us as to how to interpret the signs (the play, for example) need not be themselves explicitly referential, in the way in which metalanguage is.

Arguably the most important development in the latter part of the 20th century in the area of metasemiotics was Michael Silverstein's distinction between metasemantic and what he called Metapragmatic usages (see especially his 'Metapragmatic discourse and metapragmatic function') (Silverstein,

1993). Metasemantics covers the realm usually studied in the metalanguage-object language literature, and seems to be what Jakobson had in mind in formulating his notion of the metalinguistic function. The distinction between metasemantics and metapragmatics parallels that between the linguist's narrow reading of semantics and pragmatics. Where 'semantics' refers to the explicit meanings of words, deriving, as per Ferdinand de Saussure, from their systematic relations to other words as part of grammatically formed language – the realm of what Peirce called symbols – pragmatics refers to the meanings conveyed by speech that must be inferred from context and paralinguistic features, including intonation contours and voice qualities. The corresponding Peircean sign modes for pragmatics are the icon and the index. In an often repeated example, suppose someone says: "My, but it's chilly in here!" when there is a window open with cold air blowing through it next to where the addressee is seated. The semantic statement may take on the pragmatic meaning of a request to close the window. Correspondingly, if there are semantic codes for interpreting the explicit meaning of words, there are also pragmatic codes for making inferences about implicit meanings.

'Metapragmatic' refers to linguistic signs that are about the pragmatic code, about how to interpret the extrasemantic meanings encoded in speech. Much of the ethnography of speaking research falls into the realm of metapragmatic investigation, for example, in studying the words, in a given language, that describe different ways of speaking. In English, the word 'to cajole' makes explicit reference to a speech act wherein the speaker is endeavoring to persuade the addressee by pragmatic means such as distractive flattering or suggesting possible benefits, without explicitly promising them. The word is thus explicitly metapragmatic in denotation.

But the distinction between metapragmatics and metasemantics does much more. By opening metasemiotics to the analysis of sign–object relations that are not symbolic (or semantic), it also opens the possibility that metasign–sign relations may be nonsymbolic (i.e., pragmatic, based on indices and icons). This brings into explicit focus the idea of frame analysis, in Goffman's sense (1974), and metacommunication, in Bateson's. We can think here of a two-by-two matrix, where the semantic-pragmatic distinction applies to either the sign–object relationship or the metasign–sign relationship, as in Figure 1.

While the ethnography of speaking has included more than is indicated here, we may perhaps use the phrase 'ethnoscience of speaking' as a convenient shorthand for studies of ethnographically describable explicit linguistic formulations of the pragmatic uses of language.

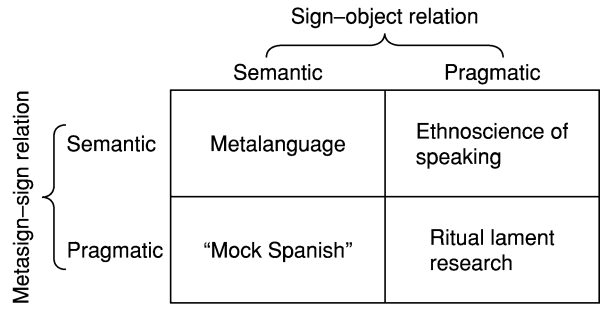

Figure 1 The semantic/pragmatic distinction can apply to either the sign–object relation or the metasign–sign relation, generating different areas for empirical investigation.

The recent language ideology research (see, for example, Schieffelin *et al.*, 1998) is part of metasemiotics, but much of it falls into the quadrant of pragmatic metasign–sign relations coupled with semantic sign–object relations. This is true, for example, of Jane Hill's work on Mock Spanish. Hill (2001) marshals numerous examples to show that Spanish phrases are deployed in American English in ways that devalue Spanish as a linguistic code. The phrase "hasta la vista, baby" – used in Hollywood films – is one in which the speaker devalues the addressee, in this case, lets them know that they are about to be killed. The idea that Spanish as a code is devalued for American speakers is nowhere explicitly formulated. That is, the metasign–sign relationship proposed by Hill is itself pragmatic and inferred. But the metasign is about the Spanish language as code, that is, about semantic sign–object relations.

Recent research on ritual laments, taking those laments as metasigns, falls into the final quadrant, in which both metasign–sign and sign–object relations are pragmatically interpreted. The lament is a metasign whose object is crying, including the specific instance of crying contained in the form of the metasign. Because the metasign is an icon of the sign, it is pragmatically related to that sign, and must be inferred rather than being explicitly formulated. Furthermore, it is not about the sign (the crying) as semantic, but rather about the sign as pragmatic, as an expressive index and social act. One salient meaning of the metasign appears to be that the instance of crying should be interpreted as a desire for social contact, a way of reaching out to other people, and of showing one's conformity to the social norms that govern relations between those people. All of this is accomplished without the aid of semantically explicit metasigns (Figure 1).

An important work on language, which includes Silverstein's paper mentioned above, is the volume

edited by John Lucy (1993) and entitled *Reflexive language*. One of the key theoretical questions raised in this volume and other recent work is the relationship between metasemiotics and consciousness or awareness. This research seems to suggest that consciousness of signs is maximal where the metasigns interpreting them are semantic. Correspondingly, pragmatic metasigns permit the manipulation of signs – as in the case of mock Spanish, for example, or advertising – relatively outside the awareness of the recipients of the signs.

Although awareness of signs may be maximal where the metasigns interpreting them are semantic, this does not mean that the metasigns are necessarily transparent to the object signs – unproblematic encodings of truth. There may be simultaneous pragmatic effects skewing the semantically encoded awareness. In his metasemiotic examination of philosophical discourse in the book *Talking heads: language, metalanguage, and the semiotics of subjectivity*, for instance, Benjamin Lee (1997) argues that Descartes' cogito argument – "I think therefore I am" – was influenced by implicit linguistic analogies between the verb *to think* and verbs of speaking: *I think* . . . is like *I state* . . . ; *I aver* . . . ; *I question* . . . ; and so forth. Such pragmatic skewing of semantic metasign–sign relations is the foundation of much recent renewed interest in the Sapir-Whorf hypothesis.

Metasemiosis is not only a neutral reflection upon culture (whether accurate or skewed). It is also an active force, thanks to its ability to evaluate and affect, as well as represent. A key area in which metasemiosis plays an active role is in the circulation of signs (notably of discourse) in the world – a theme taken up in the book by Greg Urban (2001) entitled *Metaculture: how culture moves through the world*.

Metasemiotic research is on the threshold of producing new insights into questions of agency and intentionality in social action, as well as a clearer understanding of the nature of consciousness and knowledge. Humans in interaction are more and more seen as unlike billiard balls bumping up against one another, and therefore meaning (semiosis) is seen to play the causal role in human conduct. So metasemiotics is the tool of choice for revealing the pathways and processes through which agentive causation takes place. Correspondingly, if consciousness is the product of a complex pathway of metasign-to-sign interconnections, leading from experience to knowledge, then metasemiotic investigation will prove essential for the clarification of fundamental problems about cultural relativity and truth.

See also: Iconicity: Theory; Indexicality: Theory; Jakobson, Roman: Theory of the Sign; Metalanguage versus Object Language; Semantics–Pragmatics Boundary.

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Metathesis

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Metathesis involves the transposition of elements in a string, resulting in a reordering of the segments. As an example, the English form *ask* may be found to alternate with the form *aks,* indicating a transposition of *k* and *s*. The vast majority of cases arise in order to satisfy some well-formedness constraint involving the necessity of breaking up clusters, the need to adhere to some segmental ordering hierarchy, or the repair of phonotactic violations, as suggested by Grammont (1933: 339):

> La métathèse consiste matériellement en ce qu'un phonème quitte sa place originaire pour aller en prendre une autre à une certaine distance de la première. La cause principale de ce phénomène est le besoin de donner aux syllabes ou aux mots une constitution phonique plus commode. ["Metathesis mainly consists of a phoneme that moves from its original site to take up another place at a distance from the first. The main reason for this phenomenon is the need to give syllables or words a more convenient phonic constitution."]

Hock (1985) remarks that metathesis is frequently irregular and sporadic, but then goes on to investigate the possibility of regular metathesis, citing the case of Modern Persian discussed below. The focus here will be on the case of regular, rule-governed metathesis.

A Typology of Metathesis

Ultan (1971) is one of the earliest attempts at a systematic typological study of metathesis. He observes that the most common context for the appearance of metathesis is the combining of morphemes that results in phonologically undesirable results, necessitating some form of restructuring to repair the violation. He categorizes instances of metathesis by means of a set of distinctive features: linguistically motivated, involuntary, and systematic, providing a typology of types of metathesis. While Ultan discusses a wide range of phenomena, including subject-aux inversion, under the rubric of metathesis, most linguists would limit the range of metathesis to the reversal of two segmental units.

Some types of metathesis may involve psycholinguistic phenomena such as processing problems that result in forms commonly labeled spoonerisms or slips of the tongue, for instance, *cuff of copy* instead of *cup of coffee* (Fromkin, 1971) (*see*), as well as various types of speech pathology (*see*). Systematic, paralinguistic forms, outside the realm of linguistic metathesis, include conscious manipulations of forms to alter existing words or phrases, either in play or as a form of euphemism or disguise. An example of this is the Sinhala disguised speech form *hike pulak* for the original *puke hiluk* 'asshole' (*see* **Slang, Argot and Ingroup Codes**).

Among the linguistically motivated, systematic cases, we may distinguish two varieties, synchronic and diachronic. The former is the focus here, while the latter is discussed in greater detail elsewhere (*see* **Diachronic Aspects of Metathesis**).

Phonologically Conditioned Metathesis

Of the numerous instances of synchronic metathesis cited in the literature, the vast majority must be considered to be of the phonologically conditioned type. Since most cases of metathesis arise through the juxtaposition of morphological units, phonological conditioning must be interpreted as being based solely on the ordering of segments, without regard to the morphemes concerned. Grammatical conditioning, on the other hand, refers to the use of metathesis to mark some grammatical category, i.e., metathesis as a morpheme.

In West Saxon, a sequence of /k/ followed by /s/ in the same syllable was disallowed, and therefore, the two elements were transposed, giving the permissible sequence /sk/, as in *disc* [disk] (sing) 'dish' but *dixas* [diksas] (PL) or *fisc* (sing) 'fish' but *fixas* (PL). The deletion of a final vowel in PERSIAN may result in a violation of the sonority hierarchy that is repaired by metathesizing the underlying obstruent-sonorant sequence to produce the acceptable forms *surx* (< suxra) 'red' and ars (< asru) 'tear$_N$.' Similarly, in Yagua, a Peruvian language, the juxtaposition of the first person singular possessive prefix, *ray-*, to a base results in the reversal of segments, for example, *ray + paa* 'bread' *rapyaa* 'my bread' or *ray + tooya* 'fish-hook' *ratyooya* 'my fish-hook.'

HEBREW disallows the sequence of stop + strident coronal fricative across a morpheme boundary, so when the prefix *hit-* is attached to a base containing an initial coronal fricative, the /t/ of the prefix is transposed with the fricative, as in Table 1.

Table 1 Hebrew hitpa'el binyan

hit + paʔel	>	hitpaʔel	'dressed himself'
hit + xapes	>	hitxapes	'was sought'
hit + saper	>	histaper	'got a haircut'
hit + ʃalem	>	hiʃtalem	'was completed'

Table 2 Rotuman aspect

Complete	*Incomplete*	
ŋoha	ŋwah	'peep'
leka	lyak	'go'
hosa	hwas	'flower'
tiko	tyok	'flesh'

Table 3 Clallam aspect

Nonactual	*Actual*	
čk^{ω}u	čuk^{w}	'shoot'
xči	xič	'scratch'
q̇qi	q̇iq	'restrain'
ċsə	ċəs	'hit'

Table 4 Sierra Miwok stems

Primary stem		*Fourth stem*	
kalaŋ	'to dance'	kalŋa	'a dance'
ʔumuč	'to approach winter'	ʔumču	'winter'
tuyaŋ	'to jump'	tuyŋa	'a jump'
ʔawin	'to play'	ʔawni	'a game'

Table 5 Motivations for the use of metathesis

Motivation	*Languages*
a. Sonority Hierarchy restrictions	Persian, Yagua
b. Phonotactic constraints	West Saxon, Hebrew
c. Prosodic shape requirements	Straits Salish, Rotuman
d. Templatic requirements	Sierra Miwok

In all of the above cases, we may consider the use of metathesis to be a phonological repair strategy, ensuring that the items conform to a preferred shape.

Grammatically Conditioned Metathesis

Cases have been attested that employ metathesis as a grammatical device, in effect acting as a morpheme by itself rather than as the consequence of the juxtaposition of two morphemes that results in a phonological environment requiring metathesis to repair the structure.

One of the earliest discussions of grammatically conditioned metathesis is an article by Thompson and Thompson (1969) entitled 'Metathesis as a grammatical device,' which presents several cases of what appears to be a metathesis morpheme. For example, the distinction between the 'complete' and the 'incomplete' phase in the Austronesian language, Rotuman, is realized by a metathesis of the final consonant and vowel of the forms in Table 2.

One thing to notice about the incomplete phase is that it always involves the reduction of the form by one syllable, with the concomitant change of the first vowel to a glide.

Another case discussed in Thompson and Thompson (1969) is that of Clallam, a member of the Straits Salish group (Salishan languages). There are several ways to form the actual aspect (similar to the imperfective) in Clallam, involving the use of -insertion, reduplication, and the permutation of consonant and vowel, i.e., metathesis, as in Table 3.

In all cases the syllable structure changes from CCV to CVC. In Sierra Miwok, a member of the Costanoan family (Penutian languages), verbal roots appear in one of several different forms: a primary, second, third, and fourth stem for most verbs. Freeland (1951: 96) states that "[t]his variation in the rhythmic pattern of the verb stem must, I think, be regarded as in some measure having grammatical value in itself . . . ." According to Freeland, the metathesis is always of the same type, involving the reversal of order of consonant and vowel in the second syllable of a stem, as in Table 4.

All cases of metathesis in Sierra Miwok are the result of the imposition of a CVCCV template (*see* **Template Morphology**) to which phonemes are linked, much as in the binyanim of the Semitic languages.

Motivation

A further question concerns the motivation for the use of metathesis. Previous discussion suggests several reasons for employing metathesis, all involving the need to restructure a form in some fashion, as shown in Table 5.

Thus the rearrangement of elements or the concatenation of morphemes may result in the juxtaposition of elements that are not optimal. Metathesis is one strategy for optimizing the results.

Theoretical Models of Metathesis

The subject of metathesis is a potentially troublesome one for linguists because of the kind of theoretical machinery required in order to provide an adequate analysis of the phenomenon. Most other linguistic phenomena are amenable to more or less linear analyses, perhaps involving the separation of tiers to explain certain phenomena, but no matter how one reconfigures separate tiers, there would appear to be no solution to the problem of metathesis.

Note that metathesis defies the use of strictly concatenative approaches; it violates notions of sequentiality and linearity in language, demands

context-dependent structure-changing, and requires overly powerful theoretical machinery. It has been invoked as a key example of the need for process-based morphology in such works as Anderson (1992), Janda (1984), and Zwicky (1988). The usual argument is that combinatorial models of morphology cannot handle processes such as metathesis and, therefore, we must appeal to processual treatments.

On the other hand, it is unclear how one would deal with a phenomenon such as grammatically conditioned metathesis in a concatenative model of word formation that is limited to the use of structure-building operations and concatenation. Therefore, this type of problem is a crucial one in deciding the merits of either a processual or a concatenative model of morphology.

Webb (1974) represents an early attempt at dealing with metathesis, arguing that most cases are amenable to alternative analyses. Besnier (1987) provides an autosegmental account of the Rotuman case, and Stonham (1994) attempts to address the issue of metathesis and its reanalysis from the perspective of Lexical Phonology.

Since the motivation for the majority of cases of metathesis is the optimization of some structural aspect of the word, a constraint-based approach such as optimality theory (OT) would seem ideally suited to the analysis of this phenomenon (*see* **Pragmatics: Optimality Theory**). As Hock (1985: 533) puts it:

> Most commonly, the specific structural purpose of regular metathesis lies in converting phonologically or perceptually 'marked' structures into more acceptable ones.

One relevant OT constraint for metathesis is linearity, which is intended to ensure no variation in the sequence of segments, thus militating against metathesis. In the case of metathesis, linearity is not as highly ranked as competing forces. For a recent OT analysis of the Rotuman case discussed above, see McCarthy (2000).

Conclusion

Metathesis is not always the sporadic, irregular process that is often assumed. As demonstrated above, many instances involve regular, systematic use of metathesis to reconcile various ordering requirements within a language. The metathesis may be phonologically or grammatically conditioned and invariably produces a result that conforms to the requirements of the language.

See also: Diachronic Aspects of Metathesis; Pragmatics: Optimality Theory; Salishan Languages; Slang, Argot and Ingroup Codes; Template Morphology.

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Metatypy

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Introduction

Metatypy is a diachronic process in the course of which the syntax of one of the languages of a bilingual speech community is restructured on the model of the syntax of the speakers' other language. It is thus a language-contact phenomenon (*see* **Language Change and Language Contact**).

An Example: Takia

Takia, an Austronesian language (*see* **Austronesian Languages: Overview**) spoken on Karkar Island off the north coast of New Guinea, has undergone metatypy on the model of a nearby Papuan language of the Trans-New Guinea (TNG) family (*see* **Trans New Guinea Languages**).

Many Takia morphemes, both lexical and grammatical, are clearly cognate with those of Takia's Austronesian neighbors. These include Ronji, spoken about 100 km to the southeast. The Takia and Ronji examples that follow contain three cognate pairs: the independent pronouns Takia *ŋai* and Ronji *ŋa* 'I', the subject prefixes Takia *ŋ-* and Ronji *ŋa-*, and the verbs Takia *-ani* and Ronji *-ɣaŋ* 'eat' (the terms for 'banana' happen not to be cognate). The two languages differ sharply in their syntax, however. The Takia clause is Subject–Object–Verb, Ronji is Subject–Verb–Object; the Takia irrealis morpheme *wa* is an enclitic following the verb, while its Ronji counterpart *to* precedes the verb.

Takia:	ŋai	fud	ŋ-ani=wa
	I	*banana*	*1sing-eat=IRR*
	'I shall eat banana'		

Ronji:	ŋa	to	ŋa-ɣaŋ	saula
	I	*IRR*	*1sing-eat*	*banana*
	I shall eat banana'			

Takia and Ronji belong to the Oceanic subfamily of Austronesian, for which so much comparative evidence is available that it is certain that Ronji represents an inherited set of syntactic patterns. Takia syntax, on the other hand, reflects reshaping on the model of a TNG language. This remodeling is evident when we compare a Takia sentence with its equivalent in Waskia, a TNG language also spoken on Karkar Island. We cannot be absolutely certain that Waskia was the metatypic model for the reshaping of Takia, because there are many other TNG languages with similar syntax on the nearby mainland, but it is reasonably clear that Takia has copied its Subject–Object–Verb syntax from a TNG language. It is also likely that its postverbal aspect/mood enclitics are modeled on the suffixation of verbal markers in TNG languages.

Takia:	tamol	an	ŋai	i-fun-ag=da
	man	*DET*	*me*	*3sing-hit-me=IMPERF*
	'The man is hitting me.'			

Waskia:	kadi	mu	aga	umo-so
	man	*DET*	*me*	*hit-PRES.3sing*
	'The man is hitting me.'			

The Takia pattern of Noun + Determiner represented in the previous example by *tamol an* 'the man' probably also reflects restructuring on the model of a TNG language like Waskia, because Oceanic Austronesian languages typically have a Determiner + Noun construction.

Takia also displays massive lexical calquing ('loan translation'), apparently from Waskia. Examples like those in Table 1 can be easily multiplied.

Alongside lexical calquing, we find 'grammatical calquing,' i.e., reorganization or creation of closed categories such as adpositions or tense/aspect/mood markers to match Waskia. As part of its syntactic restructuring, Takia has lost its prepositions and calqued a set of postpositions which almost exactly

Table 1 Lexical calquing in Takia

	'Literal' meaning	*Takia*	*Waskia*
'animal'	'pig-dog'	bor-goun *pig-dog*	buruk-kasik *pig-dog*
'(do) first'	'his eye his eye'	mala-n-mala-n *eye-3sing-eye-3sing*	m<o>tam-m<o>tam *<3sing>eye-<3sing>eye*
'(an) answer'	'face of word'	ru nao-n *word face-3sing*	den k<o>ma *word <3sing>face*
'I disobey him'	'I cut his mouth'	awa-n ŋu-tale *mouth-3sing 1sing-cut*	k<u>riŋ batugar-sam *<3sing> mouth cut-1sing*

Table 2 Grammatical calquing: Takia postpositions

	Takia	*Waskia*
location	na, te	se, te, i
location 'in'	lo	nuŋi
location 'on'	fo, fufo	kuali
ablative	—	ko
instrument	nam (< na mi)	se
referential	o	ko
manner	mi	wam
accompaniment	da	karo

matches the Waskia set in its semantic organization (see Table 2).

As explained in the following sections, lexical and grammatical calquing are – strictly speaking – not components of metatypy; they are preconditions of it. Metatypy is just the reshaping of the syntactic system. This may (and typically does) take place without the borrowing of grammatical morphemes, as the Takia and Waskia examples show. See Ross (1987, 1996, 2001) on Takia metatypy.

Further Examples

Accounts of metatypy that provide sufficient detail for the reader to assess the overall process are few. Sasse (1985) describes how Arvanitic, the Albanian spoken in Greece, underwent lexical and grammatical calquing and syntactic change, increasingly resembling Greek. Soper (1996) describes metatypy in one Turkic and one Iranian language, each on the model of a language from the other family. Aikhenvald (2002) gives a thorough account of grammatical calquing and metatypy in Tariana (Tariano), an Arawak language, on the model of East Tucanoan languages. Various authors, listed by Harris and Campbell (1995: 124, 142), have investigated the metatypy of Ethiopian Semitic languages on Cushitic models.

Defining Metatypy

None of these authors uses the the term 'metatypy,' which was coined by Ross (1996) to label the historical process briefly illustrated in the example for Takia: a reshaping of the syntactic system of one of a bilingual community's languages so that it more closely resembles the syntax of its speakers' other language. Metatypy means 'change in type' (just as metamorphy means 'change in form' in geology). 'Type' is used here in the sense implicit in the term 'typology': Subject–Object–Verb and Subject–Verb–Object are clause 'types,' Noun + Determiner and Determiner + Noun are noun phrase 'types.'

This definition is narrower than the one used by Ross (1996, 1997, 2001, 2003). In these works, metatypy was treated as also including lexical and grammatical calquing. This was done because contact-induced syntactic restructuring of the kind outlined earlier in this article is apparently always accompanied by lexical and grammatical calquing. Further research supports a claim by Sasse (1985: 79) and Ross (2001: 146) that lexical and grammatical calquing **precede** syntactic restructuring, i.e., they are preconditions of syntactic restructuring. Because there are cases where widespread grammatical calquing has occurred, but little or no syntactic restructuring (e.g., the Mixe dialect of Basque described by Haase (1992), where there is extensive grammatical calquing on Gascon, but only limited syntactic restructuring), it is appropriate to treat grammatical calquing and syntactic restructuring as separate processes and to reserve the term 'metatypy' for the latter, because this is the locus of the 'change in type.'

The process of metatypy was recognized by scholars long before the term was coined. For example, it was inferred that the parallel syntactic systems of Balkan languages (*see* **Balkans as a Linguistic Area**) were the result of syntactic remodelling (Sandfeld, 1930; Joseph, 1983). Gumperz (1969) and Gumperz and Wilson (1971) describe the situation at Kupwar, an Indian village on the Indo-Aryan/Dravidian border, where the local varieties of (Indo European) Marathi and Urdu have undergone radical restructuring on the model of (Dravidian) Kannada. Arvantic was mentioned above. The Arabic of Maronite Christians in Cyprus, which has undergone reshaping along Cypriot Greek lines, has attracted scholarly attention (Newton, 1964; Newton, 1972; Tsiapera, 1969). The syntax of the Rhaeto-Romance (Romansch) dialects of Switzerland has become more like German (Haiman, 1988). These are all instances of metatypy.

Other labels have been used for metatypy, but none is fully satisfactory. Appel and Muysken (1987: 158) use 'resyntactization,' but it is unclear whether this is intended to denote the replacement of single constructions or system-wide restructuring.

Sasse, Aikhenvald, and others use the term 'convergence,' but this is unfortunate on two counts. First, it seems sometimes to cover lexicon, morphology and/or phonology as well as syntax. Second, 'convergence' implies that both languages change simultaneously, each in the direction of the other, until their structures meet somewhere in the middle. There is little documentation of this. Takia has changed, but Waskia has not. Arvanitic and Maronite Arabic have changed, but not Greek. (A more appropriate context for the term 'convergence' is koineization, where dialects or closely related languages spoken in a newly forged speech community become increasingly similar until a single common language emerges. This

is quite different from metatypy, where the two languages are typically unrelated, one becomes more similar to the other, and no common language emerges.)

Another term that has been used for metatypy is 'structural borrowing.' Thomason and Kaufman (1988: 67) note that where there is 'intense contact,' i.e., widespread bilingualism, structural borrowing occurs. But the term 'structural borrowing' is inappropriate for three reasons. First, it is not simply structure that is copied, but a pairing of structure and meaning. Second, 'borrowing' implies sporadic, piecemeal changes, whereas metatypy is usually a system-wide process, a distinction also noted by Soper (1996: 295). There is a strong tendency in the literature to remark on isolated contact phenomena without giving their linguistic context, thereby creating the impression that piecemeal 'structural borrowing' is more common than it is. Third, Prince (1998) provides evidence from her study of the restructuring of Eastern Yiddish on Slavic models that speakers often do not necessarily 'borrow' constructions wholesale but instead exploit the possibilities of constructions in the language undergoing metatypy (she does not use the term) to imitate those of the model language with varying degrees of exactness. The Mixe Basque passive, for example, is an extension of the Basque resultative, which imitates the Gascon passive but is structurally unlike it (Haase, 1992: 101–102).

The Process of Metatypy

Sasse (1985: 84–85) proposes that lexical calquing, grammatical calquing, and syntactic restructuring share a single cause: bilingual speakers' need to express the same thoughts in two languages. Haase (1992: 166–168) talks of a push toward 'translation equivalence.' The inference is that lexical calquing takes place first as speakers reorganize the lexicon of one of their languages to match the semantic organization of the other. This reorganization extends to closed categories, so that grammatical calquing also occurs. Only when the categories of the two languages match each other closely does syntactic restructuring begin.

Calquing and metatypy are both dependent on the fact that a language is made up of form–meaning pairings. These include both lexical items and grammatical constructions. The form component of a grammatical construction is typically a combination of syntactic structure and certain morphemes. The meaning component is often quite abstract, and so the sequence of lexical calquing > grammatical calquing > metatypy is one in which forms that express increasingly abstract and general meanings come to be organized similarly in the two languages.

Two points are noteworthy here. First, as the Takia–Waskia examples show, calquing does not entail borrowing of form but reorganization of the way existing phonological forms match meanings. Second, because the form component of a grammatical construction often consists partly of syntactic structure, metatypy differs from calquing (where form may be unchanged) in that the structure itself is altered in the course of the push toward translation equivalence. Although this account is intuitively satisfying, it is not clear what triggers the move from calquing to metatypy, because some languages do not undergo metatypy or do so only to a limited extent. Mixe Basque, for example, has undergone extensive grammatical calquing but little metatypy. Is this because of quantitative or qualitative differences between the grammars of Basque and Gascon? We do not yet know. (For discussion, see Harris and Campbell, 1995: 123–127.)

Metatypy occurs in a three-stage sequence. The clause is restructured first, then the phrase, and finally the word, but this sequence is rarely completed. Anem, a Papuan language of New Britain, reflects restructuring of the clause only (on an Austronesian model; Ross, 2001). Takia reflects restructuring of the clause and the phrase. The languages at Kupwar reflect reorganization of clause, phrase, and word-internal morphemic structures. Outcomes that do not follow this sequence, e.g., the restructuring of the phrase but not the clause, have not been found. Metatypy has been described here as **syntactic** restructuring, but, as at Kupwar, syntax may also include the ordering of bound morphemes.

The Boundaries of Metatypy

The boundaries of metatypy need to be delineated in a number of dimensions. In Ross (1995, 2001, and particularly 2003: 190), a further social criterion for metatypy is given: the language undergoing metatypy will be the language that is emblematic of its speakers' identity and the metatypic model will be the language used to communicate with another speech community. This is true of the majority of cases found, but not of all. Sometimes the social relationship between the languages is the opposite one: the language undergoing metatypy is the inter-community language, and the metatypic model is its speakers' emblematic language. Cases in point are 'Singlish' (basilectal Singapore English; Platt, 1975) and Taiwan Mandarin (Chappell, 2001). The key here is that these are spoken in speech communities where speakers of the emblematic language are a significant majority and where a variety of the inter-community language

is used at least as much for communication among those speakers as it is for communication with speakers of another language.

Metatypy sometimes appears to be accompanied by contact-induced phonological changes, e.g., in Tsat, the Austronesian language of Hainan Island that has undergone metatypy on the model of Chinese dialects and, like them, has also become monosyllabic and tonal (Thurgood and Li, 2003). Sasse (1985) suggests that such phonological change **follows** metatypy. A number of the cases of metatypy mentioned here display no such change, and this implies that contact-induced phonological change does not usually occur until metatypy is well progressed. Cases like Singlish, where the inter-community language undergoes metatypy, are exceptions: here, phonological accommodation to the emblematic language may be part of the creation of the new variety.

Theoretical Issues

The study of metatypy touches on a number of theoretical issues in historical linguistics. One is that there is an emerging paradigm of types of contact-induced change, according to which social conditions constrain the linguistic outcomes of contact (Thomason and Kaufman, 1988; Ross, 1997; Ross, 2003). Metatypy is only one such outcome. Language shift, pidginization, and language mixing are others (*see* **Language Maintenance and Shift**).

Genealogical relationships among languages are often expressed through the family-tree model (*see* **Language Families and Linguistic Diversity**), which presupposes language continuity from generation to generation. This continuity is not disrupted by metatypy, and continuing lexical forms and bound morphemes bear witness to this. Thomason and Kaufman (1988: 83–97) discuss the fact that 'structural borrowing,' i.e., metatypy, involving a number of contiguous languages leads to the formation of a Sprachbund or 'linguistic area.' A question in the case of, say, the Balkan Sprachbund, is whether there has been gradual convergence among its languages or a sequence of bilingual situations in which (unilateral) metatypy has occurred. This requires further investigation.

Unresolved questions are whether and under what circumstances languages 'borrow' single constructions rather than making system-wide changes (Harris and Campbell, 1995: 120–150).

Other Cases of Metatypy

As well as the works mentioned earlier in this article, the following contain reports on cases of metatypy: Denison (1968, 1977, 1988) on Sauris, a German dialect of northern Italy; Haig (1988) on East Anatolia; Heine and Kuteva (2001) on African languages; Nurse (1994) on Ilwana, a Bantu language (Malakote) remodelled on Orma, a Cushitic language; and Thurgood (1999) on Austronesian Chamic languages.

See also: Austronesian Languages: Overview; Balkans as a Linguistic Area; Bilingualism; Language Change and Language Contact; Language Families and Linguistic Diversity; Language Maintenance and Shift; Rule Borrowing; Trans New Guinea Languages.

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Meter

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Meter is a poetic form defined by constraints on the rhythmic structure of language, giving the language of metrical texts a rhythmic regularity beyond the usual rhythm of the language in which they are composed. Meter therefore involves language and linguistics in at least two ways. One is a matter of descriptive necessity: the rhythmic structure of language must be described in a way that allows the constraints that define a meter to be stated – to take a simple example, a meter that requires a specific number of syllables requires in turn a notion of the syllable, which is itself a linguistic entity, and not a specifically poetic one, let alone one belonging to another domain of experience entirely. The other is a matter of theoretical inquiry: are the constraints that define meters themselves a matter of linguistic form, even if the language they define is a special kind of language we call 'poetry,' or more accurately, 'verse'; or are they something else entirely, a set of structures composed of language but according to principles that diverge from whatever may be the constitutive principles of language itself?

The fundamental methodological assumption through which both questions have been investigated within linguistics over the past few decades also derives from linguistics, though it does not on its own presuppose answers of one kind or another to the questions above. Following closely on Chomsky's (1965) observation that a description of a language should be generative in the sense that it should describe not the set of actual utterances in the language, but its speakers' competence, the intuitive knowledge lying behind those utterances through which speakers recognize that some forms count as well-formed instances of their language while others would not, Halle and Keyser (1966, 1971) proposed that a description of a meter should be held to the same standard. A poet composing in a meter has intuitions about what arrangements of the language would be well-formed in the meter and what would not, and a

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The fundamental methodological assumption through which both questions have been investigated within linguistics over the past few decades also derives from linguistics, though it does not on its own presuppose answers of one kind or another to the questions above. Following closely on Chomsky's (1965) observation that a description of a language should be generative in the sense that it should describe not the set of actual utterances in the language, but its speakers' competence, the intuitive knowledge lying behind those utterances through which speakers recognize that some forms count as well-formed instances of their language while others would not, Halle and Keyser (1966, 1971) proposed that a description of a meter should be held to the same standard. A poet composing in a meter has intuitions about what arrangements of the language would be well-formed in the meter and what would not, and a

description of the meter should make those intuitions explicit. Traditional descriptions often do not achieve this because they focus on describing the rhythmic structures that actually occur in poets' compositions, without distinguishing them from those that could not have occurred to arrive at the meter's generative principles.

For example, the English iambic pentameter is often defined as having a basic line of five iambic feet (separated in scansion by '|'), each composed of two syllables that rise in stress; in many accounts, the rise is the only requirement (Steele, 1999; Wimsatt and Beardsley, 1959; Wimsatt, 1970), while in others the basic foot is held to be specifically an unstressed syllable (x) followed by a stressed one (/) (Fussell, 1979; Stallworthy, 1983). Variant feet composed of one or three syllables, or of syllables that fall or remain level in stress (anapests, trochees, dactyls, spondees, pyrrhics, etc.), are sometimes used instead of the basic iambic foot for aesthetic variety and expressive effect. Both the basic pattern and some of its variants can be seen, for example, in Tennyson's 'The Kraken' in (1), composed of fourteen lines of iambic pentameter plus a longer fifteenth line:

(1) Below the thunders of the upper deep,
Far, far beneath in the abysmal sea,
His ancient, dreamless, uninvaded sleep
The Kraken sleepeth: faintest sunlights flee
About his shadowy sides; above him swell 5
Huge sponges of millennial growth and height;
And far away into the sickly light,
From many a wondrous grot and secret cell
Unnumber'd and enormous polypi
Winnow with giant arms the slumbering 10 green.
There he hath lain for ages and will lie
Battening upon huge sea-worms in his sleep,
Until the latter fire shall heat the deep
Then once by man and angels to be seen,
In roaring he shall rise and on the surface die. 15

Line 3, for example, has five feet with the basic structure as shown in (2a), but as shown in (2b), line 12 begins with a foot that has a fall in stress plus an extra syllable, with other complexities following, such as a succession of four stressed syllables, all contributing to the description of the uncontainable otherworldly enormity of the sea monster:

(2a) x / | x / | x / |x / |x /
His ancient, dreamless, uninvaded sleep
/ x x | x /| / / | / x | x /
(2b) Battening upon huge sea-worms in his sleep,

This description of the iambic pentameter of 'The Kraken,' however useful for identifying interesting rhythmic structures in particular lines of the poem, is, however, inadequate as an account of what makes the general rhythmic structure of its metrical language distinct from that of ordinary English. The problem, as Halle and Keyser pointed out, is that the statement of what variations on the basic pattern can occur is insufficiently constrained: any text of English (or indeed any other language) can be divided up into lines composed of successions of two but sometimes three syllables, normally with a rise in stress but sometimes with a fall or no change; but among those lines would be some with rhythmic structures that never occur in iambic pentameter, either in general or in the practice of specific poets in specific genres. The line produced in (3), for example, by replacing 'uninvaded' in line 3 of 'The Kraken' with "unvariable," can be represented as having five feet, one of which has falling stress and an extra syllable just as the language of line 6 does:

(3) x / |x / | x / | /xx|x /
*His ancient, dreamless, unvariable sleep

But (3), in having the exceptional foot begin not only mid-line but mid-word, has a structure that Tennyson does not use in this or any other iambic pentameter poem, while line 3 in (2b) is a line he actually wrote in that meter. Hence, the traditional description fails to capture what would seem to be Tennyson's intuitions about what makes some language iambic pentameter – what distinguishes metrical from unmetrical lines. The claim that a line has a structure that could not be used in a given metrical form is a claim that it is unmetrical, indicated by the same asterisk used to indicate ungrammaticality in ordinary language.

Of course, one of the difficulties faced by any attempt to achieve this standard of a generative description of a metrical form is that it is impossible to inquire directly into the poet's intuitions; all we have is evidence of what actually has been composed. In this, as Rice (1996) pointed out, metrics resembles internal reconstruction in historical linguistics, in that the system that defines some grammatical competence must be hypothesized solely on the basis of a finite corpus, and whether a structure's nonoccurrence is actually a matter of systematic avoidance on grounds of its ill-formedness – here unmetricality – or merely accidental, is always a matter of judgment. Moreover, because meter is not simply a naturally occurring part of language but an art form, with structures created for specific expressive effects, there is always an intermediate possibility that a structure would be well-formed but not create just the right effects in its particular context. These considerations apply equally to the interpretation of

counterexamples to any hypothesized description of a meter: a line that does not conform to it might reflect anything from corrupt transmission of a text to deliberate departure from the metrical form or a missed generalization in the description. And because poets are often as interested in innovation as they are in perpetuation of a tradition, a deliberate departure might be an unmetrical line, but it might also be a line that slightly revises what qualifies as metrical to define a new possibility within the tradition.

In spite of these complexities, understanding of meter has made enormous strides in the past few decades. This is not only a result of the level of attention to small details and their large consequences following from Halle and Keyser's descriptive challenge, but perhaps even more importantly because of the enormous strides made in the description of linguistic rhythm itself. In the past, metrists almost always had to invent their own systems to represent the rhythmic structures of lines they wished to discuss, because linguistic descriptions were either too impoverished to express the full range of rhythmic structures used in poems or too complex to express the essential simplicity inherent in the sense that meters increase rather than decrease regularity. Moreover, such inventions were often unavoidably subjective, tied to interpretations of poems and to assumptions about what would be appropriate performances of them. Liberman and Prince's (1977) fundamental insight that linguistic rhythm was different from other aspects of phonology gave a simple set of principles from which to represent a wide and subtle variety of rhythmic structures. In practical terms, their approach inspired fruitful crosslinguistic research into the phonology of rhythm, the articulation of an explicit theory of the principles of that phonology, and the discovery of a rich range of structures that play a role in it. This theory and its claims, even while its particulars are debated, have gone a long way toward providing metrics with descriptive mechanisms that are objective at least in the sense of being shared by a scholarly community and established on independent grounds for articulating the complex textures achieved in actual poems.

But what is especially interesting for meter is that particular characteristics of Liberman and Prince's approach make it simultaneously up to the task of illuminating the simple sense of regularity generally felt to be created by meter. The key insight is that all language has a rhythmic structure that is in fundamental ways similar to the rhythmic structure of music or other rhythmic activities in being relative, periodic, hierarchical, and culminative. The basic structural elements that create these properties are, roughly speaking, (1) some kind of regular beat that keeps time; (2) differentiation in prominence among those beats, so that some are strong and others are weak; and (3) grouping of beats according to that differentiation, so that each strong beat defines a group of its own which may also include weak ones. These rhythmic groups are themselves organized at higher levels according to the same principles, right on up to the point where an entire domain has been rhythmically organized. To take a very simple example, four beats might be organized rhythmically into a duple, falling scheme at every level, as in (4a), with the first strong beat being stronger than the second one, because the group it defines is stronger at the next level up. This is the stress pattern of a word like, for example, *úndertàker*, as shown in (4b), which has primary stress (´) on its first syllable and secondary stress (`) on its third, and a rhythmic boundary between its second and third syllables strong enough to admit word-internal expletives there (*under-fuckin'-taker* but not **un-fuckin'-dertaker* or **underta-fuckin'-ker*):

(4a)

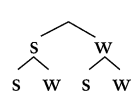

(4b)

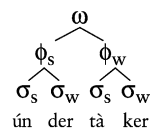

where 'S' represents a rhythmically strong element and 'W' a rhythmically weak one. As discussed elsewhere in this volume (*see* **Metrical Phonology**), the study of linguistic rhythm has in general pursued questions of what exactly are the beats in language (syllables [σ], or some lower level like moras [μ], etc.); the higher levels of organization (phonological feet [ϕ], phonological words [ω], etc.); the principles of grouping (binary [duple], ternary [triple] etc.; rising, falling, etc.); the strategies for dealing with odd numbers of elements that may leave some not fitting into the parse (deletion, adjunction, etc.); – all with the goal of being able to describe the stress systems of all the world's languages through a constrained universal set of formal devices.

For meter, one application of this theory that has proved particularly fruitful has been the assumption that, rather than specifying particular arrangements of linguistic elements at the level of specificity in (4b), what at least some meters do is define a template for a general rhythmic structure, more like that in (4a), together with a set of correspondence rules that govern how specific properties of linguistic structures like that in (4b) can be mapped into the template. For iambic pentameter, for example, the meter of the first 14 lines of example (1), the template has been argued to be that in (5), consisting of five rising feet, each composed of a weak position (W) followed by a

strong one (S), with these feet grouped in their turn ambiguously into two rising cola, which are grouped finally into a line (Halle and Keyser, 1966, 1971; Kiparsky, 1977; Prince, 1989; Piera, 1981).

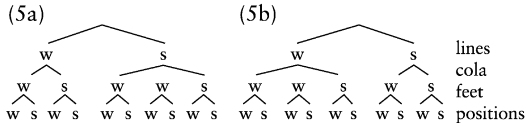

Because the correspondence rules will regulate mapping into this template of some rhythmic properties of a text but not all, this approach allows the full complexity of the actual rhythmic structure of any line to be acknowledged at the same time that the simplicity of the basic rhythm is represented in the template. Specific artistic effects may be seen to be achieved by the interactions between these two levels of representation, as the actual rhythmic structure of the language meets or – especially in the case of unregulated aspects of that structure – does not meet expectations represented by the template, a dynamic that, however it is modeled, is at the heart of virtually every account of the expressive power of meter as a poetic form (Attridge, 1982, 1995; Cureton, 1992; Hollander, 1989; Wright, 1988).

In what follows, drawing on a typology of meters particularly closely modeled on linguistic rhythm (Hanson and Kiparsky, 1996), I will show how this general approach can describe several traditional meters of modern English in ways that begin to meet Halle and Keyser's descriptive challenge. At the same time, however, it will be seen that many questions remain open as to the exact interaction of these descriptions with ever-evolving models of linguistic rhythm.

All illustrations are drawn from the practice of Alfred Lord Tennyson, a poet especially renowned for his metrical accomplishment.

Stress

Stress in English Iambic Pentameter

To return to the iambic pentameter of (1), one claim that is fairly well agreed upon is that it regulates rhythmic prominence specifically by constraining the placement of (to simplify briefly for a moment) stressed syllables of polysyllabic lexical words; such syllables must be mapped into strong positions, not weak ones (Kiparsky, 1975, 1977). Setting aside for a moment the question of the extra syllable of the unmetrical line in (3), it is thus the placement of the stressed syllable-*va*-of of *unvariable* in W as in (6b) which renders the line unmetrical, compared to the well-formed placement of the stressed syllable of *uninvaded* in S in the original metrical line scanned in (6a):

(6a) His áncient, dréamless, ùninváded sleep
w s w s w s w s w s

(6b) *His áncient, dréamless, ùnvárìable sleep
w s w s w s *w s w s

What is interesting here from a linguistic point of view is how this one type of stress has been singled out from the many types of stress that language in fact makes available. There are, for example, contrasts between unstressed and stressed syllables in an absolute sense, measured by the ability of unstressed syllables to tolerate schwa ([ə]) as their only vowel, as in, say, the second, fourth, and fifth syllables of *mètropólitan*, as opposed to the first and third, which must have full vowels with distinct qualities. There are contrasts between primary and secondary stress; even if both the first and third syllables of *mètropólitan* have some stress, that of the first is noticeably less than that of the third. Similarly, in a word like *màintáin*, both syllables have some stress, but the second has more than the first (in contrast to a word like *detáin,* in which the second has more than the first, but the first can have no stress at all). Similarly, there are distinctions between compound stress, in which two words, each already with some stress, are joined together with more stress on the first to make a new word, as in *blúebìrd*, and phrasal stress, which in English also involves the imposition of a characteristic stress pattern on a pair of already stressed words, but with greater stress on the final word, so that in a sentence like *I saw some blùe bírds*, *birds* will have more stress than *blue*, unless a reading contrasting blue birds with birds of another color is intended. And there are rather more abstract distinctions in stress, involving the fact that certain classes of words, such as nouns, verbs, and adjectives, require stress, while other grammatical classes of words do not, being free to be stressed or not depending on their phrasal context and rhetorical import; thus the conjunction *but* may be stressed ([bʌt]) or unstressed ([bət]), but the verb *butt* must always be stressed ([bʌt]).

The question for metrics, then, has been exactly which among these rhythmic contrasts in language is actually regulated in the English iambic pentameter. As Halle and Keyser observed, there seem to be no constraints on strong positions in the English iambic pentameter: they are perfectly free to include syllables with no stress at all. And weak positions can contain syllables with some stress: in line 12 repeated in (2b), for example, some of the syllables in the phrase *upon huge sea-worms* are going to have to be in W even though stressed. Weak positions can even include the strongest stress of a phrase, as in *stream* in (7):

(7) Between the loud stream and the trembling stars
w s w s w s w s w s
('Oenone,' 215)

But as Kiparsky (1975) argued, what is common to these cases of stressed syllables in W is that they are monosyllabic words; stressed syllables of polysyllabic words do not have this freedom, and it is this fundamental constraint on their occurrence in W that *unvariable* violates in (6b), making the line unmetrical.

Even as this generalization is broadly accepted in its rough form, however, there has been significant debate as to its exact formulation. Assessing which representations of English stress best capture it (Kiparsky, 1977; Hayes, 1983; Hanson and Kiparsky, 1996; Fabb, 2002); modeling its interaction with other constraints to produce variation across individual poets' practice (Kiparsky, 1977; Hayes, 1983); adducing and incorporating counterexamples (Youmans, 1983; Golston, 1998); and other challenges all suggest that the description of such a core characteristic of even this familiar meter is by no means completely settled.

Inversion

One of the core sets of counterexamples that any account of English iambic pentameter must address is the configuration traditionally called 'inversion,' illustrated by *battening* in line 12 of (1), scanned in (8a) (again temporarily setting aside discussion of the line's extra syllable), and also by *winnow* in line 10 of (1). In these lines, the constraint against stressed syllables of polysyllabic words in W is violated in the first position of the line, in a practice common to all English poets. Violations also occur line-internally, with varying degrees of frequency and disruption, as in *cities* in (8b):

(8a) Báttening upon huge sea-worms in his sleep,
w s w s w s w s w s

(8b) Much have I seen and known -- cities of men
w s w s w s w s w s
('Ulysses,' 13)

However, these violations have been shown to be systematic in their own right: roughly, again, they are allowed just in case the stressed syllable follows a break, and thus initiates a new phrase (Jespersen, 1922; Halle and Keyser, 1971; Kiparsky, 1975, 1977; Hayes, 1989). However, here, too, the exact formulation of just what kind of a break across different poets' practice has raised a number of interesting linguistic questions – Hayes (1989), for example, showed that the relevant phrasing is phonological, not syntactic, and also hierarchically organized, with inversions after fairly low-level boundaries being allowed only if they are also allowed after high-level ones, so that some conservative poets, for example, might allow only the latter. Another open interesting question involves just how inversion interacts with the metrical hierarchy of the organization of feet into cola, lines, etc.

Grammatical Words

A final example of an interesting question about linguistic organization relevant to metrical practice is the status of stress on grammatical words. The exclusion of stressed syllables of polysyllabic words from W unless they initiate a new phrase of some level is followed much less strictly for prepositions, conjunctions, auxiliaries, pronouns, etc., than it is for nouns, verbs, or adjectives by virtually all English poets. The placement of the stressed initial syllable of the preposition *into* in line 7 of (1), scanned in (9a), affords an example, but does not prove the point since it also initiates a new phrase; grammatical words whose second syllable is stressed, however, and so cannot initiate a new phrase, are likewise occasionally positioned with that syllable in W as is the preposition *upon* in (9b).

(9a) And far awáy ín to the síckly light,
w s w s w s w s w s
(9b) Like footsteps upón wool. I dímly see
w s w s w s w s w s
('Oenone,' 246)

Halle and Keyser (1966) had observed in their initial study of Chaucer that in general the stress of grammatical words seemed irrelevant to metrical well-formedness. The generalization seems true, even if the freedoms it affords are indulged with varying frequency by different poets; and the question therefore remains for linguistics exactly why that should be so (Kiparsky, 1975, 1977; Hayes, 1989; Hanson, forthcoming). What is interesting is that there is ample evidence that in ordinary language there are also significant formal differences in the nature of stress on grammatical words as opposed to others (Selkirk, 1995).

Syllable Count

Elision and Diaeresis

The other basic rule of much English iambic pentameter illustrated by 'The Kraken' is that there is a single syllable in each metrical position. As mentioned above, this raises the linguistic question of exactly what is a syllable. Since the syllable is a comparatively familiar linguistic entity, the answer may seem obvious; but it is not so obvious for poets, as it is

not for linguists. Rather, the English iambic pentameter is like virtually all meters in incorporating rather elaborate possibilities for elision and diaeresis – reductions of two adjacent syllables to one for purposes of metrical syllable count, or expansion of one into two, respectively – and description of the rules governing such practices and contemplation of their limits provide an interesting window on the question of what exactly are possible syllables.

Building on Tarlinskaja (1976) and others, Kiparsky (1977) identifies three basic rules of elision in English iambic pentameter, conventionally annotated by a slur '‿'. One, illustrated in line 6 of 'The Kraken' and scanned in (10a), allows an unstressed high vowel (here [i]) followed by another unstressed vowel to be treated as a glide, and hence allows the whole sequence to be treated as a single syllable. (This rule is what accommodates the extra syllable of *unvariable* in (6b), but it cannot rescue the line from its problematic stress placement.) Sequences of this type involving separate grammatical words can be elided in the same way, as in (10b) (as can sequences involving the other high vowel of English ([u]) as in words like *influence*, or phrases like *to embrace*):

(10a) Huge spónges of millénnial growth and height;
w s w s w s w‿ s w s

(10b) And áfter mány a súmmer dies the swan
w s w s w‿ s w s w s
('Tithonus,' 4)

Another rule of elision allows an unstressed vowel followed by a single sonorant consonant ([n, m, ŋ, r, l, w, j]) and then another unstressed vowel to be deleted, as in the elision of *battening* from line 12 of 'The Kraken,' scanned in (8a) above, or *slumbering* from line 10 scanned in (11):

(11) Wínnow with gíant arms the slúmbering green.
w s w s w s w s w‿ s

A final rule of elision allows any two adjacent vowels to count as a single syllable, as in (12):

(12) Of happy men that have the power to die
w s w s w s w s‿ w s
('Tithonus,' 70)

As Kiparsky (1977) argued, these rules can be seen to be plausible phonological reductions partly because they are actual phonological reductions in many English dialects. What is interesting, however, is that they cannot be assumed to simply reflect actual reductions in the poet's dialect, because they are optional. In (13), for example, in *shuddering,* exactly the same type of sequence that is read as one syllable in (11) is read as two:

(13) Reel, bruised and butted with the shuddering
w s w s w s w s w s
('Tiresias,' 97)

Rather, they represent a more abstract notion of a possible English syllable, as if that is a notion the poet is using the meter to explore. The question of what range of elisions poets use in particular languages and also universally is thus of interest to the theory of syllable structure in general.

Syllable count in English iambic pentameter also poses a few historical puzzles that remain unsolved. The word *heaven* is treated as if it has a monosyllabic variant, as in (14), in virtually every English poet's practice:

(14) From me, heaven‿'s queen, Paris, to thee king-born
w s w s ws w s w s
('Oenone,' 125)

Other words that behave similarly and have similar phonological structures include *even, ever, over,* and *devil*. Since some of these have monosyllabic variants either in poetic notation (*e'en*) or regional dialects (*de'el*), it has been argued that the practices might have their origins in reductions that were phonologically plausible for forms of these words now lost, perhaps having, for example, a glide where we now have [v] (Kökeritz, 1953); but the question remains open, and the words stand as a testimony to the possibility of conventions persisting in poetic practice even when they cease to be grounded in the language.

In a similar way, another familiar poetic practice can recuperate a syllable from a suffix that no longer constitutes one in the ordinary language, as in *aged* in (15a). And finally, the English iambic pentameter sometimes also exhibits hiatus, the reverse of elisions of the type in (12), in the counting of two adjacent vowels that might well be considered a single syllable in the ordinary language as two for purposes of the meter, as in *cruel* in (15b):

(15a) Match'd with an aged wife, I mete and dole
w s w s w s w s w s
('Ulysses,' 3)

(15b) Me only cruel immortality
w s w s w s w sws
('Tithonus,' 5)

Extrametricality and Catalexis

The foregoing complications in syllable count are akin to the earlier-discussed question of the treatment of the stress of grammatical words, in that they involve questions of what the linguistic representation of the language to be mapped into the template looks like – whether it is like or unlike the ordinary

language, and how and why. There is another complication in syllable count even for this simplest form of the English iambic pentameter, however, that is more like the question of inversions discussed above, in involving an exceptional mapping of that language into the template. It is a completely familiar characteristic of the English iambic pentameter for some lines to have what is sometimes called a 'feminine ending,' an unstressed syllable at the end of the line in excess of the usual ten. These syllables have been analyzed as exactly analogous to extrametrical syllables in language, in being peripheral constituents that simply remain outside of a basic rhythmic parse, and in fact were the inspiration for that crucial component of the theory of the phonology of rhythm (Hayes, 1988). Hence, they are normally referred to by linguists as 'extrametrical' and notated by the same angled brackets ('<>') used for extrametricality in language, as in (16):

(16) O móther Ida, mány fóuntain'd Ida
w s w sw s w s w s<>
('Oenone,' 33)

Extrametrical syllables are in many ways analogous to the inversions discussed earlier, except for being a phenomenon special to ends rather than to beginnings. It comes as no surprise, then, that just as inversions are possible within lines at the beginnings of phrases, so extrametrical syllables are possible within lines at the ends of phrases, as in (17), raising the same issues as to exactly where they are allowed and why, and in particular how the phenomenon interacts with phrasing:

(17) Unbías'd by self-prófit, O, rest thee sure
w s w s w s <> w s w s
('Oenone,' 156)

Still another complication in syllable count is, like these phenomena, confined to edges – beginnings or ends, as we will see, depending on the meter – and interacts with extrametricality to give one of the most traditionally vexing issues in metrics. It is well known that during certain periods especially, English poets have occasionally allowed an initial syllable to be missing from an iambic line, as in the line from Chaucer in (18) cited by Halle and Keyser (1971) to illustrate this possibility:

(18) ø Twenty bookes, clad in blak or reed
w s w s w s w s w s
(*The Canterbury Tales*, 'General Prologue,' I 294)

In English, such lines have sometimes been called 'headless' and sometimes 'catalectic.' Interestingly, Kiparsky (1993) argued that the metrical practice has an analog in language just as much as extrametricality does, in that languages sometimes treat a syllable as present for purposes of a rhythmic parse even though it has no segmental manifestation, just as under extrametricality they sometimes treat one as absent even though it has segmental manifestation; the phonological possibility was developed extensively for English by Burzio (1994) but has not been nearly so thoroughly explored cross-linguistically as extrametricality has.

What is problematic for meter if these phonological suggestions are correct, then, is not the existence of the catalexis, but rather the way it interacts with extrametricality to confuse the very issue of what template a meter has. Catalexis is not especially common in English iambic meter – as noted by Young (1928), it serves the same function as inversion of allowing a line to begin with a stress and went out of fashion as that came in. But in trochaic meter, it is the norm for the final weak position to go unfilled by any syllable, as illustrated by Tennyson's short poem 'Home they Brought her Warrior Dead' in (19):

(19) Home they brought her warrior dead;
She nor swoon'd nor utter'd cry.
All her maidens, watching, said,
"She must weep or she will die."
Then they praised him, soft and low, 5
Call'd him worthy to be loved,
Truest friend and noblest foe;
Yet she neither spoke nor moved.
Stole a maiden from her place,
Lightly to the warrior stept, 10
Took the face-cloth from the face;
Yet she neither moved nor wept.
Rose a nurse of ninety years,
Set his child upon her knee,
Like summer tempest came her tears – 15
"Sweet my child, I live for thee."

The first line is scanned in (20a) as trochaic tetrameter, assuming the same correspondence rules as for iambic pentameter but a different template, and line-final catalexis:

(20a) Home they brought her warrior deadl Ø
s w s w s w s w
(20b) Like summer tempest came her tears – Ø
<> s w s ws w s w

The problem is that if this poem is indeed trochaic, then line 15 shows that trochaic meter must admit extrametrical syllables initially, as represented in the scansion in (20b). From a formal point of view, if iambic meter allows catalexis initially and extrametricality finally, it is entirely to be expected that trochaic meter should allow catalexis finally and extrametricality initially. The consequence of this, however, is that, as Saintsbury (1906) observed, it

becomes possible to scan any iambic line as trochaic or vice versa using these devices; the lines in (20) could equally be as in (21):

(21a) ø Home they brought her warrior dead;
w s w s w s w s

(21b) Like summer tempest came her tears –
w s w s w s w s

This ambiguity has been used to argue that English meter is defined only by a fixed number of beats (Wallace, 1996). However, this conclusion misses the artistry with which this ambiguity is exploited by poets: on the model of English meter developed here – itself based on the model of linguistic rhythm as a complex hierarchical structure – the analysis of a line as iambic or trochaic is not just a question of whether one starts with a weak or a strong position, but entails a complex hierarchical organization of those positions, as, for example, in (5), defining precise positions for boundaries of metrical units like feet, cola, and lines as well as precise positions for which syllables may be extra or missing, all of which define expectations that the language of a line may fulfill, challenge, or disappoint in some way. Which is the right template in a particular poem may not be decided on linguistic grounds, but it is not without interpretive consequences; for example, on the scansion in (20b), line 11 might be seen as especially tumultuous, with its unincorporable extra syllable, whereas on that in (21b) it can be seen as coming as a relief, in that something missing has been restored. Or in Tennyson's 'The Lady of Shalott,' the example of the problem famously discussed by Saintsbury (1906), the inability to get one's metrical bearings is part of what makes the poem seem to waver between what is real and what is imagined, an effect that would be inexplicable if a line simply had a fixed number of beats and no other structure.

Resolution

Another traditional observation about English meters that has received a rather new interpretation as a result of developments in linguistics is that extra syllables sometimes occur in positions where they can be neither elided nor understood as extrametrical. Lines like those in (22), if they are to be mapped into an iambic pentameter template like that in (5) as other lines in the poems they come from can be, must have the two syllables marked by the brace '⏟' (distinct from the slur marking elision) in one position:

(22a) The long brook falling thro' the cloven ravine
w s w s w s w s

(‘Oenone,’ 8)

(22b) In cataract after cataract to the sea
w s w s w s w s w s

(*ibid.*, 9)

As Kiparsky (1977) observed, building on Young (1928), whenever such sequences involve stress, they consist precisely of a short stressed vowel followed by a single consonant (or a pair that can be parsed together as an onset) and then another unstressed vowel all in the same word, as in (22b), or the additional examples with different vowels in (23):

(23a) Ineffable beauty, out of whom, at a glance
w s w s <> w s w s w s

(‘Tiresias,’54)

(23b) To some great citizen, win all praise from all
w s w s w s w s w s

(*ibid.*, 82)

(23c) Here trampled by the populace underfoot
w s w s w s w s w s

(*ibid.*, 166)

Because they involve stressed syllables in polysyllabic words that cannot be understood as somehow potentially reduced to monosyllables, these sequences occur only in strong positions (unless initial). They thus resemble the structures of 'resolution' found in classical and in Old English meters, in which a single position is realized by a sequence of this type. In fact, those structures have been argued to play a role in ordinary stress systems, as a particular variant of the phonological foot type called 'moraic trochees,' normally consisting of two light syllables with stress on the first (Hanson, 1992; Hanson and Kiparsky, 1996). English iambic meters that allow resolution have thus been proposed to actually not be syllabic at all; instead of requiring a single syllable in each position, they require a maximum of a single moraic trochee of this type in each position (Hanson and Kiparsky, 1996). Because that is a unit of stress assignment, the presence of pairs of syllables with no stress on either follows – as in (22a) – and indeed is virtually always found wherever resolution is (incidentally giving each line in (22b) and (23) an alternative scansion). Thus, there are really two distinct types of iambic meter in English: one is based on having a syllable in each position, and one measured by this other principle. As Halle and Keyser (1999) observed (although analyzing the phenomenon rather differently) the distinction was recognized by Robert Frost, who called the two 'strict' and 'loose' iambics.

Stress in 'Strong-Stress' Meters

What is shared by the two versions of iambic meter just discussed is their constraint against having the stressed syllables of polysyllabic words in weak positions, as well as their iambic template. That is not, however, the only constraint on stress that English meter can have, even in meters sharing that template.

Most strikingly, the variable syllable count illustrated in (22) and (23) occurs in the exact same form not only in the loose iambic meter illustrated there, but also in another meter, sometimes called 'iambic-anapestic' (Leino, 1986), illustrated in (24) by lines from Tennyson's hexameter poem 'The Voyage of Maeldune.' In this meter, there is no constraint against stress in weak positions, so resolution can occur in there as in *melon* and *flourished* in (24b and 24c). Instead, there is a requirement that the strong positions must contain stress:

(24a) And the fig ran up from the beach and rioted over the land
w s w s w s w s w s w s
('The Voyage of Maeldune',58)

(24b) And the warm melon lay like a little sun on the tawny sand,
w s w s w s w s w s w s
(*ibid.*, 57)

(24c) And the poplar and cypress unshaken by storm flourished
w s w s w s w s w
up beyond sight
s w s
(*ibid.*, 15)

This requirement of stress in strong positions aligns this meter with the classical dactylic hexameter, to which it clearly makes reference with its six-foot line, which in addition to the variation between one and two syllables in weak positions discussed above has a requirement of heavy syllables in strong positions. It also aligns it with Old English meter, which differs in having a tetrameter template (Getty, 1998), but likewise in addition to its variation in syllable count has a requirement of stress in strong positions. This meter is also the basis of Hopkins' 'sprung rhythm' (Kiparsky, 1989; Hanson, 1992).

This iambic-anapestic meter is in its turn distinct from genuine anapestic meter, which shares this property of requiring stress in strong positions, but does not does not have variable syllable count (Hanson, 1992). Rather, it has a regular triple rhythm (apart from variations attributable to catalexis, extrametricality, elision, and diaeresis, which are in principle available to all meters). This can be understood as deriving from a different template genuinely comprising three positions, though perhaps, as Prince (1989) suggested, built hierarchically out of groups of two as in (25), in keeping with hypotheses that only binary structures figure in the phonology of linguistic rhythm, and involving a natural differentiation in stress between the first and second positions of the subdivided weak position, as indicated. Only the unsubordinated strong position requires stress, and the subordinated weak position eschews stressed syllables of polysyllabic words as in iambic meter:

(25)
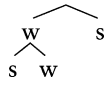

This meter is illustrated in (26) by lines from some anapests Tennyson wrote as a youngster, pairs of tetrameters that join to form octometers:

(26) For its sweet breathing tones in forgetfulness languish,
s w s s w s s w s s w s <>
And around it the ivy shall weave a green veil.
s w s s w s s w s s w s
('Written by an Exile of Bassorah')

Alignment

Finally, although they do not figure conspicuously in English metrical descriptions, this survey of principal elements of meter would be incomplete without mention of correspondence rules that regulate neither syllable count nor stress, but the **position** of linguistic boundaries, like those of words, phrases, or sentences, in relation to the boundaries in the template, such as those of feet, cola, or lines. Such rules are central to the canonical meters of some languages; in the classical French *décasyllabe*, for example – a meter that shares exactly the same template and rule for syllable count as the strict English iambic pentameter, and likewise used for sonnets – there must be a word boundary (a caesura) between the syllables in the fourth and fifth positions, which is to say between the cola of the structure in (5a), as in (27a); a line like Tennyson's in (27b) would be unmetrical:

(27a) Mais ce repos, qui soulage le monde
w s w s w s w s w s <>
(du Bellay, 'l'Olive')

(27b) It little profits that an idle king
w s w s w s w s w s
('Ulysses,' 1)

Such rules also find an analogue in language, in, for example, constraints mandating coincidence of prosodic boundaries with those of other linguistic constituents (McCarthy and Prince, 1993). And even though rules of this kind have received comparatively little attention in English metrics, and indeed do not figure as centrally there as the other rules discussed do, they are not without a role in English: they underlie constraints on enjambment (Hayes, 1989); they appear as statistically significant tendencies in some poets' practice (Duffell, 2002); they govern subregularities of well-formedness noted by Kiparsky (1977); and they exert enormous aesthetic influence

(Kiparsky, 1977). This last was already noted above in connection with the alternative metrical analyses of 'Home They Brought Her Warrior Dead' in (19), but it can also be seen here that the opening line of 'Ulysses' in (27b), for example, in not allowing the rest that comes from having a word boundary coincide with a foot boundary until the end of the line, where any such restfulness is undone by enjambment, portrays Ulysses' restlessness at being consigned to spend the remainder of his life ruling over the unstriving Ithacans characterized metrically in just the opposite way:

(28) That hoard, and sleep, and feed, and know not me

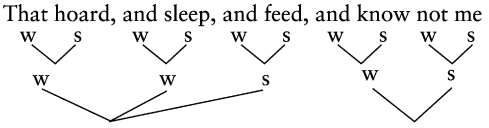

('Ulysses,' 5)

Conclusion

The foregoing has of course only scratched the surface of the analysis of some properties of some of the most familiar meters of one language. However, even in this brief survey it can be seen that at every turn, the question of why meters have the precise properties they do seems to be illuminated by considering those properties not as accidental conventions, but as manifestations of the fundamental nature of meter as a linguistic form. In turn, simply understanding what those properties are allows a richer appreciation of how poets have used meter to create aesthetic effects.

Understanding these properties has also allowed the broaching of new questions about meter, such as how to model intuitions about not just well-formedness, but also complexity (Friedberg, 2002), the organization of lines into stanzas (Hayes and MacEachern, 1998; Kiparsky, forthcoming), or the principles governing how texts are set to music (Hayes and MacEachern, 1998; Kiparsky, forthcoming). Understanding these properties is also a significant preliminary to questions – made especially compelling by 20th-century poetic practice – of how meter differs from the organizing principles of compositions that are exceptionally rhythmic yet not metrical (Hartman, 1981), and even how meter differs from music itself. Further study of meter in more challenging English forms and in other languages is thus a wide open and rewarding field of research in linguistics, literature, and aesthetics today.

See also: Literature and the Language of Literature; Metrical Phonology; Rhythm.

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Metonymy

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Metonymy: History and Terminology

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A classic example of the rhetorical use of metonymy is 'The pen is mighter than the sword.' In 1980 the cognitive linguists Lakoff and Johnson (1980) introduced the concept of conventional or conceptual metonymy alongside the concept of conceptual metaphor. They argued that metaphor and metonymy are not just rhetorical devices, but pervade our talking, thinking and acting in the world. According to this new view, a conventional metonymy is a metonymy that is commonly used in everyday language in a culture to give structure to some portion of that culture's conceptual system. Metonymies can be based on many cognitive and culturally based conceptual relationships. To give only two examples (there are more later in this article): in 'Napoleon lost at Waterloo,' metonymy is based on the controller-controlled relationship; in 'The kettle is boiling,' metonymy is based on the container-contents relationship. One of the more recent definitions of metonymy, rooted in this new view of metaphor and metonymy, is the following:

> Metonymy is a cognitive process in which one conceptual entity, the vehicle, provides mental access to another conceptual entity, the target, within the same idealized cognitive model. (Radden and Kövecses, 1999: 21)

Here the 'near and close things' referred to in the *Rhetorica ad herennium* have been replaced by Lakoff's 'idealized cognitive models.' Other researchers work with the terminology of domains, schemas, or frames instead.

In between the *Rhetorica ad herennium* and the more recent publications, research into metonymy picked up ideas from traditional rhetoric (metonymy was part of the tropical triad of metaphor, metonymy, and synecdoche or else of the quadruple of metaphor, metonymy, synecdoche, and irony), from associationist psychology (it inherited the distinction between contiguity and similarity as defining the difference between metonymy and metaphor), from Saussurian linguistics (it inherited the distinction between syntagmatic and paradigmatic relations, which Jakobson (1956) used to distinguish between metaphor and metonymy), from interactionist approaches to metaphor (Black, 1979) (it inherited the distinction between tenor and vehicle), and from Gestalt psychology (it inherited the distinction between figure and ground). This last influence has come to the fore in recent years through Langacker's work and has been successfully integrated into various frame-based analyses of metonymy.

An example of this type of analysis can be found in Panther and Radden (1999). They study the following metonym:

> (1) The first violin has the flu.
>
> The concept 'the first violin' is part of a knowledge structure that it evokes. As a musical instrument, a violin is immediately associated with the violinist as the player of that instrument. Moreover, the first violinist is defined as a member of a larger group of musicians, the symphony orchestra. Among the musicians of the orchestra, the first violinist is the most outstanding member. Finally, our knowledge of orchestras includes, among other things, the notion of music and its representation in scores. The predication *has the flu* as well as the attribute *first* trigger a non-literal interpretation of the noun phrase *the first violin*. Thus, the metonymic reading in [1] involves a shift from the instrument to the musician as the most readily available element in the frame. Through this metonymic shift, the reference point ('the first violin') is backgrounded and the desired target ('the first violinist') is foregrounded. (Panther and Radden, 1999: 9)

This analysis draws on Langacker's (cognitive) distinction between reference-point and target (1993: 3). For Langacker, metonymy is a reference-point phenomenon in that "the entity that is normally designated by a metonymic expression serves as a reference point affording mental access to the desired target, i.e. the entity actually being referred to" (Langacker, 1987: 385–386).

The distinction between reference-point and target can be compared to those made in pragmatics between what is said and what is meant, what is said and what is referred to, what is said and what is only implied, and between the conventional meaning/referent and the intended meaning/referent of the words used. This brings us to the question: Is metonymy a conceptual/cognitive or a referential/pragmatic phenomenon? Or both?

Metonymy: From Cognition to Social Interaction

At present, there are two camps in the cognitive linguistic community: those who see metonymy essentially as a referential and/or pragmatic phenomenon and those who see it essentially as a conceptual and cognitive one (Nunberg, 1978; Feyaerts, 1997: 74–76). For Seto, for example, metonymy "is a referential transfer phenomenon based on the spatio-temporal contiguity as conceived by the speaker between an entity and another in the (real) world" (Seto, 1999: 91). At the other end of the spectrum we find Kövesces and Radden's (1998) work, in which metonymy is radically defined as a conceptual phenomenon. Lakoff and Turner (1989: 103) were rather more cautious when they wrote that metonymy "is used primarily for reference: via metonymy, one can

refer to one entity in a schema by referring to another entity in the same schema."

More recently, Warren has made the distinction between referential metonymy and propositional metonymy, in which the former is based on reference-based relations, such as between cause and effect or container and content, the latter on antecedent-consequent relations (or if-then relations). An example of referential metonymy is: "*The bathtub* is running over. [That which is in the tub, i.e., the *water*]" (Warren, 1999: 127). An example of propositional metonymy is: "It won't happen while I still *breathe*. [If he breathes, then he lives]" (p. 129). Warren defines referential metonymy in the following way:

> For anything to qualify as a referential metonym, the following applies:
> (i) it should have a referent,
> (ii) the intended referent is not explicitly mentioned but its retrieval depends on inference,
> (iii) inference is made possible because there is some connection between the mentioned referent (the trigger) and the implied referent (the target) deemed so well known that in the context in question the former will automatically suggest the latter. (Warren, 1999: 123)

For Warren, "the actual meaning-construction of metonyms depends on successful referent-identification. We cannot be certain that we have worked out the correct metonymic extension, unless we believe we know what the referent is" (Warren, 1992: 68). It seems that our ability to create and understand metonyms is grounded in our ability to infer the referential intentions of others in linguistic interaction (see Burling, 1999).

Metaphor and Metonymy

From this point of view, one can argue that metonymy is a pragmatic strategy used by speakers to convey to hearers something new about something already well known. This distinguishes it from metaphor, which can be regarded as a pragmatic strategy used by speakers to convey to hearers something new that cannot easily be said or understood otherwise or to give an old concept a novel, witty, or amusing package. Using metaphors, speakers tell you more than what they actually say; using metonyms they tell you more while saying less. From the point of view of the hearer, metaphor is a strategy used to extract new information from old words, whereas metonymy is a strategy used to extract more information from fewer words. Metaphor is a conceptual and semantic simulation device, whereas metonymy is a conceptual and syntactic abbreviation device. Both are pragmatically grounded and exploit cognitive mapping processes.

An example of the use of a metaphoric strategy would be the child who points to an oil spill on the road and says:

(14) "Look: A dead rainbow!" (Todd and Clarke, 1999)

An example of the use of a metonymic strategy would be the German passenger who, in 1997, looked down from a plane approaching Heathrow and said to his wife, when pointing to a cow:

(15) "Look: BSE!"

In the first case, the mother has to *create* a relation between the oil spill shimmering in many colours and a rainbow, a rainbow that seems to have been reduced to a sad puddle. In the second case the wife can *exploit* a given relation between cows and the potentially deadly disease they might carry. Here the relation is not created but presupposed (Bredin, 1984: 57). In the case of metonymy, the hearer has to find the target item and interpret it by retrieving a relation between it and the trigger. As conceptual metonymic relations (such as cause-effect, part-whole, container-content) are cognitively well entrenched, the interpretation of metonymy is less demanding than the interpretation of a metaphor, where the possible links between what is said and what is meant are relatively open-ended (Warren, 1992: 99).

Whereas our ability to leap through mental spaces and establish unexpected but enlightening links between features of these spaces underlies metaphor, our ability to access an entire state, situation or object from the mention of some part is the hallmark of metonymic thinking (Warren, 1999: 122).

Both metaphor and metonymy can lead to semantic change and polysemy. In the case of metonymic sense extension, the pathways we use seem to be cognitively entrenched and rooted in patterns of human action and experiences of handling objects. Many linguists have tried to establish typologies of these 'pathways' of metonymic sense extension (Nerlich *et al.*, 1999), but one example will suffice here. In 1981, Norrick distinguished the following types of metonymy and correlated them with 18 metonymic principles. This typology includes the part-whole relationship often called synecdoche (on the metonymy and synecdoche, see Nerlich and Clarke, 1999; Seto, 1999, 2003).

I. Cause – effect
   1. Cause – effect
   2. Producer – product
   3. Natural source – natural product
   4. Instrument – product

II. Acts and major participants
   1. Object – act
   2. Instrument – act
   3. Agent – act
   4. Agent – instrument

III. Part – whole
   1. Part – whole
   2. Act – complex act
   3. Central factor – institution

IV. Container – content
   1. Container – content
   2. Locality – occupant
   3. Costume – wearer

V. Experience – convention
   1. Experience – convention
   2. Manifestation – definition

VI. Possessor – possession
   1. Possessor – possession
   2. Office holder – office

This use of well-established conceptual pathways makes metonymy quite different from metaphor.

As a result of the use of a metaphor, salient features of words and objects are blended across semantic and conceptual space. Metaphor binds distant conceptual domains together and creates conceptual networks. As a result of the use of a metonym, a word absorbs salient features inside a referential or conceptual space or, to put it differently, it spreads out over conceptual space(s). Whereas metaphor creates new meaning and possibly new conceptual structures, metonymy incorporates free-floating meaning, steals meaning from related concepts and conceptual domains, and thereby changes or strengthens given conceptual structures.

Synchronically, metonymies are created by exploiting contiguous relations inside a conceptual/referential domain. This can have a rhetorical effect, as in "Look, BSE!" or else be the result of pragmatic constraints on cost-effective communication (as in 'The appendix has just passed out'). Diachronically, metonymies can spread serially (which can lead to synchronic polysemies, such as *panel* which can mean either 'flat distinct section of a larger surface, such as that in a door' or 'a group of people as a team' or 'list of jurors,' etc., similar to *board*) from, say, *board* to table to food (as in *bed and board*) to the people who set around the table, etc. This chaining follows 'natural' relations, quite often based on immediate proximity between objects and people in space. As interlocutors do not cross distant conceptual boundaries, they tend not to exploit and create the wide conceptual networks on which metaphorical expressions are based.

Conclusion

The definition of metonymy inside cognitive linguistics is still fluid and this article could only provide a glimpse into some aspects of research. It did not deal with metonymy and salience (Paradis, 2004), metonymy and qualia, the interaction between metaphor and metonymy, and the universality of conceptual metonymies (see Panther and Thurnburg, 2003).

See also: Cognitive Semantics; Frame Semantics; Metaphor and Conceptual Blending; Metaphor: Philosophical Theories; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Polysemy and Homonymy; Rhetoric, Classical; Rhetoric: History; Rhetoric: Semiotic Approaches.

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Metrical Phonology

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Introduction

Metrical phonology is a cover term applied to explorations of stress and rhythmical phenomena. Although metrical phonology yielded important insights into the representation and description of metrical verse in English and other languages (Hayes, 1984, 1989; Kiparsky and Youmans, 1989; Russom, 1987, 1998), nevertheless the impression of metrical phonology was most clearly felt in the analysis of syllable structure, word stress, and phrasal rhythm. In these fields, research on the nature and construction of nonlinear representations became intense after the publication of Liberman and Prince's seminal 1977 article. Important early contributions to the analysis of word and phrase stress were made by Hayes (1982), Giegerich (1983, 1985), Prince (1983), and Selkirk (1984). Metrical phonology then gained further impetus from the publication of Halle and Vergnaud (1990), a strand of research that developed into the 1990s and saw publication of revised, or entirely new, kinds of representational

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models (Halle and Idsardi, 1995). The mid-1990s also saw publication of what is perhaps still the most significant single work of summary and analysis of the nonlinear project. This was Hayes (1995). At the same time, nonlinear representational models helped explore topics in diachronic linguistics, particularly with respect to the history of English stress (McCully and Hogg, 1990; Lass, 1992; Lahiri *et al.*, 1999), and this strand of research also informed analyses of some of the same phenomena, as these were developed in a variety of optimality-theoretic approaches (Pater, 1995; Minkova, 1997; Gasiorowski, 1998). Metrical phonology also made its impression on the foundation of optimality theory (OT; Prince and Smolensky, 1993), and elements of its particular kinds of nonlinear representation can be discerned in important modifications of OT (McCarthy and Prince, 1993).

Trees and Grids

From the beginning, metrical phonology was relational in character. That is, stress was not viewed as an absolute property of syllables and words. Rather, syllables and words were analyzed as either stronger than, or weaker than, adjacent syllables or words. Stress was not seen, as in Chomsky and Halle (1968), as a matter of *degree*, with specifiable phonetic correlates; it was a matter of relative prominence. Therefore, a word of two syllables, with most prominent stress on its initial syllable, might be notated as follows, where *S* stands for 'stronger than' and *W* for 'weaker than':

(1)

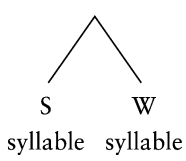

S and *W* can never exist in isolation, nor can *S* be sister to *S*, or *W* a sister to *W*. Additionally, and therefore, ternary relationships are debarred. The representations found in (2) are ill formed:

(2)

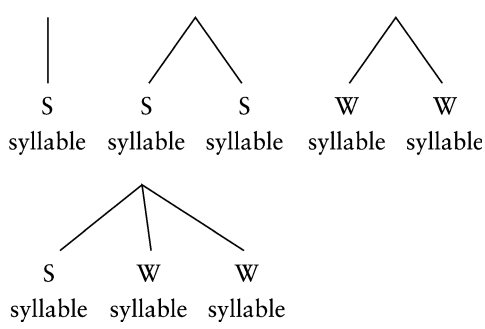

Notice that, a notation such as [W S] would in principle be well formed for both the following English examples:

(3)

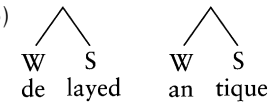

Clearly, there are differences in the prominence of the syllables *de-* in *delayed, an-* in *antique*. One difference is phonetic (*an*-is rarely or ever subject to reduction to schwa, cf. */œnti:k/), whereas the vowel shape in the first syllable of *delayed* will always display relative stresslessness. Consider also the strings *delayed flight* and *antique spoon*. In the first, the prominence pattern of *delayed* is unaltered. In the second, prominence on *antique* shifts to [S W]. Trees of the kind sketched in (3) have no way of capturing the distinction in prominence patterns of words such as *delayed* and *antique* (both are underlyingly – one might say – [W S]), and such tree representations cannot, in themselves, predict prominence switching.

To remedy this problem, the earliest version of metrical phonology used a supplementary notational device, the metrical grid. Grids were built from the bottom upward, and no gaps in construction were allowed. Further, grids, unlike trees, could 'read' which syllables were stressless, or nonreducible and therefore 'footed,' along with which syllable within the phrase was most prominent. Consider the representations in (4):

(4a)	de	layed	flight	
	x	x	x	Level 1
		x	x	Level 2
			x	Level 3
(4b)	an	tique	spoon	
	x	x	x	Level 1
	x	x	x	Level 2
		x	x	Level 3
			x	Level 4

In (4a), syllables are grid marked at Level 1, then prominence relations are projected onto the grid at Levels 2 and 3. Once this has been achieved, then the phrase-final word in both examples must receive more grid marks than anything else in the string, because both *flight* and *spoon* are (and will remain) the heads of their respective phrases: they are the strongest elements of each string. Compare grid structures in (4a–b) with their associated trees (5a–b). Notice how the strongest word of each phrase is uniquely dominated by *S*:

(5a)

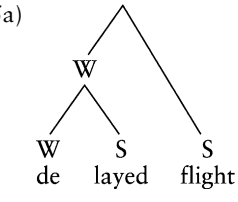

(5b)

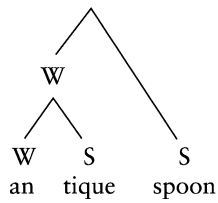

Tree structures expressed prominence relations, but were not in themselves structured enough to capture nonrelational facts (such as the degree of prominence accorded to *an-* in *antique*, compared with *de-* of *delayed*). To express those nonrelational facts, the grid was needed. Trees might express the environments for, i.e., the 'permission,' for rhythmically motivated change, but grids expressed the 'pressure' for such change, largely because certain configurations of grid marks could be defined as clashing or lapsing.

Clashes and lapses can be defined as follows. A grid *clash* occurs when grid marks in two directly adjacent columns have marks on two contiguous rows (not counting Level 1). A grid *lapse* occurs when grid marks in two directly adjacent columns have equal marking on the same row. Thus, the grid found in (6a) expresses a clash, that in (6b), a lapse:

(6a) Grid clash

Level 1	x	x	x
Level 2	x	**x**	**x**
Level 3		**x**	**x**
Level 4			x

(Grid clash at Level 3)

(6b) Grid lapse

Level 1	x	x	x	x
Level 2		**x**	**x**	x
Level 3				x
Level 4				

(Grid lapse at Level 2)

Repairs take place so that the new grids are 'better' (in a sense to be shortly defined here) than their underliers. In (6a), for example, a possible repair strategy would be to *move* the clashing grid mark at Level 3 leftward from the site of the clash, relocating it atop the next adjacent leftward column. In (6b), a possible repair strategy might be to *add* a grid mark to column 2, Level 3, simultaneously (and consequentially) adding a further mark to column 4, Level 4, so that that column remains strongest of the string:

(7a) Grid clash, repaired

Level 1	x	x	x
Level 2	x	x	x
Level 3	**x**		x
Level 4			x

(7b) Grid lapse, repaired

Level 1	x	x	x	x
Level 2		x	x	x
Level 3		**x**		x
Level 4				**x**

Repaired grids in (7a–b) may be said to be 'better' because they not only express alternating structures, but also eurhythmic ones, in the sense of Hayes (1984). Alternation may be defined as follows: where grid marks are adjacent on one level, but where the adjacent marks are separated at the next lower level by one (and only one) grid mark. Consider here the structures expressed at Level 3 in (7a–b). In both instances there are adjacent grid marks in the first and third columns. But at the next level down, Level 2, the erstwhile adjacent columns and their markings are separated by an intervening grid mark (the boxed mark in (8a–b) below):

(8a) Grid clash, repaired

Level 1	x	x	x
Level 2	x	$\boxed{x}$	x
Level 3	x		x
Level 4			x

(8b) Grid lapse, repaired

Level 1	x	x	x	x
Level 2	x	$\boxed{x}$	x	
Level 3	x		x	
Level 4			x	

In Hayes (1984), disyllabic outputs were only one facet of the rhythmical phenomenon of eurhythmy, where quadrisyllabic intervals (for example) could also be optimally well formed provided that alternation was defined on every relevant lower level of the grid:

(9) Quadrisyllabic intervals and eurhythmic structures

Level 1	x	x	x	x	x
Level 2	x		x	x	x
Level 3	x		x	$\boxed{x}$	x
Level 4	x		$\boxed{x}$		x
Level 5	x				x
Level 6					x

The marks at Level 5 – spaced four syllables apart – are adjacent, but separated evenly at the next lower level (the boxed mark at Level 4). Again, the marks in columns 3 and 5 of Level 4 – spaced two syllables apart – are adjacent, but are separated evenly at the next lower level (the boxed mark at Level 3). The grid seen in (9) is perfect: no addition or movement of grid marks is possible, and none would be motivated. In addition, the structure obeys two principles of eurhythmy, the disyllabic principle (Hayes, 1984: 48), and the quadrisyllabic principle (Hayes, 1984: 46).

It would be possible to express some of these pressures and permissions in annotated tree structures, and encode rhythmicity into rewrite rules, as in (10):

(10a) Tree-only rhythmicity (I)

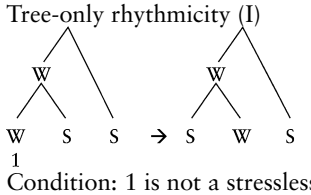

Condition: 1 is not a stressless syllable

(10b) Tree-only rhythmicity (II)

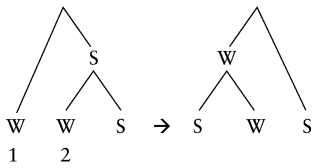

Condition: 1, 2 may dominate lexical monosyllables

Such representations and rules were explored in papers and other work by Giegerich (1980, 1983, 1984, 1985). This approach eschewed grids, and sought to develop a truly relational approach to the representation of word and phrase stress. The most innovative feature of this work lay in the representation of lexical monosyllables in English. In grid-only formats (and with the exception of the grid-only representations developed in Selkirk, 1984), the representation of lexical monosyllables tended to be a matter of stipulation. Such items were inherently stressed (because they were lexical items, word stress had clearly applied to them somewhere and somehow), and therefore, they were in some sense 'strong,' or perhaps 'footed.' In versions of Giegerich's early work, lexical monosyllables could not properly be S(trong) *unless that S had a sister W*. It followed that a lexical monosyllable, in a citation form, might be followed by a *W* node that dominated a zero syllable. Compare the representations of the numeral *three* below. In (11a), *three* is given a grid representation, a somewhat stipulative height capturing the fact that it is a syllable, a foot, and a (prosodic) word. In (11b), the syllable is represented as being dominated by terminal *S*, with accompanying *W* zero syllable:

(11a) x (Level 3, 'word level')
x (Level 2, 'foot level')
x (Level 1, 'syllable level')
three

(11b)

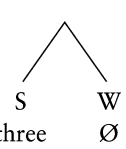

The role of zero syllables in the rhythmic and junctural phenomena of English (and other languages) has never been explored as fully, perhaps, as it deserves, though see also Burzio (1994) for a different account. Allowing zero syllables into a theory of representation also had a consequence: some zeros would have to be post cyclically deleted, making derivations cumbersome (on defooting, see Giegerich, 1983: 8–17). What might be called 'mainstream' nonlinear phonology preferred, as the 1980s progressed, to explore the representation of stress and rhythm as these might be captured in grid-only representations. There were exceptions – the continuing work of Giegerich, and the representational program fronted by Halle (Halle and Vergnaud, 1990; Halle and Idsardi, 1995) – but grid phonology, as it had been developed by Prince (1983), Selkirk (1984), and Hayes (1984), seemed so exciting, so fresh, and so economical that it was among the columns and levels of the metrical grid that perhaps the most significant advances in nonlinear theory took place.

Stress and Extrametricality

Many of these advances concern word stress. It had been well known ever since Chomsky and Halle (1968) that word stress could be seen as operating under a set of principles that were both *directional* and *iterative*. But Hayes (1982) postulated that certain constituents lying at the edges of stress-assignment domains might be *extrametrical* to stress-assignment processes. Consonant segments, syllables, affixes of certain kinds, or even whole words might, in principle, be extrametrical. A particularly interesting (because complex) example of the working of extrametricality comes in the presumed stress behaviour of English nouns, where (i) word-final *consonants* are marked as extrametrical, and (ii) word-final *syllables* are listed as extrametrical (except in the case of some exceptionally behaving loan words, which are listed as *not* undergoing default extrametricality rules). A noun such as *torment*, for example, stressed on its initial syllable, would have the following lexical entry prior to the operation of any stress parsing:

(12a) torment‡ (final C extrametrical by Consonant Extrametricality)
(12b) torment‡ (final syllabic Rhyme extrametrical by Noun Extrameticality)

Because Consonant Extrametricality is extrinsically ordered before Noun Extrametricality, a noun such as *agenda* would have the following lexical entry prior to stress parsing:

(13a) agend~~a~~ (Consonant Extrametricality applies vacuously)
(13b) agenda (final syllabic Rhyme extrametrical by Noun Extrametricality)

If *torment* and *agenda* are then subject to a right-to-left parse, the syllables available to be scanned are the first syllable of *torment*, and the medial syllable of *agenda*. In the (tree-based) version of stress rules given in Hayes (1982), these syllables are footed. In the case of *torment*, and because no other stress rules can apply, the extrametrical final syllable is incorporated into the output structure by a postcyclical process of Stray Syllable Adjunction, see (14a–b), where Σ stands for 'foot'

(14a)

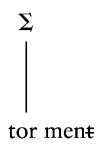

(14b)

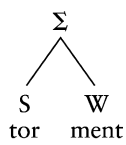

In *agenda*, though, once the medial syllable has been parsed the stress-assignment rule must continue to parse leftward, where it reaches the syllable *a-*. This is footed underlyingly, though will have its honorary foot status postcyclically adjusted (i.e., it will be subject to 'Defooting'). The two feet created by the basic stress assignment process are then relationally labeled, in this case [W S] (the 'Word Rule'). And in a final adjustment, the initial foot is stripped, and in its new guise as a 'mere' W syllable, is adjoined to an immediately preceding/following foot – in this instance, a following foot. The stages of stressing can be seen in (15a–c):

(15a)

(15b)

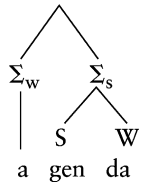

(15c)

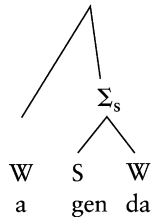

This tree-based, rule-based approach, for all its conceptual neatness, seems also somewhat inelegant, particularly in the need for (postcyclic) destressing rules. It was not long before modified grid-based representations were developed, partly owing to the pioneering work of Selkirk (1984), who developed a theory of word stress and juncture whereby

- Representations were wholly grid based
- Extrametricality applied prior to stress assignment
- Rhythmicity was 'written into' word-stress assignment, in that the addition of grid marks (Beat Addition) was motivated by the Principle of Rhythmical Alternation at each level of a derivation
- The need for constituency – particularly, for the constituent 'foot' – was driven by the grid alignment of the sentence, rather than by inherent properties of the (presumed) foot, and therefore the new representations apparently could *dispense* with constituents such as 'prosodic foot' and 'prosodic word.'

In the spirit of Selkirk (1984), (16a–c) shows the scansion of the English (loan) word *chimpanzee*. In (16a), syllables are aligned one-to-one with grid marks (Demibeat Alignment, DA). In (16b), heavy syllables receive grid marks at the second level of the grid (Heavy Beat Rule, HBR), along with initial syllables (Initial Beat Rule, IBR). And in (16c), main word stress is projected onto the rightmost grid column by the Main Stress Rule (MSR):

```
(16a)              (16b)              (16c)
                   x   x   x                  x
                                      x   x   x
x   x   x          x   x   x          x   x   x
chimpanzee         chimpanzee         chimpanzee
```

Because rhythmicity applies throughout a derivation, grid (16c), which contains a grid lapse, is subject to Beat Addition:

```
(16d) x
      x   x
      x   x   x
      x   x   x
      chimpanzee
```

Given the phonetic evidence for the phonological foot, however, such parsimonious derivations were arrived at prematurely. In this model, constituency can be *inferred* (if one wishes so to infer) from particular grid arrays, but constituency is not *defined* in the representations.

Stress and Parameters

A new strand of metrical phonology attempted to address this question and to some extent underlies the representations found in Hayes (1995). This was the

approach developed in Halle and Vergnaud (1990), a modification of which can be found in Halle and Idsardi (1995). In these models, stress assignment was

- Cyclic
- Directional
- Constituentized
- Parametrized.

Consider parameters (and see also Hayes, 1995: 54–55, from which some of the following is drawn). The edge of the word from which stress parsing begins is a parameter, and so in theory it would be possible for languages to have a right-parameter set (thus present-day English or Latin), or a left-parameter set (thus Hungarian). A further parameter might be the choice of foot type (are feet maximally unary? binary? unbounded?). Another might be constituent labeling (initial, as opposed to final, prominence). Another might be iterativity (whether stress assignment rules apply once only, or iterate across domains).

Now consider a specimen representation from the 'parametrized grids' found in Hayes (1995). In (17a) the relevant parameters are set out. In (17b) the result of the parameters is given (the 'application of the stress rules'):

(17a) Hungarian stress, parameter settings (Hayes, 1995: 54–55)
- i Feet are maximally binary.
- ii Heavy syllables may occur in weak position.
- iii Feet have initial prominence.
- iv The head of a foot need not be a heavy syllable.
- v Parsing is left to right.
- vi Foot construction is iterative.
- vii Foot construction is allowed to create a new layer of structure.

(17b) Hungarian stress, word of 8 syllables

(σ = syllable; 'x' represents a stressed syllable, '.' an unstressed syllable, and '()' the boundaries of the foot)

```
(x .)   (x .)   (x .)   (x .)
σ σ     σ σ     σ σ     σ σ
→ direction of parse
```

Halle and Idsardi's (1995) approach incorporates similar features, but is an even more parsimonious version of parametric theory in that it dispenses with superfluous constituent brackets. Headedness can be read off any grid if the relevant element is directly adjacent to a left/right bracket, and once headedness – or potential headedness – has been identified, it is a simple matter to *project the head of the constituent* by adding a grid mark at the next higher level. Thus, Halle and Idsardi's (1995) approach may be called the 'parameters and projections' approach to stress. Certain kinds of syllable have a boundary *projected* into Level 0 of the grid. Then the left-/rightmost element of each constituent is *projected* onto the next line of the grid (Level 1). Then, to mark the edge of the string, a further boundary is projected – and here, parameters can be set to project a *left boundary* to the *left* of the *leftmost* element of the grid, or alternatively, a *right boundary* to the right of the rightmost, or a *right boundary* to the *left* of the rightmost . . . and so on.

A specimen representation – which happens to be part of the stress representation of Koya (Halle and Idsardi, 1995: 409) – can be found in (18):

(18) Parameters and projections in Koya (CV = light syllable, CVX = heavy syllable)

```
 x   x   x   x     x   x   x     x   x   Level 0
CV  CV  CV  CVX   CV  CV  CVX   CV  CV
```
(Longhand: 'Project each syllable head into a representation at Level 1')

```
 x   x   x   (x    x   x   (x    x   x   Level 0
CV  CV  CV  CVX   CV  CV  CVX   CV  CV
```
(Longhand: 'Project the left boundary of heavy syllables onto Level 0.')

```
                x               x           Level 1
 x   x   x   (x    x   x   (x    x   x   Level 0
CV  CV  CV  CVX   CV  CV  CVX   CV  CV
```
(Longhand: 'Project the leftmost element of each constituent onto the next level of the grid.')

```
 x               x               x           Level 1
(x   x   x   (x    x   x   (x    x   x   Level 0
CV  CV  CV  CVX   CV  CV  CVX   CV  CV
```
(Longhand: 'Mark an edge. Place a left boundary to the left of the leftmost constituent, and project its head onto the next grid Level.')

```
 x                                           Level 2
(x               x               x           Level 1
(x   x   x   (x    x   x   (x    x   x   Level 0
CV  CV  CV  CVX   CV  CV  CVX   CV  CV
```
(Longhand: 'Project main stress. Apply Edge Marking – left/left/left – and project the head of the created constituent onto the next level of the grid.')

Conclusion

As the millennium turned, those working with non-linear representations continued – some still continue – to ask questions about which, and how many, parameters, apply to a given language; questions concerning the extent of an inventory of foot types still prove troublesome (particularly that concerning the existence of a possible 'Germanic foot,' see here Dresher and Lahiri, 1991; Lahiri *et al.*, 1999); some issues concerning the nature and representation of word-stress remain contentious (McCully, 2002); and many questions concerning the application of metrical phonology to both diachrony and metrics remain open, unsatisfactorily answered (McCully, 1997), or badly put. As scholarly attention has tended to move from the representation of word and phrase

stress to an ever closer examination of the phonology/morphology interface, as this might be captured in a variety of OT models, then 'metrical phonology' has seemed to become an unfulfilled project – despite still having a great deal to say.

See also: Foot; Meter; Phonology: Overview; Prosodic Aspects of Speech and Language; Rhythmic Alternations; Word Stress.

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Mexico: Language Situation

M A French

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The national language of Mexico and the mother tongue of over 90% of its 84 million inhabitants (1989) is Spanish, making Mexico the largest Spanish-speaking country in the world. In addition, there are well over 50 indigenous minority ethnolinguistic groups, amounting to a total of over 6 million people. Many of these groups subsume more than one language.

Most of the surviving indigenous languages are in the eastern half of the country, mainly in rural areas; almost 90% of their speakers are located in just 10 of Mexico's 32 states, with Oaxaca having the highest number of speakers. The 10 states, in rank order, are Oaxaca, Vera Cruz, Chiapas, Yucatán, Puebla,

stress to an ever closer examination of the phonology/morphology interface, as this might be captured in a variety of OT models, then 'metrical phonology' has seemed to become an unfulfilled project – despite still having a great deal to say.

See also: Foot; Meter; Phonology: Overview; Prosodic Aspects of Speech and Language; Rhythmic Alternations; Word Stress.

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Mexico: Language Situation

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Most of the surviving indigenous languages are in the eastern half of the country, mainly in rural areas; almost 90% of their speakers are located in just 10 of Mexico's 32 states, with Oaxaca having the highest number of speakers. The 10 states, in rank order, are Oaxaca, Vera Cruz, Chiapas, Yucatán, Puebla,

Estado de México, Hidalgo, Guerrero, Distrito Federal, and San Luis Potosí. The only state with a majority of indigenous language speakers is Yucatán, while in both Quintana Roo and Oaxaca over 40% speak minority languages. According to the 1980 census, the five largest minority languages were Nahuatl (also called Mexicano), with about 27% of the total of minority language speakers (aged 5 or over), Yucatec-Maya (13%), Zapotec (8%), Mixtec (6%), and Otomí (6%). However, of these five, only the second refers to a single, relatively homogeneous language; the others are, in reality, families of closely related languages (with a single general name). The expression '(linguistic) group' (e.g., 'Mixtec group') is a convenient cover term for such families and for so-called language complexes (linguistic and geographic continua in which only adjacent varieties are mutually intelligible).

Probably less than half of the indigenous languages spoken at the time of the Spanish conquest survive. The proportion of speakers of indigenous languages fell from 15% (1900 census) to only 3% in the censuses of 1950 and 1960. The 1970 census, however, showed an increase to over 6% while the 1980 figure was almost 8%. The 1980 census revealed that more than 75% of minority language speakers (aged 5 or over) could also speak Spanish. The majority of indigenous language-speaking communities exhibit unstable bilingualism, with various rates of shift to Spanish. Most indigenous languages show extensive borrowing from Spanish.

Many of the languages once spoken in the north have disappeared. Indeed, with one small exception, the north-east part of Mexico is now entirely Spanish speaking. In the northwest, the main indigenous languages all belong to the Uto-Aztecan language family; the largest of these are the Tarahumara group, mainly in Chihuahua, with about 60 000 speakers, and Mayo, on both sides of the Sonora/Sinaloa border, with about 50 000 speakers.

Mexico City is on the site of the capital of the empire of the Aztecs. Nahuatl, their language, was the official language of the empire and was later spread further through its use for a time as a lingua franca under the Spanish. Nahuatl-speaking areas are still to be found in various parts of central Mexico; the Nahuatl group (in many varieties, some called Nahuat and Nahual) has more than 1 250 000 speakers; the variety with the most speakers is Huasteca Nahuat (700 000) in San Luis Potosí and Hidalgo, with two main dialects, but Nahuatl speakers are also numerous in the states of Puebla (over 200 000 speakers), Vera Cruz (over 100 000), and Morelos and Guerrero (about 80 000 each).

Most of the other languages of central Mexico and Oaxaca belong to the Otomanguean (OM) superfamily. In the northwest of the area are Tarascan (Purépecha), a language isolate (spoken by about 100 000 people) in central Michoacán; the Otomí group (OM, with about 300 000) mainly in Hidalgo; and Mazahua (OM, with about 200 000) mainly in Estado de México. In the northeast of the central area the principal indigenous languages are Huasteca Nahuat and Sierra de Puebla Nahuat (125 000) in northeastern Puebla; Huastec (100 000), the most westerly language of the Mayan family, in eastern San Luis Potosí and northern Vera Cruz; and the Totonac group (200 000) in northern Puebla and adjacent parts of Vera Cruz. To the south, in addition to Nahuatl (in Morelos and northern Guerrero), there is the Mixtec group (OM, with about 300 000 speakers) mostly in western Oaxaca but also in eastern Guerrero. Also located in eastern Guerrero is Tlapanec (OM), with about 50 000 speakers. The Mazatec group (OM), in the extreme north of Oaxaca, has over 100 000 speakers, while the Zapotec group (OM) is spoken in central and eastern Oaxaca by around 500 000 people. The Mixe group, mainly in northeastern Oaxaca, has, in total, some 50 000 speakers.

The other main indigenous languages of Mexico all belong to the Mayan language family, which extends into much of Guatemala and parts of Belize. In central Chiapas are found the closely related Mayan languages Tzeltal (200 000 speakers) and Tzotzil (100 000). The Mayan language with the largest number of speakers (about 665 000) is Yucatec (or Yucatec-Maya), situated in the Yucatán peninsula (Campeche, Quintana Roo, Yucatán), with the great majority of speakers in the last-named state. Yucatec is the largest and most flourishing language of Mexico after Spanish. Although most of its speakers also know Spanish, language shift is slight.

Practically all broadcast and published material in Mexico is in Spanish. Spanish is also the medium at all levels of education. Literacy in indigenous languages is rare.

See also: Nahuatl; Spanish; Uto-Aztecan Languages; Zapotecan.

Language Maps (Appendix 1): Maps 62–65.

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Meyer, Kuno Edward (1858–1919)

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Kuno Meyer was born in Hamburg on the 20th of December 1858 as the younger brother of Edouard Meyer, the great German historian. He spent some of his teenage years in Scotland, where he heard Gaelic spoken. This inspired him to study Celtic under Ernst Windisch at Leipzig University. He took his doctorate in 1884 with an edition of the medieval Irish story of Philipp and Alexander, the earliest of the translations from Latin to Irish. In 1885, he published an edition of *Cath Finntrága* (The Battle of Ventry), an early modern tale of the Fianna. In the same year, he was appointed lecturer in the Teutonic languages at the University of Liverpool. This, with promotion to Professor in 1895, was his post for 27 years. He developed arthritis in his thirties through spending nights on the Welsh hills with John Sampson, the Librarian of Liverpool University and the great authority on the language of the gypsies. Meyer's interest was in Celtic rather than in Teutonic. In 1896 he founded the *Zeitschrift für celtische Philologie*, which is happily still with us. In 1903, with the cooperation of John Strachan, he founded the School of Irish Learning in Dublin, aimed at the cultivation of Irish scholarship among the Irish and the provision of scholarships to enable Irish students to study on the continent. This has been the principal source of Irish scholars and scholarship in the century or so since its foundation. In 1912, on the death of Heinrich Zimmer, he was appointed Professor of Celtic at the University of Berlin. On leaving his post in Liverpool, his friends presented him with a festschrift entitled *A Miscellany presented to Kuno Meyer* (1912). In that year the freedom of the cities of Dublin and Cork was conferred on him.

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See also: Celtic; Strachan, John (1862–1907).

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Meyer-Lübke, Wilhelm (1861–1936)

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Michif

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Michif (/mitšif/; Mitchif, Mitif, erroneously also spelled Métchif) is a mixed language spoken by some of the Métis in Canada and the United States. The Métis are a separate ethnic group, who came into being as a result of European men marrying Amerindian women. Around the year 2000, the number of speakers had dwindled to fewer than 1000, in scattered locations mostly in Saskatchewan, Manitoba (Canada), North Dakota, and Montana (United States). All speakers are elderly. The language is highly endangered.

Mixed European-Amerindian marital unions took place from the first days of contact in New France. In the early period, the children of these relationships were typically raised by the mother as aboriginal children. In the early 1800s, the children of mixed parentage increasingly identified as separate from Europeans and from Amerindians, which was strengthened by political developments such as free trade, in which many such people were involved (Dickason, 1985). They called themselves *La Nouvelle Nation*, and also Mitif, Métis, Halfbreed, and similar terms. The name of the language is regularly derived from the term Mitif, which was the name for a person of mixed parentage in New France in the early 1600s.

The Métis combine aspects of Native cultures and French Canadian culture. Traditionally, the Métis had a very diverse lifestyle throughout the 19th century. Many were farmers, hunters, traders, and/or craftsmen. The hunters were especially famous for their massive buffalo hunts, until the near extinction of this animal in the late 1800s. Linguistically, the Métis were and are diverse as well, counting speakers of Ojibwe, Cree (both Algonquian), French, English (mostly in recognizable ethnic variants) as well as Michif, which combines, roughly, Cree verbs with French nouns. This is a typical example, from a fairy tale told by Norman Fleury in January 2004 (French elements in bold):

(1) **sa** **fam,** **sa** **pramyer**
3-POSS *woman* *3-POSS* *first-F*
fam kii-wanih-eew
woman *PST-lose.AN-3.SUBJ.3OBJ*
'He had lost his wife, his first wife.'

(2) eekwa kiihtwam kii-wiiw-eew
then *again* *PST-marry-3.SUBJ.3OBJ*
'And now he had remarried.'

(3) kii-wiikim-eew onhin **la** **fam**-a
PST-marry-3.SUBJ.3OBJ *this-OBV* *the* *woman-OBV*
'He had married this woman.'

(4) **sitenn** **moves** **fam,** **enn** **moves** **fam**
it.was.F *bad-F* *woman* *a-F* *bad* *woman*
'She was a bad woman. A bad woman.'

(5) kii-machi-manitu-wi-w awa **la** **fam**
PST-bad.spirit-BE-3SG *this-AN* *the-F* *woman*
'She was a real devil, this woman.'

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PST-bad.spirit-BE-3SG *this-AN* *the-F* *woman*
'She was a real devil, this woman.'

(6) **pi** **ilave** **trwaa** **fiy** ana
and *she-had* *three* *girl* *this-AN.SG*
kii-ayaw-eew **la** **fam**
PST-have-3SG *the-F* *woman*
'And she had three daughters, this woman had.'

This fragment, using a unified orthography for the two components, illustrates some aspects of the mixture of the language. In this fragments all verbs are from Cree, except the two copulas *sitenn* (F. *c'est une*) and *ilave* (F. *il/elle avait*). The nouns are all from French, including definite and indefinite articles and possessives (*la, lii, aen, enn*), the demonstratives from Cree (*awa, ana, onhin*), numerals from French (*trwaa, pramyer*), and conjunctions and adverbs from Cree (*kiihtwam, eekwa*) or French (*pi* < F. *puis*).

Sentential word order is free: (1) shows Object-Verb word order, (3) Verb-Object. Some preverbal modifiers can be separated from their nouns, notably numerals from the nouns, and in (6) a demonstrative from the noun. In morphology, French elements display French derivational and inflectional elements, whereas Cree elements combine with Cree morphology. The Cree noun *mushum* 'grandfather' gets Cree possessives and plural morphemes (*ni-mushum-ak* 1SG-grandfather-PL 'my grandfathers'). There are a few exceptions, such as the nontopic or so-called obviative suffix as in *la fam-a* in (3) that is often added to French nouns, and borrowed or code-switched French and English verbs as in *gii-li-park-ii-naann* 1PST-MARKER-park-INF-1PL 'we parked' or *kii-li-move-ii-w* PST-MARKER-move-INF-3SG 'she moved (away)'. This sentence switches languages four times: Cree-French-English-French-Cree.

The phoneme inventory of Michif is a combination of the inventories of the Métis variety of French (influenced by a Northern dialect of Cree) and Southeastern Plains Cree (influenced by Saulteaux Ojibwe). For instance, preaspirated consonants and nasal /i/ are only found in words of Cree etymology, and phonemes such as /r/ and /l/ are only found in the French part. Strikingly, the range of allophones for Cree and French phonemes differs: whereas voiced /b/ and unvoiced /p/ (and other stops and fricatives) are allophones in Cree between vowels, they are distinct phonemes in the French part. The Cree and French components also follow their own phonotactic patterns. Only stress patterns seem to have moved in the direction of Cree.

Michif combines Cree and French agreement: the (Algonquian) animacy of nouns is reflected in the gender inflection of demonstratives and verbs, and the (French) masculine-feminine distinction is shown in definite and indefinite articles and preverbal adjectives.

Michif is more complex than both of its components, having two parallel semantic, phonological, morphological, and syntactic systems. It combines the complexity of the Algonquian verb, with hundreds of forms, with the irregularities of French nominal derivation.

The language probably came into being in the early 19th century, parallel with the development of a new identity of mixed persons as a new ethnic group. Michif is associated with descendants of the Métis buffalo hunters and their winter camps, and it is likely that these hunts played a role in the dissemination of the language.

Michif belongs to the small set of mixed or intertwined languages, of which a few dozen examples are known from all parts of the world. Whereas other such languages usually combine the grammatical system of one language with the lexicon of another, Michif seems to be almost unique in that it combines verbs from one language with nouns from another. Only the Nigerian language Igbo-Okrika seems to display a similar pattern (Igbo verbs, Ijo nouns).

See also: Algonquian and Ritwan Languages; Canada: Language Situation; Language Change and Language Contact; United States of America: Language Situation.

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Micronesia, Federated States: Language Situation

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The Federated States of Micronesia (FSM) is a linguistically diverse Pacific nation consisting of numerous high volcanic islands and low coral atolls. Estimates of the number of speakers of the 15 indigenous languages spoken within the four states of FSM (based on 1980 census data) are provided here in parentheses after each language name.

Kosrae State, the easternmost state of FSM, contains only the single high island of Kosrae. The language of this island is Kosraean (4700), formerly Kusaiean.

Pohnpei State takes its name from the high island of Pohnpei (formerly Ponape), the site of the FSM capital. Pohnpeian (19 700), also known as Ponapean, is the principal language of its inhabitants. A dialect of Pohnpeian and an English/Pohnpeian-based creole are spoken on the nearby atoll of Ngatik. Mokilese (1050) and Pingelapese (1300), which border on mutual intelligibility with Pohnpeian, and Nukuoro (550) and Kapingamarangi (1300), Polynesian outliers, are spoken on neighboring atolls. Speakers of these atoll languages, as well as speakers of Mortlockese from Chuuk State, have established colonies on Pohnpei and maintain use of their languages.

All the languages of Chuuk State are members of the Chuukic continuum. Degrees of mutual intelligibility among the many dialects that make up this continuum decline as one moves across the chains of islands making up this state. The exact number of languages in this continuum is consequently indeterminate, but five language names are commonly cited. Chuukese (31 500), formerly Trukese, is spoken on the high and reef islands of the Chuuk Lagoon. Mortlockese (11 000), Pááfang (1300, in the Hall Islands) Namonuito (750), and Puluwatese (1500, on Puluwat, Pulap, and Pulusuk) are spoken on atolls within this state. Colonies of speakers of these atoll languages also reside on the island of Moen in the Chuuk Lagoon.

The Chuukic continuum continues into Yap State. Ulithian (1100), Woleaian (1900), and Satawalese (500), all Chuukic languages, are spoken on atolls to the east of the high island of Yap. On Yap, the indigenous language is Yapese (5800). Yapese is only distantly related to the other languages of Micronesia.

Kosraean, Pohnpeian, Chuukese, and Yapese, all high-island languages, serve as official languages for the states with corresponding names. English is a second official language in all states. Ulithian has semiofficial status as a language representing the Chuukic-speaking atolls of Yap. Official languages are employed in the media and serve as lingua francas within each state. English is an official language and lingua franca of the nation.

English is promoted through transitional programs of bilingual education. Children are educated in their native language in the first few years, with an increasing emphasis on English throughout the first eight years of schooling. Secondary and tertiary instruction are almost exclusively in English. Use of the indigenous languages remains robust, but English is encroaching into all realms of discourse.

Language Maps (Appendix 1): Map 151.

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Microparametric Variation

A Henry, University of Ulster, Antrim, UK

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What Is Syntactic Variation?

Syntactic variation exists on larger and smaller scales. On a large scale, languages clearly differ from one another in many ways; such variation is captured within Chomskyan theoretical syntax with reference to parameter setting. However, 'syntactic variation' generally means the finer-grained variation within a speech community or within the grammars of individual speakers. Such variation is sometimes referred to as 'microparametric variation' or microvariation within theoretical linguistics.

For example in English, we find variation across dialects and in the grammars of individual speakers in relation to such aspects as subject-verb agreement,

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For example in English, we find variation across dialects and in the grammars of individual speakers in relation to such aspects as subject-verb agreement,

as in (1) and (2) below, negative concord as in (3) and (4), and the use of relative pronouns in relative clauses, as in (5) and (6).

(1) There are students at the door.

(2) There's students at the door.

In sentences like (1) and (2), some speakers have obligatory agreement of the verb with the post-verbal noun phrase, so that only (1) is grammatical. Others always use sentences like (2), where the verb does not agree with the post-verbal noun phrase, so that only (2) is grammatical. For many speakers, however, both are grammatical, with (1) used more in formal settings and (2) in more informal settings.

(3) I didn't see nobody.

(4) I saw nobody.

Many speakers of English allow sentences like (3), with negative concord (so that the sentence means the same as (4), whereas some only allow sentences like (4), without negative concord.

(5) It's always you who makes the decisions.

(6) It's always you makes the decisions.

Again, some speakers allow sentences like (6), as well as (5).

To take an example from another language, in French we find variability in the use of inversion in questions and of *ne* in negatives:

(7) Il lit beaucoup de livres?
He reads many of books
'Does he read many books'?

(8) Lit-il beaucoup de livres?
Reads-he many of books
'Does he read many books'?

(9) Elle ne va pas a Paris
She neg-particle goes not to Paris
'She is not going to Paris'.

(10) Elle va pas a Paris
she goes not to Paris
'She is not going to Paris'.

The following examples from Classical Arabic also show optional variation in word order (Wright, 1896:100)

(11) كَانَ قائِماً زَيْدٌ
Kâna zaydun qâ'iman
Was(3sg) Zeid(nom) standing (acc)
'Zeid was standing'.

(12) زَيْدٌ قائِماً كَانَ
Kâna qâ'iman zaydun
Was(3sg) standing Zeid
'Zeid was standing'.

These examples are taken from only three languages, but examples can, of course, be found in a wide range of languages.

Approaches to Variation in Syntax

There are two major approaches to studying syntactic variation. One, from sociolinguistics, essentially studies language at the level of the speech community, focusing on the ways in which groups of speakers vary in their use of syntax and how this variation relates to nonlinguistic variables, such as social class, gender, age, and the degree of formality of the interaction. At an early stage in his pioneering work on language variation, Labov (1969) studied variation in the use of the copula in African-American English. Key figures in the study of variation in syntax from the sociolinguistic perspective have been Cheshire (1982) and Tagliamonte (1998). Such study is typically based on the collection of a corpus of recorded data from a range of speakers. It generally aims to study language at the community rather than individual level.

Variation is also studied within syntactic theory. Although much of syntactic theory has been concerned with establishing what is common to all languages (Universal Grammar) and how languages differ from one another, a body of work now exists on what is usually termed microparametric variation or microvariation; that is, differences between closely related dialects (see, for example, Haegeman, 1992; Henry, 1995; Black and Motapanyane, 1996). This is a relatively recent development within this framework, and there have as yet been very few studies of nonstandard varieties of English, for example. One reason for this may be that theoretical linguists typically work on their own intuitions and those of their colleagues and students, and these groups both tend to be relatively standard speakers, at least on reaching higher education. In general, work in syntactic theory relies on the intuitions of native speakers as data, rather than on the recording of actual speech. This reliance may reduce the amount of variation observed, because if native speakers are only asked about one form of a structure, the linguist may not realize that there is another possible form. For example, the linguist studying agreement in sentences with expletive *there* may only seek to establish whether the verb can agree with the associate, as in:

(12) There were three books on the table.

and omit to test whether there is an alternative form such as (13):

(13) There was three books on the table.

Recent work developing optimality theory, an alternative approach to grammar that was originally developed in relation to phonology as an approach to syntax, has offered a possible alternative view of syntactic variation as arising from different rankings of violable constraints. Work on syntactic variation in this framework has not as yet been highly developed, however.

Indeed, studies of syntactic variation within theoretical linguistics, as well as within sociolinguistics and theoretical linguistics, have been comparatively sparse. Within sociolinguistics, studies of syntactic variation have been greatly outnumbered by studies of phonological variation. No doubt, one reason for this is that phonological variables occur much more frequently than do syntactic variables in recorded data. Thus, if one is interested in whether or not /r/ is pronounced, it is likely that even a relatively short stretch of recording will produce many instances of the variable. However, if one is interested, for example, in variation in the structure of passive sentences, then these types of sentences are going to occur relatively infrequently in data. For example, the Belfast database available on CHILDES, the child language database, contains 130 hours of recording, much of it in fact adult-adult conversations. However, if one looks in it for individual variables, the number of examples are actually rather sparse: for example, there were only three examples of the structure, 'I'm only after Verb-ing', (meaning 'I just Verbed'), which most speakers of the variety find grammatical. Thus, studies of syntactic variation within sociolinguistics have not only been rather few in number, but have typically focused on frequently occurring elements; for example, forms of the verb *be*.

A further problem is establishing that alternative forms of syntax in fact have the same meaning. A 'sociolinguistic variable' is an alternative way of saying the same thing, but it is much easier to identify such alternatives in phonology than in syntax. Thus, for example as noted above, many colloquial varieties of English have negative concord, where two negative elements occur in the sentence with only a single negative interpretation:

(14) I didn't say nothing.

(15) They don't know nobody.

As alternatives to these, speakers use forms without negative concord, for example:

(16) I said nothing.

(17) I knew nobody.

However, in order to consider this alternation as an example of a sociolinguistic variable, we would need to be able to show that these alternative forms of syntax mean exactly the same, and that is not absolutely clear – some speakers of negative concord varieties feel that the examples with negative concord are more emphatically negative.

It is particularly important to note that variation from standard language syntax is not deviation from the standard form, but rather an equally linguistically valid means of expressing the same sentence. Thus, to say (14) and (15) above is not to deviate from the rule of standard English that allows only one negative per clause, but rather to follow a different rule; that negative concord varieties are just as rule-governed as standard varieties is shown, for example, by the fact that, in most English negative concord dialects, it is ungrammatical to have an N-word, such as *nothing* or *nobody,* precede the verbal negative marker *not* or its contracted form *n't*. Thus, sentences like the following are ungrammatical, unless they are given a double-negative reading, in many negative concord varieties of English.

(18) Nobody didn't help.

(19) Nothing wouldn't surprise me.

Within syntax, the question of whether there is variation within individual grammars has never been resolved fully. At an early stage in the development of generative syntax, Chomsky (1965) posited that the goal of study should be the linguistic competence of the "ideal speaker-hearer in a homogeneous speech community." This is clearly an idealization, and Chomsky was not claiming that such communities existed, but rather that it is a legitimate idealization to study language *as if* this were the case; some would argue, however, that, in doing so, one of the essential characteristics – its variability – is excluded, thus distorting the understanding of how human language works. Some models of syntactic theory in fact hold that there is 'no optionality' (see, for example, Chomsky, 1995, 2000, 2001a, 2001b) and that where speakers apparently have two or more options within a grammar, they must in fact have two separate grammars, being in effect bidialectal. A considerable amount of effort has gone into showing that apparently variable features are not really variable or that such variation is very highly constrained.

However, not all syntacticians agree that variation involves switching between separate grammars. For example, Henry (1995), in a study of syntactic variation in Belfast English, argued that the type of variation found between dialects is of exactly the same type as that found between languages and that it involves the settings of parameters; however, this work suggested that different settings

of the same parameter can be present in individual grammars.

Some studies have sought to reconcile the sociolinguistic and syntactic theory approaches; for example, see Wilson and Henry (1998), who argued for an integration of the findings of generative syntax into sociolinguistics, and Corrigan and Cornips (2005), a collection of papers in which sociolinguists and syntacticians search for an integrated approach to variation. One of the reasons it is difficult to find a common approach is that, although the area of study of syntactic theory is the representation of syntax in the mind/brain, sociolinguistic theory is studying the relationship of language to society and thus gathers data in general at a group rather than individual level.

The study of variation has also been important in the study of syntactic change. Kroch (for example, 1989) has studied variation in historical texts in English, for instance, between the use of DO-support and verb movement (i.e., alternations, such as 'Do you have any change?' versus 'Have you any change?'). He proposed that variation is caused by competing grammars coexisting in the community or the individual. This offers an explanation for why language change often takes place not dramatically, as one might expect from a pure parameter setting model, but very often with old and new forms being used side by side over a considerable period of time.

Syntactic variation is also a noticeable feature of first language acquisition. Thus, when children first develop a new syntactic structure – for example, the use of inversion in English questions – they use it optionally, alternating for a period between questions without inversion (their previous grammar) and questions with inversion (their new grammar).

(20) You can play?

(21) Can you play?

This variation seems to be a natural feature of language acquisition, applying to many aspects, including the acquisition of both grammatical morphemes and syntactic structures. In general, children's developing grammars, although not adult-like, conform to the requirements of Universal Grammar; therefore, the fact that they contain so much variability may indicate that syntactic variation is the norm, rather than the exception, in human language grammars.

See also: Arabic; Bilingualism; Constant Rate Hypothesis; Corpora in Studies of Variation; French; Gender; Generative Grammar; Idealization; Idiolect; Linguistic Features; Linguistic Universals, Chomskyan; Principles and Parameters Framework of Generative Grammar; Register Variation: Core Grammar and Periphery; Social Class and Status; Speech Community; Style and Style Shifting; Synchronic and Diachronic Variation; Syntactic Variation; Syntax: Optimality Theory; Variation and Formal Theories of Language: HPSG; Variation and Language: Overview; Variation in First Language Acquisition; Writing Variation into Formal Grammars.

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Middle English Dictionaries

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Though there were occasional bilingual glossaries and word lists written in the Middle English period itself (c. 1100–c. 1500), it was not until the second half of the 19th century that comprehensive dictionaries of Middle English began to be written. The first, by Herbert Coleridge, editor of the fledgling *Oxford English dictionary* (*OED*), appeared in 1859, but it was limited to early Middle English (1250–1300) and intended primarily as a 'foundation-stone' for the larger dictionary; it contains brief glosses for some words, occasional etymologies or notices of cognates, and references to illustrative examples, but no quotations. The next, by the German F. H. Stratmann, was published in 1867 (having been written in parts between 1864 and 1867) and then appeared in further editions until the end of his life in 1884; it is based on nearly 200 editions of texts, with brief glosses in English and/or Latin for most words, notices of variant spellings and grammatical forms, etymologies and notices of cognates, and either references to illustrative examples or a selection of (usually brief) quotations. In 1878 another German, Eduard Mätzner, began to publish his *Wörterbuch,* beginning with the letters A–D; this dictionary was planned on a larger scale than any of the other 19th-century dictionaries, with full sets of definitions (often subdivided), lists of variant spellings, brief etymologies, and extended illustrative quotations, but it only reached the middle of the letter M (even so, it amounted to some 1880 pages, compared to some 750 for Stratmann's latest edition). A. L. Mayhew and W. W. Skeat's (1888) was next: it is based on the glossaries to only 11 published collections of texts, but useful for the student; it has brief but adequate glosses, lists of variant spellings and (frequently) etymologies, and references to illustrative examples but no quotations. A few years later, in 1891, Henry Bradley, the second editor of the *OED,* published a revision, rearrangement, and enlargement of Stratmann, running to a little over 700 pages and based on nearly 300 editions; the main differences are its formal (rather than etymological) arrangement of words, stricter alphabetization, and the addition of more words of Romance origin. Like Stratmann, it contains brief glosses (though more precise and in English only), etymologies and notices of cognates, notices of spellings and forms, and either references to illustrative examples or a selection of (usually brief) quotations.

In 1919, as the *OED* was nearing completion, W. A. Craigie, the third editor, proposed a series of period dictionaries of English to extend and supplement the treatment in the *OED,* one of which was a dictionary of Middle English on historical principles. Work began on it at Cornell University in 1925, and in 1930, now called the *Middle English dictionary* (*MED*), it moved to the University of Michigan. The *MED* is based on a collection of quotations from Middle English texts written in England, Ireland, and Wales, having as its nucleus those that had been extracted for the *OED* (c. 430 000) and the additional ones extracted at Cornell (c. 175 000); the collection has since grown to some 3 000 000 slips. Between 1930 and 1945, under editors Samuel Moore and then Thomas Knott, a reading program to supplement the original collection of quotations was carried out, a dialect survey completed, and experiments with editorial plans and some preliminary editing performed. In 1946–1947 newly appointed editor Hans Kurath drew up a formal editorial plan, editing began in a systematic way, and in 1952 the first fascicle was published. Work progressed slowly but deliberately, and the last fascicle (of 115) appeared in 2001; there is now an electronic version of the *MED,* as part of the online *Middle English compendium.*

The completed *MED,* which runs to nearly 15 000 pages, over 55 000 separate entries, and nearly 900 000 quotations, contains brief definitions, preferably Modern English equivalents if available, with the definitions becoming more detailed and more precise as the work progresses; a full and systematic treatment of spellings, grammatical forms, and regional variants; etymologies containing the immediate source of the word, with variants noted if they are reflected in the Middle English spellings; and a full

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Midway Islands: Language Situation

Editorial Team

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Forming a coral atoll in the North Pacific Ocean, about one-third of the way from Honolulu to Tokyo, the Midway Islands were formally claimed by the United States in 1867. The first inhabitants arrived in 1903 in concomitance with the lying of the trans-Pacific cable, which passed through the islands. In 1996, Midway opened to the public as a wildlife refuge, but having closed in 2001 for reorganization, it remains off-limits to this day. The population now consists of about 40 people, the staff of the U.S. Fish and Wildlife Service, a division of the Department of the Interior. The official language of Midway is English.

Migration and Language

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Introduction: Migration, Language Diversification, and Contact

Migration – that is, the permanent or temporary movement of people from one geographical area to another – has been a constant of human history since earliest times and has shaped the areal distribution of languages and the history of linguistic groups.

Language diversification and spread as a consequence of migration underpins the histories of large language families, such as Indo-European, Sino-Tibetan, Austronesian, and Afro-Asiatic. The geographical dispersion of languages belonging to these families is the result of large-scale prehistoric migrations, reflecting both military invasions and agricultural expansion. Language diversification through people movement and the subsequent communicative isolation of the migrating group is depicted in the classic *Stammbaum* or family tree model of language change: each split in

display of illustrative quotations for each sense, chronologically arranged, with at least one quotation for each quarter-century, if available. Special features are the 'double-dating' system (all texts are given manuscript dates, with composition dates added in parentheses for texts composed a quarter of a century or more earlier) and the use of surnames and place names (primarily to corroborate etymologies by showing chronological links to the various source languages).

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Midway Islands: Language Situation

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Forming a coral atoll in the North Pacific Ocean, about one-third of the way from Honolulu to Tokyo, the Midway Islands were formally claimed by the United States in 1867. The first inhabitants arrived in 1903 in concomitance with the lying of the trans-Pacific cable, which passed through the islands. In 1996, Midway opened to the public as a wildlife refuge, but having closed in 2001 for reorganization, it remains off-limits to this day. The population now consists of about 40 people, the staff of the U.S. Fish and Wildlife Service, a division of the Department of the Interior. The official language of Midway is English.

Migration and Language

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Introduction: Migration, Language Diversification, and Contact

Migration – that is, the permanent or temporary movement of people from one geographical area to another – has been a constant of human history since earliest times and has shaped the areal distribution of languages and the history of linguistic groups.

Language diversification and spread as a consequence of migration underpins the histories of large language families, such as Indo-European, Sino-Tibetan, Austronesian, and Afro-Asiatic. The geographical dispersion of languages belonging to these families is the result of large-scale prehistoric migrations, reflecting both military invasions and agricultural expansion. Language diversification through people movement and the subsequent communicative isolation of the migrating group is depicted in the classic *Stammbaum* or family tree model of language change: each split in

the diagram reflects a situation where people occupying a geographical area divided, and one group settled in a new, nonadjacent territory.

Migration movements not only support language diversification through geographical dispersion, but also create the conditions for inter-group contact and linguistic convergence, that is, structural borrowing and the leveling of marked distinctions between dialects and languages (*Sprachbund* phenomena and koinéization/dialect leveling). Contact between different linguistic groups also leads to the formation of new forms of speech: trade jargons and other contact languages (pidgin/creoles, mixed languages, second language varieties) have emerged as a direct result of human mobility.

Migration movements are particularly prevalent in times of accelerated social, political, and economic change (e.g., demographic growth, technological innovation, political conflict and persecution, economic deprivation and poverty). Wars, industrialization, colonialism, and the subsequent emergence of a global capitalist world market have all led to high rates of national and transnational migration, and have shaped states and societies across the world (Castle and Miller, 1998).

Dialect Leveling and Dialect Formation

Whereas traditional dialectologists often evoked an idealized 'linguistics of isolation and immobility' (Chambers, 2002: 117) – epitomized in the construct of the 'non-mobile, older, rural male' (NORM; cf. Chambers and Trudgill, 1998) as the ideal informant – modern dialectologists and sociolinguists have shifted their attention to the systematic study of the linguistic consequences of geographical mobility. High levels of rural-to-urban migration have not only contributed to the gradual decline of traditional rural dialects (dialect loss), but new composite dialects have crystallized rapidly in urban environments. London, for example, has always been characterized by high levels of in-migration and linguistic mixing. In the 16th century the emerging London norm was significantly shaped by the influx of large numbers of northerners into the city. Some northern dialect forms, such as, e.g., the northern third person plural marker *–(e)s* (*know(e)s* vs. southern *–th*, *knoweth*), were incorporated into the emerging norm of London English (and subsequently into standard English; Nevalainen, 2000).

The development of planned urban communities in areas targeted for industrial expansion in the 1960s and 1970s, the so-called new towns, offered linguists an opportunity to study processes of dialect mixing and leveling in real time. Kerswill and Williams (1992; also Kerswill, 1996) compared the speech of children in Milton Keynes, a new (1969) urban development near London, with that of their parents who had moved to the town from elsewhere in the southeast, and also northern England and overseas. They found that the children's dialect lacked regional distinctiveness, and differed both from their parents' dialects and from the local dialects spoken in the nearby areas. Children used various linguistic strategies in their creation of the new dialect: they avoided strong regional forms used by their parents, developed phonetically intermediate forms, which mediated between the various dialect inputs, and generally preferred forms that were similar to the non-localized, RP-like southeastern norm.

Dialect leveling also played a major role in colonial settlements. In South Africa, Australia, and New Zealand relatively homogenous colonial dialects developed on the basis of the diverse input dialects of the migrating settlers (Trudgill, 1986; Chambers, 2003: 65ff.).

In multilingual countries (e.g., South Africa, Switzerland) urbanization also led to the formation of multilingual cities (in other countries this development is a consequence of transnational migration): Xhosa, the language of many rural-to-urban migrants in South Africa, is now a major language in Cape Town (next to Afrikaans and English), and French and Italian are competing with Swiss-German in Basel, a historically German-speaking town (Lüdi, 1995).

Whereas traditional dialectological and sociolinguistic studies stipulated that their subjects should be locals (or have arrived in the area before the age of seven, i.e., at an age when they could still master the phonological complexities of the dialect), Chambers (2002) argued for the need to include non-local residents into modern dialect surveys. He introduced migration as an independent variable using the Regionality Index (RI), which identifies the migration history of informants on the basis of the following indicators: place of birth of informant, place of birth of parents, area where respondent grew up, and area of residence. The RI is similar to the 'combined birth-country criterion,' i.e., birth country of person as well as parents, which is used in transnational migration research (cf. Extra and Gorter, 2001).

Bilingualism, Language Shift, and Maintenance

In some cases migrating people have imposed their language(s) on the indigenous population: the southward migration of Bantu-speaking groups (starting around 1000 B.C.) led to the absorption or displacement of indigenous hunter-gatherer communities; the Roman Empire spread its language through warfare

and conquest; European colonial settlements transformed the political and linguistic landscapes in Africa, the Americas, and Asia. In-migration of powerful groups can thus contribute to the creation of indigenous minority groups and/or language shift. Less powerful migrant groups usually assimilate to the dominant language of the new society: the French Huguenots who arrived in South Africa in the 1680s adopted Dutch, the dominant language of the colony; in the 20th century Jewish migrants to the United States adopted English, in earlier migrations their ancestors had adopted Lithuanian and Polish (which they used alongside their ethnic language, Yiddish). Bilingualism and code-switching are frequently observed among second and third generation migrants, where they become markers of the migrants' hybrid, bi-cultural identities (cf., for example, Zentella's 1997 study of Spanish-English code-switching in El Barrio, a Puerto Rican neighborhood in NYC; cf. also Dabène and Moore, 1995; a classic article on migration and hybridity is Park, 1928).

Long-term language maintenance is rare among migrants who move as individuals or in small family groups, and intergenerational language shift – which is indicated by the co-existence of different mother tongues within a household – is usually completed within three generations (Nahirny and Fishman, 1965). Clyne (1991) has shown on the basis of his analysis of the Australian census information that the rate of shift differs across migrant language groups. Important variables, which support or delay language shift, are: settlement patterns (presence or absence of cohesive ethnic suburbs), endogamy, cultural distance from the host society, contact with the home country, and cultural values attached to language. Horvath (1985), in her study of vowel variation in Australian English, has illustrated how Italian and Greek migrants are gradually incorporated into the Australian English speech community: first-generation migrants form a peripheral group (she describes their English as 'accented' and 'ethnic broad'; basically, they use second-language varieties), second-generation migrants were full (usually bilingual) members of the host speech community.

Group migration tends to delay language shift. Long-term intergenerational language maintenance has been documented for the so-called *Sprachinseln* ('language islands' or language enclaves). These geographically-bound territories are typically located in rural areas and reflect the cohesive settlement patterns of the original migrants. Subsequent generations maintain their linguistic and cultural/religious distinctiveness from the surrounding host society. Well-known examples of linguistic enclaves are the German-speaking settlements in eastern and southeastern Europe that were formed as a consequence of migrations since the Middle Ages, and also the 18th century Amish settlements in North America. Language maintenance in these areas occurs in functional complementarity with the language(s) of the host society (cf. the papers in Berend and Mattheier, 1994). Community bilingualism, however, affects the structures of the heritage language, and heavy lexical and structural borrowing are commonly observed (cf. Louden on Pennsylvania Dutch in Berend and Mattheier, 1994).

Mass Migration and Language Formation

The forced mass migrations associated with slavery have led to the formation of stable contact languages in Africa, the Caribbean, and Asia. The plantation system created a catastrophic break in linguistic tradition: captured slaves not only spoke a variety of diverse native languages, but they also dramatically lost all contact with their homeland, did not share a lingua franca with the other slaves, and had only minimal access to the dominant colonial language of their masters (Sankoff, 1979). The pidgin/creole languages that emerged in these contexts supplanted the original languages of the slaves, and became the basis for the formation of new cultural and linguistic communities in the diaspora.

The situation was different in the case of indentured labor migrations that took place in the mid- to late 19th and early 20th centuries. Although work conditions were generally poor and laborers were often coerced into employment, it was, at least in principle, possible to return home upon completion of the contract. Moreover, unlike slaves, indentured workers did not form "a pulverized mass of individuals from several tribes, but instead they were limited to men of a few nationalities, who found themselves together in a situation in which community life of a sort was possible" (Reinecke, 1969: 114). Conditions were thus generally favorable for language retention, and inter-dialect leveling has been described for the transplanted languages of indentured workers (Mesthrie, 1991 with regard to Bhojpuri in South Africa). At the same time workers acquired a knowledge of the language(s) of the host society. These second language acquisition processes contributed to the creation of new varieties of the dominant language, which replaced the workers' original mother tongues after several generations in the diaspora (cf. Mesthrie, 1992).

Structural similarities between pidgin/creole languages and the outcomes of second language acquisition in the context of mass labor migration have been explored systematically with regard to

fossilized interlanguages such as, e.g., *Gastarbeiterdeutsch* ('guest workers' German'; cf. Clyne, 1968 for an early discussion), and also 'immigrant Swedish' (e.g., *Rinkeby* Swedish, as described by Kotsinas, 2001). Both varieties show grammatical reduction and phonological simplification akin to pidgin languages (cf. also Smart, 1990 for a description of pidgin Arabic used by Asian labor migrants in the Gulf states). However, a stable contact language did not emerge among second generation migrants in either Germany or Sweden. Instead, teenagers with a migrant background have been found to use a stylized pan-ethnic form of the local language that incorporates certain features (e.g., phonology, intonation) of their parents' second language. This pan-ethnic variety of the target language is seen as 'deficient' by native speakers, but serves as a symbolic badge of membership in the larger migrant community (on the ideological implications of popular debates about *Rinkeby* Swedish, see Stroud, 2004). A similar phenomenon has been described for Australia where such speech forms are colloquially referred to as *wog-speak* ('wog' can be used in a self-mocking sense by migrants to designate their bicultural identity; Warren, 1999; Clyne *et al.*, 2001). Under conditions of social segregation and intergroup conflict, such ethnolectal developments can lead to long-term processes of linguistic divergence and the development of oppositional linguistic (sub-)cultures.

Transnational Migration, Language, and Citizenship

Transnational migration has grown in volume and significance since 1945. High levels of in-migration have changed the demographic, economic, and social structures in many countries and have led to the formation of new ethno-linguistic minorities (cf. the papers in Extra and Gorter, 2001 and Extra and Verhoeven, 1998). Transnational migration is largely an urban phenomenon. Fraser Gupta (2000) uses the term 'cosmopolis' to describe multilingual urban settings that have been created by waves of migration, and where the individual's linguistic and cultural repertoires are characterized by a multiplicity of registers, languages, and cultural traditions (cf. also Castle and Miller, 1998 on the rise of 'global cities').

Many countries have recognized the necessity of introducing special language services for new arrivals, and education has been a key site for the implementation of migrants' linguistic rights. Policies that accept the cultural differences created by migration and grant minority linguistic and cultural rights to migrants have since the late 1970s been instituted in countries such as Australia, Canada, and Sweden. In Australia the Adult Migrant English Program (AMEP) offers up to 510 hours of ESL lessons to adult migrants, and special school-based programs exist for children. At the same time Australia's language policy aims to develop and maintain languages other than English within the school curriculum and also radio, TV, and print media. In Australia (also Canada and the United States) heritage language education, which focuses on developing appropriate teaching methods for second and third generation migrants, has developed into an important branch of second language pedagogy.

However, multilingual programs have come under attack in Australia (and elsewhere) since the mid-1990s: linguistic and cultural diversity are increasingly viewed as a threat to national homogeneity, and there has been a marked policy shift in favor of emphasizing the teaching of English. As a result bilingual programs and services have been reduced (a similar development has been observed in Sweden: see the articles by Boyd, Ozolins, and Clyne in Extra and Gorter, 2001; for the United States cf. Crawford, 2000). Assimilatory language policies see linguistic and cultural integration as a prerequisite for citizenship, and exclude the migrants' bicultural and bilingual identities from the public sphere.

Conclusion: Migrants as 'New' Ethnic Minorities

Today, migration is a central force in social transformation, international relations, and domestic policy in countries as diverse as Germany, Malawi, and Singapore. Chain migration (secondary migration of family members) and migrant's social networks, which encourage and facilitate settlement in a new country, can lead to the formation of ethnic enclaves in societies with large migrant populations. The subsequent development of community networks and institutions (social clubs, churches, etc.) in the host society gradually transforms transitory migrant groups into permanent and relatively cohesive 'new' ethnic communities. Like 'historic' indigenous minorities, migrant minorities are usually vulnerable populations whose linguistic and cultural rights need to be addressed and protected by national language policies and planning.

See also: Bilingual Education; Bilingualism; Code Switching and Mixing; Education in a Multilingual Society; Ethnicity; Immigrant Language Education; Interlanguage; Language Maintenance and Shift; Language Planning and Policy: Models; Language Spread; Language/Dialect Contact; Linguistic Rights; Minorities and Language; Multiculturalism and Language; Pidgins and Creoles: Overview.

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Migration and Language Planning

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Ideologies Toward Immigration

In addition to the traditional forms of migration, there are new forms of population movements, such as overseas students and highly qualified professionals, who mostly offer their knowledge and expertise on universities to transnational companies. This new form of population movement is an essential component of the globalization process, and it results in increasing language diversity in the host societies. It is important to remember that immigrant minority (IM) groups do not create their communities in

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Ideologies Toward Immigration

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isolation; they interact with the mainstream society, mostly, in the social and legal frameworks provided by the receiving society. The connection between source and destination countries is an inherent aspect of the migration phenomenon. The type of connection varies depending on the type of migration, whether it be the push or pull factor. In addition, receiving societies' integration policies have a decisive role concerning the integration patterns and language use of IM groups.

As documented by Extra and Yağmur (2004), the legal status of IM groups within host societies is not as straightforward as that of regional minorities. In most immigration contexts, legally, socially, and economically, immigrants are not considered to be equal members of the mainstream society; instead they are often considered as temporary, marginal, or even undesired within the host society. In this way, state policies may define the social-psychological reality of being an immigrant and accordingly, may influence the sociocultural orientation of immigrants. In the literature, four clusters of state ideologies shaping integration and language policies of immigrant-receiving societies are identified (Bauböck *et al.*, 1996; Bourhis, 2001; May, 2001; Penninx, 1996). These ideologies range from pluralism to ethnist ideologies, in terms of pluralist, civic, assimilation, and ethnist ideology.

Pluralist ideology proposes duties and responsibilities to be observed by all members of the society. In this ideology, learning the official or mainstream language is the responsibility of the citizens themselves, and the state provides opportunities to facilitate language learning. Concerning the home languages of citizens, the state has no mandate in defining or regulating the private values of its citizens in the domestic domain, nor their political or social affiliation. As different from other ideologies, the state provides financial support for mainstream language classes and for cultural activities to promote first language maintenance. Australian and Canadian multicultural policies are good examples of the pluralist ideology as presented here.

Civic ideology expects that immigrants adopt the public values of the mainstream society. Like pluralist ideology, the state does not interfere with the private values of its citizens but unlike pluralism, the state does not make any provisions for the maintenance or promotion of linguistic or cultural values of IM groups. A typical example of civic ideology might be the Netherlands. Given the centuries-old coexistence of people varying in descent, religious denomination, culture, and class, the Netherlands might be considered to be a plural society. In discussing the relationship between integration of immigrants and pluralism, Vermeulen and Penninx (2000: 3) assume that the tradition of religious pillarization in the Dutch society can be associated with pluralism. Yet, Penninx (1996) argues that due to nation-state ideology, Dutch state policies cannot be identified as pluralistic. Nonetheless, the long-standing pillarized structure of the Dutch society has acted as a barrier against assimilationist or ethnist ideologies.

Assimilation ideology expects IM groups to comply fully with the norms and values of the mainstream society. As different from pluralist and civic ideologies, assimilation ideology expects complete linguistic and cultural assimilation into the mainstream society. In the name of homogenization of the society, assimilationist language policies aim at accelerating the language shift and language loss of IM groups. With its unitarian approach, French policies fit the assimilationist ideology cluster quite well. Recent political developments, such as restrictions on marriage partners of IM groups, abolition of community language classes, and compulsory integration classes in Denmark show a strong shift toward assimilation ideology. During the last few years, the Netherlands has moved in the same direction (Extra and Yağmur, 2004) Such shifts prove that changing political circumstances have a profound effect on integration and language policies of immigrant-receiving countries. Basically, all nation-states are assimilationist in nature. According to Waldinger and Fitzgerald (2004: 1179), "as ideology of the nation-state society, the sociology of assimilation necessarily obscures coercive efforts to build a nation-state society by excluding outsiders – via control of external borders – and to distinguish between members and unacceptable residents of the territory – through regulation of the internal boundaries leading to citizenship and legal residence." For most immigrants the link between old-ancestral homeland and the new country of residence is an inevitable reality, and contributes to the shaping of a transnational identity; but for the nation-state ideology, that link and identity are difficult to accept. Irrespective of the traditional and conservative discourse on immigration and integration, however, IM groups maintain, build and reinforce multiple connections between their old and new homelands. In the contemporary era of migration, such linkages maintain and reinforce the dynamism of globalization. Yet, especially in nation-states, IM groups are often conceived as aliens, and they are subject to different treatment. Different language policies with respect to regional vs. IM groups highlight the unfavorable position of the latter in assimilationist societies.

Ethnist ideology shares most aspects of the assimilation ideology; yet it makes it difficult for IM groups

to be accepted legally or socially as full members of the mainstream society. Citizenship and naturalization laws are quite representative for distinguishing ethnist ideologies. The principle of *ius sanguinis* ('law of the blood') underlies acquisition of citizenship in such countries. For instance, while third-generation Turkish immigrant children born in Germany are not automatically entitled to German citizenship, German repatriates, most of whom cannot even speak German, coming from ex-Soviet Union countries, are granted German citizenship. On the policy level, ethnist ideology seems to favor full linguistic and cultural assimilation of IM groups, but in reality achieving full membership is not easy. Even though there is variation between the policies of various states in Germany, federal state ideology in Germany can be identified as ethnist in nature.

Even though different IM groups exhibit different reactions to the above policies, generally speaking, host societies' policies have an effect upon their integration and language use patterns. Depending on the extent to which IM groups consider their own language as part of their core values, they either maintain their first language or shift to the mainstream language (Smolicz, 1981).

Sociolinguistic Outcomes of Migration

Emigration processes inevitably lead to a rupture with the original L1 community, and to contacts with a new and dominant L2 community. As a consequence of reduced L1 input, processes of L1 erosion may occur, leading to, for example, reduction of stylistic variation or overextension of morphosyntactic rules. IM groups often use their L1 in the domestic domain but they mostly use the mainstream language outside the home context. Varying degrees of L1 and L2 use bring up the issues of language maintenance, shift, and loss. Language maintenance usually refers to relative language stability in the number and distribution of its speakers, its proficient usage by children and adults, and its retention in a number of domains (Baker, 2001: 59). The choice and the efforts of maintaining an IM language may be made on the basis of the instrumental functions of the language involved or on the basis of its symbolic functions such as group identification and cultural identification (Kipp *et al.*, 1995). An individual's maintenance of the L1 in an L2 environment is usually referred to as language retention (Hyltenstam and Stroud, 1996). The opposite of societal language maintenance is termed language shift, and the term 'language loss' is used for the opposite of language retention (*see* **Language Maintenance and Shift**). How much societal use of a first language is considered language maintenance or how much societal use of a second language is considered language shift cannot precisely be specified. Generally, language shift is used in the literature to refer to a negative language development. "There is a reduction in the number of speakers of a language, a decreasing saturation of language speakers in the population, a loss in language proficiency, or a decreasing use of that language in different domains. The last stages of language shift are called language death" (Baker, 2001: 59).

It can be argued that language attrition is an intragenerational phenomenon while language shift is intergenerational. The term 'intragenerational' implies that the loss of linguistic skills takes place within individuals over a more or less extended period of time, mainly because of a break in linguistic continuity. With respect to intergenerational and intragenerational language loss, an examination of Gonzo and Saltarelli's (1983) well-established model is helpful for the differentiation between language attrition and language shift. In relation to the sociolinguistic situation in IM families, Gonzo and Saltarelli suggested that, because of nonuse of L1 and influence from L2, first-generation immigrants experience language attrition over the years. The children of these immigrants acquire the already attenuated L1; even this reduced system is, however, not entirely passed on to the second generation for a number of (socio)-linguistic reasons. Following this incomplete L1 acquisition, there is again L1 attrition among second-generation immigrants, and even further reduced forms are transmitted to the third generation. This cascade model thus predicts that within three or four generations, IM languages in contact with a mainstream language are doomed to be lost (Gonzo and Saltarelli 1983). This view is supported by Fishman's (1991) conclusion that a number of language contexts that unless the minority language is an indigenous one, the shift to the mainstream language is almost irreversible. Yet it is important to point out that language loss is not an isolated phenomenon; rather it is a special case of variation in the acquisition and use of language(s) and can best be studied within a larger framework that includes other phenomena of L1/L2 acquisition, bilingualism, language use and choice, code-switching and mixing, and language attitudes (Yağmur, 1997).

In order to systematically investigate minority language contexts, various language use typologies have been proposed, including the well-known and frequently cited works of Ferguson (1966), Haugen (1972), Haarmann (1986), and Bourhis (2001). Each of these frameworks considers a particular set of linguistic and social factors to be essential for an accurate description of language contact situations.

In addition to these models, a number of sociolinguistic and social-psychological models have been proposed to investigate language maintenance and shift (Kloss, 1966; Giles *et al.*, 1977; Smolicz, 1981; Conklin and Lourie, 1983; Fishman, 1991; Edwards, 1992). These models have been tested in different contexts with different language groups. Clyne (1991, 2003) and Kipp *et al.* (1995) have tested the relevance of some of these models against Australian Census data (for a comprehensive account, see Clyne, 2003).

The factors involved in language maintenance or shift are divided into two categories: those affecting a speech community and those affecting individuals within a speech community (Kipp *et al.*, 1995). In that division, birthplace, age, period of residence, gender, education and qualifications, marriage patterns, prior knowledge of the mainstream language, reason for migration, and language variety are included in the category of individual factors. Group factors are listed as "size and distribution of an ethnic group, the policy of the host community towards community languages, the position of the language within the cultural value system of the group, and proximity or distance of the community language to or from English" (Kipp *et al.*, 1995: 123). However, Kipp *et al.* admit that it is not always easy to draw the line between individual and societal factors, as there is an ongoing interaction between an individual and the speech community that he or she belongs to. In most cases, these factors are interrelated, both on the individual and on the group level.

Researchers in immigrant-receiving societies have carried out detailed studies on various aspects of language use among migrants. These studies range from early bilingual development to language loss. Bilingual development among school children and various models of bilingual programs are another field of study. Code-switching and borrowing, as well as language maintenance and loss are issues resulting from language contact and migration. For a detailed discussion of such research issues and findings, readers are referred to research monographs and edited books such as Ammerlaan *et al.*, 2001; Extra and Verhoeven, 1993, 1998; Fase *et al.*, 1992; Klatter-Folmer and Van Avermaat, 2001; Lambert and Freed, 1982; Schmid *et al.*, 2004; Seliger and Vago, 1991; Weltens *et al.*, 1986; Yağmur, 1997.

See also: Ethnolinguistic Vitality; Language Maintenance and Shift; Multiculturalism and Language.

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Mikasuki *See:* Muskogean Languages.

Miklosich, Franc (1813–1891)

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Franc K. Miklosich was a Slovenian philologist specializing in Slavic philology. Born in Ljutomer, Styria, Slovenia, then part of Austria, he graduated as a doctor of philosophy from the University of Graz where he subsequently taught philosophy. In 1938, he went to Vienna to read law but dedicated his life to Slavic philology. From 1844 to 1862, he worked at the Imperial Library. In 1849, he was appointed as a professor of the new chair of Slavic philology at the University of Vienna and worked there until 1866. He became a member of the Academy of Vienna, which appointed him as the secretary of the historical and philosophical section. He is credited with introducing the historical and comparative method to the Slavic languages. He is held in great esteem by Ukrainians because he recognized Ukrainian as a separate language. He also wrote on Romanian, Albanian, Greek, and the languages of the Roma and Sinti people. Miklosich edited various texts in ethnography and history, and he was described as a man of great erudition. He was interested in public education and was a member of the council of public instruction and was a corresponding member of the French Academy of inscription.

Miklosich followed from Grimm's work in comparative and historical linguistics and published on the Slavic languages from 1852 to 1874. His first early major contribution was a review of Bopp's *Comparative grammar*. He followed Grimm's and Diez's models of syntax. Syntax for Miklosich was the study of word classes or forms and their meaning. This was characteristic of other Indo-Europeanists, who tended to concentrate on morphosyntax and pursued extensive description of the categories of the languages they researched. The fourth volume, his *Vergleichende Grammatik der slavischen Sprachen*, is on syntax (1852–1875, 2nd edition 1876–1883). He also wrote on impersonal forms such as 'it is snowing.' He was awarded the Volney Prize for the 1856 third volume of the *Vergleichende Grammatik*. Following Pott's list of roots, Miklosich (1886) prepared an etymological dictionary for the Slavic languages, as did Benfey (Greek), Curtius (Greek), and Diez (Romance). His contributions to lexicography are significant. B. Delbrück (1880) refers to Miklosich's role along with Schleicher's in pursuing work on the Slavonic languages, comparing them to what Bopp and Grimm did for the Germanic

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See also: Dictionaries; Jagic, Vatroslav (1838–1923); Potebnja, Alexander (1835–1891); Slavic Languages; Slovenia: Language Situation.

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Mill, John Stuart (1806–1873)

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John Stuart Mill (1806–1873) is regarded as the most influential British philosopher of the 19th century. He counts as one of the representative 19th-century philosophers who developed grand theories encompassing philosophy, ethics, language sciences, politics, and social sciences. He is also well known as one of the figures who effectively represent English empiricism and a liberal philosophical and political view of society and culture.

He was born on May, 20, 1806, in his father's house in Pentonville, London. His father, James Mill, had a great influence on the eldest son, J. S. Mill, from early childhood by providing him with a rigorous humanities training of the Greek and Latin classics. At about the age of 12, the intellectual interest of Mill was broadened to include philosophy, logic, politics, and economics. A utilitarian such as Jeremy Bentham, whose philosophical thinking James Mill pursued, counts also as one of the significant figures who influenced Mill early on in the development of his philosophical thought.

From May 1820, when he was 14 years old, Mill spent 1 year in France, continuing his laborious reading of various disciplines including chemistry, botany, and advanced mathematics. This visit made him fluent in the French language and he soon

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From May 1820, when he was 14 years old, Mill spent 1 year in France, continuing his laborious reading of various disciplines including chemistry, botany, and advanced mathematics. This visit made him fluent in the French language and he soon

became acquainted with French history and philosophical thought. In 1823, when he was 17, he began working as a clerk in the Examiner's office of the East Indian Company in which his father, James Mill, eventually became the Chief Examiner. In 1856, after having been in charge of the Company's relations with the native states for 20 years, Mill also becomes the Chief Examiner of the East Indian Company, succeeding Thomas Love Peacock. After retirement from this post in 1858, Mill was elected to the House of Commons in 1865. During his political career in the Parliament, he advocated for married women's property rights, women's suffrage, and women's equal access to education. It is sometimes maintained that it was through his relationship with Harriet Taylor, later his wife, that he came to be convinced that the promotion of the rights of women was crucial to the understanding of liberal culture as a form of modernity at that time.

As an important public figure during the Victorian era, his writing in philosophy and economics drew great general public recognition, more than any other thinker during the second half of the 19th century in England. His prolific academic activities centered around *The Westminster Review*, *The London Review*, and *The London and Westminster Review*. He died in Avignon on May 7, 1873 and was buried in the place beside the remains of his beloved wife, Harriet Taylor.

Mill is known as the key figure representing the so-called Utilitarianism in the philosophical tradition. Utilitarianism is a philosophical thought that the morality of any action or law is defined by its utility. Utilitarianism was proposed for the first time in England by Jeremy Bentham who formulated 'the greatest happiness principle.'

Mill was also influenced by the movements of Romanticism and Conservatism. After the deaths of Bentham and his father, James Mill, a suddenly created vacuum was filled by these intellectual movements and by the relationship with his wife, Harriet Taylor. Conservative Romanticists such as Thomas Carlyle and Samuel Taylor Coleridge had a great influence on Mill in the sense that they helped Mill turn away from radicalism. Mill's reading of later French thinkers such as Saint Simon and Auguste Comte and their French works on human science also played a crucial role in Mill's intellectual evolution. Mill and Comte both saw the drawbacks of the doctrinaire versions of the Enlightenment Project and the importance of the philosophy of history. As a disciple of Saint Simon, Comte held the view that history was a progressive process and that a scientific explanation is expressed in terms of empirically identifiable underlying causes, as opposed to speculative entities. This positivistic thinking required an explicitly identifiable and empirically confirmable explanation.

Mill was not intrinsically interested in the technical dimensions of philosophical thought. The technical considerations of philosophy were the basis for practical sciences and implications, for example, social sciences. Mill's discussion of the origins of knowledge in the *System of logic* became the foundation for his moral, political, and economic views. One of the targets that Mill wanted to debilitate in the philosophical and intellectual tradition in Europe was the philosophical position known as intuitionism, which was employed as the epistemology of political conservatism.

Intuitionism takes the view that innate truths exist independent of experience. Mill was opposed to the philosophical views of Kant, who claimed that there was *a priori* human knowledge. This philosophical view of Mill's is explicit in that Mill himself states in his *Autobiography* (pp. 233–235) contained in *Collectd works* (v. 1.) that "the System of Logic supplies what was much wanted, a text-book of the opposite doctrine – that which derives all knowledge from experience and all moral and intellectual qualities principally from the direction given to the associations... The notion that truths external to the human mind may be known by intuition or consciousness, independently of observation and experience, is, I am persuaded, in these times, the great intellectual support of false doctrines and bad institutions."

The traditional rationalist deductive mode of thinking is refuted in Mill. Mill develops the idea that all thinking processes are possible due to experience and that this proceeds through the association of ideas based on those experiences.

Even the most well-known traditional deductive way of argument such as the following is argued to be the result of an inductive way of thinking that started with individual experiences:

All men are mortal.
Socrates is a man.
Therefore, Socrates is mortal.

Based on our experiences and historical facts, we realize that all men die eventually. Therefore, this syllogism itself is thought to be the result of an inductive process. This way of logical thinking reflects Mill's political and social agenda in which he held the view that all customary human practice should be subject to revision or modification in the light of the constantly changing social and political circumstances and environments.

Mill's hostilities toward principles of innateness and intuitionism shaped his views on political

economics. Mill and other social reformers of that time voiced several major objections to intuitionism concerning its belief in the innateness of human nature, the inability to promote progressive thinking, e.g., utilitarianism, and the lack of a rational foundation and objectivity.

Through this empiricist thinking, it is obvious that Mill sees that the real world we live in is reflected purely in the ontology of language and logic that we use. In the light of modern linguistics, the parts of Mill's writings on logic (*System of logic*, 1843) are closely related to the study of meaning, i.e., semantics. The essence of Mill's theory of meaning is to be found in the first book of *A system: of names and propositions*; in Book 2, Mill discusses deductive reasoning, while Book 3 is reserved for induction.

Mill's contribution to linguistics can be positively evaluated with respect to the theory of reference and the theory of meaning. This discipline investigates the relations between linguistic expressions and their corresponding objects, facts, or events. Mill also uses for the first time the concepts 'denote' and 'connote,' i.e., the distinctive and oppositional technical terms, which are of prime importance to his semantics. For Mill, denotation has the function of direct reference. To this category belong proper names (Peter) and abstract names (truth), whereas "a connotative name is one which denotes a subject, and implies an attribute"(Mill, *Collected works* VII: 31). Mill further explains that "the word 'white' denotes all white things [...] and implies, or in the language of schoolmen, connotes, the attribute 'whiteness'" (Mill, *Collected works* VII: 31). This distinction between denotation and connotation is crucial for Mill's theory of meaning. It should also be noted that Mill did not distinguish the two categories in a fully consistent way.

According to de Jong (1992), Mill visualized language primarily from the standpoint of logic. Mill's work with respect to deductive logic is also often argued to fall near the transitional passage between Aristotelian syllogistic logic to modern logic. It is also the case that, from a modern perspective, his mode of thinking is treated merely "as a psychologistic variant of English empiricism" in the sense that Mill represents "a highly simple form of inductivism, while also his liberalism and his utilitarian views are often taken to be outdated" (de Jong, 1992: 402).

Mill's great intellectual achievements were *System of logic: ratiocinative and inductive* (1843), *Essays on some unsettled questions of political economy* (1844), and *Principles of political economy* (1848). In 1859, *On liberty* appeared, and his *Thoughts on parliamentary reform*. His *Considerations on representative government* was published in 1860; and in 1863 came his *Utilitarianism*.

In 1865, *Examination of Sir William Hamilton's philosophy* was published; in 1867, his Rectorial *Inaugural address* at St. Andrews University, on the value of culture; in 1868, the pamphlet on *England and Ireland*; and in 1869, his treatise on *The subjection of women*. Also in 1869, his edition of his father's *Analysis of the phenomena of the human mind* was published. After his death in 1873 were published his *Autobiography* (1873) and *Three essays on religion: nature, the utility of religion, and theism* (1874), written between 1830 and 1870.

See also: Empiricism; Reference: Semiotic Theory.

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George Armitage Miller, one of the fathers of and a chief driving force of modern cognitive science, was born on February 3, 1920, in Charleston, West Virginia. He studied at the University of Alabama (B.A. 1940; M.A. 1941), then at Harvard University, where he received an A.M. (1944) and a Ph.D. (1946) in psychology. He has been a professor at Harvard, MIT, Rockefeller University, and Princeton, where he is currently James S. McDonnell Distinguished University Professor of Psychology, Emeritus. Miller was President of the American Psychological Association (1969). Among the numerous honors conferred

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Miller's decisive contribution, as a key figure in the dramatic shift away from behaviorism to cognitivism, can be traced back to the late 1940s and the early 1950s, when he applied C. E. Shannon's information theory to his experiments, most notably those involving short-term memory capacity. Since then, the field of psychology has evolved into the collaborated field of sciences of cognition, in which psychology, linguistics, and computer science, as well as philosophy and biology, come together to share a common interest, the human mind. Henceforth, memory, language, and processing, rather than just learning, speech, and stimulus–response, have been the key subjects of inquiry in cognitive science.

In line with this evolutionary development, Miller was co-founder, along with J. S. Bruner, of the Harvard Center for Cognitive Studies (1960–1967). The center was a critical counterforce to behaviorism, where, under the influence of N. Chomsky's linguistic mentalism, Miller developed experimental procedures for the study of mental processes underlying grammar. In the late 1960s he turned his interest from grammar to semantics, and the mental lexicon has been his abiding research interest ever since, beginning at the Princeton Institute of Advanced Study. Later, in collaboration with G. Harman, he established the Princeton Cognitive Science Laboratory (1986), where he has been principal investigator of WordNet, an evolving online English lexical reference system designed under psycholinguistic theories of human lexical memory. He was also Director of the McDonnell-Pew Program in Cognitive Neuroscience (1989–1994).

See also: Bruner, Jerome (b. 1916); Chomsky, Noam (b. 1928); Cognitive Linguistics; Cognitive Science: Overview; Identity and Language; Information Theory; Language Attitudes; Language Loyalty; Psycholinguistics: Overview; Word; Society and Language: Overview; WordNet(s).

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Leslie Milroy – her full name is actually Ann Leslie Milroy – is, as of 2004–2005, professor and chair of the Linguistics Department at the University of Michigan, where she holds the Hans Kurath Collegiate Chair. Although Milroy has done work on communication disorders (Lesser and Milroy, 1993) and conversation analysis (Wei and Milroy, 1995; Shin and Milroy, 2000), she is best known for her work in sociolinguistics.

Two related characteristics of Milroy's work in this discipline are the broadness of her interests and her ability to make significant contributions in multiple areas. She has produced important works in sociolinguistic methodology (Milroy and Gordon, 2003), language ideology (Milroy, 2001), and bilingualism (Milroy and Muysken, 1995; Wei and Milroy, 1995; Shin and Milroy, 2000). However, the most prominent sociolinguistic contribution Milroy has made, and continues to make, involves language variation and change.

Milroy performed a pioneering study in Belfast on the role of social networks as vehicles for language change processes, and her monograph on that subject (Milroy, 1987) has become a classic. The concept of social network originates in sociology, and Milroy's sociolinguistic use of it in Belfast involved an analysis along two dimensions: the amount of contact with

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other networks and the degree to which members of a single network have contact with each other. A common misunderstanding opposes social network analysis to analysis of macrosocial structure – notably gender, ethnicity, and class – and the symbolic role of linguistic variables in conflicts between such groups. However, in Milroy's Belfast study, social network analysis actually complements and interacts with correlations of variants with macrosocial categories by connecting microsocial structural differences to macrosocial ones. As such it creates a more sophisticated and sociolinguistically plausible analysis than one based solely on macrosocial identity. Milroy is currently continuing her variationist research in Detroit. This project is in a fairly early stage as of this writing, but it has the promise to provide data and theoretical contributions to our understanding of English variation in North America, and particularly the role of ethnicity and race in that variation.

Another important contribution Milroy has made involves language prescription and the origin and maintenance of standard language varieties. Together with her husband, James Milroy, she undertook one of only a very few studies of this important sociolinguistic phenomenon. Their book, *Authority in language: investigating standard English*, was the first major work to explore prescription as an ideology of language and to establish the linguistic characteristics of standard languages, in particular the suppression of variation among linguistic forms. The impact of this work can be seen in the fact that the book has been reissued in three editions (Milroy and Milroy, 1985 [1991, 1999]). Leslie Milroy has had an important career in sociolinguistics and a number of related areas. She is one of the few sociolinguists who have managed to make important contributions across a number of subfields.

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Mind Style

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Definition and Scope

The notion of mind style was introduced by Fowler (1977, 1986, 1996) in order to capture the way in which distinctive and systematic linguistic patterns in fictional texts may project an individual's characteristic mental habits and view of the (fictional) world:

> We may coin the term 'mind style' to refer to any distinctive linguistic representation of an individual mental self. (Fowler, 1977: 103)

> Cumulatively, consistent structural options, agreeing in cutting the presented world to one pattern or another, give rise to an impression of a world-view, what I shall call a 'mind style.' (Fowler, 1977: 76)

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> Cumulatively, consistent structural options, agreeing in cutting the presented world to one pattern or another, give rise to an impression of a world-view, what I shall call a 'mind style.' (Fowler, 1977: 76)

Building on Fowler's work, Bockting has more recently defined mind style as "the expression in language of the conceptualisation of 'reality' in a particular mind" (Bockting, 1995: 23).

The most famous and influential analysis of mind style, which inspired Fowler's own work, is Halliday's (1971) study of the language of William Golding's novel *The inheritors*. Halliday noted that the part of the novel that conveys the viewpoint of a Neanderthal character called Lok contains few transitive constructions with animate agents, but a relatively high number of inanimate agents. For example, Lok's perception of being shot at with bow and arrow by a stranger is conveyed as follows:

> The stick began to grow shorter at both ends. Then it shot out to full length again.
>
> The dead tree by Lok's ear acquired a voice.
>
> "Clop!" (Golding, 1955: 106)

Halliday concluded that these unusual transitivity patterns reflects Lok's cognitive limitations, and particularly his poor understanding of human agency, cause-effects relationships, and of the distinction between animate and inanimate entities.

The notion of mind style can be applied to authors and narrators, as well as characters. Leech and Short (1981: 191), for example, compare the mind styles of the (implied) authors of three different novels, and Boase-Beier (2003) applies the notion of mind style to the way in which poems reflect the cognitive states of their authors. However, most work in this area has focused on the worldviews of characters in third-person narratives (e.g., Lok in *The inheritors*), or of characters-narrators in first-person narratives (e.g., the Compson brothers in Faulkner's *The sound and the fury*).

As Fowler (1977: 103) originally pointed out, a character, narrator, or author may or may not be (presented as being) consciously aware of the linguistic and cognitive peculiarities that characterize their mind style. We are unlikely to imagine, for example, that Lok is aware of his poor grasp of agency, animacy, and causation. By contrast, the kinds of characteristics that are normally seen as constituting a mind style tend to be fairly permanent traits, which may either not change in the course of a novel, or change very gradually. Lok's understanding of his world, for example, changes very little in the course of *The inheritors* (see Black, 1993), whereas the mind style of Clegg in Fowles's *The collector* does not seem to change at all (see Semino, 2002; see also Boase-Beier, 2003, for the view that the concept of mind style should be extended to the expression of transient cognitive states).

Fowler presents the notion of mind style as equivalent to that of "point of view on the ideological plane" (Fowler, 1986: 15). In contrast, Semino and Swindlehurst (1996) and Semino (2002) have proposed that these two notions can be applied to different *aspects* of worldviews. They suggest that ideological point of view is most apt to capture the elements of worldviews that are "social, cultural, religious or political in origin" and that individuals share "with others belonging to similar social, cultural, religious or political groups" (Semino, 2002: 97); mind style, by contrast, best captures the elements of world views that are mostly "personal and cognitive in origin" (Semino, 2002: 97), and that may be entirely idiosyncratic, or shared by people with the same cognitive habits or limitations, such as young children or sufferers from a particular type of mental condition. Clearly, however, these different aspects overlap and interact within individual worldviews.

Linguistic Patterns and Mind Style

The application of the notion of mind style requires two interrelated analytical steps, namely, the identification in a text (or part of a text) of linguistic patterns that are distinctive and systematic, and the interpretation of these patterns as the reflection of the characteristic, often idiosyncratic, workings of an individual's mind. Both analytical steps can be problematic, however.

The identification of distinctive and systematic linguistic patterns can be aided by quantitative analysis and comparison, as showed in Halliday's (1971: 342–343) study of *The inheritors* and some of Fowler's analyses (e.g., Fowler, 1986: 165–167). Hoover's (1999) more recent work on *The inheritors* shows the potential contribution of corpus-based analytical techniques. His machine-aided comparison of the text of *The inheritors* with several different corpora arrives at a more fine-grained and reliable account than Halliday's of what exactly characterizes the "Lok-language" in the novel (see Hoover, 1999: 155). By contrast, however, interpretative significance cannot be straightforwardly correlated with frequency. For example, in Semino (2002). I have claimed that Clegg's mind style in *The collector* is characterized in part by the metaphorical construction of women as butterflies, even though Clegg's narrative in the novel contains less than fifteen examples of this metaphor. However, Clegg's descriptions of women as butterflies are very unusual, highly elaborated, and intimately related with Clegg's life and habits (he is a passionate, almost obsessive, butterfly collector). All this (as well as the title of the novel itself) can be regarded as evidence for the fact that the metaphorical conceptualization of women as butterflies is an important feature of Clegg's mind style.

The interpretation of linguistic patterns in terms of mind style relies on the assumption that *linguistic* behaviors and habits reflect *cognitive* behavior and habits, or, in other words, that the way we speak reflects the way we think. This involves a weak version of the Whorfian hypothesis that the language we speak both reflects and determines our thinking. In this respect, however, Halliday (1971: 333) points out that "[t]he speaker can see through and around the settings of his semantic system" and Fowler (1986: 149) adds that "[a] language embodies ways, not *one* way, of looking at the world," so that "speakers are not going to be trapped within one overriding system of beliefs." With fictional characters, in any case, claims about mind style are sometimes made on the basis of the (verbal) representations of thought, which is legitimized by the special conventions of fictional discourse. The issue remains, however, that what exactly we infer from an individual's language, or represented thoughts, about their worldview or mental habits is a matter of interpretation (see, for example, Fish's 1981 critique of Halliday's interpretation of *The inheritors*). Bockting (1994, 1995) tackles this issue by explicitly drawing from psychoanalysis and psychiatry in order to interpret the narratives of the Compson brothers in *The sound and the fury* as indicative of different types of mental illness.

A large variety of linguistic phenomena and patterns have been linked, in different studies, to the projection of mind style. As far as characters are concerned, these patterns may be found in the representation of speech, thought, and internal point of view more generally. In the case of authors and narrators, any part of a text or narrative may be evocative of mind style. Fowler usefully distinguishes between linguistic devices that "make explicit (though sometimes ironic) *announcements* of beliefs" (e.g., modal verbs), and linguistic phenomena that "indirectly, but nevertheless convincingly, may be *symptomatic* of world-view" (Fowler, 1986: 132, emphasis in original). Not surprisingly, it is the latter type of devices that have received the greatest attention, as I will show below. Although, for the sake of exposition, I discuss each relevant linguistic phenomenon in turn, it is important to bear in mind that it is normally the interaction of different types of linguistic patterns in a particular context that results in the perception of a particular mind style.

Transitivity

Halliday's claims about Lok's worldview are mostly based on patterns of transitivity, namely on how processes, participants and circumstances are expressed at the level of the clause. In his corpus-based study of *The inheritors*, Hoover (1999) found more specifically that the section of the novel that reflects Lok's worldview is characterized by the use of "body parts and inanimate objects as agents, and as subjects of mental process and perception verbs, and intransitive verbs of motion," and by "body parts and inanimate objects with attributes normally associated with animate beings" (e.g., "Lok's feet were clever. They saw." Golding, 1955: 11) (Hoover, 1999: 155).

A number of studies have identified unusual transitivity patterns in other novels, and have analyzed them as a reflection of idiosyncratic worldviews. In the case of Faulkner's *The sound and the fury*, the low frequency of transitive structures and human agents in Benji Compson's narrative has been interpreted (alongside other lexical and grammatical peculiarities) as a reflection of Benji's limited understanding of causation and human actions, which results from his mental retardation: Benji is normally described as an adult with the mind of a small child (Bockting, 1995: 43ff.; Fowler, 1986: 133; Leech and Short, 1981: 202ff.).

A particularly interesting phenomenon is the use of normally transitive verbs as intransitives. In *The sound and the fury*, Benji's unwitting description of a game of golf contains sentences such as "he hit and the other hit," and "Luster threw" (Faulkner, 1987: 3). Similarly, in Kesey's *One flew over the cuckoo's nest*, Bromden, the first-person narrator (who is a patient in a mental hospital), uses the verb 'hate' as an intransitive verb, as in "When they hate like this" (Kesey, 1973: 9). In both cases, readers may infer that the character in question has a limited understanding of basic activities and reactions: Benji does not understand the motives and goals of the actions he is observing, and Bromden has difficulties relating to people's emotional states and responses (Bockting, 1995: 45; Fowler, 1986: 133; Leech and Short, 1981: 206; Semino and Swindlehurst, 1996: 151). In contrast, the frequent attribution of human actions and characteristics to inanimate entities in Gothic novels has been interpreted by Fowler as contributing to evoke the morbid mind style of characters who perceive their surroundings as disturbing and menacingly active (Fowler, 1986: 158ff.).

Grammatical Structure

The length and structure of sentences often has been seen as an indication of the degree of sophistication of the projected worldview. More specifically, the use of short, simple sentences can, in conjunction with other linguistic markers of 'simplicity,' contribute to evoke the mind style of a child, or of a childlike adult. Many of the sentences in Benji's narrative in *The sound and the fury* are relatively short, and have simple grammatical structures (e.g., "He hit"

and "I held to the fence," Faulkner, 1987: 3) (see Bockting, 1995: 44; Leech and Short, 1981: 205–206). Similarly, the projection of the world view of Stephen Dedalus as a child in Joyce's *A portrait of the artist as a young man* partly results from the use of short, simple sentences, such as "He sang that song. That was his song" (Joyce, 1977: 9). In the relevant parts of these novels, longer, more complex sentences tend to involve co-ordination (usually via 'and') rather than subordination, as in the following extract from Benji Compson's narrative: "Then they put the flag back and they went to the table, and he hit and the other hit" (Faulkner, 1987: 3) (see Bockting, 1995: 44; Leech and Short, 1981: 205–206). Lennie, the mentally retarded co-protagonist of Steinbeck's *Of mice and men*, also tends to alternate, in his speech, between short simple sentences and longer paratactic sentences, as in "We gonna have a house an' a garden and a place for alfalfa, an' that alfalfa is for the rabbits, an' I take a sack and get it all fulla alfalfa and then I take it to the rabbits" (Steinbeck, 1992: 94).

The interpretation of such patterns as indicative of childlike mind styles partly relies on parallels with the language typical of young children, and assumes a connection between degree of grammatical complexity and degree of cognitive sophistication. However, the use of short, simple sentences can only convey simplicity of mind when it cooccurs with certain other phenomena, such as the transitivity patterns I mentioned earlier and some of the lexical patterns I will mention next.

Lexis

Vocabulary choices are perhaps the most salient and versatile technique for the projection of mind style. It has been noted, for example, that the vocabulary of Benji's narrative is relatively restricted and repetitive, and mostly consists of short words denoting concrete concepts. This contributes to suggest his rather limited experience and understanding of the world (Bockting, 1995: 43, Leech and Short, 1981: 204–205).

As Fowler (1986: 151ff.) makes clear, the study of mind style relies on the assumption that an individual's lexical repertoire reflects their conceptual repertoire: generally speaking, the availability of a particular lexical item suggests access to the relevant concept, while gaps in vocabulary suggest lack of (or limited) access to the relevant concepts. Another fundamental assumption concerns the notion of an average, adult lexical repertoire, which includes, for example, items such as 'arrow' and 'parachute' but does not include more specialized terms such as 'complementiser' or 'Fritillaries.'

Most studies of mind style have focused on examples that involve 'underlexicalization,' namely the absence of common vocabulary items from an individual's lexical repertoire (Fowler, 1986: 152). In the section of *The inheritors* that presents Lok's point of view, as we have seen, the word "stick" is used where we would normally use 'bow,' whereas "twig" is used in place of 'arrow.' Similarly, in *The sound and the fury*, Benji uses 'table' in place of the golfing term 'tee.' In Fowler's (1986: 152) terms, here we have the suppression of lexical items from the relevant area of experience (e.g., a particular type of warfare, golf, etc.), and the substitution of these lexical items with simpler, less specific words or paraphrases. Underlexicalization, therefore, often results in what Bockting (1995: 43) calls "overgeneralization," namely, the use of more general lexical items where more specific ones would be more appropriate and expected. This may not only suggest that a character lacks a particular word and concept but also that they have simplistically assimilated a member of a new category into an existing, but inappropriate, category (e.g., Lok does not seem to realize that what are referred to as "stick" and "twig" are weapons).

A slightly different type of substitution is involved when, in Louis de Bernières *Captain Corelli's mandolin*, the sight of a man floating down from a parachute is described as follows: "A sort of white mushroom was drifting down with a tiny man suspended underneath" (de Bernières, 1999: 333). The relevant section of the novel reflects the viewpoint of a rather simple-minded shepherd called Alekos, who is suddenly confronted with examples of modern warfare during World War II. From his point of view, a parachute is therefore referred to as "a mushroom," and hand grenades as "heavy khaki-colored iron pine cones with metal levers" (de Bernières, 1999: 335). Here, the terms that substitute for the missing vocabulary items are not more general but, rather, belong to a different domain of experience with which the relevant character is more familiar, namely nature. Such examples can therefore be interpreted as metaphors based on a visual similarity between the relevant, unknown, entity and another, familiar, entity (see Semino, 2002: 103). Other examples of this kind of substitution, however, seem to suggest misinterpretation on the part of the relevant character: Alekos, for example, does seem to know that the "mushroom" and the "pine cones" are not actual instances of mushrooms and pine cones, but mistakenly regards the man landing with the "white mushroom" as an angel, and continues to hold this belief even after he has been presented with ample evidence to the contrary. As Black (1993) points out in relation to Lok in *The inheritors*, it is sometimes difficult to decide

whether to read a particular lexical choice as a metaphorical expression or as an instance of mistaken categorization. In some cases, it is indeed possible to conclude that a particular expression reflects a literal belief on the part of the character, while simultaneously providing an apt metaphorical description for the readers (e.g., when Lok's feet are described as "clever").

The opposite of underlexicalization, 'overlexicalization,' also can be used to evoke mind style. Fowler (1986: 155–156) shows how a profusion of terms to do with nature, fruit, and ripeness contributes to the worldview projected by Keats's poem '*To autumn*.' Semino and Swindlehurst (1996) show how in *One flew over the cuckoo's nest*, Bromden is underlexicalized in the area of human emotions, but overlexicalized in the areas of machines and technology. Similarly, Clegg's passion for butterflies in Fowles's *The collector* is partly conveyed by his use of technical expressions from the field of lepidoptery, such as "sporadic," "Mazarine blue" and "Queen of Spain Fritillary" (see Semino, 2002). The 15-year-old autistic narrator in Mark Haddon's *The curious incident of the dog in the night-time* has an exceptional mathematical talent, which is reflected in his use of complicated graphs and formulae, and of technical vocabulary as in "λ is what is called a constant" (Haddon, 2003: 127). In all such cases, a character's above-average expertise in a particular field is combined with deficiencies in other areas, and the resulting mind style is central to the development of the plot.

Figurative Language

A powerful device for the evocation of mind style is the use of systematic but unconventional figurative patterns, which, following recent research on metaphor (Lakoff and Johnson, 1980: Lakoff and Turner, 1989), can be interpreted as reflecting idiosyncratic ways of thinking. In fact, some of the transitivity patterns that I discussed earlier can be seen as unusually frequent and creative uses of personification. This applies particularly to the frequent occurrence of inanimate subjects for verbs requiring animate agents in the language that reflects the worldviews of Lok in *The inheritors* (Black, 1993; Halliday, 1971), Benji in *The sound and the fury* (Bockting, 1995; Fowler, 1986; Leech and Short, 1981), and the characters of some Gothic novels (Fowler, 1986).

In the case of personification, the relevant metaphorical source domain (i.e., knowledge about people) is equally familiar and available to human beings generally. In other cases, an area of experience with which a character has particular familiarity can function as the source domain for systematic but idiosyncratic metaphorical patterns in (part of) a literary work. Bromden (the first-person narrator in Kesey's *One flew over the cuckoo's nest*) is an expert electrician, but he has a rather deficient understanding of his world, and especially of people and their emotions. Semino and Swindlehurst (1996) note that Bromden's narrative shows an unusually high frequency of highly creative metaphors and similes drawing from the source domain of machinery. Fo example, he describes society as the "Combine," the hospital ward where he lives as a "factory for the Combine [. . .] for fixing up mistakes made in the neighborhoods and in the schools and in the churches" (Kesey, 1973: 36), the nurse who runs the ward as being "like a watchful robot" (Kesey, 1973: 27) or "quiet as an electric alarm about to go off" (Kesey, 1973: 44), and the category of patients he belongs to (the "Chronics") as "machines with flaws inside that can't be repaired" (Kesey, 1973: 17). Semino and Swindlehurst (1996) argue that Bromden compensates for some of his cognitive limitations by drawing from the domain of experience most familiar to him, namely machinery. This leads to an alienated and mechanistic worldview, particularly because, at times, Bromden appears to believe that people and society really are machines, rather than simply machinelike.

Similarly, in Semino (2002), I have shown that, in Fowles's *The collector*, Frederick Clegg often talks and thinks about women in terms of metaphors drawn from his favorite area of experience, lepidoptery. For example, he describes the hair of the woman he is infatuated with, Miranda, as "very pale, silky, like burnet cocoons" (Fowles, 1998: 9), and a prostitute he fails to have sex with as "a specimen you would turn away from, out collecting" (Fowles, 1998: 15). When he suddenly becomes rich, he kidnaps Miranda much as he would collect a butterfly, and attempts to keep her captive so that he can enjoy watching her, rather like he enjoys looking at the butterflies in his collection. As with Bromden, Clegg's worldview is unusually reliant on a particular area of experience which functions as a particularly productive metaphorical source domain. However, in both cases the characters are deficient in other areas (Bromden has some form of mental illness, Clegg has difficulties with socialization and sex, and finally behaves like a psychopath), and this ultimately results in the impression of minds that are deeply disturbed, albeit in different ways and with different outcomes in the plots of the two novels. As Semino and Swindlehurst put it, consistent but idiosyncratic metaphorical patterns may be interpreted as a reflection of "an idiosyncratic cognitive habit, a personal way of making sense of and talking about the world: in other words, a particular mind style" (Semino and Swindlehurst, 1996: 147). In contrast, in *The curious incident of the dog in the night-time*, Chris Boone,

who has Asperger's syndrome, candidly and lucidly explains that he does not understand common metaphorical expressions such as "He was the apple of her eye" and "The dog was stone dead" (Haddon, 2003: 19). Although, inevitably, his first-person narrative is not entirely consistent, it is indeed largely devoid of metaphorical expressions of this kind.

Other Phenomena

A number of further linguistic phenomena can contribute to the evocation of mind style. Fowler (1986: 160) includes the frequent use of negation and paradox among the linguistic triggers of the peculiar worldview of a Gothic novel. Both Fowler (1986: 134) and Bockting (1995: 46–47) mention unusual choices in referential expressions and deixis as contributing to Benji's mind style in *The sound and the fury*. Bockting (1995) also notices how each of the Compson brothers in *The sound and the fury* has an unusual way of reporting others' (or their own) words, and shows how this combines with other aspects of their linguistic behavior to suggest different types of mental illness.

Some studies have pointed out how apparently factual descriptions of contextually implausible events can contribute to the presentation of abnormal mind styles. In *The sound and the fury*, Benji describes what appears to be a dizziness attack as an external event: "The ground kept sloping up [...] Then the barn wasn't there and we had to wait until it came back" (Faulkner, 1987: 23–24) (Bockting, 1995: 53). In *One flew over the cuckoo's nest*, Bromden states that the hospital staff regularly switch on a "fog machine," which renders him unable to see and hear other people properly but also makes him feel unusually safe. Readers, however, are likely to interpret this as an indication that Bromden suffers from intermittent episodes of loss of consciousness and disorientiation (see Semino and Swindlehurst, 1996).

A useful area for further exploration is to do with the ways in which characters communicate with other characters in dialogue, or the ways in which narrators communicate information about the fictional world to their audience or addressees. A particularly interesting case is Chris Boone in Haddon's *The curious incident of the dog in the night-time*. The fact that Chris has Asperger's syndrome explains why he does not like to be touched, has a whole range of apparently nonsensical fixations (e.g., he refuses to touch yellow or brown things), finds it difficult to understand people's emotional reactions, starts groaning when upset, and so on. In addition, as I have already said, Chris cannot understand the kinds of metaphorical expressions that have nonsensical literal meanings (e.g., "We had a real pig of a day") because, as he puts it, they are "lies" (Haddon, 2003: 20). Similarly, he is unable to lie himself, even when a lie would be advantageous and socially acceptable. For example, early in the novel he is arrested for hitting a policeman who had touched his arm while questioning him. When he is later told that he is being released because his attack on the policeman was "an accident," Chris replies, "But it wasn't an accident" (Haddon, 2003: 23). In Grice's (1975) terms, Chris is unable to break the maxim of quality ("Do not say what you believe to be false"): he can neither violate the maxim (i.e., lie), nor flout it (i.e., say something that is patently untrue in order to generate an implicature, as is the case with some metaphorical expressions). He also cannot relate to the fact that others might violate or flout the maxim of quality themselves.

Conversely, Chris constantly infringes Grice's maxim of quantity ("Give the right amount of information"), i.e., he breaks it without intending to do so. Because he has an obsessive attitude to detail, he constantly provides too much information, both as a narrator and as a character. In his narration, he regularly gives to-the-minute time updates even when they are not relevant to the plot (e.g., "It was 1:12 am," Haddon, 2003: 21), and describes in minute detail the most trivial events and actions (e.g., how many pellets of food for his pet mouse he has in his pocket). Similarly, in conversation with other characters, he either provides too much or too little detail. At the beginning of the novel, the police are called to investigate the death of a neighbor's dog, which Chris has found in the next-door garden. When a policeman asks him what is going on, Chris replies, "The dog is dead" (Haddon, 2003: 7), which clearly does not give the policeman any information he did not already have. By contrast, when the policeman asks him how old he is, Chris replies, "I am 15 years and 3 months and 2 days" (Haddon, 2003: 7). Overall, then, Chris's narrative reveals some fairly profound difficulties in managing the exchange of information and communication generally, which can be related to a particular autistic condition, and can be accounted for in terms of Grice's (1975) conversational maxims.

Degrees of Abnormality and Opaqueness in Mind Style

Leech and Short (1981: 189) propose a cline from "natural and uncontrived" mind styles "to those which clearly impose an unorthodox conception of the fictional world." They then go on to discuss some "normal" authorial mind styles as well as some more "unusual" mind styles, such as Benji Compson's. It is indeed possible to compare different mind styles in terms of their degree of distance from what might

be regarded as a normal worldview. For example, Lok's understanding of his world is further removed from the average reader's worldview than the heightened awareness that Fowler (1986: 158ff.) detects in a Gothic novel. The notion of mind style is in any case particularly relevant when the presented world view differs in some noticeable way from the reader's assumed normal or default way of making sense of things. As Leech and Short (1981: 202) point out, it is more likely for character's mind styles to be constructed and perceived as odd, which explains why most studies of mind style focus on characters or first-person narrators.

The evocation of a unusual mind styles may also result in different degrees of opaqueness in the presentation of the fictional world. In some cases, the choice of a particular mind style may confuse first-time readers, even though what is being described is a familiar activity. This applies, for example, to Benji's description of a golf game at the beginning of *The sound and the fury*, and to the description of a stranger shooting an arrow at Lok in *The inheritors*. In other cases, readers can more easily "read through" a character's mistaken understanding, such as when, in *Captain Corelli's mandolin*, we are presented with Alekos's belief that he is being visited by an angel. With Chris in *A curious incident*, in contrast, there is little risk of confusion, but readers will often make inferences about the fictional world that Chris seems unable to make (such as concerning the motives and goals of adults in the story).

It is worth noticing that lexical and grammatical simplicity does not necessarily correlate with ease of reading, but may sometimes contribute to opaqueness. As I have mentioned, the language that conveys Lok's mind style in *The inheritors* is lexically and grammatically simple, but the use of generic lexical items in place of more specific ones makes it difficult for readers to recognize familiar objects and actions (see also Hoover, 1999: 79ff.). It is also worth mentioning, in conclusion, that describing a mind style as unusual or limited does not necessarily involve a negative evaluation: as many studies have pointed out, the worldviews of characters such as Benji or Bromden often result in highly poetic and insightful images, partly because the relevant characters often have an innocent, fresh perspective on things, unconstrained by the conventions and preconceptions that result from what might be called 'normality.'

See also: Cooperative Principle; Metaphor: Stylistic Approaches; Narrative: Cognitive Approaches; Reference: Stylistic Aspects; Style; Stylistics, Cognitive; Transitivity: Stylistic Approaches.

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Minimalism

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The Immediate Antecedents of the Minimalist Program

Minimalism is the most recent instantiation of transformational generative grammar. The fundamental idea continues to be that a sentence is the result of a computation producing a derivation, beginning with an abstract structural representation sequentially altered by structure-dependent transformations. The Minimalist program maintains that these derivations and representations conform to an economy criterion that demands that they be minimal in a sense determined by the language faculty (perhaps ultimately by general properties of organic systems): no extra steps in derivations and no extra symbols in representations, and no representations beyond those that are necessary for the system to function at all in connecting sound (or, in the case of signed languages, gesture) and meaning.

Minimalism, as articulated by Noam Chomsky, can best be understood against the background of its immediate predecessor, called Government-Binding (GB) or the Principles and Parameters model. In that model, there are four significant levels of representation, related by derivation as in Figure 1.

The deep structure (D-structure) is constructed based on the thematic (θ) relations of the predicates and arguments that will occur in the sentence. Transformations alter this D-structure representation, movement transformations displacing subunits of structure leaving traces marking the positions from which the movement took place, eventually producing a surface structure (S-structure). For instance, in a wh-interrogative sentence such as (1), the auxiliary verb *are* is moved to a position preceding the subject *you*, and the wh-interrogative word *what* is moved to initial position (t indicates a trace).

(1) what are you t_{are} talking about t_{what}?

Transformations of the same character continue the derivation to the logical form (LF), the interface with the conceptual-intentional system of the mind. The rules of the phonological component continue the derivation from S-structure to the phonetic form (PF), the interface with the articulatory-perceptual system. The portion of the derivation between the D-structure and S-structure is often called 'overt syntax'; that between the S-structure and LF is called 'covert syntax' because operations in that portion of the derivation have no observable phonetic effects, given the organization in Figure 1. Under the traditional view that a human language is a way of relating sound and meaning, the interface levels PF and LF were assumed to be ineliminable. Minimalism begins with the position that these levels of representation are the only levels. Eventually, as discussed later, in a certain sense even these levels are eliminated. This kind of argument is characteristic of Minimalism, which differs in several technical ways from its predecessor and which also differs in perspective. Early work in transformational grammar concentrated heavily on descriptive adequacy, that is, on the task of formulating grammars that correctly describe the intrinsic competence of the idealized native speaker. Beginning with Chomsky (1965), the focus began to shift toward explanatory adequacy, the formulation of models of linguistic theory that show how the child can succeed in selecting a descriptively adequate grammar on the basis of primary linguistic data. This was the central concern of the GB program, instantiated in terms of principles (universal properties argued to be innately given by the human language faculty) and parameters (limited options set by the language learner based on simple readily available data). Minimalism, too, is a principles and parameters approach, but one that aims to move even beyond explanatory adequacy by raising the question of why the language faculty has just the properties it has, given that alternative organizations of the computational system can easily be imagined that also provide good solutions to the puzzle of how children acquire their language so quickly and easily.

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D (eep)-Structure
        |
S (urface)-Structure
   /          \
PF            LF
(Phonetic Form)  (Logical Form)
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Figure 1 Levels of representation in Principles and Parameters model.

Structure Building

Minimalism, in a partial return to the technical apparatus of pre–1965 transformational theory, has no level of D-structure. Rather, lexical items are inserted 'online' in the course of the syntactic derivation. The derivation proceeds cyclically with the most deeply embedded structural unit created first, then combined with the head of which it is the complement to create a larger unit, and so on, all in accord with X'-theory. For example, in the derivation of a simple sentence such as *the woman will see the man*, the noun (N)

man is combined with the determiner (D) *the* to form the determiner phrase (DP) *the man*. This DP then combines with the verb *see* to produce an intermediate projection traditionally labeled V', V-bar (although recent work assumes that such intermediate-category labels have no significance). The DP *the woman* is created in the same fashion as *the man* and is combined with the V' to produce the VP (assuming the VP-internal subject hypothesis, under which the subject, along with the other arguments of a verb, is initially introduced into the structure inside VP). Next, this VP merges with the Tense/Inflectional element *will,* producing I'. The DP *the woman* finally moves to the specifier position of I', yielding the full clausal projection IP (sentence), schematically illustrated here (with some details suppressed) as a phrase structure tree in Figure 2 and as labeled bracketing in example (2).

(2) $[_{IP}$ $[_{DP}$ the woman$]$ $[_{I'}$will $[_{VP}$ *t* $[_{V'}$ see $[_{DP}$ the man$]]]]]$

In a more complex sentence such as *you think the woman will see the man*, the derivation of the embedded sentence is exactly as just outlined. The results of that derivation are then combined with the matrix verb *think*, forming a V', which then combines with *you*, and so on. The processes that merge independent units into new combined structures (generalized transformations) are intermingled with those manipulating existing structures (singulary transformations). There is thus no **one** representation following all lexical insertion and preceding all (singulary) transformations. That is, there is no D-structure.

Some Minimalist Goals

The constraint that derivations proceed strictly monotonically, from the bottom up, had been introduced, along with D-structure, in the standard theory of Chomsky (1965). Chomsky argued that this requirement of cyclicity explains the absence of certain kinds of derivations in language. This was presented at the time as an argument against generalized transformations and for D-structure. But it was cyclicity, rather than D-structure, that was crucial in the account. Minimalism rejects D-structure, reinstates generalized transformations, and preserves cyclicity, still ruling out the kind of anticyclic derivations that were the original concern. The Minimalist version of the cyclic principle, the Extension Condition, demands that both the movement of material already in the structure (singulary transformation) and the merger of a lexical item not yet in the structure (generalized transformation) target the top of the existing tree. Further, in accord with Minimalist precepts, we should seek a deep reason for any constraint we find. In this instance, the idea is that derivations conform to a condition demanding as little tampering as possible with existing structure. When a transformation targets the top of a tree, that tree still exists as a subtree of the new one. On the other hand, when a transformation targets some lower position in the tree, the original tree (such as the one in Figure 3) is itself altered. These two kinds of derivation are schematically displayed in Figures 4 and 5, where Figure 4 involves adjunction of β at the top of Figure 3 and Figure 5 has β adjoined at the bottom of Figure 3.

Some other constraints on the operation of transformations are argued to follow from general principles of economy of derivation. Derivations beginning from the same lexical choices (the numeration, in Chomsky's term) are compared in terms of number of steps, length of movements, and so on, with the less economical ones being rejected (although this raises certain questions of computational complexity,

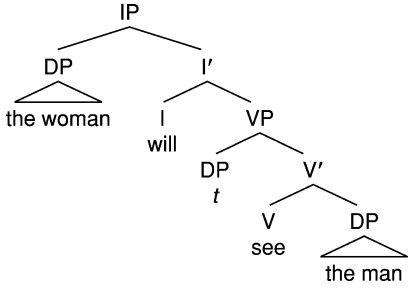

Figure 2 Phrase tree structure.

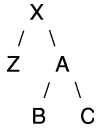

Figure 3 Original tree.

Figure 4 Derivation 1: Adjunction of β at top of tree in Figure 3.

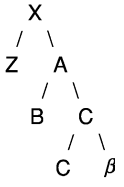

Figure 5 Derivation 2: Adjunction of β at bottom of tree in Figure 3.

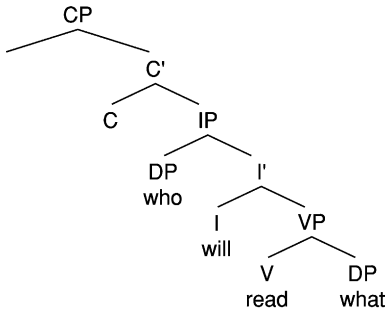

Figure 6 Tree structure for wh-movement.

discussed later). An example is the Minimalist deduction of the original Superiority Condition, which demands that when multiple items are available for wh-movement in a language, such as English, that allows only one to move, it is the highest one that will be chosen:

(3) who *t* will read what?

(4) *what will who read *t*?

(* indicates unacceptability.) Economy, in the form of Shortest Move, selects (3) over (4) because the sentence-initial interrogative complementizer position needs a wh-expression and the subject is closer to that target of wh-movement than the object is, as can be seen in Figure 6, where C is Complementizer (sentence introducer).

This analysis, like many Minimalist analyses of transformation application, assumes that lexical items are composed of features, some of which need to be checked in particular configurations. This is what drives movement because, all else being equal, a derivation with an instance of movement is less economical than one without. Many of the movement constraints that fall under the Relativized Minimality (RM) constraint are susceptible to an analysis similar to the analysis of Superiority effects. RM, which had an important impact on the developing Minimalist program, forbids movement to a position of a certain type (head position, A(rgument type)-position, A'(non-A)-position) across an intervening position of the same type. Within the Minimalist approach, the effects of this constraint are taken to fall under general economy constraints on derivation.

The simplifying developments in the theory leading toward the Minimalist approach generally led to greater breadth and depth of understanding of both how human languages are organized and how they are acquired by children. This success led Chomsky to put forward the audaciously Minimalist conjecture that the human language faculty might be a computationally 'perfect' solution to the problem of relating sound and meaning, the minimal computational system given the boundary conditions provided by other modules of the mind. This conjecture leads to a general Minimalist critique of syntactic theorizing, including in particular much of Chomsky's own earlier theorizing. Consider, first, the leading idea that multiple derivations from the same initial set of lexical choices are compared, the most economical one being chosen and all the others rejected. This introduces considerable complexity into the computation, especially as the number of alternative derivations multiplies. It thus becomes desirable, even necessary, to develop a model in which all relevant derivational decisions can be made online. At each step, the very next successful step can be determined and determined easily. This arguably more tractable local economy model is suggested by Chomsky (1995a), developed in detail by Collins (1997), and then fully adopted by Chomsky (2000).

The Last-Resort Nature of Syntactic Movement

One major Minimalist concern involves the driving force for syntactic movement. From its inception in the early 1990s, Minimalism has insisted on the last-resort nature of movement: in line with the leading idea of economy, movement must happen for a reason and, in particular, a formal reason. The Case Filter, roughly the requirement that every nominal expression appear by the end of the derivation in a position appropriate to its Case (nominative, accusative, etc.), which was a central component of the GB system, was thought to provide one such driving force. A standard example involves subject raising, an instance of movement proposed in one form or another from the earliest days of transformational generative grammar. This operation captures the thematic relatedness in pairs of examples such as the following:

(5) Mary is certain to win the race

(6) it is certain that Mary will win the race

In (5), as in (6), *Mary* is the understood subject of *win the race*. This fact is captured by deriving (5) from an underlying structure like that of (6), except with an infinitival embedded sentence instead of a finite one:

(7) __ is certain [Mary to win the race]

Crucially, *Mary* in (7) is not in a position appropriate to any Case, as evidenced by parallel examples with pronouns (the only nominal expressions in English overtly displaying a range of Case realizations):

(8) *it is certain [she to fail the exam]

(9) *it is certain [her to fail the exam]

By raising to the higher subject position, the thematic subject of the lower clause can rectify its Case theoretic inadequacy, because, in this instance, the raised position is one licensing the nominative Case:

(10) she is certain [*t* to fail the exam]

But notice that, if the Case requirement of *Mary*/*she* provides the driving force for movement, the requirement will not be satisfied immediately upon the introduction of that nominal expression into the structure. Rather, satisfaction must wait until the next cycle, or, in fact, until an unlimited number of cycles later, because raising configurations can iterate, and it is only the ultimate landing site that licenses nominative Case:

(11) Mary seems to be likely to win the race

(12) Mary is believed to seem to be likely to win the race

A Minimalist critique favors an alternative in which the driving force for movement can be satisfied immediately rather than indefinitely later in the derivation. In the present instance, suppose the crucial inadequacy lies not in the nominal expression but rather in the item that licenses its Case, say the Tense/Inflection head of the clause. That is, Tense has a feature that must be checked against the NP. Then, as soon as that head has been introduced into the structure by generalized transformation, it can attract the NP that will check (and consequently delete) its feature. Movement is then seen from the point of view of the target rather than the moving item itself. The Case of the NP apparently does get checked as a result of the movement, but that is simply a beneficial side effect of satisfying the requirement of the attractor. In an elegant metaphor, Uriagereka (1998) likens the attractor to a virus. Immediately upon its introduction into the body, it is dealt with (by the production of antibodies in the case of physical viruses, by movement to check the viral feature in the syntactic instance). The earlier Minimalist approach to the driving force of movement was called 'Greed' by Chomsky. This later one developed from what Lasnik (1995a) called Enlightened Self-Interest. There is still one residue of Greed, however. As discussed by Lasnik (1995b) and Chomsky (2001b), once the Case feature of a nominal expression has been checked, that expression is no longer available for A-movement, either to another Case position or even to a non-Case position:

(13) *John is certain [*t* will fail the exam]

(14) *it is believed [John to be likely [*t* will fail the exam]

The Syntactic Similarity of Languages

One recurrent theme in GB and Minimalist theorizing is that human languages are syntactically much more similar than they appear to be. The standard GB and early Minimalist approach was the proposal that apparent differences result from derivational timing differences among languages. In a language in which the effects of a transformation are phonetically observable, that operation has happened in overt syntax (i.e., before Spell-out, the branch point toward PF). If the effects are not phonetically observable, the operation has happened in covert syntax. Under both circumstances, LF reflects the results of the transformation. For example, the wh-movement operative in English interrogative sentences such as (1) is overt. In many other languages, including Chinese and Japanese, the interrogative expressions seem to remain *in situ*, unmoved. Huang (1981–1982) presented a very influential argument that even in such languages there is movement but that it is covert. Huang's argument was based on his discovery that certain well-established locality constraints on wh-movement also constrain the distribution and interpretation of certain seemingly unmoved wh-expressions in Chinese. This argument laid the groundwork for much GB and Minimalist research. Along similar lines, Chomsky (1991) discussed object shift, a process moving a direct object out of the VP. In Icelandic, for example, it is overt. Chomsky suggested that it happens even in English, but covertly, so that the object 'sounds' as if it is still within VP. Similarly V-raising is overt in virtually all the Romance languages, among many others, and, as argued by Chomsky, is covert in English. Consider the following examples from English and French.

(15a) John often kisses Mary
(15b) *John kisses often Mary

(16a) *Jean souvent embrasse Marie
(16b) Jean embrasse souvent Marie

Recall that under the last-resort concept, movement is driven by a feature needing to be checked. For V-raising, the feature is assumed to be one that resides in Tense/Infl. Now, what about the difference between French and English? Chomsky (1993) proposed that features that drive movement come in two flavors, strong and weak. Although all such features must be checked eventually (i.e., by the end of all LF operations), strong features must be checked specifically before Spell-out. (See Lasnik, 1999b for a comparison of three theories of strong features.) Given the argument presented previously from computational complexity, a strong feature must be checked immediately on its introduction into a structure. Thus, in French

there is a strong feature in Tense forcing overt raising. The corresponding feature in English is weak. This accounts for (16a), (16b), and (15a), leaving just (15b) as mysterious. In that example, overt movement took place even though only covert movement should have been required. Chomsky argued that this state of affairs should be excluded in general and formulated the principle 'Procrastinate,' which disallows overt movement except when it is necessary (i.e., for the satisfaction of a strong feature).

Procrastinate was often called an economy principle, but it was not obvious that it was. Why is delaying an operation until LF more economical than performing it earlier? In part to answer this question and in part to account for the fact that many of the hypothesized instances of covert movement did not have the expected semantic effects (with respect to quantifier scope, anaphora, etc.) that corresponding overt movements had, Chomsky (1995a), followed by Lasnik (1995b), proposed a modified theory of covert movement. The leading idea of this modified theory was that if movement is driven by the need for formal features to be checked, all that should really move is formal features, in particular Case and agreement features. When movement is overt, this will generally not suffice because phonology will not be able to deal with the resulting scattered object. Thus, the entire word or phrase hosting the features moves along with them, an extension of a phenomenon dubbed 'pied piping' by Ross (1986). Because covert movement does not feed into PF, feature movement in the LF component will not necessitate pied piping. Now, if only formal features of an element raise, plausibly the semantic features relevant for such phenomena as scope and anaphora are left behind (along with the phonological features, of course). For such semantic purposes, then, it is as if no movement took place. Further, Procrastinate now would follow from reasonable notions of economy. Delaying a movement until LF means that pied piping will not be necessary; only formal features will have to move. And moving less is more economical than moving more.

Chomsky (2000, 2001b) took this line of reasoning even further, proposing that there is no feature movement. Rather, a process of agreement (potentially at a substantial distance, constrained only by Relativized Minimality) relates the two items that need to be checked against one another. Many of the phenomena that had been analyzed as involving covert movement are reanalyzed as involving no movement at all, just the operation Agree. (However, see Lasnik, 2002, for some evidence that feature movement cannot be entirely dispensed with.) With no feature movement, phrasal movement is not really a matter of pied piping. Instead, it takes place to satisfy the requirement of certain heads (including the Tense/Inflection head) that they have a specifier, in the X-bar theoretic sense. In fact, such a requirement was already formulated in the early GB framework by Chomsky (1981) and, slightly later, dubbed the Extended Projection Principle (EPP) in Chomsky (1982).

Syntactic Interfaces

The precise nature of the connection between the syntactic derivation and semantic and phonological interfaces has been a central research question throughout the history of generative grammar. In the earliest generative model, the interface is the T-marker, which includes all of the syntactic structures created in the course of the derivation. Subsequent models had the following interfaces with semantics:

- The standard theory: D-structure
- Government-Binding (GB): LF (via S-structure)
- Early Minimalism: LF (via an uninterrupted transformational derivation beginning with the numeration)

The Minimalist approach to structure building is much more similar to that of the 1950s than to any of the intervening models, suggesting that interpretation in the Minimalist model also could be more like that in the early model, distributed over many structures. Already in the late 1960s and early 1970s, there were occasional arguments for such a model and for phonological interpretation as well as semantic interpretation. For example, Bresnan (1971) argued that the phonological rule responsible for assigning English sentences their intonation contour applies cyclically, following each cycle of transformations, rather than applying at the end of the entire syntactic derivation. There were similar proposals for semantic phenomena involving scope and anaphora put forward by Jackendoff (1972). Chomsky (2000, 2001a, 2001b) argued for a general instantiation of this distributed approach to phonological and semantic interpretation, based on ideas of Epstein (1999) and of Uriagereka (1999), who called the approach 'Multiple Spell-Out.' Simplifying some, at the end of each cycle (or 'phase' in Chomsky, 2001b) the syntactic structure created thus far is encapsulated and sent off to the interface components for phonological and semantic interpretation. Thus, although there are still what might be called PF and LF components, there are no levels of PF and LF. Epstein argued that such a move represents a conceptual simplification (in the same way that the elimination of D-structure and S-structure does), and both Uriagereka and Chomsky provided some empirical justification. The role of

syntactic derivation, always very important in Chomskian theorizing, becomes even more central on this view because there are no levels of representation at all. Epstein reasoned that the centrality of (asymmetric) c-command (as opposed to one of a whole range of other conceivable geometric relations) in syntax is predicted on this strongly derivational view but not in a more representational theory. As the derivation proceeds, always merging together pairs of items or substructures, sisterhood and domination (transitive closure of motherhood) are the only immediately available primitives. And X (asymmetrically) c-commands Y if and only if Y is dominated by the sister of X.

Multiple Spell-Out effectively deals with a range of reconstruction phenomena, situations in which a moved item behaves for certain interpretive processes as if it had not moved. For example, a reflexive such as *himself* normally requires an antecedent that c-commands it:

(17) John criticized himself

(18) *himself criticized John

But when the reflexive is fronted from a position c-commanded by an antecedent to a position not in that structural relation, the anaphoric connection is nonetheless still available:

(19) himself, John criticized

This possibility follows straightforwardly if anaphora is interpreted prior to movement. However, other examples show that anaphora at least can be interpreted after movement, as in the following acceptable subject raising example, whose source would not license the anaphoric connection:

(20) John seems to himself to be clever

(21) ___ seems to himself [John to be clever]

At least for this class of phenomena, then, Multiple Spell-Out just provides an option.

Chomsky (1993, 1995a) explored another kind of approach to reconstruction, based on a condition that he calls Inclusiveness. This condition demands that a syntactic derivation merely combine elements of the numeration, without creating any new entities. Traces, traditionally conceived as new objects created by movement, violate this condition. Chomsky therefore proposed that a trace of movement is actually a copy of the item that moved rather than a new sort of entity. Interestingly, this is yet another return to much earlier generative approaches (wherein movement was seen as a compound of copying and deletion, as in Ross, 1986). The copy left behind is normally deleted in the phonological component (although, as shown by Bošković, 2001 and Nunes, 2004, under certain circumstances lower copies are pronounced in order to rescue what would otherwise be PF violations), but it could well persist for semantic purposes, such as the licensing of anaphoric connection. Fox (2000) presented an extensive analysis of scope and anaphora reconstruction effects in terms of the copy theory. Lasnik (1999a, 2001) examined the presence and, especially, the absence of certain reconstruction effects with A-movement. For dealing with reconstruction effects, the proper division of labor between Multiple Spell-Out and the copy theory of traces is an important ongoing research topic.

As previously noted, asymmetric c-command is of central importance in Minimalist syntax (as it was, at least implicitly, in the GB framework). A very influential research line, initiated by Kayne (1994), extended the importance of c-command to PF as well. Generative syntax has always been concerned with the hierarchical organization of representations, and the overwhelming majority of syntactically and semantically significant structural relations are hierarchical: domination, immediate domination, c-command, and sisterhood. None of these relations involve linear order, although linear order is obviously manifest in phonological representation. A natural speculation is that linear order is manifest **only** in PF. Kayne's hypothesis is that this comes about via his Linear Correspondence Axiom (LCA), which states that asymmetric c-command is mapped onto PF linear order. This has the far-reaching consequence that structures must always be right-branching, a consequence that is, on the face of it, flagrantly violated in the vast majority of languages. For example, SVO languages such as English are broadly consistent with the requirement, but SOV languages such as Japanese are not. Further, given that movement is always to a c-commanding position, leftward movement is fine but rightward movement is prohibited, contrary to the apparent existence of extraposition-type operations. The antisymmetry approach reanalyzes SOV languages as underlyingly SVO (as all languages must be by this hypothesis) with the SOV order derived by (leftward) movement. Similarly, apparent rightward movement is reanalyzed as a series of leftward movements, many of them remnant movements in which X moves out of Y and then the residual Y moves to a position higher than X. Many phenomena have been productively analyzed in these terms, but one crucial unanswered question at this point is the source of the driving force for all of the required leftward movements.

Phases and Successive Cyclic Movement

Chomsky (1973) first proposed that apparent long movement, as in (22), is actually compounded from a series of short steps.

(22) what does Mary think [that you are talking about *t*]?

Torrego (1984) and McCloskey (1991), among many others, showed how the postulated successive short steps composing a long instance of wh-movement (in interrogatives and/or relative clauses) are overtly marked, for example in Spanish and Irish. In both instances, the marking shows up in or near the complementizer position (via the obligatory fronting of a finite verb or by a change in the form of the complementizer); this is significant in light of Chomsky's proposal that long movement proceeds via (the Specifier of) C. Chomsky (1973) simply stipulated this locality with his Subjacency constraint. At the time, Subjacency represented a notable advance because it unified several disparate locality constraints. However, Minimalism seeks even more – a reason that derivations should work this way. Chomsky (2001b) suggested that when a phase is sent off for semantic and phonological interpretation, its 'edge' (typically a specifier, Spec, position) remains until the next phase and thus is available as an escape hatch. Assuming that CP is a phase, the moving wh-phrase will have to move to the Spec of each CP on the way to its ultimate destination. Phase Impenetrability thus can account for a substantial amount of the locality of movement, and, as seen previously, Relativized Minimality can account for additional instances of locality. Accommodating all island constraints on movement in a Minimalist way is a lively research area.

Conclusion

Minimalism, as Chomsky emphasized, is as yet still just an approach, a conjecture about how human language works (i.e., 'perfectly') and a general program for exploring and developing the conjecture. The explanatory success attained thus far gives some reason for optimism that the approach can be developed into an articulated theory of language.

See also: Generative Grammar; Principles and Parameters Framework of Generative Grammar; Transformational Grammar: Evolution.

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Minorities and Language

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Introduction

The relationship between minorities and language is complicated. Historically, the problem of minorities is closely related to the development since the 16th century of the modern system of 'nation-states.' The process of state formation, still relevant today, leads to a differentiation between majorities and minorities. It is an inevitable consequence of policies aimed at national homogeneity and cohesion. A distinction has to be made between 'language minorities' and 'minority languages.' The former refers to the social group or community, and the latter to a specific category of languages. Sometimes terms such as 'lesser used,' 'heritage,' 'stateless,' and 'ethnic' language are used in place of 'minority language.' Minority languages are different from majority languages, which are also referred to as 'dominant,' 'national,' or 'state' languages.

There are between 6000 and 7000 different languages in a world of over six billion people. Of all those languages, just a few, such as English or Chinese, are spoken by hundreds of millions of speakers. Most languages are spoken by only a few thousand speakers, or sometimes just a handful of speakers. In fact, 96% of the world's languages are spoken by just 4% of the people. Most of the world's languages are spoken in a broad area on either side of the Equator, in Southeast Asia, India, Africa, and South America. Not all of the 'smaller' languages are minority languages, but most of them are. The theme of minority languages is closely related to 'endangered' or 'threatened' languages, an issue that received increasing attention after Krauss (1992) rang the alarm bell over the future of 90 percent of the world's languages.

Definitions

The concept of 'minority' is problematic from the point of view of several disciplines. What constitutes a minority depends on who defines a minority, and who the beneficiaries are of minority rights. Much work has been done in international law – in lengthy debates and in many forums – concerning minority protection. After World War II, the United Nations expressed a felt need for a clear definition of the concept 'minority.' In particular, the Sub-Commission on the Prevention of Discrimination and the Protection of Minorities became an important agency. Arriving at such a definition took many years, and proved to be a difficult task. Finally, UN Special Rapporteur Capotorti (1979: 7) defined a minority as "a group numerically smaller than the rest of the population of the State to which it belongs and possessing cultural, physical or historical characteristics, a religion or a language different from those of the rest of the population and show, if only implicitly, a sense of solidarity, directed toward preserving their culture, traditions, religion or language."

Although later studies tried to improve on this definition, it still reflects the general understanding of 'minority' in international law (Pentassuglia, 2002: 72), and covers most minority situations (Thompson, 2001: 130). This definition combines 'objective' and 'subjective' approaches which are sometimes seen as

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Minorities and Language

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Introduction

The relationship between minorities and language is complicated. Historically, the problem of minorities is closely related to the development since the 16th century of the modern system of 'nation-states.' The process of state formation, still relevant today, leads to a differentiation between majorities and minorities. It is an inevitable consequence of policies aimed at national homogeneity and cohesion. A distinction has to be made between 'language minorities' and 'minority languages.' The former refers to the social group or community, and the latter to a specific category of languages. Sometimes terms such as 'lesser used,' 'heritage,' 'stateless,' and 'ethnic' language are used in place of 'minority language.' Minority languages are different from majority languages, which are also referred to as 'dominant,' 'national,' or 'state' languages.

There are between 6000 and 7000 different languages in a world of over six billion people. Of all those languages, just a few, such as English or Chinese, are spoken by hundreds of millions of speakers. Most languages are spoken by only a few thousand speakers, or sometimes just a handful of speakers. In fact, 96% of the world's languages are spoken by just 4% of the people. Most of the world's languages are spoken in a broad area on either side of the Equator, in Southeast Asia, India, Africa, and South America. Not all of the 'smaller' languages are minority languages, but most of them are. The theme of minority languages is closely related to 'endangered' or 'threatened' languages, an issue that received increasing attention after Krauss (1992) rang the alarm bell over the future of 90 percent of the world's languages.

Definitions

The concept of 'minority' is problematic from the point of view of several disciplines. What constitutes a minority depends on who defines a minority, and who the beneficiaries are of minority rights. Much work has been done in international law – in lengthy debates and in many forums – concerning minority protection. After World War II, the United Nations expressed a felt need for a clear definition of the concept 'minority.' In particular, the Sub-Commission on the Prevention of Discrimination and the Protection of Minorities became an important agency. Arriving at such a definition took many years, and proved to be a difficult task. Finally, UN Special Rapporteur Capotorti (1979: 7) defined a minority as "a group numerically smaller than the rest of the population of the State to which it belongs and possessing cultural, physical or historical characteristics, a religion or a language different from those of the rest of the population and show, if only implicitly, a sense of solidarity, directed toward preserving their culture, traditions, religion or language."

Although later studies tried to improve on this definition, it still reflects the general understanding of 'minority' in international law (Pentassuglia, 2002: 72), and covers most minority situations (Thompson, 2001: 130). This definition combines 'objective' and 'subjective' approaches which are sometimes seen as

contrasting. 'Objective' means that minorities are seen as given historical facts, in which group membership is given or involuntary. In a subjective approach, the free choice and will of the group members are decisive. However, up to the present day, the term 'minority' is not defined in the most important instruments of international law. The reason is that a definition has to serve certain ideological or political goals. Thus it can exclude certain minorities, and as a consequence some can profit from protective measures, where others cannot. In a more sociological sense, the term 'minority' may also be used to refer to less status and less power. In many studies, this usage is given preference over the commonsense understanding wherein 'minority' only refers to sheer numbers ('less than half' or 'a smaller number').

A basic distinction can be made between 'regional minority languages' and 'immigrant minority languages.' The first type are languages that are indigenous and territorial, minorities created during state formation or because of migration of population groups many centuries ago. The second type is the outcome of more recent international migration processes. Still, many examples can be given of how difficult it is to decide whether a language is a minority language or not (Hoffmann, 1991: 219–247). The difficulty in arriving at an acceptable definition lies in the diversity of situations in which minority languages exist.

In recent years, the definition in the European Charter for Regional or Minority Languages (1998) has gained wide acceptance. 'Regional or minority languages' means:

> Languages that are traditionally used within a given territory of a State by nationals of that State who form a group numerically smaller than the rest of the State's population; and different from the official language(s) of that State.

This definition shows the decisive role the nation-state plays in the determination of which language varieties obtain minority rights (and protection), and which do not. The status of a variety as either language or dialect depends primarily on political recognition by a state.

Membership and Numbers

Who belongs to a language minority, and who does not, is not always easy to establish. It does not seem to be possible to give criteria that are valid for all members of a particular group. It is clear that most members of a language minority have certain characteristics in common, but that does not have to be the case for all members. Fundamental criteria for belonging to a language minority are (1) self-categorization, (2) common ancestry, (3) distinctive linguistic, cultural, or historical traits, and (4) a form of social organization that places the language group in a minority position.

These four criteria do not have to be valid for all members of a group, but they do for a large part of them. Self-assignment is a fundamental criterion; categorization by others can also be important, but it is not decisive. Ancestry is usually mixed, and a criterion such as 'linguistic distance' can be extremely complex. A minority can be recognized by the government and obtain provisions or not. Moreover, it is possible to choose to become a member of a minority (by learning the language), or to leave the group (by no longer speaking the language).

Language minorities differ very much in size; there may be only a handful of speakers, or there may be millions. The number of individuals who speak a language seems a simple given, but it does not have to be (Fishman, 1991: 45–46).When drafting a list of minority languages, and the numbers of speakers, one runs inevitably into a lack of consensus on which varieties belong on the list as separate languages, and which may be sub-varieties (Ethnologue, 2004). Counting individuals as speakers is not a straightforward task because there are many different criteria. The most common is mother tongue (i.e., language acquired as a child), but also language competence (the language that someone is able to speak) and main language used (the most important daily means of communication) are considered as criteria. The size of a language minority can therefore differ, depending on whether the mother tongue speakers are counted, or the persons being able to speak a language are included. The speakers of language minorities are counted in different ways; one has to be careful when comparing the sizes of different minorities. All figures are usually estimates.

Analytic Frameworks

Many scholars have presented ideas, models, and theories designed to answer questions related to the conditions under which a shift from minority to majority language takes place, or when a minority language is maintained or revived. Here we can point briefly to a few models, but it is important to mention that a general theory of minority language development is still lacking. These frameworks analyze the relative strength of minorities and the measures necessary for their survival. Often in the past analysts failed to place sufficient emphasis on the social context. The central issue is people, not numbers.

A framework that has gained wide currency in the literature is the ethnolinguistic vitality model (Giles *et al.*, 1977). It is designed as an analytic tool to better assess the position of languages against each other, originally the position of French in Quebec relative to English. The key notion is 'vitality,' which is defined as, "that which makes a group likely to behave as a distinctive and active collective unity in intergroup situations" (Giles *et al.*, 1977: 308). The more vitality a group has, the greater its chances for survival as a distinctive linguistic community. There are three main sets of structural factors that influence the vitality of an ethnolinguistic group: status, demographic, and institutional. The status of a language is dependent upon historical, economic, social, and linguistic factors. Demographic factors have to do with the numbers and distribution of the speakers. Institutional factors concern the position of the language in various sectors of society, such as government, education, mass media, and religion. The stronger the language is on these structural factors, the higher is the ethnolinguistic vitality of the group speaking the language, and the greater are its chances for survival as a linguistic community.

The question can be raised whether an 'objective' account of the position of a (minority) language provided by an expert researcher or a language planner is perceived in the same way by the speakers of the language themselves. For that reason, a 'subjective vitality questionnaire' has been developed to measure the way speakers perceive the vitality of their own and other language groups (Bourhis *et al.*, 1981; Giles and Johnson, 1987).

In 1991, Fishman published his book *Reversing language shift* (RLS) in which he presents a set of ideas for analyzing the situation of (minority) languages around the world. The core of his ideas is formed by the GIDS (Graded Intergenerational Disruption Scale), a kind of scale similar to the one used to measure earthquakes. It establishes the extent to which a language community has been disrupted in the modern world. It is a functional approach where the language is seen to be used for certain functions in society, and not for others. Many threats face minority language communities, and Fishman wants to offer a diagnostic framework in which language planners and language activists can base their strategies to repair the situation, and to prevent further harm from occurring. The GIDS consists of eight stages, from the first and lowest stage where the language community has been broken up and few speakers remain, to the last stage where the language has the highest functions in national media and government. The crucial point is that the family-neighborhood-community nexus has to be secured in order to make certain that a language is transmitted from one generation to the next. Only when that process of intergenerational language transmission is assured, will a language survive.

An innovative combination of the vitality and RLS perspectives is given by Grin (2003; Grin and Moring, 2002) who has constructed a model of language policy for minority languages. Central is a 'policy-to-outcome' path, and the end result is that the minority language is being used to enhance the vitality of the language. In this model three conditions are necessary to reach the goal of minority language use. The first is the *capacity* to use the minority language, in the sense of an adequate degree of linguistic competence, and education is essential for the capacity development of speakers. Second are *opportunities* to use the language, not only in private but also in public. The language policy of the state can play a crucial role in creating opportunities for public language use. Finally, there must be a *desire* to use the language; usually speakers are bilingual, and have a choice to use either the majority language or the minority language. Policy has to improve language attitudes. Together, these three conditions constitute a set of necessary and sufficient conditions for the outcome of language use to appear. This model of capacity, opportunity, and desire must be seen in a 'language ecology' paradigm that stresses the interrelationship between a language and its broader social context (Grin, 2003: 43–48).

See also: Endangered Languages; Language Planning and Policy: Models; Reversing Language Shift.

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Minority Languages: Education

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Definitions and Purposes

Minority language education is here defined as the school's use of a language (or languages) spoken by students whose heritage language differs from that of the more powerful members of society who usually exercise the most control over state schools. Although minority language education always includes the teaching of the minority language, its main purpose is to educate the minority group by using the heritage language as a cognitive and affective instrument to make sense of their world, and sometimes as a way to improve their mastery of the majority language. Minority language education is most often a component of an education that includes the majority language. Thus, minority language education is more specific and focused than, but usually is a part of, what has been termed bilingual/multilingual education.

Minority language education is important for individuals and groups, especially for the language minority community, but also for the majority community. All quality education builds on strengths, and the greatest strength children entering school possess is the language that they bring from home, the instrument they have used to communicate with others, especially with members of their family, and to make sense of their world. For language minority children, therefore, an education which includes their heritage language has effective benefits, enabling them to find continuity between their first learning context, the home, and the school, and making it possible for them to identify with teachers in ways that build on relationships they have with caregivers and friends. A heritage language education also enables minority children to find themselves in school, in the voices of the books they read, the songs they learn, the stories they weave. In addition, minority language education has sociocognitive benefits, enabling children to use the language they know best

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to develop their understanding of cognitively complex academic material (Baker and Jones, 1998; Cummins, 2000; Baker, 2001). With time, and alongside a quality education in the majority language, a minority language education enables students to reap some of the sociocognitive benefits that have been associated with bilingualism – greater metalinguistic awareness and divergent thinking (Bialystok, 2001).

In society, minority language education is important for both the minority group and the majority group. It provides minority groups with a way to understand their culture and their history. It is empowering for the minority, offering them educational opportunities and building their capacity as educated citizens in majority society. If well done, it provides a vehicle for greater intercultural understanding. Finally, it conserves the language resources of a society and builds its capacity for multilingualism (Fishman, 1976).

After contextualizing the traditions and the controversies surrounding minority language education around the world, this article will (1) identify the different power-related dimensions that affect whether a minority language has the possibility of being successfully included in education, and introduce a scale that can be used to predict its ease and success; (2) describe the different ways in which minority language education has been organized, giving examples from different societies.

Traditions, Continuities, Possibilities, and Controversies

Minority language education is not new and it has seldom been uncontroversial. Although common sense would dictate an education in the language of the student, the sociohistorical and socioeducational conditions of states often work against the inclusion of the minority language in state education systems. It is then the tension produced, on the one hand, by the understanding that students should be instructed in their home and community language, and, on the other hand, by the inability or unwillingness of the state to do so, for either political or economic reasons, that surrounds minority language education in controversy.

Minority language education has sometimes been established by educators themselves, many times without official state sanction or funds, and often in private venues. For example, frustrated by the difficulty of evangelizing in Spanish, the language officially sanctioned by the Spanish Empire, missionaries in the New World used the languages of natives during the first two centuries of the Empire. But in 1770, Charles III ordered that only Spanish be used in an effort to spur the spread of Spanish and eradicate the Indian languages (García, 1999). During the Franco dictatorship in 20th-century Spain, *ikastolas*, where Basque children were taught in Euskera (Basque), grew as an underground movement of resistance to schooling in Spanish only (Etxeberria Balerdi, 2001). In the United States, the languages of immigrants, especially German (Standard German), were used in schools throughout the 19th century. But by the early 20th century, and in the wake of the xenophobia surrounding World War I, the practice had become controversial, and 23 states passed laws banning the use of languages other than English in education (Wiley, 1998). Examples of the use of indigenous languages in schooling children in countries in Latin America, beyond those of official bilingual intercultural programs, have been well documented by Hornberger (1997). And throughout the world, language minority groups themselves, especially those with religious affiliations, have organized minority language education programs, sometimes after-school and weekend supplementary programs, other times day schools. This is the case, for example, with the many yeshivas and Islamic schools in New York City, as well as with Mandarin (Mandarin Chinese) after-school and weekend programs.

There are also many examples of officially initiated and supported minority language education programs, although unfortunately many of these efforts continue to meet opposition. In the 20th century, as many African and Asian countries were achieving independence, minority language education was supported, especially by the UNESCO declaration that it is axiomatic to use the child's mother tongue in teaching reading. But the selection of which mother tongue to use as the medium of instruction, and the use of diverse children's mother tongues in the highly multilingual contexts of Africa, has proven problematic (Alidou, 2004; Webb, 2004). Likewise, the transitional bilingual education programs that were created by US federal legislation in the 1970s have recently undergone attack, and by the early 21st century Arizona, California, and Massachusetts had outlawed the practice (Crawford, 2004). The European Union, through the efforts of the European Bureau for Lesser Used Languages and Mercator, supports the development of minority and regional language education, although more attention is often paid to the spread of international languages such as English (Truchot, 2003). It is in contexts where indigenous languages are protected by law and not considered a threat to the majority language that minority language education has gathered momentum and strength. This is the case of Maori-medium education in Aotearoa/New Zealand (May, 2004), of Welsh/Cymru in Wales

(Jones and Martin-Jones, 2004), and of the regional languages of Spain, especially Catalan (Catalan-Valencian-Balear) (Artigal, 1993), since the advent of democracy. When minority language education leads to political and economic advantages, the majority also becomes interested in being included. The exemplar in this case is Quebec, where immersion programs engage the anglophone majority in French-medium instruction (Genesee, 1987).

In the 21st century, as globalization has spurred the movement of people, goods, and services across national boundaries, creating huge linguistic diasporas and the need for communication across languages and in many languages, minority language education has gained in importance, and also in complexity. In societies with high population mobility such as the United States, two-way dual language programs have been developed, involving language minority children with different degrees of proficiency in their heritage or majority language, as well as language majority children. Although problematic (see García, 2004; Valdés, 1997), these programs build on the interculturality of the multiple knowledge bases that shape the transnational/transcultural identities of students in the 21st century.

Power-Related Dimensions of Minority Languages and Their Access to Education

The power-related dimensions identified in Table 1 affect the possibility that minority language education will be developed and successfully implemented with official support. Successful officially sanctioned minority language education depends on the will of the majority, often determined by the linguistic rights it is prepared to cede (Skutnabb-Kangas, 2000), which are related to the historical status of the language (indigenous or immigrant), its economic value, and its uniqueness, that is, whether it is the sole minority language or is in competition with others. But beyond the majority's will lies the will of the minority itself, whether it considers the language important enough to its survival as a people (identity). There are then schooling factors that are important to consider regardless of the will of peoples – whether, as

Table 1 Power-related dimensions for implementation of minority language education

Factors	*Dimension*	*Score = 4*	*Score = 3*	*Score = 2*	*Score = 1*
Majority will factors	Historical power	ML[a] is indigenous language of long standing	ML is indigenous but of more recency	ML is spoken by indigenous settlers and immigrants	ML is spoken only by immigrants
	Economic power	ML has economic value in local and global contexts	ML has economic value only in local context	ML has economic value in other contexts only	ML has no economic value
	Uniqueness power	ML is sole in community and has many speakers	ML has numerical majority, far beyond the other MLs	ML is one of many in community, but is numerically important	ML is one of many in community, and constitutes a small minority
Minority will factors	Identity power	ML and ethnic identity are deeply intertwined	ML is an important ethnic marker to most	ML is an important ethnic marker to some, but not to most	Ethnic identity has lost all link to ML
Schooling factors	Political power	ML has official status in many developed countries	ML has official status in at least one developed country	ML has official status only in developing countries	ML has no official status in any country
	Literacy power	ML has rich literary tradition and academic texts	ML is written but has few published works and few texts	ML lacks written standardization. Academic texts not available.	ML is not written
Organizational factors	Sociolinguistic power	ML is spoken by all or mostly all the ML community	ML is spoken by over $\frac{2}{3}$ of the ML community, both old and young	ML is spoken by approximately $\frac{1}{2}$ of the ML community	ML is spoken by less than $\frac{1}{4}$ of the ML community, mostly aged
	Demographic power	ML community is numerically strong and lives in very isolated communities	ML community is numerically strong and lives in somewhat isolated communities	ML community is demographically weak, although lives in somewhat isolated communities	ML community is demographically weak and lives in integrated communities

[a]ML = minority language.

a result of its official status in other countries (political), there are teachers, books, and a rich literacy and literature tradition (literacy). Finally, the organizational factors of minority language education depend on the sociolinguistic status of the language (whether it has been maintained or has undergone shift) and whether there are many speakers of the same language in isolated schools (demographic).

Table 1 presents a rubric that enables states to determine whether implementation of minority language education would be relatively easy or very difficult. The higher the score, the more likely that minority language education can be implemented successfully and without too much effort. It is important to point out, however, that despite low scores, some language minority communities succeed on their own, and without external support, in running highly successful minority language education efforts.

Organization of Minority Language Education around the World

Although, as stated above, minority language education is not new, it was in the 20th century, and specifically after the UNESCO declaration of 1953 supporting the teaching of reading in the children's mother tongue, that it was first considered a field of study. The organization of minority language education responds to the different sociolinguistic and sociopolitical needs of different societies and language communities. At least seven different organizational models of minority language education coexist in the world today, and examples of such models in different societies follow.

1. *Heritage language education models*, specifically supplementary (after-school and weekend) classes, are often run by the minority language community itself to maintain and develop the heritage language in the language minority community. Instruction is most often solely in the minority language. Programs of this type are found throughout the world.

2. *Developmental maintenance bilingual education (DMBE) models* are either private all-day schools organized and run by the language minority community itself or state-funded all-day schools. Instruction is in two languages, with some portion of the school curriculum or day taught in the majority language and the other taught in the minority language.

Sometimes, the more ethnically encumbered subjects (such as history and social studies) are taught in the minority language, and the other subjects are taught in the majority language. This is the case, for example, with the Hebrew day schools in the United States, which use Biblical Hebrew for the study of the Old Testament and the Commentaries, modern Hebrew to teach the history of Israel, and English to teach all secular subjects. This is also the case of schools in the Philippines, which reserve Filipino (Tagalog) to teach Philippine history and literature and use English to teach math and science (Gonzalez, 1998).

The strict compartmentalization and functional complementary of languages observed in the DMBE model of the Philippines contrasts sharply with that in Wales. The purpose of the DMBE model in the Philippines was to spread Filipino (Tagalog) as a national language in a highly multilingual context, and thus it was formally protected. In Wales, however, Welsh and English are used to teach all subjects, with a great deal of instructional code-switching used to contextualize Welsh for those for whom it is not a mother tongue, as well as for those who have undergone language shift (Jones and Martin-Jones, 2004).

DMBE models do not always devote equal time to the two languages. Sometimes, as in the Cuban-American schools in Dade County, Florida (García and Otheguy, 1988), Greek day schools throughout the world, or the Frisian (Western Frisian) schools in Friesland (Zondag, 1988), the minority language is used as a medium of instruction only for literacy-related functions, and often for just one instructional period a day. Usually, the minority language is taught by a different teacher.

3. *Heritage immersion bilingual education models* have been developed in societal contexts where there has been a high degree of language shift. In an effort to reverse the language shift that had occurred in Aotearoa/New Zealand, the Kóhanga Reo movement established nursery schools completely run in Maori by the community elders. Those early immersion efforts have now been complemented by the establishment of *kura kaupapa* bilingual schools, following a developmental maintenance model (May, 2004). Likewise, immersion bilingual education models where language minority children are initially immersed in their heritage language are now prevalent in Scotland for Gaelic (Scots Gaelic), Ireland for Irish (Irish Gaelic), and Spain for Euskera (Basque), societies in which there has been a great deal of language shift. Immersion in the minority language is always followed by an education which balances the minority with the majority language.

4. *Bilingual intercultural education models* are prevalent in Latin America for indigenous groups who have traditionally received a poor Spanish-medium education. Bilingual intercultural education is available in Aymara, Guarani (Guaraní) and especially Quechua/Quichua, among others, alongside Spanish. The purpose of such minority language education is to provide basic literacy to the

indigenous population, while giving them the intercultural skills that enable them to interact in the Spanish-speaking world (López, 1995). Despite legislation supporting intercultural bilingual education, programs are few and often experimental in nature.

5. *Transitional bilingual education models* exist mostly in contexts with a high degree of immigration such as the United States, or in countries of Africa and Asia where minority language education lasts only until the child acquires the majority language. Transitional bilingual education models are an example of subtractive minority language education and lead away from the minority language to the majority language.

6. *Two-way bilingual education models* provide language minority children with an education in their heritage language, while making it possible for language majority children to learn the minority language. Although these models usually keep the two linguistic groups separate during the period of emerging bilingualism, especially for literacy instruction, the recent programs developed in the United States insist on the linguistic integration of children at all times. This linguistic integration often works better for the acquisition of English than for the maintenance and development of the minority language (García, 2004).

7. *Language Awareness and Inclusive models* are organized in contexts where the minority language speakers are integrated throughout the school system and it is impossible to provide them with minority language education. It cannot be considered minority language education in its own right. Children in these models are encouraged to use the minority languages to read, find information, and write reports (García, 2000). Language awareness models specifically encourage children to compare and contrast their minority language to the majority one (James and Garrett, 1991). The teacher does not instruct in the minority language or about the minority language since she or he rarely has knowledge of the minority language.

Conclusion

Minority language education is very important, but it is fraught with controversy and challenges. By using the scale provided here, educators will be able to determine the kinds of human and financial resources needed to implement minority language education successfully. Each society and community will have to determine the kinds of models that it can support. More minority language education is better than less, and its absence in a society is a sure sign that a large proportion of the school-age population is being excluded from a meaningful education.

See also: Bilingual Education; Education in a Former Colonial Language; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language.

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Minority Languages: Oppression

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Throughout history, minority languages have been very frequently subjected to oppression and often extinction by state policies rooted in colonial and neocolonial traditions, which aim at linguistic and cultural homogeneity, and also by majority ethnic groups within national states in their efforts to culturally and linguistically dominate and oppress minority groups. In addition, many minority indigenous groups, together with their cultures and languages, have been completely wiped out by introduced epidemics. As part of ethnocentric 'civilizing' projects, which see indigenous languages and cultures as inferior and discriminate against native speakers for using their own languages, the work of traditional missionaries, until recent decades, has also frequently prohibited the use of indigenous languages. In 1981, the Tukano leader Álvaro Sampaio denounced at the Russell Tribunal in Holland that, in the Upper Rio Negro region of Amazonas, Brazil, many indigenous languages disappeared as a result of (mission) boarding schools, where the use of Portuguese was enforced and the use of indigenous languages was prohibited (Sampaio, 1981: 13). Some indigenous peoples, especially in urban settings, facing violent discrimination and, having become ashamed to speak their own languages, avoid teaching their children their language out of fear that they too will be discriminated and, thereby, have fewer chances of a better life.

Historical evidence shows that, when prestige has been conferred on a minority language, it has more chances of survival. The valuing of the Navajo language as a code language by the U.S. government in World War II led to an increase in its use at the time. James Crawford (1998), referring to endangered native languages in North America, outlined the acute loss of these languages; even in the case of languages which have large populations of speakers such as Navajo (148 530 in 1990, which accounts for 45% of all native American language speakers in the U.S.), the percentage of Navajo who speak only English is increasing. Crawford presented Census Bureau data to show that between 1980 and 1990, among school-age Navajo children living on the reservation, the number of monolingual English speakers more than doubled. Crawford stressed the need to examine the social and historical causes of 'language loss' and the failure on the part of many linguists, in an attempt to separate external and internal factors, to take proper account of the question. This author further demonstrated how the coercive assimilation policy, as practiced by the Bureau of Indian Affairs from the late 1880s until recent decades, has alienated many native people from their cultural roots. In contrast, from the 1980s several indigenous peoples have adopted policies which aim at promoting the use of their languages. Citing Krauss (1992), Crawford emphasized that the will to revive or maintain native languages must come from the speakers, who must feel a need to value their languages (*see* **Pragmatics: Linguistic Imperialism; Linguistic Decolonization**).

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After a long history of oppression, there have been some recent governmental initiatives such as the Native American Language Acts of 1990 and 1992 in the United States, aiming to promote the protection of indigenous languages with a grant program. A Universal Declaration of Linguistic Rights was drawn up at a meeting of institutions and nongovernment organizations that took place in Barcelona, Spain, in June 1996. It was asserted that invasion, colonization, occupation, and other instances of political, economic, or social subordination often involve the direct imposition of a foreign language, distorting the perception of the value of 'native' languages. This was the first time that the claim to be able to exercise freedom of speech in the language of one's choosing was clearly stated. Some years later, at the 31st session of the UNESCO General Conference in Paris (November 2, 2001), the UNESCO Universal Declaration on Cultural Diversity was adopted as a legal statement that recognizes, for the first time, cultural diversity as a 'common heritage of humanity' and considers its safeguarding to be a concrete and ethical imperative, inseparable from the respect for human dignity. In 2001, the UNESCO published an atlas of endangered languages (Wurm, 2001) (*see* **Linguistic Rights**).

Crawford (1998) argued that, in defending the protection of minority languages, the most effective line of argument is an appeal to social justice. The loss of culture and language can, he stressed, destroy a sense of self-worth. Language death occurs to the dispossessed and the disempowered peoples who most need their cultural resources to survive under hegemonic pressures. The oppression of minority languages must be seen as part of a much more encompassing cultural and political oppression, in which any divergent political discourse is oppressed. Jacob Mey argued that an alternative strategy to brutal political repression by hegemonic powers is that "the hegemonic forces of the political majority may take their aim at disrupting the minority's possibilities of participating in the ongoing political discourse by eliminating the access for minority cultures to the exercise of their free speech rights in their own tongues" (1994: 154). The developing field of pragmatics (Mey, 2001) – the study of language from the perspective of its users, of the choices they make, the constraints they encounter in the use of language in social interaction, and the effects their use of language has on other participants in communication – provides an important tool for studying the oppression of minority languages. This and similar approaches stress the socially oriented thinking that sees language primarily as a means of communication between human users (*see* **Pragmatics: Overview**; **Social Aspects of Pragmatics**).

One of the pioneers in showing a concern about the oppression of minority languages is the anthropologist-linguist Edward Sapir (1884–1939) (*see* **Sapir, Edward (1884–1939)**), trained by Franz Boas in the early 20th century. Being the only professionally trained linguist among Boas's students, Sapir showed a concern for the need to record endangered Amerindian languages before they were lost to humanity. In 1915, on the Berkeley anthropologist Alfred L. Kroeber's invitation, Sapir went to work in California with Ishi, the last speaker of Yahi, a Yana language, recording the language and culture (1917) (*see* **Anthropology and Pragmatics**).

Jay Powell of the University of British Columbia and Michael Krauss of the Alaska Native Language Center of the University of Alaska have carried out important research on language loss and participated in attempts to revitalize languages which have been oppressed, with varying degrees of success. Powell defended the symbolic significance of revitalizing indigenous languages; even when the language does not become fluently spoken again, the use of indigenous words or phrases can help give value and meaning to indigenous cultures and strengthen a sense of indigenous cultural identity. The philosopher Marcelo Dascal (2004) drew attention to the cognitive, emotive, cultural, social, and political functions of languages that, in addition to being tools of communication, carry traditions and cultures.

Among recent works, David Crystal (2000) examined the threat to minority languages and revealed a concern to retain the linguistic and cultural diversity in the world, estimated to comprise 6000 languages in the year 2000. Crystal defined language death, presenting reasons for his concern for the alarming rate of loss of languages (one language dying every two weeks) (2000: 19). He calculated that 4% of the world's 6 billion inhabitants speak 96% of the languages (2000: 14); for 51 languages a lone speaker survived, while 25% of languages had less than 1000 speakers. Crystal explored contributing factors, a major one being negative attitudes to a language, in government policy and local communities. He presented considerations as to how to redress the situation. From his argument of the value of languages, Crystal showed that the attribution of prestige to a threatened language and policies to promote the empowerment of its speakers, given better economic conditions, are favorable factors for its survival.

R. M. W. Dixon (1980) estimated in 1980 that in Australia around 25% of the original languages were extinct and 50% threatened with extinction. Anette Schmidt (1990), ten years later, estimated that 64% are extinct or have only a few elderly speakers, and that 28% are severely threatened. Of the 90 languages

this author described as 'surviving,' 70 are classified as being threatened or severely endangered.

Andrew Dalby (2003) focused especially on the linguistic history of Europe and the processes by which minority languages are lost. Lenore Grenoble and Lindsay Whaley (1998) offered an overview of the issues involved in language loss, combining articles of authors of different backgrounds to provide sociological and economic as well as linguistic perspectives on language loss. After an overview of language endangerment, their book presents the situation confronting threatened languages, the issue of what can be lost as a language ceases to be spoken, and the linguistic processes involved.

Daniel Nettle and Suzanne Romaine (2000) related ecological and linguistic vitality, and examined assumptions about why languages die and how some languages have become dominant; however, their approach has a predominantly ecological bias. Tove Skutnabb-Kangas (2000) examined how most indigenous and minority education contributes to linguistic genocide from a multidisciplinary perspective. This author combined different theoretical concerns such as linguistic human rights, minority and multilingual education, language ecology and threatened languages, the impact of linguistic imperialism and unequal power relations on ethnicity, linguistic and cultural competence, and identities. The book presents many empirical examples from around the globe.

Darcy Ribeiro estimated that between 1900 and 1957, 87 indigenous peoples with their languages and cultures had become extinct in Brazil (1979: 239). Aryon Rodrigues (1993) affirmed that there were about 1273 indigenous languages spoken in Brazil in 1500; here, the loss is of the order of 85% (1993). Bruna Franchetto estimated that, of the 180 languages spoken today in Brazil, the average number of speakers per language is less than 200 (2000: 84–88).

After centuries of oppression, with the rise of indigenous political movements, especially since the 1970s, there have been attempts to demand respect for cultural and linguistic plurality. Efforts have been made to revitalize languages seen as being on the way to extinction, and to revive languages that have become extinct. In the past two decades, constitutional amendments have been introduced in many national states that aim to recognize cultural and linguistic plurality parallel to movements of ethnic and linguistic resurgence. However, despite the very rapid growth of indigenous and minority ethnic group cultural and political movements, the revitalization of oppressed languages occurs in radically different ways across the globe. Rita Segato (1999: 162) observed that some voices, which celebrate the process of 'globalization' and do not interpret it as an exacerbation of imperialism, subscribe to the idea that only as a consequence of the internationalization of modern ideas about citizenship and human rights has it become possible for previously invisible peoples to emerge and today claim rights in the name of their identity. Segato proposed that this is only partly true, and pointed to the fact that we are dealing with an ambiguous and unstable process, capable on the one hand of affirming minorities' rights, but, on the other hand, homogenizing cultures, flattening their lexicons and values, so that they can enter the generalized dispute for resources (1999: 162–163).

In examining the oppression of minority languages and cultures, a dynamic concept of culture is necessary. Language and culture are dynamic and in constant change, embodying a set of meanings – beliefs, values, knowledge – in an ongoing process of construction, reconstruction, and transformation. Traditions are revitalized, reinvented, and lived through languages. However, many minority languages and cultures suffer violent oppression not only from strictly language-oriented policies (such as practiced in education), but also by the encroachment of national societies on the lands of indigenous peoples and as part of cultural and political domination.

See also: Anthropology and Pragmatics; Linguistic Rights; Pragmatics: Linguistic Imperialism; Pragmatics: Overview; Social Aspects of Pragmatics.

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Miskito *See:* Misumalpan.

Missionary Linguistics

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The History of Linguistics and the Linguistic Work of Missionaries

Most of the languages spoken today – estimates range from 3000 to 6000 – never gained any official status, most are not written, they are not taught in school and there is nothing like a dictionary, a grammar or even a primer. Yet a considerable number of descriptions of such languages do, in fact, exist. Most of them were, and still are, composed by missionaries. From the very beginning of European expansion to other continents, missionaries set out to convert the uncivilized and the pagan peoples. Languages of the Americas, Australia and Africa, of Southeast Asia and Polynesia, were affected most by the efforts of missionaries of various denominations. It is well known that most of the indigenous languages of North America and Australia today are at the verge of extinction or are already extinct. Sometimes their documentation by missionaries is the only one bearing testimony, providing today's scholars with invaluable information that otherwise would no longer be available. In those cases where the languages are still spoken, such knowledge helps to establish a diachronic dimension, however shallow it may be.

Although the existence of such grammars, dictionaries or notebooks was well known and sometimes even extended bibliographies were compiled, such as Pilling's (Pilling, 1973), hardly any research was done on this considerable body of material, with the notable exception of Victor Hanzeli's *Missionary linguistics in New France*, written in 1969 (Hanzeli, 1969). Even when the interest in the history of linguistics set in, in the 1970s, it did not extend to descriptive works on exotic languages. The very obvious shortcomings of many of the missionaries' linguistic efforts, their being shaped by the formulae of Latin-based grammar, and the way such work came about did not help to stir much interest. At the same time, the rise of syntactic theory and its claims as to general validity, the simultaneous spread of language typology, its pronounced interest in linguistic diversity and its corpus-based methodology, caused a new interest in languages other than the well-known Indo-European ones and finally gave rise to first attempts at grammars on structurally interesting, i.e., deviating, languages

Native American Languages Act of 1991: hearing before the Select Committee on Indian Affairs. Washington, DC: U. S. Goverment Printing Office. 18–22.
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The History of Linguistics and the Linguistic Work of Missionaries

Most of the languages spoken today – estimates range from 3000 to 6000 – never gained any official status, most are not written, they are not taught in school and there is nothing like a dictionary, a grammar or even a primer. Yet a considerable number of descriptions of such languages do, in fact, exist. Most of them were, and still are, composed by missionaries. From the very beginning of European expansion to other continents, missionaries set out to convert the uncivilized and the pagan peoples. Languages of the Americas, Australia and Africa, of Southeast Asia and Polynesia, were affected most by the efforts of missionaries of various denominations. It is well known that most of the indigenous languages of North America and Australia today are at the verge of extinction or are already extinct. Sometimes their documentation by missionaries is the only one bearing testimony, providing today's scholars with invaluable information that otherwise would no longer be available. In those cases where the languages are still spoken, such knowledge helps to establish a diachronic dimension, however shallow it may be.

Although the existence of such grammars, dictionaries or notebooks was well known and sometimes even extended bibliographies were compiled, such as Pilling's (Pilling, 1973), hardly any research was done on this considerable body of material, with the notable exception of Victor Hanzeli's *Missionary linguistics in New France*, written in 1969 (Hanzeli, 1969). Even when the interest in the history of linguistics set in, in the 1970s, it did not extend to descriptive works on exotic languages. The very obvious shortcomings of many of the missionaries' linguistic efforts, their being shaped by the formulae of Latin-based grammar, and the way such work came about did not help to stir much interest. At the same time, the rise of syntactic theory and its claims as to general validity, the simultaneous spread of language typology, its pronounced interest in linguistic diversity and its corpus-based methodology, caused a new interest in languages other than the well-known Indo-European ones and finally gave rise to first attempts at grammars on structurally interesting, i.e., deviating, languages

under theoretical and methodological perspectives. Until the late 19th century, grammars and descriptions of such languages were not composed by linguists or philologists. In most cases they were compiled in the course of Christianization by missionaries living in the respective area. Having today's knowledge and perspectives in mind, the critical consultation of these first representations may help to reconstruct the genesis of prevailing opinions on grammatical structures, especially unfamiliar ones such as ergativity, syntactic nonconfigurationality, or polysynthesis. Yet today only two or three articles and a few collections of papers are dedicated to such investigations, some also including reflections on linguistics methodology, especially the overall role of empirical research in the history of linguistics. It must also be noted that even today many linguists doing field work are related to a missionary society or church, such as the *Summer Institute of Linguistics*. Critical reviews of earlier work of missionaries are not necessarily welcome and it is rather their labors and good intentions that are appreciated. Attempts at reconstructing the influence of occasional mother tongue knowledge of the author on the development of grammatical representations, or their modification, as is the case with Samuel Kleinschmidt's grammar of 1851 (Kleinschmidt, 1851), are of great value but rather rare. They require an in-depth knowledge of the respective language by the historiographer.

Missionaries as Linguists

From the beginning of European colonial expansion, Christianization and the establishment of trade were seen as being important for gaining political influence and subsequently power. In the early period, the need to communicate with the local population was especially pronounced with respect to conversion to Christianity, which in turn was seen as a step towards 'civilizing,' i.e., pacifying the local populations. Missionaries as men of the word seemed predestined to tackle the foreign tongues. Subsequently, most, if not all grammars of exotic languages from the 16th century onwards, were composed by missionaries. The Catholic church and her missionaries of various orders exerted enormous influence in Central and South America, and parts of North America. Missionaries of Protestant churches, such as the Anglican Church, and numerous evangelical congregations became active in the British sphere of influence. Spheres of political power are largely mirrored by the spheres of missionary activities and the impact they made on the local population.

It must be emphasized that initially, languages were not described out of scientific interest, but because of very practical needs for communication. The descriptions share a number of characteristic features, yet at the same time each piece is unmistakably shaped by very specific factors, the most important being the capability of the author. To master the language was a necessary exercise the missionaries had to undergo – for most missionaries, a tiring and demanding experience. Most of them were not exactly ambitious with respect to the composition of a grammar, and many were not capable of achieving more than the most elementary outline. The educational background of the missionaries influenced their linguistic work greatly. The different standards of training between the clergy and the members of evangelical congregations, who most often were lay people with little if any formal education, are all too obvious. As a rule, descriptions and manuals were composed exclusively for the use by fellow missionaries. Genuine interest in the language itself developed with some individuals, as did the urge to improve and adjust the template provided by the standard Latinate grammar. This is especially true of later generations of missionary linguists, when, in some cases, mother tongue speakers could add their knowledge to the description of the respective language.

Impact on the Languages

Most grammars were not published, but merely circulated as manuscripts within the mission, copied and developed further, but they were hardly ever fundamentally revised. Within the orders or congregations, they were of considerable influence and by being frequently in use over long periods of time standards were established.

The translation of the bible was of utmost importance to all Protestant missions, and many evangelical congregations would only accept converts who had proven their understanding of the bible. Bible translation required not only a very good command of the language and the coining of a new terminology, but also the representation of the speech sounds by letters. The attempts at teaching how to read the Bible initiated the introduction of schooling for the native population. The establishment of a writing standard, of whatever quality, in most cases greatly influenced the respective language. Besides the bible, other books were printed and circulated, and in many cases writing was taken up for everyday life and gained importance beyond religious matters. Literacy became part of the respective culture. Yet in other cases, most prominently in the Catholic sphere of influence, reading was not propagated and writing never reached the population, which sometimes remains largely illiterate until today. In yet other

cases, competition between missions led to an unnatural diversification of otherwise closely related languages – or even the same language. The impact on the target languages varies to a large extent, but still missionaries were teachers, and education, especially with respect to the teaching of reading and writing, is of utmost importance for a speech community. While in time revisions and improvements were made, and education was subsequently handed over to other institutions, in some cases this never happened. The missionaries' standards became part of the cultural identity and tradition and, as heritage, today are fiercely defended, no matter how useful and appropriate a revision might be.

Reception in the Scholarly World

As for the scholarly public, or the interested public, grammars and descriptions composed by missionaries were not readily accessible, since most were not published. But motivated by the debates of enlightenment, scholars tried to get hold of as much information as possible, usually through correspondence or personal relations. Humboldt's treatises on the Mexican grammar (Humboldt, 1996), for example, are based on such manuscripts, his judgment on their qualities, however, is rather harsh and unfavorable. The ingenious grammar written by a missionary is by far the exception, not the rule. Whether an influence of the linguistic achievements of missionaries on the prevailing standards of grammar writing of the time can be traced, seems to be rather dubious. Even in those cases where attempts at grasping the peculiarities of these alien tongues were made, they were more often than not dismissed or doubted by the scholarly public. The concept of cultural and intellectual superiority, mirrored by the structure of the languages, was so deeply rooted that even Humboldt could not accept the fact that the inflectional system of Nahuatl, the Mexican language, is richer than that of Ancient Greek. His controversy with John Pickering concerning the nature of polysynthesis illustrates the intellectual bias prevailing at his time – and a long time to come. To give one more example, Kleinschmidt's grammar (Kleinschmidt, 1851), published in Berlin and earning him an honorary doctorate, was consistently ignored by European scholars, underestimated or criticized, and its potential contribution to the debates on ergativity or polysynthesis was not recognized.

Considering how slowly peculiarities of European vernaculars made their way in to grammatical terminology, it seems even more unlikely that those of indigenous languages should have been more successful.

In the second half of the 19th century, when in North America ethnographic and linguistic interest in the vanishing indigenous cultures and peoples instigated a rush to taking record of the languages still existing, geologists and others surveying the land were equipped with explicit instructions for the elicitation of language data. By the end of the 19th century, in North America fieldwork had become an institutionalized part of the emerging sciences of anthropology and linguistics. Yet today's role of missionary societies should not be underestimated. They are still most active in the field and so are exquisitely trained missionaries who are linguists.

See also: Bible Translation into Lesser-Known Languages; Language Education: Grammar; Linguistic Decolonization; Linguistic Influence; Literacy Practices in Sociocultural Perspective; Pragmatics: Linguistic Imperialism; Religion and Literacy; Translation and Genre: Sacred Texts.

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Misumalpan

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Misumalpan is a Central American linguistic family with five members: Cacaopera, Matagalpa, Miskito, Sumo (Sumo Tawahka), and Ulwa. Cacaopera was spoken in eastern El Salvador and became extinct during the first half of the 20th century. Matagalpa, once diffused through the western portions of mid- and northern Nicaragua, and in the immediate adjacent zone of southern Honduras, became extinct at the end of the 19th century. Sumo is the language of 9000 people in northeastern Nicaragua (the area of the Waspuk and Bambana rivers) and about 500 people in the neighboring area of Honduras (along the middle Patuca River). Sumo has two dialects: Panamahka, which includes 80% of the speakers, and Tawahka. Ulwa, formerly widespread in southeastern Nicaragua, is currently spoken by about 500 people in the area of the lower Grande de Matagalpa and Kuringwas rivers. Miskito is spoken in the Caribbean coast and neighboring lowlands from the Black River in Honduras (25 000 speakers) to the Pearl Lagoon in Nicaragua (100 000 speakers). The following dialects are mentioned: Mam (Honduras), Wangki, Tawira, Baldam, and Kabo (Nicaragua).

Ulwa and Sumo on the one hand, and Matagalpa and Cacaopera on the other, constitute two uncontroversial subgroups. Lexicostatistics show a closer relationship between them than that of either one to Miskito, so the family seems to be basically divided into the latter and what we could call Western Misumalpan. The time depths according to glottochronology are Miskito/Western Misumalpan, 5800; Sumo–Ulwa/Matagalpa–Cacaopera, 5300; Matagalpa/Cacaopera, 1200; and Sumo/Ulwa, 880.

The only external relationship that has been proven by means of the comparative method is that with the Lencan family from Honduras and El Salvador. The split of the common ancestor would have taken place about 7200 years ago.

Many have thought Misumalpan to be related to Chibchan. This seems probable but has not yet been properly demonstrated.

The Misumalpan languages belong to the Lower Central America linguistic area, characterized by features such as SOV order, postpositions, preposed genitive, postposed numerals and adjectives, and contrasts between voiced and voiceless stops. Inside the area, they are part of a Northern Subarea characterized by features such as person inflection for possession in nouns and for agent and patient in verbs, predominance of accusative-nominative case systems, serial verb constructions, postposed or suffixed negation, and vowel length contrasts.

See also: Chibchan; El Salvador: Language Situation; Honduras: Language Situation; Nicaragua: Language Situation.

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Mitchif *See:* Michif.

Mitigation

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In everyday language, 'mitigation' as an action noun can refer both to the action of mitigating, and to the fact of being mitigated. The former sense foregrounds the process, the latter the result. In the technical use of the term, mitigation is an all-embracing category employed in pragmatics (*see* **Pragmatics: Overview**) to label the wide set of strategies by which speakers attenuate one or more aspects of their speech.

Many rhetorical figures, such as periphrasis, euphemism, litotes, understatement, meiosis, or reticence, can be subsumed under the label 'mitigation,' as they can all be viewed as saying less, while not necessarily meaning more. In mitigation, something which is somehow expected, is substituted, side-stepped, disguised, or simply deleted and left unsaid by the speaker, out of manners, cautiousness, or modesty: it is up to the hearer to reconstruct it inferentially.

The notion and the term were introduced in pragmatics by Fraser (1980) to refer to the linguistic devices by which speakers try to protect themselves against various kind of interactional risks. Fraser (1980) listed the following as typical mitigating devices in English: indirect acts and justification moves (especially for directives), passive and impersonal constructions where references to speaker and hearer are deleted, epistemic disclaimers (e.g., *If I'm not wrong*) and non-epistemic disclaimers (e.g., *I hate to do this, but…*, *If you wouldn't mind…*), parenthetical forms and modal adverbs reducing commitment to the proposition (e.g., *probably*, *possibly*, etc.), tag questions, hedges (e.g., *technically*) in Lakoff's (1973) sense of the term. According to Fraser (1980), mitigation can be 'self-serving,' in which case it aims at avoiding possible unwelcome outcomes for the speaker, or 'altruistic,' in which case it aims at reducing negative effects for the hearer.

Historical Background

Both the term (*mitigatio*) and the notion itself are found in the *Rhetorica ad Herennium*, a treatise from the second decade of the 1st century B.C., of uncertain authorship, usually attributed to Cicero. This manual transposes the Greek art of rhetoric (*see* **Rhetoric, Classical**) into the practical Roman spirit; the author describes the effect of *deminutio* ('belittlement') and explains that it should be used, out of prudence, to avoid antagonism and antipathy in speaking (*Rhet. Her.*, IV, XXXVII, 50).

Mitigation has been used as a technical notion in linguistic pragmatics since the late 1970s, when a main concern in pragmatic research was to make the concept of illocutionary act (Austin, 1962) operational in the analysis of discourse.

From this period on, in the vast research field on politeness (a vastness that is well documented, among others, by Kasper, 1990; Watts *et al.*, 1992; DuFon *et al.*, 1994), some mitigation-related notions, if not the term, are overtly or covertly at work. Among these, the most influential model of politeness (*see* **Politeness**), that of Brown and Levinson (1987 [1978]), treats mitigation as a synonym of politeness (1987: 42). The 'face-saving view' of interaction (Fraser, 1990), based on Goffman's notion of 'face' (Goffman, 1967; for a reexamination, see the Focus-on Issue on 'Face' of the *Journal of Pragmatics,* 2003) (*see* **Goffman, Erving (1922–1982); Face**), has the idea of mitigation at its core: the strategies of both positive politeness (related to social approval) and of negative politeness (related to privacy and autonomy) can be read as mitigating strategies. Subsequent research into politeness, which is more directly linked to mitigation, has focused on the devices that minimize the impact of a face-threatening act (FTA), especially requests. The 'maxims of politeness' put forward by Leech (1983: 132ff) in his model of discourse, in particular the 'Tact Maxim,' all have a bearing on mitigation as they are based on a general 'interpersonal rhetoric,' which mainly aims at avoiding disagreement and at fostering agreement between interlocutors (*see* **Maxims and Flouting**).

Significantly, the notion of mitigation becomes a widely recognized analytical tool when the epistemological orientation in pragmatics shifts from an introspective, philosophically oriented paradigm to an empirical one that is increasingly addressing real, non-constructed data, in *situated* contexts (in the sense assigned to the term by Mey, 2001: 219ff).

These two requirements (non-constructed data that are taken from, or are characteristic of, specific interactional contexts) are distinctive features of studies in which mitigation is used. In particular, Labov and

Fanshel (1977), in their thorough analysis of one session of therapy between Rhoda, a girl suffering from anorexia, and her psychotherapist, introduce the concept of mitigation as opposed to that of 'aggravation' to designate two "basic interactive dimensions" (p. 84). Mitigation is rooted in "the subject's desire to mitigate or modify his [*sic*] expression to avoid creating offense" (1977: 84). In a pedagogical framework, Edmondson and House (1989), applying Edmondson's (1981) theoretical model, propose many moves that are conceptually related to mitigation inasmuch as they can be described as 'hearer-supportive.' Specifically, Edmondson (1981: 115ff) proposes three types of supportive moves, viz. grounders, expanders, and disarmers, which play mitigating functions. In a similar vein, Meyer-Hermann and Weingarten (1982) focus on psychotherapeutic conversation, whereas Langner (1994) takes his data from college classroom interaction. Both these works use an interesting notion of mitigation (German: *Abschwächung*) which is defined as a reduction of obligations for the interlocutors. Prince *et al.* (1982), based on a corpus of physician-physician dialogues, is a study of the linguistic means doctors use in order to be cautious and to weigh the degree of certainty of their utterances. Two main types of modifications are distinguished: 'approximators' (roughly corresponding to Lakoff's [1973] 'hedges') and 'shields,' i.e., expressions "conveying some markedness with respect to speaker's commitment" (Prince *et al.*, 1982: 86).

Among the works that do not only apply the concept but propose insights on its grounding and functioning, Holmes (1984) concentrates on strategies that attenuate or reinforce ('boost') illocutionary force. Moving on from Fraser (1980), Holmes (1984) treats mitigation as a particular case of attenuation, occurring when the predictable effects of a speech act (*see* **Speech Acts**) are negative. According to Holmes, attenuation devices affecting illocutionary force can be grouped into the following four categories: (1) prosodic devices (e.g., a falling-rising intonational contour, realizing the epistemic mode in English, decreased emphasis, lower voice, etc.); (2) syntactic devices (e.g., tag questions, impersonal constructions, double negatives in formal discourse, etc.); (3) lexical devices; and (4) discourse devices (e.g., digression indicators like *by the way*, which, as already observed by Brown and Levinson [1978: 174], reduce the relevance of the utterance they introduce). Lexical devices are further divided into: attenuating devices focusing on the speaker (for instance, parenthetical expressions such as *I gather*, *I guess*, *I suppose*); attenuating devices focusing on the hearer (e.g., *you know*, *if you don't mind*, *if you are sure that's OK*); and attenuating devices focusing on content or 'other.' This latter category includes attenuating mechanisms realized by epistemic adverbials such as *possibly* and *probably*, and adverbials displacing the responsibility for what is being said to other sources (e.g., *allegedly, reportedly, presumably*).

Blum-Kulka *et al.*'s (1989) study in the framework of a research project on cross-cultural speech act realization (CCSARP) is centered on the linguistic realizations of requests and apologies in various languages, with different degrees of conventionalization. As to requests, these lend themselves to mitigation more easily than do other speech acts because they are inherently invasive of the other's territory, being face-threatening acts (FTA) in Brown and Levinson's (1987 [1978]) terms (*see* **Face**). Conversely, apologies tend to be reinforced in order to be more effective. The authors draw a distinction between internal and external mitigation: the former occurs within the speech act, while the latter occurs outside it and corresponds to what in other frameworks (*see* **Conversation Analysis**) are called 'pre-sequences' or 'grounders.' As documented by Blum-Kulka *et al.*'s important collection of data, the category 'mitigation' proves to be useful for the interethnic comparison of different strategies of performance of speech acts in cross-cultural research (*see* **Intercultural Pragmatics and Communication**).

Theoretical Questions

Even from the brief overview above, it appears that diverse notions of mitigation, in different approaches and in varying terminology (from 'cajolers' to 'sweeteners,' from 'softeners' to 'disarmers,' from 'rounders' to 'shields,' etc.), all rely on some assumptions that can be summarized in the following points:

1. the notion of mitigation presupposes that an illocutionary act can be modified; in other words, illocutionary force can be seen as having degrees of strength (among others, Holmes, 1984; Sbisà, 2001);
2. such a modification calls into play an intensity factor that in many cases can be thought of as scalar;
3. the intensity factor itself can be modified in the direction of a weakening (resulting in what is called 'mitigation,' 'attenuation,' 'downgrading,' etc.) or in the direction of a strengthening (resulting in what is called 'reinforcement,' 'upgrading,' 'boosting,' etc.). Caffi (1990) proposes the superordinate category 'modulation' to refer to both directions of modification.

In the case of weakening, in particular mitigation, some questions arise; these may be grouped in three

sets. The first set is relevant from a descriptive viewpoint and can be formulated as follows:

> i. Leaving aside the important role played in mitigation by nonverbal means (in particular, proxemic and kinesic cues, such as smiles, gestures, postures, etc.), what are the kinds of mitigating devices that a natural language offers as resources for situated interaction? Are they mainly lexical, morphological, syntactic, or prosodic? Which combinations of different devices are more often attested in use? Is it possible to map types of mitigating strategies onto types of interaction? Is it possible to discover significant distributional constraints on mitigating devices and strategies used for performing different (macro-)types of illocutionary acts?

The second set of questions, at a higher level of abstraction, can be summed up as follows:

> ii. What is it that is weakened by mitigators? In other words, what is the linguistic scope, whether lexicalized or not, that is affected by the mitigating operation? Is there a correlation between the abstract scope of the linguistic mitigating device and the inferrable effect with respect to the value assigned to a given interactional dimension? What modifications are a matter of degree and what a matter of type? How do different kinds of mitigating devices interact? With which results? It should be noted that these questions are not abstractly speculative but have a direct bearing on the analysis of data.

A third set of questions is theoretical in nature:

> iii. What are the types of presuppositions or illocutionary felicity conditions that are influenced by attenuating modulations? (*see* **Presupposition**; **Pragmatic Presupposition**.) Is it possible to envisage significant connections between types of mitigation and different types of speech act felicity conditions?

Research still has to provide satisfactory answers to these questions, which need both an adequate theoretical framework and an adequate empirical grounding in different cultures/languages in different interactional contexts for different illocutionary acts. From a theoretical viewpoint, research conducted so far on various languages has shown that a systematic treatment of mitigation requires the integration of a speech act theoretical approach with other frameworks that take into account both the sequential dimension of discourse and the type of encounter in which mitigation is enacted.

The main question (which is far from being answered) regards the co-variance of variables involved in mitigating processes. From a methodological viewpoint, a first typological distinction needs to be made between form and function, between the formal means of the attenuating operation and its function in mitigation. As to form, research into various languages has shown that lexical and morphosyntactic mitigators are often employed in combination. While some mitigators are special to particular illocutions, so much so that they can be described not only as mitigating devices, but as illocutionary devices in their own right (e.g., *please* both functions as mitigator and indexes a speech act as a request), other mitigating devices can be called *passe-partout* mitigators (e.g., *a bit*, *a moment*), which are employed across a whole range of illocutions. As to function, the typologies of mitigators proposed by different authors converge in identifying, within the utterance, two abstract scopes to which the mitigating operation applies, i.e., proposition and illocution. Operating on the former, mitigation produces vagueness; operating on the latter it produces indirectness. A third scope can be added to these two, namely the deictic origin of the utterance (Bühler, 1934): the detachment of the utterance from its actual utterance source, as it happens in impersonal constructions, works, too, as a mitigating device (Haverkate, 1999). Deleting the source of the utterance and assigning it to other sources is a very frequent strategy by which speakers avoid taking responsibility for their speech acts.

As to the results of mitigation (in the second sense of the term, mentioned at the outset), they are at the same time calculable and uncertain. This holds not only in the general sense that perlocutionary acts and their perlocutionary effects, not being conventionally determined, cannot be foreseen, but also in the sense that mitigating operations may produce a margin of uncertainty, even with respect to the locutionary act, i.e., the intended act of reference and predication. In this respect, a syntactically negative structure, for instance a litotes (e.g. *John is not particularly bright*) can be described as a mitigation from a formal viewpoint (cf. Giora *et al.*, 2005); however, from a functional viewpoint, it can be attenuating (similar in that to a 'true' minimization) or reinforcing (similar in that to an hyperbole), the latter function being the one assigned by classical rhetoric to this figure of speech. In addition, it is ultimately up to the hearer to work out not only the illocutionary force of the utterance, but also its propositional content (in speaker's opinion, is John too uptight for his role, a bit shy, or just dull?).

The conclusion is that the privileged object of analysis in the study of mitigation processes should be *form*, i.e., the linguistic expressions and structural patterns of discourse in a given (macro- and micro-)context. A pragmatic analysis of each of these forms, at different degrees of conventionality, will show the interplay of heterogeneous communicative dimensions.

Research Perspectives

Mitigation lies at the core of what can be called the rhetoric of everyday interaction. This rhetoric plays

out against the background of our metapragmatic awareness (*see* **Metapragmatics**), i.e., our knowledge of what is appropriate to a given communicative situation. Mitigation is a relative concept: something is always mitigated with respect to something else. Within a repertoire of possible communicative choices which shape interactional styles in activity types, some choices will be preferred. For this reason, mitigation can only be defined contextually and co-textually within the global (and locally managed) system of the interactants' mutual expectations (*see* **Context, Communicative**). Hence, mitigation raises the issue of a complex system of knowledge, encompassing attitudinal and emotive factors: about the world, about the words, about ourselves, and about our interlocutors. It can only be dealt with satisfactorily when all these aspects (macro- and micro-sociocultural, linguistic, psychological, relational) and their interplay are considered.

As a concept that captures the rhetorical, indexical quality (*see* **Deixis and Anaphora: Pragmatic Approaches**) of our communicative behaviors, mitigation cannot be fully accounted for by an exact, abstract definition or strict classification: such techniques are only possible for decontextualized units. Precisely because of its rhetorical nature, ambivalence is its inherent quality: an antiphrastic tension, even a slight paradoxical current, runs through mitigation. After all, if someone mitigates, it means that there is something to be mitigated: where everything is (interactionally) 'safe,' there is no need of mitigation.

So far, mitigation has been a subtopic of the wide field of research in politeness and its dominating metaphor of 'face.' In Caffi (1999, 2001, and forthcoming), an extended view of mitigation is put forward: mitigation is defined as a weakening of one or more heterogeneous interactional variables (e.g., commitment to the proposition, degree of (in)directness of the illocution, endorsement of a social role, emotive involvement, topical salience, etc.), which constitute the system of an encounter. The predominant currents in pragmatics have been sociologically oriented. In accordance with their emphasis on the cultural and social aspects of the construction and negotiation of meaning, the notion of mitigation as a type of strategic behavior in a goal-oriented activity has been foregrounded. What so far has remained in the background is the psychological side of this meaning-construction that can be summed up in the question: In a given encounter, what kind of person would I like to be taken as? What is the relationship between the use of different types of mitigation and speakers' constructions of the 'self,' i.e., their self-presentations beyond mere face-work? What is the impact of mitigated choices on the process of interlocutors' mutual attunement (Caffi, forthcoming)? An integrated approach does not dismiss the sociological view, but emphasizes the need to take the personal, psychological, emotive dimension into account. The model speaker of pragmatics is, at present, a *face*. This 'face' should be seen as belonging to a *person*, viz., a complex speaking subject endowed with a metapragmatic awareness covering social as well as cognitive and emotive discursive competences. In mitigating processes, there seems to be another motivational factor, more basic than politeness, i.e., minimizing responsibility. By mitigating, a speaker can avoid running unnecessary risks. Once again, it becomes clear that 'saying is doing'; as a type of doing, saying presupposes rights, implies risks, triggers obligations, produces effects, and changes contexts. Far from being relegated to some kind of stylistic variation (*see* **Style**) or assigned to some province of (classic or new) rhetoric, mitigation is directly linked to the optimization of the system triggered by an encounter; it smooths out the interactional processes by presenting the speaker as considerate, tactful, thoughtful, and empathetic, and thus makes the attainment of interactional goals easier. In conclusion, mitigation both presupposes and reaffirms the multidimensional character of actual discursive choices, and foregrounds our identities both as social actors and as interacting persons.

See also: Context, Communicative; Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Deixis and Anaphora: Pragmatic Approaches; Dialogue and Interaction; Face; Goffman, Erving (1922–1982); Metapragmatics; Performative Clauses; Periphrasis; Politeness; Pragmatic Acts; Pragmatic Presupposition; Pragmatics: Overview; Presupposition; Rhetoric, Classical; Speech Acts; Style; Taboo, Euphemism, and Political Correctness.

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Miwokan *See:* Hokan Languages.

Mixed Categories

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Background

The notion 'part of speech' has been a central feature of the Western linguistic tradition from the beginning. The classical grammatical tradition, rooted in Aristotle (384–322 B.C.) and the grammars of Dionysius Thrax (c. 170–c. 90 B.C.) and Aelius Donatus (fl. 353 A.D.), left us with eight parts of speech: the verb, the noun, the pronoun, the adjective, the adverb, the preposition, the conjunction, and the interjection.

This traditional view has been carried over to modern generative grammar, in which it is assumed that there is a small number of primitive, probably universal, probably innate grammatical categories (Chomsky, 1965: 65):

> The question of substantive representation in the case of the grammatical formatives and the category symbols is, in effect, the traditional question of universal grammar. I shall assume that these elements too are selected from a fixed, universal vocabulary, although this assumption will actually have no significant effect on any of the descriptive material to be presented.

This marks a break from earlier American structuralist methods, in which the problems with naively applying the traditional part of speech distinctions to typologically diverse languages were well known. Whorf (1945: 1) warned that "the very natural tendency to use terms derived from traditional grammar,

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Mixe-Zoquean Languages

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The Mixe-Zoquean languages are found in southern Mexico in the area of the Isthmus of Tehuantepec. The family is divided into two branches, Mixe languages in the Oaxacan highlands and the Zoquean languages, which are found on the Gulf of Mexico and in western Chiapas. The languages are:

- Zoquean
  - Gulf Zoque
    - Sierra Popoluca
    - Texistepec
    - Ayapa Zoque (Tabasco Zoque)
  - Southern Zoque
    - Chimalapa
    - Copainalá
    - Francisco León
    - Zoque de Rayón
- Mixean
  - Veracruz Mixe
    - Oluteco (Oluta Popoluca)
    - Sayuleño (Sayula Popoluca)
  - Highland Mixe
  - Western Mixe
    - Totontepec
    - Tlahuitoltepec
  - Eastern Mixe
    - Coatlán
    - Isthmus
    - Quetzaltepec
    - Juquila
    - Mazatlán

The Southern Zoque region of western Chiapas and the Highland Mixe region are dialect chains, such that the number of dialects and varieties is unevenly reported. The division given above represents varieties that show significant differentiation as measured by degree of mutual intelligibility (Grimes, 2004).

Historically, the ancestors of the Mixe-Zoqueans were the Olmecs (Campbell and Kaufman, 1988). This once controversial assertion was proved in the 1990s with the decipherment of Epi-Olmec hieroglyphics by Terry Kaufman and John Justeson, who have shown incontrovertably that the language represented is Zoquean (Kaufman and Justeson, 2003).

Phonology

The most salient phonological patterns of the Mixe-Zoquean languages are best understood through the

phonological patterns of the protolanguage. Proto-Mixe-Zoquean had a six-vowel system, both long and short.

i	*ɨ*	*u*
e	*a*	*o*

The consonantism was

p	*t*	*ts*	*k*	*ʔ*
m	*n*			
	s			*h*
	(l)			
		j	*w*	

The basic shapes of proto-Mixe-Zoquean roots are:

CVC	**tik*	'house'
CVCC	**niːʔh*	'water'
CVCV	**niːwi*	'chile'
CVCCV	**tahpi*	'hawk'
CVCVC	**kiʔak*	'sandal'
CVCCVC	**pistik*	'flea'

The possible first consonants of these root internal clusters are very limited, *ʔ*, *h*, *s*, and nasals. There is one further pattern that exists only in verb roots. The (ʔ)C[sib] cluster allows only *p* and *k* as the medial consonant.

CV(ʔ)C[sib]-	**heps*-	'shovel'

The phonotactics of proto-Mixe-Zoquean words allow a full array of clusters as a result of morphemic combination.

There were four phonological patterns in Proto-Mixe-Zoquean that leave significant reflexes in the modern languages. The first pattern featured metathesis of glottal stop to the front of a consonant cluster in word internal construction. When that metathesis crossed an obstruent, the obstruent was voiced. This is still an active process in some Zoquean languages, as shown in (1), and has left frozen traces in Mixean as in (2).

(1) Sierra Popoluca (Zoque)

(a)	*ʔaʔniʃpa*		'I see him/her'
	ʔan	*-ʔiʃ*	*-pa*
	1ERG	**-see**	-INCOMP
(b)	*tigiʔjpa*		'he has a house'
	Ø	*-tik*	*-ʔiʔj*	*-pa*
	3ABS	-house	**-have**	-INCOMP

(2) Sayuleño (Mixe)

ˈtigɨjp		'he enters'	
Ø	*-ˈtik*	*-ʔij*	*-p*
3ABS	-house	**-VERBALIZER**	-INCOMP

In the second pattern in syllable coda obstruents were augmented with a preceding *h*. The reflexes of this pattern yield allomorphies of morphemes with and without coda *h*s in both Zoquean and Mixean languages, although in most languages the patterns are radically restructured. In a few languages, including Sierra Popoluca and Oluta, the pattern was leveled away.

(3) Francisco León Zoque

(a)	***petpa***		'he sweeps'
	Ø	***-peht***	*-pa*
	3ABS	-sweep	-INCOMP
(b)	***pehtu***		'he swept'
	Ø	***-peht***	*-u*
	3ABS	-sweep	-COMP

In Sayuleño (Mixe) the restructured pattern is one of *h* metathesis, as shown in (4).

(4) Sayuleño (Mixe)

niˈʔeʔhpɨp			'he sees himself'	
Ø	*-ni*	*-ˈʔeʔp*	***-hɨ***	*-p*
3ABS	-REFL	-see	**-MIDDLE**	-INCOMP

The third pattern affected a class of roots containing VːʔC. In construction with a consonant initial suffix the glottal was deleted. In construction with a vowel initial suffix the glottal was retained. This allmorphy has been leveled away in Zoquean.

(5) preconsonantal prevocalic/preglide

(a) Oluteco (Mixe)

ˈmimpa	'he comes'	***miʔn***	'come'	
Ø	***-ˈmiːʔn***	*-pa*	***ˈmiːʔn***	*-ɨ*
3ABS	-come	-INCOMP	come	-IMP

(b) Totontepec (Mixe)

diˈpɛːtp	'I sweep it'	
di	*-ˈpɛːʔt*	*-p*
3ERG	-sweep	-INCOMP
diˈpeʔ	'(that) I sweep it'	
di	*-ˈpɛːʔt*	*-I*
3ERG	-sweep	-INCOMP_DEP

The last pattern in the phonology of the protolanguage featured a limited height harmony in a few suffixes. The reflexes remain most clearly in the Zoquean languages.

(6) Copainalá Zoque

haʔn	*mini*		'he doesn't come'
haʔn	*j*	*-min*	***-i***
NEG	3ABS	-come	**-NEG.INCOMP**
haʔn	*mjone*		'he doesn't wrap it'
haʔn	*j*	*-mon*	***-i***
NEG	3ABS	-wrap	**-NEG.INCOMP**

Much of Mixean has lost unstressed vowels. One effect is that vowels were lost from final syllables. One of the key phonological developments related to this vowel loss is that the Highland Mixe languages developed an umlaut that expanded the vowel systems in some dialects to three-height nine vowel systems with higher vowels triggered by suffixes that had high vowels.

(7) Totontepec Mixe
(a) normal
ʃɛhp 'I breathe' (< **ʔiˈʃehpa*)
Ø *-ʃɛh* *-p*
1ABS-breathe-INCOMP
raised
nʒeh '(that) I breathe' (< **ʔinˈʃehi*)
n *-ʃɛh* *-I*
1ABS_DEP-breathe-INCOMP_DEP
(b) normal
tʊːmp 'I work' (< **ʔiˈtuːmpa*)
Ø *-ˈtʊːn* *-p*
1ABS-work-INCOMP
raised
ndun '(that) I work' (< **ʔinˈtuːni*)
n *-ˈtʊːn* *-I*
1ABS_DEP-work-INCOMP_DEP

Syllable coda *w*s in Zoquean are nasalized to *ŋ*. In all varieties the alternation is at least partially leveled leading to a marginal contrast.

(8) Copainalá Zoque
tsiŋba 'he bathes' *tsiŋu* 'he bathed'
Ø *-tsiŋ* *-pa* *Ø* *-tsiŋ* *-u*(*-u* < **wi*)
3ABS -bathe -INCOMP 3ABS -bathe -COMP
tsiwi 'bathe!'
tsiŋ *-i*
bathe -IMP
(cf. Say. *chiwjahpa* 'they bathe')

There are two other phonological developments in the Zoquean branch that are typologically notable. Most varieties of Zoque have lost vowels from initial person markers. The result is those that contain *i* historically synchronically contain *j*, which metathesizes to the onset final position. This metathesis generalizes to other *j*C clusters.

(9) Copainalá Zoque
mbjopjamih 'you (sg.) are running'
nj *-poj* *-pa* = *mih*
2ABS -run -INCOMP = 2

Finally, Texistepec has undergone a typologically unusual sound change, denasalizing root initial nasals in nonnasal environments, e.g., *bok* 'maize,' *dʲeːw* 'chile,' cf. Copainalá *mok*, *niwi*.

Morphology

The Mixe-Zoquean languages are agglutinative, as exempified in (10), and they show extensive compounding, as in (11).

(10) Sierra Popoluca (Zoque)
ʔitʲiʔŋ o ʔjkaʔa ʔjnepa 'he$_i$ is cutting with his$_j$ instrument'
ʔi *-tiŋ* *-ʔoʔj* *-kaʔ* *-ʔaʔj* *-ne* *-pa*
3ERG -cut -ANTI -INST -APPL -PROG -INCOMP

(11) Coatlán Mixe
tsahptihk 'church'
tsahp *-tihk*
sky -house

The family also shows widespread cliticization, for example, the person clitics in the Copainalá verb complex in (12a) and the stressed clitics of Sayuleño.

(12) (a) Copainalá Zoque
*mbjoju**mih*** 'you ran'
nj *-poj* *-u* = ***mih***
2ABS -run -COMP = **2ABS**
***nimih** mbjoju* 'you are running'
ni = ***mih*** *nj* *-poj* *-u*
PROG = **2ABS** 2ABS -run -DEP
(b) Sayuleño (Mixe)
ˌtikˈnaʔ 'the house'
ˈtik = *ˈnaʔ*
house = **DEF_(NON-FEM)**
ˌniʃˈpej 'he is going, too'
ˈniʃ *-p* = *ˈ**ej***
go -INCOMP = **also**

Mixe-Zoquean languages have two inflectional classes, nominal and verbal. Adjectivals are inflected like nominals.

Nominals inflect for number and possessor, and in southern Zoque, for case. The cases are absolutive and ergative/genitive.

(13) (a) number
ˈtihkat 'houses' Sayuleño (Mixe)
*ˈtik-**hat***
house-**PL**
(b) possessor
ŋguj 'my stick' Texistepec (Zoque)
n *-kuj*
1POSS -stick/tree
(c) case
pin 'man (*abs*)' Copainalá Zoque
*piʔ**nis*** 'man (*erg/poss*)'

Nominals also have derivational forms with adpositional meanings, many built on reflexes of the protomorpheme **-mi* 'locative.' There are more adpositionals in southern Zoque and fewer in Mixe.

(14) Francisco León Zoque
*kumguʔ**jomo*** 'in/to the town'
*kumkuj-**ʔomo***
town-**LOC**

Verbs inflect for aspect, subordination, and person and number of both subject and object.

The aspects are incompletive and completive with allomorphs registering subordination. Most languages also have forms for future. In Zoque, the subordinate forms are only used in auxiliary constructions.

(15) (a) Oluta (Mixe)

	independent	subordinate	
incompletive	*tiˈkajp*	*tinˈkaje*	'I am eating'
completive	*tiˈkaju*	*tinˈkaji*	'I ate'
future	*tiˌkaˈjam*	*tinˌkaˈjaʔn*	'I will eat'

(b) Copainalá Zoque

independent	subordinate
popjaʔih	*haʔnih mboje*

'I'm running'/ 'I'm not running'

pojuʔih	*hapjojaʔih*

'I ran'/ 'I didn't run'

maŋbaʔih poju	–

'I will run'

The persons are first, second, and third, with a contrast of inclusive and exclusive in the first person plural.

(16) Sierra Popoluca (Zoque)

	singular		dual
'I go'	*ʔanikpa*		
		'you and I go'	*tanikpa*
'you (sg.) go'	*miɲikpa*		
'he/she goes'	*nikpa*		
		plural	
	'we (ex.) go'	*ʔanik taʔmpa*	
	'we (in.) go'	*tanik taʔmpa*	
	'you (pl.) go'	*miɲik taʔmpa*	
	'they go'	*nikyahpa*	

Transitive verbs are marked inflected for both subject and object (or ergative and absolutive).

(17) Sierra Populca

	'… me'	'… you'	'… him'
'I love :'	–	*miɲtʲojpa*	*ʔantojpa*
'you love :'	*ʔantojpa*	–	*ʔiɲtʲojpa*
'he loves :'	*ʔatojpa*	*mitʲojpa*	*ʔitʲojpa*

In the Mixean branch there is inversive person marking, including some true inverse systems, as in Sayuleño. Such systems contain two distinct transitive forms for third person acts on third person, a direct form in which the subject is in focus and an inverse form in which the object is in focus. The Sayuleño system is based on a person hierarchy that ranks first person above second person above third person. The inverse marker in Sayuleño is *-ʃ-*, which has the third person allomorph *-gi-*.

(18) Sayuleño (Mixe)

	'… me'	'… you'	'… him'
' I hit …'	–	*tiˈmojp*	*tinˈmojp*
'you hit …'	*ʔiʃmojp*	–	*ʔinˈmojp*
'he hits …'	*tiʃmojp*	*ʔiʃmojp*	*ʔiˈmojp* (direct)/ *ʔigiˈmojp* (inverse)

As in some other Meso-American language families, there is a special class of verbs that are used to refer to the positions of people and objects. These are built on the reflexes of the derivational suffix **-nay-*. In most cases, the lexical roots found in this construction cannot be used in other combinations. The positions referred to are frequently semantically complex.

(19) Sayuleño (Mixe)

ˈwehnap	'he sits with his legs apart'	
ˈweh	*-naY*	*-p*
sit with legs apart	-POSITIONAL	-INCOMP

Syntax

The syntax of the Mixe-Zoquean family is typologically typical of Meso-American. Most of the languages are headmarking ergative, with VSO word order.

(20) Copainalá

jahkiʔmu		*jomoʔs*	*teʔ sapane*	
j - jah - kiʔm - u		*jomo -ʔs*	*teʔ sapane*	
3ERG - CAUS - go_up - COMP		woman-ERG	DEFbanana	
V		S	O	
paktihkohmo	*waʔy*	*kjiŋu*		
paktihk - ohmo	*waʔy*	*j - kiŋ - u*		
attic- LOC adv	that	3ABS - ripen - DEP		

'The woman took the bananas to the attic to ripen.'

The syntax of dependent verb forms differs between the two branches of the family. The Zoquean languages use the dependent inflections only in construction with auxiliaries. The Mixean languages have a wider variety of constructions triggering dependent inflection, for example, in clauses with fronted adverbials.

(21) Totontepec Mixe

yam	*ʔəts*	*mpəːʔkʃ*
ˈyam	*ˈʔəts*	***n***
here	1	**1ABS_DEP**

'I'm resting here.'

-ˈpəːʔkʃ	*-Ø*
-rest	**-INCOMP_DEP**

In auxiliary constructions, the auxiliary has third singular subject and bears the aspect. The lexical verb bears the subject person/number marking and incompletive dependent aspect.

(22) Sayuleño

kiʃp naʃˈkajga	
Ø -ˈkiʃ -p	***naʃ***
3ABS-finish-**INCOMP**	**1INCL_ERG_DEP**

'We (incl.) finished eating.'

*-ˈkaj-**ka**-**Ø***
-eat-**PL-INCOMP_DEP**

Object incorporation is widespread throughout the family.

Distinguishing the Branches

Phonological development distinguishes the two branches of the family. Zoquean underwent two

significant developments. First, the length contrasts were leveled.

(23)	Mixean		Zoquean		
	Sayuleño	Totontepec	Copainalá	Texistepec	
	moːhk	*mɔːhk*	*mok*	*bok*	'maize'
	tiːhts	*təːts*	*tits*	*tɨts*	'tooth'

The contrastive length in Gulf Zoquean is a secondary development. The first syllable of disyllabic roots is lengthened if it is underlyingly open, e.g., Sierra Popoluca *kaːma*, Copainalá *kama* 'cornfield,' proto-Mixe-Zoquean **kama*. Second, a class of proto-Mixe-Zoquean CVːʔC roots show glottal allomorphy in Mixe, which was leveled to CVC roots in Zoquean.

(24)	Mixean		Zoquean	
	Sayuleño	Coatlán	Copainalá	Sierra Popoluca
	ʔuːkp	*ʔʊːkp*	*ʔukpa*	*ʔukpa* 'he drinks'
	ʔuʔk	*ʔuʔuk*	*ʔukɨ*	*ʔuːkiʔ* 'drink *imp*'

There are a few regular morphological features that distinguish Mixean from Zoque, for example, the future. Throughout the Mixean branch, the future is formed on the reflexes of a verbal compound with the stem *waːʔn*-'want'. In Gulf Zoque the future is one of the meanings of the incompletive forms (*-pa*). In Southern Zoque, futures are auxiliary constructions.

(25)	Mixean		Zoquean	
	Sayuleño	Coatlán	Copainalá	Sierra Popoluca
	ˌʔuʔˈkam	*ˈʔʊʔʊkʊp*	***maŋ***	***baʔuhku*** 'hewilldrink' *ʔukpa*

A number of common words or usages also distinguish the two branches.

(26)	Mixean		Zoquean		
	Sayuleño	Coatlán	Copainalá	Sierra	Popoluca
	ʃɨhw	*ʃɨː*	*hama*	*haːma*	'sun, day'
	ʔɨˈwamp	*jwaːmb*	*ʃumpa*	*ʔɨʃumpa*	'he wantsit'
	ˈtoʔʃaj	*ˈtoʔʃjhaɾj*	*jomo*	*joːmo*	'woman'

See also: Mesoamerica: Scripts; Mexico: Language Situation.

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Mobilian Jargon

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Mobilian Jargon or the Chickasaw-Choctaw trade language was a Muskogean-based pidgin of the lower Mississippi River valley, typologically comparable (although unrelated) to Chinook Jargon of northwestern North America. Not to be confused with Mobilian proper of southern Alabama, whose genetic classification has remained in doubt until today, Mobilian *Jargon* (MJ) was a structurally and functionally reduced contact medium that drew principally on Muskogean as its source languages. MJ displayed a characteristic Muskogean phonology,

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Miwokan *See:* Hokan Languages.

Mixed Categories

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Background

The notion 'part of speech' has been a central feature of the Western linguistic tradition from the beginning. The classical grammatical tradition, rooted in Aristotle (384–322 B.C.) and the grammars of Dionysius Thrax (c. 170–c. 90 B.C.) and Aelius Donatus (fl. 353 A.D.), left us with eight parts of speech: the verb, the noun, the pronoun, the adjective, the adverb, the preposition, the conjunction, and the interjection.

This traditional view has been carried over to modern generative grammar, in which it is assumed that there is a small number of primitive, probably universal, probably innate grammatical categories (Chomsky, 1965: 65):

> The question of substantive representation in the case of the grammatical formatives and the category symbols is, in effect, the traditional question of universal grammar. I shall assume that these elements too are selected from a fixed, universal vocabulary, although this assumption will actually have no significant effect on any of the descriptive material to be presented.

This marks a break from earlier American structuralist methods, in which the problems with naively applying the traditional part of speech distinctions to typologically diverse languages were well known. Whorf (1945: 1) warned that "the very natural tendency to use terms derived from traditional grammar,

like verb, noun, adjective, passive voice, in describing languages outside of Indo-European is fraught with grave possibilities of misunderstanding." Sapir (1921: 118) clearly rejects the notion of parts of speech as syntactic primitives:

> A part of speech outside of the limitations of syntactic form is but a will o' the wisp. For this reason, no logical scheme of the parts of speech – their number, nature, and necessary confines – is of the slightest interest to the linguist.

More moderately, Bloomfield (1933: 196) warned against what he saw as the practice of traditional grammarians:

> The term *parts of speech* is traditionally applied to the most inclusive and fundamental word-classes of a language, and then . . . the syntactic form classes are described in terms of the parts of speech that appear in them. However, it is impossible to set up a fully consistent set of parts of speech, because the word-classes overlap and cross each other.

Bloomfield here was not arguing against a set of either universal or language particular parts of speech but against the very idea of parts of speech as anything but vague generalizations across overlapping word classes.

Gerunds

For the most part, the structuralists' concerns have not played a major role in the development of generative grammar because the notion of lexical category is central to grammatical theory. Since the advent of generative grammar, linguists have made considerable progress in the understanding of language and, not surprisingly, the traditional inventory of parts of speech has proven to be sufficient for the analysis of most constructions in English and for a broad range of other languages. However, there is a class of constructions, known as transcategorial or simply mixed category constructions, that do not fit well with any refinement of the four basic categories. These constructions involve lexical items that seem to be core members of more than one category simultaneously. A well-known example is the English verbal gerund, which combines with both a direct object (like a verb does) and a genitive possessor (like a noun does).

English has a wide range of nominalization constructions, a few of which are demonstrated in (1):

(1a) the DA was shocked **that Pat illegally destroyed the evidence**
(1b) the DA was shocked by **Pat having illegally destroyed the evidence**
(1c) the DA was shocked by **Pat's having illegally destroyed the evidence**
(1d) the DA was shocked by **Pat's illegal destroying of the evidence**
(1e) the DA was shocked by **Pat's illegal destruction of the evidence**

As these examples show, the uses of words roughly fall along an apparent continuum that ranges from fully nounlike uses to fully verblike uses. The examples in (1b–c), the verbal gerunds, are intermediate cases that do not have all the characteristics of either nouns or verbs but seem to fall somewhere in between these two categories. These constructions simultaneously show some of the properties of noun phrases and some of the properties of verb phrases. Thus, they pose a potential problem for the tradition conception of parts of speech.

Verbal Gerunds as Nouns

The strongest evidence for the nominal nature of verbal gerunds comes from the external distribution of verbal gerund phrases (VGPs). Like NPs, VGPs can appear as direct arguments of finite verbs:

(2a) Pat('s) getting arrested alarmed Chris
(2b) Chris witnessed Pat('s) getting arrested

Although many phrase type can occur as a complement, VGPs appear in contexts in which otherwise only NPs can occur. For example, complement clauses, unlike NPs, are generally prohibited from occurring sentence internally:

(3a) *I believe that Pat took a leave of absence bothers you.
(3b) *Why does that Pat took a leave of absence bother you?
(3c) *It's that Pat took a leave of absence that bothers you.

However, VGPs are subject to no such constraint:

(4a) I believe that Pat('s) taking a leave of absence bothers you.
(4b) Why does Pat('s) taking a leave of absence bother you?
(4c) It's Pat('s) taking a leave of absence that bothers you.

Similarly, VGPs can occur as the object of a preposition, a context clauses are normally barred from:

(5a) Pat is concerned about Sandy('s) getting arrested.
(5b) *Pat is concerned about (that) Sandy got arrested.

On the other hand, there are contexts that admit verbal gerunds but not regular NPs:

(6a) There's no use (you/your) telling him anything.

(6b) Your idea is worth (him/his) giving further thought to.

These constructions that require a verbal gerund provide evidence that verbal gerunds form a subcategory of noun distinct from common nouns.

Verbal Gerunds as Verbs

Although the external syntax of verbal gerunds is much like that of NPs, their internal structure is more like that of VPs. In particular, VGPs have roughly the same internal syntax as a nonfinite VP headed by the same verb. For one, verbal gerunds take adverbial modifiers. In contrast, true nouns take adjectival modifiers:

(7a) Pat didn't expect me to *quiet/quietly leave before anyone noticed.
(7b) Pat disapproved of (me/my) *quiet/quietly leaving before anyone noticed.
(7c) Pat disapproved of my quiet/*quietly departure.

Similarly, verbal gerunds can be negated with the particle *not,* but *not* cannot in general be used to negate a noun:

(8a) It's unusual for Pat not to have bathed for a week.
(8b) Pat's not having bathed for a week disturbed the other diners.
(8c) *The not processing of the election results created a scandal.

Also, verbal gerunds take accusative NP complements, whereas the nominal gerund in (9c) can only take a PP complement:

(9a) Pat diligently calls the roll each day.
(9b) (Pat's/Pat) diligently calling (*of) the roll started each day.
(9c) The diligent calling *(of) the roll started each day.

Furthermore, the verbal gerund, unlike the nominal gerund, has the same selectional properties as the corresponding main verb:

(10a) Chris casually put the roast in the oven.
(10b) Chris's/Chris casually putting the roast in the oven appalled the visiting vegetarians.
(10c) Chris's casual putting of the roast in the oven appalled the visiting vegetarians.

This extends even to derived subcategorization frames, such as the passive or the resultative:

(11a) Pat was helped by Sandy.
(11b) Pat's being helped by Sandy made all the difference.
(11c) Lee hammered the sheet flat.
(11d) Lee's hammering the sheet flat made a terrible noise.

Types of Verbal Gerunds

To summarize, VGPs have four basic properties that need to be accounted for:

1. A verbal gerund takes the same complements as the verb from which it is derived.
2. Verbal gerunds are modified by adverbs and not by adjectives.
3. The entire VGP has the external distribution of an NP.
4. The subject of the gerund is optional and, if present, can be either a genitive or an accusative NP.

Properties 1–4 are shared by accusative subject (ACC-*ing*), genitive subject (POSS-*ing*), and subjectless (PRO-*ing*) verbal gerund phrases and are not shared by any other English constructions. The three types of verbal gerunds seem to be subtypes of a single common construction type, and any analysis of verbal gerunds ought to be able to account for their similarities in a systematic way.

It is important to note, however, that there are differences among the three types that also must be accounted for. The most obvious difference is the case of the subject. In this and a number of other respects, POSS-*ing* phrases are more like NPs, whereas ACC-*ing* phrases are more like Ss (Reuland, 1983; Abney, 1987; Malouf, 2000). For example, as Abney (1987) observed, POSS-*ing* but not ACC-*ing* VGPs with *wh* subjects can front under 'pied piping' in restrictive relative clauses:

(12a) The person whose being late every day Pat didn't like got promoted anyway.
(12b) *The person who(m) being late every day Pat didn't like got promoted anyway.

The same contrast can be seen between genuine NPs and Ss:

(13a) The person whose chronic lateness Pat didn't like got promoted anyway.
(13b) *The person (for) who(m) to be late every day Pat didn't like got promoted anyway.

What these examples show is that although all VGPs show a mixed of nominal and verbal properties, some are slightly more verbal, whereas others are slightly more nominal.

Theoretical Approaches

Any grammatical theory that places any importance on parts of speech must account for the basic properties of verbal gerunds (Table 1).

The earliest generative analyses of English verbal gerunds took a brute-force approach to accounting

Table 1 Properties of verbs, verbal gerunds, and nouns

Verb	*Verbal gerund*	*Noun*
Govern NP complements	Govern NPs	Don't govern NPs
Adverbs	Adverbs	Adjectives
Subjects	Subjects/ specifiers	Specifiers
Occur with _Not_	Occur with _Not_	Don't occur with _Not_
S distribution	NP distribution	NP distribution

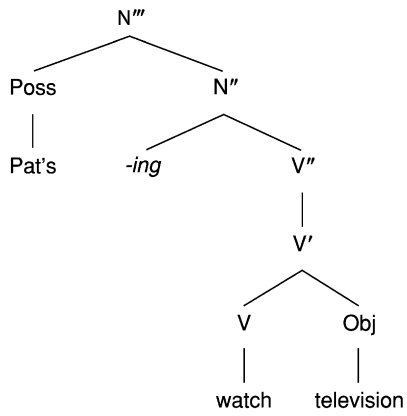

Figure 1 Structure from which POSS-*ing* gerund is derived.

for these facts and treated them as exocentric constructions. To take one example, Jackendoff (1977) proposed the exceptional rule schema in (14a) for nominalizations, in which (14b) is an instantiation of for POSS-*ing* gerunds:

(14a) $X^i \rightarrow \text{Aff } V^i$
(14b) $N'' \rightarrow$ *-ing* V''

A POSS-*ing* gerund such as *Pat's watching television* would be derived from a structure like that in Figure 1. The affix *-ing* then lowers onto the verb via some variation of Affix Hopping. Although this analysis captures some of the basic facts of the gerund construction, it misses an number of important generalizations. By treating the verbal gerund as an exocentric construction, it fails to account for its mixed verbal and nominal character.

Phrasal Nominalization Approaches

In an effort to assimilate the syntax of verbal gerunds to the general properties of nominal and verbal projections in English, Abney (1987) proposed an analysis of English gerunds based on affixation of the abstract nominalizing morpheme *ING* to the *-ing* form of a verb. Abney assumed that categories are marked for three features: ±N, which distinguishes nouns from verbs; a feature ±F, which

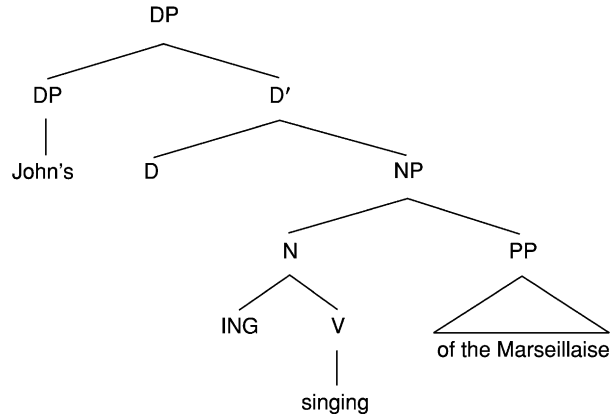

Figure 2 *ING* combining with a lexical verb to produce an N.

distinguishes lexical from functional categories; and a multivalued feature for bar level. The properties of English gerunds then follow from the assumption that *ING* bears the feature specification [+N] but is unmarked for F and bar level. When *ING* combines with a lexical verb, it inherits the verb's values for F and bar level, producing an N (Figure 2). This means that nominal gerunds will have all the syntactic properties of underived common nouns.

When *ING* affixes to a higher verbal projection, the result is a verbal gerund, either POSS-*ing* or ACC *-ing* (Figure 3). Abney correlated the degree of nominalization with the scope of the nominal affix *ING*: The higher the attachment of *ING*, the more verbal properties the phrase will have. In Figure 3A, *ING* combines with the VP *singing the Marseillaise*. VP is a nonfunctional maximal projection; VP plus *ING* is a nonfunctional maximal nominal projection, also known as an NP. Because the subject is outside the nominalized part of the VGP, it takes genitive case. In Figure 3B, *ING* combines with the entire IP *John singing the Marseille*. IP is a functional maximal projection, so IP plus *ING* is a functional maximal nominal projection, or a DP.

Abney's analysis relies on *ING*, an abstract, phonologically null nominalizing clitic. Developing this intuition further, Kaiser (1999) took an explicitly morphological approach to the problem. Kaiser's analysis is framed in Anderson's (1992) theory of A-morphous Morphology, in which derivational and inflectional morphology is handled via Word Formation Rules (WFRs) that map one lexical form onto another. As the phrasal equivalent of word-level morphology, phrasal clitics are analyzed using a similar device, the Clitic Placement Rule (CPR). Most of the clitics that Anderson discussed are inflectional, but if clitics reflect phrase-level morphology, then we would expect to find derivational clitics as well.

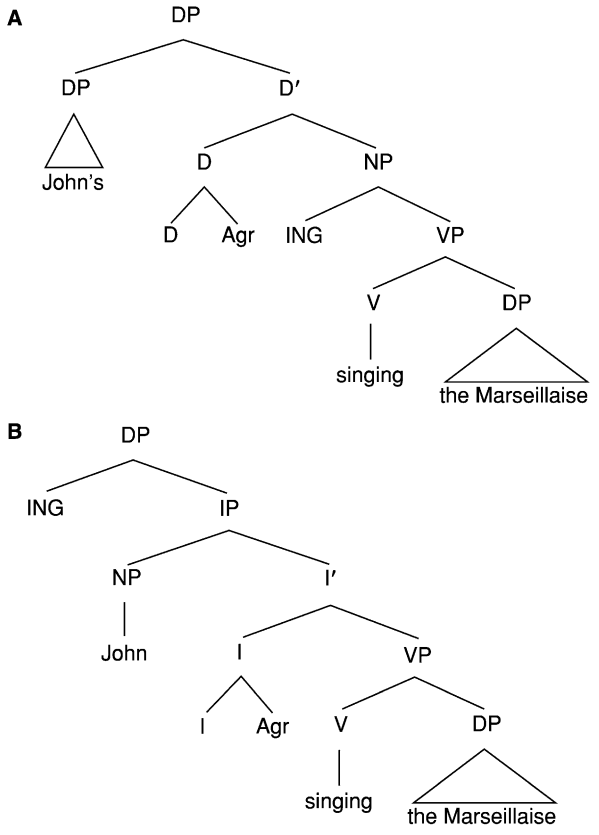

Figure 3 *ING* affixing to a higher verbal projection to produce a verbal gerund, either (A) POSS-*ing* or (B) ACC-*ing*.

Taking this as a point of departure, Kaiser (1999) proposed the derivational clitic placement rule for English POSS-*ing* gerunds in Table 2. This rule places the clitic-*ing* on the head of a verb phrase and changes the category of that verb phrase to NP.

Table 2 Derivational clitic placement rule

CPR	[. . . [. . .]v^0 . . .] VP → [. . . [. . . *ing*]v^0 . . .]NP
Phonology	The clitic -*ing* is realized rightmost within the domain [. . .]v^0
Syntax	VP is directly converted into NP

Source: Kaiser (1999).

Mixed Projection Approaches

In English, the putative nominalizing clitic is phonologically null. However, in some languages with overt nominalization morphology, the relevent suffix can be shown to be lexical and not phrasal. For example, Quechua has a number of nominalization constructions, one of which, exemplified in (15) (Lefebvre and Muysken, 1988: 16, 15), is comparable to the English POSS-*ing* gerund.

(15a) Manuil Pidru-man libru-ta qu-n
Manuel Pedro-DAT book-ACC give-3
'Manuel gives Pedro the book'

(15b) Manuil-pa Pidru-man libru-ta
Manuel-GEN Pedro-DAT book-ACC
qu-sqa-n-ta yacha-ni
give-NMLZ-3-ACC know-1
'I know that Manuel gives the book to Pedro'

The subject of the nominalized verb is marked like the possessor in an NP, and the complements of the nominalized verb are marked just like the complements of the equivalent finite verb would be. Unlike the English POSS-*ing* gerund, this construction has an overt morphological marker, the nominalizing affix -*sqa*-.

This nominalizing affix -*sqa*- is a good candidate for being an overt analog to the covert English nominalizer *ING*. However, Lefebvre and Muysken (1988: 82) gave numerous arguments that -*sqa*- and the other Quechua nominalizers must be treated as lexical affixes and not as phrasal clitics. For one, if -*sqa*- is a clitic then the agreement and case markers that follow it must also be clitics (Zwicky and Pullum, 1983). But, Lefebvre and Muysken showed that, in contrast to the genitive clitic -*qpa*, the accusative marker -*ta* must be an affix.

In order to account for the lexical nature of nominalizing morphology in some languages, as well as to preserve lexical integrity for English gerunds, Pullum (1991) proposed an analysis of verbal gerunds that exploits the flexibility of the Generalized Phrase Structure Grammar (Gazdar *et al.*, 1985) Head Feature Convention (HFC) to allow V to project NP under certain circumstances. Pullum (1991) started with the following rule for ordinary possessed NPs:

(16) N[BAR:2] → N[BAR:2, POSS:+], H[BAR:1]

The head of the phrase is specified only for the feature BAR. The HFC is a default condition that requires that the mother and the head match on all features, as long as they do not conflict; for instance, for the rule in (16) this ensures that the head will match the mother in its major category and that the phrase will be headed by an N. Given these assumptions, Pullum observed that POSS-*ing* VGPs may be accounted for by a slightly modified version of the previous rule:

(17) N[BAR:2] → (N[BAR:2, POSS:+])
H[VFORM:prp]

This rule differs from the rule in (16) only in the feature specification on the head daughter: In (17), the head daughter is required to be [VFORM:prp]. An independently motivated constraint that requires that any phrase with a VFORM value must be verbal overrides the HFC, so the rule in (17) will only admit phrases with -*ing* form verb heads. However, the

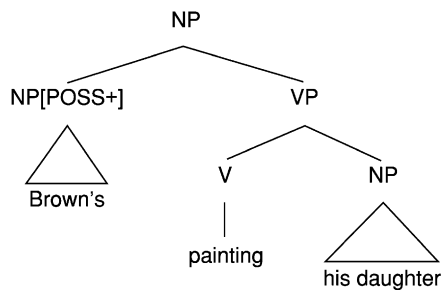

Figure 4 Verbal gerund structure, application of rule (17).

left-hand side of the rule is the same as the left-hand side in (16), so (17) gives verbal gerunds the structure in Figure 4. This reflects the traditional description of VGPs as 'verbal inside, nominal outside' quite literally by giving verbal gerund phrases a VP node dominated by an NP node.

However, as Lapointe (1993) observed, there are at least three problems with Pullum's analysis. The first problem is that it leaves very little content to the notion of a phrasal 'head,' yielding rules that are very similar to those proposed under the headless gerund analyses such as Jackendoff's. Another problem is that it has no way of representing that some types of mixed category constructions are much more common than others. Nothing in it prohibits outlandish and presumably nonattested rules such as:

(18a) VP → H[NFORM:plur], PP
(18b) N′ → (QP), H^0 [VFORM:psp]

And, nothing in it explains why constructions parallel to the English POSS-*ing* verbal gerund are found in language after language.

To avoid these shortcomings, Lapointe (1993) (and similar analyses proposed by Wescoat, 1994); Bresnan, 1997 offered a more conservative modification to the standard notion of endocentricity. He proposed introducing dual lexical categories such as <N|V>, a V that projects a VP dominated by an NP. This approach avoids some of the problems associated with default projection by restricting the conditions under which 'changeover' from nominal to verbal projection can occur.

Mixed Category Approaches

The analyses described in the previous section account for the hybrid properties of mixed category constructions by positing mixed nominal and verbal syntactic projections. In contrast, the approach taken by Malouf (2000), along with the similar proposals by Francis (1999) and Hudson (2003), offered a strictly lexical account of verbal gerund's mixed behavior. It did this by factoring syntactic properties into separate categorial, selectional, and

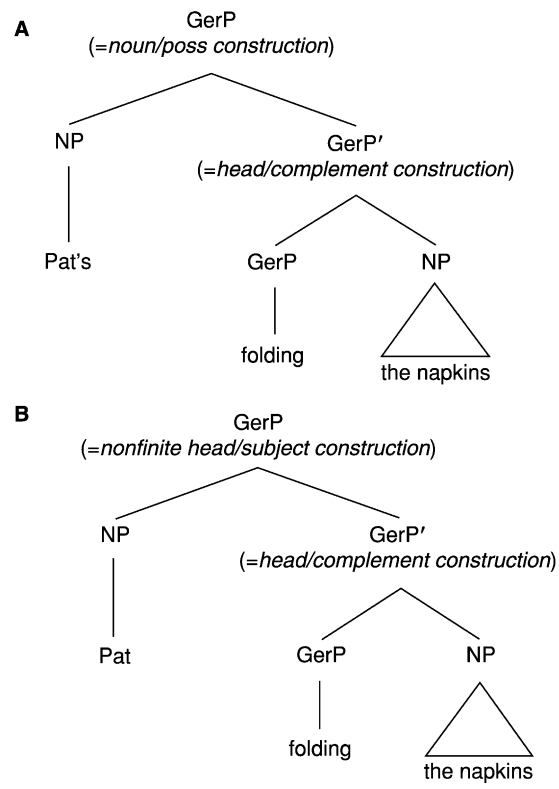

Figure 5 Malouf's (2000) structures for (A) POSS-*ing* and (B) ACC-*ing* verbal gerunds.

constructional dimensions. Categorial information, projected from the lexical head following the conventions of standard X′ theory (Chomsky, 1970), determines the external distribution of a phrase. A lexical head's selectional features, on the other hand, determine what kinds of other phrases can occur in construction with that head. Finally, constraints on particular constructions control the combination of syntactic units. Within each of these three domains, VGPs show fairly consistent behavior. What is unusual about verbal gerunds is that their lexical entries combine of nounlike categorial properties with verblike selectional properties. Given this, their distribution is fully predicted by the language's inventory of syntactic constructions.

Under Malouf's (2000) account, POSS-*ing* and ACC-*ing* verbal gerunds are assigned the structures in Figure 5. The gerund *folding* selects for a subject and a direct object, like a verb does, and it combines with its dependents via the same constructions by which a verb combines with its dependents. In one sense, under this analysis a verbal gerund together with its complements really is like VP, in that both are instances of the same construction type and both are subject to any constraints associated with that construction. In the same way, a verbal gerund plus an accusative subject really do form an S, whereas a

verbal gerund plus a genitive subject really do form an NP. This reflects the traditional view that verbal gerund phrases are built out of pieces of syntax 'reused' from other parts of the grammar. However, verbal gerunds project the categorial type Gerund, a subtype of noun. This means that the entire VGP has the external distribution of an NP.

Although Malouf (2000) formalized this approach to mixed categories using Head-Driven Phrase Structure Grammar, it is in its general outlines more in the spirit of a functionalist notion of grammatical categories. In contrast to the strictly extensional, discrete view of categories in generative grammar, functional and cognitive approaches to language have developed theories of prototype categories (e.g., Lakoff, 1987; Langacker, 1987; Croft, 1991). Quite unlike generative grammar's parts of speech, prototype categories allow gradient membership and have indistinct boundaries. Instead of sorting linguistic units into larger or smaller discrete uniform classes, functionally oriented linguists explore the variation within heterogeneous classes.

Croft (1991: 6) framed the difference between the two views of categories as a difference in the interpretation of morphosyntactic tests, "grammatical construction[s], one or more features of which define or require a specific type of linguistic unit to satisfy it or fill it." For example, in English only nouns can be pluralized through the addition of the suffix *-s*. Thus, the plural suffix can be used as a test for nounhood. We might take the occurrence with the definite article *the* as another test for nounhood in English.

Ideally, all morphosyntactic tests for a particular linguistic unit in all languages will give the same result, but this is rarely the case. Croft argued that formal and functional approaches to linguistics diverge in their reconciliation of the ideal behavior of syntactic tests with their actual behavior. Generative grammarians take certain tests to be criterial while dismissing other conflicting tests as peripheral or unreliable. This preserves the ideal view of categories as universal and discrete domains at the cost of "cut[ting] the link between the tests (i.e., features of grammatical constructions) and their domain of application (i.e., the class of linguistic units that those features admit)" (Croft, 1991: 15).

Syntactic Variation

If categories are defined in terms of their properties, rather than the other way around, then mixed category constructions pose no problem. Under this view, parts of speech as such play no role in the grammar. Instead, grammatical processes are sensitive to a number of independently varying types of information. Far from being an anomaly, some degree of categorial mixing is to be expected. In fact, we would be surprised not to find a wide variety of ways in which categorial properties can combine. However, looking at the range of variation among mixed category constructions, both within English and cross-linguistically, shows that not all possible combinations of properties are actually attested.

Table 3 Pattern of properties of nominalizations

	Finite verb	*Direct case subject*	*Adverb modifier*	*Direct case object*	*Verbal form*
a.	+	+	+	+	+
b.		+	+	+	+
c.			+	+	+
d.					+
e.					

We began the section on gerunds by considering a number of English nominalization constructions, exemplified in (1). We can differentiate these nominalization types on the basis of five properties: whether they include a finite verb, whether they take a direct case (i.e., nominative or accusative) subject, whether they allow an adverbial modifier, whether they take a direct case object, and whether they include a regularly inflected verb form. When we arrange the results, a clear pattern emerges (Table 3). Nominal and verbal properties are not arbitrarily mixed in these constructions. Rather, they can be arranged into the implicational hierarchy.

Croft (1991), drawing on Comrie (1976) and his own survey of the properties of syntactic categories in diverse languages, observed that a similar pattern comes up in other languages with several nominalization types. On this basis, he proposed a universal hierarchy:

(19) Deverbalization Hierarchy (Croft, 1991, 83)

If a verbal form inflects for tense-aspect-modality like a predicated verb, then it will take subject and object dependents like a predicated verb. If a verbal form takes a subject dependent like a predicated verb, then it will take an object dependent like a predicated verb

This generalization is confirmed by Koptjevskaja-Tamm's (1993) much more extensive and systematic cross-linguistic survey of nominalization types. Interestingly, the cross-linguistic data do not support including the choice between adverbial and adjectival modification in the hierarchy.

Although they are generally motivated on language internal grounds, analyses that involve a changeover in projection from V to N have an obvious connection to the Deverbalization Hierarchy. Lapointe (1993), Borsley and Kornfilt (2000), and Bresnan (1997)

made this link explicitly, pointing out that the attested nominalization types correspond to different levels of phrasal nominalization. Consider the structures in Figure 6. In each case, the fully nominal part of the phrase is limited to the contiguous region within the dotted line. Outside the dotted line, the phrase is fully verbal. Malouf (2000) called this explanation the Phrasal Coherence Hypothesis: the Deverbalization Hierarchy follows from the fact that in a mixed projection there must be a single point of articulation dividing the nominal part of the phrase from the verbal part. A nominalization that, say, combines with its subject like a verb does but with its complements like a noun does would have the structure as in Figure 7. In such a case, the nominal part of the phrase would be split into two regions by an intervening verbal projection, violating the Deverbalization Hierarchy.

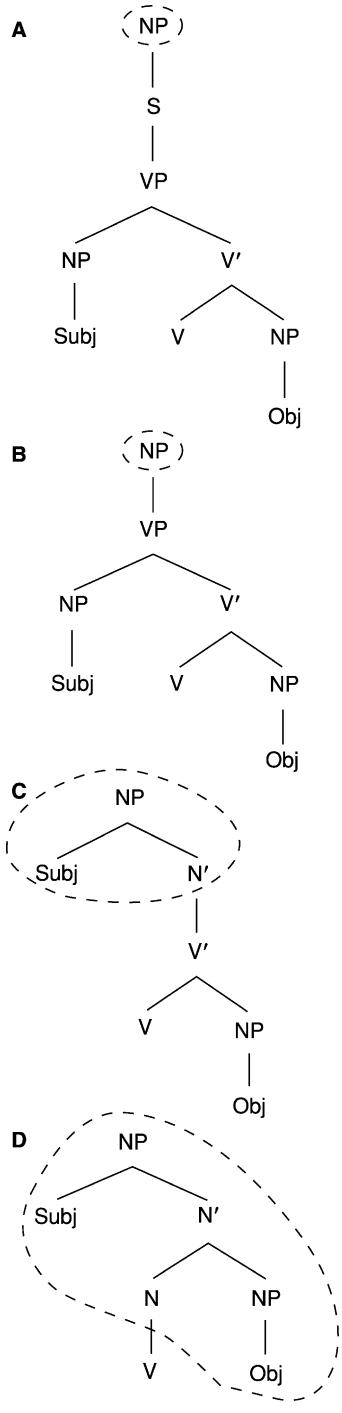

Figure 6 In each structure, the fully nominal part of the phrase is limited to the contiguous region within the dotted line; outside the dotted line, the phrase is fully verbal.

Although the Phrasal Coherence Hypothesis explains the distribution of verbal gerunds in many languages, in some respects it appears to be too strong. Among other things, it predicts that all words associated with the nominal part of the phrases should appear outside those associated with the verbal part of the phrase. And, indeed, in many languages (including English) this prediction is borne out. When we look at verb-initial languages, however, this is not always the case.

One such language is Standard Arabic. Arabic has fairly strict noun-possessor order within noun phrases (Fassi Fehri, 1993: 223):

(20a) zur-tu ʔumm-a r-rajul-i
visited-I mother-ACC the-man-GEN
'I visited the man's mother'

(20b) *zur-tu r-rajul-i ʔumm-a
visited-I the-man-GEN mother-ACC

Any additional nominal modifiers or complements come after the possessor (Fassi Fehri, 1993: 218):

(21a) daxtal-tu daar-a r-rajul-i
entered-I house-ACC the-man-GEN
l-waasi^{c}at-a
the-large-ACC
'I entered the large house of the man'

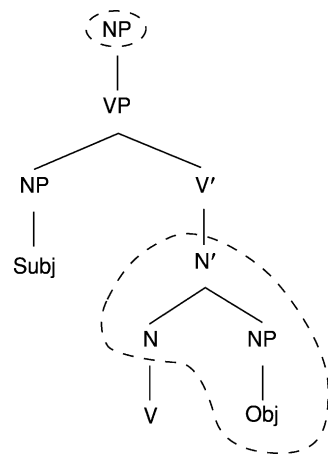

Figure 7 Structure of a nominalization that combined with its subject like a verb does but with its complements like a noun does.

(21b) daxtal-tu daar-a r-rajul-i
entered-I house-ACC the-man-GEN
l-latii ḥtaraq-at
the-that-FEM burned-3.FEM.SING
'I entered the man's house that burned'

And this same NSO order is found in the *maṣdar* construction, comparable to the English POSS-*ing* verbal gerund (Fassi Fehri, 1993: 223):

(22a) ʔaqlaqa-nii ntiqaad-u zayd-in ᶜamr-an
annoyed-me criticizing-NOM Zayd-GEN Amr-ACC
'Zayd's criticizing Amr annoyed me'
(22b) *ʔaqlaqa-nii ntiqaad-u ᶜamr-an zayd-in
annoyed-me criticizing-NOM Amr-ACC Zayd-GEN
(22c) *ʔaqlaqa-nii ᶜamr-an ntiqaad-u zayd-in
annoyed-me Amr-ACC criticizing-NOM Zayd-GEN

This construction is the same as its English counterpart in many respects. The *maṣdar* combines with a possessor like a noun does and with a complement like a verb does, and the entire phrase has the distribution of an NP. However, unlike the English construction, the verbal part of the phrase is not strictly inside the nominal part.

This problem is especially striking when we look at modification. *Maṣdars*, like POSS-*ing* verbal gerunds, take adverbial modifiers. In Arabic, modifiers appear after the genitive subject (Fassi Fehri, 1993: 240):

(23) ʔaqlaqa-nii ntiqaad-u r-rajul-i
annoyed-me criticizing-NOM the-man-GEN
bi-stimraar-in haadaa l-mašruuᶜ-i
with-persistence-GEN this the-project-ACC
'the man's persistent criticizing of the project annoyed me'

According to a projection changeover analysis, gerunds take adverbial modifiers because they contain a partial verbal projection. This means there must be a verbal projection between the lowest nominal projection (which gives the phrase its nominal specifier) and the highest (which gives the phrase its NP distribution) (see Figure 8). However, that is exactly the structure that is ruled out by the Phrasal Coherence Hypothesis: the nominal part of the phrase is divided into two discontinuous regions.

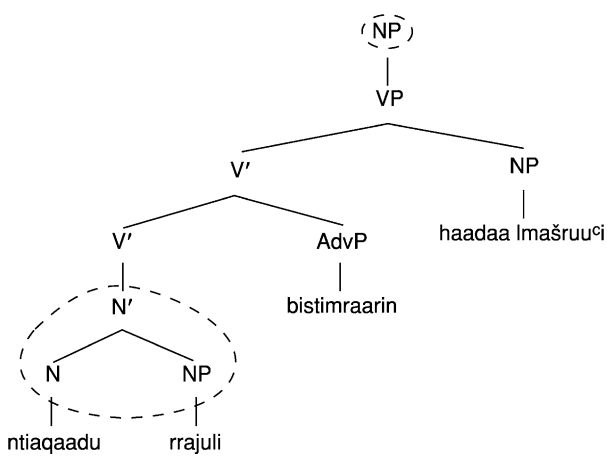

Figure 8 Verbal projection between the lowest nominal projection (which gives the phrase its nominal specifier) and the highest (which gives the phrase its NP distribution).

Standard Arabic *maṣdars* can be given an analysis that is compatible with the Phrasal Coherence Hypothesis, if we assume that they have an underlying English-like SVO structure. Alternatively, Malouf (2000) proposed a Lexical Coherence Hypothesis, which constrains the way categorial and selection properties can combine in a single lexical entry. Under this view, *maṣdars* and gerunds have comparable lexical representations, combining the categorial features of a noun with the selectional features of a verb. The surface differences between the constructions follow from independently motivated differences in the construction inventories of the two languages.

Conclusion

Mixed category constructions such as the English verbal gerund show properties of both nominal and verbal constructions. Other mixed categories include some deverbal nouns (which are also simultaneously nominal and verbal) and participles (which are also adjectival and verbal). Any theory of parts of speech must be able to account for these apparent chimeras in a natural way.

See also: Noun Phrases; Nouns; Verbs; X-Bar Theory.

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Mixe-Zoquean Languages

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The Mixe-Zoquean languages are found in southern Mexico in the area of the Isthmus of Tehuantepec. The family is divided into two branches, Mixe languages in the Oaxacan highlands and the Zoquean languages, which are found on the Gulf of Mexico and in western Chiapas. The languages are:

- Zoquean
  - Gulf Zoque
    - Sierra Popoluca
    - Texistepec
    - Ayapa Zoque (Tabasco Zoque)
  - Southern Zoque
    - Chimalapa
    - Copainalá
    - Francisco León
    - Zoque de Rayón
- Mixean
  - Veracruz Mixe
    - Oluteco (Oluta Popoluca)
    - Sayuleño (Sayula Popoluca)
  - Highland Mixe
  - Western Mixe
    - Totontepec
    - Tlahuitoltepec
  - Eastern Mixe
    - Coatlán
    - Isthmus
    - Quetzaltepec
    - Juquila
    - Mazatlán

The Southern Zoque region of western Chiapas and the Highland Mixe region are dialect chains, such that the number of dialects and varieties is unevenly reported. The division given above represents varieties that show significant differentiation as measured by degree of mutual intelligibility (Grimes, 2004).

Historically, the ancestors of the Mixe-Zoqueans were the Olmecs (Campbell and Kaufman, 1988). This once controversial assertion was proved in the 1990s with the decipherment of Epi-Olmec hieroglyphics by Terry Kaufman and John Justeson, who have shown incontrovertably that the language represented is Zoquean (Kaufman and Justeson, 2003).

Phonology

The most salient phonological patterns of the Mixe-Zoquean languages are best understood through the

significant developments. First, the length contrasts were leveled.

(23)	Mixean		Zoquean		
	Sayuleño	Totontepec	Copainalá	Texistepec	
	moːhk	*mɔːhk*	*mok*	*bok*	'maize'
	tiːhts	*təːts*	*tits*	*tɨts*	'tooth'

The contrastive length in Gulf Zoquean is a secondary development. The first syllable of disyllabic roots is lengthened if it is underlyingly open, e.g., Sierra Popoluca *kaːma*, Copainalá *kama* 'cornfield,' proto-Mixe-Zoquean **kama*. Second, a class of proto-Mixe-Zoquean CVːʔC roots show glottal allomorphy in Mixe, which was leveled to CVC roots in Zoquean.

(24)	Mixean		Zoquean	
	Sayuleño	Coatlán	Copainalá	Sierra Popoluca
	ʔuːkp	*ʔʊːkp*	*ʔukpa*	*ʔukpa* 'he drinks'
	ʔuʔk	*ʔuʔuk*	*ʔukɨ*	*ʔuːkiʔ* 'drink *imp*'

There are a few regular morphological features that distinguish Mixean from Zoque, for example, the future. Throughout the Mixean branch, the future is formed on the reflexes of a verbal compound with the stem *waːʔn*-'want'. In Gulf Zoque the future is one of the meanings of the incompletive forms (*-pa*). In Southern Zoque, futures are auxiliary constructions.

(25)	Mixean		Zoquean	
	Sayuleño	Coatlán	Copainalá	Sierra Popoluca
	ˌʔuʔˈkam	*ˈʔʊʔʊkʊp*	***maŋ***	***baʔuhku*** 'hewilldrink' *ʔukpa*

A number of common words or usages also distinguish the two branches.

(26)	Mixean		Zoquean		
	Sayuleño	Coatlán	Copainalá	Sierra	Popoluca
	ʃɨhw	*ʃɨː*	*hama*	*haːma*	'sun, day'
	ʔɨˈwamp	*jwaːmb*	*ʃumpa*	*ʔɨʃumpa*	'he wantsit'
	ˈtoʔʃaj	*ˈtoʔʃjhaɾj*	*jomo*	*joːmo*	'woman'

See also: Mesoamerica: Scripts; Mexico: Language Situation.

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Mobilian Jargon

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Mobilian Jargon or the Chickasaw-Choctaw trade language was a Muskogean-based pidgin of the lower Mississippi River valley, typologically comparable (although unrelated) to Chinook Jargon of northwestern North America. Not to be confused with Mobilian proper of southern Alabama, whose genetic classification has remained in doubt until today, Mobilian *Jargon* (MJ) was a structurally and functionally reduced contact medium that drew principally on Muskogean as its source languages. MJ displayed a characteristic Muskogean phonology,

including the lateral fricative /ł/ as in /łało/ 'fish', even if the pronunciation of particular sounds ranged more widely than in Muskogean languages because of second-language interferences, and because it lacked most of their morphophonological complexities (*see* **Muskogean Languages**). Whereas early grammatical descriptions have presented MJ as a reduced form of Choctaw (Western Muskogean), it actually has revealed considerable lexical variation over space and time, reflecting the influences of its speakers' first languages. Among the primary other sources were Eastern Muskogean languages such as Alabama and Koasati and quite possibly Muskogee. Several 'exotic' loans from northern Algonquian languages with only a few from European sources suggest that MJ's range of variation extended farther north than the available linguistic evidence indicates, while remaining comparatively immune to European influences. A closer examination of MJ syntax demonstrates that whereas some constructions could derive from Choctaw or Chickasaw (Western Muskogean) equivalents, others displayed fundamental syntactic differences in need of their own explanations. (The initial dagger indicates that these MJ sentences were not actual recordings, but corresponding word-for-word *reconstitutitions* of such to match the Choctaw constructions, illustrating both the similarities and differences between the pidgin and Western Muskogean.)

(1) MJ:	†hattak	išno	pisa	taha	
	man	*you*	*see*	PAST	
Choctaw:	hattak	iš-	pisa	tuk	
	man	2 sing ACT (NOM)	*see*	PAST	

(Jacob *et al.*, 1977: 65)
'You saw a man.'

(2) MJ:	†išno	iti	ino	čali	taha
	you	*wood*	*I*	*cut*	PAST
Choctaw:	iti	chĩ-	chãli	-li	-tok
	wood	2 sing DAT	*cut*	1 sing	PAST

(Davies, 1986: 41)
'I cut wood for you.'

MJ:	†ofi	ino	banna	ino	yimmi	
	dog	*I*	*want*	*I*	*believe*	
Ch:	ofi	sa-	banna	yimmi	-li	-h
	dog	1 sing ACC (PAT)	*want*	*believe*	1 sing NOM (ACT)	PRED

(Davies, 1986: 71)
'I believe I want a dog.'

Without some means of formally marking case in words, MJ speakers could rely only on word order to identify the grammatical functions of its sentence parts, which was X/OsV and quite possibly X/OSV (with no actual attestations available for two- or multiple-argument constructions, including nominal subjects). As the above examples illustrate, MJ's unique word order probably derived from Muskogean constructions consisting of a noun plus a verb with a prefix, the latter of which speakers replaced with etymologically independent and full pronouns in their languages and which came to function as true grammatical subjects in MJ, although not necessarily as agents. MJ thus followed a grammatical pattern that was fundamentally Muskogean, even if structurally analytic and ultimately unintelligible to Muskogean speakers for larger constructions, unless they had considerable prior exposure to it.

Alternatively known as *anompa ĩla* ('other/different/strange talk'), *yama* ('yes, right, alright, indeed'), and *yoka anõpa* ('servant/slave talk'), MJ performed not only as a true pidgin in multilingual contexts with non-Muskogeans (as in intertribal gatherings, pantribal alliances, and intertribal and colonial trade), but also in bilingual contacts with distant peoples, including Algonquians, Siouans (such as the Osage), and eventually Europeans (as on long-distance travels, on diplomatic missions, in intertribal and interethnic marriages, and in the European employment of Indians). By the early 18th century, MJ moreover assumed meta-communicative functions of a sociolinguistic buffer against overly eager outsiders: its use helped confirm the native identity of its speakers, thus providing a safeguard against continuously threatening enslavement, while at the same time protecting their privacy against intrusions by missionaries, immigrant settlers, government officials, and anthropologists.

MJ's structure and functions raises questions about its origin. Because the linguistically and culturally fairly uniform Muskogeans had little reason to develop a pidgin, early analyses favored a colonial origin of MJ (Crawford, 1978). I have since proposed a pre-European origin for MJ on grounds of three interrelated arguments: its indigenous grammar and lexicon, its well-established use in diverse native interlingual contexts, and its geographic distribution closely overlapping with that of the linguistically diverse, but socioculturally quite uniform, paramount chiefdoms of the pre-Columbian moundbuilders known by archaeologists as the Mississippian Complex (Drechsel, 1996, 1997).

See also: Algonquian and Ritwan Languages; Bilingualism; Creek; Interlanguage; Language Change and Language Contact; Lingua Francas as Second Languages; Linguistic Anthropology; Muskogean Languages; Siouan Languages; Spatiality and Language; United States of America: Language Situation; Variation and Language: Overview.

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Modal Logic

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In classical propositional logic, all the operators are truth-functional. That is to say, the truth or falsity of a complex formula depends only on the truth or falsity of its simpler propositional constituents. Take the monadic operator $\sim$. This is interpreted to mean 'it is not the case that', and its meaning is defined by **Table 1**, called a truth table, in which 1 represents 'true' and 0 represents 'false'. This operator is truth-functional because the truth value of the complex proposition it forms is determined by the truth value of the proposition it starts with. If α has the value 1, then $\sim\alpha$ has 0. If α is 0, $\sim\alpha$ is 1. (I use standard operators for propositional logic: $\sim$ for negation, $\vee$ for (inclusive) disjunction, $\wedge$ for conjunction, $\supset$ for (material) implication and $\equiv$ for (material) equivalence.) Modal logic is concerned with understanding propositions about what **must** or about what **might** be the case, and it is not difficult to see how we might have two propositions alike in truth value, both true, say, where one is true and could not possibly be false and the other is true but might easily have been false. For instance it must be that $2+2=4$, but, although it is true that I am writing this entry, it might easily not have been. Modal logic extends the well-formed formulae (wff) of classical logic by the addition of a one-place sentential operator L (or $\Box$) interpreted as meaning 'it is necessary that'. Using this operator, an operator M (or $\Diamond$) meaning 'it is possible that' may be defined as $\sim L\sim$. The notation L and M for the necessity and possibility operators dates from Feys (1950) (for L) and Becker (1930) (for M). (For a history of notation, see Hughes and Cresswell, 1968: 347–349). The use of $\Box$ for the necessity operator is due to F. B. Fitch and first appears in Barcan (1946); the use of $\Diamond$ for M dates from Lewis and Langford (1932). In fact, any one of L or M can be taken as primitive and the other defined in terms of it. Another operator that may be defined in terms of L and M is the operator Q (or ∇), where $Q\alpha$ means that α is contingent, that is, neither necessary nor impossible. $Q\alpha$ may be defined as $\sim L\alpha \wedge M\alpha$. Many uses of *possible* in natural language suggest that what is possibly true is also possibly false, and those uses are better served by Q than by M.

The modern development of modal logic dates from 1912 when C. I. Lewis published the first of a series of articles and books (culminating in Lewis and Langford, 1932) in which he expressed dissatisfaction with the notion of material implication found in Whitehead and Russell's (1910) *Principia mathematica*. In the system of *Principia mathematica* – indeed in any standard system of propositional calculus (PC) – there are found the theorems:

(1) $p \supset (q \supset p)$

(2) $\sim p \supset (p \supset q)$

The sense of (1) is often expressed by saying that if a proposition is true, any proposition whatsoever implies it; the sense of (2) is often expressed by saying that if a proposition is false, it implies any proposition whatsoever. Lewis did not wish to reject these. He argued that they are "neither mysterious sayings, nor great discoveries, nor gross absurdities" (Lewis, 1912: 522), but merely reflect the truth-functional sense in which Whitehead and Russell were using the word *imply*. But he also maintained that there is a sense of *imply* in which when we say that *p implies q* we mean that '*q* follows from *p*' and that in this sense of *imply* it is not the case that every true proposition is implied by any proposition whatsoever or that every

Table 1 Truth table

$\sim\alpha$
01
10

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$\sim\alpha$
01
10

false proposition implies any proposition whatsoever. A brief account of the early history of modal logic is found in Hughes and Cresswell (1968: pt. 3, with Lewis's contributions documented in Chaps. 12–13).

Until the early 1960s, modal logics were discussed almost exclusively as axiomatic systems without access to a notion of validity of the kind used, for example, in the truth-table method for determining the validity of wff of the classical propositional calculus. The semantical breakthrough came by using the idea that a necessary proposition is one that is true in all possible worlds. But whether another world counts as possible may be held to be relative to the point we are at. So an interpretation for a modal system would consist of a set W of possible worlds and a relation R of accessibility between them – where the worlds accessible from a given world are often described as the worlds that world can see. For any wff α and world w, $L\alpha$ will be true at w iff α itself is true at every w' such that $w\mathrm{R}w'$. Put formally, a frame is a structure $\langle \mathrm{W},\mathrm{R}\rangle$ in which W can be any class at all, although it members are often called 'worlds' or 'indices,' and R is a relation between them. A model can then be based on that frame by adding a value assignment V. V assigns to each variable p a truth value in each world. If we read $\mathrm{V}(p,w)=1$ (0) as 'V assigns p the value true (false) in world w', then we may, for instance, define the truth table for $\sim$ so that $\mathrm{V}(\sim\alpha,w)=1$ if $\mathrm{V}(\alpha,w)=0$, and 0 otherwise, and we may define the disjunction operator $\vee$ so that $\mathrm{V}(\alpha \vee \beta,w)=1$ iff either $\mathrm{V}(\alpha,w)=1$ or $\mathrm{V}(\beta,w)=1$. $\mathrm{V}(L\alpha,w)=1$ iff $\mathrm{V}(\alpha,w')=1$ for every w' such that $w\mathrm{R}w'$. We define validity on a frame by saying that a wff α is valid on a frame $\langle \mathrm{W},\mathrm{R}\rangle$ iff, for every model $\langle \mathrm{W},\mathrm{R},\mathrm{V}\rangle$ based on $\langle \mathrm{W},\mathrm{R}\rangle$ and for every $w \in \mathrm{W}$, $\mathrm{V}(\alpha,w)=1$. The ideas that underlie this account of validity appeared in the late 1950s and early 1960s in the works of Kanger (1957), Bayart (1958), Kripke (1959, 1963), Montague (1960), and Hintikka (1961). Anticipations can be found in Wajsberg (1933), McKinsey (1945), Carnap (1946, 1947), Meredith (1956), Thomas (1962), and other works. An algebraic description of this notion of validity is found in Jónsson and Tarski (1951), although the connection with modal logic was not made in that article.

An axiomatic basis for a logical system consists of a selected set of wff, known as axioms, together with a set of transformation rules, licensing various operations on the axioms and on wff obtained from the axioms by previous applications of the transformation rules. The wff obtained from the axioms in this way, together with the axioms themselves, are known as the theorems of the system. The system of modal logic whose theorems are precisely the wff valid on every frame is known as the system K. This name, which has now become standard, was given to the system in Lemmon and Scott (1977) in honor of Saul Kripke, from whose work the way of defining validity for modal logic is mainly derived. The word 'frame' in this sense seems to have been first used in print in Segerberg (1968), but the word was suggested to him by Dana Scott. The axioms of K consist of all valid wff of PC together with the modal wff **K**:

$$L(p \supset q) \supset (Lp \supset Lq)$$

and it has the following three transformation rules:

- US (The Rule of Uniform Substitution): The result of uniformly replacing any variable or variables $p_1, \ldots, p_n$ in a theorem by any wff $\beta_1, \ldots, \beta_n$, respectively, is itself a theorem.
- MP (The Rule of Modus Ponens, sometimes also called the Rule of Detachment): If α and $\alpha \supset \beta$ are theorems, so is β.
- N (The Rule of Necessitation): If α is a theorem, so is $L\alpha$.

Other modal systems may be obtained by adding extra axioms to K. Each of these will be a proper extension of K (i.e., it will contain not only all the theorems of K but other theorems as well). Modal systems that contain K (including K, itself) together with US, MP, and N are commonly known as normal modal systems.

A wff valid on every frame is called K-valid, and the theorems of the system K are precisely those wff that are K-valid. It is important to be clear that this is a substantive fact and not something that is true by definition. To be a theorem of K is to be derivable from the axioms of K by the transformation rules of K; to be K-valid is to be valid on every frame, and the fact that a wff is a theorem of K iff it is K-valid is something we have to **prove**, not something we can assume. Similar remarks hold for extensions of K because different systems of modal logic can represent different ways of restricting necessity. It can then happen that whether a principle of modal logic holds or not can depend on the properties of the accessibility relation. We may have an axiomatic modal system defined without any reference to an account of validity and a definition of validity formulated without any reference to theoremhood in a system, and yet the theorems of that system are precisely the wff that are valid by that definition. To show that there is a match of this kind between a system and a validity definition, we have to prove two things: (1) that every theorem of the system is valid by that definition and (2) that every wff valid by that definition is a theorem of the system. If the first holds, we say that the system is sound, and if the second holds we say

that it is complete, in each case with respect to the validity-definition in question.

The wff $Lp \supset p$ is not K-valid because it is not valid on a frame in which there is a world that is not accessible from itself. (Put p false in this world, and true everywhere else.) We could, however, add it as an extra axiom to obtain a system stronger than K itself. The system obtained by adding $Lp \supset p$ as a single extra axiom to K is usually referred to as T, and it has had a long history in modal logic dating from Feys (1937). Feys's own name for the system is 't' (it was first called 'T' by Sobociński, 1953). Feys derived the system by dropping one of the axioms in a system devised by Gödel (1933), with whom the idea of axiomatizing modal logic by adding to PC originates. Sobociński showed that T is equivalent to the system M of von Wright (1951); for this reason 'M' was occasionally used as an alternative name for T. T is K + **T**.

T: $Lp \supset p$

Although **T** is not valid on every frame it **is** valid on all frames in which R is reflexive, that is, frames in which every world is accessible from itself – where $w\mathrm{R}w$ for every $w \in \mathrm{W}$. It can be proved that the system T is sound and complete with respect to such frames. In any system containing T, $L\alpha$ is equivalent to $\alpha \wedge \sim Q\alpha$, and so necessity may be defined in terms of contingency. Without T, this cannot usually be done. An examination of when necessity can be defined in terms of contingency in systems that do not contain T may be found in Cresswell (1988).

If we interpret L as expressing obligatoriness (moral necessity), we are unlikely to want to regard $Lp \supset p$ as valid because it will then mean that whatever ought to be the case is in fact the case. There is, however, a formula that, like $Lp \supset p$, is not a theorem of K but that, under the moral interpretation, it **is** plausible to regard as valid, and that is the wff $Lp \supset Mp$. If Lp means that it is obligatory that p, then Mp will mean that it is permissible that p (not obligatory that not-p), and so $Lp \supset Mp$ will mean that whatever is obligatory is at least permissible. This interpretation of L is known as a deontic interpretation, and for that reason $Lp \supset Mp$ is often called **D**, and the system obtained by adding it to K as an extra axiom is known as the system D; that is, D is defined as K + **D**.

D: $Lp \supset Mp$

D is sound and complete with respect to the class of frames in which R is serial – for every $w \in \mathrm{W}$, there is some w', perhaps w itself, as in T, but perhaps not, such that $w\mathrm{R}w'$.

In the early days of modal logic, disputes centered around the question of whether a given principle of modal logic was correct or not. Often these disputes involved formulae in which one modal operator occurs within the scope of another – formulae such as $Lp \supset LLp$. Sequences such as LL are known as iterated modalities, and it is tempting to consider the possibility that all iterated modalities might be equivalent to uniterated ones or to a small number of iterated ones. Consider the following:

(3) $Mp \equiv LMp$

(4) $Lp \equiv MLp$

(5) $Mp \equiv MMp$

(6) $Lp \equiv LLp$

None of these is a theorem even of T. Some of them can be derived from others. We can obtain (5) and (6) by adding $Lp \supset LLp$ to T; this system is known as the system S4. We can obtain all of (3)–(6) by adding $Mp \supset LMp$ to T; this system is known as the system S5. The names 'S4' and 'S5' derive from Lewis and Langford (1932: 501), in which systems deductively equivalent to these are the fourth and fifth in a series of modal systems. These systems too can be studied semantically. Suppose that R is required to be transitive; that is, suppose that, for any worlds w_1, w_2, and w_3, if $w_1\mathrm{R}w_2$ and $w_2\mathrm{R}w_3$ then $w_1\mathrm{R}w_3$. If so, then $Lp \supset LLp$ will be valid, but if nontransitive frames are permitted it need not be. S4 is sound and complete with respect to all reflexive and transitive frames. Suppose that in addition R is symmetrical, that is, if $w\mathrm{R}w'$ then $w'\mathrm{R}w$. S5 is sound and complete with respect to all reflexive, transitive, and symmetrical frames.

Not all normal modal logics are so well-behaved, however. There exist systems that can be proved to be incomplete in the sense that there is **no** class of frames such that their theorems are precisely the wff that are valid on every frame in the class. One simple example is the system KH = K + **H**.

H: $L(Lp \equiv p) \supset Lp$

Every frame for H also validates $Lp \supset LLp$, but $Lp \supset LLp$ is not a theorem of KH. The incompleteness of this system is proved in Boolos and Sambin (1985). A simplified proof appears in Hughes and Cresswell (1996: Chap. 9). Much current research in propositional modal logic is devoted to the systematic study of large families of logics to examine the conditions under which they have, or lack, properties such as these.

Modal logic can be given a temporal interpretation. The propositional logic of linear time in which L means 'it is and always will be that ...' is called S4.3; it is S4 together with **D1**.

D1: $L(Lp \supset q) \vee L(Lq \supset p)$

The logic of discrete time, in which each moment has a unique successor, S4.3.1, is S4.3 + **N1**.

N1: $L(L(p \supset Lp) \supset p) \supset (MLp \supset Lp)$

This logic has a venerable history. In 1957, Arthur Prior conjectured that S4 was the logic of time with this structure, but later authors proved it to be S4.3.1. Prior's name for this was D (for Diodorus Cronos, not to be confused with D for the deontic system). The history is told in Prior (1967: Chap. 2). Another logic with a philosophical and mathematical interest is one variously called KW or G. It is K together with **W**.

W: $L(Lp \supset p) \supset Lp$

One of its interpretations is that it expresses the logic of provability – with L meaning, 'it is provable that'. From a purely modal point of view, it is sound and complete with respect to the class of all finite frames in which R is transitive and asymmetrical. The name W is from Segerberg (1971: 84); it is called G in Boolos (1979). For a more recent survey of the history of provability logic, see Boolos and Sambin (1990). The system dates at least from Löb (1966).

An important modal notion is that of entailment. By this we understand the converse of the relation of following logically from (when this is understood as a relation between propositions, not wff); that is, to say that a proposition, p, entails a proposition, q, is simply an alternative way of saying that q follows logically from p or that the inference from p to q is logically valid. In modal logic, we can say that p entails q iff $L(p \supset q)$. But then we are faced with the following valid wff.

(7) $L((p \wedge \sim p) \supset q)$

(8) $L((q \supset (p \vee \sim p))$

With this interpretation, (7) means that any proposition of the form $(p \wedge \sim p)$ entails any proposition whatever, and (8) means that any proposition whatever entails any proposition of the form $(p \vee \sim p)$. Although this may seem strange, those who wish to reject either (7) or (8) have to face the following argument. The following principles seem intuitively to be valid:

1. Any conjunction entails each of its conjuncts.
2. Any proposition, p, entails $(p \vee q)$, no matter what q may be.
3. The premises $(p \vee q)$ and $\sim p$ together entail the conclusion q (the principle of the disjunctive syllogism).
4. Whenever p entails q and q entails r, then p entails r (the principle of the transitivity of entailment).

Table 2 Derivation of propostions using the four principles

Principle	Proposition
	(i) $p \wedge \sim p$
From (i), by A	(ii) p
From (ii), by B	(iii) $p \vee q$
From (i), by A	(iv) $\sim p$
From (iii) and (iv), by C	(v) q
So by **D**, $(p \wedge \sim p)$ entails q	

Lewis showed long ago (Lewis and Langford, 1932: 250–251) that by using these principles we can always derive any arbitrary proposition, q, from any proposition of the form $(p \wedge \sim p)$, as shown in Table 2. This derivation shows that the price that has to be paid for denying that $(p \wedge \sim p)$ entails q is the abandonment of at least one of the principles 1–4. The most fully developed formal response to these paradoxes consists of abandoning principle 3, the principle of disjunctive syllogism. Logics that do this are called relevance logics. A survey of relevance logic is found in Dunn (1986) and Mares and Meyer (2001).

First-order predicate logic can also be extended by the addition of modal operators. (For more details of modal predicate logic see Hughes and Cresswell, 1996: pt. 3; Garson, 1984.) The most interesting consequences of such extensions are those that affect mixed principles, principles that relate quantifiers and modal operators and that cannot be stated at the level of modal propositional logic or nonmodal predicate logic. Thus, (9) is valid, but (10) is not.

(9) $\exists x L\alpha \supset L\exists x\alpha$

(10) $L\exists x\alpha \supset \exists x L\alpha$

(Even if a game must have a winner there need be no one who must win.) In some cases the principles of the extended system will depend on the propositional logic on which it is based. An example is a formula studied by Ruth Barcan Marcus, who first considered combining modal logic with first-order predicate logic and introduced the formula in Barcan (1946). The Barcan formula (BF) is:

$\forall x L\alpha \supset L\forall x\alpha$

which is provable in some modal systems but not in others. If both directions are assumed, so that we have $\forall x L\alpha \equiv L\forall x\alpha$, then this formula expresses the principle that the domain of individuals is held constant over all possible worlds. A temporal version of the Barcan formula might make its interpretation clearer. Let us assume that everyone now in existence will die before 2154. Then, if L means 'it will always

be the case that' and α is the wff 'x dies before 2154', then $\forall x L\alpha$ is true. But it is not at all likely that it will always be the case that everyone will die before 2154 because people who do not now exist may well live beyond then, and so $L\forall x\alpha$ will be false. This assumes that a quantifier only ranges over the individuals that exist at the time or in the world at which the wff is being evaluated, but indicates why BF has been a matter of controversy.

It is possible to have complete predicate logics whose predicate extensions are incomplete. One such is S4.2, which is S4 + **G1**.

G1: $MLp \supset LMp$

S4.2 is characterized by frames that are reflexive, transitive, and convergent, in the sense that, if a world w_1 can see two worlds w_2 and w_3 then there is a world w_4 that both w_2 and w_3 can see. But the predicate extension of S4.2 + BF is not characterized by any class of frames. Perhaps more interesting is the case of the systems S4.3.1 and KW (or G) previously mentioned, the logics of discrete time and of provability. It is established in Cresswell (1997) that the predicate logic characterized by all frames for these systems is not recursively axiomatizable because they, together with a whole family of systems containing N1 and $Lp \supset LLp$, when combined with first-order logic, enable the expression of second-order arithmetic.

When identity is added, even more questions arise. The usual axioms for identity easily allow the derivation of LI:

$(x = y) \supset L(x = y)$

but should we really say that all identities are necessary? Take:

(11) the composer of 'Threnody for Mrs S' = the composer of 'Salm'

An important feature of (11) is that it uses the phrases *the composer of 'Threnody for Mrs S'* and *the composer of 'Salm'*. Such phrases are often called definite descriptions, and they pose problems even in nonmodal predicate logic. One of the first to see this was Bertrand Russell, whose celebrated example was

(12) the present king of France is bald

Because there is no present king of France, it would seem that (12) is false. But then it would seem that (13) is true.

(13) the present king of France is not bald

But (13) does not seem true either, for the same reason as (12). Even worse is sentence (14).

(14) the present king of France does not exist

Russell claimed that the phrase *the present king of France* does not function like a name at all, and his account of the matter can help with (11). If we follow Russell, (11) makes five claims:

1. At least one person composed 'Threnody for Mrs S.'
2. At most one person composed 'Threnody for Mrs S.'
3. At least one person composed 'Salm.'
4. At most one person composed 'Salm.'
5. $\forall x \forall y$(x composed 'Threnody for Mrs S' $\wedge$ y composed 'Salm') $\supset x = y$).

Look carefully at claim 5. This claim is true but not necessarily true, so putting L in front of it gives us a false sentence. But LI does not license us to put L in front of claim 5. What LI does allow is for us to move from claim 5 to claim 6.

6. $\forall x \forall y$(x composed 'Threnody for Mrs S' $\wedge$ y composed 'Salm') $\supset L(x = y)$).

And it is less clear that claim 6 is at all objectionable.

Suppose, nevertheless, that we still wish to abandon LI. To falsify LI, we let the values of the variables be strings of objects that may coincide in some worlds but not in others. In the present example, letting x mean 'The composer of "Threnody for Mrs S"' would mean requiring its value in a world w be whoever in w composed 'Threnody for Mrs S,' while y could stand for whoever composed 'Salm' in w. But there is a problem. Allowing all such strings would make the wff (10) valid, and it was remarked that (10) could be false in a game in which it is necessary that some player will win, although there is no individual player who is bound to win. There is, however, one way in which we could make (10) sound plausible. Consider, for example, the expression *the governor-general of New Zealand*, as it may occur in a constitutional context. The law may specify that at a certain point the signature of the governor-general is required before an act of parliament becomes law; yet on one occasion the governor-general may be Michael Hardie-Boys and on another it may be Sylvia Cartwright. Thus, the phrase *the governor-general of New Zealand* does not designate any particular individual (as an assemblage of flesh and blood); yet we can in a sense think of it as standing for a single object, contrasted with *the prime minister* and so forth.

Such objects are often called intensional objects or individual concepts. In a logic in which the individual variables range over all intensional objects, (10) would be valid because, if it must be the case that there is someone who must sign acts into law, then

although no individual person must be that someone, yet there is someone (viz. the governor-general) whose signature is required. An adequate semantics for the contingent identity systems that do not validate (10) would therefore have to place restrictions on allowable strings of objects and neither require that only strings consisting of the same member of D in each world should count as objects—for that would validate LI – nor that any string whatever of members of D should count as an object – for that would validate (10).

All the systems of modal logic considered so far have assumed a single necessity operator, with its possibility dual. An important class of systems with more than one is the class of tense logics. (For a survey see Prior, 1967.) A tense logic has two operators, L_1 and L_2, where L_1 means 'it always will be the case that' and L_2 means 'it always has been the case that'. In frames for a tense logic, the associated relations R_1 and R_2 are so related that one is the converse of the other, that is, wR_1w' iff $w'R_2w$. Another way of introducing families of modal operators is suggested by a possible interpretation of modal logic in computer science. In this interpretation, the worlds are states in the running of a program. If π is a computer program, then $[\pi]\alpha$ means that, after program π has been run, α will be true. If w is any world, then $wR_\pi w'$ means that state w' results from the running of program π. This interpretation of modal logic is called dynamic logic. What gives dynamic logic its interest is the possibility of combining simple programs to get more complex ones. Thus, if π_1 and π_2 are two programs, then the expression $\pi_1;\pi_2$ refers to the program 'first do π_1 and then do π_2', and $[\pi_1;\pi_2]\alpha$ means that α will be true if this is done. The relation corresponding to $[\pi_1;\pi_2]$ may be defined to hold between w and w' iff $\exists u(wR_{\pi 1}u \wedge uR_{\pi 2}w')$. Other computing operations can generate similar modal operators, with appropriate conditions on their accessibility relations (see Goldblatt, 1987: Chap. 10). It is also possible to develop dynamic predicate logic. For an introductory survey, see Goldblatt (1987: pt. 3).

The most general kind of possible-worlds semantics for propositional operators is based on that idea of the truth set of a formula. In any model, we can define $|\alpha|$ as $\{w \in W: V(\alpha,w) = 1\}$. In evaluating $L\alpha$ in a world w, all the input that we require is to know which set of worlds forms the truth set of α. Whatever L means, what it has to do is to declare $L\alpha$ true at w for some truth sets and false for others. So the meaning of L must specify which sets of worlds form acceptable truth sets in world w. These sets of worlds are called the neighborhoods of w, and a neighborhood frame for a language of modal propositional logic is a pair $\langle W,R\rangle$ in which W is a set (of worlds) and R is a neighborhood relation. (For some remarks on the history of neighborhood semantics, see Segerberg, 1971: 72.) A neighborhood relation is a relation between a world w and a subset A of W, and A is a neighborhood of w iff wRA. We then say that $V(L\alpha,w) = 1$ iff $wR|\alpha|A$. A frame of the kind assumed earlier, in which R is a relation between worlds, is often called a relational frame, and it is not difficult to see that every relational frame is a special case of a neighborhood frame. To be precise, a relational frame is a neighborhood frame in which for every $w \in W$ there is a set B of those and only those worlds that are accessible to w (i.e., B is the set of worlds w can 'see') and wRA iff $B \subseteq A$. What this means is that α's truth set is a neighborhood of w iff it contains all the worlds accessible from W, which is of course precisely what the truth of $L\alpha$ in a relational frame amounts to.

Neighborhood semantics can be devised for systems with operators taking more than one argument. A philosophically important example here is the logic of counterfactuals as developed in the late 1960s and early 1970s. We present here a version of the semantics found in Lewis (1973), but the same idea is also found in Stalnaker (1968) and Åqvist (1973). Counterfactual logic is based on a dyadic operator $\Box\!\!\rightarrow$, where $\alpha \Box\!\!\rightarrow \beta$ means that 'if α were to be the case then β would be the case'. Lewis's idea is that, given a possible world w, some worlds are closer to w than others. If we write $w' <_w w''$ to mean that 'w' is closer to w than w'' is', then the semantics for $\Box\!\!\rightarrow$ will be that $\alpha \Box\!\!\rightarrow \beta$ is true in w iff either α is not true at any world or there is a world w' at which α and β are both true that is closer to w than any world w'' at which α is true but β is not. A counterfactual frame can be described as a neighborhood frame in the following way. Because $\Box\!\!\rightarrow$ is dyadic, its neighborhood relation R will relate worlds to pairs $\langle A,B\rangle$ where $A \subseteq W$ and $B \subseteq W$. The standard rule for a dyadic operator δ using an associated neighborhood relation R is (15).

(15) $V(\delta\alpha\beta,w) = 1$ iff $wR\langle|\alpha|, |\beta|\rangle$

A frame $\langle W,R\rangle$ will be a counterfactual frame iff it is based on a nearness relation $<$ in such a way that $wR\langle A,B\rangle$ iff either (16) or (17).

(16) $A = \varnothing$

(17) There is some w' such that $w' \in A \cap B$ and for every w'', if $w'' \in A \cap -B$ then $w' <_w w''$

Which counterfactual logic we get will depend on what kind of conditions we put on $<$. For instance, under the plausible assumption that the closest world to w is w itself, we get a frame that validates the wff in (18).

(18) $p \supset ((p \Box\!\!\rightarrow q) \equiv q)$

By contrast, on any plausible account of nearness, many wff that are valid for $\supset$ fail for $\Box\!\!\rightarrow$. For instance in standard systems of counterfactual logic, neither (19) nor (20) is valid.

(19) $((p \Box\!\!\rightarrow q) \wedge (q \Box\!\!\rightarrow r)) \supset (p \Box\!\!\rightarrow r)$

(20) $(p \Box\!\!\rightarrow q) \supset (\sim q \Box\!\!\rightarrow \sim p)$

Questions such as these bring us to the boundary between modal logic, metaphysics, and semantics and remind us of the rich potential that the theory of possible worlds has for illuminating such issues. The possible-worlds semantics can be generalized to deal with any operators whose meanings are operations on propositions as sets of possible worlds and form a congenial tool for those who think that the meaning of a sentence is its truth conditions and that these be taken literally as a set of possible worlds – the worlds in which the sentence is true.

Further information on modal logic, including more detailed bibliographical references, may be found in a number of works. See, for instance, Blackburn *et al.* (2001), Bull and Segerberg (1984), Chargrov and Zaharyaschev (1997), Chellas (1980), and Hughes and Cresswell (1996).

See also: Boole, George (1815–1864); Carnap, Rudolf (1891–1970); Conditionals; Fictional Discourse: Philosophical Aspects; Hintikka, Jaakko (b. 1929); Indexicality: Philosophical Aspects; Inference: Abduction, Induction, Deduction; *De Dicto* versus *De Re*; Kripke, Saul (b. 1940); Mood and Modality in Grammar; Negation; Propositional Attitudes; Quantifiers: Semantics; Semantic Value; Tense and Time: Philosophical Aspects.

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Modality Issues in Signed and Spoken Language

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The modality of a language is the means by which that language is produced and perceived. Linguists long believed that human language was bound to a particular modality; language was necessarily spoken and heard (e.g., Hockett, 1960). Reading and writing were not overlooked, but these visual representations are largely derivative of a primary spoken language. Research since 1960 has shown that there are two modalities in which naturally evolved human languages are expressed: not only the oral–aural modality of spoken languages, but also the visual–gestural modality of signed languages. There may even be a third possibility: specifically the tactile–gestural modality that is used in deaf–blind signing (see Quinto-Pozos, 2002). However, we know of no independent languages that have emerged within the tactile–gestural modality.

Signed and spoken languages are encoded using different articulators, and decoded using different sensory-perceptual systems. Beyond such obvious facts as the irrelevance of voicing to signed languages and of handshape to spoken languages, there are interesting differences between the two language modalities; see **Table 1** and **Table 2** (adapted from Meier, 2002b). For example, in speech, the oral articulators are largely hidden from view; thus the failure of lip reading as a means of understanding speech. Although hearing addressees are not blind to the visual configuration of the oral articulators (as demonstrated by the McGurk effect), addressees must perceive the acoustic consequences of oral articulation if they are to understand the speaker. The relationship between auditory percept and articulator movement is exceedingly complex, a fact that

Table 1 Some properties of the articulators in sign and speech

Sign	*Speech*
Light source external to signer	Sound source internal to speaker
Manual articulation not coupled (or loosely coupled) to respiration	Oral articulation tightly coupled to respiration
Manual articulators move in a transparent space	Oral articulators largely hidden
Manual articulators relatively massive	Oral articulators relatively small
Manual articulators paired	Oral articulators not paired
No predominant oscillator associated with sign syllables	Mandible is predominant oscillator associated with speech syllables

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No predominant oscillator associated with sign syllables	Mandible is predominant oscillator associated with speech syllables

Table 2 Some properties of the sensory and perceptual systems subserving sign and speech

Sign	*Speech*
Signer must be in view of addressee	Speaker need not be in view of addressee
High bandwidth of vision	Lower bandwidth of audition
High spatial resolution of vision; lower temporal resolution than audition	High temporal resolution of audition; lower spatial resolution than vision
Articulatory gestures as the object of perception	Acoustic events as the object of perception

contributes to the intractability of the so-called invariance problem in speech perception.

Because the manual articulators move within the transparent space in front of the signer (the 'signing space'), the postures of the hands and their movements can be directly observed. If he or she chooses, the addressee can attend to the movements and postures of those articulators (although any addressee normally attends to the signer's message, not its articulation). The addressee in a spoken conversation cannot attend directly to the position of the vocal cords, or to movements of the tongue body, or to the lowering or raising of the velum.

Do such modality differences have important effects on the structure, acquisition, and processing of signed versus spoken languages? The research to date inescapably leads to the conclusion that there are many noneffects of modality upon linguistic structure and processing. In crucial ways, signed and spoken languages are structured similarly. Evidence for particular modality effects is more scattered. The subsequent paragraphs examine: 1) Noneffects of modality, 2) Methodological issues that make the identification of modality effects difficult, and 3) Evidence for modality effects.

Noneffects of Modality

Spoken and signed languages share many properties. In signed and spoken languages, a lexical item is a form-meaning pair that is conventional within a particular linguistic community (see Saussure, 1916/1959). Just as the English word *tree* and the Spanish word *arbol* share the same meaning but have very different forms, the signs for 'tree' in American Sign Language (ASL), Danish Sign Language, and Chinese Sign Language are quite distinct in form, although – as it happens – each of these signs is in its own way quite iconic (Klima and Bellugi, 1979). In signed and spoken languages, meaningful units (words or signs) are built in rule-governed ways from meaningless units of sound or gesture (Brentari, 1998; Stokoe *et al.*, 1965). Slips of the hand show that these sublexical units are not merely convenient descriptive devices for the linguist; they are instead integral to a signer's planning of utterances (for ASL, Klima and Bellugi, 1979; for German Sign Language, Hohenberger *et al.*, 2002). These meaningless units of handshape, movement, and place of articulation form the lines of cleavage along which signs break apart when signers err, just as phonemic segments may be switched, anticipated, or perseverated in slips of the tongue. Thus, signed and spoken language show what Hockett (1960) called duality of patterning.

Signed and spoken languages have open-ended vocabularies; they add new lexical items by means of derivational morphology (e.g., Supalla and Newport, 1978), compounding (Klima and Bellugi, 1979), and borrowing (Battison, 1978; Padden, 1998). In signed languages, as in spoken languages, syntactic rules constrain the concatenation of signs within sentences (Liddell, 1980). Signed languages display the same parts of speech as spoken languages. They use word order and verb agreement to mark subject and object. Evidence of subordinate clauses in ASL and other signed languages means that recursion is a property of signed and spoken languages alike (e.g., Padden, 1983).

The developmental milestones of language occur on roughly the same schedule in signing and speaking children (Newport and Meier, 1985; Meier, 1991). In general, adult processing of signed and spoken languages has proven to be fundamentally similar, although there have been discussions about the extent of right hemisphere involvement in the processing of sign and about whether sign shares with speech the property of being categorically perceived; see Emmorey (2002) for a review.

Noneffects of modality can be important for our understanding of human language. The findings reviewed here show that many crucial properties of human language are not products of a particular modality of transmission; instead those properties are common to signed and spoken languages. The striking similarities in linguistic structure, in child language development, and in adult processing between signed and spoken languages demonstrate that, with respect to the modality of language, the human language capacity is highly plastic.

Problems in Identifying Modality Effects

Given that signed and spoken languages share so many fundamental properties, are there nonetheless interesting differences between signed and spoken languages? For various reasons, it is not easy to

identify effects of the particular modality in which a language is expressed or perceived. First, there are problems of sample size: there are many fewer signed languages than spoken languages. The much larger set of spoken languages gives those languages more opportunity to express linguistically unusual properties. Even within the relatively small set of signed languages, most attention has focused on just one language, ASL. Although recent years have brought important work on other signed languages, much of that work has examined European signed languages, some of which have historical links to ASL through French Sign Language.

A second problem lies in the fact that most, if not all, signed languages are relatively young languages. Young languages – whether signed or spoken – may not fully represent the space of linguistic possibilities that are available within a given language modality; thus spoken Creole languages may be relatively uniform in their structure (Bickerton, 1984). Note that, the youth of signed languages is not an inherent property of the modality, but is instead an artifact of the demography of the deaf community and of attitudes toward deaf education. Interestingly, the unusual demographics of signing communities may serve to keep signed languages young. For deaf children, parent-to-child transmission of language is the exception, not the rule. Few deaf children are the offspring of native signing parents. Frequent interruption of the generation-to-generation transmission of language may mean that in signed languages, more than in spoken languages, children can shape languages that conform to their own biases. Languages that closely fit children's biases may represent only a subset of the kinds of languages that are learnable within a given modality.

Examples of Possible Modality Effects

The Resources of the Visual–Gestural Modality

The visual–gestural modality makes a three-dimensional space available to signed languages. It also enables many conceptually important lexical items to have some iconic basis. Iconic lexical items are possible in both language modalities: in spoken languages, onomatopoetic words such as *cock-a-doodle-doo* or Spanish *quiquiriqui* are sound images. Such words are not *ad hoc* creations; they are instead conventional members of the lexicon of a specific language. The resources of the visual–gestural modality appear to allow more frequent iconicity in sign language lexicons. For example, the ASL sign HOUSE seems to sketch a two-storey house with a peaked roof, as shown in Figure 1. However iconic,

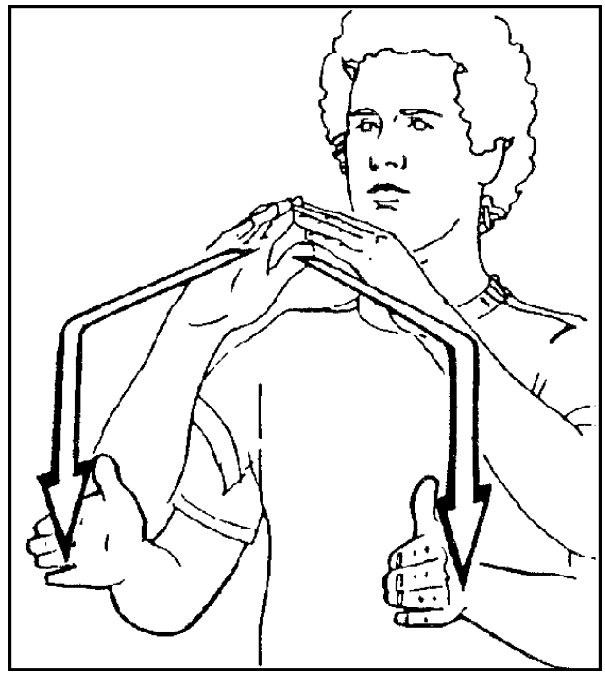

Figure 1 The ASL sign HOUSE. Drawing by Frank A. Paul, copyright RPM.

this sign is a conventional member of the ASL lexicon. What allows frequent iconicity in the visual–gestural modality? Contributors may include the fact that the two hands can move in tandem through the transparent sign space to sketch the shape of objects. The visible movement of hands through that sign space can also be used to represent the movement of objects in the world (including movement of the hand itself). In contrast, the oral–aural modality of spoken languages seems to have a limited capacity for iconic representation; in most instances, arbitrary words are the only available option (cf. Goldin-Meadow and McNeill, 1999).

The incidence of iconicity in signed languages – and the less-frequent occurrence of iconic spoken words – allows us to reassess the role of arbitrariness in language. The human language capacity does not demand arbitrary words or signs. Instead, all languages must allow arbitrary signs. Absent arbitrariness, languages could not readily express concepts that are not imageable. So, in ASL, signs such as BLACK, HOME, CURIOUS, and GIRL are fundamentally arbitrary; as shown in Figure 2, an inward rotation of the forearm in the sign BLACK causes the tip of the index finger to brush the forehead. This sign has no obvious motivation.

Iconicity appears to have few consequences for the grammar of signed languages: for example, morphological processes are not blocked by the iconicity of the lexical items to which those processes apply (e.g.,

Figure 2 The ASL sign BLACK. Photograph by Claude Mauk, copyright RPM.

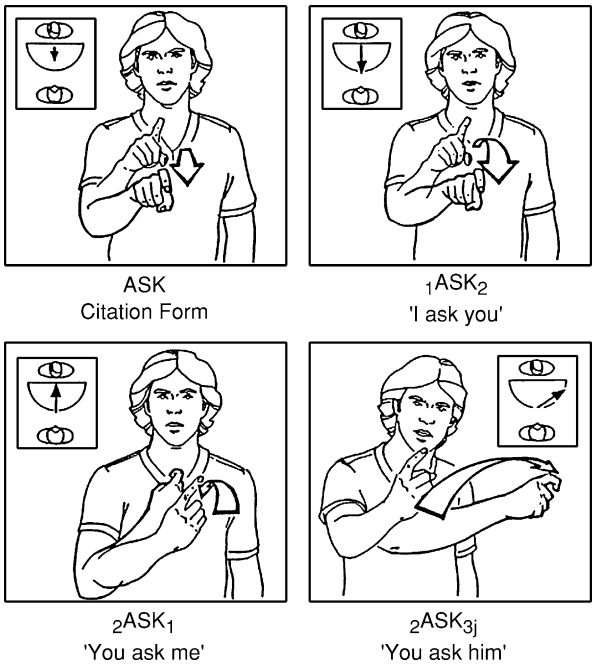

Figure 3 Four forms of the ASL verb ASK. The citation form is the uninflected form of the verb. The three other forms mark spatial locations associated with the subject and object of the verb. The subscripts indicate locations associated with the signer (1), the addressee (2), and a nonaddressed participant on the signer's left (3j). Drawings by Frank A. Paul, copyright RPM.

Klima and Bellugi, 1979). In many instances, the iconic properties of signs have been obscured by historical change (Frishberg, 1975). Iconicity does not appear to be an important determinant of the overall timecourse of language acquisition, of the kinds of errors children make, or of which signs children learn first (see Newport and Meier, 1985, for a review). But the iconic potential of the visual–gestural modality does appear to be an important contributor to the rapid emergence of signed languages, in particular the home sign systems that are invented by deaf children of hearing, nonsigning parents (Goldin-Meadow, 2003). A deaf child can reasonably expect that iconic gestures will be understood by nonsigning parents.

The resources of the visual gestural modality give signed languages access to a three-dimensional space not just for the movement of the hands, but also as a source of locations that signs may indicate. To refer to people, objects, and locations that are not present in the immediate environment of a signed conversation, the signer may associate that referent with an empty location in space. Later in the conversation, signer and addressee alike can continue to use that location when they wish to refer anaphorically to that same referent (Bellugi and Klima, 1982). Many transitive verbs can move between locations in space (whether the real-world locations of referents or empty locations established in the sign space) to indicate the referents of their subjects and objects; see Figure 3. The ready availability of the sign space for referential purposes appears to have important consequences for the grammar of deixis (Meier, 1990; McBurney, 2002), verb agreement (Meier, 2002a; Liddell, 2003), and anaphora (Lillo-Martin, 1990) in signed languages. The availability of this sign space may also be one factor accounting for the substantial uniformity in how these grammatical phenomena are manifest in different signed languages.

The use of space is not an inevitable product of the visual-gestural modality, although it appears characteristic of all naturally evolved signed languages examined to date (with the apparent exception of Abu-Shara Bedouin Sign Language, a very newly emerged sign language described by Aronoff *et al.*, forthcoming). Sign systems that do not use space are imaginable: for example, artificial sign systems such as Signing Exact English (SEE 2) are organized like English and make little use of the sign space for referential purposes. However, deaf children who are exposed only to SEE 2 adapt that system so that space is used in ways akin to the uses of space in naturally evolved sign languages (Supalla, 1991).

Rate of Signing

Perhaps because the sign articulators are massive and must often execute long movement excursions, signing rate (i.e., the rate at which signs are produced) appears relatively slow compared to the rate at which English words are produced. But, paradoxically, the

rate at which propositions are transmitted is the same in ASL and English (Bellugi and Fischer, 1972; Klima and Bellugi, 1979). How can this happen?

Bellugi and Fischer resolved this paradox – a slow signing rate that has no effect on the rate at which propositions are transmitted – by looking to the typological organization of signed languages. They argued that simultaneity in ASL morphology and in syntactic marking allows efficient transmission of propositions. In this view, natural signed languages largely avoid sequential morphological structure; that is, they avoid affixation. In Bellugi and Fischer's data, utterances from an artificial sign system that has English-like morphological structure (i.e., affixation) were slow to be produced and, for that reason, such systems may be disfavored by the Deaf community. Instead, natural sign languages rely largely on morphological processes that are nonconcatenative: for example, contrasting patterns of repetition, doubling of the hands in one-handed signs, and changes in movement direction or palm orientation that reflect the spatial locations linked to a verb's arguments. Sign languages also seem to favor the use of facial expression as adverbial markers and as markers of grammatical structure: e.g., facial expressions marking different sentence types. These nonmanual markers may be articulated simultaneously with manual signs.

Nonconcatenative morphology is certainly possible in spoken languages: e.g., the root and pattern morphology of Semitic languages, ablaut in Germanic languages, and tonal morphology in many African languages. However, signed and spoken languages seem to differ in their preferred type of morphological organization, with spoken languages generally opting for sequential structures of stems and affixes. In contrast, such morphology is sparse in signed languages; although compounding (which is of course sequential) is common in signed languages, nonconcatenative inflectional and derivational morphology is, with a small set of possible exceptions, the rule (Aronoff *et al.*, 2005).

Conclusions

Signed and spoken languages share many fundamental properties of linguistic organization. They may differ in subtle ways, too: for example, signed and spoken languages may differ in their predominant typological organization. It has also been hypothesized that signed and spoken languages might differ such that signed languages are relatively more uniform in their grammatical properties, whereas spoken languages are more diverse (Newport and Supalla, 2000). Much further research will be necessary to confirm the extent to which these hypothesized differences are true. Explaining these differences will also require substantial work. For example, the relative uniformity of signed languages in contrast to the diversity of spoken languages might arise from the differing properties of the two language modalities. But it might also be a consequence of the interesting history and demography of signing communities – specifically the fact that signed languages are relatively young languages (sometimes exceedingly young, as is Nicaraguan Sign Language (Senghas and Coppola, 2001)). The demography of signing communities might mean that the learning biases of children – and not necessarily the constraints of the visual–gestural modality – may have a crucial role in structuring signed languages. We have every reason to think that children's biases are much the same from community to community and generation to generation. Further research is needed to examine just how varied signed languages are, to detail the role that children play in elaborating signed languages, and to uncover the precise role that modality factors might have in shaping signed languages.

See also: Iconicity: Sign Language; Pidgins and Creoles: Overview; Saussure: Theory of the Sign; Sign Language: Interpreting; Sign Language: Morphology; Sign-Based Morpology.

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Modern Greek *See:* Greek, Modern.

Modern Hebrew *See:* Hebrew, Israeli.

Modern Linguistics: 1800 to the Present Day

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Introduction

It is during the course of the 19th century that we first find linguists self-consciously making statements about the history of their own discipline. The very fact that they do so is part of the *prima facie* evidence for the existence of that discipline (as indeed it was intended to be). For, it need hardly be said, their main concern was not so much to establish what had happened in the past as to establish the contemporary autonomy of their own branch of inquiry. For this purpose they usually adopted a familiar "torch of learning" model, in which knowledge is passed on from one age to the next. As successive generations fan the sacred Flame with their own contribution, it burns ever brighter. The current torch-holder often turns out to be the scholar telling the story, or a close colleague.

This pattern of historical self-justification has been repeated more or less without interruption in linguistics from 1800 down to the present day, beginning with the Comparative Philologists and continuing with the Neogrammarians. A classic case from the early 20th century is the introductory chapter in F. de Saussure's *Cours de linguistique générale* (1916), which itself recruits the Comparative Philologists and the Neogrammarians as honorable predecessors. Another is chapters 1–4 of *Language: its nature, development and origin* (Jespersen, 1922). A third is chapter 1 of *Language* (Bloomfield, 1933). A fourth and even more blatant example (if that were possible) is *Linguistics* (Fries, 1966), which leads up to what Fries calls triumphantly "the breakthrough" of American structural linguistics and the arrival of transformational-generative grammar. Endemic to this self-justificatory pattern is the notion that one's predecessors, although great scholars, never quite got it right (or even, occasionally, got it wrong, thus all but extinguishing the Flame).

Underlying most of these self-justificatory historical accounts lies a concern to show that linguistics is – or at last has now, i.e., in the author's own generation, become – a 'science.' This anxiety is bound up with the whole question of the academic prestige of 'the sciences' as developed in 19th- and 20th-century universities in Europe, and the diminishing prestige of 'the arts.' 'Science' was from the beginning a watchword or slogan that modern linguistics appropriated as its own, thus implicitly distinguishing the subject from all 'pre-scientific' studies of language and languages. It is emphatically reaffirmed in the glossary to the first edition of this encyclopedia, which contains the blunt propagandist equation "linguistic science = linguistics" (Asher, 1994).

The brief account that follows describes the main phases usually identified in this self-serving tradition of historiography. It makes no attempt to list all the individual 'schools' and 'movements' that have contributed to modern linguistics, let alone all the eminent scholars. Nor does it cover 'applied' linguistics in such diverse areas as language acquisition, language pathology, language planning, language teaching, and psycholinguistics.

Comparative Philology

Modern linguistics is usually portrayed as arising out of a preceding inquiry called Comparative Philology or Comparative Grammar. The Comparativists were already anxious to distinguish themselves from an earlier scholarly tradition that they often referred to as Classical Philology. Adopting a "torch of learning" model requires an identification of some person or persons who first lit the torch. That role was retrospectively thrust, by the Comparativists and their successors, upon Sir William Jones (1746–1794).

According to later scholars seeking to validate their version of the history of linguistics, the stimulus that Jones provided to 19th-century developments was 'immense' (Robins, 1994). But this overenthusiastic claim is based mainly on the endless quotation of one paragraph from a single lecture that Jones gave in India to the Asiatic Society in 1786. There he proposed that Sanskrit, Greek, and Latin were languages that might be derived from "some common source, which, perhaps, no longer exists." He also suggested in the same paragraph that Gothic, Celtic, and Old Persian might have belonged to the same family.

On this flimsy evidence, Jones could hardly have anticipated that later generations would hail him as a 'founder' of Comparative Philology, much less as 'the first modern linguist.' Jones was a newly arrived British judge sent out from London to administer colonial justice in India. What he saw was the practical advantage of having at his disposal a digest of Hindu and Islamic law. For this purpose, a knowledge of Sanskrit was essential, and he applied himself to it. The irony is that Jones himself had no great regard for philological studies as such. As far as he was concerned, languages were "mere instruments of

real learning." They were not objects of study in their own right.

But that, precisely, was the central notion of the Comparativists. In their view, languages were in themselves organic growths, developing in accordance with their own organic nature, and therefore qualifying as raw 'materials' for a modern science of language. On this basis, as F. M. Müller (1823–1900), first professor of Comparative Philology at Oxford, insisted, it was possible to envisage the study of languages as comparable to such natural sciences as biology and astronomy. But no such project was further from the mind of Jones.

The scholars who, in practice, set up Comparative Philology as an academic discipline were J. Grimm (1785–1863), R. Rask (1787–1832), and F. Bopp (1791–1867). Their work had as its focus the comparative study of the Indo-European languages. They were not engaged in what later came to be known as 'general linguistics,' except insofar as their methods and arguments presupposed certain assumptions about the 'nature' of language. One of their preoccupations was the historical task of 'reconstructing' the unattested ancestral language from which, they assumed, all Indo-European languages had sprung. In this respect, they placed previously inchoate discussions of linguistic origins on a new footing (*see* **Western Linguistic Thought Before 1800**).

The Neogrammarians

The Neogrammarians are seen as marking an 'advance' on Comparative Philology, inasmuch as they endeavored, in the mid 19th century, to establish 'laws' of linguistic development. Discovering 'laws' was then regarded as a *sine qua non* for setting up a 'science.' The principal figures in the Neogrammarian (*Junggrammatiker*) movement were acknowledged to be H. Osthoff (1847–1909), K. Brugmann (1849–1919), A. Leskien (1840–1916), and H. Paul (1846–1921). Their main claim to fame was their formulation of the principle that the 'laws' of sound change hold without exception. Thus if, for example, an intervocalic stop consonant becomes a fricative in one word, this is predicted to happen in all such words when that sound occurs in a similar environment in the same language. In this respect, the Neogrammarians supposedly brought linguistics in line with the 19th-century conception of the natural sciences. Osthoff spoke of the "blind necessity" with which sound laws operate. (Cf. the Newtonian law of gravitation.) The claim itself is virtually worthless, since any instance of an exception could always, for the Neogrammarians, be accommodated by *ad hoc* modification of the 'law' in question. We end up with mere statements of what has been observed to happen with regularity in the past. The exceptionless laws are no more than products of their own hind-sighted formulation.

Saussurean Structuralism

Although F. de Saussure (1857–1913) paid great respect to the Neogrammarians, his approach opened up a quite different chapter in academic language studies. The posthumously published *Cours de linguistique générale* (1916), based on lecture notes taken by his students at the University of Geneva, came to be regarded as the Magna Carta of modern linguistics. In this work, linguistics is presented as one branch of a more all-embracing study of signs, which Saussure referred to as 'semiology' (*sémiologie*).

Saussure did not believe in linguistic 'laws.' He saw 19th-century 'historical' linguistics as a muddle and thought that the Neogrammarians offered no insight at all into what a language was for its speakers. He accordingly drew a fundamental distinction between 'synchronic' and 'diachronic' linguistics. Synchrony is often equated, but mistakenly, with a study of the present-day language. Nor is Saussure's *linguistique diachronique* a synonym for *linguistique historique*, as will be evident to anyone who reads attentively the section on that subject in the *Cours de linguistique générale*. But it was often misunderstood by later linguistic theorists.

Saussure did not mount an all-out attack on comparative and historical linguistics, but he shunted those inquiries into an intellectual siding from which they could make no effective contribution to answering the main questions that linguistic theory had to tackle.

For Saussure, *linguistique diachronique* was an academic edifice set up by the linguist, with a perspective altogether different from that available to the individual member of a linguistic community at any one time. *Linguistique synchronique*, on the other hand, was an attempt to capture the psychological reality underlying the way a typical member of the linguistic community uses its communal language. This distinction was, and always will be, controversial. Saussure himself did not help matters by sometimes appearing to identify the synchronic viewpoint with that of the traditional (prescriptive) grammarian.

Saussure's distinction between *langue* (the collective language system) and *parole* (the linguistic act of the individual) also remained a bone of contention. Although Saussure neither coined nor used the term "structuralism," this was the label later attached to his conception of synchronic analysis. Its principal

feature is that forms and meanings (*see* **Western Linguistic Thought Before 1800**) are not to be identified by matching them with anything external to language (e.g., sounds or physical objects), but solely by reference to internal (structural) contrasts arising within the language itself. Thus, for example, the form of the English word /bat/ cannot be stated in terms of the sequence of sounds [bat] but only by listing the contrasts that distinguish this word from /kat/, /fat/, /hat/, etc. This, for Saussure, is a necessary consequence of realizing that different languages operate with different sets of phonological contrasts: there is no fixed and finite set of phonemes valid for all languages. Similarly, the meaning of a word like *horse* cannot be stated by identifying a certain species of animal and saying that *horse* is the name of this species. Why not? Because different languages recognize different biological species. Thus Saussure's view of meaning departed radically both from traditional lexicography and from that of the founder of modern semantics, his older contemporary M. Bréal (1832–1915). Saussure rejects the entire nomenclaturist approach to language entrenched in the Western tradition. It follows from this that all languages are irreducibly different. They are not just alternative ways of expressing some universal set of concepts, as Aristotle and many others had supposed.

By adopting this uncompromisingly holistic approach to linguistic analysis, Saussure in effect pulled the theoretical rug from under both Comparative Philology and historical linguistics as practiced by the Neogrammarians. His ideas were taken up and developed, particularly in Europe, by the so-called Prague school of linguistics. Two of its leading members were N. Trubetzkoy (1890–1938), whose work on phonology became highly influential, and R. Jakobson (1896–1983). Another branch of structural linguistics emerged in Denmark as 'glossematics,' whose leading exponent was the Danish linguist L. Hjelmslev (1899–1965). In France, G. Guillaume (1883–1960) was responsible for a highly original exploration of – and reaction against – some Saussurean ideas, in propounding what he called the 'psychomechanics' of language.

During Saussure's lifetime, two other approaches – linguistic geography and linguistic anthropology – came to prominence in language studies.

Linguistic Geography

In Europe, dialectologists began the task of documenting current linguistic usage and the geographical distribution of linguistic features. This led to the compilation of the first linguistic 'atlases.' The earliest (1881) was that of the German dialectologist G. Wenker, who sent questionnaires to 30,000 German schoolteachers in an attempt to survey features of local pronunciation. A Romanian linguistic atlas was published by G. Weigand in 1909, compiled on the basis of direct interviews with informants. In France, J. Gilliéron and E. Edmont published (1902–1910) a linguistic atlas based on interviews carried out at more than 600 localities. All this early work was done without the benefit of sound-recording apparatus and thus depended very much on the linguist's ear and the transcription system used. From it emerged, however, one new (and controversial) theoretical concept: the 'isogloss.' Isoglosses were lines drawn on a map, demarcating areas in which a particular feature occurred and separating those from areas of non-occurrence. The study of isoglosses in turn gave rise to controversial conclusions concerning the existence of 'dialects,' which, according to some investigators, proved to be illusory.

J. Gilliéron (1854–1926), on the basis of his cartographical studies, pronounced the 'bankruptcy' of traditional etymology and reached the famous conclusion that "each word has its own history." When this conclusion is combined with doubt about the existence of dialects, it leads directly to doubt about the existences of 'languages' too (*see* **Integrational Linguistics and Semiology**).

Linguistic Anthropology

In America during the same period, anthropologists provided a significant input to language studies, in particular under the auspices of the Bureau of American Ethnology. Attention focused upon the description and classification of native Amerindian (i.e., non-Indo-European) languages – a source of material unavailable in Europe. The study of these languages was also in part motivated by missionary activities and Bible translation – enterprises that played no comparable role in Europe. As early as 1838, the French scholar P. E. Duponceau (1760–1844) argued that all Amerindian languages had a basic grammatical structure unknown in the Indo-European family, and popularized the term 'polysynthetic' to identify it. In 19th-century language typologies, polysynthetic languages were often distinguished from 'synthetic' and 'analytic' languages. The characteristic of polysynthetic languages was said to be a tendency to prefer long, complex words that 'incorporate' a variety of grammatical distinctions. Thus, for example, in Eskimo a single word expresses the idea that might be rendered in English by the sentence "Do you think he really intends to go to look after it?" (The term 'incorporating' is also used to describe this type of structure.)

One result of this American anthropological tradition of language study was the publication of the *Handbook of American Indian languages* (1911–1922). The team responsible for this was led by F. Boas (1858–1942), a German scholar who had emigrated to the United States. The *Handbook* comprised brief descriptive accounts of the phonetics, grammar, and vocabulary of a range of Amerindian languages. Boas himself rejected the view that all Amerindian languages were 'polysynthetic.' His most important theoretical contribution to general linguistics is sometimes said to be his observation that Europeans were prone to misdescribe the sounds of Amerindian languages, because they could not avoid hearing them through the grid imposed by the phonetics of the European languages they themselves spoke. This idea has obvious links to Saussure's insistence that every language is structurally unique, although Boas arrived at this notion independently of Saussure.

In Europe, the chief influence of anthropology on the development of linguistics is to be seen in the work of the Polish anthropologist B. K. Malinowski (1884–1942), whose fieldwork in the Trobriand Islands inspired his view of language. Malinowski popularized the notion of "phatic communion," which, in contrast to the traditional idea that language existed to communicate 'thoughts,' emphasized the role of language as a mode of action for establishing social bonds.

Malinowski's ideas were taken up by J. R. Firth (1890–1960), professor of general linguistics at London University, whose ideas were in turn developed by 'neo-Firthians,' such as M. A. K. Halliday (b. 1925). Firth's 'polysystemic' linguistics emphasized the need for linguists to set up different 'systems' in order to describe relations between linguistic units at different 'levels.' Firth viewed linguistics as language "turned back upon itself." He is sometimes regarded as the archetypal 'hocus-pocus' linguist, for whom linguistics is a verbal game played in accordance with metalinguistic rules devised by the linguist (as distinct from 'God's-truth' linguists, who view their task as being to discover some external linguistic reality that exists independently of their inquiries).

Linguistic Relativity

Another line of thinking in which Saussurean ideas link up with those emanating from the American anthropological tradition of language study concerns the theory that came to be known as 'linguistic relativity' or 'linguistic relativism.' It is also known as the 'Sapir-Whorf hypothesis,' of which there are various versions.

The term *relativity* is often taken as alluding to the work of A. Einstein (1879–1955) in physics. In one sense, this is not misguided, inasmuch as Einsteinian relativity emphasized the dependence of 'facts' on the viewpoint of the observer. The Sapir-Whorf hypothesis does likewise. Einstein himself, however, was far from being a linguistic relativist. Another figure often invoked in connection with the Sapir-Whorf hypothesis is the German polymath W. von Humboldt (1767–1835), whose ideas are seen as anticipating the hypothesis, in that he associated each national language with a distinctive way of viewing the world.

E. Sapir (1884–1939) was a student of Boas's and published a study of Takelma in the *Handbook of American Indian languages*. B. L. Whorf (1897–1941) worked for the Hartford Fire Insurance Company and became a student of Sapir's at Yale. In his insurance work, Whorf was struck by the fact that accidents were often caused by the way things and situations were described. (For example, an oil drum described as 'empty' had actually been full of highly dangerous vapor.) In its most general version, the Sapir-Whorf hypothesis claims that the language we speak provides a linguistic lens through which we view the world. It follows from this that speakers of different languages see the world – and interpret their own experience of it – in different, incommensurable ways.

This is probably the most revolutionary idea to emerge from modern linguistics – revolutionary in the sense that it overturns the assumptions underlying the development of language studies throughout the Western tradition (*see* **Western Linguistic Thought Before 1800**). It also has far-reaching implications for linguistic epistemology. These implications tend to be ignored in mainstream linguistics, because they subvert the whole basis of establishing linguistics as a 'science.' Insofar as mainstream linguistics has an answer to the problems raised by the Sapir-Whorf hypothesis, it lies in mounting a rival hypothesis claiming that there exists at some 'deep' level in human psychology a universal grammar common to all languages (Chomsky, 1986). It is difficult to see how this conflict of views could ever be resolved by the adduction of empirical linguistic 'evidence.' The debate is ultimately sterile. Both the Sapir-Whorf hypothesis and the universal grammar hypothesis open up routes that lead linguistics nowhere. That has not prevented partisans on both sides from devoting much time and effort to driving their own hypothesis further into no-man's-land.

Behaviorism

In America Saussure's work remained for some time without noticeable influence, in part because

Saussurean linguistics eventually found itself under attack from psychologists, and in particular from linguists who had adopted the psychological doctrines of behaviorism. The leading linguistic exponent of these views between World War I and World War II was L. Bloomfield (1887–1949).

Although Bloomfield had himself studied Amerindian languages, and early in his career had been attracted to the psychological theories of Wundt, he was 'converted' to behaviorism at Ohio State University by A. P. Weiss (1879–1931). Bloomfield said of Weiss that he "was not a student of language, but he was probably the first man to see its significance" – an astonishing statement and an astonishing tribute. From the time of his acquaintance with Weiss, Bloomfield became increasingly and implacably opposed to 'mentalism' in linguistics. This entailed a rejection of Saussurean linguistics, given Saussure's view of the linguistic sign as a purely psychological unit existing in the human mind as a pairing of form (*signifiant*) with meaning (*signifié*). Somewhat more equivocal was Bloomfield's attitude to Boas's notion that linguistic structure lay below the level of human consciousness. Boas's introductory essay to the *Handbook of American Indian languages* had contained a concluding section on the "Unconscious Character of Linguistic Phenomena."

In accordance with behaviorist precepts, Bloomfield set out to banish from 'scientific' linguistics all appeal to unobservables. This meant no great loss as far as sound was concerned, since speech was audible and recordable. The problem lay with meaning. If meaning were in the mind of the speaker, they were unobservable and unrecordable. Accordingly, Bloomfield had to fall back on the ancient reocentrism of the Western tradition and declare that, for instance, the meaning of the word *salt* is nothing other than the physical substance salt. Thus meaning was rescued and brought within the domain of linguistic observation. The question then arose, however, 'What is salt?' Recognizing that linguists could not be expected to be omniscient, Bloomfield's answer was that meanings could not be stated precisely except in domains where science had 'determined' the nature of the thing in question. Thus science had determined that salt in the physical world is sodium chloride. So the semantics of words for substances like salt posed no problem. But science had not yet determined what items in the 'real world,' if any, corresponded to such words as *love* and *hate*. There, according to Bloomfield, semantics would have to wait until scientists had got round to investigating such matters. So semantics was "the weak point in language-study" and was likely to remain so "until human knowledge advances very far beyond its present state" (Bloomfield, 1933).

The effect of this behaviorist doctrine was to skew linguistic inquiry in the direction of phonetics, since so much of semantics lay in the limbo of the unknown or unknowable.

Distributionalism

Some of Bloomfield's followers drew the conclusion that a 'science' of language was possible only if it ignored the analysis of meanings and concentrated solely on the analysis of linguistic forms. The attempt to theorize this nonsemantic approach to linguistic structure came to be regarded as characteristic of American (as opposed to Saussurean) 'structuralism.' Saussure would have regarded any such development as retrograde, rather than as an advance in the science of linguistics. In effect, it was a reversion to Greek atomism (*see* **Western Linguistic Thought Before 1800**), although few if any of the American linguists involved were sufficiently well educated in the Classics to see the connection. Be that as it may, the outcome was a profound and misleading difference between the terms *structural* and *structuralism* as used in linguistics on either side of the Atlantic. Thus, for example, *Structural linguistics* (Harris, 1951) was the title of a well-known American textbook that (deliberately) excluded any consideration of linguistic meaning.

For the distributionalists, linguistic description consisted in identifying phonological units and defining all higher-order complexes by reference to the distribution of the basic units already defined. They assumed this could be done 'formally' – that is, without appealing at any stage to the supposed meaning of the items under investigation. The doyen of distributional linguistics was Z. S. Harris (1909–1992), whose critics argued that distributional analysis, contrary to its proclaimed principles, tacitly took meaning into consideration at every turn. In other words – so the argument went – the linguist's task of determining whether two sounds were the same or different was impossible without information about whether the native speaker treated them as articulating a minimal semantic distinction.

Distributionalism was 'formalist' in another sense. It reduced the definition of linguistic units to the sum total of analytic procedures involved in identifying them. Adoption of a different set of procedures might produce a different set of units. This in turn had implications for the status of linguistics as a 'science.' (The assumption was that 'scientific' knowledge should not be at the mercy of the methodological preferences of the scientist.)

However, at a deeper level, distributionalism also connected with the revolution in the epistemology of

science associated with Einsteinian relativity. In particular, the theory of operationalism in physics, as advanced by P. W. Bridgman (1882–1962), could be seen as a counterpart to Harris's distributionalism in linguistics. For Bridgman, all physical concepts were defined ultimately by reference to the techniques of measurement deployed in any scientific observation.

Generativism

One of Harris's students, A. N. Chomsky (b. 1929), proposed a novel approach to linguistic analysis by borrowing an idea from mathematical logic. It is possible to define a formal logistic system by setting out a string of 'rules' or algorithms that constrain transformations from one sequence of symbols to another. Chomsky saw that this procedure could be applied *in extenso* to the description of languages like English, if it were possible to propose a nucleus of symbols and transformational rules that would eventually 'generate' all and only the sentences of English. Many years of work were devoted to this Herculean quasi-mathematical labor, which never came to completion, either for English or for any other language.

Chomsky attacked behavioristic approaches to language, in particular the explanations offered by the experimental psychologist B. F. Skinner (1904–1990) concerning language acquisition. In the view of Chomsky and other generativists, language users were to be credited with reliable linguistic 'intuitions' as to the grammaticality or otherwise of expressions in their language. How these intuitions were to be distinguished from the products of teaching, rationalization, or personal preference was never clearly explained.

Although Chomsky at one point saw his project as a formalization of the Saussurean distinction between *langue* (= Chomskyan 'competence') and *parole* (= Chomskyan 'performance'), that would have amused Saussure, for whom the naïve notion that a language could be reduced to a set of sentences was not even a starter. Generativism has been criticized by sociolinguists (see the next section) for ignoring linguistic variation and verbal interactions in 'real-world' contexts. In particular, Chomsky's frequent appeal to an "ideal speaker-listener" is seen as an unacceptable evasion of linguistic issues that should be addressed empirically.

Sociolinguistics and Pragmatics

During the 20th century, there had also emerged in linguistics the simple but powerful idea that languages could be studied independently of any theory about "the language system." So it did not matter too much what theorists like Saussure or Bloomfield or Chomsky said. Whatever they said, linguistic behavior was still available for description as a social phenomenon. This is the basic idea behind what came to be called 'sociolinguistics.'

It derives from traditional dialectology, but it now incorporates the notion that linguistic variation has other than geographical parameters. In particular, it embraces the notion that there are discernible patterns of linguistic variation that depend on age, sex, education, social status, social occasion, professional occupation, and other factors. All these may intersect in numerous ways. It is the task of the sociolinguist to document, disentangle, and explicate these complex patterns.

A sociolinguistic approach leads on naturally to 'pragmatics' or 'pragmalinguistics.' This has now become a catch-all category embracing virtually all forms of linguistic variation or distinguishing characteristics that can be detected when language is used in a particular type of activity or communication situation.

The main objection that has been leveled against linguistic research of this kind is that it falls inevitably under the aegis or influence of sociology, and thus is led to adopt techniques of investigation and methods of classification that are approved in that discipline (in particular the adoption of certain social classifications and statistical assessments that may perhaps be inappropriate or misleading for linguistic purposes).

Speech-Act Theory

Pursuing a sociolinguistic approach to its logical conclusion, one is led to ask not "What are the basic sound units of a language?", nor "What are the basic grammatical units and constructions?", but "What are the basic speech acts by which one human being communicates with another?" Curiously, this question had been more or less neglected in modern linguistics until it was raised in the neighboring discipline of philosophy. That it was raised at all is due largely to the Oxford philosopher J. L. Austin (1911–1960), whose work in turn owes much to the climate of inquiry created in philosophy of language and philosophy of mathematics by G. Frege (1848–1925), B. A. W. Russell (1872–1970), G. E. Moore (1873–1958), and L. Wittgenstein (1889–1951).

The title of Austin's brief but highly influential book *How to do things with words* (1962) strongly suggests the pragmatic orientation of his thought. He

realized that stating a fact (recognized in traditional grammar as the province of the indicative mood) was only one of many verbal activities it was possible to engage in, even though it was the activity that traditional philosophy valued and paid attention to above all others. This led Austin to ask what other types of act were available to the speaker or writer. He pointed out that saying "I apologize" is not a description of an apology but the execution or performance of the act in question. This simple observation had escaped all traditional grammarians, for whom *I apologize* is on a par with any other first-person present indicative active, such as *I walk*.

Austin's initial exposition of the performative dimension in linguistic communication was followed up in work by J. Searle (b. 1932) and H. P. Grice (1913–1988). No comprehensive taxonomy of speech acts has been forthcoming. One reason alleged by critics of speech-act theory is that this is impossible, because speech-acts proliferate *ad infinitum*, depending on the criteria adopted for identifying them. Another, perhaps more damaging, criticism is that speech-act theory itself tacitly relies on accepting of the prior existence of a code (i.e., a language) by means of which the act is articulated. In other words, the speech-act theorist is led into complicity with the traditional assumptions of orthodox linguistics. Without these, the speech act cannot be identified or described.

Language Origins and Nonhuman Language

The ancient question of linguistic origins fell out of favor in the course of the 19th century. The Société de Linguistique, founded in Paris in 1866, expressly forbade the presentation of papers on the subject. The eminent American philologist W. D. Whitney (1827–1894) dismissed all discussion of the origins of language as "mere windy talk." Interest was renewed, however, in the 20th century, largely through research from two directions.

With the general acceptance of Darwin's theory of evolution, it seemed likely to many that language itself had developed from more primitive forms of communication used by less advanced ancestors of the human race. On this view, it ought to be possible in principle to account for language as having evolved on the basis of natural selection.

Others thought it more probable that language was the result of a unique genetic mutation. Others again maintained the skepticism of the 19th century and insisted that, in the present state of knowledge, it is impossible to progress beyond speculation to 'science.' The debate continues (Botha, 2003).

In the study of animal behavior, much attention was paid in the second half of the 20th century to the possibility of teaching linguistic skills to other primates, particularly those genetically close to *Homo sapiens*. It was generally accepted that apes were, for physiological reasons, unlikely to be able to produce articulated speech. But there seemed no reason why they might not master a language of gestures. Some of these projects developed systems based on American Sign Language for the Deaf. In later experiments, computer-monitored keyboards were used, and apes proved adept at mastering them.

From the beginning, work in this area was controversial. Skeptics questioned whether the use made by apes of the signs taught to them by human instructors was genuinely 'linguistic,' as distinct from being merely 'imitative.' (Pigeons had been taught to 'play ping-pong,' or at least to go through the motions, but no one seriously supposed that the birds understood what they were doing – i.e., playing a game.) However, it subsequently emerged that bonobos not only could use signs regularly to communicate their own wants, but could understand spoken English of a certain degree of grammatical complexity (Savage-Rumbaugh *et al.*, 1998).

Retrospect

When one looks back at the ambitious academic program that Saussure (1916) first laid out for modern linguistics, it is interesting to note what progress has been made. The program had three objectives. There is still a long way to go in pursuing Saussure's first goal of describing all known languages and recording their history. His second goal, of determining the forces operating permanently and universally in all languages, is no nearer to fulfillment, because of fundamental disagreement about the methods to be pursued. His third goal, that of defining and delimiting linguistics itself, threatens to disappear as the boundaries separating linguistics from neighboring disciplines become increasingly porous. The real weakness in Saussure's original program, as it now appears, was its failure to make provision for any study of the actual contexts in which linguistic communication is embedded. Such studies seem inevitably to involve trespassing on or borrowing from work done by specialists in adjacent fields. As a result, fewer and fewer linguists any longer believe in the autonomy of linguistics. It would be a more accurate reflection of current trends to say that across a wide spectrum of academic research in the humanities the importance of linguistic considerations is increasingly acknowledged, and the interdependence between verbal and nonverbal communication recognized.

See also: Behaviorism: Varieties; Firth, John Rupert (1890–1960); Integrational Linguistics and Semiology; Jones, William, Sir (1746–1794); Müller, Friedrich Max (1823–1900); Neogrammarians; Pragmatics: Overview; Speech Acts; Structuralism; Structuralist Phonology: Prague School; Western Linguistic Thought Before 1800.

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Modes of Participation and Democratization in the Internet

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It has almost become a cliché to say that new communication technologies are having enormous effects on political discourse. Examples of these effects abound, from the use of the Internet by democracy activists in China to its use in political campaigns in the United States. Discussion of the political impact of electronic communication and its implications intensified after September 11, 2001, with governments voicing fears that the Internet had become of tool for terrorist elements, and some citizens voicing fears that new regulations allowing the government to curtail freedom and privacy in cyberspace violated what they saw as the 'democratic ethos' of the medium.

The debate about the relationship between computer mediated communication and democracy has always been characterized by ambivalence and contradiction. Howard Rheingold, one of the earliest analysts of online community building, noted in the early 1990s that virtual communities could either assist citizens in revitalizing democracy, or become a substitute for democracy, luring users into attractively packaged forms of superficial discourse.

Linguists, discourse analysts, and scholars in communications studies have contributed to this debate in a number a ways, focusing on a wide range of issues, including code choice and the domination of English in electronic discourse, the norms of interaction that develop in online discussions, the ways the Internet has affected global and local flows of information and, in some ways, changed the nature of information itself, the ways the medium has contributed to the imagination of new communities and news kinds of social identities, especially for marginalized groups, and the new kinds of 'literacies' necessary for citizens in the electronic age. Scholars working in these areas have tended to eschew technological determinism, putting

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forth positions that emphasize the complex interaction among language, culture, technology, economic forces, political forces and the contingencies of situated social interaction.

This article will provide a brief overview of the major issues in the above areas, arranged around the concept of 'participation.' New communication technologies provide new ways for people to participate in the political process, from macro-level participation of collective action and community building to micro-level participation, in what Goffman calls 'the interaction order.'

The Internet as Tool and Artifact: Competing Discourses

The first important distinction that needs to be made when discussing ways those interested in language and communication study the Internet is that between the study of discourse **on** the Internet and discourse **about** the Internet. Technologies, as Christine Hine points out in her book *Virtual Ethnography*, are both tools for communication and artifacts that we create through the symbolic meanings we invest in them. Lakoff and Johnson, as well as others, have reminded us of the importance the metaphors we use have in shaping the ways we interact with the world. In his book *Internet Dreams: Archetypes, Myths and Metaphors*, Mark Stefik presents a number of these metaphors along with examples of how they are used, including how they apply to the Internet: as 'a digital library,' 'a communication conduit,' 'an electronic marketplace,' and 'a collection of virtual worlds.' In the United States, the most powerful metaphor for the Internet has been that of the 'information superhighway,' and this metaphor has an important ideological effect in shaping government and industry policy towards the medium, in particular, focusing recourses on the development of the informational rather than the relational aspects of the medium and on conceptualizing it as a network for the transportation of goods and services, much like the interstate highway system.

In terms of its political uses, media and academic representations of electronic communication can be divided into two broad discourses, one utopian and the other dystopian. The utopian vision has focused on the Internet's potential to widen political debate by providing the resources for disseminating information to a greater number of people, providing a forum for debating policy, providing spaces for the development and the strengthening of communities, and providing more efficient means for citizens to interact with their governments. This discourse emphasizes both freedom (illustrated by the 'electronic frontier' metaphor) and democratic governance (illustrated by the 'electronic commons' metaphor). An example of this perspective can be seen in predictions, like those of political scientist Anthony Corrado's in his 1997 book *Elections in Cyberspace,* that the Internet would bring about "a revitalized democracy characterized by a more active informed citizenry."

The dystopian discourse, on the other hand, sees the Internet alternately as a tool of criminal elements such as pedophiles or terrorists and as a tool for governments or large corporations to expand their influence. Here, the main focus is on security, whether it be couched in questions of how to protect national security from online terrorists, how to protect the security of our children and families from sexual predators, or how citizens can secure themselves against the enhanced surveillance capacity the Internet has afforded to governments and corporations.

The importance of these discourses is not merely academic. They help to shape the kinds of material policies governments enact to regulate the medium, and help to shape the patterns of usage adopted by individuals and communities. The ways we use the Internet is always both reflective and constitutive of the tension between these two competing discourses.

Participation: Deliberation and the Public Sphere

Most contributions to the debate about the Internet and democracy from the field of communication studies have focused on macro-political issues. In this approach, participation is seen in terms of individuals and groups interacting with larger political institutions and media organizations, and the emphasis is on the ways the new flows of information the Internet makes possible are changing the way information is used and policy is made. Electronic communication is seen as having the potential to undermine hierarchical institutions on a grand scale, allowing for new forms of uncontrolled horizontal communication.

Characteristic of this approach is the work of Peter Dahlgren, who explores the way the Internet is changing what Habermas calls "the public sphere." For Habermas, the public sphere is made possible and maintained through flows of discourse; it is constituted by social interaction. Computers have had the effect of shifting these flows of discourse, opening up different kinds of access to discursive practices for more people.

Others have also focused on the potential for the Internet to foster democracy, examining the extent to which the medium fulfills Habermas's criteria for

democratic discourse due to its near universal accessibility, social decontextualization, lack of usage conventions, and the difficulty of enforcing censorship. The two areas that have been most thoroughly considered are the effect the Internet has on citizens' access to information and its potential to provide a medium for the kind of considered deliberation seen necessary for democratic decision making.

The major impact the Internet has had on the flow of information is decentralization; whereas in the past sources of information tended to be concentrated among a few major commercial and governmental outlets, the Internet allows those with limited resources to publish information, and for users all over the world to bypass traditional gatekeepers of information and avail themselves of primary sources and of a wide range of perspectives on these sources. This feature has proved particularly important in nations in which traditional media (newspapers, television) are tightly controlled by governmental or commercial interests.

Not only has information itself become decentralized, so has the power to decide what kinds of information are important and what kinds are not – the process of 'agenda setting.' In the past, large media corporations and governments perpetuated a top-down model of political discourse, in which those at the top of the information business held control over the public discussion. Now, even web pages run by individuals can have an enormous impact on the shape of the political debate. Two good examples from the United States are the way the right wing website *The Drudge Report* introduced a sex scandal into the public discourse that led to the impeachment of President Clinton, and the way the activist site *MoveOn* helped to mobilized public opinion against the impeachment process.

This fracturing of the information market has given rise to new genres. Perhaps the most dramatic development in journalism in the early 21st century has been the growth of 'web-logs' or 'blogs,' websites on which individuals filter, organize, and comment upon the information made available by more traditional media. Many of these sites offer users the chance to participate in this filtering process. One of the best examples is *Plastic*, a site that allows members to post links to interesting articles they have read on the web and to invite others to debate on them.

The extent to which these new forms of journalism will cultivate the kind of informed public often seen as necessary for democracy is uncertain. Just because a public has more information available to it does not necessarily mean it is more informed, and much of the information that circulates on the web can be inaccurate or biased. It is also possible that these new modes of participation can actually limit users' access to opposing points of view, their exposure to information more than ever defined by preexisting interests. Furthermore, even though weblogs and other interactive forums allow users to participate, there are still limits on participation that are determined by moderators' interests and biases.

Of particular interest to discourse analysts is the way the Internet is changing the nature of information itself, particularly in regard to time and space. Not only has electronic communication increased the amount of information available, it has also resulted in written texts being circulated in the public at a greater frequency than ever before. In his essay, 'The Frequencies of Public Writing,' John Hartly notes that on the Internet the speed at which texts are produced and consumed has speeded up, altering the ways people regard and use the information in these texts. This increased speed of information has effects on the political decision-making processes of both leaders and citizens, forcing them, in many cases, to make hastier decisions in response to the furious flow of information.

The nature of information as it manifests in electronic communication is also of concern to those interested in literacy and the kinds of information processing skills citizens will need in the new electronic age. In their book, *New Literacies*, Colin Lankshear and Michele Knobel enumerate some of these skills, from the more pedestrian, like sorting and evaluating information and participating discursively in online marketplaces like *e-bay*, to the more subversive, like 'culture jamming' at *ADBUSTERS*. Applied linguists and educationalists have engaged in a wide range of research on how students process and produce information using computers.

In his book, *The Electronic World*: *Democracy, Technology and the Arts*, Richard Lanham posits that the superabundance of information on the Internet and the new capacity for texts to be easily reproduced will result in fundamental changes in political economy and the democratization of education. At the center of these changes, he suggests, are those who will develop new ways to assist citizens in choosing and using electronic texts through the creation of what he calls "attention structures." The ability for humans to formulate new architectures for attention, particularly through higher education, he insists, will determine the extent to which information will be useful in nurturing democratic institutions.

Many argue that the increased exchange of information afforded by the Internet and the ability to filter and use this information are not in themselves sufficient to foster democratic participation, that a more crucial element is the opportunity for citizens

to engage in deliberative communication, the process of openly sharing ideas and debating upon them. Many journalistic, political, and governmental web pages provide opportunities for users to participate in deliberative discussions. Examples include the *WELL*, 'Table Talk' at *Salon*, 'The Fray' at *Slate*, and forums at *The New York Times*.

Although computer-mediated forums seem to have the potential to foster the kind of deliberative dialogue useful for effective democratic decision making, studies of various computer mediated forums, newsgroups, bulletin boards, and chatrooms using principles of discourse analysis, and conversation analysis have been fraught with contradictions. While early studies suggested that the lack of conventional social cues might inhibit deliberative discourse and the formation of relationships, later research suggested just the opposite, that synchronis and asynchronis computer-mediated communication are often more expressive communication or, what Walther calls "hyperpersonal communication." At the same time, it has been found, that computer-mediated discussions tend to be dominated by a few individuals, mostly men, that contributions tend to be short, with a high degree of value placed on rapid response, that online decision making tends to be more competitive than cooperative, and that users are often given to personal attacks and abusive language, possibly due to the anonymity afforded by the medium that may inhibit the development of or adherence to shared social norms. Successful electronic deliberation seems to be a feature of electronic communities with more stable membership that are able to coalesce around shared goals.

Participation: Communities, Marginalization, and Activism

Another important issue relating to electronic discourse and democratization is the way the medium makes possible new kinds of communities, social identities, and forms of political action, particularly for marginalized groups.

One of the most widely debated questions about the Internet has been its ability to foster electronic communities and the effects Internet use might have on real life communities. A famous early proponent of electronic communities was Howard Rheingold, who insisted that cyberspace provides individuals with the freedom to form their own communities free of physical and political limitations. The extent to which electronic communities have become a force for democratic participation is debatable. In many instances, particularly among those suffering from social stigma, such as people with HIV/AIDS, the Internet has made available the means to form important networks for social support and information sharing. Detractors worry that involvement in electronic communities may actually weaken democracy by diminishing people's involvement in real life communities. Despite such concerns, most studies, for example the 2000 study of the Pew Internet and American Life Project, have found that Internet use tends to enhance contact with one's physical community.

Related to the issue of communities is that of how people in socially or politically marginalized groups have made use of the discursive practices offered by the Internet to alter their social situations and engage in online political activism (or 'hacktivism'). Perhaps the earliest and most famous examples of a socially radical perspective on new technologies is the Cyberfeminism movement, best characterized by the writings of Donna Haraway and her theory of the 'cyborg.' Cyberfeminists see the Internet as freeing women (and men) from the limits of biology. It focuses on such aspects of electronic communication as the lessening of hierarchy and the nurturing aspects of virtual communities, claiming that the Internet will represent the death of patriarchy and the dawn of a postgender world. Other examples of the Internet being used to advance the agendas of marginalized communities include the creation of digital 'queer spaces' by gays and lesbians, and the use of electronic communication by democracy activists in places like China and Burma.

At the heart of the ability for the Internet to foster free speech and political activism is the fact that new technologies of communication fundamentally change how people are able to manage their identities in interaction. The Internet has altered what Saco calls "the politics of visibility" in two ways. On the one hand, it has increased the visibility of heretofore marginalized people and perspectives. On the other hand, it has facilitated free speech by providing people ways to conceal or alter their identities. Here we see one of the chief paradoxes of electronic communication in relation to democracy. The anonymity that is possible on the Internet can simultaneously facilitate free speech and democratic deliberation by creating conditions under which people feel more comfortable expressing themselves, and inhibit free speech and serious deliberation by creating the conditions under which people do not have to take responsibility for what they say. Thus, while the Internet is a bastion of free expression for the socially and politically marginalized, it is also a major forum for those who seek to further marginalize them – purveyors of racist, sexist, and extreme nationalist ideas and other forms of hate speech. Thus, while

the Internet can, in some ways, counter marginalization, in other ways it can contribute to it. In her book *Cybertypes: Race, Ethnicity, and Identity on the Internet*, Lisa Nakamura argues against the utopian myth of a 'raceless Internet,' claiming that the kinds of racism that exist in physical space are often mirrored, or even accentuated in cyberspace. Similarly, the linguist Susan Herring, in her studies of gender and online language use, has found that attempts by females to participate on an equal basis in online discussions are often ignored or delegitimized by male users. Others critical of the potential for the Net to foster new political identities point to the fact that the identities most Internet websites make available for their users are not empowering political identities, but rather consumer identities. Despite the use of cyberspace for political activism, 90% of all web pages are commercial in nature.

Finally, any discussion of marginalization would not be complete without mentioning the 'digital divide,' the fact that many people in the world do not have access to the material resources or the skills to take advantage of the new modes of political participation that the Internet affords. Of the world's online population, for example, 41% is in the United States and Canada, while only 4% is in South America. In the United States, in 2000, white and Asian American households had Internet access at more than double the levels of black and Hispanic households.

Participation and the Interaction Order

Most of the issues above focus on language and discourse and how they operate in cyberspace on the level of governments, social institutions, and communities. Answering questions about the effect of the Internet on political life, however, requires not just attention to the politics of governments and institutions, but also to the more local politics of everyday life. Perhaps the greatest impact that new communications technologies have had on politics has to do with the way they have altered what Goffman calls the 'interaction order' – the patterns of participation and power that we construct with others on a moment to basis in our everyday lives. One branch of sociolinguistics particularly concerned with this aspect of cyberspace is mediated discourse analysis. In their book *Nexus Analysis*: *Discourse and the Emerging Internet*, Ron and Suzanne Scollon argue that, while the role of the Internet in disseminating political information and facilitating organized political deliberation and action are certainly important, a much more important impact of the medium has been the way it makes possible new linkages of social practices and, through these, new identities. The Internet, they say, has altered the participation frameworks and power relations associated with face to face communication: people once separated by more stable social boundaries of age, power, and geographical location are communicating more, identities are becoming more fluid and contingent, and the distinctions between conversational topics and activities (such at work and play) are becoming blurred. What discourse analysts should focus on when studying the Internet, they insist, is not just the discourse that they find on it, but the kinds of everyday social actions it makes possible for users.

Related to this approach is a concern not just with what people do online, but with how Internet use alters physical spaces – not just geopolitical spaces, but more local geographies of homes, offices, schools, and coffee shops where computers are used. In his article 'The problem of context in computer mediated communication,' Rodney Jones explores this issue. More conventional notions of context from sociolinguistics and linguistic anthropology, he argues, need to be revised to take into account the ways technology allows users to strategically alter multiple spaces and enact multiple ways of being socially present. This layering of multiple contexts has fundamentally altered power relations in workplaces, schools, and livings rooms.

Any review of the impact of new communication technologies on democracy will inevitably raise more questions that provide answers. Much will likely change in the coming years in terms of the ways people communicate and the ways governments govern, and these changes will provide a rich source of study for those interested in language.

See also: Computer-Supported Writing; Conversation Analysis; Gender and Political Discourse; Genres in Political Discourse; Identity and Language; Language in Computer-Mediated Communication; Literacy Practices in Sociocultural Perspective; Media and Language: Overview; Media and Marginalized Groups; Media, Politics, and Discourse: Interactions; Media: Pragmatics; Multimodality and the Language of Politics; Politics, Ideology and Discourse; Power and Pragmatics; Reading and Multiliteracy; Spatiality and Language.

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Modularity

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Here is a general characterization of the concept of a mental module: it is a department of the mind that is dedicated to a specific domain of content and is largely autonomous from other departments of the mind. Possible content domains are visual perception, language, arithmetic, music, spatial orientation, social relations, and scientific reasoning, each of which may itself be made up of more fine-grained domains.

Although domain specificity and autonomy are central to any notion of modularity, there are also important differences in the kinds of mental structure that may be referred to as modules. The main distinction is between (a) systems of mental representations and (b) computational mechanisms (see Samuels, 2000). Modules of the first sort are sometimes called 'information' modules, 'Chomskyan' modules (after Noam Chomsky, who proposed such a modular view

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of the human language capacity), or 'competence' modules. Modules of the second sort are computational devices, processing systems, or 'performance' modules. Of course, modular systems of both kinds often coexist. For instance, a modular system for performing arithmetic computations might call on a domain-specific system of arithmetic knowledge; similarly, a modular mechanism for comprehending language (a parser) might deploy the contents of a Chomskyan module of linguistic information (see Segal, 1996).

Chomskyan modules ('C-modules' hereafter) are domain-specific bodies of knowledge that underpin a cognitive capacity. In addition to the well-known case of linguistic knowledge (the phonological, syntactic, and semantic knowledge constituting an individual's language), plausible candidates for such competence modules are physical knowledge (knowledge of some of the properties of physical objects), biological knowledge (knowledge of some of the properties of living things), psychological knowledge (knowledge of some of the properties of human minds), and mathematical knowledge (knowledge of counting and numerical quantities).

However, there are bodies of domain-specific knowledge that do not qualify as C-modules. Consider, for instance, a child's beliefs about Batman or an adult's knowledge of British history. To count as a C-module, a knowledge system must meet two additional constraints. First, there must be restrictions on information flow (both the accessibility of the system's knowledge to other content domains and the effect of outside information on the system itself). Second, at least some subset of the knowledge comprising a C-module is innately given (hence universal). With regard to language, a strong case has been made for a universal grammar (UG), an innate system of mental representations, which is shaped by environmental input into a specific linguistic system (Chomsky, 1984; Chomsky, 1986). By analogy with UG, we can envision that each of the other possible C-modules mentioned above develops from an innate knowledge base: UPh, UBio, and so on.

Computational or performance modules ('P-modules' hereafter) are mechanisms that process and transform mental representations. They are only able to carry out computations on a restricted range of inputs, namely, those concerning a particular domain, and in processing these inputs they can only use their own proprietary principles and procedures (their own database, which may comprise a C-module). For instance, an arithmetic computational module will only provide solutions to arithmetic problems and will only use arithmetic operations to solve those problems. Fodor's landmark 1983 book on modularity focused on P-modules (while acknowledging the existence of C-modules), arguing in particular that language processing is a P-modular system.

In addition to the central properties of domain specificity and informational encapsulation, Fodor suggested a number of other criterial properties of P-modules. Like reflexes, they function mandatorily when presented with an appropriate input, and they are very fast in their operation; consequently, their output is relatively shallow. There are three criteria that reflect their innate basis, distinguishing them from learned habits (which may also be fast and automatic): neural localization, a relatively fixed ontogenetic pace and sequence, and characteristic patterns of independent breakdown. Fodor (1983) provides evidence that language parsing (or perception) has all eight of these properties, though others dispute this (Marslen-Wilson and Tyler, 1987).

The big question about the architecture of the human mind concerns the extent to which it is modular as opposed to employing domain-general principles and processes. Fodor's (1983, 1989, 2000) answer is that only input and output systems (roughly, the various perceptual systems, motor systems, and language) are modular. The central cognitive systems, responsible for belief fixing and reflective thought, are content general and highly sensitive to contexts and individual utilities. So, according to Fodor, they are nonmodular (global, isotropic) and, as a result, are beyond the reach of scientific investigation.

The strict Fodorian view of a module, with its application only to peripheral mental systems, is widely seen as too restrictive (Karmiloff-Smith, 1992; Sperber, 1996, 2005; Carruthers, 2003, 2004). From an evolutionary perspective on human cognition (Cosmides and Tooby, 1994; Sperber, 1996), what characterizes a mental module is that it is a special-purpose mechanism attuned to regularities in a particular domain, a biological adaptation selected for its efficiency in dealing with problems specific to that domain. It will tend to employ principles and heuristics that have evolved for the task at hand and are not applicable to problems outside its domain.

On this broader view of a mental module, human cognitive architecture is likely to be massively modular. Not only perception but also many central conceptual systems are modular (Sperber, 1996, 2002; Carruthers, 2003). One central inferential capacity that has received much attention as a likely modular system is 'mind reading,' that is, the capacity to attribute mental states such as intentions and beliefs to others on the basis of observed behavior (Scholl and

Leslie, 1999; Wilson, 2003). It is further claimed that the pragmatic capacity (that is, the ability to infer the intended meaning of communicative acts, whether verbal or nonverbal) is a sub-module of the mind-reading module, with its own special-purpose principles and mechanisms (Sperber and Wilson, 2002; Wilson, 2003).

Strong supporting evidence for any modularity claim comes from 'double dissociations,' where for one group of people a specific capacity (say, mind reading) is impaired while another (say, language) remains intact, and, for another group, the pattern is the reverse (see Shallice, 1988; Smith and Tsimpli, 1996; Wilson, 2003).

See also: Cognitive Science: Overview; Fodor, Jerry (b. 1935); Modularity of Mind and Language; Philosophy of Mind.

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Modularity of Mind and Language

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Parameters and Definitions

Modularity is an important concept relevant to a number of central debates in the cognitive and neurosciences, including theories of the structure of the mind/brain. Broadly speaking, modularity concerns the degree to which cognitive domains can be thought of as separable – i.e., whether they function independently of one another. Exactly what constitutes a module varies widely across disciplines and theoretical approaches.

The most explicit definition of modularity comes from Fodor (1983). In Fodor's view, a module is a perceptual input system that meets the following criteria:

(1) It is *informationally encapsulated*; other parts of the mind/brain cannot interfere with the internal functioning of a module. (2) The operations within a module are *unconscious* and not available for reflection. (3) Modules have *shallow outputs* – i.e., the intervening operations that give rise to output are not apparent from that output. (4) The operation of a module is mandatory – *obligatory firing*.

Four more criteria apply and are exclusive to the notion of 'innate' modules. Innate modules are (5) *localized* in particular brain areas, common to all individuals. They exhibit (6) *ontogenetic universals*; their development is bound to a given time schedule. Additionally, there are characteristic ways in which modules break down, giving rise to (7) *pathological universals*. Finally, innate modules are (8) *domain specific*. They operate exclusively on certain types of input; in Fodor's terms, modules have proprietary inputs.

Albeit the most explicit, Fodor's vision of a module is by no means unchallenged. Importantly, different definitions of what constitutes a module may include various combinations of these criteria (Elman *et al*., 1996). Also, some criteria may be more important than others, depending on the level of description: anatomical structure, computation, function, or knowledge. It is generally accepted that some form of modularity exists in the human mind/brain, but there is little agreement on what exactly that is, nor on the degree of fractionation. For example, there is little controversy regarding the notion that highly specialized areas of the visual cortex selectively process specific dimensions of the visual experience of color and orientation. However, for higher-level cognition, whether a specific brain region can be thought of as the 'language module' or the 'face module' involves more controversial questions.

Bearing that in mind, we find it more useful to think of Fodor's criteria as separable hypothetical parameters – as opposed to necessary criteria – that are important in theorizing about the architecture of the mind/brain. For the purposes of this article, we will focus on three crucial questions in the modularity debate that correspond to some of the parameters discussed. These questions are by no means exhaustive, but they capture key elements that are relevant to the field as a whole.

1. The question of localization: At what level is the brain modular?
2. The question of ontogenetic and pathological universals: When, and how, do certain functions become modularized?
3. The question of domain specificity: Are modules independent of one another?

The Theory and Methodology of Modularity: Logic and Assumptions

Before we discuss the key questions, it is important that we present the methodological framework most widely used in investigating modularity. As a theoretical construct, modularity is tightly linked to the field of adult neuropsychology and can be thought of as one of its axioms. The main objective of this discipline has been to use patterns of impairment in the adult to arrive at a theory of normal cognitive processes and brain structure. Modularity is also an important construct in the more recent field of developmental neuropsychology, where one of the objectives is to arrive at a model of the normal child state from patterns of developmental impairment. Of course, both adult and child neuropsychology share another important and practical goal of diagnosis and symptomology for clinical populations.

The single most important piece of evidence for functional modularity is deemed to be the existence of double dissociations (DD), of which different versions share an underlying logic.

The adult and child brain damage version: After brain injury, Patient A loses the capacity to perform task X but can still perform task Y. Another Patient, B, shows the opposite pattern, where he or she can perform X but not Y. In this case, researchers infer that functions X and Y are doubly dissociated.

A further inference is also often made – i.e., that the sites of lesion in Patients A and B are causal for functions X and Y respectively. Although worded to fit the single case, the logic of DD applies to group studies as well. There is considerable debate about whether single-case or group studies are more appropriate in investigating modularity (Robertson *et al.*, 1993; Shallice, 1988). Nevertheless, most of the issues discussed here apply equally to single-case and group studies.

The developmental disorders version: The extension of the adult DD logic to development is somewhat curious, since most conditions of developmental disorders are not associated with frank neurological lesions (despite differences in brain anatomy and physiology being extremely common). In the developmental case, the logic is modified: Child A has learned skill X but not skill Y. Another Child, B, has learned Y but not X. It is then inferred that skills X and Y are dissociated over developmental time.

Yet another, stronger version of DD is used to support a particular claim – namely, genetic modularity: due to genetic impairment, Child A fails to learn skill X but learns skill Y. Another Child, B, with a different genetic mutation, displays the opposite pattern, in that he learns Y but not X. In this case, researchers infer that skills X and Y map onto the mutated gene or specific set of genes in each case. The necessary module is hypothesized to be defective or missing and thus unable to develop the skill in question, as illustrated in the following claim:

> ... Overall, the genetic double dissociation is striking... The genes of one group of children [specific language impairment] impair their grammar while sparing their intelligence; the genes of another group of children [Williams syndrome] impair their intelligence while sparing their grammar (Pinker, 1999).

The different versions of the modularity claim, as applied to language, will be discussed in detail later. However, first it is important to examine the critical assumptions embedded in the logic of DD, which are often overlooked, and to determine whether these assumptions hold in each version of the modularity claim.

There are at least four critical assumptions: (1) that specific brain substrates underlie dissociable functional components – the *dissociability assumption*; (2) that there is a direct mapping between behavioral impairment and functional components – *the transparency assumption*; (3) that lesions or disorders cause the subtraction of the affected module, reflected in functional impairment on tasks relevant to that module, while all other functions operate normally – the *subtractivity or residual normality assumption*; finally, (4) that all cognitive systems are similar across individuals with individual differences being noncontributive – the *universality assumption*. In sum, a direct mapping between modules and behaviors is assumed.

The extension of the DD logic to cases of developmental or acquired disorders has a number of strong implications: (1) that the behavioral patterns in the adult case and in the child case share the same underlying cause – namely, the defective module in question; (2) that a static model can explain patterns of behavioral outcomes, deeming the developmental process itself to be a minor contributor; and (3) that pure cases, exhibiting selective deficit as in the adult, can be found in infancy and childhood. These assumptions and implications shape the kinds of inferences that are made from the data and will thus be evaluated in detail when we turn to our three main questions.

Localization: At What Level is the Brain Modular?

A certain function or domain is said to be localized if it is represented and/or processed in circumscribed regions of the brain. At the other end of the continuum is distributed processing, where multiple, potentially discontinuous brain regions are involved in the representation or processing of a given function. Localization is not necessarily held as a criterion for modularity. Some theorists distinguish between cognitive modularity (arising from cognitive neuropsychology) and neural modularity (arising from classical neuropsychology), where each is of more relevance to cognitive and neural theories respectively. In some strong versions of this distinction, the neural substrates of cognitive modules are deemed irrelevant (see Robertson *et al.*, 1993).

It is fairly widely accepted that adult neurological patients can in some circumstances exhibit deficits that can be described as selective. The accumulation of a significant body of data from brain damage, and more recently from imaging, has helped elucidate what the components of cognition might look like in the adult. Classic findings point to breakdown within the language domain, including grammatical processing in Broca's area, and comprehension and word finding in Wernicke's area. Face processing is another domain claimed to be carried out uniquely in a specific region of the brain – i.e., the fusiform gyrus.

The logic and assumptions of DD face a number of theoretical challenges. Modular analysis lends itself to vast flexibility in the face of inconsistent data; a modular framework can, without fail, carve existing modules into increasingly smaller components or

keep adding new modules to accommodate a given behavioral pattern. At the extreme, multiple modules the size of each tiny concept could be hypothesized (Sperber, 2002). This infinite decomposition is best exemplified by the modular analysis of the language function, where linguistic knowledge is separated from general cognition, and grammar from the lexicon (Pinker, 1999), with further decomposition of the lexicon into components for nouns and verbs, and nouns into separate modules for tools vs. utensils (Tranel *et al.*, 1997). This seemingly infinite refinement of cognitive architecture raises the possibility that it is simply the task demands themselves that can account for what is deemed to be a module, shedding doubt on the of modular theories.

Even more problematic for modularity is whether it can really be considered a data-constrained model at all. Finding the doubly dissociated components requires a model that defines *a priori* what the components are. Furthermore, it requires a model of how the tasks used to assess the integrity of a given component relate to that module. Shallice (1988) highlighted the circularity inherent in such an analysis:

> An argument to justify [modular analysis] could . . . proceed in the following way: "If modules exist, then . . . double dissociations are a relatively reliable way of uncovering them. Double dissociations do exist. Therefore modules exist." Presented in this form, the logical fallacy is obvious.

According to Shallice, the validity of this claim rests on the assumption that dissociations can arise only from damage to modular systems. Yet findings from neural network lesioning clearly demonstrate that selective deficits can arise not only from a modular structure but also from a distributed neural network architecture (for example, Plaut, 1995). In fact, Shallice presents a number of alternative theoretical possibilities of nonmodular architectures that would also give rise to double dissociations after impairment.

On empirical grounds, the classic conclusion that damage in specific areas produces selective functional deficit has been countered by numerous findings. In language, agrammatic patients showed some preservation of grammatical judgment, albeit at a fragile level (Wulfeck and Bates, 1991). Conversely, clinical populations with damage in areas other than Broca's exhibited agrammatic symptoms (Dick *et al.*, 2001). More generally, the standard association between damage to these areas and patterns of language breakdown does not hold consistently – i.e., damage to Broca's or Wernicke's areas is neither necessary nor sufficient to produce the classic symptoms (Goodglass, 1993). Similar conclusions come from reviews of brain-imaging studies of phonological speech processing where, across different studies, little overlap was found in the activated regions (Poepel, 1996).

Turning to the developmental literature, we observe that in normal circumstances, infants' brains become progressively specialized and localized in a relatively specific manner that might suggest predetermined modularity. On the other hand, many have argued that cases of acquired lesions in infancy and childhood pose a major problem for claims of prespecified modular architecture. Although reorganization post-injury is not viewed as an important factor in adult cases, plasticity and reorganization are the rule rather than the exception in childhood for both typical and atypical development. Research on vertebrate brains has elucidated the extent to which reorganization and compensation are possible (reviewed in Johnson, 2005). Experience-dependent plasticity appears to be a hallmark of the brains of our species.

Some general trends come from large longitudinal studies of individuals who suffered focal brain lesions before 6 months of age (Reilly *et al.*, 1998). Despite their lesions, the majority of these children still attained normal language skills. As a general trend, the effects of lesions in children were consistently different from the effects of acquired lesions in similar locations in adults. This challenges the notion that , in both the adult and child cases, a missing or damaged module causes the breakdown of separate cognitive components. This does not imply, however, that language developed in the normal fashion in these atypical circumstances. In fact, there are clear demonstrations that that is not the case. For example, for the majority of children with focal brain lesions, language acquisition was delayed. Another interesting example comes from patterns of language specialization of adults who suffered focal brain damage during childhood. There does not seem to be a uniform solution that the brain employed after damage; some individuals exhibited specialization for language production in the left hemisphere, others in the right hemisphere, and others bilaterally (Satz *et al.*, 1990).

For decades, much of neuropsychology has focused on where functions and behaviors are localized. Indeed, far more emphasis has been given to the *where* question at the expense of the *why* question. Beyond claims of genetic specification, very little is understood about why in default circumstances a region takes on certain functions and not others. An argument can be made that in normal circumstances, Broca's area may become specialized for language processing not because it is specifically designed

for language but partly because it is the area with the computational characteristics that are particularly well suited to deal with the requirements of this domain (Elman *et al.*, 1996). In other words, a 'domain-relevant' region becomes domain specific over developmental time (Karmiloff-Smith, 1998). Thus, many regions may initially compete for the processing of given inputs, with the special computational properties of one region ultimately winning out. However, a full specification of what those computational properties are is as yet largely unknown. We return to these issues in the final section, on domain specificity.

Ontogenetic and Pathological Universals: When and How Does the Brain Become Modular?

Thus far, the application of modular analysis to disorders acquired in adulthood and childhood does not necessarily imply genetic specification of a modular architecture. This is accepted even by those who are proponents of the applicability of the adult neuropsychological approach to the child (e.g., Temple, 1997). On the other hand, cases of developmental disorders with genetic etiology have been used to support claims of genetic modularity. The critical assumptions in the adult model – namely, *dissociability*, *transparency*, *and subtractivity* (*residual normality*) – are relevant here, too. The universality assumption has a stronger version, where the child's modular architecture is considered to be not only universal but also *prespecified*. The goal is simply finding out what that structure is. Furthermore, the same implications of the extension of the adult model to the child case hold here – namely, *shared causes*, *appropriateness of static models*, and *the existence of pure cases*.

Some of these claims seem to be supported by evidence from childhood disorders. For example, Temple (1997) described the similarity between behavioral profiles of adults and children with prosopagnosia, dyscalculia, and certain subgroups of dyslexia, where in some instances the behavioral symptoms were indistinguishable in the child and the adult. Interestingly, such similarities were clearest with respect to school achievement skills, like reading and mathematical abilities.

Additional claims for genetic modularity come from the study of Williams syndrome (WS) and specific language impairment (SLI). According to some authors, WS involves "striking preservation" of language and face processing alongside severe visuospatial deficit (Bellugi *et al.*, 2001). In some forms of SLI, grammar is severely impaired, whereas all other functions are claimed to be unaffected (van der Lely *et al.*, 1998). This has led to the conclusion that behavioral components in these cases are indeed dissociable (*dissociability*) and that performance in the unaffected domains is normal (*residual normality*).

In a stricter application of modular analysis, SLI and WS have been taken as a doubly dissociated pair of the rule-based vs. associative memory language systems, implying genetically specified modules for these two domains (Pinker, 1999). Evidence for this claim comes from investigation of English past-tense formation. Crucially, children with SLI do not exhibit the normal advantage for regular over irregular past tense (Ulman and Gopnik, 1999). Children with WS, on the other hand, are claimed to display a particular difficulty in generating irregular past-tense forms, whereas the regular forms are unproblematic (Clahsen and Almazan, 1998).

The vast majority of claims pertaining to genetic modularity have been challenged, particularly with respect to the utility of applying a strictly modular approach in investigating developmental disorders. There are, for example, some general arguments against the view of genetic modularity based on current understanding of how genes and the brain work. If modularity is genetic, then genes would have to specify the representational content of each module – an unlikely claim. Genes obviously contribute to behavioral outcomes, but it is more likely that the mapping between these is indirect and highly experience dependent. Instead of specifying domain-specific knowledge, genes are more likely to contribute to the formation of domain-relevant learning mechanisms, which are gradually refined by the ontogenetic process (Karmiloff-Smith, 1998).

In addition to these arguments, specific claims of *pure cases and residual normality* have been refuted by studies, for instance, of Williams syndrome. First, once fine-grained methods are used to assess participants, clear-cut selective patterns of impairment and sparing are no longer found. For example, Thomas and colleagues found subtle deficits in WS for *both* regular and irregular past-tense formation (Thomas *et al.*, 2001). Second, equivalent levels of performance may be achieved by atypical processing strategies. For example, face processing in WS seems to be driven by a featural rather than a configural processing strategy (Deruelle *et al.*, 1999; Karmiloff-Smith *et al.*, 2004). Moreover, different brain processes are involved in the albeit proficient face processing in WS (Grice *et al.*, 2001). Similar analyses have been conducted of persons with SLI, who – despite the name *specific* language impairment – consistently displayed subtle deficits in domains other than language (reviewed in Leonard, 1998).

Further arguments against genetic modularity can be made when we simultaneously consider typical and atypical language development. While it is true that there are clear developmental milestones in language acquisition (*ontogenetic universals*), there is also substantial variability in the rate and style or strategy of acquisition (see Bates and Goodman, 1997, for a review). If a defective grammar module explained SLI as well as individual differences in normal language learning, then we should see a bimodal distribution of language abilities, with genetic differences accounting for the separation between the impaired and unimpaired groups. But the distribution is normal, not bimodal (Bates and Goodman, 1997). Furthermore, if grammar and the lexicon were separate modules (Pinker, 1999), it would be difficult to explain the strong correlations between early grammar and early lexical ability, whereas growth curves for late and early talkers show that the level of grammatical complexity reflects lexical abilities and not chronological age (Bates and Goodman, 1997).

In sum, the use of developmental disorders as evidence for genetic modularity is, in our view, flawed.

Domain Specificity: Are Modules Independent?

The domain specificity question concerns the extent to which the operations of a proposed module, such as syntax, are special and exclusive to that domain. It is critical that the question is phrased in a relative, as opposed to a dichotomous manner, since it is clear that at some level of processing, the brain integrates information from various sources to produce coherent experience. Elman *et al.* (1996) pointed to a number of broad notions of domain specificity. Domains can be specific because they have specific input/output systems: visual cortical areas receive input from the retina, whereas auditory cortical areas receive input from the ears. Specificity may also arise because different problems require different behavioral solutions and/or different computational mechanisms. It is hardly surprising, then, that because a particular domain requires specific kinds of representations or behavioral solutions, domain specificity would seem to exist. The important question, however, is the extent to which computational mechanisms of a given domain are exclusive to that domain – i.e., modular – throughout development or in adulthood.

In a narrow interpretation of domain specificity, Fodor (1983) claimed that modules operate using specialized mechanisms dedicated to handling specific types of input, what he called "proprietary inputs." For example, speech perception is distinguished from general problem-solving ability, where speech perception involves computing what is heard, with little reflection or analysis of the problem domain of language in which it is used. Moreover, any module deemed to be innate is, by definition, domain specific. However, converging evidence from different areas of research reveals a more complex pattern of how different domains interact and become specialized.

1. Both infants and adults have shown remarkable skills in discovering patterns and regularities not only in linguistic input but also in the general auditory and visuospatial domains (Newport and Aslin, 2000). While we still have little understanding of how these are used in learning and processing language, and importantly, of the constraints on this type of learning, these findings indicate that domain-general abilities could and may well play a crucial role in organizing linguistic input.
2. Increasingly, evidence points to the involvement, in other, more general skills, of the areas classically thought of as uniquely housing domain-specific operations. With respect to language, Broca's area has also been implicated in a number of non-linguistic processes, including musical structure, general selection mechanisms, and imitation.
3. In certain cases, dedicated mechanisms appear to be the result of experience with a given class of stimulus. For example, behavioral and brain-imaging studies have shown that the experience of experts with various classes of stimuli (e.g., dog judges) or training with an artificial class of stimulus ('greebles') results in activation of areas in the fusiform gyrus, which was previously thought to be activated exclusively for faces (Gauthier *et al.*, 1999). So, additional factors, such as level of categorization and expertise, also modulate the involvement of the fusiform gyrus in the processing of visual stimuli.

The question of whether domain specificity is prespecified in the human brain as a result of evolution or arises during ontogenesis from experience-dependent processes, coupled with self-organizing cortical mechanisms, is still an open one. What is clear, though, is that patterns and regularities in the input can quickly and efficiently lead to progressive specialization of the brain. Evolution is more likely to have given rise to greater flexibility of learning than to increasingly complex prespecified modules (Karmiloff-Smith, 1992).

In cases of developmental disorders, the domain-specificity question has also been discussed extensively. In the genetic-modularity view, genes code for specific representations that are domain specific. The alternative view is that domain-relevant computations

early in development are better able to handle certain forms of input, and those become progressively specialized in close interaction with the environment (Karmiloff-Smith, 1992). The idea of progressive modularization forcefully challenges the notion that a static model can be used to explain development in both the typical and the atypical case. On the contrary, the developmental process itself is a major contributor to behavioral outcomes (Karmiloff-Smith, 1998). In support of this claim, brain-imaging data from infants and toddlers have shown that over developmental time, there is a pattern of very progressive specialization and localization of important functions for our species, such as face processing (de Haan *et al.*, 2002). In atypical cases, the origins of the behavioral profiles found later in development may stem from differential processing of input and utilization of different strategies beginning early in infancy.

A related hypothesis is that deficits in 'low-level,' perceptual mechanisms are contributing factors in developmental disorders. Some possible mechanisms are rapid auditory processing impairment in specific language impairment (Temple *et al.*, 2003), magnocellular system impairments in dyslexia (Stein, 2001), and attentional abnormalities in Williams syndrome (Brown *et al.*, 2003).

Some have challenged the view that low-level impairment can be viewed as causal in many of these developmental conditions (Rosen, 2003), because of the fact that such impairments are not found in all cases. The validity of this claim is difficult to assess, for a number of reasons. First, many developmental disorders are diagnosed based on behavioral impairment in a specific area; this sheds doubt on whether it is necessary to look for impairments in other domains, after having *a priori* excluded those whose impairment is less marked. Second, low-level problems need not exist throughout the entire life span. The crucial point is that their presence *early* in development may trigger cascading effects, the *indirect* results of which are found later in development. Third, even if not taken as singular explanatory factors, low-level impairments may play an important role in altering the experience of the child in the environment, providing a possible mechanism by which developmental outcomes are achieved.

In sum, converging evidence suggests that modules are the final outcomes of the developmental process, as opposed to prerequisites to it. Furthermore, the progressive development of modules, both in infancy and adulthood, is tightly bound to experience. Even in adulthood, experience continues to play a role in forming brain architecture and processing.

Concluding Remarks

We started this article with three questions relevant to the modularity debate. The question of localization: At what level is the brain modular? Second, the question of ontogenetic and pathological universals: When and how do certain functions become modularized? Third, the question of domain specificity: Are modules independent of one another? We aimed to provide insights into each of these questions, but current understanding of how the human brain organizes itself over time remains relatively limited. However, the substantial body of evidence in support of dynamic interactions in development, as well as plasticity, experience dependency, and very indirect gene-behavior mapping, enables us to arrive at useful reformulations for future modularity debates.

First, with respect to localization, the important question for future theorizing will be why is it that certain areas take on the functions they do in default circumstances, and why can other areas support the same functions with a fair degree of success in certain atypical circumstances but not others? With respect to ontogenetic and pathological universals, we need to ask: How can we characterize the developmental process in each case? How do altered sensitivities affect the developmental process and give rise to different phenotypic outcomes? With respect to domain specificity, future theorizing should focus on the following issues: Are there general principles by which our species handles and organizes input to produce coherent units and learn regularities? And finally, how do these domain-relevant mechanisms progressively give rise to the specialized and complex adult brain? In our view, these types of questions will further the modularity debate on the relations between syntax, the lexicon, and other cognitive domains, beyond the claims of adult neuropsychological models, and where the gradual process of development is center stage.

See also: Human Language Processing: Connectionist Models; Specific Language Impairment; Williams Syndrome.

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Moldova: Language Situation

Editorial Team

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The Republic of Moldavia is a former republic of the USSR and has been independent since 1991. The population is estimated to be around 4.4 million (July, 2004). The national or official language is Moldovan, which is spoken by 64.5% of the population (1989 census). Moldovan is very similar to Romanian and is often classified as a dialect of it. Other languages spoken are Russian, natively spoken by about 13% of the population; Ukrainian (13.8%); Gagauz, a Turkic language (3.5%); and Bulgarian (2%). An even smaller section of population speaks Belarusian (Belarusan), Polish, Romani, German, and Yiddish.

Most Russians came to the country after it was annexed by the Soviet government in 1940 and after World War II. Before 1940, the country was ruled as a principality by Romania. After it was annexed by the Soviet government, there was forced Russification. Moldovan was claimed to be a language distinct from Romanian and was considered to be at least partially Slavic in origin and was spelled with the Cyrillic alphabet. The Latin alphabet was reintroduced in 1989. Since then, the role of Russian has diminished greatly, although it is still an important language in the northeastern Dniester region (together with Ukrainian), and it is also retained as the language of interethnic communication. The Gagauz region in the southwest of the country, where Gagauz is spoken, was granted autonomous status in 1994.

See also: Romanian; Russian.

Möller, Hermann (1850–1923)

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Hermann (Herman) Møller was born near Tønder, Denmark, just north of the German border, in 1850. He spent his childhood in the North Frisian islands, where he became fluent in North Frisian (Frisian, Northern), High and Low German (German, Standard and Plautdietsche), and Danish. While his early education focused on classical languages, his university studies concentrated on Germanic and Indogermanic. He earned a Ph.D. from the University of Leipzig in 1874 and conducted his postdoctoral studies (*Habilitation*) at the University of Kiel. In 1883 he joined the University of Copenhagen as an instructor, becoming professor of Germanic philology in 1888. He retired two years before his death in 1923.

Møller's earliest scholarly writings concerned Germanic reflexes of Indogermanic phonology. In 1883 he made a foray into Old High German poetics, followed by a description of North Frisian. Møller's best-known contributions to linguistics were in the fields of Indo-European phonology and classification. He provided proofs for the Indo-European ablaut that was proposed by August Schleicher and most thoroughly treated by Ferdinand de Saussure. In contrast to Schleicher, Møller argued that vowel irregularities, like those in such modern English sets as *bear*, *bore*, *borne*, *born*, *birth*, *burden*, and Scottish *bairn*, are not the product of decay from an earlier, more regular stage but reflect irregularities already present in the Indo-European root. He further proposed that the Indo-European root consisted of a single syllable, all else being derivational or inflectional morphology. The notion that ablaut was an old phenomenon in the Indo-European root facilitated the discovery of further 'regular irregularities' in IE reconstruction, though strict monosyllabicity was later rejected.

Though Møller initially held that regular vowel alternations had no consonantal equivalents, the search for such correlations was the focus of the last two decades of his career. Adding to the class of laryngeal consonants (*coefficients sonantiques*) identified by Saussure, Møller was able to analyze Proto-Indo-European initial vowels as reflexes of earlier laryngeals followed by vowels. He proposed that these laryngeals corresponded to consonants in Proto-Semitic, a relationship first asserted in 1863 by Rudolf von Raumer. *Semitisch und Indogermanisch* represents Møller's attempt to discover the rules governing the relationship between IE consonants and Semitic consonants. The work posited similarities between Semitic and IE root structure. The findings were based on the assumption that roots composed of similar consonants and having similar meanings are related and the corollary assumption

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that vowel changes and affixes affecting such roots are also related. Though Møller's conclusions were and are viewed guardedly, the depth and breadth of his undertaking provide evidence of a strong conviction in a relationship that has not yet been thoroughly proved or disproved.

See also: Germanic Languages; Indo–European Languages; Saussure, Ferdinand (-Mongin) de (1857–1913); Schleicher, August (1821–1868); Semitic Languages.

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Moluccan Languages *See:* Malukan Languages.

Mon

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Mon is the principal language in the Monic subbranch of Mon-Khmer languages, which form the bulk of the Austroasiatic language phylum. The near-extinct language Nyah Kur, spoken in Thailand, seems to be similar to Old Mon.

Mon is spoken in Burma/Myanmar and Thailand. In southeastern Burma, the Mon-speaking population lives in the area from Thaton across the lower Salween river area and down the coastal strip as far as Ye. Mon villages are interspersed with those of Burmans/Bamar and Karen/Kayin. The speakers of Mon in Thailand are thinly scattered in provinces surrounding Bangkok.

It is very difficult to put a precise figure on the number of people who speak Mon, not least because there is a large category of people who identify themselves as ethnically Mon but who do not speak the language. A further problem is the general lack of demographic data. Bauer (1990) undertakes a detailed analysis of the available information and concludes that there are probably one million Mon speakers, though this figure incorporates various degrees of bilingualism. Most of the Mon-speaking population is bilingual in Burmese or Thai. Of this million, roughly 50 000 – about 5% – reside in Thailand, and the remaining large majority resides in Burma. In Thailand, Mon have become heavily culturally and ethnically assimilated through extensive intermarriage between Mon and Thai, although being of Mon descent seems to carry some prestige.

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that vowel changes and affixes affecting such roots are also related. Though Møller's conclusions were and are viewed guardedly, the depth and breadth of his undertaking provide evidence of a strong conviction in a relationship that has not yet been thoroughly proved or disproved.

See also: Germanic Languages; Indo–European Languages; Saussure, Ferdinand (-Mongin) de (1857–1913); Schleicher, August (1821–1868); Semitic Languages.

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Moluccan Languages *See:* Malukan Languages.

Mon

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The records of Mon cover a period from the sixth century to the present day. Certain collections show the state of the language at various times. The best-represented historical periods are the eleventh and twelfth and the fifteenth centuries C.E. Modern Mon dates from the mid-eighteenth century onward. Mon has influenced the major languages of mainland Southeast Asia, in particular Karen, Burmese, and Thai, all of which borrowed words from Mon in the first half of the second millennium C.E.

Modern spoken Mon differs considerably from written, literary Mon in phonology, lexicon, and syntax, to the extent that it is possible to consider literary Mon a source of loanwords in spoken language, just as much as Pali and Sanskrit. Early descriptions of Mon tended to ignore the difference between the colloquial and literary forms of the language. The two appear to have diverged from the sixteenth century, and both forms of the language have developed independent inconsistencies but remain inextricably intertwined. This complex situation has resulted in a high degree of ambiguity and redundancy in the orthography. For instance, the initial consonant of the first syllable in a typical disyllabic word is frequently h- in spoken Mon, though this pattern does not occur in literary Mon, which, despite being archaic, is the basis of the written language. The initial h- may be etymologically derived from a large number of different consonants, and so historically inaccurate variant spellings are common. For instance, the word pronounced *hədoh* 'strain, filter, sift' may be written in nine different ways: ခရှိုဟ် KHAḌUIH, ဂရှိုဟ် GAḌUIH, ထရောဟ် THAḌOH, ထရှိုဟ် THAḌUIH, ထိုဟ် THḌUIH, ဒရောဟ် DAḌOH, ဖရှိုဟ် PHAḌUIH, သရှိုဟ် SAḌUIH, and ရှိုဟ် SḌUIH. Literary Mon is an artificial construct that does not make sense without reference to spoken patterns. The mixture of the two forms has been described by the Mon scholar H. L. Shorto (1962: xvi) as 'a confusing scatter of seemingly aimless variation.'

Colloquial Mon exists in a range of dialects in Thailand and Burma, although all are mutually intelligible. The variety of Mon described here is that of Shorto's *A dictionary of modern spoken Mon* (1962), which corresponds mostly with the Mon Rao of Nai Pan Hla's *An introduction to the Mon language* (1989), spoken by Mon in Burma.

There are a number of Mon language sites on the Internet. Some are associated with Mon political organizations, and some with news and information, such as ကော /kaowao/ *Kao Wao* ('black cuckoo') and သွံ်ငတိုင် /hnɔŋ taŋ/ *Guiding Star.* At the time of writing, Mon language is not included in Unicode or other international standards, and so, Mon text is displayed on the Internet as graphics.

Like the scripts used to write Burmese, Shan, and certain other languages of Burma/Myanmar, Mon is written with a script derived from the Indic scripts that spread with Buddhism to continental Southeast Asia in the early part of the first millennium C.E. The Mon were the dominant group in the south of an area that now straddles the border between Thailand and Burma/Myanmar and were centered in two areas, one along the Chaopraya River in Thailand, and the other in the Moulmein–Pegu (Mawlamyine–Bago) area of lower Burma, with a principle center at Thaton on the east coast of the Gulf of Martaban.

The oldest Mon inscription, found at Lopburi in Thailand, dates from the eighth century and is written in the Southern Indian Pallava script. Because there are inscriptions in Pyu, an important language of the period, which predate those in Mon, it may be that the Mon borrowed the writing system from the Pyu. However, given, first, that Mon script bears a closer resemblance to Pallava script, and second, that the Mon city Thaton was itself a major Buddhist center, it may be that the Mon borrowed the writing system directly from India independent of the Pyu. It is thought that Mon scribes brought to the city of Pagan after the Mon were defeated by the Burmese king Anawratha in 1057 C.E. resulted in Mon script being adapted to write Burmese, though this theory has been disputed in recent research.

The Mon writing system is essentially the same as the Burmese one in appearance, but with certain modifications and some elements unique to Mon. The system is best suited to writing the Indic languages for which its parent scripts were first designed, such as Pali and, with a few extra symbols not shown here, Sanskrit.

Table 1 The consonants of Mon transliterated and transcribed; consonants associated with second ('chest') register are bold

Mon script					*Transliteration*					*Transcription*				
က	ခ	ဂ	ဃ	ङ	K	KH	G	GH	Ṅ	k	k^h	k	k^h	ŋ
စ	ဆ	ဇ	ဈ	ည	C	CH	J	JH	Ñ	tɕ	$tɕ^h$	tɕ	$tɕ^h$	ɲ
ဋ	ဌ	ဍ	ဎ	ဏ	Ṭ	ṬH	Ḍ	ḌH	Ṇ	t	t^h	d	t^h	n
တ	ထ	ဒ	ဓ	နဉ	T	TH	D	DH	N	t	t^h	t	t^h	n
ပ	ဖ	ဗ	ဘ	မ	P	PH	B	BH	M	p	p^h	p	p^h	m
ယ	ရ	လ	ဝ	သ	Y	R	L	V	S	y	r	l	w	s
ဟ	ဠ	အ	ဣ	မ္	H	Ḷ	Ḅ	-	MB	h	l	ɓ	ʔ	ɓ

Table 2 A minimal pair illustrating the register contrast in Mon

	Mon script	*Transliteration*	*Transcription*	*Phonetic detail*	*Gloss*
Head register	ကၜုၢ်င်	KLUN	/klɜŋ/	[klɜ^{i}n]	come
Chest register	ဍုၢ်င်	GLUN	/klɜ̀ŋ/	[klɜ̤^{i}n]	boat

Table 3 Mon word-initial and word-internal vowel symbols

Word-initial		*Word-internal*		*Transliteration*	
အ	အာ	◌	◌ာ	A	Ā
ဣ	ဤ	◌ိ	◌ီ	I	Ī
ဥ	ဦ	◌ု	◌ူ	U	Ū
ဧ	အဲ	◌ေ	◌ဲ	E	AI
ဩ	အော်	◌ော	◌ော်	O	AÓ
အံ	အး	◌ံ	◌း	AṀ	AḤ

Mon is not a tonal language like its geographical neighbors, but vowels in Mon occur mainly in pairs distinguished only by a quasitonal distinction known as a register distinction, which is found in many Mon-Khmer languages, including Wa and Cambodian (Khmer). First or 'head' register is characterized by clear voice quality and is associated with more peripheral vowels; second or 'chest' register is characterized by breathy voice (transcribed here with a grave accent, `), a general laxness of the speech organs, and centralization of the vowels.

The consonants of the Mon writing system are set out in Table 1. As in Cambodian (see Henderson 1952), each consonant is associated with one of the two registers, and the reading of a vowel in a given context is determined by the register designation of the consonant that governs it – usually the initial consonant of a syllable. The minimal pair in Table 2 illustrates the contrast.

Mon, like many Mon-Khmer languages, has a rich array of vowels. The word-initial and word-internal vowel symbols of Mon are shown and transliterated in Table 3. Table 4 shows how each of these is pronounced in head and chest register.

One of the distinctive features of Mon-Khmer phonology is the prevalence of relatively unrestricted initial consonant clusters. Mon is no exception, though as mentioned above, in the colloquial language many such clusters are not pronounced as spelt. Mon script

Table 4 Mon vowels in head and chest register

First ('head') register			*Second ('chest') register*		
Mon	*Translit.*	*Pron.*	*Mon*	*Translit.*	*Pron.*
ကာ	KA	kaʔ	ဎ	GA	kɛ̀ʔ
ကာ	KĀ	ka	ဎါ	GĀ	kɛ̀a
ကိ	KI	kɔeʔ	ဎိ	GI	kìʔ
ကီ	KĪ	kɔe	ဎီ	GĪ	kì
ကု	KU	kaoʔ	ဎု	GU	kùʔ
ကူ	KŪ	kao	ဎူ	GŪ	kù
ကေ	KE	ke	ဎေ	GE	kè
ကဲ	KAI	koa	ဎဲ	GAI	kòa
ကော	KO	kao	ဎော	GO	kɔ̀
ကော်	KAO	kao	ဎော်	GAO	kɛ̀a
ကံ	KAÓ	kɔm	ဎံ	GAÓ	kɔ̀m
ကး	KAḤ	kah	ဎး	GAḤ	kɛ̀h

Translit. = transliteration; Pron. = pronunciation.

writes the second element of such clusters with a subscript form of the consonant, as shown in Table 5.

In addition to this already rich inventory of open syllable vowels, Mon features a large array of additional syllable rhymes that involve further diphthongs and final consonants (see Nai Pan Hla [1989]) for further details.

The following example sentences in Mon illustrate some of the basic properties of Mon syntax. Modifiers generally follow what they modify (1); SVO (subject–verb–object) order is observed (2); subject pronouns are dropped (3). Unusually for the languages of mainland Southeast Asia, Mon makes only limited use of classifiers and has a system of plural marking.

(1) ရဲ အဲ
RAI AI
ròa ʔòa
friend I
'My friend'

(2) အဲ ရာန် ယာတ် မ္ဆ် အုပ်
AI RĀN YĀT MVAI 'UP
ʔòa ràn yàt mòa ʔup
I buy cloth one length
'I bought a length of cloth.'

(3) ဒ္ဓံင် ပ္ဍဲ ဍုၢ်င် လ္ဂုၢ်င်
DMÅÑ PḌAI DṬUÑ LGUÑ
mòŋ ɖoa ɖɜŋ təkɜ̀ŋ
live in town Rangoon
'(He) lives in Rangoon/Yangon.'

Table 5 Subscript forms of Mon consonants

ꩌ	ꩌ		ꩌ	TṄA	təŋaʔ	crossbow
ꩌ	ꩌ		ꩌ	KÑA	ɲaʔ*	(honorific prefix)
ꩌ	ꩌ		ꩌ	CḌA	ɗaʔ*	span
ꩌ	ꩌ		ꩌ	PNA	pənaʔ	pretence
ꩌ	ꩌ		ꩌ	KMA	kəmaʔ	insect
ꩌ	ꩌ		ꩌ	KYA	caʔ*	be defeated
ꩌ	ꩌ		ꩌ	GRA	krɛ̀ʔ	gather up
ꩌ	ꩌ		ꩌ	KLA	klaʔ	tiger
ꩌ	ꩌ		ꩌ	KWA	kwaʔ	short of stature
ꩌ	ꩌ		ꩌ	THḂA	həɓaʔ*	lift up
ꩌ	ꩌ		ꩌ	LHA	ɬlaʔ	leaf (also spelt ꩌ SLA)

* Note the divergence of spoken forms from written spellings in these words.

See also: Austroasiatic Languages; Burma: Language Situation; Mon-Khmer Languages.

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History of Research

Much of the early work on Mongolic focused on the philological analysis of Written Mongol texts. Isaac-Jacob Schmidt, working in service to Russia, was the first to publish a scientific grammar and dictionary of Written Mongol in the 1830s. Linguistic work on living Mongolic languages was initiated in the 1840s by the Finnish ethnolinguist M. A. Castrén (who worked on Buryat) and continued in the late 19th and early 20th centuries by G. J. Ramstedt (on Khalkha, Oirat/Kalmuck, and Moghol), A. D. Rudnev (on dialects of Buryat and Mongol proper), Nicholas Poppe (on Buryat, Khalkha, and Dagur), and Antoine Mostaert (on Ordos). The documentation of Moghol was completed by Michael Weiers in the 1970s. The last major blank spot in Mongolic studies was the Shirongolic branch. After the pioneering contributions by Antoine Mostaert (Huzhu Mongghul) in the 1920s and 1930s, the Shirongolic languages were studied by a Sino-Russian expedition under the leadership of B. Kh. Todaeva in the 1950s and by an Inner Mongolian expedition in the 1980s. Even so, material on some Shirongolic languages and dialects has been extremely scarce until the present day. The last major Mongolic language to be documented was Minhe Mangghuer, described by Keith W. Slater (2003). The most up-to-date general work, with grammatical sketches of all Mongolic languages, was edited by Juha Janhunen (2003).

In the field of diachrony, the focus was long on external comparisons in the Altaic framework. The main source on Mongolic comparative studies remains the work of Nicholas Poppe (1955), which, unfortunately, has already become obsolete in some respects, especially as far as the languages of the Shirongolic branch are concerned.

See also: Altaic Languages; Areal Linguistics; China: Language Situation; Classification of Languages; Contact-Induced Convergence: Typology and Areality; Endangered Languages; Kazakhstan: Language Situation; Kyrgyzstan: Language Situation; Mongolia: Language Situation; Russian Federation: Language Situation; Tungusic Languages; Turkic Languages; Uralic Languages.

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Mon-Khmer Languages

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The Mon-Khmer languages constitute a disparate group of languages belonging to the Austro-Asiatic phylum spoken in a large area across Southeast Asia. The term 'Mon-Khmer' has several interpretations. One sense in includes all non-Munda Austroasiatic languages (except Nihali if this is in fact to be considered Austroasiatic at all; for more *see* **Austroasiatic Languages**). Another sense of Mon-Khmer excludes Nicobarese, while a further interpretation excludes both the Nicobarese and the Aslian branches. This latter one is the understanding of the term 'Mon-Khmer' relevant for this article.

Within this narrow-scope interpretation of Mon-Khmer, the following subgroups can be reckoned: Bahnaric, Katuic, Khasi(c), Khmeric, Khmuic, Monic, Palaung-Wa, Pearic, and Viet-Muong. The internal relations of these subgroups have yet to be adequately determined to the satisfaction of specialists; as such, no *Stammbaum* of Mon-Khmer can be here offered.

One proposal (Grimes, 2000) on the internal subgrouping of Mon-Khmer within the broadest understanding enumerated above, recognizes a major cleavage between Aslian and all other Mon-Khmer languages; these latter are further subdivided into an Eastern Mon-Khmer subgroup consisting of Bahnaric, Katuic, Khmer, Pearic, Monic, and Nicobarese and a Northern Mon-Khmer group that consists of Khmuic, Khasic, Palaung-Wa, and the isolate Mang of Vietnam. Viet-Muong is considered a separate branch coordinate with other Mon-Khmer subgroups. In addition, a number of relatively recently identified Mon-Khmer languages of China and Vietnam either appear to be isolate branches or remain unclassified, e.g., Palyu or Bugan. These are briefly discussed below. Lower-level taxonomic subgroupings have also been offered, e.g., Katuic-Bahnaric within the Eastern Mon-Khmer branch. Further research will refine and revise the classification and internal relations of the Mon-Khmer languages.

However, given the controversial nature of all but the highest-order taxonomic subdivisions within Mon-Khmer, a conservative approach is offered here.

Within the context of individual subgroups of Mon-Khmer, comments are offered below on total numbers of speakers, etc. However, a few general overall comments on certain salient linguistic features can be made. Many Mon-Khmer languages exhibit unusual or noteworthy phonological features, such as the predilection to 'sesquisyllabic' (one-and-a-half-syllable) words that consist of a major/full syllable and a minor/reduced syllable. This takes the shape of reduced + full (or minor + major) and yields words with atypical clustering in initial position; examples can be found even in the names of several Mon-Khmer languages (or subgroups), e.g., Khmer, Khmu, Sre, Mnong, Mrabri, etc., Vowel systems among Mon-Khmer languages are frequently highly developed, with elaborate systems of back unrounded vowels, centralized vowels, etc. often in combination with various phonation types or register phenomena. Such phonation types include creaky voice, breathy voice, etc. This combination of large core vowel systems and phonation types yields exploded inventories of syllable nuclei and/or vowel phonemes in various individual Mon-Khmer languages. These rank among the largest, if not the largest, such inventories in the languages of the world.

While the phonological systems of Mon-Khmer languages are highly developed, the languages are relatively impoverished morphologically and tend toward isolating word structure. However, the presence in most languages of lexicalized derivational elements, as well as productive or active systems in such languages as Bahnar, suggests that Proto-Mon-Khmer may have been more morphologically rich than most of its daughter languages. Indeed, a range of affixational processes may be used in individual languages within the Mon-Khmer language family, such as the following examples of derived nouns from Palaung (Milne, 1921: 74–75): *ra-pʌn-hwɔːi* [NOM$_1$-NOM$_2$-finish] 'completion'; *pʌn-ra-iːr* [NOM$_2$-NOM$_1$-hate] 'loathing, abhorrence'; *ra-ka-rɔt* [NOM$_1$-NEG-arrive] 'the not arriving'; etc. Morphologically rich verbs are also to be found in individual Mon-Khmer languages, as is found in the following Khasi form:

(1) yɑ-pɨn-sɑm-θyɑʔ
RECIP/DIST-CAUS-INCLIN-*sleepy*
'together make (others) feel sleepy'
(Nagaraja, 1985: 27)

Similar morphologically developed verb forms may also be found in such Mon-Khmer languages as Katu and Bahnar. Indeed, it is possible to find cognate processes of affixation across several branches of the family, which may thus be reconstructed back to the Mon-Khmer protolanguage. Such is the case with the derivation of causative verbs. It appears that Proto-Mon-Khmer utilized a causative prefix when the verb stem was monosyllabic, but an infix when the stem was sesquisyllabic or longer. Such a pattern is found for example in Mon (Old Mon and modern Mon), the Katuic language Kuy, and Khmu. Note that the infix allomorph is realized as a (syllabic) nasal in Khmu and Kuy but as a schwa in Mon.

(2) Khmu
p-háan 'kill' *p-rəh* 'raise' *k-m-sés* 'drop'
←*háan* 'die' ← *rəh* 'rise' ←*k-sés* 'fall'
t-m-lùuy 'hang (something)'
←*t-luy* 'hang'
(Svantesson, 1983: 104)

(3) Spoken Mon: *p*-vs. -ə- (<*m/C__C)
hum ɗaik → *p-hum ɗaik* *klàŋ* →
'have a bath' 'bathe' 'be numerous'
hə-làŋ
'increase'
(Bauer, 1989: 90)

(4) Old Mon
kcøt → *kəcøt*
'die' 'kill'
(Bauer, 1990: 149)

(5) Kuy
kəcet → *kəmcet*
'die' 'kill'
(Bauer, 1990: 149)

This pattern is cognate with the system seen in Nicobarese and Proto-Munda as well, and as such appears to be a formation dating all the way back to the Proto-Austroasiatic level; see Anderson and Zide (2001) for more on this.

Syntactically, Mon-Khmer languages, like many languages of greater southeast Asia, possesses sequences of verbs commonly referred to as serial verb constructions (Schiller, 1990). Examples of a verbal sequence of this type includes the following from Khmer and Ravüa of the Palaung-Wa branch:

(6) Khmer
təu jɔɔk kɑsɑɛt mɔɔk
go take newspaper *come*
'go get the newspaper'
(Schiller, 1990: 40)

(7) Ravüa
ti me ho tɑw lik me pin ke-en
take you go send letter you accompany *to-here*
'go take the letter and come back'
(Schiller, 1990: 58)

Mon-Khmer languages are generally spoken in remote, hilly/mountainous, and isolated enclaves

spread across northern Thailand, Laos, Cambodia, southern China, Myanmar, northeastern India, and Vietnam. In many instances they are spoken by only a few hundred or few thousand speakers. However, Mon-Khmer languages are also the national majority language of both Cambodia (Khmer) and Vietnam (the heavily Sinicized Vietnamese).

Bahnaric is a large group of minority languages spoken in southern central Vietnam, southern Laos, and northwestern Cambodia. The total number of all Bahnaric language speakers is likely less than one million. There are three or four major subdivisions within Bahnaric. Bahnaric clearly has Northern, Western, and Southern branches, to which is added by some researchers a Central Bahnaric branch as well. The entire Southern subgroup is spoken in Vietnam, as are all but one of the Northern Bahnaric languages (Talieng is spoken in Laos). South Bahnaric is separated from the other Bahnaric languages by a group of Mainland Austronesian languages. West Bahnaric languages, on the other hand, are not found in Vietnam at all, but rather are dispersed throughout various enclaves in Laos and Cambodia. The Central Bahnaric languages, which includes Bahnar proper, is a disparate group of five languages scattered across Vietnam, Laos, and Cambodia.

(8) Bahnaric subgroups
- Northern Bahnaric
  - East: Cua, Kayong
    - Takua
  - West: Halang Doan
    - Jeh, Halang
    - Rengao
    - Sedang, Hre; Monom, Todrah
    - Unclassified: Talieng, Trieng
  - Unclassified: Katua
- Southern Bahnaric
  - Sre-Mnong: Mnong: Eastern Mnong
    - Central Mnong,
    - Southern Mnong
  - Sre: Koho, Maa
  - Stieng-Chrau: Chrau
    - Stieng (Bulo Stieng)
- Western Bahnaric
  - Brao-Kravet: Brao (Lave), Kravet, Kru'ng (Kru'ng 2), Sou
  - Laven: Laven
  - Nyaheun: Nyaheun
  - Oi-The: Jeng, Oi (Oy), Sapuan, Sok, The

Central Bahnaric
- Bahnar, Romam (Vietnam)
- Alak (Laos)
- Lamam, Tampuan (Cambodia)

Languages or dialects within these various headings include the following:

(9) Dialects/languages within various Bahnaric-speaking groups
- Stieng: Budip, Budeh, Bulach, Bulo (a.k.a. Ke-dieng, Se-dieng, and Rmang)
- Southern Mnong: Nong/Diq, Prong (Prang)/Rbut; perhaps also Rahong, Bu Sre
- Central Mnong: Preh, Budong, Burung, Dih Bri, Bunor, Biat
- Eastern Mnong: Rlam (Ro'lo'm), Gar, Kuenh, Dliê Ruc, Ndee
- Koho: Maaq, Sre, Töla, Nop, Köyon, Cil (Kou N'ho), Tring, Nohang, Lat/Lac, Riong, Pru, Laya, Röda, Co Don, Kalop
- Bahnar: Alakong, Tolo, Bonom, Golar, Jolong, Kontum, Röngao (Rengao), Kon KO De, Krem, Roh, To Sung, Hodrung, Hroi, 144 M'nhar
- Sedang: Central Sedang, Greater Sedang, Daksut, Kon Hring, Kotua
- Tampuon: Kroi, Lamam/Rmam

It is not possible to accurately gauge the exact number of speakers of Bahnaric languages, due in part to the extensive displacement many experienced during the Vietnam War. Many Bahnaric language speakers have been influenced by and/or shifted to national languages such as Vietnamese or Khmer or locally dominant languages such as Rhadé (Rade) or Cham (Austronesian). The following constitute rough estimates only:

(10) Estimated number of speakers of Bahnaric languages
- Koho 100 000+ (including 23 000–30 000 Sre, 30 000–40 000 Maaq, 14 000 Cil, 3000 Lac, 6000 Nop, 14 000 Riong, very few each of Laya, Co Don, Töla)
- Bahnar 85 000?
- Hre 80 000?
- Stieng 48 000?
- Sedang 40 000?
- Central Mnong 23 000?
- Chrau 20 000?
- Boloven (Laven) 18 000?
- Cua 15 000?
- Southern Mnong 12 000?
- Eastern Mnong 12 000?
- Halang 10 000?
- Jeh 10 000?
- Brau/Lavé 3000?
- Koyong < 3000?
- Nha Hön 2500??
- Todrah, Alak, Takua, Cheng, Sapuan, Oi, Souq, Pragar, Kayong, Bout, Duan ??

Note that Parkin (1991) considers Central Bahnaric languages to be North Bahnaric.

Katuic languages are spoken in the region where Laos, Cambodia, and Vietnam meet. There are two

subgroups within Katuic, conventionally called Eastern and Western Katuic. The total number of speakers of Katuic languages is approximately 200 000–300 000. The main languages include Katu, with 20 000–30 000 speakers, Bru, with possibly as many as 80 000 speakers, Sô (Tro), with 10 000 speakers, Pacoh, with 15 000 speakers, Ta'oih, with perhaps 10 000 speakers, Souei (Proom), with around 10 000 speakers, Kataang, with at least 10 000 speakers, Kaleung, who have mainly shifted to Lao but who number perhaps 40 000, and finally Kuy, with possibly as many as 150 000 speakers. Other than the Katu proper, the Pacoh (and the closely related Phuong), and the Khua, who live in Vietnam, and the Kuy and Western Bru of Thailand (and northern Cambodia), Katuic-language speakers live mainly in Laos. Many are undergoing shift to Lao.

(11) Katuic languages
- Eastern Katuic
  - Kasseng
  - Kataang
  - Katu–Kantu
  - Ngeq–Khlor–Alak 2
  - Pacoh–Phuong
  - Lower Ta'oih–Upper Ta'oih–Ir–Ong
  - Tareng
- Western Katuic
  - Kuy–Nyeu
  - Eastern Bru–Western Bru–Khua–Leun–Mangkong–Sapoin–So Tri–Sô

Khasi[c] is the only branch of the Mon-Khmer language family spoken in mainland India. For more details *see* **Khasi**.

Khmeric consists of two languages: Central or Standard Khmer, the national language of Cambodia, and Northern Khmer, spoken mainly across the border in Thailand. For more on Khmer *see* **Khmer**. Khmer has been attested since the 7th century and appears in at least four historical stages: Pre-Angkorian, Old Khmer, Middle Khmer, and Modern Khmer. There may be as many as seven million Khmer speakers.

The Khmuic subgroup of Mon-Khmer consists of approximately a dozen languages scattered across Laos, Vietnam, and Thailand, with small enclaves in Myanmar and China as well. The Khmuic branch is further subdivided into the following subgroups:

(12) Khmuic languages
- Khao
  - Khao (Vietnam)
  - Bit (Laos)
- Mal-Khmu
  - Khmu
    - Khmu (Laos, Thailand, Vietnam, China, [Myanmar])
    - Khuen (Laos)
    - O'du (Vietnam)
  - Mal-Phrai
    - Lua' (Thailand)
    - Mal (Laos)
    - Phrai (Thailand)
    - Pray (Pray 3) (Thailand)
- Mlabri (Thailand)
- Xinh Mul
  - Khang (Vietnam)
  - Pong (Phong Kniang) (Laos)
  - Puoc (Vietnam)

Apart from these designations, which are standard in the Western linguistic tradition, Khmuic-speaking peoples are known by a plethora of local variants (Parkin, 1991: 96). These include the folk-etymologized Kha Mu in Laos (*kha* is a general term for subjugated 'hill tribes' in Laotian), sometimes also Phou Theng or local designations such as Thay Hay or Hok in Laos and Rook in Thailand; in China they were formerly known as Chaman, now Kemu; in Vietnam, the Khmu are often referred to as Xa Cau. The total number of Khmuic speakers is moderately large, with Khmu proper the largest group, having between 350 000 and 500 000 total speakers in numerous local variants. Mal-Phrai, also known as T'in, has perhaps 20 000 speakers and is probably the next largest Khmuic-speaking group. Many languages are spoken by very small populations, e.g., Khang Ai of Tay Bac Province, Vietnam, which may have fewer than 1000 speakers; a similar number is estimated for Bit of northern Laos, while Mlabri (also known as Mrabri and Yumbri) may have as few as 200 speakers.

One group that deserves special mention here are the Lamet, who are sufficiently Khmuized linguistically and culturally to make their classification unclear. It is possible that they were originally speakers of a Palaungic language but their exact classificatory status remains open.

The Monic branch of Mon-Khmer consists of just two languages, Mon of Myanmar and Thailand and Nyahkur of Thailand. Mon, like Khmer, has a long literary tradition, with texts dating back 1000 years to the time when the Mon ruled an empire in this region; isolated inscriptional sources date back as far as the 7th century. Ethnic Mon may number nearly half a million, but the total number of speakers is significantly less, possibly only a tenth of that figure. The Nyahkur, on the other hand, total no more than a few thousand speakers, and probably represent the remnant of an old Mon kingdom of southern Thailand. In Thai they are called Chaubon; both ethnonyms mean 'mountain people.'

Members of the widespread Palaung-Wa branch of Mon-Khmer are found scattered throughout

Myanmar, Thailand, the Yunnan province of China, and Laos. The total numbers of Palaung-Wa speakers is likely over one million. Several divergent groups are to be found within this branch, the exact internal relations between which remain to be worked out to the satisfaction of specialists. The major languages or subgroups within this branch are Danau, the various divergent Angkuic groups, Palaung proper, Riang, and the large Waic group with multiple subdivisions. Some reckon an Eastern and a Western group, the former including Danau, Palaung and Riang, the latter consisting of Waic, Angkuic and possibly Lametic as well.

Palaung speakers, who fall into several dialect/language groups, are heavily influenced by Shan and undergoing linguistic assimilation to this Tai language. At least three Palaung languages are reckoned, viz. Pale (Silver), Rumai, and Shwe (Gold). The Palaung languages are mainly spoken in Myanmar, but each have a small number of speakers in China, where they are all united under the official De'ang nationality; Pale Palaung speakers are also found in Thailand. The total number of Palaung speakers is difficult to estimate but may be in the range of 500 000–600 000, or it may be much smaller. A divergent Palaung group, the P'u-man, are found in Yunnan, China. As this Chinese ethnonym refers to other groups as well, it is not known how many speakers of P'u-man are really to be found. Riang, like Palaung, is heavily influenced by Shan and rapidly losing its similarly small population of speakers. Danau is also severely endangered and could have as few as 2000 speakers, if that many, at present.

Lametic, as mentioned above, shows considerable influence from Khmuic and may not really belong in this branch of Mon-Khmer. It consists of Con, with perhaps 1000 speakers, and Lamet, with around 10 000 total speakers or maybe more.

The large and diverse Waic languages of Palaung-Wa constitute a heterogeneous group of languages spoken in enclaves throughout Myanmar and Yunnan, and originally in adjacent parts of Thailand as well. The number of Waic languages and its internal divisions remain open questions, despite considerable work by Diffloth in particular. Most Waic languages are spoken by small populations which range from less than 100 to more than 100 000. Wa is often known as Va in China; other common ethnonyms referring to Wa-speaking groups include (Parkin, 1991: 111): Vu, Vo, Lave, Ravet, Krak, Kut Wa, Hsap Tai, and Gaung-pyat (head cutting). One possible subgrouping of this group is as follows:

(13) Waic languages

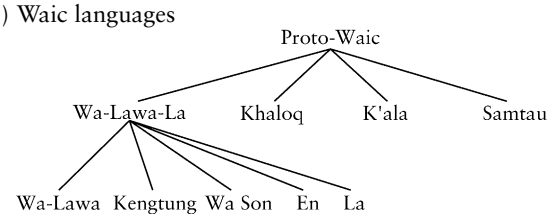

Proto-Wa
- Wa of Drage
- Wa Proper
  - Wa of Davies
  - Wa of Milne
  - Other Wa
    - Southern Wa
    - non-Southern Wa
      - Kawa
      - non-Kawa
      - Tung Va Wa
      - Wa of Antisdel
      - 'Bible Wa'
      - Praok

NB: Names refer to authors who described these languages.

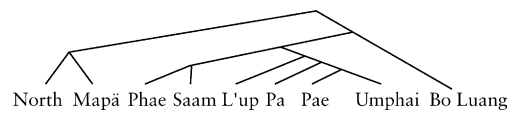

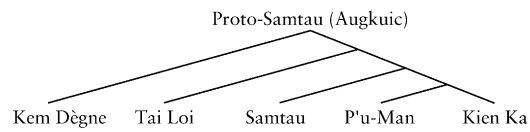

NB: Samtauic/Angkuic P'u-Man is not the same as Palaungic P'u-Man.

As with other Mon-Khmer subgroups, there is a proliferation of names associated with languages of this group. Thus, to Angkuic may be found such names as Hu, Kiorr, Kon Keu, Man Met, Samtao, Tai Loi, and U. To Waic also belongs the official minority Bulang (Blang) language of China; this officially recognized ethnic designation in China also subsumes many other related languages of the Waic group. The Ethnologue reckons only four other Waic languages, Eastern Lawa, Western Lawa, Vo, and Parauk. As in many areas, the language/dialect distinction is ill defined and subject to the whims or biases of individual researchers.

The important languages of the Pearic branch of Mon-Khmer were spoken by around 8000–10 000 people in Cambodia before the ravages of the Vietnam War and the subsequent terror imposed by the Khmer Rouge regime. Only a handful of speakers of the half-dozen or so languages may remain. The languages of the Pearic branch include Chhong

(Chong), known for its unusually developed system of register/voice quality contrasts characterizing its vowel system, Pear, Samre, Somray, Sa'och, and the poorly known Suoy (not to be confused with the Katuic-speaking group of the same name). Pearic peoples are dark skinned and have curly hair and as such were often discriminated against in Cambodia. Traditionally, the Pear proper were tribute payers of the Khmer in cardamom (Parkin, 1991: 68).

The large and diverse branch of Mon-Khmer known as Viet-Muong consists of an indeterminate number of languages spoken primarily in Vietnam and adjacent parts of Laos. First and foremost belonging to this branch is Vietnamese, far and away the Austro-Asiatic language with the most speakers, with perhaps as many as 60–70 million. In fact, Vietnamese has more speakers than the other 150-odd Austro-Asiatic languages combined. Highly divergent within the family, with a developed tone system, lack of minor syllables and monosyllabic structure, lack of affixation processes, and heavy lexical influence from Chinese, the Austro-Asiatic affiliation of Vietnamese was not established until relatively recently (and is still disputed by some). Among the other languages of the branch, Muong stands out with its 400 000–500 000 speakers. Most other Viet-Muong languages have between several hundred and several thousand speakers. Most are poorly known or are indeed unattested linguistically, save perhaps an isolated word list. These are conventionally divided into a Chut subgroup, consisting of Arem, May, Pakatan, Ruc and Sach; a Cuoi subgroup, to which belong Hung, Pong, and Tum; a Muong group, consisting of Bo, Kha Tong Luang, Muong proper, Nguôn, and another Pong; a small Thavung-Phon Sung (Aheu) group; Vietnamese; and the poorly known and still unclassified Tho language. Other languages not recognized by the Ethnologue belonging to Viet-Muong include Coi, Dan Lai, K'katiam-Pong-Huok (Thai Pong), Ly Ha, Ma Lieng, Nguoi Rung, Nha Lang, Tay Cham, Tay Pum, and Tay Tum (Ktum) (Parkin, 1991). Many Viet-Muong languages are undergoing rapid assimilation to Vietnamese. While included here, it is possible that Viet-Muong is not actually a subgroup of Mon-Khmer, but, like Aslian and Nicobarese, a separate subgroup of (non-Munda) Austro-Asiatic.

In addition to the subgroups of Mon-Khmer languages adduced above, there are a number of as yet unclassified or isolated groups as well. Most of these are relatively recently described minority languages from China and Vietnam in particular.

The Mang or Mang U of Vietnam and China number perhaps 1000 speakers. Mang has similarities with Khmuic and Palaung-Wa, more with the latter, but may constitute its own subgroup within Mon-Khmer.

The Palyu, who occupy the Guangxi–Guizhou border region of China, have also been recently identified as a Mon-Khmer-speaking group, the exact affiliation of which remains to be demonstrated. They are locally known as Lai (not to be confused with the Tibeto-Burman Lai Chin of Bangladesh and Myanmar).

Other recently discovered and as yet unclassified Austro-Asiatic languages of China possibly belonging to Mon-Khmer include Bugan, Buxinhua, Kemiehua, and Kuanhua. What little is known of these languages suggests that they may well be important for comparative Mon-Khmer linguistics.

There is a specialist journal devoted to the linguistic analysis of Mon-Khmer languages, *Mon-Khmer Studies*, where the interested reader may find a wide range of articles covering virtually every conceivable linguistic topic in the investigation of the languages of this family. The majority of articles are devoted to phonological analysis, as Mon-Khmer languages, as mentioned above, are particularly unusual in this domain. Among present-day specialists in Mon-Khmer linguistics, Gerard Diffloth deserves special mention.

See also: Austroasiatic Languages; Cambodia: Language Situation; China: Language Situation; Khasi; Khmer; Mon; Southeast Asia as a Linguistic Area; Thailand: Language Situation; Vietnam: Language Situation; Vietnamese; Wa.

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Monotonicity and Generalized Quantifiers

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Many quantified noun phrases give rise to entailment relations between sentences that differ with respect to some modification of a verb phrase in their scopes. Consider the following sentences:

(1a) No students laughed.
(1b) No students laughed loudly.

(2a) Every philosopher smokes.
(2b) Every philosopher smokes heavily.

Whereas Example (1a) entails Example (1b), this is not the case with Examples (2a) and (2b). On the other hand, Example (2b) *does* entail Example (2a), whereas Example (1b) does not entail Example (1a). The important property to note here is that in the (b) sentences, the verb phrases pick out a smaller set of entities than the (a) sentences do (those who laugh loudly constitute a subset of those who laugh, and the set of heavy smokers is a subset of the set of smokers). So, the truth value of a sentence with *No students* in its subject position is unaffected if the denotation of its verb phrase (VP) is reduced. At the same time, the truth value of a sentence with *every philosopher* as subject remains unaffected whenever the denotations of its VP is extended. These entailment relations are known as 'monotonicity' relations, and *no students* is said to be 'monotone decreasing' (MON↓); *every*

Monaco: Language Situation

Editorial Team

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With its 1.95 km^2 of almost totally urbanized territory, the principality of Monaco is the second smallest independent state in the world after the Vatican. In the hands of the Grimaldi family since the 15th century, the Monégasque state is located on the southeastern coast of France on the Mediterranean Sea near the border with Italy. The national language of Monaco is French, which is spoken by 58% of the population. Of the 32 270 inhabitants (July 2004), 99% are literate and 1879 deaf. Seventeen percent of the population speaks one of two Ligurian dialects: either Genoese (Genoan, Genovese) or Monégasque (Munegasc, Ventimigliese). Even though Ligurian is a language predominantly spoken in Italy, it is closer to Piemontese, Lombard, and French than standard Italian. Monégasque was at risk of extinction in the 1970s, but compulsory learning in schools successfully revived it. A further 15% of the population of Monaco speaks the Niçard (Niçois) variety of Provençal, which greatly influences the French of the Monegasque region. In fact, the Niçard-speaking community comprises mainly individuals of over 50 years of age, but Provençal is increasingly gaining status as a literary language. There is a strong demand for teaching in schools and books in Provençal. Monaco is a tax haven and this has attracted many foreign companies and individuals to the principality, with the result that a number of other languages, such as English and Italian, also are in current use. The nine radio and five television stations of Monaco are supplemented by broadcasts from France and Italy.

See also: French.

Mongol *See:* Mongolic Languages.

Mongolia: Language Situation

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Sandwiched between Russia to the north and China to the south, Mongolia has an area of about 1.5 million square km and a population of about 2.6 million. Mongolia was the center of the Mongolian empire, which, under Genghis Khan in the 13th century, extended from the Chinese Sea to the Persian Gulf and the Black Sea, and was one the largest empires ever built. From the 17th century large parts of Mongolia were controlled by the Qing Empire. An independent Mongolian republic was founded in 1921 with Soviet backing, and Mongolia remained closely associated with socialist politics and the USSR until 1990, when multi-party elections were held. One result of Mongolia's turbulent history is that most languages of the country are also spoken in the neighboring countries Russia and China, and some even farther away, e.g., Kazakh in Kazakhstan. Mongolian can be divided into several varieties spoken by different groups.

The main and national language of Mongolia is Halh (or Khalkha) Mongolian, the variety of Mongolian on which modern literary Mongolian is based. Halh Mongolian is the language of about 90% of the population, and most speakers of other languages of Mongolia are bilingual in it, and use it for writing. Mongolian is written in three different alphabets: the traditional Mongol alphabet originally developed in the 13th century, whose use has increased during the 1990s; the Cyrillic alphabet, introduced in the 1940s with the advent of communism; and the Latin alphabet, which since 1990 is being used slightly more often, mostly for the writing of English words and phrases.

A variety of Mongolian closely related to Halh, Peripheral Mongolian, is spoken by over 3 million speakers in China, who are part of a large ethnic

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Sandwiched between Russia to the north and China to the south, Mongolia has an area of about 1.5 million square km and a population of about 2.6 million. Mongolia was the center of the Mongolian empire, which, under Genghis Khan in the 13th century, extended from the Chinese Sea to the Persian Gulf and the Black Sea, and was one the largest empires ever built. From the 17th century large parts of Mongolia were controlled by the Qing Empire. An independent Mongolian republic was founded in 1921 with Soviet backing, and Mongolia remained closely associated with socialist politics and the USSR until 1990, when multi-party elections were held. One result of Mongolia's turbulent history is that most languages of the country are also spoken in the neighboring countries Russia and China, and some even farther away, e.g., Kazakh in Kazakhstan. Mongolian can be divided into several varieties spoken by different groups.

The main and national language of Mongolia is Halh (or Khalkha) Mongolian, the variety of Mongolian on which modern literary Mongolian is based. Halh Mongolian is the language of about 90% of the population, and most speakers of other languages of Mongolia are bilingual in it, and use it for writing. Mongolian is written in three different alphabets: the traditional Mongol alphabet originally developed in the 13th century, whose use has increased during the 1990s; the Cyrillic alphabet, introduced in the 1940s with the advent of communism; and the Latin alphabet, which since 1990 is being used slightly more often, mostly for the writing of English words and phrases.

A variety of Mongolian closely related to Halh, Peripheral Mongolian, is spoken by over 3 million speakers in China, who are part of a large ethnic

Mongolian group that is one of China's five official nationalities. There are also a few thousand speakers of Mongolian in Russia.

In addition to Mongolian, 10 further languages are spoken in Mongolia (Grimes, 2000). Except for Chinese (Mandarin, 35 000 speakers), Russian (4000 speakers), and Mongolian Sign Language, all of them are, like Mongolian, Altaic languages: Mongolian, Buriat (Buriat, Mongolia), Darkhat, and Kalmyk-Oirat belong to the Mongolian group, Evenki is a Tungus language, and Kazakh, Uyghur and Tuvin belong to the Turkic group.

Furthermore, all Mongolian languages except for Darkhat (4000 speakers), a more distinct variety of Kalmyk-Oirat, have further speakers outside Mongolia, mainly in China and Russia. Thus, Kalmyk-Oirat is spoken in Russia by 174 000 Kalmyk people, as well as by Oirat people in Mongolia (205 500) and in China (139 000). Buriat varieties exist in Russia (Buriat, Russia) and China (Buriat, China) in addition to the 64 900 Buriat speakers in Mongolia. Tuvin (27 000) is spoken by a much larger community of 206 000 in Russia. There are small communities of about 1000 speakers each of Evenki and Uyghur in Mongolia, matched by much larger communities in Russia and China. Finally, Kazakh has about 120 000 speakers in Mongolia, but is mainly spoken in Kazakhstan, where it is the official language.

The language of education is Mongolian at all levels of education, except in Kazakh-speaking areas, where Kazakh is used at the primary and, to a lesser extent, secondary level. The most widely taught foreign language has traditionally been Russian, but it is being replaced by English as a result of the increased orientation of the country towards the West. With the increase of the role of English, the Latin alphabet is being used slightly more often, for example, for names of foreign products or companies. The English-language newspaper *Mongol Messenger* is published weekly by the state-owned news agency Montsame.

See also: Altaic Languages; China: Language Situation; Kazakhstan: Language Situation; Mongolic Languages; Russian Federation: Language Situation.

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Relevant Website

http://www.tlfq.ulaval.ca/axl – homepage of L'aménagement linguistique dans le monde.

Mongolic Languages

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Definition

Mongolic is the technical term for the group of languages (conventionally also known as Mongolian) spoken by the linguistic descendants of the historical Mongols, a medieval ethnic group that created the political entity known as the Mongol Empire (early 13th to late 14th centuries). The historical Mongols were pastoral nomads who started their expansion from a relatively compact homeland centered in northeastern Mongolia and northwestern Manchuria, but under the Mongol Empire they were dispersed all over central and northeastern Asia, where populations speaking Mongolic languages still survive today. By the degree of dispersal and diversification, Mongolic may be characterized as a medium-large language family. The principal neighbors of Mongolic in premodern times have included Turkic (in the west), Tungusic (in the northeast), (Mandarin) Chinese (in the southeast), and Tibetan (in the south). There is also both direct and indirect information of a group of historical and protohistorical languages, termed Para-Mongolic, which were collaterally related to the language of the historical Mongols. Due to problems of deciphering and linguistic analysis, these languages have not yet been incorporated into the corpus of Mongolic comparative studies.

Distribution

The geographical core area of the Mongolic family coincides with the historical and geopolitical entity of Mongolia, covering both Outer Mongolia (the

Mongolian group that is one of China's five official nationalities. There are also a few thousand speakers of Mongolian in Russia.

In addition to Mongolian, 10 further languages are spoken in Mongolia (Grimes, 2000). Except for Chinese (Mandarin, 35 000 speakers), Russian (4000 speakers), and Mongolian Sign Language, all of them are, like Mongolian, Altaic languages: Mongolian, Buriat (Buriat, Mongolia), Darkhat, and Kalmyk-Oirat belong to the Mongolian group, Evenki is a Tungus language, and Kazakh, Uyghur and Tuvin belong to the Turkic group.

Furthermore, all Mongolian languages except for Darkhat (4000 speakers), a more distinct variety of Kalmyk-Oirat, have further speakers outside Mongolia, mainly in China and Russia. Thus, Kalmyk-Oirat is spoken in Russia by 174 000 Kalmyk people, as well as by Oirat people in Mongolia (205 500) and in China (139 000). Buriat varieties exist in Russia (Buriat, Russia) and China (Buriat, China) in addition to the 64 900 Buriat speakers in Mongolia. Tuvin (27 000) is spoken by a much larger community of 206 000 in Russia. There are small communities of about 1000 speakers each of Evenki and Uyghur in Mongolia, matched by much larger communities in Russia and China. Finally, Kazakh has about 120 000 speakers in Mongolia, but is mainly spoken in Kazakhstan, where it is the official language.

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See also: Altaic Languages; China: Language Situation; Kazakhstan: Language Situation; Mongolic Languages; Russian Federation: Language Situation.

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Distribution

The geographical core area of the Mongolic family coincides with the historical and geopolitical entity of Mongolia, covering both Outer Mongolia (the

modern independent state of Mongolia) and Inner Mongolia (an autonomous region within China). In terms of physical geography, this area comprises the steppes and adjoining forested highlands of the Mongolian Plateau, the Ordos region south of the Yellow River, and the Gobi Desert. In the north the Mongolic area extends to the Baikal region in the Siberian forest zone (Russia), in the east to the plains of the Manchurian provinces (China), in the south to the Gansu corridor and the Amdo (Kokonor) region (China/Tibet), and in the west to the Jungarian basin in eastern Turkestan or Xinjiang (China). Separate areas and relicts of Mongolic-speaking populations are found in Afghanistan and the Caspian region (Russia), as well as in some parts of middle Asia (Kazakhstan and Kyrgyzstan). The area of the historical Para-Mongolic languages was centered on southwestern Manchuria.

Time Depth

Mongolic (excluding Para-Mongolic) is a well-delimited family of a dozen closely related languages, which derive from a relatively shallow and dialectally coherent protolanguage, termed Proto-Mongolic. In view of the circumstances underlying the dispersal of the Mongolic languages, the diachronic depth of Proto-Mongolic must be less than 1000 years. Although Proto-Mongolic is, by definition, a hypothetical construction that can only be approached by the method of comparative linguistics, it must have been close to the language of the historical Mongols, also known as Middle Mongol, which is actually documented in a variety of sources contemporary with the Mongol Empire. To some extent, these sources illustrate the gradual dialectal diversification of Middle Mongol, which ultimately led to the separation into the modern Mongolic languages. Contacts between some of the individual Mongolic languages have continued until modern times, making their boundaries with one another, in some cases, fuzzy.

Genetic Status

Mongolic is often classified as a branch of the Altaic language family, which is also supposed to include Turkic and Tungusic, as well as Korean(ic) and Japonic (Japanese-Ryukyu). Although the conception of an Altaic genetic unity still has adherents, modern research has demonstrated that the relationships of Mongolic with the other languages of the Altaic complex are best explained in terms of a complex and multilayered network of historical and prehistorical areal contacts. Most important, Mongolic has over several millennia been in contact with Turkic (in the west) and Tungusic (in the east), resulting in a considerable corpus of shared structural properties and linguistic substance among all the three language families. This interaction has continued up to the present day in some regions (Siberia, Manchuria, Eastern Turkestan, and Amdo). On a higher level, Mongolic also belongs to the areal and typological context of Ural-Altaic, which in addition comprises the Uralic language family. Both Altaic and Ural-Altaic remain relevant (and still insufficiently understood) concepts of areal linguistics and typology, but in the genetic sense these terms may today be regarded as obsolete.

Classification

Due to the shallowness of Proto-Mongolic, the Mongolic languages are difficult to classify in terms of a clear-cut (binary) family tree. It is, however, possible to establish four relatively distinct branches of Mongolic (Table 1). Two of these branches comprise only one marginal language each: Dagur (Daur; in Manchuria) and Moghol (Mogholi; in Afghanistan), which also seem to be the two Mongolic languages most distant from one another as determined by the number of shared isoglosses. The two other branches may be called Central Mongolic and Shirongolic. Central Mongolic covers a large coherent area centered on Mongolia, but it is differentiated into five distinct, although closely related, languages: Khamnigan Mongol (in the northeast), Buryat (Russia Buriat, Mongolia Buriat, and China Buriat; in the north), Mongol proper (in the center and east), Ordos (Peripheral Mongolian; in the south), and Oirat (Kalmyk-Oirat; in the west). Shirongolic also comprises a cluster of at least five distinct languages in the Amdo (Kokonor) region: Shira Yughur (also known as East Yughur), (Huzhu) Mongghul (Tu), (Minhe) Mangghuer (Tu), Bonan (Baoan), and Santa

Table 1 Classification of the Mongolic languages

Branches		*Languages*	*Location*
1. Dagur(ic)		(1) Dagur	Manchuria
2. Central Mongolic	2.1.	(2) Khamnigan Mongol	Manchuria
	2.2.	(3) Buryat	Siberia
	2.3.	(4) Mongol proper	Mongolia
	2.4.	(5) Ordos	Ordos
	2.5.	(6) Oirat	Jungaria
3. Shirongolic	3.1.	(7) Shira Yughur	Amdo
	3.2.	(8) Huzhu Mongghul	Amdo
	3.3.	(9) Minhe Mangghuer	Amdo
	3.4.	(10) Bonan	Amdo
	3.5.	(11) Santa	Amdo
4. Moghol(ic)		(12) Moghol	Afghanistan

(Dongxiang). All of the Mongolic languages comprise a number of dialects and subdialects, some of which could linguistically also be counted as separate languages. Internal diversification is particularly conspicuous in Mongol proper, Buryat, and Huzhu Mongghul.

Typology

Proto-Mongolic may be reconstructed as a rather consistently agglutinative language with a sentence structure and suffixal morphology of the Ural-Altaic type. This conclusion is confirmed by actual information from Middle Mongol, and similar typology is still synchronically observed in both Dagur and the languages of the Central Mongolic branch. The two other branches of Mongolic have, however, undergone fundamental changes in their typological orientation. Moghol, under the influence of the local Iranian languages, has developed a large number of non-Mongolic features, including prepositions, conjunctions, and new inflexional categories. The Shirongolic languages, on the other hand, have been influenced by both local Chinese and local (Amdo) Tibetan in a complex framework of areal interaction that may be termed the Amdo Sprachbund (also known as the Qinghai-Gansu Sprachbund).

Literary Use

Since the time of the Mongol Empire, the principal literary language of Mongols has been Written Mongol (also known as Literary Mongol), written in a Semitic script adopted from the ancient Uighurs of eastern Turkestan. The early forms of Written Mongol were close to Middle Mongol, also recorded in other scripts, whereas the later forms become increasingly close to the spoken dialects of Mongol proper, the most important modern Mongolic language. An adaptation of Written Mongol known as Written Oirat was introduced as a written language of the Oirat speakers in 1648, but otherwise Written Mongol has been used by the speakers of all the Central Mongolic languages. Written Mongol was the official written language of Mongolia until the 1940s, and it still has an official position in Inner Mongolia. Outside of Inner Mongolia, it has, however, been replaced by new literary languages (in Cyrillic and Roman scripts) based on the local vernaculars.

Political Status

Written Mongol used to be one of the five official languages of the Manchu Empire of China (1644–1911), and it still remains one of the few minority languages in which public education is available in China.

The dominant spoken language of the Mongols in both Outer and Inner Mongolia is Mongol proper. The principal dialectal form of Mongol proper in Outer Mongolia is Khalkha (Halh Mongolian), which has been developed as a literary language (in Cyrillic script) since the 1940s and is today the official state language of Mongolia.

Within the Russian Federation (in Siberia), Buryat has an official status (including a literary standard in Cyrillic script) in the Republic of Buryatia and other Buryat administrative areas, whereas a diaspora variety of Oirat known as Kalmuck (or Kalmyk) has a similar status in the Republic of Kalmykia (in the Caspian region). Other Mongolic languages have no official position, but experiments with modern literary languages (in Roman script) for Shira Yughur, Huzhu Mongghul, Minhe Mangghuer, and Santa are being made.

Demography

The total number of Mongolic speakers today is ca. 5–7 million. Most of these speak dialects of Mongol proper, of whom ca. 2 million live in Mongolia and ca. 3–4 million in Inner Mongolia (and other parts of China). Other relatively large Mongolic populations are those speaking Santa (ca. 600 000), Oirat (including Kalmuck, ca. 300 000), Buryat (ca. 300 000), Dagur (ca. 100 000), Ordos (ca. 100 000), and Huzhu Mongghul (ca. 100 000). The other languages are spoken by considerably smaller populations: Minhe Mangghuer (ca. 30 000), Bonan (ca. 10 000), Shira Yughur (ca. 3000), and Khamnigan Mongol (ca. 2000). Moghol is spoken by only a few individuals, if any.

With regard to linguistic vigorousness, there are considerable differences among the Mongolic languages. Whereas Moghol is moribund or nearly extinct, some groups of Khamnigan Mongol and Bonan are still viable in spite of their small numbers of speakers. Huzhu Mongghul is rapidly declining, whereas Minhe Mangghuer seems to be stable for the time being. The numbers of Buryat, Dagur, and Ordos speakers are diminishing due to assimilation by Chinese, Russian, and Mongol proper. Mongol proper is also rapidly losing ground in Inner Mongolia due to assimilation by Chinese. In this situation, Santa, a little investigated Mongolic language spoken by a compact and mainly monolingual Moslem population, with a low general level of literacy and education, is possibly the most vigorous and demographically the most rapidly growing Mongolic language today.

History of Research

Much of the early work on Mongolic focused on the philological analysis of Written Mongol texts. Isaac-Jacob Schmidt, working in service to Russia, was the first to publish a scientific grammar and dictionary of Written Mongol in the 1830s. Linguistic work on living Mongolic languages was initiated in the 1840s by the Finnish ethnolinguist M. A. Castrén (who worked on Buryat) and continued in the late 19th and early 20th centuries by G. J. Ramstedt (on Khalkha, Oirat/Kalmuck, and Moghol), A. D. Rudnev (on dialects of Buryat and Mongol proper), Nicholas Poppe (on Buryat, Khalkha, and Dagur), and Antoine Mostaert (on Ordos). The documentation of Moghol was completed by Michael Weiers in the 1970s. The last major blank spot in Mongolic studies was the Shirongolic branch. After the pioneering contributions by Antoine Mostaert (Huzhu Mongghul) in the 1920s and 1930s, the Shirongolic languages were studied by a Sino-Russian expedition under the leadership of B. Kh. Todaeva in the 1950s and by an Inner Mongolian expedition in the 1980s. Even so, material on some Shirongolic languages and dialects has been extremely scarce until the present day. The last major Mongolic language to be documented was Minhe Mangghuer, described by Keith W. Slater (2003). The most up-to-date general work, with grammatical sketches of all Mongolic languages, was edited by Juha Janhunen (2003).

In the field of diachrony, the focus was long on external comparisons in the Altaic framework. The main source on Mongolic comparative studies remains the work of Nicholas Poppe (1955), which, unfortunately, has already become obsolete in some respects, especially as far as the languages of the Shirongolic branch are concerned.

See also: Altaic Languages; Areal Linguistics; China: Language Situation; Classification of Languages; Contact-Induced Convergence: Typology and Areality; Endangered Languages; Kazakhstan: Language Situation; Kyrgyzstan: Language Situation; Mongolia: Language Situation; Russian Federation: Language Situation; Tungusic Languages; Turkic Languages; Uralic Languages.

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Mon-Khmer Languages

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The Mon-Khmer languages constitute a disparate group of languages belonging to the Austro-Asiatic phylum spoken in a large area across Southeast Asia. The term 'Mon-Khmer' has several interpretations. One sense in includes all non-Munda Austroasiatic languages (except Nihali if this is in fact to be considered Austroasiatic at all; for more *see* **Austroasiatic Languages**). Another sense of Mon-Khmer excludes Nicobarese, while a further interpretation excludes both the Nicobarese and the Aslian branches. This latter one is the understanding of the term 'Mon-Khmer' relevant for this article.

Within this narrow-scope interpretation of Mon-Khmer, the following subgroups can be reckoned: Bahnaric, Katuic, Khasi(c), Khmeric, Khmuic, Monic, Palaung-Wa, Pearic, and Viet-Muong. The internal relations of these subgroups have yet to be adequately determined to the satisfaction of specialists; as such, no *Stammbaum* of Mon-Khmer can be here offered.

One proposal (Grimes, 2000) on the internal subgrouping of Mon-Khmer within the broadest understanding enumerated above, recognizes a major cleavage between Aslian and all other Mon-Khmer languages; these latter are further subdivided into an Eastern Mon-Khmer subgroup consisting of Bahnaric, Katuic, Khmer, Pearic, Monic, and Nicobarese and a Northern Mon-Khmer group that consists of Khmuic, Khasic, Palaung-Wa, and the isolate Mang of Vietnam. Viet-Muong is considered a separate branch coordinate with other Mon-Khmer subgroups. In addition, a number of relatively recently identified Mon-Khmer languages of China and Vietnam either appear to be isolate branches or remain unclassified, e.g., Palyu or Bugan. These are briefly discussed below. Lower-level taxonomic subgroupings have also been offered, e.g., Katuic-Bahnaric within the Eastern Mon-Khmer branch. Further research will refine and revise the classification and internal relations of the Mon-Khmer languages.

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Monotonicity and Generalized Quantifiers

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Many quantified noun phrases give rise to entailment relations between sentences that differ with respect to some modification of a verb phrase in their scopes. Consider the following sentences:

(1a) No students laughed.
(1b) No students laughed loudly.

(2a) Every philosopher smokes.
(2b) Every philosopher smokes heavily.

Whereas Example (1a) entails Example (1b), this is not the case with Examples (2a) and (2b). On the other hand, Example (2b) *does* entail Example (2a), whereas Example (1b) does not entail Example (1a). The important property to note here is that in the (b) sentences, the verb phrases pick out a smaller set of entities than the (a) sentences do (those who laugh loudly constitute a subset of those who laugh, and the set of heavy smokers is a subset of the set of smokers). So, the truth value of a sentence with *No students* in its subject position is unaffected if the denotation of its verb phrase (VP) is reduced. At the same time, the truth value of a sentence with *every philosopher* as subject remains unaffected whenever the denotations of its VP is extended. These entailment relations are known as 'monotonicity' relations, and *no students* is said to be 'monotone decreasing' (MON↓); *every*

philosopher is 'monotone increasing' (MON↑). So a quantified noun phrase (QNP) is monotone just in case:

$$\text{QNP VP}_1 \vdash \text{QNP VP}_2,$$

where $\vdash$ is the entailment relation and the denotation of VP_1 contains that of VP_2 (decreasing) or vice versa (increasing). Some further examples of monotone-increasing quantifiers are shown in the following examples:

(3a) Proper names:
Kim sang loudly $\vdash$ Kim sang.
(3b) *Many N*:
Many lecturers eat a lot of chocolate $\vdash$
Many lecturers eat chocolate.
(3c) *At least n N*:
At least three cats were killed by the dog $\vdash$
At least three cats were killed.
(3d) *Most N*:
Most students passed with high marks $\vdash$
Most students passed.
(3e) *More than half of the N*:
More than half of the congregation came to church on time $\vdash$
More than half of the congregation came to church.

There are fewer monotone-decreasing quantifiers that do not directly involve a negation particle:

(4a) *Few N*:
Few lecturers eat chocolate $\vdash$
Few lecturers eat a lot of chocolate.
(4b) *At most n N*:
At most three cats were killed $\vdash$
At most three cats were killed by the dog.
(4c) *Less than half of the N*:
Less than half of the congregation came to church $\vdash$
Less than half of the congregation came to church on time.

Not all quantifiers are monotonic, however (represented as MON∼):

(5a) *Exactly n N*:
Exactly three cats were killed $\not\vdash$
Exactly three cats were killed by the dog.
(5b) *A few N*:
A few lecturers eat chocolate $\not\vdash$
A few lecturers eat a lot of chocolate.

Interestingly enough, it seems to be universally the case that 'simple' noun phrases – i.e., proper names, noun phrases consisting of a simple determiner plus noun, and quantifier noun phrases such as *everyone*, *no one* – are always monotonic. Only noun phrases containing complex determiners, such as *a few*, *exactly five*, *all but seven*, etc., may not be.

To give more precise definitions and to explore the properties of monotonicity, most semanticists follow Montague (1973) in taking QNPs as denoting **generalized quantifiers**. These are defined as higher order denotations, picking out sets of sets of entities, each set bearing some specified relation to the set of entities denoted by the common noun (phrase) in the QNP. Thus, *every philosopher* denotes the set of all sets that contain as a subset the set of philosophers. *Every philosopher smokes* expresses a true proposition, therefore, just in case the set of smokers is a superset of the set of philosophers, in which case $\|\textit{smoke}'\| \in \|\text{every philosopher}\|$ (where $\|\alpha\|$ represents the denotation of α). More generally, given a sentence consisting of a quantified noun phrase in subject position and some verb phrase, $\|\text{QNP VP}\|$ is then defined as being true just in case $\|\text{VP}\| \in \|\text{QNP}\|$.

The monotonicity properties of generalized quantifiers have been the object of considerable research within semantics since the seminal work of Barwise and Cooper (1981). Within this framework, the monotonicity property of a quantifier is easily defined. A generalized quantifier QNP VP is as follows:

(6a) MONOTONE INCREASING just in case whenever
$\|\text{VP}_1\| \in \|\text{QNP}\|$ then $\|\text{VP}_2\| \in \|\text{QNP}\|$
where $\|\text{VP}'_1\| \subseteq \|\text{VP}'_2\|$.
(6b) MONOTONE DECREASING just in case whenever
$\|V\,P'_1\| \in \|\text{QNP}\|$ then $\|\text{VP}_2\| \in \|\text{QNP}\|$
where $\|\text{VP}_2\| \subseteq \|\text{VP}_1\|$.

Quantified noun phrases may combine with the 'Boolean' connectives *not*, *and*, *or*, and these combinations may have an effect on the monotonicity of the resulting quantifier. For example, negation reverses the direction of the monotonicity of a quantifier, whether it is internal (corresponding to VP negation) or external (corresponding to the negation of the QNP).

(7a) Not all philosophers smoke $\vdash$ Not all philosophers smoke heavily.
(7b) All students don't like semantics $\vdash$ All students don't like formal semantics.
(7c) Few lecturers don't eat a lot of chocolate $\vdash$ Few lecturers don't eat chocolate.

Formally, negation of quantifiers can be defined as follows:

External negation :

$$\|\neg QNP\| = \{X \subseteq E | X \notin \|QNP\|\}. \tag{8a}$$

Internal negation :

$$\|QNP\neg\| = \{X \subseteq E | (E - X) \in \|QNP\|\}. \tag{8b}$$

To see the effects of these definitions, consider the negation of the quantifier *all N*:

(9a) $\|\text{all N}\| = \{X \subseteq E \mid \|\text{N}\| \subseteq X\} = \{X \subseteq E \mid \|\text{N}\| \cap X = \|\text{N}\|\}$.

(9b) $\|\neg\text{all N}\| = \{X \subseteq E | X \notin \|\text{all N}\|\} = \{X \subseteq E | \|\text{N}\| \cap X \neq \|\text{N}\|\}$
(external negation plus (9a)).

(9c) $\|\text{all N}\neg\| = \{X \subseteq E | (E - X) \in \|\text{all N}\|\}$
$= \{X \subseteq E | \|\text{N}\| \cap (E - X) = \|\text{N}\|\}$
$= \{X \subseteq E | \|\text{N}\| \cap X = \emptyset\}$
$= \|\text{no N}\|$
(internal negation plus (9a)).

To see that negation does indeed reverse monotonicity, consider how the definitions in Examples (8a) and (8b) affect a monotone increasing quantifier. Assume a QNP is MON↑ and that X and Y are arbitrary sets such that $X \subseteq Y$, so that 'QNP X' entails 'QNP Y' (where X and Y are VPs that denote X and Y, respectively). If $Y \in \|\text{Q}NP\neg\|$, then $(E - Y) \in \|\text{QNP}\|$ (by Example (8b)) and $(E - Y) \subseteq (E - X)$, so $(E - X) \in \|\text{QNP}\|$ and hence $X \in \|\text{QNP}\neg\|$. So 'QNP not Y' entails 'QNP not X,' as required. Analogously, if $Y \in \|\neg\text{QNP}\|$, then $Y \notin \|\text{QNP}\|$, so that $X \notin \|\text{QNP}\|$ and hence $X \in \|\neg\text{QNP}\|$. So 'not QNP Y' entails 'not QNP X,' and both forms of negation thus make a monotone-increasing quantifier into a decreasing one.

Note that because $\text{QNP} = \neg\neg\text{QNP} = \text{QNP}\neg\neg$, any decreasing simple quantifier is a negated form of a simple increasing one. This may explain why negating decreasing QNPs is generally ill formed, because the corresponding simple increasing QNPs could be used.

(10) *Not few students = Many students.

Monotonicity is maintained if two (or more) QNPs with the same direction of monotonicity are conjoined by *and* or *or*.

(11a) A student and every lecturer were snoring loudly ⊢
A student and every lecturer were asleep.

(11b) Bill or both women ran home quickly ⊢
Bill or both women ran home.

(12a) No student and not all lecturers were asleep ⊢
No student and not all lecturers were snoring loudly.

(12b) At most ten men or less than half the women ran home ⊢
At most ten men or less than half the women ran home quickly.

Again it is fairly easy to show that this must be the case using the formal apparatus of generalized quantifiers, given conjunction interpreted as involving set intersection and disjunction as set union, as in Examples (13a) and (13b):

(13a) $\| \text{NP}_1 \text{ and } \text{NP}_2 \| = \| \text{NP}_1 \| \cap \| \text{NP}_2 \|$.

(13b) $\| \text{NP}_1 \text{ or } \text{NP}_2 \| = \| \text{NP}_1 \| \cup \| \text{NP}_2 \|$.

We take the persistence of monotonicity properties with *and* as an illustration of how the proofs of these four theorems are established:

Assume that QNP_1 and QNP_2 are both MON↑ and that X and Y are arbitrary sets such that $X \subseteq Y$. If $X \in \|\text{Q}NP_1\| \cap \|\text{Q}NP_2\|$, then it must be the case that $X \in \|\text{Q}NP_1\|$ and $X \in \|\text{Q}NP_2\|$. So, by increasing monotonicity, $Y \in \|\text{Q}NP_1\|$ and $Y \in \|\text{Q}NP_2\|$. Hence, $Y \in \|\text{Q}NP_1\| \cap \|\text{Q}NP_2\|$. QED.

Barwise and Cooper (1981) suggest that coordination of noun phrases is constrained by monotonicity:

Co-ordination constraint: Two NPs can be coordinated by conjunction (*and*) and disjunction (*or*) iff they are both monotone increasing or both monotone decreasing.

(14a) No student and every lecturer liked the book.
(14b) Most students and every lecturer liked the book.
(14c) *No student and most lecturers liked the book.
(14d) *No student and a lecturer liked the book.

On the other hand, the connective *but* seems to require quantifiers with different monotonicity:

(15a) Every woman but no man agreed with the Prime Minister.
(15b) No student but most lecturers liked the book.
(15c) *Most students but every lecturer liked the book.

However, there are many counterexamples to these apparent constraints, so they cannot be adopted universally and some other explanation remains to be given for the ill-formed examples.

(16a) At least three cats and at most four dogs (were killed on this road last year).
MON↑ and MON↓

(16b) Bill and a few women (met in the pub).
MON↑ and MON∼:

Although the constraint against conjoining quantified noun phrases with different monotonicity properties cannot be maintained as a linguistic universal, there is one property that is fully robust. Negative polarity items such as *any* or *ever* are typically within the scope of negation (Examples (17a)–(17d) (Klima, 1964), but they also appear in the scope of certain types of quantified noun phrases that do not contain an overt negation marker (Examples (18a)–(18d)). The latter are all monotone-decreasing quantifiers and the generalization in Example (19) appears to be universally true (Ladusaw, 1983):

(17a) John didn't eat any chocolate.
(17b) *John ate any chocolate.
(17c) No students were ever early.
(17d) *All students are ever early.

(18a) At most five residents saw anything.
(18b) Few students fail any exams.
(18c) *Many students fail any exams.
(18d) Less than half of the congregation ever stays to the end of the service.
(18e) *Exactly five people ever sing loudly enough.

(19) Negative polarity items may appear in the scope of monotone-decreasing quantifiers but not in the scope of nonmonotonic or monotone-increasing quantifiers.

In the discussion so far, the monotonicity of quantifiers have been treated as referring to entailment relations involving increases or decreases in their **scope**, as denoted by a VP with which they may combine. Because quantified noun phrases consist of a determiner plus a common noun phrase, the latter, like verb phrases, are taken in extensional semantic theories to denote sets; the theory of generalized quantifiers conceptualizes **determiners** as denoting relations between sets:

(20) *DET*(*A*) (*B*), where *A* is the set denoted by the common noun phrase (the restrictor) and *B* is the set denoted by the verb phrase (the scope).

Given this view, it is natural to consider whether monotonicity applies not only to variations in the scope of a determiner but also in its restrictor. Clearly, this is the case, and restrictor (or left) monotonicity can be defined in the same way as scope (or right) monotonicity was defined for QNPs (some examples are given in Example (24)).

(21) A determiner DET is LEFT (or RESTRICTOR) MONOTONE INCREASING (↑MON) iff
DET N_1 VP ⊢ DET N_2 VP, where $||N_1|| \subseteq ||N_2||$.
A student with red hair is singing entails *A student is singing*.

(22) A quantifier DET is LEFT (or RESTRICTOR) MONOTONE DECREASING (↓MON) iff
DET N_1 VP ⊢ DET N_2 VP, where $||N_2|| \subseteq ||N_1||$.
No student failed their degree exams entails *No student of linguistics failed their degree exams*.

(23) A quantifier DET is LEFT (or RESTRICTOR) NONMONOTONIC (∼MON) iff
DET N_1 VP ⊬ DET N_2 VP, where $||N_2|| \subseteq ||N_1||$ or $||N_1|| \subseteq ||N_2||$.
Exactly five students failed badly neither entails nor is entailed by *Exactly five students of linguistics failed badly*.

(24)

↑*MON*↑	A, some, at least *n*
↓*MON*↓	No, less than *n*
↓*MON*↑	Every, all
↓*MON*↑	Not all, not every
∼*MON*↑	Most, many
↑*MON*∼	Some but not all
∼*MON*↓	Few
∼*MON*∼	Exactly *n*

See also: Compositionality: Semantic Aspects; Formal Semantics; Polarity Items; Quantifiers: Semantics.

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Montague Semantics

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Historical Background

Montague semantics emerged around 1970, and constituted a fundamentally new approach to the semantics of natural language. In order to understand the importance of this approach, it is useful to consider the situation in that period of some neighboring disciplines of semantics: philosophy of language, philosophical logic, and linguistics. These subjects are considered below, a more extended picture of the historical background is given by Partee and Hendriks (1997).

One of the subjects studied in philosophy of language was meanings of natural language, and these were (before 1970) sometimes represented in some or other logic. The mapping between a sentence and its logical representation was made in an *ad hoc* way; it was more or less stipulated which formula was the correct meaning representation of a given sentence. The situation could be characterized as follows: a 'bilingual logician,' who knew logic and who knew a natural language, provided the formula. It was noticed that there could be a large difference between the sentence and the formula, and a dominant view of these matters at that time was the so-called 'misleading form thesis,' saying that there is a sharp distinction between the grammatical and the logical form of sentences, and that the grammatical form disguises the logical form to such an extent that they cannot be related in a systematic way. It was sometimes even proposed to design for certain purposes an improved version of natural language in which the form does not obscure the meaning.

In philosophical logic there is a tradition to study words of natural language that are philosophically interesting. Examples are 'necessarily' and 'possibly.' Axiom systems for these notions were designed which expressed their properties. A jungle of systems of modal logics arose, motivated by different properties of embeddings of these notions. Kripke brought about, in the mid-1960s, an enormous change in this field. He introduced semantic models for modal logics, thereby making it possible to conceive modal logic in the same way as mathematical logic: as a formal language with a model-theoretic semantics. The variety of systems could be structured by conceiving them as expressing relations between possible worlds in a model.

Around 1960, Chomsky brought about great changes in linguistics by introducing mathematical standards of explicitness. He developed the tools for this (context-free grammars and transformations), and syntax became a flourishing branch of linguistics. There was some attention to semantic issues, such as whether transformations were meaning-preserving, or what would be the input for a semantic component, but the theory was a theory about syntax that did not deal explicitly with semantics.

These three lines were brought together by Richard Montague. He was a mathematical logician who had made important contributions to the foundations of set theory. He was attracted by Chomsky's formal treatment of natural language, but unsatisfied by its (lack of) treatment of semantics. Therefore he developed an alternative to the Chomskyan approach that satisfied his (logical) standards. He presented a fragment of English and provided it with a rigorous model-theoretic interpretation. Most important is the fact that the relation between a sentence and its meaning is defined in a systematic way. It became possible, for the first time in history, to calculate which meaning is associated with any given sentence, hence to make predictions concerning semantics.

By developing his grammar model, Montague provided evidence for his opinion that there is no important theoretical difference between natural languages and the languages studied by logicians: both can be dealt with using the same methods and with the same mathematical rigor (Montague, 1970a: 189; Montague, 1970b: 313; Thomason, 1974: 188, 222). The title of one of Montague's first publications on this subject provides clear evidence of his position: 'English as a formal language' (Montague, 1970a).

Aims

The aim of Montague semantics is to describe, predict, and explain semantic relations between natural language utterances, an aim it shares with other theories. In the present section, some important semantic relations between natural language utterances will be introduced by means of examples, viz. entailment, valid reasoning, synonymy, and ambiguity. The examples given here are realistic in the sense that they are treated within the field of Montague semantics, thus giving an impression of the variety of phenomena that are studied. The examples that occur without reference are within the fragment of Montague (1973), or are variants of such examples.

An important semantic relation is the 'entailment' relation between sentences, say A and B. This means

that whenever A is accepted as being true, B must also be accepted as being true, on grounds of meaning properties. Sentence (1) entails sentence (2):

(1) Mary is singing and dancing.

(2) Mary is singing.

This entailment, however, does not hold for all grammatical subjects: witness (3) and (4), where in fact the inverse relationship holds.

(3) No-one is singing and dancing.

(4) No-one is singing.

This means that the noun phrases have to be divided into two classes, one for which the entailment holds, and one for which it does not. Then one would like to have an explanation of why precisely *two girls* and *both girls* are in different classes (*Both/precisely two girls were singing and dancing*), and a prediction concerning compound terms like *few girls and many boys*. For an overview of properties of quantified noun phrases, see Keenan and Westerstahl (1997) *and* the article **Quantifiers: Semantics**.

An example of a different nature is the following. (5) entails (6) (see Dowty, 1979):

(5) John cools the soup.

(6) The soup cools.

Here, one would like to have a description of the relation between the meaning of *cool* as a transitive causative verb and *cool* as an intransitive verb. And one would like to know why the implication holds for *boil* but not for *stir*.

A 'valid reasoning' is a generalization of entailment that involves more sentences than two. If someone accepts (7) and (8), they may conclude correctly (9):

(7) John sings.

(8) John is a man.

(9) A man sings.

A more intricate example is (Groenendijk and Stokhof, 1982):

(10) John knows whether Mary comes.

(11) Mary comes.

(12) John knows that Mary comes.

Here, one sees that there is a relation between the meaning of the *whether* clause and the *that* clause. It seems that the latter is weaker. However, the relation is more complicated: if one has the negated version (11a), then (12a) follows from (10) and (11a)

(10) John knows whether Mary comes.

(11a) Mary does not come.

(12a) John knows that Mary does not come.

Hence the relation between the *whether* clause and the *that* clause depends on the factual situation.

A special case of entailment is 'synonymy.' Sentences are called synonymous just in case they entail each other. For example, sentences (13) and (14) are synonymous:

(13) John or Mary comes.

(14) John comes or Mary comes.

Another example of synonymy is (Partee and Bach, 1981):

(15) Mary admires herself, and Sue does too.

(16) Mary admires herself, and Sue admires herself.

It may seem that the meaning of the *does too* clause can be found by the substitution of a phrase that occurs elsewhere in the sentence. This is, however, not always the case. It is, for instance, possible to conclude from (17) to (18).

(17) Mary believes that she is ill, and Sue does too.

(18) Mary believes that she is ill, and Sue believes that Mary is ill.

This illustrates the important phenomenon of 'ambiguity.' Sometimes a sentence can be understood in two or more ways corresponding with distinct consequences. From (17), one may conclude either that

(19) Sue believes that Mary is ill.

or that

(20) Sue believes that she (= Sue) is ill.

Another example of ambiguity is (e.g., Janssen, 1983, 1986b):

(21) Ten years ago, John met the president of the USA.

(22) The president of the USA is Bush.

On the one reading of (21), one may conclude that ten years ago John met Mr. Bush. On the other reading, this does not follow since John met the person who was president ten years ago. This ambiguity clearly concerns the functioning of tense operators.

The decision whether a sentence is ambiguous or vague is not always clear. Consider (23):

(23) Two girls are five sandwiches.

One may ask what counts as a source of semantic ambiguity; if it makes a difference whether they shared all five sandwiches; whether the sandwiches were distributed between the girls; or if it makes a

difference whether they ate together or whether each girl ate on her own. Maybe the issue would be more exciting if the sentence was *Two girls shot five men* and one had to judge the girls. Verkuyl and Van der Does (1996) argue that (23) has one meaning, whereas they refer to other authors who argue for a fourfold or even ninefold ambiguity.

So far, only examples of relations between declarative sentences have been cited. Other types of sentences take part in 'other semantic relations,' as between the questions (24) and (25):

(24) Which girls came to the party?

(25) Did Mary come to the party?

In this example, there is nothing like the acceptance of a premise or of a conclusion. Nevertheless, there is a relation: every answer to the first implies an answer to the second question. The meanings assigned to these questions should account for this (Groenendijk and Stokhof, 1989).

Sequences of sentences likewise have logical properties. Consider (26) and (27).

(26) A man walks in the park. He whistles.

(27) A man in the park whistles.

This example puts a requirement on the treatment of texts. The meaning of the two sentences together should be equivalent to the meaning of the single sentence.

All examples discussed in this section have the common feature that they do not depend on specific details of the meanings of the words involved (except for logically crucial words such as *not* or *and*). It is, for example, possible to account for the inference from (1) *Mary is singing and dancing* to (2) *Mary is dancing* without describing the differences between *dancing, jogging*, and *walking*. Each of the examples can be replaced by another which exhibits the same pattern but uses other words. The examples illustrate that in Montague semantics one is mainly interested in structural aspects of the semantic relations between sentences, that is, in the systematic aspects of meaning. The formalization of what meanings are, does not need to go further than is required for an adequate account of these structural aspects.

The Compositional Approach

The most salient aspect of Montague semantics is the systematic way in which natural language expressions are connected with their respective meanings. This relation is characterized by the principle of compositionality of meaning. Such a principle can, in several formulations, be found in many disciplines that deal with semantics, such as linguistics, philosophy, and computer science. In philosophy of language, it has a long tradition and is often called 'Frege's principle.' The version of this principle that describes the method of Montague grammar most explicitly is (Partee *et al.*, 1990: 318):

> The meaning of a compound expression is a function of the meanings of its parts and of the syntactic rules by which they are combined.

The formulation of the principle contains several vague terms, and a proper application of the principle requires a more formal interpretation (for a discussion of the principle, its formalization, consequences, and its status, *see* **Compositionality, Aspects of**). The main points of its formalization are summarized here.

The syntax of the grammar consists of rules which express how new expressions can be formed from already available ones. The rules are, therefore, operations which act on inputs and yield an output. If an expression E is the output of the application of a rule R, then the inputs that form E are defined as being the parts of E in that derivation. The semantic component is organized in a parallel way: there are semantic rules that operate on input meanings and yield an output meaning. The crucial factor for obeying compositionality is that there is a strict correspondence between syntax and semantics. For each syntactic rule, there should be a corresponding semantic rule expressing the semantic effect of that syntactic rule. Compositionality is taken to be not an empirically verifiable property of natural language but a methodological principle: it constrains the organization of the grammar.

Consider example (28):

(28) Penguins do not fly.

A very simple grammar will be considered, naively as regards its meaning. For example, it will be assumed that the sentence says something about all penguins, whereas plurals without article usually have a more subtle meaning. The intention of this example is, however, only to illustrate the *method* of compositionality.

Suppose the grammar has as basic expressions the plural noun phrase *penguins* and the verb *fly*. A rule (say R1) forms the verb phrase *do not fly* from this verb. Furthermore, there is a rule (R2) combining a noun phrase with a verb phrase to form a sentence, by concatenating them and performing the required changes in the verb phrase for agreement and similar trimmings. Then sentence (28) has, according to this grammar, two parts: *penguins* and *do not fly*, and the latter phrase has in turn one part: *fly*.

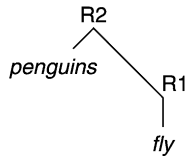

Figure 1 The derivation tree of 'Penguins do not fly.'

This derivation might be represented in the form of a tree, as in Figure 1. Note that this tree does not depict the constituent structure of the sentence; for example, there are no separate nodes for *do* and *not*. The tree shows how the sentence is formed; it is a construction tree or derivation tree. There is no *a priori* reason why the derivation would be identical to the constituent structure of the result (one might impose this as an additional requirement).

Of course, there might be good arguments for preferring a different grammar. Thus, one might construct (28) out of the positive sentence *Penguins fly*, or, alternatively, from *penguins, fly*, and *not*. In the former case the rule has one part, and in the latter case three parts. Compositionality as such provides no criterion for such issues. The best choice is probably to be discovered by considering more examples and larger fragments.

The principle of compositionality states that the meaning of the sentence is a function of the meanings of its parts, hence (according to the given grammar) of *penguins* and *do not fly*. Of course, the meaning of the latter is, in turn, a function of the meaning of its part *fly*. So, in the end, the meanings of the basic expressions are attained. Adopting for the moment a very simple conception of meaning that will be revised in the next section, one can take the meaning of *fly* to be the set of individuals who fly, and the meaning of *penguins* to be the set of individuals who are penguins.

According to the rules, the verb phrase *do not fly* has only *fly* as a part, and therefore the meaning of this verb phrase has to be formed out of the meaning of *fly*. So there has to be a semantic operation that expresses the meaning of negating a verb. For the moment, the meaning of *do not fly* is, in analogy of that of *fly*, the set of individuals who do not *fly*. The operation that forms this meaning from the meaning of *fly* is the formation of a set complement. In line with the above assumptions about meaning, one may say that the sentence means that the set of penguins is included in the set of nonflying individuals. This meaning is to be obtained from the meanings of its parts: from the set of penguins, and from the set of individuals who do not fly. This can indeed be done.

The situation is as follows. Two syntactic rules (R1 and R2) are each accompanied by a semantic interpretation (M1 and M2, respectively):

R1: negating a verb
M1: complement formation
R2: concatenating a noun phrase with a verb phrase, performing agreement changes
M2: set inclusion

In this section, the method of compositionality has been exemplified. The crucial aspect is the correspondence between syntax and semantics. One might change the concept of meaning used above, or change the syntax used; but as long as the correspondence remains infact, the grammar can be seen as an instance of Montague grammar. This characterization of Montague's method is given in a formal mathematical terminology in his paper 'Universal grammar' (Montague, 1970b).

Interpretation in a Model

In Montague grammar, as well as in all other formal theories of semantics, the natural language expressions are interpreted in a class of abstract models. For example, a name like *John* is associated with an individual in such models, and an adjective like *brave* is a property. Each model is constructed out of a number of basic sets by means of standard constructions, and the result can be restricted by 'meaning postulates.' The most characteristic feature of the models in Montague grammar is the distinction made between the 'extension' of an expression and its 'intension,' a distinction that will be the topic of the next section. In the present section, the status of the model and its connection with natural language will be considered.

The model in which humans interpret natural languages has, of course, a certain resemblance to the real world, but it should not be conceived of as a model of the real world. There are two differences. First, in language, one speaks not only about the real world, past, present, and future, but also about situations that might be the case. Even though unicorns do not exist, one can speak about them, and the sentences used have semantic properties that should be dealt with. The model thus embraces much more than reality.

Second, as far as the model is connected with reality, it is a model of how natural language 'conceives' of it. This conception might be different from the real situation. Examples are mass nouns like *water* or *air*. In natural language, they are used in a different way from count nouns such as *chair* or *flower*. The mass noun *water* is used as if every part of a quantity of water is again water; as if it had no minimal parts. The same holds for *air*. Although in reality water has minimal molecules, and air is a mixture, the model will not reflect that fact (Pelletier and Schubert, 2003).

Although the model does not reflect reality, one can be interested in the relation which it has with reality. Examples are the relation between *blue* and the frequencies of light, or the number of exceptions accepted when it is said that *all ravens are black*. This kind of research is rare in Montague grammar, however, because it amounts to the analysis of specific words, whereas in Montague grammar one is mainly interested in the more structural aspects of the semantics of natural language.

The model, not being a model of reality, might be regarded as a model of how the human mind conceives reality. Although psychological reality is not one of the claims of Montague grammar (it is so in some other theories), the issue has received some attention (e.g., Dowty, 1979: ch. 8).

The connection between natural language and the model can be made in two ways. One method, the direct one, was followed in the section 'The Compositional Approach': for a word, some element (set, function) in the model is given as the meaning of that word, and for each syntactic rule a corresponding meaning operation is given. This method is used in Montague's first publication (Montague, 1970a), and in a few other publications as well (e.g., Keenan and Faltz, 1985). The other method is the indirect one: natural language is translated into some logical language, which is interpreted in a model. If this translation is compositional, and the interpretation of the logical language is compositional, then the combination of the two processes is a compositional process of meaning assignment. Care has to be taken that the logic is used as an auxiliary language only, so that this intermediate language can in principle be eliminated. This implies that every operation that is performed in the logic should have an interpretation in the model. This indirect method is the standard method in Montague grammar; usually, (variants of) intensional logic are used as the intermediate language.

Extension and Intension

An important decision concerns the question of how to model meaning. Previously, the meaning of *penguins* was defined as the set of penguins, and of *fly* as the set of flying individuals. Applying the same approach to *the president of the USA* [example (22)], would yield as meaning the individual Bush, and applied to *unicorn* (assuming there are none) the empty set. This approach would, however, give results that are intuitively incorrect. It would have the consequence that in case neither unicorns nor centaurs exist, the meaning of *unicorn* would be equal to the meaning of *centaur*. As for *the president of the USA*, it would have the undesirable consequence that its meaning changes after each election. Examples like these have led to the distinction between two kinds of interpretation: extension and intension.

At the time of writing, the president of the USA is Mr Bush, but at other moments in time a different person will be president, and in another course of events Mr Bush could have lost the election and Mr Kerry would be president. The model in which natural language is interpreted has components dealing with this. It has a collection of time points for dealing with changes in the course of time, and it has a collection of so-called 'possible worlds.' These possible worlds represent the possibility that Kerry has won. They also represent the possibility that unicorns exist. Intensions are functions with possible worlds and time points as domain. The intension of *the president of the USA* is a function from time points and possible worlds that yields an individual (the president at that moment in that possible world), and the intension of *unicorn* is the function that yields for each possible world and time point a set of individuals (the unicorns). The extension of an expression is the value of the intension function with respect to a given world and time point, for example, the moment now in the actual world. Then the extension of *the president* is the president now (Mr Bush), and the corresponding extension of *unicorn* is the actual set of unicorns. The extension of a sentence is traditionally identified with its truth value. Thus, the extension of *John kisses Mary* is true just in case John kisses Mary. The intension is the function which says, for each possible world, in which moments John kisses Mary.

Since there are possible worlds in which there are unicorns but no centaurs, the words *unicorn* and *centaur* have different intensions. As a consequence, sentences (29) and (30) will have different intensions too.

(29) John seeks a unicorn.

(30) John seeks a centaur.

Thus, using intensions, the nonsynonymy of (29) and (30) can be accounted for. For this purpose, no further information concerning relations between different possible worlds is needed, nor any information concerning relations between time points. This holds for all examples mentioned in the section 'Aims,' and therefore the set of possible worlds and the set of time points are usually introduced as just sets without further specification. This is, however, not always sufficient.

If one is interested in tense phenomena in natural language, then more has to be said about the

moments of time, for example that they are linearly ordered, and whether they are indivisible points or intervals with a duration. If one is interested in causatives (*John broke the glass*) or counterfactuals (*If Mary did not come, John would fly*), then the set of possible worlds needs more structure. For dealing with these phenomena, it is crucial to know how the world was just before the breaking of the glass, or which world resembles the present one except for the coming of Mary.

The above discussion shows that the formalization of the intuitive notion of meaning as intension is much better than as extension. However, intensions only deal with those aspects of meaning that have to do with truth and denotation, and neglect aspects such as style, new information versus old information, etc. Therefore, they can only be regarded as a restricted approximation of meaning. Even accepting this limitation, however, intensions are still not completely satisfactory. At important shortcoming concerns tautologies. Consider (31):

(31) Bill comes or does not come.

The intension of this sentence is the function that always yields 'true.' Hence (32) and (33) have the same intension.

(32) John comes.

(33) John comes and Bill comes or does not come.

This causes problems with embedded clauses. Sentences (34) and (35) will have the same intension, whereas they should not be equivalent since Mary's beliefs in (34) do not concern Bill; she may not even know about his existence:

(34) Mary believes that John comes.

(35) Mary believes that John comes and that Bill comes or does not come.

The conclusion is that intensions are not fine-grained enough to distinguish the meanings of sentences like (34) and (35). Several improvements have been proposed, such as structured intensions (Lewis, 1970), and an approach based on partial functions (Muskens, 1989).

A Small Fragment

This section presents as examples three sentences and their treatment. The treatment given in Montague (1973) will be followed, except for one detail (see next section). In the course of the presentation, some important features of intensional logic will be explained.

The sentences are:

(36a) John walks.

(37a) A man walks.

(38a) Every man walks.

These sentences are very simple, and it is easy to present their interpretation in traditional predicate logic:

(36b) $\text{walk}(\text{john})$

(37b) $\exists x[\text{man}(x) \wedge \text{walk}(x)]$

(38b) $\forall x[\text{man}(x) \rightarrow \text{walk}(x)]$

One immediately sees that these three sentences are syntactically much alike (a subject and a verb), but the formulas in predicate logic are rather different: two with a quantifier (different ones!), and in each case another main operator ($\rightarrow$, $\wedge$, and predicate application). What makes it interesting to present these examples here is not the meaning assigned to them, but the fact that these very different meanings can be derived compositionally from the corresponding sentences.

All three sentences are built from a singular noun phrase and the verb *walks*, and for this reason one can design a single syntactic rule that combines a noun phrase and a verb. Since in Montague grammar there is a correspondence between syntactic rules and semantic rules, one also has to design a rule that combines the meaning of the verb with the meaning of the noun phrase. This in turn requires that there be meanings for verbs and for noun phrases. These meanings will be discussed first, then the semantic rule will be designed.

As explained in the previous section, predicates are given intensions as meanings: functions from possible worlds and moments of time to sets of individuals. Thus, the intension, or meaning, of the verb *walk* is a function from possible worlds and moments of time to sets: for each possible world and each moment of time, there is a set (possibly empty) of individuals who walk. Such an intension is called a 'property.' For the noun phrases, it is more difficult to select a format that allows these meanings to be rendered uniformly. In order to keep the calculus going in a maximally uniform way, all noun phrase meanings should preferably be of the same type. This requirement is easily seen to be nontrivial, as, for example, the expression *every man* extends over sets of possibly many individuals, where *John* seems to refer to one individual only.

Montague proposed (1973) to model the meaning of a noun phrase as a set ('bundle') of properties. An

individual is, in this approach, characterized by the set of all its properties. This is possible since no two individuals share all their properties at the same time, if only because the two cannot be at the same place at the same time. This approach permits generalization over all noun phrases referring to (sets of) individuals (see also Lewis, 1970).

Meanings of linguistic expressions (functions from world–time pairs to specific world extensions) are denoted by formulas in the language of intensional logic. The meaning of *John* will be denoted by:

(39) $\lambda P[^{\vee}P(\text{john})]$

To explain this formula, the variable

(40) P

is a variable over properties of individuals: P may be replaced, for example, by the property 'walking.' The expression

(41) $^{\vee}P$

denotes the extension of the property expressed by any predicate P in any given world at a given moment of time. Thus, for the actual world now.

(42) $^{\vee}P(\text{john})$

is true if the predicate $^{\vee}P$ holds for John now in this world, and false otherwise. Any property denoted by P can be abstracted by means of the lambda operator: λP. Lambda abstraction of (42) gives:

(43) $\lambda P[^{\vee}P(\text{john})]$

which is the same as (39) above. This expression denotes a function which says, for any property α, given a world–time pair <w, t>, whether John belongs to the extension of that property in <w, t>. Let this function be called X_j. Some properties of this function will now be investigated.

According to the definition of X_j:

$X_j(\alpha)$ is true if and only if α now holds for the individual John, i.e., $^{\vee}\alpha$ (*john*) is true, and false otherwise (I)

X_j is, therefore, the characteristic function of the set of properties that can be predicated of John. As usual in logic, this characteristic function can be identified with the set of properties that John has X_j can therefore be seen as a formalization of the idea that the meaning of *John* is a set of properties.

This function X_j can be evaluated with as argument the property of being a man, that is, the function that yields for each index (i.e., for each world and time) the extension of the predicate *man*. The notation for this argument is:

(44) $^{\wedge}\text{man}$

The symbol $^{\wedge}$ translates the predicate *man* into the language of intensional logic, where $^{\wedge}$*man* denotes the intension associated with *man*. X_j is now applied to this argument to obtain, using result (I).

$X_j(^{\wedge}man)$ is true if and only if $^{\wedge}man$ now holds for the individual John, i.e., if and only if $^{\vee\wedge}man(john)$ is true, and false otherwise (II)

In the expression $X_j(^{\wedge}\text{man})$, X_j can be replaced by its original definition (viz. (43)). Then, (45) is obtained.

(45) $\lambda P[^{\vee}P(\text{john})]\ (^{\wedge}\text{man})$

Result (II) now states that this is equivalent with

(46) $^{\vee\wedge}\text{man(john)}$.

Thus, it has been shown, using semantic considerations, that it is allowed to substitute the argument $^{\wedge}$*man* for the variable P, an operation known as 'lambda conversion.' According to the definitions given with (41) and (44), $^{\vee\wedge}$*man* denotes the present value of the property of being a man. Hence (46) and (45) are equivalent with (47)

(47) man(john)

Summarizing, the variable P in (45) has been replaced with the property $^{\wedge}$*man*, which is in the range of P, and $^{\vee\wedge}$*man* has been reduced to just *man*. As the operations concerned are admissible independently of the particular choice of the predicate *man*, the procedure can be generalized to all predicates of the same class (type).

To revert to the treatment of the simple sentence *John walks*, the syntax has, as stipulated earlier, a rule that combines a noun phrase with a verb to form a sentence. What is still needed is a semantic operation that matches the syntactic rule with its semantic consequences. The operation that does this is so-called 'function application': one of the two syntactic constituents acts as a function, while the other acts as argument (input). In this case, the verb meaning is allowed to act as the argument, and the noun phrase meaning as the function. The result of function application, in this case, is a function from world–time pairs to truth-values, or the set of world–time pairs where John walks.

According to the rule just given, the meaning of *John walks* is found by application of the meaning of *John*, that is (43), to the meaning of *walk*. This is denoted by:

(48) $\lambda P[^{\vee}P(\text{john})](^{\wedge}\text{walk})$

This, as seen above, can be reduced, in two steps, to:

(49) walk(john)

which now gives the meaning representation aimed at.

For the other sentences, one proceeds analogously. The noun phrase *a man* is likewise translated as a set of properties:

(50) $\lambda P[\exists x[man(x) \wedge {}^{\vee}P(x)]]$

This denotes the characteristic function of the set of properties such that for each property in the set there is a man that has that property. The sentence *A man walks* is then represented as:

(51) $\lambda P[\exists x[man(x) \wedge {}^{\vee}P(x)]]({}^{\wedge}walk)$

which reduces to:

(52) $\exists x[man(x) \wedge walk(x)]$

Analogously, every man walks is represented as.

(53) $\lambda P[\forall x[man(x) \rightarrow {}^{\vee}P(john)]]({}^{\wedge}walk)$

or equivalently

(54) $\forall x[man(x) \rightarrow walk(x)]$

This treatment illustrates some of the power of lambda abstraction and lambda conversion. The meaning of the verb is 'plugged into' the meaning of the noun phrase in the right position. Lambda calculus is frequently used in Montague grammar. Without the lambda operator, it would be impossible to maintain compositionality. Impressed by the power of lambdas, Barbara Partee once said: 'Lambdas really changed my life.' What has been, in the end, obtained as meaning representations for the three sentences discussed is nothing more than the formulas usually associated with them in elementary logic courses. There, however, they are found on intuitive grounds, whereas in Montague grammar they are the result of a formal system which relates syntax and semantics in a systematic way.

Some PTQ Phenomena

Montague worked out his ideas in a number of papers, the most influential of which is 'The proper treatment of quantification in ordinary English,' henceforth PTQ (Montague, 1973). This article deals with some semantic phenomena, all connected with quantifiers. Three such phenomena will be discussed here: identity and scope ambiguities (both presented here because they have been the subject of a great deal of discussion since the publication of PTQ), and the 'de dicto–de re' ambiguity, central to Montague grammar, and the origin of its trade mark, the unicorn.

The first phenomenon concerns problems with identity. Consider:

(55) The price of one barrel is $1.00.

(56) The price of one barrel is rising.

(57) $1.00 is rising.

It is obvious that (57) must not be allowed to follow logically from (55) and (56), as $1.00 will remain $1.00 and will neither rise nor fall. The same phenomenon occurs with temperatures, names, telephone numbers, percentages, and in general with all nouns which may denote values. The PTQ treatment of such cases is as follows. Prices, numbers, etc. are treated as basic entities, just as persons and objects. The expression *the price of one barrel* is semantically a function that assigns to each world–time index a particular price. Such a function is called an 'individual concept.' In (55) an assertion is made about the present value of this function, but in (56) an assertion is made about a property of the function. Thus, the expression *the price of one barrel* is considered ambiguous between a value reading and a function reading. The difference in readings blocks the false conclusion (57).

In spite of criticisms, mainly related to the treatment of such nouns as basic entities (e.g., Bennett, 1976), the notion of individual concepts also seems useful to account for cases like the following (Janssen, 1984).

(58) The treasurer of the charity organization is the chairman of the hospital board.

(59) The treasurer of the charity organization has resigned.

(60) The chairman of the hospital board has resigned.

Here, substitution *salva veritate* of terms under an identity statement seems to be running into difficulty. Again, one can say that (58) is a statement about the identity of the values of two different functions at a given world–time index, whereas (59) is a statement about the function (in Frege's terms, about the *Wertverlauf*). Hence the nonvalidity of (60) as a conclusion is explained.

The second phenomenon is scope ambiguity. Consider

(61) Every man loves a woman.

In PTQ, this sentence is considered to be ambiguous (though many linguists would disagree; see below). In the one reading, one particular woman is loved by all men, and in the other every man has at least one woman whom he loves. The first reading is given in

(62), and is called the specific reading, or the wide scope reading for *a woman*. The second reading is given in (63); it is called the 'narrow scope reading.'

(62) $\exists x[\text{woman}(x) \wedge \forall y[\text{man}(y) \rightarrow \text{love}(y, x)]]$

(63) $\forall y[\text{man}(y) \rightarrow [\exists x\ \text{woman}(x) \wedge \text{love}(y, x)]]$

Many linguists consider (61) to be unambiguous. Well-known is the principle which states that the most plausible reading is given by the surface order of the quantified NPs (and of the negation). Following this principle, (61) has only one reading, viz. (63). Note that the reading expressed by (62) is a special case of (63). The principle has not remained unchallenged. Witness (64), where the most plausible reading is not given by the surface order.

At the finish, a medal is available for all participants in the race.

There are other linguistic theories which also assign one reading to (61). But whether (61), the PTQ example, really is ambiguous is less relevant as long as there are sentences that do show scope ambiguities, which seems beyond doubt. For instance, previously an example involving tense was given (*Ten years ago, John met the president*). The machinery of PTQ for dealing with scope ambiguities is presented below.

Since the scope ambiguity does not seem to have a lexical source, the principle of compositionality of meaning requires the construction of two different derivations for the two readings. In PTQ, this is done as follows. First, the basic sentence (65) is formed, in which neither of the two noun phrases occurs but which contains indexed variables (he_n) instead:

(65) he_1 loves he_2.

Next, noun phrases are substituted for the variables. This can be done in two different orders. The noun phrase that is substituted last gets the widest reading. Thus, the specific reading (wide scope for *a woman*) is obtained from (65) by first forming (66).

(66) Every man loves he_2.

and then

(67) Every man loves a woman.

These rules are called 'quantification rules.' The corresponding semantic rule leads to an interpretation equivalent to that of (62). For the other reading, the reverse order of quantifier substitution is used.

These quantification rules have met with some resistance from linguistic quarters, where they are looked upon as unusual creatures. Other solutions have been attempted, where the disambiguation is not done in the syntax. Cooper (1979) deals with scope phenomena in a separate component, a 'storage' mechanism. Hendriks (1993) uses rules which change the meaning of a noun phrase from a narrow scope reading to a wider scope reading.

The third phenomenon is the ambiguity of 'de dicto' versus 'de re' readings. To see the difference, first consider (68) and (69):

(68) John finds a unicorn.

(69) There is a unicorn that John finds.

Sentence (69) follows from (68). Yet (71) does not follow from (70):

(70) John seeks a unicorn.

(71) There is a unicorn that John seeks.

In fact, (70) is ambiguous between a specific reading in which there is a specific unicorn that John seeks, and an intensional reading where John is said to engage in the activity of seeking a unicorn and nothing is implied about the real existence of such animals. The latter reading is usually called the 'de dicto' reading ('de dicto': Latin for 'about what is said'). The former reading is the 'de re' reading ('de re': Latin for 'about the thing'). The ambiguity is accounted for, in principle, in the following way. In the 'de re' reading, a relation is asserted to hold between two individuals. The 'de dicto' reading establishes a relation between John and the set of properties of a unicorn (i.e., the interpretation of the noun phrase *a unicorn*). Whether this way of analyzing and accounting for the 'de dicto' reading is satisfactory in all respects is a question still widely debated (see e.g., Gamut, 1991).

The two readings of *John seeks a unicorn* are obtained in the following way. For the 'de re' reading, a quantification rule introduces the expression *a unicorn*. And if the expression *a unicorn* is introduced directly, that is, without the intervention of a quantification rule, the result is the 'de dicto' reading. In principle, this method is analogous to the method used to express scope differences. One may, in fact, regard the distinction between 'de dicto' and 'de re' readings as a distinction due to scope differences of the intensional operator *seek*.

Developments

Montague (1973) (henceforth PTQ) signaled the start of a great amount of semantic research. Nowadays there are many linguistic theories that deal in a formal way with semantics, and certainly not all of them obey Montague's compositional framework, but in one respect they are all indebted to him: lambdas are used frequently (see section 'A Small Fragment' for the power of lambdas). This section reviews some

of the developments that have emanated since PTQ and remain more or less within his compositional framework.

In the first period one kept close to the style of PTQ: one widened the original fragment with new phenomena. A characteristic example is the title 'A variation and extension of a Montague fragment of English' (Bennett, 1976). In such articles one finds treatments of relative clauses, passives, scope, control, numbers, plurals, generics, complement structures, and deictic pronouns: most deal with English, some with other languages. For references to these early works see Partee (1976), Gamut (1991), and Dowty *et al.* (1981). Nowadays the habit of providing explicit fragments is abandoned: one focuses on some semantic phenomenon and provides rules for that phenomenon only.

The first broadening of the scope of Montague semantics was toward lexical semantics. In PTQ the words are regarded as basic and remain unanalyzed except for a few logically interesting words such as the verb *be*: often, however, it is linguistically interesting to carry the analysis of words further. Examples (5) and (6) featured the word *cool*, which can be an adjective, an intransitive verb phrase, and a causative verb, with related meanings. Such lexical analyses are given in Dowty (1979).

Montague used a primitive kind of syntax. On the one hand, this appears from the fact that the syntactic rules are not subject to any formal restriction; on the other hand, from the absence of grammatical features and a well-motivated constituent structure and grammatical functions. Soon after the publication of PTQ, proposals were made to incorporate syntactic know-how as developed in transformational grammar into Montague grammar (see, e.g., Partee, 1975 and Dowty, 1982). Partee's ideas for combining Montague grammar with transformational grammar are worked out in the large grammar used in the machine translation project Rosetta (Rosetta, 1994).

Since the earliest years of Montague semantics there have been attempts to make the syntactic rules as restricted as possible by using only concatenation rules. As a consequence, the constituent structure of the natural language expression becomes isomorphic to its compositional analysis. Because of this feature, such approaches are said to obey 'surface compositionality.' The approach leads to (variants of) categorical grammar. An early advocate of this approach was Bach (see, e.g., Oehrle *et al.*, 1988); a recent monograph within the framework of Montague is Morill (1994). Surface compositionality requires a treatment of scope phenomena different than Montague's. An important idea is the use of type shifting rules: such rules make the relation between a word and its semantic type less rigid than in PTQ, and therefore this approach is called 'flexible Montague grammar.' The method is useful for several phenomena (including scope); see Partee and Rooth (1983), Hendriks (1993), and Groenendijk and Stokhof (1989).

As explained previously, noun phrases are treated in PTQ as sets of properties. Consequently the determiner 'every' is a function from sets to sets: it can be conceived of as a relation between two sets (e.g., in 'Every man dances' as a relation between 'man' and 'dance'). This abstract analysis of noun phrases opened the way to a new field: the theory of 'generalized quantifiers,' in which many phenomena concerning noun phrases are studied. The pioneering article is Barwise and Cooper (1981); monographs are Keenan and Faltz (1985) and Winter (2001), (*see* **Quantifiers: Semantics**).

The largest linguistic units analyzed in PTQ are sentences. The task of extending Montague's method to discourses looked unrewarding at first, particularly in view of cross-sentential anaphora phenomena. The first step from sentence to discourse (Kamp, 1981) was, on certain details, not compositional. Later a compositional treatment was given (Groenendijk and Stokhof, 1991). The key feature of their approach was that the meaning of a sentence is not a truth value, but its information change potential: a function that changes the information state. This led to dynamic semantics, an approach in which several other 'information' phenomena can be analyzed (*see* **Dynamic Semantics**).

Also, the ontology used by Montague has been challenged. His ontology was based upon a hierarchy of typed sets, but several phenomena suggest a change. Mass nouns seem to ask for sets that do not have elements (Pelletier and Schubert, 2004). Nominalizations (as in *I love loving*) seem to ask for an alternative in which functions can have themselves as arguments; this leads to property theory (see, e.g., Chierchia, 1982). Perception verbs challenge the basic role of possible worlds. They are abandoned by Barwise and Perry (1983), who replace them by 'situations,' but a classical model with partial functions can also be used (Muskens, 1989). PTQ deals with only one type of language utterances, declarative sentences, and one may think that other utterances require other types. But questions can be treated without a new ontology, as is shown by the work on the semanties of questions and wh-complements (Groenendijk and Stokhof, 1982, 1989).

Further Reading

A well-known introduction to Montague grammar (especially written for linguists) is Dowty *et al.*

(1981). An introduction with much attention paid to logical and philosophical motivation is Gamut (1991). An introductory article on 'Universal grammar' (Montague, 1970b) is Halvorsen and Ladusaw (1979), its mathematical background is investigated in Janssen (1986a) and discussed in Janssen (1997). Publications on Montague grammar often appear in *Linguistics and Philosophy*. Many references are given in Partee and Hendriks (1997), recent collections of papers about Montague grammar are Partee (2004), and Portner and Partee (2002).

See also: Compositionality: Semantic Aspects; Dynamic Semantics; Extensionality and Intensionality; Formal Semantics; Montague, Richard (1931–1971); Quantifiers: Semantics.

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Montague, Richard (1931–1971)

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Richard Montague was a logician and philosopher whose seminal works on language (Montague, 1970a, 1970b, 1973) were the basis for the theory known after his death as Montague grammar, one of the main starting points for the field of formal semantics.

Montague was born September 20, 1930 in Stockton, California, and died March 7, 1971 in Los Angeles. At St Mary's High School in Stockton, he studied Latin and Ancient Greek. After a year at Stockton Junior College studying journalism, he entered the University of California, Berkeley in 1948, and studied mathematics, philosophy, and Semitic languages, graduating with an A.B. in philosophy in 1950. He continued graduate work at Berkeley in all three areas, especially with Walter Joseph Fischel in classical Arabic, with Paul Marhenke and Benson Mates in philosophy, and with Alfred Tarski in mathematics and philosophy, receiving an M.A. in mathematics in 1953 and his Ph.D. in philosophy in 1957. Tarski, one of the pioneers, with Frege and Carnap, in the model–theoretic semantics of logic, was Montague's main influence and directed his dissertation (Montague, 1957). Montague taught in the UCLA philosophy department from 1955 until his death.

Montague quickly became a major figure in mathematical logic, with contributions to proof theory, model theory, axiomatic set theory, and recursion theory. He applied logical methods to a number of problems in philosophy, including the philosophy of language, and co-authored a logic textbook (Kalish and Montague, 1964). He directed three UCLA Ph.D. dissertations (Cocchiarella, 1966; Grewe, 1965; Kamp, 1968). A fourth, by Gallin (1972, revised and published as Gallin, 1975), was completed at Berkeley after Montague's death. Michael Bennett would also have been Montague's dissertation student; his dissertation on Montague grammar (Bennett, 1974) was supervised by David Kaplan and Barbara Partee.

Of most significance for linguistics was Montague's work on semantics. Building on his development of a higher-order typed intensional logic with a possible-worlds model–theoretic semantics, and a formal pragmatics incorporating indexical pronouns and tenses (Montague, 1968, 1970c), Montague turned in the late 1960s to the project of 'universal grammar.' For him that meant developing a philosophically satisfactory and logically precise account of syntax, semantics, and pragmatics, encompassing both formal and natural languages. Montague's idea that a natural language like English could be formally described using logicians' techniques was a radical one at the time. Most logicians believed that natural languages were not amenable to precise formalization, while most linguists doubted the appropriateness

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of logicians' approaches to the domain of natural language semantics. At the time of Montague's work, Chomskian generative syntax was well established, and the 'linguistic wars' between generative semantics (George Lakoff, J. R. 'Haj Ross, James McCawky, Paul Postal) and interpretive semantics (Ray Jackendoff, with the support of Chomsky) were in full swing. In introductions of Montague's work to linguists, including Partee, 1973 and 1975, and Thomason's extended introduction to Montague, 1974, it was argued that Montague's work offered the potential to accommodate some of the best aspects of both of the warring approaches, with some added advantages.

It was the short but densely packed paper known as "PTQ" (Montague, 1973) that had the most impact on linguists and on the subsequent development of formal semantics. 'Montague grammar' has often meant PTQ and its extensions by linguists and philosophers in the 1970s and 1980s. But it is the broader algebraic framework of 'Universal grammar' (UG) (Montague, 1970b) that constituted Montague's theory of grammar. Crucial features of that theory included the truth–conditional foundations of semantics, the algebraic interpretation of the principle of compositionality, and the power of a higher-order typed intensional logic.

Before Montague, semanticists focused on the explication of ambiguity, anomaly, and 'semantic relatedness'; data were often subjective and controversial. The introduction of truth–conditions and entailment relations as core data profoundly affected the adequacy criteria for semantics, and led to a great expansion of semantic research. While some cognitively oriented linguists reject the relevance of truth conditions and entailment relations to natural language semantics, many today seek an integration of cognitive and formal perspectives by studying mind–internal intuitions of mind–external relations, such as reference and truth–conditions.

The Fregean principle of compositionality, that the meaning of any complex expression is a function of the meanings of its parts and of the way they are syntactically combined, was central to Montague's theory and remains central in formal semantics. In UG, Montague formalized it as the requirement that there be a homomorphism between a syntactic algebra and a semantic algebra. The nature of the elements of both the syntactic and the semantic algebras is open to variation; what is constrained by compositionality is the relation of the semantics to the syntax.

The richness of Montague's logic was crucial for the possibility of a compositional semantic interpretation of independently motivated syntactic structure. This was well illustrated in PTQ, where a typed higher-order logic with lambda-abstraction made it possible to interpret noun phrases (NPs) like *every man, the man,* and *a man* uniformly as semantic constituents ('generalized quantifiers'), an idea simultaneously advocated by Lewis (1970). PTQ also contained innovative treatments of quantifier scope and binding, intensional transitive verbs, phrasal conjunction, adverbial modification, and more. Montague's type theory introduced to linguists Frege's strategy of taking function–argument application as the basic "semantic glue" for combining meanings, and gave new significance to categorial grammar (Bach *et al.*, 1987).

Montague's logic was an intensional logic, developing Frege's distinction between *sense* and *reference* and Carnap's distinction between *intension* and *extension*, using possible-worlds semantics to treat the phenomenon of referential opacity, pervasive in belief-sentences and many other constructions.

Details of Montague's analyses have in many cases been superseded, but in overall impact, PTQ was as profound for semantics as Chomsky's *Syntactic structures* was for syntax. Bach (1989) summed up their cumulative innovations thus: Chomsky's thesis was that English can be described as a formal system; Montague's thesis was that English can be described as an 'interpreted' formal system.

Feferman and Feferman (2004) offered vivid glimpses into Montague's relation to Tarski, Montague's life (he was an accomplished musician, became wealthy in real estate, and was a member of the homosexual community), and his death, an unsolved murder.

See also: Compositionality: Semantic Aspects; Formal Semantics; Logic and Language: Philosophical Aspects; Montague Semantics; Pragmatics: Overview; Quantifiers: Semantics.

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Montanus, Petrus (ca.1594–1638)

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but is demonstrated largely on the basis of contemporary spoken Dutch. Although the influence of tradition is clearly discernible in various issues, Montanus's views on most of them are far superior to those of his predecessors. As Montanus understood that a speech sound is a complex of features, he developed an ingenious system of distinctions and in fact worked with binary oppositions, being keenly aware of the function of speech sounds as phonemes; the setup of his remarkable book is largely dichotomous.

The *Spreeckonst* gives a highly complicated and sophisticated account of the vocal organs and speech in general, restricting itself to a description of the material aspects of speech forms. Among other things, it was on the basis of sonority (the 'Height of Sound') that Montanus developed a table of the distribution of consonants in a syllable. He describes the syllable as a sound-substance and then as a part of a word, dealing with the word, the word group, and the sentence in a similar way.

Following his compatriot, the distinguished mathematician Simon Stevin (1548–1620), who deemed Dutch to be the most appropriate language to express scientific knowledge, Montanus wrote his study in Dutch instead of in Latin or French, thus largely cutting himself off from a wide European audience. It is understandable that he found it easier to devise technical terms in his native language than in Latin, but owing to the complexity of his newly coined terminology his work is hard to read, even for a native speaker. Montanus's book did not go unnoticed and was recognized as an important publication, for example in D. G. Morhof's well-known *Polyhistor* (1688), but in fact it was not studied seriously for centuries and did not influence the course of phonetic studies. Nowadays, however, the *Spreeckonst* is regarded as a unique document in the history of phonetics and phonology.

See also: Wallis, John (1616–1703).

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Montserrat: Language Situation

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Montserrat is an overseas United Kingdom territory in the eastern Caribbean chain of islands. It is one of the Leeward Islands, known fondly as the Emerald Isle of the Caribbean for its lush green vegetation. Its size is expanding as a result of the volcanic activity in the south of the island. According to the artifacts found on the island, which date from about 500 B.C.E. to 500 C.E., the area was populated during this period by the Arawak people. These people were driven out and absorbed by later Carib people, who were also present when Columbus first visited the island in 1493. The island was later colonized by the English and Irish in 1632. Later it changed ownership between France and Britain several times, and finally it was ceded to Great Britain in 1783. Slavery was abolished in 1834. The production of sugar, on which the country's economy was previously based, fell toward the end of the 19th century and was later replaced by cotton.

Montserrat has had internal self-government since 1960. In 1995 the Soufrière Hills Volcano erupted and destroyed most of Montserrat, together with the capital and the main port. A large part of the population was evacuated, and more than half of the land area was rendered uninhabitable. As a result, the island population underwent a 50% drop after

but is demonstrated largely on the basis of contemporary spoken Dutch. Although the influence of tradition is clearly discernible in various issues, Montanus's views on most of them are far superior to those of his predecessors. As Montanus understood that a speech sound is a complex of features, he developed an ingenious system of distinctions and in fact worked with binary oppositions, being keenly aware of the function of speech sounds as phonemes; the setup of his remarkable book is largely dichotomous.

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Montserrat is an overseas United Kingdom territory in the eastern Caribbean chain of islands. It is one of the Leeward Islands, known fondly as the Emerald Isle of the Caribbean for its lush green vegetation. Its size is expanding as a result of the volcanic activity in the south of the island. According to the artifacts found on the island, which date from about 500 B.C.E. to 500 C.E., the area was populated during this period by the Arawak people. These people were driven out and absorbed by later Carib people, who were also present when Columbus first visited the island in 1493. The island was later colonized by the English and Irish in 1632. Later it changed ownership between France and Britain several times, and finally it was ceded to Great Britain in 1783. Slavery was abolished in 1834. The production of sugar, on which the country's economy was previously based, fell toward the end of the 19th century and was later replaced by cotton.

Montserrat has had internal self-government since 1960. In 1995 the Soufrière Hills Volcano erupted and destroyed most of Montserrat, together with the capital and the main port. A large part of the population was evacuated, and more than half of the land area was rendered uninhabitable. As a result, the island population underwent a 50% drop after

1995. Since then, many of the inhabitants have moved back, leaving the current number of residents at about 9245 (July 2004 estimate), which is close to the number before the eruption of 1995.

The official language of Montserrat is English. Montserrat Creole English (Leeward Caribbean Creole English) is also spoken, which has a great deal in common with other Caribbean English–based creoles. Primary education for children has been compulsory since 1892. The adult literacy rate is 97%.

See also: Pidgins and Creoles: Overview.

Mood and Modality in Grammar

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Introduction

The study of mood and modality as grammatical categories has been a relatively underresearched area of interest in recent years, though the many volumes and monograph-length works produced in the past 30 years may seem to belie such a statement. Among the principle publications that discuss aspects related to the general field of mood and modality are Lyons (1977), Coates (1983), Palmer (1986), Horn (1989), Traugott (1989), Sweetser (1990), Warner (1993), Bybee *et al.* (1994), and Bybee and Fleischman (1995). More recent and innovative contributions have also come from other grammatical perspectives such as those of Van der Auwera and Plungian (1998), Goossens (2000), Nuyts (2001), Hart (2003), and Facchinetti *et al.* (2003). Although some of this work, especially the later publications, provides a typological viewpoint, what is noticeable about many of the studies listed is an underlying tendency to focus on the modal system of English, or at least to establish English as a benchmark for the comparison of modal systems in other languages. This practice has resulted in a number of terminological problems, as discussed below.

One of the key attractions of research on mood and modality in grammar, as outlined by Plank (1984), is the facility with which the category can serve to exemplify the diachronic processes of language change in general, for example, grammaticalization. Plank's study linked a blossoming area of linguistic endeavor with a field of grammatical study that was, at the time, largely restricted to the straitjacket of philosophical logic. Grammaticalization occurs when lexical items, or even constructions, used in specific discourse environments, may become automated over time to serve a particular grammatical function, or may come to serve a function that is more grammaticalized than previously (Traugott, 1994: 1481), and as a consequence, become more abstract in meaning. For the most part, the explanation of grammaticalization to account for the meaning shifts in modal verbs and other forms of modality has remained relatively unchallenged, though Fischer (2003) noted that another typical consequence of grammaticalization, decrease in the scope of the grammatical function, is not always observable in the grammaticalization of modal verbs. However, scope decrease is not considered to be a universal feature of grammaticalization in other accounts (Tabor and Traugott, 1998).

Definitions and Categories

The use of the term 'mood' in grammar is often held to be somewhat confusing, especially because of its early associations with classical grammar. Allan (2001: 343) noted that the Greek philosopher Protagoras was the first to identify four moods, the optative-subjunctive, the interrogative, the declarative, and the imperative, linking mood with clause type. The use of mood was discussed by Palmer (2003: 2) as a 'subcategory' of a wider, more general area called modality. Palmer (1986) also qualified mood with reference to a grammatical category, in the same way as tense and time are related; in other words, modality is a notional, or semantic, domain, whereas mood is its grammaticalization across languages. (The use of the term grammaticalization by Palmer and Lyons is not intended so much to describe a historical process, but rather to refer to the formalization of a functional category within a language system.) Bybee *et al.* (1994: 181) described mood as the inflectional expression of modality, which they consider to be the grammaticalization of speakers' subjective attitudes and opinions. Lyons (1995: 179) described mood as the result of the grammaticalization of (subjective) modality and "...other kinds of

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expressive meaning, including some part of what is nowadays commonly referred to as illocutionary force." He went on to stress that the modal verbs of English have, for the most part, assumed the former functions of the Old English subjunctive (the only grammaticalized mood in English), which, arguably, has become reduced, at least in form, to a few isolated, frozen expressions (*If I* ***were*** *you . . .*) and to variable use, for example, in the complements of noun clauses (*She emphasized that the old system* ***be*** *maintained*). In languages such as Spanish and Italian, the subjunctive is still alive and well, though there is a system of modal auxiliary verbs as well.

Allan (2001), following Protagoras in the 4th century B.C., and Palmer (1986) and Lyons (1977), among others, also described mood as a clause type, expressing the primary illocutionary force of an utterance, for example, in making statements, questions, imperatives, and wishes. In using such a definition, he was also comparing the notion of mood, as did Lyons (1977), to that of a speech act (see Searle, 1979). Palmer (1986) was more reserved in involving modality with the theory of speech acts, though he concedes that imperatives, described by Searle as directives, are important in any discussion of deontic modality. In the fact that there is no unique grammatical marker for marking the changes in illocutionary force of utterances (with the exception of the expression of wishes, which are often hypothetical and thus marked with modal auxiliaries or hypothetical past verb tense), it makes little difference whether the definition of mood (in English) describes its formal representation or the clausal environment in which it is found; however, it could be suggested that to use the term to describe the latter is to use an extended definition of the meaning of mood, at least as far as English is concerned. Thus, mood has been described both as the inflectional representation of modality and as the clause type in which modal inflection may appear (in some languages).

All such discussion is futile without a sufficiently comprehensive definition of modality itself. Palmer (2003: 6), dismissing logical, truth-conditional notions of modality relating to factuality or non-factuality, discusses modality as reflected mainly by the presence or absence of assertion in the intended illocution. Lyons (1995: 253–254) discussed speaker commitment, rather than assertion, in defining modality, thus allowing for the fact that even in uttering a declarative statement, the speaker is making a commitment to the truth of that statement. However, there is still conflict with a definition that describes modality in terms of the absence of assertion in the illocution. Palmer's (1986) suggestion, therefore, was that the domain of modality must include the unmarked oppositions and that there exist languages in which a declarative statement cannot be made without some form of modal marking, if only to describe the source of evidence available (as in Tuyuca (Tucanoan)); e.g., visual evidence presents the statement as the strongest with regard to factuality. The definition of modality must include languages in which reference to the factuality of a situation cannot be distinguished from other factors such as reference to distance and perception, providing the speaker's empirical justification for making the statement, all of which can be modalized across languages and not necessarily in the verbal system (e.g., in the examples of Pilagá (Mataco-Guaicuru) noted by Bybee (1998: 265)). Notions of objective factuality, therefore, cannot always be divorced from those of speaker commitment to factuality.

Chung and Timberlake (1985: 241) believed that languages that express modality in terms of mood distinctions such as indicative vs. subjunctive, or optative, as in Attic Greek, are placing finer distinctions on the basic notions available in which modality is the semantic domain expressed in grammar, distinguishing between actual and nonactual events. The evaluation of such events as actual or non-actual, though, is a language-specific matter and there is no way of predicting where such divisions may fall from one language to the next. For example, in some languages, there is no marked distinction between potential and hypothetical or potential and future (Chung and Timberlake, 1985: 243). The typological study of modality involves a much more flexible definition of a semantic domain, which in some languages has reference to actuality versus non-actuality and in others may have reference merely to actuality versus the realm of thought, e.g., for Central Pomo (Hokan), and for Amele (Trans-New Guinea) (Mithun, 1995: 375). Chung and Timberlake referred to the morphological terms 'realis' and 'irrealis' to describe modality from a typological perspective; such terms have also presented their problems, as the functions they serve across a range of languages may vary to the point at which the meaning of the term becomes vague. In their cross-linguistic survey of 76 languages, Bybee *et al.* (1994: 238) declared the term irrealis as not a valid term cross-linguistically to describe modality in the languages concerned. Their frustrations were due partly to the restrictions implied in the use of such terminology to express a binary distinction, something that Bybee herself (1998) criticized later as related to former structuralist ideology and which should be replaced by a description founded in prototype theory. Reaction to the claims of Bybee *et al.* (1994), though, came in a spate of publications that

followed, pressing for some justification for rescuing the terminology or for appropriating to it a more realistic definition. The work of Givón (1994) was one such publication, suggesting that the domain of irrealis interconnected with a range of other grammatically encoded and semantic categories and that as a category it was functionally incoherent and lacked a central meaning. However, some common characteristics did exist, such as the grouping of two broad modal clusters, deontic and epistemic, and the allowance for non-referring noun phrases under their scope (1994: 322). Others followed, e.g., Chafe (1995) in his study of Caddo (Caddoan, Southern), who found that the realis–irrealis distinction was determined by how far people's ideas were judged to be in accord with what they believed to be objective reality (1995: 364). From the discussion that ensued it was clear, as Van der Auwera and Plungian (1998) asserted, that there is no one correct way to define and name modality and the types it represents cross-linguistically.

Modal Verbs

The cross-linguistic tendencies noted by Givón (1994) for a clustering of modal nuances around the two semantic subdomains of deontic and epistemic modality are probably what led some researchers working in the field to conflate the notion of modality as a general term with merely the grammatical realization of deontic and epistemic meanings as expressed through modal auxiliary verbs (e.g., Coates, 1995). With regard to such a paradigm, the main contenders in English include pairs such as *will/would*, *may/might*, *can/could*, *shall/should*, as core forms, and *must* and a variety of peripheral forms such as *be able to*, *be supposed to*, *ought to*, *have to*, *be going to*, *dare*, *and need (to)*. In the case of the pairs, the first of the pairings is the present tense form and the second is the past tense form, described as such on formal grounds only, as the temporal meanings have long disappeared from use in many cases, leaving the past tense form to express, usually, hypothetical meaning. In the case of the peripheral group, described variously as semi-modals, semi-auxiliaries, emerging modals, and so on, recent publications have included Ziegeler (2001, 2003a) for historical studies of *be able to* and *be supposed to*, Visconti (2004) for historical details on *be supposed to*, Nordlinger and Traugott (1997) and Traugott and Dasher (2002) for a study of wide-scope modality with special reference to the history of *ought to*, Fischer (1994) for a study on *have to*, and Krug (2000) for interesting comments on the direction in which *be going to* is going, along with other emerging forms such as *hafta* 'have to', and Duffley (1994) for a comprehensive study of *dare* and *need*. All the core modals are structurally isolable by their identification with other auxiliary forms in English (the NICE properties outlined by Huddleston (1976)) – the capacity for negation, inversion, code, and emphasis, but are distinguished from other auxiliaries by having no third-person singular-*s* suffix, no non-finite forms, and no co-occurrence (in standard English) of two modal forms together (Palmer, 1990: 4). All such properties are brought about by historical development, described below. In the following section, the English modal verbs are discussed with reference to the contemporary distinctions made in much of the recent literature, in order to understand the importance of these cluster types of deontic and epistemic modality. However, it cannot be taken for granted that such terms are sufficient, even to describe the English system.

Classifications

As noted above, Givón (1994) pointed to a common conceptual clustering of modal types around deontic and epistemic senses. Although most accounts agree on the definition of epistemic modality, it is exceedingly difficult to find a suitable, uniformly appropriate term to capture the semantic classification of non-epistemic modal verbs, or even to determine whether all non-epistemic modals can in fact be classed together as one category. Treatments of present-day English modal verbs in more traditional accounts have usually maintained conservative distinctions between root meanings and epistemic meanings, root modals having been associated with meanings such as permission and obligation, but also possibility and necessity, and epistemic meanings being expressive of the degree of confidence held by the speaker in the proposition (Coates, 1995: 55). However, 'root' modality has been criticized as a term to describe such categories (Nuyts, 2001: 25), since it encompasses all the non-epistemic categories, which could mean that modalities originating in the subject are not distinguishable from modalities imposed on the subject by an external force (see below, regarding agent-oriented and speaker-oriented modality). Others have distinguished between categories such as deontic, epistemic, and dynamic modals. Deontic and epistemic modals are said to relate to the speaker, with the former concerning the influence of actions, states, and events (Palmer, 1990: 7). The word *deontic* comes from the Greek meaning 'binding' (Allan, 2001: 359) and thus the meaning of present-day deontic modals usually refers to the permission or prohibition imposed on an actor to

undertake an act, as illustrated in the use of the modals *may* and *can* in (1):

(1) You may not/cannot smoke in this building.

Epistemic modals, on the other hand, are said to refer to the speaker's judgment on the truth of a proposition (Palmer, 1990: 6), the word *epistemic* being derived from the Greek meaning 'knowledge' (Lyons, 1977: 793). Epistemic meanings are illustrated in (2), in which the same modal *may* can be used to express the speaker's evaluation or degree of knowledge of the truth of a situation:

(2) He may/must be smoking outside.

The use of the progressive aspect in (2) clearly indicates a correspondence outlined by McDowell (1991), i.e., the co-occurrence of epistemic modality with perfect or progressive aspect in the complement. Epistemic modality normally co-occurs with stative predicates, and the English perfect and progressive are stative in form, being marked by the auxiliaries *be* and *have*. In (1), on the other hand, the deontic meaning is derived by the co-occurrence of the modal verb with a non-stative predicate, *smoke*.

Because of their relation to the speaker, both deontic and epistemic modal types were considered to be subjective (Palmer, 1990: 7). Subjectivity, in Palmer's account, referred to speaker involvement, whether in terms of influencing a future act or event, as in deontic modality, or in the act of expressing judgment of the truth of a proposition, as in epistemic modality. However, Palmer did not distinguish degrees of strength in the subjectivity of modal utterances; he also did not account for situations in which the deontic modality is imposed by an unexpressed source (not necessarily the speaker) on an inanimate modal verb subject. Such cases have been described as intermediate between prototypical deontic and epistemic functions and are differentiated from deontic modals by the fact that the scope of the modality covers the entire proposition, as for epistemic modals. They are termed 'wide-scope' deontic modals and are associated typically with obligation modal forms such as *ought to* (Nordlinger and Traugott, 1997).

Palmer (1986: 17) made some reference to objective modality, in the fact that a directive such as (1) can have the speaker as source, or some unidentifiable authority whose prohibitions the speaker is simply conveying to another participant. Some modal types are difficult to express non-subjectively, or at least are ambiguous between subjective and objective modality, especially given a first-person subject. Sweetser (1990: 53) illustrated this difference in the use of two lexically differentiated forms of (semi-)modals: *have to* and *need to*:

(3a) I have to stay home, or Mom will get mad at me.

(3b) ? I need to stay home, or Mom will get mad at me.

Have to expresses an externally imposed authority and is therefore less subjective than *need to*, which has a source internal to the subject. Lyons (1977: 800) also discussed subjective and objective modality, maintaining that subjective modality always could be accounted for by the speaker's qualification: an *I-say-so* element in the meaning of the utterance. Objective modality, in addition, had an *it-is-so* element qualifying the utterance, could be quantifiable to a certain degree of probability, and corresponds to the alethic, or aletheutic, modality associated with formal logic. One could hardly associate the meanings of obligation expressed in (1) or (3) with quantifiable degrees of probability, though there is still a clear difference in the degree of subjectivity demonstrated by various deontic modals. Furthermore, it would be difficult to attribute the source of the epistemic modality in (2) to an external participant. Lyons later suggested that the capacity to express objective modality might not be found in some languages and is certainly less commonly encoded in others (1995: 335).

Dynamic modals such as *can* and *will* are associated with the ability and volition of the subject and are suggested to be not modal verbs at all, since they were claimed by Palmer (1990: 7) to express no indication of speaker subjectivity. (In this way, Palmer excluded objective modal meanings from the modal paradigm.) The absence of subjectivity is shown in the following example, in which the modal *can* merely reports on the abilities of the subject (Palmer, 1986: 102):

(4) John can speak Italian.

The only reason for defining *can*, used in such senses as a modal, is based, according to Palmer, on formal grounds. Denison (1993: 293) also made a distinction between deontic and dynamic modality, suggesting that deontic modality is involved with giving permission or obligation imposed performatively by the speaker (as in (1) above) and that dynamic modality lacks a performative sense. The use of the term factive has also been applied to such modals by Li (2003), who considered such modals, especially in past form, as expressive of past facts:

(5) In those days only men could vote in elections. (Quirk *et al.*, 1985: 222)

In (5), the modal *could* has a generic subject and describes a past state of ability or potentiality. Although referring to a statement of fact with regard

to the abilities or capacities of the subject, the inferences of potentiality rather than actuality still influence the modality of the predicate: no specific act of voting is asserted as having taken place. For this reason, such examples are similar to past habituals in that they are modally hybrid, as Givón (1994) suggested, and a 'swing' category between realis (factive) modality and irrealis (non/counter-factive) modality.

Bybee (1985) introduced a single term that cut across the general distinctions of root, some deontic, and dynamic modality described by Coates (1995) and Palmer (1986, 1990). This is agent-oriented modality, which, as its name suggests, describes modality in a notional way by referring to the functions performed. Agent-oriented modality was defined by Bybee *et al.* (1994: 177) as reporting "the existence of internal and external conditions on an agent with respect to the completion of the action expressed in the main predicate." Agent-oriented meanings, then, include obligation, necessity, ability, desire, and root possibility. Bybee *et al.*'s categories also embrace the deontic/dynamic/epistemic distinctions of Palmer (1986) and Denison (1993) noted above; modals such as *can* and *will*, dynamic modals according to Palmer, are listed under agent-oriented modalities as ability and desire, respectively, but deontic modals used in directives, such as *must* and *can* (with a permission sense), are described as speaker-oriented (Bybee *et al.*, 1994: 179). One criticism of the use of such a term, however, might be that it appears to allude to a relational role for the subject of a modal verb; this is clearly not the case, as the expression of modality refers to no committed, agentive act. In fact, Diewald (2001: 32) suggested that the subjects of (deontic) modal verbs are thematically experiencer roles, bearing both goal and source features: the goal is the subject as recipient of the modal directive and the source is the subject as intended actor. For this reason, terms such as 'agent-oriented' might refer instead to situations that are 'potentially agent-oriented', or as Goossens (1987: 28) suggested, describe 'potency', since the agentive act is only implied in the modality.

Other terms that might provide a better insight into the general description of non-epistemic modals could be used to suggest that non-epistemic modality is 'goal-centered' (Frawley, 1992: 425), and involves the commitment of participants other than the speaker, or that it is future-projecting (Bybee *et al.*, 1994: 184), in that the participant is projected to be involved in an activity at some time in the future. In this way, both agent-oriented and speaker-oriented modalities are included and it is clear that any non-epistemic modality will serve a secondary function of expressing future time. Bybee *et al.* specifically excluded the modalities of ability on these grounds – such modalities refer only to a present, on-going state or a state that has been completed at some time. James (1986: 51), however, referred to ability and obligation as precursors or antecedents of action. In one way, then, such modalities have in common the fact that they imply the possibility of future action and for this reason they are lumped together under one semantic umbrella. Perhaps the only difference is that for ability types the modality is only a necessary condition for the subject to attain a future action, whereas permission modals involve an additional qualification – the removal of any social barriers to action (see Talmy, 1985; Sweetser, 1990).

Another categorization is that of semantic maps, as illustrated in van der Auwera and Plungian (1998), in which the domains of deontic and epistemic modality are interlaced with those of participant-internal modality and participant-external modality, with participant-internal modality being illustrated by greater subjectivity, such as in *need to* in (3b), and including Palmer's dynamic modals, whereas participant-external modality could be illustrated by examples such as (3a) as well as (1), having also reference to performative, deontic uses. Van der Auwera and Plungian's account is succinct, dealing strictly with the (logical) modal notions of possibility and necessity, but the mechanisms of change that motivate the pathways shown are not discussed.

Modals of prediction, such as *will/would*, therefore, should not, as they have been in previous studies (e.g., Ziegeler, 1996), be considered on a par semantically or historically with epistemic modals; epistemic uses may be associated with them in some cases, e.g., with present-time reference as in Palmer's (1986) example (*That will be the postman*), but even in combination with stative verb complements, they may be considered in most cases to be non-epistemic (it is quite likely that the use of *will* in *That will be the postman* is pragmatically or meta-textually predictive; it predicts the future actualization of a present assumption: *that is the postman*). According to Palmer (1990: 47), with deontic modality the proposition must always refer to the future, though with epistemic modality the proposition can refer to either the present or the future, e.g., *he may arrive tomorrow* (the speaker's estimations of the truth or the falsity of what it expresses are, nevertheless, grounded in the present time of the utterance). It could be argued then, that, in the case of epistemic future reference, the speaker's assessment of the situation is still deictically located in the present, regardless of the time of the referring event, which in such examples can be marked by the presence of a temporal adverb.

Diachronic Paths of Development

The fact that the same modal verb may be used in either a non-epistemic or an epistemic sense, as shown above in (1) and (2), is reflective of the diachronic route of development demonstrated in the history of the modal forms. All the core modal forms appear to have undergone a similar path of development from main verb to non-epistemic modal, and from non-epistemic to epistemic uses, and there is evidence in a number of historical studies to illustrate such development. One of the earliest studies on the historical priority of non-epistemic over epistemic meanings was Goossens (1982); Shepherd (1982) demonstrated that such a relation could also be captured in the history of a creole language. Plank (1984), as noted above, was an exemplary study of the growing interest in the historical semantic development of the modal verbs at the time, but it was not until Traugott and Dasher's (1989) paper that anything had come near an explanation in terms of pragmatic theory to account for the local, micro-changes that were responsible for the shifts that were apparent from a broader chronological perspective.

Traugott (1989) proposed that the development of epistemic modal meanings in English was mainly the result of the gradual conventionalization and strengthening of pragmatic implicatures; such an explanation has been further developed in a more recent study of the Invited Inferencing Theory of Semantic Change (IITSC) (Traugott and Dasher, 2002). It is a process more closely associated with the effects of metonymic inferencing than with the abrupt shifts of meaning typical of bleaching or metaphor that is the mechanism espoused by Sweetser (1990) to explain the historical development of modal verbs. In a diachronic study of the modals *shall* (**sculan*), *will* (**willan*), and *must* (**motan*), Traugott (1989) traced their development from main verb uses in Old English (600–1125 A.D. in her study), when they often appeared with transitive objects, while at the same time appearing as deontic modals, as in the case of *wolde* (later) 'would', and *wille/wile* 'will' in the following (1989: 37–38), e.g.,

(6) . . . þæt he geornor **wolde** sibbe wi^{I}N hiene þonne gewinn
that he rather wanted peace with him than conflict
'. . . that he wanted peace with him rather than conflict.'
(*Or.* 96.17)

(7) se de wunde lacnigean **wille** giote win on.
he who wounds heal wants pour wine on
'Whoever wants to heal wounds should pour wine on them.'
(*CP* 17 125.11)

Some of the modals already had a use expressing general or typical occurrence, e.g.,

(8) elpendes hyd **wile** drincan wætan
elephant's hide will absorb water
(*Or.* 230.26)
(Traugott, 1989: 39)

Example (8) indicates that predictive inferences were beginning to appear as early as in the Old English period, though Traugott questions the likelihood of a purely deictic future form in Old English. Similarly, *must* was believed not to have developed epistemic meanings expressing the speaker's conclusions and certainty until well after the Old English period. Using an example cited from Visser (1969–1973: 1811), Traugott noted that the first uses of strong epistemic *must* occurring alone without a reinforcing adverb (such as *nedes*) did not appear until the 17th century:

(9) the fruit muste be delicious, the tree being so beautiful
(1623 Middleton, *Spanish Gipsie* 1, i.16)
(Traugott, 1989: 42)

In showing the development of strong epistemic meaning in this way, she illustrated the way in which modal meanings became gradually more subjective over the period of time from Old English to the present day and maintained that such a process did not involve metaphor, as suggested by Sweetser (1990), since it is difficult to understand how a proposition can be obliged to be true on the basis of the obligation contained in the proposition. Old English **motan*, according to Traugott, already was used as a deontic modal of permission (1989: 38); thus, if a speaker says 'You must go', meaning, according to the Old English interpretation of *must*, 'you are allowed to go', and is, according to Traugott, observing Grice's (1975) conversational principle of Relevance and Quantity 2, it can be inferred from the maxim 'say no more than you must' that the addressee is expected to go (Traugott, 1989: 50–51); co-occurrence with an epistemic adverb such as *nedes* is presumed to have contributed to the developing epistemic inferences in the modal as well. This account was later rejected by Bybee *et al.* (1994: 200–201), whose claim of a metaphoric explanation for the development of *must* alone was based on the exclusive temporal domains to which the separate deontic and epistemic uses are restricted. Their argument did not use much analysis of historical data, however, and Goossens (1987) had already revealed that a conceptual overlap between deontic permission (the Old English sense) and epistemic necessity was

possible via the bridging context of deontic necessity in negative environments, with negative permission to do X being semantically equivalent to obligation (social necessity) not to do X (these are the social-manipulative correspondences to the logical equivalences of possibility and necessity). Once the necessity meanings had infiltrated the modal uses via negation, it would only be a matter of time before positive necessity meanings could be generalized from the same source. Goossens (1999, 2000) also illustrated a number of linking stages between deontic and epistemic uses, showing that the transition was not as abrupt as at first perceived and ambiguities were possible, for example, between deontic necessity and inevitability, or weak epistemic necessity (Goossens, 1999: 204):

(10) Wherto and why burieth a man his goodes by his grete avarice, and knoweth wel that nedes **moste** hy dye?
'Why does a man bury possessions because of his great avarice, when he knows well that he must necessarily die?'
(1350–1420. Chaucer, *The Parson's Tale*, 567–571)

Goossens describes this sense as intermediate between deontic necessity and inferable necessity; a similar example is given in Traugott and Dasher (2002: 128) (to whom the gloss in (10) may also be attributed), which reveals true ambiguity between general (or wide-scope) deontic necessity (not necessarily imposed by the speaker) and epistemic readings:

(11) ho-so hath with him godes grace: is dede **mot** need beo guod
'he who has god's grace necessarily is required to be/we can conclude is good'
(c. 1450. *Life of St. Edmund*, p. 440)

Note again the collocation with the adverb *need* meaning, here, 'necessarily', which Traugott and Dasher (2002: 128) considered to have been instrumental in the development of epistemic necessity meanings. Examples such as (11) are evidence that the development from deontic to epistemic was not illustrative of an abrupt leap from one conceptual domain to another as would be associated with metaphor, as metaphor does not allow for such ambiguity; ambiguity, or indeterminacy of meaning, is evidence of the semantic continuity necessary for a metonymic extension, in which the extended meanings are already present as part of the meaning of the source and thus epistemic meanings are already present as latent pragmatic inferences in the earlier root meanings.

Epistemic meanings have been attested for the Old English period, as shown by Warner (1993) in the fact that modals such as *wile* (will), *mæg* (may), *mot* (must), and *sceal* (shall) occur with impersonal subjects, but pre-dating the developmental stages does not affect the fact that the route of development remains the same, with stronger subjective meanings not occurring until after weakly subjective ones and epistemic senses not developing until after deontic or agent-oriented senses. All the evidence leads to a unidirectional path of development for modal verbs from main verb uses to pre-modals, and then from future-projecting, weakly epistemic modals (including habitual and relative future uses) to strong epistemic meanings.

Post-modality

Similar pathways of development have been found in the modal verbs of other languages, as illustrated in, for example, German (Heine, 1995), Mandarin Chinese (Li, 2003), and in most of the 76 languages surveyed by Bybee *et al.* (1994), though there are numerous differences and diversions in the developmental routes and in the source meanings. There are also recent studies that have demonstrated that post-modal stages do exist, e.g., for Swedish *må* 'may' to develop meanings of 'feel' and Standard German and Dutch cognates of the same verb, developing meanings of 'like' (van der Auwera and Plungian, 1998), and a modal verb in Mandarin Chinese, *děi* 'must' has been shown to develop post-modal meanings of lexical necessity from epistemic necessity (Ziegeler, 2003b). Much future work in similar areas may reveal that the development of modal meanings in grammar could be only a participating series of changes in a broader dimension of ever-shifting semantic change, motivated by extensions emerging out of discourse and contextual need. The descriptions and categorizations that we use to explain the cross-linguistic semantic differences of modality in grammar at any one time in their history may reveal only a cross section of a much more enduring process that is likely to extend beyond the boundaries of the grammatical functions to which they are restricted in today's usage.

See also: Future Tense and Future Time Reference; Imperatives; Modal Logic; Mood, Clause Types, and Illocutionary Force; Speech Acts and Grammar; Tense, Mood, Aspect: Overview.

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Mood, Clause Types, and Illocutionary Force

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Sadock and Zwicky (1985) surveyed 35 languages representing a wide range of language families and linguistic areas. They found that every language distinguishes at least three **clause types**: declaratives (1), interrogatives (2), and imperatives (3). It is surely no accident that these are the clause types orthographically marked by '.', '?', and (often) '!', respectively. Clause type is formally defined by morphosyntax, lexis, and prosody.

(1) He just wouldn't stop whining. Bill was shot by Max. Bill, Max shot. Bill died. Max gave the Salvos a donation. *It's snowing* is a declarative sentence. Mortgage rates down at last. Dunno who did it.
(2) Will you stop whining? Care to come along? Which came first? The chicken or the chicken nuggets? Why bother? After all, who wants to crash a convivial high by spending an hour at the sink? I shouldn't have worn those heels today, should I? He's not bad, huh? Please may I be excused? You were where on the night of eighteenth May?
(3) Stop your bloody whining! Move it, Grandma. Be warned! Get yourself checked by someone qualified. You give me that ball, you! Nobody move! Let the Games begin. Let me help. Let's eat. Have a good day!

The western classical tradition in linguistics identifies three **moods**: indicative, subjunctive, imperative – which partially correspond to clause types. Protagoras (490–420 BCE, Diogenes Laertius, Book IX) splits the indicative into interrogative [erōtēsis] and declarative [apokrisis]. Palmer (2001) recognizes only two moods: indicative and subjunctive, which he compares with the realis-irrealis division proposed for some Native American languages (Chafe, 1995; Mithun, 1995) and Papuan languages (Roberts, 1990); and also with the assertive/non-assertive division proposed by Quirk, Greenbaum *et al.* (1985), Wierzbicka (1988), and Lunn (1995). Cross linguistically, there is a cline between indicative/realis/assertive at one pole and subjunctive/hypothetical/irrealis/uncertain at the other (Givón, 1994; Wehmeier, 2004).

The semantics of a clause type is its **primary illocution** (PI). All languages have a **declarative** as the most frequent and least marked clause type; here its PI is symbolized **T**, because its token potentially bears a truth value when used by a speaker in an utterance in a certain context (*see* **Type versus Token**). The declarative is typically realis (though it may include a hypothetical). At the opposite extreme is the PI **H**, characteristic of hypotheticals, counterfactuals, intensionals, traditional subjunctives, and other irrealities. Like the subjunctive (Givón, 1994: 277; Jespersen, 1958: 318), hypotheticals often have no unique morphology. Between the extremes of **T** and **H** are strung interrogatives, imperatives, negatives, futures, and habituals which may align with **T** or with **H**. For instance, 'Jim is not here' describes an event that can be seen as a factual statement having a truth value; and therefore aligned with **T**; alternatively, it is a counterfact aligned with **H**. A question 'Who

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is that?' has no truth value (*It is true that who is that), thus it can align with **H**; but in the Western classical tradition it is indicative and aligned with **T**. In the space here, it is unrealistic to force all languages into a universal mold any more specific than that already described; so the focus is on English.

Coincidence between clause type and illocutionary force may have been recognized by Protagoras, certainly by Apollonius Dyscolus (100 CE); cf. Householder (1981); Sanctius (1585); Lancelot (1644); Lane (1700); Whitney (1888); Sadock (1974); Van Valin and LaPolla (1997); and Huddleston and Pullum (2002).

How does illocutionary force enter the picture?

- Linguistics is concerned (*inter alia*) with utterances in which Speaker uses a language expression and thereby performs a locutionary act; to do so, Speaker uses an identifiable sentence or clause fragment from a language L (sentence type, intonation type, etc.). The resulting token is a locution.
- Producing the locution demands that Speaker has knowledge of the morphosyntax, lexicon, semantics, and phonology of the language used. Recognizing the locution demands that Hearer has comparable knowledge.
- A locution will normally bear more than one illocutionary force (e.g., 'I'll see you at 10' is a statement, prediction, (potentially) commissive); yet, it will usually have only one message to convey (depending on context, perhaps a promise or a threat). The illocutionary force that carries this message is called the illocutionary point of the utterance.
- The form of the locution in the utterance must be the starting point for Hearer's interpretation of the utterance meaning. Thus, Hearer must seek to recognize (a) the locution, including the sense of each clause; (b) what Speaker intends the locution to refer to; and (c) the illocutionary forces within the utterance that give rise to its illocutionary point. Hearer hears the locution, recognizes its sense, looks to the context to figure out the apparent reference, and then seeks to infer Speaker's illocutionary intention.
- Speaker's illocutionary intention is to have Hearer recognize the illocutionary point of Speaker's utterance in order to achieve a particular perlocutionary effect – the behavioral and/or cognitive and/or emotional response to the illocutionary forces in the utterance. Speaker's perlocutionary act is an act of achieving a particular perlocutionary effect on Hearer as a result of Hearer recognizing (what s/he takes to be) the locution and illocutionary forces in Speaker's utterance.
- Recognizing the clause type is the first step toward discovering the illocutionary point via the PI. It is important to reaffirm that the PI is the semantic property of the clause type (details are given shortly). The PI of 'I'll see you at 10' is a statement (with its potential truth value); the statement makes a prediction about the Speaker's future behavior which, entering the pragmatic domain, typically constitutes a commissive; in turn, this commissive may be a promise or a threat depending on several contextual factors. The PI is one semantic basis for the pragmatic inferencing that leads to the illocutionary point.

What criteria identify clause type? Word order distinguishes declarative 'He is tall' from interrogative 'Is he tall?' Morphosyntactic marking distinguishes the hypothetical backshifted modal in the temporally non-past '**Could** you mail this letter for me?' from the indicative '**Can** you mail this letter for me?', and these two interrogatives from the declarative 'I can certainly mail it for you.' Intonation distinguishes declarative from interrogative versions of 'John's gone to New York(./?)' Similarly, in other languages: In Navajo, the imperative has the same morphosyntax as the declarative, but is prosodically distinct; in Korean, declarative, interrogative, imperative, and propositive ('let's' constructions) are formally identical in intimate and polite speech levels, but are distinguished by prosody. In addition to prosodic marking, the interrogative 'John's gone where?' is lexically marked by the wh- word at the questioned location. Lexical marking is significant in identifying interrogatives in subordinate clauses: 'She asked **how / whether / if** John had traveled to New York.'

Many (uttered) subsentences (clause fragments whose missing constituents are recoverable from context) clearly function like well-established clause

Table 1 The declarative PI

<form>	**T**[Φ], see (1). The typical prosody involves downdrift.
<description>	Speaker says that Φ. (Declaratives potentially have truth values.)
<precondition>	Speaker has reason to believe that Φ.
<illocutionary intention>	Speaker reflexively intends the utterance of the clause to be recognized as a reason for Hearer to believe that Speaker has reason to believe that Φ. (Notice Speaker's purported commitment to the truth of what is being said.)

types. It is prosody (or its typographic counterpart) that distinguishes interrogative 'John?' ['Is that you?'] and imperative 'JOHN!' ['Come in at once!'] from each other and from declaratives. An utterance of the name 'John' in answer to 'Who's that?' must be judged declarative on prosodic and contextual grounds. The clipped clause 'If only!' is judged hypothetical on lexical and perhaps also contextual grounds. Such subsentences seem intuitively to function like distinct clause types and to have distinct PIs.

The primary illocution of a **declarative**, the default clause type, is defined in Table 1 below. In the definition the precondition ('preparatory condition,' Austin, 1975) establishes proper grounds for uttering a declarative clause. The illocutionary intention of a declarative arises directly from Speaker's use of it, given the precondition. As its primary illocution, the declarative performs an act of saying that Φ. The fact that declaratives (potentially) have truth values is the principal way to positively identify them. A declarative illocution is the primary illocution and not the illocutionary point of an utterance. There are few illocutionary points that cannot be achieved using a declarative: e.g., declaratives 'I'm asking what your name is,' 'I'm telling you to stop making that noise' issue directives. Performatives such as 'I promise to be good', 'You are prohibited from smoking' also have the primary illocution of a declarative (*see* **Performative Clauses** for discussion).

The PI of **interrogatives** is exemplified in Table 2. The purported option for the Hearer to refuse or plead inability to comply distinguishes interrogatives from imperatives – which purportedly offer no such option. These different options are what make interrogatives (askings) 'more polite' than imperatives (tellings) – but the pragmatics of the comparative uses of interrogatives and imperatives are too complex to be adequately discussed here.

Imperatives have the PI as shown in Table 3. Many imperative clauses are entreaties; they include supplications to someone powerful or wronged ('Forgive me'), propositives ('Let's eat'), and instructions which are of primary benefit to Hearer ('Have a nice day!'). Cross linguistically, first and third person 'imperatives,' often called 'jussives,' are frequently subjunctive (Palmer, 2001).

English has two independent **hypothetical** constructions that contrast with the three major clause types (see Table 4). Otherwise, in English, hypotheticals occur within the scope of declaratives, interrogatives, and imperatives, whose prosody they adopt along with their values. Hypotheticals may occur within the scope of a declarative, **T**, such that they (potentially) have truth values within some hypothetical world; for example, the complement of a verb of wishing. In **T**[I wish **H**[I were rich]], the 'were' is backshifted, i.e., looks like a past tense, but is in fact the nonpast derived from Old English subjunctive 'wǣre' (past tense would be 'I wish(ed) I **had been** rich'). In conditional **I**[**H**[If Harry should call], tell him 'No'], the protasis invokes a hypothetical world; the apodosis is imperative and supplies the PI. Within interrogatives, **Q**[**H**[Φ]], ('Could you mail this for me?'), the hypothetical is marked by one of four

Table 2 The interrogative PI

<form>	**Q**[Φ]. Lexical markers such as post clausal English 'eh?', clause final Japanese 'ka', English 'wh'- words, 'if' and 'whether' in subordinate clauses, and/or morphosyntactic markers such as subject-auxiliary inversion in main clauses. Because rising intonation typically marks orientation toward Hearer, interrogatives typically display updrift.
<description>	Speaker asks Hearer something—makes a request (cf. Allan, 1986; questions are requests for information to be delivered verbally). There is a purported option for the Hearer to refuse (or plead inability) to comply.
<precondition>	Speaker purportedly believes that Hearer can or might be able to respond appropriately to what is asked in the clause.
<illocutionary intention>	Speaker reflexively intends the utterance of the clause to be taken as asking Hearer something.

Table 3 The imperative PI

<form>	**I**[**F**[Φ]]. Prosodic marking: falling intonation. Imperatives occur only in independent clauses (including coordinate and appositive clauses). The verb is in the base form and non-past tense, but semantically future (**F**).
<description>	Speaker directs or entreats Hearer to do A. The direction or entreaty is present time, the act A is future – though often expected to start immediately. There is purportedly no option for the Hearer to refuse (or plead inability) to comply.
<precondition>	Speaker purportedly believes that Hearer can do A.
<illocutionary intention>	Speaker reflexively intends Hearer to take the utterance of the clause as a reason to do A.

Table 4 The hypothetical PI

<form>	**H**[Φ] where Φ is either 'Would that S' (e.g., 'Would that I were rich') or 'May S' ('May he rot in hell!') in which 'Would' and 'May' are main verbs using the root senses of these modals, and in which neither 'Would' nor 'May' can be negated.
<description>	Speaker vehemently wishes (hence the root senses) that the proposition in S may (or may have) come about in some hypothetical world accessible from the real world in which the utterance takes place.
<precondition>	Speaker has some reason to wish that S may (or may have) come about.
<illocutionary intention>	Speaker reflexively intends the clause to be taken as a reason for Hearer to believe that Speaker vehemently wishes that S may (or may have) come about in some hypothetical world.

backshifted modals: 'could,' 'might,' 'should,' 'would.' What is here called *hypothetical* is often referred to as *subjunctive mood*; but the fact that it occurs within the scope of other moods makes this classification problematic—at least for those who wish to retain traditional definitions of mood.

Expressives are not traditionally recognized as a clause type because none are full syntactic clauses, e.g., 'Goodness gracious!' 'Wow!' 'Jesus!' 'Thanks.' 'Congratulations.' 'Hi.' 'Bye.' 'Good luck!' They can be distinguished on semantic and lexical-cum-morphosyntactic grounds; they are short and usually verbless. Like clauses, they can stand alone in expressing a complete thought. They are **idioms**, often with idiomatic counterparts in other languages. They do not admit passivization or negation. Expressives do not have truth values, so they are not declaratives; they do not make requests, so they are not interrogatives; they do not direct or entreat, so they are not imperatives. Some are subjunctive. Their principal function is to display a sometimes perfunctory, sometimes strongly felt emotive reaction or social interaction toward something that has occurred. One subset of them will serve to illustrate all. 'Thanks' is presumably foreclipped from 'I offer you my thanks.' However, one can't willy-nilly strip out the possessed noun from a string 'I offer (you) my NOUN' to create a synonymous utterance. The monosyllable 'Book' could, in a well-defined context such as proffering the book, be interpreted as 'I offer you my book'; but this not the kind of condition applicable to 'Thanks.' Furthermore one cannot foreclip 'I offer you my help' to create the monosyllable 'Help', which is imperative. Apparently, utterances with an expressive illocutionary point facilitate the creation of brief idiomatic counterparts for ritualized behavior and to satisfy the constraints on verbal ejaculation. 'Thank you' is normally subjectless and idiomatic by contrast with the declarative 'I/We thank you.' It is not part of a normal paradigm: It is not imperative like 'Thank him.' It cannot be tensed: 'Thanked you' is perhaps possible as an aphetic diary entry, but not as a normal report of past behavior. Both 'Thanks' and 'Thank you' are reported like any declarative ('I thanked him') – which is normal for expressives. 'No thanks' and 'No thank you' are idiomatizations of two separate subsentences ('No, thanks' / 'thank you') from which the disjuncture has disappeared. 'Thanks' and 'Thank you' mean 'I thank you'; their negation is 'I don't thank you.' This is not the meaning of 'No thanks' / 'thank you' which are explicit rejections of an offer; just as 'Yes, thanks' is an acceptance.

Exclamatives occur within the other clause types and do not count as a distinct clause type in their own right (despite the way they are discussed here). Exclamatives are all prosodically marked by exaggerated acoustic intensity (wide-ranging peaks and troughs) that is indicated orthographically by an exclamation mark, '!', and there is lexical marking of some declarative exclamatives by clause initial 'how' and 'what' immediately followed by the preposed clause constituent in the focus of exclamation ('What a bloody whiner he was!' 'How she hated it!'). Speaker expresses within Φ a forcible, emphatic, or vehement point of approbation, delight, pleasure, pain, surprise, anger, irritation, etc.; the reflexive-intention is to focus Hearer's attention on a part of what is being said in Φ as being of particular importance in the context of the communication in progress; but this is just a modification on the PI of the governing clause type. The same might be said of hypotheticals when they do not contrast with the other clause types, which is one reason to deny that there is a subjunctive mood in English.

Primary illocution (PI) is the semantics of clause type or corresponding subsentence. Declarative, interrogative, imperative, subjunctive, expressive, exclamative clause types or subsentences are identified through morphosyntactic, lexical, and prosodic form, their use in main and subordinate clauses, and behavior under negation. The PI is identified with Speaker's illocutionary intention in using the clause type/subsentence. This PI is the starting point for Hearer inferring the illocutionary point of (Speaker's message in) the utterance containing the clause, in the manner first described in Searle (1975) (see also Bach and Harnish, 1979; Allan, 1986, 2001). It is probable that all languages have most of the clause types/subsentences described here. Further research is

needed to systematically accommodate conditionals, imprecatives, jussives, laudatives, obligatives, optatives, prohibitives, propositives, and purposives within the network of relations manifest by clause types and illocutionary forces. Exactly how all these are to be related to the traditional category of mood remains to be seen.

See also: Compositionality: Semantic Aspects; Counterfactuals; Imperatives; Indo–Iranian; Mood and Modality in Grammar; Performative Clauses; Semantics of Interrogatives; Speech Acts; Type versus Token.

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See also: Afghanistan: Language Situation.

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Morocco: Language Situation

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Four major languages are used in Morocco: Berber, Standard Arabic, Moroccan Arabic, and French, and two minor ones: Spanish and English. Each one of these languages has a special status in the overall Moroccan linguistic market.

Berber is the oldest language in Morocco and indeed in North Africa (cf. Ayache, 1964; Laroui, 1977; Chafik, 1982). It is an Afro-Asiatic language (cf. Cohen, 1947; Basset, 1952; Galand, 1960), genetically related to Old Egyptian (Coptic), Cushitic, Chadic, and Semitic. Three major varieties of Berber are found in Morocco: Tashelhit in the south, Tamazight in the center, and Tarifit in the north. According to the 1994 official statistics, Morocco has 28 million inhabitants, of which 30% speak one of the Berber varieties. However, some linguists state that almost half of the Moroccan population speaks Berber (Boukous, 1995; Ennaji, 1997; Sadiqi, 1997b). In September 2004, Berber started to be taught in 300 Moroccan primary schools after its codification through its original alphabet, Tifinagh. This initiative was preceded by the creation of the Royal Institute of the Amazigh Culture in October 2001.

As for Standard Arabic, it is a modern version of Classical Arabic, the language of the Qur'an and pre-Islamic poetry. Standard Arabic was introduced in Morocco at the end of the 7th and the beginning of the 8th centuries from the East and Islamic Iberia. At the present time, Standard Arabic is the official language of Morocco. It is used in the key formal and powerful domains, namely religion, government, education, and the media. It has great prestige as the 'language of God' and as the unifying language of the Arab world (*al-umma al-çarabiyyah*) and the

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Muslim world (*al-umma al-islaamiyyah*). It is also a symbol of identity, especially outside Morocco and the Arab world. After independence, and especially since the 1960s, the policy of language planning in Morocco was characterized by the Arabization of the different sociocultural sectors, especially the mass media, education, and governmental administrations. This Arabization proceeded with varying and debatable success (cf. Grandguillaume, 1983).

Although Moroccan Arabic (or *darija*, derived from the Standard Arabic verb *daraja*, which means 'spread among' or 'proceed gradually') shares many linguistic aspects with Standard Arabic, it is structurally different as it has simpler morphosyntax, lexicon, and phonology (cf. Ennaji and Sadiqi, in press). Like Berber, Moroccan Arabic is not a homogeneous language in form, as various Moroccan Arabic dialects are spoken in various geographical areas of Morocco. However, unlike Berber, Moroccan Arabic is the lingua franca in Morocco, its wider use has reduced the interdialectal differences and allowed intercomprehensibility between the Moroccan Arabic dialects. Moroccan Arabic is used in family circles, among friends, in commerce, on television, in the theater, and in the cinema.

French is a second language in Morocco; it is also the country's window on the West. Five factors have contributed to the maintenance of French: (a) Morocco's economic dependence on France, (b) social factors (the requirement of French in the job market, especially in the private sector), (c) historical factors, (d) immigration, and (e) tourism. It is in the domain of education that French has the most prestige in Morocco. This strong position of French in Morocco has given rise to bilingualism (Arabic/Berber and French) and to code-switching (see Sadiqi, 2003).

Spanish was introduced in Morocco in the 17th century. In spite of 300 years of presence in the country, this language has had much less impact on Moroccan culture than French because it has not been used as a means of communication, except in the North by Rifian Berbers and in the Rio de Oro region, where it has had some effect (the Spanish did not formally withdraw from the latter region until 1975). Nowadays, the younger generations in the north of Morocco use Spanish less and less. Further, unlike French, Spanish has never been used in the Moroccan administration and its use in the educational system has remained limited. As for English, it was introduced in Morocco during World War II when Americans established military bases on Moroccan territory to link them to battlegrounds in Europe. The presence of English has been greatly enhanced by tourism, the movies, music, and now globalization. The international status of English as the language of science and technology, business, cyberspace, and research, even by French-educated Moroccans, has also contributed to the spread of English (cf. Sadiqi, 1991). Nowadays, English has supplanted Spanish in the economy and education, and is competing with French in education. It is the fastest growing language in Morocco. The new American style University of Al-Akhawayne has greatly boosted the status of English in Morocco.

See also: Afroasiatic Languages; Arabic; Berber.

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Morpheme

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A remarkable number of the terms we use today were coined by the Polish linguist Jan Baudouin de Courtenay in the 1880s, among the most prominent being 'morpheme.' Baudouin defined the morpheme as "that part of a word which is endowed with psychological autonomy and is for the very same reasons not further divisible." Curiously, despite the fairly speedy widespread adoption of Baudouin's term 'phoneme' by Saussure and others, the term "morpheme" did not become popular until it was adopted by Bloomfield in his *Language* in 1933. Bloomfield's definition of this term is characteristically precise and opaque: "a linguistic form which bears no partial phonetic-semantic resemblance to any other form, is a *simple* form or *morpheme*." (Bloomfield, 1933: 161). He goes on to write that "... it appears that every complex form is entirely made up, so far as its phonetically definable constituents are concerned, of morphemes." The term "simple form" appears to echo Saussure's distinction between simple and complex signs, but while Bloomfield's morpheme is equivalent to Saussure's sign, it is Bloomfield's (or more properly Baudouin's) term that has become more widely accepted in technical linguistics (quite likely because of its exotic sounding name and similarity to other exotic technical terms).

The Baudouin/Bloomfield morpheme, like Saussure's sign, must be a concrete unit: a morpheme for Bloomfield and for Baudouin must have continuous segmental phonetic content. This means that not all of the elements that many modern linguists think of as morphemes were morphemes for Bloomfield, because, while these modern linguists think of morphemes first in terms of meaning, for Bloomfield there could also be grammatically meaningful elements that were not morphemes, because they did not have segmental content. Having a grammatically isolated meaning was a necessary but not sufficient condition for calling something a morpheme; having form and meaning together was both necessary and sufficient for morphemehood.

This means that when we read Bloomfield from a modern perspective, we sometimes find his analyses puzzling. Thus, on the page where he first defines the term 'morpheme,' Bloomfield explicitly analyzes the English verb *ran* as a single morpheme, even though it is grammatically complex, being the past tense of the verb *run*. For Bloomfield, *ran* could not possibly consist of two morphemes, say [*r* ... *n*] and [*a*], since [*r* ... *n*] would be discontinuous and hence not phonetically concrete (leaving aside the problem of relating *run* and *ran*). Bloomfield solves both the problem of the complexity of *ran* and its relation to *run* by analyzing both the past tense form *ran* and the infinitive form *run* as alternants, calling the infinitive basic and the past tense "phonetically modified". Phonetic modification, not being segmental, could not be a morpheme for Bloomfield, although it could be grammatically meaningful.

Later on (Bloomfield, 1933: 216), in discussing plurals like *mice* and *geese*, Bloomfield writes that "In these plurals, a grammatical feature, phonetic modification, expresses a meaning (namely the sememe '*more than one* object') which is normally expressed by a linguistic form (namely the morpheme [-ez, -z, -s]). We may say that 'substitution of [ij]' in *geese* ... [*and*] 'substitution of [aj]' in *mice* ... are alternants of the normal plural-suffix *substitution-alternants* or *substitution-forms*." He then goes on to extend this analysis to English past tense verbs like *ran*. But nonetheless Bloomfield insists that words like *ran* consist of "only one morpheme, accompanied by a ... substitution feature" (Bloomfield, 1933: 218), though he recognizes the peculiarity of words like *ran* and *mice* by calling them secondary morpheme-words. To repeat, a substitution feature cannot be a morpheme, because for Bloomfield morphemes must be segmental. It is important to note, though, that substitution can nonetheless be meaningful. In other words, unlike his modern descendants, Bloomfield allowed two kinds of meaningful entities, only one of which he called morphemes.

But if operations like substitution are not morphemes for Bloomfield, because they are not segmental, even though they may be meaningful, then what are they? For him they are features of arrangement or grammar and he makes a fundamental opposition between grammar and the stock of morphemes or lexicon. Bloomfield distinguished four structural types of potentially meaningful grammatical features (or 'taxemes'): order, modulation, phonetic modification (including substitution), and selection. But because phonetic modification can be meaningful for Bloomfield and yet still not morphemic, his famous pronouncements that "Since every complex form is made up entirely of morphemes, a complete list of morphemes would account for all the phonetic forms of a language" (Bloomfield, 1933: 162) and that "every complex form is made up entirely of morphemes" (Bloomfield, 1933: 161) must be read especially carefully: Bloomfield's morphemes exhaust the

sound of the complex form (at least its segmental aspect), but they do not exhaust its **meaning**.

Beginning shortly after Bloomfield, linguists began to believe that language should consist entirely of morphemes and their arrangement (a belief to which Saussure may have contributed) and that even non-segmental processes like substitution or subtraction, which Bloomfield had explicitly refrained from calling morphemes, should by some means be reduced to Bloomfieldian morphemes. Hockett and others in the 1940s and 1950s believed that by "following a pattern that had proved eminently successful in dealing with [*languages*'] sound aspect . . . morphemes are, on the grammatical level, what phonemes are on the phonological level" (Hockett, 1987: 65). This belief could only be enhanced by the positivist culture that Bloomfield inculcated in his followers. After all, if we are only permitted to posit the existence of entities that have some sort of physical existence, then meaningful elements that are not possessed of segmental substance become a distinct embarrassment.

While Bloomfield's definition of morpheme was clear, the criterion for identity among individual morphemes was only implied. For the Structuralists who followed Bloomfield, abstract units of meaning, Bloomfield's sememes, consisted of allomorphs, alternants that subsumed grammatically equivalent units at the level of the morpheme (Harris, 1942). Under this approach, the phonological variants are called morphs, the abstract unit, e.g., [PLURAL] and [PAST], morphemes.

Such reductionism was reinforced by the generative phonology movement, in which, under the influence of Roman Jakobson, much effort was expended to reduce alternants such as *run* and *ran* or the allomorphs of the English *-s* plural to single invariant underlying forms, from which the alternants could then be produced by rule. The apparent success of the generative program in phonology reinforced the hope that, at some level of analysis, language could be reduced to phonetically contentful Bloomfieldian morphemes. By contrast, much morphological theory over the last two decades (Matthews, 1991; Anderson, 1992; Halle and Marantz, 1993; Aronoff, 1994; Beard, 1995) in reaction to both these trends, has instead tried to deal head on with the problems that first led Bloomfield to define the morpheme in the way that he did.

One way of dealing with Bloomfield's distinction between meaningful modification and meaningful form is to concentrate instead on what the two have in common, meaning, uniting both under the term "morpheme" and thereby changing the focus of the term and of morphology itself. Distributed Morphology (Halle and Marantz, 1993) defines morphemes quite explicitly in terms of syntax alone as the terminal elements of syntactic trees, regardless of whether they are filled by segmental phonological exponents or not. These terminal elements are complexes of grammatical features. (Halle and Marantz, 1993: 114). Later work in Distributed Morphology (Harley and Noyer, 2000) recognizes a distinction between L-morphemes (lexical morphemes) and F-morphemes (functional morphemes). L-morphemes are the terminal nodes of categorically unspecified roots, which are, by stipulation, featureless; F-morphemes are feature bundles whose exponents including NULL are inserted in accord with the subset principle. Thus, for an element to be called a morpheme in this theory, it is not necessary that it be simultaneously realized phonologically, as Bloomfield insisted. The theory deals with the problem that led to Bloomfield's definition of the morpheme by redefining the morpheme in terms of meaning alone.

Lexeme-Morpheme Base Morphology (Beard, 1995) employs the French functionalist usage (Martinet, 1960) whereby the term 'morpheme' is reserved for only the closed-class functional forms, e.g., adpositions, pronouns and affixes (Martinet's term for something akin to the post-Bloomfieldian morpheme is 'monème'). Beard uses the term 'lexeme' (Matthews, 1992) for the open-class categories verb, noun and adjective.

Anderson's A-morphous Morphology (1992) asks the provocative question "Is morphology really about morphemes?" (Anderson, 1992: 48), to which he replies with a resounding "No!". Anderson discusses various classical problems with the morpheme including the existence of structure without meaning, e.g., Aronoff's *-ceive* morphemes (1976), empty morphs such as the Latin thematic vowels, and portmanteau morphs, e.g., the French *du* 'of the' (= *de* + *le*). Anderson's problem with the morpheme is not with these problematic cases, *per se*, but with the usefulness of the classical Bloomfieldian morpheme, to which he attributes no synchronic relevance. For Anderson, words are not related by virtue of their containing identical morphemes, but rather by word formation rules (WFR) (Aronoff, 1976), which derive the more complex word from an existing word (also perhaps derived by a previous WFR).

Aronoff (1994) introduces a new term, 'morphome,' to identify morphological units whose identity is established on purely formal grounds, independent of meaning, in the spirit of Harris (1951). Consider the English verb *stand*, whose past tense form is *stood*. The verbs *withstand* and *understand* similarly have the past tense forms *withstood* and *understood*, yet we would be hard pressed to claim that these two verbs are semantically related

to the sense of the free verb *stand*. What they share is a stem whose default form is *stand* and whose form is *stood* when the verb that contains it is PAST. Aronoff calls such stems and other units that are identified purely in terms of formal alternations morphomes and uses the existence of morphomes to argue for an autonomous morphological component in language.

Bloomfield's original definition of the term 'morpheme' fell into disuse quite quickly after its first promulgation. It was replaced by either an ideology that wished away the entire category of meaningful nonmorphemic processes that Bloomfield so carefully distinguished from morphemes or, failing that, by a more recent definition in which the distinction between meaningful form and meaningful process is declared moot. Still, the central argument in morphology over the last decade has been about whether the distinction that Bloomfield made by defining the morpheme as precisely as he did is valid. So, if we are asking whether theorists are still haunted by the sort of phenomenon that led Bloomfield to his peculiar definition of the morpheme, then the answer must be that Bloomfield's morpheme is still a useful notion. And if we are to take away a lesson from all this it is the enduring value of precise distinctions, especially when made by a master who knew where to draw them.

See also: Bloomfield, Leonard (1887–1949); Generative Phonology; Jakobson, Roman (1896–1982); Phoneme; Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism.

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Morphological Change, Paradigm Leveling and Analogy

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In this article, I assume that all so-called language change, including analogy, is best understood as a relationship between grammars instantiated in different minds at earlier and later points in time (Hale, 2005). Thus, analogy is not a property of any particular mental grammar, but we can nonetheless gain insight into such diachronic processes by considering them from the perspective of a theory of language acquisition in the generative tradition.

The change from Early Modern English *reach/raught* to *reach/reached* represents one kind of analogy, referred to as paradigm leveling. This change decreases allomorphy for a given verb, but is by no means general, since *teach/taught* survives. Four part proportional analogy can be illustrated by the pronunciation *my*[θ]/*my*[ðz] (as against historically prior *my*[θ]/*my*[θs]) by some speakers of English. This type of analogy may increase allomorphy, and in this particular case it resulted in parallelism with paradigms such as *ba*[θ]/*ba*[ðz]. The name derives from the fact that the analyst can set up a proportion as follows, and solve for X:

Four-part proportional analogy: ba[θ] : my[θ] :: ba[ðz] : X, X = my[ðz]

Many examples of both kinds of analogy can be found in a standard historical text such as Hock (1991). The two types are typically treated as distinct, but in fact are probably unifiable, since analysis of paradigm leveling implicitly involves comparison with other paradigms: *reached* was formed, in some sense, because other verbs gave evidence for a separable past tense morpheme that could be added to the present stem. We, however, maintain the traditional distinction in what follows.

Both these English examples present some difficulties, because the analysis of the synchronic patterns (suppletion in the case of *teach/taught* and apparently irregular phonology in the case of the voicing alternations) is controversial. However, we retain them because of the familiarity of the data.

No 'explanation' of language change will be able to state why a given change occurred at a particular time and place; at most we can suggest why such a reanalysis was possible or perhaps even probable under certain conditions. Furthermore, given our conception of language change, it is apparent that no grammar-internal principle, universal or particular, can account for any example of language change, whatsoever: the prechange and postchange stages are both possible languages, so the cause of the change cannot possibly be the fact that the prechange stage is incompatible with Universal Grammar. Although widely ignored in generativist writings on language change, the essence of this fundamental principle was articulated already by Bloomfield (1933: 386).

So, if analogies of the type shown cannot be identified as computations of synchronic grammars, where do the patterns come from – is the analyst's analogy just a fiction? I propose that the analogies reflect the process of lexicon building during language acquisition. Retaining the notion that language change refers to a relationship between various grammars, we can ascribe the analogies to a difference in the lexicons at two stages of a 'language,' that is, two grammars, the output of one serving as the PLD for the construction of the other.

The example referred to as paradigm leveling is particularly easy to account for under these assumptions. The change from stage 1 *reach/raught* to stage 2 *reach/reached* merely reflects a failure by the stage 2 speaker to internalize the form *raught*. In the absence of a stored past tense form for this verb, the speaker applies the productive, default past tense formation rules, learned on the basis of numerous other data points, and generates the regular form *reached*. If *raught* had been acquired, it would block the formation of *reached*.

Accounting for proportional analogy is more difficult: it cannot be a failure to internalize *my*[θs] that automatically leads a speaker to produce *my*[ðz]. Since no grammatical principle can explain this, the relevant factor must be accidental priming effects. Assume that a stage 1 speaker has *my*[θ]/*my*[θs] and *ba*[θ]/*ba*[ðz]. Suppose that this output has allowed a learner to acquire *ba*[θ]/*ba*[ðz], and suppose that such forms have just been uttered in the presence of the learner. Upon presentation of the form *my*[θ], which is ambiguous as to whether it is a plain, regular form, or a form that has a voicing alternation, the recency of the *ba*[θ]/*ba*[ðz] token (even just one element of the pair) will prime the [θ]/[ð] alternation, and lead the learner to override the default parse and set up a representation for *my*[θ] that mimics that which she already has for *ba*[θ], including whatever information relates it to *ba*[ðz].

In sum, an understanding of so-called analogy depends on a difference in the nature of the lexical representations of the two grammars. Such an explanation relies on careful analysis of diachronic change, with due appreciation for the nature of grammar and the nature of the acquisition process, including

real-time processing, subject to priming effects and other nongrammatical processing.

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Morphological Typology

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At the beginning of the 19th century, linguistic typology established a small set of types, i.e., isolating, agglutinating, fusional (*see* 'The Fusional Type,' 'The Agglutinating Type,' and 'The Isolating Type' below), to which any single language could be assigned. The main criteria for the assignment were related to word structure.

For a long time, word structure remained the dominant criterion to classify languages into types, so that morphological typology is sometimes defined as classical typology as well.

Friedrich Schlegel (1772–1829) and his brother August Wilhelm (1767–1845), together with Wilhelm von Humboldt (1767–1835) – who was also the first scholar who identified the polysynthetic type (*see* **Polysynthetic Language: Central Siberian Yupik**) – gave the most important contribution to the assumption that it was possible to describe the whole grammatical structure of a language starting from the way in which relational concepts are morphologically encoded (following suggestions from contemporary research in botany and paleontology).

With Edward Sapir (1921) there was an important shift within morphological typology. Abandoning the holistic approach, he underlined the internal inconsistencies of the classical schema of classification, and distinguished and made explicit the relevant parameters for classification. According to Sapir, it is possible (and usual) for the same language to show morphological structures belonging to more than one type.

Modern linguistic typology – which arose with the work of Joseph Greenberg (1966) – attempts to classify languages simultaneously on several dimensions, using implicational types of relations to establish limitations on the range of possible variation occurring within linguistic structures. Therefore, morphology is no longer seen as the most fundamental form of language classification, but one of the main levels in which languages can be described.

In contemporary typology, the classification by morphological types is mostly a convenient way to rapidly identify some morphological characteristic of languages, but it is marginal both in theoretical and descriptive studies.

If compared with those of the beginning of the 19th century, the aims of morphological typology have become more modest. However, the role played by morphology in the research of possible patterns of co-variation and correlation with other levels of linguistic analysis is still very relevant today.

Morphological Types

The classification of languages by morphological types is still today part of the standard terminology of linguistics. However, it is also strongly criticized by the majority of typologists for three main reasons:

1. the classification criteria are rather vague and difficult to apply in a consistent way;
2. the morphological type is defined in terms of mutual favorability of properties rather than of implicational correlations, resulting in a low predictive power;
3. morphological typology has a holistic background.

Another reason for criticism comes from the emotive appeal of linguistic imperialism: modern linguistics has disavowed the ideological prejudice dating back to the beginning of the 19th century, according to which the fusional morphological type was considered superior to other types both on a functional and on an evolutionary scale (the presumed superiority stemmed from scholars' Western-centered standpoint: in fact, all the older and many of the contemporary Indo-European languages can be classified as fusional).

There are three fundamental conceptions of language type based on morphological criteria:

real-time processing, subject to priming effects and other nongrammatical processing.

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There are three fundamental conceptions of language type based on morphological criteria:

1. the classical (cf. Schlegel, 1808): each type is distinguished from the others in a clear-cut way and is characterized by the presence/absence of one single feature (e.g., languages with or without inflection);
2. the continuum (cf. Sapir, 1921): each type shares with the others a combination of various features, each of them having a continuum of values with two well-defined ends; the structures of a language can be placed on a specific point along the axis anchored by each feature;
3. the ideal (cf. Skalička, 1966): each type is an ideal model (which is never fully realized), consisting of a set of features which tend to co-occur.

According to the last conception, each morphological type may be described as a combination of functionally interconnected features, which, as a whole, form an ideal construct characterizing (the whole, or some aspects of) the morphology of languages (Sgall, 1995). Languages are rarely pure types; they usually mix elements of different types. Assigning a language to a specific type depends on the preponderance of features considered significant (the quantification of such features is a difficult problem to solve from a practical point of view).

Criticism of Morphological Types

The vagueness of the classification in morphological types is shown by the lack of consensus on the number of both types and parameters identifying them. The three main types are: fusional, agglutinating, and isolating. There is no agreement either on whether the polysynthetic type should be considered autonomous or an extreme degree of the agglutinating one (*see* **Polysynthetic Language: Central Siberian Yupik**), or on whether Semitic language features are sufficient to distinguish an introflecting type from the fusional one.

The classical morphological typology only referred to the formal encoding of single morphological features. Sapir (1921: Chap. 6) recognized the shortcomings and contradictions of the 19th century typologists, and, in modern linguistic terms, made explicit the formal components implicit in previous proposals. He adopted a multidimensional approach to morphological typology that could integrate different dimensions of classification, among which the semantic content of morphological expression as well. He distinguished three main criteria of classification:

1. morphological technique: isolating, agglutinating, fusional, symbolic (internal modification);
2. index of synthesis: analytic, synthetic, and polysynthetic structures;
3. how relational concepts are expressed (making a distinction on whether they are expressed through lexical bases or relational elements), and the degree of grammaticalization of relational concepts.

With Sapir, there is a move from a taxonomic criterion according to which each language has to be ascribed to one type, to a classifying criterion based on possible types of morphological structures, in the definition of which semantics plays an important role as well. Moreover, it is explicitly recognized that a language can be classified into more than one type, and that types shade one into the other.

Greenberg (1954) elaborated Sapir's proposal with the aim of applying it to quantitative evaluations on the morphology of different languages.

The three parameters that are nowadays mostly used for the typological classification of languages are the ratio of morphs to word forms, the number of morphemes to morphs, and the degree of word-internal modification of morphs. The first parameter distinguishes analytic from synthetic languages; the other two distinguish, within the synthetic group, agglutinating from fusional languages.

Lists of Clustering Features

The best-known attempt to establish a list of features that co-occur in morphological types is the one made by Skalička (1966), which also includes aspects of word phonology and word order. In the following sections, the features of the three main types (agglutinating, fusional, and isolating) will be given (*see also* **Finnish as an Agglutinating Language**; **Italian as a Fusional Language**; **Chinese as an Isolating Language**), with the reminder that whereas the final ends of some dimensions can be reached, others are unlikely or impossible to reach. The analysis and discussion of polysynthetic and introflecting types is carried out in sections devoted to them (*see* **Polysynthetic Language: Central Siberian Yupik**; **Arabic as an Introflecting Language**). Suffice it to say here that whereas the polysynthetic type presents a variety of forms and is spread in a lot of languages, the introflecting type is not widely spread and, even in those languages where it is found, it is restricted to a part of morphology.

The features that tend to cluster in languages displaying one of the three main morphological types can be listed as shown in the following sections.

The Fusional Type

1. Words are formed by a root and (one or more) inflectional affixes, which are employed as a

primary means to indicate the grammatical function of the words in the language. Agreement is widely employed.
2. High degree of modification of internal morph boundaries, with a consequently difficult linear segmentation.
3. Tendency to cumulate morphological meanings in a single affix (with consequent asymmetry between the semantic and formal organization of grammatical markers).
4. Word-class distinction is maximal. Inflection is rich, as regards both the number of inflectional classes and the extension of paradigms.
5. Stem suppletion; many cases of both homonymy and synonymy among affixes; clear distinction between inflectional and derivational affixes.
6. A slight correlation with syntax can be seen in the relatively free word order (but there are also fusional languages with a fairly fixed word order).

The Agglutinating Type

1. Words are formed by a root and a clearly detachable sequence of affixes, each of them expressing a separate item of meaning. Affixes are widely employed to indicate the relationships between words. Therefore, there are few or no independent relational elements (e.g., pronouns, pre-/postposition, articles, etc.), and a wide use of nominal cases.
2. Very high matching between morphs and morphemes. Morphs are loosely joined together; consequently it is very easy to determine the boundaries between them.
3. Each affix carries only one meaning: no cases of homonymy or synonymy among affixes; the semantic structure is directly reflected in the morphological articulation of the word; no principled limits to the number of affixes in a word.
4. Word-class distinction is minimal: the same affixes tend to occur with roots belonging to different parts of speech (e.g., personal endings to nouns, case endings to verbs); almost the same morphology for adjectives and verbs. No inflectional classes, no gender distinction.
5. Derivational affixes are widely employed in word formation. The distinction between inflectional and derivational affixes is slight. Many affixes reveal their lexical origin to some extent. The latter feature, together with the tendency of affixes to form autonomous syllables and to be relatively unconstrained in number, results in words that are quite long.
6. Relatively fixed word order. Agreement is almost completely absent.

The Isolating Type

1. Words are monomorphic, invariable, and formed by a single root. Ideally, bound forms are completely missing. Position is the main way of expressing the relationship between independent words.
2. Relational meanings are not overtly expressed, or the same units that normally encode lexical concepts are used for that purpose as separate helper words; the meaning and function of a word considerably depend upon the syntagmatic context.
3. There is little to no morphological complexity. Morphs are clearly identifiable both phonologically and semantically: morph boundaries are sharply defined, phonological form is invariant, there are no instances of overlapping exponence. Derivation is nonexistent, partly replaced by compounding.
4. The distinction in parts of speech is not clear; there is no overt expression of grammatical categorization.
5. Tendency to monosyllabism with no phonetic distinctions between the elements expressing lexical meaning and the ones expressing relational meaning.
6. Rigid word order.

Comparison

The fusional type is differentiated from the isolating type by the use of bound morphs and the clear-cut distinction between word classes; it is differentiated from the agglutinating type by the kind of juncture between morphs, and the nonbiunivocal correspondence between morphs and morphemes. In the synthetic vs. analytic distinction, the fusional and even more the agglutinating type tend toward the synthetic end.

Types characterization can be schematically summed up in Table 1.

Contemporary Morphological Typology

In spite of criticism, the classification by morphological types is still convenient and widely used in order to rapidly identify a number of features that tend to co-occur in the morphology of a language. Some authors also use it to assess the extent to which a language moves away from such ideal constructs both in a synchronic and in a diachronic perspective (Dressler, 1985 argues that languages tend to move toward a typological goal according to a linguistic economy criterion; *see* **Natural Morphology**).

On the contrary, the classification by morphological types is now negligible in contemporary

Table 1 Features characterizing fusional, agglutinating, and isolating types

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
Fusional	Yes	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Agglutinating	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No
Isolating	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No

(1) affixes; (2) word function determined by position; (3) possibility of segmentation (morph-morpheme correspondence); (4) clear-cut distinction in part-of-speech; (5) tendency to monosyllabism; (6) fixed syntactic order; (7) syntagmatic structures employing particles; (8) noun marked for number; (9) noun marked for case; (10) noun marked for gender; (11) adjectives expressing agreement; (12) synthetic expression of comparison on adjectives; (13) verb: use of analytic structures (vs. affixes); (14) verb: presence of inflectional classes.

typological research, since scholars do not expect the morphological type to correlate in a significant way with other typological parameters. As they refuse the possibility of classifying the whole of a language into a given type, typologists pay increasing attention to the practice of partial typology, focusing on specific areas of linguistic structure (Bynon, 2004). Partial typology analyzes clusters of properties with a view to ascertaining significant connections and hierarchical organization. The main tool for analysis is establishing implication universals according to Greenberg's (1966) suggestions. However, disregarding morphological types does not result in the death of morphological typology: almost half of Greenberg's 45 universals concern morphology. These universals mainly focus on two aspects previously neglected by morphological typology:

1. the relative order in which (derivational and inflectional) concepts are expressed morphologically within word forms;
2. the hierarchy of concepts which a language expresses morphologically.

Examples of the first are universals 28 and 39. The former states that if derivational and inflectional affixes are on the same side of the root, then the derivation is always closer to the root. The latter says that in a noun the expression of number is nearly always closer to the base than the expression of the case. Examples of the second are universal 36 'If a language has the category of gender, it always has the category of number,' and 37 'A language never has more gender categories in nonsingular numbers than in the singular.'

While it is true that only with Greenberg (1966) does syntax start to play a major role in typology, it is to be said that even the famous syntactic universals concerning word order (e.g., universals 3 and 4, which relate VSO order with preposition, and SOV order with postposition) show a link with morphology, for example, via universal 27 (which relates suffixing and postpositional languages on the one hand and prefixing and prepositional languages on the other). Another example is universal 41, which states the implication between the SOV word order and the presence of a case system. Because of such a link, morphology has acquired importance for scholars interested in word order typology. There are many studies that associate the use of suffixes or prefixes with OV and VO order, respectively (see Cutler *et al.*, 1985; Hawkins and Cutler, 1988; Hawkins and Gilligan, 1988, where affix preference is related with head position and also explained by psycholinguistic factors; see Bybee *et al.*, 1990 for a diachronic approach; Dryer, 1992, who attempts to integrate different approaches).

At the interface between morphology and syntax there are works such as Nichols (1986), which distinguishes head- and dependent-marking, and others, such as those dealing with the morphologically based typology of causative constructions.

Greenberg (1966) barely takes into account phonology. However, the Universals Archive (cf. Plank and Filimonova) collects some universals concerning the interaction between morphology and phonology. Examples are universal 219 stating that affixes have a more limited inventory of phonemes than roots and universal 713, which correlates agglutinative morphology with vowel harmony, and fusional morphology with stress accent.

As far as morphology itself is concerned, the main effect of Greenberg's typology has been to stimulate the investigation of implicational relations between morphological categories, to promote the study of the markedness (overt expression) of morphological values, as well as the investigation of the reasons for the greater or lesser closeness of relational morphemes to the lexical base, and of the role played by morphological heads.

One of the main problems that stands before morphological typology is to identify a phenomenon as the same thing in different languages, since the values of one grammatical category may be expressed morphologically in some languages and in a different way in others. Cross-linguistic identification on purely formal criteria is not far-reaching (an example is

Greenberg' universal 26: 'If a language has discontinuous affixes, it always has either prefixing or suffixing or both'); on the other hand, purely functional statements are not sufficient, because, by definition, they need a formal counterpart to be morphological. This type of difficulty explains why studies on inflectional morphology are overwhelmingly prevailing over derivational ones: categories such as case, gender, and number are cross-linguistically better identified and defined (see Blake, 2001; Corbett, 1991, 2000) than derivational ones; furthermore, the internal articulation of inflectional categories, featuring a number of values within one category (e.g., singular, plural for number), favors cross-linguistic comparison within the inflectional domain. The study of the variation in the expression of derivational categories is certainly more difficult and much remains to be done; see Bauer (2002) for a recent attempt.

See also: Arabic as an Introflecting Language; Chinese as an Isolating Language; Finnish as an Agglutinating Language; Italian as a Fusional Language; Natural Morphology; Polysynthetic Language: Central Siberian Yupik.

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Morphological Universals

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Overview

Morphological universals are generalizations about the morphological structure of a possible human language. Languages differ radically as to the properties of their morphological systems, but this variation is not unlimited: certain morphological patterns are not attested in any language, and morphological universals are explicit statements that impose restrictions on cross-linguistic variation in the domain.

Because all theories of morphology (e.g., natural morphology, lexical phonology, a-morphous morphology, distributed morphology, prosodic morphology, to mention only a few) deduce predictions about what morphological properties cannot occur in natural language, any such theory is associated with its own set of

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morphological universals, even if not recognizing the notion of universal explicitly. But morphological frameworks differ substantially as to their basic assumptions, descriptive and analytic tools, and theoretical primitives. As a result, morphological universals recognized within different frameworks are highly theory bound. For example, a theory assuming that words and word forms (at least to some extent) are built in the syntax and are transparent to rules and principles that operate at the phrasal level (e.g., Halle and Marantz, 1993), is expected to produce less purely morphological universals than a strict lexicalist theory, which assumes that words are created presyntactically. A theory whose primary concern is the meaning of grammatical (and, in particular, morphological) items (e.g., grammaticalization theory) is unlikely to recognize universals about noun incorporation. A theory exploring the interaction of prosodic structure and morphological structure (e.g., prosodic morphology) has very little to say about possible patterns of case syncretism, and so on. Furthermore, what is recognized as a universal in one theory can be theoretically impossible in another theory (or even in the same theory at the later stage of its development). For instance, Jelinek (1984: 74) puts forward the generalization that syntactically nonconfigurational languages (those possessing a flat syntactic structure) are agglutinative. Evidently, this generalization is only valid as long as nonconfigurationality is recognized as a theoretical possibility. Because later on nonconfigurationality was abandoned by generative grammar in favor of strict binary branching enforcing a hierarchical structure, no room was left for Jelinek's generalization.

Therefore, the whole inventory of morphological universals, if thought of as a union of all sets of theory-internal universal statements, is extraordinarily huge and, given that the number of possible linguistic theories is not restricted, potentially infinite. Furthermore, as we have just seen, this inventory may contain incompatible or even controversial statements.

For this reason, a more restricted notion of morphological universal is commonly assumed. In a narrow sense, morphological universals are those generalizations about morphological structure that are established within Greenbergian tradition of linguistic theorizing (see Greenberg, 1963, universals 26–45). These generalizations are essentially inductive, rather than deductive: formulating universals that capture various properties of morphological items and processes precedes explanation and constitutes a necessary condition for it. Universals can only emerge as a result of cross-linguistic study, in which representative samples of natural languages are taken into account. This contrasts sharply with many other linguistic frameworks where generalizations are deduced on purely theoretical grounds and only after that are tested against cross-linguistic data.

At present, morphological universals seem to be less systematically documented than phonological and syntactic ones. The Konstanz Universals Archive (KUA, Plank and Filimonova, 2002), the most complete and systematic collection of information on natural language universals on which this article relies heavily, contains about 2000 records, and only about 150 of them are filed under the rubric 'morphology' (although a number of relevant universals are also listed under the rubric 'inflection'). In what follows, I will review main universals about a possible shape of morphological items and their meaning/function. The concluding section surveys possible ways of explaining morphological universals.

A Possible Structure of Morphological Items

One of the most familiar universals, frequently referred to in the literature, captures the implicational relation between affixation and nonconcatenative morphology. It claims that if there is internal stem modification or suprasegmental modification or subtraction or conversion or suppletion in derivation or inflection, then there is affixation. This universal allows languages in which affixation and other types of derivational and/or inflectional morphology are absent altogether (Vietnamese is frequently cited as an example), languages in which both occur (e.g., English) and languages that only make use of affixation (e.g., Turkic). It rules out the fourth possibility, e.g., languages with stem alternations but without prefixes/suffixes. A closely related observation (Greenberg's, 1963, universal 26) says that if there are discontinuous affixes, then there is prefixing and/or suffixing.

As far as affixes are concerned, natural languages tend to have suffixes rather than prefixes. Various manifestations of this tendency have been cited in the literature. Thus, Hall (1988) observed that only 4% of languages that have affixes are exclusively prefixing, and 41% of such languages are exclusively suffixing. Moreover, whether languages have prefixes, suffixes, or both correlates with the order of constituents in the syntax. Greenberg's (1963) universal 27 states that exclusively suffixing languages are prepositional whereas exclusively prefixing languages are postpositional. If the VO/OV order is taken into account, one can observe that exclusive prefixing does not occur in OV languages at all, whereas about 64% of such languages are exclusively suffixing. VO languages are more tolerant to prefixation: 72% have prefixes and suffixes, about 9% are exclusively

prefixing, and only 19% are exclusively suffixing. Hawkins and Cutler (1988) surveyed implicational relations between prefixing/suffixing and basic word order for the exponents of 11 inflectional categories: gender, case, indefiniteness, nominalization, definiteness, plurality, mood, tense, aspect, valence, and causative. In particular, they observed that there are no prefixal exponents of gender and indefiniteness in OV and postpositional languages, whereas case marking is suffixing rather than prefixing regardless of the basic word order.

Another manifestation of prefixation/suffixation asymmetry is that there is more prefixing on verbs than on nouns. If a language has any prefixes on nouns, it will also have prefixes on verbs with considerably more than chance frequency. Thus, there are languages that only have suffixes on both nouns and verbs, languages that have prefixes on both nouns and verbs, and languages with verbal prefixation but without nominal prefixation. An example of the latter type is Darghi (North-Caucasian) in which a verb can take up to four prefixes indicating agreement, location, movement with respect to the speaker, and movement with respect to a landmark other than the speaker (e.g., *či-j-ka-w-qid* 'dismount, get off (the horse)', where *qid* is a stem 'go', *w* is a masculine singular agreement marker, *ka* indicates movement upside down towards the speaker, *ĉi* – location on the surface of the landmark and *j* – movement from the landmark). Yet, nominal prefixation in Darghi is not attested at all.

Another type of morphological generalizations about the shape of morphological items relates various aspects of their phonological structure to the celebrated classification of languages as isolating, agglutinating, fusional, and incorporating. In particular, it has been observed (especially within natural morphology framework, see, e.g., Dressler, 1985) that if morphology is flexive, word forms tend to be two or three syllables long, whereas if morphology is agglutinating or incorporating, word forms tend to be longer. Trivially, if a language is isolating, that is, lacking bound morphology, word forms are shorter. Polysynthesis implies that consonant–vowel ratio is comparatively high. Agglutinating morphology implies simplicity of syllable structure, and higher syllable-per-sentence and syllable-per-word ratios than flexive morphology. At the same time, derivational affixes show more phonological complexity in agglutinating languages than in flexive languages. Although generalizations of this type do capture significant asymmetries found in the data, they seem to be problematic given the vagueness of the very notion of agglutinating vs. flexive languages. Recent work has shown that agglutination should not be viewed as a primitive notion but rather as a family of related but logically independent morphological parameters such as separatist vs. cumulative exponence and invariant vs. variant exponence (Plank, 1999); furthermore, it has been shown (Haspelmath, 2000) that values of these parameters exhibit no statistically significant correlation (thus, e.g., Nivkh (isolate) shows a high degree of cumulation but virtually no multiple exponence, while Ponapean (Oceanic) demonstrates a great deal of stem alternation but virtually no cumulation). As a result, the empirical validity of the above-mentioned generalizations can only be verified if such notions as 'agglutinating' or 'flexive' are made more precise.

Bybee (1985) makes significant cross-linguistic generalizations about the distribution of inflectional and derivational morphological items. Having examined verbal morphology across 50 languages, she proposed that derivational/inflectional status of morphological items correlates with their semantic relevance for the root and generality of their meaning. The degree of relevance is determined by the extent to which morphological items modify the semantic content of the root; generality suggests that a morphological item applies consistently to the vast majority of roots and yields the same semantic effect. The more relevant, the meaning of a category is for the meaning of the root, and the less general it is, the higher is the probability that it is expressed derivationally. The opposite holds for inflectional morphology. Thus, causative morphemes tend to be derivational, because they affect the argument structure of a verb, whereas tense morphemes are normally inflectional, because they only relate a situation referred to a deictic centre without changing the number of its participants. Furthermore, the concept of relevance accounts not only for the inflectional or derivational status of morphemes, but also for their relative order (cf. Greenberg's, (1963) universal 28): derivational items (e.g., causative morphemes) occur closer to the root than inflectional ones (e.g., tense and aspect morphemes) because of their high semantic relevance (a possible counterexample is Navajo and other Atapaskan languages). Clearly related to Bybee's observations is Greenberg's (1963) universal 39, which states that if morphemes of both number and case are present and both follow or precede the noun base, then the exponent of number 'almost always' comes between the noun base and the exponent of case (cf., e.g., the genitive plural *malaj-lar-niŋ* || **malaj-niŋ-lar* 'of the boys' in Tatar (Altaic)). If plurals are more relevant to a nominal stem than case markers, because they affect its reference properties, this ordering is again expected.

Bybee has been frequently criticized for not providing a precise definition of relevance. Alternative,

strictly structural, explanation of the morpheme order involves Baker's (1985) mirror principle that states that the order of morphemes mirrors the sequence of functional projections above the verbal projection. However, this approach relies crucially on the assumption that words and word forms (at least to some extent) are built syntactically and can hardly be implemented within lexicalist frameworks assuming a presyntactic word-formation component of the grammar. Another structural account for the relative order of inflectional and derivational morphemes is offered in Anderson (1992). Anderson suggested that whereas derivation occurs in the lexicon, inflection is part of the syntax, and rules of the syntactic component applies after lexical rules. Given this architecture of grammar, Greenberg's universal 28 and similar generalizations.

Universal restrictions on phonological structure of morphological items frequently reveal themselves in templatic morphology. Consider reduplication as an example. The reduplicant is commonly thought of as an affix that does not have a fixed segmental content, but provides a template to which segments are copied from the base. Moravcsik (1978) suggests that the shape of the reduplicant is constrained by the following universal: there is no reduplication pattern that involves reference to phonological properties other than syllable number, consonantality-vowelhood, and absolute linear position. The further elaboration of this generalization is provided by prosodic morphology theory (McCarthy and Prince, 1986 *et seq.*), which hypothesizes that all templatic requirements on varying segmental material are defined in terms of prosodic units – mora, syllable, foot, and prosodic word. Thus, in Ilokano (Austronesian) a reduplicative template for nominal plurals is a heavy syllable (*kaldíŋ* 'goat' – *kal-kaldíŋ* 'goats', *róʔot* 'litter' – *ro:-róʔot* 'litters'; in the latter case, because glottal stops cannot occur as codas, it is not copied from the base, but the vowel *o* is lengthened instead to meet templatic requirements), while in Diyari (Australian) it is a minimal prosodic word consisting of a bisyllabic trochaic foot: *tʲilparku—tʲjilpa-tʲjilparku* 'bird species'. Although there are debates as to whether reduplication is templatic in all languages, to the extent it is templatic the crucial generalization is that templates are never defined in morphological or linear terms (e.g., 'copy the first morpheme', 'copy the last three segments', and so on.)

Prosodic considerations play an important role in answering the question of whether infixation should be universally recognized as a special type of affixation. Recent studies (McCarthy and Prince, 1993), implemented within optimality-theoretic framework, have shown that at least many instances of infixation can be reduced to suffixation/prefixation to a phonologically defined prosodic unit located within the morphological unit. Possessive markers in Ulwa (Misumalpan) are attached after the first foot of the root, so that they are suffixed if a root contains just one foot (e.g., *sana-ka* 'his/her deer') and infixed in roots that are longer than one foot (e.g., *kulu-ka-luk* 'his/her woodpecker'). In Tagalog (Austronesian), the actor topic morphemes *-um-* is prefixed to vowel-initial roots, but infixed in consonant-initial roots to avoid onsetless syllables whenever possible. Ultimately, these generalizations led to a more spartan conception of affixation whereby only prefixes and suffixes are recognized as possible affixes cross-linguistically.

Although universals and universal-like generalizations discussed so far mostly involve morphology proper as well as morphology–phonology interface, further universal generalizations emerge at the morphology–syntax interface. Thus, widely discussed are incorporation phenomena, and, in particular, noun incorporation. Mithun (1984) observes regular cross-linguistic asymmetries as to what types of nouns can undergo incorporation: if patients of intransitive verbs can be incorporated, patients of transitive verbs can also be incorporated. Baker (1985) provides a syntactic explanation of the observed asymmetries in terms of government and binding theory. On his analysis, noun incorporation is a head movement that adjoins a noun to a verbal head provided that the latter properly governs the former. The latter condition, a manifestation of the general head movement constraint adopted within government and binding theory, predicts, correctly, that only material governed by the verbal head (objects of transitives and subjects of unaccusatives) can incorporate. It is only possible to move the lower lexical item, the noun, in order to combine with the higher lexical item, the verb. Crucially, this is not a theoretical possibility for agents of transitives and unergatives, which are base generated above the verb and not c-commanded (and hence governed) by it. Under this analysis, incorporation of such nouns, which is attested in, e.g., Mayali (Australian), can only be analyzed as involving lexical compounding. Alternative approaches to the noun incorporation suggest (see, e.g., Rosen, 1989) that in fact all instances of incorporation are purely lexical and its distribution is to be captured in semantic rather than syntactic terms. But whether either of these approaches can be proved to hold for all languages still remains to be seen.

Possible Functions of Morphological Items

A bulk of morphological universals impose restrictions on inventories of inflectional and, less frequently,

derivational categories, thus determining a possible number, gender, case, tense-mood-aspect system, etc. Frequently, these generalizations take form of hierarchies whereby existence of a morphological exponent for a category C entails existence of morphological exponents for categories dominated by C. For instance, Greenberg's (1963) universal 34 suggests the following number hierarchy: singular < plural < dual < trial. According to this hierarchy, for example, if a language possesses a morphological exponent for the trial number, it also possesses those for the dual, plural, and singular numbers (Yimas (Sepic-Ramu) is an example of such a language).

Other grammatical categories and their morphological exponents show much the same behavior. Thus, the masculine gender is dominated in the hierarchy by the feminine gender, which is in turn dominated by the neuter gender, pronominal person systems are constrained by the hierarchy 1, 2 person < 3 person; comparative and superlative degrees expressed on adjectives entail that adjectives have also a positive degree, the passive voice entails the active one, and the hypothetical mood entails the indicative.

Corbett (1991) and Dahl (1999) explore gender assignment systems cross-linguistically. The main finding of these studies is that the gender of the vast majority of nouns can be predicted from the information (semantic, morphological, and phonological) required independently in the lexicon (Corbett, 1991: 68). Furthermore, the gender is never assigned according to phonological or morphological properties of nouns (e.g., declension class) exclusively: there is always a general semantically based principle for assigning gender to animate nouns, whereas individual languages vary as to where the cutoff point between semantic and morphological/phonological assignment is located at the animacy hierarchy. In Tamil (Dravidian), for example, there are separate genders for male humans and female humans; everything else is assigned to a third gender. In many Indo-European languages, humans and also, to a varying extent, higher animals, are assigned masculine or feminine gender on the basis of their sex, whereas inanimates and lower animals get their genders by lexeme-specific or formal criteria.

Cross-categorical implicational relations are also well attested. A frequently cited example is provided by Greenberg's (1963) universals 30 and 36. The first states that if the verb inflects for person-number or for gender, then it also inflects for tense-mood. The second establishes the implicational relation between gender and number: if a language has a category of gender it always has a category of number. Another example is Greenberg's universals 37 and 45 discussed in Plank and Shellinger (1997): a language never has more gender categories in nonsingular numbers than in the singular. This universal turns out to be statistical rather than absolute: for instance, Hadza (Khoisan) distinguishes between first person plural masculine and feminine (*o(ne)bi* vs. *obe*) while using the same pronoun in the singular (*эno*).

Typological studies of tense and aspect systems reported in Dahl (1985) and Bybee *et al.* (1994) reveal a new trend in the analysis of the universal properties of grammatical items. Rather than establishing a set of implicational universals about the meaning and distribution of tense and aspect morphemes, Bybee and Dahl identify what they call cross-linguistic gram types (CGTs), that is, clusters of semantic properties that tend to be expressed grammatically in genetically and areally unrelated languages and possess their typical morphosyntactic means of expression. Verbal forms that constitute tense-mood-aspect systems of individual languages are manifestations of CGTs. For example, the CGT *past* is characterized by its meaning ('a situation occurs before the moment of speech') and form (inflectional expression), and its manifestation in English is Simple Past verb forms. The crucial assumption within this approach is that a restricted set of CGTs defines the structured universal grammatical space from which individual languages choose available possibilities to develop their grammatical systems. Besides, CGTs come into existence by a restricted set of paths of diachronic development. For example, perfects can only emerge from resultatives and through the grammaticalization of lexical items like 'finish' or 'already' and can only develop into the past perfective or indirect evidence grams. Generalizations like these impose additional restrictions on both the inventory of grammatical items in individual languages and on the meaning and distribution of individual grammatical morphemes. The question of how many cross-linguistic gram types are there is still debated: Dahl (1985) identified about 20 CGTs, whereas Bybee *et al.* provide a more extended list containing about 40 items.

Another type of cross-linguistic generalization determines minimal inventories of grammatical distinctions. Thus, Comrie (1985) observes that tense systems in natural languages minimally provide a two-way distinction between past and nonpast temporal reference (e.g., Finnish), whereas no systems differentiating between present and nonpresent or future and nonfuture temporal reference are attested.

Various universal lexical restrictions on the distribution of grammatical morphemes are attested cross-linguistically. In a few languages only nouns denoting people show plural number marking. This observation is captured by Corbett's (2000: ch. 3) generalization that if a language has plural forms of nouns at all,

it will have plural forms of nouns denoting people. In the WALS sample (Haspelmath, 2005) containing 290 languages the majority (133) possess obligatory plural marking in all nouns, 28 languages lack plural marking altogether, in 59, plural marking is restricted to human nouns, either optionally, as in Hatam (West Papuan; Indonesia), or obligatorily, as in Jamul Tiipay (Yuman; southern California). In 15 languages (e.g., Arawak (Arawakan; Suriname)) plural marking is obligatory in human nouns and optional in inanimate nouns. Crucially, no languages are attested where plural, either optional or obligatory, occur only in inanimate nouns, nor languages in which plural marking is compatible with all nouns, but only optional in human nouns.

A common lexical restriction within tense-mood aspect domain is incompatibility of the progressive marking with stative (e.g., 'see'), especially individual-level (e.g., 'like'), verbs. Another example of lexical asymmetry is frequently attested systems in which the same verbal form can have different interpretation depending on a lexical class of a verb. In such systems, the atelic/stative verbs yield imperfective/present interpretation, whereas telic verbs are associated with the perfective reading, either past (e.g., Tundra Nenets (Uralic)) or future (e.g., Russian).

Because grammatical morphemes are normally multifunctional, an important area of cross-linguistic research are universal constraints on grammatical polysemy. For example, the dative case in Tatar (Altaic) can express, among other things, the recipient semantic role and the direction of movement, while in Russian only the former meaning of the dative is available. Therefore, the general question is what are universal constraints on how meanings can be combined within the same grammatical morpheme. Recently, a number of such constrains have been identified in a few areas of grammatical semantics.

An area in which cross-linguistic generalizations are still to be found includes syncretism and blocking phenomena. Syncretism is the correspondence of a single inflected word form to two or more sets of morphosyntactic features defining a cell in the morphosyntactic paradigm. In English, an instance of syncretism is verb forms such as *hit*, identical for the simple present and simple past, which are distinguished by the overwhelming majority of other verbs. In Russian, the dative singular (e.g., *mashin-e* 'to the car') is identical to the locative singular (*(v) mashin-e* 'in the car') for all nouns of a particular morphological class. Cross-linguistic patterns of syncretism are extremely diverse. The Surrey Syncretisms Database (Baerman *et al.*, 2002) lists about 70 case pairs in 30 languages that share the same fully inflected forms (e.g., ablative/ergative, accusative/genitive, etc.), more than 60 number pairs, more than 50 person pairs, more 30 tense pairs, and so on. Various attempts have been made to find out constraints on syncretism. For example, Carstairs-McCarthy (1998) formulated four principles that restrict a possible morphosyntactic content of inflectional affixes. These are the Principle of Contrast (every two affixes contrast in meaning); Exclusive Disjunction Bar (the meaning of an affix cannot contain a disjunction of incompatible morphosyntactic properties, e.g., 'past' or 'future', 'instrumental' or 'dative'); Complementarity Bar (the meaning of an affix cannot be specified negatively, as 'nonpast' or '–2nd person'), and Unmarked Property Bar (the meaning of an affix cannot contain specific mention of the least marked value of a feature, e.g., 'present', 'indicative' or 'singular'). Additionally, Carstairs-McCarthy assumed the Elsewhere Condition: if two distinct affixes are compatible with a given morphosyntactic context, the more specific one is preferred. These constraints account for syncretism in Hungarian, Latin, and Turkish, discussed extensively in his study, and, because they do not involve any language-specific assumptions, they can potentially apply to all languages. However, this account (as well as other accounts offered in the theoretical literature, see, e.g., Stump, 2001: ch.7) is to be tested against a wider sample of languages.

The same is true of blocking whereby a possible morphological construction does not occur due to the existence of another, functionally equivalent morphological construction, cf. **mans* vs. *men*, **badder* vs. *worse*, etc. Kiparsky (2005) argued that blocking is a mechanism that resolves the competition between the potential expressions relying on two universal constraints, economy and expressiveness. Economy requires that, other things being equal, the simplest expression be chosen, and expressiveness requires that, other things being equal, all the input meaning be expressed by the output expression. As a result, among equally expressive expressions, the simplest is optimal (this is the reason why *worse* wins over **badder*), and among equally simple expressions, the most expressive one is optimal (this ensures that *bad* is not used instead of *worse*, because *bad* does not express the semantic content of the comparative, thus violating expressiveness). Given the attractive simplicity and restrictiveness of approaches of this type, their universal validity remains to be seen.

Explaining Morphological Universals

Linguistic theories vary sharply not only in what explanatory mechanisms they use in accounting for

cross-linguistic generalizations but even in what they take as explananda.

For formal theories of grammar, particularly, for Generative Linguistics explaining universals is not a (primary) goal; rather, it aims at identifying characteristics of the innate language faculty, Universal Grammar. The primary explanandum is why the acquisition of systematic and structured grammar is possible on the basis of random and non-structured experience ('Plato's problem') and the common assumption is that explanation for universals can be derived directly from the hypotheses about Universal Grammar. In contrast, for functional-typological approaches to language grammatical universals themselves are an ultimate explanatory goal (see Haspelmath (2004) for the extensive discussion).

Functionalists primarily rely on system-external considerations such as frequency, economy, and processing. Haspelmath (2002: ch.12) provides a collection of diverse asymmetries in inflectional categories observed cross-linguistically that can be accounted for in terms of speech frequency. Thus, there is a positive correlation between the frequency of expression and its shortness (cf. Haiman, 1983), which is motivated by the languages users' preference for economical structures: speakers tend to reduce expressions that hearers can predict, and frequent expressions are more predictable and therefore expected by default. This explains why the most frequent words (e.g., articles, prepositions, and conjunctions) are the shortest, why affixes are shorter than roots, why the more frequent inflectional categories cannot be more morphologically marked than less frequent ones, and why the most frequent inflectional categories (e.g., singular, nominative, etc.) can have zero expression (cf., e.g., Greenberg's universal 35: there is no language in which the plural does not have some nonzero allomorphs, whereas there are languages in which the singular is expressed only by zero). In addition, one can observe more syncretism and less suppletive allomorphy in less frequent categories. For instance, in Old Russian verbal conjugation second and third persons were identical in the dual (e.g., *znaj-eta* 'you/they two know' but not in the singular (*znaj-eš* 'you know' vs. *znaj-et*^{j} 'he knows') and plural (*znaj-ete* 'you all know' vs. *znaj-ut*^{j} 'they all know'), and in Latin there were threex suppletive first-person singular endings in the indicative (*amo* 'love', present vs. *amavi*, perfect vs. *amaba**m**,* imperfect) and only one in the subjunctive (*ame**m***, present vs. *amaveri**m**,* perfect vs. *amare**m***, imperfect). Finally, frequency determines the direction of analogical leveling: if analogical leveling occurs, more frequent items tend to replace less frequent ones.

A novel perspective on explaining universal characteristics of human language has been recently developed within Optimality Theory (OT, Prince and Smolensky, 1993). OT relies on the assumption that surface forms of language emerge as a result of resolution of conflicts between universal constraints. All constraints are present in every language and are assumed to be part of our innate knowledge of language. All systematic differences among languages are explained through different constraint rankings. Constraints are ranked with respect to their importance, and each language has its own constraint hierarchy distinct from all others. Constraints are violable, and violations of lower-ranked constraints may be tolerated in order to satisfy a higher-ranked constraint; in this way, the grammar selects an optimal output, which best satisfies the system of ranked constraints.

Within OT framework, universal restrictions on morphological (as well as phonological and syntactic) structure that are not subject to cross-linguistic variation (especially those that take a form of hierarchies) can be captured through the fixed constraint rankings. Aissen (2003) is a particularly straightforward example of this type of analysis. She explored the phenomenon of differential object marking whereby overt case marking of direct objects occurs with some objects, but not with others, depending on their animacy and definiteness. For instance, in Sinhala (Indo-Iranian) only animate-referring objects may be case marked, whereas in Turkish (Altaic) only specific (either definite or indefinite) direct objects receive the accusative case. Aissen proposed two fixed constraint hierarchies (*Oj/Human » *Oj/Animate » *Oj/Inanimate and *OJ/PRO » *OJ/PN » *OJ/DEF » *OJ/SPEC » *OJ/NSPEC) for animacy-sensitive and definiteness-sensitive differential object marking respectively. These constraints penalize the absence of a value for the feature CASE. Additionally, she introduced the constraint *STRUC, which penalizes the specification of morphological CASE. *STRUC can be interpolated at any point in the hierarchies, excluding case marking of all object types in the dominated constraints. Thus, for Turkish *STRUC is located in between *OJ/SPEC and *OJ/NSPEC, effectively eliminating the possibility of case making in nonspecific indefinite objects.

A powerful tool for accounting for universal restrictions on the meaning of grammatical morphemes are semantic maps, which are currently gaining a growing popularity. A semantic map is a connected graph in which nodes are meanings/functions distinguished by grammatical morphemes cross-linguistically. Meanings/functions are arranged on the map in order to meet the adjacency requirement: all

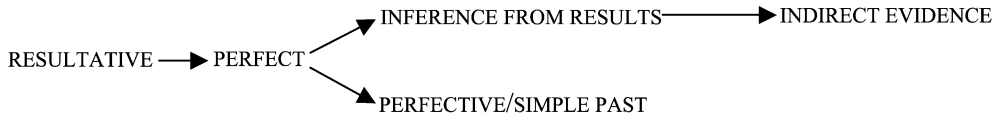

Figure 1 Diachronic semantic map for the resultative, perfect, and related categories.

language-specific grammatical morphemes should occupy contiguous areas on the map, and there must be no language in which a grammatical morpheme is connected to nonadjacent meanings, unless the same morpheme covers all meanings located in between. Due to the adjacency requirement, any semantic map generates a family of implicational universals of the form «If a grammatical morpheme expresses meanings m_1 and m_2, then it expresses meaning(s) m_3, m_4,...» (see Haspelmath, 2003). Semantic maps can be made even more restrictive if symmetric adjacency relations between meanings/functions are replaced by asymmetric paths of diachronic development. Diachronic semantic maps make the same predictions as synchronic ones and, additionally, delimit possible ways of how the meaning of grammatical items can change. Consider perfects as an example. Figure 1 shows a partial diachronic map from Bybee *et al.* (1994) with minor adjustments.

This map allows for a wide variety of languages, both synchronically and diachronically. One of the possible scenarios is represented by the Past forms in East Slavic languages, which are products of diachronic development of the perfect both formally (loss of the auxiliary) and semantically ('perfect' → 'past time reference'). Another development of the same form is attested in Bulgarian (South Slavic), in which the Perfect gave rise to the indirect evidence form. Synchronically, this semantic map predicts, correctly, that no language possesses a grammatical morpheme that can be used, say, in indirect evidence and resultative contexts unless the same form occurs as the perfect. (Such a morpheme is attested in Bagwalal (North Caucasian), where the same verbal form comprises the whole range of uses from the resultative to indirect evidence.) Diachronically, it represents prohibition against violating unidirectionality: the development of resultatives into perfects and so on is irreversible.

See also: Affixation; A-Morphous Morphology; Aspect and Aktionsart; Case; Compound; Distributed Morphology; Evidentiality in Grammar; Functionalist Theories of Language; Gender, Grammatical; Generative Grammar; Grammatical Meaning; Incorporation; Inflection and Derivation; Internal Modification; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Morpheme; Morphological Typology; Morphology: Optimality Theory; Natural Morphology; Number; Reduplication; Semantic Maps; Subtraction; Syncretism; Tense, Mood, Aspect: Overview.

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Morphologization

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Introduction: Definition of Terms

The term 'morphologization' has had two main uses in historical linguistics: (1) a restrictive one, i.e., the reanalysis of a phonological rule or process as a morphological one, and (2) a less restrictive one, i.e., the reanalysis of any nonmorphological element or process as a morphological one. This latter definition would include various processes that also fall under the rubric of grammaticalization. The difference in usage, coupled with varying understandings of associated terms (like 'grammaticalization'), has led to some confusion. Since much effort has gone into attempts to distinguish the usage, the issue will be briefly treated here at the outset.

The restrictive definition is the traditional one, insofar as classic cases of it like the morphological reanalysis of German umlaut (see below) were the only examples of morphologization that received much attention until more recently. It is the definition still maintained by Klausenburger (1994), who explicitly excluded any kind of grammaticalization from being covered by the term. More commonly nowadays, however, the term is understood in its broader sense, and it is this usage that will be followed here. This usage is also likely to be less confusing, since etymologically there is nothing in the term 'morphologization' to suggest restricting it solely to input from the phonological domain.

While the domain from which the input for morphologization is drawn should not be understood restrictively, matters are different concerning the output. In what follows, it will be understood that the result of morphologization is a genuine morphological change, that is, a change to the morphological component of the grammar. (Terms like 'morphological component' and 'morphological system' will be used here for the sake of convenience and for conceptual purposes to refer to the set of elements and rules used for derivation and inflection. For fuller discussion of the controversies surrounding the

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issue of whether an autonomous morphological component of the grammar exists and what its properties might be. This conception naturally excludes some of the processes to which the term 'morphologization' has been applied and that have appeared in discussions of the difference between morphologization and grammaticalization. An example is Modern German *heute* 'today,' originally a hypostasis of an early Old High German phrase reconstructed as **hiu tagu* 'on this day.' Joseph (2003) claims that such hypostases are much better characterized as morphologization than grammaticalization: although a once transparent phrase has been reduced to an adverb whose morphological structure is synchronically opaque, the end result *heute* is, in his view, "as grammatical (or not, as the case may be) before the phrase was reduced as it is afterwards," (Joseph, 2003: 477) and so the term 'grammaticalization' does not apply. In the view suggested here, neither 'grammaticalization' nor 'morphologization' is a good label for the history of *heute*. The change **hiu tagu* > *heute* is little different from the histories of words like *stirrup* or *sheriff*, once also transparent compounds (Old English *stīgrāp* 'mounting-rope,' *scīr-gerēfa* 'shire-reeve') that have been rendered opaque through a combination of sound and semantic change. If precision in terminology is to be achieved, **hiu tagu* > *heute* is really a minor adjustment to the lexicon, hence a lexical change: what started out as, or soon became, an idiomatic prepositional phrase functioning adverbially (a polymorphemic adverb, so to speak) underwent univerbation and phonological reduction – probably in that order – and came out as a monomorphemic adverb. When exactly it became morphologically opaque is difficult to say (this is a famous chicken-and-egg question in historical morphology), although it is clear that the semantic specialization or idiomatization was a precondition for it. There was no change to the morphological rules or building-blocks of the language, and hence no morphologization in any meaningful sense.

This is not to suggest that no phrasal contractions qualify as morphologizations, but it depends somewhat on individual conceptions of the morphology of a grammar, which, as alluded to above, vary widely and wildly from framework to framework. Hypostases of the *heute*-type (further examples include Eng. *to-day, to-night,* Lat. *īlicō* 'right away' < **in stlocō(d)* 'on the spot,' Russ. *voobšče* 'in general' < *vŭ obšče*) probably do not qualify under most current conceptions of the morphology (though some earlier ones subsumed the whole lexicon within it, meaning that any change to the lexicon would be simultaneously a morphological change). But less clear are crosslinguistically common developments like Span. *vuestra merced* 'your grace' becoming reanalyzed as the formal 2nd person pronoun *usted*: this is a morphologization if one takes pronouns to be part of the morphological system (as, for example, in their capacity to provide phonologically overt expressions of features manipulated by the syntax), or merely a lexicalization under other frameworks (with, to be sure, morphological ramifications, such as the spread of originally 3rd-singular verb forms like *habla* 'speaks' that were used in agreement with *vuestra merced* into the 2nd-singular paradigm slot alongside *hablas*).

Morphologization of a Phonological Rule

The most familiar type of morphologization is the reanalysis of a phonological rule as a morphological one. The identification of this as a type of linguistic change goes back to Kruszewski (1881), who, among the examples he discusses, mentions the use of umlaut to mark plurals in German; this has subsequently become the most famous example of the type. Umlaut was a sound change that affected West and North Germanic languages during the first millennium A.D., apparently beginning in the north and spreading southward. There were several different umlauts; the one that concerns us here is *i*-umlaut, which was the fronting of a back vowel (or diphthong beginning with a back vowel) before a syllable containing either *i* or the palatal glide *j*. As long as this trigger was present, umlaut was simply a low-level phonetic process; over time, however, the *i*'s and *j*'s that had caused umlaut either weakened or disappeared, and what had been simply a predictable phonetic alternation was phonologized.

One important class of umlauted forms were the plurals of nouns whose plural suffix had contained *-i-*, such as Old High German *gast* 'guest' pl. *gesti*, *apfel* 'apple' pl. *epfili* (Modern *Gast Gäste*, *Apfel Äpfel*). At some point the umlaut of the vowels associated with these plurals became reanalyzed as a plural marker itself, and spread to many words where originally no umlaut had taken place because the phonological conditions for it had not been met. Thus, the Old High German *o*-stem plurals *scazza* 'jewels,' *halsa* 'necks,' and *suarma* 'swarms' became Modern German *Schätze, Hälse, Schwärme*, the plurals of *Schatz, Hals, Schwarm*.

The individual steps in this process have been much discussed. It has been frequently averred, most recently in Janda (2003: 409ff.), that the phonemicization of umlauted vowels preceded the loss of the conditioning environment, the reasoning being that if umlaut were simply conditioned by *i* or *j*, the loss of those entities would have automatically caused the simultaneous disappearance of umlaut. This is not

the place to entertain this issue in any detail, but a few observations may be offered. Umlaut prior to the loss of *i* and *j* was surely comparable phenomenologically to the lengthening of vowels in Modern English before voiced consonants. It is a universal fact, due to vocal-tract physiology, that vowels are lengthened somewhat before voiced consonants; but in English, the lengthening is considerably greater than can be accounted for on the basis of physiology alone. The extra lengthening must be due to a rule of English phonology that lengthens vowels before voiced consonants above and beyond any physiologically automatic lengthening. (Apparently, some learners interpreted the automatic lengthening as due to a lengthening rule and incorporated such a rule into their grammars; the result was greater-than-original lengthening in their output and in the output of subsequent generations.) Similarly, the fronting of back vowels by umlaut, at first purely physiological in nature (due to anticipation by the articulators of the high front vocoid), must have (through similar reanalyses on the part of learners) grown to exceed whatever automatic fronting was induced by the following high front vocoid. That does not mean that the front vowels were phonemic; as long as their environments were predictable, all that needed to be learned was an automatic fronting rule in a certain environment. It only became phonemic when a learner missed the rule, and deduced that the fronted vowels were morphological or lexical. This either happened because the learner heard the *i*'s and *j*'s but did not pay proper attention to them, or because the learner missed the *i*'s and *j*'s.

In an important monograph, Klausenburger (1979), resuscitating and adapting Kruszewski's original framework, sought to situate our understanding of morphologization within an explicit theory about morphophonemic rules. Noting that allomorphs are best defined as phonologically different variants of a morpheme rather than simply phonetically different ones (i.e., allomorphs differ from each other by virtue of having different phonemes, not different allophones), he located morphologization already at the time that a phonetic difference was phonologized and produced different allomorphs. To take a concrete example, /s/ in early Latin developed an intervocalic allomorph [z] which was subsequently rhotacized to [r]; this was classified as a different (and already existing) phoneme, /r/. A morpheme like *ges-* 'wage, carry' appeared in two phonetically predictable forms, [ges] and (before vowel) [gez], the second of which later became rhotacized to [ger]. Since the distribution of [r] (unlike [z]) was not predictable ([r] occurred in all word positions), what had been a form phonetically predictable on the basis of its allophones was now predictable only on the basis of its morphological distribution (that is, in those morphological categories in which the morpheme was followed by a vowel–initial suffix). This, for Klausenburger, represents the true 'morphologization' (or, as he puts it, technically 'semi-morphologization') of an original phonetic, now phonological, distinction. Thus any subsequent changes, such as the reanalysis of the *r* (or the *s*) as signaling some specific piece of morphological information, would be merely a solidification of an already present morphological conditioning factor.

An important precondition for morphologization, either under Klausenburger's localization of it or under more traditional views that localize it slightly later in the process, is that the original source of the alternation (phonological rule in these cases) be rendered inaccessible to the learner, forcing the learner to ascribe the alternation to something else. Once [gez] turned to [ger] in the Latin example above, there was no evidence in the primary linguistic data available to a learner that the alternation was motivated by phonological principles. Similarly, in Modern English, verbs can sometimes be formed from nouns ending in voiceless fricatives simply by voicing the fricatives: *shelf/shelve*, *mouth* [θ]/*mouth* [ð], and so forth. The alternation was originally purely phonologically conditioned, as any voiceless fricative between two voiced segments was automatically voiced; in the nouns, the fricative was usually word-final, whereas in the verb, it preceded verbal derivational and inflectional suffixes that have since been lost. As that old verbal morphology disappeared, and as borrowings from French with word-initial [v] resulted in a phonemic contrast between [f] and [v], the original phonological motivation for the voicing was obliterated, leading to its reinterpretation as morphologically motivated. In truth, more can be made of this than is perhaps necessary, since a precondition of all reanalysis is presumably the opacity (or, at the very least, ambiguity) of the motivation for some feature in the data.

Morphologization of a phonological alternation is stated by Anderson (1988: 336) to change only the formal expression of a category rather than the set of morphological categories in the grammar. Under his view, a change to the morphological system must entail change to the set of morphological categories rather than simply their expression. In the present treatment, however, the morphological system is not defined so narrowly, and a change to the morphological system also includes changes to its rules (rules that "specify [the] structural changes that determine the formal reflections of morphological categories," Anderson, 1988: 334). German umlaut, as all agree,

is a morphological rule; thus, it follows that morphologization of a phonological rule entails change to the morphological system, and is more far-reaching than, for example, just replacement of one morpheme by another.

Opacity of the function or role of a segment was mentioned above as a necessary precondition of the morphologization of a phonological rule; it is also a precondition of a second type of morphologization, not normally treated separately, namely the morphological reanalysis of a segment or sequence (rather than of an alternation) by metanalysis of a root, stem, or other affix. An example is the French agent-noun suffix *-ier* being renewed as *-tier* when added to words ending in a vowel, such as *bijou-tier, chapeau-tier, indigo-tier*; the *-t-* was abstracted from forms like *égout-ier, charpent-ier*, where it was part of the stem. (Several other vowel–initial suffixes underwent the same change, though historically there has been some fluctuation in how widely the *t*-initial variants have spread; for details, see Nyrop, 1936: 57–61). Suffixes frequently 'grow' diachronically in this matter; a familiar example is the growth of the Latin suffix of appurtenance *-nus* to *-ānus* and further to *-iānus*: the first is seen, e.g., in *Rōmā-nus* 'Roman,' which was metanalyzed as *Rōm-ānus* to create, e.g., *Tulli-ānus* (to *Tullius*, name of a Roman gens), itself metanalyzed as *Tull-iānus* to form adjectives like *Cicerōn-iānus*. Such processes occur frequently in artificial written language as well, especially in chemistry and zoological nomenclature, as in the abstraction of a suffix *-cosa* to form genera of wolf-spiders from the name of the type genus *Lycosa* Latreille (really *Lyc-osa* < Gk. *luk-õsa* 'tearing like a wolf') such as *Schizo-cosa* Chamberlin ('split' [*schizo-*], from the excised tips of the transverse arms of the median septum of the epigynum in the female) and *Musteli-cosa* Roewer (Lat. *mūstēla* 'badger'; H. D. Cameron, p. c.).

Such morphologization also causes new inflectional morphology to arise. In the Jersiais dialect of French, historically final *-r* disappeared, while *-rC* became *-r*, as in [me] 'sea' (< OFr. *mer*) but [kɔr] 'body' (OFr. *cors*). Nouns and adjectives ending in *-r* therefore lost the *-r* in the singular but retained it before the (subsequently lost) plural marker *-s*: [ave] 'child' (< OFr. *aver*, lit. 'a belonging,' cp. Standard French *avoir*), pl. [avɛr]; [dü] 'hard,' pl. [dür] (< OFr. *dur*). The resulting alternation sg. *-ø* : pl. *-r* led to a reanalysis whereby *-r* was interpreted as a plural suffix, leading to its (limited) spread to some words that never ended in *-r* in the singular (Morin, 1986). In Northern French, [*-z*] has been reanalyzed as a feminine marker in adjectives, generalized from adjectives where it was a surviving stem-final consonant, e.g. [žoli] 'beautiful,' fem. [žoliz].

Not all metanalyses are morphologizations. In the reanalysis known as Watkins's law, a third-singular form of a verb has become opaque, is reanalyzed as ending in zero, and thereby becomes the base for a new paradigm. The example that led to the law's name is Watkins's analysis of the Old Irish *t*-preterite (Watkins, 1962), where he showed that the preterite marker *-t-* to which the preterite desinences are added was itself originally the 3rd-singular preterite ending. Here the inflectional ending **-t* lost its specification as an agreement marker and became reinterpreted as a tense marker. In this reanalysis, we have a resegmentation, but the *-t-* remains a morpheme throughout the change, though changing somewhat in function. Other persons of the verb can be reanalyzed in this way as well: in certain southeast Peloponnesian dialects of Modern Greek, for example, the *-n* that is historically the 1st-singular imperfect desinence (e.g., *(e)fórun* 'I wore, put on') has been reanalyzed as an imperfect suffix in certain verbs (whence singular *fórun-a -as -e* pl. *fórun-ame -ate -ane*; see Pantelidis, 2003).

The examples of morphologization of phonological alternations discussed so far involve a shift from interpreting one feature of a category as the marker of the category to interpreting another feature of the category as its marker. This is in keeping with Anderson's statement that no new category is created by the morphologization of a phonological rule.

Morphologization of Syntactic Structures

Morphologization that results from the reanalysis of independent words as derivational or inflectional affixes is often subsumed under grammaticalization, as stated earlier. Examples are legion; one will suffice to illustrate. In Karelian dialects, a postposition was reanalyzed as a case-ending, creating a new comitative case ending in *-kela*; the evidence that it no longer functions as a postposition comes from the fact that it is added not only to nouns but also to their modifiers, and participates in vowel harmony with the root (Comrie, 1980). If the independent word undergoing the shift is already a function word like a pronoun, the change may or may not be labelable as morphologization, depending on whether pronouns are considered part of the morphology or not (cf. *Introduction* section above). Thus, for example, a body of evidence suggests that in colloquial Modern French, the first and second person subject pronouns have been reinterpreted as proclitics; when disjunctive pronouns are used in addition, the clitics then function essentially as agreement prefixes (type *Moi, je pense* > *moi j-pense*, where *moi* is the innovated subject

pronoun and *j-* is an agreement marker; Fonseca-Greber and Waugh, 2003).

Anderson (1988) claims that the morphologization of independent lexemes normally creates new categories, in contrast to the morphologization of a phonological rule. Counterexamples to this claim can be found, however. It is generally agreed that the ablative singular case of thematic nouns in Proto-Indo-European, traditionally reconstructed as **-ōt*, consists of the thematic stem-vowel **-o-* plus a postposition **-(H)ot* or **-(H)at* 'from' (where H = an undetermined 'laryngeal'; *see* **Proto-Indo–European Phonology**) that still survives as an independent word in Balto-Slavic (e.g., Russian *ot* 'from'). The ending **-ōt* is therefore the result of the morphologization of an old postposition as in the Karelian comitative; yet in this case no new morphological category was created. The language already possessed an ablative case in the other nominal declensions as well as in the pronouns. (What is imperfectly understood is why exactly the postposition was captured only in this stem-class and only in the singular, but that is a separate issue.) Examples of this type of morphologization, in which a new desinence is formed by grammaticalization but no new overt morphological category comes into being, are not uncommon; a few others are known even from Proto-Indo-European, as well as elsewhere (e.g., the Sanskrit 2nd sing. imperative middle ending *-sva*, originally a reflexive pronoun that was captured as a desinence only in this place in the imperative middle paradigm).

Whether it is true that a new category is always created by the morphologization of syntax depends also on whether one subscribes to theories that posit underlying categories for languages where those categories are not overtly represented on the surface. Thus, some might well claim that Karelian always had an underlying comitative; at one stage, it was expressed by a postpositional phrase, and at a later stage it came to be expressed inflectionally. There is, of course, considerable debate over these issues, and this is not the place to try to resolve them. A second difficulty with the literature on this matter is a tendency to reify the language being studied (as just seen in the statement, 'Karelian always had a comitative'). Learners do not come to the language-learning task knowing what categories already exist in the grammar that they are trying to acquire, but only with the set of potential categories afforded by universal grammar. A category does not have to be present in a target grammar for the learner to interpret the data as reflecting the existence of that category. (The reinterpretation of motion verbs in many Southeast Asian languages as prepositions is a prime example of this.)

This is not to suggest that morphologization is unconstrained with respect to possible categorizations on the part of learners. Just how constrained it is, and what it is constrained by, are very broad issues in language acquisition that still await resolution.

The reanalysis of a syntagm as a sequence of bound morphemes led Talmy Givón to say what has become perhaps the most familiar statement in historical morphology, "Today's morphology is yesterday's syntax" (1971: 413). The claim is that morphological patterns that involve sequences of underlying parts of speech whose ordering would be exceptional synchronically as sentential constituents are the result of morphologization of earlier syntactic patterns. To take a standard example from English, compounds such as *nutcracker* have object-verb order, which is at variance with the normal order of those elements in the syntax today; this compound is said then to be evidence of object–verb order at an earlier stage of the language.

Much study has been devoted to determining the extent to which Givón's aphorism is true; the consensus is that, while suggestive, the statement is too problematic upon close examination to be a reliable principle for syntactic reconstruction. First, not all polymorphemic words originated in the grammaticalization of originally separate words, or at least not at a time-depth to be useful for historical linguistics. Thus, the 3rd plural ending *-n* of verbs in Spanish has been a 3rd plural desinence as far back as we can trace its history, over 5000 years to Proto-Indo-European **-nt(i)*; there is no evidence that this was ever anything but a 3rd plural ending. Second, while it is true that earlier stages of English (especially Old English) admitted the syntactic order object–verb more commonly than English does now, this means neither that that was the default order, nor that *nutcracker* and its ilk have anything to do with that order; verb–object was also common, and compounds of the *nutcracker*-type are found in most branches of Indo-European, regardless of the word-order in those languages. Even if *nutcracker* was a reflection of earlier verb–object order, it is unclear what that really means; we would not have a clearer understanding of the syntax of earlier English in any meaningful way. Syntax is not the same as word order; the latter is simply a byproduct of the former. The conclusion is that polymorphemic constructions must be analyzed on a case-by-case basis, and cannot be automatically interpreted as magic windows onto the past.

See also: Grammaticalization; Morphology: Overview; Proto-Indo–European Phonology.

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Morphology and Language Processing

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The mental lexicon is the stored mental representation of what we know about the words in our language. A critical question in the cognitive science and neuroscience of language is to determine the properties of these representations, especially where complex forms are concerned, and how they participate in processes of language comprehension and production. This is a relatively recent development. Earlier psychological investigation of the mental lexicon was dominated by research in English. Because of the properties of the English language, coupled with a primary focus on the recognition of visually presented simple words, relatively little attention was paid to the internal structure of lexical representations. Over the last two decades, however, with a marked broadening of the crosslinguistic spread of experimental psycholinguistic research, and growing interest in the processing implications of lexical complexity, issues of lexical representation have moved centre stage, with the role of morphology as a key element. This research has focused on three main topics – the cognitive representation of complex forms, regularity and irregularity in inflectional morphology, and crosslinguistic contrasts in morphological processes.

The Cognitive Representation of Complex Lexical Forms

Considered in the functional context of language comprehension and production, where lexical representations play a key role in mediating between form and meaning, there are two kinds of questions that need to be asked. These are, first, questions about the properties of a core "lexical entry," defined as the central mental representation of a word's syntactic, semantic, and abstract phonological properties. The issues here bear at least a family resemblance to the kinds of problems that might be raised in a linguistic context.

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The Cognitive Representation of Complex Lexical Forms

Considered in the functional context of language comprehension and production, where lexical representations play a key role in mediating between form and meaning, there are two kinds of questions that need to be asked. These are, first, questions about the properties of a core "lexical entry," defined as the central mental representation of a word's syntactic, semantic, and abstract phonological properties. The issues here bear at least a family resemblance to the kinds of problems that might be raised in a linguistic context.

In addition, however, there are important questions to be asked about perpetual "access representations" and about the processes which operate upon these. What are the mechanisms whereby the sensory input, spoken or written, is linked to a given lexical entry? Typically, this process is thought to be mediated via modality-specific representations of word forms, which provide the perceptual target for the early stages of lexical access and word recognition.

It is still a matter of intense debate how complex lexical forms are centrally represented, and how these representations are accessed. Three principal kinds of approaches can be identified – fully decompositional accounts, assuming morphologically structured lexical representations which are accessed by decomposing complex forms into their constituent morphemes; dual route accounts, where complex forms are typically represented in decompositionally, but are accessed both as whole forms and in a decomposed format; and full listing accounts, where complex forms are stored and accessed as unanalyzed whole forms, so that morphological organization does not play an independent role in either central representation or in access to these representations.

These types of account tend to ally themselves with very different assumptions about the general computational properties of cognitive systems – whether they are based on distributed representations or on a network of interacting localist nodes. Decompositional and dual route models, which we focus on first, typically assume localist accounts, where the specific form and meaning associated with a given word – or with its decompositional components – is represented in terms of labeled symbolic nodes, and where lexical access and selection depends on excitatory and inhibitory interactions between these nodes. Behavioral data, from a range of experimental psycholinguistic tasks, is then used to make inferences about the properties of these representational nodes, and how they are organized in a processing hierarchy leading from form to meaning.

Two kinds of evidence have dominated research of this sort – experiments examining the clustering of frequency effects, and experiments using priming tasks. The frequency of occurrence of a lexical entity determines speed and accuracy of response in a timed recognition task such as lexical decision ("Is this a real word or not?"). In a hierarchically organized decompositional system, it is argued that frequency effects will collect at specific points of the system. For example, if there is a lemma level of representation, into which feed all of the inflectional variants of a given noun or verb stem, then the frequency effects for each of these variants should follow the summed (or base) frequency across the lemma, rather than being driven by the frequency of occurrence of each surface form separately.

Research along these lines has been the principal input, for example, into the dual route model developed by Baayen, Schreuder, and others, building on earlier work by Caramazza (Caramazza *et al.*, 1988; Baayen *et al.*, 1997). The first stage of this type of model consists of access representations both of words as a whole and of their potential components (so that *dogs*, *dog*, and *-s* are all separately represented), and where complex forms are recognized either through a whole word route or through a decompositional route. The specific patterning of response times to singular and plural forms, for example, as a function of their respective surface frequencies and of their summed base frequency, is then used to deduce whether plural forms are recognized by direct lookup via these whole word access representations, or whether recognition is based on decompositional parsing into morphemic components. These questions have been pursued for both inflectional and derivational morphology across a range of languages, although the story has become very intricate as the notion of frequency has itself become increasingly complex.

Priming experiments approach questions of representation and organization in a different way, by exploiting the phenomenon of repetition priming, typically in speeded recognition tasks. The underlying assumption is that if two words share a common element at some level of representation – for example, the pair *darkness* and *dark* may share the morpheme {dark} – then the activation of this element by the prime word will affect responses to a target word sharing the same element. Different versions of this basic paradigm can then be used to tap into different levels of internal representation. In crossmodal priming, the prime and target words are presented in different modalities (for example, a spoken prime and a written target), in order to tap into central lexical representations, rather than modality-specific access representations. Marslen-Wilson, Tyler, and colleagues have used this task to argue for a decompositional account of English derivational morphology (as discussed in the section 'Crosslinguistic Contrasts in Morphological Processes' below), where semantic transparency plays a major role in determining whether central lexical representations are morphologically structured or not (Marslen-Wilson *et al.*, 1994). Synchronically transparent prime/target pairs such as *punishment/punish* prime each other robustly, but no priming is found between opaque pairs such as *department/depart* or *casualty/casual*.

A different picture emerges, however, when priming tasks are used that tap into modality-specific access

representations. A case in point is masked priming, where a visual prime word (followed by a visual target) is presented so briefly that the reader is not aware that the prime is present, and simply makes a lexical decision to the target. Here we see, even for English, that there is strong priming not only between transparent pairs such as *bravely/brave*, but also between pairs such as *hardly/hard*, which are synchronically opaque, and even for pairs such as *corner/corn*, where *corner* clearly has no morphological interpretation as {corn +-er} (Rastle *et al.*, 2000). The process underlying these effects is nonetheless morphologically sensitive, since pairs such as *scandal/scan*, where {-dal} is not a derivational affix in English, do not show priming. Similar patterns are reported for French by Longtin and colleagues, where transparent pairs such as *gaufrette/gaufre* ('wafer/waffle') and pseudostem pairs such as *baguette/bague* ('small stick/ring') both prime robustly, but pairs such as *auberge/aube* ('inn/dawn') do not (Longtin *et al.*, 2003). When the prime is overt (not masked), however, then only transparent pairs prime, for both French and English. Results like this point to a distinct, modality-specific level of access representation, where all morphologically decomposable surface forms are segmented into potential stems and affixes by a process which is blind to semantic factors, and even to higher order lexical structure.

These localist models, with their decompositional leanings, contrast strongly with current full listing models, which typically assume distributed connectionist accounts of lexical representation and processing. Here the mapping from form to content is implemented as the learned pattern of connections among the elementary units in a multilayer neural network. Nowhere in the system is either the phonological form or the semantic content of the word explicitly represented, except indirectly as a pattern of connections over units. Morphological relations between words, seen as regularities in form–meaning relations, are captured as subregularities in the form-to-meaning mapping process, and are not assigned any independent status in the system. This approach to lexical representation, although it has had some impact in derivational morphology, has had its major influence in the domain of inflectional morphology, to which we now turn.

Regularity and Irregularity in Inflectional Morphology

The clash between localist and distributed approaches to lexical representation has reached its widest audience in the context of the 'words and rules' debate that has flourished in the cognitive sciences since the mid–1980s. This debate has taken English regular and irregular inflectional morphology as its principal empirical focus, as a way of addressing fundamental questions about whether rulelike behavior should be explained in terms of symbolic computation (Pinker, 1999; Pinker and Ullman, 2002), or in terms of connectionist learning systems, containing neither rules nor symbols (Rumelhart and McClelland, 1986; McClelland and Patterson, 2002). The reason why the English past tense is relevant here is because of the sharp contrast that it offers between a potentially rule-based system – the procedure for forming the regular past tense by combining a phonologically unchanged stem with an inflectional suffix (as in *jump/jumped*, *agree/agreed*, etc.) – and an idiosyncratic set of irregular forms where there is no predictable relationship between the stem and its inflected past tense form (as in *bring/brought*, *give/gave*, etc.), and no basis for segmentation of these irregular forms into a concatenative stem + affix format.

Leaving aside issues about the nature of mental computation, which are outside our current remit, this debate has raised basic questions about how morphological regularities are instantiated in a cognitive system and how this system is structured in terms of brain organization. From a no-morphology, single-system point of view, regular morphological phenomena – in this case the process of past tense formation in English – are represented internally as part of a continuous, distributed process where there are no qualitative differences in the representation of simple or complex forms. Not only is there no qualitative distinction between regular and irregular forms, but also there is no separation between different types of morphemes – for example, noun or verb stems as opposed to grammatical morphemes such as the English past tense and plural morphemes. Going along with this single-system view of cognitive organization is a similar view of the underlying neural system – that it too is organized as a single undifferentiated process.

The contrasting approach argues not only that the representational system does make qualitative distinctions between types of morphemes – and between regular and irregular past tense morphology in English – but also that these distinctions are linked to a significant differentiation in the underlying neural machinery. Evidence from neuropsychology (Marslen-Wilson and Tyler, 1998), in the form of selective deficits following injury to the brain, strongly suggests that aspects of the neural systems required to produce and comprehend regular inflectional forms are dissociable from those required for irregular forms (in English). Patients with left hemisphere damage to core language areas often show major

impairments when confronted by regular inflected forms, while their performance is relatively intact for irregular forms.

More recently, a combination of behavioral and neuro-imaging research, both with patients and with unimpaired adults, has made it possible to flesh these claims out in more detail (Tyler *et al.*, 2005). General lexical access processes seem to be mediated by temporal lobe structures, linking sensory inputs to stem-based representations of lexical form and meaning. Additional left hemisphere frontal lobe systems are brought into play, however, when regular inflected forms like *jumped* or *smiled* are encountered, with their characteristic stem + affix structure. Intact left frontal systems, as well as intact pathways connecting frontal and temporal lobes, seem to be required to support the processes of morphophonological parsing triggered by inputs such as *jumped*, where the stem morpheme {jump} enters into temporal lobe access processes but the inflectional morpheme {-d} obligatorily engages left frontal areas. Irregular past tense forms, in contrast, do not have a segmentable stem + affix structure in English, and must be stored and accessed as whole forms. This can largely be handled by temporal lobe access processes, so that performance on irregulars is relatively less impaired by left frontal damage that disrupts the regulars.

This decompositional approach to access and representation is consistent with the behavioral data reviewed in previous sections. There is evidence that complex inflectional and derivational forms are decomposed early in the access process, and that different neural processing streams may be engaged by the different types of morpheme that are involved. However, we are very much at the beginning of the process of understanding the different neural systems involved in the representation and access of complex linguistic forms. But it is likely that these are pointers to how research into human language will develop in the context of a cognitive neuroscience of language, where functional neuro-imaging makes it possible to directly visualize the brain activity associated with different aspects of language function in the morphological and other linguistic domains.

Crosslinguistic Contrasts in Morphological Processes

Both cognitive and linguistic accounts of lexical structure ultimately have to be situated in a universalist context. As other articles in this encyclopedia amply demonstrate, there is an immense variety of lexical arrangements across languages. A relatively new aspect of the cognitive enterprise is the attempt to explore and describe this crosslinguistic variation from a functional perspective. Do we find evidence for common underlying processing principles in lexical organization? The results so far suggest that lexical systems are as notable for the differences in their underlying computational properties as for their similarities.

A language like English, for example, can be described as exhibiting a range of word formation procedures, each of which have their diagnostic behavioral characteristics. Derivational and inflectional processes in English are arguably combinatorial in nature, with the same morpheme combining with other morphemes across a morphological family to create the basis both for meaning and for structure. Thus, the morpheme {dark} in *darkness* is the same lexical and cognitive entity as the {dark} in *darkly*. Similarly, the {-ness} in *darkness* is the same as the {-ness} in *toughness*, with parallel claims being made for regular inflectional processes. The diagnostic behavioral evidence for these claims comes from a specific set of experimental effects – for example, stem priming (where *darkness* primes *dark*), affix priming (where *toughness* primes *darkness*), and so forth (Marslen-Wilson *et al.*, 1994). At the same time, English also has a very productive set of compounding processes, which, in contrast, do not appear to be combinatorial in nature. For example, unlike the derivational case outlined above, shared morphemes between transparent compounds do not lead to priming unless the compounds as a whole are semantically related. Thus *headache* does not prime *headscarf*, even though they both transparently contain the morpheme {head}. This is not consistent with a morphemic, combinatorial story, where {head} is a constituent of *headache* and *headscarf* in the same way that {punish} is a constituent of both *punishment* and *punishable*. Instead, each compound seems to require a separate lexical entry, perhaps reflecting the unpredictability of a compound's meaning from the simple combination of its constituents.

These kinds of behavioral effect can be used to explore how far other languages share similar word formation systems – and therefore similar underlying processing procedures. One case study was for Polish, a Slavic language with an rich morphological system, and which, like English, employs a concatenative derivational morphology, combining stems with sequences of prefixes and affixes. Unlike English, essentially all surface forms are morphologically complex, combining a bound stem with one or more suffixes. Thus the word *przybiegłam* 'I ran up' consists of the stem *-bieg-*, the derivational-aspectual prefix *przy-*, and the inflectional suffixes *-ł* and *-am*,

indicating the past tense and the 1st person singular feminine. A series of studies, chiefly using delayed repetition priming tasks to reduce semantic effects, reveals a profile of results that is very similar overall to English (Reid and Marslen-Wilson, 2003). There is clear evidence of stem and affix priming, and the same strong effects as in English of semantic transparency in overt priming tasks that tap into central representations. The profile of results for the different kinds of priming relationship suggest that Polish and English have a great deal of common in terms of basic morphological mechanisms. Although they are very different languages in important respects, they both fit an overall template that we interpret in terms of a morphemically organized and combinatorial mental lexicon, operating in a similar computational framework.

A valuable typological contrast is provided by Semitic languages, such as Arabic and Hebrew, which possess a complex nonconcatenative morphology, where the surface phonetic form is constructed by interweaving two or more abstract morphemes – the consonantal root, carrying semantic information, and a word pattern which specifies the syntactic category and the phonological structure of the surface form. These are abstract, bound morphemes that never surface as phonetic forms on their own. Do these abstract entities function cognitively in ways comparable to stems and derivational morphemes in concatenative morphologies such as English or Polish? Using a range of behavioral techniques (including both masked and overt priming tasks), extensive research in both Hebrew and Arabic (e.g., Frost *et al.*, 1997; Boudelaa and Marslen-Wilson, 2001) finds evidence for priming between pairs that share the same consonantal root – for example, the Arabic prime word /ʔidxaalun/ ('inserting') speeds responses to the target /duxuulun/ ('entering'), where prime and target have in common the root {dxl}. Strikingly, and quite differently from English and Polish, semantic transparency does not determine priming in either masked or overt priming tasks. Across both types of task, priming is just as strong when the prime is semantically opaque, as in the form /mudaaxalatun/ ('interference'), which also shares the root {dxl} with the target /duxuulun/, but where the meaning of the form is not synchronically predictable. This preservation of overt root priming under conditions of semantic opacity shows up consistently in both Arabic and Hebrew. Analogously to affix priming, priming is also found between pairs that share the same word pattern but have different roots and different meanings – to take an Arabic example, for pairs like /xudˤuuʕun/ and /ħuduuθun/ ('submission'/'happening') which share the word pattern {fuʕuulun}.

These results for Semitic languages suggest strong support for a decompositional, combinatorial system, with abstract morphemes combining to produce the surface form, and being separated out in the process of recognition. The absence of a semantic transparency effect in overt root priming, however, signals a potentially major difference in the principles underlying the role of morphological combination in central lexical representations.

A final set of illustrative comparisons involves Mandarin Chinese. This has essentially no derivational morphology, so that compounding is its only productive means of word formation, under conditions where there is considerable communicative pressure due to rampant homophony at the syllabic level. Indeed, recent analyses suggest that around 70% of word types in Mandarin are disyllabic compounds, which raises the question of whether these are represented as whole forms (as in English), or whether a more combinatorial, morpheme-based account holds here. Mandarin seems to be a plausible environment for such an account, because of the salience of individual morphemes in the spoken language and in the writing system. Extensive research using auditory-auditory repetition priming shows that this is not the case (Zhou and Marslen-Wilson, 1995). Compounds are represented as separate lexical entries, and not as combinations of their constituent morphemes. This means that Mandarin, unlike the other languages we have studied, does not have a system of word formation that is decompositional and combinatorial.

Even within this small sample of languages, we see a wide range of underlying processing procedures brought into play to support lexical representation and processing. Mandarin Chinese seems to lie at one extreme, with apparently no combinatorial procedures for word formation, and with a lexicon made up of whole forms, where the behavioral evidence suggests that compounds and the words that make up these compounds all have separate lexical representations. English has a similar system for compounding, but also has a decompositional system of word formation and representation, reflecting the different processing requirements of derivational procedures that operate on a combinatorial basis, and that deliver predictable and compositional meanings. In this respect English parallels the broad characteristics of a language such as Polish, which has a much richer and more complex morphological system. Both of these languages share with Arabic (and Hebrew) a combinatorial and decompositional approach to lexical representation. In these Semitic languages, however, morphological representation appears to play a more fundamental structural role, so that no surface form can be produced without some

underlying process of morphophonological combination. This delivers both the surface form, and its basic syntactic and semantic properties.

These differences in lexical representation, although reflecting only a preliminary sample of languages, and reflecting a single type of experimental approach, nonetheless suggest that unitary models of the representation and processing of complex lexical forms may not be possible across languages. Although all lexical systems must share the same underlying cognitive and neural constraints on representation, process, and acquisition, these constraints seem to be sufficiently broad to allow different systems to be constructed on apparently quite different organizational principles.

See also: Arabic as an Introflecting Language; Chinese as an Isolating Language; Dual-Mechanism Morphology; Morphology in Parallel Distributed Processing.

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Morphology in Parallel Distributed Processing

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Parallel distributed processing (PDP) is a computational framework for understanding behavior and its brain bases. The approach emphasizes how behavior emerges from the aggregate activity of large numbers of simple neuronlike processing units. The behavior of the system changes over time as it learns from experience, subject to constraints imposed by the architecture of the system. PDP models are the most widely studied type of connectionist network; for brevity the terms PDP and connectionist will be used interchangeably. Such systems have been widely used

underlying process of morphophonological combination. This delivers both the surface form, and its basic syntactic and semantic properties.

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in cognitive science, but their relevance to language has been strongly questioned, largely on the basis of attempts to apply them to morphological phenomena. In 1986 Rumelhart and McClelland described a PDP model of the formation of the past tense in English. They claimed to have demonstrated that language involves the use of PDP networks rather than grammatical rules, and that linguistic phenomena are governed by general rather than domain-specific principles.

Pinker and Prince (1988) contested these claims, identifying many ways in which the model's behavior differed from people's. For example, the model did not generalize well; it was unable to distinguish homophones such as STEEL and STEAL, which have different past tenses (STEELED, STOLE); it exhibited the U-shaped learning curve typical of language learners only because the model's training protocol was engineered to produce it; and so on. Pinker and Prince proposed an alternative, dual-mechanism theory consisting of a past tense rule and a separate lexical system to handle irregular past tenses. Connectionist models, they argued, could be helpful in understanding how these mechanisms are implemented in the brain, but the important linguistic generalizations were to be found at the level of "words and rules" (Pinker, 1999).

Many linguists have found these arguments compelling and consistent with arguments against earlier learning-theoretic approaches to language (Chomsky, 1959). Pinker and his colleagues subsequently amassed a large body of empirical evidence, related to many aspects of the past tense (e.g., acquisition, skilled performance, breakdown following brain injury), that provided additional evidence for his theory (see Pinker, 1999, for summary).

For many connectionists, the Pinker and Prince arguments were less decisive, as they seemed to be about details of the Rumelhart and McClelland model rather than the principles of the connectionist approach. A model is an instantiation of critical components of a theory; limitations on the scope of the implementation guarantee that its behavior will deviate from people's at some level of detail. Whether such deviations are theoretically relevant requires additional research, which Pinker and Prince's critique stimulated.

The PDP Approach to Morphology

According to connectionist theories, the past tense in English, like other aspects of language, is quasi-regular rather than rule-governed (Seidenberg and McClelland, 1989): it is systematic but admits many exceptions, which often share structure with the 'rule-governed' forms. For example, many irregular past tenses end with the correct inflection but have an 'incorrect' vowel (e.g., SLEPT, FOUND); a high percentage of the no-change past tenses such as HIT also end with either /t/ or /d/; most irregular past tenses retain the onset and coda of the present tense, as in the rule-governed forms. These facts are not captured by theories in which the two types of forms are allocated to separate subsystems. Thus, the central claim is that there is no categorical boundary between rule-governed forms and exceptions; they are governed by the same principles, which are general rather than specific to the past tense or to language. And (it is argued), when examined closely the empirical phenomena do not exhibit the strong dissociations between rule-governed forms and exceptions predicted by the dual-mechanism theory.

This approach is different from but also complementary to traditional grammatical theorizing. Connectionist networks are not attempts to rationalize a body of well-formedness data; rather the goal is a mechanistic theory that explains how morphological, linguistic, and other types of knowledge are acquired, used, and represented in the brain. Grammatical theories are seen as abstractions about the behavior of the networks that determine performance, useful for many purposes. The network is not an 'implementation' of any grammatical theory insofar as it behaves in ways not deducible from it.

Modeling Issues

The Pinker and Prince critique launched a large number of attempts to address limitations of the Rumelhart and McClelland model. The model's limited capacity to generalize was related to the coarse way in which phonological information was represented. This representation contributed to errors on novel forms, which require recombining elements of known forms. Improving the phonological representation improves generalization and greatly reduces the number of implausible errors (Joanisse and Seidenberg, 1999; Harm and Seidenberg, 2004).

Similarly, the homophone problem was also easily remedied. Rumelhart and McClelland's model focused on the classic WUG test in which a child hears a nonsense word and produces an inflected form (e.g., plural or past tense). Thus, the model instantiated a mapping from the phonology of the present tense to the phonology of the past tense. Such systems represent homophones identically and therefore cannot learn to produce different past tenses for items such as /sti:l/. Pinker and Prince noted that adding semantic representations to the network would not fix the problem because it does not reliably indicate the

correct inflection; their examples were STRIKE, SLAP, and HIT, which are semantically similar but form the past tense three different ways. Hence, they concluded that PDP networks could not in principle accommodate homophones. However, they overlooked the solution of using both semantics and phonology simultaneously. Joanisse and Seidenberg (1999) implemented such a model. The model encoded phonological regularities that supported generalizations such as WUG-WUGGED; the model learned to use semantics in producing correct irregular past tenses, particularly lower frequency ones, and disambiguating homophones.

Joanisse and Seidenberg's (1999) model exhibits several important features. The model was not purpose-built to produce the past tense; rather, it learned about the sounds and spellings of words and how to perform various tasks: comprehension, mapping from sound to meaning; production, mapping from meaning to sound; transformation, mapping from present tense to past; and others. The well-formedness of the model's output is a function of the degree to which it satisfies semantic and phonological constraints, encoded by the weights on connections between units. The model is not tabula rasa; it is configured with the capacity to encode semantic and phonological information and to learn from experience. This type of model is now the focus of the debate (Pinker and Ullman, 2002).

Empirical Issues

The debate about connectionist models has led to a re-examination of the primary behavioral data thought to favor the dual-mechanism theory. The literature is too extensive to review here, but consider the following examples, which are representative.

Compounding

Kiparsky (1982) observed that rule-governed plurals are dispreferred as modifiers in compounds. Thus, an eater of rats is a RAT-EATER, not a *RATS-EATER. The irregular plural does not seem to be proscribed, however: MICE-EATER is acceptable. These facts seem to support the dual mechanism theory (Pinker, 1994): singular forms such as RAT and irregular forms such as MICE are represented in the lexicon; RATS is generated by rule. RATS-EATER is blocked because the rule governing the formation of inflected words applies after the rule for compounding. Gordon (1985) showed that young children also exhibit this preference pattern.

A great deal has been argued on the basis of examples such as *RATS-EATER and MICE-EATER, but what are the facts? Haskell *et al.* (2003) found that native speakers strongly prefer forms such as RAT-EATER and disprefer forms such as RATS-EATER, but rate MICE-EATER as intermediate in acceptability. Corpus analyses indicated that there is a general dispreference in the language for plural modifiers; both types occur less often than would be expected based on the frequencies of the corresponding singular forms. Haskell *et al.* (2003) proposed that the well-formedness of compounds is a graded function of probabilistic constraints, as in connectionist networks. The two primary constraints are preferences for modifiers that are singular in sound and in meaning. This explains the ordering of the preference data described above; MICE-EATER is intermediate because it satisfies the phonological constraint (it does not sound like a standard plural) but it violates the semantic constraint. Haskell *et al.* extended this analysis to compounds including other forms such as *pluralia tanta*. They also proposed an account of the origin of the constraints (that they are inherited from other forms of modification, principally adjectival phrases) and suggested how they could be acquired based on information available to the child.

Generalization

A strong claim of the dual-mechanism theory is that rule application is blind to phonological and semantic properties of words. An inflectional rule (e.g., past tense, plural) is a default that applies unless it is blocked because the relevant form is an exception stored in lexical memory. However, this generalization is easily violated. Children produce novel past tenses like SPLANG, under the phonological influence of irregular past tenses such as RANG (Bybee and Slobin, 1982). Ramscar (2002) showed that semantic factors influence generalization: in the context of drinking events, adults preferred FRANK as the past tense of FRINK, whereas in other contexts they preferred FRINKED. Thus, generalization is penetrated by information to which the rule component does not have access according to the dual-mechanism theory.

Current Status of the Debate

Although it may be hard to believe that any aspect of the English past tense has not been thoroughly dissected by now, the debate has in fact shifted in a new direction recently: to the brain. Patterson and her colleagues have studied individuals with a form of degenerative neuropathology called semantic dementia (Patterson *et al.*, 2001) in which lexical semantic information progressively deteriorates. These researchers have also studied patients with anterior

(Broca-type) aphasia, for whom semantics is intact but phonology is impaired (Bird *et al.*, 2001). The empirical question, then, is how these different conditions affect knowledge of the past tense. The striking result is that semantic dementia patients first begin to make errors on lower frequency irregular past tenses – the items for which semantic input was necessary in the Joanisse and Seidenberg (1999) model. As the disease progresses, higher frequency irregular past tenses and then eventually rule-governed past tenses are affected. In contrast, the anterior aphasics show greater impairments in generalization than in producing irregular past tenses.

Modeling research is also continuing. One goal is developing models of English embodying the same principles as Joanisse and Seidenberg (1999) but with broader coverage of the phenomena. A second is applying the same principles to more complex inflectional systems. Mirkovič *et al.* (in press), for example, developed a model of Serbo–Croatian that has inflections for number, case, and gender. This inflectional system is difficult to merely describe in rules, given the apparent exceptions and multiple contingencies that appear at every turn. However, it can be instantiated by a connectionist network that learns through exposure to a large number of examples. Plaut and Gonnerman (2000) developed a model of some aspects of infixing in Hebrew utilizing connectionist principles. Although preliminary, this research extends the modeling of inflectional morphology well beyond the overworked English past tense.

Finally, can the same principles be extended to noninflectional morphological phenomena? Seidenberg and Gonnerman (2000) offered some suggesztive observations. They argued that morphological structure emerges from correlations between form (phonology, orthography) and meaning, and that these correlations vary in degree. Morphemes are construed as underlying representations that develop in connectionist networks employing interlevel 'hidden' units. Thus they are graded rather than discrete. This approach seems well suited to classic phenomena (Aronoff, 1976) concerning forms that behave as though they are morphemes but are semantically weak (e.g., MIT in PERMIT, SUBMIT, etc.). Other aspects of derivational morphology also seem compatible with this approach, e.g., the different degrees of semantic transparency and compositionality in formally similar words such as TALKER (high), CORNER (low), and SLIPPER (intermediate). Dealing with this broader range of phenomena, in multiple languages, in an implemented computational system that adequately represents semantic and phonological information is a daunting task, one to send a person tearing back to the English past tense. Still, the relevance of PDP principles to these phenomena seems clear and worthy of further attention.

The past tense debate has struck many linguists as turgid because the English past tense has little of the complexity that inflectional systems can exhibit. However, if PDP-connectionist systems cannot handle even this minor aspect of morphological structure, it would place severe limitations on their relevance to language. It appears that the reports of the inadequacy of this approach were greatly exaggerated, at least regarding the past tense. It remains to be determined whether it can account for the much broader range of morphological and linguistic phenomena that lay beyond.

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Morphology in Pidgins and Creoles

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Introduction

It is often believed that pidgins and creoles have no or very little morphology. Seuren and Wekker, for example (1986: 66), claimed that "morphology [is] essentially alien to creole languages," and in Thomason (2001), a textbook on contact languages, one can read that "[m]ost pidgins and creoles either lack morphology entirely or have very limited morphological resources compared with those of the lexifier and other input languages" (Thomason, 2001: 168; see Degraff, 2001 for more discussion and more pertinent references). Furthermore, it has been claimed that, if there is morphology in pidgins and creoles, it is (for the most part) regular, semantically transparent, iconic, or otherwise unmarked (e.g., Seuren and Wekker, 1986; McWhorter, 1998, 2000; see also Thomason, 2001: 168).

Most recently, there is a growing body of literature on pidgin and creole morphology in which these traditional views are seriously challenged (see, for example, the papers in Plag, 2003a, 2003b, and Kouwenberg, 2003). In the following, we address the traditional claims in more detail and see whether they are borne out by the facts. It will become clear that all of these claims are problematic and need to be abandoned or substantially revised. Overall, we can say that, even though pidgins and creoles seem to have less morphology than their lexifiers, there is indeed morphology in pidgins and creoles, with important differences between individual languages and also between languages of different status (pidgin or creole).

Apart from the questions about the presence and nature of morphology in pidgins and creoles discussed under 'Is There Morphology?' and 'What Kind of Morphology Is There?', the other major issue in pidgin and creole morphology is the question of how morphology arises and develops in pidginization and creolization. What is the role of the languages involved in the particular contact situation and what is the role of universal factors such as markedness and iconicity in the emergence of the pidgin and creole morphological systems? These questions are dealt with in the final section.

Is There Morphology?

Let us first turn to the question of how much morphology we find in pidgins and creoles. To answer that question, it seems necessary to distinguish between pidgins and creoles. It is often assumed that pidgins are morphologically more impoverished than creoles (e.g., Siegel, 2004a on restricted pidgins). However, typological research by Bakker (2003a) has shown that this is probably not the case. Based on a large sample of varieties, Bakker found that pidgins tend to have more, rather than less, inflectional morphology than creole languages. With regard to lexical morphology, Mühlhäusler (1997), for example, argued that rudimentary pidgins rely on syntactic means to expand their lexicon (cf. e.g., *gras belong fes* 'beard' in early Tok Pisin), whereas expanded pidgins develop morphological means as well.

A serious review of the literature on creoles also refutes the claim that there is little or no morphology in these languages. Many creoles have inflectional morphology in their nominal, verbal, or adjectival systems. Pertinent cases from numerous creoles can be found in the overviews by Holm (1988), Stolz (1989), Bakker (2003a), and Baptista (2003). Prominent examples are suffixes encoding plural and/or definiteness on nouns in Kabuverdianu (Cape Verdian Creole) or Palenquero (Baptista, 2003), the long and the short verb forms in some French-based varieties

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to mark tense distinctions or argument/adjunct status of the following NP (e.g., Veenstra (2003) with further references), the transitivity marker *-im/-em* (derived from English third-singular and third-plural pronouns *him/'em*) in Tok Pisin and other Pacific varieties, and the superlative suffix *-st* in Negerhollands (Stolz, 1989).

With regard to lexical morphology, creoles exhibit conversion, affixation, reduplication, and compounding as very common processes. These processes encode semantic categories that we also find in non-creole languages, such as agent, instrument, nomina actionis, intensification, diminutive, causative, resultative, and relational adjective. Overviews of the word-formation processes of specific creoles can, for example, be found in Dijkhoff (1993) for Spanish/Portuguese-based Papiamentu, in Degraff (2001) and Lefebvre (2003) for French-based Haitian Creole, in Braun and Plag (2003) for English-based Sranan, and in Steinkrüger (2003) for Spanish-based Chavacano (Chabacano).

In summary, it is now an established fact that creoles do have morphology, at least to a non-negligible extent. This allows us to turn in more detail to an analysis of the particular characteristics of creole morphology.

What Kind of Morphology Is There?

Given that there is morphology in creoles, two problems emerge. What is the nature of these systems and how do they come about? In this section, we shed light on the first problem. We answer the questions 'What kinds of morphology can be found in pidgins and creoles?' and 'Is pidgin and creole morphology in some sense particularly restricted?'

The first thing that is characteristic of pidgin and creole morphology in general is that it seems to be less rich than that of the lexifier languages, both in terms of formal means and in terms of the functional and semantic categories to be expressed. For example, whereas English has dozens of derivational affixes plus a small number of inflectional categories, English-based creoles generally feature by far fewer affixes (see Braun and Plag, 2003 for Sranan). Haitian Creole has a number of derivational affixes, but the inventory is again much smaller than that of French (Lefebvre, 2003). Note, however, that the inventory of derivational affixes in a creole language is not necessarily limited to a subset of the affixes of the lexifier. Creole languages also exhibit a number of innovations (see below for examples and discussion of the developmental issues involved). But even including the innovations, the total inventory of processes is still smaller than that of the lexifier.

Another type of restriction concerns the kind of processes that we find. In his survey of pidgin morphology, Bakker (2003b) observed that reduplication seemed to be conspicuously absent in the overwhelming majority of pidgins, whereas it was almost universally present in creoles. In contrast, word-class marking morphology was attested only in pidgins, and not in creoles (Bakker, 2003a). The reasons for these findings are largely unclear, but seem to have their origin in the fact that attested pidgins emerged in contact with a much wider range of lexifier languages than creoles, involving more morphologically rich languages (see Bakker, 2003a for more discussion).

Third, the nature of possible form-meaning relationships in creoles is often invoked as an important characteristic of pidgin and creole morphology, such that these languages may generally be characterized by transparent, iconic relationships in their morphological system. As we will shortly see, this is not the case either.

Transparency can be defined as the possibility of inferring a meaning of complex words from the parts of such a word. This means that the complex words must be segmentable into different morphs and that these morphs must be semantically interpretable (cf. e.g., Ronneberger-Sibold, 2001: 98). The belief that there is no semantic opacity in pidgin and creole morphology is fed by the idea that creoles are fairly young languages, so that long-term semantic drift, taken as one of the major factors leading to opacity, has had no chance to apply. McWhorter (1998: 798), for example, wrote that the "semantic irregularity of derivation arises from the inevitable process of semantic drift and metaphorical inference." However, apart from long-term semantic drift, opacity can also arise through various other mechanisms, with borrowing chiefly among them. Plag (2001) and Braun and Plag (2003) therefore argued that opacity is predicted to arise in a language emerging through language contact, such as a creole. In their study of early Sranan complex words, they showed that semantically opaque forms occur frequently even at an early stage of creole development and that the semantic transparency and regularity hypothesis cannot be upheld.

A similar picture emerges with regard to iconicity. Iconicity is a semiotic principle according to which there is a resemblance or analogy between the signifier and the signified. Complexity of meaning should be reflected in complexity of form (e.g., Mayerthaler, 1980). Conversion, for example is non-iconic in the sense that there are two meaning components with only one surface exponent. Plural marking by way of an additional morpheme is iconic because more of form signifies more of content. Reduplication to

express plurality with nouns, or repeated action with verbs, is considered iconic because more of the same form expresses more of the same content (e.g., Sapir, 1921: 79; Botha, 1988: 3). Applying the concept of iconicity to pidgins and creoles yields, however, sobering results. The fact that conversion is one of the most widely employed strategies in pidgins and creoles for deriving new lexemes indicates that iconicity does not play a dominant role in pidgin and creole morphology. With regard to reduplication, we indeed find cases of iconic reduplication, as in *mango-mango* 'many mangoes'. However, Kouwenberg and La Charité (2003) showed that there is also an abundance of productive non-iconic reduplication processes in various creoles. For example, in Ndjuká, reduplication of verbs expresses a stative result (e.g., *bai* 'buy', *bai-bai* 'bought') and in French-based creoles reduplication of adjectives expresses similarity or a diminutive (e.g., *blanch* 'white', *blanch-blanch* 'whitish').

A final characteristic of pidgin and creole morphology has often been claimed to lie in the formal means of expressing concepts. Thus, under the hypotheses of transparency and iconicity mentioned above, one would expect the avoidance of the more marked or less natural morphological encoding strategies such as ablaut, subtractive morphology, root-and-pattern morphology, tonal morphology, or those involving allomorphy. This is, however, not the case. In general, comparatively unmarked strategies such as affixation, conversion, reduplication, and compounding are the predominant processes, but instances of allomorphy are also not uncommon (e.g., in the pronoun systems of creoles), and even tonal morphology is found (Good, 2003; James, 2003). It thus seems that there is in principle no greater limit to the formal power of the morphological system of pidgins and creoles than to that of other languages.

How Does Pidgin and Creole Morphology Emerge?

There are three major sources of morphology in pidgins and creoles. Morphological markers can be taken directly from one of the languages involved in the contact ('borrowing') or they can have developed through grammaticalization. A third possibility is that the markers can be innovated by taking the phonetic/phonological form of a morpheme from one of the input languages (usually the superstrate) and using it in the function (or with the meaning) of a semantically related morphological marker from another input language (usually the substrate). The latter process has been referred to as 'relexification' (e.g., Lefebvre, 1998).

Examples of borrowing are the Spanish suffix-*ndo* in Papiamentu (Dijkhoff, 1993), the plural prefix *ma*-in Palenquero borrowed from Kikongo (Parkvall, 2000: 100), or the past tense marker *-ato* in the Italian-based pidgin lingua franca of the Mediterranean. Note that the form and meaning of the borrowed item are not necessarily totally identical to those of the donor language, which makes borrowing sometimes hard to distinguish from grammaticalization or relexification.

Instances of grammaticalized affixes can be found among preverbal markers, which in many creoles behave like bound morphemes or clitics. For example, in French creoles, *été*, *va*, and *après* grammaticalized to a tense marker *te*, a mood marker *va*, and an aspect marker *ap*. Similarly, the English object pronouns *him/'em* became a transitivity marker *-em/-im* in Pacific pidgins and creoles. It should be noted, however, that many apparent instances of grammaticalization turn out to be cases of substrate transfer or relexification on closer inspection (e.g., Plag, 2002; Siegel, 2004b).

A clear example of relexification is the case markers in Indo-Portuguese (Sri Lanka Creole Portuguese), such as the dative suffix *-pa*, which was derived from the Portuguese preposition *para* 'for'. Bakker (2003a) reported that this creole has the same set of case markers as the input languages Tamil and Sinhala (Singhalese), but all of them derive from Portuguese forms. The markers are used with a purely Tamil function and usually also in a Tamil position. The problem with relexification is, however, that we often do not find a complete mapping of inventory, positions, meanings, and functions of the substrate morphemes onto the superstrate forms (see Lefebvre (2003) and Siegel (2004b) for some discussion).

Generally speaking, it is largely unclear which kind of process – borrowing, grammaticalization, or relexification – is to be expected in a given contact situation. What is clear is that the different processes and their language-specific combinations lead to diverse patterns in the morphology of pidgins and creoles. On the one hand, there are many pidgins and creoles in which none of the lexifier affixes have survived (e.g., Sranan and Saramaccan), whereas on the other hand, there is a set of pidgins and creoles (e.g., Papiamentu and Haitian) that have preserved (or reconstituted) bound morphemes of their input languages. The latter set of languages refutes the claim that the derivational morphemes of the input languages are lost in creolization and are not reconstituted later (cf. Bickerton, 1988: 278; Jones, 1995: 121; Mühlhäusler, 1997: 169; McWhorter, 1998: 798).

The quite divergent morphological systems and phenomena found in pidgins and creoles have given

rise to a lively debate about which forces shape the morphology of these languages. In general, the question of the emergence of structure in pidginization and creolization is among the most hotly debated issues in the field. Universals of first and second language acquisition, transfer or preservation of features from the input languages, and universal linguistic principles of grammar (such as markedness and iconicity) have all been invoked to account for the characteristics of pidgin and creole grammars and lexicons. The investigation of the morphology has yielded no greater consensus among scholars about the influence of these factors than the investigation of other features of these languages.

What is indisputable is that both the socio-historical settings and the structure, availability, and prominence of the languages present in the contact play an important role. Furthermore, as convincingly argued in, for example, Siegel (2004a, 2004b), the diverse cognitive and socio-linguistic processes involved in language contact and language learning must be taken into account, with contact-induced grammaticalization, language transfer, and dialect mixing and leveling chiefly among them.

See also: Grammaticalization; Iconicity; Language Change and Language Contact; Pidgins and Creoles: Overview; Rule Borrowing.

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Morphology: Optimality Theory

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Optimality Theory (OT) is a general approach to modeling human linguistic knowledge (Prince and Smolensky, 2004). OT has had a significant impact on various fields of linguistics, and one of those fields is morphology, the study of word formation. This article discusses how OT provides insight into various morphological phenomena, including affixation, reduplication, and allomorphy. The sections of the article are organized around the several premises of OT that are most directly applicable to morphology: constraint ranking and violability, competition among candidate output forms, faithfulness, and parallelism of evaluation.

Violable Constraints in Morphology

The most important element of OT is constraint violability. Constraints on linguistic forms are ranked in a hierarchy that is specific to each language. A higher-ranking constraint can compel the violation of a lower-ranking one; nonetheless, the violation is always minimal, so no constraint is violated more than is absolute ly necessary to satisfy the constraints that dominate it in the hierarchy. Constraint violability is pervasive in applications of OT, but there are two areas of morphology in which it assumes particular importance: affix location and template morphology.

Affix Location

Alignment constraints demand that the edges of two constituents coincide (McCarthy and Prince, 1993a; Prince and Smolensky, 2004). In particular, a constraint requiring that the left edge of an affix align with the left edge of a word (ALIGN(Afx, L; Wd, L)) or a constraint requiring that the right edge of an affix align with the left edge of a root (ALIGN(Afx, R; Root, L)) will have the effect of declaring this affix to be a prefix. Like all other constraints in OT, alignment constraints are ranked and violable, so an affix's status as a prefix is not absolute it is, rather, contingent on interaction with higher-ranking constraints.

The minimal violation of affix alignment constraints is responsible for several types of infixation. For example, in Timugon Murut (Austronesian, Malaysia), the reduplicative prefix skips over the first syllable if it begins with a vowel (Prentice, 1971), as shown in **Table 1**.

The responsible constraint is ALIGN(RED, L; Wd, L), where RED stands for the underlying form of the reduplicative prefix. This constraint is violated in Timugon Murut because it is dominated by the markedness constraint ONSET (as shown in example 1), which forbids vowel-initial (i.e., onsetless) syllables, as shown in **Table 2**.

(1) ONSET ≫ ALIGN(RED, L; Wd, L)

Table 1 Timugon Murut reduplication

Basic	*Derived*	*Meaning*
bulud	bu-bulud	'hill/ridge'
limo	li-limo	'five/about five'
abalan	a-ba-balan	'bathes/often bathes'
ompodon	om-po-podon	'flatter/always flatter'

Table 2 ONSET ≫ ALIGN(RED, L; Wd, L)

/RED + abalan/	*ONSET*	*ALIGN*
a. ☞ a-ba-balan	*	*
b. a-abalan	**!	

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Morphology: Optimality Theory

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Optimality Theory (OT) is a general approach to modeling human linguistic knowledge (Prince and Smolensky, 2004). OT has had a significant impact on various fields of linguistics, and one of those fields is morphology, the study of word formation. This article discusses how OT provides insight into various morphological phenomena, including affixation, reduplication, and allomorphy. The sections of the article are organized around the several premises of OT that are most directly applicable to morphology: constraint ranking and violability, competition among candidate output forms, faithfulness, and parallelism of evaluation.

Violable Constraints in Morphology

The most important element of OT is constraint violability. Constraints on linguistic forms are ranked in a hierarchy that is specific to each language. A higher-ranking constraint can compel the violation of a lower-ranking one; nonetheless, the violation is always minimal, so no constraint is violated more than is absolute ly necessary to satisfy the constraints that dominate it in the hierarchy. Constraint violability is pervasive in applications of OT, but there are two areas of morphology in which it assumes particular importance: affix location and template morphology.

Affix Location

Alignment constraints demand that the edges of two constituents coincide (McCarthy and Prince, 1993a; Prince and Smolensky, 2004). In particular, a constraint requiring that the left edge of an affix align with the left edge of a word (ALIGN(Afx, L; Wd, L)) or a constraint requiring that the right edge of an affix align with the left edge of a root (ALIGN(Afx, R; Root, L)) will have the effect of declaring this affix to be a prefix. Like all other constraints in OT, alignment constraints are ranked and violable, so an affix's status as a prefix is not absolute it is, rather, contingent on interaction with higher-ranking constraints.

The minimal violation of affix alignment constraints is responsible for several types of infixation. For example, in Timugon Murut (Austronesian, Malaysia), the reduplicative prefix skips over the first syllable if it begins with a vowel (Prentice, 1971), as shown in Table 1.

The responsible constraint is ALIGN(RED, L; Wd, L), where RED stands for the underlying form of the reduplicative prefix. This constraint is violated in Timugon Murut because it is dominated by the markedness constraint ONSET (as shown in example 1), which forbids vowel-initial (i.e., onsetless) syllables, as shown in Table 2.

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Table 2 ONSET ≫ ALIGN(RED, L; Wd, L)

/RED + abalan/	*ONSET*	*ALIGN*
a. ☞ a-ba-balan	*	*
b. a-abalan	**!	

The choice here is whether to reduplicate an onsetless syllable or to skip over it in search of something more promising. Because ONSET is ranked higher, the latter option prevails.

This analysis highlights a difference between OT and parametric theories of language. Parameters are all or nothing, but in OT, a constraint that is violated remains potentially active because the violation is always minimal. Although ALIGN(RED, L; Wd, L) is violated by the winning candidate *a-ba-balan*, it is still active: it rules out the even more poorly aligned **aba-la-lan*; and it bars the gratuitously unaligned **bu-lu-lud*. Furthermore, even the higher-ranked markedness constraint ONSET is active but violated in Timugon Murut because there are onsetless syllables both initially (*abalan*) and medially (*ambilu.o* 'soul'). Onsetless syllables are marked in Timugon Murut – they are avoided in reduplicative copying – but they are not categorically prohibited because ONSET is ranked below constraints requiring faithfulness between input and output. (Faithfulness is discussed in greater detail later.)

Constraints on affixal alignment have also been applied to clitic and affix order restrictions (Anderson, 1996; Hargus and Tuttle, 1997; Legendre, 2000). For example, the position-class morphology of the Athapaskan languages lends itself to a description in terms of constraints of the ALIGN(Afx, R; Root, L) variety. The prefix that is preferentially closest to the verb root is governed by the highest-ranking such alignment constraint; the prefix that is next closest is governed by a constraint that is next in the ranking; and so on.

Alignment constraints are relevant to the prosody-morphology interface as well. For example, ALIGN (Stem, L; PWd, L) requires that the left edge of a stem coincide with the left edge of a phonological word. This constraint is arguably responsible for the resistance to resyllabification that is observed at the left edges of stems in languages such as German. For example, *ab-arbeit-en* 'to work off' is pronounced [ʔap.ʔar.baj.tən] and not *[ʔa.bar.baj.tən].

Template Morphology

Template morphology refers to those cases in which a morphological category is expressed by imposing a particular syllabic structure on an affix or stem. Partial reduplication is the best-known type of template morphology (*see* **Prosodic Morphology**).

For example, in Diyari (Dieri; Pama-Nyungan, Australia), the reduplicative prefix is disyllabic (Austin, 1981), as shown in Table 3. The reduplicative prefix has its own main stress and always ends in a vowel, as do all phonological words of Diyari. These characteristics show that reduplicated forms have the prosodic structure of compounds, consisting of two separate phonological words, $[t^{j}ilpa]_{PWd}$-$[t^{j}ilparku]_{PWd}$. The analytic problem is to explain why the reduplicative prefix contains exactly two syllables, no fewer and no more.

The reduplicative prefix contains **no fewer** than two syllables because it is a phonological word, and all phonological words of Diyari are minimally disyllabic. Such minimal-word effects follow from independently motivated constraints on prosodic structure: For a phonological word to bear stress, it must contain a metrical foot; and metrical feet are preferentially disyllabic because of the foot-binarity constraint FT-BIN. The reduplicative prefix contains **no more** than two syllables because of other prosodic constraints. PARSE-SYLL is violated by any syllable that is not assigned to a foot, as in trisyllabic $(pína)_{Ft}du$ 'old man.' ALIGN(Ft, L; PWd, L) requires every foot to be initial in a phonological word, so it is violated by noninitial feet, as in $(ŋánda)_{Ft}$ $(wàlka)_{Ft}$ 'to close.' Both PARSE-SYLL and ALIGN(Ft, L; PWd, L) are independently motivated in the stress system of Diyari and other languages.

Neither PARSE-SYLL nor ALIGN(Ft, L; PWd, L) expresses a categorical truth of Diyari. Although these constraints affect the size of the reduplicative prefix, they are ranked in a way that does not allow them to affect the stem or any other unreduplicated word. They dominate the reduplicative identity constraint MAX-BR, which is violated by uncopied segments. But they are themselves dominated by the faithfulness constraint that says every input segment must be preserved in the output (MAX-IO, usually just called MAX). Table 4 illustrates these rankings for PARSE-SYLL. Total reduplication (as in Table 4 line b), reproduces the stem's unfooted syllable, thereby

Table 3 Diyari reduplication

Root	*Word*	*Meaning*
ŋama	ŋama-ŋama	'to sit'
kanku	kanku-kanku	'boy'
ku|kuŋa	ku|ku-ku|kuŋa	'to jump'
t^{j}ilparku	t^{j}ilpa-t^{j}ilparku	'bird species'

Table 4 MAX-IO ≫ PARSE-SYLL ≫ MAX-BR

/RED + t^{j}ilparku/	*MAX-IO*	*PARSE-SYLL*	*MAX-BR*
a. ☞ $[(t^{j}ilpa)_{Pt}]_{PWd}$-$[(t^{j}ilpar)_{Pt}\ ku]_{PWd}$		*	***
b. $[(t^{j}ilpar)_{Pt}ku]_{PWd}$-$[(t^{j}ilpar)_{Pt}\ ku]_{PWd}$		**!	
c. $[(t^{j}ilpa)_{Pt}]_{PWd}$-$[(t^{j}ilpa)_{Pt}]_{PWd}$	***!		

adding a PARSE-SYLL violation. Shortening the stem (as in Table 4 line c), offers another way of satisfying MAX-BR, but it does so at the expense of deleting input material, thereby violating top-ranked MAX-IO. The best option under this ranking is partial reduplication (as in Table 4 line a): It preserves the input stem and accepts a less than perfect copy as the price of avoiding an unfooted syllable.

Timugon Murut and Diyari illustrate a consequence of OT known as emergence of the unmarked (McCarthy and Prince, 1994). Marked structures, such as onsetless or unfooted syllables, may be present in the language as a whole but systematically avoided under certain conditions, some of which can be characterized morphologically. The emergence of the unmarked follows from OT's basic structure: Through ranking, a markedness constraint can be active in a language even when it is not generally obeyed. ONSET in Timugon Murut and PARSE-SYLL and ALIGN (Ft, L; PWd, L) in Diyari are examples of emergent markedness constraints.

Candidate Competition in Morphology

Because constraints are violable in OT, the output of the grammar need not be, and almost never is, perfect in the sense that it obeys all the constraints. Rather, the output is that member of a set of competing candidates that best satisfies the constraint hierarchy of the language in question. An OT grammar therefore chooses from among a set of competitors. Candidate competition offers new insights into many phenomena, among them allomorphy and haplology.

Allomorphy

In generative phonology, it is standard to assume that a morpheme's surface alternants are derived by regular phonological processes from a single underlying representation. There are cases, however, in which this assumption does not hold up. In Catalan (Catalan-Valencian-Balear), for example, the personal article has two forms, *en* before a consonant and *l* before a vowel: *en Wittgenstein*, *l'Einstein*. The surface alternants *en* and *l* cannot be derived from a single underlying form by regular phonological processes – they are simply too dissimilar. Nonetheless, the distribution of the alternants makes sense phonologically, as shown by comparing candidates: *en Wittgenstein* avoids **l'Wittgenstein*'s initial *lw* cluster, and *l'Einstein* avoids **en Einstein*'s initial onsetless syllable. This phenomenon is called phonologically conditioned allomorphy.

The analytic problem presented by allomorphy is this: how can the unpredictability of the allomorphs be reconciled with the predictability of their distribution? The approach to allomorphy developed in OT combines an old idea with a new one. The old idea is that the allomorphs are lexically listed as suppletive alternants (Hudson, 1974). The Catalan personal article has two underlying forms, /l/ and /en/, or /{en, l}/ for short. The new idea is that the same markedness constraints that are responsible for regular phonological processes also choose among the alternants (see Kager, 1996; Mascaró, 1996; Tranel, 1996; Bresnan, 2001; and additional references cited in McCarthy, 2002: 183). The winning candidate is the one that best satisfies the markedness constraints as ranked in the language in question.

Table 5 $*[_{\sigma}lC \gg$ ONSET

/{en, l}+ Wittgenstgein/	$*[_{\sigma}lC$	ONSET
a. ☞ en Wittgenstein		*
b. l'Wittgenstein	*!	

The Catalan constraint hierarchy must favor *en Wittgenstein* over **l'Wittgenstein* as output from /{en, l}-Wittgenstein/. This is accomplished if the constraint against syllable-initial *l*C clusters is ranked above ONSET, as shown in Table 5. The prohibition on syllable-initial *lw* is part of a more general limitation on permissible onset clusters, but for our present purposes it is enough to use the *ad hoc* constraint $*[_{\sigma}lC$. With a vowel-initial stem, such as /{en, l}-Einstein/, the constraint $*[_{\sigma}lC$ is satisfied by both candidates, so ONSET is decisive, correctly favoring *l'Einstein*.

Rule-based or process theories of phonology and morphology emphasize mechanisms of derivation: A rewrites as B in context C. This perspective is unhelpful in allomorph selection, where the mechanism of derivation is trivial, because the allomorphs must be lexically listed. OT, on the other hand, is inherently comparative, using a constraint hierarchy to select the right output from a range of options. Because outputs are chosen comparatively rather than derived by rule, it is possible through ranking for the same constraint to be responsible for allomorph selection in one language and infixation or epenthesis in another. As we have seen, ONSET is an example of such a constraint.

Haplology

In haplology, an affix is absent in a context that is phonologically identical (or similar) to it, for example, /boy-s_{PL}-s_{GEN}/ → *the boys' books*, **boys's*; /Moses-s_{GEN}/ → *Moses' descent from Mt. Sinai*, **Moses's*. An adequate theory of haplology must answer two questions: what causes haplology, and how can an entire affix go missing?

Haplology is to morphology what dissimilation is to phonology. The contextual conditions that encourage haplology – identical or similar speech sounds in close proximity – are the same as those that trigger dissimilation. The only real difference is in what is affected and how. Haplology affects morphemes, which then disappear, whereas dissimilation affects segments, which then change. An example of dissimilation is Latin /popula:lis/ → [popula:ris] 'of the people' (cf. [re:ga:lis] 'royal').

Work in OT supports the idea that the same constraints are responsible for both processes (Russell, 1997; Plag, 1998; Gouskova, 2003). The juxtaposition of identical or similar segments is a marked structure, actively avoided in many languages. Constraints against such structures can force phonological dissimilation or morphological haplology, depending on how they are ranked. The competition between *Moses'* and **Moses's* is abstractly the same as the competition between *popula:ris* and **popula:lis*; in both cases, a markedness constraint forbidding sequences of nearby identical segments is decisive.

Dissimilatory markedness constraints therefore answer for the 'why' of haplology. As for the 'how,' the key insight is that the final [əz] of *Moses'* is doing double duty, serving as part of the root *Moses* and as the genitive suffix (Russell 1997; de Lacy 1999). Haplology, then, is fusion or overlap of morphemic exponence. In haplologized *Moses*,' both root and suffix are fully present, but they use the same segmental material. The competitor **Moses's* avoids this overlap, but at a cost in segmental markedness. When the dissimilatory markedness constraint is ranked higher than the constraint against overlap, the haplologizing candidate wins.

Allomorphy and haplology illustrate the virtue of OT's inherently comparative nature. OT takes the focus off operations and puts it on outcomes. ONSET is as relevant to allomorph selection in Catalan as it is to determining placement of the reduplicative prefix in Timugon Murut. At the operational level, these phenomena are as different as could be, but at the level of comparing candidates, this similarity emerges. Likewise, haplology and dissimilation are operationally distinct, but both reflect similar markedness pressures that become apparent when candidates are compared.

Faithfulness in Morphology

A unique aspect of OT is the idea of faithfulness: the existence of a set of constraints that require identity between the input and output. Faithfulness constraints are generally antagonistic to markedness constraints; the former support lexical contrasts, whereas the latter resist them. A phonological process, such as final devoicing in German /bund/ → [bʊnt] 'federation,' reflects the crucial ranking of a markedness constraint above a faithfulness constraint, favoring an unmarked output structure over fidelity to the input structure.

There have been several proposals to incorporate morphological notions into faithfulness constraints: root and affix faithfulness, morphological polarity and subtraction as antifaithfulness, and constraints on morpheme realization.

Root and Affix Faithfulness

Distinct faithfulness constraints protect distinct properties of the input. For example, MAX requires every input segment to appear in the output, thereby forbidding deletion. DEP, on the other hand, requires every **output** segment to appear in the **input**, so epenthesis violates DEP. The various IDENT(feature) constraints forbid segments from changing their distinctive feature values in the input-output mapping.

Faithfulness constraints are also distinguished by the type of morpheme to which they apply (McCarthy and Prince, 1995, 1999; Beckman, 1999). MAX_{Root} and $\text{MAX}_{\text{Affix}}$ are separate and therefore separately rankable constraints. MAX_{Root} is violated by the deletion of root material and $\text{MAX}_{\text{Affix}}$ by the deletion of affixal material. There is a similar division of the DEP and IDENT(feature) constraints. Universally, MAX_{Root} is ranked higher than $\text{MAX}_{\text{Affix}}$, so roots will in general be treated at least as faithfully as affixes and sometimes more faithfully.

Two sorts of evidence support the distinction between root and affix faithfulness constraints and the universally fixed ranking between them. Evidence from phonological inventories shows that languages often permit certain marked structures to appear in roots but not in affixes. In Arabic, for example, the marked uvular and pharyngeal consonants /χ, ʁ, ħ, ʕ/ are found in roots but never in affixes, which are limited to less-marked consonants such as /t, n, m/. Similarly, in the Cuzco Quechua language of Peru, consonants that are marked by virtue of glottalization or aspiration are allowed in roots but not affixes (Parker and Weber, 1996). In general, if the segments that violate some markedness constraint M are allowed in roots but not affixes, then the language in question must have the ranking $\text{Faith}_{\text{Root}} \gg \text{M} \gg \text{Faith}_{\text{Affix}}$,. In this way, affixes will consistently obey M, but roots need not.

Evidence from phonological alternations also supports the $\text{Faith}_{\text{Root}}/\text{Faith}_{\text{Affix}}$ dichotomy. In Finnish, for example, affix vowels assimilate in backness to a root vowel, but the vowels within a root need not

agree with one another in backness. This means that the markedness constraint that compels vowel assimilation is ranked below IDENT(back)$_{Root}$ and above IDENT(back)$_{Affix}$. Sometimes such effects are preferential rather than absolute. In Emai (Emae; Benue-Congo, Nigeria; Casali, 1998), hiatus is resolved by deleting one of the two adjacent vowels: /... $V_1 + V_2$.../ → [... V_1...] versus [... V_2...]. Whether V_1 or V_2 deletes is determined by the status of the morphemes they belong to: If one is a content morpheme (a root) and the other is a functional morpheme (an affix), then the vowel of the functional morpheme is deleted; otherwise, if the morphemes are of equal status, the morpheme-final vowel V_1 is dropped. The preference for deleting affixal vowels is expressed by the universal ranking MAX$_{Root}$ ≫ MAX$_{Affix}$, although even MAX$_{Root}$ must be violated if a hiatus is produced by the juxtaposition of two roots.

Polarity, Subtraction, and Antifaithfulness

A rather more controversial idea is antifaithfulness, the claim that there is a class of constraints that is obeyed only when a faithfulness constraint is violated (Horwood, 1999; Alderete, 2001a, 2001b). Antifaithfulness constraints have been applied to two of the most thorny problems in morphology, polarity switching and subtraction.

In effect, antifaithfulness constraints say, 'Be different!' and so they are rather well suited to morphological distinctions that involve the reversal of a phonological contrast. For example, in Luo (Nilotic, Kenya), plurality is marked *inter alia* by reversing the voicing of a stem-final obstruent (Gregersen, 1974), as shown in Table 6. The antifaithfulness constraint ¬IDENT(voice) is obeyed when a consonant in the plural disagrees in voicing with its counterpart in the singular. If it is ranked above the faithfulness constraint IDENT(voice) and if other analytic details are attended to, then the final consonant of the plural stem will invert the voicing of its counterpart in the singular.

There are two main types of subtractive morphology: templatic and truncating. In templatic subtractive morphology, the amount of the original stem that remains is constant throughout the morphological category. For example, the vocative forms of personal names in Yapese (Austronesian, Micronesia) are formed by dropping everything except the initial consonant–vowel–consonant sequence (Jensen, 1977), as shown in Table 7. The templatic target in Yapese is the minimal word of the language, and so subtractive morphology of this type is analyzed in the same way as Diyari reduplication.

In truncating subtractive morphology, on the other hand, the amount of the original stem that is dropped is what remains constant. For example, in Koasati (Muskogean, Louisiana and Texas) a class of verbs pluralize by dropping the rhyme (i.e., everything except the onset) of the last syllable in the stem (Kimball, 1986), as in Table 8. In antifaithfulness terms, this type of subtractive morphology is a consequence of the constraint ¬MAX-V, which is satisfied only by candidates in which at least one vowel has been deleted. Additional constraints ensure that truncation occurs at the right edge of the stem and that it also affects a stem-final consonant.

Morpheme Realization Constraints

Occasionally, a language will deviate from its regular phonotactic patterns in a particular morphological category but nowhere else. This phenomenon is usually associated with subsegmental morphology, in which a morpheme consists of one or two distinctive feature values that constitute less than a full segment. Subsegmental morphemes are realized phonologically by autosegmental association with a segment of the stem to which they are affixed (Goldsmith, 1979; Lieber, 1987; Zoll, 1998).

For example, in Javanese (Austronesian, Java and Bali), the morpheme that marks the elative (comparative and superlative) adjective consists of the distinctive feature values [+high, +tense]. This morpheme is associated autosegmentally with the final vowel of the stem (Dudas, 1976), as shown in Table 9. The final vowel of the elative combines the rounding

Table 6 Luo voicing reversal

Singular	*Plural*	*Meaning*
bat	bed-e	'arm/arms'
luθ	luð-e	'walking stick/sticks'
tʃogo	tʃok-e	'bone/bones'
owadu	owet-e	'brother/brothers'

Table 7 Yapese templatic subtraction

Personal name	*Vocative*
luʔag	luʔ
baja:d	baj
maŋɛ:fɛ:lʔ	maŋ

Table 8 Koasati truncating subtraction

Singular	*Plural*	*Meaning*
latáf-ka-n	lát-ka-n	'to kick something'
ataká:-li-n	aták-li-n	'to hang something'

feature of the underlying vowel and the [+high, +tense] features of the elative morpheme, so, for example, /a/ becomes [i] and /ɔ/ becomes [u].

The morphology of the elative interacts in an interesting way with the general phonology of Javanese. In the language as a whole, the tense high vowels /i/ and /u/ are regularly replaced by their lax counterparts [ɪ] and [ʊ] in syllables that are closed by a consonant: /tulis/ → [tulɪs] 'write' (cf. [nulis-i] 'write (LOC)'). Elative forms such as *aŋil* and *abut* are remarkable for having a tense high vowel in a closed syllable, thereby breaking this otherwise inviolate phonotactic generalization of this language.

In a theory where constraints are violable under crucial domination, no phonotactic generalization is necessarily inviolate. The phonology of Javanese as a whole shows that the markedness constraint prohibiting tense vowels in closed syllables, *tnsC]$_\sigma$, is ranked above the antagonistic faithfulness constraint IDENT(tense), as shown in (5). This ranking produces alternations such as *tul*ɪs versus *nulis-i*, as shown in Table 10. The constraint *tnsC]$_\sigma$ is crucially dominated, however, by a special kind of faithfulness constraint that demands the realization of a morpheme that would otherwise disappear entirely (Samek-Lodovici, 1993; Gnanadesikan, 1997; Kurisu, 2002). This constraint, called MORPH-REAL, forces the appearance of a tense vowel in a closed syllable when the alternative is the total disappearance of the subsegmental [+high, +tense] elative morpheme. The ranking is shown in Table 11. Additional constraints rule out other candidates, such as **abt*, where the [+high] and [+tense] features of the elative morpheme are decoupled.

In the emergence of the unmarked, marked structures that are permitted in the language as a whole are forbidden in some limited situations, such as the reduplicative prefixes of Timugon Murut and Diyari. The Javanese elative is, in a sense, the antithesis of that: the marked structure is forbidden in the language as a whole but permitted under specific conditions. The difference follows from the interaction of markedness and faithfulness constraints through ranking. In the emergence of the unmarked, the general faithfulness constraint (e.g., MAX-IO) is ranked above the emergent markedness constraint, thereby limiting its force. In cases such as Javanese, however, the markedness constraint dominates the general faithfulness constraint, but it is overridden only in those circumstances where the more specific faithfulness constraint MORPH-REAL is relevant.

Table 9 Javanese elative

Adjective	*Elative*	*Meaning*
rame	rami	'noisy'
aŋɛl	aŋil	'hard, difficult'
laraŋ	lariŋ	'high in cost'
alʊs	alus	'refined, smooth'
rosɔ	rosu	'strong'
abɔt	abut	'heavy, hard'

Table 10 *[+tense]C]$_\sigma$ ≫ IDENT(tense)

/tulis/		**[+tense]C]$_\sigma$*	*IDENT(tense)*
a.	☞ tulɪs		*
b.	tulis	*!	

Parallelism in Morphology

OT permits, but does not strictly require, a 'flat' derivation, in which the grammar evaluates fully formed output candidates that show the effects of various phonological and morphological processes simultaneously. This parallel view of OT is distinct from the serial derivation of rule-based theories. In its strongest form, parallel OT maps a morphosyntactic input representation directly to the surface form of an utterance. Some implementations of OT are more weakly parallel, positing separate constraint hierarchies for, say, word phonology and phrase phonology (see, e.g., Roca, 1997; Hermans and van Oostendorp, 1999; and the references in McCarthy, 2002: 185).

In a strictly modular, serial theory, all morphology precedes all phonology. If morphology and phonology occur in parallel rather than sequentially, however, then it is possible for derived phonological structure to influence the morphology. Two phenomena that exhibit this behavior are allomorph selection and reduplication.

Parallelism in Allomorph Selection

When allomorphy is phonologically conditioned, the choice of allomorph can be based on the surface phonology rather than the underlying representation of the stem. English supplies a nearby example. The indefinite article has two allomorphs, *a* and *an*. The allomorph *a* is favored preconsonantally by the constraint NO-CODA, which expresses the universal

Table 11 MORPH-REAL ≫ *[+tense]C]$_\sigma$ ≫ IDENT(tense)

/abɔt+ [+high, +tense]/		*MORPH-REAL*	**[+tense]C]$_\sigma$*	*IDENT(tense)*
a.	☞ abut		*	*
b.	abɔt	*!		

markedness of syllables that end in consonants: **an book*. The allomorph *an* is favored prevocalically by ONSET: **a apple*. Clearly, the choice of *a* versus *an* in English bears a more than passing resemblance to the Catalan example discussed earlier.

The selection of *a* and *an* is determined by the surface form of the following word, not its underlying form. In English, underlying /h/ deletes in an unstressed syllable, leading to [h] ~ Ø alternations for some speakers: [hˈɪstəɹiː] *history* versus [ɪstˈɔɹɪkəl] *historical*. Those speakers who have an *h*-less pronunciation of *historical* will most naturally use the *an* allomorph with it: *an historical fact*. Allomorph selection is here being determined by the surface rather than the underlying form, as expected if morphology and phonology take place simultaneously. In a strictly modular theory, allomorph selection could not be affected by the surface properties of syllabification because the syllabification would not yet have been determined at the point in the derivation when the allomorph must be chosen. Modular theories may adopt work-arounds for this problem, such as hanging on to both allomorphs until late in the phonological derivation, but such moves seem more to embarrass than support strict modularity.

Parallelism in Reduplication

There is considerable evidence that reduplication requires access to surface phonological representation. This evidence suggests that the contents of the reduplicative copy are determined in parallel with the surface phonology, and an approach to reduplication in OT has been worked out along these lines (McCarthy and Prince, 1995, 1999).

For example, in Malay (Austronesian, Malaysia), a sequence of vowels and glides following a nasal consonant becomes nasalized (Onn, 1976; Kenstowicz, 1981): /mahal/ → [mãhãl] 'expensive'; /mawas/ → [mãw̃ãs] 'a type of monkey.' As shown in Table 12, this process interacts in an interesting way with reduplication. For expositional purposes, the [w̃ã] syllables of the first example will be referred to as $\tilde{w}\tilde{a}_1$ and $\tilde{w}\tilde{a}_2$: $\tilde{w}\tilde{a}_1\tilde{ŋ}\tilde{ı}$-$\tilde{w}\tilde{a}_2\tilde{ŋ}\tilde{ı}$. The syllable $\tilde{w}\tilde{a}_2$ is nasalized for purely phonological reasons, because it is preceded by the nasal consonant [ŋ]. $\tilde{w}\tilde{a}_1$'s nasalization cannot be explained phonologically, however, because nasality never spreads to the left in Malay: /tahan/ → [tahan] 'withstand,' *[tãhãn]. Rather, $\tilde{w}\tilde{a}_1$ is nasalized because it is a copy of $\tilde{w}\tilde{a}_2$, and $\tilde{w}\tilde{a}_2$ is nasalized. In other words, the reduplicative prefix both triggers the nasalization in $\tilde{w}\tilde{a}_2$ and copies that nasalization.

If reduplication and phonological processes such as nasalization take place in parallel, this kind of behavior is fully expected. Let SPREAD-R(nasal) stand for the markedness constraint that, by dominating IDENT-IO(nasal), forces rightward assimilation of nasality. The overapplication of nasalization seen in reduplicated words shows the effect of IDENT-BR(nasal), a member of the family of constraints introduced in the discussion of Diyari. Table 13 shows how these constraints dispose of the relevant candidates. In keeping with OT's parallel orientation, the output candidates are finished products, showing the results of both nasalization and reduplication. Table 13, candidate b, would be expected on purely phonological grounds, but it is ruled out because it has a fatal disparity in nasalization of *wa* between the reduplicative copy and the stem. Table 13, candidate c's, problem is the failure to conform with the basic phonology of nasalization in Malay because nasality has not spread as far to the right as it can. The winner, then, is Table 13, candidate a, in which the reduplicative prefix both triggers and copies nasalization in the following root.

Table 12 Malay reduplication

Root	*Word*	*Meaning*
waŋĩ	**w̃ã**ŋĩ-w̃ãŋĩ	'odor/many different odors'
hamə̃	**hã**mə̃-hãmə̃	'germ/pl.'
aŋãn	**ã**ŋãn-ãŋãn	'to daydream/id.repeatedly'

Table 13 Overapplication in Malay

/RED + waŋi/	IDENT-BR (nasal)	SPREAD-R (nasal)	IDENT-IO (nasal)
a. ☞ w̃ãŋĩ-w̃ãŋĩ			***
b. waŋĩ-w̃ãŋĩ	**!		***
c. waŋĩ-waŋĩ		**!	*

Conclusion

This article has described various ways in which properties of Optimality Theory can offer new insight into some old morphological problems. Readers should not, however, come away with the view that these are now settled questions. OT is an area of ongoing research and lively debate. Although some aspects of OT are essential to this theory – for example, constraint violability and ranking, candidate competition, and the existence of faithfulness constraints – others are not; and indeed some – such as antifaithfulness and strong parallelism – are quite controversial. For this reason, the main emphasis has been placed on understanding the theory behind OT and the inferences and implications that can be

derived from it. Morphology is one of many areas where OT has offered and will no doubt continue to offer new and surprising insights.

See also: Affixation; Autosegmental Phonology; Dissimilation; Internal Modification; Metrical Phonology; Phonology: Optimality Theory; Prosodic Morphology; Reduplication; Subtraction; Suppletion; Syllable: Phonology; Template Morphology.

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Morphology: Overview

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Morphology is concerned with the relationship between the form of a word and its meaning. For example, if we consider the words *manage, manages, managed, managing, management, manager,* and *managerial* we find that there is a common core of meaning corresponding to the meaning of *manage*, and if we consider the words *managing, obliging, refusing, seeking,* and *teaching,* there is also a common element of meaning (even if it may be quite difficult to specify that meaning precisely) that is reflected in the recurrent *-ing*.

Etymologically, the term *morphology* seems to indicate the study of forms, though it can be seen from the preceding that form alone does not provide an object of study within morphology. Morphologists are not interested in the fact the word *notable* might be considered to contain the orthographic forms *no* and *table* because neither *no* nor *table* as a unit provides any meaning that can be found in *notable*. It is where form and meaning reflect each other directly, either because a certain formal sequence can be seen as being regularly correlated with a particular meaning (as in the examples above) or because there is a regular patterning of semantic relationships, and a particular form can be seen as filling a cell in the pattern. Thus, *worse* is taken to be in the same relationship to *bad* that *bigger* is to *big* or *frailer* is to *frail*, not because of any regularity of form but because of the equivalence of the cells in the pattern or *paradigm*.

Since morphology is concerned with form, it is related to the study of phonology (*see* **Morphophonemics**), and since it is concerned with meaning, it is related to the study of semantics. It is also related to the study of syntax in that many of the meanings that find expression in morphology are related to syntactic function: for example, the comparative, past tense and present participles illustrated above. Morphology is also related to lexis in that morphological patterns can be used in the creation of new lexical items, as illustrated by *manager* and *management* above. This 'cross-road' (Kastovsky, 1977) nature of morphology means that it has been open to influence from phonological and syntactic theories, as well as to changing ideas about the nature of the lexicon. All this is reflected in morphological theorizing.

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Morphology is often viewed in terms of the operations that apply to simpler units (like *manage*) to create more complex ones (like *manager* and *managerial*). This view of morphology is reflected in the articles in this encyclopedia on affixation, backformation, neoclassical compounding, conversion, incorporation, internal modification, morphotactics, and reduplication. It can also be viewed through the notion of related sets of words like *go, went, going,* etc. This is reflected in the article on paradigm.

There are also various problems inherent in morphological study, which are discussed in the articles for inflection and derivation, lexicalization, morpheme, productivity, suppletion, and syncretism. Theoretical approaches to morphology are discussed in a-morphous morphology, autosegmental phonology, declarative morphology, distributed morphology, lexeme-morpheme based morphology, lexical phonology and morphology, onomasiological theory of word-formation, optimality theory in morphology, paradigm function morphology, seamless morphology, sign-based morphology, syntax of words, and template morphology.

Morphological typology and linguistic universals are discussed in some of the articles mentioned above, but also in the articles on morphological typology and morphological universals, and the articles on Arabic as an introflecting language, Chinese as an isolating language, Finnish as an agglutinating language, Italian as a fusional language, and Central Siberian Yupik as a polysynthetic language.

Other aspects of morphology are discussed in acquisition of morphological knowledge during the school years, clitics, dictionaries and inflectional morphology, folk etymology, history of morphology, metathesis in morphology, morphology and language processing, morphology and word formation in corpus linguistics, morphology in pidgins and creoles, splinters, subtraction, and word.

See also: A-Morphous Morphology; Autosegmental Phonology; Distributed Morphology; Language Policies: Policies on Language in Europe; Lexeme-Morpheme-Based Morphology; Lexical Phonology and Morphology; Morphology: Optimality Theory; Onomasiological Theory of Word Formation; Paradigm Function Morphology; Sign-Based Morpology; Syntax of Words; Template Morphology; Whole Word Morphology.

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Morphophonemics

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Morphophonemics

Morphophonemics (henceforth MP) is an area of considerable complexity. The basic subject matter is easy to grasp; the ways of treating it in linguistic and psycholinguistic theory are what generate the complexity. All MP is a problem for (structural) linguistics, for reasons that will be spelled out below. As an instance of an MP problem, consider the fact that, in English, the word *nature* 'changes' its pronunciation when the suffix *-al* is added; the vowel of the first syllable of *natural* is short, low, and not a diphthong, unlike the corresponding one in *nature*. The scare-quotes around the word 'changes' hint at one of the problematic issues that will be dealt with below. It must be emphasized at the outset that there is no single agreed approach to MP among linguists, and much remains very controversial. It is therefore impossible to avoid a substantial amount of technicality in this article. The term 'morphophonemics' is used in a broader and a narrower sense (the former including the study of phonetically driven regular correspondences or alternations), and it is used in the broader sense here. The range of phenomena that might be covered can best be seen in Dressler (1985: 316–317); MP might include 'changes' in the form of morphemes that may be described by phonetically natural or unnatural rules, by rules that effect fusion between adjacent phonemes or do not, by rules that are subject to grammatical or lexical limitations on their applicability, and by rules describing correspondences that are phonologically unnatural or mere historical residues (Carstairs-McCarthy, 1983: 237–238). An attempt has been made to find a middle way through the competing terminologies used for the phenomena and constructs of MP without dwelling on the differences. The best comprehensive, well-exemplified, introductory survey of MP as a field is Matthews (1991: Chap. 8).

Languages show a great deal of typological difference with respect to MP. Some languages have an immense number of such phenomena, for instance classical Sanskrit and Latin, the Celtic languages, and some Amerindian languages such as Tübatulabal and Yawelmani Yokuts. At the other extreme, there is remarkably little in the indigenous languages of Australia. Others show next to none; a case in point is Vietnamese, it is often claimed. However, even these preliminary comments are problematic, for the very definition of MP, and therefore of what is an instance of it, is linked to the theoretical assumptions one makes. 'Classical Morphophonemics' and 'Post-Structuralist Approaches' of this article roughly follow the historical order of developments within the subject since the 1930s.

The Place of Morphophonemics Within Linguistics

MP is an area of study that sits astride the boundary between the major subdisciplines of phonology and orthography on the one hand and grammar and the lexicon on the other. Its subject matter concerns the fact that the same grammatical or lexical information may be encoded in different ways, phonologically and orthographically, though there are cases of such multiple encoding that are not in the domain of MP as usually understood (see the mention of suppletion below). MP is a phonological and/or orthographical matter in that it studies variation in the spoken or written shape of words, or, more strictly, of individual morphemes (*see* **Morpheme**). It is a grammatical matter in that some, but by no means all, of such variation is a consequence of placing individual words together in grammatically organized structures; and a lexical one in the sense that some of the variation found is a consequence of structuring complex lexical items out of individual morphemes. MP therefore has as its basis the comparison of (1) the shapes that words/morphemes have in different grammatical and lexical

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Morphophonemics

Morphophonemics (henceforth MP) is an area of considerable complexity. The basic subject matter is easy to grasp; the ways of treating it in linguistic and psycholinguistic theory are what generate the complexity. All MP is a problem for (structural) linguistics, for reasons that will be spelled out below. As an instance of an MP problem, consider the fact that, in English, the word *nature* 'changes' its pronunciation when the suffix *-al* is added; the vowel of the first syllable of *natural* is short, low, and not a diphthong, unlike the corresponding one in *nature*. The scare-quotes around the word 'changes' hint at one of the problematic issues that will be dealt with below. It must be emphasized at the outset that there is no single agreed approach to MP among linguists, and much remains very controversial. It is therefore impossible to avoid a substantial amount of technicality in this article. The term 'morphophonemics' is used in a broader and a narrower sense (the former including the study of phonetically driven regular correspondences or alternations), and it is used in the broader sense here. The range of phenomena that might be covered can best be seen in Dressler (1985: 316–317); MP might include 'changes' in the form of morphemes that may be described by phonetically natural or unnatural rules, by rules that effect fusion between adjacent phonemes or do not, by rules that are subject to grammatical or lexical limitations on their applicability, and by rules describing correspondences that are phonologically unnatural or mere historical residues (Carstairs-McCarthy, 1983: 237–238). An attempt has been made to find a middle way through the competing terminologies used for the phenomena and constructs of MP without dwelling on the differences. The best comprehensive, well-exemplified, introductory survey of MP as a field is Matthews (1991: Chap. 8).

Languages show a great deal of typological difference with respect to MP. Some languages have an immense number of such phenomena, for instance classical Sanskrit and Latin, the Celtic languages, and some Amerindian languages such as Tübatulabal and Yawelmani Yokuts. At the other extreme, there is remarkably little in the indigenous languages of Australia. Others show next to none; a case in point is Vietnamese, it is often claimed. However, even these preliminary comments are problematic, for the very definition of MP, and therefore of what is an instance of it, is linked to the theoretical assumptions one makes. 'Classical Morphophonemics' and 'Post-Structuralist Approaches' of this article roughly follow the historical order of developments within the subject since the 1930s.

The Place of Morphophonemics Within Linguistics

MP is an area of study that sits astride the boundary between the major subdisciplines of phonology and orthography on the one hand and grammar and the lexicon on the other. Its subject matter concerns the fact that the same grammatical or lexical information may be encoded in different ways, phonologically and orthographically, though there are cases of such multiple encoding that are not in the domain of MP as usually understood (see the mention of suppletion below). MP is a phonological and/or orthographical matter in that it studies variation in the spoken or written shape of words, or, more strictly, of individual morphemes (*see* **Morpheme**). It is a grammatical matter in that some, but by no means all, of such variation is a consequence of placing individual words together in grammatically organized structures; and a lexical one in the sense that some of the variation found is a consequence of structuring complex lexical items out of individual morphemes. MP therefore has as its basis the comparison of (1) the shapes that words/morphemes have in different grammatical and lexical

contexts and (2) the shapes that morphemes have in different but related lexical items. As to (1): many Italian words such as the noun *amico* 'friend' (plural *amici*) have a stem that varies in pronunciation–here, between /amik-/ (singular) and /amitʃ-/ (plural); and as to (2): the English verb *describe* /dɪskraɪb/ has as its counterpart the noun *description* where the related stem is pronounced /dɪskrɪp-/.

In terms of the standardly recognized subdisciplines of linguistics, MP has been reckoned by some as part of morphology, though, for reasons that will become apparent below, it (or a substantial portion of it) has been reckoned to be part of phonology (*see* **Phonology: Overview**) in Generative Phonology (*see* **Generative Phonology**) and approaches derived from or influenced by this movement. The view is taken here too – and it was taken by a figure so early in the history of linguistics as Baudouin de Courtenay – that some instances of MP alternation are truly phonological while the rest are morphological. This is not especially controversial, but it does entail that a language's MP is not a unitary collection of phenomena. A useful summary of whose work regards MP as part of phonology, as part of morphology, and as a hybrid is given by Dressler (1985: 1–10). An extended history of MP is given by Kilbury (1976), and Dressler's book extends this still further. The account below restricts itself to matters of pronunciation, in accordance with the strictest interpretation of the term MP. Much of interest could be said about spelling variation of parallel and equivalent type; however, much of this would simply reiterate what is said about MP in relation to a different medium. 'Orthographic MP' could be termed morphographemics, though this term has no very widespread currency, largely because the orientation of most modern linguistics leans toward speech, not writing, and tends to bypass the entire issue.

This field of study should be very clearly distinguished from that branch of morphology, inflectional morphology, which studies variation in word form expressing difference of grammatical function; variation such as that exemplified by *dust*, *dusts*, *dusted*, *dusting* or *mensa*, *mensam*, *mensae*, etc., is not a question of MP. The 'endings' or inflectional elements in these words each express a different grammatical meaning (or set of meanings); the individual elements themselves show no variation in shape.

Classical Morphophonemics

MP and Structuralist Linguistics

The term 'morphophonemics' and its relatives 'morphophonemic' and 'morphophoneme' originated in structuralist linguistics. This survey opens with an account of the phenomena in structuralist terms, though a stance free of any party line is adopted further on. The term in this form was used in the American branch of this movement. The European school, exemplified particularly by Trubetzkoy (1931), preferred the term 'morpho(pho)nology' for essentially the same concept, but Trubetzkoy included some matters that are not regularly attributed to MP these days, and these are omitted here. Dressler (especially 1985) uses the variant term 'morphonology' to denote the collection of phenomena that he sees as produced by semiotically natural interactions between phonology and morphology, which corresponds closely with the subject matter envisaged by Trubetzkoy. The concept of MP, though not the word, can be traced to the work of early phonologists in Russia, especially Baudouin de Courtenay and his pupil Ščerba; indeed, the differences between these two scholars can be seen replicated in the history of American linguistics sketched below.

Alternation

The account of MP given below is centered, purely for expository reasons, around the American usage. Understanding it depends on the prior identification of the phonemes (*see* **Phoneme**) of a language and of the morphemes (*see* **Morpheme**) or minimal meaning units that are realized by strings of phonemes. Thus the word (consisting of a single morpheme) {turnip} is realized in many accents of British English by the string of five phonemes /t, ə:, n, ɪ, p/. The morpheme bearing the grammatical meaning 'gerund' is realized by the two-phoneme string /ɪ, ŋ/. The methodology of structuralist analysis requires us to proceed 'upward' from the identification of phonemes to the identification of morphemes. A consequence of this procedural requirement is that many a morpheme is analyzed as having more than one phonological shape. For instance, it is clear that /d/ and /s/ are distinct phonemes of English, in that they distinguish pairs of words like *raid* and *race*, *deal* and *seal*. Yet they do not have this word-distinguishing function when we come to examine the strings /ɪveɪd/ and /ɪveɪs/ (in one variety of British English, Received Pronunciation). The former represents the word *evade*, and the latter represents the first element in the word *evasive* (the second element being the adjective-forming suffix *-ive*). It is clearly reasonable from the semantic point of view to argue that /ɪveɪd/ and /ɪveɪs/ bear the same meaning, and represent the same linguistic unit; and that /ɪveɪs/ is (loosely speaking) just the form of /ɪveɪd/ that is used when it appears in a derived adjective. When a linguistic unit has more than one shape in this way, it is said to *alternate*, and its various shapes

are called *alternants*. In the present case, the morpheme {evade} has two alternants; alternants of a morpheme are called *allomorphs* (cf. and contrast the concept allophones of a phoneme). In its classical sense, then, MP is the study of the relations between phonemes that are involved in alternations of this kind.

If such alternations were casual and unsystematic, MP would not be very interesting. It would involve making a list or catalog of pairs (triples, etc.) of allomorphs and that would be that. Such an approach is technically called an item and arrangement (IA) approach to MP, i.e., the items or allomorphs are simply stated along with their pattern of distribution or arrangement in relation to other linguistic units. This notion contrasts with item and process description (see further below), in that IA presupposes no directionality of relationship between the alternants; the synchronic relation is not stated as one where one alternant replaces another, or where one is basic. Such an approach is commonly thought especially suitable for the statement of alternations that are of restricted frequency in a language. There are indeed cases of allomorphy that are isolated in their language; for instance, the relation between the vowels in the semantically related word(-stem)s *broad*, *bread(th)* in English is unique. The morphophonemic relation between /ɔː/ and /e/ is realized only in this pair of words. IA has of late been less favored as a descriptive technique where there are many parallel and/or similar alternations. As originally formulated, it was a descriptive technique rather than a theory; as such it can, of course, be made to work, but has fallen out of favor since the mid-1960s where linguistic theorizing has been a dominant concern and generalizations have therefore been thought more interesting than disconnected facts. It was, especially in the period from ca. 1967 to 1980, widely believed that IA accounts could not express generalizations in a revealing way within many then-current theoretical models. This is because, in classical structuralist methodology, alternations were treated essentially as properties of individual morphemes rather than as wider-ranging phonological correspondence sets; or rather the process of analysis involved identifying alternation in one morpheme, establishing a morphophoneme (see below), and generalizing its use to other morphemes. This is what the leading structuralist Zellig Harris said explicitly (1951: 219); he also introduced the notion of MP as having to do with "irregular [sic] phonological alternations," by definition. But it would be unfair and even illogical to conclude that it is totally impossible to express such generalizations within an IA account permitting some extraction of regular correspondences. What is said below about via rules has a strong affinity with IA-type descriptions.

In fact, MP alternations are very frequently recurrent. The relation between /d/ and /s/ that we noted above recurs in the following pairs of semantically related English words (in Received Pronunciation [RP]): *allude/allusive*, *elude/elusive*, *invade/invasive*, *corrode/corrosive*, *divide/divisive*, *explode/explosive*, *exceed/excessive*, *expend/expensive*, and so on. We can express such mass correspondences as morphophonemic generalizations, e.g., that stem-final /d/ word-finally alternates with /s/ where the suffix /ɪv/ follows. (Actually, further conditions would need to be built in for strict accuracy. For instance, *attend/attentive* is an irregularity within this phonologically defined group of words. But the point to note here is simply that a definable recurrent pattern exists, even if it is not exceptionless.)

Notice that these relations appear under conditions that are not entirely to do with pronunciation. While /sɪ/ appears to replace /dɪ/ in the cited forms, nothing about English phonology makes the sequence /dɪ/ illegal; it is pronounced in a host of words like *dip*, *edition*, *additive*, *recordist*.

It is illegal only when the /ɪ/ belongs to a suffix; and, more specifically still, that suffix must be /ɪv/. It is legal in otherwise analogous cases such as *record-ist*, *winding*, *acid-ic*, *nud-ity*. Thus the alternation between /d/ and /s/ is triggered by a detail of word structure and not of phonology. This is entirely typical of MP. Sometimes the triggering factor is grammatical. Some words ending in /ŋ/ add a /g/ (i.e., /g/ alternates with zero) in RP; but only before a suffix /ə/, and only when they are adjectives and when that suffix is the comparative suffix: *young-er*, *strong-er*, *long-er*; contrast *sing-er*, *hang-er*, which are nouns, with a phonologically identical but grammatically different suffix.

Some MP, however, occurs under much more strictly phonological conditions (allowing as 'phonological' information the positioning of word and morpheme boundaries). Numerous languages, including Polish, Russian, Dutch, German, vernacular Turkish, Mandarin Chinese, and Korean, have a contrast between voiced and voiceless or between unaspirated and aspirated consonants, except in word-final position (and some others that need not concern us). If this restriction is a structural one, then there is no MP; thus in Mandarin Chinese, no syllables ever end in a voiced obstruent (i.e., stop, affricate, or fricative), and since lexical stems in Mandarin may be thought of as realized by single syllables, and words as comprising strings of one or more stems, it follows that no words end in a voiced obstruent either. In other languages, the matter is different. It may be that the restriction on voiced consonants in word-final

position does not apply to stem-final position, and that stem-final position need not coincide with a syllable boundary; in which case there may be alternation between consonants at that position for any stem to which vowel-initial affixes may be added. For instance, in Russian /t/ and /d/ generally contrast (e.g., *doska*, *drok* vs. *toska*, *trok*), but the word *god* 'year' is pronounced /got/ in isolation while its alternative nominative-case plural forms both contain a /d/: /goda/ or /gody/. Many other words show parallel behavior: /t/ and /d/ are therefore in a morphophonemic relation in such words. European structuralists would say that the consonant at the end of such words as *god*, *l'od*, *sad*, *trud*, etc. is an archiphoneme consisting of the intersection of the distinctive features (*see* **Distinctive Features**) defining /t/ and /d/; i.e., nonnasal dental stop consonant, with no specification for voiced/voiceless. In Russian, it happens to be phonetically voiceless; but phonologically speaking, it is neither voiced nor voiceless, since the contrast or distinction between these two feature values is inoperative in this position.

Using an archiphoneme, which is an underspecification (*see*) of the phonemes involved in the morphophonemic relationship, is the first technique we will note for describing sets of alternating phonemes as a linguistic unit at some level. Hudson (1980) provides a reductivist demonstration of how archiphonemic representations can provide an integrated account of all regular MP phenomena, at the cost of some psychological plausibility where the conditioning factors are not purely phonetic. Outside Hudson's work, the technique has generally been thought unsatisfactory in those cases where the phonemes involved are not closely related phonetically or where a phoneme alternates with zero. Harris (1951: Chap. 14) was, however, prepared to use special symbols covering some phoneme and its absence; for instance he transcribes /sɪmpL/ (Harris, 1951: 239) for the morpheme {simple}, pronounced /sɪmpl/ in isolation and /sɪmp/ before the adverbial suffix /li/. This, and other U.S. structuralists' morphophonemes, which are just cover symbols for alternating phonemes, should not be confused with archiphonemes, for the morphophonemes do not necessarily have unitary phonetic feature content – despite what Harris asserts (1951: 219); the example given, /L/, cannot be the intersection of the phonetic features of /l/ and zero, but must actually be their disjunction. In practice, they are just names for sets of phonemes. Archiphonemes are defined as having some real featural content. Hudson's approach sets out a way of combining these two notions, however.

Some American analysts, it should be noted, used morphophonemes of a rather different character. For instance, Swadesh and Voegelin (1939), describing the phonology of Tübatulabal, employ symbols that represent simultaneously a phoneme and an effect of that phoneme on adjacent phonemes; their /N/ is an [n] that has the effect of shortening preceding vowels even where those vowels, for prosodic reasons, might be expected to be long. This descriptive technique is anomalous within the more simplistic varieties of structuralist linguistics, and has something in common with Prosodic Phonology as developed by J. R. Firth and his associates, because the phenomenon is not confined within the boundaries of a phoneme considered as one of a sequence of 'vertical slices' in the flow of speech. This – and especially a related work by Bloomfield (1939) on Menomini – has been championed as a precursor of the technique of Generative Phonology (see below), but strictly that is not the case.

Nonsegmental MP

The entire discussion so far has been in terms of alternation between segments, for these are the phenomena that have been understood as prototypical MP. But it is completely thinkable that suprasegmental aspects of pronunciation, i.e., stress and tone, could alternate in similar ways. Similar to the regular alternations such as that involving word-final obstruents in Russian is the so-called rhythm rule of English. This may operate when two stressed syllables come to be adjacent to each other in running speech; if the first is in a noun's premodifier (usually a compound adjective, a noun, or a numeral), stress shifts back by one or more syllables if there is a suitable site to accommodate it within the premodifier. (There are phonological restrictions on what may qualify as a site, but these may be taken for granted here.) For instance, stress is on the final syllable in the words *sixteen*, *hard-boiled*, *Tennessee*, *canteen*, pronounced in isolation, but shifts back by one or more syllables when one of these words precedes a word bearing initial-syllable stress, as in *sixteen years*, *hard-boiled egg*, *Tennessee Williams*, *canteen manager.*

Tone languages often show variation in tone-form paralleling the segmental MP that was discussed above. A straightforward instance occurs in Mandarin Chinese. This language has four lexical (distinctive) tones, as diagramed in Table 1.

Tone 3, however, has a shape indistinguishable from that of Tone 2 when it occurs before a word also bearing Tone 3. Thus the words *hěn* 'very' and *hǎo* 'good' both have lexical Tone 3; but when occurring together in the phrase *hěn hǎo* 'very good', 'okay', *hěn* appears to bear Tone 2. Similarly in Yoruba, a language with three distinctive level tones (low, mid, high), sentence structure requires what

Table 1 Contrasting tones in Mandarin

jī	jí(le)	jǐ	jì
'chicken'	'extremely'	'how many?'	'to remember'
Tone 1	Tone 2	Tone 3	Tone 4

immediately precedes a finite verb to have a high tone, irrespective of the tone this material would have in isolation. Thus *baba* 'father' has lexical mid tones on both syllables, but in *babá túndé* 'father comes again', the second syllable of *baba* has a high tone. These Mandarin and Yoruba instances might be thought of as tone-sandhi (see below for sandhi). Tonological apophony (see below for discussion of this term, including of whether it is really a form of MP) may also be found. In Longunda, there is no difference between the segmental makeup of the first-person noninclusive and that of the second-person pronouns (there are several pronouns in each category); but the former all bear high tones and the latter low tones. In several Bantu languages, relative clauses are marked (to simplify somewhat) by overall lower pitch than the same material when used as main clauses. Pitch range is raised in Mandarin to indicate certain types of question.

Regular Accommodations

In many languages, regular accommodations take place where morphological operations have brought together certain strings of phonemes. These accommodations are often called morphophonemic in the narrow sense, synchronically motivated or automatic; though the last term is misleading if it suggests that the speaker necessarily adjusts his/her pronunciation during the course of production. For instance, in English, /m/, /n/, and /ŋ/ are distinct phonemes (cf. *ram*, *ran*, *rang*; *hammer*, *Hannah*, *hangar*); but wherever prefixes ending in /n/ occur before a stem beginning with a consonant of a different place of articulation (let us concentrate on labials and velars), a replacement of the alveolar articulation by a labial or velar one has taken place. Before a vowel, two such prefixes might be pronounced /ɪn/ and /∧n/, as in *inadmissible*, *unacceptable*; before /p/, /b/ they are pronounced /ɪm/, /∧m/, as in *impossible*, *unbelievable*, and before /k/, /g/ they are pronounced /ɪŋ/, /∧ŋ/, as in *incredible*, *unguarded*. (Some anglophone readers may be totally in agreement only in the case of *impossible*, where the claim is backed up by the spelling; that will be sufficient to establish the point, however. Some readers may make the other accommodations only in fairly rapid speech, but nevertheless do so. We return to the question of rapid speech effects and their relation to MP below.)

The Transition to Nonstructuralist Approaches

The traditional description of Sanskrit developed by Hindu scholar-priests in India includes highly systematized rules, effectively MP rules, for adjusting the shape of stems according to the phonological properties of the adjacent word or morpheme (the rules of external and internal sandhi, respectively; the English example at the end of the last section is a case of internal sandhi). An instance of external sandhi in Vedic Sanskrit is as follows: words pronounced in isolation with final voiceless consonants appear with a voiced consonant of the same position of articulation (where the following word begins with a voiced sound (including vowels but excluding nasals), and with a nasal consonant of the same position of articulation where the following word begins with a nasal consonant. The same is true in internal sandhi, i.e., within morphologically complex words. But in Vedic Sanskrit the rules of internal and external sandhi are not precisely identical. In words ending in *-r*, the /r/ is preserved within lexical items in compounds like *ahar-páti* 'day-lord', while *áhar* 'day' used independently would appear with final so-called *visarjanīya*, rendered <h>, if the following word began with /p/. (The precise nature of *visarjanīya* is debatable, but for present purposes the only crucial point is that it is **not** realized as [r].)

This Sanskrit example shows alternation between sounds, or rather phonemes. Let us examine a further example where there is alternation between a sound and its absence, so to speak. The familiar *liaison* of French is a matter of sandhi, as just defined; but here, in the principal instances, /z/, /n/, and /t/ are variably present or absent. Concentrating on /z/: this phoneme may serve as a realization of the grammatical category {plural} As such, in the definite article *les* it alternates with zero, in external sandhi, under strictly phonological conditions (allowing word boundaries to be such, as above), namely depending on whether the word following begins with a vowel or a consonant: *les oeufs* /lez ø/, *les choses* /leʃoz/. It also alternates in more complex ways under partly grammatical conditions. It is obligatorily present in plural adjectives that precede the noun within the noun phrase (*de grands arbres* [də grãz arbr]) and in pronouns preceding the finite verb (*elles ont* . . . . [elz õ . . . .]); but only variably present between the noun and a following adjective within the noun phrase (*des tourments affreux* [de turmã(z) afrø]) and between a noun phrase (not consisting merely of a pronoun) and the finite verb (*mes parents ont* . . . .[me parã(z) õ . . . .]); and scarcely ever in conjuncts before the word *et*. (The account just given is idealized to some degree; individual French speakers differ widely in their application of these informal rules.)

Traditional accounts of these two sets of phenomena by Indian and French grammarians do not treat the alternants as being of equal status. The Sanskrit data are customarily presented in terms of sandhi rules applying to pausal forms, i.e., forms used in isolation or before a pause. The French data are, by conservative analysts, usually described in terms of the omission of /z/ in certain circumstances. All the above therefore may be used to exemplify a second possible descriptive technique for handling the alternations involved in MP in terms of 'underlying' units (as opposed to mere sets of alternants; see above). It consists of taking one of the alternants and treating it as basic in relation to the other(s) (for the issues, see Matthews, 1991: 146). The other(s) must then be derived from it by means of transformational rules changing the nature of the alternating element(s). One might, for instance, decide that /ɪn/ was the basic form of the English negative prefix referred to above, and have a rule changing it into /ɪm/ or /ɪŋ/, depending on the pronunciation of the element immediately following. In a fully integrated linguistic description, it is generally reckoned most desirable for all elements showing similar behavior to be handled in the same way in this respect; thus if /ɪn/ were chosen as basic, then /ʌn/ rather than /ʌm/ or /ʌŋ/ would no doubt be chosen as the basic form of the other prefix, meaning that the same rule of phonological adjustment could serve to derive the range of forms seen in both prefixes. The same would go for such other possible elements in English as *non-*, *con-*, *syn-*, *pan-*, and so on.

Some Considerations from the Perspective of Language Change

The evidence of language change suggests that there is some historical justification for the idea that one alternant is more basic than the other(s) in elements that alternate. The present state of knowledge on this matter is summed up in Witold Mańczak's second 'tendency' of analogy, which states that, at least as far as the stems of words are concerned, alternation is more often abolished than introduced, i.e., one of the alternants is generalized into positions formerly occupied by others. A simple instance involves the English word *old*, from Germanic *[ald], which originally had a comparative and superlative form *elder*, *eldest*, developed by regular and explicable phonetic change from an earlier *[aldiro], *[aldist-], but these are now retreating before the forms *older*, *oldest*. It is a commonplace finding that basic forms tend to replace the others in such cases. A partial explanation may be sought in the tenets of Natural Morphology (*see* **Natural Morphology**), associated with W. Mayerthaler. But there is room for debate about what criteria should be involved in deciding which forms are basic. The case of *old* is mercifully straightforward; it is reasonable to argue both on morphological grounds (it is unsuffixed) and on semantic grounds (it shows only the positive degree of comparison) that *old* is more basic than *eld-*. Many similar cases can be found (cf. e.g., Hock, 1986: Paras. 9.1.1, 9.1.4; Romaine, 1983). They are usually termed cases of analogical leveling. (Readers with a knowledge of historical linguistics may note that Jerzy Kuryłowicz's second 'law' of analogy, that basic forms are replaced by derived forms, seems to pull in the opposite direction from the claim just made; but Kuryłowicz's law is best seen as a condition on proportional analogy and not on straightforward leveling of the kind just cited.)

A further possible basis for the elimination of alternation is the generalization of the allomorph most frequent in actual usage, as opposed to the basic one (as defined above). MacWhinney (1978) provides good psycholinguistic documentation for this over a good range of languages, and historical linguists have long suspected that it takes place.

Post-Structuralist Approaches

Within the framework called Generative Phonology (*see* **Generative Phonology**), the descriptive technique discussed in the previous paragraphs using English, Sanskrit, and French examples is accommodated rather naturally. The theory requires that, in the overwhelming majority of cases, a unique underlying form or underlier be chosen as the lexical representation of the set of allomorphs representing a morpheme. In the easy cases, the chosen underlier is one of the alternants (though not necessarily the most 'basic' one in any sense of the word *basic* that relies on semantic criteria). The underlier is then reconnected to the actual pronunciations by a block of statements called (process or transformational) *rules* effecting changes in phonetic/phonological feature content. Sometimes the underlier may consist of a string of phonemes not all of which occur in any one allomorph, i.e., the underlier may be form-abstract (see Coates, 1987: 40). Here is an example, adapted from Anderson (1974: 141–144; it is actually part of a rather more complex argument there). In Icelandic, Anderson suggests, it is defensible to select as underliers for the stems of the lexical items 'kettle' and 'gods' the forms /katil/ and /ragin/, respectively. These words appear in different case forms, realized suffixally. Anderson justifies analyzing the vowel of the first syllable as /a/ in the light of the genitive plural forms *katla* and *ragna*; we will simply accept this for the purposes of the discussion (Table 2).

There is rather more to this example, in fact. A few moments' exercise with a pencil and paper will reveal

Table 2 An illustration of the operation of MP rules in Icelandic

katil + r	katil + um	ragin + ZERO	ragin + um	Underliers
katil + r	katl + um	ragin +	ragn + um	Rule deleting vowels in stem-final syllables where a vowel follows in the next
katil + r	kötl + um	ragin +	rögn + um	Rule converting [a] to [ö] before [u] in the next syllable
ketil + r	kötl + um	regin +	rögnum	Raising of [a] before [i] in the next syllable
ketill	kötlum	regin	rögnum	Actual pronunciations, after other minor adjustments

that stating the three key rules in the order given is not an arbitrary matter. If the rules, as formulated, were allowed to apply in some other order, their output would not be the actual forms found in Icelandic. None of the forms cited could be affected by the second rule if it applied before, and only before, the first. And if the third were to apply first, the second would find no forms to apply to. The notion of ordering relations among rules is therefore introduced (cf. **Rule Ordering and Derivation in Phonology**). Such a block of rules may or may not be extrinsically ordered, i.e., be obliged to be applied in a particular sequence, depending on which of the variants of Generative Phonology is being considered. Various principles have been proposed that might dispense with the necessity to stipulate a particular order of application. For instance, in relation to the Icelandic data above, one might argue that if all the rules mentioned were deemed at the outset to be relevant to the forms potentially undergoing them, then the first rule (vowel elision) must precede the other two to ensure that all three are operative; no special stipulation of order needs to be made, therefore. Adherence to particular principles of such a kind was one of the main marks of belonging to the various subschools of Generative Phonology. There is fuller discussion of this point under rule ordering (**Rule Ordering and Derivation in Phonology**).

A unique underlier is chosen in accordance with the (psycholinguistically not fully supported) principle that economy in the lexicon is to be maximized (as opposed to, for example, economy in the number of rules needed to produce representations of actual pronunciations, or economy in the number of ways in which these are permitted to interact). Obviously, the nature of the rules that need to be formulated is dictated by the choice of unique underlier, and the need for rules in any case is dictated by the requirement of having such a unique underlier.

In some, particularly earlier, variants of Generative Phonology, a considerable degree of abstraction was tolerated. In terms of the present discussion, this means that the underlier was not required to actually be one of the alternants, nor to consist exclusively of segments found in the set of alternants (as is the case in the Icelandic example above). The underlier could contain abstract (i.e., nonoccurring) segments, especially if their selection resulted in some overall economy in the grammar of the language being described. A celebrated instance of this, much discussed and rediscussed, was the group of alternations in English produced by the late medieval pronunciation changes called the Great Vowel Shift. Their precise phonetic nature is not important here, but their effects are. In collaboration with a rule of vowel shortening applying in the antepenultimate syllable of words having at least three syllables, they produced alternations such as those heard in the stems of the following word pairs: *alkaline/alkalin(ity)*, *obscene/obscen(ity)*, *sane/san(ity)*. Champions of the classical variant of Generative Phonology postulated as underliers for these pairs of stems not one of the occurring alternants, but a form in which the crucial vowel was a kind of compromise between the two occurring ones. Respectively, these were /i:/, /e:/, and /æ:/; long in duration like the diphthongs in the adjectives, but of an articulatory quality more resembling the short vowels in the nouns. In that sense, the symbol representing the alternating pair of vowels was an abstract entity. These objects, called systematic phonemes by generativists, were essentially morphophonemes in the sense of being representations, in the guise of units, of the alternations in question. This notion of systematic phoneme should be compared and contrasted with the notion archiphoneme introduced above. Both notions are attempts to solve the problem of phoneme sets which, under particular circumstances, do not do their primary job of distinguishing pairs of words. Within GP, systematic phonemes were the 'phonological' units of lexical representation, and lexical representations were therefore encoded at a **level** of MP (Spencer, 1991: 53–55). Although the concept was foreshadowed in earlier structuralist work, in structuralist analysis any MP 'level' was a consequence of analytic procedures and had no important theoretical status.

In developed Generative Phonology, the term 'systematic phoneme' was understood rather more broadly, but the origin of the notion was in the representation of alternation, as just outlined. This analytical technique was pushed to its limits by a few linguists such as Lightner (1983), who was content, in his synchronic phonology, to link such (historically distantly related) English word pairs as *wolf/lupine*,

three/ternary (1983: 151–155 and especially 184–186), by a single phonologically specified underlier, i.e., a string of systematic phonemes. The result of this was immensely complicated phonological descriptions containing many rules with little generality (i.e., they are lexically triggered) or psychological plausibility (i.e., the complexity is not revealed by extended processing time in experiments). In reaction to such attempts, some theorists tried to limit the power of generative phonologies by restricting the systematic phoneme to the job of capturing of regular and phonetically natural alternations; e.g., Kiparsky with his alternation condition (1974) and Hooper with her true generalization condition (1976: 13ff). Other suggested restrictions precluded the use of abstract segments in underliers, i.e., segments that never show up in actual phonetic forms in the language being analyzed. All of these tendencies pushed in the direction of making (process) rules generally applicable rather than lexically triggered, and making them correspond quite closely with the operations seen in phonetic change. For reasons well set out by Bauer (2003: 155–156), it is hard to find common ground in which a compromise position between analysts for and against phonological abstractness can be worked out, but Bauer himself has consistently (e.g., 1983: 133–139, 2003: 157) emphasized the importance of productivity as a concept in morphology and championed the idea of a level of lexical representation just sufficiently abstract to allow all productive phonological processes to apply to it in the guise of general (essentially phonetically natural) rules. There is a clear relationship, but by no means one of identity, between productive processes and phonetically natural ones.

The generative approach just outlined is an instance of what has been called the item and process (IP) approach to MP (contrast IA introduced above). The item in question is the chosen underlier, and the process or processes are the rule(s) formulated to convert it into the full range of actually occurring alternants.

Debate in Generative Phonology after the formulation of the above ideas in the mid-1960s was, in most cases, of a technical kind concerning, for example, whether some kinds of rules/processes are restricted to operating at certain postulated levels or strata of the phonological system of a language (or of languages in general), such as those defined by particular patterns of affixation (surveyed by Bauer, 2003: 174–191), or whether systematic phonemes need to contrast in distinctive feature specifications at the lexical level; or concerning what degree of abstraction is permissible in the choice of underliers. (For some such developments, *see* **Lexical Phonology and Morphology**, and Lieber, 1987: 72–129, 145–150.) None of this queries the fundamental nature of MP rules under the IP interpretation outlined above: they are formal devices for changing the value of some phonetic/phonological feature into some other value, and thereby 'changing' the pronunciation of the segments embodying the feature in the phonetic environment specified in the rule. Some critical discussion on the periphery of this mainstream approach has raised interesting questions, however. Proponents of Natural Generative Phonology (especially Hooper, 1976) canvassed the wider use of rules simply associating pairs of allomorphs (via rules) rather than claiming, and expressing by means of a common underlier, a deeper unity (as with the minor rules of the 'classical' model; in NGP, 'classical'-style MP rules were restricted to the expression of exceptionless, and in practice usually phonetically natural, alternations. In effect, this claim meant that alternations having some currency in the lexicon, while not being fully regular, had more in common with suppletion than with regular alternation. (Suppletion is the relation holding between grammatically related but phonologically totally distinct word forms, such as *go* and its past tense form *went*, or between the corresponding French word forms *va/vais* and *allais* and the future tense *ira*, etc.) The claim of an intimate relation between suppletion and all nongeneral MP processes is made explicit in Hudson (1980). Zwicky (1986) also makes an important qualitative distinction between productive rules and fossilized allomorphy and assigns them to different analytic levels or strata with different properties. Fossilized allomorphs are chosen in particular contexts; the basic form appears by default in others, and (relatively) general MP rules apply to the output of this first analytic level. The relatively arbitrary link between forms related in nonproductive ways, expressed very much like (generalized) IA statements (see above), could be seen as accounting for Mańczak's second 'tendency' of analogy, discussed above; the bonds between allomorphs, because arbitrary and not directional in any phonological sense, could be easily dissolved and one member of the pair (or n-tuple) be promoted at the expense of the other(s).

Within the context of the debate about the overall structure of linguistic theory in the generative paradigm, Per Linell's (1979) typology of MP rules can be seen as building on the antiabstract direction embarked on by NGP theorists such as Vennemann and Hooper. This interesting work, with enduring consequences, emphasizes that numerous psychologically distinct phenomena were not properly distinguished in the theoretical apparatus of Generative Phonology. In particular, Linell distinguishes phonotactic rules from morphophonemic rules proper. The

former correspond essentially to what in this article are called phonetically natural rules, and the latter to the residue, including not only the via rules of the NGP approach but all subregular alternations in addition, which are seen as the fossil residues of completed phonological change and thus not a matter for synchronic phonology at all (Linell, 1979: 135). Most analysts now distinguish these two types of rule as describing automatic alternations and lexical or MP alternations proper, respectively (Haspelmath, 2002: 181) or principled and casual alternations (Coates, 1999: 67), though there remain minor differences in how particular alternation types are viewed. Linell gives special status to citation forms (cf. MacWhinney's dissertation [1974], reported in MacWhinney, 1978: 82) as providing a base for morphophonemic derivations in a sense compatible with Mańczak's usage of the term 'base' discussed earlier; this base is quite distinct in theoretical terms from the notion underlier, because bases are not formulated with lexical economy in mind, neither is any segment abstraction or form abstraction permitted. Bases for Linell, and Mańczak, are actual grammatical word forms, usually the citation form, of particular lexical items. As such, they are not morphophonemic representations but phonemic ones (or something closely analogous). Dressler (1985) offers a further sophisticated typology of rules that subsumes Linell's proposals.

Phonetic naturalness as a property of some MP rules has often been mentioned above. In generative practice, the most highly valued rules were those that had counterparts in expected historical changes; for instance assimilation of the feature content of one segment to that of some adjacent segment (including what is usually called vowel harmony), epenthesis of consonants to ease the simultaneous switching of several feature values, reduction of the inventory of vowels in unstressed syllables, the breaking up of clusters of consonants and the elimination of hiatus (strings of vowels without intervening consonants), both of which latter types may tend to promote syllable structure consisting of supposedly optimal strings of alternating consonants and vowels (CVCVCV . . .). Some of these processes typically operate also in the distribution of the allophones of phonemes (**Phoneme**), but, by definition, do not result in the alternation of otherwise distinctive sound units. Such processes may also be closely paralleled in the fast speech rules of a language (essentially Dressler's allegro rules [Dressler, 1972], and Linell's articulatory reduction rules [Linell, 1979]).

It is reasonable to see an intimate relationship between all these facts. Fast speech tends to effect changes, not always observed by speakers or hearers, in the form of the words being uttered; the structural units of phonology may thereby come to be pronounced in a greater variety of ways than previously, and may in some phonetic environments come to be pronounced identically to others. At this extreme point in development, alternations will have arisen that are regular and governed by sequence-structure or phonotactic rules. When (1) the processes of analogical leveling get to work on these alternations, when (2) borrowing and lexical creation introduce words of novel pronunciation structure into the language, and when (3) subsequent sound changes () destroy the environments that gave rise to the alternations (making the reasons for their existence opaque), their residue no longer corresponds to the language's previous phonotactics and has come to consist of Linell's MP rules proper, i.e., rules without purely phonetic motivation.

Let us consider some examples of these processes at work, resulting in alternations that are barely identifiable as such without special philological training.

1. Old English /tʃ/ arose from /k/, in morpheme-initial position, only before nonround front vowels as a result of a familiar sort of phonetic change. (It first became a separate phoneme from /k/ in other positions, e.g., after front vowels.) Where front and back vowels once alternated in stems, they could give rise to alternations between /tʃ/and /k/, as in *cēosan* [tʃe:ozan] 'to choose', *(ge)coren* [(jə)korən] 'chosen'. As can be seen, the /tʃ/ occurs in present-day English in an environment where there was an original back vowel (in the perfect participle *chosen*). As a result, any surviving alternations between these phonemes, distinct since late Old English, have lost transparency and synchronic motivation.
2. The borrowing of words from French and other languages with (at the time of the loan) initial /tʃ/ before back vowels accelerated this process (e.g., *choice*, *chock*, *chocolate*), as did the post-Old English creation of new words (such as *chomp*, *chop*, *chortle*).
3. Subsequent sound change in vowels gave rise to words with /tʃ/ followed by a back vowel (as in the cases of *choose* itself, and of *chew*, *choke*, *chalk*). The effect of all these developments was to isolate any surviving alternations between /k/ and /tʃ/, to the extent of making identifying them a matter of historical controversy; as in the case of *cool*, *cold* with /k/ vs. *chill* with /tʃ/, and *cock* with /k/ vs. *chick(en)* with /tʃ/.

The emergence of forms that are inexplicably exceptional to morphophonemic patterns is the most direct testimony to the breakdown of perceived alternation and of alternational regularity.

The relation between final /t/ in certain English verbs and /ʃ/ in their derived abstract nouns (as in *graduate*, *graduation*) is upset by the existence of *equation*, pronounced in RP with /ʒ/. The alternation between /t/ and /ʃ/ is now therefore a morphophonemic rule proper, in Linell's sense.

Facts such as these lead us to the conclusion that there is a one-directional relationship between sound change, automatic (phonetically natural) MP, and lexical (proper) MP (Haspelmath, 2002: 195–199). Regular alternations produced by sound change tend, over the long term, to fossilize into MP that may have exceptions and therefore not be subject to the current phonotactics of the language in question. Such MP does not regeneralize.

Degrees of Regularity or 'Automaticity'

It is possible to set up a typology of MP alternations, in the light of the above comments, based on how 'automatic' their 'operation' is. Most analysts nowadays accept some kind of special status for those alternations that are fully automatic; i.e., in the terms outlined above, which are exceptionless and responsive to aspects of the pronunciation of adjacent units. These are the most purely phonological. The pronunciation triggers may be phonetic, i.e., the pronunciation substance of the adjacent units in question is responsible for the alternation. Cases of this may include vowel harmony, assimilation, and sometimes also epenthesis. Otherwise, the triggers may be phonological in a narrower sense, i.e., it may be the position in the CV structure or skeleton (cf. *see* **Autosegmental Phonology**) that is responsible; we may find end-of-word or end-of-syllable effects, for instance (of which an instance from Russian was given above), or alternations dependent on whether the next segment is a consonant or a vowel (like that which governs whether [r] is pronounced or not in the huge number of words ending in orthographic <r(e)> in many accents of British English: *for*, *dear*, *here*, *visitor*, etc.).

Cross-cutting this classification is the system of possible triggers not having to do with pronunciation, which are therefore not fully automatic in the rather narrow sense defined above. Some MP alternations may be lexically triggered, i.e., occur only in particular items of the vocabulary (like that involving *a/an* in English and that involving the pronunciation of *news* with /s/ instead of /z/ in *newspaper* but not in *newsprint* in the RP accent of English). Some may be triggered only by particular adjacent lexical items, e.g., the so-called contact mutations of certain initial consonants caused in Welsh by the prepositions *i*, *o*. Some may be triggered by the lexical-subclass membership of the affected words; thus, in Welsh, nouns after the article vary their initial consonant in a systematic way only if they fall into the category called 'feminine.' Some may be grammatically triggered. /d/, /t/, and /ɪd/ alternate in a systematic way in English, but only in the regular past tense and the homophonous regular past participle suffix, both spelled <-ed>.

Apophony and MP

Special attention needs to be given to instances of variation in form that do not appear to be cases of MP in the light of the definition given above. It was stated that such alternations as *dust/dusts/dusted/dusting* were not cases of MP, and an explicit warning was given against considering them as such. They are instances of suffixation for the purpose of expressing grammatical distinctions. They do not result in alternating forms of the stem (*dust*) or of the suffixes involved, which are separate units, not alternants of some single one. The same is true for the plural suffixation seen in *station* vs. *stations*. But there are certain English words that show internal modification for the expression of exactly such grammatical categories. The variation seen in the forms *ring/rang/rung* parallels precisely *dust/dusted/dusted*; and *foot/feet* is a precise parallel for *station/stations*. Such element-internal variation is due to the fusion of the lexical items and their grammatical inflection. The fused forms, which cannot be segmented in a way typical of other English morphology, simultaneously realize lexical and grammatical information; this is not true of *dust*, *station*. (It would usually be considered eccentric to say that the verb form *dust* represented the fusion of {dust} and {present tense, non-third-person-singular}, and *station* the fusion of {station} and {singular}, because the grammatical categories mentioned are not overtly marked in other relevant English words.) This internal modification of a stem vowel is called ablaut or apophony. It differs from other cases of MP in that no overt trigger for the variation in form (here, tense/aspect and grammatical number, respectively) is recoverable elsewhere in the linguistic environment in which the word forms are used. It differs, for instance, from synchronic umlaut (a type of vowel harmony), in which some kind of trigger, or rather an indication of the grammatical trigger, is recoverable; in the German singular/plural pair *Gast/Gäste* 'guest(s)' the plurality is additionally marked by a suffix. The terms 'ablaut' and 'umlaut' are often used with a considerable degree of slackness, involving failure to distinguish synchronic criteria from diachronic ones. Diachronically, ablaut was generally used in those instances in which no

historical phonetic motivation for the alternation other than possible tonal differences in the Indo-European protolanguage could be discovered, while umlaut was a phonetically motivated change due to the quality of nearby segments, often regressive assimilation (**Assimilation**). However, from a synchronic point of view, many instances of umlaut are indistinguishable from what might appear to be ablaut. Consider alternations in German such as *Acker/Äcker*. This means 'arable land', singular and plural; the difference has come about in this originally non-alternating word due to analogy with umlauting nouns (i.e., those that show umlaut as a result of sound change in their plural forms), and such nouns are said to have 'joined the umlauting class.' Such word pairs are just like *singen/sangen* 'to sing', non-second person plural present and past tense; but here the difference is due to ablaut. Instances like the former are never called ablaut in the literature about German. Perhaps the word 'ablaut' could usefully be restricted to mean the historical change resulting in this kind of vowel alternation, while 'apophony' could be specialized in a synchronic sense to mean 'internal modification of the stem for exclusively grammatical reasons, and as the sole indication of those reasons.'

This may be the place to discuss further the question of Welsh initial consonant mutation (which is paralleled in the other Celtic languages also). On many occasions, it is a straightforward instance of MP alternation, sensitive to other units in the linguistic environment in which the affected word is found, as illustrated earlier. Sometimes, however, mutation occurs unaccompanied by any overt trigger. Instances of this are vocative usages of nouns, e.g., *gyfaill!* 'friend!', *bawb!* 'everybody!' (whose base forms, in standard descriptions of Welsh, are *cyfaill*, *pawb*); and polar question structures, where the interrogative is signaled (excepting intonation) only by mutation of the sentence-initial verb, as in *allwch chi ddod?* 'can you come?', where the first word is the mutated (in this case consonantless) second-person plural present tense form of *gallu* 'to be able'. Such instances as these are entirely parallel with cases of apophony mentioned above and could reasonably be called consonantal apophony. In the strictest possible interpretation of the term, they are not MP, because the variation in form signals, and is the sole signal of, some difference in grammatical meaning.

Whether one actually regards apophonic phenomena in the general sense sketched here as instances of MP is a matter of definition. They have been excluded here for reasons based on a strict interpretation of the term MP, but it has been considered quite defensible to redraw the boundary to include them, as Dressler (1985: e.g., Sect. 0.3.1) does for at least some instances.

MP in Psycholinguistics

Experimental work (cf. Garman, 1990: Chap. 5) seems to suggest that while morphological patterns are readily perceived, and may in some cases guide the accessing of words in the mental lexicon, and while they may be used analogically in new situations (by children as well as adults), MP patterns are noted much more patchily and are subject to leveling. A famous and much-reported experiment by Jean Berko established that MP rules operating on an exclusively phonological basis were highly likely to be used productively (Berko, 1958, and cf. Derwing, 1980). Her main interest was in children's use of the automatic allomorphy of the regular English plural suffix, which alternates between /z/, /s/, and /ɪz/. At the other end of the plausibility spectrum, a good deal of work has been done to test the psycholinguistic validity of the Great Vowel Shift alternations of English, referred to earlier. When induced to create new lexical items using nonsense stems with, for instance, suffixation by *-ity*, subjects tended strongly to produce words with the expected suffixal structure but without the MP alternation seen in (e.g.) *sane/sanity* (cf. Moskowitz, 1973; Steinberg and Krohn, 1979; Jaeger, 1986; Derwing and Nearey, 1986: 188–196, 205–207). Moskowitz found children able to perform some of the vowel alternations accurately, but they turned out to be being guided by the spelling of the relevant words. Children of around age 7 could stumble, or be manipulated experimentally, into performing any old alternation, suggesting that the use of MP of this type is an acquired skill. Jaeger found no convincing evidence that children acquire MP representations of either a form-abstract or segment-abstract type.

Historically, some leveling has been noted, which tends to reinforce these findings, as in *obese/obesity*, where no alternation of the second vowel is heard in standard dialects of English. There is clear evidence, therefore, that MP alternations are not heeded in a systematic way in acts of lexical creation. As for online processing, either encoding or decoding, there is little to suggest that speakers really do access underlying forms of any great abstraction. Such arguments as were formerly presented in support (e.g., MacKay, 1978) have been criticized as suffering from defective experimental design – they did not show what they purported to show (Henderson, 1985). Indeed, the extent to which speakers process any internal morphological structure of a derivational kind at all in preparing familiar words for spoken as opposed to

written utterance is debatable. Garman acknowledges the 'instability' of morpheme shape – i.e., the very existence of MP – as a problem for psycholinguistics (Garman, 1990: 297). If the paucity of evidence is read at face value, it means that familiar lexical items differing morphophonemically from each other must be stored in a phonological sense independently of each other, not derived from phonologically unitary morphological primitives online. This view seems to be contradicted in an experiment by Stanners *et al.* (1979). They set up a lexical priming task (i.e., one where the investigators let subjects hear a word that is supposedly relevant in some way to the one they wish the subject to say before he or she says it, with a view to influencing what is actually said). Their subjects' responses were to some extent (though not remarkably) inhibited (i.e., slowed down) by being offered primers requiring the desired response words to undergo phonological adjustments of the type (P) *describe* → (R) *descriptive*. As revealed by such apparent evidence of a certain processing cost, therefore, the connections between the words, while being essentially semantic and/or grammatical, are also, even if to a lesser degree, phonological. That allows the possibility that speakers perform some online phonological derivation. However, evidence interpretable as showing the opposite was presented by Fowler *et al.* (1985): that priming by words inflectionally (i.e., regularly) and derivationally (i.e., potentially with phonological irregularity) related to the target word was equally effective. This whole difficult area is reviewed by Marslen-Wilson *et al.* (1994: especially 30–31), who offer a sophisticated model of the phonological level of lexical representation allowing some degree of phonologically abstract representation. In recent work, Bybee (2001: especially Chaps. 3, 5) makes the radical but well-motivated proposal that the entities that are stored in the mind are extrapolations from tokens of words actually experienced in usage, and that connections between related but different forms, while undoubtedly real, are not reified as units of an abstract representational level; that is, morphophonemes as such do not exist, even if recurrent partial resemblances between morphemes (or in her model, words) do.

It is possible, indeed highly likely, that the connections between separate but formally related lexical entries may sometimes come to receive a phonological interpretation, however; some principles are quite well established, such as 'one meaning, one form,' which is to be understood here as pressure for historically related words of similar meaning to gain, or regain, similar pronunciation (analogical leveling), and the somewhat grossly misnamed 'folk etymology,' which has to do with similar pressures divorced from the need for a shared origin, as when the English word *female* acquired its present shape through historically unwarranted association with the semantically related (antonymous) word *male*. But these pressures are emphatically not about shared underliers related to actual pronounced forms by a battery of successively transformed states of the human 'phonology machine.'

There is a very important issue which, as a psychological issue, is only partially made explicit and addressed in the pages above. This is the question of storage vs. computation (processing). For a given set of alternants, are all stored in the mental lexicon (and, if so, are they stored with equal status)? Or is one of the set stored and the others derived from it as required during processing? Or is some surrogate for the whole set stored and all actual alternants derived from that? Our current state of knowledge allows us to come to provisional but fairly well supported conclusions on this question. The account given below is based mainly on the vast amount of evidence collected and presented by Dressler (1985), but does not agree in every detail. He takes into account child language acquisition, language processing, and language pathology (aphasiological) data.

1. For suppletive alternants, it is clear that all must be stored, though not necessarily as equal partners; for essentially semantic and/or grammatical reasons, one form may be basic and the other(s) less central, in some sense, in the word's entry in the mental lexicon.
2. For those alternations that are described here as 'purely phonological,' i.e., phonetically natural and exceptionless, it is reasonable to postulate the storage of a single alternant, converted by a phonological rule to produce others during the act of speaking. This seems to be supported by the preservation of a general suffixal alternation pattern in some production errors involving lexical transposition (Garrett, 1980; Henderson, 1985: 28). There are grounds for supposing, however, that in cases of potential communication difficulty (e.g., to avoid ambiguity or the appearance of facetiousness) the operation of such automatic rules may be suppressed (cf. e.g., Gussmann, 1979: 102, who mentions that in Polish *pocztowy kod* 'postcode' may be avoided because the second word is pronounced [kɔt], making the expression homophonous with 'postcat').
3. For other alternations, the evidence is less clear-cut. Those that describe the behavior of relatively few, often irregularly or unnaturally alternating, words may be considered as suppletive. New alternants created on the basis of such older sets may be

considered as analogical (cf. MacWhinney, 1978). Essentially regular alternations that are not 'purely phonological' seem able to tolerate exceptions. A cline of productivity in such alternations may be seen, therefore, which suggests that no single psychological mechanism may account for them. As Bauer (1983: 130) puts it: "... there does not seem to be any principled way to decide under what conditions two surface phonetic strings [i.e., alternants, R. C.] should be derived from the same underlying morpheme, that is, when the rules of the phonology should predict a given alternation, and when they should not, and consequently, when words should be considered as being linked by a process of word-formation [i.e., morphology, R. C.]." Dressler is prepared to allow a highly redundant model involving both the storage of all alternants in these cases and the existence of rules relating them (cf. also in relation to the production of spoken word forms Anshen and Aronoff, 1988), and a two-level model of phonological lexical relatedness, i.e., one with differing levels of permitted phonological abstraction, is proposed by Marslen-Wilson *et al.* (1994). It would be satisfying to envisage these rules as being differentially grasped by different speakers, i.e., to be a function of their own individual insight and/or explicit teaching, and therefore to be used to different degrees in structuring their individual mental lexicons and in governing the patterns of alternation in their creation of new words. It would not follow from such a view that these rules are used in routinized online processing of words that are already part of the lexicon. Whether they are or not is in principle an empirical matter, but in practice very difficult to investigate.

A problem that has not so far been teased out, and to which there is no clear solution, has to do with whether MP alternations of any sort have equal significance in both directions of psycholinguistic processing: production (encoding) and reception (decoding) of utterances. We might envisage that an ability to reverse the effect of MP rules could be of assistance in decoding the morphology, and hence the meaning, of unknown or partly undecoded words. This view is enshrined in the system called upside-down phonology proposed by Leben and Robinson (1977). MP would in this system be a court of appeal that was more or less consciously accessible in cases of uncertainty. For instance, in hearing the new word *conflagrate* in adverse conversational conditions, an English user knowing the word *conflagration* might be able to arrive at an identification partly on the basis of knowledge of the relation between /ʃ/ in nouns and /t/ in related verbs. Maybe MP, viewed as a set of redundancy rules over the existing lexicon of a language, could constrain the encoding of unfamiliar material in the same way.

Conclusion and State of the Art

MP alternations seem best summed up as statements about regularities, subregularities, or irregularities of lexical relations between phonemes across the vocabulary of particular languages (or better, lects of any description) discerned by linguists, but not attended to in any systematic way by naïve speakers. Speakers may internalize them in a subconscious way, of course, and normally do so during routine first-language learning. They may become adept at using MP alternations and apophonic ones in practical ways as a result of instruction or insight, for instance in the creation of new vocabulary or in exploiting such alternations to make form-sensitive jokes (e.g., the often-observed *Wittgensteinian* with the vowel in the third syllable pronounced /ɪ/; *snuck*, *thunk*, *succame* for *sneaked*, *thought*, *succumbed* in English – institutionalized to different degrees in the vocabularies of different speakers).

The study of MP in its familiar form has become sidelined since the mid-1990s because of the development of Optimality Theory (OT) in phonology (**Pragmatics: Optimality Theory**) in which rules as previously conceived, and the unique underlying forms that license them, have no place. The protagonists of OT (Prince and Smolensky, 1993) noted that rules were often set about with constraints, sometimes *ad hoc*, on their operation, and have reconceptualized phonological systems as systems describing sets of phonological forms that satisfied constraints, rather than being derived from anything that could be reified such as a systematic phonemic (level of) representation. The work by Bybee referred to above has also bypassed MP as usually conceived.

See also: Phoneme; Assimilation; Autosegmental Phonology; Distinctive Features; Generative Phonology; Internal Modification; Lexical Phonology and Morphology; Morpheme; Natural Morphology; Phonology: Overview; Pragmatics: Optimality Theory; Rule Ordering and Derivation in Phonology; Sandhi; Structuralism.

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Morphopragmatics

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Definition

Morphopragmatics is a subdiscipline integrating morphology and pragmatics. It describes grammatical morphological phenomena (within both word formation and inflection), capable of systematically contributing autonomous pragmatic meanings to discourse. Morphopragmatics is definable as the set of general pragmatic meanings/effects obtained by morphological rules. The privileged objects of a morphopragmatic description are evaluative suffixes, such as diminutives, as in Portuguese *adeuz-inho,* Spanish *hasta lueg-ito* 'good-bye-DIM,' augmentatives, as in Spanish *cabez-ota* 'big head'; Portuguese *animal-aço* 'huge animal,' elatives, as in Italian *fort-issimo*, 'very strong,' but also reduplicatives, as in Italian (*occhi*) *neri neri* 'very dark (eyes),' excessives, as in German *das Aller-schlecht-este* EXC-bad-SUPERL 'the very worst,' and, within inflection, personal pronouns of address and Japanese honorifics.

The model fills in a gap concerning meanings not systematically dealt with by linguists, although influential in interactive discourse. Evaluative/alterative affixes, the major representatives of the central category investigated by the model, are characterized by semantic elusiveness, i.e., they exhibit no stable semantic value in terms of either denotations or connotations, and their meaning contributions to the speech event are better described within pragmatics, e.g., in terms of their dependence on speech situations, speech acts, attitudes of interactants. Due to lack of semantic stability, their meanings have been granted sporadic and impressionistic descriptions by morphologists. Pragmaticists, on the other hand, have overlooked morphopragmatic meanings as these are often overridden by the general pragmatic impact of the word meanings or, even, of the syntactic construction, which is perceived as more influential in terms of pragmatic constraints. For example, in a request such as *wouldn't you read this book-let* (a thick volume!) *for me?*, the diminutive *book-let* is pragmatically intended to downgrade the load of the request, but the *wouldn't*-construction is capable of the same effect and may darken the pragmatic contribution of the suffix *-let*. Morphopragmatics is intended to shed light on cases of exclusive relationships between morphology and pragmatics. It is a framework for describing cases of grammaticalized (i.e., morphologized) pragmatics, i.e., pragmatic effects produced by grammatical operations. The model marginalizes extra-grammatical phenomena, as in, for example, English reduplicatives (*teeny-weeny*) or slangy formations (*lanky* ← 'Lancashire'), although these obtain similar discursive effects because they belong to a heterogeneous group of word-forms admitting irregularities in their coining.

The Theory

The theory was pioneered by Wolfgang U. Dressler and Lavinia Merlini Barbarese in successive steps (Dressler and Merlini Barbarese 1986, 1987, 1991), and expanded into a fully fledged model in 1994. It started with the observation that some still productive elements, Italian interfixes such as *-ic-, -ol-*. and *-e/ar-*, placed before evaluative suffixes (as in *brutt-ar-ella* 'ugly-INT-DIM' 'not exactly nice'), retained some pragmatic effects as a remnant of their former status as suffixes, although, synchronically, they were semantically empty, i.e., denotationally meaningless. The investigation of such effects prompted the authors' interest toward the entire paradigm of evaluative suffixes. Predictably, meaningful suffixes also had a privileged and autonomous relationship with pragmatics. It is in this area that morphopragmatic studies achieved their most fruitful results. Other applications are Dressler and Kiefer (1990) on German and Hungarian excessives, Kilani-Schoch and Dressler (1999) on French *-o* suffix, Crocco Galéas (1992) on Italian ethnics, Merlini Barbaresi (1999) on English -y/ie suffix, and more recently Cantero, 2003 on Spanish phenomena.

Morphopragmatics is parallel to other well-established subdisciplines, such as morphosemantics, lexical semantics of morphology, lexical pragmatics of morphology, and pragmatics of syntactic patterns and textual strategies, but it is to be carefully distinguished from them:

- Morphosemantics studies the semantic meanings of morphological rules, i.e., the regular denotational and connotational modifications obtained by derivational or inflectional rules. Within a morphosemantic investigation, pragmatic variables connected with speech situations become irrelevant. Reference to a pure denotational meaning of smallness added by a diminutive suffix, as in *room-ette*, belongs here.
- Lexical semantics of morphology deals with the denotational and connotational meanings of single, morphologically complex, words, as lexicalized *star-let*.
- Lexical pragmatics deals with the pragmatic meanings idiosyncratically conveyed by single complex

words, such as lexicalized *bunn-y* 'rabbit,' selecting a child environment and obtaining a meaning of endearment.

- Syntactic patterns and textual strategies may convey pragmatic meanings of their own and interfere with those obtained by single constituents of the text.
- Morphopragmatics deals, instead, with pragmatic meanings that can be regularly obtained through the sole application of morphological rules, given certain sets of contextual conditions. The morphological operation may be totally responsible for the added utterance meanings, with the wordbase being either neutral (*dogg-y*) or contributory (*dear-ie*, Italian *piccol-ino* 'small-DIM') or even contrary (Italian *gross-ino* 'big-DIM') to the effect pursued.

The Tenets of the Theory

The theory relies on the assumption that pragmatic meanings are not completely derivable from semantic meanings with the help of general pragmatic principles; it favors the claim that a morphopragmatically relevant rule possesses some nonsemantic, autonomous pragmatic feature in its meaning description. In the case of Italian diminutives, for example, the pragmatic effects they obtain cannot be derived from a semantic meaning [small] with its allosemes [unimportant] and [young]. They are based on an autonomous pragmatic feature [fictive], and on a derived, more specific character [nonserious]. Evidence of that is the fact that many of such pragmatic effects can also be obtained by augmentatives, which share with diminutives the pragmatic feature [fictive], but certainly not the semantic meaning [small]. In Italian, saying to somebody:

(1) mangi come un maial-ino
you eat like a pig-DIM
'you eat like a little piggy'

would not sound dissimilar from:

(2) mangi come un maial-one
you eat like a pig-AUGM
'you eat like some huge pig'

In both cases, the suffix is capable of hedging the critical remark, i.e., of downgrading the illocutionary force of the evaluative assertion, via a playful character added. Compare with a nonsuffixed version:

(3) Mangi come un maiale
'you eat like a pig'

which is insulting and likely to cause an angry retort by the addressee.

The playful character, on the other hand, cannot be viewed as a stable connotation of the two suffixes, because, with a change of context (e.g., a sarcastic approach), the same suffixes may turn their meanings into aggravating unpleasantness. See:

(4) Italian: vuoi tener fuori le tue man-ine/one dai miei affari, per favore?
will you keep out the your hand-DIM/AUG-PL from the my business-PL, please?
'why don't you mind your own bloody business'

Fictiveness is conceptualized as a departure from conventionally accepted standards of meaning; it generates a frame of personalized values where such standards glide according to the speaker's evaluation. Fictiveness creates an area of fuzziness, which, in interactional discourse, needs explanations and allows negotiation, as in:

(5) Italian: il tuo articolo è un po' cort-ino
the your article is a little short-DIM
'your article is a bit short, I'm afraid'

A likely rebuttal could be:

(6) che intendi per cort-ino?
what do you mean by short-DIM?

The use of the un-affixed base *corto* (as in *l'articolo è corto* 'the article is short'), by contrast, would activate conventional standards and would not allow meaning negotiation; it might at most trigger a discussion on what is 'short' for an article, due to the meaning relativity of dimensional adjectives.

In Italian, but also in other languages, such as Spanish, Portuguese, German, English, Dutch, Polish, Russian, and others, a diminutive formation produces modifications that may be at the same time relevant for morphosemantics, i.e., denotational diminution and positive or negative connotations, and for morphopragmatics, i.e., fictiveness and its derived character [nonserious], capable of constraining the type of speech situations and of downgrading the strength of the illocutionary force of the entire utterance. So, in the Italian example above, the diminutive formation *un po' cort-ino* 'a bit short-DIM', besides conveying a meaning of semantic diminution, by virtue of its fictive and nonserious character, suits a case of nonofficial evaluation, indicates the speaker's lower responsibility in uttering it and obtains mitigation of the critical remark.

Morphopragmatic effects may even be independent of the denotative meaning of smallness and of connotational meanings of positivity (pleasantness, coziness, etc.), or negativity (meanness, meagerness), or emotionality (endearment, tenderness). Cases are conceivable in which none of these meanings is

actually activated and still morphopragmatic effects obtain, as in:

(7) Italian: ho bisogno di una sua firm-etta qui, per favore
I have need of a your signature-DIM here, please
'well, now, could you just sign here, please?'

where the meaning [small] of the suffix in *firm-etta* is suspended and superseded by its feature [nonserious], which lowers the speaker's responsibility for the face-threatening directive speech act and obtains a downgrading of the deontic imposition of the request and of the requestee's liability in case of noncompliance.

A fictive character is recognizable also in other morphological rules, as, for example, in German and Hungarian excessives. From a semantic viewpoint, excessives are not different from superlatives: like these, they indicate the highest possible degree of a value along a scale, but excessives obtain a fictive upgrading of this extreme, which can be exploited, for example, in paradoxical or sarcastic hyperboles, as in:

(8) German: aber das Aller-schoen-ste kommt erst jetzt
but the EXC-beautiful-SUPERL comes only now
'but the most beautiful of all is about to come up now'

where 'beautiful' is used sarcastically of something unpleasant.

The model also concerns morphopragmatics in inflection, as, for example, Japanese honorifics, particularly the suffix *–masu*, which indexes social and psychological distance in conversation. The honorific system is a matter of morphopragmatics because its sociopragmatic meaning is biuniquely expressed by such suffixes.

New, promising areas of morphopragmatic studies have recently opened up, for example in language acquisition (Dressler, 1997).

Factors Favoring Morphopragmatic Meanings

Child-centered speech situations and the emotionality involved, the ludic character of playfulness among intimates, familiarity and informality in general, sympathy and empathy, but also understatement, euphemism, false modesty, irony and sarcasm, are all factors favoring morphopragmatic meanings of diminutive formations and other morphological rules. In a child-centered speech situation, the feature [nonserious] is constitutive and triggers diminutive formations. Examples are:

(9) who's my lovely little girl-ie?
German: wer komm-erl-t denn da?
who come-DIM-s PART here
'what cute boy is coming here?'

involving emotions and signaling intimate relations between mother and child. The other factors, such as irony, understatement, etc., are regulative. See below:

(10) Italian: un tantino anziano per lei, no? (irony)
a bit-DIM old for her, no?
'a shade old for her, eh?'

(11) Italian: io facevo un ragionamento un po' divers-ino (understatement: downgrading speaker's responsibility; said by a student to a professor)
I made a reasoning a bit different-DIM
'I was approaching the matter slightly differently'

Emotive factors are not primarily connected with diminutive formations, as can be seen from the last example. Constitutive and regulative factors combine in determining the application of the rule, which is also dependent on whether the utterance contains a suitable base for the suffix. Whatever the word chosen as a base ('landing site'), the effects clearly extend to the entire utterance.

See also: Affixation; Cognitive Science: Overview; Concepts; Connotation; Denotation versus Connotation; Diminutives and Augmentatives; Emotion: Stylistic Approaches; Expressive Power of Language; Grammaticalization; Historical and Comparative Linguistics in the 19th Century; Honorifics; Humor: Stylistic Approaches; Inflection and Derivation; Irony: Stylistic Approaches; Irony; Jargon; Language as an Object of Study; Language Development: Morphology; Language Development: Overview; Lexical Semantics: Overview; Lexicalization; Linguistic Anthropology; Linguistics: Approaches; Meaning: Overview of Philosophical Theories; Mitigation; Morphologization; Orality; Politeness Strategies as Linguistic Variables; Politeness; Pragmatics and Semantics; Pragmatics: Overview; Semantics–Pragmatics Boundary; Semiotics: History; Slang, Argot and Ingroup Codes; Speech Acts; Spoken Discourse: Morphophonological Aspects; Syntax-Pragmatics Interface: Overview; Text and Text Analysis; Variation and Language: Overview.

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Morphotactics

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Tactics refers to the ordering of elements at any level of linguistic structure, and the rules that govern this ordering. Morphotactics, then, deals with the possible sequencing of morphemes within words. Researchers studying morphotactics are concerned with the question of why some combinations of morphemes are completely acceptable (e.g., *atomlessness, atomicity*) and others are unacceptable (*atomlessity, atomnessic*). More recently, attention also has turned toward accounting for degrees of acceptability.

A common observation regarding the ordering of affixes concerns the relative ordering of inflectional and derivational affixes. Derivational affixes are affixes which create new words (e.g., *-ity*, *-ness*), as opposed to inflectional affixes (such as plurals, and tense markers) that simply add grammatical information to existing words. In general, where a language has both inflection and derivation, derivational affixes are positioned between the stem and the inflection (Greenberg, 1963). That is, inflections can be added to words that contain derivational morphemes, but derivational morphemes cannot be added to words that contain inflectional affixes.

Inflectional affixes themselves seem to show hierarchies of proximity to the stem (Greenberg, 1963). Bybee (1985) investigated the ordering of verbal inflectional affixes across 50 languages and found a hierarchical ordering of aspect, tense, mood, and person, where aspect tends to appear closest to the stem, and person tends to occur furthest from the stem. This suggests that the ordering of inflectional affixes is governed by a relevance hierarchy, such that the more relevant the meaning of the inflectional morpheme is to the meaning of the verb, the closer it will appear to the verb stem.

Rice (2000) also finds a role for semantic factors in her survey of the highly complex verbal morphology in Athabascan languages. These languages display a systematic relationship between morpheme ordering and scope. In Athabascan languages, the ordering of elements is fixed whenever the scopal relation between them is fixed. This finding is consistent with the more general observation that meanings that are closer to the verb will appear closer to the verb. However, in Athabascan languages, this extends to a wide range of affixes, including derivational affixes. The degree to which this account can be extended to other languages has yet to be explored.

Although semantics certainly plays a role in the ordering of derivational affixes, the literature on derivational affixes has tended to focus on other issues. A particular focus has been the degree to which it is desirable to distinguish between different 'classes' of derivational affixes in order to explain their ordering. This debate has been waged largely on the turf of English derivation. The question of the restrictions on ordering among derivational affixes in English is one of the most debated problems of English morphology. Of the many potential combinations of different affixes, only a very small number actually occur. The challenge is to provide an account that eliminates all of the nonoccurring combinations, but allows those combinations that are attested.

It is well established that, phonologically, English has two types of derivational affixes – those that affect the phonology of the base to which they attach (such as *-ity*, and *-ic*), and those that do not (*-less*, *-hood*)

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(Bloomfield, 1933; Newman, 1946). Chomsky and Halle (1968) label the former nonneutral affixes, which create a weak boundary (+), and the latter neutral affixes, which create a strong boundary (#).

Siegel (1974) proposed that this phonological division correlates with a morphological division in terms of the potential ordering of the morphemes involved. The basic claim of Siegel's Affix-Ordering Generalization is that affixation occurs at two different strata – commonly known as level 1 and level 2. Level 1 affixation occurs prior to level 2 affixation, and so, as a consequence, no level 1 affix can attach outside of any level 2 affix.

Many attempts to account for apparent restrictions on affix ordering in English have invoked some form of the affix-ordering generalization. The affix-ordering generalization also is known as the level-ordering hypothesis, and forms a part of most models of lexical phonology. Some common English suffixes and prefixes and their proposed strata membership are as follows:

(1) Level I suffixes: +ion, +ity, +y, +al, +ic, +ate, +ous, +ive, +able, +ize
Level I prefixes: re+, con+, de+, sub+, pre+, in+, en+, be+
Level II suffixes: #ness, #less, #hood, #ful, #ly, #y, #like, #ist, #able, #ize
Level II prefixes: re#, sub#, un#, non#, de#, semi#, anti#
(Spencer, 1991: 79)

As noted, level 1 affixes may cause various phonological changes in the stems to which they attach, whereas level 2 affixes do not. The affixes belonging to each level share various additional properties. For example, level 1 affixes tend to be Latinate, whereas level 2 affixes tend to be Germanic. In addition, level 1 affixes can attach to bound roots, and tend to be phonologically and semantically less transparent than level 2 affixes. Crucially, in terms of accounting for morphotactics, level 1 affixes may not attach outside level 2 affixes. Thus, the affix-ordering generalization can account for the acceptability of *atomlessness* and *atomicity*, and correctly rules out *atomlessity* and *atomnessic,* both of which contain a level 1 affix attached after a level 2 affix.

Authors who have utilized stratum-based models along these general lines include Siegel (1974), Allen (1978), Selkirk (1982), Kiparsky (1982), Mohanan (1986), and Giegerich (1999). Most authors also incorporate compounding and inflection into their level-ordered approaches, although there is variation in exactly where this is done, and how many levels result. Level-ordered approaches have achieved explanatory power in languages other than English, although the number of proposed levels varies, as do the criteria on which the levels are differentiated. Booij (2001) identifies the following languages as having received level-ordered treatments of morphotactics: Dutch, Malayam, Dakota, Mandarin, Icelandic, German, Igbo, Italian, Basque, and Turkish.

Several different types of objections to the affix-ordering generalization have been made. Although level ordering appears to rule out a large number of unattested affix combinations, it does not make any predictions about possible and impossible combinations within a given level. In fact, it predicts that all combinations of affixes within a level should theoretically be possible.

Fabb (1988) investigates the possible combinations of 43 English suffixes. He finds that syntactic restrictions, together with level-ordering constraints, limit the possible combinations of these suffixes to 459. However, of these 459, only 50 are actually attested. Thus, the power of the level-ordering hypothesis is not as strong as first appeared – it does rule out some unattested combinations of affixes, but it leaves many more unexplained. Fabb argues that English morphotactics solely result from the selectional restrictions held by individual affixes. That is, each affix has certain phonological, semantic, and syntactic restrictions, which limit the type of base it can attach to. One of the most widespread restrictions is a restriction against attaching to an already suffixed word. Because such restrictions are necessary to account for cooccurrence patterns within each level, then they also are likely to operate across levels. This renders the levels themselves redundant, at least in terms of explaining affix ordering.

A related approach (Plag, 1996) ascribes the morphotactic patterns to selectional restrictions but positions the restrictions with the base, rather than the affix. In a base-driven approach, each stem or affix contains specifications restricting what can attach to it. This differs from an affix-driven approach, in which each affix contains specifications restricting what it can attach to.

Hay (2002, 2003) proposes an account of ordering that is based on parsability: *complexity-based ordering*. Complexity-based ordering claims that many constraints on ordering are a result of general language-processing mechanisms. Some affixes are very easy to parse, and words containing these affixes are likely to be accessed via their parts in speech perception. Other affixes are much less parsable, and words containing them are likely to be accessed whole in speech perception. Complexity-based ordering maintains that less parsable affixes, cannot attach to more parsable affixes.

This account captures one of the primary insights of the affix-ordering generalization. Affixes create

different boundary strengths, and there is some relationship between boundary strength and ordering. However, this insight is extended by considering boundary strength to be gradient, and a function of decomposability in speech perception. The overall prediction is that the less phonologically segmentable, the less transparent, the less frequent, and the less productive an affix is, the more resistant it will be to attaching to already affixed words. Hay and Plag (2004) investigate a set of English suffixes, and demonstrate that they can be ordered on a hierarchy of boundary strength, with suffixes with weaker boundaries being located closer to the base, and with suffixes with stronger boundaries being located further away from the base. Although this new approach looks promising, it remains to be tested in other languages, and with further empirical data.

See also: Lexical Phonology and Morphology.

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Anna Elbina Laura Margherita Morpurgo Davies, Diebold Professor of Comparative Philology, Emerita, at the University of Oxford, is the most distinguished living historical linguist in the United Kingdom. An Italian national from a prominent academic family, she was born in Milan on June 21, 1937 but has spent nearly her entire career at Oxford, where she was for seven years University Lecturer in Comparative Philology before being named in 1971 to what would come to be called the Diebold Professorship, a position she held for a record 33 years. The recipient of numerous honors from universities and academies the world over, she was awarded an Honorary DBE in 2000 for services to philology and was presented with a festschrift with 42 contributions on the occasion of her retirement in 2004.

The hallmark of Morpurgo Davies's scholarship is the careful analysis of large bodies of often difficult data. She is best known for her pioneering work in three quite distinct areas: the interpretation of Ancient Greek dialects, particularly Mycenaean (Linear B), but also Arcado-Cyprian, Thessalian, and others; the decipherment and analysis of the Anatolian language Hieroglyphic Luvian; and the elucidation of the history of linguistics, especially in the 19th century. In addition to numerous reviews and encyclopedia entries, Morpurgo Davies has written nearly 70 articles in major academic venues and is the author of three books (one in each of the subjects just mentioned) and the co-editor of two more. A focus

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In 1973, Morpurgo Davies published, together with J. D. Hawkins and Günter Neumann, *Hittite hieroglyphs and Luwian: new evidence for the connection*, a work that established the readings of a number of critical Luvian hieroglyphs. The discoveries reported there and in subsequent articles, many with Hawkins as co-author, have laid the foundation for the serious study of Hieroglyphic Luvian, the only Indo-European language written in an indubitably indigenous system.

Finally, in a series of papers and a 1998 book, *Nineteenth-century linguistics* (written in English but published earlier in Italian), Morpurgo Davies has chronicled the exciting and often choppy development of linguistic ideas in Europe from, roughly speaking, Franz Bopp to Karl Brugmann.

See also: Bopp, Franz (1791–1867); Brugmann, Karl (1849–1919); Classical Antiquity: Language Study; Greek, Ancient.

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Charles William Morris was born in Denver, Colorado on May 23, 1901 and died in Gainesville, Florida, on January 15, 1979.

He studied at the University of Chicago, and received his Ph.D. in philosophy in 1925. His academic career included the jobs of instructor at the Rice Institute (1925–1931), Associate Professor (1931–1947) and lecturer (1948–1958) at the University of Chicago, and Research Professor at the University of Florida. He also taught at Harvard and at the University of Texas.

In 1934, Morris edited the collection of lectures *Mind, self, and society* by his former Professor George Herbert Mead.

Morris was interested in logical positivism, and in scientific empiricism as promoted by the Vienna Circle. He dealt in formal logic (along the line inaugurated by Rudolph Carnap), behavioral psychology, and language philosophy. He participated in the international congresses of the philosophy of science (Prague 1934, Paris 1935).

From the beginning of the 1930s, Morris gave the very first course in semiotics (so labeled). He thought a close interdependence existed between science and semiotics. Consequently, in his first major work, *Foundations to a theory of signs* (1938), Morris claims that science is "at once a language, a knowledge of objects, and a type of activity." The *Foundations* were originally intended as the first volume of an *International encyclopedia of unified science* (a project promoted by Neurath and Carnap). The basic idea in this work is the tripartition of semiotics into syntactics, semantics, and pragmatics. This distinction was also adopted in linguistics. Pragmatics, as studied by contemporary linguistics, originates in Morris' idea of a branch of semiotics concerned with "the relations of signs to their interpreters."

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Charles W. Morris (1901–1979), who spent most of his scholarly life at the University of Chicago, influenced both semiotics and linguistics from the 1930s through the 1950s. In semiotics he formed a bridge between Charles S. Peirce's abstractly tenebrous works and the foundation in 1962 of the modern discipline, with its growing scientific emphases; in linguistics he promoted pragmatics, the study of language as people actually use it. To both disciplines he brought the belief that the study of signs would advance the unity of science; this faith, which his best-known student later conceded was largely restricted to "programmatic announcements" (Sebeok, 1979: 65), was advanced in his 'Foundations of the theory of signs' (1938) – a chapter in a volume entitled *Foundations of the unity of science: toward an international encyclopedia of unified science* – and in later works such as *Signs, language, and behavior* (1955) and *Signification and significance* (1964). The 'unity of science' now seems a rather quixotic endeavor, but Morris's ecumenical influence can still be discerned wherever biologists characterize how other creatures (and even plants) signal to one another (e.g., Frings and Frings, 1964; Sebeok, 1968; Krampen, 1981) and in the semiotic notion that the means by which biotic sign users send and receive signs is a cardinal aspect of signs themselves (for Morris, their 'sign-vehicles'). In this respect Morris argued for charging Peirce's notion of the interpretant, an abstraction, with physical reality, thus beneficially altering the modern notion of semiosis, the transmission of signification, so that it acknowledged that sign-vehicles are affected by brains and bodies. This view led ultimately to cognitive semiotics and an examination of how signs owe their forms to their senders' and receivers' (neuro-)anatomies (Watt, 1993, 2002). So while Peirce's interpretants were divorced from animal corporeality, Morris's interpreters received their signs with real eyes and ears.

Morris's most lasting concerns may seem obvious in retrospect, but he deserves credit for having promoted them when both modern psychology and semiotics were in their formative stages. There was little novelty in his 'programmatic announcements'; nobody in linguistics, often an inspiration for the rest of semiotics, had ever doubted that the sounds of language are emitted by real tongues and vocal cavities. But his insistence that **all** signs habitually sent and received derive their 'vehicles' from the physiology of their senders and receivers proved influential

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within semiotics during and after the transitional decades he dominated.

Morris promoted another advance over Peirce's central foci when he evinced an interest in the relations obtaining within semiotic systems between sign and sign (see e.g., Morris, 1938: 84–85, 1955: 217–219). Such sign–sign relations, the very sinew of the morphologies and syntaxes of languages, prove to bind together other semiotic systems as diverse as alphabetic letters (Watt, 1981), Chinese characters (Wang, 1983), and heraldic arms (Mounin, 1986).

In sum, though all of Morris's writings on semiotics might now be viewed as having been at the level of tutorials, they were nevertheless influential at a time when just such tutorials were what was needed.

See also: Morris, Charles (1901–1979); Pragmatics: History; Pragmatics: Overview; Semiosis; Semiotics: History; Sign Theories.

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Morrobalama (Umbuygamu) is an endangered Australian Aboriginal language of the Cape York Peninsula in northern Australia. Originally spoken in Princess Charlotte Bay on the eastern coast of Cape York, its speakers were forcibly displaced from the region in the early 1960s. A handful of remaining speakers now live in the Cape York towns of Umagico and Coen. Morrobalama is atypical of most Australian languages in its phonemic inventory but typical in all other respects: it is nonprefixing with nominal case inflections, verbal inflections, and pronominal cross-referencing. It has free word order with a complex verbal structure that includes a fixed order of verbal stems, tense/aspect markers, and pronominal clitics.

With the other languages of the Princess Charlotte Bay region – Lama-Lama, Umbindhamu, Rimanggudinhma (Mbariman-Gudhinma), and the Flinders Island language – Morrobalama forms a subgroup of the northern Paman languages known by some linguists as the 'Lamalamic' languages or 'Bay Paman.' While speakers of the language refer to it as 'Morrobalama,' it is also called 'Umbuygamu' in the neighboring Umpila language, and this name had been used by linguists for many years. 'Morrobalama' is now the name preferred by both speakers and linguists (see Dixon, 2002: xxxi).

Australian languages are known to be relatively homogeneous in their phonemic inventories. Typically they display four to six paired stops and nasals (labial, apico-alveolar, apico-postalveolar, lamino-dental, lamino-palatal, and dorso-velar), two rhotics (trill and retroflex), no fricatives, no voicing contrasts, and a three-vowel system. In contrast, Morrobalama has a large phonemic inventory that includes atypical sounds such as fricatives, prestopped nasals, voicing contrasts, and a system of five vowels that contrast in length. More thorough analysis is needed of the sound system, but it may have seven places of articulation, including two laminal series (dental and palatal), three rhotics (two of which contrast in voice), two glides, and a glottal stop which is only found in a few other Australian languages (in western Australia and in Arnhem Land). While a typical Australian inventory

within semiotics during and after the transitional decades he dominated.

Morris promoted another advance over Peirce's central foci when he evinced an interest in the relations obtaining within semiotic systems between sign and sign (see e.g., Morris, 1938: 84–85, 1955: 217–219). Such sign–sign relations, the very sinew of the morphologies and syntaxes of languages, prove to bind together other semiotic systems as diverse as alphabetic letters (Watt, 1981), Chinese characters (Wang, 1983), and heraldic arms (Mounin, 1986).

In sum, though all of Morris's writings on semiotics might now be viewed as having been at the level of tutorials, they were nevertheless influential at a time when just such tutorials were what was needed.

See also: Morris, Charles (1901–1979); Pragmatics: History; Pragmatics: Overview; Semiosis; Semiotics: History; Sign Theories.

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Morrobalama

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consists of seventeen phonemes, the Morrobalama inventory has expanded to include thirty-six phonemes.

Morrobalama and other languages of Cape York have undergone phonological changes that may at first glance make them appear unrelated to other Australian languages. One such well-described change is the loss of the initial consonant (in the case of Morrobalama) or the initial syllable (in the case of other Princess Charlotte Bay languages). Thus, for example, **nyura* 'you (all)' has become *orha* and **nyulu* 's/he' has become *ola*. Initial dropping also occurs in other languages in separate parts of Australia, such as Nhanda in western Australia and Arrernte in central Australia.

Morphologically, Morrobalama is typical of most Australian languages in that it displays a split-ergative system: nouns operate in an absolutive/ergative paradigm, while pronouns are nominative/accusative. Thus in Morrobalama, absolutive is marked by zero on both the subject of an intransitive verb and the object of a transitive verb, and the ergative is marked by *-a* suffixed to the subject of a transitive verb. Pronouns have three numbers – singular, dual, and plural – and distinguish inclusive and exclusive in first-person dual and plural. They can occur both independently or bound, and when bound, occur as the final constituent of the verbal structure with the initial vowel dropped. So the independent pronoun *ola* 's/he' becomes bound as *-la*:

ola	nya – la – nan
3RD.SING.ACC	hit-3RD.SING.ACC. she-2ND. SING. OBJ. you
'she (emph.) hit you'	

This example also shows a typical Australian word-order feature: order is generally free, but there is a tendency for it to be based on pragmatic rather than grammatical principles, in which the emphasized phrase occurs first. In Morrobalama, all verbs must include at least a verbal stem plus a pronominal subject clitic; order of the clitics is free. Other suffixation on the verb marks tense, aspect, and mood (TAM). There is fixed order within the verbal structure (stem-TAM-PRO).

As is typical in Australian languages, Morrobalama derives new words via suffixes. For example, the comitative case *-pinh* acts as a lexical formative by being suffixed to a word to form a compound *x-pinh*, meaning 'with or having x':

ithi-pinh	lirrin-pinha	marr-pinh
bone-COM	smoke-COM	face-COM
('with bone')	('with smoke')	('with face')
'bony bream'	'steam boat'	'red-faced flying fox'

Most compounds, though, are of the 'general-specific' type, with stress falling on the specific element as though the general component acted as a clitic:

lam-eethal	lam-agaparr
hand-bone	hand-belly
'back of the hand'	'palm of the hand'

Morrobalama has not been passed on to the next generation, which speaks Cape York Creole (Torres Strait Creole) instead and, given the age of the few current speakers, it will probably disappear in the next decade unless intense language revitalization takes place.

See also: Arrernte; Australia: Language Situation; Pidgins and Creoles: Overview.

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Mother Tongue Education: Nonstandard Language

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Historical Background

Mother tongue education became a political, pedagogical, and linguistic issue when formative education became in principle universally available to every citizen and formalized education came under the centralized control of the state in the modern period. It came then to refer restrictively to minority language education inclusive of minorities of endemic and migrant languages. The issue of mother tongue education came to the forefront during decolonization after World War II when the newly independent nations gave a new political and educational role to their native languages and when they formulated new policies about language use in education. The tendency of the new states was to give primacy to the mother tongue of the majority in education, and to designate it as the national language. The mother tongues of minorities, who were weak not just numerically, but politically and economically, too, were given a marginal place, or none at all, in education.

United Nations Formulation

The United Nations recommended in 1951 the favoring of mother tongue education for all linguistic communities through a UNESCO report that drew on the experience and research findings of experts and on its declaration of human rights, which proclaimed in 1948 that "everyone is entitled to all rights and freedoms...without distinction of any kind such as...language" (Article 2). This report, called *The Use of Vernacular Languages in Education* (UNESCO, 1953), is the basis of subsequent developments in educational policy and programs in mother tongue education around the world. Mother tongue education in this report includes development of literacy skills in the mother tongue and development of subject knowledge and skills through the mother tongue. The recommendation for using mother tongue in education, irrespective of speakers' political and economic position in the country they are living in, was reiterated in 2003 by UNESCO in its position paper titled *Education in a Multilingual World* (UNESCO, 2003). This reiteration draws its support for the earlier position on the use of mother tongue in education from various subsequent United Nations declarations and conventions such as Convention against Discrimination in Education (1960, Article 5), International Covenant on Civil and Political Rights (1966, Article 27), Declaration on Race and Racial Prejudice (1978, Article 9), Declaration of the Human Rights [of those] who are not Nationals of the Country in which they live (1985, Article 5), ILO Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries (1989, Article 28), Convention on the Rights of the Child (1989, Article 29), International Convention on the Protection of the Rights of all Migrant Workers and Members of their Families (1990, Article 45), Declaration on the Rights of Persons belonging to National or Ethnic, Religious Minorities (1992, Article 4), Declaration on Integrated Framework of Action on Education for Peace, Human Rights and Democracy (1995, Article 19), and Universal Declaration on Cultural Diversity (2001, Article 6). All these documents sanction the right to learn and use one's mother tongue and, when combined with the right to education, cover the right to learn the mother tongue in schools and use it there. This recommendation made in different civil contexts shows that there is continuity in the international support for mother tongue education over half a century. There are, however, hedges and loopholes in the language of the recommendation to use mother tongue in education, which give enough room for states to procrastinate (Skutnabb-Kangas and Phillipson, 1994: 71–110).

Supporting Grounds

Mother tongue education is supported on ideological and pedagogical grounds. Ideologically, it is an aspect of language rights, which are a component of human rights and a way of protection from discrimination by language. Pedagogically, it aims to close the gap between language use at home and in school and to make seamless the progression of children from primary to secondary socialization. It also aims to improve academic performance and to develop positive attitudes in speakers about their linguistic and cultural heritage. Intergenerational transmission of language motivated by the pride of minorities in their language by use in a public domain is critical for the maintenance of language and cultural diversity in the world.

Definitional Problem

Two questions about mother tongue education give rise to interminable debate and delay in its execution. The conceptual question is how to define and identify a mother tongue. There are multiple interpretations of the term (Skutnabb-Kangas, 1981: 12–57), which

include the language in which one has primary competence, the language which gives identity and a sense of belonging, the language used extensively in daily life, and the language one learned first at home. Each of these meanings may assign a different language to be the mother tongue of a person. The other problem is of multiple identity with, equal competence in, and simultaneous acquisition of more than one language. In a multilingual situation, speakers have a repertoire of languages, which meet these criteria differently, and not one mother tongue. The solution is to leave the choice of the mother tongue for education to the speakers, not to the state. The programmatic question is how long the mother tongue will be taught as a language in school and used as a medium of instruction there. It is possible, even desirable, to teach the mother tongue as a language even after it ceases to be a medium of instruction. The decision about duration is normally decided by the state through political and economic considerations. The political consideration may express itself in pedagogical terms through disputable notions such as language load and unequal distribution of load between majority and minority language speaking students (Srivastava *et al.*, 1978). The view gaining greater acceptance among linguists and activists is that the rights and desires of the linguistic community about the introduction and duration of mother tongue education must outweigh the concerns of the state.

As mother tongue in the context of education refers to minority mother tongue, the definitional problem of the qualifying term minority raises legal questions of interpretation. Because it is a relational term, the question of frame of reference being the country, the state, or the county arises. There is also legal differentiation among kinds of minorities, and international laws apply differently to them (de Varennes, 1996: 129–173).

Various Models

The various models of mother tongue education address in different ways the questions of purpose, duration, and load about mother tongue education. All of them share the goal that it should not exclude the learning of the majority language, which is most likely the official language of the state, in which the government is run, and the dominant language for the political and economic advantages it grants to its speakers. The education models integrate the dominant language in some way in a bilingual education program. They, differ, however, on the goals of using the mother tongue in education. The difference lies basically in using it as a means of learning the dominant language and also viewing it to be an end in itself, such as promoting diversity in world view and creativity.

A long-standing model is bilingual (or multilingual) education (Crawford, 1995), in which the use of two (or more) media – the mother tongue and the dominant language – in the educational process, is combined in different ways motivated by ideologies and sociolinguistic situations in which the mother tongue is located. One basic difference between the models is whether the mother tongue and the dominant language are used simultaneously as the media of instruction by distributing them over the subjects taught or used sequentially starting with the mother tongue and switching over to the dominant language. In the former, either set of students can have their mother tongue or their non-mother tongue as the medium. The second variation is called immersion learning, which aims at students mastering the non-mother tongue, i.e., as a second language. This works when both languages have comparable economic, social, and cultural importance for their speakers as, for example, French and English do in Montreal (Lambert and Tucker, 1972). This is more a model for additive bilingualism through second language learning than for education in the mother tongue. The model that uses the medium of mother tongue minimally is the one that uses the mother tongue when teaching the language itself and not any other subject. This is a model for first language learning and not for use of mother tongue in education. Medium of instruction in a language comprehensively refers to the use of that language in teaching materials, classroom interaction, and examination. Use of the mother tongue only in classroom interaction by students does not qualify it to be a bilingual education model.

Experimental Results

The models were tested in different parts of the world and gave widely varying results with regard to academic achievement in the languages and the subjects (Cummins, 1981: 3–49; Rivera, 1984; Srivastava and Ramasamy, 2001: 29–43). The results relating to personality development and attitude toward mother tongue also vary. The variations in findings relate to variables such as the status difference in the two languages, socioeconomic background of students, community involvement, commitment of the teachers and the educational establishment, and so on. One universal finding, however, is that bilingual education aids acquisition of strong literacy skills in both the mother tongue and the dominant language (Swain *et al.*, 1990). Another repeated finding is that community involvement greatly contributes to

successfully achieving the objectives of bilingual education (May, 1999).

Resistance

In spite of consensus among the states, the shared opinion of experts in linguistics and education, and important positive findings of bilingual education experiments, there is resistance to mother tongue education at political, bureaucratic, and community levels. The political concern is the presumed threat of mother tongue education to national unity by hindering assimilation of the linguistic minorities with the majority and by the minority recipients making claims for territorial autonomy or devolution of power. But the historical evidence is that non-recognition of the minority mother tongue has led to conflicts and separation in a polity that otherwise allows its people freedom of expression. The bureaucratic reluctance stems from the mistaken notion that the minority mother tongues often do not have a grammar or literature to teach in the schools and that there is dearth of trained teachers who speak the mother tongue. This misses the logic of language development, according to which the grammar and literature come to be written down after the speakers become literate in the language; literacy in the mother tongue is a prerequisite for teachers to develop in the minority community. The apprehension about the cost in providing mother tongue education entertained by governments does not count the social cost of not doing it, of which the educational failure of the minority students is only a part. The solution suggested that, while the government has a supportive policy, the actual cost of mother tongue education should be borne by the minority community is discriminatory, which international declarations prohibit.

Community Response

The reservations of the minority community come from the suspicion that mother tongue education is a ploy of those in power to keep them perpetually marginalized, or the belief that their language is a liability for them to progress, which is ingrained subliminally in their minds by the negative articulation of the value of their language by the dominant language speakers. This reservation will disappear when they are convinced by non-partisan players in education that such fear and belief are unfounded empirically. The realization that mother tongue education is not exclusive of acquiring skills in the dominant language and that it actually aids its acquisition will bring in community support and involvement for the success of mother tongue education. Such awareness will also help the minority communities to exercise their right to the use of language in education prudently in favor of their mother tongue, and not in favor of the dominant language, as it is found in some places (Annamalai, 2000: 87–92).

Language Rights and Pedagogical Rationale

Mother tongue education stands on the two legs of linguistic human rights and pedagogical prudence. The two legs do not stand parallel when mother tongue stands as a symbol of identity without competence. When this is the case, teaching of the mother tongue (the right to language) and the medium of instruction (the right pedagogical tool) get separated. When the mother tongue is not the language of early childhood experience, i.e., the language learned competently at home and in the streets to relate oneself to the world, it is possible in the midst of this separation to teach the mother tongue as a new language and to use the language of early childhood experience for curricular instruction while the mother tongue gradually becomes the medium of life experience.

See also: Bilingualism and Second Language Learning; Language Policy in Multilingual Educational Contexts; Language Teaching Traditions: Second Language.

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Mother Tongue Education: Standard Language

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Education, ideally, should start in the mother tongue of the learners. That is the conclusion of research over more than half a century (UNESCO, 1953, 2004). Yet the reality of mother tongue education reflects more complex issues. Policies on which language (or languages) is used in primary and secondary education depends on political, social, economic and historic factors. An irony is that in former colonies the language of education is often the colonial language and not any indigenous mother tongue. There are several reasons for this:

- The existing educational system at the time of liberation used the colonial language.
- Those who had been previously educated, including teachers, had learned a colonial curriculum in a colonial language.
- The colonial language may be the only one in wide enough use to qualify as a unifying national language.
- It is economically and linguistically impractical to educate teachers and produce instructional materials in a range of mother tongues.
- The governmental, legal and business groups are likely to expect use of the colonial language.
- In South Africa, mother tongue education was a device used for segregation under the apartheid policies of the ruling party.

Children have a universal ability to learn the languages they need so in African countries, for example, it is common for children to know two or more languages before coming to school and then learn a new one in school.

In some countries, such as the Philippines, one official language may be used in instruction but not be the mother tongue of the majority of people. English still plays an important role there, and there is

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In some countries, such as the Philippines, one official language may be used in instruction but not be the mother tongue of the majority of people. English still plays an important role there, and there is

a policy of providing at least primary education in several regional mother tongues.

Countries with immigrant populations show variation in providing instruction in the mother tongue of each group. Singapore has four official languages: English, Mandarin Chinese, Tamil, and Malay. Hong Kong, now part of China, retains English and Cantonese for instruction though Mandarin is the national language. Some schools are switching from English to Cantonese. Britain has had a policy of providing mother tongue teachers where sufficient numbers exist in a school. Finland provides instruction in Finnish or Swedish though less than 10% of its citizens are Swedish speakers. Kazakhstan, a former Soviet Republic provides schools in Russian or Kazakh. Canada has two official languages, French and English, but also provides mother tongue immersion programs in indigenous Indian languages and European minority languages. In Haiti, the mother tongue instruction is not French but Haitian Creole. In nearby Aruba, however, instruction is in Dutch and not Papiamento, the Creole mother tongue.

All languages are actually families of dialects that are, more or less, mutually comprehensible. When dialects are not mutually comprehensible, they are considered separate languages. For example in Spain, Catalonia has its own language that is not a dialect of Spanish and is now the language of instruction in some communities. What the Chinese refer to as dialects are actually related languages since a speaker of Shanghai dialect cannot understand a speaker of Cantonese.

So the issue of what is and what is not a mother tongue is not a simple one.

Standards and Conventions in Mother Tongues

Education, whether in national language or mother tongue, traditionally involves using 'a standard' or idealized prestige form. In Italy, the saying is standard Italian is Florentine Italian from a Roman mouth. The standard form of Arabic used in writing is no one's mother tongue. In fact, becoming literate in Arabic involves virtually learning a second language.

Language is both personal and social invention. All humans have the ability to create language, to invent it. That is why there is so much linguistic diversity in the world. But language communities share conventions in order to serve their communicative needs. Children invent language as they develop within the conventions of the community language(s). We need to make a distinction between standard language and linguistic conventions as a base for a discussion of standard language.

- Language develops conventions for its use in all its aspects to serve its social functions.
- Conventions are based on and changed by the inventions of the language community.
- Language communities are not homogeneous; each group (age, race, ethnicity, region, profession, class) will develop its own conventions.
- Conventions allow for a high degree of variability which is resolved as users make sense of language.

Linguistic conventions and standard language are not the same thing. The term, standard language, carries with it nonlinguistic judgments. Different people within any community have different social status that may result from their economic, political, or religious positions. In England, high-status language is the Queen's English or Received Pronunciation.

Historically, conquerors imposed their language or dialect on the conquered people. By contrast, as rural people migrated to the cities, they continued to use their dialects because they lived separately from groups there before them.

It is not surprising that people have confused linguistic difference with linguistic deficiency. Its not surprising either that people believe that their neighbors will get along better and behave more acceptably if they learn to speak the 'standard language.'

What Is Standard?

The noun use of standard in English produced a verb form: to standardize, to make something uniform, and reduce variation. In industry, things that are not standard are neither good nor bad, though they may be problematic. Most of us would prefer a custom-made car, suit or dress, or house to a standard one. But in discussing language, the standard becomes the epitome of quality. That leads to terms like substandard and nonstandard to characterize everything or everyone else.

Napoleon created the French Academy to standardize the French language. Spain has its Royal Academy. Israel established an Academy to control the transition of Hebrew from a classical language to a living language. But no authority has ever succeeded in standardizing language. Even where there are official bodies, the standards they establish involve nonlinguistic factors. In Israel, often by the time the Academy has announced a standard term, popular terms have already become conventional.

Standard language does not match the conventions of any dialect in use, partly because of the aspects of dynamic change. Standard language is a myth that fits a powerful popular belief. It is that linguistic correctness has an existence outside of the normal processes

of language development. Partly that is because of the desire of upwardly mobile people to sound like people with prestige. Partly that is because of traditions that assigned the schools the job of socializing every pupil into a standard language and culture. Scientific linguistic concepts have had a hard time penetrating a curricular tradition that legitimates the imposition of school grammar on the living language of pupils.

Standard Spelling

Spelling is the one area in which standardization has been most successful. Standard spelling facilitates the work of printers and serves the needs of writers. Printers chose to standardize spelling across dialects rather than print different editions for each community. Noah Webster led a group who wanted to see the development of an American literature distinct from British literature. So he deliberately used spelling in his dictionary that differed from British spellings.

But standardizing spelling involves a trade-off. Alphabetic writing builds into the orthography some level of correspondence to the phonology of a language. But phonology varies greatly among dialects. By opting to standardize spelling, deviations from the alphabetic principle result. And over time the deviations become greater. The Scandinavian languages, Danish, Swedish, and Norwegian, although closely related, have spelling standards that differ considerably from each other.

Children learning to read and write with standardized spelling face a linguistic anomaly. An important part of learning language is moving toward the conventions of the social language. Within dialects, these conventions are quite consistent. So learners test out their inventions against the conventions of the language they hear. Standard spellings cannot match young readers' and writers' inventions. In fact studies of the invented spellings of young writers show their remarkably keen perceptions of the oral language as they hear it. (Read, 1975, 1986; Ferreiro *et al.*, 1996) Their consistent inventions show their growing control of the alphabetic principle: that there is a systematic correspondence not simply in matching sounds and letters; rather they match spelling patterns and phonological patterns.

Reading plays a major role in learning standard spellings. Readers see spellings that do not match their inventions and move to the standard forms in their writing. It takes a lot of reading and writing to become a conventional speller. Inhibiting the willingness of readers to take risks and invent spelling gets in the way of this natural progression.

In writing his 18th-century English dictionary, Samuel Johnson warned lexicographers against the folly of thinking that they could fix language at a point in time and preserve it from change. Dictionary makers take on the job of recording the meanings and spellings of words in use at the time they are working. The myth of the dictionary as the arbiter of standard language turns reality on its head. Dictionaries record the words in use and attempt to represent their meaning to the users. But by popular mythology it is turned into the authority for deciding whether words may be used and how. A dictionary may be useful as a tool to check whether the meaning of a word encountered in reading fits the ones in the dictionary. Even professional writers may need to use words and not be sure of the standard spelling.

Written Language Standards

Many people see written language as a single standard form unlike oral language. In fact, this is an area in which conventions are most confused with standards. Within written genre there are often conventions accepted by those that use the genre. There are conventions for essays, short stories, menus, business letters, receipts, and recipes. However formal these are, their conventions have been socially constructed and they change overtime. Authorities may presume to tell people how to write a business letter, how to write a novel, or a five-paragraph essay, but each written genre has conventions quite independent of such authorities. Often, attempts by schools to impose standards for a particular written genre lead to unsuccessful writing.

Schools and Standard Language

Schools traditionally have been regarded as having the right and duty to standardize the language of their pupils, often rejecting the language of the learners as substandard. In this view, difference is deficiency – even the differences in the ways high-status dialects vary from the school grammar. Too much time and energy is spent on teaching such standard features as avoidance of double negatives in English, for example. In reading instruction, children are corrected for use of their home dialect. In writing, some strange standards are taught that have no basis in the actual conventions, such as "do not end sentences with prepositions." Disproportionate instructional time is spent on the form of language to the exclusion of meaningful expression.

Although it is a school goal to support learners in developing the flexibility to use a range of registers in multiple contexts, it is not their function to standardize language. Schools should help pupils to be confident, effective language users. Developing readers

should read for pleasure and a full range of other functions. They should learn to write confidently and develop their own voices; and they should expand on their ability to speak and understand spoken language(s). In school, learners should feel free to take risks in language and experiment with new forms, words and styles. None of this translates into the rigidity of traditional school standards.

Supporting Language Development

Whether they teach in the mother tongue or in a national language, school language curricula should support expansion of language, building on the mother tongue of the learners. In language development at all levels, there is constant disequilibrium between the inventions of the learner and the conventions of the language. Learners should be encouraged to take risks as they learn a new language or as they use new forms of their first language or a new genre. In this push and pull they move toward the conventions of the language form and use it successfully. Language learners should be encouraged to study language variation in their own communities. Students take on the role of linguists as they inquire into language processes and their uses.

Schools have tended to suppress linguistic invention pushing learners toward an oversimplified or misrepresented version of the conventional language. Rather, pupils should be invited to participate in authentic speech acts and literacy events in which they encounter socially constructed conventions. Teachers can play a powerful role in demonstrating the conventions in their own authentic language use and in mediating the students as they experience the richness of language in its multiple forms and functions.

See also: Educational Linguistics; Language Policies: Policies on Language in Europe; Language Policy in Multilingual Educational Contexts.

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Motivation and Attitudes in Second Language Learning

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The concepts of motivation and attitudes have been associated with individual differences in second language learning since at least the 1950s, and over the years numerous perspectives and issues have developed. The corresponding research has been intensive and varied, and today there exist many different constructs and theoretical models seeking to explain individual differences in second language learning and use. The intent of this article is to consider the area in general, to discuss some of the more dominant perspectives and theoretical models, and to review some of the issues that are of interest to researchers and educators in this field.

Motivation Defined

The term motivation is used in the area of language learning with many definitions, processes, and measures proposed, and this variety is shared with the general area of psychology. In the early history of psychology, motivation was considered variously in terms of reinforcement, instincts, expectancy, valence, needs, and drive reduction. Recently, there has been more of a focus on process-oriented conceptualizations, including but not limited to curiosity, self-determination, causal attributions, and goal setting.

Some of the conceptualizations referred to above are represented in one form or another in the area of motivation in second language learning, and there have been calls for more attention to be given to others (see, for example, Crookes and Schmidt,

should read for pleasure and a full range of other functions. They should learn to write confidently and develop their own voices; and they should expand on their ability to speak and understand spoken language(s). In school, learners should feel free to take risks in language and experiment with new forms, words and styles. None of this translates into the rigidity of traditional school standards.

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Some of the conceptualizations referred to above are represented in one form or another in the area of motivation in second language learning, and there have been calls for more attention to be given to others (see, for example, Crookes and Schmidt,

1991; Oxford and Shearin, 1994). Dörnyei and Ottó provided a formal definition of motivation as "the dynamically changing cumulative arousal in a person that initiates, directs, coordinates, amplifies, terminates, and evaluates the cognitive and motor processes whereby initial wishes and desires are selected, prioritised, operationalised, and (successfully or unsuccessfully) acted out" (1998: 65). This is a very comprehensive definition but it might not be accepted by all researchers. In fact, in his excellent book on motivation and second language acquisition, Dörnyei pointed out that most agreement would be obtained from researchers that motivation concerns the direction and magnitude of behavior, and that it is "responsible for *why* people decide to do something, *how long* they are willing to sustain the activity, and *how hard* they are going to pursue it" (2001: 8; italics in the original). This latter characterization is closer to that proposed by Gardner, who defined motivation in second language acquisition as "the combination of effort plus desire to achieve the goal of learning the language plus favourable attitudes toward learning the language" (1985: 10).

Attitudes Defined

The term attitude is also used quite extensively in the language-learning literature, and it too has a very large number of associated linkages. An early definition proposed by Allport in 1935 characterized attitude as "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1954: 45). Attitudes are considered to have cognitive, affective, and conative components and can be further characterized in terms of their direction, magnitude, intensity, ambivalence, cognitive complexity, embeddedness, flexibility, salience, and consciousness (cf., Scott, 1968). In terms of standard attitude measurement techniques, however, the assessment of attitudes tends to make use of questionnaires that focus on evaluative reactions to the attitude object. Thus, Gardner proposed that "an individual's attitude is an evaluative reaction to some referent or attitude object, inferred on the basis of the individual's beliefs or opinions about the referent" (1985: 9); reference to beliefs and opinions is made because of the way in which they are typically measured, though obviously attitudes also can be inferred on the basis of other aspects of behavior as well. Consideration of the two concepts, attitude and motivation, makes it very clear that they are closely interrelated. Motivation has attitudinal components, and attitudes have motivational implications, and the bulk of studies in the area of second language acquisition tend to recognize this interrelationship.

Theoretical Conceptualizations of Motivation in Second Language Learning

The definition of motivation proposed by Dörnyei and Ottó (1998) is important because it highlights the many features of motivation in terms of its dynamic nature, its continuity over time, and its implications for the task at hand. Similarly, Allport's (1954) definition of attitude provided a clear insight into its dynamic nature, notwithstanding its overall continuity as well. It is clear that both constructs are complex, interrelated, and implicated in most behavioral activities, and this is reflected in the research on individual differences in second language acquisition. A close inspection of the literature will reveal that although many researchers are concerned with the role played by attitudes and motivation, there are a number of different trails that have been followed. That is, there are conceivably a very large number of possible attitudes (in terms of attitude objects) and motives (in terms of reasons for doing an activity) that might be investigated. Moreover, each of these can be considered in terms of at least three different and distinct levels of analysis and generalization. In the area of motivation to learn another language, these can be classified in terms of three perspectives, societal, activity-centered, and individual.

Perspective I

The societal perspective of motivation focuses on community-level reasons for learning a second language. Because of different social and political exigencies or historical precedents, different cultures or national groups have different pressures on them to learn other languages or to attempt to revive or maintain their own language. In fact, the societal level was perhaps one of the first approaches to the concept of motivation in second language acquisition. In the lead article of the inaugural issue of *Language Learning*, Marckwardt identified five motives for learning another language, and at least four of them focus more on societal reasons than on individual ones. The primary one, and clearly the more individualistic, is for self-cultural development, viz., "a knowledge of modern languages is one of the accomplishments of a cultivated man" (1948: 3). The others refer to such societal reasons as maintaining the ethnic identity of a minority group, assimilation of an ethnic minority, promotion of trade and commerce, and scientific and technical usefulness. The actual descriptions of the motives clearly place emphasis on why individuals should learn other languages for the good of the

community. In all five cases, these motives can be seen as pressures placed by society on individuals to learn another language.

Societal motives are sometimes mistaken for individual ones, either by the researcher or by the individual student. Thus, when students state that their reason for studying a language is to obtain a degree, or to meet an academic requirement, etc., they are not really reporting on a motive of their own, but rather are voicing pressures exerted by society. In some of the literature, these types are described as extrinsic motives, but they are really pressures imposed by society. They could be considered motives that have been internalized by the individual if they are linked to other aspects of motivation; otherwise they are best characterized as reflecting external pressures. The important point is that motives are named on the basis of the reason for engaging in the particular activity, but motivation involves a series of related consequences such as effort, persistence, interest, and enjoyment. Without these, a reason is just a reason, not a motive.

Perspective II

The second perspective treats motivation as a characteristic of the individual that is tied directly to the task at hand. Constructs associated with this type of model are state motivation, which refers specifically to the motivation to do well at a specific time (cf., Gardner *et al.*, 2004; Heckhausen, 1991), and "on-line motivation" (Boekaerts, 2002), which focuses on the task itself and includes emotions, appraisals, and intentions before the task begins and emotions, attributions, and effort reported at the end of the task. Elements of these constructs are represented in many models, but one model that focuses directly on the task of language learning is that proposed by Dörnyei and Ottó (1998). It consists of three phases: preactional, actional, and postactional. It is a model that treats motivation in very conscious terms. Individuals have objectives, set goals, perform acts, experience their outcomes, appraise their success, and behave accordingly. It is an informative analysis of what takes place at specific stages of learning and as such provides very useful perspectives for individuals concerned with explaining specific behaviors in language learning. It does not, however, deal with aspects of motivation of which the individual is unaware (unconscious features) or long-range motivation.

Perspective III

The third perspective has been characterized by Dörnyei (2001) as comprising two different approaches. One focuses on social motivation that treats second language acquisition as a task closely linked with self-identity and ethnic relations. The other is described as "education-friendly" and focuses on the individual and classroom interactions. Both treat the motivation to learn the language in terms of relatively stable affective characteristics. That is, motivation to learn another language is seen as a general disposition of the individual that nonetheless may be influenced by a number of external factors.

One of the earliest studies based on the social motivation approach was conducted by Gardner and Lambert (1959), based on Lambert's seminal research and theorizing on bilingualism (see, for example, Lambert, 1955, 1967). In their study, Gardner and Lambert demonstrated that two factors, language aptitude and motivation, were associated with achievement in French among a sample of English-speaking high school students. The motivation factor was characterized by a high level of motivational intensity to learn French, favorable attitudes toward French Canadians, and a preference for integrative as opposed to instrumental reasons for learning the language – the so-called integrative–instrumental dichotomy, which subsequently became a topic of much discussion (see below).

There have been a number of models that have developed from this tradition. One of the earliest was the socioeducational model of second language acquisition (Gardner and Smythe, 1975; Gardner, 1985). The basic assumption underlying this model is that language is a significant part of one's self-identity and that learning another language is much more complex than learning another school subject because it involves "the acquisition of skills or behaviour patterns which are characteristic of another cultural community" (Gardner, 1985: 146). In the socioeducational model, second language learning is seen to take place in the context of a series of antecedent experiential and biological factors (such as the sociocultural milieu, and prior educational experiences, gender, etc.) which act on a host of individual variables. These individual difference variables in turn act in conjunction with formal and informal language acquisition contexts to yield linguistic and nonlinguistic outcomes.

Although a number of individual difference variables, such as language aptitude, intelligence, language anxiety, instrumental orientation, and language learning strategies, are considered in the socioeducational model, the major attention is directed toward the concept of integrative motivation. The model proposes that two attitudinal factors, integrativeness and attitudes toward the learning situation, serve as supports for and influences on the motivation to learn another language and that motivation and language aptitude are two primary variables

influencing achievement. It also allows that other affective individual difference variables, such as language anxiety and an instrumental orientation, may influence second language learning. The constellation of integrativeness, attitudes toward the learning situation, and motivation has been described as reflecting an integrative motive to learn another language in that the integratively motivated individual is perceived as one who has an open interest in the other language community and other ethnic communities in general, perceives the language learning context positively, and expresses a high degree of motivation to learn the language. Associated with this model is the Attitude Motivation Test Battery (AMTB), which is designed to measure various features of the integrative motive as well as instrumental orientation and language anxiety, and has been used in many investigations in this area (see, for example, Gardner, 1985, 2000).

Clément (1980) proposed an alternative model that considered many of the same variables, but focused more attention on the social context and the relative vitality of the first- and second-language communities. Integrativeness and fear of assimilation were seen to influence the motivation to learn a second language in unilingual communities but to be mediated by the frequency and quality of contact and the resulting self-confidence in the language in multicultural contexts. Individual differences in motivation resulted in competence in the language, which in turn could influence the individual's level of acculturation. In subsequent research, this model has been modified and extended to deal with acculturation of ethnic minority group members (cf., Clément, 1986; Noels *et al*., 1996).

MacIntyre *et al*. (1998) proposed a Willingness to Communicate Model that is based on similar constructs as these models, but viewed the ultimate goal as willingness to communicate rather than achievement itself. This is an important development in this area in that it stresses that the ultimate goal is not to learn the language but to develop the competence and the confidence to use it in communication. Like the other models discussed in this section, it includes variables associated with integrative motivation. Also, like Noel's (2001) self-determination model (see below), it includes some personality characteristics, etc., but it places ultimate use of the language at the pinnacle of a pyramid and actual learning further down, whereas the other models treat ultimate communication more or less as a given of learning the language. As many language teachers will note, however, this is not a foregone conclusion.

Noels (2001) has proposed a model of second language acquisition based on Deci and Ryan's (1985) self-determination model. It considers both intergroup and individual motivational processes and links them to six classes of variables. These are immediate social contact, fundamental needs, orientations, intention and engagement, L2 use, and linguistic and nonlinguistic outcomes. In this model, proficiency in the other language is seen as a linguistic outcome resulting from the interplay of contact with the language with four fundamental needs, social identity, relatedness, autonomy, and competence leading to three orientations, integrative, intrinsic, and extrinsic. These in turn can influence the willingness to communicate and the effort and persistence demonstrated in learning the language, which in turn leads to language use and ultimately proficiency and some possible changes in identity. As can be seen, this model is comparable to the others discussed above, although, as with the willingness to communicate model, it is perhaps more detailed in that it explicitly identifies many variables that might be implicated in language learning. The overlap is recognized by Noels, who claimed that "The primary contribution of this approach lies in that it figuratively takes a magnifying glass to look more closely at the nature of orientations, how they are affected by significant others in different contexts, and how they may be differentially related to L2 variables" (2001: 61).

These models vary in terms of parsimony, with the socioeducational and the social context models being the most parsimonious in that they involve fewer variables and processes than the others. They are all similar, however, in that each of them recognizes that second language acquisition involves the acquisition of features that are characteristic of a different culture. This in turn could have implications for feelings of self-identity for some individuals.

The education-friendly models place more of an emphasis on characteristics of the individual, and the implications this can have for learning, and focus on variables that could be appropriate to any learning situation. Dörnyei (2001) described a number of such models, some of which are drawn from other fields of psychology, including educational psychology. One example of such a model is Dörnyei's (1994) "extended motivational framework." This model considers motivation in terms of three levels, the language level, the learner level, and the learning situation level, and proposes that each of them can supplement or cancel the motivation generated at the other levels. The language level focuses on motivation associated with the language itself (i.e., the community, value of knowing the language, etc.); the learner level refers to characteristics of the student similar to the social motivation models; and the learning situation level focuses on motivation deriving from the curriculum, the teacher, and the classroom.

Another example of an education-friendly model is the social constructivist model proposed by Williams and Burden (1997). This model distinguishes between internal factors, such as the individual's intrinsic interest, perceived value, feelings of competence, and attitudes about the language, and external factors, such as significant others, the learning environment, and the social context. This model includes a large number of variables that could be implicated in the language learning situation that would be of particular interest to teachers and educators who wish to consider various aspects that could influence an individual's level of achievement in the language.

Each of these models is useful in helping us understand the learning process, in making us aware of variables that can influence learning, and in suggesting perspectives that we might embrace. It is important to note, however, that the models are not contradictory. None makes a prediction that is not consistent with the others. The models do differ somewhat in the specificity of the processes involved, varying from statements about how variables in the model influence or effect others to largely a description of variables or classes of variables that can be involved. They also differ in terms of the amount of research that has been devoted to testing specific predictions deriving from them. Clearly, there are a number of different ways of conceptualizing motivation in second language acquisition and in the types of attitude variables that might be implicated. An interesting question, however, is whether or not they capture different sources of variation in second language achievement. That is, each of them postulates the importance of somewhat different constructs and processes, but to the extent that they all are concerned with explaining the role of motivation in second language learning, one might well ask whether any one model would contribute to prediction over another or whether the ultimate degree of prediction of achievement would be essentially the same regardless of the model followed. If this is the case, the value in the model rests not so much in accounting for variation in achievement but in the nature of the variables to be emphasized.

Issues

There are many questions that have been raised by researchers and educators about the role of motivation and attitudes in second language acquisition, and at least five of these have become issues that are relatively central to this area of research.

One very basic question deals with the direction of causation between attitudes and motivation on the one hand and language achievement on the other. It is implied in many of the models that individual differences in motivation are responsible in part for differences in achievement, but it has been questioned whether this is the most meaningful cause–effect sequence. One could equally argue that achievement in the language promotes motivation and favorable attitudes (cf., Ellis, 1994). When dealing with the relationship between individual differences, however, it is not possible to demonstrate simple causation of the nature that A causes B. The only way to demonstrate such causation is to randomly assign individuals to the various values of A and to assess whether this results in variation in B (cf., Gardner, 2000). The attempt to use procedures such as structural equation modeling to demonstrate the direction of causation is not a solution. Such 'causal models' are not tests of causation, but simply tests of one way of explaining relationships in terms of regression coefficients. This is a big difference! With characteristics that individuals bring with them to any situation, random assignment is not possible; hence, unequivocal conclusions about causation are not possible. Though this may seem like a major problem, in point of fact, the direction of causality is immaterial. To the extent that there is a correlation between motivation and achievement in the population, this means that there are conditional (Bayesian) probabilities linking the two variables. For example, a positive correlation demonstrates that there is an increased probability that an individual with high levels of motivation will be more successful in learning the language than an individual with low levels and there is also an increased probability that the individual who is successful in learning the language will be more motivated to learn the language than an individual who is less successful.

This can be demonstrated by an example from a study we recently conducted in Spain (Gardner and Bernaus, 2004). In that study, a correlation of 0.40 was obtained between motivation assessed in the autumn and the following spring grades in English among a sample of 166 Level 2 secondary school students. Further analysis revealed that the probability that individuals scoring above the median in motivation would be in the top 30% on achievement was 0.40, whereas the probability was 0.19 for those scoring below the median on motivation (i.e., twice as great). Similarly, those above the median on achievement were more likely to be in the top 30% of motivation with a probability of 0.37, whereas the probability of those below the median on achievement being in the top 30% on motivation was 0.23 (again close to twice (1.61) as great). These are not certainties, of course, and could vary from sample to sample, but they do indicate clearly

that a correlation as low as 0.40 has clear implications about the conditional probabilities that operate when it is established that there is a correlation between two variables.

A second, but related, issue involves the degree of relationship between the two classes of variables. It is true that a correlation of 0.40 between motivation and achievement indicates that only 16% of the variation of one of the variables is explained by the other (cf., Ellis, 1994; Dörnyei, 2001), and as a consequence, some researchers consider low correlations to be trivial. The first part of this statement is true; the last part is arguable. Cohen described a correlation of 0.30 as reflecting a medium effect and that such a relationship "would be perceptible to the naked eye of a reasonably sensitive observer"(1988: 80). He noted too that "many of the correlation coefficients encountered in behavioral science are of this magnitude" (1988: 80). Moreover, as indicated above, such a correlation still implies a level of conditional probabilities that are not trivial.

A third issue is long-standing and deals with the distinction between integrative and instrumental orientations. In their initial study, Gardner and Lambert (1959) classified students as integrative or instrumental in their orientation to studying French as a second language based on the reason they ranked as most applicable to themselves. The results demonstrated that individuals who were integratively orientated were more motivated, had more favorable attitudes toward French Canadians, and had higher levels of achievement in French than those who were instrumentally oriented. In subsequent research (e.g., Gardner and Lambert, 1972; Gardner and Smythe, 1975), this dichotomous measure was dropped in favor of separate measures of the applicability of each type of orientation to language learning. Although the results demonstrated that the two orientations were positively related to each other, many other researchers and educators tended to emphasize the relative superiority of one over the other (cf., Crookes and Schmidt, 1991; Oxford and Shearin, 1994). A meta-analysis conducted by Masgoret and Gardner (2003) demonstrated that achievement tended to be more highly related to individual differences in an integrative orientation than in an instrumental one but the differences were not large. In fact, the mean correlations were relatively low over all, though in the various samples, correlations with grades were as low as −0.21 and as high as 0.56. For three different types of achievement measure (grades, objective measures, and self-ratings), the mean correlations ranged from 0.15 to 0.20 for integrative orientation and 0.08 to 0.16 for instrumental orientation.

Some of the questions concerning the lack of importance of the role of attitudes and motivation in second language acquisition derive from individuals who focus only on the orientations (cf., Crookes and Schmidt, 1991) rather than considering the other attitudinal and motivational variables. All of the social motivation models include other attitude and motivation measures, however. In the socioeducational model, for example, Gardner (1985, 2000) stressed that motivation, not orientations, is the major affective variable implicated in second language learning, but that it is supported and maintained by integrativeness (as distinct from simply an integrative orientation) and evaluation of the learning situation. He has proposed (Gardner, 2000) that many factors might contribute to motivation, even though integrativeness will always be important because of the link between language, ethnicity, and self-identity.

A fourth issue has to do with the distinction between second and foreign language learning. Inspection of the literature reveals that there are at least two reasons for making such a distinction, one based on the availability of the language in the community (cf., Oxford and Shearin, 1994) and the other on the sociopolitical importance of the other language (cf., Dörnyei, 2001). It has been proposed that motivational and attitudinal variables would play slightly different roles in the case of a second as opposed to a foreign language learning context, but to date there has been little evidence to support such a hypothesis. For example, a meta-analysis of research conducted by Gardner and associates failed to detect an effect of bilingual vs. monolingual settings on the relationship between motivation and language achievement (Masgoret and Gardner, 2003). Furthermore, research conducted in Hungary, in which English is clearly a foreign (as opposed to a second) language, found significant relationships between integrative motivational types of variables and achievement in English (Dörnyei and Clément, 2001).

Perhaps the most dominant issue currently is the distinction between motivation and motivating and the implications that the education-friendly vs. the social motivational models have for this distinction. Education-friendly models highlight features that educators might use to motivate students. Close inspection of these models will reveal, however, that many of the features discussed are common to virtually any subject from mathematics to history (i.e., interest, intrinsic motivation, teaching techniques, course content, causal attributions, feedback, arousal of curiosity, feelings of competence, age, and gender). These are important attributes to be sure, but it is important to determine whether these models contribute anything to the prediction of achievement or related behaviors such as the willingness to

communicate that is not predicted by the social motivation models. Clearly, there is nothing in the education-friendly models that is inconsistent with predictions from the social motivation models, or vice versa, and the social motivation models could incorporate the other features without changing their basic assumptions or postulates.

The problem of motivating students is one that can be difficult in the context of second language learning if one accepts that such learning involves a construct such as integrativeness. In the socioeducational model (Gardner, 1985), integrativeness involves more than just an integrative orientation. It refers to the individual's cultural openness and interest in other communities and languages and favorable attitudes toward the target language group as well as an integrative orientation. Integrativenss is a higher-order construct with many levels. At one level, it can mean simply a willingness or capacity to take on characteristics of another cultural community. At another, it can reflect a full desire to identify and integrate with the other community. Most language learners do not study languages in order to become members of another cultural community (though some might), but at a minimum they must be able to make features (i.e., language) of another community part of their own behavioral repertoire, and there are individual differences in the ability (or willingness) to do this.

Two examples from the literature illustrate possible extremes of an integrativeness dimension. One, described by Nida (1956), was the case of an individual, the son of immigrants, who identified strongly with the American way of life and hid his immigrant background while growing up. Despite a superior language program and a strong motivation to learn a foreign language to aid him in his life as a missionary, he was unsuccessful in learning the language. Nida proffered that his earlier rejection of his immigrant background made him incapable of learning a foreign language. At the other extreme, Lambert (1955) described an American graduate student majoring in French who measured dominant in French on measures of bilingualism. This student had an extreme attachment with France, read French newspapers, etc., and planned to move there when he graduated. Although these are extreme examples, they serve to define the potential extremes of integrativeness from high negative to high positive and also indicate that the effects of integrativeness on motivation might well be unconscious. That is, individuals might want to learn a language but because of emotional issues associated with ethnicity simply may not be capable of doing so.

The construct of integrativeness has implications for the issue of motivating students. Educators may use procedures to motivate students, but these techniques may well be ineffective for some students, and it is important to conduct research to evaluate their effectiveness in motivating students to actually learn and use the language. Recently, we investigated attitudinal and motivational changes over a year-long course, and the results were instructive. Two studies were conducted, one with Canadian university students of French as a second language (Gardner *et al.*, 2004) and the other with EFL secondary school students in Spain (Gardner and Bernaus, 2004). In both studies, significant interactions were obtained between ultimate achievement in the course and time of testing for attitudes toward the learning situation but not for other attitudinal and motivational characteristics measured by the AMTB. In both studies, students who were ultimately successful in the course evidenced relative increases in attitudes toward the learning situation, whereas students who were least successful showed declines and the middle students showed virtually no change. That is, the degree of success in the course had an effect only on reactions to the course and/or the teacher. Admittedly, there was no attempt to investigate specific motivational techniques, but the teachers in the study, like most teachers, were quite likely doing their best to teach the students and to motivate them. In both studies, there was also a tendency for the measures of integrativeness and motivation to become less positive over the course of the year, but these changes generally were not moderated by ultimate success in the course. The implication is therefore that what goes on in the course can influence learning and reactions to the learning situation but not integrativeness or motivation. It is possible, therefore, that educators' attempts to motivate students could result in improved reactions to the course but not in more general attitudes, motivation, or the willingness to use the language outside the classroom environment. Clearly, much more research is required to investigate the issue of motivating students in language classes to determine whether or not it has the desired effect in terms of achievement and willingness to use the language. This is an important challenge for the future.

See also: Bilingualism and Second Language Learning; Identity: Second Language; Intercultural Pragmatics and Communication; Interlanguage; Language Attitudes; Second and Foreign Language Learning and Teaching.

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Motoori, Haruniwa (1763–1828)

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Haruniwa Motoori (1763–1828) was the son of the great Japanese studies (*Kokugaku*) scholar Motoori Norinaga (1730–1801). Like his father, Haruniwa spent most of his life as a scholar, teacher, and medical therapist in the town of Matsusaka, northwest of the city of Ise, in modern-day Mie Prefecture. As a child, Haruniwa was totally devoted to Norinaga, helping to copy his father's manuscripts and prepare them for printing. He even assisted his father, who was also a physician, in preparing and prescribing herbal medicine. Devoting himself to learning Japanese studies from his father and other eminent teachers, Haruniwa began to develop a level of expertise in Japanese language, literature, and philology that Norinaga hoped would enable his son to become a leading Japanese studies scholar in his own right.

Unfortunately, Haruniwa's eyesight began to fail when he was in his late 20s. Despite the best medical attention then available, Haruniwa lost his sight completely by the time he was 32. Norinaga felt that Haruniwa's blindness would make it impossible for his son to function successfully as a scholar. Instead, he adopted Inagaki ōhira (1756–1833), the studious son of a local tofu merchant, and designated ōhira as his successor. When Norinaga died a few years later, Haruniwa accepted ōhira as the head of the household, and the senior scholar in the family. Even so, Haruniwa continued his own scholarly work, with the help of his wife and his sister, who read to him, recorded his research notes, and wrote down his manuscript pages as he dictated them.

Despite Norinaga's misgivings about Haruniwa's disability, Haruniwa spent the rest of his life carrying on his father's work in various ways. As an acupuncture therapist, he carried on Norinaga's medical practice in Matsusaka, and helped support the family. He also taught Japanese language, literature, and philology, attracting advanced students who helped transcribe his lectures and research for publication. He carried on Norinaga's literary and philological research on the 8th-century Japanese historical classic known as the *Kojiki* (Record of Ancient Matters.) With his students' assistance he also edited a large body of Norinaga's manuscripts for posthumous publication.

In the history of Japanese linguistics, Haruniwa is best known for two of his own original studies of Japanese morphology and syntax, *Kotoba no yachimata* (The crossroads of words),written in 1808, and *Kotoba no kayoiji* (The interaction of words), his final work, completed shortly before his death in 1828. *Kotoba no yachimata* was a large-scale morphological study of Japanese verb inflections that developed and systematized Norinaga's earlier ideas on the subject. *Kotoba no kayoiji* was a comparative study and classification of transitive and intransitive verbs, as well as of passive and causative inflections. These studies were the basis of development for the way these forms are taught in Japanese schools today.

Yachimata (The crossroads), a detailed 1974 study of Haruniwa's life and work by the critic Adachi Ken'ichi, finally gave this scholar his long-denied place in the history of Japanese linguistic studies. The fact that Haruniwa was able to achieve so much after he lost his eyesight makes him a remarkable figure in his time, when blindness was generally considered an insuperable disability. Haruniwa's courage and success in persevering with his linguistic research in such times deserves our greatest respect today.

See also: Japanese; Motoori Norinaga (1730–1801).

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Motoori, Norinaga (1730–1801)

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Norinaga Motoori (1730–1801) was a leading Japanese studies (*Kokugaku*) scholar. He was a native of Matsusaka, a town northwest of Ise, in present-day Mie Prefecture. He was from a family of merchants with connections in Edo and Kyoto, and Norinaga visited both cities. His father's early death, family problems, and business losses made him self-reliant. He chose to become a physician, so he could be independent and support himself while continuing to develop his scholarly abilities.

In 1752 Norinaga went to Kyoto to study traditional medicine and humanistic subjects. He was attracted by the innovative historical and philological research done by Keichū (1640–1701) on the ancient *Manyōshū* poetry collection. Norinaga combined Keichū's methods with his own system of appreciating literature through the 'emotive perception of phenomena,' *mono no aware o shiru koto*. This focus on intuitive perception of the emotions and sentiments inherent in a text superceded the didactic and moralistic approaches then common. Norinaga's *Genji Monogatari tama no ogushi* (1793–1796), a detailed reinterpretation of the *Tale of Genji,* established a system of literary and textual analysis of this novel that endures to the present day.

In 1757, at the age of 27, Norinaga returned to Matsusaka. Supporting himself as a pediatric physician, he pursued linguistic, literary, and historical studies in his free time, giving lectures based on them to a growing number of students from the Ise area. Scholars began to come from Kyoto to visit as well. He wrote more than 40 books, based on his own research and lecture material. His advanced students compiled many more, during his lifetime and posthumously, from manuscripts and notes.

Japanese scholarship had traditionally tended to focus on texts from China, using centuries-old methods of analysis. Norinaga was part of a new generation of Japanese scholars who explored their own country's heritage instead. He admired the work of Kamo no Mabuchi (1697–1769), one of the founders of the Japanese National Studies movement, who came to visit him in Matsusaka. Like Keichū before him, Mabuchi analyzed the historical and linguistic features of the texts in the *Manyōshū*. Norinaga undertook analogous research on the *Kojiki* (Records of ancient matters), an 8th-century Japanese historical text. He spent more than 30 years compiling his monumental *Kojiki-den* (Commentary on the *Kojiki*), in forty-four volumes.

Norinaga also did original work in the fields of morphology and phonology, based on his analysis of classic Japanese literary texts. The *Kotoba no tama o* (Beads of jeweled words), completed in 1779, summarizes Norinaga's ideas on the functions of postpositional particles and verb inflections, with usage examples taken from Japanese literary texts. His *Jion kanazukai* (Phonetic uses of Chinese characters), written in 1776, is a study of how Chinese characters were adapted to serve as phonetic symbols in ancient Japanese texts. The *Kanji san on kō* (A study of the three phonetic uses of Chinese characters), completed in 1785, studied variations in phonetic uses of Chinese characters in Japan due to diachronic phonological changes in China.

While Norinaga's nationalistic approach in interpretation may no longer be accepted by most 21st-century literary critics and historians, conditioned as it was by his era, his careful methods of linguistic analysis still command the respect of scholars today, and his thorough textual annotations of the *Kojiki* and other classics will continue to be consulted and taken into consideration by modern translators.

See also: Motoori Haruniwa (1763–1828).

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Mounin, Georges (1910–1993)

P Martin

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'Georges Mounin' is a pseudonym used for the first time by Louis Julien Leboucher in 1943 to escape censorship by the Vichy government, which had identified him as an active member of the French communist party and a Resistance fighter. The son of a glassworker, Delphin Leboucher, and of Julienne Lansoy, Mounin was born on June 20, 1910, in Vieux-Rouen-sur-Bresle, a small village in Normandy.

He married Julienne Montagné on September 18, 1930, and they had three children. After graduating from teacher-training college in Rouen (1929), Mounin held teaching positions at the primary and secondary school levels, in France and in Egypt. In 1946, he was named teacher of Italian at the 'Ecole normale des instituteurs' in Aix-en-Provence. In 1958, he was appointed to the 'Conseil national de la recherche scientifique' as 'Attaché de recherches,' and in 1961 he joined the University of Aix-en-Provence, where he remained until 1976, holding the positions of 'Maître assistant' (1961), 'Maître de conférences' (1965), and 'Professeur titulaire' (1966) of general linguistics, stylistics, and semiology. While in Aix, Mounin helped train a number of French and foreign students who later became recognized linguists. His working class origins, but more importantly the influence of French rationalism, no doubt account for his early involvement in communism. He was a regular contributor to *Lettres françaises, Vie ouvrière*, and *Action*, journals of the communist intellectuals. But the open-minded and prudent militancy that resulted in his contributing also to noncommunist journals such as *Esprit* and *Confluences* finally led him to a rejection of dogmatism when, in 1980, he officially abandoned the French communist party. He died on January 10, 1993 in Béziers.

In linguistics, Georges Mounin is a disciple of André Martinet (*see* **Martinet, André (1908–1999)**), the French functionalist. Mounin's contributions to linguistics are both numerous and varied, showing open-mindedness, and extensive and wide-ranging knowledge. An admirer, great reader, and sharp analyst of poetry, he has written penetrating studies which have opened up new perspectives on the scientific analysis of literary texts (see his frequent articles in *La pensée, La nouvelle critique, Les temps modernes*, and *Cahiers du sud*, as well as Mounin (1946, 1961, 1969, 1992). An impassioned Italianist, Mounin has repeatedly demonstrated his profound knowledge of Italian culture (1958, 1960, 1964b). His doctoral dissertations (Mounin, 1963, 1964a) placed him among the top theoreticians of translation (see also 1955, 1976). Mounin is also well known for his remarkable contribution to the history of linguistics (Mounin, 1967, 1972a, 1974). An excellent teacher and popularizer (1968a, 1968b, 1975a), semanticist and philosopher (1972b, 1970, 1975b, 1985), Georges Mounin has set a high goal for other linguists, that of combining versatility and profundity.

See also: Functional Grammar: Martinet; Martinet, André (1908–1999).

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Mozambique: Language Situation

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Most Mozambican languages have no official written tradition. However, they are used in correspondence, songs, lyric poetry, and mostly in ecclesiastical contexts by a limited number of individuals who can read and write in their mother tongue. Some of these languages have a Bible and are broadcast by the state broadcasting station. The station keeps delegations in all the provincial capitals. State television does not broadcast in any national language, contrasting with emerging private television stations, which also broadcast in Xichangana (a dialect of Tsonga) and Xirhonga, two languages from south Mozambique. There are few periodicals published in Bantu languages, and the number of writers who have been published or had their works translated into those languages is equally small. Notwithstanding the fact that the Mozambique Constitution (paragraphs 5 and 6) sanctions the multilingual status of the country, no national language has been adopted as a working language in Parliament. The reason for this is to preserve the country's unity.

The Republic of Mozambique is a multiethnic and multilinguistic state in which, because of its history as a colony of Portugal, the official language is not the mother tongue of most Mozambicans, but rather the language of the colonizer, Portugal. Therefore, Portuguese language is the bridge between the different peoples that form the country (Table 1). In fact, 1980 census data (14 million inhabitants) and 1999 data (18 million inhabitants) revealed a heterogeneous country, formed by several ethnic groups and their subsequent divisions, all possessing different languages, cultures, values, and traditions. The political choice of Portuguese as the official language of Mozambique is not a recognition of the colonizer's cultural superiority; it is, rather, according to Graça Machel, a former Minister of Education,

> "a way of disavowing causes of division and national alienation, integrating it as a vehicle of social, political and economic communication . . ., turning it into a harmonious whole of the new national reality. . . . We must have in mind that, despite the colonization, national idioms have handed down and created Mozambican culture, propagating arts and techniques and the ancient knowledge of nature. In them were forged the words and concepts, forms, rhythms and the musicality which characterize the Mozambican being (NELIMO, 1989)."

Despite the Portuguese colonizers' attempts to destroy Mozambican culture, their inability to govern the whole territory allowed the oral transmission of knowledge to occur, from generation to generation, in rural areas. Later on, several factors led to unsolvable breaches in Mozambican life's natural scope, by killing knowledge holders – the elders, who were therefore also the most vulnerable: These included the civil war (1975–1992), past and present epidemics that killed specialized personnel (recent statistics show that 500 people become infected with HIV each day), famine, and natural disasters. Such factors, as well as the lack of qualified personnel for teaching the mother tongue and eternal and sensitive questions of sociolinguistic and political order, make the comprehensive and systematic teaching and development of national languages at school an almost impossible job. Though there are no data to prove it, the insidious entry of English language as a second foreign language of prestige in the country's capital (Portuguese is regarded as the first foreign language, despite the fact that some are advocating turning it into one of the national languages) used in business, tourism, and even in teaching makes it an even more complex job to value Mozambican languages.

The diglossia/assimilation policy followed by colonizers lasted for five centuries, before the seriousness of the delay was felt. Paixão's words (1948: 10)

Table 1 Percentage of Mozambicans who speak Portugese[a]

Age	*% Who Speak Portuguese*		
	Total%	*Men*	*Women*
Total population	39.6	50.4	29.7
5–9	23.0	23.7	22.3
10–14	48.6	52.0	44.9
15–19	52.5	62.7	43.2
20–24	47.6	61.4	37.2
25–29	45.8	62.0	33.3
30–34	48.4	66.9	32.6
35–39	43.1	65.0	23.9
40–44	37.7	59.2	18.5
45–49	31.8	51.6	13.8
50–54	27.0	45.8	11.1
55–59	24.1	40.2	9.0
60–64	22.0	37.1	8.3
65–69	17.5	29.7	6.3
70–74	15.8	26.0	6.2
75–79	13.2	21.8	4.9
80+	11.3	18.7	4.7
Urban	72.4	80.7	64.2
Rural	25.4	36.6	15.6

[a]The calculations exclude the unknown population in relation to the knowledge of the Portuguese language.

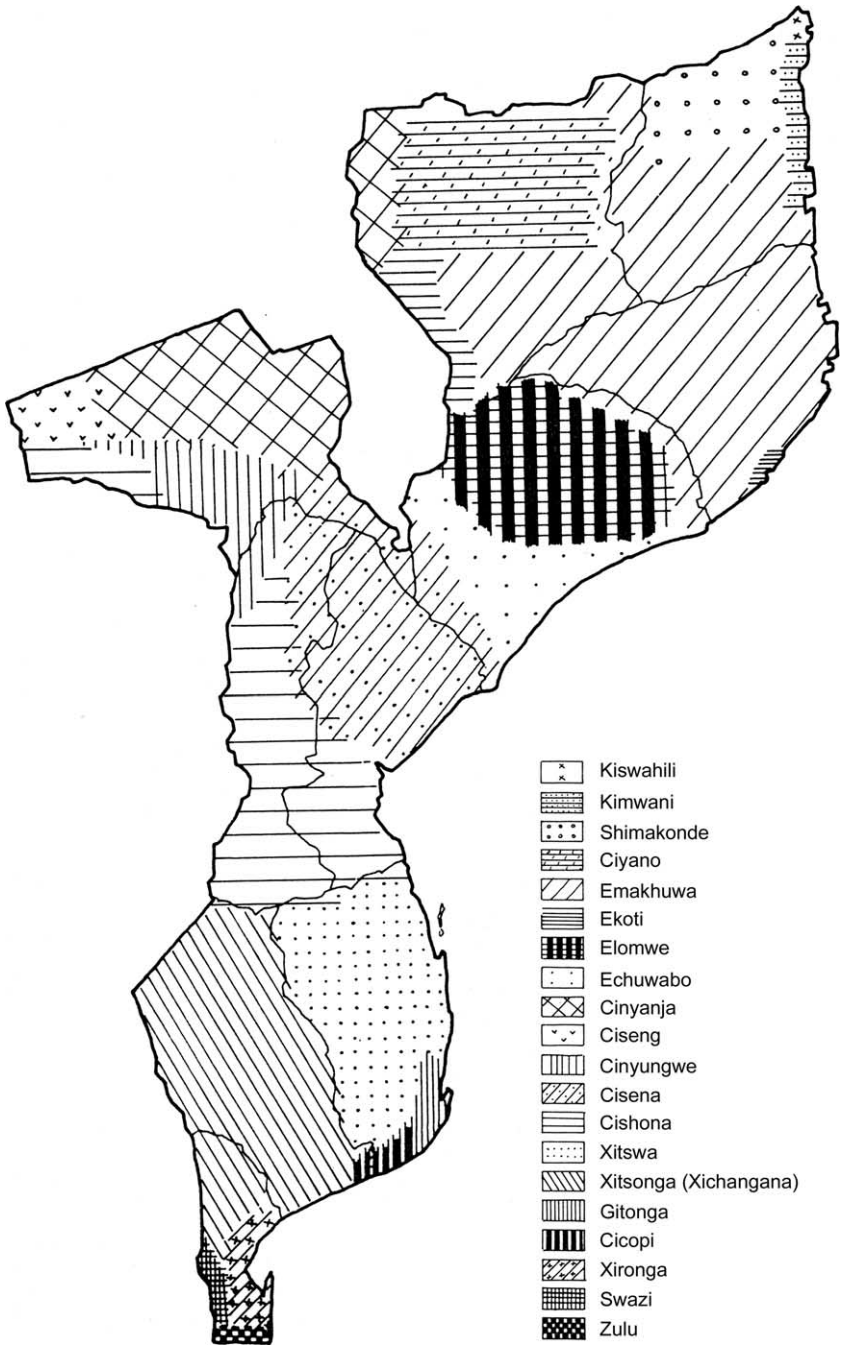

Figure 1 Mozambigue's linguistic map.

regarding this matter are unmistakable: "Our mission towards the native is civilization and naturalization . . . we approach the native to turn him into another Portuguese."

If a return to a situation devoid of colonial influence is impossible, then it is up to Mozambican linguists and others to (1) describe the current situation of Mozambican languages, (2) preserve the languages through the building of grammars, (3) value the languages through teaching and literature, and (4) study those languages' interactions with the Portuguese language. Only objective (1) is the current focus of attention.

Linguistic Network

Problems

Mozambique has a multiplicity of languages, which correspond to several ethnic groups. For example,

Xithwa is spoken by the Mathwa, Cisena (Sena) is spoken by the Senas, Nyungwe is spoken by the Nyungwes, Emakhua (Makhua) is spoken by the Makhuas, etc.

At an administrative level, the country is made up of 10 provinces, from south to north: Maputo city, the capital, Maputo country, Gaza, Inhambane, Manica, Sofala, Zambezia, Tete, Nampula, Cabo Delgado, and Niassa. Mozambique's linguistic network (Figure 1) shows clearly that there is not one Bantu language that is spoken in all provinces, but rather languages belonging to the same group have a high degree of intelligibility to each other. Between different groups, however, this intelligibility diminishes drastically. This fact has three important implications.

1. Geographical variety plays a relevant role in successful communication between speakers.
2. It is difficult to determine when and if a dialect can be considered a language. Some linguists think that languages that are mutually intelligible are dialects from the group after which they are named; others, despite that intelligibility, consider them to be independent languages. The Tsonga group, for instance, comprises Xironga, Xichangane, and Xitshwa; some consider these to be Tsonga dialects, whereas others consider them independent languages.
3. Internal migratory flows due primarily to the war, have given rise to intermediate languages, because displaced individuals had to communicate in an entirely new linguistic scenery (Figure 2).

The existence of this complex language network was one of the main reasons why FRELIMO (Front for the Liberation of Mozambique; in Portuguese, Frente de Libertação de Moçambique), even during Mozambique's national liberation armed struggle (1964–1974), defined the Portuguese language as the national unity language and the country's official and educational language, thus forestalling any eventual claims of a nationalistic character, because no national language would then meet with country-wide consent.

Data

Figure 1 reveals an unavoidable situation: the country is a rich land made up of different linguistic nations, whose culture and *modus vivendi* are equally dissimilar. Different studies suggest a clear divergence regarding the total number of idioms with language status spoken in the country. For example, Lopes (1994) suggested that there are 21 national languages. Table 2 shows 10 different categorizations of Mozambican national languages.

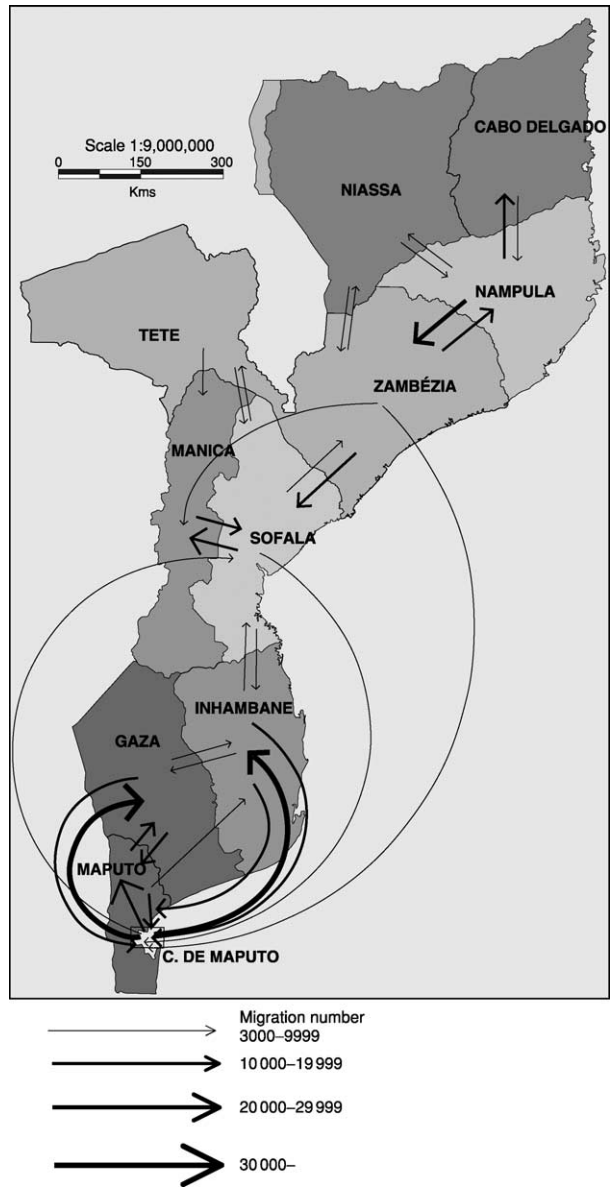

Figure 2 Internal migratory flows, due primarily to the war, have given rise to intermediate languages.

Unfortunately, it is not possible to create a full description of Mozambican languages at the morpho-syntactic and phonological level in the present text because of the lack of reference grammars in these languages. The fullness and richness of their phonological aspects cannot as yet be shown because there are still no consensual phonetic representations of those languages. Instead, this article presents a general structural description of sentences.

A Mozambican Bantu sentence, as a rule, has the following basic order: (DP1-Subject + V + DP2/3 + Oblique(s)). Sentences are mostly SVO and have symmetric objects.

Table 2 Mozambican languages

Author	*Mozambican languages*
Cabral (1975a)	Cicopi (Txitxopi), Cindau, Cinyanja, Cinyungwe, Cisena, Ciwutewe, Ciyao, Echuwabo, Emakhuwa, Gitonga, Shimakonde, Xichangana, Xirhonga (Xironga), Citshwa (Xitshwa, Tswa)
Marinis (1981)	Cinyanja-Cisena, Cishona, Emakhuwa, Xirhonga (Xichangana, Citshwa (?)), Cicopi, Ciyao, Gitonga, Shimakonde
Yai (1983)	Chichewa, Chinyanja, Cishona, Ciyao, Echwabo, Emakhwa-Lomwe, Shimakonde, Xichangana, Xirhonga, Cicopi, Gitonga, Isizulu, Kiswahili, Shiswati
Katupha (1985a) Guthrie's Typology	G40 Ki-Swahili, P20 Ciyao e Shimakonde, P30 Emakhuwa (Lomwe [Elomwe] e = Echuwabo), N30 Cinyanja, N40 Cisena, S10 Cishona, S50 Xitsonga, S60 Cicopi
NELIMO (1989)[a]	Cicopi, Cinyanja, Cinyungwe, Cisena, Ciwutewe, Cishona, Ciyao, Echuwabo, Ekoti, Elomwe, Emakhuwa, Gitonga, Isizulu, Kimwani, Kiswahili, Shimakonde, Siswati, Xichangana, Xirhonga, Citshwa
Ngunga (1991) Census 1980	Cicopi, Cinyanja, Cinyungwe, Cisena, Cishona, Ciyao, Echuwabo, Emakhuwa, Gitonga, Kimwani, Lomwe, Marendje, Shimakonde, Xichangana, Xirhonga, Citshwa
Electoral Process (1993)	Cicopi, Cimanyika, Cindau, Cinyanja, Cinyungwe, Cisena, Ciwutewe, Ciyao, Echuwabo, Elomwe, Emakhuwa, Emeeto, Gitonga, Kiswahili, Shimakonde, Xichangana, Xirhonga, Citshwa
Firmino and Machungo (1994)	Cibarwe, Cicopi, Cikunda, Cinyanja, Cinyungwe, Cisena, Cishona, Ciyao, Echuwabo, Ekoti, Elomwe, Emakhuwa, Gitonga, Kimwani, Nsenga, Shimakonde, Xichangana, Xirhonga, Citshwa
Lopes (1994)	Cicopi, Cinyanja, Cinyungwe, Cisena, Cisenga, Cishona, Ciyao, Echuwabo, Ekoti, Elomwe, Emakhuwa, Gitonga, Isizulu, Kimwani, Kiswahili, Memane, Shimakonde, Siswati, Xirhonga, Xitsonga, Citshwa
NELIMO (2000)[a]	Grupo I (Kimwani, Shimakonde, Ciyao) Grupo II (Emakhuwa, Echuwabu) Grupo III (Cinyanja, Cinyungwe, Cisena, Cibalke) Grupo IV (Cimanyika, Cindau, Ciutee) Grupo V (Gitonga, Cicopi) Grupo VI (Xichangana, Citshwa, Xirhonga)

[a]The orthography and phonetics of languages in NELIMO (1989) and (2000) are currently being studied.

The form structure of sentences occurs mainly in a post-verbal context in such constructions as (DP1-Subject + V + DP2 + DP3 ...). The selected structure has a double object, and the object sequence is ruled by such criteria as animacity degree, class of the involved DPs, symmetry/asymmetry, and the presence or absence of applicative, causative, and other morphemes. However, the disposition of objects can also be (DP1 + V + DP3 + DP2), as if, for example, it would be possible to say in English *John sent a letter Mary*. This structure causes serious problems to those speakers of a Bantu language as a first language who learn Portuguese as a second language. When imposing their first language structure onto Portuguese (their second language), they create atypical sentences according to European Portuguese syntax.

Current Bantu language studies are examining other grammatical components, as well as how Bantu language structures are imposed over Portuguese language and vice versa. This systematic and deepened study of Mozambican languages will lead to the consequent building of reliable grammars.

Current Status

Despite the current situation, recent studies point toward a promising future for the Mozambican languages. In the first *Seminar on the Standardization of Mozambican Languages Orthography* (1989) promoted by NELIMO (Eduardo Mondlane University), 20 Mozambican languages were identified. However, only 13 of those were submitted to an exploratory study.

Fifteen years after this important meeting and after the completion of several intermediate studies, NELIMO (2000) undertook the description of phonetics and the preparation of an orthography for 17 languages. The creation of consensual and definite orthographic systems is the first step toward preserving national languages. This may be a Herculean job, if we consider that the country's priorities also include eradicating poverty and epidemics while stabilizing a still young democracy.

Although the task of rehabilitating and regaining the national languages' prestige belongs to Mozambicans, the role played by the colonizing nation in the destruction of Mozambican's linguistic tissue remains the worst of all evils. The fact that Portugal has not yet defined a consistent linguistic policy and has no center of Bantu linguistics or a university that teaches structured classes of idioms from African Countries of Official Portuguese Languages (PALOP) aggravates the situation. Portuguese institutions still follow the New State policy by not investing in this area, despite Bantu languages' hegemony in the significant African underworld existing in ghettos surrounding great cities. Such neglect is in sharp contrast with the example given by such countries as Germany, the

Netherlands, Poland, Sweden, among others who have invested in Africa, despite the fact that they were former colonizers. In the United States, the United Kingdom, and France, teaching and research on the area of Bantu Linguistics are supported by acknowledged centers.

Conclusion

The historical experience of Portuguese colonization, its epidemics, natural disasters, scanty economic resources, three decades of war that tore apart the country, and the subsequent lack of public investment in education have left indelible marks on Mozambicans, the educational network, and the linguistic network. In spite of all that, Mozambican institutions and nongovernmental organizations directed at the study and systematization of Mozambique Bantu languages have increased their efforts, which are already bearing fruit. According to INDE (National Institute of Educational Development; in Portuguese, Instituto Nacional do Desenvolvimento da Educação) data, the teaching of national languages is taking place in several schools in different provinces, and official speech instigates the process, both of which point to an encouraging though still uncertain future.

See also: Bantu Languages; Language Education Policies in Africa; Southern Bantu Languages.

Language Maps (Appendix1): Map 22.

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Mufwene, Salikoko (b. 1947)

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Salikoko S. Mufwene, an expert on creoles and pidgins, was born on November 1, 1947, in Mbaya-Lareme (Democratic Republic of Congo). The multilingualism of this environment was one the decisive factors that steered him toward a linguistic career. He graduated with highest honors in 1973 from the National University of Zaire at Lubumbashi, having majored in English philology. Thanks to a Fulbright scholarship, he was able to continue postgraduate studies in linguistics at the University of Chicago, completing his Ph.D. in 1979 with distinction. His doctoral dissertation, 'Semantic field' vs. 'semantic

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Mufwene's research is informed by diverse sources, such as population genetics, macroecology, complexity theory, and globalization, as is evident from the way he applied ideas of multiple causation and non (uni)linear evolution to language phenomena in his most recent book, *The ecology of language evolution* (2001).

Ever since he became interested in creoles, he has studied morphosyntactic and semantic characteristics of Gullah, African–American Vernacular English, and Guyanese and Jamaican Creole. Around the mid-1980s, the development of his interests toward more general perspectives and theories became obvious as his focus widened from the development of 'Atlantic creoles' to varieties such as Kikongo-Kituba, Lingala, and North American English varieties, leading him in recent years to defend uniformitarianism. He raises a host of issues about the traditional practice of genetic linguistics. According to him, creoles have developed by the same restructuring processes that are observable in other languages; they remind us of the relevance of several factors, such as the dynamics of population contact and mutual accommodation, that have typically been downplayed. He questions the linguistic justification of the distinction between internally and externally motivated change, challenging genetic linguists to explain in which way creoles cannot be classified genetically.

See also: Code Switching and Mixing; Environment and Language; Evolutionary Theories of Language: Current Theories; Jamaica: Language Situation; Pidgins and Creoles: Overview; Variation in Pidgins and Creoles; Vernacular.

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Jan Mukařovský was born in the ancient city of Písek, Southern Bohemia. In 1915, he graduated with a degree in linguistics and aesthetics from the Charles University, Prague. After several years of teaching at Prague grammar schools, he became Professor of Aesthetics at Charles University in 1929. Since the early 1920s, he maintained contact with Roman Jakobson as well as with the group of Czech avant-garde authors V. Nezval, V. Vancura, K. Teige, and so on. Beginning in 1926, he participated at the informal meetings of a group of linguists and philologists sharing the ideas of functional structuralism. (His first lecture, given to the club in 1927, was titled 'On the motoric moves in poetry.') In October 1930, the informal group became an official association, the Prague Linguistic Circle (PLC), and Mukařovský was one of the 17 people who signed the foundation chart.

Mukařovský's first articles dealt with literary critics, but soon he turned to theoretical poetics, specifically the phonic and syllabic structure of verse. Influenced by the Russian Formal School of poetics, and by Jakobson's treatise *Foundations of the Czech verse*, Mukařovský developed an analysis of poetic language focusing on a language (linguistic) form of a literary utterance (text), on its sound patterning, its semantic organization, and its thematic structure. His analyses of Czech authors such as Mácha and

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Němcová combine the abstract poetics of universal categories with an analytical poetics of individual literary works. The concentration on the formal features of literary texts brought Mukařovský to elaboration of a theoretical concept of a poetic language as opposed to the 'standard language' used in other fields of communication (cf. Jakobson's 'poetic function'). The most prominent feature of poetic language presented and studied in Mukařovský's articles and treatises since the early 1930s is the emphasis on the (language) form in which the content is being conveyed. A poetic language accentuates itself, drawing attention primarily to the deliberately foregrounded form (Mukařovský's term is *aktualisace*) of the message. The aesthetic values of a literary (poetic) work consist in the unusualness and uniqueness, in the maximum of formal disautomatization ('aesthetically purposeful distortion') of the articulated meaning. In different degrees, poetic language deliberately breaks the rules of grammar; wherever poetic function is dominant, the language represents itself first, and only secondarily it refers to the reality. It does not mean that poetic language is entirely independent of the other language functions. All signs, including aesthetic signs, fulfill certain needs of their users. As Mukařovský wrote, every concept is determined by all the others and in turn determines them; thus, a concept is defined unequivocally by the place it occupies in a conceptual system. Therefore, even aesthetics and poetics are interdisciplinary fields; they should not lose touch with the advancement of human and social sciences. Later, Mukařovský proposed and explored the concept of semantic gesture, a poet's idiosyncratic 'constructional principle,' which is applied in every segment of the work, even the most minute, and which results in a unified and unifying systematization of all the constituents. Both in its name and in its sense, semantic gesture ties the literary structure to the creative subject; the organizational principle of the work's semantics has a pragmatic base. Mukařovský's considerable pragmatic inspiration by dramatic arts and presentation of poetry are reflected in his often quoted study, *Dialogue and monologue* (1940). Mukařovský's most important theoretical and analytical studies were published in 1948. His concept of poetic language is still influential in the literary semiotics.

After World War II, PLC activities were resumed only on a limited basis since some of the prominent members had died (Trubeckoj and Mathesius), and others did not return from exile (Jakobson and Wellek). Soon (especially after February 1948), the theoretical principles of PLC, as well as structuralism in general, became ideologically unacceptable for the new communist regime in Czechoslovakia, and the PLC ceased to exist. Unlike most of the other former PLC members, Mukařovský, obviously due to his prewar contacts with left-wing authors and artists, did not have a problem to embrace the Marxist ideology and political requirements of the new communist government. He became a rector (president) of Charles University in the years in which political pressure affected the Czech academic environment (1948–1953). Later he became head of the Academic Institute of the Czech Literature, established after a Soviet model (1951–1962). In his bibliography of 1947–1967, ideological and political articles are far more numerous than literary studies. Nevertheless, the influence of his earlier works has lasted.

See also: Jakobson, Roman (1896–1982); Mathesius, Vilém (1882–1945); Prague School; Structuralism; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Mulcaster, Richard (1532–1611)

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Richard Mulcaster was born in Cumbria, England, in 1531 or 1532. From Eton he went on to Cambridge in 1548, and from there to Oxford, where he took an M.A. in 1556. He then moved to London, and in 1581 was made head of the Merchant Taylors' School. From 1586 to 1596 he trained for the priesthood, but in 1596 was appointed to a post at St. Paul's School, resigning as High Master in 1608. He died on April 15, 1611.

Mulcaster's interest to historians of language and linguistics lies in his *Positions* (1581) and the *Elementarie* (1582). Mulcaster's purpose in the *Positions* was "to shew mine opinion how the great varietie in teaching which is now generally vsed, maye be reduced to some vniformnesse" (Mulcaster, 1581: 296). Dedicated to Queen Elizabeth I, *Positions* provided an outline for a comprehensive system of public education covering such topics as the role of languages in the curriculum, physical education, access to education, and readiness for learning.

The *Elementarie* addresses the problem of establishing a satisfactory system of spelling for English and constitutes the first survey of rules for English orthography. The heart of the work is "THE GENERALL TABLE" (1582: 170–225), which gives a list of English words in their recommended orthographies. In this work, Mulcaster advocated, first, adopting existing forms which came closest to a so-called 'phonemic' orthography (an argument from 'reason' – analogy) and second, allowing unphonetic spellings in common words sanctioned by custom (anomaly). Among the spelling reforms credited to Mulcaster are the reduction of final double consonants from two to one after a lax vowel (*put* and *grub*, for *putt* and *grubb*) and the regularizing of final *–e* as a sign of vowel quality (sometimes described as 'length') as in *name*. Mulcaster also corrected some false 'etymological' spellings such as *abominable* for *abhominable* (*ab* + *omen* for *ab* + *homo*).

Mulcaster assigned an innovative role to grammar in education: an English child should first acquire a reading knowledge of English, followed by a reading knowledge of Latin. After this, the grammar of the native language should be learned as a foundation for learning the grammar of Latin (Mulcaster, 1582: 55).

Mulcaster's proposals for orthographical reform stand in a line of development running from Smith (1568) and Hart (1569) – both more radical in their proposals than Mulcaster – to Coote (1596), Gil (1619) (his successor at St. Paul's), and Butler (1633).

Mulcaster also constitutes an important touchstone in the history of English, marking shifts in the language ecology and changing attitudes to the vernacular. He believed that English had achieved its highest level of perfection and could stand comparison with any language: "I do not think that anie language . . . is better able to vtter all arguments, either with more pith, or greater pleasure, than our *English* tung is . . . " (Mulcaster, 1582: 258).

See also: English Spelling: Rationale; Hart, John (?1501-1574); Language Education: Grammar; Latin; Spelling Reform Proposals: English; Vernacular.

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Mulder, Johannes W. Franciscus (b. 1919)

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J. W. F. Mulder was born in Arnhem, the Netherlands on June 28, 1919. After an interrupted education and anti-Nazi activities during World War II, he found himself in Indonesia at independence, having picked up some Chinese, Sundanese, and Korean. He completed 2 years at the reopened University of Djakarta. On returning to the Netherlands, he was allowed to matriculate at the University of Leiden after impressing a panel, including Uhlenbeck, with his linguistic skills. His talents as a polyglot were now to be extended to theoretical linguistics to satisfy his need for data description. He was fortunate in the active group of linguists in Leiden, who also participated in contacts with the descendants of the Prague School and Martinet's emerging Paris school. These various elements included a keen interest in the philosophy of science, logic, and mathematical techniques alongside a practical knowledge of an impressive array of world languages. In such circles, analytical proposals were immediately tested across a wide range of languages.

Mulder completed his doctorate at Leiden in 1958 on Chinese. In 1961, he became Far Eastern librarian at the Oriental Institute in Oxford. Finding that his preceding degrees were not recognized, he set about presenting a D.Phil. under the supervision of David Hawkes, Professor of Chinese. This was subsequently published in revised form as *Sets and relations in phonology: an axiomatic approach* (1968, Clarendon). During this period, he also lectured in linguistics at Oxford (when there was no formally constituted linguistics program) and became the guiding light of a group of students (studying Chinese or Japanese) who were to provide the base for the implementation of his strategic linguistic vision.

In 1968, he was appointed Senior Lecturer in Linguistics at St. Andrews University and set about turning one post into a department. In an era of generative dominance, to create a new theoretical base and then apply it via descriptions of a wide variety of linguistic phenomena (as well as to semiology) might seem verging on the hubristic. Fortunately for us, pluralism still finds its niches.

With the appointment of Sandor Hervey, one of the Oxford bunch – and the openness to his ideas provided by the Martinet network (including the journal *La Linguistique*) and the LACUS forum, Sidney Lamb and other colleagues in the US and Canada – they set about teaching, writing, and supervising M.A. and Ph.D. theses to expand their field. In 1980, *The strategy of linguistics* was published with Hervey. By this time, his theory was graced with a name: Axiomatic Functionalism (or AF). Hervey's own Ph.D. on semantics appeared in 1979. Mulder has been involved with the Société Internationale de Linguistique Fonctionnelle (SIL) since its inception in the early 1970s and has been its honorary president for some years. Mulder, now based in Belgium, is still actively researching and publishing.

See also: Martinet, André (1908–1999).

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Friedrich Max Müller was a comparative philologist and Sanskritist at Oxford who presented public lectures on the science of language. These made him very famous in his lifetime, but he is also often (though controversially) considered a founder of comparative mythology and comparative religion. Largely forgotten after his death, his reputation is now making a comeback to the extent that his historical importance is understood beyond the boundaries of linguistics.

Born in Dessau on December 6, 1823, Müller was the son of the poet Wilhelm Müller, most famous for Schubert's musical setting of two poems, 'Die schöne Müllerin' and 'Winterreise.' In 1841, Müller began studying classical languages and also Oriental

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languages and Sanskrit with Brockhaus, as well as philosophy at the University of Leipzig. After receiving his Ph.D. in 1843, he studied comparative philology and Sanskrit with Franz Bopp, and philosophy with Schelling in Berlin for one year. In 1845, he studied in Paris with Eugène Burnouf and was influenced by his racial theories of comparative religion. Burnouf also encouraged Müller to translate the *Rig-Veda*, a project which took Müller to England in 1846 and 1847, where manuscripts were located in the library of the East India Company in London. With the patronage of German Ambassador Baron Bunsen, Müller was able to convince the Company to publish his translation with Sayana's commentary. To supervise the publication, Müller went to Oxford in 1848, where he remained until his death on October 28, 1900.

At Oxford, Müller took over the Taylorian Professorship of Modern Languages in 1851 when its holder became ill, and he was officially appointed in 1854. In 1860, Müller was passed over for the Boden Chair of Sanskrit at Oxford in favor of M. Monier-Williams, because Colonel Boden's intentions with the founding of the Chair were primarily missionary. In 1868, Oxford established a Chair of Comparative Philology for Müller, a position he held until he retired in 1876.

Müller was a very prolific scholar, whose oeuvre comprises many thousands of pages, and whose interests ranged from political uses of linguistics (e.g., *Suggestions for the assistance of officers in learning the languages of the seat of war in the east*, 1854) to comparative religion and mythology (e.g., *Introduction to the science of religion*, 1873), and philosophy (he translated Kant's *Critique of pure reason* in 1881). His most important contributions to Sanskrit studies are his 6-volume *Rig-Veda* translation (1849–1874) and his *Sanskrit grammar for beginners* (1866). In comparative religion, his most lasting contribution was inaugurating and editing the *Sacred Books of the East*, a series of 50 translations of religious texts deemed canonical in their communities, some of which he translated himself (including *Upanishads* Pts. 1 and 2, 1879–1884, and *Vedic Hymns*, Pt. 1, 1891). Without these translations, the comparative study of religions would not have been possible.

In comparative philology, Müller is best remembered for his *Lectures on the science of language* (1865), which were delivered at the Royal Institution in London in 1861 and 1863 and attended by notables such as Queen Victoria and J. S. Mill. With these lectures, Müller popularized "the science of language" by emphasizing its relevance to all human knowledge, based in his understanding of the "identity" of language and thought. With this phrase, Müller was echoing a Humboldtian notion that language and thought were interdependent processes (see Sutcliffe, 2001: 26). This claim also provided the foundation for Müller's refutation of Darwin's theory of evolution as applied to man. (Darwin had asked Müller to provide his expert opinion.) For Müller, because language and thought were 'identical' or interdependent, both had to be present from the beginning – language could not have evolved gradually because that would imply that thought could have existed independently of language. The roots of language as exemplified by the roots of Sanskrit thus represent the fundamental concepts, the roots of human thought, to him. On the other hand, prefiguring the Neogrammarians, Müller posited two principles of language change, phonetic decay and dialectal variation, to explain its regularity. Müller even classified the science of language as a physical, rather than a human, science because of the law-bound behavior of languages.

It was probably Müller's extremely broad range and popularity that led to the swift decline of his reputation after his death. He had a number of critics among linguists who considered him superficial, among them William Dwight Whitney, who devoted a book to discrediting Müller's theory (Whitney, 1892). Also, with the advent of Saussurean structuralism and its concomitant scientific specialization, the importance of comparative philology and of humanist scholars like Müller diminished. Van den Bosch located Müller's most lasting legacy in comparative religion and mythology, where Müller influenced H. Usener, who in turn influenced E. Cassirer (Van den Bosch, 2002: 523). Yet Müller's analysis of religion and mythology was grounded in his linguistics, utilizing etymological analysis of gods' names to conclude that mythology arose from a "disease of language", a property inherent in it causing ancient peoples to interpret metaphors to explain natural phenomena literally. As Müller himself wrote, the thread connecting all of his labors also connected "the origin of thought and language with the origin of mythology and religion" (Müller, 1901: 3).

See also: Bopp, Franz (1791–1867); Kant, Immanuel (1724–1804); Phonological Impairments, Sublexical; Whitney, William Dwight (1827–1894).

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Multiculturalism and Language

J R Edwards

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Focusing upon linguistic and cultural contact means focusing upon group identity. It is this sense of 'groupness' – ethnic or national – and the recognition that both underpins and reflects it, that constitute the core of the discussion on multiculturalism, a discourse that is essentially sociopsychological and usually emotionally charged. This can be true from either side of group boundaries: linguistic and cultural continuity, for example, can be both a rallying point for members of a beleaguered minority and an irritant (or worse) for those fearful of social balkanization or fissiparous movements. Multiculturalism is an icon for some, an illusion for others. And language – particularly in its symbolic roles, as well as in those communicative ones that link past to present, that bear culture across generations – is in many instances the centerpiece of the multicultural thrust. During and after language shift, it is certainly possible to maintain cultural distinctiveness and the sense of border that is the heart of group definition. However, this is not a viewpoint likely to be endorsed by people who feel themselves at risk of assimilation, nor can it be denied that continuity of language use is a powerful cultural buttress.

The politics of identity – the skeleton, that is to say, which is fleshed out by cultural and linguistic differences, details, and demands – is of special current salience. Our age is one of transition, and transitions are often difficult and painful. In the territories of the former Soviet Union, in the increasing western European federalism, in the killing fields of Africa – but also in the struggles of indigenous peoples in North and South America, in the debates on multicultural accommodations in new-world 'receiving' societies (Canada, Australia, the United States) – we see contexts in flux, identities up for renegotiation, languages in contact or conflict, 'small' cultures attempting to resist larger ones, and so on. It is true that, in some cases, the 'ethnic' factor in conflict is something of a red herring. The Hutus and the Tutsis of Rwanda essentially share the same culture, religion, and language and, consequently, ethnic difference was not the real nub of the conflict that led to the massacres in 1994. In Africa, Asia, and elsewhere, colonialism planted many delayed-action devices, emphasizing and stiffening cultural difference. But even if ethnic or nationalist roots are not, in themselves, causal phenomena (in situations of group friction), their very existence – the fact that they are *there*, the fact that dormant, or even unreal, traditions can be evoked and played upon, the fact that manipulated or selective history can be made to serve current ends – is of considerable importance. In some other cases, matters of language and culture are not only symbolic markers signaling deeper waters, but are more centrally implicated in intergroup conflict. It is not economic deprivation or lack of effective political representation in federal corridors that primarily fuels the sovereignty movement in Quebec – yet its power has come within a hair's breadth of breaking up the country.

Multiculturalism usually implies multilingualism and, at a *de facto* level, they exist in virtually all

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countries, in very few of which national and state borders are coterminous (see Connor, 1978). At a *de jure* level, languages are more often accommodated than are cultures. Still, despite a large number of languages and a small number of states – about 5000 and 200, respectively – only about a quarter of the world's polities recognize more than one language (and recognition itself rarely implies or reflects equivalent status; see Edwards, 1995).

Legislated attention to cultural diversity is rare, and Canada and Australia are virtually alone in having official multicultural policies. The Canadian approach is generally illustrative. Two years after the establishment of linguistic duality (with the Official Languages Act of 1969), a policy of multiculturalism was announced, and an Act was passed in 1988 – the aims were, from the first, to assist cultural groups to develop and to contribute to the larger society, and to help them learn either or both of the two official languages. Further elaboration (as found in the Act) stressed the preservation and enhancement of other languages – but this is supposed to coincide with the strengthening of English and French, too, the national commitment to which is reaffirmed. The Canadian policy demonstrates, then, the generalities employed when cultural maintenance or the continuity of non-official languages is under discussion (the Act talks of enhancing the Canadian 'multicultural heritage'), as opposed to the specificity attaching to the status of legally sanctioned varieties. Unsurprisingly, this package has been seen as rather an empty one; more pointedly, the feasibility of **multi**culturalism within a **bil**ingual framework and the depth, therefore, of real government commitment has been questioned. Of course, reactions to official multiculturalism range very widely, from the mistaken notion that it is a spur to ethnic separatism and an impediment to national unity (perhaps, indeed, to the emergence of some eventual, nonhyphenated **Canadian** identity), to the naïve belief that it enshrines and reflects a general tolerance for diversity – evidence for the moral superiority of the Canadian 'mosaic' over the more southerly 'melting pot.'

But the Canadian policy, for all its generality and its possible interpretations, is more broadly significant as an example of political response to diversity. Liberal democracies are of course obliged by deepest principle to consider multicultural realities – but consideration does not imply uniformity of sensitivity or reaction. In the Canadian approach to multiculturalism, an apparent response at the level of the group, the collectivity, is arguably of such a general nature (and, one should add, is so weakly supported, financially and otherwise) that it represents only a tiny course adjustment to the more traditional liberal stance in which rights are seen to inhere in individuals, a stance broadly descriptive of contemporary Western society. So, to the reactions already mentioned, we can add two further interpretations of multicultural policy: it represents only politically opportunistic lip service to the idea of cultural maintenance (a view which could of course be **endorsed** by the cynical assimilationist); or, it is a genuine response to heterogeneity, but one that is unfortunately flawed in its framing and its application. It need hardly be said that these and other stances are not unique to the Canadian context.

The appropriate democratic response to cultural diversity is of course the underlying issue here. Should there be formal multicultural policies at all and, if so, should they enshrine some level of commitment to group rights? What level? And what groups? The literature on multiculturalism and its ramifications – pluralist accommodation, the negotiation of identity, the rights of minorities, the obligations of the liberal state, and so on – has only recently turned to such matters. The turn, however, has been significant, and there is now a concern for 'identity' that extends from literature, to the social and political sciences, to philosophy.

In his treatment of 'identity politics,' Taylor invokes the idea of 'recognition' and, more specifically, the politics of equal recognition as fundamental. But this can shade easily into a politics of group difference, in which the uniqueness of group identity is emphasized. It is this, of course, that adherents claim is at risk of being ignored or, worse, assimilated to some overarching majority (the "cardinal sin against the ideal of authenticity": Taylor, 1994: 38). So we arrive at an interesting juncture: the principle of universal equality is stressed but within that, as it were, arise demands for the recognition of distinctiveness. The demands of general respect, on the one hand, and of particularity, on the other, lead to difficulties:

> The reproach the first makes to the second is just that it violates the principle of nondiscrimination. The reproach the second makes to the first is that it negates identity by forcing people into a homogeneous mold that is untrue to them. (Taylor, 1994: 43)

Bearing in mind the traditional liberal sense that society ought to ensure individual equality but remain neutral as to the desired contents of lives, but aware of the concerns of cultural collectivities (especially, of course, those under threat from powerful neighbors), Taylor argues for a more 'hospitable' liberalism that departs somewhat from this traditional neutrality, for the idea that cultures should be given some means of self-defense, for at least an initial presumption of equal worth – for something, that is, between

a cruel homogenization and an ethnocentric self-immurement.

Kymlicka (1995) has also addressed the matter, arguing that it is within the bounds of liberal democracy to provide groups with the means to ensure their cultural continuity – and, where these groups are specially disadvantaged, this may in turn require special attention, perhaps special rights. In this connection, he defends treatment differentiating between indigenous minorities and immigrant groups. Kymlicka (see also 1998) has concerned himself particularly with the Canadian context, suggesting that the multicultural policy is – or could be – an effective instrument. It is interesting (given what I have noted above) that he repeatedly points out that this policy, now to be understood as a vehicle for the provision of group rights, is, after all, no real threat to the *status quo*. Diversity will be subject to reasonable limits, and existing conceptions of rights, freedoms, and human dignity will not be overturned.

It is impossible to analyze here the rich detail of these sorts of arguments (or, indeed, to note the criticism they have elicited). But they are the ones we now need, since they confront the underpinnings of multiculturalism and may thus lead to useful generalities applicable across contexts. A great deal of the literature has, for too long, consisted of special pleading for one group or another, under the guise of a broad concern for pluralist accommodation. A more profound assessment of multiculturalism will necessarily involve its linguistic components, and that is why I have emphasized the former in this brief discussion. It is of course possible to attend to language *per se* without much concern for its cultural foundations. But an instrumental approach omits the essence of the matter here: the interweaving of language as a strand in the larger fabric, as part of a broad concern with identity and belonging.

See also: Anthropological Linguistics: Overview; Identity and Language; Nationalism and Linguistics.

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Multilingualism: Pragmatic Aspects

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Monolingual Perspective of Pragmatics Research

The study of pragmatics should answer two primary questions. From the perspective of production, the question is, why do we choose to say what we say? As far as comprehension is concerned, it is, why do we understand things the way we do? One of the major problems of pragmatics is that so far the only answers to these questions come from research that is heavily biased by monolingual approaches. When pragmaticians develop their theories, they usually do not think about people who speak more than one language. This has been a long-standing problem in pragmatics-oriented research. Communication is becoming more and more intercultural because it involves interactants who have different first languages, communicate in a common language, and represent different cultures. Pragmatics research, however, with the exception of interlanguage pragmatics, does not seem to pay much attention to intercultural communications and remains predominantly monolingual in scope. Major issues and theories of pragmatics are discussed in a monolingual framework that lacks or excludes any explanation of or reference to the applicability of ideas, theories, and research findings to bi- and multilingual settings.

Why is this narrow focus a problem? What is wrong with the monolingual view? The problem is that the most powerful theories of pragmatics, including the Gricean (1961) approach, Brown and Levinson's (1987) politeness theory, and Sperber and Wilson's relevance theory, presuppose that rules of communication, communicative principles, and interpretation and production processes are basically the same or very similar no matter what language we use. However, a close look at bi- and multilingual language production demonstrates that this is not exactly so.

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Language Use of Multilinguals

Language use is governed not only by universal but also by language- and culture-specific rules. A person who speaks two or more languages may share universal rules with a monolingual speaker, but will have two different sets of culture-specific, language-community-specific rules. This will result in production in either language that is not exactly the same as the language production/use of a monolingual speaker of either language. A bilingual is not two monolinguals in one body (Grosjean, 1985). Bi- and multilingualism are characterized by a unique synergism of more than one language and culture that significantly affects how bi- and multilinguals use language (Kecskes and Papp, 2000).

Pragmatics is about language use. Morris defined pragmatics as "the study of the relation of signs to interpreters" (Morris, 1938: 6). Ever since, all definitions of pragmatics have derived from his, trying to make it more specific. The participants in the 'game' that we call communication are the same in all definitions: the linguistic code, the interpreters of the code, and the linguistic and extralinguistic context (frame) of interpretation. Communication is about the interplay of these three elements. No one denies that interpreters do similar things with the code, no matter what language(s) they speak.

Consequently, the real issue for those investigating bi- and multilingual language use is not *what* is done with the code, but rather *how* it is done. Monolingual people and bilingual people do not differ in what they do with language, but in how they do what they do. There are similarities and differences between the language use of monolingual people and of bi- or multilingual people. The differences are usually manifested in such phenomena as code switching, different interpretation of one and the same thing, misunderstandings, different values, and approaches. What interests us here is why and how the same code is used differently by three groups of people: (1) monolinguals speaking that code as their L1; (2) bi- or multilinguals using that code as their L1, but having access to other language channels in their mind; and (3) bi- or multilinguals who do not have the language of interaction as their L1, but as their L2 (or Ln). Researchers working in two subfields of pragmatics – interlanguage pragmatics and cross-cultural pragmatics – have attempted to answer this question (*see* **Intercultural Pragmatics and Communication**.

Interlanguage Pragmatics

In the last two decades, interlanguage pragmatics has grown as a discipline that has been engaged in research in L2 learner language. This branch of pragmatics discusses how nonnative speakers comprehend and produce a speech act in a target language and how their pragmatic competence develops over time (e.g., Kasper and Blum-Kulka, 1993; Kasper, 1996). To date, many cross-sectional, longitudinal, and theoretical studies have been conducted mainly on a classroom basis, which has resulted in a special tie between interlanguage pragmatics and second language acquisition research.

Interlanguage pragmatics is based primarily on three theoretical constructs: the Gricean (1961) theory of pragmatics, Brown and Levinson's (1987) view of politeness, and interlanguage theory. Recently, attempts have been made to integrate Relevance Theory (e.g., Escandell-Vidal, 1996; Jary, 1998) and Conversational Analysis (e.g., Kasper, 2004) into interlanguage pragmatics. The main areas of research in this paradigm are pragmatic competence, speech acts, politeness, and pragmatic transfer. The ability to comprehend and produce a communicative act is referred to as *pragmatic competence* (Paradis, 1998; Kasper, 1997). This ability usually is based on one's knowledge about social distance and social status between speakers, cultural knowledge such as politeness, and both explicit and implicit linguistic knowledge (*see* **Relevance Theory**; **Conversation Analysis**).

Interlanguage pragmatics often goes hand in hand with cross-cultural pragmatics, which emphasizes that pragmatic principles that people abide by in one language are often different in another language. There has recently been a growing interest in how people using different languages observe the same pragmatic principle. Cross-cultural studies focus mainly on speech-act realizations in different cultures, cultural breakdowns, pragmatic failure, and the way something that is considered polite in one language is sometimes considered impolite in another.

The problem with interlanguage pragmatics is that it represents a monolingual and cross-cultural rather than a multilingual and intercultural view because all of its theoretical resources (Gricean theory, politeness theory, and interlanguage theory) advocate the relative independence rather than interdependence of language systems and the universality of cooperative and politeness principles. Wierzbicka (1985), Goddard and Wierzbicka (1997), and Meier (1997) questioned the claims that emphasized the universality of Grice's Co-operative Principle and of Brown and Levinson's theory of politeness (Brown and Levinson, 1987). For instance, they made a case for the cultural relativity of definitions of sincerity and relevance in a given speech community, or the ranking of imposition when a request is made.

The interlanguage theory sets out to describe the developmental route of the new language from the moment it is still a subcategory of L1 until native-like competence is achieved. According to this approach, theoretically one person can have two language competencies, which contradicts the "a bilingual is not two monolinguals in one body" claim of Grosjean (1985). As a consequence of the two native-like competencies view, interlanguage theory supports crosscultural rather than intercultural pragmatics research. Although the terms 'intercultural' and 'cross-cultural' are often used interchangeably, they do not have the same meaning. Cross-cultural communication is usually considered to be the study of a particular idea(s) or concept(s) within several cultures that compares one culture to another on the aspect of interest, whereas intercultural communication focuses on interactions among people from different cultures.

Another problem with the interlanguage theory is that it focuses on linguistic and sociocultural aspects of language development and use while ignoring almost completely its cognitive, conceptual aspects. The cognitive aspect is present in the account of mental representation of the linguistic system.

Interlanguage theory is about the emerging second language, rather than a unique symbiosis of two languages, a dual language, which is affected by the dynamic nature and bidirectionality of transfer, as well as conceptual blending. The final goal of interlanguage development is native-like competence, which is possible only if we accept that a new conceptual system emerges to operate the new language system, and switching between two languages presupposes switching between two conceptual systems. This, however, contradicts recent findings in bi- and multilingual research where there is a strong claim for a common underlying conceptual system (e.g., Paradis, 1995; Kecskes and Papp, 2000).

Dual Language Theory

The dual language theory has been put forward as an alternative to interlanguage theory (Kecskes and Papp, 2000; Kecskes, 2003). 'Inter' means 'in between.' However, the language learner is not in between something, but rather is in the process of changing the existing conceptual and linguistic system by adding new information that will result in a qualitative change in the conceptual system and the emergence of a new linguistic system rooted in one and the same conceptual system. The dual language theory (DLT) is an 'intake' rather than an 'input' approach because it emphasizes the conceptual system and investigates what happens to the knowledge that enters the Common Underlying Conceptual Base (CUCB) through the two or more language channels, as well as how this knowledge is used through the language channels.

Rather than focusing on the target language features, the DLT points to the process of language construction itself, conceptual change, bidirectional influence, and movements not only up but also down on the developmental continuum. The languages are kept separate, but thoughts originating from the same conceptual system can be fed into two language channels. This fact has a profound impact on pragmatic skills and performance: what we choose to say, how we choose to say something, how we understand things said to us, and what we consider relevant. Consequently, the DLT can serve as a theoretical foundation for bi- and multilingual pragmatics. From a perspective of the extent of the interdependence of two or more languages in the dual or multilingual system, the DLT differentiates two main developmental periods: transfer period and conceptual change period (Kecskes and Papp, 2000; Kecskes, 2004).

Language Transfer

The first phase of bi- and multilingual development is dominated by unidirectional (L1→L2) processes and the production of the individual learner's elements. Transfer in the opposite direction (L2→L1) is not significant. In this period, the L1 is usually flexible enough to add the emerging second language as an additional register to those already in existence (De Bot, 1992). Transfer in this phase seems to be a matter of interaction of the language channels, rather than the conceptual system. Consequently, this transfer is usually considered to be a negative phenomenon that is generally the sign of the lack of some kind of linguistic and/or pragmatic knowledge and that takes the form of grammatical and/or lexical mistakes and errors. In this period, the main issue is correctness, rather than appropriateness.

Conceptual Change

The second developmental period begins when the conceptual system of the learner is affected by the knowledge and new information that come through the emerging new language channel. This phase is characterized by bidirectional influence and by changes both in the linguistic and conceptual system. The more proficient the learner becomes in the L2, and the more firmly the CUCB is established in the mind, the more positive is the result of bidirectional influence. This period is dominated by qualitative conceptual change that makes it possible to use knowledge and skills gained through either

language channel in both monolingual and bilingual language modes. This has a serious bearing on the learner's language behavior and discourse organization, which may be characterized in this period by switches between codes, depending on communicative needs. This phenomenon hardly resembles what we call 'transfer' in the first period. It is 'blending.' rather than transfer: conceptual blending of knowledge and information that come through either language channel. The result is positive rather than negative and originates in the changing and dynamic nature of bidirectional movements in the dual language system.

Inferencing in the Multilingual Mind

According to Grice (1961), the decisive feature of pragmatic interpretation is its 'inferential' nature. He argued that most aspects of utterance interpretation that traditionally are regarded as conventional, or semantic, should be treated as conversational, or pragmatic. This means that the hearer constructs and evaluates a hypothesis about the speaker's meaning. In this process, the hearer relies on three factors: the meaning of utterances, contextual and background assumptions, and general communicative principles that speakers are supposed to observe in normal circumstances. The question is how these three factors affect the process of inferencing in the case of multilinguals.

In the language transfer phase of dual language or multilanguage development, pragmatic failures in production and comprehension are mainly caused by the low proficiency level of learners and the strong dominance of the L1-based conceptual system that determines the communicative behavior of learners. The conceptual change period, however, is entirely different. Linguistic problems decrease while acculturation issues come to the fore. An advanced nonnative speaker cannot be expected "simply to abandon his/her own cultural world" (Barro *et al.*, 1993: 56). Adamson (1988) also pointed out that nonnative speakers are often reluctant to accept and share the values, beliefs, and presuppositions of an L2 community, even if they have been living there for a long period of time and can speak the language quite well. Kecskes and Papp (2000) argued that students seem to have more control over their pragmatic development than their grammatical development. They frequently learn pragmatic units and develop pragmatic attitudes by choice, which they usually cannot do when learning grammar. This is why speakers with high grammatical proficiency will not necessarily show concomitant pragmatic skills. Bardovi-Harlig (1996) observed that the range of success among students with a high level of grammatical proficiency is quite wide. Successfully reaching the acculturation threshold depends not only on the development of L2 language proficiency but also on the willingness of the speaker to acquire new sociocultural frameworks and make them a functional part of his or her CUCB.

Conceptual blending in the CUCB may result in a pragmatic style that does not exactly match that of either language. Rather, this style is a unique synergic mode of communicative behavior that is the result of conceptual blending. Blum-Kulka and Kasper (1993) discussed a similar phenomenon in their intercultural style hypothesis. They argued that speakers who are fully competent in two languages may create an intercultural style of speaking that is both related to and distinct from the styles prevalent in the two substrata, a style on which they rely, regardless of the language being used. This claim is supported by several studies of crosscultural communication, especially those focusing on interactional sociolinguistics (e.g., Gumperz, 1982; Tannen, 1985) and the pragmatic behavior of immigrant populations across generations (e.g., Clyne *et al.*, 1991).

Conclusion

Pragmatics research has two important tasks: (1) to develop a theory (or theories) that can explain not only monolingual but also multilingual language use and discourse, and (2) to revise our existing knowledge about the emergence of subsequent languages and their effect on the conceptual system of learners. In this endeavor, special attention must be paid to the analysis of real-life conversations between speakers who have different first languages, use a common language, and represent different cultures. Bi- and multilingual pragmatics requires that our perspective on language use be not only cross-cultural but also intercultural, where the focus is on interactions among people from different cultures, rather than on a comparison of interactions among people from the same culture to those from another.

See also: Conversation Analysis; Intercultural Pragmatics and Communication; Relevance Theory.

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Multimodal Interaction with Computers

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Multimodal Interaction

Multimodal interaction involves a person's use of more than one of their natural communication modes, such as spoken language, gesture, sketch, writing, eye gaze, body posture, and so forth, to communicate with a partner. For a computer to respond appropriately, it will need to derive coherent communicative intent from this combined set of inputs. This article summarizes the advantages of multimodal interaction, progress in our understanding of humans' multimodal performance, the state of the art in multimodal system processing, and challenges and opportunities for future science and technology of multimodal interaction. This article does not cover multimodal presentation planning and output (e.g., generating utterances coupled with the graphical output).

Currently, the best developed multimodal systems process users' speech and touch- or pen-based inputs (e.g., sketch and/or handwriting) and audiovisual speech recognition. Multimodal systems frequently involve spatial applications, such as map-based planning (Cohen *et al.*, 1997; Johnston *et al.*, 1997; Oviatt and van Gent, 1996; Oviatt, 1997) and have been used to support information-seeking dialogues, for example, at public kiosks (Wahlster, 2001). Pen–voice multimodal systems enable users to refer to or describe objects, events, and relations, while processing gestures that depict spatial location, shape, number, motion, or other object or action modifiers. Audiovisual speech recognition systems recognize speech by combining both acoustic and visual information (e.g., from lip movements). Potamianos *et al.* (2004) provide an excellent introduction to the state of the art in this area.

Research is progressing on other modality combinations. Inspired by Bolt's (1980) seminal Put-that-there system, there have been numerous systems that process both users' speech and arm or hand gestures, often for virtual reality applications (Kaiser *et al.*, 2003; Pavlovic *et al.*, 1997; Richard *et al.*, 1996; Latoschik, 2002) or robot control (Perzanowski *et al.*, 2001). Some multimodal systems also incorporate information about what is in the user's field of view (Kaiser *et al.*, 2003). Finally, eye gaze is rapidly becoming a tool that can be used in multimodal systems, with systems having been built that combine eye gaze with manual input or speech (Koons *et al.*, 1993; Zhai *et al.*, 1999). Other research is working toward combining information on gaze movements with task-oriented spoken dialogue (Qvarfordt, 2004).

These modalities are especially suited to nontraditional computing environments, i.e., those that are off the desktop, such as mobile usage, both pedestrian and in-vehicle (Potamianos and Neti, 2003). In these environments, multimodal interaction will be particularly advantageous both for small devices (cell phone, PDA (Kumar *et al.*, 2004), and digital paper (Cohen and McGee, 2004)) and for large ones (data walls) as well as computing environments for which the user is not intended to conceive of a device *per se*, such as so-called 'ubiquitous computing' or 'smart' environments. In all these environments, the user is always equipped with their natural modes of communication – speech and body movement, as well as use of tools (e.g., a pen). Precisely how that human is sensed by a machine drives the overall multimodal human–computer experience. However, before building high-performance multimodal systems, it is crucial that the architecture be based on an understanding of how humans communicate multimodally in different contexts.

Human Multimodal Interaction and Performance

There are large individual differences in ability and preference to use different modalities of communication, and one major advantage of a multimodal system is that it permits people to exercise selection and control over how they interact with a computer. In this respect, multimodal interfaces have the potentia to accommodate a broader range of users than traditional graphical user interfaces and unimodal interfaces – including users of different ages, skill levels, native language status, cognitive styles, sensory impairments, and other temporary or permanent handicaps or illnesses. Multimodal interfaces that incorporate modes such as speech, pen, touch, and gaze are also the preferred interface for supporting mobile tasks, since these input modes are compact and naturally portable. When combined, people can shift these input modes from moment to moment as environmental conditions change, which permits the alternation needed to cover a wider range of changing circumstances encountered during actual field use. The natural alternation between modes that is permitted by a multimodal interface also can be effective

in preventing overexertion and physical damage to any single modality, especially during protracted periods of computer use.

Compared with speech-only interaction, empirical work with users during visual–spatial tasks has demonstrated that multimodal pen–voice interaction can result in 10% faster task completion time, 36% fewer task-critical content errors, 50% fewer spontaneous disfluencies, and also shorter and more simplified linguistic constructions with fewer locative descriptions (Oviatt, 1997; Oviatt and Kuhn, 1998). This constellation of multimodal performance advantages corresponds to a 90–100% user preference to interact multimodally (Oviatt, 1997; Oviatt *et al.*, 1994). In large part, people's performance difficulties during visual–spatial tasks are due to their error-proneness and reluctance to articulate spatially oriented information. During multimodal interaction, people instead prefer to use pen input to point or create graphics, since it generally is a more effective and precise way to convey locations, lines, areas, and other inherently spatial information.

Recent work has revealed that a flexible multimodal interface can support users in managing their cognitive load. One study indicated that users spontaneously respond to dynamic changes in their own cognitive load by shifting to multimodal communication as load increases with task difficulty and communicative complexity (Oviatt *et al.*, 2004). Specifically, users' ratio of multimodal (versus unimodal) interaction increased substantially from 18.6% when referring to an already established dialogue context to 77.1% when they had to establish a new context. Likewise, multimodal interaction increased as tasks became more difficult, from 59.2% during low-difficulty tasks to 75.0% on very-high-difficulty tasks. These changes are believed to reflect users' efforts to self-manage limitations on working memory as complexity increases, which is accomplished by distributing communicative information across multiple modalities.

A particularly advantageous feature of multimodal interface design is its ability to support superior error handling, compared with unimodal recognition-based interfaces, in terms of both error avoidance and graceful recovery from errors (Oviatt *et al.*, 1999; Rudnicky and Hauptman, 1992; Suhm, 1998). Many of the reasons that multimodal systems facilitate error recovery are user centered. First, in a multimodal interface, users will select the input mode that they judge to be less error-prone for particular lexical content, which leads to error avoidance. Second, users' language is simplified when interacting multimodally, which reduces the complexity of natural language processing and thereby reduces recognition errors (Oviatt and Kuhn, 1998). Third, users have a strong tendency to switch modes after system errors, which facilitates error recovery because the confusion matrices differ for any given lexical content for the different recognition technologies involved in processing (Oviatt *et al.*, 1999). A fourth reason that multimodal systems support more graceful error handling is that users report less subjective frustration with errors when interacting multimodally, even when errors are as frequent as in a unimodal interface.

Significant efficiency advantages can also be found if system interfaces are designed to take advantage of the power of multimodal interaction. For spatially oriented tasks performed on desktop machines, that efficiency gain over graphical user interfaces has been found to range from 10% (Leatherby and Pausch, 1992) to a 400% increase in speed (Cohen *et al.*, 2000). Because the same multimodal interfaces can operate on smaller devices, the efficiency advantage is expected to be considerably larger as the device shrinks in size.

Independent of users' behavior, there are other system-centered reasons that multimodal systems yield superior error handling. The main reason is that a well-designed multimodal architecture can support 'mutual disambiguation' of input signals (Oviatt, 1999). Mutual disambiguation involves recovery from unimodal recognition errors within a multimodal architecture, because semantic information from each input mode supplies partial disambiguation of the other mode. For example, if a user says *ditches* but the speech recognizer confirms the singular *ditch* as its best guess, then parallel recognition of several graphic marks can result in recovery of the correct plural interpretation. This recovery can occur in a multimodal architecture even though the speech recognizer initially ranks the plural interpretation *ditches* as a less preferred choice on its *n*-best list. In two studies involving over 4,600 multimodal commands, a multimodal architecture was found to support mutual disambiguation and error suppression ranging between 19 and 41% (Oviatt, 2002a,b). Improved robustness also was greater for 'challenging' user groups (accented vs. native speakers) and usage contexts (mobile vs. stationary use). These results indicate that a well-designed multimodal system can perform not only with greater average reliability, but also in a more stable manner across varied real-world users and usage environments. To reap such error-handling advantages fully, a multimodal system must be designed so the modes provide duplicate functionality so users can accomplish their goals using either mode alone.

In the design of multimodal architectures, it is important to note that data on the order of input modes and

average intermodal lags have been used to determine the likelihood that an utterance is multimodal versus unimodal and to establish temporal thresholds for fusion of input. Previous empirical work on multimodal pen–voice integration patterns has revealed two main types of user: those who habitually deliver speech and pen signals in an overlapped or simultaneous manner and others who synchronize signals sequentially with pen input preceding speech by up to 4 s (Oviatt *et al.*, 2003). A user's dominant integration pattern typically can be identified on his or her first multimodal command and it remains highly consistent (i.e., 88–97%) throughout his or her interaction with the computer. In addition, a user's dominant pattern is strikingly consistent and resistant to change, even when explicit instruction or strong selective reinforcement is delivered to encourage switching from a sequential to simultaneous pattern, or vice versa (Oviatt *et al.*, 2003). These findings indicate that future multimodal systems that can **detect and adapt to a user's dominant integration pattern** potentially could yield substantial improvements in system robustness and overall performance.

Within biology, experimental psychology, and cognitive neuroscience, a separate rapidly growing literature has clarified that multisensory perception and integration cannot be predicted by studying the senses in isolation. When individual modalities are merged during normal processing, nonlinear interaction effects and illusions dominate (Stein and Meredith, 1993). Examples include the McGurk effect (McGurk and MacDonald, 1976), spatial ventriloquism effects (Bertelson and deGelder, 2004), temporal ventriloquism effects (Welch *et al.*, 1986), and cross-modal matching on pitch, loudness, brightness, and other features (Marks, 1989). Large individual differences and within-subject stability likewise have been documented in the perception of multisensory synchrony between auditory and visual events (Mollon and Perkins, 1996). Contrary to the historical focus on studying perceptual senses individually, multisensory processing effects now are viewed as pervasive and fundamental to the understanding of perception. These findings within cognitive science offer dynamic models of multimodal timing and fertile grounds for building the theoretical foundation needed to design future adaptive multimodal interfaces with greater flexibility, generality, and power. They also have the potential to define what it means to build a 'well-integrated' multimodal interface, including the circumstances under which so-called 'superadditivity' effects (i.e., mutual disambiguation) can be expected rather than interference between modalities (Spence and Driver, 1999).

Multimodal Collaboration

Computer support of human face-to-face communication is a very rich and relatively uncharted area of multimodal processing, although one that is now attracting researchers' attention. Numerous research groups (AMI, supported by the European Union, CHIL, supported by the European Commission's Sixth Framework Programme, and CALO, supported by the U.S. Defense Advanced Research Projects Agency) are now engaged in systematic data collection and analysis of multiparty meetings, incorporating information about people's speech, gesture, body posture, facial expression, and emotion, as well as information about the artifacts they use, their writing, sketch, and computer entry. These data are intended to provide a basis for understanding what people in fact do when they work together.

Although many studies have videotaped and attempted to analyze human–human dialogue, only recently have researchers attempted to build systems that can analyze such dialogues, providing the potential for computer support. First, there needs to be a base of understanding of how people engage in collaborative discourse. Of course, many disciplines have analyzed interpersonal dialogue, including ethnographers, educators, linguists, philosophers, and researchers in artificial intelligence, but often only at the linguistic level. Others have examined gesture in great detail (McNeill, 1992; Quek, 2003) but have not systematically and quantitatively studied the complete multimodal performance. When groups collaboratively use shared artifacts, the interaction becomes highly multimodal. In a recent study (Cohen *et al.*, 2003), it was found that for four military personnel collaborating over a horizontal paper map, 68% of utterances in a 20 min sample were multimodal, with a mean of 1.7 gestures per utterance (a maximum of 7 gestures, using both hands). Also, people often gestured within another person's utterance, and even collaborated on gesturing (e.g., by completing the other's gesture), much as they finish each other's sentences. Overall, collaborative interaction in various forms – lectures, meetings of various kinds, remote interaction – will be heavily multimodal, and significant research effort will be required to develop computer systems that can provide support.

Multimodal Architectures

Unlike graphical user interfaces, for which the user's inputs are certain, multimodal interfaces must first and foremost handle uncertainty – recognizers will always have some probability of error in processing

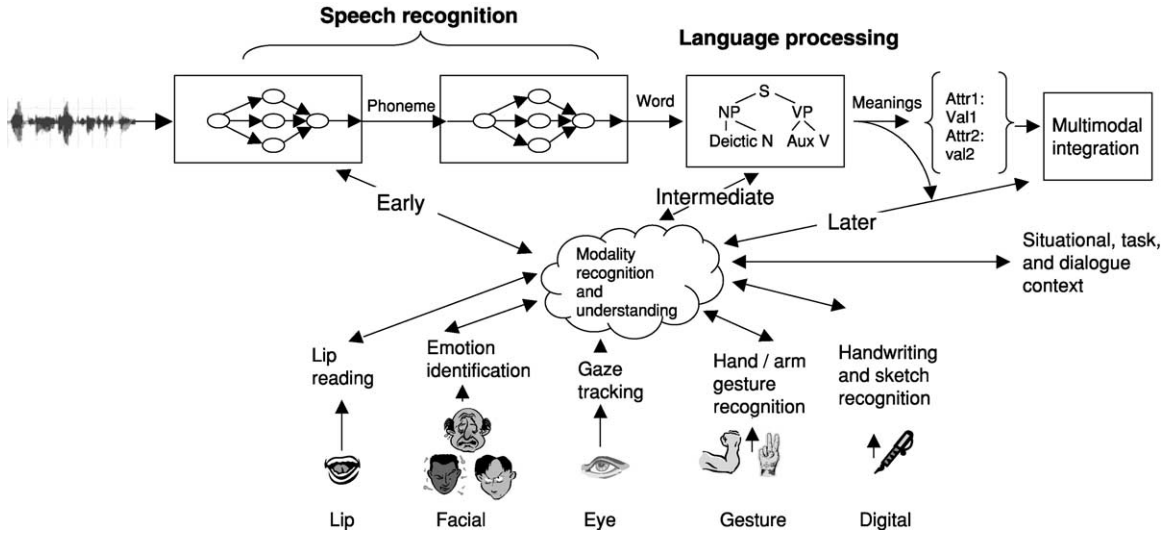

Figure 1 The many stages of multimodal integration.

human signals. Suited as they are to nontraditional computing environments, multimodal interfaces will also be confronted with substantial noise, perhaps in many channels simultaneously. Moreover, it is well known that there exists substantial variability in people's natural communication styles. Such interfaces need to handle variability at all levels, especially variability in human multimodal integration patterns, e.g., people's issuing of simultaneous and sequential input (Potamianos *et al.*, 2004; Oviatt *et al.*, 2003; McNeill, 1992; Kendon, 1980). An example of simultaneous input would be the use of the audio signal along with visual information about lip movement during speech recognition (see Potamianos *et al.*, 2004b, for an excellent review). An example of the latter would be speech and gesture integration, for which it is known that gesture often precedes the speech with which it should be combined (Oviatt *et al.*, 2003; McNeill, 1992; Kendon, 1980). The architecture also needs to be able to accommodate unimodal inputs, e.g., speech alone, iconic hand gestures, pen-based drawings. Some modalities provide meaningful information, whereas others, such as eye movements, may be useful as statistical predictors of human behavior in another mode. Systems thus need to function with whatever modality combinations the user chooses.

Figure 1 depicts a generic multimodal processing architecture, with a concentration, for expository purposes, on the language-processing pipeline. The architectural concepts discussed below also apply to other recognition/understanding processes, such as gesture understanding.

Assume that the speech recognition pipeline converts acoustic signals to phonemes and then to words, utterance, and meaning. In parallel, the user's lip, hand, arm, eye, pen, and torso motions are sensed by a variety of means (computer vision, magnetic or acoustic sensors, touch-sensitive surfaces, digital paper, etc.), characterized in various feature spaces, and then classified and understood. Multimodal processing needs to fuse these classifications with the language stream in order to arrive at the best joint interpretation of the multiple inputs. From Figure 1 we see that it is not clear where the information derived from processing the other individual modalities should affect the speech recognition and understanding process – that information could be merged during the signal processing, after the identification of constituent items, such as phonemes or syllables, during the search for words, the parsing of utterances, or the determination of meanings. Likewise, speech processing could be used to help understand input from the other modes, especially gesture, writing, or sketch. In the next section, we discuss three approaches to the architecture of multimodal fusion.

For ease of exposition, we use speech understanding as the base modality into which others will be integrated. Three approaches to modality fusion, early, intermediate, and late, can be applied: (1) during speech recognition, (2) during the language processing, and (3) after a linguistic meaning has been derived. We illustrate how these three approaches apply at different stages, both within a recognizer and further down the pipeline. Thus, depending on the granularity of the recognition or understanding process, a mid- to late-fusion algorithm at the stage of speech recognition is still an early-stage fusion process when one considers the larger process of spoken

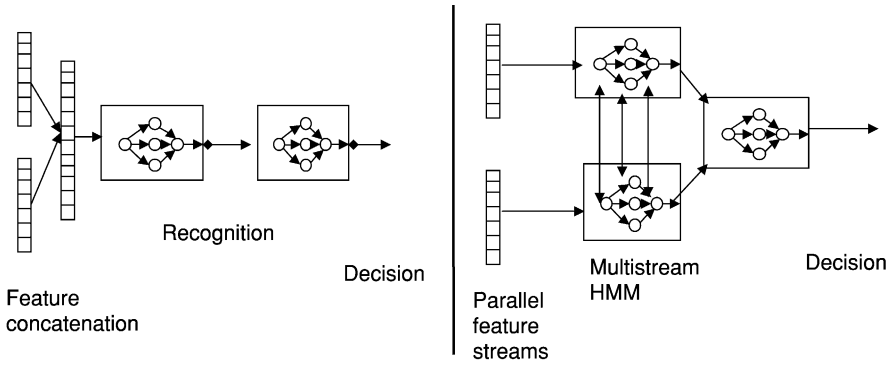

Figure 2 Early-stage multimodal fusion architectures.

language understanding. Moreover, the information sources can be combined, and each might be best utilized at a different stage of the pipeline.

Early or feature-level fusion involves joint recognition based on a merger or concatenation of synchronized feature streams (see Figure 2). An example would be audiovisual speech recognition for which auditory and visual features are incorporated into one larger feature vector. Because these signal streams are produced from the same physical source – the human facial and vocal tract apparatus – audio information and visual information about speech are relatively well correlated in time. Audio features have been combined with visual features (so-called visemes (Potamianos *et al.*, 2004b; Bregler and Konig, 1994; Stork and Hennecke, 1995) into a combined feature vector that is then dimensionally reduced and subject to a relatively standard hidden Markov Model (HMM) speech recognition decoder. A single-stream HMM receives the concatenated feature vector (as depicted in Figure 2, left panel) or multiple features streams (Figure 2, right panel) are fed into a state-synchronous, multistream hidden Markov Model (Gravier *et al.*, 2002). More complex HMMs can be employed that factor the state space as a 'product' of states (Potamianos *et al.*, 2004) or coupling of the states (Brand *et al.*, 1997) (as in Figure 2, right panel). A second example of early fusion would be multisensory microphone technologies that combine acoustic signals transmitted through the air, with signals transmitted through bone or skin (e.g., throat) (Graciarena *et al.*, 2003; Zhang *et al.*, 2004; Zheng *et al.*, 2003).

Intermediate-level fusion (Figure 3) occurs when some amount of recognition has been carried out on at least one feature stream, which results in partial classification (such as into phonemes). However, a decision has not yet been reached about the final output classification (e.g., as words). The intermediate fusion process merges the additional modality information after the partial classification has been

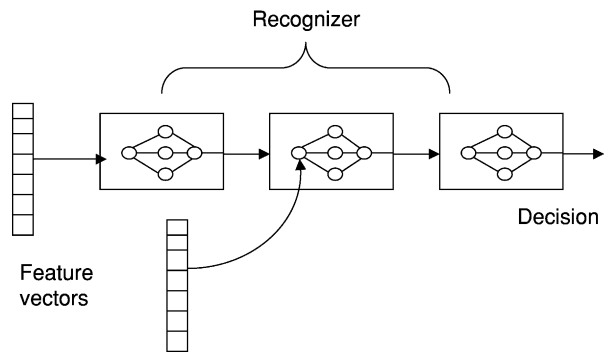

Figure 3 Intermediate-stage fusion.

carried out. One application of this approach during speech recognition is again audiovisual processing of speech. Because audio information and visual information are often asynchronous by as much as 120 ms, which is approximately the length of a phoneme, some researchers have investigated the intermediate-stage merger of information at phoneme boundaries, leading to phone-synchronous multistream product hidden Markov models (Potamianos *et al.*, 2004a).

At the linguistic level, Bangalore and Johnston (2000) have experimented with intermediate-stage fusion by providing gestural information during speech recognition. In this approach, finite-state recognition subgrammars that incorporate information from a small class of pen-based gestures are downloaded dynamically into the speech recognizer to be used as language models. The gesturally based subgrammars then alter the speech recognition search for words (e.g., deictics such as 'this') that typically co-occur with gestures. This approach relies on empirical results that indicate that people usually draw or gesture before or while speaking (Oviatt and van Gent, 1996). Other researchers have restricted the system's recognition vocabulary by identifying the objects that the user can see (Roy and Mukherjee, in press; Yu and Ballard, 2003). However, information in such architectures tends to flow only one way, restricting speech

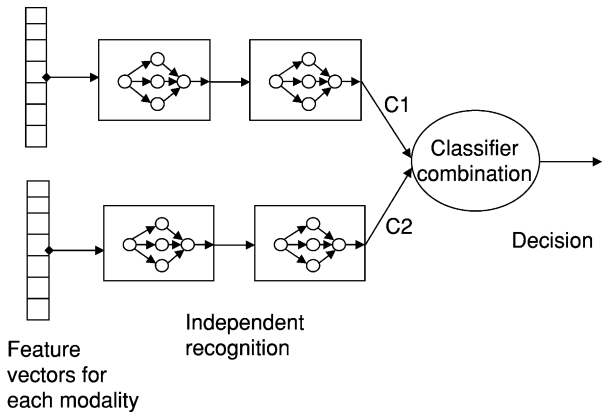

Figure 4 Late or decision fusion.

with gestural or object identification information, but not vice versa.

Finally, late or decision fusion (Figure 4) combines the results from classifiers, using statistical and/or semantic information. For audiovisual speech recognition, decision fusion algorithms combine the word classifications from audio and visual information, often with a linear combination of log-likelihoods of the classifications over the top-*n*-scoring class recognition hypotheses (or a lattice) in each modality (Potamianos *et al.*, 2004b). The weights applied in the combination can be trained to model variations in the confidence reported provided by the various recognizers themselves, or situation-specific experience about the success of a given recognizer. Overall, for audiovisual speech recognition, decision fusion methods have been found to outperform feature fusion methods (Potamianos *et al.*, 2004b; Potamianos and Neti, 2003), e.g., by a 12–17% relative reduction in word error rate (Potamianos and Neti, 2003). This approach also has a practical advantage of simplicity of implementation, allowing for independently developed 'black box' classifiers to be incorporated.

Further down the pipeline of Figure 1, late or decision fusion combines the results from individual speech and gesture understanding components, which may also be sensitive to contextually relevant information from the physical or discourse contexts (see Figure 4). Whereas late fusion at the word recognition stage involves recognizers that produce alternative classifications (e.g., word hypotheses), late fusion at the level of meaning representation derived from speech and gesture (for example) will fuse the classifications into a more comprehensive whole. Semantic combination methods have frequently been based on the unification of the meanings derived from each input (Johnston *et al.*, 1997; Vo and Wood, 1996; Yu and Ballard, 2003), whereas statistical classifier combination methods have involved a hierarchical classifier combination procedure (Oliver *et al.*, 2002; Wu *et al.*, in press). Hybrid methods that combine statistical and symbolic approaches have also been applied to derive the best-scoring joint ultimodal interpretations (Kaiser and Cohen, 2002).

In order to accomplish late-stage fusion at the level of meaning, the multimodal integration subsystem **unifies** the meaning representations derived from each mode (Johnston *et al.*, 1998), often with a statistical process to rank the fused hypotheses. Unification is a recursive matching process derived from automated theorem-proving and logic programming. Here, it is used to combine information from different modalities when represented in an attribute/value structure with shared variables. Unification combines redundant and complementary information from the two information sources, but rules out inconsistent information. By examining (a subset of) the cross product of the hypothesis lists from each modality, such an architecture is capable of 'mutual disambiguation' (MD) of the joint inputs (Oviatt, 1999). This fusion process searches the lists of hypotheses from each mode for the best-scoring unified multimodal hypothesis. MD occurs because the best joint hypothesis may in fact not use the top-rated modality hypothesis from any mode. When it does not, the method has disambiguated the poorer scoring modalities. For example, consider a case from a multimodal virtual reality system (Kaiser *et al.*, 2003) in which the user says *Rotate the monitor clockwise* while making a twisting movement with her hand. Figure 5 shows an instance of double mutual disambiguation in which the top-scoring multimodal hypothesis has combined the best speech hypothesis with the second-best gestural and third-best object identification hypotheses. Diagrammatically, when the line is not straight, MD has occurred.

Mutual disambiguation benefits a system most in challenging environments, where, at any given time, a channel of input can be corrupted by noise, physical movement, or other factors. Other modalities that are unaffected by that situational variable (e.g., gesture is likely to be unaffected by noise) can often provide sufficient disambiguating information.

The purpose of these architectures is to support robust system processing of people's multimodal performance in challenging environments. In the next section, we discuss how this robustness is achieved.

Robustness

There are many reasons that multimodal systems are more robust than unimodal ones. Empirical studies of multimodal human–computer interaction have found that, in comparison to speech-only interactions,

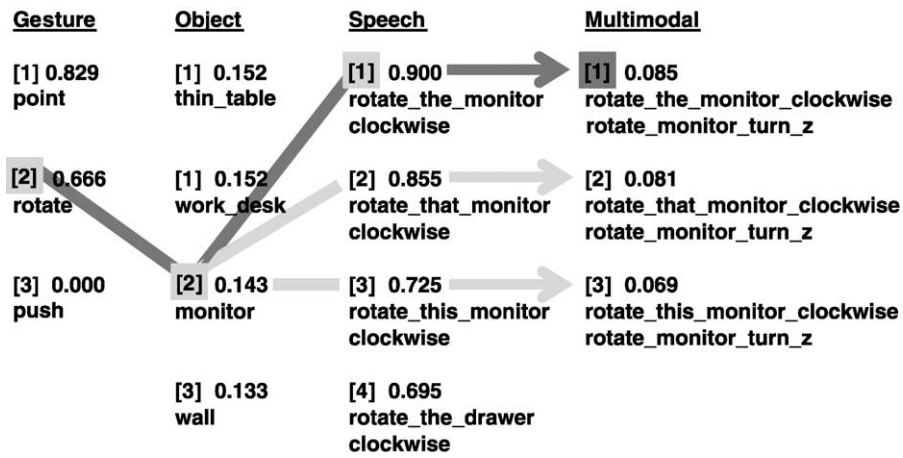

Figure 5 Example of double mutual disambiguation.

people change their language when allowed to communicate multimodally (Oviatt and Kuhn, 1998). Specifically, in a map-based task, it was found that multimodal utterances are shorter and less disfluent, with locative information being expressed gesturally rather than in complex (and disfluent) phrases. Thus, systems that allow users to distribute their content across modalities will face simpler recognition and understanding problems and thus are likely to be more robust.

A second major benefit for multimodal interaction is the opportunity to use other sources of information to compensate for recognition errors, especially in challenging environments. These benefits have been found with each stage of modality fusion.

At the early stage of spoken language understanding, the use of multisensory microphones that fuse bone-conduction signals with standard acoustic signals has been found to lower the ASR relative error rate by 50% (Zhang *et al.*, 2004; Zheng *et al.,* 2003). Research on audiovisual speech recognition has shown that the use of visual information in a studio environment lowers the relative error rate for large-vocabulary ASR by 8% in noisy environments (babble noise), which is the equivalent of lowering the noise level by 7dB (Potamianos *et al.*, 2004). Variation in lighting and pose can be overcome through the use of a multimodal microphone that incorporates both an infrared camera aimed at the lips and an audio microphone (Huang *et al.*, 2003). Using a feature fusion architecture, with multispeaker noise, the audiovisual headset accounted for a 53.7% relative reduction in word error rate.

In using a midstage fusion process of language understanding, Bangalore and Johnston (2000) found a relative reduction in the speech recognition errors of 23% through the incorporation of gesture. Roy and Pentland (2002) found a 31% RER in speech recognition by priming the speech recognition language model using the objects that the user could see.

Systems that do late fusion and examine the lists of hypotheses that arise from the various recognizers or interpreters support mutual disambiguation. Oviatt (1999) reported that MD led to a 41% relative error rate reduction (RER) for nonnative speakers of English, rendering their performance with the multimodal system on a par with that of native speakers. One in eight utterances succeeded because of MD. MD also helps in mobile contexts, which may have unpredictable noise, movement, and exertion. When using a high-quality noise-canceling microphone vs. a microphone onboard the computer, Oviatt *et al.* (2004) reported a 19% relative error rate reduction of speech recognition due to the fusion of pen-based gesture and a 30% RER for speech recognition because of multimodal interaction, when subjects were walking vs. stationary. Kumar *et al.* (2004) reported a 35% RER for speech recognition when subjects were highly exerted, with a stable overall multimodal system performance compared to that of a stationary user. For highly exerted users, 16% of multimodal inputs succeeded in virtue of MD. Finally, when a multimodal virtual/augmented reality system had access to four types of information in arriving at a joint interpretation – sets of hypotheses about the user's speech, his or her 3D arm gestures, a set of objects in the virtual world that were potentially being referred to, and a set of objects that were in view (derived from head position) – MD led to a 67% RER for multimodal interpretations over the performance of the system that fused only the top-scoring hypothesis from each information source (Kaiser *et al.*, 2003). Thus, increased levels of robustness may be found by combining more sources of information.

Multimodal Language Processing

Many researchers have built systems that incorporate both natural language and gesture, especially mouse, touch, pen, and 3D gesture. Such systems often embodied the assumption that the processing of spoken language is central, with the processing of other modes based on its control strategy. Indeed, many systems were built with the assumption that human use of gestural modes would be flagged in any utterance by a deictic determiner (e.g., *this*, *these*). Thus, when a parser detected a deictic determiner, it would look in its buffer of deictically indicated objects (again, assuming that the function of the secondary modes was deixis) for the referent(s). Unfortunately, the assumptions that guided the early systems were falsified by examination of user data. Frequently, users of multimodal pen–voice systems would speak and draw, but not issue a deictic expression (e.g., *Show me <draws circle on an object>*) (Oviatt, 1997). Users of multimodal virtual reality systems often issued commands with gestures indicating the manner of action (e.g., *Rotate the monitor clockwise <rotate gesture>*) (Kaiser *et al*., 2003; Corradini and Cohen, 2002). Without a deictic phrase, these language-centric systems would thus not detect the gesture. The upshot of these results is that multimodal systems need to be built to accommodate modalities equally – any combination of modes should be allowed, but subject to empirically discovered constraints on human behavior.

Another empirical finding about multimodal interaction with implications for the language processing is the observation that people cluster into two groups in terms of how they integrate speech and gesture – they either provide gesture and speech sequentially (usually with gesture preceding speech) with a gap between gesture and speech of no more than 4 s (for a pen–voice interface) or they provide their output simultaneously. Not only do they not tend to speak and then gesture, they have a consistent integration style, which they resist changing (Oviatt *et al*., 2004). This latter finding has obvious implications for adaptive processing. In general, the sequential nature of some users' multimodal performance indicates that a spoken language analysis system cannot rely on precise time synchronization to locate the relevant information in other modalities with which to integrate.

In coping with actual human data, multimodal language interpretation has involved the development of multimodal grammar rules that are parsed by a unification-based multidimensional chart parser (Johnston, 1998; Denecke and Yang, 2000). The rules specify how meaning representation fragments derived from any collection of modalities combine into larger structures. Examples could be noun phrases with deictically specified gestures, or visual language rules that specify how sketched shapes combine to form larger structures (e.g., a flow chart). Unlike the aforementioned speech-centric approaches to multimodal integration in the literature, the multimodal grammar rules are independent of modality and thus do not require that speech dominate any analysis. Because users may issue both unimodal and multimodal actions (Oviatt, 1997, 1999), multimodal parsing also involves empirically derived temporal constraints (Oviatt, 1997; Oviatt *et al*., 1997) that can 'bracket' the various inputs, providing guidance on which should be interpreted together and which alone. For example, because gesture tends to precede speech for a habitually sequential user, a sequence of Gesture_1, Speech, Gesture_2 should most likely have (Gesture_1, Speech) interpreted together followed by Gesture_2 alone. Similarly, spatial constraints are also common in these rules, especially for sketch understanding.

Johnston (2002) discussed various alternative architectures that combine spoken language with multimodal parsing. In earlier systems (e.g., Johnston *et al*., 1997; Johnston, 1998), multimodal parsing and spoken language parsing were combined in a multidimensional chart parser. However, it is argued that combinatorics of parsing can be better managed by interleaving spoken language and multimodal parsing, such that deictic noun phrases are parsed and integrated separately by the multimodal subsystem, with the results returned back to the spoken language parser. Other phrases, such as manner adjuncts (e.g., *this way <gesture>*), can also be handled in the same fashion. However, the architecture still needs to be sensitive to the existence of gestures that may not be marked linguistically, but contribute to the overall meaning.

Future Research and Development

The science and technology of multimodal interaction are progressing rapidly. Research is examining not only how spoken language, gesture, eye gaze, body movement, and other modalities can be integrated, but also is investigating how more than two modalities can be combined, in order to achieve greater degress of robustness in challenging environments. Expanding our purview, multimodal interaction will begin to become integrated with dialogue and task context in order to further reduce uncertainties inherent in the underlying recognition-based technologies. Collaborative multiparty multimodal interaction is also affording fascinating challenges to current multimodal science and technology, often undermining long-held assumptions and simplifications. Moreover,

though we could not explore the topic of multimodal output processing in this paper, the planning of a multimodal presentation with coordinated graphics and language that achieves the system's goals is receiving substantial interest among researchers. Future research will strive to build systems that can take advantage of scientific knowledge of humans' multisensory perceptual capabilities to build systems that can design presentations on the fly that are maximally effective for the task at hand.

The emerging base of science and technology is now spawning a nascent industry. Multimodal systems are now being sold commercially, including multimodal map systems (Advanced Interfaces' GeoMip, and Natural Interaction Systems's NISMap systems), computer-aided design (Think3), personal information management (Microsoft's MiPAD), and cellular telephony (IBM, Kirusa, Motorola, Nokia,) products. In the last case, multimodal interfaces are likely to be the preferred user interface paradigm for interacting with small devices. Most current products offer multiple modalities as alternatives (e.g., voice or touch), but future products will undoubtedly attempt modality fusion with the goal of increased robustness and expressivity. Many other corporations are experimenting with multimodal product solutions.

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Multimodality and the Language of Politics

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The term 'multimodality' is now used by many scholars to capture an emerging perspective on language and communication. Although such scholars differ considerably in what is considered to be a separate mode and in the ways in which these modes may interact, all take it that any use of language is inescapably multimodal. That is, spoken or written language inherently cooccurs in grammatical interactions among other semiotic modes such as gesture, image, color, texture, shape, or spatial layout and configuration.

In multimodal analysis, written text is analyzed together with text shape, typography, print color and paper, and graphic and photographic images (Kress and van Leeuwen, 1998, 2001). Spoken utterances are most commonly analyzed together with the speaker's gestures, posture, and physical placement and movement in the moment of speaking (McNeill, 1992). There is a growing interest in the analysis of relations among speech (gesture, etc.), and writing (screen scrolling text or captioning), in television and computer-displayed communications (Chouliaraki, 2004), but relatively less research that focuses on the semiotics of the spaces and places in which communications are produced or uttered (Scollon and Scollon, 2003; Crang, 1998; Crang and Thrift, 2000; Norris, 2004).

Research on the language of politics within a multimodal perspective has begun to range considerably beyond traditional printed newspaper accounts or tape-recorded and transcribed radio and television accounts of the language of political figures. Such research makes central use of ethnographic methodologies, and now includes the comparison of printed and spoken statements, the study of the production of political texts through the study of the discursive histories of political statements and policies, and the use of graphics, photographs, videos, and other images in television and internet presentations of news stories. Further, scholars take it to be of central importance in their analyses to see, record, and analyze not only the text, nor only the moment and contexts in which political statements are made, but also the vastly distributed moments in which political language is taken up by readers or viewers in the conduct of their daily lives (Wodak, 2001; Reisigl and Wodak, 2001; Chouliaraki, 2004; Dunne, 2003; Blommaert, 2005).

The linguistic study of language and politics within a multimodal perspective has consequently broadened to encompass a complex interdisciplinary field of study (Lemke, 2002). Linguists are becoming interested in design, typography, or cultural geography, as necessary disciplines in the study of the social, physical, and spatial use of language. Designers or typographers are becoming interested in the formal means used by discourse analysts to study such semiotic relationships as focus, theme, transitivity,

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grammatical mode, or tense and aspect. There is also an increased interest among cultural geographers in discourse analysis and social theory. Hence, these multimodal theorists now see political life as a complex process by which meaning is produced across many modes; and therefore, the analysis of the language of politics is beginning to incorporate methods, and theoretical tools from disciplines that only a few years ago were rarely referenced by linguists and discourse analysts.

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Multivalued Logics

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Logic is the formal discipline establishing *calculi of entailments*. A sentence, or set of sentences, A *entails* a sentence B just in case in all cases where A is true, B must also be true on account of the meanings of A and B (on analytical grounds). Since meanings are varied and manifold, it is, in general, not possible formally to *compute* entailments: most entailments are recognized intuitively. Aristotle discovered, however, that in some cases entailments can be computed with the help of specific words, the logical constants, whose semantic properties are precise enough to allow for formal computation. The logical constants usually recognized are *all* and *some* for quantification theory (predicate logic), and *not*, *and*, *or,* and *if* for both predicate and propositional logic. When an entailment is computable by virtue of one or more of the logical constants, it is a *logical* entailment.

Standard modern logic is firmly based on the Aristotelian *Principle of Bivalence*, also known as the *Principle of the Excluded Third* (PET), which says that (a) all propositions always have a truth value, and (b) there are exactly two truth values, 'true' (T) and 'false' (F), without any transitional values, and without any values outside T and F. Some logicians have queried the validity of PET with regard to natural language.

Strawson's attempt at infringing PET (Strawson, 1950, 1952) is most widely known among linguists and semanticists. His 'gapped bivalent logic' keeps the values T and F but introduces the possibility of a 'truth-value gap' for sentences without any truth value. Strawson thus violated subprinciple (a) of PET, in that he allowed for propositions (sentences) without a truth value. He never provided a formal account of this logic, but one surmises that it is identical to standard propositional calculus, except that a logically complex sentence lacks a truth value when at least one of the component propositions (sentences) does so: lack of truth value is 'infectious.' Lack of truth value, in Strawson's analysis, is the fate incurred by sentences that suffer from presupposition failure. The main empirical problem with this analysis (besides problems of a metalogical nature) is that such sentences are generally judged to be false, while their negations are judged to be true (*see* **Presupposition**).

Other logicians have developed nonbivalent logics that infringe subprinciple (b) of PET. The linguistic justification for such logics is the consideration that if the predicates 'true' and 'false' in natural language

grammatical mode, or tense and aspect. There is also an increased interest among cultural geographers in discourse analysis and social theory. Hence, these multimodal theorists now see political life as a complex process by which meaning is produced across many modes; and therefore, the analysis of the language of politics is beginning to incorporate methods, and theoretical tools from disciplines that only a few years ago were rarely referenced by linguists and discourse analysts.

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Other logicians have developed nonbivalent logics that infringe subprinciple (b) of PET. The linguistic justification for such logics is the consideration that if the predicates 'true' and 'false' in natural language

allow for degrees, or if there are different kinds of truth and/or falsity, then it should be possible to devise logical calculi reflecting the different degrees or kinds of truth and falsity. It has turned out that this is not only possible but also highly enlightening.

Apart from PPC_3, to be discussed in a moment, the main developments in formal multivalued logics occurred between the 1920s and the 1950s, as an outflow of the formalization of logic that had just occurred, with C. S. Peirce as an early precursor (Rescher, 1969: ch. 1). The multivalued logics developed in that period are all restricted to propositional calculus – that is, to truth tables for the logical constants (the so-called connectives) *not*, *and*, *or*, and *if*. Extensions to predicate logic, where the logic of the quantifiers *all* and *some* is defined, were not attempted. Moreover, all multivalued logics (apart from Strawson's gapped bivalent logic) developed during the period mentioned work with a value 'intermediate' or 'undefined.' They were devised to provide logical accounts for future contingency (J. Łukasiewicz), modalities (C. S. Peirce), intuitionism (A. Heyting), logical paradoxes (D. A. Bochvar), or undecidable mathematical statements (S. C. Kleene). There is a great deal of overlap among the logical machineries proposed by these authors.

The more interesting multivalued logics are extensions of standard bivalent logic, in the sense that there is, for each type of extension L^m, an algorithm that generates the precise form of L^m for any desired number of truth values in such a way that the theorems of standard logic, with the operators $\neg$, $\wedge$, and $\vee$, are preserved. That is, they are closed under $\{\neg, \wedge, \vee\}$. One may repeat what Peirce wrote in a letter to William James in 1909 (Rescher, 1969: 5): "The recognition [of multivalued logics] does not involve any denial of existing logic, but it involves a great addition to it."

The best known, and most fruitful, system is Kleene's trivalent logic (Kleene, 1938, 1952), with the values 'true' (T), 'false' (F), and 'intermediate' (I). This logic thus violates subprinciple (b) of PET as defined earlier. Kleene's truth tables are as shown in Figure 1, with '$\sim$' for Kleene's trivalent negation, '$\wedge$' for conjunction, and '$\vee$' for disjunction (the implication is definable as '$\sim A \vee B$.' One sees that the negation '$\sim$' turns T into F and vice versa, and leaves I unaffected; conjunction selects the lowest of the values of the component sentences A and B ($T > I > F$); disjunction selects the highest of the values of A and B. This accounts for the fanlike arrangement of the values T, I, and F in the tables for conjunction and disjunction. Kleene's calculus has no operator turning I into T. Such an operator can be added to the system by letting '?A' produce T for I, and F for both T and F. The standard bivalent negation operator '$\neg$' also finds a place in this system, in that it turns T into F and all other values into T (it simply says that A is not true). One notes that $\neg$ is the disjunction (union) of $\sim$ and ?: $\sim A \vee ?A \equiv \neg A$.

The algorithm for generating Kleene logics with an unlimited number of values is simple. For an *n*-valued Kleene logic ($n \geq 2$), let the highest value be T, and the lowest F. All intermediate values I^i ($i \leq n-2$) are optional and are ranked between T and F. Then $\sim$ turns T into F and vice versa, and leaves all I^i unaffected; $\wedge$ selects the lowest of the values of A and B; $\vee$ selects the highest of the values of A and B. $?^i$ turns the intermediate value I^i into T and all other values into F. An extension of the value I to an infinite number of intermediate values generates the multivalued 'fuzzy' logic of Zadeh (1975). Standard bivalent logic is merely the minimal variant of this Kleene family of logics, with $n = 2$ and without any intermediate values.

Although Kleene developed his logic with a mathematical purpose in mind (to account for undecidable mathematical statements), it is of specific linguistic interest in that it appears to account for cases of vagueness, in the sense of neither clearly true nor clearly false, as when one can say of a dimly lit room either that it is dark or light.

A different trivalent propositional calculus, likewise extendable to any number of truth values, was developed in Seuren (1985) for the specific purpose of capturing the logical properties of presupposition. This calculus, *trivalent presuppositional propositional calculus*, or PPC_3, distinguishes between two kinds of falsity. For logically atomic sentences, radical falsity (F2) ensues when there is presupposition failure; minimal falsity (F1) ensues when all presuppositions

A	~A	?A	¬A
T	F	F	F
I	I	T	T
F	T	F	T

∧		B: T	B: I	B: F
A	T	T	I	F
	I	I	I	F
	F	F	F	F

∨		B: T	B: I	B: F
A	T	T	T	T
	I	T	I	I
	F	T	I	F

Figure 1 Truth tables of Kleene's trivalent propositional calculus.

A	~A	≃A	¬A
T	F1	F1	F1
F1	T	F1	T
F2	F2	T	T

∧ (A \ B)	T	F1	F2
T	T	F1	F2
F1	F1	F1	F2
F2	F2	F2	F2

∨ (A \ B)	T	F1	F2
T	T	T	T
F1	T	F1	F1
F2	T	F1	F2

Figure 2 Truth tables of PPC_3.

are true but an update condition of the main predicate is not satisfied (*see* **Presupposition; Lexical Conditions**). Thus, a sentence like *The present queen of England is bald* is valued F1, because no presupposition is violated, but the person in question happens not to be bald. By contrast, a sentence like *The present king of France is bald* is valued F2 because the existential presupposition that there is such a person is not fulfilled.

The first proposal to this effect was made in Dummett (1973: 421), also on grounds of presuppositional phenomena, though more from a philosophical than from an observational point of view: Dummett does not provide an actual trivalent logical system incorporating the two kinds of falsity. He also considered the possibility of two kinds of truth – a suggestion that should be taken seriously but is not elaborated here. The logical system that corresponds to Dummett's suggestion is PPC_3. Yet it must be emphasized that PPC_3 does not *define* presupposition in natural language. Presupposition is defined by its purely linguistic and semantic characteristics (*see* **Presupposition**). PPC_3 is merely meant as a description of the epiphenomenal logical properties of presupposition.

In PPC_3 there are two negations, a *minimal negation* '$\sim$' turning T into F1, F1 into T, and leaving F2 unchanged, and a *radical negation* '$\simeq$' turning both T and F1 into F1 and F2 into T. The standard bivalent negation $\neg$ can be added for good measure: it turns T into F1 and all other values into T. Moreover, the conjunction $\wedge$ selects the lowest ($T > F1 > F2$), and the disjunction $\vee$ selects the highest of the component values. This gives the tables of Figure 2, again with the typical fanlike arrangement for conjunction and disjunction observed in Figure 1.

The algorithm for extension to *n* truth values with one value T and *n*–1 values F^i ($i \geq n-1$) is again simple. Define a specific negation '$\sim^i$' for each kind of falsity. $\sim^i$ turns F^i into T, all higher values ($T > F^1, \ldots > F^{n-1}$) into F^1 and leaves all lower values unaffected. $\wedge$ selects the lowest, and $\vee$ selects the highest of the component values. Again, standard bivalent logic is merely the minimal variant of this family of logics, with the values T and F^1 and the one specific negation $\sim^1$, which then equals standard $\neg$. Again, $\neg$ is the disjunction (union) of $\sim^1$ to $\sim^{n-1}$: $\sim^1 A \vee \sim^2 A \vee \ldots \vee \sim^{n-1} A \equiv \neg A$.

The two families – the Kleene family and the PPC_n family – can be combined into one large family with any number of intermediate values between any two values of the PPC_n system. Which selection of this wealth of possible logical options suits the facts of natural language best is an empirical question. The theory of language benefits substantially from this widening of the range of available options. Before multivalent logics were discovered, there was only one option for the logic of the propositional operators, the standard bivalent system, and there was, therefore, no empirical question because there was no choice. The extension of logical space in various directions has given rise to the empirical question of what the correct logic of language amounts to.

Research into the empirical question just formulated is relatively recent. What has been found so far suggests that a system like PPC_3 with an infinite set of Kleenean intermediate values between T and F1 appears to stand a reasonable chance of providing a suitable frame for an adequate analysis and description of the logical properties of the propositional connectives, including negation, in human language.

See also: Discourse Semantics; Lexical Conditions; Presupposition; Propositional and Predicate Logic: Linguistic Aspects; Vagueness: Philosophical Aspects.

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Munda Languages

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'Munda' is a group of languages belonging to the Austroasiatic language family spoken in eastern and central India, primarily in the states of Orissa, Jharkand, Bihar, and Madhya Pradesh and in adjacent areas of West Bengal, Maharashtra, and Andhra Pradesh. Some Munda speakers are found in expatriate or diaspora communities throughout India, Nepal, and western Bangladesh as well. In earlier literature, Munda is often referred to as Kol or Kolarian.

The Munda language family recognizes a major split between a North Munda and a South Munda subgroup. Within the North Munda subgroup, there is a binary opposition between Korku and a large group of Kherwarian languages, which is perhaps more properly described as a dialect continuum. Kherwarian includes both the largest of the Munda languages, Santali, with nearly 7 million speakers, as well as some of the smallest, such as Birhor, with under 1000. Other noteworthy North Munda languages include Mundari and Ho, each with approximately 1 million speakers, and smaller languages such as Agariya, Asuri, Bhumij (Mundari), Karmali Santali, Koraku, Korwa, Mahali, and Turi. Publications may be found in the larger of the Kherwarian languages (Mundari, Ho, Santali), including a range of Santali publications in a native orthography (the Ol' Cemet script). Short wave radio broadcasts are also available in Santali. The newly founded 'tribal' state of Jharkhand has a Munda-speaking majority and is lobbying to have some form of Kherwarian declared another state language of India.

The South Munda subgroup is older and more internally diversified than North Munda. At least the following languages belonging to this subgroup: Sora (Savara), Juray, Gorum (Parengi, Parenga), Gutob (Gadaba, Bodo), Remo (Bonda, Bondo), Gtaʔ (Gataʔ, Didey), Kharia, and Juang. In terms of further subgrouping, it is clear that Sora and Gorum form a branch of their own, as do the closely related Gutob and Remo. Gtaʔ, which is properly speaking two separate languages: the poorly known Hill Getaʔ and Plains/Riverside Getaʔ, has been traditionally linked at a slightly higher taxonomic level with Gutob-Remo (so-called Gutob-Remo-Gtaʔ), and Kharia and Juang have been linked together in a branch as well. These latter two classifications are tenuous and remain to be adequately demonstrated (Anderson, 2001). South Munda languages range in total number of speakers from 300 000 or more Sora speakers to between 150 000 and 200 000 Kharia speakers to Gutob with approximately 30 000–50 000 total speakers and Juang with around 15 000 speakers. The remaining South Munda languages have around 2000–4000 speakers each.

Typologically speaking, all Munda languages are moderately to extensively agglutinating, show SOV basic clause structure, and possess preglottalized or unreleased 'checked' consonants. This latter feature is quintessentially Munda, and readily distinguishes Munda languages from the surrounding languages of the subcontinent.

The shift to SOV word order from SVO to VSO may be attributed to influence from Indo–Aryan or Dravidian languages (Anderson, 2003), which varies from moderate to strong in individual Munda languages. Generally speaking, the southernmost South Munda languages show the greatest degree of structural influence from local tribal Dravidian and lexical influence from the local tribal Indo–Aryan (e.g., Desia/Kotia Oriya). In addition, Kharia has been heavily influenced by Kherwarian North Munda languages such as Mundari.

Kherwarian North Munda languages are characterized by a high degree of morphological complexity, standing out even within the morphologically rich languages of South Asia. Among the most noteworthy characteristic features of Kherwarian verb structure is

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Kherwarian North Munda languages are characterized by a high degree of morphological complexity, standing out even within the morphologically rich languages of South Asia. Among the most noteworthy characteristic features of Kherwarian verb structure is

the extensive system of referent indexing that includes, subjects, objects (direct and indirect), benefactives, and possessors as well. An example of this type of marking may be seen in the following Santali form:

(1) Santali (North Munda)
sukri-ko gɔ'c-ke-d-e-tiñ-a
pig-PL die-ASP-TR-3-1POSS-FIN
'they killed my pig'
(Bodding, 1929: 209)

South Munda languages show a lesser degree of morphemic complexity than their sister languages to the north. Making this assertion is not to say that large complexes are not found among the South Munda languages, however. All South Munda languages reflect some degree of noun incorporation, either as an active morphosyntactic process (Sora, Gtaʔ) or preserved only in lexicalized formations (Kharia). In fact, Sora is among the very small number of the world's languages that allows for both instances of multiple noun incorporation (2), as well as the typologically unusual agent incorporation with transitive verbs (3).

(2) Sora (South Munda)
jo-me-bob-dem-te-n-ai
smear-oil-head-RFLXV-NPAST-INTR-CLOC/1
'I will anoint my head with oil'
(Ramamurti, 1931: 143)

(3) Sora (South Munda)

ñam-kit-t-am	*sa-bud-t-am*
seize-tiger-NPAST-2	mangle-bear-NPAST-2
'tiger will seize you'	'bear will mangle you'
(Ramamurti, 1931: 40)	(Ramamurti, 1931: 142)

South Munda languages also show agreement in the verb with a possessor of a logical argument, but unlike Santali, which utilizes a special set of possessive inflectional suffixes, South Munda languages like Gorum show the more typologically 'normal' pattern of 'Possessor Raising' (4), raising the possessor to term argument and encoding it in the verb in a manner identical to object marking.

(4) Gorum (South Munda)
putiputi-nom ir-om luʔr-om
heart-2 beat-2 AUX-2
'your heart is beating'
(Aze, 1973)

Among the more salient phonological features of the Munda languages from a South Asia areal perspective include, in addition to the characteristic 'checked' consonants mentioned above (5), are such areally atypical features of individual Munda languages as low tone in Korku, creaky voice in Gorum, prenasalized stops in Santali, and, unusual syllable structure in Gtaʔ following a series of regular sound changes (seen in such words as Gtaʔ itself).

Munda languages also make extensive use of auxiliary verb constructions. Both a wide range of formal and functional subtypes of auxiliary verb constructions are found across the Munda language family. In general, these are in keeping with both typological and areal norms. Thus, one finds the use of the verb 'eat' in a passive construction found in a number of South Asian languages in such languages as Juang (6). Further, doubled or serialized agreement is found in auxiliary verb constructions in Gorum (7), and is characteristic of local Dravidian languages as well (Parji, Gondi, etc.).

(6) Juang

aiñ ma'd-jim-sɛkɛ	*aiñ ma'd-jim-sɛrɔ*
I beat-eat-PERF.PRES.T	I beat-eat-PERF.PAST.T
'I am beaten'	'I was beaten'
(Pinnow, 1960)	

(7) Gorum
miŋ ne-gaʔ-ru ne-laʔ-ru
I 1-eat-PAST 1-hit-PAST
'I ate vigorously'
(Aze, 1973)

Among present-day researchers of Munda languages, Norman Zide deserves special mention.

See also: Austroasiatic Languages; India: Language Situation; Santali.

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Her American Indian dictionaries (generally coauthored with native speakers) and grammars are major contributions to American Indian linguistics. Her Chickasaw dictionary (1994) is the first scholarly dictionary of this language. It contains a Chickasaw-English section with approximately 12 000 main entries and an extensive introductory section describing the structure of Chickasaw words. Chickasaw is a Muskogean language spoken in Oklahoma, where Chickasaws were moved over 150 years ago from their homeland in the southeastern United States. Her *Dictionary of San Lucas Quiaviní Zapotec* (1999) is the first dictionary of the language of this pueblo in Oaxaca, Mexico. It includes Zapotec entries with English and Spanish definitions and English-Zapotec and Spanish-Zapotec indices. She is coeditor and coauthor of *Making dictionaries* (2002),

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an important work that provides a comprehensive picture of the theory and practice of Native American lexicography and a source for scholars interested in preserving endangered languages.

In 1983 she began collecting a database of slang words and expressions used by UCLA undergraduate students. Every four years she and her students have published a slang dictionary of words and expressions collected during those years. So far she has published four volumes (1989, 1993, 1997, and 2001). Every dictionary reflects cultural changes in American society over the previous four years, with words referring to topics that interest young people away from home for the first time.

In the field of syntax, she has worked on problems of agreement, reference, and subjecthood. She is coeditor and coauthor of *Switch-reference and universal grammar* (1983), in which Munro and other authors analyze the correlation of referential tracking of subjects with particular verbal affixes in several languages. Switch-reference is related to grammatical devices that narrowly define subject identity, such as reflexivation, and devices that broadly define subject identity, such as obviation.

See also: Chomsky, Noam (b. 1928); Endangered Languages; Lexicography: Overview; Mobilian Jargon; Reinhart, Tanya; Switch Reference; Uto-Aztecan Languages; Zapotecan.

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Shichirô Murayama is an outstanding Japanese linguist and philologist, who specialized in Mongolian, Japanese, Tungusic, Russian, Korean, and Ainu. Born in 1908 in Ibaraki city (Ibaraki prefecture, Japan), a graduate of Waseda University (1931), S. Murayama initially combined his scholarly activities with a career as a journalist and then a diplomat until 1948, when he became a professor at Juntendô University, where he taught German, Latin, and linguistics until 1968, and linguistics at Kyushu University until his retirement in 1972. After retirement, he continued to teach selected courses in linguistics at Kyoto Industrial University until 1981 and at Tokyo Municipal University almost until his demise in 1995. His extraordinarily long and fruitful pedagogical career was combined with no less productive scholarly pursuits, which included active participation in national and international scholarly conferences, research trips, and publication of 16 monographs and approximately 200 articles, reviews, and scholarly reports in Japanese, German, English, and Russian.

S. Murayama's first and last publications dealt with the Ainu language and its history (Murayama, 1944a, 1944b, 1988, 1993, 1995), although he really never left the topic in the middle of his career as well, as his most important publication on Ainu is a study on old sources on Ainu dialects once spoken on Kuril islands (Murayama, 1971). He was under the great influence of the greatest Mongolist of the last century, Nicolaus Poppe, and subsequently Mongolian and Tungusic linguistics, especially Mongolian historical linguistics, became another area where Murayama was very active (Murayama, 1957, 1959a, 1959b, 1962, 1976a). His research on the language of shipwrecked Japanese sailors in 18th-century Russia (Murayama, 1965, 1985), which was a pioneering effort in the sense that it uncovered Japanese dialects as spoken 200 years ago, also led him into the field of Slavic studies (Murayama, 1977). Probably the major research interest of S. Murayama was the genetic affiliation of the Japanese language, which he pursued throughout his life, but especially in the latter part of his career. S. Murayama has published numerous

an important work that provides a comprehensive picture of the theory and practice of Native American lexicography and a source for scholars interested in preserving endangered languages.

In 1983 she began collecting a database of slang words and expressions used by UCLA undergraduate students. Every four years she and her students have published a slang dictionary of words and expressions collected during those years. So far she has published four volumes (1989, 1993, 1997, and 2001). Every dictionary reflects cultural changes in American society over the previous four years, with words referring to topics that interest young people away from home for the first time.

In the field of syntax, she has worked on problems of agreement, reference, and subjecthood. She is coeditor and coauthor of *Switch-reference and universal grammar* (1983), in which Munro and other authors analyze the correlation of referential tracking of subjects with particular verbal affixes in several languages. Switch-reference is related to grammatical devices that narrowly define subject identity, such as reflexivation, and devices that broadly define subject identity, such as obviation.

See also: Chomsky, Noam (b. 1928); Endangered Languages; Lexicography: Overview; Mobilian Jargon; Reinhart, Tanya; Switch Reference; Uto-Aztecan Languages; Zapotecan.

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Murayama Shichirô (1908–1993)

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books and monographs on this extremely complex topic where historical linguists still have no consensus. Although S. Murayama started his research in this area as a scholar advocating Altaic origins of the Japanese language (Murayama, 1957, 1962), in later years he steadily moved in the direction of viewing Japanese as a mixed Altaic-Austronesian language (Murayama, 1974a, 1974b, 1976b, 1978, 1979a, 1979b, 1981a). Although the prevalent view today is that Japanese together with its relative Ryukyuan constitutes a portmanteau family (Japonic), not demonstrably related to any other languages, S. Murayama's main merit lies in establishing a number of important etymologies for Japanese, as well as in uncovering many important internal rules and correspondences in Japanese-Ryukyuan. Also, in a sense, S. Murayama contributed considerably to the theory of mixed languages about 10–15 years before a research on mixed languages surged in Western linguistics. In addition, S. Murayama is famous as a critic of Japanese traditional philology for its weak methodology in comparative linguistics, especially Susumu Ôno's theory of a common origin for Japanese and Tamil (Murayama, 1975, 1981b, 1982). By the breadth of his scholarly interests and importance of his achievements, S. Murayama together with Shirô Hattori and Natsuki Osada, represents one of the three most prolific Japanese linguists of the last century.

See also: Ainu; Altaic Languages; Austronesian Languages: Overview; Japanese; Mongolic Languages; Ryukyuan; Tungusic Languages.

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Murray, Alexander (1775–1813)

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The distinguished linguist Alexander Murray was born in Dunkittering, Scotland into a family of shepherds. He learned the alphabet from his father and was only able to attend school irregularly. Thanks to his excellent memory and extraordinary facility in the acquisition of languages, Murray was able, primarily by his own efforts, master Latin, Greek, Hebrew, and French so well that he was admitted to Edinburgh University, where he studied philosophy and divinity. Later he contributed to *Scots Magazine* and the *Edinburgh Review*, writing on different philological and historical subjects. He also prepared the second edition of J. Bruce's *Travels in Abyssinia*. Eventually he became parish minister of Urr. Meanwhile, Murray continued studying languages and acquired substantial knowledge of the spoken tongues of Europe, ancient and new Semitic languages, Persian, and Sanskrit.

In 1812, Murray was elected a professor of Oriental languages in the University of Edinburgh and received the degree of Doctor of Divinity. However, his health was rapidly deteriorating and he died of consumption on April 15, 1813.

In his book *Philosophical history of the European languages*, Murray elaborated a particular theory of historical development of the languages of Europe beginning from the appearance of speech. For the primeval language, he restored nine primary monosyllabic words – *ag*, *bag*, *dwag*, *gwag*, *lag*, *mag*, *nag*, *rag*, and *swag* – which constituted the foundation of language; all other words in European languages developed from them by way of composition, contraction, phonetic changes, and addition of 'consignificative' verbs (future inflexion). This alleged development is illustrated by a profusion of examples.

Murray's theory is characteristic of the transitional period between the Calcutta lecture of W. Jones and the basic works of F. Bopp and R. Rask. It is thoroughly historic and is based on the comparative approach to languages. His wide knowledge of languages allowed the author to use a wealth of linguistic material. On the other hand, Murray set himself unrealistic goals, went too far in his reconstructions, and could not avoid hazardous etymologies and unfounded speculations – two shortcomings against which he persistently warned in the theoretical section of his book.

Murray's book, written from 1805 to 1812, was published posthumously in 1823. It became overshadowed by the tremendous development of the new linguistics and remained on the periphery of linguistic science. A century later, Murray's ideas possibly exerted some influence on the 'Japhetic' theory of N. Marr.

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He was born into a humble family in Denholm, Scotland, on February 7, 1837. An intellectually inquisitive child, he developed a wide range of linguistic, scientific, and cultural interests – all of which were to stand him in good stead in his later roles as teacher and lexicographer. At the age of 17, he was appointed to a teaching post in one of the schools in the neighboring town of Hawick; this was followed

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While still at Mill Hill, he was appointed editor of the *Dictionary* and took over the responsibility for work that had been carried out fitfully and sometimes inconsistently over the previous 20 years by various members of the Philological Society and their helpers. A modicum of finance for the project was now provided by the Clarendon Press in Oxford. Murray imposed on the work a well-formulated scheme for the collection and analysis of data, based on his assessments of earlier lexicographical methodologies (e.g., those of Samuel Johnson and Noah Webster) and on certain principles of synchronic and diachronic linguistics.

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He graduated with a B.A. from London University in 1873. In 1874 he was awarded the honorary degree of LL.D by Edinburgh University; in later years he received honorary degrees from eight other universities. He was knighted in 1908, and died in Oxford on July 26, 1915.

See also: Dictionaries; English Lexicography; Lexicography: Overview.

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Lindley Murray (1745–1826), best known for his *English grammar* and as a writer of English school textbooks, trained and had a successful career as a lawyer before he began his work on language. Born into a Quaker family in Pennsylvania in 1745, he was the eldest child of Robert Murray (1721–1786), a merchant and business man. He was educated in Philadelphia and New York but left school at 11 to go into his father's counting house. Unhappy with this work, he studied and subsequently practiced law. In 1767 he married Hannah Dobson (1748–1834) and shortly after, the couple went to England, where he assisted his father in his London business.

In 1771, Murray returned to New York, where he became the scapegoat for the family's involvement in shipping illegal goods during the American Revolution. He went into permanent exile in England, settling in Holdgate near York, where there was a strong Quaker community. It was here that he began his writing career.

Although chiefly known for his books on grammar and the English language, Murray's first publication was a religious treatise, *The power of religion on the mind* (1787). Not until he was fifty, in 1795, did he publish his influential *English grammar*, which was to hold sway for the greater part of the next century. The *Grammar* was quickly followed by *English exercises* and *A key to the exercises* (1797), which were designed to be used in conjunction with the *Grammar;* 1797 also saw *An abridgment of the English grammar* for 'the younger classes of learners.' In 1799, he published *The English reader*, which was particularly popular in America. It was followed by *A sequel to the English reader* (1800) and *An introduction to the English reader* (1801). The *English spelling-book* appeared in 1804, as did *A first book for children*.

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drew on the work of a number of other grammarians. His originality lay in the design of his books for use in the classroom. All together they provided a complete course for the teaching of English in schools and won immediate popularity. Used for teaching English in countries as far apart as Germany and Japan, the *Grammar* continued to be published until at least 1891 (author's private collection); the *Reader* was published in America until 1856.

The gradual emergence of state education in England during the 19th century may have occasioned the decline in the use of Murray's books. The *Grammar* was certainly used in many private schools and academies (it is referred to in the novels of George Eliot, Dickens, and others), but when the early teacher training colleges began to be set up in the 1840s, these quickly produced their own grammars. Murray's *Grammar* was superseded by those of Allen and Cornwell and Robert Latham. It is unlikely that it was ever much used in the church or state schools to which the majority of the population went. However, many of its precepts concerning 'correct' grammar survive.

Murray's other books were all of a moral or religious nature. An active member of the York Meeting to the end, he died in Holdgate on February 16, 1826.

See also: Lowth, Robert (1710–1787).

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Musical Semiotics

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Oddly enough, few of the great semioticians have said anything about music as a sign. Umberto Eco (1968), in his *Struttura assente*, described music as a system having denotation but not connotation, giving the note 'c' as an example. That is all. He touched on music again only in passing, in his essays on number symbolism in the Middle Ages (Eco, 1986). Not one word about music appeared in the massive output of A. J. Greimas or in that of Yuri Lotman. In contrast, Roland Barthes had much to say about music (1975, 1977). A competent pianist himself, Barthes's essay on the 'grain of the voice' remains a classic in studies of vocal expression. Little less quoted but still inspiring are Barthes's ideas on corporeal meanings – 'somathemes,' the smallest units of bodily expression – as they occur in Robert Schumann's piano music.

Claude Lévi-Strauss is a semiotician whose name is almost synonymous with music, which inspired his monumental study of the myths of North and South American Indians (1967–1971). In that study, he introduced his famous model of music and myth, both of which derive from language (**Figure 1**).

His starting point was language as conceived by the Swiss linguist, Ferdinand de Saussure; that is, as a system with units (words) that are divided into two sides: signifier (sound) and signified (sense). For Lévi-Strauss, music was a language without sense (signified), and myth existed independently of its 'sounds' (i.e., the phonemes of the language in which

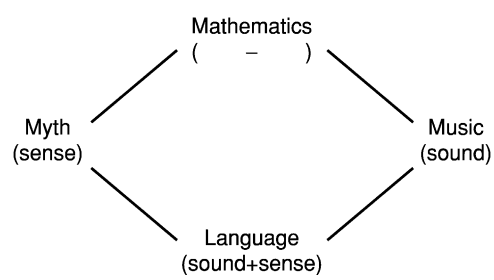

Figure 1 Lévi-Strauss's model of music and myth, both of which derive from language. From Lévi-Strauss (1967–1971).

drew on the work of a number of other grammarians. His originality lay in the design of his books for use in the classroom. All together they provided a complete course for the teaching of English in schools and won immediate popularity. Used for teaching English in countries as far apart as Germany and Japan, the *Grammar* continued to be published until at least 1891 (author's private collection); the *Reader* was published in America until 1856.

The gradual emergence of state education in England during the 19th century may have occasioned the decline in the use of Murray's books. The *Grammar* was certainly used in many private schools and academies (it is referred to in the novels of George Eliot, Dickens, and others), but when the early teacher training colleges began to be set up in the 1840s, these quickly produced their own grammars. Murray's *Grammar* was superseded by those of Allen and Cornwell and Robert Latham. It is unlikely that it was ever much used in the church or state schools to which the majority of the population went. However, many of its precepts concerning 'correct' grammar survive.

Murray's other books were all of a moral or religious nature. An active member of the York Meeting to the end, he died in Holdgate on February 16, 1826.

See also: Lowth, Robert (1710–1787).

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Musical Semiotics

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Oddly enough, few of the great semioticians have said anything about music as a sign. Umberto Eco (1968), in his *Struttura assente*, described music as a system having denotation but not connotation, giving the note 'c' as an example. That is all. He touched on music again only in passing, in his essays on number symbolism in the Middle Ages (Eco, 1986). Not one word about music appeared in the massive output of A. J. Greimas or in that of Yuri Lotman. In contrast, Roland Barthes had much to say about music (1975, 1977). A competent pianist himself, Barthes's essay on the 'grain of the voice' remains a classic in studies of vocal expression. Little less quoted but still inspiring are Barthes's ideas on corporeal meanings – 'somathemes,' the smallest units of bodily expression – as they occur in Robert Schumann's piano music.

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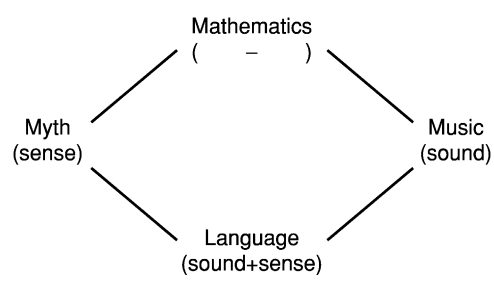

Figure 1 Lévi-Strauss's model of music and myth, both of which derive from language. From Lévi-Strauss (1967–1971).

it is told). Given his structuralist frame of reference, Lévi-Strauss thought that everything meaningful originated in language and that when we listen to music we feel an "irresistible" need to fill it with meanings. That is to say, the listener imbues music with sense.

Such a view of musical signs is known as 'musical formalism,' the founder of which was the German musicologist and critic, Eduard Hanslick. In his essay, *Vom musikalisch Schönen* (1854), Hanslick defined music simply as *tönend bewegte Formen*, 'moving aural forms.' Igor Stravinsky (1956) later rearticulated this view in his Harvard lectures, saying that music had no place for the subjective; it only had to be played. This practical view is shared by many other musicians who refuse to discuss their skills or craft.

This practical view evokes one basic distinction within musical semiotics and concerns the very possibility of the existence of such a discipline, as a part of semiotics, on the one hand, and as a part of musicology, on the other. The formalist standpoint is that music is an a-semantic art, unable to convey any kind of meanings. The acceptance of the contrasting view – that music contains meanings – opens the avenue for musical semiotics in the proper sense. Yet, even there we have a variety of theoretical positions:

- Music *represents* (i.e., musical signs stand for something). This view is shared by scholars who apply Peirce's semiotics to music. Vladimir Karbusicky (1986) attempted to do so in his *Grundriss der musikalischen Semantik,* the seminal work of Peircian applications to music.
- Music *signifies* (i.e., musical signs are their own special type of language). We can approach the problem of meaning in the Saussurean tradition by saying that there are at least two levels of meaning in musical semiotics with corresponding units: syntactic and semantic entities, phonemes and sememes, or first articulation units (words) and second articulation units (phonemes; Andre Martinet's classifications). Most of the work done in musical semiotics during the previous decades has followed this line of thinking.
- Music *expresses* (i.e., music has a relationship to emotions). Susanne Langer (1942) said that musical is a logical symbol of the emotions, or consider these terms proposed by other scholars: referential/embodied meanings of music (Meyer, 1973), intrageneric/extrageneric meaning (Coker, 1972) and even the existential semiotic view by Eero Tarasti (endogenin/exogenic signs; 1979) referring as well to A. J. Greimas' s distinction between interoceptive/exteroceptive semiotic categories. In contrast, the British esthetician Roger Scruton denied the language-likeness of music. He proposed that musical meanings are always due to extra-musical association evoked by the titles and programs; for example, if Debussy's 'La Mer' would not have had that title, it could be taken as a portrayal of a forest fire or anything else.

All these positions are related to another one, particularly in terms of musical signs, namely their notation. It is somewhat surprising how few scholars have pondered notation as a truly semiotic problem: Do traditional musical notations have their own syntax and semantics? Charles Seeger (1977) distinguished between two kinds of notation: prescriptive and descriptive. Notation is prescriptive if one is able to perform the music from the signs; descriptive notation only describes music in some respect, but does not lead into a performance. Most of the analyses done in musical semiotics belong to the latter category.

However, when considering the first historic phases of the Western *eruditem usic notation* – namely, the creation of neume writing of the Gregorian plain chant – we already encounter truly semiotic problems. Leo Treitler discussed these issues in the Peircian framework in his recent study, *With voice and pen* (2003). Regarding neumes that represent pitch and time of a melodic line, he wrote, "The philosopher Charles Peirce provided useful and influential conceptual apparatus for the analysis of the functioning of signs in terms of their modes of representation" (Treitler, 2003: 330). Yet, he then asked, "How did the early writers and readers of music conceive of what it was that their notations signified?" The problem goes further: Does traditional notation also represent semantics (i.e., is it a semiotic system in *that* sense?). Willi Apel has pointed out in his *Notation der polyphonen Musik* that the red and black neume writing signified that those notes were to be performed three times faster than other ones. This means that the kinetic energy of music changed. Here, we can already see a tiny marginal semanticism on purely musical terms.

Precursors of Semiotic Analysis of Music

In the area of music theory and analysis, German-speaking academe produced two remarkable music scholars who may be considered protosemioticians: the Austrian Heinrich Schenker (1868–1935) and the Swiss Ernst Kurth (1886–1946). According to Schenker (1956), the great composers improvised their musical works out of a deep structure that he called *Ursatz* (the resonance of the term with Goethe's *Urpflanz* is not coincidental). He distinguished three

level of musical generation: background, middle ground, and foreground (see Neumeyer, 1988 and a deconstructionist interpretation of Schenker by Littlefield, 2001). The merit of this 'structuralist' idea was that every musical event was significant and had its right place. Temporally separated tonal events formed a part of *Urlinie*. Hence, the method also accounted for the fundamentally kinetic nature of music. After his death, his model became dominant in the United States.

When musicologist Fred Lerdahl and linguist Ray Jackendoff published their work, *A generative theory of tonal music* (1985), it became obvious that Schenker's model was very similar to Noam Chomsky's 'Tree Model' of linguistic phrase structure. Yet, in fact, Leonard Bernstein (1976) in his *The unanswered question* was the first to suggest the parallel between generating a piece of music and a linguistic utterance. As early as the 1960s, semioticians had proposed that language and music were analogous phenomena because they both consisted of chains of acoustic signals (cf. Posner, 1988).

In contrast, Ernst Kurth's 'energetic' conception of music has only been considered a precursor of musical semiotics. His views have proved particularly useful as a counterbalance to the segmentational and taxonomic methods of semiotic music analysis in the 1980s. Kurth (1922) stressed the energetic, continuous nature of music and not the separate, discrete signifiers – the signs perceived by the auditory sense. What mattered for Kurth was the signified, the kinetic energy pulsating behind the notes. He even spoke of notes as having "a will to a chord." In this sense, he joined the philosophical epistemes at the turn of the century; for example, Henri Bergson's (1975) view of two kinds of time: *temps d'espace* (space time), which could be physically measured, and *temps de durée* (duration), which was phenomenal, experienced time. Kurth also emphasized the temporal nature of music; for him, the pertinent aspect in music was the experience of movement as he stated in his *Grundlagen des linearen Kontrapunkts* (1922), a study of J. S. Bach's melodic style.

Thus, Kurth can be considered a semiotician in three senses. He taught (1) that the sound stimulus of music always functions as a sign for something (semantics), (2) that attention must be paid to what happens in the mind when one is listening to music (cognition), and (3) that analysis starts 'inside' and moves toward the 'outside'; that is, from deep structure to the surface (a structuralist and generativist approach). Kurth did not develop an explicit analytic procedure, though his theories always remained closely connected to musical practice; for example, his treatise *Romantische Harmonik and ihre Krise* (1923) dealt with Wagnerian chromaticism, and his most extensive analyses were of Bruckner's symphonies (1925).

On the basis of language inflection and of Kurth's theories, Boris V. Asafiev (1884–1948) developed his intonation theory, which became the prevailing theory and analytic method in Eastern Europe for decades after World War II. Asafiev was a prolific writer who also published under the pseudonym, Igor Glebow. His main work, *Musical form as a process*, translated into English in 1977, launched his basic concept of 'intonation,' which paired any musical element – interval, chord, rhythm, motive, timbre – with its emotional value or content. In its aim to unite musical signifiers and signifieds, this theory was inherently semiotic. He also emphasized the mobile character of music and presupposed that intonations formed chains of functions, such as *initium* (beginning), *motus* (movement), and *terminus* (ending, cadence). He hypothesized that 'stores' of intonation are formed from characteristic musical passages and that these repositories of intonations remain in the collective memory of listeners. These stores contain the bases of the way people feel in a given period, such that music could be sensed as 'true speech.' When people's thinking changes, new intonations arise. Asafiev studied such an intonation crisis in connection with the French Revolution.

In the West, Asafiev remained almost completely unknown until music semioticians in the 1970s rediscovered his work. His theories were adapted to modern narratology by Viatcheslaw W. Medushewski, who distinguished between protointonation – an expressive shape, such as a cry or exclamation, without any compositional articulation – from musical intonation in the proper sense. In Russia, Asafiev's theories were applied further by Joseph Kon, Yury Kholopov, and Yevgeny Nazaikinsky, and they have influenced the work of Jaroslav Jiranek – for example, his *Grundfragen der musikalischen Semiotik* (1985) – and of the Hungarian academician Jozseph Ujfalussy (e.g., 1968). Moreover, some present-day studies of popular music reflect the influence of Asafiev, as in the theory of 'hooks' of popular song (Frith, 1978, 1984.) and the 'affect analysis' of popular music by Philip Tagg (1979).

In the United States, as a precursor of modern ethnomusicology, Charles Seeger (1960) pondered deeply the semiotic problems of music, and it is unfortunate that his epoch-making essay, 'On the moods of a music logic', was left out of discussions of musical semiotics in the 1960s and 1970s. In that essay, Seeger presented a structuralist model of analysis in which various musical parameters are divided into their smallest units, called 'moods,' which can be

combined into larger entities. Seeger (1977) also studied the semiotic nature of transcription in ethnomusicology as a prescriptive or descriptive procedure and dealt with issues of value in music.

The term 'semiotics' rarely appeared in Leonard B. Meyer's extensive work in music analysis and esthetics, though he nevertheless dwelt on semiotic problems, such as the distinction between referential and embodied meanings. Meyer's most outstanding analytical work is *Explaining music* (1973), in which he presented a model of analysis based upon the concept of implication. Susanne K. Langer (1895–1985) was among the foremost American semioticians (cf. Sebeok, 1991), but her musical esthetics, advanced in her book *Philosophy in a new key* (1942), is rarely mentioned in connection with musical semiotics. According to Langer, music does not present symptoms (indexical signs) of feelings, but rather their 'logical expression' (symbols).

In Europe, it is often hard to distinguish traditional musicologists from semioticians of music. A typical example was the Swede Ingmar Bengtsson, who began his career as a music historian and style analyst and only later became interested in musical semiotics and nonverbal communication (see Bengtsson, 1973).

Main Lines in the Development of Musical Semiotics

Musical semiotics, as a field relatively independent of both semiotics and musicology, started to develop as early as the 1950s and 1960s. Like general semiotics in those days, musical semiotics was structuralist in its strong allegiance to linguistic models.

The first noteworthy application of linguistics to music was Nicolas Ruwet's (1972) studies of the interrelationships of language and music, and particularly his analyses of the prelude to Debussy's *Pelleas* and of medieval *Geisslerlieder.* Reading a myth as one would read a musical score – an idea borrowed from Lévi-Strauss's (1958) analysis of the Oedipus myth and now turned back to music – Ruwet invented the paradigmatic method of analysis. Similar musical motives were placed in a chart one under the other so that one could see at a single glance their distribution in a whole piece of music. From the beginning, the problem of singling out paradigmatic units received much emphasis, and criteria by which to carry out segmentation were discussed at length. Jean-Jacques Nattiez (1975, 1990) adopted distributional analysis from Ruwet and established it for a long time as *the* music–semiotical analytic method. The model example of Nattiez's paradigmatic method is his analysis of Debussy's Sy*rinx*.

The paradigmatic method aimed to derive a generative grammar for musical texts. Focusing on the styles of some relatively restricted and simple musical works, one could formulate generative rules by which new, style-coherent, grammatically well-formed melodies could be produced endlessly by a computer; in a test situation, the computer-produced melodies were indistinguishable from the 'authentic' melodies. Such applications were performed on children's songs in Germany by Thomas Stoffer (1979); in Sweden by Johan Sundberg (1992), Sundberg and Lindblom (1970); in Italy by Mario Baroni and Franco Jacoboni (1978), Rossana Dalmonte (1981) on Bach's chorales and Legrenzi's arias, and later by Lelio Camilleri (1992); in Canada by Ramón Pelinski (1981) and by Jean Jacques Nattiez on the music of the Inuits; and in Finland by Erkki Pekkilä (1988) on folk music.

Nattiez improved his paradigmatic model by recasting the musical message or text itself as the 'neutral level,' to which he added the levels of creation (poiesis) and reception (esthesis), which altogether comprise what Jean Molino (1975) called the "total musical fact." In addition to musical production and reception, musical semiotics also had to clarify the implicit criteria used in the paradigmatic analysis itself. Nattiez's own analysis of Wagner's 'Tristan chord' and its various interpretations well illustrated this strategy (1990: 216–238). Nattiez applied his tripartite model to Chéreau's and Boulez's Wagner interpretations (1983) and then improved it considerably in his *Musicologie générale et sémiologie* (1987) and *Music and discourse* (1990).

The First International Congress on Musical Semiotics, held in Belgrade in 1973 and organized by Gino Stefani and others, brought attention to a whole group of such musical semioticians. Many of them fit the profile of a traditional musicologist, to whom semiotics came more or less naturally. For example, Stefani, the leading contemporary Italian semiotician of music, was influenced by his education in Catholic liturgical music and music of the Baroque era. In his numerous works (e.g., 1974, 1976, 1977, 1982; Stefani *et al.,* 1990), Stefani remained close to the everyday practices of music. He wanted to develop a musical semiotics that could be used in music education, music therapy, and cultural animation. His theoretically most cogent work, *La competenza musicale* (1982), was based upon the distinction between two models of musical competence: popular and erudite. The model contained five levels altogether – work, style, musical techniques, social practices, and general codes – that are present to varying degrees in the aforementioned competences. Lately, Stefani and his wife Stefania Guerra Lisi developed a new approach to the application of semiotics, based on the 'globality

of languages,' understood as musical universals of prenatal origin. Pupils of Gino Stefani, such as Luca Marconi, Marco Beghelli, Dario Martinelli and Francesco Spampinato, have become influential among the younger generation of music semioticians.

From a very different direction came the musical semiotics of two Czech scholars, Jaroslav Jiranek and Vladimir Karbusicky, both of whom have a structuralist background. Whereas Jiranek leaned more toward Asafiev's intonation theory (and earlier, the Marxist model), Karbusicky chose Peirce's sign theory as his starting point. Karbusicky's *Grundlagen der musikalischen Semantik* (1986), one of the most essential readings in the field, was based upon Peirce's concepts of icon, index, and symbol. He considered music to be an indexical expression of emotions and has conducted experimental studies in musical meaning to prove this assumption.

Peirce's theory has also been applied to music by the Canadian David Lidov (1980) and the American Robert S. Hatten (1987), who also developed a theory of markedness in his analyses of Beethoven (1994). Hatten's ideas on style and strategy were particularly noteworthy in his studies that aimed to unite the semiotic approach with a detailed style analysis of classical composers. Recently, Hatten has focused on gestures in music. Wilson Coker (1972), William Dougherty (1993), Kofi Agawu (1991), David Mosley, and Naomi Cummings also have followed this approach. Lewis Rowell has studied a.o. the musical time.

Polish scholars have made important contributions to musical semiotics in Eastern Europe; they include Mieczyslaw Tomaszewski, who has developed a highly original semiotic–hermeneutic approach in his Chopin studies; Michal Bristiger in his researches in music history; Anna Czekanowska in ethnomusicology; and the younger scholars, Danuta Mirka and Maciej Jablonski.

A special school of musical semiotics sprang from the theories of the Lithuanian-born semiotician, Algirdas Julien Greimas. Eero Tarasti (1979) applied his *semanalyse* to mythical meanings in music, trying to show that the interaction of myth and music, in Lévi-Strauss's sense, has also taken place in the context of Western music. Tarasti's later narratological inquiries – mainly based on Greimas but also using concepts drawn from the theories of classical semiotics – have dealt both with programmatic and absolute music. His theory of musical semiotics is based upon four phases chosen from Greimas's generative course: (1) isotopies; (2) spatial, temporal, and actorial categories and their engagement/disengagement; (3) modalities; and (4) semes/phemes. Perhaps, the most important and original of these levels is the one dealing with musical modalities: 'will, know, must, can, and believe.' These modalities, which originated in linguistic–semiotic theories, can be defined in purely musical terms as well (see Tarasti, 1992d, 1994a).

Other scholars, too, have applied Greimas's concepts to music. For example, Ivanka Stoianova (1978) developed an original theory combining psychoanalysis, intonation theory, and semiotics. Márta Grabócz (1986), a Hungarian musicologist and student of Jozseph Ujfalussy, applied the concept of isotopy to Liszt's piano music and to electronic compositions. Especially noteworthy are her studies of electronic music by François-Bernard Mâche (Grabócz, 1991–1992). Remarkable music semioticians in Strassburg University around Grabócz are Xavier Hascher and Beat A Foellmi.

Moreover, Greimas's method still prevails in his homeland Lithuania, in Southern Europe, and in Latin America. Daniel Charles is one of the outstanding music philosophers of France, specializing in Heidegger, on the one hand, and on John Cage's Zen philosophy, on the other. His recent works have a strong semiotic relevance. Greimas's pupil, composer Costin Miereanu, now a professor in Paris I, has maintained the Greimassian approach in his theoretical writings. Furthermore, Greimas has inspired other younger scholars, particularly those at Aix en Provence, where one finds such scholars as Bernard Vecchione (1986, 1987), the music sociologist Jean-Marie Jacono, Christine Esclapez, and Christian Hauer.

In ethnomusicology, semiotic ideas have been used by such scholars as John Blacking, who studied the musical semantics of South African Veda music in his *How musical is man?* (1976). Charles Boiles clarified how meanings were united with music by the Tepehua Indians (1973). Simha Arom has studied the music of the pygmies (1969). Erkki Pekkilä (1988) has focused on music and media, as well as on rural Finnish musical styles. Together with North and South American scholars, Pekkilä is leading an international research project on music and media. Yoshihiko Tokumaru (1980) has applied semiotics to Japanese traditional music, and Shuhei Hosokawa (1981) has investigated contemporary Japanese culture, as in his analysis of the Walkman. Also notable in Japan is the teaching and theoretical work of Satoru Kambe in Tokyo.

Raymond Monelle (1992) of Edinburgh, in his *Linguistics and semiotics in music*, provided an overview of musical semiotics in all its breadth to British academe, though as early as the beginning of the 1980s, nearly all the most important introductions to music analysis published in the Anglo-Saxon world already contained at least one chapter on musical semiotics (cf. Bent, 1987; Dunsby and

Whittall, 1988). Monelle's (2000) study, *The sense of music*, applied deconstructionist ideas to music. Most recently Monelle has studied the theory of musical topics. Younger scholars have focused on these areas: Michael Spitzer at Durham University on the interrelationships of music and arts in his recent study on musical metaphors; Nicholas McKay on style analysis following Hatten's model; and Tom Pankhurst on further developments of Schenker's theories.

The most extensive research project in musical semiotics being conducted today is entitled 'Musical Signification.' It includes about 450 scholars from all over the world, bringing together music semioticians of all stripes, both traditional musicologists and ethnomusicologists, computer theoreticians, cognitive scientists, psychoanalysts, historians, and many other music researchers. The project was founded in Paris in 1985 by a group of scholars including François Delalande, Costin Miereanu, Marcello Castellana, Gino Stefani, Luiz Heitor Correa de Azevedo, and Eero Tarasti, who has directed it since then. So far, it has held eight international congresses: in 1986 in Imatra, 1988 in Helsinki, 1990 in Edinburgh, 1993 in Paris, 1995 in Bologna, 1998 in Aix en Provence, in Imatra again in 2001, and in Paris again in 2004. The papers of these symposia have been published by various international and academic publishing houses (among others, see Tarasti, 1996; Miereanu and Hascher, 1998; Stefani *et al.,* 1998). Anthologies and papers from the doctoral seminars are regularly published in the series *Acta Semiotica Fennica* by the International Semiotics Institute at Imatra, in collaboration with Indiana University Press.

This project has become the world's largest gathering of music semioticians and has contributed to establishing this new discipline in colleges and universities around the globe. It also includes an international doctoral and postdoctoral seminar that is organized annually at the University of Helsinki. In these seminars, training is given to future doctors in musical semiotics.

Musical semiotics has also expanded into Latin America. For example, José Luiz Martinez, who received his doctorate from the University of Helsinki, has focused on musical semiotics in Brazil – to which we have to add the work of Heloísa Araújo de Duarte Valente, Edson Zampronha and Maria Louisa Zekeff, Lia Tomas, and others. In Mexico, seminars have been held at UNAM in Mexico City by Susanna Gonzalez Aktories, Mario Stern, Ruben Lopez Cano who is now in Spain, and others.

Present Trends: From Biosemiotics to Existential Semiotics

During the last 30 years musical semiotics has become part of 'normal' musicology. At the same time, it has gained its freedom from the control of general semiotics and has focused on the autonomy and originality of musical discourse. Recently, semiotics has become one of the branches of cognitive studies, which investigates the counterparts of musical processes in neural network models of the human brain.

More and more, there is a general tendency to abandon the simple generative models of rules for linear configurations in a search for new types of theoretical schemes. This trend has been encouraged by results in the semiotics of other fields, such as deconstructionism, psychoanalysis, feminist studies, critical studies, and so on. On the American scene, musical semiotics has been appropriated by the so-called new musicology. This field includes a.o. psychoanalytically and gender oriented studies, which often come close to semiotic reflections. One may even speak of the 'emancipation of musical signs,' which has delivered American scholars from their earlier, rigidly positivist models and led them to more interpretative and hermeneutic reflections. Thus, Richard Taruskin (1997) has adopted the concept of the semiotic from Kristeva (1969), and Marianne Kielian-Gilbert (1987) has applied it to feminist musicology. However, without the theoretical groundwork laid by semioticians, these important applications would not have been possible.

Many scholars (e.g., Imberty, 1976, 1981) who practiced semiotics in the area of experimental psychology of music have quite naturally ended up in the cognitive sciences. One of the leading scholars in this field with close ties with semiotics is Mark Reybrouck. Conversely, one can consider the cognitive approach as but a subdiscipline of semiotics. It is in fact a rather recent invention, when viewed in light of the 2000-year history of semiotics in Western civilization.

Quite new paradigms have also been devised in musical semiotics recently. One is the school stemming from biosemiotics, established in the 1940s by the Estonian biologist Jakob v. Uexküll (1940) and rediscovered by Thomas A. Sebeok and colleagues in the 1990s. The central idea of a living organism in an interaction with its surroundings or *Umwelt* was elucidated by the principle of *Ich-Ton,* a kind of code or inner principle that decides which signs an organism accepts from its surrounding and which it rejects. According to Uexküll, the organism seemed to function on the basis of an inner 'score' that guides its activities, signifying and acting (*Merken und Wirken)*. This principle could be brought back to music by assuming that each composer and each single music work have its own particular 'Me-Tone' that decides which musical signs are adopted from its musical environment and tradition

and which are excluded. Biosemiotics leads to the discussion of the metaphor of musical organism or what makes music organic. In music, biosemiotics is the term for the zoomusicology of Francois-Bernard Mâche to Dario Martinelli (2002).

Another new approach is the existential semiotics of Eero Tarasti (see Tarasti, 2000 and the special issue of 'Degres, Sémiotique existentielle,' 2003). It aims for a radically new epistemology of semiotic theories, and hence ultimately a new application to music analysis. This new philosophy is inspired by German, Danish, and French philosophers from Hegel to Kierkegaard, from Heidegger to Jaspers and Sartre, and launches new concepts as *Dasein* and transcendence. Yet, it is in no way any return to existentialism. Rather, it strives to examine the life of the signs as processual entities, from the inside. Quite a deal of new sign categories have been discovered in the dialectics between *Dasein* and transcendence: presigns, actsigns, postsigns, transsigns, quasisigns, endo- and exosigns, and pheno- and genosigns. Using these tools, one can better explain the nature of music as a temporal and dynamically forming art. Scholars working in this field include Daniel Charles, Drina Hocevar (Venezuela; see Hocevar, 2003), Maciej Jablonski (Poland), and others.

In any case, semioticians of music are no longer outsiders, neither in general semiotics nor in musicology. The field of musicology has in fact tacitly adopted many concepts introduced by semioticians, such as the distinction between the subject of the enunciate and that of the enunciation (Dahlhaus made this distinction, erroneously thinking he had borrowed it from the Russian formalists).

There have been several publishing venues for musical semiotics. The journal *Musique en jeu,* in which Nattiez published his first articles, was such a venue in the 1970s. Later, music semioticians had to publish their essays either in general musicological journals, such as IRASM, *Analyse musicale, Music Theory Spectrum, Indiana Theory Review, Music Analysis,* and the like, or in semiotic journals; on the latter, see the special issues on the semiotics of music in *Semiotica* (1976 and 1987), *Zeitschrift far Semiotik* (1987), and *Degrés* (1987–1988). *Eunomio*, edited by the Italian musicologists Paolo Rosato and Michele Ignelzi, is devoted totally to the semiotic analysis of music. Nevertheless, the number of dissertations underway in many parts of the world, the increasing number of new books on the subject, and the widening variety of theoretical approaches available to scholars working in the field show that musical semiotics is continuing to grow both in quantity and quality.

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Muskogean Languages

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Introduction

Muskogean languages were originally spoken across much of the southeastern United States, from Georgia to Louisiana. As a result of population movements, both voluntary and forced, many speakers of Muskogean languages are now located outside the original Muskogean-speaking area. More than half of the speakers of Muskogean languages now live in either Oklahoma or southern Florida.

There are six different Muskogean languages that are still spoken.

1. Choctaw is the largest Muskogean language, with perhaps 7000 to 11 000 speakers divided between the Mississippi Choctaw reservation in eastern Mississippi and the Oklahoma Choctaw nation of southeastern Oklahoma.
2. Chickasaw is spoken by a few hundred people in the Chickasaw nation of southern Oklahoma.
3. Alabama is spoken by a few hundred people on the Alabama-Coushatta reservation in eastern Texas.
4. Koasati (also called Coushatta) is spoken by a few hundred people in the area around Elton, Louisiana, and by a smaller number (probably fewer than 50) on the Alabama-Coushatta reservation.
5. Mikasuki (also spelled Miccosukee) is spoken by approximately 1000 people in the Seminole and Miccosukee tribes of Florida, located in the Everglades region of Florida.
6. Creek (also called Muskogee or Muscogee) is spoken by approximately 4000 people. The great majority of these speakers live in the Muscogee (Creek) Nation of Oklahoma and in the Seminole nation of Oklahoma. There are perhaps 200 speakers of Creek in the Seminole tribe of Florida.

'Seminole' is a term that is potentially confusing. It refers primarily to a political grouping of Creek and Mikasuki speakers who moved from their former territory in Georgia and Alabama to new locations in south Florida beginning in the mid-18th century. During the Indian removal period of the 1830s, many Seminoles were forcibly resettled in Oklahoma, so that there is now both a Seminole Nation of Oklahoma and a Seminole tribe of Florida.

Oklahoma Seminoles who retain their native language speak a dialect of Creek called Oklahoma Seminole Creek. Florida Seminoles speak two different languages – the majority speak Mikasuki and a minority speak a dialect known as Florida Seminole Creek.

In addition to these six languages, three other extinct Muskogean languages are attested:

7. Apalachee was spoken by inhabitants of northwest Florida. The language is attested in a 17th century letter to Charles II of Spain, but has long been extinct.
8. Hitchiti was a language that seems to have been quite similar to Mikasuki. It was spoken

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8. Hitchiti was a language that seems to have been quite similar to Mikasuki. It was spoken

in Florida and Oklahoma until the early 20th century.

9. Mobilian Jargon (Mobilian) was a Muskogean-based trade language spoken in the lower Mississippi Valley. Some fragments of the language were spoken by a few people in Louisiana until the 1970s.

Classification

The currently spoken Muskogean languages fall into the following groups:

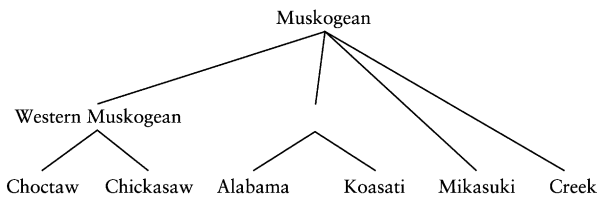

Kimball and Haas have argued that the extinct language Apalachee was most closely connected to Alabama and Koasati.

Higher level classification of the Muskogean languages is difficult and a subject of controversy. Based on several identifiable sound changes, Haas proposed that Alabama, Koasati, Mikasuki, and Creek formed a group called Eastern Muskogean. However, another subsequently discovered sound change (Proto-Muskogean $*k^w \rightarrow b$) supports a rather different grouping, in which Western Muskogean, Alabama, Koasati, and Mikasuki form a group called Southern Muskogean (affected by the $*k^w \rightarrow b$ rule). This group is distinct from Creek, which was not affected by this rule. Munro and Broadwell have also presented morphological evidence in favor of a Southern Muskogean group. There is as yet no consensus on this issue.

Phonological Characteristics

Muskogean languages have relatively simple phonological inventories. Choctaw and Chickasaw, for instance, have an inventory of 16 consonant phonemes (Table 1).

In addition, all Muskogean languages have three phonemic vowels /a, i, o/ that appear short, long, and nasalized.

Muskogean languages have pitch-accent. In verbs, the position of pitch accent is generally dependent on the 'grade' in which the verb appears. Grades are a series of related verb forms that differ in tense and/or aspect from each other, and that are formed by infixing a consonant or consonants, lengthening a vowel, or changing the form and position of the pitch accent. Consider the following examples from Creek:

Table 1 Choctaw and Chickasaw consonant phonemes

Bilabial/ Labiodental	*Alveolar*	*Postalveolar/ Palatal*	*Velar*	*Glottal*
p	t	tʃ	k	ʔ
b				
f	s	ʃ		h
m	n			
	l			
	ɬ			
w		j		

/ʔ/ in most Choctaw dialects is restricted to word-final position, while it has a wider distribution in Chickasaw.

(1) Creek
wanáj-as [wanáyas] 'tie it!'
underived grade
wana<:>j-ís [wana:jís] 's/he is tying it'
lengthened grade
waná<h>j-is [wanáhjis] 's/he tied it (today, last night)'
aspirated grade
wanâ<:>j-is [wanâ:jis] 's/he has tied it.'
falling-tone grade
wanǎ<:˜>j-is [wanǎ:jis] 's/he keeps tying it.'
nasalizing grade

In these examples, the lengthened grade is associated with eventive aspect, the aspirated grade with the perfective aspect, the falling tone grade with the stative perfective aspect, and the nasalizing grade with the expressive grade (a grade expressing a large degree of something, sometimes equivalent to a continuative).

The infixed material or vowel length change in a grade appears in the syllable that is historically the penult of the verb stem. This continues to be the location of infixation and lengthening in Western Muskogean, Alabama, and Koasati. Due to loss of final vowels in Creek and Mikasuki, these changes now affect the final syllable of the verb stem.

For the purposes of calculating the final or penultimate syllable of the verb stem, all Muskogean languages need to make a distinction between those suffixes after the verb root that count as inside the stem ('stem-forming suffixes') and those that count as outside the stem ('non-stem-forming suffixes'). For example, in the following Creek examples, the plural suffix /-ak-/ is a stem-forming suffix, but neither the indicative /-is/ nor the second-person singular Agentive suffix /-ítʃk-/ counts as stem-forming:

(2) Creek
wanaj-á<h>k-is.
tie-PLUR<PERF>-INDIC
'They tied it (today/last night).'

waná<h>j-ítʃk-is
tie<PERF>-2.SING.AGENT-INDIC
'You tied it (today/last night).'

Some suffixes may require that the preceding stem appear in a particular grade. The negative suffix /-o/ in Chickasaw, for example, must appear with the preceding verb in the glottal grade, which infixes a glottal stop in the penult of the stem.

Morphosyntactic Characteristics

All Muskogean languages show verb morphology of the agent/patient (or 'active') type, where verbs show different types of subject and object agreement based on the semantic roles of their arguments. In Choctaw, for example, intransitive verbs fall into three types: one type uses a morphology we can refer to as Agentive agreement, another uses Patientive agreement, and a third type uses Dative agreement:

(3) Choctaw
Tolo:wa-li-tok.
sing-1.SG.AGENT-PAST
'I sang.'
Sa-lakʃa-tok.
1.SG.PATIENT-sweat-PAST
'I sweated.'
Am-ihaksi-tok.
1.SG.DATIVE-forget-PAST
'I forgot.'

The Dative agreement type is primarily used for the subjects of some verbs of cognition and emotion in Choctaw. In addition to these types, there is also a distinct set of Agentive prefixes with negative subjects.

Although there are clear semantic generalizations about the agreement type, the system is partially lexicalized, and verbs with similar semantics may take different types of agreement:

(4) Choctaw
Sa-yimmi-tok.
1.SG.PATIENT-believe-PAST
'I believed.'
Anokfilli-li-tok.
think-1.SG.AGENT-PAST
'I thought.'

There are other areas of irregularity in the system as well, such as the fact that quantificational verbs (e.g., 'be all') take Agentive agreement in all the Muskogean languages.

Despite the existence of active verb agreement morphology, overt noun phrases are case-marked on a nominative-accusative basis, and all subjects receive nominative case, regardless of what type of agreement they trigger.

Consider the following Choctaw examples:

(5) Choctaw
An-ako:ʃ John(-ã)
I-CON.NOM John(-ACC)
ahpali-li-tok.
kiss-1.SG.AGENT-PAST
'I kissed John.'

An-ako:ʃ John(-ã)
I-CON.NOM John(-ACC)
sa-nokʃopa-tok
1.SG.PATIENT-fear-PAST
'I was afraid of John.'

In these examples, both subjects receive obligatory nominative case, though one triggers Agentive agreement and the other triggers Patientive agreement. Accusative case marking is optional in Choctaw.

Although the division among different agreement types is complex, the morphology itself is fairly regular in Western Muskogean, Mikasuki, and Creek. Mikasuki and Creek have suffixed forms of the Agentive agreement markers and prefixed forms of the Patient and Dative agreement markers. In Western Muskogean, all the agreement markers are prefixes, with the single exception of the first-person singular Agentive suffix /-li/. Though verbs vary in which type of agreement markers they use, the placement of these agreement markers is consistent across these languages.

In Alabama and Koasati, however, the situation is much more complex, with prefixed, suffixed, and infixed agreement markers. Consider, for example, the affirmative conjugation of the verb /ó:tin/ 'to gather' in Koasati:

(6) Koasati

ó:ti-1	'I gather'
ó<s>ti	'You gather'
ó:t	'She/he/they gather'
ó<l>t	'We gather'
ó<has>t	'You (pl.) gather.'

Kimball's grammar of Koasati identifies 10 distinct conjugation subclasses based on the identity and position of the agreement morphology, with membership in one or another subclasses reflecting an intersection of lexical specification and verbal semantics.

Muskogean verbs may have a large number of both prefixes and suffixes. The prefixes mark subject, object, dative, and negative agreement; direction, instrument, applicative, reflexive, reciprocal, and location. A Muskogean verb may be followed by a large number of suffixes showing valence, causation, tense, negation, modality, adverbial modification, mood, and evidentiality/illocutionary force. Consider the following Chickasaw and Choctaw examples, which display some of the possibilities for suffixes.

(7) Chickasaw
Ak-tʃi-hiɬa- <ʔ>tʃ-o-ki-tok-aʔni.
1.SG.NEG.-2.SG.PATIENT-dance-
<GLOTTAL.GRADE>CAUSE-NEG-NEG-PAST-EVIDENTIAL
'I must not have made you dance.'

(8) Choctaw
Hatʃik-im-asíɬɬ-ok-ĩʃa-k-akĩli-h -õ,
2.PL.NEG-3.DATIVE-ask-NEG-YET-COMP-EMPH-TENSE-PARTIC.DIFF.SUBJ
hatʃi-ki-yat ithãna-h-o:ki:.
2.PL.DATIVE-father-NOM know.DUR-TENSE-TRUE
'Even when you (pl.) have not yet asked him, your (pl.) father knows.'

Word Order Properties

Muskogean languages are rather consistently head-final languages: verbs are final in the clause, nouns are final in the noun phrase, and the languages have postpositions (though these may be a subtype of relational noun rather than a distinct word class). Consider the following example from Creek:

(9) Creek
Má tʃokó ó:fa-n apíswa-t
that house in-ACC meat-NOM
ó:tʃ-i:-t ô:m-i:-s.
exist-DUR-SAME.SUBJ be:STAT.PERFECT-DUR-INDIC
'There is meat in that house.'

All Muskogean languages have switch-reference morphology, in which the complementizer of an embedded clause indicates whether the subject of the embedded is clause is the same as the subject of the clause containing the embedded clause.

The following Choctaw example (10) shows that same-subject marking is obligatory even in contexts where there is no possible ambiguity. The Koasati example (11) shows a nice mix of same-subject and different-subject markers from a natural discourse.

(10) Choctaw
Ka:h sa-banna-ha:toko:-ʃ,
car 1.SG.PATIENT-want-BECAUSE.SAME.SUBJ
iskali' ittahobli-li-tok.
money save-1.SG.AGENT-PAST
'Because I wanted a car, I saved money.'

Ka:h banna-ha:toko~,
car want-BECAUSE.DIFF.SUBJ
iskali' ittahobli-li-tok.
money save-1.SG.AGENT-PAST
'Because he wanted a car, I saved money.'

(11) Koasati
Já:li mók itʃo:fi-k tʃokkó:li-n
here also uncle-NOM sit:SG-DIFF.SUBJ
kó:si-k tʃokkó:li-n
aunt-NOM sit:SING-DIFF.SUBJ
i<h>l-ok
arrive<CLAUSE.SEQUENCE>-SAME.SUBJ.FOC
ittim-mánka-to- ~.
RECIP.DATIVE-tell-PASTIII-PHRASE.TERMINAL
'Here also his uncle dwelt, and his aunt dwelt, and he came here, and they spoke to each other.'

The Koasati example also shows that in some cases partial identity is enough to trigger same-subject marking. Note that in this example the verb 'arrive' is marked same-subject with respect to 'speak to each other,' though the subject of the first verb is 'he' and the subject of the second verb is 'they' – a group consisting of the subject of 'arrive' plus the previously mentioned uncle and aunt. Different Muskogean languages (and perhaps different speakers of these languages) seem to follow slightly different principles in deciding whether partial-identity of subject is sufficient for use of the same-subject markers.

Conclusion

All the Muskogean languages are endangered; Mississippi Choctaw and Mikasuki appear to be the only languages that are currently being acquired by more than a few children. And even with these languages, there are indications that the percentage of children in the communities who acquire the language is declining.

The past two decades have seen many tribes recognizing the danger of language loss and initiating language preservation efforts. There have also been major strides in the documentation of the Muskogean languages, with the publication of grammars, dictionaries, and text collections. In the coming decades, the effort to document and preserve these languages will continue to be an issue of great urgency.

See also: Creek; Language Education Policies in North America; Mobilian Jargon; United States of America: Language Situation.

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Munro P & Gordon L (1982). 'Syntactic relations in Western Muskogean: a typological perspective.' *Language 58*, 81–115.
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Muskogee *See:* Creek.

Muslim/Islamic Language Education in Pakistan and India

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The Muslims of Pakistan and India live in multilingual societies: India has 387 languages and Pakistan 69, according to the *Ethnologue* (Grimes, 2000). (For major Pakistani Muslims' languages, see **Table 1**.) Thus, while Muslims in Arabic-speaking countries have to learn only classical Arabic through formal schooling, the Muslims of India and Pakistan learn the Arabic script for religious reasons and learn the language of the domains of power for instrumental ones. Language learning, therefore, has always been an important aspect of education in South Asia.

This article is divided into three parts dealing with the teaching of (1) the classical languages; (2) the modern languages; and (3) the indigenous languages of the Muslims of Pakistan and India.

Classical Languages

Persian

Traditionally, a Muslim child was supposed to have his *bismillāh* (beginning with the name of God) at the age of 4 years, 4 months, and 4 days, but usually this happened at 7 years of age. Children were taught Persian, the marker of elitist identity and the language of the domains of power till the 19th century, through the *khaliqbārī* (a rhyming primer giving Hindvī equivalents of Persian words) and the *karīmā* (a rhymed compendium of moral sayings) of Sa'adī. Later, they were taught the Persian classics (see **Table 2**). Letter writing was an important part of education, and several models of composition (*inshās*) were taught.

Persian lost its power when it was replaced by English at the higher level and by the vernacular languages of India at the lower ones between 1835 and 1837. After this period, it became either a specialized interest for scholars or historians or, which was more often the case, an easy option for students. At present, Persian is compulsory in some Islamic seminaries (*madrasās*) both in India and Pakistan, but the students do not learn how to use the language in real-life situations. In secular institutions, Persian is sometimes an option, but its teaching is so deficient that students do not learn the language in any meaningful sense of the term. However, functionaries of the state are taught modern Persian in a fairly efficient manner.

Table 1 Languages of Pakistan

Language	*Percentage of speakers*	*Number of speakers*
Punjabi	44.15	66 225 000
Pashto	15.42	23 130 000
Sindhi	14.10	21 150 000
Siraiki	10.53	15 795 000
Urdu	7.57	11 355 000
Balochi	3.57	5 355 000
Others	4.66	6 990 000

The population is assumed to be 150 million in 2003 as it was 132 352 000 in 1998 and the growth rate is 2.69%. Source: *Census 2001*: Table 2.7.

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The population is assumed to be 150 million in 2003 as it was 132 352 000 in 1998 and the growth rate is 2.69%. Source: *Census 2001*: Table 2.7.

Table 2 Persian

Attār, Farīduddīn. c. 12th c. *Pand Nāmā*. Multan: Maktabā Shirkat-i Ilmiā, 1959 [Urdu meanings in margins by Sajjād Hussain].
Bukharī, Sharfuddīn. c. 14th c. *Nām-i Haq*. Karachi: H. M. Saīd Company.
Ghanīmat, Muhammad Akram. 1684. *Masnawī Naurang-i Ishq*.
Hāfiz, Shams Uddīn. c. 14th c. *Dīwān-i Hāfiz,* numerous reprints.
Inayatullāh, Sheikh. 1650–1651. *Bahār-i Dānish*. Lahore: Punjab Adabī Academy, 1962.
Jāmī, Abdur Rahmān. c. 15th c. *Yūsuf Zulaikhā,* numerous reprints.
Nizāmī, Jamāl ud Dīn Abu Muhammad Ilyās. c. 12th c. *Khamsāh* [containing *Makhzan ul-Asrār* (1188), *Shīrīn-Khusrao* 1180), *Haft Paikar* (1197), *Sikandar Nāmā* (1197) and *Layla-Mujnun* (1188)].
Sa'adī, Muslehuddīn. 1257. *Gulistān,* translated into English, R. P. Anderson. Calcutta: Thacker Spink & Co, 1861.
Sa'adī, Muslehuddīn. 1258. *Bōstān*. Multan: Maktabā Haqqāniā [Urdu meanings in margins by Sajjād Hussain].
Sa'adī, Muslehuddīn. c. 13th c. *Karīmā*. Multan: Bairūn Bohar Gate [Urdu words in margins by Qāzī Sajjād Hussain].

Table 3 Arabic texts used in the *Madrasās*

The following books have been commonly used in South Asian *madrasās*. Those not in use nowadays are marked with an asterisk. Those in the original *Dars-i Nizāmī* as given by Sufi (1941:73–75) are in bold type.

Ṣarf (morphology)
Abwāb. c. 19th c. *Abwāb al-Ṣarf* by Hāfiz Muḥammad bin Barak Allah Lakhwi (d. 1893).
Bahāī. c. 16th c. *Sarf-i Bahāī* by Muḥammad bin 'Abd al-Ṣamad al-Harīsī, known as Sheikh Bahā' al-Dīn (1546–1621).
***Fusūl*. c. 17th c. *Fusūl-i Akbarī* by 'Alī Akbar Allahādādī (d. 1680).**
Irshād (S). n.d. *Irshād al-Ṣarf* by 'Abd al-Karīm.
***Mirāh. c. 839 Mirāh ul-Arwāh* by Aḥmad bin 'Alī bin Mas 'ūd.**
***Mīzān*. n.d. *Mīzān al-Ṣarf* by an unknown author (Sheikh Sā 'di; Ḥamzā Badāyūnī; Muḥammad ibn Muṣtafā (d. 1505–1506) are named in different sources).**
***Munsha'ib*. n.d. *Munsha'ib* by Ḥamzā Badāyūnī (Sirājuddīn Awadhī is also named in some sources).**
Muqaddamāt. n.d. *Jama'al-Muqaddamāt* [two works on *ṣarf: Amsalāh* and *Sharḥ Amsalāh*. Taught in Shi'ā *madrasās*].
***Panj*. c. 14th c. *Panj Ganj*, probably by Sirāj al-Dīn Usmānī al-Awadhī (d. 1356)**.
***Ṣarf (M)*. c. 14th c. *Ṣarf-i Mīr* by 'Alī ibn Muḥammad Mīr Sayyid al-Sharīf al-Jurjānī (1339–1413).**
***Shāfiyah*. c. 13th c. *al-Shāfiyah* by Jamāl al-Dīn Abi 'Amr 'Uthmān ibn 'Umar ibn al-Ḥājib (1174–1248).**
Ṣīgha. 1859. *'Ilm al-Ṣīgha* by 'Ināyat Aḥmad Kākōōrvī (1812–1863).

Naḥw (syntax)
'Aqīl. c. 14th c. *Sharḥ Ibn-i 'Aqīl* by Bahā' al-Din 'Abd Allāh bin Aḥmad Ibn 'Aqīl (1298–1367).
***Hidāyat*. c. 14th c. *Hidāyat al-Naḥw* by Sirāj al-Dīn al-Awadhī or Ḥayyān al-Andalūsī.**
**Irshād (N)*. c. 15th c. *Al-Irshād fi' l-naḥw* by Qāzī Shahāb al-Din al-Ghaznawī ad-Daulatābādī (d. 1455).
***Jāmī*. c. 15th c. *Sharḥ kāfiyāh** (Mullā Jāmī)* ***by* Abu Barkat Nur al-Din 'Abd al-Raḥmān Jāmī (1414–1492).**
***Kāfiyāh*. c. 13th c. *Al Kāfiyāh fī 'l-Naḥw* by ābn-Ḥiib.**
***Mi'at*. c. 11th c. *Mi'at 'Āmil* by 'Abd al-Qāhir al-Jurjānī (d. 1078).**
Miṣbāḥ. c. 13th c. *al-Miṣbāḥ fi 'l-Naḥw* by Abul Fatḥ Nāsir bin al-Sayyid Abī'l-Mukarram ibn 'Alī al-khawārizmi al-Mutarrizī (1143–1209 or 1213)
***Naḥw (M)*. c. 14th c. *Naḥw-i Mīr* by Sharīf al-Jurjānī.**
***Sharḥ*. c. 14th c. *Sharḥ Mi'at Āmil* by Sharīf al-Jurjāni or others?**

Rhetoric/Poetics
****Miftāḥ*. c. 12th c. *Miftāḥ al-'Ulūm* by Sirāj al-Dīn Abū Ya'qūb Yūsuf ibn 'Alī ibn Muḥammad al-Sakkākī (d. 1228).**
***Mukhtaṣar*. 1355. *Mukhtaṣar al-Ma'anī* by Sa'd al-Dīn Mas'ūd Ibn 'Umar al Sa'd al-Taftāzānī (1322–1389).**
***Mutawwal*. 1347. al-Taftāzānī.**
Talkhīṣ c. 13th c. *Talkhīṣ al-Miftāḥ* by Abū 'Abd Allāh Muḥammad bin 'Abd al-Raḥmān Jalāl al-Dīn Muḥammad Qazwīnī (1268–1338).

Literature
**'Ajab* c. 19th c. '*Ajab al-'Ujāb fī mā Yufid al-Kuttāb* by Aḥmad bin Muḥammad al-Shirwānī al-Yamanī (d. 1840).
Hamāsah. c. 9th c. *Dīwān-i Hamāsah* compiled by Abū Tammām Ḥabīb (786–845).
Maqāmāt. c. 12th c. *Maqāmāt al-Ḥarīrī* by Abū Muḥammad al-Qāsim al-Ḥarīrī (1054–1121 or 1122).
Mutanabbī. c. 10th c. *Dīwān al-Mutanabbī* by Abū at-Tayyab Aḥmad Ibn Ḥusayn al-Mutanabbī (915–965).
**Nafḥat al-Yaman*. c. 1820s. by Aḥmad al-Yamanī.
Nafḥat. c. 20th c. *Nafhat ul-'Arab* by Muḥammad 'Aizāz 'Alī (1883–1955).
Nahj al-Balāghah c. 10th c. by 'Alī ibn Abī Tālib (600-661). Compiled by al-Sayyid al-Rādī (970–1015).
Qaṣīdāh. c. 7th c. *Qaṣīdāh al-Burdah* by Sharafuddīn al-Busīrī (1212–1296).
Ṣab'a. c. 7th c. *Ṣab'a Mu'allaqāt* by several pre-Islamic Arab poets narrated by Abul Qāsim Ḥammād bin Ṣabūr bin al-Mubārak al-Rāwiyah (d. 772).

Table 4 Newer textbooks of Arabic

Only the most commonly used textbooks are given below. Otherwise, most Arabic texts have translations and explanations in Urdu.

Textbooks of Arabic of all the Textbook Boards of Pakistan from class VI to XII.
Charthāwalī, Mushtāq Ahmad. n.d. *'Ilm al Sarf.* 3 vols. Rawalpindi: Raza Publications.
Charthāwalī, Mushtāq Ahmad. n.d. *'Ilm al Nahw.* Hazro: Maktabā-i Siddīqia.
Charthāwalī, Mushtāq Ahmad. n.d. *'Arabī Zubān Kā Āsān Qā'idā* [Primer]. Hazro: Maktabā-i Siddīqiā.
Charthāwalī, Mushtāq Ahmad. 1962. *Rōzatul Adab.* Multan: Makabā Imdādia.
Misrī, Muhammad Amīn ul. n.d. *Al-Tarīqat ul-Jadīdiah fī Tālīm ul Arabia.* 2 vols. Al Jamiat ul Islāmiā bil Madīnā Munawwarā.
Nadwī, 'Abdul Majid. 1951–1952. *Mu'allim ul Inshā,* vol. 1. Karachi: Majlis Nasharāt-i Islām.
Nadwī, 'Abdul Majid. 1954–1955. *Mu'allim ul Inshā,* vol. 2. As above.
Nadwī, 'Abdul Majid. 1955. *Mu'allim ul Inshā,* vol. 3. As above.
Nadwī, Abul Hasan 'Ali. n.d. *Al-Qirat ul Rāshidā,* 3 vols.
Nadwī, Abul Hasan 'Ali. n.d. *Mukhtārāt Min Adab ul 'Arab,* 2 vols.
Nadwī, Abul Hasan 'Ali. n.d. *Qasas al Nabi'īn.*
Razzāk, 'Abdul. 1980. *Al-Tarīqat ul-Asriāh fī Talīm al- Lughat al 'Arabia.* Rawalpindi: Urdū Bazār (copy used in Pakistani *madrasās* is dated 1980).

Table 5 Differences in costs in major types of educational institutions (in Pakistani rupees)

Institution	*Average cost per student per year*	*Payer (s)*	*Cost to the state*
Madrassas	5714 (includes board and lodging)	Philanthropists and religious organizations	Rs. 1.55 in 2001–2002; An additional sum of Rs. 28.60 for subsidies on computers, books, etc. in some *madrassas* in 2003–2004.
Urdu-medium schools	2264.5 (tuition only)	State	2264.5
Elitist English-medium schools	96 000 for 'A' level & 36 000 for other levels (tuition only)	Parents	None reported except subsidized land in some cantonments.
Cadet colleges/ public schools	90 061 (tuition and all facilities)	Parents and state (average of 6 cadet colleges and 1 public school)	14 171 (average of 5 cadet colleges only)
Public universities	68 000	Parents and state (parents pay an average of Rs. 13 000 per year)	55 000
Public colleges (provincial)	9572	State and parents (parents pay Rs. 1591 per year on average)	7981
Public colleges (federal)	21 281	Parents pay Rs 2525 for B.A. on average.	18 756

Source: Data obtained from several institutions.

The Iranian embassy, too, has made arrangements to teach modern Persian in the *Khonā-i Farhang* centers in Pakistan. In short, Persian is now a foreign language in India and Pakistan that people acquire for instrumental reasons.

Arabic

The other classical language of Indian Muslims, Arabic was always a religious, liturgical language that Muslims learnt to read as a religious obligation. It came to South Asia with Arab merchants who traded on the Malabar Coast and Sri Lanka before the Arab conquest of Sindh in 711–712 C.E. It was used extensively by religious figures, including the mystics (*sūfīs*), whose letters and other writings in Arabic are extant. Books on Arabic grammar and literature were taught in India in the 11th century C.E. (see Table 3).

Arabic was taught in the *madrasās,* which were attended by educated people, intended for religious teaching (*tadrīs*), issuing religious decrees (*iftāh*), and leading prayers, the judiciary (*qazīs*), and the

Table 6 State of the languages of Pakistan[a]

Language	*Material available*
Aer	
Bagri	
Balochi	Alphabet book, primers, folktales, health books, phrase book, Balochi-Urdu-English dictionary, printed books on Islamic observances, poetry, modern literature, textbooks, etc.
Balti	Ancient records (Devanagari-based script), grammar, parables (Roman), verse, folk songs, etc. (Nastaliq script)
Bateri	
Bhat	
Bhaya	
Bhil Sindhi	Material in Sindhi may be used.
Brahvi	Alphabet book, primers, folktales, health books, phrase book, Brahvi-Urdu-English dictionary, printed books on Islamic observances, poetry, modern literature, textbooks, etc.
Burushaski	Transition primer (Urdu to Burushaski), folktales, bilingual vocabulary: Burushaski-English
Chilisso	
Dameli	
Dehwari	
Dhatki	Alphabet book, primer, transition primer, folktales, stories for children
Domaaki	
Gawar-bati	
Ghera	
Goaria	
Gowro	
Gujari	Poetry books, short stories, songs, etc.
Gujarati	Primers, grammars, textbooks, books, etc. (in India, also computers)
Gurgula	
Hazaragi	Alphabet book, folktales, health books, proverbs, stories for children. Material in standard Persian may also be used.
Hindko	Primers, literature, prose, dictionaries, magazines, etc.
Jandavra	
Jatki	Primers, word lists, grammars. Naskh/Nastaliq
Jogi	
Kabutra	
Kachchi	Primers of Sindhi may be used
Kachchi (Bhil)	
Kachchi (Katiawari)	
Kalami	Alphabet book, transition primer, poetry books, collection of texts from Gawri writers' workshop, proverbs, phrase dictionary Gawri-Urdu-English
Kalasha	Alphabet book, pre-reader, dictionary
Kalkoti	
Kamviri	
Kashmiri	Primers, folktales, poetry, textbooks, other books, etc. (most of this literature is in India)
Kativiri	
Khetrani	
Khojki (script, not a language)	Ancient records, *Ginans*, old documents, primers, school textbooks, other books
Khowar	Primers, grammar, dictionary, folktales, poetry, religious books, other popular books
Kohistani (Indus)	
Koli (Tharadari)	
Koli (Kachi)	Alphabet books, folktales, health books, stories for children, primer
Koli (Parkari)	Alphabet book, primer, folktales, health books, bilingual vocabulary: Parkari-English, stories for children
Koli (Wadiyara)	
Kundal Shahi	
Lasi	
Loarki	
Marwari	
Memoni	Primers of Sindhi may be used
Od	
Ormuri	Primer, grammar, word list [Roman], verse, prose, grammar, word list: Ormuri (Pashto script)
Pashto	All kinds of textbooks and books; usable in computer (also used in Afghanistan in some domains of power)
Persian	All kinds of books (usable in computer)
Phalura	
Panjabi	Books on literature; history; textbooks, etc. in Nastālīq script (all kinds of books in the Gurmukhi script in India)

Continued

Table 6 Continued

Language	*Material available*
Sansi	
Shina	Poetry, grammar, word lists, folktales, songs, religious books, etc.
Sindhi	All types of books and in computers
Sindhi Bhil	
Siraiki	Ancient poetry, modern literature, magazines, etc.
Torwali	Lexicographic work using Nastaliq is in progress.
Urdu	All types of books and computers
Vaghri	
Wakhi	Primer, word list, folksongs proverbs, word lists
Waneci	Primer, songs, folktales, word lists: Nastaliq (Pashto variant)
Yidgha	

[a]This provides information on the availability of written material in a language, especially that which is suitable for teaching small children or illiterate adults. Blank columns mean that no material is available. The information has been obtained from various field researchers and was reasonably sure through February 2004.

bureaucracy (*munshīs*). The curricula of Arabic grammar and literature was standardized in the *Dars-i Nizāmī* by Mullā Nizām Uddīn of Sihalī (a town near Lucknow) (d. 1748).

During the British period, as secular educational institutions developed, Arabic became more strongly identified with Islamic education and religious identity.

In present-day Pakistan and India, Arabic is strongly associated with the Islamic identity. Its script is learnt in order to read the Qur'ān, but the language itself is not learnt by ordinary Muslims. It is a major subject of studies in the *madrasās,* where canonical texts, explained through commentaries and marginal exegesis in Arabic, are still used. However, these texts, ranging from as far back as the 12th century, are used to provide a symbolic continuity with the past. Arabic is actually taught in the *madrasās* through modern, accessible texts such as are used in secular institutions (see Table 4). The Pakistani state also uses Arabic as a marker of Islamic identity. During Zia ul Haq's military rule (1977–1988), Arabic was emphasized in the educational system. It is still compulsory in the state-controlled government schools at the middle level. These attempts, intended to counteract ethnicity and emphasize the Islamic identity of Pakistan, led to the strengthening of Islamic pressure groups in Pakistan.

The Modern Languages

Urdu

Though Urdu, or rather its earlier form called 'Hindī,' 'Hinduī,' or 'Hindvī,' has been traced back to the 11th century, it is a modern language in its present form. There were simple books on religious and romantic themes in circulation among the common people in the 18th century. Poets taught the language informally to their apprentice pupils. However, it was formally taught first by the British at the Fort William College, where early Urdu prose works and grammar were written. The British also introduced it in some schools from 1826 and widely in the 1840s when they established schools in Uttar Pradesh.

By the 1870s, Urdu became an identity symbol of the elitist (*ashrāf*) Muslims who opposed Hindi in the Devanagari script as its rival. A number of institutions, such as Delhi College (established 1792), made Urdu suitable as a medium of instruction at the higher level by translating works of English into it. There are 'Urdu Universities' in both India and Pakistan that are supposed to teach all subjects through the medium of Urdu but still teach some in English. Urdu is not used in the elitist domains of power in Pakistan where, as in India, English continues to hold sway, as it has since British times.

Urdu is, however, the major language of ordinary state schools in Pakistan except in parts of Sindh. Moreover, it is the language of the media and urban life in Pakistan. In most of India, although it is visible at the upper level of academies and university departments, its script is not taught effectively, except in Kashmir where it is the official language. Muslims regard it as an identity symbol and complain that the market conditions discourage their children from learning its script. However, its spoken form is so close to the spoken Hindi of Indian cities and the entertainment sector (songs, films, dramas, etc.), that it is acquired naturally.

English

English has been the major language of power since British rule in both India and Pakistan. Although none of the major Islamic '*ulemā* opposed its learning,

ordinary Muslims regarded it as a symbol of alien rule and a threat to their religious identity. Thus, most did not study English, although some did as early as 1814. Travelers such as Dean Mahomet (1759–1851) wrote in English after settling down in Britain. Muslim prejudice against English was overcome by the efforts of Abdul Latīf (1828–1893) in Bengal and Sir Syed Ahmad Khan (1817–1898) in North India, including the areas now in Pakistan. These interventions, however, came after T. B. Macaulay's 'Minute' of 1835 had officially established the 'Anglicist' policy of making English the language of higher and elitist education in India.

English is now regarded as the language of prestige and power and can only be acquired fluently in expensive private English-medium schools or cadet colleges (public schools on the lines of elitist English boarding-school institutions). In Pakistan, the latter type of institutions are influenced, generally through boards of governors, by the military and the bureaucracy. They are also subsidized by the state (see Table 5). There are also nonelitist, so-called 'English-medium' schools that charge lower fees than the elitist ones, although still high enough to impose a painful burden on the upper-working-class and lower-middle-class parents who send their children to learn English in them. In short, English serves as a marker of socioeconomic class in Pakistan as well as India. While some of the more conservative Muslims, especially in the traditional *madrasās*, feel that this language undermines or dilutes the Islamic convictions and identity of Muslim children, most regard it as an empowering language and, hence, one that Muslims should acquire.

The Indigenous Languages

As the indigenous languages of most Muslims of India and Pakistan were neither the languages of power nor of wider communication, they were generally not taught formally. However, these languages were maintained for reasons of identity. Both Bengali and Sindhi developed into powerful identity symbols because of their ancient literary traditions and because they were used as the languages of the lower domains of power in the Bengal and Sindh, respectively, during British rule. The other languages of Pakistan – Punjābī, Pashtō, Balōchī, Brahvī, and so on – have also been used as markers of ethnic identity to mobilize a pressure group to force the Federal Centre to distribute goods and services more equitably.

Except for Sindhi, no indigenous language is used in the domains of power, including the educational system, at all levels. Pashto is used as the medium of instruction up to class-5 in some parts of the country and in the *madrasās*. However, since students switch to Urdu in the schools after that level and the examinations of *madrasā* students are held in Urdu, they gain more proficiency in Urdu than Pashto. The major indigenous languages – Sindhī, Pashtō, Balōchi, Brahvī, and Punjābī – are optional in some Pakistani nonelitist state schools and colleges. There are also M.A. degrees in all of them. Though language and ethnic activists demand more teaching and jobs in these languages, students opt for the utilitarian options of acquiring English and Urdu. However, some do study these languages as easy options, just as they study the classical languages.

There are primers and textbooks in all the major indigenous languages. In addition, there are chapbooks on religious and romantic themes. Most Pakistani languages are still unwritten, and even those that are written (see Table 6) have little material suitable for teaching them. In the absence of a policy to teach the minor languages in Pakistan, there is no official support for developing such material.

In India, Kashmiri is the only Muslim language besides Urdu. It is associated with Muslims, although both languages are spoken by people of other religions. The official language of the state of Jammu and Kashmir is Urdu, which is taught through the schooling system. Kashmiri written in the Urdu script is also taught, but either as an optional subject or at the higher level.

To conclude, Muslim language education has been governed by both instrumental reasons and reasons of identity consciousness. The languages of power (Persian, English, Urdu) have been learned because they have been the languages of the domains of power, while the languages of identity (Arabic for Muslim identity; Urdu for Pakistani nationalistic identity; indigenous languages for ethnic identities; and English for modern, educated, upper-class identity) have been learned, or merely acknowledged, for the maintenance, promotion, or assertion of identity.

See also: Applied Linguistics in South Asia; Arabic Linguistic Tradition; Cross-Linguistic Comparative Approaches to Language Acquisition; Education in a Former Colonial Language; Education in a Multilingual Society; Educational Linguistics; English in the Present Day (since ca. 1900); Hindustani; India: Language Situation; Islam and Arabic; Language of Tertiary Education; Language Teaching: History.

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Myanmar *See:* Burma: Language Situation; Burmese.

Myth

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Myth is commonly assumed to designate the primal stories shared by members of a society or community. It is often thought to consist of fictional narratives which, at root, reveal the most deep-seated beliefs, attitudes, and desires of a group of people. Typically, for Joseph Campbell,

> myth is the secret opening through which the inexhaustible energies of the cosmos pour into human cultural manifestation. Religions, philosophies, arts, the social forms of primitive and historic man, prime discoveries in science and technology, the very dreams that blister sleep, boil up from the basic, magic ring of myth. (1975: 13)

Importantly, then, myth has a fictional bearing: at the very least, it usually contains semifictional stories. As such, myth is frequently contrasted with 'history' and the real. But it is also possible to compare and contrast myth to the deliberate confections of the 'literary.'

Northrop Frye suggests that the Egyptian tale of the two brothers, in which an elder brother's wife attempts to seduce the younger brother, exemplifies a movement from 'credible' myth to a more 'literary' exposition. After the younger brother has resisted his sister-in-law's advances, he is forced to run away, pursued by his enraged brother; he then prays to Ra for assistance, and the god helpfully places a crocodile-infested lake between him and his brother. Although the earlier part of the story is recognizable as 'true to life,' the magical intervention of Ra imbues

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the mythical episode with "an abstractly literary quality" (1990: 135). Myth, then, consists of stories that inform cultural memory by relating events that might be credible, but are not necessarily tied to the historical record, and might be highly fictional but are not the result of stylized authorial embellishment. As Vernant argues (2001: x), myth represents a category distinct from history and literature in that it does not arise from fact or personal invention but from transmission and memory. It is a story form that exists independently of any particular storyteller.

This last point is of central importance when considering the etymological basis upon which concepts of myth operate. Myth is derived from the Greek word 'muthos.' 'Muthos' presents an interesting case in the matter of translation because it means 'anything that is spoken' and is hence often taken to mean simply 'speech.' However, 'muthos' refers also to 'story,' which, in the origins of narrative, was always spoken (prior to the invention of writing) and was told by a storyteller who was not necessarily the author. After Aristotle especially, 'muthos' became associated with the kind of binding in narratives that adds up to a 'plot' or, as Ricoeur (1984) would say, 'emplotment.' This is particularly prominent in tragedy, for Aristotle, where fate constantly binds the story events that implicate the tragic hero. Frye is one critic who attempts to negotiate the different meanings of 'muthos' inherent in myth and to answer questions about the relation to history and literature. He suggests that there are two broad approaches to myth. First, one can understand myth as a verbal sequence, where the issue of sequence is already an organizing principle in narrative akin to a 'plot.' He adds: "The verbal culture of a pre-discursive society will consist largely of stories, but among those stories there grows up a specialization in social function that affects some stories more than others" (1982: 32). Thus, certain stories take on special significance and there can then be a *second* approach to myth: a focus on the stories that take on a 'sacred' (as opposed to 'profane') ambience. Depending on the approach, then, there are, for Frye, two types of myth, primary and secondary.

Largely because of its Greek derivation in 'muthos,' we tend to associate myth, both primary and secondary, with a Greek model. This ranges from the kind of myths propounded in the works of Homer (featuring the everyday lives of characters as well as the activities of the gods) to Hesiod's *Theogony* where myth is profoundly cosmological. It is hardly surprising, given myth's grounding in speech, in narrative, and in signs, that primary and secondary myths became an important focus for a linguistically based semiotics. Indeed, semiotics' specific treatments of myth have broadly reproduced the split in 'the mythological' between that which is at the deepest, most profound roots of human consciousness and that which is commonplace and everywhere on the surface. The two approaches in question here have had an important influence on the course of semiotics. They are associated with the anthropologist Claude Lévi-Strauss (b. 1908) and the literary/cultural critic, Roland Barthes (1915–1980).

Crucial to Lévi-Strauss's conception of myth is Saussure's insistence on how the differentiality between linguistic signs gives rise to value *(valeur)*. Rather than carrying intrinsic 'meaning,' Saussure argued that linguistic terms were imbued with an identity that relied totally on their difference to other terms. For Lévi-Strauss, in turn, differentiality characterized a range of anthropological phenomena, particularly in the practices of exchange found in kinship rules, but also elsewhere. This included such binary formulations as the 'raw' and the 'cooked,' one of a number of anthropological oppositions discussed at length by Lévi-Strauss in a Saussurean spirit heavily refracted through the work of Jakobson and Troubetzkoy. Taking the oppositions instanced by phonemes as the smallest possible units participating in the differentiality of language, Lévi-Strauss proceeded to formulate a study of myth. He took it as given that myths were stories that gave sense to the society in which they flourished; but he also sought to analyze myth's very basis in order to reveal that its deep-rooted patterns were responsible for the complex surface patterns of the stories themselves. Moreover, he sought to demonstrate that the uniform 'deep' patterns were able to generate a considerable diversity of 'surface' myths. The analogy of phonemes combining and opposing to produce linguistic signs, in particular, provided the paradigm of myth.

Broadly, then, Lévi-Strauss considered myth's roots to be fairly consistent despite the many shifts of narrative that took place across cultures on the surface. As such, he saw mythic narratives as relying on 'mythemes' – a term that directly echoes 'phonemes,' of course. The conclusions that Lévi-Strauss reached about Saussure – that "language can be analyzed into things which are at the same time similar yet different" (1977: 209) – were coupled with his discovery that "anthropology of the nineteenth and even early twentieth century had been content [rather than form], as was the linguistics of the neo-grammarians . . ." (1987: 139). By concentrating on the 'form' by which phonemes were combined rather than on the strictly semantic orientations of a myth's content, Lévi-Strauss devised a method that enabled him to break down all myths to allow the identification of a basic substrate. The most famous example of this is

his 1955 interpretation of the Oedipus myth in which he treats it "as an orchestra score would be if it were unwittingly considered as a unilinear series" (1977: 213):

> Say, for instance, we were confronted with a sequence of the type: 1, 2, 4, 7, 8, 1, 3, 4, 6, 8, 1, 4, 5, 7, 8, 1, 2, 5, 7, 3, 4, 5, 6, 8 . . . the assignment being to put all the 1's together, all the 2's, the 3's, the result is a chart:

1	2		4			7	8
	2	3	4		6		8
1			4	5		7	8
1	2			5		7	
		3	4	5	6		8

He then goes on to break down the features of the Oedipus myth – for example, 'Oedipus marries his mother, Jocasta' and 'Antigone buries her brother, Polynices, despite prohibition' (1977: 214) – which he re-orders in a similar way. Effectively, Lévi-Strauss comes up with four columns of relations in the myth: (a) over-rating of blood relations; (b) under-rating of blood relations; (c) slaying of monsters; (d) (names for difficulty of balance/standing). These mythemes suggest that the orchestrated myth has at its core a common human concern: anxiety over our origins. Put another way, the myth plays out the drama of humankind's quest to determine whether it has been forged in blood/earth or by human reproduction.

Summing up his view of myth in general, Lévi-Strauss concludes, "The kind of logic in mythical thought is as rigorous as modern science, and . . . the difference lies not in the quality of the intellectual process, but in the nature of things to which it is applied" (1977: 230). Here, Lévi-Strauss has used myth as a touchstone for the common concern of 20th-century anthropology: the investigation of so-called primitive cultures to shed light on our own. The myths circulated in 'primitive' cultures are therefore found to be as logical and consistent as the kind of thought procedures that characterize modern rigor. What myth demonstrates above for Lévi-Strauss, though, is that human thought is programmed by a predetermined set of coordinates: a 'language.'

Where Lévi-Strauss proposes that an analysis of 'mythical thought' can reveal the deep structure of the human mind, Barthes' notion of myth, whilst attempting to be equally revelatory, prefers to stay at the surface level. Nevertheless, he shares with Lévi-Strauss a reliance on fundamentally Saussurean principles (and, it may be added, like Lévi-Strauss, his version of Saussure is refracted through the readings of other linguists). Famously, in *Mythologies* (1957; English translation 1973), Barthes drew together a series of brief articles he had written for magazines in the period 1954 to 1956 to demonstrate different aspects of the myth of French life and society. Central to his formulation of myth was the tracking down in the "decorative display of *what-goes-without-saying*, the ideological abuse which, in my view, is hidden" (1973: 11). From the outset, Barthes insists that "myth is a language" (1973: 11); but he also clarifies myth in terms of the following: it is a collective representation (like other definitions of myth, it is not individual or literary); it involves credibility which is sustained by 'inversion' (the element of the fictional but not the fanciful); it is expressed in all places in the contemporary world (whereas, traditionally, myth was only expressed at certain times and places, such as ceremonies); it is susceptible to semiological analysis (as Lévi-Strauss maintained) (Barthes, 1977a: 165–166).

The most obvious difference between the approach to myth outlined by Lévi-Strauss and Barthes is that the latter's version has an absolute grounding in the everyday. Traditional myths tell of heroes and major identity-founding events; concomitantly, they seem to suggest that there is special material – stock situations and characters – that harbours particular aptitude for mythic status. For Barthes, however, *anything* is susceptible to myth, especially the most everyday of phenomena. As he argues, "nothing can be safe from myth" (1973: 131). It can take almost anything and transform its cultural bearing into a natural one. Like Lévi-Strauss, Barthes believes that myth cannot be fixed as a correspondence between a configuration of signs and a stable meaning. Similarly, too, Barthes sees myth as a process of thought that enables the conceptualization of pressing matters in human existence. Yet, where Lévi-Strauss sees myth as framing the profound and sacred, Barthes sees myth as the medium of ideology and the profane. For Barthes, myth is the domain of stereotypes and other means of fixing limits to representation.

The form that the 'speech' of myth takes for Barthes involves systems of 'denotation' and 'connotation.' As Barthes suggests in his analysis of an advertising photograph (1977b: 36–37), there is a tendency for connotation to be foregrounded in representations. Embodied in connotation will also be an ideological travesty of the truth. Despite the foregrounding of connotation, myth uses 'denotation' (straightforward indicating), at the level of the *language-object*, to 'naturalize' what is expressed: "it is the language which myth gets hold of in order to build its own system" (1973: 115). So, for Barthes, myth is a two-level process. Where Lévi-Strauss conceives of myth in terms of 'surface' structures with a concealed, generating layer beneath, Barthes sees

myth as consisting of a dual system at the surface: popular culture and everyday life are 'mythical' because they are 'spoken' through a naturalization. What is 'hidden' in Barthes' version of myth, and what needs to be revealed by semiology, is the *inversion* of real relations that has taken place to transform an ideological proposition into common sense. In this respect, then, the perspectives of Barthes and Lévi-Strauss are similar because they suggest that myth is a process of thought. However, these perspectives are at considerable odds when it comes to the issue of whether myth is comparable to science: Lévi-Strauss hails the rigor of myth, while Barthes condemns its persistence.

See also: Barthes, Roland: Theory of the Sign; Greimas, Algirdas J.: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Jakobson, Roman: Theory of the Sign; Mythologies in Pop Culture; Narrative: Linguistic and Structural Theories; Narratology, Feminist; Occitan; Phoneme; Phonology: Overview; Saussure: Theory of the Sign; Significs: Theory; Structuralism.

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Mythologies in Pop Culture

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The notion of a 'mythology' as developed by Roland Barthes (1915–1980) is based on an apparently substantial linguistic foundation. For Barthes, a mythology is a phenomenon of everyday life that represents a departure from that which is defined, traditionally, by the term 'myth.' In *Mythologies* (1957; English translation, 1973), Barthes drew together a series of brief articles he had written for French magazines during the period 1954 to 1956. These were his investigations into the nature of contemporary French life, each one a separate 'mythology.' Barthes' aim in drawing attention to these facets of everyday (French) existence was "to track down, in the decorative display of *what-goes-without-saying*, the ideological abuse which, in my view, is hidden" (1973a: 11). The mythologies he singles out in this way, then, include wrestling, the haircuts of the Roman characters in Mankiewicz's film of *Julius Caesar*, the face of Garbo, *steack frites*, striptease, the New Citroën, and the brain of Einstein. Importantly, though, Barthes does not simply expose the power interests underpinning these commonplaces and commodities of everyday life. In addition, he insists that their existence as myths is dependent on the fact that "myth is a language" (1973a: 11). The magazine essays were therefore supplemented by an essay called 'Myth today' in which "semiological analysis [was] initiated, at least as far as I am concerned" (1973b: 9).

Fourteen years after the publication of *Mythologies* in France, Barthes summed up the project of his book as a set of theoretical articulations:

1. Myth, close to what Durkheimian sociology calls a 'collective representation,' can be read in the anonymous utterances of the press, advertising, mass consumer goods; it is something socially determined, a reflection.
2. This reflection, however, in accordance with a famous image used by Marx, is *inverted*: myth consists in overturning culture into nature or, at least, the social, the cultural, the ideological, the historical into the 'natural.' What is nothing but a product of class division and its moral, cultural, and aesthetic consequences is presented (stated) as being a 'matter of course'; under the effect of mythical inversion, the quite contingent foundations of the utterance become Common Sense, Right Reason, the Norm, General Opinion, in

myth as consisting of a dual system at the surface: popular culture and everyday life are 'mythical' because they are 'spoken' through a naturalization. What is 'hidden' in Barthes' version of myth, and what needs to be revealed by semiology, is the *inversion* of real relations that has taken place to transform an ideological proposition into common sense. In this respect, then, the perspectives of Barthes and Lévi-Strauss are similar because they suggest that myth is a process of thought. However, these perspectives are at considerable odds when it comes to the issue of whether myth is comparable to science: Lévi-Strauss hails the rigor of myth, while Barthes condemns its persistence.

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The notion of a 'mythology' as developed by Roland Barthes (1915–1980) is based on an apparently substantial linguistic foundation. For Barthes, a mythology is a phenomenon of everyday life that represents a departure from that which is defined, traditionally, by the term 'myth.' In *Mythologies* (1957; English translation, 1973), Barthes drew together a series of brief articles he had written for French magazines during the period 1954 to 1956. These were his investigations into the nature of contemporary French life, each one a separate 'mythology.' Barthes' aim in drawing attention to these facets of everyday (French) existence was "to track down, in the decorative display of *what-goes-without-saying*, the ideological abuse which, in my view, is hidden" (1973a: 11). The mythologies he singles out in this way, then, include wrestling, the haircuts of the Roman characters in Mankiewicz's film of *Julius Caesar*, the face of Garbo, *steack frites*, striptease, the New Citroën, and the brain of Einstein. Importantly, though, Barthes does not simply expose the power interests underpinning these commonplaces and commodities of everyday life. In addition, he insists that their existence as myths is dependent on the fact that "myth is a language" (1973a: 11). The magazine essays were therefore supplemented by an essay called 'Myth today' in which "semiological analysis [was] initiated, at least as far as I am concerned" (1973b: 9).

Fourteen years after the publication of *Mythologies* in France, Barthes summed up the project of his book as a set of theoretical articulations:

1. Myth, close to what Durkheimian sociology calls a 'collective representation,' can be read in the anonymous utterances of the press, advertising, mass consumer goods; it is something socially determined, a reflection.
2. This reflection, however, in accordance with a famous image used by Marx, is *inverted*: myth consists in overturning culture into nature or, at least, the social, the cultural, the ideological, the historical into the 'natural.' What is nothing but a product of class division and its moral, cultural, and aesthetic consequences is presented (stated) as being a 'matter of course'; under the effect of mythical inversion, the quite contingent foundations of the utterance become Common Sense, Right Reason, the Norm, General Opinion, in

short, the *doxa* (which is the secular figure of the Origin).

3. Contemporary myth is discontinuous. It is no longer expressed in long fixed narratives but only in 'discourse'; at most, it is a *phraseology*, a corpus of phrases (of stereotypes); myth disappears, but leaving – so much more the insidious – the *mythical*.
4. As a type of speech (which was after all the meaning of *muthos*), contemporary myth falls within the province of a semiology; the latter enables the mythical inversion to be righted by breaking up the message into two semantic systems: a connoted system whose signified is ideological (and thus 'straight,' 'non-inverted,' or, to be clearer – and accepting a moral language – *cynical*) and a denoted system (the apparent literalness of the image, object, sentence) whose function is to naturalize the class proposition by lending the guarantee of the most 'innocent' of natures, that of language – millennial, maternal, scholastic, etc., (1977a: 165–166).

Concerning point (1), Barthes transforms the customary understanding of myth, and it is a momentous shift toward recognition of the importance of popular culture and the quotidian. Myth is usually contrasted with 'history' (usually a matter of fact tied to the historical record) and the 'literary' (frequently a deliberate fictional confection). Myth is different from both in that it arises "neither from personal invention but rather from transmission and memory" (Vernant, 2001: x); it is a (story) form that exists independently of any particular storyteller and relays not fact or fancy but 'cultural memory.' The continuities with Barthes' notion of myth, then, are evident. The main difference in the latter, however, is the absolute grounding in the everyday. Traditional myths tell of heroes and major identity-founding events; concomitantly, they seem to suggest that there is special material – stock situations and characters – that harbours particular aptitude for mythic status. For Barthes, however, *anything* is susceptible to myth, especially the most everyday of phenomena. As he argues, "nothing can be safe from myth" (1973a: 131). It can take almost anything and transform its cultural bearing into a natural one.

Thus, the work of myth on nearly all cultural phenomena is the work of *inversion*, as Barthes insists in point (2). What the process of myth carries out (in producing a mythology) is a way of uttering a message. To paraphrase Barthes, a football game is a football game, but when it features David Beckham in a leading role, it can become a myth invoking all the platitudes associated with this contemporary cultural icon. The cohesion of such utterances is largely what enables them to become, convincingly, the norm or common sense. The spectacle of wrestling, an example that opens *Mythologies*, has at its core the moral concept that the villain (or 'bastard') will pay for his deeds. It is a formulation of justice in mythic guise, deliberately oblivious, of course, to the fact that individuals evade justice every minute of every day.

Wrestling, then, is a particularly good example of Barthes' third point. That is, that myth cannot be fixed as a correspondence between a configuration of signs and a stable meaning. Rather, it is a discourse or, put another way, it is the framework that makes it possible to remark on and think about various cultural phenomena. Stereotypes are a central part of myth as a discourse because they fix the limits of representation: what does and does not fit a cultural phenomenon. In the history of the representations of African Americans, from the end of the Civil War through the first half of the 20th century, the myth of the 'mulatto' was always bound to stereotypical tragedy because of the mulatto's abortive attempts to 'pass' as 'white.' In this period, a representation of a mulatto without the tragic element would likely be a contravention of the norm and common sense. As Barthes argues, this kind of representation can be *seen* to be *mythical* given the right conditions of analysis, but as long as such recognition is not in place, the representation insidiously sets the boundaries for conceiving what is represented.

Crucially, myth is a type of speech [point (4)]. Like speech, myth produces two levels of signification. Both levels make up a system that Barthes was to elaborate in *Elements of semiology* (1967) five years after *Mythologies,* demonstrating a clear debt to the work of Louis Hjelmslev (see Hjelmslev, 1969). The first level of this system Barthes calls the *language-object*: "it is the language which myth gets hold of in order to build its own system" (1973a: 115). This level is the domain of the signifier (*signifiant*, sound pattern) and signified (*signifie*, mental concept), which Saussure envisaged as being connected in the brain to produce a (linguistic) sign. This is the level at which straightforward indicating takes place: denotation. The second level Barthes dubs *metalanguage*, because it is a language that speaks about the first level. This level is constituted by connotation, and Barthes suggests that it is *cynical* because it is ideological, through and through. It puts forth a proposition (for example, mulatto = tragic) without any conscience. However, it relies on the level of denotation to naturalize the proposition.

Interestingly, Barthes argues in the space of a sentence that it is because of this dominance of the

two-level schema (language/metalanguage) in myth that semiology is licensed to treat writing and pictures in the same way: their signs both partake of denotation/connotation. Thus, in his often quoted essay on 'The rhetoric of the image,' Barthes suggests that the pictorial advertisement for Panzani food products, as with all photographs, foregrounds its connotation overwhelmingly and from the outset of viewing (1977b: 36–37). As such, denotation – a system devoted to establishing the literalness of the object – executes the key part of ideological work for connotation, saying 'this is how it is.' Denotation, then, might vitiate the more fanciful conceptual leaps of connotation by placing the object and anchoring the myth system in a language that appears to be dominated by mere indication. Semiology's task, according to Barthes, is to recognize the operations of these systems and to reveal the invertion that has taken place in the process of a mythology being uttered.

Given the focus of Barthes' concept of 'myth' on popular culture, it was hardly surprising that his work was taken up with great fervor, especially by Anglophone media and cultural studies from the 1970s to the 1990s. The example that Barthes uses in 'Myth today,' that of a photograph on the cover of *Paris-Match* of a black Algerian soldier saluting the French flag, has served numerous commentators as a prime example of the pervasive nature of myth, from Coward and Ellis (1977: 27–29) to Deacon *et al.* (1999: 144–145). Weedon *et al.* deal with Barthes' version of myth better than most. They write:

> Barthes' principal aim in *Mythologies* was to provide a basis for a critique of the 'naturalizing effect' of ideology, its quality of *vraisemblance*. For example, even though she or he may be critical of its connotations, the reader of *Paris-Match* nevertheless believes its denoted 'truth': this event took place, it has a real history and so, in a sense, the soldier's behaviour is 'only natural'. Barthes locates this 'very principle of myth' in the relations between his two orders of signification. The denoted signified establishes the reality of the ideology; it allows myth to be innocently consumed (1980: 180).

However, some media studies versions of *Mythologies* are not so clear. There is a tendency to assume that denotation and connotation exist in a linear, mechanistic relation whereby connotations are conspiratorial supplements working upon simple denotations. Bignell attempts to explain myth with the following:

> It is as if myth were a special form of language which takes up an existing sign system and makes a new sign system out of it. As we shall see, myth is not an innocent language, but one that picks up existing signs and their connotations, and orders them purposefully to play a social role (1997: 16–17).

He adds, "A set of iconic signs which already possess a meaning ('a black soldier is giving the French salute') becomes the basis for the imposition of an important social message, that French imperial rule is fair and egalitarian" (1997: 23). Putting the cart before the horse in this way is characteristic of a great deal of the writing on mythologies in Anglophone media studies (cf. Fiske, 1990: 85–91, and, to a slightly lesser extent, Dyer, 1982: 128).

Ironically, years before Barthes' initial conception of myth was being taken up by cultural critics and media theorists in Britain and North America, he had already shifted the emphasis of his analysis. In his 1971 retrospective on *Mythologies*, Barthes argued that the identification and uncovering of myths were no longer sufficient in the post-1968 world. Myths had become easily recognizable and their exposure a routine exercise. Barthes therefore recommended that work should proceed on the identification of 'sociolects.' The task of semiology was

> No longer simply to *upend* (or *right*) the mythical message, to stand it back on its feet, with denotation at the bottom and connotation at the top, nature on the surface and class interest deep down, but rather to change the object itself, to produce a new object, point of departure for a new science . . . (1977a: 169).

For Barthes, "denunciation, demystification (demythification)" (1977a: 166) of the bourgeois and the petit-bourgeois has become, itself, a mythological *doxa*. 'Mythoclasm' was succeeded by 'semioclasm,' he claimed, and what was needed was a far-reaching interrogation of *all* sign systems and a *challenge* to their very basis. This would not simply entail unraveling the connection of denotation and connotation but a more thorough assault on the mechanics of meaning. For many, this is the very crux of contemporary semiotics.

See also: Barthes, Roland: Theory of the Sign; Greimas, Algirdas J.: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Saussure: Theory of the Sign; Sign Theories; Structuralism.

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Myths about Language

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The Tongue of God

A mythic riddle is solved when God creates the other side of a metaphor, one that owes its existence to the Word, which establishes the prismatically mirrored image of God in man. Now, tenor and vehicle in place, a world comes into being. Lucian tells of the Celtic Ogmios and the Roman Hercules depicted as gods followed by men; the men are attached to God by gold chains, linking their ears to the tongue of God.

Among the Burun and Meban people of Sudan, Juon, the creator, modeled humans out of clay. He knew that man must eat, so he gave him a mouth. Man must be able to dance, to speak, to sing, so he gave him a tongue. God knew that man must be able to hear the sound of the dance, the speeches of great men, so he gave him two ears. God sent into the world a perfect man. In the creation myth of the Dyaks of Sakarra from British Borneo, Salampandai, the creator of humans, fashioned a man of stone and a man of iron, but those men did not speak; when he created a man of clay, the man spoke, and he became the ancestor of all humans.

Some creator gods, such as Awonawilona of the Zuni Indians of New Mexico, are alone at the beginning of time. Then God conceives in himself a thought, and the thought takes shape, just as Awonawilona himself changes into the sun. The thought or the word of the creator god becomes an externalization of the creator, so that the world that results is in fact the shadow of god. Thought, according to the mystics of Islam, is a manifestation of God and the life of the spirit of the universe. Its basis is man. Every path that a human takes leads back to God. A man is a copy of the perfection of God, who is simultaneously creation and creator. God is both seer and seen; the world a mirror of him. A man's essence is the essence of God.

Amma, the Dogon creator of Burkina Faso and Mali, planted a seed within herself and a man was the result. But because of a flaw, the universe contained within it the possibilities of incompleteness. The egg became two placentas, each containing a set of twins, male and female. One of the males, Ogo, broke out of the placenta and attempted to create his own universe. But he was unable to say the words that would bring such a universe into being. His counterpart, Nommo, was killed by Amma; parts of his body were cast in all directions, bringing a sense of order to the world. Amma brought pieces of Nommo's body together and restored him to life, and Nommo became ruler of the universe. He created four spirits, the ancestors of the Dogon people, and Amma then sent Nommo and the spirits to earth in an ark. Along the way, Nommo uttered the words of Amma, and the sacred words that create were made available to humans.

Among the Kwakiutl of Canada, a man built a house in a remote place and then heard numinous noises. He searched and found the house from which the sounds came: sparks were flying from the roof. He looked through a knot hole and saw the Xwexwe dancing. When a certain word was uttered in the song they were singing, they fell, transforming into red cod, with their tails striking the ground and making the noise the man had heard; the words of the song were foreign to the man. The earth in a California Wappo myth was flooded. When the water disappeared, Coyote told Chicken-hawk that he would create people. He took feathers, placed them in a sweat-house that he had created, and

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transformed the feathers into people. But the people did not speak. Coyote went to Moon to ask for words. Moon put words into a sack, and Coyote went back to the sweat-house and untied the sack, and the people were able to speak.

The World and the Word

A Xhosa storyteller identified the myth-maker's materials: "the world and the word." The Word orders the metaphor, bringing the world into being. Hindu mythology tells of Projapati, hatched from a primal egg; the first sound that he made, the Word, became the earth. The next sound became the sky, and so with the Word, the world came into being. In Egyptian mythology, Ptah the creator was both mind and tongue of the gods, the mind bringing to fruition every creation, the tongue repeating the thought of the mind. In a hymn to Aten, it is said that men's tongues were loosened that they may speak. In an Egyptian gnostic creation myth, God spoke and everything was set into motion. The primal world was under the control of the powerful Word in a Wapangwa myth from Tanzania: it was the disembodied Word that created. The Yuki Indians of northern California tell of the mythic Taiko-mol, Solitary Walker, who created the world from chaos, attempting various linear organizations of the world; then, the plan complete, he spoke the Word, and earth came into existence. Io, or Iho, was the creator of the Maori: Io transformed darkness and water into night and day by means of the Word. Among the Maidu Indians of California, when Earth-Initiate called the stars by name, they came into being. In the Babylonian creation epic, the *Enuma elish*, Tiamat tells Kingu that his Word will dim the fire, humble the weapon. The gods tell Marduk, after he has killed Tiamat, of the power of the Word: open his mouth, and the cloth will vanish; speak again, and the cloth will return.

In the Mayan *Popol Vu*, the creator, Tepeu, and Gucumatz, the maker, said the word, and the earth appeared. So they created light, mountains, rivers, birds, and animals, telling the birds and animals to speak; humans were created by an incantation. Among the Netsilik in Greenland, the first people uttered magic words and could thereby move houses.

The Gospel according to St. John opens, "In the beginning was the Word, and the Word was with God, and the Word was God. . . . And the Word was made flesh, and dwelt among us. . . ." In Genesis, ". . .God said, Let there be light: and there was light." The apostle John wrote in Revelation, ". . .I heard a great voice out of heaven. . . ." In Zoroastrian belief, it was the union of Word and Nature that resulted in the transformation of chaos. Among the Orinoco of South America, the Kahuhana who resided in the Sky Place taught humans how to establish and maintain rhythm with the *wasaha*, the dance stick: when the earth is beaten with the dance stick, and when the words of the Kahuhana song are precisely uttered, the food spirits will be summoned.

Q!aneqelak of the Kwakiutl of Canada heard the voices of many men. He discovered that the voices came from a single man whose body contained many mouths. Q!aneqelak touched the man's body, and all the mouths but one closed. In a Nias creation myth from Sumatra, Luo Zaho created a man, called him Sihai, and then moved him to earth where he died. Out of his mouth grew two trees, from which diseases arose, and from his throat grew a tree from which gold came, and from his heart grew a tree from which humans descended. The sun came out of his right eye and the moon from his left.

Earthmaker, in a myth of the Winnebago Indians of Wisconsin, took a piece of earth and shaped it to resemble himself. But when he spoke to this new being, it did not answer. He made it a tongue; still, it did not respond. He made it a soul; though it did utter something, it was unintelligible. Earthmaker breathed into its mouth, and then the man spoke. In a Siberian-Altaic myth, the word of God gave shape to the world. "Day unto day," wrote the Psalmist, "uttereth speech, and night under night sheweth knowledge. / There is no speech nor language, where their voice is not heard. / Their line is gone out through all the earth, and their words to the end of the world." Gendered order of speech may be significant: in a Japanese myth, because the creator goddess, Izanami, spoke first as she and her creator husband, Izanagi, ritually moved about a sacred column as a part of their sexual ritual, the children whom they conceived were first a monster, then an island. Only when Izanagi spoke first did they produce gods as children.

Gods were masters at the manipulation of the word. In a Kumulipo myth of Hawaii, an early chief, Lono-i-ka-makahiki, cultivated the art of word play and was an expert riddler. And Maui-tikitiki, a trickster god, a shape-shifter, became a master of the double-intentioned word. Gods controlled the means of verbal expression in written as well as oral forms. In a Hopi myth, Hurúing Wuhti, deity of the west, and Hurúing Wuhti, deity of the east, taught the birds and animals created by Hurúing Wuhti of the west to make appropriate sounds. Then Hurúing Wuhti of the east created a man and a woman out of clay. Hurúing Wuhti of the east made two tablets, drew on them with a wooden stick, and gave them to the humans. But the humans did not know what they meant. So the two gods taught the humans

a language. Then they sent them to a place to live. But the gods decided that their creations were not yet complete. Spider Woman, Kóhkang Wuhti, anticipated their wishes and molded a man and woman from clay, sang over them, brought them to life, and taught them the Spanish language. Spider Woman continued to create people, always a man and a woman, giving a different language to each pair. Chinese calligraphy had its mythic beginnings in the marks made when birds hop across sand, in twigs, in marks on the coat of a divine horse. Ts'ang Chien, with four eyes, patterned Chinese characters after nature: the stars he saw above him, the marks on the back of the turtle running, the footprints left by birds on the ground. And Brahma, when he sought a way to write down his teachings, is said to have invented Hindu letters by copying the patterns of the seams of the human skull. In Irish myth, Oghma, created writing, *ogham*, with strokes and notches carved into wood or stone.

The Serpent and the Word

All the animals could talk in a Yuchi myth from Georgia and Oklahoma, and they spoke one language. They were at peace, set free from humans.

In some myths, animals and humans speak to one another. Among the Apache Indians of Arizona and New Mexico, First Man lived with animals; they spoke the same language. Myths of the Cheyenne of the North American plains tell of the paradise created by the Great Power, a paradise where people and animals understood one another. But when a great flood came, humans and animals had to move out of the paradise, and they no longer spoke to one another. An Eskimo myth tells of how, in primal time, humans and animals lived together and were able to transform when they wished, all speaking the same language. Words were magic: when a word was spoken, what it expressed would happen. Nanabozho, the divine trickster of the Chippewa Indians of Canada, was able to talk to all humans and animals. After a devastating flood, he recovered the land along with all living beings, including the Chippewa. Until this time, animals were able to speak, but Nanabozho deprived them of this ability because of their conspiratorial acts against humans.

Sigurdr, in *The Prose Edda* of Snorri Sturlson, killed the villainous Fáfnir; when he was roasting Fáfnir's heart, blood ran onto Sigurdr's finger, and he put his finger to his mouth. As soon as he tasted the blood, "straightway he knew the speech of birds," which then warned him of those who were his enemies. Democritus observed that, because serpents were made of the blood of birds, whoever ate a serpent would understand the language of birds. Arabs and the Paraka of India received premonitions from birds because of their knowledge of birds' language, a knowledge achieved by eating the heart or liver of a serpent. The Viking Rollo understood the language of animals after eating a black serpent. In Scandinavian and German myths, the person who ate the flesh of a serpent would understand the language of animals. In ancient Greece, wise men understood the language of birds after saving the lives of serpents.

Lord Siva, the Sun God, controls human destiny among the Kadar people of India. A poor Kada farmer was told that messengers of death had an appointment with him at his home that night. The cows went to the farmer's home, gave the messengers fine food and milk, and then asked them to be kind to the farmer. As a result, the messengers stole another soul, put it into their bag, and took that to Lord Siva. When Siva learned the truth, he was angry at the cows and took away from them the power of speech.

Reaching to Heaven

"*Ubani ongaphoth' igoda lokukhuphuka aye ezulwini*?" is a Zulu proverb: "'Who can plait a rope for ascending that he may go to heaven?"

In many myths, when humans were created, all spoke one language. A World Tree, or Knowledge Tree, or a tower of some sort became the center of an epical language change, as one tongue gave way to many, and human groups could no longer speak one to the other. In an Armenian myth, three proud men built a tower that was blown over by the wind; at the same time a confusion of languages descended on humans, with the consequence of confoundment and war. The Kabah is the navel of the earth in Malay Charmbook mythology, its branches moving to the corners of the world. Hindu myth tells of a World Tree or Knowledge Tree that grew in the center of the earth, so tall it almost reached heaven. The Tree was proud, determined that its head would touch heaven, its branches would spread over the earth, and all humans would live in its shade, keeping them together as one. Brahma punished the Tree, cutting off its branches and throwing them to the earth where they became smaller trees; with this act, belief, speech, and customs became diverse, and humans were dispersed across the earth. In Scandinavian myth, Yggdrasill, the Mundane Tree, is situated in the center of the earth, its branches covering the earth's surface, its top reaching to heaven. This cosmic tree, the World Tree, was filled with many worlds, its roots moving to the underworld. Three wells were at its base, one of which gave wisdom.

The god Odin gave one of his eyes for a drink from this well; he thence became the wisest of the gods, moving from the oral word to the printed, runic word, which he devised. The Knowledge or World Tree in myth has many manifestations, including the tree of the knowledge of good and evil in Hebrew myth, the tree of life that stood in the middle of Eden and tempted Adam and Eve, leading to their expulsion from paradise.

The World Tree sometimes took the form of a tower reaching from earth to heaven, a means whereby humans might gain access to God. In a number of world myth systems, the Tower of Babel played a significant role in language dispersion. This tower was constructed in Babylon after the great flood. For whatever reason, some say because of the pride of the Babylonians, they decided to build a city and a tower "whose top may reach unto heaven," fearing that they would "be scattered abroad upon the face of the whole earth." When God came down to see the city and tower, he observed, "Behold, the people are one, and they have all one language." He was concerned: "...now nothing will be restrained from them, which they have imagined to do." He therefore decided to "confound their language, that they may not understand one another's speech." God did this, at the same time scattering humans "abroad upon the face of all the earth." Esthonian myth calls this "the cooking of languages." There are African and Australian versions of this myth. In ancient Mexico, the building of the tower was supervised by a giant, Xelhua, called "the architect," one of the seven who were saved from the flood. Bricks were made and conveyed to Cholula, where the tower was constructed. When the top of the tower reached the clouds, the gods were angry; they hurled fire at the pyramid. Many of those who were working on the tower were killed, and each family that worked on the tower was given its own language, so the builders could no longer understand one another, and confusion was the result.

A Confusion of Tongues

When Koevasi, the Melanesian snake goddess, was busy providing the people of the Solomons with their basic needs, her speech was garbled and disorganized, and she therefore passed on to each group a different language. The trickster, Little Coyote, of Ansarkoes myth, was responsible for the different languages when he was the assistant of Old Man Coyote. Old Man Coyote taught people to build homes, make weapons, and hunt. Little Coyote suggested that if Old Man gave the people different languages, they would not understand one another and would therefore use their weapons to make war, and the people would become heroic and wealthy in battles. Old Man agreed, and people, speaking different languages, warred on one another. Hurukan was the Guatemalan god of whirlwind and thunder. He created fire and made the earth and animals. When he ordered the animals to worship him and they responded with animal sounds, he became angry. So he created humans out of wood and then maize. But there was not yet a sun, the humans could not see, and this led to their division. Because they lived apart from each other, different languages evolved.

The Yenisei-Ostyaks of northern Siberia told of the flood and how some people and animals were saved when they climbed onto logs floating in the rising waters. A strong wind blew the logs in many directions, scattering the people. After the flood, they began to speak different languages and form diverse groups. The Maidu Earth-Maker shaped the earth at a time when all was water; he created pairs of humans and deposited them in various parts of the world, each with a different language. The Indo-Chinese people, the Chin, tell the story of a father who instructed his sons to catch a rat. During the chase, the sons got so excited that a multitude of tongues resulted, and they could never again understand one another. In the Voltanic empire of Yucatan was a myth about Voltan, the first man God sent to what is now America. His task was to divide the lands among various peoples who would come after him; he found the ancient ruins of a structure meant to enable people of the past to climb to the sky. Voltan was told that this was the place where God had given to each tribe its own language.

Unombotte, the creator god of the Bassari people of Togo, created a man and a woman and gave them seeds. A tree was the result. Every 7 days, Unombotte came and ate one of the fruits from the tree. When the man and his wife also ate the fruits, Unombotte asked them why they had done this; they said that the serpent had told them they could do so. Unombotte then gave sorghum, yams, and millet to the humans. The numbers of people grew, and they ate in groups, each from its own bowl. From this evolved the differences in language, with each group speaking its own language. Among the Kono of Guinea, Alatangana was the supreme god. Sa, the god of death, while seeking a place to live, created a sea of mud. Alatangana was shocked when he saw this place without light, plants, or living beings. He brought the dirt together and created the earth. Then he created plants and animals, and Sa was pleased. But against Sa's wishes, Alatangana married his daughter; they were parents of 14 children, some black and some white. But they all spoke different languages: this was Sa's

revenge and punishment. In a Kashaya myth, from northern California, Coyote descended into an underground sweat-house where he stuck birds' feathers in a circle, and then said four times, "Let there be people!" Suddenly, the sweat-house was full of people. Coyote gave them separate languages, sending them off to different places.

In the southern part of India, in the Parambikulam area where the Kadar live, is a rock called Maduteenipara. God the Sun summoned all mankind to dinner on that rock. He invited the people to eat beef or buffalo. The Kadar refused both, choosing venison instead. Other groups made their own selections. The Brahmins refused to touch meat at all. Then God separated the different peoples on the basis of their choice of food, instructing them to live in different parts of the world.

Xowalaci, the creator in the mythology of the Joshua Indians of Oregon, shaped a beautiful woman out of tobacco smoke. Because she was lonely, he gave his friend to her. Xowalaci, to bring the man and woman together, made her sleep, and she dreamed that a man was with her but when she awakened there was no man. A child was born, and the woman longed for the father. With the child on her back, she sought him for 10 years. When they got home, she told the child about her dream. She opened the door of her house and saw the man she had dreamed of. Now, the family had many children, and, under the influence of Xowalaci, the children spoke different languages and formed the different tribes.

While his older brother, Kuksu, sang the creation song, Old Man Madumda created the world from a ball of skin from Kuksu's armpit. He made people, but they began to kill each other, so Madumda destroyed them with a flood. Then, from his thoughts, he created a village and people; they too were bad people, so he annihilated them with fire. A third group was created out of willow wands, and when they went bad they were exterminated by ice. Finally, he made out of willow wands many groups, each of which spoke a different language. Then, in this Pomo Indian myth from California, he departed from the world, warning the people to behave properly. Among the Okanagon Indians of Canada is a myth about Old One, who sent Coyote to destroy monsters and to show the Indians how to spread out and live in various places, giving them their names and different languages. In Papua New Guinea in Melanesia, the Papuan Keraki people believe that the first humans emerged from a palm tree. The Great Creator, Gainji, heard voices inside a tree and released the people in separate groups, each of which spoke a unique language. So it was that different languages were spoken in different parts of the world. The Creator of the Snohomish Indians of the Pacific Northwest, as he moved to the west, gave each group of people that he created its own language. He arrived at Puget Sound and liked it so much that he stopped there for a time, with the result that there are many different languages in this area. When it came time to lift the sky (it was so low people kept bumping into it), all humans had to help, but all spoke different languages. They found one word that meant 'Lift together' in all languages, and they were then able to move the sky.

The Broth of Oblivion

The Creator in a Skagit myth gave four names to the earth, insisting that the names would be known to only a few, the argument being that if many people knew those names, the world would change too soon and suddenly. But after a time, everyone came to know the four names, everyone spoke the Skagit language, and when people began to talk to the trees change occurred: there was a flood. Five people escaped the flood in a canoe. A child born to a man and his wife in the canoe became Doquebuth, the new Creator. Old Creator instructed Doquebuth to wave the blanket of the earth and to utter the four names of the earth, and food was provided. Then Doquebuth was told to gather the bones of all those who lived before the flood; the people returned to life. Brains were made for them, and they could talk; they spoke many languages, and Doquebuth blew them to various parts of the world. It was prophesied that a time would come when a new language would be introduced; it would be the only language spoken when the next change came.

In a Chinese myth, Lady Cheng, who lives on the border of hell, prepares the broth of oblivion. Whoever drinks the broth forgets everything and loses the ability to speak. Now, the past erased, the soul is prepared for rebirth.

"A world ends," Archibald MacLeish wrote, "when its metaphor has died."

See also: Ancient Egyptian and Coptic; Animal Communication: Overview; Armenian; Dogon; Eskimo-Aleut; Figurative Language: Semiotics; Malay; Maori; Mayan Languages; Ogam; Origin of Language Debate; Religion: Overview; Xhosa; Zulu.

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N

Nadeljaev, Vladimir Mikhailovich (1912–1985)

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Vladimir Mikhajlovič (Mikhailovich) Nadeljaev was born in 1912 in Khabarovsk, and died in 1985 in Novosibirsk. He was a versatile Russian scholar who had an impressive command of a number of Turkic, Mongolian, and Tungusic languages. Under his guidance, 130 higher education specialists were educated in the Tuvan (Tuvin), Altai, Sakha (Yakut), Buryat (Buriat), Mongol (Mongolian), and Kalmyk (Kalmyk-Oirat) languages, as well as experimental phonetics.

It was in East Siberia that he received his primary and secondary education. At the age of 21, he was offered a teaching position at the newly organized school for Dolgan children in Taimyr (a polar peninsular in North Siberia). He accepted the post, and for the first time in his life Nadeljaev encountered a people whose language did not have any records and was passed from one generation to another only orally. Over a span of five years the Dolgan language, which Nadeljaev wrote down and learned, became for him a unique means of survival and access to the traditional lifestyle of reindeer breeders. Nadeljaev retained a lifelong attachment to the Dolgan people. He was further educated at the University of Leningrad (present St. Petersburg), where he studied Mongolian languages under Academician Kozin, experimental phonetics under Academician Ščerba, Professors Zinder and Matusevič, Tungusic languages under Professor Cincius, and Turkic languages under Professor Malov. His years at the university fell during the Leningrad blockade period during World War II. As Nadeljaev was very shortsighted, he could not fight at the front and stayed in Leningrad through the whole year of its blockade: he took part in civil defense, studied, and helped people around him. At that time, he was 176 cm. tall and weighed 48 kg.

In 1958, Nadeljaev became one of the authors and editors of *The old Turkic dictionary* (*drevne-tjurkskij slivar'*), published in 1969. In 1966, Nadeljaev was invited to work at the Siberian Branch of the USSR Academy of Sciences in Novosibirsk, where he founded a new Laboratory of Experimental Phonetics. With the help of laboratory equipment, more than 30 Siberian languages and dialects were tested and researched by laboratory workers and postgraduate students. Nadeljaev worked out the theoretical basis for all investigations at the laboratory. His theory of articulatory bases greatly contributes to the theory of human race and language origin, general phonetics, etc. It holds that the articulatory-acoustic base is a system of articulatory skills that was historically built up at the earliest stages of a particular ethnic group development and is not a language evolution. Considering the articulatory-acoustic base as an ethnological characteristic that might serve as a potential historical source in the reconstruction of ethnic processes, Nadeljaev advanced and justified a series of hypotheses about the ethnogenesis of North Asian peoples. He also put forward a hypothesis about the system of consonants in the Uyghur-Oghuz languages of the Eastern branch of Turkic languages, with a contrast in the degree of tensity: strong vs. weak vs. superweak. A similar system has been retained in several central regions of Mongolia, and this fact became one of the grounds to forward the hypothesis about the Turkic substratum in the Khalkha-Mongolian (Halh Mongolian) language. Scholars also credit Nadeljaev with deciphering a series of messages left in runic script by the Siberian Turkic peoples. Nadeljaev received many honors, including the title of Honored Scientist of the Tuvan Republic, the Medal for Leningrad Defense, and the Badge of Honor.

See also: Turkic Languages.

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Na–Dene Languages

J Leer

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The term 'Na–Dene' was coined by Sapir (1915) in the early twentieth century to reify his proposal of a genetic affiliation between the Athabaskan language family and two northwest coast Native American languages: Tlingit and Haida (*see* **Sapir, Edward (1884–1939)** Since then, the nearly extinct Eyak language has been shown to be closely related to Athabaskan, and the inclusion of Haida in Na–Dene has come to be regarded as unprovable by most specialists in the field. The alternative hypothesis is that the similarities between Haida and Athabaskan–Eyak–Tlingit are the result of prolonged areal contact.

Language Classification and Distribution

Athabaskan–Eyak–Tlingit (AET) consists of the Athabaskan language family plus Eyak and Tlingit, contiguous languages of the northern Northwest coast. Athabaskan is located in three main enclaves: northern Athabaskan, Pacific Coast Athabaskan, and Southern Athabaskan. Most researchers agree that the last two are the result of prehistoric migrations southward along opposite flanks of the Rocky Mountains, and that the Pacific Coast migration was earlier than the Southern. Subclassification, especially in Northern Athabaskan, is rendered difficult by the fact that these languages tend to share features with their neighbors, so that it is often difficult to distinguish the inherited from the borrowed.

The Northern Athabaskan languages are spoken in the interior of Alaska and northern Canada. Neighboring the Eskimo of southcoastal Alaska are the Ahtna, Tanaina, and Ingalik; proceeding upriver Holikachuk, Koyukon, Upper Kuskokwim, Tanana, Tanacross, and Upper Tanana are encountered. The latter, together with the Han and Kutchin (or Loucheux), straddle the border between Alaska and Canada. Proceeding southward along the Cordillera, Northern and Southern Tutchone, Tagish, Tahltan, Tsetsaut, Kaska, Sekani–Beaver, Babine, Carrier, and Chilcotin are found. South of the Beaver on the plains live the Sarcee. Continuing in an arc through the Arctic drainage area, are the Chipewyan, Dogrib, and Slavey–Mountain–Bearlake–Hare, whose languages constitute a dialect complex.

Near the mouth of the Columbia River once lived small bands collectively called the Kwalhioqua-Tlatskanai. They appear linguistically closest related to the Pacific Coast Athabaskan of southern Oregon and northern California. Oregon Athabaskan consists of languages spoken in the interior (Upper Umpqua, Galice–Applegate) and a coastal dialect chain (Coquille, Euchre Creek, Tututni, Chasta Costa, Chetco, and Tolowa). The largest California Athabaskan language is Hupa; south of this is Mattole-Bear River and the Sinkyone–Nongatl–Lassik–Wailaki–Kato dialect complex.

The Southern Athabaskan enclave is located in the southwestern United States. The largest and best-known tribe is the Navajo, who reside mainly in Arizona and New Mexico. Most of the Apache languages are geographically and linguistically close to Navajo: Western Apache, Chiricahua–Mescalero, Jicarilla, and Lipan. The most divergent Southern Athabaskan language is Plains Apache (or Kiowa–Apache), spoken in Oklahoma.

Typological Features

The most compelling evidence for AET as a genetic grouping is the profound congruity in the makeup of the verb, as seen in **Table 1** (the lines emphasize major displacements). The AET languages have a 'templatic' structure, such that each element assumes a predetermined position relative to the others. Of particular interest are the 'classifiers,' fused combinations of what were historically separate prefixes: **ł-* (which forms causatives) and **də-* (which forms

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Table 1 Comparison of the verb template in the Athabaskan–Eyak–Tingit (AET) languages

Proto-AET	*Pre-Proto-Athabaskan*	*Eyak*	*Tlingit*
[8]Proclitic	[9]Disjunct prefix	[10]Proclitic	[8]Proclitic
			[7]Pluralizer *daẋ-, has-*
[7]Incorporated alienable N	[8]Incorporated N [7]Pronominal prefix	[9]Pronominal prefix, *(u)ʔ-* [8]Future *quʔ-˜*. . . [7]*(i)lih* 'mind'	[6]Incorporated alienable N (including pron. pref.)
[6]Pluralizer **qə-*	Pluralizer **qə-*	Pluralizer *qə-*	
[5]Incorporated inalienable N	Lexical/derivational/ classificatory prefix [5c]**qu-, *yə-* [5d]**u·-* [5c]**tə-* [5b]**də-* [5a]**nə-, *sə-*, . . .	Lexical/derivational/ classificatory prefix [5c]*Gə-, gu-* [5d]*xə-* [5c]*qi·-, ləẋə-*, . . . [5b]*də-, yə-* [5a]*lə-*	[5]Incorporated inalienable N [5c]*x'e-, ǯi-*, . . . [5b]*ÿa-* [5a]*ka-*
[4]Aspect-mode prefix [4b]**ʔ-* [4a]**Gə-, *s(ə)-*	Aspect-mode prefix **iʔ-, *s-* **Gə-, *nə-, *sə-, *Gu-*	Aspect-mode prefix *(ə), ə˜·-,* *Gə-, s(ə)-*	[4]Aspect-mode prefix [4d]*ga-* [4c]*u-* [4b]*Ga-, na-* [4a]*Ga-, ÿu-*
			[3]Pluralizer *daGa-*
[3]Subject prefix **x^{w}-, *ŋi-*, . . .	Subject prefix **x^{w}/š-, *ŋə-, *ẋ^{w}-*, . . .	Subject prefix *x(^{w})-, yi-, ləẋ-*	[2]Subject prefix *ẋa-, i-, ÿi-, du-*
[2]Stative prefix **ŋi-*	Stative prefix **ŋə-*	Stative prefix *yi-, s(ə)-*	
[1]Valence prefix [1b]**ł-* [1a]**də-*	Classifier **ł-* **(d)ə-*	Classifier *ł-* *(d)ə-*	[1]Classifier [1c]*ł-, s-, š-* [1b]D-component [1a]I-component
[0]ROOT	ROOT	ROOT	ROOT
[−1]Derivational-aspectual suffix **-g, *-ẋ* . . .	Derivational-aspectual suffix **-g, *-ẋ, *-d, *-x*	Derivational aspectual suffix *-g, -ẋ*	[−1]Derivational-aspectual suffix *-g, -ẋ, -ǯ, -d, -x'*, . . .
[−2]Aspect-mode suffix **·, *-ŋ, *-ł*	Aspect-mode suffix **·, *-ŋ, *-ł*	Aspect-mode suffix *·, -ł, -k'*	[−2]Aspect-mode suffix [−2a]*·, ', -ÿ, -n* [−2b]*-ǯ*, . . .
[−3]Enclitic **-G*	Negative enclitic **-he·*	Negative suffix *-G*	[−3]Epimode suffix *-i', -i'n, -(i')G*

passives, reflexives, etc.). An ancient irregularity is the absorption into the classifier of the stative prefix **ŋi-* which combines with **(d)ə-* to yield **(d) i-* in Athabaskan–Eyak and has become a component of the classifier in Tlingit. Verb stem variation also shows ancient similarities, including lengthened stem forms and in Athabaskan and Tlingit, shortening of the stem vowel before consonant suffixes. Haida verb structure exhibits some general similarities with that of AET; for example, the object pronouns precede the subject pronouns.

Other less specific typological traits are also common to Haida and AET; in particular, head-final syntactic structure (postpositions follow nouns; verbs generally come last in the sentence) and the lack or paucity of labial stops and fricatives. However, these traits are shared also with Aleut, a language that is incontrovertibly non-Na–Dene. It has been suggested that these languages, particularly Haida, Eyak, and Aleut, were part of an ancient northern northwest coast language area. If this hypothesis is borne out by archeological evidence, it may put to rest the controversy about the relationship between AET and Haida: Na–Dene will prove to be an areal grouping rather than a genetic one.

See also: Navaho; Sapir, Edward (1884–1939); United States of America: Language Situation.

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A major figure in the controversy surrounding the origins of the Ainu language, Pierre Naert was an ardent believer in the inclusion of Ainu into the Indo-European family of languages. Born on May 29, 1916, in Albi in southern France, Naert grew up in the same town as had Jean François de Galaup, Compte de la Pérouse, one of the first European explorers to encounter and describe the Ainu and their language in the late 18th century. Naert studied at the Sorbonne until 1936, when he took a post teaching French in Iceland. Naert's stay there would be short, however, and he moved to Sweden to pursue his studies. He would become a Swedish citizen in 1960.

Naert received his doctorate from the University of Lund in 1946 and became a lecturer and researcher. Although his specialty was Nordic linguistics, Naert broadened his studies to include Basque, Tocharian, and Ainu, among others. He was particularly attracted to threatened and minority languages and demonstrated great concern for the fate of endangered languages and cultures. This eclecticism was cause for concern for many who would have preferred that he focus his research and publishing efforts more narrowly. This concern would become fierce criticism upon Naert's 1958 publication of *La situation linguistique de l'Aïnou*, a book dedicated "to the future of the Ainu people," in which he argued that the Ainu language represents a branch of the Indo–European language family.

The academic community was sharply divided between those who supported his theory, a group that included Louis Hjelmslev and Ivar Lindquist, and those who derided it as nonsense. The Ainu–Indo–European Hypothesis hinged on the supposed relatedness of the Ainu vocabulary to that of ancient Indo-European. The items for study were pulled almost entirely from John Batchelor's Ainu–English–Japanese dictionary, which contains numerous inaccuracies as well as an inconsistent transcription system. In addition, Naert was unfamiliar with both the Ainu and the Japanese languages and did not provide a grammatical description of the language or take into account the influence of Japanese on Ainu.

The controversy took its toll on Naert's career, and he was denied the chair of Nordic languages at the University of Lund. He would eventually take up a position as professor of Nordic languages at the University of Åbo in Finland. His last work on the Ainu was published in 1960. This book, *Aioina: a book on the White people of the Far East*, was an account of his fieldwork in Hokkaido, where he had the opportunity to meet Ainu language informants in person, including Shigeru Kayano, an Ainu speaker and scholar who would later become the first Ainu elected to the Japanese Diet. As the title of the book suggests, Naert had not given up hope that the Ainu would prove to be descendants of ancient Indo–Europeans – a conviction he maintained until his death on June 4, 1971.

See also: Ainu; Batchelor, John (1853–1944); Chiri, Mashiho (1909-61); Japan: Language Situation; Japanese; Kindaichi, Kyosuke (1882–1971).

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Nāgojibhaṭṭa (d. 1755)

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Nāgojibhaṭṭa, also known as Nāgeśa, was a prolific Sanskrit writer. He wrote 93 works ranging from religion and yoga to commentaries on literature and grammar. In the field of grammatical thinking, he is famous for his *Pradīpodyota* ('The Enlightening of That Which Enlightens'), which is a commentary on the *Mahābhāṣyapradīpa* ('That Which Enlightens the Mahābhāṣya') of Kaiyaṭa (12th century A.D.). In many ways Nāgojibhaṭṭa's *Pradīpodyota* is more a commentary on the *Mahābhāṣya* ('The Great Commentary') of Patañjali (2nd century B.C.) than a work that enlightens Kaiyaṭa's *Mahābhāṣyapradīpa*. Nāgojibhaṭṭa's second great work is the *Paribhāṣenduśekhara* ('The High Moon of Paribhāṣās or Interpretive Key-Rules'). *Paribhāṣās* are required for Pāṇini's grammar (5th century B.C.), the *Aṣṭādhyāyī* ('The Eight Chapters'). Most of them are given in his grammar, but there are many that are assumed. The authoritative ones that are not actually given but implicitly assumed in the *Aṣṭādhyāyī* are compiled and commented on by Nāgojibhaṭṭa in his *Paribhāṣenduśekhara*. Equally significant are some of his smaller grammatical works, such as *Vaiyākāraṇa Siddhānta Mañjūṣā* ('The Basket of Settled Conclusions of Grammar') and its shorter version, *Laghumañjūṣā* ('The Small Basket').

The *Paribhāṣenduśekhara* ends with a biographical note (Singh, 1987: 216): . . . *śivabhaṭṭa suta satīgarbhaja nāgēśabhaṭṭa kritaḥ Paribhāṣenduśekharaḥ samāptaḥ*. "Thus ends the *Paribhāṣenduśekhara* written by *Nāgēśabhaṭṭa*, son of Śivabhaṭṭa, born of the womb of Satī."

Nāgojibhaṭṭa was born toward the end of the 17th century in Maharashtra, but for most of his life, he lived and taught in the city of Varanasi, where his genealogical line still continues (Singh, 1987: ii). We know about his date from an incomplete manuscript of his *Bṛhacchabdenduśekhara* ('The great high moon of words') in the collections of the Sarasvati-Bhavan Library, Varanasi. It is dated 1704. Another source for his date is the belief that in 1714 he received an invitation to participate in a religious ceremony by Savai Jayasingh, the ruler of Jayapur, which Nāgojibhaṭṭa declined on the grounds that he had taken a religious vow to never leave Varanasi.

The text of his *Pradīpodyota* was edited by Pandit Shivadatta D. Kudalal and Pandit Raghunath Shastri in 1912. It forms an ancillary text along with Kaiyaṭa's *Pradīpodyota* to the *Mahābhāṣya* of Pātañjali. His *Paribhāṣenduśekhara* was edited and explained by F. Kielhorn in 1868. It consists of 132 *Paribhāṣā*s and their significance and meaning written in simple and clear Sanskrit. For an illustration of his method and style of argumentation, consider the following two *Paribhāṣā*s from his *Paribhāṣenduśekhara* (Kielhorn: 19, 185–86):

Paribhāṣā 38: *pūrva para nityāntaraṇgāpavādānām uttarottaram balīyaḥ*. "Of (these five kinds of rules, for example) a *pūrva* 'prior (rule),' a *para* 'subsequent (rule),' a *nitya* 'perpetual or obligatory (rule),' an *antaraṇga* 'internal (internally conditioned rule),' and an *apavāda* 'exception (rule),' each following (rule) possesses greater force (than any one of, or all of, the rules that are mentioned before it in this *Paribhāṣā*)."

Nāgojibhaṭṭa's comment on the *Paribhāṣā* runs as follows: *pūrvātparam balvat vipratiṣedhaśāstrāt pūrvasya paramm bādhakamiti yāvat*. ('A subsequent (rule) possesses greater force than a preceding (rule); i.e., a subsequent (rule) (as stated in Pāṇini's *sūtra* 1.4.2) supersedes that which precedes it.')

Pāṇini's *sūtra* 1.4.2 referred to by Nāgojibhaṭṭa in his comment is: *vipratiṣedhe param kāryam*. 'When rules of equal force are in conflict, then the last in the order herein given is to take effect.'

Thus, in the formation of the dative plural of *vṛkṣa* 'tree,' from *vṛkṣa + bhyaḥ*, there occurs a conflict between two rules and the question arises as to whether the final *a* of *vṛkṣa* should be lengthened by *sūtra* 7.3.102, which changes *a* to *ā* before a suffix beginning with *bh* (as in the dative singular *vṛkṣa + bhyām > vṛkṣābhyām*), or changed to *e* by *sūtra* 7.3.103, which changes *a* to *e* before a suffix beginning with *bh*. Here the *para* or the subsequent *sūtra* 7.3.103 supersedes, by the present *Paribhāṣā*, the *pūrva* or the prior *sūtra* 7.3.102, and *a* is accordingly changed to *e*. We thus obtain *bṛkṣebhyaḥ*.

Concerning the place of the *apavādas* 'exception (rules)' in the organization of a grammatical text, Nāgojibhaṭṭa cites the following *Paribhāṣā* (62): *pūrvam hyapavādā abhiniviśante paścādutsargāḥ*. ('*Apavādas* or exceptions, it is certain, are considered first (in order to find where they apply); afterwards, the general rules (are made to take effect in all cases in which it has been ascertained that the *apavādas* do not apply).)

Nāgojibhaṭṭa's comment on the *Paribhāṣā* runs as follows: *lakṣṇaikacakṣuṣko hyapavādaviṣayam paryālocya tadviṣayatvābhāvaniścaya utsargeṇa tattallkṣyam sanskaroti* . . . "The meaning is this, that he who is guided solely by the rules (of grammar) first looks

about to find out where the *apavāda* applies, and having thus ascertained that a particular form does not fall under that (*apavāda*), he employs for its formation the general rule . . . ."

The last *Paribhāṣā* cited in the *Paribhāṣenduśekhara* characterizes the traditional belief and the guiding principle that grammatical rules must be expressed with extreme brevity. To secure this brevity, many devices are adopted: cases are used pregnantly, verbs are omitted, leading rules are understood to govern others, and algebraic formulae replace real words. This stated as follows:

Paribhāṣā 132: *ardha mātrā lāghavena putrotsavam manyante vaiyākaraṇāḥ*. 'By saving half a mora grammarians rejoice as much as by having a son.'

The economy and conciseness found in his work attests that Nāgojibhaṭṭa himself practiced the belief expressed in this *Paribhāṣā*. But, as noted by Brough, he was keenly aware of the difference between the realities of language analysis and the actual use of language, as he stated *tad tad arthavibhāgam śāstramātraviṣayam* (*Laghumañjūṣa*: 5) ('The analysis of sounds and the distribution of meanings between stem and affix and between the words in the sentence – these proceedings are the occupation of grammarians.') In other words, in actual usage, the linguistic forms remain as units and convey their sense as units.

See also: Panini; Patanjali (2nd Century B.C.); Sanskrit.

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Nahuatl

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Nahuatl (Náhuatl) (by some written as Nahua, Nauatl, or Nawat) is also known as Aztec and Mexicano.

Nahuatl forms with Cora and Huichol a branch of the Uto-Aztecan family and is the southernmost language of that family. Today, Nahuatl is spoken in enclaves in 10 Mexican states, from Durango in the west to Tabasco in the east. One variety of Nahuatl, Pipil, by some considered a distinct language, is spoken in El Salvador. Some 10 dialect areas have been recognized; they are different enough that mutual intelligibility is problematic. Of the 500 000 to 600 000 speakers only few are monolinguals, and the language is rapidly losing ground to Spanish.

Speakers of Nahuatl entered Meso-America some 1000 to 1500 years ago from today's northwest Mexico. The best known group, the Aztecs, settled in the Valley of Mexico, where their traditional history goes back to 1300 A.D. It was the renown of their empire that drew the Spaniards to Tenochtitlan, the capital of the Aztec empire and today's Mexico City. As a result and due to the function of Nahuatl as a lingua franca in Meso-America, Nahuatl is the most thoroughly studied and best documented of the languages in the Americas. The earliest known grammar, by Andrés de Olmos, is from 1547; by 1645 another four had been published. Olmos's grammar and Horacio Carochi's from 1645 are exceptionally accurate descriptions of the language. Alonso de Molina's dictionary of Spanish-Nahuatl (about 17 400 entries) and Nahuatl-Spanish (about 23 600 entries) from 1571 has still not been superseded. The Spanish formed the primary target group of the Nahuatl grammars and dictionaries, since they needed to speak Nahuatl in their efforts to educate and evangelize. Faced with the multitude of languages in New Spain, they even argued that Nahuatl should be the official auxiliary language, and in 1570 Philip II declared Nahuatl the official language of New Spain's Indians. As a consequence, Nahuatl was used officially in all contexts; an abundance of letters, complaints, testaments, land deeds, and the like, written in Nahuatl, are found in university libraries in the United States and Europe and in local archives in Mexico, where new ones emerge every year. Nahuatl is thus richly documented over a period of nearly 500 years.

Under the influence of Meso-American languages, Nahuatl has shifted away from some features characteristic of Uto-Aztecan, and the last 500 years of Spanish influence is clearly evidenced. Whereas proto-Uto-Aztecan is reconstructed as verb-final, Nahuatl has verb-first word order, modified-modifier order such as possessed-possessor order, and preposed relational nouns, some of which also function as postpositions. Due to Spanish influence, former relational nouns now function as prepositions. Nahuatl basically is a polysynthetic language with person of subject and object marked on the predicate; incorporation of object and adverbials is widespread, although rare in some dialects, probably due to Spanish influence. The verb is central in Nahuatl both syntactically and in the root corpus; adjectives are derived from verb roots; and derivation is richly developed.

Phonologically, Nahuatl is uncomplicated with four vowels, short and long; 15 consonants, no voiced stops; and currently a fixed stress on the penultimate syllable

See also: El Salvador: Language Situation; Mexico: Language Situation; Polysynthetic Language: Central Siberian Yupik; Uto-Aztecan Languages.

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Nakoda/Nakoda *See:* Lakota.

Named Entity Extraction

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Named entity (NE) extraction is the task of identifying and classifying the names in a text. Many types of text contain a significant proportion of names and cannot be properly analyzed unless these names are identified. For example, understanding a news story requires the ability to recognize the names of people, places, and organizations.

NE recognition has received considerable attention since the mid-1990s because it is both practically important and computationally relatively tractable. The task was introduced for English in 1995 as part of Message Understanding Conference 6 (Grishman and Sundheim, 1996). It included three classes of names – people, organizations, and locations – as well as date and time expressions, monetary expressions, and percentages. NE recognition was soon extended to several foreign languages (Spanish, Chinese, and Japanese) in the Multilingual Entity Task (MET) evaluations (Chinchor, 1998) and has since been applied to a large number of languages.

Text annotation for NE is typically done using an XML notation, with a 'type' attribute indicating the type of name. For example,

Press secretary <name type = "person">Ima Rite </name> announced that President <name type="person">Dean</name> would attend the meeting of the <name type = "org">World Trade Organization</name> in <name type="location">Paris</name>.

Texts in different domains have different classes of names, and the NE task has had to be adjusted accordingly. For example, for biomedical texts the principal name classes have included gene and protein names (Collier *et al.*, 2000). Current question-answering technology has come to rely heavily on NE tagging to identify suitable answers. For example, a simple question-answering system may seek to answer *In which city is the Alhambra located?* by looking for names of type 'city' appearing in close proximity to *the Alhambra* in a large text corpus. This use of NEs has led to both finer distinctions and more comprehensive classifications, with some NE systems now including over 100 classes (Sekine and Nobata, 2004).

The first NE recognizers were based on manually constructed regular (finite-state) patterns that reflect the various clues that can be used to classify names. For example, a person name can usually be recognized by being preceded by an honorific (such as *Mr* or *Ms*) or title (such as *President* or *Governor*) or by beginning with a recognizable first name (such as *Adam* or *Alice*). This can be captured by patterns such as:

person-name = titled-person | person-with-known-first-name

titled-person = honorific capitalized-word+ | title capitalized-word+

honorific = 'Mr' | 'Mrs' | 'Miss' | 'Ms' | 'Dr' | . . .

title = 'President' | 'Prime Minister' | 'Governor' | 'Gov.' | . . .

person-with-known-first-name = known-first-name capitalized-word*

known-first-name = 'Adam' | 'Alice' | 'Albert' | . . .

Here, in regular expression notation, we use * to indicate zero or more repetitions of an element, and + to indicate one or more repetitions of an element. By hand-annotating the names in a text corpus and repeatedly comparing recognition performance against this corpus, it is possible to develop an accurate recognizer for the most common name types. However, this is a quite labor-intensive process requiring considerable skill.

Corpus-Trained Taggers

To reduce the skilled labor required, many name recognizers (or name taggers) have been developed that can be automatically trained from annotated corpora. One of the first such corpus-trained models was the Nymble system (Bikel *et al.*, 1999), based on Hidden Markov Models (HMMs). For a name tagger with n name types, an ergodic HMM with $n + 1$ states was constructed – one state for each name type, plus one for the not-a-name (NaN) state (**Figure 1**). To improve the performance of the HMM, transition probabilities in Nymble were conditioned on the prior word, emission probabilities were conditioned on the prior word or state, and several levels of back-off were provided.

Another early approach to corpus-trained name tagging used maximum entropy (ME) models (Borthwick *et al.*, 1998). The ME approach has the benefit of easily allowing the incorporation of specific clues for identifying a particular name type. For example, if a list of common first names is available, the membership of a token in this list can be used as a feature for detecting person names. If a regular expression has been developed for a particular type of name, matching this expression can be treated as a feature within the ME framework.

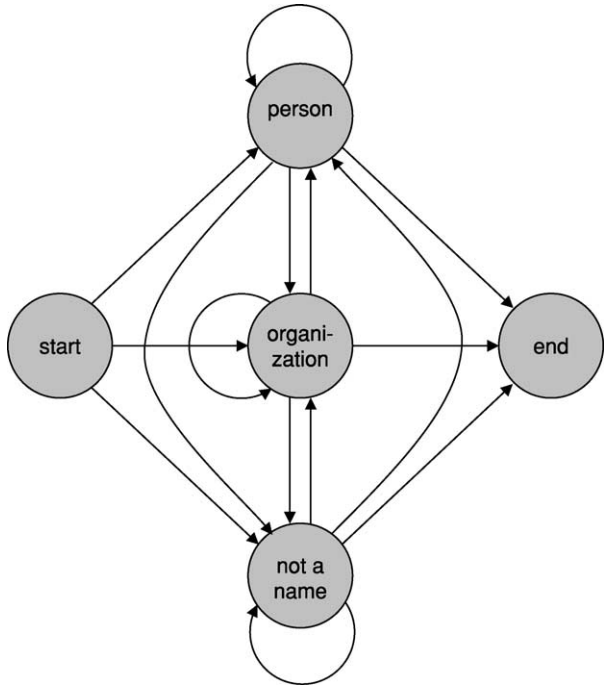

Figure 1 Markov model for a name recognizer with two name types (person and organization names).

More generally, name tagging can be viewed as a token classification task, so that any type of classifier can be used to construct a name tagger. If the name types are X and Y, we assign the tags B-X and B-Y to the first tokens of names of those types, the tags I-X and I-Y to subsequent tokens of such names, and the tag O to tokens that are not part of a name (this is one of many possible tagging schemes). A large number of trainable classifiers have been applied to the name tagging task (see, e.g., the papers in Daelemans and Osborne, 2003). By annotating a corpus and then training one of these classifiers, it is possible to create a name tagger of moderate quality for a new domain or language in a few weeks (May *et al.*, 2003).

These NE classifiers rely primarily on relatively simple, local features: the identity of the current token, the preceding and following one or two tokens, and capitalization (for languages with capitalized names). A variety of other features have been employed to enhance performance, including presence on word lists (such as lists of common first names or titles), orthographic patterns (for example, presence of a hyphen or ampersand), parts of speech, and affixes (Daelemans and Osborne, 2003). In addition, NE taggers frequently use some form of name cache, which records name tokens previously tagged within the same document. If such a token occurs again later in the document, the tagger will, in the absence of other information, assign the token the same name type. For example, if the name *Fazar Fastener Corp*. appears at the beginning of a document (and is tagged as an organization), a later reference to *Fazar* (by itself) will also be tagged as an organization.

The amount of data that needs to be annotated for a given level of performance can be reduced by as much as 80–85% through the use of active learning (Miller *et al.*, 2004; Shen *et al.*, 2004). Instead of annotating all the names in a corpus sequentially, we can begin by annotating a small portion of the corpus and building an NE model from that. This model is then used to tag the remainder of the corpus and, in particular, to identify tokens or sentences in the corpus about which the model is relatively uncertain. These tokens or sentences are then presented for manual tagging, the model is rebuilt (with the additional manually tagged training data), and the process is repeated.

Lightly Supervised Taggers

Several algorithms have been developed for creating NE taggers from much smaller training samples, typically on the order of a dozen names for each type of name (a seed set). Although the methods differ in detail, they all follow a general bootstrapping approach. Given the seed sets of names, the algorithm begins by looking for all instances of these names in a large (untagged) corpus and collecting the contexts of these name instances. A context that appears around two or more names of type T, and no names of type $T' \neq T$, is a good indicator for type T. We then look at other names (not in the seed set) that appear in these contexts. A name that appears in two or more contexts that are indicators of type T is probably a name of type T. These names are added to the seed sets of the respective types and the process repeats, gradually classifying more and more names.

Specific procedures differ in terms of the types of contexts that are used. Strzalkowski and Wang (1996) used the words immediately preceding and following the candidate names; Collins and Singer (1999) classified words that appeared in specific syntactic contexts. In general, such discovery procedures work much better when multiple word classes are being built concurrently so that positive examples of one class can serve as negative examples of other classes (Lin *et al.*, 2003).

Evaluation

The basic idea for evaluation of NE taggers is straightforward. We select a test corpus, generate an answer key by tagging the corpus manually, and

generate a system response by running the tagger. Any name tag in the response that exactly matches one in the key is 'correct,' one in the response that does not match anything in the key is 'spurious', and one in the key that does not match anything in the response is 'missing'. We then define recall = correct / (correct + missing) and precision = correct / (correct + spurious). The F measure, the geometric mean of recall and precision, is often reported when a single quality measure is required.

The Message Understanding Conference evaluations used a evaluation metric that gave partial credit for certain errors – correctly identifying some tokens as a name but assigning it the wrong name type or correctly identifying the name type but making an error on the extent (start or end point) of the name. The resulting scores, of course, are somewhat higher than with the strict measure.

Typical (strict metric) F measures for a small set (3–5) of name classes range from the low 80s to low 90s, depending on the language, domain, and amount of training data. Some languages are easier to tag than others (in particular, languages in which names are distinguished by capitalization are easier). However, even for the same tagger, language, and set of name classes, performance can vary widely depending on the choice of test corpus. Performance is affected by the overlap of names between the training and test corpora, and this is likely to be greater if the texts are on the same topic and from the same time period. These factors should be kept in mind when the results of different evaluations are compared.

See also: Information Extraction, Automatic; Natural Language Processing: System Evaluation; Question Answering from Text, Automatic; Text Retrieval Conference and Message Understanding Conference.

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Names and Proverbs: Religious Significance

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Introduction

All societies have philosophies and religious beliefs. The content of a philosophy or belief structure becomes very clear when societies have written documents, such as the Bible or the Qur'an, or when holy people in the society preach, explain, and interpret those documents. In oral societies, however, it is not easy to draw the line between philosophy and religion on the one hand, and on the other hand to know for sure what they are, because oral texts are ambiguous and many times contradictory. By examining the language Kinyarwanda (Rwanda), it is possible to show that a society's language can shed light on the worldview and religious beliefs of its people. The lexicon, personal names, proverbs, greeting expressions, swear words, and insults in the countries of Rwanda, the Democratic Republic of Congo, Tanzania, and Uganda, where Kinyarwanda is spoken, as in other regions of the world, provide information about the values of the people who speak the language, about their philosophy, and about what they think about God. The linguistic elements reveal, for instance, how people conceptualize God and conceive his physical and moral attributes, and his relation to the world and to the people.

Concept and Names of God

The name of God in Kinyarwanda is *Imana,* pronounced [imáana] (where ′ indicates high tone). Morphologically, *Imana* consists of three morphemes: the preprefix /i-/, the class marker /-n-/ for class 9 (CL 9) nouns, and the stem /-máana/. The morphological representation is thus /i+n+máana/. Nouns belonging to this class pluralize in class 10. In this instance, the singular and the plural are the same in form. The difference is manifested only in the prefix taken by modifiers of the noun. For demonstratives and possessors, for instance, the prefix is /yi-/ for singular and /zi-/ for plural, as shown by the following expressions: [imáana y'í rwaanda] 'God of Rwanda' and [imáana izo] 'Great! So much the better' (literally 'those gods'). The word *Imana* provides no information, however, about the nature of God – whether God has anthropological features, for example – nor does it indicate information about God's gender. What is certain, as revealed by a regional proverb, is that *Imana* does not have a family, wife/husband, or children:

(1) Imana ntigira umuryango.
God doesn't-have family
'God doesn't have a family.'

This proverb implies that God is impartial and does not take sides or favor some individuals over others. Other names used to refer to *Imana* provide further insight into 'his' attributes:

- *Nyagasani* [nyagasani] /nya+a+ka+sani/ 'the one who has luck.'
- *Rugira* [rugirá] (from the verb *kugira*) 'the one who causes everything' or 'the owner of everything.'
- *Rurema* /ru+rem+a/ (CL11+create+asp) 'the creator.'
- *Iyakare* /iya+kare/ (of+CL9+early) 'that of early' or 'of times immemorial.' (This name implies that God is 'ancient,' or the oldest being.)
- *Iyambere* /iya+imbere/ (of+CL9+before) 'the one of before.' (This name implies that God was the first to exist, preceding everything.)

Physical and Moral Attributes of God

Imana is very much similar to the Christian God. In Kinyarwanda, *Imana* is the creator of everything, is almighty, knows everything, and is everywhere. *Imana* loves his creation, he loves everybody, and does not discriminate. Personal given names, as in Examples (2)–(4), and proverbs, as in Examples (5)–(7), illustrate these attributes:

(2) Niyongabo
It-is-it-that-is-shield/warrior
'It is He who is almighty.'

(3) Niyonzima
It-is-it-that-is-healthy/alive
'It is He who is healthy/alive.'

(4) Niyonkuru
It-is-He-who-is-old/great/important
'It is He who is the oldest/the greatest/the most important.'

(5) Umubande w'ibyago urutwa n'imanga y'Imana.
valley of misery is-inferior to precipice of God
'The valley of misery is inferior to God's precipice.'

(6) Imana ntigira inzigo.
God doesn't-have revenge
'God doesn't avenge/ retaliate.'

(7) Imana ntivuna.
God doesn't-tire/exhaust
'God doesn't create problems (for anybody).'

The proverbs show that Imana is thought of as good and generous and that he does not bear grudges. The expressions given in Examples (8) and (9) show that *Imana* is also thought of as a good and caring parent and guardian:

(8) kurota Imana
to dream God
'Good night'

(9) kubana n'Imana
to live with God
'Bye-bye'

Names Related to God

The many personal names for God in the Kinyarwanda language reveal how the people in the culture conceive of God. Clearly, there is only one God, and he is almighty, the creator of everything, omniscient, good, and generous:

Niyibizi	'It is He who knows'
Niyonsenga	'It is Him that I pray to'
Niyonsaba	'It is Him that I ask for help'
Habarurema	'The creator exists'
Habarugira	'The causer/possessor exists'
Habonimana	'Only God sees'
Habyarimana	'Only God gives birth'
Hakizimana	'Only God cures/saves/makes rich'
Havugimana	'Only God speaks'
Hitimana	'Only God gives names'
Hategekimana	'Only God rules'
Manirakiza	'God saves/cures/makes rich'
Manirareba	'God watches'
Maniragaba	'God gives'
Bizimana	'Only God knows it'
Bimenyimana	'Only God knows/understands it'
Nsengimana	'I pray to God'
Nsengiyumva	'I pray to the one who understands'
Nizeyimana	'I trust God'
Ngendahimana	'I walk because of God/I walk in God's space'
Ndahimana	'I am/exist because of God'
Nahimana	'It is up to God'
Nkunzumuremyi	'I like the creator'
Mbarushimana	'I have God on my side more than you/them'
Mukeshimana	'I have him/her because of God'
Muhawenimana	'S/he given to me by God'

Predestination

The Banyarwanda (speakers of Kinyarwanda) believe that before everybody is born, God has already decided each human being's destiny, and that nothing can be done to change the course of a life. This is illustrated by the following proverbs:

(10) Uhawe n'Imana ntiyamburwa n'umuyaga.
who-is-given by God is-not-dispossessed by wind
'S/he who receives something from God is not dispossessed by the wind.'

(11) Umwanzi agucira icyobo
enemy makes-for-you hole
Imana igucira icyanzu
God makes for you compound-exit
'An enemy digs a hole for you while God is making a secret exit for you.'

(12) Umugisha w'Imana ntuhamagarwa urizana.
blessing of God is-not-called it-comes-by-itself
'God's blessing is not called, for it comes by itself.'

(13) Uwarasiwe n'Imana ni we
is-shot-for by God is him/her
urasirwa n'inshuti.
is-shot-for by friends
'S/he who God has shot the game for, s/he is the one that friends shoot for.'

(14) Uwo Imana ihaye amata ntashyiramo amazi.
whom God gives milk doesn't-put-in-it water
'S/he to whom God gives milk doesn't mix it with water.'

(15) Ntawiha icyo Imana itamuhaye.
nobody-gives-himself/herself what God doesn't-give-him/her
'Nobody can give himself/herself what God has not given him/her.'

(16) Upfuye akuruta n'iyo ageze
who-dies is-superior-to-you even if arrives
ikuzimu arakuruta.
underworld is-superior-to-you
'S/he who dies superior to you, even when s/he arrives in the underworld remains superior to you.'

(17) Wibwira neza ugahirwa nabi.
you-tell-yourself well you-are-lucky bad
'You plan well but you don't succeed well.'

(18) Iyo urupfu rwagutumiye nturara.
when death invites-you you-don't-spend-the-night
'When death invites you, you can't spend the night.'

(19) Nyamunsi ntitsindwa.
destiny is-not-surpassed
'Destiny is never defeated'

(20) Iminsi nticuza Imana.
days don't-dispossess God
'Destiny doesn't dispossess God.'

(21) Iyo nyamunsi yaciye ishumi, nta
when destiny cuts link there-is-not
mubyeyi uyihisha ikibando.
parent who-hides-from-him baby
'When destiny cuts the link, there is no mother who can hide her baby.'

(22) Iyo Serupfu yaje,
when Death comes
Semiti ntaharara
Medicine doesn't-spend-the-night-there
'When Death comes, Medicine doesn't spend the night.'

(23) Hagena Imana.
there-decides God
'It is God that decides (everything).'

(24) Hica umunsi.
there-kills day
'It is destiny that kills.'

(25) Icyo Imana iguhaye urakira.
what God gives-you you-accept
'What God gives you you accept.'

(26) Icyo Imana igututse ni cyo kikwica.
what God insults-you is what kills-you
'God's curse on you is what kills you.'

(27) Icyo umuntu agaya Imana
what person criticizes God
irara ikirema.
spends-the-night creates-it
'What a person criticizes of God, God spends the night creating it.'

(28) Iminsi ikora umugabo mu nnyo ngo shiii.
days touch man in anus it-makes [shiii]
'Destiny mocks people.'

(29) Iminsi irisha umugabo ikivuza.
days make-eat man an-old-squash
'Destiny makes a man eat an old squash.'

Why Rwandans Do Not Pray to God

In Rwanda and many other societies, people become religious and turn to God mostly when they are in trouble, have serious health problems, or are getting very old, thus approaching death. To pray to God in these circumstances is seen in traditional Rwanda as trying to bribe him, which can be too costly. This belief is illustrated by the following proverb:

(30) Imana iraguha, ntimugura,
God gives-you you-don't-buy,
iyo muguze raguhenda.
if you-buy he-overcharges-you
'God gives you, you don't buy from him; if you buy, he overcharges you.'

The Kinyarwanda-speaking people also believe that God does not need their prayers. Since *Imana* is omniscient, omnipotent, good, and generous, he can save people from their trouble when he wants to. He has his own plans and is very patient. He does not act or react on the spot of the moment, as illustrated in examples (31)–(33):

(31) Imana itanga ishaka.
God he-gives he-wants
'God gives when he wants.'

(32) Imana niguha ntuyimanuze.
God if-he-gives-you don't-ask-too-much-from-him
'If God gives you (something), don't ask for more.'

(33) Imana irahora amaherezo igahora.
God keeps-quiet/silent in-the-end he-avenges
'God keeps quiet/silent but in the end he avenges.'

Further, to pray to God is seen as *kugondoza Imana* 'asking too much from God,' as shown by Examples (34) and (35), two proverbs that warn people not to abuse God's generosity. It is believed that prayer is a waste of time, since, knowing everything and caring about his creatures, *Imana* may intervene without being asked.

(34) Ugowe agora Imana.
Who-is-exhausted exhausts God
'Who is exhausted exhausts God.'

(35) Ukanura cyane Imana igafata
You-stare a-lot God touches
mu ryayo.
in his (eye)
'When you stare too much God closes his (eye).'

Rwandans believe that God has done a lot for people and needs to be left alone. The relationship with God is personalized. There are no holy days or holy places for him. There is no need to preach about him, because nobody doubts his existence, and there is no need for proselytizing. Instead of praying to God or worshiping God, Rwandan people pray to or worship *abazimu* 'spirits.' Families have shrines where they go and talk to the spirits of their ancestors. These shrines are called *indaro*, phonetically [indáaro], from /i+n+ráar+o/, meaning 'a place where one sleeps.' The stem /–ráár-/ means to sleep, /i-/ is the preprefix, /-n-/ is the prefix marker for class 9, and /–o/ is the nominalizer suffix.

The Paradox of a Transcendent and Immanent God

Although *Imana* spends the night in Rwanda and cares about everybody, he always appears to be remote and removed. He does not interfere with people's lives and actions. He allows people to do whatever they want, whether it is good or bad. Rwandans thus understand that they have to depend on themselves to improve their lives and to make their world a better place to live. The language of the proverbs shown in Examples (36)–(41) illustrates this belief:

(36) Imana ifasha uwifashije.
God he-helps who-helps-himself/ herself
'God helps those who help themselves.'

(37) Habyarimana abantu bakarera.
there-gives-birth-God people they-raise
'It is God who gives birth and it is the people who raise (the children).'

(38) Imana ikubyarira si yo ikurerera.
God gives-birth-for-you it-is-not him raises-for-you
'The God who gives birth to your children is not the one who raises them for you.'

(39) Imana iguha inka, ntikubwiriza kuziragira.
God gives-you cows doesn't-tell-you to-graze-them
'God gives cows to you but he doesn't tell you how to teach them to graze.'

(40) Haba Rugira haba rugizi.
there-is Causer there-is agent
'There exists the causer and there exists the doer.'

(41) Abagiye inama Imana irabasanga.
those-who-ask-each-other advice God joins-them
'Those who consult each other, God joins them.'

Since Rwandans have to take their destiny into their own hands despite the existence of a caring and loving God, human beings who fail to fulfill their responsibilities to contribute to the society are linguistically demoted from the 'human being' category (marked by the prefixes /-mu-/ and /-ba-/ for the singular and the plural forms, respectively, referred to in Bantu linguistics as class one 1 and class 2) to the 'inanimate objects' category (marked by the prefix /-ki/- of class 7), as shown by the language in the following examples. (Note that /-ki-/ changes into /-gi-/ before nominal stems which start with a voiceless consonant (Dahl's Law).)

[ikiréemba]	'impotent'
[ikimára]	'useless individual'
[ikimúga]	'a person with many health problems'
[ikiréma]	'a crippled person'
[ikiragi]	'a mute person'
[igipfáamatwí]	'deaf person'
[igikuri]	'dwarf'
[igisaambo]	'thief/crook'
[igicúucu]	'stupid'

The philosophy reflected in this vocabulary is very similar to existentialist philosophy because of its activism and humanism.

Conclusion

It is possible to know something of people's religious beliefs through knowledge of their language. The vocabulary of a people contains all of the concepts that are in the collective knowledge of their society. The language of the culture as expressed in onomastics, proverbs, exclamations, and expressions adds further information in a particularly clear way.

See also: African Lexicography; Bantu Languages; Bible; Christianity in Africa; Folk Linguistics; Islam in Africa; Lexical Conceptual Structure; Personal Names; Proper Names: Philosophical Aspects; Qur'an; Rwanda: Language Situation; Society and Language: Overview.

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Relevant Website

http://www.kimenyi.com – Biography, publications, research, poetry, course syllabi, and other information related to the work of Alexandre Kimenyi and the Kinyarwanda language.

Namibia: Language Situation

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The territory that is presently known as Namibia was known by the name South West Africa during the colonial period. It is a country on the southwestern side of Africa with a size of 824 269 square kilometers. It borders Angola in the north, Botswana and Zambia in the east, South Africa in the south, and the Atlantic Ocean in the west. It is inhabited by close to 2 million people, of whom the Oshiwambo-speaking Namibians make up the largest ethnic group. Languages in Namibia may be classified into three groups: Bantu, Khoesan (Khoisan), and European languages. The most comprehensive study of the language situation in Namibia to date is by Maho (1998).

Bantu Languages

Bantu languages are characterized by common typological features, such as a balanced symmetrical vowel system, distinctive tone, agglutinating word-formation process that includes a wide variety of derivative affixes, highly grammaticalized noun class systems with a rich concordial agreement system, a highly complex verb conjugation system that includes a rich set of tense-aspect distinctions, and a syntax based on SVO word order (Maho, 1998).

The majority of Namibian languages are Bantu languages, and they are also the largest Namibian languages in terms of numbers of speakers. The Namibian Bantu languages can be divided into the following groups (the number of speakers are based on Grimes, 2000):

- Otjiherero (Herero): 125 000 speakers, including 12 000 speakers of Oludhimba
- Oshiwambo dialects: Oshindonga (Ndonga), Oshikwanyama (Kwanyama), Oshimbalanhu (Mbalanhu), Oshikwambi (Kwambi), Oshingandjera (Ngandjera), Oshikwaluudhi (Kwaluudhi) and Oshimbandja (Mbandja): 713 919 speakers altogether
- Kavango languages: Rukwangali (Kwangali), Thimbukushu (Mbukushu), Rugciriku (Diriku) and Shishambyu (Sambyu): 128 400 speakers altogether
- Caprivi languages: Cisubiya (Subiya), Silozi (Lozi), Shiyeyi (Yeyi), Chifwe (Fwe), Chitotela (Totela), Mbalangwe, and Mashi: 62 300 speakers altogether
- Setswana (Tswana): 6050 speakers in Namibia

Based on these figures, the total number of speakers of Namibian Bantu languages is just over 1 million, but it is likely to be higher as many figures in the list above date from the early 1990s. The language group with the largest number of speakers comprises the Oshiwambo dialects. A number of Namibian Bantu languages are also spoken outside Namibia, in particular those spoken in the north of the country and in the Caprivi; these languages include Silozi (Lozi) in Zambia, Oshikwanyama in Angola, and Otjiherero (Herero) in Angola and Botswana. Setswana is the national language of neighboring Botswana.

All Namibian Bantu languages are tone languages as they make lexical, grammatical, and expressive tonal distinctions.

Khoesan Languages

Namibia is home to a number of Khoesan languages, the smallest African language family. Khoesan languages are only spoken in Southern Africa (except for two languages spoken in Tanzania), and most of them are highly endangered. The only Khoesan language with over 100 000 speakers is Khoekhoegowab (Nama), spoken by 176 201 speakers in Namibia (plus another 5000 in South Africa and between 200 to 1000 in Botswana). All remaining Namibian Khoesan languages have fewer than 30 000 speakers (Grimes, 2000), although some are also spoken in the neighboring countries of Angola and Botswana:

- !Xóõ: 200 speakers in Namibia
- ǂĀkhoe: 5000 speakers in Namibia and Angola
- //Kh'au//'e: 2000 speakers in Namibia
- Hai//om: 16 000 or fewer speakers in Namibia
- Ju/'hoan: 25 000–30 000 speakers, together with !Xun (!Xũũ) and //Kh'au//'e
- Ekoka-!Xun (Kung-Ekoka): 5000 speakers in Namibia and Angola
- Khwe (Kxoe): 4000 speakers in Namibia
- Naro: 4000 speakers in Namibia

The use of click sounds characterizes the Khoesan languages, though some clicks are adopted by some Bantu languages, such as Rugciriku. The following five primary clicks are common in Namibian Khoesaan languages. They are named according to their places of articulation: labial (⊙), dental (/), alveolar (!), palatal (ǂ), and lateral (//).

European Languages

Namibian European languages are those languages that originated from Europe, as they are not indigenous African languages. The main European languages spoken in Namibia are English, Afrikaans, German, and Portuguese. German, English, and

Afrikaans entered Namibia as official languages during the different colonial periods. German was the official language before World War I and is currently spoken by about 12 000 speakers. Although there is no substantial English-speaking community in Namibia, English became the official language after Namibia became independent in 1990 and is used widely as a second language, as well as in more formal, official, or written contexts.

Afrikaans, spoken as a first language by about 133 324 speakers, has been the established lingua franca of Namibia, but is losing that status since English was adopted as an official language. Afrikaans has a slightly different status than other European languages, as it can be regarded as a distinct (African) language, rather than a variety of Dutch, to which it is historically related; it has undergone much more changes than the Namibian varieties of English, German, or Portuguese and has an indigenous norm of its own, making it independent from Dutch in a different way from other European languages (see Maho, 1998). Furthermore, Afrikaans is the mother tongue of a number of speakers who are not ethnically Afrikaaners – for example, the Rehoboth Basters and the Coloreds – thus making the relation between language and ethnicity more complex.

Language Policy and Use

According to the language policy in Namibia, all languages are equal, except the official language, regardless of the number of speakers or the level of development of a particular language. The 1990 constitution identifies English as the official language (Article 3) and safeguards individuals' rights to "enjoy, practice, profess, maintain and promote any culture, language, tradition or religion" (Article 19).

Thirteen languages are used in primary education as languages of instruction, whereas English is usually the language of instruction in secondary education, with national languages being taught as subjects.

The University of Namibia offers courses in several national languages. Language standardization and development are conducted through different government agencies, such as language committees.

Although English also plays an important role in the media, the country's multilingual character is reflected in the print media, with daily papers or sections in English, Afrikaans, Oshiwambo, and Otjiherero. Television broadcasts are mainly in English, though the news is also broadcast in Otjiherero, Oshindonga, Oshikwanyama, Silozi, Rungwali, and Setswana.

See also: Bantu Languages; Khoesaan Languages; Multilingualism: Pragmatic Aspects.

Language Maps (Appendix 1): Map 23.

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Nanjio, Bunyiu (1849–1927)

S Watanabe, Tokyo, Japan

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Buddhologist and Sanskrit scholar. Nanjio Bunyiu was born as the third son of a priest in charge of a temple of the Ōtani branch of the Jōdo Shinshu sect (the True Pure Land sect) in Mino Province (now part of Gifu Prefecture) in 1849, about 20 years before the Meiji Restoration and the same year an English ship came to Uraga. When he was 18 years old, he was forced to join the Tokugawa Shogunate in fighting against the loyalists against the loyalists to the emperor. Two years later, however, the head temple of his

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sect ordered his group to disband before the Meiji Restoration. He claimed in his later years that he, originally of delicate constitution, owed a long life free from any serious illness to these two years of military training.

He enrolled himself in Takakura College, and his scholarly eminence was recognized by many elder priest-scholars. He had been able to compose rhyming poems in classical Chinese since he was quite young. After studying for two years in Kyoto, he returned home and helped his father teach Chinese classics. Jinko, one of the most famous scholars of the sect, succeeded in adopting him after persistent efforts. He returned to Kyoto as an administrative officer of his sect, teaching Chinese Classics in the evening.

In 1872, the government published decrees concerning religion, which allowed Buddhist priests of all sects to marry (Nanjio's sect had permitted priestly marriage since its foundation) and ordered every Buddhist priest to take a surname. Bunyiu took as his surname Nanjio, which was the place name of his adoptive father's temple. Since the latter part of the 8th century, the so-called Dual Shinto system had allowed Buddhist priests to administratively control a large proportion of Shinto shrines, but the decree of 1868 concerning the separation of Shinto and Buddhism ordered these Buddhist priests to relinquish their traditional positions. A nationwide anti-Buddhist outburst started and continued until the decree of 1875 ordered that every religious sect be free and protected. Nanjio was an eyewitness to this period of religious turbulence, and his records are precious.

The highest priest of Nanjio's sect, who had visited Europe for two years, decided as soon as he returned home to send the two brightest young priests to Europe in order to study Sanskrit. Japanese Buddhists had been studying Buddhist sutras through Chinese translations since their first introduction to Japan in about 850 A.D. To acquire direct access to sutras in Sanskrit meant an event of revolutionary magnitude to Japanese Buddhism. In 1876, Nanjio went to Oxford to study Sanskrit under Friedrich Max Müller and worked with him, publishing many Sanskrit Buddhist texts and English translations. Returning to Japan in 1884, he taught at Tokyo University and later became president of the private university of his sect. He seems to have advised Baron Iwasaki to buy Max Müller's library. Among his numerous works, *The catalogue of the Chinese translation of the Buddhist Tripitaka* (*the Nanjō Nanjo? catalogue*) is the most famous.

See also: Buddhism, Japanese; Historical and Comparative Linguistics in the 19th Century; Japan: History of Linguistics; Müller, Friedrich Max (1823–1900).

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Napoli, Donna Jo (b. 1948)

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Although best known as a syntactician, Donna Jo Napoli's teaching areas include syntax, phonetics, phonology, morphology, historical and comparative linguistics, Romance studies, structure of Japanese, structure of American Sign Language, poetics, poetry workshops, dialogue, fiction writing workshops, writing for ESL students, and mathematical and linguistic analysis of folk dance. Napoli is also an award-winning creative writer, whose works include co-edited anthologies of poetry by linguists.

Napoli, both a U.S. and Italian citizen, was born on February 28, 1948. She received her B.A. in mathematics (1970), her M.A. in Italian literature (1971), and her Ph.D. in general and Romance linguistics (1973), all from Harvard University. She completed a postdoctoral year studying linguistics at MIT before becoming a lecturer in the departments of philosophy and Romance languages and literatures at Smith College in Massachusetts from 1973 to 1974. From 1974 to 1975, Napoli was a lecturer in the departments of mathematics and Romance languages and literatures at the University of North Carolina at Chapel Hill. She served as assistant professor of linguistics at Georgetown University in Washington, D.C. from 1975 to 1980. From 1980 to 1987, Napoli

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taught linguistics at the University of Michigan at Ann Arbor, where she both earned tenure (1981) and became a full professor (1984). Napoli is currently a professor of linguistics at Swarthmore College in Pennsylvania, a position she has held since 1987.

Napoli has been a visiting lecturer at numerous universities in the United States, Africa, Asia, and Australia.

In the field of linguistics, Napoli has authored, co-authored, and edited a total of 11 books and more than 50 articles ranging from theoretical linguistics to practical matters in language structure and use. Within the area of syntax, her works focus primarily on Romance languages, particularly Italian. Her dissertation, published in 1976, focused on an analysis of reflexive, inchoative, and indefinite subject sentences in Modern Standard Italian, particularly the two clitic *si's* of Italian, one generated by the transformation rule REFLEXIVE, the other by the transformation rule si-INSERTION. Napoli has also written on such topics in Italian syntax as infinitival relatives, variations on relative clauses, evidence for syntactic analogy based on adverbs and prepositions, syntax of word-initial consonant germination, subject pronouns, clitic climbing, complementation, comparative structures, inflected prepositions, secondary resultative predicates, reflexivization across clause boundaries, and evaluative affixes.

Within English syntax, Napoli has researched definites in there-sentences, initial material deletion, comparative ellipsis, comparative 'rather,' analysis of null complement anaphora, and verb phrase deletion.

Anaphoric processes have also interested Napoli. In *Predication theory: a case study for indexing theory* (1989), Napoli claimed that predication and role players are primitives that are not configurationally defined. She sought to extend predication coindexing principles into a general indexing theory, suggesting that indexing principles between predicates and their subject role players should and could be extended to handle coindexing between anaphors and their antecedents. This theory illustrated that the indexing relation was semantic in nature, that predicative NPs were not necessarily exceptions to binding theory, and that anaphors and predicates were a single phenomenon.

In addition, Napoli has researched prosody. Napoli edited a 1978 volume (*Elements of tone, stress, and intonation*; Napoli, 1978), based on an interest group she organized for the 1977 Georgetown University Round Table, which explored tone, stress, and intonation, and the ways in which these prosodic elements are sensitive to syntactic and semantic information. She has applied metrical theory to analysis of the metrics of Italian nursery rhymes and Robert Frost's poetry and co-authored a book titled *A prosodic template in historical change: the passage of the Latin second conjugation into Romance* (Stuart and Napoli, 1994).

Recently, Napoli has studied American Sign Language (ASL) and the education of deaf children, on which she has co-authored numerous papers. In the 'Exploitation of morphological possibilities in signed languages: comparison of American Sign Language with English' (Fernald and Napoli, 2000), Theodore Fernald and Napoli explored how ASL shares derivational and inflectional morphological processes with spoken languages, claiming that ASL has an extensive nonderivational, noninflectional morphology involving phonological alternation. They posited 'ion-morphs,' phonologically incomplete lexical items that bond with other compatible ion-morphs, that draw lexical items into 'families' of related signs (Fernald and Napoli, 2000). They found that ASL makes little use of concatenative affixation, common among spoken languages, which they explained by the slowness of movement of manual articulators compared to speech articulators, and the perceptual robustness of the manual articulators to the visual system. In 'Morpheme structure constraints on two-handed signs in American Sign Language: notions of symmetry,' (Napoli and Wu, 2003), Napoli and Jeff Wu dealt with notions of mathematical symmetry that play a role in the well-formedness of signs. In 2004, Napoli also organized the conference, 'Signs and Voices: Language, Arts, and Identity from Deaf to Hearing' (2004).

Napoli's passion for teaching linguistics is evident in her instructional texts. The stated goal of her co-authored book, *Syntactic argumentation* (Napoli and Rando, 1979), which included 12 articles, each preceeded by an explanation of historical context and followed by questions, comments, and references, was to foster the habit of reading articles critically and evaluating the reasoning. Similarly, her 1993 book, *Syntax: theory and problems,* challenged readers new to syntactic analysis to develop a theory based on the data provided. In both *Syntax* and *Linguistics: an introduction* (1996), Napoli stressed that one can only learn linguistics by looking at data and solving problems. Napoli recently co-authored *L'animale parlante* (Nespor and Napoli, 2004) with Marina Nespor, an introduction to the field of linguistics in Italian.

Although Napoli's recent work *Language matters: a guide to everyday questions about language* (2003), which explored language issues in daily life by addressing misconceptions about language, was intended for the general public, the public is probably most familiar with Napoli in her role as an

award-winning author. Napoli, the mother of five children, Elena, Michael Enzo, Nicholas Umberto, Eva, and Robert Emilio, who all share her husband Barry Furrow's last name, has authored picture books, children's and young adult novels, stories, and poems, many of which have received major awards in creative writing. Her writing ranges from contemporary fiction to fantasy to historical novels. She also writes mathematics tales and science tales as well as books geared toward helping deaf people learning to read. In addition, Napoli has written several essays about children's literature and writing for children. Napoli has also co-edited and contributed to five poetry anthologies, containing poems written by linguists including Deborah Tannen and Dell Hymes, the most recent of which is *Tongue's palette: poetry by linguists* (Sunshine and Napoli, 2004).

See also: Intonation; Sign Language: Overview; Tannen, Deborah (b. 1945).

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Relevant Website

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Narrative and Discourse Impairments

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Introduction

Communication between people takes place over many channels and relies on an array of component abilities, including phonological, syntactic, and lexical semantic competence. Accordingly, many communication impairments can be understood best in terms of these highly constrained, rule-governed domains. However, speakers also invariably use sentences or utterances in context to convey thoughts and goals to a listener. The use of utterances in context constitutes the domain of discourse. As will become clear from this article, discourse and discourse impairments represent fundamental aspects of human communication. We examine in turn several topics bearing on impaired discourse resulting from acquired brain injury in adults. We start by mentioning some caveats to the findings reviewed and then provide summaries of representative impairments in production and then comprehension of conversational and narrative discourse. We conclude by mentioning some topics that fall beyond the scope of this article but that are nonetheless related to discourse.

Caveats

Discourse should be treated as distinct from other levels of language description, but in practical terms it is difficult to separate discourse-level impairments from traditional aphasic impairments at the levels of phonology, syntax, and lexical semantics because so much of language is based on words and sentences. As a result, much of the neuropsychological

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Discourse should be treated as distinct from other levels of language description, but in practical terms it is difficult to separate discourse-level impairments from traditional aphasic impairments at the levels of phonology, syntax, and lexical semantics because so much of language is based on words and sentences. As a result, much of the neuropsychological

literature on discourse has addressed impairments in the absence of aphasia in patients with unilateral right-sided brain damage due to stroke (see reviews by Code, 1987; Goodglass, 1993; Joanette *et al.*, 1990; Myers, 1999; Tompkins, 1995) and in patients with unilateral or bilateral (often prefrontal) damage due to traumatic brain injury that lies outside of the classical language zones (McDonald, 1993). The reason is that an initial goal for researchers in this field was to establish the existence and relevance of discourse impairments as distinct from aphasia. It was clinically important to characterize the subtle but very real communication deficits of patients without aphasia. It was theoretically important to identify discourse-level impairments that corroborate the distinction between discourse and other levels of language description.

Partly as a function of this history, it is necessary to use caution when interpreting the literature on discourse impairments. Many studies compare the performance of nonaphasic brain-injured patients against the performance of non-brain-injured control participants. This experimental design leaves unspecified the precise localization of function related to a deficit: Comparable problems might result from damage to other regions of the brain as well. In addition, good performance on any discourse task requires several component skills and therefore relies on the contributions of several cognitive as well as neurological systems. Disruption to any component skill could result in superficially similar declines in task performance. In addition, there is considerable variation in symptoms exhibited by different patients with apparently similar lesions. For example, a large proportion of patients with right hemisphere damage (approximately half by one estimate) show no obvious communication deficit (Joanette *et al.*, 1991). Some researchers have responded to this heterogeneity across patients by advocating the use of case studies rather than group studies for cognitive neuropsychological investigations (Caramazza, 1986). Studies that report comparisons between groups of patients characterized by damage to different areas of the brain support stronger claims concerning localization of function. Even in these studies, patient groups are often defined in terms of diffuse damage or in terms of focal lesion anywhere within large areas of cortex. Precise localization of discourse functions is not yet established.

In this article, we use the term LHD to denote adult patients with unilateral, left hemisphere brain damage that is accompanied by aphasia. The corresponding terms RHD (unilateral right hemisphere damage), TBI (traumatic brain injury), and SDAT (senile dementia of the Alzheimer type) are used to denote the absence of marked aphasia.

Production Impairments

Discourse production can be a viewed at a number of levels; however, most studies have analyzed discourse production at either a microlinguistic (intrasentential) or a macrolinguistic level (suprasentential). Microlinguistics refers to linguistic units (phonology, semantics, and syntax) at the word or sentence level. Macrolinguistics refers to larger pieces of language units analyzed in relation to types of nonlinguistic textual and extratextual factors.

In this section, we discuss production deficits that occur beyond the sentence level in two different types of discourse genres: conversational exchange and oral narrative. The analysis of conversational exchange has its roots in ethnomethodology, a branch of sociology that is concerned with everyday social interaction and specifically with how individuals within a society come to know, and to know in common, what they are doing and the circumstances in which they are doing it (Heritage, 1984). The field of conversational analysis, as it relates to disordered language use, is a relatively new and complex field of inquiry that involves linguistic, cognitive, and social domains of human interaction in brain-damaged patients.

In contrast, the analysis of oral narrative is deeply rooted in linguistics. The study of oral narratives has focused primarily on formal structure using story grammars (Mandler and Johnson, 1977; van Dijk, 1980) and only recently has incorporated the relationship between story grammar and other world knowledge (Black and Wilensky, 1979).

Analysis of discourse production, with its rich interaction between the linguistic, cognitive, and social domains, has the potential to influence the ways in which we assess and treat patients. However, as is evident from this article, this new field needs a uniform application of elicitation procedures and analytic frameworks to support comparisons of discourse performance within and across diagnostic groups.

Conversational Discourse

Communicative exchange depends on social rules and behaviors (Searle, 1969). A successful conversation requires basic linguistic ability and also the ability to maintain a topic, sensitivity to a conversational partner's knowledge and needs, appropriate turn-taking, and accurate monitoring of the emotional dimensions of a message. Discourse further requires constant

interpretation and prediction as a conversation progresses. Any individual utterance within an exchange reflects the preceding context and refines or redirects that context and, in some sense, anticipates the ultimate direction or goal of the conversation. Heritage (1984) described conversational utterances as being both 'context-shaped' and 'context-renewing.' Finally, conversation is an essential means of establishing and maintaining social relationships. Despite the central role played by conversation in daily life, only a relatively small number of studies have focused on conversational discourse in adults with acquired brain injury. The results of these studies suggest that the type of discourse disruption depends on the type of brain damage; however, it is difficult to derive firm conclusions because the studies used different elicitation procedures and approaches to analysis.

One body of studies on conversational skills has focused on aphasic patients indicates primary disruption in conversation at the microlinguistic level: Disturbed phonological, semantic, and/or syntactic-level skills can appear simultaneously with a preservation of macrolinguistic abilities such as informational structure (Glosser and Deser, 1990; Ulatowska and Chapman, 1994) and speech acts in some patients and a restriction of communicative functions in others (Kasher *et al.*, 1999; Wambaugh *et al.*, 1991).

Studies based on other populations often reveal a contrasting pattern with less impairment at the level of microstructure. For example, TBI patients show difficulties with the macrolinguistic structure of language characterized by difficulty with topic introduction and management and providing more information than requested about a topic (Coelho *et al.*, 2002).

Results from studies of SDAT patients similarly reveal disruption at the macrolinguistic level of discourse with fewer elaborations on the topic (Garcia and Joanette, 1994; Glosser and Deser, 1990) impaired cohesion, and inappropriate topic shifts, topic introduction, and topic development (Mentis *et al.*, 1995; Ripich and Terrell, 1988). In addition to these topic management disruptions, SDAT patients resort more often to nonverbal responses.

RHD patients also display more difficulty with conversation at the macrolinguistic level; however, the reason for the disruption has not been clearly delineated. Kennedy *et al.* (1994) evaluated first-encounter conversations between a speech–language pathologist and RHD patients in order to examine turn-taking skills and topic manipulation. Although results revealed large variation in conversational skills within the RHD group, characteristic RHD impairments were evident in the number of turns taken. RHD conversations contained more turns than those of control participants but fewer requests for information from the conversational partner and more statements about themselves. In addition, the RHD group produced far fewer words per turn than did the NBD group. In another first-encounter conversation study (Kennedy, 2000), the introduction of topic scenes (things that get talked about) was compared to assess similarities between the RHD and the NBD groups in incidence, type, and location of topic scenes within a discourse. During the termination phase of a conversation, RHD patients produced larger proportions and different types of topic scenes than are typical of a first-encounter conversation, perhaps due to suppression/inhibition deficits or misinterpretation of subtle indicators used to wrap up a conversation. In addition, Chantraine *et al.* (1998) reported varying degrees of impairment in how well RHD patients take into account knowledge shared between themselves and a listener.

Narrative Discourse

Oral narratives constitute the genre used most frequently to study discourse skills after brain damage. Investigation of narratives can concentrate on an individual's microstructural skills using, for example, word counts and indices of intrasentential grammar and intersentential cohesion, as first proposed by Kintsch and van Dijk (1978), or on a person's global or macrostructural abilities linked to story grammars, as first proposed by Mandler and Johnson (1977), and to the overall goal, plan, theme, or topic of a narrative. (Models of narrative discourse such as story grammars are more structured than are descriptions of conversational discourse.) Although results of studies examining narrative production are also difficult to interpret due to the wide range of sampling techniques and analysis measures reported, some patterns parallel those found in studies of conversation.

Studies of people with aphasia indicate narrative disruption at the microlinguistic level, with phonological, semantic, or syntactic skills at greatest risk and with the macrostructural skills fairly preserved (Glosser and Deser, 1990).

Results from studies of TBI indicate disruption generally at the macrolinguistic level rather than the microstructural level. TBI patients produce a normal number of episodes in a story-retell task but produce fewer episodes in a story-generation task (Liles *et al.*, 1985). Disrupted production of cohesion ties and difficulty with referential cohesion and logical coherence have also characterized narrative discourse in

individuals with TBI (Mentis and Prutting, 1989). The specific disruptions observed vary as a function of the elicitation procedure: Logical coherence deficits have been found using story-retell tasks and referential cohesion deficits with picture-elicitation tasks.

Performances of SDAT patients did not differ significantly from those of age-matched control groups in terms of microlinguistic measures during narrative production. However, dementia is associated with semantic impairments as well as impairments at the macrolinguistic level defined in terms of cohesion (Glosser and Deser, 1990).

RHD patients similarly exhibit macrolinguistic deficits; however, there does not appear to be agreement regarding the type or severity of deficit. A number of investigators have suggested subgroups of RHD patients based on discourse performance (Joanette *et al.*, 1986), with some RHD subjects performing somewhat like the normal control group. However, Cherney *et al.* (1997) suggested that the presence and persistence of unilateral neglect may be a factor in determining subgroups and may be related to disruptions in narrative discourse.

Comprehension Impairments

Narrative Discourse

Using Context to Guide Comprehension of Single Sentences The general statement that brain injury limits patients' understanding of discourse and linguistic context is not controversial. However, there are many differences across patient populations that underscore the composite nature of discourse. Discourse rests in large part on comprehension of single sentences, which is limited by most forms of aphasia due to left hemisphere brain damage but is often relatively spared subsequent to RHD or TBI, which often leaves a patient without marked aphasia. One issue is to determine how discourse impairments can differ from symptoms of aphasia, even if many conclusions are still subject to revision. For example, brain injury often disrupts a patient's ability to use context to build a complete understanding of a discourse. However, the ability to use context effectively varies as a function of the nature of the task. Leonard *et al.* (1997), for example, showed that RHD patients are typically able to establish at least some forms of discourse connections across sentence boundaries: RHD patients perform very well comprehending ambiguous pronouns whose antecedents are constrained by verb meaning, and they can establish cohesive ties that span sentence boundaries. On the other hand, the literature contains reports of impaired use of intrasentential context. Grindrod and Baum (2003), for example, reported that both aphasic LHD and nonaphasic RHD patients exhibited different types of abnormal use of within-sentence or 'local' context to guide lexical access. Briefly, neither LHD nor RHD patients showed normal effects of context at the briefest time intervals. At longer time intervals, the RHD patients showed some effects of context but still made less use of context than nonbrain-injured participants. Tompkins *et al.* (1997) argued that although aspects of lexical access may be spared subsequent to RHD, postaccess processing, such as suppression of contextually irrelevant meaning within a sentence, appears disrupted.

When the precise timing of inferences based on context is not the focus, studies document that LHD, aphasic patients do relatively better, and RHD and TBI patients do relatively worse. For example, Hough *et al.* (1989) showed that aphasic patients could use linguistic and nonlinguistic predictive context to facilitate comprehension of target sentences. Using longer discourse samples, Hough (1990) illustrated how RHD limits a person's ability to infer a gist or theme from multisentence texts. Whereas RHD patients' comprehension was clearly disrupted when the theme of a text was not presented until the end of the stimulus passage rather than at the beginning, LHD patients' comprehension was much less disrupted by the delayed presentation. Joanette *et al.* (1986) similarly reported that RHD patients were deficient in terms of the inferential aspects of recall of a more complex story.

Short story jokes provide a useful vehicle for examining discourse comprehension impairments because the form for the genre is well established. A standard analysis rests on two components: incongruity and coherence. A standard joke begins with a set up or context that plays on a listener's cultural knowledge: The body of a joke makes very clear what should happen in a normal situation. The punch line of a joke is incongruous in that it violates those expectations and is surprising. The humor of a joke is tied to the listener being able to understand the incongruity of the punch line and perform an inference that shows how the punch line might in fact relate to the body of the joke on some alternative analysis. Bihrle *et al.* (1986) reported that RHD patients retained knowledge of how jokes worked: They were able to choose candidate punch lines that were incongruous. However, the RHD patients showed reduced ability to carry out the inference necessary to identify the correct punch line from among a set of incongruous alternatives. (Other work has documented analogous inference deficits in RHD patients using nonhumorous materials, which rules out any explanation tied to emotion.) When presented with multiframe,

captionless cartoon jokes, LHD patients were better able than RHD patients to identify correct endings to humorous narratives. Thus, some aspects of impaired discourse can be dissociated from aphasia.

Conversational Discourse and Nonliteral Language

Metaphor and Idioms Language is often nonliteral in the sense that the intended or speaker's meaning is different from a completely conventional, literal, or denotative interpretation of a word or utterance. Examples of nonliteral language include metaphor and idioms, sarcasm, and indirect requests. Of these, metaphor and idioms rest at the bridge between lexical semantics and discourse. We include metaphor here because deficits in the literature are reported for the same patient populations (RHD patients) as are other more clear discourse-level forms of speech.

One straightforward investigation of metaphor and idiom comprehension by unilaterally LHD and RHD patients was reported by Van Lancker and Kempler (1987). One task was an idiom comprehension task in which patients had to listen to a common (frozen) idiom such as "He's turning over a new leaf" and select the appropriate pictorial representation from a set of four that included a picture of a man with a halo tossing a liquor bottle and a Playboy magazine into the trash (correct), a man raking leaves (literally correct but inappropriate), an angry defiant convict sitting in a prison bunk (opposite or related to the appropriate meaning of the idiom), and an unrelated item (people sitting in a movie theater). In another condition, patients listened to novel sentences such as "When the happy girl pushes, the angry boy swings" and had to select the correct depiction from a set of four that represented permutations of grammatical roles (an unhappy girl pushing a boy, a boy pushing a girl, etc.). The major result was that the RHD patients performed worse than the aphasic patients in the idiom condition and better than the LHD patients in the syntactically demanding novel sentence condition. The most important results indicated that impairment on this form of nonliteral language comprehension appeared to be specific to right hemisphere lesion and not to left hemisphere lesion. Other work has broadened the scope of the RHD deficit in interpreting nonliteral language to include the interpretation of single words such as 'warm' used to mean not only high temperature but loving (Brownell *et al.*, 1990).

Interpretation of Nonliteral Utterances in Context Brain-injured patients' use of context as a guide to nonliteral utterance interpretation has been most thoroughly examined using indirect speech acts, such as indirect requests and sarcasm. Requests can take a range of forms, from the most direct ("Get out of here") to less direct ("Would it be possible for you to leave us alone for a while?") and mere hints ("It seems a little crowded in here"). Increasing degrees of indirectness can be used to increase the politeness of a request by leaving more up to the hearer's discretion. With respect to indirect requests, Foldi (1987) suggested that RHD patients exhibit a tendency to focus on literal interpretations of utterances and that LHD aphasic patients fare relatively better at extracting a pragmatically appropriate interpretation. Stemmer and colleagues (1994) presented a more detailed theoretical guide to assessing the performances of RHD patients. They reported that the RHD patients tested were deficient in evaluating the level of directness of requests as well as the degree of politeness and the likelihood of occurrence of a request form. The nature of the deficits outlined is more interpretational and social than based on linguistic analysis of the component sentences.

A similar line of investigation has explored comprehension of sarcasm and irony, in which a host of meanings can be conveyed by stating the opposite of what is literally true. For example, the utterance "You played a great game" spoken to someone who has just performed terribly can convey a negative intent. Alternatively, a literally false utterance could be simply a mistake or even a white lie designed to protect a hearer's feelings. Similar to the work on indirect requests, investigations of sarcasm comprehension have shown that most RHD patients are able to decode the literal meanings of utterances and to realize when an utterance is literally false. It is deriving the appropriate pragmatic interpretation that presents difficulty because doing so rests on inferential ability and on attention to the social as well as linguistic context. Kaplan *et al.* (1990) varied the relationship (hostile or friendly) between a speaker and hearer in a reported conversation and also the literal truth of a comment made about either a good or a poor performance. Nonbrain-injured controls interpreted utterances in terms of the relationship and the conventions of politeness. For example, the comment "You played very well" uttered after a terrible performance was interpreted as a white lie in the context of a friendly relationship and as a sarcastic and nasty comment in the context of a hostile relationship. The RHD patients as a group were less able to make those sorts of distinctions; the RHD patients were able to arrive at similar conclusions but less reliably. It is worth noting that the role of speech prosody was minimized in this study. Other

work has explored similar deficits in TBI patients (McDonald and Pearce, 1996) or has also examined tone of voice (Tompkins and Mateer, 1985).

Summary

This article listed a range of language-based impairments in discourse and, as shown by the representative studies cited, discourse impairments can usefully be discussed and partially understood in terms of a person's appreciation of linguistic and social context. However, several other domains within language and cognition contribute to success in the realm of discourse. Although they fall outside the scope of this article, these topics have great relevance to understanding how brain injury can affect discourse performance and thus warrant mention. The most closely related is speech prosody, which can be used to convey a host of linguistic, pragmatic, and affective content (for a review, Baum and Pell, 1999). Brown and Levinson's (1987) work on politeness provided a different perspective that links linguistic forms to social considerations such as relative social power and autonomy. Theory of mind – that is, the ability to use other people's thoughts, emotions, and beliefs as a guide to understanding their words and actions – is a burgeoning area of investigation that informs interpretation of discourse impairments (for a review, see Baron-Cohen *et al*., 2000). Finally, there are efforts to account for discourse-related impairments under different theoretical umbrellas, such as 'coarse semantic coding,' weak central coherence, executive dysfunction, theory of mind, relevance theory, or working memory (Beeman and Chiarello, 1998; Martin and McDonald, 2003; McDonald, 1999; Tompkins *et al*., 1994). This breadth of topics reflects the complex nature of discourse and its importance to understanding human communication.

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Narrative: Cognitive Approaches

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Introduction: The Scope of Cognitive Narrative Analysis

Study of the cognitive dimensions of stories and storytelling has become an important subdomain within the field of narrative analysis. Concerned both with how people understand narratives and with narrative itself as a mode of understanding, cognitive approaches have been brought to bear on stories in a variety of media. Studies range from cognitively inflected accounts of narrative perspective in fictional and nonfictional texts (van Peer and Chatman, 2001), to inquiries into narrative as a resource for navigating and making sense of computer-mediated environments (Ryan, 2001), to intermedial research suggesting that narrative functions as a cognitive 'macroframe' enabling interpreters to identify stories or storylike elements across any number of semiotic media, literary, pictorial, musical, and other (Wolf, 2003). Equally various are the disciplinary traditions from which cognitive approaches borrow descriptive and explanatory tools. Source disciplines include cognitive linguistics; pragmatics; discourse analysis; narratology; communication theory; anthropology; stylistics; cognitive, evolutionary, and social psychology; rhetoric; computer science; literary theory; and philosophy.

It should not be surprising that, given the range of artifacts and media falling under their purview, their richly interdisciplinary heritage, and the varying backgrounds and interests of their practitioners, cognitive approaches to narrative at present constitute more a set of loosely confederated heuristic schemes than a systematic framework for research on stories. Nonetheless, for descriptive convenience I use the term *cognitive narrative analysis* (hereafter CNA) as a blanket designation for all the approaches discussed in this article – even though CNA in fact encompasses a number of distinct tendencies, each with a particular theoretical emphasis, battery of concepts, and preferred investigative method.

The second section of this article contextualizes CNA by sketching two overarching research developments from which it took rise. The third section then surveys specific analytic paradigms that have helped shape CNA; the section traces forward the influence of these paradigms to provide an overview of some of the main trends within CNA as currently practiced. Finally, after discussing criticisms leveled against the enterprise of CNA, the fourth section outlines areas of concern that can be viewed as targets for future research activity in the field.

Contexts for CNA

Two related trends have functioned as precipitating events for the emergence of CNA. The first is the 'narrative turn' that began to unfold across many disciplines in the mid to late 1960s, in part as a result of the development of structuralist narratology in France. Noting that narratives can be presented in a variety of media, communicative situations, cultural traditions, and genres, structuralists such as Barthes (1977 [1966]) argued explicitly for a cross-disciplinary approach to the analysis of stories. In large part, Barthes's call for an interdisciplinary approach to narrative was answered in the years following the heyday of structuralism. Stories became at once a metaphor more or less loosely applied to disparate content areas ('stories of nationhood,' 'narratives of gender,' etc.), an object of inquiry in multiple field of study, and an explanatory framework for making sense of events defined by their position in an unfolding time-course (Mink, 1978).

Second, this cross-disciplinary concern with stories has facilitated an especially momentous convergence of humanistic and cognitive-scientific research on narrative. On the one hand, in the constellation of disciplines associated with the cognitive sciences (including linguistics, neuroscience, psychology, computer science, and philosophy), scholars have shown an increasing willingness to take on ever more complex and richly situated narratives (see, e.g., Bamberg, 1997; Emmott, 1997; Ochs and Capps, 2001). Researchers in these fields have begun to embrace the challenge of characterizing how readers or listeners process extended natural-language narratives, as opposed to the short, artificially constructed narratives designed by early cognitive theorists. On the other hand, humanists studying various forms of verbal art, and in particular narratives, have become increasingly open to and knowledgeable about developments in the cognitive sciences (Abbott, 2001; Richardson and Steen, 2002). Indeed, the central aim of literary CNA and of related endeavors whose focus extends beyond narrative, including cognitive semiotics (Fastrez, 2003), cognitive poetics (Stockwell, 2002; Gavins and Steen, 2003), and cognitive stylistics (Semino and Culpeper, 2002), is to discover ways of reconnecting the study of literary narratives (among other semiotic artifacts) with the study of language and mind. These initiatives thereby seek to promote

new, synergistic interactions among areas of inquiry that have remained overcompartmentalized up to now.

Varieties of CNA: Paradigms and Practices

At a more granular level of description, current-day practices in CNA can be traced back to a number of (partly overlapping) research paradigms. Three of the relevant paradigms were roughly coeval, coming into prominence in the 1960s and 1970s: structuralist narratology, sociolinguistic approaches to narrative (among other forms of talk) as a contextually situated practice, and efforts within psychology and artificial-intelligence research to model the cognitive infrastructure of narrative, i.e., the mental equipment that enables people to design and interpret stories. Subsequent researchers built on these precedents to generate ideas whose pertinence for CNA is only now beginning to be grasped. Because of the limited scope of this entry, I single out two later paradigms (or groups of paradigms) as especially salient. On the one hand are the frameworks developed under the auspices of cognitive linguistics and cognitive grammar, which characterize embodied human experience as the basis for all language structure and use. On the other hand are models of 'the discursive mind' (Harré and Gillett, 1994), which are sometimes associated with what has been called the 'second cognitive revolution' (Harré, 1992; Harré and Gillett, 1994). This work grounds humans' intelligent activity in the situated production of talk rather than in the minds of solitary cognizers. Space limitations require that my synopsis exclude other important research – e.g., work in evolutionary psychology, neuroscience, and cognitive anthropology – that would need to be discussed in a fuller account of CNA.

Structuralist Narratology: Codes and Cognition

Tzvetan Todorov coined the term *la narratologie* in 1969 to designate what he and other Francophone structuralists (e.g., Roland Barthes, Claude Bremond, Gérard Genette, and A.-J. Greimas) conceived of as a science of narrative modeled after the 'pilot-science' of Saussure's structural linguistics. By analogy with Saussurean structuralism, the early narratologists sought to account for the underlying code (*la langue*) supporting the production and interpretation of particular narrative 'messages' (*la parole*).

Emphasizing the need for a systematic investigation of the narrative code in whatever setting, medium, or genre it obtains, structuralist narratology prepared the ground for interdisciplinary research on stories, including CNA. Moreover, structuralists such as Barthes anticipated the work on knowledge representations reviewed below. Barthes (1977 [1976]) suggested that people make sense of narratively organized sequences of events by subsuming particular clusters of events under 'essential headings' of 'the narrative language within us' (Barthes, 1977 [1966]) – a language or semiotic code which Barthes would eventually reanalyze into five interlocking subcodes, including the proairetic code (used to parse event-sequences into patterns of action) and the semic code (used to interpret narrated events as anchored in characters' traits and dispositions). As discussed later, arguments along these lines set an important precedent for some strands of CNA (e.g., Cook, 1994; Herman, 2002: 85–113; Stockwell, 2002: 75–89). Yet the early narratologists were hamstrung by their own structuralist methodology; their use of the 'pilot-science' of Saussure's code-centered linguistics was already out of phase with emergent developments in language theory and related fields of study. Focusing on how the language system is anchored in particular contexts of use, these new developments provided important underpinnings for CNA. Theorists began to concern themselves with the material circumstances of narrative transactions, not just the structural properties of narrative viewed as a semiotic code; in the process analysts acquired new tools for describing cognitive dimensions of storytelling situations.

Contextualism (I): Thinking through Narrative Transactions

For researchers concerned with the social contexts of language use, 'messages' or utterances (including the extended utterances that take narrative shape) should be viewed not as manifestations of a code that preexists all communicative acts but, rather, as an interactional achievement, negotiated by participants using an inherently variable linguistic code in situated contexts. Fostering the creation of subfields such as linguistic pragmatics, discourse analysis, and sociolinguistics, this contextualist approach to language-in-use also gave birth to Labov and Waletzky's (1967) pathbreaking account of personal-experience narratives, which in turn spawned an extensive body of research in this area (see Bamberg, 1997, for a useful overview).

The model outlined by Labov and Waletzky (1967) forged an approach to studying stories-in-use that could accommodate structural, contextual, and cognitive factors. Establishing what remains a much-relied-on vocabulary for labeling the macro-units of personal-experience narratives (abstract, orientation, complicating action, evaluation, resolution, coda), the model had important implications for CNA along two

dimensions. First, it identified linguistic structures tending to surface in each of these macro-units and suggested that interpreters monitor the discourse for signs enabling them to 'chunk' what is said into units-in-a-narrative-pattern. Second, at the interactional level, the framework stressed the importance of 'point,' i.e., the need for storytellers to provide various sorts of cues (e.g. expressive phonology and evaluative lexical items) that enable interlocutors to infer the *raison d'être* of the narrative, or why it is worth accommodating within an ongoing discourse. The model thus targeted multiple kinds of inferential activity engaged in by storytellers and their interlocutors. At issue are inferences about part-whole and part-part relations among story components, as well as judgments about the appropriateness of narrative tellings in particular kinds of communicative environments.

Building on Labov's and Waletzky's work, subsequent theorists have thrown additional light on cognitive features of narrative transactions, some of them arguing for an even more rigorously contextualist approach (again, Bamberg, 1997, provides an overview). Students of narrative working in the conversation-analytic tradition, for example, argue that theories about the cognitive and communicative properties of narrative cannot be adduced *a priori* and imposed as a one-size-fits-all template on all narrative interactions; rather, they must emerge on a case-by-case basis from the disposition or sequencing of structural elements of stories told during interactions unfolding within particularized settings. Whatever their special emphasis, however, studies within the contextualist paradigm underscore how narrative facilitates intelligent behavior. Stories support the (social) process by which participants determine and evaluate the meaning of events, enable the distribution of knowledge via storytelling acts more or less widely separated in time and space from the experiences that they recount, and assist with the regulation of communicative behaviors on a turn-by-turn basis, such that participants can coordinate behaviors required to engage in knowledge-yielding and-conveying talk. The later section on contextualism (II) details how research informing current work in CNA extends and enriches this 'first-wave' contextualism by incorporating ideas from other traditions, e.g., Vygotsky's (1978) account of the social origins of human intelligence.

From Story Grammars and Knowledge Representations to CNA

In the 1970s and 1980s, both cognitive psychologists and artificial-intelligence researchers developed hypotheses about cognitive structures underlying the production and understanding of narrative. This work bears a family resemblance to structuralist accounts of narrative sequences, but features a more explicit and productive nomenclature that continues to shape the practice of CNA today.

Story Grammars On one front, researchers such as Mandler (1984) postulated the existence of what they characterized as cognitively based story grammars or narrative rule systems. Such grammars were cast as formal representations of the cognitive mechanisms used to parse stories into sets of units (e.g., settings and episodes) and principles for sequencing and embedding those units (for a fuller discussion, see Herman, 2002: 10–13). As Mandler put it, "[t]he contention of all story grammars is that stories have an underlying, or base, structure that remains relatively invariant in spite of gross differences in content from story to story. This structure consists of a number of ordered constituents" (1984: 22).

Although the effort to develop full-fledged story grammars is a thing of the past in cognitive psychology and no longer occupies pride of place in CNA, narratological adaptations of the story-grammar enterprise by scholars such as Prince (1973) and Pavel (1985) have had a lasting impact on narrative analysis in general and CNA in particular. Furthermore, current-day work in artificial intelligence builds on the earlier work: a number of theorists are attempting to develop both story-recognizing and story-generating algorithms (Sengers and Mateas, 2003). This research continues the effort to create formal representations of the mind's capacity to design and interpret stories, testing the adequacy of those formal models through computer implementations.

Knowledge Representations Roughly contemporaneously with the advent of story grammars, research in artificial intelligence also began to focus attention on the cognitive basis for creating and understanding stories. Schank and Abelson's (1977) foundational work explored how stereotypical knowledge reduces the complexity and duration of many processing tasks, including the interpretation of narrative. Indeed, the concept of 'script,' i.e., a type of knowledge representation that allows an expected sequence of events to be stored in the memory, was designed to explain how people are able to build up complex interpretations of stories on the basis of very few textual or discourse cues. Whereas the term *scripts* was used to refer to kinds of world-knowledge that generate expectations about how sequences of events are supposed to unfold, *frames* referred to

expectations about how domains of experience are likely to be structured at a given moment in time.

Although subsequent research on knowledge representations suggests the limits as well as the possibilities of the original frame and script concepts (see Sternberg, 2003, for a critical review), practitioners of CNA continue to draw on this work as both a model and a metaphor for understanding how particular features of narrative discourse cue particular kinds of processing strategies. Some theorists have focused on how experiential repertoires, stored in the form of scripts, enable readers or listeners of stories to 'fill in the blanks' and assume that if a narrator mentions a masked character running out of bank with a satchel of money, then that character has in all likelihood robbed the bank in question. Analysts have also discussed how literary narratives in particular involve processes of script recruitment, disruption, and refreshment (Cook, 1994; Herman, 2002: 109–113; Stockwell, 2002: 75–89), depending on how critically and reflexively the narratives relate to prevailing scripts.

Three especially noteworthy extensions of the original research can be mentioned here. In Jahn's (1997) proposal for a cognitive narratology, higher-order knowledge representations or frames enable interpreters of stories to disambiguate pronominal references, decide whether a given sentence serves a descriptive or a thought-reporting function (e.g., depending on context *the train was late* might either be a thought mulled over by a character or part of the narrator's own account of the narrated world), and, more generally, adopt a top-down as well as a bottom-up approach to narrative processing. A frame guides interpretation until such time as textual cues prompt the modification or substitution of that frame. Along similar lines, Emmott (1997) focuses on how what she calls contexts, or spatiotemporal nodes inhabited by configurations of individuals and entities, constrain pronoun interpretation. Information about contexts attaches itself to mental representations that Emmott terms *contextual frames*. An action performed by (or on) a given configuration of participants is necessarily indexed to a particular context and must be viewed within that context, even if the context is never fully reactivated (after its initial mention) linguistically. Finally, Palmer (2004) studies how readers' world-knowledge allows them to make sense of a variety of techniques for representing fictional characters' minds. Synthesizing work on knowledge representations with accounts of the 'social mind in action' that are emerging in social psychology, philosophy, and linguistics, Palmer explores how readers construct inferences about fictional minds by using various textual indicators, including thought reports, speech representations, and descriptions of behaviors that span the continuum linking mental with physical actions.

Cognitive Linguistics and Cognitive Grammar: Regrounding CNA

In their overview of the field, Croft and Cruse (2004) identify three basic hypotheses underlying cognitive-linguistic research, namely:

i. language is not an autonomous cognitive faculty
ii. grammar is conceptualization
iii. knowledge of language emerges from language use

Further developed in the specific approach to cognitive linguistics that has come to be called *cognitive grammar* (Langacker, 1987, 1999), each of these hypotheses has important implications for CNA. Indeed, as confirmed by the publication of Stockwell's (2002) introductory textbook on cognitive poetics and by the interpretive applications gathered in Gavins and Steen's (2003) companion volume, ideas developed under the auspices of cognitive linguistics generally and cognitive grammar specifically have proven to be one of the must fertile sources of recent work in CNA (see also Semino and Culpeper, 2002).

Hypothesis (i) connects language use to other cognitive tasks, militating against generative grammarians' assumption of a special-purpose language faculty. From this perspective, psychological models of attention and perception (e.g. Gestalt theories of figure and ground) and theories of categorization processes involving prototypicality and graded centrality can be brought to bear on linguistic (and by extension narrative) phenomena. Hypothesis (ii) suggests that meaning cannot be reduced to language's truth-conditional correspondence with the world, and that semantic theories must therefore take into account the way the mind conceptualizes humans' embodied experience. Hence, the cognitive-linguistic focus on conceptual metaphors and image-schematic reasoning; this work suggests that source concepts deriving from having or rather being a body in the world are used to help construe novel experiential domains. Metaphors anchored in a positive valorization of being upright provide coordinates for making sense of emotions and attitudes (*I feel really up today* versus *I feel really low today*), as do image schemata deriving from what Talmy (1988) characterized in terms of 'force dynamics' (*I resisted the temptation, fighting against it with all my might*). According to hypothesis (iii), categories and structures at all levels of language organization are built up through inductive

schematization from specific utterances in specific contexts, in effect making discourse the birthplace of linguistic and for that matter meta-linguistic knowledge.

Practitioners within CNA have made productive use of many of these ideas. Particularly consequential in the recent development of CNA is Fludernik's (1996) account of experientiality as constitutive of narrative; her study harmonizes with work based on both hypotheses (i) and (ii). For Fludernik, unless the representation of an event-sequence conveys a sense of how those events were experienced by an embodied human or at least anthropomorphic consciousness attempting to construe them, then the representation at issue cannot be characterized as a full-fledged narrative. For his part, Turner (1996) draws on cognitive-linguistic research to develop the idea of 'parabolic projection,' which involves the use of a familiar source story to make sense of a less familiar experience, or target 'story.' Thus, allegories such as Euripides's *Alcestis* cast Death as an agent and thereby ascribe agentivity as well as intentionality to what would otherwise be an agentless happening, in the process transforming an atelic event into a goal-directed action. Providing further support for hypotheses (i) and (ii), projections of this kind suggest that narrative relies as crucially on image-schematic reasoning and conceptual metaphors as other kinds of language use. In recent work, the term *conceptual blending* (Fauconnier and Turner, 2002) has been used to describe how textual cues in narrative and other discourse create such laminated structures, blending states, objects, and events that would otherwise remain anchored in different conceptual domains. (Hypothesis [iii], it might be mentioned in passing, squares with Turner's 1996 argument that language is a product, not the cause, of humans' storytelling impulse.)

CNA also has drawn on developments in cognitive grammar, a subdomain of cognitive linguistics. A key idea of cognitive grammar (and one interconnected with all three hypotheses above) is that a basic psychological resource used to make sense of experience, namely, the contrast between figure and ground, constitutes a core cognitive primitive that manifests itself in the structures of language as well. Thus, the English word *aunt* means what it does because of the way it profiles a particular substructure of a larger conceptual base – namely, a specific understanding of kinship relations (Langacker, 1999: 27). Similarly, some linguistic expressions acquire their meaning by profiling a trajector as a primary figure that stands out against the secondary figure (or ground) of the landmark (if one is present) (Langacker, 1999: 31–32). For example, although *The cat is above the desk* and *The desk is below the cat* refer to the same spatial configuration of objects, the meaning of these two expressions differs. In a cognitive-grammatical account, the difference derives from contrasting conceptual structures involved: in one case the cat is profiled as a trajector against the desk as landmark, whereas in the other case the desk is the trajector and the cat is the landmark.

The previous examples concerned words and clauses, but practitioners of CNA have demonstrated that there are also significant discourse-level implications of these ideas from cognitive grammar. Stockwell (2002: 13–25), for example, comments on the the relevance of trajector-landmark profiling in a (quasi-)narrative poem by Ted Hughes, anchoring his discussion in a more general discussion of figures and grounds in the processing of literary texts. Similarly, Herman (2002: 263–299) has drawn on figure-ground relationships to explore processes of spatial reference in narrative discourse. Emmott (1997) has also discussed foreground-background relationships as a key component of contextual frames, e.g., when readers compute inferences about which characters are focal participants in a scene as opposed to the participants who form part of the background for the main action.

Contextualism (II): CNA after the Second Cognitive Revolution

In Harré's (1992) and Harré and Gillett's (1994) account, the first cognitive revolution marked a shift away from behaviorism to the study of cognition, postulating that "there are mental processes 'behind' what people say and do, that these processes are to be classified as 'information processing,' and that the best model for the cognitively active human being is the computer when it is running a program" (Harré, 1992: 5; cf. Harré and Gillett, 1994: 1–17). In contrast, although the second cognitive revolution also accepts that there are cognitive processes, it views them as immanent in discursive practices. People thus acquire the status of psychological beings just by participating in discourse, in normatively accountable ways (Harré, 1992: 6; cf. Harré and Gillett, 1994: 18–36). This second revolution, also referred to as discursive psychology (Harré and Gillett, 1994), began to unfold in the late 1980s and emanated from sources such as the later Wittgenstein's emphasis on meaning as use, Vygotsky's (1978) hypothesis that intramental functioning derives from prior experiences of intermental functioning, or shared thinking, and social-constructionist accounts of human identity. Although it builds on the first-wave contextualism discussed previously, discursive psychology seeks to radicalize the insights of earlier studies. Thus, Harré and Gillett (1994: 30–31) argue that Newton's

ontology of the physical world needs to be complemented with a Vygotskyean ontology of the social world, whereby an array of persons constitutes a system of location like Newtonian space and speech acts are the counterpart to 'things' in the Newtonian system (cf. Harré and van Langenhove, 1991: 393–394).

This paradigm shift has major implications for CNA – implications yet to be fully worked out, particularly for story analysts concerned with literary narrative. A key issue is the exact status of narrative itself in discursive-psychological research. The concept of narrative or 'story-line' is a basic analytic construct in the theory of positioning (outlined in, e.g., Harré and van Langenhove, 1991) that has influenced much of the research in this area. In Harré and van Langenhove's (1991) account, one can position oneself or be positioned in discourse as powerful or powerless, assertive or timid, etc. In turn, a position can be specified by characterizing how a speaker's contributions are taken as bearing on these and other 'polarities of character' (1991: 396) in the context of an overarching story-line being jointly elaborated by participants, via self-positioning and other-positioning speech acts.

But if the story-line is used as a basic explanatory device, a way of accounting for people's sense-making strategies in everyday social life, the question remains how narratively organized discourse practices bear on such overarching stories of self and other. What is the relation between (culturally or subculturally transmitted) story-lines viewed as global sense-making strategies and the cognitive activity involved in the moment-by-moment interpretation of particular stories in context? Furthermore, how might positioning in particular and the framework of discursive psychology more generally be extended beyond the study of communicative practices in face-to-face interaction and used to study stories conveyed in literary, cinematic, or computer-mediated formats? Can communicative encounters represented in literary fiction be construed as meta-positioning acts, whereby everyday positioning practices are held up for inspection, connected to new story-lines, and thereby denaturalized? Beyond fictional representations of positioning acts, in what ways might the structures of literary narratives – e.g., their use of embedded storytelling scenarios – be related to discursive-psychological research on the socially distributed nature of intelligence itself?

Prospects for CNA

Whereas my discussion has thus far assumed the basic viability of CNA as a framework for study, criticisms by Sternberg (2003) question both the extent to which CNA constitutes a genuine interdiscipline and the degree to which it enables true methodological convergence between fields concerned with narrative. Sternberg's (2003) wide-ranging critique mainly concerns the use of cognitivist methods for the study of literary narrative. Sternberg disputes that there has been any real rapprochement in this area, arguing that when it comes to the analysis of literary discourse in particular, linguists have not yet matched the most accomplished analyses advanced in the fields of poetics and criticism. Conversely, cognitively oriented theories of literary narrative tend to have more in common with one another than with the source disciplines from which they borrow. Part of the problem lies in the attempt to translate foundational concepts such as 'frames' and 'scripts,' 'emotion,' and even 'narrative' across what remains for Sternberg a disciplinary divide between humanistic and social-scientific research.

At the very least, Sternberg's critique reveals the extent to which CNA remains an unfinished project. If CNA is to become a bonafide interdiscipline, it will have to work toward synergistically combining its source concepts and methods into a whole greater – more capable of description and explanation – than the sum of its parts. Although not presuming to be exhaustive, the following is a checklist of concerns that will need to be addressed collaboratively by theorists working in different areas of the field if CNA is to move toward the goal of genuine interdisciplinarity.

Methodological Issues

- *Synthesis of quantitative and qualitative approaches*. Researchers in cognitive and social psychology, corpus linguistics, and other fields within the social sciences have developed methods for gathering, sorting, counting, and analyzing empirical data pertaining to stories. These quantitative (= 'empirical' or 'data-driven') methods address questions about *how much* (the degree to which) and *how often* (the frequency with which) those data display a given property or set of properties. By contrast, grounded in what might be called the phenomenology of reading, qualitative (= 'phephenomenological' or 'intuition-driven') methods address questions about *how* and *why* narrative data have the particular character that they do (Johnstone, 2000). CNA spans both of these research methods, and though some analysts have worked toward reconciliation and synthesis (van Peer and Chatman, 2001), much more needs to be done to increase dialogue among theorists working within these two broad perspectives.

- *Integration of research on narrative as target of cognitive activity with research on stories as mode of cognition.* To some extent, this divide parallels the other methodological split just described, since quantitative methods often are used to study narrative processing and qualitative methods are brought to bear on narrative viewed as a cognitive instrument. But in any case, CNA can only benefit from more dialogue among scholars who attempt, in these two ways, to connect narrative structures with modes of intelligent activity.

Topics Requiring Collaborative Research

- *Emotion.* Both Sternberg (2003) and Stockwell (2002) identify emotion as an underexplored area within literary CNA in particular (but see, e.g., Harré and Gillett, 1994: 144–161; Hogan, 2003). More generally, theorists in all areas of CNA need to pool their resources to investigate which explanatory frameworks can best account for the functions of emotion, viewed both as part of narrative content and as an aspect of the interpretation of stories.
- *Theory of mind/folk psychology.* Palmer (2004) and Zunshine (2003) suggest that narrative understanding hinges on interpreters' capacity to develop a theory of mind powerful enough to account for characters' beliefs, desires, intentions, and behaviors. In turn, practitioners of CNA need to collaborate in studying how people use stories to build a theory of mind in the first place. At issue is the way narrative provides a resource for folk psychology, generating meta-knowledge about human knowledge.
- *Narrative acquisition and narrative disorders.* Further study of the processes of narrative acquisition and of various sorts of narrative disorders (e.g., those deriving from schizophrenia, Alzheimer's disease, or traumatic injury) promises to throw light on the cognitive abilities bound up with 'narrative competence.' A cross-disciplinary perspective on these issues is most likely to pinpoint what constitutes competence (or its diminishment) to begin with.
- *Intermedial inquiry.* Intermedial research also may illuminate cognitive dimensions of narrative. Connecting scholars in the fields that inform CNA (linguistics, film studies, literary studies, etc.), research on narrative across media stands to reveal core aspects of narrative understanding as well as the extent to which narrative artifacts are translatable across various semiotic formats. A focal point for dialogue and debate is the question of whether the new electronic media reveal the power of narrative as a sense-making strategy, or rather expose its limits.

See also: Activity Theory; Cognitive Anthropology; Cognitive Grammar; Cognitive Linguistics; Cognitive Science: Overview; Cognitive Semantics; Conversation Analysis; Corpus Linguistics; Data and Evidence; Discourse, Narrative and Pragmatic Development; Discourse Processing; Discourse Representation Theory; Distributed Cognition and Communication; Emotion: Stylistic Approaches; Frame Semantics; Identity and Language; Macrostructure; Metaphor and Conceptual Blending; Metaphor: Stylistic Approaches; Mind Style; Narrative and Discourse Impairments; Narrative: Linguistic and Structural Theories; Narrative: Sociolinguistic Research; Narrativity and Voice; Reference: Stylistic Aspects; Schema Theory: Stylistic Applications; Semantics of Spatial Expressions; Structure and Structuralism: Semiotic Approaches; Stylistics, Cognitive; Thematics.

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Narrative: Linguistic and Structural Theories

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Introduction

The production, reception, and use of narratives is one of the hallmarks of human life. Indeed narrative has been called a metacode and a human universal, with story-making now as widely bruited as metaphor as a basic mode of humanistic sense-making. As representations of events removed from the immediate here-and-now, narratives are a vital human resource in making sense of the world – and even in the making (construal) of that world itself. Indeed, some now suggest that it is the narrativizing faculty (with its other-orientedness or intersubjectivity and attention to goals and intentions), rather than simply a language faculty, that most sharply differentiates humans from other animals. Narratives reflect one of the key design features of the language faculty – displacement – although narrative is itself a faculty that can be realized in other media than the verbal. Narratives are also astonishingly various and heterogeneous in forms and functions, with rich possibilities for embedding of stories within stories.

In this article the focus is on contributions to the understanding of core elements of narrative that have come from narratologists and narrative poeticians, who chiefly consider fiction and film narratives; other analyses and models of narrative – e.g., those rooted in sociolinguistics, anthropological linguistics, ethnomethodology, and elsewhere – are addressed in a range of separate entries. One important development not addressed here because it is treated fully in a

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Narrative: Linguistic and Structural Theories

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Introduction

The production, reception, and use of narratives is one of the hallmarks of human life. Indeed narrative has been called a metacode and a human universal, with story-making now as widely bruited as metaphor as a basic mode of humanistic sense-making. As representations of events removed from the immediate here-and-now, narratives are a vital human resource in making sense of the world – and even in the making (construal) of that world itself. Indeed, some now suggest that it is the narrativizing faculty (with its other-orientedness or intersubjectivity and attention to goals and intentions), rather than simply a language faculty, that most sharply differentiates humans from other animals. Narratives reflect one of the key design features of the language faculty – displacement – although narrative is itself a faculty that can be realized in other media than the verbal. Narratives are also astonishingly various and heterogeneous in forms and functions, with rich possibilities for embedding of stories within stories.

In this article the focus is on contributions to the understanding of core elements of narrative that have come from narratologists and narrative poeticians, who chiefly consider fiction and film narratives; other analyses and models of narrative – e.g., those rooted in sociolinguistics, anthropological linguistics, ethnomethodology, and elsewhere – are addressed in a range of separate entries. One important development not addressed here because it is treated fully in a

separate article concerns the putative genderedness of narratives, narrative production, and reading (*see* **Narratology, Feminist**).

Core Elements: Story and Discourse

It may not be possible to offer here a wholly satisfactory definition of narrative, because the theories to be discussed have in fact objects of enquiry that differ from each other in significant respects. Nevertheless a minimal characterization may be proposed:

> a perceived sequence of nonrandomly connected events, i.e., of described states or conditions which undergo change (into some different states or conditions).

By 'nonrandom connection' is meant some connectedness that is taken to be motivated and significant. This principle is formulated in terms of "transformation" by the structuralist Todorov (1977: 233):

> The simple relation of successive facts does not constitute a narrative: these facts must be organized, which is to say, ultimately, that they must have elements in common. But if all the elements are in common, there is no longer a narrative, for there is no longer anything to recount. Now, transformation represents precisely a synthesis of differences and resemblance; it links two facts without their being able to be identified.

But perceiving nonrandom connectedness in a sequence of events is the prerogative of the addressee: the ultimate authority for ratifying a text as a narrative rests not with the teller but with the perceiver/addressee. Before structuralists and literary theorists and sociolinguists turned to narrative, however, it had been examined with considerable analytical sophistication by folklorists and anthropologists, tending to identify as narratives those stories where an initial state of equilibrium is disturbed by various forces of turbulence, before some sort of action (perhaps a magical intervention) leads to the restoration of a modified version of the original equilibrium.

Recent studies in narrative poetics have tended to divide the subject of study into two main domains or levels of inquiry. Thus, the early 20th-century Russian Formalists (Propp, Tomashevsky, etc.) distinguished *fabula* from *sjuzhet,* roughly equivalent to the more recent French (*see* **Benveniste, Emile (1902–1976); Barthes, Roland (1915–1980)**) terms *histoire* and *discours*. These are equivalent in turn to the widely adopted English labels (as in Chatman, 1978) of story and discourse. By the first term of each of these pairs is meant a basic description of the fundamental events of a story, in their natural chronological order, with an accompanying and equally skeletal inventory of the roles of the characters in the story:

> A fabula is a series of logically and chronologically related events that are caused or experienced by actors (Bal, 1985: 5).

This is the level at which we may expect the possibility (and impression) of 'total transfer' from one medium to another: everything at the level of story in, e.g., Dickens's *Great Expectations* can and perhaps should appear as easily in a film or cartoon version, or a ballet, as in the original written version. In a story outline all the events and characters are presented synoptically, with the minimum attention to, for example, complexities of sequence – it as if the paradigmatic raw materials of the narrative are displayed. The syntagmatic dimension, the linear distribution of event-and-character presentation, disclosure, elaboration, and so on, is severely attenuated.

Relatedly, the *sjuzhet* or *discours* of a narrative is the version of the core story that is realized in an actual cinematic or dance or literary creation. In fact both the process and the product – the realizing and the realized end product – are referred to by these terms. For *sjuzhet* and *discours* also denote all the techniques that authors bring to bear in their varying manners of presentation of the basic story.

In literary studies, discourse has been viewed as the more interesting area of narrative poetics, whereas story has been treated as a focusing on the preartistic, genre- and convention-bound basic event-and-character patterns of narrative, with scarcely any room for evaluative contrasts or discriminations, a level at which authorship seems an irrelevant concern. It is worth stressing that such a marginalizing of story is controversial in some quarters, where attention has been directed to the cultural and ideological 'work' done by certain kinds of recurrent story elements, character-types, generic plots, and so on. Despite such revaluations, this pair of terms remains current, with discourse understood as the artistic and individualized working with and around the genres, the conventions, the basic story patterns, in the distinctive styles, voices, or manners of different authors.

Events and Event-Structure

Propp's Morphology

The starting-point of Propp's famous study (Propp, 1968, originally published in Russian in 1928; *see* **Propp, Vladimir Iakovlevich (1895–1970)**) seems to have been something like the minimalist definition of narrative introduced earlier – a text in which there is recounted a change from one state to a modified state, i.e., an event. In his proposed 'morphology' of the Russian fairy tale, Propp offered an inventory of all

and only the fundamental events (called 'functions') in his chosen corpus of 115 Russian fairy tales. Looking particularly for recurring elements or features (constants) and random or unpredictable ones (variables), Propp concluded that although the characters or personages of the tales might superficially be quite variable, yet their functions in the tales, viewed in terms of the story's development, were relatively constant and predictable. Both the number (31 in all) and the sequencing of the functions is asserted to be fixed. Examples from the set of 31 functions include

1. One of the members of a family absents himself from home. (An extreme exponent of this function is the death of one of the parents.)
2. An interdiction is addressed to the hero.
3. The interdiction is violated.
16. The hero and villain join in direct combat.
31. The hero is married and ascends the throne.

Propp noted some internal patterning within the 31-function sequence. Certain functions clearly go together as pairs, such as prohibition and violation (2 and 3), struggle and victory (16 and 18), and pursuit and deliverance (21 and 22). Clusters of functions are also grouped under general headings. Thus, functions 1–7 are potential realizations of the 'preparation,' 8–10 are the 'complication,' and later general groupings include 'transference,' 'struggle,' 'return,' and 'recognition.' In addition to the 31 functions Propp identified 7 basic character types or roles:

villain; donor/provider; helper; princess (+ father); dispatcher; hero (seeker or victim); and false hero.

An actual character may fill more than one character-role (e.g., some individual in the tale may be both villain and false hero) and of course one role might be filled by several individuals (there might be several people jointly functioning as helper or villain).

Propp's methods have been used extensively, particularly in anthropological studies, and it is certainly striking that fictions rather remote from the Russian fairy tale (children's stories, TV crime series, etc.) do seem to lend themselves to Proppian analysis. But at the same time the question of reductivism has persistently undercut regard for Propp's work – particularly when attempts are made to apply it beyond the fairy tale. It is argued that the morphology is a model that severely distorts, because it sets on one side the important and necessary cultural context in which these tales occur and ignores also the varying details of stories. The counterargument is that a structuralist–morphological approach must necessarily 'reduce,' and explicitly sets out to shear off the nonessential from the essential, appealing to intuition. Truly uncovering intuitive judgments (rather than learned and conditioned ways of talking publicly about plots and plot structures) will always present difficulties. But the substantial degree of agreement that similarly acculturated groups of readers reveal, concerning what they regard as essential or not in plot and character and in other respects, suggests that some common sense of structure exists. Like all other kinds of common sense, this is undoubtedly relative to sociocultural determinants and ideologically motivated in subtle ways. But this generality of agreement and commonality of sense are the essential justification for the inductive speculations of Propp, Barthes, Todorov, and others (*see also* **Barthes, Roland (1915–1980); Structure and Structuralism: Semiotic Approaches**).

Barthes's 'Functions'

Barthes (1977 [1966]) proposed three major levels of narrative structure:

a. functions (as in Propp and Bremond);
b. actions (roughly, characters – cf. Greimas's *actants*, discussed later),
c. narration (equivalent to the *discours* or discourse described in the first section).

In fact Barthes focused almost entirely on the level of functions or narrative events, the level at which narrative is 'driven.' Every function has the effect of starting or developing a story line that will have consequences at a later point in the narrative; thus function is teleological. It is the means of achieving the overarching coherence of a narrative, rather than any merely local or proximate cause-and-effect logic. There are for Barthes two types of functions: functions proper (similar to Propp's) and indices. The latter include pointers to characters' psychological states, notations of atmosphere, and so on. Whereas functions proper are distributional, sequential, 'completed' further on in the story, and so have a kind of syntagmatic rationale and ratification, indices are said to be integrational, hierarchically oriented, empowered by the reader's relating of them to some higher, integrated level, a paradigmatic ratification. On a broad continuum, Barthes suggests, there are heavily functional narratives such as folktales, in contrast with heavily indexical ones such as psychological novels.

Barthes subcategorized both functions and indices. Thus, the former are of two types, nuclei (cardinal functions) and catalyzers. Nuclei are moments of risk, hinge-points or branches in story development, where events could proceed in two radically different directions; they are consecutive and consequential. Catalyzers 'fill in' between nuclei and are parasitic on

them; they are the prevarications and other accompanying actions that may flank a genuinely nuclear function. Indices can also be ranked for salience, with indices proper, charged with implicit relevance in, e.g., character portrayal, contrasted with informants, which are relatively insignificant and depthless identifiers. Furthermore, a unit can be a member of more than one class at time: it could be both a catalyzer and an index, for example. But nuclei (also termed kernels) remain the core items providing the necessary framework, the other three types being enhancements of these.

Even the smallest of these segments may combine into coherent sequences (in a way reminiscent of Propp's notion of clustering, and of phrasal syntax generally):

> A sequence is a logical succession of nuclei bound together by a relation of solidarity: the sequence opens when one of its terms has no solitary antecedent and closes when another of its terms has no consequent (Propp, 1968: 10).

For example, 'having a drink' is suggested as a closed sequence with the following nuclei: order a drink, obtain it, drink it, pay for it. Seeing a sequence in such a string of reported events, and labeling it as 'having a drink' is for Barthes the kind of projective interpretive activity readers are always performing in their narrative processing (this is later subsumed under the proaieretic code: see Barthes, 1970). Naming is the key act of mental processing, under the assumption that the reader is selective in attention in the course of reading or hearing a narrative and instead registers, and may even verbalize, the main threads of the narrative. The reader enacts an incremental and revisable précis making.

Despite the attractions of Barthes's basic four-way categorization of narrative material, problems immediately arose and persist concerning reliability of identification of nuclei, informants, and so on – i.e., concerning diversity of interpretation. It may be concluded that kernels and catalyzers are less textual givens than analytical constructions, and that, in true Saussurean structuralist terms, they are essentially relational units:

> What is a kernel in one plot or at one level of description will be a satellite [catalyzer] at another. For the hero to lie in wait for the villain is, at one level, a kernel, since it logically requires a temporal consequence: the villain arrives and is shot down. But at another level these functions are satellites which expand the kernel 'revenge,' the consequence of an initial kernel such as 'suffering harm' (Culler, 1975: 13).

In readers' retrospective processes of sense-making and plot-determination, Barthes's notion of sequence-identification, or something similar, must be crucially involved. But much of this model-building is guided by our cultural background and our assumptions about 'normal' behavior. It is because there is always this context of cultural significances and saliences 'around' all our involvements with narratives that Barthes says we have 'a language of plot' within us even before we approach any particular story (*see also* **Barthes, Roland (1915–1980)**).

In the last dozen years or so, many narratologists and discourse linguists have revisited such fundamental notions as event and 'eventhood,' the episode, narrativity, and the bases on which a causal and not merely sequential relation is inferred between events. In a plot-based approach to narrative those are clearly the fundamental building blocks of production and comprehension, but their linguistic shape and grammaticization (e.g., via contextually contrastive use of tense, aspect) or reflection in particular lexical choices, defy easy formulation.

Plot-intuitions and Summaries, and Grammaticization

In addition and perhaps in contrast with the assumption that his morphology uncovers the essential structure of a corpus of stories, Propp's work may be seen as an exploitation or display of (Russian fairy tale) readers' narrative competence, i.e., of the kinds of structuring and progression that story-recipients apparently expect and require in particular kinds of tales. This reader-oriented emphasis is the basis for research on sharedness of plot-identification and evaluation, ability to summarize plots and agreement on what constitutes a good summary, and agreement in recognition of the transformational relatedness of plots. Culler (1975) argued that evaluation of models of plot analysis must be in terms of the adequacy as models of aspects of readers' 'literary competence' (here, intuitive knowledge of plot essentials, plot similarities, etc.). But literary competence significantly contrasts with what is claimed of 'linguistic competence' in generativist theory, because the former is learned and markedly culture specific.

Relatedly, calling these culture-specific abilities 'intuitive knowledge' remains a matter of debate (significantly, in areas such as discourse analysis, in recent years, the emphasis on intuition has been displaced to some degree by one on shared knowledge, or common background). People can be better or worse at plot summarizing and can improve at

it. In Western societies, constructing and communicating plot summaries is a valued skill; it might not be so in a settled oral community, where a set time and social space was reserved for storytelling. There, to précis a plot might be either incomprehensible or taken as indicative of poor storytelling skills. In addition, literary texts are arguably a problematic testing ground for general principles of summarizing, such narratives being too category-marginal, too deautomatizing of plot logic, to be suitable exemplification of our standard ability to summarize. The case of literary fiction is perhaps particularly expressive of Henry James's famous rhetorical questions and their challenge to the structuralist assumption of the separability of event, character, and setting:

> What is character but the determination of incident? What is incident but the illustration of character?

At a more narrowly grammatical level, interest continues in the possibilities of specifying the typical grammatical features of, for example, fully narrative or functional clauses (and, by contrast, of nonnarrative clauses of description, evaluation, and background). Various functionalist-oriented linguists support the postulation of a set of lexicogrammatical features that may be most expected and salient in narrative clauses. Additionally, there may be a need to rank, from most expected or appropriate to least so, the range of options that are possible candidates at particular points in text structure. Thus, past tense transitive clauses of action, physical or mental, may be one kind of most expected clause in narratives (cf. the narrative clause *Goldilocks ate up all the porridge* with the more descriptive clause *Goldilocks was hungry*). Similarly there seem to be narrative–clause preferences for nonprogressive aspect (*ate* not *was eating*); *realis* rather than *irrealis* mode and positive polarity rather than negative (thus not *would (not) have eaten*); and a clearly individualized participant as subject and actor (not *the porridge had been eaten*). Some such set of preferred options in the grammar of narrative clauses may in turn guide a reader's real-time processing of text in the search for plot, constituting links between grammar and plot structure. But such lexicogrammatical tendencies are preferences or expectations, not stipulations hence are provisional and liable to be overridden in particular narrative situations. They and the provisional plot assessments they give rise to may need radical recasting as the reading process is enacted and completed.

Temporal Order, Duration, and Frequency

This section concerns the temporal aspects of the transformation and elaboration of a story as a discourse (as those terms were characterized earlier). A starting point must be acknowledgment of the heavily convention-laden nature of so-called story time and text time: in both cases a verbal representation of temporality, rather than actual temporal progression, is the focus of study. And the processes of time representation are made more richly complex by the fact that the performance of narrative reception – listening to an oral story, or reading a written one – itself involves some passage of time. Artifice and aesthetic issues are therefore involved here, where the reader/analyst may be postulating or assuming some kind of match between real-world temporality as this is implied in the story and our sense of time passing during the experience of processing the narrative discourse. Another kind of disruption of a steady linearity of the temporal dimension of narrative is entailed whenever a narrative involves more than one story line, i.e., more than one set of developing circumstances affecting at least partially distinct sets of characters. But even where the correlation between real-world time and text-world time seems least noticeable or manipulated as in pure direct speech storytelling (monologue or dialogue), it is probable that the actual extent of the reading time considerably exceeds that which would be spent in an actual enactment.

The most influential recent theorist of text time has been Gérard Genette (1980, 1988), who specified three chief dimensions of temporal articulation of story in discourse – order, frequency and duration – addressed in the following:

a. Order: the relations between the assumed sequence of events in the story and their actual order of presentation in the narrative. Any storytelling departure from the natural or logical order of events is an anachrony, these being achronological movements either back in time (a delayed disclosure of an earlier-occurring event, or flashback) or forward in time (a premature disclosure of a later-occurring event, or flashforward). Genette's terms for these anachronies are analepsis and prolepsis, respectively. An analepsis, further, may take the reader back to a time earlier than that which has previously been established as the starting point of the story, in which case the analepsis is termed 'external'; or the shift may be to an earlier time within the established frame: an 'internal'

analepsis. Both kinds of temporal jump may be either 'homodiegetic' or 'heterodiegetic,' i.e., relating events involving the same character or story line as was the focus of attention immediately before the textual shift (homodiegesis) or relating events involving some other character or story line than the one previously focused on (heterodiegesis). And more complex narratives, such as Genette's chosen study, Proust's *A la recherche du temps perdu*, show that there are ample opportunities for analepsis within analepsis, heterodiegesis within homodiegesis, and so on, and the functions of such anachronies are equally numerous. A caveat worth recording immediately concerns the need to distinguish fleeting anachronistic allusions to temporally distant events (e.g., in the course of character portrayal), from substantial shifts of temporal grounding, anachronies proper. The former may be better thought of as analeptic or proleptic traces, contributions to a rich narrative texture (in Barthes's terms, indices or informants rather than functions).

b. Frequency: the congruence, and means of divergence, between frequency of some event happening in the story, and frequency of its narration in the text. Modernist novels, such as Faulkner's, often reveal interesting manipulations of frequency, away from the singulative norm (telling once what happened once). Thus, Faulkner's *Absalom, Absalom!* focuses on the murder of Charles Bon, told 39 times in all, by various tellers; whereas *As I Lay Dying* involves multiple tellings of the death and burial of Addie Bundren, and *The Sound and the Fury* includes versions of particular events (from Benjy, Quentin, Jason, and a more detached narrator) from significantly contrastive perspectives.

c. Duration: for Genette, this covers the relations between putative temporal extent of events in the imagined world of the story, and the textual extent of treatment in the narrative: duration is both the most problematic and the most creative of dimensions of temporal formulation. Genette's interest is in narrative pacing as a text–internal strategy, rather than in relating it to external factors such as duration of reading time. Thus, textual pace at any point in a narrative is to be assessed relative to pace (protractedness or brevity of event narration) elsewhere in the same narrative. Thus, for every narrative, norm of pace can be derived, against which notional departures can be charted. Constancy of pace would emerge if the ratio between story duration and extent of textual presentation were invariant – e.g., a chapter for every year of a character's life, with a page for every month of each year. The weaknesses in this approach lies in its mechanical and simplistic treatment of what is rarely so simple a textual phenomenon – notations of time elapsed, in a story, may be scarce and ambiguous – and its failure to concentrate specifically on the sense of rapidity of disclosure that readers report experiencing in their reading of particular delimited scenes. The latter phenomenon, perceptions of local accelerated telling, may again be related to lexicogrammatical features, such as use of transitive clauses, many different clause themes and affected participants, and nonfinite progressive clauses.

It seems possible and reasonable to distinguish duration from narrative selectivity and discontinuity. The latter concern the various blocks of time that a reader infers must have elapsed between narrated events and ordinarily will have no special interest: e.g., where a character retires to sleep at the end of one chapter and is depicted taking breakfast the next morning at the opening of the following chapter. Duration and variations of duration are not concerned with narrative gaps of this order, but rather with variations of extent in telling, from the evidently protracted to the evidently neglected or suppressed, of those things that are indeed told.

The extremes of textual duration are ellipsis (no textual treatment of some temporal segment of the story) and descriptive pause (textual presentation of that which involves no passage of time in the story). But more widespread are relative accelerations and decelerations, commonly labeled 'summary' and 'scene.' Shift of duration from the summary to the scenic is typically taken as a narratorial indication of the importance of the events and conversations so presented, whereas a shift from the scenic to the summary will often be taken to signify that the reported events are of secondary or backgrounded importance. Consequently, shock and ironic effects can be achieved by textual inversion of such norms – fleeting depiction of some cataclysmic event, framed by lengthily described routine matters. A complication common in modern novels is the attribution of choices in textual duration to a character within the narrative, whose thoughts are being represented, rather than to an external narrator. Thus, within the single scene of Peter Walsh's morning visit to Clarissa Dalloway (in Woolf's *Mrs. Dalloway*) there are both scenic and summarized mental recollections, by Clarissa, of their encounters in the past. And this recollected material is part of a story of far greater time span (Clarissa's life) embedded within one of relative brevity (Clarissa's day). As a unit within the framing narrative the reminiscence maintains normal

order, apparently text–normal duration, and singulative frequency. But as a separate narrative embedded within the framing narrative, it is marked by various anachronies, with variations of duration (some recollected events are highly summarized) and some repetitive frequencies. Useful as such applications of Genettian order and duration may be, they seem not to address directly the reader's experience of the text, which is primarily linear, whatever the narratorial practices of temporal reordering and embedding. In complex ways that may resist analytical unraveling, readers may – and arguably have to – synthesize the story of things happening with that of happenings remembered. In such a holistic reading, Mrs. Dalloway's reminiscences may paradoxically be both timely as well as anachronistic, past in actuality, present in consciousness.

Character

Until recently, there was noticeable neglect of character by narratologists (but important recent contributions include books by Phelan, Culpeper, and M. Smith). Some of this neglect reflected ambivalence about the ontological status of characters or individuals in fictional narratives, itself a reaction to lay and literary critical tendencies to talk and write about fictional characters as if they were real people. By contrast structuralists saw character as mythical in the sense of involving fabrications and illusions to a powerful and compelling degree; for that very reason it was taken to be a core principle device of narrative, whereby addressees are drawn to assess and evaluate a story's actors by their own deepest-held standards (ethical, social, or aesthetic). The compelling illusion is one in which the reader is a creative accomplice: a variety of descriptions of some posited individual, together with descriptions – implicit or explicit – of that individual's actions and reactions, suffice to lead most readers to conceive of a person of whom these references and insights are just glimpses.

The strictly structuralist–semiotic view is that all character descriptions are notations, linked by nothing more psychological than textual devices asserting coreference (repetition of a name, of pronouns, and of definite descriptions), comprising a fabric of interwoven traces: message-bearing (semiotic) data on the status, goals, drives, consciousness, etc., of a person embedded in some particular culture, located in history, shot through with various (potentially inconsistent) values and beliefs, defined by their putative gender, class, ethnicity, and subtler affiliations. The text of the person, in narratives, belies individuality and at every point discloses typicality. This 'purist' approach to character asserts the nonrepresentational dimension in narrative art, treating Hamlet and Dorothea Brooke as textual entities (things), not people.

What is most apparent in this contrast of approaches to character, the individualizing approach (where the reader is 'seduced' into suspending their disbelief and apprehending the character as a person) versus the constructivist (where the reader remains resistant, detached, and judging of the narrator's efforts to represent characters), is that they counterpose quite different ways of reading, ways that adopt quite different criteria for reading narrative, and for the identification of great narrative, in the first place. (In part, too, the debate is related to a foundational one about naturalism versus conventionalism in semiotic systems, and the ontological status of representation.) A dual perspective is needed, where we see characters in a different light according to the change of perspective. Most readers continue to perceive characters (particularly in novels) as individuals (whether seen dimly or sharply, fathomable or alien), and as those perceptions are built up, revised, and articulated, all sorts of extratextual knowledge, including knowledge of characters in the everyday world, is brought to bear. The reverse is also true: our experiences of literary and film characters affecting our construction of ourselves and others. Such practices are consonant with a theorizing of fictional and nonfictional worlds that assumes that in both a semiotic constructedness of people, things, settings, and events operates, so that both the fictional and the nonfictional are representational to their roots.

Greimas's Actant Model

One attractively simple model of character-roles in narrative, a tellingly workable anatomy that has been adapted and applied in diverse fields, is that of Greimas (1966). He has proposed that, as general categories underlying all narratives, there are just six character roles, or *actants*, comprising three interrelated pairs: giver: receiver; subject: object; and helper: opponent. The six roles are usually diagrammatized as shown in Figure 1.

Such a model fits many traditional folk and fairy tales remarkably well: the subject or hero, perhaps a young man of lowly origin, seeks marriage to a beautiful princess (object), in which case the man will also be beneficiary (possibly the princess and the country will too). In his quest he is helped generously but with

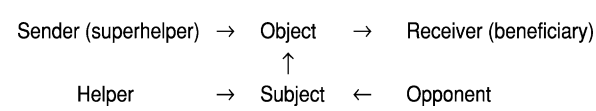

Figure 1 Greimas's actant network.

limited success by a friend or relative (helper), but their combined efforts count for little, in the struggle against some opponent (a wicked uncle of the princess, some other eligible but ignoble suitor), until a sender (better, a superhelper) such as the king, or God, or some individual with magical powers for good, intervenes.

Despite the model's simplicity, and despite the need to annotate it variously so as to fit different genres better, the scheme is worth applying to a range of texts, from religious stories to Henry James's *The Ambassadors*. One thing to note is that two of the 'roles,' Sender and Object, are not typically strictly characters at all in most modern stories: modern literary narratives are likely to have quality of life, liberty or liberation, the pursuit of happiness, or greater self-knowledge, or mental peace, as their object. Nevertheless there remain plenty of spy stories, westerns, romances, and detective stories, however, where a particular concrete object is clearly the target. The role of higher help is interestingly problematic: in a secular and rationalist society, there is evidently some resistance to adult narratives that invoke such a role.

Greimas's six-role schema seems particularly applicable to advertisements, where the targeted consumer is understood to be both subject and receiver, the object is something contributory to a new or improved lifestyle, while the marketed product often functions as superhelper. In a range of product-oriented advertisements there is a narrative-style emphasis on change of state, and the product providing some important assistance in that transformation. However, this narrative format tends to fall away in the promotion of truly luxury items, such as perfumes, fur coats, very expensive cars, and so on. In these, a more synecdochic relation seems to obtain, where the product is presented as intrinsic part (however small) of the chic and elegant lifestyle that the advert typically portrays. The product is part of the object, rather than representing the sender.

Character Traits and Distinctive Feature Analysis

In many modern narratives of the more complex kind, details of characterization – the kind of material that Barthes labels as indices or (mere) informants, often irrelevant to story – are just what the reader finds most engrossing. In evaluating such material, readers are inevitably guided by real-world background knowledge, the mental scripts and schema that we bring to our reading of any narrative, derived from our previous experiences of individuals, events, and situations. Such knowledge has been characterized as an interwoven complex of facts and ideology. Some of this knowledge is perhaps particularly important, as it can underpin a kind of feature analysis of the characters.

A semantic feature analysis (loosely analogous to distinctive feature phonology) of the characters of a tale involves specifying a limited list of what the analyst takes to be the crucial and contrasting attributes that distinguish particular characters. From this viewpoint, extensive description of character is secondary and even undesirable (just as, in the similar phonological analysis, the minimum set of contrasts needed is the preferred set). Although comparison and contrast of characters in terms of attributes is basic, a refinement of the method involves assessing variations in degree (how weakly or strongly?) and modality (how probably or usually?) of an attribute. And in light of the importance of change to narrative, a further enrichment is where a character's shift in 'trait realization,' e.g., from being proud and presumptuous to being chastened and grateful, can be recorded. Given the nature of narratives and their reception, the method does not assume the same level of agreement in analysis, powers of prediction, and replication, as are claimed for distinctive feature analyses in phonology or semantics. Rarely will reader analysts agree over the precise set of features appropriately present or absent in a text's characters. Such variant emphases, in analyses, are in themselves and in their reflection of analysts' assumptions an indication of ideological and interpretive diversity. The feature matrices that this method nurtures are often held in low esteem today, yet a great many critical commentaries on literary narratives draw, in their discussion of character motivation and appropriateness of plot development, on informal accounts of characters' crucial traits. A more difficult charge to refute is that the model takes reductive structuralism to an extreme, so that the given texture of characters, their syntagmatic extension through a long narrative, is largely neglected.

Names and Faces

Names and faces are so typically attributes of individuals that are immediately in the public domain, and so often regarded as unique and indicative, that they are a staple resource for characterization. In matters of naming, textual designation of a character by way of proper name, or definite descriptions, or pronominally, is a basic choice that often reflects narratorial point of view. The effects of irony or sympathy, approval or distaste achieved by particular naming strategies can be quite complex, given that there is usually an ongoing designating of several characters, in any stretch of text, by these varied means.

Another heavily exploited means of characterization, often with the assumption that outer surfaces

reflect inner essence, is description of characters' outward appearance – especially clothes and facial features. Given the rarity of surgical adjustments of the latter, one commonsense rational assumption is that looks, build, and physical qualities of an individual (and so, a character) are both given and arbitrary, certainly rejecting any claimed causal link between appearance and personality (such theories of physiognomy and phrenology, popular in the 19th century, influenced writers such as Balzac and Dickens). On the other hand, common sense also recognizes the multiple consequences, in life, that particular physical attributes can assist or impede. Physical attributes are in this sense facts in the world, constraining and defining individuals in very real ways (sex, skin color, and physical handicap being three of the most socially defining). Cyrano's protruding nose, Falstaff's vast belly, Esther Summerson's disfigurement by smallpox, and Othello's blackness are just a few instances where body, life, and narrative fate seem to interact. Then again, some features of physical appearance such as body shape, hairstyle, facial expression (propensity to frown, with head lowered, versus a smiling disposition with an 'enquiring' tilt of the head) are judged to be partly under a character's control, something for which they can be held accountable.

The source of character apperception that is perhaps most complex to chart – using structuralist or any other methods – is the process of implicit characterization based on how a character acts and reacts. Twentieth-century fiction has tended to opt for the indirectness of presentation, a 'showing' of character that respects the ability of the reader to infer, evaluate, and draw conclusions on the basis of presented behavior, rather than direct (and directive) presentation, an authoritative one, of how a character is. But the multiplicity of types and formal exponents of what Barthes first called indices and informants and later (in *S/Z)* assimilated to five overarching interpretive codes, seem triumphantly resistant to grammarlike modeling.

Characterization through Dialogue

One of the most striking things that characters do in literary narratives is speak and think, and the nature and structure of characters' reported discourse is treated in several independent entries (*see*, e.g., **Dialect Representations in Texts; Speech and Thought: Representation of**). But some evidence is also derived from *how* characters in narratives participate in conversation: how cooperatively, aggressively, sensitively, and so on, they interact. Models that have been widely applied in such analyses of fictional dialogue include the ethnomethodologically oriented tradition of conversation analysis (Sacks, Schegloff, etc.), the discourse analytical system associated with linguists at Birmingham University (exemplified by Burton, 1980), and more pragmatic and social psychological approaches that focus on how individuals' conversational contributions are shaped by concern to maintain an appropriate image of self and other, so that 'face,' 'politeness,' and other pragmatic principles are greatly affecting just how turns of talk are formulated (see especially Goffman 1981; Leech, 1983; Brown and Levinson, 1987). But probably the greatest influence has been wielded by Grice's seminal paper of 1975, in which his Cooperative Principle and its four subsidiary maxims of quality, quantity, manner and relation are outlined, together with his account of how addressees (including here, readers) derive implicatures concerning the speaker's covert or indirect meaning, where there seems to be a calculated departure from simple maxim observance.

Setting

Though less essential to a narrative than event and character, the establishment of an identifiable setting is a strong psychological preference in most readers. We like and expect clear spatiotemporal indications of just where and when a thing happened. However, this specificity requirement seems relative to genre and story type: some fables and folktales do not need elaborate details of setting, nor do certain speculative or psychological stories, whereas Kafkaesque or Beckettian stories may appear deliberately to withhold setting.

In the novel, settings (especially but not exclusively residential ones) are often depicted at length and come to seem inseparable from character and motivation: they may function like a character (at least a Forsterian flat one), and be the cause of various events. In novels by Fielding and Austen, particular houses, country estates, inns, parsonages, and cottages are instrumental in this way, as may be the contrast between a drawing room and an open-air encounter. In analyzing fiction from the late 19th century onward, critics have come to attend to questions of public and private space and gender, and changes in these, especially where implicit norms in these matters have functioned to confine women to their 'proper place.'

Although it is customary to talk of the relations between setting on the one hand and character and events on the other as either causal or analogical, often texts are indeterminate between these two types of relation. Hardy's characterizations of Egdon Heath in *The Return of the Native*, for example, are so distinctive and compelling partly because we sense

but cannot fathom the influences the heath has on specific characters. But even quite conventional and 'undramatized' settings play an important part in promoting verisimilitude and indirect characterization.

Narrators, Narration, and Focalization

A distinction in narratives may be made between:

a. the individual or position we judge to be the source and authority for whatever words are used in telling; and
b. the orientation we infer to be that from which what gets told is told.

The first of these factors is 'narration'; the latter, arguably only a highly developed aspect of the former, is known as 'focalization.'

Narrators and Narration

Just how many optional or obligatory roles are involved the process of narration remains richly controversial. Many narratologists (e.g., Chatman, 1978: 151) identify as many as six major participants (Figure 2).

In Chatman's discussion, the real author and reader are left out of discussion, on the grounds that their 'implied' counterparts are their functioning substitutes in the business of narrative transmission, and the further claim is made that the narrator–narratee pair are optional positions. Others, perhaps chiefly concerned that study of literary narratives should not appear unrecognizably different from more comprehensive study of narratives in society, have argued for just three essential roles in narrative transmission, and an optional fourth (e.g., Toolan, 2001) (Figure 3).

It is no accident that of the six roles usually discussed in narratological studies, these three are the ones that are robustly present on the surface of narrative texts and the most deeply recalled when we ordinarily think about narratives. By contrast, the implied author, the narratee, and the implied reader are rather more notional: potentially analytically important, but in more oblique ways.

The implied author is the mental picture of the author that a reader constructs on the basis of the text in its entirety. That such an imagining of the author can and often is undertaken is easiest to see where we read an unattributed text. More important than the general characteristics a reader might impute to the implied author are the values – the ideology – that, rightly or wrongly, the reader imputes to him or her. The reader reasons that in having constructed the kind of narrator to be found in the narrative and in having written about the kinds of things here written about, and written about in just the way found here, the implied author must tacitly subscribe to these particular values rather than others.

The notion of the 'implied author' was first proposed by Wayne Booth (1961), who suggested that each of an author's novels projects a different 'official version' of that author and his or her values. But such versions can be separated from the actuality of authorial narrative production: they may be important in narrative reception and critical theory, but are arguably irrelevant to narrative production. In this view, the 'implied author' is a real position in narrative processing, a receptor's construct; but it is not a real role in narrative transmission. It is a projection back from the decoding side, not a real projecting stage on the encoding side. That is to say, it is extremely doubtful whether writers do set out to create an implied or refracted version of themselves, perceptible by the reader, over and above (and logically prior to) the creation of a narratorial persona, in each of the fictions they embark upon. It is harder for most readers than Booth assumes, to keep in mind and separate an 'official scribe' and an 'official narrator.'

Although sociolinguistically oriented narratologists argue for a reduction of the production side of narrative transmission from three participants to two, they tend to simplify the reception side even further: they disregard two of the participant roles assumed in much narrative poetics (narratee and implied reader) and treat only the real socially situated reader as central. Again, this reduction involves no denial that narratee and implied reader are important strategic positions in the processes of narration and narrative reception (for vigorous defense of poeticians' enlarged view of the narratee, see especially Prince, 1983). The narratee is an individual, whether involved in or detached from the events of the story, who is directly addressed and to some degree characterized by the narrator (the process of characterizing an addressee is important: on this criterion, many first-person narratives of *prima facie* 'direct address' do not have an addressee: *Tom Jones* has such a narratee, *Great Expectations* does not). Very occasionally narrators address their discourse to themselves, but much more typically the addressee is a character–receiver within the story, even if one seemingly marginal to the action. Sometimes, as in Sterne's *Tristram Shandy*, a narratee

Real author → Implied author → (Narrator) → (Narratee) → Implied author → Real reader

Figure 2 Participants in the process of narration.

Author → Narrator → (Narratee) → Real reader

Figure 3 Core participants of narration.

is playfully conjured up and, for instance, castigated for inattentiveness. But in all such cases, with their overt and displayed addressee-constructions, the narratee position is less than a proper part of the framework of the telling and is rather an integral device in narrational strategy. Almost invariably, the narratee is addressed by an intradiegetic narrator, i.e., not the narrator of the narrative in our foundational sense (the source or agent for everything that gets told) or, in Bal's words (1985: 120): "that agent which utters the linguistic signs that constitute the text."

The 'implied reader' is another reader-based construct, like the implied author: it is a picture, based on the text in its totality, of the kind of reader or archetypal reader that real readers assume that the text has or had in mind as its audience. Inferencing and stereotyping is involved in positing any text's implied reader. It usually seems easier to sketch the implied reader for narratives that are themselves rather generic and formulaic; it is harder to say who is, or is not, the implied reader of any particular literary masterpieces. The notion of the implied reader, and its implication that certain readers are directly addressed or interpellated whereas others are not, is always likely to provoke contention and controversy. But the ascription of a particular kind of implied reader to particular kinds of texts certainly happens, and to that extent this secondary role or notion is valuable. Rightly or wrongly, in the face of a certain kind of writing (which appears to treat one gender or ethnic group or nationality or class or professional or technical group, etc., as insiders) we assume that the author had a particular kind of reader in mind. Nevertheless, actual readers and audiences can assimilate stories in quite unpredicted ways, seeing a different point to them and picturing quite dissimilar authors of them.

Relations between Story and Narration

Among the more significant of these is the time relation between postulated events and their narration. The commonsense norm for written narratives, perhaps reflected in the use of past tense, is for events to precede their narration: by anything from just a few minutes to many years. But we can also get 'anterior narration,' a telling of what, it is asserted, will happen. A third type of narration, simultaneous with the action, reports events as if they were currently taking place (in the present tense). Of course, the simultaneity is notional rather than real, creating the effect of minimal story-to-narration distance: such narration is akin to news film, in which we see things as if they were just happening, even if the film is broadcast many hours after the incidents have taken place. Intriguing subsidiary effects also seem to derive from use of simple present tense in literary narration, reflective of that tense's commonest uses: particularly, a sense of habituality and even of the quasigeneric in some of the events and states reported. Simultaneous present-tense narration is popular with many contemporary novelists (Updike, Bradbury, Coetzee, Gordimer, and many more).

Framing or embedding relations are also important – for example, the coordinate chaining of several stories within a single text or the embedding of one story (told by a character, for example) within another (about that character). In Genette's terms, the latter case is one of a main story (the diegetic level) narrated by an extradiegetic narrator and an embedded story (the hypodiegetic level) with an intradiegetic narrator. Hypodiegetic narratives commonly serve to advance the action of the first narrative, to explain the background of the first narrative (analepsis is often involved here), or, through similarity of theme with that of the first narrative, to enhance that theme by implicit comparison.

A Typology of Narrators

Literary criticism uses a number of well-established terms for distinguishing kinds of narrator and, by extension, kinds of narration, and many of them continue to be used by linguists. The terms often appear to constitute binary alternatives: *third-person* vs. *first-person* narration; within third-person narration, *omniscient* vs. *limited* narration; and, within omniscient narration, *intrusive* vs. *impersonal* narration. Although invaluable, these terms are far from uncontroversial, and they also direct attention to the narrator, whereas the schemes to be introduced next focus more directly on the narration (and derive tentative characterizations of narrators therefrom). These latter schemes are thus more text linguistic and less psychological in orientation, and thus more suited to a linguistic study of narrative.

Following Genette, first distinctions are made between narratives where the narrator figures within the world of the story they tell (intradiegetic), or is outside it (extradiegetic); and where she or he is an involved story participant (homodiegetic) or a peripheral reporter (heterodiegetic). More linguistically complex are gradations in the narrator's prominence within the telling. The kinds of textual material listed following are indicative – in order of increasing intrusiveness – of narratorial presence and of claims of increasingly full knowledge and understanding of whatever story is articulated:

a. Descriptions of settings
b. Identification of characters
c. Temporal summaries
d. Definition of characters

e. Reports of what characters did not think or say
f. Commentary: interpretation, judgment, and generalization

There are also degrees of intrusion and understanding within any of these stages; for example, descriptions of the same setting may range from the vague and superficial to the precise and detailed. Such a scheme is one way of attempting to measure narratorial control or power or more precisely the effects and illusion of control (or 'mastery' and management) that a particular style of narration conveys to the reader. But it is not just a matter of control – as in a sense the reader knows that the author controls everything anyway. It is perhaps more the effect of the narrator displaying their foreknowledge of what (they know) will transpire, the final nature of the characters, etc.; some narratives do not advertise or display their possession of this foreknowledge.

An alternative and equally effective typology of narrators is of the kind suggested by Uspensky (1973), whose approach is congruent in many respects with the early 20th-century Jamesian poetics of Lubbock. Fowler (l986) is a convenient exposition of this typology, in which there are just four basic types of narration, grouped into pairs on the basis of whether the narration is internal and intrusive or rather external and limited:

> Internal narration is, then, narration from a point of view within a character's consciousness, manifesting his or her feelings about and evaluation of the events and characters of the story (which I shall call type A); or from the point of view of someone who is not a participating character but who has knowledge of the feelings of the characters – the called 'omniscient' author (type B). 'External' point of view relates the events, and describes the characters, from a position outside of any of the protagonists' consciousnesses, with no privileged access to their private feelings and opinions (type C), and in some cases actually stressing the limitations of authorial knowledge, the inaccessibility of the characters' ideologies (type D) (Fowler, 1986: 135).

In recent years, as an interesting revision of the Fowler/Uspensky scheme, which yields nine distinct narrative modes, Simpson (1993) has proposed a typology that merges two three-way distinctions. The first of these is between first-person, third-person narratorial and third-person reflector (or 'limited' to one character, as in Jamesian novels) types of narration; as these are familiar distinctions no more need be said about them here. The second three-way distinction is between narration that is positive and 'engaged' in modality (especially that expressing wishes, desires, and obligations) and in evaluation (including epithets and generic sentences); narration that is negative and 'dissociated' in modality (especially that expressing epistemic uncertainty, and assertions qualified by perceptual language: what *seemed*, *appeared* to be the case, etc.) and in evaluation; and narration, which is neither of these, but neutral, 'objective,' largely confined to the observable facts. This last, neutral mode is suited to physical description rather than psychological development (as in Camus and Hemingway). Each of the voices (first-person, third-person narratorial, etc.) can adopt any of the three stances (positive, negative, neutral), giving rise to nine notional distinct modes of narration. In practice, actual narratives can modulate frequently and subtly between these modes, especially among the three posited stances (and of course the more numerous the postulated types, the more noticeable such modulation becomes).

In Simpson's scheme as in Fowler's, a major emphasis is on identifying the linguistic markers of these distinct narratorial stances toward the material that is being reported. But in both these schemes it could also be suggested that so much bearing on 'point of view' is addressed that the phenomenon known as focalization, to be described in the following section, really has no scope for fully independent existence.

Focalization

In the process of telling a narrative, and the concomitant specifications of time and place, some perspective or other is always implied as the vantage point from which spatiotemporally determinate events are related. This inescapable adoption of a (limited) perspective in narrative, a viewpoint from which things are seen, felt, understood, and assessed is now (following Genette, and Bal) widely referred to as 'focalization.' Focalization is least problematically a matter of visual perception (cf. the Anglo-American counterpart critical term: point of view). But in a more liberal interpretation it concerns all aspects of narrative orientation, including the cognitive, emotive, and ideological.

Unlike the older notion of point of view, the term focalization may help to keep analytically distinct two major aspects of narrative practice:

a. The orientation from which what gets told is told
b. The individual who seems to be the source for whatever words are used in the telling

These two aspects may be summarized in the question, 'From whose perspective do we "perceive"?' and 'Whose words do we "hear"?' In many narratives, perspective and speaking are sourced in a single individual. But speaking/thinking and seeing need not come from the same agent. There are numerous

cases where a narrator 'undertake[s] to tell what another person sees or has seen' (Rimmon-Kenan, 2002: 72). In the early chapters of *Great Expectations*, for example, the narrator is Pip the adult, with an adult's extended vocabulary, whereas the focalizer is Pip the child. A corollary of the notion of focalizer or agent-of-the-focalization is that there must also be someone or something that is the object of the process: this entity is termed the 'focalized.'

Focalization may be external or internal. External focalization occurs where the focalization is from an orientation outside the story and is not associatable with that of any character within the text: in such cases the narrator/focalizer distinction tends to collapse. Internal focalization usually takes place inside the setting of the events and almost always involves a character–focalizer, though some unpersonified stance could be adopted. In Faulkner's 'Barn Burning,' the boy Sartoris is often the focalizer, because the story is told largely from his orientation, though he is not directly responsible for the words used, as this extract from the opening indicates:

> The Store in which the Justice of the Peace's Court was sitting smelled of cheese (1). The boy, crouched on his nail keg at the back of the crowded room, knew he smelled cheese, and more: from where he sat he could see the ranked shelves close-packed with the solid, squat, dynamic shapes of tin cans whose labels his stomach read, not from the lettering which meant nothing to his mind but from the scarlet devils and the silver curve of fish . . . (2). He could not see the table where the Justice sat and before which his father and his father's enemy stood, but he could hear them (3).

Here, sentence (2) expresses exclusively the boy's orientation, whereas (1) is less specific, what anyone inside the store would perceive; and (3) mixes the boy's focalization ('he could hear') with information about the relative positions of the Justice and his father and the table, which we are explicitly told the boy could not see.

Like the two types of focalizers, there are also two types of focalized, where the distinction is between viewing from outside or from within.

The great interest in focalization lies in its function of revealing both the focalized and the focalizer. Here, too, one can distinguish between focalizeds that readers accept exist in the world of the narrative and those taken to be dreams, fantasies, or other figments of the character–focalizer's imagination. Some narratives productively exploit the reader's uncertainty as to whether what is focalized is actual – and potentially public experience – or imagined and hence an index of psychosis (a celebrated example is James's *The Turn of the Screw*).

A final facet of focalization–variation is the ideological. It could be said that all text containing either explicit or implicit evaluation of the major categories or classifications that inform our daily lives and/or evaluation of known individuals or groups or positions that are regarded as ideological is disclosing significant ideological orientations or focalizations. Often, it seems, one ideology or worldview, of an external narrator–focalizer, is the dominating norm, and any characters' ideologies that deviate from this standard are at least implicitly (and sometimes explicitly) censored. On the other hand, there may be a juxtaposition of different ideological orientations without any overt adjudication between them, so that the reader is torn between different views of certain events in particular and (by extension) the world in general (on this rich topic, see Bakhtin, 1981; *see also* **Dialogism, Bakhtinian**).

Unreliable Narration

A narrator may willfully or unwittingly distort, mislead, or suppress important information. The interest is primarily in the reliability or otherwise of intradiegetic narrators, i.e., narrators visible – if only by way of the first-person pronoun – within the narrative. Unreliability constitutes another text-processing burden for the reader; and the linguistic interest is in specifying the chief text–linguistic patterns or indices of unreliability and of levels of unreliability. But it remains true that narratorial unreliability is not always traceable to textual cues – particularly where the unreliability is in essence a simple silence or secrecy on certain issues.

Unreliability takes many forms, though the general principle is that unreliability is attributable to any narrator the veracity of whose account the reader comes to suspect. Some narrators are liars or consciously flatter themselves and are clearly intended to be seen as attempting to deceive. Other narrators mislead for less culpable reasons: e.g., the limited knowledge of a young narrator, or one with limited mental capacity like Benjy in *The Sound and the Fury*. Personal involvement with events – especially when the narrator is a direct or indirect victim of those events – may often give rise to narratorial suppression, distortion, prevarication, and so on (as one example, consider Rosa's account of events in *Absalom! Absalom!*). Abnormal values may give rise to a type of unreliability that makes it difficult to decide whether we have a normal narrator telling terrible things with much covert irony, or simply an awful narrator. The great attraction and danger of unreliable narration is, as Booth (1961) rather regrets, that no clear moral or ideological stance is spelt out and held

to, and we as readers are not *told* what to think. But a fully articulated theory of what unreliability consists in, and of the grounds for attributing it to one narrator but not another, remains elusive and contentious. For important recent discussions of the topic, which also usefully challenge us to rethink what we mean by *reliable* narration, see Yacobi (1981), Wall (1994), Nünning (1999), and Fludernik (1999).

Psycholinguistic and Cognitive Studies of Narrative

Much psycholinguistic research has been undertaken into the question of whether humans develop mental frameworks specifying the standardly accepted linear and hierarchical structuring of stories, which frameworks they can then use as an aid in the comprehension, storage, and recall of actual stories (see especially Mandler, 1984). These mental frameworks are termed story schemata, and their probable configuration can be represented on the page as a grammar. Hence researchers in this area are often described as story grammarians.

New applications of story grammar theory continue to be proposed. The primary foci of attention remain story recall and comprehension in normal and cognitively impaired adults and children – for example, presenting one group of readers with a story that is slightly scrambled story-grammatically, and noting the effect on readers' rate and extent of recall when compared with a control group's performance with an unscrambled ('grammatical') version of the story. But besides studies of recall and comprehension, the theory has also been interestingly invoked in identifications of and predictions about defective ('ungrammatical') stories.

In recent years, many branches of literary linguistics have taken a 'cognitive' turn, including narrative, so that this new approach merits an article of its own (*see* **Narrative: Cognitive Approaches**). Distinct from the latter are those studies rooted in linguistic pragmatics and philosophy, which attempt to specify the basic types of logical, informational, and evaluative inferences that story processors must use in comprehension. The study of inference making and inference triggering seems likely to grow in importance, not least because it broaches the daunting but essential task of modeling aspects of the interaction between situated discourse and what is sometimes called 'background knowledge' but has recently been dubbed 'impliculture' (Bhaya Nair, 2003).

See also: Barthes, Roland (1915–1980); Benveniste, Emile (1902–1976); Dialect Representations in Texts; Dialogism, Bakhtinian; Narrative: Cognitive Approaches; Narratology, Feminist; Propp, Vladimir Iakovlevich (1895–1970); Speech and Thought: Representation of; Structure and Structuralism: Semiotic Approaches; Structure and Structuralism: Semiotic Approaches.

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Narrative: Sociolinguistic Research

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Labov and Waletzky, 1967

In the sociolinguistic quest to 'tap the vernacular', one of the richest sources of data comes from narratives of personal experience (Labov, 1972; Labov and Waletzky, 1967). As the narrator becomes immersed in the details of the narrative itself, he is "no longer free to monitor his own speech as he normally does in face to face interviews" (Labov, 1972: 355), hence mitigating the 'Observer's Paradox' (Labov, 1970: 32). Thus, this type of data provides a wealth of largely unmonitored speech amenable to analysis of variable lexical, phonetic, and morphosyntactic forms. However, these narratives of 'ordinary people' (Labov, 1997: 397) which are commonplace in sociolinguistic data, have a more intrinsic interest: the internal structure of the narrative itself. These funny, tragic, trivial tales may appear to be idiosyncratic to the individual narrator, but despite their disparity vis-à-vis content and style, similarities in linguistic structure and function abound.

In an attempt to uncover the underlying mechanisms at work in the course of telling and retelling narratives of personal experience, Labov and Waletzky (1967: 12) propose an analytical framework which isolates "the invariant structural units which are represented by a variety of superficial forms." In other words, the deep level structures which map onto surface-level variations. Although this framework is nearly 40 years old, it "continues to dominate the field," (Macaulay, 2002: 289) alongside more wide-ranging treatments of narrative (e.g., Prince, 1983; Linde, 1993). It has thus remained the bedrock for sociolinguistic narrative analysis over the last few decades.

Fundamental to this framework is (1) the clause as a grammatical unit, and (2) the semantic functions of these clauses. The individual clauses are grouped into sections which have different functions within the story. Labov (1972: 359–360) defines narrative as "one method of recapitulating past experience by matching a verbal sequence of clauses to the sequence of events which ... actually occurred" (see also Labov and Waletzky, 1967: 201). A minimal narrative contains "a sequence of two clauses which are temporally ordered" (Labov, 1972: 360–361), as in (1) and (2):

(1) and I took his nappy off
and as I took it off literally he pooped all over the cubicle!
(2) and then his mum and dad woke up
and Mel punched his dad

(All examples come from a large number of narratives collected at the University of York (Smith *et al.*, 2002–2004) by students enrolled in the course Variationist Narrative Analysis).

These chronologically ordered clauses, or **complicating actions** (Labov and Waletzky, 1967: 32) provide the **referential** function of the narrative, reporting 'a next event' in response to the potential question 'What happened [then]?' (Labov, 1997: 402). They provide the backbone of the story and are the 'most reportable event' (Labov, 1997: 404): without these, there is no narrative. (The complicating action is often terminated by a result or resolution, "the set of complicating actions that follow the most reportable event" (Labov, 1967: 414).

However, most narratives are not this minimal, and, significantly, one "which serves this [referential] function alone is abnormal: it may be considered an empty or pointless narrative" (Labov and Waletzky, 1967: 13). In addition to the question 'What happened next?', we also want to know 'What's the point?'. Labov refers to this as the **evaluative** function of the narrative.

Evaluation clauses in a narrative contain statements or words that tell the reader what to think

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Narrative: Sociolinguistic Research

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Labov and Waletzky, 1967

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Evaluation clauses in a narrative contain statements or words that tell the reader what to think

about a person, place, thing, event, or entire experience. They are "the means used by the narrator to indicate the point of the narrative, its *raison d'être*: why it was told, and what the narrator is getting at" (Labov, 1972: 366). They give the story reportability and make it worth telling. These clauses can be highly embedded within the narrative itself and can include evaluation of a third person as in (3).

(3) And so he said in future years he'd only shag actresses.

On the other hand, it can be a much more direct statement about the narrator's feelings, as in (4):

(4) They've just got absolutely no scruples about owt.

The circumscription of evaluation, both structurally and semantically, has proved to be the most problematic. Its defining qualities underwent substantial revision in Labov (1972) and Labov (1997).

Added to the referential and evaluative function of narrative are orientation, abstract, and coda.

The **orientation** section of a narrative contains statements that provide the setting or context of a narrative which "serve to orient the listener in respect to person, place, time, and behavioral situation" (Labov and Waletzky, 1967: 32), as in (5):

(5) and he used to drink Lowenbrau
and he used to like ten pints every night
and at the weekends he'd get so drunk he couldn't stand up.

The **abtract** "is an initial clause that reports the entire sequence of events of the narrative" (Labov, 1997: 402) in summary form, as in (6):

(6) Last time I got pulled it were for drink driving.

In other cases, they are requests for an extended turn at talk, as in (7):

(7) So did you hear about the gas leak?

These often act as some type of advertisement in order to 'get the floor', as in (8):

(8) Right, I can tell you a birthday story and a half!

The *coda* is "a functional device for returning the verbal perspective to the present moment" (Labov and Waletzky, 1967: 39). These clauses often employ deixis, as in (9), or make the effects of the narrative applicable to the here and now, as in (10):

(9) Erm, and that was it. That was me getting arrested for fraud.

(10) So we live and learn and I shall never ever move a static caravan again.

These five major sections most often follow a linear structure: the story opens with the abstract, followed by some orientation clauses and then the complicating action, while the coda signals closure. Evaluation clauses are interspersed throughout this bounded unit.

In discourse level phenomena, "narrative is the prototype, perhaps the only example of a well-formed speech event with a beginning, a middle, and an end" (Labov, 1997: 396). Moreover, they have "a fairly regular structure that is largely independent of how they are embedded in surrounding talk" (Schiffren, 1994: 284). Although there are differences, both structurally and functionally, in how a narrative is realized, the study of a large body of narratives have demonstrated that this structure is fundamental to the majority of narratives of personal experience, it is the 'normal form' (Labov and Waletzky, 1967: 40).

Sociolinguistic Correlates

Although Labov and Waletzky's prime motivation in the 1967 paper was the narrative itself, one of the 'ultimate aims' was to "require close correlations of the narrator's social characteristics with the structure of their narratives" (Labov and Waletzky, 1967: 13). Since that time, a number of classic sociolinguistic categories have been examined against the backdrop of narrative: in particular class, gender, geography, age, and ethnicity.

Class

Labov (1997: 412) observes class differences in narrative: upper middle class speakers report on emotions, while lower class speakers "are sparing in their reporting of subjective feelings." Horvath (1987: 219) also finds differences in content: the majority of working class speakers' stories concern themselves and other family members; in middle class speakers' narratives, protagonists not personally known to them predominate.

Class differences may also exist not only in content, but in quantity, too. Macaulay's (1991: 139) study of Ayr in South West Scotland shows that working class speakers have on average a greater number of narratives both in number terms and as a proportion of the overall sociolinguistic interview than their middle class counterparts. This finding was replicated in his study of Glasgow speech (Macaulay, 2002: 298).

Gender

Labov and Waletzky make no explicit reference to gender differences in narrative, but it, too, may have an impact on content. Findings from Johnstone's

(1990: 66) study of middle class whites in Fort Wayne, Indiana, suggests that men's narratives focus on their personal exploits and successes, whereas women underplay the 'protagonists' personal roles.' Holmes' (1997: 286) results from the Wellington Corpus of Spoken New Zealand English are similar: "the women focus on relationships and people, affirm the importance of their family roles, family connections, and friendships. The men focus on work and sport, events, activities, and things, and affirm the importance of being in control, even when they don't achieve it."

Cheshire's (2000) research into the narratives of teenage friendship groups in Reading also finds gender stratification in how stories are co-narrated: in a nutshell, "for the boys, the telling was the more salient aspect of a narrative, whereas for the girls it was the tale" (Cheshire, 2000: 200).

Age

Labov (1972: 393–396) finds that the ability to narrate evolves with age. This is supported in subsequent research (e.g., Peterson and McCabe, 1983; Bamberg, 1897; Toolan, 1988). 'Leap frog' narratives are the most common among four year olds where the child jumps from event to event unsystematically. By six years old, the classic pattern established by Labov is more in evidence: temporal relationships have developed, but the referential function predominates, with little evaluative function evident (e.g., Peterson and McCabe, 1983), and a paucity of orientation clauses (e.g., Snow and Imbens-Bailey, 1997). In later years, there is a focus away from factual information to getting the point across, with an increasingly sophisticated use of evaluative devices with increasing age (e.g., Romaine, 1985; Kernan, 1977: 101).

Syntactic complexity increases with age from preadolescent to adult (Labov, 1972: 393), and remains stable in later years (Labov and Auger, 1993).

Ethnicity

Labov and Waletzky (1967: 38) state that their proposed framework "will achieve greater significance when materials from radically different cultures are studied in the same way." Indeed, whether their framework is culture specific or universal has been the subject of scrutiny (e.g., Tannen, 1981, 1982, 1984; Blum-Kulka, 1993; Tsitipis, 1988). Divergences from the 'expected' model appear from the very earliest years. Michaels (1981, 1984, 1985) shows that "children from different backgrounds come to school with different narrative strategies" (Michaels, 1981: 423). White children have as a framework 'topic-centered' narratives which have minimal assumption of shared background, full description of objects, explicit spatiotemporal grounding; black childrens' narratives are 'topic associating,' where the narrator presents "a series of implicitly associated personal anecdotes" (Michaels, 1981: 429). Ethnic differences are not restricted to children: Holmes (1997) finds in her New Zealand corpus that Maori speakers, in comparison to their Pakeha counterparts, leave parts of the narrative relatively inexplicit, including the evaluation section.

Geography

Johnstone (1990) suggests that there are regional differences in discourse style explicable in terms of different cultural contexts. In her analysis of Indiana narratives, she finds that the narrators use highly specific details, or 'extrathematic orientation' (Johnstone, 1990: 201) in orientation sections of narratives. She interprets this within the context in which the narratives take place: they must be culturally embedded, or 'anchored in the real, local world' (Johnstone, 1990: 210) in order for the narratives and narrators themselves to sustain, in Labov's (1997: 407) terms, credibility.

Linguistic Internal

The syntactic correlates of narrative structure are discussed in Labov and Waletzky (1967) and Labov (1972). Hopper (1979) and Hopper and Thompson (1980) also find that certain linguistic forms predominate in particular parts of the narrative: complicating action verbs are most usually punctual rather than iterative or durative and are usually perfective; stative predicates predominate in orientation; evaluation clauses are often irrealis, with use of modals, subjunctives, and negatives (see also Silva-Corvalán, 1983). These "predictable grammatical correlates not only for narrative type but also within narratives" (Fleishman, 1985: 852) are realized formally in some languages: for example, in Swahili, foregrounded clauses or complicating actions are marked with the prefix ka-, background with ki- (Hopper, 1979: 213). In other languages such as English, they derive from the discourse structure itself (Hopper, 1979) and are used as devices to signal levels of 'information relevance' (Fleischman, 1985: 852).

Variable morphosyntactic forms that cannot be explained at clause level may find interpretation within the broader discourse unit of the narrative. Schiffren (1981) finds hardly any use of the historic present in abstracts, codas, and evalulative clauses, and a minimal number in orientation. In contrast, almost one-third of complicating action clauses are in the historic present. The interpretation of these

quantitative results relies on Labov and Waletzky's model: as verbs in complicating action clauses are temporally ordered, they are free from providing a reference time, thus marking for tense is redundant (see also Johnstone, 1987; Wolfson, 1979; Silva-Corvalan, 1983).

Despite some findings on differential behavior across a range of sociolinguistic and linguistic internal categories, the foundations of Labov and Waletzky's framework remain largely unchallenged. In the field of sociolinguistics, they continue to provide a solid foundation for research into narratives of personal experience.

See also: Aging and Language; Conversation Analysis; Corpora in Studies of Variation; Cultural and Social Dimension of Spoken Discourse; Discourse Markers; Discourse, Narrative and Pragmatic Development; Elicitation Techniques for Spoken Discourse; Ethnicity; Evaluation in Text; Foregrounding; Gender, Grammatical; Identity and Language; Labov, William (b. 1927); Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Narrativity and Voice; Narratology, Feminist; Oral Traditions and Spoken Discourse; Particles in Spoken Discourse; Social Class and Status; Sociolect/Social Class; Speech Community; Teenagers, Variation, and Young People's Culture; Variation and Language: Overview; Variation in Child Language; Vernacular.

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Narrativity and Voice

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'Voice' concerns the question 'Who speaks?' (who tells the story in a narrative?) and presupposes a pragmatic view of language. Hence, the concept of voice implies that any narrative is uttered by someone. Usually, one speaks of narratives 'in the first person' when the voice refers to itself and 'in the third person' when it does not and the narrative appears to just flow (Bal, 1996). More rarely, narratives are told 'in the second person,' so that the first person is strongly implied but not mentioned. An intermediate form is 'free indirect discourse,' where the narrative espouses the idiosyncrasies of the character closely without using the first-person pronoun. Voice is the concept that, in the wake of Roland Barthes, killed the author while enabling critics to continue analyzing texts by positing a 'speaker' who allegedly uttered them. At the time, many were preoccupied with the French tradition, and I was myself interested in emending Gérard Genette's theory of narrative. At this time, I want to give some opacity to the perhaps too transparent veil of these alternative approaches, so that it helps to cast a somewhat amazed look at that key concept of voice. I will deprive the concept of its 'naturalness' and refrain from taking it for granted. Instead, I argue that 'voice' is an extremely artificial and skewed concept.

This reversal of what is 'normal' or 'natural' and what is *techne* or artifice accomplishes three things. It helps to suspend – but not give up – what seems 'normal' or even 'natural' in the equipment we have inherited from our training and from the traditions within which we work, including the concepts of voice and others we routinely work with and the methods learned and practiced. It suspends the certainties regarding the domains the humanities have accustomed all of us to consider **separately**: art, literature, film, and the ideas and images that run through philosophy and religious studies. Moreover, it questions the concept of voice as one borrowed from the domain of the **anthropomorphic imagination** and as deriving its apparent self-evidence from it.

Voice and Its History

The metaphor of 'voice' in literary studies came into use after the 1930s, in the wake of certain technological discoveries and developments. Neither of the two earliest modern publications considered narratological – the collection of Henry James's prefaces to *The art of the novel* from 1907 and E. M. Forster's *Aspects of the novel* from 1927 – uses the term. James uses a remarkably **visual** vocabulary, whereas Forster uses the term 'story-teller' (Forster, 1974: 22–23) to refer to the author of narrative literature. When he uses the term 'voice,' he is referring either to tone ('a tone of voice' (Forster, 1974: 86)), or to the literal, physical voice. For example, he writes: "... the story as a repository of a voice. It is the aspect of the novelist's work which asks to be read out loud." (Forster, 1974: 27) But, though he does not use the concept in the analytical sense of later narratologists and linguists, his phrasing tells of the transforming meaning of voice in a culture about to embark on a 'secondary orality,' as radio and sound film became common. He writes, with a tellingly enthusiast primitivism:

> What the story does do in this particular capacity [...] is to transform us from readers into listeners, to whom 'a' voice speaks, the voice of the **tribal** narrator, squatting in the middle of the **cave**, and saying one thing after another until the audience falls asleep among their offal and **bones** (Forster, 1974: 27, emphasis added).

The late 1920s and the 1930s would be the moment that the word 'voice' became replenished with sense and relevance in a culture that saw itself as modern. It is the moment that posed the problem of voice in the culture at large. Specifically, it was the moment, heavy with consequences, in the middle of the so-called modernist period, of the transition from silent to sound film (see Lastra, 2000).

Before that transition, the idea that images could have a voice was as utopian as it was exotic. The 'movement' of the image was already quite an impressive miracle, for which artists like Degas and photographers like Muybridge and Marey had prepared the public. To turn technological experiments into multimedia spectacles, pianos were put in the theater room. Sound was a luxury – decorative. It did not narrate. But one day, technology facilitated the transition that we now find so natural – from silent to sound film.

This was not a single transition. The particular moment I am interested in here is when sound began to transform from ornament to supplement, and before it became an integral element of the moving image. It is the moment when sound began to be 'added' to the image. The image was made first, and then sound was literally put together with it. The procedure of adding sound was jokingly called 'goat-glanding' (Armstrong, 1998). A generation later, the true wonderment of the procedure, its technological spectacularity soon forgotten, was evoked

nostalgically in fictional form in the film *Singin' in the Rain* by Stanley Donen and Gene Kelly (1952; see Armstrong, 1998). This film can serve here as a theoretical object and contribute to an understanding of the full impact of the concept of 'voice,' which is not taken into account when it is used for narrative analysis.

In this film, play-acting without words, the 'original' or 'natural' form of the moving image is represented in all its fantastic splendor when Debbie Reynolds acts as an acoustic prosthesis to the 'mute' actress whose voice wouldn't 'pass.' Whereas Reynolds ends up achieving final victory, the class-bound censorship of her counterpart's voice exceeds the hilarious humor of the set-up of doubling and splicing between body and voice. It also puts the finger on what may well be called 'the politics of voice,' which would link this 'classism' to Forster's primitivism. In line with Schmid's narratological concept, we could speak here of 'voice-interference.'

'Goat-glanding' opened the possibility of a new engagement between language and image. This new engagement turned cinema into the third art. Neither literature nor visual art nor a simple combination of the two, cinema was a fundamentally different art where language and image were inextricably intertwined, along with other media such as music and space. From that position, cinema was able to cast doubt on the essentialism that sought to separate the media and consequently house them in separate disciplines.

In this culture, cinema had the role of cultural model that we are only now beginning to grant it, in its break with the idea of 'pure' media and its accession to the mass public, which accorded the masses the status of both consumer and **judge** of art. But this cultural situation also generated a crisis. I contend that the concept of 'narrative voice' is an instrument of the **repression** in that crisis and the crisis of authorial authority that it entailed.

This cultural crisis, which knocked absolute authority out of the hands of expertise, is also the crisis of the authority of the author. Barthes and Foucault drew only philosophical consequences from the technological change, and that, quite late, when they proposed the ideas of the dispersion (Foucault, 1979) and death (Barthes, 1986 [1968]) of the author. The moment of crisis had, in fact, already happened several decades before. The trigger was the cinema, recently furnished with a voice.

The metaphor of voice as technological would, for example, direct attention to the production of the 'diegetic chronotope' – the timespace in which the plot is set – as the domain of the effect of the real. Far from possessing an authority that goes without saying, narrative voice seen as 'addition' distracts attention from the total lack of authority of, to recall the example, Debbie Reynolds' character, in order to implement the diegetic fiction as the frame of viewing the work as a whole. That fiction draws the story into a chronotopological hole, from which, in general and with the exception of postmodern experimentation, it will not reemerge.

In this respect, again, the literalized revelation in the raising of the curtain in *Singin' in the Rain*, with its explicitly added voice, can serve as model. The identity of the woman 'who speaks' shows itself in a *mise-en-scène*, which is also a theoretical *mise-en-abîme* of the question, 'Who speaks?' Here, the *mise-en-scène* 'explains' why, in the history of cinema, the artificial character, the nonidentity, the 'added' quality of the voice, has been 'forgotten' so easily, so fast, and perhaps, so desperately.

In the cinema of former days, this technology had had its own materiality: sound, music, tools, and machines. But a new cognitive understanding also underlay that very materiality whose conception it had made possible because thinkable. That understanding is anchored in the sciences of the time. It concerned not the overestimation but rather the fundamental deficit of the body, so that it was seen as being in constant need of supplementation by means of prostheses, one of which was the voice. The concept of voice, disembodied, made technical, thus makes its appearance as a tool for analysis, as if to over-compensate for the anxiety triggered by a generalized sense of the body's defective state. A body part pried loose of its body.

In view of the fiction that proclaims the disincarnation of narration, one must take a position in the debate that subtends such an attitude towards voice. On the one hand, the concept of narrative voice is constructed on the presupposition of spatial distance. By not matching the images in any obvious way, the voice seems to lose its body. This loss brings it into the present of reading, where it partakes of the strong perceptual and affective experience. This, in turn, reincarnates the voice. But, on the other hand, in the very attempt to incarnate it, to give it body – for example, by marking its gender, age, and other social positions – the voice is deindividualized by the analyst who uses the term 'voice.'

Faced with these cases, where the concept of voice is artistically theorized as meaningful after all, it is necessary to 'work through,' put under erasure, those aspects of the metaphor of voice that distort and censure the analysis.

Images of Authorship

Among the aspects of the metaphor of voice that might have informed its creation and that remain its primary motor, is, first of all, the notion of the 'subject' as the owner or site of the narrative voice. This incites the analyst to privilege voice over other aspects of the fabric of the narrative text that contribute equally strongly to the production of its meaning. Most obvious of all is the example of the 'image.' The text is not reducible to the ensemble of words that constitute it. The image is an element in all narratives. The narrative voice entertains a relationship with the visual fabric that permeates the text, but this is not a systematic relation of mastery.

The narrative voice does not 'create' or produce all the images rendered in the text; many preexist the voice's description of them. 'Voice' is a term invented to eliminate authorship as the prime preoccupation of literary studies, yet to let it in again through the back door. Wayne Booth published a book in 1961 called *The rhetoric of fiction*. As the title indicates, two elements of what constitutes the field or object 'literature' in the common understanding orient it away from the author's primacy: 'rhetoric' and 'fiction.' The one indicates that whoever 'speaks' the words in the text does not speak straightforwardly in a direct, reliable, constative mode of language use, but may be caught in acts of seduction, deviation, figuration, or outright lying. Hence, the second element, 'fiction,' which takes literature away not only from the author but also from the world within and for which she writes. Appealing to a mode of reading still most adequately defined as 'the willing suspension of disbelief,' fiction takes the substance, content, or reality of the literary work out of the hands of the author. The latter can wash her hands of everything that shocks, disturbs, annoys, or dangerously entices the reader. The latter, as the definition has it, is responsible for willingly giving up on the author's epistemic answerability.

Booth's book introduced a term – the 'implied author' – that from that moment on was so widely used that it became a cliché. The term is deceptively straightforward. It suggests that the biographical author has a textual delegate behind which she can hide, a guarantee of discretion and cultural politeness morphed into a methodological *de jure* argument. But the concept *de facto* operated the switch, not really from author to text but from author as speaker of the text to reader who construes an image of that person. The reading, the concept promised, would give all information, relevant and desired, about who 'spoke' the narrative. Any questions beyond who wrote the book were indiscreet and redundant. Inscribed within the text by a 'hand' she could manipulate at will, the author could be read off the page, and it befell to the reader to compose the image of the author from the data gleaned during the reading.

The 'implied author' offered a bonus that the author as corpse did not, and that became too attractive to turn down. In a quite literal double sense, it **authorized** the interpretation one wished to put forward without taking responsibility for it. The phenomenological edge of the concept wore off. What was left was the authority of the constative statements that speaking of – but simultaneously **for** – the implied author afforded. Judgments based on the idiosyncrasies of individual readings could be presented with the aura of having detected what the author, willy-nilly, 'meant to say.' Meaning thus collapsed into intention, as it had before Booth came along.

Meanwhile, a mere seven years later and in a totally different vein, Roland Barthes had put the author to death, given birth to the reader, and conjured up a phantom author rather comparable to Booth's. The author whose death he hyperbolically declared was the masculinist, individualist bossy one of classical narrative and its obedient theorists. Instead, between the lines of his murderous prose, he proposed a figure without identity or voice, an impersonal 'scriptor.'

Neither Booth, who displaces the author into the realm of interpretation, nor Barthes, who attempts to disembody the author, eradicates this figure. It appears as if the author cannot be entirely dispensed with. For the moment, it seems preferable to just bracket 'him' and look at the results of these rhetorical moves.

Once the author is bracketed and reemerges on the reader's side of things, the first major problem that this move leaves hanging is the question of 'who speaks' the words on the page if it isn't the actual author. The first step, further away from the now rhetorically built author, was the concept of 'narrator.' This addition was necessary because a single narrative, by definition attributed to a single implied author, can easily have many narrators. Also, a narrative 'in the first person' sometimes speaks with the voice of the younger self, and then with the one of the disabused older fellow who decides to write down the life story.

In search of reliable concepts, yet intent upon conceptualizing agency 'beyond' the author, literary studies reformulated the question of 'who speaks' as the question of 'voice.' The word 'voice' is naturalized, a near-catachresis, to account for the fact that a story

doesn't come out of the blue, and that someone is responsible for it. As such, it seems indispensable to circumscribe the subject of the text. But when we use words like 'responsible,' we enter the domain of the ethical.

Related to this responsibility is yet another aspect of voice – as metaphor of textual subjectivity. This metaphor is also the starting point of a search, of the 'whodunit' kind, the quest for the identity of the unknown criminal. This question indicates that words and images matter, that they 'act,' as speech-act theory teaches us. Where acts are performed, someone is accountable; the entire social and legal system works on that premise. No wonder the disciplines that comprise the humanities also take for granted the importance of that fundamental question.

The question 'Who speaks?' interrogates the nature of the verb 'to speak.' This question implies two questions about meaning. The first concerns the construction of meaning. 'What does this mean?' and 'What does she mean (to say)?' are two different conceptions of meaning that the metaphors of authorship conflate, namely signification – the production and processing of publicly accessible meaning – and intention – that inevitable urge to identify meaning with the mind of the genius-artist who put that meaning out. The former has no bearing on authorship; the latter does. Conflating them, then, begs the question of meaning.

The second question implied in the 'Who' question concerns agency. 'What are the consequences?' is perhaps the best way of phrasing it. This question raises two others: on the one hand, that of the effectivity measurable only in terms of reception, in other words, what does the work 'do' to its readers or viewers?, and on the other hand, the social relevance of the work, that is, 'What does it do to the public domain in which it functions?' These two questions, I hasten to add, must be asked in the positive but also in the negative form. What meanings and critical possibilities are repressed when we use a concept of the 'who?' kind, such as narrative voice? In other words, what is the metaphorical status and import of the analysis structured on the basis of 'voice?' In anticipation of my conclusions, this need to ask the question 'who?' negatively – which is rarely done – makes it impossible to dismiss the personification implied by the question.

Conceptions of the Artistic Text

A second cluster of features imported by the metaphor of voice concerns not the subject of the work but the conception of art that underlies it. The privilege mostly unreflectively accorded to narrative voice easily entails an extreme 'mimeticism,' an assumed and endorsed, albeit disavowed, seamless match between social relations and literature, a match that is literature and art's very mission to question. The relevance of literary narrative resides, precisely, in its refusal to obey the pressure of realism as *trompe-l'œil*. The question of 'who speaks?' can only escape that *trompe-l'œil* if its other, the question of 'who doesn't speak?', is systematically carried on its back, like a parasite. The question of which character, in what social position, does **not** have access to speech, is, on the one hand, one of voice, but on the other, one that undermines the belief in and obedience to the text as 'account.' As Gayatri Spivak remarked in a brief but forceful analysis of the case of Friday in Defoe's *Robinson Crusoe*, (1975 [1719]) – later revisited by Coetzee's *Foe* (1986) – Friday's tongue has been cut (1999: 186–187). In Coetzee's postmodern version, his tongue has been cut literally, hence, physically. This mutilation can, in and of itself, serve as a theoretical object. It stages an almost naïvely literalizing perspective on Defoe's story in a rewriting that is disabused of realism.

The addictive attachment to realism is rooted in the need to protect the aspect of the metaphor of voice that most badly needs scrutiny, namely authority. Authority is both obliterated and protected – and abducted by a criticism that nevertheless derives its authority from it. As I mentioned above, the presence of authority in humanistic studies allows the authorization of interpretation to be naturalized. The concept of voice, hence of narrator, is part of that authorizing impulse. As a phantom presence, the author continues to lurk in the wings as long as the major analytical concepts partake of the author's anthropomorphic shape. The attribution of intention that this concept of narrator facilitates is a weapon in the service of subordinating the reader. The latter, brainwashed by education to interiorize the taboo on exercising her function of 'second person,' is too easily submissive to the intention that clothes the text as long as it is conceived as the unquestioned product of voice. But, I contend, 'below' or 'behind' the thematic of narratorial sincerity, authenticity, and competence lies an alleged and naturalized unity of cultural memory in which those features are given the status of virtues.

Responsibility, in other words, does not equal authority. Both the scriptor and the reader are responsible for their acts of meaning-making, all the more so because they cannot appeal to and hide behind authority. Nor does subjectivity equal agency; one can exist as a subject and still be deprived of agency. Conversely, agency cannot take advantage of the problematization of unity to disavow responsibility. Here

lies the importance of a disbelief that undermines realism. Against the desire for authority that informs the addiction to mimeticism, and before a different kind of entanglement between reader and work becomes possible, a disentanglement of responsibilities is necessary.

Nor can voice claim 'origin,' that other doxic cultural obsession. Origin implies generativity, and that perspective must be kept in its limited place. If words and images 'come from' somewhere, it is from the culture that the work and its readers share, at least partially. They are picked up like graffiti and litter from the roads we walk along throughout our lives. They end up in works of art and literature. Then we hasten to narrow their provenance to the single speaker we call 'voice.' Mikhail Bakhtin insisted long ago on cultural polyphony, and many scholars have followed suit (*see* **Dialogism, Bakhtinian**). Against this craving for and self-evident alleging of origin, I suggest that voice insists too exclusively on illocution, that aspect of speech – and by extension, of all cultural utterances – that indicates the speaker's intent. In the process, it privileges the speaker, writer, or maker of images. Thus, the concept lends itself to subordinating and easily obscuring perlocution, the utterance's **effect**, and thereby disempowers the listener, reader, or viewer. We need to suspend **time**, in the sense of sequence, as narrative's defining principle, if only because of its obsession with the idea of origin. Together, then, the aspects of voice discussed so far – subjectivity, mimeticism, its grounding in authority, and origin – have in common a tendency to restrict narrative analysis to the inscription of time as foundation of narrativity. This remains important. The concept of 'voice' must remain functional, albeit 'under erasure.' But this temporality is located inside the chronotope that constitutes all narrative works.

See also: Dialogism, Bakhtinian; Discourse, Foucauldian Approach; Fictional Discourse: Philosophical Aspects; Intention and Semantics; Interactive Fiction; Literary Pragmatics; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Narratology, Feminist; Pragmatics of Reading; Rhetoric: Semiotic Approaches.

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Abstract:

The article presents the narratological key concept of 'voice' through two main paths. It positions the concept historically in the early days of cinema and modernist literature, and it offers a critical assessment of the implications of this concept. When one takes 'voice' as a conceptual metaphor, its implied connotations carry a heavy load of ideological presuppositions. Instead of dismissing it, however, the article recommends a use that is self-aware and refrains from endorsing these implications.

Biography:

Mieke Bal, a well-known cultural critic and theorist, holds the position of Academy Professor in the Royal Netherlands Academy of Arts and Sciences (KNAW). She is also a Professor of the Theory of Literature in the Faculty of Humanities at the University of Amsterdam. Her most recent book is *Travelling concepts in the humanities: a rough guide* (University of Toronto Press, 2002). Among her many other publications are: *Louise Bourgeois'* Spider: *the architecture of art-writing* (University of Chicago Press, 2001), *Quoting Caravaggio: contemporary art, preposterous history* (University of Chicago Press, 1999), and *Narratology: introduction to the theory of narrative* (2nd, revised and expanded edition) (University of Toronto Press, 1997). *a Mieke Bal Reader* is forthcoming from the University of Chicago Press. Her areas of interest include literary theory, semiotics, visual art, cultural studies, transcultural history, feminist theory, French, the Hebrew Bible, the 17th century contemporary culture, and art presentation. She is also a video artist.

Keywords:
Agency
Anthropomorphism
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Author
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Cinema
Chronotope
Constative (Constative statement)
Diegesis
Discourse
Ethical responsibility
Ethics
Fiction
Film
First person narrative
Free indirect discourse
Genius
Graffiti
Humanities
Illocution (Illocutionary act/statement)
Image
Implied author
Intention
Interpretation
Literary work
Literature
Mastery
Meaning
Memory (Cultural memory)
Mimeticism (Mimesis)

Narratology, Feminist

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Feminist narratology emerged as a distinctive area within narrative theory in the late 1980s. It might be understood as a response to classical narratology where earlier models and approaches are revisited and critiqued from a feminist perspective. In its broadest sense, feminist narratology embraces the study of narrative (including its formal features, interpretation, and function) with particular attention to the ways in which these might inform or be informed by aspects of feminist theory. However, defining what constitutes both 'feminism' and 'narratology' is not unequivocal, for both terms encompass a range of diverse positions. This has led to some debate as to the validity of feminist narratology. In its strictest sense, narratology might be understood as describing the abstract systems behind literary narratives, in which case feminist narratology has been deemed problematic for it is understood to be concerned with matters in the domain of application and interpretation (Diengott, 1988). However, the development and diversification of contemporary narrative theory have broadened its realms to include nonliterary texts and theoretical paradigms, thus incorporating the potential influence of feminism(s) in this enterprise. Like the multiplicity characterizing narrative and feminist theories, feminist narratology cannot be said to present a unified 'school'. Instead, work that might be considered under this umbrella term spans varied terrain. This is not *ad hoc*, but might be grouped together in distinctive streams. Each of these is discussed below.

Psychoanalytic Plot Dynamics

Feminist narratology has been usefully applied in studies derived from psychoanalytic theory that explore issues of plot dynamics. The premise underpinning this approach is that the trajectory of plot may be conceptualized in terms of desire, both of which then may be related to gender. Thus, Brooks characterizes the progressive rise and subsequent decline of tension in conventional, action-driven plot structure as the "male plot of ambition" (1984: 39). Feminist critics have sought to expose the gendered erotics behind this paradigm and instead have offered alternatives where the stereotypical characteristics of women's writing as repetitive, cyclical, or resistant to closure are associated with dynamics of desire grounded in explicitly female experience, such as breastfeeding, childbirth, and the female orgasm (Winnett, 1990). The corollary of this is a binary pairing of linear versus nonlinear plots, which is then transposed onto male and female values and experience. This opposition is not unproblematic, and though it reflects a second wave feminist impulse to identify difference and to recoup, indeed celebrate 'female' alternatives, this stream of feminist narratology has been critiqued in later years. In line with the shift away from essentialism, a recognition of the socially constructed nature of gender and an increased awareness of cultural diversity in feminist thought, these studies have been termed 'Eurocentric' and interrogated for their potential elitism (Homans, 1994). Furthermore, the psychoanalytic theory that these models draw on has itself been challenged in a variety of ways. In particular, the universal mapping of gender onto erotic desire or the death drive has been questioned. This has led to closer attention to the specific intersections of gender, plot structure, and cultural situation as they are manifest in specific texts and contexts.

Postclassical Narratology

A second, and highly influential, stream of feminist narratology is that which might be termed 'postclassical'. This work has followed the imperative given in Susan Lanser's seminal paper 'Toward a feminist narratology' (1986) to re-examine the classical models of narratology. As Lanser's groundbreaking paper indicates, the intersection of narratology and feminist theory exists as a dialectic relationship whereby *both* paradigms are informed and altered by the other. Studies in this area might be understood not only as illuminating texts by or about women in the light of narratological analysis (examples of applied narratology) but also as challenging or extending the narratological frameworks employed.

Central to this re-evaluation of classical narratology is the move away from structuralism's attempt to identify universal components of narrative (for example, Propp, 1968 [1928]; Barthes, 1977; Labov, 1972). In line with narratology's shift toward a more contextualist stance, postclassical feminist narratology seeks to understand the form and function of narratives in relation to specific texts and contexts. Underpinning this is a critique of the limitations imposed by corpora as seen from a feminist perspective. As Lanser puts it, "the narratives which have provided the foundation for narratology have been either men's texts or texts treated as men's texts" (1986: 343). Specific studies have pursued this matter further. Notable examples include the re-evaluation of

Labov's work on narratives of personal experience where the apparent neglect of gender as a salient speaker variable (at least in certain subsequent applications of his model) has been called into question.

The feminist application of narrative theory to texts by women has gone on to be far-reaching and highly fruitful, encompassing the re-evaluation of many different aspects of narratology. This includes studies of plot; closure; narration and voice; manipulation of time; reader response; focalization; and spatialization. Although the individuality of particular studies should not be underestimated, a general (although not unequivocal) trend found in this kind of approach has been to explore the distinctive character of these texts in relation to a binary model of gender. This is inherent in the direction indicated by Lanser's (1986) paper, which is shaped by the second-wave feminist emphasis on the difference of women's writing and speech. Significant collections of this kind of work include Mezei (1996).

Clearly, this postclassical re-evaluation has been a vital stage, not only in elucidating a range of texts that had been excluded from the canon but also in re-energizing aspects of narratology. However, shifts in feminist theory have now begun to have an impact on more recent approaches in feminist narratology. In particular, the influence of Butler's (1990) work has resulted in the replacement of a reductive, binary model with an acceptance of the potentially shifting and multiple nature of gender as performed by individuals in particular situations. The outworking of this has yet to fully emerge, but has included interpreting nonconventional narrative structures, intertextuality, and multiple voices as forms of performance (Page, 2003a).

Linguistic Studies

One of the proposed outcomes of feminist narratology as indicated by Lanser's paper was the exploration of whether or not women's writing of narratives differed from that of men and hence could be located as a separate tradition. This investigation of gender difference in relation to storytelling style may be paralleled with the analysis of 'nonliterary' narratives taking place in other research paradigms. Specifically, the sociolinguistic work that has come to be known as 'feminist linguistics' has included within it the study of women and men's conversational narratives. This may be considered as a third significant subfield of 'feminist narratology'. Work in this area has examined data from a range of cultures and contexts. The results of this indicate that, within certain contexts, there does seem to be a measure of evidence for women and men's differing use of linguistic features in storytelling styles. This has focused on specific areas, such as uses of evaluation (Page, 2002), humor (Eggins and Slade, 1997), the creation of narrative worlds (Johnstone, 1990), and the use of reported speech (Coates, 2000). Although they indicate points of difference, these studies caution against the simplistic mapping of isolated narrative features onto a single variable such as 'gender'. Rather, the trend has been to argue that speakers' use of narrative features might be seen in terms of performance where these features act as 'contextualization cues' for gender that may interact in complex ways with other potential influences such as class, ethnicity, or sexuality. Moreover, these studies are grounded in local contexts, from which abstracting a generalized conclusion about a definitive narrative style distinguished on the grounds of gender is seen as untenable.

The analysis of narrative and gender has also been influential in the study of identity in the social sciences, particularly as means of understanding the ways in which individuals use storytelling as a means of self-portrayal, a way to explore possible selves, and a way to negotiate alignment with their audience(s). Individual studies range across diverse areas from preschoolers' use of narrative (Kyratzis, 1999) to the construction of masculine identity (Coates, 2001). These studies reinforce many of the points made earlier, particularly that the correlation of gender and narrative features must be understood as dynamic and jointly constructed and reconstructed by those who produce and interpret narratives in particular contexts.

One further area of significance is the analysis of media narratives from a feminist perspective. These studies often draw on critical discourse analysis, but may use frameworks derived from narratology (focalization, evaluation, characterization) in conjunction with this in order to interrogate the relationships between form, content, and ideology. In contrast to the work on literary narratives, though these studies do point to the differences in the representation of groups of women and men, they are also concerned with the origins and sociopolitical ends to which these narrative representations may be put. For example, the objectification of women (constructing them as the 'focalized') might be understood as reflecting and maintaining the masculinist agenda of the media, thereby continuing to perpetrate gendered stereotypes with negative effects for women. This has been the subject of extensive work and intersects with research in media studies and discourse analysis. The data that have been analyzed include advertisements (Mills, 1995), magazine articles (Caldas-Coulthard, 1996), newspaper reports (Caldas-Coulthard, 1995;

Page, 2003b), and web pages (Chandler-Olcott and Mahar, 2003).

Although not strictly within the domain of feminist narratology as such, the intersection of feminism and narrative theory has also been highly influential in feminist film theory. Key theorists in this field are Mulvey (1975) and De Lauretis (1984), both of whom draw heavily on semiotics and psychoanalytic theory in their feminist interpretations of gender politics, desire, and pleasure in film. In particular, Mulvey's work developed a theory of the male gaze that argues that in its voyeurism, the structures of Hollywood cinema must be understood as patriarchal and therefore rejected by feminists. De Lauretis also focuses on the power dynamics inherent in the structures of narrative desire and, via psychoanalysis and semiotics, maps this gendered paradigm (male as agent, female as object) onto the processes of representation. As with the psychoanalytically inflected feminist narratology, this work has been subsequently critiqued for its essentialism and universalizing tendency, with later work calling for recognition of gender's intersection with other variables such as sexuality, race, class, and cultural context, thereby embracing feminism's increasing multiplicity.

Feminist narratology is thus a diverse enterprise that continues to expand along with narratology's influence. Despite this diversity, many of these studies reflect similar shifts in feminist thought. This includes the early preoccupation with exploring narrative in relation to gender difference in line with second-wave feminism; a contextualist position where gender is seen as one of multiple, intersecting variables that influence particular tellings in specific situations; and a third-wave understanding of gender as performed and shifting rather than a fixed, stable entity. As such, the feminist theory that has influenced this field includes both French feminists and those from the Anglo-American school. Feminist narratology's wide-ranging use in applications across disciplinary boundaries suggests that it is a field that will continue to shape and be shaped by changes in feminist thought and perspectives from other research paradigms.

See also: Critical Discourse Analysis; Gender and Language; Narrative: Linguistic and Structural Theories; Stylistics, Feminist.

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Nationalism and Linguistics

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What Is Nationalism?

Nationalism is the political expression of the notion that humanity falls naturally into distinct peoples or nations. As a political doctrine, nationalism is conventionally traced to Europe in the beginning of the 19th century (Kedourie, 1993). Nationalism has been characterized as involving the invention of "imagined communities" (Anderson, 1991), and the modern origins of political doctrine of nationalism are frequently contrasted with the claims of nationalists for the antiquity and historical continuity of their nation (Gellner, 1998). The historian Eric Hobsbawm argues that the criteria used for defining nations such as language and ethnicity are themselves "fuzzy, shifting and ambiguous" and thus "unusually convenient for the propagandist" (Hobsbawm, 1992: 6). This notion of nationalism as a purely artificial creation has been criticized as inadequate to an understanding of the preexisting cultures and bonds of kinship on which modern nationalism was often built (Smith, 1999: 8–9). Thus, some theorists of nationalism reject the notion that criteria such as a common language or common descent are purely subjective constructs. The terminology in relation to nationalism is notoriously problematic. For example the term 'nation' refers both to ethnic collectivities as well as to political states, and nationalism involves the interplay of many different and frequently interacting parameters of identity (religion, class, race and lineage, language, territory, history, etc.).

Linguistics and the Politics of Linguistic Diversity

One key element in the development of European nationalism was the politics of language, and the rise of a theory of identity based on mother tongue. The notion of linguistic identity that underlay the emergent European nationalisms of the 19th century became an immensely powerful political force, which was to rewrite the political map of Europe and much of the world. Humanity was conceived of as falling naturally into groups defined by language, and these groups were held to reach maximal self-expression in an independent state.

The extent and nature of the prehistory of modern linguistic nationalism is open to debate. Roman Jakobson (1945) argued that the ideal of a national language as having high cultural value was first formulated as an ideology in the Slavic world in the Middle Ages, and was not a product of the Western European Renaissance and Reformation as is generally assumed. This prehistory of linguistic nationalism is conventionally taken to include the translation of the Bible into the European vernaculars, the development of proto-national print cultures, and the decline of Latin as the pan-European language of scholarly exchange. The Protestant logic that required that the ordinary person should understand the language of the Bible and of the liturgy was ultimately applied to the language culture of the modern nation–state.

The prehistory and history of modern linguistics is intertwined with the emergence of linguistic nationalism, though one should note the strong currents of philosophical universalism running through linguistic theorizing in the West. One proto-nationalist strand involved 18th century debates about the interrelationship between language and national character (Morpurgo Davies, 1998: 114–118). A second strand concerned the status and standardization of vernacular languages, in particular in relation to their use in scholarly literary expression. Although in the late, highly professionalized phase of the discipline, linguists have tended to be wary of purism and other forms of normative discourse, historically language scholars played a central role in defining the boundaries between languages and promoting proto-nationalist or nationalist language engineering (Gottsched, 1758; Webster, 1789; Linn, 1997; Milroy and Milroy, 1991: 5–11).

To demonstrate the worth of the European vernaculars, scholars identified them with the language of the Garden of Eden (Olender, 1992). Alternatively, languages were assessed with reference to links traced back to the sons of Noah, i.e., Shem, Ham, and Japhet. The ancestor of the Europeans was held to be Japhet, and the term 'Japhetic' as applied to a language family was the precursor of the terms 'Aryan' and 'Indo-European.' In the framework adopted by James Parsons (1705–1770), the study of the 'striking affinity' or resemblance between the European languages was a means of distinguishing genuinely primitive, i.e., original languages, from mixed or derivative languages (Parsons, 1767). This model was based on the idea of "every one after his tongue, after their families, in their nations" elaborated in Genesis (10: 2). Gradually, however, the results of comparative linguistic analysis came to stand alone as observational truths within a secular science of language.

The comparative and historical study of language did not necessarily provide support for straightforward nationalist models, though it could be used for that end. There were many levels to the possible affinities between peoples and their languages, and the postulation of an original Aryan or Indo-European language implied a deeper kinship than the vernacular-based linguistic nationalism of modern European political culture. The inclusion of Sanskrit as one of these languages raised difficult historical questions about the relationships between territory, language, race, and the emergent European nation–states.

Like nationalism, modern or 'scientific' linguistics is conventionally said to have emerged as an independent discipline at the beginning of the 19th century, with the founding of historical and comparative linguistics. This emergent discipline inherited the Biblical concept of a nation or *Volk*, as a descent group sharing a common language and territory. This model was found in the influential theories of human diversity offered by Johann Gottfried von Herder (1744–1803) (1770) and Wilhelm von Humboldt (1767–1835) (1836), and in the nationalist understanding of the concept elaborated in Germany by Johann Gottlieb Fichte (1762–1814) in response to the Napoleonic conquests (1808). Romantic theories of organic community stressed the role of native language or mother tongue in self-fulfillment and self-expression and in defining the cultural and conceptual boundaries between human groups or nations. The modern discipline of linguistics continues to debate the issue of linguistic relativity in relation to the writings of Humboldt, Benjamin Lee Whorf (1897–1941), and others.

A proto-nationalist or nationalist understanding of language lay behind the canonical features of the study of language as an aspect of national culture, i.e., the comprehensive historical dictionary project, the modern grammar, the dialect atlas, and the history of the language. One can track the progress of self-conscious linguistic modernity with reference to such projects. The writing of the history of the vernacular languages, in parallel with national literary histories, often carried an implicit or explicit teleology of national liberation from the dominance of dynastic, clerical or foreign languages and from the categories of classical grammar.

The second half of the 19th century saw increasingly complex and contradictory models of human linguistic and racial affinity being proposed by European intellectuals, including linguists (Renan, [1882] 1990). Scholarly investigations of human history and affinity were assumed to have political consequences, in that they were capable of identifying true or natural bonds or ties of kinship underlying the complex surface affiliations of the contemporary world. Widely varying models and horizons of identity were debated. Some envisaged broad horizons of affinity (pan-Slavism, pan-Arabism, pan-Germanism, pan-Italianism); others stressed regional linguistic loyalties or the nonlinguistic ties of race or religion.

Linguists have generally sympathized with the political aspirations of ethnolinguistic groups to achieve statehood, but have simultaneously favored the language rights of marginalized or disenfranchised ethnic minorities within such states. The contemporary sociology of language has its roots in pre-war European ethnolinguistic politics, and in the political tensions that underlay the vulnerable position of linguistic minorities in the newly drawn political boundaries of post-Versailles Europe. In the 1930s and 1940s, the advocacy by nationalist linguists of the rights and autonomy of national languages and their distinct world view, as well as of historically grounded claims of the relationship between language and territory, in some cases offered support for aggressively expansionist political ideologies (Kloss, 1941; Hutton, 1999). However, internationalism and support for auxiliary international languages was also a strong feature of linguistic theorizing in the first half of the 20th century, with links to the search for a universal language of science.

Linguistics and Anticolonial Nationalism

Debates about the interrelationship of language and identity were exported to Africa and Asia via European colonialism. The rejection of classical languages (in India, Persian, Sanskrit, Arabic) and the standardization of vernacular languages was one of the central linguistic projects of modernizing colonial language politics, in tandem with the use of the colonial language. This model was laid out in Thomas Macaulay's "Minute on Indian Education" (Macaulay, 1835). Modernizing colonialism promoted hybrid systems in education, government, the armed forces, etc. using both the vernacular and the colonial languages, and within the framework of colonialism, language censuses, the rise of centralized education systems, and the fieldwork of missionary and colonial linguists, introduced Western linguistic concepts and labeling practices. As in Europe, these politicized vernacular identities put in question the authenticity of the colonial or dynastic state, and often formed the basis for anticolonial nationalism. Nationalist linguists picked up where their missionary and colonial predecessors had left off, continuing with standardizing and lexicographical projects, but now within a nationalist or nativist ideological framework. In 19th century China, Protestant missionaries

had devised writing systems for dialects and pressed for language reform at all levels (Gibson, 1902). In the 20th century, Chinese linguists and intellectuals debated a wide range of possible modernizing reforms, and saw language reform and modernization as central to the nationalist project (DeFrancis, 1950). Language reforms may support a modern egalitarian national identity, but often at the cost of a rupture with a complex (elite) textual history, as has been argued in the case of Turkish (Lewis, 2000).

In the post-war era of decolonization, sociolinguists turned to Africa and Asia to analyze the sociopolitical dilemmas of newly created states. These states were arguably more weakly rooted in a preexisting "ethnic-cultural unity" than the new nations that emerged after World War I (Fishman, 1968). However, again as in Europe, the application of a political ideology based on mother tongue or language rights was potentially both liberating for the postcolonial state and destabilizing for any hybrid polity. Einar Haugen (1906–1994) described an evolutionary process within emergent nationalism from dialect or vernacular to language (Haugen, 1966). A dialect was in effect a thwarted language, one that had failed to become the medium of an independent polity. The political problem intrinsic to this model is that the number of potential languages, and therefore nations, is unbounded, as there is no limit to the number of divisions in the linguistic continuum that can be made. The application of this (essentially northern European) model to postcolonial Africa and Asia remains problematic for the integrity of multiethnic states.

One needs to be aware of the diverse positioning of academic linguists within the political culture of the states in which they work. A professional linguist based in North America concerned with the syntax of English can evade questions of national language policy more easily than a linguist working in a postcolonial state with complex language planning problems. For example, the linguist Y. R. Chao (1892–1982) was active in the promotion of a unified national language and of a standardized Romanization system in Republican China (1912–1949). One could not write the history of linguistics in the People's Republic of China (1949 to the present) without giving national language planning and language policy a central role.

Languages as Sociopolitical Constructs

Complicating the politics of language for the linguist is doubt about the methodological and political status of the term 'language' itself. Ferdinand de Saussure's synchronic notion of *langue* can be read politically as reflecting the ideal of a polity organically integrated and conceptually united through a shared linguistic system (de Saussure, [1916] 1972). Yet linguistics also provides intellectual tools for emphasizing the inadequacy of this model, and for conceptualizing almost unlimited forms of diversity and variation, as well as offering different understandings of the linguistic unity (e.g., universal grammar) and diversity of the human species.

Linguistics has wavered between the view that human linguistic diversity is natural (Fishman, 1997) and the understanding that languages are sociopolitical constructs. The ideal of a national language that gives identity to the polity that it represents can be seen as a product of Western modernity, which when applied to other cultural contexts involves the destruction of the preexisting linguistic ecology, one which may not have involved self-awareness about discrete linguistic labels (Mühlhäusler, 1996). In the same way, the European nation state model has been seen as disrupting non-Western indigenous political ecologies. Roy Harris has characterized the notion of languages as stable systems of communication as "the language myth," which in its modern form "is a cultural product of post-Renaissance Europe" and reflects "the political psychology of nationalism, and an educational system devoted to standardizing the linguistic behaviour of pupils" (Harris, 1981: 9). To Western linguists applying the mother tongue model of European identity politics, the Chinese regional varieties were akin to the national languages of Europe (Dyer Ball, 1907). Within the national and nationalist framework of modern Chinese linguistics, there is, however, no question but that these varieties are the dialects of a single language, Chinese. But the rise of vernacular dialect/language politics in contemporary Taiwan points to the evidently political nature of these categorizations.

The view of languages as constructs can be contextualized in debates about globalization within linguistics. The nation–state has been understood as one of the pillars of modernity, and as such it is presumed to have been eroded under the impact of postmodern globalization, with the rise of hybrid forms of identity and cultural affiliation, and the emergence of the first truly global language, English. English itself can be understood either as taking on partially or wholly indigenized national forms (Indian English, Singapore English, etc.) or as an increasingly decentered language that does not respond to national and state boundaries. Nationalism, including linguistic nationalism, remains, however, a potent political force, especially following the dissolution of the Soviet Union in 1991. No doubt linguists will continue to play a complex range of roles, including those

of commentator, ideological critic, and nationalist activist.

See also: Academies: Dictionaries and Standards; Critical Applied Linguistics; Dialects: Early European Studies; Language Policies: Policies on Language in Europe; Linguistic Ethnonationalism; Linguistic Rights; Minority Languages: Oppression; Standardization; Vernaculars: European Earliest Studies.

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Native Speaker

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Although the rise of the idea of a (naïve) native speaker can be, as pointed out by Dasgupta (1998), traced as far back as the antiurbanist impulse released by German Romanticism of the 19th century, the use of the expression *native speaker* became prevalent in modern linguistics, particularly since the Chomskyan intervention in linguistics, which in perhaps its least appreciated aspect brings metropolitan linguistics back home to the West after a rather long detour to various peripheries and colonies. Although some would argue that Chomsky's ideal native speaker does not look very different from the native speaker of those who hold a more prescriptivist position, he takes the theoretical view that we are all native speakers of the steady state grammar we develop on the basis of innately specified language capacity.

Scholars concerned with what Chomsky calls E-language are, of course, preoccupied with the question: of which language? This, as Muysken (1998) points out, is not a straightforward matter for the internal language/external language (IL/EL) mapping is more often than not asymmetrical (cf. Hindi and Urdu in South Asia, which arguably represent the same IL, and Patois, Dialect, and Quechua in South America, which presumably manifest different IL's). Nor is the relationship between language competence and language use a straightforward one, for the former seems to crucially depend on the latter, as can be clearly seen in language attrition (cf. Seliger and Vago, 1991). These considerations of asymmetrical mapping and use bring social parameters and sociolinguists into the picture. A further complication is added by the so-called indigenized varieties of some European languages, particularly English (for obvious reasons behind its international spread). The debates regarding the status of these varieties, at least some of which are demonstrably fully rule-governed linguistic systems, have made it increasingly clear that both ownership and multilingualism must be taken into account in providing a more viable characterization of the notion of *native speaker.*

Earlier accounts of the notion of native speaker, such as the ones collected in Paikeday (1985) and Coulmas (1981), try to come to terms with some of the complications summarized above. However, with only a couple of exceptions, they do so with what must be seen as a monolingual/monocultural bias, remarkably clearly spelled out by Crystal (1985) and Quine (1985), and with almost no awareness of questions thrown up by the existence of varieties such as Indian and Singaporean English. The old monolingualist characterization of the concept of native speaker – as mother tongue or first language – may no longer be sufficient (cf. Pattanayak, 1981 and Harris and McGhee, 1992; among others). Token homage to multilingualism or minor adjustments to such a characterization can't solve the problem, because they tend to take a simplistic view of multilingualism.

The functionally determined distribution of the use of particular languages and the concomitant acquisition and competence in them in multilingual societies makes such accounts inadequate because neither the proficiency nor the competence of a multilingual speaker can be described in simple, additive terms – a bilingual speaker is not a simple, additive union of two monolingual speakers. The existence of indigenized varieties of English (and some other European languages) makes these accounts look even worse. It is one thing to de-emphasize or question the role of introspection in linguistics, as many of the contributors to both Paikeday (1985) and Coulmas (1981) do, but quite another to come to terms with what Coulmas (1981: 1) calls "the common reference point" for all of linguistics. Although the question of the relationship between use and the acquisition and sustenance of competence needs to be researched more thoroughly than it has been, no harm is done if the expression *native speaker* is understood as *native speaker/user,* as no one will deny that to become and to remain a native speaker of a language one must use it.

The question, as Kandiah (1998: 90) puts it, is not whether the native speaker/user exists – Paikeday's dismissal of the concept is much too cavalier – but "what we mean when we say that people know, use and view a language in a manner that allows them to see themselves as and to be recognized and accepted as native speakers/users of it." "To be recognized as" and "to be accepted as" add the dimension of ownership or proprietorship to an already complex set of parameters that must be taken into account in defining the native speaker/user. In other words, the native speaker/user is not dead, as the title of Paikeday's book suggests, but has simply been somewhat prematurely buried by some. Kandiah (1998) rightly insists that the fact that large numbers of ordinary people consciously or unconsciously assume the notion *native speaker/user* in their interactions guarantees that it captures something real. Although it is instructive to deconstruct certain construals of *native speaker/user,* not much is to be gained by discarding the concept completely. Even if

the assumption that one is naturally proficient in one's mother tongue is rejected, Paikeday's suggestion that we use "proficient user of a specified language" instead of *native speaker/user* is not productive because we need to know how to measure proficiency and who determines the norms against which such measuring will take place.

As the considerations that preoccupy most of the contributors to Paikeday (1985) – for example, mother tongue, the age at which acquisition of the language in question began, and the order of acquisition – are rendered irrelevant by the functionally distributed use of and competence in several languages in multilingual societies' the only way to avoid being sidetracked by them is to attempt a characterization grounded squarely in the reality and psycholinguistics of multilingualism. Singh (1994) offers the sort of characterization I believe is needed: "Grammatically speaking, a native speaker of a language is a person who has relatively stable and consistent grammaticality judgements, which he shares with some other speakers, regarding structures alleged to be from his language." A native speaker/user is, in other words, a speaker/user whose well-formed judgments on utterances said to be from her language are shared by her community. Only a definition of this sort can, it seems, preserve the innocent grain of truth in structuralist and generativist conceptions of the native speaker and acknowledge the considerations Kandiah rightly brings to our attention. It also exposes the oxymoronic nature of labels such as *non-native varieties of X* by making it clear that whereas one can legitimately say that native speakers of Texan English are not native speakers of Heartland Canadian English, one cannot legitimately say that native speakers of Texan English are not native speakers of English (because they do not speak Standard British or Standard Midwestern American English).

Although some of the questions thrown up by the emergence of varieties of English such as Indian and Singapore English are very important for characterizing the notion of a native speaker/user, the debates regarding the status of such varieties unfortunately tend to be almost journalistic. Consider the easily understood matter of lexical innovation and morphology, for example. The preoccupation with pedagogy and an almost complete neglect of grammar in the contemporary sense reduce most discussions of lexical innovation in such varieties to journalistic reports on exotica. It is true that Indian English, for example, has words that are peculiarly its own, but all varieties of English have words that are peculiarly their own. Although the delight of discovering words that are unknown in other, particularly standard, varieties of English is understandable, the unfortunate conclusions that are drawn from such excursions into exotica are unwarranted and seem to stem from a lack understanding of the morphology of Indian English. It is important to look carefully at the morphologically complex words in Indian English and other such varieties. Morphologically complex innovations result from an interaction between requirements of the material landscape and what grammar permits, and here these varieties do not offer much that is radically different.

The fact that *goonda* 'gangster' or *lathi* 'stick' exist only in Indian English is no more interesting than the fact that *tuque* 'a knitted cap resembling a long stocking' exists only in Canadian English. These would be notable if the peculiarity of the lexicon of Indian English could be attributed to a distinct and peculiar morphology. Such an attribution, however, seems unwarranted. Like the peculiarity of the lexica of all other varieties of English, the peculiarity of Indian English seems limited to simplexes. Hosali (1998) intended her example of *lathi-charge* 'an attack with *lathis*' to show a distinctive morphological pattern in Indian English. She notes that the distinctive feature of this morphologically complex item is "the use of a *lathi* or 'a long heavy stick made of bamboo and bound with iron.'" This explanation shows, contrary to her own suggestion, that the item is not a result of substratum- influenced morphology or of an unlicensed extension of English rules of word formation, but reflects the fact that the simplex *lathi* is a word of Indian English, a fact which is of no particular relevance to the morphology of that language. Other complex words also suggest that no such substratum influence or illegal extension is involved in the morphology of Indian English. There is, as I argue in Singh (2002), little in Indian English morphology that cannot be seen as a natural extension of patterns or rules of word-formation used or exploited in other 'native' varieties of English. Indian English certainly has simple and complex words that don't exist in these other varieties, but each one of those has simple and complex words that don't exist in the other varieties. Morphologically complex words in Indian English are, in other words, fully licensed by word-formation rules of English morphology. *Batch-mate* exists in Indian English because *class-mate* and *room-mate* exist in all varieties of English; *collectorate* exists because *directorate* exists throughout the English-speaking world.

Comparable illustrations from syntax and phonology are easy to find, but perhaps it is sufficient to point out here that there are no structural features at any level of grammatical description that characterize all non-native varieties of English to the exclusion of all native varieties. Given that most linguists

who have made serious efforts to find such features acknowledge that there aren't any (cf. Trudgill, 1995), we are fully justified in concluding that the dichotomy native variety/non-native variety cannot be structurally or grammatically sustained. And if it indeed cannot be sustained, speakers of at least the varieties that can be shown to have their own norms, such as Indian English and Singapore English, must be classified as native speakers of English by virtue of the fact that they are native speakers of their respective varieties – the fact that they are not native speakers of some other variety is irrelevant. This is, of course, consistent with the definition in Singh (1994). Although we fully recognize the importance of acceptance, recognition, and ownership, the definition itself does not have anything to say directly about them, because, as I have argued extensively, these are clearly politico-economic matters, better discussed and negotiated elsewhere (see Lele, 2005). It is perhaps counter-usage, but, fortunately, no more so than the definitions of *democracy* in English dictionaries, for example, which define it not in terms what it actually is but in terms of what it could potentially be. It can, hopefully, be used to persuade those who insist on using technical expressions somewhat arbitrarily that they should refrain from doing so.

It is at least mildly ironic that whereas the asocial tradition of linguistic or grammatical inquiry sees and characterizes the speakers of the sorts of varieties mentioned above as native speakers of these varieties, the allegedly socially responsible tradition of sociolinguistics is responsible for creating the expression *non-native variety*. The former honors its commitment to treat all viable, rule-governed systems of linguistic communication at par, but the latter seems more than willing to sacrifice the grain of innocence contained in the impulse released more than a century ago. It is the sociolinguist's intervention that adds to the understandable pedagogical dichotomy *native/non-native speaker* the unlicensed dichotomy *native/non-native variety*. Why some native speakers of English want to treat some other native speakers of English as non-native speakers is an important question, the answer to which is to be found in the political economy of the contemporary world, though sociolinguists are welcome to try to answer it. Why some English-speaking sociolinguists also want to do that is perhaps an even more important question, at least for theorizing about language and society. And in what is perhaps the final irony, the only sustainable interpretation of 'non-native variety' may well be the interpretation 'not of the land' or 'still retaining its otherness' – that is why the structuralist argument that Indian English, for example, is just as self-contained a system as RP English, for example, sounds like a threat to speakers of other Indian languages in India. That it also sounds like a threat to speakers of RP English is easy to explain – such a status is seen as a demand for a share in the cultural and political power wielded by the native speakers of English in the inner circle inhabited by RP English speakers. This interpretation is, at any rate, not the one that the creators of the expression *non-native variety* and the promoters of a demonstrably unwarranted use of *non-native speaker* in scientific discourse have in mind. It is not available to them because the non-nativeness they see in or want to confer on varieties such as Indian English and Singaporean English resides in their view, as they make repeatedly clear, in the Indianness or Singaporeanness of these varieties. It can be invoked only by those who, like Dasgupta (1993), believe that the non-nativeness of these varieties (from an indigenous perspective) resides instead in their Englishness.

See also: English: World Englishes; India: Language Situation; Multiculturalism and Language; Multilingualism: Pragmatic Aspects.

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Natural Kind Terms

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Natural kind terms denote, or purport to denote, natural kinds – for example, physical, chemical, and biological kinds. They are of particular interest to philosophers concerned with what enables us to think and talk about natural kinds. According to *descriptivism*, the denotation of natural kind terms is determined by an associated description. According to *causal theories*, the denotation is determined by language users' causal interactions with exemplars. Hybrid views are also espoused. These positions parallel those taken on the denotation of proper names (cf. Stanley, 1997; *see* **Proper Names: Semantic Aspects** and **Proper Names: Philosophical Aspects**).

Debates about natural kind terms carry implications for a variety of philosophical issues. Causal theories, for example, are *prima facie* in tension with a methodological individualism that assumes that cognitive properties – including the semantic properties of an individual's terms – are determined by properties intrinsic to the individual (cf. Burge, 1979). Discussions of natural kind terms also intersect with debates in cognitive psychology concerning tacit essentialism (cf. Gelman, 2003) and with discussions in the philosophy of science concerning the bases for successful inductive generalization (cf. Kornblith, 1993).

What Are Natural Kind Terms?

Human first languages do not syntactically or morphologically mark natural kind terms as such. Natural kind terms are distinguished solely by the kind of kinds they purport to denote. What then are natural kinds? The core idea is that they are object groupings that reflect real distinctions in nature – in particular, distinctions that play an explanatory role in (accurate) scientific theories. Natural kinds are contrasted with arbitrary groupings of objects whose behavior cannot be explained by shared fundamental properties – for example, the kind comprising Plato's left ear, the natural numbers, and the shoes owned by current heads-of-state. Natural kinds are also contrasted with conventional groupings that reflect practical human concerns, such as the citizens of Pennsylvania. Relatedly, they are contrasted with artifactual kinds – objects grouped together in virtue of our intending them to fulfill certain functions, such as tables. Natural kind terms thus arguably include 'gold,' 'tiger,' and 'H_2O'; but not 'keys' or 'gorks' (where it is hereby stipulated that something is a gork if and only if it is Plato's left ear, a natural number, or a shoe owned by a current head-of-state).

This basic characterization leaves much room for disagreement about just which terms are natural kind terms. First, it admits adjectives – at least those that denote groupings that reflect real distinctions in nature (perhaps 'red' but not 'cultural' – cf. Kripke, 1972). But on some views, not all groupings are kinds, and so not all terms for them are kind terms. Many restrict kind terms to nouns or noun phrases that admit a generic reading, accept kind-level predicates like 'are widespread,' and are associated with criteria of individuation. These terms may be either mass or count nouns (cf. Carlson, 1991).

Second, there are disagreements about various further theses concerning natural kinds and, as a result, disagreements about which kind terms are natural kind terms. Some maintain, for example, that instances of a natural kind share an unchanging essence, that natural kinds fall into a non-cross-classifying hierarchy, or that natural kinds have no borderline instances.

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Natural Kind Terms

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Natural kind terms denote, or purport to denote, natural kinds – for example, physical, chemical, and biological kinds. They are of particular interest to philosophers concerned with what enables us to think and talk about natural kinds. According to *descriptivism*, the denotation of natural kind terms is determined by an associated description. According to *causal theories*, the denotation is determined by language users' causal interactions with exemplars. Hybrid views are also espoused. These positions parallel those taken on the denotation of proper names (cf. Stanley, 1997; *see* **Proper Names: Semantic Aspects** and **Proper Names: Philosophical Aspects**).

Debates about natural kind terms carry implications for a variety of philosophical issues. Causal theories, for example, are *prima facie* in tension with a methodological individualism that assumes that cognitive properties – including the semantic properties of an individual's terms – are determined by properties intrinsic to the individual (cf. Burge, 1979). Discussions of natural kind terms also intersect with debates in cognitive psychology concerning tacit essentialism (cf. Gelman, 2003) and with discussions in the philosophy of science concerning the bases for successful inductive generalization (cf. Kornblith, 1993).

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On such bases, they argue against the inclusion of various candidate kinds – and thus against the inclusion of various candidate kind *terms*. Debates concerning biological species and terms for them are a prominent example (cf. Dupré, 1981; LaPorte, 2004). (Philosophers debate many other issues concerning natural kinds, not all of which affect the classification of natural kind *terms*. For example, they disagree about whether natural kinds have reality independent of our categorizations and about what sorts of entities they are: sets, properties, complex individuals, or something *sui generis*.)

Third, the use of many putative kind terms seems sensitive to human interests. It may seem that we have discovered that the denotation of 'water' is shared by 'H_2O.' But the uses of 'water' and of 'H_2O' are sensitive to amounts and kinds of impurities in differing ways. We would hesitate to call tea 'water' but not the stuff flowing in a river, even though the latter might have more impurities vis-à-vis H_2O than the former. However, neither tea nor a contaminated river is H_2O. Some conclude that 'water' is not a natural kind term, while others argue that such phenomena can be explained pragmatically (cf. Malt, 1994; Braisby *et al*., 1996; Abbott, 1997).

The Semantics of Natural Kind Terms: Descriptivism

We may distinguish three questions concerning the semantics of natural kind terms:

1. the *property* question: what are the semantic properties of natural kind terms?
2. the *foundational* question: in virtue of what do natural kind terms have these semantic properties?
3. the *competence* question: what is required for a speaker to grasp the semantic properties of natural kind terms?

The past 30 years of debate have been shaped to a large extent by Kripke's (1972) and Putnam's (1975) attacks on *descriptivism*. Classic descriptivism maintains three theses corresponding to these three questions. According to *property descriptivism*, the semantic properties of a natural kind term are those of some definite description. According to *foundational descriptivism*, a natural kind term has a particular semantic property – its denotation – in virtue of its relation to such a description. According to *competence descriptivism*, a speaker understands a term in virtue of associating it, explicitly or tacitly, with such a description.

Forms of descriptivism can be further articulated in various ways. For example, John Locke (1979: Book III, Chapter VI) – a *locus classicus* of descriptivism – in effect required that the relevant descriptions be constructed from observational terms. This is because his descriptivism is in service to his developmental and epistemological empiricism, according to which mental states arise from and are justified by experience. Locke distinguished the 'real essence' and the 'nominal essence' of substances, such as gold. The real essence is what makes gold what it is. Locke was pessimistic that we could ever discover a substance's real essence. The nominal essence is the list of observable properties that a speaker associates with the term for this substance. Locke held that the term 'gold' signifies an "abstract idea" composed of ideas of these observable properties (shiny, yellow, malleable, etc.). A natural gloss is that the content of a natural kind term like 'gold' is given by and identical to an observational description such as 'the stuff that's shiny, yellow, malleable, etc.,' and a speaker grasps that this is the term's content in virtue of taking that description to define it.

Against Descriptivism

Descriptivism is a natural view since such features clearly play a role in categorization. But Kripke and Putnam raised a host of objections aimed at separating how people categorize things from what determines the denotation in fact possessed by their terms.

First, there are *modal* objections. Consider 'gold' and a candidate Lockean description. Arguably, the sentence 'gold is gold' expresses a necessary truth – as does, on at least one reading, 'the shiny, yellow (etc.) stuff is the shiny, yellow (etc.) stuff.' But 'gold is the shiny, yellow (etc.) stuff' does not. For it is metaphysically possible both that there be stuff that possesses those observable properties but differs from gold in some fundamental way and that there be gold lacking some one of those properties. Relatedly, 'it's necessary that gold is gold' expresses a truth, but 'it's necessary that gold is shiny, yellow, etc.' does not. (It is thus often maintained that natural kind terms are rigid designators [*see* **Rigid Designation**], although how best to extend the concept beyond proper names is not obvious and depends on what one takes a kind to be; cf. Soames, 2002.)

A second, *epistemic* objection is that the descriptions associated with natural kind terms may be false without affecting the natural kind term's denotation. Suppose that I falsely believe that tigers are the fastest cat and that this is a fundamental, defining characteristic of tigers. It does not follow that, when I use the word 'tiger,' I in fact denote cheetahs. More generally, one might reject a view according to

which, as scientists revise their core beliefs in the light of new research, the denotation of their terms changes, so that scientists adopting different theories become communicatively isolated behind incommensurable vocabulary.

Finally, the *absence* objection points out that speakers competent in the use of a natural kind term often do not associate any particular description with it at all – or at least none that the speakers themselves would consider especially relevant semantically or that would uniquely pick out the natural kind at issue. Putnam (1975) notes that what he happens to know of beeches basically coincides with what he happens to know of elms, so he has available no descriptions that would account for the distinct denotations of 'beech' and 'elm.' Further, even if there are descriptions that uniquely pick out these kinds, it is far from obvious that they play any role in a speaker's cognitive economy.

Causal Theories

Rejecting descriptivism allows one to recognize the possibility of misalignment between what one's terms are about and how one conceives of them. But, if not one's conception, what determines the denotation of natural kinds terms? Causal theories deriving from Kripke (1972) and Putnam (1975) endorse a two-part account of the foundational semantics of natural kind terms: the denotation of natural kind terms is fixed by appropriate causal interaction with instances of the kind and can be socially transmitted to others by patterns of linguistic deference. A natural kind term is introduced with an intention – or comes to be used with an intention – that it denote stuff relevantly similar in underlying structure to *stuff like that*. What fixes the denotation is thus something like a Lockean real essence. 'Gold' denotes, not the stuff that shares various observable properties, but rather the stuff that has some fundamental properties responsible for the observable ones, whatever those fundamental properties might be. People not privy to samples of such stuff intend to use the term as do those who are. The denotation of 'beech' in Putnam's idiolect, for example, is fixed by the fundamental properties of the samples with which those to whom he defers have interacted. Scientific inquiry enables us to learn about these fundamental properties, but linguistic competence does not require – indeed, arguably helps make possible – such knowledge.

On such a view, what semantic properties a natural kind term has are in part determined by features external to speakers – by the (perhaps unknown) underlying nature of the ostended stuff and by features of one's linguistic community. Kripke's and Putnam's foundational semantics for natural kind terms thus supports *linguistic semantic externalism* – the thesis that the semantic properties of one's terms do not supervene on one's intrinsic states. A particularly vivid illustration is provided by Putnam's 'Twin Earth' thought experiment. Suppose that there is another planet just like ours except that, in place of water (H_2O), its lakes, oceans, swimming pools, etc., are filled with XYZ, a liquid superficially similar to water in appearance, taste, odor, etc., but with a different chemical microstructure. Since XYZ is not H_2O, it is not water but rather something that merely resembles water. Now, suppose Oscar is a denizen of Earth, and Twin Oscar is his counterpart on Twin Earth – an exact duplicate with respect to intrinsic properties. Out of Oscar's mouth, 'water' denotes water (H_2O), but not XYZ. Were it pointed out to Oscar that the liquid he just referred to as 'water' was in fact made up of completely different stuff, he would admit that he'd been misled by its superficial resemblance to water. Out of Twin Oscar's mouth, 'water' denotes XYZ (that is, what *they* call 'water' on Twin Earth), but not water – for parallel reasons. But Oscar and Twin Oscar are intrinsically identical. Therefore, their words' semantic properties are a function, not just of their intrinsic states, but also of external factors. Such externalism stands in sharp contrast to, for example, Chomsky's internalist conception of language (*see* **E-Language versus I-Language**).

Descriptivism Redux

Descriptivists have defended themselves both by replying to Kripke's and Putnam's objections and by raising problems for causal theories.

In reply to the *modal* argument, one finds four objections, presented here in increasing order of concessiveness. Some reject the very idea of metaphysical modalities. Others reject the intuitions behind the particular modal claims made, sometimes adding that such intuitions are sensitive to framing effects (and might not be cross-culturally robust – cf. Machery *et al.*, 2004). Then there are those who deny that critics have considered the *right* descriptions: if 'gold' is associated with a *rigidified* description such as 'what's actually the most precious yellow metal,' the modal argument is blocked. Finally, some point out that the argument, if successful, applies only against *property* descriptivism and so does not yet pose a problem for strictly *foundational* descriptivists.

In reply to the *epistemic* objection, a descriptivist might likewise complain that causal theorists focus on the wrong descriptions. There must be *some*

accurate description that can be associated with the natural kind term. For instance, the relevant description could be constructed from the causal theorist's account of the determination of natural kind terms' denotation: 'the stuff that (actually) stands in such-and-such causal relations to users of the term K.' It may be objected that speakers can be competent in the use of natural kind terms despite not associating them with such theoretically sophisticated descriptions. We return to this sort of objection presently. But there are also less theoretically sophisticated candidate descriptions, such as 'the stuff that's (actually) relevantly like *this* stuff, or the stuff others have talked about' (so long as there is no bar on demonstratives), or on some views 'the stuff that's called water in this language' (cf. Haas-Spohn, 1997).

In reply to the *absence* objection, a descriptivist might posit tacit knowledge of the description's bearing on the natural kind term. That is, the descriptivist might hypothesize that the mind or brain associates natural kind terms with such descriptions, even though a speaker is not necessarily aware of this. Alternatively, a descriptivist might argue that such descriptions can play the role required by *property* and/or *foundational* descriptivism despite speakers' ignorance of them. Rather than positing tacit knowledge, the descriptivist might then abandon *competence* descriptivism altogether. This might appeal in particular to those who deny that a semantic theory must also play a role in an account of semantic competence. According to such theorists, the task of semantics is to characterize the semantic properties of expressions, not to explain how speakers grasp those properties (cf. Katz, 2004).

In addition to replying to causal theorists' objections, descriptivists emphasize that causal theories face *prima facie* problems of their own. First, it is not obvious how causal theories should accommodate apparently denotationless natural kind terms such as 'phlogiston' and 'unicorn' (*see* **Empty Names**). These terms are not synonymous. But it is unclear how a causal theorist can distinguish them semantically, since the theorist cannot appeal to a difference in denotation. Descriptivists face no problem here, since they can associate such terms with nonsynonymous descriptions ('the stuff flammable material gives off in combustion'; 'the horse-like mammal with a magical horn').

Moreover, causal theorists face the *prima facie* problem that, on their view, 'phlogiston' is not a denotationless term after all, since it was introduced via interaction with instances of combustion and thus arguably denotes *oxygen*, the stuff in fact responsible for the observed behavior. Unless they can resist this consequence, causal theorists would be committed to a history of science according to which phlogiston theorists were correct that phlogiston exists but simply wrong that it comes from the flammable material.

Finally, an object can be an instance of various natural kinds. If my use of 'gold' is associated with exemplars that are not only Au but also all instances of a particular isotope, what determines to which kind my term refers? Perhaps indeed the term should denote *metals*. This is an instance of the *qua*-problem (anticipated by Locke – cf. Stanford, 1998): it is unclear of what kinds the instances are exemplars, in particular whether we are to consider the instance *qua* gold, *qua* metal, *qua* a certain isotope, etc. Here too it can seem that the foundational semantics requires a constraining descriptive component.

Hybrid Views

In part for these reasons, some have developed hybrid views. There are two not mutually exclusive ways one can combine a moderate descriptivism with a causal theory – both of which have antecedents in Putnam (1975). First, some defend a limited *property* descriptivism while abandoning the claim that the denotation of natural kind terms is determined solely by such descriptions. The idea is that among the semantic properties of a natural kind term is an associated description (or a meaning with description-like content), even though the denotation is not determined by this description and might not align with its extension. Second, some maintain that a natural kind term's denotation is determined by causal relations to exemplars as constrained by some descriptively characterized requirement. It is not sufficient to say that a natural kind term denotes *stuff like that*: it must be stuff that is *relevantly similar* to the exemplar in ways that require at least some descriptive elaboration (cf. Stanford and Kitcher, 2000).

Neodescriptivists have attempted to absorb the insights of causal theories in other ways as well. We have already noted that one might include rigidifying and/or demonstrative expressions in the descriptions. In addition, some theorists distinguish two dimensions of semantic content: a description-like first intension and a second intension that, in the case of natural kind terms, is a function of the first intension and the actual environment of the speaker. The first intension determines a classically descriptivist extension. The second intension, however, does not determine an extension on its own at all; it constrains an extension that is in part determined by how the world in fact is (cf. Chalmers, 2002; *see* **Two-Dimensional Semantics**).

See also: Adjectives; Causal Theories of Reference and Meaning; Chomsky, Noam (b. 1928); Descriptions, Definite and Indefinite: Philosophical Aspects; Developmental Relationship between Language and Cognition; E-Language versus I-Language; Empty Names; Empty Names; Extensionality and Intensionality; Generics, Habituals and Iteratives; Inference: Abduction, Induction, Deduction; Kripke, Saul (b. 1940); Locke, John (1632–1704); Mass Expressions; Mass Nouns, Count Nouns, Non-count Nouns: Philosophical Aspects; Meaning: Development; Nominalism; Nouns; Proper Names: Philosophical Aspects; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects; Proper Names: Semantic Aspects; Putnam, Hilary (b. 1926); Reference: Philosophical Theories; Rigid Designation; Rigid Designation; Two-Dimensional Semantics; Two-Dimensional Semantics.

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Natural Language Interfaces

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Communicating More Effectively with Computers

As technology has progressed to the point where computing hardware is at its most affordable, one can readily argue that the limiting factor in the usability of computers is the usability of the interface. At the onset of interactive computing, the ability to manipulate the data and programs resident on a computer was restricted to individuals able to master the very rigid syntax and vocabulary of command line interfaces. Consider the following scenario:

> Given a file of data containing test results, calculate the relevant statistics about each person and display and save a table of results in sorted order based on average.

A command line to complete this task might look like the following:

```
stats < data.txt | sort –k 3,3n > results.txt ; lpr
  results.txt
```

where *stats* is the program for calculating statistics, *data.txt* is the input file, and *results.txt* will be the output file.

See also: Adjectives; Causal Theories of Reference and Meaning; Chomsky, Noam (b. 1928); Descriptions, Definite and Indefinite: Philosophical Aspects; Developmental Relationship between Language and Cognition; E-Language versus I-Language; Empty Names; Empty Names; Extensionality and Intensionality; Generics, Habituals and Iteratives; Inference: Abduction, Induction, Deduction; Kripke, Saul (b. 1940); Locke, John (1632–1704); Mass Expressions; Mass Nouns, Count Nouns, Non-count Nouns: Philosophical Aspects; Meaning: Development; Nominalism; Nouns; Proper Names: Philosophical Aspects; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects; Proper Names: Semantic Aspects; Putnam, Hilary (b. 1926); Reference: Philosophical Theories; Rigid Designation; Rigid Designation; Two-Dimensional Semantics; Two-Dimensional Semantics.

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where *stats* is the program for calculating statistics, *data.txt* is the input file, and *results.txt* will be the output file.

Alternatively, if one wanted to produce some type of graph or bar chart, the sort command would have to be replaced with the name of the appropriate program and another complicated set of flags and arguments (such as *–k 3,3n*) would likely need to be specified to produce the proper behavior.

An advance in interface usability is the now ubiquitous graphical user interface (GUI). The GUI primarily relies on the point-and-click control of a mouse to select files, data in files, and programs. With a GUI, the sample problem might be handled by completion of the following tasks:

- Select the desired program (*stats*) based on location of its associated icon.
- Select the run action from a hierarchical set of menus.
- Specify the input file *data.txt* in a dialog box.
- Reorder the displayed output by clicking on the appropriate column header once or twice.
- Select the 'save as' action to store the results into *results.txt*.
- Select the print menu action and perhaps click on a few more buttons and options to generate the desired output.

With a GUI, the graph or bar chart would likely require other menu selections within the same program. Although the GUI has made interaction with computers more accessible to a greater number of people, it restricts users to a 'select and use' mode of communication and problem solving, requires users to maintain a specialized cognitive model of selection ('when do I left-click' vs. 'when do I right-click'), and requires users to have special knowledge about the location and organization of menus and icons that may vary from application to application and machine to machine.

Now consider the following alternative – a natural language interface (NLI) that might allow the user to specify the necessary actions for our sample scenario as follows:

> "I need stats run for the skills tests. Please sort them by average and display and save them into a file."

No specialized knowledge about communication is required by the user. The specification could just as easily have been provided to a human assistant. A NLI can allow people to use all the communicative power of language they already possess rather than be forced into an unnatural and limiting mode of communication such as a GUI.

This article provides an overview of the utility of various areas of study in natural language processing (NLP) (*see* **Natural Language Processing: Overview**) for constructing effective NLIs to computer applications. After discussing technical challenges in constructing NLIs, this article describes approaches to meeting these challenges and concludes with a discussion of representative NLIs that illustrate past, present, and future trends in NLI research and development.

NLI Complexity and Limitations

NLIs are subject to most if not all of the technical challenges studied by researchers investigating fundamental problems in natural language understanding (*see* **Natural Language Understanding, Automatic**) at both the utterance and discourse level. However, since NLIs are grounded within the specific domain of a computer application, the required breadth of linguistic coverage is not as large as it could be, but usually it is broad enough to lead to potential complications such as the ones discussed next.

Contextual Subtlety of Meaning and Ambiguity

Consider a NLI to an in-car navigational system that helps provide directions to the driver of an automobile. Suppose the user says, "I need to get to the airport quickly." Suppose also that the driver is somewhere in the vicinity of New York City, where there are three major airports. Without confirmation, the system could begin directing the driver to the wrong airport. An appropriate follow-up response could be, "Which airport, LaGuardia, JFK, or Newark?"

Assuming that the referential ambiguity of *the airport* is resolved, the interpretation of *quickly* is not clear-cut either. Some possible parameters that the navigational application might require in order to produce a proper response include the following:

- Exactly how quick? The possibly quickest route might also have a higher risk for traffic delays.
- The reason for getting there quickly. There is a major difference in going to the airport to catch a flight and going to the airport to pick someone up. In many applications, it is important for the system to understand the underlying user goals.

Now consider a slight variation of the same situation, in which the NLI is to a telephone-based travel assistant and the user is now looking for suggestions that involve public transportation, such as subways, buses, and taxis.

> "I want to get to the airport quickly and cheaply."

Depending on the relative constraints of time and money, various suggestions are possible. The interface must be capable of engaging the user in extended dialog that takes context and domain knowledge into account in order to properly advise the user.

Diversity of Expression

Consider the following paraphrases of "I want to get to the airport quickly":

What's a [fast|quick|short] route to the airport?
How do I get to the airport as [fast|quickly] as possible?
Can you tell me a [fast|quick|short] route to the airport?
It would be nice to get to the airport quickly.

All these statements are reasonable within the context of a conversation between two people. Unfortunately, not all of them are likely to be reasonable for a NLI. Due to resource constraints in the development process, designers of NLIs invariably must take steps to constrain the allowed language. Common strategies include the following:

1. Constrain syntax and vocabulary of system responses to the allowed forms of input. Users will tend to adopt the language forms they perceive the system to be using.
2. Structure responses to constrain user input choices. This presumes that users will attempt to be cooperative. Compare the following two choices for the initial system statement for a NLI for a travel assistant:

   "What are your travel plans?"
   "Tell me your destination city."

   The second response naturally constrains the set of maximally cooperative user responses.
3. Provide feedback that enables users to track the progress of the interaction to ensure that proper understanding is occurring. Consider the following sample:

   System: Tell me your destination city
   User: Nashville.
   System: Your destination is Asheville. Tell me your departure city
   User: No, I said Nashville.
   System: Correction, your destination is Nashville. Tell me your departure city.

   Without feedback, the system error might not be detected until several statements later. Note that the previous example would occur in a speech-based interface rather than a typing interface. However, a NLI that uses typed text for input tends to allow a wider range of syntax and vocabulary as well as encourages users to communicate via longer responses. Techniques for handling these issues associated with typed input are discussed later when a description of the Why2-Atlas physics tutor is provided.

To summarize, NLIs enable much greater expressiveness for users than GUIs, but steps must be taken to constrain the level of expressiveness so that the NLI is technically feasible. The next section examines key development principles of NLIs and presents a generic architecture for a NLI that will form the basis of our discussion of actual NLIs.

NLI Design Principles

In this section, some key principles for NLI development are discussed. Examples are drawn from the author's experience in developing a system called the Circuit Fix-It Shop (Smith, 1995).

Principle 1: Acquire data on language use for the application domain. It is absolutely crucial to collect data on language use for the problem domain for which the NLI is being constructed. The most common sources of data are samples of human–human conversation and the use of Wizard-of-Oz (WOZ) simulations of human–computer interaction. In a pure WOZ simulation (Fraser and Gilbert, 1991), the user is led to believe that he or she is interacting with an actual computer system, but in reality a human is processing the user's input and controlling the prototype system responses. WOZ simulations tend to require extra time initially to develop, but they can potentially provide more accurate data on what users may actually attempt with a real NLI.

Principle 2: Develop semantic representations for the meaning of user input that are consistent with the semantic representation used in the application domain. Consider the following two utterances and possible meaning representations:

"The switch is not on."
assertion (switch, position, on, false).
"The switch is off."
assertion (switch, position, off, true).

The utterances have the same meaning but their basic representation looks different. This can be further compounded if we consider 'up' and 'down' to be synonyms for 'on' and 'off' in this domain. A decision must be made about the form of canonical representations and consistently used. This is, of course, easier to achieve when the NLI designer is the same person or group as the application domain designer, but this is not always the case, especially in nonresearch-oriented NLIs in which the application software is likely to predate the NLI. This problem can become very challenging in an NLI to a database in which many synonyms and paraphrases for entities and relationships may be present in the NLI.

This same principle applies to the natural language generation (NLG) component. This component must be able to take the representations for responses that come from the application program and produce appropriate natural language responses.

Principle 3: Decide early the level of separation to be maintained between language processing components of the NLI and the application's domain reasoning components. Greater reusability is possible if the NLI software is kept completely separate from the application domain software, but it is not always easy to do. The issue becomes particularly complex when choices of meaning representations are made. Consider the following statements about a numeric electronic display called an LED:

1. The LED is displaying a flashing five.
2. The LED is not displaying a flashing five.
3. The LED is displaying only a flashing five.

The simplest way to keep a separation is to have the NLI produce parse trees for the sentence structure and then send them to a hybrid component that produces a meaning representation usable by the domain reasoning component. The complication arises when domain context is needed to get a complete and accurate meaning representation. Suppose for example, the desired LED display is an alternately flashing five and seven. Given that context, the domain-specific meaning for each utterance would be the following

1. The seven may or may not be displaying with the flashing five.
2. The five may be displaying without flashing (or not displaying at all).
3. The specification is reasonably unambiguous.

When system designers are constrained by development time, it is convenient to have the Natural Language Understanding (NLU) component parse the user response using a semantic grammar (Jurafsky and Martin, 2000) that translates the input directly into a domain-usable representation. In such cases, the opportunity for portability and reusability is normally sacrificed. It is important to take this trade-off into consideration early in the development process.

Figure 1 shows a generic architecture for an NLI to some type of functional application (such as a database manager). This diagram is not meant to imply that only one design is possible, but it is meant to describe the primary required components of an interface that will be present in some form in all NLIs (sometimes the response component may not use natural language). Users can provide input to the interface through a variety of devices, primarily keyboard and microphone for the NL text/speech, but input may be augmented via devices designed to capture aspects of body language that people also use in face-to-face communication (e.g., gesture and eye gaze).

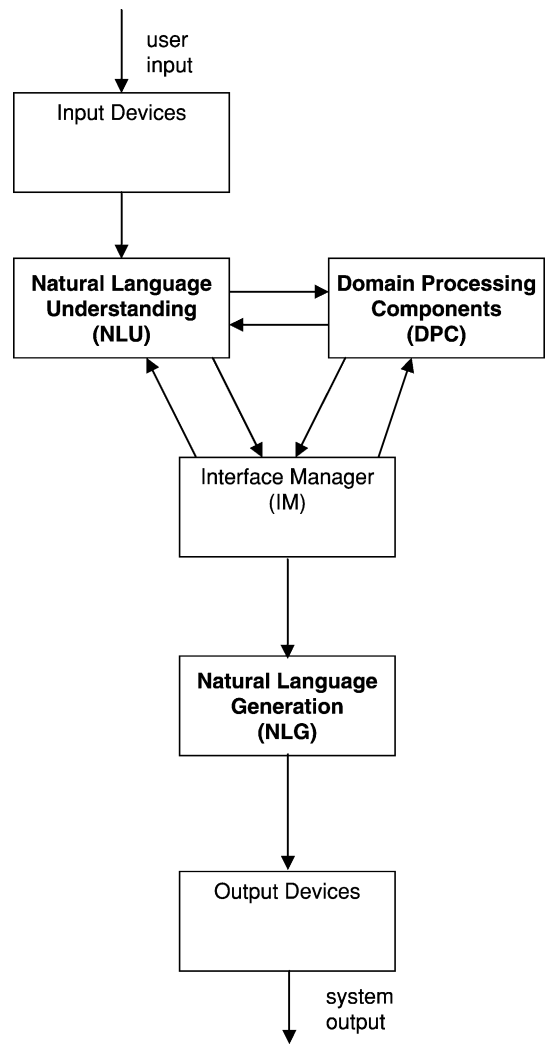

Figure 1 Generic architecture for a natural language interface.

Once the input signal is acquired, it will be transmitted to the NLU component for analysis. The NLU component may optionally need to interface with domain-specific information in order to complete its task.

In addition, the NLU component may need to communicate with the interaction manager (IM) as part of the understanding process. Generically, we consider the IM to be all components of the NLI that maintain information about the ongoing interaction. The most common component of the IM would be a dialog manager and associated components designed to track contextual information.

Once the understanding process is complete and a semantic representation of the user input is created,

the IM must take the user input and, in conjunction with its knowledge about the interaction and relevant information provided by the domain-processing component (e.g., the content for a response to a user query), formulate a response and send the result to the NLG component. This component will then produce an appropriate response involving NL text and possibly other output forms (e.g., graphical) and transmit the result to output devices such as a monitor, speech synthesizer, or printer.

The following section describes how several application NLIs were designed. How each interface implements the different components in the diagram and handles the key design principles previously described is the focus of the presentation.

Representative NLIs

Text-Based Interfaces

A classic early example of a research system for studying issues in developing NLIs is the Berkeley UNIX Consultant (UC) (Wilensky *et al.*, 1988). The system takes as input typed statements that specify aspects of UNIX about which a user wants to know and produces natural language responses. For instance, suppose a user wishes to remove a directory. Any of the following forms of input would be acceptable:

"I want to delete a directory."
"I want to remove a directory."
"What's the best way to delete a directory?"

In all cases the response would be the following:

"use rmdir. For example, to delete the directory named foo, type 'rmdir foo'."

The system carries out the NLU process via a two-step mechanism. The first step produces a semantic representation of what is termed the 'primal content' of an utterance. This idea is related to the notion of literal meaning, but it can be more abstract than that. For example, in representing the meaning of prepositions, the word *on* can function in various ways (e.g., "The dog is on the chair" vs. "The picture is on the wall"). However, in a primal content representation *on* is considered to have the same usage in both (i.e., it indicates a support relationship). In the second step, a more domain-specific representation that is termed the 'actual content' is produced.

Once the NLU processes are complete, domain processing carries out goal analysis, user modeling, and domain planning. The IM takes the inferred user goals (e.g., learning how to delete a directory) and normally will just specify that the NLG components produce an appropriate answer (e.g., telling the user how to delete a directory), but it can also check to ensure that the user's goals are not malicious. However, it is not capable of managing extended dialog about a topic. It manages the interaction in terms of user/system response pairs.

An example of a text-based interface that illustrates the advance in core technologies of NLP to create more sophisticated NLIs is the Why2-Atlas physics tutor (VanLehn *et al.*, 2002). The system teaches qualitative physics by having students write paragraphs explaining simple mechanical phenomena. The explanations are translated into proofs that are then analyzed for correctness. Here is a sample interaction (transcript courtesy of Pamela Jordan):

System: Suppose a man is in a free-falling elevator and is holding his keys motionless right in front of his face. He then lets go. What will be the position of the keys relative to the man's face as time passes? Explain.

Student: The keys should remain in a constant relation to the man's face. Both objects will be in a state of free-fall, and the force of air-resistance should be negligible in an enclosed elevator, so the keys, and the man's face, which are falling and accelerating at the same speed, should remain in the same relation.

System: You have answered the problem correctly except that what you have in your essay is not a sufficient explanation. Before the release, what is the relationship between the man's velocity and the keys' velocity?

Student: equal.

System: Uh huh. If gravity is the only force acting on an object, will it be moving or staying still?

Student: moving.

System: Good. Not only are the person, keys, and elevator moving, they have only gravitational forces acting on them. When an object is falling and has only gravitational force on it, it is said to be in what?

Student: normal force state.

System: Well . . . it's said to be 'in freefall.' Thus, after the release the only force on the keys and man is the downward force of earth's gravity, so they are in freefall. What force acts on all objects within close proximity to earth?

Student: the gravitational pull of the earth.

System: Yes. Besides the earth's gravitational force, are there any other forces acting on the person, keys, and elevator after the release?

Student: no, perhaps air resistance on the elevator.

System: Good. Thus, keep in mind that after the release, the only force on the person, keys, and elevator is the force of gravity.

For Why2-Atlas, the NLU is separated into two components, the sentence-level understanding (SLU) component and the discourse-level understanding (DLU) component. The SLU parses each sentence in the student's response and produces a set of logical propositions to represent the meaning of a sentence. It consists of a lexical preprocessor, parser, repair module, and statistical analyzer. The lexical preprocessor will perform spelling correction and stripping of prefixes and suffixes to produce root forms of words. The parser then does both the syntactic analysis and the construction of the logical form. It handles ungrammatical input through a variety of techniques, including skipping words, inserting missing syntactic categories, and possibly relaxation of grammatical constraints. If an excessive number of analyses is produced, statistical information about word root frequencies and grammatical analyses is used to determine the most likely parse. If the parser cannot produce a complete analysis, its partial results are passed to the repair module. If this module also fails, then statistical approaches (*see* **Parsing: Statistical Methods**) are used, including latent semantic analysis (Graesser *et al.*, 2000).

The DLU takes the collection of logical forms produced by the SLU and constructs an explanation in the form of a proof using abductive reasoning (i.e., if $P \Rightarrow Q$, and we know Q, then hypothesize P). After the proof is constructed, the DPC, a tutorial strategist, analyzes the proof to find flaws. Each flaw that is found is associated with a tutorial goal to have the student remedy the flaw in the explanation. The goals are prioritized and sent to the IM, which then sends appropriate specifications to the NLG component for construction of a response. The IM will also insert transitions as each flaw is remedied (e.g., "Good. Not only are the person, keys, and elevator moving, they have only gravitational forces acting on them . . . .").

Recent work with this system involves the use of a speech interface ITSPOKE (Litman and Silliman, 2004) for engaging the student in the follow-up interaction after the initial explanation has been typed, submitted, and analyzed. In general, speech has become a prevalent input device for NLIs; consequently, the focus of the remaining NLIs to be discussed is on those for which speech is the primary input device.

Speech-Based Interfaces

Robust Language Analysis Depending on the domain, one key factor in the construction of speech-based NLIs that must be handled is that traditional NLU strategies based on the assumption that the input is grammatical are not likely to succeed. This is due to the nature of human speech and the accuracy limitation of speech recognition technology. A system that successfully demonstrates the use of alternative strategies for NLU is the "How May I Help You" system of AT&T (Gorin *et al.*, 2002). The purpose of this system is to allow users to avoid the use of frustrating menu systems for obtaining customer service. A sample interaction is shown in the following dialog excerpt from Gorin *et al.*:

Machine: AT&T. How may I help you?
User: I have a question about my June bill.
Machine: Okay, what is your question?
User: There's a call to Tallahassee, but I don't know anyone there.
Machine: I can help you with that. Are you calling from your home phone?
User: I'm calling from my house.
Machine: Please hold on while I transfer your call.

The idea of the system is to direct user requests more quickly and accurately to the correct service provider. In fact, the authors report greater than 90% success, which represents an improvement on customers' ability to select and navigate through the alternative of hierarchical menus.

Once the word recognition process is complete, the system attempts to find phrases within the user response that are meaningful, where a mathematical measure is used to estimate meaningfulness. Furthermore, information must be used from the IM as the language model changes depending on the state of the dialog. That is, once an initial context has been established (e.g., "I have a question about my June bill"), the next response to the system query will be based on a different language model than the response to "How may I help you?"

Architecturally, this part of NLU is done by the system's speech recognition component, and the NLU component focuses on classifying the type of call the user is making. The IM decides if confirmation and clarification are required as part of the system's response and also decides if additional information is needed in order to properly route the call. It interacts with the DPC that provides a hierarchical description of operator services.

A contrasting approach that is also a commercial phone application is reported in Dybkjær and Dybkjær (2004). Their system responds to frequently asked questions for employees about holiday benefits. The system combines the use of menus with natural language. For a detailed discussion of design issues for speech interfaces (*see* **Speech Interface Design**).

NLIs That Focus on Dialog Management As technological advances have occurred in NLU and NLG, and speech recognition, although still imperfect, has

become usable, many researchers have built NLIs in which the focus has been on enhancing conversational capabilities of systems through the development of more sophisticated IMs (commonly referred to as dialog or discourse managers in specific systems). Two examples of this type of NLI work are the Carnegie Mellon Communicator System (Rudnicky *et al.*, 1999) and the Paco tutorial agent (Rickel *et al.*, 2002).

The Carnegie Mellon Communicator agent is a speech-based NLI that allows users to create travel itineraries that involve multileg airplane trips as well as hotel and car reservations. For speech recognition, NLU, and NLG components, it uses preexisting modules and techniques, sometimes with slight modifications based on domain language modeling. The IM is designed to be domain independent by creating an interpreter that can use a task-dependent script that is provided as part of the DPC. The script provides an overall guide for the structure of the interaction but does not rigidly specify a fixed order for the interaction.

The Paco tutorial agent makes use of the Collagen software system (Rich *et al.*, 2001) for managing extended collaborative interactions. One implemented instructional domain is the operation of a gas turbine engine that propels a ship. An excerpt of a sample interaction from Rickel *et al* (2002) is given below.

Student: "What next?"
Paco: (pointing) "Press the on button on engine one."
Student: presses the on button on engine one.
Paco: "Good."
Student: "I think I should set the throttle speed."
Paco: "Right."
Student: "What should the speed be?"
Paco: "The speed should be stop."
Student: sets the throttle speed to stop.
Paco: "Good."

Note that in this sample, both linguistic and nonlinguistic inputs are handled by the interface. Collagen's theory of discourse is based on the work of Grosz and Sidner (1986), which includes information about the current focus of attention in the task as well as the mutually believed plans of the dialog participants. Ongoing work uses Collagen to develop NLIs for GUI applications (Sidner, 2004).

There are many other examples of NLIs that make use of sophisticated dialog management that cannot be discussed at length in this article. One particularly notable interface is the TRIPS system (Allen *et al.*, 2001). This broad body of work includes an emphasis on issues involving speech acts and planning (*see* **Speech Acts and Artificial Intelligence Planning Theory**). We now turn our attention to the future of NLIs, a future being driven by technological advances in computer hardware, particularly in regard to alternative communication modalities used by people.

The Future of NLIs: Integration with Other Communication Modalities

We saw with the Collagen-based system, Paco, the ability to handle nonlinguistic inputs as part of the NLI. Another recent development with interfaces is the ability to combine the linguistic and nonlinguistic inputs into a single user communication. This type of input is known as multimodal input and has been shown to improve accuracy in human–computer communication (Oviatt, 2000).

An example of such a system is Smartkom (Wahlster *et al.*, 2001). Smartkom merges ideas about user interfaces from spoken interaction, GUIs, and natural gestural interaction (e.g., touch-screen technology) into a single system. As part of the project, a set of large-scale WOZ experiments were conducted that captured both audio and visual data in order to develop statistical language models based on machine learning techniques (*see* **Language Processing: Statistical Methods**). In addition, the system makes use of both NLG techniques and graphical displays for communication with users. Two other representative systems that use multimodal communication are the AdApt system (Gustafson *et al.*, 2000) and the MATCH system (Johnston *et al.*, 2002). These systems demonstrate how NLIs can evolve to be incorporated into more complex interfaces that exploit even more of the means by which humans have been able to communicate with each other – and are now able to use in a limited fashion with computers as well (*see* **Multimodal Interaction with Computers**). In general, the future of NLI research and development should see continued efforts in this type of integration work with other modalities. In addition, there should be continued application of more advanced core techniques in NLP, particularly in the area of dialog management, that will increase the range of communicative power by which computer applications can interact with human users.

See also: Language Processing: Statistical Methods; Multimodal Interaction with Computers; Natural Language Processing: Overview; Natural Language Understanding, Automatic; Parsing: Statistical Methods; Speech Acts and Artificial Intelligence Planning Theory; Speech Interface Design.

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Natural Language Processing: Overview

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We have seen the rise of Internet publishing for fun and profit coupled with increased velocity of both private and business communications by cellular phone and electronic mail. Information accessories, such as Web browsers, search engines, and personal digital assistants, have become commonplace. New modes of behavior have developed around such everyday activities as purchasing goods, accessing entertainment, and conducting business, enabled by mass connectivity and affordable bandwidth.

The medium of all these communications and transactions is still primarily natural language, albeit embedded in a framework that includes hypertext markup and is capable of being augmented by multimedia. Various forms of language processing provide access to Web sites, access to products and services within those sites, and organizational principles for navigating and browsing Web pages. The supporting technologies range from the simplest keyword search to more sophisticated methods that use statistical models of language.

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The goal of applied research is to put customers at the center of the design process and to use technology to enable their wishes and to amplify their abilities. Successful applications are not usually built from solutions in search of a problem; rather they are carefully crafted combinations of science and engineering that focus upon providing a well-defined set of capabilities. Considerations such as cost, scale, and speed also are paramount in calculating how much performance can be delivered at a price that customers are prepared to pay.

Successful natural language applications typically involve deploying more than one such technology. Thus the ability to parse free text is of limited utility unless one can also extract, interpret, and collate semantically meaningful units of information from documents. Successful deployment also requires that these technologies be fielded in a manner that is carefully tailored to a problem-solving context. Thus, while general-purpose parsers are useful research vehicles, such programs tend to find commercial application only if they can be customized to a particular task or trained on data drawn from a problem domain. There are many kinds of documents – such as news, financial reports, scientific and medical articles, contracts, court reports, and public records – that have their own peculiar format, structure, and vocabulary. Programs to process these data will normally need to incorporate some prior knowledge of both the purpose of such documents and their significant features, such as proper names, dates, monetary amounts, and other identifiers that are highly context-specific.

For example, the Deal Proof software for proofreading legal contracts deploys a pattern-learning algorithm that first identifies recurring phrases in a document, or collection of documents. The language employed in contracts is highly variable, if one considers the whole gamut from simple rental agreements to complex mergers and acquisitions, and so it is not feasible to write a parser that will perform a complete analysis of unseen documents. First, significant patterns of language must be anticipated or discovered, as a prelude to checking consistency in the usage of terms and phrases, together with their definitions and qualifications. Only then can the program identify parts of the document that might be problematical, e.g., because instances of these patterns conflict. In any event, the user remains in the driver's seat, so the program is functioning as an intelligent assistant, rather than as a decision maker.

Getting the right allocation of function between person and machine is always extremely important in knowledge-based systems, and natural language applications are no exception. In this context, it is useful to distinguish between application components that are tools and those that are appliances. It was Norman (1999) who first promulgated this distinction in an information setting.

- A **tool** is an artifact that amplifies the skill of the user, but also requires skill for its use.
- An **appliance** is an artifact that performs some function, and requires minimal skill on the part of the user.

For example, most search engines function as tools, because a user's result is only as good as the query the user has crafted. By contrast, document categorization programs ought to function as appliances. They are either capable of classifying documents correctly to some level of accuracy, or not.

As we shall see, this distinction is not always so simple to make. When multiple technical approaches are combined, some of these tool and appliance properties can be interwoven. For example, Google is a search engine, and therefore a tool, but it has some appliance-like characteristics. As well as employing an extended form of natural language indexing, it also exploits the link structure of the Web to give preference to popular sites. As a result, it is often able to deliver good search results when faced with underspecified queries.

This article outlines new application areas for natural language processing enabled by the advent of the World Wide Web, and describes some of the advances that have been made to date (see Jackson and Moulinier, 2002, for a more extended treatment). The emphasis is upon showing how research results outlined elsewhere in this encyclopedia can be exploited to create products and services that have genuine value, either in a commercial arena or in some nonprofit setting, such as government, academia, or healthcare. We begin with a rather simple map of the natural language concept space, show how combinations of such concepts can create interesting capabilities, and outline areas where further challenges and opportunities exist.

Application Areas and Technologies

There are many applications of natural language processing (NLP), some of which appear to be quite disparate from each other. However, they can be systematically compared and contrasted by considering some underlying properties. Two dimensions are particularly useful.

1. The degree to which the application **reproduces** or reinstates some linguistic phenomenon versus a requirement to **transform** or translate it.

2. The degree to which an application **recognizes** or analyzes linguistic input versus a requirement to **generate** or synthesize linguistic output.

These properties are neither absolute nor mutually exclusive. Almost all applications involve recognizing linguistic units and reinstating linguistic information, e.g., by looking up a word in a lexicon. By the same token, most NLP programs generate linguistic output in some form, whether in the form of annotations or text itself. However, most programs have a primary function that can be seen as either analytic or synthetic, while most programs work either by reproducing some linguistic stimulus, e.g., finding the right document, or transforming it, e.g., translating a document into another language.

Figure 1 attempts a rough and ready categorization of NLP applications based upon these two dimensions, which we represent as being orthogonal.

Document categorization, as used herein, denotes an application that seeks to sort documents into categories based upon the language that the documents contain. This activity can be distinguished from other, related activities, such as classifying documents by author, publisher, or type of document (e.g., letter, report, poem, e-mail). Whether a document is placed in one, more than one, or no categories, the activity is basically the same from a functional point of view in that it involves no material changes to the document or its language. The difficulty of the task is typically a function of the number of categories the program has to choose from and the complexity of the underlying taxonomic structure.

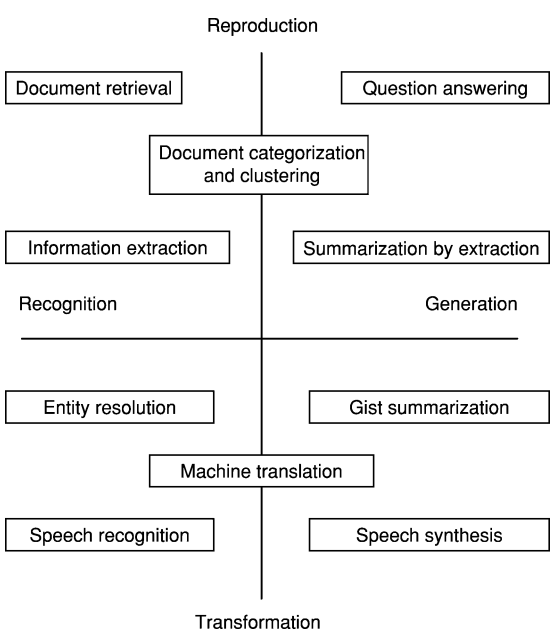

Figure 1 Natural language applications.

If, instead of classifying documents to an existing category scheme, we somehow group documents into **clusters** by similarity of content, then we are engaged in a more generative activity, particularly if the program also suggests names for the clusters, based upon the language in the relevant documents. Hence, this activity is allowed to straddle the Recognition-Generation dimension. But it remains close to the Reproduction end of the spectrum, because even then the documents are not changed in any way.

By contrast, **machine translation** (MT) is inherently an exercise in transformation that involves both recognition and generation. Analysis of the input language generates correct word and phrase translations for weaving into a sentence in the output language. The Reproduction aspect of lexical access is dwarfed by the word disambiguation problem inherent in the transformation, which, absent a solution, will generate outputs that are humorous or incomprehensible.

Document retrieval is perhaps the most obvious activity under the heading of Reproduction, because its primary purpose is to locate and present text that appears to be relevant to some information need. Recognition provides the underlying means by which query terms and indexing terms are matched and weighed. The closer the correspondence, the higher the returned documents are ranked by relevance. We include document filtering under document retrieval, even though a filtering process may actually suppress documents. This kind of 'negative retrieval' is a key component of spam filters and software designed to protect minors from objectionable material on the Internet.

We can distinguish **question answering** from document retrieval in the following way. Question answering generates an intelligible answer to a specific question, rather than presenting a user with a list of documents to sift through in search of an answer. Furthermore, this answer may be synthesized from multiple documents, instead of being drawn from a single document.

Summarization is primarily a generative activity, but there are, roughly speaking, two different ways in which a summary can be produced. One is to select and combine snippets of text from the document to be summarized, and could involve something as simple as identifying the most representative paragraph and presenting that to the user. The problem is then selecting the right text to reproduce. The other is to somehow create a 'gist' summary, or paraphrase, that does not rely upon actual wording from the document but which nonetheless captures its salient contents. This approach involves transforming text from the document, as a student would summarize a document in his or her own words.

The extraction of **named entities** and other information from text also has two aspects. One involves simply identifying the extent of names in the text, so that they can be extracted in one piece, without losing any information or importing any extraneous material. The emphasis is therefore upon accurate selection and reproduction. Another aspect involves the attempt to reduce a proper name to a canonical form with which one can perform further processing, such as **entity resolution**, e.g., by consulting a database or on-line directory to identify the actual person or organization. This activity involves transforming found names according to some standard scheme, and requires some kind of semantic representation of the underlying entities.

Finally, both **speech recognition** and **speech synthesis** involve transforming an input from one modality to another. Thus speech recognition transforms a physical sound signal into a symbolic structure representing the spoken words, while speech synthesis transforms such a structure into spoken words. The obvious difference between them lies not so much in the direction of the transformation but in the locus of the difficulty associated with each of these tasks. Speech recognition involves transforming a highly ambiguous and noisy signal into an unambiguous representation, while speech synthesis involves transforming an unambiguous representation into a human-sounding speech signal.

In what follows, we shall discuss example applications drawn from all four quadrants in Figure 1, concentrating upon document retrieval, information extraction, document categorization, and summarization/question answering. These four areas were chosen as exemplars because they are highly representative of the kind of applications that are found upon the World Wide Web or in organizational intranets.

The Role of NLP in Modern Applications

Early attempts to apply NLP were focused upon three main areas: machine translation, speech recognition, and database access. Leaving machine translation to one side for a moment, NLP was largely seen as a medium for person–machine interaction, in which people would be able to talk to computers instead of typing, or extract information from databases without using a special syntax. Nearly fifty years later, the vast majority of computer users are still typing commands, clicking through menus, and issuing database queries in the good old-fashioned way. Meanwhile, machine translation looks almost as difficult as ever, thanks to the intractability of the natural language understanding problem. Although advances have been made in MT, none of these rest upon providing a solution to one of the central problems of artificial intelligence (AI), namely, how to endow machines with enough knowledge of the world to make sense of simple sentences and draw trivial inferences from them. This is an aspect of the 'commonsense reasoning' problem, an area of AI in which progress has arguably been slow. Nonetheless, MT software can certainly function as an aide to human translators in a person-machine system in which humans perform pre- and post-editing (*see* **Machine-Aided Translation: Methods**). Again, we see the importance of getting the right division of labor between person and machine.

Over the last two decades, the emphasis in NLP has shifted away from these three traditional research areas toward applications that in some way amplify human intelligence in the performance of some information-processing task. Applications such as Internet search, automatic summarization, and text classification/clustering can mostly be viewed as tools and appliances that help users find, select, comprehend, and group documents. Most of the NLP techniques involved in information retrieval (IR) applications involve little AI of the traditional kind, where the emphasis was upon knowledge representation, deductive inference, and modeling the plans and intentions of individual speakers and writers. Instead, the recent emphasis has been upon statistical methods for modeling the language of entire corpora (*see* **Corpus Linguistics**). Probabilistic machinery for profiling documents and matching them to queries or categories has largely replaced cognitive models based upon linguistics, psychology, and epistemology.

The new approach to NLP is largely rooted in the statistical analysis of language. It is sometimes characterized as 'empirical' NLP, because it distills data about linguistic patterns from large text corpora, such as news feeds and Web pages. Unlike symbolic NLP (*see* **Symbolic Computational Linguistics: Overview**), which tends to work top-down by imposing grammatical patterns and meaning associations upon texts, empirical NLP tends to work bottom-up from the texts themselves, finding regularities which may or may not correspond to purely syntactic or semantic relationships.

The symbolic approach is still around, of course, and is applicable to many practical situations where the right corpora do not exist. Furthermore, there are applications where absolute accuracy is so important that any solution requires both handcrafting of the program and hand-correction of the program's output. However, Armstrong (1994) identifies a number

of advantages to the corpus-based approach with regard to addressing some of the key problems of NLP.

- **The problem of acquisition.** It relieves at least some of the labor involved in the hand identification and coding of linguistic information.
- **The problem of coverage.** It helps account for all of the phenomena associated with a given domain, or set of documents.
- **The problem of robustness.** It has a greater potential to accommodate actual language usages that may not be accounted for in 'official' language models.
- **The problem of extensibility.** It provides some basis for applying existing models and data to new domains or document sets.

The growth of the World Wide Web has only confirmed the importance of scale in NLP applications, driving home the realization that computationally expensive techniques for analyzing text are infeasible when one is faced with billions of documents. Coverage is an important aspect of scale, given the diversity of documents available on the Web, and so is robustness, given the high degree of variation in their linguistic style and format. Although there exist on-line directories of information (such as Yahoo!) that have been constructed largely by hand, it is hard to believe that this is the way forward.

NLP for Information Retrieval

In the past, commercial information retrieval technologies employed minimal NLP, often no more than the simplest stemming algorithms. But the globalization of business, aided and abetted by the World Wide Web, has increased demand for linguistic tools that are capable of processing languages other than English (*see* **Web Searching**). Many non-English languages require a more sophisticated treatment of tokenization and morphology for the purposes of indexing and retrieval.

Earlier experiments suggested that stemming delivers only modest improvements to retrieval performance on English documents, but such is not the case for languages such as French, which are much more inflected and have many more classes of irregular verbs, or for languages such as German, where additionally nouns are both compounded and case-inflected (*see* **Stemming**). Tomlinson (2001) suggests that modern approaches to stemming deliver double-digit performance gains up to 50% for many European languages, including significant improvements of more than 10% on English documents. Finite-state approaches have proved to be successful vehicles for this kind of analysis, judging from the number of toolkits that now use cascaded finite automata to layer different levels of linguistic processing. In a typical scenario, tokenization is followed by part-of-speech tagging, morphological analysis, and other, more domain-specific, analyses, such as the identification of proper names.

Experiments have shown that named entity recognition (NER) is also a significant factor in document retrieval; this result is both intuitive and unsurprising (*see* **Named Entity Extraction**). Many proper names are orthographically identical to non-names, and any confusion between the two is bound to affect search-engine performance. Name clashes and name variants can pose similar problems, e.g., in those instances where persons have the same name, or where company names have acronyms and other short forms. NER has implications beyond document retrieval, of course, in that linguistic processing of names is essential to many other tasks in the four quadrants of Figure 1. Nevertheless, the NER task is a core issue in information retrieval as broadly construed, and will therefore be dealt with here.

Successfully identifying and tracking name occurrences requires an indexing scheme that is more sophisticated than the typical inverted file structure in which individual words are tagged with the documents in which they occur. One approach is to construct a controlled vocabulary of terms, some of which may be multiword expressions, and add these terms to searchable fields in documents that feature the corresponding entities. The challenge for NLP is to provide automated assistance to what would otherwise be an extremely arduous and expensive editorial effort.

Wasson (2000) describes an Entity Indexing program at Lexis-Nexis in which names are treated as controlled vocabulary terms that can be searched for in certain document fields using special query syntax. Such indexing must be automated, given the sheer volume of daily news feeds. As noted earlier, one complication is that proper names, such as the names of companies, typically have shortened forms that are ambiguous when viewed in isolation. Thus the name 'American Airlines' may be used in the first paragraph of an article, but the short form 'American' or the abbreviation 'AA' may occur subsequently. Reliable name identification requires the ability to generate and recognize such variants. Wasson reports precision and recall of more than 90% on the indexing task.

The quality of these results is consistent with reports from the Message Understanding Conferences, or MUCs, (*see* **Text Retrieval Conference and**

Message Understanding Conference), which provided a stimulus for research and development in information extraction during the 1990s. In the 7th such conference, there was a track devoted to named entity recognition, with data collections and test conditions being set up along the lines of earlier conferences. The best MUC-7 system came from Edinburgh University, and employed a variety of methods, combining lists, rules, and probabilistic techniques, applied in a particular order.

First, the program applies a number of heuristic rules to the text that rely heavily upon syntactic cues in the surrounding context. For example, in *John Smith, director*, we know that *John Smith* refers to a person, because a string of capitalized words followed by a title or profession indicates the name of a person with high reliability. Then all named entities already identified in the document are collected and partial orders of the composing words are created. For example, names and name parts such as *Lockheed Martin Production*, *Lockheed Martin*, *Lockheed Production*, *Martin Production*, *Lockheed*, and *Martin* will be gathered and marked as possible organizations. The system then looks for short forms of personal names, such as *White* when *James White* has already been recognized as a person, and to label company names, such as *Hughes* when *Hughes Communications* has already been identified as an organization.

An alternative approach to NER is to write a program that uses **Hidden Markov Models** (HMMs) to learn how to recognize names. Some key work in this area derives from BBN Technologies, and resulted in the Nymble system (Bikel *et al.,* 1997), which also participated in MUC-7, and has since morphed into the more highly developed Identifinder system.

One way to think about NER is to suppose that the text once had all the names within it marked for our convenience, but then the text was passed through a noisy channel, and this information was somehow deleted. Our task is therefore to construct a program that models the original process that marked the names. In practical terms, this means learning how to decide, for each word in the text, whether or not it is part of a name. Typically, we are also interested in what kind of name we have found, so the word classification task reduces to deciding which name class a word belongs to. For convenience, we include NOT-A-NAME as a name class.

As with the heuristic approach, it is necessary to identify features of words that provide clues as to what kinds of words they are. The Nymble system used the features shown in Figure 2, which sort all words and punctuation into one of fourteen categories. Although these word features are not informative enough in themselves to identify names, or parts of names, reliably on a word-by-word basis, they can be leveraged, in conjunction with information about word position and adjacency, to provide better estimates of name class.

Word Feature	Example Text	Explanation
twoDigitNum	90	Two-digit year
fourDigitNum	1990	Four-digit year
containsDigitAndAlpha	A8-67	Product code
containsDigitAndDash	09-96	Date
containsDigitAndSlash	11/9/98	Date
containsDigitAndComma	1,000	Amount
containsDigitAndPeriod	1.00	Amount
otherNum	12345	Any other number
allCaps	BBN	Organization
capPeriod	P.	Personal name initial
firstWord	The	Capitalized word that is first word in a sentence
initCap	Sally	Capitalized word in midsentence
lowercase	tree	Uncapitalized word
other	.net	Punctuation, or other word not covered above

Figure 2 Nymble's word feature set, based on Table 3.1 from Bikel *et al.,* 1994.

Their approach is based on the commonly used bigram language model, in which a word's probability of occurrence is based on the previous word. The needed probabilities are estimated from corpus counts, as usual. Sparse and missing data are handled by back-off models and smoothing.

Although named entity recognition is close to being a solved problem, few search engines offer specialized name searching. This is despite the fact that, if proper names were recognized as such, orthographically identical non-name terms would not bring back irrelevant documents. The main drawback to providing such a feature is the computational cost of query processing on the front end and document loading on the back end. A user can specify that part of a query is actually a name, as in the Lexis-Nexis example cited above, thereby saving query-processing cycles that would be required for name recognition.

Figure 3 Cascade of modules in an information extraction system.

But the additional space and CPU time required for name identification and name indexing at load time still looks like a substantial overhead cost to many on-line publishers.

With regard to other possible contributions of NLP to the practice of information retrieval, there is some truth in the observation that the current technology is "either too weak to have a measurable impact . . . or else too expensive to be cost-effective" (Tzoukermann *et al.*, 2003).

NLP for Information Extraction

The ability to identify named entities is useful for both information retrieval and document linking (*see* **Information Extraction, Automatic**). But this quickly leads to the desire to identify also the relationships in which such entities participate. There has been interest in obtaining automatically more and more information from both individual documents and whole corpora. At the document level, this activity is generally described as 'information extraction'; at the corpus level, it is more often referred to as 'text mining' (*see* **Text Mining**). One important subproblem is that of event extraction, in which we seek to identify the 'who', 'when', 'where', and 'how' of an event, and assign the correct roles to participating parties, times, places, and instruments. Another important subproblem is that of entity resolution, in which we seek to identify unambiguously the referents of proper names associated with events.

Event Extraction Intelligence agencies have been using computers to screen electronic news feeds and communications traffic since the 1970s. In the past, programs would look for key terms, such as *oil* or *bomb*, and analysts would sort through the documents found. But modern extraction programs go further in attempting to identify, extract, and present interesting events and relationships. An information industry has grown up around 'homeland security' in the United States, as demand for more sophisticated tools has increased. The majority of such toolkits feature an information extraction capability, as well as other tools, such as document clustering and data visualization.

Unlike more ambitious forms of NLP, information extraction programs usually analyze only a subset of any given text, e.g., those parts that contain certain 'trigger' words, and then attempt to fill out a fairly simple data structure that represents objects or events of interest. Thus, if our focus were corporate takeovers, we might be interested in who acquired whom, and for what price. Similarly, if we cared about personnel changes among senior executives or board members in large corporations, we might want to know who vacated what positions and who was hired to replace them.

Information extraction can be regarded as a subfield of NLP that focuses upon finding rather specific facts in relatively unstructured documents. No practitioner would claim that his or her program 'understands' the text, or is artificially intelligent in the traditional sense. For the most part, such a program is simply recognizing linguistic patterns and collating them.

A common approach to parsing free text for information extraction is to separate different levels of linguistic processing into modules that are then pipelined together, as in Figure 3. Each stage or level consists of one or more pattern recognition elements, called finite automata. Earlier stages of processing recognize more-local linguistic entities, such as words and sentence boundaries, perform part-of-speech (POS) tagging, and work in a more or less domain-independent fashion. Later stages recognize more domain-specific patterns, necessitating knowledge of objects and events that will differ between applications. Thus the patterns to be recognized will differ across domains, as will the templates that need to be filled. Similarly, the knowledge required to merge filled templates successfully will be domain-dependent.

As Grishman (2003) states, a minimal event extraction system needs domain-specific stages that identify proper names, noun groups, verb groups, and finally recognize the event itself. Names need to be categorized to the domain, e.g., as to whether they represent persons, companies, places, etc., while for noun and verb groupings it is essential to identify the *head*, i.e., the main noun or verb in the phrase. Finally, there must be an event template that knits this information together, with the constituents in the right roles.

For example, the FASTUS approach to parsing (Appelt *et al.*, 1993) follows the general sequence of operations shown in Figure 3 and Figure 4. In the *Regular Expression Matching* phase, finite-state machines target specific noun and verb groups, and

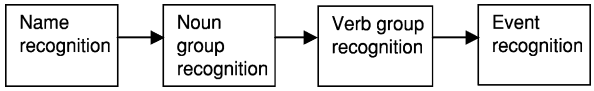

Figure 4 Cascade of modules for an event extraction system.

then match them up heuristically, i.e., using rules of thumb that are not guaranteed to produce the correct parse. Thus, in the sentence,

> The home of the mayor of the city of Bogota suffered a terrorist attack.

the program might conclude that the mayor of Bogota or the city of Bogota underwent the attack, rather than the mayor's home. The *Template Filling* phase takes the patterns found in the previous two steps and puts them into some canonical form, storing them in a data structure. Thus the different sentences,

> Terrorists bombed the mayor of Bogota's home.
> The mayor of Bogota's home was attacked by terrorists armed with bombs.
> The home of the mayor of Bogota suffered a terrorist bombing attack.

should, in theory, all result in the same information being extracted, and the same structure being generated, along the lines of Figure 5. However, different wordings may result in slightly different extractions, thereby hampering recognition that these all represent the same event.

It is important to realize that, for current extraction technology to work, the information sought must be explicitly stated in the text. It cannot be merely implied by the text. For example, a court opinion might end with the words *I find for the plaintiff*, but unless there is other text in the document stating exactly what this means for the disposition of the case, such an extraction might have limited value. The lack of inferential capability can pose significant problems when programs extract text from documents that expect the reader to be able to draw simple conclusions.

Entity Resolution The success of information extraction technology has led to an interest in text mining, i.e., the ability to both extract useful data from text and then perform data mining upon the results. The key idea is to discover something interesting about the relationship between text and the world, e.g., what persons or companies an article is discussing, what trend or train of events a news story belongs to, and so forth. Thus, determining the correct referent of a proper name is crucial, as is dealing with ambiguous names and name variants. Current text mining efforts focus on elucidating within-document and cross-document relationships, typically

Field	Filler
TYPE OF INCIDENT	ATTACK
PERPETRATOR	TERRORISTS
PHYSICAL TARGET	HOME
HUMAN TARGET	MAYOR
INSTRUMENT	BOMB
LOCATION OF INCIDENT	BOGOTA

Figure 5 FASTUS extraction template for the terrorist domain.

building metadata repositories, such as directories of persons (Dozier and Haschart, 2000) and historical relationships between court decisions (Jackson *et al.*, 2003).

For example, Dozier and Haschart describe an application that creates hypertext links from about a million attorneys and judges featured in cases published on Westlaw to personal biographies of those persons in West Legal Directory. The system, called PeopleCite, creates such links by extracting templates from text and linking them to biographical information in a relational database (see Figure 6). Their matching technique is based on a naïve Bayesian inference network, and since its deployment in June, 2000, the implementation has automatically created of millions of reliable hypertext links in millions of documents. Their experiments show that this combination of information extraction and record linkage enables them to link attorney and judge names in case law to biographies with an accuracy rivaling that of a human expert.

The central problem addressed by the program is determining whether or not two names refer to the same person, given the rendition of the names and any contextual information. For example, is the current biography of attorney James Jackson of Palm Springs, California, really the biography of a James P. Jackson practicing law in Sacramento, California, in 1990? Probably. Experiments have shown that PeopleCite can perform this task at 99% precision and 92% recall, which is as good as a human expert.

Once an attorney has been matched against West Legal Directory, a number of other browsing options become possible. In addition to jumping from an attorney's name in a case to that person's biography, one can also bring up all the cases that a particular attorney has litigated, or all the Law Journal articles an attorney has written. This is obviously not possible unless a real connection has been established between

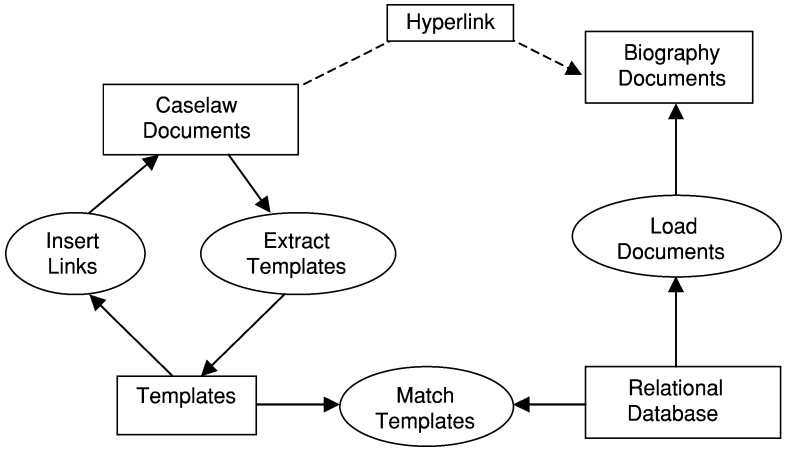

Figure 6 Overview of PeopleCite Tagging System.

a possible name string in the text and an actual person in the world.

Another aspect of text mining relates not to reference but to relationships that exist between concepts, some of which might be hypothetical but nonetheless interesting. For example, the voluminous nature of modern biomedical research has led to ancillary research on the information processing side, aimed at the uncovering of possible connections between genes and diseases, or uncovering similarities among drugs. Arguably, this work began with attempts to connect unrelated literatures (Swanson and Smalheiser, 1997), and has since progressed to the direct mining of textual or semi-structured data for scientific hypotheses (Srinivasan, 2004).

This extension of data mining to textual sources is an interesting concept that is generating more research than applications at the present time. There are already products and services on the market that claim to be able to perform text mining across the World Wide Web, but one must treat these claims with skepticism at the present time. Although it is certainly possible to handcraft solutions that will mine interesting information out of a particular document type and collate that information for presentation, we are still a long way from being able to mine arbitrary text collections in this manner.

NLP for Document Categorization

Document categorization is an application of significant interest to digital librarians, on-line publishers, and intelligent agencies, to name but a few potential customers of this technology. In the early 1990s, a number of tools for this task made the transition from research laboratories to the marketplace, but their success was quite limited. Regardless of the algorithms employed, accuracy was lackluster and deteriorated rapidly as a function of the number of alternative categories the program had to choose from.

Many academic studies have shown that machine learning and document retrieval algorithms can be adapted to the task of text categorization. However, these experiments have typically confined themselves to a relatively small number of alternative categories. For example, Dumais *et al.* (1998) compared five different learning algorithms on the task of routing about 12,000 news stories to 118 categories. Their results were encouraging, and led the authors to conclude that "very accurate text classifiers can be learned automatically from training examples." But it is well known that the difficulty of performing classification increases with the number of alternative categories and inter-category similarity. No single machine-learning algorithm has demonstrated its usefulness from the standpoint of fielding larger, industrial-strength applications, e.g., in electronic publishing. However, researchers have shown that superior classification can be achieved through a combination of multiple classifiers (e.g., Papka and Allan, 1998).

Document categorization is an interesting technology because it can be harnessed to drive a multitude of applications, such as automatic indexing, supplementation and linking, document recommendation, and the enhancement of search results. Companies such as Northern Light and Vivisimo have shown how the clustering of Web search results into categories, typically displayed as folders, can simplify the task of picking through result sets in search of relevant documents. So long as the number of documents and the number of categories are manageable,

this kind of processing can be done in real time without affecting the speed with which the search engine delivers results.

Strictly speaking, document categorization and document clustering are distinct operations. Categorization programs typically assign documents among a set of predefined classes after having been trained on a set of sample documents for each class. By contrast, clustering programs attempt to discover such classes by grouping similar documents together, often based on the same metrics employed by document retrieval systems. Automatic categorization errors tend to be characterized by uneven performance across categories, while automatic clustering errors tend to be characterized by a decline in cluster quality as smaller and weaker clusters are formed to account for all the data. Both suffer from the problems of scale outlined earlier, in that performance tends to decline as a function of the number of underlying classes.

A major problem facing on-line information services is how to deal with the problem of scale when indexing or updating large document collections with respect to a rich set of categories. By 'large' we mean document collections containing hundreds of thousands or millions of documents. By 'rich' category sets, we mean classification schemes containing tens of thousands of categories, with membership in one category rather than another being based on fairly fine distinctions.

For example, a significant task in on-line publishing involves keeping encyclopedia, review, or survey products up-to-date. Such compendia typically summarize, annotate, and discuss other documents as they are published. Thus, each new document needs to be routed to the editor responsible for the relevant topical areas, preferably with suggestions as to where that document should be cited. Ideally, a document categorization engine should help determine both which products are relevant and which chapters or sections of those products would be good places for these documents to appear. In such a scheme, the table of contents associated with an encyclopedia, say, can be viewed as a taxonomy to which one would like to classify incoming documents.

The good news is that the chapters of such compendia typically contain both text and extant citations which provide material for building a statistical model of the language contained both in the chapter itself and in the already-cited documents. The bad news is that a multivolume series might have thousands of chapters or sections, many of them dealing with similar topics. In addition to dealing with relatively small numbers of categories, most reported document categorization efforts involve making fairly broad distinctions, e.g., separating news reports into topics such as sport, trade, finance, and so forth.

It is readily apparent that there is no simple algorithm that will solve the large-scale text categorization problems associated with on-line publishing, given the number and richness of the categories involved. A hand-written, rule-based approach would be quite impractical for such a category space. However, artful combinations of more than one classifier appear to give good results.

For example, Al-Kofahi *et al.* (2001) used this technique effectively to route case-law summaries to various secondary law volumes in which they should be cited. Incoming documents were classified to zero or more categories that represented the 14 000 chapters of American Law Reports. These suggestions were then reviewed by editors to ensure quality and to achieve balance in terms of the number of citations accorded to each chapter. The precision and recall of the system compared favorably with the work of human contractors, who were later replaced by the new person–machine system. Error data is fed back to the system to enable incremental improvement through retraining.

The most effective linguistic feature for representing both documents and their destination chapters turned out to be content-word pairs occurring within a relatively small window of text. This feature outperformed both bigrams and noun phrases by a substantial margin. Other features that turned out to be useful were citations within the documents being routed, and any additional classifications to other taxonomies that had already been assigned. As with most document categorization systems, the linguistic processing used was extremely shallow. Most systems do not even employ stemming algorithms, and many do not bother to distinguish tokens that are part of names from non-name tokens. This use of naïve linguistic models in such applications is hardly surprising, given that most academic research on text categorization has concentrated upon the distributional properties of individual tokens, or the 'bag of words' approach. This may also explain why the topics of document categorization and clustering were omitted from a recent handbook on computational linguistics (Mitkov, 2003).

Another application of text categorization is document recommendation, as exhibited by the ResultsPlus feature on Westlaw. ResultsPlus is a feature that recommends additional relevant material to case law searches on Westlaw, enabling users to perform more comprehensive research. The system suggests articles from Law Reviews and encyclopedia products that are relevant to user queries. ResultsPlus

recommendations are based on both the query text and the retrieved cases.

Spam filtering is another successful application of document categorization, as evidenced by products such as SpamBayes. The so-called naïve Bayes approach to binary classification is both well understood and has been used effectively on categorization problems where the number of competing categories is not too large. Such an approach is based upon the assumption that the probability of a term vector being generated by a document of a given class can be decomposed into a simple combination of the distribution of the terms within that class. This probability distribution is derived from word counts, while zero probabilities are avoided by smoothing. Recent experiments suggest that statistical approaches to spam filtering are far superior to keyword-based approaches (Androutsopoulos *et al*., 2003).

NLP for Summarization and Question Answering

Text summarization can be defined as a process that takes a document as input and outputs a shorter, surrogate document that contains its most important content (*see* **Summarization of Text, Automatic**). 'Importance' can be determined with respect to a number of different criteria. The most common reflect user requirements, such as being relevant to a given topic, or helping the user perform a certain task.

For example, intelligence agencies need to monitor message traffic for certain topics, or to have long documents that feature associated keywords or phrases summarized, but only with respect to certain chosen topics, such as terrorism. Similarly, people working in bioinformatics research or health technologies need to keep up with the latest research, new product developments, or changes to regulations and guidelines relevant to their profession.

From this list of potential consumers for automatic summarization, one can see that the range of text and media types serving as input for such a tool might vary greatly. The range may include single documents (news articles, books, etc.) as well as collections of texts (news streams, archives of papers or books, etc.). In addition, the input data could be a database of non-textual data (such as medical records, or data gathered from an observation camera) and only the summary would be textual, providing a concise high-level description of the data set.

Because of the wide range of possible users interested in automatic summarization tasks and of different input formats, the actual summaries may also vary considerably. Most basically, one can distinguish between a summary as being an extract or an abstract, with rather different implications. An **extract** is a summary that is constructed mostly by choosing the most relevant pieces of text, perhaps with some minor edits. An **abstract** is a gloss that describes the contents of a document without necessarily featuring any of that content.

In terms of the graph in Figure 1, a system that produces an extract would be placed along the reproduction axis, whereas a system that is capable of producing an abstract would be placed along the transformation axis. In both cases, one can think of summarization as compressing or condensing a document. An extract performs compression by discarding less relevant material, whereas an abstract performs compression in more sophisticated ways, e.g., by suppressing detail and replacing specific facts with generalities. Obviously, one could mix these two modes of compression in a longer summary, although doing this effectively raises many design issues.

In addition to this basic distinction between extracts and abstracts, summaries can be categorized according to their overall purpose.

- An **informative** summary is a compressed version of the original covering the most important facts reported in the input text(s) (e.g., summary of a journal article).
- An **indicative** summary reports only that certain topics were covered in the input text without providing further details (e.g., keywords for scientific papers).
- An **evaluative** summary gives an opinion on the input text most often by comparing it to similar documents (e.g., a book review).

Another distinction that one finds in the literature is between **generic** and **query-relevant** (or topic-focused) summaries. Generic summaries give an overall sense of a document's content, while query-relevant summaries confine themselves to content that is relevant to a background query. As we shall see, the features and mechanisms needed for query-relevant summaries also find application in question-answering systems where an answer for a specific question is found by consulting on-line sources or ready-made response repositories.

A question-answering system first has to analyze the question, then find the correct answer in the available resources (Internet, text collection, etc.), and finally prepare the answer accordingly to the user's profile together with supporting information (e.g., a link to the source).

Summarization Technologies Most summarization systems work by picking sentences out of the full text,

employing a mixture of linguistic knowledge and more generic statistical methods. A typical example of such a hybrid approach is that of the Trainable Document Summarizer (Kupiec *et al.,* 1995), which uses the following set of discrete features for selecting sentences:

- **Sentence length feature**. Summaries rarely contain really short sentences, so we expect sentences to be longer than a threshold, such as five words.
- **Fixed phrase feature**. Certain phrases suggest summary material, e.g., 'in conclusion'.
- **Paragraph feature**. The first and last several paragraphs of a document are most likely to contain summary material.
- **Thematic word feature**. The most frequent words in a document can be regarded as thematic, and summary sentences are likely to contain one or more of them.
- **Uppercase word feature**. Proper names and acronyms (especially with parenthesized explanations) are often important for summaries.

Every sentence in a document can be scored according to its probability of being in the summary using Bayes's rule, if we assume independence among the features. The prior probability can be approximated by a constant factor, such as the reciprocal of the number of sentences in the document, and therefore ignored. The other probabilities can be estimated from counts over training data.

Other features used in automatic summarization focus on the discourse level and try to address the overall structure of a document. There are two aspects of discourse structure that help find summary sentences. The first one is called **cohesion** and is concerned with different relations that can hold between text units of various sizes and content (e.g., words, phrases, word senses, or referring expressions).

By building a graph consisting of these text units and where the connections between the text units represent certain relationships between these text units (e.g., word similarity or co-reference), parts of the graph can be identified that are well connected in contrast to other parts that are less well connected or are even islands in the graphs. Paragraphs or sentences that contain many well-connected (or 'bushy') nodes are assumed to be good candidates for summaries.

Such an approach that takes into account several different relations holding between the words of several texts to be summarized in one summary can be found in Mani and Bloedorn (1997). They generate cohesion text maps that have the words of the texts as nodes, and the arcs represent adjacency, co-reference, and lexical similarity among other things.

Another aspect of discourse structure is **coherence**. Determining the coherence of a text by deriving the relations between sentences (or clauses) may also improve the performance of text summarization systems. Based on text structure theories such as **Rhetorical Structure Theory** (RST) (Mann and Thompson, 1988), summarization systems have been proposed that make use of the overall discourse structure of a text (see Marcu, 2000). Such approaches seem to be quite compelling for the summarization task because they try to model the way an author organizes a text. A coherence-based approach may also help with generating a coherent summary text; most current applications cannot provide this feature because they are extraction-based systems. Omission of material and lack of coherence are the two main problems facing automatic summarization.

Researchers have typically used two methods in trying to quantify the performance of summarization programs. One is to compare the machine's output with a human-written summary, produced by an editor or a domain expert. This has been called 'intrinsic' evaluation, and it is the more widely used of the two. The other, 'extrinsic', approach is to evaluate the usefulness of a summary in helping someone perform an information-processing task. Both methods are known to be sensitive to basic parameters of the experimental context, such as summary length.

Experiments have shown that a given pair of **human-written** summaries may only exhibit about 40% to 50% overlap in terms of their content. As Mitra *et al.* (1997) point out:

> If humans are unable to agree on which paragraphs best represent an article, it is unreasonable to expect an automatic procedure to identify the best extract, whatever that might be.

Extrinsic evaluations typically treat a summarization system as a post-process to an information retrieval engine. The summary generated is meant to be tailored to the user's query, rather than reflecting the document as a whole. Human subjects then use the summaries to decide whether or not the document is relevant to the query. Their performance on this task is measured with respect to time taken, the accuracy of their decisions, and sometimes the degree of confidence they are prepared to place in their decisions. The assumption is that, given good summaries, users will be faster to judge the relevance of search results than if they had to delve into the documents themselves, and that accuracy and confidence will not suffer too much.

These results illustrate both the imperfect state of automatic summarization and the imperfect state

of our evaluation methods. The evaluation of summarization technology may ultimately remain a subjective matter, because there is no unique right answer to the question 'What is a good summary?' for a given document or set of documents. Consequently, current studies tend to focus on evaluations based upon more than one model summary (Lin, 2004).

Further applications of summarization techniques go beyond summarizing a single text. These more recent trends take into account the information overload of a user or professional and try to facilitate processing the information a user has to cope with. Multidocument summarization systems represent the next logical step from Google News where news messages are only clustered according to a recent news theme. For example, the Newsblaster system (Evans *et al.,* 2004) is a multidocument system that creates one genuine summary composed out of several different news messages on the same topic. E-mail summarization tools must also deal with multiple texts as they summarize the gist of an e-mail thread.

So far, the output of summarization systems discussed produce text, but other formats are also possible. So-called multimedia summarization offers a totally new avenue of research and will lead to many new applications. The capability of taking multiple, different input formats (images, speech, video, music, etc.) and producing different mixed output formats makes this a powerful future application area. For example, the Broadcast News Navigator (Maybury and Merlino, 1997) is a tool for searching, browsing, and summarizing TV broadcast news from different news sources. The technology used for this application goes beyond pure text-processing techniques (e.g., video segmentation, face recognition, speech recognition), but language (as speech or text) combines all the different modalities information is presented in.

Another challenge for natural language processing is the summarization of text in different languages and the production of output in a language that the user understands. This new trend will combine machine translation technology with summarization techniques and allow Internet users around the world to have access to the content of the increasingly growing number of non-English web pages (see, e.g., Evans *et al.,* 2004).

In multilingual text summarization, one general and important requirement for a successful application is the capability to adjust to the user's needs. The findings of evaluation experiments have shown that a good general-purpose summary is difficult to determine. Moreover, user-oriented summaries generated by automatic summarization systems seem to achieve better scores than general-purpose summaries (Mani and Bloedorn, 1998). One consequence of this observation is that an ideal summarization system needs to understand the task at hand, and should be capable of inferring what question the user has in mind when looking for a document.

As pointed out earlier, there is a growing need to merge the two distinct areas of summarization and question answering. In the future, this development will most likely lead to more user-oriented systems that process natural language by engaging the user in a dialog on the user's task and her particular information needs. How current systems address the task of question answering will be discussed in the following section.

Question Answering Question answering (QA) can be contrasted with both information retrieval and information extraction (*see* **Question Answering from Text, Automatic**). In information retrieval, a query to a search engine typically returns a list of documents, ranked by relevance to the query. The specific information that the user needs is contained somewhere in one of these documents, if he or she is lucky. The answer to the user's research question is not usually ready to hand, unless the search was actually for the document itself, or for a URL. Information extraction, on the other hand, locates specific information, but the nature of this information is predetermined, and cannot be served up in response to an open-domain query.

The potential applications of question-answering technology are almost too numerous to list. Most users of search engines are not searching for particular documents, but for specific products, services, prices, people, and companies, not to mention a plethora of facts and figures.

The prototypical QA system is a pipeline model that processes the answers step by step in specialized modules:

- **Question Analysis**. Because the user asks a natural language question rather than a Boolean one where the syntax is precisely defined, some sort of linguistic analysis of the input query has to be carried out.
- **Document Collection Processing and Candidate Document Extraction**. The document collection can be preprocessed and text chunks may be tagged according to likely answer types (e.g., PERSON, DATE). The system has to retrieve a set of candidate documents that presumably contains the correct answer to the question asked.
- **Candidate Document Analysis and Answer Extraction**. Documents that are assumed to contain the

right answer are scrutinized more deeply, and a string, phrase, or paragraph is extracted that represents the correct answer.

- **Response Generation.** The answer format generated can range from a string limited by a fixed number of characters to a clarification question asked by the system to improve the search result.

Many different methods have been proposed and described in recent years, mainly presented at the QA track of the Text Retrieval Conference (TREC). For a concise overview of current QA systems, consult Harabagiu and Moldovan (2003), who offer a taxonomy of such systems, based upon a combination of language and knowledge resources, NLP techniques, and reasoning methods required. The systems discussed run the gamut from relatively simple processors of factual questions, through systems that must use some form of inference to deliver answers to more complex questions, to systems that are capable of debating or opining on more speculative issues such as future trends.

True question-answering systems allow the user to pose actual questions, rather than merely typing queries consisting of keywords. However, the reality is that such questions are subject to query processing that identifies keywords for searching. Such processing may be superior to that used in normal Boolean or ranked retrieval systems, e.g., it may involve the identification of proper names, but the query that is typically run is a Boolean expression based on the original question, possibly augmented by expansion terms from a thesaurus.

To overcome this shortcoming, recent systems try to make use of shallow semantic parsing techniques. Analyzing the question and the data collection, predicate-argument structures or semantic frames can be extracted. Based on the derived semantic representation, a better match of the question type and the potential answer candidate can be achieved. In addition, some sort of simple reasoning can be carried out with simplified logical forms derived for the questions and potential answers as well as for domain-dependent axioms (see Moldovan *et al.,* 2002).

The remaining piece of the question-answering puzzle is an answer-type taxonomy that represents the different kinds of questions that a user can pose, such as 'who', 'when', 'where', 'how much,' etc. Many taxonomies developed for QA, or used in QA systems, are built around WordNet (Fellbaum, 1998) (*see* **WordNet(s)**), by identifying semantic categories of nouns and verbs that represent key concepts in the domain, and then factoring in named entities that instantiate those concepts. Adjectives and adverbs are also needed to answer questions about properties of objects, which represent values of attributes or dimensions.

Future Directions

Statistical approaches to natural language processing have made significant contributions to the state of the art in application areas such as document retrieval, information extraction, and text categorization. Finite-state technology, originally developed for speech recognition, has since been successfully applied to other linguistic processing tasks. Named entity identification has progressed to the point that automatic enhancement of news and business information is now possible, by providing links from documents to the persons and companies that they reference. Text categorization algorithms can now route millions of documents to hundreds of thousands of categories with reasonable accuracy, and are also effective against spam e-mails.

Challenges for the future include the extraction of events and other fact patterns by means other than the laborious writing of rules. Summarization and question answering remain topics for further research, and are still in their infancy, as far as being able to deal with a broad range of document types. So-called 'concept search' engines, such as Recommind and DolphinSearch, are also quite rudimentary, relying as they do upon patterns of word co-occurrence, rather than upon concept identification.

It seems likely that applications of natural language processing will continue to drive research, as on-line information services, intelligence agencies, and healthcare professionals come to demand, and depend upon having, unlimited access to textual information. The tools and appliances needed to perform the tasks identified in **Figure 1** will need to be robust in coping with the real world problems of colossal scale and imperfect data. The NLP community has shown itself to be responsive to these challenges, and we can look forward to further advances.

See also: Corpus Linguistics; Document Retrieval, Automatic; Information Extraction, Automatic; Language Processing: Statistical Methods; Machine Translation: Overview; Machine-Aided Translation: Methods; Named Entity Extraction; Question Answering from Text, Automatic; Stemming; Summarization of Text, Automatic; Symbolic Computational Linguistics: Overview; Text Mining; Text Retrieval Conference and Message Understanding Conference; Web Searching; WordNet(s).

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Natural Language Processing: System Evaluation

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Evaluation: Introduction and Terminology

Evaluation is the systematic application of methods, metrics, and measures for the assessment of computer applications for natural language processing. Community-based, task-focused evaluation has accelerated scientific advancement in areas such as automated speech processing, information extraction, and machine translation. Several other articles in this encyclopedia describe specific evaluation efforts in areas such as information extraction, question answering, and summarization. However, evaluation methods have much in common. This article motivates purposes for evaluation, introduces key concepts, terms, and metrics, and summarizes evaluation in several areas.

Evaluation involves methods, metrics, and measurements:

- The **method** is the general strategy or approach to evaluation, such as what is being evaluated (e.g., evaluation of a complete system or of individual components), who or what performs the assessment (e.g., a human such as an engineer or system user, a committee, or a machine), and how evaluation is performed, such as comparison with a standard data set, by other comparative means (e.g., human vs. machine, machine vs. machine), or by performance in support of a real task.
- **Metrics** are the specific relevant characteristics or properties to be assessed in the system, such as speed, accuracy, and usability. These can be quantitative and qualitative.
- **Measures** are the specific technical measurements assessed. For example, to assess the performance accuracy of information extraction systems and algorithms, typical measures include precision (the proportion of identified items that are correct) and recall (the proportion of items correctly identified).

Table 1 lists a few of the more popular measures used in natural language processing evaluations.

Evaluations should be informative, reproducible, comparable, and cost effective. By standardizing metrics and measurements applied to evaluate performance, the tests can be repeated and the multiple results compared. Evaluations should not be sensitive to data samples or evaluator error.

Motivated by research in information retrieval, evaluations typically depend on **test collections,** which include

- **documents** – typically a few thousand to a few million, which can be text, web, audio, or video documents;
- **queries** – typically between 50 and 400 characterizations of typical user information needs;
- **answers** – typically a set of document relevance judgments or extracted answers that have been

Table 1 Common evaluation measures for natural language processing

Measure	*Definition*
Word error rate (WER)	Minimum number of edits (insertions, deletions, or substitutions) required to created the reference from the hypothesis as a portion of the reference size.
Precision (P)	Portion of hypotheses that are consistent with the reference.
Recall (R)	Portion of references that are present in the hypotheses.
F-measure	Harmonic mean of P and R. $2PR/(P+R)$
Mean average precision (MAP)	Mean of average precision for a set of queries at a range of recall levels.
Mean reciprocal rank (MRR)	The reciprocal of the rank at which the first correct response is returned or 0 if none of the first n responses contain a correct answer. For a sequence of queries, MRR is the mean of the individual query's reciprocal ranks.
Detection error Tradeoff (DET)	Curves which show the tradeoffs between miss and false alarm rates at multiple operating points.
Equal error rate (EER)	The point at which the number of misses equals the number of false alarms. The intersection of the DET curve with the y–x line.

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Equal error rate (EER)	The point at which the number of misses equals the number of false alarms. The intersection of the DET curve with the y–x line.

checked by humans or some combination of machines and humans.

This approach is in marked contrast to, for example, the field of human–computer interaction, which, in addition to task-based, formal experimentation (termed 'summative' evaluation), includes in its evaluation arsenal

- **cognitive walkthroughs** – evaluation done by experts who step through each task asking detailed questions;
- **heuristic evaluation** – evaluation by experts using well-defined heuristics or guidelines;
- **formative evaluation** – observational user studies, questionnaires, and interviews.

For example, in dialogue evaluation, researchers could use the TRINDI 'tick list' (TRINDI, 2001), aimed at triggering significant dialogue features such as error recovery. Also, simulation-based evaluation and Wizard-of-Oz experiments could yield novel insights. However, these are rarely used in the evaluation of natural language processing systems.

Researchers, product developers, program managers, and end users have distinct requirements for evaluation:

- **Researchers** need feedback on the performance of technical approaches on various realistic data sets to identify errors and limitations, to drive further algorithmic refinements, and to inspire new technical directions.
- **Product developers** need metrics (e.g., quality, performance, usability) that relate to user tasks so they can guide further development efforts.
- **Program managers** need to understand performance of capabilities to assess costs and benefits (e.g., cost savings, efficiency, productivity). They need to measure progress in order to manage cost and schedule and decide into which user communities to deploy solutions as well as where to invest in new technologies.
- **End users** need guidance on how well tools will work in their environments in order to make decisions on when, where, and how to use various tools.

Speech

The development of large training and test collections, often in concert with the Linguistic Data Consortium, and quantitative measures of performance on common tasks has been essential to continuous progress in speech processing. The standard word error rate (WER) metric is the minimum number of edits (insertions, deletions, or substitutions) required to create the reference from the hypothesis as a portion of the reference size. Figure 1 illustrates the reduction in WERs benchmarked by the National Institute for Standards and Technology (NIST) (Pallett *et al.*, 2000) since 1988 for a range of tasks including speech read from North American news sources such as the *Wall Street Journal*. More challenging tasks have included spontaneous speech, varied microphones, noisy environments, conversational speech, and foreign broadcast processing. Speech in meetings recorded with multiple distant microphones turns out to be one of the greatest challenges, giving very high error rates relative to broadcast news and conversational telephone speech.

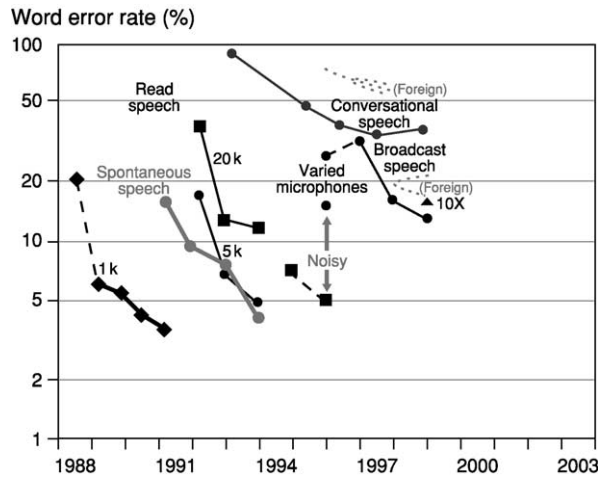

Figure 1 History of speech recognition word error rate for best systems.

Following a 1995 pilot, a few years of broadcast news speech transcription evaluations led up to a 13.5% WER, half the error rate of the original pilot. This led to new research in spoken document retrieval and to a new program in topic detection and tracking (TDT). It also led to the Text Retrieval and Evaluation Conference (TREC) video retrieval track and the Automated Content Extraction program. Another important benefit of corpus-driven, community evaluation that is seen here is the ability to disseminate knowledge among research groups as they publish not only their performance results but also papers about methods used and lessons learned. The 1998 broadcast news tests included an evaluation of the extraction of named entities (i.e., people, places, organizations) from speech, exploring the relationship between WER metrics for speech transcription and precision and recall (and their weighted combination into an F-measure as defined in Table 1) for detection of named entities. For example, a team from Bolt, Beranek, and Newman Technologies (BBN) reported an 82% F-measure on a 14.7% WER. In the spoken document retrieval task,

measures included WERs for transcription together with mean average precision (MAP) for document retrieval. In 1998, the highest MAP of the spoken document retrieval systems was 0.567 by the University of Massachusetts. When teamed with Dragon Systems and AT&T the university achieved similar results (0.507 and 0.512) using their own recognizers.

Information Retrieval

A key venue for evaluating human language technology has been the Text Retrieval and Evaluation Conference (TREC). TREC is broken up into various task- and data-focused evaluation 'tracks.' TREC's annual cycle typically starts with data distributed in the spring, experiments run over the summer, and results presented at a fall conference.

One part of the evaluation process is the informal piloting of evaluations with a small group to establish evaluation data, methods, metrics, and measures, followed by broader participation. Figure 2 shows the level of participation by size of group in various TREC tasks from 1992 to 2003, growing from 22 to 93 participants. The graph illustrates the increase in diversity of evaluations over time. These included multilingual retrieval such as Spanish and Chinese (Mandarin Chinese), multimedia retrieval as in video story retrieval, finding novel information, and special domain focus such as genomic linkage and annotation to support retrieval. Also evident is the growth in participation in tasks such as *ad hoc* retrieval, web retrieval, very large test collection, and question answering. TREC is detailed further in a separate article (*see* **Text Retrieval Conference and Message Understanding Conference**).

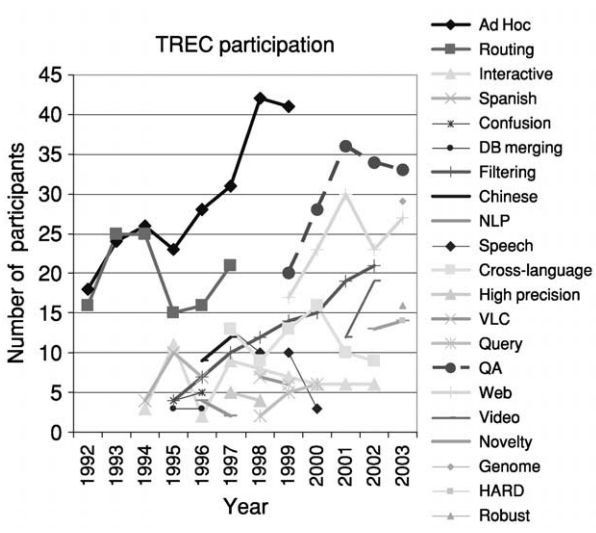

Figure 2 History of participation in TREC tracks.

The Cross-Language Evaluation Forum addresses digital library applications by (1) developing an infrastructure for the testing, tuning, and evaluation of information retrieval systems operating on European languages (extending also to Russian, Japanese and Chinese [Mandarin Chinese]) in both monolingual and cross-language contexts, and (2) creating test suites of reusable data which can be employed by system developers for benchmarking purposes. A series of evaluation tracks, as in TREC, include mono-, bi- and multilingual information retrieval on news collections, mono- and cross-language information retrieval on structured scientific data, interactive cross-language information retrieval, multiple language question answering, cross-language retrieval in image collections and cross-language spoken document retrieval.

Text Parsing

Parsing text is one of the most basic of language technology tasks, including labeling parts of speech, semantic classes (e.g., person, object), and function classes (e.g., subject, direct/indirect object) of words and sentence constituents. The Parseval system (Black *et al.*, 1991; Harrison *et al.*, 1991) was initially applied to seven parsers (Black *et al.*, 1993) to syntactically evaluate broad-coverage English-language parsers using common test data. Semeval (Moore, 1994) is a Parseval-modeled plan to extend parsing evaluation to semantic analysis. An annual Semeval competition includes such tasks as word sense disambiguation and logical form. A related task is the creation of a treebank or set of sentences parsed correctly by hand by competent humans (Black, 1993) that serve as an answer key both for building and for evaluating parsers. *See* **Treebanks and Tagsets** for details on the separate use of treebanks as training data.

Question Answering

Question answering (QA) is the task of responding to natural language questions by providing answers extracted from free text (*see* **Question Answering from Text, Automatic**). The QA track in TREC uses the mean reciprocal rank (MRR) metric (defined in Table 1), which credits finding answers to questions as high as possible in the ranked output (i.e., the score on a given question is the reciprocal of the rank at which the first correct response is returned or 0 if none is returned in the first n answers). The best current systems answer simple 'factoid' questions (i.e., who, what, when, where?) about 70% of the time. More complex evaluation tasks being

investigated in 2003 included questions whose answer is a list or a biography and 'how' and 'why' questions. Tasks under consideration for evaluation include definitions of people and things, fixed domain QA, dialogue, answer justifications, relationship QA, opinion QA, multimedia and multilingual QA, and QA where there is no answer.

Fukumoto *et al.* (2003) described the Question Answering Challenge, a 16-system Japanese question-answering evaluation that involved both single and multi-answer factoid questions from two years of the *Mainichi Newspaper*. The systems could retrieve the answers, in the form of named entities (*see* **Text Retrieval Conference and Message Understanding Conference**), from newspaper articles or other information sources such as an encyclopedia, thesaurus, corpus of data, and so on. There were three tasks: providing the best five answers (Task 1), providing the best single answer (Task 2), and then answering a question followed by a series of follow-up questions (which contained anaphora and ellipsis) (Task 3). Two hundred questions were prepared for Task 1, 40 for Task 3. The most accurate of 14 systems evaluated in Task 1 achieved a MRR of 0.61. The best system returned correct answers in the first rank for more than 50% of the questions and in the top five ranks for more than 75% of the questions. The most accurate of 14 systems evaluated in Task 2 achieved a mean F-measure of 0.36. Only six systems were evaluated on Task 3 and 14 of the 40 questions could not be answered by any system. The best system achieved a 0.14 mean F-measure.

Multilingual Topic Detection and Tracking

Topic detection and tracking (TDT) research sponsored by the Translingual Information Detection, Extraction, and Summarization program (TIDES) of the Defense Advanced Research Projects Agency (DARPA) has held evaluations since a pilot in 1997. TDT algorithms discover and thread together topically related material in streams of data such as news wire and broadcast news in both English and Chinese (Mandarin Chinese) (Wayne, 2000). TDT evaluation includes the following five tasks:

1. **Story segmentation** – detect changes between topically cohesive sections
2. **Topic tracking** – keep track of stories similar to a set of example stories
3. **Topic detection** – build clusters of stories that discuss the same topic
4. **First story detection** – detect if a story is the first story of a new, previously unknown topic
5. **Link detection** – detect whether or not two stories are topically linked.

The primary metric of evaluation is detection error tradeoff (DET) curves, which show the tradeoffs between miss and false alarm rates at multiple points. A single number metric often used is the equal error rate, the point on the DET curve at which the number of misses equals the number of false alarms.

Information Extraction

The Message Understanding Conference and the Multilingual Entity Task explore the extraction from text of the names of entities (e.g., people, places, organizations), coreferences, properties, relations, and events in several domains (e.g., joint ventures, microelectronics) and many languages (e.g., English, Chinese [Mandarin Chinese], Japanese, Spanish). Performance measures include precision, recall, and F-measure (with recall and precision weighted equally). Today, entities can be extracted with more than 90% accuracy, relations with about 75% accuracy, and events with about 50% accuracy.

Summarization

The first large-scale evaluation of automatic text summarizers took place in May 1998 at the TIPSTER Text Summarization Evaluation Conference (SUMMAC) (Mani *et al.*, 1999, 2002). Summarization evaluation is challenging as answers cannot be simply classified as right or wrong, there is low human agreement on the best summary content, and notions such as fidelity to source are vague. Unlike intrinsic evaluations which judge the quality of the summarization, such as its fluency, coverage, or similarity to an ideal summary, SUMMAC investigated two extrinsic evaluations. In the first a summary was used to make document relevancy assessments and in the second it was used to categorize the document. SUMMAC established that automatic text summarization is effective in relevance assessment tasks. Summaries as short as 17% of full text length sped up decision making by almost a factor of two with no statistically significant degradation in F-measure accuracy.

Summaries can be simply extracts of phrases or sentences from the original source or newly generated abstracts of the source content. A Japanese version of SUMMAC using intrinsic evaluations found that human abstracts were better than human extracts, which were better than machine-generated extracts in terms of coherence and informativeness. These experiments also repeated English results that summaries (up to one-third of the source) save time (up to one-third) without loss of accuracy.

A complementary evaluation approach is readability/comprehensibility. In this approach to evaluation,

a user first reads a full source or summary and then answers multiple-choice questions about the text; the correctness of the answers indicates the quality of the summary (Hirschman *et al*., 1999).

Sponsored by TIDES and run by NIST, since 2000 the Document Understanding Conference has focused on the evaluation of summarization (Over and Yen, 2004). Evaluations have included assessments of both single and multiple document summarization at a variety of lengths (e.g., 10, 50, 100, 200, and 400 words). Evaluations have included both English and Arabic news clusters from TDT and TREC collections. The evaluation method compares system performance with both a human-authored ideal or 'model' summary and a system-created 'peer' summary. Metrics include content coverage (recall and relevance) and linguistic adequacy (e.g., human judgments about summary coherence, conciseness, repetition, clarity of referents, grammaticality, and formatting). Eighteen organizations participated in the 2003 evaluation.

Machine Translation

The first machine translation evaluations by the Automatic Language Processing Advisory Committee (ALPAC, 1966) compared the quality of unedited output with human translations (*see* **Machine Translation: History**). More recently, the TIDES-funded Machine Translation Evaluation Workshops, administered by NIST, use human judgments of fluency and adequacy (the degree to which the translated target corresponds to the meaning in a high-quality reference translation). This evaluation focuses on languages such as Chinese (Mandarin Chinese) and Arabic. Performance is assessed by automatic evaluation of machine translation using *n*-gram co-occurrence statistics based on IBM's BLEU system (Papineni *et al*., 2002). BLEU measures the *n*-gram precision of hypotheses with respect to references, with a brevity penalty for hypotheses that are too short. *n*-gram evaluation has a high correlation with human judgments and enables inexpensive and rapid feedback.

Dialogue Systems

Assessing the efficiency and effectiveness of human–machine dialogue is another important evaluation task. Objective measures include dialogue duration, the number and duration of user and system turns, the frequency of correction and repair turns, word error rate, the precision and recall of question answering in the dialogue, and transaction or task success. Subjective measures include ease of use, naturalness, clarity, and perceived robustness, speed, and quality. PARADISE (Walker *et al*., 1997) compares dialogue strategies on the same task using a weighted linear combination of measures. The assumption is that optimal dialogues will maximize user satisfaction by minimizing costs (time, recognition errors) and maximize task success. DARPA's creation of the Galaxy Communicator plug-and-play spoken language architecture enables developers to combine various components and evaluate them gracefully across modalities, from speech-only to interfaces that include graphics, maps, pointing, and gesture (Bayer *et al*., 2001). Walker *et al*. (2002) reported a DARPA Communicator cross-site evaluation in June 2000 of nine spoken dialogue travel-planning systems (AT&T, BBN, CMU, Colorado, IBM, Lucent, MIT, MITRE, SRI), resulting in a corpus of 662 dialogues. Evaluations varied different back ends, different modules (automated speech recognition, text to speech, and language understanding), and different dialogue strategies for managing mixed-initiative interaction.

Conclusion

This article has reviewed methods in evaluation in a range of natural language processing research areas including speech transcription, text retrieval, information extraction, multilingual topic detection and tracking, parsing, question answering, summarization, machine translation, and dialogue. Common among research in this evaluation is an emphasis on shared data, common tasks, and research community evaluation conferences. Future evaluations need to include focus on user-centered evaluation, systems issues such as portability, multilinguality and multimodality, and rapid and inexpensive evaluations. Finally, evaluation should not stifle innovation, creativity, and risk taking but rather balance assessment of continuous progress with fostering of revolutionary ideas.

See also: Machine Translation: History; Question Answering from Text, Automatic; Text Retrieval Conference and Message Understanding Conference; Treebanks and Tagsets.

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http://duc.nist.gov – Document Understanding Conference.

http://communicator.sourceforge.net – Galaxy Communicator.

Natural Language Understanding, Automatic

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'Understanding' Natural Language

Can computers be made to understand natural language? At first sight, the question does not even seem to make sense. Surely understanding is a mental state, and it is difficult to see how you can attribute mental states to devices made out of wire and silicon, no matter how complicated they are.

Yet computational linguists persistently talk about '**natural language understanding systems**' and about '**meaning representations**.' In order to see more clearly what is meant by these terms, we need to consider the circumstances in which it would be reasonable to say that a computer system 'understood' what it heard or read.

When would you be sure that another person had understood what you said to them? You cannot get inside their heads to inspect their mental state. The only way you can assess whether they have understood you or not is by inspecting their behavior. If their actions are related to what you wanted them to do, there is a fair chance that they understood you. If they are not, then either they did not understand you, or they do not wish to cooperate with you. It can be difficult to distinguish between these two, but if their behavior does reliably correlate with what you believe your utterances mean then you would tend to conclude that they did understand you (I use the term 'utterance' to mean a piece of spoken *or written* language produced in a context for some purpose, since both forms raise very similar questions when we are thinking about how to make a computer understand something. I similarly use the terms 'speaker' and 'hearer' to talk about the individual who produces or apprehends an utterance, regardless of whether it is spoken or written).

This is, of course, a way of testing whether someone has understood something rather than a definition of what understanding is. As such, it is a test that could be applied to a computer system. If a computer system reliably responded to utterances by taking actions that seem appropriate, then it would be difficult to say it did *not* understand you.

Passing this test would not guarantee that the computer was in the same kind of mental state as a person whose actions were equally appropriate. It is very difficult to see what kind of test *could* be used to investigate this. If a system did not respond appropriately then it would be reasonable to conclude that it was *not* in a mental state similar to the state of a person who understood what was being said, but no observation could show that it *was* in such a state. The best we can do, then, is try to make systems that display appropriate behavior. This test is a subset of the **Turing test**, which suggests that if you could not tell whether you were conversing with a computer or a person then it would be difficult to say that the computer was *not* intelligent. It may be that there is something ineffable about the mental state associated with understanding. Whether there is or not, developing computational models that behave as though they understood what they were told is difficult enough.

Conversational Agents

What kind of behavior would a system that understood natural language display? When people use language to communicate, they display two distinct sorts of behavior: they produce utterances that respond to what they have just heard, and they carry out actions that are linked to what they have just heard.

How could we produce a computer system that carried out either of these kinds of behavior? Weizenbaum (1966) noticed that in certain circumstances you can produce appropriate utterances simply by making systematic changes to what you hear. If someone is pouring out their troubles to you, you can sound sympathetic if you take what they say and turn it around:

(1) PATIENT: My mother always hated me.
DOCTOR: What makes you think your mother always hated you?
PATIENT: I was shouted at nearly every day.
DOCTOR: Did it upset you that you were shouted at every day?

Transformations of this kind can be carried out by very simple pattern-matching algorithms. When you are trying to help somebody to work through their problems by letting them talk about themselves without casting judgment on what they say, you can make a number of simplifying assumptions:

- Almost everything that is said will be about the speaker and his or her relationships with other people.
- Almost everything that is said will be about some sort of problem, and most of it will be a judgment rather than a statement of fact.
- The speaker is not expecting you to add anything substantive to what he or she has said. In fact, your role requires you *not* to say anything substantive.

```
[my ?X me]  ==>  [what makes you think ?X you]
[I was ?X]  ==>  [did it upset you that you were ?X]
```

Figure 1 Sample ELIZA-like rules.

In these circumstances, rules, each of which has a left-hand side that matches the user's input and a right-hand side that inserts matched elements of the input into a canned phrase, can be used to generate reasonable sounding responses. A set of patterns such as the ones in Figure 1 will produce reasonable responses to most of what the 'patient' says. A set of rules such as these will produce individually satisfactory responses. It is important to be careful to turn every single occurrence of '*me*' and '*I*' to '*you*,' and every single occurrence of '*my*' to '*your*,' and to change '*am*' to '*are*,' and so on, to avoid exchanges like (2):

(2) PATIENT: I was always arguing with my parents.
DOCTOR: Did it upset you that you were always arguing with my parents?

So long as we take a bit of care about things like this, the responses to each sentence in isolation will be fairly sensible. To maintain the illusion of a sympathetic listener over a sustained dialogue, however, it is important to keep track of the rules that have been fired at earlier stages. The following is taken from a dialogue with a freely available implementation of Eliza (distributed as part of the Emacs text editor):

(3) PATIENT: My mother always hated me.
DOCTOR: Tell me something about your family.
PATIENT: My father was very cruel,
DOCTOR: You seem to dwell on your family.
PATIENT: My family was the cause of all my problems,
DOCTOR: Are you hung up on your family?
PATIENT: Yes
DOCTOR: I see . . . . Well, why do you say this is so?
PATIENT: Because they treated me badly.
DOCTOR: Is it because they treated you badly that you came to me?
PATIENT: Yes.
DOCTOR: Yes, hmmm . . . so, what makes you believe this is so?

Looking at this dialogue, it is clear that this implementation contains the rules in Figure 2.

Once a rule has been applied, it is shifted to the end of the rule set so that it does not get used again too soon, since otherwise the dialogue will become very repetitive. Even so, conversations tend to die out after a while, particularly once the 'doctor' has asked a polar question (e.g., *Are you hung up on your family?*). If the patient just says '*yes*,' the doctor has very little to go on for its next move, and hence it will only be able to respond with very generic utterances. If the patient's utterance does not contain any key words, then it will not match any rules with content words in their patterns, and hence the response will either be completely generic (*I see . . . . Then what makes you think this is so?*) or it will just be a variation of what the patient said (*PATIENT: Are you just a box of tricks? DOCTOR: What makes you believe are me just a box of tricks?*). (Note that, in this example, the rule that was triggered failed, as discussed previously, to convert '*are you*' to '*am I*,' let alone to '*I am*' as would be required for the response to be well-formed.)

This kind of approach to making a '**conversation agent**' (or '**chatterbot**') has a number of evident limitations, but it does show what can be done by exploiting the user's expectations. In certain situations these expectations can be extremely low in terms of 'added value' by the system – ELIZA mimics the surface behavior of a Rogerian nondirective psychotherapist, where anything other than rephrasing of the user's input is actively discouraged, and another well-known early system, PARRY (Colby, 1976), mimics the surface behavior of a paranoid schizophrenic, where again the system is not actually expected to produce utterances that relate coherently either to the way the world is or to the user's utterances. In settings in which the system is not actually expected to say anything new or useful, this kind of approach can produce reasonably plausible behavior. If we want a system that will take an active part in a goal-directed conversation about external facts, however, we need something more.

Nonetheless, the idea that a typical dialogue consists of a collection of variants on a set of simple patterns has been exploited in numerous '**natural language front-ends**,' where the user is expecting to converse with a database containing information about some specific domain. Suppose, for instance, that we want a system that can be used for interrogating a database of train times. A set of patterns such as the ones in Figure 3 would cover a large fraction of the things a user would be likely to say.

If the system is supposed to respond to users' queries by telling them about train times, the right-hand sides of the 'rules' in Figure 3 cannot just be canned phrases with slots to be filled by elements of the query. They also have to include actions that interrogate the relevant database, with the results of these queries being inserted into the response. The principle, however, remains much the same. If we know what the user is likely to say, and what he or

```
[?X my mother/father/family ?Y] ==> [tell me something about your family]
[?X my mother/father/family ?Y] ==> [you seem to dwell on your family]
[?X my mother/father/family ?Y] ==> [are you hung up on your family]
[because ?X me ?Y] ==> [is it beacuse ?X you ?Y that you came to me]
[my ?X me] ==> [what makes you think ?X you]
[I was ?X] ==> [did it upset you that you were ?X]
```

Figure 2 EMACS-ELIZA rules.

```
[when is the next train to ?Y] ==>
[do you know when the next train to ?Y is] ==>
[can you tell me the time of the next train to ?Y] ==>
```

Figure 3 Train timetable queries.

she is likely to want the system to do as a result, then a simple set of patterns will often suffice for interpreting the input (indeed, in the context of a train timetable system a single pattern such as `[?X next train to ?Y]` ⇒ `???` would cover all the patterns in Figure 3 since if the user says anything about the next train to Y he or she is likely to want to know when it is). The key difference between chatterbots that have been constructed for entertainment and practical systems based on this simple technology resides in the actions on the right-hand sides of rules. Simple substitution produces an ELIZA or a PARRY; actions that interrogate a repository of facts and rules produce a useful front end to a database.

This kind of approach is popular for spoken dialogue systems. Automatic speech recognition (ASR) software for use by arbitrary speakers is only reliable if the range of utterances that will be said is tightly constrained. Dedicated ASR systems can attain considerable accuracy if the user is prepared to train them, for example, by reading out an extended passage so that the system can adjust to the characteristics of the way the user speaks (accents, properties of his or her vocal tract, etc.). However, if a system is to be used on a casual basis by a wide range of speakers, then it will have to be provided with strong hints about what is likely to be said. Such hints often take the form of a context-free grammar (CFG), with specific actions attached to the rules of the grammar.

Associating actions with the rules of a CFG is very similar to attaching actions to the right-hand sides of rules like the ones in Figure 3. CFGs are somewhat more powerful than the simple rules given previously, although it is possible to use regular expressions to specify the patterns on the left-hand sides of these rules, in which case the range of utterances that can be compactly covered is very similar. In any case, the grammars that are used to guide ASR systems tend to be very simple since there is a trade-off between the size of the grammar and the reliability of the ASR system (many such systems allow different CFGs to be switched in depending on the state of the dialogue, thus allowing for a wide range of possible utterances in different contexts). The main advantages of using a CFG rather than a set of regular expressions is that elements of a pattern can be reused. In particular, actions can be associated with *constituents* of an utterance (e.g., when the system encounters a definite noun phrase (NP) it might try to find a referent).

This kind of approach has been used as the basis for a range of systems that respond appropriately to stylized queries about restricted domains (Allen *et al.*, 1996; Jokinen *et al.*, 2003). The question is: does the ability to answer stylised queries about restricted domains constitute evidence of 'understanding'?

Meanings, Consequences, and Actions

In general, a system that is going to perform appropriate linguistic and extralinguistic actions in response to input spoken or written language will have to be able to carry out the following set of tasks:

- It must detect the structural properties of the utterance that invite the hearer to respond in some particular way. These include the words that were produced, the order in which they occur, and the intonation contour (for speech) or typography and punctuation (for written language). A system cannot understand what someone who says '*Give it to me*' wants it to do unless it can recognize that the utterance contains the words '*Give,*' '*it,*' '*to,*' '*me*'; that they occur in the standard order for an English imperative sentence with a ditransitive main verb; and that the word '*me*' is stressed.
- It must decode the significance of these items. It is no good just knowing what the words are, what order they appear in, and where the stress falls. The system has to know what the words mean, how the surface order encodes specific relationships between word meanings, and how intonation/typography encodes the speaker's attitude to the content of the utterance.
- It must reason about what the speaker wants. To respond appropriately to an utterance, it has to think about why the speaker produced it – about

what the speaker's overall goals are and how producing this particular utterance might help achieve them.

Regarding the pattern-action rules of the previous section, detecting the structural properties corresponds to finding a pattern that fits the input text; decoding their significance is done by executing the associated pattern; and there is very little reasoning about what the speaker wants – in general, the user is expected to be either adding new information to a repository or interrogating a repository about existing information. The ability to switch to a different grammar or set of patterns depending on the history of the dialogue does provide an opportunity for responding differently depending on the context, but even here the system designer will have done the 'reasoning about what the speaker wants' in advance, rather than the system adjusting its own responses.

To make a system that displays a deeper level of understanding than these pattern-action rules, then, we will need to increase the range of surface cues that can be detected, decode the significance of this wider range of surface cues, and deepen the reasoning ability of our systems.

Increasing the range of surface cues that can be detected means writing a grammar and a set of procedures for applying that grammar to the input text. Other articles in this encyclopedia discuss the mechanisms required for recognizing the structural cues that carry the meaning – speech recognition systems, parsing algorithms, datastructures for representing lexicons, and so on. This article focuses on the construction of meaning representations and the inference processes that are applied to those representations. Note, however, that as the range of structural cues that a system can detect increases, two related problems arise:

- Wide-coverage grammars tend to derive large numbers of different analyses for a given input string. Many words belong to multiple syntactic classes or have multiple interpretations, and this can easily lead to multiple analyses of a given string. Furthermore, it frequently happens that the function of a particular phrase is underdetermined by the grammar (this is particularly true of modifiers such as prepositional phrases and relative clauses that have a range of possible attachment sites – *I saw the man in the park*, *I believed she loved me when she said that*).
- Spoken language in particular seldom obeys the norms of conventional grammar anyway. It may be possible to write a grammar that describes what a speaker of some language 'ought' to be able to say, but even if we had such a grammar it would not cover what people actually say.

The simple pattern-matching approaches of the previous section tend to be more robust in the face of these two problems than systems based on more linguistically sophisticated grammars. They cope with ambiguity by simply being unaware of it; the first available pattern that fits the input is used, and the fact that there may be many other possibilities is simply ignored. Also, ungrammatical input tends not to cause problems because the pattern is only targeted at part of the input, and hence problems with the remainder are ignored. Nonetheless, it seems likely that systems that are sensitive to the full range of structural cues will prove more flexible, and hence more likely to display 'understanding.' The remainder of this article concentrates on the kind of information that is encoded by the full range of structural cues and on the reasoning that can be based on this information. Strategies for dealing with ambiguity are discussed, but the problem of detecting fine-grained structural cues in ungrammatical input is left to other articles in the encyclopedia.

Meaning Representations

Computer systems operate by applying **transformations** to **internal states**, where there is a correspondence between internal states and the task the system is intended to perform. All computer systems do this – procedural programs, object-oriented programs, logic programs, and neural nets. There is no other way for a computer to work.

The internal state of a computer system that interprets and acts on natural language utterances has to correspond to two aspects of the task. There has to be a mapping between the structural cues in the input text and the state of the system, and there has to be a mapping between this state and a view of the external world. It must also be possible to carry out transformations to extract information that is implicit in the current state of the system – in other words, to carry out inference using it.

We start by considering the second of these mappings, between the internal state of the computer and a view of the external world. How is it possible to make a mapping from an internal state of the computer and a view of the external world?

One approach is to devise a language for describing the world and then make a mapping between states of the computer and this language, where a language is defined by a set of primitive building blocks (words and terms) and a set of rules of combination. Consider, for instance, the language of first-order logic:

Building blocks

- **Variables:** There are a set of symbols, x, y, z, x_1, x_2, ... , y_1, y_2, ... , that are designated as 'variables.'
- **Constants:** There are a set of symbols, a, b, c, a_1, a_2, ... , b_1, b_2, ... , that are designated as 'constants.' The set of constants may be extended to include arbitrary symbols as required.
- **Functions:** There are a set of symbols, f, g, h, f_1, f_2, ... , g_1, g_2, ... , designated as 'function symbols.' Each function symbol has an associated integer called its 'arity.'
- **Predicates:** There are a set of symbols, P, Q, R, P_1, P_2, ... , Q_1, Q_2, ... , designated as 'predicate names.' Each predicate name also has an associated integer called its arity. The set of predicate names may be extended to include arbitrary symbols as required.
- **Connectives:** The set of symbols &, $\vee$, $\rightarrow$, $\neg$, $\forall$, $\exists$ are designated as 'connectives.'

Rules of combination

- **Terms:** Any variable or constant is a term. If f is a function symbol of arity n and t_1, ... , t_n are terms, then $f(t_1, \ldots, t_n)$ is a term.
- **Atomic formulae:** If P is a predicate name of arity n and $t_1, \ldots, t_n$ are terms, then $P(t_1, \ldots, t_n)$ is an atomic formula.
- **Compound formulae:** If A and B are (atomic or compound) formulae, and x is a variable, then $A\&B$, $A \vee B$, $A \rightarrow B$, $\neg A$, $\exists xA$ and $\forall x$, A are formulae.

This language can be used for describing states of the external world as follows:

Denotations

- **Constants** denote individuated entities.
- **Functions** denote mappings from (N-tuples of) entities to entities.
- **Predicate names** denote sets of N-tuples of entities (so, for instance, if *brother* was a predicate name then it might include the pair of entities denoted by the constants *cain* and *abel*, the pair denoted by *romulus* and *remus*, and so on).

Truth conditions

- **Atomic formulae:** If $P(t_1, \ldots, t_n)$ is an atomic formula, and $d(t_i)$ is the entity denoted by the term t_i, then it is true if and only if the N-tuple $\langle d(t_1), \ldots, d(t_n)\rangle$ is a member of the set denoted by P.
- **Compound formulae:** $A\&B$ is true if both A and B are true, $A \vee B$ is true if at least one of A and B is true, $A \rightarrow B$ is true unless A is true and B is false, and $\neg A$ is true if A is false. If A is a formula, then let $A_{t/x}$ be the formula obtained by replacing every occurrence of x in A by the term t (there are no restrictions on how many times x appears in A: in particular, it may not occur at all, in which case $A_{t/x}$ is the same as A). Then $\forall xA$ is true if $A_{t/x}$ is true for every term t, and $\exists xA$ is true if $A_{t/x}$ is true for some term t.

This description of first-order logic glosses over some fine detail (it is important to be careful about how terms are substituted for variables in the truth conditions of quantifier formulae, for instance, and some accounts provide truth conditions for formulae containing free variables). Nonetheless, it provides a reasonable working definition of a language for describing the world in terms of individuals and relations between individuals, as long as all that matters about a relation is the set of individuals that belong to it (e.g., as long as the relation *brother* simply denotes a set of pairs of individuals).

This language has a number of useful properties:

- It is **representable** within a computer. The basic building blocks (constants, variables, function symbols, predicate letters, and logical connectives) can be mapped to unique locations in the computer's memory, and the rules of combination can be mapped to rules for building datastructures.
- It supports a notion of **consequence** that make it possible to extract implicit information from a set of formulae. This notion is expressed by a set of rules such as $\{\ldots, A\&B, \ldots\} \vdash A$ (you can infer A from any set containing $A\&B$), $\{\ldots A, A \rightarrow B, \ldots\} \vdash B$ (you can infer B from a set containing A and $A \rightarrow B$), $\{\ldots, \forall xA, \ldots\} \vdash A_{t/x}$ (you can infer $A_{t/x}$ if you already have $\forall xA$), and so on.
- The inference rules are also representable: You can write procedures that will transform a state of the computer that represents some set of formulae $\{A_1, \ldots, A_n\}$ to a state representing $\{A_1, \ldots, A_n, B\}$, where B is obtained by applying one of the inference rules to $\{A_1, \ldots, A_n\}$.

First-order logic, then, is a candidate for the language to be used for constructing meaning representations. Recall that such a language must support two mappings: one from structural cues present in natural language to formulae and one from formulae to views of the world. The formula obtained by the first mapping is referred to as a '**logical form**' for the sentence in question. The second mapping is defined by the interpretation rules for first-order logic given previously. A typical logical form is shown in Figure 4, which was obtained from (4) ($\exists X$: $\{P\}Q$, to be read as '*some X which satisfies P also satisfies Q*,' is

$$
\begin{array}{l}
\exists A : \{aspect(now, simple, A)\} \\
\quad \theta(A, agent, ref(\lambda B(speaker(B)))) \\
\quad \&\theta(A, \\
\qquad event, \\
\qquad \exists C : \{aspect(now, simple, C)\} \\
\qquad\quad \theta(C, agent, ref(\lambda D(centred(D, ref(\lambda E(cdiscourse(E)))) \ \& \ f(D)))) \\
\qquad\quad \&\theta(C, object, ref(\lambda F(speaker(F)))) \\
\qquad\quad \&love(C)) \\
\quad \&know(A))
\end{array}
$$

Figure 4 Logical form for '*I know she loves me.*'

equivalent to $\exists X(P\&Q)$, and $\forall X$: $\{P\}Q$, read as '*every X which satisfies P also satisfies Q*,' is equivalent to $\forall X(P \rightarrow Q)$.):

(4) I know she loves me.

If we want to use first-order logic as a framework for building meaning representations, we have to be able build logical forms of the kind in Figure 4 for every sentence of our natural language, and we have to be sure that these logical forms capture all the distinctions that can be made in our natural language. Suppose, for instance, that it turned out to be impossible to express the distinction between *I believe John is an idiot* and *John, I believe, is an idiot* in first-order logic (or worse, that it turned out to be impossible to express what these two sentences have in common). Then clearly this language would not be suitable as a vehicle for building meaning representations.

Compositionality

One approach to specifying the mapping between sentences of natural language and formulae of some logic involves specifying a set of rule-to-rule correspondences. This idea originated with the work of Richard Montague (Thomason, 1974) (Montague's formulation of his ideas is fairly dense, and his work is cited more often than it is actually read: Dowty *et al.* (1981) provided a slightly more digestible introduction to the key ideas).

The idea is that the system builds a meaning representation by starting with the meanings of individual words and gluing these together in ways determined by their structural relations. For this to work, natural language must obey the **principle of compositionality**, which states that 'the meaning of the whole is a function of the meaning of the parts and their mode of combination.' To put it another way, when a system is trying to work out what something means, the only evidence it has is the sequence of words that were uttered. So the only thing it can do is look up the meanings of the individual words and use the structural properties of their arrangement to decide how to put these meanings together.

The principle of compositionality is both inescapable and unworkable. It is inescapable because there is nothing but a sequence of words, arranged in a particular order and uttered with a particular intonation contour. So there is nothing but a set of parts and a 'mode of combination,' and if these do not suffice for building a meaning representation then there is nothing else to fall back on. It is unworkable because it is generally not clear what the parts are or how they are arranged. Consider (5) and (6):

(5) I keep it tied up at the bank.

(6) I am going to see to John.

(5) admits two interpretations, one in which *the bank* is the border of a river (*What do you do with your boat when you're not using it? I keep it tied up at the bank*) and one in which it is a financial institution (*What do you do with the rest of your capital? I keep it tied up at the bank*). (6) also admits two interpretations, one in which *to see John* is the purpose of my travel (*Why are you going to London? I am going to see John*) and one in which *going to* is a future tense marker (*Will you see John or Mary? I am going to see John, and then I might give Mary a ring*).

In (5) it is unclear what the parts are. In (6) it is unclear how the parts are combined to make the whole. So simply relying on sets of rule-to-rule mappings will not uniquely determine the meaning: given a sequence of words, the principle of compositionality generally produces a set of possible meanings rather than determining a single unique interpretation. We return to this question later. For now, suppose that we could construct a single meaning representation in first-order logic by examining the words and their structural arrangement. Would such a meaning representation enable a system to respond appropriately to whatever was said to it?

Adequacy of First-Order Logic

In order to respond appropriately to an utterance, a system has to be able to work out its consequences in the context in which it was produced. In particular, given two distinct but closely related utterances it has

$$\exists A : \{man(A)\}$$
$$\exists B : \{peach(B)\}$$
$$\exists C : \{aspect(now, prog, C)\}$$
$$\theta(C, agent, A) \& \theta(C, object, B) \& eat(C)$$

Figure 5 Logical form for '*a man is eating a peach.*'

to be able to distinguish between their consequences – the speaker will have chosen between them because one more accurately carries the intended message than the other, so if the system cannot tell the difference between them it will inevitably sometimes extract the wrong consequences.

It is therefore worth trying to ascertain the extent to which formulae of first-order logic can capture the import of natural language sentences. We start by considering a simple case in which it does seem to be possible to capture the meaning of a sentence of natural language:

(7) A man is eating a peach.

The logical form in Figure 5 displays many of the characteristics of a typical logical form. In particular, it mentions an 'eating event' *C*, with the other items introduced in the sentence playing named roles ('*agent*,' '*object*') with respect to that event. The notion that natural language sentences report **events** has become widespread since the work of Davidson (1967, 1980). Once we allow events to have a central role, other entities have to be linked to them as participants. Note that, there are no clear surface markers for the links between the event and its participants. It is clear that the NP *a man* is the subject of the verb phrase *is eating a peach*, but it is less obvious that he is playing the role of *agent* with respect to the eating event, as opposed to being the *actor*, the *protagonist*, the *eater*, or indeed just the *subject*.

We see here an immediate divergence from strict compositionality. The person who wrote the semantic rules underpinning the logical form in Figure 5 decided that the participants in a typical eating event play the roles of *agent* and *object*, with the (semantic) *agent* of the event denoted by the (syntactic) subject of the verb and the (semantic) *object* of the event denoted by the (syntactic) object of the verb. This is a perfectly reasonable decision, but it is difficult to argue that it is the 'right' one. Following Fillmore's (1968) analysis of the issues, there have been numerous proposals for sets of thematic roles (e.g., Bruce, 1975). Dowty (1989) provided an insightful discussion on the issues, explaining why allocating each verb its own set of thematic roles (so that '*eat*' has an *eater* and an *eatee*, and '*drink*' has a *drinker* and a *drinkee*, and so on; Pollard and Sag, 1988) is unattractive but coming up with a small universal set such as the ones originally proposed by Fillmore is extremely challenging. The key for natural language understanding systems seems to be that there is little point in providing names for thematic roles without also describing the properties of particular roles. We might, for instance, attempt to characterize a set of roles by providing '**meaning postulates**' (background information couched in the same formal language as the logical forms), as in Figure 6.

The meaning postulates (MPs) (Carnap, 1936) in Figure 6 attempt to capture the relationships between various roles (*actor*, *agent*, and *protagonist*) and then to relate the verbs '*watch*,' '*look at*,' and '*see*' by noting that they have a common core ('*see*') involving an animate entity that exercises varying degrees of control and intentionality. Note that, MPs are not *definitions*, in the sense that they provide necessary and sufficient conditions for the use of particular terms. They depict relationships that can be used to determine whether some sentence *S′* can be appropriately uttered in a situation in which some other related sentence *S* has been uttered, given what else is known about this situation ("Synonymy of two forms is supposed vaguely to consist in an approximate likeness in the situations which evoke the two forms, and an approximate likeness in the effect of either form on the hearer" (Quine, 1953)).

Relating these three verbs by saying that they depict the same kind of visual experience, but with the see-er involved in slightly different ways, lets us capture the commonalities between these verbs and also the correlation between '*see*'/'*hear*' and '*look at*'/'*listen to*.' It seems likely, then, that the decision about which thematic roles we admit to our ontology depends more on the MPs we back them up with than on any intrinsic properties of the relevant verbs. Logical forms as a whole are only useful insofar as they allow us to infer the consequences of an utterance in its context. As a corollary, parts of logical forms, such as the terms used for thematic roles, are only useful insofar as we have rules that link them to other terms.

Temporal, Modal, and Intensional Logics Similar remarks apply to the aspect marker *aspect (now, prog, C)* from Figure 5. This time the term in the logical form does derive from an explicit structural clue in the text, namely the aspect marker '*-ing*.' Again, however, there is no point in including material related to the aspect in the logical form unless we are going to back it up with MPs that exploit it.

Trying to write MPs that explain the significance of aspect markers requires us to come up with an appropriate logic of time. The basic intuition behind (7), for instance, is that an eating event has begun and has not

$$\forall X \forall Y\, (\theta(X, agent, Y)) \rightarrow (\theta(X, actor, Y) \& intended(Y,X))$$
$$\forall X \forall Y\, (\theta(X, agent, Y) \rightarrow caused(Y,X))$$
$$\forall X \forall Y \forall Z\, ((watch(Z) \& \theta(Z, actor, X) \& \theta(Z, object, Y)) \rightarrow \exists U\, (see(U) \& \theta(U, protagonist, X) \& \theta(U, object, Y)))$$
$$\forall X \forall Y \forall Z\, ((lookAt(Z) \& \theta(Z, agent, X) \& \theta(Z, object, Y)) \rightarrow \exists U\, (see(U) \& \theta(U, protagonist, X) \& \theta(U, object, Y)))$$
$$\forall X \forall Z\, (((see(Z) \& \theta(Z, protagonist, X)) \rightarrow animate(X)$$
$$\forall X \forall Y \forall Z\, ((see(Z) \& \theta(Z, protagonist, X) \& \theta(Z, object, Y)) \exists U\, (light(U) \& reflect(Y, U) \& project(U, retina(X)) \& \ldots)$$

Figure 6 General-purpose thematic roles.

yet finished. To unpack this simple intuition as a set of MPs relating eating events to times, however, we have to devise a workable view of what time is like: Are intervals sets of instants or are instants the end points of intervals? Does time branch forwards? Does it branch backwards?

This has proved extremely slippery, despite a number of efforts (Allen, 1984; Moëns and Steedman, 1988; Smith, 1991; ter Meulen, 1995). The problem seems to be that our temporal intuitions are very underdeveloped. Precise mathematical models that map time onto structures like the real numbers provide answers to questions that our basic intuitions leave unanswered (e.g., Zeno's paradoxes). Physical accounts of time make the situation even cloudier, following the development of the theory of relativity and quantum mechanics (Reichenbach, 1958). It seems best, therefore, to try to say just enough about tense and aspect to support simple everyday inferences and to accept that the idea of time that underpins our everyday language is very simple and very underspecified and admits a wide range of models.

Logical forms, then, are useless without meaning postulates to back them up. You do not know what (7) means unless you know how the agent of an eating event is involved in it, what it means to have started and not finished such an event (for which you need a theory of times and events and starts and ends), what peaches are like, and so on. Some of the meaning postulates for 'closed class items' (tense and aspect markers, determiners, and prepositions) require careful manual construction, but developing a general-purpose set of MPs for open class items by hand seems extremely unappealing. We consider how to obtain MPs for open class terms later. For now we continue to review whether first-order logic will be generally expressive enough.

We have already seen that natural language enables us, indeed almost forces us, to talk about time. Suppose we wanted to pin down what eating events are like in more detail. We would want to say things like "Before the event starts, there will be an animate being that requires energy and some organic material that releases energy when subjected to appropriate chemical processes" and "After the end of the event some or all of the organic material will have been transferred to a position inside the animate being and the process of releasing energy from this material will be under way." To describe this in a formal language, we would need MPs like the ones in Figure 7.

The first few of these just say that any eating event has an agent, an object, and a pair of start and end points, where the end is later than the start. These are fairly straightforward statements: we need to know that times can be partially ordered, but that is a very weak property and does not commit us to any particular view of time. The last two, however, talk about relationships between the agent and the object at particular times, namely that before the eating starts the object is outside the agent and after it ends the object is inside the agent. This involves a move beyond ordinary first-order logic since there is now a predicate, '*at*,' which relates a term *T* and a formula *(inside(X, Y)* or *outside(X, Y))*. This cannot be captured in ordinary first-order logic, where there is a clear distinction between terms, predicates, and formulae.

We therefore need to move to a language where formulae can occur as constituents of other formulae. One way to do this is to use a '**modal logic**,' where operators that talk about 'truth in a possible world' are added to the language. One advantage of using a modal logic is that it is fairly easy to adapt inference engines that work for ordinary first-order logic so that they work for modal logics (Moore, 1984; Wallen, 1987). As ever, the only reason we want logical forms is so that we can work out the consequences of what has been said, and for that we need inference engines. So if we can take an inference engine for first-order logic and adapt it to cope with modal logic then we will be able to carry out the inferences we need.

Several other expressions of natural languages map more or less smoothly onto modal operators. The auxiliaries '*can*,' '*may*,' '*must*,' and so on clearly talk about alternative states of affairs and hence can be

$$\forall X : \{eat(X)\}\, \exists Y(animateBeing(Y) \& \theta(X, agent, Y))$$
$$\forall X : \{eat(X)\}\, \exists Y(animateMaterial(Y) \& \theta(X, object, Y))$$
$$\forall X : \{eat(X)\}\, \exists T \exists T'(start(X,T) \& end(X,T') \& T' > T))$$
$$\forall X : \{eat(X)\}$$
$$\forall Y : \{\theta(X, agent, Y)\}$$
$$\forall Z : \{\theta(X, object, Y)\} \forall T : \{start(X, T)\} \mathrm{at}(T, outside(Y, X))$$
$$\forall X : \{eat(X)\}$$
$$\forall Y : \{\theta(X, agent, Y)\}$$
$$\forall Z : \{\theta(X, object, Y)\} \forall T : \{end(X, T)\} \mathrm{at}(T, inside(Y, X))$$
$$\ldots$$

Figure 7 What is eating like?

easily treated using modal logic. '*Know*' and '*believe*' can also be seen as dealing with possible states of affairs (if you believe some proposition *P*, then your view of the world has *P* true in it), although the mapping proposed by Hintikka (1962) and very widely taken up within artificial intelligence does have a number of problems.

Natural languages do, however, tend to contain very large numbers of '**propositional attitude**' verbs that denote a relationship between an individual and a proposition – '*want*,' '*regret*,' '*expect*', '*require*,' '*allege*,' etc. Some of these do not map at all well to modal operators, and it may be that '**intensional logics**' (Bealer, 1989; Turner, 1987) that respect Frege's distinction between the extension and intension of a term are more appropriate.

Either way, we need to extend the expressive power of first-order logic in order to deal with a large number of common aspects of natural language. We also have to allow for the fact that natural language sentences often express tendencies and defaults rather than black-and-white rules. First-order logic provides two kinds of quantification: We can say that there is something of a certain kind (*A man is eating a peach*), and we can make generalizations over every item of a certain kind (*All professors are clever*). However, natural languages provide **default** quantifiers:

(8) Most cats are lazy.

(9) Few professors work as hard as they should.

It is easy enough to extend the notation of first-order logic to allow for such quantifiers: $most(X : \{cat(X)\}, lazy(X))$. The difficulty comes in trying to propose coherent interpretations of these quantifiers and to see what sorts of inference they support. The obvious way to interpret them is to say that $most(X : \{cat(X)\}, lazy(X))$ is true if the size of the set of lazy cats is greater than half the size of the set of cats. This seems reasonable enough, but it does raise a number of questions:

- Is 50% actually the right threshold, or does *most cats* mean something more like 75%? If (9) had been *Very few professors work as hard as they should*, would this mean that 95% of them do, or 98%, or . . . ? Picking an arbitrary threshold seems inappropriate, and picking the right threshold seems impossible.
- What happens if the set in question is unbounded? *Most cats are lazy* does not just mean that most of the cats born on or before April 1, 2005, are lazy; it means that most of the cats that will ever be born are lazy. But since this is an unbounded set we cannot really talk about its size (the situation is worse for a sentence like *Most prime numbers occur in clusters*, whose truth or falsity depends on the distribution of subsets of an infinite set).
- Rules like (8) can be used with a simple statement of fact like *Splodge is a cat* to support the conclusion *Splodge is lazy*. The ways that people actually use these rules tend not to fit the idea that *most cats* means *more than half the set of cats* very well.

There have been a number of attempts to deal with quantifiers of this kind by appealing to cardinalities of sets (Barwise and Cooper, 1981) or by using default logics (McCarthy, 1980; Reiter, 1980). Either way, the presence of words such as '*most*' and '*few*' requires an expressive power that is not available in standard first-order logic.

This extra expressive power is also useful when we are trying to characterize open class words such as '*cat*' and '*table*.' As noted previously, we cannot in general provide sets of necessary and sufficient conditions for the use of everyday words such as '*cat*' and '*table*.' What we have instead are '**semantic traits**' (Cruse, 1986) – properties that *most* items of the kind in question possess: $most(X : \{table(X)\}, hasFourLegs(X))$, $most(X : \{table(X)\}, hasFlatSurface(X))$, $most(X : \{table(X)\}, rigid(X))$ etc. The use of default logic or generalized quantifiers for dealing with explicit use of words such as '*most*' and '*few*' also allows us to express the meaning postulates for everyday concepts in a '**defeasible**' manner, thus allowing, for instance, for various kinds of nonstandard tables (ornamental tables that are not designed

to have items put on them, inflatable camping tables, etc.).

Dynamic Logics The final problem with first-order logic is that it does not provide anything corresponding to the use of referring expressions in natural language. Natural languages provide a range of devices whose primary aim is to pick out known individuals. These include proper names ('*Allan Ramsay*'), definite NPs ('*the author of this article*'), pronouns ('*he*'), and referential tense markers ('*he* ***had*** *been thinking about corpus-based approaches*'). The nearest thing that first-order logic has to these is the use of constants, but there is a sharp distinction between the constants of first-order logic and the referring expressions of natural language: constants point to individuals by stipulation, whereas referring expressions point to individuals by describing them. To interpret a formula of first-order logic we have to know the mapping between constants and individuals. This mapping is arbitrary and is simply stipulated: you either know it or you do not. Referring expressions, on the other hand, provide information that should enable a properly informed hearer to find the entity in question. The NP '*the only person to have scored a double century in postwar Irish cricket*' provides enough information about the person in question to enable any interested party to track down the individual being referred to.

Referring expressions are used to **anchor** an utterance in a context so that it provides new information about the entities in that context. To do this, there must be exactly one thing in the context that fits the description. If there is not anything at all that fits the description, then the utterance simply does not provide any information: uttering '*The present king of France is bald*' at the present time says nothing about what the world is like because there is no present king of France. If more than one thing fits the description, the utterance provides no useful information since it is not clear which of the potential referents the utterance is concerned with: '*Two masked men came into the bank. The masked man pointed a gun at the cashier while the masked man carried out the cash.*'

To mimic the function of referring expressions within a formal language, most theories include terms which contain descriptions to be satisfied. Interpreting an utterance then involves two stages: start by resolving the referring expressions, using information that is available in the current context (discourse state, situation, slate, (etc.) and then add the consequences of the resulting anchored logical form to the context. Meanings are thus viewed dynamically, as relations between contexts. A given sentence will produce different effects in different contexts, partly because the anchoring process will be different in different contexts and partly because the resulting anchored form will have different consequences in different contexts.

This is not just because the referring expressions will point to different things in different contexts. Clearly, '*the hill we walked up yesterday*' will denote one thing if you say it today to your girlfriend and a different thing if a tour guide in the Andes says it next year to a walking group. In both cases, the addressees use their knowledge of their recent activities to find a single entity that fits the description, and that is all there is to it. But the conventions around referring expressions can be exploited to introduce entities into a conversation by '**accommodation**' (Sperber and Wilson, 1986), and they can also be used in contexts in which you know there must be exactly one thing that satisfies the given description, even if you know nothing else about it – you can meaningfully say '*I always feel better when I see* ***the first snowdrops of Spring***' because you know that every year there is some earliest occasion when there are snowdrops to be seen, even though you may have no idea when or where it will be this year.

We thus, need to extend the language we use for logical forms to include something corresponding to the use of referring expressions in natural language. There have been numerous proposals for such extended languages, including file change semantics (Heim, 1983), discourse representation theory (Kamp, 1984; Kamp and Reyle, 1993), situation semantics (Barwise and Perry, 1983), dynamic predicate logic (Groenendijk and Stokhot, 1991). The details of these theories vary, but the key observation that logical forms include descriptions that have to be anchored before their consequences are added to the current context is generally shared.

Ambiguity

Whatever formalism we choose for meaning representations, the structural properties of the text do not in general determine a unique meaning representation. We have already seen examples of lexical and structural ambiguity in (5) and (6), and it is extremely easy to find more. To make matters worse, there are cases in which there are clearly multiple readings but where there is no apparent lexical or structural cause:

(10) Someone is mugged every five minutes in New York, and he's getting pretty sick of it.

Most people are momentarily taken aback when they first encounter (10) and have to think about it for a second. When you read the first part, *someone is mugged every five minutes in New York*, you

$$
\begin{array}{l}
\forall A : \{five(A, \lambda B(minute(B)))\} \\
\quad \exists C : \{one(C)\} \\
\quad\quad \exists D : \{aspect(now, simple, D)\} \\
\quad\quad\quad \theta(D, object, C) \\
\quad\quad\quad \&during(A, D) \\
\quad\quad\quad \&mug(D) \\
\quad\quad\quad \&in(D, ref(\lambda E(named(E, \text{'New York'}))))
\end{array}
$$

Figure 8 Primary reading of (10).

construct an interpretation like Figure 8, in which *every five minutes* **outscopes** *someone* (i.e., where for every set of five minutes, *five* $(A, \lambda B(minute(B)))$, there is someone C who is mugged in New York). When you hear the second part, *he is getting pretty sick of it*, you realize that some earlier part of the discourse must have mentioned a single male individual for *he* to refer to. This forces you to rethink the interpretation of (10) to make *someone* outscope *every five minutes*.

It is hard to see a lexical or structural source for the ambiguity of (10). Dowty *et al.* (1981) do analyze an example rather like this one by proposing alternative, rather forced, syntactic analyses, and certain categorial approaches make it possible to obtain this ambiguity by following different derivation paths. However, most grammars assign a single structural relation between *someone* and *every five minutes* (there is also an attachment ambiguity involving *in New York*, but that is not the key point here). (10) suggests that the structural cues '**underdetermine**' the meaning – that even when we have examined as closely as possible the surface form, there may still be some doubt about what was meant.

What can we do if the structural cues do not give us a unique meaning representation? Sometimes inspection of the alternatives makes it possible to rule out some options because they seem to make no sense, either in isolation or when we try to anchor them:

(11) I saw the man with a big nose.

(12) I saw the man in the park.

The interpretation of (11) that attaches *with a big nose* to *saw* can be ruled out because noses are not the kind of thing you can use for seeing with. The choice between attaching *in the park* to *saw* or to *man* in (12) can be determined when our system is trying to anchor the logical form: if there are two men, one of whom is in the park, then it should attach *in the park* to *man* since the NP *the man in the park* will uniquely identify one of the men, whereas *the man* will not; if there is only one man, then it should attach *in the park* to *saw* since *the man* will uniquely identify the individual, and the extra information is not needed for anchoring (Hirst, 1987).

In many cases, however, the choice is less clear-cut. In such situations, there are two possibilities: The system can make an arbitrary choice (or a choice based on statistical evidence) and backtrack when it realizes that it has got it wrong, or it can decline to make a choice. It is clear that people do sometimes make a concrete choice and then backtrack: the fact that most people report doing a double-take when confronted with (10) shows that they made a choice and then realized that it was the wrong one. It often happens, however, that two interpretations lead to the same conclusions. Consider (13) (the same as (12), but with *a man* instead of *the man*):

(13) I saw a man in the park.

Most of the time, you only see things that are quite near to you, unless they are extremely large or you are using an optical device such as a telescope. Since men do not tend to be extremely large, and there is no mention of a telescope in (13), it is reasonable to assume that the man was not very far away from the speaker. In which case, it is likely that the speaker, the man, and the seeing event were all in the park at the time: if the seeing took place in the park, and the man was not far away, then he was probably in the park, and if the man was in the park when he was seen from not far away then the seeing was probably in the park. It does not matter.

This notion was explored by Blackburn *et al.* (1997), who suggested the 'most informative' interpretation is the best. This can be found by looking for the one that has the largest number of consequences. This is a rather tricky notion since every proposition has an infinite number of consequences, so what is actually required is the one with the largest number of *nontrivial* consequences. This can be carried out by looking for models rather than for consequences (Baumgartner and Kühn, 2000; Ramsay and Seville, 2000), where model generation is a variant of automated reasoning that has close correlates with observations from psychological studies (Johnson-Laird, 1983).

Whatever we do about ambiguity, however, we have to accept that sometimes our system will make the wrong choice. Unless there is very strong evidence for or against particular interpretations, it can often be a good idea to carry the choices forward unresolved in the hope that (a) the required information will turn up later, (b) the alternatives may have the same consequences, or (c) the task being carried out does not require a choice to be made anyway (machine translation systems often try to exploit a similar strategy: the French sentence *J'ai vu un homme dans le parc* has exactly the same ambiguity as the English

sentence *I saw a man in the park*, so a system that carries out the translation like this is in no danger of choosing the wrong interpretation).

Corpus-Based Approaches

From the previous discussion, it is apparent that systems for understanding natural language must be able to represent the external world, in the sense that there is a mapping between (some subset of) their internal state and ways that the external world might be. Such a mapping is generally obtained by producing a one-to-one mapping of internal data-structures to formulae of some suitable language and relying on the standard semantics of that language to provide the mapping to states of the external world.

The previous discussion considered some of the constraints on such a language and suggested that it would at least need to extend standard first-order logic by allowing for modal and intensional operators, default rules, and referring expressions. However, there is no point in having such a language for expressing logical forms unless they can be linked to general knowledge about the world. A system will at least seem to understand what you say to it if it can react appropriately, but in order to react appropriately it has to have knowledge beyond the literal propositional content of what has just been said to it.

When an adult human 'reacts appropriately' to an utterance, he or she will bring a lifetime's knowledge about the world to bear – commonsense knowledge about the basic physics of the world, social and societal knowledge, technical and academic knowledge, and so on. To understand a simple pair of sentences such as '*We went out for a meal last night. The waiters were so rude that we decided not to leave a tip*' requires huge amounts of background knowledge – that when you go out for a meal you usually go to a place that employs people who find out what you want to eat and then bring it to you, and that these people are generally very badly paid and rely on extra payments by customers to supplement their wages, but that you can decide not to make these extra payments if you do not feel that you have been well treated (Schank and Abelson, 1977).

Providing a computer system with all this knowledge seems to be a very daunting task. Do we have to provide it all manually, telling the computer everything it needs to know, or can at least some of it be acquired automatically?

For a system that needs to display a detailed level of understanding about some restricted domain, it is feasible to specify everything that the system needs to know by hand. If, for instance, we want a speech-driven interface to an e-mail system, it makes sense to tell it that e-mail messages generally contain information about who sent them, what they are about, and when they were sent, and that mail tools generally annotate messages to indicate whether they have been read and, if so, whether a reply has been sent. The amount of knowledge required for even a simple domain like e-mail handling often turns out to be surprisingly large, but it is usually possible to encode it manually. The advantage of doing it this way is that we can be sure that the rules we have written are correct, and cover the headings that need to be covered, so that we have some confidence that the system will indeed know what to do when a user says '*Do I have any new messages from Adam about the DUMAS workshop?*'

For task-oriented systems, then, it is often sensible to hand code the background knowledge that will be used to enable the system to respond. For more open-ended systems, this may not be possible.

There have been a number of attempts to develop large-scale knowledge bases that can be used for, among other things, open-ended natural language understanding systems. The CYC project (Lenat and Guha, 1990) is a continuing attempt to produce a very large knowledge base of this kind. The CYC project has been running for approximately 15 years (similar to the time that a typical human adult spends acquiring his or her own knowledge base), and has consumed many person-years of effort, in order to encode a substantial amount of knowledge in a language that is an "augmentation of first-order predicate calculus (FOPC), with extensions to handle equality, default reasoning, skolemization, and some second-order features" (http://www.cyc.com/cyc/technology/whatiscyc_dir/howdoescycreason #cyc1) (in other words, in a language possessing many of the characteristics outlined previously). WordNet (Fellbaum, 1998) is a similar attempt to hand code large amounts of information about relations between lexical items, although here the vast majority of the information deals with hypernym/hyponym (superset/subset) relations, mainly between nouns.

These projects, and others like them (Johnson *et al.*, 2003), show that you *can* produce very large knowledge bases, but only if you are prepared to put in very large amounts of effort. Even so, many of these projects only encode subset/superset relations, which are unlikely to be adequate for filling in the gaps in natural language discourses.

Instead of hand coding the required knowledge, using some fairly awkward formal language for the task, it is tempting to try to extract it automatically.

To do this, of course, there has to be an existing repository from which it can be extracted. There is now a very large repository containing huge amounts of information that has been hand coded in natural language (mainly English), namely the Web. It is therefore very tempting to try to use machine learning/data mining techniques to convert this knowledge into something more amenable to processing by machine.

In order to decide what sorts of data mining techniques are appropriate for this task, we have to decide where in the Web we are going to search, and we have to decide what sort of information we want to extract.

- **Where in the Web?** The Web as a whole is unstructured, and the information it contains is unreliable (sites propagating conspiracy theories and alternative medical practices) and highly idiosyncratic (many Web pages contain personal details of individuals and their families and hobbies). We therefore have to choose whether to trawl the entire Web for whatever we can find, and accept that much of it will be unreliable, or whether it would be better to concentrate on a few well-informed sites such as on-line encyclopedias (e.g., Wikipedia (http://en.wikipedia.org)) or dictionaries.
- **What information?** Since most information on the Web is still encoded just in natural language, to extract it we need a natural language understanding system. This is problematic: if we had a reliable high-performance natural language understanding system, we would not need to trawl the Web for the knowledge required by reliable high-performance natural language understanding systems. The vast majority of the information that is obtained from the Web, then, must be extracted by using systems that do not fully understand the text they are reading.

For this reason, most automatic knowledge acquisition concentrates on information that can be obtained by looking at cooccurrence patterns. By looking for 'meaningful' cooccurrence patterns (e.g., looking for nouns that occur as the heads of the objects of identical verbs) it is possible to extract sets of words with 'similar' meanings (Pantel and Lin, 2000). This kind of information can be used internally within natural language understanding systems or to supplement the hand-coded information provided by knowledge bases such as CYC and WordNet.

Inference

No matter how much knowledge we provide, and how rich our logical forms are, our systems will not display understanding unless they can carry out inference. Understanding involves appropriate directed action – either linguistic action (answering a question) or extralinguistic action (reading out a list of e-mails in response to a query such as '*Do I have any new messages?*'). For a computer to carry out inference, it has to be able to apply inference rules that extract implicit information from its current state. There are essentially two approaches to this task: structural and statistical inference.

Structural Inference

Structural inference involves writing sets of rules that match patterns in the formulae of some formal language and produce new formulae when they are triggered. An obvious example of such a rule is the classical rule of *modus ponens*: If you have one formula that has the form $P \rightarrow Q$, for some pair of subformulae P and Q, and another one that has a form that matches P, then you can infer Q.

Modus ponens would allow you to infer '*rain*' from '*people are carrying raised umbrellas*' → '*rain*' and '*people are carrying raised umbrellas,*' *poor(John)* from *student (John)* → *poor(John)* and *student(John)*, and so on.

Numerous sets of structural rules have been proposed, from Aristole's syllogisms through the rules of natural deduction to a range of uniform rules designed explicitly for use within computational inference engines (Davis and Putnam, 1960; Robinson, 1965). These rules are designed to be sound (any conclusions that can be produced by using them are safe) and as far as possible complete (if something is guaranteed to be true given a set of hypotheses, then the rules will lead to a proof). Unfortunately, as the rules become more complex it becomes more difficult to choose a good order in which to apply them. In particular, once we start allowing default rules and arbitrary quantification over propositions and properties, as suggested by the previous discussion, it turns out that no inference engine can be guaranteed to find a proof if one exists, let alone to report when there is no proof to be found.

Statistical Inference

The structural rules of the previous section cannot cope with cases in which the connection between two propositions is inherently probabilistic. This may occur in two situations. First, the text may contain an ambiguous word or syntactic structure, and it may be possible to use statistical evidence to choose between the alternative readings. For instance, we may have managed to collect information about the relative frequency of the two main senses of the word '*bank*' in articles that also mention words that are similar to the word '*loan*' (in the sense outlined

previously). If we have such statistical information about word frequencies, we may use it to choose the appropriate meaning for '*bank*' in '*I asked the bank for a loan*' or for deciding on the appropriate attachment for the prepositional phrase in '*I saw the man with a big nose*.' Second, the background knowledge triggered by an utterance may itself be statistical. If you know that 90% of white cats are deaf and that 70% of deaf cats get run over in their first year of life, then the sentence '*We just got a white kitten*' might prompt you to expect that the animal in question is unlikely to live very long.

Most attempts to exploit probabilistic reasoning within computational systems depend on Bayes's theorem, which aims to determine how likely some conclusion is given a body of evidence. Bayes's theorem relies on the observation that the probability of outcome O given some body of evidence E, written $P(O|E)$, can be obtained by dividing the likelihood that O and E will both happen by the probability that E will happen regardless of whether O also does (in other words, the probability of O given E is the proportion of occurrences of E that are accompanied by occurrences of O):

$$p(O|E) = p(O\&E)/p(E)$$

However, we can also obtain

$$p(E|O) = p(E\&O)/p(O)$$

by the same reasoning, and then, since $p(O\&E) = p(E\&O)$, we can get

$$p(O|E) = p(E|O) \times p(O)/p(E)$$

This rule can be combined with the rule that says that the probability of two propositions, E_1 and E_2, both occurring is the product of their individual probabilities

$$p(E_1\&E_2) = p(E_1) \times p(E_2)$$

to produce

$$p(O|(E_1)\& \ldots (E_n)) = \frac{p(O) \times p(E_1|O) \times \ldots \times p(E_n|O))}{p(E_1) \times \ldots \times p(E_n)}$$

This rule seems to provide a mechanism for combining probabilities. The problem is that $p(E_1\&E_2) = p(E_1) \times p(E_2)$ only holds if E_1 and E_2 are independent of one another – if $p(E_1|E_2) = p(E_1)$ and vice versa. This almost never happens when there is a causal connection between the evidence and the relation, so applying Bayes's theorem for calculating the probability of some outcome is always a dangerous thing to do (its proper function in statistics is for investigating independence: If Bayes's theorem *fails* for some set of observations, then you can conclude that they are *not* independent).

A range of mechanisms for combining probabilities have been proposed (e.g., Dempster–Shafer theory of evidence), but they generally fall foul of similar constraints (Voorbraak, 1991). Similar problems arise when you try to apply rules involving qualitative judgments (Shortliffe, 1976), and things get even worse when you need to combine probabilistic and qualitative rules. The problem is that most techniques for combining numerical 'truth values' depend on assumptions of independence that very seldom hold so that when individual truth values are combined, the results are extremely unreliable. One way out of this is to use multilayered neural networks (Rumelhart *et al.*, 1986), where the arithmetic for combining individual truth values is locally adjusted during the learning process to take account of correlations and anticorrelations between atomic propositions. Even here, though, it is extremely difficult to represent quantification, and it seems likely that hybrid reasoning systems that use standard structural rules to determine *what* follows from a given starting point and statistical rules to determine the *strength* of the evidence will be the best way forward (possibly by embodying the degree of belief in some proposition as a '**label**' (Gabbay, 1996)).

Summary

When could you say that a computational system understood natural language? If it passed the Turing test you would be hard-pressed to say that it did *not* understand what was said to it, and it seems impossible to devise any more concrete demonstration than that.

Several versions of the Turing test have been set as competitions in recent years – the Message Understanding Competition (MUC; www.itl.nist.gov/iaui/894.02/related_projects/muc/) and Text Retrieval Competition (TReC; www.trec.nist.gov/pubs.html) series require systems to answer questions posed in natural language where the answer is contained somewhere in a substantial body of text. The Loebner prize directly requires systems to pose as human beings and take part in open-ended dialogues. All these competitions pose restricted versions of the Turing test, and it is possible to argue that the systems that perform well at them use tricks that exploit the restrictions (e.g., some systems that performed well in the MUC series depended very heavily on recognizing proper names, which were important in the context of some of the early competitions but are less useful in

less restricted contexts). Nonetheless, as the tasks set in such competitions become more general, the systems that perform well in them will become ever closer to displaying understanding.

The systems that perform well in recent competitions tend to have the general architecture outlined previously. Structural cues are used for building a detailed meaning representation of the input question, and then general-purpose inference mechanisms are deployed to find an answer to that question. Systems that perform well in the MUC/TReC series tend to be good at hunting through large bodies of text for segments that contain relevant-looking material, exploiting the techniques discussed previously. As these competitions move from '*who*'/'*what*' questions to '*why*'/'*how*' questions, however, it will become important to be able to reason in-depth about source text rather than simply looking for relevant chunks. As this happens, it seems likely that constructing meaning representations from structural cues will come to be seen as a fairly minor element of understanding. Having a large body of knowledge and being able to reason about it will be the key to demonstrating understanding.

See also: Compositionality: Semantic Aspects; Disambiguation, Lexical; Formal Semantics; Language Processing: Statistical Methods; Meaning Postulates; Modal Logic; Montague Semantics; Quantifiers: Semantics; Temporal Logic; Tense; Text Retrieval Conference and Message Understanding Conference; Turing Test.

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Natural Morphology

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Natural morphology, as based on an integration of concepts of markedness and of natural phonology, was founded in 1977 by W. Mayerthaler, W. U. Dressler, and W. U. Wurzel, in order to account for what is more or less natural among comparable morphological phenomena. It consists of three subtheories (Dressler *et al.*, 1987; Kilani-Schoch, 1988; Dressler, 2000; Kilani-Schoch and Dressler, 2005). The first subtheory of universal markedness, or system-independent morphological naturalness (Mayerthaler, 1981), is a preference theory (cf. Dressler, 1999). It establishes deductively the degrees of universal preferences on a restricted number of naturalness parameters. Here naturalness does not refer to any global or overall preference, but to what is universally preferred on one given parameter. Parameters and their preference degrees are deduced from semiotic and cognitive bases. The most important parameters are as follows:

1. The parameter of iconicity: a morphosemantically marked category, compared to an unmarked category, is expressed preferentially by a longer form. Thus, among English plurals, suffixation (as in *fife* + *s*) is most iconic, modification (as in *feet* vs. the unmarked singular *foot*) is less iconic (since it involves only a change), and the plural *fish* is noniconic (no change).
2. The parameter of morphosemantic transparency: full transparency means fully compositional meaning, as with most inflectional meanings. For example, the meaning of *fife* + *s* combines the meanings of *fife* and of plurality. Among compounds, *blue* + *berry* is more transparent than *straw* + *berry* is because *blue* contributes more to the meaning of the whole compound than *straw* does.

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3. The parameter of morphotactic transparency: the most natural forms are those for which there is no opacifying obstruction to decomposability. Thus the singular base is easier to recover in *fife* + *s* than it is in *wive* + *s*, for which an opacifying, lexically restricted morphonological rule intervenes.
4. The parameter of binarity: binary morphological relations are preferred to ternary or *n*-ary ones. Thus compounds consisting of two members are most preferred, followed by ternary compounds with a structure that can be split into two binary relations, as in *three-star general*, meaning a general who has (binary relation) three stars (binary relation) on his shoulders. Truly ternary compounds such as *blue–white–red* (the French flag) are exceptional.
5. The parameter of optimal shape: the optimal shape of a word has the extension of one metrical foot (whereby, due to binarity, bisyllabic words are preferred); the optimal shape of an affix is one syllable.

The second subtheory of typological adequacy (cf. Dressler, 1985: 337–348), inspired by Skalička's theory (1979) of ideal language types, has reinterpreted these ideal constructs as sets of consistent responses to naturalness conflicts. Since a given language cannot limit itself to the most natural options on all universal parameters, naturalness on certain parameters must be, so to say, sacrificed for greater naturalness on others. Thus, the agglutinating type, as best represented by Turkish morphology, is very natural on the parameters of iconicity and transparency, but not on the parameters of binarity and optimal shape of words, because words are typically longer than one metrical foot and contain more than two morphemes. The inflecting-fusional type, as represented by conservative Indo-European languages, is more natural on parameters 4 and 5 than on parameters 1–3.

The third subtheory of system-dependent naturalness, or language-specific system adequacy (Wurzel, 1984), accounts for what is normal within the morphology of a language, although it may contradict some universal morphological preference (of the first subtheory). The most important concepts are productivity, default, and morphological (especially inflectional) class (cf. Dressler, 2004).

In language acquisition, young children follow universal preferences more than adults do, since these preferences are not yet curbed by an extensive knowledge, and thus by system adequacy, of a specific language. Relatively early, children are sensitive to typological characteristics of the language they acquire (cf. Bittner *et al.*, 2003). In diachrony, morphological changes that initiate within morphology tend to result in more morphological naturalness, which is not the case with contact-induced change or when syntactic or phonological patterns or rules are morphologized (cf. Dressler, 2003).

See also: Iconicity: Theory; Markedness; Natural Phonology.

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Natural Phonology

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General Characteristics

Natural Phonology (henceforth NatPhon) is a theory developed by David Stampe in the late 1960s (as in Stampe, 1969) (much of the original literature had circulated and remained unpublished), with a first point of culmination in his dissertation (1973b) and a parasession of the Chicago Linguistic Society in 1974 (Bruck *et al.,* 1974), as well as Patricia Donegan's dissertation in 1979. The most thorough presentation of the theory was published by Donegan and Stampe (1979). The term *natural* refers to the view that the forces governing phonological systems, alternations, phonological change, and phonological behavior in general are inherent to the limitations of human capacities of speech production and auditory perception. The dual meaning of the word *phonology* as a scientific discipline and as the specific human knowledge/capacity is mediated insofar as the former is nothing but a direct reflection of the latter.

One of the early observations by Stampe comes from language acquisition (Stampe, 1969), namely that children obviously apply different and additional processes to those from adult phonology, processes the children seemingly never have actively learned. Analogously, the same holds for aphasic varieties, where it would be difficult to claim that the speech of aphasics is characterized by a constantly more highly elaborate cognitive effort than is normal speech; cf. also other external influences that alter a given phonology and where the application of additional processes can hardly be explained by a model in which the application of a process raises the complexity of a derivation.

NatPhon is not a formal theory in the sense that formalisms themselves are considered a calque of formal restrictions of mental operations, but it is as much subject to formalizations as any other theory. A good deal of formalization in the framework of Optimality Theory can also be considered as directly corresponding to processes in NatPhon. The difference from classical and post-classical generative phonology is not so much to be sought in questions of formalizations, but rather in the status that formalizations, as opposed to functional approaches, have in grammatical theory.

A frequent misunderstanding concerns the relation of naturalness and a rather abstract notion of optimization to systems. Natural processes are antagonistic in nature, i.e., they may give opposing results in different contexts. Any specific auditory, and especially any specific articulatory, difficulty can have more than one possible resolution. Finally, the dichotomy of auditorily and articulatorily motivated changes interact to locally avoid a specific difficulty or non-preferred constellation, but – as in any other dialectic theory – naturalness is never claimed to be an evaluation device for *systems*. Each phonological system is as 'natural' as any other; every single phonology responds to the needs of its users in the same adequate way as any other phonological system. Natural phonology takes up traditional, pre-structuralist knowledge, combining it with modern advances in linguistic research.

Specific Concepts

Phonology and Morphophonemics

NatPhon advocates a sharp distincion between phonology and morphophonemics. Only phonology (including prosody) is *natural* in the above sense, morphophonemic alternations express grammatical relations. Phonologically motivated sound substitutions are termed processes, morphophonemic alternations are called rules. Alternating forms such as Ger. [ʀɑ·t] vs. [ʀe·dɐ] *Rad* vs. *Räder,* 'wheel, SG vs. PL' show both substitution types: the final devoicing of the former is a process, the umlauting of the latter a rule. This is not just a difference of definition, but instead we are dealing with two ontologically different phenomena, and it is necessary to stress this argument, as mostly formal oriented theories do claim that these two types hold the same ontological status, differing only in the location in the grammar (cf. Donegan and Stampe, 1979). Processes always apply when the phonological context is met, but the application of rules depends on lexical specifcations and/or grammatical domains. Processes thus are automatic, rules are not. Processes interfere in second language phonology, rules do not. Thus, speakers of German do apply final devoicing when talking English, but they never apply the German rules of umlaut, etc. Further, processes, because they are natural, reflect inborn restrictions of the human articulation and/or perception and need not be learned and thus are restrictions the speaker imposes on his language, whereas rules are restrictions the language imposes on the speakers (Donegan and Stampe, 1979) and have to be learned in language acquisition.

Morphophonemic rules (like the above quoted example from German umlaut) are petrifications of older phonological processes, which became opaque through morphologization. As important historical changes are gradual, rules may show remnants of phonological naturalness, and the former phonological character may be recognizable to varying degrees. In derivation, morphophonemic rules precede processes.

Fortitions and Lenition

A natural process is defined by Stampe (1973b: 1) as a "mental operation that applies in speech to substitute, for a class of sounds or sound sequences presenting a specific common difficulty to the speech capacity of the individual, an alternative class identical but lacking the difficult property." Processes responding to auditory restrictions are called fortitions, those responding to limitations of articulation are termed lenitions. Fortition, thus, is a cover term for all centrifugal tendencies in which an acoustic image of a sound or sound sequence (either in isolation or in relation to other sounds) is sharpened, the perceptual distance between sounds enlarged, or the sequencing improved. Lenitions, on the other hand, embrace all assimilatory and centripetal tendencies which make pronunciation less expensive. Centripetal tendencies do normally have a negative effect on perceptual clarity. The basic order in derivation is *fortition first – lenition last*. Both fortitions and lenitions strongly depend on prosodic variables (e.g., a preference for fortitive processes in prosodically strong positions and for lenitions in weak contexts).

Paradigmatic and Syntagmatic

Processes can work in two different ways, paradigmatically and syntagmatically. For NatPhon, a given phonological system is the result of the paradigmatic functioning of processes. In her seminal dissertation, Donegan (1978) has exemplified this view in the working of vowel systems: a limited number of processes, justifiable on general grounds, systematically limits the phonatory capacities of the oral tract in order to select preferred points of vocalic articulation, thus producing vowel systems. Syntagmatic processes derive phonetic realizations from underlying representations. Paradigmatic operations are fortitive in character, and they may both be context-free and context-sensitive; syntagmatic ones may either be fortitive or lenitive and are always context-sensitive. This is the only way in which we can conceptualize a language-specific phonology as a harmonic entity comprising both the system and its concrete realization.

Naturalness and Markedness

The concept of naturalness has often been paralleled yet both confused with and substituted by markedness. And indeed the effect of a paradigmatic process devoicing obstruents at first sight is equivalent to a markedness relation that postulates voiced obstruents to be more marked than unvoiced obstruents, or an implicational law that states that the existence of voiced obstruents implies the existence of voiceless obstruents. It was specifically proponents of Natural Morphology who advocated assuming markedness to be the driving force of phonology in analogy to their concept of describing morphological regularities (Wurzel, 1984). Stampe (1973a) showed that the concept of antagonistic processes is both able to explain underlying representations and surface realizations, as well as historical change, and that what surfaces as markedness in phonology is a direct reflex of natural processes.

Prosody

Prosody is as integrally part of phonology as the segmental aspect, it merely deals with a different side of the same phenomenon. Prosodic units are the result of processes of human temporal behavior and the realization of specific linguistic and segmental phonological units in time. Each prosodic unit stands in a double relationship as the organizational procedure of smaller units and itself being an element of a hierarchy directed upward. And both faces of the coin determine structural aspects. Although we do not have convincing arguments to assume the syllable to be part of the *lexical* representation of words, it is considered to be the central unit for realizing segments in time and of grouping segments together so as to make them manageable on the level of prosodic feet. Segments thus to some extent determine the structure of syllables and at the same time are determined by it (e.g., the inherent sonority of segments determines the nucleus, hence structural aspects, which in their turn determine voicing in specific non-nuclear positions). Virtually the same holds true for accent: on the one hand, accent organizes syllables into feet, on the other, it is the result of the application of prosodic processes of accentuation which create accent patterns to which the syllables are mapped. Again, certain syllabic positions are the material basis on which accent works, and they are themselves structurally dependent from their prosodic context.

The specific importance of prosody in NatPhon has also been outlined by its role in typology. An interesting study by Donegan and Stampe (1983) shows that

it is probably rising and falling word accentual patterns that condition the setting of important typological variables on other prosodic, morphological, and syntactic grounds.

Related Proposals in Phonology and Outside Phonology

In the beginning, NatPhon was sometimes confused with *Natural Generative Phonology* (NGP), a theory intimately associated with the names of Joan (Bybee) Hooper (1976) and Theo Vennemann (1974). NGP contributed to the abstractness debate of the late 1970s and early 1980s by postulating a *naturalness condition* which severely constrains the arbitrariness of underlying representations by linking them directly to existing suface patterns.

Within the development of ideas referring directly to NatPhon, there should be mentioned at least two schools: cognitive phonology as outlined by Nathan (1996, 1999) and the proposal by Dressler (1985, 1996). Dressler's main issue is that there has to be established a concept of naturalness across the components based on general semiotic parameters on which he maps the Stampean concept of phonetically conditioned naturalness. Nathan seeks to parallel a concept of phonological space with organizational principles developed in Cognitive Grammar, such as prototype theory, mental images, and so on.

The radical difference between NatPhon and generative phonology has somewhat been attenuated with the rise of Optimality Theory (Hurch, 1998). Although the latter apparently postulates a radical change in questions of form and substance, it more thoroughly refers to traditional knowledge and also reduces the arbitrarity of analyses by requiring constraints to be motivated on independent grounds.

See also: Generative Phonology; Natural Morphology; Phonology: Optimality Theory; Phonology: Overview.

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Natural Semantic Metalanguage

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Introduction

The term 'natural semantic metalanguage' (NSM) refers to the theory of language description originated by Anna Wierzbicka and to its principal method of semantic representation, namely, a minilanguage of empirically established universal semantic primes along with their inherent universal grammar. Semantic primes are simple indefinable meanings that surface as identifiable word meanings in all languages. The NSM system has been developed and refined over 30 years, primarily in Australia. There is a large body of descriptive-analytical work in the framework, dealing with lexical, grammatical, and illocutionary semantics across many languages. Although it is controversial, the NSM system is one of the most refined, productive, and comprehensive systems of semantic analysis.

The NSM program has unfolded in four phases. The 1970s to mid-1980s saw the early development of the semantic primitives approach, led by Anna Wierzbicka. The initial inventory of primes was austere (14 in number), their syntax was not well-specified, and explications often involved extremely complex configurations. From the mid-1980s to late 1990s, the search for lexical universals, with its concomitant attention to an ever-widening range of languages, was added to the program. During this period, the number of proposed primes rose to the mid-30s in number. The additional primes enabled a cleaner and more transparent metalanguage. From the mid-1990s onward, the emphasis shifted to the grammar of semantic primes and to thinking of the 'whole metalanguage' as an operational tool. The number of proposed primes stabilized in the mid-sixties. The approach began to experience a notable upswing. From the early 2000s onward, systematization and formalization of the metalanguage began in earnest. No doubt due to the importance of meaning-based studies, the NSM system has attracted considerable attention from adjacent disciplines, especially anthropology and cultural psychology.

The NSM system is arguably approaching the standard expectations of a formalized metalanguage for natural language, in that it aims to combine the explicitness of statements with clarity of expression and its terms and processes are all well-specified and strictly adhered to. On the other hand, because the NSM metalanguage works within such strict confines, it is not a fully natural system. It is an artificial or semi-artificial system based on natural language and understandable on the basis of natural language. It aims to unify formalism and naturalism in a single descriptive and analytical system for meaning in natural language.

Semantic Primes

The foundational assumption of the NSM system is that of the metasemantic adequacy of natural languages: that it is possible to carry out exhaustive reductive paraphrase of the words and grammatical constructions of any language using a subset of the word meanings and grammatical constructions of the language itself. The attractions of this approach can be itemized as follows. First, any system of representation has to be interpreted in terms of some previously known system, and, because the only such system shared by all language users is natural language itself, it makes sense to keep the system of semantic representation as close as possible to natural language. Second, clear and accessible semantic representations enhance the predictiveness and testability of hypotheses. Most other systems of semantic analysis are hampered by the obscurity and artificiality of the terms of description. Third, the system is intended to represent the cognitive reality of ordinary language users, so it would be problematical to employ symbols whose meanings are completely opaque to language users themselves.

The current NSM model is the result of a 30-year program inaugurated by Anna Wierzbicka in her 1972 book *Semantic primitives*. It started with lexical semantics, but has since extended into grammatical and illocutionary semantics and (with the theory of cultural scripts) into cultural pragmatics. A significant body of crosslinguistic evidence indicates that the primes and their associated grammar are universally manifested in all human languages. The current inventory of primes is listed (using English exponents) in Table 1. Each has a well-specified set of syntactic properties (combinatorics, valency, and complementation), so that the system as a whole can be seen as a kind of minilanguage. All these terms identify simple and intuitively intelligible meanings that are grounded in ordinary linguistic experience. The NSM system aims to be exhaustive, that is, capable of adequately paraphrasing the entirety of the vocabulary of any language. The claim is both that semantic primes are essential for explicating the meanings of other words and grammatical constructions and that they cannot themselves be explicated in a noncircular fashion.

Table 1 Table of semantic primes

Substantives	I, YOU, SOMEONE/PERSON, SOMETHING/THING, PEOPLE, BODY
Relational substantives	KIND, PART
Determiners	THIS, THE SAME, OTHER/ELSE
Quantifiers	ONE, TWO, SOME, ALL, MUCH/MANY
Evaluators	GOOD, BAD
Descriptors	BIG, SMALL
Mental/experiental predicates	THINK, KNOW, WANT, FEEL, SEE, HEAR
Speech	SAY, WORDS, TRUE
Actions, events, movement	DO, HAPPEN, MOVE
Existence and possession	THERE IS/EXIST, HAVE
Life and death	LIVE, DIE
Time	WHEN/TIME, NOW, BEFORE, AFTER, A LONG TIME, A SHORT TIME, FOR SOME TIME, MOMENT
Space	WHERE/PLACE, HERE, ABOVE, BELOW, FAR, NEAR, SIDE, INSIDE, TOUCH
Logical concepts	NOT, MAYBE, CAN, BECAUSE, IF
Augmentor, intensifier	VERY, MORE
Similarity	LIKE/WAY

After Goddard and Wierzbicka (2002).

The lexical exponents of primes can be formally complex. English SOMEONE and SOMETHING, for example, consist of two morphological elements, and A LONG TIME and FOR SOME TIME are phrasemes. The NSM claim is that these expressions each represents a unitary meaning. Not surprisingly, in many languages their equivalents are morphologically simple. The exponents of semantic primes can also have multiple realizations (allolexes) in a single language. The 'double-barreled' items in Table 1, such as SOMETHING/THING, SOMEONE/PERSON, and WHEN/TIME, indicate meanings that, in English, are expressed by means of different allolexes in different grammatical contexts. *Something* and *thing*, for example, express the same meaning, except that *something* cannot be used in combination with a specifier. Compare the following three sentences:

something happened
the same thing happened again
I don't know when this thing happened

Similarly, *else* is an English allolex of OTHER, and *don't* is an allolex of NOT. Patterns of allolexy can vary from language to language.

Semantic primes exist, not at the level of whole lexemes, but as the meanings of lexical units (*see* **Polysemy and Homonymy**). Language-specific polysemy can therefore obscure the identification of individual primes. Detailed language-internal evidence is always necessary to support an identification that depends on a polysemy analysis. A great deal of empirical research exists in the NSM literature on the typological semantics of semantic primes. In particular, 'whole metalanguage' studies have been carried out for English, Polish, Malay, Lao, Mandarin, Mbula, Spanish, Korean, and East Cree (Northern East Cree), and more selective studies on French, Italian, Amharic, Japanese, Ewe (Éwé), Yankunytjatjara, and Hawai'i Creole English. On the basis of these studies, semantic primes appear to be lexical universals, in the sense of having an exact translation in every human language (although the term 'lexical' is used here in a broad sense because it includes phrasemes and bound morphemes as well as words proper).

Although it is not possible here to explain how the primes were identified in the first place, an example may be helpful. Consider the word *say*, in sentences such as *Mary said something to me*. How could we paraphrase the meaning of *say* in these contexts using simpler words? An expression such as *verbally express* will not do because terms such as *verbally* and *express* are more complex and difficult to understand than *say* is in the first place. The only plausible line of explication might something like 'Mary did something, because she wanted me to know something'; but this fails because there are many actions a person could undertake because of wanting someone to know something, aside from saying. On the other hand, if we take a word such as *ask*, as in *Mary asked me something*, it seems readily paraphrasable in simpler terms, including SAY, WANT, and KNOW: 'Mary said something to me, because she wanted to know something; she wanted me to say something because of this.' On account of its resistance to paraphrase, SAY is a good candidate for the status of semantic prime. Furthermore, SAY is clearly required for the explication of many other lexical items involving speaking and communication, especially speech-act verbs and many discourse particles, and, in some languages, specialized grammatical constructions too. Upon checking a range of languages, we find that all languages appear to have a word with the same

Table 2 Some common polysemies involving exponents of semantic primes

Prime	*With meanings*	*Languages*
SAY	'speak' or 'make sounds'	Thai, Mandarin, Kalam, Yankunytjatjara
THINK	'worry,' 'long for,' or 'intend'	Amharic, Mandarin
WANT	'like,' 'love' or 'seek'	Spanish, Ewe, Ulwa[a]
HAPPEN	'arrive' or 'appear'	French, Ewe, Mbula
DO	'make'	Malay, Arrernte, Samoan, Kalam
BEFORE	'first,' 'go ahead,' or 'front'	Lao, Samoan, Kayardild,[b] Ewe
FEEL	'taste,' 'smell,' or 'hold an opinion'	Acehnese,[c] Ewe, French, Mandarin
BECAUSE	'from'	Yankunytjatjara, Arrernte

[a]Sumo Tawahka. [b]Gayardilt. [c]Aceh.
Data from Goddard and Wierzbicka (1994).

meaning as English *say*. For example: Malay *kata*, Yankunytjatjara *wangkanyi*, and Japanese *iu*.

As mentioned, polysemy is frequently a complication when we are trying to identify primes and match them up across languages. Often the range of use of equivalents of the same prime do not coincide because, aside from the identical shared meaning, the words in question also have additional meanings that differ from language to language. Frequent polysemies in which semantic primes are involved are summarized in Table 2.

Grammar of Semantic Primes

The inherent syntactic properties of semantic primes (i.e., their combinatorial, valency, and complementation possibilities) are literally universals of syntax, albeit that they can be realized differently, in terms of word order, morphological marking, and constituent structure, in different languages. The most significant single NSM publication on the metalanguage as a whole, and on its syntax in particular, is the two-volume set of studies *Meaning and universal grammar – theory and empirical findings* (Goddard and Wierzbicka, 2002).

The syntactic properties of primes can be seen as falling into three kinds. The first type is basic combinatorics, for example, the fact that substantive primes such as SOMETHING/THING, SOMEONE/PERSON, and SOMEWHERE/PLACE and relational substantives such as PART and KIND can combine with specifiers to form semantic units: THIS THING, THE SAME PERSON, SOMEWHERE ELSE, ONE PART, MANY KINDS, and so on. The second type is an account of basic and extended valencies; for example, the fact that the prime DO can occur not only in its basic frame SOMEONE DID SOMETHING, but also in extended frames such as SOMEONE DID SOMETHING TO SOMETHING (or TO SOMEONE) and SOMEONE DID SOMETHING TO SOMETHING WITH SOMETHING. Valency options, which are argument-like, are distinguished from adjuncts such as temporal and locational phrases along conventional lines. The third type of syntactic properties concerns the propositional complement possibilities of primes such as KNOW, WANT, and THINK, for example, that KNOW can occur in the frame I KNOW THAT SOMETHING HAPPENED IN THIS PLACE and that WANT can occur in frames like I WANT TO DO SOMETHING and I WANT SOMETHING TO HAPPEN. For other examples of valency frames, see Table 3. Primes vary widely in the number of alternative valency frames and complementation options available to them. Although groups of primes share particular properties and can be regarded as falling into natural classes, it is equally true that virtually every prime has some idiosyncratic properties, giving each prime a distinctive syntactic signature.

Table 3 Valency arrays for three semantic primes

Prime	*Array*
DIE	X DIES
HAPPEN	something HAPPENS
	something HAPPENS to X [undergoer]
	something HAPPENS in this place/here [locus]
SAY	X SAYS something
	X SAYS something to someone [addressee]
	X SAYS something about something [locutionary topic]
	X SAYS: ''———'' [direct speech]
	X SAYS something in some words [verbal means]
	X SAYS some words (these words) [cognate object]

Typological research within the NSM framework indicates that the full set of semantic primes is necessary to capture (in maximally clear and translatable terms) the semantic content of language-specific grammatical categories and constructions in the world's languages. (See Table 4 for summary details.) This finding runs counter to the claim advanced by some authors that only a subset of the conceptual primes implied in the lexicon is needed for grammatical purposes.

Using Natural Semantic Metalanguage for Lexical Semantics (Explications)

Explication in terms of semantic primes allows the study of meaning to become concrete and tangible,

Table 4 Some morphosyntactic construction types and associated semantic primes

Primes	*Morphosyntactic constructions*
ONE, TWO, SOME, MUCH/MANY	Number-marking systems (including duals, paucals)
THE SAME, OTHER	Switch-reference, obviation, reflexives, reciprocals
WANT	Imperatives, purposives, uncontrolled marking
KNOW, SEE, HEAR, SAY	Evidential systems
WORDS	Delocutive verbs
DO, HAPPEN	Active marking, passive voice, inchoatives
FEEL, THINK	Experiencer constructions
GOOD, BAD	Benefactives, adversatives
BIG, SMALL	Diminutives, augmentatives
VERY	Superlatives, expressives
NOW, BEFORE, AFTER, A LONG TIME, A SHORT TIME	Tense systems (including degrees of remoteness)
HERE, ABOVE, BELOW, SIDE, NEAR, FAR	Elaborate locational deixis
PART OF	Inalienable possession

especially in comparison with methods that employ abstract and obscure representional devices. NSM explications can be directly or indirectly substituted in place of the expressions they are intended to represent and so can be submitted to the test of substitution *salvo sensu*. There is a substantial body of descriptive empirical work in the NSM framework on many aspects of lexical semantics (*see* **Lexical Semantics: Overview**), grammatical semantics and illocutionary semantics, cultural pragmatics, and, more recently, into universal grammar. The look and feel of NSM explications can be illustrated with a series of thumbnail examples: first, with words that can be explicated directly in terms of semantic primes and, then, with more complex examples that call for the use of intermediate-level semantic molecules.

Explicating Directly into Semantic Primes

Verbs *kill* and *break* The causative verbs (*see* **Causatives: Semantics**) *kill* and *break* are frequently analyzed in the general linguistic literature as CAUSE TO DIE (or CAUSE TO BECOME NOT ALIVE) and CAUSE TO BECOME BROKEN, respectively. The NSM explications are given next. Aside from the fact the NSM system recognizes BECAUSE (rather than CAUSE) as its basic exponent in the causal domain, it can be seen that the explications give a more articulated and nuanced account of the event structure. In both cases, the explications depict an action by the agent X with an immediate effect on the patient Y and, consequently, the cessation of a prior state that otherwise would have continued. In the case of *kill*, an intermediate event is also involved, namely, something happening inside person Y's body.

(1) person X **killed** person Y =
X did something to Y
because of this, something happened to Y at the same time
because of this, something happened inside Y's body
because of this, afterwards Y was not living anymore

Break is both more complex than *kill* and more polysemous. The explication that follows applies only to one sense of the word, as found in examples such as *to break a stick*, *an egg*, *a lightbulb*, *a vase*, or *a model plane*. There is an aspectual component involved, namely that the immediate effect on thing Y 'happened in one moment,' and a final subjective component indicating that the result (namely, that 'Y was not one thing anymore') can be seen as irrevocable or irreversible.

(2) person X **broke** thing Y =
X did something to Y
because of this, something happened to Y at the same time
it happened in one moment
because of this, afterward Y was not one thing anymore
someone could think about it like this: 'it can't be one thing anymore'

It is an interesting fact, and one consistent with the somewhat schematic nature of this explication, that many languages lack any comparably broad term that subsumes many different manners of *breaking*.

Adjectives *sad* and *unhappy* According to NSM research, the meanings of emotion terms involve feelings linked with a characteristic or prototypical cognitive scenario (*see* **Prototype Semantics**) involving thoughts and wants. The scenario serves as a kind of 'reference situation' by which the nature of the associated feeling can be identified. For example, *joy* is a good feeling linked with the thought 'something very good is happening now'; *remorse* is a bad feeling linked prototypically with the thought 'I did something bad.' A large body of emotion explications is presented in Wierzbicka's (1999) *Emotions across languages and cultures*. Consider the explication for English *sad*.

(3) X was **sad**
X felt something because X thought something
sometimes a person thinks like this:
'I know that something bad happened
I don't want things like this to happen
I can't think like this: I will do something because of it now
I know that I can't do anything'
when this person thinks like this, this person feels something bad
X feels something like this

The prototypical scenario involves an awareness that 'something bad happened' (not necessarily to me) and an acceptance of the fact that one cannot do anything about it. This is compatible with the wide range of use of *sad* – for example, that I may feel *sad* when I hear that my friend's dog died or when I think about some unpleasant bickering in my workplace.

This format of explication enables subtle meaning differences to be modeled both across languages and within a single language. Consider some of the ways in which *unhappiness* differs from *sadness*.

1. *Unhappiness* requires the experiencer to have certain real thoughts (although we can say *I feel sad, I don't know why*, it would be a little odd to say *I feel unhappy, I don't know why*).
2. *Unhappy* implies a more intense feeling and a stronger negative evaluation, as implied by the fact that it is less readily combinable with minimizing qualifiers like *a little* or *slightly*.
3. *Unhappy* has a more personal character; we can easily be saddened by bad things that have happened to other people, but we are more likely to be *unhappy* on account of bad things that concern us personally.
4. *Unhappy* does not suggest a resigned state of mind but rather focuses on some thwarted desires. The attitude is not exactly active because we do not necessarily want anything to happen, but it is not passive either.
5. *Unhappy* suggests a state extended in time.

All these differences are modeled in the differences between the two explications.

(4) X was **unhappy**
X felt something because X thought something
sometimes a person thinks like this for some time:
'some very bad things happened to me
I wanted things like this not to happen to me
I can't not think about it'
when this person thinks like this, this person feels something bad for some time
X felt something like this because X thought like this

The Noun *friend* The NSM literature contains many fascinating studies of the meanings of culture-rich words from various languages. Often they can give us a new insight into an entire cultural point of view – across time as well as across space. For example, we can trace changing ideas about personal relationships by tracking the changing uses and meanings of the English word *friend*. Several hundred years ago, *friend* designated an exceptional, intimate, and lifelong bond, but the meaning has since weakened considerably, presumably as social relationships have become more flexible and broadly based. The modern English word *friend* can be explicated as follows:

(5) (my) **friend** =
I think about this person like this:
I know this person well
when I do things with this person, I feel something good
when I am with this person, I feel something good
I know that this person thinks the same about me

With a meaning like this, it makes sense that we can quickly make *new friends* and that there is nothing unusual about a person having *many friends*. In the modern sense, *friends* are people who we know, like, and enjoy doing things with. Several hundred years ago, however, *friend* designated a relationship bound by something closer to *love* than to liking. Samuel Johnson, in his 1755 *Dictionary of the English language*, offered the following definition: "*friend* – one joined to another in mutual benevolence and intimacy." Jane Austen regularly used *friends* to include family members. In this older use, the meaning of *friend* involved knowing someone not just 'well' but 'very well'; and moreover, there were additional components that are missing from the contemporary sense: 'I want this person to know how I feel; I want this person to know what I think about things; I want to do good things for this person.' To get anything like this older meaning in modern English, we have to strengthen the word *friend* with a modifier; to speak of, for example, *a close friend* or *a real friend*. The old meaning lingers on, to some extent, in the word *friendship,* which designates something weightier, more committed, and more long-lasting than merely *being friends*. Many European languages still categorize social relationships rather differently to English. French *ami*, Italian *amico*, German *Freund*, and Polish *przyjaciel* have much in common with *friend* (especially in its older meaning), but there are important differences as well as similarities. Across broader cultural gulfs, the differences are even more substantial.

Explicating Complex Concepts Using Semantic Molecules

According to NSM research some kinds of concept (emotions, values, speech acts, and interpersonal relations) are semantically much simpler than others (artifacts, animals and plants, and many human activities) because the former can be explicated directly in terms of semantic primes, whereas the latter can only be explicated in stages using intermediate-level semantic molecules. For example, the concept that certain kinds of thing are 'made by people' is necessary in the explication of artifact concepts such as *cup, knife,* and *umbrella;* the concept 'animal' is necessary in the explications of *cat*, *dog, horse*, and so on; body-parts concepts are required in verbal meanings such as *eat*, *hit*, and *run*; and almost all concrete vocabulary items require semantic molecules such as 'long,' 'round,' 'flat', and 'hard.'

A semantic molecule is a packet of semantic components that exists as the meaning of a lexical unit – properly speaking, a lexico-semantic molecule. They have a special cognitive significance in that they allow a 'conceptual chunking' that makes it possible to manage concepts of great semantic complexity. The semantic molecule 'make' can be explicated as in (6). It involves a certain intention, some actions involving some materials, and an outcome, that is, something existing which did not exist before. The semantic molecule 'animal' is explicated in (7).

(6) person X **made** something (Y) out of Z (e.g., X **made** an omelette out of eggs)
person X did some things to some things because this person thought like this:
'I want there to be something of kind Y here now
because of this, I have to do some things to these other things (Z)'
because X did like this, after this there was something of kind Y in this place
the other things (Z) were parts of this thing of kind Y

(7) **animals**
a kind of living thing
living things of this kind are like people in some ways, they are not like people in other ways
some parts of their bodies are like parts of people's bodies, other parts of their bodies not like people's bodies
there are many kinds of living things of this kind

In the structure of most complex concepts, there are multiple levels of nesting: molecules within molecules. To see this, it is useful to look at part of the explication for *cats*. The following is the first part of such an explication. Generally speaking, explications for animal terms follow the same general format: (a) category in the taxonomic hierarchy, (b) habitat, (c) size, (d) appearance, (e) behavior, and (f) relation with people. The explication in (8) only includes items (a)–(d). In the case of *cats*, the subsequent sections are very long and elaborate, reflecting the detailed folk knowledge people have of these animals that share their lives. The (a) component establishes *cats* as 'a kind of animal [M].' The notation [M] indicates a semantic molecule. The (b) components claim that *cats* are conceptualized primarily as domestic animals. The size component (c) is defined in relation to the human body, a kind of anthropocentrism that recurs in countless words of diverse types. The components in (d) identify the distinctive physical features of *cats* as soft fur, a round head with pointy ears, a special kind of eyes, whiskers, a long tail, and soft feet with small sharp claws.

(8) **cats** =>
a. a kind of animal [M]
b. they live with people
sometimes they live in places where people live
sometimes they live near places where people live
c. they are not big
a person can pick up [M] one with two hands [M]
d. they have soft [M] fur [M]
they have a round [M] head [M]
their ears [M] stick out [M] on both sides of the top part of the head [M], they are pointed [M]
their eyes [M] are not like people's eyes, they are shiny [M]
they have some stiff [M] hairs [M] near the mouth [M], they stick out [M] on both sides of the mouth [M]
they have a long [M] tail [M]
they have soft [M] feet [M]
they have small sharp [M] claws [M]

Two kinds of semantic molecules predominate in the explication in (8): body-part terms (*hands, head, ears, eyes, mouth, hairs, fur, feet, tail, claws*) and physical descriptors of various kinds (*long, round, pointed, sticking out, soft, stiff, sharp, shiny*). To these two groupings, we can add bodily actions and postures (*eat, climb, jump, fight,* etc.) that are needed in subsequent sections of the *cats* explication; obviously they will require the use of body-part terms as semantic molecules. If we now look into the semantics of body-part terms (*see* **Cognitive Semantics**), it emerges that certain shape descriptors are required as molecules in these explications. For example, *head* (in the sense of a 'human person's head') requires the shape

descriptor 'round [M],' and words such as *arms*, *legs*, and *tail* require 'long [M].'

It would be incorrect to assume that shape descriptors are semantically more basic than all body-part terms, however, because one human body part, namely *hands*, is necessary in the explication of shape descriptors themselves. This is because shape descriptors designate properties that are both visual and tangible, and to spell out the nature of the latter concept requires the semantic prime TOUCH (contact) and the semantic molecule 'hands [M].' For example:

(9) something long e.g., a tail, a stick, a cucumber)
when a person sees this thing this person can
think about it like this:
'two parts of this thing are not like any other parts
because one of these two parts is very far from the other'
if a person's hands [M] touch this thing
everywhere on all sides
this person can think about it in the same way

From an experiential point of view the importance of the semantic molecule 'hands [M]' is perhaps not so surprising. The experience of handling things, of touching them with our hands and moving our hands in an exploratory way plays a crucial role in making sense of the physical world and in our construal of the physical world. It turns out that, unlike many other body-part words, *hands* can be explicated directly in terms of semantic primes, although space prevents us from demonstrating this here. Although shape descriptors such as 'long [M]' are only of a moderate level of semantic complexity, it is interesting that to ordinary intuition they appear so basic and unanalyzable. Presumably this is because they are formed very early in childhood and are subsequently incorporated into the molecular substructure of so many other concepts.

Terms for most natural kinds and artifacts are semantically extremely complex, both because they incorporate numerous semantic molecules and because they encapsulate tremendous amounts of cultural knowledge. For natural kinds, this applies in particular to terms for animal species with which people have close relationships, so to speak, either currently or in historically recent times. English *cat, dog, mouse,* and *horse*, for example, are far richer in conceptual terms than *moose* or *kangaroo*. Similarly, artifact terms can differ in their amount of conceptual information depending on the complexity of the function or functions they are intended to serve, including its degree of cultural embeddedness. For example, a word such as *knife* is simpler than one such as *cup* because *cup* involves a great deal more social information.

Other Uses of Semantic Primes

The metalanguage of semantic primes can be used not only for lexical and grammatical semantics, but also as a notation for writing cultural scripts, that is, hypotheses about culturally shared assumptions, norms, and expectations that help regulate interaction in different cultural settings. By using simple crosstranslatable expressions, this approach to cultural pragmatics (or ethnopragmatics) avoids the implicit terminological ethnocentrism of conventional approaches that rely on complex technical and/or English-specific descriptors. Cultural scripts written in semantic primes aim to present an insider perspective on cultural norms in terms that are accessible to outsiders. The NSM metalanguage can also be used to spell out the meanings conveyed by nonverbal signals, such as facial expressions, gestures, and body postures.

See also: Causatives: Semantics; Cognitive Semantics; Lexical Semantics: Overview; Markedness; Polysemy and Homonymy; Prototype Semantics.

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Natural versus Nonnatural Meaning

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Grice's Distinction

H. P. Grice noticed a potentially confusing lexical ambiguity in the word 'means' (see Grice, 1957). Contrast claim (1) with claim (2):

(1) The flooded river means that the mountain snow is melting
(2) The sentence 'La neige des montagnes fond' means that the mountain snow is melting

If it turned out that the mountain snow was not melting, then claim (1) would have to be withdrawn, whereas claim (2) would not. The French sentence in (2) would mean what it does even if it was untrue. Grice distinguishes what he calls natural meaning, which is what 'means' means in the context of a claim such as (1), from nonnatural meaning, invoked in (2). He offers a range of criteria for distinguishing the two kinds of meaning – 'meaning$_{N}$' and 'meaning$_{NN}$' as he abbreviates them – but the key difference is sometimes put in terms of meaning$_{N}$, unlike meaning$_{NN}$, being *factive*: what is meant$_{N}$ can only be a fact, whereas what is meant$_{NN}$ need not.

Sentences are not the only kind of entity that may be said to have meaning$_{NN}$. Others include people, as when we say that so-and-so meant something; utterances of a sentence as opposed to the sentence itself; and mental states, such as beliefs, which have representational content without necessarily representing accurately. The distinction seems to be available no matter what one takes to be the primary bearers of meaning$_{NN}$.

Grice stressed this distinction because he was interested in nonnatural meaning, which he deemed to be harder to pin down and so more in need of investigation than natural meaning. Natural meaning is simply a relation of necessitation between one event and

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Natural versus Nonnatural Meaning

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Grice's Distinction

H. P. Grice noticed a potentially confusing lexical ambiguity in the word 'means' (see Grice, 1957). Contrast claim (1) with claim (2):

(1) The flooded river means that the mountain snow is melting
(2) The sentence 'La neige des montagnes fond' means that the mountain snow is melting

If it turned out that the mountain snow was not melting, then claim (1) would have to be withdrawn, whereas claim (2) would not. The French sentence in (2) would mean what it does even if it was untrue. Grice distinguishes what he calls natural meaning, which is what 'means' means in the context of a claim such as (1), from nonnatural meaning, invoked in (2). He offers a range of criteria for distinguishing the two kinds of meaning – 'meaning$_N$' and 'meaning$_{NN}$' as he abbreviates them – but the key difference is sometimes put in terms of meaning$_N$, unlike meaning$_{NN}$, being *factive*: what is meant$_N$ can only be a fact, whereas what is meant$_{NN}$ need not.

Sentences are not the only kind of entity that may be said to have meaning$_{NN}$. Others include people, as when we say that so-and-so meant something; utterances of a sentence as opposed to the sentence itself; and mental states, such as beliefs, which have representational content without necessarily representing accurately. The distinction seems to be available no matter what one takes to be the primary bearers of meaning$_{NN}$.

Grice stressed this distinction because he was interested in nonnatural meaning, which he deemed to be harder to pin down and so more in need of investigation than natural meaning. Natural meaning is simply a relation of necessitation between one event and

another, for example a causal relation such as the one alleged in (1). The investigation of nonnatural meaning is handicapped, he felt, by confusions that arise through failure to see the distinction between it and meaning$_N$. In his 1957 paper, he criticizes the attempt to understand meaning$_{NN}$ in terms of meaning$_N$, and then appeals to the distinction in the course of blocking objections to his own theory of meaning$_{NN}$.

Grice's Theory of Non-natural Meaning

Grice's distinction is acknowledged even by those who do not endorse his theory of meaning$_{NN}$. But this latter has been influential nonetheless (see Schiffer, 1972 for a development of it, and Schiffer, 1987 for a retraction). The meaning$_{NN}$ of an act, he suggests, turns entirely on the intention of its agent. Not all acts have meaning$_{NN}$, but those that do are performed with a triplex of intentions. First, the agent intends to bring about an effect of some kind in the mind of her audience – a change of belief, for example. Second, she intends to be recognized by this audience as having this first intention. Third, she intends the effect to arise *through* this recognition. If an act is performed with intentions of this form, then the intended effect is said by Grice to be the act's meaning$_{NN}$ (or, equivalently, it is what the agent meant_{NN} by the act; or again, it is what the expression used means$_{NN}$ on that occasion).

In practice, recognition of the intention is usually achievable only because of the close association between acts typed according to whether they share the same meaning$_{NN}$ and acts typed according to an overt, recognizable pattern. In the linguistic case, for example, typing according to the sentence uttered will usually group together utterances with the same meaning$_{NN}$. Shared knowledge of which sentences are paired with which meanings$_{NN}$ is what makes individual acts of meaning$_{NN}$ possible in the first place. This leads Grice to introduce a derivative notion, timeless meaning$_{NN}$, which is the meaning associated with the repeated use of a particular pattern. Sometimes this timeless meaning$_{NN}$ of a sentence is distinct from the meaning$_{NN}$ of an utterance of it on an occasion. Someone could use the sentence *I know where you live* to mean$_{NN}$ something distinct from what it timelessly means$_{NN}$. It is no coincidence that Grice was among the first to notice and develop a theory of the phenomenon of implicature (see Grice, 1975).

Other Remarks

Though the existence of a distinction between natural and nonnatural meaning is clear once pointed out, it is easy to become confused over its precise nature. After all, utterances are events and, as such, have meaning$_N$ as well as meaning$_{NN}$. And (3) is true on both readings of 'means':

(3) The canyon-dweller's shout of "Here comes an echo" meant that we would shortly hear an echo

Moreover, the utterances of an omniscient truth-teller – God, for example – mean$_N$ whatever they mean$_{NN}$. Efforts by philosophers of mind and language in the 1980s to understand systems of representation naturalistically (see Millikan, 1984; Dretske, 1988) may shed light on these cases. A distinction is sometimes drawn between what an instance of mental representation R *indicates* and what it *represents*. What it indicates (or what information it carries) is understood entirely in terms of the causal relations instances of R tend to enter into – something like meaning$_N$. It represents not what it indicates but *what it is the function* of instances of R to indicate, within the representational system as a whole. So when the representation system, i.e. the mind or some part of it, is functioning properly, an instance of R will indicate what it represents. Misrepresentation is a matter of functional breakdown in the system, resulting in instances of R that fail to indicate what they represent, i.e., what it is their function to indicate. An omniscient truth-teller can be thought of as a properly functioning representational system, which is why God's utterances mean$_N$ (or indicate) what they mean$_{NN}$ (or represent).

See also: Expression Meaning versus Utterance/Speaker Meaning; Grice, Herbert Paul (1913–1988); Implicature; Intention and Semantics; Representation in Language and Mind.

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any claims are analytic, or true just in virtue of their meaning and not in virtue of whether they fit with observation (see also Burge, 1992: 6–9). Statements that seem to be true just in virtue of their meaning, and even Russell's 'laws of logic,' are not in principle immune to disconfirmation any more than ordinary empirical claims, so there is little reason to exclude the latter from one's account of knowledge.

Quine was criticized for straying from his naturalist scruples when it came to language. Based partly on worries about language acquisition, Quine argued in favor of two theses: the indeterminacy of translation (1960) and the inscrutability of reference (1960, 1970). According to the former, there is no fact of the matter about which translation among competing translations of a given language into another is correct. The claim is not that it is rather difficult to be sure one has achieved the proper translation but that there is no fact of the matter about which is correct at all. The latter thesis claims that there is no fact of the matter about what specific terms in a language refer to. Taken together, these theses led Quine to a general skepticism about meaning and reference.

Chomsky (1968, 1975, 1980) objected to Quine's theses on the simple grounds that they contradicted Quine's claims about every other science. Just about everyone has agreed that the empirical evidence underdetermines one's theory of a phenomenon. So, indefinitely many theories can account for any given set of evidence. This does not interfere with science's progress, and it is not clear why the study of language should answer to a higher standard than the other sciences.

> If the underdetermination of physical theory by evidence does not lead us to abandon the 'realistic point of view' [...] then the comparable underdetermination of grammatical theory by evidence does not support Quine's claim that there is no fact of the matter [...] to be right or wrong about .... (Chomsky, 1975: 183)

Complaints in a similar vein can be found in Fodor and Lepore (1992: 70–82). Quine (1960: 75–6, 1968) argued that the cases are not parallel. In a remark that nicely paralleled Quine's quote (1969: 76), Robert Fogelin complained:

> ... Quine's attempt to trace a path from stimulation to science is carried out with almost no concern for the psychological reality of the process, that is, with almost no references to empirical investigations of how language is actually acquired. (1997: 561)

In the end, Quine's controversial claims should, by his own lights, be subject to empirical confirmation or disconfirmation. According to linguists and many philosophers, the weight of the evidence seems to be against him. Scott Soames (2003: 404–405) suggested that Quine's views might not admit of empirical support one way or the other, which would, on Quinean grounds, render them meaningless and useless.

Naturalized philosophy of mind tries to show how facts about intentionality, consciousness, meaning, and the like can be explained in terms of what the natural sciences – particularly psychology, neuroscience, and biology – tell us about ourselves. Here, too, we find problems with normativity. For example, concepts have intentional contents. They are about things and states of affairs. What, then, makes my concept of snow about snow? Perceptual encounters with snow cause me to think of snow and have certain beliefs about it. Perhaps, then, my concept of snow has its content in virtue of what causes me to deploy it. Cleverly placed whipped cream, however, can fool me into believing that there is snow on my windowpane. Whipped cream is not snow, of course, and my snow concept is not about whipped cream at all. It cannot be just anything causing me to deploy my snow concept figures in its content. If it did, the content would be quite disjunctive – snow or whipped cream or cotton gauze at a distance, etc. – and none of my uses of the concept would be mistaken. Any naturalistic theory of content must explain how we incorrectly use concepts, and this appeals to norms regulating their application. Scientific theories tend not to appeal to norms. Attempts to naturalize content are due to Fred Dretske (1981), Ruth Millikan (1984), and Jerry Fodor (1990), among others. Burge (1992) helpfully reviewed the development of naturalized philosophy of mind and language in the 20th century (*see* **Representation in Language and Mind**).

Chomsky's (1980, 1995, 2000) commitment to naturalism has been 'methodological' in that he has taken scientific explanation to be the goal when we investigate language and mind. He famously denied that there is an interesting 'metaphysical' sense to naturalism according to which research aims to explain mental and linguistic phenomena in physical or biological terms. Chomsky has been skeptical of metaphysical naturalism because, first, reduction is rarely a prerequisite for conducting science. For example, biology has not been reduced to physics, but it is a science nonetheless. And second, we do not have a clear enough conception of the physical for the metaphysical project to make sense.

> Lacking a concept of 'matter' or 'body' or 'the physical' we have no coherent way to formulate issues related to the 'mind-body problem' ... the sciences postulate

> whatever finds a place in intelligible explanatory theory, however offensive that may be to common sense. (Chomsky, 1995: 4–5)

Naturalists are committed to following science wherever it leads, but we do not understand the world well enough to make a stronger, metaphysical commitment to reducing the mind to the physical. Since our notion of what is physical is frequently in flux, it seems odd to insist that the mind must be explicable in terms of it. Responses to Chomsky's views, with replies by Chomsky, can be found in Antony and Hornstein (2003).

Biology, more than most other sciences, must deal with normative notions. What is the function of this trait? Is it adaptive? What was its original purpose? And so on. Philosophers have not missed the fact that biology offers a promising approach to the moderate naturalists' goals. Alex Rosenberg (1996: 4) suggested that "[i]f naturalism is to replace *a priori* first philosophy with scientific theory, then at least for the present the theory in question will be Darwin's." Millikan's work (1984, 1993) has focused on explicating a naturalistically acceptable notion of biological function and applying it to problems in the philosophy of mind and language. Dretske (1988), David Papineau (1993), Karen Neander (1995), and Daniel Dennett (1995), among others, have followed her lead.

See also: Representation in Language and Mind.

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Nauru: Language Situation

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The world's smallest independent republic, Nauru is a single island, an uplifted coral reef with a total land area of 21 square kilometers, located just south of the equator in Micronesia, northeast of New Guinea in the central-western Pacific.

Nauru was initially settled over 2000 years ago by Austronesian speakers. It remained isolated from Western influence until the arrival of whalers during the 19th century. Annexed by Germany in 1888, Nauru was taken over by Australia in 1914 and administered as a trusteeship until independence in 1968. Phosphate was discovered there in 1896, and throughout the 20th century, Nauru was extensively mined, leaving the island's large central plateau as barren as a lunar landscape. The current population of Nauru predominantly lives on the narrow coastal perimeter.

The country is home to one indigenous language, Nauruan (*Ekakairũ Naoero*). Nauruan belongs to the Micronesian branch of Oceanic within the Austronesian language family. Nauruan on its own forms a first-order subgroup of Micronesian, as a sister of the Nuclear Micronesian grouping comprising all the remaining members of the Micronesian branch (including Kiribati, Marshallese, Kosrean, etc). This suggests that Nauruan split away from Proto-Micronesian very early, probably representing the first wave of migration away from the Proto-Micronesian homeland, which may have been Kosrae or Kiribati. At the time of European contact, several distinct dialects of Nauruan were spoken, but these distinctions have now effectively disappeared.

Despite its status as the sole indigenous language, Nauruan is the first language of only about 50% of the country's population of approximately 13 000 inhabitants. The remaining population, largely workers associated with the phosphate mines, includes a sizeable Kiribati-speaking community of about 1700 and smaller language communities of other Pacific Islanders, including Fijians, Marshallese, Kosreans, and Tuvaluans. These communities total close to 1000 individuals, some of whom speak Nauruan as a second language. In addition, Nauru is home to about 600 non-Nauruan native English speakers and about 600 Chinese speakers of Cantonese, many of whom apparently also speak Chinese Pidgin English.

Government policy is to support Nauruan, and a language board has been established. The board is currently preparing a dictionary using two orthographies, pending a decision about which to use. However, although Nauruan has semiofficial status as the national language, a policy of bilingualism with English exists. Both English and Nauruan are official languages, and English predominates in official government business and in commerce. Education is bilingual in Nauruan and English. Almost all native Nauruan speakers are bilingual in English, and children are reportedly no longer learning Nauruan as their first language. The language's future is far from secure.

See also: Austronesian Languages: Overview; Language Education Policies in the Pacific; Malayo-Polynesian Languages.

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Navajo

H Landar

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Navajo is an Athapaskan (Apachean) language, with perhaps 200 000 speakers in Arizona, New Mexico, and Utah. Vowels /i e o a/ are single, clustered, nasalized (ą), and of low or high pitch. Syllables have strong, medium, or ordinary stress. Junctures are rising, falling, and sustained. Voiceless stops are labial, apical, and velar /p t k/ written *b*, *d*, *g*; labial and palatal sonorants are /w y/; voiceless nonlabial stops /t k/ and affricate clusters with /t/ have aspirated counterparts, e.g., /th kh/ written *t*, *k*, /tsh tšh/ written *c*, *č*. Aspirated segments are allophones of /h/; checked segments, of /ʔ/. Thus /tšʔ/ is the componential reduction of *č*. Voiceless nonfaucal fricatives have voiced homorganic counterparts, apical /s z/, palatal /š ž/, velar /x ɣ/, lateral /ł l/. Nasals are /m n/. Navajo

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lacks a Proto–Athapaskan series of labialized consonants and contrast of front and back velar consonants.

Navajo is a SOV language. Word classes are nouns, postpositions (adjuncts), verbs, and particles. Their functions define syntactic classes, nominals, adjunctives, verbals, and relationals. Pronominal prefixes of nouns and postpositions are similar in form but not in meaning; those of nouns are possessive, whereas those of postpositions translate as datives and accusatives, with adverbial stems. Compare *ší* 'I' (independent subject pronoun), *ši-má* 'my mother' (noun), *ši-tšʔɩ̨ʔ* 'me-towards' (postposition); *ni* 'you (SG),' *ni-lɩ̨ʔ* 'your horse(s),' *nitšʔɩ̨ʔ* 'toward you'; *bí* 'he (she, it, they),' *b-ádí* 'his older sister(s),' *b-aa* 'to him.'

Verb prefixes take 10 positions before a stem: adverbial, iterative, plural, objective, deictic, aspectual, modal, perfective, subjective, and classifier. Stem shapes vary for modes (imperfective, perfective, optative, and others) and aspects (momentaneous, continuative, and others); some stems, however, are invariable. Neuter verbs are intransitive; active verbs include agent and patient; third persons and other prefixes may have a zero (∅) form. Thus *ní-ʔaah* 'you (SG) move it (as a compact or round object)'; cf. *š-aa ní-ʔaah* 'give it to me'; that is, 'to me you move it as a compact object.' The stem *-ʔaah* belongs to a classificatory gender system for movement or handling of various objects (e.g., a container with contents, a living being, a flat flexible object, a thin rigid object, a ropelike object, and others). Navajo shares verbal patterns with other Athapaskan languages but has lost a rich Proto–Athapaskan system of prefixation and suffixation for aspect and mode.

Sentences are transformed principally by rules for moving words or inserting enclitics (a subclass of particles). The enclitic *íš* 'is it?' makes one type of question: *ʔaškii* ('boy') *ʔatʔééd* ('girl') *yiztsǫs* ('he kissed her') *íš* ('is it?'), 'did the boy kiss the girl?' Negatives are generated commonly by *doo … da*: *doo yiztsǫs da* 'he did not kiss her.' The prefix *yi-* alternates with *bi-* to indicate the third person object when the subject is a third person (∅ in position (i)). *Yi-* and *bi-* involve a hierarchy of animacy for some speakers; they may preserve the Proto–Athapaskan–Eyak semitransitive category identified by Krauss (1965). Often *yi-* shows that an action is controlled or semitransitive while *bi-* shows full transitivity on a foregrounded object. Thus object advancement from *ʔaškii ʔatʔééd yiztsǫs* 'the boy kissed the girl' to *ʔatʔééd ʔaškii biztsǫs* 'the girl was kissed by the boy' foregrounds NP_2 and cancels semitransitivity.

See also: Na-Dene Languages; United States of America: Language Situation.

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Navarro, Tomás (1884–1979)

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Tomás Navarro Tomás, born in La Roda (Albacete), was Spain's leading specialist in phonetics and dialect geography. His long and productive career was divided between Spain and, after the Spanish Civil War, Columbia University.

His first linguistics publications studied Old Aragonese verbal morphology. In 1911, Navarro Tomás was appointed by his teacher Ramón Menéndez Pidal to direct the Phonetics Laboratory attached to the newly created Centro de Estudios Históricos. Thereafter, the bulk of his efforts were devoted to a scholarly and scientific objective description of the facts of Spanish pronunciation. In the second decade of the 20th century, he published a series of detailed phonetic studies on Spanish pronunciation (all in the *Revista de Filología Española*), which paved the way for the first edition (1918) of his most successful and influential book, *Manual de pronunciación española*, a work that was revised, expanded, and oft-reprinted. Navarro Tomás was elected a member of the Royal Spanish Academy of the Language in 1935. His inaugural lecture *El acento castellano* (1935) led to further work on Spanish intonation (Navarro Tomás, 1946).

Though he continued to publish on Spanish phonetics and phonology (from a Praguean structuralist perspective), Navarro Tomás turned to dialect geography, viewed principally as the distribution of phonetic variation. He became Director of the *Atlas lingüístico de la Península Ibérica*. The fieldwork begun in 1931 was interrupted by the Spanish Civil War in 1936 and continued later in the 1940s and 1950s. In 1962, he published the first volume (with

lacks a Proto–Athapaskan series of labialized consonants and contrast of front and back velar consonants.

Navajo is a SOV language. Word classes are nouns, postpositions (adjuncts), verbs, and particles. Their functions define syntactic classes, nominals, adjunctives, verbals, and relationals. Pronominal prefixes of nouns and postpositions are similar in form but not in meaning; those of nouns are possessive, whereas those of postpositions translate as datives and accusatives, with adverbial stems. Compare *ší* 'I' (independent subject pronoun), *ši-má* 'my mother' (noun), *ši-tšʔɪ̨ʔ* 'me-towards' (postposition); *ni* 'you (SG),' *ni-lɪ̨ʔ* 'your horse(s),' *nitšʔɪ̨ʔ* 'toward you'; *bí* 'he (she, it, they),' *b-ádí* 'his older sister(s),' *b-aa* 'to him.'

Verb prefixes take 10 positions before a stem: adverbial, iterative, plural, objective, deictic, aspectual, modal, perfective, subjective, and classifier. Stem shapes vary for modes (imperfective, perfective, optative, and others) and aspects (momentaneous, continuative, and others); some stems, however, are invariable. Neuter verbs are intransitive; active verbs include agent and patient; third persons and other prefixes may have a zero (∅) form. Thus *ní-ʔaah* 'you (SG) move it (as a compact or round object)'; cf. *š-aa ní-ʔaah* 'give it to me'; that is, 'to me you move it as a compact object.' The stem *-ʔaah* belongs to a classificatory gender system for movement or handling of various objects (e.g., a container with contents, a living being, a flat flexible object, a thin rigid object, a ropelike object, and others). Navajo shares verbal patterns with other Athapaskan languages but has lost a rich Proto–Athapaskan system of prefixation and suffixation for aspect and mode.

Sentences are transformed principally by rules for moving words or inserting enclitics (a subclass of particles). The enclitic *íš* 'is it?' makes one type of question: *ʔaškii* ('boy') *ʔatʔééd* ('girl') *yiztsǫs* ('he kissed her') *íš* ('is it?'), 'did the boy kiss the girl?' Negatives are generated commonly by *doo … da*: *doo yiztsǫs da* 'he did not kiss her.' The prefix *yi-* alternates with *bi-* to indicate the third person object when the subject is a third person (∅ in position (i)). *Yi-* and *bi-* involve a hierarchy of animacy for some speakers; they may preserve the Proto–Athapaskan–Eyak semitransitive category identified by Krauss (1965). Often *yi-* shows that an action is controlled or semitransitive while *bi-* shows full transitivity on a foregrounded object. Thus object advancement from *ʔaškii ʔatʔééd yiztsǫs* 'the boy kissed the girl' to *ʔatʔééd ʔaškii biztsǫs* 'the girl was kissed by the boy' foregrounds NP_2 and cancels semitransitivity.

See also: Na-Dene Languages; United States of America: Language Situation.

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Tomás Navarro Tomás, born in La Roda (Albacete), was Spain's leading specialist in phonetics and dialect geography. His long and productive career was divided between Spain and, after the Spanish Civil War, Columbia University.

His first linguistics publications studied Old Aragonese verbal morphology. In 1911, Navarro Tomás was appointed by his teacher Ramón Menéndez Pidal to direct the Phonetics Laboratory attached to the newly created Centro de Estudios Históricos. Thereafter, the bulk of his efforts were devoted to a scholarly and scientific objective description of the facts of Spanish pronunciation. In the second decade of the 20th century, he published a series of detailed phonetic studies on Spanish pronunciation (all in the *Revista de Filología Española*), which paved the way for the first edition (1918) of his most successful and influential book, *Manual de pronunciación española*, a work that was revised, expanded, and oft-reprinted. Navarro Tomás was elected a member of the Royal Spanish Academy of the Language in 1935. His inaugural lecture *El acento castellano* (1935) led to further work on Spanish intonation (Navarro Tomás, 1946).

Though he continued to publish on Spanish phonetics and phonology (from a Praguean structuralist perspective), Navarro Tomás turned to dialect geography, viewed principally as the distribution of phonetic variation. He became Director of the *Atlas lingüístico de la Península Ibérica*. The fieldwork begun in 1931 was interrupted by the Spanish Civil War in 1936 and continued later in the 1940s and 1950s. In 1962, he published the first volume (with

80 maps) of the *Atlas lingüístico de la Península Ibérica*. The remaining materials remained unpublished and have only recently been made available on the Internet (see Heap, 2002). The various essays in which he offered the linguistic interpretation of selected maps were gathered together in Navarro Tomás (1975). Navarro Tomás also made valuable contributions to Latin American dialect geography (Navarro Tomás, 1943, 1948).

A bibliography of his writings appears in Diputación de Albacete (1988: 151–166). Appreciations of his life and work can be found in Lapesa (1979), Zamora Vicente (1979), Malkiel (1981), and Diputación de Albacete (1988).

See also: Dialect Atlases; Menéndez Pidal, Ramón (1869–1968); Spanish.

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Antonio Martínez de Cala y Xavara, known under his pseudonym Elio Antonio de Lebrija, was born in Lebrija (Spain) in 1444 and died in Alcalá de Henares on July 2, 1522. His name has several orthographic variations: apart from Antonio de Lebrija, in the *Introductiones Latinae* of 1501 it is spelled as Antonius Nebrissen, and in the *Introductiones Latinae* of 1481, Antonius Lebrixen. He was an important Spanish humanist and the author of the first grammar of a Romance language.

The great humanist was born in ancient Nebrissa, which is called Lebrija nowadays, in the province of Sevilla and not far away from the province of Cádiz. His father was Juan Martínez de Cala and his mother, Catalina de Xarana y Ojo. He was the second of five children. The young Nebrija studied philosophy and mathematics in Salamanca. At the age of 19, he left for Italy in order to continue his studies in theology, jurisprudence, and classical languages for 10 years at the Collegio di San Clemente of Bologna as well as in Rome, Florence, Pisa, and Padua. When he returned to Spain, he worked for the archbishop Fonseca in Seville. After three years as a private tutor he held various chairs at the University of Salamanca (1476–1487), teaching mainly grammar and rhetoric. He resigned from the university and spent the following years in the house of his former student, the future cardinal and archbishop of Seville, Juan de Zúñiga. He wrote most of his works during this time. Then he contributed to the project of a polyglot Bible under the direction of Cisneros. In 1503 he gave up this collaboration for another chair at the University of Salamanca, this time teaching jurisprudence and theology. After having lost this post in 1509 and working as a chronicler of the court for a short time, he accepted the chair of rhetoric at Salamanca in the same year. In 1513 he left Salamanca for good and withdrew to Alcalá de Henares. He was appointed to the chair of rhetoric of the Universidad Complutense de Alcalá de Henares, which he was to hold until his death, and the cardinal Cisneros commissioned him to work on the Biblia Poliglota Complutense.

Nebrija wrote on various domains of cosmography, botanics, and theology. He is known for his efforts to

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Encouraged by the success of the book, he published his famous *Gramática castellana* in 1492. It was the first grammar written in Europe on a vernacular language, and it is subdivided traditionally into orthography, prosody, etymology, and syntax. He wrote it for ideological reasons: the language must follow the political improvement of a people, which he proved by examples from antiquity and tried to apply to the condition of the Spanish after the victory over the Moorish inhabitants of the south of Spain. But the main reason for writing his grammar was the teaching of Latin: children should first be taught the grammar of their mother tongue before they learn Latin. Nebrija dedicated his grammar to the Catholic Queen Isabel I, claiming that Spain reached its political unity and was about to conquer the world. In this situation language and political power had to be closely linked. By codifying the Spanish language Nebrija wanted to raise it to the ranks of classical languages and protect it from further changes. Nebrija's grammar is evidence of linguistic consciousness in Spain at the beginning of the Siglo de Oro, and it is the first systematic exposition of the Spanish language. In 1517 he published the rules of Spanish orthography (*Reglas de ortografía española*). Nebrija asserted the need for a one-to-one relationship between pronunciation and spelling.

Nebrija is also the author of a Latin–Spanish *Lexicon* (1492) and a Spanish–Latin *Vocabulario* (1495). These dictionaries were as successful as the *Introductiones Latinae* and were republished many times. The Spanish grammar, however, was not a success and was not published again until the 18th century.

See also: Latin; Renaissance Linguistics: Spanish Tradition; Vernaculars: European Earliest Studies; Western Linguistic Thought Before 1800.

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Negation

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Negation in natural languages is very different from and much more complicated than negation in logic or mathematics. In many languages, for instance, it is not true that two negations correspond to a positive value according to the well-known formula $\neg\neg P = P$. Even in Latin, in which *non nullus* (lit. 'not nobody') means – according to classical texts – 'somebody,' we may find two negative terms preserving a negative value. Compare, for example, *iura te non nociturum esse homini … nemini* (Plautus) 'swear that you will not harm anybody' with Cockney and substandard English *I don't see nothin' nowhere* (for a not perfect correspondence between logical and linguistic negation, see later section, 'Negation and Presuppositions').

Consider first a declarative negation that refers to a real state of affairs. This declarative negation has to be distinguished from a prohibitive (e.g., *Do not*

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Consider first a declarative negation that refers to a real state of affairs. This declarative negation has to be distinguished from a prohibitive (e.g., *Do not*

lean out), which does not refer to a real state of affairs and, on the contrary, is used in order to prevent the realization of a state of affairs (see later section, 'Prohibitive NEG'). The linguistic operation of negation (NEG) consists in denying the truth value of the negated sentence, or of a part of the sentence. By applying a NEG operator (π_{NEG}) to sentences such as those in Examples (1a) and (1b),

(1a) John likes to work.
(1b) John likes beer at lunch.

we get

(1a′) John does not like to work.
[it is not true that [John likes to work]]
(1b′) John does not like beer at lunch.
[John does like beer, [$\pi_{\text{NEG ADV SATELLITE}}$ at lunch]]

Negative sentences are most frequently used to correct states of affairs assumed by the speaker to be either shared knowledge or to represent the commonest ones to be expected in the contextual situation. *The post hasn't been delivered this morning* is a felicitous message only under the assumption, shared by speaker and hearer, that the post has to be delivered every day. This is the reason why negative sentences are normally not used to introduce new propositions or new referents. The sentence *A train didn't arrive yesterday*, extrapolated from a situational context that makes a sense possible, is deemed to be rather odd; not so its affirmative counterpart, *A train arrived yesterday*. Consider also *When didn't a/the train arrive?*: it does not make sense to ask when an event did not happen.

The content resulting from a negated sentence can be either negative or positive: *I know* → *I do not know*, and *I ignore* → *I do not ignore*. There are no known languages that do not possess a means for negating the truth value of a positive sentence. NEG is a linguistic universal: for cognitive and pragmatic reasons, every language must have the possibility of asserting that the state of affairs expressed by a sentence is not true.

The 'Scope' of the NEG. Sentence vs. Phrase Negation

By adducing Examples (1a) and (1b), the notion of 'scope' has already been introduced implicitly. The widest scope of NEG (i.e., its sphere or domain of operation) is the sentence (S), but NEG may apply also to sentence subunits, that is to syntagms (noun phrases (NP), adverbs (ADV), prepositional phrases) or even to lexemes:

(2) $_{\text{S[NP}}$[Many arrows] hit the target] →
$_{\text{S[}\pi\text{NEG NP}}$[Not many arrows] hit the target]

(3) $_{\text{S}}$[Many stars are $_{\text{PRED}}$[visible]] → $_{\text{S}}$[Many stars are $_{\text{[}\pi\text{NEG NP PRED}}$[invisible]]

(4) $_{\text{S[ADV}}$[Consciously,] Mary smiled] →
$_{\text{S[}\pi\text{NEG ADV}}$[Unconsciously,] Mary smiled]

Examples (2)–(4) are affirmative sentences (a negative counterpart of Example (2) would be *Many arrows didn't hit the target*).

It may be concluded that the phrase/lexeme negation operates by applying a π_{NEG} to the phrase/lexeme to be negated, i.e., by negating the truth condition or the existence of that phrase/lexeme. However, in Example (5),

(5) Mary doesn't drive dangerously/like a stunt car driver.

NEG has in its scope just the modal and the sentence makes sense only if the presupposition is that Mary is capable of driving. Only when NEG applies to S and its predicative (PRED) nexus do we get a negative sentence. Consider the English sentence in Example (6):

(6) You may not read the newspaper today.

This has two different intonations (suprasegmental traits), which correspond to two different readings: *You are not allowed to read the newspaper today* and *You have the option of not reading the newspaper today*. Only by the first reading do we have a negative sentence, and, in fact, the scope of NEG includes in this case the entire predication. This is not the case with the second reading. Now, this is precisely the reason why negative quantifiers (the so-called negative pronouns) make a sentence negative. Consider Example (7a):

(7a) Nobody knows my sorrow.

In other words, *There is no x such that x knows my sorrow* – the entire predication lies in the scope of 'nobody.' Note that this holds true also for negative quantifiers in object position:

(7b) John had nothing, he knew nobody.

Not every language possesses this kind of quantifier. Compare Example (8a), Danish,

(8a) Har du set noget? – Nej, jeg
Have you seen something? No I
–
har ikke set noget.
have not seen something.
'Have you seen anything? – No, nothing.'

with Example (8b):

(8b) Har du ikke set noget? – Jo,
Have you not seen something – Yes
jeg har set noget.
I have seen something.
'Haven't you seen anything? – Yes, I have seen something.'

The opposition between 'nothing' and 'something/anything' is realized syntactically in the context and not lexically, and *noget* acquires a negative meaning if it is in the scope of NEG (*ikke*), as in the answer of Example (8a) and in the question of Example(8b).

Negation and Presuppositions

Commenting on Example (5), reference has been made to the presuppositions that make a sentence felicitous or not (in Grice's sense). As may be argued from the 'tag question' *didn't they?* at the end of Example (9)

(9) They almost sold it, didn't they?

the sentence is felt to be positive, even though the proposition it asserts entails the negative state of affairs that they did not sell it (see Taglicht, 1984: 108). Conversely, Example (5) does not imply that Mary does not drive, but, quite on the contrary, that she drives (cf. also Example (1b)). What determines the negative effect of π_{NEG} and its applications are the pragmatic presuppositions at the discourse and situation level.

Typology of Negation

The means for realizing π_{NEG} show a large cross-linguistic variety, as may easily be seen by comparing the simple declarative negative English sentence in Example (10a) with its translations in various languages (Examples (10b)–(10k)):

(10a) John doesn't eat fish.
(10b) French: Jean ne mange pas de poisson.
J. NEG eats NEG PART fish
(vs. Jean mange du$_{PART+ART}$ poisson)
(10c) German: Hans ißt keinen Fisch.
J. eats no:ADJ fish
(vs. Hans ißt Fisch 'J. eats fish')
(10d) Finnish: Jukka ei syö kalaa.
J. NEG-3SG eat fish
(vs. Jukka syö kalaa 'J. eats fish')
(10e) Turkish: John balık ye-mi-yor.
J. fish eat-NEG-PRES(3SG)
(vs. John balık yiyor 'J. fish eats')
(10f) Japanese: John wa sakana wo tabenai.
J. TPC fish OBJ eat-NEG 5
(vs. John wa sakana wo taberu 'J. eats fish')
(10g) Welsh: Nid yw John yn bwyta pysgod.
NEG is J. in eat fish
(vs. Y mae John yn bwyta pysgod
DECL is J. in eat fish)
(10h) Russian: Ivan ne est rybu.
J. NEG eats fish
(vs. Ivan est rybu 'J. eats fish')
(10k) Guarani Juán nd-o'u-i pira.
(Tupi family): J. NEG-eats-NEG fish

Notice that in English there exists a special auxiliary verb to form negative sentences, the semantically main verb remaining uninflected. French and Guarani have the so-called discontinuous NEG around the verb (*ne . . . pas*); French shows also a morphosyntactic alternation between *de* and *du* depending on whether the sentence is negative or positive. In German, the NEG may be expressed by an adjectival inflected form; in Finnish, there is an inflected NEG verb whereas the lexical verb remains uninflected. Turkish agglutinates a NEG mark *-ma-/-me-* to the verbal accented stem, before other stem determinations (e.g.,*-me + yor > -miyor*). The Japanese NEG is a verbal negative form *-nai* suffixed to the indefinite verbal base; Welsh has a particle (*nid*) introducing NEG sentences parallel to the particles for declaratives (*y*) and interrogatives (*a*, as in *a mae John yn bwyta pysgod?*) so that we can say that NEG is a modality of the sentence. Among the eight languages under scrutiny, Finnish is, from the typological viewpoint, the nearest to English.

The phenomena emphasized here by no means exhaust the phenomenology of NEG sentences. Éwé (Kuwaa, Niger-Congo family) expresses NEG via a verbal prefix plus a strictly sentence-final clitic:

(11) Kofi yi vs. Kofi mé-yi o
K. went K. did not go

Dravidian languages have the possibility of a negative conjugation for every active, passive, 'neutral,' or even causative verb (recall the Welsh examples). In Tamil, the NEG mark is *-ā-*; but this *-ā-* agglutinating with the desinential vowel may disappear. The negative verb is therefore characterized by the absence of a specific mark (one of the not very common examples of unmarked forms for semantically and functionally marked meanings): *kāṇ-p-ēṇ* 'I shall see,' *kāṇ-ṭ-ēṇ* 'I saw,' but simply *kāṇ-ēṇ* 'I do not/I shall not/I did not see.' However, NEG forms usually contain one or more marks, in comparison with the corresponding positive sentence (cf., for instance, Examples (10c) and (10d)). In fact, from a philosophical point of view, it has been said (Henri Bergson) that, whereas the positive sentence has to be considered as a judgment, the negative is more complex, being a judgment on a judgment (see Example (1): [[it is not true

that]. . .]). Basically, the main strategies for sentence negation are as follows:

1. Morphological – a NEG mark (e.g., Examples (10g) and (10h)) that can be integrated in the verb (e.g., Examples (10e) and (10f)).
2. Morphosyntactic – NEG is expressed by a particular verbal cluster, with a negative auxiliary expressing tense aspect mood and person (e.g., Examples (10a) and (10d)); however, the verb categories may be distributed between the negative auxiliary and the main verb, as is the case for some Uralic languages. Purely syntactic strategies, such as specific word-order rules as in Kuwaa, are rather exceptional.
3. Lexical – as in Example (10c); special lexemes, different from the corresponding affirmative existential verb, can occur for the negative copula 'there is not, there does not exist' as in Turkish *yok* vs. *var*.

Considering the lexical strategy, compare Examples (12a) and (12b):

(12a) Ekmek yok.
bread there-is-not
'There is no bread.'

(12b) Ekmek var.
bread there-is
'There is bread.'

Östen Dahl published in 1979 a large study on the expression of NEG in around 240 languages; the study showed that NEG is most frequently expressed by either bound morphemes as part of the predicate or by separate particles. NEG auxiliaries make up only 16.7% of Dahl's sample, whereas the use of dummy auxiliaries, as in English, is quite rare. Dahl's (1979) results on the expression of NEG were as follows (the total is greater than 100% because a number of languages have more than one type of NEG):

1. Morphologically as part of the predicate, 45.0%.
2. Morphologically in an auxiliary verb, 16.7%.
3. By a separate negative particle (44.9%):
   a. In preverbal position, 12.5%.
   b. In pre-auxiliary position, 20.8%.
   c. Before verbal group, 2.1%.
   d. In postverbal position, 1.2%.
   e. In post-auxiliary position, 3.7%.
   f. In sentence-initial position, 0.4%.
   g. In sentence-final position, 4.2%.

Diachronic Evolution of NEG Markers

In several linguistic traditions, a trend can be observed that moves toward the use of an invariant NEG particle (preferably in preverbal position; see later). This is actually the most natural NEG strategy and comes nearest to the transparency ('diagrammatic') principle of optimization, i.e., 'one meaning: one form.' Thus Estonian does not inflect the NEG verb *ei* (3SG), which in this way approaches the uninflected particle construction type, drifting away from the auxiliary construction of the Finno-Ugric languages – that is, shifting from a morphological to a syntactic strategy (*John ei söö kala* 'John does not eat fish' but also with a subject in plural, *John ja Mary ei kohtunud koolis* 'John and Mary did not meet at school'; similarly, English *ain't* 'I'm not' has become a generalized NEG form).

A very interesting case is represented by the French-based creoles:

(13a) Louisiana: Mo kup pa and mo pa
me cut NEG me NEG
kup.
cut:
'I don't cut.'

(13b) Mauritius: Mo mõte pa pe travaj.
my watch NEG PROGR work
'My watch isn't working.'

(13c) Guyanese: Mo pa ka dromi.
me NEG FUT sleep
'I shan't sleep.'

There is a clear tendency to place the NEG marker (<French *pas*, postposed to the inflected verbal form: see Example (10b)) before the verb and also before tense and aspect markers (*pe*, *ka*). Exactly the same trend has been observed for Maghreb Arabic dialects, where the discontinuous NEG *ma* + verb + *-š* tends to be replaced by a simple preverbal NEG. It may be inferred from this evolution that Jespersen was right in stating (1917: 5) that there is "a natural tendency, also for the sake of clearness, to place the negative first, or at any rate as soon as possible, very often immediately before the particular word to be negatived (generally the verb)" – in other words, to construct negative sentences with the verb (i.e., the core of the predication) in the 'scope' of NEG. Danish, Norwegian, and Swedish are on the way to reintroducing preverbal NEG, and English-speaking children may produce, during their learning period, sentences with preverbal NEG (e.g., *No wipe fingers*), though their mother language has NEG after the inflected verbal form (*I do not wipe my fingers*). The same has been noticed also for Japanese adults learning English: though Japanese has NEG suffixed to the verb at the sentence end, as in Example (10f), in the first stages of their English instruction, Japanese learners formed in the first stages of their learning process sentences such as *I no want many children*,

I no like English, and also *He don't like it*, whereby *don't* is clearly perceived as a negation particle, simply a variant of no (similar to the usage of *ain't*). Also, from a diachronic point of view, postverbal NEG usually seems to imply preverbal NEG, via discontinuous NEG. French *pas* derives from Latin *passu*(*m*) 'step.' Together with other Romance NEG particles, such as French *goutte* 'drop,' Italian *mica* 'crumb,' Catalan *cap* (<Latin *capu*(*t*)) 'head,' Sursilvan Romantsch *buc*(*a*) (< Latin *bucca* 'cheek'), etc., *pas* represents a clear instance of a lexeme having developed to NEG marker (first in postverbal position). The original meaning of *pas* (and that of *goutte*, *cap*, etc.) was not at all negative – rather, it was the 'measure' object of the verb occurring in postverbal position, as expected in an subject-verb-object (SVO) languages, such as Late (Vulgar) Latin: *non vado passum* 'I do not proceed a step'(> French [*je*] *ne vais pas*), *non bibo guttam* 'I do not drink a drop' (> French [*je*] *ne bois goutte*). We find the same evolution in the already mentioned Arabic discontinuous NEG: *ma-katabuu-š* (Cairo Arabic) 'they did not write,' wherein the second NEG form derives from the indefinite accusative *šay ʔ*(*an*) 'thing' – thus 'not + verb + a thing.'

By occurring mostly in sentences with negative meaning, *pas*, *goutte*, *šay ʔ*(*an*), etc. assumed negative value *per se* and became negative polarity items (NPIs), no longer bound to a semantically congruent verb. Generalization of *pas* as NEG particle gives *je ne vois pas*. NPIs can thus occur only in negative contexts. But discontinuous constructs such as *ne* ... *pas* are marked constructions and tend to be avoided: only 17% of the languages (usually of the SVO type) have this kind of NEG. Actually, the preverbal, weakly articulated part of the French negative construct (i.e. [n]) is redundant: *je ne vais pas* > colloquial *je vais pas*. The NPI may also be emphatically reinforced (*pas* > *pas du tout, literally 'not at all') and become in turn redundant (pas du tout* > *du tout), as in Example (14):*

(14) Croyez-vous que je vous blâme? Du tout.
'Do you believe that I blame you? No, I don't.'

Schematically, the so-called 'NEG cycle' may be represented as follows (see Schwegler, 1988):

(15) ne + verb > ne + verb + pas > verb + pas (> pas du tout > du tout)

The same holds true also for English and German, in which *not* and *nicht* derive from *naught*, *nought* < Old English *na-wiht* and, respectively, Old High German *niowiht*, literally 'no-whit, no-thing':

(16) English: ne + verb > ne + verb + not > verb + not

Syntax of Negation: NEG Quantifiers

There is an important topic to be dealt with, partly related to what has been said so far about the NPIs, namely, the so-called permeable and impermeable negation, which is relevant to the syntax of NEG. The term 'permeable/impermeable negation' was suggested by Tesnière (1966: 235f.). There are languages that repeat the negation on every element of the sentence that can be negated: In Russian we find

(17a) Nikto ni s kem ni
Nobody NEG with anybody NEG
o čëm ne govoril.
about anything NEG spoke
'Nobody spoke with anybody about anything.'

or

(17b) Nikto nigde nikogda ètogo ne skazal.
Nobody nowhere never this NEG said

On the other hand, in (Standard) Latin we find

(18a) Nemo hoc unquam dixit.
Nobody this ever said

or

(18b) Numquam hoc ullus dixit.
Never this anybody said

with just one negated element. NEG is not 'permeable.' The same holds for English (recall the counterexample from substandard English, *I don't see nothin' nowhere*):

(18c) Nobody ever said this.

or

(18d) Never did anybody say this.

Between the two poles of highest permeability (as in the Russian examples) and highest impermeability (as in the Latin and English examples) there are intermediate stages along a 'continuum':

(19a) French: Pas une fois il n'a adressé la parole à personne.
NEG a time he NEG has spoken to nobody
'He has never spoken to anybody.'

vs.

(19b) Italian: Mai una volta ha rivolto la parola ad alcuno/nessuno.
Never a time has spoken to somebody/nobody
'(S)he has never spoken to anybody.'

and not

	PERS.ANIM.PRON. &	NTR.PRON. >	TEMP. >	LOC. >	OTHER ADVs
Russian:	*nikto*	*nicto, ničego*	*nikogda*	*nigde*	*nikak*
English:	*nobody*	*nothing*	*never*	*nowhere*	*(no way)*
Modern Greek:	*kaneịs*	*tịpote*	*poté*	*pouthenà*	
Spanish:	*ninguno*	*nada*	*nunca*		
Welsh:	*neb*	*dim (byd)*			

Figure 1 Hierarchy of negative quantifiers: personal animate pronouns and neuter pronouns > temporal > locative > other adverbs.

(19c) *Mai una volta non ha rivolto. . .

Italian uses a NEG (or two) less than French does.

Returning to Examples (18a) and (18b), *unquam* and *ullus* are quantifiers (an adverb and, respectively, a pronoun) that usually occur in the scope of NEG and become therefore NPIs. But NPIs, which do not (yet) have full negative value, must be preceded by a clear NEG mark, as shown for French in Example (20a):

(20a) Jean n'a pas dormi de la nuit.
'John hasn't slept all the night long.'

Here, *de la nuit* is on the way to acquiring negative value. However, it is not (yet) possible to say

(20b) *Jean a dormi de la nuit.

without a clear NEG mark before the NPI (and the verb). On the contrary, it is possible to say

(21) Je n'imagine pas que Jean ait dormi de la nuit.
'I do not imagine that J. has ever slept during the night.'

since the NPI appears in a sentence that is subordinated to a negative main sentence. The general rule for these quantifiers is therefore that in negative sentences an element clearly showing negative value must have in its scope (i.e., must precede) the NPIs and the verb. Compare two Italian sentences, both meaning 'Nobody/no people came':

(22a) Nessuno venne.
(22b) Non venne nessuno.

If an NPI comes first in a sentence, then it means that its negative value has already fully developed, and no other NEG is strictly required before verb. It has already been stated that there may also be languages that do not have a lexeme for negative quantifiers, as in the Hindi sentence in Example (23), which has the same meaning as the Italian sentences in Examples (22a) and (22b) (see also Examples (8a) and (8b)):

(23) Koî nahî âya thâ.
somebody NEG come was

Note that NEG precedes the verb and gives a negative meaning to the sentence.

Four main types may be distinguished for quantifiers in negative sentences: (1) existential quantifier + NEG, as in Hindi (Example (23)); (2) 'neutral' (not negative) quantifier + NEG, as in English *John did not see anybody*; (3) NEG + negative quantifier, as in Italian *Giovanni non vide nessuno* (same meaning as the previous English sentence); and (4) negative quantifier without NEG, as in German *Hans hat niemanden gesehen* (same meaning). Otherwise, languages may appeal to nonexistential constructions; e.g., in Modern Standard Arabic:

(24) Fī bilādi-nā laysa dayfan.
in town 1PL NEG:EXIST visitor
'Nobody is a stranger in our town.'

Cross-linguistic comparison hints at the hierarchy of negative quantifiers, shown in **Figure 1**, when they exist (the preceding quantifier types 3 and 4). Moreover, inherently negative quantifiers may be restricted to some position. The Australian language Tiwi has *kar ∂kuwani* 'no-one' and *karθkamini* 'nothing,' which are restricted to subject position (see Payne, 1985: 238).

Another phenomenon of the syntax of negation that deserves to be dealt with and can be explained in terms of discourse pragmatics is the so-called NEG-raising:

(25a) John wants the secretaries not to leave early.
(25b) John does not want the secretaries to leave early.

These sentences are not completely synonymous. There is indeed a semantic-pragmatic difference. Example (25b) indicates a lesser degree of control on the part of John over the state of affairs, whereas Example (25a) states as a matter of fact what John's firm will is. Moreover, the so-called raising of NEG we may observe in Example (25b) is not possible with every verb. There are semantic constraints: only verbs that admit the possibility of being controlled by the 'subject' (first actant), such as *think* or *want*, may let NEG 'leak' into the main sentence. This is not possible with a verb such as *fear*, although it and *think* belong to the same class of opinion verbs: the sentence

(26a) I fear that he will not arrive tomorrow.

has a completely different meaning than

(26b) I do not fear that he will arrive tomorrow.

Now, a transformation rule (here 'move NEG') governed by semantic criteria is not easily accepted in the generative theory. Moreover, since there is no hint of any trace whatsoever left by the NEG in its original position before the movement, we cannot decide whether NEG has been 'raised' to the main sentence in Example (25b) or 'lowered' to the subordinate clause in Example (25a). There seems to be no use in adopting the generative point of view. The position of NEG is determined by the speaker's intentions of focusing this or that part of the message (note the different message organizations of Examples (28a) and (28b)).

Pragmatics of Negation

As may be argued from the historical evolution sketched in the previous section, pragmatics plays an important role in NEG strategies, especially because of the wish to reinforce the negative value of the utterance. NPIs such as *pas*, *goutte*, etc. are emphasizing expressions that originally served to underline the negative meaning of the sentence and then became grammaticalized as NEG markers. An example in English is the statement and response *I heard what you said – The deuce you did!* ('You didn't at all') (Jespersen, 1917: 33). If the 'natural' position of NEG is the preverbal one, so that the verb lies in the scope of NEG, why is it that there are languages, including German, Brazilian Portuguese, some Italian dialects, etc., that have postverbal NEG? The origin of German *nicht* and its postverbal position have already been discussed. In Brazilian Portuguese, or other Romance traditions, this is (equivalent to Examples (10a)–(10f))

(27a) O João (não) come peixe não.

Compare also the very similar Afrikaans construction

(27b) Jan eet nie vis nie.
J. eats NEG fish NEG

in which the first NEG comes after the verb, according to the Germanic pattern. The first *não* may be omitted. Postverbal *não* is, with few exceptions, sentence-final. However, in subordinate clauses, we do not find sentence-final NEG:

(28a) Eu imagino que você não tem dinheiro.
'I imagine that you not have money.'

and not

(28b) *Eu imagino que você tem dinheiro não.

Note also in

(28c) Eu não imagino que você tem dinheiro não.
'I do not imagine that you have money.'

that the subordinate clause is not negated and the final *não* represents the second NEG marker of the main verb, as in Example (27a). This is also exactly the case in Afrikaans:

(29) He het nie gesê, dat hy hierdie
he has NEG said that he this
boek geskrywe het nie.
book written has NEG
'He has not said that he has written this book.'

All this hints at an 'afterthought' strategy as the origin of the sentence-final NEG, a kind of comment after an intonational break that later disappeared when the final position became grammaticalized as regular. Compare for this kind of pragmatic discourse strategy substandard English *I'm not gonna say it, nah*, or French *J' vais pas le dire, non*.

The afterthought strategy may account for sentence-final NEG occurring also in SVO languages such as Portuguese. This is not the only possible explanation, however. It is clear that diachronically, there is a great difference between the *pas* or *not/nicht* cases (ancient postverbal 'measure objects') and that of Portuguese *não*. Synchronically, however, they belong to the same type of NEG. Many different sources may have contributed to the origin of postverbal (sentence-final) NEG. A large-scale analysis of all of the languages of the world that have sentence-final or postverbal NEG remains, however, to be done. In any case, it seems that word order does not play a decisive role in assigning to NEG its position in the sentence – contrary to what was thought in the first attempts at typologizing according to the word-order types (see Lehmann's (1978: 18) 'structural principle'). Rigid and consistent SOV languages should always have NEG after the verb, as is the case for Sinhalese (SOV):

(30a) Jōn ballavə̄ däkke nä:.
J. dog saw NEG
'John didn't see the dog.'

In rigid and consistent VSO languages, NEG should always come at the beginning of the sentence, as in Irish:

(30b) Ní fhaca Seán an madadh.
NEG saw John the dog
'John didn't see the dog.'

But this is not always the case. In Dahl's language sample, only Bengali and Tamil are in fact quoted as

having the order SOV + NEG, wherein NEG is an uninflected particle that seems to have developed out of auxiliary verbs (see Dahl (1979: 94) and Appendix A therein). This kind of historical development for syntactic negation has to be noticed as another possible diachronic explanation for sentence-final/postverbal NEG.

Prohibitive NEG

The difference between declarative and prohibitive NEG was indicated previously. Prohibitive is linked to imperative modality, which is often expressed by a different verbal form – namely, a nonreality form (imperative, subjunctive, optative, etc.). There are languages that make use of the same NEG marker for both, and languages that distinguish between them:

(31) You do not eat fish. [declarative]

as well as

(32) Do not eat fish, John! [imperative]

The distinction rests in this case on the opposition between indicative form with obligatory pronoun, and imperative form without pronoun. On the other hand, we find (with the same meaning as in Example (31) in Modern Greek the sentence

(33) (Su) dén trôs psári.
you NEG eat:2SG fish

versus the sentence

(34) Mēn pernâs, Giánnē.
NEG cross:2SG VOC
'Do not cross, John!'

Notice that in Modern Greek, indicative and subjunctive endings may not be distinguished: in this case, the opposition is based solely on the distinction *de*(*n*)/*mē*(*n*). Italian offers the reverse strategy: whereas NEG remains unchanged, the second-person singular imperative has a special form:

(35) Giovanni, non-attraversare.
J. NEG-cross:2SG.IMPERAT

versus

(36) Giovanni non attraversa.
J. NEG cross:3SG.INDIC
'John does not cross.'

Different verbal forms together with different NEG markers are found redundantly in Examples (37) and (38) (Ancient Greek) and Examples (39) and (40) (Latin):

(37) Mḗ, m' eréthize.
NEG me make.angry:2SG.IMPERAT
'Don't make me angry.'

(38) Ou m' erethízeis.
NEG me make.angry:2SG.INDIC
'You do not make me angry.'

(39) Ne cantes.
NEG sing:2SG.SUBJ
'Do not sing.'

(40) Non cantas.
NEG sing:2SG.INDIC
'You do not sing.'

In some cases, there may be just an intonation difference:

(41) Jean ne traverse pas.
'John is not crossing.'

versus

(42) Jean, ne traverse pas!
'John, do not cross!'

The cognitive-behavioral difference between declarative and prohibitive negation is basic, and every language has a means to express the functional opposition. In order to show the large variety that is possible, the following scale for marking prohibitive negation could be tentatively drawn (see Bernini and Ramat, 1992: 105):

Intonation only (Example (42)).
Morphosyntax (Examples (31) and (32)).
Different markings on NEG (Examples (33) and (34)).
Different markings on verb (Examples (35) and 36)).
Different marking on both NEG and verb (Examples (37)/(38) and (39)/(40)).
Different lexical choice (Examples (43) and (44)).

(43) Latin: Noli me tangere.
don't want:2SG.IMPER me touch
'Don't touch me.'

(44) Welsh: Peidiwch â siarad!
stop:2PL with talk(ing)
'Do not talk!'

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Negation: Philosophical Aspects

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Most people, if they think of negation at all, have in mind something fairly simple, namely classical (or Boolean) negation. Classical negation is an operator that works as a sort of toggle switch on propositions or predicates: When applied to a proposition with the semantic value 'True,' it returns a proposition with the semantic value 'False' and vice versa. When applied to a predicate true of some collection of individuals (of some type), it returns another predicate that is true of exactly those individuals (of that type) for which the original failed to hold. If one regards relations as predicates that apply to pairs (triples, quadruples, etc.), and considers pairs (etc.) as individuals of a higher type, one has a general-purpose notion of negation. Make the convenient assumption that every proposition has exactly one of the two truth values just mentioned, and that predicates have sharply defined domains of application and sharp boundaries within those domains, and nothing more needs to be said.

It is increasingly rare to find philosophers of logic who are happy with the idea that this is the whole story about negation. Most philosophical issues regarding negation are illuminated by considering some reasons for their dissatisfaction. However, first it is useful to consider the question of what properties an operator needs to have to count as a genuine negation. This is surely the fundamental philosophical question about negation, and it must be answered before one can adjudicate the justice of the most common complaint raised against various nonclassical negations – that they are not really negations at all.

To keep the discussion manageably brief, we gloss over some philosophical niceties. For instance, we shall move freely between negations of propositions and of predicates when it makes examples clearer, although some contend that these might not involve the same operator. We also mostly ignore the question of whether negation is an operation on sentences (and predicates) or on propositions (and properties), thereby pretending some issues are simpler than they really are. We use the symbol '¬' for the negation operator.

Possible Properties of Negation

Probably the strongest opinion most people would have about negation, is that for any sentence P, P and ¬P cannot both be true. If ¬P is really the negation of P, then it must be incompatible with P. However, one must remember the distinction between negations and mere contraries. For if P is '*x* is white,' then '*x* is black' is certainly incompatible with P – it is a contrary of P – but it is not ¬P. For, surely, if the *x* in question is orange, ¬P must come out true. However, '*x* is black' does not. One natural way to think about ¬P is as the weakest proposition that is incompatible with P. In our example, ¬P is a proposition implied by any proposition that rules out *x* being white, perhaps equivalent to '*x* is black or *x* is orange or *x* is yellow . . . ,' running through all the nonwhite colors. Thinking of negation in this way, and assuming that if A is incompatible with B then also B is incompatible with A (which not everyone grants, for reasons we will not pursue), is equivalent to assuming that negation obeys the following law: A implies ¬B if and only if B implies ¬A. (In this view, A implies ¬B exactly when A is incompatible with B. If this means also that B is incompatible with A, this happens exactly when B implies ¬A.) This is the characteristic law of so-called 'minimal negation,' and almost all candidate negations satisfy it.

Of course, the classical negation of P is not merely the weakest proposition contrary to P (although it is that) but also satisfies many additional laws. Most significantly, ¬P must be a complement of P; that is,

not only must (P and ¬P) be a logical falsehood but also (P or ¬P) must be a logical truth. That ¬P satisfies the latter condition for any P is called the law of excluded middle and is close enough kin to the principle of bivalence (for any P, P gets exactly one of two truth values, and so ¬P gets the other) that we can ignore the difference here. Other important principles that hold for classical negation include the four De Morgan laws: ¬(P and Q) implies (¬P or ¬Q) and vice versa, and ¬(P or Q) implies (¬P and ¬Q) and vice versa. The logical principle sometimes called 'explosion' is valid for classical negation: Everything follows from a contradiction (i.e., a pair P, ¬P). In the presence of explosion, the law of excluded middle is equivalent to the principle of double negation elimination: ¬¬P implies P, which therefore also holds for classical negation.

We can now efficiently describe the most discussed nonclassical negations. (The philosophical significance of these distinctions should become clear in later sections.) If a minimal negation also satisfies explosion, we have an 'intuitionistic negation.' On the other hand, if a minimal negation satisfies the four De Morgan laws, we have what is sometimes called 'Ockham negation.' This unfortunate name is needed because common usage has it that a 'De Morgan negation' is an Ockham negation for which also the principle of double negation elimination holds. An 'orthonegation' is both intuitionistic and De Morgan. Classical negation is orthonegation in a logical system in which 'and' distributes over 'or' and vice versa. Nonclassical orthonegations show up in nondistributive quantum logics. Distributivity guarantees that every proposition has at most one complement, but we will ignore the differences between classical and orthonegation here.

One sometimes sees discussion of 'subminimal negation.' It is characterized by the condition that the following principle of contraposition must hold: If A implies B, then ¬B implies ¬A. Every minimal negation satisfies this principle, but not conversely. Although most would accept that this is a necessary condition for an operator to count as a negation, it seems insufficient because there are operations in natural language that seem to be subminimal negations that are difficult to take seriously as negations. Skipping details, an example is the operation we might call 'few N': If '*x* is a fish' implies '*x* has gills,' then 'Few dogs have gills' implies 'Few dogs are fish,' and similarly for any similar example, but 'few N' looks even less like a negation than any mere contrary forming operator. Sometimes, especially in programming applications, one sees operations called 'negations' that are not even subminimal (e.g., some 'negation as failure' operators). We shall not consider these operations.

Negations, Consistency, and Paradoxes

We begin with some responses to the so-called 'semantic paradoxes,' especially the liar paradox. Consider (L):

(L): L is false.

(L) certainly looks to be true if and only if it is false. Nonclassical negations often appear in proposed solutions to such paradoxes; we briefly consider a simple example later. For now, we consider so-called 'dialetheism.' Dialetheists hold that some sentences P are both true and false (and so that both P and ¬P are true, if ¬P is true whenever P is false). Sentences such as (L) are their prime candidates for this status. In barest outline, they argue that a century of intense effort aimed at explaining what is going on with (L) while preserving consistency has led, at best, to solutions that are plausible only to those who formulate them. The mistake, they suggest, is in trying to preserve consistency.

One obvious objection to dialetheism is that if P and ¬P can both be true at the same time, the ¬ symbol is not functioning as a negation. In such a case, ¬P is not even a contrary of P, violating the most basic intuition about negation. One dialetheist response is that in many dialetheic logics, ¬(P and ¬P) is a necessary truth for all P, even those where P is both true and false. They suggest that this captures the truth behind the idea that negations are contraries. It is just a surprising development that (P and ¬P) is also true in some cases.

Dialetheist must defend a negation for which explosion is not valid, on pain of holding that all statements are true. Others defend nonexplosive logics, called 'paraconsistent' logics, for a variety of other reasons. For instance, correct reasoning from a set of beliefs seems to be quite constrained, despite the fact that most sets of beliefs are inconsistent. However, if explosion were valid, correct reasoning from an invalid set would presumably be completely unconstrained. Paraconsistent systems often have De Morgan negations. Philosophical debates about the acceptability of such logical systems often turn on the surprising cost of giving up explosion. Consider the following: If both P and ¬P are true, we may choose an arbitrary Q and infer (P or Q) from P and then by so-called 'disjunctive syllogism' infer Q from (P or Q) and ¬P – so we seem to have shown that explosion is a correct derived rule of inference. To

block this argument, it seems we must: change our rule of 'or introduction'; hold that the result of stringing together deductively valid inferences is not always valid; or declare that disjunctive syllogism is not valid, despite appearances to the contrary. Many philosophers regard any of these as a higher price to pay than accepting the counterintuitive explosion rule.

Consider next the 'paradoxes of vagueness.' For concreteness, let P(n) stand for 'there are more than n seconds in my childhood.' It seems we have good reason for accepting (i) P(0) is true; (ii) for any n, if P(n) is true then so too is P($n + 1$) (since one certainly does not change from a child to a nonchild from one second to the next); and (iii) for a sufficiently large m, ¬P(m). However, P(m) follows from (i) and (ii). In classical logic, rejecting (ii) implies that there is a number n such that one is a child for n seconds, but 1 second later one is not. However, in many logics this does not follow. In particular, many logics that reject the law of excluded middle avoid this conclusion. Indeed, the phenomenon of vagueness is thought by some to pose a more direct challenge to classical negation. The minimal logic condition applied to predicates instead of propositions means that ¬P(x) picks out the property whose extension is as large as possible while remaining disjoint from the extension of P(x). However, if P(x) is vague, why should we suppose that all relevant x fall either in P(x) or in ¬P(x)? To suppose there is always such a property seems to be assuming that every property has sharp boundaries, which seems to amount to saying that there are no vague properties.

Finally, consider the 'knowability paradox': in classical logic, given some seemingly innocuous presuppositions about the nature of necessity and of knowledge, it follows from

(AR) all truths are *knowable*

that

(AK) *all truths are known.*

(Here is one set of assumptions suffices: knowledge distributes over conjunction; what is known is true; what is proved to be a theorem is thereby proved to be necessarily true; and if (necessarily ¬P) then ¬(possibly P).) Many philosophers are inclined to accept (AR), at least for certain domains of discourse, but almost none are tempted by (AK). However, the argument that (AR) implies (AK) depends essentially on double negation elimination. Hence, one can block the argument if negation is not De Morgan (e.g., if it is intuitionistic). Of course, to argue for this requires, if this solution is not to be merely *ad hoc*, giving independent reasons for rejecting classical negation – one could, after all, have rejected one of the plausible assumptions about necessity or knowledge instead, if blocking the paradox were alone sufficient to motivate such reformation of philosophical presuppositions.

More Than One Negation?

Some authors argue that it is a mistake to think that the same operation is involved in forming the negation of sentences and properties, something we have assumed without question. For instance, arguably the logical behavior of 'x is not-P' differs from that of 'it is not the case that x is P'; for example, x will be not-white only if x is definitely not white (i.e., is not a boundary case of whiteness), whereas if x is a boundary case, then it is not the case that x is white, but if the same operator is at work in both claims they should be equivalent.

Nonclassical languages sometimes suffer from a lack of expressive power if there is only one negation, in the sense that that negation leaves us unable to express what we seem able to express in natural language. For instance, ¬P, using intuitionistic negation, says that P is, in some suitable sense, impossible. (In both minimal and intuitionistic logic, ¬P is often defined as 'if P, then absurdity results.' To see why this makes sense, look again at the characterization of minimal negation in the first section and note that adding explosion merely makes the consequences of absurdity particularly dire.) One loses the link to impossibility in De Morgan (and so classical) negations. For instance, with De Morgan negation one can infer from ¬(P and Q) that (−P or −Q), but it certainly does not follow from the impossibility of P and Q being jointly satisfied that one of P and Q must be impossible. This matters because although one cannot intuitionistically derive (AK) from (AR), one can derive, for any P,

(∗)¬(P and ¬(It is known by someone at some time that P))

which is okay because this means only that it is impossible for P to be true and at the same time it be impossible for anyone to know it, which should follow from AR. However, if intuitionistic negation is the only one available it is difficult to see how one might express the claim that 'some claims are true but never known' since, as we have seen, (∗) says something quite different. The obvious response is to argue that some other negation, compatible with but distinct from intuitionistic negation, is involved in expressing it. (Note that this other negation must be nonclassical, for if P has both a classical

and intuitionistic negation, they are the same proposition, viz. the weakest proposition incompatible with P, so classical and intuitionistic negation cannot exist as distinct negation operators for the same class of sentences.) Similarly, if the only negation is the dialethic negation, how can we express things like 'P is true, and is not also false'?

Negation and Denial

Why not say, "The problem with (L) is that it *does not express a proposition*, and so *fails to have a truth value*? Since it fails to have a truth value, so too does its negation – (L) and it's negation fall into a *truth value gap*." One reason is that this seems not to work for the so-called 'strengthened liar' (SL):

(SL) SL is not true.

For if (SL) is neither true nor false, then it is not true, and so should be true.

Notice that in our discussion of (L) we suggested that if P falls into a truth value gap, so too does ¬P, but in discussing (SL) we assumed that if P falls into a gap, not-P is true. If what we have said in both cases were correct, 'not' in the (SL) case is expressing some different notion of negation than is expressed by the negation sign in the (L) case, and we seem to be stuck with an ambiguity in the meaning of 'not.' It has been suggested, though, that 'not' is pragmatically, rather than semantically, ambiguous: It is sometimes used to form negations, and at other times it is used to deny a claim. When we say that (SL) is not true, we are denying (SL) without thereby asserting its negation. However, we only fall back into paradox if we assert the negation of (SL). What makes this proposal philosophically contentious is that the prevailing view, going back at least to Frege, is that denial is not a separate speech act but is equivalent to the assertion of the negation of the claim in question.

See also: Logic and Language: Philosophical Aspects; Negation: Semantic Aspects; Paradoxes, Semantic; Semantics–Pragmatics Boundary; Vagueness: Philosophical Aspects.

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Negation: Semantic Aspects

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Classical and Nonclassical Negation

In logic, negation is an operation that applies to a sentence (or more generally a formula), thus yielding a new sentence. The sentence thus obtained is called the negation (or in some authors the denial) of the sentence negated. The negation sign is a logical operator, which is written in front of the relevant formula. The negation of a sentence φ is – depending on the notation convention adopted – written as $\neg\varphi$, $\sim\varphi$, $-\varphi$, $\bar{\varphi}$ or $N\varphi$. In Frege (1879), we find a small vertical stroke attached to the lower side of the content stroke. In his notation, the judgment that φ is not the case thus comes out as $\vdash\!\!\neg\varphi$.

In a classical two-valued logic (which allows exactly two truth values and moreover takes for granted that every sentence has a truth value), there is only one possible semantic definition of negation: the negation operator is a function that maps truth to falsity and falsity to truth. We may, however, deviate from classical semantics in various ways. One way is to question the assumption that every sentence has a truth value, another way is to allow for more than two truth values. This comes down to rejecting the principle of bivalence. The first strategy gives rise to so-called partial logics, the second to multivalent logics. A partial logic thus allows a sentence to have no value and it is common to refer to this third possibility as a truth value gap. In multivalent logics, we may define several negation operators; what their truth tables look like will depend on the intended interpretation of the nonclassical values. In a three-valued logic, a sentence that is not true may either be false or have the third truth value. In this view, falsity is a subcategory of what is not true. An alternative account takes the third value as a special way of

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being not false. Finally, we may see the third value as independent of both truth and falsity. We thus may interpret the third value as a special way in which a sentence may go wrong and different interpretations will generally give rise to different truth tables.

Nonclassical accounts of negation go back to Aristotle. Aristotle argued (in his famous 'sea battle' argument) that if the sentence *There will be a sea battle tomorrow* were now either true or false, we would be committed to fatalism. Lukasiewics concluded that such contingent future tense sentences are neither true nor false and consequently rejected bivalence. He introduced a third truth value to be interpreted as indeterminate or contingent, which naturally yields a truth table that maps truth to falsity, falsity to truth, and the third value to the third value. The Russian logician Bochvar gave another motivation for three-valued logics, arguing that it allows us to avoid logical paradoxes. Other writers have given various linguistic arguments for such deviations from classical logic. Three cases that received quite a bit of attention in the linguistic literature are category mistakes, vagueness, and presupposition failure.

Examples of category mistakes are Carnap's *Caesar is a prime number* or Chomsky's *Colorless green ideas sleep furiously.* Such sentences do not ascribe properties to things they do not have (which would result in falsity), but properties they cannot possibly have, thus yielding absurdity. And, since this holds for both the unnegated sentence and its negation, it gives a truth table that maps the third value (interpreted as nonsensical) on itself. The problem is closely related to the problem of presupposition failure (see below).

Vague predicates comprise predicates such as *small*, *beautiful*, *long*, etc., that is predicates that apply to a thing or set of things to a certain extent. In some cases, it is simply unclear whether a predicate applies to an object. An example is Austin's *France is hexagonal*. Vague terms admit borderline cases, cases in which it cannot be uniquely determined whether a concept falls under the term or not. Three-valued logics are not of much help in solving the problem, since they replace the classic dichotomy between true and false with a strict trichotomy between true, false, and indeterminate, which yields results that are equally counterintuitive as those that result from a bivalent approach.

The most popular accounts are the so-called fuzzy logics introduced in the mid 1960s (Zadeeh, 1965) and the method of supervaluations (Van Fraassen, 1966). Fuzzy logics accept an infinite number of truth values (a real number in the interval [0, 1]). The idea is that the closer the value is to 1 the 'truer' the sentence is. The value of a negated sentence is taken to be 1 minus the value of the unnegated sentence. Assuming that vague sentences get their value somewhere in the middle of the interval, it follows that if a sentences is maximally vague, so is its negation. The same holds for conjunctions and disjunctions of vague sentences. Fuzzy logics have been objected to on a number of counts. Most importantly, people have objected to the artificiality of assigning precise numerical values to the degree to which an object is small or beautiful. An alternative account is found in the method of supervaluations. Supervaluations – which were originally developed to account for presupposition failure – differ from multivalent logics in that they accept only two truth values but allow truth-value gaps. Just as in fuzzy logics, the negation of a vague sentence will come out as vague; but in contrast to fuzzy logics, formulas that are classically valid (or contradictory) will always come out as true or false no matter what the values are of their atomic components. A comparison between the approaches and a linguistic application is found in Kamp (1975).

Some of the best-known deviations from classical logic originate from presupposition theory. For Frege (1892) and Strawson (1952), presuppositions act as preconditions a sentence should satisfy in order to be true. Strawson and many other authors took preservation under negation as the defining characteristic. Thus (1b) seems to suggest as strongly as its unnegated counterpart (1a) that (1c) is true.

(1a) The king of France is bald.
(1b) The king of France is not bald.
(1c) France has a king.

This phenomenon is general and seems to hold for all other lexical items that are said to induce presuppositions:

(2a) John quit smoking.
(2b) John didn't quit smoking.
(2c) John used to smoke.

Inspired by Strawson the so-called neo-Strawsonians turned preservation under negation into a definition of semantic presupposition:

(3) A sentence φ presupposes ψ just in case
(i) φ entails ψ; and
(ii) $\neg\, \varphi$ entails ψ.

If we assume that negation maps truth to falsity and vice versa and, if we also adopt the standard definition of semantic entailment (φ entails ψ iff for any model M if $[[\varphi]]^M = 1$ then $[[\psi]]^M = 1$), (3) is equivalent to

(4) φ presupposes ψ just in case
(i) in any model in which $[[\varphi]]^M = 1$ it holds that $[[\psi]]^M = 1$; and
(ii) in any model in which $[[\varphi]]^M = 0$ it holds that $[[\psi]]^M = 0$.

The latter simply comes down to the idea that if a sentence φ presupposes a sentence ψ, φ cannot have one of the classical values true or false, unless ψ is true. In a classical two-valued logic, this would predict that sentences can only presuppose tautologies. This forces the theorist to either allow for truth-value gaps or alternatively to introduce a third value to account for presupposition failure. If we allow truth-value gaps, compositionality predicts that if the unnegated sentence has no value, its negated counterpart will not have a value either. In a three-valued logic, this is captured by adopting the following truth table for negation (* indicates the third value):

(5)

φ	$\neg\varphi$
1	0
0	1
*	*

In conjunction with definition (3), this correctly predicts that presuppositions are preserved under negation.

Russell pointed out that (1b) has a second reading according to which this sentence is true simply because there is no king of France. In his analysis, the difference between the two readings is cashed out in terms of scope. In addition to the 'standard' interpretation, which is obtained by giving negation narrow scope and thus yields the formula (6a), we obtain the second reading by giving the negation scope over the full formula as in (6b):

(6a) $\exists x \forall y[[KF(x) \leftrightarrow x = y] \wedge \neg\ Bald(y)]$
(6b) $\neg\ \exists x \forall y[[KF(x) \leftrightarrow x = y] \wedge Bald(y)]$

This retains classical two-valued negation and eliminates presuppositions. It also illustrates the idea, found in Frege, that negation can always be represented as the standard operator suitably placed in the logical representation.

Russell's theory eliminates presuppositions. However, the difference between a presupposition preserving and presupposition canceling interpretation can also be obtained in a three-valued logic by defining a second negation operator $\sqsupset \varphi$ that maps the third value onto truth:

(7)

φ	$\sqsupset\varphi$
1	0
0	1
*	1

We perceive two kinds on nontruth. Nontruth as plain falsity and nontruth as a result of presupposition failure. The operator given in (5) is known as the weak Kleene-negation or the internal Bochvar connective; the operator defined in (7) is the same as the external Bochvar negation (also called the denial operator).

Negation and Polarity

Natural language contains a class of expressions whose distribution is limited to contexts that feel negative. Such items are called negative polarity items (NPIs). NPIs come in various types and syntactic categories: quantifiers and quantifier phrases (*any, any book*), verbs (*bother to*), factives (*mind that, matter that*), adverbs (*ever, yet*), prepositions (*until*), modals (*need*), idioms (*give a damn, lift a finger*), and many more. Thus the a sentences below, where we find the NPIs *any* and *ever* in the scope of a negative expression, are fine, but the b sentences are unacceptable.

(8a) Mary didn't find any coin.
(8b) *Mary found any coin.

(9a) No one ever squared the circle.
(9b) *Somebody ever squared the circle.

In addition to NPIs, we find a class of positive polarity items (PPIs). Positive polarity items typically occur in non-negative contexts. Just like NPIs, they belong to various syntactic categories. Examples of PPIs are quantifiers like *each* and *some*, factives like *be delighted that*, adverbs like *already*, and a rich variety of other expressions. The following examples show that PPIs shun negation:

(10a) Harry is already serving breakfast.
(10b) *Harry is not already serving breakfast

(11a) Everybody inspected each package.
(11b) *Nobody inspected each package.

Contexts that license NPIs however, need not contain overt negative elements. Thus negative polarity elements may be allowed in, for example, conditionals and *before*-clauses.

(12a) If you find any clue, you should report it to the police.
(12b) Mary left before John* already/even arrived.

In addition, some types of contexts only allow certain subclasses of polarity items. The central problem is thus to give a general characterization to the classes of contexts that license NPIs and PPIs and to relate different subclasses of polarity elements to the contexts that license them. On the question of why natural language contains such items and in view of what semantic properties makes them they behave as they

do, there is no agreement whatsoever. Though most authors assume that there is a general mechanism that governs all such items, they also assume that positive or negative polarity is at least in part a conventional feature that is given in the lexicon.

Klima (1964) called contexts that license NPIs, affective contexts. Affective contexts in Klima's sense are contexts that are either explicitly negative or contain an underlying negative element NEG. Related views are put forward by Baker (1970) and Linebarger (1980), who claim that NPIs are licensed by negative contexts but the negative element need not surface. Baker requires that the licensing context be either negative or entail a negative sentence. Linebarger states that a NPI may be licensed by an overt negative element or a negative implicature. Ladusaw (1979) was the first to propose a semantic characterization of negative context as a NPI licenser. According to Ladusaw, an expression acts as a trigger for NPIs if it denotes a downward entailing function. The central notion is downward entailment or downward monotonicity. The definition runs as follows:

> A function is downward entailing (monotone decreasing, downward monotonic) iff for all X and Y: if $X \subseteq Y$, then $f(Y) \subseteq f(X)$.

We can test for downward monotonicity by checking whether a context validates inferences from sets to subsets. Given that $\|\textit{chickpeas}\| \subseteq \|\textit{peas}\|$, the inference from (13a) to (13b) holds:

(13a) Mary doesn't eat peas.
(13b) Mary doesn't eat chickpeas.

And this predicts that (14a), where we find the NPI *any* in a downward entailing environment, is fine, though (14b) is unacceptable.

(14a) Mary doesn't eat any peas.
(14b) *Mary does eat any peas.

The converse property is upward entailment or upward monotonicity.

> A function f is upward entailing (upward monotonic) iff for all X and Y: if $X \subseteq Y$, then $f(X) \subseteq f(Y)$.

The inference from *Some Texans eat chickpeas* to *Some Texans eat peas* is valid, which shows that *Some Texans* is upward entailing.

Most authors agree that Ladusaw's generalization is basically right when taken as a necessary condition (e.g., Van der Wouden). In order to license an NPI, the context should have the property of downward monotonicity. Zwarts (1986), Hoeksema (1983), and van der Wouden (1997) show that the issue is more complicated, however. Not all NPIs are licensed in all downward monotonic contexts. As a consequence, they distinguish between weak and strong NPIs (Zwarts) or between weak, medium, and strong ones (Van der Wouden). Weak NPIs conform to Ladusaw's generalization, NPIs of medium strength and strong ones require contexts that satisfy additional algebraic properties. The picture that arises from this work is that polarity licensing of both NPIs and PPIs is not a homogeneous phenomenon.

There is an additional complication. According to the characterization given above, putting a PPI in a negative context yields ungrammaticality. However, such constructions often allow for a special interpretation that suggests that the corresponding non-negative sentence has been uttered before. Seuren (1985) calls this the 'echo' effect and takes it as an argument for the existence of a special presupposition-canceling negation operator. For Horn (1985, 1989), it is a diagnostic for a special use of negation he calls metalinguistic. Thus (15) is acceptable as a reaction to the utterance of *Mary is still in Paris*.

(15) Mary is NOT still in Paris. She never intended to be there and went to London instead.

It is implausible, though, that this phenomenon has anything to do with the formal properties of negation or negative context. We observe the same effect when NPIs are put in uncontroversially positive contexts.

(16) It DOES matter that my bunny is ill.

We return to the phenomenon of polarity reversal at the end of the last section.

Negation Versus Denial

The negation of a sentence is sometimes called its denial. It is, however, important to strictly separate the concepts of denial and negation. The concept of denial belongs to speech act theory. In this respect, denials are on a par with assertions. And, in contrast to negation, denials – just like assertions – should not be characterized in terms of truth and falsity but in functional terms. The primary function of assertions is to introduce new information, that is information that is not already taken for granted by the participants in a discourse. Denials differ in this respect. Their essential function is to object to information that has already been introduced before or is in some sense taken for granted. In doing so, a denial will have the effect of removing information from the discourse record. Despite being overtly negative, (17a) and (17b) will, if processed as the first sentence of a discourse, not be interpreted as denials but as assertions of negative sentences.

(17a) Mary is unhappy/not happy.
(17b) It does not matter that Mary read your letters.

Note, moreover, that a denial need not contain a negative morpheme. If uttered as a reaction to (17a) or (17b), B-b and B-c below will not be interpreted as assertions but as denials of the utterances they object to. The utterance by means of which the denial is performed may thus be of a negative or positive form. This shows that the concept of denial is logically independent of the concept of negation.

The difference in status of the concepts of denial and negation gave rise to a view according to which denials can be semantically characterized in terms of assertion and negation. Following Frege–Austin, Searle, and Dummett claimed that denials can be semantically analyzed as assertions of negative sentences. Further pragmatic effects that distinguish denials from assertoric utterances must be accounted for independently. Frege (1918: 149; Geach 1997: 40) – states: "People speak of affirmative and negative judgments; even Kant does so [...] For logic at any rate such a distinction is wholly unnecessary; its grounds must be sought outside logic." A linguist like Givón (1978) implicitly adopts the view that negation in language should be analyzed as a logical sign, which operates on sentences, but points out that denials have, in addition to their logical aspect, a pragmatic function that should be treated independently. Thus, though denials should logically be treated as negations of positive sentences, they constitute a different speech act from assertions. "While the latter are used to convey new information on the presumption of ignorance of the hearer, negatives are used to correct misguided belief on the assumption of the hearer's error." (Givón, 1978).

However, Frege also points out that it is not easy to make sense of the interpretation of denials as negative statements. "It is by no means easy to state what is a negative judgment (thought). Consider the sentences 'Christ is immortal', 'Christ lives for ever', 'Christ is not immortal', 'Christ does not live for ever'. Now which of the thoughts here is affirmative, which negative?[n] (Frege, 1918: 150; Geach 1977: 41). The central problem is that a treatment of the negation sign as a sign of denial forces us to introduce a further operator to account for negatory or denial force, in addition to the negation operator. Clearly, no operator that would go or fuse with Frege's assertion sign can be given a sensible interpretation in an embedded environment. Though an interpretation could be given to such an operator for simple sentences in an unembedded environment, it precludes the possibility of using this very same sentence as the antecedent of a conditional sentence. In this context, the sentence cannot have denial of negatory force. Fregean force always goes with full sentences and does not contribute to the proposition expressed. Thus in embedded environments, negation can only be interpreted as an ordinary functional expression, reversing the truth value of the proposition expressed. However, the introduction of some kind of denial operator having the same role as assertion would force us to recognize two ways of judging and accordingly two negative operators of a different status, one as some kind of speech act device, the other as a semantic operator reversing the truth value of the proposition expressed. Consequently, we should separate force from content, thus ending up with a theory that is preferable for being both conceptually and formally simpler.

Metalinguistic Negation

Horn (1985, 1989) drew attention to the fact that an utterance may not just be rejected in view of falsity of the propositional content, but that denials may instead apply to a variety of information, comprising presuppositions, various types of implicatures and connotations related to style and register. He points out that denials can be used to reject an utterance of a previous speaker for whatever reason. And equating the notions of denial and negation, he made a distinction between the well-known truth-functional operator and a non-truth-functional metalinguistic device. On this view, standard truth-functional negation is found in negative assertions and propositional denials. His metalinguistic device applies to presuppositional inferences, implicatures, and connotations of style and register. He labeled this device 'metalinguistic negation' and characterized it as follows: "I am claiming [...] for negation [...] a use distinction: it can be a descriptive truth-functional operator, taking a proposition p into a proposition $\neg p$, or a metalinguistic operator which can be glossed 'I object to u', where u is crucially a linguistic utterance rather than an abstract proposition" (Horn, 1985: 136). The relevant examples can be classified in the following categories:

A Assertions of negative sentences:
- (A-a) Mary is unhappy.
- (A-b) Mary is not happy.
- (A-c) It does not matter that Mary read your letters.

B Propositional denials:
- (B-a) Mary is NOT happy (as a reaction to the utterance of 'Mary is happy').
- (B-b) Mary IS happy (as a reaction to the utterance of A-a or A-b).
- (B-c) It DOES matter that Mary read my letters.

C Presuppositional denials:
- (C-a) The king of France is NOT bald – France does not have a king.
- (C-b) Virginia CANNOT know that the earth is flat.
- (C-c) John DIDN'T stop smoking – he never smoked.

D Implicature denials:
- (D-a) It is not POSSIBLE, it is NECESSARY that the church is right.
- (D-b) That haggis is not GOOD, it is EXCELLENT.
- (D-c) That was not a LADY I kissed last night – it was my WIFE.

E A variety of connotations (conventional implicature, style, register)
- (E-a) That is not a STEED – it's a HORSE.
- (E-b) Grandma didn't KICK THE BUCKET – she passed away.
- (E-c) He didn't call the POLICE, he called the POLICE.

Abstracting from their discourse function and focusing on truth conditional content, we may first note that Frege's strategy of analyzing the denial B-a as an assertion of a positive sentence works as far as truth conditional content goes. Assuming double negation in their underlying form, B-b and B-c can also be analyzed in the Fregean way. The presuppositional denials under C have historically either been handled by means of some nonstandard logic (thus postulating an ambiguity in the negation operator), or by an appeal to the Russellian notion of scope (see the first section above). More recent accounts that are formulated in a dynamic framework achieve a similar effect by invoking the notion of local accommodation. Though such theories take it that presuppositions normally escape from the scope of negation and other embedding operators, they introduce a special mechanism that forces presuppositional information – under specified conditions (e.g., threatening inconsistency) – to remain *in situ*, i.e., the place where they were triggered, and thus keep them within the scope of the embedding operator (Heim, 1983; Van der Sandt, 1992). The examples under D and E are problematic for any purely logical account. Their standard translations amount to plain contradiction, which led authors to call for some non-truth-functional analysis or else a nonliteral reinterpretation in view of a violation of Gricean maxims.

Horn treats categories C–E as metalinguistic uses of negation. The following diagnostics act as a kind of litmus test:

- Metalinguistic negation requires wide scope, thereby blocking lexical incorporation.
- Such sentences exhibit a rising intonation contour (fall-rise) pending further clarification, thereby stressing the offensive item or else triggering contrastive stress on the negative morpheme.
- Metalinguistic negation reverses the polarity of the sentence.

Example (18) illustrates the first diagnostic. In contrast to example D-a, it amounts to a straightforward contradiction:

(18) It is impossible, it is necessary that the church is right.

Note, moreover, that the same holds for example D-a if we destress the offensive item *possible*. Sentences (15) and (16) show that – contrary to received wisdom – negative denials accept PPIs, while positive denials allow NPIs.

Van der Sandt (1991, 2003) stressed that in view of their function, denials should be interpreted in context. They are not incremental in the sense assertions are, nor can they naturally occur in isolation. They take up or 'echo' a previous utterance; and since utterances convey information of various kinds (comprising presuppositions, implicatures, and further connotations), the interpretation of a denial may be sensitive to all the information that is invoked by the utterance they object to. Just as a speaker, when uttering any of the B sentences, objects to the truth-conditional content of a previously uttered sentence, he objects in the C cases to the presuppositions carried by a previous utterance, in the D cases to implicatures invoked, and in the E cases to offensive connotations of style and register a previous speaker may have conveyed with a corresponding non-negative utterance. Consider (19b), which is typically a reaction to (19a)

(19a) It is possible that the church is right.
(19b) It is not POSSIBLE, it is necessary that the church is right.

The utterance of (19a) invokes the implicature that it is not necessary that the church is right. By denying this utterance by means of (19b), the second speaker does not just react to the propositional content but to all the information conveyed by (19a). This information comprises the (scalar) implicature that it is not necessary that the church is right. Thus, if we take the negation in (19b) to apply to the full informative content of the first utterance, this yields an interpretation that can be paraphrased as (20):

(20) $\neg(\Diamond \text{ the_church_is_right} \wedge \neg \Box \text{ the_church_is_right}) \wedge \Box \text{ the_church_is_right}$

This simply conveys that it is necessary that the church is right and rejects all information conveyed by the previous utterance. The formal account is implemented in a nonincremental theory of discourse processing.

While Horn subsumes only presuppositional denials, implicature denials and the style and register cases under his notion of metalinguistic negation, Van der Sandt takes the phenomenon to be fully independent of the notion of negation and proposes an explanation of both the Horn cases and propositional denials based on the discourse properties of denial. Geurts (1998) objects to both views. According to him, denial or metalinguistic negation is not a homogeneous phenomenon. Instead he claims that a different semantic mechanism is operative in each of the cases B–E. His account divorces metalinguistic negations from the discourse characteristics of denial. Propositional denials are simply assertions of negative sentences. Presuppositional denials are handled by the mechanism of local accommodation. For the last two categories, Geurts assumes that the negative morpheme operates on a different level. For implicature denials, he invokes the notion of semantic polysemy. Crucially, he maintains that a scalar like *possible* may either have an *at least* or an exhaustive sense (i.e., *possible and not necessary*). Example (19a) selects the *at least* interpretation and here the exhaustive interpretation comes about by way of conversational implicature. In the denial (19b), the exhaustive sense is selected immediately. Only the style and register and pronunciation cases are metalinguistic in that they make reference to linguistic objects. Example E-b typically corrects the pronunciation of *police*. In this context, the phrase POlice corrects pronunciation, and here this phrase may be constructed as 'the body whose name is pronounced "POlice".'

Returning to the second section of this article, I conclude with a remark on polarity reversal. On the account that strictly distinguishes between the use of a (negative) sentence to convey new information and its use as a denial, polarity reversal falls out as a consequence of the discourse function of denial.

Consider first the unmarked (21a) and (21b):

(21a) It does not matter that Mary has read my letters.
(21b) Harry did not pick any of the flowers.

A denial interpretation of either of these sentences would require that the corresponding non-negative sentence has been uttered just before (or is at least 'in the air'). Note that their non-negated counterparts would contain a negative polarity element in a non-negative context and thus be ungrammatical. This forces the regular assertoric interpretation. But (16), which does contain an NPI in a non-negative context, can very well be used to echo a negative and thus grammatical utterance. An analogous explanation can be given for negative sentences containing PPIs. Since affirmative sentences containing PPIs require a non-negative context, their negated counterparts cannot be interpreted as isolated assertions. But they can very well be interpreted as the denial of a previous utterance, which being positive, is fully grammatical. Sentence (15) illustrates this.

See also: Negation; Negation: Philosophical Aspects; Presupposition; Vagueness.

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Nenets

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Nenets is a subbranch of the Samoyed branch of the Uralic family comprising two closely related but distinct languages, Forest Nenets (FN) and Tundra Nenets (TN). Tundra Nenets is spoken by nearly 30 000 people across the vast tundra zone of Arctic Russia and northwestern Siberia, while Forest Nenets has perhaps 1500 speakers along the Pur, Agan, Lyamin, and Nadym river basins in northwestern Siberia. A clear majority of the speakers are proficient in Russian, and in the European part of the Tundra Nenets territory in particular, the native language is in these days rarely transmitted to younger generations. In addition to Russian, Tundra Nenets has had contacts especially with Komi and Northern Khanty, and Forest Nenets has been greatly influenced by Eastern Khanty.

Besides Nenets, the Samoyed branch includes Nganasan, Enets (Forest Enets and Tundra Enets), Yurats, Selkup (Northern Selkup, Central Selkup, and Southern Selkup), Kamas, and Mator; of these, Yurats, Kamas, and Mator are extinct, the Enets languages as well as Central Selkup and Southern Selkup are critically endangered; Nganasan is still spoken by approximately 500 people and Northern Selkup by 1500. Samoyed is the easternmost branch of the Uralic family; the other branches are Khanty, Mansi, Hungarian, Permian, Mari, Mordvin, Finnic, and Saami.

The Nenets languages are synthetic, agglutinating with some fusion and, in Forest Nenets, metaphony, morphophonologically complex, suffixing and predominantly verb-final.

The vowel system of Tundra Nenets in the first syllable includes nine vowels differing in both quality and quantity (one short vowel marked with *ø* in phonological transcription, five basic vowels, *i e a o u*, a mixed [diphthongoid] vowel *æ*, and two long vowels, *í ú*; in unstressed syllables, a schwa, °, typically realized as extra lengthening of the preceding segment, occurs in addition to the five basic vowels. The Forest Nenets vowel system has been restructured after the Eastern Khanty model and consists of stressed syllables of six long vowels, *i e ä a o u*, and four short vowels, *î ã â û* (corresponding to *i ä a u*); in unstressed syllables, only a schwa ° and *i a u* are possible. The stress is not contrastive but falls on nonfinal odd or pre- and postschwa syllables. A feature affecting both consonants and vowels is palatalization: the traditional formulation is that vowels have back vs. front allophones after nonpalatalized vs. palatalized consonants, but palatality (marked with *y* between a consonant and vowel in phonological transcription) can also be understood as a suprasegmental feature with a CV sequence under its scope. The consonant system of Tundra Nenets consists of 26 units (up to 31 in dialects); in Forest Nenets there are 24 consonants. Both systems include a velar nasal (*ng*) and a velar fricative (*x*); in Forest Nenets, vibrants have changed to fricolaterals (*lh*) under the Eastern Khanty influence; in Tundra Nenets, there are affricates (*c*) that have developed from consonant clusters still retained in Forest Nenets; both languages have a glottal stop marked with *q* or, in Tundra Nenets, *h* in case it has nasal sandhi alternants. The above figures include palatalized consonants, which in Tundra Nenets are only contrastive in the labial and dental series, while in Forest Nenets, there are palatalized velars as well. An old phonotactic peculiarity of Nenets is the lack

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of initial vowels: this is now relaxed in most varieties, but in the Central dialects of Tundra Nenets the principle is still fully alive and is even reflected in recent Russian loanwords such as *ngarmiya* 'army.' In Tundra Nenets, there is a sandhi system affecting both the final consonant of the preceding word and the initial consonant of the following one, for instance, *nyeh xøn°* 'woman's sledge' is transformed to *nyeng_køn°*, *pyíq xøn°* 'sledge for wood' to *pyí_køn°*, and *ngarka to* 'big lake' to *ngarka_do* by sandhi.

Nouns distinguish seven cases: nominative, accusative, and genitive are the grammatical cases that in their basic functions denote subject, object, and possessor; dative, locative, ablative, and prosecutive ('through, along, by') constitute the local cases. There are three numbers, singular, dual, and plural, but there is a gap in the nominal paradigm in that the local cases do not combine with the dual number, the respective meanings being expressed by postpositional phrases. The inflection of personal pronouns follows a distinct pattern, and their local cases are also replaced with forms of postpositions. Besides absolute declension, the nominal inflection includes possessive as well as predestinative ('for') forms, e.g., FN *wyîq* 'water': *wyîqj°* 'my water': *wyîqtâj°* 'water for me.' The postpositions are typically inflected in local cases and have possessive forms as well, e.g., FN ablative *ngîlh°tâj°* 'from under me' or prosecutive *pumnantung* 'along their tracks.' In predicative position, nouns agree with the subject employing the same personal suffixes (but not showing the other inflectional peculiarities) as intransitive verbs, e.g., TN *lúca* 'Russian': *lúcad°m* 'I am a Russian.'

Verbs have numerous grammatical categories, covering person, number, tense, and mood. The number of moods is large, in Tundra Nenets up to 18, making it possible to express various levels of probability and necessity morphologically; the imperative and optative moods employ sets of personal suffixes different from other moods. Perfective vs. imperfective aspect is an inherent feature of a verb, and aspectual pairs are created through derivational morphology. The tense is expressed by two distinct systems: first, there is an opposition between unmarked basic tense and suffixally marked future and habitive tenses; second, there is unmarked aorist vs. preterite marked by a suffix that morphotactically follows the personal suffix; it is possible to combine the two tense systems, e.g., TN *xada-* 'kill': aorist *xadaøw°* 'I killed it (just now)': preterite *xada°wøsy°* 'I killed it (earlier)': future aorist *xadangkuw°* 'I am going to kill it': future preterite *xadangkuwøsy°* 'I was going to kill it.' As seen from the examples, the basic aorist refers to immediate past in case of perfective verbs such as 'kill,' whereas the aorist of imperfective verbs simply expresses present, e.g., *nyoda-* 'follow': *nyodaøw°* 'I am following it.' A specific grammatical category in Nenets is known as conjugation: it covers the opposition between subjective forms used when the object is focused and objective forms referring to previously known or omitted objects, e.g., TN *tim xadaød°m* 'I killed a/the reindeer (and not another animal)' vs. *tim xadaøw°* 'I killed the reindeer (instead of doing something else to it)'; in the objective conjugation, the number of the object is expressed morphologically, e.g., *xadangax°yun°* 'I killed them (two)' vs. *xadeyøn°* 'I killed them (several)'; furthermore, there are reflexive forms that either contrast with forms with a transitive meaning, e.g., *tonta-* 'cover': objective *tonta°da* '(s)he covered it': reflexive *tontey°q* 'it got covered,' or constitute the only finite forms of a lexical verb, typically expressing sudden movement or change in state. The personal suffixes cannot generally be attached directly to the verbal stem, but they trigger a complex system of morphological substems.

There is a wide range of nonfinite verbal forms in Nenets, with an important function in embedded clauses (either independently or within postpositional phrases, often with switch-reference, whereby a nonfinite verb is marked differently depending on whether its subject is the same as, or differs from, that of the finite verb), as there are no conjunctions or relative pronouns. Negation is expressed by a negative auxiliary verb incorporating all categories of verbal inflection followed by a specific connegative form of a lexical verb, e.g., TN *nyíx°yun° xadaq* 'I did not kill them (two)'; since the nominal paradigm lacks a connegative, negative nominal predicates must incorporate a copula, e.g., TN *lúcad°m nyíd°m ngaq* 'I am not a Russian.'

Within the basic SOV word order of a transitive sentence, the adverbial phrases are typically placed as Time S Place/Recipient O Manner V, but any focused element can occur preverbally, and even postverbal constituents are possible in case of two morphologically or functionally similar phrases, e.g., FN *ngopk°na myatuqngaj° mâj° myaqk°naj°* 'we (two) live together in our tent,' where both *ngopk°na* 'together' and *mâj° myaqk°naj°* 'in our tent' are in the locative case. In imperative sentences, typically without an overt subject, the nominal object is in the nominative instead of the accusative. The personal pronouns, by contrast, employ their accusative forms even in imperative sentences, while in possessive phrases with a morphologically marked possessed noun they appear, if not omitted, in the nominative rather than in the genitive. Agreement within a

nominal phrase is possible in number when the non-singularity of the noun is more definite, and in relative clauses possessive agreement also occurs, e.g., TN *metyida wadyida* 'note the words he uses', cf. *meta* imperfective participle of 'use,' *wada* 'word.'

Both Nenets languages are endangered, but there are major differences between localities in language use. Tundra Nenets has a literary language deriving from the 1930s used in semiregular book printing and having a limited presence in schools and the press, while Forest Nenets remained unwritten until the 1990s, when a primer and a school dictionary appeared. In the areas where the languages remain vigorous, oral literature, including tales, stories, and riddles as well as epic, lyric, and personal songs, is also flourishing (Castrén and Lehtisalo, 1940; Lehtisalo, 1947; Kupriyanova, 1965; Tereshchenko, 1990; Niemi, 1998). The traditional way of life based on reindeer husbandry or fishing (Khomich, 1995) continues to be appreciated by many Nenets as long as oil and gas excavations do not entirely destroy their lands and the authorities do not force them to relocate (Golovnev and Osherenko, 1999).

For a small indigenous language, Tundra Nenets is reasonably well studied, especially with regard to its phonology and morphology (Castrén, 1854; Tereshchenko 1947, 1956; Décsy, 1966; Janhunen, 1986; Salminen, 1997, 1998a) and lexicon (Pyrerka and Tereshchenko, 1948; Lehtisalo, 1956 [covering both Nenets languages]; Tereshchenko, 1965), while there is only one monograph devoted to the syntax of the Samoyed languages in general (Tereshchenko, 1973). This article is mainly based on Salminen (1998b) as well as more recent field studies funded by the Endangered Languages Documentation Programme. Forest Nenets has been studied much less extensively than Tundra Nenets, with a couple of basic grammatical treatments published (Verbov, 1973; Sammallahti, 1974).

See also: Russian Federation: Language Situation; Uralic Languages.

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Neo-Gricean Pragmatics

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In 1967, H. P. Grice delivered his Williams James Lectures at Harvard. In these lectures, Grice presented a panorama of his thinking on meaning and communication – what he called his "tottering steps" (Grice, 1989) toward a systematic, philosophically inspired pragmatic theory of language use, which has since come to be known as 'Gricean pragmatic theory.' Since its inception, Gricean pragmatics has revolutionized pragmatic theorizing and has to date remained one of the cornerstones of contemporary thinking in linguistic pragmatics and the philosophy of language. This article undertakes to present and assess a neo-Gricean pragmatic theory of conversational implicature, focusing on the bipartite model developed by Laurence Horn and the tripartite model advanced by Stephen Levinson (*see* **Implicature; Maxims and Flouting**).

The Hornian System

Horn (1984, 1989, 2004) developed a bipartite model. In Horn's view, all of Grice's maxims (except the maxim of quality) can be replaced with two fundamental and antithetical principles: the quantity (Q-) and relation (R-) principles.

(1) Horn's Q- and R-principles:
  (a) The Q-principle:
    Make your contribution sufficient.
    Say as much as you can (given R).
  (b) The R-principle:
    Make your contribution necessary.
    Say no more than you must (given Q).

In terms of information structure, the Q-principle is a lower bounding pragmatic principle that may be (and characteristically is) exploited to yield upper bounding conversational implicatures: a speaker, in saying '. . . *p* . . . ,' conversationally implicates that (for all he or she knows) '. . . at most *p* . . .' (*see* **Implicature**). The *locus classicus* here is those conversational implicatures that arise from a prototype Horn-scale. Prototype Horn-scales are defined in (2) (see Levinson, 1987, 2000):

(2) Prototype Horn-scales:
  For <*S*, *W*> to form a Horn-scale:
  (a) A(*S*) entails A(*W*) for some arbitrary sentence frame A.
  (b) *S* and *W* are equally lexicalized, of the same word class, and from the same register.
  (c) *S* and *W* are 'about' the same semantic relation, or from the same semantic field.

An example of Q-implicature is given in (3) (the symbol '< >' represents 'Q-scale'; '+>' represents 'conversationally implicates'):

(3) <all, some>
  Some of his friends took a taxi to the station.
  +> Not all of his friends took a taxi to the station.

On the other hand, the counterbalancing R-principle is an upper bounding pragmatic law that may be (and systematically is) exploited to engender low-bounding conversational implicatures: a speaker, in saying '. . . *p* . . . ,' conversationally implicates that (for all he or she knows) '. . . more than *p* . . .' (Atlas and Levinson, 1981). This is illustrated in (4):

(4) Have you got a watch?
  +> If you have got a watch and know the time, please tell me what time it is.

Viewing the Q- and R-principles as instantiations of Zipfian economy (Zipf, 1949), Horn explicitly identified the Q-principle ("a hearer-oriented economy for the maximization of informational content") with Zipf's 'auditor's economy' (the force of diversification), and identified the R-principle ("a speaker-oriented economy for the minimization of linguistic form") with Zipf's 'speaker's economy' (the force of unification). Furthermore, Horn argued that the whole Gricean mechanism for pragmatic inference can be largely derived from the dialectic interaction (in the classical Hegelian sense) between the Q- and R-principles in the following way:

(5) Horn's division of pragmatic labor: The use of a marked (relatively complex and/or prolix) expression when a corresponding unmarked (simpler, less 'effortful') alternate expression is available tends to be interpreted as conveying a marked message (one that the unmarked alternative would not or could not have conveyed).

In effect, what (5) says is this: the R-principle generally takes precedence until the use of a contrastive linguistic form induces a Q-implicature to signal the nonapplicability of the pertinent R-implicature (for further discussion, see Huang, 1991, 1994, 2000, 2003, 2004a,b, 2005).

The Levinsonian System

Horn's proposal to reduce Grice's maxims to the Q- and R-principles was called into question by Levinson (1987, 1991, 2000). In Levinson's view, Horn failed to draw a distinction between what Levinson called semantic minimization ("semantically general expressions are preferred to semantically specific ones") and expression minimization ("'shorter' expressions are preferred to 'longer' ones"). Consequently, inconsistency arises with Horn's use of the Q- and R-principles. For example, in Horn's division of pragmatic labor (see (5)), the Q-principle operates primarily in terms of units of speech production, whereas elsewhere, in Horn-scales (see (2)), for instance, it operates primarily in terms of semantic informativeness.

Considerations along these lines led Levinson to argue for a clear separation between pragmatic principles governing an utterance's surface form and pragmatic principles governing its informational content. He proposed that the original Gricean program (the maxim of quality apart) be reduced to three neo-Gricean pragmatic principles, or what he dubbed the quantity (Q-), informativeness (I-), and manner (M-) principles. Each of the three principles has two sides: a speaker's maxim, which specifies what the principle enjoins the speaker to say, versus a recipient's corollary, which dictates what this allows the addressee to infer:

(6) Levinson's Q-principle (simplified):
Speaker's maxim: Do not say less than is required (bearing I in mind).
Recipient's corollary: What is not said is not the case.

The basic idea of the metalinguistic Q-principle is that the use of an expression (especially a semantically weaker one) in a set of contrastive semantic alternates (such as a Horn-scale) Q-implicates the negation of the interpretation associated with the use of another expression (especially a semantically stronger one) in the same set. In other words, as already mentioned, the effect of this inference strategy is to give rise to an upper bounding conversational implicature. Seen the other way round, from the absence of an informationally stronger expression, it is inferred that the interpretation associated with the use of that expression does not hold. Hence, the Q-principle is essentially negative in nature.

Three types of Q-implicatures can then be identified: $Q_{\text{-scalar}}$ implicatures, $Q_{\text{-clausal}}$ implicatures, and $Q_{\text{-alternate}}$ implicatures. The $Q_{\text{-scalar}}$ implicatures are derived from prototype Horn-scales. They were illustrated in (3) (recall that '+>' represents 'conversationally implicate') and are shown schematically in (7):

(7) $Q_{\text{-scalar}}$: <x, y>
y +> $Q_{\text{-scalar}} \sim$ x

$Q_{\text{-clausal}}$ implicatures are inferences of epistemic uncertainty (Gazdar, 1979). They are shown schematically in (8) and are exemplified in (9):

(8) $q_{-\text{clausal}}$: $< x(p), y(p) >$
$y(p) +> q_{-\text{clausal}}\ p, \sim p$

(9) <(since *p*, then *q*), (if *p*, then *q*)>
If you want to sell more, you should reduce your prices.
+> You may want to sell more, or you may not; perhaps you should reduce your prices, or perhaps you should not.

$Q_{\text{-alternate}}$ implicatures come from a nonentailment semantic contrast set (Harnish, 1976; Horn, 1989; Hirschberg, 1991; Levinson, 2000). Roughly, there are two subtypes here. In the first, the expressions in the set are informationally ranked, as in (10). Following Huang (2005), let us call this subtype 'Q-ordered' alternate implicatures. By contrast, in the second subtype, the expressions in the set are of equal semantic strength, as in (11). Let us term this subtype 'Q-unordered' alternate implicatures:

(10) <marry, engage>
They've engaged.
+> They haven't got married.

(11) <dog, cat, hamster, Λ>
John has a dog.
+> He doesn't have a cat, a hamster, and Λ as well.

We come next to Levinson's I-principle:

(12) Levinson's I-principle (simplified):
Speaker's maxim: Do not say more than is required (bearing Q in mind).
Recipient's corollary: What is generally said is stereotypically and specifically exemplified.

Mirroring the effects of the Q-principle, the central tenet of the I-principle is that the use of a semantically general expression I-implicates a semantically specific interpretation. In other words, as already noted, the working of this inferential mechanism is to induce a lower bounding conversational implicature. More accurately, the conversational implicature engendered by the I-principle is one that accords best with the most stereotypical and explanatory expectation, given our real-world knowledge. This is depicted schematically in (12) (the '[ ]' here is intended to indicate an 'I-scale']:

(13) I-scale: [x, y]
$y +>_I x$

The class of I-implicature is heterogeneous, ranging from conjunction buttressing (as in (14)) through negative raising to interpretation of spatial terms, but I-implicatures do share a number of properties, notably: (a) they are more specific than the utterances that engender them, (b) unlike Q-implicatures, they are positive in nature, (c) they are characteristically guided by stereotypical assumptions, (d) they are nonmetalinguistic, in the sense that they make no reference to something that might have been said but was not (*see* **Metapragmatics**), and (e) unlike Q-implicatures, they normally cannot be canceled by metalinguistic negation (for an attempt to formalize the Q- and I-principles, see Blutner (1998)):

(14) *p* and *q* +> *p* and then *q*
+> *p* therefore *q*
+> *p* in order to cause *q*
John pressed the spring and the drawer opened.
+> John pressed the spring and then the drawer opened.
+> John pressed the spring and thereby caused the drawer to open.
+> John pressed the spring in order to make the drawer open.

We finally turn to Levinson's M-principle:

(15) Levinson's M-principle:
Speaker's maxim: Do not use a marked expression without reason.
Recipient's corollary: What is said in a marked way is not unmarked.

Unlike the Q- and I-principles, which operate primarily in terms of semantic informativeness, the metalinguistic M-principle operates primarily in terms of a set of alternates that contrast in form. The fundamental axiom on which this principle rests is that the use of a marked expression M-implicates the negation of the interpretation associated with the use of an alternative, unmarked expression in the same set. Putting it another way, from the use of a marked linguistic expression, it can be inferred that the stereotypical interpretation associated with the use of an alternative, unmarked linguistic expression does not obtain. This can be represented schematically as in (16) (the symbol '{ }' indicates an 'M-scale'):

(16) M-scale : {x, y}
$y +>_M \sim x$

An example of M-implicatures is given in (17b):

(17a) Mary went from the bathroom to the bedroom.
+> in the normal way

(17b) Mary ceased to be in the bathroom and came to be in the bedroom.
+> in an unusual way, e.g., in a magic show, Mary had been made to disappear by magic from the bathroom and reappear in the bedroom.

Given the preceding tripartite classification of neo-Gricean pragmatic principles, the question that arises next is how inconsistencies arising from these potentially conflicting inference apparatuses can be dealt with. According to Levinson (1991, 2000), they can be resolved by an ordered set of precedence, which encapsulates in part Horn's division of pragmatic labor, as previously discussed.

(18) Levinson's resolution schema for the interaction of the Q-, I-, and M-principles:
(a) Level of genus: Q > M > I.
(b) Level of species: e.g., $Q_{\text{-clausal}} > Q_{\text{-scalar}}$.

This is tantamount to saying that genuine Q-implicatures (whereby $Q_{\text{-clausal}}$ cancels rival $Q_{\text{-scalar}}$) takes precedence over inconsistent I-implicatures, but otherwise I-implicatures take precedence, until the use of a marked linguistic expression triggers a complementary M-implicature, leading to the negation of the applicability of the pertinent I-implicature

(for further discussion, see Levinson, 2000; Huang, 1991, 1994, 2000, 2003, 2004a,b, 2005).

Further Neo-Gricean Contributions

Building on the Gricean generalized versus particularized implicatures dichotomy, Levinson (1995, 2000) developed a theory of presumptive meaning. He proposed to add a third level – utterance-type meaning – to the two generally accepted levels of sentence-type meaning and utterance-token meaning. This third layer is the level of generalized, preferred, or default interpretation, which is not dependent on direct computations about speaker intentions, but rather on expectations about how language is characteristically used. Stated thus, a neo-Gricean pragmatic theory of conversational implicature is essentially a theory of presumptive meaning – pragmatic inference that is generalized, arises by default, and thus is presumed. Furthermore, on a classical Gricean account, the total signification of an utterance is divided into what is said and what is implicated. Simply put, what is said is generally taken to be mapped onto the truth-conditional content of an utterance. What is implicated is then defined in contrast to, and is calculated on the basis of, what is said (and in the case of M-implicatures, together with how what is said, is said). Seen in this light, what is said is supposed to provide the input to what is implicated.

To work out what is said, according to Grice (1989), it is required to (a) resolve reference, (b) fix deixis, and (c) disambiguate expressions. To these requirements, Levinson (2000) added (d) unpacking ellipsis, and (e) narrowing generalities. It turns out, however, that the determination of requirements (a)–(e) involves pragmatic inference of some kind. Put another way, there is 'pragmatic intrusion' of some sort, namely, the intrusion of pragmatically inferred content into truth-conditional content, involved in the working out of what is said. The question that arises next is what kind of pragmatic intrusion it is. Roughly, there are two positions. The first is that the pragmatic inference under consideration is of a special kind, which differs from conversational implicature. Within this camp, of particular interest are two lines of argument. According to Sperber and Wilson (1986), the pragmatic inference is an 'explicature' (*see* **Relevance Theory**). Another argument is due to Bach (1994), who proposed a third category of communicative content, intermediate between Grice's 'what is said' and 'what is implicated.' Bach dubs the vehicle of such a content 'impliciture,' since it is implicit in what is said. The second position is represented by Levinson (2000), who argued that these so-called explicatures/implicitures result from the same pragmatic apparatus that engenders what is implicated. Therefore, they are largely the same beast as conversational implicature. Consequently, this gives rise to a problem known as 'Grice's circle,' namely, how what is implicated can be defined in contrast to, and calculated on the basis of, what is said, given that what is said seems both to determine and to be determined by what is implicated (e.g., Huang, 1991). Levinson's (2000) proposal was to reject the 'received' view of the pragmatics–semantics interface, namely, the view that the output of semantics is the input to pragmatics, and even to allow implicatures to play a systematic role in 'pre'-semantics, i.e., in the derivation of the truth-conditional content of an utterance. These matters will continue to be debated (*see* **Pragmatics and Semantics; Maxims and Flouting; Principles and Rules**).

In recent years, the classical Gricean theory of conversational implicature has successfully and profitably been generalized to other core areas of linguistics. One such area is formal syntax, and the particular topic of inquiry is anaphora. Levinson (1987, 1991, 2000) and Huang (1991, 1994, 2000, 2004a) developed a (revised) neo-Gricean pragmatic theory of anaphora (*see* **Deixis and Anaphora: Pragmatic Approaches**). The theory has effected a radical simplification of formal syntax, especially as regards Chomsky's binding theory (*see* **Syntax-Pragmatics Interface: Overview; Pragmatics: Optimality Theory**) Finally, a number of neo-Gricean experimental works have appeared, putting various aspects of classical and neo-Gricean pragmatic theory to a test (for further discussion, see Huang, 2003, 2004b).

See also: Deixis and Anaphora: Pragmatic Approaches; Implicature; Maxims and Flouting; Metapragmatics; Pragmatics and Semantics; Pragmatics: Optimality Theory; Principles and Rules; Relevance Theory; Syntax-Pragmatics Interface: Overview.

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Neologisms

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New words frequently appear in English. Some words enter the language while others are used for a short time, or perhaps only once. During the last century, however, the rate of growth has accelerated. Neologisms draw on traditional word-formation devices, but some processes which were previously marginal have become common, for example, the new bound morpheme *-holic* as in the blend *workaholic*. Another process which has become productive is verb-headed compounds like *oil-paint*.

Neologisms Based on Common Word Formation Devices

One of the commonest word formation devices is compounding – combining two or more free morphemes. Compounds can be headed by any major lexical class, and all types are found in neologisms. A few examples are *jock talk* (N-N), *ripjob* 'negative publicity' (V-N), *dolphin-safe* (N-ADJ), *fail-safe* (V-ADJ), *red-hot* (ADJ-ADJ) *after-born* 'child born after the father's death' (P-ADJ), *over-quick* (P-ADV), and *off base* (P-N).

Traditional textbooks such as Marchand (1960), Selkirk (1982), Bauer (1983), and Spenser (1991) claim that verb-headed compounds are rare. The few existing ones are backformed by deletion of a suffix such as *-er* or *-ing* or formed by, for example, converting a compound noun into a verb. Examples are *sky-dive*, derived from *sky-diving*, and *carbon-copy*, which becomes a verb by being converted from a noun compound (Bauer, 1983: 208). The compound *self-destruct* is backformed from *self-destruction*. Although verb-headed compounds may have been rare in the past, this is no longer true. They occur so frequently in print and in spontaneous speech that it is reasonable to conclude that such compounds have become productive in recent years. In addition to the few listed in the works cited (*air-condition*, *baby-sit*, and *breast-feed*) are many other already conventional verb-headed compounds: *lip-read*, *gift wrap*, *copyread*, *custom-make*, *double-park*, *brain-wash*, *flight-test*, *test-drive*, *spot-check*, *window-shop*, *plea-bargain*, *stir-fry*, *chain-smoke*, *handpick*, *stage-manage*, *code-switch*, *guest-conduct*, *dry-clean*, *sun-dry*, *spot-weld*, *backpedal*, *channel-surf*, and *spell-correct*. Many verb-headed compounds are used in sports: *bounce-pass*, *pinch-hit*, *bucket-drive*, *speed-climb*, *jump-shoot*, *jump-pass*, and *kick-turn*. Many compounds are formed with the verb *hop*, as *in bed-hop*, *castle-hop*, *island-hop*, and with initial *self*:

Neoclassical Compounding

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Neoclassical word formation is word formation with elements of Greek or Latin origin. In the European languages neoclassical word formation is found 'next to' native word formation. In these languages neoclassical elements combine productively with each other (cf. *automobile, morphology, hydrophobic*) and with native elements (see below).

History and Scope of Neoclassical Word Formation

A neoclassical word or element is not simply any element that is etymologically Latin or Greek. Because Latin (and partly Greek) was the European lingua franca and the official language in many countries for many centuries, it is no wonder that many Latin and Greek elements found their way into the European languages. Elements that were borrowed early are often phonologically and morphologically assimilated and show no structural differences to native words (examples are German *Fenster* 'window' from Latin *fenestra,* which became trochaic and lost the full vowel in the last syllable or English *market* from Latin *mercatus*). Such elements behave in word formation just like native elements.

What we call neoclassical word formation, on the other hand, uses elements that are not totally assimilated. It became productive in the 17th and 18th centuries in many European languages, mainly because there was a movement away from Latin as a lingua franca to the vernacular languages. At the same time the evolution of sciences furthered the development of terminology that used and combined classical elements. Neoclassical words are not simple borrowings but are formed by new mechanisms that often differ from word formation with native stems. (This is a very rough picture; for a historical survey of the development and influence of Latin and Greek elements in some European languages see Munske and Kirkness, 1996, and histories of the morphology of each language, e.g., von Polenz, 1994, for German, Marchand, 1969, or Baugh and Cable, 2002, for English.) Because there are many elements, words, and mechanisms that are similar across different languages (sometimes called internationalisms), there are a number of common questions that need to be addressed in morphological theory. These concern the status of neoclassical elements, the nature of their combination and the question of their productivity.

The Status of Neoclassical Elements

Regarding the morphological status of neoclassical elements two questions must be addressed (a) How do neoclassical and native elements differ from each other? and (b) Are neoclassical elements like *hydr(o)-*, *psych(o)-* or *–morph/morph(o)-* stems or affixes?

As described earlier, the notion 'neoclassical' is not simply an etymological notion. First, speakers cannot be expected to have etymological knowledge. In addition, it is often difficult to determine the origin of a morphological element because many elements reach a language via other languages. Is an originally Latin element that reached English via German – and has perhaps undergone changes on its way – Germanic or classical (cf. Anshen *et al.*, 1986)? Therefore 'neoclassical' (or 'latinate' or 'learned') refers to structural properties of some elements that distinguish them from 'native' elements in the base language. These structural differences can be

a. Phonological: neoclassical affixes may attract or bear stress, cf. *cèremony – ceremònious*, *sincère – ìnsincere*, while Germanic affixes do not. Neoclassical words may have sounds that are not phonemes in the base language.
b. Morphological and morphophonological: neoclassical elements tend to combine mainly with other neoclassical elements (see following section) and affix ordering principles may be sensitive to the neoclassical-native distinction (Kiparsky, 1982; Aronoff and Fuhrhop, 2002).
c. Orthographic: neoclassical elements may contain graphemes (for example <ph> in *philosophy*) that are not part of the grapheme inventory of the base language.
d. Use: neoclassical elements are often used in 'higher' or 'learned' registers.

Lüdeling *et al.* (2002) show that these differences do not lead to clear-cut categories but rather have to be seen as constituting similarity classes. It seems clear, however, that in many languages the class of neoclassical elements is distinguishable (at least in many cases) from the class of native elements. Randall (1980) provides psycholinguistic evidence that speakers distinguish between native and neoclassical elements.

In a simple morphological model that distinguishes between affixes and stems, the status of many neoclassical elements is difficult to determine. Semantically, they behave like stems but often they appear only as bound forms. Examples are *psych(o)-*, *hydr(o)-*, *morph(o)-* or *-(o)phob*, *-(o)log-* (the modes of combination and the status of the 'linking element' *o* are taken up in the next section).

To mark this, neoclassical elements are sometimes called formatives, combining forms or confixes (see Donalies, 2000). Generative theorists have come to different conclusions concerning the status of these elements. Aronoff (1976), in his word-based approach, assumes that these elements have no status but occur only in complex words. Others, like Scalise (1986) or Selkirk (1982), argue that these elements are bound stems. Still others assume that these elements are affixes (Williams, 1981). In this view there would be words consisting only of affixes. Finally, Lüdeling *et al.* (2002) and Lüdeling and Schmid (2003) propose that the features bound and selecting should be used rather than the stem-affix distinction. The preceding described elements are then bound, nonselecting elements.

Another point that is often discussed in this area is the question whether some of the neoclassical elements should be seen as abbreviations or clipped forms rather than as full elements – an examples would be *gastro-* in *gastroguide* where *gastro-* stands for *gastronomy* (see Petropoulou and ten Hacken, 2002). It is clear that any analysis of these elements has implications for the classification of the morphological process that combines them.

The Status of Neoclassical Word Formation

Before discussing the theoretical status of neoclassical combination the different modes of combination need to be described.

Although details differ between languages, in general we have the 'bound stems' described earlier that combine with each other to *morpholog-, hydrophob, telephone*. This is sometimes called neoclassical compounding. Neoclassical compounds and neoclassical elements also sometimes combine with neoclassical affixes to *morphology, morphologist, hdrophobia,* or *hippopotomonstrosesquippedaliophobia* 'fear of long words' (the two *p*s are really used here). Although neoclassical elements tend to combine with other neoclassical elements, there are also patterns in which neoclassical elements combine with native elements. This seems unproblematic when the neoclassical element itself is a free element (cf. German *Flugnavigation* 'flight navigation'), but some authors assume that it is problematic to combine native elements with bound neoclassical elements – the results are sometimes called 'hybrid' formations (van Marle, 1985, states that such combinations aim at a 'special effect'). This is taken as one argument for the assumption that neoclassical word formation and native word formation form separate systems. The picture is not as simple as this, however. Although there are neoclassical elements that are quite specific in their selectional restrictions there are others that combine easily with native elements (Bauer, 1998; Booij, 2002; Lüdeling *et al.*, 2002; Lüdeling and Schmid, 2003). As an example consider the negation prefixes *un-* (Germanic) and *in-* (from Latin). Although it is in general true that *in-* (or one of its allomorphs) attaches only to classical words, it is not always true that *un*-attaches only to Germanic words, compare *uninteresting*, *unconscious* or the unclear situation in *undigestable/indigestable*.

Often, a 'linking element' (mostly *o* but sometimes other vowels) is added between two elements: *morph-o-logy*. Does this 'linker' belong to the first or to the second element? In contrast to 'linking elements' in many Germanic compounds, which are usually assumed to belong to the nonhead of the compound, here we seem to have patterns in which each element requires an *o* (and then one of them is deleted). This can be observed in those cases where a neoclassical element combines with a native element, as in German *krypt-o-* as in *Kryptogesetz* 'crypto law' or *Kryptoverbot* 'crypto ban' as well as *-o-thek* in *Traumothek* 'dream-o-theque' or *Jazzothek* 'jazz-o-theque'.

All these differences – especially the facts that there are complex words that consist solely out of bound elements and the phonological differences – suggest that neoclassical word formation should be seen as a system that is different from native word formation in the base language in that it has its own rules and elements (Bloomfield, 1933; Domenig and ten Hacken, 1992; Fuhrhop, 1998, and many others). Aronoff (1976) assumed a nonconcatenative model in which neoclassical elements appear only in complex words and if an element appears in more than one complex word, one of them must be primary. Selkirk (1982) and Scalise (1986), for example, suggest that we have a class of stem compounds that differs from (native) word compounds. Lüdeling *et al.* (2002), on the other hand, argue that the class of neoclassical combinations, just like the class of native combinations, is not homogeneous and suggest a unified concatenative approach where Neoclassical is simply one feature among many.

Productivity

Some of the authors that assume different systems for native and neoclassical word formation also assume that neoclassical word formation is not synchronically productive (van Marle, 1985 even states that the notion 'productive' is only applicable to native elements in a language). The data suggests otherwise, however; qualitative aspects (roughly what Bauer,

2001, calls *availability*) as well as quantitative aspects (Bauer's *profitability*, see Baayen, 2001) show that neoclassical word formation is productive (see also Plag, 1999). Lüdeling and Evert (2005) show that neoclassical elements like nonmedical *-itis* have become productive within the last decade or so.

See also: Affixation; Compound; Word Formation.

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Neogrammarians

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The success of a scientific endeavor is measured by the degree to which laws can be found for the phenomena being investigated. Linguistic science, emerging toward the beginning of the 19th century as a discipline in its own right, had to grapple from early on with determining the type and nature of the laws upon which to base its research procedure.

Wherever languages were studied, in ancient Greece and Rome, and especially in central Europe from the Middle Ages to the end of the 18th century, language in itself had rarely been the main objective. Researchers were primarily interested in fields of knowledge, for which language would provide

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promising avenues that no other field could possibly offer.

With the emergence of Indo-European studies during the first quarter of the 19th century, matters changed dramatically. While Franz Bopp (1791–1867), Rasmus Rask (1787–1832), Jacob Grimm (1785–1863), and numerous other contemporary scholars from many European countries continued language investigations valuable for explaining the development of individual cultures and humanity in general, language for the first time had been focused on as something of primary importance.

The impressive achievements of the natural sciences inevitably stimulated researchers in the humanities to obtain results similarly significant for the study of languages. This was by no means a new idea. In the 17th century Francis Bacon (1561–1626), for example, had pointed in the right direction; this was acknowledged, for instance, by one of the most prominent beneficiaries 200 years later, August Friedrich Pott (1802–1887), who stated (1833: xxiiiff.) that "Bacon's procedure, that is, carefully observing and tirelessly seeking out analogies and laws, . . . has fortunately been employed at long last also in linguistics" (English translations, here and elsewhere, by the author of this article). Even more explicit was Gottfried Wilhelm Leibniz's (1646–1716) admonition about 100 years after Bacon: "The study of languages must not be conducted according to any principles other than those of the exact sciences" (Leibniz, 1768). But although these words were widely heard and heeded, they did not immediately lead to momentous results. Only after trial-and-error experimentation over a lengthy period of time did the notion gain ground that it was the individual letter – and through it the individual sound unit – on which linguists would initially have to focus to obtain the most tangible results. Once this insight had been converted into a rigorously employed procedure, linguistic science grew stronger by leaps and bounds. Jacob Grimm had believed that "the sound shift occurs in bulk, but never happens in each and every instance" (Grimm, 1822: 590). Yet, a few decades later, linguists used the term 'law'(*Gesetz*) more frequently, often to replace the term 'rule' (*Regel*), which until then had been deemed more appropriate for the description of historical events in the humanities. In the decades following Grimm's discovery of the sound shift, the number of exceptions that Grimm had to worry about had grown much smaller, made possible by a systematic scrutiny of known exceptions under sound-physiological viewpoints. A contemporary admirer of Grimm, Rudolf von Raumer (1815–1876), surpassed his master by comprehensively investigating the physiological properties of the individual sounds, thereby initiating a movement that culminated in removing the last exception to Grimm's Law by the Danish linguist Karl Verner's (1846–1896) discovery of another 'phonetic law': IE voiceless spirants become voiced in Germanic if in IE the stress did not immediately precede.

Interestingly, the conclusions that Verner drew from his observation, published in 1877, were also arrived at independently by Henry Sweet (1845–1912) and Eduard Sievers (1850–1932), even though neither of them seems to have been aware of their far-reaching significance. The search for further sound laws grew obviously widespread and was much more seriously pursued. The results both anticipated and actually obtained should explain the almost boundless enthusiasm felt by a group of young German linguists who thought they now had a reliable device to investigate the history of languages with a precision matching that of the natural scientists.

For various reasons, some older colleagues raised objections (cf. Curtius, 1885), calling the members of the group, slightly derisively, "*Junggrammatiker*" ('Neo-grammarians'). The name, much to the addressees' delight, rapidly became the trademark of those so named. The original group, loosely associated from about 1875 for several decades, comprised four Indo-Europeanists – Karl Brugmann (1849–1919), Berthold Delbrück (1842–1922), August Leskien (1840–1916), Hermann Osthoff (1847–1909) – and four Germanists – Wilhelm Braune (1850–1926), Friedrich Kluge (1856–1926), Hermann Paul (1846–1921), and Eduard Sievers.

They all were scholars of enormous productivity. Apart from shared general objectives, they were united in their interpretation of how sound changes in languages proceed, even though they individually placed different emphases on certain aspects involved.

The closest to a 'program announcement' is the foreword to *Morphologische Untersuchungen* Vol. 1 (Osthoff and Brugmann, 1878). The crucial item is the insistence on the need to rethink the methodology for investigation and to make the case for a more rigorous application of the sound law principle: "Only those who strictly adhere to the sound laws, this fundamental pillar of our entire science, do stand on firm ground in their research" (1878: xiv). All language changes, the Neogrammarians believe, are attributable to a sound law or the effect of analogy. By taking recourse to analogy, the Neogrammarians focus on a methodological device previously used, but, as they claim, less consistently applied. Analogy draws in psychological considerations. It involves transferring one particular form item from one member to other members of a grammatical paradigm without regard for historical

development. Thus, the MHG past tense singular forms of *neman – ich nam, du naeme, er nam* – did accept, unhistorically, the vowel form of the plural, â. The Neogrammarians admit only sound changes attributable to the operation of a sound law or due to analogy. These pronouncements were backed up by a formidable amount of hard-core research produced over many years, even by scholars not expressly proclaiming adherence to the Neogrammarian group. But the bulk of the research explaining sound changes by reference to sound law and analogy was the result of the ceaseless effort of the individual Neogrammarians.

Since there was no effort to launch a formal 'Neogrammarian movement,' it is understandable that some formulations of what the Neogrammarians stood for as a group were flawed or insufficiently explicit. Their primary objective was to conduct research. There were numerous casual statements, but the manifesto of 1878 remained the only formal presentation of the general theoretical approach. The loosely knit association of strongly independent-minded individuals hardly warranted a more systematic outlay of common endeavors. Leskien's rather cryptic sound law statement of 1876, the first offered by a Neogrammarian, presupposed more than it explicitly said:

> If exceptions are understood to mean those cases where an expected sound change did not occur due to certain recognizable causes, . . . there can of course be no objection to the statement that the sound laws suffer no exception. (Leskien, 1876: xxxiv)

In the same year, Sievers published his *Grundzüge der Lautphysiologie,* hailed by Johan Storm (1836–1920), who was the only contemporary phonetician comparable in stature to Sievers apart from Henry Sweet, as "an outstanding achievement . . . full of minute statements and meticulous observations which outdistance by far their predecessors" (cf. Streitberg, 1910: 584). Sievers did not employ the term 'sound law' yet, using *Lautwandel* ('sound change') instead. Sound change is treated on 19 of the book's 150 pages. Both regular and irregular changes are examined. The book was praised likewise by fellow Neogrammarians as a crucial advancement over the work of earlier phoneticians because "not only the individual sounds were treated, but also, which is of special importance for the understanding of the development of sounds, the way in which individual sounds combine to syllables, words, and sentences" (Paul, 1901: 124). Even today the work is an indispensable classic in the field.

Hermann Paul's own most influential contribution, *Prinzipien der Sprachgeschichte* (*Principles of the history of language*), provided a comprehensive model methodology of how language studies should be conducted. From the first edition of 1880 to the fifth and last edition of 1920, extensive revisions were made, but the elaborately devised foundations needed no essential change. The two basic principles, the concept of the exceptionless operation of the sound law supplemented by the analogy principle, are accorded a place of special prominence. They are shown in their interdependent role within the larger framework of language studies, which, according to Paul, have to be **historical** studies, if they deserve to be called **scientific** (cf. Paul, 1920: 20).

Paul elaborates on another point of central importance that is fully shared by all Neogrammarians, that "the creation of each language item is always the work of an individual" (1920: 18). Equivalently, in the "Neogrammarian creed" (Osthoff and Brugmann, 1878: xii), the case is made that language "has its true existence only in the individual and that, accordingly, all changes in the life of language can start only in the speaking individuals." The significant role of the individual was discovered long before the Neogrammarians, first by von Raumer's research (cf. Raumer, 1837, 1861). The Neogrammarians, while greatly profiting from scholars like him, thoroughly evaluated those previous achievements and added to them their own. From their interest in contemporary speech and dialectal variation, Paul and especially Sievers, but also other Neogrammarians, drew logical conclusions, paying closer attention to sound articulation and psychological considerations related to sound formation in particular and language production in general. One example for the resulting research is Hermann Osthoff's article on how physiological and psychological elements interrelate to provide the basis for adequate understanding of sound law and analogy, devices that he identifies "as the principal and most important leading norms of [language] research" (Osthoff, 1879: 3).

As they repeatedly acknowledged, the Neogrammarians owed a great deal to Wilhelm Scherer (1841–1886), particularly to his notion of the constancy of language development. August Schleicher (1821–1868) had taught that language history consists of (1) a prehistorical period of language formation and (2) a historical period of language decay (Schleicher, 1850: 10–11). Scherer, in contrast, insisted "that the distinction between development and decay is based on an error. I for my part have only noticed development, only history" (Scherer, 1868: x). Constancy of language development assigns to the speaking individual the central role in creating, shaping, and changing language. The Neogrammarians utilized the inherent implications by making this

'perfectly obvious idea' serve as one of the fundamental tenets of their research procedures: "that the psychic and physical activity of man when acquiring the language ... and when reproducing ... the sound images received into consciousness must have been essentially the same in all periods of time" (Osthoff and Brugmann, 1878: xiii).

The amount of criticism leveled against the Neogrammarians is considerable. It began shortly after their first writings appeared, continued well into the 20th century, and was alive even toward the end of the 20th century, although by then it occurred much less frequently and was characterized by a greater amount of objectivity.

One major objection was directed against the preoccupation with the sound side of language, seemingly at the expense of syntax and the meaning component. The plausible answer is that investigating syntax or semantics presupposes an elaborate investigation of sound and morphological structures. The Neogrammarians did exemplarily well on both counts and made significant advances in the field of syntactic studies (cf. Delbrück-Windisch, 1871–1888). They even ventured into the field of semantics (cf. Kluge, 1883).

More to the point was the criticism that the Neogrammarians tended to equate sound laws with natural rather than with historical laws. This unwarranted charge persisted for some time, even though earlier overstatements were swiftly rectified, for instance, by Paul (1920: 68).

Their insistence on the exceptionless operation of the sound law, however, was never substantially modified. Leskien's 1876 formulation remained valid and was widely accepted: "If any number of deviations are allowed, it amounts to simply admitting that the object of investigation, language, is inaccessible to scientific inquiry" (Leskien, 1876). Refinement over the years became necessary only with regard to a more precise definition of the specific conditions under which a particular sound law is applicable in a particular speech community.

Graziadio Ascoli (1829–1907), who was both somewhat critical and highly appreciative of what the Neogrammarians had achieved, put the overall criticism into proper perspective: "When checking into the entire controversy thoroughly and comprehensively without bias, it seems indeed almost impossible that it could ever exist" (Ascoli, 1887: 171).

The Neogrammarians did not invent the procedure of how to handle sound change, but they made it a much more effective tool for language research by examining all of its possible frameworks and ramifications and, above all, by showing through an abundance of practical investigations that the procedure works.

See also: Ascoli, Graziadio Isaia (1829–1907); Bacon, Francis, Lord Verulam (1561–1626); Bopp, Franz (1791–1867); Braune, Wilhelm (1850–1926); Brugmann, Karl (1849–1919); Curtius, Georg (1820–1885); Delbrück, Berthold (1842–1922); Grimm, Jacob Ludwig Carl (1785–1863); Leibniz, Gottfried Wilhelm (1646–1716); Leskien, August (1840–1916); Osthoff, Hermann (1847–1909); Paul, Hermann (1846–1921); Pott, August Friedrich (1802–1887); Rask, Rasmus Kristian (1787–1832); Raumer, Rudolf von (1815–1876); Scherer, Wilhelm (1841–1886); Schleicher, August (1821–1868); Sievers, Eduard (1850–1932); Storm, Johan (1836–1920); Sweet, Henry (1845–1912).

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Neo-Gricean Pragmatics

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In 1967, H. P. Grice delivered his Williams James Lectures at Harvard. In these lectures, Grice presented a panorama of his thinking on meaning and communication – what he called his "tottering steps" (Grice, 1989) toward a systematic, philosophically inspired pragmatic theory of language use, which has since come to be known as 'Gricean pragmatic theory.' Since its inception, Gricean pragmatics has revolutionized pragmatic theorizing and has to date remained one of the cornerstones of contemporary thinking in linguistic pragmatics and the philosophy of language. This article undertakes to present and assess a neo-Gricean pragmatic theory of conversational implicature, focusing on the bipartite model developed by Laurence Horn and the tripartite model advanced by Stephen Levinson (*see* **Implicature; Maxims and Flouting**).

The Hornian System

Horn (1984, 1989, 2004) developed a bipartite model. In Horn's view, all of Grice's maxims (except the maxim of quality) can be replaced with two fundamental and antithetical principles: the quantity (Q-) and relation (R-) principles.

(1) Horn's Q- and R-principles:
  (a) The Q-principle:
    Make your contribution sufficient.
    Say as much as you can (given R).
  (b) The R-principle:
    Make your contribution necessary.
    Say no more than you must (given Q).

In terms of information structure, the Q-principle is a lower bounding pragmatic principle that may be (and characteristically is) exploited to yield upper bounding conversational implicatures: a speaker, in saying '. . . *p* . . . ,' conversationally implicates that (for all he or she knows) '. . . at most *p* . . .' (*see* **Implicature**). The *locus classicus* here is those conversational implicatures that arise from a prototype Horn-scale. Prototype Horn-scales are defined in (2) (see Levinson, 1987, 2000):

(2) Prototype Horn-scales:
  For <*S*, *W*> to form a Horn-scale:
  (a) A(*S*) entails A(*W*) for some arbitrary sentence frame A.
  (b) *S* and *W* are equally lexicalized, of the same word class, and from the same register.
  (c) *S* and *W* are 'about' the same semantic relation, or from the same semantic field.

An example of Q-implicature is given in (3) (the symbol '< >' represents 'Q-scale'; '+>' represents 'conversationally implicates'):

(3) <all, some>
  Some of his friends took a taxi to the station.
  +> Not all of his friends took a taxi to the station.

On the other hand, the counterbalancing R-principle is an upper bounding pragmatic law that may be (and systematically is) exploited to engender low-bounding conversational implicatures: a speaker, in saying '. . . *p* . . . ,' conversationally implicates that (for all he or she knows) '. . . more than *p* . . .' (Atlas and Levinson, 1981). This is illustrated in (4):

(4) Have you got a watch?
  +> If you have got a watch and know the time, please tell me what time it is.

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Neologisms

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New words frequently appear in English. Some words enter the language while others are used for a short time, or perhaps only once. During the last century, however, the rate of growth has accelerated. Neologisms draw on traditional word-formation devices, but some processes which were previously marginal have become common, for example, the new bound morpheme *-holic* as in the blend *workaholic*. Another process which has become productive is verb-headed compounds like *oil-paint*.

Neologisms Based on Common Word Formation Devices

One of the commonest word formation devices is compounding – combining two or more free morphemes. Compounds can be headed by any major lexical class, and all types are found in neologisms. A few examples are *jock talk* (N-N), *ripjob* 'negative publicity' (V-N), *dolphin-safe* (N-ADJ), *fail-safe* (V-ADJ), *red-hot* (ADJ-ADJ) *after-born* 'child born after the father's death' (P-ADJ), *over-quick* (P-ADV), and *off base* (P-N).

Traditional textbooks such as Marchand (1960), Selkirk (1982), Bauer (1983), and Spenser (1991) claim that verb-headed compounds are rare. The few existing ones are backformed by deletion of a suffix such as *-er* or *-ing* or formed by, for example, converting a compound noun into a verb. Examples are *sky-dive*, derived from *sky-diving*, and *carbon-copy*, which becomes a verb by being converted from a noun compound (Bauer, 1983: 208). The compound *self-destruct* is backformed from *self-destruction*. Although verb-headed compounds may have been rare in the past, this is no longer true. They occur so frequently in print and in spontaneous speech that it is reasonable to conclude that such compounds have become productive in recent years. In addition to the few listed in the works cited (*air-condition*, *baby-sit*, and *breast-feed*) are many other already conventional verb-headed compounds: *lip-read*, *gift wrap*, *copyread*, *custom-make*, *double-park*, *brain-wash*, *flight-test*, *test-drive*, *spot-check*, *window-shop*, *plea-bargain*, *stir-fry*, *chain-smoke*, *handpick*, *stage-manage*, *code-switch*, *guest-conduct*, *dry-clean*, *sun-dry*, *spot-weld*, *backpedal*, *channel-surf*, and *spell-correct*. Many verb-headed compounds are used in sports: *bounce-pass*, *pinch-hit*, *bucket-drive*, *speed-climb*, *jump-shoot*, *jump-pass*, and *kick-turn*. Many compounds are formed with the verb *hop*, as *in bed-hop*, *castle-hop*, *island-hop*, and with initial *self*:

self-identify, *self-calm*, *self-censor*, *self-limit*, *self-evaluate*, and *self-regulate*. Examples from spontaneous speech include *people-watch*, *reality-test*, *guilt-trip* (*she guilt-tripped us into doing that*), *trail-blaze*, *cattle-ranch*, and *oil-paint*.

Affixation

Another productive process is affixation, where a derivational suffix or prefix is attached to a word or a bound morpheme. Neologisms often use relatively unproductive affixes. Recent examples include *girl-**dom***, *astronaut**ess***, *market**eer***, ***be**jeaned*, ***re**tribalize*, and ***circum**stellar*. Some neologisms use unusual bases, as in *otherize* 'make someone different from other people'.

Conversion

Conversion is a process that turns a word belonging to one part of speech into another (e.g. noun → verb or verb → noun). Examples of noun-to-verb conversion are *to impact*, *to blackhole*, and *to network*. Examples of adjective-to-noun conversion are *a given* and *a nasty*.

Clipping and Acronyms

Clipping and acronyms have also become popular and productive in the 20th century. Clipping or shortening simply deletes part of a word: *veteran*, *veterinarian* → *vet*; *laboratory*, *Labrador* → *lab*. Although most clippings delete the end of the word, in some the beginning is removed: *omnibus* → *bus*, *airplane* → *plane*, and in a few, only the middle remains, such as *flu* ← *influenza*. Acronyms are formed by taking one or more of the first letters of a phrase, as in *SARS* (*severe **a**cute **r**espiratory **s**yndrome*), *AIDS* (*acquired **i**mmune **d**eficiency **s**yndrome*), *RAM* (*random **a**ccess **m**emory*). Many acronyms are created so that they form an existing word with a relevant meaning: *NOW* (***N**ational **O**rganization of **W**omen*), *BASIC* (***B**eginner's **A**ll-purpose **S**ymbolic **I**nstruction **C**ode*). Clipping and acronyms are extremely productive and efficient because they reduce long phrases and words, a process described by George Zipf (1949), who formulated a law which says that frequently used forms tend to become shorter.

Blends

Blends are underlying compounds which take one word and part of another word or parts of two words. The part of a word is called a splinter. Common examples are *beefalo* ← *beef* + *buffalo*, *smog* ← *smoke* + *fog*, *camcorder* ← *camera* + *recorder*, *sitcom* ← *situation* + *comedy*. The splinter is formally identical to a clipping, but whereas clippings function as full words, splinters do not. A sentence like *phone the vet* (*telephone the veterinarian*) is fine, but not *I am watching a sit* (*sitcom*) *right now*.

A few blends were recorded as early as the 19th century: *brunch* ← *breakfast* + *lunch* (1886 OED/MW), *slanguage* ← *slang* + *language* (1879 OED/MW), *solilioquacity* ← *soliloquy* + *loquacity* (1895 MW). Blends have become more common: *motel* ← *motor* + *hotel* (1925), *transceiver* ← *transmitter* + *receiver* (1934), *permafrost* ← *permanent* + *frost* (1943). Many of these etymological blends have become conventional words and speakers are no longer aware of their more complex sources. However, the speed of creating blends has accelerated so that blending can no longer be considered a marginal word formation device. Many novel blends are not defined, and readers and listeners are expected to figure out their source words and the appropriate meaning from the context.

The Structure of Blends

The commonest type of blend is a full word followed by a splinter: *wintertainment* ← *winter* + *entertainment*, *chatire* ← *chat* + *satire*, *vodkatini* ← *vodka* + *martini*. Blends can also begin with a splinter, followed by a full word: *narcoma* ← *narcotic* + *coma*, *cinemenace* ← *cinema* + *menace*.

Also common are blends consisting of two splinters. Two types are possible: (1) the beginning of one word is followed by the end of another word: *psychergy* ← *psychic* + *energy*, *hurricoon* ← *hurricane* + *typhoon* or *monsoon*, *cheriodical* ← *cheery* + *periodical*, or (2) both splinters are the beginnings of words: *biopic* ← *biographical* + *picture*, *sitcom* ← *situation* + *comedy*.

Blends typically show overlap in spelling and pronunciation. For example, in *wi**nter**tainment*, the bold letters belong to both source words: *winter* and *entertainment*. In *cine**m**enace*, the *m* belongs to both words. Sometimes the overlap is not simply of contiguous letters or sounds: ***astro**city* ← *astronaut* + *atrocity* and ***flus**tratred* ← *flustered* + *frustrated* distribute overlapping letters (and sounds) noncontiguously.

A fourth type of blend consists of complete overlap. Although nothing is missing, a part of the blend belongs to both words: ***sex**ploitation* ← *sex* + *exploitation*, ***pal**imony* ← *pal* + *alimony* 'money paid to an unmarried partner after breaking up', *coca**colo**nization* ← *Coca-Cola*® + *colonization*, ***cat**titude* ← *cat* + *attitude*, *W**heat**ables*® ← *wheat* + *eatibles*.

A fifth type of blend where one word is embedded in another is rare and has not increased in frequency. Examples are *entreporneur* ← *entrepreneur* + the clipping *porn*, *ambisextrous* ← *ambidextrous* + *sex*.

Some blends are eye blends, that is, they must be read: *leerics* ← *leer* + *lyrics*, *eracism* ← *erase* + *racism* (bumper sticker), *shampagne* ← *sham* + *champagne*. Blends may involve the deletion of some letters so that the neologism conforms to English spelling, as in *abusage* ← *abuse* + *usage*, instead of *abuseage*.

A very small number of blends consist of three source words. Examples are *intelevisionary* ← *Intel* + *television* + *visionary* (a journal article heading), *teenangstrel* ← *teenaged* + *angst ridden* + *minstrel* (Glowka *et al*., 2003: 339).

Although blends are sometimes created in casual conversation, they are more likely to appear in print, especially in advertising, product names, and magazine and newspaper headings. Product names: *Craisins*® ← *cranberry* + *raisins* 'dried cranberries', *Dijonnaise*® ← *Dijon* + *mayonnaise* 'mustard and mayonnaise', *Eurotard*® ← *Europe* + *leotard* 'style of dancewear', *Gogurt*® ← *go* + *yogurt* 'portable yogurt'; shop names: *Zoofari* ← *zoo* + *safari*, a gift shop at a zoo, *Thriftopia* ← *thrift* + *utopia*, the name of a thrift shop; hybrids of plants and animals: *broccoflower* ← *broccoli* + *cauliflower*, *cockapoo* ← *cocker spaniel* + *poodle*; events: *ARTstravaganze* ← *art* + *extravaganza*, an art auction. Halloween events included a *spooktacular event*, *Howl-o-scream*, a haunted house, and *Halloweek*, a week of scary movies.

Splinters Become Morphemes

Sometimes splinters occur in several blends. For example, *-topia* (← *utopia*) is found in *Fruitopia*®, *Thriftopia*, and *Artopia* (names of shops); *-ploitation* is found in *sexploitation*, *blaxploitation*, and *assploitation* (a criticism of a Nike ad showing a runner's derriere). If there are only a few examples, the process of analogy can account for the semi-productivity. However, splinters like *-thon*, *-holic*, *-gate* 'scandal', and *-scape* have spawned so many examples that it is plausible to argue that a new morpheme has been created (Lehrer, 1998).

-Thon ← *marathon* means something like 'event that lasts for a long time.' Other implications may be 'difficult' and 'fundraiser for charity.' Examples are *telethon*, *walkathon*, *bikathon*, *rockathon*, *dancethon*, *paint-a-thon*, *sew-a-thon*, *pianothon*, *performancethon*, *smilathon*, *soccer mom-athon*, *eat-a-thon*, *swimathon*, and *gore-a-thon* (in a review of Mel Gibson's *The Passion of the Christ*).

-Holic ← *alcoholic* 'addict' can be freely added to nouns and verbs, and it has produced dozens of neologisms: *workaholic*, *chocoholic*, *foodaholic*, *drugaholic*, *shopaholic*, *spendaholic*, *controlaholic*, *faxaholic*, *newsaholic*, *videoholic*, and many more.

-Gate 'political scandal' began with *Watergate* and generated *Irangate*, *Whitewatergate*, *Contragate,* and more recently *Skategate* 'scandal involving the attack on skater Nancy Kerrigan' (Glowka *et al*., 2000a: 190). French and Hungarian have borrowed *–gate* for their political scandals.

-Scape ← *landscape* 'view or representation of a scene' occurs in *seascape*, *mountainscape*, *oceanscape*, *rockscape*, and semantic extensions like *soundscape*, *spacescape*, *mindscape*, and *dreamscape*.

Most of these splinters occur at the end of the word, but a few can be initial, as *Mc* ← *McDonald's*, which has given rise to *McJobs* 'low-paying jobs', *McMansions* 'developments of large, expensive, identical houses', *McGarbage* 'waste created by disposable dishes, cutlery, and packaging', as well as the neologisms created by the McDonald Corporation, such as *McMuffin*. Another very popular initial splinter is *e-*← *electronic* (Safire, 2003), in dozens of items: *e-commerce*, *email*, *e-tail* (*electronic* + *retail*), *e-slammer* 'prison system with a web site' (Glowka *et al*., 2000b: 435), *e-bucks* 'electronic money', and *e-celebrity* 'a famous person promoting an Internet company' (Glowka *et al*., 2001a: 86).

Although some linguists and lexicographers consider these splinters to be prefixes or suffixes, they are best considered as bound bases, in particular, as combining forms. They are like many classical bases which must be combined with something else, such as initial combining forms *eco-* and *bio-*, or *-crat* and *-ology* (Bauer, 1983; Warren, 1990; Lehrer, 1998).

Trendy Neologisms

Neologisms often involve many kinds of wordplay: word-forming devices, rhymes, puns, allusions, and metaphors. For example, *yuppie* (*yuppy*), influenced by *hippie*, starts with the acronym *YUPP-* for *young urban professional people* with the added suffix *-ie* or *-y*, and this has generated many analogous terms, such as *buppie* ← *black urban professional people*, *maffy* ← *middle-aged affluent folks* (Glowka and Melançon, 2002: 316), In addition, *yuppie* has become the base of a verb, *yuppify*, and an adjective, *yuppie-ish*. *Malaprophesizing* ← *malapropism* + *prophesizing* (Glowka *et al*., 2001c: 417) 'telling the future inadvertently through verbal mistakes and slips' is a blend of two words, each morphologically complex.

The Internet has given rise to a large number of neologisms. A regular column in *American Speech*, 'Among the new words,' devoted two issues to neologisms concerning computers and the Internet in 1999 (vol. 74, no. 3, pp. 298–323 and no. 4, pp. 403–425). There are many compounds with *virtual* as the first

word or *techno-* and *e-*as initial combining forms. Analogous to *e-*we find *m-commerce* 'business conducted from a mobile telephone' (Glowka *et al.*, 2001c: 417). *Dot com* is a pronounced form of the Internet expression written as *.com*, which has spawned neologisms like *dot snot* 'arrogant young person with wealth derived easily through the Internet' (Glowka *et al.*, 2001c: 417). *Dot bomb* refers to a failed Internet business (Glowka *et al.*, 2001b: 307). *Dot-orging* is 'changing from a commercial establishment *.com* to an organization, *.org*'. As with blends, compound words may be segmented in unconventional ways. *Weblog* ← *World Wide Web* + *log* 'personal website full of commentaries' has been clipped to *blog* and converted to a verb *blogging* and an agentive *blogger*.

Many neologisms used in a highly specific context, such as a heading for a newspaper or magazine article, will disappear. But some will enter the language. Brand names will remain if the product succeeds. Other neologisms have entered English as permanent words, but are still informal, even slang, such as *yuppie* and *chocoholic*. A few, however, have become or will be permanent additions to Standard English and no longer elicit responses to newness or trendiness.

See also: Affixation; Back-Formation; Blend; Compositionality: Semantic Aspects; Compound; Conversion; Creativity in Language; Morphological Typology; Morphological Universals; Nonmorphological Word Formation; Phonetically Motivated Word Formation; Semantic Change, the Internet and Text Messaging; Splinters; Syntax of Words; Word Formation.

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Nepal: Language Situation

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Successive decennial censuses of Nepal have counted the mother tongue speakers of an increasing number of languages: only 18 in 1981, but 31 in 1991 and 92 in 2001. This reflects a change in official attitudes to Nepal's linguistic diversity, with the old Panchayat-period (1962–1990) insistence on the exclusive dominance of Nepali giving some ground after the democracy movement of 1990 to the demands and assertions of minority ethnic and linguistic activists.

The censuses record that the proportion of the population that reports the national language, Nepali, to be its mother tongue, has fallen from a high of 58.4% (in a population of 15 million) in 1981 to 48.6% (in a population of 23 million) in 2001. Of the 92 languages enumerated in the 2001 census, however, only 16 recorded a total of mother tongue speakers in excess of 100 000:

Indo-Aryan Languages:
- Nepali 11 053 255 [48.6%]
- Maithili 2 797 582 [12.3%]
- Bhojpuri 1 712 536 [7.5%]
- Tharu 1 331 546 [5.9%]
- Awadhi 560 744 [2.5%]
- Bajjika 237 947 [1.05%]
- Rajbangsi 129 829 [0.58%]
- Urdu 174 840 [0.77%]
- Hindi 105 765 [0.47%]

Tibeto-Burman Languages:
- Tamang 1 179 145 [5.2%]
- Newari 825 458 [3.6%]
- Magar 770 116 [3.4%]
- Bantawa 371 056 [1.64%]
- Gurung 338 925[1.5%]
- Limbu 333 633 [1.4%]
- Sherpa 129 771 [0.58%]

This new listing was in some senses more reliable than previous ones: for instance, it distinguished between over 20 languages, most of them mutually incomprehensible, which had previously been lumped together as 'Rai-Kiranti'. On the other hand, it gave greater scope for minority groups to achieve a higher profile by returning their ethnic language as their mother tongue, thus presenting what is perhaps an exaggerated picture of Nepal's undeniable language diversity. In fact, five languages (of which four were Indo-Aryan) were claimed as mother tongues by 80% of the population, while 28 languages were claimed as mother tongues by fewer than 1000 people each and 30 by fewer than 10 000 people each. The claim of some of these smaller languages (e.g. Haryanwi, Hyolmo, Kisan, Lhomi) to be languages rather than dialects is disputable.

Nepali was brought into the region from the far west by Khas and Rajput immigrants sometime before the 10th century. It is therefore strongest in the western hill regions: in some districts, it is the only language spoken. Since its introduction, the Nepali language and its speakers have moved steadily eastwards, and Nepali is now firmly established as the lingua franca throughout the hills and mountains. The strong relationship between ethnic identity and language, and heightened ethnic awareness in Nepal during the 1990s, have influenced 2001 census returns, but levels of bilingualism with Nepali continue to grow nonetheless.

Tibetan and Tibetan dialects are spoken all along the northern border, while speakers of a great variety of Tibeto-Burman languages inhabit hill regions throughout central and eastern Nepal. These languages become increasingly diverse as one moves from west to east. Newari is still spoken by around half of the inhabitants of the towns of the Kathmandu valley, and the maintenance of the language and the development of its literature are buttressed by a strong politicocultural movement.

Languages common to populations both north and south of the India–Nepal border are current in the Tarai, and in some areas Hindi is used more commonly than Nepali as the lingua franca. Speakers of Maithili predominate in the lowland districts of the Sagarmatha and Janakpur zones, speakers of Bhojpuri in those of the Narayani zone. The Austro-Asiatic languages Santali and Satar are spoken by 40 000 people in districts adjacent to the border with Bihar and Bengal, while Tharu holds out among tribals in the remaining forests of the inner Tarai, particularly in the valleys of Dang and Deokhuri. In recent decades there has been a dramatic change in the composition of the population of the Tarai as hillspeople are resettled in the plains: this has led to a strengthening of the status of Nepali there.

Since the mid-20th century successive governments of Nepal have been concerned to standardize and develop Nepali as the national language, and have traditionally limited the use of other languages in most spheres of public life. The 1990 constitution reflected a softening in this attitude: Nepali is the *rastrabhasa*, the language of the nation, but the other mother tongues of Nepal are recognized as *rastriya*

bhasa, 'national languages,' too. Education in the mother tongue medium is permitted at preprimary level, and English is taught at secondary level, but Nepali remains the official medium of all state education. It is also the sole language of government and of the law courts. Nepali and English were the only languages used on Radio Nepal and Nepal TV until 1990, but since then news has been broadcast in a wide range of languages, including Newari, Maithili, and Tamang. Nepali is the main language of journalism, though the Nepali employed by official and government media is Sanskritized and high flown. The national literacy rate is 59.6%, up from 39% in 1991, though literacy rates vary widely between the various castes and ethnic groups, and between urban and rural populations. The majority of literature is published in Nepali, though significant quantities are available in other languages – notably Maithili, Newari, and Hindi. Sanskrit and classical Tibetan are important for religious purposes.

In hill regions, the trend has until recently been toward the diminution of minority languages, and most now show evidence of strong Nepali influence, particularly with regard to their word-stock. However, many minority communities, particularly those that speak Tibeto-Burman languages, are now concerned to protect and defend their languages, and many initiatives are under way to achieve these aims. In the Tarai, demands have been made for the constitutional recognition of Hindi as a second national language, but it is unlikely that these will be granted and in any case Maithili is a more potent ingredient of local identity.

See also: Applied Linguistics in South Asia; Bilingualism; Education in a Multilingual Society; Hindi; Indo–Aryan Languages; Indo–European Languages; Language Education Policies in South Asia; Language Policy in Multilingual Educational Contexts; Lingua Francas as Second Languages; Minorities and Language; Multiculturalism and Language; Nationalism and Linguistics; Nepali; News Language; Radio: Language; Sino-Tibetan Languages; Teaching of Minority Languages; Tibetan.

Language Maps (Appendix 1): Map 108–111.

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Nepali

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Nepali was introduced into the central Himalaya by immigrants who entered from the northwest before the 10th century. Its ascendancy over the other languages of the region is linked to a process of political domination and cultural assimilation. Written in the Devanāgarī script, its earliest records are 13th-century royal inscriptions from far western Nepal, though Nepali was rarely used for literary purposes until the 18th century, and its first major work, the *Nepālī Rāmāyaṇa* of Bhanubhakta Acharya, was written in the mid-19th century.

Among the other major Indo-Aryan languages, Hindi is Nepali's closest cousin, and many literate Nepali speakers are proficient in Hindi. However, in its everyday vocabulary Nepali preserves many Sanskrit and Sanskrit-derived words (e.g., *ghām* 'sun', *khukurā* 'chicken', *ritto* 'empty') that have been displaced by Perso-Arabic loans in Hindi, and the Arabic and Perso-Arabic element of its lexicon is

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Netherlands Antilles: Language Situation

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Before the first Europeans appeared here, the islands were inhabited by Arawaks and Caribs. In the 17th century, the islands were colonized by the Netherlands, and plantations were established using the labor of African slaves until slavery was abolished in 1863. The economy is now based mainly on the oil industry and tourism.

The population is 218 126 (according to a July 2004 estimate). The largest part of the population descends from the African slaves who were once traded here for work. A smaller portion of the population comprises Caribbean Indians, Europeans, and Asians. The official language is Dutch on all islands. The most widely used language on the Leeward Islands is Papiamentu (a creole formed by Dutch, English, Spanish, and Portuguese), which is spoken by more than 80% of the population. On the Windward Islands, the local language is English, which is also spoken in all other parts of the Netherlands Antilles. Spanish, Virgin Islands Creole English, and Sranan are also spoken everywhere. The language of instruction in schools is Dutch on the Leeward Islands and English and Dutch on the Windward Islands. On the Leeward Islands, Papiamentu has been introduced fully in kindergartens and is taught in primary schools as a subject. The adult literacy rate is 96.7%.

See also: Aruba: Language Situation; Guadeloupe: Language Situation; Pidgins and Creoles: Overview.

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Netherlands: Language Situation

J W M Verhoeven

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Compared to many other countries, the language situation in the Netherlands is straightforward in that there is only one national, official language – that is, Dutch. The designation of Dutch in the language itself is '*Nederlands*,' and it is used as the language of government, administration, education, and culture by around 15 000 000 people. Dutch emerged as the country's standard language in the 17th century from the Holland and Brabantine dialects. The characteristics of modern standard Dutch are quite homogeneous, although regional differences in pronunciation have to be recognized.

Matters of linguistic policy in the Netherlands are the responsibility of the Dutch Language Union, which is an intergovernmental institution founded in 1980 in order to promote the integration of Dutch language and literature in the Netherlands and the Dutch-speaking community in Belgium, that is, in Flanders. It coordinates policies regarding Dutch spelling, grammar, dictionaries, terminology, the teaching of Dutch as a foreign language, and literature.

The main foreign language taught at secondary schools is English. In addition, German and French are widely offered, and occasionally it is possible to take Spanish. Some schools also provide the opportunity to study Arabic and Turkish. The medium of instruction at university level is Dutch. It is, however, common practice to teach language-related subjects for language degrees in the target language.

In Friesland, the northeastern province of the Netherlands, Frisian (that is, West Frisian) is recognized as an official language besides Dutch: it is spoken either as a first or a second language by around 400 000 people, or two-thirds of Friesland's total population. Efforts to increase the status of Frisian have met with some success. In 1980, the language became a compulsory subject at primary schools in the province, and it is offered as an optional subject at 25% of secondary schools in the region. Furthermore, there are regular religious services, radio and television broadcasts, and newspaper articles in Frisian.

See also: Belgium: Language Situation; Dutch.

Language Maps (Appendix 1): Map 135.

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Neurolinguistics from the Middle Ages to the Pre-modern Era

H A Whitaker, Northern Michigan University, Marquette, MI, USA

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Very Early Studies and an Overview

One of the earliest observations of disorders of language is in the Pharonic medical document, *The Edwin Smith Surgical Papyrus*, purchased in 1862 by Edwin Smith and translated in 1930 by James H. Brestead (Wilkins, 1964). Although the papyrus itself dates from the 17th century B.C., as Egypt was moving toward the zenith of the Pharonic period, it derives from an earlier text c. 3000–2500 B.C. Case 22 (out of 48) describes the patient who, having sustained a blow to the temple sufficient to break the skull, is rendered aphasic: "If thou callest to him and he is speechless and cannot speak" (Breasted, 1930). A cuneiform clay tablet c. 1500 B.C., described an event in the life of the Hittite king Mursilis II: while riding in his chariot during a thunderstorm, he was rendered speechless. Mursilis attributed this to an intervention by a storm god; the description of the event suggests a transient ischemic episode, from which the king later recovered.

As described by Benton and Joynt (1960), there are examples of loss of speech in the Hippocratic corpus circa 400 B.C., in Latin texts c. 1st century A.D., in a number of Latin texts from the 10th to the 14th century, in Renaissance texts such as the Schenck compendium of 1558, in various 17th century texts such as the Schmidt and Rommel cases, and in 18th-century books such as the Wepfer compendium of 1727 (based on material from the 1660s). The late 18th and early 19th century phrenological

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contributions of Franz Joseph Gall and his colleague Johann Gaspar Spurzheim and the phrenologically inspired case studies of Alexander Hood, along with the more orthodox medical work of Claude François Lallemand, Jean Baptiste Bouillaud, Jacques Lordat, and Marc Dax, inaugurated a period of intense interest in the brain localization of language functions, culminating in the classic work of Paul Broca, Theodor Meynert, Carl Wernicke, Henry Charlton Bastian, John Hughlings Jackson, and others during the late 19th century. Although questioned on occasion by wholist views such as those of Henry Head and Kurt Goldstein, the localization model presevered until, by the second half of the 20th century, classical neurolinguistics became firmly entrenched in both clinical and experimental neuroscience research.

Medieval and Renaissance Neurolinguistics

The longest lasting model of functional brain localization has been Medieval Cell Doctrine. Derived in part from the ideas of the Alexandrian physicians Herophilus (c. 270 B.C.) and Erasistratus (c. 260 B.C.) and in part from Aristotle's concepts of sensation, perception, cognition and memory, Medieval Cell Doctrine, in its particular variant, Ventricular Theory (MCD-VT), was first articulated by the Church Fathers Nemesius (c. 400), Poseidonius (c. 370), and St Augustine (354–430), with later Arab contributions, particularly from Avicenna (980–1037). MCD-VT was a model based on fluids (spirits) and fluid flow for the apparent reason that thoughtful early philosophers must have realized that something in the brain must move from place to place in order to be responsible for the separable functions of creating a mental image (*sensus communis*), engaging cognitive operations, and storing the result in memory, a model loosely based upon Aristotelian descriptions of mental functions. These early philosophers evidently hypothesized that something passes from sense organs to the brain, then through the brain and back to muscle effectors; the animal spirits (in the Galenic sense) were likely as good a candidate as any available. MCD-VT had become sufficiently entrenched in medicine and philosophy that it was the dominant model of brain function well into the 17th century, seen for example in the mechanistic model advocated by René Descartes (1596–1650). In point of fact the basic principle of MCD-VT – that there are different functions located in different places in the brain – as well as other vestiges of this two-millenia-old idea, remain as recognizable features of contemporary cognitive neuroscience and neurolinguistics.

From the 11th century through the Renaissance, one finds textual discussions and graphic representations, some worthy of being identified as Renaissance art, of MCD-VT; accompanying these one occasionally finds what one could call neuropsychological case reports, usually interpreted in terms of MCD-VT, typically although not invariably accepting the standard model, which placed memory in the third ventricle. Memory, in turn, was typically described as verbal memory, making it apparent that many of these cases would square with what 20th-century authors called aphasia. Language, or more precisely speech output, was, *ab propagatio*, situated in the third cell or ventricle, an association perhaps derived from Galen's correct belief that motor functions were a property of the cerebellum. Whether the cause or the result of a view of memory as verbal memory, it is clear that memory and language were so closely connected that memory disorders were language disorders and vice versa. For example, consider this case from an 11th-century manuscript: Guillaume de Conches (1080–1150) reported that Solin had spoken of a man who suffered traumatic injury to the last cell of the brain and who fell into an amnesia so profound that he had forgot his own name. Another report, by Brassavola, from the 16th century, refers to a Corsican soldier who, after recovery from a severe head wound, could not remember anything, could not speak, and was so out of his mind that he could not understand nor say anything. Many of these cases were compiled by Johannes Schenck (1584) and by Johannes Wepfer (1727), both of whom are discussed below. Others were compiled in Jules Soury's *Le Système Nerveux Central* (1899).

Eventually the Ventricular Theory component of Medieval Cell Doctrine fell by the wayside, the demise beginning in the 17th century, as some of its key components (e.g., animal spirits flowing through hollow nerves or in and between empty ventricles) were challenged both by experimental and by theoretical arguments. However, other aspects of the model, for example, the concepts of localization, of information flow, of the links between memory, language, and motor function, and the idea that memories are stored images, were not only never challenged but seem to have become absorbed into post-Renaissance models of brain function. From at least the 16th century, a correlation between language disorders and particular cerebral lesions (as opposed to ventricular or simply 'in the brain' lesions) has been recognized. The late-Renaissance physician Johannes Schenck von Grafenberg (1530–1598) published '*Observationes medicae de capite humano*' (Basel: Frobeniana) in 1584; it is a treasure-house of neuropsychological observations, including a number

of observations on language disorders. There are contributions from 20 Greek authors, 5 classic Latin authors, 11 medieval Arabic and Jewish authors, 37 barbarian Latin authors, 292 recent Latin authors, and 139 nonmedical authors. Schenck also included 64 unpublished cases reported by his contemporaries. His encyclopedic collection of clinical information, all with an explicit bibliographic citation, has no counterpart in its time or earlier. At least 16 of Schenck's observations mention language disorders *qua* memory disorders subsequent to brain lesions. Although many case descriptions are superficial, some include very clear observations, demonstrating that neuropsychological knowledge was in fact far more advanced than one might have surmised. Armand Trousseau, a contemporary of Broca, cited Schenck as an early physician who appreciated the essential nature of aphasia.

A sampling of Schenck's cases (see Luzzatti and Whitaker, 1996) illustrate the level of description in this early neurolinguistic work. Reporting a 14th-century case from Gentile da Foligno and a 16th-century case from Cristobal deVega, Schenck notes the selective loss of the alphabet and object names, accompanied by loss of reading and writing. Another 16th-century case from Tertius Damianus reports that a patient studied his letters again, an early written documentation of rehabilitation. Schenck recorded an impressive 16th-century description by Conrad Lycosthenes of his own right hemiplegia and aphasia, described as a loss of voice. The inability to speak lasted 12 days, and the severe motor deficits lasted 3 months. Lycosthenes had even lost rote-memorized passages such as the Mass but had retained internal language and thinking; he was able to communicate by pointing, with his left hand, to letters in sequence in order to form words. Evidently one of his friends had hit upon the idea of writing the alphabet down on a board as a communication aid. Citing Jakob Oethaeus, Schenck observes that the tongue may retain its motor functions when word memories have been lost, thus establishing very early the dissociation between articulatory control and language production that became a focal point of discussions in the early 19th century. Clearly the Renaissance's neurolinguistic legacy to the 17th century's so-called age of reason and scientific discovery was considerable.

17th and 18th Centuries: Johannes Jakob Wepfer

Wepfer (1620–1695) was an acquaintance of Thomas Willis and, although less well known than either Schenck or Willis, was in fact one of the most important 'neurologists' of the 17th century. Author of several works on stroke, Wepfer's work that is pertinent to the history of neurolinguistics is '*Observationes medico-practicae de affectionis capitis internis et externis*,' which was written around 1690 but available only in a posthumously published version of 1727. The book is notable for its accuracy, colorful clinical descriptions, and systematic organization. In observation #98, 'loss of memory,' Wepfer describes a transient language disorder with selective impairment of proper names, accompanied by a syntactic disorder; no acalculia nor other neuropsychological deficits were reported. The following is translated and paraphrased from the Latin:

> A 53-year-old man returning from a walk vomited several times. He spoke both in Latin and German, but his words did not relate to the topic of conversation nor were they answers to questions put to him. He continuously repeated the same utterances, (became) stuck on the pronunciation of words, and frequently complained that he could not express his thoughts in words. A month later he suddenly forgot all names, even his own. He could not name any object, neither in Latin nor in German. He gave the impression that he was able to recognize objects and people but the words he uttered were alien and incoherent.
>
> After one more month, his memory was almost completely restored; his faculty of hearing and repeating was adequate and he could count, add, subtract and divide without error. Occasionally, he could not find the proper names of a person or a places as quickly as usual and from time to time he could not find some of the little words of the sentence. He is able read again and writes full texts without hesitation. His faculty of judgement is normal and he was able to fulfill his duties as before. When he was talking, I could observe him from time to time violate syntactic rules and, against the structure of German sentences, he would antepose one word to another (word-order errors) and sometimes he could not complete some little word (inflectional morphology errors). In general he recognised his errors and corrected them (Luzzatti and Whitaker, 1996: 161–162).

In addition to its interest as an early study of agrammatism, Wepfer's case is also exemplary of most, but not all, classical aphasia research on grammatical or syntactic disorders up to the 1960s: a descriptive summary of the omission or misuse of function words or inflections in spontaneous or elicited speech samples of patients with an expressive aphasia. It is exemplary as well of an analysis that made no attempt to explain the disorder but rather described it, a tradition in neuropsychology that still has its advocates.

Wepfer's Observation #102, a loss of memory followed by melancholia, is instructive for its neuropsychological detail:

> A most reverend 44-year-old cleric sat in judgement on a controversy proposed by a peasant; however, when he tried to express his judgement, he could not find the words he wanted to communicate his thoughts. From that moment on, he lost his memory so much that he no longer was able to call the onlooker by his name nor could he name any object. He clearly saw the colours and features of objects and drawings presented to him, but he could neither read nor combine letters. All his remaining outward and inner sensations were normal. He recognised his loss of memory and the errors he made while speaking. There was no trace of paralysis; he could pronounce every letter, even the R.
>
> The site of suffering is neither in any nerve pertaining to both types of sensation, because he hears, sees, tastes, etc., nor in the nerve subserving speech, because he can pronounce all sounds, even the R, nor in the brain stem or spinal cord, because there is no trace of movement disorder. It seems to be located in that part of the brain, where the images of objects are organised. These may be retrieved, as from a store, and, when required, supplied by means of the mnestic faculty. What part of the brain this might in fact be, cannot be defined, but clearly it is not an involvement of the entire brain, because the patient is not drowsy, and has lost neither his ingenuity nor his understanding (Luzzatti and Whitaker, 1996: 162).

Compared to the similar collection (in organization and focus) of clinical cases compiled by Schenck, Wepfer's cases were more carefully selected, most were followed by autopsy, and the etiological-pathogenic commentary is notably advanced in relation to the *Zeitgeist* of the 17th century, particularly in comparison with Wepfer's contemporary, Thomas Willis. Wepfer is arguably the first modern physician to discuss the nature of cognitive functions, particularly language, using a neuropsychological approach. To our knowledge, he is the first to consistently report the side of the lesion and the presence of aphasia; however, Wepfer does not overtly discuss a relationship between language disorders and left hemisphere lesions, in spite of the fact that he often wrote, "*paralysis dextri lateris, cum loquelae impedimentum*." Luzzatti and Whitaker (1996) speculated that perhaps the philosophical milieu in which Wepfer was studying and working did not lead him to appreciate the relevance of his own observations to laterality issues; on the other hand, perhaps his silence on the matter of hemispheric asymmetry was out of a concern for an unwelcome reception by the church for what would have obviously been a materialistic viewpoint. After all, Galileo had been accused less than 30 years earlier, and the squares of Europe still smelled of the stakes of the Inquisition.

Other 17th-century neurolinguistic reports worth mentioning include one by Johann Schmidt (1624–1690), a case of severe fluent paraphasia with right hemiparesis; the patient showed good recovery of oral language and agraphia, but not for his reading disorders:

> A leading citizen among us, Nicholas Cambier, an old man of 65 years, was seized with a very severe attack of apoplexy which all his attendants feared would lead to his death. Upon returning home, it was evident that he has had a metastasis to the right side producing hemiplegia; the tongue started doing its task with difficulty, so that he could say many things but in an incorrect way. He was incapable of expressing the feelings of his mind; he substituted one word for another so that his interlocutors had difficulty in determining what he wanted. Furthermore, he could not read written characters, much less combine them in any way. He did not recognise a single letter nor could he distinguish one from another. But it is remarkable that, if some name were given to him to be written, he could write it promptly, and that with the correct spelling for any of the language he previously knew. However, he neither could read what he had written, even though it had been done by his own hand, nor could distinguish or identify the characters. For if he were asked what letter this or that was or how the letters had been combined, it seemed as if he had done it only by chance or through his habit of writing. It appeared that he wrote without deliberation. No teaching or guidance was successful in inculcating recognition of letters in him. It was otherwise with a certain stone cutter in our country, Wilhelm Richter came to see me after his apoplexy receded because he was not able to read at all or to recognize letters. However, he learned the alphabetic elements of the language again in a short time. He then combined them and attained perfection in his reading (Benton and Joynt, 1960).

Another is Peter Rommel's (1643–1708) 1682 study of a patient whose spontaneous output was reduced to a few automatisms; however, serial speech, prayers, and comprehension were preserved. Considering the cases by Schmidt, Rommel, Schenck, and Wepfer, it is clear that scientists of the 16th and 17th centuries were able to clearly distinguish language disorders from general cognitive deficits, language production versus comprehension deficits, lexical from sound or letter errors, and both syntactic and morphological impairments, not to mention differential bilingual impairments. Although the neuropsychological modeling needed to complete these analyses did not begin to develop until the beginning of the 19th century, the 18th century also witnessed more systematic clinico–pathological observations of memory disorders and language disorders, with frequent report of the cooccurence of aphasia with right-sided paralysis. Giovanni Baptista Morgagni, widely regarded as the founder of clinico–pathological

correlations, reported several cases of aphasia in his 18th-century compendium on the seats and causes of disease.

Franz Joseph Gall and His Times

Whatever else may be said of the 18th century, it is clear that by its end, medicine and had fully accepted the idea of the discrete localization of functions in the brain, or, in the vernacular of the time, faculties. Although much has been written about Franz Joseph Gall's (1758–1828) contribution to neuroscience, not a lot is known about the roots of his ideas. It has been argued that there is a close parallel between the faculty psychology of Thomas Reid (1710–1796) and the craniological faculties proposed by Gall; it has also been pointed out that there is a commonality between the (hundreds of) physiognomic characteristics proposed by Johann Christian Lavater (1741–1801) and Gall's faculties. Gall's idea that growth patterns of the cortex, hypertrophy or atrophy, could impress themselves on the inner table of the skull, and thus by inference be, 'readable' as bumps on the skull, appears to have been directly borrowed from Lavater.

Charles Bonnet (1720–1792), a Swiss naturalist and philosopher approvingly referred to by Gall, authored books on botany, zoology, and psychology; Bonnet's psychological ideas were consistent with those of Etienne Bonnot de Condillac (1715–1780), a leading exponent of French sensationalism, an extreme form of empiricism. Bonnet believed that every faculty – sensitive, moral, or intellectual – is linked to a bundle of fibers in the brain. According to Bonnet, every faculty has its own laws, which determine its mode of action; not only does every faculty have its own fasciculus of fibers in the brain, but every word has its own fiber in the brain. In light of these ideas already present in the 18th century, Gall's craniology, or faculty neuropsychology, appears to be a logical if somewhat fanciful development.

Gall had, theoretically, described a division between two aspects of the language function and had proposed two distinct localizations. On a skull shelved in the University of Vienna medical museum Gall inscribed in an elegant penmanship the various faculties of the mind. At the back of the left bony orbit (eye socket) but not the right one (an odd coincidence, since we have no reason to think that Gall discussed any version of the lateralization of brain functions) he wrote *Wortsinn*, the memory for words, and *Sprachsinn*, the faculty of spoken language. This distinction was implicit in the work of Wepfer discussed earlier. Thus, Gall had assigned two separate but adjacent localizations to motoric (*sprachsinn*) and lexical (*wortsinn*) language functions, which he rather imaginateively localized in the frontal lobes of the brain. Gall's reasoning was taken from the essence of craniological theory: (1) he thought he had observed that people with high verbal skills exhibited 'cow's eyes' eyes that seemed to stick out because of shallow eye sockets; thus (2) he reasoned that a well-developed language faculty would cause a protuberance of the inferior, anterior frontal lobe, which in turn would push on the skull, making the eye sockets shallow. Although Gall's entire craniological, later phrenological, doctrine was challenged by the scientific community, this putative localization of language was not directly challenged, even though in fact it should be regarded as a mistake, an error in reasoning using the craniological method. It was well known at the time that the backside of the eye sockets do not abut the frontal lobe; a great deal of sinus cavity lies between the two. It is quite impossible that a frontal brain bump could impinge upon the eye sockets.

The most important scientific challenge to craniology/phrenology came from Flourens's experiments demonstrating that animals whose cerebellums he had lesioned still exhibited copulatory behavior. This was clear empirical evidence against Gall's localization of the reproductive faculty in the cerebellum and is arguably one of the principle reasons why many scientists rejected craniology/phrenology. Gall refused to accept Flourens's evidence; the scientific community, particularly Jean-Baptiste Bouillaud, who is discussed below, accepted it. On the other hand, curiously from the standpoint of 'good science,' Bouillaud not only accepted Gall's localization of language function in the frontal lobe, he championed it unceasingly, right up to 1861 when Broca's publication seemed to vindicate Gall's model. Evidently it was the accumulating evidence that frontal lesions typically led to speech disturbances, documented by Lallemand, Bouillaud, and other from the 1820s on, that kept the phrenological language model alive until the great paradigm shift of the 1870s. Although Gall stated his belief that the clinico–pathological correlation of brain lesions to language disturbances could furnish evidence in support of his model, and he did in fact study two cases of sword injury to the frontal lobe referred by Napoleon's surgeon, Dominique Larrey, Gall himself evinced little direct interest in language and brain relations. However, in the hands of that stalwart of medicine Jean-Baptise Bouillaud, as well as those of the relatively unknown country doctor Alexander Hood, the phrenological model based upon Gall's ideas did serve to preserve studies of brain–language

correlations through the first two-thirds of the 19th century.

From the 1820s to Broca

Pierre Paul Broca (1824–1880) focused on disorders of speech production (*langage articulé*) because, before the 1860s, one did not discuss disorders of language comprehension. Language was constructed as speech output, and the rest, what could have been discussed under the rubric 'comprehension,' fell under the notion of 'mind,' which at the time was in the province of philosophy, religion, and nascent psychiatry (e.g., the alienists). This of course had been tradition since the time of Galen; the primary difference was that now the location had shifted from the third cell or ventricle as in Medieval Cell Doctrine to the frontal lobe as in Gall's craniology, later phrenology.

From the 1820s on, both the orthodox medical and the unorthodox phrenological journals were filled with case reports of expressive language impairments arising from stroke and trauma, with and without autopsy evidence of the involvement of the frontal lobes. That is to say, Gall's hypothesis that the frontal lobes are the seat of language was hotly debated for over 40 years before Broca's famous articles. The publications of Jean-Baptiste Bouillaud, François Lallemand, François Broussais, Marc Dax, and Jacques Lordat are the more familiar; however, there were dozens of obscure medical practitioners publishing these reports. Alexander Hood was one such lesser known researcher.

Alexander Hood

To better appreciate the phrenological contribution to neurolinguistics, it is instructive to look at what practicing phrenologists actually did; with that in mind, let us consider one of Spurzheim's intellectual legacies, 'The Phrenological journal and miscellany' (PJM), the house organ of the Edinburgh Phrenological Society, founded in 1820 by George Combe (1788–1858). In 1824, an obscure medical practitioner and phrenologist from Scotland, Dr Alexander Hood, published a remarkable case history of one Adam M'Conochie, who, subsequent to a CVA in the left frontal lobe, had become what by the 20th century would be called a 'Broca's Aphasic.'

Patient Adam M'Conochie, a 48-year-old gardener in Dankeith, Scotland, sustained a mild left hemisphere CVA the morning of May 31, 1824. Hood first saw the patient that same afternoon and took a brief history from his wife, who noticed "a striking deficiency . . . in the use . . . of language, which in fact was limited to a few words."

Hood questioned his patient about his complaint but was unable to get a satisfactory response "on account of his utter inability to give a description in language of the state of his mind." To indicate where the problem lay, M'Conochie obligingly raised his (left) hand to the left side of his head, and, pointing particularly to the temple behind the angle of the eye, said there was "something about it." One can only imagine Hood's reaction as an aphasic patient signalled the site for the *Organ of Language* as having a problem! Not to mention that, given the presumed left hemisphere locus of the stroke, M'Conochie's left arm and hand undoubtedly functioned better than the right.

An outline of Hood's entries documenting the course of his patient's difficulties are arguably the first time that recovery from aphasia has been carefully chronicled:

> June14th: M'Conochie continues to improve in reading, to which he applies himself assiduously; but there is apparently not quite so much improvement in his powers of conversation.
>
> June 21st: . . . by now the patient can read tolerably well, with the exception of a few words that he cannot pronounce. He cannot, however, repeat a sentence or even a syllable of the Lord's prayer, with which he was formerly familiar. He moves his legs and arms with perfect facility and apparent vigour; but says the right hand is 'dumb.'
>
> July 2nd: M'Conochie has been melancholic; his right arm and leg are weak; he can read pretty well, but cannot repeat anything which may have been committed to memory; there are still some words which he cannot pronounce. A strong degree of excitement seems to give him temporary command of a few words which he has not in his calmer moments.
>
> July 10th: His reading is not materially improved since last report, but can read verses much better, having obviously acquired an extensive addition to his vocabulary. He can use both arms and hands equally well and perceives little difference with regard to strength, but a striking difference with regard to sensation. This day, for the first time, by means of language, he has been able to make himself intelligible with respect to the state of his feelings since the commencement of his complaint.

At the end of his case report, Hood included parts of the discussion of three other cases, reported earlier in the same journal, arguing that one may separate or fractionate two features of the organ for language, based upon the evidence from these patients. Although one patient had forgotten in general the names of objects with which he was familiar, yet when the name of a thing was given in his hearing, he was capable of recollecting it for a few seconds of time, so as to be able to pronounce it again. Hood notes

that this is quite different from case R. W., who very often could not recollect the word long enough to enable him to pronounce it a second time, thereby demonstrating that the paralytic affection was more severe in this case than the other.

Hood argues that the case of M'Conochie and the case of R. W., considered together, bear the most pointed analogy with respect to the phenomenon of language. One must bring a degree of credulity to the localization, of course; in Hood's terms, however, it was perfectly credible that a patient could indicate the site of a lesion by pointing to the spot on his head. Hood claimed that in one patient the damage "affected a much greater surface"; accordingly, the organ of language was not exclusively affected, for some of the muscles that assist in articulation were paralytic, from the impediment which was conspicuous in the pronunciation of some words. Hood also took note of the loss of sensation on right side of face, numbness of arm and particularly of the hand, without any loss of power of motion. Thus, for Hood, cases R. W. and M'Conochie "mutually illustrate each other." In R. W.'s case the affliction was confined exclusively to the organ of langauge; in M'Conochie's case, the organ of language was also affected, though not quite so severely; however, the lesion extended further, involving the area controlling the muscles of articulation (p. 92).

In sum, by comparing two different aphasic cases, Hood provided empirical evidence for the fractionation of the organ of language into a part directly controlling the articulatory muscles, another controlling verbal expression, and a third controlling the memory or ideas for words. This was a remarkably prescient experimental conclusion, employing a theoretically coherent, albeit implausible, clinico–pathological correlation. Hood concludes with a homily advising that one needs to have a good theory before studying the brain, so that the evidence of impaired function may be properly related to the elements of the theory. In his case, the theory was the map of the phrenological organs neatly painted on a plaster bust.

The paper describing the case of Adam M'Conochie, the fourth of six that Alexander Hood published in the PJM collectively titled "Mr. Hood's Cases of Injuries of the Brain, Case 4th – July 28, 1824," generates historical interest on several counts: its contribution to the technique of clinico–pathological correlation, its indebtedness to the phrenological movement in Scotland launched by Spurzheim and Combe, its use of aphasic data to argue for both the modularity and the fractionation of language, and, not least, the coincidence that it was published on the very day and year that Paul Broca was born, July 28, 1824.

Jean-Baptiste Bouillaud

Bouillaud (1796–1881), a cardiologist, was also a phrenologist, and as well one of Gall's close circle of friends; between 1825 and 1861 he gave a number of papers at meetings of the French academy of medicine, defending the frontal lobe localization of language. He published a paper in 1825 providing clinical arguments that the two organs for language were situated in the anterior lobes of the brain. Although Bouillaud has been credited with having made the first observation of 'internal' and 'external' speech, or what he termed the "power of creating words as signs of our ideas and that of articulating these same words" (Harrington, 1987), it is clear that he borrowed the concept from Gall (who may or may not have picked it up from earlier writers such as Wepfer). Bouillaud may, however, have been the first to attribute one to gray and the other to white matter tissue. In his own words:

> The tongue and its related organs in the act of speech can be separately paralyzed, that is to say, without the other parts being affected simultaneously . . . the loss of speech depends now upon the loss of the memory of words, now upon the loss of the muscular movements by which speech is composed, or, what comes perhaps to the same thing; now upon a lesion of the gray matter and now upon that of the white matter of the anterior lobes (translated in McHenry, 1969: 490–491).

After the death of F. J. Gall in 1828, Bouillaud was the major medical figure in France who supported the concept of cerebral localization; he thus became the major link between Gall and Broca (Harrington, 1987). Broussais, one of the more prestigious physicians in France, had pronounced in favor of phrenology, but most other recognized scientists had sided with Flourens against Gall. Not generally appreciated is that Bouillaud did not uncritically accept Gall's theory: e.g., he sided with Flourens on the matter of the role of the cerebellum and further, in 1830, agreed with Flourens that phrenology was a pseudoscience. Clearly, Bouillaud had distanced himself from phrenology *per se*, while maintaining the truth of the theory of cerebral localization with respect to language. There has been a tendency for historians to jump from Bouillaud's 1825 paper to the Auburtin-Gratiolet-Broca discussion of 1861. One reason, as Clarke and O'Malley (1968) *inter alia* noted, is that Bouillaud's views did not gain wide acceptance during the three-decade interval in question; however, he was not by any means ignored. In the pages of the French academy of medicine publications of 1826, 1827, 1839–1840 and 1847–1848, Bouillaud debated the concept of cerebral localization, using language

and its frontal lobe location, with important clinical and experimental opponents such as Andral, Flourens, Pinel (fils), Cruveilhier, Lallemand, Rochoux, Rostan, and Castel. It seems evident that any medical researcher during this 30+ year period was frequently confronted with the theory of cerebral localization, particularly that of language. It is also apparent that people were quite aware of the fact that, if the proof of the localization of language were to be established, then the entire enterprise of cerebral localization would be viable and legitimate (e.g., see Cruveilhier, 1839).

Although the major purpose of Bouillaud's 1825 paper was to support Gall's theory of a relation between loss of speech and a lesion of the frontal lobes, the paper is of additional interest because of the discussion of the major issues of functional–anatomical correlation, particularly for language. After a brief introduction, Bouillaud vehemently attacked the prevailing view (Flourens's view) of the hemispheric localization of motor functions, arguing that to accept the idea that the hemispheres control motor functions is not enough because different parts of the brain control different types of movements; this is particularly clear for movements of the tongue and eye. Bouillaud's stated purpose in his paper was actually to demonstrate the brain's control of speech movements. He claimed to be able to demonstrate, first, that speech movements may be compromised separately from those of the limbs and second, which specific part of the hemispheres are involved in the control of speech movements. By way of finding evidence to support his first claim, he described clearly and sharply, and he seems to be the first to do it, the principle of double dissociation: two activities are functionally separate if they can be disrupted in isolation or independently from each other.

Bouillaud's proof came from the description of three cases in which a severe speech disorder was not accompanied by any limb disorder or by any defect of the movements of the tongue that are required for any act besides speech. Somewhat in contrast to his own premises, Bouillaud seemed to predict the existence of a pure motor disorder of the movement of the mouth and tongue (what we might call a dysarthia of speech) in isolation from any articulatory deficit; but he actually only presented half of his claimed double dissociation, omitting to present the opposite case of motor disorder of limbs and/or of tongue without any speech deficit. Bouillaud then moved straight to the major purpose of his work: to identify the specific area of the hemispheres that is responsible for speech motor control, i.e., following Gall's theory, the frontal lobes. But how could one demonstrate this? Surgical lesions in animals do not help, because animals do not have speech (a rebuttal to the work of Flourens), and this kind of experiment is not possible in humans; anatomo–functional correlations of cerebral lesions in humans can help for this purpose. He thus suggested testing the hypothesis of a localization of speech motor control, and/or of language (because he does not seem to have had a clear insight about the interface between thought and motor speech control), in the frontal lobe. In this context he demonstrated a clever insight, clearly defining the principle of necessary and sufficient condition to test anatomo–functional correlations: if frontal lobes are crucial to direct speech movements, two conditions must be satisfied, i.e., when frontal lobes are affected, speech must be affected; but also, when frontal lobes are spared, the same must happen for speech movements.

Following this principle, Bouillaud described several (as he called them) positive and negative cases, in which the anatomo–clinical correlation fully corresponded to his expectations; he then tested the localization of speech in the frontal lobes on the basis of two neurological and neuropathological sourcebooks (Lallemand, 1820, 1822; Rostan, 1823). Analyzing the data from these two authors, Bouillaud confirmed his theory both for the positive and for the negative observations. He even seemed to show surprise as to why Lallemand and Rostan had not themselves come to the same conclusion, in the face of such clear evidence.

Bouillaud's paper continues with a short debate on the nature of speech production, where he addresses the problem of the interaction between lanaguage and speech. After discussing Gall's principle of the location in the frontal lobes of the memory for words, Bouillaud differentiates his position from Gall's, arguing that while the frontal lobes are the site of both these distinct faculties, the gray matter is the site for the organ of the verbal representations and the white matter the site of the speech motor output. It should be emphasized how outstanding these observations are in the context of orthodox medicine of the mid-1820s.

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Neutralization

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'Neutralization' is the term first proposed by members of the Prague School in the 1930s referring to the suspension, in a particular context, of a contrast that is maintained in other contexts (*see* **Prague School**). A similar phenomenon in which contrasts between morphological categories is eliminated in a particular environment is referred to as syncretism (*see* **Syncretism**). Two types of neutralization are usually distinguished, namely contextual neutralization and positional neutralization (see Trubetzkoy, 1939).

Contextual neutralizations suspend some contrast in the context of neighboring sounds. For example, in many languages there is a contrast between voiced and voiceless sounds in certain environments (e.g., word initially and/or word finally), but this contrast cannot be observed in the neighborhood of a voiced or voiceless sound, e.g., Serbian contrasts /p/ vs. /b/ word finally in /stub/ 'pillar' vs. /skup/ 'expensive', but only /p/ surfaces before voiceless sounds, e.g., [sr̩b] 'Serb' vs. [sr̩pski] 'Serbian'.

Positional neutralizations occur when a contrast is suspended at the edge of some constituent (e.g., word, syllable). A standard example illustrating this type of neutralization in phonology is found in Dutch and German. In both of these languages, there is a contrast between voiceless and voiced obstruents, e.g., /p t k f s/ vs. /b d g v z/ that can be observed word initially (e.g., German *Pass* /pas/ 'passport' vs. *Bass* /bas/ 'base') and word internally (e.g., German *Ente* /ɛntə/ 'duck' vs. *Ende* /ɛndə/ 'end'). In word-final position, many German and Dutch words end in a voiceless obstruent (e.g., German *bunt* /bʊnt/ 'colorful'), but in neither language are there words that end phonetically in a voiced obstruent. In German and Dutch, there are many word pairs that show an alternation between voiced and voiceless obstruents, e.g., German *Tag* [taːk] 'day' vs. *Tag-e* [taːgə] 'day + plural'. This word pair shows that in the singular the underlying /g/ devoices to [k] because it is in syllable-final position and in the plural the /g/ stays [g] because it is in syllable-initial position. In this example, the contrast between voiced and voiceless obstruents is neutralized in syllable-final position. The alternations mentioned above are captured in phonology with some formal mechanism, e.g., a rule of final devoicing, i.e., [−sonorant] → [−voice] / ___ $]_{\sigma}$. Final devoicing is an example of a phonological rule of (positional) neutralization.

Neutralizations typically eliminate the marked member of a contrast (*see* **Markedness**). For example, the final devoicing example mentioned above eliminates voiced obstruents from occurring in syllable-final position because voiced obstruents are [+voice] (as opposed to [−voice]). The output of a neutralization need not belong to one of the two sets of sounds that contrast. For example, in American English /t/ and /d/ contrast word initially and finally (e.g., *tip* vs. *dip* and *write* vs. *ride*), but this contrast is neutralized to the flap [ɾ] in intervocalic position before an unstressed vowel, e.g., *writer* and *rider* both surface with [ɾ]. In Prague School phonology, the output of a neutralization was assumed to be an archiphoneme (see Trubetzkoy, 1939 and Lass, 1984), which is an abstract entity that subsumes the totality of the properties that are common to the contrasting phonemes.

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Contextual neutralizations suspend some contrast in the context of neighboring sounds. For example, in many languages there is a contrast between voiced and voiceless sounds in certain environments (e.g., word initially and/or word finally), but this contrast cannot be observed in the neighborhood of a voiced or voiceless sound, e.g., Serbian contrasts /p/ vs. /b/ word finally in /stub/ 'pillar' vs. /skup/ 'expensive', but only /p/ surfaces before voiceless sounds, e.g., [sr̩b] 'Serb' vs. [sr̩pski] 'Serbian'.

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The typical context for positional neutralizations is word- (or syllable-) final position. In contrast, rules that neutralize contrasts in word- (or syllable-) initial

position are rare. The explanation for this asymmetry is that there is a strong tendency in natural languages to preserve underlying segments (and sequences of segments) in word-initial position because this is a perceptually salient position (see the psycholinguistic literature on the importance of word-initial position in processing, e.g., Hawkins and Cutler, 1988). Thus, if languages make an effort to preserve phonological material in contexts in which this material is more salient, then a preservation of segments (and contrasts) in word-initial position is to be expected (*see also* the recent literature on this topic in **Pragmatics: Optimality Theory,** e.g., Beckman, 1997).

It is important to distinguish between neutralization and defective distribution. The latter concept is exhibited by a segment that fails to surface in some of the environments occupied by other members of its class. For example, English [ŋ] has a defective distribution because, unlike the other nasals /m n/, it cannot surface word initially or after /s/.

See also: Markedness; Phonology: Optimality Theory; Prague School; Rule Ordering and Derivation in Phonology; Syncretism.

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New Caledonia: Language Situation

Editorial Team

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Located in the South Pacific Ocean, east of Australia, New Caledonia comprises a main island, Grande Terre, which is divided into a South and a North Province, and a number of smaller islands, known collectively as Îles Loyauté (the French translation of the original name, Loyalty Islands, given to them by early British explorers). After Papua New Guinea and New Zealand, it is the third-largest territory in the Pacific. Although the oldest archaeological remains suggest New Caledonia may have been settled from about 1300 B.C.E. onwards, other clues, such as the linguistic diversity on Grande Terre or a Paleolithic barrow on the Île des Pins, point to a much earlier date. The first contact with the West came in 1774, when Captain Cook, on his second Pacific expedition, landed on Grande Terre, baptizing it New Caledonia, for the island reminded him of his native Scotland. In 1853 the French admiral Fébvrier-Despointes claimed the islands for his country, and in 1946 New Caledonia became an overseas territory of France. The official language of New Caledonia is French, but 37 other languages are currently in use on the islands; the linguistic situation is more homogeneous on the Îles Loyauté than on Grande Terre, where a large number of languages are spread over a relatively small space. All the autochthonous languages of New Caledonia belong to the Eastern Malayo-Polynesian group of the Austronesian family. The indigenous languages with the most speakers are Dehu (10 000 speakers on Lifou and 5000 in Nouméa, the capital city), Nengone (6100 speakers on Mare), Paicî (5500 speakers around Koné and along the coast between Poindimié and Ponérihouen), Ajië (5000 speakers in Houailou), and Xârâcùù (5000 speakers in Canala and Thio). The majority of the other languages, however, are spoken by fewer people; the tonal language of Cemuhî, for example, is spoken by 2500 islanders, Fwaî by 1000, and Yuaga by 2000. Other language communities are even smaller: Pwapwa, for instance, counts only 130 speakers, Vamale 150, and Arhâ 250. Because of the scarcity of speakers, some of the languages are under threat of extinction: this is true for Arhö and Haeke, which are spoken by fewer than 100 people. Two languages, Waamwang and Zire, are already considered extinct; there are a few who have learned the latter, but only as a second language. There are also two creoles spoken on New Caledonia: Bislama is an English-based creole; Tayo, a French-based one, is used as a first language by some who normally are also bilingual in French and as a second language by others, mainly immigrants from Wallis Island. According to the 1996 governmental census, almost 40% of ethnic Melanesians, who constitute 44.1% of the entire population, no longer speak their mother tongue. Kanaks, as Melanesians are called in New

position are rare. The explanation for this asymmetry is that there is a strong tendency in natural languages to preserve underlying segments (and sequences of segments) in word-initial position because this is a perceptually salient position (see the psycholinguistic literature on the importance of word-initial position in processing, e.g., Hawkins and Cutler, 1988). Thus, if languages make an effort to preserve phonological material in contexts in which this material is more salient, then a preservation of segments (and contrasts) in word-initial position is to be expected (*see also* the recent literature on this topic in **Pragmatics: Optimality Theory,** e.g., Beckman, 1997).

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See also: Markedness; Phonology: Optimality Theory; Prague School; Rule Ordering and Derivation in Phonology; Syncretism.

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Caledonia, have increasingly opted for French, thus favoring the emergence of diglossia, in which the indigenous languages are the lower-status ones. Access to schooling was guaranteed to all Kanaks only in 1953; nowadays all adults are considered bilingual, but levels of proficiency are still varied. Many of the islanders, including a large number of those of European descent, use a regional variant of French to communicate. Caledonian French has phonetic idiosyncrasies and possesses a few grammatical constructions, calqued on Kanak languages, that distinguish it from standard French, but the differences are fewer than those, for instance, between standard French and Quebec French. Immigrants make up 21.3% of the population of New Caledonia; thus Polynesians, Indonesians, and Vietnamese, among others, constitute nonterritorial linguistic and cultural minorities, which tend to be centered around the capital city of Nouméa. English plays an important role in New Caledonia, which, it may be worth remembering, is surrounded by at least 25 million Anglophones. A large section of the school-educated population speaks English, as do a number of Kanak communities, whose inhabitants' ancestors were Christianized by British missionaries; also a good part of the immigrant population knows English.

French, being the official language of New Caledonia, is used in formal circumstances, and it is the language of government, law, administration, and education. At times, during official meetings on the Îles Loyauté, the local Kanak tongues may be used, but only for oral communication. A program has been launched to prepare Melanesians who want to go into politics at either the municipal or the provincial level, but the courses are available only in French. In fact, French remains the language of education in general, even though the Nouméa Agreement (1998) between France and New Caledonia stipulates that the Kanak languages are also languages of culture and education. In 1985 a number of Kanak primary schools opened with the aim of promoting Kanak identity and culture by conducting the teaching in the local languages, but disappointing results led to their early closure – only the one in Canala remains open to this day. In the early 1990s the provinces launched a plan to integrate indigenous languages in mainstream education; this means that a few lessons, such as geography or art, are taught in one of the local languages, but nothing is being done to spread literacy among young Kanaks in their mother tongue. Only 5% of students in secondary education in 2001 followed courses in one of the four languages available at that level (Ajië, Dehu, Nengone, and Paicî). At the University of New Caledonia, teaching is conducted exclusively in French, although Dehu and Ajië have been taught there since 1999 and Nengone and Paicî since 2000. A Kanak Language Academy is also being planned for the not too distant future, and there are plans to start preparing teachers to teach local languages at both the primary and the secondary levels. It must be noted that often many of the Melanesians themselves feel that only education entirely in French can guarantee academic success and secure access to work. As for the media, all the papers and periodicals are in French, and television and radio also broadcast in French, although Radio Djiido, associated with the Kanak Socialist Liberation Front, has a few programs in the local languages. As a last point, it can be added that even if the two provincial governments with a Kanak majority should decide to favor the use of a Melanesian language, they would face the problem of the multiplicity of languages present in New Caledonia, and they could never hope to quell completely the importance of French, notwithstanding France's decision to adhere to the European Charter for Regional or Minority Languages, which will prompt a change in the linguistic policies adopted in French overseas possessions.

See also: Austronesian Languages: Overview; Pidgins and Creoles: Overview.

Language Maps (Appendix 1): Map 152.

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New Religious Movements

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New religions emerge as either schisms off existing faiths or creative compositions of unique (or previously unsynthesized) material (Stark and Bainbridge, 1987: 126–128). In either set of circumstances, these new religions must establish themselves amid skeptical if not hostile social environments, and their use of language reflects this challenge. Consequently, researchers find unique uses of language as new religions attempt to establish their credentials, identify their goals, undertake projects, maintain their members, and deal with critics and defectors. Scholars differ as to whether the term 'new religions' should apply only to groups emerging in the late postcolonial period or can apply to the first appearances of older faiths into societies, but in any case the language issues share common features.

In their efforts to establish themselves, new religions develop terms of legitimacy. Indeed, the very designation of groups as 'religious' usually is something that their leaders desire since the designation brings with it degrees of societal legitimacy while deflecting pejorative labels (such as sect or cult) that their critics often prefer (Kent, 1990). Moreover, the religious designation allows these groups to establish or create spiritual lineages that sanctify their existence in the context of the existing sociocultural landscape (Kent, 2003). The language of naming groups, for example, illustrates numerous legitimation strategies. Some new religions choose names that indicate their role as restorers of the true faith – for example, the Restored Church of God, which is a schism of the Worldwide Church of God (Barrett, 2001: 503); Uganda's deadly Movement for the Restoration of the Ten Commandments of God (Barrett, 2001: 94–95); and the schism of gay and lesbian Mormons titled The Restoration Church of Jesus Christ (Shields, 1990: 274–276). Others use language that identifies their reputed role as unifying the faiths, such as the Holy Spirit Association for the Unification of World Christianity, founded by the controversial Korean leader, Sun Myung Moon (Barker, 1984: 42); or Church Universal and Triumphant, based on the reputed communications received from the Ascended Masters to Elizabeth Clare Prophet in America (Whitsel, 2003). Similarly, many groups assert an international or global appeal, such as the controversial International Churches of Christ (Giambalvo and Rosedale, 1997), the increasingly mainstream Christian organization called the Worldwide Church of God (Tkach, 1997), and the Hindu-based International Society for Krishna Consciousness (Brooks, 1989). At least one group, the science-fiction based Church of All Worlds, claims cosmic appeal (Barrett, 2001: 401–405).

Numerous other organizations attempt legitimation by using scientific language in either their names or doctrines – for example, Christian Science; Scientology and its foundational book, *Dianetics: the modern science of mental health* (Hubbard, 1950); the United Church of Religious Science in the United States (Melton, 1991: 58–60); and the School of Economic Science, based in the United Kingdom (Barrett, 2001: 266–276). Using a related strategy, various new religions insist that they are scientifically based. Among them are the Raelians, who claim that all members of the human race are alien clones (Barrett, 2001: 390–395), and Transcendental Meditation, which claims that its meditation techniques are scientific procedures that produce measurable improvements in personal and social life (Barrett, 2001: 276). Regardless of what legitimation strategies new religions use, they intend to carve out a social space for themselves in sociocultural environments that contain (potential) spiritual supporters, competitors, and critics.

Language plays an equally important role in how many new religions define their goals. As a recruitment strategy, these new religions may describe their goals as being purer, more effective, and more important than those of the groups that likely provide their largest recruitment pools. For example, amid the floundering anti-Vietnam-War movement in the early 1970s, numerous new religions adopted the radical rhetoric of youth protest culture in order to attract converts to them (Kent, 1993, 2001: 44–150). Followers of the teenaged guru, Maharaj Ji, frequently heard him speak about his message bringing peace to the planet, using language very similar to slogans that were commonplace in contemporary youth counterculture (Kent, 2001: 48–54). Likewise, Scientologists widely distributed a claim by their group's leader, L. Ron Hubbard, that Scientology techniques could end war (Kent, 2001: 99). Also in that same period, the Children of God's founder, David Berg, spoke about his group as offering the disillusioned youth of the period a "revolutionary new life" within his organization, drawing heavily from the politically revolutionary rhetoric that was standard parlance among activist youth. Whatever variations the technique took, the use of rhetoric among the new

religions of the 1970s helped converts believe that they were furthering a social revolution whose political efforts (they believed) largely had failed.

Regardless of the projects that new religions undertake, these groups often view their efforts as being uniquely spiritual and pure. Consequently, a set of binary terms frequently develop that identify and separate the 'pure' from the 'impure' and 'us' versus 'them.' Members of the Hare Krishnas, for example, who call themselves 'devotees,' refer to nonmembers as 'karmies,' which implies that their secular, materialist lives create bad karma for their next rebirths (dasa, 1985: 346). Scientologists refer to nonmembers as 'WOGs' or "raw meat preclears" (Hubbard, 1975: 471, 335) and themselves as "specialist[s] in spiritual and human affairs" (Hubbard, 1975: 369). Followers of David Berg, who (throughout the 1970s) called themselves Children of God, referred to people in society as 'Systemites' (Van Zandt, 1991: 51, 129). When members used claims of missionary work to procure donations from Systemites, they were 'provisioning' by 'spoiling Egypt' (Van Zandt, 1991: 36, 39).

An essential aspect of elitism or 'specialness' that is so common among new religions is the frequent use of familial language. Leaders assume parental roles, and members assume new names and take on sibling roles toward one another. Examples are numerous (and certainly occur within more established faiths): Reverend Moon and his wife are the "True Parents" to their flock (Barker, 1984: 80–81, 168, 195), and Elizabeth Clare Prophet was 'Guru Ma,' 'Mother,' or 'Divine Mother' to Church Universal and Triumphant members (Paolini and Paolini, 2000: 55, 59; Whitsel, 2003: 5, 38). Remarkably, members of Scientology's notorious Guardian's Office in the 1970s, whose members carried out burglaries against governmental and nongovernmental offices in the United States and Canada, concluded their internal memos with the word 'love' before signing their names (U.S. District Court for the District of Columbia, 1979).

The use of familial, 'loving' language contributed significantly to groups' maintenance of members by creating for them a 'fictive family' atmosphere (Cartwright and Kent, 1992). Equally binding are group experiences of (what outsiders might call) linguistic nonsense – collective chanting in foreign languages that members do not understand, unintelligible high-speed chanting, or glossolalia (speaking in tongues; Samarin, 1972). For example, English-speaking adherents to the form of Japanese Buddhism known as Soka Gakkai chant for extended periods long verses of transliterated Japanese (Barrett, 2001: 304). Church Universal and Triumphant members (and many potential converts) participated in 'decreeing,' which were rapidly spoken prayers allegedly to destroy evil and enhance positive energy (Whitsel, 2003: 36). Finally, many Christian groups affiliated with Pentecostalism practice 'speaking in tongues,' in which people supposedly possessed by the Holy Spirit speak in unknown, heavenly languages (Hood *et al.*, 1996: 201–204; Samarin, 1972).

Whatever spiritual interpretations the believers of various faiths may assign to these uses of language, from a social scientific standpoint they illustrate crucial examples about attribution theory. According to attribution theory, groups place potential converts in social circumstances for which they have no interpretive frameworks (i.e., unusual prayer or chanting situations) and then give them a religious (as opposed to a psychological or linguistic) interpretation (Hood *et al.*, 1996: 32–33; Proudfoot and Shaver, 1975: 325–326). Without competing interpretive frameworks, people often accept the religious (mis)attribution and join the group. As members, they continue participating in these activities, thereby strengthening their commitment.

Closely related to a group's use of language to create situations that are ripe for (mis)attribution are "thought-terminating cliché[s]" that psychiatrist Robert J. Lifton (1961: 429) identified as "loading the language." These simple, clichéd phrases constrict individuals by reducing complex "human problems ... into brief, highly reductive, definitive-sounding phrases, easily memorized and easily expressed" (Lifton, 1961: 429). They assuage many of the questions and concerns of group members by both providing easily remembered platitudes and dividing the world into dichotomous absolutes. These dichotomies may strengthen group cohesion but they limit people's capacity for expression and complex thinking.

When group members use loaded language as part of their collective opposition to society, that language operates as part of an 'antilanguage' within a subculture (DeBernardi, 1987; Halliday, 1978: 164–165). Viewing many new religions as 'antisocieties,' members reformulate the meaning of existing words or create new words entirely, thereby expressing their resistance to and differences from mainstream society. Moreover, these linguistic reformulations help maintain the unorthodox social reality that the group has created. Thus, language functions as a method of normalization within the context of resocialization. As one of many examples from the 1970s,

the Children of God's leader, David Berg, specifically borrowed popular slogans from the women's liberation movement but inverted the meaning of the words by portraying 'revolutionary women' as ones who were sexually available and seductive (rather than independent and opposed to patriarchy) (Kent, 2001: 163–165.

Keeping in mind the role that language plays in resocialization, the logic behind a basic tenet of Scientology becomes clear. All of its books begin with the instruction that the reader should never go beyond a word that he or she does not understand. This instruction reflects the fact that Hubbard's writings are filled with new terminology, new words, new meanings for existing words, and frequent abbreviations. The system of values that these new words and meanings create is an integral part of Scientology's socialization of members into its ideology. One is reminded, however, of George Orwell's (1949: 320) observation that "telescoped words and phrases had been one of the characteristic features of political language; and it had been noticed that the tendency to use abbreviations of this kind was most marked in totalitarian countries and totalitarian organizations." Orwell made this observation in the context of discussing Newspeak and added that abbreviations are effective in the reorganization of language because they remove the full meaning and context that nonabbreviated words carry. In addition, abbreviations and shortened words suggest "a tightly-knit organization and a well-defined body of doctrine" (Orwell, 1949: 320–321).

More dramatically, Scientology's redefinition of words is also an attempt to transform society to its values by getting its definitions to replace commonplace ones. Hubbard instructed his followers that "words are redefined to mean something else to the advantage of the propagandist" and added, "[g]iven enough repetition of the redefinition, public opinion can be altered by altering the meaning of a word" (Hubbard, 1971/1991: 42). The alteration of public opinion supposedly would come about "by associating different emotions and symbols with the word than were intended" (Hubbard, 1971/1991: 42). Hubbard offered these instructions as part of his efforts to "redefine medicine, psychiatry, and psychology downward and define Dianetics and Scientology upwards" (Hubbard, 1971/1991: 43), but many ideologically driven groups that have strong social agendas attempt analogous redefinitions for their own ends. Jehovah's Witnesses, for example, use 'theocratic language' to describe their group's 'divinely inspired' organizational structure and the 'godly' actions that members undertake. This language "includes the redefinition of standard English words, the emotional charging of words, the peculiar use of metaphor in argument, and the adoption of particular mannerisms of speech" (Botting and Botting, 1984: 84).

A final consideration concerning new religions and language is that some of them eschew words for silence. Although pervasive in new religions, silence remains understudied. However, some insights into its replacement of words come from a study of 17th-century Quakerism – a religion that was 'new' in 1650s England. Quakers in this period adopted a frugality of language that reflected their desire to refrain from 'fleshly activity,' believing that the use of unnecessary language was characteristic of a carnal life. Furthermore, Quakers regarded silence as a means of realizing a closer relationship with God (Bauman, 1983: 22–23). Such sentiments reappear in some new religions, occasionally with dramatic variations. For example, members of Heaven's Gate – a group forever immortalized by their members' mass suicide in 1997 – engaged in 'tomb time,' during which they only could offer brief responses to necessary questions. Because they believed that all communication would be telepathic upon their arrival in the Kingdom of Heaven, tomb time served as a method of socialization (Balch, 1995: 155). More typical is the appearance of silence in groups that practice meditation, which involves (in various ways) attempting to still the mind and eliminate the constant flow of words that constitutes ordinary consciousness.

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New Zealand: Language Situation

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New Zealand's population of just over 4 million speaks a wide range of languages, yet the appearance presented to the casual visitor and the reality of life for most New Zealanders is as monolingual as one can find anywhere. English, spoken by all but a few immigrants, is by far the dominant language of public life and of most New Zealand households. Eighty-four percent of the population is monolingual and of that proportion, 98% speak only English (Census 2001, see Statistics New Zealand, 2002). This monolingualism is seen not only in these statistics, but also in the perceptible apathy towards foreign languages in the education system.

English was introduced into New Zealand for the most part by settlers who arrived in large numbers from the 1840s. Since then, New Zealand English has developed as a distinct variety, showing some similarities with Australian English.

Since well before the arrival of English however, an Eastern Polynesian language, Māori (Maori), has been spoken in New Zealand. It was brought by voyagers from the Cook Islands and other sites in Central Polynesia some 800 to 1000 years ago (see papers in Sutton, 1994). Particularly since the 1950s, there has been very considerable language shift by the Māori population, so that it was estimated in the mid-1990s that there were only some

10 000 native speakers, almost all of whom belonged to older generations.

However, since the early 1980s there have been energetic efforts to maintain and develop the language. It is now the only *de iure* official language of New Zealand (though English is clearly so *de facto*), is the language of tuition in a substantial number of preschools (*köhanga reo* 'language nests') and schools (*kura kaupapa Māori*) and even into the secondary and tertiary levels of education. Recently, a television channel that broadcasts a high proportion of its programmes in Māori was opened. At present, it is estimated that some 160 000 people can hold a conversation in Māori (Statistics New Zealand, 2002), of whom all but 12 000 are of Māori ethnicity. Thus, only about one-quarter of the half million or so people who assert Māori ethnicity can speak their language, but the present marks a considerable improvement in the language's status over the last 20 years.

Beside these two major languages of the country, another 200 or so languages are spoken by immigrant communities, especially from Northern Europe, Asia, and the Pacific. In general, these community languages do not survive beyond the first generation of immigrants and their children, but there are exceptions such as Chinese and Greek, which are preserved vigorously within their communities.

See also: Bilingual Education; Language Maintenance and Shift; Malayo-Polynesian Languages; Maori; Minorities and Language; Multilingualism: Pragmatic Aspects.

Language Maps (Appendix 1): Map 153.

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A number of New Zealanders, several of whom had been students of Ian Gordon in Wellington, established scholarly careers in lexicography. Gordon himself served for many years as a New Zealand consulting editor for Collins dictionaries. R. W. Burchfield was appointed editor of the four-volume supplement to the *OED* from 1957 to 1986. H. W. Orsman was responsible for compiling the monumental *Dictionary of New Zealand English* (1997), on historical principles, containing some 6000 headwords in the format of the *OED*. Orsman also edited the *Heinemann New Zealand Dictionary* (1979), contributed a substantial selection of New Zealand items for the *Macquarie Dictionary* and (with Elizabeth Orsman) compiled a *New Zealand Dictionary* (1994). He also contributed New Zealand material for the *OED Supplement* and for the *Australian National Dictionary* (Ramson, 1988). Turner (1966) had earlier provided an overview of distinctive characteristics of New Zealand English vocabulary in different domains of use, and Deverson (2001) surveyed the emergence of dictionaries that seek to capture this idiom.

Most recently, Bardsley (2003) has completed a study of the influence of the rural sector on the New Zealand English lexicon. Deverson (1991), Kennedy (2001), and Macalister (2003) have described the influence of Maori on New Zealand English, about six word tokens in every 1000 in New Zealand English now being of Maori origin. Names of flora and fauna and place names constitute many of these, but there are increasing borrowings from social and cultural domains. Looser (2001) has explored the lexicon of New Zealand prisons. Deverson has edited a series of New Zealand dictionaries for Oxford University Press, and with Kennedy has jointly edited the comprehensive and encyclopedic *New Zealand Oxford Dictionary* (2005).

See also: English Lexicography; Lexicography: Overview; Maori; New Zealand: Language Situation.

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Newman, Paul (b. 1937)

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Paul Newman (born March 7, 1937, Jacksonville, Florida) is one of the preeminent (Africanist) linguists of his generation and an intellectual mentor to many of his peers and colleagues. Newman's early education was at the University of Pennsylvania, where he received his B.A. (philosophy, 1958) and M.A. (anthropology, 1961), and he was awarded his Ph.D. (linguistics, 1967) at UCLA. He has held academic positions at Yale University, Bayero University (Kano, Nigeria), and Rijksuniversiteit te Leiden (The Netherlands), and has been professor of linguistics at Indiana University, Bloomington, since 1983. In January 2002 he was appointed a distinguished professor, the university's highest academic rank. He is also the founding editor of the *Journal of African languages and linguistics*, the leading journal in the field.

Newman's first experience of Africa was as a Peace Corps volunteer in Nigeria (1961–1963); he has since returned to Nigeria numerous times to work and conduct research. In 1966, together with his fellow graduate student (and future wife) Roxana Ma Newman, he published a breakthrough paper on the Chadic language family (including Hausa), which has become the accepted point of departure for subsequent descriptive and comparative research in the field, with broader implications for the Afroasiatic phylum. With this bold and influential paper, he announced his arrival on the Hausa/Chadic/Afroasiatic stage.

Newman is a prolific scholar who has authored 16 books and monographs and more than 110 articles and reviews over the last 40 years; his key publications are all highly original but accessible works that have established his international reputation as a fearless and expansive thinker, always prepared to challenge prevailing orthodox views and notions. Although his scientific output spans a wide range of linguistic investigation, his most significant contributions have been in the area of morphophonology. His sophisticated insights regarding the phonological role of 'syllable weight' in Hausa (Newman's term) and two related languages (1972), for example, informed and influenced not only subsequent studies by Chadicists and Africanists, but also caught the wider attention of theoretical generative phonologists and typologists, placing him fairly and squarely within the general linguistic frame. Although he has introduced important concepts to the linguistic canon (e.g., 'pluractional verbs'), Newman remains an instinctive and unrepentant empiricist who prefers working with facts rather than formal theories. His crowning scientific achievement, which synthesizes his linguistic erudition and enormous knowledge of Hausa, is his landmark *The Hausa language: an encyclopedic reference grammar* (2000), the most comprehensive grammar ever written on an African language, complete with a revolutionary alphabetic ordering of topics. As an authority on linguistic fieldwork methodology, he also co-edited *Linguistic fieldwork* (2001), a collection of essays that has helped revive interest in anthropological linguistics and endangered languages. In 2002 a *Festschrift* was published in recognition of his immense contribution to our knowledge and understanding of Hausa and Chadic.

Possessed of an insatiable intellectual curiosity and desire for knowledge, Newman later turned his attention to legal studies and received a J.D. degree from Indiana University (*summa cum laude*) in May 2003. As an adjunct law professor he has taught contract law at the university's School of Law in Bloomington, in addition to undergraduate linguistics classes in 'Freedom of speech in the United States' and 'Language and law,' while continuing to teach African linguistics courses. An inveterate and tenacious fighter for liberal causes (and a jazz aficionado), in 2002 he won an age-discrimination complaint against Indiana University, helped force the local Monroe County Council to abandon prayer at its public meetings in 2004, and does pro bono work for the Indiana affiliate of the American Civil Liberties Union.

See also: Africa as a Linguistic Area; Afroasiatic Languages; Chadic Languages; Pluractionals (Distributives).

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The language of news media has always attracted the attention of linguists (particularly applied and sociolinguists) and discourse analysts. The practical and principled reasons for this interest include the accessibility of language data from the media, the significance of the media as language-producing institutions, linguistic interest in the ways media use language, and the importance of media institutions and their discourses in shaping culture, politics and social life.

Linguistic research on the media has always emphasized this last concern, focusing where issues of ideology and power are closest to the surface. It has analyzed the macro level of discourse structures rather than phonological or syntactic structures and has concentrated mainly on the 'factual' genres (particularly news) rather than fictional or advertising content (an emphasis that is shared by sociological and communications research on media).

The principal lines of contemporary research on news language were established in the 1990s, mainly under the umbrella of 'Critical Discourse Analysis'. CDA represents an outgrowth of the work of the British and Australian pioneers of Critical Linguistics, particularly Fowler and Kress, in convergence with the approaches of the British discourse analyst Fairclough and Dutch text linguist van Dijk. Van Dijk began to apply his theory and methodology of discourse analysis to media texts in the 1980s. The first general textbooks in English on media language appeared in 1991, by Fowler and by Bell, to be followed in 1995 by Fairclough's text. Boyd-Barrett (1994) provides a clear summary and even-handed assessment of the approaches of van Dijk, Fowler, and Bell.

Some form of CDA has become established as the standard approach to media texts within European linguistics, although the paradigm is less familiar in the United States. The major work reviewed here is either explicitly a form of CDA or congenial to it where its concerns overlap (Bell, 1991, 1994). CDA is more a shared perspective than a single school or a methodology. It has an explicit sociopolitical agenda, a concern to reveal the role of discourse in reproducing or challenging sociopolitical dominance. The media are a particular subject of CDA analysis because of their manifestly pivotal role as discourse-bearing institutions.

The most comprehensive work on media discourse has been undertaken by van Dijk (1988a, 1988b, 1991). Van Dijk's framework aims to integrate the production and interpretation of discourse as well as its textual analysis. His approach to news discourse was proposed as a 'new, interdisciplinary theory of news in the press' (1988b: vii). *News as discourse* (van Dijk, 1988b) appeared as a primary theoretical contribution to the analysis of news stories, supplemented by a volume of case studies, *News analysis* (1988a). These are drawn mainly from a massive sample of international news reporting and a study of racism in the European press. His 1991 book *Racism in the press* analyzes the reporting of ethnicity in a large sample of stories from British newspapers. Van Dijk's later work (e.g., 1998) extends beyond news to genres such as opinion texts and editorials.

Van Dijk's main contribution has been a framework for analyzing the discourse structure of news stories. The thematic structure of a story consists of its topics and their organization within the story. This gives the broad semantic structure. Closely parallel is the syntactic structure, which van Dijk terms 'news schemata'. News schemata are thus a syntax of news stories, the formal categories into which news can be analyzed and their relations to each other. They can be tree-diagrammed to show the discourse structure of the story. Van Dijk's analysis of newspaper stories in many languages (1988a) found few significant differences in news discourse structure. There were some differences between papers in the 'First' and 'Third' Worlds, but the greatest differences were between 'quality' and 'popular' newspapers, for instance within West Germany and the United Kingdom.

Also working within CDA, Norman Fairclough has developed an approach that draws on Halliday's functional linguistic framework, but he adds a knowledge of recent social theory that is rarely encountered in linguistics. His framework was initially developed independent of a concentration on media language, although it is no accident that many of his example analyses are of media texts, because the media – whose business is discourse – play a crucial role in shaping and purveying discourses. His book on *Media discourse* (1995) ranges more widely across the media than just the news, covering a variety of nonfictional broadcast genres. In a wider text, Fairclough (2003) lays out his

approach to CDA in general terms, including some specific news examples.

Fairclough has worked with three dimensions in discourse analysis. Text analysis concentrates on the actual language text, examining vocabulary, syntax and cohesion, and the macrolevel of text structure. Secondly, analysis of discourse practice examines how the text is produced and interpreted, and also how it is distributed, with the media as a case of complex distribution of texts from other sources. This level of analysis also looks at wider issues of orders of discourse – the characteristic discourse practices of institutions such as the media. Thirdly, analysis of social practice focuses on discourse in society, institutions, and culture and in particular on the relation of discourse to power and ideology.

Fairclough has emphasized several trends toward change in the discourses of contemporary society, particularly in the media. Marketization is the increasing use of promotional language adopted from advertising by other domains. A second trend is toward the democratization or conversationalization of discourse in the media as in other institutions – a shift to increased informality of language. Fairclough (2000) covers the discourse of the Blair government in the UK in these terms. Fairclough's is probably the most influential of the approaches to news language, with published studies by others frequently adopting aspects of his approach and methodologies in their analyses.

Bell's text *The Language of News Media* (1991) draws on the author's experience as a journalist and editor, including analysis of news stories written or edited by himself or journalistic colleagues. Three themes are central in this approach: the processes that produce media language, the notion of the news story, and the role of the media audience.

Bell stresses that news discourse is the product of multiple hands. Journalists make use of a range of spoken and written sources in writing a story. Once the story leaves the journalist's hands, it then passes through multiple editing stages before being eventually published. Bell emphasizes that the idea of the story is central to news. Journalists do not write articles, they write stories – with structure, order, viewpoint, and values. Bell (1991) examined how news stories differ from other kinds of narratives, beginning with a summary 'lead' sentence and eschewing chronological order. News values drive the way news stories are structured, and the lead sentence embodies the character of the story. News discourse is analyzed in terms developed from analysis of personal narratives and van Dijk's framework: summary (headline and lead), attribution, events, actors, setting (time, place), followup, commentary, and background. Bell has continued to work on the structure of news stories (e.g., 1995), more recently looking at how news discourse developed across the 20th century (Bell, 2003).

A fourth leading approach to news language is through the analysis of broadcast interviews, which is of interest largely because of the sociopolitical salience of the content and participants in political interviews. Since the mid–1980s a number of researchers have used Conversation Analysis to analyze broadcast interviews. The leading work is by Clayman and Heritage in the United States and by Greatbatch in the United Kingdom (e.g., Clayman, 1991; Greatbatch, 1998). Clayman and Heritage's book (2002) brings together much of the material in this area.

Useful overviews of media language research include Cotter (2001), which covers both discourse studies and more 'sociolinguistic' work focusing on the linguistics of news language in its own right below the discourse level (e.g., Bell, 1991, 2003; Biber, 2003; Jucker, 1992). The reader edited by Bell and Garrett (1998) brings together summary presentations and exemplifications of the main approaches to news discourse. Each contributor summarizes their framework and provides an illustrative analysis to show how it works. The apparatus involved in some of the approaches is formidable, and this text attempts to make them more accessible to students and other nonspecialists.

Most contemporary studies of news language claim CDA as their framework, although in many cases they work with only a small amount of the social or linguistic apparatus involved. The journal *Discourse & Society* (edited by van Dijk) is a particular forum for CDA and related work, and a significant proportion of the papers it publishes concern media discourse. These range across discrimination and stereotyping in areas such as sports reporting (Bishop and Jaworski, 2003) and coverage of ethnic minorities in Finland (Pietikäinen, 2003). Studies of 'news about the future' have been conducted by Jaworski, Fitzgerald and Morris (2003, 2004), examining how unscheduled leaks of news and the buildup to a scheduled future event are represented linguistically. The intertextuality or hybridity of media genres is the focus of Östman and Simon-Vandenbergen (2004), who brought together several studies that look at how discourse styles mix in the media.

With the growth of new media, particularly those that are based on the Internet, scholars have begun to research language use in these forms. For example, Richardson (2001) examined news and internet newsgroups, Richardson and Meinhof (1999) investigated how 24-hour channels affect news, and

Aitchison and Lewis (2003) covered a range of work on the language of new media. Nevertheless, the gaps in research on news language remain very much as identified by Bell and Garrett (1998) – there is a dearth of work on the production of news language and to a lesser extent on its reception.

See also: Critical Discourse Analysis; Language in Computer-Mediated Communication; Media: Analysis and Methods; Media and Language: Overview; Media and Marginalized Groups; Media, Politics, and Discourse: Interactions; Newspeak; Radio: Language; Television: Language.

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Newspeak

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Newspeak

The word 'Newspeak' was introduced by George Orwell in his novel *Nineteen Eighty-Four*, which was first published in Great Britain in 1949. In that novel, Orwell represents a totalitarian society in which the ruling party is in the process of inventing a new artificial language, Newspeak. According to a definition given in an appendix to the novel, "the purpose of Newspeak was to provide a medium of expression for [a] world-view," and at the same time to "make all other modes of thought impossible."

According to Orwell's fiction, Newspeak is based on the premise that a particular 'reality' can be imposed by imposing a particular language. A number of other details are given in the novel, almost all of which are psychologically and linguistically implausible. There were three classes of Newspeak: a class required in everyday life; a class "deliberately constructed for political purposes"; and a scientific and technical class. The vocabulary of each is supposedly constructed to express only ideologically approved meanings. Thus, some words are removed entirely, new words representing new concepts are introduced, and old words are 'stripped' of unorthodox meanings. Orwell seems to have been aware of the difficulty of preventing speakers from producing new meanings, for he notes that Newspeak also eliminates "the possibility of arriving at them by indirect methods." Thus, the word *free* would have its political and philosophical sense removed and would be restricted entirely to the sense found in a sentence such as *this field is free from weeds*. Morphological processes and categories are simplified. Nouns and verbs have the same form. Thus, the noun *thought* is replaced by *think*. Semantically connected terms have similar morphology: *cut* is eliminated and replaced by the verb *knife*. Adjectives are formed by regular suffixation of nouns (*speed*, *speedful*), with a only a small set of independent adjectives (*good*, *strong*, *black*, etc.) being retained. Comparative and superlative forms are formed by regular suffixation: *good–gooder–goodest*; suppletive forms are suppressed. All adverbs are formed by the suffix *-wise*: e.g., *goodwise* replaced *well*. Antonyms are all derived by the prefix *-un*: *good–ungood*, *cold–uncold*, *person–unperson*. Other prefixes are *ante-*, *post-*, *up-*, *down-*, etc., and the intensifiers *plus-* and *doubleplus-*, giving, e.g., *pluscold* and *doubleplusungood*. The tense morphology of verbs is regularized: *think–thinked*, *steal–stealed*, etc. The number morphology of nouns is also simplified: *mans*, *lifes*, etc. The principle behind these changes or tendencies, according to the novel, is ease of pronunciation, but the major principles are evidently agglutination and one-to-one correspondence of meaning and morpheme.

Compounding and abbreviation are supposed to be additional characteristics of Newspeak. For example, *goodthink* replaces *orthodoxy* and has the forms *goodthinked*, *goodthinkful*, *goodthinkwise*, *goodthinker*, *crimethink*. These forms are modified (in the political version of Newspeak) by apocope and 'euphony' principles: *Thinkpol* (Thought Police), *Minitrue* (Ministry of Truth)–*Minitruthful*, *Minipax–Minipeaceful*, *Miniluv–Minilovely*.

Newspeak meanings are supposed to be unique to the system and intelligible only to its speakers. Thus, *oldthinkers unbellyfeel Ingsoc* had a language-specific and untranslatable meaning, according to Orwell. The Newspeak sentence *all mans are equal* could only mean 'equal in size' (*see* **Meaning: Overview of Philosophical Theories**). The 'Declaration of the Rights of Man' is untranslatable. Newspeak meanings are also unique in the sense that there is supposedly no ambiguity, polysemy, or connotation: "Every concept that can ever be needed will be expressed in exactly *one* word, with its meaning rigidly defined and all its subsidiary meanings rubbed out." But Newspeak also aims to reduce the number of words in its lexicon and to achieve this end some meanings are simply eliminated. (Orwell, or his novel, does not tell us how.) Thus, the meanings covered by the English words *honour*, *justice*, *morality*, *internationalism*, *democracy*, *science*, and *religion* cease to exist along with the words themselves. They are replaced, we are told, by semantically vague words, such as *crimethink*, *oldthink*, *goodsex*, and *sexcrime*.

The meanings of all lexical items in Newspeak are ideological; many are euphemisms and some terms are supposed to invert the evaluative associations of 'oldthink' terms: *joycamp* (forced-labor camp), *Minipax* (Ministry of War). This principle is followed in the sentences of party propaganda: "Ignorance is Strength," "War is Peace," "Slavery is Freedom." Since the political vocabulary of Newspeak is an elite variety, some words represent the structures of society with cynical literalness, e.g., *prolefeed* (cheap entertainment for the proletariat) (*see* **Taboo, Euphemism, and Political Correctness**).

Names of organizations, countries, institutions and the like are abbreviated: *Recdep* (Records Department), *Ficdep* (Fiction Department), *Teledep*

(Tele-programmes Department), *Minitrue*, and *Ingsoc* (English Socialism). Orwell presents these fictional forms as a continuation of the real historical tendency to produce forms such as *Nazi*, *Gestapo*, *Comintern*, and *Agitprop*. According to Orwell, the reason for these forms is not just economy of effort, but the intention to limit and control associations. He also claims that the syllabic structure of Newspeak words (always one or two syllables), together with a regular word-stress pattern, has not only a phonological function (to permit rapid speech) (*see* **Intonation**), but also a cognitive function: to reduce conscious reflection. The use of such words is termed, non-pejoratively, *duckspeak*.

Orwell's Newspeak is part of a tradition. Utopian fictions often portray idealized languages; *Nineteen Eighty-Four* turns the idea on its head. Speculation about language from the 17th century rationalists to Wittgenstein raised suspicions about natural language and proposed ideal rational systems that would mirror the world directly. Some writers, such as Jonathan Swift, satirized the idea; some writers, such as C. K. Ogden in the 20th century, popularized it. Orwell, appalled by contemporary totalitarianism, gave it a contemporary political twist.

See also: Artificial Languages; English in the Present Day (since ca. 1900); Intonation; Meaning: Overview of Philosophical Theories; Ogden, Charles Kay (1889–1957); Taboo, Euphemism, and Political Correctness.

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Ngan'gi

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Introduction

Ngan'gi (Ngan'gikurunggurr) is an Australian Aboriginal language spoken in the Daly area several hundred kilometers to the southwest of Darwin. The language now has two significant dialectal variations: Ngan'gikurunggurr has about 150 speakers, and Ngen'giwumirri has about 50. These two dialects share about 89% of vocabulary, have nearly identical systems of complex verb morphology, and are mutually intelligible. For our purposes, we can treat them as a single language and give it the label 'Ngan'gi,' although speakers are careful to distinguish between them as characterizing two separate groups with distinct social identities. Ngan'gi is spoken predominantly in the townships of Nauiyu (formerly Daly River) and Peppimenarti, and the outstations that those two towns supply. Most people who speak Ngan'gi fluently are aged more than 50 years, and the children of Ngan'gi speakers now mostly learn Kriol as their first language. With this number and age profile of speakers, Ngan'gi is classified as a 'threatened' language, under real danger of extinction within a few decades.

Classification

The first classification of Daly region languages (Tryon, 1974) paired Ngan'gikurunggur and Ngen'giwumirri as constituting the Tyemeri branch of the 'Daly Family,' with neither related to Murrinh-Patha, the neighboring language to the west. This understanding, of either no relationship or at best a very distant one, between Ngan'gi and Murrinh-Patha, was based on the lexical data; Ngan'gi and Murrinh-patha have at most an 11% shared vocabulary density.

Present research is however overturning this view. Green (2003) has made a compelling case for Ngan'gi and Murrinh-patha making up a genetic subgroup now labeled 'Southern Daly.' The case is based primarily on formal correspondences in the core morphological sequences of finite verbs. Green argues that these sequences match too closely in their complexities and irregularities to have plausibly come about through anything other than a shared genetic legacy; he demonstrates through reconstruction of finite verb paradigms that they are systematically derivable from an innovative common parent. The intriguing question, of how related neighboring languages have come to share as little as 11% lexical cognacy, remains unanswered.

Instead of a single 'Daly Family,' there now appears to be five separate Australian subgroups in the Daly

(Tele-programmes Department), *Minitrue*, and *Ingsoc* (English Socialism). Orwell presents these fictional forms as a continuation of the real historical tendency to produce forms such as *Nazi*, *Gestapo*, *Comintern*, and *Agitprop*. According to Orwell, the reason for these forms is not just economy of effort, but the intention to limit and control associations. He also claims that the syllabic structure of Newspeak words (always one or two syllables), together with a regular word-stress pattern, has not only a phonological function (to permit rapid speech) (*see* **Intonation**), but also a cognitive function: to reduce conscious reflection. The use of such words is termed, non-pejoratively, *duckspeak*.

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See also: Artificial Languages; English in the Present Day (since ca. 1900); Intonation; Meaning: Overview of Philosophical Theories; Ogden, Charles Kay (1889–1957); Taboo, Euphemism, and Political Correctness.

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Instead of a single 'Daly Family,' there now appears to be five separate Australian subgroups in the Daly

Table 1 Genetic subgroups in the Daly River region

Subgroup	*Principal language varieties*
Anson Bay	Batytyamalh (aka Wadyiginy) (Wadjiginy) Kenderramalh (aka PunguPungu)
Northern Daly	MalakMalak (Mullúkm̀ulluk), Tyeraty, Kuwema (Tyaraity)
Eastern Daly	Matngele Kamu
Western Daly	Marrithiyel (Marithiel), Marrisyefin, Marri Ammu Marringarr (Maringarr), Mati Ge Marramaninydyi (Marimanindji) Marranunggu (aka Warrgat) (Maranunggu), Emmi, Menhthe
Southern Daly	Murrinh-Patha Ngan'gikurunggurr (Nangikurrunggurr), Ngen'giwumirri

region that cannot convincingly be related together as a single genetic unit (Table 1) (Green, 2003). Those similarities that Tryon took to be diagnostic of the 'Daly Family' are better accounted for either diffusionally or as genetically inherited features shared with a wide range of northern Australian languages.

Areal Features

Like the majority of languages spoken in Australia's central far north, Ngan'gi is of the polysynthetic (*see* **Polysynthetic Language: Central Siberian Yupik**) structural type, and is categorized within Australianist typology as belonging in the non–Pama-Nyungan and prefixing groups. It has complex verbal structures built up through the addition of strings of prefixes and suffixes to lexical roots. Some of the affixes are suppletive in form and many are portmanteau in nature, simultaneously encoding a number of grammatical categories. A large complex verb might have up to a dozen constituent morphemes and correspond in meaning to a whole English sentence. The most distinctive grammatical features of Ngan'gi are its extensive pronominal indexing, a set of 31 classifying verbs, 4 number categories for pronouns, a system of 16 noun classes, and a 3-way stop/fricative contrast.

Pronominal Indexing

Verbs obligatorily index core participants such as 'subject' (***I*** *saw you*) and 'object' (*I saw* ***you***) by bound pronominal prefixes. Most languages additionally allow for the verbal cross-referencing of other kinds of participants, such as 'goals' (*I told* ***her*** *the news*), 'benefactives' (*I cooked it* ***for her***) and 'adversatives' (*My wife ran away* ***on me***). Pronominal indexing is shown in (1), where subject, object, and adversative arguments are indexed on the one complex verb.

(1) Danginy-nyi-fime-ngidde-wurru.
3sg.S.Poke.Perf-2sg.O-give-1sg.Adv-bad
'She gave it away to you against my wishes.'

Some grammatical categories, such as person, number, and tense, can be marked discontinuously via different affixes at different points in the verb. This marking is illustrated for subject number in (2), which stacks plural, dual, and trial affixes.

(2) Ngarrgu-nime nge-rr-beny-gu-da-nime.
1exdlPRO-trial 1.S-nsg.S-Bash.Perf-dl.S-hit-tr.S
'We (trial exclusive) hit it.'

Verbal Classification

Many languages of Australia's central far north share the characteristic of forming their verbs with not one, but rather two, root-like elements. This two-part structure typically involves the pairing of a relatively inert root (or coverb), which provides the main lexical information for the verb, with a root that hosts the core grammatical affixes (or finite verb). Coverbs form an open class, while finite verbs constitute a small closed class – Ngan'gi has 31 of these. This two-part verbal structure is thought to be an ancient diffusional feature. While in some languages of Australia's north the finite verbs have synchronically no clear semantic value, in the Southern Daly languages, it functions as a classifier of the verbal action. Verbal classification may simply involve specifying the relative orientation of the subject, as with the intransitive posture classifiers in (3) and (4).

(3) Peke dini-fifi-tye.
tobacco 3sgSit.IMP-smoke-Past
'He was sitting smoking.'

(4) Peke wirringe-fifi-tye.
tobacco 3sg.S.Sit.IMP-smoke-Past
'He was standing smoking.'

Other verbal classifiers are concerned with how objects are handled or manipulated, as illustrated by the transitive classifiers in (5) and (6). In (5), the finite verb *Hands* functions to conceptualize the action as performed within the grasp of the fingers. Contrast with (6), in which the replacement of *Hands* with *Poke* achieves a different schematic conceptualization, this time of the action as performed at the end of an elongated instrument.

(5) Ngeriny-fityi peke.
1sg.S.Hands.Perf-roll tobacco
'I rolled a cigarette' (in my hands).

(6) Ngariny-fityi screwdriver-ninggi.
1sg.S.Poke.Perf-roll screwdriver-INSTR
'I screwed it up with a screwdriver.' (I rolled it at the end of a long thin instrument).

Table 2 Ngan'gi freeform pronouns

Number	*1st inclusive*	*1st exclusive*	*2nd person*	*3rd person*
Singular		*ngayi*	*nyinyi*	*nem* (male) *ngayim* (female)
Dual	*nayin*	*ngagarri*	*nagarri*	*wirrike*
Trial	*nayin nime*	*ngagarri nime*	*nagarri nime*	*wirrike nime*
Plural	*nayin nime*	*ngagurr*	*nagurr*	*wirrim*

When compared to the other languages of the Daly, and to northern Australia generally, the classifying verb structures of Ngan'gi reveal two aberrant features. First, they exhibit a tight morphophonological binding between coverb and the inflected finite root. Second, they show an innovative ordering, placing the coverb after the inflected finite root rather than preposed to it. Reid (2003) argued that these shared features result from recent diffusion rather than a shared genetic legacy, demonstrating how the Southern Daly languages Ngan'gikurunggurr and Ngen'giwumirri have acquired them only within the last hundred years.

Free Pronouns

The Daly languages have freeform pronoun systems that are complex by virtue of grammaticizing multiple nonsingular number categories. Some languages, including Ngan'gi, have singular/dual/trial/plural systems, while others have singular/dual/paucal/plural systems. As can be seen from Table 2, Ngan'gi has a slightly nonsymmetrical system where the trial/plural contrast is neutralized in 1st inclusive.

Nominal Classification

All the Daly languages have at least a few generic nouns, such as 'meat,' 'vegetable food,' and 'fire,' which are regularly placed in front of specific nouns to encode salient cultural categories. In some Daly languages, this encoding has become extended into a system in which the category membership of all entities is obligatorily encoded by one of around a dozen NP initial generic nouns. In Ngan'gi, such generic-specific constructions have undergone even further grammaticalization, displaying agreement phenomena and reduction of the independent generic to bound forms. Sometimes, agreement is marked by bound forms attached to nouns as well as modifiers such as adjectives or demonstratives. In other cases, noun class assignment is marked by freeform generics that precede specific nouns and also precede the modifiers. Each of these types is demonstrated in (7) and (8).

Table 3 Ngan'gi phonemic inventory consonants

Consonant type	*Bilabial*	*Alveolar*	*Palatal*	*Velar*
Voiceless stop	p	t	ty	k
Voiced stop	b	d		
Fricative	f	s	sy	g
Nasal	m	n	ny	ng
Lateral		l		
Approximant		r		
Trill		rr		
Glide	w		y	

(7) a-tyalmerr a-kerre a-kinyi
animal-barramundi animal-big animal-this
'this big barramundi fish'

(8) syiri magulfu syiri marrgu
weapon fighting.stick weapon new
'a new fighting stick'

Noun class phenomena in Daly languages have proved theoretically interesting by providing a perspective on the historical development of class markers from freeform nouns to proclitics to prefixes. They have also contributed to theorizing about the process by which agreement phenomenon develop (Reid, 1997) and to considerations of the nature of the distinction between noun class and noun classifying systems (Green, 1997).

Phonology

Australian languages generally lack phonemic fricatives and typically have just a single series of stop. The Daly region shows a significant departure from this pattern, with all languages except Anson Bay showing at least some phonemic voicing contrast. Ngan'gi has both a partial stop contrast, and phonemic fricatives, yielding a 3-way obstruent contrast between a voiced stop, voiceless stop and fricative for the bilabials and alveolars. The phonemes of Ngan'gi, showing the atypical obstruent set in an

Table 4 Ngan'gi phonemic inventory vowels

Vowel type	*Front*	*Back*
High	i	u
Low	e	a

otherwise standard Australian inventory, are given in Table 3 and Table 4 in their practical orthography.

See also: Australia: Language Situation; Classifiers and Noun Classes: Semantics; Polysynthetic Language: Central Siberian Yupik.

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Nicaragua: Language Situation

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The República de Nicaragua has recognized its citizens' right to develop and use local languages, and it has been especially active in reviving and promoting its minority languages. Spanish is the dominant household language throughout all but the Caribbean coastal areas, and its dominance is unchallenged in the urbanized departments of the highlands and the Pacific coast. The language of national government and the medium of school instruction, Spanish is also the country-wide lingua franca. However, eastern parts of the country, which historically have been more closely linked to British and U.S. commercial interests, have maintained a significant indigenous presence. Recently, these areas have been reorganized into the RAAN (Región Autónomo del Atlántico Norte) and the RAAS (Región Autónomo del Atlántico Sur), and Miskitu, Sumo, and English have been declared official languages of these *departamentos*. According to one government survey, more than 20% of the RAAN and RAAS residents use mother tongues other than Spanish, as compared to less than 3% for the republic as a whole.

Miskitu (Mískito, Mísquito) speakers inhabit the Atlantic coast and lowlands, especially from the Honduran border on the river Coco south to the Laguna de Perlas. A Misumalpan language spoken on both sides of the international border, Miskitu

Table 4 Ngan'gi phonemic inventory vowels

Vowel type	*Front*	*Back*
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The República de Nicaragua has recognized its citizens' right to develop and use local languages, and it has been especially active in reviving and promoting its minority languages. Spanish is the dominant household language throughout all but the Caribbean coastal areas, and its dominance is unchallenged in the urbanized departments of the highlands and the Pacific coast. The language of national government and the medium of school instruction, Spanish is also the country-wide lingua franca. However, eastern parts of the country, which historically have been more closely linked to British and U.S. commercial interests, have maintained a significant indigenous presence. Recently, these areas have been reorganized into the RAAN (Región Autónomo del Atlántico Norte) and the RAAS (Región Autónomo del Atlántico Sur), and Miskitu, Sumo, and English have been declared official languages of these *departamentos*. According to one government survey, more than 20% of the RAAN and RAAS residents use mother tongues other than Spanish, as compared to less than 3% for the republic as a whole.

Miskitu (Mískito, Mísquito) speakers inhabit the Atlantic coast and lowlands, especially from the Honduran border on the river Coco south to the Laguna de Perlas. A Misumalpan language spoken on both sides of the international border, Miskitu

has long been written by the Moravian Church, the most important religious organization in the Miskitu community, and it is the language of worship in the Miskitu speech area. Good dictionaries, a reference grammar, bibles, hymnals, and other religious materials are available, and Miskitu language literacy is widespread. The national government has encouraged the maintenance of Miskitu and has facilitated the publication of dictionaries and other literacy materials, especially for the Wangki dialect. Miskitu language courses are offered in Bilwi, the capital of RAAN. With well over 70 000 speakers, Miskitu is, along with Spanish, a lingua franca throughout the Miskitu area. There are regular radio broadcasts in Miskitu.

Up river from the areas of Miskitu dominance live two-thirds of Nicaragua's 6000 speakers of Sumo (Sumu, Sumo Tawahka), another Misumalpan language. This ethnic group prefers the collective name Mayangna, which is now used in government reports, though its three Nicaraguan dialects are known as Tuahka (Twahka, Nicaraguan Tawahka), Panamahka, and Ulwa. Though they continue to resist complete acculturation by maintaining their own language, they are highly multilingual, preferring to speak Miskitu, Creole English, or Spanish, a fact that has contributed to counting errors in language surveys. The greatest concentration of speakers is in Bonanza. Especially endangered, the southern dialect Ulwa is not readily intelligible to speakers of the northern dialects Tuahka and Panamahka, and it has received separate recognition by the government, even though it has but a few hundred older speakers, nearly all in Karawala near the mouth of the Río Grande de Matagalpa.

A language rescue project was begun in 1984 for the Chibchan language Rama, which had only 31 known speakers in 1986, living in Cane Creek, Monkey Point, Wiring Cay, and Pataste. Although most ethnic Rama speak Spanish and Creole English, a basic Rama language course was developed for the elementary school on Rama Cay to teach this heritage language to the ethnic Rama children, and this seems to be the only community where Rama is now actively spoken.

Nicaragua reports over 20 000 speakers of Western Caribbean Creole English, found throughout the RAAN and RAAS, but most dominant in Rama Cay and the area around Bluefields. Even though these Creole speakers often consider English their standard target, they do not normally identify with the United States or Great Britain. Many Creole speakers are ethnic Mayangna or ethnic Rama who have forsaken their ethnic language. A small population of ethnic Garifuna live in Orinoco and other villages of Laguna de Perlas, and they too are reported to now speak Creole English.

Over 3000 deaf use a regional sign language, Idioma de Señas de Nicaragua (Nicaraguan Sign Language), which is distinct from American Sign Language and other well-known sign languages.

See also: Honduras: Language Situation; Misumalpan; Pidgins and Creoles: Overview; Spanish.

Language Maps (Appendix 1): Map 66.

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Nicknames

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Social Origin and Function of Nicknames

A nickname is an 'eke name' (from Middle English *eke* 'also'), an additional name borne in addition to a person's proper or official name. According to Morgan *et al.* (1979), nicknames typically originate "in the autonomous social world that children construct independently of adult influences. Children invent nicknames spontaneously, using language creatively in accordance with a logic which is not laid down from outside." It should be noted, however, that not only children coin nicknames: Adults coin nicknames with almost equal readiness, Abel (2004) gives some examples. The linguistic register of a nickname is always informal. Nicknames are typically ephemeral and, as with certain kinds of slang, confined to quite small in-groups. To know who *Sweaty Nine Fingers* was, you would have to have attended a particular British school in the 1950s, where the slang term *sweaty* meant 'prone to sudden outbursts of anger (*sweats*)' and one such individual had, congenitally, fewer fingers than the norm. The total language community using this term was thus confined to around 300 people for a period of less than 10 years.

Nevertheless, some nicknames – those bestowed on public figures – transcend the in-group and can even become established as a permanent part of the historical record of a culture. Yet, even though the phenomenon of nicknames seems to be universal, not every public figure receives a nickname. Nicknames are based on a salient distinctive character or characteristic. The Roman Emperor Gaius Germanicus is known to history by his nickname *Caligula,* which means, roughly 'little boots.' Napoleon accumulated nicknames throughout his career – some hostile, some admiring, some respectful, some demeaning (depending on who coined them): *Le Petit Caporal, The Man of Destiny, The Corsican Ogre,* and *Boney* are just some of them. By the end of her career, the British politician Margaret Thatcher had received almost as many nicknames as Napoleon: *The Iron Lady, Attila the Hen, The Leaderene, Tina* (an acronym based on her catch phrase "There is no alternative"), *Milk Snatcher* (a rhyming nickname alluding to her policy of withdrawing government support for free milk for schoolchildren), among others. A politician who does not receive a nickname is generally a rather dull and colorless individual. By contrast, it is unusual for civil servants and bankers to receive nicknames, at any rate outside their immediate circle, although a recent governor of the Bank of England, Sir Edward George, received the nickname *Steady Eddie*. This was not only a tribute to his reliable judgement and calming influence, but also an indication that he had achieved an unusually high public profile.

Sports personalities are particularly prone to receiving nicknames. The English writer William Hazlitt records attending a prize fight in 1822 involving an individual named *The Gas Man* – another prize fighter of the period was known as *The Game Chicken* – whereas in more recent times, such nicknames as *The Brown Bomber* (Joe Louis) and *The Louisville Lip* (Muhammad Ali) spring to mind. Baseball players, footballers, and cricketers are nicknamed equally often.

Even when an unpleasant characteristic is singled out as a basis for a nickname, the effect is normally humorous, rather than hostile. The 'official' full form of a person's name (e.g., 'Mr Francis Leverett Smith') is considered cold and unfriendly in many cultures and in many places is mainly reserved for bureaucratic transactions and reprimands. In other circumstances, it can be taken as an indicator of high social status. In both cases, the effect of using the formal form of a person's name is to distance the person referred to from the speaker's social interactions. In contrast, the effect of a nickname – even a cruel, offensive, and obscene nickname – can often be to weaken the isolating effect of an offensive remark and to promote social interaction. A child with problems of personal hygiene is called *Sewer* or *Smelly*, a plump child is called *Fatty*, a child with a birthmark is called *Strawberry.* This may be cruel; yet, as a general rule, no offense is intended. As one child in Morgan's survey remarked, "She's called *Fleabag*, but she's nice and she ain't got no fleas" (Morgan *et al.,* 1979). In this case, the origins of the surname turned out to be anecdotal. It cannot be denied that such nicknames, drawing attention to a sensitive point, can wreak havoc on delicate sensibilities, yet it might also be argued that such a frank, socially interactive, and often humorous acknowledgement of salient characteristics is socially healthier than mealy-mouthed, humorless political correctness. Placing taboos on offensive terms merely serves to empower them.

Not only people but also institutions (the BBC – *The Beeb, Auntie*), companies (IBM – *Big Blue*), cities (New York – *The Big Apple*, Edinburgh – *Auld Reekie* 'Old Smokey'), and locations (the

high-technology computer research region south of San Francisco – *Silicon Valley*, the fundamentalist Christian southern states of the United States – *Jesusland*) may receive nicknames. Nicknames are sometimes exploited to form other nicknames, so that for example when the computing research industry began to become established in the cities of Cape Cod, it was nicknamed *Silicon Sandbar,* a reference to the better known *Silicon Valley.*

Nicknames are probably found in all languages. For example, the following Arabic nicknames are mentioned in Morgan *et al*. (1979): *El A'raj* 'the lame one,' *El Abufas* 'the smelly one,' *El Abushenab* 'the mustachioed one' (a tough guy), and *El Mawsou'a* 'the encyclopedia' (a know-it-all).

Nicknames and Hypocoristics

People love to play with words, and this is also true of names. People alter the forms of names in their language, creating hypocoristic forms or pet forms, which have similar properties to those of nicknames – in particular, informal register and a socially integrative function. However, whereas nicknames are independent formations, hypocoristics are altered forms of the surname or forename.

The inventory of conventional hypocoristic suffixes or processes in most languages is quite small, but is generally supplemented by occasional rare or one-off formations. In present-day English, *-y* is the most common hypocoristic suffix, added to the first syllable of forenames and surnames alike, as in *Billy, Johnny, Jenny, Jilly, Smithy, Jonesy.* In Middle English and early Modern English, *-kin* was commonly added to male forenames, as in *Peterkin, Hankin, Wilkin*. The process of forming a hypocoristic by shortening a name and adding *-l* was well established by Shakespeare's day, as in *Hal* for Henry. This is still an active process in present-day English, as in *Del* for Derek and *Tel* for Terry. Reduplication is also common, as in *Lulu* for Louise and *Jo-Jo* for Joseph or Josephine.

In all European languages, but especially in the Slavic languages and Italian, nouns often receive a hypocoristic suffix (pet form, diminutive). In Slavic languages, this is quite normally done with common nouns and equally so with names, so that for example the Czech word (and surname) *dvořák* 'freeholder' or 'landowner' is more often than not used in the hypocoristic form *dvořáček*, and Polish *bednarz* 'cooper' is generally used in the hypocoristic form *bednarczyk*. Czechs with the forename *Bohuslav* are often addressed and referred to by the hypocoristic form *Boček*. Russians called *Anastasia* receive various pet names; for example, *Nastasia, Nastya, Nastenka*. Altered forms are sometimes surprising. English *Will* is obviously enough a shortening of *William*, but where did the *B-* come from in the equally common hypocoristic form *Bill*? This form is first recorded in the 17th century in Ireland, where it seems likely that the *B-* is a hypercorrection, caused by a mistaken association with Gaelic words and names beginning with *B-*, the lenited form of which begins with *Bh-*, pronounced as /w/ in some dialects.

Many European family names are derived from hypocoristic forms of given names. In Italy in particular, this was a general pattern, sometimes accompanied by so much alteration or truncation that the original given name is quite unrecognizable. For example, *Pucci* is derived from a hypocoristic form of either of two given names (*Filippo* or *Iacopo*), even though it shares only one letter with the source name. An Italian hypocoristic may receive a second hypocoristic suffix, resulting in such forms as *Puccetti, Puccini,* and *Pucciarelli,* and even a third suffix, as in *Puccinelli.*

Typology of Nicknames

There is sometimes interaction between vocabulary words and nicknames. For example, the English vocabulary word *doll* (denoting a child's toy in the form of a miniature child) originated as a hypocoristic shortening of the female personal name *Dorothy*, as in the case of Shakespeare's *Doll Tearsheet*. Subsequently, the vocabulary word came to be used as an appellative for any young woman (as in "Hey, Doll, where's my burger?"). With the addition of a further hypocoristic marker *-y* (*Dolly*), it is both used as an appellative and has passed back into the general vocabulary as a term for a young woman with a superficially sexually attractive appearance (a *dolly bird*).

The main types of nicknames may be classified as follows:

- Reference to physical appearance. Examples: *Fatty, Twiggy* (a thin person), *Beaky* (someone with a large nose), *Dumbo* (large ears, from the cartoon elephant in a 1941 Disney film of this name), *Ginger, Copperknob* (red hair), *Four-eyes* (someone with glasses)
- Imputation (often unfairly) of an unpleasant characteristic. Examples: *Sewage, Stinker Hargreaves, Slimy Jones*
- Imputation of other characteristics, often satirically. Examples: *Brainbox Henderson*, *Gorgeous George*
- Behavior. "A child who used to bite in playground scuffles acquired the nickname *Tiger.* One who did

messy work became *Smudge*" (Morgan *et al.*, 1979: 40).

- Supposed resemblance to an animal. Examples: *Piggy, Frog, Toad, Fish; Animal* (in the sense 'big, strong, and stupid')
- Cultural references. Examples: *Dalek,* 'an unpopular child with a monotonous voice' (from the destructive robots in the long-running British science-fiction TV series *Dr Who*, noted for their monotonously repeated catch phrase, "Exterminate them! Exterminate them!"); *Goldilocks* (a blond boy or blonde girl); *Saffy* (a solemn young woman, from a character in the British comedy TV series *Absolutely Fabulous*), *Speedy Gonzalez* (an American cartoon film character)
- Punning reference to a job or social function. Examples: *Haversack* (a foreman, "because he's always on my back"); *Balloon* (because he had a catch phrase, "Don't let me down"); *The Bishop* (the presenter of a religious TV program)
- Pun on surname. Examples: *Long bum* and *Ramsbum* for people with the surname *Longbottom* and *Ramsbottom* (disregarding the etymological fact that the 'bottom' in question has nothing to do with the human anatomy, but refers in fact to a geographical feature – the bottom of a valley)
- Rhyming and assonance. Examples: *Beef* for someone with the forename *Keith*, *Bracket* for the surname *Hackett*
- Survival of babytalk. Example: *Ellie,* from *Eletant,* from *elephant*.

Finally, some nicknames seem to have been coined arbitrarily, or rather the reason for their origin is lost (e.g., *Biff, Dibby*), whereas in other cases the origin is anecdotal, though the circumstances may be very uncertain. The jazz musician Charlie Parker (1920–1955) was universally known as *Bird*, a shortening of *Yardbird*. It is said, with uncertain reliability, that this was a reference to his fondness for fried chicken, illustrated by his proposal, after running over a stray chicken in the road on the way to a gig, that the band should pick it up and take it with them, so that they could cook it for dinner.

Conventional Nicknames

Some nicknames are conventionally associated with particular surnames. Examples include *Dusty Miller, Chalky White, Nobby Clark*, and *Spud Murphy*. Anyone who has ever visited a traditional flour mill will know immediately why the occupational surname Miller attracted the nickname *Dusty*. For those who recall from their schooldays teachers using white chalk on a blackboard, the association of *Chalky* and White is equally obvious. It is less obvious why the surname Clark should have attracted the conventional nickname *Nobby*. *Spud Murphy* clearly owes its origin to the days when potatoes were the subsistence diet of the poorer inhabitants of rural districts of Ireland. But then why only Murphy? Why not *Spud Kelly* or *Spud Cullinane*? Even here, linguistic arbitrariness seems secure.

Nicknames as Sources of Surnames

A large class of European surnames originated as nicknames. Exemplars from all the categories of nicknames described above are also found as surnames. Particularly common are terms denoting animals and birds, such as *Fox, Hawk,* and *Lamb,* generally with reference to characteristics conventionally imputed to the creatures in question. In addition, the following classes may be mentioned.

- Occupational nicknames: English *Copestick* 'cut the stick' (a woodcutter), German *Knaack* 'bone' (a butcher), and French *Painchaud* 'hot bread' (a baker)
- Dress habits: Italian *Fazzolari*, which most probably originated as a nickname for someone who habitually wore a *Fazzolo*, a kerchief
- Speech habits English *Goody* 'good day,' and Italian *Addio* 'farewell.'

See also: Personal Names; Proper Names: Linguistic Status; Proper Names: Semantic Aspects; Register: Overview; Slang Dictionaries, English; Slang: Sociology.

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Eugene Nida was born in 1914 at Oklahoma City, Oklahoma, in the United States. This linguist is known worldwide to most students of linguistics and to most teachers and researchers who have used his *Morphology, a descriptive analysis of words* (1946b), which involves theoretical analyses, practical exercises with and without answers, and concrete advice for fieldwork. This handbook contributed to the instruction of generations of linguists, thanks to its abundant empirical data (problems are taken from 49 languages, from Arabic to Zoque) and to the meticulous precision in the structuralist analysis of morphemes where the various stages are differentiated, from their identification and their classification into types to their distribution and elaboration as structural classes.

In his handbook, Nida provided definitions and demonstrations of the structuralist leaders of the period, L. Bloomfield and E. Sapir, together with incisive discussions of contributions from his contemporaries R. S. Wells, B. Bloch, and Z. Harris. During this period, two of his papers published in *Language* (1948a,b) testify to the methods and theory of American structuralism.

However, Nida's long career and many publications could have remained little known or poorly understood by the international linguistic community, since he devoted himself very early and entirely to the translation of a single corpus, the Bible (primarily the New Testament). In 1946 he published simultaneously his *Bible translating* and *Morphology, a descriptive analysis of words*.

He was one of the directors of the Summer Institute of Linguistics, founded in 1934 in Mexico, a humanitarian and missionary agency whose aim was to provide a basic linguistic education whose beneficiaries would be competent in describing the languages of minority populations and in establishing a writing system for each so that the New Testament could be read in more than 1000 languages. In 1943, during World War II, the American Bible Society was founded, and by 1947 the United Bible Society had 30 member states. Nida contributed to the translation of the Scriptures into many more languages in the last half century than had been done during the entire Christian era, making 200 official trips in 40 years. He was a consultant for the United Bible Society from 1947 to 1990 and has been a consultant for the American Bible Society since 1984.

In his latest book, entitled *Fascinated by languages* (2003), he characterizes his professional activity and choice to lecture as that of "an eclectic and a pragmatic," recalling that he organized sessions in translation in more than 90 countries and that he has published, alone or in collaboration, 13 handbooks on translation applied directly at various Biblical texts, from the *Gospel of John* in 1961 to Paul's *Letter to the Ephesians* in 1983. He explicitly links his long career to two childhood experiences as a reader of the revue *Scientific American*, which created in him a passion for the diversity of forms, and of *Genesis*. Both of these inspired him profoundly and guided him in his twofold university education: a B.A. from the University of California, Los Angeles in 1936, an M.A. in patristics from the University of Southern Carolina in 1939, and a Ph.D. in linguistics from the University of Michigan in 1943.

His principal aim has always been "to see through and beyond the words to the meaning of the text." As shown by his simultaneous publication of *Bible translating* and *Morphology: the descriptive analysis of words* in 1946, one text, the Bible, was for him the only text.

Nida has belonged to numerous learned societies that reflect his varied interests, including the American Anthropological Association, the Linguistic Society of Canada and the United States, the American Association for Applied Linguistics, and the Society of Biblical Literature, as well as the Linguistic Society of America (of which he was president in 1968) and the Society for Textual Scholarship (president, 1987–1988).

See also: Bible Translation into Lesser-Known Languages; Morpheme.

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Niger: Language Situation

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The Republic of Niger covers a landlocked territory of 1.27 million km^2 in the semiarid and arid zones of the southern Sahara, bordering on Nigeria, Burkina Faso, Mali, Algeria, Libya, and Chad. The population in 2001 was approximately 11 million. A narrow southern zone in the valley of the river Niger and along the border to Nigeria allows agricultural activities and is settled by speakers of Gulmancema (Gourmanchéma), Zarma, Hausa, and Kanuri, whereas a much larger northern zone hosts mostly nomadic peoples who speak Arabic, Fulfulde, Tamajaq, and Tubu (Tedaga), and a few oasis dwellers who speak Tasawaq or Kanuri. There are only few Buduma speakers left in the country due to the drying up of Lake Chad. With the exception of the speakers of Tasawaq, all languages are of cross-border nature, i.e., they are also indigenous to neighboring countries, with even larger numbers therein.

Niger's population is predominantly Muslim (estimated 80–95%); traditional religions are adhered to by about 5% of the people and Christians comprise less than 0.5% (other sources have indicated up to 20% non-Muslims). About 85% of the population lives in rural areas; only 15% of these rural lands are suitable for agriculture.

Since obtaining independence from France in 1960, Niger has used French as the 'official language'; French is actively spoken by only about 10% of the population, however, and these people tend to be employed in the public sector and to have a background in formal educational, living in the capital Niamey and in administrative headquarters. With notable exceptions in the educational system and the media, French is the only language used for official purposes, i.e., in the domains of legislature, public administration, and jurisdiction, and in the formal economic sector. Occasionally and only for oral communication, French is supplemented by the use of Hausa and/or Zarma. In public life, the African languages are practically invisible. There is little demand outside expert circles for the empowerment of these languages, which generally suffer from negative attitudes on the part of many of their speakers. However, following democratization in the early 1990s, politicians seeking (re-)election have shifted from their 'French-only' mannerism to occasional usage of national languages. French remains associated with power and prestige, upward social mobility, successful professional careers, employment in the public sector, etc. in a very elitist way. The educational system is based almost exclusively on the 'imported' language, which most children do not speak on entering school, resulting in drastic school failure (frequent class repetitions or total abandonment of education). This conspires toward restricting access to higher education, and an inadequate command of the official language ultimately contributes to social exclusion and a potential for social violence.

The *Ethnologue* (2004) lists 20 spoken languages for Niger. Ten languages have constitutionally recognized legal status as 'national languages', with the following official spellings: *Arabe*, *Buduma*, *Fulfulde*, *Gulmancema*, *Hausa*, *Kanuri*, *Soŋay-Zarma*, *Təmajaq*, *Tassawaq*, and *Tubu*. This means that members of three of the four African language phyla of the Greenbergian language classification are represented: Afroasiatic (Arabic (Semitic), Buduma and Hausa (Chadic), and Tamajaq (Berber)); Nilosaharan (Kanuri and Tubu (Saharan) and Zarma (Songai));

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Niger-Congo Languages

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It is widely accepted that the languages of Africa, apart from the creoles, pidgins, and 'official' languages inherited from the colonial era, belong to four major families: Niger-Congo, Nilo-Saharan, Afro-Asiatic, and Khoisan. Niger-Congo is the largest, both in terms of the number of languages and in geographical spread. It extends from Dakar east to Mombasa and south to Cape Town. Of the 2000 languages spoken in Africa, some 1400 belong to Niger-Congo. Recent estimates put the number speaking a Niger-Congo language at around 400 million people.

Early Classification

In the 19th century, scholars began to make groupings of African languages. Koelle (1854) published word lists in some 200 languages, grouped so as to reflect the relationships among the languages. Many of his groupings correspond closely to the accepted classification today.

Bleek (1856) recognized that languages in western and southern Africa were related and wrote of "that great family which, with the exception of the Hottentot dialects, includes the whole of southern Africa and most of the tongues of western Africa."

Subsequently, scholars tended to lose sight of the essential unity of these languages and to focus on the Bantu languages of southern Africa. The large number of languages elsewhere that had similar features were regarded as being 'mixed' in origin, and their similarities were explained as being the result of migrations and language contact, rather than as deriving from a common genetic origin with Bantu.

Significant development came with the work of Westermann (1927). He set up 'Western Sudanic' as distinct from 'Eastern Sudanic' (since classified as Nilo-Saharan). Westermann divided Western Sudanic into six subfamilies: Kwa, Benue-Congo, Togo Remnant, Gur, West Atlantic, and Mandingo (Maninka). He also compared a large number of proto-Western Sudanic roots with the corresponding proto-Bantu forms. Though Westermann did not go on to draw the conclusion that pointed to a common genetic origin, Joseph Greenberg did. He showed that Westermann's Western Sudanic and Bantu formed a single genetic family, which he called 'Niger-Congo.' Subsequently, Greenberg (1963) brought in Kordofanian as coordinate with Niger-Congo.

Greenberg retained the subfamilies that Westermann had already established – Kwa, Benue-Congo, Gur, West Atlantic, and Mande (Mandingo) – but included Togo Remnant within Kwa and added a new subfamily, which he termed 'Adamawa-Eastern.' His most revolutionary innovation was to include Bantu as a subgroup of a subgroup within Benue-Congo and not as a subfamily coordinate with the other main branches of Niger-Congo.

Accepted Classification

Although Greenberg's work has set the classificatory framework within which most scholars have worked since (Figure 1), there were, as he readily

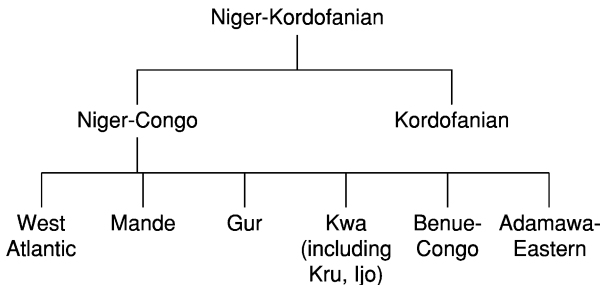

Figure 1 Greenberg's classification.

admitted, still many unresolved classificatory questions. Subsequent research has clarified some of these issues, and Greenberg's classification was revised by a group of scholars (Bendor-Samuel, 1989) (Figure 2). The languages that are spoken today are classified into nine major language subfamilies: Mande, Kordofanian, Atlantic, Ijoid, Kru, Gur, Adamawa-Ubangi, Kwa, and Benue-Congo. Scholars are not agreed on the classification of Dogon; hence, it is listed separately, though it does not constitute a subfamily.

These nine major language subfamilies relate to each other in different ways, some being related more closely than others. The relationships reflect the fact that the nine major subfamilies did not derive directly from a common ancestor. There were intermediate steps that have been tentatively reconstructed on the chart.

Since the publication of *The Niger-Congo languages* (Bendor-Samuel, 1989), further consideration has been given particularly to three issues:

1. Although it is generally accepted that the five subfamilies of Kru, Kwa, Benue-Congo, Gur, and Adamawa-Ubangi are related more closely to each other than to Mande, Kordofanian, Atlantic, and Ijoid, there is no agreement on the sequence in which Mande, Kordofanian, Atlantic, and Ijoid split from the main stock. Some have suggested Kordofanian was the first to split off; others have proposed Mande.
2. As regards the Volta-Congo group, one view gaining acceptance is that the five subfamilies fall into two groups: Gur, Adamawa-Ubangi, and Kru in North Volta-Congo and Kwa and Benue-Congo in South Volta-Congo. It has been suggested that Gur and Adamawa-Ubangi originated as a dialect continuum. Kwa and Benue-Congo could be treated in the same way. Although geographically separated from Gur, Kru is related more closely to Gur than to any of the other languages in Volta-Congo and so is placed in the Northern group. The attraction of this analysis is that it provides for a northern and southern spreading of languages in the Volta-Congo group, with Gur and Adamawa-Ubangi spreading across the Savannah lands to the north of this area, in contrast to Kwa and Benue-Congo spreading to the south (see Williamson and Blench, 2000).
3. Discussion has continued about where to draw the boundary between Kwa and Benue-Congo. Some have followed Greenberg in regarding the western groups of languages in Benue-Congo as an eastern group within Kwa. Others draw the boundary farther to the west, with these languages grouped within Benue-Congo, as is the case in this article (Williamson and Blench, 2000).

One thing is clear from the continuing discussion: the classification of Niger-Congo is far from final. Many questions are still being asked about the internal structures of the present subfamilies, their relationship to each other within Niger-Congo, and the relationship of Niger-Congo itself to Nilo-Saharan (Williamson and Blench, 2000).

The Niger-Congo Subfamilies

Mande

Mande languages are spoken by over 10 million people over a wide area, including large parts of Guinea, Mali, Sierra Leone, Liberia, and northwest Ivory Coast. Substantial numbers are also found in Burkina Faso, Senegal, Gambia, and Guinea-Bissau, with much smaller pockets in southern Mauritania; northern parts of Ghana, Togo, Benin, and Nigeria; and in southwest Niger.

The internal relationships of the languages within the Mande subfamily are loose. Lexicostatistical studies give only 17% cognates between the Western and Eastern groups.

The much larger Western group, with 27 languages, divides into a Southwestern group of 4 languages and a Northwestern group of 23 languages. Within the Northwestern group, the core group comprises 10 languages, all scoring from 80–90% lexicostatistically, with three of those languages – Bambara (Bamanakan), Maninka, and Jula – being major languages with over 1 million speakers each.

The 13 languages within the Eastern group relate to each other at levels of 30–35% lexicostatistically.

Kordofanian

Kordofanian languages are isolated from the rest of the languages of Niger-Congo, being spoken in the Nuba mountains of central Sudan by 250 000–500 000 people.

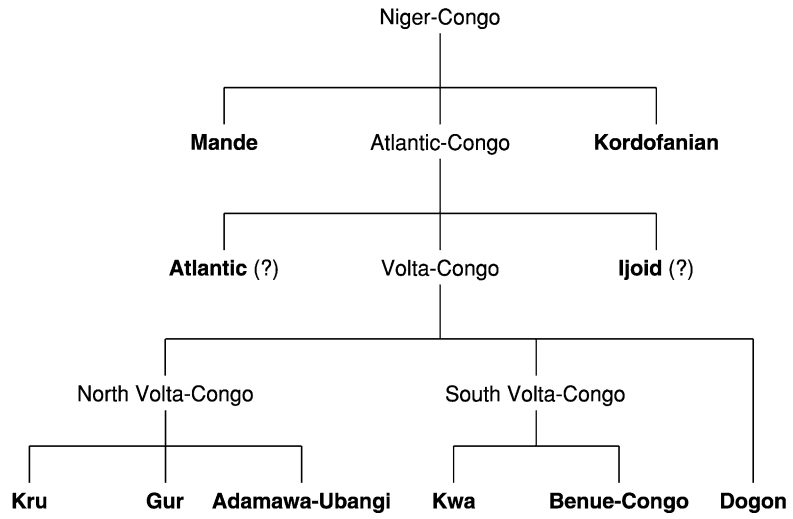

Figure 2 Revised classification.

Kordofanian is divided into four main groups: Heiban, Talodi, Rashad, and Katla. Greenberg included a fifth group, Kadugli, but it is so divergent from the others that there is serious doubt whether it belongs to Kordofanian but rather to Nilo-Saharan (see Schadeberg, 1981).

Atlantic

Atlantic languages are spoken by about 20 million people. One language, Fula, accounts for 12–15 million of those people and is the most widely scattered language group in Africa, all the way from Senegal to the Sudan. Except for Fula, the Atlantic languages are located primarily along the Atlantic coast from the Senegal River to Liberia.

All of the Atlantic languages fall into one of two groups, northern and southern, except for the languages spoken on the Bijago Islands, which constitute a small third group with 20 000 speakers.Within the northern group, which includes Fula, Wolof, Serer, Jula (Jola), Manjaku-Papel, and Balanta (Balant-Ganja), lexicostatistical percentages range between 24–37.

The languages in the southern group are generally not related closely to each other. Three subgroups are recognized; Mel is the largest, comprising 13 languages, of which Temne (1 million speakers) and Bullom-Kissi (650 000) have the most speakers.

Ijoid

Ijoid is very different from the other subfamilies of Niger-Congo. It comprises the language cluster Ijo and a single language, Defaka. Ijo is not a single language, but a cluster of rather closely related languages/dialects with a total of over one million speakers. The whole subfamily is confined geographically to the Niger Delta. Ijoid does not belong either to Kwa or to Benue-Congo and seems to be outside the Volta-Congo grouping. Hence, it is treated as a branch of Atlantic-Congo.

Kru

Kru languages have been included by some scholars, including Greenberg, within Kwa, but later studies suggest that Kru is closer to Gur. Some have gone further and included Kru in a North Volta-Congo group together with Gur and Adamawa-Ubangi.

The 26 Kru languages are spoken by approximately 2 million people, mostly in the forest regions of southwest Ivory Coast and southern Liberia.

An Eastern and a Western group are recognized. The Western group is the larger and more heterogeneous and can be divided into four subgroups, each of which has one principal language complex: Grebo, Guere (Guere-Krahn), Bassa, and Klao. The Eastern group is more homogeneous and comprises two major subgroups, the Bete and the Dida language complexes, both in Ivory Coast.

Gur

The 85 Gur languages are found in the savannah lands north of the forest belt extending from southeast Mali across northern Ivory Coast, Burkina Faso, Ghana, Togo, and Benin into northwest Nigeria. The number of speakers of these languages is around 12–15 million.

Most Gur languages belong to Central Gur, which is a comparatively closely related group of languages. Within Central Gur, there are two major subgroupings, that of the Oti-Volta (some 25 languages) and Grusi (20 languages). Additionally, there are some 15 languages outside these two main subgroups. The

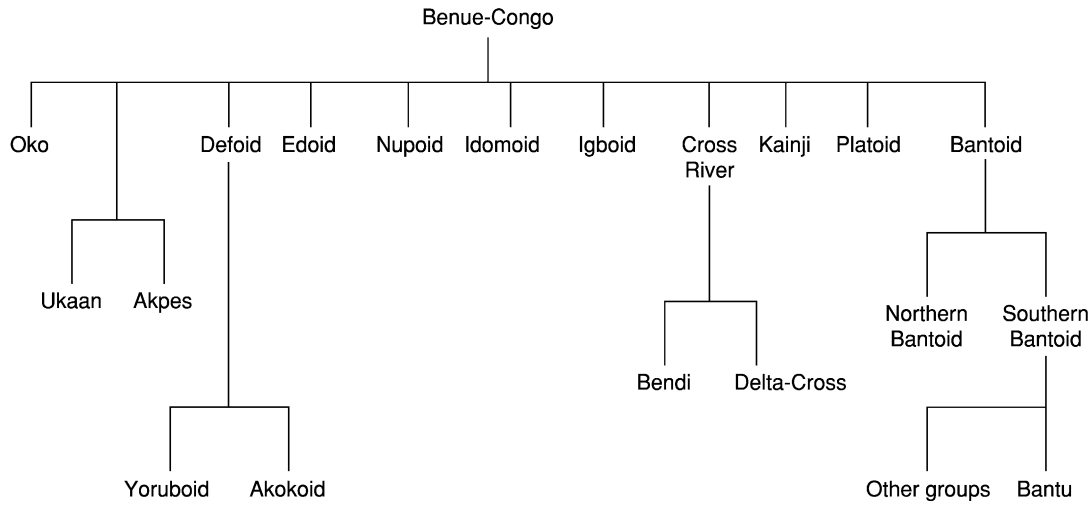

Figure 3 Benue-Congo subfamily.

languages within Oti-Volta show appreciably closer relationships to each other than do the languages within Grusi.

To the west of Central Gur lies the Senufo subgroup, comprising some 20 languages, grouped into 7 subgroups. Its relationship to Central Gur is not close, but there is no evidence to group Senufo with any other subfamily.

Dogon

Dogon is spoken in Mali, east of Mopti. Previously, scholars had included it within Gur, but there is general agreement that the grounds for this classification are inadequate. However, there is no evidence to group it with any of the other subfamilies within Volta-Congo.

Adamawa-Ubangi

Adamawa-Ubangi languages are spoken by approximately 8–9 million people from eastern Nigeria across northern Cameroon, southern Chad, the Central African Republic, and northern Zaire into southwestern Sudan.

Some lexicostatistical studies suggest that the Adamawa-Ubangi languages are closer to some of the Gur languages than they are to any of the languages in the other subfamilies within Volta-Congo. A preliminary hypothesis groups Gur and Adamawa-Ubangi in a North Volta-Congo grouping.

The languages within the Adamawa group are found mostly in Nigeria and Cameroon and are rather loosely related. The 70 plus languages/dialects are divided into 16 groups.

The Ubangi group has a larger number of speakers. The languages in it are related more closely to each other and include a number of widely spoken languages, such as Banda, Ngbandi, Ngbaka (Ngbaka-Mba), Gbaya, and Zande. The most probable classification suggests a core group comprising the three subgroups Banda, Ngbandi, and Ngbaka, with two peripheral groups Gbaya and Zande.

Kwa

The 45 Kwa languages stretch across southern Ivory Coast, Ghana, Togo, Benin, and into the southwest corner of Nigeria, with a total of at least 20 million speakers.

This subfamily divides broadly into two main groups. The larger group, Nyo, comprises some 24 language clusters/languages/dialects covering most of southern Ghana and southeastern Côte d'Ivoire. Within Nyo, Potou-Tano is the largest subgroup with some 17 languages/dialects, including the major languages Akan (Twi and Fanti), Baule (Baoule), and the Guang cluster.

The smaller group, sometimes termed 'left bank' because its speakers live east of the Volta river, comprises seven language clusters/languages, of which the Gbe cluster (better known by the name of its largest member, Ewe) is the largest.

Benue-Congo

Benue-Congo is the largest of the subfamilies within Niger-Congo in terms of the number of languages, speakers, and geographical extent. It stretches from the Benin-Nigeria border across Nigeria eastward to Kenya and southward to the Cape. Thus, it covers over half the habitable terrain of the continent and a similar percentage of the population.

Benue-Congo is divided into 11 groups that can be arranged on an approximately west-to-east basis as in Figure 3.

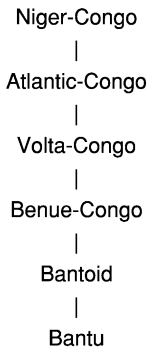

Figure 4 Bantu's genetic relationships.

All these groups, with the exception of Bantoid, are found primarily in Nigeria. The principal languages of each group are as follows: Defoid: Yoruba and Igala; Edoid: Edo and Urhobo; Nupoid: Nupe, Ibira (Ebira), and Gwari (Gbagyi); Idomoid: Idoma and Igede; Igboid: Igbo; Cross River: Efik, Ibibio, and Ogoni; Kainji: Kambari; Platoid: Berom, Tarok, and Jukun.

The 11th group, Bantoid, is the largest group in Niger-Congo, comprising several hundred languages, covering most of the area southeast of Nigeria and Chad.

Bantoid is divided into a small northern group of languages spoken in eastern Nigeria and western Cameroon, and the very much larger southern group, which includes all the Bantu languages. Bantu's genetic relationships are illustrated in Figure 4 (*see* **Bantu Languages**).

See also: Adamawa-Ubangi; Bantu Languages; Benue-Congo Languages; Gur Languages; Kordofanian Languages; Kru Languages; Kwa Languages; Mande Languages.

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Nigeria: Language Situation

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Nigeria is the largest nation in sub-Saharan Africa, with approximately 25% of the population of the subcontinent. At the time of writing, reliable census figures are not available; estimates of Nigeria's population range from 80 million to 120 million. Linguistically speaking, it is one of the most complex countries in the world, with approximately 440 languages (Crozier and Blench, 1993), comprising over 20% of Africa's 2000 plus languages. The most widely accepted classification of African languages (Greenberg, 1963, and subsequent modifications) postulates four major phyla for the continent: Niger–Congo, Afro–Asiatic, Nilo–Saharan, and Khoisan; all but the last of these are well represented in Nigeria. Nigeria's linguistic complexity is manifested first in the mere existence of such a large number of languages within one nation's borders, and second in the attendant situation of multilingualism, and its implications for development and education.

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Niger's population is predominantly Muslim (estimated 80–95%); traditional religions are adhered to by about 5% of the people and Christians comprise less than 0.5% (other sources have indicated up to 20% non-Muslims). About 85% of the population lives in rural areas; only 15% of these rural lands are suitable for agriculture.

Since obtaining independence from France in 1960, Niger has used French as the 'official language'; French is actively spoken by only about 10% of the population, however, and these people tend to be employed in the public sector and to have a background in formal educational, living in the capital Niamey and in administrative headquarters. With notable exceptions in the educational system and the media, French is the only language used for official purposes, i.e., in the domains of legislature, public administration, and jurisdiction, and in the formal economic sector. Occasionally and only for oral communication, French is supplemented by the use of Hausa and/or Zarma. In public life, the African languages are practically invisible. There is little demand outside expert circles for the empowerment of these languages, which generally suffer from negative attitudes on the part of many of their speakers. However, following democratization in the early 1990s, politicians seeking (re-)election have shifted from their 'French-only' mannerism to occasional usage of national languages. French remains associated with power and prestige, upward social mobility, successful professional careers, employment in the public sector, etc. in a very elitist way. The educational system is based almost exclusively on the 'imported' language, which most children do not speak on entering school, resulting in drastic school failure (frequent class repetitions or total abandonment of education). This conspires toward restricting access to higher education, and an inadequate command of the official language ultimately contributes to social exclusion and a potential for social violence.

The *Ethnologue* (2004) lists 20 spoken languages for Niger. Ten languages have constitutionally recognized legal status as 'national languages', with the following official spellings: *Arabe*, *Buduma*, *Fulfulde*, *Gulmancema*, *Hausa*, *Kanuri*, *Soŋay-Zarma*, *Təmajaq*, *Tassawaq*, and *Tubu*. This means that members of three of the four African language phyla of the Greenbergian language classification are represented: Afroasiatic (Arabic (Semitic), Buduma and Hausa (Chadic), and Tamajaq (Berber)); Nilosaharan (Kanuri and Tubu (Saharan) and Zarma (Songai));

and Niger-Congo (Fulfulde (Atlantic) and Gulmancema (Voltaic)), plus Tasawaq (possibly a creole of mixed Songai-Berber origin; research on its origins is still in progress).

The 10 indigenous national languages in the following list are of very distinct sociolinguistic nature. Half of them (Arabic, Buduma, Gulmancema, Tasawaq, and Tubu) have pronounced minority status, and they are each spoken by only a few thousand people. In terms of numbers of speakers (and with figures differing according to source), the midfield is covered by Kanuri (4–7%) in the southeast, Tamajaq (8–11%) in the vast northwest (but more recently settling further south), and Fulfulde (9–14%), with speakers scattered across most parts of the country. Hausa and, to a much lesser extent, Zarma, stand out as Niger's most prominent national languages and indigenous lingua francas in terms of being both the first and the second languages among the greatest number of users.

1. Arabic. Spoken by about 0.3% of the population; the nomenclature refers to the mother tongue of small local groups, not to classical or 'lingua franca' Arabic. The *Ethnologue* lists four varieties of spoken Arabic in Niger: Algerian Saharan Arabic (10 000 speakers around Agadez and in the Azaouagh region), Hassaniya Arabic (with most of its 10 000 speakers in Mauritania), Libyan Arabic (5000 speakers in eastern Niger north of N'Guigmi), and Shuwa Arabic (5000 in eastern Niger).
2. Buduma (Yedina). Traditionally spoken by people who live on the shores and islands of Lake Chad; their language is – surprisingly, and possibly incorrectly – no longer listed for Niger in the 2004 *Ethnologue*, quite likely due to heavy migration of Buduma speakers into Chad, following the receding waters of Lake Chad eastward.
3. Fulfulde. Listed as being of two main varieties in the 2004 *Ethnologue*: a central-eastern variety, spoken from around Dogondoutchi and eastward to the Chad border (450 000 speakers), including the nomadic Woɗaaɓe (dialect, 'people of the taboo'), plus a western variety (400 000 speakers), spoken between the Burkina Faso border and Dogondoutchi (dialects: Dallol and Bitinkoore).
4. Gulmancema (*Ethnologue*: Gourmanchéma). Spoken by about 0.3% of the population along the southwestern border with Burkina Faso.
5. Hausa. Mother tongue of an estimated 5 million speakers (55% of the population) and second language of about 80% of the speakers in Niger. It is widely spoken in major towns and in administrative posts across the country. Hausa dialectology is little advanced; the following dialects appear to be distinct varieties found in Niger in association with certain settlements or areas (given in parentheses): Kurfey (Filingué), Ader (Tahoua), Arewa (Dogondoutchi), Damagaram (Zinder), Dawra, Gaya, Gobir (Maradi), Katsina (Maradi), and Tibiri.
6. Kanuri. Listed in the 2004 *Ethnologue* as being of three varieties: Central Kanuri (80 000 speakers), in eastern Niger along the Nigerian border and including the oases of Fachi and Bilma; Manga Kanuri (280 000 speakers); and Tumari Kanuri (40 000 speakers), better known as Kanembu, including dialects such as Sugurti and Kubari, in far eastern N'Guigmi and neighboring villages.
7. Tasawaq (*Tassawaq*). Spoken by about 8,000 people in the oasis of In-Gall and in the neighboring salt-mines of Teguidda-n-Tessoumt. Closely related Tagdal (Tihishit) is spoken by the Igdalen and Iberogan (dialect: Tabarog), with about 25 000 speakers between Agadez and Tahoua. Together with Tasawaq (or Ingelsi) and others, these languages are referred to in the specialized literature as Northern Songai, also including the extinct language of the Agadez area, Emghedeshie, mentioned by the German explorer Heinrich Barth in the 1850s.
8. Tamajaq (*Təmajaq*). One of several designations for the language spoken by the Tuareg (plural; cf. sg. masc. Targi, sg. fem. Targia). The 2004 *Ethnologue* lists three varieties: Tamahaq (or Tahaggart, with 20 000 speakers around the Hoggar Mountains and Tamanrasset), Tamajaq (or Tawallammat, with 450 000 speakers), and Tamajeq (or Tayart, with 250 000 speakers around the Aïr Mountains and Agadez).
9. Tubu. Spoken by about 0.4% of the population, the name is a cover term for speakers of two related languages, i.e., Teda (*Ethnologue*: Tedaga; 10 000 speakers) and Daza (*Ethnologue*: Dazaga; 30 000 speakers). These varieties are spoken in the extreme east and northeast, in Termit, N'Gourti, Bilma, and Djado.
10. Zarma (*Soŋay-Zarma*). Mother tongue of an estimated 2.2 million speakers (22% of the population) and the second language of 30% of the speakers; alternate names include Dyerma, Djerma, Zerma, and Zabarma, among others. Zarma is part of a language continuum along the river Niger from Mali (Gao, language: Songai) into Niger (Zarma; dialect: Kaado) and then turning south into Benin (language: Dendi).

Bi- and multilingualism are widespread in Niger, largely involving Hausa and/or Zarma as the principal lingua francas, but also French to some extent.

Hausa and/or Zarma can be understood by up to 90% of the total population across the whole country. There are also large pockets of monolingual communities, especially in the rural areas. Any revision of the language policy in terms of 'official language(s)' would have to be based on a trilingual model of Hausa, Zarma, and French.

Niger's multilingualism is paralleled to a lesser extent by multiscriptism: orthographies using modified versions of the Roman alphabet are available for all national languages in Niger. In addition, the Tuareg have a long tradition of writing in the *tifinagh* script, which has its origins in the Phoenician script. Arabic writing known as *àjàmí* is also in use for non-Arabic languages.

Since achieving independence, Niger has developed a remarkable record for efforts regarding adult literacy (both in French and in the national languages) and bilingual formal education on primary level, despite a persistent high rate of illiteracy (over 80%), which is still higher among women (over 90%). School attendance has generally been low in the past (below 30%); recent figures from official sources draw a much brighter picture of school attendance (about 50% in 2004), including a considerable increase in female pupils. Formal education on all levels is dominated by French language use, but bilingual French-Arabic schools (*medersas*) and the Arabic-medium Islamic University of Say are allowed, and there is continuing experimentation with bilingual (French plus a national language) education. In 1998, an education bill establishing French and the national languages as the media of instruction was passed, prescribing mother-tongue primary education for 6 years. The bill awaits implementation. By 1998, 42 bilingual experimental schools, having begun in 1973, were in existence; 22 of these schools officially use Hausa, 6 use Zarma, 5 use Fulfulde, 5 use Tamajaq, and 4 use Kanuri as the medium of instruction, in addition to French. Several governmental and nongovernmental institutions provide materials and training for formal education based on national language competence. In the informal education sector, qur'anic schools play a continuing role. These schools, however, have no impact on oral and writing skills in the Arabic language, other than aiming at oral and, at the advanced stage, written recitation skills of the Qur'an.

In the electronic and print media, a similar dominance of French as the only official language is notable, particularly in the print media, such as in all of the major newspapers. However, indigenous languages have some record of having been used in the print media since 1965, including nationwide distribution of *Ganga* ('drum') in both Hausa and Zarma, printing of special pages of the weekly *Sahel Hebdo*, and creation of a rural press (*journaux ruraux*) in the 1970s. In the early 1990s, the weekly *Kakaki* ('(Emir's) trumpet') was established for indigenous language usage. Given a long-standing high illiteracy rate, radio and later television (the Office de Radiodiffusion-Télévision du Niger, or the ORTN) became of prime importance. About 65% of the programs are by now transmitted in indigenous languages, i.e., in all the national languages (possibly with the exception of Tasawaq), and this is accompanied by a steady decentralization policy. Private radio stations are now being established in urban areas, broadcasting in Hausa, Zarma, and French, which are the major languages found among urban listeners. They also broadcast popular Hausa language programs taken from *Voice of America* and *Deutsche Welle*. The United Nations Development Program (UNDP) has become active in establishing noncommercial rural radio stations that broadcast in the local indigenous languages, including programs even in the otherwise largely neglected languages Buduma (in N'Guigmi) and Tasawaq (in In-Gall). Daily television programs on *Télé-Sahel* (ORTN) are broadcast in one of seven national languages. The first private television station (*TV Ténéré*) broadcasts programs in Hausa, Zarma, and French.

See also: Afroasiatic Languages; Algeria: Language Situation; Benin: Language Situation; Berber; Burkina Faso: Language Situation; Chad: Language Situation; Chadic Languages; Libya: Language Situation; Mali: Language Situation; Niger-Congo Languages; Nigeria: Language Situation; Nilo-Saharan Languages; Semitic Languages.

Language Maps (Appendix 1): Maps 24, 25.

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Niger-Congo Languages

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It is widely accepted that the languages of Africa, apart from the creoles, pidgins, and 'official' languages inherited from the colonial era, belong to four major families: Niger-Congo, Nilo-Saharan, Afro-Asiatic, and Khoisan. Niger-Congo is the largest, both in terms of the number of languages and in geographical spread. It extends from Dakar east to Mombasa and south to Cape Town. Of the 2000 languages spoken in Africa, some 1400 belong to Niger-Congo. Recent estimates put the number speaking a Niger-Congo language at around 400 million people.

Early Classification

In the 19th century, scholars began to make groupings of African languages. Koelle (1854) published word lists in some 200 languages, grouped so as to reflect the relationships among the languages. Many of his groupings correspond closely to the accepted classification today.

Bleek (1856) recognized that languages in western and southern Africa were related and wrote of "that great family which, with the exception of the Hottentot dialects, includes the whole of southern Africa and most of the tongues of western Africa."

Subsequently, scholars tended to lose sight of the essential unity of these languages and to focus on the Bantu languages of southern Africa. The large number of languages elsewhere that had similar features were regarded as being 'mixed' in origin, and their similarities were explained as being the result of migrations and language contact, rather than as deriving from a common genetic origin with Bantu.

Significant development came with the work of Westermann (1927). He set up 'Western Sudanic' as distinct from 'Eastern Sudanic' (since classified as Nilo-Saharan). Westermann divided Western Sudanic into six subfamilies: Kwa, Benue-Congo, Togo Remnant, Gur, West Atlantic, and Mandingo (Maninka). He also compared a large number of proto-Western Sudanic roots with the corresponding proto-Bantu forms. Though Westermann did not go on to draw the conclusion that pointed to a common genetic origin, Joseph Greenberg did. He showed that Westermann's Western Sudanic and Bantu formed a single genetic family, which he called 'Niger-Congo.' Subsequently, Greenberg (1963) brought in Kordofanian as coordinate with Niger-Congo.

Greenberg retained the subfamilies that Westermann had already established – Kwa, Benue-Congo, Gur, West Atlantic, and Mande (Mandingo) – but included Togo Remnant within Kwa and added a new subfamily, which he termed 'Adamawa-Eastern.' His most revolutionary innovation was to include Bantu as a subgroup of a subgroup within Benue-Congo and not as a subfamily coordinate with the other main branches of Niger-Congo.

Accepted Classification

Although Greenberg's work has set the classificatory framework within which most scholars have worked since (**Figure 1**), there were, as he readily

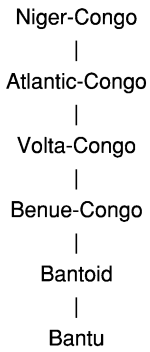

Figure 4 Bantu's genetic relationships.

All these groups, with the exception of Bantoid, are found primarily in Nigeria. The principal languages of each group are as follows: Defoid: Yoruba and Igala; Edoid: Edo and Urhobo; Nupoid: Nupe, Ibira (Ebira), and Gwari (Gbagyi); Idomoid: Idoma and Igede; Igboid: Igbo; Cross River: Efik, Ibibio, and Ogoni; Kainji: Kambari; Platoid: Berom, Tarok, and Jukun.

The 11th group, Bantoid, is the largest group in Niger-Congo, comprising several hundred languages, covering most of the area southeast of Nigeria and Chad.

Bantoid is divided into a small northern group of languages spoken in eastern Nigeria and western Cameroon, and the very much larger southern group, which includes all the Bantu languages. Bantu's genetic relationships are illustrated in **Figure 4** (*see* **Bantu Languages**).

See also: Adamawa-Ubangi; Bantu Languages; Benue-Congo Languages; Gur Languages; Kordofanian Languages; Kru Languages; Kwa Languages; Mande Languages.

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Nigeria: Language Situation

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Nigeria is the largest nation in sub-Saharan Africa, with approximately 25% of the population of the subcontinent. At the time of writing, reliable census figures are not available; estimates of Nigeria's population range from 80 million to 120 million. Linguistically speaking, it is one of the most complex countries in the world, with approximately 440 languages (Crozier and Blench, 1993), comprising over 20% of Africa's 2000 plus languages. The most widely accepted classification of African languages (Greenberg, 1963, and subsequent modifications) postulates four major phyla for the continent: Niger–Congo, Afro–Asiatic, Nilo–Saharan, and Khoisan; all but the last of these are well represented in Nigeria. Nigeria's linguistic complexity is manifested first in the mere existence of such a large number of languages within one nation's borders, and second in the attendant situation of multilingualism, and its implications for development and education.

Despite the diversity, three languages (putting aside English for the time being) dominate: Hausa in the north, spoken as a first language by about 20% of the population (with perhaps an equal number of second language users); Yoruba in the west, by about 25%; and Igbo in the east, spoken by perhaps 20% of Nigerians. The remaining 35% are speakers of the so-called 'minority' languages, many of which are spoken by only a few thousand, or less. Of these, Ibibio in the southeast and Kanuri in the northeast are the largest, each being spoken by about 3% of Nigerians. English, the colonial language brought to Nigeria, is also relatively widely spoken, at least by the educated. Estimates vary, however, as to what percentage of the population use English with any degree of fluency, with claims from 10 to 30%. Determining the extent of English use is complicated by consideration of Nigerian Pidgin, which, at the more elaborated end of its spectrum, merges with English. Nigerian Pidgin is spoken by perhaps as much as 30% of the population, mostly in the south, but is also increasingly used in the northern urban areas.

With regard to government attitude toward language, there is, at the time of writing, no specifically formulated language policy. The importance of choice of language with regard to education, however, has been recognized since the early days of the British colonial administration, which sought to implement the recommendations of the Phelps-Stokes Commission (1922) concerning the use of indigenous languages in schooling. Two documents that can be regarded as policy statements do exist, however, one being the Constitution of 1979 (revised 1989) and the other, the National Policy on Education (1977, revised 1981). The National Policy on Education (NPE) essentially echoes the Phelps-Stokes Report in presenting a three-stage program with regard to language use in education: first, that preprimary instruction should be in the mother tongue or language of the immediate community; second, that at the primary level, instruction should initially be in the mother tongue or language of the immediate community, and later in English; and third, that in secondary school one of the three major languages, as well as the language of the community, should be taught. Subsequently, another Nigerian language is also to be included as a core subject. The need for a mass literacy campaign is also recognized in the NPE.

Implementation of the various aspects of this policy is to be accomplished through the development of indigenous languages, by the creation of orthographies and dictionaries, and the writing of primers and other textbooks. Various agencies have been established to help achieve these goals, ranging from the National Language Centre (now under the Nigerian Educational Research Development Council) and Mass Literacy Boards, to University Departments of Linguistics. The Policy stipulates that this program should be implemented when (economically) feasible, and as a result in most areas of the country full implementation has yet to be achieved. At the time of writing, only 20 languages have officially sanctioned (standardized) orthographies, although over 100 others also have been given writing systems. The outlook for increased future development is not encouraging, as all questions dealing with language have been struck from the 1991 census. On the other hand, State governments, which are responsible for broadcast media, appear to be more active in encouraging use of local languages, although this attitude varies from state to state. Bornu State, for example, encourages use of 17 local languages, while in many southern states, news and feature programs are broadcast in Nigerian Pidgin.

The National Policy on Education and the Federal Constitution also recognize the role of language in fostering national unity. Regarding 'official' or 'national' designations of languages, the 1979 Constitution recognizes the three major languages, Hausa, Yoruba, and Igbo, and stipulates that any of these three may be used, along with English, in the National and State Assemblies. The status and role of English is controversial. Although many Nigerians feel it is now time for an indigenous language to take on the role of lingua franca, there is no ethnically neutral language able to assume this mantle. English, therefore, continues to function as the major language of communication among the educated of different ethnic groups. Nigerian Pidgin, despite its widespread use, has no official recognition and for the most part is regarded by the ruling and educated elite as a bastardized form of English. Its increasing popularity in the towns and cities, and especially on university campuses, however, suggests that in the not too distant future its status may change.

A high degree of multilingualism exists in the country. Few, if any, detailed studies have been conducted, but the following remarks can be assumed to be accurate. Among speakers of minority languages, greater multilingualism exists. This usually takes the form of speaking (a) the mother tongue and having at least passive knowledge of one or more neighboring and closely related languages, (b) in the south, and particularly urban areas, Nigerian Pidgin, or in the north, Hausa (i.e., for non-Hausas), and (c) for the educated, English. Most Nigerians, then, are at

least bilingual, and probably multilingual; for the most part, monolingualism exists only among the uneducated in the heartlands of the three largest languages. As regards lingua franca, English, Pidgin, and Hausa all serve, with the choice depending on geographical and social considerations. Together with studies dealing with sociolinguistics and multilingualism, descriptive and comparative/historical work constitute major areas for future linguistic research in Nigeria.

See also: Hausa; Yoruba.

Language Maps (Appendix 1): Maps 26–36.

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T. M. Nikolaeva was born in 1933 in Leningrad, into a family of scholars renowned in the field of theoretical medicine. In 1956, she graduated from the department of Russian language and literature, Moscow State University; she was influenced mostly by the lectures of V. V. Vinogradov, Vjach. Vs. Ivanov, and V. A. Zvegintsev. Besides her major-related courses, she attended lectures on Sanskrit, Indo–European Linguistics, Hittite, and Latin.

From 1958 till 1962, she was a graduate student of A. A. Reformatski at the Institute of Linguistics. At approximately the same time, from 1957 till 1960, she worked as a member of the Group of Automatic Machine Translation (Institute of Fine Mechanics and Computer Engineering, Russian Academy of Sciences).

When, in 1960, a section of structural linguistics was created under the auspices of the Section of Language and Literature RAS (Russian Academy of Sciences), Nikolaeva was appointed the learned secretary of the Department of Typology, first holding the position of a junior researcher, later becoming a senior researcher, and then a principal researcher. Since 1990, Nikolaeva has been head of the department of typological and comparative linguistics at the Institute for Slavic Studies RAS.

Nikolaeva is an outstanding specialist in theoretical linguistics, text theory, linguistic typology, Slavic and specifically Russian linguistics, phrasal intonations, and word prosody. All of these topics are covered in her numerous publications (numbering over 420, including 10 books).

Part of Nikolaeva's research (carried out according to the principles of the Moscow Semiotic School) is focused on the properties of poetic texts, such as Silver Age verses of contemporary poetry. In 2001, she arranged a conference on 'Proper name: semantic aura and context,' inspiring many scholars to begin investigating the problem of linguistic detachment of a proper name. Nikolaeva edited and prepared for publication important collections of scholarly papers, such as *Text linguistics* (1978) and *From the oeuvre of the Moscow Semiotic Circle* (1997).

Nikolaeva was the first scholar to produce a whole and thorough description of intonational systems in Slavic languages; she worked out principles for the typologically oriented study of phrasal intonation, having also introduced such currently universally accepted terms as, for instance, 'prosodic scheme of a word,' being a correspondence of what is labeled a 'soundclass' in segmental phonetics.

Nikolaeva is the editor-in-chief of the journal *Voprosy Jazykoznanija* and a member of several international societies and committees. She has also been a corresponding member of the Russian Academy of Sciences since 2000.

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See also: Hausa; Yoruba.

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From 1958 till 1962, she was a graduate student of A. A. Reformatski at the Institute of Linguistics. At approximately the same time, from 1957 till 1960, she worked as a member of the Group of Automatic Machine Translation (Institute of Fine Mechanics and Computer Engineering, Russian Academy of Sciences).

When, in 1960, a section of structural linguistics was created under the auspices of the Section of Language and Literature RAS (Russian Academy of Sciences), Nikolaeva was appointed the learned secretary of the Department of Typology, first holding the position of a junior researcher, later becoming a senior researcher, and then a principal researcher. Since 1990, Nikolaeva has been head of the department of typological and comparative linguistics at the Institute for Slavic Studies RAS.

Nikolaeva is an outstanding specialist in theoretical linguistics, text theory, linguistic typology, Slavic and specifically Russian linguistics, phrasal intonations, and word prosody. All of these topics are covered in her numerous publications (numbering over 420, including 10 books).

Part of Nikolaeva's research (carried out according to the principles of the Moscow Semiotic School) is focused on the properties of poetic texts, such as Silver Age verses of contemporary poetry. In 2001, she arranged a conference on 'Proper name: semantic aura and context,' inspiring many scholars to begin investigating the problem of linguistic detachment of a proper name. Nikolaeva edited and prepared for publication important collections of scholarly papers, such as *Text linguistics* (1978) and *From the oeuvre of the Moscow Semiotic Circle* (1997).

Nikolaeva was the first scholar to produce a whole and thorough description of intonational systems in Slavic languages; she worked out principles for the typologically oriented study of phrasal intonation, having also introduced such currently universally accepted terms as, for instance, 'prosodic scheme of a word,' being a correspondence of what is labeled a 'soundclass' in segmental phonetics.

Nikolaeva is the editor-in-chief of the journal *Voprosy Jazykoznanija* and a member of several international societies and committees. She has also been a corresponding member of the Russian Academy of Sciences since 2000.

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See also: Slavic Languages.

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Nilo-Saharan Languages

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One of Africa's major language phyla, Nilo-Saharan consists of at least 120 languages spoken in an area covering major areas in eastern and central Africa, with a westward extension as far as the Niger Valley in Mali, West Africa. The genetic unity of these languages was first proposed by Greenberg (1963) on the basis of recurring morphological features and lexical similarities. According to Greenberg, Nilo-Saharan constitutes one of the four phyla on the continent, next to Afroasiatic, Khoisan, and Niger-Congo.

Greenberg initiated his classificatory work on African languages in the late 1940s and early 1950s when he established, among others, a Macro-Sudanic family, consisting of Eastern Sudanic, Central Sudanic, Berta, and Kunama (cf. Greenberg, 1955, which contains a collection of articles published earlier in the *Southwestern Journal of Anthropology*). Macro-Sudanic was subsequently renamed Chari-Nile, after the two major rivers in the area. Based on a judicious evaluation of the available data, Greenberg (1963) pulled together several disparate groups formerly considered linguistic isolates and known primarily through the pioneering work of Tucker and Bryan (1956) into a new phylum called Nilo-Saharan, of which Chari-Nile formed the core, with Songai (Songhay), Saharan, Maban plus Mimi, For (or Fur), and Koman as additional primary branches (see **Table 1**).

There are at least 120 distinct Nilo-Saharan languages, the number of speakers for individual languages ranging from several millions (compare the sections on Dinka, Kanuri, Luo, and the Songai cluster) to languages with only a few speakers, e.g., Aka, Kelo, and Molo, which belong to the Jebel group within Eastern Sudanic. Although considerable progress has been made over the past few decades with the description and comparison of several Nilo-Saharan subgroups, a number of lower-level units, for example Daju or Koman, remain poorly known.

Several Nilo-Saharan languages are used only in oral communication; for others orthographies in Latin, Arabic, or Fidäl script have been developed. Old Nubian, which was written in a modified Coptic script, dates back to the 8th century of the Christian era. The role of Nilo-Saharan languages in education also varies considerably depending on the number of speakers, and also on the language policy in the countries where these languages are spoken. For major languages such as Kanuri or Luo, but also for other languages, in particular those spoken in Kenya and Uganda, there is a growing body of literature containing novels, poetry, and oral traditions. Apart from written texts and reference grammars, dictionaries have become available more recently for several Nilo-Saharan languages, for example, Keegan (1996)

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Table 1 Nilo-Saharan subgroups

Greenberg, 1955		*Greenberg, 1963, 1971*	*Current nomenclature*
Songhai	isolate	Songhai	Songai
Central Saharan	isolate	Saharan	Saharan
Maban	isolate	Maban	Maban
Mimi	isolate	Mimi	Mimi
Fur	isolate	Fur	For
Nyangiyan	isolate		Kuliak (also: Rub)
Temainian	isolate		Temein, Keiga Jirru
Nubian			Nubian
Beir-Didinga			Surmic
Barea			Nara
Tabi			(West) Jebel
Nyimang	Eastern Sudanic	Eastern Sudanic	Nyimang, Dinik
Merarit			Taman
Dagu			Daju
Nilotic			Nilotic
Great Lakes			
Central Sudanic			Central Sudanic
Berta			Berta
Kunama			Kunama
Koman	isolate		Koman

on the Central Sudanic language Mbay, Creider and Creider (2001) on Nilotic Nandi, or Heine (1999) on the Kuliak (Rub) language Ik.

More Recent Comparative Work

To date, neither the limits of Nilo-Saharan nor the internal organization has been settled. This situation is due to heterogeneity within the phylum (with several genetically isolated languages) and the presumably considerable time depth involved, as well as the paucity of descriptive sources for a variety of languages. The genetic status of the Songai cluster on the great bend of the Niger River, mainly in Mali and Niger and extending into neighboring countries, remains debatable, for example. However, as a result of the pioneering descriptive work on several varieties of Songai by Heath (e.g. 1999a), future in-depth comparative work with respect to this cluster may be expected.

Some progress has been made over the past decades with the historical comparison of lower-level units such as Central Sudanic, Daju, Koman, Maban, Nilotic, Nubian, Saharan, and Surmic. More recently, it has been argued by Rilly (2003) that the extinct language of the Meroitic empire, preserved in written records which have only been partly deciphered, not only shows Eastern Sudanic affinity, as already proposed by Greenberg (1971), but that it was most closely related to Eastern Sudanic groups such as Nubian, Taman, Nara, and Nyimang (plus Dinik).

On the basis of an extensive comparison of lexical entries, presumed sound correspondences, and grammatical comparison, Ehret (2001) has regrouped various Nilo-Saharan units; according to this classification using shared phonological and grammatical innovations for subclassification, Central Sudanic and Koman, which are also typologically rather distinct from remaining Nilo-Saharan groups, constitute genetic outlayers.

Bender (1996, 2000) has also proposed lexical isoglosses and grammatical isomorphs for Nilo-Saharan. Moreover, the same author assumes that Songai, Saharan, and Kuliak constitute primary branches of Nilo-Saharan, whereas the remaining subgroups form a fourth branch. Unlike Ehret, Bender assumes that the Koman group is most closely related to the Eastern Sudanic group. Moreover, he assumes, as other scholars have done, that the Kadu languages in the Nuba Mountains are also part of Nilo-Saharan.

Controversy also remains over the inclusion or exclusion of languages like Biraile (Birale; also known as Ongota), whose speakers live along the Weyt'o River in Ethiopia, and the Shabo (or Mekeyir), another small ethnic group living in southwestern Ethiopia.

The Areal Dimension

Corresponding to the wide geographical spread of Nilo-Saharan languages, considerable typological diversity exists between them. A number of properties nevertheless are widespread and in fact are shared with neighboring Niger-Congo, and to a lesser extent Afroasiatic, languages. For example, ATR-vowel harmony, in its classical form involving a set of [−advanced tongue root] vowels (I, ɛ, a, ɔ, ʊ), and a set of [+advanced tongue root] vowels (i, e, ä, o, u), is attested in varieties of Songai, For, Kunama, Eastern Sudanic groups like Nubian, Temein, Nilotic, and Surmic as well as in Koman languages. The role of areal contact in this respect remains to be determined. Less common are systems with seven vowels (e.g., in the Nilotic language Datooga) or five vowels (e.g., in Nara). As shown by Andersen (1991), the contrast between breathy and creaky voice vowels in the Nilotic language Dinka goes back historically to an ATR contrast.

Another areal property of Nilo-Saharan shared with neighboring Niger-Congo and Afroasiatic languages is tone, with systems varying between classical

two-tone systems with downdrift and downstep and systems with up to four distinct level tones which may also form complex (contour) tones. A number of Nilo-Saharan languages spoken along the northern edge and bordering on Afroasiatic, such as the Songai language Koyra Chiini, appear to be nontonal (Heath, 1999b). There are relatively few tonal grammars of Nilo-Saharan languages. Also, the historical-comparative study of tonal systems is still in its initial stage, Boyeldieu (2000) on a group of Central Sudanic languages being one of the few modern studies in this respect.

Consonant systems range from fairly simple, e.g., thirteen consonants in Southern Nilotic Kalenjin, to a wide range of contrasts in Central Sudanic and Koman languages. Here too, areal contact appears to have played a role; the Kalenjin consonant system, for example, is similar to that of neighboring Bantu (Niger-Congo) languages. Central Sudanic languages like Ngiti have a contrast between voiced and voiceless implosive stops, according to Kutsch Lojenga (1994); moreover, words in Ngiti as well as in the closely related language Lendu may consist of syllabic consonants like s, z, or r only. Whereas voiced implosive stops are more common across Nilo-Saharan, such stops are found in combination with ejectives in Berta, Koman and Surmic; a similar contrast is found in neighboring Omotic (Afroasiatic) languages. The dental/alveolar contrast for stops appears to berestricted to Eastern Sudanic groups like Nilotic, Surmic, Temein, Central Sudanic Kreish, or the Koman language Kwanimpa. Labial velars stops are common in Central Sudanic as well as neighboring Nilotic languages. The role of areal contact with Niger-Congo languages again remains to be determined.

A prototypical feature of many Nilo-Saharan groups, which appears to be relatively rare elsewhere in the world (except in Cushitic and Semitic, i.e., Afroasiatic, languages), involves a distinction between singulative, plural or collective, and replacement marking (Dimmendaal 2000). Nouns referring to items usually occurring in pairs or in larger numbers, such as 'breast', 'fly', or ethnonyms, tend to take a singulative marker and are morphologically unmarked in the plural. In addition to plural (or collective) marking, nouns (in particular derived ones) tend to be inflected for number both in the singular and the plural. This three-way distinct is not attested in geographically more peripheral Nilo-Saharan zones, e.g., in Central Sudanic, Saharan, or Songai. Gender marking, though not widespread, is found as an inflectional feature of nouns in Eastern Nilotic, for example, and as a derivational property in the Southern and Western branch of Nilotic.

From a morphosyntactic point of view, Nilo-Saharan language groups spoken in an area ranging from northern Ethiopia and Eritrea across north-central Sudan and extending into Chad and Nigeria share typological features with Afroasiatic languages in Ethiopia. These include a basic constituent order whereby the verb occurs in final position, an extensive case marking system, verbal compounding (e.g., with 'say' or other types of light verbs, such as 'put' or 'do'), as well as the use of converbs as dependent verb forms in complex sentences, although not all properties are necessarily present in all groups. These common typological features to some extent may be due to areal diffusion as a result of long-term cultural contacts and corresponding patterns of multilingualism between speech communities in these areas. The Wadi Howar, also known as the Yellow Nile (a former river sanctuary and tributary to the Nile which connected the mountainous area in eastern Chad with the Nile Valley from about 8000 B.C. till about 1000 B.C.; cf. **Figure 1**), possibly constituted an important geographical condition for this cultural and linguistic diffusion (cf. Keding, 2000, for a discussion of the geomorphological and archaeological background; see also Amha and Dimmendaal, in press, for a discussion). The gradual extinction of this riverine system may have resulted in a diaspora of Nilo-Saharan languages from the Wadi Howar region in an eastern, western, and southern direction.

Ehret (2001: 202–209) has argued for the reconstruction of a series of case suffixes for the earliest stages of Nilo-Saharan. Such dependent-marking systems are indeed attested in a range of Nilo-Saharan groups between Chad and Eritrea, as pointed out above. Remnants of case marking are also attested in Central Sudanic languages, but not apparently in Koman or Songai. Reduced case marking systems, and, correspondingly, a more extensive verbal strategy of marking semantic roles like location, direction, and instrument, is found in Berta and Eastern Sudanic groups like Daju, Nilotic, Surmic, and Temein. Rather than having preverbal subjects, several languages belonging to these latter groups allow for postverbal subjects which are marked for case (the so-called 'marked nominative'). An interesting combination of head marking and dependent marking at the clausal level is found in the verb-initial Kuliak (Rub) languages (cf. König, 2002). For a number of Nilotic languages using the marked nominative strategy for postverbal subjects, it has been argued that this applies only to transitive predications, thus giving rise to ergative properties, as the object or the subject of an intransitive predicate precede the verb and are not marked for case. As shown by Reh (1996) for the Nilotic language Anywa (Anu), OVS and SV are but

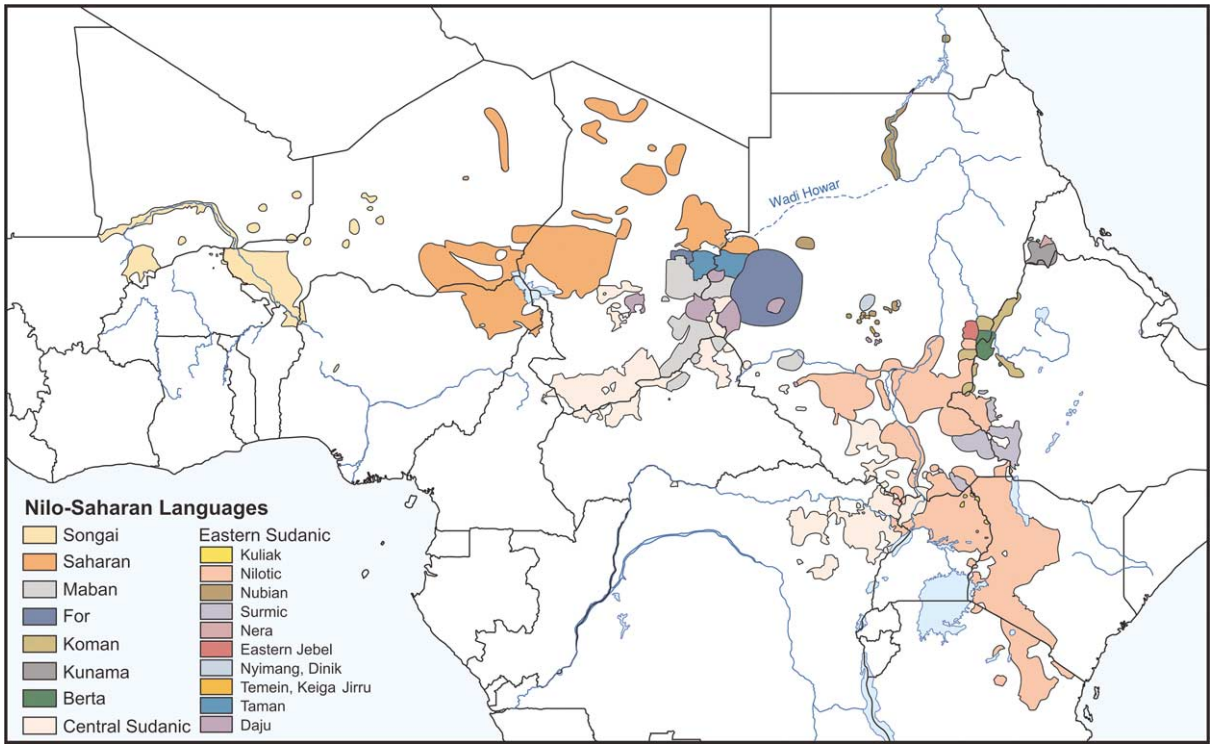

Figure 1 Map of Nilo-Saharan languages.

one of several constituent order types allowed for in the language, alternatives being governed by pragmatic principles (e.g. active and less active participants, or participant orientation as against action orientation).

Pronominal subject (and occasionally object) marking, diathesis, causative, and pluractional marking are common morphological properties of verbs in Nilo-Saharan. Languages in the border area between Sudan and Chad, such as For or the Maban and Taman group, manifest complex morphophonemic alternations for consonants in their verb systems. Derivational morphology tends to be expressed mainly by way of suffixation, and by prefixation in Central Sudanic; the causative marker, however, involving a presumably cognate morpheme consisting of a high front vowel, tends to be expressed as a prefix in Central Sudanic as well as elsewhere in Nilo-Saharan.

The use of logophoric pronouns marking coreferentiality between argument positions across clauses and sentences is a feature of some Nilo-Saharan groups which is shared with Niger-Congo and Chadic as well as Omotic (i.e. Afroasiatic) languages. A universally uncommon anti-logophoricity marking is found in Western Nilotic Mabaan.

See also: Afroasiatic Languages; Kanuri; Khoesaan Languages; Luo; Niger-Congo Languages; Songhay Languages.

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Tatsuo Nishida is best known for his work on the Tangut (Xixia, Hsi-hsia) language. Born in Ōsaka, he began his study of Tangut in 1950 by writing a paper on Tangut phonological reconstruction for Juntarō Ishihama, the pioneer of Tangut linguistics in Japan.

At Kyōto University in 1962, Nishida submitted a doctoral dissertation on Tangut, which he later revised as a two-volume monograph (1964–1966). This is his greatest work. It contains the first full-scale reconstruction of Tangut phonology, an overview of Tangut script and grammar, a dictionary of Tangut characters, and two decipherments of Tangut texts.

As an assistant and later full professor at Kyōto University, Nishida produced many articles and books on Tangut aimed at both scholarly and lay audiences. The most notable among them is *Hsi-hsia writing* (1967; rev. 1980; partially translated 1980). Nishida also served as a consultant on Tangut culture for the film *Tonkō* (Dun-Huang, 1988) and appeared in the documentary *Tonkō: Sono rekishi ga kataru roman* (Dun-Huang: the epic told by its history).

Although Nishida's phonological reconstruction of Tangut has not been widely accepted outside Japan, his analysis of most Tangut characters as semantic compounds without phonetic elements is still well within the mainstream of Tangut linguistics. However, such an analysis is at odds with DeFrancis's (1991) view of all writing systems as primarily phonetic and has been questioned by a few scholars such as Janhunen (1994).

In addition to his work on Tangut, Nishida has also written numerous books and articles on many other Sino-Tibetan languages, Tai-Kadai languages, and the extinct Khitan and Jurchen scripts. He has contributed to three book translations.

In 1976, Nishida proposed a genetic relationship between Japanese and Tibeto-Burman languages and explored this idea over the next several years. His attempts to branch out into Japanese historical linguistics have not been welcomed by specialists (e.g., Miller, 1980), who have overwhelmingly rejected his Japanese-Tibeto-Burman hypothesis.

See also: Burmese; China: Language Situation; China: Scripts, Non-Chinese; Chinese; Japan: Language Situation; Japanese; Mongolic Languages; Sino-Tibetan Languages; Tai Languages; Tibetan; Tungusic Languages.

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Tatsuo Nishida is best known for his work on the Tangut (Xixia, Hsi-hsia) language. Born in Ōsaka, he began his study of Tangut in 1950 by writing a paper on Tangut phonological reconstruction for Juntarō Ishihama, the pioneer of Tangut linguistics in Japan.

At Kyōto University in 1962, Nishida submitted a doctoral dissertation on Tangut, which he later revised as a two-volume monograph (1964–1966). This is his greatest work. It contains the first full-scale reconstruction of Tangut phonology, an overview of Tangut script and grammar, a dictionary of Tangut characters, and two decipherments of Tangut texts.

As an assistant and later full professor at Kyōto University, Nishida produced many articles and books on Tangut aimed at both scholarly and lay audiences. The most notable among them is *Hsi-hsia writing* (1967; rev. 1980; partially translated 1980). Nishida also served as a consultant on Tangut culture for the film *Tonkō* (Dun-Huang, 1988) and appeared in the documentary *Tonkō: Sono rekishi ga kataru roman* (Dun-Huang: the epic told by its history).

Although Nishida's phonological reconstruction of Tangut has not been widely accepted outside Japan, his analysis of most Tangut characters as semantic compounds without phonetic elements is still well within the mainstream of Tangut linguistics. However, such an analysis is at odds with DeFrancis's (1991) view of all writing systems as primarily phonetic and has been questioned by a few scholars such as Janhunen (1994).

In addition to his work on Tangut, Nishida has also written numerous books and articles on many other Sino-Tibetan languages, Tai-Kadai languages, and the extinct Khitan and Jurchen scripts. He has contributed to three book translations.

In 1976, Nishida proposed a genetic relationship between Japanese and Tibeto-Burman languages and explored this idea over the next several years. His attempts to branch out into Japanese historical linguistics have not been welcomed by specialists (e.g., Miller, 1980), who have overwhelmingly rejected his Japanese-Tibeto-Burman hypothesis.

See also: Burmese; China: Language Situation; China: Scripts, Non-Chinese; Chinese; Japan: Language Situation; Japanese; Mongolic Languages; Sino-Tibetan Languages; Tai Languages; Tibetan; Tungusic Languages.

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Niue: Language Situation

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Niue is a 260-sq-km coral island in the South Pacific, west of Tonga and about 2400 km to the northeast of New Zealand, of which it is a self-administered territory. Because of large-scale immigration to New Zealand, the population of the island has been decreasing over the last decades and stands currently at about 1500. English is the official language of Niue. Apart from English, Niuean (Niue) is the only language of Niue.

The sociolinguistic features of Niuean have undergone a radical shift, from its use as a purely local language to an endangered one that is being replaced by English. In pre-European and precolonial times, Niuean was the sole language on the island, and there was little opportunity for language contact due to the extreme isolation of Niue. Following colonization and missionary indoctrination of the Niuean population (originally estimated to be close to 10 000 islanders), both rapid depopulation (due to diseases and forced removal of labor – known as 'blackbirding' in the South Pacific) and language loss occurred. While Bible and hymn translations into Niuean established a highly formalized Niuean church language that survives to this day, the attendant education in English soon made the whole population bilingual.

The modern age, with its features of globalization and political and linguistic imperialism, further eroded the Niuean language use in favor of English – so much so that the younger generations now speak English as their first language and various degrees of Niuean as their second language. Still, contrary to popular perceptions, a 1995 survey of Niuean primary and secondary school children showed that over 80% wanted to keep Niuean as their first language but also wanted to be fully proficient in English. Education authorities in Niue, together with New Zealand language experts, are only now devising a formal curriculum for the Niuean language, while as a whole the Niuean education system follows that of New Zealand, where English is the main medium of instruction.

A sole radio broadcast channel on Niue plays mainly Western music, and the local television channel has only a 15-minute slot in Niuean. The local and intermittent newspaper is typically written in English, with some items translated into Niuean. As a consequence of not using Niuean as much as it could be used in both formal and informal domains, it is now an endangered language, with fewer than 1500 speakers left on the island. There are no monolingual speakers of Niuean left. With over 20 000 Niueans living in New Zealand, there have been some attempts to keep Niuean as their second and/or heritage language. Since Niue gained Internet access, there have also been some attempts to reconnect the Niue diaspora to its home island, and a number of websites promote the use of the Niuean language. However, a 2004 linguistic analysis of one such site casts doubt on the ability of cyberspace to revitalize a language in severe decline.

See also: Educational Linguistics; Endangered Languages; English in the Present Day (since ca. 1900); Niuean.

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See also: Educational Linguistics; Endangered Languages; English in the Present Day (since ca. 1900); Niuean.

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Ne	kai	he	pusi	ia	e	moa
T	eat	ERG	cat	that	ABS	chicken

'that cat ate the chicken'

To better express the ergative case above, a more literal (but less idiomatic) translation would be via the English passive: 'The chicken was eaten by that cat.' Indeed, some linguists have compared the ergative case marking to that of passives, noting, however, that the ergative case is unmarked. Niuean does not have antipassives. Other syntactic areas of special interest include raising, instrumental advancement, topicalization, causatives, possession, reflexives, and noun incorporation. A special feature of Niuean morphology is reduplication. Furthermore, highly productive affixation allows complex morphological strings. The causative prefix *faka-* and the prefix *ma-*, which changes verbs into participles, are most common. Various degrees of lexicalization can make analysis difficult. The phonological inventory is simple in its use of only some 10 consonants (and no clusters) but is complex in its use of vowels, which are either short or long. Short vowels give rise to practically all combinations of diphthongs. Since the syllable structure is (C)V(V), there are many extended vowel sequences across morpheme boundaries, as for example in the complex word *faka-fe-haga-ao-aki*, where the sequence *-alaola-* is rearticulated.

Niuean as a conservative language is an important witness for historical linguists who work on proto-Polynesian and proto-Oceanic languages, as well as being an important sample language in typological and comparative linguistics.

See also: Diphthongs; Ergativity; Reduplication.

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Nivkh

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Nivkh (Gilyak; *Ethnologue* code NIV) has perhaps 400 speakers (1991) out of an ethnic population of 4400 (as of 1996; G. A. Otaina) in East Siberia. There are two dialects, the Amur and the Sakhalin; the latter is subdivided into eastern and northern clusters. There are approximately 100 Amur Nivkh speakers out of a population of 2000 and 300 Sakhalin Nivkh speakers out of a total population of 2700 (as of 1995; M. Krauss). On Sakhalin Island, many Nivkh live in the villages of Nekrasovka and Nogliki. Along the Amur River, a number of Nivkh reside in Aleevka village. Nivkh is a true language isolate. Attempts to link it with other groups have never succeeded. The Nivkh still maintain their long-practiced traditional economies based on subsistence fishing supplemented by hunting and gathering.

Word initially, the velar nasal is common in Nivkh, as shown in Example (1) (Gruzdeva, 1998: 11–13, 24, 32):

(1)	ŋaarla 'very fat'	ŋaχ 'soft roe'
	ŋax '6'	ŋamk '7'
	ŋɨñk 'face'	pŋafqŋafq 'each other'

One of the hallmarks of Nivkh structure is the curious and characteristic system of morphologically conditioned stem-initial consonant mutation to mark a range of inflectional (and derivational) categories. In this regard, note the initial consonant in the word for 'head' in the following three Nivkh forms (Gruzdeva, 1998: 14):

(2)	kyxkyx tʲoŋr	ɨt zoŋr	čam dʲoŋr
	swan head	drake head	eagle head
	'swan's head'	'drake's head'	'eagle's head'

Like many languages of the Pacific Rim, Nivkh contrasts special portmanteau counting forms for nouns of various types (e.g., people vs. animals). Twenty six such classes of numerals have been reckoned for Nivkh by Panfilov (1962) and Krejnovich (1932). Compare the following examples for Amur and East Sakhalin dialects (Panfilov, 1962: 6–7; Gruzdeva, 1998: 24):

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(3)	**Amur**	**E. Sakhalin**	**Gloss**
	ñin, ñen	ñenŋ	'1 person'
	nɨr	nɨrŋ	'4 people'
	ŋax	ŋax	'6 people'
	ŋamk	ŋamk	'7 people'
	Amur	**E. Sakhalin**	**Gloss**
	ñɨñ	ñan	'1 animal'
	nur	nur	'4 animals'
	ŋax	ŋax	'6 animals'
	ŋamk	ŋamk	'7 animals'

Nivkh is typical of Siberian languages in its use of a range of grammatical and local/directional case forms. Among the oppositions found in Nivkh is a contrast between a dative and an allative case, as shown in the following examples (Gruzdeva, 1998: 20, 21) (NEG, negative; DAT, dative; IMP, imperative; REFL, reflexive; LOC, locative; ABL, ablative; ALL, allative; TERM, terminative; FUT, future; FIN, finite; PRED, predicative):

(4a) t^ha ɨkɨn-doχ t^haxta-ya
NEG elder.brother-DAT be.angry-IMP
'Don't be angry at (your) elder brother.'

(4b) ɲin-doχ p^h-vo-x
we-DAT REFL-village-LOC/ABL what
t^hamdid xer-ya
tell-IMP
'Tell us what is (going on) in your village.'

(4c) ɲi eri-rχa vi-nɨ-d^j-ra
I river-ALL/TERM go-FUT-FIN-PRED
'I shall go (up) to the river.'

(4d) tʃ-ɨtk haimŋaf-toɣo hunv-nd-ra
2-father old.age-ALL/TERM live-FIN-PRED
'Your father lived (up) to old age.'

One category marked morphologically in the Nivkh verb is reciprocal action. This is encoded by the prefix *v-* in Amur Nivkh and *v-/o-/u-* in Sakhalin Nivkh.

(5) v- or 'meet' v-aɣaɣ 'disturb each other'
o-smu 'love each other'

Also found is a syntactic means of indexing this category through the word *p^hŋafqŋafq* (REFL-friend. friend) 'each other,' a possible calque from Russian *drug druga*, etc.; the verbs in such sentences lack the reciprocal prefix (Gruzdeva, 1998: 32):

(6) imŋ p^hŋafqŋafq. lov-d^j
they each.other imitate-FIN
'They imitated each other.'

Subordinate clauses in Nivkh are generally marked by some kind of nonfinite, nominalizing, or adverbializing morphology. This is common in many Siberian and other Eurasian languages (Anderson, 2003). The following example is from Gruzdeva (1998: 50):

(7) ɨmk čo hak-vul
mother fish cut-TEMP.CV
p^h-ajmŋař-kiř rořˇ k^herai-d
REFL-husband-INSTRUMENTAL together talk-FIN
'Mother talked with her husband while cutting fish.'

See also: Isolated Language Varieties; Russian Federation: Language Situation; Turkic Languages.

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Noghay *See:* Turkic Languages.

Nöldeke, Theodor (1836–1930)

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Theodor Nöldeke, preeminent German philologist and historiographer, has afforded generations of specialists and generalists seminal scholarship on the ancient Semitic languages as well as documents from pre-Islamic and Islamic civilization. The remarkable work of this revered Orientalist has had the interest and admiration of the Semitist and the Classicist. Many of his writings remain basic resources in both fields. In work such as his pioneering *Geschichte des Korans,* Theodor Nöldeke served the needs of specialists as well as those of the general public. Not only a recognized scholar of prodigious talent and energy, he was also a visionary. He recognized and answered the immediate needs of fellow Orientalists and arguably became the primary force for future scholarly work, for instance, through his translations of key texts of Arab and Persian writers. His work can be grouped as the philology of Semitic languages and dialects, on the one hand, and the historiography of pre-Islamic and Islamic civilization, on the other. Shahīd describes Nöldeke as "the foremost Semitist of his time" (1977: 119). The measure of influence of the man Goshen-Gottstein called "the first great master of Aramaic dialectology" (1978: 170) can be seen in Garr's *Dialect Geography* (1985).

Nöldeke was born on March 2, 1836, in Harburg, Prussia – today, Harburg-Hamburg, Germany. Benefiting from his father's position and direction, he received a classical education. Childhood ailments influenced the young prodigy to focus early on the mastery of, first, modern and then, ancient languages – Arabic (Classical), Syriac, Turkish, and Persian. After he earned the prize of the French *Académie des Inscriptions* with his doctoral thesis on the history of the Qur'ān in 1859, he rewrote it in German for publication the following year at Göttingen under the title of *Geschichte des Korans*. He subsequently lectured at the prestigious universities of Göttingen, Kiel, and Straßburg. Despite lifelong infirmities, Nöldeke continued his ceaseless and prodigious work throughout the 94 years of his life (Hurgronje, 1982: 240–241). While many of his seminal works are periodically republished, the following may be considered among his most important:

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As a well-respected scholar and colleague, Nöldeke figured prominently among fellow Orientalists like Bergsträsser, Brockelmann, and Lagarde. William Wright, the father of Arabic grammar in the west, sought recognition for and published Nöldeke's noteworthy translation (Nöldeke-Wright, 1884 [1981]). MacLean (1901 [1972]) dedicated his *Dictionary* to Nöldeke. In recent times Shahīd labels him "the equal of his contemporary, Ulrich von Wilamowitz-Möllendorf, the foremost figure in classical philology" (1977: 119). Lipinski (1997) relies upon a number of Nöldeke's unique contributions for his recent Semitic grammar.

See also: Brockelmann, Carl (1868–1956); Semitic Languages.

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Nominalism

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Nominalism is usually characterized in contrast to other two major theoretical alternatives concerning the ontological status of universals. According to this characterization, the nominalist position holds that universals are mere words (e.g., the word 'round'); in contrast, the conceptualist position would identify universals with concepts (e.g., the concept expressed both by the English word 'round' and by the Latin word 'rotundus'), and the realist position would claim universals to be universal things (e.g., the nonmental, nonphysical, abstract Form of Roundness itself).

Both historically and theoretically, there are a number of problems with this simple, indeed, simplistic conception. First, by these standards, no premodern author would qualify as a nominalist since all these authors held that our universal terms owe their universality to the universal concepts they express (thus, on this account all these authors would have to be classified as conceptualists), and no medieval author would count as a realist because they all denied the real existence of Platonic 'abstract entities' (although most medieval authors did posit universals both *in re*, as trope-like individualized forms such as the individual roundness of *this* billiard ball as opposed to the numerically distinct roundness of another one, and *ante rem*, as Divine Ideas, identical with God, who is not an 'abstract entity') (Klima, 2001). Accordingly, this conception leaves in obscurity the genuine theoretical differences of medieval nominalists and realists, who first distinguished themselves under these designations. However, as we shall see, clarifying these genuine theoretical differences, we can have a deeper understanding not only of what a genuinely

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nominalist position was in the late Middle Ages but also what in general a genuinely nominalist position has to consist in, as well as the important conceptual connections such a position has to such broader issues as ontological commitment, abstraction, induction, essentialism, and the possibility of valid scientific generalizations.

Extreme Realism: Plato's Ideal Exemplars

The problem of universals originated with Plato's answer to the question of how universal knowledge (e.g., our knowledge of geometrical theorems) of a potential infinity of individuals is possible. Plato's answer in terms of his theory of Forms involves the idea of regarding individuals of the same kind as copies of an original exemplar or archetype and assuming that our understanding has some direct access to this exemplar. Clearly, if I can read today's news on the printer's printing plates, then I do not have to buy the copies at the newsstands to get my news. Likewise, knowing that the form of all triangles, after which all triangles are modeled, has three angles equal to two right angles, I know that all triangles have the same property. Thus, Plato's answer is obviously a good answer to the question of the possibility of universal knowledge. However, this answer raises more problems than it solves. If the exemplar is not one of the copies, yet it has to be like the copies (given that the copies all have to be like it), then what sort of entity is it? In fact, this is precisely the basis of the most famous argument against Plato's theory, the Third Man (Wedberg, 1978). For if the exemplar has to be of the same sort as its copies, it can be grouped together with its copies into the same kind. However, if for a group of individuals of the same kind there always has to be a common exemplar, and nothing can be its own exemplar, as Plato's theory claims, then there has to be another exemplar for the exemplar and its copies taken together. Since this reasoning can be repeated indefinitely, we have to conclude that for a given set of copies there would have to be an infinity of exemplars, contrary to the theory's explicit claim that there can only be one such exemplar. Therefore, since the theory as stated entails inconsistent claims, it cannot be true in this form.

Moderate Realism or Conceptualism: Aristotle's Universals

Prompted by such and similar inconsistencies, Aristotle famously rejected Plato's Forms and provided a radically different sort of answer to Plato's original question concerning the possibility of universal knowledge. Plato's idea was that this sort of knowledge is possible because of the human soul's prenatal access to the Forms serving as the common exemplars of all sorts of particulars the soul comes to experience in this life and the soul's ability to recollect these Forms and their properties prompted by these experiences. In contrast, Aristotle's idea was that we can have this sort of knowledge from experience in this life. To be sure, the finite number of experiences we can have in this life with individuals of the same sort can never justify universal knowledge claims that cover a potential infinity of such individuals. However, if our cognitive faculties enable us to recognize a common pattern that equally characterizes any possible individual of the same sort, then even this finite number of experiences may enable us to make valid generalizations covering all possible individuals of the same sort. Using the previous analogy, in this case I do not have access to the printer's plates (if there is any such thing at all, which need not be the case if copies can 'self-reproduce,' as in photocopying); I can only collate a number of variously smudged, incomplete newspapers, from which, nevertheless, I am able to extract their common content so that I will know the news any other copy of the same issue may carry even before actually checking it. This is the idea Aristotle worked out in his theories of abstraction and induction.

The Moderate Realism/Conceptualism of Medieval Aristotelians

According to Aristotle and his medieval interpreters, human understanding is characterized by two intellective powers or faculties, namely the active intellect (nous poietikos, *intellectus agens*) and the receptive intellect (nous pathetikos, *intellectus possibilis*). Due to the obscurity of Aristotle's formulations, in the Middle Ages there was much debate about the makeup of these faculties, namely whether they are material or immaterial, and whether they existed as individualized powers of individual human souls or, rather, as separate substances connected to individual human souls to carry out their intellectual operations (pretty much as mainframe computers are connected to their terminals). However, regardless of these differences, there was quite general agreement concerning the function of these intellective powers (whatever they are in themselves) and how they can produce universal knowledge without having to 'look up to' or 'recollect' Platonic Forms. The active intellect has the function of producing simple, universal concepts (i.e., universal representations of individuals) from their singular representations provided by

the senses. The receptive intellect, on the other hand, receives these universal representations for further processing, combining them into more complex concepts and judgments by means of complexive concepts, the so-called syncategorematic concepts ('syncategoremata'), and using these judgments in reasoning.

Abstraction, Induction, and Essentialism

In the process of abstraction, the active intellect forms a common concept by considering the multitude of experiences of particulars of the same kind, disregarding what is peculiar to each while focusing on what is common to all. The common concept retained in the receptive intellect is a mental representation that represents the individuals it is abstracted from only with respect to what commonly characterizes them all. Accordingly, the same mental representation will naturally represent in the same respect not only those individuals that it is abstracted from but also other individuals of the same kind – that is, individuals that resemble the observed ones precisely in the same respect in which the abstracted concept represents the observed individuals. Therefore, if the receptive intellect forms a judgment with this concept in which the predicate belongs to the particulars that fall under this concept on account of falling under this concept, then it is able to produce a valid scientific generalization by induction – that is, by reasoning in the following way: This observed S was P, and that observed S was P, and so on for all observed S's; therefore, in general, every S is P. Obviously, this inference is valid (not formally, but materially) only if an S is essentially and not merely coincidentally P – that is, if an S is P on account of being an S so that any S is necessarily P, as long as it is an S (and if it is also essentially an S, then it is necessarily an S, and hence also a P, as long as it exists). This is precisely why this inference requires the multitude of experiences, namely to ensure that the observed S's have been P not by mere coincidence but precisely on account of being S's. However, if this inference is valid, then it obviously provides a good answer to Plato's original question (concerning the possibility of universal knowledge) without resorting to Plato's universal Forms.

The Ontological Commitments of Moderate Realism

However, the previous conception may still involve an enormous amount of ontological commitment; admittedly, not to Platonic universal Forms but to individuals of a rather strange sort, the individualized forms of individual substances. If all our common terms are applicable to individual things on account of our common concepts, and we gain these concepts by abstraction from the individualized forms or properties that sort individuals into various kinds, then apparently there are as many individualized forms in an individual substance as there are true common predicates of it. (Yet, this conception need not make individual substances into mere congeries of individualized forms, in the vein of modern trope theories. On this conception, individual substances are the primary units of reality that account for the individuation of individualized forms, and not the other way around (cf. Campbell, 1997; Daily, 1997).) In this moderate realist view, commonly endorsed by medieval authors of the 13th century (e.g., Thomas Aquinas), the world is a world of individuals without 'universal entities,' but it is populated by all sorts of nonsubstantial particulars, serving as the individualized *significata* of our common terms. The universals of this world, then, are the common terms of our language as well as the concepts they express, and the individualized forms as-conceived-in-a-universal-manner by means of these concepts (i.e., as-existing-in-the-mind as the direct objects of these concepts) (Klima, 1999). To be sure, these authors were able to reduce the ontological commitment of their theories by two fundamental semantic strategies: the distinction of several senses of 'being' and the identification of the semantic values of various terms.

On the first strategy, ontological commitment simply becomes ambiguous among different kinds of entities credited with different degrees of reality corresponding to different senses of 'existence' or 'being' (such as being in reality, *esse reale*, and being in the mind, *esse rationis*; cf. Klima, 1993) – a move generally rejected by nominalists.

On the second strategy, however, ontological commitment is reduced even within the same domain of entities. For instance, since two billiard balls A and B are similar in shape, the moderate realist view is apparently committed not only to the individualized roundness of A and the individualized roundness of B but also to the individualized similarity of A to B and to the individualized similarity of B to A. However, several moderate realist authors would argue that nothing prevents us from saying that the roundness of A is the same thing as the similarity of A to B, merely conceived differently, by means of a different concept (Henninger, 1989; Brower, 2001).

Late Medieval and Modern Nominalism

This strategy actually anticipates the more radical reductionist program of William Ockham and his

14th-century followers, such as John Buridan, Albert of Saxony, Marsilius of Inghen, and in general the late medieval nominalist tradition of the *via moderna*. These nominalist authors agreed with their moderate realist counterparts in positing a world consisting only of individuals and identifying universals with universal terms of written and spoken languages, which owe their universal mode of representation to universal concepts of the human mind, interpreted as singular mental acts representing their singular objects in a universal manner. However, they denied even the 'diminished' existence of universals as universal objects of these mental concepts admitted by moderate realists, and they reduced the number of really distinct categories of singulars to two or three, admitting distinct entities only in the categories of substance, quality, and possibly quantity. (Ockham, for example, identified substance with quantity, whereas Buridan argued against their identification.)

To be sure, using their own eliminative strategy of identifying the semantic values of linguistic items in different linguistic categories, the moderate realists could in principle achieve the same degree of ontological parsimony. However, for them this was to be achieved separately, based on metaphysical considerations. Their semantics demanded positing as many different types of semantic values for their terms as there are different linguistic categories, although it was possible for them to decide on the basis of further metaphysical considerations about the identity or nonidentity of these semantic values. In contrast, the nominalists had the principles of ontological reduction (i.e., eliminating unwanted ontological commitment) 'built into' their semantic principles (Klima, 1999). The reductionist program of the nominalists was devised to show that it is possible to have a sufficiently 'fine-grained' semantics without a complex ontology by 'moving' the requisite distinctions from (a full-fledged or 'diminished') reality to the conceptual structures posited in the mind.

For example, in contrast to the moderate realist interpretation of similarity alluded to previously, in the nominalist approach there is no metaphysical question of whether the relation signified by the term 'similar' is identical with its foundation, for example, the roundness of ball A. The signification of 'similar' is not construed in the same way in the first place. Instead of assuming that in 'A is similar to B' this term signifies A's similarity to B, an extramental entity that may or may not be distinct from the roundness of A, the nominalists would say that this term simply signifies A in relation to B, on account of the relative (connotative) concept whereby we conceive of A in relation to B. Therefore, even if we do have the obvious semantic difference between the absolute term 'round' and the relative term 'similar,' this semantic difference need not be accounted for in terms of a bloated ontology of distinct extralinguistic correlates of these terms because the relevant semantic distinctions can be made with reference to conceptual distinctions in the mind.

Following this nominalist strategy, once we have identified a basic 'vocabulary' of simple concepts that only commit us to entities in the 'permitted' ontological categories, any further apparent ontological commitments of our language can be eliminated by means of nominal definitions, which show how the semantic features of linguistic items carrying such apparent ontological commitment can be accounted for in terms of an implicit conceptual structure that can be explicated by means of the basic vocabulary carrying commitment only to permitted entities. Indeed, this strategy of eliminating ontological commitment by means of nominal definitions explicating this implicit conceptual structure foreshadows the similar strategy of elimination by paraphrase characteristic of all modern nominalistic programs.

Thus, in this approach, and this is the gist of medieval nominalism in general, a sufficiently fine-grained semantics for natural language is achieved by mapping linguistic constructions onto sufficiently rich conceptual structures in a mental language (comparable in its role to the contemporary 'language of thought hypothesis'), which in turn can be mapped onto a parsimoniously construed reality without any loss of semantic distinctiveness.

Modern nominalistic programs, such as the program promulgated by Goodman and Quine (1947), apply the same basic strategy, but without the medievals' appeal to a mental language, by introducing the explicit ontological commitment of a primitive vocabulary and by eliminating any further apparent commitment (e.g., to such 'abstract entities' as numbers) by providing suitable paraphrases of relevant linguistic items (e.g., numerals) in terms of this primitive vocabulary. Indeed, in this program, Platonistic descriptions of language in terms of linguistic types are replaced by a nominalistic syntax treating of tokens, such as singular inscriptions. (In fact, medieval nominalists also formulated their logical theories in terms of token-phrases (Klima, 2004a).) The successful paraphrase then shows that there is no need to assume the existence of the putative entities apparently required by the semantic features of the phrases that appeared to carry commitment to them, so nominalists are entitled to get rid of them by one swoosh of Ockham's razor.

Nominalism, Antirealism, and Skepticism

Yet, despite customary charges and modern tendencies to the contrary, the 'reductionist' program and the corresponding strategy of medieval nominalism did not necessarily result in metaphysical antirealism, conventionalism, or skepticism. Medieval nominalists typically regarded concepts as naturally representative of a world of individuals presorted into natural kinds and not sorted into these kinds by our concepts and/or linguistic conventions. Thus, they maintained an essentialist metaphysics, and so the scientific knowability of a mind-independent reality, yet without any ontological commitment to (whether subsistent or inherent) universal essences distinct from their individuals. Whether they could consistently do so is a further issue, which bears direct relevance to contemporary considerations concerning ontological commitment and metaphysical essentialism. Plato's problem of the possibility of universal knowledge still remains a problem for nominalists: Once they have rejected the moderate realists' distinct individualized forms, which in the moderate realist conception are precisely the items in reality that serve as the foundation for the abstraction of our universal concepts, the nominalists still have to provide a plausible story about how universal concepts can be abstracted from observed singulars (and hence how they can apply even to previously unobserved singulars), unless they want to give up on the possibility of universal knowledge in the classical sense altogether (Klima, 2004b, 2005).

See also: Concepts; Empiricism; Mentalese; Natural Kind Terms; Objects, Properties, and Functions; Semantic Value; Syncategoremata.

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Nominalization

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Nominalization proper means 'turning something into a noun' (Comrie and Thompson, 1985), and refers both to the corresponding processes or operations and to their results. Nominalization covers a broad range of transpositional phenomena, where transposition, in turn, refers to word-class-changing operations (Haspelmath, 2002). Often applied without clear criteria and definitions, the term has been grossly misused. A clear definition of nominalizations and any serious attempts to approach them cross-linguistically should take into account at the least the following parameters:

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- What expression types are turned into a noun?
- What are the meanings of the resulting expressions?
- What does turning into a noun really mean, i.e., in what sense is the resulting expression a noun?
- How regular is this process, e.g., is it derivational or inflectional?
- Do the resulting expressions show mixed properties (partly nominal, partly stemming from the base expression type)?
- What are the functions of the resulting expressions?

The next section will show how most of these parameters work for one particular kind of nominalizations that has received most attention within various linguistic theories and has been intensively studied cross-linguistically – action nominals. This is followed by a sketch of some other nominalization phenomena. The final section will give a brief survey of the functions in which nominalizations are typically used and point out possible connections between these uses and the morphosyntactic properties of the corresponding nominalizations. Throughout the chapter the main emphasis will be on the phenomena themselves, rather than on the various attempts to present a formal analysis of them.

Action Nominals and Action Nominal Constructions

Action nominals (*nomina actionis*, AN), such as *running, arrival, reading,* and *conquest* are in some reasonably productive way derived from verbs, either derivationally or inflectionally. Broadly speaking, they refer to situations and not only to actions, as the name might imply (Comrie and Thompson, 1985; Koptjevskaja-Tamm, 1993, 2003, 2005). Action nominals head action nominal constructions (ANCs) that may also contain expressions referring to the participants in the situation designated by its head, most often serve as arguments (complements) to predicates and refer to events, facts, and propositions, to use the semantic taxonomy launched by Vendler (1967). For instance, predicates *to assert* and *to be unlikely* combine with ANCs referring to propositions (*The collapse of the country's economy is unlikely*), the verbs *to know, to regret,* and to *lead* take ANCs referring to facts (as in *The enemy's destruction of the city led to a complete collapse of the country's economy*), while the verbs *to hear* and *to go on* take ANCs referring to events (*The singing of the Marseillaise went on for hours*).

ANs are either 'full-fledged' nouns or at least occur in typical nominal positions and show inflectional properties, such as case inflection, and/or combinability with adpositions typical of nouns. There is, on the whole, relatively little consensus in terminology used for what is called 'ANs' and 'ANCs' here. Thus, 'verbal nouns,' 'gerunds,' 'nominalizations,' 'masdars,' 'infinitives' often, though not necessarily, refer to ANs (Koptjevskaja-Tamm, 1993: 22–43). Grimshaw (1990) used the term 'complex event nouns,' opposed to 'simple event nouns' (or act nouns), such as *announcement*. Action nominals, as defined here, are robustly attested cross-linguistically, though not everywhere. Thus, they are as a rule absent from Australian and most North American Indian languages.

In their semantics and discourse behavior, action nominals combine verbal and nominal properties and occupy an intermediate position between typical nouns and typical verbs. Thus, both *John's singing* and *John sings* can describe one and the same event involving the same participant, and the same goes for *the enemy's destruction of the city* and *the enemy destroyed the city.* However, ANCs, as opposed to normal finite clauses, merely name situations and occur in functions typical of NPs, for instance, as arguments to predicates. On the other hand, they differ from typical nouns that refer to things, persons, places, and other more or less concrete objects. Also, action nominals take arguments more or less like the corresponding (finite) verbs do. Nouns normally do not take arguments, even though this might be doubtful for relational nouns, such as kinship terms or words for body parts.

Morphosyntactically, ANs often show a mixture of verbal and nominal properties and provide, therefore, good examples of mixed categories (Lefebvre and Muysken, 1987; Spencer, forthcoming). Thus, in the example *John's repairing the house so quickly [came as a big surprise],* the AN *repairing* combines with its 'object' *the house so quickly* and with the adverb in a typically verbal way, as in the corresponding finite clause *John repaired the house* so quickly. Moreover, the AN in the same construction can be negated and/or combine with auxiliaries, again in the way typical of verbs, e.g., *John's having not repaired the house*. Its 'subject,' however, appears with the *'s*-marker, typical of adnominal dependents (possessors). The same action nominal may also build constructions that look very much like 'normal' NPs with underived nouns (cf. *John's quick repairing of the house* and *John's accurate map of the city*).

The question that has attracted most research is whether and how action nominals can combine with expressions referring to the participants in the situations designated by them, primarily with S (as *John* in *John's running*), and with A and P (as *the enemy* and *the city* in *the enemy's destruction of the city*). There

is a long tradition in distinguishing between derivational nominalizations (like *conquest, refusal,* and *arrival*) and inflectional nominalizations, like English gerunds (Chomsky, 1980). According to this tradition, derivational nominalizations are said to be lexically restricted; they may have unpredictable semantic and syntactic properties as compared to the verbs they are derived from, as well as idiosyncrasies in formation; they also combine with their dependents in exactly the same way as prototypical nonderived nouns. Inflectional nominalizations are described as being formed from any verb in a regular way, their meaning is completely predictable, and they retain a good portion of verbal syntactic properties. This distinction is, however, of little use for a cross-linguistic comparison, because it is precisely action nominals that in many languages pose serious problems for a clear-cut distinction between derivational and inflectional forms, in that the various criteria suggested for distinguishing inflection and derivation clash when applied to them (Comrie and Thompson, 1985; Koptjevskaja-Tamm, 1993: 263–266; Haspelmath, 1996). A part of the difficulties with distinguishing between derivation and inflection can stem from diachronic processes; for instance, English gerunds started as derivational, but have gradually become inflectional forms (Miller, 2002: 315–350).

Cross-linguistically ANCs may be classified in accordance with their sentence-likeness and/or NP-likeness, i.e., with the degree to which the relations between an AN and its arguments are encoded in the same way as verb-arguments relations in finite clauses or as head-dependent relations in NPs (primarily, the possessee-possessor relations, *see* **Possession, Adnominal**), respectively. The typology of ANCs assumed here is based on marking of the arguments themselves (by means of case-marking and adpositions) as a primary parameter, in a few cases supplemented by head-marking as an additional parameter (for details cf. Comrie and Thompson, 1985; Koptjevskaja-Tamm, 1993, 2003, 2005). One and the same language often has several ANC types, not necessarily possible for one and the same AN.

Thus, in English *John's running* and *the enemy's destroying the city* illustrate the Possessive-Accusative type: S and A are treated as possessors, while P retains sentential marking (in this case, the absence of any overt marker). *The destruction of the house by the enemy* belongs to the Ergative-Possessive type, where S and P are treated as possessors, while A is treated differently. In this particular example, A looks like the agent in passive sentences; this is a cross-linguistically usual, but not a necessary option. A may be treated as other peripheral NPs. Finally, in *the enemy's destruction of the city,* all major arguments are treated as possessors, this is the Double-Possessive type. While English has two distinct possessor forms and possessor positions that can differentiate between the A and the P, most languages with this ANC type use one and the same form for both, as shown by ex. (1) from the Austronesian language Tukang Besi (Tukang Besi South). This type is cross-linguistically relatively rare, compared to the other ANC types.

(1) te basa-'a nu La Petrus nu boku
CORE read-AN POSS PROP.M Peter POSS book
'Peter's reading of the book.' (Mark Donohue p.c.)

In a number of languages ANCs are built according to the Sentential type: S, A, and P receive the same dependent-marking as in the finite clause. In ex. (2) from Tamil, the A and the P appear in the unmarked form both in the finite clause (2a) and in the ANC (2b), while possessors normally take the genitive case.

(2a) coomu tampikki paŋam
Somu younger.brother.DAT money
kuɽu-tt-aaru
give-PAST–3SG.HUMAN
'Somu gave younger brother the money.'

(2b) [coomu tampikki paŋam
Somu younger.brother.DAT money
kuɽu-tt-atu] aaccariyamaa iruntatu
give-PAST-AN surprising be.PAST.3SG.N
'It was surpring that Somu gave younger brother the money.' (lit. 'Somu's giving the money to the younger brother was surprising.') (Asher, 1982: 110)

In a number of languages, action nominals can never combine with both A and P within one and the same construction. Sometimes there are strategies for expressing both A and P at the same time without, however, making both of them syntactically dependent on the AN. Thus, the English ANC *John's repairing the house* may be rendered by constructions like *John's house-repairing* (where the P and the action nominal build a compound), *the repairing of the house that John did,* or *the repairing that John repaired the house*. The latter option is illustrated by (3) from Yoruba. The cover term for this somewhat heterogeneous class is the Valency-Lowering type; the common denominator is the reduced valency of an AN compared to that of the verb. This is, of course, well in line with the behavior of more typical nouns that hardly ever take two arguments.

(3) rírà tí Olú ra aso
buy.AN REL Olu buy dress
'Olu's buying of the dress' (Ayo Bambgbose p.c.)

These major patterns can be ordered as a scale from sentence-like constructions to those that have a

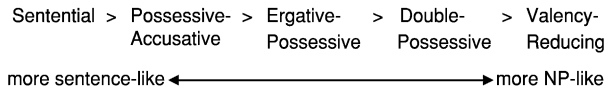

Figure 1 Scale of sentence-like and NP-like dependent-marking in the major ANC patterns.

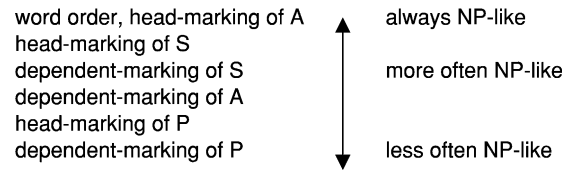

Figure 2 Hierarchy of sentential vs. NP-like syntactic means in ANCs.

NP-syntax, with intermediate patterns combining elements of both sentences and NPs (Figure 1).

Cross-linguistic variation in ANC structure is, thus, severely restricted in at least two respects. First, arguments differ systematically in their proneness to retain sentential marking. Second, the three kinds of overt means for encoding head-dependent relations – dependent-marking, head-marking (agreement), and word order – form a hierarchy that predicts which combinations of nominal and sentential properties are possible (cf. Figure 2). For instance, of the two arguments in transitive ANCs, the one most likely to lose its sentential dependent-marking is the A; in addition, the A never retains its head-marking. To a certain degree, though not completely, this corresponds to the assumption found in various theories that finiteness of a clause and the properties of its subject are crucially related; since ANCs are not finite, their 'subjects' may be or even should be different from those in finite clauses.

The data in Koptjevskaja-Tamm (1993) show that there is also a correlation between the different ANC types, on the one hand, and the presence vs. absence of other typical verbal vs. nominal features in their head, such as the ability to express tense/aspect distinctions (cf. ex. (2) from Tamil), voice and negation, and the ability to combine with adverbs/adjectives. More systematic research is, however, needed here. Also, even though ANs generally pose problems for the derivation/inflection-distinction, the 'extreme' ANC types do show a high degree of consistency among the different criteria. Thus, action nominals with a sentence-like syntax normally involve generally applicable and regular markers and show semantic transparency, while action nominals with a nominal syntax often manifest various idiosyncrasies typical of derivation (cf. also Haspelmath, 1996: 57–58).

Other Kinds of Nominalization and Nominalization-Related Phenomena

Expressions That Can Be Turned into Nouns and the Meanings of the Resulting Expressions

Some languages have verbal nouns which refer to the way, or manner, of performing the action denoted by the base verb – mode, or manner nominals (*nomina modi*), distinct from action nominals, e.g., in Amharic *akkiyahed* 'the way of going' vs. *mohed* 'to go, going,' or in Turkish *yürü-yüş* 'the way of walking.' Verbs may also be turned into nouns that name one of their arguments, or various circumstances concomitant to the situation designated by them. The former class includes agentive nouns (*nomina agentis*), or subject nominalizations, e.g., *singer, employer,* object nouns, e.g., *employee,* and result nominalizations, e.g., *agreement* (as in *The agreement they signed was submitted in four copies*). The latter includes instrument nominalizations, e.g., *sharpener,* locative nominalizations and reason nominalizations, e.g., derivations with the suffixes *-vvik* resp. *-ssut* in West Greenlandic (Inuktitut, Greenlandic), such as *puisinniarvik* 'place for hunting seal' and *kamassut* 'reason for anger' (Fortescue, 1984: 319).

Adjectives may also be turned into nouns, e.g., state/property nominalizations such as *stupidity* and *redness*. Occasionally words from other word classes can be turned into nouns. Languages may have much more fine-grained semantic distinctions in nominalizations than what is presented above. It is also often the case that one and the same nominalization marker can produce different meanings, e.g., the English suffix *-er* used for deriving both agent and instrument nouns.

In all the examples considered so far, a word of one particular class (verbs, adjectives) has been turned into a noun – these are instances of lexical nominalization. In clausal nominalizations, on the other hand, it is the whole finite clause that gets nominal inflectional features, while its head cannot be considered a noun (Comrie and Thompson, 1985: 392), as in (4) from Imbabura Quechua (Quichua, Highland, Imbabura).

(4) Pedro ya -n [ñuka Agatu-pi kawsa-ni]-ta
Pedro think-3 I *Agato-in live–1-ACC*
'Pedro thinks that I live in Agato.' (Cole, 1982: 43)

More specifically, the verb in such nominalized clauses normally retains all its verbal characteristics (such as person and number inflection) and does not occur with nominal derivational affixes, although the whole nominalized clause may be more or less similar to an NP. Clauses may be nominalized in different ways, for instance by taking an article or by attaching nominal inflectional suffixes to finite verbs, such as

the accusative case in (4). In the latter case, the verbs inflect in the same way as nonderived nominals, but there may still be arguments against considering them lexical nominalizations. Clausal nominalizations are quite widespread across North American Indian languages, which, as a rule, lack action nominals, and across Tibeto-Burman languages (Matisoff, 1972).

In a few cases, however, the distinction between lexical and clausal nominalizations is difficult to draw. Or rather, nominalization markers may be 'omnivorous' in attaching to expressions of structurally different kinds – words, word combinations, clauses. One reason for this may lie in diachronic processes; thus, it has been suggested for several languages (e.g., for Newari in Genetti, 1991 and for Navajo in Mithun, 2002) that nominalizers, case morphology, and adpositions have been extended from lexical items to clauses.

What Does Turning into a Noun Really Mean?

One of the criteria for ANs given earlier in this article is that they should at least occur in typical nominal positions and show inflectional properties, such as case inflection, and/or combinability with adpositions, typical of nouns. However, ANs often show only a subset of nominal inflectional and combinatorial properties; thus, they normally lack number distinctions.

Individual inflected forms of action nominals, often used in particular functions, may gradually detach themselves from the original paradigm and become nonfinite verb forms on their own. Thus, infinitives in many languages originate as purposive action nominals, i.e., action nominals with the dative or allative marker (Haspelmath, 1989), e.g., the Slavic infinitive ending *-ti* is the dative case of the earlier verbal noun. Adpositional or case forms of verbal nouns are a frequent grammaticalization source for converbs, i.e., nonfinite verbal forms used in adverbial subordination (Haspelmath, 1995). Such processes can sometimes result in a set of forms that all look like inflected forms of one and the same verbal noun. Synchronically, however, this analysis is hardly appropriate, and the term 'nominalization' is not applicable to such phenomena. Thus, typically, the whole paradigm is significantly reduced compared to the normal nominal paradigm; in addition, the inflected forms may have very specialized meanings not always easily deducible from the 'normal' case meanings. Examples (5) and (6) from Finnish illustrate the inflected (adessive, abessive, illative, and elative) forms of what is labeled 'third infinitive' in the Fennicist tradition. While the forms in (5) should rather be classified as converbs, the forms in (6) correspond to the typical infinitival uses.

(5) Finnish (Ylikoski, 2003: 204, 212)
Pekka tek-i rikokse-n. . .
*Pekka make-*PAST.3SG *crime-*GEN
'Pekka committed a crime. . .'

(5a) juo-malla olut-ta.
*drink-*CONV (='INF3.ADE') *beer-*PART
'by drinking beer.'

(5b) juo-matta olut-ta.
*drink-*CONV (='INF3.ABE') *beer-*PART
'without drinking beer"

(6a) Pekka rupes-i juo-maan olut-ta.
*Pekka begin-*PAST.3SG *drink-*'INF3.ILL' *beer-*PART
'Pekka began drinking beer.'

(6b) Pekka lakkas-i juo-masta olut-ta.
*Pekka case-*PAST.3SG *drink-*'INF3.ELA' *beer-*PART
'Pekka began drinking beer.'

Typical infinitives may in turn be further 'nominalized,' e.g., by attaching a definite article, and start being used as action nominals, often acquiring more and more nominal properties. Ex. (7) shows that infinitives combined with definite articles in German and Italian may take P (object) in the possessive form and be modified by adjectives. This completes thus 'a full cycle of noun-to-infinitive-to-noun' (Disterheft, 1980; Gaeta, 1997).

(7a) Italian
Sento il mormorare somesso del mare
*hear.*PRES.1SG *the whisper.*INF *soft of.the sea*
'I hear the soft whisper of the sea'

(7b) German
Das schnelle Zerstören der Stadt
*the.*N *rapid destroy.*INF *the.*GEN.F.SG *city*
war notwendig.
*was.*3SG *necessary*
'The rapid destroying of the city was necessary.'

There has been surprisingly little discussion in the literature of the criteria that can be used for deciding when 'something has been turned into a noun' and for distinguishing nominalizations from related phenomena (for some attempts cf. Noonan, 1985; Koptjevskaja-Tamm, 1993: 33–45; Haspelmath, 1995; Ylikoski, 2003). This is also, probably, the domain where different local traditions particularly diverge from each other and where consistent research in terminology is particularly urgent. To quote one example, Nordlinger (2002) argued that 'nominalized verbs' in the Australianist linguistic tradition are not nominalized in the usual sense of the word, i.e., have not been turned into nouns. Even though they may attach some (but not all) of the case markers (e.g., the allative case marker in ex. (8)), they cannot occur in syntactic positions typical of nouns, such as arguments. Rather they function as modifiers

– either as heads of relative clauses modifying a head noun, or as adverbial modifiers.

(8) Warlpiri (Simpson, 1988: 205, ex. 2)

Ngarrka-ngku	marlu	pantu-rnu
man-ERG	*kangaroo*	*spear*-PAST
[marna	nga-rninja-kurra].	
grass	*eat*-NMLSR-ALL	

'The man speared the kangaroo while it was eating grass.'

Functions of Nominalizations Nominalizations can be used in many ways, but two groups of functions are particularly salient cross-linguistically – as non-main (dependent) predicates in a sentence and as a part of analytical or periphrastic verb forms.

There is a considerable cross-linguistic variation in how much and where nominalizations are involved in dependent predication. Some languages have a more or less strict division of verb forms into those that can be main predicates and those that cannot. In many of those action nominals are among the predominant forms used in complementation, e.g., in Cuzco Quechua (Quechua, Cuzco), Tamil, Daghestanian languages. However, even in such languages, the exact range of functions attributed to action nominals and to action nominal constructions is to a high degree language specific and depends, primarily, on what other verb forms there are in the language. In other languages, action nominal constructions compete both with other types of nonfinite complements and with finite complementation. On the whole, determining where action nominal constructions are used (as a less frequent alternative to another major complementation type, as a regular and even the only complementation type) is far from evident, and the cross-linguistic variation here is enormous. Thus, in English, *to stop* is one of the verbs that obligatorily take gerunds as complements, e.g. *to stop reading/*to stop to read* (in the intended meaning), while its close synonym *cease* takes only infinitives (*to cease to read*). In Russian, the verb *perestat'* 'to stop' cannot take action nominals as complements, the only option for the latter being infinitives, e.g., **perestat' čtenie/perestat' čitat.'* Curiously, its close synonym *prekratit,'* as well as most of the other phasal verbs, allow combinations both with action nominals and with infinitives, e.g., *prekratit' čtenie/prekratit' čitat.'* Still, in contrast to English, no predicates in Russian obligatorily take action nominals as complements.

Action nominals in various case forms and/or combining with various adpositions are also frequently used in adverbial functions, e.g., *after/before John's arrival…*, and as adnominal attributes, e.g., *a knife for cutting apples*.

In many languages, subject and object nominalizations constitute the main relativization strategy, i.e., they function often as adnominal clausal modifiers. In ex. (9) from the Tibeto-Burman language Kham (Parbate, Western), the nominalizer *-o* derives a subject nominalization, which is used as a noun in ex. (9a) and as a subject relative clause in ex. (9b). Ex. (10) shows how the same marker may produce object nominalizations, which again can function both as nouns and as adnominal modifiers.

(9a) ba-o-rə
go-NMLZ-PL
'those who went'

(9b) ba-o mi:-rə
go-NMLZ *person*-PL
'the people who went'

(10a) o-ra-e-o-rə
3S-3P-give-NMLZ-PL
'those to whom he gave it'

(10b) [no-e mədə o-ra-e-o] sehr-rə
he-ERG *wine* *3S–3P-give*-NMLZ *elder*-PL
'the elders to whom he gave wine'
(Watters, 2002: 201–206)

There is a clear correlation between the pervasiveness of action nominals in complementation and the extent to which they show sentential/verbal properties. Thus, in most of the languages with the sentential ANC type, ANs are among the predominant forms used in complementation; these are also inflectional according to most criteria and often retain, at least partly, such verbal categories as tense/aspect, voice, etc. The same tendencies seem to be operative for other nominalizations as well; thus, in languages where argument nominalizations constitute the main relativization strategy, they tend to behave like inflectional forms and retain a good portion of sentential/verbal properties. However, no systematic research has yet been conducted on argument nominalizations.

Nominalizations are also frequently used in analytical (periphrastic) verb forms, with an impressive diversity of resulting grammatical meanings. Thus, progressives often grammaticalize from locational constructions with verbal nouns, 'X is located in V-ing.' The English continuous forms (*Peter is going*) exemplify this development. In Iraqw, the future is expressed by the auxiliary *aw* 'to go' with the verbal noun of the main verb as the object preceding it (the complement of the verbal noun forms a genitive construction with the verbal noun), as in ex. (11):

(11)

makay	i	ma'á
animals	SUBJ.*3*	*water*.CONSTR
wahúngw	ay-á'	
drinking.CONSTR	*go:3*-PL	

'The animals will drink water.' (Mous, 1983: 267)

Finally, (erstwhile) nominalizations may also develop main-clause (or independent-clause) functions. Thus, in a number of languages nominalizations as independent clauses are used for various discourse-pragmatic functions, primarily in backgrounded portions of discourse, e.g., setting the scene, or providing parenthetical, subsidiary information. Variations on the theme are attested in languages as diverse as Japanese (Iwasaki, 2000), Navajo (Mithun, 2002), and Kham (Watters, 2002). Mithun suggested that these functions arise due to extension from marking syntactic relations among sentences to marking pragmatic relationships among sentences in discourse.

This is not the only scenario by which nominalizations can acquire main-clause functions. Gildea (1998) suggested that the verb forms of main clauses in many Cariban languages descend from earlier copular sentences based on nominalizations, from which the copula has gradually disappeared, and showed which nominalizations become which tenses and aspects. Thus, e.g., agent nominalizers become immediate future, habitual, and 'universal' tense-aspects, object nominalizers become past, perfect, and perfective, and action nominalizers become 'universal,' immediate future, and imperfective tense-aspects.

See also: Mixed Categories; Nouns; Possession, Adnominal; Verbs; Word Classes/Parts of Speech: Overview.

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NonAustronesian Languages of Melanesia *See:* Papuan Languages.

Nonhuman Primate Communication

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Introduction

All primates live in social groups. Some, like orangutans, live a largely solitary life, but come together for mating, aggressive competition, and offspring care. Others, such as chimpanzees, live in large communities, but on a day-to-day basis exist in small ephemeral parties. Independent of group size and composition, monkeys and apes engage in a wide variety of social and nonsocial activities including the discovery of food, the detection of predators, intergroup encounters, group movement, play, grooming, aggressive attacks, coalitions, submissive retreats, and reconciliatory actions designed to redress imbalances in a relationship. In principle, one can readily imagine the adaptive significance of a signaling system capable of informing others of these various activities. Of particular use would be a vocal system designed to convey such information in the absence of any other contextual information. Such a system would enable Monkey A to inform Monkey B of the location, movement, and type of predator, and monkey B would be able to decode this information and more, including the fact that monkey A is a member of the same species, same group, is high ranking, and male. This hypothesis about adaptive design is only partly accurate. Nonhuman primates do produce vocalizations in a variety of contexts, and listeners do extract considerable information from the signal. But there are significant constraints on the kind of information conveyed and the kind of information extracted. These constraints are both internal (peripheral and central processing mechanisms) and external (habitat, climate, distance to receivers, competing acoustic signals) to the animals themselves.

Students of animal behavior have long argued over the proper definition of communication (Hauser, 1996; Bradbury and Vehrencamp, 1998; Owings and Morton, 1998). Early theories, centered primarily in classical ethology, focused on the veridical transmission of information from sender to receiver. One variant of this view borrowed from engineering, and in particular Shannon-Weaver information theory. Communication was said to occur if a receiver's uncertainty about an event was reduced by the information transmitted in the sender's signal. Critics of this information perspective emerged with the sociobiology revolution. Dawkins and Krebs (1978) argued that a veridical signaling system was invadable by a mutant who generated the same signal but with a different, and deceptive motivation. Thus, for example, if an aggressive signal was designed to convey information about the probability of escalating aggression, then a mutant who always signaled the highest level of aggressive intent, but was bluffing, would always win because receivers would readily back down. Thus, so Dawkins and Krebs originally argued, the adaptive function of communication is for signalers to manipulate the behavior of receivers. This view was quickly criticized for being signaler-centric. Dawkins and Krebs responded by modifying their original model to include both manipulative signalers and skeptical receivers. Thus, communication evolves as an arms race in which selection favors signals designed to manipulate the behavior of receivers for fitness gains, and counterselection favors receivers that distinguish between truths and lies. Riding along with this selfish-gene perspective was

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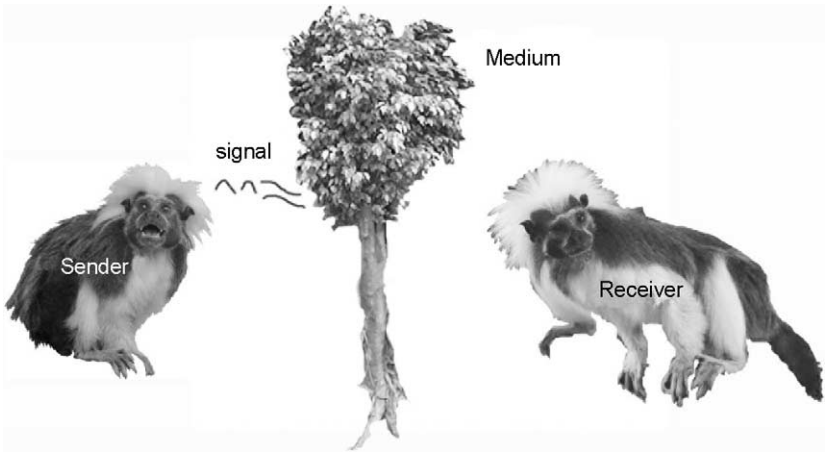

Figure 1 The basic structure of communication systems. Shown are the four central elements that comprise communication: the sender emits a signal that travels through a medium to a receiver. Shown is a vocal communication in which the signal is a vocalization and the medium is a forested environment.

Zahavi's (Zahavi, 1975) handicap principle, often interpreted as a specific explanation for mating behavior, but originally proposed as a general theory of signaling. For Zahavi, signals provide veridical information about the signaler if, and only if, there are costs to signaling relative to current condition, and the capacity to generate such cost-bearing signals is heritable. Although there have been several empirical examples supporting Zahavi's intuition (e.g., stotting in gazelles, courtship displays in several bird species), it is also clear that honesty can emerge in the absence of significant costs. For example, a series of studies by Fitch and colleagues indicate that physical constraints anchor honesty in the absence of costs (e.g., the length of the vocal tract correlates with body size which provides, via formant frequency dispersion, an honest indicator of size (Fitch, 1997)).

All of these definitions of communication have pros and cons, and most side step the cognitive mechanisms underlying both the production and perception of communicative signals. For purposes of exposition, we borrow from these different definitions and focus on what we see as the most empirically tractable aspects: the information encoded in the signal, the transmission medium, and the perceptual decoding of and response to the signal (Figure 1).

In the present article, we focus our discussion on communication in nonhuman primates (see chapters of this volume for similar discussions of other taxonomic groups). We focus on vocal communication because there has been considerably more progress for this sensory channel in primates than for all others. This is largely because the analytical techniques for analyzing the signal and testing its perceptual significance in primates are far more sophisticated than for the visual, tactile or olfactory channels. We begin with a discussion of call context, focusing on three functional problems: food, sex, and antipredator alarm. We then focus on the potential for signalers to convey information about individual, sex, and group identity, and the capacity for receivers to decode this information. We end this article with a discussion of some pressing gaps in our understanding and the need to develop new analytic tools and comparative data sets.

Call Context

Primates produce an astonishing array of vocalizations – from the simple, tonal phees of the common marmoset (Figure 2B), to the spectrotemporally complex syllable sequences of the chimpanzee pant hoot (Figure 2A), to the moving formants found in rhesus monkey girneys (Figure 2C). There is enormous variability in the spectrotemporal structure of different call types within species and in the acoustic properties of particular calls within and between individuals. These observations raise two questions: to what extent is the variability in signal morphology behaviorally relevant and how shall we go about quantifying call morphology? One method is to chart the association between social and ecological situations and call morphology. More recent work has extended these earlier findings to explore the possibility that, like human words, primate vocalizations have the capacity to pick out salient objects and events in the environment, and convey this information to listeners. We focus here on functional aspects of these calls, leaving aside discussion of their cognitive substrates.

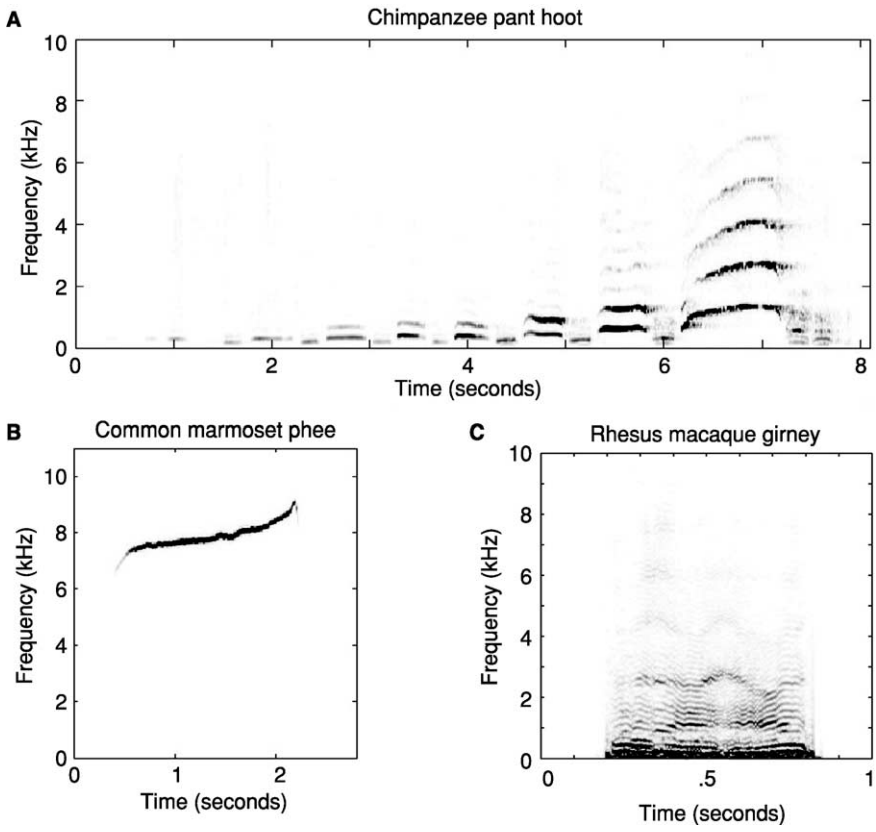

Figure 2 Spectrograms show inter-species variation in the acoustic structure of primate vocalizations. For each spectrogram, the X-axis shows time and the Y-axis shows frequency. Depicted are (a) chimpanzee pant hoot, (b) common marmoset phee, and (c) rhesus monkey girney.

Food

Many primates produce distinct calls when discovering or eating food. Call rate appears to correlate with hunger in rhesus macaques (*Macaca mulatta*), with food preference in cotton-top tamarins (*Saguinus oedipus)*, with amount of food and location in toque macaques (*M. sinica*), and with amount of food and whether that food is divisible in chimpanzees (*Pan troglodytes*). In addition, distinct vocalizations for low quality/common and high quality/rare foods have been observed in rhesus macaques (Hauser, 1996).

Rhesus macaques not only produce acoustically distinct vocalizations for low and high quality food items, they also appear to recognize these categories. In a habituation–discrimination experiment (Hauser, 1996), habituation was shown to transfer between two high quality food call types ('warbles' and 'harmonic arches') despite the fact that they are acoustically distinctive; this suggests that both calls are classified as falling within the same functional category. Information in rhesus food calls was shown to be relevant to conspecifics in another context as well (Hauser, 1996). Experimenters observed individual rhesus following discovery of food. Discoverers produced food calls 45% of the time. However, because of the density of the population, other conspecifics detected the food discovery 90% of the time. On average, vocal discoverers consumed more food than silent discoverers because silent discoverers, when detected, were often chased away from the food or aggressively attacked. Similar results have also been observed in white-faced capuchins (*Cebus capucinus*) (Gros-Louis, 2004).

Predators

Many primates produce alarm calls in response to predators. Several species, including Barbary macaques (*M. sylvanus*), chacma baboons (*Papio hamadryas*), ring-tailed lemurs (*Lemur catta*), redfronted lemurs (*Eulemur fulvus rufus*), Verraux's sifakas (*Propithecus verreauxi verreauxi*), Diana monkeys (*Cercopithecus diana*), and most famously, vervet monkeys (*C. aethiops*) (Cheney and Seyfarth, 1990), produce acoustically distinctive alarm calls to different predators. Vervets living in Amboseli National Park, Kenya, produce acoustically distinctive alarm calls to large felines (leopards, etc.; Figure 3A), large

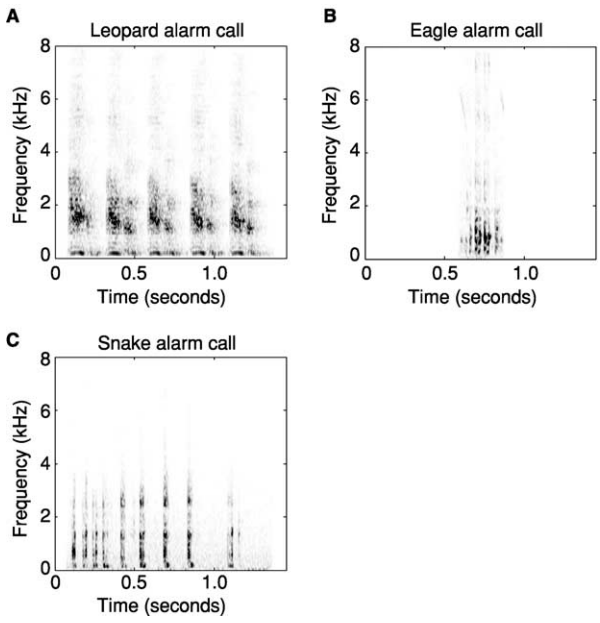

Figure 3 Spectrograms of the three major vervet monkey alarm vocalizations. For each spectrogram, the X-axis shows time and the Y-axis shows frequency. Shown are the species-typical alarm calls produced in response to (A) leopards, (B) eagles, and (C) snakes.

	Prime	Probe
Baseline	*Eagle shriek*	*Eagle shriek*
	Leopard growl	*Leopard growl*
Test	*Eagle alarm call*	*Eagle shriek*
	Leopard alarm call	*Leopard growl*
Control	*Leopard alarm call*	*Eagle shriek*
	Eagle alarm call	*Leopard growl*

Figure 4 Outline of the experimental design used in Zuberbuhler *et al.* (1999). This experiment consists of two trials (prime/probe) for each of the three test conditions (baseline/test/control). For these experiments, the prime stimulus was presented first, followed by the probe stimulus. The logic here is that if the information provided to the subjects is similar in both the prime and probe trials, then subjects should show a response to the prime stimulus, but not the probe stimulus. If, however, the information is different, subjects should show similar levels of response in both trials.

raptors (martial eagles and crowned eagles; Figure 3B), snakes (pythons and mambas; Figure 3C), baboons, and some humans (e.g., the Maasai who occasionally hunt or threaten them). What information is transmitted in these signals? Two criteria must be met for an alarm vocalization to transmit information about a specific predator as opposed to predators or fearful stimuli more generally: (1) the vocalization must be evoked by the presence of the specific predator, and not by any other stimuli and (2) playback of the vocalization alone must be sufficient to produce the same response as the presence of the predator. If these two criteria are met, the alarm call is considered 'functionally referential' (Marler *et al.*, 1992), that is, it functions as if it conveys information regarding a specific predator. Studies on vervet monkeys, ring-tailed lemurs, and Diana monkeys provide evidence for functionally referential alarm calls. We focus here on the Diana monkey as this work has included some of the most detailed perceptual experiments to date.

Diana monkeys live in small single male, multi-female groups. Female Diana monkeys produce eagle alarm calls in response to playbacks of both crowned eagle shrieks and male Diana monkey eagle alarm calls and produce leopard alarm calls to playbacks of both leopard growls and male leopard alarm calls (Zuberbuhler *et al.*, 1997). Because male alarm calls and the calls of the predator that elicits them are acoustically distinct, the commonality in the females' response suggests that what is driving the response is the commonality of referent. Further evidence for this comes from an elegant priming study in which responses to the acoustic and referential features of the calls were assessed (Zuberbuhler *et al.*, 1999). In the study, a priming stimulus was presented, followed five minutes later by a probe stimulus (see Figure 4). The prime-probe pairs fell into three categories: the baseline condition, in which the prime and the probe were identical (e.g., both leopard growls), a test condition, in which the prime and the probe differed in acoustic structure but had identical referents (e.g., a male leopard alarm call followed by a leopard growl), and a control condition in which the prime and the probe differed in both acoustic structure and referent (e.g., a male leopard alarm call followed by an eagle shriek). In the baseline condition females produced significantly fewer alarm calls to the probe than to the prime while in the control condition females responded strongly to both the probe and the prime. Habituation therefore occurs when prime and probe share both referential and acoustic features, and does not occur when they share neither referential nor acoustic features. The response of females to the test condition, in which prime and probe share referential but not acoustic features, was similar to that in the baseline condition: females produced significantly fewer alarm calls to the probe than to the prime, suggesting that they were attending to the referential features of the probe.

Mating

A wide variety of primates produce vocalizations in the context of mating. These vocalizations are

typically referred to as copulation calls, and are produced immediately before, during or following copulation. In some species it is the male who produces copulation calls, in other species the female emits the vocalizations, and in a handful of species both sexes produce copulation calls (Hauser, 1996). Because of the variability in the vocal behavior surrounding copulation calls, the functional significance of this class of vocalizations has been difficult to ascertain. However, some similarities exist between species that suggest these calls are likely to play a role in mating behavior. For example, copulation calls are acoustically distinctive within the repertoire, carry information about individual identity, and are often produced at high intensities. These properties enable group members to identify and localize the caller, as well as the context. Although copulation calls have been investigated in a wide range of species, including Old World monkeys and apes, the most detailed work concerning the function of these calls comes from studies of Barbary macaques.

Barbary macaques live in social groups consisting of multiple males and females. Their mating system is typically classified as polygynous, with both males and females mating with multiple individuals. During copulation, females produce acoustically distinct copulation calls. Because these calls can be heard from several meters away, it was proposed that they could function to incite competition between males (Hamilton and Arrowood, 1978). Such competition could occur either through direct male–male competition, with the winner of a fight gaining access to a female, or through sperm competition from mating with multiple males in a short period of time. To address this issue, Semple (1998) conducted a series of field playback experiments. Results indicated that males were more likely to approach females following the playback of her copulation call relative to controls suggesting that copulation calls functioned to alert males that she was currently in estrous. Furthermore, when two males were in the vicinity of the playback, only the more dominant male approached. These data provided evidence for both types of competition because although males were drawn to females after hearing her copulation calls (potentially leading to increased sperm competition), dominant males gained greater access to these females than lower ranking males (consistent with male–male competition). Further experiments showed that the Barbary macaque copulation calling system consisted of another layer of complexity. Analyses showed that copulation calls produced during peak estrous were acoustically distinct from those calls produced early in the estrous cycle (Semple and McComb, 2000). Following this analysis, Semple and McComb conducted a playback experiment in which peak estrous and early estrous copulation calls were broadcast to males. Results revealed that male subjects were more likely to approach females following playback of calls produced during peak estrous than those produced early in the estrous cycle, thus confirming that the acoustic differences between calls produced at these two periods of estrous were both perceptible and meaningful to male macaques. Overall, these data provide evidence that the Barbary macaque copulation call is a salient acoustic cue that plays a significant role in modulating male mating behavior.

Caller Identity

In this section, we focus on three layers or levels of identity: individual, sex, and group. Major research questions in this area are: (1) What are the necessary and sufficient acoustic features associated with an individual's acoustic signature? and (2) To what extent do listeners recognize specific individuals, their sex, or their group identity based on particular features of the signal?

Individual

It has long been known that individual identification based on an acoustic signal is technically possible – in the same way that genetics and environment combine to produce individually distinctive faces, all individuals have individually distinctive voices. However, whether a conspecific can identify an individual based purely on a vocal signal depends on several factors. One important factor is purely perceptual: the listener's auditory system simply may not be sensitive enough to detect the individual distinctiveness in a vocalization. Another factor is the specific vocal signal involved: just as some vocalizations appear to be designed to be either difficult or easy to localize (Marler, 1955), vocalizations appear to vary in their degree of individual distinctiveness. One candidate for the acoustic basis of individual recognition in primate vocal signals is the spectral patterning introduced by vocal tract filtering. The spectral peaks introduced by the vocal tract have been shown to be individually distinctive across two very different calls (coos and grunts) in the rhesus macaque (Rendall *et al.*, 1998). The vocal tract filtering hypothesis is supported by the observation that screams, calls that do not display prominent vocal tract filtering peaks, are also less individually distinctive in playback experiments. However, other experiments in rhesus and pigtail macaques (Gouzoules *et al.*, 1984; Gouzoules and Gouzoules, 1990) have found individual recognition with screams, raising the possibility of a different, or at least an additional, acoustic substrate for

individual recognition. Another candidate for individual recognition is the degree of acoustic variability within and between calls (Fitch *et al.*, 2002).

Regardless of the specific substrate, there are many *a priori* reasons for thinking that primates would benefit from the ability to recognize the identity of a vocalizer: (1) many primates live in dense cover and are often out of sight of group members, (2) success in the social domain often depends on support from conspecifics (particularly kin), and (3) an acoustic signal is better suited to eliciting support from social partners than a visual signal because acoustic signals can travel in 360 degrees and over large distances. Individual recognition by voice has been elegantly demonstrated in vervet monkeys.

Vervet monkey females remain in their natal troupe whereas males emigrate. Each troupe, therefore, consists of several groups of closely-related females. Alliances between close kin during agonistic encounters are common and have repercussions in terms of maintenance of dominance rank, access to scarce resources and reproductive success. When a juvenile vervet vocalizes during an agonistic encounter, its mother often intervenes to support her offspring. Cheney and Seyfarth (1980) took advantage of this behavior to test whether or not vervet females could recognize the vocalization of an individual juvenile. They began by locating three females whose juvenile offspring were out of sight. They then recorded the behavior of the three females before and after playback of the recruitment scream of the juvenile offspring of one of the females. They showed that although all three females responded to the playback by looking in the direction of the concealed playback speaker, the mother of the juvenile whose call had been played responded with a significantly shorter latency and longer duration (Figure 5) than did the other two, 'control,' females. Interestingly, the control females also were more likely to look at the mother after playback. These two pieces of data together suggest that vervet females are able to recognize the individual who produced a particular vocalization.

Similar abilities have been shown using a variety of methodologies in yellow baboons (*P. cynocephalus*), rhesus macaques, Barbary macaques (where it has been shown to emerge as early as 10 weeks of age), pygmy marmosets (*Cebuella pygmaea*), chimpanzees, grey-cheeked mangabeys (*Cercocebus albigena*), squirrel monkeys (*Saimiri sciureus*) and cotton-top tamarins (Snowdon, 1986).

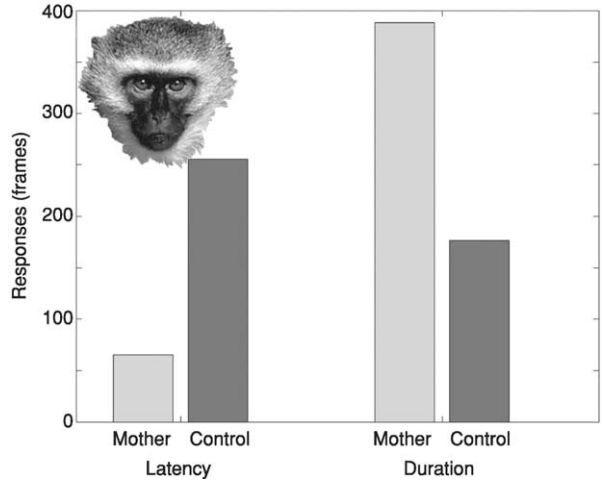

Figure 5 Bar graph showing results from individual recognition playback experiments in vervet monkeys. In each playback, juvenile screams were played back to the juvenile's mother and two control females who also had offspring. Results show that mothers responded with a faster latency and with longer looks than control females. The Y-axis plots responses in frames [18 frames/second]. Redrawn from Cheney and Seyfarth (1980).

Sex

As with many aspects of primate behavior, sex differences exist in primate vocal behavior. Sex differences emerge both in the overt behavior associated with vocalizations, as well as the acoustic structure of the vocalizations themselves. Producing vocalizations with sex differences may be crucial for animals such as primates that must navigate complex social systems. Being able to determine an individual's sex without having experience with that individual is likely to provide one with cues about how and whether to interact with an animal before coming into physical or visual contact with the individual. Although the acoustic differences between male and female primates are often reported, little is known about the perceptual salience and behavioral relevance of this information.

Recently, researchers have begun to address this issue using different experimental techniques. In a study of wild baboons, Rendall and colleagues (Rendall *et al.*, 2004) recorded grunts, a close distance affiliative call. Acoustic analyses showed that the fundamental frequency and the first three formant frequencies were lower in males than females suggesting that these acoustic differences could potentially be used to determine the sex of a caller. To test this possibility, Rendall and colleagues trained captive baboons to discriminate between exemplars of male and female grunts in a psychophysical experiment. Results indicated that subjects successfully discriminated between grunts produced by males and females suggesting that this could be accomplished using the natural acoustic differences present in the vocalizations. Although these data show that the animals are able to perceive a difference between male and female

calls following training, they do not address whether the animals are able to do this naturally. Evidence of spontaneous discrimination is critical for making arguments about whether information about the caller's sex is used in natural behavioral interactions. This gap in our understanding was recently addressed in a study of captive cotton-top tamarins.

Cotton-top tamarins produce a species-specific vocalization called a combination long call (CLC) when separated from group members. This long distance, multisyllabic vocalization typically elicits antiphonal calls and approach behavior from conspecifics. Acoustic analyses of CLCs showed that male calls consisted of significantly shorter syllables than female calls. To test the perceptual and behavioral salience of these acoustic differences, Miller and colleagues (Miller *et al.*, 2004) conducted a phonotaxis experiment. In phonotaxis experiments, subjects are presented with vocalizations from two speakers situated equidistant from subjects and scored for which speaker is approached first. In the first experiment, subjects were presented with naturally produced exemplars of male and female CLCs. Subjects showed significant preference to approach female CLCs suggesting that they could discriminate between the sexes of the caller. When the syllable durations were then manipulated to be identical, subjects no longer showed this behavioral bias, suggesting that syllable duration is a critical feature in sex recognition. Building on this result, a second experiment tested whether the basis for sex differences in CLCs was due to perceptual biases in signal receivers. In this experiment, subjects were first presented with CLCs from animals of the opposite sex in which the syllable durations were manipulated to be at the high and low end of the naturally produced range. Results showed that whereas males showed a preference for female calls with the longest syllable durations, females preferred male calls with the shortest syllable durations. When the syllable durations were manipulated to be outside the naturally produced range, this preference persisted suggesting that sensory biases may impose selective pressure on the structure of CLCs.

Group Membership

Similarities in the spectrotemporal properties of vocalizations within primate social groups have been shown in a variety of species: chimpanzees, Barbary macaques, pigtail macaques (*M. nemestrina*), rhesus macaques, cotton-top tamarins, and mouse lemurs (*Microcebus murinus*). These acoustic similarities are called different things by different authors: dialects, vocal signatures or vocal accommodation (Fischer, 2002). However, they all may serve the purpose of signaling current group membership. This may be particularly useful in species in which group membership is relatively fluid, or in species, such as most of the Old World monkeys, in which there are many different kin groups within a single troupe.

A group level signature has been shown in the chimpanzee's pant hoot. This vocalization, which consists of a an introductory phase of long tonal syllables, a buildup phase with shorter elements, a loud and high frequency climax phase and a short let down phase (see **Figure 2A**), is a long-distance vocalization used by males to maintain contact between allies. Mitani and Gros-Louis (1998) recorded pant hoot choruses between a variety of males in Mahale Mountains National Park in Tanzania. They observed that the pant hoots of males that chorus together are more similar to each other than when they are chorusing with other males, providing a potential cue for current alliance membership. Variation in pant hoot structure also was shown by Marshall and colleagues (Marshall *et al.*, 1999), who described the introduction of a spectrally distinct pant hoot syllable (the 'Bronx cheer' or 'raspberry' variant) by a single individual into a captive colony of chimpanzees. Finally, Crockford and colleagues (Crockford *et al.*, 2004), have observed variation in pant hoot structure between neighboring chimpanzee communities, but not between isolated communities. These authors suggest that groups that are within acoustic contact actively modify their vocalizations to make them distinctive, allowing community allegiance to be detectable at a distance.

However, all studies on group-specific signatures to date have been observational. It is still an open question whether these signatures are meaningful to receivers, though it seems likely, given that the tendency to produce such signatures appears to be widespread among primates. Demonstrating the salience of such signatures, however, will be challenging, as any discrimination based on a group-specific signature might also be supported by individual recognition. It will, therefore, be necessary to create synthetic calls in which a signature at the individual level is maintained, while the group level signature is manipulated.

Future Directions

Primate senders can clearly transmit a variety of information to primate receivers. This information can range, as we have discussed, from information about the sender's location, size, or sex, to information about an external object, such as quality of food or predator type. In addition, other experiments

have shown that signalers can convey information about dominance rank, degree of risk in an agonistic encounter, call bout termination and contact with another conspecific group. Given the richness of information transfer, what are the next steps in the study of primate vocal communication?

Initially primate vocal repertoires were characterized as either 'discrete' or 'graded.' Discrete vocal repertoires contain calls whose spectrotemporal features are distinct from one another, whereas graded systems are those in which there are intermediate forms between many of the calls types. One problem with this sort of distinction is that a sparsely sampled (either in terms of total number of calls recorded, or type and complexity of social contexts observed) graded system will look like a discrete system. More critically, describing a system as graded or discrete assumes that the experimenters estimation of the relevant acoustic parameters matches those of the species under study. Selection of appropriate acoustic features is implicit in identifying call types and critical to asking experimentally rigorous questions. This task is complicated by the fact that primate vocalizations are extremely variable, both within and between individuals. How do we determine what variation is meaningful? Historically vocalizations have been analyzed based on features that are obvious in a spectrogram. Unfortunately, there is no guarantee that the acoustic features that are obvious to a human observer in a spectrogram are features that are behaviorally meaningful to a nonhuman primate (Owren and Linker, 1995). We are therefore faced with a threefold problem: (1) what features exist in the vocalizations? (2) Of these features, which features are behaviorally relevant? and (3) Are these features perceived as discrete or graded? Addressing question 1 requires analysis techniques suitable to the high-dimensional and variable nature of primate vocalizations. Addressing questions 2 and 3 requires behavioral experiments in which identified features are tested for behavioral relevance.

Mathematical methods designed to uncover the low-dimensional structure embedded in high dimensional data have been developed in a variety of fields and some, such as multidimensional scaling (MDS) and principle components analysis (PCA), have been adopted by bioacousticians. However, there are two drawbacks to these methods, one in implementation and one inherent to the analytic techniques themselves. The implementation problem is that researchers usually carry out the feature extraction by hand, and then use these handpicked features in the analysis (thus exposing the results to bias). This problem can be mitigated, however, by selecting a large number of uncorrelated features for analysis. The second problem is more critical, namely that both MDS and PCA require a large number of high quality recordings to be effective. Until recently such data sets have been rare in the primate literature, because of the difficulty of recording vocalizations in normal social contexts.

In the past there has often been a tradeoff between the quality of the recording and the naturalness of the social situation – it is no accident that some of the best studied vocalizations are either very loud, common vocalizations (like alarm calls) or calls that can be elicited by isolation (e.g., the CLC of the cotton-top tamarin or the isolation peep of the squirrel monkey). The short range vocalizations of primates living in large social networks, with the most potential for information transmission of a high degree of complexity, are often the most difficult to record and then test experimentally. To extend our investigations to the rest of repertoire, we need a method for collecting large, high quality data sets, particularly of rare and quiet vocalizations. Advances in radiofrequency transmitters, making them both smaller and more affordable, now allow the possibility of recording large numbers of calls from freely behaving animals, both in captive colonies and in the wild. The advantages of such systems are (1) high-quality recordings of clearly identified callers are possible because the microphone is attached to the animal, (2) recordings can occur during all social contexts, (3) a large number of recordings can be collected automatically, and (4) if all members of a social group carry transmitters, information about call sequencing and bout structure can also be collected. Such systems, in conjunction with observations of behavioral context, will allow a deeper look into nonhuman primate vocal behavior.

Finally, researchers must begin to recognize the limitations of current perceptual tests. Most playbacks elicit a simple orienting response associated with a particular reaction time and duration – the robust behavioral responses elicited by alarm calls, or the antiphonal calling to contact calls, are relatively rare. Following the lead of researchers working on other non-primate systems, including frogs, birds, and humans, single playback experiments must be extended to include habituation–dishabituation procedures, phonotaxis, interactive playbacks, and physiological measures (e.g., heart rate, skin conductance, neural recordings) to complement orienting responses.

Natural vocal communication offers a privileged window into primate mental processes, but studies of primate vocal communication to date have focused on the transmission of relatively simple types of information. However, primates produce a richness of vocalization in a diversity of contexts. This variation

suggests that a considerable amount of information is potentially encoded and decoded about the signaler's motivational and affective state and the nature of the social and ecological environment. As the field of primate vocal communication advances to include more complex types of information transmission, the study of primate vocal communication has the potential to offer insight into the cognitive substrates underlying the primate mind.

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Birdsong; Categorical Perception in Animals; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Fish Communication; Frog and Toad Communication.

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Nonmanual Structures in Sign Language

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General Characterization

Sign languages are often characterized as manual–visual languages, with the perceptual channel being vision and the articulatory mechanism the hands. It has long been recognized that besides the hands, non-manual articulations play an important role in all sign languages studied to date. Non-manual features in sign languages do not only include facial actions and expressions but also movements and positions of the head, shoulders, and upper body as a whole. Although the area of the body below the waist (hips, legs, and feet) is occasionally used as the location for manual articulations in some sign languages, it very rarely serves as an active articulator.

Aspects of facial expression that appear to be relevant include the eyebrows, eyelids, eye gaze, cheeks, nose, lips, and jaw. Together with the use of the head, shoulders, and body, this list constitutes a large number of potentially independent articulators that can be used simultaneously with the manual components and with each other. This simultaneity is a striking feature of all sign languages.

The different non-manual articulators play a role at all levels of linguistic structure, from meaningless phonological components of lexical items to discourse markers. Their role is often compared to that of prosody, particularly pitch or intonation in spoken languages, both in the sense of being superimposed on 'segmental' (manual) material and in the sense of the multiple functions that non-manual signals fulfill. Non-manual features also resemble intonation in often taking on paralinguistic roles.

Facial expressions in particular, but also head and upper body movements, also figure prominently in nonverbal communication among hearing people using spoken languages. Facial expressions revealing emotional states have been studied in great detail from a psychological point of view, and to a great extent they have universal forms among all human cultures (Ekman, 1982). Although such expressions can also be found universally in communication between Deaf people, non-manual expressions also have a range of more narrow linguistic functions in sign languages. Not only is the functioning limited to expressing particular linguistic features but also the form is very specific, typically consisting of a narrow subset of the facial musculature (e.g., affecting only the eyebrows or cheeks). Emotional facial expressions, in contrast, are typically marked by the involvement of larger facial areas. Baker-Shenk (1983) was one of the few authors to systematically investigate this distinction, and she found a difference in timing as well: in her data set, grammatical facial expressions showed clear and rapid onsets and offsets, whereas emotional facial expressions were characterized by a more gradual and more variable pattern over time.

It is a commonly accepted intuition that linguistic non-manual signals have grammaticalized from emotional facial expressions, but few studies have explicitly addressed this hypothesis. Similarly, little is known about how linguistic and emotional facial expressions can occur simultaneously in sign language utterances.

A broad distinction in linguistic facial markers can be made between the lower and upper half of the face. Actions of the mouth, jaw, cheeks, and nose are typically specified in the lexicon, whereas actions of the eyebrows and eyelids as well as eye gaze typically have a function at a syntactic or discourse level.

Phonological and Lexical Roles

The phonological shape of a free morpheme in sign languages is typically composed of aspects characterizing the hands (*see* **Sign Language: Phonology**). In some signs, however, there is also a phonological role for non-manual aspects, in the sense that they are obligatory formal features that do not carry meaning themselves. **Figure 1** illustrates this for the sign TRY-OUT in NGT (Nederlandse Gebarentaal, Sign Language of the Netherlands; Ethnologue name, Dutch Sign Language). The round cheek that is contacted by the index finger contrasts this sign with the sign DAYS, which has a flat cheek.

Forward and backward leans of the head and/or body have also been found to serve a phonological

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It is a commonly accepted intuition that linguistic non-manual signals have grammaticalized from emotional facial expressions, but few studies have explicitly addressed this hypothesis. Similarly, little is known about how linguistic and emotional facial expressions can occur simultaneously in sign language utterances.

A broad distinction in linguistic facial markers can be made between the lower and upper half of the face. Actions of the mouth, jaw, cheeks, and nose are typically specified in the lexicon, whereas actions of the eyebrows and eyelids as well as eye gaze typically have a function at a syntactic or discourse level.

Phonological and Lexical Roles

The phonological shape of a free morpheme in sign languages is typically composed of aspects characterizing the hands (*see* **Sign Language: Phonology**). In some signs, however, there is also a phonological role for non-manual aspects, in the sense that they are obligatory formal features that do not carry meaning themselves. Figure 1 illustrates this for the sign TRY-OUT in NGT (Nederlandse Gebarentaal, Sign Language of the Netherlands; Ethnologue name, Dutch Sign Language). The round cheek that is contacted by the index finger contrasts this sign with the sign DAYS, which has a flat cheek.

Forward and backward leans of the head and/or body have also been found to serve a phonological

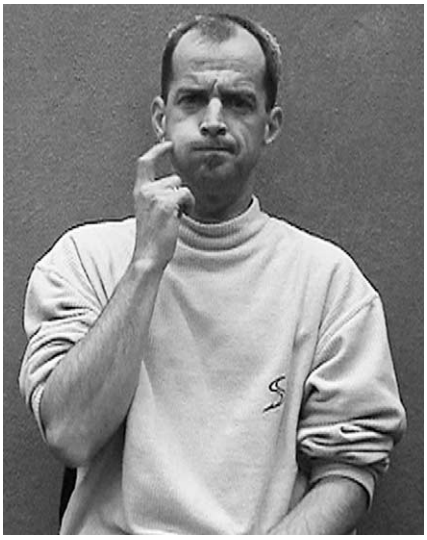

Figure 1 Obligatory non-manual component in the NGT sign TRY-OUT: cheek blown on one side.

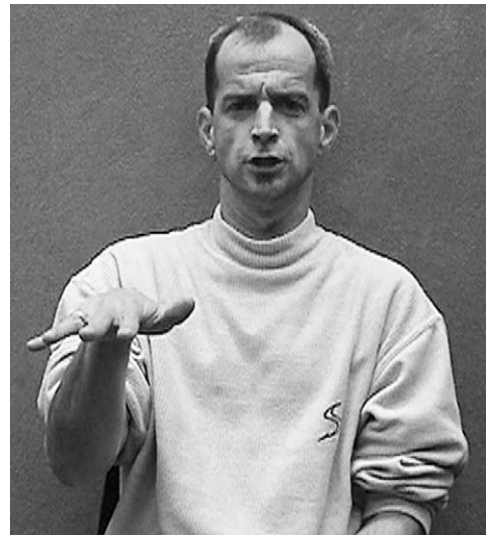

Figure 2 Mouth gesture in the NGT sign TO-BE-PRESENT.

role in American Sign Language (ASL) (Wilbur and Patschke, 1998).

The most common non-manual articulator in lexical items is the mouth. One finds both articulations that are borrowed from, or can be traced back to, spoken words (termed 'mouthings' or 'spoken components') and forms that have no apparent relation to the surrounding spoken language (termed 'mouth gestures' or 'oral components'). Examples are presented in Figures 2 and 3. In the NGT sign BE-PRESENT (Figure 2), the rounded and pursed lips, typically accompanied by egressive airstream and resembling IPA [ʃ], bear no relationship to any Dutch word that is semantically close. (The Dutch gloss is 'aanwezig,' IPA (a:nwe:zəχ).) In contrast, the sign TREE (Figure 3) is in most realizations accompanied by the silent articulation of the Dutch word [bo:m] 'tree.'

There are signs that differ only in the form of their mouthing. For example, the NGT minimal pair BROTHER and SISTER is only differentiated by the (silent) articulation of the Dutch words 'broer' versus 'zus' (Schermer, 1990).

There has been a vivid debate in the literature on the status of mouth actions that are derived from spoken words. Because sign languages are always surrounded by spoken languages, and since many Deaf sign language users are also competent in a spoken language to a certain degree, some researchers argue that mouthings are an instance of code mixing rather than parts of the sign language lexicon itself. It does appear that, at least in some Deaf cultures, mouthings are used in any sign language interaction, irrespective of the context (e.g., the presence versus the absence of hearing people) or the embedding of the signer in the Deaf community (Ebbinghaus and Heßmann, 2001). Mouthings do not figure equally prominently in all sign languages: Western European sign languages seem to show a larger frequency of mouthings both in the lexicon and in actual discourse than ASL or Adamrobe Sign Language (a village-based sign language in Ghana).

In addition to this phonological role for actions of the face in signs that also have a manual component, there are free morphemes that consist only of a non-manual specification. These typically function as adverbs that are realized simultaneously with action verbs produced on the hands. In NGT, for example, the form 'pursed lips' functions as an adverb with the meaning 'in a relaxed manner'; blown cheeks and squinted eyes function as an adverb with the meaning 'with difficulty.'

Syntactic and Discourse Roles

The role of non-manual expressions in marking various sentence types, for example, distinguishing statements from questions, has been clear since the studies of ASL in the 1970s. These markings typically concern features of the eyebrows and head. An example from NGT is given here. The syntactic category 'yes–no question' is marked in this language by a slight forward tilt of the head and raising of the eyebrows during the whole sentence; only this non-manual form distinguishes the corresponding statement from the question.

y/n
TIRED INDEX-2
'Are you tired?'
TIRED INDEX-2
'You are tired.'

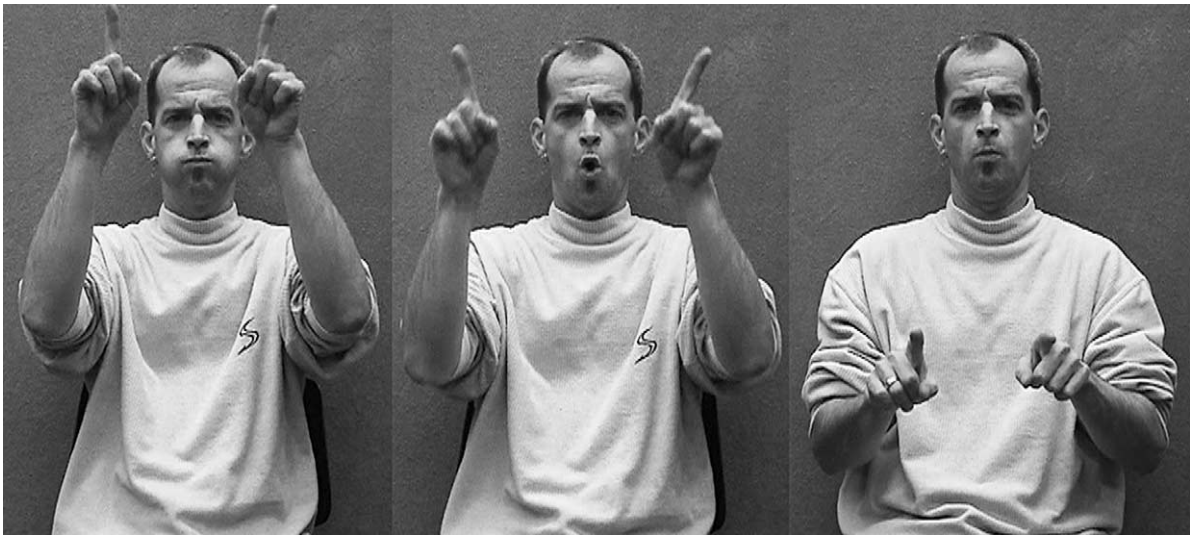

Figure 3 Initial, medial, and final stage of the NGT sign TREE, showing the articulation of the Dutch word [bo:m] 'tree.'

It is this use of non-manual features that gives rise to the comparison with prosody in spoken languages: Question intonation in languages such as English and Dutch also consists of a pattern (of pitch movement) that is 'overlaid' on the lexical and grammatical content of the sentence. Sentence types that are marked by non-manual features in sign languages studied to date include yes–no questions, wh-questions, negations and affirmations, topic–comment structures, and conditionals. One of the ongoing theoretical debates in the literature centers around the source of non-manual markers such as head shakes in negative constructions: are they directly generated by the syntactic structure, or are they prosodic features that are the indirect result of certain semantic–syntactic features? If the latter would be the case, one predicts that the alignment of the non-manual feature in time coincides with a prosodic domain, which may not always be isomorphic to the relevant syntactic domain that is the source of the feature. Another open question concerns the grammatical specificity of markers such as those used in questions: Are they perhaps pragmatic markers with a more general function in the interaction, rather than being specified syntactically?

From one of the first larger typological studies on sign languages, it clearly appears that sign languages do not uniformly recruit non-manual mechanisms for the same semantic or syntactic structures in the same way. Zeshan (2004) showed that interrogative constructions in sign languages in different areas of the world feature different combinations of manual and non-manual markers. Non-manual features were found to universally accompany yes–no questions but are not used to the same extent in wh-questions across languages.

The direction of eye gaze has been claimed to play a role in expressing syntactic agreement in ASL (Bahan, 1996). In BSL, eye gaze is used at different levels of the grammar, including phonology (lexical distinctions) and regulating the interaction between signer and addressee (Sutton-Spence and Woll, 1999). In NGT, eye contact with the interlocutor occurs consistently on focused constituents.

For ASL, Wilbur and Patschke (1998) argued that forward and backward leans of the body (and/or head) function as a marker of contrasting categories. This feature is found in the lexicon, distinguishing a sign such as ONLY (backward lean) from ALSO (forward lean). At a syntactic–pragmatic level, backward leans may signal restrictive focus marking, whereas forward leans can be associated with expanding focus. Thus, the use of leans also extends to pragmatics and discourse and is not confined to realizing syntactic distinctions.

Eye blinks of different duration are hypothesized to be correlated to linguistic structure in some way. Rapid periodic eye blinks may have a boundary marking function, typically occurring between rather than within sentences. On the other hand, longer ('voluntary') eye blinks may have a semantic impact in sign languages such as ASL, expressing emphasis, for example.

A large set of non-manual features is related to 'role-taking' in sign languages, marking direct speech.

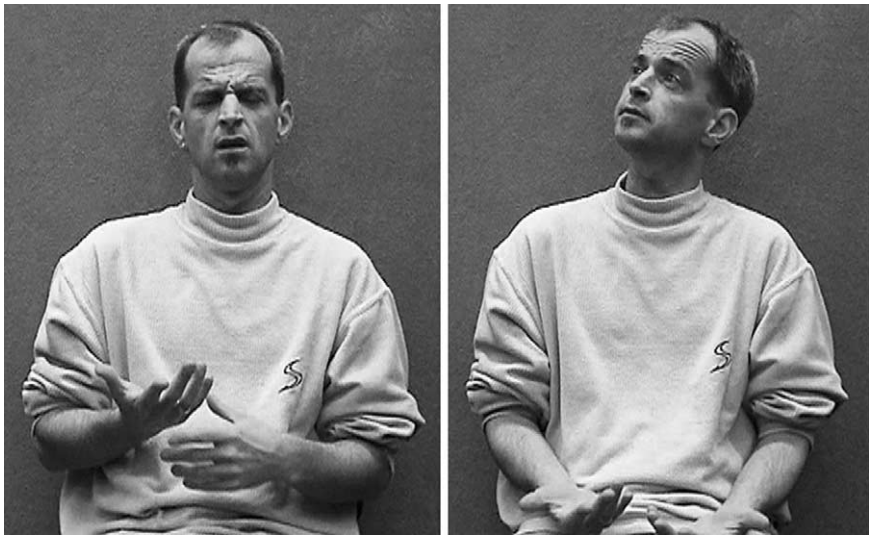

Figure 4 Sentence translation: ''My brother came up to me, and said, 'what are you doing?!' I replied, 'I'm just working.' He said, 'well hurry up!' I said 'OK,' and continued my work.'' (Left) Taking the role of the brother, who is conceptualized as standing to the right of the signer (who is conceptualized as being seated). (Right) Taking the role of the signer, who is seated.

After establishing the location of a referent in signing space, eye gaze, head movement, and body movement can all be used to take on the role of one of the referents while signing a sentence. In many cases, the different non-manual features are used in tandem. Interestingly, the role of a referent can also be indicated by mimicking physical or emotional properties of the referent, such as a bent-forward position in which he or she is seated or an angry facial expression. Liddell (2003) discussed these combinations of linguistic and seemingly extralinguistic (or 'gestural') expressions in more general terms. An example is presented in Figure 4.

In NGT, the role of a referent is typically indicated by turning the head left or right, and this can be accompanied by reinforcing motion of the upper body. However, depending on the context, it is also possible to use upward and downward rotation of the head. This occurs in distinguishing parents (relatively tall) from children (relatively low), but it can also be used for people of identical height who happen to be located at different heights in a specific context that the signer reports about – for example, one person seated and the other standing (as in the example in Figure 4). In addition, this height difference is used metaphorically in some sign languages, distinguishing people with low and high status, and it can be marked by other non-manual features such as the gaze direction.

As in spoken language interaction, non-manual cues are also involved in providing feedback from the addressee to the signer and in regulating the interaction between the participants in a conversation.

Methodological Note

There are few, if any, quantitative studies of non-manual aspects of sign languages using data from measurements. Studies have typically relied on transcription of categories that were considered to be functionally relevant. Most researchers have composed their own transcription system, and there has not been any standardization to speak of. One of the few well-documented linguistic transcription systems is the Edinburgh Non-manual Coding System (ENCS; Colville *et al.*, 1984). The Facial Action Coding System (FACS; Ekman *et al.*, 2002) has also been used. FACS is a narrow phonetic transcription system for facial expressions developed for psychological research on the expression of emotion in the face. This system is very time-intensive to learn and use, and it has primarily been used in some early studies of ASL (Baker-Shenk, 1983).

See also: Body Language; Intonation; Nonverbal Communication; Sign Language: Discourse and Pragmatics; Sign Language: Overview; Sign Language: Phonology; Sign Language: Syntax.

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Nonmonotonic Inference

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In most logical systems, inferences cannot be invalidated simply by the addition of new premises. If an inference can be drawn from a set of premises *S*, then it can also be drawn from any larger set incorporating *S*. The truth of the original premises guarantees the truth of the inferred conclusion, and the addition of extra premises cannot undermine it. This property is known as *monotonicity*. (The term is a mathematical one; a monotonic sequence is one whose terms increase but never decrease, or vice versa.) *Nonmonotonic* inference lacks this property. The conclusions drawn are provisional, and new information may lead to the withdrawal of a previous conclusion, even though none of the original premises is retracted.

Much of our everyday reasoning is nonmonotonic. We frequently jump to conclusions on the basis of partial information, relying on rough generalizations – that people usually mean what they say, that

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Much of our everyday reasoning is nonmonotonic. We frequently jump to conclusions on the basis of partial information, relying on rough generalizations – that people usually mean what they say, that

machines usually work as they are designed to, that objects usually stay where they are put, and so on. We treat these conclusions as provisional, however, and are prepared to retract them if we learn that the cases we are dealing with are atypical. To take an example that is ubiquitous in the literature, if we know that Tweety is a bird, then we may infer that Tweety flies, since we know that birds typically fly, but we shall withdraw this conclusion if we learn that Tweety is an atypical bird – a penguin, say.

An important feature of inferences like this is that they are sensitive to the absence of information as well as to its presence. Because we lack information that Tweety is atypical, we assume that he is not and proceed on that basis. (That, of course, is why the acquisition of new information can undermine the inference.) In standard logics, by contrast, inference is sensitive only to information that is explicitly represented, and we would need to add the premise that Tweety is not atypical in order to reach the conclusion that he flies. This feature of nonmonotonic inference makes it highly useful. We do not have the time or mental capacity to collect, evaluate, and process all the potentially relevant information before deciding what to do or think. (Think of everything we would need to know in order to be sure that Tweety is not atypical – that he is not a penguin, not an ostrich, not a hatchling, not injured, not tethered to the ground, and so on.)

Because of its central role in commonsense reasoning, nonmonotonic inference has attracted much interest from researchers in artificial intelligence – in particular from those seeking to model human intelligence in computational terms. The challenge has been to *formalize* nonmonotonic inference – to describe it in terms of a precisely defined logical system that could then be used to develop computer programs that replicate everyday reasoning.

Nonmonotonic logic also has applications to more specific problems in artificial intelligence, among them the so-called *frame problem* (McCarthy and Hayes, 1969; *see also* **Frame Problem**). In order to plan how to reach its goals, an artificial agent will need to know what will and what will not change as a result of each action it might perform. But the things that will *not* change as a result of an action will be very numerous, and it would be impracticable to list them all in the system's database. A more efficient solution would be for the system to reason nonmonotonically, using the rule of thumb that actions leave the world unchanged except in those respects in which they are known to alter it. Another application is in the area of database theory. Here it is often convenient to operate with the tacit assumption that a database contains all the relevant information and to treat as false any proposition that cannot be proved from it. This is known as the *closed world assumption* (Reiter, 1978). Again, this involves a nonmonotonic inference relation, since the addition of new data may permit the derivation of a proposition that was previously underivable and had thus been classified as false. Further areas of application include reasoning about natural kinds, diagnostic reasoning, and natural language processing (Reiter, 1987; McCarthy, 1986).

Work on formalizing nonmonotonic inference has progressed rapidly since its beginnings in the 1970s, and there is now a large body of mature work in the area, much of it highly technical in character. (For a collection of seminal papers, see Ginsberg, 1987; for surveys of the field, see Brewka *et al.*, 1997, and the articles in Gabbay *et al.*, 1994. Antoniou, 1997, offers a relatively accessible introduction to the area.)

One of the most important nonmonotonic formalisms is *default logic*, developed by Raymond Reiter (1980). This involves supplementing first-order logic with new rules of inference called *default rules*, which have the form in (1).

(1) $\dfrac{p : q}{r}$

P is known as the *prerequisite*, q as the *justification*, and r as the *consequent*. Such rules are to be read, 'If p, and if it is consistent with the rest of what is known to assume that q, then conclude that r.' In simpler cases ('normal defaults'), q and r are the same, so the rule says that given the prerequisite, the consequent can be inferred, provided it is consistent with the rest of one's data. Thus the rule that birds typically fly would be represented as (2).

(2) $\dfrac{Bird(x) : Flies(x)}{Flies(x)}$

This says that if x is a bird and the claim that x flies is consistent with what we know, then we can infer that x flies. Given that all we know about Tweety is that he is a bird, we can therefore infer that he flies. The inference is nonmonotonic, since if we subsequently acquire information that is inconsistent with the claim that Tweety flies, then the rule will cease to apply to him.

The application of default rules is tricky, since it is necessary to check their justifications for consistency not only with one's initial data but also with the consequents of any other default rules that may be applied. The application of one rule may thus block that of another. To solve this problem, Reiter introduced the notion of an *extension* for a *default theory*. A default theory consists of a set of premises W and a set of default rules D. An extension for a default

theory is a set of sentences E that can be derived from W by applying as many of the rules in D as possible (together with the rules of deductive inference) without generating inconsistency. An extension of a default theory can be thought of as a reasonable development of it.

Another approach, one closely related to default logic, is *autoepistemic logic* (Moore, 1985). This turns on the idea that we can infer things about the world from our introspective knowledge of our own minds (hence the term 'autoepistemic'). From the fact that I do not believe that I owe you a million pounds, I can infer that I do not owe you a million pounds, since I would surely know if I did. Building on this idea, autoepistemic logic represents rules of thumb as implications of claims about one's own ignorance. For example, the rule that birds typically fly can be represented as the conditional claim that if something is a bird and one does not believe that it *cannot* fly, then it does fly. Given introspective abilities, one can use this claim to draw the defeasible conclusion that Tweety flies, based on one's ignorance of reasons to think he cannot. This approach can be formalized by using the apparatus of modal logic, with the modal operator L interpreted as 'It is believed that.'

A third approach is *circumscription* (McCarthy, 1980, 1986; see also Lifschitz, 1994). This involves formulating rules of thumb with abnormality predicates and then restricting the extension of these predicates – *circumscribing* them – so that they apply to only those things to which they must apply, given the information currently available. Take the Tweety case again. We render the rule of thumb that birds typically fly as the conditional in (3), where 'Abnormal' signifies abnormality with respect to flying ability.

(3) $\forall x(Bird(x) \,\&\, \neg Abnormal(x) \rightarrow Flies(x))$.

This does not, of course, allow us to infer that Tweety flies, since we do not know that he is not abnormal with respect to flying ability. But if we add axioms that circumscribe the abnormality predicate so that it applies to only those things that are currently known to be abnormal in this way, then the inference can be drawn. This inference is nonmonotonic, since if we were to add the premise that Tweety *is* abnormal with respect to flying ability, then the extension of the circumscribed predicate would expand to include Tweety, and the inference would no longer go through. Unlike the other strategies mentioned, circumscription can be formulated by using only the resources of first-order predicate calculus, though its full development requires the use of second-order logic, allowing quantification over predicates.

Each of these approaches has its own strengths and weaknesses, but there are some general issues that affect them all. One problem is that all of them allow for the derivation of multiple incompatible sets of conclusions from the same premises. In default logic, for example, a theory may have different extensions depending on the order in which the rules are applied. The standard example is the theory that consists of the premises *Nixon is a Quaker* and *Nixon is a Republican*, together with the default rules *Quakers are typically pacifists* and *Republicans are typically not pacifists*. Each of these rules blocks the application of the other, since the consequent of one is incompatible with the justification of the other. The theory thus has two incompatible extensions – one in which the first rule is applied and containing the conclusion that Nixon is a pacifist, the other in which the second rule is applied and containing the conclusion that Nixon is not a pacifist. Similar results occur with the other approaches mentioned.

The existence of multiple extensions is not in itself a weakness – indeed, it can be seen as a strength. We might regard each extension as a reasonable extrapolation from the premises and simply plump for one of them. (This is known as the *credulous* strategy. The alternative *skeptical* strategy is to endorse only those claims that appear in every extension.) In some cases, however – particularly in reasoning involving time and causality – a plausible theory generates an unacceptable extension. Much work has been devoted to this problem – one strategy being to set priorities among default rules, which determine the order in which they are applied and so restrict the conclusions that can be drawn. (A much-discussed case is the *Yale shooting problem*, introduced in Hanks and McDermott, 1987, where the rule of thumb that living things typically stay alive generates an unexpected conclusion in reasoning about the effects of using a firearm. For a description of the scenario, *see* **Frame Problem**, and for discussion, see Shanahan, 1997.)

A second problem concerns implementation. The goal of much work in this area is to build artificial nonmonotonic reasoning systems, but the formal approaches that have been devised are not easy to implement. Default logic, for example, requires checking sets of sentences for consistency, and there is no general procedure for computing such checks. Restricted applications have been devised, however, and aspects of nonmonotonic reasoning have been effectively implemented by using the techniques of *logic programming* (programming in languages based on formal logic).

A third issue concerns the piecemeal character of much work in this area. Theories have been developed

and elaborated in response to particular problem cases and with relatively little attention to the features of the inference relations they generate. Recent work has begun to address this issue and to identify properties that are desirable in any nonmonotonic inference relation (see, for example, Makinson, 1994). One of these is that adding a conclusion back into the premise set should not undermine any other conclusions – a property known as *cautious monotonicity*.

Finally, a word about probabilistic logics. Most nonmonotonic formalisms embody a *qualitative* approach: premises and conclusions are treated as either true or false, as in deductive logic. But probabilistic logics, in which propositions are assigned continuous probability values, can also be used to model certain types of nonmonotonic inference. In probabilistic reasoning, it is common to treat a conclusion as warranted if its probability, given the premises, exceeds a certain threshold. This inference relation is nonmonotonic, since the addition of new premises may lead to a readjustment of one's probability assignments, with the result that a conclusion that previously passed the threshold now falls short of it. However, although probabilistic logics are well suited for modeling reasoning under uncertainty (see Shafer and Pearl, 1990), it is unlikely that they can do all the work required of a theory of nonmonotonic inference (McCarthy, 1986).

See also: Conditionals; Frame Problem; Inference: Abduction, Induction, Deduction; Logic and Language: Philosophical Aspects; Logical Consequence; Monotonicity and Generalized Quantifiers.

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Nonmorphological Word Formation

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Introduction

With the exception of those terms created by word manufacture, the items described here result from applying reduction mechanisms; however, what is shortened is not actually a morph, a lexeme, or a base but rather a word-form, that is, the phonological or orthographic shape adopted by a word whenever it occurs. Orthoepic, phonotactic, or purely orthographic constraints, which are to a great extent unsystematic and language-specific, play an important role in the creation of these items; that explains why they are often regarded as marginal or unpredictable and also why the attempts at describing and categorizing them usually end up in vague overlapping definitions, complex taxonomies, or chaotic lists of irregularities.

On the whole, clippings, initialisms, and abbreviations are the result of shortening phonological and/or

and elaborated in response to particular problem cases and with relatively little attention to the features of the inference relations they generate. Recent work has begun to address this issue and to identify properties that are desirable in any nonmonotonic inference relation (see, for example, Makinson, 1994). One of these is that adding a conclusion back into the premise set should not undermine any other conclusions – a property known as *cautious monotonicity*.

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On the whole, clippings, initialisms, and abbreviations are the result of shortening phonological and/or

orthographic words in different degrees with respect to length and complexity. Clippings (e.g., *lab* for *laboratory*) are medium-size (i.e., usually syllable-based) shortenings initially involving the phonological shape of a word, which then develops a graphic version with occasional spelling adjustments. Initialisms (e.g., *laser, BBC*) are the result of maximal reduction plus minimal fusion (i.e., the simple concatenation of constituents). They are originally graphic, but develop a phonic version. Last, abbreviations are exclusively graphic shortenings, thus having no place in morphological description. Nevertheless, their categorization as a homogeneous group is difficult because some may evolve to clippings (e.g., *Inc*: for *Incorporated*) or to initialisms (e.g., *F.O.B./f.o.b.* for *free on board*), or stay in between as fluctuating hybrids. In the same way, a discrete treatment of complex (both graphic and phonic) shortenings is prevented by the existence of an increasing number of cases of difficult ascription that approach the periphery of typical blends (the product of medium to minimal reduction and maximal fusion, such as *motel*), for instance, English *Satcoma* (for *Satellite Communications Agency*) and Russian *SMERSH/Smersh* (for *Smert Shpionam* 'death to spies', a section of the KGB).

Shortening

Splinter-Based Shortenings: Clippings (*lab*, *phone*)

In the present case, the term splinter refers to those graphic and phonemic sequences that are neither morphs (e.g., *-ness*) nor combining forms (e.g., *electro-*), and whose length generally allows their identification as belonging to a previous word. Consequently, splinters tend to be syllables or units larger than syllables in their sources, such as *Digi-* and *-alt* in *Digiralt* (from *digital radar altimeter*), although that is not always the case; note, for instance *smo-* and *-og* in *smog* (from *smoke* and *fog*).

Clipping is the process by which a word-form of usually three or more syllables is shortened without a change in meaning or function. Clipped forms often convey informal or affectionate connotations; sometimes, however, widespread use can cause them to replace their sources and therefore lose their informal quality, as in English *pram* (from *perambulator*) and French *vélo* (from *vélocipède*) 'bike'. Familiarity and affection are particularly displayed in reduced forms of proper names, such as Spanish *Lupe* (*Guadalupe*), German *Uli* (*Ulrich*), and English *Rick* or *Ricky* (*Richard*).

On the whole, and as Kreidler (1979: 29) points out, this device is basically characterized by unpredictability, particularly as regards "the precise shape of the shortening" and "where the cut will be made." The process often ignores morphemic boundaries, as in English *(heli)copter*, French *ordi(nateur)* 'computer,' or German *Abo(nnement)* 'subscription.' General trends can, however, be inferred from the analysis of existing items; Spanish, for example, exhibits a clear tendency toward syllable-based, vowel-ended clipping. Accordingly, prototypical clippings are partial shortenings of simple word-forms, their lexical categories being usually nouns or adjectives. The most typical clippings have one or two syllables left and only one stress. Because their sources are often tri- or polysyllabic, their degree of shortening can be described as typically medium. The process may affect either the final part of the source (i.e., 'hind' clipping), as in Polish *pozdr(owienia)* 'greetings' and Japanese *anbiri (baburu)* (the borrowing of English *unbelievable*), or the beginning of the source (i.e., 'fore' clipping), as in Spanish *(violon)chelo* 'violincello', with plural morphs being retained if present in the sources, as in English *spec(tacle)s*. Minor spelling adjustments do not affect the centrality of the items, for example, English *mike* (from *microphone*) or French *sensass* (from *sensationnel* 'fantastic'). These adjustments may include the replacement of final vowel letters, as in Spanish *forasta* (from *forastero* 'foreigner'), French *apéro* (from *apératif* 'cocktail'), and English *ammo* (from *ammunition*), or the addition of hypocoristic suffixes *-y/-i/-ie*, as in English *comfy* (from *comfortable*) and German *Hausi* (from *Hausaufgabe* 'homework').

The shortening of both ends – for instance, English *(in)flu(enza)* or *(de)tec(tive)* – is far less frequent and therefore results in less typical items. Other instances of still central but not prototypical clippings as regards source unit and type of shortening are those having a source form other than one simple word-form, such as English *fed*(*eral government employee*) and *pub*(*lic house*), French *beauf* (from *beau-frère* 'brother-in-law') and *d'acc* (from *d'accord* 'OK'), and Spanish *porfa* (from *por favor* 'please'), and also midclippings, that is, items in which the shortening affects the middle of the source form, for instance, English *corti(co)s(ter)one* and *proc(ura)tor.*

In contrast with prototypical and central cases, peripheral clippings exhibit some outstanding irregularities as far as spelling, shortening, source form, and use. Some peripheral clippings are respelled items with extensive modifications, such as English *brolly* (from *umbrella*) and French *hosto* (from *hôpital* 'hospital'); there are also peripheral items in which the remaining part is a full word-form as in (*lysergic*) *acid* (*diethylamide*)or *soap*(*opera*); in other cases, peripherality arises from contextual or semantic restrictions: for example, English *optical* is shortened only in *op art*, and French *politiques* is shortened only in *les*

sciences po 'political science'; similarly, *examination* becomes *exam* only with an academic meaning.

Finally, it would be possible to classify as quite marginal clippings some items mainly used orally and only in certain contexts; actually, they are instances of three types of phonetic elision sometimes called aphaeresis (phonetic fore clipping), syncope (phonetic midclipping), and apocope (phonetic hind clipping), for example '*fraid* (from *afraid*), '*deed* (from *indeed*), and *o'er* (from *over*). In writing, these truncations are usually marked by means of apostrophes.

Letter-Based Shortenings (Initialisms): Alphabetisms (*NBC*) and Acronyms (*laser*)

The superordinate term initialism is intended to refer to both the method of formation and the graphic origin of these items: An initialism is, therefore, the result of selecting the initial letter, or occasionally the first two letters, of the orthographic words in a phrase and combining them to form a new sequence. Free forms with no lexical meaning, such as prepositions and conjunctions, are usually excluded. The new item can be pronounced as a word (prototypical acronyms), as in Italian *Fiat/FIAT* (from *Fabbrica Italiana Automobili Torino* 'Italian Motorworks in Turin'); as a series of letter names (prototypical alphabetisms), as in Tagalog *MGB* (from *Magadang Gabi Bayan* 'Good Evening People', a TV show); in both ways, as in English *VAT/Vat* (from *Value Added Tax*); as some combination of the two, as in Spanish *PSOE* (from *Partido Socialista Obrero Español*, a political party), pronounced /pe'soe/ or /'soe/, and English *VJ/VeeJay* (from: *Video-Jockey*); or even display idiosyncratic pronunciations, as in English *SWF* (from *Shockwave Flash File*), read [swɪf]. The choice of letters and pronunciation is due to a variety of factors, such as the number and location of vowel letters in the item, the phonotactics of the language, the need to obtain (or avoid) an already existing phonic and/or graphic word-form, stylistic conditions, and the speaker's familiarity with the form and the expanded expression it replaces. An increasingly popular pattern for the creation of acronyms consists in building the expanded expression around the constituent letters of a word previously selected, as in *ASH* (for *Action on Smoking and Health*).

The lexicalization of initialisms consists of a combination of parallel processes: in pronunciation, a development from expanded to letter-by-letter and finally orthoepic reading; graphically, a change from capitals (with or without periods) to small letters; morphologically, the acceptance of inflectional and derivational morphemes; and semantically, the replacement of the original expanded expression (which is the only associated meaning those forms initially have) with semantic features that have arisen from their use as common nouns.

In contrast with the regular behavior of alphabetisms, the orthoepic requirements of acronyms allow some freedom in the selection of initials, thus adding to the complexity of the category. Less central acronyms result from recurrent irregularities in the selection of constituents, for example, *DISPLAY* (from *Digital Service Planning Analysis*). As regards peripheral acronyms, the most interesting deviations include constituents with medium, minimum, or even no shortening. The dividing line between acronyms and blends tends to blur when splinters are selected as constituents, either alone or in combination with one or more letters that are not necessarily initials. Consider the examples in Table 1.

Similarly, central but not prototypical alphabetisms comprise items displaying irregularities in the choice of initials, forms whose source is a word instead of a phrase, for example, *ECG* (from *electrocardiogram*), or items with a written alternative in lowercase, such as *CIF/c.i.f.* (from *cost, insurance, and freight*). Peripheral alphabetisms include extraneous or uncommon constituents such as numbers, symbols, full word-forms, or letters indicating series, phases, or types, as in *US of A* (from *United States of America*) and *UVA* (from *ultraviolet A*). They may also lack a source form, for example, *KLF* or *LFO* (both names of pop music groups).

Initialization is also present in letter compounds, that is, combinations of one initial (or, at most, two)

Table 1 Acronyms or blends?

Example	*Language*	*Full phrase*	*Meaning*
Gulag	Russian	Glavnoye Upralevniye Lagerei	'Soviet prison and labor camp system'
Ma'âlî	Arabic	Mu'jam al-'Arabiyya l-'âlî	'Electronic Arabic Dictionary'
Ekubang	Indonesian	Ekonomi, Keuangan dan Pembangunan	'Economics, Finance and Development'
AFNOR	French	Association Française de Normalisation	'French Standards Organisation'
COPCON	Portuguese	Comando de Operaçoes do Continente	'Continental Operations Command'
SAPHYDATA	English	Systems for Acquisition, Transmission and Processing of Hydrological Data	

and one full form, such as English *e(lectronic)-mail*, Spanish *bomba H* 'H(ydrogen) bomb', and German *SB-Tankstelle:* 'self-service gas station' (*SB* from *Selbstbedienung* 'self-service'). Although the initial often replaces a word-form, it may also be iconic (as in *T-shirt*) or simply reduplicate the first letter of the following word-form (*H-hour*).

The Bridge toward Neighboring Categories

The Periphery of Blends and Compounds: Clipped Compounds (*Op-Ed* from *opposite-editorial* page) Because blends are obtained by joining two or more word-forms through simple concatenation or overlap and then shortening at least one of them, clipped compounds can be regarded as a peripheral type of blends composed of initial splinters joined with a low degree of phonic integration, that is, with simple concatenation, as in English *fro-yo* (from *frozen yogurt*). Syllable-based clipped compounds are the closest equivalent to native initialisms in languages traditionally classified as analytic or isolating, such as Chinese, Korean, and Indonesian, for example, Chinese *Beijing da xue* 'North-capital big school' (that is, Peking University) becomes *Beida* 'North-big' and Indonesian *tahanan politik* 'political prisoner' is shortened to *tapol*. Compound loanwords are also usually reduced in this way in Japanese, thus *hangaa-sutoraiku* (the borrowing of English *hunger strike*) becomes *han-suto*.

The Periphery of Abbreviations: Unexpanded Items Items lying between abbreviations and clippings fall into several types, although they could all be described as unexpanded abbreviations. The most important group comprises a set of hybrids with two possible readings, expanded like abbreviations and unexpanded like clippings, the latter reading having informal connotations, for example, English, *Co* (from *Company*). In the same way as proper abbreviations, these items may exhibit alternative spellings with periods.

As regards the borderline between alphabetisms and abbreviations, the speaker's habits, background knowledge, and style (*see* **Style and Style Shifting**) play an important role in the choice of unexpanded or expanded readings. Three basic types of fluctuating forms can be distinguished: items in capitals with two possible readings (expanded and unexpanded), as in *LA*(*Los Angeles*); items in lowercase with two readings, as in *cps* (*cycles per second*); and items with two spellings and two readings, as in *ETD/e.t.d.* (*estimated time of departure*).

Word Manufacture

In comparison with the number of words created from already-existing bases or word-forms, the number of items resulting from word manufacture is quite limited. There are basically two types to be distinguished: motivated and *ex nihilo*. In the former, the creation of the new word seems to follow some discernible logic, for example, because the item has been formally or semantically inspired by an already-existing word (compare Tolkien's *hobbit* and *rabbit*). However, the purest cases of non-morphological word formation result from creating a new item with no morphological, phonological, or orthographic motivation, that is, *ex nihilo*. Most of these items are either commercial, for example, *Kodak,* or literary, for instance, *grok* 'to communicate sympathetically' (invented by Robert Heinlein in his novel *Stranger in a Strange Land,* 1961) and *quark* (first used in James Joyce's *Finnegan's Wake,* 1939); see Bauer (1983). Further examples of this type of word manufacture are *googol* (a word coined by the nephew of the American mathematician Edward Kasner, who used it to refer to the numeral 1 followed by 100 zeros), *Krámpack* (a Spanish movie title intended to mean 'mutual masturbation'), and *Bersuit* (the name of a rock band).

See also: Blend; Compound; Morpheme; Splinters; Style and Style Shifting.

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Nonnative Speaker Teachers

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Introduction

Although the statistics on the number of English users in the world vary widely depending on which scholars are reporting in the field, Strevens (1992) maintains that more than one and a half billion people use English around the world as a first, second, or foreign language. One fourth of the total users are native speakers, whereas the remaining majority use English as a second or foreign language. Kachru (1989) conceptualizes three concentric circles according to the different roles that English plays in different countries: (1) the Inner Circle, where English is spoken as the first language in countries such as the United States, Australia, the United Kingdom, and Canada, (2) the Outer Circle, where English is used as a second language in a multilingual setting in countries such as the Philippines, India, and Singapore, and (3) the Expanding Circle, where English is studied as a foreign language such as in Japan, Korea, and China. In the Inner Circle, it is estimated that 320–380 million people use English as their first language, whereas 150–300 million people use it as their second language in the Outer Circle. In the Expanding circle, 100–1000 million people are estimated to use it as a foreign language. To summarize, Kachru (1996: 241) states that "there are now at least four non-native speakers of English for every native speaker". Similarly, Graddol (1999) projects that during the next 50 years the balance between native speakers and non-native speakers will shift critically with non-native speakers eventually overtaking native speakers.

Traditionally, English teachers in the Outer Circle and the Expanding Circle have been considered as non-native speakers of English or teachers who share the same cultural and linguistic backgrounds with their students. As the number of English users increases in these two circles, the education of non-native English speaking teachers (non-NESTs) becomes critical. Braine (1999) states that the place of native and non-native speakers in teaching English has always been an issue since English was taught internationally, however, interest in non-NESTs is a fairly recent phenomenon. Since his seminal book, *Non-native educators in English language teaching* was published in 1999, there has been tremendous interest in non-native speaker issues among researchers and practitioners in Teachers of English to Speakers of Other Language (TESOL). Although the issues related to non-NESTs have been studied widely, in this article three areas of research will be highlighted and discussed: (1) definitions of native and non-native speakers, (2) non-NESTs' perceptions of their status and roles, and (3) professional development of non-NESTs. Based on the discussion over these areas, recommendations for future research also will be made.

Definitions of Native and Non-native Speakers

Defining a native speaker and a non-native speaker has been a controversial issue in applied linguistics. Davies (1991) asserts that the definition of a native speaker tends to be circular in that the native speaker is defined as he or she who is perceived as NOT being a non-native speaker, whereas the non-native speaker is defined solely as being a non-native speaker. Some common characteristics associated with being a native speaker of a language, according to Rampton (1990: 97), include the following:

1. A particular language is inherited, either through genetic endowment or through birth into the social group stereotypically associated with it.
2. Inheriting a language means being able to speak it well.
3. People either are or are not native/mother-tongue speakers.
4. Being a native speaker involves the comprehensive grasp of a language.
5. Just as people are usually citizens of one country, people are native speakers of one mother tongue.

More recently, Davies devoted his entire book to demystify the construct of a native speaker both psycholinguistically and sociolinguistically. In his recent book, *The native speaker: myth and reality*, Davies provides six attributes of a native speaker (2003: 210–211):

1. Childhood acquisition: The native speaker acquires the L1 of which s/he is a native speaker in childhood.
2. Intuitions about idiolectal grammar (Grammar 1): The native speaker has intuitions (in terms of acceptability and productiveness) about his/her own language.
3. Intuitions about group language grammar (Grammar 2): The native speaker has intuitions about those features of which are distinct from his/her Grammar 1.

4. Discourse and pragmatic control. The native speaker has a unique capacity to produce fluent spontaneous discourse. . . . In both production and comprehension the native speaker exhibits a wide range of communicative competence.
5. Creative performance. The native speaker has a unique capacity to write creatively.
6. Interpreting and translating. The native speaker has a unique capacity to interpret and translate into the L1 of which s/he is a native speaker.

How does a L2 user compare with the native speaker in terms of these attributes? Can she/he become a native speaker of the target language? Using the same criteria, Davies asserts that all except the first criterion, 'childhood acquisition,' are contingent issues. In his own words, "The answer to the question of L2 learners evolving into native speakers of the target language must therefore be 'Yes': but the practice required, given the model of the children L1 acquirer who for five to six years spends much of his or her time learning language alone, is so great that it is not likely that many second-language learners become native speakers of their target language" (p. 212).

In his comparison of a native speaker and a non-native speaker, Medgyes (1992, 1994) considers the native and non-native categories as clearly impermeable. In other words, he maintains that a native speaker's linguistic competence constitutes an "advantage . . . so substantial that it cannot be outweighed by other factors prevalent in the learning situation, whether it be motivation, aptitude, perseverance, experience, education, or anything else" (1992: 342). The non-native speaker, by contrast, has to labor eternally under a "linguistic handicap" (1994: 103) while progressing along the interlanguage continuum. Medgyes sees native speakers as those who "have acquired English in comparison with nonnative speakers who are still acquiring" (p. 12). Even if they acquire "native-like" proficiency, non-native speakers still will be labeled as "pseudo-native speakers" (1994).

Cook (1999), by contrast, challenges the "comparative fallacy" (Bley-Vroman, 1983), in which a non-native speaker's performance is constantly compared with a native speaker's performance. He asserts that "the prominence of the native speaker has obscured the distinctive nature of the successful L2 user and created an unattainable goal for L2 learners (p. 185). In addition, Cook maintains that non-native speakers differ from native speakers in their knowledge of their L2s and L1s and in some of their cognitive processes; hence, we must stop imposing the native speaker norm on non-native speakers and treat them in their own right.

Similarly, Kachru and Nelson (1996) reject the notion of native and non-native dichotomy. They assert that the spread of English in its sociohistorical context has created different varieties of English, along with highly proficient speakers and professionals in English Language Teaching (ELT). To view them through the lens of the native versus non-native dichotomy is to accept "a linguistic caste system and maintain a monocultural and monolingual point of reference (p. 79).

Non-native English-Speaking Teachers' Perceptions of Their Status and Roles

Due to the growing awareness of the large number of non-native teachers working in the ELT field worldwide, researchers started to examine their perceived status and/or roles in relation to native English-speaking teachers (NESTs) (e.g., Medgyes, 1992; Samimy and Brutt-Griffler, 1999; Seidlhofer, 1999; Tang, 1997). Some scholars retain the difference in NESTs' and non-NESTs' professional expertise (Medgyes, 1992; Reves and Medgyes, 1994; Arva and Medgyes, 2000). This dichotomous position, however, has been questioned by other scholars due to the complexity involved in ELT professional expertise (e.g., Brutt-Griffler and Samimy, 1999; J. Liu, 1999).

In a series of studies, Medgyes and his colleagues examined non-NESTs' unique features as ELT professionals in comparison to native teachers. Medgyes (1992), for example, investigated non-NESTs' perceived difficulties in the use of English and differences in teaching behavior between the two groups of teachers. The findings, through questionnaires obtained from approximately 220 native and non-native teachers in 10 countries, showed that most teachers viewed their teaching approaches as different mainly due to discrepancies in their linguistic competence. However, Medgyes also points out that non-NESTs have equal opportunities of becoming as effective as NESTs because the former possesses teaching strengths derived from being successful English learners. These strengths are, for example, to "serve as imitable models," "teach learning strategies more effectively," "anticipate language difficulties," "provide learners with more information about the English language," "show more empathy to their students," and "share the learners' mother tongue" (pp. 346–347). For implications, therefore, Medgyes suggests that the different roles in teaching practices between NESTs and non-NESTs should be acknowledged. He also encourages collaborative teaching between the two types of teachers to balance their respective strengths and weaknesses.

In a similar vein, Reves and Medgyes (1994) examined the relationship among non-NESTs' English proficiency, their teaching behavior, and their self-image as English teachers. They delivered questionnaires to 216 ELT teachers in 10 countries, among which about 90 percent of the participants were non-native teachers. Based on their findings, Reves and Medgyes argue that the factors such as "non-NESTs' teaching qualifications," "the time non-NESTs spent in an English speaking country," and "the frequency of non-NESTs' contact with NESTs" would affect non-native teachers' self-images and their ways of teaching (p. 357). The authors, therefore, emphasize the importance of non-NESTs' "frequent exposure to an authentic native language environment and proficiency-oriented in-service training activities" to improve their self-image (p. 364).

Arva and Medgyes (2000) further expanded the previous research and compared actual teaching behavior of five NESTs and five non-NESTs in Hungarian secondary schools. Unlike the previous studies, the data were collected through interviews and classroom observations. The researchers found several differences between the two groups of teachers which included the following: (1) NESTs had superior English language competence; (2) non-NESTs were more confident about grammatical knowledge; (3) NESTs lacked the ability to speak the students' native language; (4) NESTs adopted more flexible teaching approaches; and (5) NESTs supplied more cultural information about English speaking countries. Arva and Medgyes argue that these differences in their teaching behavior can be attributed to the linguistic discrepancy between non-NESTs and NESTs. Furthermore, they also maintain the position that each group of teachers is likely to have appropriate roles to play in teaching English. That is, for example, NESTs teach conversation classes, whereas non-NESTs take care of other components such as grammar.

To summarize thus far, Medgyes and his colleagues draw a clear professional distinction between NESTs and non-NESTs in relation to the teachers' linguistic competence. However, some researchers view such distinction as simplistic. Samimy and Brutt-Griffler (1999), for example, explored the perceptions of non-native TESOL graduate students as ELT professionals in relation to native teachers. Seventeen international students who attended a graduate seminar at a university in North America participated in this case study. The findings obtained through multiple data methods (questionnaires, classroom discussion, in-depth interviews, and autobiographical accounts) suggest that the participants perceived themselves differently from native teachers in their English proficiency and in their teaching practices. However, they generally agreed that the question of "who is more successful [native or non-native speakers] depends on learner factors, teacher factors, and contextual factors" (p. 141). Moreover, some of the participants raised a question about the debate over the native versus non-native speaker dichotomy, and argued that major issues of EFL teachers involve the English education curriculum and professional development rather than the lack of native-like proficiency.

Similarly, Seidlhofer (1999) also expresses the danger of a simple transfer from "*competent speaker* to *competent teacher* based on linguistic grounds alone" and the needs to take "cultural, social and pedagogic appropriateness" into account (p. 237). She explains the "double" roles of non-NESTs in the Expanding Circle when they are required to negotiate among competing demands such as the global claims and local realities. Through a careful process of analyzing and mediating competing claims, she emphasizes that teachers can make local decisions for appropriate pedagogy in given contexts. She points out, therefore, that teachers as mediators need to be familiar with not only the target language but also local educational contexts, their students' requirements, and the current development in the research communities relevant to their professions.

J. Liu (1999) also examined non-NESTs' professional issues from the perspectives of seven TESOL professionals and the complexity involved in labeling native and non-native teachers. All participants in this case study were non-NESTs working at the university level in North America. The findings collected through individual interviews revealed that the distinction between the two types of teachers involves various factors such as "precedence in learning languages, competence in the learned language, cultural addition, social identity, and language environments" (p. 85). Moreover, the participants expressed concerns raised by the native versus non-native speaker dichotomy such as "the invisible power relations in the labels" (e.g. hiring process and teaching and learning in the language classroom) (p. 97). Based on the results, Liu argues against the rigid separation between native speakers and non-native speakers and suggests better understanding the complexity involved in the label.

Like Liu, several other researchers have also captured the power relations involved in the label in the Outer and Expanding Circles by investigating non-NESTs' professional identities with comparison to NESTs (e.g., Tang, 1997; Seidlhofer, 1999). Although in both Tang's and Seidlhofer's case studies, non-NESTs acknowledged their strengths as non-native

professionals such as their shared L1 with students and L2 learning experiences, they all clearly expressed their feelings of insecurity or inadequacy due to their perceived low proficiency of English. Both authors, therefore, point out that non-NESTs' self perception had a strong impact on shaping their identities as English teachers.

In summary, this section reviewed the literature examining non-NESTs' self-perceptions of their status and roles as compared to NESTs. The central question about the topic is whether non-NESTs or NESTs are better ELT professionals. Two positions seem prominent on the issue among the scholars. One of the groups of researchers maintains that the distinctive roles between native speakers and non-native speakers need to be acknowledged mainly due to their different language competence (Arva and Medgyes, 2000; Medgyes, 1992; Reves and Medgyes, 1994). The other group of researchers, on the other hand, denies such a sharp division based on linguistic competence because of the multidimensionality of ELT professionals that is shaped by sociocultural and linguistic contexts (Samimy and Brutt-Griffler, 1999) and the complexity that the labels have (J. Liu, 1999).

Few deny the critical role of English language proficiency that English teachers need to have and develop for their professions. In fact, as seen before, some studies examining non-NESTs' professional identities reveal their feelings of insecurity as ELT professionals because of their perceived lower English proficiency as compared to NESTs (Tang, 1997; Seidlhofer, 1999). However, given the various factors involved in ELT professionals, to judge teachers' expertise primarily by language competence as opposed to native speakers seems to be simplistic. In addition, such sharp distinction between the two types of teachers through language competence may demoralize both future and practicing non-NESTs. It also may obscure other similarly critical roles that they need to play as mediators in a given context. Therefore, to acknowledge the multidimensionality of teachers' professional expertise (linguistic, learner, teacher, and social and cultural factors) is critical for non-NESTs' professional success.

Professional Development of Non-native English-Speaking Teachers

English language teachers have experienced high professional demands because of the diverse needs of English learners accompanied by the impact of globalization. To meet these demands, a number of prospective and experienced non-NESTs around the world participate in second language (L2) teacher education programs. Given such circumstances, it is critical to understand non-NESTs' needs for their professional development, on the one hand, and how L2 teacher education programs must be transformed to meet their diverse expectations, on the other hand.

Non-native-Speaking Teachers' Professional Needs and Concerns

The issues of non-NESTs' professional development have gradually received attentions among scholars in the TESOL field. The literature on the topic has revealed their specific professional needs and challenges. Drawing on the various studies on the topic, Kamhi-Stein (2000), for example, describes the four areas which non-NESTs perceive as their needs and concerns in their professions (p. 10):

1. low confidence and self-perceived challenges to professional competence
2. self-perceived language needs
3. lack of voice and visibility in the TESOL profession
4. self-perceived prejudice based on ethnicity or non-native status.

Kamhi-Stein has noted that non-NESTs' perceived low confidence may have an impact on those who are, in particular, studying in English speaking contexts. Samimy and Brutt-Griffler's (1999) case study, for example, reports that, although non-native graduate students considered themselves as successful teachers in their home countries, many questioned their professional competence because of the cultural, educational, and linguistic unfamiliarity involved in the study in the United States. Regarding "self-perceived language needs," several researchers in the TESOL teacher education programs both inside and outside the Inner Circle describe non-NESTs' concerns about the development of their English language proficiency for their professional success (D. Liu, 1999; Carrier, 2003; Murdoch, 1994; Cullen, 1994; Medgyes, 1999). Lack of non-NESTs' voices in the TESOL field is another serious concern (Carrier, 2003; Kamhi-Stein, 1999, 2000; Samimy and Brutt-Griffler, 1999; Thomas, 1999). Samimy and Brutt-Griffler's (1999) case study, for example, demonstrates EFL teachers' awareness of the need to contribute to the TESOL communities with EFL autonomy. Kamhi-Stein (1999) also describes the importance of encouraging non-NESTs to participate in professional conferences in order to raise their voices and status. In terms of "self-perceived prejudice," scholars describe non-NESTs' challenges inside and outside the Inner Circle, especially regarding their credibility as ELT professionals because of their ethnicity and

non-native status (e.g., Amin, 1997; Kamhi-Stein, 1999; Thomas, 1999; Hubbell, 2002). Amin (1997), for example, demonstrates five minority female teachers' perceptions of their students' ideal ESL teachers. The findings through interviews reveal that non-NESTs felt disempowered by their students' strong connection between white native speakers and ideal ESL teachers. In the Expanding Circle, Hubbell (2002) also discusses, in her autobiographical narrative, discriminations that she experienced because of her status as a non-NEST. One of them is an assumption made by administrators and colleagues that NESTs and non-NESTs are assigned different teaching roles, which are conversation classes and required courses respectively, regardless of non-NESTs' English proficiency.

Furthermore, the literature also depicts non-NESTs' concerns about a discrepancy between what they learn in L2 teacher education programs in the Inner Circle and what they may encounter in their teaching practices in their home countries (e.g., Li, 1998; D. Liu, 1999; Pacek, 1996). D. Liu (1999), for example, broadly points out cultural, socioeconomic, and educational differences between the two contexts, and then proposes three areas that the TESOL teacher education programs in the Inner Circle need to address for non-NESTs' professional needs. These areas include: (1) L2 acquisition theories and teaching methodologies relevant and applicable to the EFL contexts, (2) the development of teachers' English language proficiency for their teaching success, and (3) cultural knowledge of English speaking countries.

In addition, focusing on communicative language teaching (CLT), the currently promoted teaching approach in the Expanding Circle for its educational innovation, empirical studies also reveal the difficulties that non-NESTs encounter or perceive in implementing the teaching approach in their classrooms (Li, 1998; Pacek, 1996). Li, for example, examines South Korean secondary school English teachers' perceptions of CLT through questionnaires and interviews. Eighteen teachers who participated in the in-service teacher education program at a Canadian university expressed perceived difficulties such as teacher, student, educational system, and CLT factors to reconcile local realities and the demands expected by the teaching approach. Pacek (1996) also investigated the impact of the one-year U.K. in-service teacher education program sponsored by the Japanese Ministry of Education for Japanese secondary school English teachers to assess its usefulness and practicality. The foci of the program were the improvement of teachers' English proficiency, the understanding of theoretical concepts of teaching approach especially CLT and British culture and society, and its educational system. Forty-three participants who answered the questionnaires expressed their experiences of pressure to mediate local expectations in Japan and what they had learned in the program despite the teachers' positive feedback on the program in general.

Attempts to Meet non-NESTs' Professional Needs in L2 Teacher Education

Although the studies examining how L2 teacher education programs specifically incorporate non-NESTs' issues into the curricula are considerably dearth (Kamhi-Stein, 2000), several teacher educators propose their TESOL program models and/or suggest implications for L2 teacher education (e.g., Brutt-Griffler and Samimy, 1999; Carrier, 2003; Cullen, 1994; Kamhi-Stein, 1999, 2000; Samimy and Brutt-Griffler, 1999). In the Inner Circle, Samimy and Brutt-Griffler (1999), for example, introduce a graduate level seminar, entitled *Issues and Concerns Related to NNS Professionals*, that discusses issues of ELT professionals from different teaching contexts in the TESOL program. Central aims of this seminar were (1) to raise graduate students' critical awareness of the dichotomous discourse of non/native speakers, (2) to develop their identity as ELT professionals, and (3) to promote 'counterdiscourses' regarding cultural assumptions in the center community within the field of applied linguistics and L2 pedagogy. Based on the participants' experiences of a new sense of agency as ELT professionals in the seminar, Samimy and Brutt-Griffler propose more emphasis on "multidimensionality and expertise" than "nativeness or authenticity" in teaching methodologies (p. 142).

Kamhi-Stein (2000) also proposes a different approach, which integrates the discussion on non-NESTs' issues across the curriculum of the TESOL MA program. According to her, central to this "cross-curricular approach" is that both native and non-native student teachers come to understand international students' L2 learning experiences and challenges. Therefore, non-native teacher-trainees re-evaluate themselves as resourceful informants. The approach also aims at helping non-NESTs raise their status with NESTs. To achieve these objectives, Kamhi-Stein introduces activities in and outside the classroom across the curriculum of the program. These activities are reflection on trainees' L2 learning histories to understand their own knowledge and beliefs, web-based discussion to enhance their participation in class, collaborative projects between native and non-native teacher-trainees, and participation in professional conferences to discuss non-native issues.

Most currently, Carrier (2003) proposes "an introductory first semester course" for non-NESTs in

the TESOL program as "a first step" to meet their professional needs. Several key areas emphasized in the course include "contextually responsive teacher education content, training in a different school culture, competing with native English-speaking teacher trainees, self-confidence, and encouraging contributions by non-native teacher trainees to the field of English language teaching" (p. 242). Regarding the contextually responsive content, the course attempts to develop non-NESTs' abilities to evaluate their acquired knowledge in the program for its applicability through assigned readings, class discussions, and course projects relevant to their teaching contexts. With respect to training in a different school culture, the focus is placed on non-NESTs' development of "Western-style academic writing and oral presenting" (p. 245). According to Carrier, teachers' improvement of language proficiency would lead to their self-confidence as ELT professionals and allow other teachers to hear non-NESTs' voices in professional communities.

Furthermore, researchers also make implications for L2 teacher education in the Expanding and Outer circles to meet non-NESTs' professional needs. The central topics of the scholarly discussion seem to be non-NESTs' roles as mediators (Seidlhofer, 1999; Canagaraja, 1999) and their professional expertise, especially regarding language elements (Cullen, 1994; Murdoch, 1994; Medgyes, 1999). In terms of the former, Seidlhofer (1999), for example, stresses non-NESTs' 'double' roles for appropriate pedagogies in a given context when they are required to reconcile the contradictory demands of global claims with the local reality. She then suggests that, in teacher education, EFL teachers need to be encouraged to consider what choices they can make to develop appropriate pedagogy in a given context and how teachers can cultivate their strengths of their double capacity. Canagarajah (1999) also emphasizes teachers' 'double' roles of critically examining and negotiating the inherent tension between local and dominant expectations in the Outer and Expanding Circles. He situated his ethnographic study in "resistance theories" within the critical pedagogical paradigm – that is "there are sufficient contradictions within institutions to help subjects gain agency, conduct critical thinking, and initiate change" (p. 22). Canagaraja, for example, urges teachers to employ ELT teaching beyond the "communicative teaching methods" because of its insensitivity to the reflexivity and its potential role to reinforce the norm. In the reflexive and negotiated process of pedagogy, he argues that there is possibility for developing a "context-sensitive and culture- specific approach" to language teaching (p. 195).

Regarding the latter, the development of non-NESTs' language proficiency, Cullen (1994), for example, argues that, given a circumstance in which CLT has been widely used around the world, teacher training programs need to take non-NESTs' language demands into serious consideration. He introduces an in-service teacher training model, which integrates language elements with other components, especially methodology, by providing trainees with direct learning experiences as language learners. According to him, such a model is valuable because of its objective to meet teachers' needs and its practice-driven approach. In addition, Murdoch (1994) also introduces a curriculum revision of the teacher education program in Sri Lanka to develop teachers' English language proficiency levels. Among a total of 208 in- and pre-service non-NESTs participated in his study, many trainees viewed linguistic skills as the most important components in their professional expertise. Therefore, Murdoch suggests that teacher trainees' language proficiency should be the priority of the teacher-training curriculum, especially in the early stage of the program, to reduce their anxiety caused by the lack of language ability.

As can be seen, non-NESTs have faced various challenges in their profession such as perceived low self-confidence, concerns regarding applicability of their acquired knowledge, and lack of their voices in the professional community. To help them become successful ELT professionals, however, several teacher educators in the TESOL field introduce different approaches to L2 teacher education. In the Inner Circle, these approaches include a graduate seminar discussing non-NESTs' issues (Samimy and Brutt-Griffler, 1999), "the cross-curricular approach" (Kamhi-Stein, 2000), and "an introductory first semester course" for non-NESTs (Carrier, 2003). In the Expanding and Outer Circles, Cullen (1994) specifically suggests an approach integrating language elements across the curriculum. Other researchers discuss the importance of non-NESTs' double roles as mediators for their professional development.

Conclusion

The literature reviewed in this paper demonstrates that there has been recently a growing interest in the issues of non-NESTs such as the definitions of native and non-native speakers, non-NESTs' perceptions of their status and roles, and their professional development. In the first area, although the definition of a native speaker is highly debatable and problematic,

the underlying assumptions of existing pedagogical models in TESOL are primarily based on a native-speaker model. In terms of non-NESTs' status and roles, a body of literature explores their perception of their professional expertise in comparison to native teachers. Some scholars emphasize the differences in each type of professionals' teaching behavior mainly in relation to language competence and recognize non-NESTs' advantages and disadvantages as compared to NESTs. Other scholars, by contrast, consider such native/non-native dichotomy problematic because of the multidimensionality involved in their professions. Another body of the literature on non-native teachers' professional development examines their needs, challenges, and concerns, and further demonstrates several attempts made in the TESOL programs inside and outside the Inner Circle in order to meet non-NESTs' needs.

Thus, the existing literature on the three areas has provided us with great insights into the issues involved in non-NESTs. More research, however, needs to be conducted to further understand and handle various issues that they have faced. Based on the findings and discussions of the studies reviewed in this paper, the following future research questions can be suggested. First, instead of simply transferring the native speaker models to various teaching contexts, alternative pedagogical models need to be explored and field-tested. This research must be foremost, as the issue relates to the goals of English language learning and teaching both at the macro (e.g. national curriculum) and micro (e.g. school and classroom) levels in given contexts. Second, in the area of non-NESTs' status and roles, instead of dichotomizing ELT professionals based on native/non-native status, more research on what professional expertise is required to be successful ELT professionals in a given context needs to be studied. In so doing, the questions such as what the nature of English language learning as a subject is (Widdowson, 1994) and how non-NESTs can develop their unique roles as mediators must be explored. For non-NESTs professional development, more case studies in different social contexts need to be conducted to investigate their professional needs and concerns (Samimy and Brutt-Griffler, 1999). In addition, the question of what kind of trainings in the L2 teacher education programs will better develop non-NESTs' professional competence in the given contexts need to be explored. To do so, it is critical to examine prospective and currently working teachers' experiences of learning to teach in the contexts of L2 teacher education programs and schools. These studies will eventually help voice their concerns and needs related to their professions. Some scholars also point out that the studies in the field of L2 teacher education especially in the Expanding Circles are considerably scarce (Widdowson, 1997; Crandall, 2000). To develop effective L2 teacher education programs for non-NESTs, more EFL teachers' voices need to be incorporated into the L2 teacher education field. Finally, to develop effective L2 teacher education programs for non-NESTs both inside and outside the Inner Circle, studies examining the applicability of their learning in TESOL programs also need to be explored.

See also: Communicative Language Teaching; Critical Applied Linguistics; English: World Englishes; Foreign Language Teaching Policy; Identity: Second Language; Language Education: Teacher Preparation; Language Teaching Traditions: Second Language; Languages of Wider Communication; Motivation and Attitude in Second Language Learning; Native Speaker; Nonnative Speaker Teachers; Politics of Teaching; Second and Foreign Language Learning and Teaching; Teacher Preparation: Second Language.

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Nonstandard Language Use

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To talk of *non*-standard language use presupposes that we understand what it is for a use of language to be *standard*. A standard use can be thought of either as a use that conforms to some standard (viz. to a linguistic rule or convention) or as a use that is the usual or most common one. So, a non-standard use is either one that flouts a linguistic convention or that is an uncommon or novel use. Various linguistic phenomena somehow marked as non-standard will be discussed and classified as belonging to one or another of these two categories of non-standard usage. A possible third sense of 'non-standard,' which is the opposite of Bach's (1995) notion of a standard*ized* use, also will be discussed. Although non-standardized uses may be *pragmatically marked* uses of expressions, they don't flout linguistic conventions and are not novel. Speech errors, such as cases in which a speaker says 'pig vat' instead of 'big fat,' also could be viewed as cases of non-standard language use, but will not be discussed in this article.

A conventional use, one conforming to a linguistic convention, is an agreed-upon use. The agreement needn't be an explicit one but simply a matter of members of a linguistic community conforming their use to that of other members of the community, so long as others do the same. Malapropisms are one sort of example of *non*-conventional use. Malapropisms are cases where a speaker (unintentionally) substitutes a word for another word, whose agreed-upon

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Nonstandard Language Use

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To talk of *non*-standard language use presupposes that we understand what it is for a use of language to be *standard*. A standard use can be thought of either as a use that conforms to some standard (viz. to a linguistic rule or convention) or as a use that is the usual or most common one. So, a non-standard use is either one that flouts a linguistic convention or that is an uncommon or novel use. Various linguistic phenomena somehow marked as non-standard will be discussed and classified as belonging to one or another of these two categories of non-standard usage. A possible third sense of 'non-standard,' which is the opposite of Bach's (1995) notion of a standard*ized* use, also will be discussed. Although non-standardized uses may be *pragmatically marked* uses of expressions, they don't flout linguistic conventions and are not novel. Speech errors, such as cases in which a speaker says 'pig vat' instead of 'big fat,' also could be viewed as cases of non-standard language use, but will not be discussed in this article.

A conventional use, one conforming to a linguistic convention, is an agreed-upon use. The agreement needn't be an explicit one but simply a matter of members of a linguistic community conforming their use to that of other members of the community, so long as others do the same. Malapropisms are one sort of example of *non*-conventional use. Malapropisms are cases where a speaker (unintentionally) substitutes a word for another word, whose agreed-upon

meaning is different from what the speaker intends to convey. Usually the substitution is based on some sort of sound similarity between the 'correct' and 'incorrect' usage.

In his play *The Rivals*, Richard Sheridan has a lot of fun at the expense of his character Mrs. Malaprop. For example, Mrs. Malaprop exclaims to Sir Anthony Absolute, 'you surely speak laconically!,' meaning to surmise that Sir Anthony is speaking ironically. A little later she hopes that Sir Anthony will regard her niece, Lydia Languish, 'as an object not altogether illegible,' meaning that she hopes her niece will not be regarded as someone ineligible for a match with Sir Anthony's son.

Such malapropisms are not confined to fiction. For example, in some experimental work on referential communication reported by Brown (1995), a participant in a map-reading task referred to an electric pylon as a colon. Another example occurred on the June 16, 2004, broadcast of the Tavis Smiley Show on National Public Radio. One of Smiley's guests praised him by saying, 'You have spoken up so unanimously for black people.' The concept of unanimity only makes sense when one is talking about a group of people, and Smiley is a single individual. However, what the guest was thinking is that whenever Smiley speaks up he speaks up for black people. So, if one thinks of Smiley and his past selves as a group, one can think of them as speaking with one voice and hence as unanimous. This last example shows that malapropisms are not always based on *sound* similarities but can arise from quite complicated cognitive comparisons (e.g., Smiley and his past selves are like a group of individuals).

Malapropisms are extreme examples of misuse, and rather idiosyncratic. There are other examples of 'misuse' that are more widespread among members of a linguistic community. For example, many people use the sentence, 'Hopefully, Bush will be defeated' to express their hope that Bush will be defeated, not the thought that the defeating of Bush will be performed with hope. Or again, many people say things such as, 'Me and him are going to the movies' or 'I could care less' or 'Everyone will be bringing their spouses' instead of 'He and I are going to the movies' or 'I couldn't care less' or 'Everyone will be bringing his or her spouse.'

Given how widespread these latter 'misuses' are, one might argue that, rather than being misuses of English, they are acceptable uses within some 'non-standard' dialects of English. Calling these dialectical varieties 'non-standard' is rather contentious. There are some language purists who argue that only 'standard' English is acceptable usage. However, as Chomsky (2000) points out, calling some varieties of English 'standard' and regarding them as normative for English usage generally has nothing to do with the linguistic properties of these language varieties, but is purely a matter of power politics. The dialect of the ruling group is inevitably regarded as the norm for correct speech. Everyone has heard the old saw about a language being a dialect with an army and a navy. But as Chomsky remarks: "To say that one variety of English is 'right' and another 'wrong' makes as much sense as saying that Spanish is right and English is wrong" (2000: 71).

According to the second sense of 'non-standard' articulated above, non-standard uses are novel or 'nonce,' i.e., one-off, uses. The largest class of uses that have been thought of as 'nonce' are the uses of sentences to convey Gricean *particularized* conversational implicatures. For instance, a mother asks her teenage son to tidy his room and he replies: 'I have to beat this boss real quick.' The son is explicitly talking about what he has to do in the video game he's playing but is implicitly refusing to clean his room right then. In this sense of 'nonce' meaning, the novel meaning is something that is merely *indirectly* or *implicitly* conveyed. Such nonce meanings are conveyed because the hearer understands the speaker to have explicitly said one thing but to have meant something else (either in addition or instead). Thus, implicatures are not nonce meanings *for expressions*. Rather, they are novel meanings conveyed *by* the use of expressions that are understood to have their conventional meanings.

Metaphorical, ironic, metonymic, and other such 'non-literal' uses of expressions have also been thought of as nonce uses. For example, 'The soldiers butchered the villagers' can be used metaphorically to express the fact that the soldiers killed the villagers in a particularly inhumane way. 'You're a fine friend' can be used ironically to express the fact that the hearer has done something unfriendly. 'The ham sandwich is getting restless' can be used metonymically to express the fact that the orderer of the ham sandwich is getting restless. Many philosophers analyze such uses in terms of Gricean particularized conversational implicatures. The speaker says one thing but indirectly conveys something else. Inasmuch as such uses are analyzed in Gricean terms, these again would not be cases in which *expressions* are given novel meanings. Rather, *by* using expressions with their conventional meanings, speakers *indirectly* express novel meanings.

(Of course, the examples of metaphor, irony, and metonymy given above are very hackneyed, and in this sense are not 'novel.' For example, the 'butcher' metaphor has become a 'dead' metaphor. Many dictionaries of English usage now list 'to kill in a brutal

manner' as one of the meanings of 'to butcher.' Other, 'fresher,' examples could have been given, but these would have required more context setting.)

Not everyone would agree that cases of metaphor and metonymy are correctly analyzed in Gricean terms. An alternative 'contextualist' view denies that we interpret the entire sentence literally and only then (because of a violation of some Gricean maxim, such as the maxim of quality) derive an implicated metaphorical meaning. For example, consider the following

(1) Dickens is easy to read.

(2) The appendectomy is on top of the cabinet.

(3) The stinkbug has left the room.

In (1), which is an example of a producer-for-product metonymy, 'Dickens' is used to refer to the novels that Dickens wrote. In (2), one can imagine a context in which 'the appendectomy' is used to refer to the file of the patient who is scheduled for an appendectomy. And in (3), 'the stinkbug' can be used metaphorically to refer to a person whose personal hygiene leaves much to be desired. According to the contextualist, local pragmatic processes operate on the referring terms ('Dickens,' 'the appendectomy,' 'the stinkbug') to yield pragmatically determined contents. These become a part of the propositional contents that are directly expressed by sentences (1)–(3) in their conversational contexts. For example, the speaker of (2) doesn't say falsely that a medical procedure is on the cabinet and thereby indirectly convey the proposition that the file of a patient scheduled for an appendectomy is on the cabinet. Rather, the latter proposition is directly expressed. See Carston (1997) and Bezuidenhout (2001) for a defense of the contextualist view of metaphor.

If this view is correct, there is a sense in which the expressions 'Dickens,' 'the appendectomy,' etc. are given novel meanings in different contexts. These novel meanings are not merely indirectly conveyed *by* literally saying something else. Note, this view is *not* committed to a 'Humpty Dumpty' theory of meaning, according to which expressions can mean whatever their users intend them to mean. (In *Through the Looking-Glass*, Humpty Dumpty says to Alice, 'There's glory for you' and claims to mean 'There's a nice knockdown argument for you.') According to the contextualist view, the novel contextual meanings of expressions are pragmatic developments of semantically encoded meanings. The local pragmatic processes that determine contextual meanings are thus not completely unconstrained. Speakers cannot convey novel meanings that are completely unrelated to conventionally encoded meanings. (For a more radical view, see Donnellan [1968] and Davidson [1986]. They argue that, in appropriate contexts, 'glory' *can* mean *a nice knockdown argument*.)

Another class of uses that have been called 'nonce' are ones in which speakers coin new words. Attested examples are as follows, the first two given by Clark (1992: 315–316), the third by Higginbotham (2002: 577):

(4) He's being grand juried for possible conflict in real estate loans.

(5) Today I'm going gallerying.

(6) I've hard-drived the diskette.

These novel uses are similar to ones that have already entered common usage, such as 'He docked the boat' or 'The librarian shelved the books.' These uses all obey a productive rule, in which a noun is turned into a verb by the addition of a verbal particle ('–ed' to signal past tense, '–ing' to signal an ongoing or incomplete action). The novel words are coined because there is no readily available, short expression already in common use that quite covers the speaker's intended meaning.

In some cases, people invent new words when there are already perfectly good words in common usage that mean exactly what the speaker intends. For example, on the June 16, 2004, edition of the *Tavis Smiley Show* on NPR, one of Smiley's guests said: 'You have to conversate and talk to your child on a man to man level.' Presumably what was meant was that one should *converse* with one's child. What is already a verb, 'to converse,' is subjected to a morphological rule for verb formation, by the addition of the suffix '–ate,' perhaps on analogy with the verb 'to orientate,' which is frequently used instead of the plain 'to orient' (this latter being the norm in standard American English, although not in standard British English, which favors 'to orientate').

A third sense of 'standard use' should be mentioned. It corresponds to what Bach (1995) calls a *standardized* use, which he distinguishes from a conventional use. One reason that Bach appeals to his notion of standardized use is to counter attempts by relevance theorists such as Carston (1995) to reconstrue Gricean *generalized* conversational implicatures as part of what is directly expressed. Consider, for example, the Gricean treatment of scalar terms, such as numerals. On this view, 'Grice has three teeth' literally says that Grice has *at least* three teeth, but it conversationally implicates in a generalized way that Grice has *at most* three teeth. These two propositions together entail that Grice has *exactly* three

teeth. Carston's alternative view is that 'three teeth' is semantically underspecified. When used in an appropriate context, it can be specified in such a way that what is said (i.e., what is explicitly conveyed) in that context by 'Grice has three teeth' is that *Grice has exactly three teeth*.

Bach offers a third alternative. On this view, 'three teeth' has a standardized use to convey *exactly three teeth*. A standardized use is something like a default use. It is a default in the sense that it has become a regular practice – perhaps a mental habit – for members of the linguistic community to use the word(s) in question in a certain way, given that circumstances are normal. Only if circumstances are somehow unusual will a different interpretation be called for. Bach denies that the standardized meaning is explicitly conveyed. It is implicitly conveyed (he calls it an 'impliciture'), but because it is conveyed by default in normal circumstances, it gives the illusion of being directly conveyed. The inference that is needed to derive this standardized interpretation has become compressed by precedent. Hence, hearers are not aware of having made any inference. A similar view, according to which generalized implicatures are default inferences, has been defended by Levinson (2000).

The details of Bach's views are not important here. The main point is to introduce a third sense of 'non-standard use.' It corresponds to a *non*-standardized use in Bach's sense. A non-standardized use is one that is called for when circumstances are somehow not 'normal' and hence the default meaning must be overridden. For instance, suppose Grice has a large collection of shark teeth and you need exactly three shark teeth for an artwork you are creating. Believing that Grice might be willing to give up some of his shark teeth for you I say 'Grice has three teeth.' Arguably what is conveyed here is that Grice has at least three teeth, not that he has exactly three. Now, according to Griceans such as Bach and Levinson, the conventionally encoded meaning of 'three teeth' is *at least three teeth*. In other words, when circumstances are *not* normal and the default meaning is overridden, the meaning that is conveyed is the literally encoded meaning. So the non-standardized use in this case is the conventional one (i.e., it is a standard use in the first sense articulated above).

In the example given in the previous paragraph, pragmatic context indicated that a non-default understanding of 'three teeth' was called for. Sometimes, however, the linguistic expression itself signals whether it is to be given a default or non-default reading. There are pragmatically marked and unmarked ways of saying things. Unmarked ways of saying things call for default interpretations. Marked ways of saying things call for non-default interpretations. For example, there is a difference between saying 'The policeman stopped the car' and 'The policeman brought the car to a stop.' The former suggests that the stopping was the normal sort of stopping, whereas the latter suggests that the policeman did something unusual to halt the car. But although non-standardized uses may be *pragmatically marked* uses of expressions, they don't flout linguistic conventions and they are not novel uses, or at least no more novel than their unmarked alternatives. Both 'The policeman stopped the car' and 'The policeman brought the car to a stop' will call for quite a lot of pragmatic inferencing to understand what the speaker said.

See also: Conventions in Language; Metaphor: Philosophical Theories; Pragmatic Determinants of What Is Said.

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Nonverbal Communication

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Framing 'Nonverbal' and 'Communication'

Empirical researchers in the field of nonverbal communication must operationally define both 'nonverbal' and 'communication' to suit their investigations (Farnell, 2004). This is difficult because both notions carry extraordinarily wide connotations (cf. Sebeok *et al.*, 1964).

'Nonverbal' suggests a relationship with 'verbal,' that term narrowly referring to human spoken language, or speech. If that relationship with the 'verbal' is obligate, 'nonverbal' would be limited to communication accompanying, complementing, or substituting for speech, termed the paralinguistic. If, on the other hand, the relationship with the 'verbal' is instead one of contrast, 'nonverbal' would potentially include any and all extralinguistic communication.

Then, most inclusively, communication (in terms of transmission of information, matter, and/or energy) extends beyond the realm of humans, certainly when it involves sentient organisms; all such nonhuman communication is perforce 'nonverbal.' Ultimately, beyond 'nonverbal communication,' webs of 'communication' connect everything from planets to living things to molecules, in orbits of relations of significance and exchange. However, the typical frame for 'nonverbal communication' will be restricted here to the human.

Situating Nonverbal Communication Studies within Semiotics

The semiotic analysis of nonverbal communication only partially parallels the semiotic analysis of verbal communication (Key, 1980). Verbal communication draws on human language (modeled as deep structure), realized vocally as speech and its nonvocal derivatives such as writing (both modeled as surface phenomena), all studied within linguistics. Semiotics as a whole subsumes linguistics together with the diverse disciplinary and metadisciplinary approaches to the understanding of communication within culture and nature as a whole.

Specifically, semiotics studies signs and the behavior of signs in space and through time, signs being anything carrying significance in a system. Significance boils down to meaning-making, that is, potential communication, irrespective of the agents, patients, subjects, objects, or media of the process. We tend to think first of humans as communicators, and moreover of them communicating in the medium of human language. Human verbal language may be carried by sound, as in speech, or visually, as through writing. Nonverbal communication associated with human verbal behavior ranges from aspects of vocalization accompanying speech (intonation, stress, pitch, rhythm, etc.) to nonvocal bodily gestures, movement, and interpersonal spatial positioning, accessed by vision and other senses (Birdwhistell, 1952; Efron, [1941] 1972; Kendon, 1997; Wenzel, 1968).

Webs of Verbal, Nonverbal, Vocal, and Nonvocal Communication

Nonverbal communication without obligatory ties to language is by far the most diverse category, and may be vocal, involving sounds originating in the vocal tract, or nonvocal. Nonvocal signs in turn may draw on sound production and interpretation, as in whistles and clapping, or may involve any other sense modality – such as vision, olfaction, taste, and touch, with vision paramount, whether through gesture, dress styles, or architecture.

Another foundational distinction made in nonverbal communication centers on context, especially whether face-to-face, more generally interpersonal, or between more remote actors (Goffman, 1963). Contemporary media have introduced many innovations for nonverbal communication. Cell-phone use is verbal, leading to some ordinary nonverbal signs accompanying speech being masked by the medium while others are exaggerated. Emailing represents the verbal both nonverbally and nonvocally, in writing; yet further nonvocal and vocal nonverbal expression seeps in through emoticons and yet-to-be standardized strings of icons, indexes, and symbols.

Finally, sign languages for the deaf, such as American Sign Language (ASL), are quintessentially both nonverbal and nonvocal communication (Armstrong *et al.,* 1995). These constitute, however, genuine languages with full syntactic and productive properties, which cannot be said for so-called body language (Eibl-Eibesfeldt, [1967] 1975) or for the communication systems of other animals (Rauch and Carr, 1980).

Semiotic research on nonverbal communication by linguists, anthropologists, cognitive psychologists, and others ranges from the experimental (often quantitative, considering individual, internal, and

microunits of analysis) to the naturalistic (usually qualitative, assessing social, relational, embodied, and emergent units of analysis) (Schere and Ekman, 1982; Poyatos, 1992).

The Primary Media of Sound (Oral–Aural) and Sight (Vision)

In referring to nonverbal communication, the first frame of reference will be that contrast with human verbal language. In connection with language and speaking, nonverbal communication itself may be vocal or nonvocal, depending on the activation of the vocal chords or other sound-shaping apparati of the mouth and vocal tract, keeping the coding and decoding within the oral-aural realm as spoken language itself. Examples of such nonverbal communication include intonation, stress, pitch, and rhythm. These elements of sound coupled with tempo vitally contribute to the verbal message, whether emphasizing that message or calling the message into question. While the symbols of the International Phonetic Alphabet support the transcription of the sound units of verbal language, nonverbal coexpression can only be more provisionally transcribed in notational systems inclined to be iconic and indexical, rather than symbolic.

Spatially located visual elements also contribute to any verbal message. Of great significance in speech are those nonvocal facial (Ekman, 1972) and bodily (mostly hands and arms) gestures (Bremmer and Roodenburg, 1992) accompanying articulation – these sometimes affecting the voice itself. For instance, the hearer can detect when a speaker is smiling, even on the telephone. Other gestures, say, a shrug, can shape if not negate the verbal message itself.

Still another realm of semiotic research centers on nonverbal vocal utterances not in conjunction with speech, studied as extralinguistics. Some extralinguistic phenomena such as laughing and crying may appear to be species-specific, but in fact these are for the most part shaped by culture, particularly if the pragmatic context is considered. The sounds generated by laughing, crying, screaming, sighing, and other nonverbal vocal utterances vary by individual and culture, and the culture further determines when, where, how, and why such utterances occur. A sigh, for instance, carries meaning, regardless of whether it occurs with speech or in other contexts; it's worth noting that the sigh does not carry vocal-chord sound although it is generated by the vocal tract.

Paralinguistic (nonlinguistic sounds, such as sighing, hissing, and hesitations; and marked linguistic sounds, such as pitch and interruptions) and extralinguistic (and, by extension, 'nonverbal,' such as bodily signs) communication may also rely on sound and sight, as well as on other sense modalities such as smell, taste, and touch.

A much larger category of bodily communication, being neither verbal nor vocal, stands alone without linguistic accompaniment, although some may flourish in a setting including linguistic communication. The body itself communicates particularly through the face, and through all gestures, all stances, and all other behavior, especially that involving movement (Birdwhistell, 1952) and distance (Hall, 1959) as well. The body's sign-generating potential is magnified through culture, when dress, adornment, and setting can trump the visual accessibility of the body. However, in any case, olfactory signs (smell) and haptic signs (tactile touch) shape communication when communicators are in each other's presence, and one cannot discount the occasional role of gustatory signs (taste).

The face, the privileged location of most of the sense receptors (ears, eyes, nose, tongue, and very sensitive skin), also continuously expresses and nonconsciously exudes meaningful gestures (Ekman, 1972). The face communicates through intended and unintended signs, isolated by Ekman as action units, and either category of signs may be recognized and interpreted, *or* misinterpreted, *or* ignored by others. The pout is hard to miss and is readily evaluated, but the dilation of the pupil of the eyes may not be consciously noted by either actor or observer. Furthermore, the individuals aware of such and other communication will seldom be limited to the intended or known audience.

The unintended signs leaking, as it were, from the face, comprise those macroscopic expressions discernible by conspecifics (and sometimes other coevolved creatures), as well as very short and slight muscle movements only subliminally recognized by the observer, although with training individuals can both produce and detect these signs. Pupil dilation, indicating peaked interest, lies on the threshold of such signs that untrained persons can detect. Eyebrow flashing, indicating surprise, is more subtle.

Folding in Infra-individual Emotion and Extra-individual Culture

Much nonverbal communication will be suffused with and will project subjective feelings subject to underinterpretation and overinterpretation by others. All humans share a finite number of basic emotions compared with the plethora of named conditions found in any language and culture (Russell *et al.*,

2003). By inference, and anthropomorphically, humans interpret certain of these emotional states in other animals as well (Darwin, [1872] 1965; Eibl-Eibesfeldt, [1967] 1975). Not surprisingly, emotions motivate much of communication in any medium and in all venues.

Nonverbal communication among humans also involves material and nonmaterial culture. We construct and are surrounded by disembodied signs in advertising, art, architecture, film, furniture, music, spectator sports, theater, and zoological gardens. A semiotic perspective enables the articulation of the individual agent as sign-producer and -interpreter, with the ephemeral emergent properties of emotion and with the longer traditions of history-laden spectacles and artifacts.

See also: Animal Communication: Overview; Anthroposemiotics; Biosemiotics; Body Language; Face; Gesture and Communication; Prosodic Aspects of Speech and Language; Whistled Speech and Whistled Languages.

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Nonverbal Predication

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Definition of the Domain

In the tradition of Western linguistics, the domain of predication is usually considered to cover four semantic subtypes. First, there are predicates that express an event (an action, state, or process). Since such predicates are prototypically encoded by verbs, event predication can typically be described as verbal predication. An English example of a verbal predication is the sentence given in Example (1):

(1) Mary sing-s.

In addition, and often in contrast, to verbal predication, the predicational domain also contains predications in which the predicate refers to a property (adjectival predication), to a class (nominal predication), or to a location (adverbial predication). English examples of these three predicational categories are seen in the following sentences:

(2) Mary is beautiful.
Mary is a teacher.
Mary is in the garden.

As can be seen, these sentences contrast with the verbal predication in Example (1) in terms of their formal encoding strategies. Whereas, in English, event predicates can be marked by bound morphology for tense and subject agreement, this encoding option is not available for the various predicate categories in Example (2). Thus, sentences such as those in Example (3) are ungrammatical in English:

(3) *Mary beautiful-s.
*Mary teacher-s.
*Mary in the garden-s.

We can conclude, then, that for English, there are formal reasons to make a distinction between verbal predication (which is typically used to express events) and nonverbal predication (which is used to express the other three predicate categories). The situation encountered in English is an instance of a major pattern in the encoding of the domain of predication. It is, however, by no means the only way in which the domain of predication can be encoded; as will be seen in the following discussions, neither the uniformity of the nonverbal predicational strategy nor the distribution of verbal and nonverbal encoding over the four predicational strategies, as found in English, is a universal feature of human language.

Criteria for Verbal and Nonverbal Predicate Encoding

In order to be able to set up a typology of the ways in which the domain predication is encoded cross-linguistically, we need a set of language-independent criteria to decide whether a given predicate encoding must be rated as verbal or nonverbal. Such a set of criteria was developed by Wetzer (1996) and Stassen (1997). The first of these is the agreement criterion:

(4) The Agreement Criterion
If a language has (person/number/gender) agreement on predicative verbs, then other predicate categories in that language will be rated as verbal if they show this agreement marking as well. If they do not, they will be rated as nonverbal.

In order to simplify, the discussion here is restricted to examples of the encoding of property predicates (adjectival predicates). As is demonstrated by the first sentence in Example (2), **Mary is beautiful*, the application of the agreement criterion to English enables us to decide that English has nonverbal adjectival predicates. In contrast, a language such as Bororo (Ge-Bororo) must be said to have verbally encoded adjectival predicates, as is demonstrated by the Bororo sentences in Examples (5a) and (5b) (Crowell, 1979: 50):

(5a) i-mago-re
1SG-speak-NEUTRAL
'I speak/spoke.'
(5b) i-kure-re
1SG-tall-NEUTRAL
'I am/was tall.'

A second criterion that – alone, or in alignment with the agreement criterion – can decide on verbal or nonverbal status of predicate categories is the auxiliary criterion:

(6) The Auxiliary Criterion
If a predicate category is marked by the presence of a supportive item (an auxiliary), then its encoding must be rated as nonverbal.

Application of this criterion yields, in addition to the agreement criterion, the conclusion that English predicative adjectives are nonverbal, since they need the auxiliary item *be*. A case in which the copula criterion is the sole decisive factor is presented by Modern Irish (Gaelic, Irish), as shown in Examples (7a) and (7b) for Modern Irish (Indo–European, Celtic; see Greene

(1966: 46)). In this language, predicative verbs do not show any agreement marking, so that the agreement criterion is not applicable here. Nonetheless, we can decide on nonverbal status for Irish predicative adjectives, by virtue of the auxiliary criterion (COP, copula):

(7a) téann Sean
go.PAST S.
'Sean went.'

(7b) is breoite é
COP.PRES. ill he
'He is ill.'

For languages that lack both auxiliaries and agreement marking on verbs, the two criteria presented in Examples (7a) and (7b) are not applicable. For this case, we therefore need an additional third criterion, the negation criterion.

(8) The Negation Criterion
If a predicate category has a negation that differs from the negation of predicative verbs, then the encoding of that predicate category must be rated as nonverbal.

The application of this criterion can be illustrated by the facts in Gumbainggir (Kumbainggar; Australian, Pama-Nyungan) and Tagalog (Austronesian, Philippine). Both languages lack auxiliaries and agreement on verbs. However, according to the source (Eades, 1979: 332), Gumbainggir has different negation strategies for predicate verbs and adjectives, whereas the negation strategy in Tagalog is the same for the two predicate categories (Examples (9a) and (9b); see Schachter and Otanes (1972: 518)). Hence, we decide that predicative adjectives are nonverbal in Gumbainggir, whereas they are verbal in Tagalog (TOP, topic):

(9a) hindi dumating ang bus
NEG come TOP bus
'The bus did not come.'

(9b) hindi mura ang karne
NEG cheap TOP meat
'The meat is not cheap.'

The Encoding of Adjectival Predicates

By applying the set of three criteria, it is possible to decide on the verbal or nonverbal status of any case of predicate encoding in a language-independent fashion. As a result, we are able to determine the stratification of the domain of predication (i.e., the distribution of verbal and nonverbal encoding strategies over the four predicate categories) for any language. Typological investigations into the stratification options for the domain of predication were conducted by Hengeveld (1992) on a sample of 50 languages and by Stassen (1997) on a sample of 410 languages. It turns out that there are several different parameters in the typology of predicational encoding, and that these parameters interact with one another in sometimes fairly subtle and complicated ways. Nonetheless, some general crosslinguistic trends can be stated with some degree of confidence.

First of all, the research reveals the following general crosslinguistic fact of predication encoding:

(10) No language employs more than three different encoding strategies for the domain of predication.

In other words, no natural language employs a different encoding strategy for all four predicational categories. The reason for this restriction on logically possible stratifications of the predicational domain lies in the encoding behavior of adjectival (i.e., property-concept) predicates. It can be established that the following crosslinguistic generalization holds:

(11) Property-concept predicates never have an encoding strategy that is exclusive to them. That is, their encoding is always 'taken over' by a (verbal or nonverbal) encoding strategy that is employed for the encoding of one or more of the other predicate categories.

The 'dependence' of adjectival predicates on the encoding of other predicate categories is usually explained in terms of the notion of 'time stability' (see, among others, Givón (1984)). On the scale of time stability (which orders predicates in terms of their 'permanency,' or 'resistance to change over time'), property concepts take a middle position between (very time-unstable) event predicates and (very time-stable) class predicates. In this way, property predicates constitute a 'battleground' (to use the terminology coined in Stassen (1997)) for the encoding strategies of verbal and nominal predicates, and they are taken over by either the verbal strategy or a nonverbal (usually, the nominal) encoding strategy. This, of course, raises the question of whether, in a given language, the outcome of this battle can be predicted. Wetzer (1996) and Stassen (1997) identified a parameter that appears to have remarkable predictive power in this respect. This parameter, called the 'tensedness parameter,' can be defined as follows (Stassen, 1997: 350–351):

(12) If a language has a grammatical category of tense that
(a) is morphologically bound on verbs and
(b) minimally involves a distinction between past and nonpast time reference, then that language is tensed. In all other cases, a language is nontensed.

The relation between the tensedness parameter and the encoding behavior of adjectival predicates can be stated in the following universals (Stassen, 1997: 357):

(13) The Tensedness Universals of Predicate Adjective Encoding
  (a) If a language is tensed, its predicate adjectives will be encoded nonverbally.
    If a language has nonverbally encoded adjectival predicates, it will be tensed.
  (b) If a language is nontensed, its predicate adjectives will be encoded verbally.
    If a language has verbally encoded predicate adjectives, it will be nontensed.

Both Wetzer (1996) and Stassen (1997) demonstrated the validity of these universals: counterexamples to either condition (a) or (b) in Statement (13) can be judged as 'incidental.' By way of an explanation of the correlation between tensedness and adjectival predicate encoding, Stassen (1997, 571–574) suggested the operation of principles that have to do with the general notion of iconicity.

Major Types of Predicate Encoding

The encoding behavior of predicate adjectives can be seen as a first constraining factor on the options that languages have in the stratification of the domain of predicate encoding. Most of the logical possibilities that remain after this restriction has been taken into account turn out to be attestable in at least some languages. There are, however, four stratification types that are clearly more prominent than the others, in that they occur more frequently and are usually less area determined.

The first of these stratification types can be described as 'uniformly verbal.' That is, under this type, all four predicate categories receive a verbal encoding. An example of a language in which this stratification type can be attested is Mundari (Austro–Asiatic, Munda), as shown in the following sentences (Hoffmann, 1903: 16; Langendoen, 1967: 85, 90; Bhat, 1991: 734) (INDIC, indicative; PRED, predicative):

(14a) sen-a-ing
go-INDIC–1SG
'I am going/will go.'

(14b) hodo-ko mara-a-ko
man-PL tall-PRED–3PL
'The men are tall.'

(14c) hodo-ko en-taq-re-ko-a
man-PL that-place-in–3PL-PRED
'The men are there.'

(14d) ne dasa horo-a-e
this servant Munda-INDIC–3SG
'This servant is a Munda.'

Second, we find a stratification type that can be described as 'almost uniformly verbal.' Under this type, all predicate categories receive verbal encoding, with the exception of locational (adverbial) predicates. The stratification can be illustrated by the facts of the Menomini (Algonquian) language (Bloomfield, 1962: 42, 51, 275) (ANIM, animate; INTRANS, intransitive):

(15a) mɛqsi-w
big-3SG.ANIM.INTRANS
'He is big.'

(15b) pi·-w
come-3SG.ANIM.INTRANS
'He comes/came.'

(15c) awɛ·tok-ɛw
spirit–3SG.ANIM.INTRANS
'He is a spirit.'

(15d) as i·-w
there/at.home be-3SG.ANIM.INTRANS
'He is at home.'

Third, a frequently encountered stratification type can be described as 'split verbal–nonverbal.' Under this type, event predicates and property-concept predicates (i.e., verbs and adjectives) are encoded verbally. Class (nominal) predicates and locational (adverbial) predicates each have their own, separate, nonverbal encoding strategy. A language that exhibits this stratification pattern is Mandarin Chinese (Sino–Tibetan, Sinitic); as can be seen in the following examples (Comrie, 1976: 20; Li and Thompson, 1981: 148, 365, 410), the language uses different, and noninterchangeable, auxiliaries for nominal and adverbial predicate encoding:

(16a) tā gao
3SG tall
'He/she is tall.'

(16b) Z~ngsh~n shì yi-ge hùshì
Z. COP one-CLASS nurse
'Zangshan is/was a nurse.'

(16c) Lǐsì zài hǎi-bi~n
L. be.at ocean-side
'Lisi is by the ocean.'

(16d) t~ pǎo
3SG run
'He/she runs/ran/will run.'

Fourth, and finally, we encounter a major stratification pattern that can be characterized as 'maximally nonverbal.' In this type, only event predicates are encoded by the verbal strategy. In the typical case, the other three predicate categories are encoded by a uniform nonverbal strategy, which can be employed indiscriminately for predicate adjectives, predicate nominals, and predicate adverbials alike. English,

with its nonverbal auxiliary *be*, is an example of this stratification pattern.

Schematically, then, the four major patterns of predicate encoding can be represented as follows (where V, N, and L stand for verbal, nominal, and locational encoding, respectively):

(17) Major patterns of predicate encoding:

Pattern:	I	II	III	V
Event:	V	V	V	V
Property:	V	V	V	N/L
Class:	V	V	N	N/L
Location:	V	L	L	N/L

An interesting question is why some languages should keep their nominal and locational strategies separate, whereas others have integrated them into one uniform nonverbal strategy. Stassen (1997: 584) suggested that this distinction is dependent on the encoding behavior of predicate adjectives in the language: if predicate adjectives are encoded verbally, nominal and locational encoding will be separate, whereas languages with nonverbal predicate adjectives tend to have an integrated uniform nonverbal strategy. Apparently, predicate adjectives serve as some sort of 'bridge' between nominal and locational predicates, and if this 'bridge' is 'closed down' through verbal encoding of predicate adjectives, the integration of the nominal and locational encoding strategies is prevented. A full model of the domain of predicate encoding can be found in Stassen (1997, Chap. 14).

See also: Event-Based Semantics; Negation; Predication.

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Nootka *See:* Nuuchahnulth.

Noreen, Adolf Gotthard (1854–1925)

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Scandinavian linguists have never been afraid to come down from the academy and enter debates on practical issues like spelling reform, and Noreen was no exception, but his major work, despite its homely title, *Vårt språk* (Our Language), was a monolithic and scholarly description of the Swedish language. The first volume was published in 1903, and the work remained incomplete at the time of Noreen's death, having covered the history of the language, phonology, meaning, and inflectional morphology. This seven-volume detailed study takes the Swedish language in its historical entirety, and is a classic of the early 20th-century large-scale single-authored grammar genre.

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Norfolk Island: Language Situation

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Of volcanic origin, Norfolk Island is located in the South Pacific Ocean, east of Australia, of which it is now a territory. Discovered by Captain Cook in 1774, it was claimed by him for Great Britain and named in honor of the Duchess of Norfolk. Cook sailed on, and the island was to remain uninhabited for a further 14 years. The period between 1788 and 1814 saw the first British penal colony on Norfolk Island; the second colony, the most brutal ever established by Britain, lasted from 1825 to 1855. In 1856, the island received those who call it home to this day: the Pitcairners, descendants of the *Bounty* mutineers. The descendants of the *Bounty* and their Tahitian wives brought their own language with them when they migrated to Norfolk Island in 1856 from Pitcairn Island. Norfolk (Pitcairn-Norfolk) is a unique mixture of 18th-century English and ancient Tahitian. English is the official language of Norfolk Island; however, the 1841 islanders (July 2004) use Norfolk on a regular basis to communicate. A slightly different variety than that diffused in Pitcairn, Norfolk is an in-group language used to assist in the preservation of identity. People speak Standard British English as a mother tongue; Norfolk is a second language only.

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Normativity

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Normative claims concern the ways things should be. Nonnormative (or descriptive) claims concern how things are, which can diverge from how they should be. 'No one should speed' is a normative claim; 'they are speeding' is not. Neither is '85% of drivers speed,' even if it describes how things in fact normally are. Statistical norms must be distinguished from norms or standards for how things ought to be.

In exploring the relevance of normativity to language, it is useful to bear in mind that normative claims fall into various kinds and can possess a range of further features. Consider the following examples:

1. Sheets should be clean.
2. Friends should not spread gossip.
3. Smoking is permitted.
4. If you believe some claim, you shouldn't believe its negation.
5. Only goalkeepers may touch the ball with their hands.
6. Goalkeepers should avoid straying from their goal.
7. Pedestrians may cross only at the crosswalk.
8. You shouldn't wear blue slacks with a brown jacket.
9. If you want to improve, you should practice more.

These examples illustrate a variety of features of normativity. Normative claims may state, not only how things should be (1), but also how they should *not* be (2), as well as how they are allowed though not necessarily required to be (3). The subject of norms can include agents (2), actions (3), and states of affairs (1). Normative claims can be conditional (4). The applicability of a norm may be constitutive of an activity ((5) – one is not playing soccer if players may use their hands). Or it may just be constitutive of doing it well (6). Normative claims are not restricted to moral claims; they can be legal (7), aesthetic (8); means–end (9); etc.

Issues involving normativity arise regarding language and linguistics in a variety of ways. Four particularly prominent questions are discussed below: May linguistics itself issue normative pronouncements concerning language and language use? Are semantic properties inherently normative? Are speech acts and pragmatic phenomena more generally inherently normative? What linguistic properties do the terms used to express normative claims themselves have?

Prescriptive Versus Descriptive Linguistics

Language users often turn to dictionaries to answer questions concerning how a word should be used. They view dictionaries as compendia of prescriptions, not descriptions. Linguists, however, generally do not aspire to normative conclusions in their research. They aim to describe and explain linguistic phenomena. On their view, linguistics, at least as they practice it, is and ought to be an empirical science. To the normative question 'what sort of pursuit should linguistics be?' they thus provide an answer that eschews normativity so far as the pronouncements of linguistics are concerned (*see* **Description and Prescription**).

It is a distinct question, however, whether the scientific study of language, though it should not enter normative claims, must also prescind from examining and adverting to normative phenomena. Canons of politeness, for example, are normative. But they impact language and language use. (*see* **Politeness**). For instance, they affect turn-taking in discourse and can become lexically, morphologically, and syntactically encoded. They thus seem important objects of study for linguists. Some philosophers of science suggest that naturalistic inquiry cannot accommodate intrinsically normative phenomena. Others object that this represents an overly narrow conception of naturalistic inquiry. This is an instance of a larger (venerable) debate concerning the status of the 'human' (or, social) sciences and their relation to the natural sciences (cf. Martin and McIntyre, 1994: Part III).

Semantics and Normativity

It is often claimed that semantic properties are intrinsically normative, in some manner encoding standards of correctness. Though fleshed out in various ways, the defense typically involves arguments purporting to show that the possession of a semantic property entails or is entailed by something normative.

For example, it is sometimes suggested that, if 'dog' denotes dogs, then one ought to apply the term only to dogs. If one applies the term to a cat, one has made a mistake (cf. Kripke, 1982). Here, it is claimed that possession of a semantic property has normative consequences. However, it is not generally the case that, if one should or should not do something with an X, then Xs are intrinsically normative; one ought not throw rocks at people, but rocks are not intrinsically normative – nor is the property of being a rock or

any of a rock's intrinsic properties. What matters is whether the normative conclusion follows *just* from the thing's being X. That one should not throw rocks at people follows, not just from what rocks are like, but from that and one's obligation not to cause bodily harm.

The question is thus whether the possession of a semantic property like 'denotes dogs' is sufficient in and of itself to generate obligations. Arguably, it is not: that one ought to apply 'dog' only to dogs would seem to follow, not just from its possessing the semantic property of denoting dogs, but from that and the further assumption that one ought to aim at truth. Perhaps one indeed ought to aim at truth; perhaps not always (maybe there are circumstances in which lying is justified – for example, to confuse a would-be cat-killer). But if the assumption that one should aim at truth must be added, then the normative conclusion does not follow from the semantic claim alone (Horwich, 1998: Chapter 8).

Others claim that semantic properties are intrinsically normative because *what makes it the case* that terms have their semantic properties are certain normative phenomena. The possession of semantic properties is thus alleged to be entailed or determined by the obtaining of normative facts. For example, some argue that semantic claims (such as that 'dog' denotes dogs) obtain in virtue of a language user's being disposed to apply 'dog' to dogs in appropriate circumstances – where what makes circumstances appropriate may include how things optimally ought to be when applying such a term. Others, however, attempt to show that, contrary to such claims, one can 'naturalize' semantic content. They maintain that terms have their semantic properties in virtue of facts that can be characterized nonnormatively (cf. Loewer, 1996).

One project in foundational semantics that would reject 'naturalization' thus construed is inferentialism (Brandom, 1994). According to it, semantic claims (such as 'dog' denotes dogs) obtain in virtue of it being the case that certain inferences involving the term would be correct to draw, and certain inferences would not. Logical terms provide the best cases for this approach: the claim would be that 'and' means what it does in virtue of the validity of inferences of the form (1) 'A and B' implies A and (2) A, B implies 'A and B.' Among the challenges is to extend this strategy to other terms. In the case of 'dog,' the relevant inferences would include not only transitions (in appropriate circumstances) from the presence of dogs to 'Those are dogs,' but also the inference from 'Those are dogs' to 'Those are mammals' – and much more besides.

Pragmatics and Normativity

Even if the meanings of expressions are not inherently normative, one might claim that what speakers do with expressions is inherently normative. Human language use, at least in core cases, is a species of intentional action, and all such action is done for reasons. One's reasons for acting are subject to normative assessment; they may or may not be *good* reasons. The intentional nature of linguistic action figures prominently in speech act theory (Austin, 1975) and accounts of conversational implicature (Grice, 1989). It also provides one motivation for developing game-theoretic models of language use.

Consider first the study of speech acts. It is often claimed that, for the utterance of a sentence to constitute the performance of a speech act, it must be performed intentionally by a speaker beholden to certain norms, with specific norms attaching to specific speech acts. For example, for the utterance of a particular sentence to constitute an assertion, the speaker must represent herself as having warrant for the truth of the claim asserted, with the result that she can be held accountable if the claim is not true or at least was not asserted on sufficient grounds. The transmission of truth, or perhaps knowledge, is said to be the aim or point of the practice of assertion. In this case, the norms constraining linguistic action would be constitutive of the kind of action at issue (cf. Williamson, 1996).

In performing a specific speech act such as assertion, it is often one's intention to communicate more than just what one asserts. (Sometimes one intends to communicate something *instead* of what one makes as if to assert.) For example, in answer to the question 'Do you think John is coming?' one might utter the sentence 'There's a lot of snow on the roads' in order both to assert that there's a lot of snow on the roads and to communicate that John is probably not coming. Grice (1989) argued that such 'conversational implicatures' are possible because of language users' sensitivity to the reasons for which a cooperative speaker would utter particular sentences in particular conversational contexts. He articulated a set of maxims for cooperative language use – for example, that one be as informative as possible, all else being equal, but also that one refrain from prolixity, all else being equal – that parties to a conversation tacitly assume one another to be observing. Speakers can then rely on hearers to infer an implicature, as in the case above, when doing so preserves the assumption of cooperation. Such maxims are norms that specifically apply to cooperative conversations and that enable speakers and hearers to discern the specific conversational reasons behind linguistic actions.

In the preceeding discussion, statistical norms were sharply distinguished from norms for how things ought to be. But statistical norms, like other nonnormative facts, can have normative upshot; how things are affects what means one should take to achieve one's ends. Conforming to a trend, for example, can in some cases increase the likelihood of obtaining an outcome. This is certainly so with language. Suppose one has an interest in one's utterances being understood. One then has reason to speak in a way that will promote understanding. But then, insofar as there exist statistical norms concerning pronunciation, assignment of meaning, expected prolixity, and other linguistic matters, there is reason to conform to those norms, since those norms will correlate with other language users' expectations. This provides one rationale for using game-theoretic techniques to study both the development of linguistic norms (in the statistical sense) and the ways speakers deploy language on particular occasions (see, e.g., Nowak and Komarova 2001, and with reference to pragmatic phenomena, Parikh, 2001).

Linguistic Properties of Normative Terms

We express normative claims – like any other claims – by using language. Normative expressions such as 'ought,' 'justified,' and 'you should not do that' are thus themselves proper objects of linguistic theorizing. Three examples are the use of deontic logic to capture the content of normative lexical items, expressivism as a non-truth-conditional analysis of normative sentences, and the study of generics.

Deontic logic – a branch of intensional logic – studies the logical relationships among normative expressions. 'It's obligatory that one X,' for example, implies 'It's not forbidden that one X.' Logicians studying such expressions construct formal languages with axioms and inference rules that capture these relations. Such investigations can be construed as contributions to the lexical semantics of the normative terms (see Føllesdal and Hilpinen, 1971).

Expressivism in its most basic form is the doctrine that normative claims such as 'Murder is wrong' do not purport to determine truth-conditions, but rather express an attitude toward a certain kind of action – in this case a negative attitude toward murder. Normative claims on this view are thus no more liable to assessment for truth or falsity than such aesthetic expressions as 'Chocolate: yum!' Expressivism might be motivated by the intuition that normative claims – for example, moral claims – do not purport to express objective facts. Expressivism, however, has difficulty accommodating embedded normative claims. The sentence 'If murder is wrong, then what Mary did was wrong' does not itself express any attitude to murder. This would seem to indicate that the expression of an attitude is not itself among the semantic properties of the expressions used. Moreover, the following argument seems deductively valid: murder is wrong; if murder is wrong, then what Mary did was wrong; therefore, what Mary did was wrong. It's natural to elucidate this validity by viewing the argument as an instance of the truth-preserving inference schema *Modus Ponens*. But this can seem blocked if normative claims do not determine truth-conditions. (For discussion from the perspective of a more sophisticated version of expressivism, see Gibbard, 2003.)

Generic claims – such as 'Dogs have four legs' – provide an example of unobvious normativity. The sample sentence's truth, on the relevant reading, does not depend on the four-leggedness of *all* dogs. (Amputees do not witness its falsity.) Nor does the existence of *some* four-legged dogs suffice for its truth. The claim is not even that *most* dogs have four legs: a generic claim does not report a statistical norm. (It may be true that a spider's life has four stages, even if the vast majority of spiders never make it past the first.) The content of a generic claim is rather normative; *normal* dogs have four legs. Perhaps this is even in some sense how dogs ought to be – at least to conform to conversationally relevant expectations. (On generics generally, see Carlson and Pelletier, 1995.)

See also: Assertion; Austin, John Langshaw (1911–1960); Causal Theories of Reference and Meaning; Chomsky, Noam (b. 1928); Description and Prescription; Evolutionary Theories of Language: Current Theories; Generic Reference; Generics, Habituals and Iteratives; Grice, Herbert Paul (1913–1988); Inference: Abduction, Induction, Deduction; Kripke, Saul (b. 1940); Linguistics as a Science; Norms and Correctness; Politeness; Reference: Philosophical Theories.

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Norms and Correctness

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Traditionally, a language is thought to be structured along a set of rules, or 'norms,' that prevail over all aspects of the language: phonology, morphology, syntax, and semantics. These norms serve to make the language distinctive, intelligible within a wide speech community, and learnable. However, the precise definition of a norm is controversial and difficult. It is important to distinguish between those norms (which I shall call 'descriptive norms') that enable us to describe a language or variety from observation of data, and prescriptive or 'pedagogical norms,' which often reflect some abstract ideal of how a language should be used, rather than the actual practice of native speakers of that language.

Norms and Linguistics

Descriptive norms, then, are intuitive (Itkonen, 1994: 2835) and are acquired rather than learned. Pedagogical norms, on the other hand, are learned and might not be intuitive; this is especially evident when a learned norm does not reflect the practice of the speakers of a language (the traditional prohibition on ending English sentences with a preposition is a good example). Languages are naturally subject to variation and change; without some norms, established naturally or by convention, it is likely that there would be so much individual variation that mutual intelligibility would be nearly impossible. Prescriptive norms often intend to fix the language in a certain state, so that any variation from them would be a violation of the norms of the language, and therefore 'incorrect.'

Norms or rules pertaining to linguistic composition can be quite easily identified across the spectrum of language. For example, the use of the suffix *-s* to form the regular English plural can be described as a 'norm.' Likewise, the inversion of the first auxiliary in an English sentence is the norm for creating a *yes-no* interrogative form. Phonology, too, has an identifiable set of norms: any native (or competent) speaker of English, for instance, would recognize that the sound sequence *belk* is a permissible word in English, even though it is not yet a word; under current norms, however, the sequence *blzr* is not a permissible sound structure to form a word in English. All of these norms are describable and reflect the current state of (some variety of) the language; and all of these norms are subject to change.

Norms also apply to other aspects of linguistic behavior. For example, it is a norm that one would answer a question with a statement appropriate to the question; anyone who does not do so would be behaving against the norms, or 'incorrectly.' However, where we are dealing with aspects of human behavior, rather than the abstract 'structure' of a language *per se*, the boundary between 'norms' and 'correctness' becomes even more blurred.

The concept of the linguistic norm is a crucial one for linguists in both the prescriptive and descriptive traditions. For descriptivists, norms are the means by which a language is described. Thus, the standard practice for the composition of a verb phrase in English is that the complement follows the verb; this can be rewritten as the rule VP → V.DP in a description of the language. Any deviation from this norm is ungrammatical (or, if grammatical, must be explainable by another norm). Likewise, VP → DP.V is the norm for a Japanese VP, as the complement normally precedes the verb. However, it is important to note that speakers in context do not always make consistent use of the 'rules': utterances may consist of 'ill-formed' sentences and phrases that are perfectly well understood in context and are not noted as unusual. This also applies to conversational behavior, in that a question form could legitimately be used

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to answer a question form. One of the most interesting things about linguistic norms is perhaps the fact that, in spoken language, they tend to be inconsistently applied – or even flouted – by native speakers but are always readily identifiable by them.

Indeed, it is in written language where norms are more easily identified and much more rigid. Context can be taken for granted in most speech situations but must be conveyed in the text in written language. There are more cues to aid the hearer in speech, which allows the norms to be more fluid. Love (1994: 773) points out that far more emphasis is placed on correctness via prescriptive norms in a literate society. Unlike speech, which is a passing event (except in the memory), writing provides a permanent record that may be studied and from which conclusions as to how the language should be used may be drawn. Moreover, writing is often based on a standardized language variety and usually contains far fewer dialectal variations than speech, so that, even where dialectal differences may make two varieties of the same language unintelligible, the written varieties are identical (Gleason, 1970: 425).

Correctness and Prescriptivism

'Correctness' can be thought of as insistence upon the consistent application of linguistic norms in the use of a language. A piece of language may be understood easily enough, but not 'correct,' because of some deviation from prescribed norms in terms of pronunciation, structure, or meaning. Even though this poses little threat to intelligibility, 'correctness' – meaning that there is a correct or proper way to use a language – has played a significant role in the histories of most languages, particularly those that are written. This idea of correctness stems from the recognition of, or rather, the attempt to describe, a set of rules that pertain to a language and generally pervades all levels of language. Thus, there is a feeling that there is a proper way to pronounce words (e.g., *car* as [kɑːɹ], not [kɑː] in U.S. varieties); that some morphological processes are more appropriate than others (e.g., *width* rather than *wideness*); that certain syntactic norms must be rigorously enforced (e.g., sentences may not end with prepositions); that certain uses of language are more polite than others; and so forth. Within the wide ambit of that thing we call a 'language,' there is a huge degree of individual, regional, and social variation; the idea of what is correct or proper generally becomes attached to the general set of prevailing linguistic norms associated with an influential or high-status group. This is often imposed upon the whole speech community as the 'standard' associated with the public face of that language, and is the variety usually transmitted to foreigners.

Languages change in time as well as space, and this naturally means that the norms change too. Thus, the insistence upon a correct or proper way to use written language can have the effect of freezing a language in time. Indeed, the effects of this can be seen in languages that have effectively been frozen in time for ritual purposes: e.g., Latin reflects a step in the development of the Romance languages but is no longer mutually intelligible with them, and Koranic Arabic differs widely from the modern vernaculars.

It is often the stated goal of language academies and other organizations devoted to language preservation to keep the language in a state of 'purity.' The source of the notion that a language is 'pure' is not clear, but usually language movements advocating a rigid prescriptivism seek to protect the language (and its community) from outside influence. For example, the Academie Française sought to limit the influence of English on the French language. Similarly, other language movements have sought to limit the influence of modernism, etc.

Norms and Current Linguistic Theory

Despite the vast amount of variation and change that occurs across and within languages, the study of linguistic typology suggests that all languages are based on a set of universal norms. Although this set would appear to be extremely limited, the large number of implicational universals that has been identified suggests that there is in fact a set of norms that governs linguistic variation.

Similarly, 'generativist linguists' theorize that there exists a set of universal principles, comparable to norms, that govern what is a 'potential human language' and parameters that govern linguistic variation and change, all of which are available through an innate language faculty or 'universal grammar.' Beginning with Saussure, the trend in modern linguistics has been away from prescriptivism, in the direction of descriptivism. The task of the descriptive linguist is to describe the 'spoken language'; however, as Love (1994: 79) points out, raw speech is full of phenomena that have to be discounted if one hopes to arrive at a description of the structure of the language. As already mentioned, the availability of context in the speech situation allows for much more fluidity in the application of norms; moreover, an utterance of the same sentence can mean different things on different occasions. This led to Saussure's distinction between 'langue' and 'parole' – ideas comparable to Chomsky's 'competence' and 'performance,'

respectively. For Chomsky, the speech situation is too full of extraneous, extralinguistic factors for speech alone to be a reliable indicator of what the language is like. Chomsky (1965: 3) insisted that language could only be perfectly studied through the hypothetical 'ideal speaker-listener,' living in a homogenous speech community and unaffected by extralinguistic (but entirely human) characteristics such as memory loss, shifts of attention, etc. More recently, he has developed this idea further to say that the state of any individual's language faculty is largely accidental, a result of personal experience, and "of no particular interest in itself" (Chomsky, 1995: 6f.). For Saussure, 'langue,' the invariant language of a speech community, is self-consistent, fixed, and invariant, existing in the collective mind of a speech community, although not consistently reflected in individual behavior (see Love, 1994: 779). The modern trend, then, is to perceive language itself as fundamentally normative (whether this is natural or conventional remains open for debate), and to describe language and languages in terms of these observed norms.

See also: Chomsky, Noam (b. 1928); Descriptions, Definite and Indefinite: Philosophical Aspects; Generative Grammar; Grammar; Linguistic Habitus; Saussure, Ferdinand (-Mongin) de (1857–1913); Verbal Hygiene.

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Norse and Icelandic

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Terminology and Historical Relations

Norse, or more specifically Old Norse, is a branch of medieval North Germanic (*see* **Germanic Languages; Indo–European Languages**). Old Norse is another name for Old West Nordic, referring to the language spoken from about 800 A.D. to the late 14th century in Norway and to the mid-16th century in Iceland. It was also spoken in the Faroe Islands, and in the Norse (Viking) settlements in the British Isles and Greenland. In a narrower sense, Old Norse is often used interchangeably with Old Icelandic, since most of the transmitted texts were written in Iceland. Modern Icelandic is the language of Iceland from the mid-16th century onwards, and is spoken today by about 290 000 people (*see* **Iceland: Language Situation**).

The earliest documented stage of North Germanic is Ancient Nordic (also known as Proto-Nordic, Runic Norse, or Early Runic), attested in runic inscriptions in the Old Germanic writing system, the *futhark*, dating from about 150 to 800 A.D. (*see* **Runes**). Towards the end of this period North Germanic began to divide into Old Norse (gradually splitting into Old Norwegian and Old Icelandic), on the one hand, and Old East Nordic (Old Danish, Old Swedish, and Old Gutnish), on the other.

Despite being in origin a West Nordic language like Icelandic and Faroese, Modern Norwegian has developed characteristics that are closer to Danish and Swedish (*see* **Norwegian**). Therefore, the modern Nordic (or Scandinavian) languages can be grouped into Mainland Scandinavian (Swedish, Danish, and Norwegian) and Insular Scandinavian (Icelandic and Faroese).

From Old Norse to Modern Icelandic

The evidence for Old Norse almost exclusively comes from Norway and Iceland; early documentation of Faroese is much poorer, and that of Norse in other areas settled by Norsemen is very scanty. Early on, linguistic innovations started to separate Old Norwegian from Old Icelandic, but the differences between them did not become significant until the 14th century. The oldest Icelandic manuscripts do not display dialect variation, which may indicate leveling of putative preexisting dialect differences among the settlers, most of whom are reported to have come from Norway, either directly or via the British Isles. The most copious source of evidence involves prose texts

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transmitted in manuscripts in the Latin script, the earliest dating from the 12th century. Particularly important for the study of Old Icelandic phonology is the so-called First Grammatical Treatise (ca. 1150), an outstanding work in terms of its scientific precision and methodological rigor (*see* **First Grammatical Treatise**). A further source is found in two types of Old Norse poetry, the 'eddic' and 'scaldic' poems. Both types of poetry preserve numerous archaic features, in part due to their metrical form, and thus they represent a linguistic stage predating the earliest written texts. Finally, there are runic inscriptions in Old Norse, mostly from Norway but also from Iceland. There has been an unbroken written tradition from Old Norse to Modern Icelandic.

Phonology

Ancient Nordic had five vowels, which could be long or short, and three diphthongs. Due to umlaut, breaking and other sound changes, however, Old Norse had, by the mid-12th century, developed a system of twenty-six vowel phonemes and three diphthongs. In this system not only vowel quantity but also nasality were distinguished, but the latter distinction (which only pertained to long vowels) was lost early on. In the following centuries some further changes occurred in the vowel system, the most important being the loss of distinctive vowel length. This change, known as the 'great quantity shift,' took place in Icelandic in the 16th century, but in the three preceding centuries it had affected most of the other Nordic languages. As a result of these changes, the Modern Icelandic vowel system, consisting of eight vowel phonemes and five diphthongs, is very different from that of Old Norse, although the effects of the changes are obscured by conservative orthography. By contrast, the consonant system has remained more stable from Old Norse to Modern Icelandic. Certain characteristics of Modern Icelandic consonants are rare in other languages, e.g., preaspiration of voiceless stops (*happ* [hahp] 'luck') and devoicing of sonorants (*milt* [mi̥lt] 'mild,' *fínt* [fi̥nt] 'fine'). However, such sounds also occur in Faroese and some Norwegian dialects, which may point to a common origin in Old Norse. Moreover, similar characteristics in neighboring languages, Scots Gaelic and North Sámi (Saami, Northern), are possibly due to contact between these languages and Old Norse.

Morphology

Old Norse is distinguished from its Germanic relatives by two notable morphological innovations. The first involves the development of a definite article, which can be free or suffixed to the noun; in either case the noun and the article both inflect. There is no indefinite article in Old Norse, a situation which has been preserved in Modern Icelandic but not in the other modern Nordic languages. The second innovation is 'middle' verbs characterized by an ending which originated as an enclitic reflexive pronoun. The middle has various meanings, such as reflexive, reciprocal, anticausative, and passive. The last meaning is uncommon in Old Norse and Modern Icelandic, but has become the dominant one in Mainland Scandinavian.

Otherwise, most morphological categories known from other Old Germanic languages recur in Old Norse and, by and large, in Modern Icelandic as well. These include the four cases of nouns, pronouns, and adjectives, and three degrees of comparison for most adjectives and some adverbs. Nouns are inherently masculine, feminine, or neuter, but pronouns and adjectives agree in gender with the noun they modify. Finite verbs are inflected in three persons, two tenses (present, past), and three moods (indicative, subjunctive, imperative). The nonfinite verb forms comprise the infinitive and the present and past participles.

There are two numbers (singular and plural) in Old Norse, with the sole exception of the first and second person personal and possessive pronouns that preserve the dual number as well. In Icelandic the pronominal dual replaced the plural forms, whereas the old plural forms were restricted to honorific (formal) usage; in the past few decades the use of the honorific forms has decreased so that they are by now obsolete.

Syntax

Old Norse is a verb second (V2) language: the finite verb obligatorily occurs no later than in second position in all main clauses. V2 is an innovation in Germanic *vis-à-vis* other Indo-European languages, which may originally have been limited to certain main clause types and then generalized to all main clauses. Moreover, in Old Norse the finite verb occurs in second position in subordinate clauses as well, presumably due to an extension of the main-clause pattern. This pattern ('symmetric V2') has been preserved in Modern Icelandic but not in Mainland Scandinavian.

Old Norse also has verb-initial clauses (V1), e.g., in direct questions, commands (imperatives), and conditional clauses. Declarative main clauses exhibiting V1 are frequent in narrative contexts ('narrative inversion').

In noun phrases (NPs), adjectival and pronominal modifiers regularly precede the head noun in Old Norse, but they may also follow it. Possessive genitives, on the other hand, generally follow the head noun, and this is also the case in Modern Icelandic.

In Old Norse the order of the nonfinite verb relative to an object in the verb phrase (VP) can be either verb-object (VO) or object-verb (OV). Such variable VP order also occurs in Old English. In Modern Icelandic OV orders were lost rather abruptly in the beginning of the 19th century, several hundred years later than in most other Nordic languages. The only exceptions to the strict VO pattern in Modern Icelandic are found with negative objects, which obligatorily precede the verb, and quantified objects, where either order may occur.

In the neutral word order in both main and subordinate clauses the subject occurs initially, immediately followed by the finite verb in second position (V2). In clauses containing a fronted nonsubject, the subject regularly follows the finite verb, although it may also occur further to the right, and even be extraposed to the end of the clause. Topicalization of VPs is ungrammatical in Modern Icelandic and seems not to be attested in Old Norse prose. However, fronting of nonfinite verbs (past participles, infinitives), as well as other head-like elements, is very common. This is 'stylistic fronting,' which only occurs in clauses that do not contain an overt subject ('subject gap').

As in other Germanic languages with morphological case, in Old Norse and Modern Icelandic subjects are typically in nominative case, direct objects in accusative case, and indirect objects in dative case. Various other patterns exist, however; in particular, dative objects are more common than in other Germanic languages. A further noteworthy characteristic is the occurrence of oblique (or 'quirky') subjects in Modern Icelandic (and Faroese). The status of the corresponding oblique NPs in Old Norse has been a matter of some controversy, but it is clear that in some respects they pattern syntactically with nominative subjects rather than with unambiguous objects. There is a tendency among some speakers of Icelandic to generalize dative case at the expense of accusative on some oblique subjects ('dative sickness'), or to replace the oblique case by nominative ('nominative substitution').

The emergence of a nonreferential or 'expletive' element, homonymous with the singular neuter pronoun *það* 'it,' was an innovation that gained ground in Icelandic in the latter half of the 18th century. About the same time, referential null arguments (*pro*-drop), occurring under certain rather well-defined conditions in Old Norse and early Modern Icelandic, were largely lost. A further innovation, apparently much more recent, is the 'new impersonal construction' (also called the 'new passive'), which has passive verb morphology (an auxiliary verb 'be' plus a past participle) but an accusative object in postverbal position. This phenomenon does not seem to have a match in other Germanic languages, but there are typological parallels further afield, e.g., in Polish and Irish (Gaelic, Irish).

In archaic Old Norse (eddic and scaldic poetry), negation was expressed by a verbal prefix *ne* 'not,' also found in other Old Germanic languages. At this early stage of Old Norse the prefix could cooccur with a suffix (*-a* or *-at*) attaching to the finite verb, so that together the prefix and the suffix formed a discontinuous negation. These forms were lost early on, and negation came to be expressed by sentence adverbs (cf. Icelandic *ekki*, Danish *ikke* 'not').

Vocabulary

The Old Norse vocabulary belongs to the common Germanic stock. In addition to the inherited material, it contains a number of cultural loans from neighboring languages that the Vikings were in contact with. In Icelandic a few Celtic loanwords date from the earliest period, which is comprehensible in light of the fact that some of the Norse settlers came to Iceland via the British Isles, where they had been living in the proximity of Celts. Christianity, introduced in Iceland in the year 1000, led to an influx of new loanwords relating to religious and scholarly concepts, either directly from Latin or through intermediaries, especially Old English and Old Saxon. Further contact, especially trade and translations of the literature of chivalry, brought new loans from Low German that were mostly transmitted via Norwegian, although some of them were ultimately of French or Latin origin. In the wake of the Reformation in the mid-16th century more loanwords entered the language, in particular from High and Low German. The transmission mostly followed via Danish, which remained the most influential foreign language in Iceland until the middle of the 20th century. Since then the influence of English has been increasing steadily. A recent survey indicates that today, English is used more on a daily basis in Iceland than in any other Nordic country.

Despite long-standing contact with other languages, the vocabulary of Modern Icelandic is closer to Old Norse than that of any other Nordic language. This situation has in part been achieved by conscious effort. There is a long tradition of countermovement, dating back at least to the 18th century, against the infiltration of the language by foreign words and expressions, and language purism has been practiced as an active language policy since the mid-19th century. According to this policy, neologisms are created for new concepts (e.g., *sími* 'telephone,' *tölva* 'computer') rather than adopting words from other languages. Moreover, attempts have been made to resist

phonological, morphological, and syntactic changes, even by resurrecting some archaic patterns; while some of these attempts have been quite successful, others have failed. The old custom of patronymics (*Höskuldsson* 'son of Höskuldur,' *þórhallsdóttir* 'daughter of þórhallur') has been preserved to a large degree, with the active support of the public authorities. The use of metronymics is also an option, although much less common, but it seems to have increased somewhat in recent years (*Guðrúnardóttir* 'daughter of Guðrún,' *Hrafnbjargarson* 'son of Hrafnbjörg'). In the Icelandic telephone directory people are generally listed under their first name.

Archaism and Innovation in Icelandic

Icelandic is often claimed to be a 'conservative' language that has preserved many archaic features, and it is probably true that it is no more difficult for the modern Icelander to read the Old Icelandic 13th-century sagas than it is, for example, for speakers of English to read Shakespeare. Moreover, despite a certain amount of geographically distributed language variation, which mainly affects pronunciation, there appear never to have been well-defined local dialects in Iceland with numerous distinctive characteristics. Nor are there strong contrasts between a standard and substandard register, at least compared to many other countries. Some possible reasons for this stability may be the geographic isolation of the country, an active conservative literary tradition, and a strong tradition of language purism. Nevertheless, as indicated above, numerous innovations have taken place since Old Norse, mostly affecting the phonology and syntax of the language rather than its morphology.

See also: First Grammatical Treatise; Germanic Languages; Iceland: Language Situation; Indo–European Languages; Norwegian; Runes.

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North Mariana Islands: Language Situation

Editorial Team

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The North Mariana Islands are a group of 14 isles located in the North Pacific Ocean about three-quarters of the way from Hawaii to the Philippines. Although sighted in 1521 by Ferdinand Magellan, who named them the Ladrones Islands (Thieves Islands), the Marianas were not settled by Europeans until 1668, when Spanish Jesuits arrived with the mission of converting the indigenous Chamorro people to Catholicism. The Mariana Islands, so renamed by the missionaries upon their arrival, remained a nominal possession of Spain until 1898, the year in which Germany bought them, with the exception of Guam, which was ceded to the United States. The islands belonging to Germany were seized by Japan in 1914 and were mandated to Japan by the League of Nations in 1920. During World War II, U.S. forces occupied the Marianas, and in 1947 the islands, exclusive of Guam, were included in the U.S. Trust Territory of the Pacific Islands. North Mariana residents approved separate status for the islands as a U.S. commonwealth in 1975. They became internally self-governing under U.S. military protection in 1978, and trust territory status was officially ended in 1986.

The official language of the North Mariana Islands is English, but there are three other national languages, all of them Austronesian: Carolinian (about 3000 indigenous Carolinians as of 2004), Chamorro (about 17 000 indigenous Chamorros as of 2004), and Tanapag (no estimates available). In fact, approximately 85% of the population of 69 221 (2000 census) speaks a language other than English at home, in part because the North Mariana Islands have a high number of workers of foreign extraction. For example, the governmental census of 1990 reported more than 20 000 Filipinos and 7000 Chinese (the possibility of having 'Made in USA' labels on products produced on the North Mariana Islands at low cost has attracted many industries). Carolinian, a Trukic language, is spoken on the islands of Agrihan, Anatahan, and Saipan. All Carolinian speakers on the latter are bilingual in Chamorro, and most also speak English. On Saipan, the capital island, there are also speakers of Tanapag, another Trukic language. They tend to have a limited bilingual proficiency in English or Chamorro, although it must be noted that in the traditionally Tanapag-speaking area, those under 30 years of age do not speak Tanapag but use Chamorro instead. There is now an attempt to promote Tanapag. Chamorro is spoken on the islands of Rota, Tinian, and Saipan, where it is also used as a trade language; Chamorro speakers present some bilingualism in English. The only television station and the 6 radio stations in the North Mariana Islands broadcast mainly in English, although the other national languages are also featured. Reception of satellite television channels is easy on the islands.

See also: Austronesian Languages: Overview; Guam: Language Situation.

Language Maps (Appendix 1): Map 150.

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North Philippine Languages

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There are reported to be around 70 languages spoken in the north of the Philippines, nearly half of the total number of Philippine languages (Grimes and Grimes, 2000). For the purpose of this article, these languages include all of those spoken to the north of Manila, on the island of Luzon, and on the islands of the Batanes group, located in the Bashi Channel between Luzon and Taiwan. All of these languages belong to the branch of the Austronesian family, commonly referred to as Malayo-Polynesian (but in some works as Extra-Formosan), that began with the movement of Austronesian Neolithic seafaring people from what is now called Taiwan to eventually settle all of the Philippines and ultimately the rest of the Pacific. Recent archaeological evidence (Bellwood *et al.*, 2003: 158) suggests that this movement began around 4000 years ago, with a small group of Austronesian people leaving the eastern coast of Taiwan, settling the Batanes Islands and eventually reaching the northern coast of

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Luzon. The Philippines was already occupied at that time by a large number of Negrito bands of hunter-gatherers, most of which are already extinct or which have been completely assimilated by the technologically superior inmigrating Austronesians. There are still, however, more than 20 groups of Negritos located in relatively remote areas of the northern Philippines. About 15 of these groups, variously called Agta, Alta, and Arta, live in and around the Sierra Madre mountain range, with five or more groups called Ayta scattered around the Sambal mountain range in the west of Luzon. All Negrito groups adopted the language of their closest Austronesian neighbors in the distant past (Reid, 1987), but today they have diverged to the point where they speak languages which are clearly distinct from those of their neighbors. The Negrito languages are now highly endangered, because of the continuing pressure to integrate with their non-Negrito neighbors and the influence of the local trade languages.

Three of the languages in the northern Philippines, Ilokano (Ilocano) (with 6 636 000 speakers, or approximately 8.7% of the total Philippine population of 76 504 000, according to the National Statistics Office of the Philippines 2000 Census of Population and Housing), Kapampangan (Pampangan) (with 2 066 800 speakers, or 2.7%), and Pangasinan (with 1 185 600 speakers, or 1.5%) are referred to as 'major' languages, based on number of speakers. Of these, Ilokano is most important, being widely spoken as a second language and used as a language of wider communication throughout the north of Luzon. These three languages belong to three different subgroups of Philippine languages. Ilokano is a first-order branch of the major language family in the north of the Philippines, referred to as northern Luzon or Cordilleran (Reid, 1979). Pangasinan is a member of the Central–Southern branch of the same family, while Kapampangan groups with the Sambalic languages, and possibly ultimately with the Batanic languages Itbayat and Ivatan, spoken in the far north of the Philippines (and their closely related language, Yami, spoken on Lányŭ or Orchid Island in Taiwan).

Tagalog has been used for a long period as a lingua franca in some areas of the northern Philippines, particularly on the eastern coast of Luzon, as far north as Paranan, with extensive influence on languages spoken in the area. In addition, in the guise of Filipino, the national language of the Philippines, the language has in recent years been moving out of the classroom throughout northern Luzon and into the daily lives of the younger generation, competing with Ilokano as a tool for communicating with outsiders.

The northern languages of the Philippines have a type of syntax that is found throughout the country (Reid and Liao, 2004). Predicates typically occur at the beginning of constructions, only allowing topicalized NPs to precede them. Noun phrases are typically introduced by one of a series of short, often monosyllabic forms which specify semantic features of the lexical head of the phrase, whether it is a common or personal noun, whether it is singular or plural, and in some languages its spatial or temporal relationship to the speaker. This form may also mark the case of the noun. Nominative (or absolutive) NPs are typically unmarked for case when they are lexical nouns, but are case marked when a pronominal substitute replaces them.

Each of the languages is morphologically ergative, with the patientlike noun phrase of transitive sentences being marked in the same way as the single argument of intransitive sentences, while the agentlike noun phrase of transitive sentences is marked in the same way as that of genitive constructions within a noun phrase.

Intransitive constructions are either monadic (having a single core argument) or dyadic (having two core arguments). The latter construction is amenable to an antipassive analysis, with the patientlike oblique argument being typically indefinite and marked with the same case marking as that used for locative noun phrases, unlike Tagalog, which marks such oblique NPs as genitives. Intransitive constructions are often referred to in the literature as 'actor–focus,' in that the morphology on the verb conveys the information that the nominatively marked NP is an 'actor.' Transitive constructions are typically considered to constitute at least four different types, 'goal focus,' 'locative focus,' 'instrument focus,' and 'benefactive focus,' depending on the morphology of the verb. Structurally these constructions are identical. They differ only in the semantic interpretation of the nominative NP of the sentence.

The northern languages of the Philippines tend to be more complex phonologically than other Philippine languages, which typically have only four or five vowels. Casiguran Dumagat Agta, for example, has developed an eight-vowel system, while Balangaw (Balangao), a Central Cordilleran language, is reported to have seven vowels. Karao, a southern Cordilleran language, has developed a series of fricatives /f/, /θ/, and /x/, which are unusual in Philippine languages. Several of the languages have very complex morphophonemic (sandhi) alternations. These include Ibanag, a northern Cordilleran language (Brandes and Scheerer, 1927–1928), and Karao and its sister language, Inibaloi (Ibaloi) (Brainard, 1994). Some dialects of Bontok (Bontoc), Ifugao, and Kalinga exhibit a complex range of often voiceless fricative or affricate prevocalic variants of their voiced

stops, /b/, /d/, and /g/, such as Guinaang Bontok [f], [ts], and [k̚ʰ] (Himes, 1984–1985), which because of the influence of English in the schools are losing their environmental conditioning and are now becoming separate phonemes in the languages (Reid, 2005).

Published text resources are available on a number of Cordilleran languages. Moreover, one of the finest dictionaries of a Philippine language is that of the central Cordilleran language Ifugao (Newell, 1993).

See also: Austronesian Languages: Overview; Ergativity; Kapampangan; Malayo-Polynesian Languages; Philippines: Language Situation; Tagalog.

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Norway: Language Situation

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Norwegian is a North Germanic language, spoken by around 4.5 million inhabitants of Norway and a small number of speakers elsewhere, principally emigrant workers in other Scandinavian countries and the United States, although Ethnologue also notes groups of speakers in Canada, Ecuador, and the United Arab Emirates. The spoken language is characterized by rich dialectal variation, resulting historically from small groups of speakers spread across a large area with poor internal communications. Systematic dialectology has been a fertile branch of linguistic enquiry in Norway since the second half of the 19th century. Dialectal variation is a feature of all social groups and is relatively little stigmatized. The written language situation is more complex, and written Norwegian provides the classical example of language planning.

Following political independence from Denmark in 1814, several proposals for the establishment of a native written language were put forward. The two most vigorously pursued were the work of Ivar Aasen (1813–1896) on the one hand and Knud Knudsen (1812–1895) on the other. Aasen, with the backing of the State, created a new written language based on extensive and pioneering dialect fieldwork, and Knudsen pursued a policy of Norwegianization of the inherited Danish. Both policies had their opponents, but in 1885 the two varieties were placed on an equal footing by Parliament, leading to the written standards initially known as Landsmaal and Riksmaal, respectively, but renamed Nynorsk and Bokmål in 1929. Norwegian language politics in the first half of the 20th century were characterized by a series of official reforms intended to bring the two varieties closer together. The reforms of 1917 and 1938 in particular were underpinned by the ultimate goal of creating one common Norwegian, Samnorsk. This policy was never popular, and protests were especially vehement in the 1950s,

stops, /b/, /d/, and /g/, such as Guinaang Bontok [f], [ts], and [k̚ʰ] (Himes, 1984–1985), which because of the influence of English in the schools are losing their environmental conditioning and are now becoming separate phonemes in the languages (Reid, 2005).

Published text resources are available on a number of Cordilleran languages. Moreover, one of the finest dictionaries of a Philippine language is that of the central Cordilleran language Ifugao (Newell, 1993).

See also: Austronesian Languages: Overview; Ergativity; Kapampangan; Malayo-Polynesian Languages; Philippines: Language Situation; Tagalog.

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Norway: Language Situation

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Norwegian is a North Germanic language, spoken by around 4.5 million inhabitants of Norway and a small number of speakers elsewhere, principally emigrant workers in other Scandinavian countries and the United States, although Ethnologue also notes groups of speakers in Canada, Ecuador, and the United Arab Emirates. The spoken language is characterized by rich dialectal variation, resulting historically from small groups of speakers spread across a large area with poor internal communications. Systematic dialectology has been a fertile branch of linguistic enquiry in Norway since the second half of the 19th century. Dialectal variation is a feature of all social groups and is relatively little stigmatized. The written language situation is more complex, and written Norwegian provides the classical example of language planning.

Following political independence from Denmark in 1814, several proposals for the establishment of a native written language were put forward. The two most vigorously pursued were the work of Ivar Aasen (1813–1896) on the one hand and Knud Knudsen (1812–1895) on the other. Aasen, with the backing of the State, created a new written language based on extensive and pioneering dialect fieldwork, and Knudsen pursued a policy of Norwegianization of the inherited Danish. Both policies had their opponents, but in 1885 the two varieties were placed on an equal footing by Parliament, leading to the written standards initially known as Landsmaal and Riksmaal, respectively, but renamed Nynorsk and Bokmål in 1929. Norwegian language politics in the first half of the 20th century were characterized by a series of official reforms intended to bring the two varieties closer together. The reforms of 1917 and 1938 in particular were underpinned by the ultimate goal of creating one common Norwegian, Samnorsk. This policy was never popular, and protests were especially vehement in the 1950s,

when the policy was being most actively pursued. Since the 1960s a series of developments has led to a gradual stalling of this policy, and in 2002 it was abandoned. Policy is now to leave the two varieties to develop in their own way, and while the Language Council has been disbanded, a new language agency is to be set up in its place, although its role and powers are, at the time of writing, unclear.

The majority of Norwegians use a moderately conservative form of Bokmål in writing, a variety that opponents of the reform process identify as Riksmål to distinguish it from the more radically engineered Bokmål. Riksmål has its own dictionary and an influential pressure group, The Norwegian Academy for Language and Literature. Advocates of a more conservative variety of Nynorsk, closer to the form originally proposed by Aasen, identify and champion another variety still, known as Høgnorsk. This has no official status, and its pressure groups are, at the time of writing, in some disarray.

See also: Aasen, Ivar Andreas (1813–1896); Danish; Germanic Languages; Norwegian.

Language Maps (Appendix 1): Map 136.

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Norwegian

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Sociohistorical Setting

Norwegian together with Danish and Swedish constitute the Mainland Scandinavian languages, which, together with the Insular Scandinavian languages, Faroese and Icelandic, constitute the Scandinavian languages. The Scandinavian languages belong to the Germanic family of the Indo-European languages.

Norwegian is exceptional in having two officially recognized written standards. These are called *Bokmål* 'book language' and *Nynorsk* 'New Norwegian'. Bokmål is used by more than 80% of the population, whereas Nynorsk is used by less than 20%, mainly in the area stretching from the interior of southern Norway to the western coast. As for the spoken language, there is a rich variety of dialects, although all of them are mutually intelligible. The use of (nonstandard) dialects is widely accepted, even in more formal contexts. There is no officially recognized standard for the spoken language. It is important to note that Bokmål and Nynorsk are written standards that individuals choose largely irrespective of which dialectal variety they speak.

The two written standards have their background in the history of Norway. From 1380 to 1814, Norway was in a political union with Denmark, and Danish was used as a written language. Eventually, during the flourishing of nationalism after 1814, a Dano-Norwegian written standard was developed in the 19th century, bringing Norwegian elements into the Danish language. This standard gradually evolved into present-day Bokmål. Also, in the 19th century, a more radical approach was followed by Ivar Aasen (1813–1896). He developed a written standard based on the spoken dialects. This standard gradually evolved into present-day Nynorsk.

Today, Bokmål and Nynorsk are quite similar, but there are still certain spelling differences both regarding content words and grammatical morphology. In the description of Norwegian below, I will concentrate on the common structural features of the spoken language as a whole. All examples are written in the Nynorsk standard unless otherwise stated.

Morphology and Phonology

Finite verbs in Norwegian only show tense distinctions (past, present). There are two nonfinite verb forms, the infinitive and the past participle, and an adjectival

when the policy was being most actively pursued. Since the 1960s a series of developments has led to a gradual stalling of this policy, and in 2002 it was abandoned. Policy is now to leave the two varieties to develop in their own way, and while the Language Council has been disbanded, a new language agency is to be set up in its place, although its role and powers are, at the time of writing, unclear.

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See also: Aasen, Ivar Andreas (1813–1896); Danish; Germanic Languages; Norwegian.

Language Maps (Appendix 1): Map 136.

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Norwegian

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Today, Bokmål and Nynorsk are quite similar, but there are still certain spelling differences both regarding content words and grammatical morphology. In the description of Norwegian below, I will concentrate on the common structural features of the spoken language as a whole. All examples are written in the Nynorsk standard unless otherwise stated.

Morphology and Phonology

Finite verbs in Norwegian only show tense distinctions (past, present). There are two nonfinite verb forms, the infinitive and the past participle, and an adjectival

present participle form. Example (1) shows the inflectional paradigm for the weak verb *kjøpe* 'buy'.

(1) kjøpe (infinitive) - kjøper (present) - kjøpte (past) - kjøpt (past participle)

Nouns have no productive case distinctions. However, they inflect for number (singular, plural) and definiteness (definite, indefinite), and there are three genders (masculine, feminine, neuter). Example (2) shows the paradigm for the feminine noun *geit* 'goat'.

(2)

	sg		pl
indef	geit	'goat'	geiter 'goats'
def	geita	'the goat'	geitene 'the goats'

As shown, definiteness is marked inflectionally as a suffix (*-ene* is a portmanteau morph expressing both definiteness and plurality). There is also a free-form indefinite article, varying according to gender; *ei* is the feminine form, as in *ei geit* 'a goat'.

Adjectives show agreement in gender (m/f and n) and number (sg, pl) in predicative and attributive positions.

As for phonological properties, Norwegian dialects have relatively rich vowel and consonant systems. Also, Norwegian dialects make extensive use of diphthongs. In most dialects, tones may have distinctive function.

Syntax

Norwegian is a SVO language with fixed word order, cf. (3).

(3) Mannen kjøper geita.
'The man buys the goat.'

Norwegian is also a verb second (V2) language, with the finite verb in second position in main declarative clauses. Thus, topicalization of the direct object in (1) yields *geita kjøper mannen* 'the goat the man buys' with the finite verb in the V2 position.

Auxiliary verbs are positioned between the subject and the main verb, as in *mannen har kjøpt geita* 'the man has bought the goat'. Finite auxiliary verbs follow the V2 pattern, cf. *geita har mannen kjøpt* 'the goat the man has bought'.

Adverbials are positioned in the middle field (sentence adverbials) or toward the end of the clause (predicate adverbials).

(4) Mannen har aldri kjøpt geiter på ein søndag.
'The man has never bought goats on a Sunday.'

Like other V2 languages, Norwegian shows an asymmetry between main and embedded clauses as to the relative distribution of sentence adverbial and finite verb, compare (4) to the embedded clause in *eg veit at mannen aldri har kjøpt geiter på ein søndag* 'I know that the man has never bought goats on a Sunday'.

Norwegian has a strict subject requirement in finite clauses. If there is no semantic subject, an expletive subject must be inserted.

(5a) Det regnar.
'It rains.'

(5b) Det står ei flaske på bordet.
it stands a bottle on table-the
'There is a bottle standing on the table.'

In most dialects, *det* 'it' is used as expletive subject in both meteorological (5a) and presentational (5b) sentences. Some dialects allow *der* 'there' as an expletive subject in addition to *det* 'it'.

Norwegian has two main types of passive, namely periphrastic passive and reflexive (*s-*) passive. Example (6b) is written in the Bokmål standard.

(6a) Geita blir kjøpt (av mannen) i dag.
goat-the becomes bought (by man-the) to day
'The goat is bought by the man today.'

(6b) Geita kjøpes (av mannen) i dag.
*goat-the buy-*s *(by man-the) to day*
'The goat is bought by the man today.'

Both types allow impersonal passive, as e.g., in *det blir kjøpt ei geit i dag* 'there is bought a goat today'.

There are two main types of interrogative clauses: yes/no questions (formed by placing the finite verb in initial position) and questions with a question word (with the question word placed in initial position). As for relative clauses, the most common type is introduced by the complementizer *som*. The complementizer is optional if the relativized position is a nonsubject, as in *geita (som) mannen kjøpte* 'the goat (that) the man bought'. Infinitival clauses are introduced by the infinitive marker *å* 'to', as in *mannen prøver å kjøpe geita* 'the man tries to buy the goat'.

See also: Aasen, Ivar Andreas (1813–1896); Danish; Inflection and Derivation; Language/Dialect Contact; Language and Dialect: Linguistic Varieties; Morphological Typology; Norse and Icelandic; Norway: Language Situation; Scandinavian Lexicography; Subjects and the Extended Projection Principle; Swedish.

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Noun Phrases

J R Payne

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The term 'noun' is used to describe the class of lexical items whose prototypical members refer to entities (*chair, film, leg*), substances (*butter, concrete, blood*), and named individuals or locations (*John, Paris, France*). Traditionally, the term 'noun phrase' has then been used to describe any phrase consisting of a noun as its central constituent (or 'head') and capable of functioning as an argument (e.g., subject or object) in a sentence. Examples, in which the head nouns are in bold type, are: *my big red* **chair**, *the* **butter** *on the table*; **John**, *who is a lion-tamer*. The structure of noun phrases, which in many respects appears to be as complex as the structure of sentences, has become a controversial issue. While some linguists maintain that noun phrases are headed by nouns, others insist that the head of a noun phrase should be the 'determiner' (e.g., the definite article *the* in ***the*** *butter on the table*). According to these theorists, noun phrases should really be called 'determiner phrases.'

Nouns

Nouns can be divided into a number of important subclasses based on their grammatical and semantic properties. These subclasses relate to 'definiteness,' 'person, 'number,' and 'gender,' and they play a major role in determining what categories can cooccur with a given noun in a noun phrase.

Definiteness

One subclass of nouns, the subclass of proper nouns whose prototypical members refer to named individuals or locations, contains nouns whose reference is exclusively definite (i.e., when the speaker uses such a noun, he or she indicates that the hearer will be able to identify the proposed referent by locating some mutually manifest set which consists uniquely of the named individual or location). In some languages, proper nouns are used in conjunction with definite articles (e.g., Greek *o Yanis* (literally 'the John')), which gives a noun phrase whose definiteness is indicated both by the noun and by the article. In other languages, this redundancy may be avoided and a noun phrase may consist of the proper noun alone. The majority of proper nouns in English are of this type (e.g., *John, Paris, France*); however, some proper nouns (e.g., *the Hague, the Netherlands*) require the use of the article.

Opposed to proper nouns are common nouns, for which a distinction between definite and indefinite reference is possible. In indefinite reference, the speaker does not indicate to the hearer that the hearer will necessarily be able to locate a mutually manifest set in which the referent can be found. Indefinite reference is therefore either used when some new entity or substance is being introduced into the discourse (*Yesterday I saw* ***a film in which Meryl Streep played a New York psychiatrist***), or, if a set mutually manifest to both speaker and hearer can be found, to indicate that the referent is not unique within that set. In the sentence *John lost* ***a leg*** *in the war*, a set of two legs belonging to John may be mutually manifest to speaker and hearer, but if only one leg has been lost, indefinite reference is forced (see Hawkins, 1991).

In languages which distinguish between definite and indefinite articles, common nouns are able to occur with both. English has definite article *the* and indefinite articles *a* and *some*, giving a contrast between *the film* and *a film*, and *the butter* and *some butter*. With proper nouns, on the other hand, the use of contrasting definite and indefinite articles involves special interpretations: *I met* ***a John*** *at the party, but I don't think it's the person you mean*; ***The John that I met at the party*** *isn't present today*. In this case, it can be said that *John* has been reclassified as a common noun meaning something like 'person named John.'

Person

Distinctions of person are typically carried by a special class of nouns called personal pronouns, for example, *I* (first person singular), *you* (second person singular), *he/she/it* (third person singular), and *they* (third person plural) in English. These are similar to proper nouns in that they have definite reference, and do not cooccur with the definite article: **the you*.

Common nouns are neutral with respect to person. When nouns are used with standard determiners such as the articles or demonstratives, the noun phrase is usually interpreted as having third-person reference, but, as pointed out by Postal (1966), common nouns can also be combined in English with first-person plural *we* and second-person plural *you* to give noun phrases such as *we students* and *you students*. *We* and *you* can therefore be analyzed as first- and second-person person determiners in English, rather than as personal pronouns.

The neutrality of common nouns with respect to person is especially clear in Nama (Namibia). In Nama, all noun phrases contain a final marker

showing the person (as well as the number and gender) of the phrase. These markers are as follows (excluding special plural forms for mixed masculine and feminine phrases):

	Masculine			Feminine		
	Sing	Dual	Pl	Sing	Dual	Pl
First person	*-ta*	*-khom*	*-ge*	*-ta*	*-m*	*-se*
Second person	*-ts*	*-kho*	*-go*	*-s*	*-ro*	*-so*
Third person	*-b*	*-kha*	*-gu*	*-s*	*-ra*	*-di*

All these markers can be attached to any common noun, giving forms such as *ao-b* (man-third person singular) or *ao-khom* (man-first person dual). The third-person pronoun ||*i* behaves like any other noun, except of course that it can only be followed by third-person markers: ||*i-b* 'he,' ||*i-s* 'she,' etc. In addition, Nama also has determiners representing first and second person:

	Sing	Dual/Plural
First person	*ti*	*si*
Second person	*sa*	*sa*

These occur in initial position in first- and second-person noun phrases to give forms such as *si ao-khom* 'we (two) men.'

The first- and second-person 'personal pronouns' of Nama are formed simply by combining the relevant determiner and noun-phrase suffix, for example, *ti-ta* 'I,' *sa-kho* 'you (dual),' *si-khom* 'we (dual, excluding the hearer),' *sa-khom* 'we (dual, including the hearer).' In this case, as for English *we* and *you* (plural), it can be argued that no noun root as such is present in the noun phrase.

Number

Common nouns can be divided into those which can be counted (count nouns, like *chair*), and those which cannot (noncount nouns, like *butter*). Count nouns are able to cooccur with low numerals (*one* if they are singular, and *two* if they are plural), for example, *one chair, two chairs*. The use of low numerals with noncount nouns leads to unacceptability, for example, **one butter*, **two butters*, unless the noun in question is reclassified as a common noun with a different and countable interpretation, for example 'type of butter' or 'pat of butter.'

Count nouns may refer to sets consisting of one entity, or more than one entity, and this is the basis for number distinctions in language such as singular and plural. It is necessary, however, to distinguish between grammatical and semantic number. In English, collective nouns such as *family* are grammatically singular since they cooccur with grammatically singular forms of noun-phrase modifiers such as the singular indefinite article *a* and the singular demonstratives *this* and *that*: **a** *family*, ***this*** *family*, ***that*** *family*. Equally, *family* has a grammatically plural form *families* which cooccurs with the grammatically plural indefinite article *some* and the grammatically plural demonstratives *these* and *those*: ***some*** *families*, ***these*** *families*, ***those*** *families*. However, the grammatically singular form *family* can be thought of as referring semantically to a set consisting of its individual members, and this is reflected in the possibility of plural verb agreement: *All the family* ***are*** *coming to the wedding*.

Conversely, in some languages it is possible to find grammatically plural nouns which are semantically singular. For example, the Russian noun *časy* 'clock' is grammatically plural since it is modified by plural forms of the demonstratives *tot* 'that' and *etot* 'this': *te časy* (that-plural clock) 'that clock,' *eti časy* (this-plural clock) 'this clock.' Its semantic singularity is shown by its ability to cooccur with the numeral *odin* 'one,' which also has a grammatically plural form especially for use with such nouns: *odni časy* (one-plural clock) 'one clock'! English nouns like *scissors*, which appear similar (e.g., *those scissors, these scissors*), are grammatically plural, but noncount. One cannot say **one scissors*, but must add the count noun *pair* for the numeral to be possible: *one pair of scissors*.

While count nouns typically have both grammatically singular and grammatically plural forms in English, there are a few like *remains* which are only plural (**this remains, these remains*). Note that nouns like *sheep* are count nouns with both a singular and plural form (*this sheep, these sheep*): the singular and plural forms in this case just happen to be the same.

Gender

Nouns have different genders if they fall into different agreement classes, that is, if they cooccur with different agreeing forms of other categories such as noun-phrase modifiers, predicates, or pronouns.

In English, gender distinctions are absent from noun-phrase modifiers like adjectives, articles, and demonstratives, and from predicates. However, relative pronouns distinguish between 'personal' nouns which are referred to by *who* and 'nonpersonal' nouns which are referred to by *which*, and singular personal pronouns distinguish between 'masculine' nouns (referred to by *he*), 'feminine' nouns (referred to by *she*), and 'neuter' nouns (referred to by *it*). The distinction between 'personal' and 'nonpersonal' is not quite the same as that between 'human' and 'nonhuman,' since familiar animals such as pets can be referred to by *who*, and unfamiliar babies can

be referred to by *which*. Nor is it the same as the distinction between 'animate' and 'inanimate,' since both animate nouns like *sheep* and inanimate nouns like *box* are referred to by *which*.

This then gives essentially the following gender classes in English:

(a) personal masculine nouns (who/he): *uncle*
(b) personal feminine nouns (who/she): *aunt*
(c) nonpersonal neuter nouns (which/it): *box*
(d) nonpersonal feminine nouns (which/she): *ship*

Some nouns belong to more than one class. For example, *doctor* can be both personal masculine and personal feminine; *ship* can be nonpersonal neuter as well as nonpersonal feminine. In the plural, the distinction between masculine, feminine, and neuter is neutralized (the personal pronoun is always *they*, and the only gender distinction which is preserved is between 'personal' and 'nonpersonal').

In some languages, meaning alone suffices to determine distinctions of gender (English is basically of this type). In other languages, however, information about the form of the noun (e.g., declension class, phonological form) is also required. In Russian, for example, nouns fall into a few major declensional classes, each of which is associated with a particular gender: *dom* (first declension) 'house' is masculine, *ruka* (second declension) 'arm, hand' is feminine, *skorost* (third declension) 'speed' is feminine, and *okno* (fourth declension) 'window' is neuter. This may lead, as with number, to discrepancies between grammatical and semantic characteristics of particular nouns. For example, the Russian noun *djadja* 'uncle' belongs to the second declension class, but in this case the semantic characteristic takes precedence and agreeing forms are invariably masculine (e.g., *moj djadja* (my-masculine uncle) 'my uncle'). The noun *vrač* 'doctor' belongs to the first declension, but when referring to a female doctor may be used with either masculine or feminine agreeing forms. In this case, feminine agreeing forms are more likely with pronouns and predicates than with noun-phrase modifiers like adjectives (Corbett, 1991). The similarity with the number agreement of collective nouns in English is striking, since here, too, semantic agreement is found with pronouns and predicates.

Noun-Phrase Modifiers

Noun phrases are traditionally thought of as consisting minimally of a head noun, together with any number of noun-phrase modifiers. Typical noun-phrase modifiers are determiners, quantifiers and quantifier phrases, adjectives and adjective phrases, nouns and noun phrases, adpositions and adpositional phrases, and clauses.

Determiners

Determiners form a closed class of functional words which have the general property of not themselves permitting modification. The class of determiners includes articles, personal determiners, demonstratives, interrogative determiners, exclamatory determiners, and quality determiners.

Articles Articles have the function of simply indicating definite or indefinite reference, without containing any identification within themselves of the place where the referent(s) can be located. The English articles are definite *the* and indefinite *a* or *some*. In indefinite reference, *a* is used with singular count nouns, and *some* with noncount and/or plural nouns. Examples are: ***the** film, **the** butter, **the** films, **a** film, **some** butter, **some** films*. Many languages lack articles altogether (e.g., Russian, Lithuanian).

Personal Determiners Personal determiners are determiners which indicate the person of a noun phrase. In English, the personal determiners are *we* and *you* (plural), which can cooccur with grammatically plural common nouns. Examples are: ***we** students*, ***you** students*. Nama (see Person) has both singular and plural first- and second-person determiners. Since personal determiners invariably seem to indicate definiteness, it might be argued that they are simply first- and second-person forms of the definite article. However, the definite article in English does not necessarily imply third-person reference: for example, in an appositional construction like *we, the students*, the first-person personal determiner and the definite article can cooccur. It seems better to treat the usual interpretation of third-person reference induced by the definite article as an implicature which can be canceled if the context requires it.

Demonstratives Demonstratives serve generally to indicate the location of the intended referent(s) of the noun phrase with respect to the context of utterance. English demonstratives are *this/these* and *that/those*, which cooccur with common nouns and have a distinction of grammatical number. Examples are: ***this** box*, ***these** boxes*, ***that** box*, ***those** boxes*. The distinction between *this/these* and *that/those* is one of closeness to and distance from the speaker. In some languages, further distinctions based on closeness to and distance from the hearer can also be found, as well as more recondite distinctions based on visibility

and topological factors such as 'uphill' and 'downhill,' 'upriver' and 'downriver.' For example, Dyirbal (Australia) has basic forms *giyi* (meaning that the referent is visible and here), *bayi* (meaning that the referent is visible and there), and *ŋayi* (meaning that the referent is not visible). To any basic form can be suffixed one of a set of twelve morphemes indicating distance uphill or downhill, distance upriver or downriver, and/or one of a set of three morphemes indicating 'up' (vertically), 'down' (vertically), or 'out in front' (with respect to which way either speaker or hearer is facing; Dixon, 1972). It should be noted that demonstratives may indicate definiteness, as in English, or may be neutral with respect to definiteness, as in Dyirbal.

Interrogative Determiners Interrogative determiners are forms like *which* and *what* in English. Examples are: ***which*** *box?*, ***what*** *box?*

Exclamatory Determiners Exclamatory determiners are forms like *what* in English. Examples are: ***what*** *a fool*!, ***what*** *fools*! Note that the exclamatory determiner *what*, unlike the interrogative determiner *what*, must cooccur with the indefinite determiner *a* when determining a singular count noun.

Quality Determiners Quality determiners are forms like *such* in English. Examples are: ***such*** *a fool*, ***such*** *fools*. Like the exclamatory determiner *what*, this form requires the indefinite determiner *a* when determining a singular count noun.

Quantifiers and Quantifier Phrases

Quantifiers have the general function of indicating the quantity of elements referred to by the noun phrase. Unlike determiners, they permit various kinds of modification and therefore have their own phrasal structure.

In many cases, quantifiers permit the same kinds of modification as adjectives, and might therefore be treated as a special subclass of adjectives. The quantifier *many* in English, for example, permits premodification by the adverb *very* (e.g., ***very many*** *boxes*), and has comparative and superlative forms (***more*** *boxes*, ***most*** *boxes*).

Typical quantifiers in English are: *all, both, half, every, each, any, either, some, much, enough, several, many* (*more, most*), *a few, few* (*fewer, fewest*), *a little, little* (*less, least*), *neither, no*, together with the cardinal numerals *one, two, three*, etc. Examples are: ***all*** *the boxes*, ***enough*** *boxes*, ***few*** *boxes*, ***no*** *boxes*, ***two*** *boxes*. With modification of the quantifier, it is possible to form quantifier phrases: ***virtually all*** *the boxes*, ***not nearly enough*** *boxes*, ***indescribably few*** *boxes*, ***absolutely no*** *boxes*, ***almost two*** *boxes*.

Adjectives and Adjective Phrases

Adjectives and adjective phrases are noun-phrase modifiers par excellence. As well as general adjectives like *red, large, round*, and *brave*, the class of adjectives in English includes ordinal numerals such as *first* and *second*, related adjectives such as *next* and *last*, adjectives such as *same* and *other*, and arguably the whole class of quantifiers (see Determiners).

In some languages, the class of adjectives may be extended to include possessive adjectives, for example, Italian *mia* in *la mia casa* (the my-feminine singular house-feminine singular) 'my house,' and in others, according to Dixon (1977), it may be severely reduced or nonexistent (the concepts being expressed by forms which can be classified as nouns or verbs).

Adjectives in English are generally positioned between determiners and the head noun, for example, *that* ***first brave*** *attempt, a* ***large red*** *apple*. While there is a certain natural ordering relationship between the adjectives themselves, orders which deviate from this ordering are typically possible: *that* ***brave first*** *attempt, a* ***red large*** *apple*. Even quantifiers, which in English typically occupy positions close to (or in complementary distribution with) the determiners, may occur in differing orders with ordinary adjectives: *those* ***two first brave*** *attempts*, *those* ***first two brave*** *attempts*, *those* ***brave two first*** *attempts*.

Adjective phrases in English may be formed by premodification of the adjective by adverbs, or postmodification by prepositional phrases and clauses: ***very*** *proud*, *proud* ***of her achievements***, proud ***that she had won so easily.*** The type of modification has an influence on the order of noun head and adjective-phrase modifier within the noun phrase. Only premodified adjective phrases pattern with single adjectives in occurring before the head noun: *a* ***very proud*** *woman*. Postmodified adjective phrases must occur after the head: *a woman* ***proud of her achievements,*** *a woman* ***proud that she had won so easily.***

Nouns and Noun Phrases

Nouns themselves may act as noun-phrase premodifiers. For example, it can be argued that, in English noun phrases like *a* ***plastic*** *factory*, the item *plastic* is a noun rather than an adjective. The evidence for this is that *plastic* can itself be modified by an adjective such as *corrugated* to give *a* ***corrugated plastic*** *factory* (= a factory which makes corrugated plastic). Adjectives themselves do not permit modification by

adjectives, so there is no alternative but to consider *plastic* as a noun.

It should be noted that noun-phrase modifiers of this type cannot contain determiners, although they may contain quantifiers: *a **party** committee*, **a **that party** committee, a **two-party** committee, an **all-party** committee*.

Adpositions and Adpositional Phrases

Adpositions are prepositions or postpositions, typically taking noun-phrase complements. Prepositional phrases are a common form of noun-phrase postmodifier in English: *the man **on the roof**, a box **without a lid**, the room **underneath the eaves***. Some prepositions can occur alone as postmodifiers: *the room **underneath***.

On the other hand, postpositional phrases in English with the 'genitive' postposition -'*s* are premodifiers with a variety of functions including the possessor function (***the king's** crown*), the subject function (***the king's** decree that windows should be taxed*), the object function (***the king's** execution*), and the descriptive function (*a **women's** hall of residence*).

Phrases of the first three types in English induce the so-called 'definiteness' effect, that is, ***the king's** crown* means '**the** unique crown belonging to the king,' and not '**a** crown belonging to the king.' In order to express the indefinite meaning, the 'double genitive' is used in which the preposition *of* governs a postpositional phrase with -'*s: a crown **of the king's***.

While phrases of the first three types are in complementary distribution in English with the determiners (i.e., ***Edward's** richly jewelled crown* and not **that **Edward's** richly jewelled crown*), this is not universally the case. In Finnish, for example, the premodifying possessor and demonstrative are compatible: *nuo **Aimon** koirat* (those Aimo-genitive dogs) 'those dogs of Aimo's.' There therefore seems to be no general basis for considering premodifying possessor, subject, and object phrases as themselves 'determiners.'

Descriptive 'genitive' phrases of the fourth type have an entirely different distribution. They are compatible with all the determiners and typically occur close to the head noun, after any adjective phrases: *a very pleasant **women's** hall of residence*.

Clauses

Clause modifiers can be divided into two major types: relative clauses, and complement clauses.

Examples of relative clauses in English are:

(a) the Eskimos, *who* *live in igloos*
(b) the Eskimos *who* *live in igloos*
the Eskimos *that* *live in igloos*
(c) the Eskimos *who(m)* *you met*
the Eskimos *that* *you met*
the Eskimos ø *you met*

The relative clause *who live in igloos* in (a) is 'nonrestrictive,' in that it provides additional information about the referents of a noun phrase, *the Eskimos*, whose identity has already been established. By contrast, the relative clauses in (b) and (c) are 'restrictive,' in that the information contained in the relative clause serves to restrict the intended referents to those who satisfy the condition expressed in the relative clause. For example, the relative clauses in (b) restrict the reference to a subset of the set of Eskimos, those who happen to live in igloos.

Nonrestrictive relative clauses in English always begin with a '*wh*-phrase' containing a '*wh*-word' like *who* or *which*. Restrictive clauses may, however, begin with a wh-phrase, or the subordinating conjunction *that*, or zero (symbolized by ø). Zero, however, is not permitted when the 'position relativized' (the position in the relative clause which represents the role played by the intended referents) is the subject position as in (b), rather than the object position as in (c).

The relative clauses in (a), (b), and (c) are based on the finite verb forms *live* and *met*. However, in many languages, relative clauses are essentially based on nonfinite verb forms, for example, Turkish ***John 'un Mary-ye ver-diğ-i** patates* (John-genitive Mary-dative give-participle-his potato) 'the potato John gave to Mary' (Keenan, 1975). Here, the position relativized is the object position. Such relative clauses may be called 'participial' relative clauses. The closest English equivalents are clauses like *living in igloos* in the noun phrase *all Eskimos **living in igloos***. However, in English participial relative clauses, the position relativized is restricted to the subject position, and a full finite relative clause must be used when the position relativized is the object or any other sentential function.

Complement clauses, unlike relative clauses, do not contain a position relativized. Rather, the clause represents the propositional content of a thought or utterance expressed by abstract nouns like *belief, statement, rumour*, etc. Examples are: *the belief **that linguistics is easy**, the statement **that the pound would not be devalued**, the rumour **that the prime minister would resign***.

Noun-Phrase Structure

Configurational versus Appositional Structures

There is considerable evidence that the structure of noun phrases in English is configurational, that is,

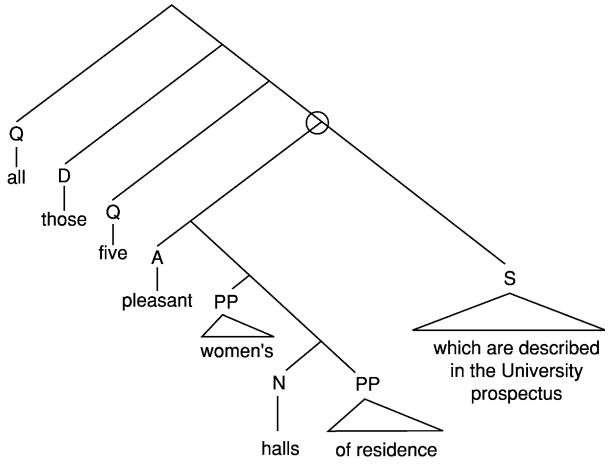

Figure 1 Q = Quantifier, D = Determiner, A = Adjective, PP = Postpositional or Prepositional Phrase, N = Noun, S = Relative Clause.

that the structure of a noun phrase like *all those five pleasant women's halls of residence which are described in the University prospectus* can be described by a hierarchical constituent structure as in Figure 1. For example, to give just one argument for one aspect of the structure in Figure 1, the circled node can act as the shared node in 'shared constituent coordination': *all those five – and all these three – **pleasant women's halls of residence which are described in the University prospectus***.

By contrast, the structure of noun phrases in many languages can clearly be appositional, with little or no hierarchical structure. In Nama, for example, a noun phrase like [≠*kini*]-*di* [*ne !nona*]-*di* [*!Gombates di*]-*di* ([book]-third person feminine plural [these three]-third person feminine plural [!Gombate of]-third person feminine plural) 'these three books of !Gombate's' can be considered as consisting of three miniature noun phrases in apposition, each marked as third person feminine plural by the postposition of -*di* and each capable of occurring in isolation. The flavor of the construction is captured by an English version like: *books, these three, the ones of !Gombate*. The whole construction, however, forms a single phrase to which a case-assigning postposition may be attached (Figure 2).

In Nama, an alternative method of constructing noun phrases is hierarchical, and in this case the modifiers are always unmarked for person, number, and gender, and always precede rather than follow the head noun. A similar distinction between 'fractured' and 'nonfractured' phrases has been reported in the Australian language Gooniyandi (McGregor, 1989). In Gooniyandi, however, the elements of a fractured phrase are each independently marked for case, and while they may form a single appositional

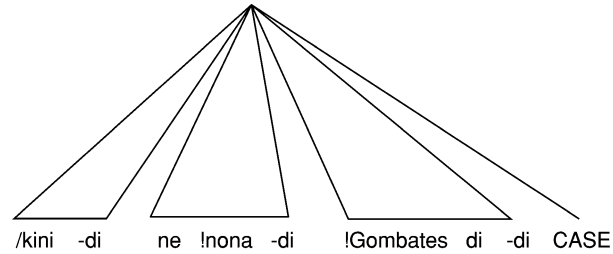

Figure 2

unit, they may also be split and placed in different clause positions according to principles of informational structure.

The X-bar Framework

One very influential framework for labeling the constituent structures of hierarchical noun phrases is the X-bar framework introduced by Chomsky (1970) in order to capture the kind of similarity between the structure of sentences and noun phrases which is seen most clearly in nominalization, the formation of nouns from verbs. According to Chomsky, the noun phrase ***Euclid's** proof **of the theorem*** is similar in structure to the sentence ***Euclid** proved **the theorem***: like the verb *prove*, the noun *proof* takes a subject (*Euclid*) and a complement (*the theorem*), the main differences between the two structures (the introduction of the adpositions -*'s* and *of*) being related to the choice of a nominal rather than a verbal head.

In one early version of the X-bar theory (see Jackendoff, 1977 for discussion), the verb is taken to be the head of a sentence, and the parallel between sentence and noun phrase emerges very clearly (Figure 3). The maximal (phrasal) level of any category is taken to be X″ (where X represents any word-level category N(oun), V(erb), P(reposition), or A(djective)). N″ is therefore equivalent to noun phrase, P″ to prepositional phrase, A″ to adjectival phrase, and V″ is equivalent to sentence. Complements are placed as sisters of an intermediate level node X′, and subjects (treated invariantly as N″ despite the presence of the adposition-*'s* in the noun phrase subject) are placed in the so-called 'specifier' position as daughters of N″ or V″. The parallelism is however spoilt in this early version only by the presence of a tense node T in the sentence, and the fact that in noun phrases the specifier position may be occupied by a determiner node D, capturing the complementary distribution between -*'s* genitive phrases and determiners which holds in English (Figure 4).

In the model of the noun phrase expressed by Figures 3 and 4, the N′ node is recursive and permits

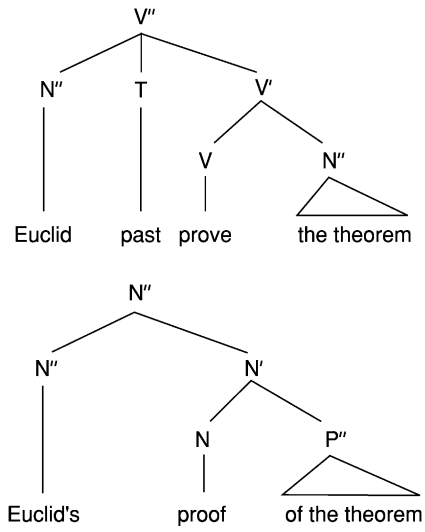

Figure 3

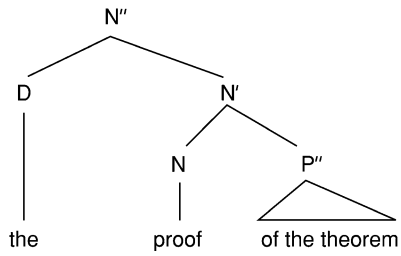

Figure 4

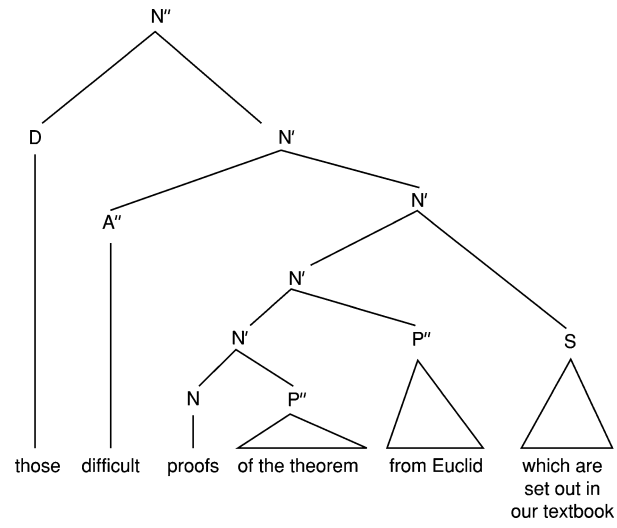

Figure 5

the addition of any number of additional modifiers such as adjective phrases, prepositional phrases, and relative clauses. A noun phrase such as *those difficult proofs of the theorem from Euclid which are set out in our textbook* would have the structure in Figure 5.

Structures like Figure 5 seem fairly successful in capturing the structure of complex noun phrases. However, there are some potential problems. First, there are elements which occur higher in the structure and do not seem to be well catered for: for example, the quantifiers *all, both*, and *half*, which in English can precede the definite determiners (***all** the boxes*), and genitive phrases in languages (e.g., Finnish and Hungarian) which allow the genitive phrase to precede the determiner rather than occur in complementary distribution with it. Second, the distinction between complements and other kinds of modifier seems related to the noun's ability to assign a 'semantic' (or 'thematic') role to the complement, but it is not clear that this entails the existence of a different 'syntactic' structure for complements involving the existence of a distinct N′ node (for example, the tendency of complements to occur closer to the noun than other modifiers could be explained by a principle such as the domain adjacency condition of Travis (1984), which requires elements assigned a thematic role by a head to be adjacent to that head).

These issues remain to be developed thoroughly. One possible direction in which solutions might lie is in abandoning bar structures altogether and treating all modifiers as sisters of a single recursive node with no distinctions of bar level (a move proposed in principle by, for example, Speas, 1990). In the case of noun phrases, the single node would be the node N, and all modifiers, without exception, would be sisters of N.

Further independent principles would then be required to account for the possible orders in which modifiers can occur. Work on the typology of noun phrases has begun to show, however, that the relative order of some basic types of premodifiers is extremely stable across the world's languages, the order being: demonstrative – numeral – adjective – head noun (see Rijkhoff, 1992). This suggests that, at least for these categories of modifier when they precede the head, very general principles governing the relative application of modifiers are involved.

The DP Hypothesis

Discussions of noun-phrase structure which maintain the noun as the head of the noun phrase have been overshadowed by the DP (determiner phrase) hypothesis, which maintains that determiners are the ultimate heads (Abney, 1987). A survey of the development of the DP hypothesis may be found in Ouhalla (1991: ch. 4).

A typical DP structure for the noun phrase *the proof of the theorem* is Figure 6 Instead of being

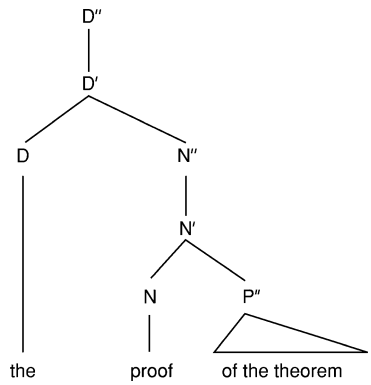

Figure 6

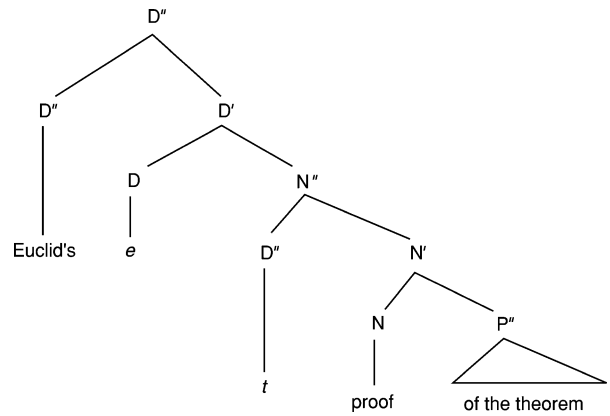

Figure 7 *t* is the trace of the D″ *Euclid* after movement from specifier position in N″, and *e* is the empty D node.

a modifier, the determiner *the* is the head of the construction, taking an N″ *proof of the theorem* as its complement. In a noun phrase like *Euclid's proof of the theorem*, the specifier positions of N″ and D″ can both be exploited by assuming that *Euclid* originates in the specifier position of N″, where it can be assigned the appropriate thematic role (agent) by the noun. *Euclid* can then move to the specifier position of D″, where it is assigned the genitive case (surfacing as the -'*s* postposition) by the empty element D Figure 7.

This structure, in which the subject and object of the noun are originally both within N″ and movement of the subject from within N″ up to the specifier position of a nominal 'functional' category D, then parallels an analysis of sentences in which the subject and object of the verb are originally both within V″ and movement of the subject places the subject in the specifier position of a sentential 'functional' category I (which contains information about the tense and agreement properties of the sentence). The parallelism between noun phrase and sentence originally sought by the X-bar theory is then complete (see Figure 8).

Work in the DP hypothesis has sought to refine the analysis of the functional categories in the noun phrase by including D (determiner) and AGR (agreement) as heads, paralleling the separation of I into T (tense) and AGR (agreement) in the analysis of sentences. This may account for noun phrases in which nouns have markers of agreement with their genitive phrases (e.g., Turkish *şu benim şapka-m* (this my hat-first person singular) 'this my hat.'

In addition, the node K (case) has been proposed as the highest functional head in noun phrases which are marked for case, reflecting the idea that case determines the external distribution of noun phrases. Cased noun phrases are then KP rather than DP or NP. It can be predicted that, parallel to the further refinement of functional categories within

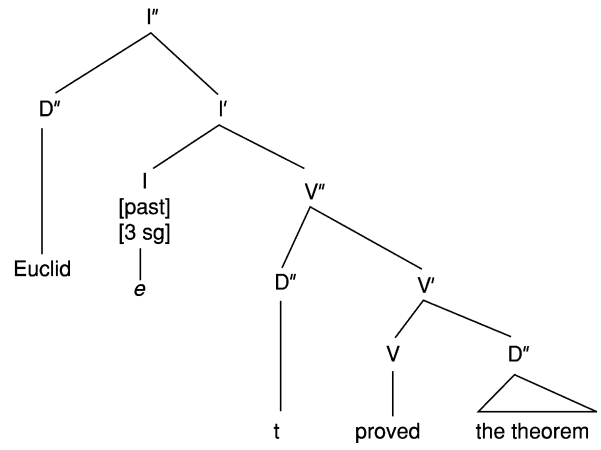

Figure 8 *t* is the trace of the D″ *Euclid* after movement from specifier position in V″, and *e* is the empty I node.

the sentence (for example, the inclusion of aspect and negation), further functional categories will emerge within the noun phrase.

While the DP hypothesis looks attractive, it too has a number of problems (see Payne, 1993 for discussion). For example, an analysis of the noun phrase in which there is a skeleton of N nodes from the phrasal to the lexical level naturally accounts for the percolation along this skeleton of morphological agreement features (e.g., case, number, gender, definiteness) in languages like Russian, in which nearly all noun phrase constituents are morphologically marked. In Figure 9, for example, the features of instrumental case and plural number percolate to every constituent of the noun phrase.

If, however, categories like case and definiteness are represented by single individual nodes K and D, and these are the highest nodes in constituency structure trees under the DP hypothesis, the natural prediction is that only the highest nodes in the tree will be morphologically marked for those categories.

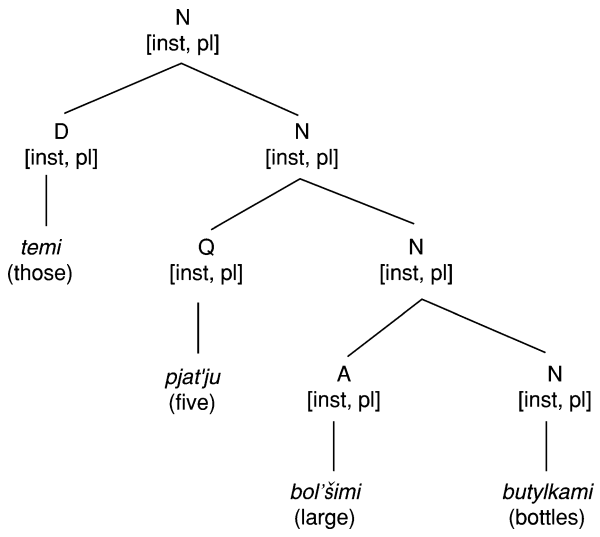

Figure 9

See also: Articles, Definite and Indefinite; Case; Definite and Indefinite; Gender; Nouns; Number; Pronouns; Word Classes/Parts of Speech: Overview; X-Bar Theory.

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Nouns

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Prototypical nouns refer to things, persons, places, and other more or less concrete objects, but the noun class itself normally includes many more items. Nouns always constitute an open class, even in languages that have relatively few nouns compared with the European languages, such as Iroquoian languages (Mithun, 2000). Languages have normally multiple ways of deriving nouns, both from other word classes by means of nominalization (*see* **Nominalization**) and from other nouns. Nouns or their different forms can develop into words of other classes, e.g., adverbs and adpositions. Nouns seem to exist as a distinct word class in most languages, even though languages vary as to how pronounced their noun–verb distinction is (Evans, 2000; also *see* **Word Classes/Parts of Speech: Overview**).

Nominal Subcategories

Nouns can be classified in various ways. It has become usual in linguistic literature to order nouns according to one or another version of what has been termed the animacy hierarchy or the topicality hierarchy (Comrie, 1981: 178–193), the hierarchy of individuation (Sasse, 1993), or the empathy hierarchy (Kuno and Kaburaki, 1977; Lehmann and Moravcsik, 2000). The basic idea is that these hierarchies reflect speakers' different degrees of empathy with different types of entities and their different needs and/or abilities

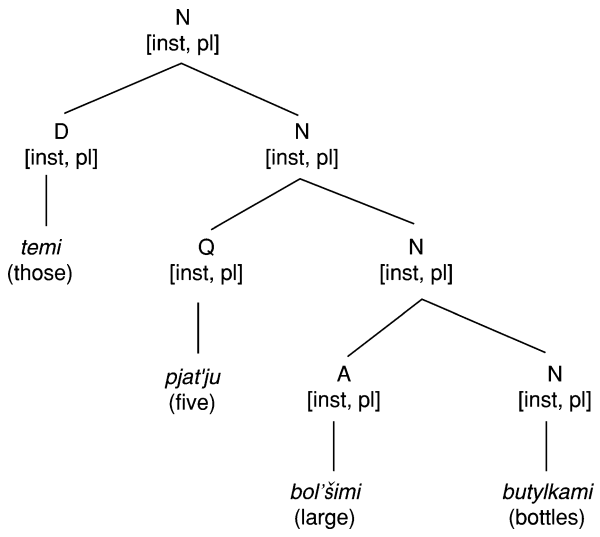

Figure 9

See also: Articles, Definite and Indefinite; Case; Definite and Indefinite; Gender; Nouns; Number; Pronouns; Word Classes/Parts of Speech: Overview; X-Bar Theory.

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Nouns

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Prototypical nouns refer to things, persons, places, and other more or less concrete objects, but the noun class itself normally includes many more items. Nouns always constitute an open class, even in languages that have relatively few nouns compared with the European languages, such as Iroquoian languages (Mithun, 2000). Languages have normally multiple ways of deriving nouns, both from other word classes by means of nominalization (*see* **Nominalization**) and from other nouns. Nouns or their different forms can develop into words of other classes, e.g., adverbs and adpositions. Nouns seem to exist as a distinct word class in most languages, even though languages vary as to how pronounced their noun–verb distinction is (Evans, 2000; also *see* **Word Classes/Parts of Speech: Overview**).

Nominal Subcategories

Nouns can be classified in various ways. It has become usual in linguistic literature to order nouns according to one or another version of what has been termed the animacy hierarchy or the topicality hierarchy (Comrie, 1981: 178–193), the hierarchy of individuation (Sasse, 1993), or the empathy hierarchy (Kuno and Kaburaki, 1977; Lehmann and Moravcsik, 2000). The basic idea is that these hierarchies reflect speakers' different degrees of empathy with different types of entities and their different needs and/or abilities

to perceive those as individuals. The common part in all of them is the basic distinction humans – other animates – inanimate entities. The highest (left) part of the proposed hierarchies differs; thus, an additional split may single out personal proper names and occasionally certain kin terms. The highest positions belong to pronouns for speech-act participants (first- and second-person pronouns), i.e., not nouns. Actually, opinions and descriptive praxis vary on whether (personal) proper names should be considered a subclass of nouns or a category of their own. Thus, they often have inflectional and distributional peculiarities stemming from their inherent uniqueness and definiteness, e.g., resistance to pluralization and noncompatibility with usual articles. In a number of languages, personal proper names require special proprial articles, distinct from those used with normal nouns.

The lower part of the hierarchies differs even more substantially among the different scholars. Thus, abstract nouns, such as *love*, *beauty*, or *democracy*, are opposed to all the others, concrete nouns and are clearly lower in their degree of individuation. The same goes for words denoting substances (prototypical mass nouns), such as *air* or *water*, compared with words denoting individual objects (prototypical count nouns), e.g., *girl*, *cat*, and *cup*. However, these two distinctions are rather orthogonal to each other (for a different opinion, see Sasse, 1993).

Various structural phenomena and grammatical rules across languages are in one way or another sensitive to the animacy/empathy/individuation hierarchy, e.g., the distribution of number distinctions (*see* **Number**), the number of case distinctions (*see* **Case**), direct versus inverse marking of subject–object relations (e.g., in Navajo), etc., (see Dahl and Fraurud, 1996 for an overview). However, since the hierarchy looks different for the different phenomena and is often "operationally defined as to whatever determines the phenomena under investigation" (Dahl, 2000: 40), one might suspect that it is in fact an illusion, hiding several different, more basic distinctions. And in fact, the seemingly self-explanatory concept of individuation is itself in need of independent psycholinguistic research (Comrie, 1981: 178–193).

Classifications along the above given lines are sensitive to the type of entity denoted by a noun, i.e., to its correlate in the physical world, the class of its possible referents. However, what often counts even more is the mental reflection of these possible referents, the way they are construed, i.e., the properties of the corresponding concepts in the mental lexicon. Take, for instance, the opposition between count and mass nouns. In English, the count noun *cow* easily combines with numerals, e.g., *one cow, three cows,* etc., with the indefinite article *a*, and with the denumerating measure words *many*, *several*, etc. The mass noun *petrol* cannot combine with numerals and with the indefinite article *a*, takes the measure word *much* instead of *many*, and lacks the number opposition otherwise typical of English nouns (cf. *cow* vs. *cows* with *petrol* vs. **petrols*). The underlying semantic difference is often described as the difference between denoting (or referring to) discrete entities with a well-defined shape and precise limits versus homogeneous, undifferentiated stuff without any certain shape or precise limits. The count/mass distinction in languages such as English, French, or Russian shows a strong correlation between the properties of referents and their proneness to be referred to by a count or a mass noun, more or less in accordance with the animacy hierarchy. Thus, humans and animals favor a high degree of individuation and are normally coded by count nouns, but stuffs are more often than not expressed by mass nouns. However, discreteness (boundedness) of count-noun referents and homogeneity of mass-noun referents reflect not so much the objective reality itself, but rather its construals by language speakers. Thus, under appropriate circumstances several cows can alternatively be referred to as *(several) cows*; as *a herd (of cows),* by means of a collective count noun; or as *cattle*, by means of a collective mass noun. There are amazing crosslinguistic differences in the lexical preferences for count or mass uses even within the European Indo-European languages, which deserve profound study; it is also far from clear to what extent the count/mass distinction is useful crosslinguistically (Behrens, 1995; Rijkhoff, 2002: 44–56; Koptjevskaja-Tamm, 2004b). Personal proper names are another example of an ontologically based, rather than phenomenologically based, classification: thus, for example, organizations are often given proper names that may behave linguistically more or less similarly to personal proper names (Fraurud, 1996).

Language-specific classifications of nouns (or of the corresponding entities in our conceptual world) underlie their different combinability with various linguistic elements. The most grammaticalized form of nominal classification is gender (*see* **Gender, Grammatical**). Several properties distinguish prototypical genders from prototypical classifiers: numeral classifiers, occurring in numeral constructions, e.g., in many Southeast Asian languages (*see* **Numerals**), or possessive classifiers, occurring in adnominal possession, e.g., in Melanesian languages (*see* **Possession, Adnominal; Classifiers and Noun Classes: Semantics**). There are, however, many intermediate cases (cf. Aikhenvald, 2000; Rijkhoff, 2002).

Relationality

While almost all verbs are relational in the sense of relating participants to an event (*see* **Verbs**), most prototypical nouns are absolute, or 'sortal' (Löbner, 1985): they designate concrete individual objects, e.g., a cup or a book, not obviously related to other entities. A lot of nouns are relational – for example, body-part nouns and nouns referring to other parts, kin terms and nouns referring to other interpersonal relations, or words like *consequence* or *results*. They invoke a special relation to another entity and can often not be understood without this entity: a person cannot be a neighbor or a son, but is always someone's neighbor or son. Many more nouns are relational in a weak sense, in that their meaning itself presupposes or invokes specific relations. Thus, for example, since books are strongly associated with their authors, with their content, and with a specific purpose, the corresponding relations are readily invoked by the semantic structure of the word *book*. The term 'qualia structure' (Pustejovsky, 1998) refers to a system of relations that characterize the semantics of nominals, in a way parallel to the argument structure of a verb, and includes the four basic roles: (1) the constitutive role (the relation between an object and its constituents, or proper parts), (2) the formal role, distinguishing the object within a larger domain (color, shape, etc.), (3) the telic role (purpose and function of the object), and (4) the agentive role (factors involved in the origin or 'bringing about' of an object).

There has been relatively much crosslinguistic research on the issues of inalienable versus alienable possession (*see* **Possession, Adnominal**), or how typically body-part terms and/or kin terms are singled out in the ways their relations to other entities are encoded. Otherwise, the nominal qualia structure has received very little attention compared with the extensive work on the verbal argument structure and its manifestations across languages. There are, however, many interesting issues and amazing crosslinguistic variation here. Thus, for example, Russian and Swedish mark the telic role of 'key' in different, not to say opposite, ways: 'the key that belongs to the door, i.e., the key the purpose of which is to open the door' corresponds to *nyckeln* TILL *dörren*, 'key.the TO door.the,' in Swedish, but to *ключ* OT *dveri*, 'key FROM door:GEN,' in Russian.

Nominal Inflectional Morphology and Functions

Nouns typically head noun phrases that are used for reference, i.e., as arguments and adjuncts to predicates (e.g., *The little* ***boy*** *is playing with the new* ***toy***) or as attributes to other nouns (the **boy's** *new toy*). They can also be used in nonreferring functions, e.g., as predicates (*Peter is a* ***boy***), and as nonreferential attributes, e.g., *a children's hospital*. In these functions nouns often show fewer of their typical inflectional properties and sometimes even acquire certain properties of other word classes (Hopper and Thompson, 1984; Stassen, 1997; Croft, 2001; Mauri, 2003; Koptjevskaja-Tamm, 2004, and **Nonverbal Predication**).

Typical nominal inflectional markers include markers of number (*see* **Number**), case (*see* **Case**), possession (*see* **Possession, Adnominal**), and definiteness (*see* **Definite and Indefinite**). The noun in (1), from Hungarian, carries the plural number marker, the third person plural possessive marker, and the accusative case marker, while the above-mentioned Swedish example demonstrates inflection for definiteness.

(1) barát-ai-k-at
friend-PL-POSS.3PL-ACC
'their friends (ACC)'

Both case markers and possessive markers usually signal syntactic relations between nouns (or noun phrases headed by them) and other expressions and thus constitute nominal dependent marking and head marking, respectively (Nichols, 1986). Possessive markers are normally chosen in accordance with the person and number of the possessor, that is either explicitly mentioned in the same construction or not. In many languages nouns can also attach person markers when used as nominal predicates. Example (2), from Chukchi (Chukot), illustrates a polite introduction routine.

(2) qun = waj enmen Cəkwaŋaqaj-eɣəm
INTERJ = INTERJ so personal.name-1SG.ABS
[Cəkwaŋaqaj:] 'Well, then I'm Cəkwaŋaqaj.'
eej Cəkwaŋaqaj-eɣət
INTJ personal.name-2SG.ABS
[The woman:] 'Ooh, you're
Cəkwaŋaqaj.' (Dunn, 1999: 318)

As predicates, nouns can sometimes attach tense-aspect-mood markers. However, even nouns used in other functions – as arguments and adjuncts – can occasionally inflect for these categories, independently of the clause they belong to, as in (3) from Guaraní.

(3) O-va-ta che-róga-kue-pe.
3-move-FUT 1SG-house-PST-in
'He will move into my former house.'
(Nordlinger and Sadler, 2004: 781)

All of the categories expressed by nominal inflectional morphology can also be expressed by other means, such as grammatical words, and the different

categories differ in their crosslinguistic proneness to be encoded by inflection. Thus, while case is a relatively common inflectional category, bound definiteness markers are much more rare.

Languages also differ considerably in whether they have nominal inflectional morphology at all (and how much). It has been suggested (Lehmann and Moravcsik, 2000; Moravcsik, 2003) that nominal inflection in a language implies verbal inflection. Thus, while there are languages with both, with neither (Vietnamese), and with only verbal but no nominal inflection (Japanese), nominal inflection without verbal does not yet seem to have been attested. There are other crosslinguistic generalizations relating nominal and verbal morphology. For example, according to Nichols (1986: 75), "If a language has major, salient head-marking morphology anywhere, it will have it at the clause level," or in other words, if a language uses head-marking in possessive noun phrases (primarily possessive affixes), it will use head-marking to relate arguments to verbs (i.e., primarily verbal agreement markers). Siewierska (1998) confirms further that the majority of languages in her large global sample show close similarity between nominal possessive affixes and verbal person marking.

There are also possible generalizations on interaction among different nominal inflectional categories. According to Aikhenvald and Dixon (1998) and Corbett (2000), there are many examples of case systems with a larger number of distinctions in the singular than in the plural, but no examples are given of the opposite possibility. In Basque, number distinctions hit only definite nouns. In other languages definite nominals sometimes show more elaborate case and/or number paradigms than indefinite ones even though languages with both case and bound definiteness markers are relatively rare: Matthew Dryer's 700-language sample contains only 25 instances (Matthew Dryer, personal communication).

The order of nominal inflectional (and derivational) markers with respect to the stem and to each other obeys certain principles, basically reflecting the degree of semantic relevance of the corresponding categories to the meaning of the stem (Bybee, 1985). However, languages sometimes show 'contradictory' orders between inflectional markers. Thus, while in (1) from Hungarian, the possessive suffix precedes the case suffix, Finnish nouns show the opposite order in their nominal suffixes.

See also: Adpositions; Articles, Definite and Indefinite; Case; Classifiers and Noun Classes: Semantics; Definite and Indefinite; Gender, Grammatical; Kinship Expressions and Terms; Mass Expressions; Nominalization; Nonverbal Predication; Noun Phrases; Number; Numerals; Objects, Properties, and Functions; Possession, Adnominal; Predication; Pronouns; Proper Names: Philosophical Aspects; Tense; Verbs; Word Classes/Parts of Speech: Overview.

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Number

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Number is one of the most common features of the world's languages. While it is common, it is certainly not uniform. The situation in languages like English is often treated as normal. Yet the number feature reveals many surprises, and the system found in English is a rather extreme one, when seen against the possibilities established from a survey of the languages of the world. We shall consider characteristics of the English-type systems in turn, showing some of the ways in which they are typical or atypical and the contrasting types of system found elsewhere. We shall give particular prominence to the question of number values. This entry is based on Corbett (2000), where a much fuller account is given.

Nominal and Verbal Number

English makes a semantic and a formal distinction between, for instance, *cat* and *cats*, *child* and *children*. In English, this number distinction reflects a nominal feature. It is realized on nouns via relatively simple inflectional morphology. (There are many languages with more complex morphological realization of number, see, for instance, the account of Nilo-Saharan languages in Dimmendaal, 2000.) In English, when the number feature is realized on verbs, this is by agreement with a subject noun phrase, as in *the children were playing together*. The verb is plural to indicate the number of children, and not the number of playing events. That is, we have a nominal feature which can be realized where expected, on the noun phrase, and also on the verb. While there are many languages like English in this respect, we also find instances of verbal number, that is, where number is realized on the verb to indicate the number of events or the number of participants. For an example we turn to Rapanui (an Oceanic language spoken on Easter Island) (Veronica Du Feu, personal communication):

(1) ruku
'dive'

(2) ruku ruku
'go diving'

The form in (2) is appropriate if there is more than one dive; it does not require more than one person to be diving. The reduplicated form indicates verbal plurality: there are plural events. Verbal number may also be concerned with the number of participants rather than the number of events (see, for instance, Durie, 1986). Verbal number may be restricted to relatively small numbers of verbs, and it rarely shows more than a two-way opposition (for details see Corbett, 2000: 243–264). Nominal number shows a greater range of possibilities and we shall concentrate on that type.

Number as an Obligatory Category

Number is an obligatory category in English. If someone says *there's a goat in the garden* when there are several, this is misleading and inappropriate. In many languages, however, the use of the plural is not obligatory, but it is available when it is important to mark number. Perhaps the clearest example is provided by the Cushitic language Baiso, spoken on Gidicho Island in Lake Abaya (southern Ethiopia) and on the western shore of the lake. Baiso nouns can mark 'general' meaning, that is, they have a form which

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is noncommittal as to number, along with singular, paucal (example (8) below), and plural (Corbett and Hayward, 1987). The form *lúban* 'lion' does not specify a number of lions (it could be one, or more than that) (Dick Hayward, personal communication).

(3) lúban foofe
lion.GENERAL watched.1SING
'I watched lion'

Having a distinct form for general number is highly unusual. There are many languages which can express general meaning, but they do so by means of a form shared with the singular. This more usual situation, with general identical to singular, can be illustrated from Arbore (also a Cushitic language). We find pairs like the following (Hayward, 1984: 159–183).

(4) a. keléh
'gelded goat(s)'
b. keleh-mé
'gelded goats'
c. goran
'heifer cow(s)'
d. gor-nó
'heifer cows'
e. kér
'dog(s)'
f. ker-ó
'dogs'

Alhough the morphology may appear comparable to English, the meanings of the forms are different: *keró* guarantees more than one dog, and it would be used when to indicate this is important; *kér* does not imply only one: it might be one, it might be more than that. (There are other, less frequent number pairings in Arbore.) Systems like that of Arbore, in which number is not an obligatory category (and so is arguably not inflectional) are common in the world's languages. At the opposite extreme from English we find Pirahã, the only remaining member of the Mura family, spoken in 1997 by some 220 people along the Maici River (Amazonas, Brazil). It has been described by Everett (1986), who stated that it had no system of grammatical number, even in the pronouns. This is extremely rare.

The Nominals Involved in the Number System

In English and similar languages, the majority of nominals can mark number, from the personal pronouns and nouns denoting persons (e.g., *nurse*) down to those denoting inanimate objects (e.g., *blanket*), and even to some denoting abstracts (e.g., *week*). Many languages restrict the number opposition to fewer nominals, namely those which are high in animacy. Thus, in Slavey (an Athapaskan language spoken in parts of the Northwest Territories, British Columbia, and Alberta, Canada), number may be marked on the noun phrase, provided the noun denotes a human or a dog (Rice, 1989: 247).

We wish to investigate the countability preferences (Allan, 1980) of nominals (including pronouns as well as nouns). There is considerable variety in the world's languages. Consider the following Warrgamay example (Queensland, Australia) (Dixon, 1980: 266–268):

(5) yibi-yibi ŋulmburu-ŋgu
child-REDUP.ABS woman-ERG
wurrbi-bajun-du buudi-lgani-y
big-very-ERG take-CONT-UNMARKED.TENSE
malan-gu
river-ALL
'the very big woman/women is/are taking the children to the creek'

We see that a noun can be marked for number in Warrgamay, as in *yibi-yibi* 'child.' However, this is not required; forms like *ŋulmburuŋgu* 'woman/women' are quite normal. Dixon (1980: 267) stated that a noun in this language 'is not normally specified for number' and suggested that this is the typical situation in Australia (1980: 22). Warrgamay is particularly interesting, since in (5) the verb does not determine number either. As for pronouns, the first and second persons (singular, dual, and plural) and the third dual and plural are "strictly specified for number and are used only for reference to humans, and occasionally tame dogs (Dixon, 1981: 39–40). The form filling the third singular slot can range over all persons and all numbers (it can have nonhuman as well as human reference) but its "unmarked sense" (1981: 40) is third-person singular.

Thus, in Warrgamay, the word for 'woman' is not normally specified for number, while in English it must be. Yet the first and second persons are. This is part of a wider pattern. The observation that the sets of nominals involved in number distinctions are related to animacy was taken up and investigated further by Smith-Stark (1974), who proposed the version of the animacy hierarchy shown in Figure 1.

Smith-Stark suggested that plurality 'splits' a language if "it is a significant opposition for certain categories but irrelevant for others" (1974: 657). The type of evidence he produced concerned marking of the noun phrase for number (usually by marking on the noun itself) and agreement in number (mainly verbal agreement but with some instances of agreement within the noun phrase).

As postulating a typological hierarchy implies, various languages make the split at different points. An

Speaker > Addressee > Kin > Rational > Human > Animate > Inanimate
(1st-person pronouns) (2nd-person pronouns)

Figure 1 The Smith-Stark (animacy) hierarchy.

example of a split between pronouns and nouns is found in Bengali, since according to Masica (1991: 225–226) number is obligatory for pronouns, while other plural suffixes are optional. In Gunwinggu, a Gunwingguan language of western Arnhem Land, pronominal affixes on the verb mark number for humans but not normally for nonhumans (Evans, 2003: 234–235, 417–418). A lower split is found in agreement in Mundari (a Munda language of east India); verbs agree in number with nominals on the hierarchy as far down as animate nouns, but not with inanimates (Bhattacharya, 1976: 191–192).

Interesting information on which nouns have a plural, and whether its use is obligatory, can be found in Haspelmath's (2005) map for the *World atlas of language structures*. His data, from a sample of 290 languages, are in accord with the animacy hierarchy. In addition, he mapped the distribution of the different types. Obligatory number marking for different types of noun (the 'English pattern') is found in western and northern Eurasia and much of Africa. Elsewhere, Haspelmath's sample reveals a more mixed picture. He found optional marking of number to be common in Southeast and East Asia and Australia, while a lack of number marking is widespread in New Guinea and Australia. For comparable data on pronouns see Daniel (2005).

Even in languages that mark number as extensively as English does, there are usually some nouns which are off the bottom of the scale, those which do not enter into number oppositions. In English, they typically pattern with the singulars, thus *reliability* has the form of a singular and takes singular agreements. On the other hand, in Manam (Lichtenberk, 1983: 269), mass nouns are treated as plural (unless they refer to a single quantity):

(6) daŋ di-éno
water 3PL-exist
'there is water (available)'

In various Bantu languages we often find both possibilities: some mass nouns are singular and some plural.

We have concentrated on the basic singular/plural opposition. An important goal of the typological investigation of number is to integrate the typology of the nominals involved in number with the typology of values (see 'Number Values'). This is a significant challenge. Smith-Stark considered only plurals, suggesting that other values, such as the dual, would follow the plural. This situation is certainly not the only possibility. For instance, in Avar, some nouns have a paucal, and in modern Hebrew and in Maltese, some nouns have a dual (in addition to singular and plural). The nouns involved are relatively few in comparison with those with a plural, and they are not those at the top of the animacy hierarchy. These paucals and duals can be analyzed as 'minor numbers'; they do not pattern according to the animacy hierarchy, but they are counterexamples of a narrowly definable type. Then there are other apparent number values that appear to run counter to the hierarchy; for example, associatives, as in Bagvalal (Nakh-Daghestanian) *jaš* 'girl, daughter,' *jaš-i* (normal plural) 'girls, daughters,' *jaš-āri* (associative plural) 'daughter and her family' (Danièl, 2001: 135–136). Associatives involve an additional category and so fall outside the scope of the constraints above (Corbett and Mithun, 1996; Moravcsik, 2003; Moravcsik and Daniel, 2005). A discussion of these various complications is beyond the scope of this entry; see Corbett (2000: 54–88) for more detailed data on the animacy hierarchy and Corbett (2000: 89–132) for an integration of the typology of the nominals involved in number oppositions with the typology of values.

The Semantics of Number

So long as we stay with innocent examples like English *cat* and *cats,* the semantics of number look clear, since *cats* is appropriate for more than one instance of *cat*. In fact, there are many concealed difficulties: a concise overview of work on number within formal semantics can be found in Link (1998), who showed how the study of plurals related to different movements in linguistic semantics and provided a substantial bibliography. Ordinary plurals like *cats* are only one possible type of number; if we consider *I* versus *we,* it becomes clear that here we have an associative use of the plural; *we* is most often used for 'I and other(s) associated with me' (Moravcsik, 2003; Corbett, 2004). These different uses are bound up with the nominal's position on the animacy hierarchy. Thus, in English, while the items at the very top of the hierarchy have associative

uses, nouns lower on the hierarchy, like *coffee,* have a number opposition provided they are recategorized. If *coffee* denotes a type, or a typical quantity of coffee, then there is an available plural, as in: *she always keeps three different coffees,* and *we've ordered two teas and three coffees.*

Number Values

A striking way in which English is limited in its number system is in terms of the number values. It can distinguish only between singular and plural. Many languages have more distinctions.

The Dual

A common system is one in which singular and plural are supplemented by a dual to refer to two distinct real-world entities. Examples are widespread. We will take Central Yupik, as spoken in southwestern Alaska; the number forms are: singular *arnaq* 'woman,' dual *arnak* 'two women' and plural *arnat* 'three or more women.' The addition of the dual has an effect on the plural, which is now used for three or more real-world entities. More generally, a change in the system gives the plural a different meaning. As with the plural, the use of the dual need not be obligatory; Slovenian is a language with a dual, but one whose use is subject to interesting conditions (see Derganc, 2003). And in Kxoe (Central Khoisan) the plural is used of a man and wife; to use the dual would be an insult, because it would suggest they were together by chance (Treis, 2000).

The Trial

The 'trial' refers to three distinct real-world entities, and it occurs in systems with the number values: singular, dual, trial and plural. A particularly clear instance is found in Larike (Larike–Wakasihu), a Central Moluccan language spoken on the western tip of Ambon Island, Indonesia. (Central Moluccan forms part of the Central Malayo–Polynesian subgroup of Austronesian.) This example is from Laidig and Laidig (1990: 96):

(7) Matidui-tue au-huse nusa
3TRIAL-live at-there island
'those three live on the island over there'

The reason for citing Larike is that it has a 'genuine' trial, which is available for use for exactly three (Laidig and Laidig, 1990: 92). The dual and trial forms of Larike can be traced back to the numerals 'two' and 'three' and the plural comes historically from 'four.' This is a frequent development in Austronesian languages. Accordingly, some linguists use the term 'trial' more widely, according to the form of the inflections (derived historically from the numeral three), even for languages where the forms are used synchronically for small groups, including those greater than three (for which 'paucal' would be more accurate). The trial of Larike is not a paucal, but strictly a trial according to Laidig and Laidig.

The Paucal

As just noted, paucals are used to refer to a small number of distinct real world entities, somewhat akin to the English quantifier 'a few' in meaning. There is no specific upper numerical limit on the use of paucals (and their lower boundary varies according to the system in which they are found). Let us return to the Cushitic language Baiso. Besides the general number forms (as in (3), where number is not specified), nouns also have singular, paucal and plural. Here is the paucal (Dick Hayward, personal communication).

(8) luban-jaa foofe
lion-PAUCAL watched.1SING
'I watched a few lions'

The paucal is used in Baiso when referring to a small number of individuals, from two to about six. The Baiso system (for nouns) of singular/paucal/plural, also with a 'general' form, is rare. The paucal is usually found together with a dual, so that the system of number values is singular/dual/paucal/plural. This widespread system is found, for example, in Manam, an Oceanic language spoken on islands off the north coast of New Guinea (Lichtenberk, 1983: 108–109).

The Largest Systems

It is interesting to ask what is the largest system of number values. There are claims in the literature for languages with a 'quadral,' for four distinct real-world entities, as part of a system of five number values. Systems with five number values have indeed been found, and these are the largest systems, but the evidence specifically for a quadral is less certain. All the claims come from within the Austronesian family, and the best documented case is Sursurunga (Hutchisson, 1986, and personal communications), spoken in southern New Ireland. The forms in question are restricted to the personal pronouns, but are found with all of them, the first person (inclusive and exclusive), the second and the third. Given the conclusion to be reached, we shall label the forms 'greater paucal' (Table 1).

Here is an example of what we shall call a greater paucal form (Hutchisson, 1986; and personal communications).

Table 1 Emphatic pronouns in Sursurunga (Based on Hutchisson, 1986, and personal communications)

	Singular	*Dual*	*Paucal*	*Greater paucal*	*Plural*
1 exclusive	iau	giur	gimtul	gimhat	gim
1 inclusive	—	gitar	gittul	githat	git
2	iáu	gaur	gamtul	gamhat	gam
3	-i/on/ái	diar	ditul	dihat	di

Note that á is used to indicate schwa (ə).

(9) gim-hat 1EXCL-GREATER_PAUCAL káwán maternal.uncle:nephew/niece
'we four who are in an uncle–nephew/niece relationship'

The greater paucal has two further uses. First, Sursurunga plural pronouns are never used with terms for dyads (kinship pairings like uncle–nephew/niece). Here the greater paucal is used, for a minimum of four, and not just for exactly four (Hutchisson, 1986: 10). Second, a speaker may use the first-person-inclusive greater paucal in hortatory discourse to suggest joint action involving more than four persons, including the speaker. These two uses account for the majority of instances of the use of the forms in question. In terms of meaning, the term 'quadral' is therefore not appropriate, and so 'paucal' is more accurate.

Why then have we suggested 'greater paucal'? To see why, we need to examine the rest of the number system of Sursurunga (using data and judgments from Don Hutchisson, personal communications). The regular use of the dual is quite strictly for two people. It also has one special use for the singular when the referent is in a taboo relationship to the speaker. The so-called 'trial' can be used for three, and it can also refer to small groups, typically around three or four, and to nuclear families of any size. It is, therefore, not strictly a trial, as discussed earlier: it could be glossed as 'a few' and it should be labelled 'paucal.' The development of trial into a paucal is a frequent one, as we noted above. The so-called 'quadral,' as we have just seen, is primarily used in different ways with larger groups, of four or more (an appropriate gloss would be 'several'). This too would qualify as a paucal. There are therefore two paucals in Sursurunga, a paucal (traditionally 'trial') and a greater paucal (traditionally 'quadral'). The plural is for numbers of entities larger than what is covered by the greater paucal; however, there is no strict dividing line. Using semantic labels, we can say that the number feature in Sursurunga has the values: singular, dual, paucal, greater paucal, and plural. Thus, Sursurunga has a well-documented five-value number feature. There are certainly other languages with five number values, namely Lihir, Tangga and Marshallese; we do not have such detailed information as for Sursurunga and there is no certain case of a quadral: it seems that in all cases the highest value below plural in such systems can be used as a paucal.

Besides the split in the paucal, we may also find languages that split the plural, with 'greater plurals' of different types, as for instance in Arabic (Ojeda, 1992). Greater plurals may imply an excessive number or else all possible instances of the referent.

Number Mismatches and the Agreement Hierarchy

Nominal number may be realized directly on the noun phrase; it may also be marked on the verb (agreement). In the straightforward cases the values of number match. There are also many instances where we find a mismatch, and English is an especially rich source here. An interesting mismatch involves nouns which are singular morphologically and (typically) have a normal plural and yet, when singular, may take plural agreement, particularly in British English:

(10) *the committee have decided.*

Having an agreement choice here is made possible by the semantics of the noun. However, the likelihood of examples like (10) being acceptable depends on the variety of English involved, and speakers from different parts of the world have opposing judgments. Speakers of different varieties were asked to consider sentences apparently produced by nonnative speakers of English and to correct them where necessary (data from Johansson, 1979: 203; Bauer, 1988: 254). The relevant test sentence was:

(11) *The audience were enjoying every minute of the show.*

(Table 2) For each variety, *n* is the number of respondents, and the other figures are the percentage giving each response. There is substantial divergence between the varieties. Most speakers of British English were happy with the example as given, as were the

Table 2 Judgments on agreement with 'Committee-Type' nouns in three varieties of English

Response (%)	*Variety*		
	GB (n = 92)	*US (n = 93)*	*NZ (n = 102)*
No correction	77.2	5.4	72.5
Was enjoying	15.2	90.3	20.6
Other response	7.6	4.3	6.9

GB = Great Britain; US = United States; NZ = New Zealand.

Table 3 Agreement in written and spoken American English (Levin, 2001: 76)

	Verbs		*Relative pronouns*		*Personal pronouns*	
	n	*% plural*	*n*	*% plural*	*n*	*% plural*
NYT	3233	3	702	24	1383	32
LSAC	524	9	43	74	239	94

NYT = New York Times; LSAC = Longman Spoken American Corpus.

majority of New Zealand English speakers (for further comparative data see Levin, 2001; and Corbett, 2006).

Another source of variation is the 'agreement target'; while Table 2 is concerned with the predicate, it is known that the relative frequency of plural agreement is different for other agreement targets such as the personal pronoun. So let us examine the different agreement targets. In attributive position there is no choice, only singular is possible:

(12) *that committee . . . / *those committee.*

In the predicate, as we know, there are two possibilities; both numbers are possible in British English:

(13) *The committee has/have agreed to reconvene.*

The English relative pronoun does not mark number, but it controls number agreement in its clause and so its number can be inferred:

(14) *the committee, which has decided . . . / the committee, who have decided . . .*

Both numbers are possible. This is also the case with the personal pronoun, and here speakers of American English admit the plural too:

(15) *The committee . . . It . . . / They . . .*

Thus, with such nouns, for speakers of British English, syntactic or semantic agreement is possible for all agreement targets, except attributive modifiers, where only syntactic agreement is acceptable. Levin (2001: 76) counted examples of these agreements with nouns like *committee* in American English, in a corpus from the *New York Times* (NYT) and from the Longman Spoken American Corpus (LSAC) (Table 3).

The picture is remarkably clear. Plural agreement is more common in spoken rather than written language. Moreover, the choice depends on the syntactic position. In attributive position we find only singular agreement. Plural agreement is increasingly possible in the predicate, the relative pronoun and the personal pronoun.

These data fit into a much more general pattern based on the agreement hierarchy, which comprises four target types (Figure 2). Possible agreement patterns are constrained as follows:

> For any controller that permits alternative agreement forms, as we move rightwards along the agreement hierarchy, the likelihood of agreement with greater semantic justification will increase monotonically (that is, with no intervening decrease).

The agreements with committee-type nouns conform to this typological claim, and there is a good deal of further evidence, both from number, and from gender (Corbett, 1991: 225–260, forthcoming).

The English examples are well known, but the phenomenon is found much more widely. For instance, Samoan has several such nouns, some morphologically simple, like *aiga* 'family,' and some derived, like '*au-pua'a* 'group of pigs':

(16) Ua momoe uma le aiga
PERF.V sleep.PL all ART.SING family
'the whole family were asleep'
(O lou igoa o Peko)

(17) 'A tete'i le
but suddenly.awake.PL ART.SING
'au-pua'a . . .
COLL-pig
'When the pigs suddenly awake . . .'
(Moyle)

Note that the article is singular, but the verb is plural; the use of the verb in the plural is frequent but not obligatory (Mosel and Hovdhaugen, 1992: 91, 443, details of sources there). The reason for the potential choice of agreement in these cases is clear. We have seen that the choice may be influenced by language variety but it is also constrained by linguistic factors, notably the agreement hierarchy.

Number and Numerals

In the discussion of number distinctions, we left out any mention of numerals. This is because they can

Attributive < Predicate < Relative pronoun < Personal pronoun

Figure 2 The agreement hierarchy.

have a strangely distorting effect on number use. There are languages like English, where numerals above 'one' typically require the plural *(two cats*, not **two cat*). On the other hand, there are languages where the indication of number by the numeral is sufficient, and the noun stands in the singular, as in Bagvalal and Hungarian, among others. And then there are languages which have both options, as is generally true of Slavonic languages. Taking Russian as our example, *odin* 'one' takes a singular noun; *dva* 'two,' *tri* 'three' and *četyre* 'four,' when themselves in the nominative, take a noun in the genitive singular (a situation which has arisen through the loss of an earlier dual); and *pjat'* 'five' and above, when in the nominative, take a noun in the genitive plural. Complex numerals govern the noun according to the last element of the numeral. The numeral phrases that result from the rules given can in turn produce interesting mismatches when predicate agreement is involved.

Conclusion

Number is indeed a more complex category than is generally recognized, and the English system, although a common one, is at one extreme of the typological space. We noted that, number may be a verbal category as well as a nominal one (but the possibilities are rather more restricted for verbal number). We also saw that number need not be obligatory, that the range of items that distinguish number varies dramatically from language to language, that the semantics of number is affected by the particular item involved, and that the values of the number category can be just two or, in various combinations, up to five. When number is marked by agreement, the values of controller and target do not always match, but the patterns of mismatching are constrained. Complex issues that we have not been able to address here include various interactions, notably between the forms of marking of number, the particular nominals that distinguish number in a given language, and the systems of number values. For these see Corbett (2000).

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See also: Mass Nouns, Count Nouns, Non-count Nouns: Philosophical Aspects.

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Numbers: Calculation

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Human beings, as well as animals, seem to be genetically endowed with some mathematical abilities including a fundamental sense of quantity: most researchers, in fact, now believe that evolution developed a specialized mechanism for number appreciation and processing (Gelman and Gallistel, 1978; Meck and Church, 1983; Fuson, 1988; Wynn, 1990; Dehaene, 1997; Butterworth, 1999; Brannon and Terrace, 2000). This conclusion rests in part on research on human infants: infants are at least able to discriminate between small numbers of entities, can enumerate physical actions, actions sequences, and sounds, and can match a number of sounds to the same number of material objects (Wynn, 1998).

Numbers are properties of objects in the external world that are mentally represented as abstract concepts. The numerosity of a collection of elements is in fact independent of physical attributes. Most researchers (Meck and Church, 1983; Gelman and Gallistel, 1992) agree that numerosity is mapped into a memory representation via a 'accumulator,' a device that sums impulses coming from the elements of a collection. In long term memory the appreciation of numerosity is confronted with previous experience. The internal representation of a number is thought to be analogical and its precision decreases with numerosity. Quantification, i.e., the process of capturing numerosity and accessing to the correspondent mental representation, is performed via three basic tasks: subitizing, counting, and estimation.

'Subitizing' refers to the ability to correctly appreciate small quantities, apparently without serial processing. The idea that subitizing differs from counting, not unanimously accepted, rests mainly on the finding that reaction times to number appreciation are the same for quantities inferior to four elements and increase exponentially thereafter, where counting or estimation become necessary.

Counting consists of pairing each element of a collection to a number word and considering the last assigned word as representing the numerosity of the collection: this latter property is called 'cardinality' The concept of 'ordinality' acquired at the age of

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about 30 months, refers to the ability to judge which of two different quantities is larger.

According to Gelman and Gallistel (1978, 1992), cardinality is part of innate mathematical knowledge. Such knowledge would also include realizing that: (a) each element must correspond to one verbal label only; (b) a conventional order rules verbal labels; (c) counting applies to any collection of objects; and (d) changing the labeling order does not modify the numerosity of the collection. A separate ability involves separating already counted objects from those that remain to be counted. Not all authors believe that counting rests on innate knowledge: the alternative view (Wynn, 1998) is that children deduce principles of counting from experience.

Estimation is a quick but less accurate process that applies also in the manipulation of internal representations. Several variables, besides objective numerosity, have been shown to influence estimation: the physical properties of the stimuli, their spatial disposition, practice in the tasks, visual clarity, etc. Estimation, however, heavily depends on psycho-physic laws, like Fechner's and Weber's, that also affect internal representations (Krueger, 1984) like the 'number line' a content of imagery that, in the majority of subjects, is thought to support number understanding.

Number processing and calculation have a complex relation with processing of language. As a consequence, neuropsychological disorders affecting the two domains, acalculia and aphasia, are often overlapping and sometimes intimately intertwined. Both linguistic and mathematical functions are largely sustained, in right-handed subjects, by the left hemisphere, whose lesions often feature aphasia as well as acalculia (in a series of 50 left hemisphere patients studied by Delazer *et al.*, 1999, none of the 37 aphasics was error free in calculation). This connection may not be the result of chance evolutionary events. Semenza *et al.* (2004) recently showed that a series of patients suffering from aphasia as a result of right rather than left hemispheric lesions were nonetheless all affected by some form of acalculia. This finding lead to the speculation that linguistic and mathematical faculties, no matter how anatomically and functionally independent from each other, developed from the one hemisphere endowed with the 'recursive faculty,' a combinatory capacity at the basis of both faculties (Hauser *et al.*, 2002).

This said, one should be cautious in drawing firm conclusions about a stronger relationship between representation and processing of language and math. First, statistical associations between deficits do not allow to infer causal relationships between cognitive functions: associations may stem from common underlying resources (such as attention) or just because two functions have neighboring neuroanatomical implementations. Second, empirical evidence argues against an obligatory verbal basis of calculation processes: indeed reliable double dissociations between calculation and language have been reported. Thus global aphasics have been described still demonstrating remarkable arithmetical skills, while severe acalculics have been observed with no detectable language impairment. The observation, in particular, of a nonaphasic patient who entirely lost her knowledge of numbers and number concepts above the numeral four was held as evidence that numbers constitute an independent semantic domain. The same sort of double dissociation may be found when written rather than oral language skills are considered. In the same way, neuropsychological dissociations have been reported of math faculties with general cognitive skills: acalculic patients can still show a higher than average I.Q., while, in contrast, patients with very poor intelligence (including *idiot savants*) may yet be able to solve complex arithmetical problems.

The deduction here is that while it is possible that some subcomponents impinge on a common basic function, the independence between mathematical skills and other cognitive skills, including language, seems proved to a large extent. This fact is reflected in neuropsychological literature where, since the very early studies on acalculia, the intuitive distinction has been commonplace between 'primary' acalculia and acalculia 'secondary' to disorders (pivotally alexia, agraphia, and spatial deficits) interfering with peripheral aspects of number and calculation processing.

Cognitive analyses of neuropsychological deficits, undertaken in the past three decades, allow nowadays extremely fine-grained distinctions among different processing and representational subcomponents of both the number system and calculation. The anatomical correlation of functions has also made some progress from the original, still basically correct, idea, that, with the exception of some spatial components located in the right hemisphere, most math skills are located in the left parietal lobe. One cognitive model, the 'triple code' model (Dehaene and Cohen, 1995), is based on recently discovered anatomical correlations. The model, while assuming that Arabic and magnitude representation of numbers are available to both hemispheres in the vicinity of the parieto-occipito-temporal junction (but extending to the occipito-ventral on the left), assigns the verbal representation underlying the retrieval of arithmetical facts (i.e., single digit problems, like tables, that are, in learned calculators, retrieved from long term memory rather than calculated) exclusively to the left

hemisphere; only the left hemisphere would possess the representation of the sequence of words corresponding to verbal numerals and lexical mechanisms for identifying and producing spoken numerals; these lexical mechanisms, not specific for numbers, would be implemented in the classic language (Broca's and Wernicke's) areas, including the inferior frontal and the superior and middle temporal gyri, as well as basal ganglia and thalamic nuclei. Within the left parietal lobe, three major circuits for number processing were recently identified (Dehaene *et al.*, 2003): a core system, called into action whenever numbers are manipulated and quantity processing is required, would be located in the horizontal segment of the intra-parietal sulcus; a left angular gyrus area, in connection with other left hemisphere areas, would support the retrieval of arithmetic facts, and a bilateral posterior superior parietal system would support attention on spatial dimensions (including the number line).

Number processing is now considered, on the basis of evidence brought about by cases of double dissociation, to be independent from calculation. Processes dealing with numbers are very often 'transcoding' processes, that transform a number from a given representational format into another format. Thus, in the contemporary Western culture (other codes, e.g., the Roman code, have been used or are used in other cultures), a task like reading aloud presupposes transcoding Arabic or alphabetically written numbers into spoken number words; in writing on dictation the reverse transcoding process is at work. Other common transcoding tasks are, for example, number repetition or number transformation from one code into the other (e.g., 'three' into '3' or vice versa). How does the cognitive system perform such tasks? Patients committing revealing patterns of errors in these tasks have been described. The most interesting findings concern two main types of transcoding errors: 'lexical' and 'syntactic' errors (Deloche and Seron, 1982). These errors most often cooccur but are sometimes observed in relative isolation from each other, reflecting independent 'lexical' and 'syntactic' processing mechanisms.

The number lexicon constitutes the collection of the symbols and of simple number words. The 'number syntax,' shown, on the basis of neuropsychological dissociations, to be independent from language syntax, defines the set of acceptable structures formed by combining the basic lexical elements. A semantic component in the system allows attribution of meaning to each sequence.

The verbal numeral system is composed of different lexical primitives (i.e., words) organized in four different classes: the Units or Ones (from one to nine), the Teens (from eleven to nineteen), the Decades (from ten to ninety), and the Multipliers. These last includes words like hundred, thousand, or million, which according to their position in a sequence are in sum (e.g., hundred and four [$100 + 4$]) or are in a product relationship (e.g., four hundred [4×100]) with the lexical primitives. The Arabic numeral system has a limited lexicon that includes the digits from 1 to 9, whose 'position' within numerals determines the power of 10 by which it must be multiplied (e.g., 487 has the value of $4 \times 10^2 + 8 \times 10^1 + 7 \times 10^0$) and the digit 0, that indicates the absence of a given power in the base of the number (e.g., in 407, 0 stands for 0 decades). Zero has a unique role: it never appears in the leftmost position, where it would not make a well-formed integer number.

The lexical processes are thus retrieved on the basis of knowledge of the correct number class and of the position within the class. 'Lexical errors' consist of the incorrect production of one or more of the individual elements in a number (e.g., 5 instead of 6, 45 instead of 55, 1305 instead of 1405).

The combination of lexical primitives leads to the formation of complex numerals. Complex numerals can be conceived as multiplicative-additive structures that can be described as sequences of embeddings of multiplicative and additive relationships. Thus every nonprimitive number is build up by the application of 'syntactic' rules (Power and Dal Martello, 1990): the 'concatenation rule' and the 'overwriting rule.' The concatenation rule is applied when the multiplier (e.g., hundred) is in a product relation with the primitives (e.g., five hundred [5×100]), while the overwriting rule is applied when the multiplier is in a sum relation (e.g., hundred and five [$100 + 5$]) with the primitive numbers. Evidence of these distinct mechanisms comes from both developmental and neuropsychological studies. The overwriting rule is generally more difficult to apply, and in some cases are the almost exclusive type of error, but cases have been described with relatively more errors involving the concatenation rule.

Syntactic errors are thus errors whereby the power of 10 is wrong with respect to the target and are often violations of the concatenation (e.g., '610043' instead of '643') or of the overwriting rules ('60043' instead of '643'); deletions of one or more zeros also occur ('46' instead of '406') or deletions of a multiplier ('1305' instead of '5305'). A recently described patient (Granà *et al.*, 2003) directed the attention of researchers to an important distinction, that between lexical zeros and syntactic zeros, the errors the patient made were exclusively on syntactic zeros. Lexical zeros are semantically derived zeros, like those in tens (e.g., the zero in '20,' and the first zero

in '20104'), that originate from a numerical concept, while syntactic zeros are syntactically produced as the result of syntactic rules, a concatenation rule plus an overwriting rule, leaving one or more intermediary zeros (e.g., the zeros in '12004'). Syntactic zeros are thus more difficult to manipulate.

Number manipulation deficits can selectively concern both production and comprehension and the Arabic or the verbal code. Patients have been reported with selective deficits for particular numbers such as 7 or 9. One still-debated point is whether or not number transcoding and calculation necessarily imply semantic mediation via a central abstract semantic representation and whether asemantic, code-specific routes exist besides the semantic one (different models have been proposed on this subject: McCloskey, 1992; Campbell and Clark, 1992; Cipolotti and Butterworth, 1995; Seron and Noel, 1995; for reviews see Noel, 2001 and Cipolotti and van Harskamp, 2001).

The nature of the semantic representation is also controversial. While, for instance, McCloskey (1992) assumed a precise representation even for large numbers, Dehaene and Cohen (1995) hypothesized an analogue magnitude representation coding for approximate quantity. The existence of this last representation and of a spatial mental number line would be documented by the SNARC (Spatial-Numerical Association of Response Codes) effect (Dehaene *et al.*, 1993), whereby, within a given interval, smaller numbers tend to be preferentially responded to with the left hand, whereas the reverse is true for large numbers. This effect has been shown to hold at least with one-digit numbers, and in speakers of languages that are written from the left to the right, whereas the effect is inverted in speakers of languages with right-to-left writing.

Ordinality and cardinality were also shown to dissociate in patients. A selective impairment with number cardinality has in fact been reported: this patient could correctly order any sequence of numbers, while unable to add 1 to a given number!

With respect to the number system, the calculation system is relatively less studied. However, with a major contribution from neuropsychology, the relatively independent domains of arithmetical signs, arithmetical number facts and rules, calculation procedures, approximate calculation, and conceptual knowledge have been investigated to a large extent.

An independent system for arithmetical signs is suggested by the relatively rare finding of patients unable to understand and name arithmetical signs and performing otherwise correct calculation according to their misidentification.

An independently stored system containing overlearned, quickly retrievable single digit problems (arithmetical facts) is also thought to be acting in calculation (Ashcraft, 1992). This system is subject to the widely investigated problem-size effect, which refers to the observation that difficulty of simple arithmetic combinations generally increases with numerical size. Arithmetical facts, *vis-à-vis* neuropsychological evidence, seem to be segregated according to the type of operation. Thus patients are there, for example, with selective disturbances of table facts only. This segregation appears also at the level of more complex operations (Cipolotti and van Harskamp, 2001). Disturbances of arithmetical facts can occur both in the memory storage and in the retrieval.

Arithmetical rules are distinct from facts and include problems where one of the elements (e.g., the multiplier or the addend) can be substituted by any number (for example, $n+1$, $n-1$, $n\times 1$, $n/1$, $n+0$, $n-0$, $n\times 0$). Rules involving zero are particularly difficult to learn and can be selectively disturbed.

Arithmetical procedures, concerning the algorithms necessary for each type of operation, are also stored independently from each other. As a consequence, acquired disturbances of procedures constitute a rather heterogeneous picture and selective deficits of multiplication or subtraction only have been described. Work on normal learners (Van Lehn, 1986) highlighted systematic, consistent errors known as bugs at certain points of the procedure. Semenza *et al.* (1997) on the basis of selective cases, also distinguished memory problems for the procedural algorithm (typically resulting in systematic misapplication of some specific rule) and monitoring problems, deriving from the inability to devote attention and keep track of each specific step in the procedure. Thus, while memory patients (Girelli and Delazer, 1996) commit, just like normals, errors of the bug type, monitoring patients, while always starting the operation in the correct way, would then make an increasing and inconsistent number of errors of all sorts, have little awareness about the precision of the performance and end the operation with difficulty. It has been recently suggested the possibility that selective right hemisphere lesions might compromise the ability to use a spatially based schema that, in complex operations, would help in keeping the single substeps together by representing the information of where exactly each substep should be placed. This theory is argued to be in line with proposals made by psychologists in the early decades of last century (see Hartje, 1987 for a review).

While the application of procedural knowledge does not require conceptual understanding of each step of the procedure and is applied only in already

familiar tasks, what has been called conceptual knowledge (Hittmair-Delazer *et al.*, 1994), in contrast, implies understanding of arithmetical operations, and the laws and principles pertaining to these operations. Also labeled 'adaptive expertise,' it may or may not be explicitly known as such to the calculator, it allows one to make inferences and can be flexibly adapted to new tasks. Examples of this sort of knowledge are potentially infinite. Delazer's *et al.* (2003) battery for the evaluation of mathematical deficits, for example, includes the following principles, allowing a calculator to answer the question 'given X, what is the result of Y?': the 'commutativity' principle (e.g., X: $22 \times 31 = 682$; Y: $31 \times 22 = ?$), repeated addition ($12 \times 4 = 48$; $12 + 12 + 12 + 12 = ?$), '10a × 10b' ($45 \times 8 = 360$; $450 \times 80 = ?$), 'a−1 × b' ($94 \times 5 = 470$; $93 \times 5 = ?$), multiplication/division invariance ($71 \times 9 = 639$; $639/9 = ?$). Such knowledge is independent from other mathematical notions and abilities. Hittmair-Delazer and coworkers described patients unable to retrieve number facts who brightly used their residual knowledge to overcome their difficulties with tables (e.g., $7 \times 8 = ?$; $7 \times 10 = 70$; $7 \times 2 = 14$; $70 - 14 = 56$), or, while unable to solve facts as simple as $3 + 2 = 5$, had no difficulty with algebraic expressions such as $(ac + bc)/c = a + b$! Conversely, there are patients who flawlessly retrieve arithmetical facts while showing no understanding of mathematical concepts whatsoever.

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Numerals

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Numeral Systems: Their Structure and Development

Quantification is essential for our cognition of the world. To quantify is to establish the limits of an entity in a relative way. Each entity is defined by its limits and identified by the relativity of its limits. It is discrete. For example, a piece of sugar is a discrete entity, which can have further spatial properties not attributable to its source, the amorphous mass of sugar.

Discreteness emerges from quantification. Discrete entities can be grouped together so as to form sets. Sets can be homogeneous or heterogeneous; they can contain many entities or be empty, yet they always have clear limits. By having clear limits, a set is an entity, too, an entity of a higher order.

Set formation presupposes entities, themselves a cognitive product of either quantification or (if the entities have already been quantified) identification. The primary act of set formation involves abstraction from all but a classifying property. An example is found in tally sticks with notches on bones, which originated in Africa around 37 000 years B.C. and in Europe some millennia later. The notches represent quantified entities; the tally stick contains a set (**Figure 1**).

Counting is based on classification, accumulation, and grouping. Cognitive units of counting are numbers; their symbolic expressions in language are numerals.

Figure 1 African tally stick (37 000 B.C.), probably representing the moon cycle (29 notches).

Grouping of entities is an essential feature of number systems, with the effect of establishing bases (in addition to digits such as '1'). Across cultures, primitive counting on fingers and toes led to the establishment of the group of '5' – symbolized by a hand – as a basis for further counting. Significantly, counting on fingers and toes operates with the base of '5' (i.e., five fingers or a hand), the base of '10' (i.e., two hands), and the base of '20' (i.e., fingers and toes or hands and feet). Contemporary examples in active use are found in Papua New Guinea, where, e.g., the Aghu language symbolizes '5' by the word for 'hand', whereas Kombai, Korowai, and Wambon symbolize '5' by the word for 'thumb'. Similar systems are found, e.g., in Mullukmulluk in Australia (cf. Greenberg, 1978: 257) and in Bantawa in east Nepal (where the numeral for '5' is *ụkchuk* 'one hand', '10' is *hụachuk* 'two hands', and '20' is *reṭkachuk* 'four hands'; cf. Gvozdanović, 1985: 137). Many systems known as advanced started from a quinary base, for example, Sumerian from the 4th millennium B.C. in Mesopotamia (**Table 1**).

Comparative studies of Indo-European have shown that Proto-Indo-European (PIE) words for '5' and '10' are also based on counting by hand. Thus, PIE *$*penk^w(e)$* '5' is connected, e.g., with Old High German (OHG) *fūst* and Russian *pjast'* 'fist',

Table 1 Sumerian numerals above '5' composed with the base '5'[a]

Number	*Sumerian numeral*	*Number*	*Sumerian numeral*
1	diš, aš	6	aš < *ia + aš (5 + 1)
2	min	7	imin < *ia + min (5 + 2)
3	eš	8	ussu < *ia + eš (5 + 3)
4	limmu	9	ilimmu < *ia + limmu (5 + 4)
5	ia	10	u

[a]Cf. Justus (1996).

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5	ia	10	u

[a]Cf. Justus (1996).

originally referring to the hand clenched to form a fist as a symbol of 'five' (cf. Winter, 1992: 17), whereas PIE **dekm̥t* '10' has been reconstructed as **de-km̥t* 'two hands', and **km̥tom* < *dkm̥tom* '100' as either the genitive plural of the neuter collective noun **dkm̥t-* (i.e., ** dkm̥t dkm̥tom* 'a decade of decades', cf. Szemerényi, 1960: 139–140), or a derivative with *–to-*, signifying the limiting point in the series of decades (cf. Coleman, 1992: 404). Indeed, the base of '100' was the highest decimal base in Proto-Indo-European (as the reconstruction of '1000' **ghes-lo-* on the basis of Aryan and Greek fails to account for the other Indo-European languages; cf. also Szemerényi, 1960: 1).

Historically seen, the development of advanced numeral systems was connected with astronomy, geometry, and calendar construction, in addition to stock administration and trade. This applies to the ancient Egyptian decimal system (since the 5th millennium B.C.) as well as to the Sumerian and later Akkadian and Babylonian sexagesimal system (cf., e.g., Neugebauer, 1947: 37 concerning the calculation of lunar phases).

Apart from bases of unrestricted productivity, rudimentary bases have been recorded, for example, in duodecimal counting of Benue-Congo languages (involving a base of '12'), later replaced by a decimal system, or in Sora, a Munda language (cf. Greenberg, 1978: 270) (related to it were probably also the 'big hundreds' transitionally present in Northern Germanic [equalling '120']). Smaller rudimentary bases have been attested in rural communities, such as base '4' in Barbareño (a Chumash language of California; cf. Comrie, 1999: 89), in Tunisian, or in Celtic (cf. Justus, 1999: 61 f.). Yuman languages of Southern California, Arizona, and Baja California, next to Coahulteco a Hokan language, provide examples of limited use of the base '3'. A rudimentary base '2' is found in the central Wintun branch of Californian Penutian (cf. Greenberg, 1978: 279). Rudimentary bases coexist with productive bases, usually of later origin.

The lowest productive base by which all higher productive bases can be divided is called fundamental (cf. Greenberg, 1978: 270). Apart from the rare exceptional types mentioned above, languages are classified by their fundamental bases as quinary (with the fundamental base '5'), decimal (with the fundamental base '10'), vigesimal (with the fundamental base '20'), or sexagesimal (with the fundamental base '60').

The capacity to undergo recursive mathematical operations makes bases into the backbone of numeral systems. The relevant operations and their asymmetrical implications (in the sense of Greenberg's hierarchies (1978: 257–272) are the following:

- addition (e.g., French *dix-neuf* 'ten-nine', i.e., '19'),
- subtraction (e.g., Latin *un-de-viginti* 'one-off-twenty', i.e., '19'); it implies the existence of addition (every minuend is a base of the system or a multiple of a base; a subtrahend is never larger than the remainder);
- multiplication (e.g., English *fifty* [5×10]); it implies the existence of addition (a rare exception is found in a subgroup of the Yuman languages, affiliated to the Hokan stock, which has the first decade only, analyzed as '1', '2', '3', '4', '5', '3×2', '7', '4×2', '3×3', '10');
- division (e.g., Welsh *hanner cunt* 'half hundred', i.e., '50'); it implies the existence of multiplication (division is expressed as multiplication by a fraction, and the denominator of the fraction is always '2' or a power of '2');
- (rarely) overcounting (e.g., older Danish *halv-tred-sinds-tyve* 'half-third-time-twenty', i.e., '50') and 'going-on' operation (e.g., in Mayan and in Finno-Ugric, cf. *Ostyak* '18' as ('8 going-on 20'));
- exponentiation (e.g., Sumerian *geš* '60', *šàr* '3600', *šàr-gal* '*šàr*-big' '216,000').

Bases show up as significant boundaries in language decay, at least at intermediate stages. This may be illustrated by the Tibeto-Burman languages of Nepal (cf. Gvozdanović, 1985: 136), which have been overlayered by the (Indo-European) standard language Nepali, but have preserved their original numerals either up to the fundamental base '5' (symbolized by 'one hand' or by the Proto-Tibeto-Burman form *ngaji*) or up to '3'. The observed regularity demonstrates the cognitive relevance of numeral bases.

Morphology and Syntax of Numeral Expressions

Numeral morphosyntax shows a combination of mathematical and linguistic properties, relating to semantic, morphosyntactic, and pragmatic levels. For numeral morphosyntax Hurford (1987) formulated a so-called 'packing-strategy' principle that states that complex numeral expressions are formed by combining the highest-valued simpler numerals available (e.g., the French numeral for '70' is *soixante dix* [$60 + 10$], not **cinquante-vingt* [$50 + 20$] or **quarante trente* [$40 + 30$]). The point at which a language changes methods for signaling addition is as a rule indicative of a base break. It is typical of Indo-European that such a break occurs between the -teens (cf. English *thirteen–nineteen*, expressed as digit + base) and the upper decades (starting from '20', regionally limited also above '60'). Outside of

Indo-European, pattern discontinuity may be illustrated by Hebrew, where the numeral plurals of '3' to '9' denote the corresponding decades '30' to '90', but the plural of '10' denotes '20'. The next-higher base is '100', for which Hebrew has a separate noun, *meʾa*.

Numeral bases are treated differently from digits. In systems with more than one base, there is a base above which certain regularities hold, e.g., complex expressions consist of a product and a remainder, and the remainder never has a value larger than the next lower base of the total expression (cf. French *soixante douze* '72, i.e., 60 + 12' is possible because the next lower base is '20').

Numeral syntax is usually highly complex, and only a part of this complexity is directly connected with numeral morphology. Typologically interesting is the tendency of the numeral to precede the noun if the descriptive adjective is also in the preceding position, as opposed to variation in the position of the numeral when the adjective follows the noun. An example of the latter is found in Malay, in which the descriptive adjective regularly follows the noun, but the numeral and the classifier may be placed either before or after the noun (the latter option seems to be pragmatically marked).

Numeral morphosyntax exhibits a set of further regularities:

- the numeral 'one' is syntactically an attribute of its denominator;
- numerals expressing bases either are syntactic heads or share headedness with their denominator (cf. Hebrew, in which these numerals have inherent gender); in the development of Indo-European, the lower bases have arguably developed from adjectives to nouns;
- the numerals 'two', 'three', and 'four' have an intermediate status; they may differentiate gender; languages with grammatical dual have a special treatment of 'two';
- many languages have discontinuity of expression around the numerals 'three' and 'four', relating especially to distinct marking for gender, case, indefiniteness, or word order; these phenomena are presumably related to short-term memory limitations (cf. Cowan, 2001);
- in rule-governed variation between the singular and the plural with numerals, the singular is favored with higher numbers, in measure constructions, in indefinite constructions, and with nouns that are inanimate or impersonal (Greenberg, 1978: 283);
- the order noun-numeral is favored in indefinite and approximative constructions (Greenberg, 1978: 284);
- predicate agreement with quantified subjects above the cut-off point around 'three' or 'four' mentioned above is sensitive to animacy and topicality: the singular agreement is preferred with inanimate and non-topical subjects, the plural agreement with animate and topical subjects.

Although quantification takes effect in the logical structure of language, its morphology and syntax depend in part on pragmatics. This shows that quantification permeates all the central levels of language.

See also: Classifiers and Noun Classes: Semantics; Number.

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Numerical Notation

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Notation is a conventional written system for encoding a formal axiomatic system. Notation governs

- the rules for assignment of written symbols to elements of the axiomatic system;
- the writing and interpretation rules for well-formed formulae in the axiomatic system;
- the derived writing and interpretation rules for representing transformations of formulae, in accordance with the rules of deduction in the axiomatic system.

All formal systems impose notational conventions on the forms. Just as in natural language, to some extent such conventions are matters of style and politics, even defining group affiliation. Thus, notational conventions display sociolinguistic variation; alternate conventions are often in competing use, though there is usually substantial agreement on a 'classical' core notation taught to neophytes.

Excluding logic (*see* **Logical and Linguistic Notation**), mathematics as a whole is divided into three parts, of which one is algebra (roughly, the realm of the discrete, including number theory and combinatorics), another geometry (roughly, the realm of the visibly codable, including topology), and the third what ordinary people call calculus, but which is spoken of by mathematicians as analysis (roughly, the realm of the continuous, including statistics, differential and integral calculus, theory of functions, and complex variables). All these areas overlap and grow into one another fractally; in particular, they crucially involve the concept of number.

Numbers and Arithmetic Symbols

Though there appear to be some cultures where counting and numbers are unknown (see Everett, 2005), almost all languages contain some numbers, and almost all cultures practice counting and other mathematical activities. The written representation of quantities and numbers is as old as, and may even predate and prefigure (see Schmandt-Besserat, 1992; Zimansky, 1993), writing itself. After alphabetic writing was developed, it was normal to use individual letters to represent particular numbers in an additive system such as Roman numerals, where, for instance, *MDCCVII* represents $1000 + 500 + 100 + 100 + 5 + 1 + 1$, or 1707. Similar systems existed for ancient Greek and Hebrew; even after the widespread use of Hindu/Arabic numerals, the Hebrew system of alphabetic number representation survived as a Kabbalistic numerological system known as Gematriya, in which the number associated with any Hebrew word has gnostic significance. See Ifrah (1991: ch. 2) in Barrow (1992), and Pettersson (1996) for history. The Hindu/Arabic numerals, with their positional notation, were originally developed in India during the Gupta empire and spread to the Muslim world, whence they made their way to Europe after the Crusades. In positional notation, the position of each numeral in a series indicates the power of the base that it enumerates; thus, *1707* in base ten represents $(1 \times 10^3) + (7 \times 10^2) + (0 \times 10^1) + (7 \times 10^0)$. Such a notation (including zero, which is necessary for it to work) represents an enormous advance in numeration over additive systems, because it makes possible algorithmic calculations such as long division.

Hindu/Arabic numerals in base ten are all but universal in the writing systems of the modern world. While the decimal (base ten) system is the norm, in principle any numeric base can be used, and several have been: the Babylonian numeric system was sexagesimal (base 60, from which we inherit the 360° circle and the 60-minute hour); the Mayan system was vigesimal (base 20); vestiges of a duodecimal (base 12) system remain in English vocabulary (*dozen*, *gross*); and several systems based on powers of 2 – binary (base 2, digits *0* and *1*), octal (base 2^3,

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digits 0–7), and hexadecimal (base 2^4, digits 0–9 plus *A–F*) – are in common use in computing contexts.

By contrast with the numerals, all of the usual symbols for arithmetic operations (+, −, ×, ÷) are of European origin, originating among a congeries of symbols used between the 15th and 17th centuries. + is simply the stylized letter T of *et*, an early ampersand. The symbol for division (÷), now seen as an obvious mnemonic of the fraction notation with a horizontal bar introduced by the Arabs, was in fact originally used in Europe for subtraction, and it is from this sign that the modern − sign comes. Finally, × is only one of several symbols for multiplication, introduced and promoted by William Oughtred (1574–1660) in the *Clavis Mathematicae* (1631). Other multiplication notation in use today includes the raised dot ($a \cdot b$), which Leibniz preferred, and simple juxtaposition (ab), which appears to have been the original notation in India, dating from the 10th century and appearing sporadically in Arabic and European sources afterward. By the 18th century, these symbols had become general in European mathematical notation.

Other Symbols

Mathematics is a gigantic intellectual area, famously unapproachable by the uninitiated, replete with multiple notational conventions and the materials and will to invent new ones. Considering the size of the field and the elaborate profusion of its notation, this article can do no more within its space constraints than touch on the notations of several areas (besides logic) that impinge on natural language, and remark on general notational tendencies in mathematics.

One example is the notation used in modern integral and differential calculus, which descends from Leibniz's original invention in the 17th century; Newton famously invented calculus independently before Leibniz, but published later. More importantly for our purpose, he used a different notation which, while patriotically employed in English mathematics for the next century, proved awkward and was eventually abandoned for Leibnizian differentials.

The basic concepts in calculus are the derivative of a function $y = f(x)$ and its integral. The derivative is another function f' whose value at any point x is the instantaneous rate of change with respect to x of the value y of $f(x)$. This function in turn has its own derivative f'', which is thus the second derivative of f, and so on. Newton used overdot $\dot{y}$ for the derivative. The integral of a function is another function whose value represents the area between the curve and an axis. Newton used overbar $\bar{y}$ to represent the integral.

While first and second derivatives are still quite commonly indicated with prime marks, replication of dots and primes becomes difficult when speaking of higher derivatives, or when using a variable. Leibniz's notation, unlike Newton's, used a ratio between the differentials dy and dx (infinitesimal increments in y and x) to represent the derivative. Second and higher derivatives are indicated by exponents on the differentials; thus $f'(x) = dy/dx$, and $f''(x) = d^2y/dx^2$, producing a natural operator notation d/dx for differentiation, in contrast to Newton's notation, which did not lend itself to such generalization.

For integrals Leibniz used a special operator, the long-S integral symbol $\int f(x)\, dx$. The differential dx after the function in this notation is a mnemonic for multiplication, just as the ratio between differentials symbolizes division in the derivative notation. Leibniz's convention recalls the fundamental theorem of calculus (i.e., derivative and integral are inverses) by use of the inverse operations multiplication and division to represent them; by contrast, Newton's notation was arbitrary and had no mnemonic value.

Following the invention of the calculus, mathematics endured for several centuries a disconnect between axiomatic theory and actual practice. Calculus worked, for reasons which mathematicians could not explain, and about which engineers did not care. The result was that practice got very far ahead of axiomatic theory, until at the beginning of the 19th century, mathematicians resolved to put such axiomatization at the front of their goals.

By 'axiomatization,' mathematicians mean the establishment of a system of undefined elements, axioms, and rules of inference for deriving theorems from the axioms, based on the model of Euclidean geometry, which for millennia has stood as the exemplar of pure mathematical thought. This is what is meant in mathematics as a 'formal system'; in linguistics this term has a different sense, since linguists do not establish axioms or prove theorems.

The most significant area of mathematics in this axiomatization effort has been set theory, which now, as a result of the 19th-century work, is taken to underlie all areas of mathematics and logic. Set theory has only three undefined terms: set, element of a set, and inclusion in a set. These are universally symbolized with capital letters to name sets, lowercase letters to name elements in them, and the relation symbol $\in$ for set inclusion, thus $a \in A$ indicates that a is an element of the set A. Sets may also be specified by using curly braces, e.g., the set of English vowel letters is {a, e, i, o, u}, and the set N of natural numbers is {1, 2, 3, . . .}. Since most interesting sets are infinite, or at least very large, simple enumeration is rarely

sufficient; thus one finds qualified set descriptions, e.g., the set of perfect squares can be described as $\{x^2: x \in N\}$, pronounced 'the set of all x squared, such that x is in N.'

From this set convention come all the various uses of parentheses and brackets for inclusion and specification, such as the ordered pair $(0, 1)$ in algebra, which is simply a special set consisting of two elements in order. Exactly the same notation $(0, 1)$ in topology is used to denote an open set, i.e., the set of all points on a line lying between 0 and 1, but **not** including the end-points; if an end-point is included, the notation changes to a square bracket, so that the closed set $[0, 1]$ has a largest and a smallest member, while the open set $(0, 1)$ has neither. In analysis, $(0, 1)$ following a function symbol such as f implies that f is a function of two arguments to be applied to 0 and 1.

Fonts play a more important role in mathematical notation than one might expect, given the arbitrariness of font choice. The problem in mathematics is that there is an infinite number of concepts that one might wish to represent with a simple symbol, but there is a limited number of simple symbols that can be printed easily. Hence, it is common to mix and match Latin, Greek, and Fraktur alphabets (among others), in boldface, italic, and plain variants, each indicating some systematic feature of the concept under discussion. Such use is quite idiosyncratic, with considerable individual variation and specific traditions in each subarea. For instance, in relativity theory, tensor indices use Greek letters when they vary from 0 to 3 and Latin letters when they vary from 1 to 3.

General Tendencies

Mathematical notation, like all mathematics, is an exemplification of the grounding metaphors that structure the field (see Lakoff and Nuñez, 2000). These, in turn, are mostly based on the basic human cognitive activity of predication, instantiated by concepts such as function, operator, or relation, which name various symbols and types of sentencelike symbolic syntax in all areas of mathematics and logic: a function $f(x)$ is a clause with a predicate and argument(s); an equation $a = b$ is a topic–comment clause. All mathematical notation is ultimately pronounceable, a subset of written language, though like Chinese characters it is not language-specific.

See also: Assertion; Mood and Modality in Grammar; Negation; Operators in Semantics and Typed Logics; Panini; Predication; Truth Conditional Semantics and Meaning.

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Nuuchahnulth

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Nuuchahnulth, also known as Nootka, Nutka, Aht, Takhaht, and *t'aat'aaqsapa*, and by the various dialect designations, is one of the earliest documented languages of Western Canada, with first contact going back to the 1770s. Early work focused mostly on the vocabulary, with word lists being documented by a number of early explorers. The earliest detailed grammatical investigations include those of Knipe (1868), Boas (1890), and Sapir (1924). The name Nuuchahnulth is an anglicized version of *nuučaaḥuł* 'along the mountains' (*nučiˇ* 'mountain(s),'-*aˇḥuł* 'along': ˇ indicates variable length of the vowel). Geographically, the Nuuchahnulth people occupy the west coast of Vancouver Island, from Brookes Peninsula in the north to Bamfield in the south.

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Table 1 Nuuchahnulth consonant inventory

Labial	*Alveolar*	*Lateral*	*Alveopalatal*	*Velar/labiovelar*	*Uvular/labiouvular*	*Pharyngeal*	*Glottal*
p	t			k	q		ʔ
ṗ	ṫ			ḱ	q̇	ʕ	
				kʷ	qʷ		
				ḱʷ	q̇ʷ		
	s	ɬ	š	x	x̣	ḥ	h
		ɬʷ		xʷ	x̣ʷ	ḥʷ	
	c	x̌	č				
	ċ	x̌ʼ	č̣				
m	n		y	w			
ṁ	ṅ		ẏ	ẇ			

Nuuchahnulth has a relatively large consonant inventory as shown in Table 1. Conversely, the vowel system is quite simple, involving just the three vowels, /i, u, a/, and a length distinction. There are, in addition, two mid vowels that are only encountered in the long variety, /eˑ / and /oˑ /, at least phonologically, and even then only under certain special circumstances, such as in foreign borrowings. Primary stress is predictable and appears on one of the first two syllables of a word, depending on weight.

Important morphophonological processes include glottalization and lenition, which affect the preceding consonant and depend on the individual suffix triggering the effect (abbreviations: LOC, locative; DUP, duplication; SUF, suffix, MOM momentaneous aspect, NOW contemporaneous, MC momentaneous causatiṽe, SUB subordinate, L lengthening, R reduplication. All data are from Sapir's unpublished fieldnotes, (Sapir, no date), unless otherwise indicated.

(1a) hiitaḥt'iχšiʔaχ
hita-ḥt -'iχ -šiχ -'aχ
LOC-exit woods-go for[L]-MOM-NOW
'They started out of the woods.'

(1b) wišḱum
wišk -'um
angry -on the rocks
'angry on the rocks'

(1c) ʔaayimkiχqas
ʔaya -miik -iχ -qa˘s
many -getter of -MC -1S.SUB
'may I be a getter of many . . .'

(1d) titinkum
DUP-ti -ṅukʷ -im
SUF-wipe -at the hand [R] -thing
'handwiper'

As can be seen from (1a) and (1b), a glottalizing suffix will trigger glottalization of the preceding consonant, whereas a nonglottalizing suffix ((1c) and (1d)) will not. Other common morphophonological processes include labialization, delabialization, vowel coalescence, and ʔ-epenthesis. One further morphophonological process involves a class of vowels labeled variable length; such vowels appear long in the first foot of the word, but are short after that. These are characteristically Wakashan in nature and constitute a special class of vowels.

Morphologically, Nuuchahnulth is extremely complex, with upward of 500 bound derivational morphemes, along with numerous inflectional paradigms. The creative genius of the language is demonstrated by the following words:

(2) ciciḥʔaqχmapt 'crab-apple tree' (< ciḥ 'sour' -ʔaqχ 'inside' -mapt 'plant')
čičiyupḱuk 'spaghetti' (< *čiyup* 'intestines' -*ḱuk* 'resemble')
ṅiikmaɬiičač̌k 'guitar' (< *ṅik* 'scratch' -*maɬ* 'about' -*iiču* 'tool') 'at strings' -*č̌akʷ*

Morphological processes include reduplication, infixation, and suffixation, although lexical compounding is absent. There is a class of lexical suffixes that requires reduplication of some part of the root as a concomitant of the attachment (3a), in addition to reduplication indicating plurality (3b), distributivity (3c), repetition (3d), and other aspectual categories. In fact, double reduplication may occur in contexts in which both derivational and inflectional triggers to reduplication cooccur (DISTRIB, distributivity; REP, repetition; PASS, passive)

(3a) kuukuḥinqiɬ
DUP-kuḥ -inqiɬ
SUF-hollow -at the ribs [RL]
'with a hole in the side'

(3b) taataayi
DUP-taayii
PL-older brother
'older brothers, seniors'

(3c) ṅuṅupqimɬayiiʔat
DUP-ṅup -qimɬ -ayi˘ -'at
DISTRIB-one -classifier -give -PASS
'He gave a dollar to each.'

(3d) tuuxtuuxʷa
DUP-tux -(y)a˘
REP-jump -DUR
'jumping'

Predicates are typically marked for aspect and often for location (e.g., *-'iɬ* 'in the house,' *-'as* 'on the ground, in the village,' and *-'is* 'on the beach'), and bear one of a set of paradigmatic mood/person/number suffixes and other possible markers. Tense is optionally marked on predicates, as is plural for nouns. Nouns may be marked for number, diminutive, augmentative, former/future state, and possession.

Syntactically, Nuuchahnulth may be described as head-initial and head-marking. The most common word order is verb initial, either verb–subject–object or verb–object–subject, although arguments may be omitted. In keeping with its head-marking nature, possessors follow possessees (4a) and relative clauses follow their heads (4b):

(4a) ḥaẇiɬukʔi q$^{\omega}$ayaċiiktaqimɬ
ḥaẇiɬ-uk =ʔiˇ q$^{\omega}$ayaċiik -taqimɬ
chief-POSS =DEF wolf -tribe
'the chief of the wolves'

(4b) łuucsmeʔi yaq$^{\omega}$acʔitq t̓aṅa
łuucsma-ʔiˇ yaq$^{\omega}$-ac -ʔiˇtq t̓aṅa
woman-DEF REL-belong to -3S.REL child
'the woman whose child he was'

In the case of relative clauses, there are two types – headed (4b), involving either *yaq*$^{\omega}$ 'who(m)' or *q*$^{\omega}$*i* 'which,' or headless (5), in which the specifier *ʔiˇ* is attached to the predicate of a relative clause:

(5) qaḥšiχʔi
qaḥ -šiχ =ʔiˇ
die -MOM =DEF
'the dead (ones)'

A process reminiscent of noun incorporation exists, but with a rather broad range of implementation:

(6a) ʔuutẏaaṗaχ [[suuḥaa]$_{N}$]$_{NP}$
ʔu-itẏaap -'aχ suuḥaa
REF-bring . . . as -NOW spring
gift silver salmon
'He brought a gift of silver spring salmon.'

(6b) suuḥ$_i$iitẏaṗat [[t$_i$]$_N$]$_{NP}$
suuḥaa -itẏaap -'at
silver spring salmon -bring . . . as gift -PASS
'He brought a gift of silver spring salmon.'

Elements incorporated may include numerals (7a), adverbs (7b), adjectives (7c), or nouns (6b), always from the object argument. Subjects of unaccusative verbs may also be involved (7d):

(7a) ḥaayumiikuk ʔuḥʔiš muu ʔiiḥtuup
ḥayu -m̓ iˇk$^{\omega}$ -uk ʔuḥʔiš muu ʔiiḥtuup
ten -capture -POSS and four whale
'He captured fourteen whales.'

(7b) ʔiiḥiiɬ χuɬ čapic
ʔiiḥ$^{\omega}$ -iiɬ χuɬ čapac
very -make good canoe
'He made a really nice canoe.'
(Rose, 1981)

(7c) ʔiiḥnaak čapic
ʔiiḥ$^{\omega}$ -naˇk$^{\omega}$ čapac
big -have canoe
'He has a big canoe.'
(Rose, 1981)

(7d) ʔayasuuχ naṁ intʔatḥ
ʔaya -sawiχ naṁ int -'atḥ
many -die Namint -tribe
'Many Namint people died.'

Coordination may involve noun phrases, verb phrases, or intermediate units and may employ one of several conjunctions, including *ʔiš* and *ʔuḥʔiš*, both meaning 'and.' Subordination is marked by special inflectional paradigms and may or may not involve subordinating conjunctions such as *ʔani* 'that,' *ʔuyi* 'when,' etc. There is a marker, *-ʔat*, which has been labeled variously passive, switch reference, or discourse marker. (The debate over the role of this morpheme continues, for which see Kim (2004) and references therein.) For further information on Nuu-chahnulth, the reader is referred to the bibliography appended to this article, in particular the discussions in Davidson (2002), Jacobsen (1979a,b), Kim (2003), Nakayama (2001), Rose (1981), and Stonham (1999, 2004).

See also: Canada: Language Situation; Wakashan.

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Nyanja

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History and Politics

ChiNyanja (Nyanja) is a language of the Bantu group of the Niger-Kordofanian language family, and is spoken in parts of eastern, central, and southern Africa. It is spoken in Malawi, where, from 1968 until recently, under the name of Chichewa, it served as the national language. It is also spoken in Mozambique, especially in the provinces of Tete and Niassa, as well as in Zambia and Zimbabwe. In the latter, according to some estimates, it ranks as the third most widely used local language, after Shona and Ndebele. The countries of Malawi, Zambia, and Mozambique overwhelmingly constitute the central location of chiNyanja.

The language derives its name from the lake that is shared by Malawi, Mozambique, and Tanzania, with most if it as part of Malawi. The local word for a large expanse of water is *nyanja*. The people who lived along the shores of the lake and the banks of the Shire River called themselves aNyanja (lake dwellers). The Shire River flows from the southern extremity of the lake, formerly called Lake Nyasa, but now known as Lake Malawi, through southern Malawi into southern Mozambique to join the Zambezi River. The aNyanja (the singular form of which is *mNyanja*, where the prefix *m* is a syllabic nasal) spoke the language called chiNyanja (henceforth, Chinyanja).

Like most languages, Chinyanja has a number of regional dialectal variations. One of these, spoken in the hinterland of Malawi, is called chiChewa (henceforth Chichewa). This dialectal variation is the one that was spoken by the first president of Malawi, the late Dr Hastings Kamuzu Banda (cf. Watkins, 1937). The ascendancy of a Chewa to the presidency in independent Malawi had repercussions on language issues. President Banda argued that the classification of Chichewa as a dialect of Chinyanja was erroneous, deriving from unfortunate aspects of the history of missionary activity in the country, whose early activities were concentrated along the lake. Banda invoked aspects of history, plausible in some ways, to argue that Chichewa was the language of which Chinyanja was the dialectal variation (for pertinent observations, see Marwick, 1963).

The version of the history of the Chewa that Banda espoused was that the people who speak Chichewa, known as aChewa, trace their origins to a group of people known as the Maravi (according to some Portuguese records) who migrated from the lower basin of the Congo in central Africa and eventually settled in the land mass now covered by Malawi, Zambia, and Zimbabwe. Pushed by wars, disease, and other maladies from the Congo area, the Maravi were the first group of Bantu peoples to move and settle in-present day Malawi in the 16th century. Other Bantu groups such as the Tumbuka, Tonga, Yao, Lomwe, and Ngoni moved into Malawi long after the Maravi group had successfully established itself (see Kalipeni, 1996).

The Chewa were led by a powerful leader called Kalonga. He founded in Malawi what later came to be called the Maravi empire. In Malawi he established his headquarters or seat in a place called Mankhamba. Once settled, he decided to extend his influence by

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The Chewa were led by a powerful leader called Kalonga. He founded in Malawi what later came to be called the Maravi empire. In Malawi he established his headquarters or seat in a place called Mankhamba. Once settled, he decided to extend his influence by

acquiring more land and having it settled by his subjects. To achieve those objectives he dispatched a number of his matrilineal relatives to establish settlements in various parts of the country. Among the relatives who traveled on were such chiefs as Mwase, who moved into the area called Kasungu, Kaphwiti and Lunda, who settled in the lower Shire valley. As they spread throughout the central and southern part of the country, into eastern Zambia, and into parts of Mozambique, including along the Zambezi River, their language spread too. The dispersion of Kalonga's relatives and the ensuing Chewa diaspora resulted in a proliferation of regional varieties of the language. The distinct names that the regional varieties acquired created the impression of the existence of a multiplicity of ethnic groups. Some of the groups identified themselves by making reference to significant features of their habitat.

Malawi is a country dominated by a huge lake that ranks as the third largest in Africa, after Victoria Nyanza (Lake Victoria) and Lake Tanganyika, and as the 12th largest in the world. As indicated, the word for a large expanse of water in Chichewa is *nyanja*, and the word for tall grass (savanna) is *chipeta*. The people who settled along the lakeshores and along the banks of the Shire River began to call themselves aNyanja, the lake people, and their particular variety of Chichewa was called chiNyanja, or simply Nyanja, the language of the lake people. Those who moved into the interior, the land of tall grass, were called aChipeta, the dwellers of the savanna land. These names began to obscure the nature of the relationship among the people. This was further complicated by the introduction of yet other labels. Thus, the advent of the Portuguese, entering the area from southern Africa in the 17th century, was accompanied by the introduction of new labels. They had been in contact with such ethnic groups as the Xhosa, the Nyika, the Tchangani, etc. These referred to themselves as amaXhosa, amaNyika, amaTchangani, etc. Banda claimed that when the Portuguese encountered the Chewa living in southern Malawi and southern Mozambique, who referred to themselves as aNyanja, they referred to them as amaNyanja (see Banda, 1974–1975). Under the influence of Portuguese phonology, the sound *ny*, a palatal nasal, got velarized to *ng'*. This gave rise to an ethnic group of amaNg'anja, whose language was called chiMang'anja, definitely not distinct from the Nyanja. Meanwhile, the Chewa who had settled around the southern end of Lake Malawi, spreading to the area surrounding Lake Chirwa, encountered another ethnic group, the Yao. The Yao predominated in Mozambique but had flowed into the southeast part of Malawi. The Yao word for a large expanse of water is *nyasa*, and they referred to the Nyanja people as aNyasa. The people had by then come to be grouped into aChewa, aChipeta, amaNg'anja, aNyanja, and aNyasa. The last designation appears to have contributed to British colonialists' eventual designation of the lake as Lake Nyasa, and of the country as Nyasaland. This is the name that the country had until independence in 1964, when the name of Malawi, apparently derived from 'Maravi,' was restored.

The multiplicity of labels under which the Chewa came to be identified was something that received some comment from various scholars. Thus, Young remarks about the language Nyanja that

> it is the language of a people scattered over a large South-east-central African area, the aMaravi, who today live under at least six different names according to the area in which Europeans found them in the closing decades of the last century. And they were more or less on the same ground at least 300 years earlier since the Portuguese records give some of them the same names as they bear to-day. (Young, 1949: 53)

Earlier, Hetherwick had stated that

> On the Shire River they are called Mang'anja, a merely local pronunciation of the word A-Nyanja. Around Lake-Shirwa they are best known by their Yao name A-Nyasa. (Hetherwick, 1901: 15)

Although Chichewa is widely spoken in Southern, eastern, and central Africa, spreading over the landmass that includes Zambia, Malawi, Mozambique, and Zimbabwe, Greenberg does not mention it in his classification of African languages. In the works of Guthrie, Chichewa and Chimang'anja are listed as two dialect variations of Nyanja. He classifies Chichewa as belonging to zone N31b, being identified as the second dialect of the main language.

Chinyanja served as the main linguistic medium for the mass media in Malawi and was taught as a subject in educational institutions at both primary and secondary levels. In 1968, under political pressure from President Banda, a resolution was passed at the annual convention of the Malawi Congress Party, then the ruling and sole political party in Malawi, to have the name of the language officially changed to Chichewa. From that point the language Chinyanja became known as Chichewa in Malawi. Simultaneously, it was elevated to the status of national language. English remained in use as the official language.

The language policy adopted in Malawi that made Chichewa the national language contributed to the promotion of Chichewa through active educational programs, media usage, and other research activities. With the exception of work carried out within the University of Malawi, tied to contributions to, and adaptations of, advances in linguistic theory, the promotion and standardization of Chichewa were placed

under the oversight of the Chichewa Board. The terms of reference of the Chichewa Board included monitoring of proper usage of Chichewa in the media, revising and updating the orthographic conventions, as well as engaging in lexicographic work. The sustained effort over many years to boost the status of Chichewa as the main language resulted in increased functional literacy in that language. Out of a population of around 11 million in Malawi, upwards of 65% have functional literacy or active command of this language.

The political directive that led to the change of name of the language in Malawi, from Chinyanja to Chichewa, did not carry over to the neighboring countries of Zambia and Mozambique. Political factors were definitely relevant. During the period when the language issue was being addressed in Malawi, political relations between Malawi and Zambia reached a nadir. This deserves comment.

Regional Politics and Language Issues

Soon after gaining independence from the United Kingdom in 1964, Malawi had a cabinet crisis. A number of radical political activists with more nationalist fervor broke ranks with Kamuzu Banda, then Prime Minister. These were among the political leaders who had invited Kamuzu Banda to return from his exile in Britain, and subsequently Ghana, to join in, and assume command of, the fight for independence. Following the granting of independence the young radicals got disillusioned with the direction taken by Kamuzu Banda's policies. The policies were seen as aiming to oppress the masses, to practically deify Banda himself as a cult figure to whom the people were to pay homage, to undermine the efforts to promote Pan-Africanism, and to maintain the *status quo*, such that the colonialists would still enjoy the privileges that they had before independence. In brief, Banda's policies brought out the dictatorial tendencies that were eventually to characterize his rule and laid the groundwork for his tyrannical grip over the country's political development. In the revolt that resulted from the rift, the dissident politicians left the country and sought refuge in the neighboring countries of Tanzania and Zambia. This resulted in strained relations between Malawi on the one hand and those other countries on the other.

The situation became aggravated when, around 1967, there was an unsuccessful effort by a group of insurgents under the leadership of Yatuta Chisiza, a dissident politician, to unseat Kamuzu Banda militarily. The military escapade was viewed as having been perpetrated with the connivance or complicity, if not open support, of those neighboring countries. At the minimum, the insurgents seemed to have received logistical support from Zambia (for relevant details see Mchombo, 1998a, 1998b).

The worsening relations between the two countries meant that the policy about language, in this regard relating to change in the name, was not merely viewed as an issue internal to Malawi but, further, as yet another instance of Kamuzu Banda's grandiose scheme to identify the country or region with his cultural and linguistic heritage, a version of Chewa hegemony. As noted by Matiki, "Banda carried this idea of Chewa supremacy a little further by claiming that the dialect spoken by his clan is the best. This is nothing but linguacentrism" (Matiki, 1997: 529). Even if the logic or historical accuracy or factual basis for the name change were to prove impeccably sound and unimpeachable, Zambia was not ready to take hints or, worse, orders, from Malawi. A subsequent dispute concerning the proper borders of the countries, again perpetrated by the Malawi regime around the same time, merely exacerbated an already grave situation. Thus, in Zambia, as well as in Mozambique, the language has always remained as Chinyanja.

In Mozambique Chinyanja is native to 3.3% of a population numbering approximately 11.5 million. In Tete Province it is spoken by 41.7% of a population of 777 426, and it is the first language of 7.2% of the population of Niassa Province, whose population totals 506 974 (see Firmino, 1995). In Zambia, with a population of 9.1 million, Chinyanja is the first language of 16% of the population and is used and/or understood by at least 42% of the population, according to a survey conducted in 1978 (cf. Kashoki, 1978). It is one of the main languages of Zambia, ranking second after Chibemba (Bemba). In fact, out of the 9.1 million people of that country, it is estimated that 36% are Bemba, 18% Nyanja, 15% Tonga, 8% Barotze, and the remainder consisting of other ethnic groups including the Mombwe, the Tumbuka, and the Northwestern peoples (see Kalipeni, 1996). The figures show that at least six million people are fluent in Chinyanja.

The Ascendancy of Chinyanja

A recurrent joke in linguistics courses about the distinction between language and dialect is the quip that a language is 'a dialect with an army and a navy.' The rise of Chichewa in Malawi was intimately connected to the tenure of Kamuzu Banda, a Chewa, as president of Malawi. With altered political dispensation through the shift to democratic practice, and Banda's subsequent demise, Chichewa effectively lost the 'army and navy' that protected it from the status of dialect. Without formally or openly introducing a

new language policy, Malawian scholars have felt it prudent to fall in line with the other countries in the region by restoring the name of Chinyanja to the language. This restoration of Chinyanja to its former status goes beyond mere efforts to promote regional linguistic harmonization. Within Malawi the national language policy adversely affected the other languages. Once again, as noted by Matiki, "the change of name [from Chinyanja to Chichewa] angered some people because there was no justification in changing the name other than the fact that President Banda was an ethnic Chewa" (1997: 527). Thus, the other ethnic groups in the country felt alienated, more so given the identification of Chichewa with political power and the relegation of their languages to relative obscurity (cf. Kishindo, 1994). The political transition to democratic practice and the departure of Kamuzu Banda from the political helm provided opportune occasion for implementation of more equitable access to political participation and the recognition of the cultural and linguistic heritage of the various segments of the nation. Kamuzu Banda's departure from the political scene was accompanied by the ascendancy of Bakili Muluzi, a Yao, as the second president of a democratic Malawi. Inevitably, the political changes witnessed shifting fortunes for Chichewa.

On Reverting to the Name of Chinyanja

Although use of the label Chichewa is likely to remain, there is systematic diminution of its former status. Thus, the Chichewa Board was subsequently dissolved and, in 1996, the Center for Language Studies (CLS), with a broader scope of activities, was established to replace it. The center is affiliated to the University of Malawi, stressing its new mandate as a locus of research and scholarship, not as an organ of political ideology or an instrument of political hegemony. The activities carried out under the auspices of the CLS have included concerted efforts to document and provide linguistic descriptions of some of the endangered languages in Malawi.

Further, the erstwhile Department of Chichewa and Linguistics at the University of Malawi, pioneered by the present author, under political directive from President Banda to the University of Malawi to contribute to the enhancement of Chichewa, was renamed the Department of African Languages and Linguistics, thereby degrading further the profile of Chichewa.

The 'politically correct' stance of diminishing the profile of Chichewa in the university through the removal of direct reference to it in the name of the department, together with the establishment of the CLS, should not, however, be (mis)construed as indicating a real diminution in linguistic work on it. Given the historical circumstances which account for the preponderance of the available trained linguists working on Chichewa, and the headstart Chichewa was given in getting material prepared for educational and other purposes, it will continue to function in the capacity of the major language of the country. Of some significance, at least to public perception, is the recent introduction of radio news bulletins in the other languages such as Chilomwe (Lomwe), Chiyao (Yao), Chitumbuka (Tumbuka), Chitonga (Tonga), and Chisena (Malawi Sena). The news bulletins have served to increase people's awareness of these other Malawian languages, subtly contributing to the subjection of Chichewa to competition.

There are grounds for the restoration of Chinyanja as the main language. These include the literary tradition that Chinyanja has enjoyed (see Made *et al.*, 1976). The description of Chinyanja goes back to at least 1875; the first significant work can be traced to Alexander Riddel's publication in 1880 of *A grammar of Chinyanja as spoken at Lake Nyasa, with Chinyanja-English vocabulary.* This work, while not linguistically very significant, was followed in 1891 with the publication of George Henry's *A grammar of Chinyanja: a language spoken in British Central Africa on and near the shores of Lake Nyasa*. This was more comprehensive than the work by Riddel. In 1892 David Scott's *A cyclopaedic dictionary of the Mang'anja language spoken in British Central Africa* appeared, a work that was later to be revised and enlarged by Alexander Hetherwick in 1929 as *Dictionary of the Nyanja language*. This still remains an authoritative dictionary of the language. Previously, in 1901, Hetherwick had produced *A practical manual for the Nyanja language*.

These descriptions of Chinyanja and the functional utility that the language enjoyed underscored its legitimacy to the status of a major language or lingua franca. The subsequent adoption of the colonialists' language policy, which recognized the position of Chinyanja in Central Africa, especially in Malawi, eliminated further detractions from its status. The establishment of the colonial administration in Malawi at the turn of the 20th century provided extra impetus to the promotion of Chinyanja. This led to the appearance of more works on Chinyanja and the emergence of more literary works and newspapers, such as *Msimbi*, a weekly Chinyanja newspaper that flourished for several years from 1951.

As Chinyanja gets rehabilitated, and some recent publications such as dictionaries now bear that name instead of Chichewa, the latter still remains

undeniably the most familiar label for the language that is spoken and understood by more than half the population of Malawi. The reversion to the label of Chinyanja, just like the prior change to Chichewa, may lack a linguistic basis but it definitely fulfills political objectives.

Linguistic Aspects of Chinyanja

Chinyanja manifests typical aspects of the linguistic structure of Bantu languages. Its nominal system comprises a number of gender classes that are involved in the agreement patterning of the language, characteristic of Bantu languages. Thus, nominal modifiers agree with the head noun in the relevant features of gender and number, as will be illustrated below.

In its verbal structure, Chinyanja, just like other Bantu languages, displays an elaborate agglutinative structure. The verb comprises a verb root or radical, to which suffixes or extensions are added to form the verb stem (cf. Guthrie, 1962). The extensions affect argument structure or the number of expressible nominal arguments that the stem can support. The verb stem also has proclitics which encode such syntactically oriented information as negation, tense/aspect, subject and object markers, modals, conditional markers, directional markers, etc. (cf. Mchombo, 2004).

Chinyanja is also a tonal language, displaying features of lexical and grammatical tone. It has two tone levels, high (H) and low (L). Contour tones are attested but result from a combination of these tone levels, usually on long syllables (Mtenje, 1986). In its segmental phonology, Chinyanja has a basic organization of five vowel phonemes. The verb stem, i.e., the domain comprising the verb root and the suffixes changing argument structure, is also the domain of vowel harmony. In its syllable structure, Chinyanja has the basic CV structure common in Bantu (Mtenje, 1980).

Classification of Nouns

The nominal morphology of Chinyanja displays the paradigmatic case of nouns maintaining, at the minimum, a bimorphemic structure, which consists in a nominal prefix and a nominal stem. The prefix encodes grammatically relevant information of gender (natural) and number, involved in agreement between the nouns and other grammatical classes in construction with them. This is illustrated by the following:

m-lenje 'hunter'	a-lenje 'hunters'
chi-soti 'hat'	zi-soti 'hats'
m-kóndo 'spear'	mi-kóndo 'spears'

A lingering perennial question relates to the semantic or cognitive basis for the classification of nouns. A definitive response to the question remains forthcoming. Noun modifiers are marked for agreement with the class features of the head noun, and these features are also reflected in the subject marker (SM) and object marker (OM) in the verbal morphology. This can be illustrated by the following:

(1a) chi-soti ch-ángá lch-á-tsópanó
7-hat 7SM-my 7SM-ASSOC-now
chi-ja chí-ma-sangaláts-á a-lenje
7SM-REL.PRO 7SM-HABIT-please-FV 2-hunters
'that new hat of mine pleases hunters'

(1b) m-kóndó w-angá w-á-tsópanó
3-spear 3SM-my 3SM-ASSOC-now
u-ja ú-ma-sangaláts-á a-lenje
3SM-REL.PRO 3SM-HABIT-please-FV 2-hunters
'that new spear of mine pleases hunters'

In these sentences, the words in construction with the nouns are marked for agreement with that head noun. (The actual agreement markers in these examples are *chi* and *u*. The *i* vowel in *chi* is elided when followed by a vowel, and the *u* is replaced by the glide *w* in a similar environment.) Chinyanja is a head-initial language. Within the noun phrase the head noun precedes its modifiers. The formal patterns that mark singular and plural number are traditionally identified by a numbering system, now virtually standard in Bantu linguistics (Bleek, 1862–1869). Consider the following data:

(2a)	m-nyamäta 'boy'	a-nyamäta 'boys'
	m-lenje 'hunter'	a-lenje 'hunters'
	m-kázi 'woman'	a-kázi 'women'
(2b)	m-kóndo 'spear'	mi-kóndo 'spears'
	mü-nda 'garden'	mï-nda 'gardens'
	m-kángo 'lion'	mi-kángo 'lions'
(2c)	tsamba 'leaf'	ma-samba 'leaves'
	duwa 'flower'	ma-luwa 'flowers'
	phanga 'cave'	ma-panga 'caves'
(2d)	chi-sa 'nest'	zi-sa 'nests'
	chi-tösi 'chicken dropping'	zi-tösi 'chicken droppings'
	chi-pútu 'grass stubble'	zi-pútu 'grass stubble'

These classes show part of the range of noun classification that is characteristic of Bantu languages. In the examples above, the singular forms of the first group above, dominated by nouns that denote animate things, constitutes Class 1, and its plural counterpart is Class 2. Of course, not all animate things are in this class. In fact it does also include some inanimate objects. The groups in (2b), (2c), and (2d) constitute Classes 3, 4, 5, 6, 7, and 8 respectively. The odd numbers indicate the singular forms and the even numbers their plural counterparts. This runs on to

Classes 5, 6, 7, and 8. There is a further class, 1a. This class consists of nouns whose agreement patterns are those of Class 1 but whose nouns lack the *m(u)* prefix found in the Class 1 nouns. The plural of such nouns is indicated by prefixing *a* to the word. For instance, the noun *kalúlu* 'hare', whose plural is *akalúlu*, typifies this class. Each of these classes has a specific class marker and a specific agreement marker. Beginning with Class 2, the agreement markers are respectively *a*, *u*, *i*, *li*, *a*, *chi*, and *zi*. Class 1 has the agreement markers *mu* (or syllabic *m*), *u*, and *a*, depending on the category of the modifier. Consider the following:

(3) m-lenje m-módzi a-na-bwélá ndí mí-kóndo
1-hunter 1SM-one 1SM-PAST-come-FV with 4-spears
'one hunter came with spears'

Here, the numeral *módzi* 'one' is marked with the agreement marker *m* but the verb has *a* for the subject marker. The *u* is used with demonstratives and when the segment that follows is a vowel. This seems to apply to most cases regardless of whether the vowel in question is a tense/aspect marker, an associative marker, or part of a stem, such as with possessives. Consider the following:

(4) m-lenje w-ánú u-ja w-á
1-hunter 1SM-your 11SM-that SM-ASSOC
nthábwala w-a-thyol-a mi-kóndo
10-humor 1SM-PERF-break-FV 4-spears
'that humorous hunter of yours has broken the spears'

In this sentence, the glide *w* replaces *u* when a vowel follows regardless of the function associated with that vowel.

Although most of the nouns are bimorphemic, there are a number of cases where a further prefix, marking either diminution or augmentation, is added to an already prefixed noun. This is shown in the following:

(5) ka-m-lenje k-ánú ka-ja k-á
12-1-hunter 12SM-your 12SM-that 12-ASSOC
nthábwala k-a-thyol-a ti-mi-kóndo
10-humor 12SM-PERF-break-FV 13–4-spears
'that small humorous hunter of yours has broken the tiny spears'

In this sentence, the preprefixes *ka* for singular and *ti* for plural get attached to nouns to convey the sense of diminutive size. These preprefixes then control the agreement patterns (cf. Bresnan and Mchombo, 1995), providing the rationale for regarding them as governing separate noun classes. One significant point to be made is that locatives also control agreement patterns. Consider the following:

Table 1 Full range of noun classes in Chinyanja

Classes		*Prefixes*		*Subject marker*		*Object marker*	
SG	*PL*	*SG*	*PL*	*SG*	*PL*	*SG*	*PL*
1	2	m(u)-	a-	a-	a-	m(u)	wa
3	4	m(u)-	mi-	u-	i-	u	i
5	6	*li-	ma-	li-	a-	li	wa
7	8	chi-	zi-	chi-	zi-	chi	zi
9	10	*N-	*N-	i-	zi-	i	zi
12	13	ka-	ti-	ka-	ti-	ka	ti
14	6	u-	ma-	u-	a-	u	wa
15		ku-	ku-	ku-			
16		pa-	pa-	pa-			
17		ku-	ku-	ku-			
18		m(u)-	m(u)-	m(u)-			

(6) ku mudzi kw-ánu kú-ma-sangaláts-á
17-at 3-village 17SM-your 17-HABIT-please-FV
alëndo
2-visitors
'your village [i.e., the location] pleases visitors'

This gives such locatives the appearance of being class markers, giving rise to the view that in Chinyanja locatives are not really prepositions that mark grammatical case but, rather, class markers (for some discussion, see Bresnan, 1991, 1994).

The full range of noun classes in Chinyanja, together with their restive subject and object markers, is given in Table 1. Some of the classes have prefixes that are starred. These classes consist of nouns that, normally, lack the indicated prefix in the noun morphology. Samples of Class 5 nouns are provided above. Most of the nouns in Classes 9 and 10 begin with a nasal but there are no overt changes in their morphological composition that correlate with number. The number distinction is reflected in the agreement markers rather than in the overt form of the noun. Examples of Class 9/10 nouns are *nyümba* 'house(s)', *nthenga* 'feather(s)', *mphîni* 'tattoo(s)', *nkhôndo* 'war'. Class 15 consists of infinitive verbs. The infinitive marker *ku-* regulates the agreement patterns, just like the diminutives (Classes 12 and 13) and locatives. The infinitives are thus regarded as constituting a separate class although, just as with the locatives, there are no nouns that are peculiar to this class. There are minor exceptions to locatives. These have to do with such words as *pansi* 'down', *kunsi* 'underneath,' *panja* 'outside of a place', *kunja* '(the general) outside', *pano* 'here (at this spot)', *kuno* 'here (hereabouts)', *muno* 'in here'. With these, the locative prefixes *pa*, *ku*, and *mu* are attached to the stems *-nsi*, *-nja*, and *-no*, which are bound. The

agreement pattern regulated by the infinitive marker *ku-* is exemplified by the following:

(7) ku-ímbá kw-anú kú-ma-sangaláts-á
15INF-sing 15SM-your 15SM-HABIT-please-FV
a-lenje
2-hunters
'your singing pleases hunters'

See also: Bantu Languages; Kordofanian Languages; Malawi: Language Situation; Mozambique: Language Situation; Niger-Congo Languages; Tanzania: Language Situation.

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O'Rahilly, Thomas Francis (1883–1953)

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Thomas Francis O'Rahilly's interests spanned the breadth of Irish (Gaelic) language, literature, and history, although successive periods of his career were marked by different predominant themes. Prior to the commencement of his formal academic career, he founded *Gadelica: A Journal of Modern Irish Studies;* it ran to just one issue, but featured articles by many of the most prominent figures in Irish language and literature studies. O'Rahilly held successive posts at Trinity College Dublin (1919–1929), University College Cork (1929–1935), University College Dublin (1935–1941), and the Dublin Institute of Advanced Studies (1940–1947). He became director of the Dublin Institute in 1941.

His early scholarly productions included the editing of volumes of Irish epigrams and proverbs, and two anthologies of traditional poetry (*Dánta grádha* in 1926; *Measgra dánta* in 1927). His major linguistic contribution, *Irish dialects, past and present*, appeared in 1932. In his later years, he focused mainly on the history and foundational mythology of Ireland; the somewhat controversial *Early Irish history and mythology* (1946) was a compendium of his work in this field. In the same year he founded the journal *Celtica* and edited its first volume, which was marked by an eclectic mix of linguistic, literary, and historical subjects reminiscent of the scope of the earlier *Gadelica* venture. *Celtica* continues to publish to this day.

In *Irish Dialects*, O'Rahilly compared the Irish dialect situation in the early 1900s to that of English in the 14th century in that there was no standard

language and great dialect differences. In contrast, however, the Irish language had since the mid-18th century, been increasingly losing ground as the primary language of everyday life; both the professional literary classes and later the English speakers whose party controlled Ireland despised the language of the common people and actively discouraged its use. O'Rahilly noted that at the time of writing "the Irish language has died out in five-sixths of the country," and lamented that "the monoglot Irish-speaker seems doomed to extinction." This situation made the collection of what information remained about Irish dialects "a task of extreme urgency." O'Rahilly collected together all the resources, both literary and oral, from the entire history of Irish literature, and including his own first-hand field research, to make his survey (which includes excursions into Scottish Gaelic and Manx). Although he believed that his resources were limited, his close analysis led to a precise delineation of historical Irish into Northern and Southern dialects, each of which was further subdivided in two main subdialects. As he assembled sources, he produced the *Catalogue of Irish* manuscripts *in the Royal Irish Academy.*

In his observations about the relationship between social status and language disappearance, O'Rahilly anticipated the later 20th century concerns about "language death." His study stands as an early model of what linguists can and should do to both document endangered languages and encourage survival of speech traditions that are threatened by overwhelming social, economic, and political circumstances. In stressing the urgency of his task, his study also serves as a warning as to how quickly a population can go from being virtually monolingual to being a minority language in constant danger of extinction.

See also: Ireland, Republic of: Language Situation.

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Oral Traditions and Spoken Discourse

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The Problems with Oral Traditions

In our society, the idea that literature exists only in the written form has for a long time meant a total devaluation of the oral tradition. It has led to the conviction that style and rhetoric are characteristics only of written discourse. This idea has remained deep-seated in public opinion even after Romanticism prompted the revaluation of some types of oral (or pseudo-oral) literature. Yet, it is clear to all that until recent times, with the expansion of compulsory schooling and above all the media, only a tiny percentage of people, concentrated in a small number of literate societies, could master the written form of expression. In the history of humankind, this form of expression is the exception and not the rule.

In every literary tradition of which we are aware, starting with those of the Levant and ancient Greece, the oldest known documents testify to the existence of at least three oral practices that can be fully classed as literature: lyric poetry, narrative poetry, and stories. Modern research in the field confirms that there is practically no human society that does not have an oral tradition, even if the society is completely illiterate. In contrast, we know of societies that despite being literate prefer not to rely on the written word for their most significant traditions, as Caesar observed was the case in the Gaul of the Druids:

> Neque fas esse existimant ea litteris mandare, cum in reliquis fere rebus, publicis privatisque rationibus, graecis litteris utantur. 'And they do not think it proper to commit these utterances [i.e., great number of verses] to writing, although in almost all other matters, and in their public and private accounts, they make use of Greek letters.'

Many oral societies have literary traditions that have an exceptionally complex structure and that are surprisingly prolific. The overview provided 70 years ago in a work that has become definitive, despite being for the most part a compilation of

O

Object-Dependent Thoughts

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Some of our thoughts involve reference to particular individual entities. Philosophers call these kinds of thoughts 'singular thoughts.' *Russell was a great philosopher*, *you're standing on my foot*, *I'm tired*, *that raccoon got into my garbage last night* – these are all singular thoughts because each involves reference to a particular thing: Russell, you, me, and a certain raccoon, respectively. As these examples indicate, singular thoughts are usually expressed by sentences containing proper names (e.g., 'Russell'), indexicals (e.g., 'you' and 'I'), and demonstrative expressions (e.g., 'that raccoon').

Singular Thoughts as Object Dependent

Some philosophers maintain that singular thoughts are *object dependent*, by which they mean that the intentional content of the thought essentially involves the object that it is about, in the sense that the thought content would not be available to a thinker were the object not to exist. More precisely, a singular thought is object dependent just in case its content is such that (1) its existence depends on the existence of the object thought about, and (2) its identity depends on the identity of the object thought about. For example, consider the thought *that raccoon got into my garbage last night*, had by me while spying a particular raccoon skulking in my backyard. According to the doctrine of object dependence, if, counterfactually, no raccoon had in fact been there to be singled out by me, owing perhaps to my delusional or hallucinatory state of mind – let us call this the "empty possibility" – then there would have been no singular thought content for me to entertain. Consequently, my psychological condition in this situation would be different from what it is in the actual situation. Moreover, if, counterfactually, my thought had singled out a qualitatively indistinguishable but numerically different raccoon instead – call this the "duplicate possibility" – then the resulting thought would have had a different content from the content that my thought had in the actual situation. Again, my overall psychological state in this duplicate possibility is different from what it actually is. The implication here for linguistic meaning is that the meaning of sentences containing genuine singular terms (e.g., proper names, indexicals, and demonstrative expressions) depends on the singular terms in question successfully referring to objects. On this view, nonfictional sentences containing nonreferring singular terms, such as empty or bearerless names, are meaningless, in the sense that they fail to express any thoughts.

The doctrine of object dependence is a species of the more general doctrine of *externalism* about thought content, according to which some states of mind are such that we can be in them only if we bear certain appropriate relations to other things in our environment, and thus is opposed to *internalism* about the mind, according to which the contents of our thoughts are never dependent on any relations between us and other things in our environment. (Some philosophers, such as Burge [1982], accept the general doctrine of externalism but reject object dependence.)

Epistemological Consequences of Object-Dependence

It is controversial which, if any, singular thoughts are object dependent. Arguably, first-person thoughts expressed with the indexical 'I' are object dependent: it seems obvious that if I did not exist, then the thought that I now express with the sentence *I'm tired* could not exist; moreover, no one else could have had the very same thought. But the thesis that singular thoughts expressed with proper names and demonstratives are object dependent has seemed paradoxical to some philosophers. For when the idea of object dependence is applied to these other types of singular thoughts, it runs up against a strongly held intuition about the nature of thought content, namely, that we have a kind of direct, noninferential knowledge of the contents of our thoughts, in the sense that we know, just by thinking, whether we are having a thought and, moreover, what thought we are having.

The doctrine of object dependence seems to contravene this intuition about the epistemology of thought.

For, first of all, condition (1) above allows the possibility that a thinker could suffer the illusion of entertaining a thought when he was not in fact doing so. If, unbeknown to me, I am in what we have been calling an empty possibility and am hallucinating a raccoon rather than actually seeing one, it may seem to me that I am having a singular thought, which I might try to express with the sentence *that raccoon got into my garbage last night*, even though I am not. But is this kind of cognitive illusion really possible? It is very tempting to think, against this, that if it seems to me as if I am having a thought with a certain content, then I am. Perhaps I might be mistaken about which object, if any, my thought is about – but how could I be mistaken about whether I was even thinking a thought at all?

Condition (2) has also seemed problematic. Consider what we have called the duplicate counterfactual possibility, in which I see a different raccoon, qualitatively indistinguishable from the one I actually see, and think *that raccoon got into my garbage last night*. In such a case, everything will seem the same to me: the duplicate raccoon does not appear to affect my conscious awareness in any way different from how the actual raccoon affects it. But is not subjective indistinguishability the criterion for sameness and difference of thought content? Opponents of object dependence argue that in order for there to be a genuinely psychological or mental difference between the two cases, this difference must impinge on my conscious awareness in some way. The object-dependent theorist denies this, arguing that it is the product of a mistaken internalist picture of the mind, a picture that the object-dependent theorist urges us to reject in favor of an externalist view. The debate between object-dependent theorists and their opponents is thus linked to a certain extent to the larger debate between internalism and externalism about thought content.

The Central Motivation for Object Dependence

A number of different considerations have been advanced in favor of an object-dependent conception of singular thought, and many involve a synthesis of key ideas of Frege and Russell (Evans, 1982; McDowell, 1977, 1984, 1986; McCulloch, 1989). Advocates of this form of object dependence are often labeled 'neo-Fregeans,' which can be confusing, because object-dependent singular thoughts are also often called 'Russellian thoughts,' so one needs to be aware of differing terminology here.

Perhaps the best way to appreciate the object-dependent theorists' point of view is to begin by noting that they do countenance thoughts that in a certain sense concern particular individuals but that would be available to a thinker were those individuals not to exist. Moreover, there is a straightforward sense in which the contents of these kinds of thoughts would remain unaffected were duplicate objects substituted for the actual ones. Calling these kinds of thoughts object-*in*dependent thoughts, we can say that although they concern particulars, the relation between their contents and their objects is much less direct or intimate than the relation between the contents and objects of object-dependent thoughts (the idea goes back to Russell's seminal distinction [1910–1911] between knowledge by description and knowledge by acquaintance).

The most obvious examples of object-independent thoughts are thoughts that involve definite description concepts, thoughts of the form *the F is G*. Consider the thought *the first man on the moon was an American*. As it happens, this thought is about Neil Armstrong because he was in fact the first man on the moon. But consider now the empty possibility in which the lunar landing was a hoax and the definite description *the first man on the moon* fails to designate anything. The object-dependent theorist holds that even though the thought fails to single out any actual object in the world, the thought still has a content, a content expressed, in part, by the definite description. Similarly, consider the duplicate possibility, in which Neil Armstrong's identical twin is the first man on the moon. Despite the thought's picking out a different man, the content of the thought remains the same – again, that expressed (in part) by the definite description *the first man on the moon*. The crucial point here is that the intentional content of the thought can be specified independently of the object, if any, that it is about.

The object-dependent theorist's idea is this. Thought content is essentially representational: it represents the world as being a certain way; it lays down conditions that the world must meet in order for the thought to be true. That is to say, the content of a thought determines its truth conditions. In the case of a thought employing a definite description concept *the F* (a descriptive thought, for short), the thinker knows what those conditions are without knowing which object, if any, the thought concerns. If I say to you *the first man on the moon was American*, it is not necessary for you to know which object is the first man on the moon, nor even that there is such an object, in order for you to understand what I have said, in order for you to "grasp" the thought I expressed with this sentence. So long as

you understand all the words in the sentence and their mode of combination, you know exactly how the world is represented as being; you know what the thought is "saying" about reality. In other words, you know that the thought is true just in case there is a unique man who was first on the moon and who was American. It does not matter who this man happens to be – Neil Armstrong, his identical twin, or Buzz Aldrin. So long as there is such a man, the thought is true; and if there is no such man – either because no man at all has ever been on the moon or because more than one man stepped onto the moon at exactly the same time – then the thought is false. The representational content of a descriptive thought is thus independent of any object that the content might be about. The truth conditions make no reference to any man in particular.

When it comes to singular thoughts, however, the object-dependent theorist maintains that their representational content is not independent of any object the content is about. On the contrary, the content requires that a certain particular object be picked out. In order to understand or grasp the thought in question, one must know which particular object this is. Consider the foregoing example of a singular thought: *that raccoon got into my garbage last night*, based on my visual experience of a particular raccoon in my backyard (these kinds of singular thoughts are sometimes called 'perceptual demonstrative thoughts'). Now, in having this thought, I am representing the world in a certain way. What way is this exactly? Well, I am not representing the world as merely containing a raccoon that got into my garbage last night, whichever raccoon that might be. The way I am representing the world as being involves that very raccoon. My thought is true just in case that raccoon (the very one I saw) got into my garbage last night; and in order for you to have this thought too, you need to know which particular raccoon is singled out by my perceptual demonstrative 'that raccoon.' Contrast this with the very different case in which I think the descriptive thought *the cleverest and boldest raccoon in the neighborhood got into my garbage last night*. All that it takes for this thought to be true is for there to be a unique raccoon, who is cleverer and bolder than all the rest and who got into my garbage – and you can grasp this thought without knowing which raccoon, if any, that was. If it turns out that there was no such raccoon, then my thought is straightforwardly false. But the truth conditions for my perceptual demonstrative thought make essential reference to the very object it is about. The truth or falsity of this thought of mine turns on the condition of a particular raccoon, namely, that raccoon – so that if there is no such creature, if (say) I am hallucinating, there is nothing in the world to count as my thought being true or false. Consequently, in this empty possibility, my mental episode, whatever exactly its nature, has no truth conditions (for, to repeat, there is nothing *of which* I have judged to have a certain property; nor have I made the mere existential claim that there is *an* object with a certain property). Since thought content is essentially truth conditional, according to the object-dependent theorist, I have not in fact had a singular thought at all, only the illusion of one. Whether considerations like these in favor of object dependence apply equally to other kinds of singular thoughts, such as those expressed with proper names and indexicals (other than 'I'), is a further question.

Criticisms and Rivals

Various criticisms have been leveled at the object-dependent conception of singular thought. Some of these arise from problems that the conception inherits from the general doctrine of externalism, such as its apparent conflict with certain features of self-knowledge (Davies, 1998). Three issues, however, stand out with respect to object dependence in particular.

The first is the question of what is going on, psychologically speaking, in the minds of deluded subjects in empty possibilities who suffer the illusion of entertaining singular thoughts. Their minds are not phenomenological blanks, after all; yet, according to the object-dependent theorist, they are not filled with any singular thoughts. Are such deluded subjects having any thoughts at all? If so, what kinds of thoughts are they having?

The second issue is closely related to the first and concerns the commonsense psychological explanation of the actions of deluded subjects. Normally, we explain agents' actions – my charging into the backyard, say – by attributing singular thoughts to them – the belief that that raccoon got into my garbage last night, for example. But now consider my deluded duplicate who, after hallucinating a raccoon in the empty possibility, engages in the very same type of behavior of charging into the backyard. According to the object-dependent theorist, my duplicate here has no singular thought; that is, he has no belief the content of which is *that raccoon got into my garbage last night*. But, although he is hallucinating, his action is perfectly rational and so is presumably psychologically explicable by ordinary commonsense standards. But how do we so explain his behavior without attributing a singular thought to him (McDowell, 1977; Segal, 1989)? Moreover, if we can explain his behavior without attributing a singular thought to him, then why can we not do the same with me in the

actual situation? But if we can do this with me too, then it looks as if the ascription of object-dependent singular thoughts is 'psychologically redundant' – and that allegedly calls into question their very existence (Noonan, 1986, 1991; Segal, 1989).

The third issue, perhaps the most serious, is that there are powerful rival object-independent conceptions of singular thought, which are free of many of the problems that beset object-dependent theories. There tend to be two different kinds of alternative conceptions.

The first of these conceptions attempts to analyze singular thought content in wholly general or descriptive terms, in such a way that the same content can exist in duplicate and empty possibilities, in the manner of thoughts involving definite description concepts, discussed earlier (Schiffer, 1978; Searle, 1983, 1991; Blackburn, 1984: chapter 9). For example, we might try to analyze the content of the demonstrative expression *that raccoon* as equivalent to the content of the definite description *the raccoon I am seeing now* or *the raccoon causing this visual experience*.

The second approach opposes this kind of descriptive reduction and maintains a genuinely singular conception of singular thought but argues that a distinction between irreducibly singular (or "*de re*") content and object can still be drawn, again, in such a way that, as with the first alternative, the same singular content can exist in both duplicate and empty possibilities (Burge, 1977, 1982, 1983, 1991; Bach, 1987; Segal, 1989). This approach exploits an analogy between the semantics of sentences containing demonstratives and pronouns (*this is red*, *she is tall*) and the semantics of the open sentences of a logical system (*x is red*, *x is tall*) – namely, that both kinds of sentences are true or false only under an assignment of values to the demonstratives, pronouns, and free variables in question. The proposal is to treat a sentence such as *that is a raccoon* as like a predicate, or open sentence in the logician's sense, and to think of it as expressing a single content (a "propositionally incomplete" content) that is mentally applied, in different situations, to different objects, and even, in some situations, to no object at all.

These two alternatives each face their own difficulties, however. The first alternative seems to overintellectualize thinking. When I think *that raccoon got into my garbage last night*, I do not appear to be thinking about myself or the present moment or about causation or my own visual experiences, and even if I were doing so in a philosophical mood, it does not seem necessary for a creature to have such sophisticated concepts in order for it to have singular thoughts (McDowell, 1991; Burge, 1991; Searle, 1991). As for the second alternative, it is not clear to what extent it departs from the intuitive principle that thought content is fully representational in the sense of always determining truth conditions. For in the empty counterfactual possibility, in which I hallucinate a raccoon, no value will be assigned to the demonstrative concept in my thought (*that raccoon*), and hence no truth conditions for the overall thought will be determined. The advocates of this second alternative approach thus seem committed to the view that I can have thoughts that possess no truth conditions, something that may give us pause.

See also: Counterfactuals; Descriptions, Definite and Indefinite: Philosophical Aspects; Dthat; Empty Names; Externalism about Content; Frege, Gottlob (1848–1925); Immunity to Error through Misidentification; Indexicality: Philosophical Aspects; Proper Names: Philosophical Aspects; Reference: Philosophical Theories; Russell, Bertrand (1872–1970); Truth Conditional Semantics and Meaning; Two-Dimensional Semantics.

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Objectivity in Moral Discourse

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Does moral discourse purport to be objective? If so, can its objectivist pretensions be justified? Roughly speaking, to say that some form of discourse is objective is to say that there is a single set of truths about whatever subject matter the discourse is about. We can make this rough characterization more precise by formulating a number of related theses – objectivity theses – that collectively capture this idea of objectivity:

Cognitivism: Declarative sentences of the discourse in question are used by speakers to make genuine assertions and function mainly to express the speaker's beliefs. Given that (sincere) belief and assertion aim at representing what is true, such sentences are capable of being true or false.

Truth: Some affirmative sentences of the discourse are true.

Independence: What makes some sentence of the discourse true is that it corresponds to some fact – where the existence and nature of the specific fact to which the sentence corresponds is independent of the attitudes and beliefs that individuals and groups have toward the fact in question. It is common to use the word 'stance' to refer to the beliefs and attitudes of individuals and groups, so using this terminology we may express the independence thesis by saying that for the discourse in question there is a stance-independent reality (realm of facts) that the discourse is about, and the facts comprising that reality are what make certain sentences of that discourse true.

Convergence: Ideally, use of the proper methods of inquiry (which may differ from discourse to discourse) may be expected to lead individuals (at least under suitably ideal conditions) to converge in a great many of their judgments about the subject matter of the discourse in question.

Discourse satisfying these four theses involves sentences that are (or may be) objectively true and hence we may say that the discourse itself is objective. Of course, it is possible for some realm of discourse to feature claims that **purport** to be objectively true but fail to be so because one or more of the above theses fail to hold in relation to the discourse in question – a possibility to which we shall return below.

Moral objectivism, then, at least as it is commonly understood by philosophers, is the view that all four theses hold in relation to moral discourse: not only does moral discourse purport to be objective, it satisfies the objectivity requirements in question and thus some moral judgments are objectively true. Sometimes this is put by saying that there is a single true morality. As we shall see, some philosophers have denied one or more of the four theses in relation to moral discourse and thus denied that morality is objective.

Determining whether moral objectivism is correct requires an examination of fundamental philosophical questions about the meaning, truth, and justification of moral judgments – questions central to that branch of ethics called 'meta-ethics.' But it also requires an examination of the very notion of objectivity. And here we find two models of objectivity. One of them is inspired by discourse about the physical world

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(including ordinary nonscientific discourse about the world as well as scientific discourse) and which I will refer to as the model of 'ontological objectivity' – so called because the central idea is that there is an ontological realm of 'really' existing objects and properties that sentences from a particular discourse purport to be about and which serve to make true certain of those sentences. An alternate, more modest form of objectivity, which I will call 'methodological objectivity,' is less focused on matters of ontology and more focused on methods of reasoning that govern the discourse in question.

In what follows, we begin with a brief characterization of the ontological model of objectivity and then proceed in the next four sections to consider some of the evidence for and controversy about whether moral discourse is ontologically objective. After reviewing the pros and cons of the claim that moral discourse is ontologically objective, we turn to the second model of objectivity – a model that promises to make sense of objectivity without ontology.

Ontological Objectivity

In meta-ethical discussion over the objectivity of moral discourse, discourse about ordinary commonsense objects and their properties as well as scientific discourse – often referred to as descriptive discourse – is taken to be paradigmatic of objective discourse. Roughly, the idea is that descriptive discourse is (or at least purports to be) about a realm of objects and properties in certain combinations (facts) whose nature and existence is independent of our beliefs, conventions, attitudes, and other mental stances we might take toward those facts. Here, the emphasis is on considerations of ontology – on what exists – hence the label 'ontological objectivity.' Moreover, the ontological objectivist typically embraces a strong form of the independence thesis, viz.,

> What makes some sentence true is that it corresponds to some sort of stance-independent fact – where the existence and nature of the fact in question is independent of the actual **and ideal** stances of individuals or groups.

The significance of this thesis of strong independence (SI) will emerge later on when we turn to methodological objectivity.

So the model of ontological objectivity (using descriptive discourse about objects and properties in the world as an example) clearly involves the first three objectivity theses: descriptive discourse serves to express beliefs (cognitivism), some of which are true (truth) when they correspond to stance-independent facts (independence). Barring epistemological skepticism, we may also expect suitably motivated inquirers, using proper methods of inquiry, to converge in their beliefs about this realm of objective fact since their inquiries are being constrained by an objective, stance-independent reality.

Ontological Objectivity and Moral Discourse

Does moral discourse have the trappings of ontologically objective discourse? Indeed, is it a form of **descriptive** discourse – discourse about a special subject matter, but nevertheless a discourse that is properly interpreted as representing a realm of objective moral facts? Those who think so often point to a number of 'markers' – features that are deeply embedded in moral thought and discourse – that either reflect or at least seem to support the various objectivity theses. Let us consider some of them in more detail.

Grammatical and Semantic Markers

Perhaps the most obvious markers of objectivity concern matters of grammar and semantics.

O1: Moral sentences such as 'John's lying to Brenda was wrong,' in which a moral term appears, are in the indicative mood and are used to make genuine assertions that express a (sincere) speaker's beliefs.

O2: Moreover, because moral sentences are typically used to make assertions they are truth apt: they are candidates for semantic evaluation in terms of their truth and falsity. Sentences which predicate the truth or falsity of a moral sentence seem to make perfect sense (e.g., 'It is true that John's lying to Brenda is morally wrong,' 'It is false that contraception is morally wrong,' and so on).

O3: Moreover, logically simple moral sentences (e.g., 'It is wrong to steal') can embed in all sorts of logically complex grammatical constructions, most notably truth-functional and quantificational constructions (e.g., 'If it is wrong to steal, then it is wrong to encourage others to steal.') It would seem that such logically complex sentences have truth values that are determined by the truth values of their simpler constituents.

Ontological Markers

The following two markers have to do with the ontological status of the subject matter of moral discourse.

O4: Moral terms that appear in moral sentences (e.g., 'good,' 'right,' 'virtuous,' and their opposites) seem to be used to denote properties that are (or may

be) possessed by items of moral evaluation. For example, to say of an action that it is wrong appears to attribute the property of wrongness to the action. Furthermore, some moral sentences are used with the apparent intention of picking out moral properties and talking about them, as when one utters the sentence 'It was the badness of the practice of American slavery that eventually led to its abolishment.'

O5: Moral truth and moral error are genuine possibilities. When we disagree over some moral issue, we take ourselves to be engaged in a genuine dispute where not all parties to the dispute are correct in their moral convictions. What is apparently being assumed in such disagreements is that there is a fact of the matter about the issue in dispute – that there is an objective truth about the matter. This makes it natural to think that the truth (or falsity) of a moral sentence is a matter of its correspondence (or lack of correspondence) to some moral fact. The putative fact that an action is wrong (supposing it is) would seem to be what makes true a sentence expressing this fact. Moral error results when what one says or believes fails to properly record moral reality.

Epistemological Marker

Finally, the following marker has to do with matters of justification and knowledge.

O6: We dispute moral claims by offering reasons for their truth or falsity and thus take such claims as being susceptible to justification. One can be justified or unjustified in claiming that John's action was morally wrong depending on one's evidence for the claim – evidence that can be offered, disputed, and discussed with others. Moreover, in some cases we at least suppose that we have some moral knowledge. Surely we take ourselves to know that torturing puppies for fun is morally wrong. Since justification and knowledge in ethics (as elsewhere) seems to require that there be reliable methods of inquiry suitable to the form of inquiry, one would expect there to be a moral methodology that would enable inquirers using it to reach a high level of interpersonal convergence in moral belief.

Thus, moral discourse, at least at first glance, **seems** to possess all of the characteristic marks of objectivity – indeed ontological objectivity. Many philosophers go one step further and claim that moral discourse **is** genuinely ontologically objective and that moral discourse is a kind of descriptive discourse whose primary function is to represent a realm of moral facts.

But ontological moral objectivism is controversial: we find a variety of meta-ethical positions that deny one or more of the four objectivist theses and among moral objectivists we find a variety of specific meta-ethical positions that differ over questions of semantics, metaphysics, and epistemology in relation to moral discourse. Let us now briefly survey some of these positions.

Moral Realism

One very straightforward way to accommodate O1–O6 is simply to affirm the four objectivist theses and, in particular, the idea that there is a realm of moral properties (and moral facts) that are strongly independent of our attitudes and beliefs about them and which serve as an objective basis for the truth and falsity of moral sentences. This meta-ethical position is known as moral realism and the task of this kind of realist view is to explain what sorts of fact serve as truth makers for moral judgments and how it is possible to have justified belief and perhaps knowledge of moral truths. Ontological naturalists, who are moral realists (Sturgeon, 1984; Railton, 1986, 1996; Boyd, 1988; Brink, 1989; Bloomfield, 2001), claim that moral properties and facts are identical to certain natural properties and facts – properties and facts that are the proper subject matter for empirical science to investigate. In the history of meta-ethical inquiry, we find various attempts by philosophers to 'reduce' moral properties and facts to some species of biological, psychological, or sociological fact. For instance, Spencer (1895) held that the property of being better than, which he took to be basic in ethics, could be reduced to the property of being more highly evolved. Ontological nonnaturalists in ethics (Moore, 1903; Ross, 1930; Shafer-Landau, 2003) hold that moral properties and facts are of a special nonnatural kind; that rightness, for example, is not identical to any natural property, but is nonetheless a real property.

Naturalist realists face the challenge of explaining why some specific set of natural properties and facts is identical to moral properties and facts. This in turn would seem to require a plausible semantic account of moral judgments that fits with naturalist realism, something which has proved difficult to do. Nonnaturalists, by contrast, propose to bloat our ontological commitments: in addition to being metaphysically committed to those entities in the natural world that common sense and natural science commits us to, the nonnaturalist wants to add a realm of nonnatural properties and facts. Such metaphysical

extravagance has been met with strong resistance from philosophers who think that such properties and facts are mysterious metaphysical accretions and that there are serious epistemological worries accompanying any such view.

Denying Ontological Objectivity in Moral Discourse

Some philosophers deny moral objectivism because they deny the thesis of cognitivism in relation to moral discourse. They claim that although the surface grammar strongly suggests that moral judgments express beliefs and thus are used to make truth-apt assertions, nevertheless all of this is misleading. Rather, according to the meta-ethical position known as noncognitivism (Stevenson, 1937, 1944; Ayer, 1946) and more recently as expressivism (Gibbard, 1990, 2003; Blackburn, 1993, 1998; Horgan and Timmons, 2006), moral judgments are not really in the business of expressing beliefs that purport to represent or describe moral facts; rather they instead function to express some noncognitive attitude toward the object of evaluation. Thus, for instance, according to emotivism (one kind of noncognitivism), uttering a sentence such as 'Abortion is wrong' really functions primarily to **express** one's negative feeling toward abortion and is roughly equivalent to saying, 'Abortion: boo!' So, the noncognitivist denies both the theses of cognitivism and truth (in relation to moral discourse) and hence denies the independence and convergence theses as well. What makes this view fairly radical is that it distinguishes between the surface trappings of moral discourse and its true, deep semantic working, and claims that a proper semantic interpretation of the discourse reveals that it really does not even **purport** to be objective, that, to repeat, moral sentences are not really used in thought and discourse to express beliefs capable of being true or false.

A slightly less radical view, the error theory (Mackie, 1977), maintains that although moral discourse is properly interpreted as at least purporting to be objective, its various objective pretensions result from massive error. More precisely, the error theorist accepts the thesis of cognitivism in relation to moral discourse, but denies the thesis of independence and so denies the claim that affirmative moral sentences are ever objectively true. This position is analogous to atheism. That is, an atheist holds that religious discourse involving affirmative claims about God or gods purports to be objectively true, but, claims the atheist, there are no theological facts of the relevant sort that can make true affirmative claims about God or gods, and so no such claims are objectively true. The error theorist in ethics is saying something similar. The moral judgment 'repaying one's debts is morally right' purports to attribute the property of moral rightness to the activity of repaying debts, but since there are no such moral properties this sentence and all affirmative moral sentences (taken literally) are false.

Finally, versions of moral relativism (Harman, 1984; Wong, 1984) typically affirm the theses of cognitivism and truth, but maintain that moral truth is not independent of the attitudes of individuals and groups. Rather, for a typical relativist, what makes a moral claim true is that some group accepts some set of moral principles and these principles are the very standard (for that group) that determine (together with nonmoral facts) which further moral sentences are true. The idea is that the sentences expressing moral principles are counted as true in virtue of being accepted by some group and the more specific moral sentences that (together with nonmoral facts) follow from these principles express derivative moral truths. So, if some group accepts as a basic moral principle that eating meat is morally wrong, then the sentence 'Eating meat is wrong' is true – relative to their moral outlook. If some animal (or its remains) is as a matter of fact meat, then this fact together with the general moral principle in question implies specific moral truths about eating this or that animal or its remains. Now, if some other individual or group does not have any such principle against meat eating, or has a principle that requires eating meat, then the sentence 'Eating meat is wrong' is false – relative to their outlook. Thus, for the relativist, conflicting moral sentences may be equally true.

There is a variety of ways to develop this basic relativist idea, but all of them are committed to denying the idea that there is some realm of moral fact that is independent of the stances of individuals and groups; in short, for the moral relativist, there is no single true objective morality.

Noncognitivism, the error theory, and relativism have their able defenders, but of course embracing one of these positions means having to claim either that at least some of the various objectivist markers (O1–O6) are illusory – not really characteristic of the discourse – or that they are genuine but deeply error ridden. Such views strike many philosophers as meta-ethical options we should try to avoid in making sense of moral thought and discourse (Wright, 1992; Timmons, 1999).

Methodological Objectivism

In light of the metaphysical and epistemological problems that beset realist (ontological) accounts of moral objectivity, some philosophers are attracted to

a different model of objectivity – a model that looks to the realm of mathematics and logic for a way of understanding how moral discourse can be objective even if there are no dedicated moral properties and facts (of the sort associated with ordinary descriptive discourse) that would serve as truth-makers for moral sentences. Such meta-ethical views are often called 'constructivist.' A central idea behind versions of moral constructivism, then, is that just as we need not suppose that there is a mystical realm of numbers and mathematical relations that make certain mathematical sentences true, so we need not make any heavy-duty ontological assumptions in making sense of the apparent objectivity of moral discourse (Putnam, 2004). For both sorts of discourse – mathematical and moral – so long as there are **methods** of reasoning governing these types of discourse that would lead properly motivated individuals to converge in their views on a large enough number of claims within those areas, then we have a proper basis for affirming the objective pretensions of both realms. So, in contrast to the ontological model of objectivity that emphasizes an SI thesis, the present model takes the thesis of convergence as central to moral objectivity. Let us explore this model in a bit more detail.

Suppose, then, that associated with moral discourse is a method of moral thought and reasoning that would (if properly applied) ideally lead to interpersonal convergence over a wide range of moral issues; in other words, suppose the convergence thesis holds for moral discourse. Then, according to this line of thought about objectivity, we would have the materials to vindicate the other objectivity theses – cognitivism, truth, and a modest form of independence. How might this view be developed?

The general constructivist idea is that there are better and worse methods of moral thinking – methods that involve constraints on moral deliberators and on the circumstances in which they deliberate. For instance, according to one variety of constructivism, called the 'ideal observer' theory (Firth, 1952; Carson, 1984), the proper method of moral thinking requires that moral deliberators thinking about a certain moral issue must for example have certain intellectual virtues and sufficient knowledge of non-moral facts to be in a position to arrive at moral verdicts that have the status of being true. But what is crucial to the ideal observer view and constructivist views generally is that it is the attitudes of ideal observers that constitute or make true certain moral judgments. So, although the constructivist accepts the independence thesis (in addition to cognitivism, truth, and convergence), she embraces the following modest form of this thesis in contrast to the strong form embraced by the ontological objectivist:

> Although the truth of a moral sentence is independent of the stances of actual individuals and groups, moral truth is ultimately constituted by the stances of ideal individuals or groups – call them 'ideal stances.'

Granted, some moral constructivists introduce ontological talk of moral properties and facts at this point (Rawls, 1980; Scanlon, 1998), understanding such properties and facts to be 'constructions' grounded in facts about moral convergence. But a moral constructivist need not make these ontological claims; she can rest content in emphasizing the importance of there being a method of moral inquiry that would lead all or most ideal agents (agents who are engaged in moral thinking under ideal circumstances) to converge in a great many of their moral convictions (Smith, 1994). What the constructivist hopes to do, then, is develop a meta-ethical view that satisfies the four main objectivist theses without (apparently) having to embrace heavy-duty ontological assumptions, and thereby vindicate the objectivity of moral discourse. In short: moral objectivity without (moral) ontology.

Of course, any constructivist view carries the burden of spelling out a moral methodology or process of moral reasoning that would lead ideal moral inquirers to converge in their moral views. The task of doing so poses a seeming dilemma for the moral constructivist (Timmons, 2004). On the one hand, if the favored moral methodology that is to be a basis for moral truth is characterized in morally neutral terms, then the constraints on such reasoning will be insufficient to lead those following the method to reach the level of convergence in their moral verdicts that a vindication of objectivism requires. This would mean, according to the constructivist, that there is no objective moral truth about those moral matters regarding which moral methodology fails to yield convergence under ideal conditions. Hence, the view would be committed to a kind of moral error theory – there is no fact of the matter in relation to a great many moral issues, contrary to what we suppose. On the other hand, if, in order to make the moral methodology yield substantive moral verdicts, one characterizes the methodology making use of moral assumptions, then relative to one set of moral assumptions the method will yield one set of moral 'truths,' but relative to a competing set of moral assumptions the method will yield a different and perhaps conflicting set of moral 'truths.' But this commits the constructivist to moral relativism, which, as we have seen, is at odds with the idea that moral

discourse is objective – that with respect to a large number of moral issues there is a single truth of the matter. Avoiding the error theory and relativism and thereby preserving objectivity is thus the main challenge for the moral constructivist.

Conclusion

The issue of moral objectivity, involving, as we have seen, semantic, metaphysical, and epistemological issues, is the central topic of meta-ethics. About the objectivity of moral discourse there are two questions to be distinguished. First, what sorts of objective features or markers are genuinely possessed by moral discourse? Second, assuming that moral discourse does genuinely possess such markers, how should they be interpreted? In particular, do they require, for their vindication, some version of moral objectivism? In response to these questions, we have surveyed a number of currently debated meta-ethical options, including two conceptions of objectivity.

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Objects, Properties, and Functions

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One of the most fundamental metaphysical distinctions is that between objects and properties. Given its depth and importance, it's perhaps unsurprising that though the distinction can be given in a canonical form, it also admits of some puzzling complexities.

By way of a first pass, let's consider some examples of objects and of properties and try to extract some hallmarks – linguistic and otherwise – of each. Examples of objects include my cat, you, the tree outside my window, and the planet Earth. These four are all physical objects. There are mental objects as well – which, depending upon whether the mental reduces to the physical, may or may not be a subvariety of physical objects. Mental objects include my wish to write a book, the pain I felt just now, my dream last night. So much for examples. Some hallmarks of objects include that they are individual things, which things (at least in the simple cases) have a specific location in space and time. What's more, objects can be counted. And, in counting, one can always ask: Is this object the same individual as that one, so that it should be counted just once, or are there two individuals here? (E.g., if Samuel Clemens is the same person as Mark Twain, then when Clemens is alone in the room, there aren't two individual people there: Clemens *and* Twain. But if Bill Clinton and Tony Blair are the sole people in the room, two people are therein.)

Examples of properties – also called 'attributes,' or "qualities" – include being red, being from Canada, being painful, knowing Charles Darwin personally, weighing exactly 16 trillion kilograms, and having belonged to Abe Lincoln. Hallmarks of properties include *not* being individual but rather being general, and being located not in one place but at various locations at once or at none. Thus the property of being from Canada is instantiated in many objects, in many places; and it might be that the property of knowing Charles Darwin personally is instantiated by no object at all these days. As for counting, while one can count *instantiations* of being red – i.e., count how many red objects there are – it doesn't really make sense to count being red itself. Another hallmark of properties, as opposed to objects, is that a given property typically has contrary or opposite properties. For instance, being green is contrary to being red, being from Spain is contrary to being from Canada, being pleasurable is contrary to being painful. (Contrast objects: What is the contrary of Abe Lincoln? What object do you get when you negate *him*? Or, again, what do you get when you negate my window? These questions don't even seem to make sense.)

There are also *linguistic* hallmarks of the object-versus-property divide. The linguistic correlates of objects are proper names ('Rob'), noun phrases ('the planet Earth'), pronouns ('me,' 'he,' 'she,' 'it'), and demonstratives (like 'this' and 'that'). The linguistic correlates of properties, by contrast, are adjectives ('red'), verb phrases ('weighs 16 trillion kilograms,' 'is from Canada') and, as above, gerundives ('belonging to me'). (In formal logic, the divide corresponds to that between constants and variables [often symbolized by lowercase letters from the beginning of the alphabet for constants, and lowercase letters from the end of the alphabet for variables: constant *a* or variable *x*] on the one hand and predicates [often symbolized by capital letters from the middle of the alphabet: F, G] on the other.) Another linguistic hallmark is this. If, following Peter Strawson (1971), we think about the different actions typically performed in speaking a sentence – for instance in saying "That cat weighs 18 pounds" – we may note that "That cat" is used for one kind of job, while "weighs 18 pounds" is used for a quite different job. "That cat" is used to *refer to*, or *talk about*, the cat. In contrast, "weighs 18 pounds" is used to *attribute* something of the cat, to *say of* it that it weighs 18 pounds. A final linguistic hallmark, then, is that in speaking, we refer to objects, but we attribute properties.

So much for the first pass at objects versus properties. The divide gets muddy, however, when we leave the canonical examples. That's because there are things that are objectlike in some respects but propertylike in others. These hard-case objects come in at least two varieties: *abstracta*, like numbers, and *kinds*, such as gold and horse. One obvious problem with such objects concerns their location. Being abstract, the square root of seven doesn't seem to have any location. The same holds for kinds: gold has multiple locations. Moreover, there are contraries to gold: silver, uranium, etc. Yet abstracta and kinds are objectlike as well. Gold *has* certain properties: it boils at 2966 °C and melts at 1063 °C. So, it isn't itself a property. And gold, along with the square root of seven, is denoted by a name; and, in speech, such things are referred to, not attributed. So, kinds and abstracta seem to exhibit some of the hallmarks of objects and some of the hallmarks of properties. At bottom, the difficulty is that such objects have instances, rather than merely being instances. To

take another case, consider the novel *War and Peace*. Some will say that it's another abstract object: it itself has no location, though its instances (i.e., copies of the book) do. But one could also take *War and Peace* to be like gold, which is located in many places at once. Whichever way one goes, it too has instances, rather than merely being an instance; and so it does not have one unique location. See Figure 1 for a summary.

One last hard case. It seems that we can form names and descriptions associated with properties. Thus, consider 'the property of being red.' This description has all the linguistic hallmarks of an object, in terms of both its form and the job it is used for. More than that, it has some of the nonlinguistic hallmarks too. We can ask whether what 'the property of being red' stands for is identical to what 'the property of being green' stands for. (Obviously the answer is no.) We can count such things. And so on. What one typically says is that 'the property of being red,' 'that property,' 'my favorite color,' and so on stand for objects that are associated with properties but do not themselves stand for properties. (Of course, this leads to the odd result that 'The property of being red is not a property' is not actually false, since according to the view under consideration, the first five words of this sentence *stand for an object*, so the sentence says of this object that it's a property – which it isn't! See Frege 1891, 1892 for a detailed discussion.)

One could continue pursuing such complexities at enormous length. For present purposes, it's enough to notice that there seem to be various kinds of objects. And several of them are propertylike in certain respects. It is in part because of the diversity of objects, and their affinities to properties, that it's hard ultimately to distinguish objects from properties.

In light of these complexities, one might wonder: Why are properties required at all? Why not just have yet another variety of object – namely, those objects that don't merely have instances (as with kinds and abstracta) but that can actually apply to other objects? Indeed, why not have the world be exhausted by its objects? Thus, on this suggestion, being from Canada would simply *be* a fourth kind of object

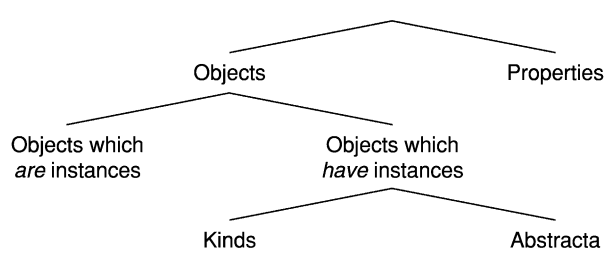

Figure 1 Varieties of objects.

beyond instances, kinds, and abstracta. In response, I want to give one reason that one seemingly cannot do away with the object/property distinction altogether, reducing everything to objects. It's a reason that goes back to Antiquity, and it has to do with combining in predication.

Patently, some objects can't combine predicationally at all: Rob and the tree can't be fused together into a complex fact. At best they can be combined by smashing them together or putting one inside the other or some such. But, so the 'properties are objects' idea goes, there are some objects that can combine in predication; there are certain objects that apply to others. Take Rob Stainton and being Canadian, understood, as per the proposal, as two different kinds of objects. These 'objects' combine together, in predication, in the sense that the former exhibits the latter: I am Canadian. The difficulty, however, is this: Not all objects actually so combine, even when one of them is of the supposed 'applying kind.' For instance, Rob Stainton doesn't in fact combine with being Algerian, and George Bush doesn't combine with being Canadian. So, what holds the two types of supposed objects together when the 'applying object' really does combine with the instance one? A natural thought is that the relation 'exhibiting' puts together the objects that really go together, and not the others: 'exhibiting' fuses Rob with being from Canada, but it does not fuse Rob with being from Algeria. However, if *all* things are objects, then relations – including 'exhibiting' – are objects too. And if, as we've been seeing, objects need something to put them together to distinguish those where the combination does really happen from those where it doesn't, 'exhibiting' needs something to put *it* together with – e.g., Rob and being Canadian. What, then, puts together these three objects in predication such that it doesn't fuse 'exhibiting,' Rob and being Algerian? We are faced with a choice: either there is something that is not an object and that puts objects together in predication, so that not everything is an object, or there is an infinite regress. Since the latter is absurd, we conclude that some things aren't objects. In particular, properties are non-objects, in the sense that they go together with objects in a way that two objects cannot: nothing is required to 'fuse' an object with a property. That, it is often said, is why we need some kind of object/property divide, even if it is hard to lay out.

An interesting upshot, of course, is that not all that is, is an object. Even more interesting, if anything we can refer to is an object, then if properties are not objects, we simply cannot refer to them. We can't talk about them, no matter how hard we try. At best we can refer to their associated surrogates, as in

the previous example of 'the property of being red' – which surrogates are objects, not actually properties.

Let's turn now to the relationship between properties and functions. What I hope to explain is how properties are, in a certain sense, equivalent to a peculiar kind of function: namely, a function whose output is a truth value. (See Frege 1879, 1891, 1892.) Now, mathematical functions are familiar: they take numerical inputs and yield numerical outputs. For instance, (1) is a function that takes zero as input and yields four as output, and takes one and yields nine as output, and so on.

(1) $y = (x + 2)^2$

But the notion of function can be generalized so that the inputs are not just numbers but objects of all kinds. To understand the broadening of the inputs, consider (2), which is a function that takes an individual as input and yields his or her father as output.

(2) $y =$ the father of x

If you take me as input, the output is Keith Stainton. One could also have a function whose input was a country and whose output was the language most widely spoken in that country. If Canada were taken as input, this function would output English. It should be clear that for any kind of object, we can cook up a function into which it can be input: trees, windows, universities, etc.

So, inputs to functions can be generalized. Moreover, their outputs needn't be numbers, either. Consider, in particular, a function whose output is either TRUE or FALSE (or yes/no, or 1/0, or any other pair of binary values). Specifically, consider a function that outputs TRUE if the object input meets the condition specified and that outputs FALSE if it doesn't. For instance, consider the function such that its output is TRUE if x is from Canada and its output is FALSE otherwise. This is the key point: such functions are interchangeable with the properties. To the property of being from Canada, there corresponds f, the function from objects to truth values, such that f outputs TRUE when the object is from Canada and outputs FALSE otherwise. (Gottlob Frege called such peculiar functions 'concepts'; Bertrand Russell called them propositional functions.)

We saw above that objects and properties have different linguistic correlates. Given that propositional functions are interchangeable with properties, it is unsurprising that a similar point applies to them. Specifically, the correlate of a verb phrase or an adjective will be a function from an object to a truth value. (In terms of Montague grammar, the correlate of objects will be expressions of semantic type <e>, while the correlate of (first-order) functions will be expressions of semantic type <e,t>.) And, as before, puzzles arise about whether functions are really so different from objects. At first the distinction is clear: objects are the inputs and outputs, while functions operate on them. But it seems that we can objectify functions and talk about them. This I did above: I talked about the function from things that are from Canada to TRUE. Put another way, there are functions whose inputs are functions, and functions whose outputs are functions. What's more, there are alleged objects, such as the kind gold, that seem to be true of instances; hence, they could be taken to be a propositional function, rather than as objects. But then are they just another kind of object? The answer here, again, is that there can't only be objects: we'd need something to combine 'ordinary objects' with 'function objects' that wasn't itself of either kind, or we'd have a regress. What goes for properties goes for propositional functions: there may be various kinds of objects, some of which exhibit functionlike characteristics, but we cannot do away with genuine functions altogether.

See also: Frege, Gottlob (1848–1925); Metaphysics, Substitution Salva Veritate and the Slingshot Argument.

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Occitan

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Occitan is the term used today to refer to the language that evolved out of Latin in southern France. Long called 'Provençal' and still referred to as 'la langue d'oc,' Occitan is the indigenous language of a region that covers approximately a third of France, the Aran Valley of Spain, and the upper Alpine valleys of Italy.

Status

It is difficult to speak of the sociolinguistic situation of Occitan today other than in terms of marginality. The diglossia that characterized usage among rural speakers a few decades ago, when Occitan served the domains of traditional agriculture, storytelling, and the like, has given way to what might be termed 'motivational distribution.' In other words, for most of the population, the use of Occitan is no longer clearly tied to any particular social domain, but rather is predictable only as a function of the enthusiasm of the speaker for the language and of his or her interlocutors' ability to manage in it. Outside the major cities, between 20 and 30% of the population claim to speak the language, though 40–50% say they understand it. This suggests that the number of speakers may be in the range of 2 million, with perhaps twice that number able to understand.

Occitan attained official status in the Aran Valley in 1983 and in Italy in 1999. In France, however, progress toward official recognition has been slow and uneven. Although the language has been present in the educational system on a limited basis since 1951, France as a whole remains committed to the anticommunitarian ideologies of the Third Republic and has refused to ratify the European Charter for Regional or Minority Languages.

Structure

The language to which Occitan is most closely related is Catalan, and it is increasingly common to classify both as members of an Occitano-Romance group, distinct from North Gallo-Romance and Ibero-Romance proper. As in French and Catalan, Occitan lost Latin final unstressed vowels, with the exception of -a (*filh* 'son,' *pan* 'bread,' *farina* 'flour'). Occitan phonology is distinctive historically in its failure to undergo the Romance diphthongization (*pòt* 'he can,' *pè* 'foot'); in its maintenance of /aw/ (*causa* 'thing'); and in a vowel chain shift that fronted Vulgar Latin /u/ to [y], raised /o/ and unstressed /ɔ/ to [u], and continues to raise /a/ to [o] in unstressed position (*madura* [madúro, modúro] 'ripe (f.)').

Occitan is a prodrop language and resembles Ibero-Romance in its morphology and syntax. However, it maintained, as did French, a two-case inflectional system into the 13th century. The most striking grammatical feature to be found in Occitan is the enunciative particle, which is limited to Gascon; it cooccurs with tense and serves discourse-level functions: *Joan que venó la vaca* 'John [neutral assertion] sold the cow.'

Diversity

The Occitan domains never developed institutions that promoted linguistic unity, and mutual intelligibility across regions is uneven. The major dialects are Gascon, Limousin, Auvergnat, Languedocian, and Provençal. Most linguists also identify a Vivaro-Alpine dialect. Gascon, spoken in the southwest from the Garonne to the Pyrenees, is certainly the most distinctive of these in phonology, as well as in grammar, and may well deserve separate-language status within Occitano-Romance.

Standardization has been a hotly debated issue over the past few decades. Today, most activists have adopted the orthographic norms of the Institut d'Estudis Occitans; this system ensures a level of morphophonemic abstraction sufficient to allow crossdialectal comprehension. However, the Standard Occitan proposed by the Institut has not been particularly successful. It appears today that the majority of activists are ready to see Occitan as a polycentric language, with regional norms in Gascony, Languedoc, Limousin, Provence, etc.

History

The earliest extensive Occitan texts date from the 11th century. The 12th century marks the opening of the language's classical period, when the troubadours (an Occitan word) produced their stunningly innovative poetic tradition and launched a genre dialect that would remain an international model of poetic creativity for nearly two centuries. However, as most of the Occitan regions were integrated into the kingdom of France, the language lost ground to French. In Bearn and Lower Navarre, it retained official status through the 18th century. By 1900, French had established its 'high' status in a diglossic situation that continued to evolve to its advantage. Although there were still a few children reared as monolinguals in Occitan in the early 1950s, the language had nearly disappeared from the cities and larger towns and was

almost universally associated with backwardness and ignorance.

Two major movements have had the goal of revitalizing Occitan. The first of these was the 'Felibrige,' founded in 1854 and centered on the personality of Frederic Mistral. This movement had an enduring influence in Provence, and it may well account for the vitality of Provençal in the face of a very heavy influx of outsiders. The second movement, 'Occitanism,' aimed to unify the language and open up modern spaces for Occitan use. In the 1970s, this movement was responsible for a surge of public visibility for the language and for a dramatic increase in its range of uses (e.g., theater, popular song, and academic writing). Occitanism also engendered the *Calandretas*, which are bilingual private schools in which Occitan once again plays a role in children's education and socialization.

Perspectives

Despite the progress made by activists in the final decades of the 20th century, and despite favorable official policy in small areas of Spain and Italy, Occitan continues to decline, and, as time passes, speakers who acquired the language in family and community settings are disappearing rapidly. The children who emerge as fluent speakers from the *Calandretas* and the enthusiasts who manage to pick up Occitan as a second language rarely have access to community settings in which speaking can take root. There can be no doubt that Occitanism has prolonged the life of the language and that there will continue to be people who speak, read, and write Occitan for many decades to come, but the time is near when speakers who learned the language in traditional communities will no longer exist.

See also: Catalan; French; France: Language Situation; Romance Languages.

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Ogam

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Ogam, or ogham, is an alphabetic system originally realized in notches cut on stone slabs and almost exclusively used for writing Old Irish. (The spelling *ogam* is that of Old Irish; *ogham* is a version reflecting the pronunciation /o:m/; both are in scholarly use.)

Epigraphic Ogam

Some 300 Old Irish lapidary inscriptions in ogam are to be found in Ireland (for the most part in the southwest, principally in Kerry), but an additional 57 are outside Ireland, 40 being in Wales (Price, 2000a: 38) and the remainder in England, the Isle of Man, and Scotland. The Irish inscriptions have been dated to between the 4th and 6th centuries C.E. and the Welsh to a slightly later period. The existence of such inscriptions outside Ireland makes it possible to argue for the continuing presence of Irish-speaking colonies in western southern Britain until the 6th or even the 7th centuries (Jackson, 1953: 171).

These inscriptions are in general very short, being funerary formulae marking a grave or memorial. Each is usually a stock phrase consisting of a personal name followed by 'son of' and a patronymic, all three nouns being in the genitive. They are therefore of limited, though not discountable, philological value to historians of the Irish language.

The system was highly wasteful of space, being realized in irregularly shaped dots or the lines drawn on or across one edge, or *arris*, of a slab or to one or other side of it. Twenty letters could be encoded in this way; they were divided into four groups, each containing from one to five identical notches (see **Figure 1**). Typically a lapidary inscription would begin at the bottom of the left edge, continue up over the top, and then terminate down the right edge. There were no word divisions or punctuation.

It is usual to transliterate these symbols by uppercase letters. ⟨C⟩ = [κ]; for further discussion see McManus, 1991. Sims-Williams (1993) argues convincingly that the letters traditionally transcribed

almost universally associated with backwardness and ignorance.

Two major movements have had the goal of revitalizing Occitan. The first of these was the 'Felibrige,' founded in 1854 and centered on the personality of Frederic Mistral. This movement had an enduring influence in Provence, and it may well account for the vitality of Provençal in the face of a very heavy influx of outsiders. The second movement, 'Occitanism,' aimed to unify the language and open up modern spaces for Occitan use. In the 1970s, this movement was responsible for a surge of public visibility for the language and for a dramatic increase in its range of uses (e.g., theater, popular song, and academic writing). Occitanism also engendered the *Calandretas*, which are bilingual private schools in which Occitan once again plays a role in children's education and socialization.

Perspectives

Despite the progress made by activists in the final decades of the 20th century, and despite favorable official policy in small areas of Spain and Italy, Occitan continues to decline, and, as time passes, speakers who acquired the language in family and community settings are disappearing rapidly. The children who emerge as fluent speakers from the *Calandretas* and the enthusiasts who manage to pick up Occitan as a second language rarely have access to community settings in which speaking can take root. There can be no doubt that Occitanism has prolonged the life of the language and that there will continue to be people who speak, read, and write Occitan for many decades to come, but the time is near when speakers who learned the language in traditional communities will no longer exist.

See also: Catalan; French; France: Language Situation; Romance Languages.

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Ogam

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Ogam, or ogham, is an alphabetic system originally realized in notches cut on stone slabs and almost exclusively used for writing Old Irish. (The spelling *ogam* is that of Old Irish; *ogham* is a version reflecting the pronunciation /o:m/; both are in scholarly use.)

Epigraphic Ogam

Some 300 Old Irish lapidary inscriptions in ogam are to be found in Ireland (for the most part in the southwest, principally in Kerry), but an additional 57 are outside Ireland, 40 being in Wales (Price, 2000a: 38) and the remainder in England, the Isle of Man, and Scotland. The Irish inscriptions have been dated to between the 4th and 6th centuries C.E. and the Welsh to a slightly later period. The existence of such inscriptions outside Ireland makes it possible to argue for the continuing presence of Irish-speaking colonies in western southern Britain until the 6th or even the 7th centuries (Jackson, 1953: 171).

These inscriptions are in general very short, being funerary formulae marking a grave or memorial. Each is usually a stock phrase consisting of a personal name followed by 'son of' and a patronymic, all three nouns being in the genitive. They are therefore of limited, though not discountable, philological value to historians of the Irish language.

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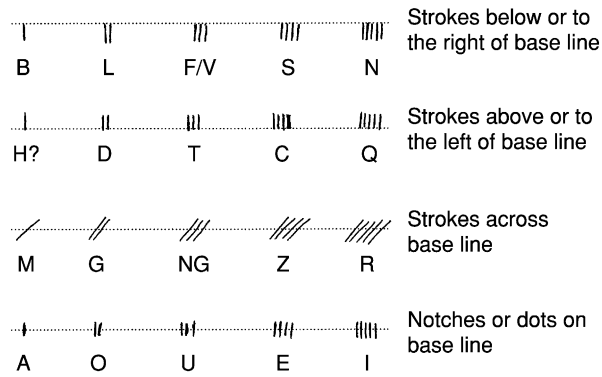

Figure 1 The Ogam alphabet.

as ⟨Z⟩ and ⟨NG⟩ represent respectively [sw] (or perhaps some other reflex of P. I.-E. [st]) and [g^w].

Scholastic Ogam

After the period of epigraphic inscriptions, ogam appeared in manuscripts ('scholastic ogam'). In these, the symbols were written horizontally from right to left, sometimes with word divisions indicated. A treatise on ogam, in the 10th- or 11th-century C.E. *Auraicept na n-Éces* ('The Scholars' Primer'), copied into the 14th- or 15th-century C.E. 'Book of Ballymote' and other extant sources, gives the list of ogam characters with their names.

Each ogam letter was called by an acrophonic name of a tree and a bird. Thus (Calder, 1917; Marstrander *et al.*, 1917–1976): ⟨B⟩ *beithe* 'birch', *besan* 'pheasant'; ⟨L⟩ *luis* 'rowan', *lacha* 'duck'; ⟨N⟩ *nion* 'ash', *naoscach* 'snipe'; ⟨F⟩ *fearn* 'alder', *faoileán* 'gull'; ⟨S⟩ *saileach* 'willow', *seabhac* 'hawk'; ⟨H⟩ *(h)uath* 'hawthorn', *(h)adaig* 'night crow'; ⟨D⟩ *dair* 'oak', *dreoilin* 'wren'; ⟨T⟩ *tinne* 'holly', *truit* 'starling'; ⟨C⟩ *coll* hazel', *corr* 'crane'; ⟨M⟩ *muin* 'vine', *meantán* 'titmouse; ⟨G⟩ *gort* 'ivy', *géis* 'mute swan'; ⟨NG⟩ *(n)getal* 'broom', *(n)gé* 'goose'; ⟨R⟩ *ruis* 'elder', *rocnat* 'rook'; ⟨A⟩ *ailme* 'pine', *airhircleog* 'lapwing'; ⟨O⟩ *onn* 'furze', *odoroscrach* 'cormorant'; ⟨U⟩ *úr* 'heather', *uiseóg 'skylark*'; ⟨E⟩ *edad* 'poplar', *ela* 'whistling swan'; ⟨I⟩ *iúr* 'yew', *illait* 'eaglet'.

The ogam alphabet is consequently sometimes known as the *Beithe-Luis* or *Beithe-Luis-Nion* (or *–Nin*) after the first letters. Ogam had fallen out of use by the end of the medieval period.

Pictish Ogam

Ogam is also used in almost three dozen other inscriptions that are manifestly not in Old Irish. These are all in Scotland, indeed within the Pictish area, and have been dated from the 7th to the 10th centuries C.E. (In them the baseline was sometimes drawn across the face of the slab.) From their location and presumed date it would be reasonable to conclude that the language written is Pictish. Unfortunately, assuming that the values assigned to Irish ogam apply also to these inscriptions, the readings are bizarre in the extreme, and none of them is immediately intelligible, a typical example being ETTYCUHETTS AHEHHTANNN HCCVVEVV NEHHTONN. This fact has resulted over the years in a number of imaginative proposals, ranging from claims that the language written is not Indo-European, or even that it is Basque, to a conjecture that the inscriptions are complete nonsense, being the work of a mason intent on deceiving a gullible, illiterate patron (see for example Rhŷs, 1892–1893; Macalister, 1940; Jackson, 1956; Price, 1984). A painstaking investigation (Cox, 1999) claims that the language recorded is not Pictish but Old Norse. However, Ó Dochartaigh (1999) persuasively demonstrates that the methodology involved is seriously flawed and that what Cox has proved is that the language is **not** Old Norse. Forsyth (1995 and 1997) cogently argues that there is no reason for supposing that the language is anything but Celtic and that at least one inscription previously thought to be impenetrable can be interpreted. One can conclude that more work remains to be done in identifying the symbols where weathering allows, reading them in the correct order, assigning word spaces, and, if possible, deciding what sort of a text is written. An indispensable clearing of the ground for this is Forsyth (1996).

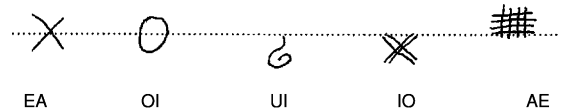

Figure 2 Additional, or *Forfeda*, letters.

Additional Letters

An additional set of letters, known as *forfeda*, of very different aspect, is attested in manuscripts and only on later stones, including the Pictish (see Sims-Williams, 1992). They are shown in Figure 2. They represent sounds that had appeared as a result of historical developments in Irish, and it has been conjectured that some at least are based on Greek shapes (see Lehmann, 1989).

The Origin of Ogam

According to the *Auraicept*, the system is named after its inventor, Ogma. (He was the son of the God of

Eloquence or Culture, whose name appears in Gaul as Ogmios and whose tasks included that of taking souls to the Other World.) Scholarly investigation does not yield anything more in the way of hard evidence, and various mutually exclusive conjectures have been made about the origin of ogam. It has been contended that ogam was influenced by runes, that runes were influenced by ogam, that each influenced the other, that the origin was in wooden tally sticks used for counting, that ogam developed from finger signaling, and that ogam originated in Phoenician. (See Vendryès, 1948; Lehmann, 1989; and Russell, 1995.)

It is tempting to regard ogam as a direct encoding of the Latin alphabet, especially as Old Irish would require seven long vowel phonemes but ogam offers only five, as in Latin. However, ogam distinguishes between /u/ represented by ⟨U⟩ and /w/ represented by ⟨F/V⟩ although both /u/ and /w/ were represented in the Latin by ⟨V⟩. It has therefore been suggested that the vowels were first notated by dots (for which there is a Latin precedent) and then this technique was extended to symbols necessary to notate the consonants of Irish (Sims-Williams, 1993). Perhaps supporting a Latin origin, Henken (1942) reports a find of bone dice dating perhaps to the 2nd century C.E. that may show a knowledge of both Roman numerals and ogam.

Ogam in Divination, Magic, and Myth

The medieval manuscripts (for example, see Calder, 1917: 278 ff.) give not only the names of the symbols but some kind of divinatory connotation of each, singly or in combination with others. This, together with the supposed divine origin of the script, has in some quarters given rise to a mystical view of ogam in which it is combined with such things as Celtic legend, religion, magic, the activities of druids, and the mythical import of writing generally (see, for example, Graves, 1961; and Thorsson, 1992).

See also: Pictish; Runes.

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Ogden, Charles Kay (1889–1957)

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Charles Kay Ogden (C. K. Ogden) (1889–1957) (known also under the pseudonyms of Adelyne More, Dorothy Gates, T. L., and C. M.) was born on June 1, 1889 to Charles Burdett Ogden and his wife Fanny Hart at Rossall School in Fleetwood, England. C. K. Ogden was good at sports (soccer, chess) until at the age of 16, rheumatic fever kept him in bed for approximately 2 years, but even after that traumatic experience he represented Cambridge University against Oxford at billiards in 1909. Ogden went to Cambridge in 1908 having been awarded a classical scholarship, and made the influence of the Greek language on Greek thought his main field of specialization. Ogden was a founding member of the *Heretics* (he first served as secretary, then for 12 years as president), a society established in order to freely discuss religion, philosophy, and art (honorary members included Bertrand Russell, George Bernard Shaw, and G. M. Trevelyan). From 1912 to 1922, Ogden was founder and editor of the *Cambridge Magazine* where readers were introduced to the issues of philosophy, psychology, aesthetics, and religion as well as language philosophy; from 1923 to 1952 he also edited *Psyche*, a journal of general and linguistic psychology. Ogden spent considerable time studying translation methods. He translated from French and German. He translated, among others, Wittgenstein's *Tractatus Logico-Philosophicus*. Together with I. A. Richards, Ogden worked on the project published under the title *The meaning of meaning: a study of the influence of language upon thought and of the science of symbolism* (London, 1923). Ogden was of the opinion that language (and via language also men) can be controlled, which could be turned to the benefit of effective communication and international understanding. In 1912–1913, Ogden visited schools and universities in Europe and the United States studying language teaching methods. He is believed to be the father of *Basic English* – a new artificial language – that was supposed to become a new lingua franca. Bearing in mind the process of globalization in education and 'shrinking distances' due to mass media proliferation, he proposed a program emphasizing reductive principles: 1) reducing the number of Basic English words for specialized subjects; 2) creating a Basic Library of General Knowledge covering the sciences in 1000 divisions; 3) establishing a Basic Parallel Library of 1000 books that would be composed of the basic form of the works of great writers. He reduced the English verb stock to 18 and came up with the idea of a word system with approximately 850 words, in which – for the sake of simplicity and clarity – words would be used only in their fundamental meanings. He divided the words into three groups (600 nouns; 78 pronouns, adverbs, and prepositions; 150 adjectives). The nouns and adjectives were divided into two groups: general and picturable. Grammatical rules were reduced to seven. By 1935, Basic English teaching centers and their representatives were to be found in 30 countries. There were also programs regularly broadcast in Basic English in many countries (including North America, South America, Africa, India, and China). The British Prime Minister Winston Churchill applauded Basic English in his Harvard speech in 1943, stating that he and President Roosevelt were of the opinion that it had "high merit as a possible international auxiliary language."

See also: Foreign Language Teaching Policy.

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Ohno, Professor Emeritus of the Gakushuin University (Tokyo, Japan), has been actively engaged in research projects as well as projects outside academia, and is considered as one of the most renowned traditional Japanese grammarians. Born in 1919 in the center of Tokyo in a family of merchants, Ohno noted a difference between the cultures of downtown and uptown Tokyo, which made him ponder the fundamental elements of the Japanese culture. This contemplation on the culture of Japan led him to major in Japanese grammar at the University of Tokyo (then called the Imperial University of Tokyo), where he studied under Shinkichi Hashimoto (1887–1945) until 1943. Influenced by Hashimoto, Ohno engaged in the study of *zyoodai tokusyu kanadukai* (phonetically based Chinese characters) and reconsidered the phonemic system of Old Japanese in the Nara period (710–794). Ohno is known for his philological work on publications by Norinaga Motoori (1730–1801), a Japanese grammarian investigating agreement/concord relations between particles and verbal endings. Ohno's interest in Norinaga Motoori's work led him to the survey of *kakarimusubi* (the concord phenomena in Old-Middle Japanese). Ohno is also engaged in editing a dictionary of Old-Middle Japanese: *Iwanami kogo ziten* (first edition published in 1974), which has successfully gone through several printings and is regarded as one of the most popular dictionaries on Old-Middle Japanese.

In addition to the works on Old-Middle Japanese, Ohno has been ardently pursuing the genealogy of Japanese. After conducting a comparative study of Korean, Ainu, and several other languages (see Ohno, 1957), Ohno gradually took an interest in the Dravidian languages, among which he focused on Tamil (with emphasis on classical Tamil). In collaboration with Arunasalam Sanmugadas from the University of Jaffna in Sri Lanka and Manonmani Sanmugadas (wife of Arunasalam), Ohno conducted an extensive comparative study of Old Japanese and Old Tamil with regard to the lexicon, morphology, syntax, and prosody, after which he reached the conclusion that Japanese is genetically related to Tamil. Ohno's hypothesis can be regarded as the most radical variant of the southern substratum theory of the origin of Japanese, which claims that Japanese has an Austronesian lexical substratum. This highly controversial hypothesis on the origin of Japanese has come to be well-known to both academic and nonacademic audiences.

Aside from academic works, Ohno enthusiastically publishes books for enlightening general readers, whose topics vary from novel interpretations of *Genji monogatari* (*The Tale of Genji*), the genetic affiliation of Japanese, interactions between the language and the culture of Japan, the grammar of Japanese, among others. His recent book for general readers titled *Nihongo rensyuutyoo* (A workbook for practicing Japanese) has sold nearly two million copies since its publication in 1999.

See also: Japan: History of Linguistics; Japanese; Motoori Norinaga (1730–1801); Tamil.

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Shigeko Okamoto studied English literature at Kyoto Prefectural University in Japan, and moved to the United States for her graduate studies in linguistics. She obtained her M.A. from California State University, Fresno, and her Ph.D. from the University of California, Berkeley in 1985. Her dissertation was on ellipsis in Japanese discourse. In 1986, she joined the Department of Linguistics at California State University, Fresno, where she continues to teach as professor of linguistics and Japanese.

She has published extensively on the Japanese language in the areas of pragmatics, semantics, discourse analysis, sociolinguistics, language and gender, language and culture, and language pedagogy. Some of her contributions are the result of her collaboration with other linguists such as Janet Shibamoto Smith, Shie Sato, Meryl Siegal, Yoshiko Matsumoto, and Haruo Aoki. Her earlier works focused on the examination of the relationship between syntax, semantics and pragmatics in Japanese discourse. In her analysis of nominal tautological constructions (e.g., *boys are boys*), for example, she extended the research to their use in discourse and to non-European language, and critically examined the adequacy of pragmatic and semantic approaches offered by the works of Paul H. Grice and Anna Wierzbicka in interpreting the discourse context dependency in the functions of the Japanese morphosyntactic patterns found in these constructions (Okamoto, 1993). Much of her recent research concerns topics in the area of sociolinguistics, including honorifics, gendered speech, regional dialects, and Japanese interaction styles (e.g. Okamoto, 1999). She has also published papers in the area of teaching Japanese as a foreign language (e.g., Matsumoto and Okamoto, 2003).

Through her approach to linguistic meaning, which emphasizes the analysis of language use, she has made significant contributions to the study of Japanese language and gender. In a series of papers (e.g., Okamoto, 1995; Okamoto and Sato, 1992), she documents diverse patterns in the use of feminine speech styles, for example, the way that young Japanese women use less feminine speech and even masculine sentence final particles in natural conversations. Her work thus gives special attention to the relationship between Japanese linguistic features and social and communicative contexts, in particular gender identity and social distance and hierarchy among participants. For example, in her works on honorifics and sentence-final particles, she examined the wide variation in the use of these indexicals, and the interactional and sociocultural factors influencing speakers' choice of speech styles (e.g., Okamoto, 1997). Most recently, she co-edited with Janet S. Shibamoto Smith *Japanese language, gender, and ideology: cultural models and real people* (2004).

See also: Variability in Japanese (Discourse); Variation and Language: Overview.

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Old Church Slavonic

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Old Church Slavonic is the earliest Slavic literary language. It was first used in the later part of the 9th century A.D. as the vehicle of translations and original compositions by SS Cyril and Methodius and their associates for the benefit of those Slav peoples who had recently accepted Christianity. Some of these texts have survived in copies thought to date from the late 10th or 11th century, which are the primary source of information about the language and have recently been supplemented by newly discovered manuscripts; others, found in copies of later date, can be used to provide important additional evidence about syntax and lexis.

The sound system implied by the two alphabets Glagolitic and Cyrillic, in which Old Church Slavonic was written, antedates the major change from open to closed syllable structure that took place across the Slavic languages between the 10th and 12th centuries. Some of the grammatical forms and constructions used in Old Church Slavonic manuscripts are also highly conservative, e.g., substantial remains of distinct consonantal nominal declensions, transparent postposition of the anaphoric pronoun to adjectival forms as a means of expressing definiteness, asigmatic aorist forms, and the supine with a genitive complement. The evidence of Old Church Slavonic therefore has considerable weight in attempts to reconstruct Proto-Slavic (Common Slavonic) and to elucidate the relationship between Slavic and other Indo-European languages (*see* **Indo–European Languages**).

Old Church Slavonic is also the main source of information about the early history of the South-East Slavic languages (*see* **Bulgarian, Macedonia: Language Situation**). As natives of Saloniki, SS Cyril and Methodius doubtless spoke the local variety of South Slavic. As a result of their work in Moravia (863–885 A.D.), Old Church Slavonic borrowed some local items of religious terminology from Latin or Old High German, such as *mĭša* < *missa*, *vŭsodŭ* < *wizzǫd*, and there is some ground for supposing that at an early stage, Old Church Slavonic also incorporated certain West Slavic linguistic features, particularly in pronunciation. However, the manuscripts of South Slavic origin, from which the information about Old Church Slavonic is largely derived, preserve only traces of such a hybrid usage at best, and for the most part reflect the Slavic dialects of the southeast Balkans and the Greek terminology of the Eastern Orthodox Church.

From its inception, however, Old Church Slavonic must have differed from contemporary spoken varieties of Slavic, as it was used primarily to translate Scriptural, liturgical, and patristic texts from Greek or occasionally from Latin and Old High German. Even pronunciation may have been modified to accommodate Greek loanwords: the Glagolitic alphabet has extra letters for the velar consonants /g/ and /x/, which seem to have been reserved for use in Greek loanwords before front vowels, a position in which these phonemes did not occur in native Slavic words at that time. Comparison with the originals shows that the translations aimed at faithfulness on the basis of correspondence, phrase by phrase, between source and target. Consequently, while the grammatical forms and most of the words and semantic distinctions are Slavic, the syntax tends to mirror the constructions of the original, usually Greek.

There is, however, a range of recurrent exceptions where imitation of a foreign model would presumably have led to linguistically unacceptable results: the placing of clitics apparently follows Slavic rules; possessive adjectives or the attributive dative frequently appear in place of an attributive genitive in the original, and simple case forms may be used to translate prepositional phrases; the use of the dual number, the distribution of subordinate complementary clause, infinitive and supine, and the choices made among the elaborate past tense system of the verb are all independent of Greek. Even the dative absolute construction, which is peculiar to Old Church Slavonic among the Slavic languages and is usually found as a translation equivalent of the Greek genitive absolute, is occasionally used to render intractable Greek constructions such as the nominalized infinitive. The compound word-formations of Greek were also frequently reproduced in Old Church Slavonic, e.g., *pravoslovie* (later *pravoslavie*) < ορθοδοξία. Texts believed to be original Old Church Slavonic compositions display the same type of language, which can be characterized as a compromise between early Slavic idiom and Greek literary usage in a balance so delicate that it was not subsequently maintained (*see* **Church Slavonic**).

See also: Balto-Slavic Languages; Bulgarian; Church Slavonic; Indo–European Languages; Macedonia: Language Situation.

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Old English Dictionaries

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The first published Old English dictionary was William Somner's *Dictionarium Saxonico-Latino-Anglicum* (1659). It was built on his predecessors' unpublished Old English dictionaries and glossaries, beginning with Laurence Nowell's 'Vocabularium Saxonicum,' compiled in the mid-15th century with the assistance of William Lambard, whose own *Archaionomia* (*ca.* 1568) included a list of Old English legal terms. John Joscelyn, Archbishop Matthew Parker's Latin Secretary, began compiling his 'Dictionarium Saxonico-Latinum' around 1566. Much longer than Nowell's and unfinished at the author's death in 1603, the manuscript was bequeathed to Sir Robert Cotton, who made it available to the next generation of Old English lexicographers.

During the 17th century, a number of important Old English dictionaries, word lists, and glossaries were prepared from extant Anglo-Saxon manuscripts. The most important of the compilers were Sir Henry Spelman, who published half of his projected two-volume glossary of Old English legal terms, *Archaeologus in modum glossarii ad rem antiquam posteriorum*, in 1626; Abraham Wheelock ('Lexicon Saxonicum-Latinum,' compiled *ca.* 1639); and William Dugdale, whose 'Dictionarium Saxonicum' is notable for its emphasis on variants. Others on whom Somner drew include Jan de Laet, Friedrich Lindenbrog, Richard Roland Verstegan, John Selden, William Lisle (Spelman's son-in-law), Sir William Boswell, Francis Tate, Richard James (Robert Cotton's librarian), as well as Simonds D'Ewes, the first to draw chiefly from his predecessors rather than from the original manuscripts.

The 18th century produced one important published contender to Somner's *Dictionarium*, Edward Lye's *Dictionarium Saxonico et Gothico-Latinum*, edited and published in 1772 by Owen Manning after Lye's death. The work of Somner and Lye together served Anglo-Saxon scholars until 1838, when Joseph Bosworth, at the time a British chaplain in the Netherlands, published *A Dictionary of the Anglo-Saxon language*, the first truly comprehensive Old English dictionary. Despite mixed reviews, it and his abridged *A compendious Anglo-Saxon and English dictionary* (1848) quickly replaced Somner and Lye as the standard Old English dictionary. Bosworth's work on a revised and enlarged edition was never completed. Two years after his death, in 1878, Oxford University Press, now owner of the copyright, turned the project over to Thomas Northcote Toller, a young lecturer at Owens College (later University of Manchester). Toller spent the next 35 years editing and enlarging Bosworth's dictionary, serially publishing *An Anglo-Saxon dictionary based on the manuscript collections of the late Joseph Bosworth* between 1882 and 1898, and a lengthy *Supplement*, also serially, between 1908 and 1921.

Also published in the late 19th century were two important dictionaries aimed chiefly at students: J. R. Clark Hall, *A concise Anglo-Saxon dictionary* (1894) and Henry Sweet, *The student's dictionary of Anglo-Saxon* (1896). In 1972, Alistair Campell published *The enlarged addenda and corrigenda* to Bosworth-Toller,

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as it had come to be called, the final addition to this seminal work.

In 1969 and 1970, two conferences were held at the University of Toronto; their purpose was to design a scholarly dictionary to replace Bosworth-Toller that would take advantage of new computer technologies and increases in manuscript editing (see Cameron *et al.*, 1970 and Frank and Cameron, 1973 for proceedings). The result was the *Dictionary of Old English*, which is still in progress. Originally published in microfiche, the first electronic version, *Dictionary of Old English: A to F on CD-ROM*, was published in 2003. At the date of this writing, entries for the letters G, H, I, and Y are being written with G shortly due out on microfiche.

See also: Dictionaries; English, Old English; Lexicography: Overview.

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Old French Dictionaries

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There are six Old French dictionaries of scientific importance:

1. Godefroy, *Dictionnaire de l'ancienne langue française* (Gdf);
2. Tobler/Lommatzsch, *Altfranzösisches Wörterbuch* (TL);
3. *Dictionnaire étymologique de l'ancien français* (DEAF);
4. *Anglo-Norman dictionary* (AND);
5. *Dictionnaire du moyen français* (DMF);
6. *Französisches Etymologisches Wörterbuch* (FEW).

Gdf is the earliest and the most comprehensive: it covers the whole medieval period (and trespasses on the 16th century and beyond). Initially, Gdf did not include any word still current in French, which means that significant amounts of the lexis of Old French (which has survived intact into modern French) was omitted. The *Complément* (in vols. 8–10) remedies this. Gdf is more comprehensive than rigorous: it tends to accumulate examples, and the glossing is often imprecise. A CD-ROM version of Gdf exists, but it is unreliable. TL, originally conceived as a supplement to Gdf, is more philologically precise, but limited both in time (pre–1350) and register (overwhelmingly literary). A CD-ROM version, with image files (JPEG) accessible from a rekeyed lemma list, is now available. A weakness of TL is its tendency (like Gdf) to list a run of quotations without differentiating the gloss, and to use (as does Gdf) often heavily normalized headword forms, some of which are unattested anywhere. DEAF is as yet incomplete and will be for some time (G, H, I and part of J are in print at the time of writing, together with indexes to the completed letters). It is both a

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See also: French Lexicography; Latin; Middle English Dictionaries; Occitan.

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Oldendorp, Christian Georg Andreas (1721–1787)

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Born on March 8, 1721 in Grossenlafferte near Hildesheim in Lower Saxony, Christian George Andreas Oldendorp was orphaned at an early age. His eldest brother, Johann Christoph Oldendorp, a pastor in Grossenlafferte, undertook his upbringing, and from 1731 he attended the gymnasium in Hildesheim, demonstrating a propensity for religious studies and an intellectual interest in a wide variety of other subjects, including botany. As a student of theology at the University of Jena in 1740, he was strongly influenced by another brother, Joann Siegfried, also a student at the university, who introduced his younger sibling to the Moravian Brethren. In 1743, the Brethren gave Christian a position as a teacher of children, a profession he intermittently pursued until his death. After the age of 26, Christian Oldendorp led a peripatetic lifestyle, residing first in Hernnhut, the center of the Moravian Brethren, and also serving as a teacher at Trebka in Silesia, Niesky, Hennersdorf, and Marienborn. In February of 1766, at the age of 44, he was engaged by the Brethren to write a history of the missions in the Danish West Indies, and so, in September of that year, set out from Niesky for the islands. An arduous 6-month sea journey brought him to St. Croix, where he immediately began an exhaustive study of not only the missions, but also of the flora, fauna, and inhabitants of the various islands. In all, Oldendorp spent 17 months in the Danish West Indies satisfying his voracious curiosity by making observations of his natural surroundings, researching historical documents, and interviewing members of all the social classes resident in the islands, including, and perhaps most significantly, slaves. Returning to Europe via the Moravian mission in Bethlehem, Pennsylvania, where he spent the winter of 1768–1769, Oldendorp was back in Marienborn by June 1769. There he began the task of converting his copious notes into an excellent two-volume description of the Danish West Indies, but the 3272-page manuscript he eventually produced underwent heavy editing by Johan Jakob Bossard before final publication in a much-reduced form in 1777. It is the original version of the manuscript that contains the fine 53-page description of Negerhollands, the Dutch-based creole of the Danish West Indies, which secures for Oldendorp a place as one of the founding fathers of Creolistics. The considerable insight he

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Born on March 8, 1721 in Grossenlafferte near Hildesheim in Lower Saxony, Christian George Andreas Oldendorp was orphaned at an early age. His eldest brother, Johann Christoph Oldendorp, a pastor in Grossenlafferte, undertook his upbringing, and from 1731 he attended the gymnasium in Hildesheim, demonstrating a propensity for religious studies and an intellectual interest in a wide variety of other subjects, including botany. As a student of theology at the University of Jena in 1740, he was strongly influenced by another brother, Joann Siegfried, also a student at the university, who introduced his younger sibling to the Moravian Brethren. In 1743, the Brethren gave Christian a position as a teacher of children, a profession he intermittently pursued until his death. After the age of 26, Christian Oldendorp led a peripatetic lifestyle, residing first in Hernnhut, the center of the Moravian Brethren, and also serving as a teacher at Trebka in Silesia, Niesky, Hennersdorf, and Marienborn. In February of 1766, at the age of 44, he was engaged by the Brethren to write a history of the missions in the Danish West Indies, and so, in September of that year, set out from Niesky for the islands. An arduous 6-month sea journey brought him to St. Croix, where he immediately began an exhaustive study of not only the missions, but also of the flora, fauna, and inhabitants of the various islands. In all, Oldendorp spent 17 months in the Danish West Indies satisfying his voracious curiosity by making observations of his natural surroundings, researching historical documents, and interviewing members of all the social classes resident in the islands, including, and perhaps most significantly, slaves. Returning to Europe via the Moravian mission in Bethlehem, Pennsylvania, where he spent the winter of 1768–1769, Oldendorp was back in Marienborn by June 1769. There he began the task of converting his copious notes into an excellent two-volume description of the Danish West Indies, but the 3272-page manuscript he eventually produced underwent heavy editing by Johan Jakob Bossard before final publication in a much-reduced form in 1777. It is the original version of the manuscript that contains the fine 53-page description of Negerhollands, the Dutch-based creole of the Danish West Indies, which secures for Oldendorp a place as one of the founding fathers of Creolistics. The considerable insight he

gained from his time spent talking with the islands' blacks, both natives and African-born, allowed him to compile extensive notes on their lingua franca, Negerhollands. Although only four pages eventually appeared in the inferior published version, the importance to Creolistics of Oldendorp's thorough description of the language's grammar and usage in social contexts is difficult to overstate. Along with his later German-Negerhollands dictionary (*Criolisches Wörterbuch. erster zu vermehrender, und, wo nötig, zu verbessernder Versuch*), it may be considered a standard for subsequent similar works in the field. Christian George Andreas Oldendorp died of dropsy in Ebersdorf at the age of 67 on March 9, 1787.

See also: Pidgins and Creoles: Overview.

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Omaha-Ponca

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Speakers and Linguistic Resources

Omaha-Ponca is the name linguists use for the language of the Omaha and Ponca peoples. *Umo^{n}ho^n* (Omaha) and *Pa^{n}ka* (Ponca, sometimes spelled Ponka) dialects differ only minimally, but are considered distinct languages by their speakers. Both tribes formerly inhabited areas near the Missouri River in northeastern Nebraska. The Omahas are still located in this area, with the tribal headquarters at Macy, Nebraska, but most of the Poncas were removed in 1878 to northern Oklahoma, around Ponca City. A smaller group of Poncas still resides in Nebraska. The Omaha-Ponca language is a member of the Dhegiha branch of Mississippi Valley Siouan, closely related to the Osage, Kansa, and Quapaw languages (for more detail on the genetic relationships of the Siouan languages, *see* **Siouan Languages**).

The Omaha and Ponca dialects are severely endangered, with only a few dozen elderly fluent speakers of Omaha in Nebraska and of Ponca in Oklahoma. However, many younger people have some ability to speak or understand the languages, and language classes at several schools and colleges in Nebraska and Oklahoma have had some success in promoting fluency among passive speakers and semispeakers, as well as in teaching the language to children and college students. Major linguistic resources on Omaha-Ponca include the monumental text collections of James Owen Dorsey (1890, 1891) and Dorsey's draft grammar and slip file, the ethnographic studies by Fletcher and LaFlesche (1911) and Howard (1965), Swetland's dictionary (1991), and an unpublished grammar by Koontz (1984). Several dissertations are currently in progress.

Sounds and Spelling

Traditionally, like other Native American languages, Omaha-Ponca was not written. Independently, both tribes recently adopted nearly identical spelling systems, similar to the orthography used by Fletcher and LaFlesche, but reading and writing Omaha-Ponca are still complicated by the existence of several other orthographies. In particular, the Dorsey materials, the largest source of texts in the language, are written in an idiosyncratic orthography that uses upside-down letters for unaspirated stops, '¢' for the dental

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approximant, 'q' for the voiceless velar fricative, and 'c' for the voiceless alveopalatal fricative, among other unusual symbols. Most modern linguistic writings on the language use a transcription that represents tense unaspirated stops with a double letter, nasal vowels with a hook under the letter, and alveopalatal consonants with a hachek (č, š, ǰ, ž); a slightly modified transcription known as 'NetSiouan' is used for electronic communication. This has the effect that even those who are literate in Omaha or Ponca do not have easy access to most works on the language.

In this article, the orthography adopted by current school programs is used. The phonemic inventory of Omaha-Ponca, using this system, is shown in Table 1. Several sounds require explanation. The plain voiceless stops are lax following a fricative, tense elsewhere. Glottalized consonants, which are ejective or co-articulated with a glottal stop, are rare. The back nasal vowel is spelled *o*^{n} in Omaha and *a*^{n} in Ponca. Throughout this article, for convenience, the Omaha spelling is used. It is not entirely clear whether there is more than one phonemic back nasal vowel. Phonetic vowels varying in quality from [a^n] to [o^n] to [u^n] occur, but are probably allophonically conditioned. A vowel *o* is written in a few words of men's speech.

The most unusual sound in Omaha-Ponca is the consonant spelled *th*. This phoneme ranges apparently freely from [l] to a lightly articulated voiced dental fricative [ð]. Historically derived from **r*, it behaves more like a liquid than a fricative, frequently occurring in syllable-initial clusters following a voiced stop (bth, gth), for instance. Because of its similarity to the sound in the English word 'this,' it is spelled *th* in the Fletcher–LaFlesche orthography and in current educational orthographies. Other systems represent it variously as ¢ (Dorsey), ð (Siouanist/linguistic), or *dh* (NetSiouan).

Vowel length is distinctive in accented syllables (*ná*^{n} *a*^{n}*de* 'heart' vs. *ná*^{n}*de* 'inside wall'), but this contrast was not recognized by linguists until the 1990s and is still marked only sporadically in written materials. Nasality is also distinctive, but sometimes difficult to hear, especially for [i] vs. [i^n] adjacent to a nasal consonant or in final position. For instance, 'water' can be found written as either *ni* or *ni*^{n}. A downstep pitch accent occurs on the first or second syllable of the word, and is distinctive, as in *wathát*^{h}*e* 'food' and *wáthat*^{h}*e* 'table', though this may turn out to correlate with vowel length. Instrumental phonetic studies of Omaha-Ponca are lacking. It would be useful to have studies of the exact quality of the various stop series, *th*, and the suprasegmental features.

Morphology

Like other Siouan languages, Omaha-Ponca has complex verbal morphology but very little elaboration of other categories. There is no grammatical class of adjectives; concepts such as 'tall' are expressed by stative verbs. Adverbs, pronouns, and demonstratives are minor, uninflected categories. Nouns, other than those derived from verbs, generally contain no inflectional morphology. The exception is vocative and inalienable possessive marking of relationship terms:

wi-ko^n	'my grandmother'
thi-ko^n	'your grandmother'
i-ko^n	'his/her/their grandmother (sometimes also used by men)
ko^n-ho	'grandmother!' (male vocative)
ko^n-ha	'grandmother!' (female vocative)

Table 1 Phonemic inventory of Omaha-Ponca

Sound	*Labial*	*Dental*	*Alveopalatal*	*Velar*	*Laryngeal*
Stops and affricates					
Voiced	b	d	j	g	
Voiceless					
Plain	p	t	ch	k	'
Aspirated	p^h	t^h	ch^h	k^h	
Glottalized	p'	t'			
Nasals	m	n			
Fricatives					
Voiced		z	zh	gh	
Voiceless					
Plain		s	sh	x	
Glottalized		s'	sh'	x'	
Approximants	w	th			h
Vowels					
Oral	i e a (o) u				
Nasal	i^n a^n/o^n				
Long	(doubled letter, e.g., aa)				

Definiteness is marked by a series of articles that also code animacy, proximateness, position, movement, and/or plurality of the nominal that they follow. This complex definite article system is an innovation shared with other Dhegiha languages:

nu ak^{h}a	'the man (proximate)'
nu thi^{n}k^{h}e	'the man (obviative animate sitting)'
zho^n k^{h}e	'the stick (long, horizontal)'
zho^n t^{h}e	'the wood (stacked vertically)'

The verb is the locus of most of the grammatical information in the sentence. Besides pronominal prefixes identifying subject and object of the clause, the verb may contain prefixal instrumental, locative, dative, possessive, reflexive, suus (reflexive possessive), and vertitive (returning motion) markers, some of which can be obscured by phonological processes. Postverbal enclitics code plurality, negation, habitual or potential aspect, evidentiality, imperative and interrogative mode, proximateness, and other categories, some marked for person. There is no category of tense (in the following examples, the abbreviations are as follows: 1S, first-person singular; 1PL, first-person plural; AGT, agent; BEN, benefactive; REFL, reflexive; POTEN, potential; AUX, auxiliary).

a-ki-g-thize-ta-mi^{n}k^{h}e
1S.AGT-BEN-REFL-get-POTEN-1S.AUX
'I'll get (it) for myself'.

Omaha-Ponca is an active-stative language, meaning that verbs take one or the other or both of two sets of pronominal prefixes, an agent set and a patient sset. The regular prefixes are given in the following example (there are also several irregular conjugations):

	1S	**2nd person**	**3rd person**	**1PL**
Agent:	a-	tha-	Ø-	o^n-
Patient:	o^n-	thi-	Ø-	wa-

Intransitive verbs take one set or the other, depending roughly on their semantics, 'active' verbs taking the agent set as their sole argument, and 'stative' verbs taking the patient set:

Active verb, gthi^n 'sit':
agthi^n 'I sit' thagthi^n 'you sit' gthi^n 'he/she/it/they sit'
o^{n}gthi^n 'we sit'
Stative verb, sni 'be cold':
o^{n}sni 'I'm cold' thisni 'you're cold' sni 'it's cold'
wasni 'we're cold'

Transitive verbs take both an agent prefix for the subject and a patient prefix for the object, e.g., *o^n-thi-do^{n}bai* 'we see you'. There is a portmanteau form *wi-* for first-person subject with second-person object, and an additional patient prefix *wa-* for third-person plural or indefinite object.

Syntax

Syntactically, Omaha-Ponca is a head-marking, head-final language. Postpositions follow their nominal arguments, as in *tiútano^n k^{h}e di* 'in the yard' (literally, 'yard the in'). Modal and evidential auxiliaries are at the end of the clause, after the verb, as are imperative and question particles. Determiners are the rightmost element in the nominal phrase (determiner phrase) and other noun modifiers also follow the head noun (noun + clause + possessive + article):

wat^{h}é	tu	wiwíta	tho^n
dress	blue	my	the

'my blue dress'

Basic sentence word order is subject-object-verb, as in the following example (PROX, proximate; EVID, evidential):

[wahó^{n}thishige	ak^{h}a]	[shó^{n}gewi^n]	[gó^{n}tha-i-t^{h}e]
Orphan.Boy	the	horse one	want-PROX-EVID

'Orphan Boy wanted a horse.'

Full subject-object-verb (SOV) sentences are actually rather uncommon, however. All constituents except the verb are optional, so subject and/or object are often missing; a verb alone constitutes a full grammatical sentence. In addition, SOV order is far from rigid; it is not uncommon for a major constituent, such as the underlined phrase in the following example, to occur after the verb. Such postverbal phrases generally seem to be topics, but may sometimes be simply an afterthought:

M. S. izházhe	athí^n	nú ak^{h}á
name	had	man the

'The man was named M. S.'.

Because all participants are marked on the verb and all nominals are optional, it is possible to analyze Omaha-Ponca as a pronominal argument language, in the sense that the pronominal affixes on the verb are the true syntactic arguments of the clause, with nominal phrases (when they occur) being adjuncts. As in other languages, this analysis is controversial.

Relative clauses in Omaha-Ponca are internal headed, with the head noun contained within the clause. The head noun is indefinite (not marked with a definite article), whereas the clause is followed by an article appropriate to the head noun's role in the matrix clause:

[[shi^{n}nuda	no^{n}ba	uxpátheawathe]	ama]
dog	two	I.lose.them	the

'The two dogs that I lost'.

Various types of nominal and adverbial subordinate clauses also exist, sometimes also marked with an article:

[[that^{h}í] t^{h}e] úudo^{n}
you.arrive.here the good
'It's good that you're here'.

Usage: Gendered Speech and Dialects

Some aspects of Omaha-Ponca language differ by the gender of the speaker. Male/female speech forms play only a minor role in the grammar and lexicon of the language; however, they are of great cultural salience and occur with high frequency, including, as they do, forms of address, greetings, terms for certain relatives, speech act markers (command, exclamation, and question particles), and interjections (see the following examples). Gendered speech sometimes hampers language teaching and revival efforts; males in particular are wary of learning inappropriate speech patterns from a female teacher. For example, *aho!*, a greeting or interjection showing approval, is used only by males. Imperative enclitics (Example (1)) and relationship terms/vocative enclitics (Example (2)) provide additional examples:

(1) -ga (male)/-a (female), sometimes with stress shift:
o^{n}'í-ga/o^{n}'i-á 'give it to me' (male/female)

(2) zhi^{n}thé-ho 'older brother!'
(male; i.e., addressed by brother)
tinu-há 'older brother!'
(female; i.e., addressed by sister)

Differences between Omaha and Ponca varieties of the language are slight, and mostly involve recently innovated vocabulary, such as 'telephone' (Ponca *má^{n} a^{n}ze ut^{h}í^{n}* 'tapping iron' (originally 'telegraph') vs. Omaha *mó^{n}o^{n}ze íutha* 'talking iron'), or 'cup' (Ponca *uxpé zhí^{n}ga* 'little dish' vs. Omaha *niúthato^{n}* 'drink water in it'). Some words differ in meaning. For instance, *shó^{n}zhi^{n}ga* (literally 'small horse') means 'colt' in Omaha but 'puppy' in Ponca. *Shó^{n}ge* (originally 'dog') has shifted its meaning to 'horse' in both Omaha and Ponca, but the young-animal term derived from it retains its older meaning in Ponca. Such lexical differences are not necessarily absolute. Given the close contact between Omahas and Poncas, in many cases both forms may be known in both communities.

Phonological and grammatical differences between Ponca and Omaha have not been well researched. There is some indication that Ponca speakers retain the final *-i* of the proximate/plural, which present-day Omaha speakers drop in most environments, though ablaut shows that it is underlyingly present, as in Ponca *athái*, Omaha *athá* 'she/he/they go', from *athé* + *i*. However, given the small number of speakers recorded, this may be more an idiolectal than a dialectal difference. In general, speakers from the two communities have no trouble understanding each other.

See also: Siouan Languages; United States of America: Language Situation.

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Oman: Language Situation

Editorial Team

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The Sultanate of Oman is situated at the eastern end of the Arabian Peninsula. It borders on the United Arab Emirates, Saudi Arabia and Yemen in the west and south, and faces the Gulf of Oman in the north and the Arabian Sea in the east. One of the oldest states in the region, the Sultanate at one time extended along the Arabian Sea and included the island of Zanzibar and the enclave Gwadur in Pakistan. Several ethnic and linguistic groups in Oman today trace their origin to former Omani territories. In the 20th century, Oman's economy became based on oil revenue, but agriculture and fishing still play a significant role.

Similar to other gulf-states, a high proportion of the population of Oman is made up of expatriates; about 570 000 out of a total population of 2.9 million are not Omani nationals. This high figure is the result of the high number of foreign workers present in Oman, mainly from India, Pakistan, and Iran, who contribute to the linguistic diversity of the country.

The official language of Oman is Standard Arabic. Monolingual speakers of Arabic are in a diglossic situation, where Standard Arabic is used in formal and official contexts, as well as for written communication, but the local dialects of Arabic are used in less formal, spoken speech situations. The main local varieties of spoken Arabic used in Oman are Omani Arabic, Gulf Arabic, and Dhofari Arabic. In addition to monolingual Arabic speakers, many Omani are bilingual in Arabic and another language.

Up to the 1990s, literacy in Oman was low, especially away from the urban centers, and was lower among women than among men. As a result of campaigns to eradicate illiteracy launched in the 1990s, however, the literacy level has gone up over the last decade, from an adult literacy of 54.7% in 1990 to one of 74.4% in 2002. However, the imbalance between males (82%) and females (65.4%) persists in adult literacy. Literacy of youth, those between age 15 and 24 years, approaches 98.5% universal literacy.

In addition to Arabic, several modern South Arabian languages are spoken in the south of Oman: Jibbali (25 000 speakers), Mehri (15 000), Harsusi (1000–2000), and Hobyót (100). Similar to Arabic, they are Semitic languages, but they are distinct from Arabic, even though increasingly influenced by – and under pressure from – it.

On the mountainous Musandam peninsula on the Straits of Hormuz, cut off from the rest of the country by a part of the United Arab Emirates, Shihuh tribesman speak Shihhi (Kumzari), an Iranian language with strong influence from Arabic not yet fully described.

In urban areas and especially in coastal towns and the capital Muscat, Swahili is widely used, mainly by Zanzbaris who left East Africa after political unrest in the 1960s. Similarly, many Balochi (Balochi, Southern) speakers are Omanis originating from South Asia. In addition to foreign-born Omanis, recent foreign workers brought new languages to Oman, notably Bengali, Hindi, and Urdu, as well as Farsi.

The most widely taught foreign language is English, which is also used as a language of instruction in tertiary education. Radio Oman operates English-language networks, and there are several English-language newspapers.

See also: Arabic; Semitic Languages.

Language Maps (Appendix 1): Map 112.

Omotic Languages

R J Hayward

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The Omotic languages constitute an indigenous Ethiopian family of the Afroasiatic phylum. They are spoken in the west and the southwest of the country, with the River Omo as a geographical locus, and from this the name derives.

Earlier opinion included Omotic within Cushitic, but subsequent to Fleming (1969), it has generally been regarded as an independent family. There is a well-founded division into North and South subfamilies. While the latter (comprising Hamar, Dime, and the Ari dialects) exhibit close internal affinities, there is greater diversity within Northern Omotic, the following groups being recognized: Gonga (Kafa varieties, Mocha, Nao, and Anfillo), Dizoid (Dizi varieties and Sheko), Mao varieties, Gimira (Benchnon and She), Ometo (an extensive cluster of

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The most widely taught foreign language is English, which is also used as a language of instruction in tertiary education. Radio Oman operates English-language networks, and there are several English-language newspapers.

See also: Arabic; Semitic Languages.

Language Maps (Appendix 1): Map 112.

Omotic Languages

R J Hayward

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The Omotic languages constitute an indigenous Ethiopian family of the Afroasiatic phylum. They are spoken in the west and the southwest of the country, with the River Omo as a geographical locus, and from this the name derives.

Earlier opinion included Omotic within Cushitic, but subsequent to Fleming (1969), it has generally been regarded as an independent family. There is a well-founded division into North and South subfamilies. While the latter (comprising Hamar, Dime, and the Ari dialects) exhibit close internal affinities, there is greater diversity within Northern Omotic, the following groups being recognized: Gonga (Kafa varieties, Mocha, Nao, and Anfillo), Dizoid (Dizi varieties and Sheko), Mao varieties, Gimira (Benchnon and She), Ometo (an extensive cluster of

languages and dialects including Wolaitta, Dorze, Gamo, Gofa, Basketto, Male, Zayse, Koyra and, possibly, Chara), and Yemsa (an isolate). The greatest numbers of speakers belong to the Ometo, Gonga, and Ari groups, though accurate figures for speakers of the Omotic languages remain unrecorded.

Omotic languages exhibit many of the linguistic features typical of the area; they show especially strong typological affinities with East and Central (Agaw) Cushitic.

Syntactically: (a) They are strictly head-final, i.e., the verb is final, all nominal modifiers precede the noun, only postpositions occur, etc.; the morphology, moreover, is entirely suffixal. (b) There is no WH-movement, though, as with any focused constituent, WH-elements may be moved to sentence-initial position by means of a type of clefting operation. (c) Verbs in non-final (but non-subordinate) clauses commonly lack agreement, and function rather like 'serial verbs.' (d) Many Omotic languages have a case system which opposes a marked nominative in subject NPs to an unmarked absolutive form found in all other syntactic functions (complement of verb, copula, or postposition) as well as for citation purposes. (e) Contrastive argument structures of lexically related verbs (e.g., passives, reciprocals, causatives, etc.) are indicated by stem suffixes. (f) Tense and modal distinctions are carried by auxiliaries following the main verb.

Phonologically: Omotic languages share the following areal features: (a) The 'emphatic' obstruent series of Afroasiatic is represented by glottalized segments. (b) There is a symmetrical system of five peripheral vowels. (c) Length is pertinent for both consonants and vowels. (d) Pitch variation functions contrastively, though functionally many of the languages probably have 'tonal accent' rather than 'paradigmatic tonal' systems.

Going beyond areal typology, a range of Omotic languages exhibit phenomena that make it plausible to hypothesize four family-specific features, which, one assumes, are inherited from the protolanguage: (a) A root-structure constraint disallowing co-occurrence of palatal (ʃ, ʒ, tʃ, tʃ', dʒ) and non-palatal (s, z, ts, ts', (dz)) sibilants. (b) A nasal suffix accusative marker. (c) A three-term tonal system. (d) A lexical classification of nominals in terms of vocalic suffixes.

Certain Afroasiatic features have undergone simplification in Omotic: (a) Except in the case of human animates, formal agreement for nominal gender has been neutralized. (b) Number categories and morphology have been simplified; singulative forms are relic only, and each language employs just one plural formative. (c) No trace of the Afroasiatic Prefix Conjugation has survived.

Certain (groups of) languages have developed characteristics of some interest: (a) Benchnon Gimira has a system of six tones, which makes it unique within Africa. (b) The Ometo languages have evolved a distinct series of interrogative verb paradigms employed both for Yes/No and WH-questions.

See also: Afroasiatic Languages; Ethiopia: Language Situation; Wolaitta.

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Oneida

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Introduction

Oneida is a Native American language of the northern branch of the Iroquoian family, related to Seneca, Cayuga, Tuscarora, Onondaga, and, most closely, Mohawk. The homeland of the Oneida people is in central New York state. Migrations in the 1800s led to the three current communities of Oneidas on reservations in central New York and near Green Bay, Wisconsin, and a reserve near London, Ontario. A century ago most Oneidas spoke the language, but currently all Oneidas speak English and there are only small numbers of Oneida native speakers, primarily in Wisconsin and Ontario. All three Oneida communities sponsor efforts to preserve the language, but it is definitely endangered with the total number of fluent

languages and dialects including Wolaitta, Dorze, Gamo, Gofa, Basketto, Male, Zayse, Koyra and, possibly, Chara), and Yemsa (an isolate). The greatest numbers of speakers belong to the Ometo, Gonga, and Ari groups, though accurate figures for speakers of the Omotic languages remain unrecorded.

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native speakers under 100. The Oneidas' name for themselves is *onʌyoteʔaˑkáˑ* 'people of the standing stone.' They also use the term *ukwehuˑwé* 'native people' for themselves and other Iroquoian people.

The oral traditions of the Oneidas support a wealth of stories and a rich set of ceremonies, shared with other members of the League of the Iroquois (also known as the Six Nations or *Haudenosaunee*). A written form of the language is a recent innovation. Jesuit missionaries established a writing tradition for the Mohawk language, and it was used by a few people for Oneida in the 19th century for personal letters, some records, and Bible translations. A linguistically based orthography was invented in the late 1930s and, slightly revised, has been in use since the 1970s for many language preservation materials.

Phonology

The Oneida phonemes are four oral vowels /i, e, a, o/, two nasal vowels /ʌ, u/, four resonants /l, w, y, n/, two stops /t, k/, a fricative /s/, two laryngeals /h, ʔ/, and a phoneme of vowel length. Two affricates are often analyzed as phoneme combinations /tsy, tshy/. The voicing of the stops and palatalization of the fricative are subphonemic processes conditioned by the following sound. Vowel length and pitch are distinctive, and the prosodic patterns produce one of the principal contrasts with the related Mohawk language. Patterns of epenthesis are another important contrast.

The sound system of the language is remarkable for a number of features: the small inventory of phonemes, the lack of labial sounds, and the presence of whispered syllables in a morphophonological process conditioned by placement within sentences. For example, the word for 'sugar' is *onutákliʔ* when it is followed by other words and *onutákehli* with the last syllable *-li-* whispered when it occurs at the end of a sentence or before a major phrase.

Morphology and the Lexicon

The morphology of the language is complex. There are only three clear word classes (nouns, verbs, and particles), but affixation is common with nouns and especially with verbs, which require, at minimum, pronominal prefixes and aspectual suffixes added to either simple or complex verb stems. There is a rich set of derivational processes that manipulate the basic argument structure of verbs. The process of noun incorporation, along with derivational morphemes such as reflexives, benefactives, causatives, and instrumentals, can build complex stems from simpler roots. There are also devices that convert nouns to verbs and verbs to nouns. Thus, derived forms can nest within others to create words of amazing length. In addition, there is a rich set of inflectional affixes for verbs. Suffixes supply aspectual and some tense inflections. One set of prefixes supplies a pronominal coding of one or two arguments (agent and patient) with number, person, and gender distinctions. There are two distinct feminine genders along with a masculine gender and a neuter gender that largely overlaps with one of the feminine genders. The other feminine gender is the unmarked gender in the singular, whereas the masculine is the unmarked gender in the plural. There are three categories of number: singular, dual, and plural. In addition verbs may have up to six of an additional set of 11 prefixes that supply various adverbial, directional, tense, mood, lexical, and syntactic functions. Words thus contain quite a few morphemes, and these morphemes are subject to quite a bit of alternation, conditioned by surrounding morphemes, by surrounding phonemes, and by accentuation patterns.

A couple of examples of Oneida verb forms demonstrate the template: Prefixes-Pronominals-Verb stem-Aspect suffix.

(1)	t	-ʌ́	-t	-k	-e	-ʔ
	back	-will	-toward	-I	-go	-ASP
	'I will come back'					

In (1), the verb stem *-e-* 'go' has a punctual aspect suffix *-ʔ-* and a pronominal prefix *-k-* that indicates 'first-person singular agent.' The sequence *tʌt* is a combination of three prefixes: *-t-* 'direction toward,' *-ʌ-* 'future tense,' and *-t-* 'returning.'

(2)	t	-huwati	-lihunyʌnít	-haʔ
	there	-they.AGT/them.PAT	-teach	-HABIT
	'school, they teach them there'			

The form in (2) is constructed as a verb, but can function as a noun. It consists of a complex verb stem *-lihunyʌniht-*, which is made of simpler components: an incorporated noun, *-lihw-* 'custom'; a verb root, *-uni-* 'make'; a benefactive derivational form that allows an argument role in the pronominal prefix for the receiver of the teaching, *-ʌni-*; and an instrumental derivational suffix that allows a focus on the means of teaching, in this case, the location, *-ht-*. When these four components are combined, certain sound rules apply: *-w-* is lost before *-u-*, *-i-* becomes a consonant before a vowel, and *-h-* is lost in the *-hth-* combination. The aspectual suffix *-haʔ* is 'habitual,' the pronominal prefix *-huwati-* indicates a third-person plural agent and patient, and the initial prefix *-t-* indicates location.

The noun morphology is simpler. A few nouns are uninflected, but most nouns have obligatory prefixes and suffixes on basic noun roots, and these affixes

mark the resulting words as nouns. The basic nominal prefixes can be replaced by possessive prefixes. There are a variety of locative suffixes, several pluralizing suffixes, a number of verb roots that function as adjective suffixes, and a few other suffixes. Many words that function as nouns in sentences, however, are not built from noun roots but instead are verb forms that produce descriptions used as nominals. In a few cases, it is difficult to tell whether a word is a noun or a verb.

(3) ka· -lút -eʔ
it -log -NOM
'log'

(4) ka -lut -o·kú
it -log -under
'under the log'

(5) ka -lu·t -ót -eʔ
it -log -stand -ASP
'tree, standing log, the tree is standing'

The prefix *ka-* is both a common noun prefix and a neuter pronominal prefix for verbs, and the suffix *-eʔ* is both a noun suffix and a verb suffix for the stative aspect.

As a result of the complex morphology, Oneida provides its speakers with enormous resources for word building. Undoubtedly not all of this potential is exploited, but many forms that are used are lexicalized, often with some semantic specialization, as in the verb for 'they teach them there,' which lexicalizes as 'school.' That lexicalization is sometimes marked by particular additional suffixes, but for many words there is no formal marking, only use, to indicate the lexicalization. Many functional nouns are thus created from formal verbs when a description becomes a name. This may account in part for the resistance the language has to borrowing words from English, which has surrounded and endangered the language for centuries.

Syntax

In the syntax, word order is not particularly rigid and intuitions of sentencehood are not strong. Particles and clusters of particles connect strings of predications and sometimes link to nominal arguments (which may appear formally to be verbs). The main arguments of the predication are encoded into the verb in the pronominal prefixes, and, if there is need to elaborate them, any elaboration tends to follow the predication. Particles and combinations of them provide discourse functions, subordination markers, deictics, emphasis, evidentials, and the pacing devices that are well developed in the oral tradition.

Scholarship

The academic study of the language includes some early text collection by Boas (1909) and analysis of verb stem classes by Barbeau (1915), but the real foundational work is by Lounsbury, based on fieldwork done in the Wisconsin community in the late 1930s and early 1940s. His work (Lounsbury, 1953), based on his M.A. thesis on Oneida phonology and his doctoral dissertation on verb morphology, set a framework not only for the future study of Oneida but for all the northern Iroquoian languages. Subsequent work by Karin Michelson has advanced the understanding of the sound system (Michelson, 1988) and the aspectual system (Michelson, 1995). The lexicon of the language is documented in two dictionaries, one based on fieldwork from the Wisconsin community (Abbott *et al.*, 1996) and one from the Ontario community (Michelson and Doxtator, 2002). A sketch of the linguistic structure of the language is available in Abbott (2000), and more complete grammars, both for reference and teaching, are in preparation. There are several text collections with linguistic analysis (Campisi and Christjohn, 1980; Abbott *et al.*, 1980; Michelson, 1981; Elm and Antone, 2000).

Community Work

Each of the three Oneida communities has a language preservation/recovery program to combat the endangered status of the language. Samples of the language, both written and spoken, are available on the websites of two of the Oneida communities: the Wisconsin community and the New York community. The language is being taught in tribal schools and in informal community classes. For the most part, the communities have adopted, since the 1970s, the writing system developed by Lounsbury, slightly modified from Lounsbury (1953). These programs have produced pedagogical materials, including some text collections (Abbott, 1982a, 1982b, 1983a, 1983b; Hinton, 1996) and word lists (Anton *et al.*, 1981; Anton, 1982), and include language material on their websites. The success of these programs in stemming the language loss over the last several decades has been fairly modest.

See also: Canada: Language Situation; Incorporation; Iroquoian Languages; Lexicalization; Lounsbury, Floyd Glenn (1914–1998); United States of America: Language Situation.

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Onions (*Companion to the English Language*) was born in Birmingham. He received a B.A. in French in 1892 and an M.A. in 1895, both from the University of London through Mason College in Birmingham. In 1895, he moved to Oxford and joined the staff of the *Oxford English dictionary* (OED). At the *OED*, he worked first under James Murray and then under Henry Bradley and W. A. Craigie, in particular on

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SUB-Sz, Wh-Worling, and the letters X, Y, and Z. In 1914, he was appointed a senior editor. He composed the last entry in the *OED*, for *zyxt,* an obsolete Kentish dialect form of the verb 'to see.' He co-edited (with Craigie) the 1933 *Supplement*.

In addition to his work on the *OED*, Onions produced a survey of Shakespearian usage, *A Shakespeare glossary* (first edn., 1911); revised Henry Sweet's *Anglo-Saxon reader* (1922); and that same year took over the editing of the *Shorter Oxford English dictionary,* completing it in 1933.

After World War I, during which Onions served in British naval intelligence, he returned to Oxford, where he was first a lecturer in English and later a reader in English philology. In 1923, he was elected to fill the fellowship at Magdalen College left vacant by Henry Bradley's death. He also served as librarian of the college from 1940 to 1955. Despite his stammer, Onions was noted for his sharp and penetrating responses to questions of etymology and usage.

Onions served as the president of the Philological Society from 1929 to 1933, as the editor of *Medium Aevum* (the journal of the Society of the Study of Mediaeval Languages and Literature) from 1932 to 1956, and as honorary director of the Early English Text Society from 1945 to 1957.

Onions was made a Commander of the Order of the British Empire in 1934, and a Fellow of the British Academy in 1938. He married Angela Blythman in 1907; they had ten children.

See also: English Lexicography; Lexicography: Overview; Murray, James A. H. (1837–1915); Sweet, Henry (1845–1912).

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Onomasiological Theory of Word Formation

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Overview

The term *onomasiology* goes back to Greek *ónoma* 'name.' An onomasiological approach to word formation (WF) encompasses several basic models whose common feature is procedure from concept/meaning to form. The onomasiological framework is cognitive, relating WF to conceptual thinking. The conceptual level establishes a link between the extralinguistic and linguistic levels of the naming process. Horecký (1983, 1999) explicitly presents this in his onomasiological chain: object–conceptual generalization–meaning–form.

In the short history of onomasiological research into WF, three main approaches have emerged. One of them is based on Dokulil's ideas; the second strictly separates the conceptual/semantic and the formal levels; in the third approach, any theory of WF is a byproduct of more broadly based onomasiological research into lexical semantics.

Dokulilean Tradition

While the basic principles of the onomasiological approach to WF were outlined by Dokulil as early as 1958, it is his later (1962) monograph that has become an onomasiological manifesto. The comprehensiveness, ingenuity, and depth of this work put it on a par with Marchand's *Categories* (1960). It anticipated a number of topics that emerged later in generative morphology.

It is assumed that a generalized picture of an extralinguistic object is processed in the human mind in accordance with the naming processes typical of a given language. While these processes (and their formal representations) differ from language to language, the conceptual basis of the act of naming is language-independent. Hence, Dokulil's central notion, the onomasiological category (1962: 29), is

SUB-Sz, Wh-Worling, and the letters X, Y, and Z. In 1914, he was appointed a senior editor. He composed the last entry in the *OED*, for *zyxt,* an obsolete Kentish dialect form of the verb 'to see.' He co-edited (with Craigie) the 1933 *Supplement*.

In addition to his work on the *OED*, Onions produced a survey of Shakespearian usage, *A Shakespeare glossary* (first edn., 1911); revised Henry Sweet's *Anglo-Saxon reader* (1922); and that same year took over the editing of the *Shorter Oxford English dictionary,* completing it in 1933.

After World War I, during which Onions served in British naval intelligence, he returned to Oxford, where he was first a lecturer in English and later a reader in English philology. In 1923, he was elected to fill the fellowship at Magdalen College left vacant by Henry Bradley's death. He also served as librarian of the college from 1940 to 1955. Despite his stammer, Onions was noted for his sharp and penetrating responses to questions of etymology and usage.

Onions served as the president of the Philological Society from 1929 to 1933, as the editor of *Medium Aevum* (the journal of the Society of the Study of Mediaeval Languages and Literature) from 1932 to 1956, and as honorary director of the Early English Text Society from 1945 to 1957.

Onions was made a Commander of the Order of the British Empire in 1934, and a Fellow of the British Academy in 1938. He married Angela Blythman in 1907; they had ten children.

See also: English Lexicography; Lexicography: Overview; Murray, James A. H. (1837–1915); Sweet, Henry (1845–1912).

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defined as a basic conceptual structure in relation to its expression in a particular language.

The most common type of onomasiological category is relational. Dokulil pursues the binaristic tradition of morphosyntactic analysis by assuming, independent of Marchand's notion of WF syntagma, that this type consists of two basic constituents: an object is identified as a member of a conceptual class which is determined within that class. This establishes the basic naming scheme, onomasiological mark (the determiner)–onomasiological base (the conceptual class), representing an onomasiological structure. While the base is always simple, the mark may contain the determining (or 'motive') and the determined components, for example:

Cz. *roman-o-pis-ec*
novel-interfix-write-er

where *-ec* is the base, *roman* is the motive, and *-pis-* is the determined component of the mark. Omission of the determining component makes a naming unit more general (*writer*); omission of the determined component causes ambiguity of coinages (is, for example, *anthraxist* a person who '*terrorizes* people with anthrax,' '*produces* anthrax,' '*sells* anthrax,' '*studies* anthrax,' 'is *obsessed* with anthrax'?).

The relational type of onomasiological category is based on the 'relation' between the concepts standing for the motive and the base, respectively. There are four basic conceptual categories, SUBSTANCE, ACTION, QUALITY, and CIRCUMSTANCE. For example, *evening paper* relates the categories CIRCUMSTANCE and SUBSTANCE, *to redden* the categories QUALITY and ACTION. Within this general structure, more specific relations can be distinguished, based on semantic categories such as Agent, Patient, Bearer of Quality, Result, Possession, Origin, etc.

The transpositional type of onomasiological category is based on hypostatization of QUALITY or ACTION (*rapid* → *rapidity*, $fall_V \rightarrow fall_N$).

The modificational type onomasiological category includes various modifications of a concept, such as the formation of diminutives, augmentatives, change of gender, the young of animals, collectiveness.

Dokulil's work found a positive echo abroad, mainly in the countries of Central and East Europe. The major developments of Dokulil's theory are as follows.

An important step in the development of onomasiological theory is Horecký's multilevel model of WF (1983, 1989, 1999), including the conceptual, semantic, onomasiological, onomatological, and phonological levels. The cornerstone of his model is the semantic level. Horecký provides an inventory of semantic distinctive features, their relations, and hierarchical organization. This system is applied to the description of WF fields defined by the word class of the WF base and that of the resulting naming unit, e.g., deverbal substantives. Each WF field is dominated by a common semantic feature. The meaning of each naming unit is constituted by a bundle of semantic features.

The meaning facet of morphemes refers either to the object of extralinguistic reality (root morphemes) or to a (string of) semantic feature (affixes). Horecký (1994) distinguishes four types of meaning of a naming unit: (i) categorial meaning; (ii) invariant meaning, (iii) specific meaning, and (iv) lexical meaning. The first three meanings constitute the 'structural meaning' (given by the interrelation between onomasiological base and mark), and underlie the lexical meaning. For illustration, the respective meanings of Sl. *tretina* ($third_N$) are as follows: (i) desubstantival noun; (ii) 'abstract quality defined by the string of semantic features –HUM –CONCR –QUAL'; (iii) 'a third part of something,' (iv) 'one part of hockey match' (as one of its lexical meanings).

The gist of Štekauer's model (1996, 1998, 2001) is the concept of WF as a naming act performed by an individual speaker/writer. Horecký's onomasiological scheme is extended to reflect the crucial triad of WF relations, which exist between extralinguistic reality (object to be named), speech community (coiner), and WF, to emphasize the active role and cognitive capacity of a coiner. Each naming act responds to a specific naming demand of a speech community. This is reflected in the concept of productivity viewed as a competition between WF types falling within the same semantic category (Agent, Patient, Action, Instrument, etc.). The naming act is viewed as creativity within the productivity constraints, which means that (a) based on his/her conceptual processing of an object, a coiner may select from several possible onomasiological structures, and (b) there are usually several options for assigning morphemes to semantic categories constituting an onomasiological structure (Object–Action–Agent: *spiderweb researcher*, *web-researcher, spider-researcher*, *spiderwebbist*, *spiderweb-scholar*, *arachnologist*, *web-biologist*, *spider-webologist*, etc., for 'someone who explores spiderwebs').

All naming processes are accounted for by the same principle of matching the semantics of morphemes with the particular categories of onomasiological structure (Morpheme-to-Seme-Assignment Principle). The traditional semasiological classification of WF processes (compounding, prefixation, suffixation, etc.) is replaced by a consistent onomasiologal classification: five onomasiological types differ by the degree of complexity of and the relation between

the onomasiological and onomatological structures. In Type 1, each constituent of the ternary structure is assigned a morpheme (Object–Action–Agent: *wood-cut(t)-er*). In Type 2, the determining constituent of the mark is absent (Action–Instrument: *lock-pin*); in Type 3, the determined constituent of the mark is left unexpressed at the onomatological level (Result–Action–Agent: *honey*-θ-*bee*); in Type 4, the mark is unanalyzable (Negation–Quality: *in-consistent*). Type 5 (conversion) also has a conceptual foundation, and is defined as conceptual recategorization (Štekauer, 1996): an object to be named is processed and named from the perspective of a different conceptual category (e.g., $cheat_V \rightarrow cheat_N$ is a recategorization from ACTION to SUBSTANCE).

Separation Models

The best-known models of the 'separation theory' are Beard (1995) and Szymanek (1988). Inspired by Dokulil, Beard, and cognitive linguistics and psychology, Szymanek attempted to find an independent and reliable motivation for the set of derivational categories in a language. His cognitive grounding condition assumes that "[t]he basic set of lexical derivational categories is rooted in the fundamental concepts of cognition" (1988: 93). Szymanek's list includes 25 cognitive categories, such as Object, Substance, Person, Number, Existence, Possession, Action, Agent, Instrument, which, being basic, are reflected in derivational categories (e.g., the derivational category Agent Noun is grounded in the cognitive category Agent). Importantly, there are one-to-many and many-to-one relations between cognitive categories and derivational categories, and between derivational categories and their formal spell-out from which they are strictly separated.

Lexicosemantics-Centered Approach

Onomasiological research into lexical semantics, studying "the different lexical 'pathways' through which a particular concept has been designated" (Blank, 2001: 7) in various languages and/or the changes in the corresponding words over time, has a long tradition. It provides its WF offshoot with well-established and elaborate terminology. The basis for analysis is three Aristotelian associative principles: similarity, contrast, and contiguity, the latter being the relation between the concepts within a frame (e.g., the relations of time and space, cause and effect, agent and action) (Blank, 1998: 8–9).

The main task of a cognitive onomasiological theory of WF, as presented by Blank, is to account for the procedure leading from a concept to its linguistic expression by incorporating the related associative and cognitive principles. In the naming process, a base is chosen from one of the prototypical associations of a concept to be named (one which is represented by a word in a given language). The semantic gap between the base word and the named concept is bridged by another word or affix.

For illustration, the associative principle of similarity (roughly, SMALLER THAN DEFAULT) underlies It. *computerino* ('notebook'), where the semantic gap between the concept to be named (NOTEBOOK COMPUTER) and the base concept (COMPUTER) is bridged by the suffix *-ino*. An example of identity relation, realized by suffixation is It. *puro* 'pure' → *purezza* 'purity,' as both words are based on the same concept.

In compounds, two base concepts are combined; for example, It. *vagone letto* ('sleeping carriage') is based on the associative relations of similarity ('sleeping carriage' – 'carriage') and contiguity ('sleeping carriage' – 'bed').

Koch (2001) elaborates on these ideas to propose a three-dimensional universal model, interrelating (i) cognitive-association relations (identity, contiguity, metaphorical similarity, taxonomic similarity, taxonomic superordination, taxonomic subordination, cotaxonomic contrast, and conceptual contrast); (ii) formal relations (zero = semantic change (diachronically) or polysemy (synchronically), change in number, change in gender, diathesis, conversion, suffixation, prefixation, compounding, lexicalized syntagma, and idiom); and (iii) lexical stratification, i.e., the difference between native lexemes and borrowings. The model establishes a large number of potential combinations, not all of which are implemented in individual languages. For illustration, Sp. *carnicero* ('butcher') is represented as <contiguity.suffixation.stratum< Sp. *carniza* ('meat'), Engl. *pear-tree* as <taxonomic subordination + contiguity.composition. stratum< Engl. *tree* + *pear*; *sombrero* as <taxonomic subordination.zero.borrowing <Sp. *Sombrero* ('hat').

See also: Conversion; Frame Semantics; Lexical Semantics: Overview; Productivity.

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Onomasiology and Lexical Variation

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The Scope of Onomasiological Research

Although it has hardly found its way to the canonical English terminology of linguistics, the distinction between onomasiology and semasiology is a traditional one in Continental structural semantics and the Eastern European tradition of lexicological research. As Baldinger puts it, "Semasiology . . . considers the isolated word and the way its meanings are manifested, while onomasiology looks at the designations of a particular concept, that is, at a multiplicity of expressions which form a whole" (1980: 278). The distinction between semasiology and onomasiology, in other words, equals the distinction between meaning and naming: semasiology takes its starting-point in the word as a form, and charts the meanings that the word can occur with; onomasiology takes its starting-point in a concept, and investigates by which different expressions the concept can be designated, or named.

To grasp the range of onomasiology, one should realize that the two descriptions of onomasiology that Baldinger mentions are not exactly equivalent. On the one hand, studying 'a multiplicity of expressions which form a whole' lies at the basis of the traditional, structuralist conception of onomasiology, i.e., to the study of semantically related expressions (as in lexical field theory, or the study of the lexicon as a relational network of words interconnected by links of a hyponymical, antonymical, synonymous nature, etc.). On the other hand, studying 'the designations of a particular concept' opens the way for a contextualized, pragmatic conception of onomasiology, involving the actual choices made for a particular name as a designation of a particular concept or a particular referent.

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This distinction can be further equated with the distinction between an investigation of structure, and an investigation of use, or between an investigation of langue and an investigation of parole. The structural conception deals with sets of related expressions, and basically asks the question: what are the relations among the alternative expressions? The pragmatic conception deals with the actual choices made from among a set of related expressions, and basically asks the question: what factors determine the choice for one or the other alternative?

This second, usage-oriented (or if one wishes, pragmatic) form of onomasiology is related to two specific points of interest: differences of structural weight that may appear within onomasiological structures, and onomasiological change.

1. The importance of structural weight may be appreciated by considering semasiological structures first. Qualitative aspects of semasiological structure involve the following questions: which meanings does a word have, and how are they semantically related? The outcome is an investigation into polysemy, and the relationships of metonymy, metaphor, etc. that hold between the various readings of an item. Quantitative aspects of lexical structure, on the other hand, involve the question whether all the readings of an item carry the same structural weight. The semasiological outcome of a quantitative approach is an investigation into prototypicality effects of various kinds: prototypicality research is basically concerned with differences of structural weight among the members or the subsenses of a lexical item. The qualitative perspective is a much more traditional one in semasiological lexicology than the quantitative one, which was taken up systematically only recently, with the birth and development of prototype theory.

The distinction between the qualitative and the quantitative aspects of semantic structure (as we may loosely call them) can be extrapolated to onomasiology. The qualitative question then takes the following form: what kinds of (semantic) relations hold between the lexical items in a lexicon (or a subset of the lexicon)? The outcome, clearly, is an investigation into various kind of lexical structuring: field relationships, taxonomies, lexical relations like antonymy and so on. The quantitative question takes the following form: are some categories cognitively more salient than others; that is, are there any differences in the probability that one category rather than another will be chosen for designating things out in the world? Are certain lexical categories more obvious names than others? Again, this type of quantitative research is fairly new. The best-known example is probably Berlin and Kay's basic level model (Berlin and Kay, 1969; Berlin, 1978), which involves the claim that a particular taxonomical level constitutes a preferred, default level of categorization. The basic level in a taxonomy is the level that is (in a given culture) most naturally chosen as the level where categorization takes place; it has, in a sense, more structural weight than the other levels.

2. The distinction between a structure-oriented and a usage-oriented form of onomasiology extends naturally towards the study of onomasiological change. On the one hand, when we think of onomasiological change in a structural way, we will be basically interested in what may be called "lexicogenesis" – the mechanisms for introducing new pairs of word forms and word meanings. These involve all the traditional mechanisms that introduce new items into the onomasiological inventory of a language, like word formation, word creation (the creation of entirely new roots), borrowing, blending, truncation, ellipsis, folk etymology, and others. Crucially, the semasiological extension of the range of meanings of an existing word is itself one of the major mechanisms of onomasiological change – one of the mechanisms, that is, through which a concept to be expressed gets linked to a lexical expression. In this sense, the study of onomasiological changes is more comprehensive than the study of semasiological changes, since it encompasses the latter (while the reverse is obviously not the case).

On the other hand, if we think of onomasiological change in a usage-oriented way, the lexicogenetic perspective inevitably has to be supplemented with a sociolexicological perspective – with the study, that is, of how onomasiological changes spread through a speech community. Beyond merely identifying onomasiological mechanisms in the traditional etymological vein, we need to study how these mechanisms are put at work and how they may lead to overall changes in the habits of the language community. Classifications of lexicogenetic mechanisms merely identify the space of possible or virtual onomasiological changes; sociolexicology studies the actual realization of the changes.

The Contribution of Various Traditions of Research

The various traditions of lexical semantics have contributed in different ways to the study of onomasiology. The major traditions are the following:

- prestructuralist semantics, as dominant between 1870 and 1930, and as represented by the work of Paul, Bréal, Darmesteter, Wundt, and many others;

- structuralist semantics, as dominant between 1930 and 1960, and as represented by the work of Trier, Weisgerber, Coseriu, Lyons, and lexical field theorists at large;
- generativist and neogenerativist semantics, as originated in the 1960s, with the work of Katz and Fodor;
- cognitive semantics, as originated in the 1980s, and as represented by the work of Lakoff, Langacker, Talmy, and others.

Of these four traditions, all except the generativist/neogenerativist have made noteworthy contributions to the field of onomasiology.

1. Prestructuralist semantics – apart from coining the term *onomasiology* itself (Zauner, 1902) – has introduced some of the basic terminology for describing lexicogenetic mechanisms. Although basically concerned with semasiological changes, the major semasiological treatises from Bréal and Paul to Stern and Carnoy do not restrict themselves to strictly semasiological mechanisms like metaphor and metonymy, but also devote attention to mechanisms of onomasiological change like borrowing or folk etymology. (Compare Quadri [1952] for an overview of the tradition.) While the distinction between the two perspectives is treated more systematically in the structuralist era, attempts to classify lexicogenetic mechanisms continue to the present day. Different proposals may be found in the work of, among others, Dornseiff (1966), Algeo (1980), Tournier (1985), and Zgusta (1990).

2. The crucial contribution of structuralist semantics to onomasiology is its insistence, in the wake of De Saussure himself, on the distinction between semasiology and onomasiology. In the realm of diachronic linguistics, this division shows up, for instance, in Ullmann's classification of semantic changes (1962). More importantly, the bulk of (synchronic) structuralist semantics is devoted to the identification and description of different onomasiological structures in the lexicon, such as lexical fields, taxonomical hierarchies, lexical relations like antonymy and synonymy, and syntagmatic relationships.

3. There are three important contributions that cognitive semantics has so far made to onomasiology. First, cognitive semantics has drawn the attention to a number of qualitative onomasiological structures that did not come to the fore in the structuralist tradition. This shift holds true, on the one hand, for the development of the Fillmorean frame model of semantic analysis (Fillmore, 1977, Fillmore and Atkins, 1992). Frames constitute a specific type of syntagmatic structure in the lexicon that received little or no attention in the structuralist tradition. On the other hand, the seminal introduction of generalized metaphor research in the line of Lakoff and Johnson (1980) can be seen as the identification of figurative lexical fields: the ensembles of near-synonymous metaphors studied as conceptual metaphors constitute fields of related metaphorical expressions (just like ordinary semantic fields consist of ensembles of near-synonymous lexical items).

Second, cognitive semantics introduces a quantitative perspective into the study of onomasiological structures. As mentioned above, basic level research in the line of Berlin and Kay introduces the notion of salience into the description of taxonomical structures: basic levels are preferred, default levels of categorization.

Third, cognitive semantics introduces a quantitative perspective into the study of lexicogenetic mechanisms. Within the set of lexicogenetic mechanisms, some could be more salient (i.e., might be used more often) than others. Superficially, this increased use could involve, for instance, an overall preference for borrowing rather than morphological productivity as mechanisms for introducing new words, but from a cognitive semantic perspective, there are other, more subtle questions to ask: do the way in which novel words and expressions are being coined, reveal specific (and possibly preferred) ways of conceptualizing the onomasiological targets? For instance, do specific cultures have dominant metaphors for a given domain of experience (and could such dominant metaphors perhaps be universal – see Kövecses, 1990)?

In addition, cognitive semantics is gradually developing a pragmatic, usage-oriented form of onomasiological research in which the various factors that influence the onomasiological choice of a category for talking about a given referent, are being investigated. It has been shown, for instance (Geeraerts *et al.*, 1994, 1999), that the selection of a name for a referent appears to be determined by the semasiological salience of the referent, i.e., the degree of prototypicality of the referent with regard to the semasiological structure of the category, by the onomasiological salience of the category represented by the expression, and by contextual features of a classical sociolinguistic and geographical nature, involving the competition between different language varieties.

A Conceptual Map of Onomasiology

To conclude, we can summarize the relationship between the various aspects of onomasiology into a single comprehensive schema in Table 1.

Filling in the chart with the names of the research traditions that have made a dominant contribution

Table 1 A conceptual map of onomasiological research

	Qualitative approaches: what are the relevant phenomena?	*Quantitative approaches: which phenomena carry more weight?*
Synchronic structures	Research into lexical structures: *structuralist semantics* (plus cognitive semantics)	Research into onomasiological salience: *cognitive semantics*
Mechanisms and processes of change	Research into lexicogenetic mechanisms: *prestructuralist semantics*	Research into preferential lexicogenetic mechanisms: *cognitive semantics*

to each of the various subfields schematizes the progressive development of onomasiology. The historical development from prestructuralist semantics over structuralist semantics to cognitive semantics implies a gradual enlargement of the field of onomasiological research, from an interest in lexicogenetic mechanisms over research into lexical structures (fields and others) to various quantitative approaches taking into account the difference in salience of the onomasiological phenomena.

See also: Lexical Fields; Lexicon: Structure; Neologisms; Prototype Semantics.

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Operators in Semantics and Typed Logics

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A 'semantic operator' $\mathcal{O}$ maps one or more semantic entities $\vec{\alpha}$ to a resulting semantic entity $\mathcal{O}\vec{\alpha}$. This broad characterization subsumes such basic notions as predication, modification, coordination, and quantification. One may restrict the characterization so that the semantic entity α is the semantic value corresponding to a syntactic clause, or to a syntactic clause containing one or more gaps (in some sense), or in other ways. We here consider semantic operators from the perspective of the family of formal systems known as the λ-calculus. One reason to do so stems from the historical prominence of the λ-calculus in semantic investigations. A more forward-looking reason is that within this family, many questions arise

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on formal grounds that are directly relevant to linguistic analysis, not only in semantics, but in all linguistic dimensions that involve compositional operations.

The historical roots of λ-calculus go back at least to Gottlob Frege (1879), who explicitly connects 'abstraction' with functions in the *Begriffsschrift,* §9. This intuitive idea was formalized by Alonzo Church (1941), and the introductory chapter of Church (1956) is in part an excursus on Frege's insights and methods. Contemporaneously, a formal system called 'combinatory logic' was introduced by Haskell Curry (see Curry and Feys, 1958; Curry, 1977) anticipated in earlier work by Moses Schönfinkel (1924). These systems have come to play a central role in a variety of basic problems in logic and computation: decision problems, recursive function theory, combinatory reduction systems, and theoretical computer science. They offer insights to a broad range of practical and theoretical issues in linguistics, as well. Our focus here will be on the variation introduced by different disciplines of resource sensitivity, and by different typing systems, and how these intrinsic parameters of variation connect with linguistic questions.

λ-terms

There are a variety of presentations of the system of λ-terms. (An excellent text is the book of Hindley and Seldin (1986); for a very readable introduction to connections with the theory of computation and the denotational semantics of programs, see Stoy (1981); Barendregt (1984) offers a comprehensive analysis; for other useful perspectives, see the books of Girard, Lafont, and Taylor (1989) and Krivine (1993). We draw freely on these works in the exposition that follows and the interested reader will find that the expositions of the subject they contain are well worth scrutiny.)

The most perspicuous is built up from a set V of variables by two operations: 'application,' which combines two terms M and N to make the term (MN); and 'abstraction,' which combines a variable x and a term M to make the term $(\lambda x.M)$, in which λx is called the 'abstraction operator' and M is its 'scope.' We use $x, y, z, \ldots$ for variables and assume that the variables represented by different letters are distinct unless explicitly identified. Similarly, we use capital roman letters ($M, N, P, Q, R, S, \ldots$) to represent λ-terms. The notation $M \equiv N$ means that M and N are the same λ-term. To reduce parentheses, we write $MN_1 \ldots N_k$ for $(\ldots(MN)\ldots N_k)$ and (nesting in the opposite direction) $\lambda x_1 \ldots x_k.M$ for $(\lambda x_1.(\ldots(\lambda x_k.\ M)\ldots))$.

An occurrence of a variable x in a term M is said to be 'bound' when it lies in the scope of an abstraction opertor of the form λx; otherwise, it is 'free.' Thus the variable x is free in the term x, in the term yx, but not in the term $\lambda x.x$. And the variable z has both bound and free occurrences in $(\lambda z.yz)z$ (while the occurrence of y is free). We write $FV(M)$ to denote the set of variables with free occurrences in the term M.

The intended interpretation of an application MN is that it represents the application of the function M to the argument N. The intended interpretation of an abstraction $\lambda x.M$ is that it forms that function which, when applied to an argument N returns the value M when free occurrences of x within M are interpreted as N. Thus, $\lambda x.x$ represents the 'identity' function: for any argument N, the intended interpretation of $(\lambda x.x)N$ is N itself. The term $\lambda x.y$ represents the 'constant' function whose value is always y: if we evaluate $(\lambda x.y)N$ by substituting N for free occurrences of x in y, the result is always y (since there are no free occurrences of x within the atomic variable y). Further examples: $\lambda xy.xy$ applies its first argument to its second argument (evaluation applied to the order *operator* · *argument*); $\lambda yx.xy$ applies its second argument to its first argument (evaluation applied to the order *argument* · *operator*); $\lambda yzx.zxy$ passes two arguments to z in reverse order (roughly as in English-like passive constructions, evaluation applies the second argument (z) to the third and applies the result to the first); $\lambda xzy.z(yx)$ applies its second argument to the result of applying its third argument to its first argument (roughly as in English subject-raising constructions); the similar term $\lambda zyx.z(yx)$ acts on its first two arguments to yield $\lambda x.z(yx)$, the *functional composition* of z and y; $\lambda x.xx$ applies its argument to itself.

Equivalent Terms and Alphabetic Variance

From the perspective of the intended interpretation, many distinct λ-terms in the presentation above are 'equivalent': $\lambda x.x$ represents the identity function, but $\lambda y.y$ and $\lambda z.z$ do so as well. Corresponding to this interpretive equivalence among such terms is a syntactic equivalence called a 'change of bound variables' or 'alphabetic variance' or 'α-conversion.' Intuitively, we start with a term of the form $\lambda x.M$ (or the occurrence of such a term in a larger term), replace the variable x in the abstraction operator with another variable (y, say), and replace all free occurrences of x in M with y (yielding a term we will denote by $[y/x]M$). But if this change of bound variables is to capture the correct notion of equivalence, it is essential to avoid two kinds of unwanted clashes.

In the first, starting with a term $\lambda x.M$ and changing to a term $\lambda y.[y/x]M$, we must ensure that M contains no free occurrences of y that would become bound in the shift to $\lambda y.[y/x]M$. For instance, $\lambda x.y$ is the constant function that returns y for any argument, but the putative alphabetic variant $\lambda y.[y/x]x \equiv \lambda y.y$ is the identity function, which is hardly equivalent (on the intended interpretation) to the function that yields y for any argument. Generalizing, we allow a change in bound variables from $\lambda x.M$ to $\lambda y.[y/x]M$ only when y is not in $FV(M)$, a restriction that prevents this form of inadvertent binding from arising.

The second kind of clash in the contemplated change from $\lambda x.M$ to $\lambda y.[y/x]M$ arises when M contains a free occurrence of x within the scope of an abstraction operator of the form λy: substituting y for free occurrences of x in M changes the essential structure of M, since free occurrences of x within the scope of λy are transformed by the substitution into bound occurrences of y. To see how to prevent such cases of inadvertent binding, let us walk through the several inductive cases of the substitution definition.

Substitution

Given a variable x, and two terms, N and M, we define substitution of N for free occurrences of x in M in a way that preserves the essential structure of the terms in question. The definition is inductive on the structure of M. If $M \equiv x$, then $[N/x]M \equiv N$ (substitute N for x); if M is an atom distinct from x, then $[N/x]M \equiv M$ (no occurrence of x to substitute for!); if $M \equiv PQ$, then $[N/x]M \equiv [N/x]P[N/x]Q$ (distribute the substitution across the application operation to the simpler arguments, which by the inductive assumption are defined); if $M \equiv \lambda\xi.M'$, then there are three subcases to consider: if $\xi = x$, then there are no free occurrences of x in $M \equiv \lambda x.M'$ and $[N/x]M \equiv M$; otherwise, if $\xi = y \neq x$, then $[N/x]\lambda y.M' \equiv \lambda y.[N/x]M'$ if $y \notin FV(N)$ (since no inadvertent bindings of y can arise by moving N inside the scope of λy in this case), but when $y \in FV(N)$, then $[N/x]\lambda y.M' \equiv \lambda z.[N/x][z/y]M'$, where z is not free in M' and not free in N. The final case addresses both forms of inadvertent binding: z must be chosen so that it is not free in M' (avoiding the change of bound variable problems) and is not free in N (so that no free variable in N can be bound in the course of inductive substitution). (A practical way to avoid the clashes that are possible under substitution is to adopt what Barendregt, [1984: §2.1.13 and Appendix C] calls the 'variable convention,' which requires that the set of bound variables and the set of free variables in any context are disjoint: under this assumption, we never need to consider alphabetic variants and the difficult and unintuitive final clause of the substitution definition above is simply preempted.)

β-conversion

Substitution plays a critical role as well in the characterization of β-conversion, a relation that models the evaluation of an application. We call an application of the form $(\lambda x.M)N$ a 'β-redex.' The 'contractum' of the redex $(\lambda x.M)N$ is the term $[N/x]M$. If a term P contains a particular occurrence of a β-redex Q and the term P' is the result of substituting the contractum of Q for that occurrence, we say that P β-contracts in one step to P' and write $P \rhd_1 P'$. We write $P \rhd R$ for the reflexive transitive closure of one-step reduction. A term that contains no β-redexes is said to be in 'β normal form.' These definitions raise a host of questions: Does every non-normal term reduce to a normal form? Can a term containing more than one β-redex reduce to different normal forms? If a term has a normal form, does every sequence of β-reductions result in this normal form?

In the system of λ-terms defined thus far, not every term reduces to a normal form. For example, consider the 'self-applicator' function $\lambda x.xx$, which takes an argument a and applies a to itself, yielding aa; if we apply the self-applicator to itself, we have $(\lambda x.xx)(\lambda x.xx)$, which β-reduces to $(\lambda x.xx)(\lambda x.xx)$ (same!). And we have $(\lambda x.((xx)x))\ (\lambda x.((xx)x)) \rhd_\beta ((\lambda x.((xx)x))(\lambda x.\ ((xx)x)))\ (\lambda x.((xx)x))$, where further steps of β-reduction lead to incremental growth. In these λ-terms, then, β-reduction does not reduce the number of λ-abstraction operators the term contains and these terms have no β-normal form. On the other hand, if a λ-term in this system has a normal form, the normal form is unique. This is a consequence of the celebrated 'Church-Rosser theorem,' which states that if a λ-term P is such that $P \rhd Q$ and $P \rhd R$, then there is a λ-terms S such that $Q \rhd S$ and $R \rhd S$. By this theorem, it is impossible for Q and R to be distinct β-normal forms, since if Q and R are both normal (and thus cannot undergo further β-reductions since they contain no β-redexes), $Q \rhd S$ only if $S \equiv Q$ and $R \rhd S$ only if $S \equiv R$, so that by the properties of $\equiv$ we have $Q \equiv R$, contradicting the premise that they are distinct. Finally, consider the λ-term T, with $T \equiv (\lambda y.z)\ ((\lambda x.xx)\ (\lambda x.xx))$, which applies the constant function $\lambda y.z$ (which returns z, by β-reduction, for any argument) to the self-applicator applied to itself. The term as a whole is a β-redex, but so is its argument. Consequently, the term offers alternative one-step β-reductions: one of them selects the β-redex whose abstraction operator is λy and yields the value z, which is β-normal; the other selects the argument

term $((\lambda x.xx)(\lambda x.xx))$, for which, as we have just seen, the input of β-reduction is identical to its output. Thus, T is a term that has a normal form (namely, z), but supports an infinite sequence of β-reductions (choose the second alternative at each step) that doesn't culminate with a β-normal form (since it doesn't culminate at all!). A system with these properties is called 'weakly normalizing': for any term with a β-normal form, its β-normal form is unique; but applying a series of β-reductions to a term need not culminate in its normal form, even when this normal form exists.

Alternative Presentations

The presence of an overt variable in each abstraction operator of the form $\lambda\xi$ makes the binding relation between the operator and the free variables of ξ within its scope relatively transparent. But as we have seen, this presentation provides many terms representing the same intended value (such as $\lambda x.x$ and $\lambda z.z$, with identical behavior with respect to β-reduction).

Congruence

One way to avoid this superfluity is to borrow a standard algebraic technique, regarding α-conversion as an equivalence relation and then showing that it is in fact a 'congruence' relation by proving that the basic operations on λ-terms respect it – that is, that if M and M' are alphabetic variants and N and N' are alphabetic variants, so are the applications MN and $M'N'$, the abstractions $\lambda x.M$ and $\lambda x.M'$ and the substitutions $[N/x]M$ and $[N'/x]M'$.

Nameless Terms

A more direct notational attack would be to replace free variables and their corresponding abstraction operators with a comparable notation providing a representation for every λ-term in which all alphabetic variants are represented by the same term. A system of this kind was devised by de Bruijn (1972). In this system, the standard set of variables represented by x, y, z, ... is replaced by the set of natural numbers 1, 2, 3, ..., and the standard abstraction operator consisting of λ followed by a standard variable (yielding such operators as λx and λy and λz) is replaced by the simple form λ. Following Barendregt's presentation, we define the system of Λ^*-terms inductively as follows: any natural number is a Λ^*-term; if P and Q are Λ^*-terms, so is (PQ); and for the abstraction step, if M is a Λ^*-term, so is λM. To interpret the result of adding the abstraction operator to a term, note that any occurrence of a variable k (i.e., a natural number) will be within the scope of n-many abstraction operators (for n a non-negative integer); if $k > n$, k is to be interpreted as a free variable; if $k \leq n$, then k is to be interpreted as a bound variable bound by k-th abstraction operator above it. On this interpretation, the Λ^* variables 1 and 2 are on a par with the standard x and y as free variables. But the identity function represented equivalently in the standard form by $\lambda x.x$ and $\lambda y.y$ is represented in the de Bruijn notation uniquely by $\lambda{\cdot}1$ (since the variable 1 is bound by the 1-st occurrence of the operator λ in whose scope it lies). If we replace the number 1 in $\lambda.1$ by any other natural number, the result is a constant function: thus, for the term $\lambda.2$, the variable 2 is free; so this Λ^*-term represents a constant function that returns 2 for any argument, just as the standard λ-term $\lambda y.z$ stands for the constant function that returns z for any argument. But whereas there are many equivalent standard λ-term representations of this function ($\lambda y.z$, $\lambda u.z$, $\lambda w.z$, ...), there is just one corresponding Λ^*-term. Although there is no formal operation in this system corresponding to α-conversion, an analog of β-reduction is still needed to evaluate β-redexes and the relevant notion of substitution has an arithmetical flavor, since it is necessary (*inter alia*) to increment the variable being substituted for each time the substitution operator traverses an occurrence of the λ-operator.

Combinatory Logic

A more radical idea, going back to Schönfinkel (1924) and developed much more fully by Curry and his collaborators and students, is to dispense with the abstraction operator altogether and replace it with a set of operators, a set of variables, and a set of postulates, which together form 'Combinatory Logic.' Surprisingly, two operators suffice. These operators are called K (*Konstant*) and S (*Substitution*) and their properties are defined by equations $\mathsf{K}xy = x$ and $\mathsf{S}xyz = xz(yz)$. In other words, K behaves like the λ-term $\lambda u.\lambda v.u$ (returning the first of its two arguments and throwing the second away), while S behaves like the λ-term $\lambda u.\lambda v.\lambda w.(u(w))(v(w))$. Consider now how to evaluate the term $\mathsf{SKK}x$: by the definition of S, this yields the term $\mathsf{K}x(\mathsf{K}x)$, which yields, by the definition of K, x itself. Thus, the combinator SKK behaves like the λ-term $\lambda x.x$. What about other λ-terms? We proceed inductively (inside out), using the following clauses: (1) $\lambda x.x = \mathsf{I} = \mathsf{SKK}$; (2) $\lambda x.M = \mathsf{K}M$ if $x \notin FV(M)$ (which covers $\lambda x.y$ as a special case); (3) $\lambda x.MN = \mathsf{S}(\lambda x.M)(\lambda x.N)$. As an example, take the term $\lambda x.\lambda y.yx$ that maps an element x to its 'type-lifted' analogue. Eliminating innermost occurrences

of the λ-operator first, we have $\lambda y.yx = \mathsf{S}(\lambda y.y)(\lambda y.x) = \mathsf{SI}(\mathsf{K}(x))$. Substituting this result for $\lambda y.yx$ in $\lambda x.\lambda y.yx$ yields $\lambda x.\mathsf{SI}(\mathsf{K}x)$, which translates to $\mathsf{S}(\lambda x.\mathsf{SI})\ (\lambda x.\mathsf{K}x)$, which in turn translates to $\mathsf{S}(\mathsf{K}(\mathsf{SI}))\ (\mathsf{S}(\mathsf{KK})\mathsf{I})$ (in several steps) (which is further reducible if we would like to replace I by SSK). If we apply this to an entity f, we obtain $(\mathsf{K}(\mathsf{SI})f)((\mathsf{S}(\mathsf{KK})\mathsf{I})f)$, which itself reduces to $(\mathsf{SI})((\mathsf{KK})f)(\mathsf{I}(f)))$. Applying this to a second argument g yields $\mathsf{I}g(((\mathsf{KK})f(\mathsf{I}(f)))g)$, which reduces to $g(\mathsf{K}fg) = gf$.

From a linguistic point of view, it is noteworthy that the 'operator / bound variable' syntax of the standard form of the λ-calculus is not required to express its fundamental concepts. In particular, in the standard presentation of λ-terms, the 'operator / bound variable' relation is unconstrained: we can add, for any variable x, the abstraction operator λx to any term and form a term. As a result, discontinuous (long-distance) binding is built into the syntax of these standard λ-terms from the outset. In the theory of combinators, all communication between arguments and operators is local (just as it is in the standard account of β-conversion). Local control opens the way to more sensitive discrimination in dealing with discontinuous dependencies. Early transformational accounts of discontinuous dependencies treated them in a way that allowed movement across an 'essential variable.' Non-transformational accounts of discontinuous dependencies – in GPSG, Combinatory Grammar, HPSG, LFG, Type Logical Grammar – have all tacitly adopted a recursive specification of discontinuty and it is explicitly recursive in the LFG-centric idea of 'functional uncertainty' and the modally-licensed postulates of Type Logical Grammar.

Parameters of Variation

The different perspectives sketched above present a basically uniform general system from different points of view. But this general system is the source of a family of quite distinct systems that arise by fixing specific values along particular dimensions. Here we examine three of these dimensions. The first involves the addition of new operators apart from application and abstraction. The second involves assigning 'types' to λ-terms, and serves as a source of variation because of different ways in which the external system of types and λ-terms interact. Our third dimension involves 'resource-relations' within λ-terms themselves, and thus deals with intrinsic properties of λ-terms themselves (although the properties in question are hardly restricted to λ-terms).

Additional Operators

A standard convention in the study of λ-terms is to assume that restricting applications and abstractions to act on one term at a time is not a restriction in principle, in view of the 1-1 correspondence between functions that map a pair of elements $\langle a, b\rangle$ to a value v and functions that map the element a to a function that maps b to the value v. For example, take the function that maps the pair $\langle a, b\rangle$ to their sum $a + b$. Instead of doing this in one fell swoop, we can start with a and get back the function $\lambda y.a + y$ (that is, the function *increase-by-a*), then apply this to b (in the form $(\lambda y.a + y)b)$), which normalizes to $a + b$, the exact value we reached from the pair. It is possible to incorporate this reasoning explicitly into the λ-calculus by introducing operators apart from application and abstraction (though it is also possible but not always convenient to *define* such operations by means of λ-terms).

The most basic case is the addition of a binary product operator $\times$, together with projection operators π_0, π_1, defined so that $\pi_0\ (A \times B) = A$, $\pi_1\ (A \times B) = B$, and $(\pi_0(A) \times \pi_1(A)) = A$. Taking '+' as a primitive, and using these definitions, one may show that $(\lambda z.\pi_0(z) + \pi_1(z))\ \langle 3,5\rangle = ((\lambda x.(\lambda y.x + y))(3))(5)$ in the sense that they both normalize (given the equation for the product operator) to $3 + 5$. If we reverse the order of arguments in such cases and at the same time reverse the order of abstraction operators, both cases normalize to the same value: $((\lambda x.(\lambda y.x + y))(3))(5) \rhd 3 + 5 \lhd ((\lambda y.(\lambda x.x + y))(5))(3)$. In just the same way that we smuggled some arithmetical notation into these terms, we can introduce the characteristic application/abstraction structure of λ-calculus with many systems (including the system of natural language expressions).

Thus, in the λ-calculus, there are interesting correspondences to be observed between cases involving multi-argument functions and cases in which functions act on one argument at a time, as well as correspondences between functions that act on several arguments successively and functions that act on a permutation of the order of these arguments. These questions bear directly on linguistic attempts to model syntactically such phenomena as discontinuous dependencies, the 'non-standard' constituent structure found in intonational phrasing, coordinate structures, and clitic structures. Rigid approaches to constituent structure are not naturally adaptable to the analysis of such phenomena, and require the introduction of theoretically *ad hoc* 'restructuring rules' that manipulate constituent structure (often under the assumed control of particular lexical expressions); on the other hand,

while the full generality of the flexible possibilities of the λ-calculus provides a capacious framework to investigate these issues, it may offer more equivalences than are actually wanted. A reasonable formal balance would be to make flexible constituency a choice, but not a requirement (as in multi-modal type logical grammar [Moortgat, 1997); [Oehrle, in press]).

Types

The basic system of λ-terms that we have focused on thus far is type-free in the sense that the formation rules for application and abstraction enforce no restrictions on the properties of their input and output terms. This has some advantages: there is a single identity operator $\lambda x.x$ (aka $\lambda.1$ in the nameless notation or I as a combinator), rather than a distinct identity function for each set (as in set-theoretical treatments of functions). And it has some disadvantages: certain combinations allowable in the type-free system, such as $((\lambda x.xx)\ (\lambda x.xx))$ have no β-normal form. Analogous choices are important in a number of places in natural language analysis, where 'type' is closely related to the notion 'category' and where grammatical composition is standardly taken to be category-dependent.

Church Typing

One way to assign types to λ-terms originates with Church (1940), with sources in earlier work going back to Russell's ramified theory of types. We first define a system T of types generated by a set of basic types t. Any element τ of t is a type in T; if τ_1 and τ_2 are elements of T, so is $\tau_1 \rightarrow \tau_2$. For example, if $T = \{np, s\}$, we have basic types np, s, and such complex types as $s \rightarrow s$ (compare sentence modifiers), $np \rightarrow s$ (a simple predicate), $(np \rightarrow (np \rightarrow s)$ (a 2-place predicate), $(np \rightarrow s) \rightarrow s$ (a monadic quantifier). Every atom a is assigned a type t (not necessarily an atomic type!). We write $M : t$ to indicate that a term M has been assigned type t.

The rules for application and abstraction are modified so that every complex expression is also assigned a type. Application is stated so that an application $(MN) : \beta$ can be formed only from $M : \alpha \rightarrow \beta$ and $N : \alpha$. (In this transition, the types $\alpha \rightarrow \beta$ and α combine to yield the type β.) Similarly, if $x : \alpha$ is a variable of type α and $M : \beta$ is a term of type β, we can form the abstraction $(\lambda x : \alpha.M : \beta) : \alpha \rightarrow \beta$.

A consequence of Church's typing system is that there is no longer a single identity function represented by the equivalence class that includes $\lambda x.x$, $\lambda y.y$, $\lambda z.z$, ... Instead, for each typed variable $x : \alpha$, there is an identity function $\lambda x : \alpha.x : \alpha$ and if the types α and β are distinct, then $\lambda x : \alpha.x : \alpha$ and $\lambda y : \beta.y : \beta$ are distinct identity functions: they act on distinct types. This usage accords with the definition of functions in algebra and category theory, where there is a particular identity function 1_A for every set or category A, but no general identity function that acts on any object whatsoever. But it conflicts with the intuition that such a general operation is a reasonable one.

A second consequence of Church's typing system is that self-application is impossible. For any typed λ-term $f : \alpha$, there can be no term $(f : \alpha f : \alpha)$, because the type restrictions imposed on the formation of applications require that in the first occurrence of $f : \alpha$, α be a type of the form $\alpha \rightarrow \beta$. But as we have defined types, this is impossible.

As a result of these restrictions, however, the system of λ-terms with Church-typing are 'strongly normalizing': every term has a β-normal form and every sequence of β-reductions starting with a given term M terminates with the normal form of M after a finite number of steps.

As we will see below, Montague's celebrated system of Intensional Logic is an extension of Church's typing system.

Curry Typing

Church's type system assigns a fixed type to every atom. And the type requirements imposed on the components of well-formed complex types preclude the formation of self-application types. Curry proposed an alternative (clearly set forth in Hindley, 1997), in which the set of terms is the same as in the general (type-free) system. Some of these terms are typable, others are not. Types are assigned to terms by a system of 'type-inference' stated over 'sequents' of the form $\Gamma \mapsto M : \tau$, where Γ is a set of type-declarations of the form $x : \alpha$ (associating an atom x with a type α), and $M : \tau$ pairs a term M with a type τ. The antecedent Γ is called a 'context.' And two contexts Γ_1 and Γ_2 are said to be 'consistent' when their union does not contain both $x : \alpha$ and $x : \beta$ with $\alpha \neq \beta$. We write $\Gamma - x$ to denote the result of removing any element of the form $x : \alpha$ (if there is one).

Curry's type assignment system starts with an infinite set of axioms: for any variable x and type α, the sequent $\{x : \alpha\} \mapsto x : \alpha$ is an axiom. Then there are two inference rules, for application and abstraction, respectively. The application rule states that if $\Gamma_1 \mapsto M : \alpha \rightarrow \beta$ and $\Gamma_2 \mapsto N : \alpha$, then $\Gamma_1 \cup \Gamma_2 \mapsto (MN) : \beta$ if $\Gamma_1 \cup \Gamma_2$ is consistent. The abstraction rule states that if $\Gamma \mapsto M : \beta$, then $\Gamma - x \mapsto \lambda x.M : \alpha \rightarrow \beta$, if Γ is consistent with $\{x : \alpha\}$.

These inference rules depend on properties of the contexts involved. But we are particularly interested

in type assignments that make no particular assumptions – that is, the empty context. For example, no particular assumptions are needed to prove that the term $\lambda x.x$ can be assigned any type of the form $\alpha \rightarrow \alpha$: we start with the conclusion of the desired proof, which takes the form $\emptyset \mapsto \lambda x.x : \alpha \rightarrow \alpha$, and this sequent can be proved using the abstraction rule from the sequent $x : \alpha \mapsto x : \alpha$, which is itself an axiom. To prove that the application of the identity function to itself is typable, we start with the sequent $\emptyset \mapsto (\lambda x.x)\ (\lambda x.x) : \alpha \rightarrow \alpha$, which is provable if we can prove both $\emptyset \mapsto \lambda x.x : (\alpha \rightarrow \alpha) \rightarrow (\alpha \rightarrow \alpha)$ and $\emptyset \mapsto \lambda x.x\alpha \rightarrow \alpha$ (where the empty antecedents are clearly consistent). But we've just seen how to carry out these two sub-proofs – in one of them, the variable x is associated with the type α; in the other, the variable x is associated with the type $(\alpha \rightarrow \alpha) \rightarrow (\alpha \rightarrow \alpha)$.

On the other hand, the term $\lambda x.xx$ is not typable at all. If it were, we could prove it by proving $\emptyset \mapsto \lambda x.xx : \alpha \rightarrow \beta$, which is provable if it is provable that $\{x : \alpha\} \mapsto xx : \beta$. And this is provable if we can find consistent contexts Γ_1 and Γ_2, with $x : \alpha \rightarrow \beta$ in Γ_1 and $x : \alpha$ in Γ_2. But this is impossible: any solution of the final requirement is inconsistent, since it requires that x be associated with distinct types. This shows that not every type-free λ-term is typable.

Any term that is well-typed in Church's system is typable in Curry's system of type assignment. And to every way of typing a term in Curry's system, there is a corresponding Church-typed term. A basic difference, however, is that Curry's system allows a single term to be typed in more than one way. This is the essential property of *polymorphic type systems*, which have played an increasingly important role in the semantics of programming languages. For example, for important practical reasons, integers (type int) and real numbers (type float) are distinct types in many programming languages, but we would like to be able to combine integers with reals in arithmetical operations (accommodated by shifting objects of type int to corresponding objects of type float) and then to print the result (conversion again to type string) in decimal notation – distinct from the underlying representation of either type of number in the machine language. There is a direct analogy here to what has been called 'coercion' in natural language semantics, involving shifts between mass and count interpretations of nouns or various aspectual categories. From a linguistic perspective, Curry's system – which is not rigid on the assignment of types to underlying constants but does demand overall consistency – is closer to natural language analysis than Church's system, because in natural language (roughly speaking) global consistency is more highly valued than rigid adherence to local values.

Resource-sensitivity

In the constant function $\lambda y.x$ (where we take y and x to be distinct atoms), there is no free occurrence of y in x. In such a case, when the variable associated with an abstraction operator has no free occurrences within its scope, the abstraction is said to be 'vacuous.' In the identity function $\lambda y.y$, the abstraction operator λy binds exactly one occurrence of the associated variable y within its scope. A case of this kind is said to be 'linear.' There is no standard term that applies to the case in which an abstraction operator binds more than one occurrence of the associated variable within its scope, as with the combinator S, which is expressed in the λ-calculus by a term of the form $\lambda x.\lambda y.\lambda z.xz(yz)$, where the abstraction operator λz binds two occurrences of the associated variable z within its scope. These same distinctions show up in a wide variety of contexts and data structures, from the differentiation of 'sets,' 'multisets,' and 'sequences,' to the study of 'relevance logic' and 'linear logic,' to graph theory (in the distinction between 'graphs,' which allow at most one edge between nodes, and 'multigraphs,' which allow distinct edges between a single pair of nodes), and probability theory (in the distinction between 'sampling with replacement' and 'sampling without replacement'). Interest in subsystems of λ-terms or combinators weaker than the full system has grown increasingly and escalated sharply in recent years. (For further discussion, see Morrill and Carpenter, 1990; van Benthem, 1995; Moortgat, 1997 and Oehrle, 2003. Steedman's Combinatory Categorial Grammar 2000) is based on a resource-sensitive fragment of combinatory logic.)

Church observed that the application $(\lambda y.z)$ $((\lambda x.xx)\ (\lambda x.xx))$ is unusual in having a β-normal form (namely, z) and allowing a non-terminating series of β-reductions (namely, the series that arises by always choosing to reduce on the subterms $(\lambda x.xx)$ $(\lambda x.xx)$, which reduces to itself). Such a case, where a term has a normal form but has a subterm with no normal form, arises only if vacuous abstraction is allowed.

Resource-sensitivity is not restricted to questions of occurrence or multiplicities (as in the differentiation of vacuous, linear, and multilinear binding just discussed), but also involves the equivalence or differentiation of structural relations, such as 'associativity' and 'order.' These properties are universal for binary operations, in the sense that any binary operation can be characterized in part by its treatment of resources. Not surprisingly, the resource-sensitive perspective that has one of its sources in the study of λ-terms has many applications to linguistic analysis.

Linguistic Applications of the λ-calculus

The λ-calculus is applicable to any system in which the notions of function or operation play a central role. In the case of natural language analysis, there are two basic perspectives one may take, in view of the fact that language is a 'multi-dimensional' phenomenon in which a variety of subsystems – segmental structure, syntactic form, intonational structure, semantic and pragmatic interpretation – play interactive and mutually-constraining roles. In such a case, one may consider the applicability of the λ-calculus to the individual subsystems, or examine how it can be used to regulate the interaction of these subsystems. In the exposition and examples to follow, we freely shift between these two perspectives.

The Extensional Subsystem of Montague's PTQ

A number of important questions regarding syntactic categories, semantic types, and semantic interpretation crystallized around the publication of a series of papers in the late 1960s and early 1970s by Richard Montague, which showed how a number of difficult problems in natural language semantics can be modeled (to a first approximation) in a possible-worlds setting. (Montague's linguistic work is contained in Montague (1974).) Before considering the full intensional system, we first examine its extensional subsystem, which is a Church-typed form of higher order λ-terms.

The extensional type system is built up from atomic types e ('entity') and t ('truth-value') and is closed under a binary operation $\langle -, - \rangle$ (which plays the same role here as the binary operation $\rightarrow$ introduced above in the discussion of Church's type system). The language associated with these types is the smallest set containing: 1. constants C_a and variables V_a for each type a; 2. the λ-term $\lambda x.\alpha$ of type $\langle b, a\rangle$, whenever x is in V_b and α is an expression of type a; 3. the application $\alpha(\beta)$ of type a, whenever α is an expression of type $\langle b, a\rangle$ and β is a term of type b; 4. the equality $\alpha = \beta$ of type t, whenever α and β are of the same type; 5. the standard truth-functional operations from propositional logic ($\neg -$, $- \vee -$; $- \wedge -$; $- \rightarrow -$; $- \leftrightarrow -$), which combine with one or more expressions of type t to form an expression of type t; 6. the (higher-order) quantifiers $\bigvee$ and $\bigwedge$ which combine with a variable u (of any type) and an expression ϕ of type t to make the existential quantification $\bigvee u\phi$ and the universal quantification $\bigwedge u\phi$.

To interpret this language, we need a nonempty set E of entities, the set $\{0,1\}$ of truth-values (0 for false, 1 for true), and we need to specify, for each type a, the set D_a of possible interpretations of expressions of type a: $D_e = E$, $D_t = \{0,1\}$, and $D_{\langle b,\ a\rangle}$ is the set of function with domain D_b and codomain D_a. In addition to these constraints, we need a function F that assigns to each constant c of type a an interpretation in D_a and a function g that assigns to each variable u of type a an interpretation in D_a. Looking back to the extensional language defined above, we can interpret it in the following way: (1) If c is a constant, its interpretation is $F(c)$ and if υ is a variable, its interpretation is $g(\upsilon)$. (2) The abstraction $\lambda x.\alpha$ of type $\langle b, a\rangle$ is interpreted as a function $h : D_b \rightarrow D_a$ from D_b to D_a; this function acts on an argument b in D_b and associates it to the entity in D_a which is the interpretation of α that differs possibly from its interpretation relative to F (which assigns interpretations to the constants in α) and the assignment function g (which interprets the free variables α) only by fixing the value of the variable x in α to the argument b. (This is a model-theoretic analogue of β-reduction: whereas we think of β-reduction as manipulating symbols 'syntactically,' by replacing one symbol with another in the course of carrying out substitution, the model-theoretic analogue simply identifies semantic values); (3) given α of type $\langle b, a\rangle$, interpreted as a function α' from D_b to D_a and given β of type b with interpretation β' in D_b, the interpretation of the application $\alpha(\beta)$ is simply the application of the function α' to the argument β', which yields $\alpha'(\beta')$ of type D_a; the remainder of the clauses are standard.

We now introduce an 'object-language,' whose elements are interpreted categorized expressions. To indicate that an expression **e** of the object-language is associated with interpretation i and type T, we write **e**:i:T. Each syntactic category C is associated with a semantic type $T(C)$; and each object-language expression belonging to C will be interpreted as an object of the semantic type $T(C)$. We assign to each 'lexical' object-language expression **e** a category and an interpretation i consistent with its category (and indicate the association between expression and interpretation by writing **e**:i). Each rule that combines expressions $e_1, \ldots, e_k$ into a complex expression $E(e_1, \ldots, e_k)$, also assigns an interpretation E' $(e'_1, \ldots, e'_1)$ based on the interpretations $e'_1, \ldots, e'_k$ of the syntactic components $e_1, \ldots, e_k$. Finally, to make the exercise more interesting, we assume that the set of categories is 'structured': we begin with some 'atomic categories' (atomic for purposes here, at least); then we close the set of categories under a binary operation $-/-$, so that whenever A and B are categories associated with semantic types $T(A)$ and $T(B)$, respectively, then A/B is a category associated with the semantic type $\langle T(B), T(A)\rangle$. As basic categories, we choose: S ('sentence'), with $T(S) = t$; Nm ('name'), with $T(Nm) = e$; CN ('common noun'), with $T(CN) = \langle e, t\rangle$.

We assume no lexical element of the category S, but we admit such lexical names as $jan{:}j^e{:}Nm$ and $lee{:}l^e{:}Nm$ (where j^e and l^e are constants of type e) and such lexical common nouns as $teacher{:}tch^{\langle e,t\rangle}{:}CN$ and $student{:}st^{\langle e,t\rangle}{:}CN$. We also assume the existence of lexical elements belonging to various complex categories. For example, we may allow the lexical element $sneezes{:}snz^{\langle e,t\rangle}{:}S/Nm$, the lexical element $everyone{:}\lambda P^{\langle e,t\rangle}\forall x^e.P(x){:}S/(S/Nm)$, and the lexical element $every{:}\lambda Q^{\langle e,t\rangle}\ \lambda P^{\langle e,t\rangle}\ \forall x^e.(Q(x) \rightarrow P(x)){:}(S/(S/Nm))/CN$.

If α is an expression whose syntactic category is of the form A/B and β is an expression whose syntactic category is B, then α and β are compositionally compatible: we know that if it is in fact possible to combine α and β syntactically, then there is available a syntactic category (namely, A) and a compatible interpretation $(\alpha'(\beta'))$ that can be assigned to A. But in Montague's syntactic category system (unlike other forms of Categorial Grammar), the structure of syntactic categories themselves does not determine how two compositionally compatible expressions can combine. As a consequence, it is necessary to state rules of combination for various pairs of syntactic categories. For example, an expression of the form $X{:}P^{\langle e,t\rangle}{:}S/Nm$ and an expression of the form $Y{:}y^e{:}Nm$ can combine to yield an expression of the form $Y\ X{:}P^{\langle e,t\rangle}\ (y^e){:}S$. (Thus, we can construct the categorized interpreted expression $jan\ sneezes{:}snz^{\langle e,t\rangle}\ (j^e){:}S$.) To make sentences with quantificational subjects, we need a similar, but different, rule: an expression of the form $Q{:}\mathrm{Q}^{\langle\langle e,t\rangle,t\rangle}{:}S/(S/Nm)$ and an expression of the form $X{:}P^{\langle e,t\rangle}{:}S/Nm$ can combine to form an expression of the form $Q\ X{:}\mathrm{Q}^{\langle\langle e,t\rangle,t\rangle}\ (P^{\langle e,t\rangle}){:}S$. Both these rules combine an expression with syntactic category of the form A/B and an expression with syntactic category B, but the two rules cannot be collapsed, since the order of combination differs: in one case, the B-category expression precedes the A/B-category expression, in the other case, it follows. There is a possible simplification which Montague took advantage of: for each expression of the form $X{:}i^e{:}Nm$, there is a corresponding expression of the form $X{:}\lambda P^{\langle e,t\rangle}.P(i^e){:}S/(S/Nm)$. (The transition from Nm to $S/(S/Nm)$ is a special case of what is often referred to as *type-lifting*.) If we combine the type-lifted form $jan{:}\lambda P^{\langle e,t\rangle}.P(j^e){:}S/(S/Nm)$ with $sneezes{:}snz^{\langle e,t\rangle}{:}S/Nm$ by an application – this time with a second order argument S/Nm, rather than with an atomic argument – the result is $jan\ sneezes{:}(\lambda P^{\langle e,t\rangle}.P(j^e))snz^{\langle e,t\rangle}{:}S$. The first and the third dimensions are the same as those we obtained earlier, on the assumption that *jan* was typed Nm, and a simple calculation using the interpretive rules for abstraction and application shows that the medial term has the same value in both cases. Moreover, by treating all names as belonging to the higher category $S/(S/Nm)$, rather than Nm, we can generalize the rule of application so that any expression of the form $X{:}\xi{:}A/B$ can combine with any expression of the form $Y{:}\eta{:}B$ to form the expression of the form $X\ Y{:}\xi\ (\eta){:}A$. For example, given the lexical assumptions above, two such applications yield an analysis of *every teacher sneezes*:...:S, whose middle term we leave for the reader to supply. The application of several β-reductions will show the equivalence of this term with the normal form $\forall x^e.(tch^{\langle e,t\rangle}\ (x^e) \rightarrow snz^{\langle e,t\rangle}\ (x^e))$.

To extend this analysis to transitive verbs, one must find a way to deal with both names and quantifiers in object position. This involves two questions: is it possible to transfer the syntactic category and semantic type of quantifiers in subject position to quantifiers in object position? How is it possible to introduce scope ambiguities which arise when quantifiers are in both subject and object position?

Montague dealt with the first question in effect by appealing to a form of type-lifting. Instead of assigning transitive verbs the type $(S/Nm)/Nm$ and the corresponding semantic type $\langle e, \langle e,t\rangle\rangle$, he assumed that each (extensional) transitive verb (such as *respects*) is associated with a corresponding constant (such as $respect_*^{\langle e,\langle e,t\rangle\rangle}$) of type $\langle e, \langle e,t\rangle\rangle$, but the verb itself takes a quantifier argument and the interpretation of the quantifier argument is applied to the object argument of the verb. Thus, we have such lexical assumptions as *respects*: $\lambda\mathrm{Q}.\lambda x.\mathrm{Q}\lambda y.\ (respect_*(y)(x)){:}(S/Nm))/(S/(S/Nm))$. We can combine *respects* with *every teacher* to form the verb phrase *respects every teacher* of syntactic category S/Nm, whose semantic value is equivalent to the β-normal form expression $\lambda x.(\forall y^e.(tch(y) \rightarrow respect_*\ (y)(x)))$.

This use of type-lifting reconciles the monadic quantifier type with nonsubject syntactic positions. But if multiple quantifiers appear in a sentence, their relative scope depends completely (on this account so far) on the order of combination: scope is inverse to the order of combination, with the earliest quantifier added having the narrowest scope and the last quantifier added the broadest scope. Montague offered an account of scope as well, an account based on the role of variables in such systems as first-order logic.

Suppose we admit the lexical element $she_1{:}\lambda P^{\langle e,t\rangle}.(P(x_1^e)){:}S/(S/Nm)$. And suppose we allow a quantifier $Q{:}\mathrm{Q}{:}S/(S/Nm)$ to combine with a sentence $sent{:}\phi{:}S$ to form the result $sent[Q/she]{:}\mathrm{Q}(\lambda x_1.\phi){:}S$. In the first dimension, $sent[Q/she]$ is defined as the result of replacing the first occurrence of *she* in *sent* (if there is one) with Q and replacing subsequent occurrences of *she* with appropriate pronouns; in the second dimension, we apply the interpretation

of the quantifier to the result of applying the abstraction operator λx_1 to the interpretation of the sentential argument. For our purposes, the interesting case arises when the argument sentence is built up from the element she_1, as is the case for *some teacher respects* she_1:$\exists x(tchr(x) \wedge respect_* (x_1) (x))$:$S$. If we now combine this expression with the quantifier *every student*:$\lambda Q.\forall z.(st(z) \rightarrow Q(z))$:$S/(S/Nm)$, the resulting sentence has the form *some teacher respects every student* and its interpretation (relative to this analysis) is equivalent to $\forall z.(st(z) \rightarrow \exists x(tch(x) \wedge respect_*(z) (x)))$, with the universal quantifier taking wide scope over the existential quantifier. When the sentential argument contains multiple occurrences of she_1, Montague's account provides a treatment of (sentence-internal) bound anaphora – a treatment that is rather rudimentary in terms of empirical coverage, but completely rigorous in terms of its model-theoretic foundations. As stated, this mode of combination is resource-insensitive, since it is compatible with a vacuous form of quantifying-in as well. In this account, the form she_1 is critical both for dealing with scope ambiguities and for dealing with anaphora. Its role is quite analogous to the individual variables in standard presentations of first-order logic (or indeed, in the standard presentation of λ-terms above). In dealing with more complex sentences than the extremely simple ones considered here, more than one variable is needed. In order to ensure that there would always be enough variables, Montague admitted denumerably many of them (she_1, ..., she_n, ..., and for each distinct variable, his fragments contain a distinct rule of quantifying-in (since the quantifying in rule must link the form of the syntactic variable and its interpretation with the abstraction operator used in the statement of the interpretation of the result).

The extensional part of the fragments that Montague introduced are much richer than we have been able to indicate above. They also include a form of relative clauses and treatments of coordination for sentences, verb phrases, and quantifiers. The use of λ-terms makes the interpretive properties of these constructions especially perspicuous. Like the quantifying-in rule, the relative clause rule depends on the variable-like terms she_1, and in fact there is a family of relativization rules, one for each variable, just as in the case of the quantifying-in rule. The n-th such rule combines a common noun ζ:ζ':CN and a sentence ϕ:ϕ':S to form a CN of the form $\zeta\phi$: $\lambda x_n.\ (\zeta'\ (x_n) \wedge \phi')$: CN. In the first dimension, $\zeta\phi$ is the result of transforming occurrences of she_n in ϕ in ways that we shall gloss over. In the second dimension, the abstraction operator λx_n binds an occurrence of x_n passed to ζ' as an argument, as well as any occurrences of x_n that might be free in ϕ'.

The treatment of verb-phrase and quantifier coordination relies on a standard fact from lattice-theory: if L is a lattice and X is any non-empty set, then the function-set L^X of all functions from X to L may be regarded as a lattice as well, with lattice-operations defined *pointwise*. This term means that if f and g are functions from X to L, we define their meet $f \wedge g$ as that function from X to L which maps x in X to $f(x) \wedge_L g(x)$ (where $\wedge_L$ is the meet operator in the lattice L). The λ-term representation of this function is transparent: $\lambda x.\ (f(x) \wedge_L g(x))$. In Montague's application of this fact to natural language coordination, we start with the lattice of truth values – that is, the set $\{0, 1\}$ whose meet operator is the conjunction $\wedge$ and whose join operator is the disjunction operator $\vee$. In addition, we have the non-empty set E of entities, and the set of functions from E to $\{0, 1\}$ is in fact the set $D_{\langle e,t\rangle}$, the set of possible denotations for one-place predicates. Given two one-place predicates γ:γ':S/Nm and δ:δ':S/Nm, we can form their conjunction γ *and* δ:$\lambda x.\ (\gamma'(x) \wedge \delta'\ (x))$:$S/Nm$ and their disjunction γ *or* δ:$\lambda x.\ (\gamma'(x) \vee \delta'(x))$:$S/Nm$. The extension to quantifiers is simply the application of the same technique to the function-set of all functions from one place predicates to the lattice of truth values. The only difference in the semantic dimension – where conjunction, say, takes the form $\lambda P^{\langle e,t\rangle}.\ (Q_1(P) \wedge Q_2(P))$ – is that the abstraction operator involves a higher-order type. Montague showed that coordination and quantification interact in semantically interesting ways. For example, it is possible to derive the intuitive non-equivalence of such pairs of sentences as *a man or a woman found every fish* and *a man found every fish or a woman found every fish*. Since Montague's work, the approach he pioneered has been applied to a much broader range of coordinate structures, including a variety of forms of so-called 'nonconstituent conjunction' – expressions whose properties are at odds with standard phrase-structure accounts, but compatible with functionally-based accounts of syntactic composition, in the sense that it is not hard to say what such expressions combine with and what the syntactic result of this combination is. See Gazdar (1980), Rooth and Partee (1982), Partee and Rooth (1983), Keenan and Faltz (1985), Steedman (1985, 1990), Dowty (1988), and Oehrle (1987).

To move from this extensional account to an intensional model requires several related changes. First, we enrich the system of semantic types with a new modal type constructor $\langle s, -\rangle$. (The symbol s here is not interpreted and the type constructor is essentially a unary operator rather than a binary one.) Second, we

enrich the associated language by introducing a modal operator $\Box$ for necessity and two tense modalities W (future) and H (past). Each of these modalities combines with an expression of type t to form an expression of type t. Finally, there are two functions that deal with the intensional type constructor $\langle s, -\rangle$: if α is an expression of type a, then $\hat{}\alpha$ ('up α') is an expression of type $\langle s, a\rangle$; and if α is an expression of type $\langle s, a\rangle$, then $\check{}$ ('down α') is an expression of type a.

To interpret this language, we assume not only a set E of entities and the set $\{0, 1\}$, but also a set of possible worlds I and a linearly-ordered set of moments of time J. We define the set $D_{\langle s, a\rangle}$ as the set of functions with domain $I \times J$ and co-domain D_a. For example, an expression of type $\langle s, e\rangle$ will be a function that associates each world-time coordinate $\langle i, j\rangle$ with an individual entity in E, and an expression of type $\langle s, t\rangle$ will be a function that associates each world time pair $\langle i, j\rangle$ with a truth value. For any constant of type a, we assume that this information is given to us, as a function that acts on world-time coordinate pairs – elements of the product $I \times J$ – and yields appropriate values at any such coordinate. We record how it is given in terms of a function F that maps constants of type a to functions from $I \times J$ to D_a. Let g be an *assignment function* that associates any variable u of any type (type a, say), with a value in D_a. (Thus, if u is a variable of type e, then $g(e)$ will be an element of E, not a function from world-time coordinates to E).

We now define the value an expression α takes at an arbitrary world-time coordinate $\langle i, j\rangle$. If α is a constant of type a, then $F(\alpha)$ is a function from $I \times J$ to the set of possible denotations of a, and applying $F(\alpha)$ to the worldtime coordinates $\langle i, j\rangle$ yields an element of D_a. The clauses for abstraction, application, equality, and the propositional and first-order operators are the same (though the quantifiers make essential use of the assignment function g and alternatives to it related to the variable involved). The clauses for the modal operators $\Box$, W, and H fix a value relative to one world-time coordinate relative to the value their argument takes at alternative world-time coordinates. For example, we define the value of the necessitation $\Box\phi$ at a given world-time coordinate $\langle i, j\rangle$ to be true if the value of ϕ is true at every world time coordinate, and false otherwise; and we define the value of the 'past-tensification' $H\phi$ at a given world-time coordinate $\langle i, j\rangle$ to be true if there is a time $j' < j$ such that ϕ is true at the coordinates $\langle i, j'\rangle$, and false otherwise. Finally, the value of α of type $\langle s, a\rangle$ at a given world-time coordinate $\langle w, t\rangle$ is taken to be that function h_α with domain $I \times J$ and codomain D_a, such that $h_\alpha(\langle i, j\rangle)$ is the value of α at the world-time coordinates $\langle i, j\rangle$. And the value of $\hat{\alpha}$ (where α is of type $\langle s, a\rangle$), simply applies the function associated with α to the coordinates $\langle i, j\rangle$ of interest.

To adapt our object language to the intensional framework, we introduce one significant change: the basic types Nm and S are still interpreted as elements of E and $\{0, 1\}$, respectively, but the atomic type CN is interpreted as $\langle\langle s, e\rangle, t\rangle$ and, more generally, the interpretation of any functor type of the form A/B is required to belong to the type $\langle\langle s, |A|\rangle, |B|\rangle$, where $|A|$ and $|B|$ are the semantic types associated with the categories A and B, respectively. For example, a one-place predicate belonging to the type S/Nm is to be interpreted as an element of type $\langle\langle s, e\rangle, t\rangle$. And a quantifier is to be interpreted as an element of type $\langle\langle s, \langle\langle s, e\rangle, t\rangle\rangle, t\rangle$. These are not quite compatible, but Montague's rule of application, which combines a quantifier of type $S/(S/Nm)$ and a one-place predicate S/Nm, ensures the semantic well-formedness of the result by applying the interpretation of the quantifier to the intension of the interpretation of the argument. In other cases, Montague introduced expressions 'syncategorematically' without assigning them a syntactic category and only implicitly assigning them a semantic interpretation. For example, the coordinators *and* and *or* are used to make conjunctive and disjunctive sentences (of category t), verb-phrases (of category S/Nm), and quantifiers (of category $S/(S/Nm)$), but they have no syntactic category themselves. (And in this case, it's useful that functors which make sentences associate them with type t, rather than type $\langle s, t\rangle$.)

Montague's syntactic system treats intensional and extensional expressions identically. To distinguish them semantically, Montague introduced a number of 'meaning postulates.' One postulate ensures that proper names are to be interpreted as the same individual across all world-time coordinates. (This fits well with the contrast between the rigid interpretation of names and the nonrigid interpretation of descriptions in such pairs of sentences *If I were Elizabeth II, I would be a Windsor* and *If I were the queen of England, I would be a Windsor*, where we're more likely to accept the first than the second.) The other postulates introduce assumptions which make it possible to deduce the different entailments of extensional and intensional expressions. Consider the interpretations of the extensional one-place predicate *walk* and the intensional one-place predicate *rise*. Each of them is assigned an interpretation of the semantic type $\langle\langle s, e\rangle, t\rangle$. If w is the interpretation of *walk*, however, a postulate ensures that there is an element w_* of the extensional type $\langle e, t\rangle$ with the property that we can define $w(x)$ to hold just in case $w_*(\check{}x)$ holds. In

other words, w is an *intensional lift* of an extensional concept. Properly intensional concepts cannot be reduced to extensional concepts in this way. For further details and analysis, see Montague's original papers, as well as the excellent textbooks by Dowty *et al.* (1981) and Gamut (1991).

The object languages in the various fragments that Montague proposed are rigorously defined, but focus on relatively simple constructions and sometimes introduce devices from the study of formal languages that do not obviously fit. One possible perspective on this work draws on the history of model-theoretic consistency proofs: just as the great 19th century constructions of models of non-Euclidean geometry prove the consistency of geometries in which the parallel postulate fails, Montague's model-theoretic construction of linguistic fragments proves the consistency of languages with intensional constructions, quantification, a limited form of generalized coordination, and modality. At the same time, the rigorous analysis Montague offered of these properties radically improved our understanding of the interactions among these properties in their natural language setting. Montague's functional perspective on composition makes it possible to assign functional types to a broad range of natural language expressions: for example, it is a simple step to move by abstraction from the interpretation of *every teacher* as $\lambda P.\forall x.(tch(x) \rightarrow P(x))$ to an interpretation of *every* itself, as $every{:}\lambda Q.\lambda P.\forall x.(Q(x) \rightarrow P(x)){:}(S/(S/Nm))/CN$. And by expliciting typing quantifiers (rather than treating them syncategorematically, as is the standard syntactical approach in first-order logic), it is natural to ask which elements of this type are actually instantiated in natural language expressions, paving the way for the work on generalized quantifiers by Barwise and Cooper (1981), Keenan and Stavi (1986), van Benthem (1986), Westerstahl (1988), and others in the late 1970s and 1980s, and to the connections between the monotonicity properties of quantifiers and other operators that have played an important role in the analysis of polarity-sensitive expressions. The fact that natural language proper names seem compatible with more than one type led to the investigation of a variety of forms of type-shifting (see van Benthem, 1986; Partee, 1987), leading to the exploration of systems of 'type-inference' and dynamic type-assignment. Finally, Montague's exploration of the relation between a functionally-based syntax and a functionally-based semantics introduced a new paradigm for the study of grammatical composition, one in which grammatical composition can be seen as a multidimensional system of type-inference systems (differentiated by contrasting resource-management regimes), linked abstractly by a common core of shared principles (as in the Curry-Howard correspondence between proofs in intuitionistic implicational logic and λ-terms).

As an example, consider the interaction of syntactic form and semantic interpretation involving infinitival arguments. In general, it is widely assumed that basic syntactic structure has a '*linear*' character. From a functional perspective, this means that it can be modeled perspicuously by using a linear form of reasoning (such as the associative Lambek calculus L or its non-associative variant NL). (In nonfunctional frameworks, the linearity of argument structure has given rise to a range of special purpose *principles*: the θ-criterion of the Government & Binding theory, the Completeness and Coherence principles of LFG.) On the other hand, various infinitival constructions suggest that the interpretations of syntactic arguments are not restricted to a linear resource-management regime, but can be used more liberally. This situation can be modeled directly by pairing a linear functional account of syntactic composition with a multilinear functional account of semantic composition, which we represent here by two systems of λ-terms.

Consider first a verb like *try*. It combines with an *np* and an infinitive to form a sentence, a fact we represent here with the linear implicational type $np \xrightarrow{\otimes} inf \xrightarrow{\otimes} s$. This type does not represent how the properties of the *np* and *inf* arguments contribute to the whole. To represent these, we label this implicational type with two λ-terms. The first involves the interpretive dimension and takes the form $\lambda x^e \lambda P^{\langle e,t\rangle}.try'\,(x, P(x))$. The second is a function involving the dimension of physical form, and the variables ϕ_1 and ϕ_2 range over phonological or orthographical representations: we shall assume it takes the form $\lambda\phi_1.\lambda\phi_2.(\phi_1 tried \phi_2)$. Note that the interpretive term is not linear: the abstraction operator λx^e binds more than free occurrence in its scope. The properties of the two term labels interact with the properties of the type system in the following ways: a *modus ponens* step in the labeled type system combines a structure that is assignable a labeled type of the form $\phi_1 : \sigma_1 : A \xrightarrow{\otimes} B$ with a structure that is assignable a labeled type of the form $\phi_2 : \sigma_2{:}\ A$, and the combination of the two structures is assignable a labeled type of the form $\phi_1(\phi_2) : \sigma_1(\sigma_2) : B$; an 'abstraction step' in the labeled type system allows one to infer that a structure Γ is assignable a labeled type of the form $\lambda\phi.\Phi : \lambda\sigma.\Sigma : A \xrightarrow{\otimes} B$ if the structure consisting of Γ together with the assumption $\phi : \sigma : A$ is assignable a labeled type of the form $\Phi : \Sigma : B$. If we reach a situation in which every upward branch of the proof ends with an 'identity axiom' instance, where the structure on the left and the type on the right are the same, the proof is successful. Structures

like Γ are built up with an operation $\otimes$ that is associative and commutative. In such a system, the labeled types $\lambda\phi_1.\lambda\phi_2.(\phi_1\ tried\ \phi_2) : \lambda x^e.\lambda P^{\langle e,t\rangle}.(Past(try'\ (x,\ P(x)))) : np \underset{\rightarrow}{\otimes} inf \underset{\rightarrow}{\otimes} s$ and $\lambda\phi_2.\lambda\phi_1.(\phi_1 tried \phi_2) : \lambda P^{\langle e,t\rangle}.\lambda x^e.\ (Past(try'\ (x,\ P(x)))) : np \underset{\rightarrow}{\otimes} inf \underset{\rightarrow}{\otimes} s$ are interderivable. In this case, since the types *np* and *inf* are distinct, this means that we can combine the arguments of try in either order, with the same result. (It is also possible to think of the situation as one in which we can combine the arguments in a way that does not depend on the order of application.)

The verb *try* has often been analyzed as a verb whose subject must syntactically control the (missing) subject of the infinitival argument. (On the account offered here, there is no representation of a missing subject of the infinitive: *try* combines directly with an infinitive.) A standard contrast (going back to the insights of Jespersen (1909–1949, 1937)) is to compare the behavior of a verb like try with a 'raising' verb like *seem*. As a first approximation, we might consider the following labeled type adequate for *seemed*. It has the same implicational type as *tried* and an analogous term in the first dimension, but differs in the interpretive dimension: $\lambda\phi_1.\lambda\phi_2.(\phi_1\ seemed\ \phi_2) : \lambda x^e.\lambda P^{\langle e,t\rangle}.\ (Past(seem'\ (P(x)))) : np \underset{\rightarrow}{\otimes} inf \underset{\rightarrow}{\otimes} s$.

There is a better analysis of *seemed*, however, one which accounts for the scope ambiguity observable in sentences with a quantifier in subject position (Jacobson, 1990; Carpenter, 1997; Oehrle, in press). For example, the sentence *Every student seems to be well-prepared* can be construed to mean either that every student seems to have the property that he or she is well-prepared or that it seems that every student is well-prepared. This distinction is directly derivable in the type system described here by assuming that *seemed* combines with a monadic quantifier as its subject, rather than a simple noun phrase. Consider the labeled type $\lambda\phi.(\phi\ seems\ to\ be\ well\text{-}prepared)$: $\lambda Q.(Pres(seem(Q(be\ well\text{-}prepared'))))$:$((np \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s$. This labeled type can combine with a quantifier of type Q:$\lambda P.Q(P)$:$(np \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s$ in this system of type-inference. On the first, the quantifier is the argument and the result (after normalizing the λ-terms) is $Q\ seems\ to\ be\ well\text{-}prepared$: $Pres(seem(Q(be\ well\text{-}prepared')))$. On this analysis, the quantifier has narrow scope with respect to the interpretation of *seem*. On the second analysis, the quantifier is the functor and we must show that the structure labeled by *seems to be well-prepared*, of type $((np \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s$ yields a structure compatible with the argument of the quantifier, namely, of the type $np \underset{\rightarrow}{\otimes} s$. We can derive this result by an abstraction inference, if we can show that the structure built up from *np* and $((np \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s$ yields the type *s*. And we can do this if we can show that the type $(np \underset{\rightarrow}{\otimes} s) \underset{\rightarrow}{\otimes} s$ is derivable from the structure *np*. This is simply the type-lifting rule, which is derivable in this system by abstraction from the structure consisting of $np \underset{\rightarrow}{\otimes} s$ and *np*, which is itself an application. The interpretive term associated with $np \underset{\rightarrow}{\otimes} s$ in this proof is $\lambda x.((\lambda Q.(Presseem(Q(be\ well\text{-}prepared')))(\lambda P.P(x))))$. And in the application of the interpretation of the quantifier to this term, the quantifier outscopes *seem*.

Quantifier scope ambiguities arise in this system without special stipulation. In fact, the type system itself provides four distinct proofs that two quantifiers and a two-place predicate can combine to form a sentence: there are two ways in which the quantifiers can bind the arguments of the predicate and for each of these two ways, two possible scopings. In natural language, the position of the quantifier in the sentence determines which argument it binds. And in the term labeled system described here, the string terms constrain which argument the quantifier binds in exactly the same way. As a result, only the two intuitively available readings are possible. For details, see Oehrle (1994, 1995) and more recent work by Muskens (2003) and de Groote (2001).

Much has happened since Montague's era. Some of the highlights include the application of Montague's basic perspective to the study of generalized coordination (mentioned above), the investigation of branching quantifiers and plural constructions, the development of theories of discourse representation and dynamic forms of Montague Grammar, and new function-based theories of binding and anaphora. Moreover, other forms of type-theory have been investigated as models for linguistic phenomena (see, for example, Chierchia, Partee, and Turner, 1989 and Ranta 1994). In all of these cases, the various forms of the λ-calculus have played a fundamental role.

See also: Categorial Grammars: Deductive Approaches; Montague Semantics; Semantics in Categorial Grammar.

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Peter and Iona got married in 1943. Shortly after they had their first child in 1944, they started their joint work on documenting children's leisure activities, including rhymes, tales, plays, chants, and jokes. Their collaborative efforts resulted in a number of widely recognized scholarly works, all of which were associated with children's folklore. The Opies' most prominent achievement was documenting children's folklore in Britain between the 19th and 20th centuries. Peter and Iona established children's folkloristics as an academic discipline through their cautious research.

The first book *The Oxford dictionary of nursery rhymes* (1951), which was published seven years after Peter and Iona embarked on their research, brings together 550 nursery rhymes (and the later *The Oxford nursery rhyme book* (1955) contains about 800 nursery rhymes and 600 illustrations). Their primary intention in compiling *The Oxford dictionary of nursery rhymes* was "to build up a picture of the surroundings in which the rhymes have thrived, and of the effect they have upon their hearers." Thus, the nursery rhymes are furnished with information on standard texts and variants, the earliest recording of each rhyme, and also illustrations of some possible circumstances of their origins and the changes undergone over the years. One particularly notable feature of *The Oxford dictionary of nursery rhymes* is the consultation of original sources wherever possible; because documentary support has always been sought, the book is known as the first classic scholarly work in folkloristics.

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Opie, Peter (1918–1982) and Iona (b. 1923)

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Optical Imaging

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Background

When light interacts with living tissue, it is scattered, absorbed, and transmitted by molecules and cells. For example, if a lamp emitting white light is pressed against a hand in a dark room, only red light will be observed to be transmitted. This occurs because the shorter-wavelength light at the blue end of the spectrum is scattered and absorbed by the tissue more significantly than longer-wavelength red light. Additionally, physiological changes in the tissue would result in changes of its optical properties. For example, alterations in the volume or oxygenation of the hemoglobin perfusing through the hand would result in a change in the amount of red light being transmitted. This is the basis of pulse oximetry, a practical method for quantitatively monitoring blood oxygenation in patients during surgery. More generally, optical measurements provide a nondestructive means of gathering information about dynamic biochemical and physiological processes in tissues.

It has long been known that the optical properties of neuronal tissue vary as a function of the level of neuronal activity. It was first reported by Hill and Keynes (1949) that invertebrate nerves scatter significantly more white light during increased neuronal activity. In the years subsequent to the Hill and Keynes report, light-scattering measurements have been used to study activity-evoked physiological changes in a variety of *in vitro* and *in vivo* laboratory studies. Since these activity-evoked optical changes can be measured without the use of extrinsic contrast-enhancing agents, they are commonly referred to in the literature as 'intrinsic optical signals' (IOS).

Of all the methods used to measure neuronal activity, IOS methods offer the experimentalist several unique technical advantages. First, IOS techniques are physiologically noninvasive in that they do not require the use of ionizing radiation or contrast-enhancing chemical agents or the insertion of recording electrodes into cells or tissues. Second, since the spatial resolution of IOS measurements is determined by the optics and size of the detector, IOS techniques can measure changes occurring over vastly different spatial scales, from single cells to centimeters of tissue. Third, as a result of continuous improvements in computer and optoelectronic technology, IOS technology is inexpensive in comparison with other functional mapping technology, such as positron–emission tomography (PET) or functional magnetic resonance imaging (fMRI).

In recent years, IOS imaging techniques have been developed to map activity-evoked optical changes in monkey and human cortex. Two categories of IOS brain-mapping techniques are currently being used by investigators. The first involves the use of near-infrared light to map cortical activity in human subjects noninvasively. Although the noninvasiveness of these techniques provides a significant advantage, they suffer from two major drawbacks: (1) the spatial resolution is limited to the theoretical maximum of approximately 0.5 cm, because photons are scattered by the cranium and dura, and (2) because only longer-wavelength light can penetrate bone and dura, noninvasive IOS imaging is limited to near-infrared wavelengths; it is not possible to take advantage of imaging with other wavelengths of the spectrum, which can provide important kinds of physiological information.

The second category of IOS imaging techniques, which is the focus of this article, involves intraoperative mapping of the exposed cortex in neurosurgery patients. Intraoperative IOS mapping has the advantage of being able to provide single-cell resolution at wavelengths throughout the visible and near-infrared spectrum. It allows for the visualization of changes occurring within distinct vascular and tissue compartments with high spatial and temporal resolution. Consequently, intraoperative IOS imaging can yield detailed information about the links between

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neuronal activity and hemodynamic changes that is not obtainable with other functional imaging modalities.

Physiological Principles: What Causes Intrinsic Optical Signals in Cortical Tissue?

The optical scattering and absorption properties of brain tissue are correlated with changes in the level of neuronal activity. Such changes are thought to be generated by a combination of at least three physiological mechanisms: (1) changes in blood volume, (2) changes in blood oxygenation, and (3) blood-independent light-scattering changes resulting from ion fluxes and cell volume changes associated with neuronal activity. This last component – blood-independent light-scattering changes – is the major generator of IOS in bloodless *in vitro* preparations such as live cortical tissue slices. However, *in vivo* IOS is dominated largely by the hemodynamic components of blood oxygenation and blood volume.

The way in which blood volume and blood oxygenation generate activity-dependent optical changes in cortex can be understood by considering their optical properties. As Figure 1 shows, the optical absorbance spectra of deoxygenated hemoglobin (Hb) and oxygenated hemoglobin (HbO_2) vary independently as a function of wavelength.

The upper plot (Figure 1A) shows the optical absorption spectra of Hb and HbO_2 (i.e., how much

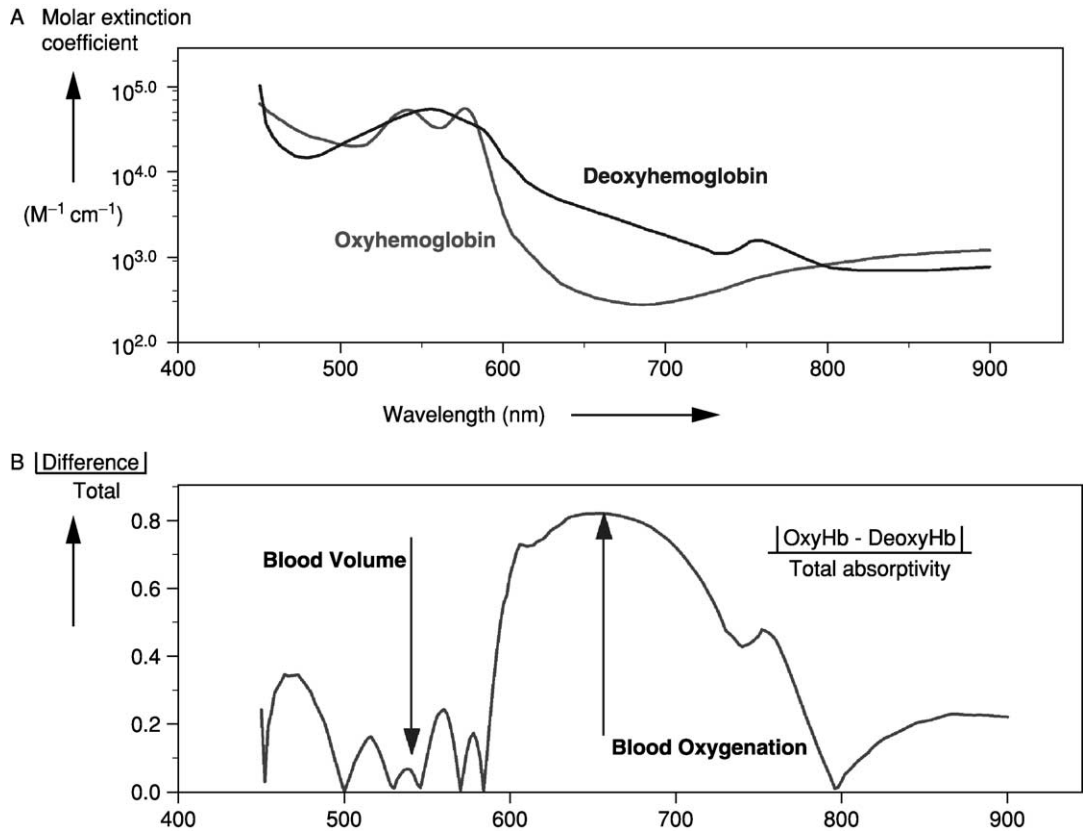

Figure 1 Optical absorption spectra of hemoglobin: Figure 1A shows the optical absorption spectra of oxygenated and deoxygenated hemoglobin as is typically shown in the published literature. It is a logarithmic plot of the molar extinction coefficient versus wavelength: it shows the amount of light absorbed by hemoglobin at optical wavelengths between 450 nm and 900 nm. The essential points to note are that at points where the graphs cross (i.e., are equal), both oxy- and deoxyhemoglobin absorb the same amount of light and hence are indistinguishable. These points are known as 'isobestic points' and represent ideal wavelengths to measure changes in blood volume. Wavelengths at which the graphs are farthest apart represent points at which the oxygenation state of hemoglobin is maximally distinguishable and hence represent wavelengths that are ideal for measuring changes in blood oxygenations. Figure 1B shows data from 1A replotted linearly; here the difference in optical absorption between oxy- and deoxyhemoglobin is plotted against wavelength, making differences in their optical absorptivity more obvious. Isobestic points, such as 535 nm, are those wavelengths where the graphs touch the x-axis (i.e., oxy- and deoxyhemoglobin absorb the same amount of light at those wavelengths). It can be seen that at 660 nm, the difference in absorptivity is maximal. (These figures were generated from data by W. B. Gratzer, 'Tabulated molar extinction coefficient for hemoglobin in water,' Medical Research Council Labs, London, and N. Kollias, 'Tabulated molar extinction coefficient for hemoglobin in water,' Wellman Laboratories, Harvard Medical School, Boston; compiled and published on the Internet by Scott Prahl.)

light Hb and HbO_2 absorb at each different pure wavelength); since they are plotted logarithmically, subtle features are difficult to distinguish. Hence, these data are replotted in Figure 1B as a single graph of the absolute differences between Hb and HbO_2 optical absorbances. Several features of these spectra are important to note. First, there are several 'isobestic points' – wavelengths at which the absorbances of both Hb and HbO_2 are indistinguishable (e.g., 530–535 nm and 800 nm). Since the absorption spectrum of hemoglobin at these wavelengths is independent of its oxygen state, and hence is dependent only on the total number of hemoglobin molecules (consequence of Beer-Lambert law; see Tinoco *et al.*, 1985), isobestic points represent ideal wavelengths to measure blood volume changes independently of blood oxygenation changes. Since Hb and HbO_2 have identical values at isobestic points, wavelengths representing isobestic points are located where their differences in light absorption vanish (i.e., where the lower graph touches the x-axis). Second, there are wavelengths at which Hb and HbO_2 are maximally distinguishable (660 nm and > 900 nm). Consequently, these 'oxygen sensitive' wavelengths are ideal for optically monitoring changes in the oxygen state of blood and are represented as maximal values in the lower plot.

It is well known that two major hemodynamic changes are evoked by increases in neuronal activity: (1) increases in blood volume and (2) increases in blood oxygenation in the veins draining regions of activated cortex. The cascade of events leading to these activity-evoked hemodynamic changes can be summarized as four steps: (1) firing of action potentials induce a release of signaling molecules that cause small surface arterioles to dilate; (2) the dilation of arterioles is strictly localized over regions of increased neuronal activity and underlies the focal increases in blood volume; (3) blood flow increases dramatically because flow is related to the fourth power of vessel diameter; and (4) large increases in blood oxygenation occur in the veins draining activated tissue because the transit time of hemoglobin in the tissue is dramatically reduced by the increased flow. It is known that the activity-induced changes in cerebral flow are facilitated by dilation of the terminal ramifications of the smallest pial arterioles lying on the cortical surface; the larger arterioles and veins do not dilate and do not play a role in the regulation of activity-evoked changes in cerebral flow (Mchedlishvili, 1986; Moskalenko, 1998; Ngai *et al.*, 1988).

In summary, both blood oxygenation and blood volume changes underlie the generation of IOS *in vivo*. Increases in neuronal firing result in highly localized changes in blood volume (restricted to the microscopic pial arterioles) and less highly localized changes in blood oxygenation (restricted to the venous network). By selecting the appropriate wavelengths, one can select specifically for changes in either blood volume or oxygenation. Because blood volume changes are spatially localized to the smallest pial arterioles near firing neurons, this signal is thought to accurately localize activity in populations of neurons. By comparison, blood oxygenation changes occur throughout the venous network; IOS mapping of blood oxygenation provides a less accurate map of activity, but it provides information about oxygen use during neuronal activity.

Comparison of IOS Mapping with Other Imaging Modalities

Since IOS mapping provides high spatial and temporal resolution, it is not only useful for localizing neuronal activity but can also provide visualization of the spread of activity between cortical areas. This ability to allow dynamic visualization of hemodynamic changes with millisecond resolution is unique to IOS imaging. Other techniques that provide information for the mapping of cortical activity include electroencephalography (EEG), fMRI, PET, and single photon emission computed tomography (SPECT). All of these modalities provide either less spatial or less temporal resolution than does intraoperative IOS imaging. EEG is useful mostly for diagnostic purposes but in some cases can provide lateralization and localization information. EEG techniques provide superior temporal resolution; however, even intracranial EEG has limited spatial resolution and can provide misleading information regarding localization. For example, activity might be initiated at a distance away from the recording site and spread rapidly to the EEG electrodes, thus falsely appearing to originate at the EEG electrode (Sperling, 1997). PET and SPECT can provide less accurate spatial and temporal information than can IOS imaging. For example, regional cerebral blood flow assessed using PET currently has a temporal resolution of 30 sec/image and a spatial resolution of $8 \times 8 \times 4.5\,mm^3$, with fluorodeoxyglucose (FDG)-PET (used in glucose metabolism studies) and SPECT having considerably lower resolutions. The slower temporal resolutions of PET and SPECT further reduce their spatial accuracies; during the spread of activity across the cortex, sites where activity is initiated are averaged together with the paths of propagation, thus 'smearing' spatial information (Roland, 1993).

There are several obvious limitations of intraoperative IOS imaging. First, IOS imaging is limited to mapping activity on the cortical surface. A number of schemes have been proposed to use longer-wavelength

light to reconstruct features from deeper structures; however, all of these schemes suffer from dramatically reduced spatial and temporal resolutions. Second, and most obvious, intraoperative IOS imaging is limited to use in the operating room; direct exposure of cortical areas is necessary for IOS mapping.

Intraoperative Optical Imaging of Language Cortex

Haglund *et al.* (1992) first reported the use of optical imaging for studying language cortex. Figure 2Aa shows a grayscale image of tongue and palette sensory cortex, and Figure 2Ba shows the adjacent Broca's area. Intraoperative electrical stimulation mapping of the cortical surface was first used to identify sites of speech arrest (sites 3 and 4 on grayscale images) and palate and tongue sensory cortex (sites 1 and 2, respectively). Optical images were acquired from Broca's area while the patient silently viewed blank slides while naming objects on slides presented every two seconds. Images obtained during this naming exercise (baseline noise is shown in Figure 2Bb, naming-evoked optical changes in Figure 2Bc) show activation of the premotor cortex, while the sites of stimulation-identified speech arrest yielded optical signal in the opposite directions (black areas in Figure 2Bc). Figure 2Ac shows the area that was activated during tongue movement, which is clearly distinct from the area activated during the naming exercise shown in 2Bc. It should be noted that the optical changes in the premotor cortex during the naming exercise coincide with the cortical areas identified by early PET studies on single-word processing. The optical changes were largest in the anatomical area traditionally identified as Broca's area (the posterior portion of the inferior frontal gyrus, or sites 5, 6, and 7 in Figure 2Ba), and not in those areas identified by where electrical stimulation caused speech arrest (sites 3 and 4).

Figure 3 shows imaging of posterior essential languages sites, or Wernicke's areas, that again were identified with electrical stimulation mapping prior to imaging. Imaging during the naming exercises showed optical changes in these regions of temporal lobe. In the patient shown, two essential languages sites were identified in sites 1 and 2 of Figure 3A; they were deemed essential because naming errors were consistently evoked by electrical stimulation of the cortical surface at these sites. A possible secondary language site (site 3) was also identified by the observation of a single naming error that occurred during three electrical stimulation trials at this site. As the surgical removal of cortical tissue anterior to the thick black line (shown in Figure 3A) neared sites 4 and 5, the patient's language deteriorated. Figure 3B shows optical imaging changes acquired during a naming exercise superimposed on the grayscale image of the cortical surface. Before the surgical removal, optical changes were found at the essential sites (1 and 2) and

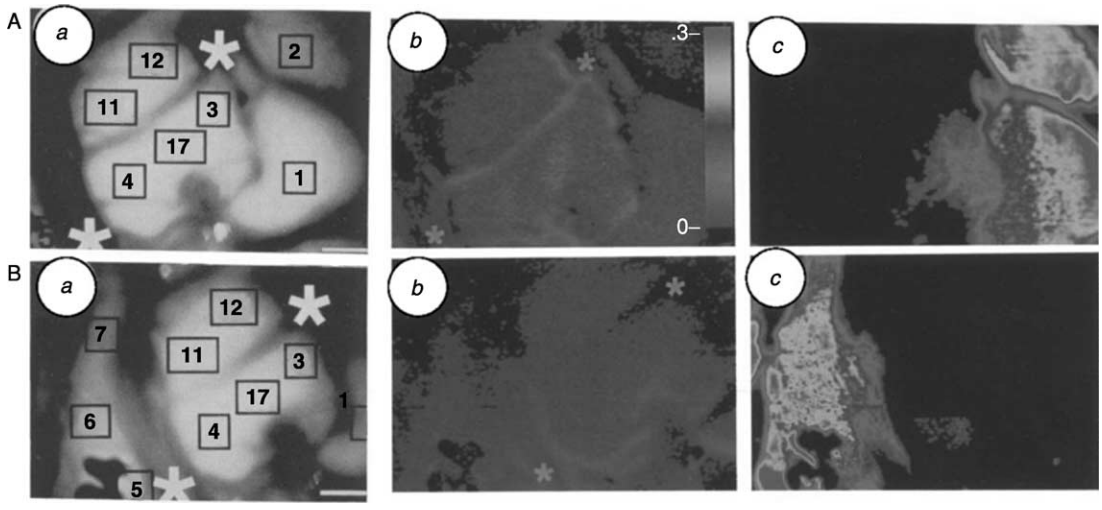

Figure 2 Figure 2A*a* shows the exposed cortical surface of a human patient; anterior, left; posterior, right; superior, top; and Sylvian fissure, bottom. Asterisks on the cortical surface serve as reference points for comparison between A*a* and *b* and B*a* and *b*. Scale bar, 1 cm. Numbered boxes represent sites where electrical cortical stimulation (4 mA) evoked palate tingling (1), tongue tingling (2), speech arrest – Broca's area (3,4), and no response (11, 12, 17, 5). A*b*, control image before tongue movement. A*c*, image collected during tongue movement. B*a*, Cortical surface from the same subject with the image translated slightly forward to incorporate more of the premotor cortex. In other premotor sites (6 and 7), no change in language was found during electrical stimulation of the cortex. The patient viewed blank slides (control) and was then required to name pictures appearing every 2 seconds. B*b* and *c*, images acquired during naming tasks. Control image (B*b*) compared with naming image (B*c*) shows that the maximum optical changes are located in the premotor region. (Figure adapted from Haglund, Ojemann, and Hochman. [1992]. *Nature 358*, 670.)

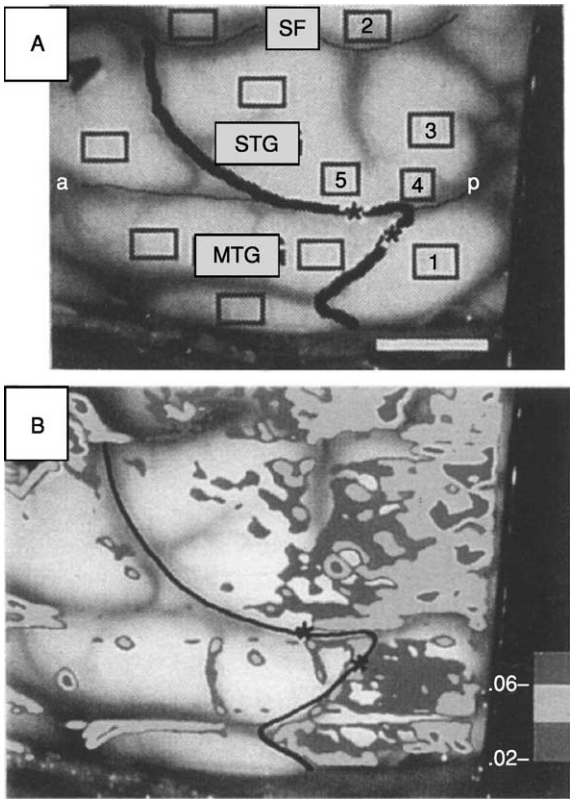

Figure 3 (A) image of the cortical surface; anterior (a), inferior (i), posterior (p), Sylvian fissure (sf), superior temporal gyrus (STG), and middle temporal gyrus (MTG). Scale bar, 1 cm. Sites 1 and 2 were identified as essential for speech. At site 3, one naming error in three stimulation trials was made. Stimulation in all unlabeled boxes did not cause errors in naming slides. Following cortical mapping of language and optical imaging, the temporal lobe cortical tissue to the left of the thick line was surgically removed while the patient's language was tested. As the surgical removal reached the asterisks (sites 4 and 5), language deteriorated. (B) graphic overlay of the optical changes in Wernicke's area during the naming task. The largest optical changes are in the region of essential and secondary language sites and not in the more anterior cortex. In these nonessential regions, the optical changes are restricted to the blood vessels (i.e., the Sylvian fissure vessels in the top left of the figure). (Figure adapted from Haglund, Ojemann, and Hochman. [1992]. *Nature 358*, 670.)

secondary language regions (sites 3–5). The anterior cortical regions, without language disruption during stimulation mapping (unlabeled boxes in Figure 3A), showed no significant optical changes during the naming exercise except along blood vessels. Note that both the essential and secondary language sites (1–5 in Figure 3A) yielded significant optical changes, though the magnitudes of the optical changes in the secondary sites were less than those of the essential language sites. This finding suggests that optical imaging can distinguish and identify essential and secondary language areas that must be preserved during neurosurgical procedures to prevent language deficits.

Conclusions

Because of its high spatial and temporal resolutions and its ability to selectively map changes in either blood volume or blood oxygenation, intraoperative optical imaging has the potential to be a valuable experimental tool to study cortical physiology and functional processing. Recent work with high magnification reported by Haglund and Hochman (2004) shows that IOS mapping can quantitatively measure oxygenation and volume changes occurring within the distinct microvascular compartments during neuronal activation. Such studies may be valuable in shedding further light on the physiological links between neuronal firing and cerebral hemodynamics. Practically, IOS mapping has the potential to be a powerful clinical tool for the localization of essential and secondary language sites and to provide intraoperative monitoring during neurosurgical procedures.

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Optimality-Theoretic Lexical-Functional Grammar

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LFG as the Representational Basis of OT Syntax

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As a constraint-based declarative grammatical formalism, LFG lends itself directly to an OT interpretation (Bresnan, 2000b). A standard LFG analysis relates a functional structure (f-structure), which encodes information about the functional relations between the parts, information such as what is the subject and what is the predicate, what agreement features are present, and so on, with a constituent structure (c-structure), the overt expression of that functional information, which is a phrase structure tree encoding phrasal dominance and precedence relations.

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In OT-LFG, the INPUT is taken to be an underspecified f-structure that represents the main grammatical information that a given sentence expresses, but without any representation of surface (and therefore language-specific) features of expression. As described above, f-structures have the right properties for this role, being representations of language-invariant grammatical information, especially once morphological information is properly factored out (Frank and Zaenen, 2002). For example, the INPUT representation of a transitive clause would include the predicate, its argument structure, semantic information about the arguments of the predicate, and tense and aspect information (cf. (1)).

The OUTPUT candidates are pairs of c-structure/f-structure pairs; (1) shows the general architecture of input-output relations in OT-LFG, based on Bresnan (2000a: 26):

(1) INPUT OUTPUT CANDIDATES

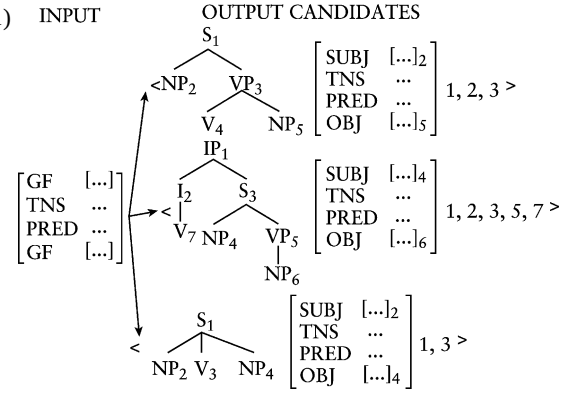

For simplicity, just three potential candidates are shown, each having an f-structure that is subsumed by the INPUT (in other words, each contains the same or more information, but no conflicting information), and each having a different c-structure form. From this point, the evaluation constraints determine an OUTPUT winning candidate relative to an INPUT. The indices on the c-structure nodes are standard LFG notations to indicate how the f-structure information of that node participates in the information carried by the whole clause.

The constraints for evaluation in OT fall into two types:

(2a) Faithfulness constraints, which prefer the output(s) that most closely represent the INPUT information.

(2b) Structural markedness constraints, which favor or disfavor certain types of structure.

Kuhn (2001, 2003) has proposed that the f-structure of the OUTPUT must be subsumed by that of the INPUT. Hence, a candidate OUTPUT with only one GF, say, a SUBJ, would not be a candidate for the INPUT in (1), for the INPUT requires two GFs. Note, though, that the INPUT does not specify which argument is subject and which is object: this is a matter for individual languages to choose, in their candidate evaluation (Aissen 1999; Sells 2001a; Asudeh 2001).

The faithfulness relations of OT-LFG hold between the two parts of each OUTPUT candidate: roughly, semantic faithfulness must hold from the c-structure to the f-structure (these would be OT's DEP constraints), and expressive faithfulness must hold from the f-structure to the c-structure (MAX constraints). The way that MAX and DEP constraints work can be illustrated using a familiar case, namely that of '*do*-insertion' in English, as in (3a), with the f-structure in (3b). Following the analysis of *do* proposed in Grimshaw (1997), and updated in the OT-LFG setting by Bresnan (2000b) and Kuhn (2001, 2003), the PRED information will be as shown in (3c); but this information is not represented in the f-structure when *do* is used as a dummy verb. In other words, the dummy use of *do* is unfaithful to the PRED information: semantically-based information associated with the word in c-structure is not matched in the f-structure. The information fails to flow from c-structure to f-structure, which is a DEP violation in Kuhn's proposal. On the other hand, the morphological inflection on *did* can and will express the TENSE PAST information in the INPUT. Intuitively, this information (correctly) flows from f-structure to c-structure, as satisfaction of a MAX constraint.

(3a) Manny did not sleep.

(3b) $\begin{bmatrix} \text{SUBJ} & [\text{PRED 'Manny'}] \\ \text{PRED} & \text{'sleep . . .'} \\ \text{TENSE} & \text{PAST} \\ \text{POL} & \text{NEG} \end{bmatrix}$

(3c) *did*	V, (↑ TENSE) = PAST	used in b.: satisfaction of MAX
	(↑ PRED) = 'do < *x* >'	not used in b.: violation of DEP

Although the second line of (3c) contains information that does not appear in the f-structure, and hence represents unfaithfulness, the use of dummy *do* is necessitated by a higher ranking constraint on English syntax, to the effect that requires negation to be expressed in construction with an overt (auxiliary) verb in INFL (cf. NEG-TO-I in Bresnan [2000b; 368ff]).

The structural markedness constraints of OT-LFG penalize or favor different kinds of structure, from affixes on words to the positions of particular elements in complex syntactic structures, and include alignment

constraints (see the section Linear Order). In other words, markedness constraints are evaluated with respect to the c-structure part of each candidate. For example, a high-ranking constraint penalizing the functional category IP, or alternatively its head I, would eliminate the middle candidate in (1), rooted in IP.

Many aspects of surface syntactic variation across and within languages are correlated with discourse or contextual features, which are arguably not directly represented in f-structure. For example, the expression of topic and focus leads to surface variation in some languages in the form of scrambling or null expression (zero pronouns), and this information has to be represented. Such 'Information Structure' properties, or more basic properties such as newness or prominence (Vallduví, 1992) have figured widely in OT analyses (Choi, 1999, 2001; Lee, 2001, 2003; Morimoto, 2000).

In addition to information structure, lexical semantic properties, expressed as part of argument structure, may also be considered in the INPUT, in those cases where it is relevant. Morphosyntactic expression may be sensitive to such Proto-Agent and Proto-Patient properties of volitionality, causality, sentience and affectedness, as well as other thematic properties of arguments, leading to different surface expressions across languages, whether those differences are manifest through surface order, grammatical functions, case morphology, head-marking agreement, or any other morphosyntactic device (Asudeh, 2001; Lee, 2001; Sharma, 2001).

In closing this introductory section, I would point out that in comparison to other styles of OT syntax, based on the Minimalist syntax model of Chomsky (1995) and involving a serial derivation of each candidate, such as the 'derivation-and-evaluation' model (Broekhuis and Dekkers, 2000; Broekhuis, 2000), or the 'local optimization' model (Heck and Müller, 2000; Müller, 2001), the OT-LFG model of syntax is a much purer instantiation of the original OT conception: a constraint-based direct evaluation of direct INPUT-OUTPUT relations. Additionally, the declarative nature of the system, and the fact that faithfulness constraints relate the c- and f-structure parts of each candidate, means that there are no ill-formed representations or derivations, in distinction to typical OT analyses based on Minimalist syntax. For example, it is assumed that an 'operator' such as a *wh*-phrase must move to the specifier position of a functional head, to check the *wh*-feature (Chomsky, 1995). Adopting constraints from Grimshaw (1997), such *wh*-movement arises from a ranking OP-SPEC $\gg$ STAY, where the latter constraint forbids movement. A *wh-in-situ* language would have the ranking STAY $\gg$ OP-SPEC (Grimshaw, 1997: 404). In such languages, the *wh*-feature would simply remain unchecked in the derivation. In the OT-LFG model, we might posit exactly the f-structure for a *wh*-movement and a *wh-in-situ* example, associated with different c-structures. Each structure would be independently well-formed; what would differ would be the profile of faithfulness and markedness constraints relating f- and c-structures.

Morphology Competes with Syntax

Much work in LFG and OT-LFG has investigated in what ways morphological and syntactic structures carry the same kinds of information, summarized in the phrase 'morphology competes with syntax' (Bresnan, 1998: 86). I will use this theme to organize my discussion of the main research areas that have been explored in OT-LFG.

Harmonic Alignment

One key idea that has been developed in OT syntax is the role of Harmonic Alignment: various scales of different kinds of markedness align with each other to express 'regions' of markedness in grammars, which in turn can generate OT markedness constraints, using the formal mechanism of Harmonic Alignment from Prince and Smolensky (1993). Harmonic alignment also directly provides an account of 'markedness reversal,' the situation where what is marked for one type of element (say, subjects) is unmarked for another (say, objects). This technique is presented with many insightful and important consequences in Aissen (1999) and Aissen (2003). For example, from the markedness scales in (4), which rank Agent above Patient among the thematic relations, and Subject above Object among the grammatical relations, Harmonic Alignment can be used to generate the OT constraints in (5):

(4a) Ag > Pt
(4b) Su > Ob

(5a) *Pt/Su $\gg$ *Ag/Su
(5b) *Ag/Ob $\gg$ *Pt/Ob

These OT constraints disfavor Patient subjects relative to Agent subjects, and show the converse preference for objects. These constraints must be interspersed with other constraints to generate complex interactions that characterize any real voice systems in natural language. However, the primary force in (5) lies in the relative ranking, which is fixed

in each of (5a)–(5b), due to the mechanism of Harmonic Alignment. These ranked constraint sets correctly characterize the fact that for a two-place predicate with Agent and Patient arguments, the unmarked linking will always be Ag=Su and Pt=Ob, as these linkings violate only the lower constraints in (5).

This is a mere sketch of a much richer system developed by Aissen. Other applications of these ideas to voice systems, more specifically expressed in LFG, can be found in Asudeh (2001) and Sells (2001a) (see also the next subsection).

Markedness in Morphological Expression

There are three different linguistic possibilities for the realization of some abstract category: morphologically unmarked expression, morphologically marked expression, and no expression at all. The simplest OT competition between candidates favors one candidate expression over another, which effectively covers the situation of expression vs. no expression: certain expressions are just impossible, in other words, ungrammatical.

For marked vs. unmarked expression, Aissen (2003) proposed the technique of local conjunction with *Ø, a constraint that disprefers null morphological structure – in other words, a constraint that prefers morphological marking. Let us consider again Active vs. Passive: Passive is a marked morphosyntactic form with respect to Active, and the argument-function linking is also marked, for the subject is not the thematically highest argument. To illustrate the effect of *Ø more directly, let us think of a simple transitive input with Agent and Patient arguments. If the evaluation grammar contains a constraint like *Su/Pat that says 'avoid Patient subjects,' this would block passive-like outputs completely. In contrast, the constraint [*Su/Pat & *Ø] says 'avoid Patient subjects in the absence of morphological marking' and has a different effect on output: it allows passive-like outputs just in case the form has some overt morphological (or morphosyntactic) marking. This is how OT syntax captures the intermediate case of marked expression. Completing the picture, there is a countervailing force in the grammar, the constraint *STRUC, which prefers the absence of (morphological) structure. This allows the requirement of overt marking to be 'turned off' at certain points, as I now illustrate with an example from Sharma (2001), who analyzes patterns of subject and object registration by case clitics in Kashmiri. To choose just one part, there is the familiar phenomenon that subjects in perfective clauses are specially registered (by Ergative case) while subjects in nonperfective clauses are not, and take the default Nominative case. Sharma proposes the constraints in (6a) that reflect the intuition that she develops, that perfective clauses (with subjects) are more marked than imperfective clauses; conjoining these with *Ø gives the constraints in (6b):

(6a) *SU/PERF $\gg$ *SU/IMPERF
(6b) [*SU/PERF & $*Ø_C$] $\gg$ [*SU/IMPERF & $*Ø_C$]

(6b) indicates that it is more marked for perfective clauses with subjects to have no morphosyntactic registration than it is for imperfective clauses: in other words, if any form is marked, it will at least be the one expressing a perfective clause. If the constraint *STRUC is interpolated between the two constraints in (6b), giving the ranking [*SU/PERF &$*Ø_C$] $\gg$ *STRUC $\gg$ [*SU/IMPERF & $*Ø_C$] means that there is special registration of the subject when the verb is in perfective aspect, but otherwise every morphological marker is penalized. So this means that subjects are registered – by clitics, in the case of Kashmiri – in perfective but not imperfective clauses, and as the relative ranking of the two constraints [*SU/PERF & $*Ø_C$] and [*SU/IMPERF & $*Ø_C$] is fixed in that order by Harmonic Alignment, a typology of just three language types emerges: languages in which there is no overt registration of subjects, regardless of clause type (*STRUC is ranked highest), languages like Kashmiri, and languages in which subjects are registered in both clause types (*STRUC is ranked lowest).

Hierarchical Structure

The position of the finite verb in a clause can illustrate what syntactic markedness constraints are like and how they interact. Here I present familiar facts from French and English (Emonds, 1978), two languages with underlying SVO structure, and with very similar clausal syntax. Both languages place the subject in the Specifier of IP (SpecIP). If IP is present, its head I may also be present, and the languages differ in precisely if and how they realize I (Bresnan, 2000a; Sells, 2001b).

English The facts of interest here are summarized in (7), based on the data in (7a)–(7d) which show that the adverbs are adjoined to VP and that only auxiliary verbs are in the pre-adverb position, namely the I head of IP.

(7) English: IP is headed only if an auxiliary verb is present.
(7a) Anna has often read novels.
(7b) ??Anna often has read novels.
(7c) *Anna reads often novels.
(7d) Anna often reads novels.

The structures for the grammatical examples are shown in (8), as annotated LFG c-structures.

(8a)

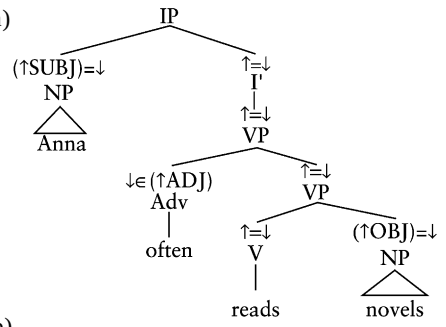

(8b)

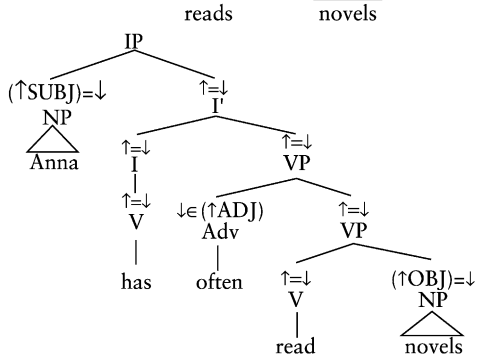

Note that in LFG, V is directly generated in I; it is not moved there (as there is no 'prior' structure). In (8a), IP lacks any head position I, as there is no overt element filling it.

French In French, the facts are slightly different, given in (9), with the associated structures in (10):

(9) French: IP is always headed, by any finite verb.

(9a)	Anna	a	souvent	lu	des	romans.
	Anna	has	often	read	(some)	novels

(9b) *Anna souvent a lu des romans.

(9c)	Anna	lit	souvent	des	romans.
	Anna	reads	often	(some)	novels

(9d) *Anna souvent lit des romans.

(10a)

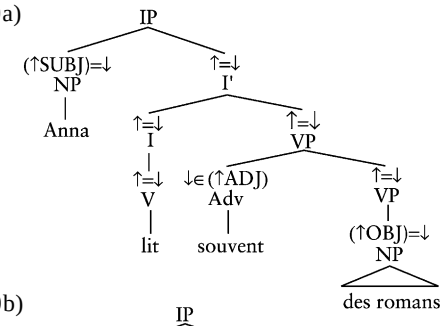

(10b)

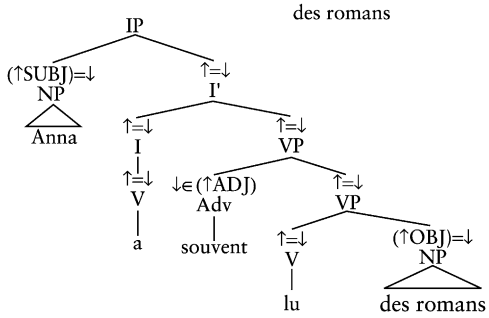

Adopting the analysis of Grimshaw (2000) whereby I and C are categorially similar to V, and are literally 'extended projections' of it (though no CP structures are shown here). I is the first functional projection of V, and C is the second. A formal construction of this in LFG can be found in Bresnan (2001: 100–101); the relevant details are given in (11):

(11) Extended Projections – Grimshaw (2000)
(11a) V = [+V, −N, FØ]
(11b) I = [+V, −N, F1]
(11c) C = [+V, −N, F2]

Once we assume that V can be generated in I or C (as well as the head of VP), we can formulate constraints that favor one type of structure or another, such as those in (12).

(12) Constraints for clausal positions:

(12a) PURE-PROJ: Projections are pure; violated by lexical heads in functional projections. Specifically, V in I = 1 violation; V in C = 2 violations. (Cf. PURE-EP in Grimshaw [1997: 393].)

(12b) OB-HD(FP): a functional projection (IP or CP) should have an obligatory head in c-structure; violated by a headless IP, etc. (from Grimshaw, 1997).

(12c) *Lex-in-I: don't allow a lexical (i.e., nonauxiliary) V in the functional head position I. This was proposed by Grimshaw (1997), and Bresnan (2000b), to account precisely for the behavior of English auxiliaries.

The effects of (12a) could alternatively be captured in a movement framework via the constraint STAY: don't move – in this case, forbidding movement from V to I (Grimshaw, 1997; Vikner, 2001).

Now we look at the constraint interactions. (12a) has the effect that V in I heading IP violates PURE-PROJ, and so OB-HD(FP) ≫ PURE-PROJ will prefer a headed IP to an unheaded IP, and so on. More generally, (12a) prefers lower heads, while (12b) prefers higher heads. The constraint in (12c) bars lexical categories in functional head positions: it is violated by a lexical verb in I, for example, but is not violated by an auxiliary verb in I. For English, this constraint is necessarily ranked quite high, as only auxiliaries may appear in I.

(13a) PURE-PROJ ≫ OB-HD(FP)
(it is more important not to express I [as V] than to give IP a head; so I is never expressed)

(13b) Lex-in-I ≫ OB-HD(FP)
(it is more important not to express I with a lexical category [verb] than to give IP a head; so I is only ever expressed as an auxiliary)

(13c) OB-HD(FP) ≫ PURE-PROJ
(it is more important to give IP a head than not to express I; so I is always expressed)

One important observation that illustrates the predictive power of OT (relative to a given set of constraints) is that every structure that violates *Lex-in-I also violates PURE-PROJ, but not vice versa. This corollary has precisely the effect that nonlexical verbs may show special positioning in contrast to lexical verbs, but not vice versa. This result is exactly as it should be, as special positioning is the hallmark of a restricted class (of verbs), which we would then classify as auxiliaries.

Using the constraints above, English has the ranking shown, and just two candidates are considered for each relevant case, namely, a structure with only a main verb (the [1] candidates), and a structure with an auxiliary verb as well (the [2] candidates). The [a] candidates have the first verb in the structure in the higher head position, I, and the [b] candidates have the first verb inside VP.

(14) English

		*Lex-in-I	OB-HD(IP)	PURE-PROJ
[1a]	$[_{IP}$ NP $[_{I'}$ V $[_{VP}$ Adv $[_{VP}$ NP]]]]	*!		*
[1b]	☞ $[_{IP}$ NP $[_{I'}$ $[_{VP}$ Adv $[_{VP}$ V NP]]]]		*	
[2a]	☞ $[_{IP}$ NP $[_{I'}$ Aux $[_{VP}$ Adv $[_{VP}$ V NP]]]]			*
[2b]	$[_{IP}$ NP $[_{I'}$ $[_{VP}$ Aux $[_{VP}$ Adv $[_{VP}$ V NP]]]]]		*!	

Here, the highest ranking *Lex-in-I knocks out the [1a] candidate, meaning that [1b] (=(8a)) is the winner in the competition for the structures with a main verb only; with an auxiliary present, OB-HD(FP) plays the deciding role, favoring [2a] (=(8b)).

Moving on to French, the highest ranking of OB-HD(FP) gives both [a] candidates as immediate winners, and these are the structures in (10).

(15) French

		OB-HD(IP)	*Lex-in-I	PURE-PROJ
[1a]	☞ $[_{IP}$ NP $[_{I'}$ V $[_{VP}$ Adv $[_{VP}$ NP]]]]		*	*
[1b]	$[_{IP}$ NP $[_{I'}$ $[_{VP}$ Adv $[_{VP}$ V NP]]]]	*!		
[2a]	☞ $[_{IP}$ NP $[_{I'}$ Aux $[_{VP}$ Adv $[_{VP}$ V NP]]]]			*
[2b]	$[_{IP}$ NP $[_{I'}$ $[_{VP}$ Aux $[_{VP}$ Adv $[_{VP}$ V NP]]]]]	*!		

Linear Order

In Grimshaw's work, the X′ projections of the verbal head and the clausal functional categories above it share categorial features. In LFG, each (nonroot) node sharing features with V is an f-structure head, annotated ↑=↓, thereby extending the clausal structure above VP (Bresnan, 2000b; Bresnan, 2001; and Sells, 2001b, who refers to the relevant set of nodes as the 'clausal spine').

(16) Clausal Spine: The spine of the clause is every node in the extended projection of the head, that is, any node sharing (categorial) features with the verbal head, including V, V′, VP, I, I′, IP, C and C′.

Now, a simple approach to basic ordering properties within the clause can be given with the constraints in (17), which are alignment constraints (McCarthy and Prince, 1993), which align the edge of a constituent with the edge of some larger domain containing that constituent. For example, the natural constraint TOPIC-L (Choi, 1999; Sells, 2001b) would be understood to align a topic constituent with the left edge of the clause that contains it. In contrast, the alignment constraints in (17) align within the domain of the local subtree. Nevertheless, the intuition that they express is that heads prefer to be initial, both locally (within the immediate constituent) and globally (within the clause), expressed by Head-L (Grimshaw, 1997) – 'heads on the left'; countering this is Spine-R, – 'everything on the right' – taking the idea from Sells (2001b) about a preference for right-branching structures.

(17) Asymmetric Alignment Constraints (Sells, 2001b)
(17a) Head-L: X^0 head aligns left in its immediately containing constituent.
(17b) Spine-R: Every node in the spine aligns right in its immediately containing constituent.

Some consequences of these constraints are given in (18). Spine-R becomes irrelevant for subtrees both of whose daughters are f-structure heads (e.g., I and VP in (10)).

(18a) Specifiers – subjects in the first instance – are on the left (by Spine-R).
(18b) Heads of functional categories are on the left (by Head-L).
(Spine-R is irrelevant in such cases, as it is always violated equally.)
(18c) Lexical categories that are either head-initial or head-final depending on the relative ranking of Head-L and Spine-R.

These predictions can be partially verified by the structures above in (8)–(10). A further consequence of Spine-R is that while structures like those in (19a) are possible, (19b) is always ruled out.

(19a)

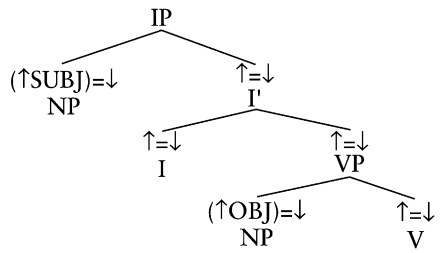

(19b)

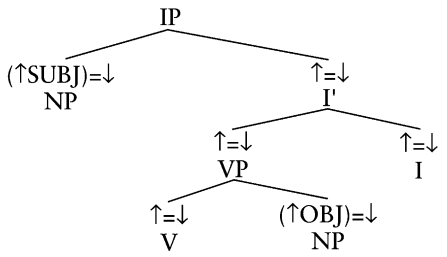

Every pair of sisters I – VP violates Spine-R once, regardless of their relative order. In turn, this means that the only constraint that orders I is Head-L, regardless of its ranking relative to Spine-R. Hence the constraint ranking Head-L ≫ Spine-R gives uniformly head-initial structures, as in (8)–(10) above. If the ranking is Spine-R ≫ Head-L, the winning candidate is (19a): as many spine nodes as possible are rightmost, and one head (I) is left.

The prediction that a language may have a head-final VP while having head-initial functional categories (see (19a)) but not vice versa (see (19b)) is borne out by the facts of clause structure change in English (Clark, 2004): though different stages of English have had different positional possibilities for verbs (e.g., (8) and (19a)), (19b) has never been one of them.

Bidirectional OT-LFG

Although I have concentrated on a 'production-oriented' approach to OT syntax, starting with an INPUT containing grammatical and semantic information that stands in correspondence to output surface forms, other approaches are possible, and, going in the 'comprehension' direction from overt form to semantic interpretation has also been the focus of a considerable amount of work in OT. A model of grammar that has both production and comprehension optimizations is a bidirectional model (Wilson, 2001), which has many important empirical consequences. As Lee (2001, 2003) has shown, it is the bidirectional OT approach that allows clear predictions to be made about the avoidance of ambiguous strings in certain circumstances, and more generally about how semantic information can be recovered from surface forms that are potentially ambiguous. Lee (op. cit.) and Kuhn (2003) show how a bidirectional model can account for other instances of word order freezing in scrambling languages, in addition to those above derived via Constraint Conjunction.

In the 'production' direction, the INPUT in OT-LFG is an underspecified f-structure, and strictly, the OUTPUT is the surface string 'yield' of the c-structure part of the winning candidate. In the 'comprehension' direction, the INPUT is a string of words, for which the OUTPUT is the f-structure part of a c-structure/f-structure pair. The following German example from Kuhn (2003) illustrates this; the relevant fact is that the form *sie* does not distinguish the nominative or accusative form of the pronoun, and given the freedom of argument ordering in German, the example could in principle be interpreted with the pronoun as subject or object, and *Peter* (which also does not distinguish case) as the other argument.

(20)	. . . weil	sie	Peter	saw
	. . . because	she/her	Peter	saw

However, the strongly preferred interpretation is 'because she saw Peter,' where the linearly first NP is the subject and the second the object, even though the order OSV is possible in principle in German, when the case marking of at least one form is specifically nominative or accusative:

(21)	. . .	weil	ihn	Peter	saw
	. . .	because	him	Peter	saw
	'. . .	because	Peter	saw	him'

The fact that (20) strongly prefers the SOV order is predicted by bidirectional OT: in the production direction, two different f-structures could yield (20) as their terminal string. However, in the comprehension direction, we take the string in (22) and consider what the best candidate for its interpretation is. In this case, the SOV structure is less marked than the OSV order, in the formal sense of OT markedness constraints, so the preferred c-structure for (20) is the SOV one, leading to the interpretation given for (20). Taking both OT analyses together, only the SOV structure with its associated interpretation is a winning candidate in both the production and comprehension directions, and so only this candidate is the winner in bidirectional OT. (On various formalizations of bidirectional systems, see Kuhn, 2003 and Beaver and Lee, 2004.)

(21) on the other hand is unambiguous: faithfulness to the accusative form *ihn* means that the c-structure assigned must be OSV in the comprehension direction.

Stochastic OT-LFG

Moving to the general phenomenon of variation, one major impact of OT work has been in the way it has

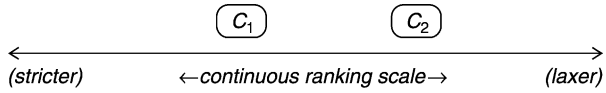

Figure 1 Categorical constraint ranking with ranges of variation.

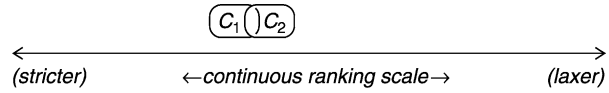

Figure 2 Overlapping constraint ranking with ranges of variation.

allowed formally and theoretically sophisticated models of syntax to be applied to data sets with inherent variability. A body of work emerged in the style known as 'Stochastic OT,' based on the original proposals of Boersma (1997). Boersma's approach gives a precise foundation to the idea of 'floating constraints' – rankings that are not total, and where two (or more) contraints can float in their relative rankings. Floating constraints in this sense are the outcome of the stochastic ranking, which effectively allows a probabilistic re-ranking of the relevant contraints for a given evaluation. This re-ranking allows the potential of multiple outputs, with relative frequency determined by the probabilistic weights, and a much more accurate theoretical construction of complex and variable data.

Grammars are conceived of as involving constraint rankings on a continuous scale of real numbers. Further, the rank of each constraint is slightly varied by adding a random value drawn from a normal distribution. Hence, the constraints are interpreted as if they were associated with a range of possible values rather than single points (the spaces around the constraints in Figures 1 and 2). The value that is used at evaluation time is called the evaluation point, and the stochastic approach can generate both categorical and variable outputs (Boersma and Hayes, 2001). Categorical output occurs when the ranges associated with the constraints do not overlap.

Figures 1 and 2, from Bresnan and Deo (2001), depict the situations where two constraints are ranked far enough apart to never allow any variation in output, and where two constraints are close enough that their evaluation points may overlap, leading to variable outputs. The space around each constraint represents the variation in the actual evaluation point of a given constraint on a given occasion. The evaluation point of C_1 always outranks that of C_2 in Figure 1, but not in Figure 2.

Asudeh (2001) showed how an OT account can predict when optionality will emerge, for argument-linking patterns in Marathi. Clark (2004) presented a stochastic OT-LFG analysis of changes in the history of English syntax based on variable data, using the kinds of clause-structure constraints given above, focusing on the gradual decline of right-headed (OV) structures, and change in the syntactic position(s) for subjects.

All in all, (stochastic) OT-LFG has provided a very rich approach to typology that goes far beyond what has standardly been accomplished in generative grammatical research: from any logically possible set of options for variation, some will be ruled out by the constraint system (due to inherent rankings derived by harmonic alignment from robust typological and functional observations); of those remaining, there may simply be different options chosen in different languages, or some languages may allow multiple options, to varying degrees, via the stochastic approach. As emphasized by Bresnan and Deo (2001) and Bresnan *et al*. (2001), the kinds of variation one finds within a language and across languages are quite similar, and the same factors are at work, whether the variation is categorical or relative.

See also: Lexical Functional Grammar; Pragmatics: Optimality Theory.

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Oracy Education

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Spoken communicative competence is of vital importance in the establishment and maintenance of individual identities, in the development of communities of shared interest, in the resolution of conflict between and among individuals or groups, in learning to read (Wells, 2003), and underlying all of these, spoken communicative competence is central to learning to think (Barton *et al.*, 2000; Measures *et al.*, 1997; Mercer *et al.*, 2004; Snyder, 2003; Young, 2000). Communicative competence might thus be thought to be central to oracy education. Bearne *et al.* (2003: 1–2) argue, however, that the interest in communicative competence that began in the 1980s and 1990s has been overtaken by a new interest in technologies of control that do not necessarily engender learning:

> In the 1980s and 1990s there were many studies in Australia, the United Kingdom and the United States about classroom interaction. In particular, Douglas Barnes, Jerome Bruner, and Gordon Wells were influential in prompting close attention to the role of language in group interactions. At that time, the idea of learners being encouraged to shape and build meanings for themselves, scaffolded by their teachers, indicated a particular stance toward pedagogy. Since that era, in which rich contributions to educational thinking were made, the term 'interaction' has gone underground; recently, however, it has been resurrected to denote a particular view of pedagogy. 'Interactive teaching' has currently come to have a new stipulative definition, one that assumes the teacher controls the interaction and that teaching will be organized through whole class arrangements. Rather than describing a dynamic exchange between partners in education, interactive teaching has taken on the flavor of transmissional teaching. Greater attention to talk and learning is welcome but tends to sideline the important interactions between, for example, reader/writer and text, or child and child.

Research on talk in classrooms in the new millennium focuses primarily on three areas:

- 'behavior management' – how to prevent students from engaging in 'inappropriate' talk, or to get them to speak in ways that fit within the discourses deemed relevant and appropriate for classrooms and for specific disciplines (Sage, 2002);
- special education – what to do with the ones who didn't learn to talk or to talk properly (Martin and Miller, 2003; Pagliano, 2002); and
- multicultural education – how to teach students whose first language is not the language of the classroom (Heller, 2003; Heller and Martin-Jones, 2001; Kennar, 2003).

The questionable assumption underlying talk only being made relevant in the areas where there are perceived deficits, is that in the normal course of events children will naturally acquire spoken communicative competence in the absence of education in oracy. This is in marked contrast to the ways in which literacy is approached as vital to learning.

The new focus on technologies of control may lead to classrooms becoming places in which the communicative practices between teachers and students restrict rather than facilitate and foster spoken communicative competences. It is a matter of concern that students are not being taught how to engage in reasoned argument and how to constructively challenge established patterns of thought (Grundy, 1997). Students with oral competence are arguably better able to deal with ambiguity, to appreciate multiple perspectives, and to be open to alternative ways of seeing things and doing things (Grainger, 2003).

In the absence of attention to and work on forms of spoken language in the classroom and playground, speaking-as-usual establishes and maintains the power of dominant groups, in terms of class (Edwards, 1997) and also in terms of gender and ethnicity (Alloway and Gilbert, 1997; Alloway *et al.*, 2003; Bjerrum-Nielsen and Davies, 1997; Tannen *et al.*, 1997). And as Bjerrum-Nielsen and Davies (1997) point out, no simple set of guidelines will change these deeply entrenched patterns of speech through which status and power are established and maintained. The extent to which communicative competences and oral competences are regarded as natural is a problem here, because it makes invisible the central means by which the differences, which perpetuate patterns of advantage and disadvantage, are established and maintained.

Formal assessment of an oral component within first language in the secondary classroom is becoming common. In this assessment students must perform themselves as individual speaking subjects in front of an audience of their peers. Informal talk generally runs alongside classroom talk and is often defined as being at odds with classroom talk. Such talk is rarely made subject to serious pedagogical attention, other than to silence it. Scrimshaw (1997) observes that the

unsupervised 'talk' on computers may be leading to the entrenching of discriminatory actions and thoughts.

The relations between formal and informal talk in classrooms are complex. Alloway *et al.* (2003) observe that there is often a small group of dominant, powerful boys who are the noisiest members of their class, such noisy and impromptu oral contributions being seen as inappropriate by teachers in the classroom context. They are "noisy, disruptive and frequently off-task. Typical disruptive activities included hitting, punching, pulling out each other's chairs, walking around the classroom, calling out loudly to the teacher" (Alloway *et al.,* 2003: 356). Even when they thus address the teacher, their oral performances are not constituted as acceptable, and they may serve to intimidate both girls and nondominant boys. Nondominant boys, for example, may be marginalized and silenced, feeling that they cannot engage confidently in nondominant masculinity in front of such dominant peers (Alloway and Gilbert, 1997; Alloway *et al.,* 2003; Paechter, 2000). These boys who engage in assertive forms of informal speech may profit from the inclusion of oral performance as part of their assessment (Harris, 1998), or they may reject public formal oral performance as 'feminine' (Gilbert and Gilbert, 1998). But even the dominant boys may perform poorly when asked to do formal assessable oral presentations if these are incompatible with their particular skills or their idea of themselves (Alloway and Gilbert, 1997; Alloway *et al.,* 2003).

Forms of speech such as those described above are often interpreted in individualistic terms and made punishable. Green and Dixon (1997) have shown that the mode of spoken interaction taken up by any individual stems from the presuppositions that are inherent in the communicative repertoire of their culture; speaking, interacting and interpreting particular contexts stem from cultures rather than from individuals. Davies and Kasama (2004), for example, show how preschool children's free play establishes and maintains detailed aspects of Japanese culture, particularly in terms of status hierarchies involving age and gender. Well before written language is accessible by them, children are actively acquiring through spoken language the understandings of status and power that their culture makes available to them. At the same time, Pagliano (1997) shows how inability to speak is often interpreted as lack of knowledge. Through a study of those who are unable to engage in oral discourse, Pagliano shows just how central spoken language and communicative competence are to the formation of identity.

Finally, there is a strong case to be made for the importance of teaching collaborative and exploratory talk (Lyle, 1997; Westgate, 1997), where teachers give up their positioning as the authority and work with students to enable them to clarify their own understandings; of teaching joint reasoning talk (Pontecorvo, 1997), where teachers scaffold the development of students' understandings; and teaching skills for generating shared understandings through ongoing talk (Mercer, 1997; Rojas-Drummond and Mercer, 2004). As Young (2000: 546) says: "Conversation ... mediates collective validity judgements, carries forward social tasks, negotiates meanings, and ... comprises at the same time the constraints on these processes .... The bringing into existence of new meanings, albeit adaptively valid ones, is a necessary feature of inquiry."

See also: Assessment of First Language Proficiency; Communicative Competence; Cultural and Social Dimension of Spoken Discourse; Language Education: Correctness and Purism; Teenagers, Variation, and Young People's Culture.

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O'Rahilly, Thomas Francis (1883–1953)

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Thomas Francis O'Rahilly's interests spanned the breadth of Irish (Gaelic) language, literature, and history, although successive periods of his career were marked by different predominant themes. Prior to the commencement of his formal academic career, he founded *Gadelica: A Journal of Modern Irish Studies;* it ran to just one issue, but featured articles by many of the most prominent figures in Irish language and literature studies. O'Rahilly held successive posts at Trinity College Dublin (1919–1929), University College Cork (1929–1935), University College Dublin (1935–1941), and the Dublin Institute of Advanced Studies (1940–1947). He became director of the Dublin Institute in 1941.

His early scholarly productions included the editing of volumes of Irish epigrams and proverbs, and two anthologies of traditional poetry (*Dánta grádha* in 1926; *Measgra dánta* in 1927). His major linguistic contribution, *Irish dialects, past and present*, appeared in 1932. In his later years, he focused mainly on the history and foundational mythology of Ireland; the somewhat controversial *Early Irish history and mythology* (1946) was a compendium of his work in this field. In the same year he founded the journal *Celtica* and edited its first volume, which was marked by an eclectic mix of linguistic, literary, and historical subjects reminiscent of the scope of the earlier *Gadelica* venture. *Celtica* continues to publish to this day.

In *Irish Dialects*, O'Rahilly compared the Irish dialect situation in the early 1900s to that of English in the 14th century in that there was no standard

language and great dialect differences. In contrast, however, the Irish language had since the mid-18th century, been increasingly losing ground as the primary language of everyday life; both the professional literary classes and later the English speakers whose party controlled Ireland despised the language of the common people and actively discouraged its use. O'Rahilly noted that at the time of writing "the Irish language has died out in five-sixths of the country," and lamented that "the monoglot Irish-speaker seems doomed to extinction." This situation made the collection of what information remained about Irish dialects "a task of extreme urgency." O'Rahilly collected together all the resources, both literary and oral, from the entire history of Irish literature, and including his own first-hand field research, to make his survey (which includes excursions into Scottish Gaelic and Manx). Although he believed that his resources were limited, his close analysis led to a precise delineation of historical Irish into Northern and Southern dialects, each of which was further subdivided in two main subdialects. As he assembled sources, he produced the *Catalogue of Irish* manuscripts *in the Royal Irish Academy.*

In his observations about the relationship between social status and language disappearance, O'Rahilly anticipated the later 20th century concerns about "language death." His study stands as an early model of what linguists can and should do to both document endangered languages and encourage survival of speech traditions that are threatened by overwhelming social, economic, and political circumstances. In stressing the urgency of his task, his study also serves as a warning as to how quickly a population can go from being virtually monolingual to being a minority language in constant danger of extinction.

See also: Ireland, Republic of: Language Situation.

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Oral Traditions and Spoken Discourse

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The Problems with Oral Traditions

In our society, the idea that literature exists only in the written form has for a long time meant a total devaluation of the oral tradition. It has led to the conviction that style and rhetoric are characteristics only of written discourse. This idea has remained deep-seated in public opinion even after Romanticism prompted the revaluation of some types of oral (or pseudo-oral) literature. Yet, it is clear to all that until recent times, with the expansion of compulsory schooling and above all the media, only a tiny percentage of people, concentrated in a small number of literate societies, could master the written form of expression. In the history of humankind, this form of expression is the exception and not the rule.

In every literary tradition of which we are aware, starting with those of the Levant and ancient Greece, the oldest known documents testify to the existence of at least three oral practices that can be fully classed as literature: lyric poetry, narrative poetry, and stories. Modern research in the field confirms that there is practically no human society that does not have an oral tradition, even if the society is completely illiterate. In contrast, we know of societies that despite being literate prefer not to rely on the written word for their most significant traditions, as Caesar observed was the case in the Gaul of the Druids:

> Neque fas esse existimant ea litteris mandare, cum in reliquis fere rebus, publicis privatisque rationibus, graecis litteris utantur. 'And they do not think it proper to commit these utterances [i.e., great number of verses] to writing, although in almost all other matters, and in their public and private accounts, they make use of Greek letters.'

Many oral societies have literary traditions that have an exceptionally complex structure and that are surprisingly prolific. The overview provided 70 years ago in a work that has become definitive, despite being for the most part a compilation of

data – Chadwick and Chadwick's three-volume opus, *The growth of literature* (1932–1940) – could now be enriched and expanded substantially.

The wealth of information at our disposal today is not only the result of the direct study of illiterate societies that had previously escaped observation. There has also been a significant enhancement we could term 'diastratic,' thanks to more careful study of the more elementary levels in our societies, ones that are peripheral either geographically or socially. In those areas, we have observed an unexpected vitality in oral traditions that at times flourish before our very eyes without our noticing them.

However, this enhancement has posed a new problem: Of what relevance are oral traditions that are not literary? In reality, most of this material has no link to literature. Yet, why should it be excluded from our concern? One need only think of a very low-level product, the urban myth, about which Stewart F. Sanderson (1982: 14) wrote, "Its most outstanding feature is the creativity, imagination, and virtuosity, brought to this performance by all kinds of people, old and young, well read and barely literate, educationally privileged and educationally deprived." Note that the scholar admits openly that tradition-bearers are literate. A significant case, where the oral tradition is in the process of coming into existence, concerns the traditions that sprang up in the trenches of the First World War, highlighted by the great historian Marc Bloch (1963).

At first sight, it is clear that a most serious limitation inherent in these studies on oral traditions is that they can only be carried out on contemporary traditions. Jan Vansina's (1985: XI) definition is fitting: "Oral traditions make an appearance only when they are told. For fleeting moments they can be heard, but most of the time they dwell only in the minds of people." Yet, the Belgian historian reminds us of a suitable Akan (Ghana) proverb: *Tete ka asom ene Kakyere* 'Ancient things remain in the ear': The present in oral traditions always incorporates the past in itself and vice versa.

In fact, studies of oral traditions have at least two different origins. They are either the descriptions of oral societies by ethnographers, who have little interest in literature, or they are motivated by the search for satisfactory present-day explanations for the literary problems of the past, most famously the Homeric problem.

Scholars have long tried to verify the hypothesis that such works as the *Iliad*, *Odyssey*, *Chanson de Roland,* and *Beowulf* are the output of much older heroic oral traditions by comparing them with heroic oral traditions of the present day. An early systematic outline of these efforts is given in Bowra (1952); for works from ex-Soviet Asia, one should also consult Zhirmunsky (1961). The hypothesis subdivides into at least two subhypotheses that should be kept distinct: These works either represent the transcription of oral epic poems, or they were composed in their written form, but draw heavily on the preexistent oral tradition.

With the wealth of data we have access to today, we should move away from such elementary approaches. The rigid application of the oral-formulaic theory to the epic poems of the European Middle Ages met with no success other than among the small number of followers of Parry and Lord. Indeed, it is essential that we do not exclude or marginalize from research into oral traditions, studies that have nothing to do with the Homeric problem and the Serbo-Bosnian epic; these studies are much more numerous and are at least as useful.

A fundamental premise underlying this discussion is that all the concepts employed must be understood very flexibly as terms that do not have exclusively oppositional meanings, but that have shorter or longer ranges of variation. This is even the case with the term 'Oral Tradition,' which in bibliographies is often synonymous with the term 'Oral Literature,' which in turn is often synonymous with 'Oral Poetry.' The observation has been made often, and it must be repeated here, that the opposition between poetry and prose also contains intermediary levels. This was also the case, in written literature, for many medieval traditions, such as the *cursus*.

The type of prose employed in the oral tradition is not the prose that Molière's M. Jourdain was pleased to have used all his life without knowing it. Only a few decades ago, the *cantastorie* of Palermo, sitting in the gardens in front of the ancient palace of the Norman Kings of Sicily, would still tell stories about Charlemagne's paladins in daily sittings that together lasted a whole year. They generally used lofty rhythmic prose that, at the most dramatic moments of the story (duels, battles), employed a rhythmic beat that had a pause after every tonic syllable; this rhythmic prose was completely in contrast with the nature of their dialect, but was an ideal way of expressing the extraordinary nature of the situation. I return later to Dell Hymes's excellent analyses.

Even more ephemeral is the distinction between what is and what is not literature. The concept 'literature' varies from society to society and often from one period to another within the same society. This concept is historical, dynamic, and entirely relative. Each social group establishes what is literature in relation to what is not recognized as such.

Ultimately, we cannot adhere to the viewpoint that the only oral traditions worthy of investigation are

those that, in one way or another, are considered literary. Rudolf Schenda (1993) has worked with a broader concept called *kommunikative Kultur*, 'communicative culture,' and has put together an impressive overview of popular narrative in Europe from the Renaissance onward. He did not focus much on contamination between oral and written codes, and perhaps his concept was too broad. However, a correct definition of oral tradition can only be inclusive, covering all traditions, literary or otherwise, that have been transmitted orally regardless of the way they were formed and without excluding, or considering spurious, reciprocal interference between the oral and graphic worlds.

Within such a broad definition, each society sets up a hierarchy in which certain traditions are awarded a higher status, and others not. Those that we consider literary are always in the upper section, yet the study of oral traditions cannot exclude the lower levels. The following section focuses on the traditions with a higher status because more work has been done on them and they are easier to identify; however they are not the only ones that exist and are worthy of attention. It follows a scheme based on the performance elements of the oral tradition, asking who bears the tradition and where, in what form, and to what ends.

The Tradition-Bearers (Who)

In societies without writing or in groups that do not use the written word within literate societies, theoretically anyone can be a tradition-bearer. The term 'tradition-bearer,' taken from previous scholars, is more appropriate than either producer or diffuser because the two aspects of production and diffusion, which are distinguished easily in written traditions, tend to blur in oral traditions where the producer is known as the diffuser and where the diffuser is often anything but passive. This confusion is criticized by Ruth H. Finnegan (1990), who noted cases in which the poet is distinct from the performer. In effect, Finnegan's counter-examples are not the only ones, but in the majority of cases the tradition-bearer does not claim to be the producer, even if nothing is known about the latter.

However, in reality, certain individuals are recognized as tradition-bearers to a much greater extent than others. The range of possible tradition-bearers goes from the prototypical tradition-bearer, who is in a certain sense the professional, to the marginal tradition-bearer who enjoys no particular recognition.

The prototypical bearer, in the traditional complex forms (the truly literary forms), has received lengthy professional training that is normally taught by an older bearer with more experience, as in all types of craft (if you want to be a potter, you learn from a potter; if you want to be a barber, you learn from a barber, and so on). The tradition-bearer's training can at times end in qualification by means of actual professional examinations.

Even more important, the tradition-bearer is normally accorded a special status. He has a sacred aura that in central Asian cultures links him to the shaman:

> All the peoples of Central Asia believed that the art of poetry is a kind of mysterious gift bestowed on the person of the singer by a prophetic call from on high . . . . the archaic type of an epic singer, who is at the same time a prophet, a magic doctor, a counsellor of the khan and the revered elder of a tribe (Zhirmunsky, 1969: 332, 334).

Yet, it was also the case in the classical world that poets received inspiration as a gift from the god Apollo or from the Muses. The famous opening words of the *Iliad* (Μηνιν άειδε, θεά 'Sing, Goddess, the anger') are not without religious connotation. It was only later that this type of invocation became a purely rhetorical device. Bridget Connelly, in her discussion of the singers (*al-sîra*) of contemporary northern Egypt, spoke of a link between the poet and an almost religious authority:

> The Hilalî poet thus has a privileged community status. Abnoudy [an Egyptian poet and scholar of popular song] stipulates that the role of the poet is deeply revered and respected in the oral, folk culture. The poet has a mission and a profession (Connelly, 1986: 148).

Even in very secular social contexts, such as the modern Scottish village, where the bearer is at times not even a professional, it still seems that his role comes as a gift from nature and it endows him with social prestige:

> What kind of people are these story-tellers [in western Ireland and Scotland]? They represent the intelligentsia of the old rural Gaelic tradition . . . . They play, or used to play, a highly important part in the life of their community because they were the focus of its intellectual activity (Jackson, 1961: 51–52).

Even though in different ways, he who recites poetry, and often in a weakened form whoever bears the traditions, is an expert who is recognized as having a function that includes entertainment but goes beyond that. The bearer's work conserves group memory and therefore reinforces group identity and demonstrates its norms and values. At its highest points, the bearer reveals a more profound reality – he approaches or replaces the prophet, the mediator of the divine. It is not by chance that the formula 'divine poet' is used for exceptional poets such as Dante Alighieri.

The Circumstances (Where)

It is rare to find that the social event where the diffusion of oral traditions takes place is in a place, time, or form that lacks significance. This is never the case with the most prestigious forms of oral traditions. Greek bards, like many of their counterparts in other civilizations, sang after banquets in the royal court in front of the gathered nobility. At other times, the tradition-bearer might recite in religious locations. At lower levels, the tradition can be recited and transmitted at the winter vigil or at the vigil after the harvest when country people gather round the fireplace. In modern urban societies, the location could be a Levantine café, a British pub, or a bistro. The traditions studied by Bloch were produced in the trenches; the historian is in fact more precise: "L'agora" de ce petit monde des tranchées, ce furent les cuisines" (Bloch, 1963: 55).

The variation among traditions can be infinite, but the fact remains that in every social group the place and the time where the tradition is used are fixed and recognized by all. The place and the time give the event the necessary authority and distance it from any other type of discourse.

Formal Procedures (How)

Oral traditions, particularly those in the upper ranges of the scale, are bound by similarly codified procedures. At lower levels, generally there are elementary linguistic markers, such as 'It is said' (It. *Si dice*, Fr. *On dit*) to introduce an anecdote or a rumor, or 'Once upon a time' (It. *C'era una volta*) to introduce fairy tales. However, at complex literary levels, the formalization of procedures is very strict and is strongly conditioned by the customs of each society and each group.

Consider the case of heroic poetry that was investigated as part of the interest in the Homeric problem. Even one of the earliest scholars of the Turkish epic of central Asia, the German W. Radloff (generally known by the Russian version of his name, V. V. Radlov), wondered how it was possible that a tradition-bearer was capable of reciting poems that contained tens or even hundreds of thousands of lines. It is worth repeating some of Radlov's observations:

> Every singer who is any way qualified always improvises his songs according to the inspiration of the moment, so that he cannot recite exactly the same song twice. But no one thinks that this improvisation produces a new song each time . . . . He [the singer] having practiced performance for a long time, has at his fingertips, as it were, a whole series of parts that he puts together in appropriate fashion as he performs the song. These parts are descriptions of specific events and situations, like the birth of the hero, the hero's awakening, the cost of his weapons, preparing for a duel . . . . The singer's art consists in placing these parts one after the other as required by the course of events and in linking them together with verses composed on the spot. The singer can sing these parts in different ways. He can treat the same image with a few quick touches or can describe it more broadly or can proceed with epic expansion to a highly detailed description . . . . A qualified singer can do an impromptu performance of any theme or any story if the sequence of events is clear to him (Radlov, 1885: XVI–XIX).

An analogous mechanism was discovered by Milman Parry who looked at Serbo-Croatian poets. This case was described in a famous book, *The singer of tales,* by Albert Lord, and is now so widely known that it seems pointless to summarize it here. It is now necessary to use the second edition (2000) of Lord's classic, which has a valuable CD with recordings of oral texts and other useful items. His second book, *The singer resumes the tale* (Lord, 1995), which was unfinished at his death and was edited and published posthumously, is also important. A systematic presentation of the Parry–Lord theory is found in Foley (1988, 1995).

Ruth Finnegan, despite criticizing many aspects of the Parry–Lord school results, rightly recognized its two principal merits:

> First its [oral literature's] variability: the absence of *the* single correct version; and second, the unique nature of *each* performance by the composer/performer; the poem or story as delivered, as a unique creation, on that particular occasion (Finnegan, 1990: 245).

In these cases, the tradition-bearers do not need particularly good memorization skills. Their memory has rightly been called creative memory. John D. Niles (1999: 153) appropriately remarked that "memory is an actively creative faculty, as specialists in cognition have long recognized." The bearer does not memorize the enormous text that he 'performs'; rather, he creates it during the actual 'performance.' For this to be possible, the bearer has to have at his disposal a kind of articulated database that he does memorize. The bearer has in his mind a finite number of narrative *topoi* (the hero's departure, the meeting with his beloved, a duel, the death of the hero etc.); at the same time, he will have memorized a greater but not infinite number of formulas such that they can be inserted into the metric form imposed by the tradition (with small adjustments, they can be used in different arrangements). Given the story's plot, which is generally already known by the bearer and his audience, who might also suggest the plot, the bearer performs it in a way that takes into consideration both the audience and the situation: cutting short

or lengthening an episode, adding or omitting another, inserting what he thinks could please the listener, or cutting what might not please, and so on. The abstract discursive structure of the plot is then elaborated by means of a sequence of *topoi*. Finally, the actual discourse (the surface level) is realized by using the appropriate structures and stylistic elements. In this way, as has been proved in experiments, two performances never produce identical texts, yet neither are the texts radically different.

These procedures entail a specific interpretation of what is original: None of these texts are presented as new, as they repeat a previous text that is often already known even to the listeners. However, no text is identical to a previous text, and the bearer often claims that his text is 'better' than similar ones performed by other bearers. In fact, not only do they not repeat from memory but they also actually modify, even if their explicit intention is to restore and therefore to improve on previous versions. The originality relies on the fact that they transmit the tradition better than others.

The higher level of formalization in heroic literature has allowed more exhaustive analyses of this fundamental aspect of oral traditions, so much so that it has imposed a model that was optimistically received as universal. Finnegan's criticisms are fitting:

> There may be a number of different ways of composing orally, corresponding to the different social circumstances of the literary piece involved or the varying ways in cultures and periods (Finnegan, 1990: 262).

Scholars who applied theories of oral literature to the realm of medieval Romance literatures concentrated by preference on the *Chanson de Roland* or on the Castilian epic, with results that have not achieved widespread consensus. The Spanish romance is a case in point of the opposite kind: It was brilliantly investigated by Ramón Menéndez Pidal even before the appearance of studies on Serbian epics. The bibliographies of oral traditions lists the late volume written by this great Spanish scholar in French translation (Menéndez Pidal, 1959). However, his ideas had been formed several decades prior to publication when he recognized the different modes of existence of the *romancero*, the name given to the rich ensemble of ballad production: For Menéndez Pidal, this is the poetry "que vive en variantes" (Menéndez Pidal, 1953, 1954).

These Castilian poetic narratives, which vary in length but are in general quite short like Scottish ballads, were known through manuscripts or late medieval printed editions, although it seemed that the tradition was no longer active. Menéndez Pidal's studies in this field allowed him to ascertain that the sung tradition was still perfectly alive around 1900 not only in Castille but also throughout most of the Hispanic world, including America. His patient collecting of many dozens of performances of each single text led to his formulation of a theory concerning the diffusion of traditions that owed much to the theory of geographic diffusion of linguistic phenomena. Compared to studies of other traditions, those on the *romancero* allowed, as mentioned above, an analysis of the different kinds of geographic dispersion of the variants: They are a very important example for future analysis of the diffusion of oral traditions.

The bearer of romances operates like the Serbian singer of tales, but with marked differences that are also made possible because of the shortness of the text. This bearer also has a repertory of themes and of structures, as well as of ways of singing, but it is not necessary to construct the text from scratch because the poem's short length makes for easy memorization. However, there is no requirement to respect any single text. It is always possible to substitute one formula for another or one synonym for another or one turn of phrase for another. There is no fixed text, just as there is no original.

An example taken from a Castilian narrative cited by Menéndez Pidal (1954: 16) is illustrative. In the romance of Gerineldo, when the king discovers the lovers, he wants to kill them. According to a printed text from the end of the Middle Ages he says:

> Mataré yo a Gerineldo el que cual hijo he querido?
> ¡Si yo matare la infanta, mi reino tengo perdido!
> ('Will I kill Gerineldo, whom I loved as a son? If I kill the princess, I will lose my kingdom.')

In the oral versions collected at the beginning of the 20th century, the king says:

> El quisiéralo matar, mas crióle de chiquito.
> ('He would have liked to kill him, but he had raised him as a child.')

or:

> Si yo mato a la princesa, queda mi reino perdido;
> y si mato a Gerineldo, que lo crié de chiquito.
> ('If I kill the princess, my kingdom will be lost; as it will be if I kill Gerineldo, whom I raised as a child.)

or:

> Yo, si mato a la princesa, mi reino ya va perdido;
> y si mato a Gerineldo, le he criado desde niño.
> ('If I kill the princess, my kingdom will be lost; as it will be if I kill Gerineldo; I raised him as a child.')

In the different versions, not only does the narrative situation remain identical (the king's desire to kill the lovers is blocked by his affection for his daughter and her young lover and also by political considerations) as does the assonance *i-o* but also the same wording returns each time, even if it is employed relatively freely.

In the Serbo-Bosnian epic, as in the Castilian romance and in many other cases, one of the principal constraints on the tradition is the meter. Yet, it would be a mistake to believe that literary oral traditions that are apparently in prose form are always and entirely without this kind of characteristic. Consider the examples studied with great finesse by Dell Hymes in which, at least in the Chinook narrative tradition, "the constraint" that is "a metrical line" in poetry instead "in oral narrative . . . is commonly a relation among lines" (Hymes, 1994: 339). The relation is expressed in terms of equivalent units, repetition, parallelism, and succession. In performance, these relations are also expressed in nonlinguistic form (gestures, pauses, etc.) that are eliminated in the printed transcriptions whenever the publishers think them irrelevant.

Let us take a short example from a Chinook tale that Hymes returned to more than once, the story of *The deserted boy*, collected and published in his own time by E. Sapir. Sapir's paragraph reads (Hymes, 1981: 141–142):

> Some long time ago the (people) said to the boy: "Now let us go for reeds." The boy was (considered) bad. So then they said: "Now you people shall take him along (when you go for) reeds." And then they said to them: "You shall abandon him there." So the people all went across the river. They went on and arrived where the reeds were. And then they cut off the reeds and said (to them): "If the boy says, 'Are you people still there?' you shall answer him, 'U'uu.'

This became the following on Hymes's (1994: 335–336) page:

> Now then they told a boy,
> "now let us go for reeds."
> Long ago the boy was mean,
> Now then they said,
> "Now you will take him for reeds."
> Now then they told them,
> "You shall abandon him there."
> Now then the people all went across the river,
> they went on,
> they came to the reeds.
> Now then they cut them off.
> Now then they said,
> "If the boy should say,
> 'Are you there?'
> you shall answer,
> 'Uuu.'

In this case, as in others, the analysis of the performance is naturally much more complex than can be summarized here. It seems necessary that the reconstruction should be reflected, as it is in this case, in the notes of the researcher who has collected the texts or, today, by listening to the recording again or checking the video.

The Chinook tradition is different from its European, Asian, or African counterparts, and it is therefore obvious that the procedures for formalizing the text are different. It is unlikely that universal procedures exist. However, it is probable that there are no examples of high-status oral traditions that are not governed by formal constraints. The scholar must point out and describe the formal constraints in each case.

As far as I know, such research has never been done for the fairy tale. It should begin with the classification of types of fairy tales. A type is the abstract structure of the fairy tale and is in turn made up of a series of motifs defined as "the smallest element in a tale having a power to persist in tradition" (Thompson, 1977: 415).

A classification of types of fairy tales done by Aarne (1961) made it perfectly clear that the same type can have an infinite number of different forms, which also correspond to the performance, and that the types can be mixed, combined, and split. The types can be analyzed as sequences of motifs that together constitute a very large, but not infinite, universe. This was demonstrated systematically by Thompson (1955–1958).

In this field, the analysis has undergone a development that it would be useful to apply to other fields within the study of oral traditions. The brilliant research done by V. Propp (1968) on Russian magic tales allowed him to identify and describe their forms. He distinguished two different levels in the oral tale, the deepest of which is made up of abstract functions, and in this case, their order follows a fixed sequence. The infinite variation of the fairy tale in its performance is due to the fact that Propp's *dramatis personae* and the 'functions' can take on an infinite variety of forms in the story. The *dramatis persona* of 'the helper' can be an individual, an animal that can speak or not, or a plant. According to Propp (1968: 79), function F (XIV: "The hero acquires the use of a magic agent") generates the following range of outcomes: The agent may be a reward or pointed out or prepared or sold and purchased or eaten or seized, etc. The level at which Propp's morphology is pitched is very abstract, and he did not claim that it would be valid outside the Russian magic tale. An application of Propp's morphology to the story of the "Birth of Abû Zayd" can be found in Connelly (1986).

One can hypothesize that the procedures that give rise to oral traditions are always less formalized as one goes down the range of types of tradition. The types considered here are high forms that are rigidly codified. Genealogy is probably equally codified, particularly when it has an important social function: determining who does and who does not belong to the clan and whether someone might have certain rights or duties (Vansina, 1961). Lyric and choral poetry are also highly formalized, both because of their musical requirements and their use of closed metrical forms. In contrast, narrative uses open structures even in its poetic form, like the Old French *laisse*, and even when prose is sung, it is done in simple and repeated ways. The saga is probably even more flexible, and even more flexible again are jokes, anecdotes, and rumors.

Themes and Functions (What and What for)

The thematic articulation of oral traditions is infinite, and it reflects the interests of each social group. However, at high levels, there are generally several basic themes present, beginning with the story of how the world was formed and, not always separate from the creation account, a story of the events leading to the formation of the relevant social group, centered on the exploits of its founding heroes. The fundamental questions that oral traditions answer seem to be the following: Why we exist, why we are here, and why are we the way we are.

The distinction between heroic tale and romance seems to be essentially secondary and therefore more recent. The creation story can include aspects that have nothing to do with war or heroism. One need only think of the space that the figure of the trickster is often given (Campbell, 1949). Tricking an enemy can be equally important and just as celebrated by the descendants as killing a dragon or a giant or asserting with arms in battle the claims of their society against another. In each case, however, the oral tradition at this level defines the nature of the group and of the world and makes its members aware of it. It also determines the basic aims of society and the accepted ways of achieving them, which at times can actually be anything but heroic.

The narrative genre of panegyric, which is dominant in black Africa, has the same function. Its celebration of the virtues or the condemnation of the vices of the person being spoken about implicitly reinforces the positive and negative values of the social group in question. This aspect is even more obvious in historical oral traditions that have been studied most notably in the last few decades by Jan Vansina who has worked mostly on African oral traditions. This Belgian scholar is particularly interested in the historic value of the oral tradition and therefore in identifying rules for criticism analogous to those that have been used for some time for written historical sources. However, in his overview, both the analysis of the performances of this type of text and the analysis of the cultural content of the messages are impressive (Vansina, 1985). Although the form is completely different and much less formalized, in this case too the oral tradition expresses the group memory and therefore its values.

At lower levels, as far down as anecdotes and rumors, the plurality of themes tends to infinity, but the social intention, however toned down it might be, does not disappear. When the *poilu* in the French trenches of the First World War took it as obvious that a German corpse was potentially a threatening vampire, he was not only subconsciously reusing themes documented at least as far back as the medieval tradition but he was also rationalizing a deep terror he felt and reinforcing an absolute opposition between his people and the enemies, upon which all his behavior was based at that moment (cf. Varvaro, 1994, where this theme is studied in relation to the Latin work of Walter Map, an Anglo-Welsh writer at the end of the 12th century).

At a more elaborate level, it is clear to what extent the spread of fairy tales among children of a group shapes their sense of values and dangers, expresses their fears, and confirms their hopes – in sum, turns them into members of the social group. In the field of oral traditions, the thematic material is in the end secondary to its functional character. This explains how the themes of oral traditions can often be transferred easily from one society to another (how they are intrinsically international) while their functional character is different.

Conclusions

Let us return to the formal problem of oral traditions because we still have to verify through what route they differ from normal everyday discourse, despite their sharing the same oral medium. It is worth repeating that the whole range of oral traditions must always be borne in mind, but that in this article, we refer in the first instance to those at the higher levels. One can expect that the oral tradition's form will be codified, given that it represents a social activity that is so close to the sacred or ritualistic; so linked to specific times, modalities, and situations; and reserved for qualified tradition-bearers. Nothing could be less entrusted to chance.

This already distinguishes the oral tradition from everyday discourse.

The Greek bard's performance has nothing in common with normal discourse, taking place as it did in the king's palace before an elite audience and with song accompanied by the music of the lyre. To varying degrees, this is true of the majority of oral traditions. The linguistic form is, of course, conditioned by the requirements of the language in question, and it is more problematic to distinguish within it constants that are more or less universal. Yet, we get the impression that such techniques as repetition and variation, parallelism and chiasmus can be found in the majority of complex oral traditions.

These techniques can be illustrated with a few examples of Serbo-Bosnian epic songs cited by Lord (2000). The following is a brief example of repetition with variation between two successive lines:

> Nit' mu porez ni vergiju daje,
> nit' mu asker ni mazapa daje.
> ('Neither tax nor tribute do they give him, / Neither soldier nor sailor do they give him.')

Another example is at a distance:

> l. 795 Ne znam đadu/ka Kajniđi gradu
> l. 799 Uze đadu/ka Kajniđi gradu
> ('I know not the road to the city of Kainiđa,' 'And took the road to the city of Kainiđa')

Below is a more complex example of paronomasia:

> Đe sedimo, da se veselimo,
> E da bi nas i Bog veselio,
> Veselio, pa razgovorio!
> ('Where we sit, let us make merry, / And may God too make us merry, / Make us merry and give us entertainment')

Unlike what happens in written literature, the relationship between the tradition-bearer and the audience is always *in praesentia* and is therefore strongly conditioned by the particular situation. However, unlike what happens in everyday discourse, the discourse of oral traditions, at high levels, has limited deictic reference (inasmuch as it is never a discourse about the here-and-now), and it retains on the contrary a high degree of redundancy, which ensures that every member of the group will understand it.

When the form of these traditionally high levels is prose, it, as has already been mentioned, retains specific characteristics. In each case, the text is realized through performance, which highlights the importance, in the transmission of high oral traditions, of gesture and more generally of the bearer's body existing in space (in that space). The *cantastorie* in Palermo accompanied his words with movements of a cane that he held in his right hand; these movements became rhythmic and solemn, as if he were brandishing a sword, during the most important passages. However, the same thing happens elsewhere. Niles (1999: 53) wrote:

> Oral performance has a corporality about it, a sensible, somatic quality, that derives from the bodily presence of performers and listeners . . . . Literature that is performed aloud in a traditional setting depends on a visible, audible, olfactory, and sometimes tactile connection between performers and their audiences.

Paul Zumthor (1983, 1987) devoted two important books to these aspects.

The discourse used in oral traditions is, by definition, never identical to everyday discourse even if the distance between these two forms of communication can be greater or smaller, depending on the level of the tradition being performed. It follows a series of shifts from normal discourse, starting with obedience to the rules of its own rhetoric. In general, this is characterized by deliberate archaism at different levels – above all at the lexical level, but also at the morphological, syntactic, and at times even phonetic levels. This archaism shows that it was a grave error of several linguistic investigations conducted in the past to use this type of discourse as material for the description of the language itself without noticing the distance that separates this type of discourse from everyday usage.

See also: Bosnia and Herzegovina: Language Situation; Corpora of Spoken Discourse; Cultural and Social Dimension of Spoken Discourse; Menéndez Pidal, Ramón (1869–1968); Performance Factors in Spoken Discourse; Spoken Discourse: Types; Text and Text Analysis.

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Orality

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Orality, both as a theoretical concept and as an empirical phenomenon, has been central to the development of theory and method in modern linguistic anthropology and sociolinguistics, as well as in sociocultural anthropology and social science more generally. Like the concept of 'culture,' orality is massive in its shaping influence on sociolinguistic (and anthropological) theory, elusive in its definitional essence, and in its very invocation a metonym for ethical, political, and theoretical controversies that far exceed the scope of the present article to review. Clearly, however, an understanding of 'orality' has significance both for the implied or explicit **historical** imagination of Western social science and its readers and for our understanding of how cultural processes are semiotically mediated in a more synchronic and processual sense.

In a deceptively simple formulation, orality could be defined as a phenomenological quality of a given cultural ethos or social institution that is dependent on the production of embodied sound as a primary vehicle or channel for discursive mediation. Such a definition only begins to suggest the productivity of a focus on sound as a medium for meaning for theories of discourse and discourse genres, for basic understandings of what language 'is' in relation to nonlanguage, and for a wide-ranging critique of some key models of social action, change, and organization that have dominated modern Western social thought. The importance of sound is suggested by the widely adopted terminological refinement 'orality/aurality,' underscoring the mediation (and embodiment, to which I shall return) of culture in and as sound, a phenomenology of culture that does not reduce to

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production ('orality') or reception ('aurality') and in which the key theoretical metaphors for cultural processes are 'dialogue' and 'discourse' rather than mechanical, cybernetic, or organic visual images.

Sound, on this account, has generic phenomenological properties (including in its interface with other modalities of semiotic mediation) that specifically contrast with, especially, the visual channel of mediation. This contrast is immediately problematic, suggesting the importance of other axes of contrast discussed below. Indeed, gesture, which is a significant nonsounding and largely visual dimension of all language grammars (and central to some syntactic systems) and of almost all discursive practice, has co-existed happily within theoretical accounts of orality and (with the exception of sign language research) been fundamentally distinguished from literacy, with which it shares the visual channel. This is of course because gesture shares with orality a fundamental inalienability from the context of copresent embodied social interaction, a point I will address below.

The key theoretical opposing term to 'orality' is, canonically, 'literacy,' roughly the porting of language into a fully visual medium dependent on extra-individual technologies of inscription, duplication, circulation, storage, and reception of written texts, and the consequences of that porting for all communicative practices it affects. ('Digitalicity' has also found its way into the keyword canon of late, suggesting another line of theoretical development now under way.) Whether implied or argued, 'literacy' has been widely understood to be a second-order cultural and social phenomenon (or set of phenomena), arising on the foundation of a more 'natural' human condition of orality under specific historical and social conditions. (It is of course simply true that oral communication historically precedes the development of literacy, and that human beings have evolved biologically to be oral/aural/gestural communicators; however, it is now widely believed that gestural communication, using the visual channel, is of similar or greater evolutionary antiquity to speech and conferred certain evolutionary advantages in the course of human evolution.) When those specific historical conditions that favor literacy's emergence are theoretically or politically valorized, literacy is seen as a progressive force in human development. When they are the object of critique, the valorized 'naturalness' of orality is often invoked. In both cases, 'orality' is constructed as a more 'primitive' mode of communication and phenomenology of culture, one that partakes of either noble or barbaric qualities attached to the 'primitive' more broadly, and one that either persists in the form of threatened 'survivals' and commodified simulacra, or is an inalienable component of human nature and thus a living social force. A more recent tradition of thought has come to view the entire orality/literacy distinction (along with the idea of the 'primitive') as ideologically diagnostic of (Western) modernity itself, with 'orality' largely a political construction of the 'literate' imagination (a view widely linked with deconstructionist theory).

Most students of orality, like most students of literacy (who are sometimes the same students), have moved in recent decades toward an interest in the **interaction** of these communicative modes and cultural phenomenologies in modern discursive formations. In many ways, the theoretical discourse on literacy has inversely mirrored that dealing with orality. For example, both orality and literacy are now widely understood to have diverse manifestations, both within and across social, cultural, political, contextual, and linguistic boundaries, and there is no doubt that 'oral' and 'literate' communities and genres (a key concept, see below) can and do interact and mutually shape a total discursive universe. It is indeed now common to write (or talk) pluralistically of 'oralities' and 'literacies' and to avoid generalizations about the overdetermined social effects of the predominance of any one technology of discursive mediation. It is, however, an open question whether advances in theoretical specificity and complexity have caused the obsolescence of the 'Great Divide' tradition, either among social scientists or the educated public. Both groups, after all, are deeply enmeshed within ideologies and institutions in which 'literacy' reflexively rationalizes the social privilege of the literate. Nor is it clear that 'Great Divide' theories (which attribute fundamental differences in consciousness, learning processes, and world view to oral and literate cultures) are without merit as a mode of historical explanation and filter for social understanding, for example, when they are applied to the study of the systematic discrimination against 'oracy' in modern educational institutions.

However, for linguistic anthropologists, the usefulness of the 'orality' concept has centered on its phenomenological implications for an account of communication as a culturally, contextually, socially, individually, and linguistically variable range of practices in the modern present. While most linguistic anthropologists do believe they are developing a general description of the semiotic codes of cultural life – that is, a comparative science aimed at developing a general, crossculturally valid historical and processual theory of communication – contemporary research practice is rooted in contextualized descriptions of specific communicative phenomena, with a strong emphasis on metacommunicative practices, expressive performance and poetics, the integration of

various communicative channels (such as spoken language, writing, and gesture), textuality and entextualization, and the mechanics of referential practice in discourse.

Ethnography is the privileged medium for this research, though works of general theory also abound (with Peircian semiotic theory and functionalist sociology providing primary models and metalanguages). The privileging of ethnography (and especially an ethnographic practice that has been shaped by critiques of 20th-century anthropology's main current of ethnographic theory and method) has serious implications for the standing of orality even among students of social and communicative life in communities and societies that are broadly and stereotypically 'literate.' Another way in which a privileging of orality has served the sciences of communication has been through the development of interdisciplinary links between linguistic anthropology and, especially, ethnomusicology and performance-centered folkloristics, as well as with other disciplines. Obviously, what unites these perspectives is a concern with the sound channel of cultural mediation as a unified (or at least re-integrated) field of research. Within the disciplines of linguistic science, acoustic and articulatory phonology have enjoyed a renewed privilege in the sociolinguistic study of orality, as has, more recently, a lexical semantics focused on sound symbolism, and research on suprasegmental sound elements of language structure, especially sentence intonation and nonphonemic stress. Relationships between music and language and speech and song have also brought certain kinds of musical analysis into a much more central place in the study of communication in general and language in particular. Another link worth mentioning is to literary disciplines, such as translation, in the context of a general advocacy for indigenous cultural rights, language maintenance, and political discourses.

Research falling under the broad heading of a focus on the phenomenology of sound as a medium for cultural reproduction has systematically addressed and altered many key theoretical concepts in linguistic anthropological, literary, and musical scholarship. Among the most important of these concepts are 'text' (and related concepts such as 'context' and 'intertextuality'), 'performance' (which has been systematically recovered from its marginalization within cognitive linguistics and is central to orality research as both an alternative to and an instantiation of 'textuality'), 'genre,' 'social power,' and, most fundamentally, our baseline models of 'cultural memory' and 'dynamics.' Literacy appears to effect an epochal transformation of any given culture's 'archive' of knowledge, making possible the rapid accumulation of massive amounts of specialist knowledge that can be transmitted across space and time (and between genres and texts) without being systematically relearned within each generation or local community. On this account, literacy both enables and is enabled by a ramifying division of intellectual and physical labor, and fosters new kinds of institution that create and sustain characteristic regimes of social power (the valuing of intellectual over physical labor, for example, in the emergence of social class systems). Innovation, or the addition of new material to the archive of stored ('written') knowledge, supersedes replication, and cultural innovators are valorized above cultural replicators. Abstraction of general principles from vast collections of facts (now increasingly modeled after the 'hypertextual' archive of the Internet) becomes the focus of education and social evaluation, rather than mastery of a specific and stable set of 'memorized' facts. Orality depends on a different sort of specialization of intellectual labor, favoring a more conservative emphasis on replication of concrete forms, techniques, formulas, and facts, and a fundamental responsibility of discourse specialists to their constituents to be, themselves, archives (and thus curators) of community knowledge (a key argument of performance-centered folkloristics since the 1970s).

Underlying these theoretical emphases is a basic phenomenological premise: oral/aural discourse (with embodied sound and gesture as its media) is fundamentally context bound in space and in time. Orality depends upon a real or simulated 'live' and copresent interaction. Sound emerges and dies away in the instant of communication, gesture in the blink of an eye. Its inscription freezes some essence of meaning, making meaning available in new and unforeseen contexts of use and interpretation. Clearly, written texts must be able to recover or create their own contexts of use, whether these are generic or novel, or literacy would not be the globally ascendant technology of meaning making and storage that it has become. But an account of orality/aurality as a distinctive phenomenology of culture must be premised on the claim that the meaning of discourse depends on a calibration of shared social experience in the fleeting moment of instantiation, and that some kinds of meaning are greatly enhanced and amplified under these conditions, just as others are diminished or obscured. (It should be pointed out that the technological mediation of sound problematizes this distinction, and has emerged as a major focus of research in ethnomusicology and cultural studies in recent years).

A related formulation might be called the 'naturalization' of sound as a medium, evident in the persistence and continued development of the study of 'sound symbolism' in linguistic anthropology,

maintaining a challenge to the privileging of the 'arbitrariness' of the linguistic sign in structuralist linguistic traditions. Another focus of this perspective (strongly shaped by the influence of Mikhail Bakhtin, ironically a theorist primarily of literary discourse) has been 'reported speech' phenomena, and especially 'direct' discourse idioms, in which the discursive and syntactic principles of imitation and preservation of the context of original 'quoted' utterances favor an elaboration of grammatical markers of evaluation and interpretation carried entirely in such suprasegmental dimensions as tone of voice and rate of speech. Bakhtin's work is also influential for its demonstration of the embedding of oral grammar within literate genres of discourse.

In principle, the visual channel is amenable to the same suspension of the privileging of arbitrariness and investigation of naturalizing mimesis bound to a specific interactive context. The temporal ordering of actions in relation to their agents and objects in syntax, for example, is as much a feature of written as of spoken language, and is subject to a significant range of variation between oral and written discourse within and across languages and dialects. Deictic gestures are, of course, highly context dependent, for example, and appear to vary widely across languages in their grammatical integration with other elements of syntax and discursive form. The iconicity of visual signs has been a major topic in sign language research, and has been treated integrally with other grammatical dimensions of oral poetics (with a focus on reference and deixis) by students of oral discourse. It is significant that so much work on gestural grammar and poetics has occurred in conjunction with work on oral discourse, suggesting an orienting distinction not between the sonic channel and the visual channel, but between the context-bound (and 'naturalized') ground of oral/aural discourse and the decontextualizable and 'arbitrary' ground of written/read discourse.

One further way of locating orality as a distinctive research tradition and perspective must be mentioned. If sound is the physical channel of oral/aural cultural processes, whether in 'primary oral' or 'secondary oral' settings, the body is the instrument or technology for the production and reception of that sound. Anthropological theory, especially under the influence of feminist thought and social phenomenology, has undergone a general and revolutionary 'return' to a privileging of the body in social explanation in recent decades, after a long phase of privileging culture as a mental phenomenon. While reading and writing are certainly embodied processes, they have rarely been studied as such, and embodiment has rarely been viewed as fundamental to the function of literate discourse. The main stream of linguistic science has, certainly since the 1960s, viewed language as primarily a cognitive faculty, somewhat to completely independent of its channel or medium of discursive mediation (though the brain has of course been understood as the embodied locus of that faculty). Linguistic anthropology, however, after a long engagement with cognitivist theory (though not brain science), has increasingly been concerned with discourse as specifically embodied in voice, gesture, and copresent social interaction, with the body seen as the semiotic ground of cultural meaning and experience. In this view, discourse is the embodiment of meaning in social interaction, with the voice as a sign of the social body and a site of a very practical kind of knowledge and consciousness. This has been very productive for the aforementioned engagements between linguistic anthropology and ethnomusicology, especially around the study of song and musical 'speech surrogates,' acoustic iconicity of natural and social worlds, the interaction of phonemic tone, prosodic intonation, and melodic structure and, above all, in the growing attention being paid to the intertwining of speech and song in particular communities and their expressive economies.

Among the most heartening implications of the contemporary research literature in linguistic anthropology and allied disciplines is that orality need not be understood as an overdetermined (or overdetermining) phenomenology of culture. 'Great Divide' views persist, and continue to play an implicit role in shaping the field of anthropological inquiry. But we have also come to see oral discourse as amenable to a sophisticated description using modified concepts developed largely with reference to the grammar, poetics, and social function of literary texts, while we have had our view of literate discourse challenged and altered by what we now understand as the richness, diversity, and orderliness of oral grammar. Earlier fears of the disappearance of orality under a regime of global literacy appear to be unfounded, along with the related fear that primarily oral cultures (or nonliterate individuals) were doomed to be isolated from the developmental benefits of modernity, or condemned to symbolize a lost golden age of unmediated 'natural' discourse and social experience. We are early in an era during which we will see oral grammars systematically described without literate prejudice, and in which the focus of empirical research will increasingly traverse the 'Great Divide,' co-evolving with modern language ideologies, discursive regimes, and communicative technologies and practices.

See also: Spoken Discourse: Types; Text and Text Analysis; Cultural and Social Dimension of Spoken Discourse; Oral Traditions and Spoken Discourse.

Ordinary Language Philosophy

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'Ordinary language philosophy' is the name given to some conceptions of philosophy, which emanated, after the Second World War, from J. L. Austin in Oxford and from Wittgenstein in Cambridge, and which championed the importance for philosophy of attention to ordinary language. The name itself, the origin of which is not recorded, has perhaps been more used by opponents of these ideas then their friends and so has, to some extent, become a term of mild abuse.

Language and Philosophy

Language itself has always been of interest to philosophers. Our ability to understand and use language is such an obvious feature of our cognitive capacities that any attempt to describe and explain cognition must consider language. In the early modern period such philosophers as Locke and Berkeley provided theories of the nature of language, trying to account principally for its semantic properties. Their thinking, however, was dominated by a belief in the priority of thought, conducted according to them in a prelinguistic medium of ideas, over language. Language was regarded as a medium for public expression of private thoughts, and its interpretation was viewed as making words public 'signs for' private ideas. For them the problem, which generated considerable disagreement, was whether the seemingly manifest differences between different parts of language, between, say, names and adjectives, required the postulation of different sorts of ideas. This was, of course, a concern about the nature of ordinary language. By the beginning of the 20th century, a more comprehensive philosophical engagement with the nature of language emerged in the writings of Frege, Wittgenstein, and Russell. This engagement was inspired by the emergence of formal logic, with its semantic categories, and it was not driven by any prior commitment to the priority of thought over language. There was a real concern with a wide range of different constructions in ordinary language. Thus began what became a, perhaps the, central branch of philosophy, the philosophy of language. Of course, this concern with language was a concern with ordinary language, amongst other sorts of language.

Ordinary Language Philosophy

The name 'ordinary language philosophy' does not stand for this general theoretical concern in philosophy with the nature of ordinary language or for any particular theory about ordinary language. Rather, it stands for two linked approaches to, or theories about *philosophy* itself. The approaches shared the conviction that the key to, or at least a necessary condition for, finally solving philosophical problems lies in some sort of detailed attention to ordinary language. This common theme lead philosophers at the time to think that there was a single movement, representing a revolutionary approach to philosophy, which held out hope of laying recalcitrant philosophical problems to rest. However, as we shall see, it is an illusion to think there is a common movement here.

The Oxford Version: Austin

The Oxford ordinary language movement was lead by, or inspired by, J. L. Austin, who became White's Professor of Moral Philosophy at Oxford in 1956. Austin himself did not publish much during his lifetime, but established his leadership within a group of highly talented philosophers in Oxford, including Grice, Strawson, Urmson, and Warnock, partly due to his seniority, but also to his extraordinary critical intelligence and personality. Austin had a deep interest in language and wrote about what he called performative utterances, that is utterances such as saying, in the right circumstances, 'I name this ship Victory,' whereby the act of speech itself accomplishes what it ascribes, in this case conferring a name on a ship. He developed a more general theory of the acts we perform by speech in the William James Lectures he gave at Harvard in 1955, published under the title *How to do things with words*. In these he criticizes his earlier views on performatives and then introduces the famous distinction between locutionary, illocutionary, and perlocutionary acts, which are categories for different types of acts we do in or by using language. Austin also presented his own theory of truth. These publications contain Austin's theories of language and of some of its properties.

Austin, however, thought that, in general, the right method when doing philosophy is to "proceed from ordinary language, that is, by examining *what we should say when,* and so why and what we should mean by it" (Austin, 1961: 129). In the most systematic presentation of his views, in his article 'A plea for excuses,' Austin recommended this for three reasons. The first is that philosophers need to ensure their own language is clear; the second is that we need to prize words apart from the world so that we can look at the world without blinkers; finally, ordinary language

contains many distinctions and subtleties that have withstood the tests of time and so must represent a subtle and plausible way of thinking about things, particularly things in normal life. Austin added that his view is that ordinary language will be the 'first word' when doing philosophy, though it need not be the 'last word.' He recommended that one should regularly consult a dictionary to get the sense of the categories and words related to a certain area or domain. Austin himself spent considerable effort plotting the distinctions that ordinary language categories embody. For example, what is the difference between a tool and a utensil? What is the difference between doing something willingly and voluntarily? Questions such as these were studied in Austin's famous Saturday morning discussion group in Oxford. It is indeed a reasonable conjecture that one thing that appealed to Austin about pursuing such questions is that they can be answered by cooperation within a group, amongst whom agreement can be reached, in sharp contrast to what has traditionally been the very solitary methods of philosophy with its continual disagreements.

Some Questions about Austin's Approach

There is, surely, no doubt that plotting the incredibly subtle distinctions of ordinary language is of interest in itself, and it certainly fascinated Austin. The main question that arises, of course, is what is its relation to, or value for, philosophy. The questions of philosophy are characteristically highly general, such questions as 'Is the will free?,' and 'Do we know about the external world?' How, then, does a study of the subtle and rather specific categories of ordinary language help with them? The major weakness of Oxford-style ordinary language philosophy is that it is not based on any theory of the nature of philosophical questions that explains and justifies the relevance of a study of ordinary distinctions to it. In fact, it would have been somewhat anathema to the mind set of such ordinary language philosophers to have a general theory of philosophy, but it meant that its relevance remained obscure.

When Austin discussed philosophy head on, as he did in *Sense and sensibilia,* criticising the sense datum approach of Ayer, he noted that philosophers employ expressions in a way which does not fit their ordinary use. For example, he pointed out that the central terms 'direct perception' which often figure in the very formulation of the problem are used in a special way (see Austin, 1962: 14–19). It is a mistake though to take this discrepancy as a basis for criticism of the talk by the philosophers. It merely reveals that the philosopher's use is technical and in need of an explanation. Austin also clearly thought that the categories of philosophers are far more general than those which are of normal employment. But, again, this fact, in itself, does not amount to a criticism of those general categories.

If this assessment of the gap at the core of Austin's approach is correct, it explains why the approach, despite the fascinations of its ordinary language investigations, simply withered in its appeal to those engaged by philosophical questions. A crucial moment was the publication in 1959 of Strawson's *Individuals,* with its self-avowed aim of doing highly general metaphysics.

The Cambridge Version: Wittgenstein

The second attitude to philosophy that was called 'ordinary language philosophy' is that of the later Wittgenstein, during his period after 1929 when he was primarily at Cambridge. The major presentation of the approach is in *Philosophical investigations,* published in 1953 after Wittgenstein's death in 1951. In the evolution of his later philosophy Wittgenstein was, in part, attempting to explain why his earlier, highly abstract and metaphysical philosophy, contained in the *Tractatus*, is wrong. In that earlier work, Wittgenstein attempted to describe the essential nature of contingent propositions, and the states of affairs that they report, basically by picturing the elements. There are also the tautologies of logic and mathematics. The pronouncements of philosophy itself seem not to belong to either category, and so the contents of the *Tractatus* were themselves inexpressible by its own standards. Philosophy itself was, therefore, a process you went through in order to realize you had to leave it behind. It is, as Wittgenstein put it, like a ladder you climb only to throw away, no longer needing it. In the process, though, something profound is shown, although not said. This is a highly unusual and paradoxical conception of philosophy.

In the later period Wittgenstein rejected his earlier ideas about the essence of saying, holding instead that speech and understanding are parts of human life, which may take many forms (as Wittgenstein might have said, 'We play many language games'), and which have no hidden common essence that a reflective process like philosophy can discern. However, he retained even in the later period an attitude to what philosophy is that is unusual and paradoxical. His theory is that there are what we might call two activities, which go under the name 'philosophy.' There is, first, traditional philosophy, which for Wittgenstein was often taken to be the *Tractatus,* according to which there are supposed to be distinctively

philosophical problems, concerned with the essence of things and our knowledge of the world, and theories are proposed as answers to these questions and rationally assessed. According to the later Wittgenstein, traditional philosophy is not actually engaging with real problems. They are, rather, pseudo problems. He suggested that engagement in traditional philosophy always stems from an initial mistake when one speaks, employing the words of ordinary speech, in a way which is not actually in accordance with how the term in question is really used. They start, that is, from linguistic mistakes. Wittgenstein's view is that these mistakes are not random, but stem from properties of the language we employ. For example, the fact that I can say both I have a pain in my foot and I have a bone in my foot may lead us to imagine that pains are special objects located in space in the same way as bones. He said, "A picture held us captive. And we could not get outside it, for it lay in our language and language seemed to repeat it to us inexorably" (Wittgenstein, 1963: sec. 115). Wittgenstein likened being misled to being tricked. "The decisive moment of the conjuring trick has been made, and it was the very one that we thought quite innocent" (Wittgenstein, 1963: sec. 308). This is a schematic characterization of what is, in many ways, itself a schematic conception of traditional philosophy.

What we might call real philosophy should, according to Wittgenstein, consist in doing what is necessary to remove the impulse to engage in pseudo theorizing. As he famously said; "What is your aim on philosophy? – To show the fly the way out of the fly bottle" (Wittgenstein, 1963: sec. 309). How is this to be done? Wittgenstein had a negative and a positive claim to make. The negative theme is that the impulse is not removed by offering a positive and novel theory about anything that philosophers have attempted to theorize about. That would be to engage in pseudo theorizing itself. The task, rather, is to remove the impulse, and it should be viewed as akin to exterminating a disease. "The philosopher's treatment of a question is like the treatment of an illness" (Wittgenstein, 1963: sec. 255). So the real philosopher should produce something like a pill which removes a headache. It is this idea that is meant when Wittgensteinians talk of philosophy as therapy. The positive recommendation is that the pill should be a reminder how language is actually used. "What we do is to bring back words from their metaphysical to their everyday use" (Wittgenstein, 1963: sec. 116). He added that "when I talk of language . . . I must speak the language of every day" (Wittgenstein, 1963: sec. 120). Hence, the idea is that proper philosophy consists in reminding those in the grip of traditional philosophy how we ordinarily speak. This, then, is the idea of Wittgensteinian ordinary language philosophy.

Some Questions About Wittgenstein's Approach

Of the many questions that Wittgenstein's later conception of philosophy prompts, I shall restrict myself to two. Does Wittgenstein's own practice actually fit it? It is fair to say that Wittgenstein is, in his later period, primarily a negative thinker, his primary aim being to show what is wrong with standard philosophical ideas about, for example, understanding, following rules, sensations, action, and necessity. However, he did not think that simply reminding people of what they say accomplishes such criticisms. Rather, his practice was to think himself into the views in a highly creative way to the point where it becomes clear that they represent illusions, but where it is also revealed why they might seem attractive. It is therefore highly misleading to summarize Wittgenstein's own practice as reducing to reminders of what ordinary people say. Second, although Wittgenstein officially seems to think that proper philosophy does not propose theories or add to understanding, he clearly advances theories or semi-theories himself. Thus, he positively links meaning and use (see Wittgenstein 1963: sec. 43), and he is often taken to be arguing for the clearly philosophical proposition that a private language is impossible (see for example, Wittgenstein, 1963: secs. 258–279). It is, therefore, colossally misleading to think that describing Wittgenstein as an ordinary language philosopher captures his real approach to philosophy.

The second question is whether there is any reason to accept Wittgenstein's official account of the nature of philosophy. There is no *a priori* demonstration by Wittgenstein that the massive variety of questions that traditional philosophers have grappled with are all pseudo problems, grounded at some point in a misuse of ordinary language. Indeed, that seems a remarkably implausible thought. To take an example, traditional philosophers often debated what it is to understand a word. Wittgenstein brilliantly criticized the most popular answer, but it does not follow that the question is misconceived and does not merit a theoretical answer. Moreover, Wittgenstein was, as we have seen, moved to indicate his own answer in terms of use and practice. It seems to me, therefore, that we should regard the attitude to philosophy in the later Wittgenstein as simply an ungrounded and independent commitment within his thought, which does not even fit his own practice.

Conclusion

Austin's own theories about language and knowledge and his critical discussions of the philosophy of perception have remained influential, but both the rhetoric about the centrality to philosophy of ordinary language and the practice of attending to it for the reasons that Austin gives have vanished. Wittgenstein's approach to philosophy is still accepted by some people, but for most the real interest of the later Wittgenstein lies in his discussions of such central concepts as understanding, meaning, rule following, privacy of experience, and so on, and not in his extreme attitude to philosophy.

However, the emphasis on attending to ordinary language lead to significant advances in the theory of language. When philosophers recommended studying ordinary language, they usually meant, or at least said, that it was to be done by asking whether we would or would not say a certain thing in a certain circumstance. So determining the verdict of ordinary language meant determining what would be said. The philosophical relevance of this was supposed to consist in its showing that a philosophical theory which affirmed that P is actually true in circumstance C, would be wrong if we would not say that P in those circumstances. This prompted Grice, who had been part of the circle around Austin, to reflect on the relation between what is true and what we would say. He noted that truth alone is not usually sufficient to lead to speech, but rather, speech is governed by principles, such as 'Be helpful' or 'Be informative.' He explained in terms of this theory how the saying of something can carry an implication that in no way corresponds to what the remark literally entails. For example, if I remark 'The Provost is sober today' my doing so carries the implication that he is normally not sober. Whether Grice's theory is correct is still under discussion, but the contrast between speech and truth, which is damaging to the rhetoric of 'ordinary language philosophy,' has now become conventional wisdom in philosophy. This insight probably emerged when it did because of those tendencies known as 'ordinary language philosophy.'

See also: Cognitive Science and Philosophy of Language; Speech Acts; Austin, John Langshaw (1911–1960); Grice, Herbert Paul (1913–1988); Strawson, Peter Frederick (b. 1919); Wittgenstein, Ludwig Josef Johann (1889–1951).

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Organizational Discourse

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Despite the diversity of their approaches, agendas and objects of scrutiny, several fields of study can be said to be devoted today to the analysis of organizational discourse, that is, the analysis of talk, writing and nonverbal communication in organizational settings. Although sources of disagreement are plentiful (Putnam and Fairhurst, 2001; Fairhurst and Putnam, 2004), scholars interested in this type of inquiry generally agree that the manner people communicate makes a difference in the way organizations come to exist, function and dysfunction. Whether the objective is to describe or denounce what is happening in organizations, studying organizational discourse enables analysts to reveal key organizational phenomena as

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See also: Cognitive Science and Philosophy of Language; Speech Acts; Austin, John Langshaw (1911–1960); Grice, Herbert Paul (1913–1988); Strawson, Peter Frederick (b. 1919); Wittgenstein, Ludwig Josef Johann (1889–1951).

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varied as identity (Phillips and Hardy, 1997), leadership (Fairhurst, 1993, 2001; Fairhurst and Sarr, 1996), negotiation (Hamilton, 1997; Putnam *et al.*, 1991), domination (Deetz, 1992; Mumby, 1987), or control (Yates, 1993; Winsor, 2000).

For the past 10 years, a growing body of literature has, for instance, developed around the topic of organizational communication as(a) genre(s). At the origin of this movement, one can identify an article by Miller (1984), who problematizes genre as a form of social action, that is, as 'a typified rhetorical action' (Miller, 1984: 151) connecting specific ways of doing things with recurrent situations. Typical genres that can be identified in organizational settings are documents such as memos (Yates, 1989), work orders (Winsor, 2000), checklists (Bazerman, 1997), records (Schryer, 1993) but also social events such as meetings or training seminars (Orlikowski and Yates, 1994). As 'typified communicative practices' (Yates and Orlikowski, 1992), these organizational genres are characterized by forms that organizational members, by imitation, tradition or imposition, reproduce when they communicate. By focusing on these patterns, those studies demonstrate how the routinization of situations, practices and objectives, so typical in organizational settings, come from the **iteration** of textual and physical modes of communication. These forms, which always evolve historically (Yates, 1993; Zachry, 2000), not only punctuate the identity game of a given organization, but also participate in the very process of organizing.

Another way to approach organizational discourse, which has been the focal point of a very important body of literature, is to focus on organizational narratives and storytelling. Why narratives? One explanation is that these discursive forms are not only action-oriented (they speak about events that happen in a given world, whether fictional or real), but also organized and ordered (they articulate these different events in a structured whole). These two qualities make organizational stories especially interesting to scholars interested in organizational values and identities (Meyer, 1995; Czarniawska, 1997), socialization processes (Brown, 1985, 1990; Kreps, 1990), organizing (Browning, 1992; Weick, 1995; Weick and Browning, 1986), ideologies (Mumby, 1987, 1993) or organizational tensions and conflicts (Helmer, 1993). To paraphrase Czarniawska's (1997) book title, all these studies show how organizational members 'narrate the organization' to make sense of their organizational experiences. This type of activity can of course be used strategically to advance a specific way of interpreting what is happening inside or outside the organization (Boje, 1995; Boje *et al.*, 1997). Given that each narrative represents a specific mode of ordering experiences, it constitutes a privileged way to manage meaning (Weick, 1995) and influence the interpretation of events (see especially Robichaud 1998a, 1998b, 2001, 2002, 2003) (*see* **Narrativity and Voice**).

The study of interactions also constitutes an important center of attention for scholars interested in organizations. Following the interpretive turn in organizational studies (Putnam and Pacanowsky, 1983), more and more analyses are indeed devoted to the way organizational members interact and exchange in organizational settings. For instance, the movement called interaction analysis (McDermott and Roth, 1978) principally focuses on how 'individuals constrain each other's linguistic behavior' (Fairhurst, 2004) and highlights the sequential effects of interactions, so crucial in organizational processes (Fairhurst and Cooren, 2004). For interaction analysts, studying organizational discourse thus consists in identifying patterns of coordinated behaviors, which leads them to conceive of organizations as temporal forms: a bottom-up approach that presents a dynamic view of organizing. This approach involves the classification of turns of talk according to a predefined set of codes, which enables analysts to assess the frequency and iterability of specific patterns of verbal exchanges between organizational members (Bakeman and Gottman, 1986; Gottman, 1982). This type of analysis has been especially useful in identifying models of interaction for negotiation and bargaining sequences (Putnam, 1990), decision-making processes (DeSanctis and Poole, 1994), or manager–employee relationships (Fairhurst *et al.*, 1995).

Another dynamic view of organizational processes can also be found in the work of conversation analysts and ethnomethodologists who have devoted some or most of their analyses to the functioning of interactions in organizational and institutional settings (Drew and Heritage, 1992). In this respect, Boden's (1994) book, *The Business of Talk*, certainly constitutes one of the most important contributions to this field of research. Paraphrasing Heritage (1984), Boden contends that, '[w]hen people talk, they are simultaneously and reflexively talking their relationships, organizations, and whole institutions into action or into 'being'' (Boden, 1994: 14). In other words, any organizational phenomenon, whether it is a matter of identity, control, leadership, or even power, has to be incarnated and negotiated in interaction in order to be brought into being. Through a very detailed analysis of the organization of talk-in-interaction, conversation analysts have,

for instance, convincingly shown how key conversational phenomena such as openings and closings, turn takings, adjacency pairs, topic shifts, disclaimers or alignments (Fairhurst and Cooren, 2004; *see* **Conversation Analysis**) can play central roles in processes as diverse as calls for emergency assistance (Whalen and Zimmerman, 1998; Zimmerman, 1992), group discussions (Adkins and Brashers, 1995), or decision-making processes (Boden, 1994).

Finally, and in keeping with the view according to which written, oral and gestural forms of communication participate in the very constitution of organization (Fairhurst and Cooren, 2004; Grant *et al.*, 1998; Keenoy *et al.*, 1997; Mumby and Clair, 1997; Putnam and Cooren, 2004), an effort at synthesis has also been developed around Taylor and Van Every's (2000) work. One of the main critiques addressed to scholars studying the microphenomena of organizational speech is that their study does not always do justice to the translocal dimension of organizations. In other words, most of the analyses in this field of research tend to focus on what happens **in** organizations, but do not necessarily go as far as to question the **mode of being** of these collective entities. Following an original intuition by John Dewey (1964), Taylor (1993) has, for the past 10 years, set about showing that instead of focusing on the communication in the organization, one should rather concentrate on the organization in the communication (Taylor and Robichaud, 2004).

This new approach to organizational discourse leads us not only to focus on the organizing property of communication (Cooren, 2000), i.e., how speech acts organize, but also on the communicative constitution of organizations (Taylor *et al.*, 1996). According to this view, the mode of being of an organization articulates itself around two essential modalities of communication: the conversational modality, which corresponds to the local, fluid, and actional dimension of speech, and the textual modality, which relates to its translocal, relatively fixed, and iterable dimension. By analyzing these two modalities of organizational discourse, one can show that the way people communicate, i.e., the conversational form, does make a difference in the way organizations come to exist, but that this existence also depends on what is communicated, the textual forms, which transcends the here and now of interactions. According to Taylor and Van Every (2000), the organization as a form of life lies in this interplay between the relative fixity of texts and the fluidity of conversations.

See also: Conversation Analysis; Critical Discourse Analysis; Ethnomethodology; Narrativity and Voice; Speech Acts: Definition and Classification.

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It is immediately necessary to distinguish between Language, the human capacity for language, and particular languages, such as Swahili, Swati (spoken in Swaziland), and Swedish. The origin and evolution of the human language capacity are essentially a biological matter, with the crucial information transmitted across generations via DNA. The evolution of Language in this 'phylogenetic' sense is relatively slow, like all biological evolution. Biological evolution in the wild (that is, under natural rather than artificial selection such as is involved in the domestication of animals) takes tens of thousands of years to produce noticeable results across a species as a whole. It is likely that much of the modern human capacity for language evolved slowly over millions of years and was fully in place approximately 150 000 years ago with the emergence of our species, *Homo sapiens sapiens*.

By contrast, the origin and evolution of particular languages happen through individuals in each generation learning their native language from the behavior of the previous generation. A newly conceived human embryo stands at the end of the biological transmission process – its distinctive genes, allowing it to develop a brain capable of acquiring a human language, are all ready to go. The same embryo stands at the threshold of the individual developmental, or 'ontogenetic' process. Once its brain is sufficiently formed, it starts to soak up the linguistic data in its environment and to internalize its own slightly idiosyncratic and new version of the language of its community. The sum of such slight modifications of a language by each generation of new learners amounts to what has been called the 'glossogenetic' evolution of a language over centuries. The evolution of languages by this cultural process is relatively fast and can easily be observed in time spans of less than a century. Older speakers of modern languages are aware of differences between 'old-fashioned' and 'newfangled' pronunciations, idioms, word senses, and even grammatical constructions.

The phylogenetic origins of modern human language capacity are surveyed in the first major section of this essay, and we survey the mechanisms of the glossogenetic evolution of the structures of particular languages in the second major section.

Biological Origins of the Language Faculty

A newborn human baby is 'language-ready.' This language readiness arose in our species through an accumulation of enabling biological changes, few of which were specific adaptations to the current functions of language, such as communication and thought. One can discern the steps toward human language readiness by noting abilities in other species similar to those that play a part in human language. In no other species do all the components come together as they do in humans; only humans have full language readiness. Where similar abilities can be found in humans and closely related species, such as great apes, these abilities may be regarded as homologous, attributable to common ancestor genes. Where similar abilities relevant to language can be found in humans and distantly related species, such as birds or marine mammals, but not in our closer relatives, these abilities must be thought of as analogous, due to independent convergent evolution. Convergent evolution suggests that natural selection has more than once shaped dissimilar genetic material to produce phenotypes that fulfill similar functions.

Birdsong is an example of a trait in distantly related species analogous to certain properties of human language (learning of somewhat complex serial signals). Such examples lead us to consider functional pressures on evolution that are not generally thought of as central functions of language. It is often assumed, for instance, that the human ability to control complex signals (the phrases and sentences of a human language) must have evolved for the purpose of conveying complex propositional messages. Birdsong, however, involves control of complex serial signals

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Origin and Evolution of Language

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(though not as complex as human utterances), and yet the functions of birdsong do not include conveying complex propositional messages. The only functions of birdsong are courtship and warning invaders off one's territory.

The human language faculty, in the broad sense, was assembled over millions of years, during which our ancestors gradually evolved toward the modern human state of language readiness. This evolutionary process was not, of course, driven by any vision of modern language as a goal, nor indeed by any goal at all. Simpler analogues of the components of the modern human language faculty can be found at all levels of description: pragmatic, semantic, lexical, phonetic, phonological, and syntactic. Each such component served some relatively simple adaptive function for its possessors, and these functions can still be seen in language, often now combined with other functions to yield the more complex functions served by modern language.

Evolutionary Precursors of Linguistic Pragmatics

Animals of the same species deal with one another. Sometimes these dealings involve no negotiation, as with raw aggressive behavior. But more often signals are given analogous to human speech acts, cueing the animals concerned to a constrained set of responses. Thus, animals ritually threaten each other, greet each other, submit to dominant conspecifics, play with each other, signal closeness (e.g., by grooming), court mates with forms of symbolic foreplay, keep in touch with the group, and convey alarm. Although most such signals have a strong innate component, not needing to be learned by the animals, their meanings are not immediately transparent to a human observer or iconically connected to the signals. Such ritualized behavior between animals can be observed across a wide variety of species, in both vertebrates and invertebrates. Animals of any species with the rudiments of social life display such elements of 'interpersonal' communication. (See Haiman, 1994, on the relationship between ritualization and the evolution of language.)

Among humans, successful communication depends on being able to read the intentions of others even when these are not made fully explicit. Animals are able to anticipate the actions of others, based on small preparatory moves. Whether any nonhuman is capable of a full 'Theory of Mind' is a matter of much controversy. (See Call *et al.*, 2003; Tomasello *et al.*, 2003.) What is certain is that animals engage in at least an elementary form of mind-reading (in the sense of predicting actions) and manipulation of others (sometimes competitively, sometimes cooperatively) (see Krebs and Dawkins, 1984, on mind-reading and manipulation in animals, and see Carpenter *et al.*, 2004 on different reactions by chimpanzees to cooperative and competitive human behavior). In the pragmatics of human language, Grice's Cooperative Principle (Grice, 1967) plays a substantial role. Humans go through rather long trains of thought, figuring out to what purpose someone said something, and make cooperative replies designed to help the interlocutor achieve that purpose. There is no evidence of such deep cooperativeness in nonhuman animals. When packs of animals hunt together, they are cooperative in only a weak sense. The pack members share a common goal, and each animal directs its own actions in accordance with the overall situation, including the actions of other members of the pack. If one lioness goes out to the right of the prey, another will move out to the left, blocking the prey's escape, but the lionesses have not planned this coordination using any deliberate signals, let alone any mention of common interest.

The assumption that a signaler is being cooperative, sending information that will benefit the recipient, is crucial in human language. The most basic kind of such cooperative signaling is deictic pointing. Humans point to objects in order to draw attention to them for some purpose involving collaboration between the people present. Although chimpanzees are quite adept at gaze-following, telling what another chimpanzee, or human, is looking at, they are not as good as humans at following deliberate pointing gestures and make such gestures themselves less often than humans. This can be interpreted as indicating a lesser role for deliberate cooperation between individuals in chimpanzee life. Interestingly, domesticated dogs are very adept at following human pointing gestures (better than chimpanzees) (see Call *et al.*, 2003). Dogs are descended from wolves and have been selectively bred by humans over the past 10 000 years. This indicates that a disposition to cooperative behavior of a certain restricted sort can be made to evolve relatively quickly. It also raises the intriguing possibility that humans have, in their relatively recent evolutionary past, domesticated themselves, by selecting mates with pragmatic dispositions ever closer to those found in modern humans.

The more elaborate manifestations of modern human pragmatics, as seen in the illocution of an utterance such as *I promise to call John tomorrow* or the implicature behind *Pierre is French but a rotten cook*, could not have evolved without the emergence of other components of modern language, such as

reference to entities other than speaker and hearer (e.g., John), more abstract semantic categories (e.g., the social obligation implicit in *promise*), and complex syntax (e.g., conjunction of clauses and phrases).

Evolutionary Precursors of Semantics

Within linguistics, semantics is defined as the relationship between linguistic entities, such as words, phrases, and sentences, and entities in the (real or imagined) world, such as individual objects, classes of objects, properties, relations, events, and situations. Most semantic theories take this relationship to be indirect, mediated by private mental representations typically called concepts. There is territorial wrangling over the term 'concept,' with some (mainly philosophers) insisting that concepts are inextricably bound to words and cannot exist without some linguistic counterpart. Researchers in animal behavior, on the other hand, are generally willing to attribute concepts to nonlinguistic creatures and furthermore make no crucial distinction between concepts and mental categories. It is on this basis that one can speak of animal precursors to linguistic semantics, even though the animals concerned may have no public signaling system. On this view, the first step toward a public signaling system simply involves associating particular gestures or sounds with the preexisting concepts. Whether this step of associating a public symbol with a concept actually affects the nature of the concept in some way is an interesting question. We should not expect animal concepts to be exactly like ours. An animal that can distinguish different types of predators, as vervet monkeys can distinguish leopards, martial eagles, and pythons, can be said to have 'concepts of' these predators. But the vervet concept of LEOPARD cannot be as rich as that which an English speaker associates with the word *leopard*, involving, for example, superordinate categories such as MAMMAL, VERTEBRATE, and ANIMAL. Furthermore, the vervet's LEOPARD concept seems likely to encompass not only sensory recognition of leopards, but also motor information about appropriate evasive action in the presence of leopards. In this way, a vervet's concept of a leopard may more closely resemble a human's concept of a tool, such as a screwdriver, which involves not just sensory recognition of screwdrivers but motor associations of appropriate actions to make with a screwdriver (see Chao and Martin, 2000).

There is no doubt, among animal researchers at least, that many nonhuman animals have far richer systems of mental representation than was earlier suspected. Examples are rhesus monkeys, who 'know when they remember' (Hampton, 2001). These monkeys' performance on tasks improved significantly when they were given a 'do not know' option, showing that the monkeys could tell the difference between what they knew and what they did not know. Another well-known example is Alex, the African grey parrot (Pepperberg, 1999). Alex can inspect an array of objects and report whether they are the same in color, in shape, in material, or in no properties at all. This task involves reasoning at what logicians call a second-order level. Alex must inspect each object and remember its color before going on to inspect the next object; when he has inspected all the objects, he must compare the remembered color categories for sameness; if they are all the same, he then must call up the superordinate category COLOR (as opposed to particular colors, such as BLUE or GREEN) and report to his trainer 'color.' It takes a great deal of training to get Alex to do this, and his performance is not 100%, although it is significantly above chance. But the experiments do reveal a previously unsuspected richness of mental representation of the world in a nonlinguistic creature.

It has been argued, on the basis of neural evidence, that many higher mammals possess the equivalent of the logician's distinction between a predicate and its arguments. Hurford (2003) related the logical predicate/argument distinction to separate neural pathways (ventral and dorsal) in the visual and auditory processing systems of primates and even animals as distantly related to us as cats.

Such examples do not imply that animals' representations of the world are exactly like our human mental representations, and humans are certainly able to think more elaborate and complex thoughts than animals. Much of the human advantage in thinking can be attributed to our linguistic ability, to the fact that we can attach public labels to our inner representations and arrange these labels syntactically into complex grammatical forms that we can rehearse aloud (or at least consciously). Numerical cognition is a good example. The language of an Amazonian tribe, the Pirahã, has no words for numbers of any kind, and adults who speak only Pirahã cannot manage very simple numerical tasks, such as matching two small sets (Gordon, 2004). But Pirahã children can be taught numeral words and then manage such tasks adequately. Human thought is festooned with abstractions that are accessible only through language.

The step of attaching learned arbitrary public labels to inner concepts is not known in any nonhuman species in the wild. But domesticated and human-reared animals can be trained to associate arbitrary labels to objects and actions. The best known example is Kanzi the bonobo, who acquired a vocabulary of

approximately 200 words by the age of 6 (much less than a human child at that age) (see Taylor *et al.*, 1998.) Another example is Rico, the border collie, who has also learned approximately 200 words, and, like humans, 'assumes' that a strange word refers to a strange object (Kaminski *et al.*, 2004). These animals can, with labor from trainers, achieve a basic referential connection between signals and concrete objects, actions, and events. This (without the training effort) is how children learn some of their first words. But children also soon begin to acquire word senses very quickly through association with other words in meaningful sentences. Although Alex the parrot can be credited with knowing word meanings that are somewhat abstract (e.g., *color*), the rate at which children acquire such meanings, and the number of meanings acquired, far outstrips what any nonhuman can manage.

Evolutionary Precursors of Modern Human Phonetics

Phonetics is concerned with the mechanics and hardware of speaking and hearing, with the vocal tract and the musculature controlling it, and with the structure and function of the human ear. We deal with hearing first.

Human hearing is, to a first approximation, very similar to that of all other mammals. Chinchillas make human-like categorical auditory distinctions between voiced and voiceless sounds (Kuhl and Miller, 1975). Tamarins can distinguish between different human languages on the basis of their rhythmic patterns, so these monkeys can hear (at least some of) the same rhythms that humans can hear (Tincoff *et al.*, 2005). Pinker and Jackendoff (2005) cited a number of research papers showing that human brains systematically process speech sounds differently from nonspeech sounds. This shows that at a certain level of detail, human speech perception differs from sound perception by animals. But it also shows an interesting parallel adaptation in human and nonhuman hearing. Songbirds pick out the songs of their conspecifics from all the other birdsongs in their environment and react differently to them. We humans, like songbirds, have adapted our hearing to be especially sensitive to the meaningful sounds made by our conspecifics.

A persistent theme in human phonetics is the 'Motor Theory of Speech Perception' (Liberman, 1985), which holds that the acoustic stimuli impinging on the ear are transformed by the brain into representations of the articulatory gestures required to make them. Recent discoveries of mirror neurons (Rizzolatti *et al.*, 1996) have revived this possibility. An automatic translation by the brain of acoustic signals into articulatory information can help to explain the remarkable capacity that human children have for extremely fine-tuned imitation of speech sounds.

Closely related primates have vocal tracts that are somewhat similar to that of humans, but here there is a far greater difference between us and our close relatives. All structures of the human vocal tract are, of course, exapted from earlier functions not connected with speech: the tongue is used for chewing, the glottis for bracing the chest, and so on.

Chimpanzees are incapable of speech; at best they can manage approximately four different grunts, which a generous human hearer can interpret as corresponding to English words. But they have nothing comparable to the extremely nimble and delicate control of lips, tongue tip, tongue blade, tongue body, tongue root, soft palate, and larynx involved in human speech. This human vocal agility is a relatively recent evolutionary development. We cannot tell exactly how long ago it evolved, but it is likely to have been well within the last million years. MacLarnon and Hewitt (1999) have found that the thoracic canals of modern humans and Neanderthals are significantly wider than those of australopithecines and *Homo ergaster*; this indicates an evolutionary development some time within the last million and a half years of the finely modulated breath control required for human speech. Another clue to the relatively recent evolution of finely articulated speech comes from research on a family, the KE family, roughly half of whose members suffer from a marked articulatory deficit (oro-facial dyspraxia; see Vargha-Khadem *et al.*, 1995; Watkins *et al.*, 2002). This deficit has been traced to a point mutation in a single gene, FOXP2. The modern human form of this gene has undergone two significant (amino acid changing) mutations estimated to have happened in the past 150 000 years. (See Enard *et al.*, 2002).

The organization of speech sounds into longer structures, such as syllables, is strictly a matter of phonology, rather than phonetics, but a very ancient biological origin for the basic shape of the most common human syllable (consonant–vowel, CV) has been suggested by MacNeilage (1998), who related this syllable shape to basic movements of the lower jaw. "These communication-related frames perhaps first evolved when the ingestion-related cyclicities of mandibular oscillation (associated with mastication (chewing) sucking and licking) took on communicative significance as lipsmacks, tonguesmacks and teeth chatters – displays which are prominent in many nonhuman primates" (MacNeilage, 1998: 499).

Precursors of Modern Syntax

The syntax of human languages is more than just stringing words together. Yet an ability to string basic units together in systematic ways is fundamental to human syntactic capacity. Without this basic ability, the more complex grammatical structures and relationships could not be built up. Although nothing like compositionally meaningful serially organized signals can be found in nonhuman animals, many birds, some whales and dolphins, and some primates do display an ability to produce quite long sequences of sounds consistently. These sequences of sounds are made up of smaller units, and there is some optionality in the placing, omission, or inclusion of these smaller units.

> "Male gibbon singing performances are notable for their extreme versatility. Precise copies of songs are rarely repeated consecutively, and the song repertoires of individual males are very large. Despite this variability, rules govern the internal structure of songs. Male gibbons employ a discrete number of notes to construct songs. Songs are not formed through a random assortment of notes. The use of note types varies as a function of position, and transitions between note types are nonrandom" (Mitani and Marler, 1989: 35).

Gibbon songs are not semantically compositional. It is not the case that the smaller units have meanings that are combined to give the meaning of the whole song. In this way, despite their apparent complexity, gibbon songs, and indeed the songs of all nonhuman animals, differ radically from human sentences, whose meanings are determined compositionally as a function of the meanings of their basic meaningful parts (morphemes). These singing animals have the ability to memorize strings of units as a whole. This ability survives in modern humans, who are able to recite mantras or sequences such as phrases from a Latin Mass or the Qur'an without knowing the meanings of their separate constituent parts or the grammatical properties of these sequences.

The attachment of meanings to the basic units of serial signals, with an understanding that these are to be combined systematically to yield 'larger' more complex meanings, lies at the heart of modern human syntactic ability. It is an open question whether modern human syntactic ability requires more than this. Throughout much of the second half of the 20th century, syntactic theory insisted that human syntactic ability involved far more than this, and detailed, specifically syntactic (as opposed to semantic or general cognitive) innate principles were attributed to newborn humans. The theoretical pendulum has now swung away from this view and it is now suggested that a capacity for recursion may be all that is distinctive of human syntactic ability (Hauser *et al.*, 2002). The hunt is on for evidence that nonhuman animals carry out recursive computations in their activities. Certainly there is no sign of any recursive (as opposed to merely iterative) organization in the communicative serial signals of nonhuman animals.

Cultural Evolution of the Scaffolding of Modern Languages

The facts surveyed above give a picture of a species that is in many respects language-ready, engaging in significant interpersonal interactions, being somewhat cooperative, having a somewhat rich array of concepts of the external world, having acute hearing tuned to conspecifics, and being capable of making finely controlled speech sounds, of learning arbitrary associations between speech sounds and concepts, and of producing systematically structured sequences of sounds. It may be reasonably supposed that this description characterizes the earliest examples of *H. sapiens sapiens,* existing approximately 150 000 years ago. This species may have inherited from its ancestors some simple communicative codes probably of the type described as 'protolanguage,' in which messages are composed by stringing a few elementary signals, which are arguably describable as words, together in ways determined directly by the pragmatics of the speech situation. Pidgin languages used in *ad hoc* situations between communities that do not share a full language also have this very basic format, with no proper syntax. Modern children at approximately the 2 year old stage also talk like this. Think of 'Tarzan talk.' What happened next?

Clearly, at some time between 150 000 and 40 000 years ago (opinions vary widely), there was a drastic explosion in the structures of languages, and probably coevolving with these, as fast as biology will allow (also an uncertain quantity), there were further genetic adjustments, allowing humans to use the new emerging codes ever more rapidly and more automatically. Possibly a genuine *H. sapiens sapiens* of 150 000 years ago (genuine in the sense that it could have mated successfully with one of us) may not have been quite as genetically language-ready as a modern child. We have, as yet, no way of knowing.

Given the array of language-ready abilities that we have attributed to the earliest *H. sapiens sapiens*, there are some well-understood ways in which some of the complex structure found in modern language could have grown without further biological/genetic changes. Two basic processes are involved in the glossogenetic mechanisms by which grammatical and phonological structures grow incrementally over generations in the history of a language. These are

learning and production. Learning is a matter of an individual internalizing rules and generalizations about a language on the basis of experience of the utterances produced around him or her. Production is a matter of putting that knowledge to use in composing new utterances. Evidently learning and production are yoked together in a perennial cycle. The productions of one generation are input to the learning of the next generation, and what is learned by one generation informs its productions input to the next generation. This interdependence of privately internalized grammars (competence) and corpora of public utterances (performance) is at the heart of language. It was recognized in some (rather enigmatic) form by Saussure (1916, 1959), expounded by Andersen (1973) as involving two kinds of change, 'abductive' and 'deductive,' and has been implemented computationally under the banners of 'expression/induction' models (Hurford, 2002) and 'iterated learning' models (Kirby and Hurford, 2002). All this rests, of course, on the assumption of the appropriate social and psychological preconditions, such as cooperative willingness to give informative signals, and a rich conceptualization of the world.

Evolution of the Basics of Phonological Structure

Human language is special by virtue of its duality of patterning, the existence of two distinct layers of organization, the phonological and the morphosyntactic. Phonological structure deals with putting meaningless units, such as phonemes or bundles of distinctive features, together into larger units such as syllables. Morphosyntactic structure deals with putting meaningful units, morphemes, together to make words, phrases, and sentences. It is possible to imagine a communication system without this two-layer organization. If humans had vast memory resources for holistically storing morphemes and their meanings, there might be no advantage in storing the morphemes as composed of lower-level units such as phonemes. But language is not like that. The existence of a separate layer of phonological structure is tantamount to the fact that the basic meaningful units are composed from a small set of reusable phonetic segments.

Several computational modeling studies have demonstrated a mechanism whereby a community can start without this basic phonological level of organization and end up with signals organized into reusable (but still meaningless) segments. The first such study was by Lindblom *et al.* (1984). This computational model started with a set of 500 'trajectories' defined over an acoustic space and finished with a small subset of trajectories being selected on the basis of a compromise between maximal distinctiveness and ease of articulation. Most significantly, the emergent trajectories all reused starting and ending points from a small set, which the authors identify as emergent phonetic segments. This rather abstract result is highly significant. The known single-unit signals of animals, such as the barks, chutters, and grunts of vervet monkeys, seem to be holistic single gestures, not composed of the same reused starting and ending points, the early precursors of phonetic segments.

A further advance in our understanding of the evolution of phonology comes from the computational models of de Boer (2001). De Boer showed a mechanism by which languages can, over many generations, evolve various vowel systems. The vowel systems that emerge in his model are quite similar to the attested vowel systems of languages across the world, from simple 3-vowel systems to more complex 10- or 11-vowel systems. The statistical distribution of vowel systems emerging from his model also resembles the distribution of systems found in real languages, with the symmetric 5-vowel (i, e, a, o, u) system being the most common. In this model, too, the result is partly obtained as a result of competing pressures of distinctiveness and economy. The significance of studies such as these is their reasonably solid grounding in realistic acoustic and articulatory physiology, coupled with the sociohistorical dimension of iterated transmission, via production and learning, of the systems themselves. Such studies begin to answer the question "How did the vowel systems of languages get to be the way they are?" That is, they propose an explanation for aspects of the modern form of languages in glossogenetic terms of growth and change over several (often many) generations.

Evolution of Grammatical Structures

The theme of glossogenetic growth of linguistic structure is strongly represented in a stream of studies under the heading of grammaticalization (Traugott and Heine, 1991; Hopper and Traugott, 1993; Traugott, 1994; Pagliuca, 1994). This tradition of study is rooted in historical linguistics, which gives it a strong empirical basis. Grammaticalization theorists observe that there is a frequent type of historical grammatical change, from very basic syntactic categories, such as Noun or Verb, to more specialized syntactic categories, such as Auxiliary Verb, Determiner, Preposition, and Complementizer. These latter specialized categories arise during the course of the history of languages by recruiting particular members of the more basic categories to specialized purposes. An example is the English Auxiliary Verb *have,* as in

John has gone, now a separate lexical item from its historical parent, which conveyed only the meaning of ownership. The process can be seen happening rather quickly in creolization. In Tok Pisin, the creole language of Papua New Guinea, a suffix *pela* or *fela* is attached to adjectives, serving as a morphological marker of adjectival status; this suffix is historically derived from the English Noun *fellow.* Coming as they do from historical linguistics, most grammaticalization theorists have been reluctant to speculate very far about the more remote prehistory of languages. But the general unidirectionality of the changes brought about by grammaticalization has a clear implication for the origins and prehistory of the syntactic systems of languages. The syntactic systems of the earliest languages were much simpler than those of most modern languages, perhaps having no more than two basic syntactic categories, Noun and Verb, and perhaps not even those, and the more complex modern grammatical systems have arisen through grammaticalization. This idea has been picked up and explored rather thoroughly by Heine and Kuteva (2002a, b).

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication: Dialogues; Animal Communication: Long-Distance Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Signal Detection; Animal Communication: Vocal Learning; Apes: Gesture Communication; Bats: Communication by Ultrasound; Bee Dance; Birdsong; Categorical Perception in Animals; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Cultural Evolution of Language; Development of Communication in Animals; Dialects in Birdsongs; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Fish Communication; Frog and Toad Communication; Grammaticalization; Individual Recognition in Animal Species; Insect Communication; Non-human Primate Communication; Production of Vocalizations in Mammals; Traditions in Animals; Vocal Production in Birds.

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Origin of Language Debate

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Preliminaries

The origin of language belongs to the most prominent topics of linguistic discussions in the 18th century. There is no doubt that the debate on the origin of language peaked during a time of much attention to the question of human faculties in general and to the investigation of the natural endowment of man in order to distinguish him from the realm of beasts or to promote man's emancipation from ecclesiastical dogma.

Of course, it was not only in the 18th century that the question of language origins became a subject of philosophical concern. Given the philosophical and anthropological relevance of the topic, it has always attracted the curiosity of scholars. Glottogonic tales of ancient times have influenced the development of philosophical thinking on the origin of language. One of the best-known myths is the story of the Egyptian King Psammetichus I (died 610 B.C.), who wanted to find out which language was the oldest and ordered an experiment that involved two children to be raised in isolation. In the course of history, several sovereigns are said to have followed the example set by the Psammetichus experiment: King Frederick II the *Stauffer* (1192/1193–1150), the Scottish King James IV (1473–1515), and the Indian Mogul Akbar the Great (1542/1556?–1605).

Important benchmarks in the discussion of the origin of language are the foundational texts of Western culture: the Bible and the philosophy of ancient Greece.

In the Bible, there are two myths of crucial importance to the further development of the question: Adam's naming of the beasts and the following dialogue between Eve and the serpent, and the legend of the Tower of Babel which ascribes the emergence of the diversity of languages to an act of divine punishment. God vindicates his realm against the sinful attempt of Man to erect a tower reaching the sky by transforming the only language that united man until that time into an inconceivable variety of idioms.

These biblical legends raised the question of whether at the very beginning there was only one language (monogenetical hypothesis) or whether diversity reigned since language came into being.

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Figure 1 Plato. Drawn by Klaus Froese.

Figure 2 Condillac. Drawn by Klaus Froese.

Discussions on the Origin of Language in Classical Antiquity

In his dialogue *Cratylus*, Plato (428/427-349/8) (see Figure 1) offered important insights into the relationship between words and things (cf. Schmitter, 1987). The disputants Cratylus and Hermogenes tried to find out whether words are created by nature or made up by convention. Cratylus advocated the natural origin of words, which was mainly based on principles of sound symbolism and imitation. The conventional origin of language was defended by Hermogenes, whose argumentation was essentially focused on the undeniable diversity of languages which seemed a suitable proof of the non-natural origin of words. A final solution to the question of the natural versus conventional origin of words was offered by Socrates (470/469–399), who was introduced as a mediator by Plato. Socrates was eager to show the complementary character of the two respective approaches.

The conventionalist approach had a deep impact on Aristotle's (384/383–322) conception of the relation between words and things. For Aristotle, this relationship was not granted by nature, but depended entirely on convention. It was by human consent, by convention, that an arbitrary relationship between words and things was established ("*non natura, sed ad placitum*").

An important contribution to the development of the discussion on language origins especially in the Enlightenment is the Epicurean conception. Epicurus (342–271 B.C.) gave his account of the ori8gin of language in a letter to Herodotus in which he attributed the emergence of language to a natural necessity, thus rejecting the idea of a conventional language origin. Epicurean philosophy was made accessible to the Roman world by Titus Lucretius Carus (98–55 B.C.) who explained the origin of language in his *De rerum natura* as a result of the natural endowment of man. It was his own nature that forced man to utter the first sounds, and his elementary needs urged him to express his first vocalizations (*At varios linguae sonitus natura subegit mittere, et utilitas expressit nomina rerum*; Lucretius V: 1028–1029). For Lucretius, language was neither a divine gift nor the invention of an ingenious language-inventor, but the result of the physical predisposition of man who tried to express his desires in a way quite similar to animal communication.

Discussions on the Origin of Language in the Enlightenment

The Epicurean philosophy had a strong impact on the Enlightenment debate on the origin of language (cf. Gensini, 1999) and inspired particularly the thought of leading figures of French sensationalism such as Étienne-Bonnot de Condillac (1714–1780) (see Figure 2), Jean-Jacques Rousseau (1712–1778) (see Figure 3) or Julien Offray de La Mettrie (1709–1751). It is well-known that both Condillac and Rousseau heavily influenced the discussion of the origin of language which reached its climax in the origin of language competition announced by the Berlin Academy for 1771 (cf. Aarsleff, 1974).

The origin of language discussion had already been decisively influenced in the 17th century by René Descartes' (1596–1650) (see Figure 4) account of the nature of mankind in comparison to animals in his *Discours de la méthode* (1637). For Descartes, the faculty of language was the distinctive criterion of the human species in contrast to the animal world, permitting man to maintain a position of absolute supremacy. The faculty of language was conceived by Descartes as an indicator of the existence of human

Figure 3 Rousseau. Drawn by Klaus Froese.

Figure 4 Descartes. Drawn by Klaus Froese.

understanding and the soul, in sharp contrast to the instinctive mechanisms of animals.

Descartes' position had provoked the critique of Condillac, who conceived only a gradual difference between humans and animals, thus undermining the Cartesian idea of an unbridgeable gap between men and beasts. Condillac's most influential work for the origin of language debate was his *Essai sur l'origine des connaissances humaines* (1746), in which he presented a post-diluvial view of the origin of language integrated into an epistemological framework, tracing the genesis of the operations of the mind. The epistemological framework underlying Condillac's *Essai* was largely influenced by John Locke's (1632–1704) (see Figure 5) *Essay concerning Human Understanding* (1690), but Condillac aimed at the abolition of the Lockean dualism between sensation and reflection for the benefit of the introduction of a leading rôle of sensation as the only source of knowledge (cf. Ricken, 1984).

For his explanation of language origins, Condillac imagined a couple of infants of both sexes, living isolated in a desert just after the great flood. Tracing their first steps toward the invention of language, Condillac described a kind of natural state, anterior to the civilized world, in which his hypothetical subjects lived in bestial conditions.

Condillac's conception of the origin of language was mainly focused on a generative reconstruction of the human mind, thus emphasizing the relation between language and knowledge. In contrast to Condillac, Rousseau, in his *Discours sur l'origine et les fondements de l'inégalité parmi les hommes* (1755), aimed at a generative reconstruction of human society. According to Rousseau, the development of human society played a decisive rôle in the formation of language, but he was unable to cope with the difficult question of the anteriority of language or society, thus entangling himself in a vicious circle and leaving to others the solution of the problem (cf. Starobinski, 1971; Droixhe/Haßler, 1989; Neis, 2003).

Rousseau integrated his theory of language into his conception of a natural state of mankind, prior to the formation of civilization. For his account of the state of nature, Rousseau followed the ideas traced by the 17th-century natural law theorists such as Thomas Hobbes (1588–1679) (see Figure 6), Hugo Grotius (1583–1645), and Samuel Pufendorf (1632–1694). However, Rousseau rejected Hobbes' vision of the state of nature as a condition of permanent war by introducing his natural man (*homme de la nature*) as a creature who led a vagabond life and lived in harmony with his environment. Into his hypothetical initial state of mankind, Rousseau integrated his conception of the origin of language and made language arise as a result of the primitive needs of man. Following this Epicurean vision, Rousseau also adopted Condillac's theory of the *langage d'action*, a first step of communication based on gestures and instinctive cries (cf. Haßler, 1984).

The vision of society and language offered by Rousseau in the *Discours* had a strong impact on the discussion of the origin of language in the second half of the 18th century, especially on the prize contest on the origin of language organized by the Berlin Academy in 1769 (cf. Megill, 1974). After a long internal discussion, the Academy invited scholars from across Europe to submit their essays on the origin of language. As language was considered an essential component of the natural constitution of man, it was required to reveal how man might have invented it and whether he might have been able to create it on his own.

This question has also to be seen in the light of a discussion at the Berlin Academy which was caused by a lecture given in 1756 by Johann Peter Süßmilch (1707–1767): the *Versuch eines Beweises, daß die*

Figure 5 Locke. Drawn by Klaus Froese.

Figure 6 Hobbes. Drawn by Klaus Froese.

erste Sprache ihren Ursprung nicht vom Menschen, sondern allein vom Schöpfer erhalten habe. In this text, Süßmilch, himself a member of the Berlin Academy, defended the divine origin of language and protested against all conceptions of the origin of language based on the Epicurean doctrine. Because of its high degree of perfection, language could only have been the work of God. Primordial man, lacking the higher dispositions of the understanding, would never have been capable of inventing a system of such a complexity as language.

By announcing the prize topic as being the origin of language in 1769, the Berlin Academy endeavored to find a persuasive solution that defended the possibility of human invention. Scholars considered the question as highly important, 31 essays were submitted to the Academy, an unusually high number of entries. Today, 24 of the manuscripts are still to be found in the archive of the *Berlin-Brandenburgische Akademie der Wissenschaften*. They constitute an important *text series* in the field of language origin study. Only the winning essay of Johann Gottfried Herder (1744–1803) (see Figure 7) has traditionally been considered a milestone of the Enlightenment's conception of language origins. According to Herder, the emergence of language was due to the so-called *Besonnenheit*, an intrinsic disposition of man predating reflection and permitting man to listen carefully to the sounds of his surroundings and to retain the most impressive sounds (e.g., the bleating of a sheep) as internal marks (*innere Merkworte*).

An analysis of the remaining entries (cf. Neis, 2003) revealed the existence of recurrent *topoi* and commonplaces in the arguments of the different participants. As the genesis of language is beyond historical times, it can only be guessed at by means of hypothesis. Among the most recurrent *topoi* used by the participants on the origin of language question were the process of language acquisition among infants and the analysis of several hypothetical groups whose acquisition of language was impaired, such as *feral children*, the deaf and dumb, and exotic peoples. It was social, physical, or cultural deprivation that caused the exclusion of these individuals from a normal process of language acquisition.

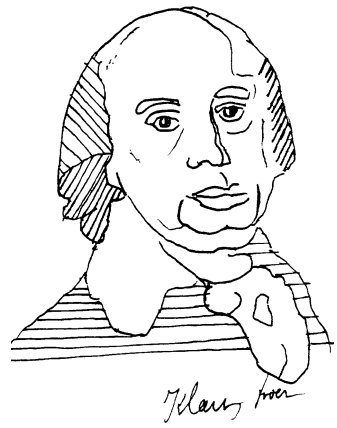

Figure 7 Herder. Drawn by Klaus Froese.

The Origin of Language Topic in the 19th and 20th Centuries

Although the Berlin Prize contest had highlighted the debate on the origin of language in the 18th century, in the course of the 19th century, scholars continued to engage themselves in the discussion (see the contributions of Jacob Grimm (1785–1863), Wilhelm von Humboldt (1767–1835), Max Müller (1823–1900), Lazarus Geiger (1829–1870), etc.). Innovative theories were developed, partly influenced by the

Darwinian paradigm and inspired by the solid empirical studies in emerging fields such as phrenology and neurology. The flood of contributions to the problem of the origin of language incited the *Société linguistique de Paris* in 1866 to ban the academic treatment of this topic within its institutional confines. By the end of the 20th century, this verdict became obsolete, and research on the origin of language was not limited to the language sciences, but became a pivotal topic for several interdisciplinary scientific domains.

See also: Anthropological Linguistics: Overview; Aristotle and Linguistics; Aristotle and the Stoics on Language; Condillac, Etienne Bonnot de (1714–1780); Conventions in Language; Descartes, René (1596–1650); Grimm, Jacob Ludwig Carl (1785–1863); Herder, Johann Gottfried (1744–1803); Historiography of Linguistics; Humboldt, Wilhelm von (1767–1835); Language of Thought; Locke, John (1632–1704); Plato and His Predecessors; Rousseau, Jean-Jacques (1712–1778); Semiotics: History; Universal Language Schemes in the 17th Century.

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Oromo

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Introduction

Oromo (self-name Afaan Oromo 'language of the Oromo') is one of the major languages of the Horn of Africa, spoken predominantly in Ethiopia, but also in northern and eastern Kenya and a little in southern Somalia. Estimates of numbers of speakers vary widely from about 17 300 000 (based on current Ethnologue figures) to 'approximately 30 million' (Griefenow-Mewis, 2001: 9), and there are probably about 2 million more who use it as a second language. Oromo is the major member of the Oromoid subgroup of the Lowland East Cushitic branch of Cushitic languages. There is currently no agreed-upon standard form of Oromo. Since it was adopted as a national language within the Oromo region in 1992, the Central-Western variety, which has the largest number of speakers, has tended to form the basis upon which a standardized form is being built. There are three main dialect clusters of Oromo, the Central-Western group, with at least 9 million speakers, comprising the Macha, Tuulamaa, Wallo, and Raya varieties, all spoken within Ethiopia; the Eastern group, also known as Harar Oromo or Qottu, spoken in eastern Ethiopia; and the Southern group, including Booranaa, Guji, Arsi, and Gabra, spoken in southern Ethiopia and adjacent parts of Kenya. Distinct from this last group are Orma, spoken along the Tana River in Kenya and apparently in southern Somalia along the Juba river, and Waata, spoken along the Kenyan coast to the south of Orma.

Under the Ethiopian imperial regime, which fell in 1974, the status of Oromo in Ethiopia was that of a spoken, vernacular language only. Its use in schools, the media, and other public forums was in effect proscribed, although Amharicized Oromos had been influential in the government of Ethiopia since the middle of the 18th century. With the advent of the Marxist regime, which gave some official recognition to Ethiopia's rich multilingual situation, Oromo was designated as one of the eventual 15 languages of the literacy campaign in Ethiopia, and printed and broadcast materials in Oromo started to appear. At first Oromo was written in a slightly adapted form of the Ethiopian syllabary, which had hitherto been mostly used for Ge'ez, or Classical Ethiopic, Amharic, and Tigrinya, but the move to write the language in Roman script, known as qubee in Oromo, soon prevailed. The decision of the Oromo Liberation Front to adopt the Roman script as early as 1974 doubtless gave this move impetus, though until 1991–1992 it was the refugee or exile community that made use of qubee. Additionally, there was at first no consensus on the representation of particular phonemes, and even today there can still be hesitations in marking vowel length.

Phonology

Oromo has 24 consonant phonemes, represented in the qubee orthography as follows, with IPA values where different between slashes as shown in **Table 1**. In addition, p, v, and z occur in loanwords, and some dialects, e.g., Eastern Oromo, also have a voiceless velar fricative /x/, typically in place of /k/ in other dialects. All consonants except for ' and h may occur both long and short, though the orthography does not indicate long consonants where the symbol used is a digraph: eenyu /ʔeːɲɲu [ʔ] / 'who?', buuphaa /buːp'p'a [ʔ] / 'egg'.

There are five vowels: a, e, i, o, u, each of which occurs both short and long, long vowels normally being indicated by doubling. In prepausal position, final long vowels are shortened somewhat and are closed by a glottal stop. According to dialect, in the same position final short vowels also are either closed by a glottal stop or devoiced. Some morphological clitics also cause a change in vowel length when added to vowel-final stems: nama 'the man' but namaa fi farda 'the man and the horse'. Additionally, several descriptions of Oromo dialects mention vowel length dissimilation, whereby long vowels in more than two consecutive syllables are not permitted:

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Oromo

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Introduction

Oromo (self-name Afaan Oromo 'language of the Oromo') is one of the major languages of the Horn of Africa, spoken predominantly in Ethiopia, but also in northern and eastern Kenya and a little in southern Somalia. Estimates of numbers of speakers vary widely from about 17 300 000 (based on current Ethnologue figures) to 'approximately 30 million' (Griefenow-Mewis, 2001: 9), and there are probably about 2 million more who use it as a second language. Oromo is the major member of the Oromoid subgroup of the Lowland East Cushitic branch of Cushitic languages. There is currently no agreed-upon standard form of Oromo. Since it was adopted as a national language within the Oromo region in 1992, the Central-Western variety, which has the largest number of speakers, has tended to form the basis upon which a standardized form is being built. There are three main dialect clusters of Oromo, the Central-Western group, with at least 9 million speakers, comprising the Macha, Tuulamaa, Wallo, and Raya varieties, all spoken within Ethiopia; the Eastern group, also known as Harar Oromo or Qottu, spoken in eastern Ethiopia; and the Southern group, including Booranaa, Guji, Arsi, and Gabra, spoken in southern Ethiopia and adjacent parts of Kenya. Distinct from this last group are Orma, spoken along the Tana River in Kenya and apparently in southern Somalia along the Juba river, and Waata, spoken along the Kenyan coast to the south of Orma.

Under the Ethiopian imperial regime, which fell in 1974, the status of Oromo in Ethiopia was that of a spoken, vernacular language only. Its use in schools, the media, and other public forums was in effect proscribed, although Amharicized Oromos had been influential in the government of Ethiopia since the middle of the 18th century. With the advent of the Marxist regime, which gave some official recognition to Ethiopia's rich multilingual situation, Oromo was designated as one of the eventual 15 languages of the literacy campaign in Ethiopia, and printed and broadcast materials in Oromo started to appear. At first Oromo was written in a slightly adapted form of the Ethiopian syllabary, which had hitherto been mostly used for Ge'ez, or Classical Ethiopic, Amharic, and Tigrinya, but the move to write the language in Roman script, known as qubee in Oromo, soon prevailed. The decision of the Oromo Liberation Front to adopt the Roman script as early as 1974 doubtless gave this move impetus, though until 1991–1992 it was the refugee or exile community that made use of qubee. Additionally, there was at first no consensus on the representation of particular phonemes, and even today there can still be hesitations in marking vowel length.

Phonology

Oromo has 24 consonant phonemes, represented in the qubee orthography as follows, with IPA values where different between slashes as shown in Table 1. In addition, p, v, and z occur in loanwords, and some dialects, e.g., Eastern Oromo, also have a voiceless velar fricative /x/, typically in place of /k/ in other dialects. All consonants except for ' and h may occur both long and short, though the orthography does not indicate long consonants where the symbol used is a digraph: eenyu /ʔeːɲɲu [ʔ] / 'who?', buuphaa /buːp'p'a [ʔ] / 'egg'.

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Table 1 The consonant phonemes of Oromo

	Bilabial	*Alveolar/ dental*	*Palatal*	*Velar*	*Glottal*
Plosive	b	d t	j ch /dʒ/ /tʃ/	k g	' /ʔ/
Glottalized Plosive/ affricate	ph /p'/	x /t'/	c /tʃ'/	q /k'/	
Implosive		dh /ɗ/			
Fricative	f	s	sh /ʃ/		h
Nasal	m	n	ny /ɲ/		
Lateral		l r			
Approximant	w		y /j/		

ijoollee + dhaaf > ijoolledhaaf 'for the children'. It has also been noted (Owens, 1985: 16) that only one long vowel per morpheme is permitted.

Consonant clusters in Oromo are limited to two components. Across morpheme boundaries, various patterns of consonant assimilation occur: dhug- + -ti > dhugdi 'she drinks', nyaadh- + -na > nyaanna 'we eat', dhaq- + -te > dhaqxe 'she went', gal- + -ne > galle 'we entered', Oromot[a]- + -ni > Oromoonni 'the Oromos' (subject case). Spoken forms of Oromo also seem to make greater use of consonant assimilation than the written language. Potential clusters of more than two consonants are always resolved by insertion of an epenthetic vowel, usually iː kenn- + -te > kennite 'you gave'. Sometimes, metathesis of the component consonants and an epenthetic vowel is also involved: arg- + -te > agarte 'you saw' beside argite.

Oromo is a tone-accent language, but details do differ somewhat from one spoken dialect to another. There is generally a simple, two-way contrast between high and non-high. As in a number of other Lowland East Cushitic languages, tone does not, however, distinguish lexical items, but is linked with morphological or syntactic categories, as for instance in Eastern Oromo xeesúmáa [L.H.H] 'the guest' in the absolute case or 'basic' form, but xeesúmaa [L.H.L] before a clitic such as the dative marker -f, or the same in sentence-final predicate position, and xeesumaa [L.L.L] optionally before a phrase-final adjective. Written Oromo, however, does not mark accent. Interestingly, potential confusion between two particles, predicate focusing hín, with high tone, and present negative marker hin, with low tone, is avoided in written Oromo by adopting an Eastern Oromo dialect variant ni in the former sense and keeping hin as the negative marker.

Morphology

Oromo has a moderately complex morphology, both inflectional and derivational, similar in categories and extent to other Cushitic languages. Nouns show gender, number, and case marking, though the first of these is more typically detectable only in agreement rather than being formally marked on the noun. Derived adjectives, however, do mostly show gender: diimaa (masc.): diimtuu (fem.) 'red'. There are two genders, masculine and feminine, and two numbers, singular and plural. In addition, there are some singulative or particulative forms: nama 'man': namicha 'a particular man', jaarti 'old woman': jaartittii 'a particular old woman'. There are two fundamental cases, the absolutive and the nominative, which generally require agreement among constituents of the noun phrase. Other case functions are only marked phrase-finally and do not elicit agreement. As with many other Cushitic languages, in Oromo the nominative or subject case is the marked form, and the absolutive case, with functions ranging from predicative, direct object, and pre-clitic position to citation form, is unmarked.

abbaa-n koo nama dheeraa dha
father.SUBJ *my* *man*.ABS *tall*.ABS COP
'my father is a tall man'

meeshaa sana arg-ite
thing.ABS *that*.ABS *see*-2SING.PAST
'did you see that thing?'

mana keessa seen-e
house.ABS *inside* *enter*-3MASC.PAST
'he went into the house'

The nominative or subject case is formed by a range of suffixes, -n, -ni, -i, or Ø (but with tonal difference), or -ti (some feminine nouns only) added according to the shape of the absolute form.

nam-ni dureess-i asi jir-a
man-SUBJ *rich*-SUBJ *here* *exist*-3MASC.PRES
'the rich man is here'

saree-n adii-n ni iyy-iti
dog-SUBJ *white*-SUBJ FOCUS *bark*-3FEM.PRES
'the white dog is barking'

bishaan hin dhug-aam-e /biʃáːn/ [L.H]
water-(SUBJ) NEG *drink*-PASS- 3MASC.PAST
'the water wasn't drunk'

bishaan dhug-ani /biʃaːn/ [L.L]
water-(ABS) *drink*-3PL.PAST
'they drank the water'

The remaining case functions all are built on the absolutive, either by means of clitics, both postpositions and occasionally prepositions, or by minor

modification in the instance of the possessive case form. Possessive marking occurs only phrase-finally and is typically formed by lengthening a final vowel usually with high tone. Optionally a possessive linking particle may also be used before the possessive noun or phrase: kan with masculine head nouns, tan with feminine.

mana nam-ichaa-n beek-a
house.ABS *man*-SINGULATIVE.POSS-*I* know-*1*SING.PRES
'I know the man's house'

farda kan
horse.ABS PART.MASC
nam-ichaa arg-ite
man-SINGULATIVE.POSS *see*-2SING.PAST
'you saw the man's horse'

Verbs in Oromo inflect for tense-mood-aspect (TMA), person (including gender and number as appropriate), and voice. Verb inflection is by means of suffixes, and the usual morpheme string is root + [voice] + person + TMA. The verb form may also be preceded by various proclitics or pre-verbs, such as negative, optative, and predicate focus markers, and may also have added in final position a conjunctive suffix:

loon ni bit-achi-siif-tanii-ti . . .
cattle FOCUS *buy*-AUTOBENEFACTIVE-CAUS-2PL.PAST-*and*
'you made (someone) buy cattle for themselves and . . .'

There are four main voices or derived stems of the verb in addition to the basic form: autobenefactive (sometimes also referred to as middle voice), causative, passive, and intensive or frequentative. The first three of these are formed by suffixes, which in the instance of the causative show some considerable variation according both to the shape of the stem to which it is added and to the shape of the following personal marker. The frequentative stem is formed by means of partial reduplication of the basic stem:

cab-uu 'to break'
break-INF
caccab-uu 'to break into pieces'
break.INTENSIVE-INF
deebi'-uu 'to return'
return-INF
deddeebi'-uu 'to keep on repeating'
return.INTENSIVE-INF

Up to two derived stem formatives may also be added to the basic verb stem according to prescribed sequences and combinations:

deebi'-uu 'to return'
return-INF
deebi-s-uu 'to answer'
return-CAUSE-INF
deebi-f-am-uu 'to be answered'
return-CAUSE-PASS-INF
deebi-f-ach-uu 'to return s.th. for oneself'
return-CAUS-AUTOBENEFACTIVE-INF
deddeebi-s-uu 'to repeat often'
return.INTENSIVE-CAUS-INF

Person markers, which follow the verbal stem, show the typical Cushitic pattern in which the 1st singular and 3rd masculine are formally identical, though in written Oromo the former is distinguished by suffixing to the preceding word -n, evidently a reduced form of the independent pronoun ani 'I':

mana barumsaa-n deem-a
house learning.POSS-*I go-1*SING.PRES
'I go to school'

mana barumsaa deem-a
house learning.POSS *go-3*MASC-PRES
'he goes to school'

In keeping with the same underlying Cushitic pattern, the 2nd sing., and 3rd fem., also have identical personal markers, -t-, though in Oromo there is a difference of TMA vocalization in the present tense. There are three basic finite TMA paradigms: the present, the past, and what has been called the subordinate, or sometimes the subjunctive. The present is a main clause form only, while the past is employed both in main and dependent clauses. The subordinate/subjunctive form is used in a range of functions, both in dependent clauses, but also as a negative present with the particle hin, and as a jussive with the particle haa. The negative past and the negative jussive are both, on the other hand, invariable with respect to person. TMA marking is by means of the vocalic elements following the person marker, essentially -e in the Past and -u in the subordinate/subjunctive, and -a in the Present except in the 3rd feminine, where it is -i. The 2nd and 3rd plural forms in written Oromo have the endings -tan [i] and -an [i] in all tenses, though -tu and -u also occur in the present tense and subordinate/subjunctive forms. A number of compound tenses also occur, combining variously finite tenses or verbal nouns, such as the infinitive or participle, with finite forms of such verbs as jiruu 'to be' or its Past tense equivalent turuu, or ta'uu 'to become'.

An interesting type of verb compound or composite, which has parallels across the Ethiopian language area, involves a fixed particle, typically underivable, and the verb jechuu 'to say', or in a causative-transitive function, gochuu 'to make':

nam-ich-i	cal	jedh-ee	tur-e
man-	*'cal'*	*say-*	*be.past-*
SINGULATIVE-SUBJ		*3MASC.PAST*	*3MASC.PAST*

(cal jechuu 'to be quiet')
'the man was keeping quiet'

The normal word order in Oromo is SOV, as can been seen from various examples above, and dependent clauses generally precede the main clause. Relative clauses, however, follow their head noun. Subordinating particles or conjunctions are usually placed at the beginning of the clause, but may also be placed immediately before the verb at the end of the clause. Some conjunctions are disjunct, comprising both an element at the beginning of the clause and a clitic or affix placed after the verb (e.g., waan . . . -f 'because' below).

gurbaa-n osoo loon tiks-uu waan
boy-SUBJ while cattle watch-3MASC-SUBJUNC because
midhaan namaa nyaach-is-ee-f
grain man.POSS eat-CAUS-3MAS.PAST-PART
abbaa-n-saa reeb-ee kur-e
father-SUBJ-his beat-3MASC.PAST be.PAST-3MASC.PAST
'because the boy, while watching the cattle, had let them eat someone else's grain, his father had beaten him'

An interesting syntactic feature that Oromo shares with most other Cushitic, and especially Lowland East Cushitic languages, is a system of focus marking by means of clitic particles with different markers for predicate and non-predicate focus. Oromo has essentially two focus constructions, both of which are optional, one used exclusively for subject focus and one for predicate focus. A third clitic is used for emphasizing non-subject nominals and is perhaps on the way to becoming a third focus marker (Griefenow-Mewis, 2001: 55). The subject focus marker is -tu[u] which is added to the absolutive case and neutralizes person/number agreement with the verb, which remains in the 3rd masculine:

mukk-een-tu	oddoo	keessa-tti	arg-am-a
tree-PL-FOCUS	*garden*	*inside-LOC*	*see-PASS-3MASC.PRES*

'**trees** can be seen in the garden'

See also: Afroasiatic Languages; Case Grammar; Cushitic Languages; Ethiopia: Language Situation; Focus Particles; Kenya: Language Situation; Valency Grammar.

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Orr, John (1885–1966)

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Of Scottish descent, John Orr passed his childhood and early youth in Tasmania. In 1910 he went to France to study at the Sorbonne, the Collège de France, the Ecole des Langues Orientales, and the Ecole des Hautes Etudes, where he studied with J. Bédier, J. Gilliéron, A. Jeanroy, M. Roques, and A. Thomas. In 1913 he was appointed Assistant Lecturer in French at Manchester University, and in 1919 he became Professor there. In 1933 he accepted the position of Professor of French and Head of the Department of French and Romance philology at Edinburgh University. In 1951 his chair was changed to that of French language and Romance linguistics. Orr held various functions in the field of education and served on the editorial board of several learned journals. In 1965 he was elected president of the Société de Linguistique Romane; he died on August 10, 1966.

Orr's favorite fields within Romance studies were lexicology, etymology, and medieval text edition (Old French literature). He wrote occasionally on issues of syntax and stylistics. He is especially known among Romance linguistic scholars for his translation and adaptation of Iorgu Iordan's Rumanian

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handbook of Romance linguistics; the English translation (1937) was for many generations of English-speaking Romance students the classic textbook.

Orr's linguistic work consists mostly of elegantly written smaller contributions, the majority of which are collected in two volumes (1953, 1963). He wrote on the impact of French upon English (1962a) and on the history of the Ibero-Romance languages (in 1934 he rejected the explanation of the evolution of Latin initial *f-* to *h-* in Castilian and Gascon as being due to the Iberian substratum and showed it to be a more general Romance phenomenon). The greater part of his studies deals with the history of words: Orr was particularly interested in processes of word contamination, word association, homonymy (1962b), partial synonymy, and folk etymology, thus focusing on phenomena that disrupt the 'normal' evolution of forms and meanings. He was very skeptical with regard to abstract theoretical explanations. Orr was strongly influenced by his teacher Gilliéron and by the findings of linguistic geography (which he saw as a "corrective to etymology"); rejecting the Neogrammarian view, he adopted the slogan that each word has a history of its own. Although not opposed to structuralism, he stressed the expressive and aesthetic dimensions of language. Orr's view of language was eclectic: he regarded it as both organism and mechanism, and stressed the coexistence of older and newer layers, as well as of various registers within the language system.

See also: Gilliéron, Jules (1854–1926); Iordan, Iorgu (1888–1986); Romance Languages.

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Orton, Harold (1898–1975)

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Harold Orton was born in Byers Green, near Bishop Auckland, County Durham. An enormous body of material worthy of investigation existed in the language of this mining community. Thus the foundation for his lifelong interest in English dialects was laid in his early childhood. Orton received his B.Litt. in 1923 at Merton College, Oxford, where he was strongly influenced by Henry Cecil Wyld and Joseph Wright. Ten years later, Orton published his Oxford thesis, a traditional phonology of the dialect of his native village, under the title *The phonology of a South Durham dialect*.

At the same time he began his survey of Northumbrian dialects – unfortunately never published – which must be regarded as the basic preparation for his work on the *Survey of English dialects*. Orton's main contribution in the field of medieval literature, *The beginnings of English literature to Skelton,* written together with William L. Renwick, also dates from the 1930s (1939, 3rd edn., 1966). In 1939 Orton moved from Newcastle to Sheffield, and in 1946 he accepted a chair at Leeds, which he held until his retirement in 1964.

Orton's lasting achievements in dialectology belong to his period at Leeds. Together with the Swiss Anglicist Eugen Dieth, who died prematurely in 1956, he began concrete planning of the *Survey of English dialects* in 1946. Formal fieldwork, mainly with nonmobile, older, rural male informants, began in 1950 and continued until 1961. The survey had originally been devised to cover England and Scotland, but a few years later work on a linguistic survey of Scotland began at Edinburgh. The two surveys differed seriously in important aspects such as data collection, for which Orton favored the direct method. The surveys also varied in the area of phonetics/phonology and in Orton's denial of structural principles. Orton was mainly interested in a

handbook of Romance linguistics; the English translation (1937) was for many generations of English-speaking Romance students the classic textbook.

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Orton, Harold (1898–1975)

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Harold Orton was born in Byers Green, near Bishop Auckland, County Durham. An enormous body of material worthy of investigation existed in the language of this mining community. Thus the foundation for his lifelong interest in English dialects was laid in his early childhood. Orton received his B.Litt. in 1923 at Merton College, Oxford, where he was strongly influenced by Henry Cecil Wyld and Joseph Wright. Ten years later, Orton published his Oxford thesis, a traditional phonology of the dialect of his native village, under the title *The phonology of a South Durham dialect*.

At the same time he began his survey of Northumbrian dialects – unfortunately never published – which must be regarded as the basic preparation for his work on the *Survey of English dialects*. Orton's main contribution in the field of medieval literature, *The beginnings of English literature to Skelton,* written together with William L. Renwick, also dates from the 1930s (1939, 3rd edn., 1966). In 1939 Orton moved from Newcastle to Sheffield, and in 1946 he accepted a chair at Leeds, which he held until his retirement in 1964.

Orton's lasting achievements in dialectology belong to his period at Leeds. Together with the Swiss Anglicist Eugen Dieth, who died prematurely in 1956, he began concrete planning of the *Survey of English dialects* in 1946. Formal fieldwork, mainly with nonmobile, older, rural male informants, began in 1950 and continued until 1961. The survey had originally been devised to cover England and Scotland, but a few years later work on a linguistic survey of Scotland began at Edinburgh. The two surveys differed seriously in important aspects such as data collection, for which Orton favored the direct method. The surveys also varied in the area of phonetics/phonology and in Orton's denial of structural principles. Orton was mainly interested in a

diachronic approach investigating the dialectal reflexes of Old English and Middle English sounds.

The results of Orton's survey were published in list form in minute phonetic transcription (Orton *et al.*, 1962–1971), from which was derived a word geography, published shortly before Orton's death (Orton and Wright, 1974) and a linguistic atlas, published shortly after (Orton *et al.*, 1978).

Strengths and weaknesses of Orton's survey will no doubt be evaluated differently by adherents of different dialectological schools, but beyond any doubt Harold Orton can be considered the major English dialectologist of the 20th century. Moreover, he provided a stimulus for much of the later work in regionally more restricted dialectology and for more sociolinguistically oriented activities in England.

See also: Dialect Atlases; Wright, Joseph (1855–1930).

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Osada, Natsuki (b. 1920)

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Natsuki Osada is an outstanding Japanese linguist and philologist, specializing in Mongolian, Manchu, Jurchen, Khidan, Chinese, and Korean, in addition to Japanese. Unfortunately, he is not well known in the West, because most of his important publications are in Japanese. Born in 1920 in Kamakura (Kanagawa Prefecture, Japan), he was a graduate of the Department of Mongolian Studies at the Tokyo College of Foreign Languages (now renamed Tokyo University of Foreign Studies), and, shortly after his graduation in 1942, he joined the Huabei Transportation Company, and worked as a railroad employee at the Zhangjiakou station and as an employee of the provisional government of Inner Mongolia in China. While in China, he managed to collect rubbings from Khidan, Jurchen, Manchu, and Mongolian inscriptions in Manchuria and Inner Mongolia, some of which are now irretrievably lost due to either World War II hostilities or to the Cultural Revolution in China. Osada managed to publish most of the inscriptions he collected over the years in different scholarly journals, and now they are available from two large published volumes that include most of his articles (Osada, 2000–2001). Osada joined the Kôbe Municipal College of Foreign Studies in 1948 (later renamed Kôbe University of Foreign Studies), where he taught Chinese and other subjects until his retirement in 1986 as a professor of Chinese language. He lives now in Kôbe (Hyôgo Prefecture, Japan) and is still professionally active, taking part in various scholarly meetings, such as meetings of Japan's Etymological Society.

It is difficult to pay proper tribute to all his publications within the limits of a short encyclopedia article, since Natsuki Osada's interests and scholarly activities are very diverse, involving historical linguistics, descriptive linguistics, and philology of various East Asian and Central Asian Languages. He is an author of two monographs dealing with proto-Japanese and its possible external relations (Osada, 1972) and the language of Yamatai (3rd century CE) glosses, which can be found in the Chinese historical source *Wei zhi* (Osada, 1979), where he presents a number of interesting and innovative ideas about reconstruction of proto-Japanese. He and his colleagues have also published a dictionary of the Suzhou dialect of the Chinese language (Wu Language Study Group, 1953), which was only very sketchily studied before him. The best-known publication of Osada in a language other than Japanese is the *Zirni manuscript*, a publication and study of a very important source on the little-known Moghol (Mogholi) language in Afghanistan, which belongs to the Mongolic language family (Iwamura *et al.,* 1961). In addition to these monographs, Osada published numerous articles over the long course of his career dealing with various aspects of Chinese, Mongolian, Manchu, and Jurchen languages, linguistics, paleography, and philology. Many of his outstanding contributions in Japanese, Chinese, Mongolian, Tungusic, and even Tai linguistics published almost half a century ago have

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See also: Mongolic Languages; Mongolia: Language Situation; Tungusic Languages.

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Ossetic

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Ethnography, History, and Literature

Ossetic (also 'Ossetian', ISO639: 'oss') is an Iranian language spoken by approximately 650 000 people, mainly in the Republic of North Ossetia-Alania (Russian Federation), the South Ossetic Region in Georgia, in various other parts of the Russian Federation, and in scattered settlements in Turkey. The capital of North Ossetia is Vladikavkaz (Dzæudžiqæu in Ossetic). All speakers are bilingual (with Russian, Georgian, or Turkish as a second language) (**Figure 1**).

Ossetic belongs to the Eastern Iranian branch of Indo-European of which the oldest historic member is Avestan. In the Middle-Iranian period, the Alanic group of languages comprised the closest relatives of the unattested predecessor of Ossetic. These quite fragmentarily attested languages were spoken from approximately 400 B.C. (earliest mention of the Sarmatians) to the 13th century A.D. in Southern Russia and on the Northern coast of the Black Sea. The first Ossetic document was a catechism printed in Moscow in 1798. Several writing systems based on the Georgian, Roman, and Cyrillic alphabets had been in use before Cyrillic was made official in 1939. In this article, we use the transliteration used by most scholars. The first grammatical description of Ossetic was Andreas Sjögren's 'Iron Ævzagaxur' (St. Petersburg 1844).

The two main dialects, Iron and Digoron, show some major phonological and morphological differences. Still, we will only discuss Iron, which is the basis for the literary language.

The mythological Nart tales, traditionally told by wandering minstrels, were collected from oral sources in the early 20th century by Vsevolod Miller. They have become the national epic. Its first translation into a Western language (French) was done by Georges Dumézil in 1930. Ossetic artistic poetry developed during the 19th century and found its heyday in the works of the national poet Xetægkaty K'osta (1859–1939).

Consonants

Ossetic shows a systematic opposition of voiceless aspirated, voiced, and voiceless ejective stops and affricates. The voiceless uvular stop has no ejective nor voiced counterparts.

The alveolar affricates /t͡s d͡z t͡s'/ are realized as fricatives in Iron, except for the ejective ([s z t͡sˀ]) and when geminated [t͡s: t͡sˀ:]. In all positions, the dentoalveolar fricatives /s z/ are realized as postalveolars [ʃ ʒ]. These changes are not reflected in the orthography. An older stage is attested in Ossetic dialects in Turkey, where /s z/ are [ʃ ʒ], but /t͡s d͡z t͡s'/ are still [t͡sʰ d͡z t͡sˀ] (**Table 1**). [h], written *γ*, occurs in some interjections like *γæj* [hɐj] 'hey'.

The postalveolar affricates [t͡ʃʰ], [d͡ʒ], [t͡ʃˀ] are assimilated variants of the velars before front vowels, e.g., *kark* 'hen' and *karč-y* 'of the hen' (genitive). The few exceptions are loan-words, such as *džauyr* 'non-believer' from Circassian *džauyr*. The only regular blocking of this assimilation occurs with the superessive marker *-yl*: *kark-yl* 'on the hen'.

Since the sequence Consonant + /uɨ/ + Consonant is not licensed otherwise in Ossetic, we assume

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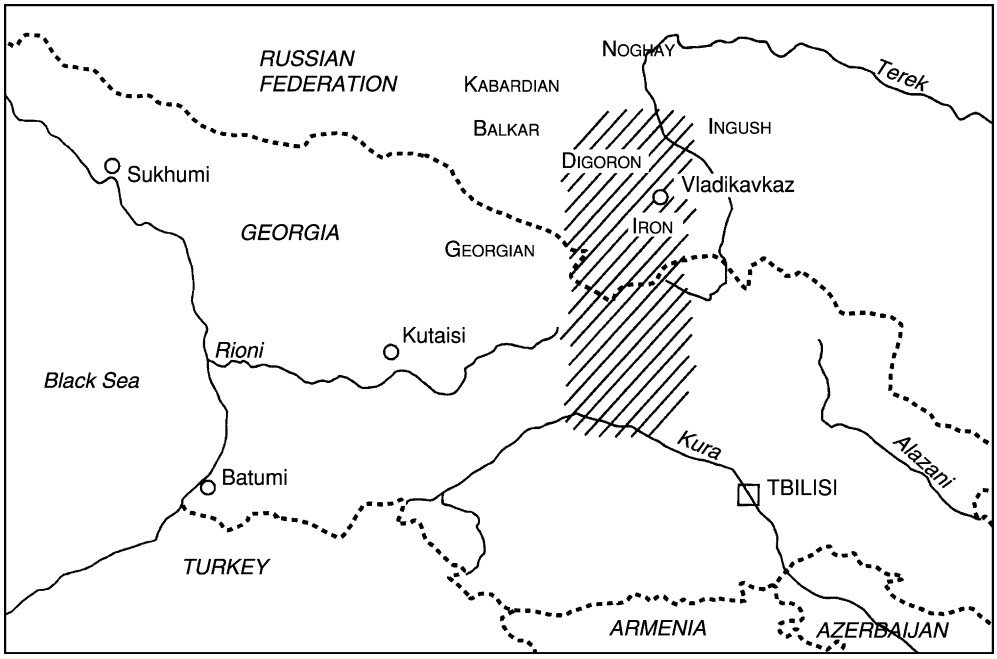

Figure 1 Ossetic area (hatched, adjacent languages in small caps).

labialized stops in words like *quyn* to be phonemic: /q^{w}ɨn/) 'hair'. Biphonemic geminated stops and affricates (which are voiceless and unaspirated) occur in lexical entries (*læppu* [lɐpːu] 'boy') or at morpheme boundaries: *dard* 'far' becomes *dard-dær* [dartːɐr] 'farther' (comparative). Initial *y-* before geminated *s* is not reflected orthographically: *ssædz* [ɨʃːɐz] 'twenty'.

Vowels

The Ossetic vowel system can be divided into peripheral (strong) and central (weak) vowels (Table 2).

The vowels /u/ and /i/ have nonsyllabic variants that are rendered as *u* (sometimes *u̯*) and *j* in the transliteration. /u/ in onsets before vowels is realized as [w]. Epenthetic [w] is inserted between /u̯/ and any other vowel: *læu-* 'stand' and the infinitive marker *-yn* form *læuu̯yn*. *j* is used as a glide between any vowel (except *u*) and *i/y*: *uda-* and *-yn* become *udaj-yn* 'humidify'.

Accent

The word accent depends on the distribution of strong and weak vowels. If the first vowel is strong (s), it receives the accent, if it is weak (w), the second vowel is stressed. Thus, the following patterns emerge (accent is marked by an acute):

.ś s .ś w .w ś .w ẃ

There are lexicalized exceptions to that rule (e.g., forms of the demonstrative pronoun and words like *Irón*). An emerging morphophonemic exception is the preverb *ys-* ([ɨʃ] or [ʃ]), which retracts the accent even with speakers who no longer articulate the initial vowel: *(y)s-ǽxgæn-yn* 'to close'. Proper names are stressed on the second syllable, while retracting the accent to the initial syllable produces a pejorative note.

Retraction of the accent within a noun phrase (NP) marks the NP as definite (*zærdǽ* 'a heart', *zǽrdæ* 'the heart').

Only scattered information is available about the phrasal accent of Ossetic. Abaev (1964) lists the noun phrase (containing adjectives or genitives, *syrx tyrysa* 'red flag'), postpositional phrases (*bælasy byn* 'under the tree'), and complex predicates (*rox kænyn* 'forget') as phonological phrases. Enclitic pronouns and particles (such as negative *næ*) are also incorporated into phonological phrases.

Loan Word Phonology

The ejectives were apparently introduced through Caucasian loans (Iron *zač'æ*, Circassian [zat͡ʃ^{ʔ}ɛ] 'beard'), although they also correspond to plain voiceless plosives in earlier Russian loans (Iron *bulk'on*, Russian *polkovnik* 'colonel'). While older loans from Russian follow the Iron accent pattern, recent loans often preserve the lexical Russian accent.

Table 1 Consonant phonemes of Iron (IPA and standard transliteration)

	Labial	*Labiodental*	*Alveolar*	*Velar*	*Uvular*
Plosive	/ p b p'/		/ t d t'/	/ k kʷ g gʷ k' k'ʷ /	/ q qʷ /
	p b p'		*t d t'*	*k ku g gu k' k'u*	*q qu*
Nasal	/ m /		/ n /		
	m		*n*		
Trill			/ r /		
			r		
Fricative		/f v /	/ s z /		/ χ χʷ ʁ ʁʷ /
		f v	*s z*		*x xu γ γu*
Affricate			/t͡s d͡z t͡s'/		
			c dz c'		
Lateral			/ l /		
			l		

Table 2 Vowel phonemes of Iron (IPA and standard transliteration)

	Front	*Central*	*Back*
High	[i]	[ɨ]	[u]
	i	*y*	*u*
Mid	[e]		*o*
	e		*o*
Low	[a]	[ɐ]	
	a	*æ*	

Also, Russian *s* [s] is sometimes realized as [ʃ] and sometimes as [s].

Nouns

Ossetic morphology is agglutinative with mildly inflectional elements. There are nine morphological cases which have, in part, developed from postnominal elements.

Subject and indefinite direct object are usually in the nominative (bare stem). Objects in the genitive are marked as definite. The dative marks the indirect object, but also the target or purpose of an action. The local cases express the primary local and temporal relations, but the ablative is also used to mark a tool or material used to perform an action, the superessive to mark a reason. The equative (EQU) marks the compared object with comparatives or the language in which something is written, said, etc. (*Iron-au* 'in Iron'), the comitative the partner involved in an action.

Plurals are formed by adding *-t-* to the stem plus the same case markers as in the singular. Sometimes, infixes are added after the stem, such as *-y-* in many cases where the stem ends in a consonant cluster (*cyxt* 'cheese', plural *cyxt-y-t-æ*) (Table 3).

Uninflected nouns function as adjectives, but there are also dedicated adjectives (*syγdæg* 'clean'), sometimes marked by formatives like *-on* (*uarz-on* 'beloved' from *uarz-yn* 'love') or *-ag* (*xox-ag* 'mountainous' from *xox* 'mountain'). Adjectives and nouns used as adjectives take the comparative marker *-dær* (*dard-dær* 'farther') and stand in the superlative paraphrase with *æppæty* or *nuuyl* 'most' (*æppæty dard* 'farthest').

Pronouns

Pronouns inflect mostly like nouns. The personal pronouns have two stems, lack an inessive and a third person series, which is substituted from the remote demonstrative pronoun (Table 4).

The enclitic object pronouns lack a nominative and an equative to the effect that enclitically expressed direct objects have to be put in the genitive (Table 5).

The genitives of the full and enclitic personal pronoun and the reflexive pronoun substitute for the missing possessive pronouns. Reflexives are formed from the object pronoun with *-x-* and a set of special endings. For reciprocal expressions, the noun *kærædzi* 'one another', which only corresponds with plural antecedents, is used.

The demonstrative system exhibits a deictic split into remote (*u(y)-*) and local (*a-*). The true pronouns mark nominative and genitive by the same form (*a-j* 'this', *uy-j* 'that'), the other cases are formed by adding dative *-mæn* (*uý-mæn*), allative *-mæ*, ablative *-mæj* (*uý-mæj*), locative *-m*, superlative *-uyl*, equative *-jau*, and comitative *-imæ*. The plural forms *adon*, *uýdon* inflect like nouns. In adnominal position, an adjective is formed by adding *-cy* (*uýcy don* 'that water').

Interrogative pronouns inflect like the deictic pronouns and are split into personal (nominative *či*

Table 3 Case system (for *kark* 'hen')

		Singular	*Translation*	*Plural*
Grammatical cases	NOM	*kark*	'hen(s)'	*kærčy-t-æ*
	GEN	*karč-y*	'of the hen(s)'	*kærčy-t-y*
	DAT	*kark-æn*	'to the hen(s)'	*kærčy-t-æn*
Local-adverbial cases	ALL	*kark-mæ*	'to the hen(s)'	*kærčy-t-æm*
	ABL	*kark-æj*	'from the hen(s)'	*kærčy-t-æj*
	SUPERESS	*kark-yl*	'on the hen(s)'	*kærčy-t-yl*
	LOC	*karč-y*	'at the hen(s)'	*kærčy-t-y*
Other adverbial cases	EQU	*kark-au*	'as/than the hen(s)'	*kærčy-t-au*
	COM	*karč-imæ*	'with the hen(s)'	*kærčy-t-imæ*

Table 4 Personal pronouns

	1 sg.	*2 sg.*	*1 pl.*	*2 pl.*
NOM	*æz*	*dy*	*max*	*symax*
GEN	*mæn*	*dæu*	*max*	*symax*
DAT	*mæn-æn*	*dæu-æn*	*max-æn*	*symax-æn*
ALL	*mæn-mæ*	*dæu-mæ*	*max-mæ*	*symax-mæ*
ABL	*mæn-æj*	*dæu-æj*	*max-æj*	*symax-æj*
SUPERESS	*mæn-yl*	*dæu-yl*	*max-yl*	*symax-yl*
EQU	*mæn-au*	*dæu-au*	*max-au*	*symax-au*
COM	*memæ*	*demæ*	*max-imæ*	*symax-imæ*

'who', other cases *kæ-*) and impersonal (nominative *cy* 'what', other cases *cæ-*).

Numerals

The numeral system is basically a mixed decimal-vigesimal system, such that (1a) and (1b) are equivalent (Table 6).

(1a) ærtyn fondz
thirty *five*
'thirty-five'

(1b) fynddæ s æmæ (y)ssædz
fifteen *and* *twenty*
'thirty-five'

Ordinals are formed by means of a suffix *-æm* (*cyppar-æm* 'fourth'), distributives add *-gaj* (*iu-gaj* 'one by one').

Verbs

The Ossetic verb has a present stem and a past stem (ending in a dental stop). The former is the basis for the present and future tenses and all deverbal nouns, adjectives, and the infinitive (*-yn*). The latter forms the past tense and the past participle (bare stem).

The past stem shows facultative ablaut of the stem vowel and some facultative modifications of stem-final consonants, as in *lidz-* 'run away' (present) and *lyγ-d-* (past). *-s-* or *-y-* are sometimes inserted before the past stem marker (*zar-yn* 'sing', *zar-yd-t-æ-n* 'I sang'). Transitive and intransitive verbs have different sets of past tense personal endings (Table 7).

The tense system distinguishes present (habitual, narrative, continuous present, and immediate future), past, and future.

In addition, the copula *uyn* distinguishes between a momentaneous (MOM) and a habitual (HAB) present. The third person present of the copula has the forms *u*, *i*, and *is*, which vary freely (Bagaev, 1965) (Table 8, Table 9).

(2) Uycy don syγdæg u.
that *water* *clean* *be*.3SG PRES MOM
'That water is clean (right now).'

(3) Uycy don syγdæg væjj-y.
that *water* *clean* *be*–3SG PRES HAB
'Such water is usually clean.'

Imperfective aspect is expressed lexically (*dzur-yn* 'say', *zæγ-yn* 'tell') or morphologically by adding one of the preverbs (generically *s-*). The preverbs also give a basic temporal-spatial orientation that takes into account the speaker's position. They also express further notions of aspect and aktionsart (Table 10).

The subjunctive expresses doubt (present), wish, possibility (present and future), and necessity, and is used to give orders (future). The past subjunctive covers all these notions.

There are several constructions involving verbal nouns, such as the passive (past participle plus *cæu-yn* 'go') and the causative (infinitive plus *kæn-yn* 'do').

(4) uarst cæu-y
loved (past participle) *go*-PRES 3SG
'she is loved'

Noun and Postposition Phrases

Nouns can be modified by means of a preceding noun in the genitive or an adjective. Many nouns can also function as adjectives:

Table 5 Enclitic object pronouns

	1 sg.	*2 sg.*	*3 sg.*	*1 pl.*	*2 pl.*	*3 pl.*
GEN	*mæ*	*dæ*	*jæ, æj*	*næ*	*uæ*	*sæ*
DAT	*myn*	*dyn*	*(j)yn*	*nyn*	*uyn*	*syn*
ALL	*mæm*	*dæm*	*(j)æm*	*næm*	*uæm*	*sæm*
ABL	*mæ*	*dæ*	*dzy*	*næ*	*uæ*	*sæ, dzy*
LOC	*mæ*	*dæ*	*dzy*	*næ*	*uæ*	*sæ, dzy*
SUPERESS	*myl*	*dyl*	*(j)yl*	*nyl*	*uyl*	*syl*
COM	*memæ*	*demæ*	*jemæ*	*nemæ*	*uemæ*	*semæ*

Table 6 Ossetic numerals

Cardinal	*Value*
iu	1
dyuuæ	2
ærtæ	3
cyppar	4
fondz	5
æxsæz	6
avd	7
ast	8
farast	9
dæs	10
sædæ	100

Table 7 Major alternations in the past stem

Present stem	*Past stem*
	-a-
-æ-	
	-o-
-a-	*-æ-*
-i-, -u-, -au-, -æu-,-o-	*-y-*
-d, -t, -tt, -nd, -nt	*-s-t*
-dz, -c, -ndz, -nc	*-γ-d*
-n, -m	*-Ø-d*

(5a) xur bon
sun *day*
'a sunny day'

(5b) lædž-y cæsgom
man-GEN *face*
'the man's face'

Coordinated elements show group inflection.

(6) Æxsar æmæ Æxsærtædž-y rajguyrd
Æxsar *and* *Æxsærtæg*-GEN *birth*
'Æxsar's and Æxsærtæg's birth'

The postpositional constructions that express spatial and temporal relations usually involve functionally interpreted nouns (such as *sær* 'head' for 'top') that additionally take one of the case endings. The dependent noun then receives the genitive marker.

(7) xox-y sær-yl
mountain-GEN *head*-SUP
'on top of the mountain'

A construction with an adnominal genitive noun can be paraphrased as dative with a clitic pronoun in the genitive.

(8a) Nart-y fyrt
Nart-GEN *son*
'son of the nart'

(8b) Nart-æn jæ fyrt
Nart-DAT he.GEN *son*
'son of the Nart'

Simple Verbal Sentences

In most cases, the arguments precede the verb (SOV order).

(9) Nart udævdz fyng-yl sæværd-t-oj.
Nart *shawm* *table*-SUP *put*-PAST-3PL
'The Nart put the shawm on the table.'

In focused word order, the verb can precede the subject. There are no expletive subjects, thus the most simple type of a verbal sentence contains just a verb.

(10) uar-y
rain-PRES 3SG
'it is raining'

Since subjects can be dropped, intransitive verbs can also form one-word sentences.

(11) xau-y
fall-PRES 3SG
'he/she/it falls (is falling)'

Clitic objects (always attached to the first phrase of a sentence) stand in for an omitted object or an adverbial noun (12a), or they are presumptive (12b).

(12a) Nart yl udævdz sæværd-t-oj.
Nart *it*.SUP *shawm* *put*-PAST-3PL
'The Nart put the shawm on it.'

(12b) Nart yl udævdz
Nart *it*.SUP *shawm*
sæværd-t-oj fyng-yl.
put-PAST-3PL *table*-SUP
'The Nart put the shawm on it, on the table.'

Table 8 Indicative verb forms (*kæn-/kod-* 'do' [tr.] and *kaf-/kafyd-* 'dance' [itr.])

	Present	*Transitive past*	*Intransitive past*	*Future*
1 SG	*kæn-yn*	*kod-t-on*	*kafyd-t-æn*	*kæn-dz-ynæn*
2 SG	*kæn-ys*	*kod-t-aj*	*kafyd-t-æ*	*kæn-dz-ynæ*
3 SG	*kæn-y*	*kod-t-a*	*kafyd-is*	*kæn-dz-æn*
1 PL	*kæn-æm*	*kod-t-am*	*kafyd-yst-æm*	*kæn-dz-yst-æm*
2 PL	*kæn-ut*	*kod-t-at*	*kafyd-yst-ut*	*kæn-dz-yst-ut*
3 PL	*kæn-ync*	*kod-t-oj*	*kafyd-yst-y*	*kæn-dz-yst-y*

Table 9 Subjunctive and imperative verb forms

	Subjunctive present	*Subjunctive tr. past*	*Subjunctive intr. past*	*Subjunctive future*	*Imperative present*	*Imperative future*
1 SG	*kæn-i-n*	*kod-t-a-i-n*	*kafyd-a-i-n*	*kæn-on*		
2 SG	*kæn-i-s*	*kod-t-a-i-s*	*kafyd-a-i-s*	*kæn-aj*	*kæn*	*kæn-iu*
3 SG	*kæn-i-d*	*kod-t-a-i-d*	*kafyd-a-i-d*	*kæn-a*	*kæn-æd*	*kæn-æd-iu*
1 PL	*kæn-i-kk-am*	*kod-t-a-i-kk-am*	*kafyd-a-i-kk-am*	*kæn-æm*		
2 PL	*kæn-i-kk-at*	*kod-t-a-i-kk-at*	*kafyd-a-i-kk-at*	*kæn-at*	*kæn-ut*	*kæn-ut-iu*
3 PL	*kæn-i-kk-oj*	*kod-t-a-i-kk-oj*	*kafyd-a-i-kk-oj*	*kæn-oj*	*kæn-ænt*	*kæn-ænt-iu*

Table 10 Directional preverbs

	Toward speaker	*Away from speaker*
Inward motion	*ærba-*	*ba-*
Outward motion	*ra-*	*a-*
Downward motion	*ær-*	*nyn-*

The *constructio ad sensum* is very common for both singular subjects with plural verbs and vice versa.

Copular Sentences

Sentences with the copula *uyn* have the word order (a) subject, predicate noun, copula or (b) subject, copula, predicative noun.

(13) Mæ nom u Zæhra.
my name be.3SG PRES MOM *Zæhra*
'My name is Zæhra.'

The copula can combine with preverbs: *s-uyn* 'become' and *fæ-uyn* 'turn out to be'.

Syntax of Embedding

We give two sample analyses of embedding constructions. Example (14) (Figure 2) shows a relative clause with a pseudo-antecedent (agreeing in number with the main verb) nested inside the relative clause. Example (15) (Figure 3) illustrates a common construction with attributive clauses and conditionals. Such clauses usually precede the main clause. If the order is inverted, the correlative word (pronoun or conjunction) is moved to the very end of the sentence behind the dependent clause (main clauses in bold print):

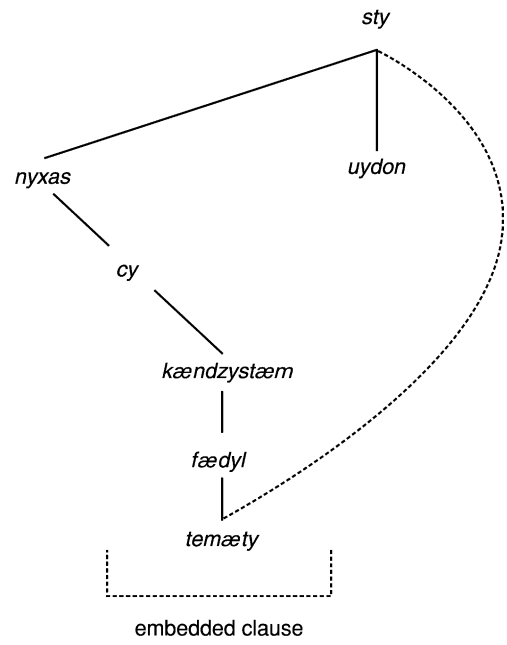

Figure 2 Dependency markers of sentence (14).

(14) **Nyxas** cy temæ-t-y
talk what subject-PL-GEN
fædyl kæn-dzyst-æm, **uydon st-y.**
about do-FUT-1 PL *those be*-3 SG
('The talk about which subjects we are going to make are these.')
The subjects about which we are going to talk are these.

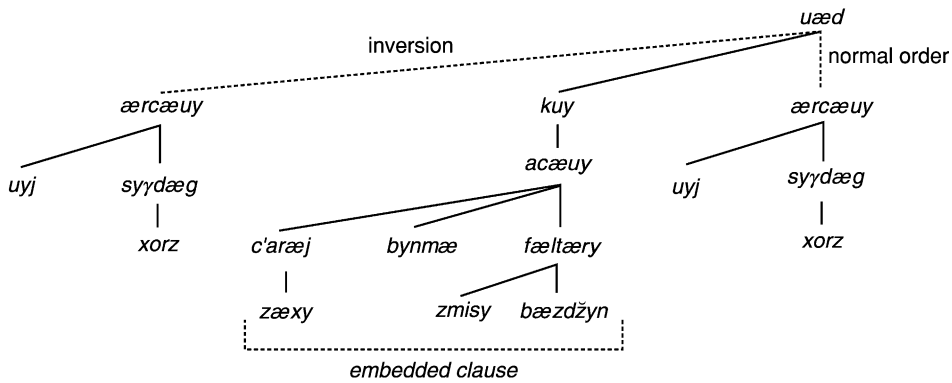

Figure 3 Dependency markers of sentence (15).

(15) **Uyj** **xorz** **syγdæg** **ærcæu-y,**
that *good* *clean* *arrive*–3SG
zæxx-y c'ar-æj byn-mæ
earth-GEN *crust*-ABL *ground*-ALL
zmis-y bæzdžyn fæltær-y
sand-GEN *thick* *layer*-INESS
kuy acæu-y, **uæd.**
when *come out*-3SG *then*
'When it (the water) comes out from the earth's crust to the ground through a thick layer of sand, then it arrives fairly clean.'

See also: Georgia: Language Situation; Indo–European Languages; Iranian Languages.

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Osthoff, Hermann (1847–1909)

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Hermann Osthoff was born on April 18, 1847 in Billmerich, a small village in Westfalia, now part of the city of Unna, Germany. He received his initial schooling in Billmerich as well as in Unna and subsequently, from 1861 to 1865, attended the high school in Giitersloh, which specialized in classical Greek and Latin (*Humanistisches Gymnasium*). One of his teachers there, Theodor Rumpel (b. 1815), appears to have had a determining influence on Osthoff's future professional career, just like Karl Windischmann (1775–1839) had on Franz Bopp (*see* **Bopp, Franz (1791–1867)**).

Osthoff studied Germanic philology, Sanskrit, and comparative grammar for four years after graduation – first at the University of Bonn and subsequently in Tübingen and Berlin. All three of the academic teachers to whom he acknowledged great in debtedness were eminent Sanskrit scholars: Johannes Gildemeister (1812–1890) in Bonn, Walter Rudolf von Roth (1821–1895) in Tübingen, and Albrecht Friedrich Weber (1825–1901) in Berlin.

He obtained his Ph.D. in 1869 with a thesis entitled *Quaestiones mythologicae* in which he pursued historical linguistic as well as mythological objectives. In 1870 he completed his *Staatsexamen,* required of future high school teachers. For three years he taught at the *Humanistisches Gymnasium* in Kassel until, in 1874, he moved to Leipzig, where he continued his studies in comparative philology for one more year to qualify for his *venia legendi* or *Habilitation,* a second doctorate, obligatory for university teachers in Germany. Appointed lecturer *(Privatdozent)* in 1875 at the University of Leipzig, he advanced

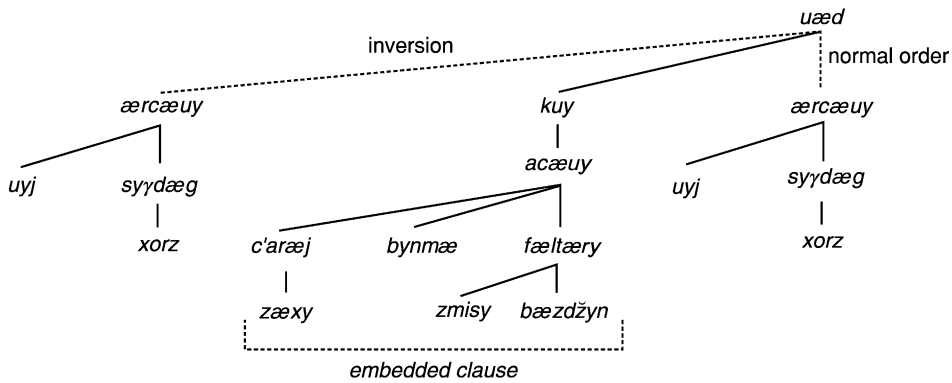

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rapidly through the ranks. He became associate professor of comparative philology and Sanskrit (*Extra-Ordinarius*) at the University of Heidelberg in 1877 and full professor (*Ordinarius*) in 1878.

On two occasions he was elected to high office in the university administration, first to serve as Dean of the Philosophical Faculty in 1885 and later as President (*Rektor*) of the University in 1899.

Osthoff took great pains to reinforce his expertise in languages of the past with information obtainable from languages of his time. Thus, he spent the fall of 1882 and the spring of 1883 on San Lazzaro, Venice, to continue his Armenian studies in the monastery of the Mechitarists (Mechitar (1676–1749), an Armenian priest, founded the congregation of Armenian Benedictines and established a monastery on the island of San Lazzaro in 1717). Osthoff also studied the Cymric language during the summer of 1905 in North Wales and went to Aran Mor in Galway Bay in the summer of 1907 to obtain firsthand data on Irish. Osthoff died on May 7, 1909 in Heidelberg.

The three years of 'academic apprenticeship' spent in Leipzig (1874–1877) were probably the most decisive years of his life. He established lifelong close relationships with faculty members like the classical scholar Georg Curtius (*see* **Curtius, Georg (1820–1885)**), the Slavist August Leskien (*see* **Leskien, August (1840–1916)**), and the Germanists Friedrich Zarncke (*see* **Zarncke, Friedrich (1825–1891)**) and Wilhelm Braune (*see* **Braune, Wilhelm (1850–1926)**). Of immense importance for him was also the contact with foreign students, such as the Danish linguist Karl Verner (1846–1896) and the Swiss Ferdinand de Saussure (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**). He cooperated most effectively, on a large number of scholarly projects, with Karl Brugmann (*see* **Brugmann, Karl (1849–1919)**), with whom he continued to stay in touch through correspondence after leaving Leipzig for Heidelberg in 1877.

From the very beginning, Osthoff was attracted to the Neogrammarian movement and drawn into the inner circle by their principal leaders, August Leskien, Karl Brugmann, and Hermann Paul (*see* **Paul, Hermann (1846–1921)**). While the first impact on the determination of his specific scholarly course undoubtedly originated for the most part from his colleagues, Osthoff was, nevertheless, a scholar who soon came to establish his own scientific agenda. He contributed substantially to drawing practical conclusions from the theoretical teachings of the Neogrammarians by exploring in greater detail the development of the sounds and the grammatical forms in the older stages of the IE languages. His specialty, aside from the Germanic languages, included Classical Greek and Latin as well as the Old Indic languages.

He laid the ground for solid treatment of the phonology and morphology in the IE languages in 1876 with his investigation into the origin of the Germanic n-declension (Osthoff, 1876: 1–89) and followed up with several important contributions along similar lines, e.g., in the *Morphologische Untersuchungen,* a series of 6 volumes (Osthoff, H. and Brugmann, K, 1878–1910), written together with Karl Brugmann. The programmatic credo of the Neogrammarians, contained in the introduction to vol. 1 (cf. pp. ix-xx), although signed by both Osthoff and Brugmann, was written entirely by Brugmann. Equally important was Osthoff's study of 1884, *Zur Geschichte des Perfects im Indogermanischen mil besonderer Rücksicht auf Griechisch und Lateinisch*. Numerous other treatises of varying length proved to be valuable models of how to focus on phonological and morphological language analysis in light of the principal Neogrammarian contention that language changes are due to either the exceptionless operation of the sound laws or to the effects of analogy.

Osthoff was less theoretically inclined than most of his fellow Neogrammarians. Hence, he ventured only occasionally into employing a more theoretical approach, as he did, for example, in the discussion of how physiological and psychological elements are intertwined in the formation of language forms (Osthoff, 1879) and when he examined the interdependency of *Schriftsprache und Volksmundart* (Osthoff, 1883).

Many of his contemporaries and friends, and even his adversaries, applauded him for the clarity of his style and praised his skills as a master of detail who never lost sight of the overall framework.

See also: Bopp, Franz (1791–1867); Braune, Wilhelm (1850–1926); Brugmann, Karl (1849–1919); Curtius, Georg (1820–1885); Leskien, August (1840–1916); Paul, Hermann (1846–1921); Saussure, Ferdinand (-Mongin) de (1857–1913); Weber, Albrecht Friedrich (1825–1901); Zarncke, Friedrich (1825–1891).

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Otfried von Weissenburg (fl. 9th Century A.D.)

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Otfried von Weissenburg is the first German poet known by name and author of the monumental *Liber Evangeliorum*, the largest text in Old High German. He was a pupil of the influential Carolingian scholar Hrabanus Maurus at the abbey of Fulda (Germany) and spent most of his life as a priest and monk at the abbey of Weissenburg (today Wissembourg, Bas-Rhin department, France), where he worked as a grammar teacher, librarian, scribe, and exegete. He was acquainted with the Carolingian elite, though otherwise very little is known about his life.

Compared with the rest of Otfried's work, which consists of biblical commentaries (mainly compilations of patristic commentaries) and Old High German interlinear glosses in schoolbooks, his *Liber Evangelorium* is surprisingly original. Here Otfried works out an account of the life of Jesus based on his own plan and selection from the Gospels. It goes far beyond an epos or a Gospel harmony, however, being extensively interwoven with exegetical comments and allegorical interpretations (based on Carolingian compilers of patristic writings) in which Otfried explains the mystery of Christian salvation. Whereas most Old English biblical poetry and the slightly older Old Saxon (Low German) epos *Heliand* adapted narrative material from the Bible to Germanic design and versification, Otfried adapted his native Germanic language to the Latin literary examples and conventions of Christian hymns and biblical poetry, e.g., by using end rhyme and short verse instead of Germanic alliterative long verse (though alliteration does occur occasionally). Such an undertaking was unprecedented and other creative religious poetry after Latin examples of comparable size and quality in the German vernacular did not emerge until much later. The most valuable source for the *Liber Evangeliorum* is the fair copy of the manuscript revised by Otfried himself, which is preserved as the Codex Vindobonensis 2687.

Otfried called his Old High German language Frankish, i.e., the language of the Franks, the dominant ethnicity in the Carolingian Empire. The *Liber Evangeliorum* testifies to Otfried's ethnic pride: in Book I, Chapter I, he argues that the Franks equal the ancient Romans and Greeks and explains that he wrote his book so as to enable them to praise God in their own language, matching their glory.

Otfried's linguistic awareness is displayed by the Latin preface to his *Liber Evangeliorum* 'Ad Liutbertum,' where he discusses such problems as how to assign Latin letters to the sounds of his native language, Sandhi-phenomena, and versification.

See also: English, Old English; German; Rhyme; Germanic Languages.

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Otfried von Weissenburg is the first German poet known by name and author of the monumental *Liber Evangeliorum*, the largest text in Old High German. He was a pupil of the influential Carolingian scholar Hrabanus Maurus at the abbey of Fulda (Germany) and spent most of his life as a priest and monk at the abbey of Weissenburg (today Wissembourg, Bas-Rhin department, France), where he worked as a grammar teacher, librarian, scribe, and exegete. He was acquainted with the Carolingian elite, though otherwise very little is known about his life.

Compared with the rest of Otfried's work, which consists of biblical commentaries (mainly compilations of patristic commentaries) and Old High German interlinear glosses in schoolbooks, his *Liber Evangelorium* is surprisingly original. Here Otfried works out an account of the life of Jesus based on his own plan and selection from the Gospels. It goes far beyond an epos or a Gospel harmony, however, being extensively interwoven with exegetical comments and allegorical interpretations (based on Carolingian compilers of patristic writings) in which Otfried explains the mystery of Christian salvation. Whereas most Old English biblical poetry and the slightly older Old Saxon (Low German) epos *Heliand* adapted narrative material from the Bible to Germanic design and versification, Otfried adapted his native Germanic language to the Latin literary examples and conventions of Christian hymns and biblical poetry, e.g., by using end rhyme and short verse instead of Germanic alliterative long verse (though alliteration does occur occasionally). Such an undertaking was unprecedented and other creative religious poetry after Latin examples of comparable size and quality in the German vernacular did not emerge until much later. The most valuable source for the *Liber Evangeliorum* is the fair copy of the manuscript revised by Otfried himself, which is preserved as the Codex Vindobonensis 2687.

Otfried called his Old High German language Frankish, i.e., the language of the Franks, the dominant ethnicity in the Carolingian Empire. The *Liber Evangeliorum* testifies to Otfried's ethnic pride: in Book I, Chapter I, he argues that the Franks equal the ancient Romans and Greeks and explains that he wrote his book so as to enable them to praise God in their own language, matching their glory.

Otfried's linguistic awareness is displayed by the Latin preface to his *Liber Evangeliorum* 'Ad Liutbertum,' where he discusses such problems as how to assign Latin letters to the sounds of his native language, Sandhi-phenomena, and versification.

See also: English, Old English; German; Rhyme; Germanic Languages.

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Oto-Mangean Languages

T Kaufman, University of Pittsburgh, Forest Hills, PA, USA

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Oto-Mangean (OM) is the most temporally diverse genetic grouping of languages spoken within Meso-America and one of the most widespread geographically. Currently, Mayans account for more speakers and more territory, but the individual identities of the approximately 30 distinct languages of Mayan are not in doubt, whereas the exact number of languages under the names Otomí, Chinanteko, Popoloka, Masateko, Sapoteko, Chatino, and Misteko is a matter of continued discussion and debate. The number recognized here (ca. 30) is probably close to a minimum number.

Oto-Mangean is a stock of roughly the time depth of Indo-European – approximately 6000 years. It is made up of seven readily recognizable language families, some of them with fairly complicated ramification and individually of varying time depth: Oto-Pamean (3600 years), Chinanteko (1500 years), Chorotegan (1300 years), Tlapanekan (800 years), Masatekan (2500 years), Sapotekan (2400 years), and Mistekan (3700 yrs). There is one language, Amusgo, that does not form part of a family, but the closest relatives of Amusgo are the languages of the Mistekan family. The previous groupings are generally agreed on.

The internal makeup of OM has been known since approximately the turn of the 20th century. Connections across these families and isolates have been observed since late in the 19th century, but the existence of Oto-Mangean as we now know it (roughly) was outlined basically during the 1920s.

Intermediate groupings are still being worked out. Comparative phonology and especially comparative grammar studies done by the author (Kaufman, 1983, 1988) show that there are two levels of ramification between the individual families and the ancestral proto-Oto-Mangean (pOM): The major splits are called 'divisions' and the groupings under the divisions are 'branches.' OM has two divisions, eastern and western. The eastern and western divisions have two main branches each: The eastern division (4700 years) contains Masatekan-Sapotekan (3500 years) and Amusgo-Mistekan (?4000 years), and the western division (4700 years) contains Oto-Pamean-Chinanteko (4000 years) and Chorotegan-Tlapanekan (4000 years). Each division is as diverse as Yuta-Nawan (Uto-Aztecan), and each branch is as diverse as Mayan; some of the families within OM (Mistekan and Oto-Pamean) are more diverse than Mije-Sokean (Mixe-Zoquean). The various families of OM are like the language groups of Indo-European, such as Indic, Iranian, Baltic, Slavonic, Germanic, Celtic, and Romance. Regarding one of the families, Mistekan, there has been some question about whether to include or exclude Amusgo and Triki.

Morris Swadesh mounted an argument that Wavi belongs to the OM stock; this hypothesis was cautiously accepted by Longacre, but no later Oto-Mangeanist has found the hypothesis valid or even promising.

The following classification gives:

- Name of language or genetic group: Okwilteko, Oto-Mangean
- Favored Spanish orthography: <Ocuilteco, Otomangue>
- Synonyms: SYN
- Lexicostatistic time depth calculated by Kaufman, etc. (mc = minimum centuries) [NNmc Kaufman]
- Number of speakers reported in 1990 Mexico census: Mx
- Number of speakers reported in Ethnologue 2002: EL
- Country or state where spoken: COSTA RICA, GUANAJUATO.

In the following classification, in which language areas are named and not further subdivided, many researchers will recognize two or more distinct (emergent or virtual) languages. This is especially true in the cases of 'Misteko' and 'Sapoteko.'

- Oto-Mangean stock (Sp. <Otomangue>) [60mc Kaufman] MEXICO, NICARAGUA, COSTA RICA

Erdmann O (1973). *Otfrids Evangelienbuch* (6th edn. by Wolff L). Tübingen: Niemeyer.
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- Western Oto-Mangean division [47mc Kaufman]
- Oto-Pamean-Chinanteko branch [40mc Kaufman]
- Oto-Pamean family [36c Kaufman]
- Pamean (northern Oto-Pamean) subfamily [25c Kaufman]
- Chichimeko language (Sp <Chichimeco>, <Jonaz>) EL: 200 GUANAJUATO
- Pame Complex [14c Kaufman] Mx: 5.6k SAN LUIS POTOSI
  1. Northern Pame virtual language EL: 1–10k
  2. Central Pame virtual language EL: 4k
  3. Southern Pame virtual language

- Southern Oto-Pamean subfamily [24c Kaufman]
- Matlatzinka-Okwilteko language area [8–9c Kaufman] STATE OF MEXICO
- Matlatzinka emergent language (Sp. <Matlatzinca>) EL: ca. 30
- Okwilteko emergent language (Sp. <Ocuilteco‘>, <Tlahuica>) EL: 50–100
- Otomían group [10c Kaufman]
- Otomí language area [8c Kaufman] Mx: 306k; EL: 223k
  1. Northeast Otomí emergent language VERACRUZ
  2. Northwest Otomí emergent language HIDALGO
  3. Western Otomí emergent language QUERETARO, MICHOACAN, Colonial
  4. Tilapa Otomí emergent language STATE OF MEXICO
  5. Ixtenco Otomí emergent language TLAXCALA
  6. Jalisco Otomí [extinct: undocumented] JALISCO

- Masawa language (Sp. <Mazahua>, COL Mazateco) Mx: 194k; EL: 365–370k
- Chinanteko family (Sp. <Chinanteco>) [15mc Swadesh] OAXACA Mx: 77.1; EL: 86.7–87.7k
  1. Ojitlán (N) Chinanteko language
  2. Usila (NW) Chinanteko language
  3. Quiotepec (W) Chinanteko language
  4. Palantla (LL) Chinanteko language
  5. Lalana (SE) Chinanteko language
  6. Chiltepec (EC) Chinanteko language

- Tlapaneko-Mangean branch (Sp. <Tlapaneco-Mangue>) [40mc Kaufman]
- Tlapaneko-Sutiaba language area (Sp. <Tlapaneco-Subtiaba>) [8mc Swadesh] Mx: 55.1k; EL: 66.7k
  1. Malinaltepec (general) Tlapaneko emergent language (SYN Yopi) GUERRERO
  2. Azoyú (orig. <Atzoyoc>) Tlapaneko emergent language GUERRERO
  3. Sutiaba (orig. <Xoteapan>) emergent language
  4. (Sp. <Subtiaba>, <Maribio>) NICARAGUA

- Chorotegan family (Sp. <Mangueano>, <Chiapaneco-Mangue>) [13mc Swadesh]
  1. Chiapaneko language (Sp. <Chiapaneco>) CHIAPAS
  2. Chorotega (Mange) language (Sp. <Mangue>, <Orotiña>, <Chorotega>, <Choluteca>) HONDURAS, NICARAGUA

- Eastern Oto-Mangean division (Sp. <Otomangue oriental>) [47mc Kaufman]
- Masatekan-Sapotekan branch [35mc Kaufman]
- Masatekan family (Sp. <Polopocano>) [24c Swadesh]
- Masateko complex (Sp. <Mazateco>) [10c Swadesh] Mx: 124.2k; EL: 174.5k
  1. Huautla-Mazatlán Masateko language EL: 50–60k OAXACA
  2. Ayautla-Soyaltepec Masateko language EL: 40k OAXACA, PUEBLA
  3. Jalapa Masateko language EL: 10–15k OAXACA, VERACRUZ
  4. Chiquihuitlán Masateko language EL: 3–4k OAXACA

- Chochoan subfamily [12c Swadesh]
- Iskateko language (Sp. <Ixcateco>) EL: <50 OAXACA
- Chocho-Popoloka language area (Sp. <Popoloca>) 8c
  1. Chocho emergent language Mx: 12.3k; EL: 428 OAXACA
  2. Northern Popoloka emergent language PUEBLA
  3. Western Popoloka emergent language PUEBLA
  4. Eastern Popoloka emergent language PUEBLA

- [Popoloka: Mx: 23.8k; EL: 23.2k]
- Sapotekan family (Sp. <Zapotecano>) [24c Swadesh]
- Sapoteko complex (Sp. <Zapoteco>) [14c Rendón] Mx: 423k; EL: 326k OAXACA
  1. Northern Sapoteko language area
  2. Central Sapoteko language area
  3. Southern Sapoteko language area
  4. Papabuco Sapoteko language area
  5. Western Sapoteko language area

- Chatino language area Mx: 20.5k; EL: 36k OAXACA
  1. Yaitepec Chatino emergent language
  2. Tatalpepec Chatino emergent language
  3. Zenzontepec Chatino emergent language

- Amusgo-Mistekan branch (Sp. <Amuzgo-Mixtecano>)
- Amusgo language (Sp. <Amuzgo) Mx: 1.7k; EL: 28.2k OAXACA, GUERRERO
- Mistekan family (Sp. <Mixtecano>) [37c Kaufman]
- Misteko-Kwikateko subfamily (Sp. <Mixteco-Cuicateco>) [25c Swadesh]
- Misteko complex (Sp. <Mixteco>) [15c Swadesh] Mx: 323.1k; EL: 327k
  1. Northern Misteko language area OAXACA, PUEBLA
  2. Central Misteko language area OAXACA
  3. Southern Misteko language area OAXACA, GUERRERO

- Kwikateko language (Sp. <Cuicateco>) Mx: 14.2k; EL: 18.5k OAXACA
- Triki language area (Sp. <Trique>, <Triqui>) [10mc Kaufman] Mx: 8.4k; EL: 23k OAXACA
  1. Chicahuaxtla Triki emergent language
  2. Copala Triki emergent language
  3. Itunyoso Triki emergent language

The homeland of the OM languages seems to have been somewhere in the highland part of Meso-America between western Oaxaca and the basin of Mexico. The OM languages began to break up after the early stages of domestication of some plants approximately 7000 years ago and long before the transition to agriculture approximately 2000 B.C.E. The extent of the homeland is difficult to gauge because, in principle, if it is large it is going to have internal diversification, especially in broken country such as the highlands of Oaxaca and Puebla. Part of Chinanteko country (the Chinantla) in Oaxaca is particularly lush and fertile and would have been favored by early populations who did not have much competition from rival groups. Before the transition to agriculture, most Meso-American populations were small and much territory was unoccupied.

Structural Characteristics of Oto-Mangean Languages

Phonological Traits

OM languages vary quite widely in the number of contrastive vowels and the complexity of syllable onsets. In the number of contrastive consonants, tones, and syllable codas, the languages differ less. We first characterize for related sets of traits how pOM phonology was developed (as outlined in Kaufman, 1988) and then discuss some of the ways that the lower-level protolanguages and individual languages deviate from the original patterns.

Consonants

pOM has five plosives /p t tz k kw/, four spirants /8 s j jw/, two laryngeals /7 h/, one lateral /l/, two nasals /m n/, and two semivowels /y w/. <tz> (or <c>) is a sibilant affricate [ts]. <8> is 'theta'; an equally plausible phonetic reconstruction is [r]. <j> (or <x>) is [x], and <jw> (or <xw>) is [xw]. There is little evidence for reconstructing *p, but it seems required for the protolanguage. Most Meso-American languages have /p/ and lack /kw/, and labialized velars generally. pOM *kw has shifted to [p] in several languages, as discussed later. The evidence for *m is better than for *p, but many OM languages lack /m/ as a phoneme.

Vowels and Syllabic Nuclei

pOM has four vowels /i e a u/ and five complex nuclei /ia ea ua ai au/. /ia/ (or <4>) may be 'barred ,' /ea/ (or <6>) may be 'schwa,' /ua/ may be [o], /ai/ (or <3>) may be 'aesc,' and /au/ (or <2>) may be 'open o.' Among extant OM languages, the smallest system has four vowels /i e a o/ (some forms of Zapotec) and the most elaborate has nine vowels /i e 3 4 6 a u o 2/ (some forms of Otomi). pOM syllables can close with nothing, /n/, /7/ (glottal stop), /h/, /nh/, /n7/, or /nh7/. Syllable-closing *n is realized as vowel nasality where it survives; some languages, discussed later, have lost nasality on vowels. Not all languages have a clear reflex of syllable-closing *h. pOM probably had three level tones and possibly a rising and a falling tone. Chorotegan seems to lack tone, but the majority of the remaining languages have a pattern analogous to the suggested reconstruction. A few have four level tones along with the moving tones; several have only two or three tonal contrasts altogether.

Syllable Onsets

These are fairly complex for pOM. A complex onset is set up as a plosive or resonant preceded by *n, *y, *h, *7, or a combination of these (although of resonants, apparently only *l can be preceded by *n). (T = plosive /p t tz k kw/, R = resonant /m n l/, H = laryngeal /7 h/.) They are set up this way even though in some branches and individual languages the reflexes of *h *7 appear following the plosive; *y always appears following the plosive or resonant and *n always precedes. The maximal onset is *nyHC, which is [nTyH] where C is a plosive and [HRy] where C is a resonant. The reason for this analysis is that all these preposed consonants appear as the exponents of prefixed, mostly derivational,

morphemes, although any particular instance of one of these preposed consonants may not be segmentable. Since there is no contrast between /yT/ and /Ty/, /7T/ and /T7/, etc., this analysis is maximally general and consistent. Some languages (Zapotecan and Mixtecan) have eliminated *h or *7 in complex onsets, some have eliminated only *7 (Tlapanecanand Amusgo), some have eliminated *n in complex onsets (Zapotecan), some realize *7T = /T7/ through (allophonic) glottalization, and some realize *hT = /Th/ through (allophonic) aspiration. In some languages, *yC has yielded palatalized consonants or their further developments.

Morpheme patterns are V, CV, VCV, CVCV, where C is any of the permitted syllable onsets, and V is any of the permitted vocalic nuclei and 'open' syllables.

Certain OM families (OP and Chin) underwent phonological change that rendered most stems monosyllabic; the remaining families have stems that are (or were) predominantly disyllabic (Masatekan, Triki, Amusgo, and Southern Chatino change many CVCV stems to CCV, especially when V1 is a high vowel); most disyllabic stems, however, are morphologically complex, consisting of a monosyllabic root preceded by another root or a derivational prefix. This means that there is a much greater than even chance that when disyllabic stems of similar or identical meaning are compared across OM branches, if they are cognate they will be cognate for the first or last morpheme only. This, along with the great time depth within the stock, makes finding valid etymologies quite a challenging undertaking. A thorough understanding of word formation processes for each language, including the now no longer productive ones peculiar to each of the families, is needed before effective cognate searches can be made.

Quite a few comparative studies designed to identify cognates and reconstruct ancestral phonology and semantics have been carried out within OM. Most have been flawed by a failure to recognize many or most of the now unused word formation processes of earlier stages.

Grammatical Traits of Oto-Manguean Languages

This discussion is presented in terms of what is most prevalent and at the same time most probably the earliest state of OM languages; less common or more recent patterns are discussed later or not at all.

OM languages are consistently left-headed, with VO word order; any affixes are prefixes. Most grammatical morphemes are clitics; some are phonologically full words.

If we take 'derivation' to include both the formation of new lexical items and the change of morphosyntactic class without creating new lexical items, the following patterns are observable: prefixes can mark active, nonactive, and mediopassive 'voice,' versive ('inchoative') intransitive verbs based on nouns and adjectives, and causative verbs based on intransitive (including versive) and transitive verbs. All of the previous functions, except possibly 'active,' can be marked with grammatical words (often clitics) in one or another language. Left-headed compounds of the form NN and NA are found in most languages, and verbs of the shape VN with incorporated nouns are widely attested.

Much cliticization can be mistaken for inflexion, and in some cases inflexion versus cliticization cannot be decisively determined. However, suffixation and unproblematic inflexion are found only in Oto-Pamean.

Pronouns are noun phrase (NP) substitutes: in most languages, when a noun argument is present, no pronominal will be present. Most pronouns have both a full and a cliticized phonological form. Nevertheless, only a few languages have redeployed cliticized third-person pronouns as agreement markers that may occur in the same clause with fully NP arguments. Non-third-person pronouns may mark an exclusive:inclusive distinction in the first person, a humble versus prideful distinction for the first person, and a polite versus familiar distinction in the second person.

Predominant constituent order includes verb–subject–object (VSO), prepositions (Pr), noun–genitive (NG), noun–adjective (NA), noun–demonstrative (ND), Quantifier–noun (QN), and noun–relative clause (NR).

Alignment

There are apparently three types of NP role alignment in OM languages, marked by distinct sets of pronominal markers for each but the last type: 'ergative' (e.g., Chinantec and probably Tlapanec), 'active' (e.g., Chocho, Matlatzincan, and probably Chiapanec), and 'undifferentiated' (Mixtec and Zapotec) (only one set of pronominal markers). No clear instances of accusative alignment have been identified.

Verbs mark aspect and mood by means of preposed morphemes that are clitics by origin, although in some languages they are indistinguishable from prefixes. Tense (time) is not marked, or it is marked by adverbs that are not positioned as are aspect and mood markers. Virtually all languages have a verb form ('dependent') that is used when the verb is subordinated to a higher predicate. The dependent form may also be used in dependent clauses expressing the function of optative, possible future, or, in some cases, imperative.

Locative adpositionals are encoded by means of body-part nouns and other nouns that denote the parts of things: thus, in/inside = belly, on [surface] = face/eye, on [top] = head, under = butt, between = interval, etc. This pattern is widespread although not universal in Meso-American languages. Other semantic connexions include tip = nose, leg [of table or chair] = foot, front = face, and edge = lip/mouth. As stated previously, adpositionals in OM languages are preposed.

Possession Classes of Nouns

Many OM languages subdivide nouns by the ways they mark types of possession; for example, a fair number of nouns will be accompanied by one or another grammatical morpheme that correlates with the fact that the noun is possessed.

Endocentric Noun Classes

Some OM languages, such as Zapotecan, Mazatecan, and Mixtecan, have a series of noun classifiers that mark such categories as 'tree,' 'fruit,' and 'animal.' They are proclitics; in some cases, their origin as independent nouns can be discerned, in others it cannot, but they do not qualify as prefixes. These classifiers occur before the noun that they classify and are therefore not like (other noun) modifiers. They may in fact be the heads of the constructions in which they occur. In some languages, some of their uses are optional. In all languages, some of their uses are lexicalized – the lexeme does not occur without the classifier, or without the classifier the noun has a different meaning than it does with the classifier. This pattern is possibly an old one dating back to the eastern OM level since some of the classifying morphemes are cognate and do not exist as independent lexical items (although some are not cognate across families or can be related to independent lexical items: These would show the effects of analogy and renewal).

Exocentric Noun Classes in Oaxacan Languages

OM languages are spoken in several zones, among which are the northern fringe of Meso-America, the basin of Mexico, southern Guerrero, the Tehuacan Valley, the Mixteca Alta, and Oaxaca, of which the last two are the most momentous linguistically. OM languages of Oaxaca belonging to several branches, including all Zapotecan, some Mixtecan, and some Mazatecan languages, assign nouns to several classes, which are marked by the third-person pronouns that refer to the nouns of the various classes. The classes that are found are semantically motivated and include such categories as 'adult human,' 'man,' 'woman,' 'irrational (baby, foreigner),' 'animal,' 'thing,' and 'god.' In virtually all cases, the pronouns (they are not agreement markers) used to mark these classes are phonologically reduced/simplified forms of nouns naming the corresponding semantic field. This phenomenon therefore seems to have originated within the past 1000–1500 years in a continuous region and to not be the continuation of a pattern present in any of the family-level proto-languages.

Precolumbian Language Contact with Non-Oto-Manguean Languages

Yokel Anxiety

Although the earliest surviving organic material pointing to (incipient) maize domestication (dating to approximately 7000 years ago) has been found in dry caves in the state of Puebla, firmly within the OM area, maize domestication was developing as well in lowland areas where the organic material simply did not survive. At any rate, Mayan speakers (in the Mayan lowlands), Mixe-Zoquean speakers (in Olmec country and in the basin of Mexico), and Totonacan speakers (in the basin of Mexico) developed complex society slightly before Zapotecan speakers (in the valley of Oaxaca), Chorotegan speakers (near Cholula), Matlatzincan speakers (near Toluca), or Mixtecan speakers (northwestern Oaxaca). Most of the OM languages spoken by long-term practitioners of complex society in Meso-America show serious phonological and lexical influence from such non-Otomanguean languages as Mixe-Zoquean and Mayan. Unlike the oldest state of OM languages, Mije-Sokean, Totonakan, and Mayan languages lack /kw/, vowel nasality, and tone, and they generally have predictable stress. In imitation of non-OM languages, whose speakers had higher prestige, the following changes were adopted by OM languages through what I call 'yokel anxiety': (1) Oto-Pamean and Zapotec (but not Chatino) changed *kw to [p]; (2) Matlatzincan, Chorotegan, and Zapotec (but not Chatino) eliminated nasality from vowels; (3) Chorotegan eliminated tone (or reduced it to a two-way stress contrast); and (4) Zapotec (but not Chatino) and Mixtec-Cuicatec imposed a penult-syllable stress pattern on its inherited and surviving tone systems of three or four tones.

The Mayanization of Oto-Pamean

The homeland of Oto-Pamean was the basin of Mexico. Between 2000 and 1500 B.C.E., it was bordered to the east by the Mayan language that developed into

the ancestor of Huastec and Cabil (Chicomuseltec). At that time, Oto-Pamean shifted its inherited *kw to [p], in imitation of Mayan, which has [p] and lacks [kw], and borrowed a few Mayan lexical items. By 1500 B.C.E., Oto-Pamean broke up into northern Oto-Pamean (or Pamean) and southern Oto-Pamean (or Otomian). Pamean expanded northward into the western parts of the state of San Luis Potosi and the southern part of the state of Zacatecas. Pamean came into contact with undocumented (and now extinct) languages beyond the northern border of Meso-America. Approximately 1000 C.E., the Pamean-speaking area dried out through climate change and agriculture was no longer possible. Pameans became foragers and occasional raiders on their Meso-American cousins to the immediate south, and they adopted some linguistic traits from their non-Meso-American northern neighbors. The (Otomian-speaking part of) basin of Mexico came under serious Mayan (probably Tabasco Chontal or Yokot'an) influence in the Epiclassic period (ca. 700–1000 C.E.). Besides some lexical influence, the grammatical effect on Otomian was extensive: VOS word order, AN word order, and marking of the person of actors and possessors by preposed morphemes were all modeled on Mayan grammatical patterns. Since Pamean shares the last trait, and it is probable that the SOV, GN, and NA orders, as well as the presence of postpositions in Pamean are an adjustment to non-Meso-American (perhaps Hokan) languages, it is possible that Pamean earlier shared the Mayanized VOS and AN orders with Otomian. If so, this pattern would have been due to contact between proto-Oto-Pamean and pre-Huastecan.

Viability

In pre-Columbian times, most OM populations (except northern Oto-Pameans = Pameans) were agricultural, communities were sedentary, and the total population for each language was at least 10 000, increasing to more than 500 000. At present,

- Four OM languages have died out: South Pame, Sutiaba, Chiapanec, and Chorotega. Jalisco Otomi was never documented.
- Many OM languages are dying (moribund) (spoken only by elderly people); for example, Ocuiltec, Chocho, and Ixcatec.
- Most other OM languages are dwindling (obsolescent) (not being learned by children); for example, Matlatzinca and Popoloca.

A number of OM languages are merely endangered (being learned by children (with some attrition) with strong pressure for bilingualism in Spanish and pressure to abandon the native language), including some varieties each of Otomi, Chinantec, Tlapanec, Mazatec, Mixtec, Zapotec, and Chatino. Otomi (306 → 223k), Mazahua (194 → 363k), Mixtec (322 → 327k), and Zapotec (423 → 326k) (Mexican census 1990 → Ethnologue 2002) each have more than 225 000 speakers. If current trends continue, in 100 years probably only some varieties of these four will still be spoken in some fashion.

Documentation

Many OM languages were documented during the colonial period (1519–1814) by Catholic missionaries who wanted their replacements to have the ability to communicate Christian teaching to the Indian population, who had mostly been forcibly converted. This documentation included grammars and dictionaries of often more than 5000 entries, along with translations of the catechism, confessional, and sermons and narratives from the Bible. The orthography was often inadequate to express all sounds accurately, and the grammatical models were often simply calqued on the traditional analysis of Latin. Especially valuable documentation for Misteko, Sapoteko, Matlatzinka, and Otomi has survived to the present day. Since 1930, Protestant missionaries, mostly English-speaking from the United States, Canada, and Great Britain and belonging to the Summer Institute of Linguistics/Wycliffe Bible Translators, have been working on Meso-American Indian languages, and most OM languages have been documented rather fully by them, especially by dictionaries and in many cases by grammars, less so by texts. Since 1950, a number of academic linguists, both Mexicans and English speakers, have worked on the documentation of OM languages. Much has been accomplished, but much remains to be done, especially with regard to dying and dwindling languages.

See also: Costa Rica: Language Situation; Honduras: Language Situation; Mexico: Language Situation; Nicaragua: Language Situation; Zapotecan.

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P

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Paget was born at Cranmore Hall, Somerset, UK, on January 13, 1869. After graduating in chemistry from Oxford in 1891, he trained and practiced as a barrister. Chairmanships of numerous government and institutional committees followed. He died in London on October 23, 1955.

His interest in speech, especially acoustics, can be traced to his undergraduate days at Magdalen College, Oxford. The acoustics of the College Chapel allowed the individual harmonics of the chaplain's singing voice to be clearly heard – "bugle-calls of an almost militant character," as Paget later described them. During World War I, when Paget worked for the British Admiralty on underwater sound detection, his interest in acoustics and vowels was reawakened. Further experimentation, using nothing more than an exceptionally fine musical ear, allowed him to analyze the first and second resonances (i.e., formants) of the vowels of RP English (1922). This led to a further interest in speech synthesis, and Paget constructed a series of plasticine resonators with which to synthesize vowel sounds. His book *Human speech* (1930) sets out at length the results of his research into speech acoustics. It also includes materials in support of the hypothesis that speech originated in gestures.

The role of gesture as a communicative device led later (1951) to his devising his New Sign Language for the deaf. This was later modified, in cooperation with Pierre Patrick Gorman (b. 1924), and is now known as the Paget–Gorman Sign System. It was used extensively in the UK in the 1970s, not only with the deaf but also with children with severe learning disabilities. Its popularity has now diminished somewhat.

See also: Speech Synthesis.

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Pahlavi

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Pahlavi or Middle Persian, descendant of Old Persian, is known from almost a millennium of textual history, from the scattered remains of the 2nd century C.E. to the last Zoroastrian compositions. From the 3rd to the 6th centuries there are a few lengthy inscriptions, some accompanied by Parthian and Greek versions, and a large Manichaean literature rediscovered at Turfan, as well as several pages of a Middle Persian translation of the Psalms, also from Turfan. There is a large Zoroastrian literature written down mainly in the 9th and 10th centuries. Finally, there is a substantial corpus of economic documents and letters on papyrus and parchment, probably from the 7th and 8th centuries. The term 'Pahlavi' applies primarily to the language of the Zoroastrian literature, but is used

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loosely about Middle Persian in general, though not usually about Manichaean. Middle Persian was replaced by New Persian as a spoken language by the 8th century.

With the exception of the Manichaean texts, which are written in the Syriac estrangelo script, Middle Persian is written in scripts descended from the variety of Aramaic used in southern Iran. The script of the earliest coin inscriptions of the local rulers of Persia is still in regular Aramaic, and the well-known early Sasanian form emerges under Ardashir's older brother Shapur (early 2nd century), of which the Pahlavi script of the Zoroastrian literature is a later development. The orthography of non-Manichaean Middle Persian is conservative (similar to that of English and French), while Manichaean orthography is largely phonetic. Non-Manichaean Middle Persian also uses a large number of aramaeograms (also called ideograms, heterograms), that is, petrified Aramaic words that were read with their Middle Persian equivalents and hence often received Middle Persian endings (e.g., Pahl. <ŠPYL'n′>, Man. <wyh'n> = *weh-ān* 'good-PL.OBL,' Pahl. <OHDWNm, OHDWNt>, Man. <gyrym, grypt> = *gīr-ēm* 'take-PRES.1SG,' *grift* 'take.PAST.3SG').

Several phonological and morphological changes take place between Old and Middle Persian, which have changed the look of the language, but many of the syntactic structures survive. Final syllables are lost, including monosyllabic case and verb endings, while disyllabic endings keep their penultimate syllables. For instance, as the case system is reduced to a two-case system, most nouns have two forms: no ending in both cases singular and the direct case plural, and the ending *-ān* in the oblique plural (e.g., *mard* 'man,' *mard-ān* 'man-PL.OBL'). The only exceptions are the *r*-stems denoting family members, which have three forms (*pid* 'father,' SG.OBL and PL.DIR *pid-ar*, PL.OBL *pid-ar-ūn* or *pid-ar-ān*), and the 1st singular personal pronoun (DIR *an*, OBL *man*). Manichaean Middle Persian has no case distinction in the plural. The two-case system eventually gives way to a caseless system, in which plurality is expressed only when emphatic and most often of animate nouns (ending *-ān*) or when individual plurality is stressed (ending *-īhā* 'all the various . . .').

Adjectives and genitives are placed either before the head nouns or are added after them by means of the connector *ī* (the newer and more productive construction). Possession is often expressed by *xwēš* 'own' (*ēn xānag ī man* [this house CONN I.OBL] 'this (is) my house,' *ēn xānag man xwēš* 'this house (is) my own = mine'). The connector *ī* is also used as a relative pronoun.

The verbal system is similar to that of Old Persian. There are two stems, present and past, related in various ways (e.g., PRES *dwār-* 'run,' PAST *dwār-ist*; PRES *gōw-* 'say,' PAST *guft*; PRES *wēn-* 'see,' PAST *dīd*). Causative and denominative verbs are formed with the suffix *-ēn-īd*, passive *-īh-ist* (*šaw-* 'go,' *šaw-ēn-* 'cause to go, send off'; *paydāg* 'evident,' *paydāg-ēn-* 'reveal,' *paydāg-īh-* 'be revealed'). There is a narrative imperfect (from the present stem) and a 'summarizing' perfect:

was	kerdagān	yazd-ān	abzāy-īh
much	*good-work*	*gods-OBL*	*increase.PRES-PASS.IMPERF.3SG*

'and much good work for the gods was increased [at the time]'

ud anī-z	kerdagān	ī	yazd-ān
other-too	*good-work*	*CONN*	*gods-OBL*
was abzūd			
much	*increase.PAST.3SG*		

'and much other good work of/for the gods has [now] been increased'

When the imperfect disappears (late 3rd century?), the perfect assumes its function as well, and becomes the general narrative past, while a new (present) perfect is made with the auxiliary 'stand' (*nibišt est-ēd/est-ād* [write.PAST stand.PRES–3SG/-PAST.3SG] 'it stands/stood written, it is/was written'). In early Middle Persian there were probably two conjugations, one from the old thematic *a*-conjugation, the other from the *aya*-conjugation, with different sets of endings (e.g., 1SG **kun-ami* 'I do' → *kun-am*, **dār-ay-ami* 'I hold' → *dār-ēm*; 3SG **kun-ati* → *kun-d* 'he does', **dār-ay-ati* 'he holds' → *dār-ēd*), but forms from the two conjugations soon merged in various ways in the dialects (e.g., NPers. 1SG *kon-am*, 3SG *kon-ad*, 1PL *kon-īm* ← *-ēm*).

The past tense is ergativic (*man dušmen was ōzad h-ēnd* [I.OBL enemy.PLUR.DIR many kill.PAST COP. PRES-3PL] 'I killed/have killed many enemies'), while the present perfect is originally only intransitive–stative (*ēdar nibišt est-ēd* 'here it stands written, here it is written'). Later on, the present perfect takes on the perfect function and becomes ergativic (*man dušmen was ōzad est-ēnd* [I.OBL enemy.PLUR.DIR many kill. PAST stand.PRES-3PL] 'I have killed many enemies').

The verb in ergative constructions sometimes agrees with an indirect object or a noun governed by a preposition, for example (in transliteration and transcription):

APš	gwpt'	'whrmzd	AYK	
u-š	guft	Ohrmazd	kū	
and-he.OBL	*say.PAST*	*Ohrmazd*	*that*	
wym'l	HWEyy	gwšwrwn'	MN	ZK
wēmār	h-ē	Gōšurūn	az	ān
sick	*COP.PRES.-2SG*	*Goshurun*	*from*	*that*

Y	gn'k'	mynwd		
ī	ganāg	mēnōy		
CONN	*foul*	*spirit*		
wym'lyh	W	kyn'	Y	
wēmārīh	ud	kēn	ī	
sickness	*and*	*hatred*	REL	
ŠDYA'n'	QDM	YBLWNt'		
dēw-ān	abar	burd		
demon-PL.OBL	*upon*	*bring*.PAST		
HWEyy				
h-ē				
COP.PRES.-2ND.SING				

'and Ohrmazd said: "You are sick, Goshurun,' from the sickness of the Foul Spirit and the hatred that the demons (have) brought upon you"'

The subjunctive and optative survive in their old functions of prospective (main and subordinate clauses) and potential or unreal conditions, respectively.

The Middle Persian lexicon is mixed, containing a fairly large number of originally non-Persian forms (Manichaean is less mixed, e.g., *damestān* 'winter,' Pahl. = NPers. *zamestān*), but with few loanwords from non-Iranian languages.

See also: Iran: Scripts, Old Persian, Aramaic, Avestan; Iranian Languages; Persian, Modern; Persian, Old.

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Pakistan: Language Situation

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The language situation in Pakistan (Shackle, 2005) exhibits many features characteristic of the South Asian subcontinent as a whole. Thus, at the local level, there exists a great variety of spoken languages at different stages of development and formal cultivation, some of which are typologically quite distinct from their neighbors, and many others with blurred boundaries. Similarly, at the national level, official policies have always had to take account of the conflicting role of English as a long-established standard of alien origin but enduring local prestige. Peculiar to Pakistan, however, is the role of Urdu as a national language that is not indigenous to any part of the country, but which is spoken as a mother tongue by the substantial community of Muhajirs – the Muslim refugees from India who came to settle in Karachi and the neighboring cities of Sindh when Pakistan was created as a homeland for the Muslims of South Asia by the partition of British India in 1947 (Jones, 2002).

The ideological basis of Pakistan as an Islamic state has always had important implications for the country's language situation. Much of Pakistan's political history has been determined by regimes led by military officers, with centralist policies framed in terms of an ideal of religious unity that would predominate over intrinsic cultural and linguistic diversity. During the period before the secession of Bangladesh in 1971, the national language issue centered upon the roles to be accorded to Urdu and Bengali. Subsequently, although centralizing regimes and their supporters found it even more natural to emphasize the

Y	gn'k'	mynwd		
ī	ganāg	mēnōy		
CONN	*foul*	*spirit*		
wym'lyh	W	kyn'	Y	
wēmārīh	ud	kēn	ī	
sickness	*and*	*hatred*	REL	
ŠDYA'n'	QDM	YBLWNt'		
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The language situation in Pakistan (Shackle, 2005) exhibits many features characteristic of the South Asian subcontinent as a whole. Thus, at the local level, there exists a great variety of spoken languages at different stages of development and formal cultivation, some of which are typologically quite distinct from their neighbors, and many others with blurred boundaries. Similarly, at the national level, official policies have always had to take account of the conflicting role of English as a long-established standard of alien origin but enduring local prestige. Peculiar to Pakistan, however, is the role of Urdu as a national language that is not indigenous to any part of the country, but which is spoken as a mother tongue by the substantial community of Muhajirs – the Muslim refugees from India who came to settle in Karachi and the neighboring cities of Sindh when Pakistan was created as a homeland for the Muslims of South Asia by the partition of British India in 1947 (Jones, 2002).

The ideological basis of Pakistan as an Islamic state has always had important implications for the country's language situation. Much of Pakistan's political history has been determined by regimes led by military officers, with centralist policies framed in terms of an ideal of religious unity that would predominate over intrinsic cultural and linguistic diversity. During the period before the secession of Bangladesh in 1971, the national language issue centered upon the roles to be accorded to Urdu and Bengali. Subsequently, although centralizing regimes and their supporters found it even more natural to emphasize the

importance of Urdu as the premier language of South Asian Islam, contrasting social dynamics have ensured the full maintenance of English as well as a certain role for some provincial languages.

Distribution of Languages

Pakistan straddles the linguistic frontier between the Iranian and Indo-Aryan language families. To the west, Pashto and Balochi cross the borders with Afghanistan and Iran; to the east, Panjabi crosses the frontier with India. Although the homelands of Sindhi and the 'Lahnda' Seraiki and Hindko are contained within Pakistan, they have come since 1947 to accommodate large numbers of Urdu speakers (plus some Gujarati speakers). Pakistan is also home to the isolated Dravidian Brahui in Baluchistan, and in its mountainous Northern Territories to a great variety of taxonomically distinct minor languages, including Dardic (Shina, Khowar), Tibetan (Balti), and the isolate Burushaski.

It may be noted, however, that linguistic boundaries only partially correspond to provincial divisions, and that the politicization of language issues has removed all language data from recent censuses. Estimates must therefore continue to refer back to the 1981 census (Geijbels and Addleton, 1986), which gives percentages of speakers by household (Table 1), while bearing in mind the under-enumeration of minority languages at the time in addition to the great subsequent increase in total population (from 84 million to 120 million) and the accompanying demographic shifts.

Patterns of Language Use

Patterns of language use need to be viewed in the general context of a low literacy rate of 26% overall (male, 35%; female, 16%), especially in rural areas and in the large tribal areas of Baluchistan and the North-West Frontier Province (NWFP) and in the Northern Territories. The low literacy rate becomes somewhat higher when counting those with some mechanical knowledge of the Arabic script, gained through instruction in the Qur'ān in mosque schools, as opposed to a functional literacy in Urdu or another Pakistani language. Much of the rural population is monolingual, although the diffusion of Urdu both as a lingua franca and as the medium of central government and administration, religion, and broadcasting ensures that it is widely understood. Notable local patterns of bilingualism include those between Sindhi and Seraiki in Sindh, Balochi and Brahui in Balochistan, and Pashto and Hindko in NWFP.

In marked contrast, trilingualism is common among members of the urban elite, who in addition to their mother tongue typically possess an active command of both English and Urdu, the official and national languages of Pakistan, respectively, which together account for the great majority of its books and newspapers. These two languages dominate the bipartite educational system, with English-medium schools, colleges, and universities continuing to be more prestigious than the officially encouraged Urdu-medium system. While Persian (Farsi, Western), the historic cultural language of the region, lost its place in the syllabus soon after 1947, a considerable attention to Arabic was initiated by the Islamicizing regime of Zia ul Haq (1977 to 1988). Other foreign languages are seldom taught.

The historical hierarchical triglossia of English, Urdu, and the local language (Shackle, 1970; Rahman, 1996) is coming increasingly to be challenged by demands for increased recognition for provincial languages, which have yet to be adequately planned for in a coherent government policy comparable to India's 'three-language formula.' While Pakistan does not share the problems stemming from the multiplicity of scripts in India, it may be noted that both Sindhi and Pashto are written in forms of the Arabic script that are distinct from the Perso-Urdu style used, with appropriate local modifications for writing other Pakistani languages.

The provincial language best established both in the educational system and the media is Sindhi, which from its secure base in rural Sindh is in conflict with Urdu, seen by many Sindhis to be excessively favored as the language of the Urdu-speaking Muhajits, who dominate the province's cities. A similarly enhanced role may be envisaged for Pashto, whose sphere is rapidly expanding not only in NWFP by also in Baluchistan and the Northern Territories, while the language debate in Panjab is rendered complex by the local rivalries between the Panjabi activists centered in Lahore and proponents of the linguistically rather closely related 'Lahnda' standards, notably Seraiki in the southwest (Shackle, 1977).

Table 1 Pakistan: Language percentages by household (1981)

	Pakistan	*Panjab*	*Sindh*	*Baluchistan*	*NWFP*
Urdu	7.6	4.3	22.6	1.4	0.8
Panjabi	48.2	78.7	7.7	2.2	1.1
Seraiki	9.8	14.9	2.3	0.5	4.0
Hindko	2.4	—	0.4	0.1	18.1
Sindhi	11.8	0.1	52.4	8.3	—
Baluchi	3.0	0.6	4.5	36.3	—
Brahui	1.2	—	1.1	20.7	—
Pashto	13.2	0.8	3.1	25.2	68.3

See also: Bangladesh: Language Situation; India: Language Situation; Indo–Aryan Languages; Indo–Iranian; Lahnda; Punjabi; Sindhi; Urdu.

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Palau: Language Situation

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Introduction

The Republic of Palau (*Belau* in the national language, Palauan) is an independent island nation of the Western Pacific, consisting of an archipelago of around 350 small islands stretched across 400 miles of ocean. Its nearest neighbors are the Philippines to the west, Indonesia and Papua New Guinea to the south, the Federated States of Micronesia to the east, and the Commonwealth of the Northern Mariana Islands to the northeast. The population of the islands in 2000 was 19 129 (see Office of Planning and Statistics, 2000 for this and all subsequent population data in this entry), of which almost 70% live in the Capital State of Koror. Sixty-seven percent of the population was born in Palau. For most of the 20th century, Palau was under colonial administration: by Spain (1885–1899), Germany (1899–1914), Japan (1914–1945), and finally, the United States of America (1945–1994). It gained its independence in 1994, though as we will see, this colonial past has had significant linguistic and sociolinguistic consequences.

Local Languages

Palauan: A Western Malayo-Polynesian language of the Austronesian family, Palauan was spoken by 65% of the population in 2000. For a linguistic description of Palauan, see Josephs (1975, 1990, 1997, 1999); Flora (1974); Wilson (1972); Tkel (2000). It is currently the only national language of the country and is an official language alongside English. Before the Japanese era, Palauan was an oral language and had no written form. During the Japanese and U.S. administrations, Japanese *kana* (*katakana* and *hiragana*) and the Roman alphabet were adopted as phonograms for Palauan. Although the Palauan writing system currently has dual orthographies depending on the age of the user, change is under way from *kana* to the Roman alphabet. The official ballot papers for the 1992, 1997, and 2004 elections in Koror, Melekeok, and Angaur States, for example, used a dual writing system for the names of Palauan candidates (Roman alphabet and *katakana*), with Palauan and English bilingual instructions in the Roman alphabet. However, after the 2004 elections, the Palau Election Commission approved a new regulation eliminating the use of *katakana* on future election ballot papers.

Numerous loanwords were integrated into Palauan during the colonial era, especially from Japanese. Many Japanese loanwords have replaced existing native Palauan words (see Josephs, 1984; Matsumoto, 2001b). Because of the change of 'high' language after World War II, there are significant differences in the use of Palauan among different age groups; older Palauans speak Palauan with many Japanese words, phrases, or expressions, while middle-aged and young Palauans speak Palauan with a greater number of English ones. However, regardless of age, in the domains of music and food culture, there is very heavy lexical borrowing from Japanese into Palauan (Matsumoto, 2001b; Matsumoto and Britain, 2003a).

Sonsorolese: A Ponapeic-Trukic, Micronesian language of the Austronesian family, Sonsorolese is spoken by the 40-odd residents of Sonsorol State (including Pulo Anna and Mirir), located about 200 km southwest of the capital, Koror. It is also spoken by an unknown number who were relocated in the early 20th century to the settlement of Eang, near Koror, following typhoon damage to Sonsorol Island.

Tobian: Also a Ponapeic-Trukic, Micronesian language of the Austronesian family, Tobian is spoken by the roughly 20 residents of Hatohebei State including

See also: Bangladesh: Language Situation; India: Language Situation; Indo–Aryan Languages; Indo–Iranian; Lahnda; Punjabi; Sindhi; Urdu.

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Helen's Reef, located about 380 km south of Koror. It is also spoken by an unknown number who were relocated to Eang. In the 2000 census, 75% of the population of Eang claimed to speak a Carolinian Micronesian language – the significance of this is that three times as many speakers of Sonsorolese – Tobian live in Eang than live on the islands themselves.

The extent of mutual intelligibility between Tobian and Sonsorolese is unclear. Capell (1969) considers them to be dialects of the same language, but the two varieties form the southwestern end of a dialect continuum that extends northeastward to islands such as Ulithi that form the western edge of the archipelago of the Federated States of Micronesia. For a linguistic description of Sonsorolese-Tobian, see Capell (1969).

Nonlocal Languages

We can distinguish two types of nonlocal language in Palau: (a) the languages with which Palauan entered a diglossic relationship following colonization, namely, Japanese and English, and (b) immigrant languages, especially Tagalog.

The Diglossic 'High' Languages – Japanese and English

As the result of the last century of colonial domination, Palauan has come into prolonged contact with other nonlocal languages. During the Japanese and the U.S. colonial eras, Japanese and English were enforced as official languages in Palau. Contemporary Palau constitutes a diglossic speech community in which, from 1945 onward, English replaced Japanese as the high language. English is used as the major written language in the media (e.g., in the press), education (textbooks), official documents, and law (the Constitution), while Palauan remains as the 'low' language and is used for informal communication. Japanese today functions as a low language and is used mostly by the elderly as a secret language, as a *lingua franca* among the elderly right across Micronesia, and in the tourist economic sector, where the majority of visitors are from Japan.

Figure 1 below (from Matsumoto, 2001b; see also 2001a, 2006) illustrates the relationship between Japanese, English, and Palauan in Palau.

Oral language ability (i.e., speaking and understanding) in Japanese sharply declines with age, while that in English dramatically increases. The crossing point of Japanese and English oral language ability among those aged 56–65 neatly corresponds to the end of World War II.

Establishing the numbers of speakers of the diglossic high languages from the census information available is difficult. From the most recent population survey, those aged 70 years and over who are likely to be fluent Japanese speakers are 719 (3.6% of the whole population), while those aged between 60 and 69 years old – likely to be former and/or semi-speakers of Japanese – number 781 (4.1%). The Japanese spoken in Palau is a nonstandard koine that developed during the Japanese colonial era as a

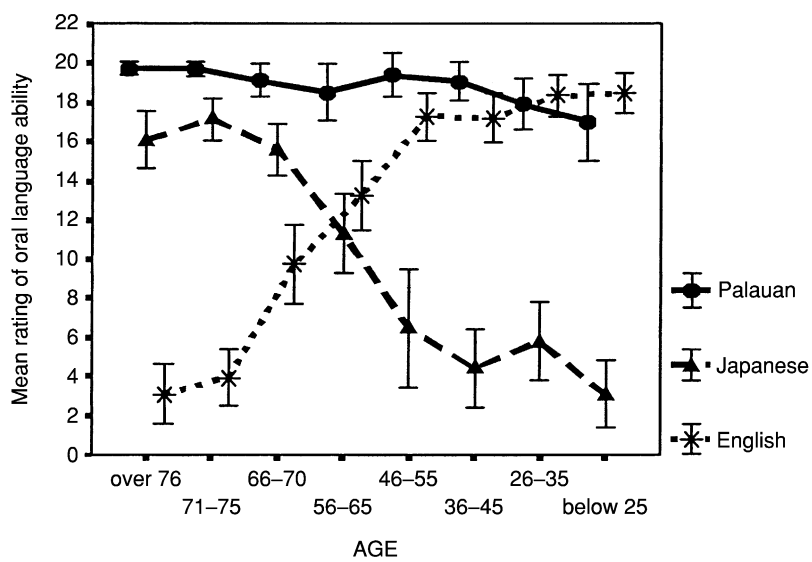

Figure 1 Oral language ability in Palauan, Japanese and English and age (Reproduced from Matsumoto K (2001). 'Multilingualism in Palau: Language contact with Japanese and English.' In McAuley T E (ed.) *Language change in East Asia*. London: Curzon Press. 84–142. With permission from Taylor & Francis Group.) Self-rating of language ability: 0 = lowest; 20 = highest.

result of the close neighborhood integration of thousands of civilian immigrant workers from Japan with local Palauan residents (Matsumoto and Britain, 2003b). While the census claims that English is spoken at home by just over 9% of the population, we can add to this figure a very much larger proportion who would use English as a second language – both Palauans and, for example, migrants from the Philippines.

Immigrant Languages

The most recent census shows that 33% of the population of the Republic of Palau was born outside Palau, and over 75% of those migrants have arrived since independence in 1994. Over 80% of the migrants are classified as 'temporary aliens' – over a quarter of the total population. Almost half of these migrants are from the Philippines, and most work as domestic helpers/cleaners and in unskilled manual occupations. Consequently, taken together, Filipino languages (e.g., Tagalog) constitute the second most widely used native language grouping in the Republic after Palauan. Other immigrant languages include a wide variety of Micronesian languages spoken by people from the Federated States of Micronesia and the Commonwealth of the Northern Mariana Islands (~2% of the population), Korean (0.7%), Chinese (~6%), Vietnamese (0.8%), and Bengali-Sylheti (~1.5%).

See also: Austronesian Languages: Overview; Bilingualism; Chinese; English in the Present Day (since ca. 1900); Hindi; Japan: Language Situation; Japanese; Korean; Language Education Policies in the Pacific; Micronesia, Federated States: Language Situation; North Mariana Islands: Language Situation; Philippines: Language Situation; Tagalog; United States of America: Language Situation.

Language Maps (Appendix 1): Map 154.

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Palenquero

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Palenquero is a Spanish-lexicon creole (*see* **Pidgins and Creoles: Overview**) spoken in the village of El Palenque de San Basilio, Colombia. Located 60 km inland from the former slave trade center of Cartagena de Indias (see **Figures 1** and **2**), this ethnically homogenous Afro-Hispanic community is inhabited by descendants of runaway African slaves who, around 1700, established their first *palenques* (primitive fortifications) in the interior of the Caribbean coast. Palenquero is unique in that it is the only known Spanish-based creole on the South American mainland (Lipski and Schwegler, 1993).

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Figure 1 Location of El Palenque.

Until the early 1990s, the Palenqueros lived in relative cultural and geographic isolation (Schwegler, 1996, 1998; Schwegler and Morton, 2003), which significantly contributed to the preservation of the local creole, although historically, they have always maintained some contact with the outside world; Palenquera women in particular visit nearby towns and Cartagena on a regular basis, where they generally sell and trade locally produced goods. However, this situation changed rather dramatically in the 1990s and beyond, when word of the existence of this 'African' village in the hinterland of Cartagena spread rapidly in academic circles. In Colombia and elsewhere, recent documentaries about Palenquero culture have contributed to the relative fame of the community. The stream of visitors to El Palenque has, however, subsided of late because guerrilla activities in nearby areas have made local travel rather risky for outsiders.

The Palenquero community has been bilingual (Spanish/creole) for at least two centuries. Starting

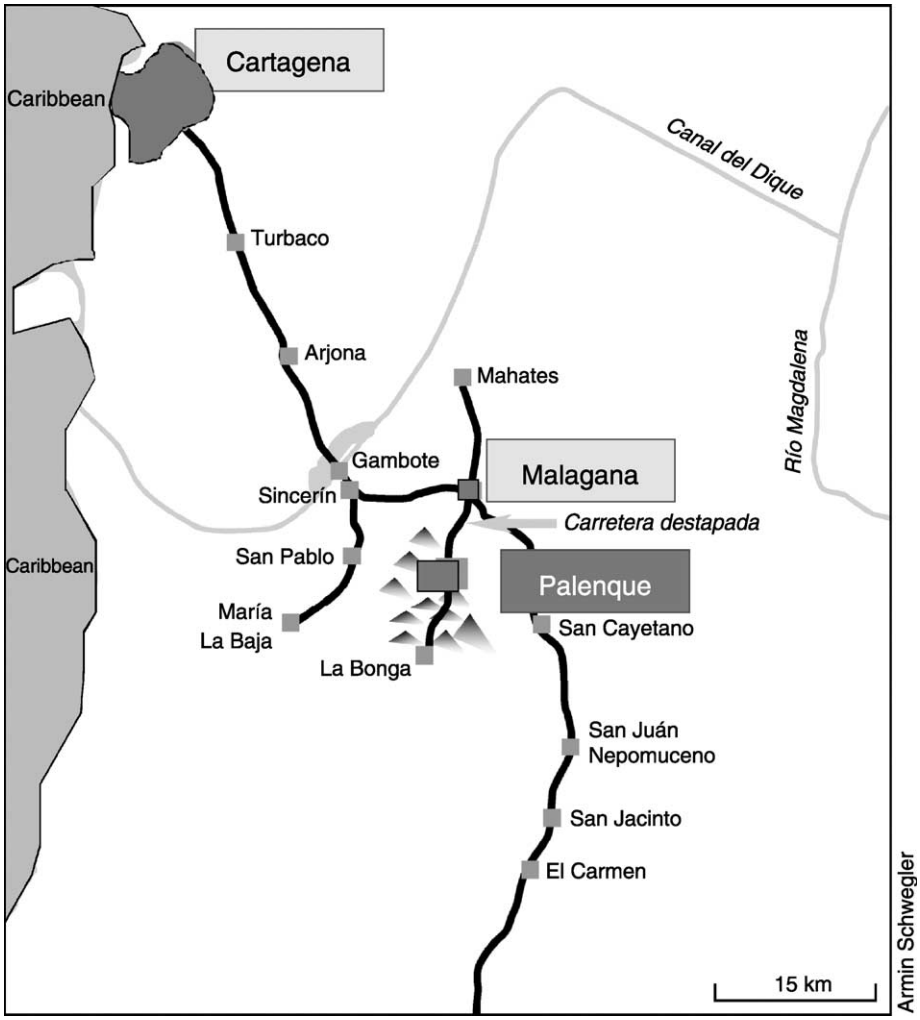

Figure 2 Cartagena/Palenque area.

around 1970, however, adolescents in particular began to shun the use of 'Lengua,' the local name of the creole. Today Spanish monolingualism is the norm among the younger generations, though many still possess a passive knowledge of the local vernacular. In recent years (1990s onward), there has been a growing awareness of '*negritud*' (black pride) among both Palenqueros and Afro-Colombians. This has led to modest institutional and political support to counter the loss of the Palenquero creole. The local elementary school, for instance, now offers some courses in Lengua, and a few adolescents have been attempting to devise 'official' spelling conventions for the creole. Also, some Palenqueros have begun to consciously adapt sub-Saharan vocabulary (including words such as *Bantú*) so as to identify, strengthen, and celebrate what is, in their view, African in their heritage.

Almost the entire Palenquero lexicon is derived from Spanish, and the phonetic distance between most creole and (Caribbean) Spanish words is relatively minor. For example, representative Spanish/creole vocabulary sets are: *mano/mano* 'hand,' *hombre/ombe* 'man,' *dedo/lelo* 'finger,' *senti(r)/sindí* 'to feel,' *agarra(r)/angalá* 'to grab, to hold.' But despite such close lexical correspondences, Palenquero and Spanish are scarcely mutually intelligible. Differences in grammar are the main reason for this unintelligibility.

Historically, a key feature of local language use has been intense and very rapid code switching (not to be confused with code mixing). The following example illustrates how speakers tend to switch language – often multiple times – within a single utterance (segments within angle brackets are in regional Spanish):

Muhé	mi	<no	quiere>	komblá-	mi	pekao,
woman	*my*	*not*	*want.3s*	*buy-*	*me*	*fish*

<a meno que	yo	vaya>	ku	ele.
unless	*I*	*go*.PRES.SUBJ.	*with*	*him/her*

'My wife doesn't want to buy me fish unless I go (buy it) with her.'

It is now clear that the Kikongo (Kongo) language, spoken in central west Africa (see Figure 3), played a pivotal role in the genesis of Palenquero. As in Cuba (Fuentes and Schwegler, 2005), in El Palenque Bakongo slaves seem to have passed down their African language for several generations, either as a ritual code or as a full-fledged everyday means of communication. Scholars have also been able to determine that Bantu (rather than west African) fugitives must have had the most profound impact on El Palenque's early language and culture (Schwegler, 1996, 2002, forthcoming).

Detailed information about the linguistic and cultural history of El Palenque can be found in Moñino and Schwegler (2002), Schwegler (1998, 2002, forthcoming), Schwegler and Morton (2003), and Schwegler and Green (in press). These studies also list earlier publications on the topic, including Friedemann and Patiño Rosselli (1983), still the most solid description of Palenquero to date. Importantly, the volume contains the only substantial corpus of Palenquero texts (readers should be aware, however, that the authors omitted to differentiate code switches from Lengua to Spanish).

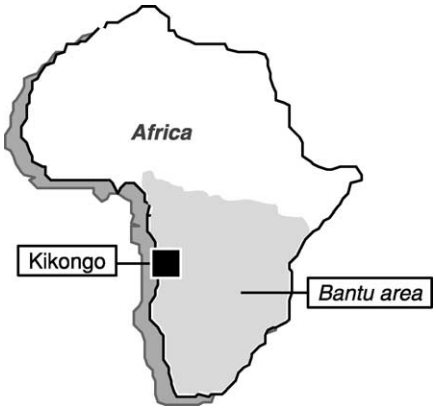

Figure 3 Location of the Kikongo language.

See also: Colombia: Language Situation; Pidgins and Creoles: Overview.

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Paleography, Greek and Latin

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'Paleography' (literally 'old writing') is the study of ancient and medieval handwriting. The term is generally used to refer to Greek and Latin scripts and their derivatives, although some include Chinese and Arabic in the study.

The term 'paleography' does not seem to have come into common use until 1708, with the publication of *Palaeographica Graeca* by Bernard de Montfaucon. First attempts to study manuscripts systematically by date and script had, however, begun at the end of the previous century with Jean Mabillon's *De re diplomatica* (1681), which included a section on Latin paleography. It was not until the invention of photography in the mid-19th century that the study of paleography attracted wide interest. Photography and, more recently, digital imaging equipment have allowed basic materials of research to be easily reproduced, collected together from different repositories, and circulated to scholars all over the world.

Paleography involves the study of writings on papyrus, animal skins, paper, and wax tablets (see section "Greek Paleography"). Inscriptions on other writing materials, including stone, metal, wood, clay, and slate, are also of interest, especially for periods where there is no other available evidence. For example, up to the beginning of the first century B.C., the development of Latin script can be established only through inscriptions. Usually, however, inscriptions are considered to be the province of the related discipline of 'epigraphy.' The technique of cutting individual letters with a chisel onto a hard surface results in a different style from writing on a flexible material such as papyrus.

The basic task of paleography is to provide the means of dating and localizing manuscripts by establishing patterns in the development of characteristic letter forms and abbreviations. Its study has developed as a result of work on other disciplines, most notably 'diplomatics,' the investigation of the form, structure, and authenticity of charter material. Paleography is therefore generally regarded as an auxiliary historical science, although it is increasingly studied in its own right.

Paleography is closely associated with 'codicology,' the study of the physical manufacture of the manuscript book, for example, the nature and preparation of the material it has been written on, the ruling for script, the make-up of the material into booklets (known as 'quires' or gatherings), the foliation or pagination, and the binding. These practices vary with the time and place of production. Together with codicology, paleography can tell us much about the methods by which a manuscript was produced and the audience for which it was made, and even about the changing role and function of writing itself.

This article concentrates on the development of Latin script in the Middle Ages, the principles and problems underlying the study of paleography during this period, and the value of the science to other disciplines. Classical Latin and Greek epigraphy and paleography are more briefly surveyed.

Terminology

Paleographers have various terms for the strokes that go to make up a letter, as well as for the types of scripts themselves. The nomenclature has not been standardized and there is still some disagreement about terminology.

Letter-forms

The most basic stroke of a letter is the simple upright stroke, known as a 'minim.' In later medieval scripts, such as Gothic, a word such as *minim* would be formed as ten virtually identical *i*-strokes. This causes obvious problems for transcribers and editors, because a group of letters such as *min* could be read variously as *ium*, *vim*, *nun*, *miu*, *uni*, among other possibilities. It is not uncommon for the scribe himself to miscount the numbers of minims in a word. An 'ascender' is a letter-stroke that extends above the top of other letters, such as *l* or the upright stroke of *b*. A 'descender' projects below the level of the shortest

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letters, such as the tail of *g* or *p*. A letter such as *p* is composed of a 'stem' (the name given to a minim when it supports another part of a letter) and a 'bow' or 'lobe.' A 'serif' or 'finial' is the name given to the fine stroke that is sometimes used to finish the main strokes of letters. A 'ligature' is where two or more letters are joined together in a way that changes the appearance of either or both of them. Ligatures are often used at the end of a line where space is confined.

The script's 'ductus' refers to the way in which it has been written, for example, how the letters have been formed or how carefully they have been executed. The general appearance of a hand is known as its 'aspect.'

Abbreviations

Abbreviations are often of great value in ascertaining when and where a text has been written. There are many thousands of different abbreviations and it is often very difficult to know how to expand them. They fall into three major categories and three major types: suspensions, contractions, and abbreviation symbols. A 'suspension' is where a letter or letters at the end of a word has been omitted. A 'contraction' is where a letter or letters have been omitted from elsewhere in the word. 'Abbreviation symbols' are often used to replace whole words, such as ⁊ for *and* or *et* and ÷ for *est*. Some types of script are much more heavily abbreviated than others.

Dating Conventions

Paleographers usually employ a system for indicating the approximate date of a script based on the word *saeculo*, abbreviated to *s.*, followed by the century in lowercase Roman numerals (so *s.ix* for 9th century). Where more specific dating limits can be arrived at, the conventions are generally as follows: $s.ix^{1}$ (first half of the 9th century); $s.ix^{2}$ (second half of the 9th century); $s.ix^{in}$ (for *ineunte*: beginning of the 9th century); $s.ix^{ex}$ (for *exeunte*: end of the 9th century); $s.ix^{med}$ (for *medio*: middle of the 9th century); *s.ix/s.x* (indicates the turn of the century). Dating information such as *s.ix–s.x* indicates no more than that the text was written at some stage during the 9th or 10th centuries.

Dated and Datable Texts

A distinction should also be made between 'dated' and 'datable' texts. Few manuscripts are reliably dated. This is particularly the case in the earlier period. A 'datable' text is one in which the date (or, more frequently, dating limits) can be reliably established by external information. For example, a royal diploma (a document recording grants of land or of privileges to religious foundations or individuals) can often be dated quite closely, first by the regnal dates of the monarch in whose name it is written and second by the persons cited in the witness list. A later medieval manuscript may similarly contain references within the text to known individuals or may name the person for whom the manuscript was written. An inscription that records details in the manuscript, such as the name of the scribe and the date or place of production, is known as a 'colophon.' Because colophons are sometimes later additions to a manuscript, they cannot be relied upon to provide accurate information.

Grades of Script

Palaeographers make initial distinctions between scripts based on their aspect. Scripts can, for example, be broadly described as 'calligraphic' or 'cursive,' 'majuscule' or 'minuscule.'

Calligraphic and Cursive In calligraphic script, individual letters or parts of a letter are formed separately. The sequence of strokes making up each letter is rigorously followed and executed. It is thus a 'constructed' script. Examples of calligraphic scripts are Uncial, Caroline minuscule, and Textualis (see the later section 'Latin Paleography'). These scripts are written with a broad quill and are known generically as 'bookhands,' formal scripts that are deliberately and carefully produced. A 'cursive' script is one in which more than one part of a letter is made in a single stroke. Letters are joined together without the writing instrument (generally a finer quill) being lifted from the writing surface. Cursive scripts are generally informal and utilitarian. They are sometimes known as 'charter-hands.' Such a distinction can, however, be misleading, as some charters are written in bookhand, and some books in a more cursive script. There are many intermediate grades between the extremes of calligraphic and cursive.

Majuscule and Minuscule The Latin alphabet existed originally in majuscule script, in which the letters are all of the same height. 'Majuscule' scripts are those that correspond to the printer's uppercase letters, that is, confined between two parallel lines. A majuscule script is therefore a 'bilinear' script. Capitalis and Uncial are examples of majuscule script. A 'minuscule' script is one that corresponds to the printer's lowercase letters and includes ascenders and descenders. It is thus a 'quattrolinear' script.

Greek and Latin Epigraphy

The earliest inscriptions in Greek date from the 8th century B.C., and the characters used (with

modifications to accommodate the requirements of Greek) resemble the letters of the Phoenician alphabet from which they derive. The forms of characters differ from area to area in archaic Greece, but these local alphabets were eventually superseded by the spread of the Ionic alphabet between the 7th and 4th centuries B.C. Inscriptions may be written right-to-left ('retrograde') in accordance with Phoenician practice, left-to-right, or 'boustrephedon' (with lines written in alternating directions, i.e., zigzag). The left-to-right direction of writing seems to have become the norm by the 5th century B.C. Some inscriptions are in 'stoichedon' style, when letters are cut in vertical as well as horizontal alignment, in a grid formation. It was particularly current in Attica, where it was the most commonly employed style from the 6th century B.C. to the end of the 4th. It is not found much after the end of the 3rd century B.C.

The earliest Latin inscriptions date from the 6th century B.C. and closely resemble the Greek ones in style, variety of letterforms, and execution. Inscriptions become distinctively Latin in identity from about the 3rd century B.C. The most calligraphic phase of Latin epigraphy is believed to extend from the time of Augustus to the 2nd century A.D., after which followed a period of decline. Latin inscriptions differ from Greek in being far more heavily abbreviated.

Inscriptions offer their own problems of dating. Generally, dating will depend on the provenance of the inscription and archaeological and historical criteria. However, changes in epigraphical practice can also assist the scholar. As with paleography, epigraphical practice varies from region to region and is dependent on factors such as the age, technique, and training of the craftsman.

Greek Paleography

The earliest Greek papyri show the influence of epigraphic writing. The oldest literary papyrus, which contains a fragment of Timotheus's *Persae*, dates from the second half of the 4th century B.C.; the earliest use of parchment is from the first century B.C. Membrane became the usual writing material from around the 4th century A.D. During the Classical period, no formal distinction was made between book and documentary hands, although individual scripts varied considerably according to how cursively they were written. Beginning in the 2nd century, biblical uncial appeared, reserved for deluxe manuscripts. From this evolved Coptic uncial, a conspicuously mannered variety employed between the 6th and 8th centuries. A less formal type of uncial that developed alongside biblical uncial is not as well recorded, but was probably used widely for the copying of more workaday literary texts. By the 9th century, minuscule had become established and had developed several identifiable varieties. Thereafter, the uncial system of scripts was reserved for large-scale liturgical manuscripts or for display purposes.

Latin Paleography

The scripts of the earliest Latin papyri derived from those employed for inscriptions. By the 3rd century A.D., formal bookhands existed alongside cursive forms of both majuscule and minuscule script. From these scripts were developed the new bookhands of Uncial and Half-Uncial during the late Antique period and the Continental minuscule scripts of the Middle Ages.

Capitalis

The most highly revered script during the late Antique period was that of Capitalis. There were two basic varieties. Square Capitalis (*Capitalis Quadrata*) was originally used for monumental inscriptions and was restricted in (occasional) use to very high-grade manuscripts (**Figure 1**). Canonical Capitalis (also known, rather misleadingly, as Rustic Capitalis or *Capitalis Rustica*), being more fluidly written, was more suitable for the pen. From the 5th century onward, Capitalis seems to have been reserved as a distinguishing script used for running-titles and where special emphasis was required. It was still used in this way into the twelfth century.

Uncial

Capitalis seems to have been superseded in popularity as a text hand by Uncial, a broader, more rounded script that became widely diffused after the 4th

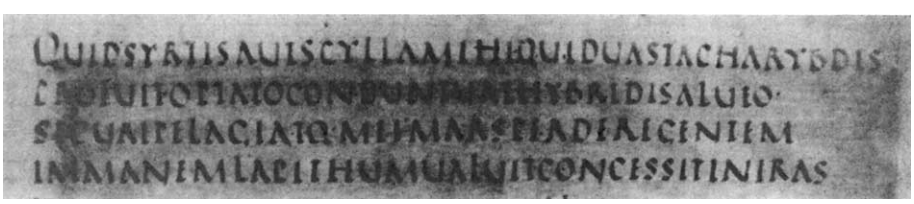

Figure 1 Canonical Capitalis (from Vatican City, Biblioteca Apostolica Vaticana, Vat. Lat. 3225, fo. 64), s. iv.

century. The term itself is attributed to St. Jerome, who criticized the script for its luxury status and waste of space, with letters as much as an inch high ('uncial') written on expensive material. Uncial appears to have been the most popular script for copying a text from about the 5th century until well into the 8th century, although its use was generally confined to gospel and some liturgical books (Figure 2). Elsewhere, it was used, like Capitalis and often in conjunction with it, as a display script. Although in many cases the ascenders and descenders in Uncial extend beyond the head and baseline, early examples show the script to be virtually confined between two lines. The script may therefore be considered majuscule. Abbreviations are rare.

Half-Uncial

Despite its name, Half-Uncial is now not believed to have developed from Uncial, but from a common ancestor, the Roman Cursive Minuscule. During the Middle Ages, it rivaled Uncial in popularity in some centers, especially in Anglo-Saxon England, where Insular Half-Uncial became a characteristic and influential script (Figure 3). 'Insular' is the name given jointly to the Irish and Anglo-Saxon system of scripts in the early Middle Ages, emphasizing the close interaction between the two countries during this period. Opinions vary as to whether Half-Uncial should be considered a majuscule or minuscule script. Half-Uncial was very important in the development of national scripts.

National Scripts

After the disintegration of the Roman Empire, various regional minuscule scripts were developed in western Europe from Roman Cursive Minuscule as well as distinct forms of the Half-Uncial scripts. In many cases we can distinguish between scripts of various centers (such as Corbie, St. Gall, Fleurie, Bobbio, and Luxeuil) and phases of development within these centers. These scripts evolved during the 5th and 6th centuries and lasted until the development of Caroline minuscule in the 9th century. Some national hands lasted longer: Visigothic minuscule (in Spain) survived until the 12th century, Anglo-Saxon minuscule survived until the middle of that century, and Beneventan minuscule survived in parts of southern Italy into the 15th century. The endurance of these scripts may be attributed to a greater measure of political independence.

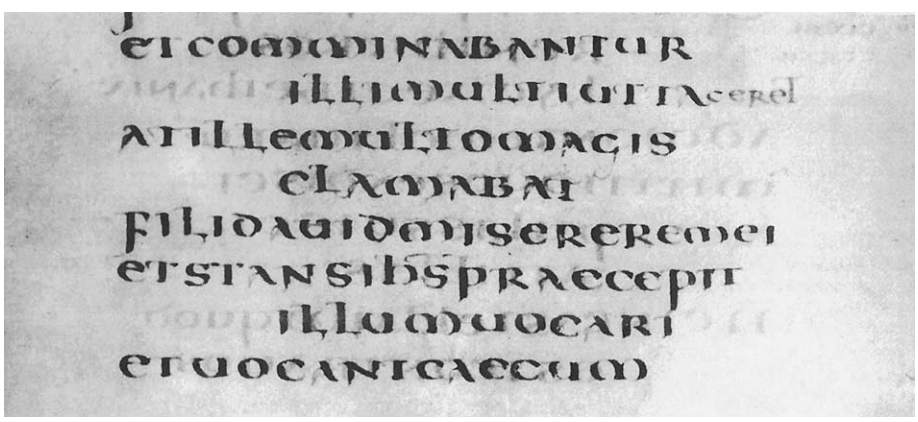

Figure 2 Uncial (from London, British Library, Harley 1775, fo. 193), s. vi.

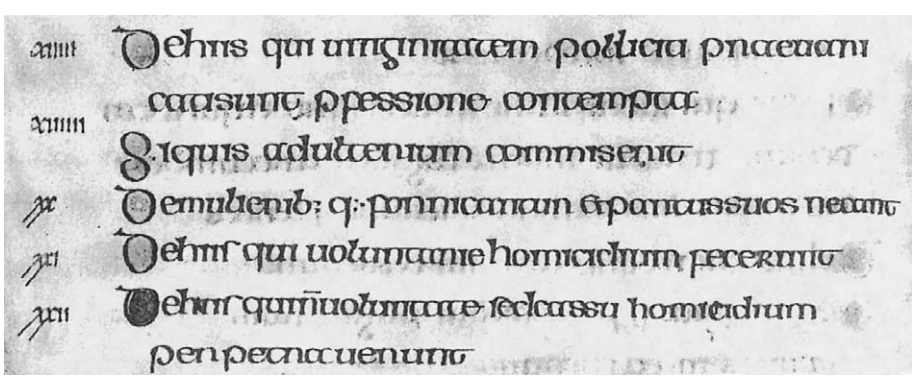

Figure 3 Half-Uncial (from Cologne, Diözesan- u. Dombibliothek 213, fo. 19v), s. viii.

Caroline Minuscule

By the beginning of the 9th century there were many regional minuscule scripts. From the 9th century to the 12th century, however, an international script was developed and eventually predominated over regional scripts (Figure 4). Caroline minuscule takes its name from the Emperor Charlemagne (771–814). Its development was closely associated with Charlemagne's extensive educational and ecclesiastical reforms, which led to a wider dissemination of texts. There is considerable debate about the precise origins of Caroline minuscule, but its obvious advantages over many of the regional scripts – it was clear, regular, and balanced – led to the gradual adoption of this disciplined and elegant script across Europe. In England, Caroline minuscule script was generally reserved for Latin texts. Old English texts continued to be written in Anglo-Saxon minuscule. Elsewhere, the scripts were used for both book and documentary purposes. Caroline minuscule was a calligraphic script and was therefore comparatively slow to write and hard to execute.

Gothic Scripts

From the 10th to the 12th century, Caroline minuscule underwent gradual changes, with the script becoming more angular, compact, and vertical in appearance. These changes became marked during the 12th century, and a new script evolved at the end of that century that was uniform and consciously systematic in character. Both calligraphic and cursive forms were evolved. Gothic scripts were used throughout much of Europe into the 16th century.

Textualis The calligraphic range of scripts is known as 'Textualis,' with four grades of script: 'textus praescissus' (used only in the most formal manuscripts, enjoying a particular vogue in England), 'textus quadrata,' 'textus semi-quadrata,' and 'textus rotunda' (the lowest grade). These grades are often impossible to distinguish, differences between them consisting mainly in the addition of approach and finishing strokes to the letters and the treatment of minims (Figure 5). As a calligraphic script, Textualis was painstakingly slow and difficult to write and increasingly became more artificial. It was used for liturgical volumes and other high-quality manuscripts.

Gothic Cursive and Bastard Scripts From the end of the 12th century in England, a cursive Gothic script (*Anglicana cursiva*) used for documents was developed, and other areas soon developed their own forms of cursive script. Beginning in the end of the 13th century, cursive Gothic scripts were also used for books. They were often highly compressed and abbreviated, making them suitable for texts which had to be produced quickly and cheaply. A noteworthy development in the fourteenth century was the development in France of the Secretary script variety, also employed in Germany and England into the eighteenth century. Gradually, 'bastard' scripts (less picturesquely known as 'hybrid') were introduced. These combined aspects both of Textualis and the cursive varieties, thus narrowing the gap between the two categories of Gothic script. The Textualis series of scripts, which apparently became too difficult for anything other than the best scribes to execute well, was supplanted by these compromise scripts. Its use thereafter was restricted to display purposes.

Humanistic Scripts

At the beginning of the 15th century, a new script was invented in Florence, Italy, by scholars closely associated with the Humanist movement. The script arose from a dissatisfaction with the Gothic series of scripts, which had become cramped and hard to read. The resulting script was clearer and more legible than Gothic and is a development from a 12th-century Italian variant of Caroline minuscule. The range of scripts included a formal and modified cursive book script and a cursive form initially intended for documentary use. The system spread from Italy into the rest of Europe beginning in the late 15th century. Our

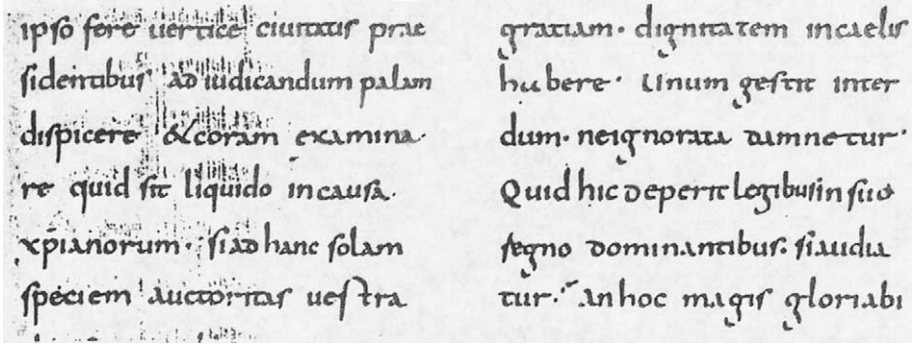

Figure 4 Caroline minuscule (from Leningrad, Publichnaia Bibliotheka im. M.E. Saltikova, Shchedrina Q.v.I.40, fo. 1), s. viii–ix.

present-day Roman font is derived from the Humanistic bookhand, and the cursive variety was the model for modern Italic fonts.

Literacy and the Development of Script

Changes in script, copying practice, and book production reflected changes in demand for manuscripts. The system of scripts adopted by the Romans suggested a wide variety of written forms and widespread literacy, from inscriptions and deluxe manuscripts to the informal and cursively written handwriting used for administrative and business purposes. The choice of script in the post-Antique period was similarly dictated by the nature of the text to be copied, with formal, calligraphic scripts being reserved for biblical and liturgical volumes and more cursive versions for library or school books.

The period from about 1200 constituted something of a watershed in the history of paleography during the Middle Ages, with secular scribes taking over much of the professional production of books from the religious communities. This was the result of a substantial growth in the numbers of schools and universities and the spread of lay literacy. The development of the Gothic cursive system of scripts could be seen as a response to the increased desire for the written word. Writing became part of everyday life, used for purposes of trade and administration. From the end of the 14th century, there was a demand from all classes for cheap books such as romances and popular texts.

From the educational revival of the 12th and 13th centuries came a more efficient method of book production alongside the new Gothic cursive scripts, devised to cater to the needs of the increased numbers of university students. To facilitate quick and controlled production of texts, a standard copy of a particular work would be produced by the university and deposited at a central stationer's. From there, sections ('peciae') could be borrowed and recopied, normally by professional scribes who would be paid for their work. This would speed up the copying process, as different scribes could copy different sections of the same text at the same time. These various parts would later be assembled for distribution to the students. The pecia system went into decline from the 15th century when university students copied much of the materials by dictation from their teachers.

Changes in Codicological Practice

The cost of production, both in the time spent executing a script and in the physical space it occupied on the page, as has been seen, was often influential in the development and adoption of new scripts. The choice of writing material and layout used was also affected by this consideration.

Wax tablets were probably the most commonly used writing material during antiquity and were used as part of daily life during the Middle Ages for correspondence, accounts, and other ephemeral documents. Letters were scratched on the surface of these tablets by a stylus, with its broad end used to erase the text when no longer required.

Papyrus was the most important writing material until the 4th century. Although it continued to be used for documentary purposes in some areas during the early Middle Ages, it was generally replaced by 'membrane,' the generic term given to animal skin that has been prepared for writing. Most commonly used were the skins of calf ('vellum') and of sheep ('parchment'). It is often impossible to distinguish between the two materials, although calfskins, larger in size than sheepskins, were generally reserved for deluxe manuscripts, such as liturgical and the more important service books. Such manuscripts, featuring large display scripts, wide margins, and few abbreviations, used enormous quantities of membrane. It has been estimated that the Lindisfarne Gospels, written c. 700 in Insular Half-Uncial, would have taken 127 calfskins to produce.

Because membrane was very expensive, scribes were reluctant to waste such valuable material. A text no longer required or considered important

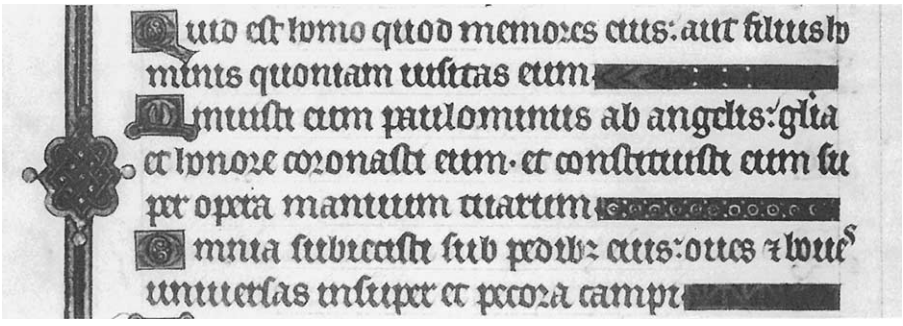

Figure 5 Textualis (from London, British Library, Additional 24686, fo. 14v, s. xiii^{ex}.

could be erased by washing or scraping. The manuscript could then be reused. The resulting text is known as a 'palimpsest.'

Paper was introduced in the West in the 13th century, although it was not commonly used until after 1400. Even after the invention of printing, the use of paper was still treated with suspicion and the canon of the mass was sometimes printed on membrane, with the rest of the text on paper. One detractor exhorted his scribes to copy out printed texts onto membrane, remarking that the latter could survive for a thousand years, but paper would barely last two hundred.

The voracious demand for texts by universities from the 12th century led to a design of the book that could be more cheaply and quickly produced and was easier to use. Manuscripts were more commonly 'foliated' (in which the leaves of a manuscript are consecutively numbered), facilitating reference. 'Pagination' (in which separate sides of a page are numbered, as in the modern practice) is found from the 13th century onwards, and manuscripts first appeared with indexes during this period. At the same time, the space between lines narrowed, abbreviations became more frequent, and the accompanying commentary would be written in a very small glossing hand.

The Establishment of a Canonical Script

A paleographer initially works on a body of manuscripts that can be localized and dated to a reasonable degree of certainty. For the early medieval period, great reliance is necessarily placed on documents such as royal diplomas to supply this evidence. Using this information, the paleographer hopes to establish the 'canonical' form of a particular script, one that is fully mature, standardized, and recognizably distinct from other scripts. It may then be possible to recognize trends and developments in the script and perhaps to ascertain where and when a manuscript that cannot be dated or localized by any other means was written.

Survival

The principal problem facing the paleographer is one of survival of evidence: much has been lost through historical accident. This makes it particularly difficult to assess the value of what remains.

A great deal of material has perished through natural deterioration. Few papyrus manuscripts dating from the medieval period have survived the European climate. Many texts were not designed to be permanent: one thinks, for example, of the ephemera recorded on wax tablets.

Still more has been lost as a result of civil unrest. Many Anglo-Saxon churches were looted during the Danish invasions of the 8th and 9th centuries. By far the biggest disaster to befall manuscripts in England was the dissolution of the monasteries in the 16th century, when many thousands of manuscripts were lost. In 1500 A.D. the monastic library of Christ Church, Canterbury, possessed some 2100 volumes. Only 300 have survived to the present day. The evidence from other foundations suggests that Christ Church escaped comparatively lightly. Some manuscripts were saved as a result of the zeal of early antiquaries keen to find some affirmation of the Protestant faith in ancient texts. Many others, however, suffered the ignominious fate of being used to fuel bakers' ovens or to wrap soap and butter.

The Value of Paleography to Other Disciplines

The study of paleography, of course, primarily enables one to read and approximately date a manuscript. Although it was first developed as an aid for diplomatists, the science has become extremely valuable in the wider field of cultural and ecclesiastical history. Paleography is also an important tool in the study of textual transmission.

The Limitations of Paleography

It is important to recognize the limitations of the discipline. A paleographer cannot prove, for example, that a dated document was actually written in a certain year, but can only say whether the appearance of the script is roughly consonant with the date of the charter in which it occurs. It is, however, sometimes possible to establish that a document is **not** original if the script is clearly much later than the date of the text. Caution is necessary here, as two pieces of writing produced in the same year can look generations apart, as a result either of the respective ages of their scribes or their source (from an active monastic center versus from a rural backwater).

Paleography and History

We have already seen how new scripts can be developed in response to changing requirements. The cursive forms of the Gothic series of scripts evolved from a need to produce texts economically and quickly. The enormous influence of its predecessor, Caroline minuscule, reflected the power and prestige of Charlemagne's kingdom. On a smaller scale, conservatively or poorly executed scripts from a single scriptorium can tell us much about the relative importance of the foundation responsible for their production at that time. If an archive is large enough to

permit identification of individual scribes, much can be inferred about the organization, efficiency, and development of monastic scriptoria in the earlier Middle Ages. A greater amount of material survives from later periods, allowing one to trace the interests and activities of many individual scribes engaged in secular book production.

Paleography and Textual Tradition

A knowledge of paleography is also important in establishing a textual tradition for a particular work. A scribe copying a text that has been written in an unfamiliar language and script is likely to confuse similar letterforms or abbreviations in that hand. Modern editors will sympathize with this tendency. A paleographer may be able to determine the script and approximate date of the copy-text used by the scribe from the errors made in transcription and thus assess the probability that the scribe used a surviving manuscript as his direct exemplar. Similarly, errors such as 'homoeoteleuton' (where a group of letters or words is omitted) or 'dittography' (where a group of letters or words is repeated by accident) can also determine the relationship of one manuscript to another based on the relative positions of words on a line or lines.

The study of paleography and codicology necessitates a return to the manuscript itself. The wise observation that records "only speak when they are spoken to, and they will not speak to strangers" (Cheney, 1973: 8) can equally well be applied to manuscripts in general, for much is lost in translation from manuscript to printed edition. Those scholars prepared and equipped to ask questions from a manuscript directly can find out a great deal about the scribe and institution responsible for its production, the interests of those for whom it was made and the age in which it was written.

See also: Calligraphy, Western, Modern; Europe, Christian: Alphabets; Greek, Ancient; Latin; Typography.

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Palestine (West Bank and Gaza): Language Situation

M Amara, Bar-Ilan University, Ramat-Gan, Israel

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The population of the two Palestinian areas in mid-2003 was 3 298 951 (West Bank, 1 969 281; Gaza Strip, 1 329 670). Six languages, four living languages and two extinct, are reported in the 2004 *Ethnologue* for the Palestinian West Bank and Gaza. This is inaccurate, however, and the Palestinian language situation is richer and much more colorful.

Palestinian Arabic is the mother tongue of the overwhelming majority of the Palestinian people. It consists of three major dialects: the *Ethnologue* South Levantine Arabic *fellahi* (rural), *madani* (urban), and *badawi* (Bedouin). *Madani* is the most elevated and prestigious dialect. The dialects mainly differ in phonology and lexicon. The national and official language of Palestine is Standard Arabic, which is the formal language of government and education. Although the literacy rate in 2002 was 91.2%, a much lower percentage of the Palestinian

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population is functionally competent in Standard Arabic because of diglossia.

Nowadays, English is the first foreign language of the Palestinians. The spread of English began with the British Mandate in Palestine after World War I. English was the main language of government (Dweik, 1986). It is now taught in all types of Palestinian schools, universities, and educational centers throughout the Palestinian areas. Private schools start teaching English in the 1st grade, whereas other types of school generally start in the 5th grade. English is used in the mass media, and there is a Palestinian English-language weekly newspaper. English is used extensively in street signs, shops, and various institutions.

Hebrew is a significant language in the Palestinian linguistic repertoire. This language, which is associated with the Israeli occupation of Palestinian territories since 1967, is mainly learned informally in direct contact with Israeli Jews, mainly at work or in commercial transactions, or in prisons. Formal instruction in Hebrew is extremely limited and is confined to basic courses at Palestinian universities and other institutions. The second Palestinian Intifada in 2000 resulted in a major reduction in contact with Israeli Jews, thus reducing the opportunity for Palestinians to learn Hebrew. The more than 250 000 Jewish settlers in the Palestinian areas speak mainly Hebrew and have little or no contact with neighboring Palestinian communities.

The Palestinian linguistic repertoire also includes various European languages, such as French, Spanish, German, and Italian. These languages are learned in educational institutions (mainly taught in private schools), at places of work, through immigration, from European missionaries, or by study abroad, tourism, and travel.

Minority languages, including Armenian, Assyrian, Abyssinian, Coptic, Domari (Nawari), Samaritan Hebrew, and Aramaic, are also to be found in the Palestinian language mosaic, though these languages are restricted to small communities in Jerusalem and Bethlehem and are each used by no more than a few hundred speakers. These languages are mainly spoken by foreign religious men in Palestine.

Various factors have contributed to the creation of this rich Palestinian language situation. In addition to the complex ethnic and cultural heritage of Palestine and the many private educational institutions, immigration, travel, and contact with tourists and visitors have introduced many languages into the Palestinian culture. The Palestinian National Authority has shown interest in promoting Palestinian multilingualism by stating its intention to teach French and Hebrew in addition to English in public schools in Palestine (Amara, 2003).

See also: Arabic; Education in a Multilingual Society; Hebrew, Israeli; Multiculturalism and Language.

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Relevant Website

http://www.passia.org – The Palestinian Academic Society for the Study of International Affairs.

Pāli

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Pāli (also Pāḷi and Pali) is an early Middle Indo-Aryan (MIA) language, or Prakrit. It is the text and ritual language of Theravada, or southern, Buddhism, the dominant school in Sri Lanka, Burma, Cambodia, and Thailand. It is of particular importance as the language in which the basic teachings of Buddhism have been preserved, especially in the collection known as the *Tipiṭaka* (literally, 'three baskets'), which are held to contain the Buddha's own pronouncements. Virtually all of the extensive Pāli literature is thus Buddhist in nature or origin, and the language is not spoken except in recitation and as an occasional vehicle of communication for monks of different languages.

The date and place of origin of Pāli have been subjected to considerable scholarly debate through the years, and the position that one accepts may not unnaturally be colored by belief as to the authenticity of the canonical texts as the word of the Buddha as spoken by him. By tradition, especially in Sri Lanka,

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the language, as the vehicle of the Buddha's preaching, would date from his time (7–6 century B.C.E.) and be identified with Māgadhī, the language of Magadha, the northeastern India kingdom in which he primarily preached. His date, however, varies somewhat in different traditions, and scholars in both India and the West have argued for progressively later dates – some as late as the 4th century B.C.E. Also, numerous scholars have pointed out that Pāli not only does not share many of the distinctive characteristics of the Māgadhī Prākrit as shown in later inscriptions, primarily those of of the 3rd century B.C.E. Emperor Asoka (Sanskrit *Aśoka*) (264–227 B.C.E.), but it does in fact share important features, such as noun inflections, of the western inscriptions. Thus, Pāli does not appear to represent any single MIA dialect but to be a literary language that incorporated features from several dialects in the course of its development.

The canonical texts were transmitted orally for a number of centuries and were collected and codified in three main councils: first at Rājagaha (Sanskrit *Rājagṛha*) shortly after the death of the Buddha, and then at Vesālī (Sanskrit *Vaiśālī*), about a century later. The third, at Pātaliputta (Sanskrit *Pāṭaliputra)*, under Emperor Aśoka. There, the canon as we know it was essentially completed and formalized, the Theravāda school founded, and the decision taken to send missions abroad made, including the mission that brought the doctrine to Sri Lanka through the monk Mahinda. The generally accepted view is that the canon was reduced to writing only in the 1st century B.C.E. at the Aluvihāra in Sri Lanka.

Pāli has no special alphabet of its own but is written in several scripts, depending on the country and the intended audience. Thus, it commonly appears in Sinhala script in Sri Lanka, in Devanāgari in India, and in Burmese, Cambodian, and Thai in those countries. In the West, and where it is intended for an international audience, it is commonly written in the Roman alphabet with some diacritics.

The Pāli system of sound elements is given in Table 1. It is, of course, represented differently in different scripts. The usual alphabetical order can be read by taking each row in turn, from top to bottom, and some manuscript traditions include a 'pure nasal' symbol, transliterated as <ṃ>, occurring between the vowels and consonants. It represents *ŋ* at the end of words, but before a consonant assimilates to it.

Table 1 The Pāli sound inventory

Vowels
a ā, i, ī, u, ū, e, o
Consonants
Velars: *k, kh, g, gh, ŋ*
Palatals: *c, ch, j, jh, ñ*
Cerebrals (Retroflex): *ṭ, ṭh, ḍ, ḍh, ṇ*
Dentals: *t, th, d, dh, n*
Labials: *p, ph, b, bh, m*
Resonants: *y, r l, ḷ, v*
Spirants: *s, h*

This is essentially the same inventory of elements as Sanskrit, though there were intervening changes that gave Pāli, like Prakrits in general, a reduced inventory. Among the most important were the following: Sanskrit vocalic *ṛ* was lost, becoming *i, a*, or *u*. The three Sanskrit sibilants were merged as *s*, and all final nasals as *ŋ*. Long vowels were shortened in checked syllables, and this extended to Sanskrit *e* and *o* (always long in Sanskrit, but in Pāli allophonically short before consonant sequences). Thoroughgoing changes applied to consonant sequences (clusters). These were numerous and complex, and there were variations and exceptions owing to dialect admixture and the long oral and textual history. But generally, some initial clusters were simplified, sometimes with the addition of a prothetic vowel, and internal clusters were assimilated internally, yielding many geminates, with sibilants becoming aspiration in some combinations. Thus Sanskrit *strī* is Pāli *itthi* 'woman', and Sanskrit *asti* is Pāli *atthi* 'is'. Sanskrit *svarga* is Pāli *sagga*, 'heaven', Sanskrit *dharma* is Pāli *dhamma* 'doctrine' (and many other meanings), and Sanskrit *prajñā* is *paññā*. Sanskrit *akṣi* is *akkhi* 'eye' (also *acchi*, probably showing dialect admixture). Sanskrit *lakṣaṇa is* Pāli *lakkhaṇa* 'feature'. Sanskrit *mārga* is Pāli *magga* 'way, path', showing long vowel reduction, and the common assimilation, but *dīgha* 'long', Sanskrit *dīrgha,* shows an alternate development: simplification of the cluster and retention of vowel length.

In morphology, Pāli remained an inflectional language, but there were numerous changes from Sanskrit in grammatical categories and forms, including simplifications and conflations. Thus, in nouns many case affixes have fallen together; in the verb, the Sanskrit past vs. aorist distinction has virtually disappeared, with a new past based on the aorist, and in both nouns and verbs the dual is gone.

Pāli basic word order is verb-final, i.e., Subject-Object-Verb, as in (1):

(1) bhikkhu cittaṃ pagganhāti
monk mind-accusative uplifts
'The bhikkhu uplifts the mind.'

However, there is much variation for pragmatic effects such as foregrounding, and in some types of existential and interrogative sentences, as in (2) and (3):

(2) atthi koci satto, yo imamhā
be *any* *being* *that* *this*
PRES-3sg (REL) ABL
kāyā aññaṃ kayaṃ saṃkamati?
body *other* *body* *transmigrate*
ABL ACC ACC PRES-3sg
'Is there any being that migrates from this body to another body?'

(3) natthi satto yo evaṃ saṃkamati.
not-be *being* *that* *thus* *transmigrate.*
PRES-3sg (REL) PRES-3sg
'There is no being that so transmigrates.'

Pāli also uses the correlative relative construction common in Indo-Aryan languages, as in (4), though there are also 'simple' relatives, as (2) and (3) have exhibited:

(4) yaṃ jānāmi taṃ bhāṇāmi
what *know* *that* *speak*
CORREL PRES-1sg PRES-1sg
'I say what I know.'

Pāli literature can be divided into two sets: canonical and non-canonical. Canonical texts are generally those regarded as the actual teachings of the Buddha, though there is some difference in what is included in the canon in different countries. The most widely known traditional classification of the canon is the *Tipiṭaka* ('Three Baskets'), by which there are three main divisions or Pitakas, the *Sutta, Vinaya*, and *Abhidhamma.* These can be generally characterized as follows.

I. The *Sutta Piṭaka* contains the *Dhamma* proper (General teachings of the Buddha), and it is sometimes referred to as such. It contains five *Nikāyas*, or collections of *suttantas* (Dialogues of the Buddha), defined and arranged essentially by their form, as follows:
   a. The *Dīgha Nikāya* ('Long' Collection) contains the longest suttas (Sanskrit *sūtra*).
   b. The *Majjhima Nikāya* ('Middle' Collection) contains suttas of middle length.
   c. In the *Saṃyutta Nikāya* ('Linked' or 'Grouped' Collection), the suttas are arranged by topic. It is this collection that contains the Buddha's first sermon, the *Dhammacakkapavattanasutta*.
   d. The *Aṃguttara Nikāya* (or The 'Gradual', or 'By one limb more' Collection), in which the sections are arranged in ascending order according to numbers that figure in the texts themselves.
   e. The exact contents of the *Khuddaka Nikāya* ('Short' or 'Small' Collection) vary somewhat between Sri Lanka, Burma, and Thailand. It includes the widely known *Dhammapada*. It also contains the *Jātaka* verses, but only the verses, not the birth stories connected with them, are canonical; the stories are considered to be commentarial. It also includes the hymns of the monks and nuns (*Theragāthā* and *Therīgāthā*) along with a number of other works such as the *Suttanipāta* and some works that might be loosely categorized as 'prayer books'.

II. The *Vinaya Piṭaka* dealing with Monastic Discipline.

III. The *Abhidhamma Piṭaka*. Scholastic and partially metaphysical in nature, it contains much philosophical treatment of the Buddha's teachings. It is generally considered the most difficult of the texts, so that a mastery of it is highly valued by Buddhist scholars.

There is another traditional classification of the canon into five divisions (*Nikāyas*). These are the five divisions of the Sutta Piṭaka of the Tipiṭaka, with the Abhidhamma and the Vinaya folded into the Khuddaka Nikāya.

In addition to the above, there is the *Mahāparitta,* a text recited by monks at *paritta* (Sinhala *pirit*) ceremonies invoking the auspiciousness and protection of the Dhamma.

In addition to the canonical texts, there is a considerable body of literature in Pāli, continuing up to the present time, and much of it is commentarial literature or chronicles. The remainder includes various types of works, including narrative and instructional works and some grammars. In addition, there are a number of inscriptions, most of them in Southeast Asia.

The commentarial literature in Pāli continued over many centuries, but the most famous commentaries, or *aṭṭhakathās*, were by a monk named Buddhaghosa, in the 5th century A.D. He was born in South India but wrote his commentaries in Sri Lanka, apparently basing much of his work on earlier Sinhala commentaries subsequently lost. He also authored the famous *Visuddhimagga* 'Path of Purification', a compendium of Buddhist doctrine. As mentioned earlier, the well-known Jātaka stories are actually commentaries on the Jātaka verses that are included in the canon, and this *Jātakaṭṭhakatā* has also been attributed to Buddhaghosa. In addition to the commentaries, there are other forms of commentarial literature, including *ṭikās,* subcommentaries on the commentaries.

The Chronicles include the *Dīpavaṃsa* (4th or early 5th century A.D.) and the *Mahāvaṃsa* (probably the early 6th century), and they present the history of Sri Lanka from a Buddhist-Monastic perspective. These chronicles were continued by the *Cūlavaṃsa*, which continued until the arrival of the British in Sri Lanka. In fact, they are being continued even today.

Among the remaining works, the *Milindapañhā* (sometimes in the singular *Milindapañho*) 'Questions of King Milinda' is particularly appealing. It dates from before Buddhaghosa's commentaries, may have been translated from Sanskrit, and was itself translated into Chinese. It consists of a series of dialogues between two people: King Milinda (Greek Menander), a second century king of a Graeco-Bactrian kingdom remaining from Alexander the Great's incursions into what is now Afghanistan and the northwest Indian subcontinent, and Nāgasena, a learned monk, who expounds Buddhist doctrine in answer to the King's questions. The penetrating nature of the King's questions and the clarity and wit of Nāgasena's answers and explanations make this still a lively as well as instructive introduction to Buddhist doctrine, and one that is accessible to the student at a fairly early stage in learning Pāli.

There is now a sizeable and growing amount of material in and on Pāli on the World Wide Web. The Pali Text Society, founded in 1881, has published many texts and translations in roman script. Its website has information on the available ones. Fifty-eight volumes of the Tipitaka were published, in Sinhala script with a Sinhala translation, as the Buddha Jayanti Tripitaka Series under the patronage of the government of Sri Lanka (Ceylon) during the 1960s and 1970s. The Pāli text in roman transcription, along with some paracanonical and other texts, has been made available online as a free public-domain edition by the Sri Lanka Tipitaka Project in association with the *Journal of Buddhist Ethics*.

See also: Buddhism, Tibetan; Sanskrit.

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http://www.palitext.com – Information on the available texts and translations in roman script is available here.

http://dsal.uchicago.edu/dictionaries/pali/index.html – The Pali Text Society dictionary can be accessed here.

http://jbe.gold.ac.uk/palicanon.html – The Pāli text in roman transcription of 58 volumes of the Tipitaka is available in a free public-domain edition here.

http://www.tipitaka.org – The Vipassana Research Institute Tipitaka Project offers various texts.

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Pallas, Peter Simon (1741–1811)

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Born in Berlin, P. S. Pallas started medical studies in his native city, then continuing his education in medicine, natural history, and mathematics in Halle, Göttingen, and Leiden. In 1761, he went to England, where he became in 1763 a member of the Royal Society. In 1767, Pallas followed an invitation from the Imperial Academy of Sciences in St Petersburg and went to Russia, where he was appointed a professor of the Academy in 1768. In 1768–1774, he led a scientific expedition into the central and eastern part of the Russian empire, planned by the empress Catherine II (known as Catherine the Great). The expedition was described by Pallas in his voluminous

Among the remaining works, the *Milindapañhā* (sometimes in the singular *Milindapañho*) 'Questions of King Milinda' is particularly appealing. It dates from before Buddhaghosa's commentaries, may have been translated from Sanskrit, and was itself translated into Chinese. It consists of a series of dialogues between two people: King Milinda (Greek Menander), a second century king of a Graeco-Bactrian kingdom remaining from Alexander the Great's incursions into what is now Afghanistan and the northwest Indian subcontinent, and Nāgasena, a learned monk, who expounds Buddhist doctrine in answer to the King's questions. The penetrating nature of the King's questions and the clarity and wit of Nāgasena's answers and explanations make this still a lively as well as instructive introduction to Buddhist doctrine, and one that is accessible to the student at a fairly early stage in learning Pāli.

There is now a sizeable and growing amount of material in and on Pāli on the World Wide Web. The Pali Text Society, founded in 1881, has published many texts and translations in roman script. Its website has information on the available ones. Fifty-eight volumes of the Tipitaka were published, in Sinhala script with a Sinhala translation, as the Buddha Jayanti Tripitaka Series under the patronage of the government of Sri Lanka (Ceylon) during the 1960s and 1970s. The Pāli text in roman transcription, along with some paracanonical and other texts, has been made available online as a free public-domain edition by the Sri Lanka Tipitaka Project in association with the *Journal of Buddhist Ethics*.

See also: Buddhism, Tibetan; Sanskrit.

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work *Journey through various provinces of the Russian Empire* (Pallas, 1771–1776). A distinguished and multitalented naturalist, Pallas was a universal mind; he collected and systematized ethnographic, historical, and linguistic data on different ethnic groups living in Russia, especially Mongolian people (Pallas, 1776–1801).

In 1785, Pallas received from Catherine II materials for a comparative dictionary of all languages and dialects, which she had started to collect herself but now commissioned Pallas to finish compiling. He would also benefit from the preliminary work of St Petersburg bibliographer H. L. C. Bacmeister (1730–1806). Pallas elaborated the program for this work and an instruction for local Russian authorities and Russian diplomats abroad, which provided the word lists of different languages spoken in Russia and throughout the world. A substantial part of the data was borrowed from published and handwritten dictionaries and other linguistic sources. The first division of the work, representing the languages of Europe, Asia, and Oceania, was published 1787–1789 in two parts. The ideographic dictionary contained 273 principal concepts and basic grammatical words (prepositions and conjunctions), plus numbers with their equivalents in 200 languages and dialects (however, several positions for some languages could not be detected). A revised alphabetical version of the dictionary with the addition of some African and American languages appeared 1791–1792, prepared by T. Janković de Mirijevo (1741–1814). The reaction to Pallas's dictionary from different scholars (among others J. C. Kraus, de Volney, J. Dobrovsky) was quite critical, because of many faults and confusions; nevertheless, this ambitious attempt encouraged comparative work and was not without influence on some late Enlightenment projects, such as *Mithridates* of J. C. Adelung and J. S. Vater (1806–1817).

In 1793–1794 Pallas led another great expedition, this time into the southern part of Russia. In 1810, he returned to Berlin, where he died.

See also: Adelung, Johann Christoph (1732–1806); Volney, Constantin-Francois Chasseboeuf, Comte de (1757–1820).

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Palmer, Harold Edward (1877–1949)

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Harold Edward Palmer was a British phonetician and language-teaching theoretician. Born in Kensington, London, Palmer left school at 15 without higher education. After some early beginnings in journalism, he changed direction in 1902 by taking up a post teaching English at a Berlitz school in Belgium, moving on later to found a school of his own. He made a dramatic escape from occupied Belgium in 1914. Once back in Britain, he was invited by Daniel Jones in 1915 to give a course of evening lectures on methods of language teaching. From 1916 to 1922, he was, again at Jones's invitation, a part-time lecturer in spoken English in the Department of Phonetics at University College; he also taught at London University's School of Oriental Studies. These years saw the publication of two important works, *The scientific study and teaching of languages* (1917) and *The principles of language study* (1921).

In 1921, Palmer was invited by the Japanese Ministry of Education to advise them on English language teaching, and from 1922 worked in Japan as a linguistic advisor to the Department of Education. In 1923, an Institute for Research in English Teaching was established in Tokyo with Palmer as its director. The degree of D.Litt. was conferred on him by the University of Tokyo in 1935. In that same year he attended the Second International Congress of Phonetic Sciences in London, reading a paper on the nature and condition of phonetics teaching in Japan. Whilst there he was offered a post by a U.K.

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publisher, which he accepted, returning to Britain the following year. He died in Felbridge, Sussex.

Palmer's long absence from Britain, and the fact that a good deal of his writing is concerned with language pedagogy, may have had something to do with an apparent lack of appreciation of him as a phonetician – a lack which is quite unwarranted. His work on English intonation dealt extensively with, and provided a rich notation for, such elements as the 'tone group,' 'head,' 'nucleus,' and 'tail,' and studied the 'semantic functions' of tone groups, thereby laying down the basis for much of what was produced by later writers. Daniel Jones held Palmer in high regard, referring in an obituary (in *Le maître phonétique* 28) to his "most original and inventive mind," and valued greatly the help he had given during Jones's work on Tswana. Palmer's work on language pedagogy teems with striking ideas about principles and procedures, drawn from and tested throughout years of practical experience, often accompanied by ingenious diagrams or symbol systems, almost always of his own devising. "He seldom" – to quote Jones again – "utilized anyone else's results to help him arrive at his conclusions."

See also: Jones, Daniel (1881–1967).

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Palsgrave, John (?1480–1554)

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John Palsgrave, a native of London, wrote the first major grammar of the French language, *Lesclarcissement de la langue françoyse* (1530), which also included an English–French dictionary. After studying in Paris, Palsgrave entered holy orders and was named French tutor to Mary, Henry VIII's sister and future Queen of France (1512–1513). Following her marriage to Louis XII in 1515, Palsgrave returned to England, worked with Thomas More, visited Erasmus, studied law in Louvain, and continued tutoring members of the royal family (for full biographical details, see Carver, 1937).

By 1523, Palsgrave had finished the first two books of his grammar, the first dealing with pronunciation and orthography, the second with morphology and some syntax. At the encouragement of his royal patrons, he undertook the third book, which combined a commentary on the second with an extensive English–French dictionary. After the publication of the entire work (totaling more than 1000 pages), Palsgrave studied at Oxford and tutored at Cambridge before taking an ecclesiastical benefice at St Dunstan's-in-the-East. His last known work is a translation of a Latin play, *Acolastus* (1540), by Fullonius (Carver, 1937).

The grammar and lexicon are both impressive achievements. In both, Palsgrave drew on French literary usage of the 14th to 16th centuries. From this literary base, Palsgrave defined a core vocabulary and constructed rules for the pronunciation of French (for the interpretation of letters), for derivational and inflectional morphology, and for some syntactic features.

The book covered pronunciation. For each letter, rules were presented for its pronunciation, and exceptions were noted. After the section on individual letters, Palsgrave described combinations of letters across word boundaries. The first book concluded with interlinear phonetic transcriptions of several poetic passages, and with the application of the rules presented earlier to produce phonetic interpretations.

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The third book elaborated on the grammatical description found in the second, and added an English–French dictionary for each part of speech (totaling approximately 23 000 entries). Many of the entries included examples of usage.

Palsgrave's influence on later developments in grammar and lexicography was limited. His work was criticized for its length and for his insistence on the importance of rules, both features that make it so extremely interesting to modern scholars.

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Panama: Language Situation

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Two important historical facts have significantly shaped the language situation in the República de Panamá. Although Panama City was an important Spanish city in the 16th century, its subsequent decline in administrative status eventually resulted in its incorporation into Colombia, thus preventing its participation in the Federación de Centroamérica (1824–1840; also known as the República del Centro de America), from which all of the other Central American nations were spawned. Even in modern times, when the Organización de Estados Centroaméricanos (ODECA) was chartered in 1951, it did not include Panama. Secondly, the presence of a populous, economically important foreign government reservation, the U.S. Canal Zone, in the middle of Panama for nearly a century (1903–1999) left an imprint of Anglo-American commerce and culture unparalleled in any other continental Latin American nation. These factors have especially influenced the commercially and educationally motivated movements of people, and the languages they speak, and have made Panama rather unusual, be it from a parochial Central American or from a general Latin American perspective.

Panamanian Spanish, the governmental language and national lingua franca, is spoken by nine-tenths of the population. Perhaps a low proportion in light of Panama's high level of economic development and its accessibility via the Pan American Highway (cf. El Salvador, which is completely Spanish speaking, despite its much lower rate of literacy), this is due chiefly to the inaccessibility of the Atlantic coast and mountain areas, as well as the historic ties with Caribbean culture. More than in other Central American countries, Panamanian Spanish follows the pattern of lowland Caribbean Spanish, and it is especially advanced with respect to the loss of final [s]. With the exception of some private schools in the cities, Spanish is the primary medium of instruction; however, English usage is typical in certain contexts. Similarly, although Spanish is the official language of government, English is an important language of banking. In fact, Panama's commercial code is based on many aspects of Delaware law, in deference to Panama's role as an international financial center. Recently, there have even been legislative attempts to give higher official status to English and to improve English-language education in Panama's public schools, but, given the five century history of Spanish civil law, there is little chance of any language but Spanish achieving more than secondary official status in Panama. Still, the complete spread of Spanish has been thus far checked.

There is considerable variation in reports of English usage in Panama, in part due to a confusion of standard English and Creole English. Speakers of Panamanian Creole English, the local version of

The second book treated the morphology and syntax of the eight parts of speech and the article. Each was defined, and its accidents listed. Unusual features included the description of the indefinite article as well as the definite, and the description of comparative syntax (French–English) under the rubric of 'accidents' (e.g., 'order contrarie to our tong' for pronouns and verbs).

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Two important historical facts have significantly shaped the language situation in the República de Panamá. Although Panama City was an important Spanish city in the 16th century, its subsequent decline in administrative status eventually resulted in its incorporation into Colombia, thus preventing its participation in the Federación de Centroamérica (1824–1840; also known as the República del Centro de America), from which all of the other Central American nations were spawned. Even in modern times, when the Organización de Estados Centroaméricanos (ODECA) was chartered in 1951, it did not include Panama. Secondly, the presence of a populous, economically important foreign government reservation, the U.S. Canal Zone, in the middle of Panama for nearly a century (1903–1999) left an imprint of Anglo-American commerce and culture unparalleled in any other continental Latin American nation. These factors have especially influenced the commercially and educationally motivated movements of people, and the languages they speak, and have made Panama rather unusual, be it from a parochial Central American or from a general Latin American perspective.

Panamanian Spanish, the governmental language and national lingua franca, is spoken by nine-tenths of the population. Perhaps a low proportion in light of Panama's high level of economic development and its accessibility via the Pan American Highway (cf. El Salvador, which is completely Spanish speaking, despite its much lower rate of literacy), this is due chiefly to the inaccessibility of the Atlantic coast and mountain areas, as well as the historic ties with Caribbean culture. More than in other Central American countries, Panamanian Spanish follows the pattern of lowland Caribbean Spanish, and it is especially advanced with respect to the loss of final [s]. With the exception of some private schools in the cities, Spanish is the primary medium of instruction; however, English usage is typical in certain contexts. Similarly, although Spanish is the official language of government, English is an important language of banking. In fact, Panama's commercial code is based on many aspects of Delaware law, in deference to Panama's role as an international financial center. Recently, there have even been legislative attempts to give higher official status to English and to improve English-language education in Panama's public schools, but, given the five century history of Spanish civil law, there is little chance of any language but Spanish achieving more than secondary official status in Panama. Still, the complete spread of Spanish has been thus far checked.

There is considerable variation in reports of English usage in Panama, in part due to a confusion of standard English and Creole English. Speakers of Panamanian Creole English, the local version of

Western Caribbean Creole English, comprise perhaps 14% of the population. This level has been unchanged for the past half century, and Panamanian Creole English has long been the emblematic home language of an ethnic group living in enclaves of the Canal Zone area. In the recent past, standard American English had been the acrolect target for these speakers, but there are now reports of increased use of Spanish in formal contexts. In fact, estimates of actual basolect usage normally indicate a smaller percentage of speakers, perhaps as low as 8% of Panama's population. Government policy is responsible for some of the confusion in statistics of English and Creole English language use. On the one hand, Panama wishes that there were more speakers of standard English; on the other hand, it has been shy about promoting its Caribbean Creole heritage. In a recent commercial assessment of the working class labor force as a potential source of English-speaking international telephone operators, it was concluded that between 3% and 5% of the labor pool had sufficient English language skills.

Indigenous American languages are spoken by approximately 6% of Panamanians, and many of these speakers live in autonomous territories known as *comarcas*. Speakers of the Chibchan languages Ngäbere (Guaymi), in the west, and Kuna, in the east, both in Caribbean drainage areas, comprise the vast majority of Amerindian mother tongue speakers, although Choco languages, such as Emberá (Empera), are also spoken, especially on the Pacific side around the Golfo de San Miguel. The level of indigenous language use is less than half of what it was in 1950. In the face of this decline, the government has implemented language protection policies, but the shift to Spanish and indigenous language loss nevertheless continues. The Chibchan languages spoken by smaller communities of only a few thousand, Teribe (also Tiribi, occasionally Naso) and Buglere (also Bokota, occasionally Sabanero), are clearly endangered. The Choco language Wounaan (Woun Meu), even though it is spoken by fewer than 3000 Panamanians, enjoys the natural protection of its geographic isolation in the eastern jungle.

Aside from Spanish, notable languages used by immigrants and resident aliens include English, Arabic, Hakka Chinese, Yue Chinese (Cantonese), and Mandarin Chinese. With the exception of English, these languages are used almost exclusively in ethnic enclaves of urban areas. Close cultural and educational ties with the United States is a guarantee of continued English usage. In recent years, the use of Sinitic languages is growing. Large-scale Chinese immigration began in the mid-19th century, and there are now over 100 000 speakers of Chinese languages in Panama. This is a politically sensitive issue, and government estimates of Chinese residents (both legal and illegal) range as high as 10% of the population. One historical society estimates that one-third of Panamanians have some Chinese blood. Nevertheless, the Chinese have become so well integrated into society that the dominant language of most young Panama-born Chinese speakers is now Spanish. Continuing Chinese immigration from Hong Kong and elsewhere, Panama's special relationship with Taiwan and its air and shipping companies, and the present Hong Kong management of the Panama Ports Company, all suggest that the use of Sinitic languages may continue to increase.

A dictionary of deaf sign language, known locally as Lengua de Señas Panameñas, has been published by the local association for deaf education.

See also: El Salvador: Language Situation; Pidgins and Creoles: Overview; Spanish.

Language Maps (Appendix 1): Map 67.

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Panel Studies and Language Variation

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Diachronic by definition, the panel study methodology is categorized in the study of linguistic variation as a real-time study, an investigation that considers the linguistic behavior of speakers over a period of time. The main objective of the panel study is to document longitudinally the linguistic behavior of individuals. Individual speakers or a particular cohort of speakers could be studied at a specific point in time and then be restudied at another point: for instance, a generation later. The panel study has to be distinguished from the trend study, another real-time method that, instead of looking at individuals, examines the linguistic community over time by comparing different samples of the community at two (or more) points in time. To contrast both methodologies, if the same time period is studied, the panel study will follow the same individual speakers, and the trend study will follow different speakers representing the same community. In brief, although both methods share the main axis of comparison, 'time', the panel study focuses on individuals while the trend study focuses on the community.

Real-time research is a relatively new avenue in the study of linguistic variation, mainly due to the short history of sociolinguistics. Most of the major real-time studies undertaken to date have adopted the trend study method (Cedergren, 1987; Trudgill, 1988), following in the path of Hermann's (1929) classic restudy of Charmey. Relatively few real-time studies have adopted the panel study method, and among these, some have combined the panel study with the trend study, as complementary ways of analyzing linguistic change in progress (Arnaud, 1998; Thibault and Daveluy, 1989; Sundgren, 2002). Although panel studies on linguistic variation are recent, this area of research has benefited from expertise in the area of developmental linguistics and language acquisition, in which research on the acquisition of a first or second language has adopted a similar longitudinal perspective. Variationists show growing interest in designing panel studies because of important research questions these studies could help to resolve. An innovative usage of panel studies could be especially helpful in shedding light on the lability of the linguistic system over the life span, in testing the apparent-time hypothesis, in distinguishing age-grading from community change, and in measuring the individual contribution to linguistic change at the community level.

A central aspect of the paradigm for research on linguistic variation and change developed in the 1960s is the Labovian formulation of the relation between 'apparent time' and 'real time' (Labov, 1966, 1972). At the initial stage of sociolinguistics, diachronic comparisons were hardly possible because of the scarcity of earlier sources of spoken data. Labov's proposal to use synchronic evidence by comparing the linguistic behavior of different generations was a way to infer linguistic change without direct diachronic evidence. This synchronic perspective of 'apparent time' has been extensively used in the field during the past 40 years, enriching the body of evidence on linguistic change. The main premise underlying the apparent-time perspective is the relative stability of the linguistic system of individuals after their initial stage of acquisition. This premise, related to Lenneberg's critical period hypothesis (1957) and confirmed by an important body of evidence in the area of language acquisition, has not however been tested within the paradigm of variationist linguistics. In this respect, the panel study of variable behavior can shed light on the lability of the individual linguistic system over the life span. In addition, the panel study could clarify the interpretation within the apparent-time perspective of differences in linguistic behavior among generations. Indeed, it is difficult to determine with certainty whether those differences are related to a community change or whether they could be interpreted as an age-grading phenomenon, a pattern that corresponds to the modification of the linguistic behavior of individuals at certain stages of their lives. As discussed by Labov (1994), real-time analyses have shown a more complex relation between the two phenomena. A judicious use of the panel study method allows us to look at individual behaviors over the life span, and is therefore helpful in distinguishing both patterns, when combined with a trend study. Moreover, the panel study helps us to understand how individuals react to community change.

Methodology

Most of the panel study investigations undertaken in variationist linguistics have used original data recollection. For example, two real-time investigations developed from initial data collections in earlier sociolinguistic studies used panel study methodology in combination with the trend study to distinguish between individual change and community change. Sundgren (2002) replicated an investigation of the morphological variation of spoken Eskilstuna Swedish by analyzing data collected in 1996, 29 years after the original Nordberg study in 1967. The panel study component of her research analyzed the linguistic

behavior of 13 recorded informants in 1967 and 1996. For Montreal French, Thibault and Vincent (1990) re-interviewed 60 speakers in 1984 out of the 120 initial speakers of Montreal French collected by Sankoff *et al.* in 1971. In following a similar approach, Vincent *et al.* (1995) again re-interviewed 12 of the initial informants in 1995 and added 2 of the 1984 new speakers, thus producing a 23-year span for the panel perspective. However, it is also possible to use data from the public domain (Sankoff, 2004; Prince, 1987; Arnaud, 1998). For example, in the study conducted by Sankoff, phonological variation from adolescence to adulthood was examined by looking at the series of British documentaries that began with the film *Seven Up*.

One of the difficulties inherent in the panel study is the reduction of the cohort of individuals over time, especially if the longitudinal methodology was not part of the initial study design. However, it is possible to overcome these difficulties and to replicate a study a generation later (Sundgren, 2002). Indeed, although one cannot necessarily re-interview the same individuals over time, the success rate of 50% of the initial informants reached in the 1984 follow-up of the Montreal study was excellent. However, researchers considering a panel study will have to use sophisticated techniques to keep track of the speakers over time, calling upon tools developed in developmental linguistics and in other areas of the social sciences.

Other social changes that modify the social environment of the speakers also occur during the time span involved in any real-time study, including geographic or social mobility. While these aspects may affect the comparability of samples in a trend study, a panel study is designed to take such intra-individual variation into consideration. Such variation enriches rather than compromises the results of panel studies.

Results

One of the main findings of panel studies is that speakers do modify at least some aspects of their linguistic behavior over time. However, if we look at the results more carefully, we can say that the different subsystems of language behave differently across individual life spans (Sankoff, forthcoming; Blondeau *et al.*, 2002; Sankoff *et al.*, 2001). A review of the most recent studies indicates that phonology is the most stable component and lexicon the least stable component of the linguistic system in terms of change over individual lifetimes (Sankoff, forthcoming), confirming in real time and at the individual level Labov's generalization about linguistic change (1994: 85). In this respect, panel studies shed light on the issue of the lability of individual linguistic systems over time.

Some findings also show that the propensity to adopt a new linguistic behavior may be linked to the social saliency of the variable. In the Sundgren studies, the panel speakers increased their usage of standard forms in all but one of the morphological variables under analysis. These results are associated with educational and gender constraints: more educated people used more standard forms over time, and women changed more than men. This patterning is also observed by Blondeau (2001) who analyzed a change in the use of strong pronouns in Montreal French. Therefore, in the case of morphological changes from above, adults can alter their linguistic behavior. More panel studies need to be undertaken on variables involving a change from below to further our understanding of the relation between the status of the variables and the propensity to alter linguistic behavior over the life span.

Sundgren's findings also showed that some morphological changes at the individual level correspond to changes identified in the trend study. A similar result is found in the Sankoff *et al.* (2001) real-time restudy of the pronunciation of (r) in Montreal French. The trend study confirms the original hypothesis of a change in progress, in which the old apical variant [r] was replaced by the posterior one [R] as a new community norm (Cedergren, 1987). But interestingly enough, the panel study results show diversity at the individual level. While some speakers remained stable, other speakers significantly altered their behavior over time. General community trends are mirrored by some individual speakers' adaptation to a change in progress in their community. In sum, panel studies showed that individual contributions to a change in progress are not as strong as the contributions of new generations of speakers entering the community.

Labov's review of real-time studies (1994) showed that age-grading is often involved at the same time as community change. In this regard, Sankoff's recent proposal introduces a new distinction into what is labeled the 'age-grading' phenomenon. Sankoff (forthcoming) introduces a conceptual refinement in the characterization of real-time modification in the speech of individuals over time. She suggests that the term *age-grading* be reserved only for those contexts in which speakers change their behavior in every generation. As a refinement, Sankoff proposes adoption of the term *life span change* to refer to another type of change "in which individual speakers change over their lifespans in the direction of a change in progress in the rest of the community" (Sankoff, forthcoming: 15).

Conclusion

Panel studies and trend studies should be viewed as complementary real-time methods that can shed light on linguistic change. In particular, the follow-up of individuals over time is well suited to verification of the apparent-time perspective and its premise. Results obtained from the panel study perspective demonstrate that some changes are possible even after the initial stage of language acquisition, and to a greater extent than was expected from the traditional perspective. However, far from simply contradicting the apparent-time perspective, the panel study perspective documents which parts of the linguistic system are subject to lability over time, and which remain stable. As already pointed out, further discussion of panel study results with regard to the status of the variables is needed. By contrasting variables that affect different levels of the linguistic structure, we will learn more about the lability of individual linguistic behavior over time. In addition, a panel study comparison between changes from above and from below will also shed light on how social considerations could affect variables at the individual level. In sum, an innovative usage of the longitudinal method can help to shed light on central issues in the study of linguistic variation and change.

See also: Age: Apparent Time and Real Time.

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Pāṇini

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Linguistics in ancient India, though spread over several centuries, was united by the continuity of its scholarly tradition, and has been maintained ever since. The Indian grammarians, such as Yāska (6th–5th centuries B.C.), Pāṇini (5th century B.C.), Kātyāyana (3rd century B.C.), and Patañjali (2nd century B.C.) are well known today. Among them, Pāṇini is considered the most distinguished, and his grammar of the Sanskrit language, the *Aṣṭādhyāyī*, the most distinguished grammar.

The date of Pāṇini is commonly fixed in the 5th century B.C., which is in accordance with the native tradition that connects him with the Nanda king of Maghadh (Agrawala, 1963: 11; Macdonnell, 1927: 137; Burrow, 1973: 48). Bardhmāna (A.D. 650), a writer of a treatise on poetics, refers to Pāṇini as *Śalāturīya* (a native to *Śalātura*). Pāṇini himself mentions *Śalātura* in the derivation of the word *Śalāturīya* (*sūtra* P4.3.94). *Śalātura* has been identified as the present day *Lahur*, a small town near where the river Kabul meets the Indus in the extreme northwest of the Indian subcontinent (Agrawala, 1963: 10). In his *Mahābhāṣya* ('The Great Commentary') Patañjali calls Pāṇini *dākṣīputra* 'son of (the woman) Dākṣī' (Agrawala, 1963: 11; Belvalkar, 1976: 16). It is believed that Pāṇini had a younger brother, Piṅgala, who wrote *Pāṇnīya Śikṣā*, a treatise on phonetics bearing his elder brother's name (Varma, 1961: 5). Pāṇini is also said to have written two epics, *Jāmbavatījaya* and *Pātālavijaya*. However, the grammatical errors that occur in these poetic works render the ascription implausible (Keith, 1948: 45; Agrawala, 1963: 23). According to a verse in *Mitraprāpti*, Pāṇini was killed by a lion (Aginhotri, 1963: 23).

Pāṇini had many noteworthy predecessors. Some of them, such as Āpiśāli, Gālava, Gārgya, Kāśyapa, Śākalya, Śākaṭyāyāyana, and Senaka, are mentioned by him in his grammar, but his work was of such preeminent merit that it superseded all of them. However, his grammar does show the culmination of a long line of previous work of which we have no direct knowledge.

Pāṇini's grammar, the *Aṣṭādhyāyī* ('eight chapters'), is also known as the *Aṣṭaka* ('collection of eight'), *Sūtrapāṭha* ('recitation of *sūtras*' ('thread, a succinct statement, a rule'), and *Vṛttisūtra* ('*sūtras* on which commentaries have been written'). As it becomes clear form his *sūtras* P8.2.83 and P8.2.84, in the *Aṣṭādhyāyī* Pāṇini records the standard language as spoken by him as his mother tongue and therefore includes an accurate representation of what was an acceptable form and what was not (Vasu, 1962: vol. II, 1582; Bloomfield, 1927: 65). The *Aṣṭādhyāyī* analyzes the spoken forms along with the forms occurring in the earlier Vedic Sanskrit by means of 3996 *sūtras*, which have to be applied in a set order. These *sūtras* are arranged in eight chapters (*adhyāya*) of four quarters (*pāda*) with a varying number of *sūtras* in each quarter. References to a *sūtra* are made by writing 'P' (Pāṇini) followed by the chapter number, quarter number, and *sūtra* number. Thus, the second sutra of the second quarter of the second book is P2.2.2.

The *Aṣṭādhyāyī* is set in a linguistic context in which the acquaintance with linguistic theories, such as the theory that nouns are derived from verbs and that all derivation is done by affixes, is presupposed. Grammatical concepts and their names, such as 'noun' (*nāman*), 'pronoun' (*sarvanāman*), 'verb' (*ākhyāta*), 'preposition' (*upasarga*), and 'indeclinable' (*nipāta*) are presumed to be common knowledge. (Pāṇini, however, reduced the traditional four-way classification to two, namely 'verb' (*dhātu*) (P1.3.1) and 'nonverb' (*prātipadika*) (P1.2.45–46)). The phonetic description of language is equally taken for granted; the set of sound units represented in the Sanskrit alphabet and listed in the *Aṣṭādhyāyī* is given without further comment, though the vowels and consonants are ordered in sequences that are both phonetically and morphologically relevant to Pāṇini's grammatical rules. Thus, for example, Pāṇini lists the five simple vowels *a i u ṛ ḷ* and the four diphthongs *e ai o au* in this order and further tells us that the simple vowels can be 'short' (*hrasva*), 'long' (*dīrgha*), or 'protracted' (*pluta*) (P1.2.27). They can also be 'nasalized' (*anunāsika*) or 'nonnasalized' (*ananunāsika*) (P1. 1. 8), and they can further be discriminated by three distinctive pitches, 'high' (*udātta*) (P1.2.29), 'low' (*anudātta*) (P1. 2. 30), and 'falling' (*svarita*) (P1.2.31) (P1.2.39). (It has been remarked that the description of these three distinctive pitches by Pāṇini (and other Indian phoneticians) allowed a comparison of Sanskrit with Ancient Greek as well as the reconstruction of the tonal stress system of Proto-Indo-European (Robins: 137).)

In addition to the *Aṣṭādhyāyī*, Pāṇini is said to have composed related minor texts given as appendices to the *Aṣṭādhyāyī*, which are referred to in his grammar and are necessary for its understanding. These are (i) the *Śivasūtra*, an ordered set of 14 *sūtras* (communicated to Pāṇini by the god Shiva) enumerating the

sounds of Sanskrit (*varṇasamāmnāya*) in abbreviatory terms (*pratyāhāra*) later used in the *Aṣṭādhyāyī*; (ii) the *Dhātupāṭha*, a collection of *dhātus* or verbal stems divided into ten main subclasses; (iii) the *Gaṇapāṭha*, a collection of *gaṇas* or non-verbal stems that undergo similar grammatical processes; (iv) the *Uṇādisūtras*, consisting of *uṇādi* or *-u* and other affixes in two versions: *Pañcapādī* ('classified in five sections'), and *Daśapādī* ('classified in ten sections'); (v) the *Phiṭsūtra*, a short treatise that gets its name by the first *sūtra* beginning with *Phiṣaḥ*, which assigns a high-pitched accent (*Phiṣo 'ntaḥ udāttaḥ*) and that describes the accentuation of forms not resulting from derivational processes; and (vi) *Liṅgānuśāsana*, a treatise dealing with the laws (*anuśāsana*) of the grammatical gender (*liṅga*) of nominals based on their form and meaning.

The linguistic analysis in the *Aṣṭādhyāyī* is presented by isolating the constituents of a sentence into words (*pada*) that are then further analyzed into bases (*prakṛti*), affixes (*pratyaya*), and processes or operations (*kārya*). In the interest of economy of statement, Pāṇini's rules are set out in such a way that the repetition of a rule in relation to a subsequent rule on word formation is rendered unnecessary. Economy is further served by a number of special devices or abbreviatory terms (*pratyāhār*). Thus, in this abbreviatory scheme, the Sanskrit simple vowels – the short *a i u ṛ ḷ* and the long *ā ī ū ṝ* (long *ḷ* does not occur in the language – are referred to as *ak*. Presupposing this abbreviation, Pāṇini gives the following morphophonemic or *sandhi* rule: *akaḥ savarṇe dirgaḥ* (P6.1.101): "A succession of like (*savarṇa*) vowels (*ak*) is replaced by the corresponding long vowel (*dīrgha*)," (e.g., *a* 'augment' + *as-* 'be' + *īt* 'third singular imperfect' > *āsīt* 'he was.'). Under *savarṇa*, Pāṇini includes all those vowels "whose place of articulation and effort are equal" (*tulyāsyaprayatnam savarṇam* (P.1.1.9)). Thus, *a* and *ā* are *savarṇa* vowels, but not *a* and *i* or *i* and *u*. Other *savarṇa* vowels are the pairs *i ī, u ū*, and *ṛ ṝ*, respectively.

Pāṇini's sensitivity to phonetic facts in different levels of linguistic analysis is revealed in the last *sūtra* of *Aṣṭādhyāyī*: *a a iti* (P8.4.68), "*a* is ." In other words, short *a*, which is treated in this grammar as an open (*vivṛta*) vowel and as a short form of long *ā,* is in fact a contracted (*saṃvṛta*) . The reason for treating *a* as the short form of the long *ā* in the rest of the treatise was that if the short *a* were held to differ from the long *ā* in articulation, the *savarṇa* or similar articulation mentioned in P1.1.9 would not exist between *a* and *ā*, and the operation of the *sūtra* P6.1.10, which depends upon the *savarṇa* principle, would be barred. However, at the completion of the analysis, there is no reason not to restore the short *a* to its natural rights, infringed throughout the *Aṣṭādhyāyī*. Thus, Pāṇini, with oracular brevity, in his closing *sūtra*, gives the injunction *a a iti* (Vasu, 1962: Vol. II, 1680).

Those who have studied Pāṇini have been most struck by the ingenuity with which he achieved the economy of his statements. The quest for economy may have been inspired primarily by the needs of oral recitation and commitment to memory, but it also became a canon of scholarly merit in its own right. Such economy does, however, make the task of the reader enormously complicated, though we must remember that Pāṇini composed his grammar at a time when many used Sanskrit in their conversation and didn't have to learn how to speak it. To them, the grammar must have been intelligible. However, it later became intelligible only when read with a commentary.

The major commentaries on Pāṇini are (i) the *Vārttikas* ('Explanatory or Supplementary Rules' (from *vṛtti* 'explanation')) of Kātyāyana (3rd century B.C.), short criticisms on about a third of Pāṇini's *sūtras*, and (ii) the *Mahābhāṣya* ('The Great Commentary') of Patañjali (2nd century B.C.), mainly concerned with explaining and criticizing the *vārtitikas* of Kātyāyana. Subsequent works on the *Aṣṭādhyāyī* include (i) the *Kāśikāvṛitti* ('The Gloss of the city of Kashi'), or simply *Kāśikā*, of Jayāditya and Vāmana (A.D. 7); (ii) the *Rūpāvatāra* ('Formation of Forms') of Dharmakīrti (A.D. 11); *Prakriyākaumudī* ('Moonlight of Derivation') of Rāmachandra (A.D. 14), which deals with the word formation and derivations; and (iii) the *Siddhānta Kaumudī* of *Bhaṭṭoji Dīkṣita* (A.D. 16) which, as its name ('Moonlight of Settled Conclusions') signifies, is a work in which the *sūtras* of Pāṇini are arranged according to subjects, such as phonetics and declensions, and commented upon concisely and clearly. Dīkṣita's splendid and brilliant piece of work has given rise to a large ancillary literature of its own. An abridgment and simplification of *Siddhānta Kaumudī* is the *Laghu Siddhānta Kaumudī* ('The Little Moonlight of Settled Conclusions') of Varadarāja (4th edn., 1896), which now serves as an excellent introduction to Pāṇini and his grammar. Franz Kielhorn (1840–1908), the eminent European Paninian of his time, gave an abridged summary of the Paninian doctrine in his *Grammar of the Sanskrit language* (1896).

Though Pāṇini's composition is about as far removed as it could be from the modern conception of a teaching grammar, the teaching and presentation of Sanskrit today, as well as several important directions and features of modern linguistics, can be traced back to his genius. For example, a descriptive device used in modern linguistics, the zero representation of an element or category, is owed directly to Pāṇini. In *sūtra* P1.1.62 he states: *pratyayalope pratyalakṣaṇam*, i.e., "When the elision or zeroing (*lopa*) of an

affix (*pratyaya*) takes place, the trace or the distinctive mark (*lakṣaṇa*) of the affix still exerts its influence, and the operation dependant upon it takes place as if it were present." Thus, when after a consonant, the tense and person suffixes *-t, -s* are elided (P6.1.68), the augmented imperfect forms of the Sanskrit root *han-* 'slay,' which would otherwise be *áhant* 'he slew,' *áhans* 'you slew,' change to *áhan*.' But it still functions as though the third or second person suffix were still there.

Pāṇini's *Aṣṭādhyāyī* has impressed and influenced many, and has been considered "one of the greatest monuments of human intelligence" (Bloomfield, 1931: 11). Paying an eloquent tribute to Pāṇini's achievement, Bloomfield further writes (1927: 270 ff.):

> Indo–European comparative grammar had (and has) at its service only one complete description of a language, the grammar of Pāṇini. For all other Indo–European languages it had only the traditional grammars of Greek and Latin, woefully incomplete and unsystematic . . . For no language of the past have we a record comparable to Pāṇini's record of his mother tongue, nor is it likely that any language spoken today will be so perfectly recorded.

See also: Bloomfield, Leonard (1887–1949); Dikhsita, Bhattoji (ca. 17th Century A.D.); Katyayana (3rd Century B.C.); Nagojibhatta (d. 1755); Patanjali (2nd Century B.C.); Sanskrit; Yaska.

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Panoan Languages

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The Panoan language family is composed of approximately 30 known languages spoken in the western Amazon basin, in eastern Peru, western Brazil, and northern Bolivia. Of these, only about 20 are still spoken today and most are in danger of extinction. Additionally, there are several uncontacted groups in westernmost Brazil suspected to be Panoans (Erikson, 1994). There are currently 40 000–50 000 speakers of Panoan languages.

History and Culture

Archeological evidence suggests that the ancestral homeland of the Panoans was in northern Bolivia and that they migrated northward around 300 A.D. (Myers, 1990: 99). In past centuries, factions of many Panoan groups were reduced at Jesuit and Franciscan missions in Peru. Currently, Panoans occupy a fairly continuous territory and are relatively homogeneous linguistically and culturally (Erikson, 1992). Traditional subsistence, still practiced today by most groups, consists mainly of slash-and-burn horticulture, hunting with bow and/or blowgun, and fishing.

Classification

The Panoan languages were recognized early on by Jesuit missionaries to be closely related (e.g., in a 1661 letter by Father Francisco de Figueroa; Figueroa *et al*., 1986: 214). The first formal demonstration that Panoan languages constitute a linguistic family was in 1888 by Raoul de la Grasserie, based on a comparison of eight word lists of Panoan languages/dialects collected by European explorers earlier that century (Grasserie, 1890). The family was named after the now-extinct Pano language (also known as Panobo 'giant armadillo people' or Wariapano). There is still no authoritative subclassification of the Panoan family available; see Valenzuela (2003b) for an evaluation of past subgroupings of the family. It has been claimed that the Panoan family is undoubtedly related to the Tacanan family (e.g., Suárez, 1973), though today not all Panoan scholars accept this as certain.

Phonology

Loos (1999) reconstructs the following phoneme inventory for proto-Panoan: p, t, k, ʔ, ts, tʃ, s, ʃ, ʂ, *β*, ɾ, m, n, w, j, h, a, i, ɨ and o. Most languages have rhythmic stress, where every other syllable in a word is stressed.

Morphology

Panoan languages are primarily suffixing and could be called highly synthetic due to the potentially very long words (up to about 10 morphemes), but the typical number of morphemes per word in natural speech is not large. It is the large number of morphological **possibilities** that is striking about Panoan languages. For example, up to about 130 different verbal suffixes express such diverse notions as causation, direction of movement, evidentiality, emphasis, uncertainty, aspect, tense, plurality, repetition, etc. Panoan languages are all morphologically ergative, with an ergative case marker that also marks instrumental and genitive cases, and in some languages also locative and/or vocative. Complex and sometimes obligatory systems of evidentiality (Valenzuela, 2003a) and body part prefixation (Fleck, forthcoming) are two further notable features of Panoan morphology.

Syntax

Panoan languages have the rare and interesting property of 'transitivity agreement,' where various parts of the grammar (including adverbs, suffixes, and enclitics) vary depending on whether the matrix verb is transitive or intransitive. Panoan discourse is characterized by 'clause chaining' (or 'switch reference'): up to about 10 clauses can be linked together using suffixes that mark argument coreference (e.g., same subject, object = subject) and temporal/logical relations (e.g., 'while,' 'after,' 'in order to') between subordinate and matrix clauses. Panoan languages are some of the few languages in the world where both nonsubject arguments of bitransitive verbs such as *give* are grammatically identical. See Sparing-Chávez (1998), Valenzuela (1999, 2003b), Faust and Loos (2002), and Fleck (2003) for modern descriptions of these and other Panoan grammatical phenomena.

Lexicon and Ethnolinguistics

Some Panoan groups have a taboo that prohibits mention of a deceased person's name and nicknames, otherwise the dead person's spirit may cause harm to the family of the person that pronounces his/her name out loud. The name taboo also prohibits mentioning words judged to sound like the deceased's name or nicknames. Languages such as Matses seem to have an unusually high rate of lexical replacement,

probably due at least in part to name taboo. Other ethnolinguistic features of interest in Panoan languages are parent-in-law avoidance speech in Shipibo-Conibo (Valenzuela, 2003b) and elaborate rain forest habitat classification nomenclature (e.g., Matsés has 47 terms for types of rain forest; Fleck and Harder, 2000).

See also: Bolivia: Language Situation; Brazil: Language Situation; Peru: Language Situation.

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Papago *See:* Tohono O'odham.

Papiamentu

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Papiamentu is a Creole language spoken on Aruba, Bonaire, and Curaçao in the Caribbean. Over 175 000 islanders (about 75% of residents) speak the language natively, and many immigrants learn it as a second language. It is widely used in both public and private domains, for artistic and practical purposes, and is included in secondary education. The earliest surviving written example is a personal letter from 1775, and many 19th-century texts also exist, including translated religious documents and news articles originally written in the Creole. Today, most Papiamentu speakers have varying levels of competence in Dutch (the official language), Spanish, and English.

Origins Researchers do not agree on whether Papiamentu was formed around Spanish (Maduro, 1966) or Portuguese (Maurer, 1986; Goodman, 1987; Martinus, 1996). Proponents of the Spanish origin suggest that the creole formed during the 16th century from contact between the Spanish and Caquetio Indians. But it is more likely that Papiamentu was formed during the latter half of the 17th century from the speech of Portuguese-speaking Jewish merchants and African slaves, with influence from Dutch colonists, Spanish traders, and native

probably due at least in part to name taboo. Other ethnolinguistic features of interest in Panoan languages are parent-in-law avoidance speech in Shipibo-Conibo (Valenzuela, 2003b) and elaborate rain forest habitat classification nomenclature (e.g., Matsés has 47 terms for types of rain forest; Fleck and Harder, 2000).

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Caquetios. Today most lexical items resemble Portuguese or Spanish, and to recognize both influences, we say that Papiamentu has an 'Iberian' lexical base.

Orthography Papiamentu has two orthographic traditions: Aruba prefers an etymological system, while Curaçao and Bonaire follow a phonological system. The phonological system is used here.

Phonology The vowel inventory of Papiamentu is a, ɛ, e, ø, ɔ, o, i, y, u. The front round vowels were introduced via Dutch lexical items; the mid round vowels are found in the Portuguese and Dutch lexicons. Consonants are p, b, t, d, k, g, s, z, ʃ, ʒ, h, tʃ, dʒ, m, n, ŋ, l, r, w, j. Lexical tone, stress, and sandhi phenomena are part of Papiamentu's prosodic structure.

Morphology Papiamentu has a few productive affixes, including *-mentu* 'the act of,' from Spanish *-miento* (i.e., *distribimentu* '(the act of) wasting,' *kapmentu* 'cutting,' and *kèchmentu* 'catching'); *-dó* 'person who', from Spanish *-dor* (i.e., *wardadó* 'keeper, guard', lit. 'person who guards'; *trahadó* 'worker'; *huurdó* 'tenant') (Dijkoff, 1993); plural marker *-nan*; and gerundive and progressive marker *-ndo* from Spanish *-ndo* (Sanchez, 2002, 2005). Borrowed morphemes which are not yet completely integrated may be sensitive to etymology. For example, *-ndo* is productive with Iberian verbs, and though it is attested with Dutch verbs, such usage is unacceptable for most speakers. Past participles are formed by shifting stress to the final syllable, but some Dutch-origin verbs take *he-* (as in Dutch) instead. Past participles may be semantically extended as nouns (e.g., *kasa* 'marry' → *kasá* 'married' → *kasá* 'spouse').

Syntax The basic word order of Papiamentu is SVO. It is neither pro-drop like Spanish and Portuguese, nor V2 like Dutch; pronominal objects cannot be moved to preverbal position, and there is no wh-movement. As in many creoles, tense, mood, and aspect are indicated by preverbal markers:

ta	imperfective
tabata	past imperfective
a	perfective
lo	future
sa	habitual

(based on the analysis in Andersen, 1990).
Papiamentu also has a passive voice, composed of a preverbal marker, a passivizing verb (*ser, wordu*, or *keda*), and a past participle (e.g., *ta wordu skuchá* 'is heard').

See also: Aruba: Language Situation; Pidgins and Creoles: Overview.

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Papua New Guinea: Language Situation

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New Guinea and its offshore islands are home to the greatest linguistic diversity in the world. Of the 6000 or so languages spoken today, perhaps 1200, or one in five, are spoken in this region. The island of New Guinea, located immediately to the north of Australia, is divided politically. The western half forms the Indonesian province of Irian Jaya. The eastern half and its adjacent islands are the nation of Papua New Guinea.

Papua New Guinea (PNG) consists geographically of its mainland and several island groups, including the D'Entrecasteaux Islands, the Louisade Archipelago, the Admiralty Islands, New Britain, New Ireland, and Bougainville. (Although geographically part of the Solomon Islands, Bougainville is politically part of PNG.) The mainland itself consists of clearly distinct highlands and lowlands. Each of these three regions – highlands, lowlands, and islands – has its own patterns of climate, land use, traditional lifestyle, and language. The mountainous highlands have a temperate climate and contain extensive grassy valleys densely populated with sophisticated agriculturalists. The mosquito-infested tropical lowlands comprise dense rainforest or vast swamplands, both relatively inhospitable. The lowlands population is much sparser than the highlands population and traditionally more reliant on exploiting the abundant resources of the environment, gathering plant foods and fishing in the many large rivers or the sea. In the islands the emphasis is typically on a combination of agriculture and the region's abundant marine resources.

New Guinea has been inhabited for at least 50 000 years by Papuan peoples. Until sea levels rose at the end of the last Ice Age some 8000 years ago, New Guinea formed a single landmass with Australia, although there is no clear linguistic or archaeological evidence of common ancestry for modern Papuan and Australian Aboriginal peoples. About 4000 years ago, the expansion of Austronesian-speaking peoples reached New Guinea, with settlement occurring in pockets along the north coast and the southeast tip of the mainland and more extensively in the islands, which, with the exception of parts of New Britain and Bougainville, became almost exclusively Austronesian-speaking. The important Lapita culture emerged in New Britain about 3500 years ago and spread rapidly east into the island Pacific, a development associated with the spread of the Oceanic branch of Austronesian, which had emerged in New Britain at the same time.

The island of New Guinea was known to Europeans from the 16th century but was largely ignored until the late 19th century. The western half was claimed by the Dutch, ultimately ending up under Indonesian control in the 1960s. The eastern half was claimed in 1884: the northeastern quarter along with New Britain, New Ireland, and Bougainville by Germany, the southeastern quarter and its islands by Britain. The British territory, Papua, was later transferred to Australian administration, to be joined by German New Guinea in 1914. This combined territory was administered by Australia until PNG achieved independence in 1975. Initially only the lowlands and islands experienced Western contact. The existence of the highland valleys with their more than one million inhabitants was unknown to outsiders until the 1930s, and contact with most of the highlands began only in the 1950s.

This complex historical picture corresponds to a highly complex linguistic situation. The languages of PNG fall into two groups: Papuan and Austronesian. About 78% of the nation's 4.6 million inhabitants speak a Papuan language as their first language, and about 20% an Austronesian language. Most of the remaining 2% are Tok Pisin speakers.

Papuan Languages

While Austronesian languages all belong to a single well-established genetic family, the term 'Papuan' refers to only a regional, and to some extent typological, grouping. Genetically there is no single Papuan language family. Instead, about sixty language families are widely recognized, along with several linguistic isolates. Several of these families are tentatively linked into larger groupings, and more extensive comparative work in the future may reveal links between other families. It seems unlikely, however, that a single Papuan family will ever emerge. Even assuming all Papuan languages are descended from a single common ancestor – and this is highly dubious – the time depth involved means that higher-level links are beyond the range of comparative linguistic methods and will remain speculative.

The most widely accepted larger Papuan grouping is the Trans-New-Guinea phylum. This putative family, with more than 500 languages, occupies almost all of the highlands, extending across the border into Irian Jaya. It appears to reflect a population expansion about 5000 to 6000 years ago resulting from the development of advanced agricultural techniques.

Trans-New-Guinea comprises a number of securely established families. The most important of these in PNG include the following:

Binanderean (16 languages)
Koiarian (6 languages near Port Moresby)
Goilalan (5 languages)
Angan (12 languages)
Finisterre-Huon (including Huon [21 languages] and several smaller families)
Eastern Highlands (including Kainantu [4 languages] and Gorokan [8 languages])
Kalam (3 languages)
Engan (8 languages)
Ok (14 languages)
Chimbu (12 languages).

The north coast of PNG, particularly the Sepik-Ramu basin, is the locus of considerable diversity, even by Papuan standards, with numerous families and isolates. However, evidence supports several larger groupings. One is Torricelli, containing 47 languages in several well-established families, the most important being the following:

Kombio-Arapesh (9 languages)
Marienburg (7 languages)
Wapei-Palei (20 languages)
West Wapei (3 languages).

Another likely larger grouping is Lower Sepik-Ramu, comprising several well-established families, the most important being :

Lower Sepik (6 languages)
Grass (5 languages).

Some scholars link Lower Sepik-Ramu with several other secure families to form a less widely accepted Sepik-Ramu phylum, including:

Ndu (7 languages)
Sepik Hill (14 languages)
Upper Sepik (6 languages).

Other important families in the north coast/Sepik region that have not been linked to larger groupings include the following:

Sko (8 languages, straddling the border with Irian Jaya)
Left May (7 languages)
Kwomtari-Baibai (6 languages)
Amto-Musan (2 languages).

Several other small but distinct families are found in the south, including:

Eleman (5 languages, Gulf of Papua)
Kiwaian (7 languages, Fly River)
Suki-Gogodala (2 languages, Fly River).

In addition to several isolates, Papuan languages found in island PNG belong to four well-established families:

Yele-West New Britain (3 languages)
East New Britain (3 languages)
South Bougainville (4 languages)
North Bougainville (2–4 languages).

Evidence linking these in an East Papuan phylum is now regarded as weak.

Austronesian

The 174 Austronesian languages of PNG all belong to the family's large Oceanic branch. Linguistic and archaeological evidence suggests a homeland for the ancestral Proto-Oceanic in the Willaumez Peninsula region of New Britain, with the family dispersing east into the island Pacific, north into the Admiralties and Saint Matthias groups, and south and west into mainland New Guinea. The result in PNG is three first-order Oceanic subgroups:

Admiralties (30 languages)
Saint Matthias (2 languages)
Western Oceanic (all but 3 of the remaining Austronesian languages of PNG).

It is possible that the Admiralties and Saint Matthias groups may form a single higher-order Oceanic subgroup. Western Oceanic itself comprises three subgroups:

North New Guinea cluster (42 languages, north coast of New Guinea and most of New Britain)
Papuan Tip cluster (54 languages, southeast New Guinea and offshore islands)
Meso-Melanesian cluster (43 languages in north New Britain, New Ireland, and Bougainville [with a further 21 in the Solomon Islands]).

In addition, three Polynesian Outlier languages are found on remote PNG islands, the result of prehistoric back-migration from Polynesian.

Speaker Numbers

Most PNG languages are small, with an average of only about 4000 speakers per language. Only four have more than 100 000 speakers, all highlands Papuan languages:

Enga dialect network (Engan): 164 750
Chimbu dialect network (Chindu) 148 000
Medlpa (Chimbu): 130 000
Kamano-Yagaria dialect chain (Gorokan): 121 400.

Table 1 Speaker numbers for PNG languages with more than 10 000[a]

	Papuan	*Oceanic*
More than 100 000	4	
70 000–99 000	3	
40 000–69 000	7	1
10 000–39 000	30	17

[a]Modified from Ethnologue.

Sixty-two indigenous languages have more than 10 000 speakers, mostly Papuan, and again mostly highlands (see Table 1). One Oceanic language, Tolai (aka Kuanua; Oceanic Meso-Melanesian), has 61 000 first-language speakers. The next-largest Oceanic language is Kilivila (Papuan Tip), with 22 000.

The country's remaining approximately 700 known languages have fewer than 10 000 speakers. At least 114 of these have fewer than 200 speakers, and at least nine are extinct.

Pidgins and Creoles

With its plethora of languages, it is no surprise that a tradition of multilingualism exists in PNG. In addition, numerous pidginized trading versions of vernacular languages have existed at various times, such as Pidgin Yimas (Papuan, Lower Sepik-Ramu), used for trading along the Sepik River. The most important of these is Hiri Motu (Motu, Hiri), a pidginized version of Motu (Oceanic, Papuan Tip). One pidginized Motu was used into the 20th century on traditional *Hiri* trading expeditions throughout the Gulf of Papua. Because Motu is the language of the Port Moresby region, another pidginized version of the language, called Police Motu, was adopted by the Australian administration of colonial Papua. This Police Motu, now renamed Hiri Motu, has lost some currency but remains an important lingua franca in that region.

Over the past century, the role of vernacular-based lingua francas has been supplanted by Tok Pisin, the PNG dialect of Melanesian Pidgin. Tok Pisin emerged in 19th century plantations in Queensland and Samoa, developing in German New Britain to stabilize as the dominant lingua franca of PNG. At least half the people now use Tok Pisin as their main lingua franca, and it is the first language of about 50 000 individuals, securing its status as a creole. Tok Pisin is largely lexified from English, with some German and vernacular input, particularly from Tolai (Oceanic, Meso-Melanesian). However, the grammar closely resembles the grammars of its Oceanic substrate languages.

Language Status

Attitudes toward vernacular languages vary widely among the population. Tok Pisin, and to a greater extent English, are seen as the languages of advancement, material wealth, and engagement with the wider world, and vernaculars are seen as the medium of traditional culture and values. The status (and to some extent future viability) of individual vernaculars depends on the balance of these competing forces in individual language communities. Some communities have shifted to Tok Pisin in an attempt to improve their prospects, and children are no longer acquiring the vernacular. Other speech communities are keen to maintain their language as a badge of cultural and social identity.

PNG has no official language. The constitution mentions language only to state a goal of universal literacy in Tok Pisin, Hiri Motu, or English, as well as a vernacular language. However, official and unofficial government policy effectively recognizes a three-tiered hierarchy. English is the primary language in government and the courts and is the *de facto* national language. Tok Pisin and Hiri Motu both also have some official recognition, and some knowledge of each is required for outsiders to be granted citizenship. The vernacular languages receive little formal recognition.

One area in which this practice has changed is education. While English remains the principle language of formal education, and the sole language at higher levels, poor results from attempts to teach literacy in early years using English prompted moves to establish an early-years vernacular education program. The logistics of providing classroom materials in even a fraction of the country's more than 700 languages prohibits the widespread application of vernacular programs. Despite this difficulty, several hundred vernacular-based primary school programs are now operating in larger language communities. In addition, nongovernment preschools have been established in many areas to teach children basic literacy in their first language. The successes of these and various adult vernacular literacy programs have led the PNG government to place its language education policies under review.

A second area in which English does not have an exclusive presence is the media. Television is in English, but radio broadcasting typically employs Tok Pisin or Hiri Motu and in some regions one or two of the larger vernacular languages. One of the four national newspapers and several provincial papers use Tok Pisin rather than English.

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Madang Languages; Malayo-Polynesian Languages; Papuan Languages; Pidgins and Creoles: Overview; Tok Pisin; Trans New Guinea Languages.

Language Maps (Appendix 1): Map 155–172.

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Papuan Languages

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Introduction

'Papuan' is a collective name for a number of language families and genetic isolates that have in common two characteristics: (a) they are indigenous to a region sometimes called the New Guinea area, comprising New Guinea and neighboring island groups extending from Timor, Alor and Pantar, and Halmahera in the west to the Solomon Islands in the east; and (b) they do not belong to the vast Austronesian family, which dominates Island Southeast Asia and the archipelagoes of the southwest and central Pacific but is only patchily represented in New Guinea itself. (The term 'family' will be used here exclusively to refer to linguistic groups of the highest genealogical order, not to subgroups.)

The hub of the Papuan-speaking region is the large island of New Guinea, which is about the size of Germany but contains about 900 mutually unintelligible languages, over 700 of which are Papuan. According to the most recent classifications, some 18 Papuan families and several isolates are represented on the New Guinea mainland (see **Figure 1**). Two of the New Guinea-based families also have members in Alor, Pantar, and Maluku in Indonesia and in East Timor. Another five, possibly six, families and several isolates are found in the arc of islands extending from New Britain to the Solomons (see **Figure 2**). Whereas Austronesian languages arrived in Melanesia from the west within the past 3500 years (Spriggs, 1997), the Papuan families almost certainly represent continuations of linguistic stocks that have been in this region for much longer than this. There is no convincing evidence that any of the Papuan families have relatives outside of the New Guinea area.

About three million people speak Papuan languages. Most have fewer than 3000 speakers. The seven largest language communities are Enga (about 200 000) and Medlpa [Melpa] (150 000), of the highlands of Papua New Guinea, and Western Dani (150 000) and Lower Grand Valley Dani (130 000) of the highlands of Irian Jaya (Papua). The small size of language communities reflects the extreme political fragmentation that is characteristic of the New Guinea area; peoples were traditionally subsistence farmers or foragers and until colonial times political groups seldom exceeded a few hundred people. In postcolonial times the main regional lingua francas in the Papuan-speaking regions have been English and Tok Pisin in Papua New Guinea, English and Pijin in the Solomon Islands, and Malay in Indonesia. No Papuan language has the status of a national or even a provincial language. While most Papuan languages are still vibrant in their local communities, their small size and lack of wider status mean that their long-term prospects of survival are poor.

Foley (1986) gives an excellent overview of Papuan languages and linguistics up to the mid-1980s; Foley (2000) reviews more recent work. Carrington (1996) is a near exhaustive bibliography of linguistic research up to 1995 and Laycock and Voorhoeve (1971) is a thorough history of early research. *Language atlas of the pacific area* (Wurm and Hattori, 1981–1983) maps in detail the distribution of Papuan languages and language families. However, since this work was compiled several important revisions to the classification have been proposed. This caveat also applies to the information given in *Ethnologue* (Grimes, 2000). The main centers for the study of Papuan languages in

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Madang Languages; Malayo-Polynesian Languages; Papuan Languages; Pidgins and Creoles: Overview; Tok Pisin; Trans New Guinea Languages.

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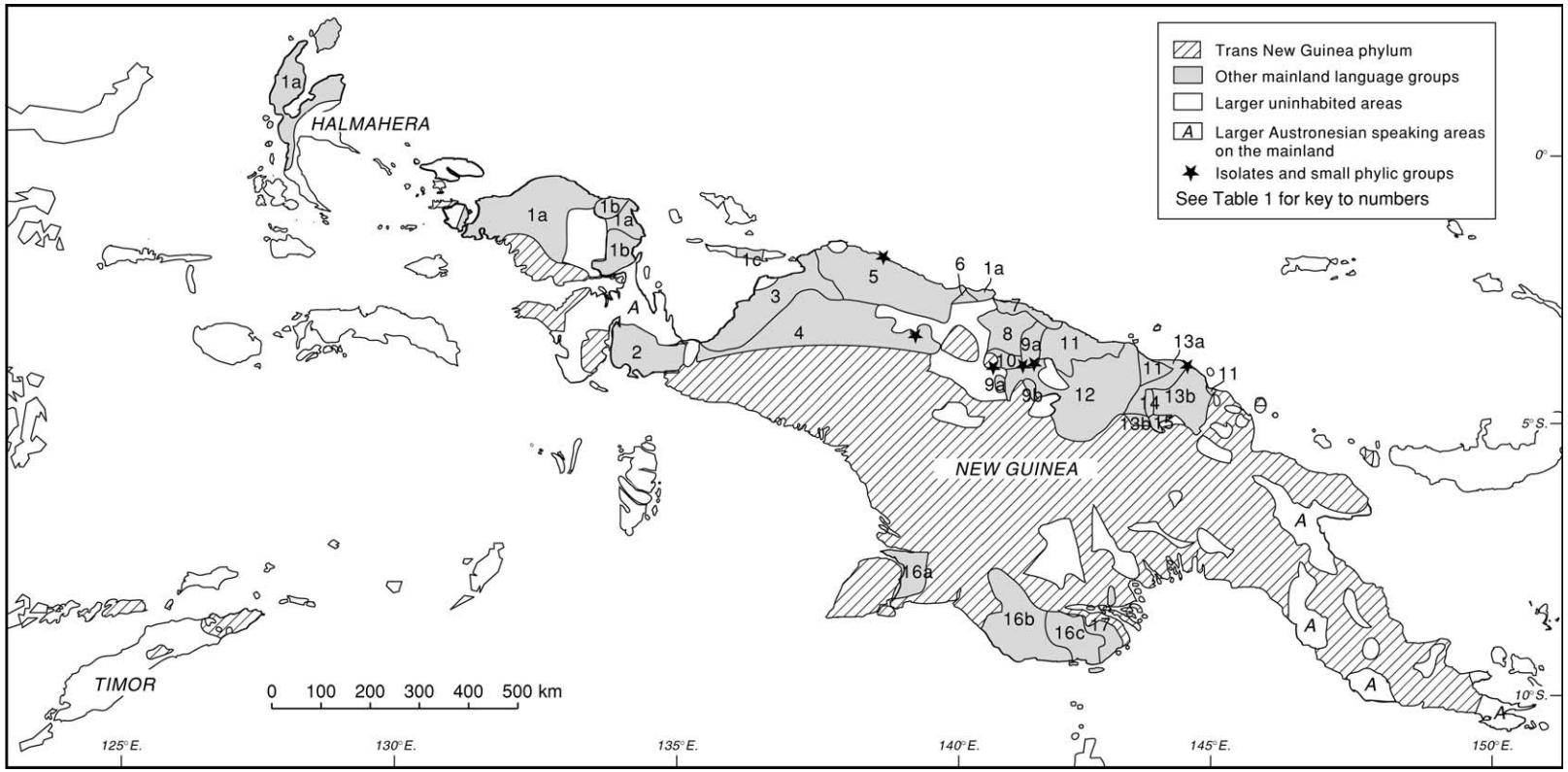

Figure 1 Distribution of Papuan language families in New Guinea and the Timor–Maluku region. Reproduced from Pawley A & Ross M (eds.) *Papuan languages and the Trans New Guinea Family*. Canberra: Pacific Linguistics (forthcoming), with permission.

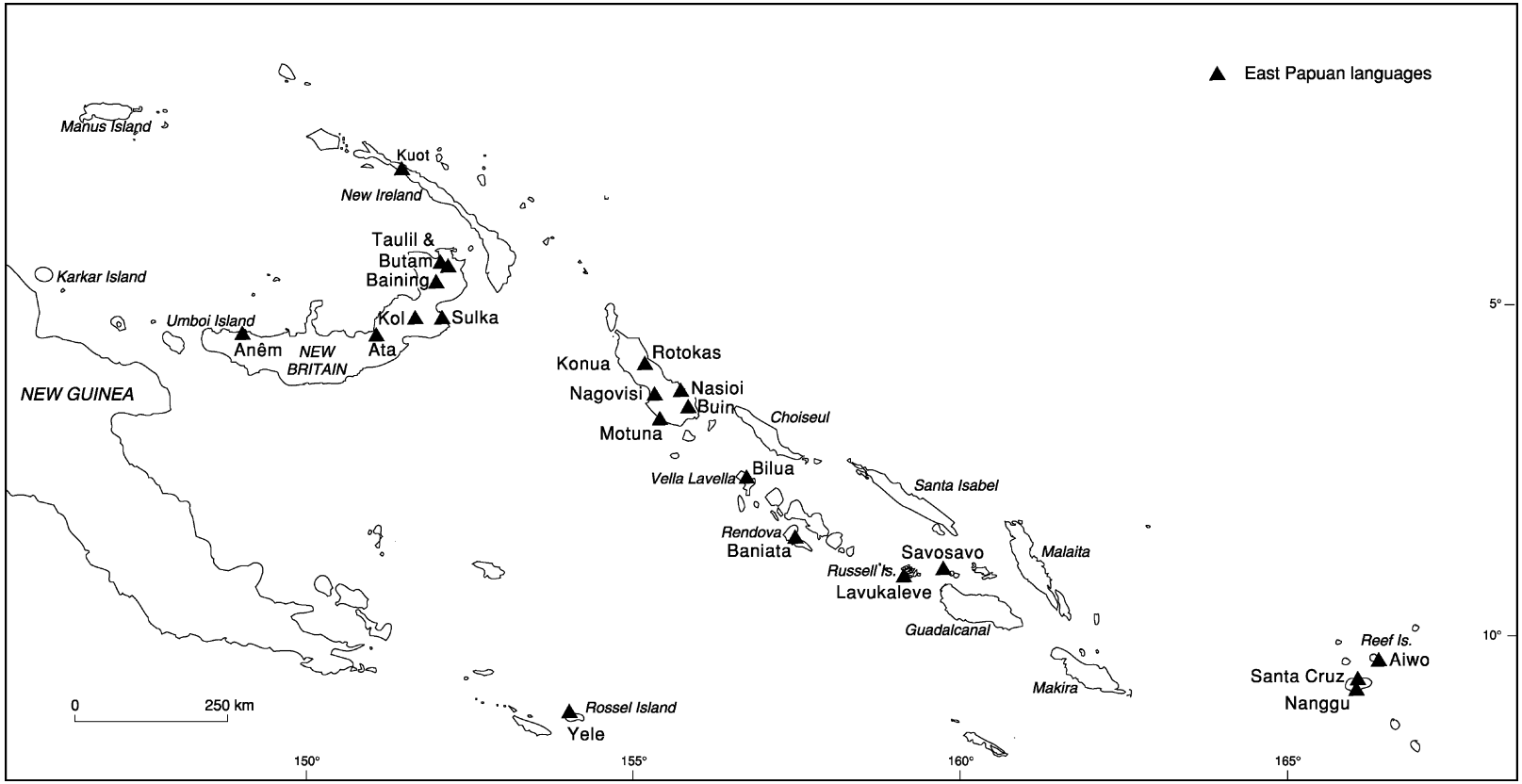

Figure 2 Distribution of Papuan languages in island Melanesia. Reproduced from M Ross, 'Is there an East Papuan phylum?' In A Pawley *et al.* (eds.) (2001). The boy from Bundaberg. Studies in Melanesian Linguistics in Honour of Tom Dutton. Canberra: Pacific Linguistics, with permission.

recent decades have been the Australian National University's Research School of Pacific and Asian Studies, the University of Sydney, Leiden University, and the Summer Institute of Linguistics's branches in Papua New Guinea and the Indonesian province of Papua (formerly Irian Jaya).

A Short History of Research on Papuan Languages

Until the last decades of the 19th century the languages of the New Guinea area were almost completely unknown to linguists. The imposition of European colonial administrations during that time initiated a period of linguistic research, mainly carried out by missionary scholars. In 1893 the English linguist S. H. Ray observed that some of the languages found in the New Guinea area do not belong to the Austronesian family. Over the next 60 years, as Western exploration of the interior of New Guinea and other large islands proceeded, it became apparent that there were hundreds of such languages and that they were genetically extremely diverse. No families of Papuan languages with more than about 20 members were identified before the 1950s.

Until the end of Word War II research on Papuan languages was largely done by scholars with no training in modern linguistics. In the late 1950s a phase of more systematic descriptive and comparative research began. Between 1958 and the 1970s extensive surveys and some in-depth studies of Papuan languages were undertaken by linguists from the Australian National University (ANU). Around 1960 the Dutch linguists Anceaux, Cowan, and Voorhoeve began research in Irian Jaya. Since the Summer Institute of Linguistics established branches in Papua New Guinea in 1956, and in Irian Jaya in 1970, SIL linguists have undertaken descriptive work on some 200 Papuan languages.

This new phase of research yielded a series of preliminary classifications, culminating in a major synthesis by the ANU group (Wurm (ed.), 1975; Wurm, 1982). In 1960 the number of Papuan families was thought to be more than 60. Using mainly lexicostatistical and typological arguments the contributors to Wurm (ed., 1975) reduced the number to 10 'phyla,' along with a number of isolates. (Following the nomenclature often used in lexicostatistical classifications the ANU group called the highest-order genetic group a 'phylum,' while using 'sub-phylum,' 'stock,' and 'family' to rank subgroups according to percentages of shared cognates.)

In linguistic classification there are lumpers and splitters. Wurm and some of his colleagues can be described as lumpers. The classification in Wurm (ed., 1975), and followed in associated works such as Wurm and Hattori (1981–1983), included three particularly controversial claims. One is that almost 500 Papuan languages can be assigned to a single genetic unit, the Trans New Guinea phylum. If true this would make Trans New Guinea the third largest family in the world in number of members, after Niger-Congo and Austronesian. Second, Wurm (1975) posited an East Papuan phylum consisting of all 20 or so geographically scattered Papuan languages of Island Melanesia plus Yela Dne (Yeletnye) [Yele] of the Lousiade Archipelago, off the southeastern tip of New Guinea. Third, Laycock and Z'graggen (1975) proposed a Sepik–Ramu phylum, to which they assigned almost 100 languages spoken in and around the Sepik–Ramu basin.

Although a good many nonspecialists accepted these proposals uncritically, none was well received by Papuan specialists. All the main reviewers of Wurm (ed., 1975) regarded the Trans New Guinea hypothesis as unproven though not without promise. The Sepik–Ramu hypothesis fell into the same basket. The proposed East Papuan hypothesis was generally viewed as the least plausible of the three.

The most extreme lumper in the Papuan field has been the American linguist, Joseph Greenberg. In a paper drafted much earlier but not published until 1971 Greenberg suggested that all the Papuan languages belong to a vast 'Indo-Pacific' group, to which he also assigned the Andaman Islands and Tasmanian languages. The languages of mainland Australia were excluded. Greenberg's Indo-Pacific proposal rested mainly on a flimsy chain of resemblances in lexical forms (84 sets) and grammatical forms (10 sets). The resemblances are flimsy because the resemblant forms are distributed very unevenly across language groups and because of the lack of means to distinguish shared retentions from chance resemblances and borrowings – one can find a chain of chance resemblances linking any set of sizeable language families. Greenberg divided the Papuan languages of New Guinea into seven major groups, some of which had merit. For example, his 'Central' group resembles the Trans New Guinea (TNG) family in that he assigned to it all the central highlands languages from the Baliem Valley in Irian Jaya to the Huon Peninsula group in Morobe Province, Papua New Guinea. However, evidence for such a group was not given except as part of the mass of etymologies adduced in support of Indo-Pacific as a whole.

Greenberg's Indo-Pacific proposal drew almost no response from Papuanists. This lack of response, no doubt, reflects (a) extreme skepticism, and (b) the difficulty of disproving a claim of this kind until linguists have established a core of well-defined

genetic groups among the languages concerned and have worked out the essentials of their historical development. The main message in the critical reviews of Wurm (ed., 1975) was along the lines of (b). Foley (1986: 3, 213) argued that a properly cautious view should recognize some 60 separate Papuan families which have not been convincingly shown to be related.

Recent Work on the Classification of Papuan Languages

Recently Malcolm Ross compared pronoun paradigms in 605 Papuan languages as a basis for recognizing language families (Ross, forthcoming, 2001, in press). For each family he sought to determine a sequence of innovations in pronoun forms and categories that would yield subgroups. The limitation of Ross's classification is that it relies heavily on a very restricted set of diagnostic criteria. Its strength is that pronoun paradigms have proved to be the most reliable single diagnostic. Ross identifies some 23 to 25 language families and 9 or 10 isolates. The pronominal evidence indicates that the Papuan languages show more genetic diversity than was recognized by Wurm (ed., 1975) but less than was proposed by Foley (1986).

The classification of Papuan groups in Figure 1 relies heavily on Ross's work but also draws on several other recent studies including Dunn *et al.* (2002), Foley (1986, in press), Pawley (1998, 2001, in press), Reesink (in press), and Terrill (2002).

The Trans New Guinea Family

A slightly reduced version of the TNG family as proposed in the 1970s has been strongly supported by recent work using sounder methods (Pawley, 1998, 2001, in press; Ross, forthcoming) (*see* **Trans New Guinea Languages**). The main evidence for TNG consists of (a) some 200 putative cognate sets, nearly all denoting so-called 'basic vocabulary,' (b) a body of regular sound correspondences in a sample of daughter languages, which has allowed a good part of the Proto TNG sound system to be reconstructed, (c) systematic form-meaning correspondences in the personal pronouns, permitting reconstruction of virtually a complete paradigm, and (d) widespread resemblances in fragments of certain other grammatical paradigms. The TNG family, as redefined, contains about 400 languages. Branches of the family occupy the central cordillera that runs the length of New Guinea as far west as the neck of the Bird's Head. They also cover large parts of the southern and, to a lesser extent, the northern lowlands of New Guinea, and have outliers in East Timor, Alor, and Pantar.

Families Confined to North New Guinea

A spectacular degree of linguistic diversity, unmatched anywhere else in the world, is found in north New Guinea between the Bird's Head in Irian Jaya and Madang Province in Papua New Guinea. No fewer than 15 different families plus several isolates are present. The putative Sepik–Ramu family is not supported by Ross's study of pronominal paradigms or by Foley's analysis of a wider range of evidence (Ross, forthcoming; Foley, in press). Foley deconstructs Sepik–Ramu into three unrelated groups: Sepik, Lower Sepik–Ramu, and Yuat. He argues that the Sepik family, containing nearly 50 languages, has its greatest diversity and therefore its original dispersal center in the reaches of the Sepik River above Ambunti. Ross (2000, forthcoming) also recognizes the Sepik and Yuat groups but divides Lower Sepik–Ramu into two possibly unrelated groups: Lower Sepik and Ramu, as well treating Taiap as an isolate. However, he accepts Foley's argument that there are fragments of morphological evidence for uniting Lower Sepik and Ramu. Ross concludes that the distribution of the Ramu and Lower Sepik languages indicates that their diversification predated the regression of the Sepik inland sea some 5000 years ago. As the silt from the Sepik delta filled up this sea Lower Sepik speakers progressively followed the river to the coast.

The Torricelli family proposed by Laycock (1975) is supported. It consists of close to 50 languages, most of which occupy a continuous area of the Torricelli and Prince Alexander Ranges between the Sepik River and the north coast. Languages of the Ndu branch of the Sepik family have expanded north from around the Chambri Lakes and driven a wedge into the Torricelli family, isolating a number of Torricelli languages to the west and south of the Murik Lakes. A small enclave of Torricelli languages also exists on the coast in western Madang Province, isolated from its relatives by a wedge of Ramu languages.

A number of smaller families, each with fewer than 20 languages, have been identified in north New Guinea. These include Skou (spoken on the north coast around the Papua New Guinea-Irian Jaya border), Kwomtari (northwest part of Sandaun [formerly West Sepik] Province), Left May (situated south of the Kwomtari group around the May River, a tributary of the Sepik), and Amto-Musian (between Kwomtari and Left May). There is some evidence for a Kwomtari-Left May group. Geelvink Bay languages are spoken on the coast of Cenderawasih (formerly Geelvink) Bay. East Bird's Head languages are spoken on the eastern side of the Bird's Head. The West

Papuan family, comprising about 24 languages, is represented on the northern part of the Bird's Head at the western end of New Guinea, on Yapen, and on the northern two thirds of Halmahera. There is slight evidence for linking West Papuan and East Bird's Head. On the central south coast of New Guinea at least two groups do not, on present evidence, belong to TNG. Ross refers to these as the South Central family and the Eastern Trans-Fly family.

Island Melanesia

Ross's pronoun study gives no support for Wurm's East Papuan phylum. Instead he finds eight distinct genetic units, including five families, which show a few noteworthy typological similarities, such as a masculine/feminine distinction in 3rd person pronouns (Ross, 2001; Terrill, 2002; Dunn *et al.,* 2002; Wurm, 1982). The Papuan languages of New Britain are divided into an East New Britain family (the Baining dialect chain, arguably more than one language, together with Taulil and Butam), a West New Britain family (Anem and Ata) and two isolates, Sulka and Kol. Another isolate, Kuot, is the only surviving Papuan language in New Ireland, although some neighboring Austronesian languages show what seems to be a Kuot-like substratum. The Papuan languages spoken in Bougainville fall into two families, North Bougainville (Kunua [Rapoisi], Kiriaka, Rotokas, and Eivo) and South Bougainville (Nasioi, Nagovisi, Motuna [Siwai], and Buin). On the basis of pronominal resemblances Ross recognizes a Central Solomons family, made up of four languages (Bilua, Baniata, Lavukaleve, Savosavo) scattered across several islands in the main Solomons group. However, there is little else to support such a grouping. In the Santa Cruz group, in the eastern Solomons, there are three languages whose status as Austronesian or Papuan has long been disputed.

Structural Characteristics of Papuan Languages

Good grammars and dictionaries exist for languages in several of the Papuan families. Some representative grammars are Farr (1999) for Trans New Guinea, Bruce (1984) for the Sepik family, Foley (1991) for the Lower Sepik family, Dol (1999) for the Bird's Head family, van Staden (2000) for the West Papuan family, Onishi (1995) for Motuna of the South Bougainville family, and Terrill (2003) for the Central Solomons family.

Because of their genetic diversity it is hard to generalize about the structure of Papuan languages. However, in New Guinea there are many diffusion areas where certain structural features as well as lexicon have spread across language family boundaries.

The phonemic inventories of Papuan languages range from among the smallest in the world (Lakes Plains of Irian Jaya and Rotokas of Bougainville each has 11 segmental phonemes) to quite large (Yela Dne of Rossel). A five vowel system /i, e, a, o, u/ is the commonest, although a number of languages have various types of six, seven, and eight vowel systems. Word-tone or pitch-accent contrasts are fairly common among Papuan languages, for example in the TNG , Lake Plains, West Papuan, Geelvink Bay, and Skou families (Donohue, 1997).

In most Papuan families the preferred order of constituents in verbal clauses is SOV. Notable exceptions are the Torricelli family, East Bird's Head, some members of the West Papuan family spoken in Halmahera, and three of the languages of the Central Solomons group, where SVO order is usual. The Halmahera and Central Solomons languages with SVO order have been strongly influenced by Austronesian neighbors.

In most Papuan families grammatical relations like subject, object, and location are signaled by adpositions or word order, or the presence on the verb of person–number affixes for subject and object. Most languages organize pronominal affixes to show a nominative–accusative (or dative) contrast. Only a few languages have a true ergative–absolutive alignment for verb pronominals. Some TNG languages optionally mark a wilful or focused agent by what is otherwise the instrument postposition.

Pronominal systems vary considerably across and even within families and there is often a discrepancy between the kinds of distinctions made in independent pronouns and in verbal affixes. TNG languages typically distinguish roots for 1st, 2nd, and 3rd person, adding number markers for plural (some languages also distinguish a dual and, less commonly, a paucal). An exclusive/inclusive contrast is absent from most Papuan families. It is restricted to groups such as West Papuan, certain Torricelli languages, and a few isolates. In at least some cases this contrast may be a feature borrowed from Austronesian neighbors.

Almost all Papuan families distinguish sharply between noun roots and verb roots. Generally a verb root cannot be used as a noun without derivational morphology and vice versa. In certain TNG languages verb roots are a small closed class, with somewhere between 60 and 150 members. The densest concentration of these languages is in the Chimbu–Wahgi and Kalam–Kobon subgroup, located in the Central

Highlands and the contiguous Schrader Ranges. Most TNG languages and some other Papuan families augment their stock of verbs by forming complex predicates consisting of a verbal adjunct or coverb plus a verb root. Verbal adjuncts are uninflected bases that occur only in partnership with a verb, often being restricted to one or a few verbs. Most TNG and Sepik and Lower Sepik–Ramu languages also make heavy use of serial verb constructions consisting of consecutive bare verb roots.

Verb morphology is typically of medium to extreme complexity. Most languages carry suffixes marking tense, aspect and mood, and person–number of subject, and some also carry prefixes marking the object. But there are exceptions: agreement affixes are lacking in Lakes Plain and Lower Ramu languages, in the TNG languages of the Timor region, and in certain Geelvink Bay languages. In TNG languages there is often a degree of fusion of the subject marking and TAM suffixes. A degree of morphological complexity is found in some languages of the Sepik–Ramu basin, such as Yimas (Foley, 1991), Alamblak (Bruce, 1984), Barupu of the Skou family, and in the Kainantu subgroup of TNG, all of which show polysynthetic characteristics.

A prominent feature of most TNG languages is the marking of 'medial' verbs for switch reference and relative tense. Whereas sentence-final verbs head the final clause in a sentence and carry suffixes marking absolute tense-aspect-mood and person–number of subject, medial verbs head nonfinal coordinate-dependent clauses and carry suffixes marking (a) whether the event denoted by the medial verb occurs prior to or simultaneous with that of the final verb, and (b) 'switch-reference,' i.e., whether that verb has the same subject or topic as the next clause.

In the Torricelli and Lower Sepik–Ramu families and in certain other small groups of north-central New Guinea, nouns carry complex inflections, marking number distinctions and noun classes. Noun class systems are an areal feature of languages belonging to diverse families in the Sepik–Ramu basin in New Guinea. The Torricelli, Sepik, and Lower Sepik–Ramu families have upwards of 10 noun classes. Most classes are assigned phonologically, according to the final segment of the stem. The isolate Burmeso, in northern Irian Jaya, has six genders and six noun classes, marked simultaneously. A few TNG languages that are neighbors of members of the Lower Sepik–Ramu group have acquired noun classes. Noun classes are also found in Bougainville and in the central Solomons. Gender classes, usually just masculine versus feminine, are distinguished in nouns in West Papuan and Skou (shown by agreement prefixes) and in the Sepik family and a small minority of Trans New Guinea languages (marked by concord suffixes). Feminine is usually the unmarked gender.

Some Trans New Guinea languages use existential verbs like 'stand,' 'sit,' 'lie,' and sometimes others like 'hang,' 'carry,' and 'come' as quasi-classifiers of nouns. Nouns select a verb according to their shape, posture, size, and composition. However, the classification is not absolute for the noun but has some flexibility relative to the situation of the referent. Papuan languages show a wide variety of numeral systems, including the 'Australian' system (1, 2, 2+ 1, 2+ 2), quaternary, quinary, vigesimal, and various kinds of body-part systems.

Explaining the Diversity and Distribution of the Papuan Languages

Why is the New Guinea area so linguistically diverse, in terms both of the number of apparently unrelated genetic stocks and the number of individual languages? One major factor is the very great time depth available for *in situ* diversification. Archaeology has shown that humans reached New Guinea and Australia (then joined as a single continent, Sahul) upwards of 40 000 years ago (Spriggs, 1997). By 40 000 to 36 000 years ago people crossed from New Guinea to New Britain, the nearest part of Island Melanesia, and from New Britain to New Ireland. By 29 000 to 28 000 years ago people had made the 180 km crossing from New Ireland to the northern end of Bougainville. The initial phase of human expansion into the southwest Pacific got no further than the main Solomons chain, which ends at Makira (San Cristobal). There is no evidence that humans settled any part of Remote Oceania, i.e., the Pacific Islands beyond the main Solomons chain, until about 3200 years ago.

A second force aiding diversification resides in social and political organization. In the New Guinea area political units were small, probably seldom larger than a collection of kinship groups or one or two villages containing a few hundred people. No unit had the political and economic power to dominate a large area. Neighboring polities were often hostile. A third factor is geographic barriers. In New Guinea, New Britain, and Bougainville, in particular, heavily forested mountain ranges and extensive swamps imposed natural limits to communication. Substantial ocean gaps between islands provided natural points of linguistic fission for people who lacked efficient ocean-going craft.

A fourth factor, which kept established language families from being overrun by invading groups, is the lengthy isolation of much of the New Guinea area itself. The evidence of archaeology and population

genetics (Friedlaender *et al.*, in press) indicates that the people of New Britain, New Ireland, and Bougainville had little contact with the rest of the world for tens of millennia following initial settlement. The same may have been true, though to a lesser extent, of populations inhabiting the interior of New Guinea. One can speculate that some of the diverse language stocks of both the New Guinea mainland and Island Melanesia continue the languages of the earliest, late Pleistocene settlers in these regions. As Australia and New Guinea were connected as recently as about 8000 years ago one might expect to find traces of old connections with Australian languages, but no solid evidence has been found (see Foley, 1986 for some speculations).

Two major expansions show up in the linguistic record for the New Guinea area. The TNG family is exceptional among Papuan families in its large membership and wide geographic spread. The great diversity among its subgroups shows that TNG is a very ancient family which, according to glottochronological estimates (admittedly not very reliable) began to diverge some 8 to 12 millennia ago. The distribution of subgroups suggests that its most likely primary center of diversification is the central highlands of Papua New Guinea. It seems unlikely that the TNG family would have achieved its present remarkable distribution unless its speakers possessed cultural advantages that enabled them to pioneer permanent settlement of the heavily forested high valleys of the central cordillera. The key advantage may have been agriculture. Archaeological work indicates the presence of full-scale agriculture near Mt. Hagen in the Upper Wahgi Valley, probably by 10 000 years ago and certainly by 7000 years ago (Denham *et al.*, 2003).

However, it is striking that speakers of TNG languages made few inroads into the Sepik provinces and the western half of Madang province and the Bird's Head. These areas are dominated by other, much smaller families. It is reasonable to suppose that at the time of the TNG expansion these regions were already inhabited by speakers of some of the non-TNG languages that are still represented there.

A second major linguistic expansion occurred in the 2nd millennium B.C. when Austronesian speakers arrived in the New Guinea area. This event shows up clearly in the archaeological record (Spriggs, 1997). There is good reason to think that 3000 years ago northern Island Melanesia contained many more Papuan languages than it does now. Whereas this region now harbors about 150 Austronesian languages (all belonging to the large Oceanic subgroup) only about 21 Papuan languages survive there. None are present in the Admiralty Islands and only one in New Ireland. Although they came to dominate the smaller islands of Melanesia, Austronesian languages had much less impact in New Guinea. There they are mainly confined to offshore islands and to certain patches along the north coast and in southeast Papua.

Table 1 Papuan families identified in **Figures 1** and **2**

1.	'extended West Papuan' (?)
	(1a) West Papuan
	(1b) East Bird's Head, Sentani
	(1c) Yawa
2.	Mairasi
3.	Geelvink Bay
4.	Lakes Plain
5.	Orya-Mawes-Tor-Kwerba
6.	Nimboran
7.	Skou
8.	Border
9.	Left May–Kwomtari
	(9a) Kwomtari
	(9b) Left May
10.	Senagi
11.	Torricelli (three separate areas)
12.	Sepik
13.	Ramu–Lower Sepik
	(13a) Lower Sepik
	(13b) Ramu
14.	Yuat
15.	Piawi
16.	South–Central Papuan
16a	Yelmek–Maklew
16b	Morehead–Upper Maro
16c	Pahoturi
17.	Eastern Trans-Fly
18.	Trans New Guinea
19.	Yela Dne–West New Britain (?)
20.	East New Britain
21.	North Bougainville
22.	South Bougainville
23.	Central Solomons

There are abundant signs that the Austronesians at first had a similar, marginal distribution in Island Melanesia. However, the eventual outcome was very different. In due course the Admiralty Islands and most of New Britain, New Ireland, Bougainville, and the Solomons became Austronesian-speaking, though not without a good deal of linguistic and cultural exchange between immigrants and aboriginal populations (Dutton and Tryon, 1994).

In much of Island Melanesia it seems that the interaction between Austronesian and Papuan speakers was of a kind that led to widespread language shift. With few exceptions the shifts appear to have been cases of communities that formerly spoke Papuan languages adopting Austronesian languages while maintaining much of their biological and social distinctiveness. As to the mechanisms of language shift, there have as yet been few studies.

See also: Austronesian Languages: Overview; Madang Languages; Papua New Guinea: Language Situation; Solomon Islands: Language Situation; Trans New Guinea Languages.

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Paradigm Function Morphology

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Paradigm function morphology (PFM) is a theory of morphology based on the assumption that the notion of paradigms is indispensable to the definition of a language's inflectional system; it is named for its use of paradigm functions (defined below) in formal models of inflectional morphology.

PFM is an inferential-realizational theory of inflection. It is inferential in the sense that it employs rules to deduce inflected word forms from more basic roots and stems; in this sense it is opposed to lexical theories of inflection, in which inflectional markings are not introduced by rules of inference, but are assumed to exist as lexical items comparable in status to the roots and stems with which they join. PFM is realizational in the sense that it deduces a word form's inflection markings from the set of morphosyntactic properties associated with that word form in the paradigm that it occupies; in this sense it is opposed to incremental theories of inflection, in which a word form is assumed to acquire is morphosyntactic properties only as an effect of acquiring the morphological exponents of those properties.

Since the inferential/lexical distinction and the realizational/incremental distinction are logically independent, theories of inflection may be of at least four imaginable types. Indeed, each of the four types has its proponents: the theory proposed by Lieber (1992) is a lexical-incremental theory; that of Steele (1995), an inferential-incremental theory; that of Halle and Marantz (1993), a lexical-realizational theory; and word-and-paradigm approaches, for example, those of Anderson (1992), Corbett and Fraser (1993), Matthews (1972), and Zwicky (1985) are of the inferential-realizational type. Stump (2001: 3) summarizes a range of evidence favoring inferential-realizational theories of inflection over theories of other sorts. First, incremental theories work best when every one of a word's morphosyntactic properties has exactly one exponent. But inflectional morphology fairly teems with instances of extended exponence (in which a single property has more than one exponent) and of underdetermination (in which a property lacks any exponent) phenomena whose incidence is both expected and easily accommodated in realizational theories. Second, lexical theories of inflection entail a fundamental difference in theoretical status between concatenative and nonconcatenative morphology; but the empirical motivation for this difference is conspicuously lacking, which is fully compatible with the assumptions of realizational theories. Third, lexical theories and incremental theories depend on the assumption that morphosyntactic properties may be associated with an inflectional affix in two different ways—as its content or as its subcategorization restriction; however, this assumption is poorly motivated, and inferential-realizational theories (in which the only association assumed to exist between inflectional markings and morphosyntactic properties is that of exponence) do without it. Finally, lexical theories of inflection assume that morphological representations generally possess the same sort of hierarchical organization as syntactic structures and that these representations condition the interface between morphology and syntax; but this assumption is poorly motivated—indeed, it engenders problematic structural mismatches at the morphology–syntax interface. Inferential-realizational theories, by contrast, assume that hierarchical structure is not invariably characteristic of morphologically complex words, and that the interface between morphology and syntax is sensitive to words' morphosyntactic content but not, in general, to their morphological structure.

In PFM, the morphology of a language is assumed to define a paradigm of grammatical words for every lexeme in that language. (It is not assumed, however, that a lexeme's paradigm is necessarily listed in its lexical entry; indeed, if a lexeme's paradigm can be deduced by rules of morphology, then the default assumption is that it is not listed.) Where L is a member of syntactic category C and σ is a complete morphosyntactic property set appropriate for members of C, the pairing $\langle L,\sigma\rangle$ is a grammatical word (or cell) in L's inflectional paradigm. In English, for instance, the lexeme OWE is a member of category V and {3rd singular present indicative} is a complete morphosyntactic property set for verbs; the pairing ⟨OWE,{3rd singular present indicative}⟩ is therefore a cell in the paradigm of OWE. Each cell is expressed as a particular phonological word, its realization; for instance, the cell ⟨OWE,{3rd singular present indicative}⟩ has *owes* as its realization. A language's paradigm function (PF) is a function from the cells in its paradigms to their realizations; thus, the English paradigm function PF applies to ⟨OWE,{3rd singular present indicative}⟩ to yield the value *owes*: PF(⟨OWE,{3rd singular present indicative}⟩) = *owes*. Thus, the definition of a language's inflectional morphology is, in PFM, equated with the definition of its paradigm function.

The definition of a language's paradigm function is stated in terms of a system of realization rules, which specify the ways in which grammatical words are phonologically realized. Some such rules are rules of exponence, which associate particular morphosyntactic properties with particular morphological markings; an example is the English rule that suffixes *-s* in the realization of third-person singular present indicative verb forms. Rules of referral (Zwicky, 1985; Stump, 1993a, 2001: Chap. 7) are another sort of realization rule: these identify regular patterns of syncretism, e.g., the fact that in Sanskrit, a neuter nominal's nominative forms are always identical to the corresponding accusative forms (whatever their morphology might be).

In languages with complex inflectional systems, more than one realization rule may apply in the realization of a given cell. In French, for instance, three distinct realization rules participate in the definition of the three-suffix sequence appearing in the conditional form *chant-er-i-ons* 'we would sing'. Realization rules that are mutually exclusive in their application because they vie for the same position in the sequence of rule applications defining a lexeme's realizations are assumed to constitute a rule block; rules that are associated with distinct positions in this sequence belong to distinct blocks. In French, for instance, the rules specifying the first-person plural exponent *-ons* and the second-person plural exponent *-ez* belong to the same block (call it block III), while those specifying the exponents *-er* and *-i* belong to other blocks (I and II). The definition of a language's paradigm function determines the order in which its rule blocks apply in the realization of a given cell; thus, the French paradigm function might be defined as a function whose value for a given cell $\langle L,\sigma\rangle$ results from the successive application of an appropriate rule from each of blocks I through III to an appropriate stem of L.

Competition among realization rules belonging to the same block is always resolved by Pàõini's principle, according to which the narrower of two competing rules wins; thus, in instances in which the default rule of *-ed* suffixation competes with the rule of *-t* suffixation in the definition of an English verb's past-tense form, the latter prevails (*lost*, **losed*) because its application is, by stipulation, limited to a restricted subclass of verbs. Anderson (1992: 128) asserts that at least some rule overrides do not follow from Pàõini's principle, but must simply be stipulated; see Stump (2001: Chap. 3) for arguments against this conclusion.)

The assumption that interactions among rule blocks are regulated by the definition of a language's paradigm function makes it possible to account for a number of phenomena arising in languages with complex systems of affix position classes; these include the phenomena of portmanteau position classes (whose member affixes straddle two or more affix positions), ambifixal position classes (in which prefixes and suffixes are paradigmatically opposed to one another), parallel position classes (whose member affixes are available to more than one affix position in a word's structure), and reversible position classes (whose ordering varies according to the morphosyntactic property set being realized). Such phenomena present a number of theoretical problems (Stump, 1992, 1993b); the ease with which these problems are resolved in PFM (Stump, 2001: Chap. 5) is one motivation for the postulation of paradigm functions.

Another such motivation relates to the phenomenon of head marking. Often in inflectional morphology, a complex lexeme inflects through the inflection of its head; in English, for example, *mother-in-law* inflects on its head, as in *mothers-in-law*. (The assumed notion of morphological head is much more restricted in PFM than in other theories: in PFM, the only words that are assumed to be headed are those that arise through the application of a category-preserving rule of word formation.) One approach to this phenomenon is to assume that certain inflectional rules are stipulated as applying to a stem's head (Hoeksema, 1984), but this approach wrongly predicts: (a) that if a given inflectional exponent ever effects head marking, then it should always do so, and it wrongly fails to predict both; (b) that if a stem exhibits head marking anywhere in its paradigm, it will do so throughout its paradigm; and (c) that the stems defined by a given rule of word-formation are always alike in either exhibiting or failing to exhibit head marking. In PFM, an alternative account of head marking is available—that of assuming that each category-preserving rule of word formation specifies whether it is permissive (i.e., allows its output to exhibit head marking) and that inflection is universally subject to the principle (1):

> (1) Head-Application Principle: If a lexeme L_2 with stem x_2 arises from a lexeme L_1 with stem x_1 through the application of a permissive rule r such that $x_2 = r(x_1)$, then for each cell $\langle L_1,\sigma\rangle$ in L_1's paradigm and its counterpart $\langle L_2,\sigma\rangle$ in L_2's paradigm, $PF(\langle L_1,\sigma\rangle) = y$ if and only if $PF(\langle L_2,\sigma\rangle) = r(y)$.

Because it correctly entails both (b) and (c) without entailing (a), this approach provides additional motivation for the postulation of paradigm functions, which are central to its formulation (Stump, 2001: Chap. 4).

A recent development in PFM (Stump, 2002) is the hypothesis that the definition of a language's morphology involves two types of paradigms—syntactic paradigms (whose cells are pairings of a lexeme with a morphosyntactic property set, e.g., ⟨GO,{past}⟩) and morphological paradigms (whose cells are pairings of a stem with a morphosyntactic property set, e.g., ⟨*go*,{past}⟩). On this hypothesis, one can assume that each cell in a syntactic paradigm is linked to a cell in a morphological paradigm and that the realization of the former is that of the latter. This assumption affords an account of deponency (instances in which $\langle L,\sigma\rangle$ is linked to $\langle x,\sigma'\rangle$, where $\sigma \neq \sigma'$), nondirectional syncretism (instances in which $\langle L,\sigma\rangle$ and $\langle L,\sigma'\rangle$ are both linked to $\langle x,\tau\rangle$, where $\tau \subseteq \sigma$, σ'), directional syncretism (instances in which $\langle L,\sigma\rangle$ and $\langle L,\sigma'\rangle$ are both linked to $\langle x,\sigma\rangle$), and heteroclisis (instances in which $\langle L,\sigma\rangle$ and $\langle L,\sigma'\rangle$ are respectively linked to $\langle x,\sigma\rangle$ and $\langle y,\sigma'\rangle$, where $x \neq y$). Other recent developments extend the theory's scope to cover a range of phenomena, including verbal clitics (A. Spencer, personal communication, 2000; Spencer and Luís, in press), word-formation (Spencer, 2003), and periphrasis (Ackerman and Stump, in press).

See also: A-Morphous Morphology; Periphrasis; Syncretism; Template Morphology; Word.

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Paradigm versus Syntagm

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These paired terms represent one of a half-dozen central sets of concepts adapted by semioticians from general linguistics. Syntagmatic relations obtain among a unit and others in the same string, for example, in English *smoke*, among the individual sounds or letters *s, m, o*, etc.; between *s* initial and the rest of the sounds; and between one or more letters (part) and the entire word (whole). Similarly, multifarious syntagmatic relations occur among the phrases, words, roots, affixes, and sounds or letters in the utterance *'Did Chanel try to transform women's fashions'?*

A recent development in PFM (Stump, 2002) is the hypothesis that the definition of a language's morphology involves two types of paradigms—syntactic paradigms (whose cells are pairings of a lexeme with a morphosyntactic property set, e.g., ⟨GO,{past}⟩) and morphological paradigms (whose cells are pairings of a stem with a morphosyntactic property set, e.g., ⟨*go*,{past}⟩). On this hypothesis, one can assume that each cell in a syntactic paradigm is linked to a cell in a morphological paradigm and that the realization of the former is that of the latter. This assumption affords an account of deponency (instances in which $\langle L,\sigma\rangle$ is linked to $\langle x,\sigma'\rangle$, where $\sigma \neq \sigma'$), nondirectional syncretism (instances in which $\langle L,\sigma\rangle$ and $\langle L,\sigma'\rangle$ are both linked to $\langle x,\tau\rangle$, where $\tau \subseteq \sigma$, σ'), directional syncretism (instances in which $\langle L,\sigma\rangle$ and $\langle L,\sigma'\rangle$ are both linked to $\langle x,\sigma\rangle$), and heteroclisis (instances in which $\langle L,\sigma\rangle$ and $\langle L,\sigma'\rangle$ are respectively linked to $\langle x,\sigma\rangle$ and $\langle y,\sigma'\rangle$, where $x \neq y$). Other recent developments extend the theory's scope to cover a range of phenomena, including verbal clitics (A. Spencer, personal communication, 2000; Spencer and Luís, in press), word-formation (Spencer, 2003), and periphrasis (Ackerman and Stump, in press).

See also: A-Morphous Morphology; Periphrasis; Syncretism; Template Morphology; Word.

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Paradigm versus Syntagm

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These paired terms represent one of a half-dozen central sets of concepts adapted by semioticians from general linguistics. Syntagmatic relations obtain among a unit and others in the same string, for example, in English *smoke*, among the individual sounds or letters *s, m, o*, etc.; between *s* initial and the rest of the sounds; and between one or more letters (part) and the entire word (whole). Similarly, multifarious syntagmatic relations occur among the phrases, words, roots, affixes, and sounds or letters in the utterance *'Did Chanel try to transform women's fashions'?*

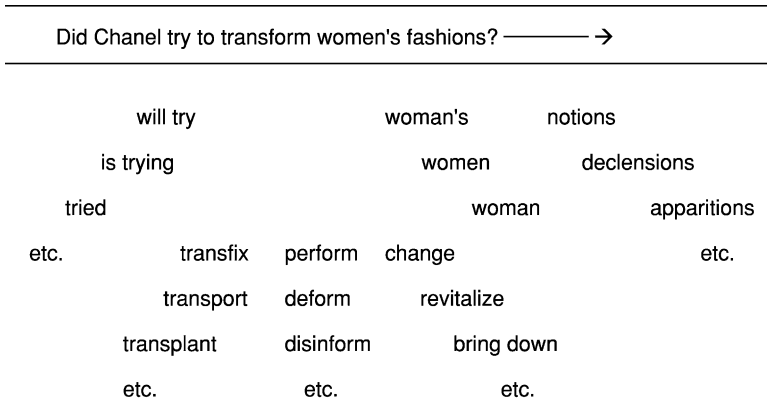

Figure 1 Sample paradigmatic relations.

Paradigmatic relations oppose a unit to others that could replace it in a given sequence, as *m* in *smoke* is opposed to *p* and *t* (cf. *spoke, stoke*). Figure 1 illustrates paradigmatic relations associated with the example sentence, to which one can add the declarative and imperative sentence types, which could replace the interrogative. Using the term 'associative' (cf. associationism in psychology) for paradigmatic, Saussure contrasts the pair: 'The syntagmatic relation is *in praesentia*. It is based on two or more terms that occur in an effective series. Against this, the associative relation unites terms *in absentia* in a potential mnemonic series' (1916: 123). Syntagmatic, 'horizontal' relations engage combination (addresser) and segmentation (addressee); paradigmatic, 'vertical' relations entail selection, substitutability, and similarity. The two axes are rigorously interdependent: to segment a syntagm into its constituents is to identify the paradigmatic classes it contains, and a linguistic category is defined by its syntagmatic and paradigmatic relations (cf. value, commutation and permutation, minimal pairs).

Compared to traditional categories such as agreement or verb paradigms, syntagmatic and paradigmatic relations represent elementary cognitive and symbolic processes found throughout the ever wider variety of languages studied, mechanisms underlying language behavior and change, which cross and straddle the boundaries of syntax and morphology, lexicology, and phonology. Defining them in purely formal terms, glossematics extends their purview to semiotics and indeed to all of science. Jakobson (1956) illustrates their fecundity, demonstrating that the two axes define parallel sets of speech disorders in psycholinguistics, as well as contrasting styles in literature, painting, and film; he defines the poetic function as the projection of paradigmatic relations onto the syntagm (1960: 71).

The twin concepts figure prominently in Barthes's semiology: in cuisine, the syntagmatic axis corresponds to the number and sequence of different courses in a meal, while the paradigmatic axis represents the choice of items within each course. Metz identifies the immediate constituents of the fictional narrative film as a paradigm of eight terms, each described by its distinctive syntagmatic organization of images, especially shots, e.g., simultaneous vs. consecutive, alternating (ABABAB . . .) vs. linear (AAAA. . .). Following Hjelmslev, Greimas defines paradigmatic vs. syntagmatic as disjunctive relations of the type 'either . . . or' vs. conjunctive relations of the type 'both . . . and,' and distinguishes separately among (a) spatio-temporal criteria such as succession, linearity, contiguity, and juxtaposition; (b) the combinatorial relations of unilateral presupposition, reciprocal presupposition, and simple co-occurrence; (c) virtual or realized semiotic existence (cf. competence and performance); and (d) language and metalanguage.

In his study arguing that science progresses more by revolution than by evolution, Kuhn uses 'paradigm' to designate the set of beliefs shared by a scientific community at a given time and 'paradigm shift' to refer to a sea change in the latter.

See also: Jakobson, Roman (1896–1982); Martinet, André (1908–1999); Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism.

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Paradoxes, Semantic

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The semantic paradoxes are a group of logico-linguistic puzzles characterized by the key roles of semantic notions such as truth, reference, or meaning in their construction. Like any paradox, their defining feature is that they force us to accept absurd consequences without employing any premise or concept that can easily be rejected. The semantic paradoxes are usually grouped together for the purpose of distinguishing them from the logical or set-theoretic paradoxes, the most famous of which are Russell's Paradox, Cantor's Paradox, and the Burali-Forti Paradox. The depth of difference between these two groups is not always clear, however, so it is unwise to attach much significance to the distinction.

The Paradoxes

The most significant of the semantic paradoxes, the Paradox of the Liar, is also the most ancient, dating at least to the 4th century B.C.E. Eubulides of Miletus is the first known writer to have formulated it as a fairly explicit logical puzzle. In a still earlier form, the Paradox (often simply called 'the Liar') consisted of an utterance attributed to the philosopher Epimenides, who was said to have framed the implicitly puzzling statement 'All Cretans are liars.' The idea was that since Epimenides himself was a Cretan, his statement, if true, would be false. An allusion to this forerunner of the puzzle even surfaced in a biblical reference from the letter to Titus, whose author seemed to take Epimenides' example rather too literally: "Even one of their own prophets has said, 'Cretans are always liars. . . .'" In any case, this version turns out not to be very obviously paradoxical, since one need not always lie in order to count as a liar. One could be a lying rascal in general who happens to be telling the truth just this once.

Avoiding some of these quibbles, Eubulides simply asked whether someone who says 'I am lying' speaks truly or falsely. This is a better paradox, though still somewhat confounded by the fact that while lying entails speaking a falsehood, the converse does not hold. If the speaker is lying, then by the meaning of 'lying' the utterance is false; but if the utterance is false, then it does not quite follow that what he says – namely, that he is lying – is true. One can speak falsely without lying. The most obviously paradoxical version of the puzzle, then, is the still simpler case 'This sentence is false.' While this may be intuitively paradoxical, we can make the problem transparent by adding explicit assumptions: Any well-formed sentence *P* in the indicative mood is true just in case P and is false otherwise; the Liar sentence is such a well-formed sentence; and the expression 'this sentence' in the Liar sentence refers to the Liar sentence itself. So assume that the Liar sentence is true. What it tells us, though, is that it is false. So if it is true, then it is both true and false. Now assume that it is false. Then, since the Liar sentence tells us that it is false, what it tells us is true; if false, it is both true and false. Whether we take the Liar to be true or false in the first instance, we are forced us to accept a contradiction. Yet by our first assumption it must be

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either true or false, so we seem committed to the contradiction. Variants of the paradox include the Strengthened Liar ('This sentence is not true'), which dispenses with the assumption that 'false' means 'not-true,' and sets of sentences as in the postcard paradox (supposing a postcard that reads on one side 'The sentence on the other side of this card is true,' and on the other side, 'The sentence on the other side of this card is false'). Various responses to the Liar are summarized later in this article.

Other well-known semantic paradoxes have more recent origins. The Grelling-Nelson Paradox (sometimes just known as Grelling's Paradox, or the Heterological Paradox) dates from a 1908 paper discussing Russell's Paradox and the Burali-Forti Paradox. Grelling and Nelson's example is based on a seemingly innocuous adjective. Adjectives, of course, are descriptive terms. Among the things they can describe are words, and among the words an adjective might describe is that adjective itself. So, for example, the adjective 'linguistic' is linguistic, just as the adjective 'short' is short and 'polysyllabic' is polysyllabic. Call adjectives that describe themselves *autological*. On the other hand, most adjectives do not describe themselves. 'Long' is not long, 'wet' is not wet, and 'plebian' is not plebian. Call adjectives that do not describe themselves *heterological*. Notice, though, that both 'autological' and 'heterological' are themselves adjectives. So are these two adjectives themselves autological or heterological? In particular, is 'heterological' heterological? In order to be heterological, the adjective must not describe itself and hence not be heterological; yet if not heterological, it is non-self-describing, and hence is heterological. It describes itself if and only if it does not.

A semantic paradox of definability is Berry's Paradox. There are two versions of it, the lesser known being the more historically accurate. In 1904 Berry wrote to Russell, suggesting a paradoxical definition: "the smallest ordinal number that cannot be defined in finitely many words." Of course, this definition defines such a number in finitely many words, yielding a contradiction. Russell later published a different paradox, which he named after Berry and which is the more familiar version: Consider the least integer not nameable in fewer than 19 syllables. We just defined (loosely, named) this integer in 18 syllables, however, so a contradiction is forthcoming: the least integer not nameable in fewer than 19 syllables is nameable in fewer than 19 syllables.

Another paradox of definability, resembling both Berry's and Cantor's paradoxes, is Richard's Paradox. Imagine a numbered infinite list of all English phrases that pick out exactly one positive real number. Now consider this definition: the positive real number having in its decimal expansion, at the nth position after the decimal, a 1 if the number defined by nth entry on the list has a 0 in its nth position after the decimal, and a 0 otherwise. This seems to define a number and hence must be an entry in the list. By hypothesis, however, any number thus identified cannot be defined by any entry on the list, since for any nth entry on the list, the Richard number differs from that entry in the nth position after the decimal. So this definition cannot be an entry in the list.

Both Berry's and Richard's paradoxes are usually diagnosed as arising from inherent imprecision in the concept of definition. Whether some definition is formulable (and in how many words or syllables) is clearly contingent upon features of the particular language in question. When a suitably precise definition is given for definability itself – explicitly relativized to a language – that is, *definable in L* – the air of paradox is dispelled.

Suggested Solutions to the Liar

An analogous explanation is typically applied to the standard example of a semantic paradox, the Liar, the literature on which is both the most extensive and the most intellectually fertile of any on the various paradoxes. The most significant and technically developed interpretation of the Liar diagnoses the problem in terms of imprecision in the semantic notions found within natural language, and particularly the notion of truth.

Alfred Tarski gave the first rigorous expression of this line of thought, arguing that a natural language like English, with its apparently univocal predicate 'is true,' is a semantically closed language. This means that when one predicates truth of a declarative sentence *S* in English, the result is another English sentence, *S is true*. And this new sentence is in turn subject to the application of the same truth predicate – and the same, *mutatis mutandis*, goes for the predicate 'is false.' Tarski argued that the contradictions arising from the Liar are an artifact of semantic closure, hence showing that natural languages cannot be understood as employing a logically coherent concept of truth. The coherent idea approximating the ordinary notion is really that of *truth in L*: truth relativized to a language, where this means a formally defined language rather than a natural language. We have to refine our use of the truth predicate by viewing it as the application of a *metalanguage* to an *object language*, in the terminology Tarski coined. Of course, since any metalanguage can in turn be characterized

by yet another language, the designations of object language and metalanguage are relative. On this view, to apply 'is true' to a sentence in a logically consistent way is to use a language of a semantic level distinct from that of the sentence to which the predicate is applied: we apply a metalanguage predicate to an object language sentence. Reading the Liar sentence as an attempt to apply the truth predicate of *L* to a sentence of *L*, we can use the Tarskian diagnosis to conclude that the Liar is simply ill formed rather than paradoxical.

Tarski's proposal and its ancillary details have been an important source of insights in logic and the philosophy of language. Notwithstanding its great influence, however, it is not generally accepted as a solution. Some writers object that natural language does not seem to contain the hierarchy of notional languages defined by Tarski. It is not clear that this complaint engages Tarski's precise view, however; he claimed, rather, that the machinery of object language and metalanguage is *imposed* on fragments of natural language for analytic purposes. Another class of objections is perhaps closer to the mark: Tarski's conclusion that the truth predicate must belong to a language 'essentially richer' than the language of which it is predicated is neither perfectly clear in its formal definition nor entirely plausible as applied to many Liar-like cases.

As Saul Kripke argued, there seem to be many cases in which linguistically internal applications of a univocal truth predicate are not ill formed. Suppose Jill's only utterance about Larry is 'Most of what Larry says about me is true.' Larry, then, might say only the following about Jill: 'Jill is a banker; Jill went to Athabasca College; everything Jill says about me is false.' In the event that Larry's first two statements are true, there is no temptation to find ill-formedness in either utterance: Jill's statement is true, and Larry's third statement is straightforwardly false. But should only one of Larry's first two statements be correct, then Jill's statement will be true just in case Larry's third statement is true. Yet this says Jill's statement is false, making Larry's third statement false as well; it is now essentially the postcard version of the paradox. Here the Tarskian analysis seems misplaced. For how could nonlogical, nonlinguistic facts like Jill's profession determine whether her statement and Larry's third should count as inherently ill formed? Kripke's solution was to reject the principle of bivalence that enables the inference from *S is not true* to *S is false*. Both truth and falsity attach to grounded statements, by which Kripke meant those whose truth conditions do not ultimately implicate truth itself. Ungrounded statements, including the Liar, are neither true nor false.

Kripke's solution, too, is not regarded as decisive. At the metalinguistic level, at least, Kripke's theory seems to inherit the *Strengthened Liar* paradox: 'This sentence is not true.' Intuitively this sentence correctly describes itself whether it is false or ungrounded, and so is true just in case it is not true. The Strengthened Liar is generally taken to be the strongest version of the paradox, the version that any successful solution must address. There is currently no consensus on how best to go about formulating such a solution. Some devotees of the puzzle continue in the Tarskian tradition, while some advocate an explanation in terms of language pragmatics or faulty presupposition; utterances of the Liar are said to amount to a sort of performative misfire on this view. Still other approaches proceed via nonstandard logics, an example of which is *dialetheism*, a kind of paraconsistency that tolerates the existence of statements that are both true and false. The Liar is suggested as an example of such a statement. As a paraconsistent approach, dialetheism rejects *ex falso quodlibet*, the classical 'explosion' principle by which the consequences of contradictions ramify without constraint. The dialetheist proposal depicts the Liar as a surprising and idiosyncratic, but logically tolerable, true-and-false statement while limiting permissible inferences from such contradictions in order to keep the idiosyncrasy localized. It is unclear what motivation can be given for this proposal, however, except for the difficulties of other attempted solutions.

See also: Logical Consequence; Metalanguage versus Object Language; Multivalued Logics; Presupposition; Semantic Value; Truth: Theories of in Philosophy.

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Paraguay: Language Situation

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Paraguay is one of the two landlocked nations in South America, the other being Bolivia. It is the only country in the Americas in which the language of the colonizers, viz. Spanish, has to share a dominant position with a language of indigenous origin, viz. Guaraní (*see* **Guarani**). According to the Paraguayan census of 1982, 40% of the population spoke only Guaraní, whereas 6.5% spoke only Spanish (cf. Melià, 1992). By contrast, in rural areas 60% spoke only Guaraní and 1.64% only Spanish. In the urban centers of the country, bilingualism was dominant (70%); these areas also held the largest number of monolingual Spanish speakers (12.67%). With 5 million speakers in Paraguay and neighboring countries (Argentina and Brazil), Guaraní is the second largest native American language used to date.

There are historical reasons for the unique position of Guaraní in Paraguay. Before the arrival of the Spaniards, the Tupí and Guaraní peoples had conquered and occupied large parts of the South American lowlands. They may have been compelled by a religious motive, the search for a 'land without evil' (*yvy marane'ỹ* [ɨˈvɨ mãɾãnẽˈʔɨ]), the Tupi-Guaraní version of paradise on earth, which incited them to frequent migrations. In 1537 the Spaniards founded a colony at Asunción (*paragua-y* [paraɣʷaˈɨ] in Guaraní). From 1610 on, the task of evangelizing the local Guaraní Indians who were not yet employed by large colonial estates (*encomiendas*) was undertaken by Jesuit missionaries, who organized them in exclusive settlements (*reducciones*) under a theocratic, missionary rule. The Jesuits tried to maintain the Indians separate from Spanish colonists but were soon confronted with devastating attacks by Brazilian slavers (*bandeirantes*), who laid waste most of the eastern and northern missions (mainly in Río Grande do Sul and Paraná). The missions situated within or near to the present-day territory of Paraguay received many refugees and succeeded in warding off further attacks. With an improved military organization, the Guaraní missions prospered until the eviction of the Jesuit Order in 1768. After the Independence, in 1811, the former mission population became the basis of the citizenry of the newly formed state of Paraguay. Although its status was unofficial at best, the Guaraní language remained in use, supported by the isolationistic policy of the first Paraguayan presidents. It became linked with the concept of Paraguayan nationhood and a distinct marker of Paraguayan identity in the often conflictive relations with neighboring peoples, especially during the Triple Alliance War against Argentina, Brazil, and Uruguay (1864–1870) and during the Chaco War with Bolivia (1932–1935). Popular literature in Paraguay is heavily impregnated with these two traumatic events. In contrast with the official predominance of Spanish, Guaraní was preferred in informal situations, within families or among friends, with special emphasis on the sphere of music and poetry. After the fall of the former dictatorial regime, a new Paraguayan Constitution (1992) granted equal rights to Guaraní and Spanish as the official languages of a bilingual nation. Since then, the Guaraní language has been gaining prestige and strength.

Guaraní literature is highly diverse. Important specimens of oral literature have been collected among Guaraní-speaking tribal groups, who have impressed researchers and visitors by their strong religious beliefs. They include the *Apopocúva* creation myths collected by Nimuendajú (1914) among one of the Nhandéva groups in southern Brazil (in Paraguay the Nhandéva are called Chiripá) and a collection of religious and ritual texts of the Paraguayan Mbyá, *Ayvu Rapyta*, recorded by Cadogan (1959). Both have provided a fruitful basis for theoretical discussion in cultural anthropology. The literature written in Paraguayan Guaraní has an entirely different character. There is a huge variety of popular songs (*purahéi*) referring to religious and romantic themes, or to the patriotic landmarks of Paraguayan history, e.g., the Chaco War with Bolivia. Poets such as Darío Gómez Serrato (1900–1985) have popularized folkloric themes of the Paraguayan rural tradition. Susy Delgado (b. 1949) writes contemporaneous poetry.

Within the margins of Paraguayan society, in the eastern part of the country, tribal groups continue to speak their own languages. Some of these groups

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Paraguay is one of the two landlocked nations in South America, the other being Bolivia. It is the only country in the Americas in which the language of the colonizers, viz. Spanish, has to share a dominant position with a language of indigenous origin, viz. Guaraní (*see* **Guarani**). According to the Paraguayan census of 1982, 40% of the population spoke only Guaraní, whereas 6.5% spoke only Spanish (cf. Melià, 1992). By contrast, in rural areas 60% spoke only Guaraní and 1.64% only Spanish. In the urban centers of the country, bilingualism was dominant (70%); these areas also held the largest number of monolingual Spanish speakers (12.67%). With 5 million speakers in Paraguay and neighboring countries (Argentina and Brazil), Guaraní is the second largest native American language used to date.

There are historical reasons for the unique position of Guaraní in Paraguay. Before the arrival of the Spaniards, the Tupí and Guaraní peoples had conquered and occupied large parts of the South American lowlands. They may have been compelled by a religious motive, the search for a 'land without evil' (*yvy marane'ỹ* [ɨˈvɨ mãɾãnẽˈʔɨ]), the Tupi-Guaraní version of paradise on earth, which incited them to frequent migrations. In 1537 the Spaniards founded a colony at Asunción (*paragua-y* [paraɣʷaˈɨ] in Guaraní). From 1610 on, the task of evangelizing the local Guaraní Indians who were not yet employed by large colonial estates (*encomiendas*) was undertaken by Jesuit missionaries, who organized them in exclusive settlements (*reducciones*) under a theocratic, missionary rule. The Jesuits tried to maintain the Indians separate from Spanish colonists but were soon confronted with devastating attacks by Brazilian slavers (*bandeirantes*), who laid waste most of the eastern and northern missions (mainly in Río Grande do Sul and Paraná). The missions situated within or near to the present-day territory of Paraguay received many refugees and succeeded in warding off further attacks. With an improved military organization, the Guaraní missions prospered until the eviction of the Jesuit Order in 1768. After the Independence, in 1811, the former mission population became the basis of the citizenry of the newly formed state of Paraguay. Although its status was unofficial at best, the Guaraní language remained in use, supported by the isolationistic policy of the first Paraguayan presidents. It became linked with the concept of Paraguayan nationhood and a distinct marker of Paraguayan identity in the often conflictive relations with neighboring peoples, especially during the Triple Alliance War against Argentina, Brazil, and Uruguay (1864–1870) and during the Chaco War with Bolivia (1932–1935). Popular literature in Paraguay is heavily impregnated with these two traumatic events. In contrast with the official predominance of Spanish, Guaraní was preferred in informal situations, within families or among friends, with special emphasis on the sphere of music and poetry. After the fall of the former dictatorial regime, a new Paraguayan Constitution (1992) granted equal rights to Guaraní and Spanish as the official languages of a bilingual nation. Since then, the Guaraní language has been gaining prestige and strength.

Guaraní literature is highly diverse. Important specimens of oral literature have been collected among Guaraní-speaking tribal groups, who have impressed researchers and visitors by their strong religious beliefs. They include the *Apopocúva* creation myths collected by Nimuendajú (1914) among one of the Nhandéva groups in southern Brazil (in Paraguay the Nhandéva are called Chiripá) and a collection of religious and ritual texts of the Paraguayan Mbyá, *Ayvu Rapyta*, recorded by Cadogan (1959). Both have provided a fruitful basis for theoretical discussion in cultural anthropology. The literature written in Paraguayan Guaraní has an entirely different character. There is a huge variety of popular songs (*purahéi*) referring to religious and romantic themes, or to the patriotic landmarks of Paraguayan history, e.g., the Chaco War with Bolivia. Poets such as Darío Gómez Serrato (1900–1985) have popularized folkloric themes of the Paraguayan rural tradition. Susy Delgado (b. 1949) writes contemporaneous poetry.

Within the margins of Paraguayan society, in the eastern part of the country, tribal groups continue to speak their own languages. Some of these groups

speak languages related to Guaraní (Aché-Guayakí) or conservative Guaraní dialects (Chiripá, Mbyá, Paĩ Tavyterã). More Tupi-Guaraní groups (Chiriguano or Guarayo, Tapieté) are found in the Gran Chaco, west of the Paraguay river. However, a majority of the tribal groups inhabiting that area speak languages unrelated to Guaraní. Closest to Asunción the distinctly Paraguayan Lengua-Mascoy language family is represented by Angaité, Guaná, Lengua (or Enxet), Sanapaná, and Toba-Mascoy. Many of them have become Guaranized and live on the eastern banks of the Paraguay river, away from their original habitat. The Matacoan language family is represented by Chorote-Manjui, Maká (Maca), and Nivaclé (also Chulupí or Ashlushlay). A group of Maká lives within the city boundaries of Asunción. The Guaicuruan family used to be well represented but has now been reduced to a small group of Toba (Toba Qom or Emok Toba). In the most remote areas of the Gran Chaco there are Ayoreo-speaking tribes of the Zamucoan language family. The Chamacoco of the same family live in a more accessible area, near the Paraguay river. Speaker numbers for all these groups are modest, and their languages may be ranked as endangered. Finally, Low German (Plautdietsch) is represented in the Mennonite settlements of the Gran Chaco.

See also: Guarani; Spanish.

Language Maps (Appendix 1): Map 68.

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Paraok *See:* Wa.

Parentheticals

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A parenthetical (P) is an expression of which it can be argued that, while in some sense 'hosted' by another expression (H), P makes no contribution to the structure of H.

So understood, the term covers a disparate and problematic range of phenomena. Espinal (1991) and Peterson (1998) offer comprehensive surveys. The problem is whether parentheticals should – and can – be treated in syntax or instead be regarded as a performance (utterance, discourse) phenomenon. The phenomenon exposes unease about whether or where to draw a competence–performance, syntax–discourse, distinction. This conceptual issue is bound up with analytical and technical issues: treating parentheticals syntactically calls for special levels of syntactic representation, special assumptions and/or categories. Reluctance to extend syntax in these ways has led many more recently to propose that the relation between P and H is not syntactic.

speak languages related to Guaraní (Aché-Guayakí) or conservative Guaraní dialects (Chiripá, Mbyá, Paĩ Tavyterã). More Tupi-Guaraní groups (Chiriguano or Guarayo, Tapieté) are found in the Gran Chaco, west of the Paraguay river. However, a majority of the tribal groups inhabiting that area speak languages unrelated to Guaraní. Closest to Asunción the distinctly Paraguayan Lengua-Mascoy language family is represented by Angaité, Guaná, Lengua (or Enxet), Sanapaná, and Toba-Mascoy. Many of them have become Guaranized and live on the eastern banks of the Paraguay river, away from their original habitat. The Matacoan language family is represented by Chorote-Manjui, Maká (Maca), and Nivaclé (also Chulupí or Ashlushlay). A group of Maká lives within the city boundaries of Asunción. The Guaicuruan family used to be well represented but has now been reduced to a small group of Toba (Toba Qom or Emok Toba). In the most remote areas of the Gran Chaco there are Ayoreo-speaking tribes of the Zamucoan language family. The Chamacoco of the same family live in a more accessible area, near the Paraguay river. Speaker numbers for all these groups are modest, and their languages may be ranked as endangered. Finally, Low German (Plautdietsch) is represented in the Mennonite settlements of the Gran Chaco.

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Parentheticals range from manifestly nonsyntactic phenomena to what are often regarded as central syntactic constructions. What all Ps have in common, observationally, is that they are marked off from their hosts by some form of punctuation in writing or special intonation contour in speech. At the clearly nonsyntactic extreme, consider the P (italicized) in (1):

(1) The main point – *why not have a seat?* – is outlined in the middle paragraph.

Here the **utterance** of P has been interpolated during the **utterance** of H. There is no syntactic – or even discourse – relation between the two. Although clearly a nonsyntactic utterance phenomenon, (1) illustrates what some would argue is true of Ps in general. And even this extreme example exposes a tension in syntactic theory. On the linear axis, P is contained by H in (1) and, as the reader may check, the position of P within H is quite severely constrained. The relevance of this is that, in syntactic theory, linear order is generally held to be a function of hierarchical syntactic structure: order is determined by, and within, constituent domains (an assumption most explicitly developed in Kayne's [1994] linear correspondence axiom). So, if one expression is contained by another expression on the linear axis, it should be contained by that expression on the hierarchical axis. In other words, it should be a syntactic constituent of that other expression. Although this consideration would never be held to apply in (1) – where the linear axis simply is wholly determined by the temporal dimension of the utterance (the performance) – it provides the rationale for some analysts' assumption that some parenthetical phenomena must fall within the domain of syntax.

Vocatives fit the above definition.

(2) If Mary had tutored him, *John*, Bill would have passed.

Notice that it does not seem appropriate to say that John is among the people **mentioned** by someone uttering (2). By contrast, the referents of genuine constituents with syntactic functions in (2) – Mary, Bill – clearly are mentioned. Furthermore, as noted by McCawley (1988: 763), the nonconstituent status of vocatives is indicated by their not participating in VP ellipsis:

(3) A: Didn't you claim, John, that Bill would pass?
B: I didn't.
= I didn't claim that Bill would pass.
≠ *I didn't claim, John, that Bill would pass.

Consider now:

(4a) Yes, I do.
(4b) No, I didn't.

With these, it is not even clear which is H and which P. *Yes* and *I do* have no syntactic function with respect to each other. They merely reformulate and thus reduplicate each other. Burton-Roberts (1975, 1999) suggested that reduplicative reformulation is characteristic of appositive parentheticals:

(5a) <u>The whole family</u> – *John, Mary, and the kids* – just disappeared.
(5b) They <u>disposed of</u> – *fired or killed* – everyone they thought obstructive.
(5c) It was <u>dawn</u>, *about quarter to six*, when they arrived.

Analyzing these Ps as reduced subordinate (relative) clauses might be thought to bring them within the syntax of (5a–c). However, that analysis is implausible here: none is appropriately introduced by 'who is' or 'which is.' Furthermore, appositive relatives arguably present us with the very problems posed by parentheticals in general (see below). Instead, appositives are generally held to be coreferential with, and have the same syntactic function as, the elements (underlined in [5a–c]) they are in apposition to. Burton-Roberts claimed that, on those terms, apposition cannot be a syntactic construction. If *the whole family* and *John, Mary, and the kids* in (5a) are each subjects, it is difficult to see how *John, Mary, and the kids* fits into the structure of (5a), given that a clause can only have one subject. The understood subjecthood of the apposed NPs cannot be captured by analyzing them as coordinated, since only noncoreferential terms can be acceptably coordinated.

Peterson (1998: 233) suggested that the phenomenon known as right node raising (RNR) – which has always defied coherent syntactic analysis – in fact consists in parenthetical (and elliptical) interpolation:

(6) Amanda is – *and Joanna used to be* – my best friend.

Since Peterson's general claim is that parentheticals fall outside the 'boundaries of syntax,' this would explain (but not solve) the analytical problems posed by the assumption that RNR is a syntactic construction. Note that the parenthetical here is not even a single complete expression. This applies to other parentheticals cited by Peterson:

(7a) It will stop raining, *I expect*, before Sunday.
(7b) The train arrived – *on time for a change*.

Haegemann (1988) contrasted the adjunct *while*-clauses in (8a–b):

(8a) John$_{(i)}$ always works better while his$_{(i)}$ / *John$_{(i)}$'s children are asleep.
(8b) John$_{(i)}$ studies mathematics, while his$_{(i)}$/John$_{(i)}$'s wife studies physics.

Referential terms such as *John* cannot be bound by (and hence co-indexed with) a c-commanding NP in an argument position. The *while*-clause in (8a) is clearly subordinate to (a constituent of) the first, so it is predictable that *his* cannot be replaced by *John's*. In (8b), by contrast, this is possible. Haegemann argued that the *while*-clause in (8b) is parenthetical and as such not a syntactic constituent of its host. This is borne out by negative polarity data, assuming that negative polarity items such as *any* and *at all* must be c-commanded by negation:

(9a) John doesn't work while (any of) his children are (at all) noisy.
(9b) John doesn't work, while (*any of) his children are very(/*at all) busy.

Again, the impossibility of negative polarity items in the parenthetical *while*-clause in (9b) suggests that it is not syntactically contained by the other clause of (9b).

The parentheticals that have received most attention are appositive relative clauses (e.g., Emonds, 1979; McCawley, 1982; Safir, 1986; Fabb, 1990; Espinal, 1991; Burton-Roberts, 1998) and the above two arguments also apply to them, in contrast to restrictive relative clauses:

(10a) John$_{(i)}$ gets on best with private firms who employ him$_{(i)}$/*John$_{(i)}$ often.
(10b) John$_{(i)}$ gets on best with private firms, who employ him$_{(i)}$/John$_{(i)}$ often.

(11a) None of the authors who had any imagination remained.
(11b) None of the authors, who had (*any) imagination, remained.

Similarly, pronouns in restrictive – but not appositive – relative clauses can be bound by c-commanding quantifiers in main clauses:

(12a) She gave every boy$_{(i)}$ who cleaned his$_{(i)}$ teeth well a new toothbrush.
(12b) *She gave every boy$_{(i)}$, who cleaned his$_{(i)}$ teeth well, a new toothbrush.

Again, the contrast in (12) suggests that the appositive clause lies outside the syntactic domain of the clause containing the quantifier.

Note also the following contrast in the acceptability of *therefore* in (13):

(13a) John works best for private firms who (*therefore) employ him often.
(13b) John works best for private firms, who therefore employ him often.

Therefore establishes a discourse connection between independent clauses (Blakemore, 1987) and thus cannot be used to connect two clauses one of which is a constituent of the other, as in (13a). Again, its acceptability in (13b) suggests that the appositive relative is independent (not a constituent) of its 'host' clause.

In addition, Fabb (1990: 71) noted that constituents of fixed phrases such as *make headway* can be distributed on either side of the boundary of a restrictive relative clause but not of an appositive clause:

(14a) The headway the students made last week was phenomenal.
(14b) *The headway, which the students made last week, was phenomenal.

Similarly with idioms:

(15a) The cat that John let out of the bag today concerned your future.
(15b) *The cat, which John let out of the bag today, concerned your future.

The explanation seems to be that the integrity of fixed phrases and idioms is maintained only if their constituents 'co-occur'. This integrity is destroyed in (14b) and (15b), suggesting that – syntactically – they do not co-occur in those examples.

Furthermore, the relative pronoun can take the form of a null operator in a restrictive relative but not in an appositive:

(16a) The car I was saving up for has been sold to someone else.
(16b) *The car, I was saving up for, has been sold to someone else.

If null operators must be 'strongly bound' by a c-commanding antecedent (Chomsky, 1986: 84) then, as Fabb (1990: 72) noted, the unacceptability of (16b) again suggests that its appositive clause is an independent clause, not c-commanded by *the car*.

The many further differences between restrictive and appositive relative clauses – including the fact that the (subordinating) complementizer *that* can introduce restrictives but not appositives – have been attributed to the parenthetical (and hence independent) character of the latter.

Several analysts have attempted to account for the relation between the parenthetical appositive clause and its host in syntactic terms, but (as mentioned) all such analyses involve special assumptions. In their different ways, they all constitute attempts to resolve the conflict between linearity and hierarchy mentioned at the outset, i.e., to reconcile the fact that the appositive is contained by the host on the linear axis with the fact that it is not contained by the host on the hierarchical axis. Notable is Emonds (1979), which treated both H and P as constituents of a special higher expression, E, thereby treating the parenthetical appositive as a syntactic constituent,

but not of the host clause itself. Safir (1986) proposed that the relation between host clause and appositive should be – and can only be – captured at a special level of logical form ('LF-prime'). McCawley (1982) resolved the conflict between linearity and hierarchy by allowing for movement rules that do not alter constituency. Hierarchically, the appositive and its host are, independently of each other, dominated by a root S, and the appositive remains dominated by that root S even when moved to a linear position within the host. The host clause is thereby made discontinuous. The movement results in a tree with crossing branches; this is generally looked on with suspicion, see, e.g., Espinal (1991). Espinal's own proposal involved an "innovation in phrase structure theory," whereby a structure can be a 'constituent' of another without being dominated by any node in the latter. However, it is not clear that this innovation is necessary if, as Espinal suggested, the relevant phenomena (which she describes as "disjunct constituents") are "best analysed at a post-syntactic level of representation," and interpreted only "at the moment of utterance processing."

Whatever the syntactic status of parentheticals, appeal to semantics and/or pragmatics might help to explain their special features. Arnold (2004) suggested that, while appositive relatives are syntactically subordinate, they are independent semantically (and pragmatically?). See also Blakemore (to appear), Potts (2002) on *as*-parentheticals and, more generally, Potts (2005) for an account of parentheticals in terms of conventional implicature.

See also: Constituent Structure; Topic and Comment; X-Bar Theory.

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Paris School Semiotics

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The label 'Paris School Semiotics' (École de Paris), which appeared at the end of the seventies, identifies a specific group of semioticians whose works reflect the theoretical foundations developed by Algirdas Julien Greimas between 1956 and 1992. The publication in 1979 of *Sémiotique: Dictionnaire raisonné de la théorie du langage* [*Semiotics and language: an analytical dictionary.* (1982)] provided these researchers with their main source of references and theoretical concepts. Those concepts would be constantly reviewed and elaborated upon in the years to follow, and the outcome of this collective endeavor was publicized as articles in *Actes Sémiotiques*, the official publication of the group. The *Actes*, which

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The label 'Paris School Semiotics' (École de Paris), which appeared at the end of the seventies, identifies a specific group of semioticians whose works reflect the theoretical foundations developed by Algirdas Julien Greimas between 1956 and 1992. The publication in 1979 of *Sémiotique: Dictionnaire raisonné de la théorie du langage* [*Semiotics and language: an analytical dictionary.* (1982)] provided these researchers with their main source of references and theoretical concepts. Those concepts would be constantly reviewed and elaborated upon in the years to follow, and the outcome of this collective endeavor was publicized as articles in *Actes Sémiotiques*, the official publication of the group. The *Actes*, which

were edited by Eric Landowski, appeared regularly from 1979 to 1987. A second volume of the Dictionary was published in 1986. However, the first volume (1979), which contains Greimas's basic semiotic theory, remained the central reference for all the group's future work and research.

As Herman Parret put it in his 'Introduction' to *Paris School semiotics* (1989), edited by P. Perron and F. Collins, "the publication of Greimas's Sémantique structurale in 1966 cannot be considered to be a 'revolution'" (p. ix). Indeed, it must be understood in the intellectual context of the structuralist movement. Greimas read Saussure and borrowed from Hjelmslev and the Danish School of Glossomatics. He was influenced by the work undertaken in linguistics by Roman Jakobson, in anthropology by Claude Lévi-Strauss, in philosophy by Maurice Merleau-Ponty, in formal logic by Robert Blanché, in folklore and narratology by Vladimir Propp. In this context Greimas conceived semiotics as having to be established on a scientific or at least a systematic basis.

In *L'actualité du saussurisme* (1956) Greimas saw lexicology as the discipline that could provide the humanities and social sciences with 'scientific' procedures and theoretical models. In 1966 *(Sémantique structurale)* semantics replaced lexicology as the exemplar discipline and in 1970 *(Du sens)* semantics was replaced by semiotics. Lexicology, semantics, and semiotics are three fields having signification or meaning as their focus of study. They are linked to each other through relationships of increasing complexity: one encompasses the other. Lexicology is a taxonomy of words. Semantics has a larger field of inquiry. On one hand it leads toward the analysis of logical systems as exemplified by Jakobson's phonological model, and on the other it refers to the notion of discourse. It is indeed important to stress the distinction between Zellig S. Harris's *Discourse analysis* (1952) and the Paris School's perception of discourse. While Harris places the emphasis on the interphrastic level of discourse, which is syntactic, Greimas stresses the transphrastic, which is semantic in nature. According to Greimas, discourse is fundamentally associated with meaning. Any discourse refers to a semantic universe that hypothetically encompasses all possible significations, although only a small number of them can or would be actualized. However, it should be stressed that the semantic universe of a specific language also carries the cultural values of the community speaking that language. Whereas semantics can account for the description of how the signified is articulated in its various forms, it remains unable to offer an exhaustive description of these forms, since this would entail an in-depth understanding of axiologies, ideologies, and meaningful social practices. Such an inquiry requires the use of a more powerful theory: semiotics. The purpose of semiotics therefore is to forge the tools necessary to describe the verbal as nonverbal languages that articulate the semantic micro-universes under scrutiny. It includes a hierarchy of metalanguages: a descriptive level where the language analyzed is elucidated through its contact with the semiotic theory; a methodological level upon which the instruments of analysis are elaborated (concepts, procedures, and models); finally, an epistemological level where the coherence and homogeneity of the analytical tools are validated. The core of *Semiotics and language* deals with the second level of the hierarchy. Here a semiotic system is elaborated, conceived as a rigorous methodological language endowed with its own rules and definitions.

This system relies primarily on the principle of narrativity already found in the elementary structures of signification. It is by means of conversion (Hjelmslev) and transformation that basic units of meaning are developed into more complex semantic components. In an interview with Herman Parret (1974), Greimas states "there exists a deep level of discourse organization and that is narrativity" (*Discussing language*, p. 62). It must be stressed that narrativity becomes ultimately the organizing principle of all types of discourse, verbal as well as nonverbal. Greimas views the concept of narrativity as the transformation of the semio-narrative structures, deployed at the most abstract level of discourse operation, into figurative discourses. The elementary structure of signification as represented by the semiotic square (where basic units of meaning are reciprocally defined according to relations of opposition and negation) does not fall under formal logic, although the operations displayed in the deep semantic structure can be described as logical in nature. Instead, it involves imaginary representations specific to a semantic micro-universe, whether individual (i.e., life/death) or collective (i.e., nature/culture). The central operation of Greimas's semiotics lies in the description of signification as a process of conversion from the deep structure to the surface syntax. At this point procedures of conversion from one level to another have to be elaborated: relations are replaced at the surface level by utterances describing a state and operations by utterances of doing; in addition, a narrative structure in which an utterance describing a state is governed by an utterance of doing is defined as a narrative program (NP). Greimas adds, "because of their anthropomorphic nature, the constitutive elements of such a surface grammar can be distinguished from the logical nature of the categories of the deep grammar" (*On meaning* [1987] 70).

Hence, the actantial structure will be introduced to account for the organization of the human imaginary, which is just as much a projection of collective as of individual universes.

In his account of the Russian folktale, Vladimir Propp had identified 31 functions falling into 7 spheres of activities: those of the hero, the false hero, the antagonist, the donor, the helper, the dispatcher, and the princess (sought-for person). In his analysis of Propp's work and Souriau's theory of drama Greimas reformulates the notions of functions and dramatis personae and proposes a more compact and powerful structure, the actantial model. The concept of actant is borrowed from the French linguist Lucien Tesnière's *Éléments de syntaxe structurale* (1959). It refers to beings or things that participate in processes according to specific areas of competence. There were initially three pairs of actants in Greimas's actantial model: Subject-Object, Sender-Receiver, and Helper-Opponent. In a later version of his theory, Greimas retains only two pairs, Subject-Object and Sender-Receiver, which he believes to be fundamental and from which other categories may be derived.

Greimas notes, after Lévi-Strauss, that the syntagmatic process of the narrative as it is described by Propp, includes various pairs of functions (leaving/returning, establishing a constraint/defying a constraint or interdict). Those paradigmatic components act as organizing principles, bringing order and coherence into the narrative. They are completed by syntagmatic features that provide the narrative with its dynamic dimension and a sense of direction. These features are ordered in a series of three stages called narrative units: the contract stage where an agreement is established and a task assigned to the Subject by the Sender; the action stage where competence is acquired to carry out performance; and the evaluation stage where the Sender will reward or punish the Subject. These three stages, or narrative units (qualifications of the Subject, completion of a task through means he has acquired, and sanction or recognition according to the Subject's success or failure), constitute what the *Dictionary* calls the narrative schema.

The next step includes the setting up of a narrative grammar and a syntax of narrative programs (NP) in which syntactic subjects are connected with, or parted from, objects of value such as love, wealth, power, freedom. The confrontation of subjects coveting the same objects of value, as they are interacting in such narrative programs, assumes the shape of a polemico-contractual relation, either of trust (exchange, transaction) or conflict (competition, combat). The circulation of objects of values among subjects who are enlisted in narrative programs relies on the modal competence of these subjects, as it is defined through a series of modalizations: virtualizing modalizations that account for wanting but having to virtualize the process; actualizing modalizations for being able and knowing how to actualize it. In his 'Introduction' to *Paris School semiotics* Herman Parret stresses that "the way in which 'modal semiotics' leads logically toward a 'theory of passions' should be evident – passions within subjects are modal concatenations that modify their cognitive and 'pragmatic' performances" (1989, xiii). For his part, Paul Perron affirms that "Greimassian semiotics evolves from a semiotics of actions to a semiotics of cognition and passions and the challenge ahead lies in working out adequate and necessary descriptive procedures not only of the modal but also of the aspectual features of discourse" (Perron, 1993, 347).

Although A. J. Greimas remained an omnipresent figure of authority within the Paris School Semiotics as its foremost theoretician and practitioner (ethnosemiotics, semiotics of literary discourse and scientific discourse), other semioticians interacted within the School and contributed to its enrichment. The following is a list of the main researchers and disciplines: semiotics of literary discourse (M. Arrivé, D. Bertrand, J.-C. Coquet, P. Perron, H.-G. Ruprecht, T. Yücel), semiotics of scientific discourse (F. Bastide, P. Fabbri, E. Landowski, G. Vignaux), semiotics of religious discourse (M. de Certeau, J. Delorme, L. Marin, D. Patte), semiotics of music (P. A. Brandt, E. Tarasti, C. Zilberberg), ethno-semiotics (C. Calame, J. Courtés, D. Bertrand, J. Geninasca), socio-semiotics (C. Chabrol, P. Fabbri, E. Landowski), psychosemiotics (A. Cohen, I. Darrault). Other valuable contributions that address significant aspects of the semiotic theory are found in the works of major scholars associated with the Paris School, such as the mathematician Jean Petitot (*Morphogenèse du sens*, 1985; *Les catastrophes de la parole,* 1985; *Physique du sens*, 1992) and the semanticist François Rastier (*Sémantique interprétative*, 1987; *Sémantique et recherches cognitives*, 1991; *Sémantique pour l'analyse*, 1994).

See also: Actantial Theory; Conversion; Discourse Semantics; Greimas, Algirdas J.: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Jakobson, Roman (1896–1982); Jakobson, Roman: Theory of the Sign; Levi-Strauss, Claude (b. 1908); Meaning, Sense, and Reference; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Narrativity and Voice; Propp, Vladimir Iakovlevich (1895–1970); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Saussurean Tradition in 20th-Century Linguistics; Semiology versus Semiotics; Semiotics: History; Structuralism.

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Parkinson's Disease and Language

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Introduction to Parkinson's Disease

Parkinson's disease (PD) is a neurodegenerative disorder that afflicts primarily persons older than 50 years of age. Among Western populations, it affects about 2% of those 65 years of age and older. It is important to note that PD is not the same as parkinsonism. Parkinsonism refers to a constellation of four signs (gait instability, rigidity or stiffness, tremor, and bradykinesia, or a slowing of movement) that are observable in numerous conditions. In contrast, PD is a specific disease and is the most common of the parkinsonian syndromes, accounting for about 75% of cases. In PD there is a progressive and marked loss of cells in the substantia nigra that project to deep brain structures called the caudate nucleus and the putamen (which is disproportionately affected early in the disease), collectively referred to as the striatum. Because these cells are the principal source of the neurotransmitter dopamine, treatment early on is by drugs that either mimic the action of dopamine (dopamine agonists) or provide the chemical building block that is converted into dopamine in the brain by enzymes (levodopa).

The proportion of persons having alterations in mental/cognitive functions early in the disease remains debated, but a recent epidemiological study found that almost 40% of persons with PD already have cognitive alterations detectable on formal neuropsychological evaluation at the time of disease diagnosis. Of course, these cognitive changes are most often subtle and detectable only on careful testing; clinically meaningful cognitive alterations probably occur in a small minority of patients this early in the disease course. Early on in PD, the cognitive alterations typically involve executive functions and

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working memory and are most readily observed on tasks that require the person to spontaneously develop and deploy efficient information processing, encoding, and retrieval strategies. It is thought that the nigrostriatal, and possibly mesocortical, dopaminergic reductions underlie these early cognitive alterations. With disease progression, multiple neurotransmitter systems become compromised, and it is likely that this multiplicity of changes, along with both cortical and subcortical pathology, underlies the more severe cognitive changes, or dementia, estimated to occur in 20–40% of patients. The dementia of PD has been referred to as a 'subcortical dementia,' given its core features of slowed thinking (bradyphrenia), impaired recall, executive dysfunction, apathy, and depression. Although the concept of 'subcortical dementia' is subject to criticism because neurodegenerative dementias eventually fail to respect anatomical boundaries, and because dementia in PD may be manifestations of different neuropathological entities, the term remains a clinically useful shorthand. For the aphasiologist and linguist, this distinction is of particular relevance because subcortical dementias, in contrast to cortical dementias such as Alzheimer disease, are not associated with frank aphasia.

Language in Parkinson's Disease

Motor speech abnormalities are often evident in mid- to late PD. The disease can affect each of the speech production systems, including respiration, phonation, articulation, resonance, and prosody. Features of the parkinsonian hypokinetic dysarthria are variable but include one or more of imprecise articulation of consonants, variable (including too fast and too slow) rate of speech, short bursts of speech, breathy or harsh voice, and reduced or monotonous loudness and pitch. Speech intelligibility can also be diminished by excessive salivation and swallowing difficulties.

In contrast to motor speech abnormalities, frank aphasia is very rare in PD. Though certain aspects of language are compromised in PD patients with dementia, the subtle alterations in performance on language and communication tasks observed in patients without dementia are often attributed to diminished attention and working memory, or inefficient information processing strategy development and deployment. The language task on which PD patients' performance has been studied most frequently is verbal fluency. Far fewer studies have addressed naming to confrontation, repetition, and the production and comprehension of complex syntax.

Verbal fluency tasks require persons to orally generate (or sometimes write) as many words as possible within a time limit. The task is constrained in one of several ways; for example, requiring that words begin with a specific letter of the alphabet, or belong to a semantic category, such as animals. Patients with PD and dementia, not surprisingly, perform more poorly on these tasks than do patients without dementia. Indeed, PD patients without dementia may demonstrate intact performance. When patients without dementia do perform below expected levels, there is a tendency for them to perform more poorly on letter category fluency tasks than on semantic category fluency tasks. The reason for this is debated but may reflect the specific letters and categories (some inherently more difficult than others) chosen for the task. Alternatively, poorer performance on letter than on semantic category tasks may be a manifestation of the retrieval deficits of PD because letter fluency tasks place greater demands on systematic word search and retrieval strategies than do semantic category fluency tasks. Several studies have attempted to identify the cognitive mechanisms underlying fluency deficits in PD. Presumably an efficient strategy on verbal fluency tasks involves the retrieval of highly related words from a subcategory (e.g., domestic animals) and then switching to a new subcategory (e.g., wild animals), rather than attempting to retrieve low-frequency and more tenuously related exemplars from the same subcategory. Researchers have quantified these two related processes of clustering (retrieving consecutive words that are semantically or phonemically related) and switching (shifting between subcategories). Given the role of the frontal lobes and basal ganglia in cognitive efficiency, and the pathology of frontal-subcortical circuits in PD, it is not astonishing that clustering (related primarily to integrity of semantic networks and the temporal lobes) tends to be relatively preserved, whereas switching (related to cognitive flexibility) is relatively diminished in PD. What remains less clear is whether diminished switching is a consequence or cause of reduced verbal fluency output.

Two other types of verbal fluency tasks may be especially sensitive to PD: alternating word fluency (requiring retrieval of consecutive words from alternate semantic or letter categories) and verb fluency tasks requiring naming of actions. Alternating fluency may be especially sensitive to PD because the task places a premium on working memory, a memory system that has limited capacity, is of limited duration, requires executive functions, and is compromised early in PD. Verb fluency may lend its sensitivity to the observation that retrieval of verbs is probably relatively more reliant on the frontal lobes, whereas noun retrieval depends especially on the temporal lobes.

Performance on visual confrontation naming tasks, requiring naming of pictured or actual objects, is preserved in PD without dementia, but a few studies report subtle naming impairments in early PD. Patients with obvious cognitive impairment, in contrast, do show naming impairments. However, in comparison to Alzheimer disease, a prototypical cortical dementia, the naming impairment is less severe and emerges later in PD. A few studies have characterized the types of naming errors made by patients with PD. One study comparing groups of patients with Alzheimer disease and PD with dementia equated for overall severity of cognitive impairment found that the Alzheimer disease patients made more phonemic errors (mispronunciations or distortions sharing at least one syllable with the target word) and 'don't know' responses. Both patient groups made more semantic errors than the control group, but unlike the Alzheimer and normal control groups, the PD with dementia group's semantic errors were largely associative (meaning the provided word described an action, function, or physical attribute of the target, a contextual associate, or a subordinate or proper noun example of the target).

These findings indicate that in patients with PD and dementia, category knowledge is available but insufficient to generate item names. That such subtle category knowledge deficits might be evident already in PD without dementia was indicated by the finding that the proportion of associative semantic errors in PD is intermediate to that of normal elderly and PD patients with dementia. The proclivity of PD patients to make associative errors differentiates them from normal elderly, whose limited errors tend to be within category errors, meaning the response is from the same semantic category as the target but visually dissimilar (e.g., misnaming 'asparagus' as 'cauliflower').

Other subtle linguistic impairments observed in PD include those in syntactic comprehension and production. The mechanisms underlying the subtle sentence comprehension deficits in PD remain controversial, but proposed ones include grammatical processing deficits, slowed information processing, and diminished attention or working memory. Some have observed the spontaneous speech output of mild PD patients to be syntactically simplified and characterized by a smaller proportion of grammatical sentences. When provided with cards with words and asked to construct a meaningful sentence, patients with PD tend to make 'capture' errors, linking two highly related words, although such a construction precludes a meaningful sentence (e.g., 'the hair brush long clogged' instead of 'long hair clogged the brush').

A few studies have examined PD patients' comprehension of complex sentences by varying the nature and location of a clause embedded in the sentences. Sentences containing a subject-relative, center-embedded clause ('the man who called the sheriff is responsible') are easier to understand than those containing object-relative, center-embedded clauses ('the man who the sheriff called is responsible'). About 45–65% of PD patients without dementia demonstrate difficulty comprehending the noncanonical, object-centered, clause-containing sentences, but the cognitive mechanisms underlying these comprehension difficulties are a matter of speculation. Preliminary functional neuroimaging data implicate attentional and information processing resource limitations in PD sentence comprehension deficits. Activations of the left anteromedial prefrontal cortex, striatum, and right posterior–lateral temporal cortex were reduced during sentence processing in patients with PD, and striatal and anteromedial activations have respectively been associated with information processing speed and attention.

There may also be mild phonetic impairment in early PD. For example, patients may have trouble detecting phonetic errors in words, regardless of the clausal structure of sentences. In addition, errors in the temporal organization and coordination of American Sign Language used by persons with PD have also been interpreted as reflecting a phonetic deficit.

Pragmatics (the study of discourse within social context) has rarely been studied in PD. However, persons with PD relative to healthy elderly individuals may show poorer conversational appropriateness, turn taking, prosody, and proxemics (the perception and use of personal space). Though the pragmatics rating score of PD patients has been related to performance on tests of 'frontal lobe function' such as the Stroop and Tower of London tasks, it is unknown to what extent motor, speech, motivational, and emotional factors (such as apathy and depression) might underlie diminished pragmatic communication skills. Whether patients with PD generally develop pragmatic compensatory strategies, as has been observed among three deaf and mute patients with PD using sign language, is still to be determined.

Effect of Neurosurgical Treatments on Language

Surgical treatments of PD, similar to drug treatments, are symptomatic rather than curative. Early ablative interventions were associated with considerable cognitive morbidity, but more recent unilateral ablative interventions, regardless of whether they are targeting the thalamus, subthalamic nucleus (STN), or globus pallidus (GPi), appear considerably

safer. The most common compromise after modern unilateral pallidotomy occurs in verbal fluency.

Deep brain stimulation (DBS) involves unilateral or bilateral implantation of electrodes and the application of high-frequency electrical stimulation from an implanted pulse generator to thalamus, GPi, or STN. Unilateral and bilateral thalamic and GPi DBS are cognitively safe, although declines in verbal fluency are possible. As in pallidotomy and GPi DBS, verbal fluency decrements appear to be the most commonly reported changes after STN DBS. Although motor speech changes may contribute to altered fluency, it appears that switching among categories rather than clustering is altered, indicating a possible executive cognitive basis for the deficit.

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Parliamentary Discourses

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Introduction

In many countries, parliamentary proceedings are broadcast nowadays on radio and television, as well as reported in the press and in specialized publications. However, in spite of the growing visibility of parliamentary institutions, the scholarly interest for the study of parliamentary discourse has been rather low until recently. There is one notable exception, though: one parliament that has drawn considerable attention and continues to be much explored is the U.K. Parliament. This interest may be accounted for by its being probably the oldest institution of its kind that has also managed to maintain a great deal of its institutional and discursive rituals. This retention is also the reason why this brief survey of parliamentary discourse is concerned to a large extent with the characteristic features and functions of British parliamentary discourse.

Ever since the latter half of the 20th century, parliamentary discourse and parliamentary rhetoric have gradually become the object of scholarly research in the fields of political sciences and sociology (Silk and Walters, 1987; Morgan and Tame, 1996; Olson and Norton, 1996; Copeland and Patterson, 1997), but only very recently have they become a truly interdisciplinary concern through the involvement of linguistic scholarship (Carbó, 1992; Slembrouck, 1992; Biryukov *et al.*, 1995; Ilie, 2000, 2001, 2003a, 2003b, 2003c, 2003d, 2004; 2005, ter Wal, 2000a; Van der Valk 2000a, 2000b; Van Dijk, 2000, 2004; Wodak and Van Dijk, 2000; Pérez de Ayala,

safer. The most common compromise after modern unilateral pallidotomy occurs in verbal fluency.

Deep brain stimulation (DBS) involves unilateral or bilateral implantation of electrodes and the application of high-frequency electrical stimulation from an implanted pulse generator to thalamus, GPi, or STN. Unilateral and bilateral thalamic and GPi DBS are cognitively safe, although declines in verbal fluency are possible. As in pallidotomy and GPi DBS, verbal fluency decrements appear to be the most commonly reported changes after STN DBS. Although motor speech changes may contribute to altered fluency, it appears that switching among categories rather than clustering is altered, indicating a possible executive cognitive basis for the deficit.

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Parliamentary Discourses

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Introduction

In many countries, parliamentary proceedings are broadcast nowadays on radio and television, as well as reported in the press and in specialized publications. However, in spite of the growing visibility of parliamentary institutions, the scholarly interest for the study of parliamentary discourse has been rather low until recently. There is one notable exception, though: one parliament that has drawn considerable attention and continues to be much explored is the U.K. Parliament. This interest may be accounted for by its being probably the oldest institution of its kind that has also managed to maintain a great deal of its institutional and discursive rituals. This retention is also the reason why this brief survey of parliamentary discourse is concerned to a large extent with the characteristic features and functions of British parliamentary discourse.

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2001; Wilson and Stapleton, 2003; Bayley, 2004). Whereas the research rooted in social and political sciences focuses primarily on the explanation of facts and interpretation of issues, political events, and socio-political processes, linguistic research has benefited from the cross-fertilization with the above-mentioned disciplines in its exploration of the shifting and multi-leveled institutionalized use of language, the communicative interaction of institutional agents, the interplay between parliamentary dialogue and the thinking processes of its participants, the interdependence between language-shaped facts and reality-prompted language ritualization and change.

Parliamentary Systems

It may be useful to recall that the word 'parliament' is derived from the the Old French *parlement*, originally from *parler*, i.e., to speak. By metonymic transfer, the term has come to refer to an institution specialized in a particular kind of talk, and even to the building that hosts such an institution. Nowadays the term 'parliament' is used as the generic term for 'a legislative assembly' in certain countries, i.e., a governmental deliberative body made up of representatives of a nation or people with the authority to adopt laws. There are legislative assemblies known by other names, such as 'congress,' 'diet,' and 'national assembly.'

Most legislatures are either unicameral or bicameral. A unicameral legislature is the simplest kind of law-making body and has only one house. A bicameral legislature has two separate chambers, an upper and a lower house. In most parliamentary systems, the lower house is more powerful, while the upper house is merely a chamber of advice or review. In presidential systems, however, the powers of the two houses are often similar or equal. In federations, it is typical for the upper house to represent the component states.

Parliamentarism is often praised, as compared to presidentialism, for its flexibility and responsiveness to the public. It is criticized, though, for its tendency to sometimes lead to unstable governments, as in the German Weimar Republic, the French Fourth Republic, Italy, and Israel. Parliamentarism became increasingly prevalent in Europe in the years after World War I, partly imposed by the democratic victors, France and England, on the defeated countries and their successors, notably Germany's Weimar Republic and the new Austrian Republic. Several nations that are considered parliamentary actually have presidents who are elected separately from the legislature and who have certain real powers. Examples of this type of governance are Ireland and Austria.

For historical and political reasons, the most geographically widespread parliamentary system is the 'Westminster system,' named after Westminster Palace, the meeting place of Britain's parliament. The Westminster system is used in Britain and in many nations of the Commonwealth countries, such as Canada, Australia, Malaysia, Singapore, Jamaica, New Zealand, and India, and in non-Commonwealth states like Ireland. There are parliamentary governments, such as Germany and Italy, whose legislative procedures differ considerably from the Westminster system.

One major difference between the Westminster system and the types of parliamentarism used in the rest of Europe and in non-Commonwealth monarchies outside of Europe is the voting system. Most Westminster systems use a kind of voting system, as mentioned above, known as 'first past the post.' In this system, each district elects one representative and that representative can be elected with a plurality. All the other European parliamentary systems use some kind of proportional representation, usually the list system. First past the post favors a two-party system, whereas proportional representation favors a multiparty system.

The Westminster Parliamentary System

The first English Parliament was formed during the reign of King Henry III in the 13th century. The emergence of Parliament in England during the Middle Ages was not an isolated phenomenon. Throughout Europe from the 12th to the 14th centuries, similar bodies were regularly summoned in other communities too, as the notion of a community of each realm began to replace the feudal ties that bound individuals only to their lord.

In the Middle Ages, especially from the 13th century on, Parliament used to be called together by the king as a reaction to pending problems. The Tudor, and especially the Elizabethan, parliamentary standardization started with a formal record of the Commons' proceedings in the Journal, which was kept from 1547, and with a group of manuals of parliamentary procedure and privileges.

By the end of the 18th century, the publication of parliamentary debates and regular press reporting became common practice. As a result, parliamentarians were becoming more aware of the changing status and responsibility of parliamentary discourse and the necessity of shaping extraparliamentary opinion.

In the 19th century, when the British Parliament resembled a 'London club,' the members' capacity to scrutinize and influence the government in office was relatively limited. It was in the latter half of the 20th

century that Parliament witnessed some of the major changes in modern times and acquired a more central role in the policy-making process.

Parliamentary Norms and Reports

Information technology provides nowadays easy access to national parliamentary websites. The fact that most parliaments have established their presence on the web makes the legislative process and parliamentary proceedings more transparent and subject to public scrutiny. These sites have searchable databases of committee reports, records, hearings, votes, and other parliamentary documents. Special sections are devoted to parliamentary questions and enquiries. Many of the parliamentary sites have a parallel version in English. Some parliamentary websites offer even audio and video web telecasting of parliamentary sessions.

The salient rhetorical features that characterize parliamentary interaction are counterbalanced by explicit institutional constraints, the most important of which are stipulated in Erskine May's *Treatise on the law, privileges, proceedings and usage of parliament* (Limon and McKay, 1997). It represents a code of behavior that regulates the various forms of parliamentary interaction in the U.K. Parliament.

Hansard is the official report of the proceedings of the U.K. Parliament and is now published on the Internet on the U.K. Parliament site. Hansard is published daily when Parliament is sitting, being also available in bound issues. In the House of Commons, the Hansard reporters sit in a gallery above the Speaker and take down every word that is said in the Chamber. The name 'Hansard' was officially adopted in 1943 after Luke Hansard (1752–1828) who was the printer of the House of Commons Journal from 1774.

The Hansard reports, which are theoretically supposed to be verbatim, actually involve a certain amount of editing meant to do away with some of the formal shortcomings of any oral delivery. Slembrouck (1992) signaled some of the problems involved in the transcription process. First, intrinsic elements of spontaneous speech, such as false starts, involuntary repetitions, or incomplete sentences, are left out. Second, the written version does not reflect features of spoken language, such as intonation, stress, and regional accents. Moreover, certain reformulations are produced by Hansard editors in order to avoid clumsy or unclear messages. Since the transcripts are not entirely accurate, it is necessary for analysts of parliamentary discourse to have access to video recordings of the proceedings under consideration.

The Genre of Parliamentary Discourse

The notions of 'discourse' and 'genre,' however fuzzy and problematic, are central to the study of interaction practices in institutional settings like the Parliament. Current discourse-analytical approaches envisage discourse as "language use relative to social, political and cultural formations – it is language reflecting social order but also language shaping social order, and shaping individuals' interaction with society." (Jaworski and Coupland, 1999: 3). This definition can certainly apply to parliamentary discourse, i.e., a discourse in which institutional facework, political meaning negotiation, and power management are being articulated and publicly displayed.

Like discourse and institutions, genres and institutions are mutually constitutive and acquire legitimacy within a speech community. In spite of its controversiality, the notion of 'genre' can offer important insights into the nature, scope, and functions of parliamentary discourse. Following Swales (1998/1990), genre may be regarded primarily as "a class of communicative events in which language (and/or paralanguage) plays both a significant and an indispensable role" (1998/1990: 45) and "the members of which share some set of communicative purposes" (1998/1990: 58). Furthermore, "these purposes are recognized by the expert members of the parent discourse community, and thereby constitute the rationale for the genre" (1998/1990: 58).

From a pragmalinguistic perspective, parliamentary discourse belongs to the genre of political discourse. As such, it displays particular institutionalized discursive features and ritualized interaction strategies, while complying with and/or circumventing a number of specific rules and constraints. The discursive interaction of parliamentarians is constantly marked by their institutional role-based commitments, by the dialogically shaped institutional confrontation and by the awareness of acting in front and on behalf of a multilevel audience. Parliamentary debates are meant to achieve a number of institutionally specific purposes, namely position claiming, persuading, negotiating, agenda setting, and opinion building, usually along ideological or party lines.

From a rhetorical perspective, parliamentary discourse belongs to the 'deliberative genre' of political rhetoric, which is defined as an oratorical discourse targeting an audience that is asked to make a decision by evaluating the advantages and disadvantages of a future course of action. Elements characteristic of the 'forensic' and 'epideictic' genres are also present, even if occasionally and to a lesser extent. This finding confirms the Bakhtinian view that genres are heterogeneous. One of the major functions of Members of

Parliament (henceforth MPs) is to contribute to problem-solving tasks regarding legal and political deliberation, as well as decision making processes. A major incentive for the parliamentarians' active participation in the debates is the constant need to promote their own image in a competitive and performance-oriented institutional interaction. The MPs' discourse is meant to call into question the opponents' *ethos*, i.e., political credibility and moral profile, while enhancing their own ethos in an attempt to strike a balance between *logos*, i.e., logical reasoning, and *pathos*, i.e., emotion eliciting force.

Subgenres of Parliamentary Discourse

The genre of parliamentary discourse displays several subgenres, such as ministerial statements, speeches, debates, oral/written questions and 'Question Time.'

A common feature of many European legislatures (for example, in Germany and Sweden) is the 'interpellation' or short debate by means of which an opposition party (or an equivalent number of MPs) can call a debate on a topical issue or a matter of public concern. Interpellations can be regarded as mini-debates on broad areas of a minister's responsibilities.

Oral ministerial statements are made in the House of Commons after questions and urgent questions, before the public business of the day. Their purpose is to announce new policies or to provide specific information about current or urgent political matters. A minister speaks on behalf of the government to present their official views to Parliament. Statements can be on any subject ranging from a new policy announcement to an important national or international event or crisis.

Parliamentary speeches are traditional forms of political discourse. In the House of Commons, all speeches are addressed to the Speaker or Deputy Speaker of the House, who acts as a chairperson. The Opening Speech is the first speech in a debate. The MP who has moved, or proposed, the motion outlines their view of why the House should adopt the motion. Parliamentary speeches are supposed to display, apart from facts or events, self-presentations and other presentations.

A parliamentary debate can be described in general terms as a formal discussion on a particular topic that is strictly controlled by an institutional set of rules and presided over by the Speaker of the House. According to Factsheet 52 (available at the U.K. Parliament website), "the style of debate in the House has traditionally been based on cut-and-thrust: listening to other Members' speeches and intervening in them in spontaneous reaction to opponents' views." Members take it in turns to speak on the subject concerned.

Since it is during debates that most of the parliamentary confrontation takes place, it is hardly surprising that several studies on parliamentary discourse have focused on highly topical issues discussed in parliaments. A recurrent theme is the debate on immigration, i.e., in the Spanish Parliament, legitimating the expulsion of illegal immigrants (Martín Rojo and Van Dijk, 1997; Martín Rojo, 2000), argumentation and counterargumentation in Italian parliamentary debates on immigration (ter Wal 2000a, 2000b), disputes on immigration and nationality in the French Parliament (Van der Valk, 2000b; Cabasino, 2001), disputes on illegal immigrants, asylum, and integration in the Dutch Parliament (Van der Valk, 2000a). Closely related themes have also been explored: the distinctive features of parliamentary discourses on ethnic issues in six European states (Wodak and Van Dijk, 2000; ter Wal 2000b), the regional parliamentary discourse from Northern Ireland on the use of Ulster-Scots and Irish alongside English in official proceedings (Wilson and Stapleton, 2003).

There is a comprehensive set of rules set out in Erskine May regarding the form, content, and scope of the subgenre of oral and written questions. One of these rules stipulates that neither the questions nor the answers should be sustained by reasoning that may give rise to controversy. Other rules apply parliamentary norms to questions, while still others define the issues on which questions could be asked. Unlike the questioning strategies in courtroom interaction, which are meant to elicit particular expected answers and to exclude unsuitable answers, parliamentary questioning strategies are not intended to elicit particular answers, but rather to embarrass and/or to challenge the respondent to make uncomfortable or revealing declarations.

As has been suggested by Franklin and Norton (1993), it seems that oral questions are asked primarily where the MP considers some publicity is desirable, whereas written questions are asked when the primary goal is to obtain information. Asking a question is usually a pretext to attack or praise the government and involves information that is already known: "Few members would run the risk of asking such a question without knowing the likely answer" (Franklin and Norton, 1993: 112).

One of the prototypical forms of parliamentary questioning discourse is 'Question Time' in the U.K. Parliament, 'Question Period' in the Canadian Parliament, 'Frågestund' in the Swedish Riksdag, 'Questions au Gouvernement' in the French Parliament, 'Heure des questions' in the Belgian Parliament, to name but a few. This questioning procedure was introduced in the European Parliament in 1973. Apart from oral questions, all these parliaments

allow for questions tabled for written answers. Question Time is a specific session devoted to questioning the foremost representatives of the Government, namely the Prime Minister and/or Government Ministers, by their fellow MPs (cf. Factsheet P1 about Parliamentary questions available on the U.K. Parliament website). Government members are held accountable for their political intentions, statements, and actions by fellow MPs. The order in which the questions are asked is previously established by a process of random selection. The Speaker calls up the MPs who want to ask questions. The first question, about the Prime Minister's engagements, is always predictable. However, it offers several possibilities for asking supplementary questions, which are the really tricky ones for the Prime Minister, as well as for the other responding Ministers, who have to be prepared for all kinds of unexpected questions.

Question Time becomes particularly confrontational when the questioning is carried out by members of the Opposition. This explains why Question Time has been described as "a face-threatening genre" by Pérez de Ayala (2001: 147), who showed that the high frequency of face-threatening acts is counterbalanced by a wide range of politeness strategies. Each macroquestion is analyzed in terms of adjacency pairs, turns, moves, and discourse acts. The histrionic and agonistic features of three parliamentary subgenres, i.e., speeches, debates, and Question Time, are examined by Ilie (2003b), who made a systematic comparison with corresponding subgenres of theatre performances, starting from the consideration that parliamentary dialogue contributes to revealing frames of mind and beliefs, as well as exposing instances of doublespeak and incompatible or inconsistent lines of action. Two rhetorical strategies are particularly investigated in the two discourse types, namely rhetorical questions and rhetorical parentheticals.

Parliamentary Activity Frames

As was shown in Ilie (2003b), in order to capture the major characteristics of parliamentary discourse activities, it is useful to take into account three main types of institutional frames, namely spatiotemporal frame, which regards the spatial and temporal dimensions, i.e., the physical environment of parliamentary institutions and participant positioning in space and time; participant frame, which regards the roles and identities of parliamentary agents, as well as speaker-addressee and speaker-audience relationship; and finally, interaction frame, which regards the institutional structuring and functions of various activity types that are carried out in parliament.

Spatiotemporal Frame in Parliament

Spatial frames regard in the first place the physical setting of the parliament building and the seating arrangements. The physical setting of the House of Commons, with the Government MPs and Opposition MPs facing each other as members of two competing camps has undoubtedly played an important role in fostering an adversarial and confrontational tone of debate. The Speaker's Chair faces the main public gallery, called the Strangers' Gallery, where members of the public at large are supposed to sit and watch the debates. A much wider audience of TV-viewers have nowadays the possibility to watch the parliamentary sessions that are telecast. But in this case, the audience's viewing perspective is restricted to the specific filming angles chosen by parliamentary TV-camerapersons when foregrounding or backgrounding certain persons, interactions, etc.

Above the Speaker's Chair is the Reporters' Gallery. On the floor of the House on the Speaker's right are the benches occupied by the supporters of the Government. By convention, Ministers sit on the front bench on the right hand of the speaker. The Prime Minister's seat is opposite to the despatch box on the Table. Official Opposition spokespersons use the front bench to the Speaker's left. The Leader of the Opposition is sitting opposite the despatch box on that side of the Table. Thus, as a result of the seating arrangement, Government MPs and Opposition MPs are practically facing each other. Minority parties sit on the benches (often the front two) below the gangway on the left, though a minority party that identifies with the Government may sit on the right-hand side. However, as is indicated in Factsheet 52, "there is nothing sacrosanct about these places, and on sundry occasions, when a Member has deliberately chosen to occupy a place on the front bench or on the opposite of the House from normal, there is no redress for such action."

Speeches made in the House of Commons have to conform to very specific rules. A Minister or Opposition spokesperson can speak from the Dispatch Box at the Table of the House, but other MPs have to rise to speak from where they were previously sitting and not from a rostrum. However, front-bench members usually stand at one of the Despatch boxes.

Important time-related constraints should also be taken into account in connection with the spatial frame. Some parliamentary sittings, such as Question Time, start at a particular pre-established time and are normally time-bound. There are, however, parliamentary proceedings, such as debates, that do not always have a fixed or pre-established duration. Their starting time is designated beforehand, but

the finishing time is often delayed. Certain debates on very controversial issues may end long after midnight. This extension is mainly due to innumerable procedural incidents, an extremely high number of amendments and frequent unauthorized interruptions. A comparable situation can be found in most parliaments.

Participant Frame in Parliament

In all parliaments, MPs enact specific participant roles, namely interacting participants and onlooking audiences. MPs are involved in a co-performance that is meant to both address and engage (sometimes even co-act with) an audience of MPs as active participants, who are expected to contribute explicit forms of audience-feedback, e.g., questions, responses, interruptions. What is important for MPs is to consistently promote a political line that meets the general wishes of the voters (as expressed at general elections), to put certain issues on the political agenda, as well as to take desirable initiatives and effective measures.

Parliamentary Forms of Address The rules controlling the parliamentary forms of address are subject to a complex interplay of sociocultural constraints: the overall effect and significance of the institutional activity in which the MPs are engaged, the nature of the institutionalized relationships (social distance and dominance) between MPs, the extent to which MPs share a common set of cultural expectations with respect to the social activity and the speech events that they are carrying out. While in noninstitutional settings politeness rules are just regulative and therefore provide more choice, in institutional settings, such as the Parliament, they are constitutive and therefore discourse-integrated.

In the House of Commons, MPs are normally not addressed by their actual names, but by the names of their constituency or by their official position. Most importantly, MPs are addressed and address each other in the third-person singular through the intermediary of the Speaker of the House, who acts as a moderator. Interestingly, the only parliamentary participant officially addressed in the second-person is the Speaker or Deputy Speaker (the address form is 'Sir' or 'Madam'). It is significant that the English second-person pronoun *you* may be used in two exactly opposite cases in terms of politeness: on the one hand, as a positive address form indicator in ritualistic politeness formulae used by MPs when addressing the Speaker of the House, and on the other hand, as a negative address form indicator in the overt face-threatening act of interrupting speaking MPs.

The MPs in other parliaments, such as the French and the Italian parliaments, are normally referred to by means of the second-person pronoun. The second-person plural pronoun of address *V* is used in many languages as a honorific form to singular respected or distant alters.

The ritualized form used in the Commons to address an MP is 'the Honourable Gentleman/Lady.' In Hansard, however, this phrase is expanded into the form 'the Honourable Member for Ockendon (Mr. Bloggs)' in order to avoid ambiguities. Two types of distinctions are marked by specific parliamentary forms of address. A hierarchical distinction is involved in the alternative uses of 'the Hon. Gentleman/Lady' (to refer to a junior and/or ordinary MP) and 'the Right Hon. Gentleman/Lady' (to refer to a senior and/or high status MP). A political distinction is conveyed by using one of the above-mentioned forms of address when referring to an MP that belongs to another political party than one's own, and by using the form 'my (Right) Hon. Friend' when referring to an MP that belongs to one's own party.

Different parliaments display different degrees of flexibility and constraint. For example, interpersonal and strategic deference is conveyed in Swedish parliamentary discourse by a wider range of devices, namely: title, first and last name, title and last name, and occasionally only first name. The third-person pronoun is the officially acknowledged pronominal term of address in the Swedish Riksdag, just as in the House of Commons, so it counts as the unmarked pronominal address form. However, the use of the second-person pronoun *ni* also occurs occasionally in the Swedish debates (Ilie, 2003d, 2005).

MPs are not expected to have a straightforward dialogue with each other, viz. to be engaged in a genuine reasoning process or truth finding discussion. All MPs are fully aware of the fact that they cannot realistically hope to persuade political opponents of the justifiability of their ideas and beliefs. While addressing the current addressee(s), their interventions and arguments are equally intended for all MPs in the House and for the wider (present or TV-viewing) audience.

Parliamentary Roles and Audiences The institutional interaction of debating MPs reveals role shifts between their public roles as representatives of a part of the electorate and their private roles as members of the same electorate they represent. The MPs who are taking the floor to address the House, as well as those MPs who are being directly addressed and act as interlocutors, can be regarded as active participants. The rest of the MPs who are not actually involved in the current debate can be regarded as side

participants. Other listeners, such as the Hansard reporters, the members of the press, or members of the public at large present in the Strangers' Gallery, can be regarded as bystanders.

As a result of the increasing mediatization of parliamentary proceedings, MPs perform a major part of their work in 'the public eye,' namely in front of several kinds of audiences made up of politicians and/or laypersons. The onlooking audience is actually a multilayered audience, i.e., the insider audience of fellow MPs, the outsider audience of visitors in the Strangers' Gallery, and the more remote outsider audience of TV-viewers. As has been shown in Ilie (2003b), in Parliament there is an awareness of and a tolerance for the audience of outsiders, but the targeted audience is the insider audience of fellow MPs. No special effort is made to acknowledge the presence of this audience of outsiders or to get their approval. One of the reasons may be the fact that it is normally a random and continuously changing audience that happens to be in the Strangers' Gallery on a particular day at a particular time.

Interaction Frame in Parliament

The interaction between MPs is convention-based and rule-regulated. As instantiations of individual and group confrontations, parliamentary debates display well-regulated competing, but also collaborative discursive processes. As manifestations of collective undertakings, parliamentary debates display, especially in matters of vital national importance, not only adversarial interaction, but also converging and complementary discursive contributions that are orchestrated institutionally and performed jointly.

Some of the most salient parliamentary interaction frames are described below.

Openings and Closings of Parliamentary Sessions Parliamentary proceedings in the Commons are officially opened and closed by the Speaker of the House, who also announces the topics of the agenda, intervening whenever these topics are not properly followed. The first speech in a debate is called the Opening Speech. The MP who has moved, or proposed, a particular motion outlines his/her view of why the House should adopt the motion.

The State Opening of Parliament takes place after a General Election and at the beginning of each new session of Parliament. On that occasion, the Queen reads the Queen's Speech. It is a reminder of times when the King or Queen actually chose the legislation to be debated in Parliament. Today, the Government prepares the Queen's speech. The speech details the Government's policies and the bills it will introduce in the next session.

Parliamentary Turn-Taking and Talk-Monitoring Rules The turn-taking structure of parliamentary interaction shows that linguistic constraints are paralleled by institutional constraints. It is the Speaker of the House who ensures the reinforcement of orderly interventions and the observance of parliamentary rules. He/She is in charge of monitoring speaker selection and turn assignment, so that MPs take it in turns to speak and present their standpoints in an orderly manner.

In the Commons, parliamentary turn-taking is regulated not only by institutional conventions, but also by the participants' spontaneous verbal, paraverbal, and nonverbal signaling. Paraverbal signaling refers to the way in which a verbal message is conveyed by means of tone, pitch, and pacing of the voice. Since MPs may speak only if called to do so by the Speaker, they must try to 'catch the Speaker's eye,' i.e., to attract his/her attention by standing, or half standing.

Parliamentary Interruptions Another way of competing for the floor is to resort to 'authorized' verbal interruptions. The orderly question-answer sequences can be disrupted by recurrent authorized interruptions or 'interventions' by MPs who want to grab the floor. In principle, an MP cannot suddenly intervene when another MP is speaking to the House unless the speaking MP allows it by 'giving way.' The interruption consists in asking the current speaker to 'give way' so as to allow the intervening MP to ask a question or make a comment.

Apart from authorized interruptions, there are also unauthorized interruptions, namely spontaneous verbal reactions of MPs who interrupt the current speaker. Such interruptions, consist of exclamations of approval or disapproval, and are perceived as some of the particularly distinctive characteristics of all parliamentary discourses. It is significant that several of the exisiting studies on parliamentary discourse have focused on the analysis of interruptions. Carbó (1992) gave a detailed account of the types of interruptions in the Mexican parliament, Cabasino (2001) and Van der Valk (2002) described interruptions in French debates on immigration, Ilie (2004b) analyzed and compared interruption patterns in British parliamentary debates and in drama dialogue, while Bevitori (2004) compared the interruptions in British and Italian parliamentary debates.

Parliamentary Questioning/Answering Patterns In all parliaments, the question-response sequences represent the default adjacency pairs of several parliamentary subgenres, such as oral/written questions and Question Time. They often display exchanges of

challenging, accusatory, but also countering, defensive and ironical, remarks between Opposition MPs and Government MPs, as well as friendly and cooperative questions from MPs belonging to the Government party. As has been shown in Chester and Bowring (1962), Franklin and Norton (1993), and Limon and McKay (1997), there are several subtypes of parliamentary questions in terms of content, scope, and purpose. These questions are often multifunctional and convey different degrees of argumentativeness depending on their specific contexts of occurrence. Thus, a frequent type of questions are the so-called partisan questions that are asked not only to defend and reinforce the power of the Government, but also to attack the Opposition. Another recurrent type of parliamentary questions are the attention-seeking questions, used particularly by backbenchers to gain attention and to acquire information, as well as to contribute to local publicity. Nowadays an increasing number of questions are being asked by MPs on behalf of lobbying and pressure groups, usually from their own constituencies.

According to syntactic criteria, a vast majority of parliamentary questions belong to the closed category of yes-no questions, which are meant to constrain the respondents' answering options. According to pragmalinguistic criteria, parliamentary questions often belong to the category of rhetorical questions, leading questions, and echo questions, which are confirmation eliciting and reaction eliciting, rather than information eliciting in that they single out and expose the opponent's weaknesses, often in an ironical or sarcastic tone.

Parliamentary Politeness Strategies As has been shown in Ilie (2001, 2003d, 2005) and Pérez de Ayala (2001), parliamentary debates involve systematic face-threatening acts marked by unparliamentary language and behavior. These acts cover a continuum that ranges from milder/mitigated acts, such as reproaches, accusations, and criticisms, to very strong ones, such as insults. The study of unparliamentary strategies provides important clues about moral and social standards, prejudices, taboos, as well as value judgments of different sociopolitical groups, as well as individuals in a community.

Cross-cultural studies are particularly enlightening in this respect, since the forms and functions of insults and their respective feedbacks vary in different cultures and institutional settings. Several aspects of the use and effects of unparliamentary language in the U.K. Parliament and in the Swedish Riksdag have been examined from a politeness and cognitive theoretical perspective (Ilie, 2001), as well as from a rhetorical perspective (Ilie, 2003d). One of the conclusions is that "what is generally referred to as unparliamentary uses of language constitute instances of institutionally ritualized confrontational interaction." (Ilie, 2003d: 81). The results of the contrastive analysis indicate that English unparliamentary language is marked particularly by *pathos*-oriented *logos*, whereas Swedish unparliamentary language is marked particularly by *ethos*-oriented *logos*.

Parliamentary Metadiscourse Metadiscourse is a term generally used to indicate a shift in discourse levels, by means of which the speaker's multilevel messages are being conveyed alongside, above, and/or beyond the unfolding discourse. Parliamentary metadiscourse is used to highlight the co-occurrence and confrontation of competing ideological and personal representations, on the one hand, and the discursive interplay between the participants' interpersonal and institutional voices, on the other.

Several metadiscursive strategies have been investigated in the British parliamentary discourse: metadiscursive argumentation through the use and misuse of clichés (Ilie, 2000), metadiscursive attribution, reporting and quoting strategies (Ilie, 2003a), and metadiscursive parentheticals (Ilie, 2003b, 2003c).

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Parsing: Statistical Methods

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Overview

Statistical parsing, broadly, is the use of statistical methods to resolve tree-level syntactic ambiguities. Most work in theoretical syntax investigates grammaticality: the distinction between what we can or cannot say in a given language. In contrast, statistical parsers model the trends of what we do or do not say in practice, using these trends to resolve syntactic ambiguities, such as prepositional phrase attachment, relative clause attachment, and coordination scope. For example, in a phrase like *increases in economic indicators and decreases in exchange rates*, the second prepositional phrase can grammatically modify both conjuncts, but probably does not. While some utterances are deeply ambiguous, most are not, and therefore good statistical models can resolve most potential ambiguities correctly. In computational systems, it is useful to model syntactic trends because many syntactic ambiguities have semantic reflexes, and therefore syntactic models can constrain semantic interpretation.

Statistical parsers are systems which take sentences as input and produce syntactic analyses of those sentences as output. The outputs produced vary in richness from parser to parser. On the impoverished end of the spectrum, there are chunkers, which might only attempt to bracket simple nonrecursive noun phrases. Chunkers are sufficiently low-level that they often have more in common with part-of-speech taggers than with full parsers, which produce nested hierarchical structures. On the rich end, some parsers operate over detailed, feature-structured linguistic formalisms such as HPSG and LFG. Most parsers produce something in between, usually context-free phrase structure trees. Statistical parsers can either

model surface trees (Charniak, 1996) or they can contain sophisticated models of deep linguistic phenomena, such as argument selection and dislocation phenomena (Collins, 2003). While many statistical models are simpler than many symbolic models, they need not be.

A statistical parser can conceptually be broken into three components, sketched briefly here and discussed in more detail over the course of this article. The first component is the grammar, which specifies the set of possible parses for a given sentence. The grammar also specifies how those parses are decomposed into derivation steps. The most common choice is to specify parses using labeled, nested trees derived by a context-free grammar (CFG). The second component in a parser is a scoring function, which rates candidate parses. This is usually done by examining the syntactic configurations present in each candidate, and using statistical learning methods to rate those configurations based on evidence from a training corpus of correctly-parsed examples. The most basic method of scoring trees in the CFG case is to associate a probability with each rewrite in the grammar, giving a probabilistic context-free grammar (PCFG). The final component of a parser is the search procedure, which is the algorithm used to find high-scoring candidates. The naive tactic of enumerating all possible parses is sometimes perfectly feasible, but often the space of possible parses is huge or infinite. In those cases, techniques known as dynamic programming or heuristic search are used. In practice, much of the work in building modern statistical parsers is making this search procedure efficient enough to be practical.

Grammar Representations

Parsers disambiguate among a set of parses licensed by some grammar. The grammar determines both what parse trees look like and also what kinds of syntactic distinctions are represented. Most parsers model labeled, nested phrase-structure trees, specified by a CFG. The grammar symbols can be coarse, like NP (noun phrase) and VP (verb phrase), or can be very fine, encoding specific details such as agreement, syntactic role, and lexical head. The more articulated the representation is, the greater the number of syntactic distinctions that can be represented, and the larger the set of possible parses.

Nonconfigurational linguistic phenomena, such as dislocation, control, or polarity effects, can be used to argue that phrase structure trees are inappropriate for representing the full range of syntactic distinctions present in natural language. However, in practice, most complex phenomena can be modeled in at least a crude way by CFGs. For example, dislocation can be modeled by threading gap features through the symbols in the grammar, giving, for example, one symbol NP[$-gap$] for noun phrases with no gap, and another symbol NP[$+gap$] for noun phrases that do contain a gap. In the parsing literature, CFGs have traditionally been augmented in several such ways, which can generally be seen as adding feature structures to the basic node labels. These feature structures can specify fine details of a phrase's syntax; for example, agreement, syntactic role, or semantic descriptors as the phrase's lexical head. In most cases, CFGs augmented with features are strictly equivalent to plain CFGs, since, for a given symbol, each setting of these features can be thought of as a single symbol in a much larger grammar (provided the features are finite-valued). However, such grammar write-outs are often too large to construct explicitly, and special techniques such as unification parsing have been developed for efficiently parsing with feature-structure representations.

There are grammar families other than CFGs, with accompanying derivational processes. Other grammar families generally have advantages over CFGs, such as increased expressivity or the ability to more naturally model nonlocal phenomena. However, the cost of these formalisms is twofold. First, their associated parsing algorithms generally require much more computation. Second, it is typically much harder to develop statistical models for them. This added complexity stems partially from the fact that most training corpora are annotated with phrase-structure trees, but not derivations of those trees. However, for most grammar formalisms beyond CFGs, multiple derivations can lead to the same tree. Estimating models is therefore a partially unsupervised task in general: one must somehow infer which derivations were used in the generation of the example parses.

Multiple derivations for a single phrase-structure tree can reflect semantic distinctions not captured by the surface phrase structure, such as different reconstruction sites for dislocated elements, or the contrast between the lexicalized and the compositional uses of an idiom. For these kinds of ambiguities, it is up to the researcher to decide whether the parser should be searching for the best single derivation of a tree or the tree whose total score across all derivations is greatest. Multiple derivations of the same tree can also result in spurious ambiguities, where two derivations can lead to the same syntactic or semantic interpretation of the sentence. For example, if we did not insist that CFG derivations be leftmost, we would have many choices of which order to use to rewrite nodes. Spurious derivations are usually regarded as model defects rather than a useful property of a

grammar. An example of a grammar family in which trees can have many derivations is the family of tree-adjoining grammars. Here, rewrites can be of multiple granularities, from single CFG-like rewrites to the substitution of a complex parse structure in one atomic step. Different choices in granularity result in different derivations of a tree. In this case, some derivation ambiguities can be seen as a choice between using large constructions compositionally or idiomatically, while others are simply spurious distinctions.

Statistical Models

Once we have a grammatical representation that describes the set of candidate derivations for a sentence, we have to design a statistical model, which assigns scores to those derivations.

Generative Models

In the classic case, we build generative models, which score the steps of a derivation one by one. At each step, there will be several options as to what happens next in the derivation. A conditional probability distribution is constructed over those options, conditioned on arbitrary properties of the derivation to date. In a PCFG, for example, derivations are composed of a sequence of context-free rewrites. At each rewrite step, some symbol x is replaced by some sequence of symbols α. We can score rewrites with conditional probabilities $P(\alpha \mid x)$, where we predict the expansion given the current symbol x. The score of an entire tree would then be the product of the scores of the rewrites in that tree. For example, we might find that noun phrases (NP) rewrite as a smaller noun phrase (NP) followed by a prepositional phrase (PP) 11% of the time. The rewrite NP → NP PP would then have probability 0.11.

If we wanted a sharper statistical model, we could also condition the choice of expansion α on the identity of the parent y of x, using the more specific conditional probability $P(\alpha \mid x, y)$. We would be modeling the same tree structures, but with a more refined model. This extra conditioning information would let us capture the effect that, while one can grammatically have PP-modified NPs in either subject or object position in English, in practice such structures are almost twice as common in object position. Conditioning on influential features of the derivation history can make a huge difference to the disambiguation performance of a statistical model. For example, adding such parent-node conditioning can, by itself, result in a 15% error reduction over a basic PCFG model which conditions only on the node itself (Johnson, 1998). In general, while the syntactic context of a phrase may have no impact on the grammatically available structures used to realize that phrase, that context may still have a substantial impact on the empirical distribution over those structures. Modeling the context of derivation steps more accurately leads to sharper probability models and better disambiguation performance.

In addition to conditioning rewrites on the immediate syntactic context, two other changes to the basic PCFG model have accounted for the bulk of the difference in performance between baseline PCFG parsing and state-of-the-art statistical parsing models (Charniak, 2000; Collins, 2003). The first is that the left-hand sides of rewrites, which are often given as very flat rewrites (such as VP → V NP PP PP) can be considered to have been produced by a stepwise, or Markov, process rather than an atomic process. Complex rules are thereby broken up into a sequence of simpler rewrites in much the way an X-bar grammar would put adjuncts into their own rewrite layers. The advantage of this view is that unknown rules can be synthesized from known rules. The second change is lexicalization, in which the behavior of specific words is modeled. For example, if we condition the expansion of a verb phrase on identity of the head verb, our model can capture syntactic and semantic selectional preferences. For example, knowing that the head verb is *gave* will make ditransitive rewrites more likely, capturing subcategorization effects, while knowing that the head verb is *ate* will cause a shift in the preferred heads of the direct object toward edible nouns, capturing a (crude) notion of semantic selection.

Once we specify the conditional probabilities that we will use to model derivation steps, we have to decide how we are to estimate those probabilities. For example, in a lexicalized PCFG, we might want to know how to expand a VP headed by the word *exchange*. In our training data, *exchange* has some observed distribution over subcategorization frames, as well as specific heads that it semantically selects for. However, while there are over 180 000 VPs in the Penn Treebank (a corpus of about 50 000 hand-parsed sentences), there are only 14 occurrences of VPs headed by *exchange* – hardly enough data to have reliable estimates of its behavior. We have a situation which frequently occurs in statistical modeling: we have poor estimates of a highly relevant quantity: $P(\alpha \mid \text{VP}, \textit{exchange})$, but good estimates of a less relevant quantity: $P(\alpha \mid \text{VP})$. We would like to combine these estimates in some way, balancing specificity against robustness and generalization. A great deal of effort can go into constructing good ways of smoothing together these various quantities.

Discriminative Models

The descriptions above are a characterization of generative models of parsing, in which we define a derivational process that produces a tree, then model the local steps in that derivation with conditional probabilities. In recent years, discriminative parsing methods have gained popularity (Collins, 2000; Riezler *et al.*, 2002). These methods need not be probabilistic at all, and may or may not decompose parses into independent derivation steps. Rather, they decompose structures into *features* (a distinct sense from the above usage). Features are structural configurations present in the parse. The presence of a specific context-free rewrite can be a feature of a tree, but so can the length of the yield of the tree, the presence of a specific pair of words occurring on the tree's boundary, or the presence of a parallel-structured coordination. In discriminative approaches, we can, in principle, have any features we like, though, in practice, some kinds of nonlocal features can drastically reduce the efficiency of parameter estimation and parsing. Estimation procedures for discriminative methods do not involve counting and smoothing, but rather involve iteratively running a parser on the training set, seeing the errors it makes, and adjusting feature scores so as to improve the model for the next iteration. Discriminative approaches can result in better parsing accuracies, since they allow more sophisticated feature engineering, but they are often prohibitively slow to train (reranking systems are a notable exception).

Unsupervised Models

The preceding discussion on statistical estimation has focused on supervised techniques where, broadly, scores or probabilities are chosen to capture the trends observed in training data. One could hope that a collection of sentences would suffice, that we could use them to learn a grammar in an unsupervised fashion. This approach has been less explored, and, despite recent advances, state-of-the-art parsers are still all trained in a supervised manner. The basic issue with unsupervised parsing is that a good unsupervised learner might posit consistent analyses of syntactic phenomena, but those analyses generally will not match our desired annotation conventions unless the grammar representation is very carefully designed (Klein and Manning, 2004). For example, an unsupervised learner may form subject-verb phrases rather than verb-object phrases, or form preposition-determiner groups.

Search Methods

Once a grammar family has been chosen, and a scoring model has been designed, it can be a substantial challenge to engineer implementations that are simultaneously fast, robust, and accurate. As a result, a good deal of parsing work has focused on efficiency issues.

Given unlimited computational resources, one can find the best-scoring derivation for a sentence by listing all possible derivations, scoring each one, and recording which one received the highest score. In some cases, a list-and-score approach is perfectly adequate. In reranking systems, or with extremely constrained grammars, there may only be a few dozen candidates. However, with most grammars, the cost of broad coverage is massive ambiguity; it is not unusual for even short sentences to have millions of derivations. Therefore, we must find ways of searching for good parses without actually writing each possibility down.

One general framework for search is known as state-space search. In state-space methods, we arrange the set of all partial derivations into a huge tree, in which each node is an incomplete derivation with one child for each immediate extension of that derivation. Paths in this tree go from the empty derivation at the root to full parses at the leaves. As we flesh out those partial derivations, our candidate set grows rapidly. In beam search, we keep that growing set small by discarding poor partial derivations early on, keeping only a few hypotheses alive at any time. The standard approach is to keep a constant number of top candidates, or to keep all candidates whose score is close to the current best candidate. The best-scoring full derivation can of course be mistakenly discarded early on because it initially looked less promising than other candidates, giving an effect analogous to garden pathing in human processing. Beam search can be sped up by shrinking the beam, all the way down to greedy search with a beam of size one, at the cost of degraded accuracy. For many complex models, beam search methods are the best option, since they make no assumption about the kinds of derivation steps and features in the model.

In many cases, another option, called dynamic programming, is possible. In dynamic programming, we independently find best parses for various subspans of the input sentence, then combine those subparses to form larger parse fragments. Dynamic programs are typically slower than beam search methods, especially for richer grammar formalisms. Their advantage is that, while beam search is approximate, dynamic programming algorithms are guaranteed to return the parse with the highest score, a property known as *optimality*. Dynamic programming algorithms can also be accelerated, either by approximate methods (Caraballo and Charniak, 1998) or by an AI technique known as A* search (Klein and Manning, 2003).

Current Research

Current research on statistical parsing spans all of the aspects above, and includes other topics that are receiving increasing attention. Now that parsers are finding more applications, it has become clear that even the best statistical parsers suffer substantially degraded accuracy when applied to text that is very different in character from the data (usually newswire) they were trained on. Medical text, web pages, and spoken language are just a few domains where this degradation occurs, and techniques for adaptation are just starting to be investigated. Another relatively recent topic of interest is the production of parsers that can produce semantic structures of some kind, for example the identification of semantic roles or the conversion of a parse into predicate-argument structure (Gildea and Jurafsky, 2002).

Of course, improving the accuracy of parsers is always of value – on the task of parsing the Penn Treebank, top parsing accuracies are in the very low 90% range. While some parser errors seem difficult to resolve in an automatic fashion without serious models of semantics and real-world knowledge, most errors are still the kinds that might reasonably be improved with better statistical models.

For further reading on statistical parsing methods, see Manning and Shütze (1999) and Jurafsky and Martin (2000).

See also: Categorial Grammars: Deductive Approaches; Chart Parsing and Well-Formed Substring Tables; Language Processing: Statistical Methods; Parsing and Grammar Description, Corpus-Based; Part-of-Speech Tagging; Treebanks and Tagsets; Unification: Computational Issues.

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the Slavic, Baltic, and Finnic languages (*see* **Circum–Baltic Area**). Special marking of partial objects and subjects mentioned earlier (cf. art. 180) is derived from PCs and PPCs with deleted quantifiers (Koptjevskaja-Tamm and Wälchli, 2001: 464–465).

See also: Case; Head/Dependent Marking; Mass Expressions; Mass Nouns, Count Nouns, Non-count Nouns: Philosophical Aspects; Nouns; Numerals; Possession, Adnominal.

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Part-of-Speech Tagging

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Introduction

Part-of-speech tagging is the task of determining the syntactic class (i.e., part of speech) of each word in a natural language text and assigning it a 'tag' accordingly. The tags generally encode coarse syntactic categories like noun, verb, adjective, etc., as well as selected sub-categories and morphological features like number, tense, definiteness, etc. Typical tagsets contain 20 to 100 categories, and in some cases cover 400 or more categories (*see* **Treebanks and Tagsets**). The following is an example from the Wall Street Journal portion of the Penn Treebank:

Bond/NN prices/NNS crept/VBD higher/RBR./.

It shows that *Bond* is used as a singular common noun, *prices* as a plural common noun, *crept* as a past-tense verb, and *higher* as a comparative adverb. In other contexts, *Bond* could also be a proper noun (NNP), *prices* a third-person present-tense verb (VBZ), and *higher* a comparative adjective (JJR). The task of a part-of-speech tagger is to disambiguate between the different uses.

History of Part-of-Speech Tagging

Probably the earliest part-of-speech tagger was part of the parser developed for the Transformation and Discourse Analysis Project (Harris, 1962). Steps 1 and 2 of the program consist of looking up the word in a dictionary and choosing one category based on a

small set of manually written rules using neighboring words. The architecture of this system, first looking up *lexical information* and then disambiguating with *contextual information*, can be found in any modern tagger.

Another early system was the Computational Grammar Coder by Klein and Simmons in 1963. It had a lexicon of 400 function words, suffix lists to handle remaining words, hand-crafted context rules based on immediately neighboring words, and a lexicon of 1500 words that were exceptions to the rules. The system had an accuracy of 90% using 30 categories.

Similar components with larger resources can be found in TAGGIT by Greene and Rubin in 1971: 3000 lexical entries, 450 suffixes, and 3300 context rules considering up to two words on either side. The rules were based on a subset of 900 sentences of the Brown corpus and manual editing; thus the system is the first instance of semi-automatic rule-learning for part-of-speech tagging. The tagger had 77% accuracy using 82 categories.

In another line of development, probabilities were introduced into part-of-speech tagging. Major components of WISSYN (Stolz *et al.*, 1965) are similar to the previous systems: a dictionary of 300 high-frequency words, 63 suffixes, and manually created context rules. The innovation was its stochastic component, which was used to handle remaining ambiguities. Conditional probabilities using up to three words on either side of the target word were generated from a hand-tagged corpus of 28 000 words.

Bahl and Mercer improved on this idea in 1976 by adopting techniques from speech recognition. They suggested the precursor for Hidden Markov Model-based part-of-speech taggers. CLAWS, presented by Leech *et al.* in 1983, used a large set of contextual probabilities and finds the most likely sequence of tags. However, it enumerates all possible sequences between unambiguous words, leading to exponentially growing run-times. DeRose (1988) used dynamic programming for decoding, which made the approach much more efficient and started the modern times of part-of-speech tagging.

Current Tagging Approaches

State-of-the-art systems achieve around 97% accuracy on English text for moderately-sized tagsets. Major paradigms are the following:

- **Statistical:** Statistical techniques model probability distributions over tags by using transition probabilities between tags or words and tags, and lexical probabilities of tags for words. The process tries to find the sequence of tags that has the highest probability, given a sequence of words. Prevalent techniques are Hidden Markov Models and Maximum Entropy Models.
- **Classification-based:** A large variety of classifiers has been used to address part-of-speech tagging, including Memory-Based Learning, Support Vector Machines, Decision Trees, and Neural Networks. These techniques make local decisions for each word without trying to find a globally optimal tag sequence, and without estimating probability distributions.
- **Transformation based:** In a first stage, a 'dumb' tagger assigns guesses of tags, e.g., by looking up the most frequent tag for each word in a lexicon. The second stage applies finite-state rules that are learned from a corpus and corrects the tagging errors of the dumb tagger.
- **Manually built rules:** This approach is based on the manual creation of large sets of (mostly finite-state) rules by experts. This has the potential of achieving much higher accuracies, but comes with the cost of manual labor.
- **System combinations:** Combining several taggers by voting; weighting; or including second-level classifiers often improves tagging accuracy, especially if the taggers use very different techniques and have roughly comparable accuracies.

We will now describe these approaches in more detail. Most accuracy results will be reported for English on the *Wall Street Journal* portion of the Penn Treebank, subsequently referred to as 'WSJ data.'

Statistical Part-of-Speech Tagging

Hidden Markov Models

Given a sequence of words $W = w_1 \ldots w_k$, the task is to find the most likely corresponding sequence of tags $T = t_1 \ldots t_k$:

$$(1)\quad \underset{T}{\operatorname{argmax}}\, P(T|W)$$

Using Hidden Markov Models (HMMs) for this task adopts Shannon's noisy channel model: first, a tag sequence is generated, then it is sent through a noisy channel, and we observe the distorted signal (the words) at the other end. The model assigns a probability to the original sequence, $P(T)$, and it assigns a conditional probability $P(w_i|\, t_i)$ of observing word w_i when the input tag was t_i to each possible word-tag pair. The probability for the tag sequence is broken down into

$$(2)\quad P(T) = P(t_1) \cdot P(t_2|t_1) \cdot P(t_3|t_1, t_2) \cdots P(t_k|t_1 \ldots t_{k-1})$$

Obtaining estimates for long sequences is impractical since the number of possibilities grows exponentially with the length of the sequence. The Markov assumption is that the conditional probabilities only depend on a very short history, e.g., two previous tags:

$$(3)\ \ P(T) \approx P(t_1) \cdot P(t_2|t_1) \cdot P(t_3|t_1, t_2) \cdots P(t_k|t_{k-2}, t_{k-1})$$

The tags correspond to states of a Markov model. Combining lexical probabilities $P(w_i|t_i)$ and contextual probabilities $P(t_i|t_{i-2}, t_{i-1})$ yields:

$$(4)\ \ P(W, T) = \prod_{i=1}^{k} P(t_i|t_{i-2}, t_{i-1}) P(w_i|t_i)$$

Finding the sequence T that maximizes equation (4) gives a solution for (1) since $P(W)$ is a constant and $P(W, T) = P(T|W) \cdot P(W)$. Equation (4) corresponds to a second-order Markov model, i.e., it uses the previous two tags. These are a good compromise between modeling accuracy and number of conditional probabilities to be estimated from data. Alternatives are first or third-order models.

Straightforward maximization of (4) by enumerating all possible sequences and calculating their probability is onerous because of the exponential number of possible sequences. The Viterbi algorithm, an instance of dynamic programming, avoids explicit enumeration and finds the solution in time linear to the length of the sequence, making the use of HMMs very efficient.

Finding appropriate values for all probabilities involved is referred to as training. There are two major variants for training HMMs. The first variant is 'supervised,' which is trained on labeled texts. For a second-order model, frequencies of tags, $f(t)$, word-tag pairs, $f(w, t)$, and trigrams, $f(t_1, t_2, t_3)$, are extracted from a corpus. Lexical probabilities are set to $P(w|t) = f(w, t)/f(t)$, contextual probabilities to $\hat{P}(t_3|t_1, t_2) = f(t_1, t_2, t_3)/f(t_1, t_2)$ in a first approximation. Contextual probabilities usually suffer the sparse-data problem, i.e., there are many triples for which the estimated probabilities are zero or unreliable because of low counts in the data, and therefore require smoothing. Supervised Hidden Markov Models are also referred to as 'n-gram models.'

The second variant is 'unsupervised.' One starts with a lexicon listing all possible tags for words and a large amount of raw text. Contextual and lexical probabilities are either randomly initialized or estimated from a small labeled sample. Lexical probabilities are constrained to have non-zero values for those word-tag pairs only that are listed in the lexicon. Then, the Baum-Welch algorithm (also known as Forward-Backward algorithm, an instance of Expectation-Maximization), is applied. It iteratively modifies the contextual and lexical probabilities, so that the probability assigned by the model to the corpus moves towards a local maximum. Actually reaching the local maximum may adapt the model too closely to the training text. This is known as overtraining, and is avoided by stopping after only a small number of iterations. In practice, models estimated from labeled data are more accurate than models trained unsupervised (Elworthy, 1994).

An important technique is smoothing, which refers to the process of taking some probability mass from higher-probability events and distributing it to lower-probability and zero-probability events. A common technique is linear interpolation of different orders of n-grams. Unigram, bigram, and trigram probabilities $\hat{P}(\cdot)$ are estimated directly from frequencies in the data, and then interpolated:

$$(5)\ \ P(t_3|t_1, t_2) = \lambda_3 \hat{P}(t_3|t_1, t_2) + \lambda_2 \hat{P}(t_3|t_2) + \lambda_1 \hat{P}(t_3)$$

with $\lambda_1 + \lambda_2 + \lambda_3 = 1$. In case of supervised learning, the λ's can be estimated by a single 'leaving-one-out' run over all n-grams occurring in the training corpus (Brants, 2000). For unsupervised training, the λ's are estimated with the Baum-Welch algorithm. Other frequently used smoothing techniques include context-dependent linear interpolation, which estimates different sets of λ's depending on the conditioning tags t_1 and t_2, Katz's backoff, and Kneser-Ney smoothing.

Hidden Markov Models became popular for part-of-speech tagging in their supervised variant with Church (1988) and DeRose (1988) and unsupervised variant with Cutting *et al.* (1992). These ideas were picked up and improved on by many researchers; Brants (2000) presented state-of-the art results of 96.7% on WSJ data.

Variants of Hidden Markov Models applied to part-of-speech tagging include Variable-Memory Markov Models, which dynamically adapt the context size, the use of second-order statistics for lexical probabilities, and the lexicalization of states, which encodes additional word information in the states. These variants tend to yield very small improvements over the original model.

Maximum Entropy Models

The general assumption of a maximum entropy model is that a probability distribution should be uniform if no knowledge about it exists, with uniformity being equivalent to having the maximum possible entropy. If constraints on the distribution exist, e.g., in the form of labeled data, then it should be as close to uniformity as the constraints allow.

The term *Maximum Entropy Model* refers to a particular way of constraining model parameters. The most common use for part-of-speech tagging involves probability distributions $p(t|c)$, where c

represents a context and t represents a tag. They are expressed as binary indicator functions f, called *feature functions* (or short: *features*), with

$$(6)\ f(c,t) = \begin{cases} 1 & \text{if } t = T \text{ and } c \text{ matches } C \\ 0 & \text{otherwise} \end{cases}$$

We constrain the expected value the model assigns to a particular feature to match the value we find in our training data:

$$(7)\ \hat{p}(f) = \sum_{c,t} \hat{p}(c)p(t|c)f(c,t)$$

where $\hat{p}(f)$ and $\hat{p}(c)$ are the empirical values found in the training data, and $p(t|c)$ are the model parameters we are trying to estimate.

As an example, we might learn that the feature

$$(8)\ f(c,t) = \begin{cases} 1 & \text{if } t = \text{NN and } c \text{ matches} \\ & \text{'the next word is } in\text{'} \\ 0 & otherwise \end{cases}$$

has an expected value of $\hat{p}(f) = 0.0023$ by determining its relative frequency in a corpus. We then require that our model assign the same value.

The goal is to find the conditional probability distributions $p^*(t|c)$ that match the given constraints and maximize the conditional entropy.

$$(9)\ H(p) = -\sum_{c,t} \hat{p}(c)p(t|c)log(t|c)$$

The solution to this constrained maximization task is an *exponential model* (also called *log-linear model*) with the parametric form

$$(10)\ p_\lambda(t|c) = \frac{1}{Z_\lambda(c)} \prod_{i=1}^{n} e^{\lambda_i f_i(c,t)}$$

where $Z_\lambda(c)$ is a normalizing constant, and λ_i are weights for the feature functions f_i. The optimal values for λ_i are determined using improved iterative scaling, generalized iterative scaling, or gradient descent methods.

It can be shown that a model of the form in (10) with maximum entropy given the constraints from the training data at the same time maximizes the likelihood of the training data. This is a second motivation for using Maximum Entropy Models. Feature functions allow for a much more flexible way of expressing dependencies in the data than HMMs, but this advantage comes with higher training costs.

Ratnaparkhi (1996) introduced Maximum Entropy Models for part-of-speech tagging. He makes the previous two words and their already assigned tags, the current word and the following two words available to the feature functions. The method achieves an accuracy of 96.6% on WSJ data.

Maximum entropy models can be extended in various ways, e.g., by improving the set of features, by applying the technique to HMMs yielding Maximum Entropy Markov Models, or by moving from local exponential representations to global exponential representations in Conditional Random Fields. Another possibility is to explicitly model forward and backward dependenies, for which Toutanova *et al.* (2003) reported accuracies up to 97.24%.

Tagging through Parsing

Some fraction of errors introduced by the methods described above are caused by their limited context, while the information necessary for disambiguation lies outside this context. This problem tends to become more visible with increasing numbers of tags that encode fine-grained morphological information or grammatical functions. Parsers can access larger contexts through tree representations. Previous research using context-free parsing found no significant improvement in tagging accuracy for English, but Hinrichs and Trushkina (2003) achieved very good results for German using a tagset of 718 tags. They report 87.69% tagging accuracy for a probabilistic context-free parser, while the HMM only achieves 80.61%. This significant error reduction comes at the price of higher processing costs and requiring structurally labeled training sets.

Classification-Based Tagging

Many different machine learning classifiers have been explored for part-of-speech tagging. They generally use neighboring words and part-of-speech tags, and information about possible tags for the current word as features, make local decisions for one word at a time, and don't try to estimate probability distributions for tags.

Memory-Based Learning

Memory-based learning in its simplest form stores all training examples in memory and retrieves the closest matching training instance(s) when a new data point is to be labeled. In the case of part-of-speech tagging, each data point consists of a word, its tag, and its context (usually the neighboring two words and their tags). It is a form of k-nearest-neighbors modeling, although for efficiency the data is often stored in a decision tree.

The approach is based on the assumption that stored learning instances can be directly re-used, no abstraction is needed for learning. While this makes the learning phase very simple and efficient, a lot of computation needs to be done during actual tagging since finding the nearest neighbor is a costly operation. Other names for this technique found in the literature are example-based, exemplar-based,

case-based, instance-based, similarity-based, lazy, and nearest-neighbor learning.

An important part in a memory-based system is the distance function used. Daelemans *et al.* (1996) used an approach named IB-IG. The distance function is expressed as

$$(11)\ \Delta(X, Y) = \sum_{i=1}^{n} G(f_i)\delta(x_i, y_i)$$

with the distance between the individual features of X and Y being

$$(12)\ \delta(x_i, y_i) = \begin{cases} 0 & \text{if } x_i = y_i \\ 1 & \text{otherwise} \end{cases}$$

and $G(f_i)$ being a weight assigned to the ith feature. The weight is set to the information gain of that feature, expressing the average amount of reduction in training set entropy when knowing the value of this feature. Daelemans *et al.* (1996) reported 96.4% accuracy on WSJ data.

Support Vector Machines

Support Vector Machines (SVMs) are binary classifiers based on vector representations of training instances that find a hyperplane between two classes such that the distance (margin) between the closest training examples and the hyperplane is maximized. The same features as for the other methods are used, i.e., current and neighboring words and tags, character-based features for unknown words. Nakagawa *et al.* (2001) experimented with various feature sets and reported accuracies up to 97.1% on WSJ data.

One reason for their success is that SVMs directly aim to minimize error rates. Statistical methods maximize probabilities, which is not necessarily correlated with error minimization. The major disadvantage of SVMs is their high computational cost. Nakagawa *et al.* reported training times around 16.5 hours on 100 000 tokens and tagging speeds around 20 tokens/second.

Other Classifiers

Virtually any classifier can be used for part-of-speech tagging. Better-known techniques include the use of neural networks and decision trees. The latter also play a major role in memory-based tagging. In addition to their direct use for tagging, they can be used for estimating n-gram probabilities and for smoothing by interpolating with parent nodes. Schmid (1994) reported 96.4% accuracy for this method on WSJ data.

Transformation-Based Tagging

The main idea behind transformation-based learning is that an initial 'dumb' method is corrected by rules that were learned from comparing the initial system's output to correctly labeled data, hence this method is also known as 'error-driven learning.' Hindle (1989) suggested such a procedure in combination with a parser. He came to the conclusion that requiring rules to be 100% correct is an unattainable idealization, and suggested learning an ordered list of rules by analyzing errors made by earlier assignments. In addition to words and tags, the rules were allowed to use the state of the parser as context information. He reports an accuracy of 97% on the Brown corpus using 46 tags.

The Brill Tagger

Brill (1995) improved the initial tagger and separated rule learning from the use of a parser. His initial tagger assigns the most common category for each word found in the training corpus. Unknown capitalized words are considered proper nouns. Unknown non-capitalized words are assigned the most common category of words that share the same three-letter suffix. This initial tagging procedure already achieves an accuracy of 92.1%.

Brill's algorithm then learns rules (patches) that correct errors made by the initial tagger by comparing its output on a held-out data set to the true tags. The rules are of the form 'change tag **a** to tag **b** if condition **C** applies.' Condition **C** is allowed to inspect the tags of the previous two and next two words, and to check whether the current or previous word is capitalized. A possible rule to be learned by the system is: change the tag of a word from noun to verb if the previous word is tagged as a modal. For each possible rule, one calculates the number of corrected errors, and the number of newly introduced errors. The rule with the greatest net improvement is added to the list of rules. The rule acquisition procedure proceeds with a greedy search until no further rules with a net improvement can be found. Brill reports an accuracy of 94.9% with 71 learned rules.

This work aims at learning rules that are similar to those created in a purely manual approach. The compactness of the representation favors this method if manual inspection and/or improvement is desired.

Later work extended the set of rule templates to also inspect the previous two and following two words instead of just their tags, and allowed the inspection of longer affixes for handling unknown words. This expansion resulted in an improved tagging accuracy of 96.5%.

Finite-State Interpretation of Brill's Tagger

Brill's original algorithm of rule application is inherently slow because each rule is compared to each

position in the text, regardless of previous comparisons and previous partial matches, and interactions between rules might cause multiple changes of the same tag. Using this observation, Roche and Schabes (1995) presented an efficient reformulation as a finite-state transducer.

The resulting tagger operates in time linear to the length of the text independent of the number of rules and size of context inspected. In practice, a speedup by a factor of more than 20 compared to Brill's original tagger is reported.

Manual Rule Construction

Most of the current work on part-of-speech tagging involves machine learning techniques. Early taggers used manually constructed rules, but Hindle (1989) observed that automatically learned rules have approximately half the error rate of manually generated rules for the Brown corpus.

There is one notable exception. Voutilainen and Tapanainen (1993) used the Constraint Grammar framework for assigning part-of-speech tags. In an initial step, possible tags are assigned to each word by a lexicon lookup. Then, finite-state rules successively remove wrong readings. Remaining ambiguities are resolved by heuristics. They report accuracies well above 99% using the Constraint Grammar tagset. A critical observation regarding the reported performance is that the tagset is not comparable to other sets, and maybe other methods would also achieve such high accuracy when using this tagset. Chanod and Tapanainen (1995) countered this criticism. They spent roughly the same time training a HMM tagger and a Constraint Grammar tagger for French. The HMM achieved 96.8% accuracy, the manual rules achieved a significantly higher result of 98.7%. Similar results can be found for English.

A trade-off for the higher accuracy is the manual work of constructing rules that requires linguistic experts. Machine learning only requires a tagged corpus, or a lexicon and raw text, which are readily available for many languages.

Classifier Combination

Classifier combinations, also known as classifier ensembles or stacked classifiers, can lead to significantly improved tagging accuracies. Classifiers are combined by voting; weighting; or using a second-level classifier.

In a heterogeneous combination, several different types of classifiers are combined. Brill and Wu (1998) combined three taggers (transformation-based, maximum entropy, HMM) and achieved accuracies up to 97.2% using a second-level classifier. Van Halteren *et al.* (2001) combined four taggers (transformation-based, memory-based, maximum-entropy, and HMM) and also reported up to 97.2% accuracy on WSJ data.

A homogeneous combination uses the same classifier trained on different data sets or variations of the same data. 'Bagging' resamples the data to generate several training sets, 'Boosting' retrains on the same data but increases weights for instances that were tagged incorrectly during the last iteration. Abney *et al.* (1999) reported on accuracy of 96.7% on WSJ data for Boosting.

Collins (2002) presented the use of the single-layer perceptron algorithm to train a Hidden Markov Model. The straightforward use of this algorithm only yields 96.3% on WSJ data. But storing intermediate models and combining them improves accuracy to 97.1%.

A different approach to classifier combination is described by Hajič *et al.* (2001). They combined a rule-based system and a HMM. The rule-based system performs partial disambiguation, the HMM disambiguates the rest.

Tagging Unknown Words

Any new text will contain some fraction of unknown words, i.e., words not found in the tagger's lexicon. The exact number depends on the language, size of the lexicon, and the domain of application. Ignoring unknown words usually leads to a significant deterioration of tagging results. As an example, Brants (2000) reported a tagging accuracy of 97.7% for those 88.1% of German words that are known to the tagger, and 89.0% for the unknown words, yielding an overall accuracy of 96.7%. Not processing unknown tokens, e.g., by assigning a special tag *don't-know*, would result in an overall accuracy of 86% only.

Major signals for determining unknown word categories are word prefixes and suffixes. These do not necessarily coincide with linguistically motivated units but refer to character sequences for which probability distributions are collected from a corpus. An unknown word is processed by retrieving the longest matching affix and the part-of-speech distribution that is shared by words with the same affix, possibly applying smoothing with shorter affixes. Other signals include capitalization, occurrence of digits, hyphens, symbols, and words in the context.

Affix estimates are best taken from infrequent tokens because these are most similar to unknown words. Consider the example in Table 1. Line (1)

Table 1 Distribution of tags for words ending in *-ion* in the WSJ corpus

-ion	*NN*	*CD*	*NNP*	*JJ*	*VB*	*VBP*
(1) tokens	55.27%	36.44%	7.13%	0.73%	0.24%	0.17%
(2) types	74.72%	0.43%	13.54%	9.25%	1.20%	0.69%
(3) low-freq tokens	79.81%	0.09%	13.78%	5.83%	0.36%	0.14%

contains the distribution of tags for word occurrences (tokens) ending in *ion*. Such a word is likely to be either a noun (NN) or a number (CD). However, very few different number words (types) end in *-ion* (line 2). Line (1) is skewed by the frequent occurrence of just three different words: million, billion, and trillion. It is unlikely to find a different number word ending in *-ion* in new text, although not impossible. Just looking at the distribution of infrequent words gives a much better picture. Line (3) is derived from words occurring 10 times or less. There, CD receives a very small probability.

Brants (2000) inspected suffixes up to length 10; the prefix is used only to identify capitalized words. Probabilities were smoothed by linear interpolation with shorter suffixes. This method achieves 85.5% for unknown tokens on WSJ data. Samuelsson (1993) showed that such a method can yield good results even when applied to all tokens. Nakagawa *et al.* (2001) use SVMs for affix analysis and report accuracies up to 87.1% for unknown words.

An alternative to machine learning approaches is the manual construction of huge lexicons and using them in combination with the automatically trained lexicon, e.g., by Hajič for a maximum entropy model, or Erjavec and Dzeroski (2004) for an HMM.

Closely related to the unknown word problem is the unknown tag problem, i.e., we find a word in our lexicon but the correct tag is not listed. This causes around 1% (absolute) error in WSJ data when generating a lexicon from the training data. The problem is currently best addressed by large manually created lexicons or morphological analyzers.

Tagging without or with Fewer Spaces

Chinese and Japanese do not explicitly mark word boundaries. These languages require an additional step of segmentation, separating a stream of characters into words. A common strategy is to first segment the text, then run the part-of-speech tagger of your choice. An alternative is to address these two tasks simultaneously. This requires adaptation of tagging algorithms but has the potential for higher accuracies.

Ng and Low (2004) compare several architectures. Running a segmenter followed by a word-based part-of-speech tagger yields a character-based accuracy of only 84.1%. Having the tagger assign tags to characters instead of words and using character-based features results in a much higher accuracy of 91.7%. Combining segmentation and character-based tagging into one maximum-entropy-based model yields an accuracy of 91.9%. This slightly higher accuracy comes with the price of 10 times longer processing times.

Kudo *et al.* (2004) used Conditional Random Fields to jointly assign segment boundaries and part-of-speech tags to Japanese texts. They reported a combined segmentation/part-of-speech F-Score of 98.31% on the Kyoto University Corpus (please note that Chinese and Japanese use different evaluation metrics). This is significantly higher than results reported for HMMs, maximum-entropy-based tagging, and rule-based tagging.

Agglutinative languages like Finnish, Hungarian, Turkish, and Korean create words by combining a potentially large number of morphemes. For these languages, the morpheme is a better unit to assign part-of-speech tags. Assignment on the word-level would lead to thousands of different tags. These languages either require an additional step of segmentation, or separate tag assignments for different morphemes without explicit segmentation.

Hakkani-Tür *et al.* (2000) use the notion of inflectional groups as the building blocks of Turkish words. They use an HMM to identify inflectional groups and assign part-of-speech, and report an accuracy of 93.95%.

A different approach to tagging agglutinative languages and other languages with potentially huge tagsets is to systematically reduce the number of tags used without losing too much information. Tufiş *et al.* (2000) presented a procedure named 'tiered tagging.' Several tags of the surface tagset are combined into one tag of the internal tagset such that the external tag can be recovered in most cases. They reduced the tagset from 2148 to 119 tags. Accuracy with the reduced tagset is 97.49%.

Comparison of Tagging Results

State-of-the-art taggers based on HMMs, Maximum Entropy, Transformation-Based Learning, and Memory-Based Learning achieve accuracies between

Table 2 Part-of-speech tagging accuracies reported for the *Wall Street Journal* portion of the Penn Treebank

Method	*Accuracy*	*Reference*
Model Combination	97.2%	Marquez *et al.*, 1999
Model Combination	97.2%	van Halteren *et al.*, 2001
Cyclic Dependency Network	97.2%	Toutanova *et al.*, 2003
Support Vector Machines	97.1%	Nakagawa *et al.*, 2001
Perceptron	97.1%	Collins, 2002
AdaBoost	96.7%	Abney *et al.*, 1999
Hidden Markov Model	96.7%	Brants, 2000
Maximum Entropy Model	96.6%	Ratnaparkhi, 1996
Transformation-Based Learning	96.6%	Brill, 1995
Memory-Based Learning	96.4%	Daelemans *et al.*, 1996

96.4% and 96.7% on the WSJ corpus. These algorithms have been tested on a large variety of data sets and languages, generally with good results. Newer, more complex models achieve accuracies between 96.9% and 97.2%. So far, these models have been tested on a much smaller variety of data sets. Table 2 lists state-of-the art tagging accuracies on *Wall Street Journal* data found in the literature. For comparison, human accuracy is 98%–99%.

Accuracies reported by different authors usually need to be taken with a grain of salt. The major source of differences is the use of different corpora and/or tag sets. Such a difference makes a direct comparison impossible. Therefore, Table 2 only includes results on the WSJ portion of the Penn Treebank. Another major difference is the amount of training data used. Generally, more data is better, and while learning curves are relatively flat at 1 million words, we still expect improvements when increasing the data size by one order of magnitude. Some variation is caused by the way the data is split. Single splits into one training set and one test set are especially susceptible to random variation. Performing a 10-fold cross-validation reduces the variation: the data is split into 10 parts, and the experiment is repeated 10 times. Each time, 1 part is used for testing, the other 9 for training. Even with this method, there is room for variation. Splitting into 10 contiguous chunks, then using 9 for training and 1 for testing usually yields slightly worse results than splitting sentence-wise, i.e., take 9 sentences for training and 1 for testing. Cross-validation also allows to accurately assess the variation in results.

An occasional practice is to test many parameter settings and then report the best results. This yields biased results since it uses parameters that are optimized on the test set. A better experimental setup is to have at least three different data sets: one set for general training, one development set for tuning and optimizing additional parameters, and one test set, on which the final evaluation is done based on the optimal parameter setting found with the help of the development set. This setup can be combined with cross-validation and reporting of averaged results.

Error rates give an indication of the tagging quality. For practical applications, other aspects need to be considered as well. Even a tagger with high error rate can be useful if the errors mostly involve distinctions that are irrelevant for the application. Another consideration is speed and its potential trade-off with accuracy.

Conclusions

Part-of-speech tagging now is a relatively mature field. Many techniques have been explored. Accuracies for English are around 97%, and newly published work tends to report on relatively small improvements in accuracy at high processing costs. A notable exception is tagging with very large tagsets, e.g., for agglutinative languages, or in cases where very fine-grained morphological and grammatical distinctions are added to the tagset. Here, current accuracies tend to be around 80–90% or even lower, leaving room for improvement. Other ongoing work addresses the creation of taggers for additional languages, which usually involves semi-automatic labeling of training data.

Part-of-speech tagging was originally intended as a pre-processing step for chunking and parsing. Today, it is also used in applications like named-entity recognition, information extraction, and question answering, and it has aided linguistic research on language usage. Some applications can be re-formulated as tagging tasks, so that tagging techniques can be directly applied, e.g., to named entity recognition, chunking, or even parsing.

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See also: Computational Lexicons and Dictionaries; Corpora; Information Extraction, Automatic; Named Entity Extraction; Parsing: Statistical Methods; Treebanks and Tagsets.

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Partridge, Eric Honeywood (1894–1979)

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Eric Partridge was the last example of the self-styled lexical adventurer, creating brilliant works through hard labor and native intelligence.

Born on a farm near Gisborne, North Island, New Zealand, he later moved with his family to Brisbane, Australia, where he learned to love writing. He read classics at the University of Queensland, but later changed to French and English.

His studies were interrupted by World War I, during which he served in the Australian infantry. He saw battle at Gallipoli and was wounded on the Western Front. His wartime experiences were later recorded in *The long trail, songs and slang of the British soldier*, published in collaboration with novelist John Brophy.

After the war, he completed his B.A. in Brisbane and received an M.A. from the University of Queensland, which later awarded him an honorary D.Litt. He also studied at Oxford from 1921 to 1923, where he took first class honors. He taught briefly at a grammar school, and between 1925 and 1927 at the universities of Manchester and London. Public performance, however, was not something he enjoyed, due in part to his dread of repetition.

In 1925, he married Agnes Dora (1893–1978). They had a daughter, Rosemary Ethel Honeywood Mann.

In 1927, he founded a small publishing imprint, Scholartis Press, which failed four years later, during the Depression. Scholartis served primarily as an outlet for his own pseudonymous fiction, but it was also where his interest in slang was revealed. Among the books published were *Songs and slang of the British soldier* (1930); Godfrey Irwin's *American tramp and underworld slang* (1930); and Partridge's edition of Francis Grose's *Classical dictionary of the vulgar tongue* (1931).

After the bankruptcy, the chairman of the publisher Routledge commissioned Partridge to create the *Dictionary of slang and unconventional English* (1937). That work made his reputation. A posthumous ninth edition, under the editorship of Terry Victor and Tom Dalzell, is expected in 2005.

During World War II he served in clerical support roles, but this led directly to his editing of *A dictionary of forces' slang*, after which he began *A dictionary of the underworld, British and American* (1949). In 1958 he came out with *Origins, a short etymological dictionary of modern English*, which, while not perfectly reliable as an authoritative source, advanced many new theories on word origins and called into question the work of previous etymologists.

Partridge was a constant fixture at the British Library and a player of tennis and cricket. Although he suffered from cancer, he continued to work until his death at the age of 85.

His work and his outlook on language are best summed up by his response to a questionnaire he received in his eightieth year. He wrote in part, "That scholar who forgets that language was created by people, not in a laboratory, and that it lives – or at one time lived – only by and in people, and that its entire raison d'être is to communicate, to express and serve civilization, not to exemplify some grammatical or philological theory, is strangely lacking in a sense of proportion or even common sense."

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Current Research

Current research on statistical parsing spans all of the aspects above, and includes other topics that are receiving increasing attention. Now that parsers are finding more applications, it has become clear that even the best statistical parsers suffer substantially degraded accuracy when applied to text that is very different in character from the data (usually newswire) they were trained on. Medical text, web pages, and spoken language are just a few domains where this degradation occurs, and techniques for adaptation are just starting to be investigated. Another relatively recent topic of interest is the production of parsers that can produce semantic structures of some kind, for example the identification of semantic roles or the conversion of a parse into predicate-argument structure (Gildea and Jurafsky, 2002).

Of course, improving the accuracy of parsers is always of value – on the task of parsing the Penn Treebank, top parsing accuracies are in the very low 90% range. While some parser errors seem difficult to resolve in an automatic fashion without serious models of semantics and real-world knowledge, most errors are still the kinds that might reasonably be improved with better statistical models.

For further reading on statistical parsing methods, see Manning and Shütze (1999) and Jurafsky and Martin (2000).

See also: Categorial Grammars: Deductive Approaches; Chart Parsing and Well-Formed Substring Tables; Language Processing: Statistical Methods; Parsing and Grammar Description, Corpus-Based; Part-of-Speech Tagging; Treebanks and Tagsets; Unification: Computational Issues.

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Barbara Hall Partee, Distinguished Professor Emerita of Linguistics and Philosophy at the University of Massachusetts at Amherst, has focused her research career on the area of formal semantics and its association with syntax, pragmatics, and logic, with a special interest in quantification. Her work in the field has been characterized by active attempts to embrace and to synthesize diverse works and diverse perspectives such as mathematics and linguistics, formal semantics and syntax, philosophy and cognitive science, and transformational and non-transformational

approaches to grammar, as well as a willingness to tackle hard problems and large-scale tasks such as the study of quantification in formal semantics and the compilation of a grammar of English using generative descriptions (Stockwell *et al.*, 1972).

In a semi-autobiographical essay (Partee, 2004) focusing simultaneously upon her own career and the entire field of formal semantics, Partee characterized herself as having been "ideally prepared for a field that didn't exist" – a field that she clearly helped bring into being. Beginning with a B.A. in mathematics and minors in Russian and philosophy from Swarthmore College (1957–1961), Partee brought diverse areas of inquiry into a unique synthesis and has kept them functioning in concert throughout her career. Partee was a member of the first doctoral class to enter and graduate from the Linguistics Department at the Massachusetts Institute of Technology, and she was the only woman in her department for the next four years. Partee attributes reduced expectations in terms of the career paths for women at the time to giving her the opportunity to pursue the esoteric combination of mathematics, philosophy, and linguistics that prepared her for the highly interdisciplinary theoretical field of formal semantics.

Partee's dissertation on 'Subject and object in modern English' (Hall, 1965, published as Partee, 1979) prefigured lexical semantic work by others on argument structure and unaccusativity that would follow only decades later and that would fail to recognize her original contribution to the analysis. In recent years, she returned to lexical semantics in collaborative work with her husband on the Russian genitive of negation (Borschev and Partee, 2002). However, she is most famous for her work in the formal semantics of reference and quantification. She pursued a research agenda grounded in formal semantic theory at a time when 'linguistics wars' were waging between linguists regarding the role and relevance of semantics to linguistic theory and managed to retain the respect of members of both camps while continuing to be a major player in bringing semantics to the core of linguistic curricula. Partee can also be credited with bringing the seminal work of Richard Montague, logician and philosopher, to the forefront of the field of linguistics after his untimely death in 1971 and with coining the term 'Montague Grammar.'

Partee's prominence in the field is corroborated not only by the proliferation of colleagues she has shepherded into the profession, but also by evidence of almost continual grant support from the National Science Foundation, IREX, Fulbright, The National Endowment for the Humanities, and other sources, as well as a host of accolades, including the presidency of the LSA (1986); honorary doctorates from Swarthmore (1989), Charles University (1992), and others; election to the American Academy of Arts and Sciences (1984), the American Association, and the National Academy of Science (1989); and being an honorary member of the Prague Linguistics Circle (1995) and fellow of the American Association for the Advancement of Science (1996), to name only a few.

See also: Montague, Richard (1931–1971).

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Participatory Research and Advocacy

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Linguistic studies that can legitimately be classified as 'participatory research and advocacy' typically include face-to-face fieldwork within speech communities resulting in findings that support greater equality and opportunity for members of the corresponding language community (or communities). Concepts of community vary across disciplines; advocacy may often be limited to subsets within a given society or culture, such as members of ethnic or religious minorities, or recent immigrants who are not yet proficient speakers or writers of the local dominant language(s).

Whereas some linguists devote attention to particular regions, others devote primary attention to members of racial groups. Others may choose gender or sexual orientation as the basis of their studies and corresponding public advocacy.

One of the earliest recorded linguistic acts of public advocacy underlies the classical Sapir-Whorf hypothesis that gave rise to the concepts of 'linguistic relativity' and 'linguistic determinism.' When pondering the relationship between language and thought processes, Sapir and Whorf hypothesized that certain linguistic concepts tended to directly influence human perceptions and thought processes. These formulations varied from language to language, typically resulting in alternative ways of describing (and perceiving) the same object or concept in two or more different languages. Their pioneering efforts grew directly from Whorf's occupation as an insurance adjuster who worked with Native Americans. Whorf observed that considerable linguistic confusion and ambiguity existed between English and Hopi. He hoped that his linguistic analyses might better serve his employer, a prominent insurance company, resulting in adjustments in policies and practices that would not only be safer for the Hopi, but which might ultimately save his employer money at the same time.

Milestones in social history tend to parallel advances in studies of language in use that have relevance beyond that of basic research. When president Lyndon Johnson declared war on poverty in the United States, William Labov began his quest for socially based linguistic analyses that revealed differences in reading abilities and the logic of nonstandard English (see Labov, 1972). Labov's mentor, Uriel Weinreich, used many explicit linguistic illustrations to account for differences in pronunciation that were attributed to Yiddish. In doing so he simultaneously shattered many bigoted stereotypes about Yiddish and its speakers (see Weinreich, 1953).

Labov's advocacy for speakers of nonstandard English was direct and emphatic on many occasions, particularly when he dispelled linguistic and cognitive myths regarding the inferiority of vernacular Black English, as well as other nonstandard dialects. Wolfram *et al.* (1999) extended educational advocacy to others who spoke nonstandard varieties of American English in overt ways, including educational exhibits and documentary films.Weinreich's early efforts regarding the linguistic liberation of Jews in the United States were indirect, and ancillary to advances in linguistic science regarding evaluations of languages and dialects in contact. Labov and Wolfram's independent acts of linguistic advocacy have been intentional and consistent with applied linguistic tradition.

Within the United States, issues of linguistic advocacy became pronounced with the 1974 passage of the National Council of Teachers of English resolution regarding 'Students' right to their own language.' Despite the predominance of English in the United States, delegates of the NCTE "became concerned in the early 1970s about a tendency in U.S. society to categorize nonstandard dialects as corrupt, inferior, or distorted forms of standard English, rather than as distinct linguistic systems, and the prejudicial labeling of students that resulted from this view."

The NCTE's concern had been informed by an extensive body of sociolinguistic literature, some of which was directly devoted to language development for educational and professional purposes. Others were devoted to studies outside of educational settings. Works by Abrahams (1985), Fought (2003), Kochman (1981), Rickford and Rickford (2000), Wolfram, Adger and Christian (1999), Valdés (1996, 2003), Zentella (1997), and others were indicative of linguistic scholars who had served directly or indirectly as advocates for speakers of minority languages or dialects.

England and Australia witnessed different approaches to matters of social and educational advocacy in the works of Bernstein (1971, 1975) and Halliday (1994). Bernstein (1971) was well known for his formulation of the concepts of 'elaborated codes' and 'restricted codes' based on studies in England. Halliday (1994) embraced complex models of language usage that were holistic, seeking to be comprehensive and universally applicable. Research by Cheshire (1982), Giles and Coupland (1991), and Milroy (1987) added alternative models of

research that explored second dialect acquisition, social networks and their linguistic consequences, and the impact of linguistic accommodation. Trudgill's (2000) broad, English-based studies provided the foundation for comprehensive surveys of the entire field of sociolinguistics. As is the case in the United States, efforts among linguists throughout the world to serve as social advocates include direct and indirect approaches.

Another dimension of linguistic advocacy is related to sex. Eckert and McConnell-Ginet (2003), Holmes and Meyerhoff (2003), and others analyzed actual and idealized differences in men's and women's language, and the usage of language among women when men are absent. The advocacy dimension that these works share sought to advance greater opportunities and equality for women worldwide. They cut across race, region, class, and education, which are often discussed in isolation of matters pertaining exclusively to women.

Skutnabb-Kangas and Phillipson (1994), Alexander (1989), Gibson (2004) and Mesthrie (1992) sought to address 'human linguistic rights' as a generic subject, or as related to the specific sociolinguistic and political circumstances of specific nations. Complementary studies of linguistic foundations of social strife were developed by Joshua Fishman, growing directly from his pioneering studies of the sociology of language.

Additional linguistic research devoted to public advocacy of various kinds, say, attending to education, women, or uses of language in the workplace, will often have an explicit regional orientation. This survey does not adequately reflect efforts by scholars who study their local linguistic community (or communities) with sensitivity to their immediate sociohistorical circumstances.

Pennycook's (1998) studies of language usage in Australia and elsewhere had relevance to other nations that are post-colonial with populations from diverse backgrounds. Similarly, Bortoni's (1985) linguistic studies in Brazil drew attention to the special plight of indigenous people in the wake of European colonization and its corresponding educational consequences. Many other studies of indigenous people strove to advance linguistic dignity with greater educational and social opportunities for people who were, or remain, marginalized – if not displaced – in their native homeland. These concerns are strongly evident in societies that are former European colonies, where European languages continue to serve dominant institutional functions while indigenous languages are often subordinate.

Differences in social opportunity become pronounced when viewed in terms of the distribution of various social services that are provided either publicly or privately in nations throughout the world. Linguistic research has also observed differential access to medical treatment or justice based on proficiency, or the lack thereof, of the dominant standard language in a given society.

Medical applications of linguistics also fall within the realm of advocacy research, and Labov and Fanshel's (1977) *Therapeutic discourse*, which was complemented by Ferrarra's (1994) *Therapeutic ways with words*, was illustrative of analyses that employed discourse analyses to the benefit of medical application in general, and therapeutic application quite specifically. Studies of doctor/patient interaction are pervasive, as are studies of language usage in the courts. Policy implications abound from these efforts, because they frequently expose the relative linguistic strengths and weaknesses that exist within a society, particularly if that society seeks to serve populations that do not share a common language or culture.

Preston's (1989) studies of dialect perceptions emphasized another reality; namely, that people tend to judge others' linguistic behavior based on egocentric impressions that are reflective of personal linguistic exposure. Long before Preston discovered this among speakers of English throughout the United States, Lambert (1972) and Tucker and Lambert (1972) demonstrated that bilingual and bidialectal attitudes toward speakers of other languages or dialects are firmly entrenched, and they have real consequences for people who are perceived to be more or less qualified for jobs or educational opportunities based on their speech.

Research by Baugh (2003) and Smalls (2004) explored the consequences of linguistic profiling and other forms of linguistic discrimination in U.S. housing markets, where speakers of minority dialects or languages have been denied access to fair housing or fair lending over the telephone. Whereas the courts in the United States are well equipped to prosecute cases where alleged racial discrimination is based on face-to-face encounters, Smalls (2004) demonstrated that U.S. courts are less capable of prosecuting cases where discrimination takes place during telephone conversations. Complementary dialectology studies illustrate that stereotypical names associated with particular racial groups within the United States result in different opportunities in the workplace. For example, identical resumes were submitted to prospective employers with only the name of the applicant changed. Jamal is less likely to get a job than is Greg, and Lakisha is less likely to get a job than is Emily; that is, with all other professional and personal attributes being strictly controlled by experimental design.

These more recent studies of linguistic prejudice have direct legal and policy implications that are currently reflected by a body of scholarship devoted to linguistic applications under special circumstances (e.g., with respect to lending practices, helping to overcome linguistic barriers to unequal access to fair housing, or the extent to which voice identification plays a direct role in civil and criminal legal proceedings (see Smalls, 2004)). Building upon studies of linguistic perceptions that were pioneered by Preston (1989), Giles and Powesland (1975), Labov (1972), Wolfram (1991) and others, studies of linguistic profiling began when Purnell, Idsardi, and Baugh (1999) exposed clear patterns of racial discrimination in housing markets based exclusively on telephone conversations. Those findings were replicated and modified by Massey and Lundy (2001), who integrated their innovative linguistic and sociological experiments into course work. Graduate students from different racial backgrounds made systematic telephone calls to prospective landlords, revealing a statistically significant bias against housing opportunities for poor African American women, in greatest contrast to white males who were proficient speakers of Standard American English.

Small's (2004) legal analysis titled 'Linguistic profiling and the law' provided a comprehensive survey of U.S. court cases where African American voice identification played a central role. Her efforts grew directly from observations made regarding a Kentucky Federal District Court that upheld the conviction of an African American defendant, based on the testimony of a white police officer who had never seen the defendant in person, but who had previously heard the alleged voice of the defendant through a wiretap.

In South Africa we find that Alexander's (1989) formulation of an expansive national language policy was a direct political result of efforts to advance racial equality in the new South Africa. Similarly, the extraordinary global event of South Africa's Truth and Reconciliation Commission (TRC) has created an exceptional corpus of discourse that graphically confirms astonishing acts of inhumane maltreatment. Gibson (2004) went beyond the text of the TRC and accounted for many of the significant social and political circumstances that lay beyond discourse. Who held power, and who did not, influenced many non-verbal or non-linguistic events within the TRC. Speakers needed to compose themselves; others wept openly, while still others seethed with controlled anger. The transcript alone does not fully convey the meaningful exchange of information that was communicated during the TRC.

The scholarly ventures described here, and many others that are supported by scholars throughout the world, continue to use linguistic science in support of advancing greater social opportunities and justice among linguistically heterogeneous people. Within the context of the current global economy, those who support these efforts do so frequently to the benefit of advancing enhanced communication among diverse populations. I believe such efforts are consistent with the enduring quest to advance world peace.

See also: Applied Linguistics in Africa; Applied Linguistics in North America; Bilingualism and Second Language Learning; Code Switching and Mixing; Discourse Studies: Second Language; English, African American Vernacular; English: World Englishes; Gender and Political Discourse; Gender, Sexuality and Language; Identity: Second Language; Interactional Sociolinguistics; Language Attitudes; Language Development: Overview; Language in the Workplace: Different Approaches; Language Loyalty; Law and Language: Overview; Politics, Ideology and Discourse; Prestige, Overt and Covert; Sociolinguistics and Political Economy; Speech and Language Community; Style and Style Shifting; Teacher Preparation: Second Language.

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Particles in Spoken Discourse

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The term 'discourse particle' is relatively new in descriptions of English but has long been recognized in grammars of, for example, Russian. There, particles are words that do not belong to any of the major word classes and do not have a syntactic function. They provide cohesion between chunks of discourse or signal the attitudes and expectations of speakers and writers. Grammars of English have used the term 'particle' for items such as *in* and *up* in phrases such as *hand in* and *give up*. Instead of 'particle' Quirk and Greenbaum (1973: 242–250) talked of disjuncts and conjuncts. Disjuncts, such as *personally* and *frankly*, convey speakers' comments on the content of what

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they are saying. Such comments disrupt or disjoin texts, hence the term 'disjunct.' Conjuncts link different pieces of text and do not contain comments on their form or content. Examples are *firstly*, *secondly*, *lastly*, *moreover*, *on the other hand*, and *in contrast*. Quirk and Greenbaum (1973) emphasized that conjuncts are different from conjunctions; as will be seen later, certain subordinating conjunctions, such as *because* and *although*, are used in unplanned speech as if they were conjuncts. Fraser (1998) and Schiffrin (2000) used the term 'discourse marker,' and Ostman (1981) and Meyerhoff (1994) used 'pragmatic particle.'

The Function of Discourse Particles

The application of these terms is controversial. Fraser (1998) treated discourse particles or markers as indicating relations between propositions; Schiffrin (2000) treated them as signaling relations between units of text and also the process of social interaction. Quirk and Greenbaum (1973) agreed with Schiffrin; their disjuncts and conjuncts cover relations between propositions and speakers' attitudes. Halliday and Hasan (1976) likewise listed a broad range of functions for discourse particles or markers. The range of discourse particles can be extended even further. In his discussion of mood and modality, Palmer (2001) gave examples of languages with modal systems closely related to the interaction between participants in discourse. These modalities are expressed by items that look like discourse particles, as in (7a) through (7e). As Schiffrin (2000: 67) put it, the production of coherent discourse is an interactive process that requires speakers to use not just their grammatical knowledge but their awareness of what has or has not been understood by the listener, their knowledge of how to indicate their attitude to what the previous speaker has said, and their knowledge of how to maintain good relationships with the other participant(s) in the discourse.

Discourse Particles in Spoken and Written Language

Fernandez (1994: 144–158) reported that the spoken version of a text may be considerably longer than the written version because of the speaker's use of discourse particles. Her remarks were based on the comparison of the spoken version of a conference paper (recorded on tape) and the written version. The written version begins "*La difficulté fondamentale (insurmontable?) en traduction automatique* . . . ." [The fundamental (insurmountable?) difficulty in machine translation . . .] The spoken version runs, "*alors la difficulté fondamentale en fait en traduction automatique* . . . ." The particle *alors* signals that the speaker is about to begin, while the particle *en fait* [in fact] highlights *la difficulté fondamentale*. The spoken text was some 30% longer than the written text.

Both writers and speakers use discourse particles, but different particles occur in unplanned speech/conversation and in various types of written text. In particular, conversation lends itself to the use of particles signaling a given speaker's attitude to information conveyed by the previous speaker. The interactive nature of conversation leads to the use of particles signaling the receipt of information or checking whether information has been received. Such particles occur regularly in conversation but are particularly frequent in the task-related dialogues studied by Anderson *et al.* (1991). The task of the participants in these dialogues was to cooperate in drawing routes on maps. The instruction givers had maps with routes and sets of landmarks; the instruction followers had maps with the start of routes and sets of landmarks; the two sets of landmarks were not identical. Checking and back-channel particles such as *right?* and *OK?* with different pitch patterns were particularly frequent when the participants were hidden from each other by a screen.

Checking and back-channel particles aside, particles occur regularly in different types of text. According to Biber *et al.* (1999: 880), linking adverbs are most frequent in academic writing (7100 per one million words), slightly less frequent in conversation (5900 per one million words), and relatively infrequent in fiction and newspapers (2200 and 1800 per one million words, respectively). The higher figure for conversation results from the intensive use of *so* and *then*, which are infrequent in academic writing. In contrast, academic writing offers a wide range of linking particles, such as *for example*, *in addition*, *nevertheless*, *furthermore*, and *hence*. These were infrequent in the corpus of conversation analyzed by Biber *et al.* (1999). According to them, given what is known about the effect of prolonged formal education on people's speech, it can safely be supposed that such linking particles are very rare in most spontaneous conversation; for example, they were not found in the conversations analyzed by Miller and Weinert (1998), even in conversation between mature university students.

Can generalizations be made about where discourse particles occur in clauses/utterances? Schiffrin (2000: 57) defined discourse particles or markers as sequentially dependent elements that bracket units of talk; this definition covers items such as *not only* . . . *but also*. Schiffrin elaborated the definition as follows: "i.e., [discourse markers are] non-obligatory

utterance-initial items that function in relation to ongoing talk and text." Discourse markers in English are indeed typically at the beginning of utterances, but some are not, such as *indeed* in this sentence and certain other items to be mentioned shortly. Discourse particles in languages other than English are not confined to utterance-initial position; German particles such as *doch* 'after all, surely,' *schon* 'never fear, surely,' and *ja* 'truly, you know' occur in the middle of clauses, as in (1).

(1) das ist ja das was uns eigentlich interessiert
that is PART *that what us really interests*
'that is you see what really interests us' (conversation analyzed by Regina Weinert)

Discussions of discourse particles typically deal with spoken and written standard varieties. An adequate account must also cover nonstandard varieties insofar as there is information about the organization of spoken texts in such varieties. For example, some nonstandard varieties of British English have two constructions with *like*, one with *like* preceding a phrase or clause and one with *like* at the end of a clause.

(2a) right so I'm just like below the allotments just now
(2b) like I go past the collapsed shelter?
(2c) my wee girl can swim you know – she has her wings like

(2a) and (2b) are from the task-related dialogues mentioned above. The occurrences of *like* are not associated with pauses, changes in pitch pattern, or any indications of problems in planning the syntax. They seem to highlight the phrase *below the allotments* and the fact that the speaker is asking for confirmation of whether she is to go past the shelter or take some other route. In (2c) the speaker realizes that he has made a statement that might sound exaggerated, since his daughter is only three years old. The clause *she has her wings like* counters possible objections.

The Glasgow variety of Scottish English has a construction with *but* in final position, in which *but* is equivalent in discourse function to *though*. In *she'll do the job for us – she's no very big but*, the speaker makes an assertion about the person's abilities but concedes a point concerning the person's size. (But this construction has yet to be described in detail.) Interestingly, there is a Dutch construction with *maar* in final position, *maar* being, in dictionaries at any rate, equivalent to *but*.

In unplanned spoken (standard and nonstandard) English, adverbial clauses of concession, introduced by *although*, are rare. Instead speakers use main clauses ending in *though*, as in (3).

(3) the car has really heavy steering – it doesn't use a lot of petrol though

In examples such as (3), *though* is not a subordinating conjunction; it can be analyzed as a discourse particle since it signals a comment by the speaker on the content of the clause in relation to the preceding clause. That is, in uttering (3), speakers make a negative judgment about the car's steering but balance that by conceding a point in its favor.

Scottish English has one further discourse particle that is worth including because it is utterance-final and illustrates the development from a tag question to a subtle marker of attitude. Speakers can use the same tag questions as in standard English, *John has left, has he no?* and *John's no left, has he?* They also use *e*, added to both positive and negative declarative clauses, as in (4a) and (4b). Occasionally *e no* is added to positive clauses.

(4a) *we know him quite well by now e?* (= '. . . don't we') [recorded informally]
(4b) *it's no too dear e?*(= 'it's not too dear, is it?') [recorded informally]

*E*occurs in imperatives, converting them to requests, even coaxing requests. In questions the tag asks the addressee to agree with the speaker's statement; in imperatives the tag asks the addressee to agree with (and act upon) the speaker's request, as in (5).

(5a) *let me tie my lace e?* [conversation]
(5b) *put it down there e*? [conversation]

Won't you makes a request sharper – *let me tie my lace won't you*, *put it down there won't you*, but *e* always makes a request less sharp and more polite. A further development in the use of *e* is shown in (6). One day in February 2002 a customer (male, over 50) in a fast-food takeaway in Fife was asked what he would like; he replied *A mini fish supper e*? The *e* carried interrogative intonation, and the standard English equivalent is *could I have a mini fish supper please?* which is also an interrogative. In July 2002 a barber (male, 30-ish) told his colleague he had gone to a particular pub over the weekend. He looked in the mirror at the customer whose hair he was cutting and said *I like Sambuca e?* The *e* carried interrogative pitch, but the barber could hardly have been asking about his own likes and dislikes. The interpretation had to be equivalent to *I like Sambuca ken* ('you know,' 'you see') or to *I like Sambuca* with the high rising terminal used by many speakers under 35. (See Meyerhoff, 1994 on an analogous particle in New Zealand English. There is an equivalent particle in Canadian English too.)

Discourse Particles and Modality

Palmer (2001: 58–62) observes that modal verbs and modal expressions have an important part to play in discourse because participants in a discourse typically interact, expressing opinions and attitudes. In Quirk and Greenbaum's terms (1973), certain English disjuncts express evidentiality; that is, they are used to signal that the speaker/writer is not committed to the reality of a particular situation. In (6a) and (6b), *evidently* and *apparently* signal that the speaker has heard that the events happened but cannot vouch for the truth of the statements.

(6a) apparently their house was badly damaged by the earthquake
(6b) evidently they had to wait six hours in the airport

Palmer briefly described modal systems that focus on discourse relationships. In some languages, such as Cashibo (Cashibo-Cacataibo), the difference between asking a question, responding to a neutral question, and responding to a question that implies skepticism is signaled by means of different verb forms. Such a mechanism is not based on discourse particles. In other languages, such as Chinese (Mandarin Chinese), the difference is signaled by utterance-final particles. Palmer (2001: 60) called them sentence-final particles. *Ne* marks a response to a question, *ba* solicits agreement, *ou* signals a friendly warning, *a/ya* softens a command, and *ma* marks a question, as shown in the following examples, all from Palmer (2001: 61).

(7a) tamen you san tiao niu ne
they exist three CLASS *cow* PART
'(since you ask) they have three cows'
(7b) wo he ban bei ba
I drink half glass PART
'I'll have half a glass, OK?'
(7c) wo yao da ni ou
I will hit you PART
'a word of warning, I'll hit you'
(7d) ni lai a
you come PART
'please come here'
(7e) ni hao ma
you well PART
'are you well?' [= 'how are you?']

Note that speakers of English have discourse particles such as *OK*, which parallels *ba*, and Scottish English has *e*, which parallels *a*.

Conclusion

Schiffrin (2000: 67) emphasized the need for more empirical work to lay the foundations of a theory integrating discourse particles with grammatical, social, and cognitive knowledge in a general theory of discourse. The importance of discourse particles is demonstrated by the fact that their function in another language than one's first is very difficult to grasp and that nonnative speakers of any language signal their status as nonnative speakers by failing to use discourse particles or by using them incorrectly.

See also: Discourse Markers.

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Partitives

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In traditional linguistics, primarily in the Indo-Europeanistic tradition, the term 'partitive' is normally associated with partitive (meanings/uses of) genitives, which include (a) reference to body parts and 'organic' parts of objects, e.g., *the roof of the house, the lion's head*; (b) reference to a set from which a subset is selected by means of various non-verbal words, e.g., *the best among the Trojans, three of the boys, a section of the barbarians*; (c) quantification, e.g., *an amphora of wine, dozens of soldiers*; and (d) reference to 'partial objects' of certain verbs (such as *to eat, to drink,* etc.), normally alternating with accusatives, primarily in Classical Greek, Gothic and Old High German, Sanskrit, and Balto-Slavic.

The idea of partiality, to which the term 'partitive' owes its name, grows more and more vague as we proceed along this list. The last two constructions do not in fact refer to a 'part' in any reasonable sense, since there is no well-defined 'whole' to which it could relate.

The 'partitive case' is, together with the nominative, accusative, and genitive, one of the four main grammatical cases in the Finnic languages. It continues the proto-Uralic separative (ablative case) but has more or less lost its original uses in Finnic. Its central functions overlap with those of the partitive genitives and include marking partial objects and subjects, complements to nominal quantifiers, and to numerals under certain syntactic conditions. The functions of the 'partitive article' in French (and in some other Romance varieties) also include marking partial objects and subjects.

Partitive and Pseudo-Partitive Nominal Constructions

Traditionally, *a piece of the cake*, *a pile of Mary's books*, *a cup of tea,* and *a pile of books* all count as examples of 'partitive nominal constructions' (PCs) (corresponding to the second and third uses of partitive genitives listed in the previous section). On closer inspection, however, we see that only in *a piece of the cake* and *a pile of Mary's books* are we really talking of a **part** of something rather than an **amount** of some substance, as we do in *a cup of tea* and *a pile of books*. This motivates the relatively recent term 'pseudo-partitive,' coined by Selkirk (1977). Both partitive and pseudo-partitive nominal constructions are noun phrases consisting of two nominals, one of which is a quantifier (*cup*, *slice, pile*), while the other nominal will be called "quantified". Although the same quantifiers may appear in both types of NPs, their role is different. Thus, PCs involve **a presupposed set** of items or **a presupposed entity** referred to by one of the nominals (*the cake, Mary's books*), and the quantifier indicates a **subset** or a **subpart** which is selected from it. In a pseudo-partitive nominal construction (PPC), the same word merely quantifies over **the kind of entity** (tea, books) indicated by the other nominal.

Swedish, along with many other languages, makes a clear distinction between the two constructions: the quantified in PCs is marked with the preposition *av*, whereas PPCs merely consist of two juxtaposed nominals.

(1a)	en	kopp	av	de-t
	a:COM	cup	of	the-NEUT.SING
	god-a	te-t		
	good-DEF	tea-DEF.N.SING		
	'a cup of the good tea'			
(1b)	en	kopp	te	
	a:COM	cup	tea	
	'a cup of tea'			

Nominal quantifiers, or measures, create units to be counted for those entities that either do not come in 'natural units' (like mass nouns) or come in 'different units' (cf. *six bunches of carrots* and *two rows of trees*). This distinguishes them from numeral classifiers in such languages as Vietnamese and Japanese, which actualize the semantic boundaries of a given count noun by designating its natural unit. In practice there is no sharp border between the two.

Semantically, the class of quantifier nouns is quite heterogeneous and covers at least the following major semantic subtypes:

- Conventionalized measures: *a liter of milk, a kilo of apples*
- Abstract quantity nouns: *a large amount of apples*
- Containers: *a cup of tea, a pail of apples*
- Fractions/parts: *a slice of bread, a quarter of an hour, a large section of students*
- Quantums (for mass nouns): *a lump of sugar, a drop of milk*
- Collections (for count nouns): *a group of students, a herd of sheep*
- Forms (both for mass and count nouns): *a pile of sand/bricks, a bouquet of roses*.

Cross-Linguistic Variation and Geographic Distribution

The mixed nature of nominal quantifiers accounts for their double similarity, both with typical nouns and

with typical quantifiers, e.g., numerals, and is to a high degree responsible for the cross-linguistic variation demonstrated by PCs and PPCs (for the details, both synchronic and diachronic, cf. Koptjevskaja-Tamm, 2001).

Partitive nominal constructions tend to be formed with an overt marker associated with the quantified, where overt markers are either inflectional (case markings) or analytical (adpositions). Such markers normally originate as markers of 'direction FROM'/ 'separation' (e.g., the ablative case and the like) and/ or as possessive markers. The two grammaticalization sources agree well with two different 'stages' in the part-whole relations relevant for PCs: the part either still belongs to the whole (the situation often encoded by possessive constructions) or is being separated from it. In the latter case, the development of PCs most probably involves reanalysis of sentences referring to physical separation of a part from an object, such as *Give me two slices from the cake*. Examples (2) (PCs with the ablative case marker) and (3) (PCs with possessive markers) from Turkish illustrate both options (Kornfilt, 1996).

(2a) Ahmet [pasta-dan iki dilim] ye-di
Ahmet cake-ABL two slice eat-PAST
'Ahmet ate two slices of the cake'

(2b) Ahmet bakkal-dan iki şişe şarap çal-dı
Ahmet grocer-ABL two bottle wine steal-PAST
'Ahmet stole two bottles of wine from the grocery store'

(3) Ahmet [şarab-in yari-sin-i]
Ahmet wine-GEN half-3SING.POSS-ACC
iç-ti
drink-PAST
'Ahmet drank half of the wine'

For PPCs, the cross-linguistically dominating technique consists in merely juxtaposing the nominal quantifier and the quantified, as in the Swedish example (1b) above. Since PCs normally involve overt markers, in these cases there will be a clear contrast between PCs and PPCs. However, in many languages, PPCs also involve a construction marker for relating the nominal quantifier and its complement to each other – either the same as or different from the one used in PCs.

Although languages tend to have one standard PC and one standard PPC, they may occasionally show other, more marginal patterns. These are often restricted to certain semantic subgroups of nominal quantifiers and/or special contexts of use, as the Turkish possessive-like PC in example (3). In Swedish, *a group of students* can be expressed by the juxtapositional construction *en grupp studenter* or by two constructions involving prepositions: *en grupp av studenter* 'a group of students' or *en grupp med studenter* 'a group with students.' *Av* (originally an ablative preposition) suggests that the PPC arises from constructions that relate an object to the material it is made of (cf. *en klänning av dyrt siden* 'a dress of expensive silk'), whereas the comitative marker *med* comes from constructions relating an object, e.g., a container to an entity that accompanies it (cf. *en väska med nycklar* 'a bag with keys').

The only systematic cross-linguistic study of the domain has been carried out on the languages of Europe (Koptjevskaja-Tamm, 2001), where the following geographic distribution of the PPC types is attested. Most Slavic, Baltic, marginally German and Icelandic, and a number of Northeast Caucasian (Daghestanian) languages, as well as Irish Gaelic and Scots Gaelic, use the genitive case-marking on the quantified nominal in PPCs, as in Russian *bokal vina* (glass wine.GEN), 'a glass of wine'; the same pattern was predominant among the older Indo-European languages. Finnic uses instead the partitive (i.e., originally the separative) case, as in Finnish *säkki perunotita* (sack potatoes.PART), 'a sack of potatoes.' Modern Romance languages, English, and Icelandic (and marginally Danish, Swedish, and Norwegian) mark the quantified nominal with a preposition. Overt markers in PPCs originate from different sources, primarily by extension from partitive markers (which in turn come from possessives and ablatives), from markers of material relations and comitatives. Given that separative constructions and ablative markers are frequent grammaticalization sources for constructions used for both possessive and material relations (e.g., cf. Heine and Kuteva, 2002), it is not always clear which of the several possible developmental scenarios a particular language has undergone. Both the French marker *de* and the English marker *of* exemplify such problems.

The juxtapositional PPC type occurs in all the European language families, especially in two clear areas: the southern and southeastern parts of Europe, where different language families meet, and in the Germanic. In a number of languages (Danish, Swedish, Norwegian and, marginally Icelandic, German, Yiddish, Dutch, Bulgarian, Macedonian, Greek) the juxtapositional type is clearly new and came to replace the more archaic genitive construction. Although the details of this development still have to be worked out, the juxtapositional strategy in these cases is clearly the final output of grammaticalization. For the majority of the languages, however, juxtaposition in PPCs appears to be an old phenomenon – at least, there is no evidence to the contrary. Juxtaposition in these cases is thus something that has hardly undergone any

grammaticalization at all. One simple explanation for the preference of juxtaposition in PPCs is that these are modeled upon, or behave like, constructions with more typical quantifiers, such as numerals, for which juxtaposition of the quantifier and the quantified is the cross-linguistically unmarked option. At a deeper level of explanation, it might be suggested that juxtaposition of the quantifier and the quantified reflects 'weak coreferentiality' of their referents. To use cognitive grammar terminology, they both profile virtually the same thing, a 'replicate mass' whose quantity and type is denoted by the quantifier and by the quantified respectively (Langacker, 1991: 83–84).

Headedness in Pseudo-Partitive Constructions

The structure of partitive, and especially pseudo-partitive, constructions, has been debated by various syntactic theories, in particular, the questions of headedness and constituency (Akmaijan and Lehrer, 1976; Jackendoff, 1977; Selkirk, 1977; Löbel, 1986, 2000; Battye, 1991; Delsing, 1993; Vos, 1999; Kinn, 2001). The facts are often controversial.

Pseudo-partitive nominal constructions with overt markers superficially look like typical asymmetrical head-dependent structures, primarily like (possessive) noun phrases. Thus, the quantified is marked with an inflectional or adpositional marker typical of marking dependents, (see examples (4a) and (4b)). In languages with case, it is the quantifier that receives the morphological case marking appropriate to the slot filled by the whole construction, i.e., is the 'morphosyntactic locus' of the construction (Zwicky, 1985; see example (4c)). These marking facts point out the quantifier as the head and the quantified as the dependent in such constructions (examples 4a to 4c are from Russian).

(4a) bokal vin-a
glass wine-GEN
'a glass of wine'

(4b) bokal Petr-a
glass Peter-GEN
'Peter's glass'

(4c) smešat' s bokal-om vin-a
mix.INF with glass-INSTR wine-GEN
'to mix with a glass of wine'

Juxtapositional PPCs work differently. In some languages, illustrated by modern Greek in (5), both the quantifier and the quantified agree in case.

(5a) [éna kiló kafés]
[one.NEUT.NOM kilo.NOM coffee.NOM]
kostízi eptá dolária
cost.PRES.3SING seven dollars.ACC
'One kilo of coffee costs seven dollars'

(5b) i aksía [enós kilú
art.FEM.NOM value.NOM [one.N.GEN kilo.GEN
kafé] íne eptá dolária
coffee.GEN] be.PRES.3SING seven dollars.ACC
'The price of one kilo of coffee is seven dollars'

A much more frequent option in languages with morphological case consists in treating the quantified as the morphological locus (see example (6) from Turkish). In still other languages, e.g., Swedish and Bulgarian, that lack morphological case, the question of the morphological locus in PPCs does not make much sense.

(6) Bir bardak süt-e bir kaşık
one glass milk-DAT one spoon
bal ekle-n-ir
honey odd-PASS-AOR
'To one/a glass of milk is added one/a spoon of honey'

Thus, in juxtapositional PPCs the criterion of being morphosyntactic locus often, but not always, points out the quantified as the head.

Agreement facts are also controversial: in example (7) from Swedish, the predicate may agree with either the quantifier or the quantified. Not all languages allow both options, and even those that do show a complicated system of restrictions governing the choice between the two (example from Delsing, 1993: 202).

(7) En låda äpple-n ha-r
a:COM box apple-PL have-PRES
blivit stulen /stulna
become.SUP stolen.SING.COM /stolen.PL
'A box of apples has been stolen'

Occasional errors of the kind *en uppfriskande kopp kaffe* 'a refreshing cup of coffee' in Swedish, where the participle 'refreshing' formally modifies 'a cup' or 'a cup of coffee' but semantically belongs to 'coffee,' provide some evidence that the quantified is interpreted as the semantic head of the whole construction (cf. the discussion of semantic heads in Croft, 2001: 254–272).

One possible interpretation of the controversial evidence is that the notions of head and dependent are perhaps not applicable to such constructions.

Relations to Other Phenomena

Numerals, particularly higher numerals, develop from nominal quantifiers. The morphosyntactic properties of numeral constructions often betray their kinship with nominal PCs and PPCs (Corbett, 1978; Greenberg, 1989). A particularly clear case is illustrated by the complicated system found in

the Slavic, Baltic, and Finnic languages (*see* **Circum–Baltic Area**). Special marking of partial objects and subjects mentioned earlier (cf. art. 180) is derived from PCs and PPCs with deleted quantifiers (Koptjevskaja-Tamm and Wälchli, 2001: 464–465).

See also: Case; Head/Dependent Marking; Mass Expressions; Mass Nouns, Count Nouns, Non-count Nouns: Philosophical Aspects; Nouns; Numerals; Possession, Adnominal.

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Part-of-Speech Tagging

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Introduction

Part-of-speech tagging is the task of determining the syntactic class (i.e., part of speech) of each word in a natural language text and assigning it a 'tag' accordingly. The tags generally encode coarse syntactic categories like noun, verb, adjective, etc., as well as selected sub-categories and morphological features like number, tense, definiteness, etc. Typical tagsets contain 20 to 100 categories, and in some cases cover 400 or more categories (*see* **Treebanks and Tagsets**). The following is an example from the Wall Street Journal portion of the Penn Treebank:

Bond/NN prices/NNS crept/VBD higher/RBR./.

It shows that *Bond* is used as a singular common noun, *prices* as a plural common noun, *crept* as a past-tense verb, and *higher* as a comparative adverb. In other contexts, *Bond* could also be a proper noun (NNP), *prices* a third-person present-tense verb (VBZ), and *higher* a comparative adjective (JJR). The task of a part-of-speech tagger is to disambiguate between the different uses.

History of Part-of-Speech Tagging

Probably the earliest part-of-speech tagger was part of the parser developed for the Transformation and Discourse Analysis Project (Harris, 1962). Steps 1 and 2 of the program consist of looking up the word in a dictionary and choosing one category based on a

Language Resources and Evaluation (LREC-2000), Athens, Greece. 1421–1426.
van Halteren H, Zavrel J & Daelemans W (2001). 'Improving accuracy in word class tagging through the combination of machine learning systems.' *Computational Linguistics 27(2),* 199–229.
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Partridge, Eric Honeywood (1894–1979)

G Barrett, Oxford University Press, New York, NY, USA

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Eric Partridge was the last example of the self-styled lexical adventurer, creating brilliant works through hard labor and native intelligence.

Born on a farm near Gisborne, North Island, New Zealand, he later moved with his family to Brisbane, Australia, where he learned to love writing. He read classics at the University of Queensland, but later changed to French and English.

His studies were interrupted by World War I, during which he served in the Australian infantry. He saw battle at Gallipoli and was wounded on the Western Front. His wartime experiences were later recorded in *The long trail, songs and slang of the British soldier*, published in collaboration with novelist John Brophy.

After the war, he completed his B.A. in Brisbane and received an M.A. from the University of Queensland, which later awarded him an honorary D.Litt. He also studied at Oxford from 1921 to 1923, where he took first class honors. He taught briefly at a grammar school, and between 1925 and 1927 at the universities of Manchester and London. Public performance, however, was not something he enjoyed, due in part to his dread of repetition.

In 1925, he married Agnes Dora (1893–1978). They had a daughter, Rosemary Ethel Honeywood Mann.

In 1927, he founded a small publishing imprint, Scholartis Press, which failed four years later, during the Depression. Scholartis served primarily as an outlet for his own pseudonymous fiction, but it was also where his interest in slang was revealed. Among the books published were *Songs and slang of the British soldier* (1930); Godfrey Irwin's *American tramp and underworld slang* (1930); and Partridge's edition of Francis Grose's *Classical dictionary of the vulgar tongue* (1931).

After the bankruptcy, the chairman of the publisher Routledge commissioned Partridge to create the *Dictionary of slang and unconventional English* (1937). That work made his reputation. A posthumous ninth edition, under the editorship of Terry Victor and Tom Dalzell, is expected in 2005.

During World War II he served in clerical support roles, but this led directly to his editing of *A dictionary of forces' slang*, after which he began *A dictionary of the underworld, British and American* (1949). In 1958 he came out with *Origins, a short etymological dictionary of modern English*, which, while not perfectly reliable as an authoritative source, advanced many new theories on word origins and called into question the work of previous etymologists.

Partridge was a constant fixture at the British Library and a player of tennis and cricket. Although he suffered from cancer, he continued to work until his death at the age of 85.

His work and his outlook on language are best summed up by his response to a questionnaire he received in his eightieth year. He wrote in part, "That scholar who forgets that language was created by people, not in a laboratory, and that it lives – or at one time lived – only by and in people, and that its entire raison d'être is to communicate, to express and serve civilization, not to exemplify some grammatical or philological theory, is strangely lacking in a sense of proportion or even common sense."

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Pashto

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Origin and History

Pashto is spoken by some 40 million people living on both sides of the border between Pakistan and Afghanistan, the famous Durand line, which has given rise to many conflicts. This line was drawn in 1893 following an agreement between Afghanistan and British India, which determined the southern limits of Afghanistan and divided Pashtun territory between Afghanistan and British India – Pakistan since Partition in 1947.

Pashto is the language of the tribes that founded the Afghan state in 1747: the Pashtuns or, according to the term that prevailed in British India, the Pathans (Indianized form of the plural of Pashtuns).

Pashto is the main language spoken in Afghanistan and one of the two official languages of the country, the other being Dari or Afghan Persian. Pashto, which is mainly spoken south of the mountain range of the Hindu Kush, is reportedly the mother tongue of 60% of the Afghan population. Many Pashto-speaking pockets are also found in the north and the northwest of the country where Pashtuns were transferred in the late 19th century and given land.

In Pakistan, Pashto, which is spoken by 20–25 million people, has the status of a regional language. While the majority of the Pashtuns live in the North-West Frontier Province (NWFP, capital Peshawar), in Baluchistan (capital Quetta), or in the Federally Administered Tribal Areas (FATA) – the Pashtun area being roughly at the East of the Indus – Karachi, where about two million people speak Pashto, remains the main Pashtun metropolis.

There is also a large diaspora in the Gulf countries, particularly in Dubai, and in Europe, the United States, and Australia.

Dialectology

From a strictly genetic point of view, Pashto, an Indo–European language, belongs to the northeastern group of Iranian languages. From one dialect to another, its morphosyntactic structure does not show any major variation. Their classification is based on phonological criteria and depends on the pronunciation of خ /x̌/ and غ /ǧ/ letters. These consonants are pronounced differently according to the regions. This constitutes a first isoglossic line: the most visible and the most notable, since it can be observed in the script. In the A zone (eastern /maʃreqi/), they are pronounced respectively /g/ and /x/. 'woman' is pronounced /xə́ja/, 'beard' is pronounced /girá/: these dialects are known as 'hard.' This is found in the English transcription 'Pukhtu' (kh = x = خ). In the C zone (western /maɤrebi/), they are pronounced /ʐ/ and /ʂ/, and sometimes reduced to /ʃ/ and /ʒ/ (Ghazni). 'woman' is pronounced /ʂə́ja/, beard is pronounced /ʐirá/: these dialects are known as 'soft' dialects or 'Pushtu' (sh = ʂ, š = ش). Both these dialects are written in the same script and the speaker is free to read his own way, with his own 'accent.' This unity of script allows the definition of a standard Pashto consisting of A- and C-type dialects, whether 'hard' or 'soft,' from Kandahar or from Peshawar (Table 1).

On the other hand, crossing the line separating 'soft' Pashto from 'hard' Pashto, another isogloss exists that defines a B zone known as intermediary or central (/mandʒanəy/). This zone, which does not present such clear unity as the zones mentioned above

Table 1 Dialects

		Zone C		*Zone B*	*Zone A*	
x̌	خ	ʂ	ʃ	x̌ = [ç]	x	
ǧ	غ	ʐ	ʒ	ǧ = [j]	g	
Standard Pashto	Afgh Pak	Kandahar Quetta	Ghazni		Djalâlâbâd Peshawar	'father'/*pla:r*/ 'mother'/*mor*/ 'daughter' /*lur*/
Nonstandard Pashto	Afgh Pak		Waziristan Bannu	Paktyâ		'father' /*plor*/ 'mother' /*mer*/ 'daughter' /*lir*/
		Zone C maɤrebi	*Zone B* mandʒanəy		Zone A maʃreqi	

Afgh = Afghanistan/Pak = Pakistan.

as far as the pronunciation of the consonants is concerned (ښ /x̌/ or /ʃ/ and ږ /ǧ/ or /ʒ/), nevertheless clearly contrasts with them due to a very particular pronunciation of the vowels of standard Pashto. It is the Waziri metaphony, taking its name from the Wazir tribes among whom it is well attested: pronunciation /o/ for /aː/, /e/ for /o/, /i/ for /u/). If this pronunciation had to be written, it would impose a script contrary to the entire orthographic tradition. This type of Pashto is not written. As a consequence, speakers belonging to this zone use a different type of Pashto when they have to communicate with other Pashtuns (from zones A or C). We find here a perfect example of diglossia: they use a variant of their language that is better recognized because it is written; better recognized, though not more prestigious because these dialects have a strong value as indicators of identity.

Another residual variant of Pashto – Wanetsi – is spoken in Pakistani Baluchistan. This archaic idiom, which has hardly been described, is virtually unintelligible to other Pashtuns.

Pashto Script and Orthography

Pashto literature dates from the 16th century. The publication in 1975 of a facsimile of a manuscript, supposedly dating from 1886, places the beginning of Pashto literature as far back as the 8th century. The authenticity of this poetry anthology – The hidden treasure /pəʈa xazaːna/ – is much debated. Pashtun land was then divided between the Safavid and the Moghul empires. The literary model was Persian, and Pashto scholarly literature has inherited Arabo–Persian poetical genres and meters. This literature starts with Khayr ul Bayan (The best discourse) of Bayazid Ansari; the most ancient manuscript dates back to 1651. Bayazid Ansari, known as Pir Roshan (The luminous master, 1524–1579), the founder of a politico-religious movement considered a heresy, waged war on Delhi.

From the point of view of development of the script, this represents the birth of the first tradition. Three other subsequent traditions can be distinguished, with some overlap and parallel developments. The first is the tradition of Khushal Khan Khattak (1613–1689) – the poet warrior, father of Pashto literature – and of his descendants, which constitutes in itself a literary tradition. A standard tradition followed in the 19th and 20th centuries, mainly in Pakistan, with some characteristic features of the Urdu script. Finally, the tradition of 'modern' script has developed since 1936 in Afghanistan.

Nowadays, on both sides of the border, the orthographic standard is the Afghan scholarly standard, which has drawn on the Persian script since the early 1990s.

In all these cases, the script is the Arabic script adapted to the needs of a language that has phonemes unknown in Arabic: these phonemes are common to Pashto, Persian, and Urdu (پ/p/, چ /tʃ/, ژ /ʒ/, ګ /g/), to Pashto and Urdu (ټ /ʈ/, ډ /ɖ/, ړ /ɽ/), while some letters are particular to Pashto (ښ /x̌/, ږ /ǧ/, څ /ts/, ځ /dz/, ڼ /ɳ/). (See phonemes in bold in Table 2.)

Basic Phonology

Pashto is a language with free accentuation.

A remarkable feature of Pashto is a series of retroflex consonants (/ʈ/, /ɖ/, /ʂ/, /ʐ/, /ɳ/), which is exceptional in Iranian languages; Pashto also has many word-initial clusters that cannot exist in Persian Table 3.

Table 2 Consonants

	Bilabial		*Dental/Alveolar*		*Retroflex*		*Velar*		*Uvular*
Plosive	p	b	t	d	ʈ	ɖ	k	g	*q*[b]
Affricate			**ts**	**dz**					
			ʧ	ʤ					
Fricative	*f*		s	z					
					x̌[a]	**ǧ**[a]	x	ɣ	*h*
					ʃ	ʒ			
Nasal	m		n		**ɳ**				
Liquid									
					ɽ				
			r						
Semivowels	w				y				

[a]Cf. '**Dialectology**.'
[b]In italics: 'the elegant phonemes.'
These phonemes are not native pashto sounds. They occur in the speech of educated speakers only (in Arabic and Persian loan words).
/q/ varies with /k/ in a stylistically determinated alternation, /f/ with /p/ and /h/ – lengthening a preceding vowel /a/ – with zero.

Basic Morphology

Nouns

Nouns in Pashto are inflected for gender (masculine, feminine), number (singular, plural) and case (direct = nominative, oblique, vocative). 'Prepositions' (preposition, circumposition, and postposition) govern the oblique case.

Pronouns

Pronouns are inflected according to Table 4. There are three series: personal pronouns (tonics); personal clitics (used as 'actant' – subject or object – and also in possessive constructions); and verbal inflections.

These forms are divided into weak and strong: /ø/ vs. /zə/; /-me / vs. /maː/. A particular weak series, the series of directional pronouns, corresponds to the strong series /maː/, when the latter is governed by 'prepositions.'

Pashto Verbs

Pashto verbs have two stems, one for present tense forms and one for past tense forms. The infinitive is derived from the past stem by adding /əl/. It is a masculine plural, for instance, 'to see' *lid-l* /win/ (past stem */lid/*, infinitive */lid-l/*, present stem */win/*). Verbs are inflected for person, number and gender (cf. Table 4).

Table 3 Vowels

Front	*Central*		*Back*
i			u
e			o
	ə		
	a	aː	

From the present stem, two presents are formed (imperfective vs. imperfective) and two imperatives (perfective vs. imperfective). From the past stem, two pasts are formed (perfective vs. imperfective). This aspectual perfective vs. imperfective opposition is dominant and is found in the entire verbal system.

In addition to these simple tenses, there are three processes of 'auxiliation': the perfect system, the capacitive system (or 'potential,' which expresses the capacity; the verb 'can' does not exist in Pashto); and the passive.

The system is enriched by the combination of these basic forms with several modal-aspectual enclitic particles (eventual /ba/, injunctive /de/, assertive /xo/), which as such are placed in second position in the utterance (cf. 'Basic Syntax' below).

There are two forms of conjugation in Pashto: one for simple verbs (for example 'to see' *lidl*) and one for denominative verbs: 'white' */spin/* gives 'to whiten' */spinedl/* (intransitive) and 'to whiten' */spinawl/*(transitive); 'in good shape' */dʒoɽ/* gives 'to build up, to get better' */dʒoɽedl/*, 'to heal, to build' */dʒoɽawl/*. There are no more than 150 simple verbs: however, the list of compound verbs is open and productive. To these are added many verbal phrases, mainly with the verb 'to make' */kawl/* ('to play' = 'game make' */lobe kawl/*, 'to sleep' = 'sleep make' */xob kawl/* vs. 'to dream' = 'sleep see' */xoblidl/*.

Basic Syntax and Typology

Order of Terms

Within the nominal syntagma, the order of terms is always 'determinant' (head modifier) + 'determined' (head noun). The process is recursive toward the left. However, two different structures can be distinguished, according to whether the determinant is a noun or an adjective. If the determinant is a noun, it is

Table 4 Personal markers in STD Pashto

	NP		*Enclitic*	*Directional*	*Personal ending*	
	NOM	*OBL*	*(OBL)*		*Present*	*Past*
1 sing	zə	maː	-me	raː	əm(a)	
2 sing	tə	taː	-de	dar	e	
3MASC	day	də				ə/ay/ø
3 sing	-daː	de	-ye	war	-i	
3FEMsing						a
1 pl	munǧ		-mo	raː	u	
2 pl	taːse / taːso		-mo	dar	əy	
3.MASC.PL						ø
3.PL	duy		-ye	war	i	
3 FEM.PL						e
	Strong pronouns		Weak pronouns			

Table 5 Nominal determination

Head modifier		*Head noun*	
	zyeɽ	**lmar**	(The) yellow sun
də ma:zi'gar		**lmar**	(The) sun of the afternoon
də ma:zi'gar	**zyeɽ**	**lmar**	(The) yellow sun of the afternoon
of aternoon.OBL	yellow.NOM	sun.NOM	

preceded by the preposition /də/ and occurs in the oblique case. If the determinant is an adjective, it directly precedes the determined, without preposition. There is agreement in gender, number, and case (Table 5).

SOV

Pashto is an SOV type language; however, this order is usually breached by the Indo–European rule of the raising of enclitics in second position in the utterance; more exactly, after the first nominal syntagma ('noun phrase'), without any particular syntactic link with the the latter. The rule is purely formal: it does not correspond to any semantic pattern.

(1) ma: da: 'x̌ədza 'wə–li'dəl-a
S **O** **V o**
'me'.OBL *this*.NOM *woman*.FEM.NOM *PERF-see*.PAST-3FEM.*sing*
'It is I who saw this woman'

(2) da: 'x̌ədza-me 'wə–li'dəl-a
O-s **V o**
this.NOM *woman*.FEM.NOM-ENCL.*1.sing* *PERF-see*.PAST-3FEM.*sing*
'I saw this woman'

(3) 'wə–me-li'dəl-a
PERF-s-**V-o**
PERF-ENCL.*1.sing-see*.PAST-3FEM.*sing*
'I saw her'

Ergativity

Pashto shows a type of 'split ergativity' determined by tense.

In present and past tenses, the subject of the intransitive verb is in the direct case and the verb agrees with it, as in example (4). The nominal term may be missing, as indicated by the brackets.

If this is compared with transitive verbs, it will be seen that in present tenses (formed with the present stem) the construction is accusative and in past tenses (formed with the past stem, both simple and compound forms) the construction is ergative, whatever the aspect.

The construction is accusative in the present because the subject of the transitive verb behaves in the same way as the subject of the intransitive verb. In example (5), it is in the direct (nominative) case and the verb agrees with it.

The construction is ergative in the past because the object of the transitive verb behaves in the same way as the subject of the intransitive verb. Thus, in examples (1)–(3), it is the object term that is in the direct case and the subject term that is in the oblique case. Moreover, the verb agrees with this object, whether it is given, as in (1) and (2), or not (3).

(4) (zə) j-əm [tl-əm]
S **V s**
'me'.NOM *go*.PRES-*1/sing [go*.PAST*]*
'It is I who am going [was going]'

(5) (zə) da: 'x̌ədza win-əm
S **O** **V s**
'me'.NOM *cette*.NOM *femme*.FEM.NOM *voir*.PRES-*1/sing*
'It is I who see this woman'

Antiimpersonal Verbs

In the past, verbs of this class construct in such a way that the 'subject' is in the oblique and the 'object' is referenced in the verb form by an absolutive marker but cannot be represented by an NP.

(6) spi 'wə-ʋapəl
dog.OBL PERF-*see*.PAST-*3* PL
'The dog barked'

The verb contains a marker of 3rd person masculine plural, which refers to nothing.

The form of this construction is clearly ergative, like the biactant one. In the present, this very small group of verbs (e.g., to laugh, to bark, to jump, to cry, to swim, to bathe) has an intransitive construction.

Differential Object Marking

Pashto also possesses a 'differential object marking.' In the present, according to the place of the object in the *nominal hierarchy*, it is placed either in the oblique case (1st and 2nd person, (7)) or in the direct case (from 3rd person to indefinite; (5)).

Table 6 Landey

گل مې په لاس کې مړاوی کېږي ا پردی وطن دی زه یې چا ته ونیسمه gwəl me pə 'laːs ke mɽaːway 'kiği. praday wa'tan day, zə ye 'tʃaː ta wə-ni'səma? 'The flower withers in my hand' 'This is a foreign land, to whom shall I give it?'

(7) (zə) taː win-əm
S **O** **V s**
'me'.NOM *you*.OBL *see*.PRES-*l/sing*
'It is I who see you'

The Landey

It is impossible to talk about the Pashtun world without mentioning a popular poetical genre: the landey, literally 'short.' Often sung, their rhythm is invariable; every one knows a number of landeys and is able to compose new ones (accented syllables are in bold (Table 6)).

– – – 4 – – – 8 –
– – – 4 – – – 8 – – – 12 –

See also: Afghanistan: Language Situation; Avestan; Balochi; Ergativity; Indo–Iranian; Iranian Languages; Lahnda; Pakistan: Language Situation; Perfectives, Imperfectives, and Progressives; Persian, Modern; Urdu.

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Passives and Impersonals

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Grammatical voice typologies often establish a primary opposition between active and passive voice, with the middle voice as an intermediate category. Syntactically, a passive construction is a detransitivized counterpart of an active construction. But semantically, the passive retains the same number of thematic 'roles' as the active, typically with a change in relative prominence. The impersonal constructions found in Balto-Finnic, Celtic, and in various Balto-Slavic languages form part of a personal-impersonal opposition that is orthogonal to the active-passive contrast. Although impersonals may serve the same communicative function as the passive, they represent a distinctive grammatical strategy for 'suppressing' reference to the subject. Like the periphrastic counterparts formed with English 'one,' French *on*, or German *man*, morphological impersonals are (i) not syntactically detransitivized, and retain direct objects, (ii) may often be formed from unaccusative verbs, which lack passive counterparts, and (iii) tend to imply an indefinite human subject, which cannot usually be specified further by an agentive oblique.

Passives

Following Jespersen (1924), it is customary to describe the surface subject of the active construction as the 'logical subject' and the surface object of the active as the 'logical object.' In an intransitive personal passive corresponding to an active transitive verb, the logical object is realized as the surface subject of the passive. The passive verb cannot govern a direct object (unless the corresponding active is ditransitive), though the participant role associated with the logical subject remains implicit, and may usually be expressed as an oblique dependent. The German examples in (1) illustrate these properties of the personal passive. The logical subject that is realized as the surface subject in the active (1a) corresponds to the optional oblique in the passive (1b). The logical object is realized by the accusative object in (1a) and by the nominative subject in (1b).

(1a) *Die Kinder haben den Igel gefüttert.*
the.NOM children have the.ACC hedgehog fed
'The children have fed the hedgehog.'

(1b) *Der Igel wurde (von den Kindern) gefüttert.*
the.NOM hedgehog was by the.DAT children.DAT fed
'The hedgehog was fed by the children.'

The passive in (1b) is syntactically intransitive but semantically transitive. In Relational Grammar (RG) terms, the alternation in (1) involves the 'demotion' of the logical subject to an oblique, and the 'promotion' of the logical object to a surface subject. This change inverts the relative prominence of the logical subject and object. Whereas the logical subject is normally more prominent than the logical object in active constructions, the opposite is true in the corresponding passive. However, this shift just reflects the tendency for surface subjects to be more prominent than direct objects in general, and for all governed grammatical functions to be more prominent than oblique dependents. Passivization clearly affects argument prominence, and a passive construction may be used for the purpose of inverting the prominence relations of the active. However, this change can be regarded as a side-effect of the change in grammatical relations in a passive construction and need not be incorporated into the definition of a passive.

Subjectless Passives

In some languages and language families, passives may be formed from intransitive verbs. This formation is usually possible in Germanic languages, though not in modern English, possibly due to the general loss of subjectless constructions. The passive counterpart of an intransitive verb is syntactically nontransitive and governs no grammatical functions. These constructions are sometimes termed 'impersonal passives' though *subjectless passive* is preferable, as it avoids further overloading the overused term 'impersonal.' An example of a subjectless passive in German is given in (2), in which the logical subject in (2a) corresponds to the oblique in (2b).

(2a) *Einige Leute haben auf der Straße gejubelt.*
some people have in the street celebrated
'Some people celebrated in the street.'

(2b) *Auf der Straße wurde (von einigen Leuten) gejubelt.*
in the street was by some people celebrated
'There was celebrating (by some people) in the street.'

Subjectless passives may allow the logical subject to be expressed an oblique dependent, as in (2b), though the use of an 'agentive oblique' is almost never as felicitous with subjectless passives as it is with personal passives. Since intransitives have only one thematic role, the prominence shift in the passive often involves the relation between this role and the activity denoted by the verb. Hence personal and subjectless

passives tend to perform slightly different communicative functions. Both constructions may 'background' or 'downgrade' the logical subject relative to the activity denoted by the verb. The prominence of the activity is particularly enhanced if no other dependent is expressed, as in the case of subjectless passives without agentive obliques. The personal passive can also 'foreground' the logical object. In English, for example, a personal passive with an agentive oblique may be used to alter theme-rheme relations that would be regulated in other languages by word order alternations within active constructions. The subjectless passive lacks this function, but can be used instead to express indefinite or generic statements.

Debates about the universal syntactic properties of passives have turned largely on which properties of personal passives are regarded as definitional, and which are either merely characteristic or else consequences of the definitional properties. RG accounts such as Perlmutter and Postal (1984) identify object promotion as the primary effect, which was taken to entail the demotion of the logical subject. The traditional alternative articulated in Comrie (1977), treated subject demotion as the primary effect of passivization, with promotion as an 'opportunistic' side-effect. Since personal passives exhibit both demotion and promotion, they provide no basis for deciding between these choices. Subjectless passives have played a pivotal role in this debate, because they exhibit the same form variation and subject demotion as personal passives, but show no evidence of promotion. As Comrie (1977) argued, any passive rule that is meant to apply to personal passives like (1) and to subjectless passives like (2) would have to demote subjects, not promote objects, since there is no obvious object to promote in (2a). The RG response involved the promotion of non-obvious ('dummy') objects to induce demotion in cases like (2b).

Unaccusativity

It is frequently noted in descriptive and pedagogical grammars that certain verbs and verb classes appear to resist passivization within a language. Theoretical and typological studies have likewise suggested that these classes are not entirely arbitrary. If a language allows passives of intransitives, it will tend to restrict this process to verbs that are, broadly speaking, volitional or agentive. Verbs corresponding to *dance*, *ski*, *smoke*, or *shout* will characteristically have passive counterparts. Verbs corresponding to *elapse*, *expire*, *shiver*, *remain*, *be*, and *arrive* will usually not. This restriction is illustrated by the unacceptable subjectless passive (and gloss) in (3b).

(3a) *Einige Leute sind auf der Straße geblieben.*
some people are in the street remained
'Some people have remained in the street.'

(3b) **Auf der Straße wurde (von einigen Leuten) geblieben.*
in the street was (by some people) remained
'*There was remaining by some people in the street.'

The most widely accepted account of the contrast between (2b) and (3b) is provided by the Unaccusative Hypothesis of Perlmutter (1978), which posits a basic split between two classes of intransitives. The first class, termed unergative, contains verbs like *dance* or *ski*, whose surface subject corresponds to a logical subject. The second class, termed unaccusative, contains verbs like *remain* or *be*, whose surface subject corresponds to a logical object. Classifying *jubeln* 'celebrate' as unergative and *bleiben* 'remain' as unaccusative offers the following account of the contrast between (2b) and (3b). If passivization is defined as demoting logical subjects, it follows immediately that "[n]o impersonal Passive clause in any language can be based on an unaccusative predicate" (Perlmutter and Postal, 1984: 107). A passive rule that demotes logical subjects will simply fail to apply to verbs without logical subjects. Since the lack of a logical subject is exactly what defines unaccusatives as a class, it follows that they should never passivize.

A similar analysis can be extended to many of the transitive verbs that resist passivization. Verbs like *last*, *weigh*, and *resemble* rarely have passive counterparts, though traditional descriptions tend either to handle these exceptions on a case-by-case basis, or to relate the problem to the lack of a 'genuine' object. If these – highly nonvolitional – verbs are also classified as transitive unaccusatives, they fall under the same generalization that covers the intransitive cases.

Impersonals

In some languages, one finds a distinctive type of impersonal construction occupying the communicative niche associated with passive constructions. This construction is obligatorily subjectless and usually receives an 'active indefinite' interpretation, in which the subject is construed as referring to an unspecified human subject, or to people in general. The functional overlap with passives often encourages a 'passive' classification in theoretical descriptions, and somewhat less often in the specialist and pedagogical literature. However impersonal constructions differ from passives in a number of significant respects, which are summarized in Blevins (2003). Perhaps the most important is the fact that they may be

formed from a wider class of verbs, which typically includes unaccusatives as well as unergatives. Impersonals may also be formed from transitive verbs, and retain direct objects, which may occur with an object case. The 'suppressed' subject must often be interpreted as human, so that impersonal forms of verbs that select nonhuman animates are interpreted as anomalous. The use of an agentive oblique tends to be much less acceptable than with passives, and in some languages is judged fully unacceptable.

Impersonal constructions are characteristic of Balto-Finnic languages and are particularly well represented in Estonian. The glosses assigned to the Estonian examples (3a) and (3b) clearly emphasize an implicit human reference. The example in (3a) also shows that impersonals may be formed freely from unergative verbs like *tulema* 'come' and *minema* 'go.' The example in (3b) shows that an impersonalized transitive retains a syntactic object, *uut maja*, that may preserve the partitive case that marks the object in a personal clause, such as *Ma ehitan uut maja* 'I am building a new house.' In the Finnish example in (3c), the pronominal object of the impersonal form *vietiin* occurs in the accusative, providing an even clearer indication of that it is an object.

(3a) *Tullakse ja minnakse.*
come.PRES.IMP and go.PRES.IMP
'They [people] come and go.' (Tuldava, 1994: 273)

(3b) *Siin ehitatakse uut maja.*
here build.PRES.IMP new.PART house.PART
'Here they are building a new house.' (Tuldava, 1994: 273)

(3c) *Hänet vietiin poliisiasemalle.*
s/he.ACC take.PAST.IMP police station.ALLA
'S/he was taken to the police station.' (Shore, 1988: 157)

Impersonal forms in Balto-Finnic inflect for the full range of tense/aspect/mood properties, and merely lack the agreement markers that occur on person forms. Fife (1993: 14) describes a similar pattern in Celtic, remarking that "all Celtic languages possess an impersonal form for each tense which is neutral as to the person and number features of the subject." In other languages, impersonals may be less tightly integrated into the grammatical system, suggesting in some cases the possibility of a contact-induced innovation (Veenker, 1967). For example, *no/to* forms in Slavonic (Billings and Maling, 1995) are historically neuter singular passive participles, which remain passive in Russian. In Polish, however, *no/to* constructions such as (4a) are impersonal, as they govern an accusative object and refer to an unexpressed human subject. Polish *no/to* forms may be based on unaccusative verbs, and do not permit agentive obliques. Yet unlike Balto-Finnic or Celtic, each verb has a single *no/to* form, which receives a past interpretation.

(4a) *Gazetę czytano.*
newspaper.FEM.ACC read.PAST.IMP
'One/they read the newspaper.'

(4b) *Tu się pije wódkę.*
here REFL drink.3SG vodka.ACC
'One drinks vodka here.' (Rothstein, 1993: 712)

Participial constructions may thus be passive in one language while their cognates are impersonal in another. The same variation characterizes reflexive constructions, which are again passive in Russian and some other Slavonic languages, but clearly impersonal in at least Polish, as illustrated in (4b), and in Croatian and Slovene (Browne, 1993; Priestly, 1993). This variation indicates that the difference between passives and impersonals as morphosyntactic constructions cannot be associated with morphotactic form, any more than with communicative function.

In sum, passives and impersonals differ in syntactic transitivity: whereas passives are detransitivized, impersonals merely suppress the syntactic expression of the subject. Both constructions have the same semantic transitivity, which distinguishes them from causative-inchoative alternations (which may also be marked by reflexive morphology). A causative sentence such as 'The submarine sank the ocean liner' has two thematic roles, a causer and causee. But the inchoative 'The ocean liner sank' has just the causee role: it is semantically as well as syntactically intransitive, with no grammatically implicit agency. Passive and impersonal constructions both likewise differ from the impersonal predicates that express weather conditions, natural forces, etc., in many languages. A predicate that is 'impersonal' in this sense, which follows essentially Babby (1989), lacks a logical subject, and thus cannot participate in passive or impersonal constructions.

See also: Argument Structure; Thematic Structure; Unaccusativity.

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Passy, Paul Édouard (1859–1940)

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Passy is best remembered as the founder of the International Phonetic Association. His interests included not only applied phonetics (language pedagogy and reading instruction), but also descriptive linguistics, historical sound change, and basic phonological theory.

Born in Versailles on January 13, 1859, Passy was educated at home by visiting teachers, governesses, and his wealthy parents. His father, Frédéric Passy, was an economist, advocate for international arbitration, and first (co-)recipient of the Nobel Peace Prize. Passy and his siblings learned not only French but also English, German, and Italian. He attended Collège Sainte Barbe, and although he easily passed his *baccalauréat* exams at ages 16 and 17, he failed his *licence* three times before passing, since the subjects bored him. As an option to avoid military service because he was a pacifist, Passy contracted to teach English and some German for 10 years in various public schools, colleges, and principally, the Teacher Training College at Auteuil. From 1879 to 1885, he studied phonetics on his own, reading Sweet, Sievers, Viëtor, and Jespersen. At the École des Hautes Études, he studied Sanskrit and Gothic and Old High German under Ferdinand de Saussure (1885–1887).

Passy gained his *doctorat ès lettres* in 1891 with his secondary thesis on the phonetics of modern Icelandic (*De Nordica lingua*) and his primary thesis, *Study of phonetic changes* (1891), which won the Prix Volney the following year. In 1894, the position of Chair of General and Comparative Phonetics at the École des Hautes Études d'Histoire et de Philologie was created for him, a position he held until retirement in 1926 (except for 1913–1917, when he was dismissed on political grounds related to his pacifism). In 1897 he also became Assistant Director of the École des Hautes Études, and was the first to admit women. Passy taught three courses: (1) phonetics of the main European languages; (2) the phonetics of Old French; (3) original research on various phonetic subjects.

In 1886, Passy founded and served as president of the 'fonètik tîtcerz' asóciécon' (Phonetic Teachers' Association), a group of mostly French teachers of English committed to improving modern foreign language pedagogy by emphasizing phonetic accuracy and by using a phonetic alphabet, in part to assist in teaching reading. The Association founded a journal, *Dhi Fonètik Tîtcer,* in May of that year. Passy's brother Jean (1866–1898) was appointed Secretary. The association quickly attracted the support of such prominent phoneticians and linguists as Otto Jespersen, Henry Sweet, and Wilhelm Viëtor. In 1889, the organization's name became 'Association Phonétique des Professeurs de Langues Vivantes,' in order to increase its appeal to modern language teachers, and its journal was called *Le Maître Phonétique*. Articles in the journal were printed in transcription, in a system Passy modified

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Passy is best remembered as the founder of the International Phonetic Association. His interests included not only applied phonetics (language pedagogy and reading instruction), but also descriptive linguistics, historical sound change, and basic phonological theory.

Born in Versailles on January 13, 1859, Passy was educated at home by visiting teachers, governesses, and his wealthy parents. His father, Frédéric Passy, was an economist, advocate for international arbitration, and first (co-)recipient of the Nobel Peace Prize. Passy and his siblings learned not only French but also English, German, and Italian. He attended Collège Sainte Barbe, and although he easily passed his *baccalauréat* exams at ages 16 and 17, he failed his *licence* three times before passing, since the subjects bored him. As an option to avoid military service because he was a pacifist, Passy contracted to teach English and some German for 10 years in various public schools, colleges, and principally, the Teacher Training College at Auteuil. From 1879 to 1885, he studied phonetics on his own, reading Sweet, Sievers, Viëtor, and Jespersen. At the École des Hautes Études, he studied Sanskrit and Gothic and Old High German under Ferdinand de Saussure (1885–1887).

Passy gained his *doctorat ès lettres* in 1891 with his secondary thesis on the phonetics of modern Icelandic (*De Nordica lingua*) and his primary thesis, *Study of phonetic changes* (1891), which won the Prix Volney the following year. In 1894, the position of Chair of General and Comparative Phonetics at the École des Hautes Études d'Histoire et de Philologie was created for him, a position he held until retirement in 1926 (except for 1913–1917, when he was dismissed on political grounds related to his pacifism). In 1897 he also became Assistant Director of the École des Hautes Études, and was the first to admit women. Passy taught three courses: (1) phonetics of the main European languages; (2) the phonetics of Old French; (3) original research on various phonetic subjects.

In 1886, Passy founded and served as president of the 'fonètik tîtcerz' asóciécon' (Phonetic Teachers' Association), a group of mostly French teachers of English committed to improving modern foreign language pedagogy by emphasizing phonetic accuracy and by using a phonetic alphabet, in part to assist in teaching reading. The Association founded a journal, *Dhi Fonètik Tîtcer,* in May of that year. Passy's brother Jean (1866–1898) was appointed Secretary. The association quickly attracted the support of such prominent phoneticians and linguists as Otto Jespersen, Henry Sweet, and Wilhelm Viëtor. In 1889, the organization's name became 'Association Phonétique des Professeurs de Langues Vivantes,' in order to increase its appeal to modern language teachers, and its journal was called *Le Maître Phonétique*. Articles in the journal were printed in transcription, in a system Passy modified

from Sweet's Broad Romic. In 1897 the association became 'L'Association Phonétique Internationale', the International Phonetic Association. Passy was elected Secretary in 1890, a position he held until 1927, when he was reelected President. Passy also served as editor (coeditor with Daniel Jones from 1909) of *Le Maître Phonétique*, from its first issue until his death, though Jones has said that, in practice, Jones had acted as sole secretary from about 1910, when Passy's health began to deteriorate, and later, when his chief interests shifted to social concerns.

Passy articulated the core principles of the IPA, which are still employed today, though they were expanded by Passy and Jones in 1912. Among them are the importance of broad transcription; this contained an implicit understanding of the phonemic principle and the commutation test, which shows phonemic status through the contrastive meanings of minimal pairs. Passy advocated symbol economy and harmonization of symbols in a phonetic font, not only for esthetics but because he wished the system to be easily utilized by teachers and understood by children. Passy also promoted the use of the alphabet for samples of little-studied languages.

Passy was the main phonetic teacher of and major influence on Daniel Jones, who spent a year in Paris studying with Passy in 1907. Passy encouraged Jones to take the International Phonetic Association examination from him and to pursue a career in phonetics, even writing in 1907 a recommendation letter for Jones to teach phonetics at University College London. In 1911, Jones married Passy's niece, Cyrille Motte. An excellent study of the relationship between Passy and Jones is found in Collins and Mees (1999).

Passy was influenced and inspired by Henry Sweet and Alexander Melville Bell, even developing his own version of an organic alphabet. In 1907 Passy and Jones published a revised but short-lived organic alphabet. Passy developed in 1888 and modified in 1891 a vowel diagram, which Collins and Mees (1999: 173–182) show was the basis for Daniel Jones's system of Cardinal Vowels. Passy realized that in practical terms, the vocalic model could reflect both acoustic reality and articulatory position, the latter of which he tended to favor. Incidentally, Paul Passy's brother Jean seems to have introduced the technique of transcribing meaningless sequences of sounds, which has become an important part of the British School tradition of phonetic ear training. In addition, Michaelis and Passy (1897) was a major inspiration for Jones's (1917) *English pronouncing dictionary*.

In 1896, Passy joined a campaign for spelling reform of French orthography, publishing his 1897 work. He was also an active participant in the Reform Movement, advocating the Direct Method of language teaching, as laid out in his 1899 book.

According to Jones (1941), Passy's greatness lay not chiefly in his phonetic work, but in the 'saintly' way he lived his life according to his 'primitive Christian' ideals, after his conversion to Protestantism in 1878, and according to his Christian socialist ideals from 1897. He formed a spartan agricultural cooperative, Liéfra (an acronym of the French ideals of liberty, equality, and fraternity), for working-class men near Fontette. This, along with his ideals, evangelization, and social work, is detailed in his 1930–1932 autobiography and in his novels *Au bois dormant* and *Après le rêve*. He was the founder of the Société des Volontaires Évangelistes and the Union des Socialistes Chrétiens. Passy died in Bourg-la-Reine in 1940.

See also: International Phonetic Association; Bell, Alexander Melville (1819–1905); Jespersen, Otto (1860–1943); Jones, Daniel (1881–1967); Language Teaching Traditions: Second Language; Phonetic Transcription: Analysis; Phonetic Transcription: History; Saussure, Ferdinand (-Mongin) de (1857–1913); Sievers, Eduard (1850–1932); Spelling Reform; Sweet, Henry (1845–1912); Viëtor, Wilhelm (1850–1918).

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Patañjali (2nd Century B.C.)

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We have little information regarding Patañjali's life. His date (2nd century B.C.) is known through the references in his grammatical text, the *Mahābhāṣya* ('The Great Commentary'), in which references are made to Puṣyamitra, who reigned in the 2nd century B.C., and to an attack on the cities of Sāketa and Madhyamikā by a *Yavana* (Greek), who has been identified with Menander (c. 156–153 B.C.) (Belvalkar, 1976: 27).

Patañjali is believed to have authored the *Yoga Sūtras* ('The Rules of Yoga'), but many grammatical deviations and the fact that the yoga tradition is very late lead to the conclusion that the authors of the *Mahābhāṣya* and the *Yoga Sūtras* were the same in name only (Keith, 1948: 427). In the tradition of Indian grammatical studies, the *Aṣṭādhyāyī* of Pāṇini (5th century B.C.) is considered the most important grammatical text. The major commentaries on the *Aṣṭādhyāyī* are the *Vārttikas* ('Explanatory Rules') of Kātyāyana (3rd century B.C.) and the *Mahābhāṣya* of Patañjali, which is mainly concerned with explaining the *vārttikas* of Kātyāyana. Patañjali's *Mahābhāṣya*, classified into 85 *āhnikas* ('day sessions'), is considered the second most important grammatical text after Pāṇini's *Aṣṭādhyāyī*. In it, Patañjali takes up Kātyāyana's *vārttikas*, explains them with examples, and in many cases defends Pāṇini. Moreover, he also carries out in great measure Kātyāyana's work by examining *sūtras* on which there are no *vārttikas*.

To see how Patañjali explains *sūtras* and *vārttikas*, consider the following:

Pāṇini 2.3.70 (*sūtra* dealing with the sixth (genitive) case ending) *akenorbhaviṣydādhmarṇyoḥ*. "(The genitive in the sense of agent and object is not added when the words ending in the suffix) *aka* or *in* (is used) denoting the sense of *bhaviṣyat* ('future (action)') or *ādhamarṇya* ('indebtedness')."

Kātyāyana's clarification *vārttikas*: (a) *akasya bhaviṣyati* "(the mention) of (the suffix) *aka* (must be taken) in the sense of *bhaviṣyat* ('future (action)'); (b) *ina ādhamarṇye ca* "(mention) of (the suffix) *in* (both in the sense of future action) and in that of *ādhamarṇya* ('indebtedness')."

Patañjali's explanation *bhāṣyas* on Kātyāyana's clarification *vārttikas*: (a) *akasya bhaviṣyatīti vaktavyam. yavān lāvako vrajati. odanam bhojako vrajati. Śaktūpāyako vrajati*. "The statement should be made that (the mention) of (the suffix) *aka* in the sense of *bhaviṣyat* ('future (action)') (only). (For example), 'He goes out to harvest the barley.' 'He goes out to eat rice.' 'He goes out to drink gruel.'" (b) *tata ina ādhamarṇye ca bhaviṣyati ceti vaktavyam. Śataṃ dāyí. Śahasraṃ dāyí. grāmaṃ gāmī*. "Next the statement should be made that (the mention) of (the suffix) *in* in the sense of *ādhamarṇya* ('indebtedness') also. (For example), 'one who is in indebtedness to pay one hundred,' 'one who is in indebtedness to pay one thousand,' 'one who intends to go to the village.'"

As can be seen, the *Mahābhāṣya* is written in a lively, simple, and animated style, which takes the form of an actual conversation. There are occasions when Patañjali gives a dynamic picture of the mode of discussion current in his time. Proverbial expressions and references to the matters of daily life are often introduced to enliven the discussions, and these give valuable hints to the conditions of life and thought at the time of Patañjali (Keith, 1948: 428). For example, consider Patañjali's comment on the Sanskrit suffix *ka*, which when added to a name denotes an image of that name, e.g., *hastika* ('the image of an elephant'), *aśvaka* ('the image of a horse'). In *sūtra* 4.3.99, however, Pāṇini says *jīvikārthe cāpaṇye*: "(The suffix *ka* is dropped) when (the image) is used to secure a livelihood and it is not for sale." Thus, when a magician uses the image of an elephant during his show, the word for the image is *hastin*, but in a toy store where it is for sale, it is *hastika*, as in *hastikān vikrīṇīte* ('He sells the images of elephant.') (Vasu, 1962: Vol. I: 975). Commenting on this *sūtra*, Patañjali says: *apaṇya ity ucyate tatredam na sidhyati śivaḥ skando viśākha iti. kim kārṇam? mauryair hiraṇyārthibhir arcāḥ prakalpitāḥ. bhavet tāsu na syāt. yās tv etāḥ samprati pūjārthās tāsu bhaviṣyati*. "(The word) *apaṇyă* ('not to be vendible') is mentioned (in the *sūtra*). On this doctrine the forms *śivaḥ*, *skando*, *viśākha* are incorrect. Why is that? Because the Mauryas, in their greed for gold, used as means the images of gods (i.e., they sold the images of these gods and called them *śivaḥ*, *skando*, *viśākha*, not the expected *śivaka*, *skandaka*, *viśākhaka*). It is granted that the rule for dropping the suffix *ka* does not apply to those images of the (greedy) Mauryas; still, as regards images now used for purposes of worship. (i.e., for livelihood only and not for sale) it does apply" (Agnihotri, 1963: 552).

The history of grammatical thought in India shows that, with the exception of Bhartṛhari (7th century A.D.), the line of great grammarians ends with Patañjali, who drew on the speech and customs of his day (as he insists in the preface of his commentary on the absurdity of learning words that are not used). With the passage of time, however, the *Mahābhāṣya*

itself became unintelligible and evidently needed explanation. Bhartṛhari, who in his *Vākya-Padīya* 2.482, stated: *sarveṣām nyāyabījam mahābhāṣye nibandhane* ("the seeds of all basic principles are embodied in the *Mahābhāṣya*"), wrote a commentary on it. Borrowing largely from Bhartṛhari, Kaiyaṭa (12th century A.D.), in his *Mahābhāṣyapradīpa* ('That which enlightens the *Mahābhāṣya*') commented on the *Mahābhāṣya*, which in turn had been commented upon by Nāgojibhaṭṭa in his *Pradīpodyota* ('the enlightening of the *Pradīpa*'), which in many ways is a commentary on the *Mahābhāṣya* itself.

See also: Bhartrhari; Dikhsita, Bhattoji (ca. 17th Century A.D.); Katyayana (3rd Century B.C.); Nagojibhatta (d. 1755); Panini.

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Paul, Hermann (1846–1921)

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Paul was born on August 7, 1846 in Salbke near Magdeburg, and died on December 29, 1921 in Munich. After attending the Gymnasium there he enrolled at the University of Berlin, where his most influential teacher was Heymann Steinthal (*see* **Steinthal, Heymann (1823–1899)**). He left for the University of Leipzig after only one semester to continue his studies under the Germanists Friedrich Zarncke and Adolf Ebert, as well as the Classicist and Indo–Europeanist Georg Curtius (*see* **Curtius, Georg (1820–1885)**). After completion of his doctorate in 1870, he attended lectures by the Slavist August Leskien (*see* **Leskien, August (1840–1916)**) where he

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See also: Bhartrhari; Dikhsita, Bhattoji (ca. 17th Century A.D.); Katyayana (3rd Century B.C.); Nagojibhatta (d. 1755); Panini.

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was introduced, as Streitberg put it in his obituary of Paul, to the 'new linguistic method'. In 1872 Paul passed his *Habilitation* in Leipzig and soon after began work, with Wilhelm Braune, on *Beiträge zur Geschichte der deutschen Sprache und Literatur* (first published in 1874), a journal which still today is referred to by the siglum *PBB* (for *Paul und Braunes Beiträge*). He received his first professorship at the University of Freiburg im Breisgau in 1874 (with promotion to full professor in 1877), and he remained there until he followed a 'call' to the University of Munich in 1893, where he taught until 1916. Although almost blind by the time of his retirement, his scholarly production was by no means reduced. The last five years of his life saw the appearance of his five-volume *Deutsche Grammatik* (1916–1920), the third revised edition of his *Deutsches Wörterbuch* (1921), and several smaller monographs. However, Paul is best known for his *Principien der Sprachgeschichte*, first published in 1880, which had five editions, two English translations, and one English adaptation (Strong *et al*., 1891) during his lifetime. It was widely regarded as the 'bible of the Junggrammatiker school', and was of particular importance as it constituted the first attempt in the annals of linguistic science to formulate the principles that should guide the scholar in his research. Paul was synthesizing the scientific ideas not only of his Neogrammarian colleagues (Leskien, Brugmann, Osthoff, Sievers, and others), but also of what was developing as linguistic practice during the concluding decades of the 19th century. His insistence on the social nature of language and on linguistics as a social, not a natural, science, his distinction between *deskriptive* and *historische Grammatik*, his discussion of the description of a *Sprachzustand* ('language state'), the terminological use of *Lautbild* ('acoustic/auditory image'), his distinction between (*Sprach*)*usus* ('language norm') and *individuelle Sprachtätigkeit* ('individual linguistic activity,' i.e., 'speaking'), and other concepts provided much of the material for the discussion of what Saussure's former students compiled and published as the *Cours* (Koerner, 1972; Cherubim, 1973; Antal, 1985).

See also: Braune, Wilhelm (1850–1926); Curtius, Georg (1820–1885); Leskien, August (1840–1916); Saussure, Ferdinand (-Mongin) de (1857–1913); Steinthal, Heymann (1823–1899); Zarncke, Friedrich (1825–1891).

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Christina Bratt Paulston was born on December 30, 1932, in Stockholm, Sweden. In 1951, at the age of 18, she moved to the United States, where she studied at Carleton College and the University of Minnesota, receiving an M.A. in English and Comparative Literature in 1955. Working as a high school teacher, Paulston stayed in the United States and Sweden from 1955 to 1963. From 1963 to 1966, she worked as scientific instructor at Columbia University, New York City, and she obtained a doctoral degree in 1966. After several years in India and Southern America, in 1969 Paulston was named assistant professor at the University of Pittsburgh, and she became professor there in 1975. She was the Director of the English Language Institute from 1970, Acting

was introduced, as Streitberg put it in his obituary of Paul, to the 'new linguistic method'. In 1872 Paul passed his *Habilitation* in Leipzig and soon after began work, with Wilhelm Braune, on *Beiträge zur Geschichte der deutschen Sprache und Literatur* (first published in 1874), a journal which still today is referred to by the siglum *PBB* (for *Paul und Braunes Beiträge*). He received his first professorship at the University of Freiburg im Breisgau in 1874 (with promotion to full professor in 1877), and he remained there until he followed a 'call' to the University of Munich in 1893, where he taught until 1916. Although almost blind by the time of his retirement, his scholarly production was by no means reduced. The last five years of his life saw the appearance of his five-volume *Deutsche Grammatik* (1916–1920), the third revised edition of his *Deutsches Wörterbuch* (1921), and several smaller monographs. However, Paul is best known for his *Principien der Sprachgeschichte*, first published in 1880, which had five editions, two English translations, and one English adaptation (Strong *et al*., 1891) during his lifetime. It was widely regarded as the 'bible of the Junggrammatiker school', and was of particular importance as it constituted the first attempt in the annals of linguistic science to formulate the principles that should guide the scholar in his research. Paul was synthesizing the scientific ideas not only of his Neogrammarian colleagues (Leskien, Brugmann, Osthoff, Sievers, and others), but also of what was developing as linguistic practice during the concluding decades of the 19th century. His insistence on the social nature of language and on linguistics as a social, not a natural, science, his distinction between *deskriptive* and *historische Grammatik*, his discussion of the description of a *Sprachzustand* ('language state'), the terminological use of *Lautbild* ('acoustic/auditory image'), his distinction between (*Sprach*)*usus* ('language norm') and *individuelle Sprachtätigkeit* ('individual linguistic activity,' i.e., 'speaking'), and other concepts provided much of the material for the discussion of what Saussure's former students compiled and published as the *Cours* (Koerner, 1972; Cherubim, 1973; Antal, 1985).

See also: Braune, Wilhelm (1850–1926); Curtius, Georg (1820–1885); Leskien, August (1840–1916); Saussure, Ferdinand (-Mongin) de (1857–1913); Steinthal, Heymann (1823–1899); Zarncke, Friedrich (1825–1891).

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Director of the Language Acquisition Institute from 1971, and the Chairwoman of the Department of General Linguistics from 1975 to 1989.

Paulston has worked extensively on sociolinguistics, especially bilingualism. Her *International handbook of bilingualism and bilingual education* is an outstanding example of her broad research activities. In this context, she has worked intensively on minority languages. Her research was intended not only to cover descriptive material for minority-majority bilingualism (cf. her co-editorship of *Language minorities in Central and Eastern Europe* of 1998), but also to give concrete – and often controversial – advice regarding minority politics (cf. her "implications for language policies" in Paulston (1994)).

Paulston expanded the scientific field of minority linguistics from a mono-dimensional linguistic viewpoint to a much broader one. She showed that social questions are directly connected to the linguistic development of minority and majority languages and introduced the claim that minority groups act through 'social mobilization,' which can result in either language shift (to the majority language) or language maintenance, while balanced bilingualism is observed only exceptionally. Social mobilization is described as a reaction to economic and political causes.

Another field of Paulston's research that had a political impact is bilingual education, which she accounted for theoretically in Paulston (1980). In all her sociolinguistic studies, Paulston based her work on international perspectives, including those of the United States and Europe; she also did intensive work on her homeland Sweden and Scandinavia.

Christina Bratt Paulston wrote, edited, and co-edited more than 15 books and published many journal articles. She received the award of the American Educational Research Association in 1980 and was granted a Fulbright-Hays scholarship to Uruguay in 1985. She is member of numerous linguistic associations, including the MLA and the International Association of Teachers of English as a Foreign Language, holding leadership positions in some. Paulston was part of the American Council on Teaching of Foreign Languages.

See also: Minority Languages: Oppression; Multilingualism: Pragmatic Aspects; Politics and Language: Overview.

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Pauses and Hesitations: Psycholinguistic Approach

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To pause is to suspend an action temporarily, and it is common to pause in the action of speaking. The term *pause* is often taken to mean silence even though speakers have other ways of suspending speech as well. Consider the spontaneous utterance in:

(1) Alan but at the same time, . u:m I uh I did. accuse them, of of uh having misled us, . on April the twenty-third, (1.2.142)

(All the examples cited, unless marked otherwise, come from a corpus of British English conversations [Svartvik and Quirk, 1980]. Each is identified by text number and line. Brief pauses are marked by periods [.], unit pauses by dashes [-], prolonged syllables by colons [:], and ends of tone units by commas [,] or question marks [?].) Alan suspends his speaking not only by going silent, but by inserting the fillers *uh* and *um*, by prolonging words (e.g., "u:m"), and by repeating words ("I uh I" and "of of"). The term *delay* will be used for any temporary suspension of speaking; the term *pause* will be reserved for silent delays.

Delays in speaking tend to be either reactive or rhetorical. Reactive delays arise as speakers react to, or try to deal with, problems in producing speech. Alan may have needed extra time to decide on the next message, formulate the next phrase, or retrieve the next word, and that led to his delays. Rhetorical delays, in contrast, have rhetorical purposes. Speakers may pause briefly, for example, as a way of emphasizing a point or heightening the suspense of a narrative (O'Connell and Kowal, 1998). The focus here is on reactive delays.

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Timing

Delays are a matter of timing. When people talk, they recognize that there is a conventional way of producing each sentence in context—its *ideal delivery*. An ideal delivery is characteristically a single action with no suspensions—no silent pauses, no fillers, no repeats, no self-corrections, no delays except for those required by the syntax of the sentence. For Alan's utterance in (1), the ideal delivery would be "but at the same time I did accuse them of having misled us on April the twenty-third." That makes the ideal delivery a model against which speakers can judge their actual delivery. It defines what it is to be a delay—a temporary suspension of the action of producing the *conventional* form of that utterance. Reactive delays arise when speakers are *unable* to produce an ideal delivery. Rhetorical delays arise when speakers choose to suspend an ideal delivery for rhetorical purposes.

In conversation, there are also conventions about how to go from one utterance to the next. In many styles of conversation, speakers are expected to move smoothly, without undue gaps, both between units within turns and between turns (Sacks *et al.*, 1974). In (1), for example, Alan's partner Ben is allowed to start speaking once Alan has completed the units ending "misled us" and "twenty-third," and if Ben does start first at either point, he gets the next turn from then on. This practice, applied generally, tends to minimize gaps both between units within turns and between turns.

The conventional standards of fluency, however, are almost impossible to live up to. Speakers cannot produce an expression until they have formulated it, and it may take longer to formulate an expression than time allows. The result is often unwanted delays. Also, people in conversation owe their partners an account for any extra time they take. If they delay, they may want to say when and why they are doing so. In (2), Duncan has been just asked about recent books he has read:

(2) Duncan I've u:m recently read **u:m . oh, .** *Lord of the Flies* (3.5a.110)

When he is delayed in recalling a book he has read, he doesn't remain silent after he suspends speaking. He inserts first *um* to say that he is delaying and then *oh* to say that he has only just recalled the name of the book. Many delays are marked with comments like this.

Dealing with such delays requires speakers to *monitor* what they are saying (Levelt, 1989). They need to compare what they *actually* are producing with what they *ideally* should be producing. It is only by monitoring their progress that they can anticipate when to delay and what comments to add. Speakers must also monitor their partners. If their partners aren't attending or understanding, or are starting to speak themselves, speakers may need to stop to deal with those problems as well.

Formulating Delays

Delays don't just happen. As parts of the speech stream, they need to be formulated with as much care as the speech itself. The act of delaying has three phases: (1) the *suspension* of fluent speech; (2) a *hiatus* in which speakers may say and do other things; and (3) the *resumption* of fluent speech (Clark, 1996). In (2), fluent speech was suspended at the end of *read* and resumed at the beginning of *Lord*. The hiatus, the interval in between, contained "u:m . oh, ."

Suspending Speech

Speakers have to formulate when and how to suspend speaking. When people monitor what they are about to say or what they have just said, there is often a point at which they first detect an imminent problem in continuing. Call this the *point of detection of trouble*. Remarkably, speakers rarely interrupt their speech at this point. Instead, they wait for the right moment and, when they do stop, mark their suspensions in special ways. They do much of this as a way of signaling why they are delaying. Here are several common forms of suspensions; the properties of each have been derived empirically in large corpora of spontaneous conversations.

1. *Complete words*. Speakers ordinarily wait until the ends of words to suspend speaking. In (1), the points of suspension come right after *time*, *I*, *of*, and *us*, and in (2), right after *I've* and *read*. If speakers interrupted their speech precisely at the point of detection of trouble, the points of suspension should occur far more often within words than at the exact boundaries between words. In fact, they do not. Speakers prefer to complete each word, just as they would in an ideal delivery.
2. *Mid-word*. When speakers *do* suspend speaking mid-word, they do so for special reasons. One reason is to mark a word as incorrect (Levelt, 1983, 1989), as in: "do you and your husband have a **j- car**? (8.21.335)." Here the speaker started a word beginning "j" and, detecting it as an error, broke it off and replaced it with *car*. Another reason is to forecast an immediate repeat of the word (Clark and Wasow, 1998), as in "and even if promises. are given, **th- the** actual words, (3.4.410)."

3. *Prolongations*. Speakers can also suspend speaking by prolonging a word beyond its normal length. Consider (3) (in which prolonged syllables are marked with dashes, and pauses in seconds):

   (3) George [1.25] A—nd this little boy—, [1.2] the scene [.3] focuses on this little boy.
   (Chafe, 1980: 303)

   George, who is in the middle of telling a story, prolongs *and* apparently while formulating the next sentence. Later, he prolongs *boy* and adds a silence apparently while formulating the next clause. Prolongations are used to mark delays already in progress (Clark and Fox Tree, 2002).
4. *Non-reduced vowels*. The words *a*, *the*, and *to* are normally pronounced with a brief, reduced vowel, the final schwa in *sofa*. They can also be pronounced with the non-reduced diphthongs that rhyme with *day*, *see*, and *flew*, but only in special circumstances, as in "She's not just *a* doctor in town, but *the* doctor in town." When *the* rhymes with *see*, it will be written 'thiy'; when it rhymes with the last syllable of *sofa*, it will be written 'thuh.' So, in an ideal delivery, *the monastery* would ordinarily be pronounced 'thuh monastery.' Yet in conversation, one speaker produced:

   (4) Julie it's **thi:y.** thuh monastery, - you know thuh very Gothic monastery, (2.13.666).

   Julia apparently had trouble describing the building, so she delayed while choosing *monastery* and again while choosing *very Gothic monastery*. She signaled her first point of suspension to begin at the end of *the* by pronouncing it 'thi:y.' In one large sample of conversation, speakers suspended their speech 81% of the time after *thiy*, but only 7% of the time for *thuh*. So when *thuh* is the appropriate pronunciation for *the*, speakers can signal a suspension of speech by using *thiy* instead. They can do the same by using the pronunciations of *a* and *to* that rhyme with *day* and *flew* (Fox Tree and Clark, 1997).

Hiatuses

The hiatus is the time interval between the point of suspension of fluent speech and the point of its resumption. Speakers may do many things in this interval. Here are several common patterns, again as borne out in evidence from large corpora of spontaneous speech.

1. *Silence*. Most hiatuses contain silence either alone or accompanied by commentary. In (3), George produced "the scene [.3] focuses on this little boy" with a simple 0.3 sec silence between *scene* and *focuses*. In many styles of conversation, such a silence cannot exceed 1 second without the participants saying or doing something to cut it off (Jefferson, 1989). By contrast, hiatuses may have no duration at all. When one speaker produced "The Lord says that and eventually you'll have to re-answer to him" (Blackmer and Mitton, 1991), there was no time between the end of *re-* and the beginning of *answer*.
2. *Fillers*. In English, speakers often insert *uh* or *um* into hiatuses. Evidence shows that these are conventional English words (interjections) that speakers use to announce that they are initiating a delay in speaking. Speakers use *uh* to announce what they expect to be a minor delay and *um* to announce what they expect to be a major delay (Clark and Fox Tree, 2002). Speakers announce such delays for many reasons. The commonest reason, illustrated in (1) and (2), is to let their partners know that they are delayed in retrieving a word, formulating a phrase, or deciding on a message. An added reason may be to hold, or cede, the floor, or, in overlap with another person's current turn, to display a desire to speak next. Fillers take other forms in other languages.

   The English fillers *uh* and *um* often do double duty. Consider this example:

   (5) Alan And from **thi-yuh** spectator point of view it looks like airplanes going in all directions (Clark & Fox Tree, 2002, p. 103)

   Here Alan pronounces *the* as 'thiy' (rhyming with *see*), but also adds *uh* as a so-called clitic at the end. In the process, he shifts the syllable boundary to before the *y* (as marked by the hyphen). The result is the trochee "thi-yuh" (a word with strong-weak stress). Other typical examples are 'an-duh,' 'bu-tuh,' and 'tu-wuh' (for *to* + *uh*). In all these cases, speakers are using *uh* both to help mark the point of suspension and to announce the initiation of a brief delay.
3. *Commentary*. Speakers often insert into hiatuses other comments about current problems. They may add *you know* or *I mean* or *that is* to say they are about to qualify or explain what they are saying, as in "is there a doctrine about that, — **I mean** a doctrine about u:h – disfavouring American applicants, (2.6.978)." They may add *no* or *pardon* or *sorry* to say that they are about to correct an error, as in "Sunday . the twenty-fifth, - **sorry** twenty-fourth (211a.173)." They may add interjections such as *well*, *oh*, and *ah* to comment on the current state of their thinking, as in (2), "I've u:m recently read u:m . **oh, .** *Lord of the Flies* (3.5a.110)." They may even suspend

speaking to carry out an action independent of what they are saying. One speaker produced "I'm not - **oh, thanks, .** not really comfortable, . like this, (1.3.1)," taking time out mid-utterance to thank his partner for a cup of coffee he had just been handed.

4. *Self-talk*. Speakers can also talk to themselves, softly, as evidence that they are busy doing something during the delay. When one person was asked, "What is the name of the extinct reptiles known as 'terrible lizards'?" she replied, "[4.5] **terrible l-** (to self) [2.0] u:h [4.0] um uh dinosaurs I guess" (Smith and Clark, 1993: 33). She repeated the question to herself, but aloud, as evidence that she was working on the answer.
5. *Continued phonation*. Once speakers have suspended fluent speech with a prolonged word, they can use the prolongation itself to fill the hiatus. In (3), when George said "A—nd this little boy—," he prolonged the word *and* to fill the hiatus.

Just as nature abhors a vacuum, speakers abhor a silence, as they add speech and gestures to their hiatuses. But what they add does more than fill a silence. It helps explain the delay itself.

Resuming Speech

Hiatuses end when speakers resume speaking fluently. Speakers have four main options in resuming, once again as documented in spontaneous speech.

1. *Continuations*. Speakers most often continue a sentence where they left off, picking up on the next word with the intonation of the phrase they suspended. This is illustrated in examples 2 and 5.
2. *Restarts*. Speakers also often return to the beginning of the current constituent and restart it, as Julia did in (4) with *the*, "it's thi:y . **thuh monastery.**" Evidence shows that speakers are more likely to restart a constituent the more disruptive the hiatus has been—the more commentary or time it contained (Clark and Wasow, 1998). So, even though their original attempt at a constituent may have been interrupted, their ultimate delivery of the constituent is fluent, befitting an ideal delivery. There is good evidence that speakers prefer to produce constituents with a continuous delivery (Clark and Wasow, 1998; Levelt, 1983).
3. *Replacements*. Still other times, when speakers resume speaking, they replace earlier material in order to correct an error, as in "Sunday . the twenty-fifth, - sorry **twenty-fourth** (211a.173)."
4. *Fresh starts*. Speakers sometimes resume speaking with a fresh start on an entirely new sentence, as in (3).

Why Delay?

If speakers delay in order to deal with problems in production, what types of problems are they? One of the earliest proposals was that delays come at points of unpredictability in production (Goldman-Eisler, 1968; Maclay and Osgood, 1959). Unpredictability was measured by deleting words from transcripts of spontaneous speech and counting the number of guesses it took other people to identify the deleted words. The more guesses it took for a word, the less predictable the word was in context. Indeed, speakers tended to pause longer and more often just before the words that were later shown to be less predictable.

According to another early proposal, speakers should also be delayed in formulating major units of their utterances. One such unit is the *intonation unit* (Boomer, 1965). These units are clauses or other phrases that are pronounced under a single intonation contour. Intonation units, in this proposal, should have many delays near their beginnings, where most planning is done, and fewer delays later on. Indeed, pauses, fillers, and repeats have been shown to be common before or after the first word of intonation units and rare later on (Chafe, 1979, 1980a; Clark and Fox Tree, 2002). Likewise, within intonation units, there tend to be more delays before long phrases than before short ones (Clark and Wasow, 1998; Ford and Holmes, 1978; Holmes, 1988).

Narratives consist of series of intonation units, as in this excerpt from a retelling of a silent film (each line is an intonation unit) (Chafe, 1980b):

(6) (1.15) A–nd (.1) then a boy comes by,
(.1) on a bicycle,
the man is in the tree,
(.9) and the boy gets off the bicycle,
and .. looks at the man,
and then (.9) uh looks at the bushels,
and he .. starts to just take a few,
and then he decides to take the whole bushel.

Many of these units begin with *and* or *and then*, and delays are common before or after these words. But narratives are hierarchical. These eight intonation units combine to form a sentence. A series of such sentences combine to form an episode (analogous to a paragraph). And a series of such episodes combine to form the entire story. In one study (Chafe, 1979, 1980a), narrators were shown to produce many delays in entering each new intonation unit (as in lines 1, 2, 4, 5, 6, and 7 of example 6), still more delays in entering each new sentence (as in the first line of (6)), even more delays in entering each new episode (or paragraph), and the most delays in entering the story at its beginning. The larger the

unit, the more planning it took, and the more often speakers had cause to delay.

Speakers are more likely to be delayed, therefore, the larger and more complicated the unit they are planning. Still, speakers don't delay simply because the unit they are planning is large. Rather, they suspend speaking on each occasion because of a *specific* problem that keeps them from proceeding.

Summary

Delays are common in spontaneous speech. Reactive delays are almost inevitable as speakers try to remain fluent while deciding on, planning, and formulating what to say. Rhetorical delays, in contrast, are part and parcel of what speakers are trying to say. The remarkable point is that delays themselves are planned. Speakers must formulate each suspension, each hiatus, and each resumption with the same care that they formulate their speech.

See also: Dialogue and Interaction; Psycholinguistics: Overview; Speech Errors: Psycholinguistic Approach; Spoken Language Production: Psycholinguistic Approach.

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Pedagogical Grammars: Second Language

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People learn languages for interactional purposes. Even a so-called library language involves interaction between a reader and texts that the reader reads. While experts agree that learning language in a natural setting, by interacting with speakers of the target language in their own community, is the best way of acquiring a language, it is not always possible to do so. Since time immemorial, people have felt the need to learn languages in classrooms, whether these were tailored to an individual or to a group. For instance, in medieval times the aristocracy employed tutors to give their wards individualized instruction, whereas religious institutions had language

unit, the more planning it took, and the more often speakers had cause to delay.

Speakers are more likely to be delayed, therefore, the larger and more complicated the unit they are planning. Still, speakers don't delay simply because the unit they are planning is large. Rather, they suspend speaking on each occasion because of a *specific* problem that keeps them from proceeding.

Summary

Delays are common in spontaneous speech. Reactive delays are almost inevitable as speakers try to remain fluent while deciding on, planning, and formulating what to say. Rhetorical delays, in contrast, are part and parcel of what speakers are trying to say. The remarkable point is that delays themselves are planned. Speakers must formulate each suspension, each hiatus, and each resumption with the same care that they formulate their speech.

See also: Dialogue and Interaction; Psycholinguistics: Overview; Speech Errors: Psycholinguistic Approach; Spoken Language Production: Psycholinguistic Approach.

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People learn languages for interactional purposes. Even a so-called library language involves interaction between a reader and texts that the reader reads. While experts agree that learning language in a natural setting, by interacting with speakers of the target language in their own community, is the best way of acquiring a language, it is not always possible to do so. Since time immemorial, people have felt the need to learn languages in classrooms, whether these were tailored to an individual or to a group. For instance, in medieval times the aristocracy employed tutors to give their wards individualized instruction, whereas religious institutions had language

instruction for groups of monks or nuns or clergy. This was true of all civilizations throughout the world from what we know of instruction in, for example, classical Arabic, Chinese, Latin, and Sanskrit.

With universal education in modern times, classroom instruction has become more systematic and more varied across the world. In the context of language classrooms, a great debate has been raging on the topic of whether grammar teaching plays any role in language learning. Krashen's distinction (1981) between language acquisition and language learning has had a major impact on practices in language classrooms. The paradigm in second and foreign language instruction changed from direct and audiolingual methods to communicative language teaching (Berns, 1990; Savignon, 2002). For many language teaching professionals, communicative language teaching meant a benign neglect, if not a total boycott, of grammar instruction (see, e.g., Eskey, 1983; van Patten, 1988). However, this extreme position was not embraced wholeheartedly by the entire language-teaching profession (Celce-Murcia, 1995; McDonald, 1999; Nassaji and Fotos, 2004; Teng, 1997; to cite just a few). The reasons for this resistance to banishing grammar from second or foreign language instructional contexts are research findings in actual language classrooms. The first set of findings shows that conscious attention to form is a necessary condition for language learning (e.g., Schmidt, 2001). Another set provides evidence for the claim that just meaning-focused communicative tasks, with no method of creating awareness of the grammatical system, are inadequate; this exclusively meaning-focused method of teaching does not lead to accuracy in language use (see, e.g., Skehan, 1998). A third set suggests that once learners have arrived at a certain level and seem ready to move to the next level of linguistic proficiency, it is possible to accelerate their learning through grammar teaching, even in the context of a communicative classroom (Lightbown, 2000). Both the second and the third sorts of research findings are discussed in Ellis (2002). A final set of findings relates to the positive outcome of deliberate grammar teaching in learning, especially in attaining accuracy that persists over time (see Norris and Ortega, 2000, 2001). As a result, there has been a great deal of discussion about the nature of grammar instruction suitable for language classrooms, and there are many publications, too numerous to be listed here, on the properties of pedagogical grammars.

The category of pedagogical grammar is defined by the specific purpose these grammars serve, namely, a source of information for teachers and learners on grammatical topics and appropriateness of use of linguistic structures in specific contexts of spoken or written interaction. Obviously, then, pedagogical grammars are different from other grammars in several respects.

Types of Grammars

There are several types of grammars in existence: linguistic grammars (descriptions), reference grammars, pedagogical grammars, and language courses (the last with grammar components). Linguistic grammars or descriptions are primarily for testing linguistic theories; two examples of such grammars are Jolly (1991), which presents a 'role and reference' grammar of English, and Haegeman and Guéron (1999), which is a transformational, or generative, grammar of English. Since the purpose of such grammars is well defined in terms of theoretical goals, they are usually limited in scope (e.g., Ginzburg and Sag, 2000), or when they attempt to be comprehensive, they tend to propose modifications and extensions of theories they are based on. A grammar driven by linguistic theory may also illustrate how the theory works. A good example of a descriptive grammar driven by linguistic theory is Halliday (1985), which illustrates how the systemic model is effective in describing English.

Reference grammars are usually theory neutral, i.e., they derive insights from several theoretically oriented descriptions and present information in traditional grammatical terms or in terms that are explained explicitly so that a wide range of users may find the information useful. Two good examples of reference grammars of English are Quirk *et al.* (1985) and Huddleston and Pullum (2002).

Language courses present language material with a view to facilitating learning; the emphasis is on making the units interesting and useful for communication via plentiful, but not overwhelming, structural, lexical, and sociocultural content. Grammatical points are explained, but they are only one of the several concerns of the course writers. Since it is tied to the lessons, the grammatical information is fragmentary and not systematic as in a reference grammar. Examples of language courses with grammatical notes are Rutherford (1975) for English and Kachru and Pandharipande (1983) for Hindi.

One distinctive characteristic of pedagogical grammars is that they facilitate awareness of the relatedness of grammatical structures to speaker/writer meanings and intentions. The primary concern of linguistic grammatical descriptions is linguistic theory; that of reference grammars is presenting grammatical topics in a systematic way in order to focus on the grammaticalness of structures. Issues of sociocultural appropriateness are not central to either type.

However, appropriateness of what can be said is essential for the language-for-interaction goal of language learning and teaching, which is systematically handled only in pedagogical grammars. Language courses illustrate them but do not present them methodically. Furthermore, language courses are focused on teaching language; their aim is not to present grammatical topics systematically.

Characteristics of Pedagogical Grammars

The following topics may be said to be the essential properties of pedagogical grammars; they are illustrated with material drawn from a number of Western and non-Western languages.

Relating Use (Function) and Usage (Grammatical Rules)

This may be illustrated by a partial description of a phenomenon in Hindi, an Indo-Aryan language spoken in northern India (*see* **Hindi** and **Indo–Aryan Languages**). As in most Indo-European languages, Hindi has a passive construction represented by the following examples:

(1) šīlā se khānā nahī
Sheila by meal MASC NEG
pakāyā jāegā.
cook PERF *go* FUT MASC SG
'Sheila will not be able to cook the meal'

(2) sab laṛkiyõ ko bulāyā
all girls OBL DO *invite* PERF
gayā hai.
go PERF PRES SG
'all have been invited'

In the two examples above, the passive auxiliary is *jā* 'go', the main verb is marked for the perfect aspect, and the agent, when it occurs, is followed by the instrumental postposition *se,* as in (1). Another interesting grammatical fact to note is that since the agent in (1) is marked with a postposition, the verb agrees with the patient, *khānā* 'meal', and so is in the masculine singular form. That the oblique noun does not control agreement can be seen in (2), where, since the patient, *laṛkiyõ* 'girls-OBL', is followed by the postposition *ko*, marking it as the direct object, the verb is not in the feminine form; it is in the default agreement form, i.e., masculine singular. The semantic fact worth noting is that the negative passive denotes a lack of capability on the part of the agent, as in (1); without the agent, the predicate expression is about the patient; the agent is either not known or irrelevant, as in (2). Grammatically, it is well motivated to describe both (1) and (2) under a discussion of passive; in terms of use, it is crucial to point out that the so-called passive with agent is used mostly for signaling the inability of the agent to perform a certain action. The one exception to this generalization is in the journalistic register, especially news reports, where, under the influence of English, the passive construction with agent is used in a way analogous to the English passive.

Capturing Regularities in Language by Grammatical Rules

The following data from African-American English (Labov, 1998: 120) seem ungrammatical and inappropriate to General American English (GAE) speakers:

(3) when June come, I be outta school

(4) when my son was young, the women be givin' him money

(5) so you know it all don't be on her, it be half on me . . .

The nonfinite *be* in the above sentences, however, has a grammar of its own. According to Labov (1998) it has three grammatical properties: it requires *do*-support (*don't be* is grammatical; **ben't* is not); it cannot be used to make tag questions; and it does not undergo subject-auxiliary inversion in, e.g., question formation, as auxiliaries such as *do* and *have* in GAE do. It has two distinct semantic properties: it indicates habitual state or activity, as in 3 and 4, and it signals a durative and intensive sense, as in 5.

Functions of Rules and Exceptions to Rules in Use

The general rules for use of articles in English are described in Quirk *et al.* (1985: 265–287); they are based on well-attested functions of the articles in English. However, English-watchers have recently reported on the case of 'missing' indefinite articles, discussed in more than one issue of *English Today.* Examples such as the following are from radio broadcasts and print media (McArthur, 1995: 43):

(6) I prefer to work with people who do think I'm important artist. (BBC Radio, June 21, 1994)

(7) Nirex are going to apply for underground laboratory. (BBC Radio, June 21, 1994)

(8) He was decent, caring man who was disgusted by the vandalism and lawlessness around him. (*The Sunday Times*, London, June 13, 1993)

(9) The point is that *it is platform* for good journalism with differing views. (*The Observer*, London, April 25, 1993)

(10) "Anti-semitism is a hideous form of racial hatred and bigotry," Mr. Chavis said in an address given at the National Museum of Natural History in Washington. "It is virulent strand of racism." (New York Times Service in *International Herald Tribune,* January 26, 1994)

(11) . . . Mrs. Nasser, 40, said in telephone interview from her home in Ramallah north of Jerusalem. (Washington Post service in *International Herald Tribune,* August 23, 1994)

This phenomenon of the missing indefinite article was noted earlier by Algeo (1988: 4–8). It may be more of a feature of British English, as Ilson (1995) asserts; it may be more a feature of the spoken language; or it may be a language change in progress. Whatever it is, pedagogical grammars need to go beyond reference grammars to point out such features, which learners are bound to notice when they interact with speakers of different varieties of English, and depending on the context, pedagogical grammars should make specific recommendations about appropriate usage.

Relating Structure and Meaning to Make Sense of Form-Function Correlation

To take another example involving articles in English, a pedagogical grammar has to point out the following two facts. First, there is no clear semantic basis for the use of the different articles in English; they overlap semantically. Secondly, there is no one-to-one correspondence between definiteness and specificity on the one hand and the definite article *the* on the other. The choice of an article is determined by grammatical, semantic, and pragmatic considerations; hence, a clear grammatical account of the use of definite NPs is not possible. These two points are supported by the following types of description and data:

- Description: count nouns in the singular must be preceded by an article; the following are ungrammatical: **girl is waiting for her mother; *he is reading book his friend gave him*.
- Semantics: articles signal whether the noun is definite or indefinite and specific, nonspecific, or generic in reference.
- Pedagogical grammatical note: There is no one-to-one correspondence between the articles *a(n)* and *the* and their meanings, as the following data show:

(12a)	*A(n)*	A cheetah is faster than a bear	(indefinite article; nonspecific, generic)
(12b)		I saw a girl jogging in the snow	(indefinite article; specific, unidentified)
(13a)	*The*	For the scientist, *the shark* is of interest because of its almost perfect streamlined form	(definite article, nonspecific, generic)
(13b)		the man in front looks sick	(definite article, specific, identified)

There are some purely grammatical functions that are associated with *a(n)* and *the*. For example, a count noun in the singular occurring as a complement to a linking verb must be preceded by *a(n)*. Thus, the following is ungrammatical: **my brother is neurosurgeon*. Similarly, the definite article *the* must precede superlative adjectives, e.g., *the best book*, *the fastest car*. For a list of such grammatical functions of indefinite and definite articles, see Quirk *et al.* (1985: 273ff. and 269ff.).

Difference between Grammatical, Referential, Utterance, and Speaker Meanings

Every utterance carries all four types of meanings. For instance, an utterance such as *I think it's getting late* has the grammatical meaning 'statement'; the referential meaning consists of *I*, referring to a particular speaker, and the rest, referring to a particular situation; the utterance meaning signals that the speaker wants change in whatever activity is taking place; and the speaker meaning can signal any of the following, depending on the context: we should close this meeting, it is time to eat/go to bed/begin the game, when are we going to eat? why aren't the guests here? can't we do this some other time? etc.

Role of Creativity versus Routines in Use

In spite of the property that human languages can generate infinitely large numbers of sentences, actual interactions depend on a large number of routine expressions (Coulmas, 1981). There is a finite set of options from which individuals select whatever seems appropriate to them when they greet, take leave, apologize, pay compliments, offer condolences, make requests, lodge complaints, etc. Pedagogical grammars, irrespective of their grammatical properties, must present such routines systematically in terms of their functions if they are to be helpful. For instance, all of the following Hindi sentences have the force of politely requesting or suggesting that the addressee act in a certain way; the literal meaning of all the sentences is the same, 'please have your meal.'

(14) khānā khā lījiye
meal eat take HON IMP

(15) khānā khā lījiyega
meal eat take HON IMP FUT

(16) khānā khā lẽ
meal eat take OPT

(17) khānā khā liyā jāe
meal eat take PERF *go* OPT

Hindi makes a distinction between intimate, familiar, and honorific forms of second person pronouns and imperative forms of verbs. The above are all honorific forms. As the glosses suggest, each one represents a different grammatical construction. In a pedagogical grammar, however, they belong together with explanations of contexts in which each one is appropriate: (14) is used for intimate or very familiar addressees one respects, e.g., one's parents, older siblings, close relatives; (15) is used when the context demands that the addressee be given the impression that he or she has a choice not to eat immediately but whenever it is convenient – the distance in time suggests a higher degree of politeness; (16) is used in very formal situations since the verb is not marked with the imperative ending but rather the optative suffix, which signals a suggestion; and (17), a passive verb with an optative suffix, is used – especially in the eastern Hindi-speaking area – to suggest the highest degree of politeness.

Interactional Norms of Speech Communities

Every speech community has its norms of interaction. All languages have interrogative structures; however, not all speech communities have the same rules of use of interrogative structures. For example, among the aborigines of southeast Queensland, Australia, direct questions are seldom used (Eades, 1982). The questioner must make assumptions and then ask questions on the basis of these assumptions. In Japanese interactions, an elaborate system of honorifics is used to indicate politeness in referring to a third party or addressing someone. The honorific system consists of not only special particles but also lexical items and syntactic structures. According to Martin (1964: 411), "[h]onorific forms incorporating negatives analogous to our 'Wouldn't you like to' are generally felt to be more polite than those without negatives." He cites a 1957 study by the National Language Research Institute of Japan of the attitudes in nonstandard dialect areas for a number of such generalizations.

Interface of Language and Culture

Language is universally used for social interaction. However, there are rules about who has the right to speak, when to speak or keep silent, what to say, and how to say something. For instance, greetings in GAE require a response that is also a greeting. In southern Asian languages, however, elders respond to a greeting from a younger person with a 'blessing' such as *may you live long, have good health, and prosper.* A compliment in GAE evokes a response such as *thank you*; in Asian languages such as Chinese, Hindi, and Japanese, a denial of being worthy of a compliment is considered polite because it shows humility; accepting a compliment by saying *thank you* is perceived to be conceited. Grammars are not concerned with such norms of interaction; pedagogical grammars, to be effective, have to describe the expected use of items such as *thank you* or constructions such as *may you live long* in the speech community.

Pedagogical Grammar in Language Education

On the one hand, pedagogical grammars organize and systematize knowledge about language; on the other hand, they represent resources that both learners and teachers can access for clarification or for stimulating discussion about grammaticality versus appropriateness in use of structural patterns. This may be illustrated with an example from French. The following sentences are all characterized as attributive in French grammatical descriptions (from Ciliberti, 1984: 28):

(18) il est professeur [more or less essential quality]
he is professor
'he is a professor'

(19) il a les yeux bleus [an essential quality]
he has the eyes blue
'he has blue eyes'

(20) il aime le fromage [attribution of a disposition]
he loves GENERIC *cheese*
'he loves cheese (i.e., all types of cheese)'

The grammatical generalization in terms of attribution does not help an English-speaking learner of French attempting to figure out where to use what seems like an article [*les*, *le,* in (18) and (19), respectively] and where not to use it [e.g., in (20)], especially if the learner wants to participate in interactions as a speaker, as opposed to decoding what has been said, as a listener. It also does not lead to the learner's internalizing the nature of the attributive sentences in French. A contrastive account of English and French article use such as the following may be helpful: a predicate nominal complement of a linking verb in French typically does not take an indefinite article as in English; on the other hand, the name of

a body part, denoting inalienable possession, does take a definite article, as does a generic nominal complement in a statement indicating habitual state.

Another example is relevant to reinforce this point. McDonald (1999) discusses a topic in Chinese (Mandarin) grammar, adopting an approach in which the text is the point of departure. Learners concentrate on what contribution vocabulary and grammar make to the meaning of texts and are thus to acquire the knowledge of grammar and lexicon they need based on their understanding of these levels as contextualized in texts (Halliday, 1985). The topic McDonald focuses on is the function of the aspect suffix *le*.

The Chinese language is very different from Indo-European languages in its grammar, as it is analytical, i.e., it has hardly any inflectional morphology and a rather small number of derivational affixes; most grammatical relations are indicated by compounds of two syllables, juxtaposition of lexical items, or variation in word order. Consequently, number, gender, tense, etc., are not overtly indicated and have to be computed from the syntax, or the context, or both. The few affixes that Chinese has include locatives; classifiers; a genitive morpheme; an adverbial morpheme; two nominalizing morphemes analogous to *-ology* (as in *sociology*) and *-ist* (as in *novelist*); and two aspect-marking suffixes, the durative *zhe* and the perfective *le*.

McDonald (1999) cites Li and Thompson (1981: 185–186), who describe the function of *le* as follows:

> The verbal aspect suffix *-le* expresses perfectivity, that is, it indicates that an event is being viewed in its entirety or as a whole. An event is viewed in its entirety if it is *bounded* temporally, spatially or conceptually. There are essentially four ways in which an event can be bounded:
>
> A. By being a quantified event
> B. By being a definite or specific event
> C. By being inherently bounded because of the meaning of the verb
> D. By being the first event in the sequence.

Li and Thompson's aim is to make sure that learners of Chinese do not equate *le* with tense in English.

Such descriptions, however, do not explain the distribution of *le* in the following text.

(21) Zuótiān wò dào chéngli qù le.
yesterday I to city go ASP: COMPL
'yesterday I went into town' [compl = completed]

(22) Zǎochén bā diǎn duō zhōng chūfā
morning eight point more clock set out
'I set out after eight o'clock in the morning'

(23) wǎnshang shíyīdiǎn yíke cái huí-lai,
evening 11 o'clock one quarter only-then return come
'(and) didn't get back till quarter past eleven at night.'

(24) zhěnzhěng máng le yìtiān.
fully busy ASP: COMPL. one day
'I was occupied for the whole day'
(McDonald, 1999: 113–114; only the first four lines are reproduced here)

The text above tells the story of a person who has performed a series of actions in the recent past; only some of these actions are marked with *le* to signal completion. In (22) and (23), the narrator describes "actions in a series, [of which] the main emphasis is on the *time* they took place, [so] they are not presented as completed" (McDonald, 1999: 115). As regards (24), "[t]he going on in this clause is not even strictly speaking an action, but rather a state; however, it is presented as completed because it has filled up the whole day" (116). McDonald summarizes the function of *le* as signaling 'completed action' (105) and goes on to list when an action is considered completed in Chinese:

a. when it is completed to a certain extent, as in 'I ran to eight different places', 'I dealt with three important matters', etc. in the description of what the narrator did during the day he spent in town;
b. if it has to happen before the following action or series of actions can take place, as in the following sentence in the text above: 'I went into town yesterday';
c. by the very nature of the verb, e.g., 'I forgot I was tired' in the same text;
d. by being extended to its ongoing result, as in 'I ran into an old university classmate' in the same text. (McDonald, 1999: 116–117)

It is clear that the morpheme *le* is functionally different from the simple past and any of the perfect tenses in English. McDonald recommends a methodology of language teaching consisting of contextualizing, consciousness-raising, and generalizing on the basis of analysis of particular texts. The recommendation is to teach grammar by first presenting a text; noting the use of grammatical items to signal meanings; generalizing on the basis of observed regularities; and systematizing the information thus gathered. The claim is that this indirect method of teaching grammar prepares learners to see the grammatical regularities and also note the correspondences or lack of correlations between grammar and textual use.

Conclusion

In the teaching of languages and grammars, the emphasis has always been on the target language; some approaches prohibit use of learners' first languages in the classroom. Since pedagogical grammars are meant for serving specific purposes, comparison with first or any other familiar languages in context need not be avoided. In fact, contrasting the target language properties with the characteristics of other languages in the learners' repertoire may be a very effective tool in helping learners internalize the target language grammars.

See also: Communicative Competence; Communicative Language Teaching; Hindi; Honorifics; Indo–Aryan Languages; Interlanguage; Language Change and Language Contact; Language Education: Grammar; Speech Community.

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Pedersen, Holger (1867–1953)

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The Danish linguist Holger Pedersen, one of the outstanding Indo-European scholars of the 20th century, was born on April 7, 1867, in Gelballe (near Kolding). He did philological studies in Copenhagen with Vilhelm Thomsen, Herman Møller, and Karl Verner. Later, he turned to Indo-European studies with the intention of doing research in all the various branches of that linguistic family. For this reason, he went on a study trip, during which he also did fieldwork on Albanian and on the Irish dialect of the Aran Islands. In 1897, he obtained his doctorate; in 1900, he became a lecturer and in 1903 extraordinary professor of Slavic philology and Indo-European studies at Copenhagen University; and in 1914, he was appointed full professor of Indo-European studies as the successor of Thomsen. Thus, he always lived in or near Copenhagen until his death on October 25, 1953, in Hellerup.

Pedersen preferred to deal with those languages that had been identified as Indo-European only after the foundation of Indo-European Studies was established by Bopp, Rask, and Grimm and that therefore were not the focus of attention. He wrote a comparative Celtic grammar (1909–1913), which is still authoritative today, commented on Albanian texts (1895), and did fundamental studies on Armenian, its historical phonology, and its relations to the cognate languages (collected in Schmitt, 1982). Pedersen also showed great interest in the newly discovered Indo-European languages known as Tocharian and Hittite, as one can see from his *Tocharisch vom Gesichtspunkt der indoeuropäischen Sprachvergleichung* (1941). He was among those scholars who from the very beginning recognized the importance of the two Hittite Arzawa letters published in 1902 by Jörgen A. Knudtzon. He studied in great detail the relationship of Hittite to the other languages in *Hittitisch und die anderen indoeuropäischen Sprachen* (1938). Because he did not see any special position of Hittite, he pronounced himself as being plainly against Edgar H. Sturtevant's Indo-Hittite theory. By means of deduction, he made important observations concerning Lycian quite early. He stood up for the Indo-European character of this language as early as about 1900 and was the first to give detailed reasons for a closer relationship to Hittite in his *Lykisch und Hittitisch* (1945).

Pedersen was engaged in general Indo-European problems, too, such as the grouping of the various dialects (*Le groupement des dialectes indo-européens*, 1925) or the different inflexional types of nouns in the proto-language in the quite original and stimulating booklet *La cinquième déclinaison latine* (1926). Moreover, Pedersen also made his mark as a historiographer of 19th-century linguistics (1931) and dealt with the relations of the Indo-European languages to the Semitic and Finno-Ugrian language families. He coined the term 'Nostratic' for the group of languages containing, according to several scholars' theories, all those languages and even more.

See also: Bopp, Franz (1791–1867); Grimm, Jacob Ludwig Carl (1785–1863); Möller, Hermann (1850–1923); Rask, Rasmus Kristian (1787–1832); Sturtevant, Edgar Howard (1875–1952); Thomsen, Vilhelm Ludvig Peter (1824–1927).

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Pehuenche *See:* Mapudungan.

Peirce, Charles Sanders (1839–1914)

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Life

Charles Sanders Peirce (pronounced 'purse') was born on September 10, 1839, in Cambridge, Massachusetts. He was regarded as a child prodigy in science and philosophy. His father, Benjamin Peirce, was a renowned mathematician at Harvard University who liked to stimulate his son's thinking by presenting intricate and original problems. This unique didactic atmosphere may have been a stimulus for Peirce's development as an original thinker. However, despite a promising youth and a brilliant mind, Peirce never achieved a tenured academic position.

Peirce graduated from Harvard in 1859 and received his bachelor's degree in chemistry from Lawrence Scientific School in 1863. That same year he married his first wife, Harriet Melusina Fay. For the most part of his life – i.e., from 1859 until the end of 1891 – he was an employee with the U.S. Coast and Geodic Survey (of which his father was a cofounder), where he performed gravity research and pendulum experiments. His work brought him to Europe on five occasions, each time for a stay of several months. From 1879 until 1884, Peirce held a parallel job at Johns Hopkins University, teaching logic at the department of mathematics. His early resignation is said to be due to his personal problems (he got divorced and later remarried).

After his forced resignation from the U.S. Coast and Geodic Survey in 1891, Peirce was never again able to obtain a steady job, although he was invited for short-term lecturing posts at various institutions such as Harvard (1865, 1869–70, 1903, 1907) and the Lowell Institute in Boston (1866, 1892, 1903). Most of his writing after 1891 was done for pay. Peirce reviewed and translated books and contributed to several dictionaries and encyclopedias. His articles, in which he worked out his theories, often remained unfinished or were rejected by editors. He also did some consultancy work as a chemist. During the last years of his life, despite inheriting money and some possessions from his mother and aunt, he often had to rely on the financial support of his friends, e.g., William James. Peirce died of cancer in Milford on April 19, 1914.

His Work

Peirce's work covers an astonishingly wide variety of subjects. He wrote on chemistry, physics, religion, perception and categories, epistemology, history of philosophy, philosophy of science, and mathematics (ranging from fundamental theoretical issues to the mathematics of card tricks). Yet he regarded himself first and foremost as a logician. His modifications and extension of Boolean logic and his work on the logic of relatives following De Morgan are still considered to be major paradigm shifts in modern logic. But even more importantly, perhaps, Peirce may be regarded as the founding father of two still very influential traditions, viz. philosophical pragmatism – later further developed by William James and James Dewey – and semiotics (which Pierce himself labeled 'semeiotic').

Categories and Signs

From a very early age Peirce was well acquainted with the works and ideas of Kant, whose *Critique of pure reason* greatly influenced his thought. Peirce disagreed with Kant's categories, however, and developed his own original and coherent set of universal categories that include ideas as well as objects. Peirce's philosophy distinguishes three universal categories: firstness, secondness, and thirdness. (Peirce always preferred trichotomies over dichotomies in his writings.) The first category refers to a mere quality or feeling, e.g., the quality of red (or the redness of red) such as it is, regardless of anything else. Secondness is the experience of pure reaction, e.g., the experience of red in reality. When a regularity or habit comes in, secondness turns into thirdness. Signs are instances of thirdness par excellence.

A sign consists of a triadic relation between a representamen, an object, and an interpretant, i.e., as a representamen a sign stands for an object with respect to a third, which is an interpretant or a sign in the mind of an interpreter. As every interpretant is again a sign, semiosis or the sign process is infinite, according to Peirce.

Classification of Signs

Another triadic distinction is applied to his classification of signs. In its simplest form, Peirce's classification distinguishes ten classes of signs based on three trichotomies that are themselves derived from his three universal categories. In later work, however, Peirce argued, albeit without offering a satisfying analysis, that there are no less than sixty-six classes based on ten trichotomies.

The first trichotomy is based on the character of the sign itself. *Qualisigns* are qualities (e.g., hardness) which may act as a sign; signs which are actual events or things (such as *a* in the previous sentence) are *sinsigns*, and a regularity (or 'law') that is a sign is termed a *legisign* (e.g., the determiner *a* as a linguistic item).

The second trichotomy is based on the relationship between the sign and its object. An *icon* is a sign that refers to its object merely because of the features it possesses. It is important to note that sheer similarity between sign and object is not what makes a sign an icon; rather, iconicity is based on the fact that the two are interpreted as similar. The second type of sign in relation to the object is called *index*. An index is a sign that is affected by its object, in other words there is a real physical relationship between the two. One popular example is smoke as a sign of fire. Fire produces smoke, so there is a direct (causal) relationship. Finally, a *symbol* is a sign that refers to its object only because there is an interpretant who links the sign to the object, e.g., words and other conventional signs. This second trichotomy is the most interesting (and most widely known) one from a linguistic point of view as it addresses the time-honored topic of the arbitrariness of the linguistic sign and whether there is iconicity involved in language (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**). The linguist R. Jakobson was the first to use Peirce's terminology to address this topic in his influential article 'Quest for the essence of language' (1966). Since the 1980s a growing number of linguists (mainly in the wake of the work of John Haiman) have argued against arbitrariness in language and in favor of the pervasiveness of iconicity.

The third trichotomy is concerned with how the sign is interpreted and corresponds to the older distinction between term, proposition, and argument. A *rheme* is understood to represent its object merely in its possibilities or features and is neither true nor false (*see* **Aristotle and Linguistics**). A *dicent sign* or *dicisign* represents its object in respect to actual existence and as such it is either true or false. Finally, an *argument* signifies a 'law' leading from a set of premises to a conclusion.

Pragmatism and Abduction

One of the hallmarks of Peirce's work is his disappointment with the results of philosophy compared with those of the natural sciences. According to Peirce, the success of science is due to its methodology; he argued that philosophy should adopt the same methods, including the use of a well-defined nomenclature. Pragmatism (which Pierce renamed 'pragmaticism' in his later writings) may be regarded as an attempt to establish philosophy as a science, i.e., 'a method of thinking' through which the impact of concepts on man's conduct can be assessed. Thus, pragmatism is ultimately a method to ascertain the true meanings, understood as possible pragmatic values, of concepts. Later pragmatists such as William James and John Dewey extended pragmaticism to other issues as well (e.g., the problem of truth).

Peirce argued that *abduction* is fundamental in scientific as well as everyday reasoning, being the only type of inference that leads to genuinely new ideas and theories – something that *induction* (i.e., reasoning from some given facts to a general law) and *deduction* (reasoning from a general idea to a particular case) never do. Abduction is the creative process of forming and provisionally accepting an explanatory hypothesis for the purpose of testing it. However, since abduction can only suggest what *may be* the case, it can ultimately never be more than ordinary guesswork.

See also: Aristotle and Linguistics; Jakobson, Roman (1896–1982); Kant, Immanuel (1724–1804); Saussure, Ferdinand (-Mongin) de (1857–1913).

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Perceptual Dialectology

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In the earliest work in perceptual dialectology, folk respondents evaluated the linguistic difference of surrounding localities. The following two questions are from a 1939 survey conducted in the Netherlands (Rensink, 1955):

1. In which place(s) in your area does one speak the same or about the same dialect as you do?
2. In which place(s) in your area does one speak a definitely different dialect than you do? Can you mention any specific differences?

The Dutch dialectologist Antonius Weijnen (1946) used a 'little arrows' mapping method to represent information uncovered by question (1); in this way, a respondent's home area was connected by an arrow to another that the respondent said was similar. Groupings of connected areas were attributed to the similar dialect consciousness of the respondents. If there were a perfect match between perception and production, every site within a traditional dialect area would be connected to every other by a two-way arrow. Although that was not the case, the perception–production match was impressive.

Early work also included speculation on which linguistic facts were most salient in perception. Weijnen (1961) believed that they are phonological ones, which are sharper than syntactic and morphological boundaries and less specific than those that arise as the result of the difference of a single lexical item. Another Dutch dialectologist, Jo Daan (1970), asked what linguistic facts *not* uncovered in traditional studies play a role in perception and pointed out that intonation might be one; vocal quality, speech rate, and a number of other factors could be added. She also asked what sociohistorical or nonlinguistic factors influence perception and suggested that a religious boundary might account for respondents' feelings that there is a linguistic one. Doubtless many other such so-called external factors influence perception.

In the 1950s and 1960s, the study of dialect perception was prominent in Japan. Takesi Sibata (1959) asked respondents from the coastal area of Itoigawa to indicate which nearby villages were (1) not different, (2) a little different, (3) quite different, or (4) mostly incomprehensible. The first question was found to be of little value, and the results of questions (2) and (3) were combined, whereas those for question (4) were treated separately. When respondents performed similarly in stating where differences were, they were grouped into a subjective speech community. Sibata and his colleague W. A. Grootaers (1959) claimed that such boundaries were of little interest to linguists, since they do not generally correspond to production boundaries.

Y. Mase (1964a) asked respondents to indicate surrounding areas that sounded the same or different, and provided maps based on both, since the Alpine Japanese in his survey were willing to name both kinds of sites. He first mapped responses to two questions: (1) *which sites sound the same?* and (2) *which sites sound a little different?*; the perceptual areas made up of the responses are based on reciprocal perceptions of similarity, on similar perceptions of the first degree of difference, and on the perception by surrounding areas of their similarity to one another. Mase (1964b) also compared his perceptual boundaries to traditional isoglosses and found a good correspondence. On the other hand, he and Nomoto (1963) found school districts, rather than feudal and other political administrative zones, areas that dominated the boundaries of the Itoigawa research, to be similar to perceptual areas. Weijnen (1968) criticized the Itoigawa research by noting that respondents were asked if there were differences rather than similarities, and praised Mase, but since Mase nowhere based maps exclusively on similarity, Weijnen might not have approved if he had had access to the original (Japanese) versions of Mase's work.

Motivated by a desire to explore folk knowledge for its own value rather than for only the perception–production correlation, Preston (1996) asked U.S. respondents to rank areas on a scale of one to four (1 = same, 2 = a little different, 3 = different, 4 = unintelligibly different). When many U.S. respondents evaluate differences, they perceive a rather large local area of similarity, but ratings of and from the U.S. South are of greatest interest. Among northern raters, a large South emerges as a territory rated 3 (different), often with a core South rated 4 (unintelligibly different). Southern raters also rank a fairly sizeable New England (i.e., northeastern) area as 4. Evaluations of the degree of difference in this style and with slight variations have been done in southeastern Michigan and southern Indiana, the U.S. South, California, and Oregon. Sites outside the United States include The Netherlands, Norway, Canada, Spain, France, Italy, Turkey, Switzerland, and Germany (e.g., Preston, 1999; Long and Preston, 2002). In addition to the reporting of means scores, some of these studies have employed

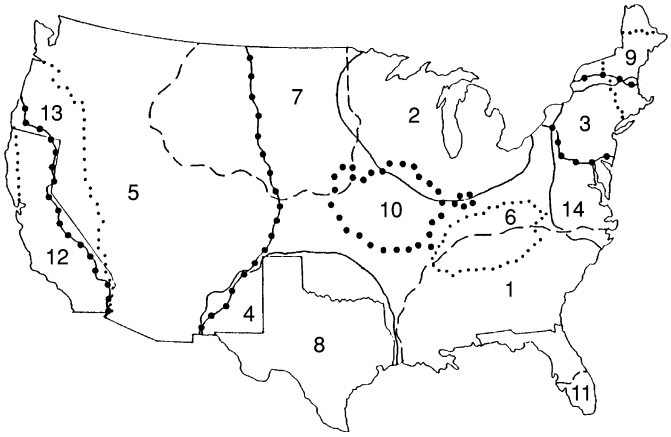

Map region	Respondents (%) (N = 147)
1	138 (94)
2	90 (61)
3	80 (54)
4	75 (51)
5	60 (41)
6	44 (30)
7	37 (25)
8	34 (23)
9	33 (22)
10	26 (18)
11	25 (17)
12	25 (17)
13	23 (16)
14	23 (16)

Figure 1 Speech regions for southeastern Michigan respondents. Key to map regions: 1, South; 2, North; 3, Northeast; 4, Southwest; 5, West; 6, Inner South; 7, Plains and Mountains; 8, Texas; 9, New England; 10, Midwest; 11, Florida; 12, California; 13, West Coast; 14, East Coast.

multidimensional scaling. Since these studies use preset areas, they have seldom been concerned with the correlation between their findings and those of traditional dialectology, although that is not true of all more contemporary work. Susan Tamasi (2003) developed a strategy in which respondents are given a deck of cards representing the areas under consideration and are asked to stack them in as many piles as necessary to show similarities.

A different approach to perception is realized in a task in which respondents are asked to outline speech areas on a blank map, label them with names of the dialect and/or area and of typical speakers, and jot down examples. Although respondent hand-drawn maps are well known in cultural geography (e.g., Gould and White, 1974), there is no tradition of this in dialectology. Several studies of the comments written on such maps have been carried out in the United States and Japan (Preston, 1999; Long and Preston, 2002).

Preston and Howe (1987) developed a technique for the computerized generalization of numbers of such hand-drawn maps. Each is traced onto a digitizing pad that feeds the outline information into a program. For each respondent's identification of an area, the program records one tally for each pixel enclosed in or touched by the respondent's boundary. This technique allows the creation of composite maps based on large numbers of respondents' individual ones. This procedure also allows questions other than that of the best generalization to be asked: for example, questions such as (1) *where is the core of a region?*, (2) *do different percentages of respondent agreement show concentric patterns or do irregularities suggest alternative interpretations?*, or (3) *are there respondent demographic variations* (*e.g., age, gender, or status*)*?* may be asked. A general map of dialect perceptions prepared in this way from southeastern Michigan respondents is shown in Figure 1. The map shows every computer-generalized dialect area drawn by at least 15% of the respondents. The South is overwhelmingly the most salient area; the 138 Michigan respondents who drew a South represent 94% of all respondents in the study. The second most salient area (the North) was drawn by only 61% of respondents, and the Northeast was the third most salient area, at 54%.

How do these perceptual boundaries correspond to production ones? If just the southern boundary of the second most salient area from Figure 1 (the North) is compared with any recent or long-standing traditional map of U.S. dialects, the perceptual generalization would not be very satisfying, but since the task asks for boundaries over the entire country, what is learned is very general. What value might such maps have? First, as noted previously, it is now known which speech areas of the region under study are more salient. Second, although the area assigned to these regions cannot be correlated with precise linguistic measurements, it is possible to calculate the core and extent of these regions in straightforward mathematical ways and also study the effects of respondent identity. Finally, perhaps most importantly, having determined what the cognitively real speech areas of a region are, it is possible to proceed to ask a number of related questions, particularly in the area of language attitudes (a topic to be discussed in greater detail later). Work with hand-drawn maps has been conducted in numerous sites in the United States and in Brazil, France, Japan, Korea, Canada,

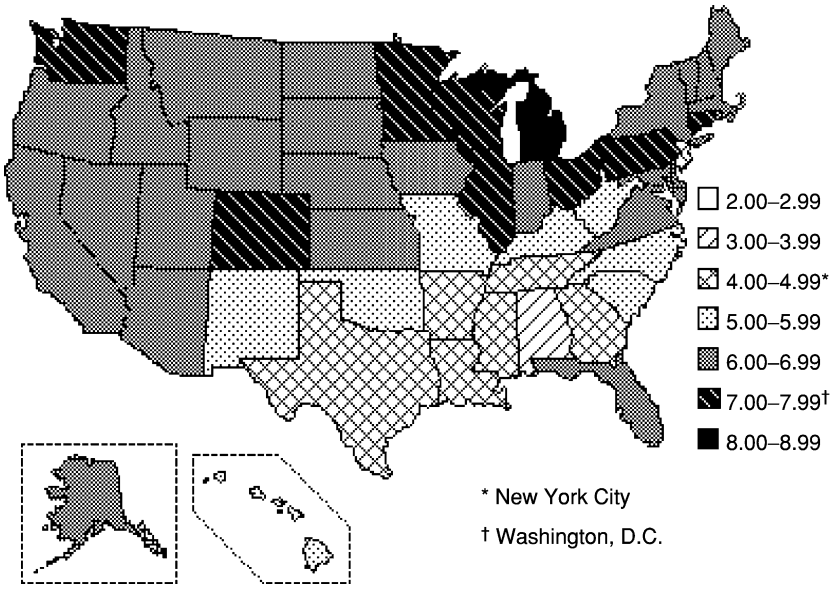

Figure 2 Mean scores of southeastern Michigan correctness ratings; higher scores indicate greater correctness.

Wales, Germany, Turkey, Italy, and Switzerland (e.g., Preston, 1999; Long and Preston, 2002).

In their recognition of regional speech, nonlinguists use protocols other than the perception of linguistic differences. A glance at hand-drawn maps from the United States, for example, suggests that respondents do not simply label them with terms such as 'Midwestern.' Their annotations range from labels such as 'standard,' 'regular,' 'normal,' 'gentlemanly,' and 'everyday,' to 'scratch and claw,' 'hillbilly,' 'damn Yankees,' 'annoyingly nasal,' and 'spoken mainly by ignorants.' It is not surprising, therefore, as Figure 1 shows, that the South is the most frequently drawn area and that the Northeast, the area that includes New York City, is also often represented. They are, in U.S. folk linguistics, the areas where the most incorrect English is spoken. Correctness is not, however, the only theme to emerge in these hand-drawn maps. Labels such as 'soft,' 'down-home,' 'gentlemanly,' 'pleasant', and 'friendly' also appear.

Language attitude studies have explored just such affective dimensions. Howard Giles and his associates have investigated numerous reactions to voice samples and have suggested a general pattern: speakers of nonstandards find their own varieties warm, friendly, honest, sympathetic, and trustworthy, but often slow, unintelligent, and plodding; they regard the standard as cold, dishonest, and unsympathetic, but quick, intelligent, and ambitious. Listeners who find their own varieties less prestigious suffer from what William Labov called 'linguistic insecurity,' and these attitudinal patterns appear to apply strongly to perceptual tasks. To measure such effects in perceptual dialectology, respondents have been asked more direct questions (*Where are the 'correct' and 'pleasant' varieties spoken?*). Such ranking procedures have a long history in cultural geography; Figure 2 is a map of means scores for the correct task from southeastern Michigan and Figure 3 is a map from southern (Alabama) respondents. These two maps show that for both groups the regions most definitely associated with incorrect English are the South and the New York City area; they are the only sites that have mean scores within the range 4.00–4.99. At the other end of the scale, predictions about linguistic security seem to be borne out. Michigan raters see themselves as the only state in the 8.00–8.99 range, exposing considerable linguistic self-confidence. Alabama respondents, however, rate themselves in the mediocre 5.00–5.99 range and clearly regard other areas (Washington, D.C. and Maryland) as superior. These correctness ratings show the predicted differences between the Michigan secure and Alabama insecure raters and confirm the low prestige assigned to southern and New York City varieties.

Figures 4 and 5 depict the ratings of the same respondents for pleasant speech. The suggestion by Giles and associates that local speech is affectively preferred is strongly confirmed. Alabama respondents rate only the home state in the 8.00–8.99 range for pleasantness, and the Michigan raters put only Washington, Colorado, and neighboring Minnesota in the same 7.00–7.99 range along with their home site.

Stereotypes and caricatures are definitively cataloged through such tasks and are only hinted at in

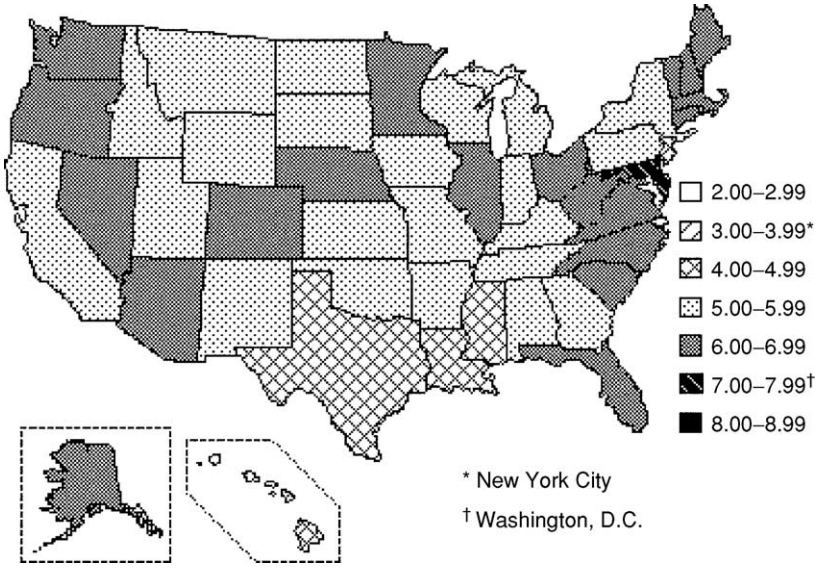

Figure 3 Alabama correctness scores; higher scores indicate greater correctness.

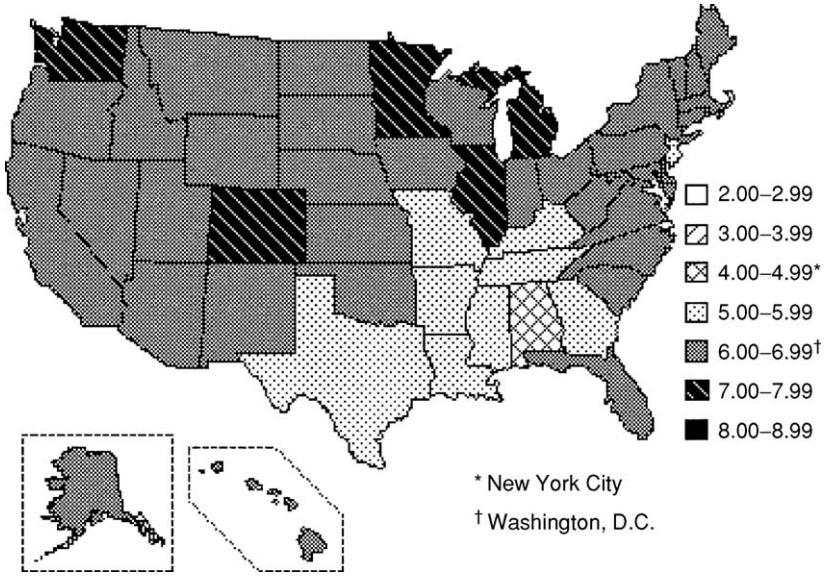

Figure 4 Michigan pleasantness scores; higher scores indicate greater pleasantness.

the earlier work of Daan and Mase. Gabriela Alfaraz, for example, showed that Miami Cubans rate pre-Castro Cuban Spanish as high as peninsular (European) Spanish on the correctness scale, but rate post-Castro Cuban Spanish as low as the other very low-rated Caribbean varieties (Long and Preston, 2002). Studies of pleasant and correct varieties, with-some other dimensions such as 'ugly–beautiful,' have been extended to the U.S. West, Turkey, Germany, France, Japan, Brazil, The Netherlands, Canada, Hungary, Korea, and Switzerland (e.g., Preston, 1999; Long and Preston, 2002). The Japanese sociolinguist Fumio Inoue (1995) has explored similar evaluative characterizations of both Japan and Great Britain using a multivariate analysis of labels indicating regional characteristics (e.g., 'urban' versus 'rural') in a program of investigation he calls 'dialect image.' More recent evaluative work takes perceptual maps (e.g., Figure 1) as the bases for the areas to be rated and follows the procedures used in a typical semantic differential language attitude study. Variety descriptors are elicited by asking respondents to mention any speech characteristics that come to mind pertaining to the regions to be studied. The most frequently mentioned descriptors are selected and arranged into pairs of opposites (e.g., 'fast–slow'). The results of a factor

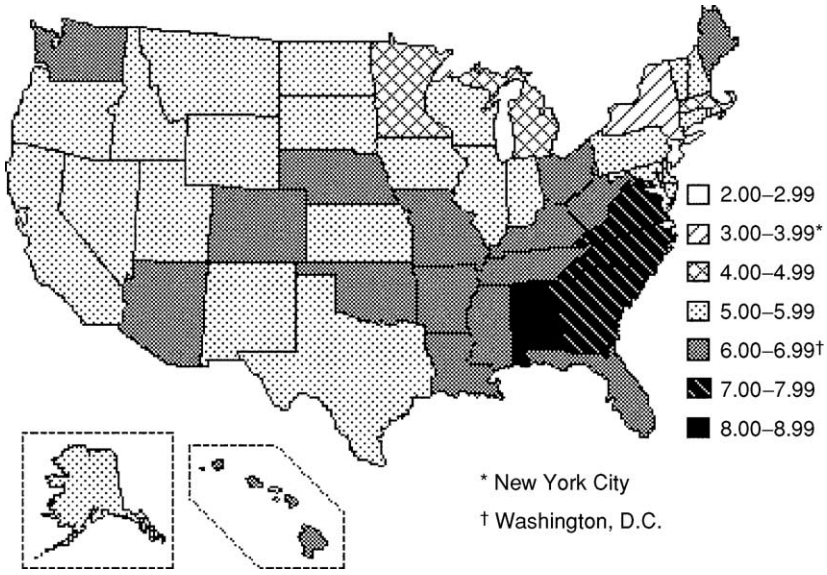

Figure 5 Alabama pleasantness scores; higher scores indicate greater pleasantness.

Table 1 The two factor groups from the ratings of all areas[a]

Factor group #1 descriptors	*Weight*	*Factor group #2 descriptors*	*Weight*
Smart	0.76	Polite	0.74
Educated	0.75	Friendly	0.74
Normal	0.65	Down-to-earth	0.62
Good English	0.63	(Normal)	(0.27)
No drawl	0.62	(Casual)	(0.27)
No twang	0.57		
Casual [Formal]	−0.49		
Fast	0.43		
Down-to-earth [Snobbish]	−0.32		

[a]From areas shown in **Figure 1** (see text for discussion). Descriptors in parentheses fall within the 0.25–0.29 rating range; the negative loadings in Factor group #1 require these two items to be interpreted at the opoosite polarity, shown in square brackets to the left.

group analysis for the areas listed in Figure 1 rated in such a task by southeastern Michigan respondents are shown in Table 1. In this table, Factor Group #1 contains categories mostly associated with education and majority norms. Factor Group #2, however, contains mostly affective factors. Only the respondent ratings of areas 1 and 2 from Figure 1 are examined further here. Region 1 is the U.S. South, clearly the most salient speech area in the United States. Although there may be historical and popular culture explanations of why that might be so, Figure 2 provides the most straightforward one – southern speech is considered incorrect.

The second most frequently rated region in Figure 1 is the local one called North. At first, it might be assumed that the local area is always salient, but Figure 2 shows that southeastern Michigan raters may have something else in mind. It is only Michigan that scores in the 8.00–8.99 range for language correctness. Perception of language correctness in the positive direction determines the second most salient area.

Table 2 shows the means scores for the individual attributes for the North and South: the ranked orders are opposites. In general, the scores for Factor Group #2 are the lowest ranked ones for the North; these same factors (e.g., Casual, Friendly, Down-to-earth, Polite) are highest ranked for the South. Similarly, Factor Group #1 scores are all low ranked for the South; the same attributes are highest ranked for the North.

Recall what Michigan raters have done previously in assessment of the notion 'pleasant.' As Figure 4 shows, the South fares badly. Alabama is the worst rated area in the United States, and surrounding states are also at the bottom of the scale. Even in that task, however, the ratings for the pleasantness of the southern states are one degree less harsh than are those for correctness. This may indicate that northern speakers are more focused on the symbolic use of their own variety as a vehicle for standardness, education, and mainstream values, but are less concerned with language variety as a vehicle for solidarity. On the other hand, as Figure 5 shows, southern speakers, aware of northern prejudices against their variety, use their own speech as a marker of solidarity, identity, and local values. For those attributes that load on Factor Group #2, the means scores are higher for the South for Casual, Friendly, and Down-to-earth. There is no significant difference for Polite, and the North

Table 2 Means scores of both factor groups for ratings of the North and South

Means scores (ordered): South				*Means scores (ordered): North*			
Factor	*Mean*	*Attribute*	*Rank*	*Rank*	*Factor*	*Mean*	*Attribute*
−1 and 2	4.66	Casual	1	12	−1 and 2	3.53	Casual
2	4.58	Friendly	2	9.5	2	4.00	Friendly
2 and −1	4.54	Down-to-earth	3	6	2 and −1	4.19	Down-to-earth
2	4.20	Polite	4	9.5	2	4.00	Polite
0[a]	**4.09**	**Not nasal**	**5**	11	0	3.94	Not nasal
1 and 2	**3.22**[b]	**Normal [Abnormal]**	**6**	3	1 and 2	4.94	Normal
1	3.04[b]	Smart [Dumb]	7	4	1	4.53	Smart
1	2.96[b]	No twang [Twang]	8	2	1	5.07	No twang
1	2.86[b]	Good English [Bad English]	9	5	1	4.41	Good English
1	2.72[b]	Educated [Uneducated]	10	8	1	4.09	Educated
1	2.42[b]	Fast [Slow]	11	7	1	4.12	Fast
1	2.22[b]	No drawl [Drawl]	12	1	1	5.11	No drawl

[a]The two rows shown in boldface indicate the only significant (0.05) break between any two adjacent means scores.
[b]Means values below 3.5 may be interpreted as the opposite polarity (attributes in square brackets).

leads the South in Factor Group #2 attributes only for Normal. These data suggest that, for these Michiganders, the Friendly attributes are more highly associated with southern speech than even with speech from the local area, indicating the importance of carrying out different tasks in the assessment of variety perception.

This use of perceptual dialectology in attitude study assures us that judges have rated regions that are cognitively real. Unlike classic matched-guise studies, this research provides respondents with names and mapped outlines of regions rather than with actual voice samples. The benefit of this is that it is not necessary to use stereotypical imitations or idiosyncratic voices. Since recent attitude research has shown that there is little or no difference in evaluations when the stimulus is a category name or an actual sample (e.g., the work of Angie Williams, Peter Garrett, and Nikolas Coupland in Preston (1999)), this is not taken to be a deficiency. Oddly enough, the most common question put to dialectologists (*Where am I from?*) has not been much exploited in perceptual studies. Williams, Garrett, and Coupland (Preston, 1999), Kerswill and Williams (Preston, 1999; Long and Preston, 2002), and Diercks (1988) addressed this problem directly, and Preston (1996) provided a dialect voice unscrambling task for the middle of the United States. In the latter study, nine male, well-educated voices from a geographical continuum running straight down the middle of the United States, from Saginaw, Michigan in the north to Dothan, Alabama in the south, edited to include only variation along the phonological dimension, were presented to respondents from southeastern Michigan and southern Indiana. The respondents from both areas heard no internal differences among the three southernmost voices, but strongly distinguished them from all others. The remaining middle and northern voices were not accurately placed along the north–south dimension by either group of respondents, although their errors were very similar. These findings continue to confirm the salience of southern speech in the United States, whether from place-label triggered caricature or from the presentation of actual speech samples.

In its most recent phase, perceptual dialectology has joined forces with sociophonetics in examining the linguistic elements that influence dialect perception. Although eliciting folk imitations is one way of approaching this problem (e.g., Preston, 1992; and see the work of Betsy Evans, in Long and Preston (2002)), the presentation of specific elements (by name, by actual sample, or by computer-modified samples) for identification, placement, and evaluation by respondents is perhaps a better way to grasp even greater details of the triggering mechanisms of language regard among the folk.

William Labov asked respondents in New York City to evaluate the social status of speakers on the basis of the frequency of nonprevocalic /r/ deletion or stop substitution for the interdental fricatives, providing an early example of perceptual (social) dialectology. Another group led by Labov instrumentally manipulated the onset of the /aw/ diphthong of an African-American speaker from Philadelphia (in which the /a/ portion was fronted to a position nearer /æ/); they succeeded in showing that this fronting alone was enough to signal white ethnicity to both African- and European-American local respondents.

Cynthia Clopper played speech samples (with appropriate regional phonetic features, e.g., New England r-lessness) for Indiana University students.

The voices were from New England, the West, the North, the North Midland, the South Midland, and the South of the United States. Correct regional identification of voices was low, about 30% overall, but Clopper also conducted a regression analysis of the relationship between the speech samples' phonetic features and the respondents' regional assignments and found four such features that were particularly well correlated with regional assignment of voice (Clopper, 2004).

In work with specific elements, Plichta and Preston (2003) found that increasingly monophthongized versions of /ay/ (in the word 'guide') were rated as 'more southern' by respondents from all over the United States, but that a female voice was always rated as less southern than a male one, even with the same degree of monophthongization. Rakerd and Plichta (2003) showed that speakers of an urban variety of northern U.S. English were more likely than nonspeakers of that variety to interpret a word as 'sock' rather than 'sack,' even when the vowel was resynthesized into a fronter (i.e., higher F2) position. Nancy Niedzielski (Long and Preston, 2002) showed that Michigan respondents are unwilling to hear (resynthesized) noncanonical vowels when they believe that the speakers are fellow Michiganders, an unwillingness that she attributes to the strong Michigander belief that their speech is standard or correct (e.g., Figure 2). Morris (2003) showed that Japanese speakers are identified as being from Tokyo, an area of caricaturistically high-frequency vowel devoicing, when respondents hear them utter words and phrases that contain environments that are likely to promote vowel devoicing, even if the vowel is not actually devoiced. This variety of findings suggests that, although specific linguistic elements may be used in identification, stereotypical or caricaturistic beliefs may interfere or even dominate, just as they do in perceptual tasks in which no actual signal is used. It is hoped that methodologies that look at morphological, lexical, syntactic, and perhaps even discoursal levels of variation will be devised in this research program.

Finally, a number of perceptual studies have relied on ethnographic or more extensive conversational data to establish folk belief about dialect. Most of the data reported in Niedzielski and Preston (1999) are of this sort, and a number of other studies reported conversations with respondents as the principal means of uncovering their attitudes toward and concepts of region (e.g., the work of Cécile Canut, Maria Romanello, and Jean Léonard, in Long and Preston (2002)). The many scholarly perspectives reviewed here on the folk identity of and regard for regional and social varieties are worthy of the attention of dialectologists, sociolinguists, and students of the social psychology of language. The work done so far in this enterprise, however, shows that perceptual dialectology is inseparable from affective social factors in the speech community, and tells us again that in folk linguistics in general the dominating concerns appear to be pre- (and pro-)scription.

See also: Accent; Cuba: Language Situation; Dialects: Early European Studies; English in the Present Day (since ca. 1900); Folk Linguistics; France: Language Situation; Hungarian; Italian; Japan: History of Linguistics; Language Attitudes; Language Education: Correctness and Purism; Language Ideology; Mali: Language Situation; Netherlands: Language Situation; Prestige, Overt and Covert; Reflexivity in Sociolinguistics; Relativism; Russian Federation: Language Situation; Social Psychology and Language; Society and Language: Overview; Sociophonetics; Spain: Language Situation; Speech Community; Speech Technologies: Language Variation; Switzerland: Language Situation; Turkey: Language Situation; United Kingdom: Language Situation; United States of America: Language Situation; Wales: Language Situation.

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Perfectives, Imperfectives, and Progressives

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Perfective versus Imperfective

The dichotomy perfective/imperfective is a primary component in tense-aspect theory (Comrie, 1976). The two labels make up the basic divide in the notion aspect. Perfectivity refers to an event's being viewed in its entirety, that is, as a terminated event. This crucially entails that the speaker envisages the terminal point as an essential part of the event. Alternative labels sometimes encountered are completive, terminative, and the like (the reader should be aware that, in this domain of linguistic research, terminological standardization is less than satisfactory). As an example of perfectivity in Spanish, consider (1), which entails the completion of the letter-writing action, namely creation of a previously nonexisting object.

(1) ayer, Juan escribió una carta
'yesterday, John wrote a letter'

Thus defined, perfectivity is also involved in the perfect tenses (*see* **Perfects, Resultatives, and Experientials**), as in:

(2) by 5 o' clock, John had written a letter

By contrast, imperfectivity refers to the terminal point of the event not being envisaged. This may correspond to not less than two aspectual subspecifications: progressive and habitual (*see* **Generics, Habituals and Iteratives**). In this contribution we consider only the first option, which is prototypically illustrated by sentences such as (3), which only informs us that, at the given time, John was involved in performing a letter-writing action, without entailing that the event ever reached completion.

(3) at 4 o'clock, John was writing a letter

This particular condition, which is typical of telic predicates, is often referred to as the 'imperfective paradox.' By contrast, with atelic predicates (such as *to cry* and *to sleep*) the very notion of completion does not apply. Yet the event may either be viewed as terminated, hence perfective, as in the French sentence in (4), or as nonterminated, hence imperfective, as in (5).

(4) Jean pleura longuement
'Jean cried for a long time'

(5) quand la maman est arrivée, Jean pleurait
'when the mother came, Jean was crying'

Another traditional way to describe the opposition perfective versus imperfective consists in saying that the former aspect involves a global or external view of the event, whereas the latter involves a partial or internal view, as though the event were seen, so to speak, from the inside. It is essential to note that the notion aspect, which is minimally articulated by this dichotomy, refers to the specific viewpoint adopted at a given moment by the speaker within her or his communicative act, quite independently of the knowledge that she or he has about the actual state of affairs. Indeed, one and the same event may be successively retold perfectively or imperfectively, depending on the communicative intention. As an example, consider the following narrative.

(6) Yesterday, Mary went to the beach (PERF), where she spent an unforgettable day. While she was going there (IMPERF-PROG), she met John. . . .

This shows that presenting an event as nonterminated (namely, selecting a particular point within its development) does not imply that the speaker ignores the further course of the event, because the initial sentence in (6) anticipates that the going-to-the-beach action was in fact performed successfully. Thus, irrespective of the objective knowledge possessed by the speaker, the aspectual choice adopted indicates (as some authors would put it) the subjective view chosen at a particular stage of the speaker's communicative act. This explains why aspect is often said to involve an individual point of view, or perspective.

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Another relevant matter is the relation between the aspectual and the temporal domains. Although there are tendencies in the correlations, such that an event occurring in the present is most likely to be imperfective, whereas an event occurring in the future is most likely to be perfective, these tendencies may be reversed. All versions of the sentence in (7) are perfective just as all versions of the sentence in (8) are imperfective, although the temporal interpretations in (7) and (8) are quite diverse:

(7) John entered/enters [REPORTIVE]/will enter the room

(8) by this time, John was/is/will be sleeping

A possible complication emerges whenever the means by which tense and aspect values are conveyed are not fully expressed at the formal level. As it happens, the morphology of most languages is defective in this respect. Whereas the tense employed in (1), the simple past, is overtly marked for both past and perfective, the first tense in (7) bears a purely statistical relationship with these connotations because the English simple past may also, in the appropriate contexts, convey a nonpast meaning (as in, *we shall only accept the applications that arrived before the beginning of next month*) or an imperfective meaning (as in, *when I was younger, I often played tennis*, an example of habitual aspect). Some languages present an extended situation of neutralization (Boogaart, 1999; Dahl, 2001). In German, for instance, the two past tenses may convey both the perfective and the imperfective aspect, as in *letztes Jahr, arbeitete Hans in der Uni* and *hat Hans in der Uni gearbeitet*, which may both mean 'last year, Hans worked in the university' or 'last year, Hans was working in the university' (the choice between the two tenses depends on the particular dialect). Although the formal means may be defective, possibly leading to a systematic neutralization of the aspectual meanings, the context allows us in most cases to disambiguate the interpretation.

For this reason, it is useful to distinguish the notion tense not only from aspect but also from temporal reference, although the frequent contrast of aspect and tense may suggest that the latter notion coincides in fact to temporal reference. But given the situation we have described, it looks more appropriate (departing slightly from current usage in linguistics) (1) to rescue the traditional sense of 'tense,' as referring to the peculiar inflectional paradigms that manifest themselves in the grammars of individual languages and (2) to acknowledge that each tense conveys both aspectual and temporal information, although these may often be derived from context rather than being directly inferred from the tense itself. (Needless to say, there may be contexts in which a formally underspecified tense may turn out to be actually ambiguous in terms of its temporal and/or aspectual reading).

On the Slavic Languages

Before proceeding, it is useful to address a related and delicate problem. As it happens, the labels 'perfective' and 'imperfective' are also used to name the two major types of predicates that build up the verbal lexicon in Slavic languages, as well as in other languages showing a similar structure. In Russian, for instance, *pisat'* means 'to write' (in the most general sense of this word), whereas *napisat' X* means 'to write X (until completion)'. This bears a resemblance with the situation described in (1) and (3); compare (9) and (10).

(9) Ivan pisal (pis'mo)
'Ivan was writing (a/the letter)'

(10) Ivan napisal pis'mo
'Ivan wrote a/the letter'

Thus, the merging of the general aspectological terminology with the terminology used in the international literature with reference to the grammar of Slavic languages seems perfectly justified. (Note that the labels used in the individual grammatical traditions differ; e.g., Russian *soverššennyi* vs. *nesoverššennyi*). The situation, however, is not that simple. In fact, although the translation provided for (10), with the 'perfective' verb *napisat'*, is undisputable, the actual interpretation of (9), with 'imperfective' *pisat'*, may depend on the speaker's communicative intentions. Disregarding further complications, suffice it to say that in some contexts (9) may be interpreted as referring to a terminated letter-writing action that did not lead to actual completion. Thus, although the verb in (9) is 'imperfective,' the aspectual interpretation may be either imperfective or perfective, depending on whether the event is viewed as terminated or nonterminated. Because of this, it is useful to distinguish between 'termination' (i.e., attainment of the terminal point of the event, implying perfectivity) and 'completion' (i.e., telic completion, hence *a fortiori* perfectivity). To understand this point, consider (11), which presents a terminated event (because its terminal point is obviously envisaged due to the delimiting adverbials), without yielding a completed action (because the painting of the whole wall is not entailed, again due to the temporal limitation imposed by the time adverbials).

(11) John painted a wall for 2 hours/between 2 and 4 o'clock/until 4 o'clock

By contrast, consider (12), which is both terminated (perfective view) and completed (telic attainment), and (13), which is imperfective and, thus, by implication noncompleted (cf. (3)).

(12) John painted a wall in 2 hours

(13) John was painting a wall

It is important to realize that although a given predicate may be telic in its basic characterization, the actual fulfillment of its telic nature depends on context. In fact, although the two predicates used in examples (2), (3), (11), (12), and (13) are all telic, their telic nature is actually fulfilled only in perfective contexts, namely (2) and (12). The important generalization here is that completion (i.e., fulfillment of telicity) implies perfectivity, whereas the reverse is not true, as suggested by (11) despite the presence of a telic predicate and by (4), which is based on an atelic predicate, for which the idea of completion cannot possibly arise.

Coming back to the Russian examples in (9) and (10), the best way to make sense of the contrast is to state that the meaning originally conveyed by the 'perfective' versus 'imperfective' opposition, as implemented in the verbal lexicon of Slavic languages, corresponds to the opposition telic versus atelic, although the further evolution of Slavic languages has largely (as in Russian) or slightly (as in Bulgarian) blurred the initial picture. Indeed, the originally actional meaning (*see* **Aspect and Aktionsart**) has been to a larger or smaller extent superseded by aspectual connotations. Needless to say, this interpretation presupposes that the notions aspect and actionality be kept apart, as suggested by several scholars (Comrie, 1976; Bertinetto, 1986; Smith, 1991).

The Progressive

As previously noted, one major implementation of imperfectivity is by the use of the progressive aspect. English has a specialized periphrasis to express this meaning, as shown in (3), (6), (8), and (13). Other languages may have generically imperfective tenses, such as the French imperfect in (5), possibly supplemented by dedicated periphrases, as is again partly the case in French with the *être en train de* + infinitive construction (which, however, undergoes restrictions) and is definitely so in Spanish, where the *estar* + gerund construction is generously employed alongside the imperfect and the present. One difference between dedicated progressive devices and general imperfective tenses is that the latter may receive other interpretations than progressivity, most notably habituality. As to progressive devices, they often derive from locative expressions or, less frequently, from movement expressions; in some cases, reduplication processes provide the formal means to convey this meaning (Bybee *et al.*, 1994).

Progressivity may be regarded as the quintessence of imperfectivity, and indeed it is often used to exemplify this notion. In progressive sentences, such as the ones already presented, the event is viewed in a specific stage of its development, as observed in the comment about (6). We may call such stage the 'focalization point.' Note that the normal course of the event may be interrupted immediately after this point (compare (6) with *Yesterday, Mary was going to the beach. But on the way she met John, so she never got there*). We can capture this feature by stating that in progressive sentences the continuation of the event beyond the focalization point is left indeterminate, irrespective of the knowledge of the actual state of affairs held by the speaker. With atelic predicates, this does not cause any problem of conceptualization because the event (by its very nature) cannot imply completion. With telic predicates, on the other hand, formalization difficulties arise. These lie in the fact that we should be able to express the idea that the specific stage viewed belongs to an event that, if carried out to its natural end, would involve completion even in cases in which we know for sure that completion could not possibly obtain (as in *while the man was crossing the street, he was hit by a lorry*). The solution to this apparent paradox has been sought, broadly speaking, in the domain of modal logic, the idea being that the continuation of the event (with its possibly hypothetical completion) lies in some possible world, everything else being equal (Dowty, 1979; Landman, 1992; Bonomi, 1997). Other scholars have looked for an alternative solution in the direction of actional coercion, under the assumption that the progressive alters the nature of telic predicates (Parsons, 1990), although this line of reasoning may present problems (Bertinetto, 1997).

One remarkable feature of the progressive is that dedicated periphrases cannot normally be combined with stative verbs. Consider the sentence **John is possessing a car.* This restriction is not absolute, however, as shown by *John is resembling more and more his father.* In addition, individual languages may be relatively tolerant, as is the case in English and Spanish with copular verbs. In such cases, nonperiphrastic predicates depict permanent situations, whereas periphrastic ones refer to contingent

situations, for example *Mary is kind* versus *Mary is being kind* and *María es amable* versus *María está siendo amable* (note that Spanish makes use of two different auxiliaries). Unsurprisingly, **Mary is being beautiful* remains unacceptable because beauty cannot be understood as a contingent property. In any case, the observed constraint does not hold for the progressive aspect as conveyed by nondedicated devices (i.e., by general-purpose imperfective tenses), as shown by the French sentence in (14).

(14) quand je suis arrivé, Marie était malade
when I am arrived, Marie be.IPF-PAST ill
'when I arrived, Marie was ill'

Thus, the constraint in question has to do with the peculiar characterization of progressive periphrases (Squartini, 1998; Dahl, 2000) rather than (as is sometimes held) with the alleged stative nature of progressive sentences, which would supposedly exclude progressivity markers from stative verbs for reasons of redundancy (Bertinetto, 1994).

Typological Remarks

It is worth observing that general-purpose imperfective tenses, to the extent that they are characterized as such in the grammar of individual languages, tend to express all imperfective values, disregarding the additional presence of specialized devices. Thus, in the Romance languages the imperfect (imperfective past) may be used in both progressive and habitual contexts, despite the availability of progressive and habitual periphrases. This shows that the different imperfective values share some important feature, presumably to be sought in the idea of indeterminacy (which in the case of progressivity may be identified with the indeterminate continuation of the event, whereas further assumptions need to be made for habituality; cf. Lenci and Bertinetto, 2000).

In regard to markedness, the issue of the relative hierarchy of perfectivity and imperfectivity has often been raised. Both members of this pair have, however, been proposed as the unmarked member by different authors, with reference to different language families. Indeed, if contextual flexibility and zero marking are taken as the basic criteria for unmarkedness, then we might observe that, for example, imperfectivity is the unmarked member in, Chasu (Asu; Bantu), whereas the reverse is to be observed in Obolo (Niger-Congo), in which the imperfective tenses are obtained by adding the morpheme *-ki-* to perfective ones. It is not easy, at the moment, to state which of these two situations is more frequently observed in the languages of the world. Presumably, both situations obtain as a result of the different evolution of the various tense systems.

See also: Aspect and Aktionsart; Generics, Habituals and Iteratives; Perfects, Resultatives, and Experientials; Contact-Induced Convergence: Typology and Areality.

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Perfects, Resultatives, and Experientials

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Perfects, resultatives, and experientials constitute a family of cross-linguistically identifiable grammatical categories (grams) associated with the verb. They can be located in the borderline region between tense and aspect. Both 'resultative' and 'experiential' are also used as names for certain functions of the perfect, but there are languages in which they are distinct grammatical categories with a morphological marking of their own. For clarity, the terms 'resultative proper' and 'experiential proper' can be used in such cases.

Not all forms called 'perfects' in the traditional grammars of various languages can be subsumed under the cross-linguistic category of 'perfect,' but the English present perfect, as in "she has read this book," for instance, does qualify as a typical instance of the perfect. Perfects express the relevance of a past situation from the present point of view – 'current relevance' or 'continuing relevance' (CR), for short. In Reichenbach's (1966: 289–290) temporal logic, the point of reference in the perfect coincides not with the point of the event but with the point of speech. This is one way of capturing the intuition that "she has read this book" tells something about the present state of affairs, although it describes a past event.

A negative characterization of the perfect follows from this property: it is not a tense used in connected narratives about past events. In Weinrich's (1964) analysis, the perfect belongs to the 'world discussed,' not to the 'world narrated.' That is why the Latin perfect, the form that originally gave its name to the category, is not a perfect at all in the present typological meaning but, rather, a perfective past tense, as it is freely used in past narratives. The term 'perfect' (together with its derivative 'perfective') thus has considerable historical ballast, and the newer term 'anterior' is sometimes used in its stead (as in Bybee *et al.*, 1994). However, in Creole linguistics, 'anterior' may refer to any relative past tense, irrespective of whether it signals CR or not.

Because the semantics of the perfect are not so easy to define as that of the 'past tense,' for instance, not all linguists consider it to be a cross-linguistic category at all; in their opinion, the perfects in different languages are only linked by their common name, reflecting the vicissitudes of the scholarly history of traditional grammar. It was Dahl (1985: 129–153) who first showed that a cross-linguistic category of perfect can be identified empirically, without a preconceived definition of its semantics: The perfects of various languages, different in their peripheral uses, center around certain prototypical uses in a nonrandom fashion. On the basis of Dahl's results, a questionnaire was developed that operationalizes the definition of this gram (Lindstedt *et al.*, 2000; Lindstedt 2000): A language possesses a perfect if it has a gram, associated with the verb, that is used in the translation equivalents of most of the first seven examples, illustrating different kinds of CR of past situations, but is 'not' used in the following four examples in the questionnaire, consisting of short narratives.

The perfect thus defined expresses 'present relevance' and is also called the 'present perfect' because in various languages it has formal counterparts on other temporal levels: these are the 'past perfects' (or 'pluperfects'), 'future perfects' (or 'futura exacta'), and even 'past future perfects'. As illustrations we may take the English sentences "she had read this book," "she will have read this book," and "she would have read this book," respectively (notice that the last of these also carries modal meanings). Although the term 'perfect' may refer to all of these grams, especially in studies considering the perfect to be an aspect rather than a tense, it should be noted that on nonpresent temporal levels, the notion of continuing relevance is not so crucial: These other perfects could simply be described as absolute-relative tenses that express temporal location of events relative not only to the present time but also to each other.

The distinction between 'resultatives' and perfects was established in linguistics in the 1980s, largely owing to the important collective work edited by Nedjalkov (1988). Resultatives "signal that a state exists as a result of a past action" (Bybee *et al.*, 1994: 54). The diagnostic difference between resultatives

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proper and perfects is that only resultatives combine with adverbs of unlimited duration, such as 'still' or 'as before.' In English, it is not possible to say "She has still gone" (if 'still' is used in its temporal meaning) – in contrast to the resultative construction "She is still gone" (see also Lindstedt, 2000: 366–368). The CR meaning of the perfect is obviously a generalization of the resultative, and sometimes the term 'resultative perfect' is used to cover both meanings. Resultatives proper have also been called 'stative perfects.'

'Experientials proper' express that a certain type of event occurred at least once in the past (Dahl 1985: 139–144). Dahl and Hedin (2000) call this meaning a "type-focusing event reference" – as opposed to "token-focusing event reference," pertaining to a particular occurrence. The Chinese past marker *-guo* is a well-known example of an experiential (Mangione and Li, 1993):

(1) Tā chī-guo tiánjī
she eat-EXP frog
'She has eaten frog (sometimes).'

Another well-known example is the Japanese *koto ga aru* construction; the functions of the Chinese and Japanese markers are, however, by no means identical (Dahl 1985: 141).

When the CR meaning of the perfect is weakened, it may develop into what is called the 'experiential perfect.' In English, the CR perfect and the existential perfect are formally differentiated only in rare cases like the following (cf. Comrie, 1976: 58–59):

(2) Mary has gone to Paris.

(3) Mary has been to Paris.

In the CR perfect of (2), the event of Mary's having gone to Paris may be relevant to the present state of affairs in various ways, but typically there is at least the implicature that Mary is now absent. The experiential perfect of (12) only expresses that this type of event occurred at least once in the past; a particular event token would be referred to with "Mary went to Paris." The semantic connection between CR and experientiality is seen with an animate agent if "certain qualities or knowledge are attributable to the agent due to past experiences" (Bybee *et al.*, 1994: 62), but the definition of the experiential proper and the experiential perfect covers inanimate agents as well, which is why some scholars prefer the term 'existential perfect,' indicating an existential quantification over past points of time.

Experientials proper and experiential perfects are typical of interrogative and negated sentences, but not exclusively. Their meaning is incompatible with specific time adverbials, and sometimes this restriction holds true of other kinds of perfects as well; thus, sentence (4) is ungrammatical in English:

(4) *I have woken up at 4 o'clock this morning.

However, a perfect would be possible – though not the only alternative – in Finnish and Bulgarian, for instance. This is because there exists a possible CR reading – "I woke up so early that I am now tired." According to Dahl (1985: 137–138), Swedish occupies an intermediate position: a specific time adverbial can combine with the perfect if it is part of the information focus. The degree of incompatibility of specific time adverbials with the perfect in a particular language shows to what extent it has become a predominantly experiential form, or a kind of past indefinite tense.

Other kinds of perfect meanings mentioned in the literature include the 'hot news perfect' (McCawley, 1971), as in:

(5) Mary has had her baby: it's a girl!

and the 'perfect continuing,' also known as the 'perfect of persistent situation,' as in:

(6) Mary has been waiting for him for an hour.

These two are minor types only; in many languages, the present would be the tense used in (6).

As for their morphological marking, perfects, resultatives, and experientials are typically periphrastic (analytic). One important exception is the old Indo-European perfect (as attested in Ancient Greek and Old Indic), which is an inflectional (synthetic) form.

Bybee and Dahl (1989: 67–68) list four typical diachronic sources of the perfect in the languages of the world: copula + past participle of the main verb, possessive constructions involving a past participle of the main verb (cf. Maslov 1984: 224–248), main verb + participle meaning 'already,' and constructions involving verbs like 'finish' or 'cast aside.' The first two, common in European languages, are originally resultatives at the early stages of their grammaticalization; the two latter sources can be called 'completive' (Bybee *et al.*, 1994: 57–61).

A perfect deriving from a possessive construction may involve an auxiliary meaning 'to have'; if this is the case, it can be called a '*have* perfect' or, using a Latin name, a '*habeo* perfect.' Because transitive verbs with the meaning 'to have' are rare outside European languages, the *have* perfect is a typically European areal phenomenon. A copula-based perfect is a '*be* perfect', or a '*sum* perfect.'

Typologically, the perfect is a gram type that is frequent, that is, likely to appear in different

languages; but unstable, as it often tends to be changed into something else – often a general past tense (as in most Slavic languages; Tommola, 2000) or a perfective past tense (as in many Romance languages and dialects; Squartini and Bertinetto, 2000). In a single language there can be two or three perfect-like grams that are at different stages of their grammaticalization path (cf. Graves [2000] for Macedonian).

In some languages the perfect has developed evidential functions – or has even become a predominantly evidential gram, as is the case in a large area stretching from the west of the Black Sea to Central Asia (Haarmann, 1970; Dahl, 1985: 149–153; Friedman, 1986), though the perfect is not the sole diachronic source of evidentials.

The evidential function most typical of perfects and resultatives is inferentiality. This is the case with the Scandinavian perfect, for instance (Haugen, 1972; Kinnander, 1973; cf. also Weinrich, 1964: 84–86 for German). Inferentiality is resultativity the other way round, as it were – from the results we infer that an event must have occurred.

See also: Aspect and Aktionsart; Evidentiality in Grammar; Grammaticalization; Implicature; Perfectives, Imperfectives, and Progressives; Tense, Mood, Aspect: Overview; Tense.

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Performance Factors in Spoken Discourse

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Speech addressed to others always involves a performance that offers the speaker an opportunity to perform well but simultaneously renders the speaker vulnerable to demonstrating inadequacy, in particular to losing 'face' (Goffman, 1967; Brown and Levinson, 1987). Clearly, there are factors that affect the speaker's ability to speak in a manner that will be judged to yield an adequate performance. What are these factors?

The Context of Utterance

Perhaps the least demanding type of speech to produce is that in which the speaker is talking to a single, familiar, and friendly listener in their shared first language, in a comfortable environment, where they are participating in primarily interactional 'chat,' each taking short turns to talk about topics they both find interesting and each agreeing with what the other says. The point of their talk is not so much its content but the maintenance of their mutually valued social relationship. Example (1) illustrates such primarily interactional conversation:

(1) *A there's a nice new postcard a nice – well I don't know how new it is + it's been a while since I've been here + of a sunset + a new one*
B oh that's a lovely one isn't it
A yes – yes it was in one of the + calendars
B yes that was last year's calendar it was in
A this year's has the Andersons' house at Lenimores in it
B they've sold their house now
A oh – have they really
B yes – erm-they weren't down last year at all
(– denotes a brief hesitation, + a slightly longer pause)

At first, *B*'s role is quite undemanding-she simply agrees with what *A* says. *A*, who initially provides the topic of conversation, seems relaxed about her pondering on the 'newness' of the postcard and about pausing while searching for the item 'calendars.' Then *B* picks up *A*'s reference to people they both know and introduces a new topic of her own, which *A* immediately responds to. In this slow, unhurried exchange, new topics based on familiar shared knowledge keep emerging with little new information imparted and no apparent goal other than to continue this pleasant, relaxed conversation.

In spoken discourse, perhaps the most significant factor influencing the confidence of the speaker is the listener and how far the listener shares with the speaker what Clark (1998) calls 'communal lexicons.' Communal lexicons are constructed by such features as shared nationality, level and type of education, language, religion, occupation, interests, age cohort, and gender. The participants in example 1 share most of these features. Talking to someone you stand in awe of with respect to one or several of such features is more inhibiting than talking to someone who is in most respects junior to you. But even in example 1, the considerate speaker tailors the content to what it is reasonable to assume the listener will already know. If *A* knows several sets of people called *Anderson* but she believes *B* knows only one of those sets, and if *A* uses the term '*the Andersons*,' *B* should be able to identify the appropriate set. Clearly, the less you know about the listener and the larger the number of addressees, the more risky the attribution of shared knowledge becomes, hence the greater the requirement on the speaker to be explicit.

Explicitness is most significant in primarily transactional discourse, in which the point of the discussion is the transfer of information, particularly when, rather than taking a short turn, coping with only one unit of information at a time, the speaker needs to take a longer turn. In a longer turn, the speaker should structure the information in a coherent manner, choosing an accessible beginning and building lucidly on that. It is less stressful for the speaker to talk on a topic that he or she is thoroughly familiar with and that the listener knows less about. Again, the communicative stress of the more demanding transactional discourse can be somewhat diminished if the speaker has the opportunity to preplan, even prerehearse, what needs to be said. In the case of a really lengthy turn, say giving a paper at a conference, the nervous speaker might prepare notes in an appropriate format to support the coherent structuring of what is to be said. Many adolescents and some adults who are perfectly competent in negotiating friendly chat find a sudden requirement to produce a long turn, transferring information clearly, more than they can comfortably cope with. The teenager *G*, talking in example (2), had mentioned that she had watched a film on television the previous evening and asked her interviewer whether she had seen it. The interviewer replied *no*, asking what had happened in the film. Example (2) shows *G*'s answer:

(2) *well – eh – you just saw the assassina + assassination and there was somebody taking the part of what the man had done that got shot him – eh – that shot him and they was following all the things and all that and then – eh this other man went and shot him because he liked the president – and then after that it just ended up that he got took to prison*

Only someone who was familiar with the events the film was based on would be likely to achieve a full understanding of this account. Cicourel (1981) recorded similar instances of adult patients attempting to give unfamiliar doctors a history of their medical problem and compared his recordings of the patients' accounts with the doctors' notes, often discovering profound discrepancies. The discrepancies were usually explicable in terms of the type of features exemplified in example (2), notably unclear temporal and causal structure, coupled with the overuse of pronominal expressions used to refer in cases in which there is more than one plausible referent. Note that control of information flow in longer turns in spoken discourse is not typically a skill taught at school. It is most readily acquired by speakers used to structuring written prose, or by older speakers who have had a good deal of practice in taking longer turns in speech and are not intimidated by their interlocutor.

The performance factors identified so far are best thought of as scales rather than dichotomies: the familiar versus unfamiliar speaker–listener relationship, primarily interactional versus primarily transactional discourse, and short versus long turns (and whether the long turns are planned or spontaneous) must all be judged in terms of manifesting more or less of the relevant category rather than in absolute terms. Similarly, the notion of a comfortable environment encouraging a more confident performance must be judged in relative terms.

Modes of Discourse

Different demands are made on the speaker by different modes of discourse ('mode' is borrowed from Smith, 2003). Modes involve types of discourse structuring, each of which can be found in many different genres. Any mode can be rendered cognitively simpler or more difficult, and hence can impose fewer or more performance constraints on the speaker, by manipulating a relatively small range of parameters (Brown, 1995: 43–52), among them:

(a) the number and distinguishability of referents: it is easier to instruct a listener to wire a 3-pin plug than to wire a heating control panel, or to tell a story involving a man, a woman, and a dog than a story involving three tall, thin, anonymous men who have no obvious distinguishing features.
(b) the relative complexity of spatial relationships: it is easier to describe how to pose one brick directly on another than how to cantilever the upper brick over the lower one, or to describe an accident involving a bus and a lorry on a straight road rather than one involving four similar blue cars at a roundabout.
(c) the relative complexity of temporal relationships: it is easier to instruct someone to undertake a task involving one step followed by another than one involving several simultaneous operations, or to tell a story that narrates each incident as it occurs rather than one involving flashbacks or simultaneous events.
(d) the relative complexity of causal relationships: it is easier to explain why bolting the door causes it to remain shut than to explain why salt dissolves in water.

The more cognitively complex the content that needs to be conveyed, the greater the demands on the speaker – on planning ability, on capacity to keep track of what has already been said, and on controlling relatively complex linguistic structures.

I shall exemplify only two of the various modes identified in Biber *et al.* (1999) and Smith (2003). A relatively easy mode to control is giving instructions when relevant features of the external world support the sequence. A 5-year-old can tell a friend how to build a house from plastic bricks, beginning with the walls, fitting in the front door, and finally putting on the roof. The short bursts of utterance need to be planned only one at a time. There is no great burden on memory for the young speaker because the components of the house act as physical reminders of what should be done next. Giving directions to a friend who has just frantically telephoned you long-distance to ask how to drive to a hotel in the middle of Padua is far more complex and demanding, even for a confident adult speaker, who must immediately dredge out of memory not only the intricate route through the narrow streets of the ancient city but also the significant landmarks in a one-way traffic system designed to deter the casual motorist.

Similarly, short narratives of the type young children usually experience have only a few characters in the story, distinguished in terms of occupation or physical appearance (a princess, a giant, and a woodcutter), and the events are narrated in the order in which they occur (*ordo naturalis*). Even apparently simple narratives can be rendered complex by being peopled by same-sex characters for whom pronominal reference alone is often inadequate to secure reference (cf. example 2). When many characters participate in the action, the speaker must carefully distinguish between them and ensure that each participant is characterized in a consistent manner throughout the narrative. The burden on memory will also be increased if the narrative begins in the middle of the action rather than at the beginning so that the speaker

has to organize flashbacks to introduce earlier events needed to explain why current events develop in one way rather than another. Such a cognitively more complex mode of narration puts a greater burden on the linguistic capacity of the speaker, who must mark earlier events by using appropriate temporal and aspectual modalities to warn the listener that *ordo naturalis* has been suspended. This is a particularly difficult feat for young speakers, who are unaccustomed to controlling such complex narratives.

Other modes of language, such as description, explanation, and argumentation, all present their own characteristic problems for the unwary speaker. And, in addition, in every case the speaker must always attempt to judge what knowledge the listener will already have as well as what level of information will satisfy the listener's intentions in listening. Then, taking all this into consideration, still before actually embarking on speech, the speaker must decide where to begin, always a hazardous enterprise.

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Performance in Culture

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To study performance in culture is to experience culture in action, culture as it is being created – in festivals, sermons, political speeches, elections, marriage ceremonies, war, and other events. Performance is enacted with the body and its senses, and sometimes with words. It is often done face to face, but mediated performances also exist. To pay attention to performance and the performative aspects of culture is to attend to the evanescent – the moment of 'now' – and how it responds to and recreates the 'then.' Performances are ephemeral, yet the stories that we tell about performance determine the foundational myths of society and personhood, including definitions of gender, ethnicity, race, nation, and subjectivity. Think of the role of the Boston Tea Party in American history classes, for example, or national holidays like Thanksgiving and Columbus Day in the United States. These are narratives about past performances (in these cases, a rebellion, a first-fruits ceremony, and a contested myth of colonization) that may have little to do with the actual events as they transpired, but that are told *as if* they were factual (Turner, 1969). Indeed, history comprises cultural performances as they are narrated after the fact. The **interpretation** of cultural performances is thus the subject of debate and political struggle.

What is a cultural performance? Is it necessarily public? To what extent is it creative and innovative? What are the implications of media on cultural performances and their interpretation? And if performances have so much political consequence, what tools exist for their analysis and interpretation? Who gets to perform the story, and how?

Two Scenarios

An herbalist sits on a blanket that he has laid on the asphalt in the main square, Jma al-Fna, in Marrakech, Morocco (**Figure 1**). This square is known for its performance traditions. In the evenings there are jugglers, storytellers, clairvoyants, acrobats, and snake charmers. The audience for these performances is largely Moroccan and the language used in the square is Moroccan Arabic. During the day, however, there are fewer performers. Abdelnacer and his brother Abderrahman sit under a large umbrella in the square waiting for customers (**Figure 2**). They are Saharaoui (people from the Sahara), but they make their livelihood in Marrakech selling medicinal herbs, potions against magic, and other ritual goods – lizard skins, amber and other resins used as incense, ostrich eggs, whale bone, etc. (**Figure 3**). I sit with them in the

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Figure 1 Jma al-Fna, Marrakech, Morocco, 1991.

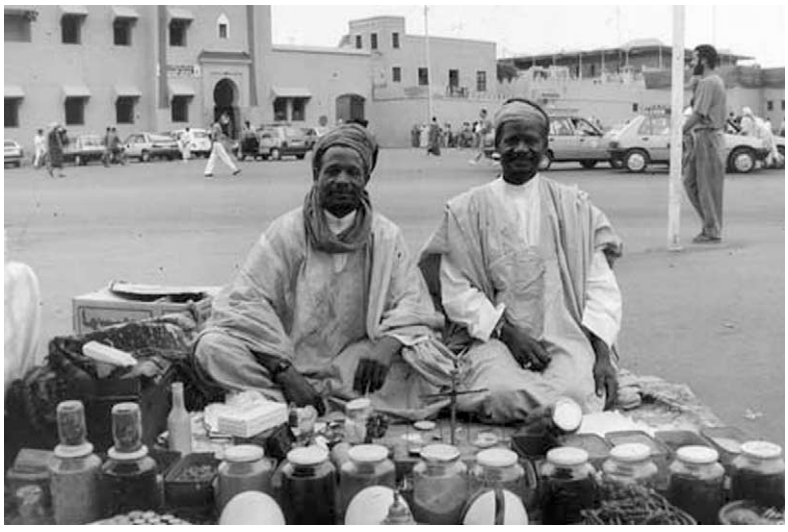

Figure 2 Abdelnacer and Abderrahman with their father's scale in Jma al-Fna, Marrakech.

mornings, observing their interactions with regular customers who, upon seeing me, whisper their problems discreetly to Abdelnacer and wait as he mixes herbs and creates amulets. He is a ritual specialist, a kind that is fast disappearing from Moroccan culture as a result of the increasing popularity of allopathic medicine. Abdelnacer's father was in the caravan trade and brought spices from Timbuktu to Marrakech. Abdelnacer and his brothers no longer travel distances to get their goods, which arrive by air now, but they do move back and forth between their desert home in Tata and Marrakech where they sell their goods.

At night, Abdelnacer performs. He hawks his herbs to the crowds on the street, describing the ailments that they cure and giving social commentary on the processes of modernity as well. He mixes Quranic verses in classical Arabic with proverbs from the Moroccan oral canon, talking animatedly and providing a choreography of gesture that glues his audience to his words and being.

> He who sees is better than he who doesn't see
> For the person who is ill or 'closed' [impotent due to magic]
> Those struck by the eye
> Because the Messenger of God said, "All of you have the [evil] eye except those who have blessing [baraka]."
> Wake up with incense and the 'wood-of-the-cross.'
> Here, we've spoken.
> If my Lord brings healing, who knows ....
> The doctor has his share [of truth] and we have our share.

Figure 3 Abdelnacer holding up a whale bone.

You see, we're called Arab doctors.
We were in the beginning of time.
I took this scale from the hand of my father.
This year, sir, forty-nine is the age of this slave.
This year, sirs, traveling, buying and selling . . . .
This is Ramadan and loved ones meet together.
There are those who never go out.
One has a store, one has a bakery,
One has a business, one has a café, one has a hotel.
He doesn't have time to wander around.
Us [Saharans], we go out.
Here it is.
You have here the news about saffron.
Yes, when Arabs stopped using saffron!
Oh Arabs.
Saffron is used in tea.
Here, two sprigs.
It's Ramadan. You drink it.
Put two sprigs, simmer them with tea or milk.
If you're eating innards, or if there's some tajine.
I have no meat.
Wa! Meat today is 1200 riyals [a kilo]!
I don't have any meat.
I can bring tea.
Simmer them with tea.
And it's good for the kidneys.
You know all about it.
It's good for the cold [in the body],
Whether in a woman or a man.
The woman is an inkwell, the man a pen.
The man is a tractor, the woman is soil.
Man, a blanket, woman a bed.
Man is the sky and the woman earth.
Saffron is used by men or women.
I remember, in Morocco . . . .
Let's not hurry with medication.
When a woman gives birth we give her saffron.
When a woman gives birth we give her chicken.
But today times have changed.
Time has turned upside down.
I remember myself when our women used henna.
Women didn't have high blood pressure.
I remember our women would use sanuj,
For men and women.
I remember our women would use henna to fight high blood pressure . . . .
The wise men and interpreters talked about the black seed, sanuj.
Look, today, without gain or loss:
You're my brother and I'm your brother.
You're my arms and I'm your arms.
Because whoever teaches his brother one letter will go to paradise.
That's what Saharans are all about.
This [Jma al-Fna] is the place of gain.
This is the sea. It's called the sea.
For example, it's called a television.
For example, it's called a video . . . .
What are we, children?
In the name of God, the healer is my Lord,
The curer is my Lord.
And the slave is just the reason.
A person can either take a risk or call or choose.
The first Arabs said,
"Don't go unless you are decided.
Don't venture out if you don't have honor."

Abdelnacer's verbal performances attract large crowds, some of whom buy his goods, but some who are there merely to be entertained (Figure 4). Abdelnacer is not merely a businessman but a verbal artist who takes great pride in his abilities to affect and move an audience (Figure 5).

In 2001 the United Nations Educational, Scientific, and Cultural Organization designated the "Cultural Space of Djamaa el-Fna Square" as an intangible heritage site, and plans began for the preservation of

Figure 4 Abdelnacer selling to a client.

Figure 5 Two pictures of Abdelnacer performing in the square, 1994.

the square. Ironically it was that very year that two events happened that changed the performance practices of Abdelnacer: 1) all herbalists were relocated to another section of the square by the Moroccan authorities and ceased their verbal performances, and 2) several performers in the square were given visas and taken to Paris, where Jma al-Fna was recreated in the Tuilerie Gardens in Paris to celebrate 'The Year of Morocco' in France. Both of these events were responses to international politics; the cleaning up and 'preservation' of Jma al-Fna in Marrakech required a codification of roles in the square, and since herbalists are neither storytellers, acrobats, or musicians, their own brand of verbal art was not recognized and was ultimately silenced. The recontextualization of the square in the Tuilerie Gardens

Figure 6 Aberrahman as an 'herbalist' in the Tuilerie Gardens in Paris, France.

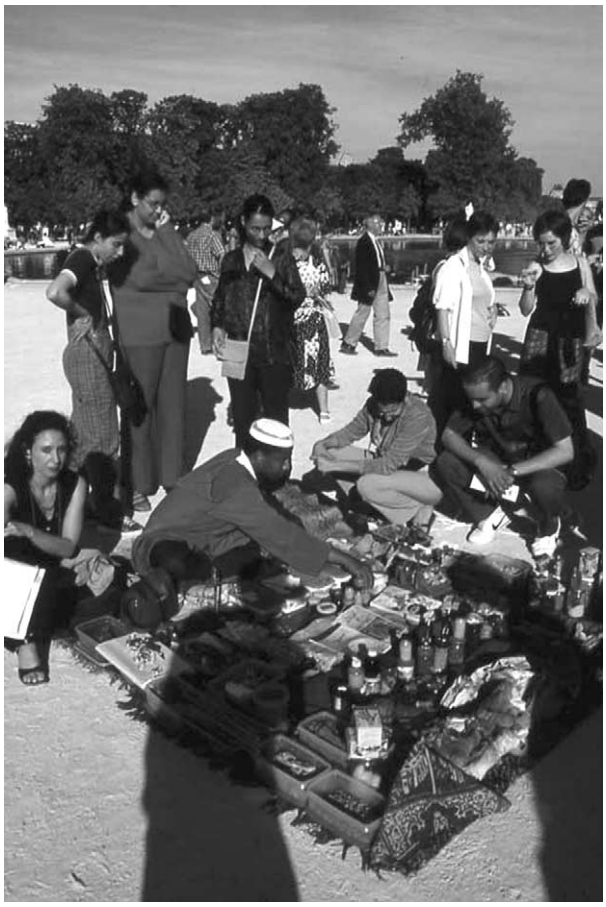

Figure 7 Potential clients in Paris.

was also politically motivated, with performative repercussions. Because of the growing power of the conservative right in French politics (and its xenophobia), French president Jacques Chirac and the late King Hassan II of Morocco engineered a year of performances in France that celebrated the presence of Moroccans and Moroccan culture in France; it eased some of the intercultural tensions. The recreation of Marrakech's famous performance square in the Tuilerie Gardens was a culminating point of this plan (Figure 6). It was an outdoor museum, a performance space of cultural tourism that allowed the French to experience exoticism at home. Moving the herbalists to Paris required yet another restriction on their practices, however; not only were their verbal performances absent, but (for tax reasons) no one was allowed to sell goods. The performances in the Tuilerie Gardens were merely display events and not reenactments. Ironically, the Moroccans living in Paris still tried to buy the goods from the herbalists, and the herbalists sold them discreetly when the authorities were not present (Figure 7).

What Is a Cultural Performance?

"Everything in human behavior indicates that we perform our existence, especially our social existence," writes Schechner (1985: 14). To perform is to act in the fullest sense of the word. While understandings of the notion of culture have changed radically over the centuries, the idea that one's environment shapes and influences one's actions has remained consistent. (In 1871 Taylor defined culture as "that complex whole which includes knowledge, belief, art, law, morals, customs, and any other capabilities and habits acquired by man as a member of society." Boas introduced the notion of 'relativistic culture' – the idea that all cultures are equally complex – while Geertz defined culture as a "model of and for action.") Humanistic anthropologists such as Abu-Lughod (1993) resist the idea of any kind of cultural homogeneity that may prejudice the observer to what is and is not there, encouraging instead a "writing against culture". One response to the difficulties of defining culture as a category is to always analyze performance in its specificity, that is, in a particular **context** – one that is informed by historical and political circumstance, by social and personal environments – whether of ethnicity, class, or gender. Performances like the ones above are infused with historical practices. Reading performances over time is also reading history. This is clear in the analysis of the two scenarios presented. In the first, Abdelnacer performed his identity as an herbalist, as a Saharan,

Figure 8 Aberrahman with scales in Paris.

and as a participant in a rapidly changing culture. In the second, his brother Abderrahman became a representative of traditional Moroccan culture and otherness. In Marrakech, the herbalist commented on modernity; in Paris his enforced silence commented on the traditional role he was made to embody (Figure 8).

Definitions of performance and the nascent field of performance studies were influenced by two major theoretical strands: 1) the 'philosophy of communication' (particularly J. L. Austin's linguistic formulation of the 'performative' as language that performs or enacts something in the world, but also Erving Goffman's work on social interaction and Gregory Bateson's theorizing on cybernetics); and 2) the dramaturgical model of culture (sparked largely by Victor Turner's work on ritual and his rediscovery of Van Gennep's analyses of rites of passage). For Turner, cultural performances enacted a social drama, whether they were Ndembu initiation rituals in Africa or festivals in the United States. Many scholars saw a correlation between different kinds of performance and different definitions, or experiences, of selfhood. Abrahams' theories of performance, for example, regarded performance genres as existing on an arc, running the gamut from "the pole of interpersonal involvement [ritual] to that of complete removal [theatrical monologue]" (1976: 207). In his early work, Schechner also delineated genres of performance according to different subjective stances. What he called the "self-assertive 'I'" was inherent in the performance of play; the social "We" dominated in games, sports, and theater; whereas the "self-transcendent 'Other'" was the domain of ritual (1969: 86–87; see Urban, 1989).

As a social drama, the performances of the herbalists in Marrakech and in Paris differ considerably. Whereas the herbalist in Marrakech may be interpreted as taking his audience into the future by providing meta-commentary on performance practices and by comparing Jma al-Fna to the media of television, for example (Bateson, 1972; Silverstein, 1976; Urban, 1989), in Paris he becomes an embodied icon of the past, displaying such items as *zuwwak*, a traditional stick toothbrush, pumice stones, and henna leaves – all 'natural' commodities that predate modern cosmetics. In Paris, that is, the social drama enacted transforms a modern performer into an emblem of the past, constructing the European spectator as situated within the present.

Some performances mark their own limits – fairy tales, for example, begin with 'once upon a time' and end with "and they lived happily ever after." The oral tale, like the oratory recorded above, can be lifted from its context of utterance and transported to other locations – a child's bedroom, a fireside, a theater or other public venue – or it can be made into a text, 'entextualized,' to use the term of Bauman and Briggs (1990), and thus become available for other usages and interpretations. Other performances have vaguer boundaries and are more linked to their context of utterance. Where does gossip begin and end, for example? As Briggs noted, "most of the meaning of performance would be lost if equal weight was not accorded to the manner in which performative and nonperformative modes intermingle as well as the way they are distinct" (Briggs, 1988: 17).

Accordingly, Hymes (1975) devoted careful attention to moments within a text where there is a "breakthrough into performance". Understanding where, when, and why this breakthrough happens, we also understand important aspects of a culture's aesthetics.

Performances are not only verbal. Because of this, writing about performance brings us to the limits of representation. How can a gesture be represented in words? How would desire or anger be represented? "All true feeling is in reality untranslatable," noted Artaud (1970: 71). "To express it is to betray it. But to translate it is to dissimulate it." Writing about performance is always a sort of fabrication, an attempt to recapture a presence forever lost. "To report it back, to record and repeat it, is at once to transform it and to fuel the desire for its mimetic return. Writing is a substitute for the failure of this return [of performance]," said Phelan (1993: 19). The transcribed performance provides only a systematized approximation, much like a musical score. Recognizing the limitations of transcription, Tedlock nonetheless formulates what he calls an 'open text,' a text that "captures a particular configuration of contour and timing that occurs just once in one audible text" (1983: 7).

Is Performance Necessarily Public?

"Every performance enacts a theory and every theory performs in the public sphere," noted Diana Taylor (2003: 27). The concept of performance relies upon a public, whether the witnesses are there or only imagined, whether they are participants or audience members. Performance is public. It is framed as such. Taylor distinguishes between the 'archive,' the textual record of history, and the 'repertoire,' by which she meant the embodied and seemingly ephemeral space of cultural memory.

> The repertoire requires presence . . . people participate in the production and reproduction of knowledge through 'being there,' being a part of the transmission. As opposed to the supposedly stable objects in the archive, the actions that are the repertoire do not remain the same. The repertoire both keeps and transforms choreographies of meaning (Taylor, 2003: 20).

Whereas colonial and other hegemonic powers have usually been the authors of the archival record, Taylor asks us to imagine what a history constituted from the repertoire would look like.

In the case of Abdelnacer it is clear that his performance changed depending on who was writing the script. When the square was controlled less by the government, his performances were more his own, although the genre of oratory that he employed is in the Moroccan oral canon. Now, however, he is silent. He sells his goods and still dispenses private advice but his performance is restricted to enacting the scenario of the herbalist, a category of profession in UNESCO's list and a genre of folklore for the tourist. He performs his personhood and his profession but not his artistic medium (oratory). He himself becomes the object of the touristic gaze, a display item in the outdoor museum of Jma al-Fna, an exhibition of himself. Kirshenblatt-Gimblett noted that:

> Heritage is a mode of cultural production in the present that has recourse to the past. Heritage thus defined depends on display to give dying economies and dead sites a second life as exhibitions of themselves (1998: 7).

To What Extent Is a Performance Creative and Innovative?

Performances always walk the line between conforming to generic conventions and the expectations they create (storytelling, dance forms, dramatic scripts) and infusing these genres with new elements of creativity. Schechner used the concept of 'restored behavior' to examine the tension between what existed in the cultural repertoire and what was added to it. For Schechner, "restored behavior is the main characteristic of performance" (1985: 35).

> Restored behavior is 'out there,' distant from 'me.' It is separate and therefore can be 'worked on,' changed, even though it has 'already happened.' . . . Restored behavior is symbolic and reflexive: not empty but loaded behavior multivocally broadcasting significances. These difficult terms express a single principle: The self can act in/as another; the social or transindividual self is a role or set of roles. Symbolic and reflexive behavior is the hardening into theater of social, religious, aesthetic, medical, and educational process. Performance means: never for the first time. It means: for the second to the nth time. Performance is 'twice-behaved behavior (Schechner, 1985: 36).

Despite the fact that there exist models for behavior, actual performances are never the same twice. There is always an emergent aspect, an indeterminate element that changes each time (Bauman, 1977). Authority is challenged (the herbalist in Paris sells his goods despite prohibition) and generic convention rebuked, reworked, and redefined.

Bauman noted the importance of the emergent in verbal art in 1977, stating that "completely novel and completely fixed texts represent the poles of an ideal continuum . . . between the poles lies the range of emergent text structures to be found in empirical performance" (1977: 40). In his later work, 'fixed'

texts became those that try to closely imitate a historical precedent in what he called, following Hymes, an act of 'traditionalization' (Bauman, 1992). Texts that distinguish themselves from prior texts make a claim to novelty or hybridity (Kapchan, 1996). The emergent in cultural phenomena, however, is what is unpredictable. Focusing on the emergent in situated expression means identifying the points at which performances challenge or play with tradition in order to inscribe a politics of difference onto the cultural landscape.

If Performances Have So Much Political Consequence, What Tools Exist for Their Analysis and Interpretation?

Bauman defined performance as "the assumption of responsibility to an audience for a display of communicative competence" (1977: 11). There is, he noted, a frame around a performance that alerts the participants to its special status as performance, a 'heightened awareness' (1977: 11). Performance is 'keyed' by formal factors such as parallelism, repetition, different registers and codes, as well as other factors (1977: 15–35), and performances index meanings outside of themselves (Silverstein, 1976). As Sherzer emphasized, attention to language play is a central concern insofar as the ludic contains a high level of metadiscourse and social critique (Sherzer, 2002; see also Bateson, 1972; Kirshenblatt-Gimblett, 1975). Performances may also be interpreted in light of the scenarios they present. Taylor compared a cultural scenario to Barthes' notion of mythical speech; it is material that is recycled, recognizable (Barthes, 1988; Taylor, 2003). The scenarios of discovery and conquest, for example, are dominant in imperial societies, although there are different outcomes and ways to subvert and parody the scenario. The analyst is implicated in the scenario, just as an actor is implicated in a plot (Taylor, 2003: 28). These theories and others assume that performance is ontologically set apart from what what de Certeau *et al.* called the "practice of everyday life" (1998). It is marked and self-reflexive behavior.

What Are the Implications of Media on Cultural Performances and Their Interpretation?

While some scholars have clung to the embodied and face-to-face aspects of performance, it is increasingly problematic to restrict performance to nonmediated events. Indeed, the nebulous boundaries between performance and practice also exist between what Auslander termed 'liveness' and mediation. Where does the body end and the cyberborg begin? Is not a privileging of the live performance also a reification of a certain 'ur' text that does not exist? What of cinematic performances, which may be played over and over again? Does the capacity for repetition change the fundamental character of performance? Auslander (1999: 54) challenged the assumption that the 'live' performance precedes mediated performance. Analyzing performances on television and cinema and their impact on 'liveness,' he concluded that "the very concept of live performance presupposes that of reproduction ... the live can exist only within an economy of reproduction". The reification of live performance is thus seen as a discourse of nostalgia situated in a modern (rather than a postmodern) moment.

Whose Performances? Whose Narratives?

Focus on performance in culture brings together several areas of inquiry. It requires an attention to aesthetic expression – whether visual, auditory, olfactory, gustatory, or tactile – as well as an understanding of the political ramifications of sensate expression in context. As Fabian (1990: 19) noted in his study of Zairean theater, "the kind of performances we find in popular culture have become for the people involved more than ever ways to preserve some self-respect in the face of constant humiliation, and to set the wealth of artistic creativity against an environment of utter poverty." In such contexts, performance is resistance. Conversely, however, performance genres such as anthems, national dances (Ozturkman, 2003), or state and religious rites may invoke meta-narratives that idealize unity, purity, and freedom in the service of monologic discourses of oppression (Lyotard, 1992). What studies such as Fabian's recognize is the intimate relation between performance and the creation of public worlds of influence. Attending to performance, we attend to the way social organization is affected – from the structures of selfhood to the structures of community, nation, and beyond.

See also: Performance Factors in Spoken Discourse.

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Performative Clauses

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The constative utterance, under the name so dear to philosophers, 'statement,' has the property of being true or false. The performative utterance, by contrast, can never be either. It has its own special job; it is used to perform an action. There are five necessary conditions (NCs) and one sufficient condition (SC) on using performatives felicitously.

To issue such an utterance **is** to perform the action – an action, perhaps, that we scarcely could perform, at least with so much precision, in any other way. Here are some examples (Austin, 1963: 22).

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>
> I name this ship 'Liberté'.
>
> I apologise.
>
> I welcome you.
>
> I advise you to do it.

According to Austin, by uttering such clauses under the right conditions, the speaker performs, respectively, the acts of naming, apologizing, welcoming, and advising.

Necessary and Sufficient Conditions

Necessary Condition 1

NC1: An explicit performative clause complies with the normal grammatical rules of the language and contains a verb that names the illocutionary point of the utterance.

(1) **I promise** to call Jo tomorrow

(2) I'll call Jo tomorrow

In (1), the speaker uses an explicit performative clause (in boldface) to make a promise. The speaker could also have made the promise by uttering (2), in which the promise is not explicitly spelled out in the semantics of the verb but is inferred by means demonstrated by Searle (1975), Bach and Harnish (1979), and Allan (1986). Here is a short list of performative verb listemes (there are many more): *abjure, abolish, accept, acknowledge, acquit, admonish, affirm, agree to, announce, answer, ascribe, ask, assent, assert, assess, assume, baptize, beg, bet, bid, call upon, caution, charge, christen, claim, classify, command, commiserate, compliment, concur, congratulate, conjecture, convict, counsel, declare, declare out, delegate, demand, demur, deny, describe, diagnose, disagree, dispute, donate, dub, excuse, exempt, fire, forbid, give notice, grant, guarantee, guess, hire, hypothesize, identify, implore, inform, instruct, license, notify, offer, order, pardon, plead, pray, predict, prohibit, proscribe, query, question, rank, recommend, refuse, reject, renounce, report, require, rescind, resign, sanction, say, state, submit, suggest, summon, suppose, swear, tell, testify, thank, urge, volunteer, vouch for, withdraw.*

Necessary Condition 2

NC2: The performative verb must be in the present tense, because the illocutionary act is defined on the moment of utterance.

Contrast the performative in (3) with the same listeme used nonperformatively in (4).

(3) **I promise** to take Max to a movie tomorrow

(4) **I promised** to take Max to a movie tomorrow

In saying *I promise* in (3), the speaker makes a promise; but the words *I promised* in (4) do not constitute the making of a promise; instead, they report that a promise was made.

Necessary Condition 3

NC3: (In English) a performative may occur in either the simple or progressive aspect.

A performative verb normally occurs in the simple aspect, perhaps for the same reason that the simple aspect is normal in on-the-spot reporting of football matches, baseball games, and so on. However, there are occasions when a performative may occur in the progressive aspect, as in (5) and (7).

(5) I am requesting you (for the umpteenth time) to tell me your decision

(6) I request you (for the umpteenth time) to tell me your decision

Example (5) has the illocutionary point of a request; the grounds for claiming it to be a statement about a request are no stronger than the grounds for claiming the same about (6).

(7) That horse has won its third race in a row, and I'm betting you $100 it'll win on Saturday

Uttered in felicitous circumstances, (7) has the illocutionary point of a bet, so the hearer can justifiably reply *You're on!* thereby taking up the bet and expecting the speaker to pay up when she or he loses, or vice versa.

Necessary Condition 4

NC4: A performative clause must be declarative and realis – real, actual, factual – that is, denote an actualization of the illocutionary act.

An explicit performative clause cannot be interrogative, imperative, or subjunctive. None of (8)–(10) is performative.

(8) Shall I bet $50 on the cup?

(9) Get out of here!

(10) Should I recommend her for the job?

NC4 also places constraints on the modal auxiliaries that may occur in performative clauses.

(11) I will hereby promise to visit you next time I'm in town

In (11) the modal *will* is used in its root meaning 'act on one's will, desire, want, hence insist' on carrying out the illocutionary act named in the performative verb. Example (11) denotes an ongoing act that can be glossed 'I will with these words make the promise to visit you next time I am in town'; so, if Max utters (11) to his aged aunt but then does not visit her the next time he is in town, his aunt can justifiably chide him with breaking his promise: *But you promised to visit!* Contrast the performative promise of (11) with (12), in which the modal *will* is used in its epistemic 'predict' sense and is irrealis because it denotes an unactualized event, namely the future act of promising (to take place *tomorrow*).

(12) Tomorrow when I see her, I will promise to visit next time I'm in town

Sufficient Condition

SC: The legalistic-sounding adverb *hereby*, inserted into a performative clause, marks the verb as performative provided that *hereby* is used with the meaning 'in uttering this performative.'

Note that *hereby* cannot legitimately be inserted between *will* and *promise* in (12) – as it was in (11) – which confirms that the clause is not performative.

The pattern established by *will* holds generally for modal auxiliaries with performative verbs that actualize the illocutionary act. The modal must be used in its root meaning, which is realis; compare the leave-taking in (13) with the warning in (14). Example (15) is ambiguous.

(13) I must hereby take my leave of you

(14) Trespassers should hereby be warned that they will be prosecuted

(15) I can hereby authorize you to act as our agent from this moment

The root meaning of *can* and *could* is linked to the adjective *cunning* and north British dialect *canny*: 'actor knows how and has the power and ability, to do act A.' In (15), if *can* means 'have the power to' and *hereby* means 'in uttering this performative,' then (15) effects an authorization ('I have the power by the utterance of these words to authorize you . . .'). However, if *I can hereby* means, say, 'using this fax from the head office makes it possible for me to,' then (15) is not an authorization but a statement about a possible authorization. Examples (16)–(18) are additional examples of nonperformative clauses with modals.

(16) I might promise to visit you next time I'm in town

(17) I might hereby authorize your release

(18) I could hereby sentence you to 10 years imprisonment

The modal *might* is never realis, and it is obvious that (16) states the possibility that the speaker will promise without actualizing a promise. The *hereby* that occurs in (17) necessarily has the sense 'using this' and refers to something in context other than the performative utterance (e.g., a confession from another party); thus, (17) is nonperformative. Similarly, (18) does not pass sentence; compare it with *I hereby sentence you to 10 years imprisonment*. In (18), *could* is epistemic and irrealis, and *hereby* once again means 'using this.'

Necessary Condition 5

NC5: The subject of the performative clause is conditioned by the fact that the speaker is the agent for either him- or herself or another person or institution, whichever takes responsibility for enforcing the illocution described by the performative verb.

This influences the form of the actor noun phrase. In all the examples so far, the actor is *I*. However, consider the following examples.

(19) We, the undersigned, promise to pay the balance of the amount within 10 days.

(20) We hereby authorize you to pay on our behalf a sum not exceeding $500.

(21) You are hereby authorized to pay . . . .

(22) Notice is hereby given that trespassers will be prosecuted.

(23) The court permits you to stand down.

Examples (19)–(20) have *we*; (21)–(22) are passive voice, and the authorization is made either on the speaker's behalf or on behalf of someone else; there is a third-person actor in (23), in which an authorized person utters the performative on behalf of the court. The verb *permits* is performative because it is the issuing of this utterance that actually grants the permission.

Other Issues

Explicit performatives can be negative. Example (24) performs an act of not-promising; note the scope of the negative: An act of not-promising is different from an act of promising not to do something, as in (25).

(24) I don't promise to come to your party, but I'll try to make it.

(25) I promise not to come to your party.

Austin (1963, 1975) insisted on a distinction between what he called constatives, which have truth values, and performatives, which, instead of truth values, have felicity conditions. In his opinion, (26) has no truth value but is felicitous if there is a cat such that the speaker has the ability and intention to put it out, and it is infelicitous – but not false – otherwise. This contrasts with (27), which is either true if the speaker has put the cat out or false if he or she has not.

(26) I promise to put the cat out.

(27) I've put the cat out.

The claim that performatives do not have truth values was challenged from the start (Cohen, 1964; Lewis, 1970; Bach, 1975), and Austin seems to have been misled by the fact that the truth value of a performative is less communicatively significant than its illocutionary point.

It is often assumed (e.g., by Gazdar, 1981) that performative clauses have only one illocutionary force: The main verb expresses the illocutionary point directly. But an analysis of (28) makes this impossible; its primary illocution – like that of every performative clause – is declarative.

(28) I promise to go there tomorrow

The primary illocution is 'S_{28} (the speaker of (28)) is saying that S_{28} promises to go there tomorrow.' This is not the illocutionary point of (28), however. S_{28} is using this primary illocution as a vehicle for a further illocution to be read off the performative verb, namely 'S_{28} reflexively intends the (primary) declarative to be a reason for H_{28} (the hearer of (28)) to believe that S_{28} undertakes and intends (i.e., S_{28} promises) to go there tomorrow.' There is no further inference to draw, so this is the illocutionary point of (28). The speaker has no choice but to make a promise indirectly by means of a declarative; the grammar of English determines the matter.

What additional evidence is there that performatives are declaratives in primary illocution as well as form? First, there is the obvious similarity between (28) and (29).

(29) I promised to go there tomorrow

Unlike (28), which is in the present tense and has the illocutionary point of a promise, (29) is past tense (which violates the definitions of performative clauses) and has the illocutionary point of a statement (or report) about a promise made in the past. The primary illocution of (29) is 'S_{29} is saying that S_{29} promised to go there tomorrow.' This is not the only parallel with (28); H_{29} will interpret (29) (subconsciously, and not in so many words) as 'S_{29} reflexively intends the declarative to be a reason for H_{29} to believe that S_{29} did undertake and intend to go there tomorrow. There is no further inference to draw, so the illocutionary point of (29) is that S_{29} did undertake and intend to go there tomorrow.'

Note that the undertaking in both (28) and (29) remains to be fulfilled. Although S_{29} is not actually making the promise in (29), as S_{28} is in (28), nevertheless, provided all normal cooperative conditions hold, S_{29} is as much obliged to fulfill the promise reported in (29) as S_{28} is in (28)! The presumption that the primary illocution of explicit performatives is that of a declarative permits a commonsense account of the similarity and difference between (28) and (29).

Second, there is a distinction between *saying Φ* and *saying **that** Φ*. The former reports locutions; the latter reports statements. Imperatives and interrogatives do not make statements, but declaratives do. Compare the sentences in Table 1. In order to be reported by *saying that*, the propositional content of the imperatives and interrogatives needs to be recast as the declarative sentences in Table 1. This is not the case with a performative because its primary illocution is already that of a declarative. Compare the sentences in Table 2, for which no recast declarative sentences are needed.

Third, there is a set of adverbials that modify primary illocutionary acts, for example, *honestly, for the last time, seriously, frankly, once and for all, in the first place,* and *in conclusion*. Consider (30):

(30) **In the first place** I admit to being wrong; and **secondly** I promise it will never happen again.

Table 1 Imperatives and interrogatives with *saying Φ* versus *saying that Φ*

Imperative	*Interrogative*
go!	what's your name?
I said go	I said what's your name?
*I said that go	*I said that what's your name?
Declarative	
I said that you must go	I said that I want to know your name

Table 2 Performatives with *saying Φ* versus *saying that Φ*

Declarative	*Performative*
the beer's cold	I promise to go there tomorrow
I said the beer's cold	I said I promise to go there tomorrow
I said that the beer's cold	I said that I promise to go there tomorrow

Example (30) means 'The first thing I have to say is that I admit to being wrong; and the second thing I have to say is that I promise it will never happen again.' It is clear that *secondly* denotes a second act of saying, not a second act of promising; from this we may further deduce that *in the first place* identifies a first act of saying, not a first act of admitting.

The evidence strongly supports the view that explicit performatives have the primary illocution of declarative and that the performative verb names the illocutionary point.

See also: Mood, Clause Types, and Illocutionary Force; Speech Acts.

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Periphrasis

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Introduction

The term 'periphrasis' is most commonly used to denote a construction type in which a grammatical property or feature is expressed by a combination of words rather than a single (inflected) word form. Periphrasis is generally applied to functional categories that are integrated into the inflectional system. However, derivational processes for the creation of new lexemes also show systematic regularities and, where sufficiently regular, may even demonstrate a paradigmatic organization (see below). A simple instance of periphrasis in English is the progressive and perfect aspect construction expressed by the auxiliary verbs BE, HAVE, and the *-ing/-en* forms, respectively, of the lexical verb: *The girls were singing/have sung*.

Example (30) means 'The first thing I have to say is that I admit to being wrong; and the second thing I have to say is that I promise it will never happen again.' It is clear that *secondly* denotes a second act of saying, not a second act of promising; from this we may further deduce that *in the first place* identifies a first act of saying, not a first act of admitting.

The evidence strongly supports the view that explicit performatives have the primary illocution of declarative and that the performative verb names the illocutionary point.

See also: Mood, Clause Types, and Illocutionary Force; Speech Acts.

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This contrasts with the expression of the past tense, which is signaled by the past tense form of the lexical verb itself: *The girls sang*. A periphrastic construction such as *is singing* is also often called an analytic construction as opposed to a synthetic inflected word form such as *sang*. The progressive/perfect aspect is not in a paradigmatic opposition with the past tense, so that we can have past and nonpast tense forms of the progressive, for instance: *The girls were/are singing*.

In saying that the progressive/perfect aspect construction is periphrastic, we are implying that, in an important sense, the constructions *is singing* and *had sung* are **forms** of the verb lexeme SING, just as *sings* (or for that matter *singing* and *sung*) are forms of that lexeme. The periphrasis thus contrasts with general syntactic constructions in which that lexeme might figure, such as *wants to sing* or *hear the girl singing*, which cannot be considered part of the paradigm of forms of the lexeme SING. This intuition is explicit in a number of traditional accounts of English grammar (see Blevins, forthcoming, for further discussion), though it is often lost in grammatical models that do not make explicit the notion of a lexeme and the paradigm of forms associated with that lexeme. In theories that do not appeal to a notion of lexeme and inflectional paradigms, for example, theories based on the post-Bloomfieldian notion of a morpheme, the periphrastic progressive is simply another syntactic construction into which a lexeme such as SING can enter. Given this, the notion of periphrasis is more than a convenient label. It is a concept that can be deployed to reflect a specific view of the organization of the grammar and the lexicon. This is emphasized in the work of Ackerman and Webelhuth. They describe expressions such as *is singing* as 'expanded predicates' (Ackerman and Webelhuth, 1998: 143), and they develop a detailed defense of the value of this notion.

The Form of Periphrastic Constructions

Most linguists would agree that the progressive/perfect constructions are periphrastic. English uses auxiliary verbs for other purposes, however. Thus, to form a question, we invert the order of the first auxiliary verb and the subject: *Have the girls been singing*? To negate a sentence, we select the negative form of the first auxiliary: *The girls haven't been singing*. To emphasize the polarity of a sentence, we stress the first auxiliary: *The girls HAVE been singing*. Such constructions, as it happens, involve periphrases, though the crucial point here is that the three grammatical processes pick out a special subcategory of verb (the traditional auxiliary verb). In the examples just illustrated, the grammatical properties of the clause independently require the existence of an auxiliary verb. However, the simple tenses lack an auxiliary verb, so in order to form the interrogative, negative, or emphatic construction we have to invoke a special periphrasis with the 'dummy auxiliary' DO: *Did the girls sing? The girls didn't sing. The girls DID sing*. Although the DO has no meaning or even a grammatical function of its own in these examples, the periphrastic construction it forms is an essential component of the expression of interrogative, negation, and emphasis. In a sense, then, the periphrasis is a partial exponent of these properties.

The typical instances of a periphrastic construction tend to involve auxiliary verbs, or such particles as the infinitive marker *to*, in a construction with sometimes specially selected forms of a lexical verb. However, we can find other types of syntactic construction leading to periphrasis. A particularly striking set of instances is found in Bulgarian. Bulgarian lacks infinitival verb forms, but has finite subordinate clauses introduced by the subordinating conjunction DA. However, the DA-clause has a number of uses beyond that of creating sentential complements. For instance, the DA-clause is used to realize certain types of imperative, as seen in (1) (Spencer, 2003: 268):

(1a) da dojde Ivan
DA come Ivan
(1b) Ivan da dojde
Ivan DA come
'Ivan should come!'

In (1b) we see that the subject can come before the DA-element, a general feature of such finite clauses that is inherited by the imperative construction. These examples show that, in this type of Imperative at least, the DA-clause construction (viewed as a piece of 'pure' syntax) can sometimes serve as an exponent (or even the principal exponent) of a feature of the imperative mood, though it does so in a fashion that cannot be derived from the normal function of the subordinating conjunction.

The DA-clause plays an important role in a number of grammatical oppositions. The future tense is expressed by a clitic particle *ště* that occurs with the present tense inflected form of the verb (Spencer, 2003: 269ff.):

(2a) Az ště piša pismoto
I FUT write.1SG the.letter
'I will write the letter'
(2b) te ště pišat pismoto
they FUT write.3PL the.letter
'they will write the letter'
(2c) az ště sâm napisal pismoto
I FUT be.1SG write.SG the.letter
'I will have written the letter'

(2d) te ště sa napisali pismoto
they FUT *be.3PL* *write.PL* *the.letter*
'they will have written the letter'

In the simple future tenses, the *ště* particle is invariable (though historically it derives from a verb meaning 'want'). However, there is a related function word that takes person/number inflections proper to the imperfect tense. This form combines with a da-clause to give a kind of 'future-in-the-past' construction, generally interpreted as a conditional mood form:

(3a) az štjax da piša pismoto
I ŠTA.1SG DA *write.1SG* *the.letter*
'I would write the letter'
(3b) te štjaxa da pišat pismoto
they ŠTA.3PL DA *write.3PL* *the.letter*
'they would write the letter'
(3c) az štjax da sâm napisal pismoto
I ŠTA.1SG DA *be.1SG* *write.SG* *the.letter*
'I would have written the letter'
(3d) te štjaxa da sa napisali pismoto
they ŠTA.3PL DA *be.3PL* *write.PL* *the.letter*
'they would have written the letter'

To negate the future or conditional forms, Bulgarian uses the verb IMA 'have.' As a lexical verb, IMA has a special fused negated form, as seen in examples (4, 5):

(4a) toj ima pari
he *have.3SG.PRES* *money*
'he has money'
(4b) toj njama pari
he NEG.*have.3SG.PRES* *money*
'he doesn't have any money'

(5a) te imaxa pari
they *have.3PL.IMPF* *money*
'they had/used to have money'
(5b) te njamaxa pari
they NEG.*have.3PL.IMPF* *money*
'they didn't (used to) have money'

The fused negated form of IMA is used to construct negative future tense forms. Exactly the same idiosyncratic allomorphy is found when IMA is used to form the negated future tenses. Corresponding to (2) we see:

(6a) az njama da piša pismoto
I NJAMA DA *write.1SG* *the.letter*
'I will not write the letter'
(6b) te njama da pišat pismoto
they NJAMA DA *write.3PL* *the.letter*
'they will write the letter'
(6c) az njama da sâm napisal pismoto
I NJAMA DA *be.1SG* *write.SG* *the.letter*
'I will not have written the letter'
(6d) te njama da sa napisali pismoto
they NJAMA DA *be.3PL* *write.PL* *the.letter*
'they will not have written the letter'

To negate the future-in-the-past or conditional construction, we use the 3sg negative imperfect form of IMA, *njamaše* (glossed NJAMAŠE), with the DA-clause. Thus, corresponding to (3) we have:

(7a) az njamaše da ša pismoto
I NJAMAŠE DA *write.1SG* *the.letter*
'I would not write the letter'
(7b) te njamaše da pišat pismoto
they NJAMAŠE DA *write.3PL* *the.letter*
'they would not write the letter'
(7c) az njamaše da sâm napisal pismoto
I NJAMAŠE DA *be.1SG* *write.SG* *the.letter*
'I would not have written the letter'
(7d) te njamaše da sa napisali pismoto
they NJAMAŠE DA *be.3PL* *write.PL* *the.letter*
'they would not have written the letter'

The only reasonable way to analyze such examples is to say that they represent inflected forms of the lexeme WRITE, in which the future/conditional and negation properties are expressed by means of an expanded predicate, though in this case a predicate expanded to include what is syntactically a complete subordinate clause. Similar constructions with negation and a subordinate clause are found in the Grasslands Bantu language Babole (Leitch, 1994).

In addition to verb inflection, periphrastic constructions can be found with adjectives and nouns. English adjectives with fewer than three syllables can have a synthetic comparative and superlative form: *happy, happier, happiest*. However, other adjectives require a multiword construction: *more/most curious* (**curiouser/curiousest*). This is not really an example of purely suppletive periphrasis, because we can also say *more/most happy*. A rather better example is cited by Haspelmath (2000: 660) from Latin. The comparative and superlative in the classical language are formed by means of the suffixes *-ior* and *-issimus*, respectively: *longus* 'long' (stem *long-*), *longior*, *longissimus*. However, adjectives whose stem ends in a vowel, such as *idone-us* 'suitable,' do not allow the synthetic forms, but require a periphrasis with *magis*, *maxime* 'more, most.'

Noun paradigms occasionally show periphrasis. In Chukchee (Chukchi), nouns inflect for case, including comitative and associative: *kejŋ-n* 'bear' *ge-kejŋ-e* 'with the bear (com.),' *ga-kajŋ-ma* 'with the bear (assoc.).' Chukchee nouns fall into two main inflectional classes. The second class includes proper names, the closest kin terms, and interrogative or demonstrative adjectives denoting people. This class lacks comitative and associative case forms, however, and instead we find the postposition *reen* 'with' following the locative case form of the noun (Skorik, 1961: 214): *Ragtnrk reen* 'with the Ragtən family.'

A rather intriguing instance of nominal periphrasis is found in Tundra Nenets. In this language, nouns are marked for grammatical and local (semantic) cases in the singular and plural. However, in the dual number, nouns lack synthetic local case forms, and their place is taken by a periphrastic construction in which the dual stem combines with the postposition NYA, which itself bears the local case suffixes (Ackerman and Stump, 2004: 152).

Periphrastic constructions differ in the extent to which the periphrasis is integrated into the morphological (synthetic) paradigm of the lexeme. Haspelmath (2000) distinguishes two main types of periphrasis on this criterion. The English aspect periphrasis would be a case of 'categorial periphrasis,' expressing a grammatical property that is never expressed by any synthetic form alone. This is what Sadler and Spencer (2001) have called 'syntactic periphrasis.' Haspelmath contrasts this with 'suppletive periphrasis,' in which the periphrasis fills in a gap in a synthetic paradigm ('morphological periphrasis' in Sadler and Spencer, 2001). Haspelmath distinguishes two subtypes of suppletive periphrasis. In type (a), the periphrasis serves to guarantee that the paradigm as a whole is symmetrical. An example of type (a) suppletive/morphological periphrasis is provided by the Latin perfective passive. Latin verbs inflect for active and passive forms and have imperfective and perfective tense forms. However, the combination of perfective and passive can only be expressed periphrastically, by combining the auxiliary verb ESSE 'be' with the perfective passive participle (8):

(8) Latin past tense forms, imperfective/perfective

Active voice	Passive voice
laudabat 'he was praising'	laudabatur 'he was being praised'
laudavit 'he praised'	*laudatus est* 'he was praised'

In type (b), the periphrasis serves to generalize the inflectional paradigm of one class of lexemes so that it parallels that of another class. Haspelmath cites the Russian examples in (9) as an instance of type (b) suppletive periphrasis:

(9) Russian past tense forms, imperfective/perfective

	Active voice	Passive voice
imperfective	delal 'he was making'	delalo-s' 'it was being made'
perfective	s-delal 'he made'	*bylo sdelano* 'it was made'

Haspelmath is tacitly assuming (somewhat controversially) that perfective and imperfective verbs constitute two distinct (derivational?) classes rather than two series of inflected forms of a single lexeme. Granted that assumption, then we can conclude that the periphrastic perfective passive *bylo sdelano* serves to create a form paralleling the synthetic imperfective passive *delalos'*. However, if we treat imperfective and perfective pairs as inflectional forms of the same lexeme, then the Russian case is identical to the Latin case.

There remains an interesting difference between the Latin and the Russian examples, however, as pointed out by Börjars *et al.* (1997) and Sadler and Spencer (2001). In principle, it might be possible to describe these constructions by saying that the synthetic paradigm is defective and that the meaning that would have been expressed by the missing cell is conveyed by an independently motivated syntactic construction. On this view, the Latin form *laudatus* is a deverbal adjective that means 'in a state of having been praised' and the finite construction *laudatus est* means 'is in a state of having been praised,' which corresponds more or less in meaning to 'he was praised.' This might well be adequate for the Russian examples, but it is inadequate for the Latin. This is because Latin has deponent verbs that are passive in form but active in meaning. An example is *loquor* 'I speak.' This lacks active voice forms but has the forms *loquiebatur* 'he was speaking' and *locutus est* 'he spoke.' Because the passive forms are active in meaning, it is impossible to account for the meaning of *locutus est* if we adopt the syntactic approach. Instead, we must say that the periphrasis fills the gap in the morphological paradigm. Deponent verbs are then those that use the whole of the passive paradigm with active meaning.

There are several important conceptual issues that need to be clarified in order to evaluate the role of periphrasis. On the form side, we need to be clear what we mean by 'word' when we describe a periphrasis as a 'combination of words.' On the content side, we need to be clear what we mean by 'grammatical property.' We begin with the question of form.

In Macedonian, the future is expressed by an invariable particle *k'e*, which appears as part of a cluster of cliticized elements, including the negation element *ne*, clitic forms of the auxiliary verb, and cliticized pronominals:

(10) Ne k'e mu go dadam učebnikot
NEG FUT TO.HIM IT I.give the.textbook
'I will not give him the textbook'

The elements *ne*, *k'e*, *mu*, *go* are clitics, and their position is not determined by normal rules of syntax. The clitics appear in a set order, and the cluster is then positioned immediately to the left of the verb if the verb is finite in form, or to its right if it is nonfinite.

The clitics do not form phrases like normal words, and it is impossible to break up the cluster with parenthetical phrases or adverbs.

In many respects, the clitics of Macedonian behave more like verbal affixes in that they are never separated from the finite verb form. If we were to redefine the Macedonian clitics as affixes, then the sequence *ne k'e mu go dadam* would be a single synthetic verb form, and there would be no question of it being a periphrastic construction. Bulgarian, which is mutually intelligible with Macedonian, has a very similar cluster with its future tense marker *ště*. However, the Bulgarian clitic cluster attaches to the right of whatever happens to be the first phrase of the clause, whether a subject pronoun (11a), a topicalized direct object (11b), or the finite verb itself (11c):

(11a) az ště mu go dam učebnikât
I FUT TO.HIM IT *give*.1SG *textbook*.DEF
'I will give him this textbook'

(11b) tazi učebnik ště mu go dam
this *textbook* FUT TO.HIM IT *give*.1SG
'I'll give him **this** textbook'

(11c) dam ště mu go učebnikât
give.1SG FUT TO.HIM IT *textbook*.DEF
'I'll give him the textbook'

Thus, it is not possible to analyze the cluster straightforwardly as a sequence of verb affixes. Nonetheless, many linguists would prefer to treat the clitics as belonging to a different category than fully fledged words. Instead, the clitics would be regarded as affixes that are placed at the edge of a phrase (phrasal affixes). In that case, it would be inappropriate to describe the examples in (11) as instances of a periphrasis. Thus, the characterization of periphrasis depends crucially on how we define the notion 'word(form).'

A related question concerns constructions in which a periphrastic pattern alternates with a clitic construction or a synthetic word form. Serbo-Croatian provides an interesting instance. One (somewhat formal) way of forming the future is to use present tense forms of the auxiliary verb *ht(j)eti* (*hoću*, *hoćeš*, etc.) together with the infinitive of the lexical verb:

(12) ja hoću čitati ovu knjigu
I 1SG.AUX *read*.INF *this book*
'I will read this book'

However, the more normal way of expressing the future is to use a shortened form of the inflected auxiliary, *ću*, *ćeš*, etc., which then appears as a clitic attached to the first phrase of the clause:

(13a) ovu knjigu ću čitati
this book 1SG.AUX *read*.INF

(13b) čitati ću ovu knjigu
read.INF 1SG.AUX *this book*
'I will read this book'

The construction in (13b) alternates with a form in which the infinitive form of the verb undergoes an idiosyncratic phonological alternation:

(14) čitaću ovu knjigu
read.FUT.1SG *this book*
'I will read this book'

The form *čitaću* now has to be analyzed as a synthetic word form. Finally, if we ask a yes-no question in the future, then a simple answer will require just the future auxiliary without a lexical verb. Because the clitic/affix form would require a lexical verb to attach to, such a one-word answer has to consist of the full form of the auxiliary, as seen in (15):

(15a) čitaćeš ovu knjigu?
read.FUT.2SG *this book*
'will you read this book?'

(15b) hoću
1SG.AUX
'yes (I will)'

Thus, the elliptical answer in (15b) has to use the periphrastic construction, although the sentence consists of only one word.

Similar formal questions are found with compounding constructions. Japanese has two types of verb–verb compound (Kageyama, 1989). One, type A, is clearly a lexical construction, but the type B construction retains a number of important syntactic properties. The first element is a lexical verb stem, while the second has a more grammatical meaning, such as aspect ('begin,' 'finish') or degree ('over-').

(16) Japanese compound verbs

kaki-hazimeru	begin to write
tabe-oeru	finish eating
syaberi-tuzukeru	continue speaking
ugoki-dasu	begin to move
tobe-sokoneru	miss out on eating
tabe-sugiru	overeat

These compounds are productive and semantically transparent, and the lexical verb component is accessible to morphosyntactic processes, such as 'soo si'-anaphora (equivalent to English 'do so') and honorification with the *o-*VERB*-ni naru* construction, which are not possible with lexicalized compounds.

(17) verbal anaphora
soo si-hazimeru/tuzukeru
so do begin/continue
'begin/continue to do so'

(18) honorifics
(18a) kaki-hazimeru
write-begin
(18b) o-kaki-ni nari hazimeru
HON-*write*-HON BECOME *begin*
'begin to write'

These examples illustrate the tight connection between periphrastic and synthetic expression.

Criteria for Recognizing Periphrasis

One of the motivations for setting up syntactic or categorial periphrasis is the intuition that the periphrasis expresses a grammaticalized property such as 'perfect aspect,' but it can be difficult to know when a property has been grammaticalized and if so, how (Blevins, 2001). For instance, what is to stop us from saying, counterintuitively, that English has periphrastic desiderative, evidential, or causative constructions with *want*, *seem*, or *make*? Surely we want to say that these are lexical verbs with specific types of complements and not grammatical formatives. Similarly, we would not wish to say that the preposition *of* is part of a periphrastic genitive case construction. This question is addressed in Haspelmath (2000), Ackerman and Stump (2004), and Spencer (2001, 2003) as well as various contributions to Ackerman *et al.* (forthcoming).

Ackerman and Stump (2004) identify three criteria. The first is feature intersectivity. If a construction expresses grammatical properties that are expressed elsewhere in the synthetic paradigm, then we have a periphrasis. The Latin *laudatus est* example expresses the properties perfective and passive, both of which are expressed synthetically elsewhere.

The second criterion is noncompositionality. For instance, in the English perfect aspect, it is impossible to ascribe a unique meaning of 'perfect' to either the auxiliary or the verb form. Rather, the perfect is a 'constructional idiom' in which the individual components are, strictly speaking, meaningless but serve as partial realizations of the property (see also Booij, 2003 for discussion of the notion 'constructional idiom').

The third criterion is that of distributed exponence. In the negative future forms of Udmurt shown in (19), we see person distributed on the negative auxiliary and number marked on the lexical verb stem:

(19) Negative future of Udmurt MÏNÏ 'go'

	singular	plural
1	ug mïnï	um mïne(le)
2	ud mïnï	ud mïne(le)
1	uz mïnï	uz mïne(le)

This behavior is not found with purely syntactic constructions. The *want/seem/make* constructions fail to satisfy any of the Ackerman/Stump criteria, so they do not count as periphrases.

Haspelmath (2000: 660ff.) cites the first two of Ackerman and Stump's criteria and adds a further one. He points out that the German auxiliary verb WERDEN, which is used to form the periphrastic future, is homophonous with the main verb meaning 'become.' However, in its auxiliary use it lacks certain forms that are otherwise available to the main verb. In particular, it is impossible to use the future auxiliary in the past tense form, hence *wird kommen* 'will come' but not **wurde kommen*. Compare *wird kalt* 'becomes cold' and *wurde kalt* 'became cold.' Spencer (2003: 260ff.) refers to this phenomenon as 'underexhaustivity.' He argues that it is possible to find the opposite phenomenon, 'superexhaustivity,' and offers this as a further criterion for periphrasis. In a superexhaustive paradigm, a construction allows more contrasts than would be expected from a straightforward compositional syntactic construction. Bulgarian has a periphrastic evidential construction form (Renarrated Mood) with the auxiliary *sâm* 'I am' and the l-participle form of the verb *sâm pisal* 'I wrote (apparently).' However, we can also have a form in which the auxiliary itself is put into the Renarrated Mood, *bil sâm*, to give a doubly renarrated or Emphatic Renarrated form (with somewhat obscure semantics): *bil sâm pisal*. Such a double application of a construction could not be mandated by purely syntactic constructions.

Derivational Periphrases

Although it is not the standard way of using the term, 'periphrasis' can also be applied to multiword lexical structures such as particle verbs (***make** a story **up***), light verb constructions (*render assistance*), and constructions in which the lexical stock is expanded systematically by multiword combinations. Other types include serial verb constructions (see Durie, 1997) and aspectual and causative complex predicates in languages such as Indo-Aryan (Butt, 1997) and Romance (Alsina, 1997).

A well-known instance of lexical multiword combinations is the case of Germanic particle + verb constructions or phrasal verb (see the papers in Dehé *et al.*, 2002, for recent discussion). In some instances, the combination has the appearance of a normal, semantically compositional piece of syntax, as in *He pulled the cork out*. Here, the word *out* appears to be an intransitive preposition having the function of an adverbial of location, much like the

phrase *to one side* in *He pushed the cork to one side*. Furthermore, constructions of this sort appear to share important features with resultative constructions such as *rub NP dry* in *He rubbed the cork dry*. However, the particle in *pull out* can be placed between the verb and its object: *He pulled out the cork*. This is not a possible position for an adverb in a pragmatically neutral context. A great many phrasal verbs are partially or completely idiomatic, however, for example, *She worked out the answer/worked the answer out*. The precise syntax of phrasal verbs differs considerably from one Germanic language to the next. For instance, depending on the language, the particle may be constrained to appear before the object or after it, or may be allowed to appear in either position (see Toivonen, 2003 for a detailed comparison of West Germanic and Scandinavian phrasal verb constructions, and Booij, 2002 for discussion of the implications of the Dutch construction). This means that for each of the Germanic languages, the grammar must capture the fact that the lexicon permits multiword verbal lexemes whose meaning may or may not be compositional and in which the particle component has its own idiosyncratic morphosyntactic properties. But this is tantamount to saying that we have periphrastic word formation.

In some languages, the word formation retains enough of its syntactic origins to influence further word formation. For instance, in English it is difficult to use phrasal verbs as the input to further derivational morphology. While we can say *This problem is solvable*, we cannot say **This problem is workable out* (or *work-out-able*). In other languages, the structure of particle verbs may be somewhat different in that the particle may appear as a preverb. In those languages, we more often find that the combination is taken to be a complex stem that can undergo further word formation. A particularly clear example of periphrastic lexical items undergoing further word formation is found with Hungarian (Ackerman and LeSourd, 1997). In that language, many verbs have essentially the same kind of structure as Germanic phrasal verbs, in that a lexical verb stem is combined with a particle of adverbial origin. Depending on the properties of the clause, this particle may appear as a prefix (bearing the word stress), as in (20a, 21a). However, under various morphosyntactic circumstances, such as when the direct object is focussed, as in (20b), or when the verb is the complement of a verb such as *akarni* 'to want,' as in (21b), the preverb must appear after the verb:

(20a) Mari meg-oldott ez a feladatot
Mary PV-*solved this the problem*.ACC
'Mary solved this problem'

(20b) Mari EZ A FELADATOT oldott meg
Mary this the problem.ACC *solved* PV
'It was **this** problem that Mary solved'

(21a) az ajtót be-csukni
the door PV-*close*.INF
'to close the door'

(21b) be akarom csukni az ajtót
PV *I.want close*.INF *the door*
'I want to close the door'

Hungarian has a variety of derivational suffixes that apply to verbs. The particle verbs can serve as input to a number of these derivational processes, as seen in (22):

(22a) meg-oldani
PV-*solve*.INF
'to solve'

(22b) meg-old-ás
PV-*solve*-NOM
'solution'

(22c) meg-old-hat-ó feladat
PV-*solve*-POSS-ADJ *problem*
'solvable problem'

(22d) meg-old-hat-atlan feladat
PV-*solve*-POSS-PRIV *problem*
'unsolvable problem'

(22e) meg-old-andó feladat
PV-*solve*-NEC.ADJ *problem*
'problem needing solution'

Ackerman and LeSourd (1997) explicitly discuss such examples in the context of a model of grammar in which a single lexeme can systematically be realized as a multiword combination, i.e., as a lexical periphrasis.

Conclusions

Periphrastic constructions differ from general syntactic constructions in that they realize a grammatical property or derivational pattern. Various diagnostics are being developed for distinguishing periphrastic constructions from the rest of syntax. While remaining essentially syntactic in form, periphrases thus exhibit certain of the properties of the morphology and may interact with morphological systems to the extent of being counted as part of the morphological paradigm of a lexeme (Sadler and Spencer, 2001) or of alternating with purely morphological constructions. Such patterning can be best understood by appealing to a lexeme and its paradigm of forms,

together with such notions as 'expanded predicate' (Ackerman and Webelhuth, 1998).

See also: Clitics; Complex Predicates; Inflection and Derivation; Lexeme-Morpheme-Based Morphology; Linguistic Paradigms; Morphological Change, Paradigm Leveling and Analogy; Paradigm Function Morphology.

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Persian, Modern

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Modern or New Persian (NPers. *fārsī*) is descended more or less directly from Middle Persian. Differences between Old, Middle, and New Persian in part reflect the fact that these were official languages of the Achaemenid, Sasanian, and various modern-time dynasties of various local affiliations, respectively. The language is known from scattered remains from the 7th century C.E. on, while Persian literature emerged in the 9th century. Among the earliest manuscripts are a few texts from Chinese Turkestan.

New Persian is written in the Arabic script, with the exception of the Central Asian variant, Tajik, which uses the Cyrillic script. There is a large and old Judeo-Persian literature, written in the Hebrew alphabet, and a few short texts in Manichean and Syriac script.

There are several dialects of Modern Persian, among them the east-Iranian Khorasani dialect; Dari and Badakhshani spoken in Afghanistan; and Tajik (q.v.) spoken in Tajikistan and adjacent areas of Afghanistan and Xinjiang. Persian is in turn a member of the group of dialects spoken in western (Lorestan) and southwestern (Fars) Iran. Persian has also not been a homogeneous language throughout its history; rather, as the cultural centers moved about, the literary language was colored by the local varieties of Persian.

The study of Persian began in Persia itself probably already in the 13th to 14th centuries, but glossaries of obsolete and dialect words had been compiled as early as ca. 1000. Interest in ancient Iranian languages was kindled in Mughal India in the 16th century and resulted in several large dictionaries, which served as the basis for 19th- to 20th-century dictionaries.

In Europe, several Persian grammars had been written by 1700, partly based on Bible translations. About this time polyglot dictionaries, including Persian among their languages, also became common. The most famous early grammar is that of Sir William Jones (1st edn., 1771), founder of the Asiatick Society in Calcutta (1784).

Phonology

New Persian phonology continues that of Middle Persian with only few changes. Some early manuscripts mark intervocalic *b* and *d* as spirants *β* (<f> with triple dots) and *δ*, but the later standard language has only *b* and only *d* with a few exceptions (e.g., *goδašt* → *gozašt*). The sounds *γ* and *ž* are common, but originate in non-Persian dialects (e.g., *rouγan* 'oil,' *vāže* 'word'). In Arabic loan words, the typical Arabic sounds have been replaced with corresponding Persian ones (ح *ḥ* > *h*; ط *ṭ* > *t*; ث *ṯ* [*θ*], ص *ṣ* > *s*; ذ *ḏ* [*δ*], ض *ḍ*, and ظ *ẓ* > *z*). The Middle Persian vowel system: *a ā ē i ī u ū ō au ai* remained in early Modern Persian, except that *ē, ō* before nasals merged with *ī, ū* early on in standard Persian. Later this merger took place in all positions, and eventually, this phonemic system based on vowel quantity distinctions was replaced by one based on vowel quality: *a* (≈ [æ]) *ā* (≈ [å]) *e ī o ū ou ei* (with length as a secondary feature). The Classical Persian labialized velar fricative *xw* [x^{o}] is New Persian [x], but is still spelled <xw> (e.g., *xwad* > *x^{v}od* 'own').

In modern colloquial standard Persian, further changes are taking place, among them *ān, ām* > *ūn, ūm*; loss of *h* and glottal stop before consonants, creating a new set of long vowels (*te:run* 'Tehran'; *baʿd* [bæʾd] > [bæ:d] 'afterward' versus [bæd] 'bad'); the assimiliation of postvocalic *st* > *ss*; the reduction of the 3RD SING verb ending *-ad* to *-e* and the change of the 2ND PLUR ending *-īd* to *-īn*; and the reduction of the stem of several common verbs (*šaw-* 'become' > *š-*, *gūy-* 'say' > *g-*, etc., e.g., *mī-šav-ad* > *mī-š-e* 'he/she/it becomes, it is possible,' *mī-gūy-īd* > *mī-g-īn* 'you [PL] say').

Morphology and Syntax

Modern Persian has no grammatical gender (e.g., *ū* 'he, she, it') or cases, but has inherited the Middle Persian plural morphemes *-ān* (usually marked animate) and *-hā*. Arabic nouns often use the Arabic broken plural (*feʿl* 'verb,' plur. *afʿāl*). Some Persian nouns have adopted the Arabic plural ending *-āt*, especially nouns in *-e* (< *-ag*), which have plural ending *-eǰāt* (< *-aǰ-āt*; e.g. *mīve-ǰāt* 'fruit'). Plural forms are not used after numerals, but classifiers are common, the unmarked *tā* 'piece' being the most common (*se ǰeld ketāb* or *se tā ketāb* 'three volume/piece book' = 'three books'; *čand tā* or [colloquial] *čan dune* 'how many?' *se tā* or *se dune* 'three').

The indefinite marker is *-ī* 'a (certain).' The definite direct object is always marked, in Classical Persian by a variety of affixes, in modern Persian by *-rā* (colloquial often *-[r]o*, e.g., *to -rā ne-mī-šenās -am* 'you-DO NEG-CONT-know.PRES-1ST.SING' = 'I do not know you'; but *man* + *-rā* 'I.DO' > *marā* 'me,' coll. *man-o*), which can be combined with the indefinite article, *-ī-rā* 'a certain.' In colloquial Persian a referential definite marker is often used, e.g., *mard-é* 'the man (we are talking about).' The indirect object is marked in modern Persian by the preposition *be* 'to,' while

in Classical Persian *-rā* was used, beside various other strategies. This was also the way of expressing possession (*ū-rā do bače and* 'he.IO two child be.3RD.PL' = 'he has two children'; modern *do tā bače dār-ad* 'two CLASS child have.PRES.-3RD.SING' = 'he he has two children').

Adnominal constructions, possession, and adjectives, are expressed by the ezafe construction (*ketāb-e man* 'book-CONN I' = 'my book,' *ketāb-e bozorg* 'book-CONN big' = 'a big book'). Possession can also be expressed by constructions such as *az ān-e man ast* 'of that/those-CONN I.OBL be.3RD.SING' = 'it is mine' or *māl-e man ast*, literally, 'it is my possession.' The *ezafe* is omitted after the indefinite article (*ketāb-i bozorg* book-INDEF big = 'a big book').

Relative clauses are introduced by the connector *ke*, which is preceded by *-ī* (attached to the noun) in restrictive clauses, e.g., (*mard-ī ke ketāb-am-rā bord* 'man-REL.PART REL.CONJ book-I.OBL-DO take.away. PAST.3RD.SING' = 'the man who took my book'). The direct object particle may be added to the relative *-ī*, e.g., *zan-ī-rā ke dī-rūz dīd-am* 'woman-REL.PART-DO REL.CONJ yester-day see.PAST-1ST.SING = 'the woman I saw yesterday.' Anaphoric pronouns referencing the head noun are common, e.g., *zan-ī dī-rūz dīd-am ke šouhar-eš dar ǰang košt-e šod-e būd* 'woman-INDEF yester-day see.PAST-1S.SING REL.CONJ husband-she.OBL in war kill.PAST-PERF become.PAST-PERF be.PAST.3RD.-SING' = 'yesterday I saw a woman whose husband had been killed in the war.' Note also constructions like *mard-ī dīd-am (ke) dāšt rāh mī-raft* 'man-INDEF see.PAST-1ST.SING (CONJ) hold.PAST. 3RD.SING road PROG-go.PAST.3RD.SING' = 'I saw a man (that) he was walking the road' = 'I saw a man who was walking along').

The verb system is based on three stems: present, past, and perfect (perfect participle = past stem + suffix *-e*; e.g., *kon-*, *kard, kard-e* 'do'). The infinitive is made from the past stem (*kard-an* 'to do'). To these stems are added personal endings and modal prefixes. The personal endings of the present and past tenses are the same, with the exception of the 3rd singular, which has no ending in the past tenses.

The most obvious feature distinguishing New Persian from its ancestors is the loss of the split-ergative (e.g., MPers. *ras-īd h-ēm* 'arrive-PAST be.PRES.1ST.SING' = 'I arrived,' *ras-īd* 'he arrived > NPers. *rasī́d-am, ras-ī́d*; MPers. *man guft* 'I.OBL say.PAST.3RD.SING' = 'I said' > NPers. *góft-am* 'I did'; MPers. *ā-š guft* 'then say.PAST.3RD.SING-he.ENCL.OBL' = 'then he said' > NPers. *goft* 'he said' [in colloquial the 3rd singular enclitic pronoun may be added, *góft-eš* 'he said']).

The perfect and pluperfect are formed with the extended past stem (perfect participle) in *-e* (*goft-é-am* [colloquial *goftám*] 'I have/had said,' *goft-é būd-am* 'I had said'). Continuous tenses, including the perfect, take the prefix *mī-* (Class. Pers. also *hamē*). New progressive forms take the auxiliary *dār-* 'hold': *dār-am mī-rav-am* 'hold.PRES-1ST.SING PROG-go.PRES.1ST.SING' = 'I am going, I am about to go.'

In Classical Persian the past tense takes the prefix *be-*, which in modern Persian is restricted to modal functions.

The future is formed with the verb *x^{v}āstan* 'wish' and with a short form of the infinitive (*x^{v}āh-ad boland šod* 'future-3RD.SING tall become.SHORT. INF' = 'he is about to get up,' different from *mī-x^{v}āh-ad boland be-šav-ad* 'he wishes to get up' with the subjunctive). This construction can also be used to mean 'be about to' (colloquial *mī-xās bolan š-e* [*mī-x^{v}āst boland šav-ad*] 'he was about to get up').

The passive is formed with the auxiliary *šudan* 'become' (but MPers. 'go') and the perfect participle (*košt-e šod* 'he was killed'). In earlier literature *āmadan* 'come' was often used instead of *šudan* (*nebešt-e mī-āmad* 'it was written').

Verbal system:	
Present continuous:	*mī́-rav-am* 'I go, I am going'
Present subjunctive:	*bé-rav-am* '(that) I go'
Past simple:	*ráft-am* 'I went'
Past continuous:	*mī́-raft-am* 'I was going'
Perfect simple:	*raft-é-am* 'I have gone'
Perfect continuous:	*mī́-raft-e-am* 'I have (regularly) gone'
Pluperfect:	*raft-é būd-am* 'I had gone'
Pluperfect continuous:	*mī-raft-é būd-am* 'I would have gone'
Future:	*x^{v}āh-am raft* 'I shall go'

Preverbs (local) are very common, and the meaning of the compound not always predicatable (e.g., *dāštan* 'have, hold,' *bar dāštan* 'remove'). Verbal phrases are also very common, often comprising Arabic nouns and adjectives (e.g., *ettefāq* 'incident' + *oftādan* 'fall' = 'happen').

The local varieties of Persian have numerous variant forms, notably Afghan Dari and, especially, Tajik, which has been influenced by Turkic languages and has forms such as progressive present *karda-istoda-ast* 'he is doing,' inferential present *me-karda-ast* 'he does (he says),' presumptive *me-karda-gi-ast* 'he appears to be doing, he probably does,' etc.

Among syntactic features, we may note the following.

The *ezafe* construction can be used to connect extended qualifiers to head nouns, including prepositional phrases (*rāh-e be Qom* 'the road to Qom').

Passive constructions are agent-less (agents can only be expressed *ad hoc* in special phrases:

be-vasile-ye 'by means of,' *az ǰāneb-e/ṭaraf-e* 'from the side of,' *be-dast-e* 'at the hand of').

The past continuous can express irrealis conditions (*agar mī-dān-est-am mī-goft-am* 'if CONT-know-PAST-1ST.SING, CONT-tell.PAST-1ST.SING' = 'if I knew, I would tell'; *agar mī-dān-est-am goft-e būd-am* 'if I knew, I would have told'; an alternative expression is *mī-dān-est-am ke mī-goft-am* 'did I know, then I would say').

The conjunction *ke* is used in a variety of functions and combinations (*vaqt-ī ke* 'the time that' = 'when'; *be-jā-ye īn ke man be-gūy-am* 'instead of this that *I* should say' = 'instead of *my* saying'). There is no indirect speech (*goft [ke] man mī-rav-am* 'he said [that]: "I am going"' = 'he said he was going'; *porsīd ke šomā be-kojā mī-rav-īd* 'he/she asked: "you [PL], to-where are you going?"' = 'he asked where they were going'; *mī-x^{v}āst be-dān-ad ke be-mān-am yā na* [SUBJ-stay.PRES-1ST.SING or not] 'he wished to know: "should I stay or not"' = 'he wished to know whether I would stay/he should stay').

See also: Iranian Languages; Iran: Language Situation; Iran: Scripts, Old Persian, Aramaic, Avestan; Pahlavi; Persian, Old.

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Persian, Old

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Old Persian was the native Iranian language of the Achaemenid Kings (522–330 B.C.), which they employed in their monumental inscriptions and foundation texts. Middle Persian and New Persian (Fārsī) are its direct descendants. Old Persian (OP) and Avestan together represent Old Iranian, that is, the earliest documented period of the Iranian language family, which is characterized by complex inflectional morphology inherited from the Indo-European parent language.

The remains of OP are not extensive, and most of the evidence belongs to the reigns of Darius I (522–486 B.C.) and his son Xerxes (486–465 B.C.). The later Achaemenids continued to compose short inscriptions in the same language, but there are indications that the spoken language was by this time evolving towards the Middle Persian stage. The meagre lexical data supplied by the OP texts is slightly enlarged by loanwords in the Persepolis Elamite Texts, Iranian words recorded by Greek authors, and Persian proper names in both literary and epigraphical sources from many areas of the ancient world.

Most Achaemenid inscriptions are trilingual, and the same text is repeated in Elamite, Akkadian, and OP. A simple form of cuneiform was invented to write OP, probably on the orders of Darius I, who wanted a Persian account of the events surrounding his own accession to accompany the relief and other texts at Mt. Bisitun in Media. There are 36 phonetic signs, including 3 for vowels; also 5 logograms, a set of numerals and a word divider. However, this specially devised writing system, which combines features of an alphabet and a syllabary, renders the language only very imprecisely, and the interpretation of OP relies heavily on Avestan, Sanskrit and later Persian.

From an Indo-European perspective, OP shows the fundamental Indo-Iranian sound changes (IE *$*e,a,o,ṇ,ṃ > a$; $*ē,ā,ō > ā$; IE labiovelars > velars, but palatals before an original front vowel; $*s > š$ after RUKI) and those changes that distinguish all Iranian languages from Indo-Aryan ($*s > h$ except before consonants; deaspiration of Indo-Iranian voiced aspirates; development of voiceless stops to spirants before consonants; dissimilation of dental clusters). Unlike Sanskrit, OP retains the Indo-Iranian diphthongs $*ai$, $*au$ unchanged (OP *daiva-* 'false god', Av. *daēuua-*, Skt. *devá-*). IE $*l$, $*r$ > OP *r*, and $*l̥$, $*r̥$ probably >OP [*ər*], but the spelling is <a-r-> initially, <-r-> medially. Following a consonant $*i̯$, $*u̯$ > OP *iy, uv* (OP *aniya-* 'other', Av. *aṅiia-*, Skt. *anyá-*).

Most notably, OP shows some SW Iranian dialect features. The outcome of the IE palatal stops $*ḱ$, *ǵ, ǵh* is represented by *ϑ, d, d*, probably all pronounced as spirants, in contrast to *s, z, z* in most Iranian

be-vasile-ye 'by means of,' *az ǰāneb-e/ṭaraf-e* 'from the side of,' *be-dast-e* 'at the hand of').

The past continuous can express irrealis conditions (*agar mī-dān-est-am mī-goft-am* 'if CONT-know-PAST-1ST.SING, CONT-tell.PAST-1ST.SING' = 'if I knew, I would tell'; *agar mī-dān-est-am goft-e būd-am* 'if I knew, I would have told'; an alternative expression is *mī-dān-est-am ke mī-goft-am* 'did I know, then I would say').

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See also: Iranian Languages; Iran: Language Situation; Iran: Scripts, Old Persian, Aramaic, Avestan; Pahlavi; Persian, Old.

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Old Persian was the native Iranian language of the Achaemenid Kings (522–330 B.C.), which they employed in their monumental inscriptions and foundation texts. Middle Persian and New Persian (Fārsī) are its direct descendants. Old Persian (OP) and Avestan together represent Old Iranian, that is, the earliest documented period of the Iranian language family, which is characterized by complex inflectional morphology inherited from the Indo-European parent language.

The remains of OP are not extensive, and most of the evidence belongs to the reigns of Darius I (522–486 B.C.) and his son Xerxes (486–465 B.C.). The later Achaemenids continued to compose short inscriptions in the same language, but there are indications that the spoken language was by this time evolving towards the Middle Persian stage. The meagre lexical data supplied by the OP texts is slightly enlarged by loanwords in the Persepolis Elamite Texts, Iranian words recorded by Greek authors, and Persian proper names in both literary and epigraphical sources from many areas of the ancient world.

Most Achaemenid inscriptions are trilingual, and the same text is repeated in Elamite, Akkadian, and OP. A simple form of cuneiform was invented to write OP, probably on the orders of Darius I, who wanted a Persian account of the events surrounding his own accession to accompany the relief and other texts at Mt. Bisitun in Media. There are 36 phonetic signs, including 3 for vowels; also 5 logograms, a set of numerals and a word divider. However, this specially devised writing system, which combines features of an alphabet and a syllabary, renders the language only very imprecisely, and the interpretation of OP relies heavily on Avestan, Sanskrit and later Persian.

From an Indo-European perspective, OP shows the fundamental Indo-Iranian sound changes (IE *$*e,a,o,ṇ,ṃ > a$; $*ē,ā,ō > ā$; IE labiovelars > velars, but palatals before an original front vowel; $*s > š$ after RUKI) and those changes that distinguish all Iranian languages from Indo-Aryan ($*s > h$ except before consonants; deaspiration of Indo-Iranian voiced aspirates; development of voiceless stops to spirants before consonants; dissimilation of dental clusters). Unlike Sanskrit, OP retains the Indo-Iranian diphthongs $*ai$, $*au$ unchanged (OP *daiva-* 'false god', Av. *daēuua-*, Skt. *devá-*). IE $*l$, $*r$ > OP *r*, and $*l̥$, $*r̥$ probably >OP [*ər*], but the spelling is <a-r-> initially, <-r-> medially. Following a consonant $*i̯$, $*u̯$ > OP *iy, uv* (OP *aniya-* 'other', Av. *aṅiia-*, Skt. *anyá-*).

Most notably, OP shows some SW Iranian dialect features. The outcome of the IE palatal stops $*ḱ$, *ǵ, ǵh* is represented by *ϑ, d, d*, probably all pronounced as spirants, in contrast to *s, z, z* in most Iranian

languages (OP *viϑ-* '(royal) household', Av. *vīs-*, Skt.*víś-*; OP *drayah-* 'sea', Av. *zrayah-*, Skt. *jráyas-*; OP *dasta-*'hand', Av. *zasta-*, Skt. *hásta-*). But IE **ḱu̯*, **ǵ(h)u̯* > OP *s, z* (OP *asa-* 'horse', Av. *aspa-*, Skt. *áśva-*), and **ḱn, *ǵ(h)n* > *šn* (OP *baršnā* 'in depth'). A series of changes result in new sibilants. IE **ti̯* > **θy* > *OP šiy (OP hašiya- 'true', Av. haiθiia-, Skt. satyá-); IE *kʷi̯, *ki̯* > **cy* > OP *šiy* (OP *šiyav-* 'to go', Skt. *cyu-*); IE **tr* >**θr* >OP ç (possibly an affricate: OP *puça-* 'son', Av. *puθra-*, Skt. *putrá-*). Also IE **su, su̯* >**hu, hv* > OP *u, uv* (*ubārta-* 'well-borne', Skt. *súbhṛta-*). A number of words found in OP texts do not show the regular SW Iranian development (*vazərka-* 'great', *vīspa-* 'all', *xšāyaθiya-* 'king', etc.). They are traditionally explained as loanwords from 'Median', but this is unverifiable.

Changes in OP final syllables have important consequences for inflectional morphology. Final **-t, -n, -h* are never written (*abara* for both **abarat, *abaran* 'he, they brought', *pārsa* for **pārsah* 'Persia' nom. sg.); but syllables that ended in an original final vowel are treated differently, as both final **-a* and final **-ā* are written with an extra sign <-a>, probably indicating lengthening (*amariyatā* for **amariyata* 'he died'; *pārsā* for **pārsā* instr. sg., and the same spelling for **pārsāt* abl. sg.).

OP nouns, adjectives, and pronouns inflect with three numbers (sg., dual and pl.) and there are three genders (masc., fem., neuter), but the eight inherited cases have been reduced to six. The forms of the Indo-Iranian dative have been lost and its functions taken over everywhere by genitive forms (*-ahyā, -ānām* in thematic stems, the most frequent type of nominal stem in OP). Ablative and instrumental have also merged; their inflections had become identical in the singular of nouns with vowel stems, but the demonstrative pronouns/pronominal adjectives possess a characteristic instrumental singular in *–nā* (*avanā*, 'with/from that'). In feminine *ā*-stems, most of the singular cases have also become formally identical (gen.-dat., instr.-abl., locative, all in *–āyā*). The inflection of other stem-types is only partially attested, but some forms are remarkable (e.g., nom. sg. *pitā* 'father', gen.-dat. sg. *piça* < **pitrah*; from n-stems, acc. sg. *asmānam* 'sky').

The OP verb distinguishes three persons, three numbers; active and middle voices (but passive is expressed by a particular type of present stem in *–ya-* with active endings); and indicative, imperative, subjunctive and optative moods. Its tense system normally consists of a simple opposition between present and preterite forms based on the same stem, continuing inherited present vs. imperfect (*baratiy* 'bears', *abara* 'bore'). Aorists and perfects are only preserved as relic forms, sometimes with a particular function (the sole perfect, *caxriyā*, is a perfect optative with irrealis value). The inherited augment *a-* is prefixed to all verb forms that indicate past time, including two that are formally optatives and indicate a habitual past action (*akunavaya(n)tā* 'they would do', *avājaniyā* 'he used to kill').

A new type of periphrastic past is built by means of the inherited past participle passive. It is intransitive (*paraitā* 'they went off') or passive (*haya idā kərta* 'which was made here'). The agent is genitive-dative (*manā kərtam* 'done by me' = 'I did / have done'; *tayamaiy piça kərtam āha* 'what had been done by my father'). This construction is the ancestor of the Middle Persian past tense (*man kard* 'I did') and that of most New Iranian languages. The ppp. was also used in a construction with finite forms from root *kar-* 'to do, to make', which developed a potential value (*yātā kərtam akunavam* literally 'until I did it done' = 'until I succeeded in doing it') and corresponds to the potentialis in Sogdian and Khotanese. The OP infinitive in *–tanaiy* is unparalleled elsewhere in IE, but is continued by the later Persian infinitive in *-tan/-dan*.

OP has a relative pronoun *haya-/taya-* that originated from a combination of the IE demonstrative **so, sā, tod* and the IE relative stem **yo-*, which were employed in correlative clauses in Indo-Iranian. In addition, this pronoun is used to connect qualifiers in a manner that prefigures the Persian ezafe (*Gaumāta haya maguš* 'Gaumāta the Magian'). The inscriptions (particularly Bisitun) also abound in paratactic constructions of the type: *vašnā Auramazdāha Tigrām viyatarayāmā avadā avam kāram tayam Nadi(n)tabairahyā ajanam vasiy Āçiydiyahya māhyā XXVI raucabiš ϑakatā āha avaϑā hamaranam akumā* 'By the will of Auramazdā we crossed the Tigris, there I defeated utterly that army of Nidintu-Bēl, of the month Āçiyādiya 26 days were passed, then we made battle'.

See also: Akkadian; Avestan; Elamite; Indo–European Languages; Indo–Iranian; Iranian Languages; Pahlavi; Persian, Modern; Sanskrit.

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Personal Names

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Roman Names

Ancient Roman names consisted of three elements: the *praenomen* (given name), the *nomen* (the family name), and the *cognomen* (nickname). Cognomina were generally acquired in adulthood or early youth, often on the basis of some exploit or physical characteristic. In some families, the cognomen itself became hereditary. Typical examples of cognomina are *Cicero* 'chickpea', *Plautus* 'flat-footed', and *Africanus* 'of Africa' (this cognomina was acquired by the Roman general Publius Cornelius Scipio on account of his victories in North Africa). These Roman names had a considerable influence on the subsequent naming systems of Italy and other Romance-speaking countries.

Emergence of the Binomial System

Most people in the modern world bear a name consisting of two main parts – a given name (or names) and a surname. So strong and widespread is this binomial system that personal naming systems in cultures where it is not indigenous are nevertheless tending to adapt themselves to it. A typical surname is inherited from the parents, whereas the given name is chosen by them. Various conventions govern the use of both kinds of name. This modern binomial system arose in Europe during the late Middle Ages and is associated with the rise of a feudal bureaucracy, but it has now spread far beyond the boundaries of Europe.

In Europe itself, the system of hereditary surnames, discussed below, generally replaced an older patronymic naming system, in which an individual was known by a forename plus a given name identifying his or her father (which, in the case of women in patriarchal societies, was generally replaced on marriage by the given name of the husband). In the patronymic system, an individual was often expected to know not only his or her father's name but also the entire genealogy stretching back for several generations. A typical example is an individual in 18th-century Anglesey, Wales, who gave his name as *David ap William ap David Lloyd ap Thomas ap Dafydd ap Gwilym ap Dafydd Ieuan ap Howel, ap Cynfrig ap Iorwerth Fychan ap Iorwerth ap Grono ap Tegerin.* This genealogical name contains a mixture of English and Welsh forms (*David, Dafydd*), occasional distinguishing double names (*David Lloyd, Dafydd Ieuan*), and epithets (*Fychan*, lenited form of *bychan* 'little'). Such a genealogical name, although no doubt valuable for such purposes as establishing inheritance rights in a society in which written documents were few, is self-evidently cumbersome for most practical purposes. It is therefore not surprising that it was replaced by the more streamlined system that is now used.

Patronymic systems were the norm in medieval Germanic and Slavic languages. In most parts of Europe, they were replaced by systems based on hereditary surnames between the 11th and 14th centuries, but survived as the norm in Scandinavia, Wales, and Ashkenazic Jewish communities well into the 19th century. This system is still used in Iceland, where hereditary surnames are still not established. Instead, an individual is known by a given name and a patronymic; for example, *Steinn Sigurðsson*. Given names often alternate from generation to generation, so the latter's father is quite likely to have been called *Sigurð Steinsson*. His sister Ragnhild is *Ragnhild Sigurðsdottir* 'daughter of Sigurth.'

In Ireland and the Highlands and islands of Scotland, the ancient Gaelic clan system made for an easy transition to the hereditary surname system.

Many modern surnames represent patronymics that became frozen at some particular point in time; for example, *MacDermott* 'son of Dermot' in Gaelic; *Powell*, Welsh *ap Hywell*, 'son of Hywel'; and English *Wilson, Williams*, *Williamson, Wills, Wilks, Wilkins, Wilkinson*, all originating as 'son of Will or William.'

Forenames

A forename (also called given name) is bestowed on a child by the parents, by a priest or other religious or social figure, or by a tribal group or clan. (The terms 'forename' and 'given name' are synonyms, but the latter emphasizes the role of parental choice in name giving.) Typically, the name is bestowed in a naming ceremony, for example Christian baptism. Naming practices are discussed in some detail in Alford (1988). In secular societies, registration at a registry office has taken the place of a religious ceremony. In European languages, the inventory of standard given names comprises a relatively small set of extremely ancient traditional items, the etymology of which may be lost or not widely known. Thus, the etymology of names such as *Elizabeth, Anne, Mary, Jane, William, Robert, Edward, David,* and *Matthew*, all of which are used throughout the English-speaking world and beyond (and all of which have cognate forms in

most European languages), is known only to a few specialists and enthusiasts. The 'meaning' of such a name rarely constitutes a component in the reasons for choosing it.

In other cases, vocabulary words are chosen as names with full cognizance of the word's meaning. The 17th-century vogue among Puritans for girls' names denoting virtues and other qualities (e.g., *Patience, Prudence, Charity, Endurance, Silence*) is an English example. Many Chinese and Arabic names are semantically transparent, and this seems to be the norm throughout Africa. Herbert (1999) commented, "There is, of course, enormous diversity – onomastic and otherwise – on the African continent, but one good generalization is that African names have meaning, i.e. the relationship between the name and its lexical meaning is typically a transparent one, at least in terms of translating the name into a European language." The hedge in the last sentence is important: Gardner (1999) wrote of a girl who was named *Mobelong,* which means 'secret' in Setswana (Tswana). It is not immediately obvious why someone should be called 'secret.' The explanation given by the bearer's family was that it was a precaution, for "through witchcraft they might kill her or do her harm." Apotropaic naming of this kind is found in other societies; for example Yiddish *Keim*, based on Hebrew *qayom* 'tough', 'enduring', was given to a sickly child as an encouragement for survival. More transparent examples of Setswana names mentioned by Gardner include *Sennye* 'tiny', *Selelo* 'cry over something' (because the child's father died before she was born; cf. the Latin name *Posthumus*), and *Mpho* 'gift' (not so very different from Greek *Theodoros* and Slavic *Bogdan*, both of which mean 'gift of God').

An individual may also bear one or more middle names, which are additional given names. A middle name may also be the surname of another family with which the parents have close ties – for example, the mother's surname before marriage – or that they wish to commemorate. Middle names are sometimes the half-way stage through which surnames enter the given-name stock.

The main parameters governing name-giving throughout the world can be summarized cross-culturally as follows:

- **Semantic transparency:** A vocabulary word may be chosen as a name because of its meaning, although in many cases the particular application or circumstances may be highly particular. This category includes anecdotal names (e.g., Zulu *Boshiwe* 'arrested' (because his father was under arrest when he was born)), apotropaic names (to ward off evil), and omen names (to encourage success or good qualities). Gardner (1999) also mentioned examples of English words used as names in Botswana, such as *Queen, Story, Comet, Jolly, Wires, Shakes*, and even *Hey* and *You*.
- **Family continuity:** In many places, it is customary to name a child after an older family member or other revered older person. In some societies this is quite strictly regulated. Thus, according to Herbert (1999), in traditional Sotho-Tswana groups, an eldest son is expected to name his first son after his father and his first daughter after his mother; then a second son is named after the wife's father and a second daughter after the wife's mother, and so on. Among Hindus, according to Krishnamurthy (1990), the motivation for naming a child after a forebear, especially a grandparent, is often the belief in reincarnation: "the children are their ancestors reborn." Thus, the honoring of a family member is allied to a religious belief as a motivating factor.
- **Religion:** The most enduring factor in name giving is probably religion. Among Muslims, the most favored names typically honor the Prophet Muhammad himself, along with his family and his immediate successors. Among Christian Arabs, the names *Isa* 'Jesus' and *Fādī* 'redeemer' (compare Italian *Salvatore*) are popular, as are Arabic forms of the names of the apostles (e.g., *Boutros* 'Peter') and certain Old Testament prophets (e.g., *Ibrāhīm* 'Abraham', *Mūsā* 'Moses'). These Christian Arabic names are not exclusively Christian; in fact, they are also used among Muslims. (It must be remembered that Islam recognizes Jesus as a prophet.) Hindu given names often contain the names of gods as components (e.g., *Krishna, Shiva, Ram(a), Vishnu*, either standing alone or more commonly in compounds, such as *Ramachandra, Ramakrishna, Ramgopal)*. Among Roman Catholics, given names often honor a saint, especially a local saint, whereas Orthodox Christians use a different but overlapping set of saints' names, including many who are revered only in the Eastern Church.
- **Sociocultural factors:** The perennial popularity of *William, Elizabeth,* and *Edward* as English forenames is largely due to the fact that these are the names of famous and much admired monarchs, and many English names are chosen on the grounds that they are 'aristocratic.' For example, *Dudley* became widespread as a given name not because of the town of that name, but because it was the surname of Queen Elizabeth I's glamorous favorite, Robert Dudley, earl of Leicester (?1532–1588). In southern Africa, *Sobhuza* has been chosen in honor of King Sobhuza II, the enlightened ruler of Swaziland for over 60 years (1921–1982). At the other end of the sociocultural scale, children are often named after

folk heroes, such as pop stars (e.g., *Elvis*), film stars, actors, and fictional characters not only from novels but also from soap operas (e.g. *Charlene,* from the Australian soap opera *Neighbours*).

• **Euphony:** A name is very often chosen by English speakers and others on the grounds that 'it sounds nice.' This is commonly given as a reason for choosing even a traditional name, but in the United States, especially among African-Americans, creativeness in naming is also highly fashionable. Names such as *Condoleezza* are expected to sound appropriate, not to mean something. Created names of this kind rely on the phonology of the language, in this case English. Certain syllables are widely accepted as euphonic; for example, the opening syllables *La-* and *Sha-* for girls' names and the ending *-on* for boys' names.

Traditional Given Names in European Languages

In all European languages, the set of forenames in conventional use is remarkably small. In countries where there is an established Christian Church, the menu of forenames from which a name may be chosen is generally regulated by the Church or by a secular authority operating within a Christian cultural tradition. These are names with some Christian association (i.e., a name that was borne by a figure mentioned in the New Testament, an early saint, or a saint with a local cult). The main sources for such forenames are the following:

• **The Bible (New Testament):** Names such as *Matthew, Mark, Luke, John, Paul,* and *Mary* have cognates in every European language, with many derivative and hypocoristic forms, which have given rise to countless thousands of surnames. Mention should also be made here of the Hispanic tradition of Marian names, according to which an attribute of the Virgin Mary may constitute a female given name, even if the noun in question is masculine in grammatical gender. Such names include *Pilar, Remedios,* and *Dolores.*

• **The Bible (Old Testament):** Old Testament names are, of course, of Hebrew etymology, and many of them are used traditionally as Jewish names. In their vernacular European forms, names such as *Job, Ezekiel, Ebenezer, Zillah,* and *Mehitabel* have been used by Christian fundamentalists (Puritans, Dissenters) since the 16th century. These names are not used by mainstream groups such as Roman Catholics or High-Church Anglicans, except in cases where an Old Testament name had also been borne by an early Christian saint (e.g., *David, Daniel).* Some Old Testament names, especially female names, such as *Deborah* and *Rebecca,* have become very popular among Protestants, partly because the stock of New Testament female names is very small indeed.

• **Early Christian saints:** Some saints' names are very widespread (e.g., *Anthony, Francis, Martin, Bernard*) and are borne by Roman Catholics, Protestants, and agnostics alike. Others, such as *Teresa, Dominic, Ignatius,* and *Aloysius,* are borne mainly or exclusively by Roman Catholics. Among Roman Catholics in continental Europe, a traditional given name is often chosen in honor of a saint who is the patron of the locality in which the child is born. For example, the Italian forename *Gennaro* is associated chiefly with Naples, Italy, and its patron, San Gennaro, a bishop beheaded at Pozzuoli during the persecution of Christians in 304 A.D. *Leocadia* is associated with Toledo, Spain and its patron saint, who was a virgin martyr who met a similar fate in or about the same year and in whose honor the male form *Leocadio* is also used.

• **Ancient Continental Germanic:** Some very familiar names, such as *William, Robert, Richard, Roger, Geoffrey, Guy, Hugh, Arnold, Baldwin, Millicent, Alice, Gertrude, Jocelyn, Hilda,* and *Matilda* – all of which have well-established cognates in German, Dutch, French, and other languages – originated in Germanic pre-history. They reached English by a circuitous route. The official language of the court of the Merovingian and Carolingian Franks (5th–9th centuries) was Latin, but their vernacular language was a Germanic dialect, and their personal names were mostly of Germanic etymology. These Frankish personal names became established in medieval France and in due course were picked up by the Vikings who settled in Normandy in the 9th century. After the Norman invasion of England in 1066, these personal names were brought to England, where they largely replaced traditional Anglo-Saxon personal names such as *Ethelred* and *Athelthryth*. A very few Anglo-Saxon personal names survived, for example *Edward,* which was borne by King Edward the Confessor (*c.* 1002–1066; ruled 1042–1066), the offspring of an Anglo-Saxon father and a Norman mother, who was revered by Anglo-Saxons and Normans alike. A rather different case is that of *Alfred*, an Anglo-Saxon name that fell out of use under the Normans, but was revived in the 19th century in honor of the great 9th-century king of Wessex.

• **Old Norse:** Old Norse is, of course, a Germanic language, but its naming tradition is quite different from that of continental Germanic, and many traditional Norse names are still used in Scandinavia today, for example *Olaf, Harald, Håkon*. There has been much borrowing from German (e.g., *Helga, Ingeborg*). Some Nordic names such as *Ingrid* have been adopted much more widely. In the latter case,

the film star Ingrid Bergman (1915–1982) was a powerful influence.

- **Ancient Celtic languages:** In the British Isles and hence elsewhere in the English-speaking world, many given names in current use are of Celtic origin (either Gaelic or Welsh). In all Celtic communities, there is a current trend for people with Celtic ancestry to choose given names from their ancestral language for their children, even if they do not speak it. There are several distinct strands here.

Some names of Gaelic origin, like *Bridget*, *Deirdre, Brian,* and *Kevin,* are well established as 'English' names. Others are in transition; for example, *Fionnuala, Siobhan,* and *Sean* are felt to be typically Irish, but are increasingly adopted by English-speaking parents seeking a distinctive name for a child. Some other Gaelic names are still highly distinctive; for example, the female name *Caoimhe* 'gentle' is sometimes found in an anglicized form as *Keeva,* but is pretty well exclusively borne by Irish people. The male name *Naoise* (pronounced /'ni:šə/) has been equally slow to catch on outside Irish communities, even though in Irish legend it is inseparable from the female name *Deirdre,* which is widely used among non-Irish people. No doubt, this is partly because the form of *Naoise* is intractable for English spelling-to-sound rules: English speakers do not know how to pronounce it.

Fiona and *Duncan* are example of Scottish names that have contributed to the stock of general English forenames. The fashion for Scottish Gaelic given names in Scotland in the 20th century worked in reverse too; i.e. there was an increase in popularity of Gaelic forms of common European Christian names – for example, *Artair* (Arthur), *Dàibhidh* (David), *Ealasaid* (Elizabeth), *Eilidh* (Helen), *Iseabail* (Isobel), *Liùsaidh* (Lucy), *Seonag* (Joan), and *Seònaid* (Janet). Many common Scottish Gaelic names are found in both a Gaelic and an Anglicized form (e.g., *Donnchadh/Duncan, Iain/Ian, Alasdair/Alistair*).

Traditional Welsh given names are completely distinct from Irish and Scottish names. Names such as *Llewelyn, Lleu, Blodwen,* and *Branwen* are very popular among people with Welsh ancestry, and other names of Welsh origin, such as *Gwyneth, Gareth,* and *Dylan,* have been adopted into the general stock of English names.

Names such as *Arthur, Guinevere, Lancelot, Gavin (Gawain), Geraint,* and *Enid*, likewise of Welsh origin, owe their popularity to a great extent to the 19th-century vogue for Arthurian legend. In form they have been mediated through Old French and Middle English Arthurian romances, in some cases to the extent that the original form of the name is no longer recoverable.

The names *Fingal, Fiona, Malvina*, and *Oscar* owe their popularity largely to the Ossian poems of James MacPherson (1760). They are popular in France and Sweden, as well as Scotland, largely because Napoleon was an admirer of the Ossian poems and transmitted his enthusiasm to Marshal Bernadotte, the French general who eventually became King Charles XIV of Sweden and had a son named Oscar.

- **Ancient Slavic languages:** Names such as *Wojciech (Vojtěch), Bogusław (Bohuslav),* and *Stanisław* (*Stanislav*) are hardly known in the English-speaking world except among Slavic immigrants, but represent a vital and independent Slavic tradition, with cognates in various Slavic languages. Many such names are pre-Christian, whereas others have been sanctified by use as a saint's name. Except where a saint has been involved, these names are not much used in Russia, because there the Orthodox Church has long insisted on using names associated with Christian saints, such as *Fyodor* (Theodore) and *Dmitri*. These are mostly of Greek etymology. Among the Western Slavs (Poles, Czechs, Slovaks) and Southern Slavs (Serbs, Croatians, Slovenians, Bulgarians, etc.), each linguistic community of Slavic speakers has its own characteristic set of traditional given names, most of which are of Slavic etymology.
- **Feminization:** The stock of conventional female given names has been augmented in many languages by feminization of masculine names. For example, the English female names *Joan, Jean, Jane,* and *Janet* all originated as feminizations of the New Testament male name *Johannes* (English vernacular *John*). This process is illuminatingly discussed in Hough (2000).
- **Flowers and gems:** Finally, mention must be made of the large number of female names, especially in the English-speaking world, that were adopted in the late 19th and early 20th century from vocabulary words denoting flowers (*Marigold, Daisy, Pansy*) and gemstones (*Beryl, Ruby, Pearl*).

A standard reference work surveying forenames in European languages (with Dutch as the focal language) is Van der Schaar (1964, 1992). Studies of European forenames with English as the focal language include Hanks and Hodges (1990, 2001) and Pickering (1999). These works reflect the decline of religious influence on name giving in the English-speaking world. A traditional scholarly account of English forenames compiled at a time (the first edition appeared in 1945) when cultural and religious homogeneity could still be assumed is Withycombe (1976).

Forenames and Cultural Loyalty

In North America the choice of a forename is not regulated, but conventional names are used alongside

more adventurous name coining. In some families, second- and third-generation Americans bear forenames in European and other languages in honor of their immigrant ancestors, even in cases where they do not speak the language. Cultural loyalties are slow to die. Thus, second- and third-generation Americans of Swedish origin are found bearing distinctively Swedish names, such as *Lars* and *Stig*. Irish-Americans are named *Declan* or *Finn*, though they may never acquire more than a word or two of the Irish Gaelic language from which these names are derived. Polish Americans are named *Zbigniew* or *Malgorzata* out of cultural respect for their immigrant ancestors, regardless of the challenge presented by the pronunciation of these names for English-speaking Americans. More often, parents try to find an English form of a name that corresponds or seems to correspond to a name in the ancestral language. Hanks and Tucker (2000) discovered a statistically significant association between forenames such as *Frank* or *Anthony* and Italian surnames in the United States, no doubt because of the clear cognate relationship with *Franco* and *Antonio*. *Stanley* is favored even more significantly by Polish-Americans, no doubt as a result of the erroneous belief that it is a cognate of the Polish forename *Stanisław*.

Nontraditional Forenames

In English-speaking countries such as Britain, choice of a forename is not regulated by the Church, but local registrars can and do advise strongly against the choice of outrageous or frivolous names; for example, a string of 11 forenames commemorating the surnames of all the members of a victorious football team or the punning choice of *Brick* and *Stone* as given names for twins by a Mr and Mrs *Wall*. In rare cases, parents defy the registrar's advice. A more common source of unusual forenames is the desire to commemorate the surname of some other family with which the individual is connected, which is often but not always the mother's maiden name. In some cases, the stock of conventional given names has been augmented in this way. For example, *Shirley, Dudley,* and *Douglas* were originally surnames, but are now also conventionally used as forenames. *Shirley* is a case that illustrates the influence of popular and literary culture. Originally a male given name until the mid-19th century, it changed gender and greatly increased in popularity as a direct result of its choice by Charlotte Bronte for the eponymous heroine of her 1849 novel.

As already mentioned, a noticeable trend, especially among African-Americans, is the creation by parents of a unique forename for a child (i.e., one that is invented on euphonic principles from the basic phonology of the language). The euphonic principles are, however, conventional, so that it seems very likely that in some cases the same 'unique' name has been unwittingly created independently by several different parents.

Among American Spanish speakers, masculinization of names that are conventionally female is a noticeable trend, so that alongside *Diana* we find the male name *Diano* and alongside *Clara, Claro*. Such altered forms are usually associated with the cult of a female saint.

Surnames

Historically, the development of surnames is a European phenomenon, although there were comparable developments in some naming systems elsewhere. Common patterns may be discerned in the history of surnames in the languages of Europe. All individuals in Europe (except in Iceland) now bear a surname or family name. Traditionally, this name is inherited from the father, although inheritance of the mother's surname is now more common than in the past. There is also an increasing fashion in many languages for using the surname of both parents as a hyphenated name (e.g., *Radzimińska-Kaźmierczak*). In Spain and some other Spanish-speaking countries, the mother's maiden name has long been conventionally placed after the father's surname (e.g., if someone is called *Juan López Castro*, it can be inferred that his mother's maiden name is *Castro)*. In Hungarian, the surname is conventionally placed before rather than after the given name.

The rise of hereditary family names took place simultaneously in many parts of Europe in the late Middle Ages (11th–13th centuries) and was associated with the development of bureaucracies, both secular (medieval tax collectors were seemingly as keen as their modern counterparts to identify taxpayers precisely) and religious (the Council of Trent, 1545–1563, decreed that every pastor of the Roman Catholic Church must keep a record of baptisms, marriages, and deaths in the parish for which he was responsible). The main types of surnames in European languages are as follows:

- Surnames derived from the forename or status of a relative.

Patronymics: Among the most common family names in all the languages of Europe are those derived from an ancestor's personal name. Some are themselves derivatives of ancient clan names (e.g., *MacDonald*). The most common patronymic surnames are polygenetic; that is, the name was coined independently in several different locations. The

range of affixes with a patronymic function is quite large. Some are prefixes (Gaelic *mac*, Welsh *ap, ab*), but the majority are suffixes (e.g., south Midland English *-s*, northern English and Scottish *-son,* Danish/Norwegian *-sen*, Swedish *-son*, Polish *-wicz*, Serbian and Croatian *-vić*, Romanian *-esco*, Russian and Bulgarian *-ov)*. In some languages, including English, surnames are also found that consist of a personal names without a suffix, as in the case of Augustus John, where *John* is the surname. There is some question as to whether patronymics with the suffix *-s* are always patronymic. The signification may be no more than 'belonging to the household of X.' Many patronymic surnames are derived from medieval hypocoristic forms; for example, *Hobbs, Hobson* and *Dobbs, Dobson*, based on vernacular forms of the baptismal name *Robert*.

Metronymics: Much less common than patronymics are names derived from a female forename. In European Christian society, it was the given name of the male head of the household that was normally handed on to successive generations. The few cases of surnames derived from female names (e.g., *Marguerite, Leece, Dyott*) are probably derived from the names of women who were either powerful and influential widows or else heiresses in their own right.

Kinship names: A few surnames derive from connection by marriage (e.g., English *Hickmott* 'Richard's in-law'), or family relationship (e.g., English *Neve, Neave, Neff* 'nephew' or 'cousin', *Maw* 'relative' or 'brother-in-law', *Eames* 'uncle', *Ayer* 'heir'; German *Vetter* 'kinsman'). Presumably, the original bearers of such names were related to the most important person in the district.

Foundling names: Surnames bestowed on foundlings in the days when legitimacy mattered include Dutch *Weese* and Polish *Serota* (both meaning 'orphan'); French *Jetté* (literally, 'thrown out'); Italian *Esposito* (meaning 'exposed'), *Innocenti* ('innocent'), *Comunale* (like English *Parrish*, a name for a child reared at the expense of the community), *D'Amore* (literally, 'of love'), and *Di Dio* (literally 'of God'); and German *Kegel* (literally 'skittle pin'). Some surnames based on Christian saints' names are undoubtedly of this origin, being taken from the name of the patron saint of the local church where the baby was abandoned or that ran the local orphanage; however, these are indistinguishable from names of patronymic origin.

- Names derived from a locality:

Topographic names are derived from a descriptive reference to a feature of the landscape such as a stream, a ford, a tree, or a hill. They can also refer to a river by its name or to a man-made feature, such as a castle, a city wall, an abbey, or a church.

Habitational names are taken from the names of towns, villages, farmsteads, or other habitations, many of which existed long before surnames came into being. Such names include those derived from the names of individual houses with signs on them (where the surname is also the word for the sign; for example, *Swan, Bell*). Other kinds of local surnames may refer to counties, regions, the names of islands, and indeed whole countries.

Regional and ethnic names tended to be acquired when someone migrated a considerable distance from his original home, so that a more specific habitational name would have been meaningless to his new neighbors; he would be known simply as coming 'from the East' or 'from Devon' or 'from France.' Some of these names derive from adjectival forms (e.g., *French, Dench* 'Danish', *Walsh* 'Welsh'); others are in the form of nouns denoting a person's nationality (e.g., *Fleming* 'from Flanders', *Langlois* 'the Englishman', *Moravec* 'the Moravian').

- Names derived from an occupation or role in society:

Occupational names refer to the trade or occupation that was followed by the first bearer. European surnames contain a virtual inventory of the trades of medieval Europe. These occupations can be divided into classes, such as agricultural (e.g., *Sheppard, Bouvier*), manufacturing (e.g., *Smith, Wright, Glover*), and retail (e.g., *Monger, Chandler, Draper*). Some occupational names refer to the activity involved (e.g., *Hunt, Webb*) and are derived often from an agent noun (e.g., *Hunter, Webber, Weaver, Webster, Potter*). Others are derived from a noun plus an agent noun (e.g., *Ledbetter* 'lead beater', *Rademaker* 'wheel maker').

Metonymic occupational names refer to an occupation by metonymy, naming an object associated with the activity in question, typically a tool – for example, *Axe, Pick, Swingle* (an implement for beating flax), Polish *Szydlo* 'awl' – or a product (e.g., German *Brott* 'bread'). In other cases the connection is less direct, for example Italian *Daino* 'fallow deer', denoting a deer hunter.

Occupational nicknames may also refer to a typical event involved in the occupation of the person concerned, sometimes in a humorous way (e.g., *Catchpole* for a bailiff).

Status names originated with reference to social status, denoting a particular role in medieval society, such as *Bachelor, Franklin, Knight*, and *Squire*. Other status names, such as *Alderman, Beadle, Sherriff*, and *Reeve*, denoted a particular administrative function. Some status names cannot be understood without reference to the feudal system of land tenure and social structure. In Czech, for example, *Svoboda*

literally means 'free', but in particular denoted a category of free peasant farmer as distinct from a serf. *Dvořák* denoted a superior class of farmer, the lord of the manor. A *Sedlák* was a slightly lower class of farmer, but who had more land than a *Zahradník,* a smallholder, or a *Chalupník*, a cottager. Similar traces of older social hierarchies are preserved in the surnames of many other European languages.

Servant names derive from status as a servant or member of the household of some person of higher social status. Many names that are ostensibly status names (e.g., *King, Prince, Duke, Earl, Squire, Bishop, Abbott, Prior*) are more likely to have been either servant names or nicknames. In other cases, such a name may have been acquired as an 'incident name' by someone who had acted such a role in a pageant or other festivities, or else the name may have been given mockingly to someone who behaved in a lordly manner. Because servants tended to be known either by the surname or by the social role of their master, it is impossible to determine whether someone now called *Squire* is descended from a squire or from the servant of a squire – or, indeed, whether the name is a nickname. Occasionally, the servant relationship is made explicit; for example, by use of the genitive case or by a suffix, such as English-*man* (e.g., *Bates* 'of Bartholomew' is ambiguous, but *Bateman* 'Bartholomew's man' is not). More often, however, servant relationships are implicit, rather than being explicit in surname-forming elements.

- Surnames from nicknames:

Descriptive nicknames: The most typical descriptive nicknames refer to some aspect of the physical appearance of the person concerned (e.g., *Black, Blake, Schwarz, Russell, Whitehead,* all referring to hair color). Others refer to a person's character (e.g., Spanish *Cortés* and English *Hendy*, both meaning 'courteous' or 'kind', German *Karg* 'sly' and *Kluge* 'refined' or 'clever'). Other names make reference to a favored article or style of clothing (e.g., *Boot, Cape*). People in past ages were less mealy-mouthed than we are today, so it comes as a surprise to many that the origin of their surname may have drawn attention to a physical deformity; for example, names meaning 'lame' include English *Halt*, German *Lahm*, Dutch *Mank*, Polish and Czech *Chromy*, Italian *Ciotto, Zoppo*, and Lithuanian *Kulys*. Names such as German *Hand* 'hand' and *Daum* 'thumb' may be presumed to allude to a deformity. Names referring to a speech defect or stammer include Irish *Balfe* and Spanish *Bobo*. Names may also have been obscene. It is quite possible that the surnames *Shakespeare* and *Wagstaff* originated as bawdy nicknames.

Bird and animal names: Surnames derived from the names of animals and birds mostly originated as nicknames, from the attributes traditionally assigned to these creatures in folk culture. These associations were reinforced by folk tales featuring animals behaving like humans. The nickname *Fox* (Danish *Foss*, German *Fuchs*, French *Goupil*, Polish and Czech *Lis*, etc.) would thus be given to a cunning person, *Lamb* to a gentle and inoffensive one, and so on.

Anecdotal surnames: Some surnames arose as the result of some otherwise unrecorded and now irrecoverable incident. Probable examples include English *Followell* 'fall in the well', *Toplady* and *Tiplady*, Italian *Mezzanotte* 'midnight'. Who topped or tipped the lady, and what action precisely did it involve? Who did what at midnight, and did he do it habitually, or just once? We shall never know. Only the names survive, to tantalize subsequent generations. An interesting group of anecdotal surnames in Czech are derivatives of the past participle of a verb. Examples include *Doležal*, a nickname for a lazy man meaning something like 'laid back', *Doskočil*, denoting an agile man, literally 'leapt about', *Kratochvíl* 'had a good time', *Kasal* 'bullied', and *Kvapil* 'rushed.'

Seasonal surnames: It has been suggested that at least some of the surnames that refer to a season (e.g., English *Winter, Summer*; German *Lenz*, *Herbst*), a month (e.g., English *May*; French *Davout* 'August'), or day of the week (e.g., German *Freitag* 'Friday') refer to the date of a person's birth, baptism, or conversion. Surnames denoting a Christian festival (e.g., *Christmas*; or French *Toussaint* 'all saints' and its Italian equivalent *Ognisanti*) were most likely acquired in this way. However, seasonal names may also have been nicknames denoting a 'frosty' or 'sunny' character, and it is possible that day names may have referred to feudal service owed on a particular day of the week.

- Humanistic names:

During the Renaissance, especially in Dutch- and German-speaking areas, Latinized forms of Germanic surnames were sometimes adopted. In some cases, the alteration consisted of nothing more than adding the Latin *-(i)us* noun ending to an existing name (e.g., Dutch *Bogardus*, based on *Bogard* 'orchard', or *Goetschius*, from German *Goetsch,* a pet form of *Gottfried*. In other cases, especially with occupational names, the whole surname was translated into Latin: *Agricola* is a translation of Dutch *Boer* and German *Bauer* 'farmer'; *Faber* is a translation of German *Schmidt* and Dutch *Smit* 'smith'; *Silvius* 'of the woods' represents a vernacular name such as Dutch *Van den Bosch* or German *Forster*. The humanistic pattern of forming Latinized surnames was subsequently copied in Sweden in the 18th and 19th centuries.

- Diminutives, augmentatives, and pejoratives:

Diminutives are surnames formed with an affectionate suffix, attached either to a vocabulary word (e.g., Czech *Bajorek* 'little marsh dweller', Italian *Abello* 'little bee') or to a personal name or nickname (e.g., Polish *Bolek*, a diminutive of *Boles{l-}aw*, English *Jess* and *Jessel* from *Joseph*). Diminutives are common in all languages, but particularly so in Italian, Czech, and Polish.

Augmentatives and **pejoratives** are much rarer. Whereas diminutives mean 'little' and are often affectionate, augmentatives mean 'big'. A typical augmentative ending is Italian *-one*, as in Italian *Iacovone* 'big Jim', or *Colone* 'big Nick.' Pejoratives are formed with an ending that originally had an insulting force. A typical pejorative is French *Becard,* a nickname for a gossip, from a pejorative derivative of *bec* 'beak.'

These different categories of surname types differ greatly from area to area both in terms of the number of names in each category and the number of bearers of each name. For example, occupational names are comparatively few in number in each language, but many of them (e.g., *Smith, Baker, Miller, Wright*, and their cognates and equivalents in other languages) have very large numbers of bearers. Every medieval European community had its smith and its baker. By contrast, in those languages in which surnames are derived from places, there are very large numbers of habitational surnames, each (typically) with quite a small number of bearers. Very large numbers of German surnames are of habitational origin, and most of them do not have very many bearers. Exceptions (e.g. German *Damrow,* English and Scottish *Milton*) are evidence of comparatively high frequency of the place name itself, rather than of multiple derivation from the same place. There are no names of habitational origin in Irish or Scottish Gaelic, where most surnames are patronymic in form, being derived either from a given name or from a nickname, or much more rarely from an occupational or status name. Much the same is true of Russian and South Slavic surnames. By contrast, very many Polish surnames are of habitational origin, to the extent that the *-ski* and *-owski* endings that are characteristic of Polish habitational names and that were often taken as indicative of gentry status have been appended willy-nilly to some nonhabitational names. Scotland has a higher proportion of occupational and habitational (but not topographic) surnames than neighboring England (see Hough, 2003).

The foregoing classification is based on that in the *Dictionary of American family names* (Hanks, 2003). As the U.S. population is very largely an immigrant population, this dictionary is in effect a survey of common surnames – along with many uncommon surnames – in all the languages of the world. Bibliographies of standard reference works on surnames in the world's major languages are given with each of the 23 introductory articles in its first volume. Hanks (2005) recently surveyed the main linguistic changes (including folk etymology and the effects of linguistics contact) that affected European surnames in North America in the 17th and 18th centuries, resulting in uniquely American surnames, such as *Cashdollar*, based on German *Kirchtaler* 'person from Kirchtal', *Rainwater,* based on German *Reinwasser* 'pure water', and *Conover,* based on Dutch *Couwenhoven*, which is probably from a place name.

Difficulties in Studying Surnames

Surnames are difficult phenomena to study, not only because records are comparatively scanty and written forms of the same name can be very variable but also because, unlike place names, their bearers move around. Certainties are comparatively rare in the world of surname studies. Instead, researchers must, in many cases, be satisfied with a high degree of probability. A handful of examples illustrate the problems of studying surnames.

The first concerns the American surnames *Shumate* and *Delashmet* or *Delashmit*. At first glance, the form of these names may seem puzzling, but in fact we can say with confidence that all three of them are Americanized forms of southern French *De La Chaumette*, which we can etymologize with equal confidence as a topographic name for someone who lived on a *chaumette* (a high, arid plateau with little vegetation). The French surname has the same form as the vocabulary word, and the vocabulary word denotes a topographic feature, so the origin of this name is no more difficult to interpret than English *Ford* or *Hill*. As far as the American form of the name is concerned, confidence is based on painstaking genealogical research, posted on a genealogical web site. There, it is reported that Pierre de la Chaumette (born 1673) came from Rochouard, France, to England in his youth, probably as a Huguenot refugee, and that he moved on to Gloucester, New Jersey, in or before 1698. Surviving documents show that, after settling in North America, he became known as Peter *Delashmet*. It is also recorded that he was joined some years later by his brother, Jean de la Chaumette, who by this time had made a fortune in the French colony of Martinique. On moving to New Jersey, the latter became known as John *Shumate*. The French and various Anglicized forms of this surname coexisted in New Jersey throughout the early 18th century.

The second example concerns the family name *Clinton*. This name too has been well researched, but here there are at least two equally plausible origins. Reaney and Wilson's *Dictionary of English surnames* (1991) records examples of the surname in England (Staffordshire, Northamptonshire, and Essex) from the 12th, 13th, and 15th centuries and attributes its origin to the place name *Glinton* in Northamptonshire. However, this attribution is probable rather than certain. Furthermore, Reaney and Wilson do not note that Clinton is also an Irish name. MacLysaght (1957) traces *MacClinton* to the Irish Gaelic name *Mac Giolla Fhionntáin* 'son of the devotee of (St.) Fintan', which is associated with West Ulster. However, he also mentions the Irish form *de Cliontún*, which is an Irish name imported from England, rare now but prominent in medieval Irish records, and comments that "the famous American Clintons were of Clintonstown, Co. Louth." Thus, there is a probability (but not a certainty) that most if not all American Clintons are descended from bearers who came to America from Ireland, but in Ireland their name is most probably of 12th-century Norman English origin, rather than Gaelic. Here, the balance of probabilities at all steps is high, but they are not certainties, and each succeeding step adds an element of uncertainty.

A third example is the English surname *Bixby*. Although this name is well established in East Anglia and looks convincingly like a habitational name from an Anglo-Scandinavian area (where the *-by* ending is common), no place of this name is recorded. The most plausible guess is that the surname may be an altered form, with intrusive *-s-*, of the Lincolnshire placename *Bigby*. This is morphologically and geographically plausible, but is not supported by documentary evidence.

The fourth example is the American family name *Dano*. The 1880 U.S. census shows that this name was already well established in the northern states at that time and also in West Virginia. Its etymology is very uncertain. Hungarian, Slovak, Bulgarian, and French etymologies have been speculatively proposed, and a study of the correlations between present-day American forenames and surnames (Hanks and Tucker, 2000) shows that a sizeable number of Americans bear Hispanic forenames such as *Anastacio, Efren, Loida, Margarita, Pacita, Pedro,* and *Trinidad*. The etymology of the name is an unsolved mystery. Detailed genealogical research remains to be done. A glance at the International Genealogical Index shows several 18th-century examples in Quebec and others in Vermont, in which the surnames have plenty of French influence. If these are confirmed, the etymology may well be French (possibly *Daneau* or *Danot*). However, even if this French etymology is confirmed, there is no guarantee that it accounts for the origin of all bearers of the modern surname. More probably, given the geographical distribution and the correlated forenames, the modern surname represents a coalescence of several surnames that originated in quite different forms in different languages. Cumulatively, there is therefore great uncertainty about this name, which may never be resolved.

Surnames, Geography, Genealogy, and Genetics

The most common surnames – for example, *Smith, Wright, Johnson*, and *Brown* – are 'polygenetic'; that is, they originated separately and independently in many different places at different times. In contrast, many European surnames, including most of the uncommon ones, are 'monogenetic'; that is, all modern bearers are descended in the male line from just one original bearer. Polygenetic surnames are, typically, quite widely scattered throughout a language or dialect area, but monogenetic surnames have a characteristic pattern of frequency distribution, with an epicenter where the surname originated or where an ancestral migrant first arrived, from which widening circles spread outward in patterns of decreasing frequency. Examples are the English surnames *Armitage, Clee, Oxenham, Rockley*, and *Rootham*. This phenomenon was first noted by Guppy (1890), who studied the frequency distribution of farmers' names in the business directories of 19th-century England. The statistical study of surnames distribution is greatly facilitated as more and more collections of censuses and other historical records become available in machine-readable form. Present-day differences in geographical distribution of the various spellings of the surname *Heard* (southwestern English), *Hurd* (Midland), and *Herd* or *Hird* (northern and Scottish) correlate with different medieval English dialect pronunciations of this word, denoting a herdsman. In other cases, different terms for the same occupation were used in different regions in medieval times; they too correlate statistically with the present-day distribution of the surname. For example, *Fuller* (southeastern English) denotes the same occupation (strengthening or 'fulling' cloth by trampling on it in a bed of water and lye) as *Tucker* (southwestern) and *Walker* (northern and Scottish).

The geneticist Bryan Sykes has pointed out that, because male children typically inherit not only their Y chromosome but also their surname from their father, DNA evidence can be adduced for or against the monogenetic hypothesis for any surname. He conducted a survey that showed that the majority of bearers of the surname *Sykes* are descended from a common ancestor (see Sykes and Irven, 2000; Sykes,

2001). Subsequently, in a BBC Radio 4 program broadcast in 2001 (summarized on the BBC website), George Redmonds, the names scholar and local historian, collaborated with Sykes to show how the surname can be traced to a family living in Slaithwaite near Huddersfield in the 15th century, and possibly to 1280, when William del Sykes is recorded as holding land in Flockton, 9 miles east of Slaithwaite. The surname itself is a topographic name derived from a word meaning 'gully.' The combined efforts of Sykes and Redmonds have shown that there is a good probability that most if not all modern bearers of this particular surname derive it from just one particular gully and that the transfer from topographic feature to surname took place in the 13th century.

In many cases, therefore, surnames are best studied statistically by interdisciplinary cooperation. The increasing availability in machine-readable form of both modern and historical population data, such as censuses and electoral rolls, further enables pooling of the expertise of historical linguists, dialectologists, local historians, demographers, geneticists, and genealogists. The best guides available at the time of this writing, showing the way ahead, are Redmonds (1997) and Hey (2000). The opportunities offered have not yet been fully exploited, however. It is to be hoped that there will be many follow-up investigations on a more substantial scale of the initiatives of Hey, Redmonds, and Sykes.

Jewish Personal Names

Jewish names reflect influences of the various local cultures in which Jewish communities arose during the diaspora, but some common features may be observed. An extensive bibliography is by Gold and Singerman (2001). Biblical Hebrew given names are found among Ashkenazim alongside Yiddish names of Germanic and Slavic etymology.

Jewish personal names followed a patronymic system until surnames were forcibly imposed by the bureaucracies of central Europe in the 18th and 19th centuries. Most of the main types of European surnames – patronymics, occupational and status names, nicknames, and habitational names – are all present among Jewish surnames, but some additional characteristics may be noted.

Although many Jewish surnames are patronymics (e.g. *Levinson, Mendelsohn, Rabinowitz*), surnames based on female names are more common among Ashkenazic Jews than among Gentiles (e.g. *Chaikin, Dworkin, Sorkin, Rifkind*) for several reasons: (1) Ashkenazic Jews often used nicknames consisting of a parent's given name plus Yiddish possessive *-s*; thus, a nickname containing the mother's given name could become established as a family name; (2) a man could be known by his spouse's given name plus Yiddish possessive *-s*; and (3) children of deserted mothers (or widows) took family names based on the mother's given name. In connection with (2), there is a class of surnames that seems to exist only among Ashkenazic Jews, indicating explicitly the husband of the woman named; for example, *Esterman* 'Esther's husband.' In other cases, it is impossible to tell whether an Ashkenazic family name belongs in this category or not: *Roseman*, for instance, might be one of these names (based on the Yiddish female given name *Royze, Rose*) or it might be merely an ornamental name. *Perlman* could be one of these names (cf. the Yiddish female given name *Perl, Pearl*); alternatively, it might be an ornamental name, or it might denote someone who dealt in pearls (though this last possibility is the least likely because the relatively high frequency of the name is at odds with the small number of Ashkenazic Jews who dealt in pearls).

A large class of Jewish names are of ornamental origin. When surnames became compulsory in the 18th and 19th centuries, people selected a pleasant-sounding name in the official language of the locality – in most places, German or Russian. Very often, the vocabulary words selected denoted plants – *baum* 'tree', *blum* 'flower' – or features of the landscape – *berg* 'mountain', *stein* 'stone or rock', *feld* 'field' – many of which could also be place-name elements. Thus, as a Jewish name, *Rosenberg* could in theory be a habitational name from any of the places called Rosenberg in the German-speaking lands, but it is more likely to be an ornamental creation meaning 'rose hill'. Clearly ornamental are such names as *Feinstein* 'fine stone', *Glassberg* 'glass mountain', *Goldbach* 'gold stream', and *Himmelfarb* 'heaven color', as no places with these names exist. The choice of an ornamental name was rarely completely arbitrary. For example, *Goldberg* and *Goldbach* were generally chosen by people with some connection with gold – goldsmiths or moneylenders – alongside more obviously occupational names, such as *Goldschmidt*. Other examples of ornamental-occupational names are *Feintuch* 'fine cloth' and *Kornreich* 'grain rich.' *Perlstein* 'pearl stone' is clearly an ornamental name, but in some cases it may also contain a metronymic reference to the female given name *Perl*. Omen surnames were also selected (e.g., *Leblang* 'live long'). In some cases, the hand of a non-Jewish government official may be detected in the selection of a surname, where the registered surname is an unflattering one (e.g. *Dorn* 'thorn', *Maus* 'mouse', *Schnautz* 'gob'). *Garfinkel* 'carbuncle' may be an unflattering name, or it may be a descriptive nickname; but because the Yiddish word also means 'garnet' or 'ruby',

it could equally be an ornamental-occupational name adopted by a jeweler.

Status names indicating descent from the priestly castes of Kohanim and Levites are common among Jews from all European countries: the form of the name varies according to the local vernacular language (e.g., *Cohen* is found in Russian as *Kogan*, because Russian has no /h/).

Among Jews as among Gentiles, habitational names are common, ranging from city names such as *Berlin, Krakauer,* and *Warsaw*, to house names, of which the most famous is surely *Rothschild* 'red shield', from a house in Frankfurt bearing the sign of a red shield.

The Russian Jewish name *Gelfand* 'elephant' may have originated as a descriptive nickname for a large man, but equally possibly it was a house name from a house bearing the sign of an elephant.

Jewish surnames from the 18th- and 19th-century Russian Empire, from 15th- to 18th-century Prague, and from the former Kingdom of Poland have been assiduously collected by Beider (1993, 1995, 1996).

Arabic and Muslim Personal Names

Arabic and Muslim names present the problem of overlapping sets. Many names of Arabic etymology are used among Muslims in languages unrelated to Arabic; for example, Iranian, Urdu, and Bahasa Indonesia. In contrast, Arabic names include many cognates of Christian and Jewish names – for example, *Harun* 'Aaron' and *Isa* 'Jesus' – which are used among Muslims and Arabic-speaking Christians alike.

Traditional Arabic personal names are quite different in structure from European names. A reliable study is Schimmel (1989). The five elements of a traditional Arabic name are:

1. *Kunya* (teknonym); for example, *abū-Da'ud* 'father of David' or *Umm-Da'ud* 'mother of David'. Naming someone according to his or her son's name is conventional in Islamic societies, because having a male heir is a matter of pride. The son may or may not already exist when the kunya is adopted, and in some cases an abstract quality or even a secret reference is adopted as a sort of omen name where one would expect the personal name of an actual living human offspring. For example, the name of the Prophet Muhammad's uncle and successor *Abū-Bakr*, caliph in 632–634, literally means 'father of the young camel', Furthermore, this same caliph was also known as known as *Abū-Tālib* 'father of the seeker.'
2. *Ism (*given name; plural *asmaa');* for example, *Ahmad* 'most praised' or 'most praiseworthy', *Nasr* 'good fortune'. Asmaa' are taken freely from vocabulary words in Arabic, but among Muslims it is common to choose a name that commemorates the Prophet Muhammad, his family, his associates, and his successors. For example, *Fātima*, the name of his favorite daughter, is a popular name among Muslims of many different nationalities. Other Muslim names invoke attributes of Allah (e.g., '*Abd-al-Qādir* 'servant of the All-Powerful', '*Abd-al-Rashīd* 'servant of the Merciful').
3. *Nasab* (patronymic or lineage name); for example, *ibn-Saud*. In some cases, the nasab is genuinely patronymic; in other cases, it is inherited over several generations and so refers to a more distant ancestor.
4. *Nisba* (a name denoting a family's tribe or place of origin); for example, *Al-Kuwaitī* 'the Kuwaiti', *Al-Qurayshī* 'descended from the Quraish' (the leading tribe in Mecca at the time of the birth of the Prophet Muhammad).
5. *Laqab* (a nickname or distinguishing epithet); for example, *al-Aswad* 'the black', *al-Haidar* 'the lion'. A very common laqab is the honorific *Al-Hajji*, denoting someone who has performed the *hajj,* the pilgrimage to Mecca.

The main linguistic source of Muslim names after Arabic is Persian. Names such as *Firdaus* (meaning 'paradise') and *Jehangir* 'world holder' are used as asmaa' not only in Iran itself but also among Muslims throughout the Indian subcontinent and elsewhere.

Indian Personal Names

In India, traditional personal names are intimately bound up with the beliefs of Hinduism (forenames) and the social structure of the Hindu caste system (surnames). An individual's name typically consists of a forename and a surname. There are, of course, distinctive names in India associated with other religions. As we have seen, Muslim names are mostly inherited from Arabic and Persian. In South India particularly, a strong Christian tradition has encouraged the use of English forms of Biblical given names, many of which have subsequently come to be used as surnames alongside those derived from Hindu given names, as South India does not have a tradition of surname use.

In Hindu society, children are often given a forename inherited from an ancestor. The motive for doing so is often a belief in reincarnation: children

are their ancestors reborn. Many Hindu given names are based on the names of deities, reflecting the belief that all human beings are manifestations of the divine. Thus, the name *Ramachandra*, literally 'pleasing moon' in Sanskrit, is derived from reference to Rama, sixth incarnation of Vishnu, plus the Sanskrit word *candra* meaning 'moon.' Other names are references to qualities some of which were themselves personified as gods; for example the girls' name, *Lakshmi* is an omen name meaning 'auspicious', but also refers to the goddess of beauty, good fortune, and wealth mentioned in epic and classical texts.

An Indian surname typically indicates an individual's clan within the caste system. The main caste divisions are Brahman (the priestly caste), Kshatriya (warriors), Vaishya (merchants), and Shudra (artisans and farmers). Generally, people do not marry outside their own caste, each caste is divided into clans, and each clan has a distinctive set of surnames. Thus, *Gupta* is a typical Vaishya name: originally, it was used to form names as a bound form meaning 'secret', as in *Chandragupta* 'shining secret', the name of not just one but two different individuals who founded empires in India at different times.

Many Indian names, like European status names and occupational names, can be traced to occupations or offices held by ancestors – for example, *Patel* and *Reddy*, both meaning 'village headman', *Desai* and *Deshmukh,* both meaning 'district chief', *Deshpande* 'district clerk', *Gandhi* 'perfume seller', *Ghosh* 'herdsman', *Jha* 'teacher', *Jhaveri* 'jeweler', *Joshi* 'astrologer', *Shroff* 'money changer', and *Vaidya* 'physician'. Among Parsis, one finds, as much more recent surname formations, occupational names derived from English words; for example, *Merchant, Contractor,* and *Engineer.*

Chinese Personal Names

Chinese personal names consist of a surname and a first name, the surname being placed first. Useful accounts can be found in Louie (1998) and Ning and Ning (1995). The earliest surnames are at least 5000 years old. In their written form, many contain a radical that denotes 'woman', from which some have concluded that the ancient Chinese inheritance system may have been matrilineal as well as patrilineal. The ratio of forenames to surnames in Chinese is precisely the opposite of that in European languages: Despite the vast population of China and Chinese speakers throughout the world, the number of Chinese surnames is small (about 2000, or at most 10 000, depending on how the estimate is made), whereas the number of given names is large, indeed open-ended.

The Chinese word for 'surname', *xingshi,* is composed of two elements: *xing*, which originally denoted a tribe, and *shi*, which originally denoted a subdivision of a *xing*. This distinction is now lost, and the two terms survive in a single word. It is a common misapprehension that there are only 100 Chinese surnames. This error derives from a misinterpretation of *Bai Jia Xing*, the title of a rhyming list of Chinese surnames compiled in Hangzhou during the 12th or 13th century A.D. (Southern Song dynasty), which was once learned and recited by all Chinese schoolchildren and is still regularly reprinted in Chinese almanacs. Literally, it means 'Hundred Family Names' but since it contains over 500 names, the term *bai* 'hundred' is not to be taken too literally: It also means 'many.'

The origins of Chinese surnames are lost in the mists of time, surrounded by myths associated with the legendary emperor Huang Di (ruled *c.* 2800 B.C.) and his successors. Hard facts come much later; nevertheless, many modern Chinese identify the origins of their surname in clan names of the aristocracy in the Zhou dynasty (1122–221 B.C.). Many of these ancient clan names are associated with a place name; others commemorate an ancestor, either by his rank or occupation or by his given name. Legends about the founders of the clans are carefully preserved. The etymology of ancient place names in Chinese is mostly lost, but in other cases the etymon of a personal name is clear: for example, the surname *Wang* is from a word meaning 'ruler', which was adopted independently as a surname by the ruling families of several different places during the Zhou dynasty or before.

The Chinese writing system is ideographic, not phonetic, so that the true form of a surname can only be determined from its written representation. A nice illustration of this concerns a certain Li Lizhen who lived during the Shang dynasty (*c.* 1766–1122 B.C.), whose surname, *Li*, denoted a title of the aristocracy roughly equivalent to duke. Having offended the emperor, he fled and changed his surname to a written character meaning 'plum tree', also pronounced 'li.'

The Chinese word for given name is *ming*. In principle, any Chinese vocabulary word may be used in creating a given name, although in practice inevitably some are preferred, and others are rare. A word used as a given name takes on a symbolic meaning. For example, the word *Ming*, meaning 'bright, clear, distinct', when used as a name conventionally symbolizes bright eyes, good eyesight, or intelligence. A uniquely Chinese naming practice is the Pai-hang system, which literally means 'ranking in rows.' It is sometimes called the 'generation name.' As explained

by Bauer (1959), it works like this: brothers in the same family are given different names, all of which share one Chinese written character. This character will also be found in the name of male first cousins of the same generation. Thus, a particular character serves to identify members of the same generation not only among brothers but also among cousins of different ages.

In large families, a number is – or was – often used as a name for a child, reflecting his or her birth order. Moreover, in traditional Chinese etiquette, children do not address their elders by their given name; instead, a numerical kinship terms such as 'Aunt Number Four' is used.

See also: Nicknames; Place Names; Proper Names: Linguistic Status; Proper Names: Semantic Aspects.

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Relevant Websites

http://genforum.genealogy.com – A genealogical website.
http://familysearch.org – International Genealogical Index.

Personality Factors in Spoken Discourse

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Searching for Personality Factors in Spoken Discourse

Even if it is widely accepted that individuals speak with their own personal style, linguists are still at the drawing board trying to integrate the idea of individual linguistic variability into their models of language and communication. Individual variation has long been a thorn in the side of generalized or abstract theoretical models and has repeatedly been used to question their validity. It is not a surprise therefore that, in the history of linguistics, those who have studied individual variation have often taken an 'asystematic' or counter-current perspective.

Involving individual variation in a theoretical linguistic model can be compared to dealing with the details of single trees without losing sight of the proverbial forest. Many branches of linguistic research share the difficulty of simultaneously accounting for the 'universal' aspects of language and for individual variability. The danger lies on one side in abstraction and on the other in atomism.

Accounting for individual variation is in itself rather complex. The overall goal is to be able to take account of individual differences (without reducing them to idiosyncrasies) and, after identifying regularities, arrive at a synthesis. The attention drawn to different features of individual variation, as well as the ways that different scholars deal with it, varies according to the field of interest and to the theoretical models' level of abstraction. In different frameworks, individual variation is from time to time treated as carrying sociological, cultural, cognitive, stylistic, and sometimes psychological values.

While exploring the relationships between linguistic features and psychological traits, one risks being mired in a swamp: even if it is the layman's common practice to identify individuals in terms of their psychological attributes and to do so relying on their language, the challenge for the linguist is to identify the *systematic* correlations among the linguistic and psychological aspects. Not by chance Sapir's "psychiatric or personalistic" approach to the study of language did not seem to inspire much further research: "if there is a significant precedent for concern with individual differences . . . there is little continuity with that precedent" (see Hymes, 1979).

Many linguistic phenomena are susceptible to psychological interpretation and can be potentially connected to personality factors. Some concern different levels of grammar, such as topicalization and focalization processes, deixis, cohesion, and so on. Studies of different linguistic styles in written text, based on correlations among different phenomena, suggest interesting leads to follow. It is a field in which there remains much to do. The first problem is to understand which of the fields of individual variation are connected to personality, and the second task is to identify some systematic relationships. As in other areas of linguistic research, an important step would be to marry quantitative analysis methods and qualitative methods.

Given these premises, it has seemed useful to adopt an expository strategy referring to those fields of linguistic research in which individual variation is taken into consideration, showing how different paradigms account for it, and then referring to those in which the aspects connected to personality factors are investigated.

Individual Variation as a 'Potentiality' of Language

An interesting view on the relationship between individual variation and theoretical models is presented by the Prague school. This view emphasizes the necessity of simplifying multiform reality to a theory that can be verified in all single cases. In the paradigmatic article, 'On the potentiality of the phenomena of language,' Mathesius (1964) introduced the notion of potentiality (i.e., a static oscillation) as denoting two kinds of phenomena: a static oscillation of individuals' spoken language different from the entire linguistic community and a static oscillation of an individual's speech. The objective is to demonstrate that oscillation is never completely free, and the recognition of the internal static oscillation of diverse phenomena can help find regularities in domains that can mistakenly seem dominated by chaos when probed in search of absolute rules. Mathesius's article presented some examples in different fields (vocalic variation, word order, and so on).

The concept of potentiality led Mathesius to an interesting view on the relationship between linguistics and stylistics. When analyzing individual speech, all of its phenomena must be considered linguistic materials, and therefore, an approach that considers some of them as stylistic is not valid. Uncovering the full extent of the potentiality of the language obliges linguists to study the speech of individual speakers. It is the aims, not the materials, which differentiate linguistics and stylistics. Linguists examine individual speech to determine the language materials used in

language community; stylists examine literary works to discover how an individual work of art was created with the available language materials.

The Individual within the Community: Romance Dialectology and Sociolinguistics

A field of linguistic research in which attention to variability soon leads to a focus on individual variation is romance dialectology. Very early on, this field had to face both the problem of the linguistic homogeneity inside a linguistic community and the difficulty of defining the unity and variability of a single linguistic variety.

Examples of attention to the speaker in a field that is traditionally characterized by the absence of the dimension of individual variation can be found in the linguistic atlases. Putting aside archaeological interest and drawing attention instead to the living language, the linguistic atlas focuses on the internal relationship to the system and on the internal variation of the linguistic community. The atlas is put forth as a tool to map data on some aspects of internal variability in the linguistics community. All the information relative to the informants, together with each linguistic and extra-linguistic reaction, are gathered and made public. The minutes of the inquiries of the fieldwork investigations of ALI (*Atlante linguistico italiano*; Bartoli, 1995–1998) are a wellspring of speaker information in the tradition of the AIS (*Sprach-und Sachatlas Italiens und der Südschweiz)* of Karl Jaberg and Jakob Jud (1928–1940). Other instances of attention to the speaker are supplied by the variationistic atlases in which the protocol of the interviewer is to gather data both on the variability inside the linguistic community and on the variability among the speakers themselves (see among others, Ruffino (1995)). In this framework, it is useful to mention the ADICA, a database of individual spoken dialects of Campania, which collects spontaneous spoken discourse with the entire range of individual variability (see Como and Milano, 2000; Sornicola, 2002).

Attention to the speaker emerges also in the field of perceptive dialectology (see Preston, 1999). The two volumes edited by D'Agostino (2002) and Cini and Regis (2002) present interesting theoretical observations, other than methodological, on the notions of linguistic consciousness, speakers' feeling of the language, production and awareness, etc.

A research area in which there is a strong push to investigate individual variation is that of contact linguistics. For example, Como (2004) analyzed the dynamics of contact of language and dialect in a small community, focusing on individual speakers. A highly diversified reality emerged in which the choice of one code or another seems interpretable, not so much with respect to sociocultural characteristics, but overall in relation to some of the aspects tied to the personalities of single informants.

As far as the relationships between linguistic and psychological features are concerned, Milano (2005), for example, studied topicalization phenomena in a corpus of spontaneous spoken Italian collected from speakers with diverse social-cultural characteristics. Differences in the behavior of processes of topicalization resulted in correlations, from an internal linguistic viewpoint, with a series of linguistic-textual traits, and, from the external linguistic viewpoint, with some aspects of the linguistic personality of the speaker.

The Individual and Social Patterned Behavior: The American Tradition

The description of individual linguistic behavior in a social pattern and the investigation of the principles of correlation between linguistic variation and social facts characterize the field of sociolinguistics research. For obvious reasons, in the analysis of individual variation, the social aspects of individuality are emphasized. The use of notions of style (starting with Labov's studies in the 1960s) is paradigmatic. Contrary to what happens in other branches of linguistic research, in sociolinguistics, style is the connection between the individual and society, a sort of wedding band joining the linguistic, cognitive, and social aspects. The stylistic activity of the speaker is connected directly to the place and role the speaker occupies in society and to the strategies that he puts into effect to relate to the socioeconomic hierarchy (for a multidisciplinary view, see Eckert and Rickford, 2001).

It is useful to mention here the essays 'Individual and social differences in language use' by Gumperz and Tannen (1979) and 'Locating the frontier between social and psychological factors in linguistic variation' by Labov (1979). Both appeared in a volume that, in the climate of general criticism of the generativist theoretical model, has the ambition of uniting various approaches, methodologies, techniques, and data on individual variation. With the strong belief that the study of language does not gain any advantage by confining itself to describing an ideal speaker-listener in a homogeneous linguistic community, the 'normal speaker-listener' is the focus of study, to which are added further types of language users: children, the disabled, non-native speakers, the linguistically self-aware, and intellectuals.

Gumperz and Tannen analyzed how a culture gap causes a series of misunderstandings in conversational exchanges between individuals from different sociocultural backgrounds. Their work suggests the investigation of miscommunication between culturally different speakers as a way of recovering shared sociocultural knowledge used in conversation. Labov (1979) reviewed data relating to variation in various dialects found in New York and Philadelphia in an attempt to explain how individual differences can be understood in sociolinguistic patterns. To that end, he analyzed speakers who demonstrated previously selected social tendencies along with others who lacked such tendencies. Making an appeal to aspects tied to the individual histories of the speakers, Labov explained deviance, concluding, "individual differences in psychological orientation have led to differences in social experience and social aspirations, which in turn are reflected in predictable, social patterned difference in behavior."

Except for some tentative approaches, in this mind frame, the human historical dimension and psychology of individual variation are generally rather neglected. A remarkable exception is represented by Johnstone's 1966 book, *The linguistic individual*, in the qualitative tradition of discourse analysis.

Cognitive and Psychological Constraints on Individual Variation

Investigations into the differences in individual first language acquisition styles proved fertile grounds for interesting contributions starting from the 1970s. In a study conducted on children 18 to 24 months old, Nelson (1973) postulated at the lexical level two styles of acquisition: (1) the referential style, characterized by a vocabulary with a high percentage of common names, and (2) the expressive style, characterized by a vocabulary with words coming from a large variety of classes, including some frozen phrases like 'stop it' and 'I love you.' The children who manifested a more referential acquisition typology tended to be more focused on naming objects, whereas those children who manifested a more expressive acquisition typology tended to focus instead mainly on the social/regulatory uses of language. Around the same time, Bloom *et al.* (1975), with respect to grammatical level, talked about a nominal style (multiword constructions comprising mainly names and content words) and a pronominal style (multiword constructions in which the significance is transported by not specifying pronominal forms). The two styles make further reference to the way in which children refer to themselves, specifically by using the personal pronoun or calling themselves by name. Successive studies showed evidence that the nominal/pronominal difference is manifested by a general contrast between the presence or absence of morphology in this first stage of nominal/morphological dimension acquisition (see, among others, Bretherton *et al.,* 1983). A stylistic dimension can be individualized also at the phonological level: the pronominal/expressive style seems to be associated with the tendency to imitate words and sentences, focusing on suprasegmental aspects, rather than phonetic details (Vihman, 1985). It seems therefore that there exist certain correlations between different levels of grammar: the same mechanism seems to be responsible for individual differences both at the phonological and at the grammatical level.

More recently, a series of studies have been conducted with the objective of identifying the correlations between linguistic variation and the external dimensions of the language (e.g., cognitive styles in problem solving and symbolic play, personality aspects of the child, environmental and social factors, social class, birth order, and maternal style). Meins (1998), for example, considered the effect of security of attachment and the relationship with the mother. The results seem to be headed in the direction of devaluing the mechanical and systematic correlation between the social and environmental aspects with the above-mentioned linguistic characteristics. More likely, linguistic differences between acquisitional styles can be mirrored in the differences between cognitive styles: "However, we can conclude that these differences originate in the child" (Bates *et al.,* 1988: 185). Discussing the last point, Dixon and Shore (1997) identified a series of temperamental parameters (activity level, distress over limitations, fear, duration of orienting, smiling and laughter, and soothability) that seem to correlate to the characteristics observed by Nelson (1973) in relation to the different acquisition styles.

In a field of research focused on learning strategies – the conscious and unconscious operations carried out by learners during the second language acquisition process – the need to focus attention on varying types of learners naturally emerged. The investigation of the role of attitudes and motivations, language learning aptitude, and cognitive prerequisites has been quite productive (see, among others, Gardner and Lambert, 1972; Slobin, 1973). Fillmore (1979), in a study of the process of second language acquisition in children, shed light on the link between individual differences and the nature of the task of learning a new language, the strategies used to reach this goal, and the personal characteristics involved.

Ehrman and Oxford (1989) examined learning strategies in relation to sex differences, career choice, cognitive style, and personality aspects. The last two

aspects are grouped together as 'psychological type.' Psychological type is made up of a combination of cognitive and personality variables, among which are considered four dimensions in particular using Jung's terminology: extraversion vs. introversion, sensing vs. intuition, thinking vs. feeling, and judging vs. perceiving. The objective of this study was to investigate the relationship among the different psychological types, integrating cognitive and emotional factors, and their learning styles (10 factors are considered relative to learning style). The study showed a correlation among sex, occupation, and level of language learning. The personality aspects make up a set of independent variables that influence the choice of leaning strategies. Recently, a volume of the French Aile edited by Jisa (1994) was dedicated to '*profils d'apprenants*' (i.e., the definition of differences between learners and their descriptive profiles).

A field outside linguistics in which a very interesting effort has been made to illuminate the relationship between individuals and language is the study of the psychology of personality. In this field, the manner in which an individual speaks, not only in terms of pronunciation, accent, or dialect but also regarding word grouping, says much about them and is assumed to be of crucial importance. Freud believed that the everyday utterances of individuals could shed light on the unconscious mind. It seems that word usage patterns are unique enough not only to describe the type of person who produced a text sample but also to specifically identify the author in the manner of a fingerprint or DNA sample (for a discussion, see Pennebaker and King, 1999; Groom and Pennebaker, 2002). Based on a heavily quantitative biased approach, Groom and Pennebaker illustrated that some particles (especially some found only in spoken language) exhibit a remarkably high stability, intriguing characteristics of predictive validity, and a correlation with personal style. They lamented that without a better developed theory of linguistic style the implications of such correlations will remain unclear.

See also: Abstraction; Code Switching and Mixing; Cohesion and Coherence: Linguistic Approaches; Deixis and Anaphora: Pragmatic Approaches; Dialect Atlases; Focus; Idealization; Idiolect; Intonation; Language as an Object of Study; Perceptual Dialectology; Prague School; Prosodic Aspects of Speech and Language; Second Language Acquisition: Phonology, Morphology, Syntax; Spatial Variation (Geolinguistics); Speech Community; Style; Style and Style Shifting; Topic and Comment; Variation and Language: Overview; Variation in First Language Acquisition; Variation in Second Language Acquisition; Vocabulary: Second Language.

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Peru: Language Situation

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Peru can be divided into three main regions: (Pacific) Coast, Andes, and Amazonia. Its projected population for 2005 is 28 million. With the European invasion and colonization in the mid-16th century, the Coast became the center of Spanish domination, and the ongoing loss of linguistic and cultural diversity in favor of hispanicization began. Independence from Spain in 1821 did not mean a change in language policy. A remarkable exception was the short-lived promotion of Quechua under the nationalist Velasco dictatorship, which included making it an official language in 1975. Adults who were not literate in Spanish obtained the right to vote only in 1979. It has been estimated that 20–25% of Peru's population spoke an indigenous language in 1993, compared to 50% in 1940. Mochica, the last indigenous language from the Coast, had no fluent speakers left about 1950.

Nevertheless, Peru remains a linguistically very diverse country; in a few departments (Southern Andes) and numerous provinces and districts, speakers of indigenous languages are the majority. Establishing the exact number of languages is not a simple matter, due to classification issues (especially among the Ashaninca/Asheninca (Arawakan) and Quechuan groups).

Quechuan and Aymaran languages are found in the Andes. Quechua varieties are spoken by roughly 4 million people, and Peru is the only country where the two main branches are represented. Quechua I is spoken in the Central Peruvian Andes, and Quechua II to the north and south of Quechua I and into the Amazon. Aymaran consists of two languages: Central Aymara (Tupino) and Southern Aymara (Collavino). With less than 800 speakers, Tupino is found only in Peru (Tupe District, Yauyos Province) and has two dialects, Jaqaru and Cauqui. Collavino is spoken by *ca*. 450 000 individuals in the departments of Puno, Moquegua, and Tacna. Quechuan and Aymaran exhibit significant lexical and structural similarities; whether these are due to genetic relationship or a long period of intensive interaction remains an open question. Although the absolute numbers of Quechuan and Collavino-Aymara speakers have remained stable since 1940, their percentage with respect to the total population has declined. Certain Quechua varieties (e.g., Pacaraos, Chachapoyas) and Cauqui are nearly extinct.

The most diverse region is Amazonia, where some 40 indigenous languages from 16 different families (excluding Quechuan) are spoken. Amazonian peoples also differ greatly in terms of culture, social organization, demographic composition, continuity of occupation in one territory, degree of contact with the majority society (a handful of Panoan and Arawakan groups remain uncontacted), and biological/ethnic vulnerability. Among the most widely spoken languages are (estimated numbers of speakers are given in parenthesis): Ashaninca/Asheninca (65 000), Aguaruna (45 000), Shipibo

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Table 1 Indigenous languages of Peru[a]

Family	*Language*	*Approximate # speakers*	*Notes*
Arauan	Culina/Madija	500 or fewer	Also in Brazil.
Arawakan	Asheninca/ Ashaninca	65 000	Listed as six separate languages in Eth.
	Caquinte	250–300	Not in map. Spoken along the Poyeni and Agueni rivers, Junín and Cuzco departments respectively.
	Chamicuro	5 in 1987 (Eth)	Two speakers, with 10–20 descendents (PE:43).
	Iñapari	4	Three brothers and one sister, about 40–45 years of age (PE: 46–7).
	Machiguenga/ Matsiguenga		13 000 in ethnic group. Most Machiguengas speak their Native language as L1 (PE:51). Some scientists consider that the uncontacted Kugapakoris speak a Machiguenga dialect. The Ethnologue lists Nanti (aka Cogapacori) as separate from Machiguenga.
	Nomatsiguenga	4500	
	Piro/Yine	3500	Also in Bolivia (Machineri) and Brazil. The Mashco Piro/Cujareño variant is listed separately in the Ethnologue. Mashco Piro speakers remain uncontacted.
	Resígaro	14 in 1976 (Eth)	Living among the Bora and Ocaina. The youngest speaker was about 40. In 1915, the number of Resígaro speakers was estimated at 1000 (PE:69–72).
	Yanesha'/ Amuesha	9000–10 000	Strongly influenced by Quechua (Adelaar & Muysken 2004:424 and references therein).
Aymaran	Southern Aymara/ Collavino	450 000	Also in Bolivia and Chile.
	Central Aymara/ Tupino	800	Jaqaru and Cauqui dialects. Only 11 speakers of Cauqui (PE:206).
Cahuapanan	Chayahuita	13 000	Not in map. Spoken along the Paranapura river and tributaries, Alto Amazonas Province, Loreto Department (northwest of Jebero area).
	Jebero/Shihuilu	503?	The estimated number of speakers is taken from BEY.
Jivaroan	Aguaruna	45 000	
	Achuar-Shiwiar	5000	Also in Ecuador.
	Huambisa	8000 (PE:112)	
Panoan	Amahuaca	300 (Eth)	Also in Brazil.
	Capanahua	120	350–400 in ethnic group.
	Cashibo-Cacataibo	1500–2000	
	Cashinahua	850–1200	Also in Brazil.
	Isconahua/ Iscobaquebo	28–50 (Eth)	Not in PE. Not in map. Callaria river, Ucayali department.
	Matses/ Mayoruna	1500	Also in Brazil.
	Sharanahua/ Marinahua	500–600	Also in Brazil. Other dialects Marinahua and Chandinahua.
	Shipibo-Konibo	30 000	
	Yaminahua	1200–1450 (Eth)	Includes Mastanahua and Chandinahua speakers. Also in Brazil and Bolivia. Yora/Nahua and Morunahua might be Yaminahua dialects.
Peba-Yaguan	Yagua	4000	Ca. 5000 in ethnic group (PE:153). Small groups in Colombia and Brazil.
Quechuan		4 000 000	This family is subdivided into less than 20 varieties in PE, but 31 in Eth. The main subdivision is between Quechua I and Quechua II. Quechua II dialects are also spoken in Bolivia, Ecuador, Colombia, Argentina and Chile. Among the most spoken varieties in Peru are: Cuzco-Puno (ca. 2 000 000), Ayacucho (ca. 900 000) and Conchucos (ca. 450 000).
Tacanan	Ese Ejja		600 individuals in ethnic group (BEY). In two out of three villages all children learn Ese Ejja as L1; in the third village this varies (PE: 162–4). Also in Bolivia.

Continued

Table 1 Continued

Family	*Language*	*Approximate # speakers*	*Notes*
Tucanoan	Orejón		288 in ethnic group. Some children learn the language.
	Secoya	144 (Eth)	Aka Angotero and Piojé. Also in Ecuador.
Tupí-Guaraní	Cocama-Cocamilla		15 000 in ethnic group. Only spoken by elders. According to Brazilian linguist Ana Suelly Cabral, Cocama-Cocamilla (and its dialect Omagua) might be a mixed language, composed of Tupí-Guaraní vocabulary and grammatical features from various languages.
	Omagua	A few elders	May be the same language as Cocama-Cocamilla.
Witotoan	Bora	2000	Out of 3000 in ethnic group. Miraña dialect in Colombia.
	Huitoto	1105 (Eth)	Listed in Ethnologue as: Huitoto Mɨnɨca, Murui and Nɨpode. These are listed as dialects in PE:98.
	Ocaina		Ca. 150 in ethnic group; only some individuals speak the language. Not in map. Found along the Yaguasyacu, Ampiyacu, Putumayo and Algodón rivers, in northeastern Loreto. Bora and Huitoto bilingualism. Also in Colombia.
Zaparoan	Arabela	100	Out of 300 in ethnic group.
	Iquito		Ca. 200 in ethnic group. Only some adults speak the language.
	Taushiro	7 in 1998 (Eth)	Listed as Zaparoan in PE:192, but as unclassified in Eth.
Unclassified/ Isolate	Candoshi-Shapra	3000	Previously believed to be genetically related to Jivaroan.
	Harakmbet/ Harakmbut (hate)	1000 (PE)	Listed in Ethnologue as two languages: Amarakaeri and Huachipaeri. These are considered dialects in PE:93. Sapiteri, Arasaeri, Toyoeri and Kisamabaeri are listed as dialects or subdialects according to the source.
	Ticuna	8000 (Eth)	Also in Colombia and Brazil.
	Urarina/Shimacu	2000–3000	

[a]The information in this table is mostly based on Pozzi-Escot 1998 (PE), the 14th edition of the Ethnologue (Eth) and Brack Egg and Yáñez, 1997 (BEY).

(Shipibo-Conibo) (30 000) and Chayahuita (13 000); speakers of Lamas Quechua (Quechua, San Martín) and Napo Quechua (Quichua, Lowland, Napo) surpass 25 000.

However, most Amazonian languages are in a critical situation. According to available data, the following are highly endangered or moribund: Arabela, Caquinte, Iquito, Isconahua, Jebero, Moronahua, Ocaina, Omagua, Orejón, Chamicuro, Iñapari, Resígaro, and Taushiro. Only Caquinte reaches 200 speakers; the last four listed languages have fewer than 10 speakers and will almost certainly become extinct within the next generation. Cahuarano, Cholón, and Muniche are still listed as extant in some sources.

Almost 80% of Peru's population speaks Spanish as their first language (L1); in the Northern Coast, Cajamarca, Ica, and part of Northern Amazonia, this group surpasses 90%, while in the Southern Andes, especially Puno, Spanish is the L1 of the minority. The main varieties of Peruvian Spanish are Coastal, Andean, and Amazonian; several varieties have been influenced by indigenous languages, especially Andean.

In addition, a large number of Peruvians speak Spanish as their second language (L2).

The 1993 Constitution recognizes Peru's multiethnic and pluricultural nature, guaranties the right of all Peruvians to their ethnic and cultural identity, and the right to use their own language before authorities. Spanish is given unconditional official status; Quechua, Aymara (Southern) and the remaining indigenous languages are declared official in the areas where their speakers predominate. The Constitution also establishes the promotion of bilingual and intercultural education by the State. But despite legal rulings, speakers of indigenous languages and nonstandard Spanish dialects suffer discrimination, and only a small minority of the children speaking an indigenous language as L1 attend bilingual schools.

Internal migration greatly favors hispanicization. Whereas Spanish is almost always transmitted to the next generation, speakers of an indigenous language seldom pass it on when migrating into an area where their language is not spoken; almost 35% of those with Quechua and Southern Aymara as L1 are in this situation. Furthermore, entire Quechuan and Arawakan speaking communities were forced to abandon their lands, enslaved or even murdered during the internal war that devastated Peru, especially between the late 1980s and early 1990s.

More than 35 000 individuals spoke a foreign language as L1 in 1993. The main immigrant communities are Chinese and Japanese (Lima), and German (Pozuzo, Pasco). In areas neighboring the Brazilian border, Peruvians may learn Portuguese as L1 (Table 1).

See also: Multilingualism: Pragmatic Aspects; Quechua; Spanish.

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Peter Helias (12th Century A.D)

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Peter Helias (b. ca. 1100; d. after 1166) was born in the neighborhood of Poitiers. A student of Thierry of Chartres at Paris in the 1130s, he became a renowned grammarian and rhetorician.

Helias composed a *Summa super Priscianum*, a textbook on Priscian's *Institutiones*; the first part, on Priscian's books I–XVI, on the parts of speech, was widely used in 12th–14th centuries the section on syntax (books XVII–VIII) was soon superseded by the *Summa* '*Absoluta cuiuslibet*,' (often incorrectly attributed to him in the manuscripts). The metrical grammar '*Sicut ab esse*,' (14th century) is spurious.

Peter Helias was deeply indebted to the Priscianic gloss commentary tradition, especially to William of Conches; on the other hand, his *Summa* is the starting point of a new current in grammar teaching. Being both a commentary and a well-structured textbook, it offers an exposition of Priscian's text and, at the same time, the opportunity to discuss systematically major linguistic issues.

The doctrine of the cause of invention as the explanatory principle of language phenomena played an essential role in Helias's discussions on the presence and functioning of the parts of speech and the secondary grammatical categories in language.

In semantics, the influence of Thierry's theological thought is apparent, e.g., in the adaptation of the three Boethian interpretations of 'substance' in the discussions on the nominal signification and the substantive verb, and in the introduction of the notion of '*complexivus*,' which stemmed from Thierry's discussion on the categories in theology into the doctrine of equivocation.

A seminal innovation was Helias's division of the traditional *accidentia* into the secondary grammatical categories that contribute to the (general) meaning of the words, as number, case, and the other accidents, such as gender and conjugation. In the 13th century, the secondary meanings will develop into the *significatio generalis* of the parts of speech, and, finally, into the *modi significandi respectivi*.

In syntax, central issues developed by Peter Helias are the distinction between the construction at word level and the construed sentence, which had a great effect on the development of dependency grammar in the Middle Ages, the systematization of the doctrine of transitivity and intransitivity, and the requirement of semantic well-formedness as a criterion for the acceptability of an utterance.

Following his master, Thierry, Helias also commented on Cicero's *De inventione* (unedited). His

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See also: Boethius of Dacia (fl. 1275); Dependency Grammar; Priscianus Caesariensis (d. ca. 530); William of Conches (ca. 1080–1154).

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Petrus de Alliaco (Pierre d'Ailly) (1350–1420)

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Pierre d'Ailly was born in Compiègne in 1351. His family's name originally was Marguerite, to which was added d'Ailly as a sign of its Picardian descent (probably from the town of Ailly-sur-Noye; see Guenée, 1987: 125 ff.). From 1363, he studied at the Collège de Navarre in Paris. He received the degrees of Baccalaureus artium (1365), Magister artium (1368), Baccaleureus cursor (1372), Baccalaureus sententiarius (1375), and Doctor of Theology in 1381. In the years 1384–1389 he served as rector of the Collège de Navarre, 1389–1395 as chancellor of the University of Paris and confessor to King Charles VI of France. Dates of his ecclesiastical career are: 1381, canon in Noyon; 1391, archdeacon of Cambrai; 1395, bishop of Le Puy; 1397, bishop of Cambrai; 1411, cardinal. In 1409 he attended the Council of Pisa, and in 1413 he functioned as apostolic delegate for Germany. With his pupil Jean Gerson we find him, in 1414–1417, as a prominent figure at the Council of Constance, examining the heretic Johannes Hus. From 1417 on, he lived in Avignon, where he died on August 9, 1420.

Apart from his highly influential works in philosophical psychology, theology, cosmology, geography, meteorology, astrology, calendar reform, church politics, and the termination of the Great Schism, he wrote in his early teaching career, before 1389, some logicogrammatical and semiological tracts (see Chappuis *et al.*, 1986): *Conceptus* (ed. Kaczmarek, 1980: 79–100; transl. in Spade, 1980: 16–34); *Insolubila* (transl. in Spade, 1980: 35–94); *Exponibila*; and a *Tractatus exponibilium*. All of these works expound on Pierre d'Ailly's conception of the sign and his theory of mental language.

Of doubtful attribution to him are the *Destructiones modorum significandi* (ed. Kaczmarek, 1994), a text arguing from nominalistic standpoint against the modistic conception of the theory of grammar and knowledge of Thomas of Erfurt, and a *Tractatus de arte obligandi*.

See also: Thomas of Erfurt (fl. 1300).

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Petrus de Alliaco (Pierre d'Ailly) (1350–1420)

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Pierre d'Ailly was born in Compiègne in 1351. His family's name originally was Marguerite, to which was added d'Ailly as a sign of its Picardian descent (probably from the town of Ailly-sur-Noye; see Guenée, 1987: 125 ff.). From 1363, he studied at the Collège de Navarre in Paris. He received the degrees of Baccalaureus artium (1365), Magister artium (1368), Baccaleureus cursor (1372), Baccalaureus sententiarius (1375), and Doctor of Theology in 1381. In the years 1384–1389 he served as rector of the Collège de Navarre, 1389–1395 as chancellor of the University of Paris and confessor to King Charles VI of France. Dates of his ecclesiastical career are: 1381, canon in Noyon; 1391, archdeacon of Cambrai; 1395, bishop of Le Puy; 1397, bishop of Cambrai; 1411, cardinal. In 1409 he attended the Council of Pisa, and in 1413 he functioned as apostolic delegate for Germany. With his pupil Jean Gerson we find him, in 1414–1417, as a prominent figure at the Council of Constance, examining the heretic Johannes Hus. From 1417 on, he lived in Avignon, where he died on August 9, 1420.

Apart from his highly influential works in philosophical psychology, theology, cosmology, geography, meteorology, astrology, calendar reform, church politics, and the termination of the Great Schism, he wrote in his early teaching career, before 1389, some logicogrammatical and semiological tracts (see Chappuis *et al.*, 1986): *Conceptus* (ed. Kaczmarek, 1980: 79–100; transl. in Spade, 1980: 16–34); *Insolubila* (transl. in Spade, 1980: 35–94); *Exponibila*; and a *Tractatus exponibilium*. All of these works expound on Pierre d'Ailly's conception of the sign and his theory of mental language.

Of doubtful attribution to him are the *Destructiones modorum significandi* (ed. Kaczmarek, 1994), a text arguing from nominalistic standpoint against the modistic conception of the theory of grammar and knowledge of Thomas of Erfurt, and a *Tractatus de arte obligandi*.

See also: Thomas of Erfurt (fl. 1300).

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Petrus Hispanus (ca. 1210–1276)

A Gianto, Pontifical Biblical Institute, Rome, Italy

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The true identity of Petrus Hispanus and exact biographical data on him are not yet altogether clear, though generally it can be established that he lived during the 13th century in northern Spain and southern France. He is the author of the widely used manual of logic *Summulae logicales magistri Petri Hispani* (Collection of logic matters of Master Peter of Spain), also known as *Tractatus*. He also wrote a treatise on the semantics of particles known as *Syncategoreumata*. The same person wrote a commentary on Dionysus the Areopagite. The traditional attribution of the author to a Portuguese savant and physician who taught in Siena and later became Pope in 1276, under the name of John XXI, has not found much support from current research that favors two other persons. One was a Spanish Dominican friar, Petrus Ferrandi Hispanus (d. between 1254 and 1259), who wrote the *Legenda sancti Dominici* and the Office of the Saint's Feast. The other possibility, less favored by scholars, was also a Dominican friar, but he lived later in 13th century or in the early years of the 14th century.

The *Tractatus* dealt with basic concepts like *nomen* 'noun', *verbum* 'verb', *oratio* 'phrase', *propositio* 'proposition', and the role of predication in syllogistic reasoning. The central part of this work explained the notion of *significatio*, which, according to the author, was a conventional representation of a thing by means of a word. This part of the work also defineed terms like *suppositio* and *copulatio*, and the differences between them. Of these three *suppositio* and *significatio* were the most important in Peter's semantics. *Suppositio* was defined as the acceptance of a substantive verb for something, whereas *suppositio* is dependent on *significatio*, because supposition could only occur via a term that already has some *significatio*. Put in other words, *significatio* pertains to a word by itself, and *suppositio* to a term as actually used in some context. The other six tracts together elaborate further the notion of supposition.

The *Syncategoreumata* was a work that dealt with words that are not nouns or verbs and have no meaning of their own, that is, function words or particles. The words discussed were *est* 'to be' and *non* 'negation', *solus* and *tantum* 'only', 'an exclusion'; *si* 'if' and aspectual words like *incipit* 'begins' and *desinit* 'ceases'; modal expressions; connectives; and comparison particles like *quanto* 'as much as', *quam* 'than', and *quicquid* 'any/all'. A very short concluding chapter in Peter's *Syncategoreumata* contained brief notes about the form of deduction in a syllogism.

See also: Logical Form in Linguistics; Ordinary Language Philosophy; Philosophy of Language, Medieval.

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Pfeiffer, Rudolf (1889–1979)

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Rudolf Pfeiffer was born on September 28, 1889 into an old Augsburg family with a long tradition in the printing business. He grew up in the house of the humanist Conrad Peutinger (1465–1547), who was one of the first German collectors of antiques and the owner of the *tabula Peutingeriana*, the only remaining ancient map of the world. As a high school student, Pfeiffer read the works of Homer and the most important Greek authors. After the Abitur (1908), he studied Classical Philology and Germanistics at the University of Munich. Subsequently, he became a staff member at the *Bayerische Staatsbibliothek München* in 1912 and obtained his doctorate at Munich University in 1913. The beginning of World War I interrupted his carrier as a librarian. Badly wounded at Verdun, he returned to Munich in 1916.

Meanwhile, substantial sections of Kallimachos's extant works had been published since 1910 in the series 'The Oxyrhynchus Papyri.' Kallimachos of Kyrene (ca. 300–240 B.C.), guardian of the gigantic collection of books in the royal library of the Ptolemaians at the *Museion* in Alexandria (Egypt), was "the most outstanding intellect of this generation, the greatest poet that the Hellenistic age produced, and historically one of the most important figures in the development of the Greco–Roman (and hence European) literature" (Bulloch, 1985: 549). Of Kallimachos's numerous scholarly works and subtly ironic poetic writings, only a few fragments have survived to our day. The discovery of the papyrus scripts made it now possible to create an entirely new Kallimachos picture, since now a wealth of new substantial information had been made available. However, decipherment, attempting to restore missing pieces, and the interpretation and literary classification of the papyrus fragments required an exceptional linguistic, literary, historical, and interpretative competence. Pfeiffer possessed all of these qualities. In 1921, he obtained the *venia legend* in Munich with *Kallimachosstudien*, and, in 1923, he published a new edition of the newly discovered fragments. In the following years, by producing numerous publications he matured to be the most knowledgeable Kallimachos expert in the world.

In 1923, Pfeiffer was offered a professorship in Berlin and shortly thereafter in Hamburg. In 1927 he transferred to Freiburg and in 1929 to Munich, where he was elected an ordinary member of the *Bayerische Akademie der Wissenschaften* in 1934. Three years later, however, the Nazi regime removed him from this position because of his Jewish wife. The following year the couple emigrated to Oxford: "Once more, Oxford gains what Nazi Germany has lost" (*The Oxford Magazine* 50/16 v. 12.03.1942).

Most of the Kallimachos papyri were stored at Oxford. Quite logically, Pfeiffer devoted his time at Corpus Christi College to planning a great Kallimachos edition. The resulting two-volume work appeared in 1949 and 1953, respectively, and constituted the foundation for Pfeiffer's worldwide fame. In 1949, Pfeiffer was inducted into the British Academy. A well-known German Kallimachos scholar ended his review of the two volumes with the sentence, "Das Werk lobt seinen Meister" (The master is known by his work) (Bible, Old Testament, Sirach 9, 24). The edition unifies all Kallimachos fragments known at that time, accompanied by a papyrological and text-critical, as well as testimonial apparatus and content-related explanatory notes in Latin. It is the basis for the present-day Kallimachos and Hellenism research.

In 1951, in spite of serious concerns, Pfeiffer returned to his chair in Munich. He received numerous honors and distinctions: election as a member of the Austrian and the Paris Academy, honorary doctorates, and the Honorary Fellowship of Corpus Christi College. He became *professor emeritus* in 1957. In the subsequent years he worked on the implementation of a plan dating back to 1938, to write a history of Classical philology. Of the three envisioned volumes, the first appeared in 1968 (antiquity), the second in 1976 (modern times; both volumes were published in English by Oxford University Press). The third volume (middle ages) did not materialize. Pfeiffer died on May 5, 1979 at almost 90 years old. Hugh Lloyd-Jones, Regius Professor of Greek at Oxford, wrote in an obituary: "So long as that subject [sc. the study of the ancient world] continued to be studied, Pfeiffer is likely to be remembered as one of the leading scholars of his time" (Lloyd-Jones, 1982: 270).

See also: Greek, Ancient.

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Philippines: Language Situation

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The Philippines is composed of 76.5 million people scattered throughout a tropical archipelago of over 7100 islands. It is a country of incredible linguistic diversity, with over 170 mutually unintelligible languages, the majority of which are devoid of a good linguistic description. Aside from the Spanish Creoles spoken in various parts of the archipelago, the indigenous languages of the country belong to the Western Malayo-Polynesian branch of the large Austronesian language family.

According to the May 2000 census, ten indigenous languages are spoken natively by more than one million people. Tagalog, the language of the capital region and the basis of the national language, is spoken natively by 21 485 900. Varieties of Bisaya that are mutually intelligible with Cebuano are spoken in the Central Visayan region and Northeastern Mindanao by over 17 646 463; this figure includes 10 030 667 Cebuano speakers, 5 778 435 Bisaya speakers, and 1 837 361 Boholano speakers. Ilocano, an indigenous language of northeastern Luzon and the lingua franca of Northern Luzon, comes in third place with 6 920 760 speakers. Hiligaynon, or Ilonggo, spoken in the Western Visayan islands of Panay and Negros, has 5 773 135 speakers; Bikol dialects are spoken in the Bikol peninsula of Southeastern Luzon by 4 583 034 speakers; Waray-Waray, spoken on Samar Island and Northern Leyte in various dialects, has 2 567 558 speakers; Kapampangan is spoken by 2 312 870 people in the central Luzon provinces of Pampanga and Tarlac; Pangasinan has 1 035 966 speakers in the central Luzon province of Pangasinan; Maranao is spoken by 1 035 966 speakers in the Lanao provinces of Central Mindanao; Maguindanao is spoken by 1 008 424 speakers in the Central Mindanao provinces of Maguindanao, North Cotabato, South Cotabato, Sultan Kudarat, and Zamboanga del Sur; and Kinaray-a is spoken in Iloilo and Antique provinces of Western Panay by 1 051 968 speakers.

Four Spanish Creole languages, collectively referred to as Chavacano, are spoken in the Philippines. These include Caviteño (Cavite, Luzon, 11 079 speakers), Cotabateño (Cotabato, Mindanao, 8810 speakers); Davao Chavacano (Davao, Mindanao, 17 873 speakers); Ternateño (Ternate, Luzon, 7044 speakers); and Zamboangueño (Zamboanga City, Mindanao, 358 729).

Many of the minor languages of the country are given in the following paragraph of this article with their 2000 census figures or Summer Institute of Linguistics [SIL] estimates, wherever available. Like the major languages of the Philippines, many of these minor languages have a number of dialects. Some of the smaller languages, especially the Agta, Ayta, Arta, and Alta languages spoken by Negrito minority communities, have never been officially counted.

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Many of the minor languages of the country are given in the following paragraph of this article with their 2000 census figures or Summer Institute of Linguistics [SIL] estimates, wherever available. Like the major languages of the Philippines, many of these minor languages have a number of dialects. Some of the smaller languages, especially the Agta, Ayta, Arta, and Alta languages spoken by Negrito minority communities, have never been officially counted.

Adasen, 4000 [SIL], Northeastern Abra Province, Luzon; *Agta, Alabat Island,* 50 [SIL], East of Quezon Province, Luzon; *Agta, Camarines Norte,* 200 [SIL], Santa Elena and Labo, Camarines Norte, Luzon; *Agta, Casiguran Dumagat,* 580 (1998 T Headland), Aurora Province, East Luzon coast; *Agta, Central Cagayan,* 700 to 800 [SIL], Northeast Luzon; *Agta, Dupaninan,* 1200 [SIL], Northeast Luzon; *Agta, Isarog,* 1000 in ethnic group [SIL], Bicol Province, Luzon; *Agta, Mt Iraya,* 200 [SIL], East of Lake Buhi, Bicol Province, Luzon; *Agta, Mt Iriga,* 1500 [SIL], East of Iriga City, west of Lake Buhi, Bicol Province, Luzon; *Agta, Remontado,* 761, Santa Inez, Rizal Province; Paimohuan, General Nakar, Quezon Province, Luzon; *Agta, Umiray Dumaget,* 14 775, Quezon Province, Luzon; *Agta, Villa Viciosa*, Abra Province, Luzon; *Agutaynen,* 10 384, Agutaya Island

vicinity, Palawan; *Aklanon,* 394 545, Aklan Province, northern Panay; *Alangan,* 3566, North central Mindoro; *Alta, Northern,* 240 [SIL], Aurora Province, Eastern Luzon; *Alta, Southern,* 1000 [SIL], Eastern Nueva Ecija, coast areas of Quezon Province, San Miguel, Bulacan Province, Luzon; *Arta*, 17, Quirino Province, towns of Aglipay, Villa Santiago, Villa Gracia, and Nagtipunan; *Ata,* Nine or more families [SIL], Mabinay, Negros Oriental; *Ati,* 1500 [SIL], Panay Island; *Atta, Faire,* 400 to 550 or 136 families [SIL], Near Faire-Rizal, Cagayan Province, Luzon; *Atta, Pamplona,* 1000 [SIL], Northwestern Cagayan Province, Luzon; *Atta, Pudtol,* 500–700 [SIL], Kalinga-Apayao Province, Luzon; *Ayta, Abenlen,* 6850 [SIL], Tarlac Province, Luzon; *Ayta, Ambala,* 1657 [SIL], scattered in Zambales and Bataan provinces, Luzon; *Ayta, Bataan,* 572 [SIL], Mariveles, Bataan Province, Luzon; *Ayta, Mag-Anchi,* 8200 [SIL], scattered areas of central Luzon; *Ayta, Mag-Indi,* 5000 [SIL], scattered barrios in Pampanga and Zambales provinces, Luzon; *Ayta, Sorsogon,* 40 [SIL], Prieto Diaz, Sorsogon Province; *Balangao,* 21 271, Eastern Bontoc Province, Luzon; *Bantoanon,* 63 158, Banton, Simara, Maestro de Campo, and Tablas Islands, Romblon Province; *Batak,* 1933, North central Palawan; *Binukid,* 146 519, North central Mindanao, southern Bukidnon, northeastern Cotabato, Agusan del Sur; *Blaan, Koronadal* and *Sarangani,* 208 019, South Cotabato Province, Sarangani, Davao Del Sur Province, Mindanao; *Bolinao,* 55 436, West Pangasinan Province, Luzon; *Bontoc,* 17 677, Central Mountain Province, Luzon; *Buhid,* 8961, Southern Mindoro; *Butuanon,* 137 159, Butuan City, Mindanao; *Caluyanun,* 30 000, Caluya Islands, Antique; *Capiznon,* 638 653, Northeast Panay; *Cuyonon,* 179 185, Palawan coast, Cuyo Islands between Palawan and Panay; *Davawenyo,* 327 802, Davao Oriental, Davao del Sur, Mindanao; *Gaddang,* 20 978, Central Isabela, and Bagabag, Solano, and Bayombong in Nueva Vizcaya, Luzon; *Giangan,* 55 040, Davao City, Mindanao; *Hanunoo,* 11 164, Southern Oriental Mindoro; *Higaonon,* 68 630, Misamis Oriental, south of Ginoog City, north central Mindanao; *Ibaloi,* 111 449, Central and southern Benguet Province, western Nueva Vizcaya Province, Luzon; *Ibanag,* 323 503, Isabela and Cagayan provinces, Luzon; *Ibatan,* 1000 [SIL], Babuyan Island; *Ifugao* languages, 193 642, Ifugao Province, Luzon; *Ilongot,* 21 800, Eastern Nueva Vizcaya, Western Quirino, Luzon; *Inonhan,* 65 000–80 000 [SIL], Southern Tablas Island, Romblon Province, Mindoro Oriental and Mindoro Occidental; *Iraya,* 6577, Northern Mindoro; *Isinai,* 5881, Bambang, Dupax, and Aritao, Nueva Vizcaya, Luzon; *Isnag,* 32 934, Northern Apayao, Luzon; *Itawit,* 86 805, Southern Cagayan, Luzon; *Itneg* languages, 14 777, Northern Luzon highlands; *Ivatan* and *Itbayat,* 20 581, Batanes Islands; *I-wak,* 1928, Eastern Itogon, Benguet Province, Luzon; *Kagayanen,* 24 510, Cagayan Island; *Kalagan,* 42 627, Davao del Sur and Davao Oriental, Mindanao; *Kalagan, Tagakaulu,* 84 018, Mindanao, South Cotabato, Southern Mindanao; *Kalanguya, Keley-I,* 5000 [SIL], Napayo, Kiangan Ifugao Province, northwest of Aritao, Nueva Vizcaya, Luzon; *Kalinga, Butbut,* 4000 [SIL], Butbut, Tinglayan, Kalinga-Apayao Province, Luzon; *Kalinga, Limos,* 20 000 [SIL], Kalinga-Apayao Province, Luzon; *Kalinga, Lower Tanudan,* 11 243 [SIL], Southern Kalinga-Apayao Province, Luzon; *Kalinga, Lubuagan,* 12 000–15 000 [SIL], Eastern Abra and Kalinga-Apayao provinces, Luzon; *Kalinga, Mabaka Valley*, Southeastern Kalinga-Apayao Province, Luzon; *Kalinga, Madukayang,* 1500 [SIL], Southern Mountain Province, Luzon; *Kalinga, Southern,* 12 000 [SIL], Southern Kalinga-Apayao Province, Luzon; *Kalinga, Upper Tanudan,* 3000 [SIL], Kalinga-Apayao Province, southern end of the Tanudan Valley, Luzon; *Kallahan, Kayapa,* 15 000 [SIL], Western Nueva Vizcaya, northeastern Pangasinan, western Ifugao, Luzon; *Kallahan, Tinoc*, Tinoc, a barrio of Hungduan in Luzon; *Kamayo,* 150 998, Surigao del Sur between Marihatag and Lingig, Mindanao; *Kankanaey* and *Northern Kankanay,* 449 349, Northern Benguet Province, Mountain Province, southeastern Ilocos Sur, northeastern La Union, Luzon; *Karao,* 2279, Karao and Ekip, Bokod, eastern Benguet Province, Luzon; *Karolanos,* 71, Mid-central Negros; *Kasiguranin,* 8992, Casiguran, Aurora Province, Luzon; *Magahat*, Mt Arniyo near Bayawan, Southwestern Negros; *Malaynon,* 8500 [SIL], Malay, northwest Aklan Province, Panay; *Mamanwa,* 4718, Agusan del Norte and Surigao provinces, Mindanao; *Mandaya, Cataelano,* 19 000, Town of Cateel, Davao Oriental, Mindanao; *Mandaya, Karaga* and *Sangab,* 102 003, Davao Oriental, and Davao del Norte, Mindanao; *Manobo, Agusan,* 40 000 [SIL], Agusan del Norte, Agusan del Sur, Surigao del Sur, Mindanao; *Manobo, Ata,* 15 000 to 20 000 [SIL], northwestern Davao, Mindanao; *Manobo, Cinamiguin,* 60 000 [SIL], Camiguin Island, north of Mindanao; *Manobo, Cotabato,* 15 000 [SIL], South Cotabato, Limulan Valley, Mindanao; *Manobo, Dibabawon,* 10 000 [SIL], Manguagan, Davao del Norte, Mindanao; *Manobo, Ilianen,* 12 000–15 000 [SIL], Northern Cotabato, Mindanao; *Manobo, Matigsalug,* 15 000 [SIL], Davao del Norte, southeast Bukidnon, Mindanao; *Manobo, Obo,* 80 000–100 000 [SIL], Northeastern slope of Mt Apo, between Davao del Sur and North Cotabato, Mindanao; *Manobo, Rajah Kabunsuwan*, Southern Surigao del Sur, Mindanao; *Manobo,*

Sarangani, 35 000 [SIL], Southern and eastern Davao, Mindanao; *Manobo, Tagabawa,* 43 000 [SIL], Davao City, slopes of Mt Apo, Mindanao; *Manobo, Western Bukidnon,* 10 000–15 000 [SIL], southern Bukidnon Province, Mindanao; *Mansaka,* 34 499, Eastern Davao and Davao Oriental Provinces, Mindanao; *Mapun,* 31 576, Cagayan de Sulu and Palawan; *Masbatenyo,* 534 004, Masbate Province; *Molbog,* 8345, Balabac Island, southern Palawan; *Palawano, Brooke's Point,* 15 000–20 000 [SIL], Southeastern Palawan; *Palawano, Central,* 12 000 [SIL], Central Palawan; *Palawano, Southwest,* 3000 [SIL], Southwest Palawan from Canipaan to Canduaga; *Paranan,* 14 291, East coast, Isabela Province, Luzon; *Porohanon,* 23 000 [SIL], Camotes Islands; *Ratagnon,* 556, Southern tip of western Mindoro; *Romblomanon,* 200 379, Romblon and Sibuyan Islands, parts of eastern Tablas Island, north of Panay; *Sama, Abaknon,* 20 000–30 000 [SIL], Capul Island near San Bernardino Strait, Northwest Samar; *Sama, Balangingi,* 90 000 [SIL], Sulu Archipelago northeast of Jolo; *Sama, Central,* 120 000–150 000 [SIL], Sulu; *Sama, Pangutaran,* 25 000–40 000, West central Sulu, west of Jolo, Mindanao; *Sama, Southern,* 30 000 [SIL], Southern Sulu; *Sambal, Botolan* and *Tina,* 134 887 [SIL], Zambales Province, Central Luzon; *Sangil,* 15 000 [SIL], Balut Island, off Mindanao; *Sangir,* 55 000 [SIL], Balut and Sarangani islands off of Mindanao; *Sorsogon, Masbate,* 85 000 [SIL], Sorsogon, Casiguran and Juban; *Sorsogon, Waray,* 185 000 [SIL], Southern Sorsogon Province; *Subanen, Central,* 120 000–150 000 [SIL], Eastern Zamboanga Peninsula, Mindanao, Sulu Archipelago; *Subanen, Northern,* 10 000 [SIL], Tuboy: Sergio Osmeña, Mutia; Zamboanga del Norte; Salog: Misamis Occidental, Mindanao; *Subanon, Kolibugan,* 20 000 [SIL], Zamboanga Peninsula, southern Zamboanga del Norte and Zamboanga del Sur provinces, Mindanao; *Subanon, Western,* 75 000 [SIL], Zamboanga Peninsula, Mindanao; *Subanun, Lapuyan,* 25 000 [SIL], Sub-peninsulas of eastern Zamboanga del Sur, Mindanao; *Sulod,* 574, Tapaz, Capiz Province; Lambunao, Iloilo Province; Valderrama, Antique Province, Panay; *Surigaonon,* 597, 556, Surigao, Carrascal, Cantilan, Madrid, Lanusa; *Tadyawan,* 1361, East central Mindoro; *Tagbanwa,* 8000, Lamane area, Central and northern Palawan; *Tagbanwa, Calamian,* 8472 [SIL], Coron Island, north of Palawan, northern Palawan and Busuanga; *Tagbanwa, Central,* 2000 [SIL], Northern Palawan; *Tausug,* 918 069, Jolo, Sulu; *Tawbuid, Eastern,* 10 000–12 000 [SIL], Central Mindoro; *Tawbuid, Western,* 10 000–12 000 [SIL], Central Mindoro; *Tboli,* 95 190, South Cotabato, Mindanao; *Tiruray,* 31 736, Upi, Cotabato, Mindanao; *Utudnon*, highland vicinity of Baybay, Leyte; *Yakan,* 155 088, Basilan Island; *Yogad,* 17 880, Echague, Isabela Province, Luzon.

Both English and Tagalog currently serve as official languages of the country. The American-based school system that was established when the United States took control of the country from Spain in 1898 instituted English as the sole medium of instruction for all schools. During the Commonwealth Period (1935–1945), most instruction continued to be in English.

The 1935 Philippine constitution provided for the development and adoption of a national language based on an existing native language. At the time, there were three serious contenders: Tagalog, Cebuano, and Ilocano. After considerable debate, President Manuel L. Quezon proclaimed the national language to be Pilipino (Filipino) to be based on Tagalog, the dialect of the capital region, through his Executive Order No. 134 on December 30, 1939. Regional languages at this time were still to be used for the first two primary years of education.

The 1973 constitution, which was translated into all native languages with more than 50 000 speakers, Spanish, and Arabic, officially established English as a co-official language. To this day, English serves as the language of higher education and is taught from the second or third year of elementary education. In the 1980 census, 65% of the population reported an ability to speak English, compared to the 44.7% who reported this ability in the 1970 census.

Following the 1991 recommendation from the Congressional Commission on Education, many areas outside the capital region conduct classes in the regional vernacular for the first two elementary years and gradually introduce Tagalog from the first or second grade. English is usually introduced by the third grade and is used for teaching technical subjects that are to be eventually transitioned into Tagalog.

The highly multilingual setting of the country is reflected by language use. Code-switching is very common. The common mixing of Tagalog and English (Taglish) is often heard in informal settings on the streets, television, and radio. Outside the capital region, most educated urban Filipinos speak at least three languages. Speakers of minority languages often speak at least four languages: their local vernacular, a regional lingua franca, Tagalog, and English. While the top four languages have considerable presence in print and broadcast media, only Tagalog enjoys a prolific life in Philippine cinema. There is also a Chinese community, one-half million strong, which is mostly Hokkien speaking, as well as over 100 000 deaf speakers of PSL (Philippine Sign Language).

See also: Austronesian Languages: Overview; Cebuano; Code Switching; Ilocano; Tagalog.

Language Maps (Appendix 1): Maps 113–116.

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Philosophy of Language, Medieval

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Medieval philosophers, grammarians, and theologians were intensely interested in problems of language. Christian theories of the creative Logos combined with philosophical discourse on language developed primarily in relation to a small set of texts by Plato, Aristotle, and their commentators. Until the 12th century, Platonism was available primarily through the *Timaeus* and synthesized with Christianity in Neoplatonism. Augustine (345–430), in *De dialectica* and elsewhere, transmitted aspects of Neoplatonism and Stoic philosophy of language to the Middle Ages: language's flexible self-referentiality (a word can refer to itself as well as to external reality or a mental concept), language's impermanent materiality and cognitive mediation, and the importance of interior cognition. Aristotle's *Categories*, *De interpretatione*, and a few other texts were available through Porphyry's (c. 232–303) *Isagoge* and Boethius' (c. 480–c. 525) commentaries. Boethius wanted to demonstrate the essential harmony between Plato and Aristotle, especially on universals, categorical participation, and speaker perspectives on word–thing relations. The writings of Augustine and Boethius, which linked Platonist and Aristotelian ideas, helped shape how medieval thinkers received the linguistic concepts and metalanguage in Donatus and Priscian's grammars. Beginning in the late 11th century, Aristotle's 'old logic' was supplemented in the arts curriculum by his 'new logic,' in particular *Topics*, *Metaphysics*, and *Sophistical refutations*, which framed new inquiries into the nature of propositions and meaning, without abandoning certain Platonist ideas, notably on illumination and mental language.

Platonism and Aristotelianism constituted versions of linguistic realism but with different linguistic emphases. Platonism and Neoplatonism focused on word–thing relations, metaphysical grounds for universals, and language's inability to fully correspond to reality. The truly 'real' were the 'forms'; language was a necessary but imperfect material medium for cognition. Aristotelianism focused on the formal logical structure of sentences and on language's capacity to denote the properties of universals. Ideal predication and universal categories (motion, stasis, quantity, etc.) constituted knowable aspects of the real.

Porphyry's influential introduction to Aristotle, *Isagoge*, in Latin translation, presented an extreme realist response to the question of "whether [genera and species] have a substantial existence, or whether they consist in bare intellectual concepts only, or whether if they have a substantial existence they are corporeal or incorporeal, and whether they are separable from the sensible properties of the things (or particulars of sense), or are only in those properties and subsisting about them." Porphyry argued that genera (universals) have real existence independent of particulars or tokens (species).

In early medieval 'grammatical platonism' (Jolivet, 1966), monastic grammarians and commentators wedded platonist linguistic meaning grounded in the 'original' name with Christianity's creative Logos informing sacred names. Augustine and Gregory of Nyssa (c. 330–394) deployed a theory of 'category participation' and the priority of signifieds to anchor reference. They argued that only one "who shares in the life of Christ" can truly be called a *Christian* (*On the Christian life*; *On what it means to call oneself a Christian*). Abstract universal terms (*Christian, justice*) referred to general ideas, prior existents that were the foundation for singular appellations applied to concrete particulars. Ideally, the divine Logos grounded the homology between language

See also: Austronesian Languages: Overview; Cebuano; Code Switching; Ilocano; Tagalog.

Language Maps (Appendix 1): Maps 113–116.

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and reality, a direct relation that was obscured and fragmented in human language but that could be restored through proper language usage and faith.

Augustine adapted Stoic concepts and metalanguage for Christian semiotics and proposed a more mediated linguistic Platonism. Words were signs of things, and things were prior and external to language and the mind. Reality existed independent of cognition or language: "The thing itself which is neither a word nor the conception of the word in the mind, whether or not it has a word by which it can be signified" (*De dialectica*, c. 5). But language signified concepts that mediated speakers' perceptions of reality. Augustine distinguished different contexts for a word's usage: 'verbum,' a word uttered for its own sake, and 'dictio,' "a word spoken not for its own sake but for the sake of signifying something else." Unlike word as word, dictio brought to mind mediating concepts, 'dicibiles,' "which the mind not the ears perceives from the word and which is held within the mind itself." Following the Stoics, Augustine stated that words' immediate referents are the dicibiles in the mind, but their ultimate referents are the eternal reality of the divine Logos, comparable to Plato's forms. Contingent language linked mental concepts to the extralinguistic world, visible and invisible, but language was part of material, temporal reality and therefore subject to change and variation.

Etymological inquiry was an important strategy in grammatical Platonism, and Isidore of Seville's (c. 560–636) encyclopedia *Etymologiae sive origines* was the early Middle Ages' base text. Isidore combined Roman and Patristic grammatical thinking with Platonic, Aristotelian, and Stoic ideas on language: "Unless you know the name (*nomen*), the knowledge (*cognitio*) of things perishes" (1.7.1); "When you see from where/how a name (*nomen*) has originated, you grasp its essential potency/semantic motivation (*vis*) more quickly" (1.29.1–1.29.3). Isidore distinguished 'philosophical denomination' (derivation) based on verbal (phonological, grammatical) criteria from 'logos denomination' (origin) based on extraverbal (semantic) criteria. Reversing morphology in favor of Platonic universals, Isidore derived *homo* (human being) from *humanitas* (humanity), but stated that *homo* is "properly named" (*proprie . . . appellatus*) from *humus* (soil) (10.1).

In the Carolingian era, Alcuin (c. 735–804), Archbishop of York, reorganized Charlemagne's Palace School (c. 782–790) and promoted the study of rhetoric and logic along with grammar. Like Isidore, Alcuin combined traditional definitions of terms (*etymologia*) with dialectical explanations for grammar keyed to Aristotelian predicables (*definitio*). He derived *littera* 'letter' from *legitera* (*iter legendi*, 'path for readers'), but he defined *littera* as "the minimum part of meaningful sound" and "indivisible elements," definitions drawn from technical grammar based on verbal criteria (*De grammatica*). Words (names), he stated, are properly understood when we know not only their etymologies but also their "reasons" or "causes," which are captured in ancient logic's categories (predicates) of existents.

Carolingian Neoplatonic grammar prompted questions about the reference of negative terms. In *De substantia nihili et tenebrarum* (*On the substance of nothingness and shadows,* c. 800), Fredegisius of Tours asked whether nouns such as *nothing* or *shadows* referred to any existent. Using syllogistic reasoning and scriptural authority, Fredegisius asserted that finite nouns signified either real entities or real concepts. A meaningful word must signify some aspect of Being: "*Nothing* [the word] signifies something. Therefore *nothing* signifies that which is, that is, an existing thing." At creation, God simultaneously imposed (impressed) names on things. These original names are themselves aspects of primordial being.

Eleventh- and 12th-century grammatical Platonism and linguistic realism made more direct use of Platonic and Neoplatonic texts, especially the *Timaeus*, and Boethius' theory of participation (in his *Commentary on Aristotle's* De interpretatione, *On the trinity*). Denominative nouns or paronyms have signification, in that the thing signified participates in a form (aspect of Being) that causes the thing to be what it is. Both the abstract name and the denominative name participate in the form, but they express different aspects (substance or quality) of the form's 'proper' name. Thierry of Chartres (d. c. 1156) took such linguistic realism further. Thierry emphasized Plato's theory of the originary imposition of names, so that rather than being an aspect of being, "Nouns in fact give essence to things." Reworking Augustine's theory of seminal language, Thierry claimed that "Form and name accompany each other. The form cannot exist without the name . . ." (*Lectiones,* II, s. 52; s. 53). The study of metaphor and dialectic attempted to grasp more clearly this creative unity of form and name (*vocabulum*).

In *De grammatico*, Anselm of Canterbury (1033–1109) proposed a powerful theory of paronyms to resolve paradoxes regarding the use of nouns and adjectives. Grammarians (Priscian) had defined the noun as a word that "properly signifies substance and quality." Paradoxically, the noun *grammaticus* in different contexts signified either a 'grammarian' (N) or 'grammatical' (ADJ). Therefore, Anselm distinguished substance nouns (*homo*, 'man') from quality nouns (*grammaticus*, 'grammarian').

Whereas *man* signified a substance "in itself and as one," *grammarian* signified directly the discipline of Grammar and only indirectly appellates the individual called a 'grammarian' as an accident (quality) of the discipline. Theories of paronyms and participation influenced theological debates about the Eucharist and the Trinity.

Bernard of Chartres (early 12th century) and other *nominales* using Platonic realism emphasized the semantic unity of names and verbs. Derived nouns (denominatives) and derived verbs signified the same thing as primary nouns "but with different consignification," that is, different grammatical functions and forms. *Albedo* ('whiteness') referred to the color itself, while *albet* ('it grows white') and *album* ('white') referred to the quality of whiteness participating in substance. Semantic unity preceded grammatical difference (see John of Salisbury's account in *Metalogicon*).

By the early 12th century, Aristotle's logic and other writings and Priscian's grammar had become core texts in university arts curricula. Departing from grammatical Platonism, many philosophers, theologians, and grammarians adopted Aristotle's modified realism as a framework for language philosophy:

> Things spoken are symbols (*symbolon*) of affections of the soul; things written are symbols of things spoken. As letters, so also are the sounds not the same for all people. But the affections of the soul of which these [words] are primarily signs, are the same for all [people] as are also the objects of which these [affections of the soul] are images (*De interpretatione*, c. 1).

Boethius's rediscovered and influential commentary on Aristotle emphasized both the conventionality of human language and the universality of cognition and the real world. Whereas Platonist theories of language privileged the original imposition of language (names) on reality, Aristotelian-influenced theories of language concentrated on dialectical analysis to grasp the formal properties and semantics of language as a signifying system. With Aristotle's newly available logic texts and Boethius's commentaries, philosophers such as Abelard (1079–1142) conceived the study of logic as the study of grammar.

Grammarians and philosophers increasingly emphasized the differences between reference and signification of individual terms as well as the signification of syncategorematic words (intensifers, conjunctions, qualifiers, etc.). For Abelard, sentences were bound up with that which they express; this was the beginning of a shift from linguistic realism to 'conceptualism' and 'nominalism.' Abelard laid the groundwork for an analysis of the double articulation of paronyms (*Dialectica*) and for much later medieval philosophy of language. Using more complex grammatical metalanguage, Abelard and other philosophers and theoretical grammarians posed linguistic questions in relation to questions of universals and sentence structure: Does a universal grammar exist for all languages? What are the proper definitions of the parts of speech? What are the criteria for grammaticality and semantic comprehension? How can we distinguish utterer's meaning, listener's meaning, and sentence meaning?

Twelfth- and early 13th-century debates about universals prompted philosophers and grammarians to ask whether languages manifested a single universal grammar or whether different languages instantiated different aspects of a set of possible grammatical elements. William of Conches (schoolmaster at Chartres, 1125–1140), in his *Glosule super Priscianum* (early version 1120s; later version 1140s), argued that the grammars of Latin and Greek articulated one and the same universal *grammatica* in different words: "Arts are therefore general and the same for everyone, although Greek explains them differently with different *voces*." Likewise, Roger Bacon (c. 1214–1292/94): "*Grammatica* is one and the same in substance [*substantia*] in all languages, although/even if [*licet*] it varies in accidents [*accidentia*]" (*Summa grammaticae*). But Peter Helias (c. 1100–c. 1166), in his influential *Summa super Priscianum* (1150), disagreed. He claimed that different languages have different grammars, each a *species* (instance) of a common grammar. One could write a grammar of a vernacular language, which would be a *species* of *grammatica*, for which Latin was the exemplar.

Philosophers and grammarians such as Abelard, Anselm of Canterbury, and Helias reformulated traditional grammatical definitions of the parts of speech and incorporated more dialectical metalanguage and explanations of the 'causes' for word classes as properties of syntax. While grounded in semantic unity, words used grammatically signified according to different modes of signifying (*modi significandi*) – that is, as nouns, verbs, participles, etc., that represented the same object or event in different verbal terms. Sharpening the *modi significandi* with Augustine's distinction between *verbum* and *dictio*, William of Conches identified four modes of signification among nouns: nouns signifying substances (common and proper nouns, *homo*, *Socrates*); nouns signifying something inherent in the substance (accidents, *albedo* 'whiteness'); nouns signifying imaginary entities (*chimaera*); and nouns signifying modes of speaking (syncategorematic terms, such as intensifiers and quantifiers). He also distinguished between 'nominal sense' and 'reference.' A noun's sense signified the general category or concept held in the mind; its

referent was the concrete particular, which may have been the word itself.

In the 13th and early 14th centuries, the philosophical grammarians known as '*modistae*' systematized this reanalysis of the *modi significandi*, parts of speech, and syntactic relations into a complex realist theory of language and grammar. Like Bacon, modistae such as Michel de Marbais (fl. 1240–1290), Boethius of Dacia (fl. 1265–1280), and Thomas of Erfurt (fl. 1300) argued that grammar was properly concerned with the underlying universal structures common to all languages. Grammar was a speculative (theoretical) science and treated the parts of speech as aspects of syntax and procedures for combining words into grammatical sentences (congruity, government), with Latin as the exemplar for all languages. The modistae produced a coherent realist theory of language that systematically linked word class properties with the properties of mental concepts and then with the properties of universals standing behind material instantiations. They took the original imposition of names on reality as given, while Latin's linguistic features constituted a second imposition of grammatical difference (*see* **Linguistic Theory in the Later Middle Ages**).

Such views did not go unchallenged. In the late 11th century, Abelard had criticized Aristotelian realism regarding language, grammar, and meaning and argued that the modes of signification and Aristotle's categories were features not of reality but of how language described reality (*Logica* 116.35–117.2). For Abelard, the modi significandi were conventionally related to referents and therefore the dialectician would use logical criteria to sort out word–thing relations and contingencies of utterances such as speakers' perceptions, intentions, and communicative situations. Logical analysis was the analysis of language and communicative contexts.

In the 13th century, nominalist philosophers and theologians criticized the speculative grammarians' realism on grounds that their complex elaboration of modes of signifying and consignifying did not really explain anything about grammar or meaning. William Ockham (c. 1280–1349) asserted that only particulars existed in the real world, and they could be known as objects of sense (external to the mind) or intellect (internal to the mind). Ockham's theory of language, which relied on Aristotle and Augustine, foregrounded empirical epistemology rather than ontology. For Ockham, thoughts and concepts were natural signs 'naturally' occurring in the intellect as mental language with no grammatical features, while language was a system of conventional (artificial) signs discursively standing in for objects or added to propositions to generate utterances: "Hence the concept signifies something primarily and naturally, while the word signifies the same thing secondarily" (*Summa totius logicae*, I.C.i).

Ockham's critique of the realist theory of universals addressed grammatical concepts and metalanguage for the parts of speech and syntax. Categorematic terms (nouns, verbs, adverbs, adjectives) had fixed, definite significations, while syncategorematic terms (conjunctions, prepositions, verb *to be*, intensifiers, quantifiers) did not have fixed, definite meanings, nor did they have definite significations apart from the meanings of the categorematic terms to which they were attached. Absolute terms (*whiteness*) signified objects directly without also signifying something else indirectly, whereas connotative terms (*white*) signified objects directly (color in its materiality) and indirectly something else associated with the objects (concept of *whiteness*).

To account for concepts and the contexts in which words could signify them, Ockham developed his theory of 'imposition' and 'supposition,' based in part on ancient semiotics. 'First imposition' was the assignment of a word to an object directly; 'second imposition' was the assignment of a word (abstract noun, universal term, metaterm) to signify other words. Grammatical metalanguage and the terms for parts of speech were examples of second imposition. Words of first imposition could be common or proper names, concrete or abstract nouns, finite or infinite verbs. 'Personal supposition' occurred when a word signified an individual object ("every man is an animal") that it was a sign of by convention in language. If the concept or general meaning signified by a word became itself the object of discourse, then the word had 'simple supposition' ("man is a species," where *man* signified my mental concept of humans). If the word as linguistic object was the object of discourse, then the word had 'material supposition' (e.g., "the word *word* is comprised of four letters and four phonemes"). For Ockham, spoken language was subordinated to mental language, such that grammatical features are transferred to the mental level and thought is articulated internally in words unlike in any language.

Not all nominalists took Ockham's route. For example, John Buridan (c. 1292–c. 1359), who worked on semantics and empirical science, accepted many nominalist assumptions but criticized Ockham's logic and also Aristotelian syntactic and semantic realism for not paying enough attention to intentions and contexts. Buridan claimed that only particulars existed, but his semantic theory took account of contingent modes of description. The nouns *Socrates* and *man* signifed the same individual reality, perceived in different contexts. Buridan argued that a

general term (*whiteness*) named a real quality shared by individuals designated by the same term (*white*). But he was skeptical that concept words could have determinate signification.

Buridan combined logic and syntactic analysis to discuss the truth values of individual utterances known as 'fallacies' (*sophismata*). From Aristotle, he took the premise that a proposition signified only those things signified by its categorematic terms in the mind of a language user (*Sophismata*, c. 1, concl. 8). Similar to intentionalists of the time, Buridan claimed that syntax and context were essential to conceptual understanding. Formal grammar alone did not account for how sentences could be understandable. No two people could know precisely the same thing unless they understood precisely the same utterance. While active and passive constructions might have had the same referent, the one who perceived the active sentence understood something different (sense) than the one who perceived the passive sentence, because the categorematic terms were related in different grammatical constructions. Temporal or modal words in a sentence 'ampliated' or constrained the supposition of at least one of the sentence's categorematic terms (*Sophismata*, c. 5). Likewise, verbs such as *understand, know, believe,* and *be acquainted with* constrained the connotations of terms with which they occur (*Sophismata*, c. 4) and thus created secondary suppositions. Take the sentence *You know the one approaching*: the person addressed may or may not recognize the one approaching as her father. Since she knows her father, the statement is true if she knows him "according to the reason for which he is called the one approaching" (*Sophismata*, c. 4, h. 8) – that is, according to the supposition of the term *one approaching* ampliated by the verb *know* and embedded in a relative or conjunctive (hypothetical) clause.

Expanding rather than abandoning Aristotle's logic and conceptual theory of language, nominalists like Ockham and Buridan and contingency realists like Aurifaber (14th century) disrupted the modistae's Aristotelian realist language epistemology. Questioning the possibility of a universal grammar, they gave new impetus to the study of individual languages and their particular grammatical as well as communicative features.

See also: Aristotle and the Stoics on Language; Bacon, Roger (c. 1214-1292/4); Grammar; Language of Thought; Linguistic Paradigms; Linguistic Theory in the Later Middle Ages; Nominalism; Peter Helias (12th Century A.D.); Plato's Cratylus and Its Legacy; Priscianus Caesariensis (d. ca. 530); Realism and Antirealism; Roman *Ars Grammatica*; William of Conches (ca. 1080–1154).

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Philosophy of Linguistics

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The philosophy of linguistics concerns itself with the nature of human language and of linguistic inquiry. The central issues concern epistemology and ontology. 'Epistemology' is the branch of philosophy dealing with the nature of knowledge – in this case linguistic knowledge. 'Ontology' is the branch of philosophy dealing with reality, with what exists (is there only one kind of reality, or should we speak of a pluralism of realities?). In the philosophy of linguistics, the main ontological question is whether we can reasonably claim that there are linguistic realities, or a single linguistic reality, as distinct from other kinds of reality. Epistemology and ontology are closely intertwined, especially if we assume that there are linguistic realities, and that they constitute a kind of knowledge. The philosophy of linguistics is closely connected with issues in the philosophy of science, which concerns itself with questions such as: is there such a thing as scientific knowledge, distinct in kind from other sorts of knowledge? Is it possible to distinguish scientific theories from other sorts of theory? If so, how? Is there such a thing as a scientific method? If so, how do we characterize it? What makes it different from other methods? Clearly, we cannot say whether, or to what extent, linguistic inquiry might be scientific unless we have some sense of what we mean by 'science.' Furthermore, given that philosophers of science disagree on the answers to the questions just raised, linguists must adopt a particular philosophy of science if they are to argue that linguistic inquiry is scientific in nature.

To set out the range of positions that have been proposed in the philosophy of linguistics, let us begin with a distinction made within the philosophy of science literature and then relate it to positions adopted within linguistics. Some philosophers of science, notably Feyerabend (1975), argued that there is no valid distinction to be drawn between scientific and nonscientific knowledge, that the idea of 'scientific method' is an illusion. Those who have denied this include Popper (1959), who argued that there is such a thing as scientific method, and thus scientific knowledge, distinct from nonscientific knowledge. But he disagreed with the views of the members of the Vienna Circle, a group of scientists and philosophers working in the Vienna in the mid-20th century, who embraced a position known as 'logical positivism.' The logical positivists (e.g., Moritz Schlick) argued that scientific knowledge is firmly and exclusively based on observation, and that, because of this, scientific theories, unlike nonscientific theories, can be proven, yielding knowledge that was certain (indubitable). They went further than this: they argued that statements that are not scientific (on their understanding of the term) are literally meaningless. Their position is often referred to as 'verificationism,' since they believed that scientific theories could be verified (proven) via observation of the physical world. Although Popper believed, like the logical positivists, that there was such a thing as a scientific method, and thus scientific knowledge, he disagreed with the idea that science yields certain knowledge via verification. Instead, he argued for 'fallibilism,' the idea that our scientific hypotheses are always fallible, and that we can never have knowledge that is absolutely certain. Popper rejected verificationism and adopted, in its place, 'falsificationism': he believed that the hallmark of scientific hypotheses was falsifiability: if a claim about the world was framed in such a way that it admitted of counterevidence, then it was falsifiable and thus scientific. There is a connection between this idea and the idea of the content of a hypothesis: the more a hypothesis excludes (the more states of affairs it rules out), the more it is claiming about the world. Popper believed that scientific inquiry rested on a process of hypothesis formation, deduction of the consequences of our hypotheses, and testing of those consequences. This is known as the 'hypothetico-deductive method.' If a falsifiable hypothesis is tested and falsified, then we may retain it until a better hypothesis emerges, abandon it, or modify it. For Popper, this was what allowed us to make scientific progress. But even if a testable hypothesis has not been falsified, that does not warrant the conclusion that it is true: for Popper, our scientific knowledge was always open to the possibility of being falsified and abandoned. Popper also rejected the view that nonscientific claims were meaningless. In its place, he argued that a given idea may begin by being nonscientific (unfalsifiable) but nonetheless meaningful, to being falsifiable, and thus scientific. An example he gave of this was the idea that the earth revolved around the sun, an idea that has its roots in Greek mythology but that eventually became scientific.

Popper's views on the scientific method were combined with another central plank in his philosophy of science: 'scientific realism.' By this he meant the idea that there are aspects of reality that are amenable to scientific inquiry but are not themselves directly observable. Examples of these are gravitational force and electromagnetic forces: we cannot, in principle, observe these, but we can observe their effects. For

Popper, it was thus valid for scientists to postulate unobservable aspects of reality and to make testable claims about them. This clearly flew in the face of the positivist claim that scientific knowledge concerns only that which is observable. Opponents of scientific-realism adopted a position referred to by Popper as 'instrumentalism,' since they argued that theoretical constructs in science were no more than that: they were instruments for systematizing and making predictions about observable phenomena. Under an instrumentalist approach, we are not warranted in saying that our constructs correspond to theory-external objects and events in the world. The term 'phenomenalism' is also used for this position. Thus, all talk of unobservable 'forces' is nothing more than a way of talking about observable phenomena: the instrumentalist withholds any ontological commitment of the sort that claims that various forces actually exist.

The distinction between positivism, with its instrumentalist, antirealist outlook, and scientific realism had an effect on modern linguistics. During the mid-20th century, many linguists (notably, the 'post-Bloomfieldians') working in the United States argued for an instrumentalist interpretation of linguistic constructs, such as 'the phoneme' and 'the morpheme.' It is arguable that they had been influenced by the logical positivists, either directly or indirectly. In insisting that linguistics, to be scientific, had to concern itself only with that which was observable, they were committed to a position that was antimentalistic, since mental states and processes are, by definition, unobservable. This outlook was combined with a positivistic conception of psychology, often referred to as 'behaviorism,' the view that a properly scientific psychology should concern itself only with observable behavior and not with unobservables.

It is arguable that much of Noam Chomsky's thinking (1965, 1993, 2002 and elsewhere) about the nature of linguistic inquiry is in line with Popper's thinking about science. Like his immediate predecessors in the United States, Chomsky believed that the kinds of linguistic inquiry he was engaged in (generative linguistics) were scientific in nature. But, unlike them, Chomsky adopted scientific realism: he argued that science is not limited to observables. It is Chomsky's scientific realism that allowed him to embrace mentalism in the study of language: freed from the insistence that science concerns itself only with that which is observable, Chomsky could allow that there are linguistic realities that are mental in nature, in stark contrast to the antimentalistic stance of his immediate predecessors. He went further than this: he insisted that linguistic realities are exclusively mental. More specifically, they are mental states, not processes, and they are strictly internal to individuals. Thus, linguistic inquiry was a branch of individual psychology for Chomsky. This clearly flies in the face of any social conception of the object of linguistic inquiry, which Chomsky labeled 'E-language,' where the 'E' means 'external to individual minds.' In contrast, he insisted that the object of inquiry in linguistics is 'I-language,' where the 'I' stands for both 'Individual' and 'Internal' (to the mind). This is Chomsky's 'internalism.' Connected with this is Chomsky's insistence that language is not designed for use. This is not intended to mean that language is not, in fact, used for communication (no one could deny that it is); rather, communicative use is not what language is for. This is Chomskys' 'antifunctionalism': in his view, language is not driven by communicative function. Rather, language is for thinking: language and thought are intimately connected, for Chomsky. Connected with this is the long-standing distinction between 'competence' and 'performance': for Chomsky, the object of inquiry is not observable utterance phenomena (performance), or acts of online mental processing of utterances (which also falls within performance), but the knowledge (competence) that allows performance (use of that knowledge) to take place. The choice of terminology was unfortunate, since in everyday parlance, 'competence' denotes the ability to perform in some domain, as in *John's competence as a manager is unquestionable*. But Chomsky long since insisted that his conception of linguistic knowledge was not to be interpreted as knowing how to do something; nor was it to be interpreted as knowing that something is the case. Rather, linguistic knowledge was an unconscious mental state that grew in the mind of the child.

This notion of growth is a biological one: according to Chomsky, language 'acquisition' (the term is inappropriate in discussing Chomsky's views, since, for Chomsky, language is not acquired – it is innate) was not something that a child did: it was something that happened to the child. In this view, 'language acquisition' is a process of biological growth. This constitutes Chomsky's 'naturalism': the view that language belongs to the natural world and not to culture, a view that is controversial. A central component of Chomsky's naturalism was his claim that human beings are born with linguistic knowledge, that there is innate cognitive content that is specifically linguistic. This is often referred to as the 'innateness hypothesis,' although Chomsky disliked the term on the grounds that everyone agreed that there are innate cognitive capacities: the question is what they might be. In arguing for innate linguistic knowledge, Chomsky adopted a version of 'rationalism,' often referred to as 'nativism.' In the history of philosophy, rationalism is most frequently associated with the

work of René Descartes, who argued that not all human knowledge is acquired through interaction with the mind-external world. Rather, he argued that there is innate cognitive content, often referred to as the 'Cartesian doctrine of innate ideas.' Chomsky explicitly associated himself with the Cartesian tradition and has elaborated a specifically linguistic version of rationalism. The Chomskyan version of the doctrine of innate ideas is that we are born with a universal set of semantic primitives, out of which specific word meanings are constructed. Although the terms 'nativism' and 'rationalism' tend to be used interchangeably, some definitions of nativism claim only that it amounts to allowing that there are innate cognitive capacities, a view that is consistent with 'empiricism,' a doctrine that has various versions, but that emphasizes the role of our experience with the mind-external world in acquiring knowledge. Empiricists need not deny that we are born with innate cognitive capacities of various sorts (such as the capacity for forming inductive and analogical generalizations); where empiricists in linguistics disagree with Chomsky is in denying that innate, specifically linguistic, knowledge exists.

Another central plank in Chomsky's philosophy of linguistics is his adoption of 'modularism,' the view that at least some aspects of the mind are modular in nature. By 'module' he meant a distinct component of mind devoted to a specific cognitive domain (such as language, or recognition of familiar faces, or the visual system as a whole). The notion of modularity of mind is associated with the work of Fodor (1983), who suggested a set of defining properties of mental modules, including the property of being 'encapsulated.' The idea behind encapsulation is that the internal workings of a mental module are unavailable to other aspects of the mind. However, the output of a module is available to other aspects of the mind. For instance, we cannot access the inner workings of the module of mind that compels us to suffer optical illusions, but we do access the output of that module. Like Fodor, Chomsky never believed that the mind is entirely modular, but he did consistently espouse linguistic modularity: he believed that the mind contains an innately endowed language module. He also followed Fodor in believing that the mind contains a central processor that is nonmodular and that is used in, among other things, the fixation of beliefs. Our experience of optical illusions provides us with an example of the distinction between the modular visual system and the central processor: while the central processor can arrive at the belief that a given picture constitutes an optical illusion, it cannot override the output of the visual system. Knowing that a picture is illusory does not allow us to escape from experiencing the illusion. Fodor claimed that the central processor contains a 'Language of Thought' (LoT), which is said to be innate. The LoT is said to be a universal set of semantic primitives that has a syntax of its own, allowing for the construction of complex concepts out of a set of semantic primitives. One of the arguments in favor of the LoT is the claim that language acquisition involves entertaining hypotheses about the structure of the language to be acquired: such hypotheses cannot be formulated unless there is an innate LoT for them to be formulated in. One important difference between Chomsky and Fodor is that, when Fodor spoke of language as a mental module, he conceived of it as an input/output module that receives certain kinds of output from the mind-external world, processes it, and creates an output. For Chomsky, input/output modules were distinct in kind from the innermost cognitive system, which constitutes language.

An alternative recent approach to modularity can be found in the work of Karmiloff-Smith (2001), who argued that, rather than postulating innate mental modules, we should postulate, in addition to general cognitive capacities, innate biases in certain domains, which then evolve into a modular organization. This notion of emergent modularity is part of Karmiloff-Smith's 'constructivism,' according to which a child actively constructs a mental grammar, revising his or her own internal representations during the course of development. This stands in contrast to Chomsky's passive conception of language acquisition. The work of Karmiloff-Smith occupies a midway position between rationalism and empiricism. A more overtly empiricist approach to linguistic knowledge was adopted by the linguist Geoffrey Sampson (1997), who opposed linguistic rationalism for several decades. Sampson claimed that the arguments given in support of nativism do not hold up to close scrutiny. Instead, he argued that the child starts with a blank slate, but with the capacity to learn via the hypothetico-deductive method. On this view, language acquisition is learning, a view entirely at odds with the Chomskyan view.

Others have objected to the ontological status of linguistic objects proposed by Chomsky. Among these are Katz (1981), who argued for Platonism in linguistics. Arguing against Chomsky's psychologism (the view that linguistics is a branch of psychology), Katz's view, which is a version of realism, was that there are linguistic realities but they are 'abstract,' in the sense of being Platonic in nature: they are not spatiotemporal (they do not exist in space and time). Katz was a semanticist who argued, among other things, that the existence of necessary truths in language leads us inexorably to Platonism, since necessary

truths are timeless: they predate human psychological states. Katz also argued that, since the notion 'knowledge of' is a two-place predicate, the notion 'knowledge of language' presupposes linguistic objects of which we have mind-internal knowledge. Knowledge of the structure of a sentence, Katz argued, is distinct from the structure of the sentence *per se*. Engaging in acts of intuitive grammaticality judgment entailed, Katz claimed, our gaining direct access to abstract Platonic objects, rather than gaining access to mind-internal states, as Chomsky argued. Note that Chomsky's use of the term 'knowledge' did not, in fact, appeal to a two-place predicate: linguistic knowledge was not knowledge of something, for Chomsky. Katz argued not only that linguistic objects such as sentences were Platonic objects, but that specific languages such as French and Spanish also had this status. For Katz, linguistics was on a par with mathematics, as one of the 'sciences of the intuition': just as mathematical objects are (according to Katz) mind-external Platonic objects to which we can gain intuitive access, so are sentences. A less radical version of antipsychologism was the view, first proposed by Roger Lass (1976), that linguistic objects are intersubjective in nature, specifically that they belong to the ontological category referred to by Popper (1972) as 'world three.' Popper argued for 'ontological pluralism,' the view that the world is open-ended and that new sorts of reality can emerge. For Popper, 'world one' was the world of inanimate physical objects and events. 'World two' was the world of mental states, which emerged with the emergence of life forms, particularly those with minds. 'World three' was where Popper believed scientific knowledge belonged: he regarded scientific theories as objective knowledge, intersubjective in nature. His principal argument was that our scientific theories may contain logical consequences that might, at a given stage in scientific history, remain unnoticed, later to be discovered. Popper believed that such consequences are real, even before being discovered, and that they therefore must be said to exist independently of our subjective mental states. Carr (1990) later elaborated on Lass's idea, arguing that linguistic knowledge is objective knowledge in the Popperian sense, while also arguing that generative linguistics is scientific in the Popperian sense.

A distinct version of linguistic knowledge as mutual knowledge can be found in the work of Itkonen (1978), who argued that the central notion in language is the notion of socially constituted rules or norms. Itkonen distinguished spatiotemporal events such as rocks rolling down hills, from our actions, which necessarily contain a component of intentionality. It is social actions that are central to Itkonen's thinking: he argued that socially constituted norms (rules) formed the basis for linguistic behavior. These norms (conventions) are the object of grammatical inquiry for Itkonen, and since they are social in nature, the object of grammatical inquiry is social, not mind-internal.

A more recent approach to the question of the respective roles of nature and social conventions can be found in the work of Noel Burton-Roberts (see Burton-Roberts and Carr, 1999). Burton-Roberts adopted a version of naturalism; he advocated 'radical internalism,' the view that the only coherent conception of Chomskyan internalism is one under which the contents of innate linguistic knowledge are not in any sense internalized. 'Internalization' implies setting up mind-internal representations of events or objects that are mind-external. This, Burton-Roberts argued, is not what Chomsky intend when he advocated internalism. He agreed with Chomsky that radically internal language is 'austere' in the sense that it has no access to other aspects of mind that contain internalization of properties of the mind-external world, such as linearity (sequentiality), derived from the linear sequencing of the speech signal. Knowledge of the conventions regarding the sequences of phonemes, morphemes, and words in a specific language is 'internalized knowledge' for Burton-Roberts. The place of phonology was a central concern for Burton-Roberts (see Burton-Roberts 2000), since sequencing is a defining feature of phonology. The relationship between phonology and semantics was equally important for Burton-Roberts, since that relationship was both arbitrary and conventional. He argued that if one allows, as Chomsky did, that phonological knowledge is part of radically internal linguistic knowledge, then one compromises radical internalism by incorporating that which is conventional into that which is natural. The distinction between that which is radically mind-internal and that which is internalized is crucial here. That which is radically internal to the mind has not been internalized from the mind-external world. That which is internalized, such as the mental image of a familiar face, is not radically internal: it results from internalizing aspects of the mind-external world.

Burton-Roberts distinguished a generic conception of language from the Chomskyan naturalistic conception of language. The former appealed to a notion of the universality of the notion 'language' by generalizing over all human languages: 'language' here is the generic term for the set of all languages. In this view, a specific language is an 'instantiation,' or 'token,' of the type 'language.' The generic conception of language lends itself to an instrumentalist interpretation: the notion 'language' can be seen as a construct

that has no reality beyond the specific languages which it ranges over. The naturalistic conception of language appeals to a notion of 'language' as something quite independent of particular languages: the reality of language, in this view, does not reside in particular languages. Rather, 'language' is the innate linguistic knowledge shared by all members of the species. The naturalistic conception of language lends itself to a realist interpretation: 'language' as a biological reality. The generic conception of 'language' embodies a methodological claim: that the way to understand the notion 'language' is to investigate particular languages. In this view, strong universals are properties attested in every human language that one will ever encounter, whereas weak universals are tendencies within the world's languages. The naturalistic conception, on the other hand, embodies an ontological claim: that the notion 'language' denotes an object in the biological world. Universals here are the properties of that object. Burton-Roberts argued that Chomsky's conception of I-language is inconsistent in that it vacillates between the generic and the naturalistic conceptions of language. This is so because Chomsky takes phonology, and thus linearity, to constitute part of naturalistic I-language. For Burton-Roberts, linearity and conventionality necessarily lay outside of language conceived of in naturalistic terms (since conventions are social in nature: they belong to culture, not nature; conventions are not given by biology). Crucially, Burton-Roberts argued that Chomsky was mistaken in regarding the relationship between 'language' (understood in the naturalistic sense) and particular languages as one of instantiation, since this amounted to incorporating an aspect of the generic conception into the naturalistic conception. Burton-Roberts argued that, if we are to sustain the naturalistic conception, we must replace the relation of instantiation with one of 'physical representation': specific utterance phenomena are mind-external physical representations of the contents of the language module. Burton-Roberts was at pains to point out that physical representation is entirely distinct from instantiation: that which is a physical representation of something is not thereby an instantiation of it, just as Magritte's painting of a pipe is not itself an instance of a pipe. For Burton-Roberts, particular languages are acquired, phonologically constituted, conventional systems for physically representing a single, natural, innate language. Burton-Roberts's main epistemological point was that knowledge of the representational conventions of a specific language is quite distinct from innate linguistic knowledge: it is acquired, internalized from the mind-external world. It is conventional, not natural, in character. Burton-Roberts was thus able to accommodate many aspects of empiricism (such as implicit and explicit learning, analogical and inductive generalization) into his conception of the acquisition of a language, while retaining Chomskyan rationalism. Interestingly, Burton-Roberts's position raises the question of whether there is any distinction to be made between the idea of an LoT and the idea of an innate language module: both have been said to contain a universal set of semantic primitives and a recursive combinatorial syntax, yielding linguistic expressions that have hierarchical structure. If no distinction is to be drawn between the two, then innate language is simply the innate LoT, which is nonmodular in nature. One then ends up with a version of naturalism that denies that there is a language module, while allowing that our knowledge of conventions of physical representation may become modular in the course of development.

Another recent approach to the language-versus-culture debate surrounding the nature of linguistic knowledge is that adopted by Levinson (2001, 2003a, 2003b). Levinson and colleagues resuscitated a version of the Sapir–Whorf Hypothesis, according to which the categories of the language one has acquired shape, to some extent, cognitive content and mental activity. Levinson claimed that, on the basis of a wide sample of languages, it is possible to conclude that there are three main kinds of Frame of Reference (henceforth FoR) for expressing the spatial location of an object relative to other objects on a horizontal plane. First, there is an 'egocentric' (viewpoint-dependent) or 'relative' FoR (what counts as left or right is relative to one's location: turn around 180 degrees and right becomes left), as in *The ball is to the left of the tree*. Second, there is a 'geocentric' or 'absolute' FoR (what counts as north or south is not relative to one's location), as in *The ball is to the north of the tree*. Third, there is an 'object-centered' or 'intrinsic' FoR. This latter kind of FoR involves locating an object A with reference to the partitioning of another object B into parts and the projection of an axis from the centre of object B through one of its parts, as in *The ball is at the front of the truck* (Levinson, 2003a: 8), where object A is the ball, object B is the truck, and the relevant part of object B is the front of the truck.

Levinson claimed that it has been assumed by nativists that concepts such as 'left' and 'right' are universal, since they are necessarily innate in the nativist view. Crucial to Levinson's argument is the claim that not all languages possess all three systems, but that any given language will possess at least one. Note that the conception of universalism appealed to here is the generic conception, not the naturalistic one: Levinson's argument here does not necessarily

undermine a consistently naturalistic conception of the notion 'language.' Importantly for Levinson, some languages (e.g., Oxchuc Tzeltal, an American Indian language spoken in Mexico) have no 'relative' spatial expressions at all. In such languages, one cannot say *The ball is to the left of the tree*; rather, one has to express the spatial location by means of absolute terms, such as *The ball is north of the tree, Please pass the plate to your east,* or *Take the first turning to the south* (but not *Take the first turning on the right*). Equally, in work with Majid *et al.* (2003), Levinson and colleagues argued that speakers of the Australian language Guguyimidjir entirely lack both relative and intrinsic FoRs and use only absolute FoRs, so that even the description of the location of an object on a body part is described, and conceived of, in absolute terms, as in *There's an ant on your south leg.* Levinson argued that the conceptual representations we use in nonlinguistic thinking vary depending on the language we have acquired, a strikingly Whorfian claim that has incited opposition among broadly Chomskyan linguists such as Li and Gleitman (2002). Levinson and colleagues carried out experiments in which a set of languages were classified as absolute, relative, or mixed and required speakers of those languages to carry out nonlinguistic tasks involving the spatial location of objects. In one such task, reported in Levinson (2001: 578–579), subjects were shown three different toy animals in a row on a table and asked to memorize the order in which they appeared. The subjects were then turned around by 180 degrees, taken to another table, and asked to place the objects in the same order they had seen them in. When he compared speakers of Tzeltal, who have a language with an absolute FoR to describe objects in a row, he found that they placed the objects in the opposite order from the way they were placed by speakers of Dutch, which uses a relative FoR: the subjects seemed to be memorizing the rows of objects in a way that was consistent with the FoR given by their native language.

The claims made by Levinson are clearly of considerable importance in debates about the nature of language, since they rest on the claim that both nature and culture play a role in linguistic knowledge. For Levinson, there is coevolution of language, nature, and culture, and cultural variation subsumes linguistic variation, which results in variation in 'cognitive style.' Levinson's work offers new empirical observations on the relative roles played by nature and culture in human language.

See also: Behaviorism: Varieties; Chomsky, Noam (b. 1928); Cognitive Science and Philosophy of Language; Katz, Jerrold J. (1932–2002); Language as an Object of Study; Linguistics as a Science; Modularity of Mind and Language; Modularity; Philosophy of Science and Linguistics; Plato and His Predecessors.

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Philosophy of Mind

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A mind is something that thinks. Most humans have minds and probably some animals do too. Minds are usually contrasted with bodies, which all organisms have, or brains, which only some have. Consciousness, intentionality, and rationality are characteristic of minds. If you are conscious, there is something it is like to be you (Nagel, 1974). There is something it is like to have the sorts of experiences that you have, e.g., hearing the birdsong outside your window, feeling the keys give way under your fingers, and seeing your office assistant go to sleep (see 'consciousness, thought and language'). By contrast, there is nothing it is like to be a stone – not even a rolling one. Another central feature of mind is its intentionality; the fact that our thoughts and feelings are *about* something (Brentano, 1874/1995). When I believe that I'm going to be late, my belief is about my lateness, and when I want an apple, my desire is about me having an apple. Stones, by contrast, aren't about anything. It may be thought that I can feel nervous, feel anxious, or be in pain, without being nervous or anxious about anything and without my pain being about something (Searle, 1983). However, when we consider carefully what these states might be about, it is possible to see how they could be about some state of the body or the world which they represent in a particular light. Undirected anxiety is about one's relation to a world which is perceived as disturbing, depression is about one's being placed in an inherently meaningless and gray world, and pain is about a part of the body in a particular light – as hurting. Intentionality can be seen as a feature of all mental phenomena (Crane, 1998).

But to think of the mind merely as something that is conscious and intentional leaves out another feature that is characteristic of thought: rationality (Davidson, 1980). Thoughts can be rational or not. Usually, they make some sort of sense. They follow on one another in a reasoned or rational way. For instance, 'it's raining,' 'I don't want to get wet,' 'I'll bring an umbrella' is a typical train of thought. The thought that I should bring an umbrella makes sense in the light of my earlier thoughts. Usually, thoughts cause other thoughts and actions in a largely rational fashion, such that we can see how they make sense in the light of one another. By contrast, a stone might roll down a hill for a reason – because I kicked it, say – but that is not to say that *it* has a reason for rolling down the hill.

The fact that there are features of the mind that seem special by comparison to features of physical objects has lead to the so-called mind-body problem. The problem is that the ways in which the mind and body **could** be related fail to do justice to our basic intuitions about the nature of mind and body. Inevitably, some intuitions must be jettisoned in any theory about the nature of mind. Dualists prefer to salvage our intuitions about the mind at the cost of our intuitions about physical causation. Idealists sacrifice our intuitions about the body and physical objects more generally for similar reasons, and materialists salvage our intuitions about the body at the cost of our intuitions about the mind.

René Descartes famously argued that the mind is separate from the body because it possesses properties that can clearly be seen as being different from those of the body. It is a thinking, non-extended thing or substance, whereas the body is a nonthinking, extended thing or substance. This is known as substance dualism. Others argue that since we can imagine beings just like us in all physical respects (zombies), but for whom there is nothing it is like to be them, there must be distinct physical and mental properties (Chalmers, 1996). This sort of dualism, property dualism, is the only form of dualism defended by philosophers these days. A major problem for dualists is to account for how the mental interacts with the physical. Sometimes the problem is put like this: physical effects have only physical causes, mental properties have physical effects (behavior), therefore minds are physical. One way to avoid this difficulty, known as epiphenomenalism, is to claim that mental properties have physical causes, but no physical effects (Jackson, 1982). But many think this is too high a price to ensure the specialness of the mental.

Most philosophers today are materialists/physicalists. Materialists are monists, since they believe that there is only one kind of substance or property,

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Most philosophers today are materialists/physicalists. Materialists are monists, since they believe that there is only one kind of substance or property,

namely a **material** substance or property. Idealists are also monists, but instead of thinking that the world is entirely material, they believe that it consists solely of minds and ideas. Although idealism has had its share of forceful proponents through the centuries (e.g., Berkeley, 1710/1982), it is now widely believed to be indefensible. By contrast, materialism used to be a minority position, even a dangerous one. The Greek atomists first suggested that everything is made up of physical particles, and the Epicureans and Stoics accepted the idea. In the intervening centuries the idea had remarkably little following until the 20th century (with the notable exceptions of Hobbes, 1651/1968, La Mettrie, 1748/1981, and D'Holbach, 1770/1991).

Identity theories hold either that each type of mental state is identical to a type of physical state, e.g., 'pleasure = endorphine release', or that each instance or token of a mental state is identical to a token (i.e., instance) of a physical state, e.g., 'pleasure at time t = endorphin release at t' (see 'type vs. token'). The latter is a weaker claim than the former because I need not always feel pleasure when endorphins are released, nor are endorphins released whenever I feel pleasure. But so-called token identity theory is so weak that it does not allow of generalizations or predictions. Because 'pleasure = endorphin release' is only sometimes true, knowing that I am releasing endorphins cannot help me predict that I will feel pleasure.

One way to figure out what mental states are identical to what physical states is by determining their causal roles. The mental state that has the same causal role as some physical state is identical to that state (either as a token or a type). This position is known as functionalism. For instance, pleasure is the state that is typically caused by eating good food, drinking good wine, being amused, having sex, etc., and typically causes the belief that one is feeling good, causes one to smile, relax, and so on. The physical state that is caused by eating good food, etc. and that causes smiling, etc. is the one that is identical to pleasure. Of course, it is unlikely that pleasure is identical to just one physical state type, in this case endorphin release, as we also feel pleasure when dopamine is released. And if we want to allow that creatures with a very different chemistry from ours can feel pleasure (aliens, perhaps), we'd better allow that pleasure can be identical to different types of physical states (known as multiple realization). Token identity theories are compatible with this view. Type identity theories allow for multiple realization by contextualization (Lewis, 1980). For instance, 'human pleasure in circumstance c = endorphin release,' 'human pleasure in circumstance c_1 = dopamine release,' and 'alien pleasure in circumstance c_2 = glopamin release,' and so on.

One brand of functionalism maintains that a mental state is identical with its functional role, *not* with the physical state that realizes the functional role (Putnam, 1975). Similarly, a house is, properly speaking, not a collection of timbers or stones, but a covered edifice that serves the function of a living space for humans. The problem with this type of functionalism is that it makes mental states causally inert. The mental state itself (e.g., pleasure) does not cause anything to happen; it is the physical state that realizes it that makes me smile, relax, and so on (e.g., endorphin release).

A more radical materialist solution to the mind-body problem is eliminative materialism. Eliminative materialists hold that mental states, like beliefs and desires, don't exist. They are merely terms of a false theory, such as 'witch' or 'hysteria.' Once we see that our theories are false, we cease to believe in the existence of the objects and properties the terms refer to. Similarly, we should abandon our belief in beliefs and desires. Paul Churchland thinks that this will solve the mind-body problem, as our new theory of mind will talk about neurophysiological states and processes, which are clearly physical. Eliminative materialism relies on the idea that mental states only exist if what we think about them is true. But we often have false theories of objects, e.g., Niels Bohr's theory of the atom. Despite this, we haven't given up believing in atoms. Instead we think that Bohr was wrong about what an atom is (*see* **Direct Reference**). If so, we can equally say that there are mental states, but that we are wrong about what they are exactly. In short, eliminative materialism relies on a particular theory of reference (descriptivism; *see* **Reference: Philosophical Theories**) that might be false (Lycan, 1988). Others, such as Jerry Fodor, object that we cannot explain behavior without making reference to mental states. Explaining behavior involves not just explaining how people move their bodies, but also what they *say*. The problem is that 'word' is a psychological category – there is no way of specifying what a word is that makes no reference to psychological properties.

Noam Chomsky is famous for claiming that there is no mind-body problem. For there to be a problem, the nature of body or matter must be understood as being incompatible with the nature of mind. But whereas Descartes's view of bodies was that they were extended and interacted only by contact, Newton's discovery of gravity showed this view of bodies to be wrong. Nowadays, there is no determinate notion of physical objects to conflict with the notion of minds. In the natural sciences the guiding principle

should be to explain what there is without any prejudice concerning what might or might not be physical. It is natural, however, that we should *think* that that there is a mind-body problem. Usually, we think of people as having thoughts, wants, and feelings, and we think of what they do in terms of what they want, think, and feel. The movements of physical objects, e.g., a leaf or a stone, are understood quite differently. As opposed to animal bodies, most physical bodies usually only move because some force is being exerted on them. At 12 months, children already distinguish animate from inanimate motion (cf. Scholl and Tremoulet, 2000). They expect animate motion to be goal-directed and optimal given the environment. Children also believe that beliefs, desires, etc. are real and different from physical states and objects (Wellman, 1990). The problem with Chomsky's approach is that a number of physicists and neuroscientists – e.g., Roger Penrose and Christian Koch – clearly seem to think that we have notions of physical objects and properties that are sufficiently precise for there to be a mind-body problem.

Among those who think the mind–body problem is a real problem, there are those who think we can never solve it. Colin McGinn argues that we are cognitively unequipped to see how consciousness could be a brain state or process. When we introspect we are not aware of any physical properties that could constitute our consciousness. When we look at the brain all we see are cells, blood vessels, and so on. But whereas the function of the brain is the interaction of its various parts, consciousness does not seem to be the result of the orchestration of smaller parts. And nothing that we see in the brain requires us to posit properties that could be identical to mental properties (consciousness). But because our understanding of the world is exhausted by introspection, perception, and theory, we have no way of solving the mind-body problem.

So-called representationalists avoid the problem of explaining the physical nature of consciousness by maintaining that what is peculiar to the mind is that it represents (or is about something), and there is nothing to what it's like to have an experience in addition to what is represented in the experience (e.g., Harman, 1990; Tye, 1995). So, if we can see how physical systems could be representational, we can see how mental systems could be physical systems (*see* **Representation in Language and Mind**). Computers are excellent examples of physical systems that are representational. A computer manipulates symbols according to a particular program—providing output in response to input in a systematic and intelligent fashion. A computer's output makes sense given its input and its program. The computational theory of mind holds that the human mind is a massively complex computer. Thinking is symbol manipulation. John Searle has objected that manipulating symbols does not amount to understanding and that computer symbols only have meaning because we *interpret* them. Our thoughts have intrinsic intentionality, computer manipulations only have intentionality derived from us. But information theoretic approaches have gone a long way towards showing how physical signals carry information. For Dretske, A carries the information B if the function of A is to indicate B. The notions of function and indication can themselves be explicated in a naturalistic way (*see* **Naturalism**). For instance, A's indicating B could boil down to there being a particular causal or law-like relation between A and B, and 'function' is commonly used in biology to describe entirely physical phenomena (cf. Millikan, 1984).

As of yet, there is no generally accepted solution to the mind–body problem. We are, however, beginning to see the shape of what it might look like.

See also: Consciousness, Thought and Language; Direct Reference; Naturalism; Reference: Philosophical Theories; Representation in Language and Mind; Type versus Token.

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If linguistics is the science of language, we might begin by asking what kind of science it is. One answer, which has been given its major impetus by the work of Noam Chomsky, is that linguistics is a branch of psychology. A second answer, in some tension with the first, is that linguistics is a branch of mathematics. There are other possibilities, too: some view linguistics as a social science like anthropology, whereas others reject the idea that it is a science at all, taking it to be continuous with literary theory. In this article, we focus on the first two answers, as these answers have both arisen within a tradition of taking language to be a generative phenomenon (something that is built up from various component parts via rules of combination). The other possibilities, by contrast, tend to view language as considerably less systematic, amenable chiefly to the description of comparatively superficial regularities.

Depending on whether one regards linguistics as psychology, then, or as mathematics, the following questions receive very different answers: What are the characteristic methods of study in linguistics and what evidence does it employ? What does linguistics aim to discover and explain? And how is linguistics related to other scientific domains? In what follows, we examine the answers that the psychological and the mathematical positions offer to these questions. But to begin, we must examine the object of that enquiry – language – and consider what a language might be, that its study should constitute psychology or, alternatively, mathematics.

The starting point of any scientific enquiry must be its object of study, because the way in which this object is conceived determines what one aims to explain. In the case of linguistics, Chomsky's work (e.g., Chomsky, 1957, 1965) brought about a substantial shift in the conception of language, importantly altering the goals of linguistic enquiry. During the first half of the 20th century, the predominant view conceived of language as an external object, the totality of marks and noises produced by language speakers. For structuralist linguists such as Ferdinand de Saussure and Leonard Bloomfield, linguistics was chiefly a descriptive enquiry, looking for patterns exhibited across the elements of the linguistic corpus. Chomsky's proposal, by contrast, was to regard language as essentially something internal, namely, as a competence underlying the speaker/hearer's ability to produce and understand the sounds and marks on which the structuralist was focused. On this view, language is an internally represented (implicit) system of knowledge that an individual speaker possesses, rather than the collection of sounds or marks that she is able to understand. Her language – this knowledge of linguistic rules and structures – is what allows her to understand such (external) objects.

In contrast with this position, several philosophers (Lewis, 1975; Katz, 1981; Soames, 1985; Devitt,

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Philosophy of Science and Linguistics

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In contrast with this position, several philosophers (Lewis, 1975; Katz, 1981; Soames, 1985; Devitt,

2003) have argued that this sort of internalist view of language is mistaken – that the structuralists were not wrong to view language as external – at least when it comes to doing linguistics. Unlike the structuralists, however, they treat languages as abstract external objects, namely, collections of sentences akin to the languages of formal logic. From this point of view, Urdu and Hungarian are on a par with the language of first-order logic: they are abstract formal systems governed by recursive grammatical rules and possessing canonical interpretations that assign meanings to their sentences. But regarded as such, languages are purely mathematical objects; psychology is not relevant to describing the properties of such entities.

For the proponent of the mathematical view, then, linguistics is an investigation of the grammatical and other structural features of languages, conceived of as abstract collections of sentences. It is, of course, compatible with this view that speakers know a grammar that allows them to understand and use the language they speak, and psychology (specifically, psycholinguistics) may tell us about the linguistic abilities of speakers and hearers. But on this view, psycholinguistics and linguistics are distinct enterprises: the former studies human psychology, whereas the latter studies abstract mathematical entities that are importantly independent of human psychology.

Thus, the goal of the mathematical linguist is to exhibit a grammar for the language being studied. As a matter of mathematical fact, there will be indefinitely many equivalent grammars for any given language, so to the extent that a language is considered in abstraction from any psychological basis it might have, there is no particular requirement that the linguist seek the grammar that the speakers of the language actually know. In a similar way, there is no reason to seek a grammar that is sensitive to regularities exhibited across multiple languages. Any grammar that is descriptively adequate, i.e., that generates all and only the grammatical sentences of the language in question, satisfies the goal of the mathematical linguist.

The principal evidence available for this undertaking consists in the judgments of native speakers about the acceptability of sample sentences: are the sentences well formed? Are they meaningful or senseless? To borrow some well-known examples, English speakers judge that sentence (1) is an acceptable sentence of their language but (2) is not. Sentences (3) and (4) are both structurally (grammatically) acceptable, but they have notable meaning-related features. Sentence (3) has two distinct interpretations, whereas (4) arguably lacks any coherent interpretation:

(1) The cat scratched the child.
(2) *Cat the child the scratched.
(3) Everyone loves someone.
(4) ? Colorless green ideas sleep furiously.

Such intuitions about the well-formedness and meaningfulness of sentences allow the linguist both to identify the class of sentences that belong to the language, i.e., the set of sentences for which a grammar must be found, and to pinpoint the grammatical and semantic features of those sentences.

Like the mathematical view, the psychological view of language takes native speaker intuitions as a central source of evidence. However, what these intuitions are evidence **for** is conceived somewhat differently. Recall that the Chomskyan linguist's goal is to uncover the rules and structures that constitute a speaker/hearer's actual knowledge of language. So, like the mathematical linguist, the Chomskyan linguist aims to discover a grammar for a given language, but this grammar must meet an additional constraint: it is supposed to be the grammar that speakers of the language actually know. The Chomskyan linguist seeks a grammar that is not merely **descriptively** adequate, but also **explanatorily** adequate, i.e., a grammar that speakers of the language could plausibly have learned, given their innate psychological endowment and the variety of their experiences.

To achieve the demand of explanatory adequacy, the Chomskyan linguist adopts two specific hypotheses about linguistic competence. First, a language-specific mental faculty is postulated, consisting of mechanisms that are dedicated to language production and comprehension. (Contrast this hypothesis with the view that language production and comprehension operate via the same mechanisms used for other cognitive tasks, such as contemplating a work of art or planning a trip.) The second hypothesis is that the language faculty of each child begins in a default state that contains a considerable amount of innate knowledge (called 'Universal Grammar'). (Contrast this hypothesis with the view that the child approaches language learning as a 'blank slate'.) From this state, the child is capable of learning any natural language and is 'trained' by experience to achieve a steady state that allows him or her to speak a specific language. This steady state is the mature speaker's linguistic competence.

With these hypotheses in place, the Chomskyan linguist's task is to describe both the starting state of the language faculty (i.e., the Universal Grammar) and the stable states of the language faculties of mature speakers of the various human languages. To this end, speaker/hearer intuitions constitute a vital source of evidence. Thinking about why specific constructions are not permissible has proved particularly revealing of the contours of linguistic constraints.

Furthermore, cross-linguistic evidence has been invaluable for showing how patterns that look *ad hoc* in one language reflect regularities that hold across multiple languages.

At the same time, evidence going well beyond speaker/hearer intuitions has proven useful. Evidence about how language is acquired (when and in what order children use various constructions, as well as about the constructions children do not make) helps to clarify what sorts of rules children might be coming to know about their language. For example, consider the formation of questions. A rule that relies on word order, such as 'move the first verb to the front of the sentence', will not work (it's fine for 'you are happy', but it won't work for 'the woman who is walking her dog is happy'). Instead, the child must learn a rule that manipulates the underlying grammatical structure of the sentence in order to form questions correctly. And, in fact, it is observed that children do not make the errors that would suggest they are ever following the incorrect (word order-based) rule.

In a similar way, experimental work on ordinary language use and clinical investigations into linguistic pathologies (impairments to the ability to use or understand language that result from illness or injury) are becoming increasingly helpful for testing linguistic hypotheses. For example, recent work tracking hearers' eye movements has sought to illuminate such topics as the fixing of the referents of pronouns (e.g., Runner *et al.*, 2003). The idea here is that knowing where hearers look – which characters draw their eye while hearing sentences about them – provides a new window onto the syntactic hypotheses (in this case, the Binding Theory) about what pronoun referents can and cannot be. The goal is to flesh out the information gleaned from native speaker intuitions, bringing linguistic theories more closely in line with psychological hypotheses about mental processing.

The full integration of linguistics with psychology still lies some distance in the future. Nonetheless, the Chomskyan approach already imposes substantial constraints on more general psychological explanations. In particular, specifically language-dedicated processes must constitute part of the overall psychological account of the mind and the innate capacities attributed to the language faculty must eventually find explanation within the domain of evolutionary biology. At the same time, of course, linguistic theories are themselves responsible to the constraints imposed by psychology and related fields. In principle, evidence from any quarter might prove relevant, although psychology, computational modeling, and neuroscience seem the most likely resources.

Where does this leave the mathematical and psychological views of linguistics? As mentioned above, they are certainly 'compatible' as long as one maintains that the latter is not really linguistics. From such a perspective, the constraints and goals of the psychological view are simply irrelevant to the pursuit of linguistics proper. However, there is a difficulty with maintaining such a strict separation of linguistics and psychology; namely, it requires that we be able to distinguish between linguistic facts and psychological facts. If linguistics is quite distinct from psychology, then it must be possible to delineate the mathematical linguist's abstract collection of sentences in a principled way that does not depend on psychological facts. But it is not clear that this is possible. Insofar as the mathematical linguist relies on speaker/hearer intuitions to decide which sentences belong to the language, there is an irreducible element of idealization involved in determining which intuitions count as data. Moreover, there are a range of other facts about the use of language (certain expressions are polite, whereas others are not; certain hand gestures have conventional meanings; poetry often employs words in unusual ways) and it is not clear what principles might allow the mathematical view to identify which (if any) of these facts are among the linguistic ones (see Fodor, 1981 and Antony, 2003 for discussion). As a result, the mathematical view risks relying on mere stipulation, whereas the psychological view is able to identify the linguistic facts through empirical investigation as those facts that are explained by the functioning of the language faculty.

This sharp distinction between the mathematical and psychological views is not mandatory, however. One can individuate some of the mathematical view's languages (i.e., its abstract sets of sentences) precisely by reference to the linguistic competence of (idealized) native speakers in specific linguistic communities: a certain abstract language L is the language spoken by speaker S in virtue of S's linguistic competence. In this way, the powerful logical and model-theoretic tools of the mathematical linguist can be brought to bear on language L in some independence from the considerations of the psychological view. Difficult questions remain about the extent to which a grammar produced in this way needs to cohere with results from psychological and other empirical research. But viewing the mathematical and psychological views as connected to this extent allows the science of linguistics to proceed in multiple directions at once, unconstrained by *a priori* restrictions on either its methods or its evidence.

See also: Chart Parsing and Well-Formed Substring Tables; Chomsky, Noam (b. 1928); Data and Evidence; E-Language versus I-Language; Language as an Object of Study; Linguistics as a Science.

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Phoenician

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Phoenician is a member of the Canaanite branch of the Northwest Semitic languages, closely related to Hebrew, Moabite, Ammonite, and Edomite. Phoenician was spoken both in the Levantine homeland and in the widespread Mediterranean colonies of the Phoenician commercial empire. Phoenicia itself is generally defined as the 60-mile long and 30-mile wide land area, from Acco to Tell Sukas south to north, and from the Mediterranean to the Lebanon Mountains, west to east (that is, the coast of modern Lebanon and part of the coast of modern Israel). It is scholarly convention to refer to this strip of land as Phoenicia after ca. 1200 B.C., the beginning of the Iron Age in the Levant. The 'Sea Peoples' (e.g., the Philistines) had forced the withdrawal of Egypt from ancient Canaan and had taken over the southern coastal region from them. The Sea Peoples do not seem to have carried their war to the northern coastal region, however, and so once the area was free of Egyptian control, the northern coastal cities became autonomous. They were never a single political entity, 'Phoenicia,' but rather a group of individual cities, although at any given time, one city was generally dominant over the others. The ancient Phoenician cities include Tyre, Sidon, Byblos, Beirut, Sarepta, and Arwad. The people of Phoenicia called themselves Canaanites or referred to themselves as the citizens of their particular city.

Again, by scholarly convention, we refer to the language of the inscriptions found in the cities along this coastal strip as 'Phoenician' from ca. 1200 B.C. onward, although the first inscriptions of any length unearthed so far date to ca. 1000. In fact, 10th-century Byblian inscriptions are written in a dialect slightly different from the Standard Phoenician of the rest of these inscriptions, but they are recognizably Phoenician all the same. 12th–11th century inscriptions that might also represent writing by Phoenicians are fragmentary or have not been found *in situ*, so that classification is difficult and dating must be paleographic: bronze arrowheads, for instance, probably from the Beqa^{c} Valley between the Lebanon and Antilebanon mountains, that are inscribed with personal names; inscribed clay cones from Byblos, also bearing personal names; the Nora fragment with parts of four words, written boustrephedon.

The alphabet and language of Phoenician inscriptions were the subject of scholarly debate already in the 18th century; by mid-century, both language and alphabet were reasonably well deciphered. The texts

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are for the most part royal, funerary, or votive. They have been found in Syria as well, and all over the Mediterranean area: Asia Minor, Egypt, Greece, Spain, Cyprus, Sicily, Sardinia, Malta, Rhodes, the Balearic Islands. Punic, the dialect of the Phoenician colony at Carthage and of its own far-flung trading empire, is a development from Phoenician (Carthage – *Qart-hadasht or 'New Town' – was founded by Tyrians in the late 9th or early 8th century B.C.), and Punic inscriptions date from the 6th century B.C. until 146 B.C., when Carthage was destroyed by the Romans. After 146, Punic inscriptions are referred to as Neopunic, although it is the script that changes noticeably rather than the language. These late Punic inscriptions continue until the 4th–5th centuries A.D., when Latino–Punic inscriptions are attested. Punic inscriptions are known to us from all over North Africa, from the islands of the Mediterranean, and from France and Spain. The majority of the known Punic inscriptions are the hundreds of child-sacrifice votive inscriptions from North Africa.

Phoenician inscriptions are written in the Phoenician alphabet and until late Punic times are written entirely consonantally, so the vocalization of the language is reconstructed from comparative linguistics and from the few outside sources that include Phoenician words: for instance, Hebrew, Assyrian, Babylonian, and Greek writings (the Phoenician in these sources is mostly personal names), and the *Poenulus* of Plautus, which includes some passages in garbled Punic. In late Punic, there are sporadic uses of vowel letters (called *matres lectionis*, 'mothers of reading'): *ʾaleph* to represent [ē] and [o], for instance, and *ayin* to represent [a].

Nominals in Phoenician are marked for gender and number (singular and plural, with rare duals) and occur in two 'states': the absolute (unbound) state and the bound state. The bound state is used for initial members of genitive chains called construct chains and for nouns before pronominal possessive suffixes. There is a definite article in Phoenician, initial *h-* plus doubling of the next consonant, as in Biblical Hebrew.

Several shifts in vowel pronunciation can be traced through the history of the language. The movement from [*ā] to [ō] between Proto-Northwest Semitic and Proto-Canaanite is known as the 'Canaanite shift'; a later shift, occurring at least by the 8th century B.C., is the 'Phoenician shift': accented /a/ in originally open syllables becomes /o/. The diphthongs **-aw* and **-ay* collapse in Phoenician to [ō] and [ē], respectively. The [ō] < *-aw and the [ō] from the Canaanite shift (*[ā]) merge, and by late Punic have become [ū]; this later shift is part of a proposed chain that sees *[u] pronounced [ü] or [i].

The verbal system of Phoenician follows the general Central Semitic pattern: a perfective *qatal* (> [qatol]) suffix conjugation; an imperfective *yaqtul* prefix conjugation; an imperative; active and passive participles; an infinitive (called the infinitive construct); and Phoenician uses (especially seen in the 8th-century Karatepe inscription from Asia Minor) the so-called infinitive absolute, actually an adverb, to represent any verb form needed in context, for instance imperative, or future or past tense.

Phoenician uses V-S-O word order in verbal clauses and makes much use of nominal or 'verbless' clauses. The verbal stems include the G stem (the *Grundstamm* or basic verb); the N stem, with prefixed *-n-*, which is passive/reflexive; the D 'intensive' stem (called D because the middle root consonant is doubled); the C or causative stem, called *Yiphil* because of the *y-* prefix; plus Gt and tD reflexive stems. There is also evidence of internal passives within the G, D, and C stems.

See also: Asia, Ancient Southwest: Scripts, Epigraphic West Semitic; Asia, Ancient Southwest: Scripts, South Semitic; Gesenius, Wilhelm (1785–1842); Semitic Languages; Writing Materials.

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Phoneme

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Traditionally, a phoneme is regarded as the smallest unit of sound in a language capable of causing a difference of meaning. As a distinctive sound unit at the level of language description (not a realized sound in speech), the phoneme has had a long life. However, although it is generally accepted as the smallest sound unit distinguishing meaning, there has never been agreement on exactly what theoretical implications this function of the phoneme brings with it. Over the decades, the phoneme has suffered a strongly fluctuating status as a theoretical unit of language description within the linguistic community. Noam Chomsky and Morris Halle (1965), among others, argued against the existence of a phonemic level of representation. However, although many linguists declared the phoneme dead as a theoretical concept after the advent of generative phonology at the end of the 1960s and the subsequent general acceptance of feature matrices for speech-sound representation, it has strongly resisted burial. Its theoretical demise has meant that the many scholarly discussions and even disputes over its exact nature and theoretical status now have only historical importance. Eli Fischer-Jørgensen (1975) presented many of the theoretical differences separating the linguistic schools in her historical survey of phonological schools, and Stephen Anderson (1985) wove the fine threads of the often subtly different aspects of linguists' understanding of the phoneme into his account of developing phonological theory in the 20th century.

Present-day use of the term still rests on the basic function of the phoneme as a 'distinctive unit constituting the sequential sound structure of words' and thus differentiating them from one another. However, some groups use this term much more loosely than the strict observance of this function might be expected to allow, simply to mean a speech sound without any particular theoretical status. This usage is particularly common among those working in speech technology. Nonetheless, the phoneme's distinctive function remains the basis of its widespread but by no means uniform use within the extended scientific speech and language community.

'Minimal pairs,' in which a single sound difference in the same context (in paradigmatic opposition) is responsible for the different meanings of two words – for example, Spanish 'pero' /ˈpɛɾo/ (Engl. *but*) vs. 'perro' /ˈpɛro/ (Engl. *dog*) – demonstrate most simply and directly the phonemic status of two sounds. Phonemic symbols are traditionally placed between slashes (e.g., /ɾ/ vs. /r/), a convention that seems to be attributable to George Trager and Bernard Bloch (cf. Pike, 1947: 59). Different sounds that are phonetically similar and do not occur in the same context (i.e., are in 'complementary distribution') are considered to be variants ('allophones') of the same phoneme (e.g., the unaspirated and aspirated allophones of the English /p/ phoneme in 'spade' [speɪd] and 'paid' [p^heɪd]). As shown in these examples, allophonic transcription is usually placed in square brackets.

The 'phoneme inventory,' in terms of the number and types of distinctive consonants and vowels in a language, and the phoneme 'distribution' – the way in which they can combine to form syllables – are a fundamental part of the phonology (the sound system) of any language. By definition, any phoneme can therefore only be associated with one language, and though the same graphic symbols (e.g., /p t k b d g/) may be used to represent the phonemes of different languages, their relative equivalence across languages depends on the way they are realized phonetically and how they function together with the other phonemes to form syllables and words. Phonetic differences that are only allophonic in one language can be phonemic in another; for example, the [p] – [p^h] difference, which is allophonic in the above example from English, 'spade' – 'paid' and is phonemic in Hindi where /pal/ and /p^hal/ are different words (/pal/ 'look after', /p^hal/ 'knifeblade'). Strictly speaking, due to the overall definition of each phoneme as part of the total sound system for its complete definition, no two phonemes from different languages can be considered

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Phoneme

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completely equivalent, however similar they might seem to be phonetically.

Pre-Generative Views of the Phoneme

The distinctive function of the phoneme is the common foundation from which a number of differing theoretical viewpoints on the phoneme's nature and status have emerged. It was generally agreed that audible differences exist between sounds that have to be considered variants of what, at another level, must be classed as the same sound. One important issue was how this other level should be viewed; in other words, how concrete or abstract should the phoneme be as a descriptive unit. The allophonic variants of the phoneme are phonetically defined more narrowly and are therefore apparently less abstract than phonemes, whether they are

- The inevitable articulatory result of realizing a phoneme in a particular context – for example, the nasal release of a plosive in a homorganic plosive + nasal sequence, such as the /t/ in [bɪtn̩] ('bitten') compared to its oral release in a plosive + vowel sequence, [bɪtə] ('bitter')
- Conventionalized positional variants; for example, the velarized syllable coda [ɫ] ('feel'), vs. the clear prevocalic [l] ('leaf') in southern British English
- Subject to free choice within the language; for example, the apical or uvular variants of 'R' ([ɾ], [ʀ] or [ʁ] in, for example, German 'rot' Engl. *red*).

Yet, as descriptive sound units they are still 'types,' rather than concrete 'tokens' or 'phones' produced in a particular instance by a particular speaker.

Although this language-philosophy problem of type vs. token can be seen as fundamental to the differing views of the phoneme, theoretical discussion of the phoneme's nature has not, in general, focused on that level (see Bromberger and Halle, 2000 for a discussion of type in phonology), though Daniel Jones (1967) approached it in his book, *The phoneme: its nature and use*.

Rather different and sometimes conflicting views of the different groups or schools (as they are often called) arose out of the more practical issue of their general approach to the study of languages. Thus, under the common principle of distinctiveness, American and European groups developed their ideas in different directions, and within Europe, the Prague School, the so-called British School, and the Copenhagen School each developed its own distinct flavor.

In terms of the relative degree of abstractness of the phoneme, it is often said that the American and British standpoints were not too far removed from each other. In both groups, there were those who saw the phonetic grounding of the phoneme as important. However, whereas many American linguists, faced with the task of recording, analyzing, and proposing writing systems for a large number of previously unrecorded (indigenous American) languages, were primarily interested in the definition of reliable and replicable procedures (cf. Pike, 1947), British phoneticians were working on known languages with existing writing systems and had a strong interest in how to learn to speak them. This difference in orientation and the emphasis on analysis procedures in American linguistics were strengthened by the scientific background of behaviorism in the United States, which precluded the consideration of anything that was not observable in behavioral patterns. This meant that, strictly speaking, the meaning of an utterance could not be taken into consideration in the procedures developed for analysis. It resulted ultimately in the strict separation of the different levels of formal description; minimal pairs had to be sought in observed utterances of undefined length, rather than in predefined word units. It has to be added that, in practice, single words remained the basis of phonemic analysis simply because the routine of eliciting repeatable utterances relied on the naming of everyday objects, parts of the body etc. In addition, even Bloomfield (1933 and see below) used the term 'meaning,' though with a particular, limited meaning, though in a particular, limited sense.

Daniel Jones (1967) who, despite his debt (which he gratefully acknowledged) to 19th-century linguists, such as Baudouin de Courtenay (Russian), Henry Sweet (English), and Paul Passy (French), can be quoted as representative of the British School:

> The term "phoneme" as used by Baudouin de Courtenay was a phonetic one, and I have never seen any reason to consider it otherwise. A comparison between his work and that of Sweet and Passy showed that this phonetic concept can be viewed in two ways, the "psychological" and the "physical." Viewed "psychologically" the phoneme is a speech-sound pictured in one's mind and "aimed at" in the process of talking. The actual concrete sound (phone) employed in any particular speech-utterance may be the pictured sound, or it may be another sound having some affinity to it, its use being conditioned by some feature or features of the phonetic context . . . Viewed from the "physical" angle a phoneme is a family of uttered sounds (segmental elements of speech) in a particular language which count for practical purposes as if they were one and the same (1967: 258).

The American linguist and missionary, Kenneth Pike, on the other hand, wrote, "It is assumed in this volume that phonemes exist as structural entities or relationships; and that our analytical purpose is to find and symbolize them" (Pike, 1947: 57; underlines

in original). Even though he then proceeded to explain the procedures for phonemic analysis with the help of premises that are stated in terms of phonetic observations, he felt that the nature of the phoneme was not phonetic.

In Prague, one of the most important and arguably the most enduring European linguistic center of the 20th century, Nikolai Trubetzkoy seemed to have had a less physical understanding of the phoneme. Despite the attention he paid to temporal and articulatory aspects of speech sound production, he was more concerned with the functional aspects of the sound system and saw phonemes as 'differentiating signs' that can only be defined with reference to their function in the structure of a particular language (Trubetzkoy, 1967), a view that is clearly related to de Saussure. In contrast to both the British and most American approaches, he did not regard the phoneme as an indivisible unit (though it was the smallest segmental element), but as "die Gesamtheit der phonologisch relevanten Eigenschaften eines Lautgebildes" (*The totality of the phonologically relevant features of a sound;* 1967: 35).

A more formally rigorous standpoint was that of Louis Hjelmslev and his colleague in the Copenhagen Linguistic Circle, Hans Jørgen Uldall, who pushed the idea of formal systems to its logical conclusion. At the level of general formal description of language systems, abstract phonemic oppositions without defined phonetic properties are possible. Substance presupposes form, but not vice versa. Therefore, it is possible to construct a system of linguistic forms without attaching substance to them. Although concrete languages naturally require a bilateral substance-form relationship, Hjelmslev's and Uldall's argument for unilateral dependence was that there may be several substances corresponding to the same form (Hjelmslev, 1943).

The geographical separation apparent in these differing degrees of abstraction associated with the phoneme is not meant to imply that there was a unified point of view within any one national unit nor even that a particular scholar adhered unswervingly to one view. Trubetzkoy, for example, moved from a more psychological orientation, similar to Baudouin de Courtenay's (Trubetzkoy, 1929), to his later functional approach, a shift that has been attributed both to his increasing recognition of the social aspects of language and to changing scientific methods (Anderson, 1985). His view of a phoneme as the sum of the phonologically relevant features may have been in part been influenced by the work of Roman Jakobson.

Within Britain, there was a strong divergence in theoretical approach even within one university. Daniel Jones at University College London (UCL) focused on the phonetic structure of the word, and J. R. Firth, who taught first at UCL and later at the London School of Oriental and African Studies (SOAS), took the sentence as his unit of analysis, examining the differing extension (a single sound or several, a syllable or several syllables) of any particular articulatory property. These extensions were called prosodies; hence, the term 'prosodic analysis' as the goal of the Firthian school. Consequently, Firth (1948) was loathe to talk of the phoneme at all, not feeling able to accept any of the then-current definitions and regarding phonemic analysis as monosystemic and thus inherently deficient for the study of polysystemically structured language.

In the United States, many different shades of scientific opinion developed, and there was, in consequence, a lively debate. Leonard Bloomfield (1933: 136) expressed thoughts that were very akin to Trubetzkoy's functionalist view: "Once we have defined the phonemes as the smallest units which make a difference in meaning, we can usually define each individual phoneme according to the part it plays in the structural pattern of the speech-forms." In addition, his phonemes were certainly not monolithic units: "Among the gross acoustic features of any utterance, then, certain ones are distinctive, recurring in recognizable and relatively constant shape in successive utterances. These distinctive features occur in lumps or bundles, each one of which we call a phoneme" (1933: 79). He expressed their abstract nature in terms that seemed to be almost as rigorous as Hjelmslev's view: "The phonemes of a language are not sounds but merely features of sound which the speakers have been trained to produce and recognize in the current of actual speech-sound – just as motorists are trained to stop before a red signal, be it an electric signal-light, a lamp, a flag, or what not, although there is no disembodied redness apart from these actual signals" (1933: 80). William Twaddell (1935) expressed his opinion on the abstract nature of the phoneme even more strongly, describing them as "abstractional fictitious units" that have no real existence, either "physically" or "mentally." Morris Swadesh (1934: 118), on the other hand, regarded phonemes as "percepts to the native speaker of the language," a view that he acknowledged as being influenced by his teacher, Edward Sapir. However, he also saw a phoneme as "a speech sound type . . . defined by separate instances of the type" 1934: 119) that, after examination of a number of occurrences of different phonetic instantiations of the type, can be defined in terms of norm and deviation from the norm.

Although imbued with a distinctly psychological hue, Swadesh was not as dogmatically psychological

inhis approach to the phoneme as was his teacher. When carrying out his fieldwork, Sapir (1933) held great stock in the intuitions of his native North American subjects on the sameness or equivalence of sounds that he might have perceived as different. In production too, he stressed the psychological difference between a blowing gesture to extinguish a candle and an assumed identical gesture for the initial [ʍ] in words such as 'what,' 'when,' etc. (Sapir, 1925).

As an illustration of the international currents of scholarship and opinion, Sapir's standpoint was seen by Daniel Jones as very similar to the psychological phonetic reality espoused by Baudouin de Courtenay, which he himself had accepted as one aspect of the phoneme. Similarly, there is more than a passing resemblance between Swadesh's definition of sound type as norm and divergence and Jones's family of sounds.

Nonsegmental Phonemes

Although the idea of the phoneme as a distinctive sound segment was and is generally accepted, the use of the term phoneme in relation to distinctiveness at the suprasegmental level was restricted to American Structuralism, though it was not accepted by all linguists there (cf. Bolinger, 1951). The American approach extended the phonemic analysis to stress, tone, and (sometimes) length. This was in adherence to the principle of the phonemic function as a change of meaning brought about by a single sound difference within a stretch of speech. Although a similar concept lies behind the expressions stroneme, toneme, and chroneme used by Daniel Jones, he coined these terms because he explicitly objected to the use of the word phoneme to characterize distinctions above the segmental level, which are dependent on syntagmatic contrasts, rather than paradigmatic opposition (Jones, 1944, 1950). Despite its phonetically heterogeneous manifestation, juncture was also considered a phoneme. Length was subject to much disagreement, being easily attributable to the segmental level as short vs. long or single vs. double vowels or consonants.

Four levels of stress were set up: loud, reduced loud, medium, and weak (cf. Trager and Bloch, 1941). These levels were criticized as arbitrary, but remained until they were overtaken by the spread of generative grammar. Pike (1948) and Trager and Smith (1951) proposed four relative pitch levels: 1–4, representing either steps from low to high or from high to low. These levels could be combined to form intonation contours that were allocated meaning and therefore had morphemic status, thereby confirming the phonemic status of the pitch levels constituting them. If thoughts about phonemic status are pushed aside, the parallels between these ideas and the basic assumptions behind autosegmental accent tones and their information-structural interpretations are striking.

Juncture phonemes were differentiated (Trager and Bloch, 1941) according to type: close juncture and internal open juncture. These types distinguished between mono- and di-morphematic pairs like *nitrate* and *night-rate*, which allowed identical segmental phoneme sequences to be differentiated without recourse to other (higher) levels of linguistic analysis, something the American Structuralist analysis principles forbade.

Later, Trager and Smith (1951) extended the juncture phoneme inventory, encroaching on what many people would consider to be an intonational phenomenon to subdivide the external open juncture phoneme into three types of phrase-terminal contour phonemes: level, rising, and falling. Previously, the external open juncture phoneme had served merely to demarcate utterances or phrases; with this later differentiation, it signaled different types of transition between phrases. It is interesting that these juncture phonemes, perhaps less modified than the tonal levels, have also re-emerged in generative formalisms as grammatical and/or phonological categories: the internal juncture phoneme as morpheme boundary (+) and the external open juncture phoneme as phrase boundary (##), with the phrase-terminal contour phonemes as boundary tones (– or %).

The Phoneme and Higher-Level Structures

The phoneme is, strictly speaking, defined without consideration of higher-level linguistic structures apart from recording differences in its immediate phonetic environment that condition allophonic variants. To define the phoneme, it is merely necessary to note that two otherwise identical utterances (in practice usually words, because they constitute the minimal utterance length in a naming task) are different because of the presence of two different sound units. However, the existence of morpheme-dependent sound alternations of otherwise distinctive sound segments was a well established phenomenon and needed to be dealt with in the overall description of the phoneme. Depending on the overriding philosophies of the scientists involved, different solutions were offered.

For the American Structuralists, the definition of the phoneme inventory was important, as was the procedural principle of separating the levels of analysis. Thus, the question of alternations was dealt with as a separate morphophonemic level of analysis, and the phonemes involved in a morphological

alternation, such as /k/-/s/ in electric-electricity (/ɪˈlektrɪk/- /ɪlekˈtrɪsɪti/), constituted a 'morphophoneme' (e.g. Swadesh, 1934; Pike, 1947; Hockett, 1955). At the level of phonemic analysis, there was no interest in complicating the inventory by introducing archiphonemes to cover cases of positional neutralization, as with German, Dutch, or Russian final devoicing. Distributional gaps in the system were accepted.

It was fairly late before the relationship between morphemes and phonemes was clarified (Hockett, 1961): Morphemes were described as being composed of morphophonemes (a one-to-one relationship), which are represented by phonemes (a one-to-many relationship); at the same time, morphemes are represented by morphs (a one-to-many relationship), which are composed of phonemes (a one-to-one relationship). The complex relationship that thus exists between the morphemes and phonemes – namely, via morphs on the one hand and morphophonemes on the other – is defined as 'programming': morphemes are programmed into a phoneme sequence.

When on the other hand the system of oppositions is of prime interest, as in Prague phonology or in Glossematics, neutralization is an important property of a system. The Prague concept of the 'archiphoneme' covers contextually and structurally determined neutralization. The opposition involved must be bilateral and consist of a minimal (single feature) contrast. The example most commonly quoted is the neutralization of voicing where, for example, the /p-b, t-d, k-g/ oppositions no longer operate. Contextually determined voicing neutralization occurs in Russian before obstruents (anticipatory voicing assimilation). Structurally determined neutralization is found for the German /s-z/ opposition, which only operates word medially; initially, only /z/ occurs in singleton onsets, and finally, only /s/ occurs. The archiphoneme may be represented either by one of the symbols in each pair or by a capital letter (e.g., /P, T, K/ or /S/) to signal the archiphoneme status. Alternatively, as is often the case with vowel neutralization, a symbol intermediate to the phoneme values (for example /ə/) may be selected.

In Russia, the Moscow School used the term 'hyperphoneme' (Reformatski, 1970, cited in Fischer-Jørgensen, 1975) for a concept very similar to the archiphoneme to capture the reduction in the number of vowel oppositions from five in 'strong' (stressed) to three in 'weak' (unstressed) position. Because only two vowel oppositions (/ɑ-o/ and /e-i/) are neutralized and /u/ has no opposition partner to neutralize with, the hyperphoneme concept cannot be equated exactly with the archiphoneme. Previous work by Bernštejn (1962, cited in Fischer-Jørgensen, 1975) had also addressed phoneme alternations of the "first, second, and third degree," covering the phenomena dealt with elsewhere under the topics allophony, neutralization, and morphophonemics. Alternations of the first two degrees were called 'divergences' (neutralization also being termed substitution), and morphologically conditioned alternations were called 'transformations.'

Direct Realism's View of the Phoneme

In addition to the general theoretical dilution of the phoneme concept – due primarily to the reaction in Generative Linguistics to behaviorism-dominated American structuralism as mentioned above – which ultimately allowed its later totally atheoretical adoption by speech technologists, a further appropriation of the term by psychologically oriented linguistic phoneticians has taken place, with a consequent new aspect to its meaning. Within a Gibsonian framework of direct perception, a theory of speech perception and production has been developed (e.g., Fowler, 2003) that centers on the 'gestural structure' of the phoneme as the basic unit. Links to traditional views of the phoneme are implicit in several aspects of its use in this framework. As a cognitively defined unit, it harks back to psychological definitions of the phoneme. This association is strengthened by the fact that production models can generate surface-phonetic realizations that deviate from the underlying 'phonemic' structure.

On the other hand, the proponents of these models do not understand the underlying units as abstract correspondences of the morphemic structure, nor can they be ascribed the status of the 'systematic phonemic' level that some generative phonologists accept. They are clearly defined in terms of their phonetic, more specifically their gestural properties, and are seen as having a definite (though numerically unspecified) temporal extension. In this respect, they clearly deviate from any previous definition of the phoneme. It is the concreteness of their definition that allows structural changes to take place during production. Because of tempo specification and the allocation of relative strength values to adjacent syllables and their constituent phonemes, 'phoneme overlap' occurs, and the gestural properties of stronger units change and even suppress those of the weaker units (Browman and Goldstein, 1990). The fact that the gestures are considered the phonological primes makes the theoretical status of the underlying phoneme string more difficult to link to previous discussions. In summary, we might say that Direct Realism and Gestural Phonology have made good use of the phoneme, taking a core term that had lost a lot of its theoretical definition during the past three

to four decades and defining their own theoretical unit of speech production.

Conclusion

This survey of the phoneme has shown how its definition has varied both synchronically across locations of linguistic research and diachronically, both from stage to stage of any one scientist's development and, more inevitably, from one generation of scientists to another, as views on language structure have changed. Discussions have centered on the degree to which it is defined psychologically, physically, or formally and how it is related to other aspects of language description, with all shades of liberal and categorical opinions being voiced. From the late 1960s onward, feelings became less intense as the focus moved on to feature matrices and phonological rules. The debate subsided as the theoretical need for a central phoneme concept disappeared. Yet, despite being discarded, the phoneme as a basic distinctive sound unit remains as a background concept. This position has allowed it to continue its contribution to work in speech and language without having to suffer criticism of its theoretical incoherence. It could be redefined as those who found it useful wished.

See also: Bloomfield, Leonard (1887–1949); Firthian Phonology; Hockett, Charles Francis (1916–2000); Jones, Daniel (1881–1967); Phonemic Analysis; Phonemics, Taxonomic; Phonology: Overview; Prague School; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Phonemic Analysis

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Introduction

In this article, the path from phonetic transcriptions to phonemes and morphophonemes of a language is considered. Fieldwork is not a topic here, nor is the prosodic structure (in terms of syllables, etc.). The procedures surveyed presuppose that the phonologist knows the language, and they take their point of departure in the pronunciation of isolated words.

Phonetic Transcriptions as Input to Phonemic Analysis

The phonemic analysis departs from a phonetic transcription, that is, a rendering of phonetic symbols as a string of segments (vowels and consonants), with or without diacritics (e.g., for aspiration, lowering, and syllabicity) and with or without prosodic symbols for stress, word tones, and so on. Such a notation is discrete in the mathematical sense, with a finite and well-defined number of symbols (e.g., taken from the inventory of IPA symbols). A huge amount of analysis, explicit and implicit, lies behind any competent use of such a phonetic transcription system.

There is a fundamental distinction between a transcription of a concrete token of speech – whether 'on-line' (e.g., in fieldwork) or from tape – and a transcription of pronunciation types. The latter task requires a systematic transcription conforming to explicit conventions and presupposes knowledge of the speech form at hand. Only phonetic distinctions that – in some contexts – can be used to convey differences in meaning within the speech norm in question, or differences with sociolinguistic significance (e.g., sexual, sociological, regional, or chronological), are typically rendered in a systematic phonetic transcription. As far as individual differences are concerned, the level of distinctness (register) is a relevant parameter. For the procedures of phonemic analysis surveyed in this article, the phonetic transcriptions concern isolated words at a high level of distinctness within a well-defined speech norm. This presupposes the concept 'word'; this is a central linguistic unit, and, in distinction to most other terms in linguistics, the word 'word' is used frequently by lay native speakers. This is related to the fact that the word is a unit with some psychological reality. The most appropriate linguistic defintion of a word is by means of distributional characteristics – a word can occur in isolation, it can be moved around in an utterance, and it has a fixed internal order; all these criteria are interrelated and connected to its psychological reality (cf. Basbøll, 2000, on word boundaries).

The sound signal contains segmental and prosodic information intertwined, and the extraction of prosody from the segmental chain is anything but straightforward. Otherwise stated, the phonological identification of segmental information (including duration of segments) vs. prosodic information can be controversial among competent phoneticians or phonologists even though they agree on whether two forms contrast (e.g., whether the phonetic difference between two contrasting pronunciations lies in segmental length or in tone).

Minimal Pairs, Contrast and Position: The Schism among Bloomfield, Trubetzkoy, and Twaddell

In the phonemic analysis, in order to establish contrastive segments, the commutation test using minimal pairs (or minimal series) is applied. Thereby both contrastive segments and positions in the sound chain are established as phonemically relevant entities. For example, taking the Danish word *sat* 'sat (past participle)' ['saḏ] as point of departure, the minimal series *sat*, *hat* 'hat' ['haḏ], *nat* 'night' ['naḏ] establishes [s], [h] and [n] as three different contrastive segments before [aḏ]; the minimal series *sat*, *sut* 'comforter (for babies)' ['suḏ], *sit* 'his/her/its (reflexive possessive)' ['siḏ] establishes [a], [u] and [i] as three different contrastive segments between [s] and [ḏ]; and the minimal series *sat*, *SAS* (the common Danish pronunciation of the *Scandinavian Airlines System*) ['sas], *sand* 'sand' [sanˀ] establishes [ḏ], [s], and [n] (with the syllabic prosody stød) as three different contrastive segments after [sa]. By the very same procedure, three different phonologically relevant positions are being established; that is, there are exactly three positions (places) in the sound chain [saḏ] where the segments can be contrasted with other segments, and this is established through the minimal pair or commutation test. Contrasts are paradigmatic (concern a paradigm, e.g., contrastive segments in one position), and positions are syntagmatic (concern a syntagm, e.g., the sequence of positions in the speech chain).

The relation between contrastive segments and positions in the sound chain are looked on in very different ways by different schools or traditions of phonology (cf. Fischer-Jørgensen, 1975). In my view, there is still genuine insight to be gained from structuralist phonology and from combining an eclectic structuralist

approach with more modern ways of considering the phonology–phonetics and phonology–morphology–lexicon interfaces.

At one end of the scale, we find the strict (post-) Bloomfieldians (cf. Bloomfield, 1933; Bloch and Trager, 1942) with the tenet "once a phoneme, always a phoneme"; that is, when a contrastive segment has been established in one position, it is phonemic in all positions. When /p/ and /b/ are established as contrasting allophones (word-)initially in German, for example (cf. the minimal pair *Pein* 'ache' pronounced with initial [p] and *Bein* 'leg' with initial [b]), the sound [p] (word-)finally must be an allophone of /p/, even though the sound [b] does not occur (word-) finally and accordingly there can be no contrast in this position either; the phoneme /b/ is then said to be defectively distributed. A consequence of this analysis is that *Lob*, *Lobe* 'praise (DAT)' [loːp], [loːbə] exhibits a morphological alternation between syllable final /p/ and syllable initial /b/. Similarly, *Rad* 'wheel' ['ʁɑːt] and *Rat* 'council' ['ʁɑːt] are pronounced identically with [t] word-finally (and hence syllable-finally), but they enter into different morphological alternations, cf. *Rade* 'wheel (DAT)' ['ʁaːdə] and *Rate* 'council (DAT)' ['ʁaːtə]. This can be analyzed, according to the Bloomfieldian school, so that the phoneme /t/ word-finally alternates with either of the phonemes /t/ or /d/ syllable-initially. Both of the morphophonemes |t| and |d| can thus be realized by the phoneme /t/ in word-final position.

In Prague phonology (cf. Trubetzkoy, 1939), there is neutralization word-finally in German; that is, a particular phonemic entity, an archi-phoneme, occurs in the position of noncontrast, namely a segment that has the properties of the two neutralized phonemes but that is unspecified for their contrastive feature. The final segment of *Lob* is thus, phonologically, neither a /p/ nor a /b/, but simply a labial stop. Such an incompletely specified segment is given a separate phonological notation, e.g., /P/ in *Lob* ['loːp], to designate a segment that is voiceless like initial /p/, but is not in contrast to a voiced /b/. A consequence of this analysis is that *Lob*, *Lobe* (DAT) ['loːp], ['loːbə] exhibits a morphological alternation between final /P/ and initial /b/.

Freeman Twaddell (1935) took the position of neutralization in phonology to its logical conclusion from a strict structuralist standpoint: Only across positions where there is the same number of contrastive segments and where they exhibit a parallel phonetic pattern can sounds be identified phonemically. This means that not only can there be no phonemic identification between the sound [p] initially and finally in German but that many other positions also differ in their inventories (e.g., after /s/, and before /r/) and do therefore not permit any phonemic identifications according to Twaddell. This is a completely logical position but also a very impractical one.

Contrastive Segments and Basic Positions: A Way Out?

The following proposal is an attempt to combine the logical insight of Twaddell's position with practicability (in line with Basbøll and Wagner, 1985; Basbøll, 2005). Positions with different inventories of contrastive segments in a given language are distinguished here, with the exception that an inventory A (in the position P-A), which constitutes a proper subset of another inventory B (in the position P-B), does not define a new position phonologically but, instead, is considered to belong to the inventory B. An example is a language exhibiting an inventory of consonants consisting of [b, d, g, p, t, k, s] (corresponding to B) in initial position (P-B) and of [p, t, k, s] (A) in final position (P-A). This means that position P-B can then be generalized to a position covering both P-A and P-B. In the example just given, what was called the 'initial inventory' can be generalized to a 'margin position' – the original initial position thereby subsuming the original final position (which, therefore, is not a basic position). To take another example, the inventory of consonants in monosyllables after a short vowel in a language could include the contrastive segment [ŋ] in contradistinction to the corresponding inventory after long vowels. If the latter inventory does not contain contrastive segments that are not found in the former inventory, we are able to generalize the position to 'final' without mentioning the quantity of the preceding vowel.

This analysis presupposes that a phonological identification between different sounds is possible in principle (as opposed to the position of the most abstract structuralists, such as Louis Hjelmslev, 1943, and other adherents of Glossematics, for example). That the symbols used at different levels (phonetic, phonemic, morphophonemic, and lexical) can be taken from the same set of phonetic symbols, expresses a hypothesis of naturalness not only in the relation between phonetics and phonology but also with regard to morphology and the lexicon.

Bisegmental Interpretation: Fusion

Sometimes two segments are fused, that is, collapsed to one segment. This can be described according to the following convention for fusions:

$[\alpha\ f_i, \beta\ f_j, \gamma\ f_k, \ldots]F[f_l]$
is defined as the input of a fusion whose output is
$[\alpha\ f_i, \beta\ f_j, \gamma\ f_k, \ldots, f_l]$

Thus, F is the operator of fusion, applying to a sequence of two segments. The Greek letters express the values of arbitrary features. The formula foresees only one relevant distinctive feature, which must be phonetically homogeneous, or unmarked, in the second segment, and the net result is that this feature is transferred to the first segment, the remaining ones being left unaltered. This convention presupposes a specific analysis in terms of distinctive features. To take an example, a low back vowel is fused with a following tautosyllabic |r| in Danish.

The same feature cannot have opposite values in the two segments in the formula, whereas it is immaterial whether it occurs with the same value in both segments or just occurs once (as will normally be the case). This convention restricts the potential power of fusions considerably, and the result of a fusion, in terms of a technically natural class of segments or an incompletely specified segment, is predictable from its input and need therefore not be stated in the formulation.

Basic Positions: Danish as an Example

According to this methodology, there are four different phonologically relevant inventories of segments that therefore also define different phonologically relevant positions, called 'basic positions,' in the phonological analysis of segments in Danish:

- Peaks of monosyllables: full vowels. This inventory is also found in polysyllabic words, more precisely, in all polysyllabic words but not in all syllables of all polysyllabic words. Thus, there are polysyllables with both full vowels and nonfull vowels as peaks, for example, *lænke* 'lenk' ['lɛŋg̊ə], and polysyllables with only full vowels, for example, *sofa* 'sofa' ['soːfa].
- Peaks that cannot be peaks of monosyllables: neutral vowels and syllabic consonants. (The latter are not phonemes in Danish.) For example, the last segment of *hoppe* '(to) hop' ['hʌb̥ə], *hopper* 'hop(s)'['hʌb̥ɐ], *handel* 'trade (NOUN)' ['hanʔl̩].
- Nonpeaks that can occur initially in a monosyllable. For example, the first segment of *håb* 'hope (NOUN)' [hɔːʔb̥], *du* 'be good' [d̥uːʔ] ([h] does not occur finally as a phonologically relevant segment; [d̥] does).
- Nonpeaks that can occur finally in a monosyllable. For example, the last segment in *mad* 'food' ['mað], *bus* 'bus' ['b̥us] ([ð] does not occur initially; [s] does).

There is no overlapping between the two peak inventories and, trivially, no overlapping between these two inventories and either of the two nonpeak inventories. On the other hand, the two latter inventories overlap to some degree, but they exhibit large and systematic differences, which is a typologically characteristic trait of Danish.

Contrastive Segments

In each phonologically relevant (basic) position of a language, a subset of the phonetic segments are defined as contrastive segments. The contrastive segments, which constitute an important step on the path from phonetics to phonemics, can be characterized by the following procedural steps.

1. The point of departure for the phonemic analysis is a distinct pronunciation of single words in the norm chosen. This means that segments that do not occur in that high level of distinctness are not contrastive segments according to this terminology (in Danish, e.g., [ɪ], [ʊ], [m̩]).
2. For each basic position, minimal pairs or potential minimal pairs (cf. the notion 'accidental gaps' used in phonotactic analysis) establish the contrastive segments. Segments that occur in phonemic contexts that are systematically different and nonoverlapping are not different contrastive segments if they are phonetically more similar to one another than either of them is to any other segment. The phonemic context in question can be segmental (involving adjacent segments) or suprasegmental (prosodic, e.g., involving stress).
3. Step 2 requires a principled decision on how to extract prosody from the segmental chain, phonologically speaking. The problems involved in this procedure are not the same in different languages. In Danish, for example, the major problem concerning the establishment of contrastive segments is the relation between vowel quality and vowel quantity. Because vowel quantity influences vowel quality for some full vowels (in the sense that certain combinations of vowel quality and vowel quantity systematically do not occur), contrastive full vowel segments must be established separately for subsystems of short vowels and of long vowels.
4. The relation among contrastive segments, phonemes, and morphophonemes is considered natural, in the sense that the phonetic content is, in principle, the same at different levels of analysis.

From Contrastive Segments to Phonemes: Biuniqueness Preserved

The analysis into phonemes is based on a distinct pronunciation of single words in the norm chosen. The path from contrastive segments to phonemes is as follows.

1. Phonetically closely related sounds that are not in contrast (in the sense that they form minimal word pairs, or potential minimal word pairs) are identified phonemically. Typically, two such sound symbols are in complementary distribution relative to the context of sounds (but they might be free variants too). The identification is based on phonetic similarity not shared by any other sound segment in the phonetic notation. With reference to a well-defined analysis of distinctive features, the sound symbols to be identified phonemically should possess a cluster of distinctive features not found together in any other sound. Examples of such identifications in Danish are [j] and [ɪ̯] to /j/, and [ʁ] and [ʁ̞] to /r/.
2. Further identifications of phonetically closely related sounds that do not contrast in any specific context can be made, still respecting the principle of biuniqueness: One and the same sound can be identified in two different ways phonemically if the phonemic context is different. It is a condition for this kind of phonemic identification that the realization be motivated by a systematic phonological principle (such as, for Danish, vowel coloring by an adjacent /r/, in the direction of this /r/). An example of such an identification in Danish is the assignment of [ɛ] after a tautosyllabic [ʁ] and of [e] not after a tautosyllabic [ʁ] to the phoneme /e/, and the assignment of [a] after a tautosyllabic [ʁ] and of [ɛ] not after a tautosyllabic [ʁ] to the phoneme /ɛ/.
3. One sound can be considered the realization of a sequence of two phonemes ('biphonemic interpretation'; cf. Martinet, 1937). This is an analysis that needs to be heavily constrained, and it should only be made under the following conditions: There is a clear gain in phonotactical simplicity, it can be formulated as an example of fusion, and the process of fusion postulated can be directly observed in the behavior of speakers.

The contrastive segments are defined separately for different basic positions (such as initial and final position in Danish) according to this methodology. The question for the phonemic analysis of Danish is, for example, whether (phonetically) different contrastive segments in initial and final positions can be phonemically identified. This is the case (still in Danish) for initial [v] and final [ʋ̞] (which have the features [labial, -stop, voiced] in common, in contradistinction to all other contrastive segments); for initial [j] and final [ɪ̯] (which have the features [palatal, -stop, voiced] in common, in contradistinction to all other contrastive segments); and for inital [ʁ] and final [ʁ̞] (which have the features [pharyngeal, -stop, voiced] in common, in contradistinction to all other contrastive segments).

Phonemes by Fusion?

If the sequence [-X#] followed (in connected speech) by [#Y-] is optionally pronounced [-Z-], and if [-Z-] can be described as a result of fusion of the segments [X] and [Y], ?/Z/ = /X Y/ phonemically. In Danish, this is the case for [s] and [j] across boundaries between words and within compounds, as in *hushjørne* 'corner of a house' *Lis Jensen* '(name)' ['hus͡ˌjœʁ̞nə] ~ ['huˈɕœʁ̞nə], ['lis ˈjɛnsn̩] ~[liˈɕɛnsn̩]. Thus:

?/ɕ/ = /sj/ by fusion
[spread glottis, -labial, -stop] F [palatal]

The product of fusion is [spread glottis, -labial, palatal, -stop], that is, [ɕ].

This biphonemic analysis of ?/ɕ/ agrees with the fact that [ɕ] only occurs initially in the native vocabulary, not finally, and with a number of other phonotactical facts (see Basbøll, 2005).

Still in Danish, the phoneme /-ŋ/ only occurs syllable-finally and only after short vowels, and a phonemic identification with /n/ plus /g/ can be formulated as a fusion. The reason why this is **not** a phonemically acceptable solution is the absence of any observable evidence for a fusion, with elision of the stop following the nasal, in real speech behavior; in cases such as *han går* 'he walks' [han ˈg̊ɒːʔ] ~ [haŋ ˈg̊ɒːʔ], there is no possibility for dropping the /g/.

From Phonemes to Morphophonemes: Introducing Morphological Relatedness

Whereas all the transcriptions so far have been 'sound-structural,' in the sense that only data on sounds (although more or less abstract) were permitted in the analysis, morphophonemic transcriptions (which are written within vertical strokes) include morphological considerations in the analysis. Heuristically, two phonemes can be identified morphophonemically if they occur in parallel positions in different forms of the same morpheme (e.g., in different inflectional forms belonging to the same paradigm) and if this applies to a significant set of morphemes in a systematical way. A Danish example is /j/ in *spøge* 'make jokes' ['sb̥øːɪ̯ə] ~ ['sb̥øːɪ], and /g/ in its past participle *spøgt* ['sb̥øg̊d̥], which may be considered as representing the same morphophoneme |g|. There is no claim of biuniqueness between morphophonemes and sound chain; that is, the same phoneme in the same phonemic context can represent different morphophonemes, for example, /v/ ([ʋ̞]) in *sagfører* 'barrister' ['saʋ̞ˌføːɐ] represents the morphophoneme |g| (cf. *føre sag* 'conduct a case, pursuit'

[føɐ ˈsæɪ̯ˀ], vs. |v| in *savklinge* ‘saw blade’ [ˈsaʊ̯ ˌkʰleŋə], (cf. *sav* ‘saw’ [ˈsæʊ̯ˀ]. The morphophonemic analysis should make phonological patterns simpler and more general, with simpler phonotactics and more general principles of realization.

In Danish, the position just before a stressed (nonnative) suffix, such as *-i*, *-ik*, *-at*, *-ere* is revealing of the morphophonemic identity of consonants undergoing consonant gradation. The morphophonemic analysis of the syllable-final phonemes /b/, /d/, /g/, and /ð/ leads to clear simplifications in the description of morphological alternations. The generalizations only pertain to a segment in word-final position alternating with a segment in morpheme–final position just before a stressed (nonnative) suffix that begins with a vowel. An example is that syllable–final /b/ alternates with syllable–initial /p/ in some (nonnative) words, thus representing the morphophoneme |þ| (e.g., in *mikroskop* ‘microscope’ [mikʰʁoˈsg̊oːˀb̥], *mikroskopi* [mikʰʁosg̊oˈpʰiːˀ]); and syllable–final /b/ alternates with syllable–initial /b/ in other (nonnative) words, thus representing the morphophoneme |b| (e.g., in *hydrofob* [hyd̥ʁoˈfoːˀb̥], *hydrofobi* [hyd̥ʁofoˈb̥iːˀ].

Morphophonemes by Fusion?

The following conditions, partially parallel to the conditions for biphonemic interpretation stated previously, apply to a bimorphophonemic analysis: There should be a clear gain in phonotactical simplicity; further simplifications of the phonological description should result from this interpretation, for example, with respect to the relation between segments and prosodies; and it must allow a formulation of a morphophonemic alternation as an example of fusion. The last demand for biphonemic interpretation (that the process of fusion postulated can be directly observed in the behavior of speakers) is not enforced at this level. An example in Danish is the fusion of /ŋg/, which is realized as /ŋ/.

The phoneme /ŋ/ in Danish only occurs syllable-finally and only after short vowels. A morphophonemic identification with |n| plus |g| is motivated – it simplifies the phonotactical description considerably because /ŋ/ has a distribution essentially like nasal-stop clusters such as /nd/. It can be formulated as a fusion:

[sonorant, stop, −labial] F [stop, velar, −spread glottis]

This results in a segment [sonorant, stop, velar, -labial, -spread glottis], viz. [ŋ]. This was not a phonemically acceptable solution due to the absence of any observable evidence for a fusion, with elision of the stop following the nasal, in real speech behavior, but at the morphophonemic level the bisegmental interpretation of the velar nasal is the one to be adopted.

A crucial condition for interpreting a phoneme as a sequence of two morphophonemes, by means of fusion, is the existence of morphological alternations supporting the analysis. In Danish, there are not very many in the case of /ŋ/, but they exist, for example, *diftong* ‘diphthong,’ *diftongere* [d̥ifˈtˢʌŋ], ‘diphthongize’ [diftˢʌŋˈg̊eːˀɐ] /difˈtɔŋ/. The fusion, like other fusions in Danish, has the syllable as its domain; thus the syllabification has the consequence of blocking fusion in the latter case, /g/ being syllable–initial here (see Basbøll, 2005).

Morphophonemes as Candidate Lexical Segments

Up to now I have characterized morphophonemic transcriptions from below, that is, from sound to transcription, as part of a discovery procedure. But morphophonemes can also be considered candidates for underlying segments in the lexicon.

Whereas the morphophonemes are derivable from the surface structure by means of a bottom-up procedure, lexical segments are the units posited as underlying. There is not a unique string of morphophonemes that corresponds to every string of phonemes or sounds but, rather, there may be different solutions, so to speak, to this discovery procedure, depending on which sets of morphological alternations are to be accounted for.

The relation between phonemes and morphophonemes is, thus, not biunique. Whereas it is in general possible – in a certain speech norm – to derive the phonemes of a given word form from the morphophonemes by means of phonological principles and mechanisms, the opposite is **not** true. Such a biuniqueness presupposes an explicit exhaustive enumeration of the word forms that are considered formally related and nonsuppletive. In many cases, in many specific phonemic contexts, several morphophonemes correspond to the same phoneme and vice versa; the same morphophoneme corresponds to several phonemes. From the point of view of the addressee, and not least of the person acquiring the language, there will be several candidates for lexical segments in many cases and an ongoing change in the lexical representations can be expected, according to an (increased) awareness of morphophonological relations, that is, of morphological relations paired to their phonological realizations.

A decision on such issues depends on whether we are talking (1) about hypotheses about speakers, that is, about psycholinguistics and psychological reality, or (2) about methodological principles for the analysis, regardless of any relation to the behavior of real speaker-hearers.

In the case of (1), speakers' knowledge and awareness of orthography must be expected to play a substantial role in alphabetized cultures, and this issue should be subjected to empirical investigation. For example, when a choice is being made between the equally possible morphophonemic transcriptions |braːv| and |braːg| for Danish [ˈb̥ʁaːʔʊ̯], it may be relevant that *brav* 'brave' is written with the letter <v>, which is the same one that occurs initially in words pronounced with [v] (/v/), and that the homophonous *brag* 'crash' is written with the letter <g>, which occurs initially in words pronounced with inital [g̊] (/g/) (cf. *vi* 'we' ['vi], *gå* 'go' [g̊ɔːʔ]. Furthermore, different speakers' ideas of the relatedness of word forms (whether historically accurate or not) may be relevant for their lexical representations; this matter also should be investigated empirically. These issues represent the strong sense of morphophonemes as candidate lexical segments.

In the case of (2), naturalness can be chosen as a methodological guideline for the relation between different levels. The correspondence between the contrastive segment [X] and the phoneme /X/ is more natural than between [X] and /Y/, and the correspondence between the phoneme /X/ and the morphophoneme |X| is more natural than between /X/ and |Z|. This is not just a question of arbitrary labels – both contrastive segments and phonemes have phonetic content, even though the degree of abstraction is not the same; and morphophonemes have phonetic content as well (i.e., can be analyzed in terms of distinctive features, and so on), even though they also encode information on morphological alternations that may have consequences for phonetic content.

Even though the relation between phonetic and phonemic representations is not as multiplex as the one between phonemic and morphophonemic representations, there is, even within a given speech norm, an array of register variations; how many of those, and which one(s), have psychological reality is a matter to be investigated empirically. According to the methodology advocated here, a particular, rather high-level stylistic variant is chosen as the basis for phonemics. That being so, the relation between phonetic representation (in exactly the form chosen) and phonemic representation can be considered biunique; but it must then be remembered that this statement is far from unconditional.

A Case for Phonotactics and Frequency: Productive Inflectional Morphology in English

The typical pattern for productive inflectional morphology in English can be illustrated by the plural formation of nouns. The ending is either [-z], [-s] or [ɪz], depending on the final segment of the stem, for example, *hens* [henz], *cats* ['kæts], *buses* ['bʌsiz]. Rather than listing all possible final segments of stems, the phonetic/phonological category of this segment can be represented through characterizations such as 'voiced nonsibilant,' 'voiceless nonsibilant,' and 'sibilant' (for the final segments combining with [-z], [-s] and [-ɪz], respectively), typically using distinctive features. Furthermore, the rules for the use of [-z], [-s] and [-ɪz] can be simplified by being ordered.

What are the phonemes that are realized as [z], [s] and [ɪz] (as morphological endings, e.g., for plural)? According to the standard Bloomfieldian principle of "once a phoneme, always a phoneme," the phonemic analysis is straightforward: [z] is realization of /z/, [s] of /s/, and [ɪz] of /ɪz/ (or /iz/ or /əz/, a difference that is immaterial here). According to Praguian principles, the phonemic analysis of [z] and [s] depends on position (context): After a sonorant, [z] is a realization of /z/ because there is a contrast between [z] and [s] in this position (cf. *hens* ['henz], *hence* ['hens]). After a voiced obstruent, [z] is not a realization of /z/, however, because there is no contrast between [z] and [s] in this position (cf. *dogs* ['dɔgz] whereas words cannot end in [gs] in English). Similarly, [s] is not a realization of /s/ because there is no contrast to [z] in this position (e.g., *['kætz] is not a possible phonetic form in English). Both the plural suffixes [z] after obstruents and [s] are therefore neutralization products (archi-phonemes) according to Praguian principles: phonological units that represent what is common to [z] and [s] without being phonologically specified with respect to voicing.

Because the English plural suffix [s] only occurs where [z] is phonotactically excluded, the following procedure (Basbøll, 1972) determines the choice of plural suffixes without any reference to phonetic or phonological content (segments, distinctive features, etc.):

1. Is [z] (phonotactically) okay? If yes, choose [z]; if no, go to 2.
2. Is [s] (phonotactically) okay? If yes, choose [s]; if no, choose [ɪz].

We can illustrate this procedure using *hens, dogs, cats, buses* as examples:

1. ['henz] and ['dɔgz] are (phonotactically) okay; but *['kætz] and *['bʌsz] are not.
2. ['kæts] is (phonotactically) okay; but *['bʌss] is not; so ['bʌsɪz]

Because we know that speaker-hearers, including small children acquiring the language, are sensitive to phonotactical patterns in the language spoken around

them, this is an interesting proposal from a psycholinguistic perspective. But where does the order [z] before [s] before [ɪz] come from? An answer could be their frequency as plural endings in the language.

The plural formation of nouns in English is phonologically similar to third-person present tense and involves the same [z]–[s]–[ɪz]-pattern. A parallel phonemic and phonotactical argument can be given for the productive formation of past tense and past participle of English verbs, which involve a [d]–[t]–[ɪd] pattern (phonotactically, [d] before [t] before [ɪd]).

Concluding Remarks

This article has focused on phonemic analysis in the narrow sense, a bottom-up procedure going from sound, rendered in a phonetic transcription, up to morphophonemes, passing via contrastive segments and phonemes (in that order). But the phonemic analysis (where the term 'analysis' is taken broadly, as is often the case) can also proceed the other way round, as a top-down procedure, called synthesis in the narrow sense (e.g., in the terminology of Louis Hjelmslev, 1943). A perspective of synthesis in this sense was taken in which morphophonemes were considered as candidate lexical segments. From that perspective, a phonological description (to avoid the term 'analysis' in order not to confuse the narrow and broad senses of this term) can be given, from lexical segments via phonemes and contrastive segments to phonetic segments. Such a description would involve realization principles or rules of some sort, such as those used in various versions of generative phonology in the broad sense.

The phonological segments arrived at in the phonemic analysis are integral parts of a structure crucially involving prosody in interplay with higher-level units, some of which are purely phonetic/phonological (i.e., representing pure sound structure) such as feet, syllables, and morae (depending on language type), and others of which are both phonetic/phonological and pragmatic/grammatical, such as phrases of different extension. This prosodic structure extends well beyond the word, which – despite its central position in much of linguistics and its status as a psychologically important unit – is only a limited part of the relevant phonological structure.

See also: Danish; Neutralization; Phoneme; Phonemics, Taxonomic; Phonetic Transcription: Analysis; Phonology: Overview; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Phonemics, Taxonomic

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Introduction

The notion of taxonomic phonemics is closely associated with Chomsky's famous attack on phonemes in 1964. The taxonomic phoneme – a term that still carries strong negative connotations after 40 years – belongs to a period of controversy over the nature of phonological representations, and in particular whether the conventional phonemic level was relevant. Chomsky's view was that a feature-based notation was more flexible and captured phonological phenomena more effectively, and left no place for taxonomic phonemes. The controversy was about rather more than just representation and raised fundamental issues that make it of continuing relevance. In retrospect, this period of the 1960s proved to be a watershed in the history of 20th century phonology.

The idea of the taxonomic phoneme underpins the notion of an alphabet, and is one of the oldest ideas in linguistics. Some kind of phonemic principle is implicit in modern times in the development of standardized spelling systems. It was standard practice in the first half of the 20th century to group speech sounds into phonemes, and this led to much excellent work, particularly in the American school of structural linguistics. Phonemes are still taken for granted in any practical study of language, in fieldwork on little known languages, in the practical description of sound systems, and in the teaching of pronunciation. Before the phoneme is discarded as a theoretical concept, it is essential to ensure that there is some more advanced concept to replace it.

The Historical Background

The taxonomic phoneme is closely related to an alphabetic view of speech, and reflects the properties of the Greek alphabet, and of the many alphabets that have been derived from it. The Greek alphabet remains the source of some fundamental assumptions about speech, such as the notion that the spoken language can be segmented into discrete phonetic units, and that speech can be adequately represented by using special letters to transcribe each of these phonetic units. As a theoretical concept, the letter is very crude but practically useful, and given a distinction between consonants and vowels, it becomes possible to talk about syllables, and that leads on to the structure of words, and even word stress.

The distinction between the form of a letter and its sound or 'voice' was familiar from medieval times, and the concept of a speech sound was clarified in the 16th century, first by Erasmus's reconstruction of the pronunciation of ancient Greek, and later by the work of English spelling reformers. The study of speech sounds was developed in the 19th century, and by the end of the century there were two different traditions. The dominant tradition was the study of sound changes, which led to the great triumph of philology. By the 1870s, philologists had begun to construct what they regarded as a body of scientific knowledge, with explicit sound laws and proofs. Their representations included symbols not only for speech sounds, but also for abstract entities that it was believed corresponded to speech sounds at some time in the past. Their greatest achievement was to produce mapping algorithms between different stages of the same language (which they believed recapitulated historical sound changes), and which led to indirect but explicit statements of the phonological relationships between related dialects and languages. The other tradition was concerned with the close study of speech sounds themselves, and was partly motivated by the need to understand sound changes. By the time of Henry Sweet, phoneticians could segment speech far more precisely than letters of the writing system, and even these smaller segments, e.g., the parts of a diphthong, or the closure-hold-release stages of a stop, could be given a precise description.

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The detailed representation of speech, which Sweet called a 'narrow transcription,' contained far more detail that was necessary for general linguistic description, and became increasingly difficult to reconcile with the alphabetic view of speech. The kind of expertise required for narrow transcription was developed in Britain in the tradition of impressionistic phonetics that flourished until the 1960s, and was enriched by the study of acoustic phonetics. From the detailed study of phonetics, it became clear that speech involves articulatory gestures that overlap in complex ways that are inconsistent with a simple alphabetic view of speech.

By the end of the 19th century, speech was routinely represented at three levels: the highly abstract level of philological 'reconstructions,' the level of speech sounds, and the level of narrow transcriptions. The intuitive idea that speech was made up of speech sounds was investigated further in the 20th century. Sweet's 'broad transcription' represented speech at a level convenient for general linguistic purposes, and was developed into the practical phonemic transcriptions of the 20th century, such as the one used for Daniel Jones's *English pronouncing dictionary*. Practical transcriptions were also used to provide writing systems for previously unwritten languages, as proclaimed in Kenneth Pike's book on phonemics, which appeared in 1947, famously subtitled 'a technique for reducing languages to writing.'

A problem known to philologists but generally disregarded in the emerging phoneme theory was that it could be difficult to reconcile phonemes with sound changes. In some cases, the introduction of the phonemic level complicated the explanation. In Old English, for example, /f/ was voiced to [v] between vowels, as in *wifas* 'wives,' but remained in final position as in *wif* 'wife.' It is easy to understand the sound change and the resulting alternation of *wife* and *wives*. It is much more difficult to ascertain the phonemic consequences of the change, especially as English had to wait until after the Norman Conquest for a /v/ phoneme borrowed from French in words such as *vine*. The usual explanation is that [v] was an allophone of /f/ and later underwent a structural change that reassigned it to the new phoneme /v/. This 'structural change' is a change without a difference, and has no observable phenomena to justify it, and has to be established solely as the logical consequence of imposing a phonemic level. Another well-known case concerns the loss of /g/ after the [ŋ] in *sing*, which is said to have the effect of promoting [ŋ] to phonemic status. In the traditional speech of North West England, the /g/ is sometimes present and sometimes absent, which means that [ŋ] is sometimes an independent phoneme and sometimes an allophone of /n/. The notion of a part-time phoneme is a contradiction, and there is no satisfactory phonemic account of the loss of /g/ in these dialects. The failure to address problems of this kind was to have unfortunate consequences.

The early 20th century saw a decline in interest in philology, and the rapid growth of phonemics, with elaborate discovery procedures to ascertain the phonemes of a language. It is an accident of history that linguists, particularly in America, attempted to give a precise definition to the phoneme before the relationship between phonemes and waveforms was adequately understood. The phoneme was defined as a distinctive speech sound, and assumed to play a role in speech roughly corresponding to that of letters in writing in linking phonetic data to grammar and lexis, so that a phonemic representation was taken for granted as the way to represent words in pronouncing dictionaries. At the same time, a number of properties were assigned to the phoneme without checking that these properties logically belonged to the same entity, and as a result the phoneme became not a single concept, but a network of closely related concepts.

Some of these properties presupposed a simple relationship between phonemes and their phonetic realizations. The study of acoustic phonetics, in particular the development of the sound spectrograph, showed that the relationship between phonetic segments and phonemes was much more complex than had previously been thought. For example, the phoneme was assumed to constitute the minimal substitutable segment of speech. This seems straightforward when a human speaker changes /t/ to /d/ in a minimal pair such as *ten* ~ *den*, but phonetically this means changing the relative timing of articulatory events. The symbols in a transcription imply a sequence of discrete sounds, but it can be difficult or impossible to find a single point in the waveform corresponding to their boundaries.

Traditional phonetic terminology, e.g., 'voiced velar stop' or 'close back rounded vowel,' recognizes partial similarities among the realizations of phonemes, and implies some kind of feature system relating phonemes to each other. The investigations of Nikolai Trubetzkoy led to a major advance in phonological theory, namely the identification of distinctive features. There is no logical reason why features should be the exclusive property of phonemes, and they can be the properties of syllables, morphemes, words, or even phrases. Nor is there any reason for features to line up neatly at phoneme boundaries, and in practice they do not. The nasalization of a nasal consonant, for example, is often anticipated, and may persevere into the next segment. Aspiration and voice onset time involve overlapping articulations, and cannot be tied to a single phonemic segment.

Related to distinctive features is the wider question of contrast, for phonemes are held to contrast by definition with other phonemes. Many phonetic contrasts are indeed associated with phonemes, but there is no reason in principle why they should all be. For example, the voicing contrast of English *train* ~ *drain* is a property of the onsets /tr ~ dr/ as a whole, and if anything of voiceless and voiced allophones of /r/ rather than /t ~ d/. For that matter, the contrast between English *beat* and *bit* is not really between the FLEECE and KIT vowels as such, but between their allophones occurring before voiceless stops. Contrast becomes even more problematical in connected natural texts. Liverpool English has a /k ~ g/ contrast, but in texts recorded in the 1960s, *guitar* could easily be mistaken for *catarrh*. A more subtle case is that of the phrase /l i dʊn ɪ/, which is likely to be interpreted as 'well, he done it' if it begins with pharyngealization of the /l/ making a 'dark' allophone, but the interpretation 'Lee done it' is more likely if /l/ has a clear allophone. Now allophones are not supposed to contrast at all, and contrast is supposed to distinguish phonemes; but here a difference of allophone leads to the different interpretation of phrases. By the early 1960s, it was clear that the attempt to give a single precise definition to the phoneme had failed, and that *reductio ad absurdum* of the concept of the phoneme was all too easy.

Alongside the theoretical problem was a practical problem of data organization. Structural linguists used discovery procedures involving the sorting of large amounts of phonetic data to ascertain the phonemes of a language. However, the effective classification and manipulation of large numbers of objects either takes a very long time, or requires the kind of database that did not become available until late in the 20th century. In the absence of real databases and sorting procedures, the databases were imaginary ones, and many procedures were actually pseudo-procedures (Abercrombie, 1963), which were not actually carried out in reality but which might perhaps be carried out some day. Much of the credibility of this approach depended on the rigorous nature of the discovery procedures, and by the early 1960s these too had lost their power to persuade.

The Controversy

Chomsky (1964: 68–75) began his attack on the phoneme by distinguishing systematic phonetics and systematic phonemics as levels of representation. Using the example *telegraphic code*, Chomsky showed how an abstract systematic phonemic representation (roughly equivalent to the output of a parser with spellings replaced by phonological representations taken from a lexicon) could be mapped on to a systematic phonetic representation (roughly equivalent to a string of phones that could be sent to a speech synthesizer) without generating an intermediate level corresponding to conventional phonemes. The point is repeated effectively several times, and Chomsky was undoubtedly right. He was not, however, necessarily original.

Chomsky's interest was in the grammar, and his systematic phonemic level of representation is consequently concerned with morphological alternations. This contained a subset of the information contained in the kind of historical phonological representations that philologists had been using for many years and that accounted for morphological alternations in pairs such as English *logic/logician* or *divine/divinity*, along with much else. The difficulty of fitting phonemes into the set of rules mapping a systematic phonemic representation on to a systematic phonetic one is not unexpected because it is logically related to the difficulty of fitting phonemes into sets of sound changes. The debt to historical linguistics soon became transparent in 1968 in *Sound patterns of English*.

The systematic phonetic level of representation (Chomsky, 1964: 76–78) is contrasted with physical phonetics, which is rightly treated as irrelevant. Although Chomsky comments on the nature of the acoustic record, he nevertheless takes for granted that speech can be regarded as a string of phones at the systematic phonetic level. This may seem to be a matter of common sense if one starts with an alphabetic view of phonology, but is not a view that arises naturally from the study of the continuously varying waveform. Chomsky refers in passing to the work of Firth, who was perhaps the first to see clearly the shortcomings of the alphabetic view, but he draws no conclusions from it. Chomsky's interpretation of systematic phonetics was to have profound and negative consequences for the development of phonological theory.

Chomsky went on to discuss the conditions that a taxonomic phonemic level of representation has to fulfill. These were linearity, invariance, biuniqueness, and local determinacy. It would perhaps be difficult to cite an individual linguist who insisted on these conditions exactly as portrayed, but it was indisputably fair to regard them as typical of established practice in phonemics. Chomsky was undoubtedly right in asserting that a position that included these positions was untenable, but this is an argument that could have been avoided, for all of these conditions had already been considered by philologists, and the problems were well known.

1. *Linearity.* According to the linearity condition, each phoneme has one or more consecutive phones as its realization, so that phonemes and phones follow essentially the same order. While this condition accurately reflected contemporary practice in phonemic and phonetic transcription, it assumes the validity of the notion of a phone. If one approaches speech from the phonemic level (as most linguists who are not phoneticians have presumably always done), it might seem that sounds in speech do indeed follow the order of phonemes; but if one starts with events in the acoustic record, the notion of phones in consecutive linear order can be seen to be a simplification of a much more complex situation. The overlapping articulatory movements and the resulting auditory sensations and acoustic patterns corresponding to phonemes do not necessarily follow neatly in linear order. For example, a word like *twin* may begin with the rounding of the lips for /w/, and in rhotic English, a postvocalic /r/ overlaps with the preceding vowel, effectively occurring simultaneously with it in certain varieties.

Chomsky's attack was based on the case of *can't* in which the vowel and /n/ are pronounced together as a nasalized vowel. Given the linearity condition, a nasalized vowel has to be as a separate phoneme in contrast with an oral vowel. Within the narrow confines of the argument, Chomsky was perfectly right; but in the context of speech, vowel nasalization is an entirely normal process, and the argument itself is based on false premises.

2. *Invariance.* The notion of invariance implies that a phoneme has a set of defining features that can be identified in all its occurrences. Bloomfield (1933: 78), for example, refers to distinctive features "recurring in recognizable and relatively constant shape in successive utterances." A fundamental assumption implied by such a view is that phonemes are Aristotelian categories with fixed criteria for membership. While many sounds do have diagnostic characteristics that can be listened for when making an impressionistic analysis or looked for on a spectrogram, there are also some that do not. It is difficult, for example, to find constant features of /l/ in the speech of younger British speakers of English, especially when it is produced as a vowel. When we look beyond a single idiolect, the invariance condition becomes more problematical. It is not easy to say what all English r-sounds have in common, and it is more profitable to think of r-sounds clustering round a number of prototypes, ranging from an apical approximant to a tap or even a uvular approximant.

Some fixed phonetic property is a necessary corrective to the use of complementary distribution as a criterion for assigning phones to phonemes, in order to exclude irrelevant cases of complementary distribution which arise by chance. For example, [h] and [ŋ] are in complementary distribution in English, but few linguists would wish to assign them to the same phoneme. Without the invariance condition, the number of possible cases of complementary distribution in a language like English is very large. Even with the condition, Chomsky managed to identify a number of cases in which complementary distribution led to absurd analyses, the most amusing being the case of the LOT vowel and /k/, which according to the acoustic feature system adopted by Chomsky had sufficient features in common to satisfy the condition, and led to the same phonemic transcription for the words *socked* and *Scot*.

If the invariance condition is set up as a doctrinaire position, then it can be shown to be false and subjected to ridicule. However, it was important in the development of phonemics as a subject that such a hypothesis should be set up. In the first place, it led to the search for distinctive features, and secondly, if the accumulated evidence includes a few cases that are not compatible with the invariance condition, that in itself leads on to better explanations, including valuable insights into the role of prototypes in the phoneme system. In any case, if we think of the phoneme as a network of closely related concepts, then a constant bundle of distinctive features is certainly one of the concepts involved.

3. *Biuniqueness.* According to the biuniqueness condition, each sequence of phones is represented by a unique sequence of phonemes, and each sequence of phonemes is represented by a unique sequence of phones. This is the situation looked for in phonemic analysis, and the condition is in practice satisfied in the majority of cases. However, if a phone sequence is entirely predictable from a phonemic representation, then variation is impossible. It is possible to handle some dialect differences by assuming that different varieties must have different phonological systems; but it is difficult to see how sound change can ever come about. Conversely, if a phoneme sequence is predictable from a string of phones, then ambiguity in this part of the phonological system is impossible.

A case of ambiguity that has almost attained the status of a standard example is that of German [bunt], which can be interpreted as *Bund* 'alliance' or *bunt* 'colored.' This situation was brought about by a well-known sound change in German that devoiced final voiced obstruents, making these two words phonetically identical. If the final [t] of both words is assigned to /t/ according to the biuniqueness condition, the problem is merely shifted to the morphology. Since the genitive of *Bund* is *Bundes* /bundəs/, while the genitive of *bunt* is *buntes*

/buntəs/, we have to set up two allomorphs /bunt/ and /bund/ for the lexical item *Bund*, and only one allomorph /bunt/ for the lexical item *bunt*. For a human being, either explanation might seem acceptable, but in a database it would be entirely perverse to list totally predictable allomorph pairs when all the forms can be derived from the pronunciation entries /bund/ for *Bund* and /bunt/ for *bunt*.

However, the biuniqueness principle is open to a rather deeper objection. It would be very difficult to prove that language has two independently motivated levels linked by a convenient and unchangeable one-to-one relationship. The general experience of working on real data is while many relationships are indeed one-to-one, one-to-many relationships are also commonly found. In the processing of texts, techniques have to be developed to solve ambiguities and determine which of several abstract categories is to be associated with an observed item. While treating German [bunt] as an instance of /bunt/ may be justifiable as a phonemic analysis, it leaves the problem of ambiguity unaddressed.

4. *Local determinacy.* The condition of local determinacy requires the distribution of sounds to be determined with reference only to the phonetic properties of neighboring segments, i.e., without reference to other linguistic levels, such as lexicon, syntax, or morphology. As a general principle, this makes a lot of sense, because it is obviously preferable to look for simple local solutions before bringing in more complex ones. Philologists had also looked for purely phonetic explanations for sound changes wherever possible, but had found that other linguistic levels were sometimes involved. For example, words in which an initial th-sound became voiced in English (e.g., *the*, *this*, *though*) are function words and most are related to the definite article. A voiced velar stop is pronounced after /ŋ/ before the comparative ending in *younger* and *longer*, but not in *singer* or *hanger*. To the extent that phonemicists really did insist on this condition, they were ignoring what had long been known.

In all four cases, the same conclusion is unavoidable. Most of the data can be analyzed in accordance with the principle, and it would be convenient if this were always so; but there are situations in which the principle cannot apply. There can be no objection to a methodology that seeks to exhaust simple solutions before considering more complicated ones; but there is also no defense for clinging to simple solutions that are already known not to work, which was the situation in the early 1960s. By bringing the problems together, Chomsky made a useful criticism of contemporary practice, and the appropriate way forward would have been to modify phonological theory in order to deal with the criticisms.

The outcome in practice was that the concept of the phoneme itself was discredited, and considered to have no place in phonological theory. Since this manifestly does not follow as a logical conclusion from the evidence given, it represents not a move on to the next stage in an organically growing discipline, but rather a major shift in ideology.

Phonology and Ideology

In order to understand fully the changes of direction in modern phonology, it is essential to take account of the shifts of ideology that have periodically taken place and affected the subject over the last century. The developments in philology of the 1870s may well have been intended to be purely scientific; but they also happened to coincide with the unification of Germany, and reflect relations between Britain and Germany in the years leading up to 1914. Nor were sound changes objective facts, as is demonstrated by the concept of 'received pronunciation.' The notion that 1000 years of English sound changes had led to a standard form of pronunciation, which by chance happened to be used by public schoolboys from the south of England rather crudely incorporated contemporary beliefs associated with the English class system.

Philology declined after the First World War, and structural linguistics flourished. De Saussure had in 1916 made a distinction between diachronic and synchronic linguistics, but the rejection of historical methods that followed represented not just a change of emphasis but a change of ideology. Linguists now insisted on a descriptive approach to language and took an interest in less prestigious languages, such as the native languages of the United States. However laudable the new ideology, the rejection of philology brought with it an astonishing blindness to accumulated phonological knowledge, and this was a major factor in the unrealistic model of phonemics that lent itself to demolition by Chomsky.

Chomsky's attack on the phoneme represents another change of ideology. It has become commonplace to refer to the Chomskyan 'revolution' in linguistics, and to comment on the resulting vitality and growth of linguistics as a discipline. The controversy over taxonomic phonemes reflects the spread of the revolution into phonology, and involves far more than a scholarly debate over methodology. The revolution was accompanied by an ideological shift that has been recognized in the case of generative semantics (Huck and Goldsmith, 1995), but applies equally in phonology. The clash of ideologies comes out clearly in Postal (1968), in which the kind of

phonology that comes under attack is called 'autonomous phonemics' in preference to Chomsky's 'taxonomic phonemics.' Postal includes philology in his attack, insisting on the mentalistic nature of sound change, and branding his opponents neogrammarians.

The logical outcome of the arguments would have been to revise phoneme theory and undertake the long-delayed reconciliation of phoneme theory with sound changes. That this did not happen shows that it was not really the point. The strategy was to ridicule Chomsky's opponents, and to undermine their credibility, and the objective was to seize control of the discourse of linguistics. For the rest of the century, any theoretical work in phonology or indeed elsewhere in linguistics had to take account of Chomsky's transformational-generative model. It controlled what was considered worth investigating, and how it should be investigated. Henceforth, a knowledge of linguistic theory involved not only understanding the structure and workings of language, but also a familiarity with the opinions of authoritative scholars working in the Chomskyan tradition.

Part of the new orthodoxy was the use of distinctive features, specifically acoustic features. Any phonetic symbol is at least informally equivalent to a combination of feature values, and in a database table, a symbol such as [k] can be used as the identifier, and the values corresponding to 'voiceless velar stop' can be entered into fields representing the features. An identifier can be selected for any combination of feature values, and so anything represented in features can also be represented much more simply by identifiers. In such a case, a string of identifiers is equivalent to a sequence of feature values, and it would be illogical to argue over which is the correct way of representing speech. The use of acoustic features and feature matrices in the notation of phonological rules in effect became a mark of the new orthodoxy. In using acoustic features, one has to understand the acoustics of speech at least enough to read a spectrogram, but it is very doubtful indeed if all the phonologists who used acoustic features in the 1960s and later had any such understanding. When acoustic features were used for dead languages such as Gothic, for which real acoustic data was out of the question, one has to suspect that phonologists were simply converting representations from conventional symbols into a feature notation.

The Legacy of the Controversy

The last third of the 20th century saw a profusion of phonological theories, with different emphases and different notations. While the superficial impression is of vigorous theoretical advance, it was not always clear what hard new knowledge was being obtained, as opposed to new methods of presentation. One of the great changes was in the use of data. Whereas phonologists had previously used real data, now they relied on the intuitions of the native speaker. This is reflected in the direction of new theories, such as lexical phonology, and concentrated effort on the form of isolated words and short phrases, rather than on connected natural texts. The focus on intuitions drew attention away from the need to account for real events in the waveform. It is ironic that as theoretical discussion moved away from phonetic data, phonological notation became apparently more phonetic. Conventional phonemic notation, using letters of the alphabet, actually looks more like spellings, whereas a distinctive feature matrix looks as though it belongs to a waveform.

Linguists working on real data continued to use the phoneme, but without solving the problems. The lack of a systematic phonemic level meant that phonemic descriptions could not handle the morphology adequately, and despite a brief flirtation with the diaphone, could not account for dialect variation. British English pronunciation continued to be identified with an increasingly archaic kind of received pronunciation, and the problem of dealing with other spoken varieties was eventually solved not within phonemics, but by means of lexical sets. The lack of an adequately described systematic phonetic level meant that phonological problems came to be bypassed in mainstream empirical research. Phonemic segments as constituents of syllables and larger structures continued to be used in models of speech synthesis, and conventional phonemes with their problems unsolved came to be represented in new computer-readable alphabets such as SAMPA and the ARPAbet.

Conclusion

Structural phonemics had clearly run its course by the early 1960s, and was beset by too many contradictions. Chomsky and his colleagues were surely right to challenge it. If the controversy had led to the appropriate modification of phoneme theory, it would now merit a footnote in the history of linguistics, not an encyclopedia entry to itself. But it was caught up in a much profounder change in the aims and methodology of linguistics as an academic subject, and its consequences for phonology were to be profound and lasting. Beliefs that were or became orthodox still influence research practices at the beginning of the 21st century. Phoneticians and speech scientists are fully aware of the complexity of speech, but the alphabetic view of speech is still considered normal in phonological research and in speech research.

See also: Abercrombie, David (1909–1992); Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Distinctive Features; Firth, John Rupert (1890–1960); Generative Semantics; Jones, Daniel (1881–1967); Phoneme; Phonology: Overview; Pike, Kenneth Lee (1912–2000); Saussure, Ferdinand (-Mongin) de (1857–1913); Sound Change; Speech Synthesis; Spelling Reform Proposals: English; Sweet, Henry (1845–1912); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Phonetic Classification

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Phonetic classification (or taxonomy) is the system of categories and descriptive labels that underlies the International Phonetic Alphabet and the unaided (impressionistic) analysis and transcription of speech by trained observers. It depends upon regarding speech as a succession of sounds (segments) and attempts to characterize the production of each such segment, often (though not exclusively) by specifying a relatively static target configuration.

Airflow and Voice

The basis of all normal speech is a controlled outflow of air from the lungs, termed the 'egressive pulmonic airstream.' Passing up the trachea, air flows through the larynx, a cartilaginous structure containing the vocal folds ('vocal cords' in older terminology). They are attached close together at the front, but are moveable at the rear by the arytenoid cartilages, thus forming an adjustable valve. For ordinary soundless breathing, the folds are held apart (abducted) at their rear ends and form a triangular opening known as the 'glottis.' In another adjustment, the arytenoids can be brought together (adducted), and the folds pressed into contact along their length. This closes the glottis and prevents the flow of air. In a third possibility, the folds can be gently adducted so that air under pressure from the lungs can cause the folds to vibrate as it escapes between them in a regular series of pulses. The open glottis position gives rise to speech sounds (generally consonants) said to be 'voiceless,' such as those symbolized as [s] or [f]; the closed position (if maintained briefly in the course of speech) corresponds to the so-called 'glottal stop,' symbolized as [ʔ] while the vibrating adjustment gives 'voiced' sounds, which include the majority of all ordinary vowels and numerous consonants. Many consonants are found in voiced–voiceless pairs; for example, [z] is the voiced counterpart of [s], and [v] is the voiced counterpart of [f].

Voice can not only be switched on and off, but also controlled in loudness, pitch, and quality. Controlled variations in pitch give rise to tone and intonation distinctions. Voice 'quality' refers to the mode of vibration of the vocal folds and its audible effects. Normal (modal) voice produces a clear, regular tone and is the default in all languages. In 'breathy' voice (also called 'murmur'), vibration is accompanied by audible breath noise. In English, such an adjustment has only paralinguistic value, but in other languages, brief interludes of breathy voice assist in marking linguistic contrasts and may be analyzed as properties of particular segments. Other glottal adjustments include narrowing without vibration, which produces 'whisper.' The generation of sound in the larynx is termed 'phonation.'

The Supraglottal Tract

Having passed through the larynx, air enters the supraglottal tract, which is usually visualized at its central (midsagittal) plane, as seen in a lateral X-ray (see Figure 1).

The lowest part of the supraglottal tract is the 'pharynx,' which is bounded at the front by the 'epiglottis' and the 'root' of the tongue. At the top of the pharynx, the vocal tract branches into the oral and nasal cavities. The entrance to the nasal cavity is

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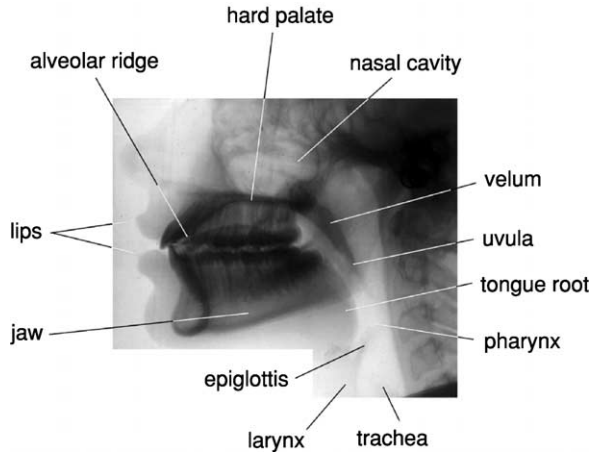

Figure 1 An X-ray image of the vocal tract at rest. The subject is an adolescent female. The velum is shown in the open position.

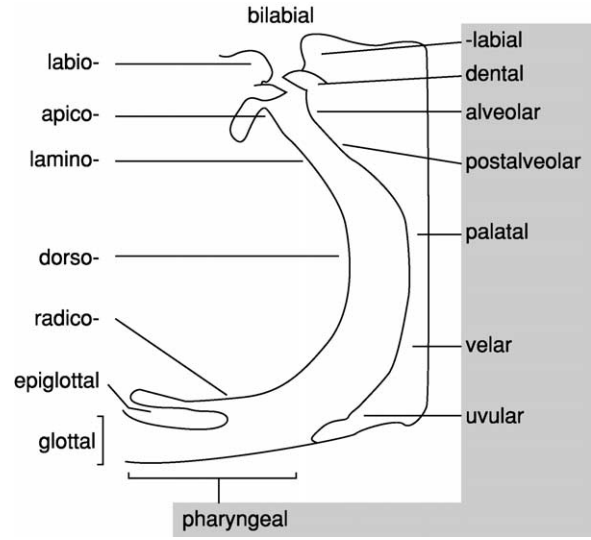

Figure 2 Terminology for place of articulation. The vocal-tract outline is rotated through 90 degrees to make the text clearer.

controlled by the 'velum' (or soft palate), which operates like a further valve. It can be raised, forming a 'velic' closure against the rear wall of the pharynx, thus preventing air from entering the nasal cavity, or lowered, allowing flow into the nasal cavity and thus out of the nostrils. Air flowing into the oral cavity can eventually leave via the lip orifice, though its path can be controlled or stopped by suitable maneuvers of the tongue and lips.

The upper surface of the oral cavity is formed by the 'hard palate,' which is continuous with the moveable soft palate. The palate is domed transversely as well as longitudinally and bordered by a ridge holding the teeth. In a midsagittal view, the portion of this behind the upper incisors is seen in section and is generally referred to as the 'alveolar ridge.' The lower surface of the oral cavity is dominated by the tongue, a large muscular organ that fills most of the mouth volume when at rest. Various parts of the tongue can be made to approach or touch the upper surface of the mouth, and complete airtight closures are possible at a range of locations, the closure being made not only on the midline where it is usually visualized, but extending across the width of the cavity and back along the tongue rims. At the exit from the mouth, the space between upper and lower teeth can be altered by adjusting the jaw opening, while the lips can independently assume a range of adjustments, again including complete closure.

Place and Manner of Articulation

Vowels are, in general terms, sounds produced with a relatively open vocal tract through which air flows with little resistance, while consonants involve some degree of obstruction to the airflow (often total blockage). 'Place of articulation' refers to the location along the vocal tract where a consonantal obstruction is formed.

Terminology for place is fairly uncontroversial. Common terms are shown in Figure 2, organized around the familiar midsagittal schematic of the vocal tract. Any word shown without a leading or trailing hyphen is a complete place term. Thus, 'palatal' refers to a type of articulation in which the front part of the body of the tongue approaches the hard palate, 'dental' refers to one made by the tip and/or blade of the tongue against the upper incisor teeth, and so on. A more precise terminology is obtained by taking hyphenated terms on the left, which denote 'active' articulators, and pairing them with terms from the shaded box that name 'passive' articulators. One of these combinations, 'labiodental,' is the only way of referring to the articulation so named. The terms 'post-' and 'pre-,' with the meanings 'back region of' and 'front region of,' are used when more precision is required in specifying a passive location. One of these, 'postalveolar,' is established on the IPA chart; 'postvelar' is in most contexts a synonym for 'uvular.' The so-called 'retroflex' place involves a backward displacement of the tongue tip towards some point along the palate, yielding apico-palatal articulation.

'Manner of articulation' refers to the type of obstruction used in the production of a consonant – whether, for example, the airflow is blocked completely for a brief time (yielding the manner known as 'plosive') or simply obstructed so that noisy turbulent flow occurs (the manner known as 'fricative').

Manners of articulation are summarized in **Table 1**. There is some variation in the order in which manners

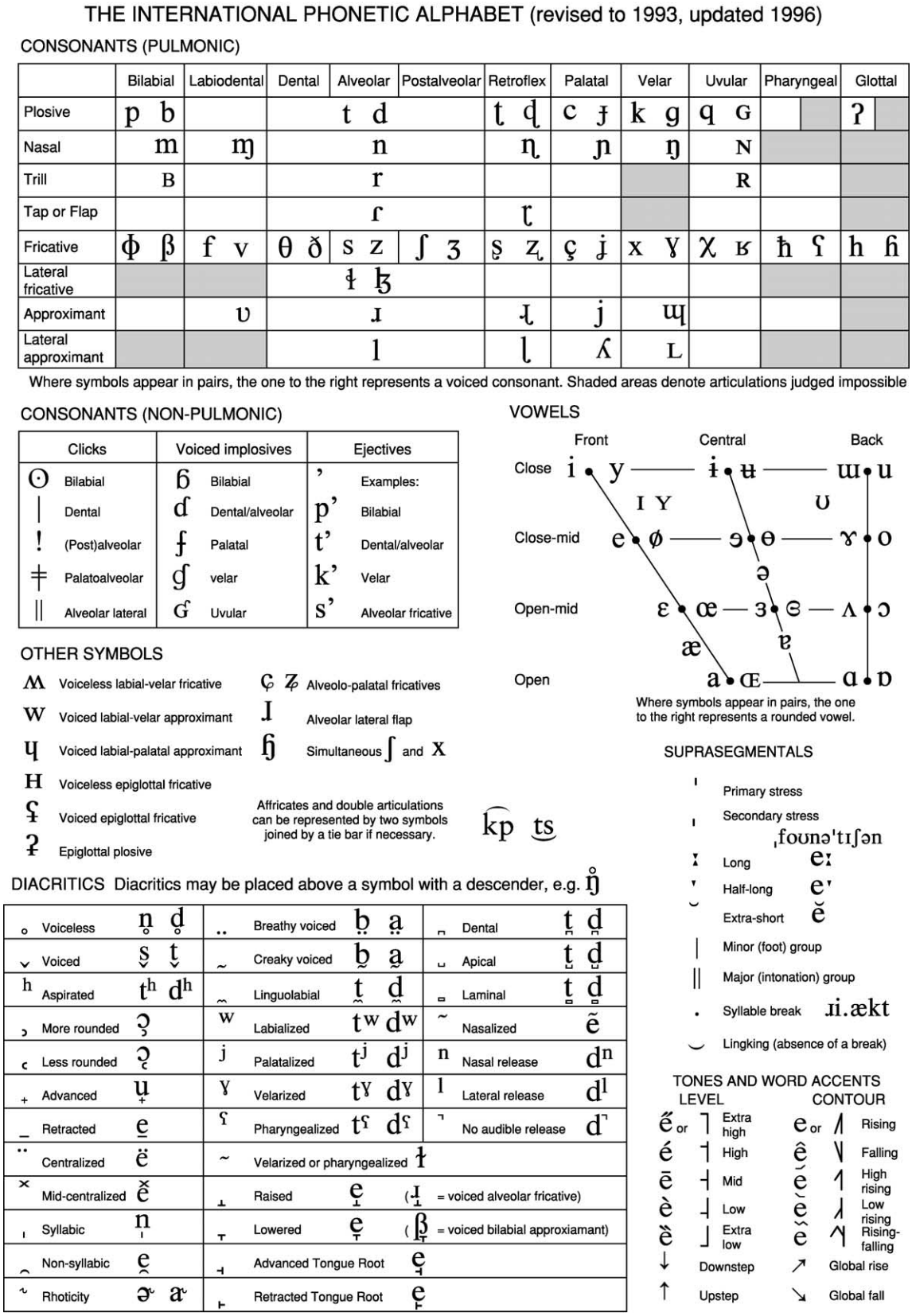

Figure 3 The Intrernational Phonetic Alphabet.

Table 1 Summary of manners of articulation

Manner	*Definition*	*Sonorant*	*Comments*
Nasal	Complete oral closure, soft palate lowered to allow air to escape nasally	+	
Plosive	Complete closure, soft palate closed	–	
Affricate	Plosive released into fricative at the same place of articulation	–	Not always treated as a separate manner
Fricative	Close approximation of articulators, turbulent airflow	–	Sibilants, having wake-turbulence at the teeth, are an important sub-category
Lateral fricative	Complete closure on mid-line, turbulent flow at the side	–	
Lateral approximant	Complete closure on the mid-line, open approximation at the side	+	
Approximant	Open approximation, flow not turbulent	+	Approximants which are within the vowel space are also called semivowels
Trill	Flexible articulator vibrates in the airstream	+	In trills and taps the brief closures do not raise intra-oral air pressure significantly
Tap/flap	A single brief closure made by the tongue hitting the alveolar ridge	+	Flaps start with the tongue retroflexed

are listed by different authorities. This illustrates the fact that, unlike place, manner is not a single dimension. It is true that there is one main dimension, corresponding to degree of constriction, but manner also incorporates the 'nasal/oral' distinction (is the velum open as in [m] or [n], permitting flow via the nose?) and the 'central/lateral' distinction (is airflow along the midline of the tract as in most sounds, or is it temporarily diverted to the side(s), as in lateral sounds such as [l]?). The 'rate' of an articulatory manoeuvre is also relevant to manner. For instance, if the tongue tip and blade make one brief flick, sealing against the alveolar ridge, the resulting sound is called a 'tap,' symbolized as [ɾ] but the same closure made at a slower rate will be a plosive [d].

The IPA Chart

The fundamental insight in the traditional classification of consonants is the realization that voicing, place, and manner are orthogonal. A sound may be voiceless or voiced, and it may use any pitch or phonation type, regardless of its place or manner of production. In a similar way, places and manners may be (with certain restrictions) freely combined. This leads naturally to the presentation of combinatorial possibilities in the form of an array, with the columns representing places of articulation arranged in order from the lips to the glottis, and the rows being manners, essentially in order of increasing openness. The voiceless–voiced distinction is represented by putting an ordered pair of symbols in each cell. Not every cell of the array formed by the intersection of place and manner categories is populated. A distinction is drawn between sound-types that are humanly possible though not attested in known languages (such as voiceless palatal lateral fricative) and those that are physically impossible, such as voiced pharyngeal nasal (impossible because a pharyngeal closure, even supposing it can be achieved, is upstream from the velum). Blank cells on the IPA chart relate to the possible-but-unattested type, shaded cells relate to impossible combinations. In some cells, such as those for nasals, there is only one symbol, corresponding to a voiced sound. The voiceless counterparts are certainly possible, and are indeed encountered in languages, but are sufficiently uncommon that a representation using an additional 'voiceless' diacritic is not an inconvenience.

Vowel Classification

Vowels are all relatively open, but their distinct auditory qualities are clearly controlled by articulatory adjustments of some sort. In all, the tongue body is arched within the oral cavity. In a vowel such as [i], the tongue body is well forward in the mouth, beneath the hard palate, whereas in [u] it is pulled back. And whereas both [i] and [u] have the bunched tongue relatively high in the oral cavity, the vowel [a] requires it to be lowered well away from the palate (the jaw may open to assist). This gives rise to the concept of a two-dimensional vowel 'space' in the oral cavity, the dimensions being 'high-low' (also called 'close-open') and 'front-back,' within which the bunched tongue may be located. A third independent factor is lip posture. The lips may form a broad, 'spread' orifice, as in [i], or be 'rounded' and protruded into a small opening, as in [u]. Again, the power of this approach comes from realizing that the three

properties that have been identified are orthogonal: any degree of height can be combined with any position on the front-back dimension, and any tongue-body position can be combined with lip-rounding or its absence. For example, keeping a tongue position for [i] but adding lip-rounding in place of lip-spreading yields a quality that the IPA symbolizes as [y] and that is essentially that which is heard in a French word such as *lune* [lyn] 'moon.' The vowels at the corners of the vowel space can be given reasonably precise articulatory definitions. For instance, the height (or closeness) of an extreme variety of [i] is limited by the requirement that the vowel shall be an open articulation without friction. Moving the tongue beyond the upper front border of the vowel space will result in a sustained (palatal) fricative consonant. In the 'Cardinal Vowel' system (a refinement of vowel classification developed by the celebrated British phonetician Daniel Jones and essentially incorporated into the IPA), not only are the corner vowels thus fixed, but additional auditory qualities at two intermediate heights, both front and back, are learned and imitated during phonetic training to provide further reference points. The vowel space, which in older literature was often represented as triangular, becomes a quadrilateral of standardized proportions, originating partly from X-ray studies of tongue position during sustained vowel production. The vowels of any language can be envisaged as points within this space (not necessarily on its periphery, of course) and symbolized appropriately. Vowels of changing quality (diphthongs such as that heard in English *mouth*) can be represented as a trajectory within the space.

Further Aspects of Vowel Classification

Many languages make use of contrastive 'nasalization' of vowels. Here, essentially identical configurations of tongue and lip adjustment are differentiated by producing one with a lowered velum, adding the acoustic resonances of the nasal cavity to give a distinct auditory effect. Thus, French [sɛ] *sait* '(he/she) knows' has a nonnasalized (oral) vowel, while [sɛ̃] *saint* 'saint' has the nasalized counterpart.

'Rhotacization' involves adding what may be called an 'r-coloring' to a vowel. It involves a modification of tongue shape and can be achieved by combining a curled-back tongue-tip gesture with an otherwise normal vowel articulation (but is not necessarily done that way by all speakers). It is common in North American English in such a vowel as that of *bird*.

With 'advanced tongue root' (ATR), and its converse, withdrawn or 'retracted' tongue root, we have an example of a property that is now included on the IPA chart but has not achieved a consensus of understanding among phoneticians. Pairs of vowels such as [i-ɪ] or [u-ʊ] are said to differ in that the first in each pair has the tongue root advanced, enlarging the pharynx. Opinions are divided over whether tongue root position is a separate controllable aspect of vowel articulation or whether, alternatively, it refers to vowel-quality differences that are already accommodated on the vowel quadrilateral. While one of the 20th century's leading phoneticians eagerly promoted tongue root position as an independently controllable aspect of articulation, and devised drills for his students to practice it (Pike, 1967), another (Catford, 2001) appears not to mention it.

Multiple Articulation

Certain consonant sounds require extensions to the simple voice-place-manner framework presented earlier in this article. Quite commonly, languages present pairs of segments that are alike in voice, place, and manner but distinct in sound because of an accompanying secondary adjustment. In the standard British pronunciation of English, for instance, a voiced alveolar lateral consonant that precedes a vowel at the beginning of a syllable (as in *look*) is very different in auditory effect from one that occurs after a vowel in the coda of a syllable (such as *cool*) that is accompanied by a raising of the back of the tongue (the sound is said to be 'velarized'). In this case, the difference is automatically conditioned and carries no meaning, but in many languages (for example, Russian) this type of difference is applied to numerous pairs of consonants and utilized to create linguistic contrasts. Along with 'velarization,' the most common types of secondary articulation found in languages are 'labialization' (the addition of a labial stricture, usually lip-rounding) and 'palatalization' (simultaneous raising of the front of the tongue towards the palate). A further kind of back modification, akin to velarization, but involving constriction of the pharynx, gives 'pharyngealization,' heard in the emphatic consonants of Arabic.

A distinct type of multiple articulation involves two simultaneous gestures of equal degree by independent articulators, termed 'double articulation.' For example, the Yoruba word 'arm' (part of the body) is [akpá], the [kp] denoting a voiceless plosive formed and released at the bilabial and velar places simultaneously. This is termed a 'labial-velar plosive.' In principle, many double articulations are possible, though only the combination of labial and velar is at all common. The common sound [w] is also a labial-velar double articulation (it is an approximant formed simultaneously at the two places).

Nonpulmonic Airstreams

Though the egressive pulmonic airstream is the basis of speech in all languages, certain languages supplement it with 'nonpulmonic' airstreams – that is, mechanisms that produce short-term compressions or rarefactions effected in the vocal tract itself and sufficient to power single consonant segments. The non-pulmonic sound types found in languages are 'ejectives,' 'implosives,' and 'clicks.' Ejectives, symbolized with an apostrophe [p' t' k' tʃ'] are the most common type. They resemble ordinary voiceless plosives and affricates, but are produced with a closed glottis, which is moved upward during the production, shortening the vocal tract and thus compressing the air contained between the glottis and the articulatory constriction (which might be, for example, at the lips). Release of the articulatory closure takes place (generally with a characteristic auditory effect, which can be relatively powerful), and the glottal closure is then maintained for at least a further short interval. The speaker will then generally return to the pulmonic airstream for the following sound. Much less commonly, languages may use the same mechanism to power a fricative. The mechanism used for ejectives can be called the 'egressive glottalic mechanism.' Because the vocal folds are closed, all sounds produced this way must lack vocal fold vibration.

'Implosives' can be viewed as reverse ejectives, made by moving the closed glottis down rather than up, giving the 'ingressive glottalic' mechanism. However, the voiceless types resulting from this straightforward reversal are rare in languages. The implosives commonly encountered are voiced and are symbolized with a rightward hook attached to the symbol for a voiced plosive, as in [ɓ ɗ ɠ]. In these, egressive lung air passes between the vibrating vocal folds at the same time as the larynx is in the process of lowering. The lung air offsets to some degree the pressure reduction caused by larynx lowering. The auditory effect resembles a strongly voiced plosive.

Ejectives and implosives invite comparison with ordinary pulmonic plosives and as recently as 1993 were accommodated as additional manners of articulation on the IPA consonant chart. By contrast, 'clicks,' which are found as linguistic sounds in relatively few languages, are really a class apart. They are brief but powerful sucking noises made by enclosing a volume of air in the mouth and then enlarging that volume by tongue movement, with a consequent reduction in pressure. The enclosed volume is invariably bounded at the back by the tongue in contact with the velum (yielding the term 'ingressive velaric' airstream); at the front, the closure may be completed by the lips or by the tongue tip and blade in various configurations. According to the place where the front of the closure is formed and released, clicks are categorized as bilabial, dental, (post)alveolar, palatoalveolar, and alveolar lateral. Basic clicks are of course voiceless, but because clicks are formed entirely within the mouth ahead of the velum, the rest of the vocal tract is free to perform a wide range of click 'accompaniments,' including voicing, aspiration, voice-plus-nasality, glottal closure, and others. No fewer than 13 accompaniments are described in Nakagawa (1995).

Beyond the Segment

Phonetic classification is almost entirely concerned with the paradigmatic axis of choice at each point in structure, and there is very little agreement on impressionistic description of structures extending along the temporal axis of speech (by contrast, much contemporary instrumental work is concerned precisely with the study of phrasal units in speech). Length, stress, and pitch are classified as suprasegmental (or prosodic) features on the current version of the IPA chart, implying that they apply not to single segments but to sequences. In fact, length often functions fairly straightforwardly as a segmental property, because languages often distinguish short and long vowels, and (less commonly) short and long consonants (the latter equivalently termed 'geminates'). Duration, loudness, and pitch are all contributors to the category stress (though in different proportions for different languages), with stress generally considered to be a property of a syllable rather than any particular segment within it. The phonetic syllable, however, is problematic, with some authorities claiming that definition is impossible. Nevertheless, phonetic taxonomies regularly make use of the concepts 'syllable division' and 'syllabicity,' and provide marks for indicating them in transcribed material. It is in the nature of the IPA stress-marks that they function additionally as syllable dividers. For still longer structures, agreement on impressionistic phonetic classification appears elusive. For example, attempts to categorize the seemingly characteristic rhythms of languages (as stress-timed vs. syllable-timed) have not met with lasting success.

A Consensus View

The basis of phonetic classification as summarized in this article is a consensus, forged over time, rather than the creation of any one figure or school. It can be found repeatedly in numerous works. One such work is in the IPA's *Handbook* (1999: 3–39), essentially the work of F. Nolan (see Nolan, 1995); another brief

account, embedded in a wider scientific context, is the appendix, 'Overview of impressionistic-phonetic classification,' in Hayward (2000: 260–275). Phonetic classification, together with the development of practical skills in production and identification, generally forms the basis of introductory courses in phonetics (Ashby, 1995; Ladefoged, 2001). The main outlines of classification have been relatively stable since at least the 19th century, doubtless because it is based on a good basic understanding of relevant anatomy and physiology, and embodies a serviceable aerodynamic and acoustic model of speech sound production. The International Phonetic Association, through its journal and periodically revised alphabet, has played an important role in the emergence of this framework.

The 1989 convention at which the IPA's alphabet was comprehensively revised might have been expected to lead to corresponding revision in the phonetic classification (as was anticipated by Roach, 1986), but this did not happen. There is essentially nothing new about the classificatory scheme embodied in the revised alphabet or the new *Handbook* (1999).

Systematizers

Some have attempted comprehensive revisions of phonetic taxonomy, though it has been the usual fate of such schemes to have only a proportion of their proposals incorporated into the consensus view.

The two phoneticians who had the greatest influence on phonetic classification in the 20th century were K. L. Pike (1912–2000) and J. C. Catford. Pike's *Phonetics* (1943) is the most original systematic treatment of classification within the last century, but probably few now read or understand it. Much of Pike's terminology has passed into common use (for example, 'airstream mechanism,' 'local friction,' 'velic closure') but his rigorous stipulative definitions are forgotten. Even the famous 'vocoid' has become an imprecise term for any sound of a generally vowel-like character.

Catford's published contributions extend over more than 60 years and are comparable to Pike's in their completeness and rigor. The title, 'The articulatory possibilities of man' (Catford, 1968), gives an indication of the coverage attempted. As with Pike, although numerous terms and concepts have passed into common use, his overall scheme of classification has not. His table showing combinations of stricture type and location involves the intersection of 9 manners with some 26 places of articulation.

The dominance of the IPA style of taxonomy is not an indication that there are no viable alternatives. An interesting and original scheme for classification is that of Peterson and Shoup (1966), whose phonetic chart is reproduced in simplified form in Figure 4.

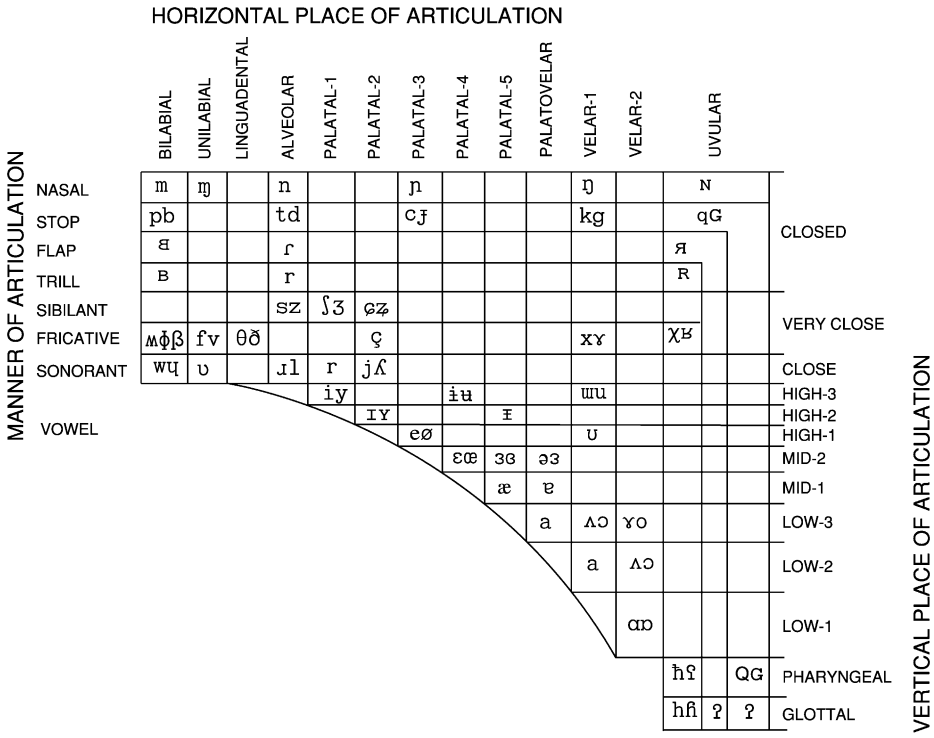

Figure 4 A portion of the phonetic chart of Peterson and Shoup (1966), considerably simplified.

Because of the way in which places and manners are defined, vowel and consonant articulations are integrated into one chart, showing, for example, the affinity between open vowels of type [a] and pharyngeal consonants. The arrangement of their chart automatically excludes impossible categories such as pharyngeal nasal (which the IPA must exclude by shading a cell in the grid). Also noteworthy is the recognition of sibilant as a manner of articulation separate from fricative (the failure to acknowledge the category 'sibilant' is one of the most surprising omissions of the IPA classification). Despite evident advantages, the Peterson and Shoup scheme appears to have had little impact.

Phonetics and Phonology

The publication of *The sound pattern of English* (Chomsky and Halle, 1968) brought a change in what is widely understood by the term 'phonetic theory.' Chapter 7 of the book, entitled, 'The phonetic framework,' contains a wide-ranging survey of phonetic classification seen from the viewpoint of the phonologist who requires a universal feature-set for linguistic analysis. Rather than favoring the proliferation of types and categories, such an enterprise prompts the search for underlying (and possibly somewhat abstract) similarities within what are superficially disparate appearances. It is, however, in danger of subordinating phonetic accuracy to the needs of an elegant feature system. It was partly in reaction to this that Peter Ladefoged developed his 'linguistic phonetics' (Ladefoged, 1971, and many subsequent publications). This retains much traditional terminology, and resembles the traditional IPA approach in that the total range of sound types to be described is taken to be a superset of attested language systems, which are arranged systematically and aligned in such a way that closely similar types in different languages are conflated. The total number of contrasting categories can then be determined, and the 'dimensions' or 'parameters' along which the categories differ can be sought. Linguistic phonetics is based on, and has stimulated, extensive valuable fieldwork, which is commonly supported by acoustic and articulatory instrumentation. Given this framework, the extensive contributions of Ladefoged and his coworkers have been pragmatic rather than philosophical. Ladefoged and Maddieson (1996) presents the closest approach yet seen to a comprehensive catalogue of human sound types, but the authors abstain from any reorganization of classification (see, however, 369–373).

Laver (1994) is probably the only extensive attempt at a novel systematization of classification in recent times. It presents an integration of classification within a very broad conception of the field of phonetics. Laver proposes that place of articulation and degree of stricture (for all segments) must be supplemented by a third factor, 'aspect' of articulation, which in turn consists of 'conformational,' 'topographical,' and 'transitional' elements. Into this aspect category he puts a wide variety of features, including the oral/nasal and central/lateral distinctions, retroflexion, ATR, and dynamic features such as tapping and trilling. It is a matter for debate whether this does more than save the appearances elegantly, by making both the place and degree-of-stricture dimensions more rational (see especially the discussion at 140–147).

Classification out of Fashion

A kind of paradox is associated with the study of phonetic classification. On the one hand, the IPA and the system of classification that underlies it are indispensable for practical use and are regarded as necessary prerequisites to more advanced study (for example, in language fieldwork, instrumental phonetics, or phonology). On the other hand, many of the basic concepts of traditional phonetic classification are widely held to be fundamentally flawed. The segment, for example, which is a cornerstone of the International Phonetic Alphabet, is very generally reckoned to be a kind of fiction, projected upon speech under the influence of alphabetic writing.

At the same time, systematic analysis of phonetic classification is now very much out of fashion as a contribution to research. It is noteworthy, for example, that among approximately 800 papers at the most recent International Congress of Phonetic Sciences, not one appears to address phonetic taxonomy directly (Solé, Recasens and Romero, 2003).

Probably many of those who use the International Phonetic Alphabet regard it as a practical tool and use it without any theoretical commitment to the taxonomy that the IPA seems to imply. Phonetic categories are seemingly not physical (in the sense of corresponding closely to acoustic or production data), nor yet linguistic (in the sense of corresponding to phonological features). In 'laboratory phonology' (Kingston and Beckman, 1990, and much further work), we see an enterprise founded on specifically ignoring the traditional taxonomic assumptions and thus bypassing phonetic classification and symbolization. It remains an open question whether, 'between the grammar and the physics of speech,' there is evidence for a level of phonetic representation as traditionally recognized.

See also: International Phonetic Association; Phonemics, Taxonomic; Phonetic Transcription: Analysis; Phonetic

Transcription: History; Phonetics, Articulatory; Phonetics: Overview.

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Phonetic Pedagogy

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Introduction

Although the teaching of phonetics today is an exciting matter that now even has its own conference (the biennial *Phonetics Teaching and Learning Conference* at UCL in London), we stand on a watershed. The technological revolution has opened doors to options we could previously only dream of and the need for phonetics (both practical skills and theoretical knowledge) has probably never been more in demand. In addition to the traditional market (linguists, speech therapists, and language teachers), a huge variety of other professionals are more speech-aware now than ever before, including forensics experts, voice and accent coaches, editors handling phonetic dictionaries (as well as language courses and travelers' phrase books), audiologists, hearing-aid technicians, teachers of the deaf, media employees (for example, both the *British Broadcasting Corporation* – as described in Pointon, 1988 – and the *Australian Broadcasting Corporation* in the English-speaking world have specific units dealing with matters of pronunciation), anthropologists, and linguistic fieldworkers (especially in connection with undertakings such as the SOAS-based Hans Rausing Endangered Languages Project) and technologists, programmers, and designers involved in the design and manufacture of all manner of speaking devices from banking machines to children's toys. At the same time, many governments are cutting funding, closing departments, and shrinking the crucial resource base, making this still rather costly subject to teach even more of a challenge to those employed in the field (and even casting doubt in some cases over our ability to continue training future generations).

Nevertheless, the combination of enhanced facilities and the widening range of 'consumers' has, necessarily, impacted on both the syllabus and the delivery of this subject.

There are still differing views over what the notion of phonetic pedagogy actually encompasses. A century ago, when the more widespread teaching of phonetics in the modern idiom first began (phonetics, of course, was around for many centuries before that), the focus was principally on phonetics applied to language teaching (see *inter alia* Catford, 1993). Today's International Phonetic Association (IPA) was cofounded in 1886 by a European group of

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English language teachers (Jesperson from Demark, Lundell from Sweden, Passy from France, Sweet from England, and Viëtor from Germany). Known initially (and somewhat ambiguously) as The Phonetic Teachers' Association, it was an association largely for the benefit of language teachers (those engaged in what might better be called applied phonetics) rather than for teachers of phonetics *per se* (that is **pure** phonetics). Their first aim was to promote the application of phonetic knowledge and techniques in the field of pronunciation teaching. It was not long, however, before interests and membership widened. These scholars (none of whom were simply or only language teachers) brought their general phonetic research as well as their teaching interests to bear on the Association. Many, however, retained their dual interest and so the link with language teaching remained strong. A seminal example of this was Daniel Jones who even distinguished these two audiences in the writing of his two famous and enduring textbooks, *The pronunciation of English,* first published in 1909 for the EFL market, and *An outline of English phonetics*, published later, in 1918, and written for the phonetician and linguist (thus confirming the by now well-defined distinction between the applied origins and the independent academic existence of and need for the subject). For more on Jones and his specific contribution to this field, see Collins and Mees, 1999.

Today, however, I believe pronunciation teaching is really no different from any of the other spheres of application listed above: it draws on phonetic knowledge to varying extents, has its own training programs and its own theories and literature. A glance at the *Journal of the International Phonetic Association* (*JIPA*) demonstrates that the IPA itself has, over the years, developed a separate and more global vision.

The Phonetics Syllabus

In many ways, what we are doing today has come full circle. In 1911, Daniel Jones was explaining the importance of ear training (Jones, 1911) and a few years later he was describing the value of experimental phonetics for linguists (Jones, 1917); in an even earlier publication, he made clear the need for a balance of theory and practice (Jones, 1909) and before that, at least two publications reinforced the significance of transcription (a review in 1906 – one of his earliest publications – and a book of transcriptions for reading purposes in 1907). Jones, then, advocated and practiced a mix of theory and practical work (ear training and transcription). Today, I am prosecuting largely the same arguments.

A century later, there is now plenty of evidence (experimental and experiential) to support the view that a phonetics course **must** cover this mix of theory and practice if it is to be successful: evidence shows that without theory, practical skills suffer (see the now classic study of Catford and Pisoni, 1970 as well as more recent studies such as Wrembel, 2003). Common sense, too, dictates that without at least some practice, the theory would soon be forgotten, a dry, difficult and meaningless chore. Although it is often the practical side of this training that is so costly to resource, it is imperative that the practice continue: the theory–practice link involves two-way traffic.

It is also the case that combined knowledge of phonetic theory and excellence in practical phonetics underpins a whole range of study and research that is central to linguistics itself. Speech perception research, for example, cannot progress unless researchers know the very essence of what they are measuring; it is not enough to regard speech as a mere string of phonemes. Such researchers must have knowledge and practical experience of all aspects of variation, accommodation, and coarticulation. They must understand the audible and symbolic significance of what is heard. Nothing can be measured unless we first know **what** to measure. In optimality theory, too, concepts such as phonological markedness and faithfulness constraints, for example, are meaningless without phonetic knowledge and definition of the data on which they are based (see Kager, 1999, for example).

To serve these ends, the syllabus must include at the very least a thorough grounding in basic articulatory phonetics (airstream mechanisms and voice qualities; the voice, place, and manner of consonants; the backness, openness, and rounding of vowels). But, in order to demonstrate that claims about what you say you are doing and what you can hear are verifiable fact and not arguable impression, it is increasingly the case that acoustic phonetics is making its way into the most elementary syllabus (minimally waveform analysis, spectrographic analysis, and palatographic analysis). In some cases, this is not only in the theoretical side of the undertaking, but in ear training as well (see below). This is a departure from the more leisurely approach of the past, where acoustic phonetics (experimental phonetics) would typically appear later in the course and often be taught quite separately from the articulatory material. Today, virtually every elementary textbook is full of waveforms, spectrograms, and palatograms (internationally recognized classics such as Ladefoged, 2001a and Cruttenden, 2001 all contain such illustrative materials and, in the case of Ladefoged, 2001a, actively teach the physics of speech alongside the articulatory and linguistic content, as does the new, fully integrated Ashby and Maidment, 2005). Students on

all courses need to be able to 'read' these images and make sense of the narratives that accompany them. Teachers and students alike must understand how they can even exploit these facilities themselves in their own teaching and learning experiences.

I do not believe that it would be too strong to say that a person with only theoretical knowledge of speech production is not a phonetician, at least not in the traditionally understood sense. The need to be able to recognize and perform the sounds that the theory deals with is a *sine qua non*. Crudely, then, the theoretical part of the syllabus consists largely of traditional articulatory phonetics (with or without the physics of speech) and the practical part consists of actually recognizing and making and transcribing all the different sounds. This is the bottom line and it is reflected in the syllabus of the Certificate examination run by the IPA (Certificate of Proficiency in the Phonetics of English), a syllabus that has remained relatively unchanged since its inception nearly a century ago in 1908. The full syllabus of the IPA Certificate and details of the examination can be obtained from the association (or by visiting the website).

In many respects, then, with regard to training phoneticians, little has changed in terms of the syllabus since the earliest times in the history of phonetic pedagogy, or at least since the beginning of the 20th century. The discipline has always consisted of two interdependent strands – theory and practice – and the latter subdivides again into production, perception, and representation. There is no doubt that there is a lot of ground to cover and that phonetics can be experienced by students as not only overwhelmingly vast but also as a very 'bitty' subject if a coherent and fully integrated syllabus is not followed. The ideal syllabus will contain a balanced and interrelated mix of general phonetic theory and practice; practice will consist of ear training, sound production practice, and representation through transcription. It may be appropriate or expedient to add to or include in this a more in-depth study of the phonetics of a particular language. Certainly, for the prospective teacher, all this is essential (an observation borne out by the mix of general phonetic and language-specific phonetic content that still pertains in the syllabus of the IPA Certificate examination mentioned above).

Teaching Phonetics

Resources

We have never been better resourced in terms of hardware, software, and books. As well as a huge number of introductory traditional paper textbooks and workbooks, a multitude of electronic resources are also available to both teachers and students, and in many instances, technology has something different to offer each user group.

From the teacher's viewpoint, the rapid, recent development of computer-driven software for speech (recording, analysis, and transmission) has opened new doors in the phonetics classroom. Twenty years ago, OHPs (if you were lucky enough to have one) and portable cassette players were at the cutting edge; 15 years ago, embryonic forms of video-projection were the prize of a small handful of professionals; today, almost any one of us can reasonably expect to have access to multimedia classroom facilities including data-projection along with live internet access while teaching, graphics pads, radio microphones, and sound-projection facilities, freely downloadable instant speech analysis programs (and even multilingual speech synthesis programs), speech sound databases (including the interactive CDRom *The sounds of the International Phonetic Alphabet* recorded by John Wells and Jill House and available for purchase directly from UCL or a similar interactive IPA chart recording with Peter Ladefoged's voice, which can be found on the CD that comes with his 2001 *Vowels and consonants* publication [2001b] and all the sound files to accompany the illustrations in the IPA *Handbook* [IPA, 1999]), and speech databases in many languages (although usually these are not developed exclusively with phonetics in mind). One recent summary of technological advancements in phonetics is Vaissière (2003).

There are also a huge number of training websites, often interactive, although a cautionary note must be sounded in that these vary widely in standard and reliability. Nonetheless, it is always worth trawling the sites of institutions that are established as centers of excellence in this field (the UK's UCL, for example, or the United States' MIT). An account of MIT's internet course is given in Slifka *et al.*, 2003.

Finally, there is the virtual classroom. The introduction of such facilities (BlackBoard, WebCT, etc.) in an increasing number of institutions enables intranet development of materials and resources to suit local needs. Private study time outside of classroom contact hours is enhanced by discussion lists (with or without tutor control), online tutorials, formative and even summative assessment (particularly of theoretical knowledge), question and answer sessions, online study groups, phonetic game playing, drilling, posting of notices, etc. Institutional link-ups are also possible, enabling us to maximize resources across small departments.

Practices and Procedures

A Balanced Learning Experience The classroom experience ideally needs to strike a balance between

theory and practice. On the theory side, it needs to give equal weight to both the production (articulatory phonetics) and the manifestation (acoustic phonetics) of speech sounds at the basic level (regardless of whether the student is graduate or undergraduate). On the practical side, the three strands identified earlier (ear training, production training, and transcription training) must also be accommodated in a balanced fashion. The pressure to deliver courses on an ever-shrinking time-scale means that we need to exploit technology to the full wherever possible. Many institutions nowadays face the prospect of delivering a basic course in a 10- or 12-week teaching period with 3 or sometimes even only 2 hours per week contact with the students in order to achieve this – quite different from the leisurely, year-long courses of a few years ago with anything up to 36 weeks of teaching and learning before assessment took place.

In terms of course delivery, my own introductory courses are typical of many the world over. I offer a basic articulatory and acoustic phonetic training to students on a range of degrees (including linguistics, literature, modern foreign languages, English language, and sociology) and also in a general-interest part-time evening course in the subject. Audiences often involve a mix of these different interest groups but all students are *ab initio*. At the introductory level (regardless of the year of study – this pattern applies to undergraduate and postgraduate programs alike), phonetics is taught in 12-week blocks, for 3 hours per week. Each week has three 'academic' 1-hour slots (50 minutes real time): a general phonetic theory lecture (delivered with or without computer-based technology, depending on the teaching space assigned), an English phonetics workshop (where we deal specifically with dictation, transcription, and intonation materials *vis à vis* English – in the Netherlands, this might be a Dutch workshop, in Tokyo a Japanese workshop, etc., but working in the UK, our common language is English), and an ear-training practical session, covering the sounds of the IPA alphabet chart via exercises such as 'nonsense' dictation, some exotic language transcription, and production practice.

For all classes, at the very least, I would expect to have an OHP, video player, and sound-transmission facilities (a classroom CD player or the like); at best there will be PowerPoint (or equivalent) available. Illustrative materials for my lectures are designed to be available both in electronic format and on OHPs with accompanying sounds files (computer-based, CD, or cassette recordings, as appropriate). I expect to be able to make use of both image projection and the white board simultaneously. (Interactive white boards are the ideal, but in 2005 these are still not universally available.)

Lectures teach articulatory and acoustic phonetics in parallel, usually with two summative or review sessions (one at the end of the first half of the syllabus, which will have covered the basic articulatory description of consonants and vowels, including airstreams) and one at the end of the second half, which will have looked in more depth at the major allophones of English, applying the descriptive techniques learned earlier. The regular lectures are led by articulatory phonetics, with the acoustics fitting in as and when appropriate (different wave forms, palatograms, and eventually different spectrographic images where the aim is to provide a 'reading knowledge' of these, rather than to train experimental phoneticians). The summative (or review) sessions are acoustically based, clarifying basic physical points and illustrating these by appealing back to basic sound types. This format seems to work well given the predominantly arts-based backgrounds of the majority of my students. The emphasis can be shifted without difficulty to cater for groups with a more science-based background. (A second, follow-on module, applies all of this to connected speech and picks up stress, rhythm, tone, and intonation; this module is largely Anglo-centric but that can be adapted to suit the audience.)

Purpose-designed reading and exercise materials back up the lectures and can now be made available electronically to all students enrolled on the course. Again, a Course Pack (specifically written for the module in question) is designed to enable timed delivery on a week-by-week basis of reading notes (supplementing rather than replacing the lecture), work packs that include a range of topical exercises complete with answers for self-monitoring as well as a limited number of formative exercises that require tutor marking (especially exercises in the broad transcription of English).

Lectures are delivered to large groups; ideally this would be the whole cohort, but often half the cohort at a time to accommodate the complex timetabling requirements of a large modular degree program with parallel classes running in the day and in the evening. Uniformity of experience is greatly assisted by all students having access to the same electronic back-up resources.

Practical Phonetics It is widely recognized that sufficient time must be allowed for the practical side of the learning exercise, the cultivation of auditory and oral skills. In 1948, describing phonetics teaching in the UCL department, Daniel Jones wrote "'Ear-training' (or more accurately 'cultivation of auditory

memory') constitutes a very important part of the teaching ... It is found that skill in pronunciation cannot be acquired without skill in HEARING, i.e. skill in the correct recognition of sounds and a good memory for sound qualities... To this end a great deal of time (one hour per week in a full course) is devoted to 'EAR-TRAINING EXERCISES'." (Jones, 1948: 129). This practice is still observed today, not just at UCL but in many departments, worldwide, which offer fully integrated theoretical and practical training. It is my personal opinion that whatever else is reduced or cut, practical phonetics cannot be developed in a student in less than this time; the level eventually achieved will depend on length of training (I personally train students to IPA Certificate standard in 24 consecutive 1-hour weekly sessions but greater proficiency still is developed by students who then take further 12-week courses, each of which includes a weekly hour of ear training). Eventually, you reach what we might deem professional standards. (An interesting summary of courses in terms of the theoretical and/or practical content available at least in turn-of-the-century Europe can be found in Bloodhooft *et al.*, 1995.)

One of the biggest challenges currently faced by teachers of practical phonetics is the acceleration effect imposed by widespread semesterization (all teaching concentrated in two blocks or semesters per year with assessment taking place directly at the end of each block) and modularization (packaging the curriculum into self-contained, often rather short, study units) in education. These measures are cost-effective in terms of financial outlay, but they carry with them the ludicrous implication that somehow, because we are delivering information in a shorter time span, student learning can accelerate to match. Phonetics, especially practical phonetics (where not only intellectual activity but also motor skills are involved), does not lend itself to acceleration of this kind.

Another difficulty here is that no technology can yet replace the face-to-face interaction between student and tutor in any known form of motor skills acquisition. This makes practical phonetics an expensive subject to resource properly. If it is to succeed, it needs extended time and a student–staff ratio that favors the student (practical groups numbering, ideally, no more than 15). For these reasons, many institutions no longer engage in practical phonetic training of this kind.

In the classroom, however, in this small-group context, the use of technology is minimal. Activities largely simulate the real-speech context, training students to listen (perhaps more attentively than they are accustomed), to hear (a whole range of characteristics that they may habitually ignore – presence vs. absence of features like aspiration, nasalization, voicing, velarization, and other secondary articulations, different voice qualities, etc.) and (above all) to watch what the speaker is doing and to master the skill of integrating visual and auditory queuing in order to reach a conclusion about the nature of the stimulus. The long-term goal is to succeed in recognition, transcription, and production of any speech sound the student may eventually encounter; the short-term goal is to achieve this for the sounds of the IPA alphabet chart.

The types of exercises used to achieve these ends are varied. In addition to traditional nonsense words, real language material can also be used (although at least in the early stages – pre-IPA Certificate level – this will be dictated by the class tutor rather than spoken by a native speaker (live or on tape). Within 12 weeks of study, students have been introduced to all the sounds of the IPA alphabet chart and are able to cope with simple nonsense words of 5–7 items, words like [d͡ʒoɲip'], [ɛɻruθ], [ʔiɓegŋ], etc. In my own case, nonsense dictation materials double for structured and eventually random production practice materials; students use both the individual sounds from which the words are crafted as well as sound sequences from the words for production practice drills.

Sound-acquisition procedures involve a wide range of exercises now known as Analytic Listening (described in Ashby *et al.*, 1995). This is the latest incarnation of a form of practice that can be traced back through Smalley's 1960s discrimination drills and differential drills (Smalley, 1963) to Pike's production drills, differential drills, and skill drills (Pike, 1947). Smalley (1963) is a wonderful resource book, incidentally, for anyone who does not have time to write their own materials for this purpose. Analytic Listening was the recent focus of a UK joint-universities research project, based at UCL, and supported by a grant from the Fund for Development in Teaching and Learning, System for Interactive Phonetic Training and Assessment (SIPhTrA). Analytic Listening is ideally suited to electronic backup and can be delivered on the internet (universally or locally using BlackBoard, etc.). Not only are the exercises easy to write and record but there are also existing internet resources (the product of SIPhTrA), accessible by exploration of the UCL Phonetics Department homepage.

Inspiration for continued production of these materials in my own case derives at least in part from MacCarthy (1978), which describes in detail 17 different types of auditory discrimination drill. Designed for the pronunciation teaching forum, these drills are all readily adapted to general phonetic ear training.

Further development of ear-training techniques are currently under way at UCL where acoustic phonetics is now being brought into the practical phonetics classroom (as well as the lecture hall). Computer-linked radio microphones are used to submit the teacher's and the students' productions to instant measurement during production work. This is described as demystifying practical skills, showing their attainment as something which can be objectively monitored and, most importantly, it forges a transparent link between the lecture hall and the practical classroom, the latter now becoming an additional route for understanding the theory and appreciating its applications (M. Ashby, personal communication, 2004).

Additionally, I use traditional substitution exercises (identification of replacements for the intervocalic consonant in an English word – *coffee*, for example – where the intervocalic [f]-sound will be replaced by items such as [ʋ], [ɸ], [p'], [ʍ], [d͡ð] and exploit them for the purpose of sound identification and labeling, symbolization, imitation, and (later) for randomized production practice and VPM-labeling or symbolization revision.

One further point that is worth emphasizing with regard to the acquisition of production skills is the value of practicing the silent setting of articulatory positions – for vowels or consonants – and of whispering sounds. Although there is never sufficient class time for extended practice of this sort, silence is the ideal solution to the problem of masking created by the audible speech signal and enables due consideration to be given to other essential forms of proprioceptive feedback (tactile sensations, kinesthetic feedback, etc.). (See, for example, Catford, 2001 on this technique.)

Apart from web-based backup and support, there are a few publications that are also invaluable for the student of practical phonetics. Two of these are Wells and Colson, 1971 and the Summer Institute of Linguistics' 1983 publication called *Introduction to practical phonetics* (SIL, 1983). Each offers valuable insight into the nature of practical phonetic training.

The other side of the practical training is the specific language workshops. At the elementary level, this focuses on the language of study and/or instruction (English, for example, in a UK-based general phonetics course). Dictations, in my opinion, need to be short and of increasing difficulty in terms of the inclusion of processes (assimilations, elisions, r-liason, coalescence, t-glottaling, t-flapping, etc., whatever is appropriate for the language in question). They also need to be purpose-written, to model natural, colloquial speech as closely as possible in monologue or dialogue form. These exercises offer the perfect preparation for later, more advanced language practical classes where live native-speakers of more exotic languages (and preferably languages that are unknown to the students) are used for the purpose of phonetic and phonological analysis.

Again, with the language-specific dictation work, my recommendation would be for small group sizes, but it is a fact that this is no longer always possible. In such cases, there are a number of strategies that can be employed, involving the students themselves. They are partly dependent on the nature of the teaching space assigned, however, and partly dependent on the policies of the institution, but two that have worked well in my experience are the following.

Peer negotiation works well in any environment (small classroom or large, raked lecture hall). After a statutory number of repeats, students debate their proposed solution with their neighbor(s) to see if they can reach reasoned agreement about what was dictated; further repetitions can be requested (or offered by the teacher) before the correct answer is revealed. This is popular and seems a very effective way of building confidence and stimulating active use of this new language called phonetics as they describe and discuss their work with each other.

Peer assistance works best in flat classroom spaces where it is possible to move around among the students. More advanced students are invited to participate as (paid or voluntary) assistants, moving around the classroom during dictations to assist the learners with decision making and representation. Assistants can be equipped with a copy of the materials being used or can be relied upon to quickly make their own transcription and to use this to help the more elementary learner. (The use of peer assistants will be dependent on institutional policies in this regard, insurance, and so forth.)

Assessment Teaching involves both delivery and assessment. As far as delivery is concerned, lectures with ancillary practical sessions (as described above) have traditionally been the favored *modus operandi* (and today, in the majority of institutions, this is still the preferred choice). Assessment varies widely, however, utilizing a huge variety of methods. Testing theoretical knowledge and transcription skills, these include traditional 3-hour written examinations, (online) multiple choice and/or short answer tests, open-book tests of various kinds, coursework essays, exercises (including phonemic transcriptions, articulatory descriptions, intonation transcriptions), field notebooks, etc.

There is also wide diversity when testing practical skills, ranging from institutions (including my own)

that continue to run full-scale practical examinations with ear training, dictation, and individual oral tests to those who have more minimal assessment requirements which, if these include a practical test at all may rely entirely on the use of language laboratories, recording stimuli and/or responses. Driven by costs (as mentioned earlier) and availability of expert examiners (the knock-on effect of these cutbacks is already being felt in the classroom), an increasing number of departments seem not to assess (or in some cases, not even to teach) the practical side of the subject at all. Assessment, of course, is a huge area of discussion in its own right, but if full phonetic training is to be comprehensively assessed, then I would say that a practical examination must form part of that assessment: the extent of both theoretical understanding and practical prowess must be measured and evaluated. Some training techniques link more readily to assessment than others.

See also: Phoneme; Phonetic Classification; Phonetics, Articulatory; Phonetics: Overview; Phonetic Transcription: Analysis.

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Phonetic Processes in Discourse

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This article serves two purposes. Its main function is to describe some of the patterns that occur in spoken discourse. A subsidiary function is to examine the ways in which speech has traditionally been analyzed and the consequences they have had for the way in which phonetic patterns in discourse have been described and analyzed phonologically. Before reading this article, the reader is advised to read introductory articles on phonetics and acoustic phonetics.

Patterns of Reduction

The phonetic shape of a word spoken in isolation and in the context of an utterance can be very different. For instance, the British English pronunciation of the word *of* spoken in isolation is [ɒv]. In an expression such as *cup of tea*, however, *of* may consist solely of a central vowel [kʌpəti:]. Likewise, the word *and* in an expression such as *fish and chips* may only consist of a syllabic nasal rather than [ænd]: [fɪʃn̩tʃɪps].

The differences between the phonetic shape of a word spoken in isolation and the different phonetic shapes of the same word spoken in the context of an utterance have mainly been attributed to various types of articulatory reduction, that is, the reduction in the size and number of movements made by the speech organs (tongue, lips, soft palate, and vocal folds).

A reduction in the size of an articulatory movement can have various consequences depending on the sound type involved.

- The stricture of complete closure required for a plosive may not be met if tongue tip or tongue body fails to make contact with the roof of the mouth or the lips fail to close completely. The resultant sounds will be fricatives or (frictionless) approximants, depending on the size of the stricture. So, for example, the German word *Tage* 'days' [ta:gə] is commonly produced with an intervocalic fricative [ta:ɣə] or approximant [ta:ɣ̞ə]. Likewise, complete closure is generally not attained in the German word *aber* ('but') [a:bɐ], resulting in an approximant: [a:β̞ɐ]. A reduction in the magnitude of tongue, jaw, and lip movement in the production of a vowel changes its quality, making it more centralized and in the case of rounded vowels less rounded; for example, English *to* [tu:] is pronounced [tə] in an expression such as *back* [tə] *back*.
- In the extreme case, reduction results in the complete disappearance or deletion of a vowel or consonant. The reduction of *and* to a syllabic nasal is an example of both vowel and consonant deletion.
- Assimilation is a type of reduction in which adjacent sounds become more similar to one another. For example, the final plosive in *bad* [bæd] takes on the place of articulation of the adjacent plosives in *bad boy* [bæbbɔɪ] and *bad girl* [bæggɜ:l].
- Coarticulation (*see* **Coarticulation**) is a feature of all speech. As the word suggests, it describes the phenomenon of two sounds being articulated together. So, for instance, in the word *lock* the lip rounding of the vowel is present during the initial lateral approximant as well as in the final plosive. In its most extreme form, coarticulation can lead to the complete temporal overlap of two or more sounds. For example, a common pronunciation of *want* in conversation (discussed later) is [wɒ̰̃]. The creaky voice and vowel nasality are the remaining phonetic correlates of the final nasal-plosive sequence found in the isolated pronunciation [wɒnt].

Many factors are thought to govern when and to what extent particular reductions can take place:

- Situation: The more formal the situation, the less reduction is to be expected.
- Rhythmic structure: Stressed syllables and those final in an utterance are less likely to reduce than unstressed nonfinal syllables.
- Word class: Grammatical items, such as prepositions, articles, and conjunctions, are more likely to be reduced than words belonging to the open classes of nouns, verbs, adjectives, and so on.

In more general terms, the speaker can be thought of as trying to successfully communicate a message but at the same time minimizing articulatory movements. In a conversation between two good friends, reduction can be maximized. Any misunderstandings that might arise from too much reduction can be cleared up immediately. However, in the formal situation of giving a speech in front of an unknown audience, a speaker will generally be at pains to speak slowly and clearly. Lindblom (1983, 1990) has proposed a theory to account for the phonetic variation a speaker can produce in different situational contexts, called the H & H (hypo and hyper) theory. This theory proposes that the phonetic variation in a speaker's utterance can be situated along a continuum from overarticulated speech, or hyper-speech, to maximally reduced hypo-speech.

The phonetic shape of a word produced in the context of an utterance has most commonly been described and accounted for in terms of changes

that have taken place from the phonetic shape of the same word spoken in isolation. For this reason, the changes are often called 'processes.' This method of accounting for the patterns is questioned later in this article.

Problems Analyzing Phonetic Processes in Discourse

Before looking in more detail at some of the phonetic patterns that occur in discourse, we should first examine some of the specific problems that arise in analyzing spoken discourse.

Difficulty of Observation and Comparability

The analysis of phonetic patterns in spoken discourse is still in its infancy. Phoneticians have begun to seriously analyze conversation only in the last 2 decades, despite the programmatic remarks by one of the most prominent figures in British phonetics and linguistics in the first half of the last century, J. R. Firth (1935: 71): "Neither linguists nor psychologists have begun the study of conversation, but it is here we shall find the key to a better understanding of what language really is and how it works." There are two main reasons for this lack of progress: difficulty of observation and lack of comparability.

Speakers generally do not like to be observed when they are involved in a conversation, and it is difficult to know the extent to which the form and content of conversation is affected by being observed. Nevertheless, large corpora of spoken discourse have been collected using various methods of elicitation. For example, in the SWITCHBOARD corpus of American English (Godfrey *et al.*, 1992), 500 speakers of several American English dialects were recorded having telephone conversations about a chosen topic.

Lack of comparability is a more serious problem. It is relatively simple to investigate the ways in which the phonetic shape of a word changes in different utterance contexts in read speech. An experimenter constructs sentences that ensure that the word or words of interest are placed in different contexts, for example, initial versus final or stressed versus unstressed. Several subjects can then be asked to produce multiple repetitions of the sentences. If the experimenter is interested in the effect of speech rate, the subjects can be asked to speak more slowly or more quickly for some of the renditions. Several repetitions of the same sentences by a large number of subjects allow the investigator to collect different phonetic shapes.

In the recording of natural spoken discourse, the analyst has no control over the form or content: repetitions of the same material will be chance occurrences. One of the ways that that researchers have sought to overcome this is to impose certain controls on elicitation. The SWITCHBOARD corpus represents one method of control by requiring speakers to talk about particular topics. The most extreme method of control is to require subjects to cooperatively complete a simple task. The map task (Anderson *et al.*, 1991) is one such scenario. Each subject receives a simple map containing fictitious landmarks. One of the maps has a path drawn on it, and it is the task of the subject with this map to instruct the other where the path goes. This form of elicitation goes some way toward solving the comparability problem because speakers produce the same lexical items in similar syntactic and interactive structures.

Analysts have also proposed less satisfactory solutions. The first has been to simply consider the phenomena of read speech to be an accurate representation of the patterns to be found in discourse. The second method has been to rely on intuition, experience, and other patterns to make some of the data up. Both of these solutions are themselves problematic. Discourse is the most complex, the most intricate, and the most frequent form of language use. At best, the patterns we produce in read speech will be a subset of the patterns we use when we talk in natural situations. And, although, there is a well-established tradition of using intuition in syntactic theory, using it to predict the patterns that occur in discourse is implausible.

Accounting for the Patterns

Up until now the phonetic patterns found in discourse have been described with reference to the phonetic shape of the relevant words spoken in isolation. However, in describing and explaining the patterns found in discourse, analysts have often used the phonetic shape of a word in isolation as the starting point from which to derive the other forms. The rationale behind this is that the shape of a word spoken in isolation is phonetically the most complete form because it has not been subjected to any of the factors giving rise to reduction.

Despite its appeal, this approach is problematic for several reasons. It is often tacitly assumed that the phonetics of the word spoken in isolation (also known as citation form) are readily accessible and stand in a simple relationship to the phonetics of nonisolation forms. However, this is not the case. In order to elicit the isolated phonetics of word, a speaker must read words from a list. This means that the isolated and discourse phonetics are taken from completely different linguistic and interactive activities. Second, reading aloud is an activity we learn to

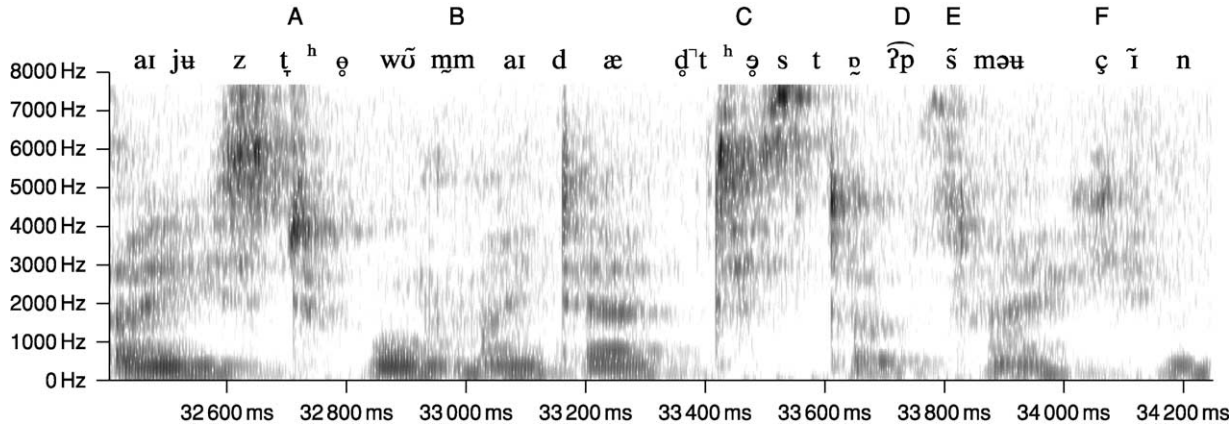

Figure 1 Sonagram and phonetic transcription of *I used to want my dad to stop smoking,* spoken by a female. Courtesy of the IViE Corpus.

do, usually at school, and is affected by sociolinguistic factors such as spelling pronunciation and being told to speak clearly. Perhaps the most far-reaching sociolinguistic effect is that a speaker who uses a nonstandard variety in discourse may produce phonetics that are closer to the standard variety when reading words from a list. A more interesting problem is that the phonetics of the word in isolation might simply be the phonetic shape of a word spoken at one particular place in the rhythmic and interactional structure of an utterance in discourse. For example, in Tyneside English, one of the phonetic characteristics of turn-final plosives is that they have an aspirated release (Local *et al.*, 1986; Local, 2003). And it is precisely the same pattern that speakers produce when reading words lists (Docherty and Foulkes, 1999).

The final problem may be clarified best with an analogy. The behavior of an animal in the wild is not described in terms of behavioral patterns observed in captivity, but this is exactly what many phoneticians and phonologists have done when trying to account for the phonetic patterns they observe in discourse.

Patterns in Discourse

The patterns of reduction we have described can be found in many types of speech, but it is in spoken language in its most common and most natural setting that the most elaborate and most systematic patterns are to be found – spoken discourse.

Figures 1 and 2 contain sonagrams (*see* **Phonetics, Acoustic**) of extracts, taken from the IViE corpus, from a short conversation between two female students talking about the effects of tobacco advertising. Both excerpts illustrate well the types of patterns that are typically found in discourse. The transcriptions above the sonagrams are designed to provide a rough indication for the reader of what is being said.

The pronunciation of the nearly every word in the two excerpts differs from what we might expect the speakers to have said had they been reading the words individually from a list. Spoken in isolation, the infinitive particle *to* is pronounced [tʰuː]. In the three occurrences of this word in Figure 1 (at A and C) and in Figure 2, we find different phonetic shapes:

- In the first example in Figure 1 (at A) and in Figure 2, no closure for a plosive is made. Instead, a fricative stricture remains. However, the friction is weaker than it is for the preceding alveolar fricative, indicating that the speaker is making a tighter stricture.
- Despite the absence of complete closure, all three examples show an abrupt increase in energy, which we expect of a plosive release.
- The central vowel following the release in each case is voiceless.

In an isolated pronunciation of *making* we might expect a voiceless prevelar plosive between the two vowels. However, in Figure 1 (at F) the speaker does not make the closure for a plosive. Instead, she produces a voiceless palatal fricative that can be seen in the spectrogram at F as energy above 2000 Hz. Likewise, in Figure 2 there is no bilabial plosive at the beginning of *be* but, instead, a voiceless bilabial approximant.

Spoken in isolation, the word *want* has a voiced alveolar nasal followed by a voiceless alveolar plosive finally: [wɒnt]. In Figure 1 (at B) the expression *want my* is pronounced [wõm̩aɪ]. The nasal at the end of *want* has assimilated its place of articulation to the nasal at the beginning of *my*. Instead of an alveolar plosive, there is short period of creaky voice that can

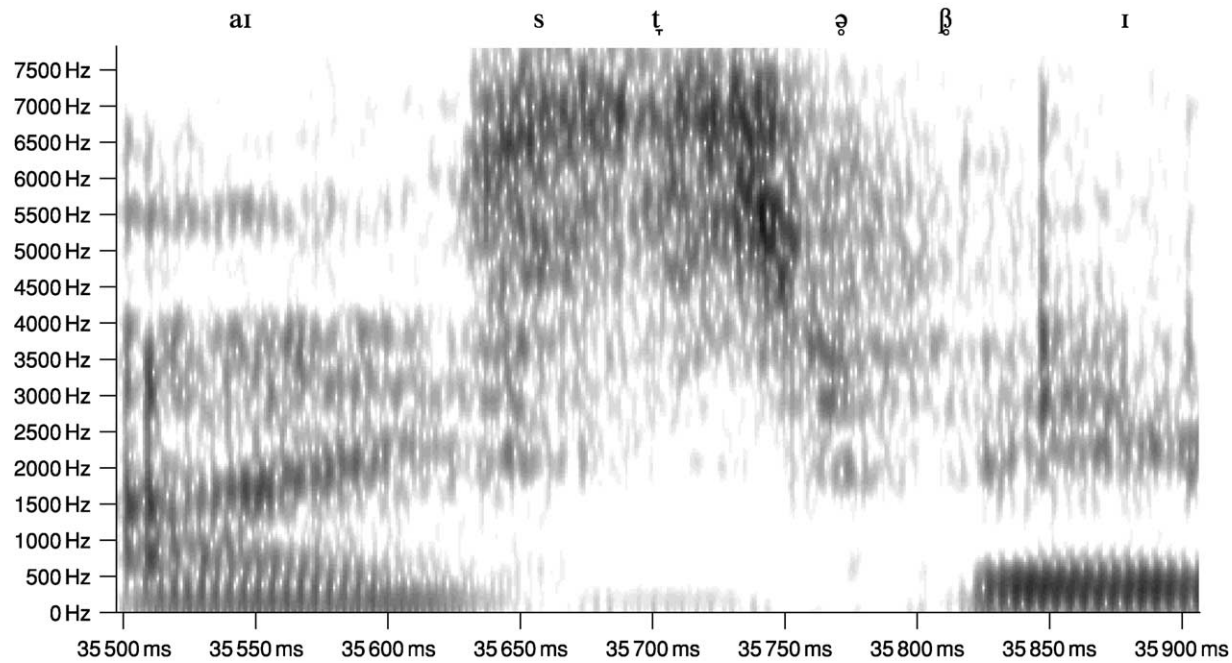

Figure 2 Sonagram and phonetic transcription of *I used to be*, spoken by a female. Courtesy of the IViE Corpus.

be seen as a brief discontinuity in regular voicing at around 33 000 ms.

Glottal Disharmony in Suffolk English

A phenomenon of consonant disharmony in some varieties of English illustrates well a typical discourse process, which was discovered and has only been observed systematically in natural conversation and which can only be adequately described without making reference to read speech or speech in isolation.

English is not traditionally regarded as a language that has systems of consonant or vowel harmony, in which a particular feature or features are spread over a structurally defined piece of utterance, such as a word (*see* **Phonetics of Harmony Systems**). Disharmony refers to the opposite process, whereby consonants or vowels in neighboring syllables become less alike.

A form of consonant disharmony involving restrictions on the occurrence of glottalization in adjacent syllables has been sporadically reported in discourse material from a few varieties of English (Trudgill, 1974; Lodge, 1984). It has been described most fully for Suffolk English in Simpson (1992, 2001).

A well-known phenomenon in many varieties of English is the realization of voiceless plosives in the syllable coda as glottal stops, for example, [bʌʔ *but* and [lʊʔ] *look*. Although the glottal stop can be all that represents the plosive, a glottal stop may accompany the oral closure of the plosive (sometimes called reinforcement), for example, [lʊʔ͡k] *look* and [kiːʔ͡p] *keep*.

Table 1 Glottal disharmony in Suffolk English

	Example	*Transcription*
Glottalization of first word		
a.	don't you	dɛ̃jə
b.	about her	bɛ̃ʔə̃
c.	keep on	kiːʔ͡p˺ʔɒn
d.	get a	gɛə̃
e.	want a	w̃ɔ̃ʔə̃
f.	make him	mɛ̃ĩm
g.	look a	lʊ̃ʔə̃
	Example	*Transcription*
No glottalization of first word		
h.	don't it	dʌnʌʔ
i.	about it	bɛːɾə̃ʔ
j.	keep it	kiːΦə̃ʔ
k.	get it	gɛɾə̃ʔ
l.	want it	wɒnə̃ʔ
m.	make it	mɛɪçə̃ʔ
n.	look at	lʊxə̃ʔ
o.	look at it	lʊgæːɾə̃ʔ

In Suffolk English, the situation is more complex. Tokens of the same word can sometimes have a final glottal stop and sometimes not. Transcriptions of word tokens extracted from a conversation that have this alternating pronunciation are shown in Table 1. In Table 1 examples (a–g), the vowel of the first word is glottalized, and in tokens (b,c,e,g) there is a word-final glottal stop. In some cases, the glottalization

continues into the following syllable. In Table 1 examples (h–o), no glottalization is present over the vowel of the first word and the final consonant of the word is either voiced or voiceless. Vowel glottalization, followed by a glottal stop is, however, found over the syllable *it* or *at*. There is one other important difference between the phonetic shape of the words in (a–g) and those in (h–o). In the words with final glottalization, (a–g), there is only rarely any accompanying oral closure, as in (c). By contrast, in examples (h–o), although there is no glottalization over the first words, there is always a stricture of close approximation (the fricatives in j, m, n) or of complete closure in the tap and oral and nasal stops of the remaining examples. What all the tokens in Table 1 have in common is that there is one instance of glottalization that defines a stretch of utterance that is one (a–g), two (h–n), or three (o) syllables in length.

The glottalization patterns in Suffolk English are of particular interest for a number of reasons. First, they have been reported for data only from spoken discourse. Indeed, in an attempt to examine the phenomenon under controlled laboratory conditions, the speaker who had produced the tokens in Table 1 was asked to read short sentences of the type *we can look it over first* in the studio. However, the recording situation together with reading aloud led the speaker to move her pronunciation closer to the standard, and differences between the two varieties had a severe effect on her reading fluency. During the majority of the instances of a tri- or quadrasyllabic stretch, for example, *we can* ***stop it at*** *work*, she produced different types of disfluency, such as pauses and repairs somewhere within the relevant stretch.

Second, the patterns constitute a long-domain phenomenon; that is, they must be described in terms of a stretch of utterance comprising one or more syllables. As such, they are comparable to phenomena such as vowel harmony. In general, analysts have treated patterns of glottalization or consonantal alternation as being restricted to the segment. For example, it is possible to treat the intervocalic dorsal fricatives in *make* and *look* (in Table 1, m, n) or the bilabial fricative in *keep* (in Table 1, j) as being the products of lenition, that is, the weakening of a plosive closure (see, e.g., Lodge, 1984, for this type of approach). However, the patterns in the data in Table 1 show that this account misses the bigger picture.

Assimilation and Nonassimilation in German Discourse

Assimilation is a phenomenon whereby a consonant or a vowel becomes more like an adjacent consonant or vowel (*see* **Assimilation**). Assimilation, like other phenomena in connected speech, is often seen as a consequence of the speaker striving to optimize and, where possible, reduce articulatory movements. One of the most common forms of assimilation is in place of articulation, for example, [bæggɜːl] *bad girl*.

Table 2 Progressive assimilation in German

Example	*Meaning*	*Transcription*
Happen	'bit'	[pm]
haben	'have'	[bm]
nehmen	'take'	[mm]
Nacken	'nape'	[kŋ]
wagen	'dare'	[gŋ]
fangen	'catch'	[ŋŋ]

Table 3 Regressive assimilation in German

Example	*Meaning*	*Transcription*
anmachen	'put up'	[mm]
hat mehr	'has more'	[pm]
hat Peter	'has Peter'	[pb]
ankleben	'stick on'	[ŋk]
angeblich	'so-called'	[ŋg]
hat keine	'has no'	[kk]

Phoneticians and phonologists have been concerned with two main aspects of place assimilation. First, there has been considerable debate as to whether the assimilation to place is as simple as the transcription of our example suggests. Research has shown that, in examples such as [bæbbɔɪ] *bad boy*, although there is bilabial closure at the end of *bad* arising from the assimilation to the beginning of *boy*, an apical gesture of the final [d] in *bad* may still be present. The second important issue that phonologists have been concerned with is providing a formal description of assimilation.

An aspect of assimilation that has received relatively little attention is what factors govern its occurrence. In common with other patterns of articulatory reduction, it is assumed that assimilation is optional but that the likelihood of occurrence increases as the conditions for reduction become more and more favorable (e.g. increased tempo, informal context, unstressed position, and function vs. content words). German, like English, is a language that has traditionally been described as having progressive and regressive assimilation in place of articulation. Examples of progressive assimilation are given in Table 2 and examples of regressive assimilation are given in Table 3.

However, research on place assimilation from discourse material (Simpson, 2001) suggests that assimilation in German, and perhaps in other languages, is a more complex phenomenon than the

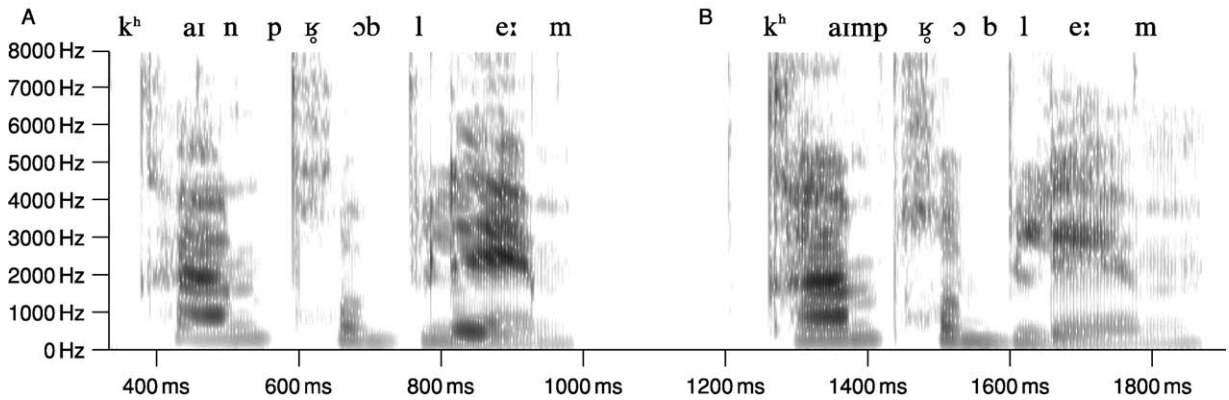

Figure 3 Sonagram and phonetic transcription of two tokens of the German expression *kein Problem* 'no problem', spoken by two females. In (A), the final nasal of *kein* is unassimilated; in (B), the final nasal shares the bilabial place of the initial plosive of *Problem*.

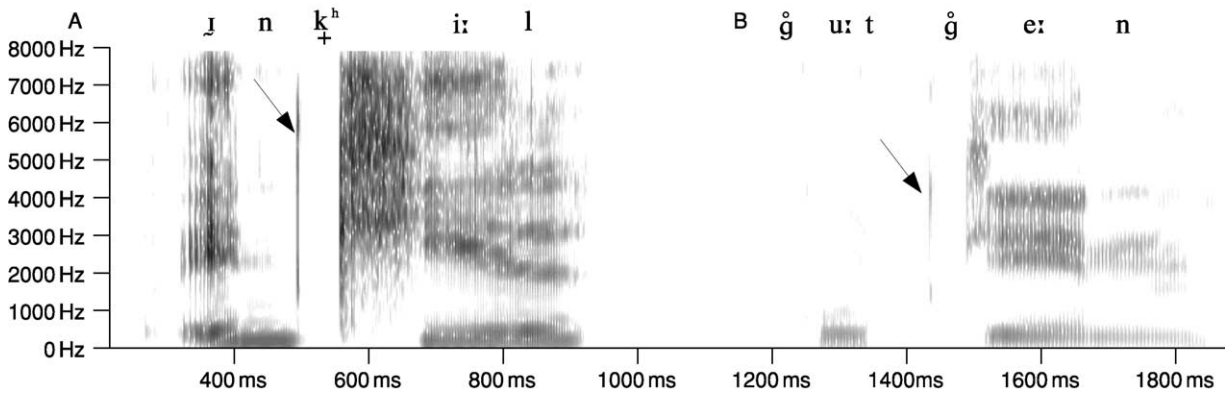

Figure 4 Sonagram and phonetic transcription of tokens of the German expressions (A) *in Kiel* 'in Kiel' and (B) *gut gehen* 'be okay', spoken by two female speakers. In both cases, the word-final alveolars retain their place of articulation. Arrows indicate nonpulmonic stop releases of the nasal (A) and the plosive (B).

examples in Tables 2 and 3 at first suggest. Places of potential assimilation in approximately 4 hours of spontaneous dialogs from the *Kiel corpus of spontaneous speech* (IPDS, 1995–1997) were examined. Two tokens of the expression *kein Problem* 'no problem' are shown in the sonagram in Figure 3. In the second example, the nasal at the end of *kein* is bilabial, assimilating to the place of articulation of the plosive at the beginning of *Problem*. In the first example, however, no such assimilation is present; the nasal is apical. Of the 14 tokens present in the 4.5 hours of dialog analyzed, over one-half were considered to have an assimilated nasal. From these examples alone, we might conclude that assimilation is indeed an optional phenomenon.

But in a whole range of other intra- and interword structures, assimilation is not as common. Two typical examples are shown in Figure 4. The example in Figure 4A is a token of the prepositional phrase *in Kiel*; the one in Figure 4B is a token of the expression *gut gehen* 'be okay.' In both of these examples, despite the presence of the word-initial dorsal plosives in *Kiel* and *gehen,* the final stop of *in* and *gut* both maintain their apico-alveolar place of articulation. Indeed, both stop releases are visible (indicated by arrows). Interestingly, these releases are produced with an oral air stream mechanism caused by the dorsal closure being made before the word-final stop closure is released. Tongue movement after both closures have been made causes a slight change of pressure sufficient to cause weak plosion on release of the apical closure. From the expectations about assimilation, the examples in Figure 4 appear to be good candidates to assimilation. However, out of 34 cases of the prepositional phrase *in + town name* (with an initial nonapical nasal or oral stop) in the corpus, only three were considered to have assimilated; in all others, the pattern shown in Figure 4 was present. In over 70 cases of the words *gut* 'gut' and *geht* 'goes' followed by a word-initial nonapical stop, only three cases were thought to constitute assimilations. In common intraword contexts, as *unbedingt* 'really' or *ungefähr*, on the other hand, assimilation occurred in nearly all tokens. By contrast, in many

noun or verb compounds also common in the corpus, such as *Termin**k**alender* 'diary' and *an**b**ieten* 'offer' tokens with assimilation were completely absent.

Although it is not yet clear in the German corpus under which circumstances a morpheme-final oral or nasal stop may be assimilated to the beginning of the following syllable, it is clear that it is not a case of optionality under appropriate conditions. In many of the interword examples, all the conditions thought to be favorable for assimilation (lack of stress, tempo, word class, and style of speech) are met, yet the final stops in *in*, *geht*, and *gut* fail to assimilate. In other cases, assimilation is the norm. Assimilation looked at from a discourse perspective (i.e., what speakers produce in the most natural environment of conversation) is a complex phenomenon, not merely accountable for in terms of a phenomenon that reduces articulatory effort.

Conclusion

It is clear from this article that research into the phonetic patterns found in discourse is still in its infancy. However, a slowly growing body of analysis is showing that the phonetic patterns of discourse are detailed and systematic. Most important, perhaps, this work shows that the phonetic patterns of discourse cannot be extrapolated directly from those found in read speech. And it is likely that many of the hypotheses and theories that have mainly been constructed on the basis of patterns in read speech will require major revisions.

See also: Assimilation; Coarticulation; Conversation Analysis; Generative Phonology; Natural Phonology; Phonetics of Harmony Systems; Phonetics, Articulatory; Phonetics, Acoustic; Phonetics: Overview; Phonology in the Production of Words.

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Phonetic Transcription and Analysis

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Introduction

Phonetic transcription is the use of phonetic symbols to represent speech sounds. Ideally, each sound in a spoken utterance is represented by a written phonetic symbol, so as to furnish a record sufficient to render possible the accurate reconstruction of the utterance. The transcription system will in general reflect the phonetic analysis imposed by the transcriber on the material. In particular, the choice of symbol set will tend to reflect decisions about (1) segmentation of the language data and (2) its phonemicization or phonological treatment. In practice, the same data set may be transcribed in more than one way. Different transcription systems may be appropriate for different purposes. Such purposes might include descriptive phonetics, theoretical phonology, language pedagogy, lexicography, speech and language therapy, computerized speech recognition, and text-to-speech synthesis. Each of these has specific requirements.

Phonetic Symbols

For most phoneticians, the symbol set of choice is the International Phonetic Alphabet (IPA), the alphabet devised by the International Phonetic Association. This is a set of about 100 alphabetic symbols (e.g., ŋ, ɔ) together with a handful of non-alphabet symbols (e.g., the length mark ː) and about 30 diacritics (e.g., those exemplified in t̪, ɑ̃). All of the symbols are summarized in the IPA chart (Figure 1); this chart and guidelines for symbol use appear in the IPA *Handbook* (Nolan and Esling, 1999), which replaced the earlier *Principles* booklet (Jones, 1949).

The IPA is not the only phonetic alphabet in use. Some scholarly traditions deviate in trivial particulars (e.g., by the use of š in place of IPA ʃ, or y for IPA j); others deviate in a substantial number of the symbols used (e.g., the Danish dialect alphabet; see Figure 2) (Jespersen, 1890). Where the local language, or the language being taught, is written in a non-Latin script, phonetic symbols for pedagogical or lexicographic purposes may be based on the local script, e.g., Cyrillic (Figure 3) or kana (Figure 4). Even where the local language is written in the Latin alphabet, IPA symbols might be judged unfamiliar and user-unfriendly. Thus, in English-speaking countries, zh is often used as an informal symbol corresponding to IPA ʒ, whereas in Turkey, ş might be used rather than IPA ʃ. Some dictionaries aimed at native speakers of English attempt to show the pronunciation of a word entirely by following the conventions of the English orthography (a practice perhaps better termed 're-spelling' rather than 'transcription'). In practice, these conventions are insufficient: for example, English spelling does not indicate word stress, and there is no unambiguous way of indicating certain vowel qualities. Thus, ordinary spelling conventions may be supplemented by the use of diacritics in symbols, such as ī (= IPA aɪ), or, indeed, by a sprinkling of IPA symbols, such as ə. Other dictionaries use entire transcription systems based on *ad hoc* diacritics, using symbols such as ā (= IPA eɪ). Between 1970 and 2000 in Britain, though not in the United States, these non-standard systems were largely supplanted in general lexicography by the use of the IPA.

Until the recent development of computers able to handle large character sets, authors who wanted to use the IPA in print publications often faced typographical difficulties, because non-specialist printers would often be unable to provide the special symbols. Since the 1990s, this problem has disappeared; customized single-byte phonetic and multi-byte Unicode fonts have become widely available, together with the applications that can use them (Wells, 2003). Nevertheless, there are many circumstances – such as in email communication – under which the robust transmission of special symbols cannot be relied upon. There is still a place, therefore, for ways of representing phonetic symbols using nothing but the American Standard Code for Information Interchange (ASCII) character set. The Speech Assessment Methods Phonetic Alphabet (SAMPA) is one widely used 'ASCIIization' of the IPA (Figure 5) (Wells, 1997).

For the remainder of this article, it is assumed that transcription will be based on the IPA. As will become clear, however, there is no unique 'IPA transcription' for a language: rather, there may be several systems, all using the IPA alphabet and all equally scientific.

Impressionistic vs. Systematic

On first exposure to an unknown language, or to an unknown dialect of a familiar language, the fieldworker does not know what sort of phonetic material is going to be encountered. Under these circumstances, a phonetically untrained observer will be likely to refer the incoming data to the known phonetic categories of his/her own first language, or to those of some other language with which he/she is familiar. This is an *impressionistic* transcription (Abercrombie, 1964: 35). The trained observer, on

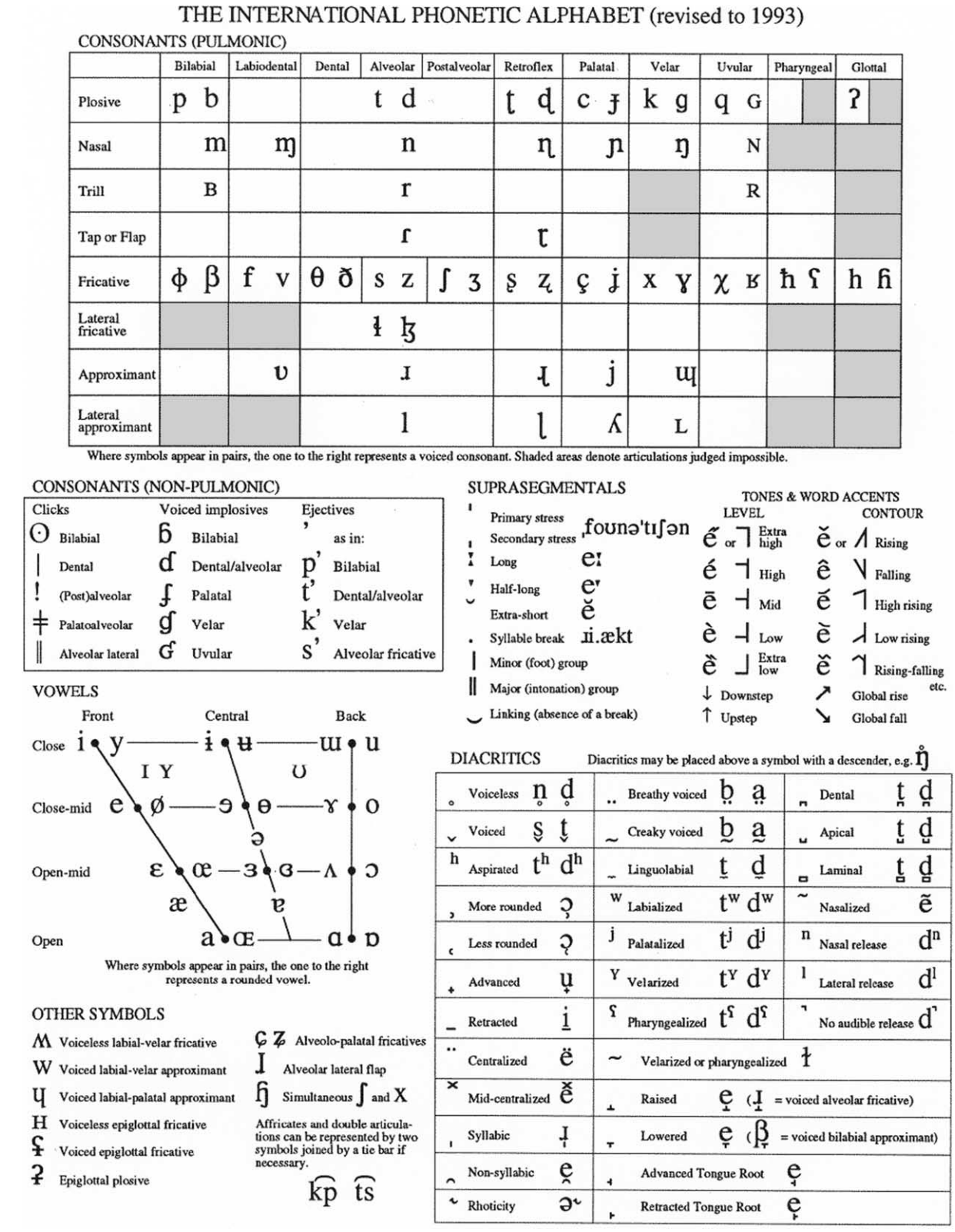

Figure 1 The International Phonetic Alphabet chart. Reprinted with permission from the International Phonetic Association (Department of Theoretical and Applied Linguistics, School of English, Aristotle University of Thessaloniki, Thessaloniki, Greece).

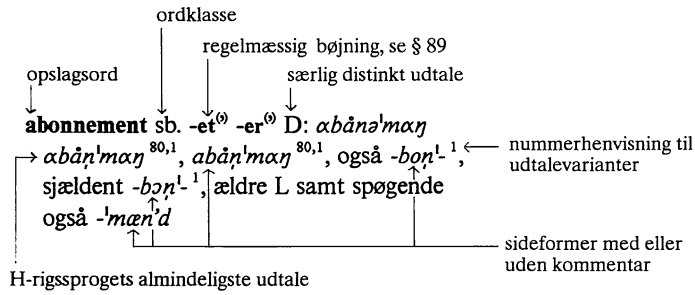

a	n*a*t	*ɹ*	u*r*	*å*	s*u*k
ȧ	s*a*v	*ṛ*	ragtime	*ɔ*	h*o*p
ɑ	r*a*t	*ʂ*	*sj*æl	*å̰*	v*or*
ɑ̇	v*e*j	*ʃ*	*sch*ludder	˜	nasalitet fx *Com*te ˈ*kɑ̃ˑd*
ð	gu*d*	*þ*	Plymou*th*		(sml. k*o*rt ˈ*kåˑd*)
e	v*i*l	*u*	n*u*	ˑ	længde fx *e*ne (sml. *i*nde)
ə	as*e*	*w*	rager	ˌ	stød fx hu*nd*, d*i*n (sml. hu*n*, D*e*an)
ɐ	ager, rager	*y*	n*y*t	ˈ	hovedtryk fx ˈ*bil*ligst, biˈ*list*
i	*i*ld	*æ*	v*e*n	ˌ	bitryk fx løgˌ*å*nde, løjerˌ*ne*
i̯	ager	*ä*	dr*e*ng	ˌ	stavelsesdannende fx sult*e*nde ˈ*suldṇə*
l̩	Hu*ll*	*ø*	*ø*l		(sml. sult*n*e ˈ*suldnə*)
ŋ	*e*ng	*ö*	s*ø*n		
o	f*o*to	*ɔ̈*	sm*ø*re		

Figure 2 The Dania phonetic alphabet, as used in *Den store Danske udtaleordbog*. Reprinted from Brink *et al.* (1991), with permission.

Hard consonants before vowels	*Soft consonants before vowels*
рад /рат/ '(is) glad'	ряд /рьат/ 'row'
тэ *name of the letter* т	те /тьэ/ 'those'
ток '(electric) current'	тёк /тьок/ 'flowed'
лук 'onion'	люк /льук/ 'hatch', 'hatchway'

Figure 3 Transcription of Russian citation forms in Cyrillic respelling, as used in *Essentials of Russian grammar*. Reprinted from Smirnitsky (1975), with permission.

the other hand, can ideally refer instead to general phonetic categories. (The purpose of phonetic ear-training is precisely to establish such language-independent, general-phonetic categories in the phonetician's mind.) As a sound system is investigated, any impressionistic transcription is subject to revision. Characteristics that were initially ignored or overlooked may prove to be phonologically relevant; conversely, some characteristics that were noticed and notated may prove to be phonologically irrelevant. Thus, for example, a European producing an impressionistic transcription of an Australian language might at first overlook a distinction such as alveolar vs. retroflex place (which then turns out to be relevant) while distinguishing voiced vs. voiceless phonation (which then turns out to be irrelevant). As a sound system becomes clear, the analyst is in a position to replace the *ad hoc impressionistic* transcription by a *systematic* transcription that reflects the structure of the language under description.

	唇	舌先		前舌・奥舌	
閉じる音	m	n			ŋ
	p	t	tʃ		k
	b	d	dʒ		g
擦る音	f	θ s	ʃ	h	
	v	ð z	ʒ		
近づく音		l			
	w		r	j	(w)

表4　子音3・3四角形で示した英語の子音表

	唇	舌先		前舌・奥舌	
閉じる音	ム	ンヌ			ンゲ
	プ	トゥ	チュ		ク
	ブ	ドゥ	ヂュ		グ
擦る音	ウ゜	ス	シュ	フ	
	ヴ	ズ	ジュ		
近づく音		ヌル			
	ゥウ		ゥル	ユイ	

表5　子音3・3四角形で示した英語の子音表

Figure 4 IPA symbols for English consonants and their kana transcription equivalents, as used in *Nihongo kara super-native no Eigo e*. Note the use of diacritics with the kana equivalents of l and r. Reprinted from Shimaoka (2004), with permission.

A maximally narrow transcription explicitly indicates all of the phonetic detail that is available. A broad transcription implicitly states much of this

SAMPA		IPA		Unicode		label and exemplification
symbol	ASCII			hex	dec.	
Vowels						
A	65	ɑ	script a	0251	593	open back unrounded, Cardinal 5, Eng. *start*
{	123	æ	ae ligature	00E6	230	near-open front unrounded, Eng. *trap*
6	54	ɐ	turned a	0250	592	open schwa, Ger. *besser*
Q	81	ɒ	turned script a	0252	594	open back rounded, Eng. *lot*
E	69	ɛ	epsilon	025B	603	open-mid front unrounded, C3, Fr. *même*
@	64	ə	turned e	0259	601	schwa, Eng. *banana*
3	51	ɜ	rev. epsilon	025C	604	long mid central, Eng. *nurse*
I	73	ɪ	small cap I	026A	618	lax close front unrounded, Eng. *kit*
O	79	ɔ	turned c	0254	596	open-mid back rounded, Eng. *thought*
2	50	ø	o-slash	00F8	248	close-mid front rounded, Fr. *deux*
9	57	œ	oe ligature	0153	339	open-mid front rounded, Fr. *neuf*
&	38	ɶ	s.c. OE lig.	0276	630	open front rounded
U	85	ʊ	upsilon	028A	650	lax close back rounded, Eng. *foot*
}	125	ʉ	barred u	0289	649	close central rounded, Swedish *sju*
V	86	ʌ	turned v	028C	652	open-mid back unrounded, Eng. *strut*
Y	89	ʏ	small cap Y	028F	655	lax [y], Ger. *hübsch*

Figure 5 Vowel symbol chart, showing the Speech Assessment Methods Phonetic Alphabet (SAMPA) and International Phonetic Alphabet (IPA). Reprinted with permission from University College London, Department of Phonetics and Linguistics.

detail in the conventions for interpreting the symbols, while keeping the transcriptions of actual language material (the text) less complicated. There are two main factors to be considered: the choice of characters (simple vs. comparative) and the number of characters (phonemic vs. allophonic). We consider these in turn.

Simple vs. Comparative

For practical purposes, it is important that a transcription system for a language be kept simple. The symbol t, part of the basic lowercase Roman alphabet, is simpler than symbols such as t̪, tʰ, or t̪ʰ. Therefore, when a language has only one voiceless plosive in the alveolar area, it is appropriate to symbolize it t, rather than to complicate the transcription by deploying the more complex symbol. Thus it is appropriate to use the same symbol /t/ for Swedish (for which the sound so denoted is typically dental and aspirated), English (alveolar, aspirated), French (dental, unaspirated), and Dutch (alveolar, unaspirated), even though the first three could more 'precisely' be written t̪ʰ, tʰ, and t̪, respectively. It is more efficient to state these interpretative conventions once only, rather than to repeat the information every time that the symbol is used. If, however, the Swedish sound is written t̪ʰ, etc., the transcription system is in this respect comparative. Similarly, the five vowels of Greek are represented as i e a o u, even though phonetically the second and fourth vowels may well be associated with the general-phonetic symbols ɛ and ɔ, respectively. The five vowels of Japanese may also be written simply as i e a o u, even though the last vowel is typically unrounded and resembles cardinal [ɯ] (Okada, 1999).

Letters of the basic Latin alphabet are simpler than other letters: d is simpler than ɖ or ɗ, and i is simpler than ɪ. More subtly, ʃ is considered simpler than ɕ or ʂ, and ə is simpler than ɘ, ø, ɜ, ɐ, and ɐ̞. Nevertheless, in languages in which ʃ and ɕ are distinct, e.g., Polish, both symbols are required; similarly, both ə and ɐ̞ are required in Danish. Letters without diacritics are simpler than letters with diacritics (as with Swedish t̪ʰ). Consonantal diacritics are usually unnecessary in the broad transcription of a language. The Arabic *'ayn* can reasonably be written ʕ, even by those who believe it to be a pharyngealized glottal stop [ʔˤ] (Thelwall and Sa'adeddin, 1999). The rather wide inventory of vowel symbols furnished by the IPA means that diacritics for raising, lowering, centralizing, and so on can normally be dispensed with in broad transcription. Again, diacritics may be necessary in languages in which they symbolize a phonemic contrast, as in the case of French nasalized vowels (ɑ̃, etc.). It is typographically simple to transcribe the English consonant in *red* as ɹ, even though phonetically it is an approximant rather than a trill. It would be comparative to write it ɹ. Equally, it is comparative to write the French consonant in *rue* as ʀ or ʁ; it is simple to write it r, as in the transcription shown in Figure 6 (Passy, 1958), but in an account of

CONVERSATIONS FRANÇAISES 19

8. ɑ̃ pɑ̃ˈsjɔ̃.

1. ɑ̃ˈri s ɛ mi ɑ̃ ˈrut, | avɛk la ˈlistə d aˈdrɛs[1] | kə ˈʒɑ̃ lɥi a dɔˈne, | pur ʃɛrˈʃe yn faˈmiːj | u i pɥis ˈprɑ̃ːdrə pɑ̃ˈsjɔ̃.[2]

2. il a deʒa vizite ˈdø meˈzɔ̃, | me l ˈyn nə lɥi a pɑ ˈply, | e l ˈoːtr etɛ trɔ ˈʃɛːr.

3. mɛ̃tˈnɑ̃, | il a pri l meˈtro | pur aˈle a nœˈji | u ˈʒɑ̃ lɥi a ɛ̃diˈke | la faˈmiːj dyˈkro.

4. i deˈsɑ̃ dy meˈtro | a la stɑˈsjɔ̃ d la pɔrt maˈjo.

5. la bɑˈrjɛːr n ɛ pɑ ˈlwɛ̃ ; | i la ˈpɑːs,[3] | sɥi ɛ̃ mɔˈmɑ̃ | l avny d nœˈji, | ˈˈpɥi prɑ̃ a ˈdrwɑt la ry d ˈʃartr, | e ˈtɔ̃ːb dɑ̃ la ˈry d sɑblɔ̃ˈvil.

6. il aˈriːv o trɑ̃t ˈsɛt, | e ˈsɔn ; | ɔ̃ ˈvjɛ̃ lɥi uˈvriːr.

7. " ɛs kə madam dyˈkro[4] | ɛt a la meˈzɔ̃ ? ɛs kə ʒ ˈpø lɥi parˈle ? "

8. " ˈˈɑ̃ːˈtre | məˈsjø, | ˈˈvwala maˈdam."

9. " maˈdam, | ɔ̃ m ˈdi k vu prɔne ʃe ˈvu | de pɑ̃sjɔˈnɛːr etrɑ̃ˈʒe ; | ʒə vjɛ̃ ˈvwaːr | si vu m prɑ̃driˈe."

10. " sa pø s ˈfɛːr, | məˈsjø, | pur ˈˈkɔ̃bjɛ̃ d ˈtɑ̃ ? "

11. " pur ɛ̃ ˈmwɑ u ˈdø | ʒ ˈpɑ̃ːs ; | nu dirjɔ̃ ˈˈɛ̃ ˈmwɑ | pur kɔmɑ̃ˈse."

12. " ˈbjɛ̃ | məˈsjø ; | vule vu ˈvwaːr la meˈzɔ̃ ? "

13. " ɛs kə ʒə sˈrɛ lə ˈˈsœl[5] etrɑ̃ˈʒe ʃe ˈvu ? "

14. " ˈnɔ̃ | məˈsjø ; | nuz avɔ̃ ɛ̃ sɥeˈdwa | e yn dəmwaˈzɛl ruˈmɛn. me ɔ̃ n ˈparl kə frɑ̃ˈsɛ."

[1] la ˈlis d aˈdrɛs. [2] wi pɥis ˈprɑ̃ːd pɑ̃ˈsjɔ̃ (ˈprɑ̃n pɑ̃ˈsjɔ̃).
[3] il la ˈpɑːs. [4] mam dyˈkro. [5] ɛs kə ʒ srɛ l ˈˈsœl.

Figure 6 A page from Passy's 1958 text, *Conversations Françaises en transcription phonétique*, as an example of a pedagogical transcription of French. The French ʁ is written simply, as r. Reprinted from Passy (1958), with permission.

the contrastive phonetics of English and French, the comparative symbols might be appropriate.

IPA symbols for voiceless plosives, such as p t k, may be regarded as unspecified with respect to possible aspiration. Diacritics are available to show them as aspirated (p^h t^h k^h) or as unaspirated ($p^=$ $t^=$ $k^=$); the latter diacritic is not part of the official IPA repertoire but rather is part of the extended IPA (ExtIPA) supplement designed for clinical phonetics (Nolan and Esling, 1999: 187, 193). In Chinese, in which there is a phonemic contrast between aspirated and unaspirated plosives, but there are no essentially voiced plosives, to write them as /p t k b d g/ (as in the Pinyin romanization) is simpler than to write them as /p^h t^h k^h p t k/ or /p t k $p^=$ $t^=$ $k^=$/ or / p^h t^h k^h $p^=$ $t^=$ $k^=$/. Some possible simplifications are generally rejected as inappropriate, except, perhaps, for special purposes, such as email. Following the orthography, the Polish high central vowel could be written y rather than ɨ (Jones, 1956: 335). The Zulu simple clicks could be written with c, q, x, again following the orthography, rather than with explicit click symbols ǀ, ǃ, ǁ (or the former IPA symbols ʇ, ʗ, ʖ).

Phonemic vs. Allophonic

For many purposes, it is more appropriate to use symbols that refer to phonemes rather than to allophones. In a transcription, the rules for the distribution of allophones can be stated once and for all in the accompanying conventions, which will allow the remaining transcription to be uncluttered and less complicated. Pedagogical transcriptions in dictionaries and language-learning textbooks are usually phonemic. One of the sources of tension in the establishment of agreed transcription systems for automatic speech recognition, as successive languages were brought within the SAMPA system (Wells, 1997), was between the generalist's assumption, that there should be a distinct phonetic symbol for each 'sound,' and the linguist's preference for a more economic notation, with a distinct symbol only for each phoneme.

The Spanish voiced obstruents have both plosive and fricative/approximant allophones. Allophonically, they include both b d g and β ð ɣ. Following the principle of simplicity, the phonemes are usually written b, d, and g. For some pedagogical purposes, it may be relevant to insist on the difference between plosives and fricatives, but for lexicographic or speech-recognition purposes, this difference is irrelevant (particularly since word-initial /b d g/ are pronounced as plosives in some contexts but as fricatives in others: e.g., *un* [d]*edo* 'a finger' but *mi* [ð]*edo* 'my finger').

The English lateral consonant varies between clear (plain) l and dark (velarized) ɫ, the conditioning factor in Received Pronunciation (RP) being the following segment: the lateral is clear before a vowel, dark elsewhere. In a phonemic transcription, both are written l (the simpler of the two symbols in question). Phonemic notation is undoubtedly advantageous in a pronunciation dictionary, since the final consonant in a word such as *sell* is sometimes clear (*sell it*), sometimes dark (*sell them*), so it is better to leave the choice of clear or dark to be decided by reference to the general rule rather than spelled out at each entry. However, there are circumstances in which a strictly phonemic notation may be considered inappropriate. In German, the fricative corresponding to orthographic *ch* is velar [x] when following an open or back vowel, but palatal [ç] elsewhere (including following a consonant and in initial position). The two sounds may be considered to be co-allophones of the same phoneme /x/, and (provided certain morphological boundaries are explicitly indicated) unambiguously so written. Nevertheless, this allophonic distinction

Bucephalus buˈtse:falʊs
Bucer ˈbʊtsɐ
Buch bu:x, **Bücher** ˈby:çɐ
Buchan[s] *engl.* ˈbʌkən[z]
Buchanan *engl.* bjuːˈkænən
Buchara buˈxa:ra, *russ.* buxaˈra
Buchare buˈxa:rə

Figure 7 Entries on a page in Mangold's standard German pronunciation dictionary, *Duden Aussprachewörterbuch*. Note the switch from x in the singular of the word *Buch*, to ç in the plural *Bücher*. In the singular this consonant is preceded by the back vowel u:, but in the plural the consonant is preceded by the front vowel y:. Reprinted from Mangold (1990), with permission.

has a high perceptual salience for speakers. The two sounds have familiar non-technical names, *Ach-laut* and *Ich-laut*, respectively. The standard German pronunciation dictionary symbolizes them distinctly (Figure 7) (Mangold, 1990).

There are many other cases when users of phonetic transcription may feel more comfortable with a selectively narrowed (partially allophonic) transcription. An example is the symbol ŋ for the velar nasal in languages (e.g., Italian) in which it is not distinctive, but arises only by assimilation before another velar. Another is Russian, wherein, for pedagogical purposes, it may be useful to narrow the transcription so as to indicate vowel allophones explicitly (Figure 8). Conversely, there are cases when users want a transcription that reflects phonemic neutralizations. In many languages, the vowel system in unstressed syllables is less complex than it is in stressed syllables. In a polysystemic transcription, different vowel systems are identified as operating in different structural positions or in different phonetic environments. In French, for example, the oppositions e–ɛ, a–ɑ, ø–œ, o–ɔ, ɛ̃–œ̃ are typically neutralized in non-final syllables, and it is possible to use special (non-IPA) cover symbols to reflect these neutralizations: E, A, Ø, O, Ẽ.

In contemporary English, speakers tend to be aware of the glottal stop ʔ as something distinct from t, and students learning phonetic transcription see it as natural to distinguish the two. In terms of classical phonemics, the status of ʔ is odd in that in some positions it behaves as an allophone of /t/ (e.g., *a*[ʔ]*mosphere*), but in other positions (notably word-initially) it realizes no underlying phoneme but, if used, merely signals emphasis (optional hard attack, as in *an* [ʔ]*egg*).

Analysis and Transcription: the English Vowels

There are often several possible phonological treatments of the same phonetic data. Naturally, different competing phonemicizations may be reflected in different phonemic notations; however, the two do not necessarily go hand in hand, and it is possible for analysts who disagree on the phonological treatment to use the same transcription system, or conversely, for analysts who agree on the phonology to use different notations. Furthermore, the shortcomings of classical phonemic theory now generally acknowledged by phonologists mean that many are unhappy with the notion of a phonemic transcription, despite its convenience in practice.

The notation of English vowels (in RP and similar varieties) has been a particularly difficult area. One view is that pairs such as *sleep–slip* contain the same vowel phoneme, but under different conditions of length (length being treated as a separate, suprasegmental, feature). This view is reflected in the notation sli:p–slip, widely used in English as a foreign language (EFL) work in the first three-quarters of the 20th century. Thus, in the first 12 editions of Daniel Jones's (1917) English pronouncing dictionary (EPD), the English monophthongs were written as follows, in what was then widely known as 'EPD transcription' (the monophthongs are exemplified, respectively, in the keywords *fleece*, *kit*, *dress*, *trap*, *start*, *lot*, *thought*, *foot*, *goose*, *strut*, *nurse*, *comma*, *face*, *goat*, *price*, *mouth*, *choice*, *near*, *square*, *force*, and *cure*):

i: i e æ ɑ: ɔ ɔ: u u: ʌ ə: ə ei ou ai au ɔi iə ɛə ɔə uə

Since this set of symbols is not maximally simple (see preceding section, 'Simple vs. Comparative'), a 'simplified transcription' also came into use and was popular in EFL work in the middle of the 20th century:

i: i e a a: o o: u u: ʌ ə: ə ei ou ai au oi iə eə oə uə

Unconfirmed hearsay has it that Jones would have liked to switch to this simplified transcription for EPD, but that the book's publishers refused to allow it. In these quantitative transcription systems, the length mark is crucial, since it alone represents the distinction between several pairs of phonemically distinct vowels: not only *sleep–slip* but also, in the simplified transcription, *cat–cart*, *spot–sport*, *put–boot*, and *insert*(n.)–*concert*.

Another possible analysis of the English vowels is that the long and diphthongal ones consist of a short vowel followed by a glide identified with one of the semivowels, j (non-IPA notational variant: y), or w, or, in the case of a non-high final tendency, h (Trager and Smith, 1951). This type of analysis has enjoyed considerable support among adherents of structural linguistics. Applied to RP (which it rarely was), it would look like this:

iy i e æ ah o oh u uw ə əh ɨ ey əw ay aw oy ih eh uh

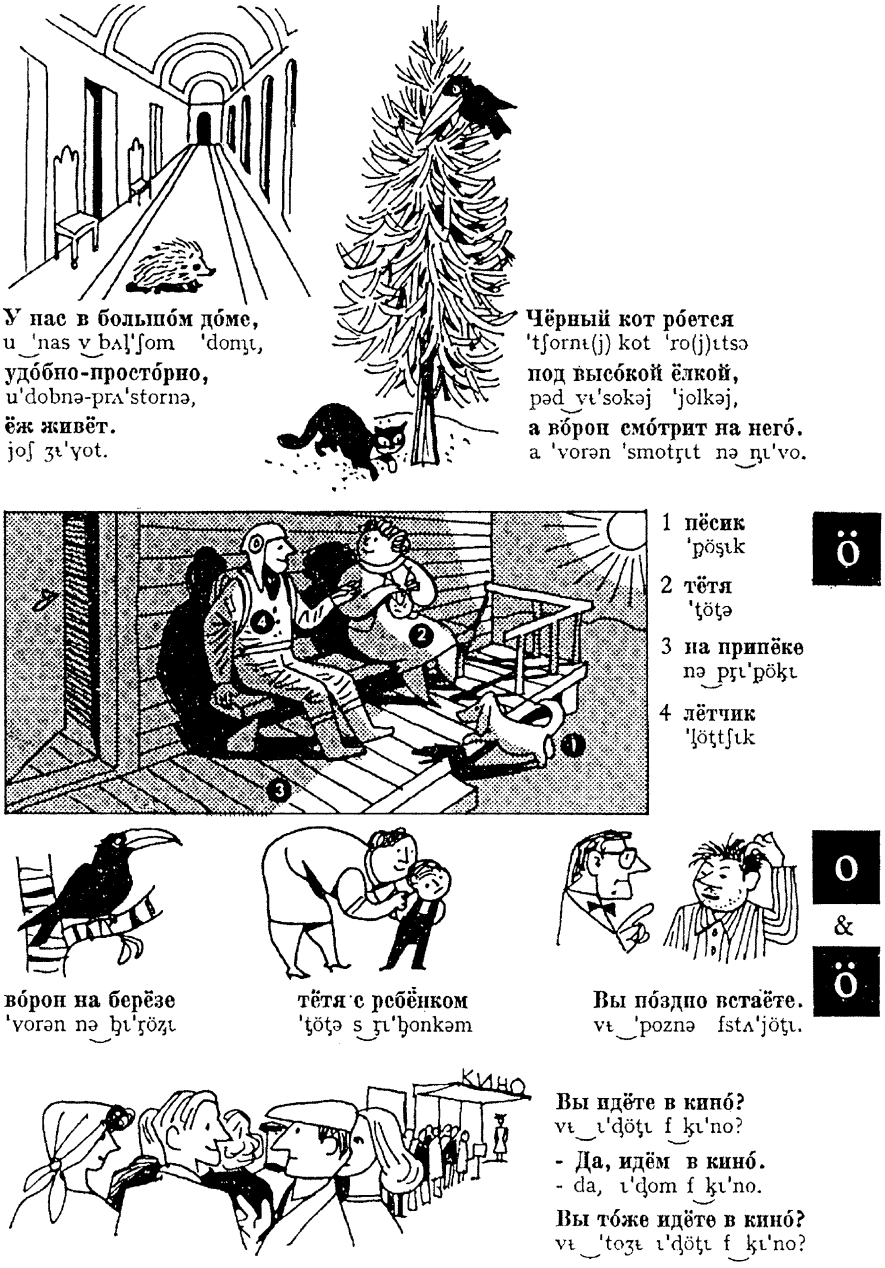

Figure 8 A page from Ward's *Russian pronunciation illustrated*, showing a narrow transcription of Russian. The symbol ö represents a centralized allophone of /o/. In 1989, the IPA withdrew recognition from the palatalization diacritic seen here, replacing it with a raised j, thus d^j in place of, ɖ, and from the symbol ɪ, an alternative to ɪ. Reprinted from Ward (1966), with permission.

The notation used by Chomsky and Halle in *The sound pattern of English* (1968) builds on this by retaining the off-glide analysis while adding a macron to symbolize tenseness in the vowels previously analyzed as long, yielding a system of the following type:

īy i e æ āh ɔ ōh u ūw ə āh ɨ ēy ōw āy āw ʒy

However, a long-established rival view saw vowel quality, rather than quantity (length) or off-glides, as the feature distinguishing *slip–sleep* and similar vowel pairs. Differences in quantity (and perhaps of off-glides) could be treated as predictable once the quality was known. From about 1920, phoneticians working on English also made use of a qualitative transcription system, in which length marks were not used:

i ɪ ɛ æ ɑ ɒ ɔ ʊ u ʌ ɜ ə eɪ oʊ aɪ aʊ ɔɪ ɪə ɛə ɔə ʊə

A variant of this was also used, in which the symbol shapes ɪ and ʊ were replaced by ɩ and ɷ, respectively.

In the United States, a system of this type was used by Kenyon and Knott (1944). They analyzed the vowels of *face* and *goat* as essentially monophthongal, and wrote them e and o, respectively:

i ɪ ɛ æ ɑ ɒ ɔ ʊ u ʌ ɝ ə ɚ e o aɪ aʊ ɔɪ

The hooked symbols are for the rhotacized vowels in *nurse* and *lett<u>er</u>*, respectively. American English does not have phonemically distinct centering diphthongs. This notation gained wide popularity in some American circles, so much so that the expression 'IPA' is often understood as meaning this transcription of English. It is often used in American-oriented EFL work.

The view that eventually prevailed in Britain was that the vowels of *sleep* and *slip* are phonemically distinct, based on a complex distinction of length, quality, and tensity. The rivalry between quantitative and qualitative transcription systems was resolved by A. C. Gimson (q.v.), whose notation system (Gimson, 1962) symbolized both quantity and quality differences, redundantly but conveniently:

iː ɪ e æ ɑː ɒ ɔː ʊ uː ʌ ɜː ə eɪ əʊ aɪ ɑʊ ɔɪ ɪə eə ʊə

By this time, the quality of the diphthong in *goat* had changed and the diphthong ɔə had merged with ɔː. Minor modifications were subsequently introduced, leading to the system now used by nearly all British phoneticians (Wells, 1990):

iː ɪ e æ ɑː ɒ ɔː ʊ uː ʌ ɜː ə eɪ əʊ aɪ aʊ ɔɪ ɪə eə ʊə i u

The important change here is the addition of two symbols for weak vowels, i (as in *happ<u>y</u>*) and u (as in *sit<u>u</u>ation*). Although sometimes viewed as an abbreviatory convention, meaning 'either iː or ɪ' and 'either uː or ʊ,' these additional symbols really reflect a dissatisfaction with classical phonemics. In weak-vowelled syllables, English has a neutralization of the phonemic contrasts iː–ɪ and uː–ʊ, and the symbols i and u stand for what some would call archiphonemes and others would call underspecified vowels. Speakers may be inconsistent in whether the vowel of *happ<u>y</u>* or *glor<u>i</u>ous* is more like the iː of *sleep* or the ɪ of *slip*, and it may often be impossible for the listener to categorize it with certainty as one or the other. There are no pairs of words distinguished by this distinction in this position.

Segments and Digraphs

English long vowels are not the only area in which it is possible for different views to exist concerning the number of successive segments in which the phonetic material should be analyzed. This question tends to arise whenever diphthongs or affricates are to be transcribed. There are also certain types of 'single sounds' that are conveniently written as a digraph, i.e., as two successive letters. The IPA does this for voiced and nasalized clicks, e.g., g‖ and ŋ!, and for consonants with double articulation, e.g., kp. (Exceptions are the approximants w and ɥ and the Swedish velar-palatoalveolar fricative ɧ, for which single symbols are available.) If necessary, the fact that these digraphs stand for single segments can be made explicit by the use of a tie bar: g͡‖, ŋ͡!, k͡p.

In general, diminuendo ('falling') diphthongs may be regarded either as unitary phonemes or as sequences of vowel plus semivowel. The corresponding decision has to be made in transcription. Thus, in some languages – Polish, for example – a diphthong of the type [e<u>i̯</u>] is best analyzed as the vowel e followed by the consonant j. In others – English, perhaps – it may be regarded as an unanalyzable whole. English orthography follows the latter approach, given such spellings as *basic* 'bbeɪsɪk, and the unitary analysis is reflected in the respelling notation ā. But IPA users, even those who consider the diphthong phonologically unitary, mostly write it with two letters, eɪ. The use of this digraph does not carry any necessary implication that the diphthong consists of e (as in *dress*) and ɪ (as in *kit*). In principle, the IPA writes affricates, too, as digraphs, as in the examples pɸ, dz, tʃ, kx. To emphasize their unitary status, the tie bar can be used: p͡ɸ, d͡z, t͡ʃ, k͡x. (In 1976, the IPA withdrew recognition from a number of affricate symbols that had featured in earlier versions of the phonetic alphabet but had never been widely used, e.g., ʤ for dz (Wells, 1976).) However the symbols c and ɟ are sometimes pressed into service to represent what might otherwise be written tʃ and dʒ. (Alternatively, the non-IPA č and ǰ may be used.) This is particularly convenient when the affricates occur contrastively aspirated and unaspirated, as in Hindi. Contrastive aspiration raises the question of whether it should be symbolized by a diacritic (p^h vs. p) or by using digraphs (ph vs. p). In the case of an aspirated affricate, as in Hindi *Jhelum*, there is a transcriptional choice between diacritics alone ($ɟ^ɦ$,), a digraph ($dʒ^ɦ$ or ɟɦ), or a trigraph (dʒɦ). (More simply, the diacritic ^{h} or the letter h could be used instead of ^{ɦ} or ɦ.) Ohala (1999) chose a digraph with a diacritic, $dʒ^ɦ$ (**Figure 9**).

In a transcription system that includes digraphs, it is important to maintain parsability, avoiding possible confusion between the single sound symbolized by the digraph and the sequence of sounds symbolized by the two symbols separately. In a language in which affricates are in contrast with clusters (or sequences) of the corresponding plosive plus fricative, either the

Transcription of recorded passage

This translation of 'The North Wind and the Sun' is a modified version of that presented in the 1949 version of the *Principles of the International Phonetic Association*.

ʊ̞ːəri həʋɑ ɔr surədʒ ɪs baʈ pər dʒʱəgəʈ rəhe ʈʰe ki həm ɖonõ mẽ zjaɖa bəlʋan kɔn he. ɪʈne mẽ gərəm tʃoga pɛhne ek mʊsafɪr ʊɖʱər a nɪkla. həʋa ɔr surədʒ ɖonõ ɪs baʈ pər ɾazi ho gəje ki ɖonõ mẽ se dʒo pɛhle mʊsafɪr ka tʃoga ʊʈərʋa dega ʋəhi zjaɖa bəlʋan səmdʒʱa dʒajega. ɪs pər ʊʈːəri həʋa apna pura zor ləgakər tʃəlne ləgi lekɪn ʋo dʒɛse dʒɛse əpna zor bərʱaʈi gəji vɛse vɛse mʊsafɪr əpne bəɖən pər tʃoge ko ɔr bʱi zjaɖa kəs kər ləpeʈʈa gəja. ʌnt mẽ həʋa ne əpni koʃɪʃ bənd kər ɖi. pʰɪr surədʒ ʈezi ke saʈʰ nɪkla ɔr mʊsafɪr ne ʈʊrənt əpna tʃoga ʊʈar ɖɪja. ɪs lɪje həʋa ko manna pəɽa ki ʊn ɖonõ mẽ surədʒ hi zjaɖa bəlʋan he.

Orthographic version

उत्तरी हवा और सूरज इस बात पर झगड़ रहे थे कि हम दोनों मे ज़्यादा बलवान कौन है। इतने में गरम चोगा पहने एक मुसाफ़िर उधर आ निकला। हवा और सूरज दोनों इस बात पर राज़ी हो गये कि दोनों में से जो पहले मुसाफ़िर का चोगा उतरवा देगा वही ज़्यादा बलवान समझा जायेगा। इस पर उत्तरी हवा अपना पूरा ज़ोर लगाकर चलने लगी लेकिन वह जैसे जैसे अपना ज़ोर बढाती गई वैसे वैसे मुसाफ़िर अपने बदन पर चोगे को और भी कस कर लपेटता गया। अन्त में हवा ने अपनी कोशिश बन्द कर दी। फिर सूरज तेज़ी के साथ निकला और मुसाफ़िर ने तुरन्त अपना चोगा उतार दिया। इस लिये हवा को मानना पड़ा कि उन दोनो मे सूरज ही ज़्यादा बलवान है

Figure 9 A page from the chapter 'Hindi' in the *Handbook of the International Phonetic Association: a guide to the use of the International Phonetic Alphabet*, showing the transcription of Hindi. Reprinted from Ohala (1999), with permission.

affricates must be written with a tie bar or the cluster (sequence) must be written with a separator symbol. Thus Polish *czy* and *trzy* must be written either as t͡ʃɨ *czy* and tʃɨ *trzy* or (more conveniently) as tʃɨ *czy* and t-ʃɨ *trzy*. Some fonts provide ligatured symbols such as ʧ (= t͡ʃ), so that one can write ʧɨ and tʃɨ, respectively. In non-IPA notation, čɨ and tšɨ can be used. (Another view of the Polish cluster represented by orthographic *trz* takes it as tʃʃ, i.e., affricate plus fricative. With this analysis, the problem of parsability does not arise.)

Problems of segmentation also arise in the annotation of spectrograms or other physical records of the speech signal. The latter tends to be continuously variable, rather than reflecting the neatly discrete segments implied by a phonetic transcription, which means that the stretch of speech corresponding to a given transcription symbol is not easily delimited. For example, the moment of silence in the middle of apa corresponds to the voiceless plosive identity of p, but its labiality can be inferred only from the formant transitions in the adjacent portions of the vowels and from the characteristics of the plosive burst at the release.

Dictionary Entries

The pronunciation entry in a dictionary will usually relate to the citation form of the word in question. This may differ in various respects from the forms to be expected in connected speech, sometimes referred to as phonotypical forms. The notion of a phonotypical transcription arises from the work of speech technologists working on French, a language in which many final consonants that may appear in running speech are absent in the citation form – the well-known phenomenon of liaison. Thus the citation form of the pronoun *vous* 'you' is vu, but the liaison form, used before a word beginning with a vowel, is vuz. The phonotypical transcription of the phrase *vous avez* 'you have' is vuzave. Pronunciation dictionaries of French must include these liaison forms, because the identity of the liaison consonant, if any, cannot be predicted from the citation form. Certain vowel-initial words block the activation of the liaison consonant (those spelled with '*h aspiré*' and certain others, e.g., *onze* 'eleven'): this, too, must be shown in the pronunciation dictionary (usually by an asterisk or some other arbitrary symbol). In English, on the other hand, forms with final liaison r (linking r, intrusive r) may not need to be listed in the dictionary, since this possibility applies to every word for which the citation form ends in a non-high vowel. As with the simple/comparative and phonemic/allophonic distinctions, it is more efficient to state a rule once rather than to repeat the statement of its effects at each relevant dictionary entry.

Many English function words have distinct strong and weak forms, e.g., *at*, strong form 'æt,' weak form 'ət.' The strong form is used when the word is accented and in certain syntactic positions (*what are you looking at?*). A few words have more than one weak form, depending on context, as in the case of *the*: e.g., 'ði eg' *the egg*, prevocalic, but 'ðə mæn' *the man*, preconsonantal. A phonotypical transcription of connected speech would select the appropriate form for the context. Aside perhaps from such special-context forms, for pronunciation in a general-purpose dictionary it may be sufficient to state only

the citation form of a word. Some dictionaries, though, and particularly specialist pronunciation dictionaries, will go further, and this may impact on the form of transcription chosen, e.g., in the use of abbreviatory conventions.

First, the word may have several competing citation forms, used by different speakers of the standard form of the language and differing unpredictably from one another. Thus, in British English, *again* may rhyme with *pen* or with *pain*; *controversy* may be stressed on the initial syllable or on the antepenultimate; *schedule* may begin with ʃ- or sk- (for statistics on speaker preferences in these words, see Wells (2000)). In English, there is great intraspeaker and interspeaker variability in the choice between ɪ and ə in weak syllables (*reduce, aspiration, horses*). (The 2003 *Longman dictionary of contemporary English* uses a special symbol ɘ̩ to show this.)

Second, the dictionary may wish to cover more than one form of the language, e.g., American English (AmE) and British English (BrE), or American and European Spanish. Rather than transcribe each relevant word separately for each variety of the language, dictionaries may use abbreviatory conventions to show such variability. For example, the English word *start* might be transcribed stɑː(r)t or stɑːʳt, with the convention that the r is to be pronounced in AmE but not in BrE.

Third, there may be predictable (rule-governed) variability. For example, in certain positions in a word, where some English speakers place the cluster ns, others pronounce nts, e.g., prɪns or prɪnts *prince*. This may be shown by an abbreviatory convention such as prɪnᵗs or prɪn(t)s. (The rule of plosive epenthesis is more general than this: it also affects other clusters of nasal plus voiceless fricative. It also applies in German, thus han(t)s *Hans*, but this is ignored in Mangold (1990).) As a second example, English words with more than one lexical stress are pronounced in isolation with an accent on the last such stress (sɪks'tiːn *sixteen*), but in connected speech, under certain surrounding accent conditions, are pronounced with the accent on the first such stress ('sɪkstiːn 'piːpl̩ *sixteen people*). Particularly in dictionaries aimed at speakers of EFL, this too may be explicitly indicated. As a third example, in both English and German, the syllabic consonants l̩ and n̩ alternate with the sequences əl and ən; words may be pronounced with either the first or the second sequence, depending on a combination of phonetic-environment, stylistic, and speech-rate factors: thus German *Gürtel* 'ɡʏrtl̩ or 'ɡʏrtəl, English *hidden* 'hɪdn̩ or 'hɪdən. Although the *Duden* dictionary mentions the alternation only in the foreword (Mangold, 1990: 32), English dictionaries often make it explicit at each relevant entry, using abbreviatory devices such as 'hɪdᵊn or 'hɪd(ə)n.

Pedagogical Transcription, Dictation, and Reading Exercises

In phonetic training of the kind associated with the Daniel Jones and Kenneth Pike traditions, those studying the phonetics of a particular language (including their own) practice the skills of transcribing phonetically from orthography, transcribing from dictation, and reading aloud from a phonetically transcribed text. In these exercises, words are transcribed not in their citation form, but phonotypically. In particular, great attention is paid to the possibility of connected-speech processes such as assimilation, elision, liaison, and weakening (including vowel reduction). In the case of English, instead of the lexical stress-marking of words, the student may be required to produce a full markup of accentuation (sentence stress) and intonation. For example, in the English phrase *bread and butter*, the word *and* would most probably be pronounced not 'ænd,' but rather ən or əm or n̩ or m̩. The transcriber from orthography should be able to predict this, the transcriber from dictation should be able to hear which pronunciation was used, and the student reading from transcription ought to be able to reproduce whichever form is in the written text.

The transcription used for these exercises is often referred to as 'phonemic.' However, if we follow current ideas in regarding phonemes as being mental entities – part of the speaker's competence – then this term is not really accurate. The word *bad* presumably always has the mental representation 'bæd,' even though under assimilation in a phrase such as *bad man* it may be pronounced with a final bilabial, nasally released, thus 'bæb mæn.' This form of transcription is better referred to as a reading transcription.

See also: International Phonetic Association; Phonemics, Taxonomic; Phonetic Classification; Phonetic Pedagogy; Phonetic Transcription: History; Phonetics, Articulatory; Phonetics, Acoustic; Phonetics: Overview; Phonology–Phonetics Interface; Second Language Acquisition: Phonology, Morphology, Syntax; Second Language Speaking.

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Relevant Websites

http://www.phon.ucl.ac.uk – University College London, Department of Phonetics and Linguistics website. Resources include information on the Speech Assessment Methods Phonetic Alphabet (SAMPA), a machine-readable phonetic alphabet.
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Phonetic Transcription: History

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Transcription, in its linguistic sense, has been defined as the process of recording the phonological and/or morphological elements of a language in terms of a specific writing system, as distinct from transliteration, which is the process of recording the graphic symbols of one writing system in terms of the corresponding graphic symbols of a second writing system. Transcription, in other words, is writing down a language in a way that does not depend on the prior existence of a writing system, whereas transliteration does.

Systems of transcription have existed from the earliest times. Traditional writing systems of most languages may originally have been transcriptions of speech, but in the course of time have lost much of this connection (*see*). Spelling reformers have often sought to restore the connection. Journalists, missionaries, colonial administrators, teachers, traders, travelers, and scholars have all at one time or another required a precise way of writing down previously unwritten languages for various purposes: to improve communication, to make available translations of the Bible and of noteworthy literary works, to provide education, to record folk literature, and so on. For phoneticians above all, it is essential to have a notation system that allows sounds to be referred to unambiguously.

The Segmentation of Speech

Speech in its physical form is a continuum, but transcription requires it to be split up into segments, on the basis of some kind of linguistic analysis. Writing systems of the world fall into different groups

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according to what types of segments they are based on – words, syllables, or consonants and vowels. Certain features of speech are associated with longer segments than others; for example, stress and intonation, which in many writing systems are not marked, are associated with stretches of speech such as the syllable, word, or sentence.

Types of Transcription

A transcription can never capture all the nuances of speech. The amount of detail it attempts to include in its text will vary according to its purpose. A system intended for the specialist linguist investigating a language never previously studied would often need to allow the recording of as many as possible of the various nuances of sounds, pitch variations, voice quality changes, and so on. Such a transcription may be called 'impressionistic,' and is unlikely to be helpful to anyone other than a specialist.

Proceeding from this initial transcription, the linguist can deduce the way in which the sound system of the language is structured, and can replace the impressionistic transcription with a 'systematic' one, which records in its text only the elements that are crucial for conveying the meanings of the language. This type of transcription may well form the basis for a regular writing system for that language, and is called a 'phonemic,' or 'broad,' transcription. For use in teaching the spoken language, however, it may be helpful to transcribe some of the subphonemic sound differences likely to present problems to the learner. This kind of transcription may be called 'allophonic,' or 'narrow.' If detailed comparisons are to be made between this language or dialect and another one, showing the more subtle sound distinctions, the transcription may begin to resemble the impressionistic one, but as it is the result of a prior analysis, it will still be systematic. Conventions may be supplied to show the way in which the broad transcription is realized phonetically in certain environments. For special purposes, such as recording the speech of the deaf, very complex transcription systems may be necessary, to cope with sound variations that rarely occur in the speech of those without such a disability (see later, discussion of the International Phonetic Association).

Notation

Transcription systems need to employ a notation that allows them to refer to a sound unambiguously. The following approaches utilize some of the principles followed in effective systems of notation:

1. To avoid ambiguity, each symbol used in the notation, in its particular environment, should be restricted to one particular sound or sound class (or, in some cases, groups of sounds, such as the syllable), and each sound, etc. should be represented by only one symbol. So, for instance, the symbol <j>, which has different values in German and English orthography, would need to be confined to only one of those values. Conversely, the sound [s], which in English may be conveyed either by <s> as in 'supersede' or <c> as in 'cede,' must be limited to only one symbol.
2. The symbols used should ideally be simple, but distinctive in shape, easily legible, easy to write or print, aesthetically pleasing, and familiar to the intended users. If printing types are not readily available, the system will be limited in its accessibility and expensive to reproduce.
3. If the transcription is to be pronounceable (not all kinds are required to be), the sound values of the symbols must be made clear, through a description of the ways in which the sounds are formed, or through recorded examples, or by 'key words' taken from a language, provided that the accent referred to is specified. Some transcription systems include pieces of continuous text to illustrate the application to particular languages (e.g., those of Carl Lepsius and the International Phonetic Association (IPA); see later).
4. The symbol system should be expandable, particularly if it is intended to be used to cover all languages. As new languages are encountered, new varieties of sounds will have to be defined.

Alphabetic Notations: Roman and Non-Roman

Alphabetic notations (e.g., the Roman alphabet) are based on the principle of having one simple symbol to represent each segment. However, many transcription systems are not based on the Roman alphabet, because of the ambiguous values of some of its symbols, or because it has been found preferable to use 'iconic' symbols, intended to convey by their shapes the phonetic nature of the sound concerned, and/or to link related groups of sounds. One variety of iconic notation has been called 'organic,' because the shapes of its symbols are meant to suggest the organs of speech used to produce them. Shorthand systems characteristically are non-Roman and iconic, but not necessarily organic. Iconic systems have a number of drawbacks. Apart from the difficulties of reading and printing them, they cannot be easily expanded to incorporate sounds newly encountered. It is also less easy to adapt them as and when phonetic theory undergoes changes.

Analphabetic Systems

Analphabetic systems are not based on alphabetic-type segments; instead, the symbols are composed of several elements, some of which resemble chemical formulas, each element representing one ingredient of the sound concerned (see later).

Supplementing the Roman Alphabet

The number of Roman symbols is far too limited to convey the sound distinctions needed. There are various ways of supplementing the basic alphabet (see Abercrombie, 1981):

1. Using 'compound letters' such as <q> and <x> (equivalent to [k(w)] and [ks], respectively, in English orthography) to stand for other sounds. Thus <x> may be used to represent the Scottish sound represented by the <ch> in 'loch.'
2. Inverting and/or reversing the letters and giving them other values, e.g., [ɔ ə ɟ ɯ ɹ ʌ] are all phonetic symbols formed by inverting <c e f m r v>, respectively.
3. Adding diacritical marks to basic symbols, as in <ä, ç, ø>. These diacritics may be attached to the letter or placed somewhere adjacent to it. They are an economical way of enlarging the repertoire, because one mark can be used to change the value of a number of symbols; for example, [~] represents nasality and may be added above any vowel symbol. Conversely, being small, diacritics may be inadvertently omitted or obscured, they tend to reduce the legibility of texts, and they can be expensive to reproduce (though less so since the advent of computers).
4. Adapting symbols borrowed from other alphabets; examples of symbols taken from Greek by the International Phonetic Alphabet, with modification to blend with the roman font, are [θ χ β ɣ] (*see* **International Phonetic Association**). Symbols may also be borrowed from another use, such as @), £, $, %, etc.
5. Using digraphs to represent simple sounds, as English orthography does in 'thing,' wherein <th> and <ng> may represent the simple sounds [θ], and [ŋ], respectively. The symbols are easily accessible, but problems arise when these sequences are needed to convey actual sound sequences, such as the aspirated stop [th].
6. Using different typefaces, such as UPPERCASE, *italic,* or **bold** (or even **blackletter**). However, these are less satisfactory for use in handwriting, they may cause confusion with other conventional uses, such as emphasis, and they do not blend well with other fonts, unless specially adapted.
7. Less commonly, using spatial relationships. With respect to a median line, symbols may be placed on the line, above it, or below it. Braille makes use of this in certain of its symbols. For normal printing and writing this is not very satisfactory, as it interferes with legibility and can easily lead to errors.
8. Inventing entirely new symbols. Unless new symbols are relatively straightforward adaptations of Roman letters, e.g., inversions or addition of diacritics, they rarely survive. One that has survived is the IPA symbol for the velar nasal, [ŋ], probably first used in 1619 by Alexander Gill.

Nonsegmental Aspects of Speech

In any language, English, for example, the position of the stress in the word may need to be indicated. This can be done by placing a raised mark before the stressed syllable, for instance, <be'come, 'beckon>, or by highlighting the syllable in some way. Extra length can be shown by doubling the segmental symbol, as in Italian *freddo* 'cold', or by adding a diacritical mark, as in [aː]. Pitch is an essential feature of the words of 'tone languages,' such as Chinese, Thai, and Yoruba, and may be marked by accents over the vowel (e.g., [á] = high, [à] = low), or by numerals (e.g., the Mandarin Chinese segmental structure [ma] can have four different tones, distinguishing different words: [ma^1], [ma^2], [ma^3], [ma^4]). The intonation pattern of English may be indicated by marking the pitch of certain prominent syllables. The first person to try to provide a detailed system of notation for these features in English was Joshua Steele (*see* **Steele, Joshua (1700–1791)**). Other features are also sometimes treated as nonsegmental, notably nasality and 'secondary articulations' such as palatalization, velarization, and labialization, because they frequently overlap segmental boundaries. Traditional transcriptions have allocated these features to segments, adding diacritical marks to the vowel or consonant symbols, but some phonological analyses of speech have associated them with longer stretches by setting up an extra tier for them. The 'prosodic analysis' of J. R. Firth allocated 'prosodies' such as nasality and velarity to longer domains, including syllable part, syllable, word, and sentence (*see* **Firthian Phonology**). A similar idea lies behind the 'autosegmental' model of phonology.

Historical Survey of Transcription Systems

Examples of some of the different types of transcription systems can be found in the alphabets from early times.

Roman-Based Alphabetic Systems (pre-19th Century)

The reform of traditional orthographies (notably those of French and English, which presented particular problems for learners) led to innovations in notation. In France, Loys Meigret's *La Tretté de la grammere françoeze* (1550; *see* **Meigret, Louis (?1500-1558)**) included a phonetically based alphabet for French. In England, Sir Thomas Smith, in his *De recta et emendata linguae anglicanae scriptura (On the proper and corrected writing of the English language)* (Paris, 1568), employed several of the devices mentioned previously. For example, diacritics ([¨]) were used to distinguish the long vowels in 'cheap' and 'hate,' symbolized <ë> and <ä>, respectively; non-Roman alphabets (Greek <υ>) were used for French and Scottish u (i.e., [y]); and the Irish form of capital <G> was used to represent the first consonant in 'judge.' A reversed <z> replaced the <sh> of 'ship,' and for the dental fricatives, Smith used Old English 'thorn' and <ð> (see Figure 1).

John Hart (*see* **Hart, John (?1501-1574)**) was familiar with Meigret's system. His book, *An orthographie* (London, 1569), included special symbols for the consonant sounds [θ ð ʃ tʃ dʒ], beautifully integrated into the text. He was a keen observer of speech and recorded the occurrence of syllabic consonants such as the final <l> in 'fable,' which he transcribed as <ḷ>. Subsequently, William Bullokar (*see* **Bullokar, William (c. 1531–1609)**), in his *Book at large for the amendment of orthographie for English speech* (London, 1580), provided 40 symbols for transcribing English. By using a **blackletter** font he opened up extra possibilities of rarely used printing sorts. He illustrated his phonetic alphabet by using it in a number of literary texts, including *Aesop's fables*.

In *Logonomia Anglica* (first edition published in London in 1619), Alexander Gill (1564–1635) introduced a number of extra letters. Like Smith, he used <ð> for the first sound in 'this,' and in the second edition (1621) of his work he introduced <ŋ> for the velar nasal, thus maintaining the connection with nasal <n>. He transcribed the word 'high' as <hjḥ>, using <j> for the vowel and <ḥ> for the final consonant. This illustrates the use of a diacritic incorporated in a letter. Charles Butler, in his *English grammar* (Oxford, 1633), also used a horizontal stroke through certain letters to avoid digraphs, replacing the letter <h>, so that instead of <sh, ph, ch, wh, gh> he had <s, p, c, w, h>, respectively, with a stroke through each letter. He also introduced inverted <t> to represent the <th> in 'thin.'

John Wilkins (*see* **Wilkins, John (1614–1672)**), in his *Essay towards a real character* (1668), devised three separate systems of notation (see Figure 2). One of these is Roman based and uses digraphs to supply extra consonant symbols. The letter <h> has a dual role: it is used both to indicate fricatives, as in <ch, gh, th, dh, sh, zh> (for [x ɣ θ ð ʃ ʒ]), and to indicate voiceless forms of nasals and liquids, so that voiced <ng, n, m, 1, r> are paralleled by [voiceless <ngh, nh, mh, lh, rh>. For some of the vowels, Wilkins employed rather poorly designed Greek symbols, though this contradicted one of his stated principles for choosing symbols:

1. They should be the most simple and facil, and yet elegant and comely as to the shape of them.
2. They must be sufficiently distinguished from one another.
3. There should be some kind of suitableness, or correspondency of the figure to the nature and kind of the letters which they express.

Wilkins's third condition refers to a nonarbitrary, or iconic, type of notation (for his other notations, see later, Iconic Alphabets, pre-19th Century).

Figure 1 Symbols devised in 1568 by Sir Thomas Smith, to represent the final sound made when pronouncing the words pith, bathe, and dish.

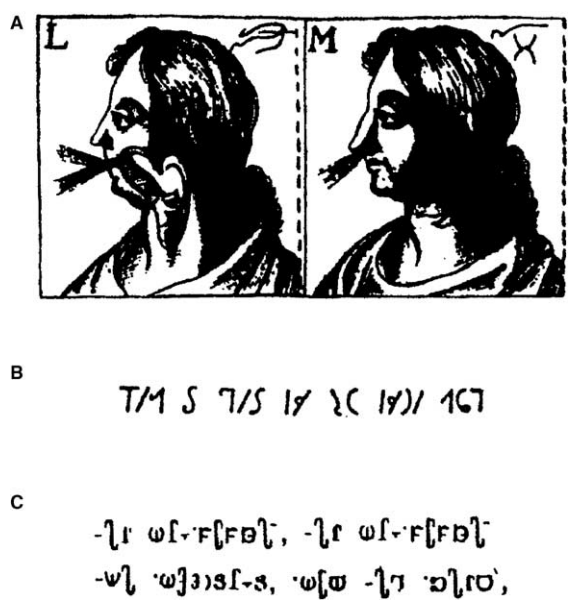

Figure 2 Three non-Roman transcriptions. (A) Iconic representations of the sounds [l] and [m] (John Wilkins, 1668). (B) Syllabic transcription of 'Give us this day our daily bread' (John Wilkins, 1868). (C) Organic alphabet. Transcription of 'I remember. I remember, the roses red and white' (Henry Sweet, 1906).

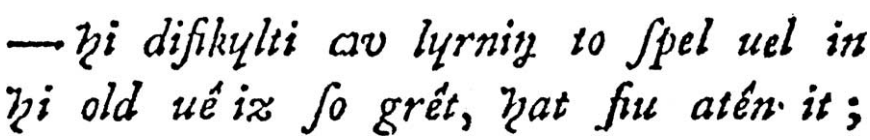
—ȝi difikylti av lyrniȝ to ſpel uel in
ȝi old uê iz ſo grêt, ȝat ſiu atên it;

Figure 3 Excerpt illustrating the extended alphabet devised by Benjamin Franklin in 1768 (published in Franklin's collected works in 1779).

In the 18th century, social reformers aiming to reduce class barriers tried to establish a standard form of pronunciation; to facilitate the spread of literacy, reformed spelling systems were suggested. Thomas Sheridan (*see* **Sheridan, Thomas (1719–1788)**) was one of the first to publish a pronouncing dictionary of English (1780), which gave a respelling to every word, and a similar dictionary was published in 1791 by John Walker (*see* **Walker, John (1732–1807)**). In America, spelling reform led the famous American statesman, scientist, and philosopher, Benjamin Franklin, to put forward a new alphabet in 1768. It was limited to 26 symbols, of which six were newly invented to take the place of the 'ambiguous' letters <c j q w x y>. Some of these new symbols were rather too similar to each other in form to be satisfactory, but the printed font was attractively designed; it was published as part of Franklin's collected works (London, 1779) (see Figure 3).

William Thornton (1759–1828), a Scottish American who traveled and lived in many places but who spent most of his life in the American capital, Washington, also attempted to reform English spelling, and in the longer term to make possible the transcription of unwritten languages. His treatise, entitled *Cadmus, or a treatise on the elements of written language* (1793), won the Magellanic gold medal of the American Philosophical Society. The notation he used was Roman based and introduced some well-designed additional letters, including <ɯ> to replace <w>, <ɾ> to represent the first consonant in 'ship,' and a circle with a dot in the center (⊙, a Gothic symbol) to represent <wh> in 'when.' He aimed to economize by using inverted basic symbols where possible, e.g., <m, ɯ>, <n, u>, <J, ɾ>. Some years later, Thornton used his alphabet to transcribe 288 words in the Miami Indian language. Among admirers of his system were Thomas Jefferson, Alexander von Humboldt, and Count Volney (see later, Volney and the Volney Prize).

The increasing involvement of Europeans with the languages of Asia, Africa, and America, whether as traders, missionaries, travelers, or colonial administrators, emphasized the need for a standard, universal alphabet. One of the first to try to provide a transliteration for Asian languages was the brilliant English oriental scholar and linguist Sir William Jones (*see* **Jones, William, Sir (1746–1794)**). He was a highly skilled phonetician, and during his time as a high court judge in India (1783–1794) saw the need for a consistent way of transcribing languages. His system was presented in *Dissertation on the orthography of Asiatick words in Roman letters* (1788). He thought it unnecessary to provide any detailed account of the speech organs, but gave a short description of the articulations. An ideal solution, he believed, would be to have "a natural character for all articulate sounds . . . by delineating the several organs of speech in the act of articulation" (i.e., an 'organic' alphabet), but for oriental languages he preferred a transliteration. This was partly because of the difficulty of conveying the precise nature of sounds to the nonspecialist, but also because he wished to preserve the orthographical structure, so that the 'grammatical analogy' would not be lost, and there would be no danger of representing "a provincial and inelegant pronunciation." The system was not intended as a universal alphabet; his notation was confined to the letters of the Roman alphabet, supplemented by digraphs and a few diacritics. He chose the vowel symbols on the basis of the values they have in the Italian language, rather than those of English, unlike some other schemes used in India at the time. His alphabet had an influence on nearly all subsequent ideas for the transliteration of oriental languages, at least for the following century. The romanization of these languages became a major concern of missionaries, administrators, educationists, and travelers, though some scholars, and literate members of the communities concerned, were less enthusiastic, believing that something culturally vital would be lost if the native scripts were changed into a different form.

Iconic Alphabets (pre-19th Century)

Two of John Wilkins's systems of notation were iconic. The more elaborate one, which was not intended to be used to transcribe connected speech, consisted of small diagrams of the head and neck, cut away to show the articulatory formation of each sound. Next to each diagram was a simplified symbol relating to the way the sound was formed (see Figure 2A). The second notation assigned each consonant a symbol, which took various forms: straight line, T shape, L shape, or various curve shapes. To this basic shape

Wilkins added a small circle or hook, at the top, middle, or base, to represent one of six vowels. Thus the composite symbol represented a syllable, either vowel + consonant or consonant + vowel. Each category of sound, such as oral stop consonant, fricative, or nasal, had a characteristic shape, as did voiceless and voiced sounds at the same place of articulation. The system was ingenious, but the symbols could easily be confused, and it is unlikely that anyone other than Wilkins actually used it (see **Figure 2B**).

Wilkins's contemporary, Francis Lodwick (*see* **Lodwick, Francis (1619–1694)**), published a similar system in 1686 under the title *An essay towards an universal alphabet*. He stated in his text the important principle that "no one character should have more than one sound, nor any one sound be expressed by more than one character." The notation was a syllabary, using shapes designed to show similarities between the sounds symbolized, which are set out in a table with six places of articulation: bilabial, dental, palatal, velar, labiodental, and alveolar. The top symbol in each column is the voiced stop, and the lower ones are formed by progressive modifications of it. As with Wilkins's system, the vowels are added to the consonant symbols as diacritics.

Another iconic alphabet is to be found in chapter 5 of the *Traité de la formation méchanique des langues*, published in 1765 by the French scholar and magistrate, Charles de Brosses (*see* **Brosses, Charles de (1709–1777)**). The work was intended for scholars researching into languages, rather than for everyday use. Brosses called it 'organic and universal.' It is based on a somewhat idiosyncratic analysis of speech production, which, among other things, assumed that the vowels were sounded at different points on a *corde*, or string, equivalent to the vocal tract tube. Brosses's understanding of speech production is suspect in a number of ways; for example, he classes <s> as a nasal consonant. His first attempt at notation was complex, using symbols that pictured the outline of the different vocal organs (lips, teeth, palate, nose, etc.), but he simplified this subsequently, using symbols made up of curves and straight lines at different angles. The vowel symbols were attached to the consonants to give a syllabic sign, and the notation included composite symbols to represent consonant clusters.

Nineteenth-Century Transcription Systems

Volney and the Volney Prize

The French orientalist, statesman, and reformer, Count Constantin François Volney (*see* **Volney, Constantin-Francois Chasseboeuf, Comte de (1757–1820)**), had been concerned for many years about the difficulties experienced by Europeans in learning oriental languages, and the poor standard of the teaching of these languages. His book, *Simplification des langues orientales* (Paris, 1795), put forward a system for transliterating Arabic, Persian, and Turkish into Roman script, supplemented by a few Greek letters and some newly invented symbols. During a visit to America from 1795 to 1798, he stayed with William Thornton, and while there became acquainted with Sir William Jones's alphabet. He conceived the idea of a universal alphabet, not for scholarly purposes, but to act as a practical tool for travelers, traders, etc. His 1795 system was used with modifications for geographical names on the map of Egypt compiled in 1803 by the French government, but his later *L'Alphabet européen appliqué aux langues asiatiques* (Paris, 1819) provided a fuller system of 60 symbols, mostly Roman, replacing some of his previous, newly invented, symbols with more familiar letters modified by diacritics. However, Volney realized that further research was needed, and his final gesture was to leave 24 000 francs in his will, for a prize to be awarded by the Institut de France to anyone who could devise a suitable 'harmonic alphabet' (to bring harmony out the existing confusion of practices) in Roman script (see Kemp, 1999).

The Volney Prize for the first year (1822) was to be for an essay setting out the necessary conditions for such an alphabet. The prizewinners were both German librarians: Josef Scherer (d. 1829) argued that what was needed was a transcription reflecting pronunciation, rather than a transliteration, whereas A. A. E. Schleiermacher (1787–1858), the co-winner, favored a transliteration, for very much the same reasons as those given by Sir William Jones. Scherer and Schleiermacher submitted detailed transcription systems for the 1823 prize, which was won by Scherer; Schleiermacher's essay was submitted later in a revised form and was published in 1835. He continued to work on his system, and his completed scheme, *Das harmonische oder allgemeine Alphabet zur Transcription fremder Schriftsysteme in lateinische Schrift* (*The harmonic or general alphabet for the transcription of foreign writing systems into Latin script*), was eventually published in Darmstadt, after his death (1864). Together with his new alphabet, this work contained examples of the non-Roman scripts of 10 languages. In all, 275 new characters had to be cast. His notation excluded digraphs and letters from other alphabets, which he felt would be typographically unsuitable, so his main resource was diacritics, both above and below the basic symbols. Some of these were used systematically (e.g., to indicate

TABLEAU DES CONSONNES DE L'ALPHABET HARMONIQUE

Lettres	simples,	variées,	fortes,	mouillées,	aspirées.
Gutturales:	k, q, g, h, ʿ,	ǧ, ḫ, ḫ,	k̲, ĝ, ḫ, ḫ,	k̇, ġ,	ḱ, ǵ.
Palatales:	c̄, ḡ, j̄, s̄,	ć, s̄,		ċ, j̇, ṡ, ṡ,	ć, ǵ.
Sifflantes:	s, z,	s̲, ṣ, z̲, ẓ, ẓ,	ṣ, ẓ, ẓ,	ṡ, ż, ẓ	ẓ́, ẓ́.
Linguales:	t, d,	t̲, ṭ, ṭ, ḍ, ḍ,	ṭ, ḍ, ḍ,	ṫ, ḋ	t́, ṭ́, d́ ḍ́.
Labiales:	p, b, f,	p̄, f̲,		ḃ, ṗ,	ṕ, b́.
Nasales:	n, m,	n̥, n̥, ň, n̲, m̲,		ṅ, ṁ,	
Mêlées:	j̈, r, l, v, x,	r̈, ř, ṛ, l̈, w,	ṛ, ẋ,	ṙ, l̇, v̇,	ṛ́.

Figure 4 Consonant symbols devised by A. A. E. Schleiermacher, as part of his transcription system, originally submitted in 1823 for the Volney Prize; the revised form was published in 1835.

nasality, aspiration, or palatalization), but he admitted that problems of legibility and combinability had often made total consistency impossible. The alphabet was never adopted for wider use (see Figure 4). Further essays on transcription were submitted for the Volney Prize over the next 20 years, but the commission set up to administer the prize deemed none of the essays to have the 'final answer' to the problem.

Shorthand and Spelling Reform

In the 19th century, the most prominent spelling reformer was Sir Isaac Pitman (*see* **Pitman, Isaac, Sir (1813–1897)**). Pitman was of comparatively humble origin, and determined from his early years to further social reform and improve the educational system by developing new alphabets to make spelling easier. His first contribution was to develop a system of shorthand (now world famous), which he published in 1837 as *Phonography*; this work explored the ways in which notation systems can be made to act efficiently in conveying language. Unlike earlier systems, it was based not on English spelling but on the English sound system.

By 1842, Pitman had devised several possible phonetic alphabets, but they still contained elements of his shorthand. In the following year, he came down firmly in favor of using the letters of the Roman alphabet as a basis, and the same year saw the beginning of his connection and cooperation with Alexander J. Ellis (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**). Ellis and Pitman were from very different backgrounds; Ellis had a first in mathematics from Cambridge and a private fortune. He had developed an interest in phonetic notation partly through his attempts to write down dialects he encountered in his travels abroad, but it was only after exposure to Pitman's work that Ellis began to study phonetics seriously. Over the next few years, Pitman's untiring enthusiasm in publicizing the new ideas, and Ellis's knowledge of languages and assiduous research into the background of phonetics and notation systems, resulted in the English phonotypic alphabet of 1847 (see Kelly, 1981). Many of the symbols used were later to form the basis of the alphabet of the International Phonetic Association. The proposed reform of English spelling never materialized, but Ellis's subsequent work on phonetic notation undoubtedly owed much to these early years of collaboration with Pitman.

In America also, proposals for spelling reform continued to appear. In 1858, the president of the Phonetic Society of Great Britain, Sir Walter Trevelyan, proposed a prize for an essay on a reform in the spelling of the English language, which should contain an analysis of sounds and an alphabetic notation containing as few new types as possible. The prizewinning essay, entitled *Analytic orthography* (Philadelphia, 1860), was by Samuel Haldeman (1812–1880), professor of Zoology and Natural History at the University of Pennsylvania, and later professor of Comparative Philology at the same university. Haldeman had a strong linguistic background, notably in Native American languages, and was a good phonetic observer, fully familiar with the work of Sir William Jones and with his contemporaries Lepsius (*see* **Lepsius, Carl Richard (1810–1884)**), Ellis, Pitman, Melville Bell (*see* **Bell, Alexander Melville (1819–1905)**), and Max Müller (*see* **Müller, Friedrich Max (1823–1900)**). Haldeman's notation was based on the Roman alphabet, and the letters used were restricted to the values they had in Latin. He used some diacritics and a few new letters, including some 'broken' letters – that is, Roman forms with part of their strokes missing, not

a satisfactory device. He also attempted to symbolize durational differences by introducing characters of different widths. However, his system had no better success than did others of the time.

Languages of America and Africa

In the early 19th century, most of the languages of Africa and the indigenous languages of America had no writing systems. Pierre Duponceau (*see* **Duponceau, Pierre Etienne (1760–1844)**), a French émigré to the United States, won the Volney Prize in 1838 with his *Mémoire sur le système grammatical des langues de quelques nations indiennes de l'Amérique du Nord*, and had shown in an earlier article ('English phonology,' 1817) a thorough understanding of the principles of a universal alphabet, though he never produced one himself. Under his influence, John Pickering (1777–1846), like Duponceau a lawyer by training, was led to publish his *Essay on a uniform orthography for the Indian languages of North America* (Cambridge, Massachusetts, 1818). Pickering, like Sir William Jones, whose work he admired, used a Roman alphabet supplemented by digraphs and some diacritics, preferring small superscript letters or subscript numerals to dots or hooks, which he felt might accidentally be omitted. This system was designed specifically for Native American languages, not as a universal alphabet.

Many of the missionary societies were concerned at this time to establish a standard transcription system. The Church Missionary Society produced a pamphlet in 1848 entitled *Rules for reducing unwritten languages to alphabetical writing in Roman characters: with reference especially to the languages spoken in Africa*. The rules allowed some flexibility in deciding how detailed the transcription should be, according to its intended use. The notation suggested was Roman based, with a few diacritics and some digraphs. Lewis Grout produced a Roman-based system for Zulu in 1853, on behalf of the American Mission in Port Natal, using the symbols <c, q, x> for the clicks.

Carl Richard Lepsius (1810–1884)

In 1852, the Church Missionary Society (CMS) invited the distinguished German Egyptologist Lepsius to adapt an alphabet that he had devised earlier, to suit the needs of the Society. Lepsius had been interested in writing systems for many years. In 1853, he won the agreement of the Royal Academy of Berlin to fund the cutting and casting of type letters for a new alphabet, to be used as a basis for recording languages with no writing system. In the following year, an Alphabetical Conference was convened in London, on the initiative of the Prussian ambassador in London, Carl Bunsen, who, as a scholar with an interest in philology, wished to explore the possibility of an agreed system for representing all languages in writing. The conference was attended by representatives from the CMS, the Baptist Missionary Society, the Wesleyan Missionary Society, and the Asiatic and Ethnological Societies, and a number of distinguished scholars, including Lepsius and Friedrich Max Müller. In spite of their well-known involvement in the transcription problem, neither Isaac Pitman nor A. J. Ellis was among those included. Four resolutions were passed: (1) the new alphabet must have a physiological basis, (2) it must be limited to the 'typical' sounds employed in human speech, (3) the notation must be rational and consistent and suited to reading and printing and also it should be Roman based, supplemented by various additions, and (4) the resulting alphabet must form a standard "to which any other alphabet is to be referred and from which the distance of each is to be measured."

Lepsius and Max Müller both submitted alphabets for consideration; Müller's *Missionary alphabet,* which used italic type mixed with roman type, was not favored, and Lepsius's extensive use of diacritics had obvious disadvantages for legibility and the availability of types. The conference put off a decision, but later in 1854, the CMS gave its full support to Lepsius's alphabet. A German version of the alphabet appeared in 1854 (*Das allgemeine linguistische Alphabet*), followed in 1855 by the first English edition, entitled *Standard alphabet for reducing unwritten languages and foreign graphic systems to a uniform orthography in European letters*. The Lepsius alphabet had some success in the first few years, but Lepsius was pressed by the CMS to produce a new enlarged edition, which appeared in English in 1863 (printed in Germany, like the first edition, because the types were only available there; see **Figure 5**). The most obvious difference from the first edition was that the collection of alphabets, illustrating the application of Lepsius's standard alphabet to different languages, had been expanded from 19 pages and

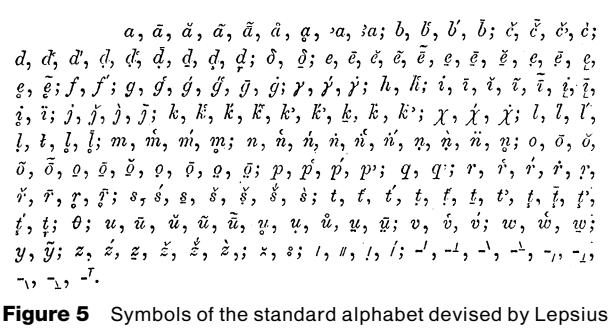

Figure 5 Symbols of the standard alphabet devised by Lepsius in 1863.

54 languages to 222 pages and 117 languages (see Lepsius, 1863).

There was as yet no phoneme theory, but Lepsius was well aware that no alphabet could or should try to convey all of the subtle nuances of speech. His practical aim was to make an intelligible and usable system available to nonspecialists, hence the expansion of the collection of alphabets and the avoidance of a technical description of the physiology of speech. However, Lepsius relied almost entirely on the use of diacritics to supplement the basic Roman symbols. They were used in a consistent way for the most part, and Lepsius foresaw situations in which it would not be necessary to use all of the distinctions provided for, namely, when, in modern terms, a 'broad' transcription would be sufficient. Nevertheless, the profusion of diacritics meant that the printing types were less accessible, and the symbols were less legible and more subject to errors in reproduction. Ellis calculated that on the basis of 31 diacritical marks (17 superscripts and 14 subscripts), Lepsius's alphabet had at least 286 characters, of which at least 200 would have to be cut for every font used.

The alphabet attained a limited success in Africa; the distinguished Africanist Carl Meinhof (*see* **Meinhof, Carl Friedrich Michael (1857–1944)**) and his missionary friend Karl Endemann (1836–1919) gave it their support by using it, with some modifications, in their works on African languages (see Heepe, 1983), and the missionary P. Wilhelm Schmidt adopted it as a basis for his 'Anthropos alphabet' (see later). However, in spite of Lepsius's high international reputation, the support of the Berlin Academy, and the resources of the CMS, the alphabet failed to find an established place.

A. J. Ellis's Later Alphabets

Ellis's *Universal writing and printing with ordinary letters* (Edinburgh, 1856) contained his 'Digraphic' and 'Latinic' alphabets, with examples, hints on practical use, and comparisons with the systems of Lepsius and Max Müller, together with suggestions for a future 'Panethnic' alphabet. The digraphic alphabet, as its name suggests, supplemented the Roman alphabet with digraphs or trigraphs, such as <kh> for [x], <ng> for [ŋ], and <ngj> for [ɲ], with the idea of making its notation accessible to as wide a group of people as possible. It was intended for use in any language, and Ellis supplied an abbreviated form of it for use when detailed precision of description was not necessary. The Latinic alphabet was intended for those wishing "to avoid the cumbersomeness of the Digraphic alphabet," which it did, by employing small capitals and turned letters; for example, [x] is rendered by <ᴋ> and [ŋ] is rendered by <ɴ>.

Probably Ellis's most well-known alphabet is Palaeotype (so-called because it used the 'old types,' without diacritics or non-Roman symbols, and with relatively few turned letters). Palaeotype was for scientific, not popular, use, and Ellis employed it in his monumental work *On early English pronunciation* (EEP) (1869–1889). There were about 250 separate symbols, the greatest number being digraphs or trigraphs, but with some italics, small capitals, and (very few) turned letters. Certain letters were used as diacritical signs – for instance <j> is used to indicate palatality, as in <lj> for [ʎ]. There were also non-alphabetic signs for features such as ingressive airstreams, tones, and stress. Ellis provided a reduced form of his alphabet, known as 'Approximative Palaeotype,' which contained about 46 separate symbols. The full alphabet was, he believed, "in all probability the most complete scheme which has yet been published," but he foresaw the need to supplement it to accommodate sounds from languages not yet phonetically studied.

In the third volume of EEP (1871), Ellis published the 'Glossic' alphabet, a simplified form of transcription for English, based on symbols used in normal English orthography. He intended it as a new system of spelling, to be used concurrently with the existing English orthography. In answer to objections that it would be too sweeping a change, Ellis produced a revised form in 1880 called 'Dimid-iun,' but this received even less support. None of these alphabets was destined to have any lasting success, but in the process of devising them Ellis laid a foundation for the development of phonetics as a discipline in Britain, and more particularly for the study and recording of English dialects.

Germany: Physiology and New Alphabets

In Germany, several schemes for a new alphabet were proposed by scholars who approached phonetics from a physiological rather than a linguistic angle. Karl Rapp (1803–1883), in *Versuch einer Physiologie der Sprache* (1836), used a Roman alphabet, supplemented by some letters taken from the Old English and Greek alphabets and a few diacritics. Ellis, writing in the 1840s, frequently paid tribute to Rapp's work. Ernst Brücke (*see* **Brücke, Ernst (1819–1891)**), in his *Grundzüge der Physiologie* (1856), also put forward a Roman-based alphabet, supplemented by some Greek letters and by superscript numerals used as diacritics. For example, <tl> represented alveolar [t], <t^2> represented retroflex [ʈ], and so on. Brücke later (*Über eine neue Methode der phonetischen Transscription*, 1863) developed an iconic non-Roman alphabet, in which the consonant symbols were based on articulations but the vowel symbols

were based on acoustic resonances. The consonant symbols occupy one or more of three vertically aligned areas and are made up of two basic parts, one showing place of articulation and the other manner of articulation. A further part is particularly interesting in its attempt to indicate states of the glottis other than 'vibrating' – open, narrowed, closed, creaky, and what Brücke called 'hard resonance' and 'soft resonance.' The vowels occupy only the middle of the three areas, so that they stand out clearly. Diacritics are provided to indicate accent, duration, and types of juncture. Carl Merkel (1812–1876) also devised a non-Roman alphabet (*Anatomie und Physiologie des menschlichen Stimm-und Sprachorgans*, 1857; revised edition, 1866), but, like Brücke's alphabet, it is extremely difficult to read, and neither system attained any success. Both Brücke and Merkel were familiar with only a small range of languages and were concerned primarily to show the total capacities of the human vocal organs in the production of sounds.

Moritz Thausing (1838–1884), in *Das natiirliche Lautsystem der menschlichen Sprache* (1863), based his system on a *Naturlaut* 'natural sound' represented by the vowel <a>, and 21 other sounds, which diverged from <a> in three different directions (seven on each path), like a three-sided pyramid. His notation used a musical staff of four lines and three spaces, thus accommodating the seven grades of sounds as notes on the staff. Each of the three sets of seven had a special note shape to distinguish it. Intermediate sounds were shown by modifiers. Thausing believed this was preferable to Brücke's scheme in that the symbols were not iconic, and so could be used for sounds for which formation was not fully understood.

Felix Du Bois Reymond (1782–1865) was stimulated by the schemes put forward by Brücke and Lepsius to complete a scheme of his own *(Kadmus*, 1862), which he had sketched out earlier. It was Roman based, but, unusually, attempted to combine this with an iconic approach. So, for instance, all the voiceless consonants had symbols that extend below the 'middle area' (*mittlere Bahn*), unlike the voiced ones: <p> and <b> already conform to this principle, and to continue it, Reymond proposed, for example, that the symbol <q> should replace <t> as the voiceless equivalent of <d>. Like Brücke, he confined the vowel symbols to the 'middle area.' In spite of a good phonetic basis outlined in his book, the scheme failed to become established.

Bell's Visible Speech

Alexander Melville Bell was the son of an elocution teacher, and in due course became his father's principal assistant. Between the years 1843 and 1870, he lectured in the universities of Edinburgh and London, after which he emigrated to Canada and continued his teaching there. In 1864, he gave public demonstrations of his new scheme for recording speech in writing, and in 1867 the system was published under the title *Visible speech, the science of universal alphabetics*. It was not (at least avowedly) intended to be a new spelling system, but rather to assist children in learning to read, and to provide "a sound bridge from language to language." Bell was unsuccessful in attempts to persuade the British government to give him funds to support the system, but continued to use it for his own purpose in teaching, and claimed that it was "perfect for all its purposes." The symbols he used were iconic, intended to signify the vocal organs involved in the production of the sound concerned. For instance, the open vocal cords are shown by <O>, which represents [h]. The consonant symbols are based on a sagittal diagram of the head facing right. The shape <C> represents a continuant (shown by the fact that there is a gap to the right) with a constriction at the back (i.e., [x]), whereas <Ↄ> represents a constriction at the front of the vocal tract, namely [ÿ]. The same symbol with the gap facing upward represents dental [θ], and with the gap facing downward, palatal [ç]. The remaining consonant symbols have similar iconic relationships, with modifiers to show complete closure (a bar across the gap), nasality (a different bar), voicing, etc. The vowel symbols are based on a vertical line, with hooks at the top (close vowels), bottom (open vowels), or both (mid vowels), facing left for back vowels, right for front vowels, and in both directions for the so-called 'mixed' or central vowels. Rounding is shown by a horizontal bar through the middle.

Ellis, writing just before the full publication of *Visible speech,* admitted that his Palaeotype was "far less complete" than Bell's scheme. "However, that alphabet," he said, "requires new types, which is always an inconvenience, though I believe that an entirely new system of letters, such as that of Mr. Bell, is indispensable for a complete solution of the problem." He pointed out also that many potential users "are ill-qualified, without special training, to use a very refined instrument." Iconic notations are certainly subject to the criticism that they may not be able to accommodate new sounds or new descriptive frameworks, and can never convey the exact nature of the sound symbolized. Bell's symbols were much better in design than most alphabets of this kind are, but he faced the immense task of persuading people to adopt a system that looked very different from what they were used to seeing. The alphabet failed to find supporters outside the circle of his pupils.

Sweet's Romic and Organic Alphabets

Henry Sweet (*see* **Sweet, Henry (1845–1912)**), perhaps the greatest of 19th-century phoneticians, studied under Bell, and his *Handbook of phonetics* (1877) was intended to be an exposition and development of Bell's work, but in this book he used a Roman-based notation (influenced by Ellis's Palaeotype), which he called 'romic,' distinguishing two varieties of it. 'Broad romic,' his 'practical' notation, intended to record only 'fundamental distinctions,' corresponding to distinctions of meaning (i.e., phonemes, in modern terms), was confined to symbols with their original Roman values supplemented by digraphs and turned letters. 'Narrow romic' was to be a 'scientific' notation and provided extra symbols, notably for the vowels, for which Sweet used italics, diacritic <h>, and, further, turned letters. However, in 1880, he took over Bell's notation, which he regarded as "an improvement on any possible modification of the Roman alphabet" for scientific purposes. He modified it and added some symbols, to form an 'organic alphabet,' which he used in his *Primer of phonetics* (1890) and in some other works (see Figure 2). At this stage, Sweet felt that, even for more practical purposes, the necessity to supplement the Roman alphabet with other devices (in particular, diacritics and new letters, which he strongly opposed) made it cumbersome and inefficient. Toward the end of his life, however, he emphasized that uniformity in notation was not necessarily a desirable thing "while the foundations of phonetics are still under discussion," and accepted that the unfamiliarity of organic types might be too formidable an obstacle to overcome. He continued to use his romic alphabet as an alternative to the organic one, and broad romic formed the basis for the new alphabet of the International Phonetic Association (see later). Sweet's organic alphabet did not enjoy a long life, nor indeed did the idea of iconic alphabets, even though Daniel Jones and Paul Passy (*see* **Passy, Paul Edouard (1859–1940)**) thought it worthwhile to propose another such scheme in *Le maître phonétique* (1907).

Analphabetic Schemes

'Analphabetic' notations use symbols that represent the subcomponents of a segment, rather like chemical formulas. One early example of such a scheme was proposed by the Dutch writer Lambert ten Kate (*see* **Kate Hermansz, Lambert ten (1674–1731)**) in 1723, and another by Charles Darwin's grandfather, Erasmus Darwin, in 1803. Thomas Wright Hill (1763–1851), a schoolmaster in Birmingham who had a keen ear, though his knowledge of sounds was self-taught, devised a notation in which each place of articulation was allotted a number. The interaction of active and passive articulators was expressed in terms of numerator (passive) and denominator (active); for example, a bilabial articulation is 1 (upper lip) over 1 (lower lip), a labiodental is 2 (upper teeth) over 1, a dental is 2 over 3 (tongue tip), and so on. The degree of stricture and state of the glottis were shown by the shape of the line between the numbers, and vowels were indicated by the use of double lines instead of a single one. It is easier, however, to typeset symbols that are in horizontal sequence. Otto Jespersen (*see* **Jespersen, Otto (1860–1943)**) included his analphabetic (later called antalphabetic) alphabet in *The articulations of speech sounds* (1889). It used a combination of Roman letters, Greek letters, numerals, italics, heavy type, and subscript and superscript letters. The Greek letters represented the active articulators involved – lower lip (α), tongue tip (β), tongue body (γ), velum and uvula (δ), vocal cords (ε), and respiratory organs (ζ). The numerals following the Greek letter showed the relative stricture taken up by the articulators and the Roman letters referred to the passive articulators. For example, the combination $\beta 1^{fe}\delta 0\varepsilon 3$ would represent one kind of [s] (β = tongue tip, 1 = close stricture, fe = in the area of alveolar ridge/hard palate, δ0 = velic closure, ε3 = open vocal cords). It was not intended for use in a continuous transcription (though Jespersen showed how this is possible in a matrix form), but served as a descriptive label for the segment concerned (cf. modern feature notations).

Friedrich Techmer had proposed an analphabetic scheme in his *Phonetik* (1880). It employed five horizontal lines that, together with the spaces in between them, showed the major places of articulation. Musical-type notes were then inserted to show the manners of articulation. It was designed essentially as a scientific notation for Techmer's own use and never achieved widespread adoption. His Roman-based alternative, published in the *Internationale Zeitschrift für allgemeine Sprachwissenschaft* (in 1884 and in 1888), was a highly detailed and systematic scheme, making use of a basic italic typeface, both uppercase and lowercase, with various diacritics either directly beneath or to the right of the main symbol. Johan Storm (*see* **Storm, Johan (1836–1920)**) judged it to be the best of the German systems of notation, and it was the basis for Setälä's 1901 transcription for Finno-Ugric languages (see Laziczius, 1966).

Kenneth Pike (*see* **Pike, Kenneth Lee (1912–2000)**), in his classic book *Phonetics* (1943), outlined an even more detailed analphabetic notation, called 'functional analphabetic symbolism.' It was composed of roman and italic letters in uppercase and lowercase, and was intended to illustrate the complexity of sound formation and to expose the many assumptions

that lie behind the customary short labels used to refer to sounds. The segment [t] is represented by the notation *M*aIlDeCVveIcAP*pa*a*t* *d*tl*t*n*r*ansfs*Si*F*Ss; the italic symbols give the broad headings of the mechanisms involved and the roman letters give subclassifications. Even this degree of complexity, Pike says, is "suggestive but by no means exhaustive."

Dialect Alphabets

Various special alphabets have been created for the transcription of particular dialects (see further in Heepe (1983)). J. A. Lundell was commissioned while a student at Uppsala to produce an alphabet for Swedish. The resulting *Swedish dialect alphabet* was first published in 1879 and has been widely used since then, not only for Swedish. The basic font is italic, which Lundell thought most suitable for cursive writing as well as for printing, and he supplemented the letters of the Roman alphabet almost entirely by employing new letter shapes, mostly formed by adding loops or hooks to the basic symbols. They retain some iconic character through a consistent use of a particular hook, etc. for one place of articulation. Lundell rejected the use of different fonts and of capital letters to make distinctions, and also avoided unattached diacritics, except those for suprasegmental features. Sweet was critical of Lundell's scheme, mainly on the grounds of the complex letter shapes and the consequent expense of casting the many new types required, but Storm, in correspondence with Sweet, expressed a much higher opinion of it, particularly the systematic character of the letter shapes used for consonants. Some of the vowel symbols are easily confused and would require extreme care in handwritten texts.

Jespersen produced a dialect alphabet for Danish, first published in the periodical *Dania* in 1890, and later used in the Danish pronouncing dictionary. It follows the 'broad' principle, employing phonetic symbols without diacritics to represent the Danish sounds. Its reversal of the values assigned to <a> and <ɑ> in the IPA alphabet is a source of possible confusion.

The Alphabet of the International Phonetic Association

L'Association Phonétique Internationale, founded in 1897, grew out of two previous organizations: The Phonetic Teachers' Association, founded in Paris in 1886, and L'Association Phonétique des Professeurs de Langues Vivantes, which replaced it in 1889. The first version of the IPA alphabet, based on Pitman's alphabet of 1847 (as revised in 1876) and on Sweet's broad romic, appeared in 1888. From the beginning, the emphasis was on practical use for language teaching. Consequently, the symbols were chosen with a view to clarity, familiarity, and economy. The published IPA principles stipulated that "there should be a separate sign for each distinctive sound; that is for each sound which, being used instead of another in the language, can change the meaning of a word" (i.e., for each phoneme). The symbols were to be letters of the Roman alphabet as far as possible, with values determined by international usage, and when "very similar shades of sound" were to be found in several languages, the same sign was to be used. The use of diacritics was to be avoided, except for representing "shades of varieties of the typical sounds," because of the problem they presented for reading and writing. It was also stipulated that, when possible, the shape of new symbols should "be suggestive of the sound they represent, by their resemblance to the old ones." For example, the basic <n> shape was retained for the palatal, retroflex, velar, and uvular nasals [ɲ, ɳ, ŋ, ɴ].

Over the years, the alphabet has been modified for use as a general phonetic resource, to make detailed phonetic transcriptions and comparisons of language sounds. Diacritics have been accepted as admissible for certain limited purposes. A thorough reappraisal of it has been made (much of it reflected in articles in the *Journal of the International Phonetic Association* (1986–1989)). Since the Kiel Convention in 1989, additions and amendments have been made to the symbols and to their presentation in chart form (see Figure 6).

The IPA principles have been amended in certain respects, notably to make it clear that IPA symbols should not be seen simply as representations of sounds, but as "shorthand ways of designating certain intersections of . . . a set of phonetic categories which describe how each sound is made." However, it is still stated that "the sounds that are represented by the symbols are primarily those that serve to distinguish one word from another in a language." Two important developments, as a result of working groups set up following the Kiel Convention, are a complete computer coding of IPA symbols and an extension of the IPA alphabet to include disordered speech and voice quality (see MacMahon, 1986; Albright, 1958; International Phonetic Association, 1999: Appendices 2 and 3).

Twentieth-Century and Later Developments

The 'Anthropos Alphabet' of P. W. Schmidt

The alphabet of P. W. Schmidt was first published in the periodical *Anthropos* in 1907, and was revised

THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993, updated 1996)

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap				ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks		Voiced implosives		Ejectives	
ʘ	Bilabial	ɓ	Bilabial	ʼ	Examples:
ǀ	Dental	ɗ	Dental/alveolar	pʼ	Bilabial
ǃ	(Post)alveolar	ʃ	Palatal	tʼ	Dental/alveolar
ǂ	Palatoalveolar	ɠ	Velar	kʼ	Velar
ǁ	Alveolar lateral	ʛ	Uvular	sʼ	Alveolar fricative

VOWELS

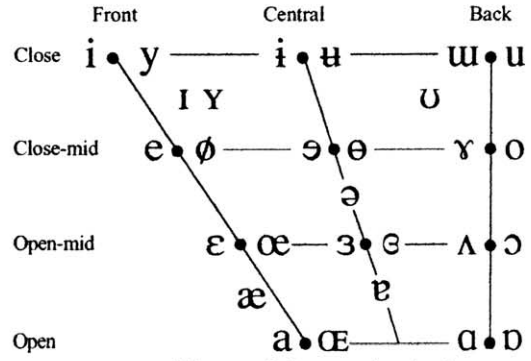

Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

- ʍ Voiceless labial-velar fricative
- w Voiced labial-velar approximant
- ɥ Voiced labial-palatal approximant
- ʜ Voiceless epiglottal fricative
- ʢ Voiced epiglottal fricative
- ʡ Epiglottal plosive
- ɕ ʑ Alveolo-palatal fricatives
- ɺ Alveolar lateral flap
- ɧ Simultaneous ʃ and x

Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary. k͡p t͡s

SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress ˌfoʊnəˈtɪʃən
- ː Long eː
- ˑ Half-long eˑ
- ̆ Extra-short ĕ
- | Minor (foot) group
- ‖ Major (intonation) group
- . Syllable break ɹi.ækt
- ‿ Linking (absence of a break)

DIACRITICS

Diacritics may be placed above a symbol with a descender, e.g. ŋ̊

̥	Voiceless	n̥ d̥	̤	Breathy voiced	b̤ a̤	̪	Dental	t̪ d̪
̬	Voiced	s̬ t̬	̰	Creaky voiced	b̰ a̰	̺	Apical	t̺ d̺
ʰ	Aspirated	tʰ dʰ	̼	Linguolabial	t̼ d̼	̻	Laminal	t̻ d̻
̹	More rounded	ɔ̹	ʷ	Labialized	tʷ dʷ	̃	Nasalized	ẽ
̜	Less rounded	ɔ̜	ʲ	Palatalized	tʲ dʲ	ⁿ	Nasal release	dⁿ
̟	Advanced	u̟	ˠ	Velarized	tˠ dˠ	ˡ	Lateral release	dˡ
̠	Retracted	e̠	ˤ	Pharyngealized	tˤ dˤ	̚	No audible release	d̚
̈	Centralized	ë	̴	Velarized or pharyngealized	ɫ			
̽	Mid-centralized	e̽	̝	Raised	e̝	(ɹ̝ = voiced alveolar fricative)		
̩	Syllabic	n̩	̞	Lowered	e̞	(β̞ = voiced bilabial approximant)		
̯	Non-syllabic	e̯	̘	Advanced Tongue Root	e̘			
˞	Rhoticity	ə˞ a˞	̙	Retracted Tongue Root	e̙			

TONES AND WORD ACCENTS

LEVEL			CONTOUR		
ȅ or ˥	Extra high		e᷄ or ˧˥	Rising	
é ˦	High		ê ˥˩	Falling	
ē ˧	Mid		e᷅ ˩˥	High rising	
è ˨	Low		e᷄ ˩˩	Low rising	
ȅ ˩	Extra low		ě ˧˩˧	Rising-falling	
↓	Downstep		↗	Global rise	
↑	Upstep		↘	Global fall	

in 1924. Schmidt kept most of Lepsius's symbols, adding some diacritics to distinguish sounds left undifferentiated by Lepsius, but introduced the IPA symbols <æ>, <œ> (and turned versions of them) and <ɯ>, mostly to replace symbols with diacritics. For the consonants, to give some examples, <ʒ̟> and <z̟> are used for the dental fricatives instead of Lepsius's <θ> and <δ>, and in Schmidt's revised edition the inverted forms of <t>, <c>, and <k> replaced Lepsius's click symbols </>, <//>, and <!>. Interestingly, the 1989 revision of the IPA alphabet adopted Lepsius's click symbols (slightly modified).

Native American Languages

In 1916, the Smithsonian Institution published a pamphlet entitled *Phonetic transcription of Indian languages,* embodying the report of the committee of the American Anthropological Association, consisting of Franz Boas (*see* **Boas, Franz (1858–1942)**), P. E. Goddard, Edward Sapir (*see* **Sapir, Edward (1884–1939)**), and A. L. Kroeber (*see* **Kroeber, Alfred Louis (1876–1960)**). The report took as a basis the alphabet used by J. W. Powell in *Contributions to North American ethnology* (vol. 3, 1877). In 15 pages, the pamphlet sets out general principles of transcription and rules for both a simpler and a more complete system. The principles closely resemble those of the IPA, concerning the use of the same symbol when the same sound occurs, the restrictions on the use of diacritics, the harmonizing of fonts, and the use of symbols for sound values like those that they customarily stand for. The simpler system is suggested for "ordinary purposes of recording and printing texts," and the complete system is for the recording and discussing of complex and varied phonetic phenomena by specialists in phonetics. The full system of vowels is based on Sweet's 36-vowel system (excluding the 'shifted' vowels of his final system). Sweet's 'wide' vowels are normally shown by Greek letters, and 'narrow' ones by Roman letters. The consonant symbols and prosodic marks are not very different from those of the IPA; some exceptions are that small capitals are used for voiceless liquids and nasals, and also for stops and fricatives said to be 'intermediate' between surd (voiceless) and sonant (voiced). These include unaspirated voiceless stops. The total system is a sophisticated one, providing both a high degree of precision in transcribing the detailed features of Native American languages and a satisfactory, simple form for nonspecialists.

Jörgen Forchhammer's *Weltlautschrift* (World Sound Notation)

Forchhammer's 'World sound notation' was published in *Die Grundlage der Phonetik* (Heidelberg, 1924). It comprises a basic set of 44 *Lautgruppen* (sound groups, made up of 13 vowels and 31 consonants), each comprising a set of sounds that can be represented by the same letter. The nuances within each group can be shown by the wide range of diacritics, which include subscript numerals to indicate successive points of tongue contact along the palate. Of the 44 basic symbols, 36 are identical with IPA symbols, but the diacritics are mostly different (see also Heepe, 1983).

The Copenhagen Conference

In April, 1925, a conference was held in Copenhagen, convened by Otto Jespersen and attended by an international group of 12 specialists in different language groups, to try to establish a norm for a universal phonetic script. Their proposals, published in 1926 in *Phonetic transcription and transliteration*, were reprinted in 1983 (Heepe, 1983). The Copenhagen group firmly rejected the possibility of further iconic alphabets and approved the notion of 'broad' transcriptions based on the phoneme. Their detailed proposals for symbols were given a somewhat cool reception by the Council of the IPA (as reported in *Le Maître Phonétique* in 1927), but the following protocols were accepted:

1. [φ β] for the bilabial fricatives (instead of [F υ])
2. [ω] for labialization
3. [ʈ ɖ ɳ ɭ ʈ ʂ] for the retroflex series (following Lundell)
4. a raised period [˙] to show length
5. vertical stress marks ['] and [ˌ] instead of the oblique [´].

Other proposals (rejected or previously adopted by the IPA) included a reversed comma below the letter for nasalization; a new diacritic for palatals; [δ] for the voiced dental fricative; [x ɣ] for velar fricatives; [ᴋ ɢ ɴ ʀ ʟ] for uvular stops, nasal, trill, and lateral and [X Γ] for uvular fricatives; [ˀ] for glottal stop; and [ᐞ] as a diacritic for clicks. Among the suggestions for the vowels were abandoning the use of [a] and [ɑ] to signify different vowels, use of superscript [˙] for central vowels, and umlaut for front rounded vowels, e.g., [ü ö].

Figure 6 The most current symbol chart of the International Phonetic Association. Reprinted from the International Phonetic Association (1999) (the Department of Theoretical and Applied Linguistics, School of English, Aristotle University of Thessaloniki, Thessaloniki, Greece), with permission.

Machine-Readable Transcriptions

One major consideration in recent years has been the choice of symbols to represent speech in computer systems. The need to have symbols that are available on normal keyboards has led to various systems of machine-readable phonetic alphabets. The most easily available method of supplementing a lowercase Roman alphabet is the use of uppercase, and there is a fair amount of agreement among different schemes in allocating uppercase symbols to IPA symbols. Another area of common ground is the use of <@> for a central schwa-type vowel, and numerals that resemble phonetic symbols, such as <3> standing for [ɜ]. The machine-readable Speech Assessment Methods Phonetic Alphabet (SAMPA), developed in 1987 and 1989 by an international group of phoneticians, is capable of dealing with the transcription of a wide range of languages (see further in Wells (1997); *see also* **Phonetic Transcription: Analysis**).

See also: International Phonetic Association; Bell, Alexander Melville (1819–1905); Boas, Franz (1858–1942); Brosses, Charles de (1709–1777); Brücke, Ernst (1819–1891); Bullokar, William (c. 1531–1609); Duponceau, Pierre Etienne (1760–1844); Ellis, Alexander John (né Sharpe) (1814–1890); Firthian Phonology; Hart, John (?1501-1574); Jespersen, Otto (1860–1943); Jones, William, Sir (1746–1794); Kate Hermansz, Lambert ten (1674–1731); Kroeber, Alfred Louis (1876–1960); Lepsius, Carl Richard (1810–1884); Lodwick, Francis (1619–1694); Meigret, Louis (?1500-1558); Meinhof, Carl Friedrich Michael (1857–1944); Müller, Friedrich Max (1823–1900); Passy, Paul Edouard (1859–1940); Phonetic Transcription: Analysis; Pike, Kenneth Lee (1912–2000); Pitman, Isaac, Sir (1813–1897); Sanctius, Franciscus (1523–1600); Sapir, Edward (1884–1939); Steele, Joshua (1700–1791); Storm, Johan (1836–1920); Sweet, Henry (1845–1912); Volney, Constantin-Francois Chasseboeuf, Comte de (1757–1820); Walker, John (1732–1807); Wilkins, John (1614–1672).

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Phonetically Motivated Word Formation

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Tacit Knowledge about Phonetics in Morphology

Speakers of a language have a wealth of tacit knowledge about phonetics that underlies some of the morphological processes that they use. For instance, in English, monosyllabic words are subject to a constraint that if they contain a long vowel or diphthong that is followed by two coda consonants or, alternatively, if they contain a short vowel followed by three coda consonants, the final consonant must be coronal (e.g., [t, d, s]) (Table 1). Coronals are special.

Due to their special phonological status, coronals (/-s, z/ and /t-d/) are the only consonants that are used in English suffixes (e.g., plural, past tense).

Phonological conditioning of allomorphs is a well-known phenomenon that highlights the interplay between morphology and sound structure. In regular English inflectional morphology, for example, the suffix need only be coronal, but it must also agree in voicing with the final sound of the stem. The choice of the suffix (/-s, z/ or /–t-d/) depends on whether the last sound of the base is voiceless, as in *bucks* [bʌk-s] and *clocked* [klɒk-t], or voiced, as in *bugs* [bʌg-z] and *clogged* [klɒg-d].

Syllables and Allomorphy

It is not just the attributes of individual sounds that are relevant. In many languages, the choice of allomorph may be conditioned by the number of syllables in the base. For instance, in English the comparative and superlative degree suffixes degree *–er* and *-est* suffix are conditioned by the number of syllables in the base. Either suffix is automatically attached to monosyllabic words (cf. *taller*, *saddest*) and may attach to disyllabic words if the second syllable ends in a weak sound like [ɨ], [I], [ə], or [əʊ] (e.g., *gentler*, *sunniest*, *safer*, and *narrowest*). Acceptability of disyllabic adjectives with a stronger second syllable is variable. Whereas *commoner* may be acceptable, **certainer* is not. However, if the base exceeds two syllables, *–er* and *–est* are ruled out. *More* and *most* are obligatory (e.g., *more intelligent* and *most beautiful*, not **intelligenter* and **beautifulest*).

The structure of syllables can also condition allomorphy. Consider the two allomorphs of the genitive in the Australian language Djabugay (Patz, 1991):

(1a) /-n/ following a base ending on a vowel
e.g., *guludu* 'dove' Genitive *guludun*

(1b) –ŋun/ after a base ending in a consonant
e.g., gaɲal 'goanna' Genitive gaɲal-ŋun

Kager (1996: 155) showed that the choice of the allomorph is partially predictable from the syllable structure of the base and from the way it is syllabified once the suffix is appended. Because Djabugay disallows syllables that end in a consonant cluster, allomorphy is not allowed to deliver impermissible syllables that have a consonant cluster in the coda. Hence, the single consonant allomorph /-n/ never attaches to a base ending in a consonant:

(2)	/-n/	gu.lu. dun	*ga.ɲal.n
	/ŋun/	(ʔgu.lu.du.ŋun/	ga.ɲal.ŋun

Phonetic Similarity

Phonetic attributes of not just individual syllables but also entire words may be important. That is the case when a language has vowel harmony, a process of vowel harmony whereby within the word vowels are required to share certain phonetic traits. The vowels of the language are divided into two sets and, within the relevant domain, all vowels must be front or back, round or unround, high or non-high, etc.

A good example of a language with vowel harmony is Turkish, which has eight vowels divided in two sets as shown in Table 2.

Vowel harmony goes from left to right, and it requires all vowels to agree with the first stem vowel in backness; in addition, where the first vowel is high, they must also agree with it in roundness.

Table 1 Privileged nature of coronal consonants

Long vowel or diphthong + CC[+coronal]		*Short vowel + CCC[+coronal]*	
blind, dined	*blink [blaɪŋk] etc.	text, vexed	*texk [teksk] etc.
fiend,cleaned	*fiemp, etc.	blocked, clocked	*blockek
Gould,cooled	*Goulg, coolep, etc.	waxed, axed	*waxep

Table 2 Turkish vowels

	Front		*Back*	
	Unround	*Round*	*Unround*	*Round*
High	i	y	ɨ	u
Non-high	e	ø	a	o

Table 3 Turkish vowel harmony

Noun stem	*Singular*	*Plural*	*Genitive plural*
adam 'man'	adam-ɨn	adam-lar	adam-lar-ɨn
ev 'house'	ev-ɨn	ev-ler	ev-ler-in
kol 'arm'	kol-un	kol-lar	kol-lar-ɨn
gøz 'eye'	gøz-yn	gøz-ler	gøz-ler-in
iʂ 'work'	iʂ-in	iʂ-ler	iʂ-ler-in
kɨz 'girl'	kɨz-ɨn	kɨz-lar	kɨz-lar-ɨn
pul 'stamp'	pul-un	pul-lar	pul-lar-ɨin

As seen in Table 3, if several suffixes follow a stem, all the suffix vowels harmonize with the root vowel.

However, things do not always work so smoothly. There is disharmony on occasion. Consider the following examples from Rocca and Johnson (1995: 155):

(3a) iki 'two'
aktɯ 'six'
yedi 'seven'
sekiz 'eight'

(3b) ikiɣen 'two-dimensional'
aktɯgen 'hexagonal'
yedigen 'heptagonal'
sekizgen 'octagonal'

The expected backness harmony does not materialize. Regardless of the nature of the root vowel, the suffix-*gen* contains the front vowel /e/.

Avoidance of Phonetic Similarity

Morphology may also be driven by the opposite concern: avoidance of similarity. The null hypothesis that consonants freely co-occur in roots is not always borne out. A classic case of this is Arabic, which normally bars verbal roots with homorganic consonants (Greenberg, 1950). In current theories of phonology, this is accounted for by invoking an OCP-Place constraint (i.e., Obligatory Contour Principle regulating Place), which prohibits consonants with the same place of articulation from occurring in the same verb root (McCarthy, 1979).

The canonical verb root in Arabic is CCC. Vowels are added and consonants may be geminated in various parts of the paradigm.

(4) kataba 'he wrote'
kattaba 'he caused to write'
kaataba 'he corresponded'
kutiba 'it was written'

There exist also roots with just two distinct consonants (e.g., *zr* 'pull'). According to McCarthy (1979), Arabic enforces the OCP:

(5) OCP: Identical adjacent consonants are prohibited.

Enforcement of the OCP means that words such as **qaqata* and **zazara*, whose first two consonants are identical, and hence violate the OCP, are not allowed.

If the root has only two consonants to associate with a template that has three positions, it is always the last two consonants that are identical. This must be due to the spreading of the second consonant to the third C position.

(6)
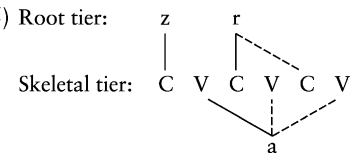

Such forms do not violate the OCP since there is just one consonant at the root tier.

Some treatments of these data in the OT framework have regarded forms such as *zarara* as violations of the OCP that are tolerated by the language because they are incurred in the context of endeavoring to satisfy a higher ranked constraint (Rose, 2000). A proposal by Frisch *et al.* (2004) dealt with the problem using the notion of similarity avoidance. The strength of the OCP-Place constraint is determined by establishing the ratio of the actual number of examples subject to the OCP effect and comparing it to the expected number if the distribution were random. It is shown that the potency of the OCP effect is a function of the phonetic similarity between consonant pairs. For instance, Arabic triconsonantal roots of the /d t C/ type (where C = any consonant) are not attested although numerous roots start with /d/ and although /t/ is a very common second consonant in triconsonantal roots. This is attributed to the pressure to conform to the OCP by avoiding near identical consonants that only differ with respect to one parameter, namely voicing, from being next to each other. In the dictionary that the study was based on there were a mere two roots with /d s C/. The near absence of such roots is again attributed to their similarity. In contrast, /d g C/ roots, which show greater phonetic distance, are more common. This suggests that the OCP is sensitive to phonetic similarity. The greater the degree of similarity, the more zealously it is observed.

Blocking

Even in a language such as English that has no general co-occurrence restrictions on consonants, there is not always total freedom. For instance, blocking of an otherwise quite general rule can be observed in the behavior of the suffix *–en*, which forms inchoative verbs from adjectives. Halle (1973) pointed out that this suffix can only be added if the base is monosyllabic and ends in an obstruent. Both conditions are

met by the forms in (7a) but not by those in (7b), which are hence ill-formed:

(7a) blacken
soften
toughen
harden

(7b) *bluen
*greenen
*comforten
*flexiblen

Licensing

Words display phonotactic patterns that are a consequence of constraints on syllabification. According to Itô (1988), syllabification can be viewed as a case of template matching. Segments that are not matched with a slot in the syllable template are unlicensed and hence fail to appear in the surface representation. This may result in allomorphy. Consider the example from the Australian language Lardil in (8), analyzed in Kenstowicz (1994):

(8a)

pir.ŋen	'woman'	wa.ŋal	'boomerang'
rel.ka	'head'	wu.lun	'fruit species'
kar.mu	'bone'	ma.yar	'rainbow'
kan.tu	'blood'	yaR.put	'snake, bird'
kuŋ.ka	'groin'	ŋam.pit	'humpy'

(8b) *[-coron] (unless followed by a homorganic consonant)
|
N'

As seen, Lardil has a CVC syllable template and there is a requirement that only coronal consonants may occur in coda position. Labial and velar consonants are not licensed to appear in coda position unless they are followed by a homorganic consonant. To conform to the requirement in (8b), the allomorph ending in CV appears in the absolute form, whereas the one with a final /k/ is found in the inflected form, where it does not violate (8b) since the velar is reanalyzed as a syllable onset:

(9)

absolute	inflected	
ŋal1	ŋaluk-in	'story'
thurara	thuraraŋ-in	'shark'

The privileged status of coronals observed here that licenses them to appear in coda position is reminiscent of their special status in English, which was observed in Table 1.

Prosodic Morphology

More interesting still are phenomena such as reduplication and root-pattern morphology, where morphology is subject to prosodic circumscription (McCarthy and Prince, 1990, 1995). These phenomena have been investigated using prosodic morphology, a theory that is reliant on the prosodic hierarchy in (10) proposed in McCarthy and Prince (1995: 284):

Prosodic word	PrWd
	|
Foot	Ft
	|
Syllable	σ
	|
Mora	μ

A light syllable such as V or CV has one mora, and a heavy syllable such as CVV or CVC has two moras (cf. Hayes, 1989; Hyman, 1985), as shown in (11):

(a) Light syllable

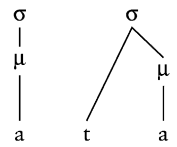

(b) Heavy syllable

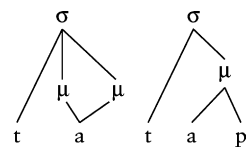

Syllable weight is the determinant of metrical structure. Metrical feet are defined in terms of the moraic structure of their syllables. A metrical foot in which a light syllable precedes a heavy one is an iambic foot; a foot in which a heavy syllable precedes a light one is a trochaic foot. McCarthy and Prince go on to posit foot binarity:

(12) Foot binarity
Metrical feet contain two moras or two syllables.

Typically, the minimal word is bimoraic and this tends to have a key role in morphology (îto, 1986; îto and Mester, 2003; McCarthy and Prince, 1995). For instance, Luganda (Uganda) has a constraint requiring a lexical stem to be a minimal word, which means that it must be at least bimoraic. To satisfy this constraint, a monosyllabic CV stem undergoes final vowel lengthening:

(13)

/mu-ti/ 'tree'	[muti:]
/ki-be/ 'jackal'	[kibe:]
/ka-so] 'knife'	[kaso:]

Reduplication also shows the central role played by the prosodic hierarchy in morphology. Many reduplicative phenomena call for the reduplication of either a light syllable (σμ) or a heavy syllable (σμμ). In Tagalog (Philippines), the future tense can be formed by reduplicating the first light syllable of the stem:

Table 4 Arabic root pattern morphology

Singular		*Plural*
nafs	'soul'	nufuus
rajul	'man'	rijaal
ʔasad	'lion'	ʔusuud
jundub	'locust'	janaadib

(14) Sulat 'write' Susulat 'will write'
ʔibig 'love' ʔiʔibig 'will love'
ʔaral 'teach' ʔaʔaral 'will teach'

Ilokano (Ethnologue name, Ilocano), which is also spoken in the Philippines, forms plurals by reduplication of a heavy syllable (McCarthy and Prince, 1995: 285):

(15) kaldíŋ 'goat' kal-kaldíŋ 'goats'
púsa 'cat' pus-púsa 'cats'
róʔot 'litter' ro: -róʔot 'litter' (pl.)
trák 'truck' tra: -trák 'trucks'

Root-pattern morphology is also highly sensitive to prosodic domains. This can be seen in the behavior of the productive plural morphology of Arabic. The plural and diminutive have a fixed canonical form whose template is an iambic foot σμσμμ. The actual segments associated with the foot vary but the prosodic template remains fixed (Table 4).

Sound-Motivated Compounding in English

Sound may also play a more direct role in selecting bases for compounding (Thun, 1963). It is possible to distinguish between two types of reduplication in English, namely rhyme motivated compounds and ablaut motivated compounds. In the former, the final syllables of the two parts of the compound rhyme:

(16) rap-tap nitwit hocus-pocus
claptrap ragtag hum-drum

In contrast, in ablaut motivated compounds, the consonants remain constant while the vowels change:

(17) flip-flop snip-snap teeny-weeny
tick-tock ping-pong riff-raff

Many reduplicatives in English are informal or familiar and occur especially in child–parent talk (e.g., *din-din* 'dinner') (Quirk *et al.*, 1985: 1579).

Conclusion

Morphology is strongly intertwined with phonetics and phonology. Allomorphy may be conditioned by bases ending in a particular sound or in a particular syllable structure. For instance, *–en* suffixation in English is not allowed after sonorants (cf. *fatten*, **greenen*). Licensing of sounds with particular phonetic characteristics may result in stem allomorphy, as demonstrated for Lardil. The selection of bases for compounding may be influenced by their sounds. Finally, the prosodic hierarchy and the minimality have vital roles in reduplicative and root-pattern morphology.

See also: Morphophonemics; Prosodic Morphology; Reduplication.

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Phonetics and Pragmatics

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Linguistic and Semiotic Matrices of Phonetics and Pragmatics

If we define pragmatics as what we do with words, that is, performing acts of referential and nonreferential (social–indexical) signification, involving both (signifying) signs and objects (i.e., what is signified), then phonetics is part of pragmatics, since verbal articulations constitute a kind of action. On the other hand, if we narrowly define pragmatics as the referential or nonreferential speech acts that result from the use of sounds, mediated by a denotational code called linguistic structure, pragmatics appears located at the signified pole of signification and thus diametrically opposed to phonetics at the signifying pole (*see* **Pragmatics: Overview**; **Semiotics: History**). Although the latter definition is usually adopted in linguistics, the former definition is preferred in philosophy, semiotics, and communication studies, which see phonetics and pragmatics as fields dealing with actually occurring indexical acts, events, or their regularities in the extensional universe, as opposed to the intensional, abstract codes of symbolic signs such as make up linguistic structure (*see* **Deixis and Anaphora: Pragmatic Approaches**). In this model, pragmatics includes phonetics (i.e., phonetically articulated signs), which, along with graphic, visual, olfactory, and other kinds of signs, may be used to signify some objects, that is, make meaningful significations.

As we shall see later, the linguistic model, which is centered around linguistic structure (i.e., a denotational code presupposingly used in the referential acts of communication), is, as Saussure and Peirce have noted, properly and systematically included in the semiotic matrix, which is concerned with communication as such, including both the referential and social–indexical aspects and both codes and processes (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**; **Peirce, Charles Sanders (1839–1914)**).

The Linguistic Matrix

In the narrower matrix of linguistics, pragmatics and phonetics are polar opposites in terms of methodology and disciplinary organization, partially because linguistics sees language primarily as structurally mediated denotational signification, starting with phonetic sounds and ending with pragmatic referents (*see* **Phonology–Phonetics Interface**). Although this is a partial (and, in fact, a somewhat limited) view of communication, inasmuch as it abstracts away the latter's dialectic (interactively processual) and social–indexical aspects, the model is compatible with the total matrix of communication and captures the asymmetric directionality of signification (see following discussion for details).

Let us briefly observe the linguistic matrix, focusing on the methodological aspect. Here, one may find a scale consistent with the flow of denotational signification and extending from phonetics to phonology, morphophonology, morphology, syntax, semantics, and pragmatics. On this scale, the positivistic evaluation of facts over interpretations tends to become gradually more dominant as we approach the leftmost pole (i.e., phonetics) and inversely for the hermeneutic evaluation of contextual interpretations regarding bare facts, as it is most prominently seen in pragmatics. Apparently, this configuration suggests that the process of signification moving from sounds to meanings is seen as the transition from physical nature to hermeneutic culture (*see* **Phonetics: Overview**; **Phonology: Overview**).

Thus, the distinct *modi operandi* of phonetics and pragmatics appear to fit neo-Kantian epistemology, which classifies all kinds of sciences into two methodological ideal types, namely (1) nomothetic natural sciences of *Erklären*, explanation, based on laws and other regularities that can be abstracted from contextualized actions and events; and (2) idiographic, cultural-historic sciences of *Verstehen*, understanding, holistically and hermeneutically dealing with uniquely contextualized eras, cultures, individuals, or events (cf. Mey, 2001) (*see* **Kant, Immanuel (1724–1804)**). One may count classical physics and chemistry among the prototypical nomothetic sciences, in contrast to historiography and ethnography as prototypical idiographic sciences; between these two extremes, the soft sciences, including linguistics, are pulled in two directions and thus contain two opposing fields within themselves, to wit: physicalistic phonetics and interpretive pragmatics, with (nomothetic but not physicalistic) structural linguistics in the middle (cf. Koyama, 1999, 2000).

Such is the *de facto* condition of phonetics and pragmatics in our times. Yet, once we take a critical stance to the actual condition, it becomes clear that pragmatics, too, can be construed positivistically, as was done by people like Bloomfield and (later) Carnap, who understood referents as physical things 'out there,' existing independently of any signifying communication; inversely, phonetics may similarly

be construed interpretively and idiographically, inasmuch as phones (unlike the abstract regularities called phonemes) are singular happenings in context. Phonetics and pragmatics both concern actual acts (i.e., unique happenings), which may show some regularities; hence, they can be studied idiographically or nomothetically, whereas linguistic structure is an abstract code of denotational regularities, which can be studied only nomothetically. Thus, a critical understanding points to the semiotic matrix of phonetics and pragmatics, to be explicated later (*see* **Bloomfield, Leonard (1887–1949); Carnap, Rudolf (1891–1970); Phoneme**).

The Semiotic Matrix of Communication

Pragmatics, Phonetics, and Indexical Semiosis

Communication, as a pragmatic (including phonetic) act or event, is a process of referential or social–indexical signification (i.e., an actual happening that occurs in the extensional universe that may presupposingly index contextual variables) (*see* **Context, Communicative**). These variables include contextually presupposable intensional codes such as are embodied in the linguistic structure and create certain effects in the extensional universe, such as referential texts, dealing with what is said, and social–indexical texts, dealing with what is done. In this model, as we will see, phonetics becomes a thoroughly pragmatic phenomenon (*see* **Pragmatic Presupposition**).

The signifying event, whether phonetically executed or not, is a singular happening in the extensional universe and functions indexically, as it points to the context of its occurrence at the *hic et nunc* (*origo*) of the signifying process. Also, the signifying event may present itself as a replica of some objects that appear similar to the event and thus iconically signify these objects, as in quotative repetition and mirroring reflection. In these ways, the signifying event may signal a number of presupposable objects, which may be types (regularities) or individual objects, and such objects may become signs signifying other objects (*see* **Semiosis; Peirce, Charles Sanders (1839–1914)**). Thus, the signifying event iconically signals or presupposingly indexes regularities and individuals in the context of its occurrence (i.e., it contextualizes them) and creates (i.e., entextualizes) some effects: the aforementioned referential and social–indexical texts (what is said and what is done), the latter primarily concerning the group identities and power relations of discourse participants and other social beings (*see* **Identity and Language; Power and Pragmatics**).

The preceding is a general picture of signification, as it obtains across the two dimensions of (a) reference and predication, and (b) social indexicality. Note that the objects that are contextualized (i.e., presupposingly indexed) in signifying events may be of various types: *viz*. (1) individual particulars found in the microsocial surrounds of the signifying event, including cooccurring signs (sounds, gestures, etc.), the discourse participants, and what has been already said and done (i.e., referential and social–indexical texts that have been entextualized and become presupposable at the time of the signifying event); (2) microsocial regularities of referential indexicality (e.g., the usage of deictic expressions) and social indexicality (e.g., addressee honorifics, turn taking, adjacency pairs, activity types, frames, scripts, pragmatic principles, maxims, norms) (*see* **Honorifics; Conversation Analysis**; and (3) macrosocial regularities of referential indexicality (e.g., the causal chain of reference) (Putnam, 1975: 215–271). The latter are involved in the use of proper names (*viz*., as macrosocially mediated references to individuals that are not found in the microsocial context) and in usage-related social indexicality (e.g., speech genres and socio- and dialectal varieties, characterized by such macrosociological variables as regionality, ethnicity, class, status, gender, occupation, or age) (*see* **Genre and Genre Analysis; Maxims and Flouting; Politeness; Pragmatics: Overview**). Importantly, these three kinds of presupposingly indexed objects are often phonetically signaled; also, they are all pragmatic in character, as they belong to the extensional universe of actions (vs. the intensional universe of concepts). Indeed, any actions, including body moves and phonetic gestures such as involving (nonphonological) intonation, pitch, stress, tempo, vowel lengthening, breathing, nasalization, laughter, belching, clearing one's throat, snoring, sneezing, going tut-tut, stuttering, response crying, or even pauses and silence, may be contextualized in the speech event so as to create some particular social–indexical (interactional) effects or to become presupposable regularities that may be expected to occur in certain contexts of particular speech communities (cf. Goffman, 1981; Gumperz, 1982; Tannen & Saville-Troike, 1985; Duranti & Goodwin, 1992; Mey, 2001 for details) (*see* **Gestures: Pragmatic Aspects; Phonetics: Overview; Silence**).

Linguistic Structure and Other Symbols in Indexical Semiosis

A fourth kind of object may be contextually presupposed, namely, the macrosocial regularities constituting symbolic codes. Recall that icons and indexicals signify objects on the empirically motivated basis of contextual similarity and contiguity, respectively. There are, however, numerous attested instances of

signification that cannot be totally accounted for by these empirical principles. In such cases, discourse participants appear to indexically presuppose the intensional kind of signs that, without any observable empirical motivation, regularly signify extensional objects. Such signs, called symbols, constitute the system of concepts (cultural stereotypes) and the denotational code called linguistic structure. The linguistic system is thus made up of the intensional signs that are presupposingly indexed in the speech event and symbolically denote extensional entities. Therefore, these intensional systems of symbols are indexically anchored on the extensional universe. This linguistic structure, at the center of which we find the maximally symbolic lexicon, that is, arbitrary (in the Saussurean sense) combinations of morphophonemes and morphosyntactic forms, is organized by the systematic interlocking of symbolic arbitrariness (language-particular structural constraints) and indexical motivation (extensionally based constraints). Of these two, the latter gradually increases as we move from (more abstract) morphophonemes to (more concrete) phonemes and to allophones and other surface phonetic phenomena such as phonotactic filters (*see* **Pragmatics: Optimality Theory**), and as we move from (formal) morphosyntax to (denotational) semantics and to (referential) pragmatics (see **Pragmatics and Semantics**). Further, just as the markedness hierarchy of distinctive features such as [syllabic] (i.e., [vocalic]), [sonorant], [voiced], which is anchored on and characterized by phonetic extensions (degrees of sonority), can be formulated to describe the differences among (morpho)phonemes and their correspondences, the markedness hierarchy of grammatical categories such as [pronoun], [proper noun], [concrete noun], which is anchored on and characterized by pragmatic extensions (degrees of the contextual presupposability of referents), can be formulated to describe the differences among morphosyntactic and semantic categories (see the Jakobsonian literature: e.g., Lee, 1997; Koyama, 1999, 2000, 2001 for details) (*see* **Jakobson, Roman (1896–1982)**; **Markedness**; **Distinctive Features**).

Dialectics of Signs: Interactions of Structure and Discourse

Similarly, at the interface of the intensional and extensional universes, just as semantic categories (e.g., [animate]) may have contextually variable extensions such as [animal] (inclusive use), [nonhuman animal] (exclusive use), as well as particular contextual referents, phonemes may have various allophones, which are contextualized happenings distinct from one another. These phonetic variants and other varying surface expressions, such as allomorphs (e.g., 'matrixes' vs. 'matrices') and syntactic variants (e.g., "It's me" vs. "It's I") appear denotationally identical; in addition, they may clearly show statistically different patterns of cooccurrence with some social categories (e.g., of class, gender, ethnicity), as the variable of 'denotation' is naturally controlled in this environment (*see* **Class Language**; **Gender and Language**) As a consequence, the variations in surface forms get distinctly associated with the variations in social categories (cf. Lucy, 1992; also see the journal *Language Variation and Change*). Under such circumstances, language users may essentialize such merely statistical (probabilistic) correspondence patterns by perceiving them as categorical and thus ascribing particular sociological categories to particular linguistic forms. The latter thereby become sociolinguistic stereotypes (Labov, 1972) or registers (made up of lexicalized stereotypes), that is, symbols having the illocutionary forces of social–indexical character (e.g., masculinity, honorificity) in themselves, independent of the actual contexts of their use (*see* **Honorifics**; **Register: Overview**). The decontextualizing process also underlies the formation of diminutives, augmentatives, and performative formulae (e.g., "I baptize thee"), which may be used as formulaic one-liners to create rather strong effects in discourse (cf. Lucy, 1993; Hinton *et al.,* 1994; Schieffelin *et al.,* 1998; Koyama, 2001) (*see* **Performative Clauses**; **Speech Acts**; **Pragmatic Acts**). This illustrates the general process in which the quotative use of a symbol achieves the effect of iconically presenting itself as a replica (token) of the symbolic pattern (type), imposing the presupposable pattern on discursive interaction, and thus creating a text that is more or less bracketed from its contextual surrounds and possesses the social–indexical meanings commonly ascribed to the symbol. More generally, the enunciative, phonetico-pragmatic act of repetition (cf. the Jakobsonian 'poetic function') saliently serves to create textuality, as witnessed by the poetic use of rhymes; the religious, political, commercial use of chants, slogans, and divinations; the quotidian use of turns, adjacency pairs, and other everyday conversational routines; and any other metapragmatic framings of discourse (cf. Tannen, 1989, 1993; Koyama, 1997; Silverstein, 1998) (*see* **Discourse Markers**; **Metapragmatics**).

Conclusion

Being abundantly demonstrated in the literature, the facts referred to in the preceding discussion unmistakably show that phonetics is a semiotically integrated part of pragmatics; it is what we do in the social context in which we live by creating referential

and social–indexical texts through the iconic or presupposing indexing of contextual particulars and regularities (types), of which the latter are systematically anchored on phonetic and other pragmatic (i.e., contextual) extensions, thus forming the basis of the relationship between phonetics and pragmatics.

See also: Bloomfield, Leonard (1887–1949); Carnap, Rudolf (1891–1970); Class Language; Context, Communicative; Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Discourse Markers; Distinctive Features; Gender and Language; Genre and Genre Analysis; Gestures: Pragmatic Aspects; Honorifics; Identity and Language; Jakobson, Roman (1896–1982); Kant, Immanuel (1724–1804); Markedness; Maxims and Flouting; Metapragmatics; Peirce, Charles Sanders (1839–1914); Performative Clauses; Phoneme; Phonetics: Overview; Phonology: Overview; Phonology–Phonetics Interface; Politeness; Power and Pragmatics; Pragmatic Acts; Pragmatic Presupposition; Pragmatics and Semantics; Pragmatics: Optimality Theory; Pragmatics: Overview; Register: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Semiosis; Semiotics: History; Silence; Silence; Speech Acts.

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Phonetics of Harmony Systems

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Introduction

Harmony involves a non-local spreading of some feature or combination of features over some domain larger than a single segment. The following example from Finnish illustrates back/front vowel harmony. The inessive suffix has two realizations. The variant containing a front vowel (-ssæ) occurs after roots consisting of front vowels, e.g., kylæssæ 'in the village', whereas the allomorph containing a back vowel (-ssɑ) appears after roots with back vowels, e.g., tɑlossɑ 'in the house'.

Harmony processes abound cross-linguistically and may be classified according to the types of features being propagated and whether vowels or consonants are targeted. The Chumash language provides an example of consonant harmony (Beeler, 1970). Chumash has two coronal fricatives, an apical /s/ and a laminal /ʃ/, which may not occur in the same word. This restriction triggers a right-to-left harmony process when a suffix containing a coronal fricative is added to a word containing a different coronal fricative, e.g., saxtun 'to pay' vs. ʃaxtun-ʃ 'to be paid', uʃla 'with the hand' vs. ulsa-siq 'to press firmly by hand'.

Up until recently, studies of harmony were strictly phonological in nature, relying on impressionistic observations rather than instrumental investigation. While this approach yielded many insights into the

and social–indexical texts through the iconic or presupposing indexing of contextual particulars and regularities (types), of which the latter are systematically anchored on phonetic and other pragmatic (i.e., contextual) extensions, thus forming the basis of the relationship between phonetics and pragmatics.

See also: Bloomfield, Leonard (1887–1949); Carnap, Rudolf (1891–1970); Class Language; Context, Communicative; Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Discourse Markers; Distinctive Features; Gender and Language; Genre and Genre Analysis; Gestures: Pragmatic Aspects; Honorifics; Identity and Language; Jakobson, Roman (1896–1982); Kant, Immanuel (1724–1804); Markedness; Maxims and Flouting; Metapragmatics; Peirce, Charles Sanders (1839–1914); Performative Clauses; Phoneme; Phonetics: Overview; Phonology: Overview; Phonology–Phonetics Interface; Politeness; Power and Pragmatics; Pragmatic Acts; Pragmatic Presupposition; Pragmatics and Semantics; Pragmatics: Optimality Theory; Pragmatics: Overview; Register: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Semiosis; Semiotics: History; Silence; Silence; Speech Acts.

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Up until recently, studies of harmony were strictly phonological in nature, relying on impressionistic observations rather than instrumental investigation. While this approach yielded many insights into the

nature of harmony processes, it also left many questions that proved unanswerable without phonetic data: What are the precise physical and acoustic properties that spread in harmony processes? To what extent is harmony motivated by phonetic considerations such as the desire to minimize articulatory difficulty and enhance perceptual salience? Are segments that appear to be transparent to harmony truly phonetically unaffected by the spreading feature? Do phonetic differences underlie the dual behavior of apparent harmonically neutral segments?

Recent advancements in instrumentation techniques and increased accessibility of speech analysis software have made possible the phonetic research necessary to tackle some of these unresolved issues. This article will discuss some of the phonetic studies that have enhanced our understanding of many aspects of harmony systems. For purposes of the present work, the research on the phonetics of harmony will be divided into two broad categories according to the types of segments affected by harmony. The first section considers vowel harmony, focusing on four types of vowel harmony that have been subject to phonetic research: front/back harmony, rounding harmony, ATR harmony, and height harmony. In the second section we discuss phonetic aspects of harmony processes affecting consonants, including nasal harmony and various types of long-distance consonant harmony.

Vowel Harmony

Different phonetically based explanations for vowel harmony have been proposed in the literature. Suomi (1983) offers a perceptual account of vowel harmony focusing on front/back harmony of the type found in Finnish. He suggests that harmony reflects an attempt to minimize the need to perceive differences in the frequency of the second formant, the primary acoustic correlate of backness, in syllables after the first. Drawing on results from perceptual experiments suggesting greater perceptibility of the first formant (Flanagan, 1955), the acoustic correlate of height, relative to the second formant, Suomi argues that vowel harmony reduces the burden of perceiving the perceptually less salient contrasts in backness.

Ohala (1994) proposes a slightly different explanation for the development of vowel harmony, suggesting that it is a "fossilized remnant of an earlier phonetic process involving vowel-to-vowel assimilation" (p. 491). Coarticulation effects between noncontiguous vowels are well documented in the phonetic literature (Öhman, 1966). Ohala suggests that vowel harmony systems arise when these coarticulation effects, which normally are factored out of the signal by the listener, are misparsed by the listener as being independent of the vowel triggering the coarticulation. This misapprehension leads the listener to infer that the speaker was producing a different target vowel than the speaker actually intended to utter. The listener then introduces into her own speech this new vowel, setting off a sound change to be adopted by other speakers.

Front/back Vowel Harmony

An important question raised by vowel harmony is whether the coarticulatory effects driving harmony actually pass over segments intervening between the target and trigger without affecting them. The apparent transparency of certain segments to harmony can be clearly seen in the neutral vowels described in many vowel harmony systems. Thus, for example, although most Finnish suffixes containing a vowel have two variants, one with a front vowel and the other with a back vowel, there are two vowels /i, e/ which are not paired with corresponding back vowels. These neutral vowels can occur in the same word with either front or back vowels as words containing the translative suffix -ksi show, e.g., kɑtoksi 'roof (translative)' vs. kylvyksi 'bath (translative)'. Furthermore, the neutral vowels can occur in roots containing either front or back vowels, e.g., hihɑ 'sleeve' vs. ikæ 'age', pesæ 'nest' vs. pensɑs 'bush'.

The dual behavior of neutral vowels raises the question of whether a neutral vowel is pronounced the same in all contexts. Specifically, one might ask whether the neutral vowels, which are widely regarded as front vowels, also have two variants, one back and the other front, parallel to other vowels. Investigation of the articulatory properties of neutral vowels potentially has important implications for the treatment of assimilatory processes in phonological theory. If the neutral vowels were phonetically front vowels even when the surrounding vowels are back, this would prove that harmony is truly a long distance phenomenon and can thus only be handled by a theory allowing for non-local spreading of a feature.

Phonetic data, both acoustic and articulatory, have recently been used to investigate the possibility that neutral vowels in front/back vowel harmony systems have both front and back variants. A key advantage of phonetic research on vowel harmony over impressionistic study is its potential ability to differentiate between categorical phonological effects of harmony and the normal coarticulation effects found in languages lacking true phonological harmony (Öhman, 1966). One recent study focuses on Finnish neutral vowels using acoustic data while another body of research investigates articulatory aspects of the Hungarian neutral vowels, which are also /i, e/.

Gordon (1999) compares the realization of the Finnish neutral vowels in front and back vowel words by inferring tongue position from the location of the first two formants. He finds an asymmetric effect that mirrors the left-to-right vowel harmony found in Finnish: the place of the neutral vowel is influenced by the frontness/backness of a preceding vowel but not a following vowel. Following a back vowel, the neutral vowels are noticeably backer as reflected in a lowering of the second formant (F2). The backing of the neutral vowels is observed between back vowels, e.g., ukithɑn 'grandfathers (emphatic)', and when preceded by a back vowel, e.g., tɑpit 'plugs', but not when only followed by a back vowel, e.g., iho 'skin'. However, the effect of vowels in adjacent syllables on the neutral vowels is relatively small, with an approximately 100 Hz difference in F2 as a function of surrounding vowel context averaged over two speakers. Gordon concludes that while vowels in neighboring syllables exert an effect on the relative backness of the neutral vowels, this effect is more consistent with phonetic coarticulation as opposed to a categorical difference in backness.

Gafos and Benus (2003) and Benus *et al.* (forthcoming) investigate neutral vowels in Hungarian using ultrasound and electromagnetic midsaggital articulometry (EMMA), two techniques that provide a direct measure of tongue position. They find that the neutral vowels are articulated with a more posterior tongue dorsum position (by an average of .67 millimeters in their EMMA data) in back vowel contexts relative to front vowel environments. However, although these differences are statistically reliable, their relatively small magnitude leaves open the possibility that the differences are due to normal coarticulation between vowels of the type found in languages lacking vowel harmony. In order to tease apart coarticulation from true harmony effects, Gafos and Benus compare neutral vowels differing in their subcategorization for front and back vowel suffixes. For example, the word viːz 'water' takes the front vowel variant of the dative suffix -nɔk/-nek, i.e., viːznek, while the word hiːd 'bridge' takes the back vowel allomorph, i.e., hiːdnɔk. Interestingly, they find that in unsuffixed roots containing neutral vowels but taking back vowel suffixes (e.g., hiːd), there is tendency for the tongue dorsum to be slightly retracted during the neutral vowel relative to the vowel in unsuffixed roots containing neutral vowels taking front vowel suffixes (e.g., viːz). They regard their results, however, as suggestive but nevertheless tentative pending the collection of more data.

Gafos and Benus and Benus *et al.*'s work builds on earlier work by Gafos exploring the articulatory basis of harmony systems. Drawing on both articulatory phonetic data and typological observations about harmony, Gafos hypothesizes that spreading in harmony systems is local rather than long-distance (see also Ní Chiosáin and Padgett, 1997 for a similar view). Under his view, segments that superficially appear to be transparent in the harmony system are actually articulated differently depending on the harmonic environment. Thus, the neutral vowels /i, e/ are claimed to be backer in back vowel environments than in front vowel environments, but crucially the effect of this articulatory backing is not substantial enough to be perceptible. He finds support for this view from Boyce's (1988) phonetic study of coarticulation and rounding harmony in Turkish, whereby high vowels agree in rounding with the preceding vowel in a word (see Rounding Harmony, below). In an electromyographic study of muscle activity, Boyce finds that the Orbicularis Oris muscle, which is responsible for lip rounding, remains contracted during a non-labial consonant intervening between two rounded vowels for Turkish speakers. This is consistent with Gafos' view that harmony is a local spreading process in which no segments transparently allow a propagating feature to spread through them while being unaffected themselves.

ATR Harmony

Hess (1992) is another study that uses phonetic data to test claims about the phonological properties of harmony. Her study focuses on ATR vowel harmony in Akan, a Kwa language of Ghana. In Akan, vowels other than the low vowel /a/ come in pairs differing in tongue root position. The advanced tongue root (+ATR) vowels /i̙, e̙, u̙, o̙/ are associated with an expanded pharyngeal cavity relative to their retracted tongue root (−ATR) counterparts /i̪, e̪, u̪, o̪/. This expansion of the pharyngeal space associated with the +ATR vowels is achieved primarily by advancing the posterior portion of the tongue (and also by adopting a lowered larynx position relative to that associated with −ATR vowels). Hess uses phonetic data to test two competing analyses of vowel harmony. According to one analysis, that adopted by Dolphyne (1988), vowel harmony is a categorical process whereby a −ATR vowel becomes +ATR when the vowel in the immediately following syllable is +ATR. For example, the −ATR vowel in the second syllable of the isolation form fre̪ 'call' turns into a +ATR vowel when followed by a +ATR vowel in the sentence fre̙ kɔ̙fí. The competing analysis (Clements, 1981) treats vowel harmony in Akan as a gradient assimilation in vowel height, whereby vowels are raised when followed by a +ATR vowel. In this account, raising gradiently propagates over all vowels preceding the trigger vowel, such that raising is

greatest in the vowel immediately preceding the trigger and gradually decreases in magnitude the farther the target vowel is from the trigger.

As a starting point in her study, Hess identifies the most reliable correlates of the feature ATR. She explores several potential indicators of ATR, including formant frequency, formant bandwidth, vowel duration, and the relative amplitude of the fundamental and the second harmonic. Hess finds the bandwidth of the first formant to be the most robust correlate of the ATR feature: +ATR vowels have narrower bandwidth values than their −ATR counterparts. (She also finds that +ATR vowels have lower first formant frequency values, but this difference is consistent not only with a difference in tongue root advancement but also a difference in height of the tongue body.) Applying first formant bandwidth as a diagnostic of ATR, Hess then examines vowels preceding a +ATR trigger of vowel harmony in order to test whether harmony involves spreading of height or ATR features and whether it propagates leftward across multiple vowels or is limited to the vowel immediately preceding the trigger vowel. As predicted by Dolphyne, Hess finds that only the immediately preceding vowel is affected by harmony. Furthermore, although the lowering of the first formant frequency in the target vowel is consistent with the height-based analysis of Akan harmony, the decrease in the bandwidth of the first formant is more consistent with ATR harmony than height harmony.

Most of the existing phonetic data on harmony comes from languages where harmony is a firmly entrenched phonological process. However, Przezdziecki's (2000) phonetic study of ATR harmony in Yoruba provides some insight into the development of harmony systems. In this study, he tests Ohala's hypothesis that harmony arises from simple coarticulation effects against data from three dialects of Yoruba differing in the productivity of their ATR harmony systems. In the Akure dialect, ATR vowel harmony is a productive process that creates alternations in the third person singular pronominal prefixes. Before a +ATR vowel, which include /i̪ e̪, u̪, o̪/, the prefix is realized as a +ATR mid back rounded vowel, e.g., ọ̪ kṵ ‘s/he died’, ọ̪ r’u̪lé ‘s/he saw the house’, whereas the prefix surfaces as a −ATR vowel before a −ATR vowel /i̪, e̪, u̪, o̪/ e.g., ọ̪ lọ ‘s/he went’, ọ r’u̪gbá ‘s/he saw the calabash’. The Moba dialect also has prefixal ATR vowel harmony, but the high vowels do not participate in the alternations either as triggers or as targets of harmony. Finally, Standard Yoruba lacks prefixal alternations entirely, though it has static co-occurrence restrictions on ATR within words. Przezdziecki explores the hypothesis that the fully productive alternations affecting the high vowels in the Akure dialect will also be observed as smaller coarticulation effects for the high vowels in the other two dialects. Taking the first formant frequency as the primary correlate of ATR harmony in Yoruba, he measures the first formant for the high, mid, and low vowels in two contexts, before a +ATR mid vowel and before a −ATR mid vowel, in the three dialects. As expected, for the Akure speakers, both the high and mid vowels differ markedly in their first formant values between the +ATR and −ATR contexts: vowels in the −ATR context have much higher F1 values than vowels in the +ATR context. Low vowels do not reliably differ in F1 between the two environments. In the other two dialects where harmony does not target high vowels, the high vowels show F1 differences going in the same direction as the Akure data (higher F1 values before −ATR vowels), but the magnitude of these differences is much smaller than in Akure. These results are consistent with the view that phonological harmony arises as a phonetic coarticulation effect that becomes sufficiently large to develop into a categorical alternation.

Height Harmony

Phonetic data has also been used to test claims about the existence of vowel harmony in a particular language. Kockaert's (1997) acoustic study attempts to experimentally verify the system of height harmony reported for siSwati (Swati). According to Kockaert, siSwati mid vowels are reported by several researchers to have two realizations in the penultimate syllable, a relatively high allophone /e, o/ when the final vowel is one of the high vowels /i, u/, and a lowered allophone /ɛ ɔ/, when the following vowel is non-high. Contra these reports of harmony, Kockaert finds that first formant values, the formant correlated with vowel height, fail to support the hypothesized variation in vowel height in the penultimate syllable.

Rounding Harmony

Kaun (1995) pursues a perceptually driven account of vowel harmony involving rounding. As a starting point in her investigation, she observes a number of recurring cross-linguistic patterns found in rounding harmony systems. First, she finds that rounding harmony is most favored among high vowel targets. We thus find languages like Turkish, in which only high vowels alternate in rounding as a function of the rounding in the preceding vowel. For example, the 1st person possessive suffix has four variants -ɪm/ -ʏm/ -ʊm/ -ɨm, where the choice of allomorph is conditioned by the frontness/backness and rounding of the root vowels: ipɪm ‘my rope’, kɨzɨm ‘my girl’, sytʏm ‘my milk’, buzʊm ‘my ice’. The non-high vowel

dative suffix, on the other hand, has only two allomorphs –ɛ/-ɑ which differ in frontness and not rounding: ipɛ 'rope (dative)', sytɛ 'milk (dative)', kɨzɑ 'girl (dative)', buzɑ 'ice (dative)'. Conversely, the typology indicates that rounding harmony is favored when the triggering vowel is non-high. Thus, there are languages in which rounding harmony is unrestricted (e.g., many varieties of Kirgiz [Karghiz]): high vowels and non-high vowels trigger rounding harmony in both high and non-high vowels. There are also languages in which rounding harmony is triggered in high vowels by both high and non-high vowels (e.g., Turkish), and languages in which rounding harmony only occurs if both the trigger and target are both non-high (e.g., Tungusic languages). We do not find any languages, however, in which only high vowels but not non-high vowels trigger harmony in both high and non-high vowels. Kaun also finds that rounding harmony is more likely when the trigger and target vowels agree in height, i.e., either both are high vowels or both are non-high vowels. Thus, in Kachin Khakass, both the trigger and target must be high vowels. Finally, rounding harmony is more prevalently triggered by front vowels. Thus, in Kazakh, rounding harmony in high suffixal vowels is triggered by both front and back vowels, e.g., kœl-dʏ 'lake (accusative)', kʊ̈l-dʊ 'servant (accusative)'. For non-high suffixal vowels, however, rounding harmony is only triggered by front vowels, e.g., kœl-dœ 'lake (locative)', kʊ̈l-dɑ 'servant (locative)'.

Kaun attempts to explain these typological asymmetries in perceptual terms. Following Suomi's account of front/back vowel harmony, Kaun suggests that rounding harmony reflects an attempt to reduce the burden of perceiving subtle contrasts in rounding. By extending a feature over several vowels, in this case rounding, the listener will be better able to perceive that feature and also will not have to attend to the rounding feature once it is correctly identified the first time. Rounding, like frontness/backness, primarily affects the second formant, which as we saw earlier, is perceptually less salient than the first formant.

Kaun draws on Linker's (1982) articulatory study of lip rounding and Terbeek's (1977) perceptual study of rounded vowels to explain the typological asymmetries in rounding harmony based on backness and vowel height. Linker's work shows that rounded vowels can be differentiated in their lip positions (expressed in terms of lip opening and protrusion) and their concomitant degree of rounding. Among the set of rounded vowels, she finds that high rounded vowels are characteristically more rounded than non-high rounded vowels and that back rounded vowels are more rounded than their front counterparts. Terbeek's study indicates a perceptual correlate of these articulatory differences in rounding: high rounded vowels are perceived as more rounded than non-high rounded vowels and back rounded vowels are perceived as more rounded than front rounded vowels. Kaun suggests that the lesser perceptibility of non-high and front rounded vowels makes them more likely to spread their rounding features to other vowels in order to enhance identification of rounding. Kaun attributes the bias for rounding in high vowels to the synergistic relationship between lip rounding and the higher jaw position associated with high vowels. Rounded vowels are associated with increased lip protrusion which is achieved in large part by decreasing the vertical opening between the lips; the decreased vertical opening is aided by a higher jaw position. The final cross-linguistic tendency in rounding harmony, the requirement in many languages that trigger and target agree in height, is attributed by Kaun to a preference for uniform articulatory gestures associated with a given phonological feature. High and non-high vowels achieve their rounding through different articulatory strategies: non-high vowels rely more on lip protrusion than high vowels, for which rounding is associated with both an approximation of the lips and protrusion.

Consonant Harmony

Nasal Harmony

Researchers have also offered phonetic accounts of harmony systems involving the spreading of nasality to both consonants and vowels. Boersma (2003) suggests a dichotomy in nasal harmony systems. One type of nasal harmony, he suggests, has an articulatory basis, while the other type of nasal harmony is perceptually driven. The articulatory nasal harmony entails spreading of nasality from a nasal consonant rightward until spreading is blocked by a segment that is incompatible with nasality. For example, in Malay, nasality spreads rightward through the glide in mãjãn 'stalk' but is blocked by the oral plosive in mãkan 'eat'. Crucially, because the spreading nasality is attributed to a single velum opening gesture, nasality fails to skip over segments whose identity would be altered too much by nasality. This explains the asymmetric behavior of oral plosives, which block nasal spreading, and glottal stop, which does not. An oral plosive would become a nasal if the velum were lowered during its production. Glottal stop, on the other hand, can be produced with an open velum, since the closure for the glottal stop is lower in the oral tract than the velum and thus does not allow for

nasal airflow. Consonants for which the acoustic effect of nasality is intermediate in strength, e.g., liquids, may or may not block nasal harmony depending on the language. In fact, Cohn's (1993) study of airflow in Sundanese suggests a distinction between sounds that completely inhibit nasal spreading, such as stops, and those that are partially nasalized due to interpolation in nasal air flow between a preceding phonologically nasalized sound and a following phonologically oral sound. Cohn argues that these transitional segments, which include glides and laterals in Sundanese, are phonologically unspecified for the nasal feature, unlike true blockers of nasal spreading, which are phonologically marked as [-nasal].

In contrast to languages in which nasal harmony is sensitive to articulatory compatibility, in languages possessing auditory nasal harmony, there is no strict requirement that nasality be produced by a single velum opening gesture. For this reason, nasal harmony of the auditory type is not blocked by oral plosives. Although the oral plosive cannot be articulated with an open velum, it still can allow spreading of nasality through it to an adjacent segment compatible with the nasal feature. Auditory nasal harmony thus reflects an attempt to expand the perceptual scope of nasality, even if this entails producing multiple velum opening gestures.

Palatal Harmony

Recent work by Nevins and Vaux (2004) has investigated the phonetic properties of transparent segments in the consonant harmony system of the Turkic language Karaim. In Karaim, the feature of backness/frontness spreads within phonological words, as in Finnish and Hungarian, but unlike Finnish and Hungarian, it is consonants rather than vowels that agree in backness. Most consonants in Karaim occur in pairs characterized by the same primary constriction but differing in whether they are associated with secondary palatalization. If the first consonant of the root has a palatalized secondary articulation, palatalization spreads rightward to other consonants in the word, including consonants in the root and suffixal consonants. If the first consonant of the root lacks secondary palatalization, other consonants in the word also are non-palatalized. Palatal harmony leads to suffixal alternations. For example, the ablative suffix has two variants: -dɑn and d^{j}ɑn^{j}, the first of which occurs after roots containing non-palatalized consonants, e.g., suvdɑn 'water (ablative)', the second of which is used with roots containing palatalized consonants, e.g., k^{hj}un^{j}d^{j}ɑn^{j} 'day (ablative)'. Crucially, descriptions of palatal harmony in primary sources suggest that it is a property only of consonants and not of vowels, meaning that back vowels remain back even if surrounded by palatalized consonants. In order to test this prediction, Nevins and Vaux conduct a spectrographic comparison between back vowels surrounded by palatalized consonants and back vowels surrounded by non-palatalized consonants. Taking the second formant as the primary correlate of backness in vowels, they find no consistent difference in backness between back vowels in the two contexts, suggesting that front/back consonant harmony mirrors front/back vowel harmony in being a non-local process. They do find, however, that vowels, which occur in contexts associated with phonetic shortening, are potentially fronter when adjacent to palatalized consonants. They attribute this effect to coarticulation rather than participation of vowels in the harmony system: phonetically shorter vowels have less time to reach their canonical back target positions.

Other Long-Distance Consonant Harmony Effects

Consonant harmony encompasses many other assorted types of long distance assimilation processes, whose phonetic underpinnings may not be uniform. Drawing a parallel to his account of vowel harmony, Gafos argues that consonant harmony systems also involve local assimilatory spreading propagating over relatively large domains. His cross-linguistic typology of consonant harmony indicates that many cases of consonant harmony entail spreading of coronal gestures involving the tongue tip and/or blade, e.g., the Chumash case discussed in the Introduction. Because the part of the tongue involved in coronal harmony can be manipulated largely independently of the tongue body, which is the relevant articulator for vowels, coronal gestures associated with consonants may persist through an intervening vowel without noticeably affecting the vowel.

Not all functional explanations for consonant harmony are purely phonetic in nature, however, although they all rely on a basic notion of phonetic similarity mediated by phonological features. Hansson (2001a, 2001b) and Walker (2003) discuss consonant harmony systems of various types (e.g., nasality, voicing, stricture, dorsal features, secondary articulations) that may not be best explained in terms of local spreading of a feature. Hansson and Walker argue that speech planning factors might account for certain consonant harmony effects which are truly long distance.

Building on work by Bakovic (2000) on vowel harmony, Hansson (2001a) observes a strong tendency for consonant harmony either to involve assimilation of an affix to a stem or to involve anticipatory assimilation of a stem to a suffix. Crucially, consonant harmony systems in which a stem assimilates to a prefix appear to be absent.

Hansson finds parallels to this asymmetry in both child language acquisition and also speech error data. Hansson reports results from Vihman (1978) showing a strong bias toward anticipatory consonant harmony in child language. Furthermore, speech errors also display a strong anticipatory effect (Schwartz *et al.*, 1994, Dell *et al.*, 1997), suggesting that errors result from the articulatory influence of a planned consonant on the production of an earlier consonant (Dell *et al.*, 1997). Hansson suggests that consonant harmony stems from the same speech planning mechanisms underlying the anticipatory bias in child language and adult speech errors.

Hansson also offers a speech planning explanation for another interesting typological observation he makes about consonant harmony. He finds that coronal harmony systems of the Chumash type involving an alternation between anterior and posterior fricatives follow two patterns. In some languages, bidirectional alternations are observed; thus /ʃ/ can become /s/ and /s/ can become /ʃ/ under appropriate triggering contexts. In other languages, coronal harmony is asymmetric, involving a change from /s/ to /ʃ/. Almost completely absent are languages that asymmetrically change /ʃ/ to /s/ but not *vice versa*. Hansson points out that this asymmetry has an analog in speech error data from Shattuck-Hufnagel and Klatt (1979) showing that alveolars such as /s, t/ tend to be replaced by palatals such as /ʃ, tʃ/, respectively, much more often than *vice versa*. This parallel in the directionality of harmony in speech error data offers support for the view that at least certain types of consonant harmony systems are driven by speech planning considerations.

Walker (2003) offers direct experimental evidence that consonant harmony is motivated by speech planning mechanisms. A survey of long distance nasal harmony over intervening vowels (Rose and Walker, 2003, Walker, 2003) indicates that harmony in many languages is subject to a requirement that the target and trigger are homorganic. For example, in Ganda (Katamba and Hyman, 1991), roots of the shape CV(V)C may not contain a nasal stop and a homorganic oral voiced stop or approximant. For example, roots like nónà 'fetch, go for', gùɣá 'curry favor with' occur, but roots like *gùŋá or *nódà do not. Roots may, however, contain heterorganic consonants differing in nasality, e.g., bónèká 'become visible'. Walker also observes that in certain languages, e.g., Kikongo [Kituba] (Ao, 1991), voiceless stops are transparent to harmony, neither undergoing it nor blocking it.

Walker sets out to explore the potential psycholinguistic basis for the sensitivity of nasal harmony to homorganicity and voicing using a speech error inducing technique in which listeners are asked to read pairs of monosyllabic words differing in the initial consonant (e.g., *pat*, *mass*) after being primed with other pairs of words with reversed initial consonants (e.g., *mad*, *pack*). In keeping with the typological observations about nasal harmony, Walker finds that more errors (e.g., *mat*, *pass*; *mat*, *mass*; *pat*, *pass*) occur when the two consonants are homorganic and when they disagree in voicing. On the basis of these results, Walker concludes that consonant harmony has a functional basis in terms of on-line speech production considerations.

Conclusions

In summary, phonetic research has shed light on a number of issues relevant to the study of harmony systems. Evidence suggests that many types of harmony systems have a phonetic basis as natural coarticulation effects that eventually develop into categorical phonological alternations and static constraints on word and/or morpheme structure. The desire to increase the perceptual salience of certain features may also play a role in harmony systems. Harmony processes that may not be driven strictly by phonetic factors may be attributed to on-line speech production mechanisms that also underlie speech errors found in natural and experimental settings. Phonetic data also provide insights into the proper phonological treatment of harmony by exploring issues such as the phonetic realization of neutral segments, the acoustic correlates of harmony, and the local versus non-local nature of assimilation.

See also: Harmony.

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Phonetics, Articulatory

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'Articulatory phonetics' is the name commonly applied to traditional phonetic theory and taxonomy, as opposed to 'acoustic phonetics,' 'aerodynamic phonetics,' 'instrumental phonetics,' and so on. Strictly speaking, articulation is only one (though a very important one) of several components of the production of speech. In phonetic theory, speech sounds, which are identified auditorily, are mapped against articulations of the speech mechanism.

In what follows, a model of the speech mechanism that underlies articulatory phonetic taxonomy is first outlined, followed by a description of the actual classification of sounds and some concluding remarks. The phonetic symbols used throughout are those of the International Phonetic Association (IPA) as

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Phonetics, Acoustic

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Introduction

Phonetics is the study of characteristics of human sound-making, especially speech sounds, and includes methods for description, classification, and transcription of those sounds. Acoustic phonetics is focused on the physical properties of speech sounds, as transmitted between mouth and ear (Crystal, 1991); this definition relegates transmission of speech sounds from microphone to computer to the domain of instrumental phonetics, and yet, in studying acoustic phonetics, one needs to ensure that the speech itself, and not artifacts of recording or processing, is being studied. Thus, in this chapter we consider some of the issues involved in recording, and especially in the analysis of speech, as well as descriptions of speech sounds.

The speech signal itself has properties that make such analysis difficult. It is nonstationary; analysis generally proceeds by using short sections that are assumed to be quasistationary, yet in some cases this assumption is clearly violated, with transitions occurring within an analysis window of the desired length. Speech can be quasiperiodic, or stochastic (noisy), or a mixture of the two; it can contain transients. Each of these signal descriptions requires a different type of analysis. The dynamic range is large; for one speaker, speaking at a particular level (e.g., raised voice), the range may be −10 to 50 dB SPL (decibels Sound Pressure Level) over the entire frequency range (Beranek, 1954), but spontaneous speech may potentially range over 120 dB and still be comprehensible by a human listener. Finally, the frequency range is large, from 50 to 20 000 Hz. Though it is well known

that most of the information in speech occurs in the range of 300–3500 Hz (telephone bandwidth), if one is trying to describe and classify speech sounds a bigger range is needed.

Aspects of the recording method and the recording environment can also introduce artifacts. Breath noise can occur if the microphone is directly in front of the speaker's lips; moving the microphone further from the speaker can reduce breath noise, but then the speech signal will have a lower amplitude at the microphone, requiring a quiet recording room and possibly a more sensitive microphone. The microphone can also be moved to one side, but then the directional characteristics of speech must be considered. Higher frequencies are progressively more directional, meaning that they are highest amplitude on-axis (directly in front of the speaker's mouth) and decreasing in amplitude with angle off-axis. For instance, in the band 5–10 kHz, at 60 degrees off-axis the amplitude is 5 dB lower than at 0 degrees (on axis) (Beranek, 1954). This difference may be important for comparisons, across subjects and recording session, of parameters such as spectral tilt or formant amplitude. Differences in microphone placement can be corrected for as long as the location relative to the speaker's mouth (distance and angle) is known and the microphone is in the acoustic far-field; if in the near-field, more parameters such as the exact shape and size of the lip opening are needed.

The acoustic far field is the region where the sound pressure decreases linearly with distance from the source. The distance **r** from the source at which the far field begins depends on the source extent and the frequencies of interest. For instance, for frequencies greater than or equal to 350 Hz, far field begins at $r = 1$ m, and the source could be as much as 16 cm across (which is much larger than a typical lip opening, or about the size of a medium loudspeaker) (Beranek, 1954). A far-field pressure can be used to compute the equivalent source strength of the radiating surface (the air between the lips) and is, thus, important for studies in which source strength is derived from the radiated acoustic signal, or when absolute sound pressures measured at different locations need to be compared.

Background noise is often a limiting factor in microphone placement. If it is 3 dB or more below the signal, it can be corrected for (or, if 10 dB or more below, ignored), but this must be true at all frequencies of interest. There can be a big amplitude difference between the peak of the first formant of a vowel and the amplitude of a weak fricative at frequencies above 10 kHz. Solutions are to reduce the background noise by making recordings in sound-proofed, even anechoic chambers, or to use directional microphones that are more sensitive to sounds coming from their 'front' than their 'back.' Directional microphones work well at reducing background noise, but their frequency characteristics tend to be much less flat across all frequencies than those of omnidirectional microphones. Another solution is to measure the ambient noise, compare it to the signal plus noise, and filter out the frequency bands where the noise dominates the signal. This is commonly done for very low frequencies (e.g., less than 20 Hz, or often to eliminate mains hum at 50 or 60 Hz).

If it is important to know the absolute sound level of a speech signal, and keep that information intact for every kind of analysis, a calibration signal needs to be recorded as part of the original recording session and put through the same stages (amplification, filtering, sampling, analysis) as the speech. Whatever factor is needed to return the calibration signal to its known level can then be applied to the speech signal. If this is desirable, the microphone and amplifier should be of instrumentation quality, and there must not be any automatic gain control applied. This is important if one needs to compare sound levels across speakers and recording sessions.

Signal Preprocessing

While preprocessing is a relative term, it tends to be used for processes that are applied to every signal in a given system before the 'elective' processes. Thus, amplification (which may have more than one stage), filtering to remove low-frequency noise, antialiasing filtering, sampling, and preemphasis tend to be common preprocessing stages. They are best understood as changes to the spectrum of the signal. Some of the changes are reversible, such as amplification and preemphasis; some are not, because a part of the original signal is permanently lost, as in high-pass (e.g., to remove low-frequency noise) or low-pass (e.g., antialiasing) filtering. Sampling is reversible, provided a suitable antialiasing filter has been used first. Theoretically, the filter should remove all frequencies greater than half the sampling rate, that is, the cut-off frequency of the filter $f_{co} = f_s/2$. In practice, no real filter can cut off abruptly, so the cut-off frequency should be set somewhat lower than $f_s/2$; how much lower will depend on the characteristics of the filter.

If the signal being sampled includes frequencies that are greater than $f_s/2$, whether because antialiasing was not done or the cutoff was too high, they will be aliased to lower frequencies. Thus, a 6 kHz component in a signal sampled at 10 kHz will appear as energy at 4 kHz, adding to whatever energy originally occurred at 4 kHz. In general, an aliased signal cannot be unscrambled. The

anti-aliasing needs to be done for every sampling stage, whether the original sampling to convert a continuous-time signal to a discrete-time (sampled) signal, or a later downsampling to lower the sampling rate of a discrete-time signal (McClellan *et al.*, 1998). In general, one should use the highest sampling rate likely ever to be needed for that signal and apply antialiasing for that f_s; this will, of course, generate the largest number of samples and, therefore, largest file sizes, so for particular parts of the analysis where such high time resolution is not needed, the signal can be refiltered and downsampled. Systems that sample, such as DAT recorders and sound cards, now often have antialiasing filters built in; analysis software, such as MATLAB, will not necessarily perform this step automatically.

Preemphasis was originally devised to make optimal use of the small dynamic range of analog tape. A speech spectrum tends to fall off with frequency; that is, amplitudes are lower at higher frequencies. The pre-emphasis filter tilts upward smoothly and thus flattens out the speech spectrum while leaving its important peaks (such as formants and harmonics) intact relative to each other. This is still useful before computing a spectrogram, since the upper frequencies will show up better if they have been boosted in amplitude. Since it is a reversible operation and simple to describe, there is no reason not to do it, but it is important to remember when it has and has not been applied to aid comparisons.

Signal Analysis

The techniques used to analyze speech should be appropriate to the local signal properties as well as consistent with the aims of the analysis. The information that is desired is typically related to the type of speech sound – whether it is voiced or not, continuant or not, the place of constriction, and so on. We will consider speech production models later; let us first consider analysis methods in relation to the properties of the signal.

Analysis of Periodic Signals

A perfectly periodic signal repeats exactly at some time interval T0 and so has a fundamental frequency $F0 = 1/T0$. It may have harmonics, which occur at integral multiples of F0, i.e., 2 F0, 3 F0, and so repeat exactly at T0/2, T0/3, ..., respectively. There is no noise; the signal is entirely deterministic.

In the real world, there is no such thing as a perfectly periodic signal. The closest equivalent in speech is quasiperiodic, meaning that F0 changes over time and has a small amount of noise. A typical example is a vowel, with the fundamental and many harmonics. We can look at and measure the time waveform, but if we want to know the distribution of energy at the frequency of each harmonic, we need to compute some type of spectrum. The classic first step for such a signal is the Discrete Fourier Transform (DFT). The signal is multiplied by a window, and the DFT is computed of the windowed signal. If we had a perfectly periodic signal, there would be no difference in the result if we included exactly one period, or exactly two, so we could think of the window as selecting exactly one period to minimize the amount of computation. With a quasiperiodic signal, the window can exclude parts of the signal in which F0 is very different. The signal within the window is approximately stationary, and so taking a single DFT is appropriate.

The window length and shape are important. The longer the window is, the finer the frequency resolution will be; the shorter it is, the coarser. In other words, the resolution in time is inversely proportional to the resolution in frequency. There is one wrinkle in this simple statement, however; the frequency resolution depends not only on the window length, but also on the number of points used to compute the DFT. If we want to be able to see every harmonic defined, we need fine resolution – perhaps 50 Hz between points on the DFT. But then the time window may be long enough for the signal to change properties somewhat; if so, the harmonics that are computed will be an average of the different sets of true values that occurred during the windowed signal.

How does the number of samples used to compute the DFT, which we call N_{DFT}, interact with the window length, and why would we ever want a N_{DFT} to be longer than the window, since all values outside the window are zero by definition? The short answer is that the number of points used to compute the DFT actually controls the frequency resolution. The Fourier transform of a discrete-time signal is a continuous function of frequency; the DFT samples that transform in the frequency domain, spreading N_{DFT} points evenly between $-f_s/2$ and $+f_s/2$. This means that the bigger N_{DFT} is – the more samples used to compute the DFT – the more tightly packed the samples are in the frequency domain and, thus, the finer the frequency resolution. The technique is called zero-padding, because the windowed signal is 'padded' with zeros to match the length of the DFT.

If the signal thus treated is perfectly periodic, it has energy only at the harmonics of its fundamental frequency. Increasing the frequency resolution beyond the harmonic spacing will not reveal anything else since there is not any other energy to see. There is a hazard, however; increasing resolution slightly beyond the harmonic spacing can mean that some of

the harmonics are missed. Increasing the resolution well beyond the harmonic spacing is less problematic; zeros between the harmonics will be revealed. If the windowed signal is not perfectly periodic, energy will exist between harmonics, and a longer N_{DFT} will define the shape of the transform of the samples occurring within the window more accurately. Zero-padding to use a longer N_{DFT} does not provide any more information about the properties of the signal, but does allow what is there to be seen better.

Finally, using a longer N_{DFT} does incur a computation cost, since increasing N_{DFT} increases the number of operations required to compute the DFT. The Fast Fourier Transform is an algorithm developed to compute the DFT efficiently; if N_{DFT} is a power of two (e.g., 64, 128) the computation will be faster. However, a 1024-point DFT will still take longer to compute than 128 or 512 points, and so N_{DFT} should always be justified in terms of the signal properties and the information sought by the analysis. We will return to this subject in the next section.

There are many window shapes, starting with the rectangular window, which weights every sample equally and cuts off to zero abruptly, and progressing to the gradually tapered windows typically used in speech analysis, the Hanning and Hamming. Since they are tapered at each end, there is no abrupt change in amplitude, which could create an artifact of seeming noise in the signal. They also have better properties in the frequency domain than does the rectangular window, minimizing the amount of leakage of one spectral component into neighboring components. **Figure 1** contrasts two Hanning window lengths used to analyze the same signal to produce DFTs and (as discussed below) LPC spectral envelopes. **Figure 1A** uses a window of 60 ms; every harmonic is clearly shown. **Figure 1B** uses a window of 10 ms. The major peaks are still visible, at approximately 250, 2600, and 3800 Hz, but the rest of the spectrum has been flattened. The peak at 250 Hz is wider, because it includes the energy for two or three harmonics, as we know from examining **Figure 1A**.

The DFT is plotted as amplitude, or log amplitude, vs. frequency. The speech spectrogram is made up of a sequence of DFTs, each computed for the same length of windowed signal and plotted as frequency vs. time, representing the spectral amplitude in greyscale. A fine-grain effect is achieved by having a skip factor that is much shorter than the window length; Olive *et al.* (1993) specified that they used a 30-ms window for their wideband spectrograms, skipping that window along 1 ms at a time. The narrowband spectrogram uses a bandwidth of 25–50 Hz and resolves every harmonic; the wideband spectrogram uses a bandwidth of 200–300 Hz and blurs the harmonics together, which shows the more widely separated formants better.

Linear Prediction Coding (LPC) is often used for a different type of spectral analysis of quasiperiodic sounds. LPC analysis consists of finding the best set of coefficients to predict the entire signal in a frame from a few of its samples. The user chooses how many samples will be used and, thus, how many coefficients will be computed; this specifies the order of a polynomial. In the frequency domain, the order specifies how many poles there will be in what is known as the LPC spectral envelope. Two poles are needed for each peak in the envelope, plus another two for overall spectral tilt. Thus, if $f_s = 10$ kHz, and the order is 12, then the spectral envelope will be a smooth envelope that captures the main five peaks of the DFT spectrum. The peaks will often, but not always, line up with the formants; two formants near each other in frequency may be represented by one peak. Increasing the order to, say, 40 will allow 20 peaks to be found in the same spectrum; depending on the actual F0, these peaks may coincide with harmonics.

Referring to **Figure 1** again, we note that the two LPC spectral envelopes are similar though not identical. A minor peak around 3 kHz is more noticeable when the wider time window is used; in the range 5–8 kHz, three peaks are visible for the short window, only two for the long window, and there are other differences at higher frequencies. There is little evidence that the signal has changed properties substantially within the 60-ms window, or the harmonic peaks would be wider; therefore its spectral representations are likely to be more accurate in this case.

The cepstrum offers another way to compute a spectral envelope. If you took a DFT and then immediately an inverse DFT (the IDFT), you would recover the original time waveform. With the cepstrum, the DFT is computed; then the log is taken, and then the IDFT. The result is called the cepstrum, in a domain that is not quite time, not quite frequency, and is known as quefrency. It is best understood by thinking of the log spectrum as if it were a time waveform. The closely packed patterns, the harmonics, would represent evidence of high-frequency components if the DFT were a time waveform; the wider-spaced patterns, the formants, would represent lower frequency components. These elements end up separated in the cepstrum into what is referred to as high-time and low-time components, respectively. If only the low-time components are selected and then the DFT is taken, the result is essentially the spectral envelope without the harmonic spikes. Unlike the LPC spectral envelope, the cepstrum will fit the troughs as well as the peaks of the spectrum. The only caveat is that the

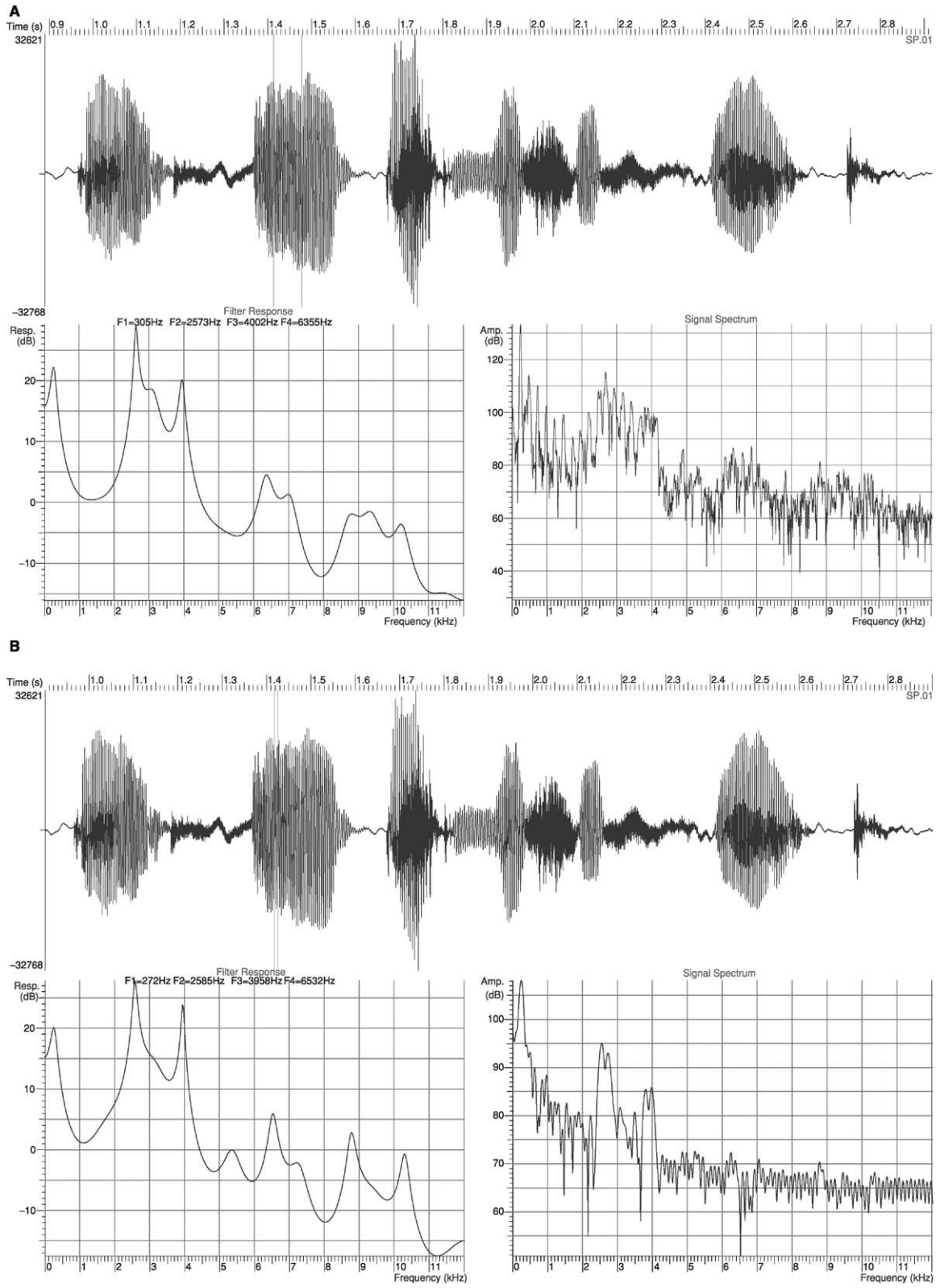

Figure 1 Same speech signal is analyzed with two lengths of Hanning window and LPC. (A) Waveform of ''Don't feed that vicious hawk'' is shown on top, with cursors marking the 60-ms window in [i] of 'feed.' DFT is lower right; LPC spectral envelope is lower left. (B) Same waveform is shown, with cursors marking a 10-ms window with the same starting point as in (A). DFT is lower right; LPC is lower left.

high- and low-time components must not overlap, which means that the process works well for low-F0 voices, and less well for higher F0 (Gold and Morgan, 2000).

With periodic signals, it is often desirable to find out what the period (or, equivalently, fundamental frequency) is; a secondary question is to determine the entire source spectrum. Many F0 trackers exist and can be roughly grouped into time-domain and frequency-domain algorithms. If a person measured F0 from a time waveform, they would look for a repeating pattern using any number of cues such as the highest-amplitude peaks or longest up- or downslope; they would check earlier and later to make sure that, even though the pattern is slowly changing, the interval of quasirepetition seems consistent; and finally, they would measure the time interval between repetitions and invert that value to obtain a local estimate of F0. Such manual tracking, when done by people with some training, is extremely consistent across trackers and has been used as the gold standard by which to evaluate computer algorithms. It should not be surprising, then, that some of the most successful algorithms use similar simple parameters defined on the time waveform (Rabiner and Schafer, 1978; Gold and Morgan, 2000).

Another time-domain algorithm takes a different approach, beginning by computing the autocorrelation of a windowed part of a signal with itself. The signal and its copy are aligned, the product is computed of each sample with its aligned counterpart, and the products are summed. The value resulting is that for the lag $\tau = 0$. Then the copy is shifted by one sample, and the process is repeated, with products being formed of each sample with its one-sample-earlier counterpart. The new sum is computed for $\tau = 1$. As the signal and its copy get more and more out of alignment, the sum of products decreases – until they are misaligned by one pitch period, and then the sum will have a high value again. When the total lag equals two and three pitch periods the sum will peak again, but because the two signals overlap less and less, successive peaks will be smaller. The algorithm computes the autocorrelation and then finds the peaks in the signal. The lag τ of the first peak is taken as T0, of the second peak is 2 T0, and so on until the peaks are too low in amplitude to be reliable indicators. Autocorrelation-based F0 trackers work better on high F0 voices, because the pitch periods are shorter so more of them fit within the same size window (Rabiner and Schafer, 1978).

Frequency-domain F0 trackers use some form of a spectrum in which the harmonics are visible. The peaks are found, and their lowest common divisor is determined. This method can work even if the fundamental and some of the harmonics are missing (as in telephone speech). Preprocessing, especially using low-pass filtering, though sometimes more elaborate, is used. In one algorithm LPC analysis is used to find the formants; an inverse filter is then devised and multiplied by the original signal to remove the formants, leaving the harmonics of now nearly uniform amplitude. Then LPC analysis with a higher order is used, and the peak frequencies, and their lowest common divisor, are found (Gold and Morgan, 2000).

F0 trackers have been compared extensively. Some work better with speech recorded in noisy environments; some work better with high, or low, voices. Generally, voices become very difficult to track when they verge into vocal fry, diplophonia, or other kinds of vocal instability. A manual tracker may be able to discern periodicity where an automatic tracker has declared a signal unvoiced. Most trackers include heuristic thresholds that, for instance, do not allow octave skips in the output F0 values. This is unfortunate when the speaker has actually produced a sudden octave change by going into falsetto or yodeling.

Analysis of Stationary Noise

In completely random noise, adjacent samples are uncorrelated, and the noise must be described statistically. The time waveform can be described by the probability distribution of amplitudes, and that distribution can be described by its mean, variance, and higher moments. The noise can also be described by its power spectrum, and can be classified in general terms as wideband or narrowband noise. White noise is flat across all frequencies and therefore is wideband. One can think of the bandwidth of noise in terms of the rapidity of the variation possible in the time domain.

For all such descriptions of noise, stationarity means that the properties of the noise do not change with time. If this is true, we can collect a very long example of the signal to analyze; equally, we could collect sections of it today, tomorrow, and next year and assume that the mean, variance, and higher moments are the same in all of our samples.

In the real world, signals carrying information are not perfectly stationary. As with periodicity, though, we can declare something to be quasistationary if its properties do not change very fast compared to the intervals we are interested in; alternatively, we can assume that a signal is stationary and, as part of the analysis, try to determine if that assumption is valid.

In speech, the central portions of unvoiced fricatives are often treated as if stationary; sometimes the entire fricative is treated this way, even though the

transitions are clearly regions of rapid change. If nonstationary noise is treated as stationary, the result is likely to be a sort of muddling together of the changing values describing the noise. However, nonstationary noise is sometimes analyzed as if it were a deterministic signal, and this is likely to lead to erroneous conclusions.

From comments in the previous section on how the frequency resolution depends on the length of the DFT (N_{DFT}), it might seem that the best way to analyze a noisy signal would be to use a relatively short window so that the noise within it is close to stationary, and then use a big N_{DFT} so that the resulting transform is sampled with a fine frequency resolution. But it is possible to prove that taking a single DFT of noise results in a spectrum with an error of the same magnitude as the true value. Some form of averaging must be done in order to describe noisy signals. Using a longer window (and DFT) before taking a single DFT, which intuitively seems to be a good idea because more samples are included, does not help; the frequency resolution becomes finer, but the values still have a large error. If, on the other hand, the samples in the long window are subdivided into many short windows, the DFT is computed for each short window separately, and the results averaged at each frequency, the resulting averaged power spectrum converges to the true value. If each window contains independent, identically distributed samples of the same underlying process, the variance of the estimate decreases as the number of such windows increases (Bendat and Piersol, 2000). This is shown graphically for white noise being time-averaged with an increasing number of averages in Figure 2.

There are three ways in which averaging can be done, each of which will reduce the error of the spectral estimate, but each also with its own pros and cons. The method just described, of chopping a long interval into short windows, is called time averaging (see Figure 3A). If Hanning or Hamming windows are being used, the samples at the tapered edges can be 'reused' by overlapping windows to some degree: rules of thumb range from 30 to 50% overlap. In this way, 100 ms of signal could be chopped into nine overlapping 20-ms windows, which could significantly improve the variance of the estimate – provided that the signal is more or less stationary during the 100 ms. The practice used in some speech studies of overlapping the windows much more than this (e.g., using a 20-ms window and a skip factor of 1 ms, so that 40 ms of signal is used to generate 21 windows and, thus, 21 DFTs) has two disadvantages: the variance of the estimate is not reduced proportionate to the number of averages, and the result is weighted toward the characteristics of the middle 20 ms of the 40 ms, since that is the most heavily overlapped portion.

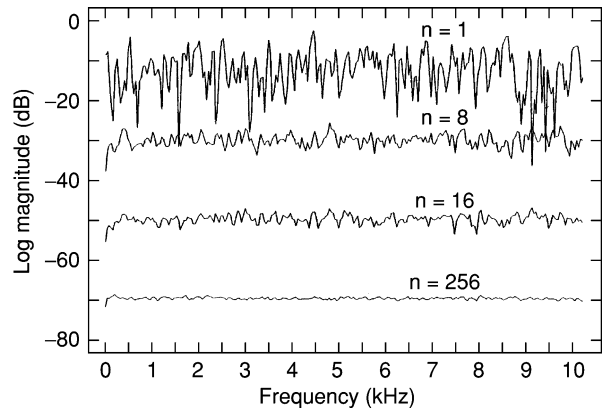

Figure 2 White noise, analyzed with time-averaging. The number of DFTs computed and averaged at each frequency is shown as an n value with each curve. (From Shadle (1985) The acoustics of fricative consonants. PhD thesis, MIT, Cambridge, MA. RLE Tech. Report 504, with permission.)

A second way is to compute the ensemble average (see Figure 3B). An ensemble of signals means essentially that different signals have been produced under identical conditions, leading to the same properties for the noise in each signal. The noise properties can vary in time, but the time variations must be the same for each member of the ensemble. For instance, if our signal is the sound of raindrops falling on the roof, and they fall louder and faster as the wind blows harder, then an ensemble could consist of raindrops falling in ten different storms, in all of which the wind increased at the same rate. We place our windows at the same time in each signal (relative to the wind speed, or other controlling parameter), compute the DFTs, and average as for the time average. The obvious problem here is in knowing that every member of the ensemble had the same controlling parameters at the same times. However, each individual signal does not need to be stationary for more than the length of the short window.

A third way is to compute the frequency average, by computing a single DFT and then averaging in the frequency domain (see Figure 3C). Ten adjacent frequency components can be averaged to produce a single component. This reduces the frequency resolution but improves the error. However, this works well only if the spectrum is fairly flat. If the spectrum has significant peaks or troughs, the frequency averaging will flatten them and so introduce bias to the estimate, meaning that it will converge to the wrong value.

For speech, all of these methods have been used, but none is ideal. Another method exists and is beginning to be used in speech research: multitaper

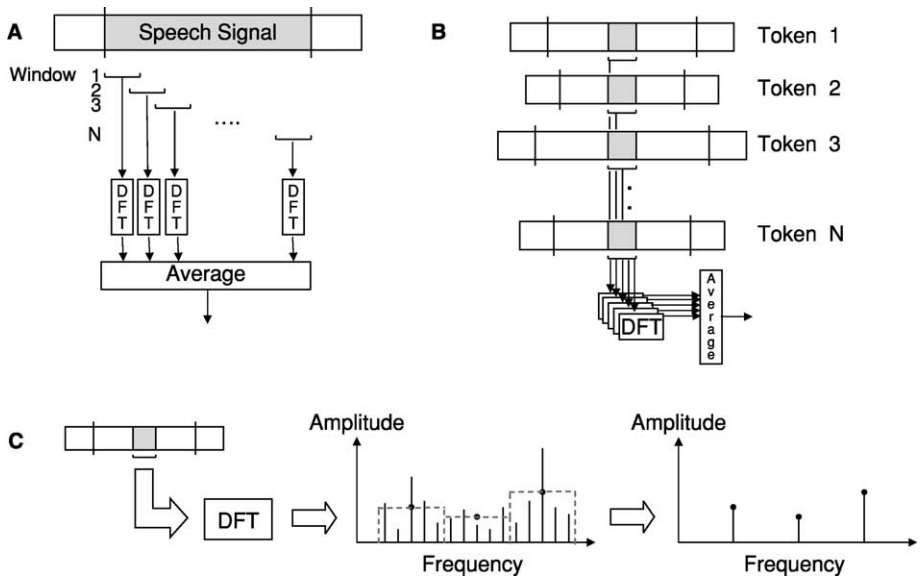

Figure 3 Diagrams indicating which parts of the signal(s) are used to generate averaged power spectra. Each rectangular box represents a part of a speech time waveform; shaded regions indicate the part being analyzed. Brackets indicate length of the window for which the DFT is computed. The 'Average' boxes compute an average of the DFT amplitude values at each frequency. (A) Time averaging. (B) Ensemble averaging. (C) Frequency averaging.

analysis. With this method, a single short signal segment is used, but it is multiplied by many different windows – called tapers – before computing and averaging their DFTs. The particular shape of the tapers satisfies the requirement for statistical independence of the signals being averaged. Figure 4 compares a multitaper estimate and a DFT spectral estimate of the same central portion of an [s]. The jaggedness of the DFT curve can provide a rough visual indication of its greater error compared to the multitaper curve. Spectrograms can be constructed of a sequence of multitaper estimates and plotted similarly. There are important choices to be made about the number of tapers to use and other parameters, but the method offers advantages in speech analysis over the three averaging techniques described above (Blacklock, 2004).

Note that spectrograms, although they do not include spectral averaging explicitly, are not as misleading as using single DFTs for noisy sounds. Essentially, the eye averages the noise, aided by the use of a small skip factor in the computation. The same is not true of spectral slices derived from a spectrogram; since these are constructed from a single DFT, there is nothing shown for the eye to average. This problem was recognized in an early article about the use of the spectrogram (Fant, 1962: Figure 6, p. 20).

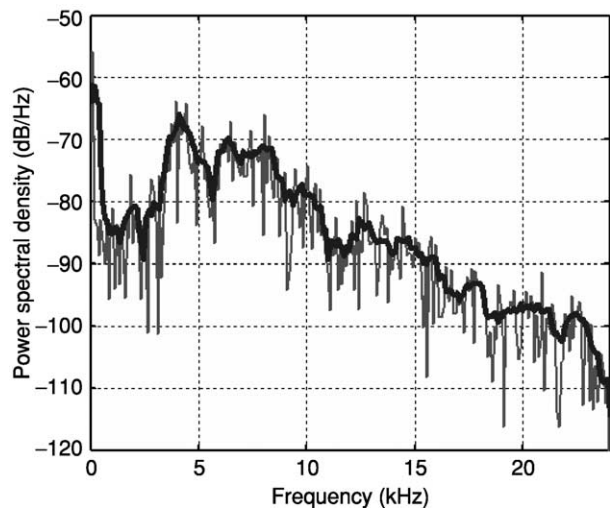

Figure 4 Multitaper spectrum of [s] in 'bassoon' in blue (smooth curve) overlaid on DFT of same signal in red (jagged curve). British male speaker. (After Blacklock, 2004.)

Analysis of Mixed Noise and Periodic Signals

Mixed-source signals would seem to call for two different analysis techniques. Examples in speech include voiced fricatives and affricates, and also breathy or hoarse productions of vowels, liquids, and nasals. In all of these cases the signal analysis is complicated by the fact that the noise and voicing source are not independent; in voiced fricatives the noise can be modulated by the voicing source, and breathy or hoarse sounds are likely to change as the vocal folds vibrate, even if the noise is not specifically modulated by the acoustic signal.

Mixed-source signals should be analyzed with time averaging, ensemble averaging, or multitaper. If the

periodic component is stationary, the spectral averaging will not affect it, but will reduce the error in the estimate of the noisy components. If F0 of the periodic component changes noticeably during the interval or across the ensemble averaged, the harmonics will be smeared out, which may be obvious in the averaged power spectrum, or may become clear when that is compared to a spectrogram. In that case, time averaging should be avoided in order to decrease the averaging interval length.

Mixed-source signals can also be decomposed into two parts, harmonic and anharmonic. A wide variety of algorithms exist that accomplish this. After decomposition, each component can be analyzed in the way appropriate to a harmonic signal and a noisy signal, respectively. Jackson and Shadle (2001) reviewed such algorithms and presented their own, which was used to investigate voiced fricatives. Multitaper analysis can also be formulated to identify harmonics mixed with colored noise; a detailed comparison of the two techniques has not yet been made.

Analysis of Noisy Transients

A transient includes nondeterministic noise, is highly nonstationary, and is generally very short. An example from speech is the stop release. Because it is noisy, it requires averaging, but with such a short signal that is difficult to do. Ensemble averaging is possible, but an independent means of aligning the signals in the ensemble would need to be established. Multitaper is also a possibility.

Production Models

We turn now from consideration of analysis techniques appropriate to the type of signal to models of speech production that indicate the parameters we seek from analysis in order to describe and classify sounds. The vast majority of speech production models that are useful for this purpose are source-filter models, with independent source and filter, and linear time-invariant filter. The assumption of independence is flawed – interactions of all sorts have been shown to exist – but it serves well for a first approximation, in part because the models become simple conceptually. The source characteristics can be predicted, and the source spectrum multiplied by the transfer function from that source to an output variable such as the volume velocity at the lips. (If both characteristics are in log form, it is even simpler; they can just be added at each frequency.) While it took years to develop the theory underlying the source characteristics and the tract transfer functions, it is now straightforward to vary a parameter such as F0, a formant frequency, or pharynx cross-sectional area in such a model and see its acoustic effect. It is not so straightforward to analyze the far-field pressure into true source and filter components.

Sources

There are two basic types of sources: the voicing source, generated by vocal fold vibration and nominally located at the glottis, and noise sources, which can be located anywhere in the vocal tract, including at the glottis. In both cases the location of the source is where some of the energy in the airflow is converted into sound. Determining the exact location for noise sources is still a subject of research, and slight differences can affect the predicted radiated pressure significantly.

A number of factors affect the voicing source: subglottal pressure, degree of adduction of the vocal folds, tension of the folds, and supraglottal impedance. They determine, first, whether the vocal folds vibrate and, if so, the frequency at which they vibrate and the mode or register of vibration. The frequency of vibration affects F0 and all its harmonics; the mode of vibration affects the amplitude of all harmonics and also whether noise will also be produced (as in breathy or whispered speech). These differences can be characterized in the time waveform of the glottal volume velocity, $U_g(t)$, or in its spectrum, $U_g(f)$. As a general rule, abrupt 'corners' or changes of slope in the time waveform, which occur for the more adducted registers like modal register or pressed voice, mean there will be more high-frequency energy, i.e., the harmonics will have higher amplitudes compared to falsetto or breathy voice. Figure 5 shows a typical glottal waveform, with a clear closed phase, and a range of possible spectra; the steeper the slope (e.g., −18 dB/oct), the smoother the time waveform, with a sound quality as in falsetto; the shallower slopes (−12, −6 dB/oct) correspond to a richer, brassier sound. The sound quality is related to the spectral tilt; the spacing of the harmonics that define the spectrum is related to T0, the spacing between glottal pulses (Sundberg, 1987; Titze, 2000).

Noise sources occur when the air becomes turbulent and the turbulence produces turbulence noise. Whether turbulence occurs is determined by the Reynolds number, $Re = VD/\nu = UD/A\nu$, where V = a characteristic velocity, D = a characteristic dimension, typically the cross-dimension where V is measured, U = volume velocity, A = cross-sectional area where D is measured, and ν = kinematic viscosity of the fluid = 0.15 cm^2/s for air. If V increases while D remains the same, or if U stays the same but A decreases, Re will increase. Thus, although the volume velocity must be the same all along the tract (since there is nowhere else for the air to go), the

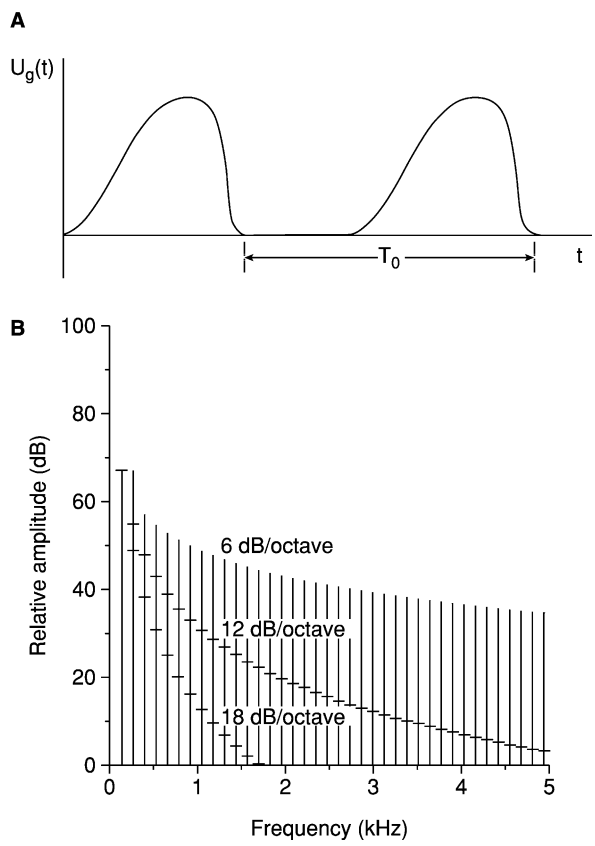

Figure 5 Plots of typical glottal volume velocity, as (A) time waveform $U_g(t)$, and (B) spectrum, $U_g(f)$. (Adapted from Titze (2000) *Principles of voice production* (2nd printing). Iowa City, Iowa: National Center for Voice and Speech, with permission.)

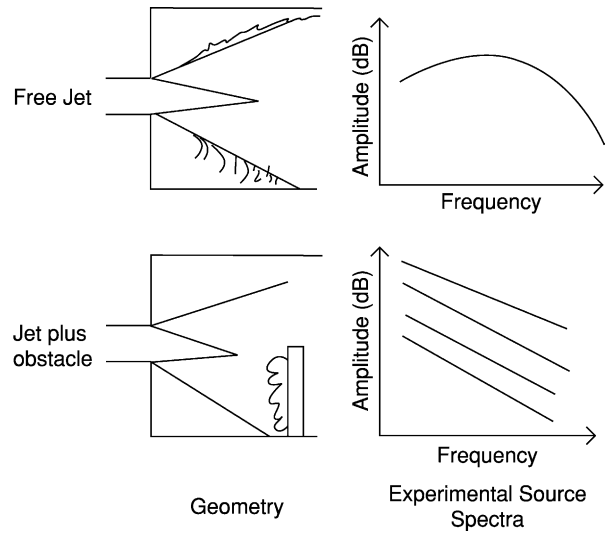

Figure 6 Noise source: shape downstream of constriction and spectrum of noise resulting experimentally, for free jet (top) and jet impinging on an obstacle (bottom).

Reynolds number will be highest at the points of greatest constriction. When Re is greater than a certain critical Reynolds number, Re_{crit}, the jet emerging from the constriction will become turbulent, but where the most noise will be generated depends on the geometry downstream of the constriction.

The simplest model for such turbulence noise is to treat it as completely localized at one place, and place a series pressure source at the equivalent place in the model. The strength of the source, p_s, is related to the parameters that affect the amount of turbulence generated: the pressure drop across the constriction, and the volume velocity and area of the constriction. The spectral characteristic should be broadband noise; sometimes, for convenience, it has been defined as high-pass-filtered white noise (Flanagan and Cherry, 1969). Stevens specified a broad peak characteristic of free jet noise (though free jet noise generation is distributed along the length of the jet) (Stevens, 1971), but some experiments indicate it should have a characteristic with its amplitude highest at low frequencies (Shadle, 1990) (see Figure 6). The location of the source has been experimented with; Flanagan and Cherry (1969) placed it 0.5 cm downstream of the constriction exit; Fant (1970) sought the location generating the best spectral match for each fricative; Stevens (1998) has demonstrated the difference made by placing it at any of three locations downstream. It seems clear that, for some fricatives, a localized source and a characteristic of spoiler in duct is fine, while for others, a distributed source with the broad peak characteristic of a free jet is needed (Shadle, 1990).

Because p_s is related to the pressure drop across the constriction, the amount of noise will change as the constriction area changes (as is needed during a stop release, or in the transitions into and out of a fricative) and as the pressure just upstream of the constriction changes (as when the pressure drop across the glottis changes). Modulation of p_s by the glottal volume velocity is possible in such a model (Flanagan and Cherry, 1969), though the actual mechanism affecting the source in voiced fricatives appears to be somewhat more complex than can be modeled by their synthesizer (Jackson and Shadle, 2000).

Filters

The filtering properties of the vocal tract depend on its shape and size and, to a small extent, on the mechanical properties of its walls. Wherever sound is generated in the tract, sound waves emanate outward from that point. At any acoustic discontinuity (such as a change in cross-sectional area, or encountering a solid boundary), some of the wave may travel onward, and some may reflect. Reflected waves can interfere with sounds emitted from the source later, combining constructively and destructively. At

frequencies in the sound where the interferences recur at the same spatial positions, standing wave patterns will be set up.

Many explanations of standing wave patterns exist (see, for example, Stevens, 1998; Johnson, 2003). It is simple to compute the frequencies at which such patterns will occur for lossless uniform-diameter tubes, where only two cases matter: tube closed at one end and open at the other, so that the boundary conditions differ, and tube open at both ends or closed at both ends, so that the boundary conditions are the same. The first sustains quarter-wavelength resonances, that is, the tube length equals integral multiples of $\lambda/4$, so the resonance frequencies are $f_n = c(2n+1)/4L$, where $n = 0, 1, 2, 3, \ldots$, and f_n = nth resonance, c = speed of sound, and L = length of tube. The second sustains half-wavelength resonances; the tube length equals integral multiples of $\lambda/2$, so the resonances are $f_n = cn/2L$, where $n = 0, 1, 2, 3, \ldots$.

More complex tract shapes can be approximated by concatenating two or more tubes, each of uniform cross-sectional area. If the number of tubes is low, it is still relatively easy to predict the resonances of the combined system and is, thus, useful conceptually. Analytic solutions can be found for the resonances of the system by solving for the frequencies at which the sum of the admittances at any junction is zero. This was first shown by Flanagan (1972) for a set of two-tube systems approximating vowels. For more than two tubes, it is still possible, but the calculations become so complex that it is preferable to use many more tubes, simulate them as a digital filter, and calculate the resonances by computer. However, if the area changes by a factor of six or more between sections, for instance, with a constricted region between two larger-area sections, one can assume that the cavities are decoupled and compute the resonances for each tube – in this case, three – separately. In this situation, each resonance of the system will have a strong cavity affiliation, with its frequency inversely proportional to the length of that cavity. In other cases, where the area does not change so significantly between sections, the resonances are coupled. An extreme case of a coupled resonance is the Helmholtz resonance, which depends on the interaction of a small-area neck and a large-volume cavity.

All of these resonances result from plane-wave modes of propagation, meaning that the acoustic wavefronts are planar, perpendicular to the duct's longitudinal axis. A point source in the duct will radiate sound in all directions, but below a certain cut-on frequency any sound traveling in directions other than along the duct's axis will die out; these waves are evanescent. The cut-on frequency depends on the cross-dimensions of the duct and its cross-dimensional shape. It is easiest to understand for a duct that has a rectangular cross-dimension, say, L_x by L_y; the cut-on frequency occurs where a half-wavelength fits the larger of L_x and L_y, which we shall call L_{max}. In other words, $f_{co} = c/2L_{max}$. For a duct of circular cross-section, with radius a, $f_{co} = 1.841c/(2a\pi)$.

Above the cut-on frequency, cross-modes will propagate. These modes are also dispersive, meaning that higher frequencies travel faster (Pierce, 1981). Many of the assumptions underlying the basic model used in speech become progressively less true.

For vocal-tract-sized cross-dimensions, what are the cut-on frequencies? If the duct is rectangular, with $L_{max} = 2.5$ cm, $f_{co} = 7.2$ kHz; $L_{max} = 4.0$ cm gives $f_{co} = 4.41$ kHz.

If the duct is circular, a diameter 2a = 2.5 cm gives $f_{co} = 8.42$ kHz; 2a = 4.0 cm gives $f_{co} = 5.26$ kHz. The maximum cross-sectional areas in these cases are, respectively, 6.2 and 16 cm^2 for rectangular duct, and 4.9 and 12.6 cm^2 for the circular duct. (We use c = 35,900 cm/s as the speed of sound at body temperature, 37 °C, and for completely saturated air.) Obviously the vocal tract is never precisely rectangular or circular in cross-section. But in comparing to Fant's data, for instance (1970), we can estimate that the cut-off frequencies for the six vowels of his subject ranged from 4.6 to 9.0 kHz (assuming a rectangular cross-section) or 4.8 to 9.3 kHz (assuming circular cross-section). For a smaller subject, and where cross-dimensions are given (Beautemps *et al.*, 1995), the largest cross-dimension in the front cavity is 1.79 cm (for /a/), giving $f_{co} = 10.0$ to 11.8 kHz; the largest back-cavity cross-dimension is 2.4 cm (for /i/), giving $f_{co} = 7.5$ to 8.8 kHz. For formant estimation for vowels, then, the lumped-parameter models considering only plane-wave propagation are based on reasonable assumptions. For fricatives, there may well be significant energy above the cut-off frequency, where these models become increasingly inaccurate, but in the absence of articulatory data good enough to support more complex high-frequency models, plane-wave propagation models are often pressed into service.

There are several sources of loss in the vocal tract that have the effect of altering resonance frequencies and bandwidths. The most significant is radiation loss, especially occurring at the lip opening, but also present to a lesser extent wherever a section with small cross-sectional area exits into a region of much larger area. The main effect is to tilt the spectrum up at high frequencies. If resonances have been computed assuming no loss, their predicted frequencies will be higher than actually occur, and the difference is bigger at higher frequencies. The larger the area of

the mouth opening relative to the front-cavity volume, the greater the radiation loss. If there is a small constriction such that front and back cavities are decoupled, back-cavity resonances will have little radiation loss and so will have sharper peaks (lower bandwidths) than the front-cavity resonances.

Viscosity describes the loss that occurs because of the friction of the air along the walls of the tract; heat conduction describes the thermal loss into the walls. Both increase when the surface area of the tract is higher relative to the cross-sectional area and increase with frequency. Though not as big sources of loss as radiation, they contribute to the increased bandwidths of higher resonances. Finally, the walls of the tract are not rigid; when modeled as yielding, the bandwidths of low-frequency resonances are predicted to increase (Rabiner and Schafer, 1978).

Any sound source excites the resonances of the vocal tract, and those resonances can be calculated, approximately or more precisely, by the methods outlined above. There may also be antiresonances, when the tract is branched and/or when the source is intermediate in the tract. The antiresonances vary according to the position and type of source; for each source possibility, a different transfer function can be computed. The transfer function is a function of frequency and is the ratio of output to input. Thus, multiplying the transfer function for a particular source by the source's spectral characteristic yields the predicted output spectrum. At frequencies where the transfer function equals zero, the output will be zero no matter what input is applied; at frequencies where the transfer function has a high amplitude, any energy in the input at that frequency will appear in the output, scaled by the amplitude of the transfer function.

It is worth remembering that the resonances and antiresonances are properties of the actual air in the tract, duct, tube system. Poles and zeros are attributes of the transfer function, where the analytical expression goes to infinity (at a root of the denominator) or to zero (at a root of the numerator). A spectrum of actual speech is best described as having peaks and troughs; according to the particular set of approximations used, these may be modeled as corresponding to poles and zeros. A given spectral peak may be produced by more than one resonance, modeled by more than one set of poles; a pole-zero pair near each other in frequency may effectively cancel, producing neither peak nor trough.

Methods of Classification

Vowels

Peterson and Barney (1952), in their classic study, determined the range of variation in the first two formants for 10 vowels, thus demonstrating not only the usefulness of those two parameters but also their average values for men, women, and children. Although they measured formants from spectral slices, having determined the best place to compute the slice from a spectrogram, that is only one of several techniques available now. One can locate the vowel using only the time waveform and compute the LPC spectral envelope and determine the frequencies of the peaks in that envelope. One can run an LPC-based formant tracker on the entire utterance, which computes the peak frequencies directly. Since LPC can occasionally fail to identify closely spaced formants separately, as a safeguard one can compute either a single DFT or the entire spectrogram, respectively, and superimpose the LPC spectral envelope or formant tracks on top for a quick visual check of the LPC performance. The window used for either DFT or LPC analysis should be at least as long as a single pitch period; the LPC order should be chosen to allow for the expected number of formants within the frequency range, or adjusted and recomputed after an initial analysis.

To understand formant patterns, it is useful to consider vocal tract shapes as departures from a uniform tube that is closed at one end, the glottis, and open at the lips. For a length of 17.5 cm, assuming no losses, resonances are predicted at 500, 1500, 2500, . . . Hz. Shortening the uniform tube raises all frequencies. Decreasing the area at the lip end only, akin to rounding, lowers all frequencies and reduces the bandwidths. To consider vowels other than schwa, we need at least a two-tube model. If the tongue is high, the pharyngeal area becomes large, and the oral cavity area becomes small. The lowest formant is best modeled as a Helmholtz resonance and moves down from 500 Hz; upper formants shift, depending mainly on the lengths of the two cavities, and partly depending on the area ratio. The rule of thumb, often quoted, is that increasing tongue height brings down F1, and increasing tongue frontness brings up F2. This rule works roughly, even though /u/ cannot really be modeled by a two-tube combination. The extreme, cardinal vowels /i/ and /a/ do fit. For /i/, the tongue is high and front, F1 is low, and F2 is high. For /a/, the tongue is low and back, F1 is high, and F2 is low. For these vowels with large area differences from pharynx to oral cavity, the tubes can be treated as decoupled, leading to the observation that cavity affiliation of each formant occurs in a different order. For /i/, F1 is a Helmholtz resonance, and F2, F3, and F4 are, respectively, back, front, and back-cavity resonances. For /a/, F1 to F4 are, respectively, back, front, back, front-cavity resonances. This means that, in a transition from one to the other, as occurs in the diphthong

/aI/, the formants do not smoothly change frequencies from one vowel to the other.

These models help us to understand, but real speech is seldom so clean. Figure 7 shows waveforms and spectrograms of two sentences, one spoken by an adult female (Figure 7A), "Don't feed that vicious hawk," and one by an adult male (Figure 7B), "You should be there on time," both British speakers. We will be referring to these spectrograms throughout this section. Note that the vowel in 'You' at the start of Figure 7B has a low F1, but high F2 inconsistent with /u/; /ju/ has apparently been realized as [jI]. The vowel in 'should' is very short, but still has three steady formants visible. The vowel in 'be,' after the initial formant transitions, has a classic pattern for /i/; note the differences between this [i] and that in Figure 7A, 'feed.' The words 'there on' show a fairly gradual lowering of F3 for [r], followed by a more sudden lowering of F2 for [a]. The formants in 'time' do change from F1 and F2, from being near each other to a wider separation, as expected, but F2 does not rise very far.

The simple models also allow one to understand how vowels vary with gender and age. As children grow, their pharynxes lengthen more than do their oral cavities; the vocal tract length differences between adult men and women are due more to differences in pharyngeal than in oral cavity length. Thus, the formant space does not scale uniformly by vocal tract length. The higher F2 in the female subject's [i] agrees with this explanation.

To a first approximation, the voicing source and the vocal tract filter are independent. We can therefore think of the transfer function from glottis to lips as a spectral envelope that is sampled by the fundamental and its harmonics. If the vocal tract remains the same shape, leaving the formants at the same frequencies, the harmonics sample it more coarsely at higher values of F0. On average, speakers with smaller larynges also have shorter vocal tracts, so that, as the range of F0 values possible moves up, the range of formant frequencies increases too. However, as Peterson and Barney's data show (1952), they do not increase at the same rate; women's F0 is 1.7 times higher than men's, while their formant frequencies are only 1.15 times higher, on average. This means that F0 is much more likely to approach F1 in women than in men, and formants may be difficult to resolve. An example of this occurs in Figure 7A in 'feed,' where F0 is 273 Hz.

Finally, sometimes the properties of the voicing source are of more interest than the filter properties of vowels. It is possible to inverse filter the speech signal and arrive at an estimate of the glottal volume velocity. In order to inverse filter, one must estimate what the filter was, invert that, and multiply it by the speech spectrum. Clearly, the estimate of the glottal volume velocity is only as good as the estimate of the tract filter function, but the technique has led to detailed explanations of voice quality differences, including source differences between men and women. One of the better-known techniques uses the Rothenberg mask to measure volume velocity at the lips and inverse filter that signal rather than the far-field pressure. This provides information about the mean flow of air through the vocal tract, including the degree of breathiness in the glottal volume velocity.

Nasals

In order to produce a nasal, the velum is lowered, and complete closure is effected in the oral cavity. The oral cavity becomes a side branch that contributes antiresonances inversely related to the length from pharynx to place of closure; the resonances arise from the pharynx and nasal cavities. The nasal cavities are convoluted in shape, uniquely so for each individual; the length of the effective tract is thus longer than that of pharynx plus oral cavity, with a correspondingly lower first formant. Bandwidths of all resonances are also larger because there are more surfaces to absorb sound.

As with fricatives, the radiated spectrum is a mixture of peaks and troughs that are not always easy to map to particular cavities. The nasal formants are packed more closely in frequency than nonnazalized vowel formants, but they may not all be apparent because of the antiresonances. Some of the series of antiresonances may appear as deep spectral troughs, but where they coincide with nasal formants, they will cancel, or nearly so, and neither will be apparent. Because of the cancellation and the wide bandwidths, the spectrum of a nasal will overall have lower amplitude than an adjacent vowel. While the antiresonances that could provide a place cue may not be strikingly apparent, particularly if there is background noise, the formant transitions in adjacent vowels will also provide place cues; briefly, all formants will decrease before a bilabial nasal, F1 and F3 will decrease and F2 will increase before a velar nasal, and F1 and F3 will decrease and F2 will decrease or increase depending on the vowel before an alveolar nasal (Kent and Read, 1992; Johnson, 2003).

The clearest example of such transitions occurs in Figure 7A in 'don't,' where F2 clearly rises during the nasalized portion. In Figure 7B, no transitions are obvious in the vowel of 'on,' though F2 and the amplitude both decrease abruptly at the start of the nasal. In 'time,' a slight F1 transition is observed, and F3 appears to drop abruptly, though it is not well-defined in the spectrogram.

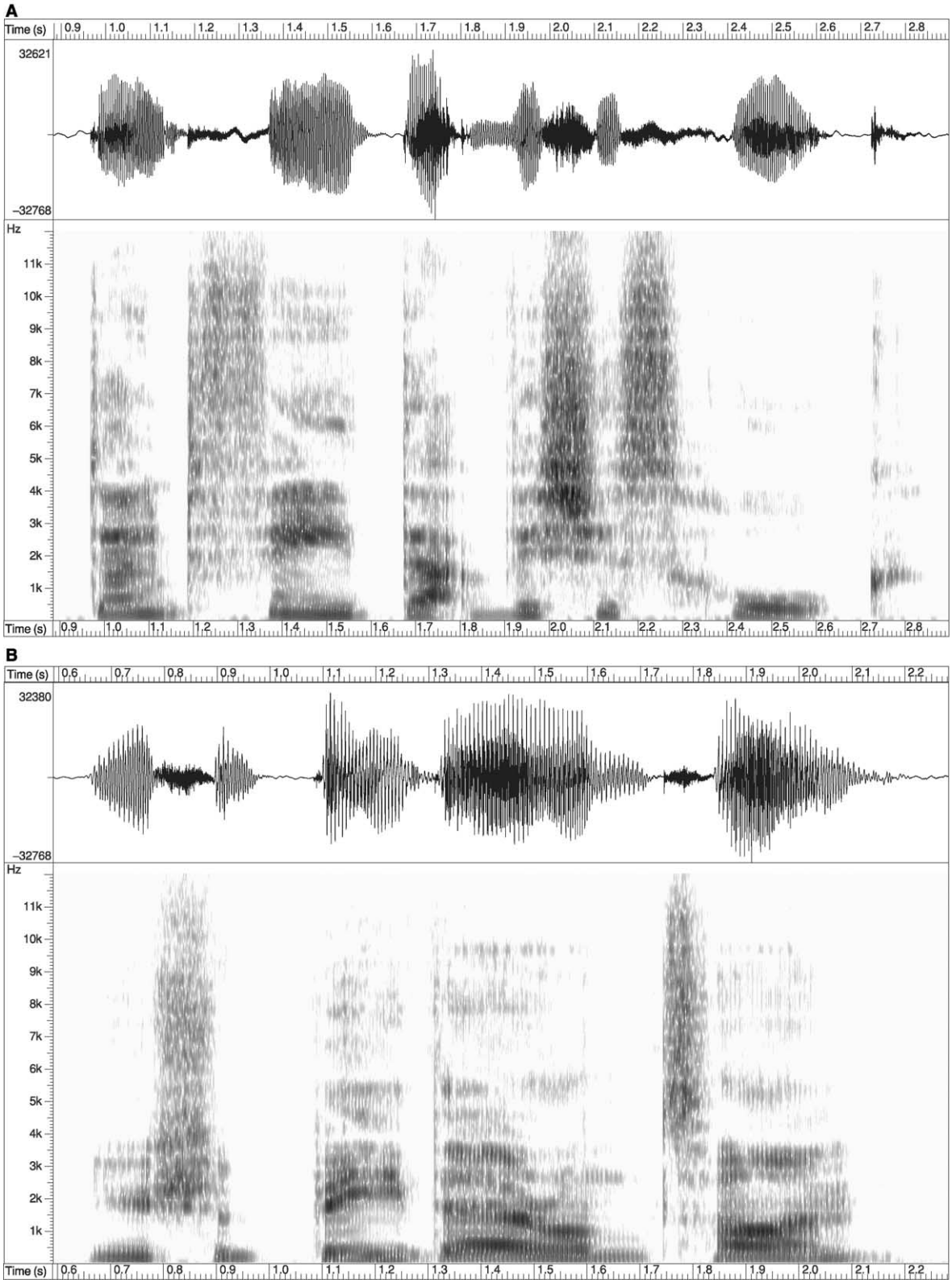

Figure 7 Waveform and spectrograms of two sentences. (A) ''Don't feed that vicious hawk,'' female British speaker, as in **Figure 1**; (B) ''You should be there on time,'' male British speaker. Note spectrograms extend up to 12 kHz.

In nasalized vowels the velum is down, but the oral cavity is not closed. The presence of two distinct paths still allows for interference effects, but the antiresonances will be at different frequencies than for nasals, and these frequencies will depend on the area of the velo-pharyngeal port. The resonances will correspond to those of the vowel alone (pharynx plus oral cavity) and the nasal formants (pharynx plus velo-pharyngeal port plus nasal cavities); the antiresonances may cancel some of these, or may show up as spectral troughs, but it is likely that the lowest nasal formant will be the highest-amplitude peak.

Fricatives

Many different sets of parameters for fricatives have been explored, but none are yet sufficient to classify them. Theoretically it seems straightforward; when the constriction is small, as during the 'steady-state' portion of a fricative, the back-cavity resonances are essentially cancelled. The noise source excites the front-cavity resonances, and antiresonances – zeros – appear at low frequencies and at higher frequencies inversely related to the distance between source location and constriction exit. If the source is not well localized, these higher-frequency antiresonances may smear out and not be readily apparent. The frequency at which the energy appears in the spectrum thus should differentiate fricatives by place, with longer front cavities for palatals and velars corresponding to energy at lower frequencies. However, the frequency ranges used for different fricatives overlap extensively across subjects. Further, interdentals seem to be highly variable even within subject, with, sometimes, barely discernable noise. For instance, in Figure 7A, [f] has significant energy from 1200 Hz to 11 kHz (and possibly higher; the anti-aliasing filter begins to act there), though clearly not as high amplitude as the [s] or [ʃ] in the same sentence, and lasting for 150 ms. The [v], however, appears to consist of a voicebar lasting 100 ms and weak noise, albeit at roughly the same frequency range, for only 10–20 ms. Note also that [ʃ] differs slightly in Figure 7A and 7B, with the frequency of the lower edge of the high-amplitude region occurring at approximately 2.0 kHz for the female, 1.5 kHz for the male subject. This may be due to a difference in length of the front cavity, or, more likely, to the influence of the vowel context, with the higher cut-on frequency corresponding to the high unrounded vowel.

It was thought at one point that identification of interdentals depends on transitions, while that of /s, ʃ/ depends only on steady-state characteristics. An obvious difference in articulation tends to support this theory; /θ/ requires the tongue tip to be in contact with the teeth, unlike in /f/. However, careful manipulation of speech signals shows that transitions as well as steady-state characteristics are important for /s, ʃ/ (Whalen, 1991).

In the transition from a vowel to a fricative several things happen, and not always in the same order. Formants shift as the constriction becomes smaller, noise begins to be produced, and the formants as well as antiresonances begin to be excited. Back-cavity resonances can be prominent for a time until the constriction area decreases sufficiently for them to be cancelled. As the noise increases, the rate at which it increases depends on the fricative; stridents appear to have the most efficient noise sources, in that the noise produced increases at a greater rate proportional to the flow velocity through the constriction. Both spectral tilt and overall spectral amplitude are affected. Within a given place and for a given subject, the spectral tilt can be thought of as occurring in a family of curves; if the same fricative is produced with greater effort, the spectrum tends to have higher amplitudes overall and a less negative slope. Voiced fricatives with the same place will have a set of curves with a similar relationship of spectral tilt to effort that is less than, but overlapping with, the range for their voiceless versions. However, these differences, while predictable from an understanding of flow noise sources, do not sufficiently distinguish fricatives (Jesus and Shadle, 2002). Finally, voicing changes during the transition for both voiced and voiceless fricatives, presumably to allow sufficient pressure drop across the constriction to support frication.

Many researchers have pursued methods of characterizing fricative spectra by statistical moments, as if they were probability distributions. Recently Forrest *et al.* (1988) described their calculation of spectral moments, indicating that these were sufficient to distinguish stops, but applied to fricatives, distinguished /s, ʃ/ from each other and from the interdentals /f, θ/, but did not distinguish the interdentals at all. More recent studies have used methods of computing the moments that showed that certain moments of the English voiceless fricatives were statistically significantly different, but the differences were not enough to allow for categorization.

Spectral moments capture the gross distribution of energy over the chosen frequency range, but ignore particular features that we can attribute to particular production methods, such as back-cavity formants appearing in the transition regions, or the salience and frequency of spectral troughs. In addition, the gross parameters captured depend greatly on the particular spectral representation from which the moments were calculated. Ideally, a low-variance spectral estimate would be used, but this has not

typically been done. Computing the moments does some spectral smoothing as with frequency interpolation, but with more bias, and amplitude thresholding and frequency range can affect the results dramatically. One question was whether using a better spectral estimate before computing moments might improve results. It appears that starting with a good spectral estimate helps, but only marginally; new parameters are needed for significant gains (Blacklock, 2004).

The best parameters appear to be based on multitaper spectra, with frequency range to 20 kHz, amplitude threshold carefully controlled, and identical recording conditions across subjects, as shown in Figures 4 and 8. Figure 8 shows examples of multitaper spectrograms of the voiceless fricatives uttered in the same vowel context, by the same subject. While differences between the fricatives are apparent in these examples, the problem is to find characteristics that hold up across tokens, contexts, and subjects. Men and women require different parameters; an examination of the variance of the mean power spectral density in 12 subjects indicated that /s, ʃ/ can best be distinguished from each other at 2.5 kHz for men, 3.0 kHz for women. The main spectral peak in /f/ occurred at 2, 4, or 7 kHz for men, but most often at 2 kHz; for women the peak occurred at 2, 4, or 8 kHz, and was more evenly distributed among these frequencies. Spectral variation within particular tokens was also examined, with somewhat inconclusive results. Clearly multitaper analysis is a powerful tool that bears further investigation (Blacklock, 2004).

Finally, voiced fricatives often devoice, with the amount somewhat dependent on language (studies on English, French, and Portuguese are cited in Jesus and Shadle, 2002) as well as with fricative place (posterior fricatives devoice more often) and position within the phrase (end of sentence devoices more often). Devoicing allows more air pressure to be dropped across the supraglottal constriction, thus strengthening the noise source. However, it appears that in some cases the fricative 'denoises' instead,

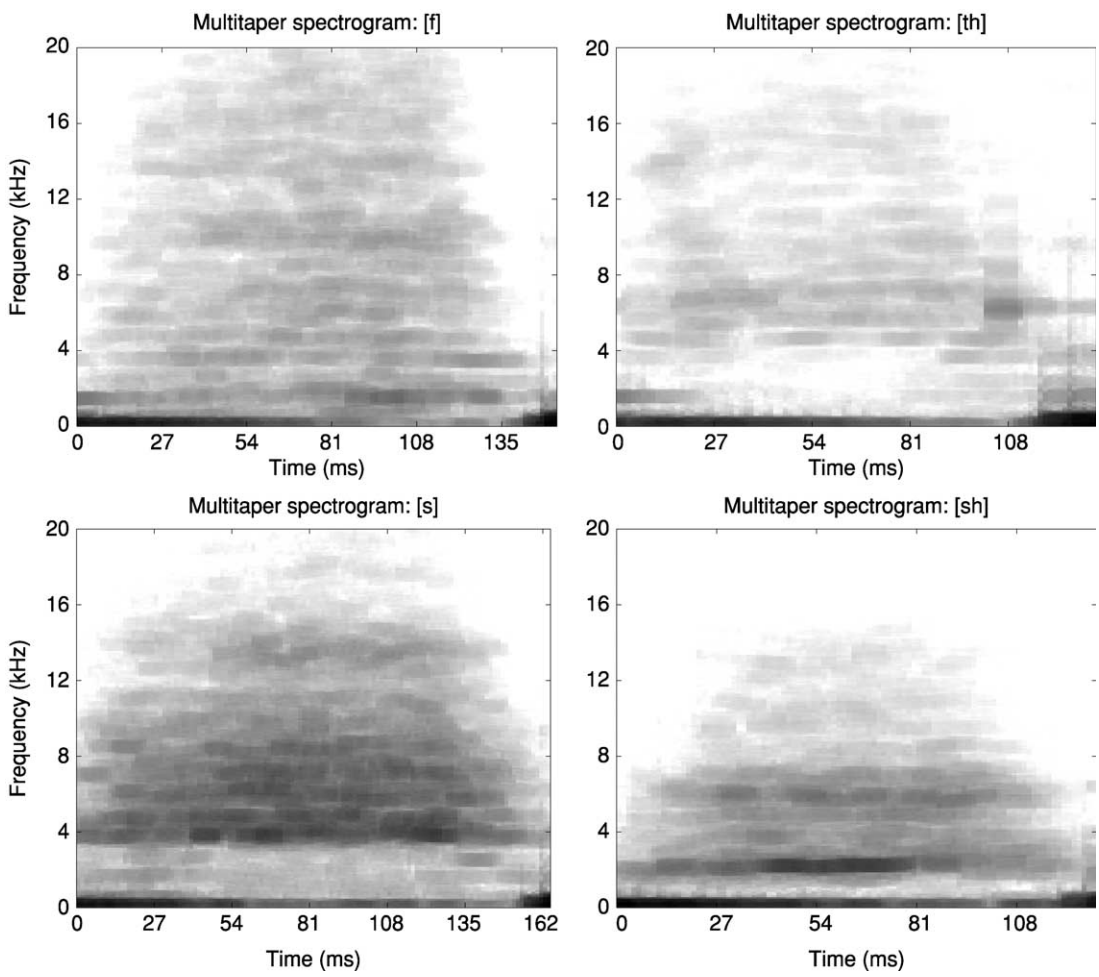

Figure 8 Multitaper spectrograms of [f] from 'buffoon,' [θ] from 'Methuselah,' [s] from 'bassoon,' and [ʃ] from 'cashew,' same British male speaker as in Figure 4. (After Blacklock, 2004.)

with additional pressure drop being used across the glottis, strengthening the voicing source. Voiced fricatives are shorter in duration than their voiceless equivalents in all languages studied. The modulation of the noise source by the voicing source indicates that the phase of the modulation changes rapidly in the transition into and out of the fricative (Jackson and Shadle, 2000). This may be a feature that humans notice and use in identification; further studies await.

Stops and Affricates

Stops are a relatively well-understood class. The manner in which they are articulated is related to the temporal events that are observable in the time waveform; the place at which they are articulated is related mainly to spectral cues. Before the stop begins, articulators are moving toward closure; if the stop occurs postvocalically, formant transitions will occur that offer place cues. For the stop itself, first is the period of closure, during which no air exits the vocal tract; voicing may continue briefly but no other sounds are produced. When closure is released, there may be the release burst, followed by brief frication as the articulators move apart, followed by aspiration and, finally, by voice onset. After voice onset the formants are more strongly excited, and transitions characteristic of the stop's place will again be observable.

Not all of these stages occur with every stop. If the stop is preceded by /s/, it has a closure period but no burst release. Syllable-final stops are often not released. The frication period is not always present and distinguishable from aspiration. Both frication and aspiration may be missing in voiced stops; they tend to be present in voiceless stops, but formant transitions are less obvious in the vowel occurring after the stop.

These latter two points are related to one of the stronger cues to voicing of a stop, the voice onset time (VOT). The VOT is the time between stop release and voice onset. In voiced stops, although voicing may well cease during closure as the pressure builds up in the vocal tract, the vocal folds remain adducted; when the supraglottal pressure suddenly drops following release, phonation begins again quickly, leading to a short VOT. In voiceless stops, the vocal folds are abducted and take time to be adducted for the following voiced segment, leading to a long VOT. Aspiration noise is produced near the glottis because the glottis, while narrowing, provides a constriction small enough to generate turbulence noise.

Experiments in which the VOT has been varied in synthetic stimuli have shown that VOT alone produces a categorical discrimination between voiced and voiceless stops, with a threshold value of 20–30 ms. However, VOT varies to a smaller extent by place, with velar stops having longer VOT than bilabial stops; this difference is as much as 20 ms. Finally, VOT varies with speech rate, with values shortening at higher rates.

The main spectral cues in stops are the burst spectral shape and the formant transitions in adjacent vowels. Additional cues lie in the spectral shape of the frication interval, but this is so brief, relatively weak, and time-varying that it is much less easy to analyze. The spectral shape of all three is related to the movement of the articulators toward closure for the stop. It can be shown that any narrowing in the anterior half of the vocal tract will cause the first formant to drop in frequency. The direction of frequency change in F2 and F3 depends on the place of the target constriction (of the stop) and the position of the tongue before the movement began (the vowel front- or backness). As demonstrated initially by Delattre *et al.* (1955) and cited in numerous references since, for bilabial stops all formants decrease in frequency when moving toward the stop (i.e., whether observing formant transitions pre- or poststop); a clear example of this is seen for 'be' in **Figure 7B**. For velar stops, F1 and F3 decrease; F2 increases when moving toward the stop. For alveolar stops, F1 and F3 decrease; F2 increases for back vowels and decreases for front vowels. But note that in **Figure 7A**, the vowel formants in 'hawk' do not change noticeably near the closure.

The burst spectra follow related patterns, since they are produced by an impulse excitation of the vocal tract just after closure is released. For bilabials, the spectrum has its highest amplitude at low frequencies and falls off with frequency. Alveolars are high amplitude at 3–5 kHz, and velar bursts are highest amplitude at 1–3 kHz. Though these are referred to, respectively, as having shapes of falling, rising, and indeterminate or compact or midfrequency, these terms are relative to a frequency range of 0 to, at most, 5 kHz. The [t] in 'time' in **Figure 7B** shows a striking burst, frication, aspiration sequence, which extends up to 12 kHz. The theoretical burst spectral shapes are roughly similar to those of fricatives at each place, as we would expect, since all back-cavity resonances should be cancelled immediately postrelease, and the front-cavity resonances are excited.

Affricates can be thought of as a combination of a stop and a fricative, but with some important differences in timing and place from either. The closure and release of a stop are evident, but the frication period is long for a stop and short for a fricative. Aerodynamic data indicate that the constriction opens more slowly for /tʃ/ than for /t/, directly supporting the longer frication duration for the affricate compared to the

stop (Mair, 1994). The rise time for the frication noise for /tʃ/ is significantly shorter than for /ʃ/ (Howell and Rosen, 1983).

Conclusion

We have surveyed some aspects of acoustics, recording equipment, and techniques, so that appropriate choices can be made. It is possible to compare speech analysis results using recordings that were not made in the same way, provided that information such as type of microphone and its position relative to the speaker have been noted, ambient noise has been recorded, and so on.

By the same token, signal processing principles and techniques have been reviewed so that the techniques can be chosen appropriately for both the signal type (whether periodic, noisy, or a combination) and the information sought (absolute level, formant frequencies, properties of the voice source, etc.). Some parameters must be estimated and the analysis done twice or more, iterating. Others must be done correctly the first time, such as antialiasing before sampling a signal. Each of the different methods of spectral analysis has its place; the choice of which is best depends not only on the type of speech sound being studied, but also on the speaker.

Finally, the basic manner classes of speech have been reviewed and parameters that can be used for classification discussed.

See also: Phonetics, Articulatory; Voice Quality.

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Phonetics, Forensic

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The term 'forensic phonetics' refers to the application of phonetic expertise to forensic questions. Forensic phonetics was a relatively new area at the beginning of the 1990s. The kind of activity that its practitioners are probably most frequently involved in is forensic speaker identification. Forensic phoneticians may act as expert witnesses in a court of law and testify as to whether or not a speech sample produced by an unknown speaker involved in the commission of a crime originates from the same speaker as a reference sample that is produced by a known speaker, the accused. Other activities in which forensic phoneticians may be engaged are speaker characterization or profiling, intelligibility enhancement of tape-recorded speech, the examination of the authenticity and integrity of audiotape recordings, the analysis and interpretation of disputed utterances, as well as the analysis and identification of non-speech sounds or background noise in evidential recordings. In addition, forensic phoneticians may collaborate with forensic psychologists to assess the reliability of speaker recognition by earwitnesses.

Speaker Recognition: Identification versus Verification

Speaker identification, whether in a forensic context or otherwise, can be regarded as one form of speaker recognition. The other form is usually called speaker verification. There are a number of important differences in the sphere of application and in the methodology employed in these two forms of speaker recognition. Speaker identification is concerned with establishing the identity of a speaker who is a member of a potentially unlimited population, verification with establishing whether a given speaker is in fact the one member of a closed set of speakers which he claims to be.

There are basically two different approaches to speaker recognition. One is linguistically oriented, the other is essentially an engineering approach. In recent years, considerable progress has been made by those taking the latter approach, culminating in the development of fully operational automatic speaker verification systems. In a typical verification application, a person seeking access to a building or to certain kinds of information will be asked to pronounce certain utterances, which are subsequently compared with identical reference utterances produced by the speaker he claims to be. If the match is close enough the speaker is admitted, if not, he is denied access.

Automatic Speaker Recognition

The success of automatic speaker verification systems has stimulated research into the application of similar techniques to the field of automatic speaker identification for forensic purposes. Although attempts in this field have been numerous, they have not so far been successful. The problem is that speaker identification, especially in the forensic context, is a much more complex affair than speaker verification. While the unknown speaker in a verification context is a member of a closed set of speakers, the suspect in a forensic identification context is a member of a much larger group of speakers whose membership is not really known and for whom no reference samples are available. Recording conditions may vary quite considerably in the identification context and speakers cannot be relied upon to be cooperative. They may attempt to disguise their voices, they may whisper, adopt a foreign accent, or speak a foreign language.

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Phonetics, Articulatory

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'Articulatory phonetics' is the name commonly applied to traditional phonetic theory and taxonomy, as opposed to 'acoustic phonetics,' 'aerodynamic phonetics,' 'instrumental phonetics,' and so on. Strictly speaking, articulation is only one (though a very important one) of several components of the production of speech. In phonetic theory, speech sounds, which are identified auditorily, are mapped against articulations of the speech mechanism.

In what follows, a model of the speech mechanism that underlies articulatory phonetic taxonomy is first outlined, followed by a description of the actual classification of sounds and some concluding remarks. The phonetic symbols used throughout are those of the International Phonetic Association (IPA) as

revised in 1993 and updated in 1996. (A chart of the International Phonetic Alphabet is given in the entries: **International Phonetic Association** and **Phonetic Transcription: History.**)

The Phases of Speech

When someone speaks, what happens is somewhat as follows. In response to a need to communicate about some state of affairs or some event, the speaker conceptualizes the event in a particular way and 'encodes' that conceptualization in accordance with the grammatical rules of his/her language. The linguistically encoded message is then externalized and apprehended by the hearer through the agency of a sequence of events that are called the 'phases of speech.'

These begin in the speaker and, assuming the hearer knows the speaker's language, culminate in the hearer 'decoding' and understanding the utterance, that is, reaching a conceptualization that closely matches that of the speaker, which was the start of the process.

The purely phonetic part of this process may be said to begin with the execution of a short-term neural program in the central nervous system, which is triggered by the lexicogrammatical structure of the utterance and determines the nature and the sequencing of what follows. This can be called the 'central programming' phase of the speech process. Thereafter, in a sequence and a rhythm presumably determined in the central programming phase, 'motor commands' are transmitted through motor nerves to muscles in the chest, throat, mouth, etc., which contract in whole or in part, successively or simultaneously, more or less strongly. This constitutes the 'neuromuscular' phase of the process.

As a result of the muscular contractions, the organs to which the muscles are attached adopt particular postures and move about in particular ways. These postures and movements of whole organs – the rib cage, the vocal folds, the tongue, the lips, and so on – constitute the 'organic' phase of speech. The successive and overlapping postures and movements of the organs act upon the air within the vocal tract, compressing or dilating it, setting it moving in rapid puffs, in sudden bursts, in a smooth flow, in a rough, eddying turbulent stream, and so on. This is the 'aerodynamic' phase of speech.

The things that happen to the air as it flows through the vocal tract during the aerodynamic phase generate sound waves, and this is the 'acoustic' phase. In the acoustic phase, an airborne sound wave radiates from the speaker's mouth to impinge upon the eardrum of a hearer, setting it vibrating in step with the waveform. These vibrations are transmitted through the middle ear to the inner ear, where they stimulate sensory nerve endings of the auditory nerve, sending neural impulses into the brain, where they give rise to sensations of sound. This process of peripheral stimulation and afferent neural transmission may be called the 'neuroreceptive' phase. Finally, the incoming neuroreceptive signals are identified as particular vocal sounds or sound sequences – 'neurolinguistic identification.' In the actual exchange of conversation, identification may normally be below the threshold of consciousness, since attention is directed more to the meaning of what is said than to the sounds by which that meaning is manifested.

These phases can be summarized as follows:

(a) *Central programming:* determining what follows.
(b) *Neuromuscular:* motor commands and muscle contractions.
(c) *Organic:* postures and movements of organs.
(d) *Aerodynamic:* pressure changes and airflow through the vocal tract.
(e) *Acoustic:* propagation of sound wave from the speaker's mouth.
(f) *Neuroreceptive:* peripheral auditory stimulation and transmission of inbound neural impulses.
(g) *Neurolinguistic identification:* potential or actual identification of incoming signals as specific speech sounds.

To these phases may be added two kinds of feedback: 'kinesthetic feedback,' that is, proprioceptive information about muscle contractions and the movements and contacts of organs, fed back into the central nervous system, and 'auditory feedback,' that is, stimulation of the speaker's own peripheral hearing organs by the sound wave issuing from the mouth and reaching the ears by both air conduction and bone conduction.

Of the seven phases of speech described above, only three lend themselves conveniently to categorization for general phonetic purposes: the organic phase, the aerodynamic phase, and the acoustic phase. All three of these phases can only be fully investigated instrumentally – the organic phase by means of radiography and fiberoptic laryngoscopy, the aerodynamic phase by air pressure and airflow measurements, and the acoustic phase by various types of electronic acoustic analysis. However, a good deal can be learned about the organic phase by direct external observation and by introspective analysis of the proprioceptive and tactile sensations derived from kinesthetic feedback.

It is not surprising, therefore, that articulatory phonetic taxonomy has always been primarily based on

the organic phase – the observation and categorization of the organic activities that give rise to speech. This was the basis of the remarkably sophisticated description of the sounds of Sanskrit by the earliest phoneticians known to modern linguists – the Indian grammarians of 2500 years ago (*see* **Phonetic Transcription: History**). The organic phase was also the basis for the phonetic observations of the Greek and Roman grammarians, the Medieval Arab grammarians, and the English phoneticians from Elizabethan times onward.

Modern articulatory phonetics, deriving largely from the work of 19th-century European phoneticians, such as Jespersen (*see* **Jespersen, Otto (1860–1943)**), Passy (*see* **Passy, Paul Edouard (1859–1940)**), Sievers (*see* **Sievers, Eduard (1850–1932)**), Viëtor (*see* **Viëtor, Wilhelm (1850–1918)**), and especially the British phoneticians Melville Bell (*see* **Bell, Alexander Melville (1819–1905)**), Alexander Ellis (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**), and Henry Sweet (*see* **Sweet, Henry (1845–1912)**), is still largely based upon the organic phase, with some contributions from 20th-century instrumental studies of the aerodynamic and acoustic phases.

Components of Speech Production

In the production of speech, organic postures and movements initiate, control, and modulate the flow of air through the vocal tract in ways that generate sound. In other words, the sounds of speech result from the conversion of muscular energy into acoustic energy through the mediation of the aerodynamic phase. In this sound-productive process, there are two essential, basic, components: 'airstream mechanism,' which sets the air in motion, and 'articulation,' which controls the air flow (arrests it, accelerates it, interrupts it, etc.) in ways that generate specific types of sound. There is a third component, present in most sounds, namely those that involve a flow of air through the larynx. This is 'phonation,' an activity in the larynx that modulates the stream of air utilized in the articulation.

Airstream Mechanism (Initiation)

The 'airstream mechanism' is that component of the sound-producing process which compresses or rarefies air in the vocal tract and, thus, initiates a flow of air through the tract. Because of its initiatory function, the airstream mechanism is also known as 'initiation,' and both terms are used interchangeably here. The organ, or group of organs, involved in the process constitutes an 'initiator.' Initiation types are classified according to the location of the initiator within the vocal tract ('pulmonic,' 'glottalic,' or 'velaric') and the direction of the initiatory movement (that is, whether it generates positive pressure in the adjacent part of the vocal tract, setting up an outward, or 'egressive,' air flow, or negative pressure, setting up an 'ingressive' flow). Thus, excluding 'esophagic' initiation, used only by laryngectomized persons (*see* **Disorders of Fluency and Voice**) and a few other very minor types, there are six basic types of initiation: pulmonic egressive/ingressive, glottalic egressive/ingressive, and velaric egressive/ingressive.

Pulmonic Initiation In 'pulmonic egressive' initiation, the initiator is the lungs, which, by decreasing in volume, generate positive pressure in the adjacent, subglottal, part of the vocal tract and thus tend to initiate an egressive flow of air, upward and outward through the trachea (windpipe), larynx, pharynx, mouth, and/or nose. This is by far the commonest airstream mechanism, used all of the time in a majority of languages, and most of the time in the approximately 30% of all languages that also utilize other airstream mechanisms.

In 'pulmonic ingressive' initiation, the lungs increase in volume, generating negative pressure and thus initiating an ingressive flow, inward and downward through the vocal tract. Pulmonic ingressive initiation (talking on inhalation) is not regularly used in any ordinary language, although a pulmonic ingressive type of [l↓] occurs in Damin, the ritual language of the Lardil people of Mornington Island, Australia. In other languages, for example English, occasional words may be pronounced with this airstream mechanism, and longer utterances may be spoken ingressively, to disguise the voice, or simply for fun.

Glottalic Initiation In 'glottalic egressive' initiation, the glottis (the space between the vocal folds) is closed; at the same time, the soft palate is raised and there is a stricture somewhere in the mouth, most commonly a complete closure, as for a stop consonant such as [p] or [k]. Consequently, a small quantity of air is trapped between the glottal closure in the larynx and the oral closure. The larynx is then suddenly raised, compressing the trapped air. When the oral closure is released, there is a sudden outflow of air, producing a 'sharp' or 'hollow' popping sound noticeably distinct from the less sharp noise-burst on the release of a pulmonic stop.

The oral stricture need not be a complete closure but can be a narrow, rather tight channel, as for a fricative, such as [f] or [s]. In this case, the upward thrust of the larynx drives a high-velocity turbulent stream of air through the articulatory channel, producing a sharp hiss noise, of fairly short duration, because of the small quantity of air available.

Glottalic egressive sounds are often known as 'ejectives' or, somewhat misleadingly, as 'glottalized' sounds – misleadingly, because the use of the '-ized' form suggests that the glottal component is a secondary articulation (see Modified Articulations section, this article), whereas in fact it is neither secondary nor articulatory, being a feature of the basic airstream mechanism of the sound. Ejective stops are regularly used in about 20% of the world's languages; the corresponding fricatives only in about 4%. Ejectives occur in all 37 Caucasian languages (*see* **Caucasian Languages**), in a number of AfroAsiatic (*see* **Afroasiatic Languages**) and American Indian languages, particularly in the Na-Dene (*see* **Na-Dene Languages**), Salish, and Penutian groups, and sporadically elsewhere. In the alphabet of the International Phonetic Association, glottalic egressive (ejective) sounds are indicated by means of an apostrophe placed after the appropriate symbol, thus [t'], [k'], [f'], [s'], etc.

In 'glottalic ingressive' initiation, as for ejectives, the glottis is closed, and there is an oral stricture, but this time the larynx is jerked downward, rarefying the air trapped between the glottal and oral strictures. Sounds with this type of initiation might be called 'inverse ejectives,' but are generally known as 'implosives.' Simple implosives, such as have just been described, are extremely rare. Although voiceless implosives are attested, for example in the Quichean languages of Guatemala, most commonly, in the 10% or so of the world's languages in which they occur, glottalic ingressive sounds (normally stops) are voiced (see 'Principal Types of Phonation' section, this article), and symbolized [ɓ], [ɗ], etc. In these voiced implosives, the glottis is not tightly closed, but disposed for the production of voice. Thus, when the larynx is jerked downward, creating a region of negative pressure above it, a small quantity of air is drawn upward through the glottis, setting the vocal folds in vibration. The amount of air drawn up into the supraglottal cavities during the oral closure is usually insufficient to raise the pressure there to the atmospheric level. Consequently, when the oral closure is released, there is normally a momentary influx of air into the mouth.

It has sometimes been claimed that voiced implosives utilize a pulmonic egressive airstream, but though there may occasionally be a brief period during an early part of the closed phase of a voiced implosive when the air is indeed being driven through the glottis by pulmonic pressure, at the moment of the actual implosion the air is 'sucked' up through the glottis by the vacuum created by the sudden lowering of the larynx and expansion of the pharynx. The initiation of the implosion is thus purely 'glottalic ingressive.'

Velaric Initiation 'Velaric ingressive' initiation is taken first because it is more familiar than the egressive type. Velaric initiation is performed entirely within the mouth. The dorsal surface of the tongue forms a closure against the roof of the mouth (largely, but not exclusively, against the soft palate, or velum, hence the name 'velaric'). A very small quantity of air is trapped between this dorsal, initiatory, closure and a second, articulatory, closure, at the lips, at the teeth, or behind the teeth. The initiatory rarefaction of the trapped air is effected by a downward movement of the centre of the tongue, or, in the case of articulatory closure at the lips, a downward movement of the jaw. Velaric ingressive sounds are also known as 'clicks,' and the most familiar one is the dentalveolar click, represented in writing as 'tut tut' or (more explicitly) as 'tsk tsk' (IPA [ǀ]) used by English speakers, and other western Europeans as an exclamation of mild regret or annoyance. In the eastern Mediterranean and the Middle East, a single 'tsk,' usually accompanied by a backward toss of the head, is part of a common gesture of negation or rejection. The reader can get an impression of the velaric ingressive mechanism by repeatedly saying this click, slowly and introspectively, noting the feeling of tension and suction in the tongue just before the tongue tip breaks away.

Other velaric ingressives include the alveolar lateral click [ǁ] in which the articulatory gesture is made by the side(s) of the tongue breaking away from the (front) molar teeth (a sound used to urge on a horse), and the bilabial, 'kiss', click [⊙]. Such sounds, though common as paralinguistic, interjectional, or gestural sounds, occur as regular linguistic sounds only in the Khoisan (*see* **Khoesaan Languages**) and Southern Bantu languages of Africa and in Damin (see 'Pulmonic Initiation' section earlier in this article).

'Velaric egressive' initiation involves much the same organic configuration as velaric ingressive, except that the trapped air is compressed by an upward 'squeezing,' or forward movement, of the tongue, so that there is a brief efflux of air on the release of the articulatory closure. Such sounds, like clicks, are sometimes used, though more rarely, as interjectional sounds. In particular, a velaric egressive bilabial [⊙↑] may be combined with a shoulder-shrugging gesture of dismissal or exculpation.

Airstream Mechanisms Summarized Table 1 shows the six basic types of initiation.

The initiation types named in bold type are those regularly utilized in normal languages. The short names in parentheses are commonly used for them, especially with reference to stops. In traditional

Table 1 Types of initiation

Location (initiator)	*Direction, i.e., movement generating*	
	Positive pressure	*Negative pressure*
Lungs	**pulmonic egressive (plosive)**	pulmonic ingressive
Larynx	**glottalic egressive (ejective)**	**glottalic ingressive (implosive)**
Tongue (with velar closure)	velaric egressive	**velaric ingressive (click)**

articulatory phonetics, pulmonic egressive, being the normal, or most frequent, type, is not usually named in the description of sounds; only the nonpulmonic types are explicitly named.

Other Initiatory Phenomena During speech, the pulmonic egressive initiator drives air ahead of it against the resistance imposed by the air pressure against which it is moving. Varying phonatory and articulatory strictures impose varying degrees of impedance on the flow of air through the vocal tract. The 'backpressures' caused by these impediments to flow react on the initiator, which either is slowed down by them, or must work harder to overcome the resistance. In other words, the initiator is constantly exerting a varying 'initiator power' during speech.

Initiator power is essentially what has traditionally been called 'stress' in articulatory phonetics, commonly defined as 'force' (e.g., Sweet, 1877; Jones, 1922) but also as 'initiator pressure' (Pike, 1943), 'reinforced chest-pulse' (Abercrombie, 1967), or 'increase in respiratory activity' (Ladefoged, 1975). Some of these definitions of stress are controversial; thus Ohala (1990), on the basis of considerable instrumental evidence, questions the claim that stress necessarily involves independent action of the respiratory system.

Stress, no matter how it is defined, is infinitely variable. However, it is customary in traditional articulatory phonetics to speak as if there were two distinct degrees of stress, called 'stressed' and 'unstressed.' This reflects the fact that in the phonology of many languages two degrees of stress are utilized contrastively. If three degrees of stress are recognized, they are usually called 'primary stress,' 'secondary stress,' and 'unstressed.' Primary and secondary stress are symbolized by ['] and [ˌ] respectively, placed before the stressed syllable, unstressed being left unmarked.

Most of the scholars mentioned above distinguish between 'stress' (as some kind of 'force' or dynamic effect, however produced) and 'prominence.' Prominence is the degree to which a sound or syllable stands out from those surrounding it. It is generally agreed that stress, duration, pitch, and inherent sonority are all factors that may contribute to prominence.

Another phonetic phenomenon which may be partly related to initiatory activity is the 'syllable.' There is no universally accepted definition of the syllable. Nevertheless, it is convenient to be able to mark intuitively determined syllable boundaries in speech, and this can be done with the IPA symbol [.]. Normally, each vowel constitutes a separate syllable peak (but see the section in this article regarding diphthongs), and flanking consonants constitute syllable margins. There are cases, however, where intuitively determined syllable boundaries occur between vowels, with no intervening consonant, and these may be indicated by the IPA symbol [.] for example [ɹi.ækt]. When a consonant is syllabic, it is marked by the IPA diacritic [ˌ] for example, *middle* [mɪdl̩] or *lightening* [laɪtn̩ɪŋ] (the gerundive form of the verb *lighten*; as opposed to the noun *lightning*).

In many languages, including English, in addition to syllables, initiatory activity appears to be parceled out into chunks, each containing one or several syllables, and all (at least within any one short stretch, such as a single intonation group) of very roughly the same duration. Each of these relatively equal chunks of initiator activity is called a 'stress-group' or 'rhythmic group' or 'foot.' Within each foot, stress appears to peak near the beginning, then decreases, to peak again near the beginning of the next foot, and so on. Consequently, the first (or only) syllable within a foot is more strongly stressed than the remaining syllable(s) of the foot.

The following example illustrates syllables, marked off by [.] between them, and feet, marked off by single vertical lines. In addition, the double lines at each end show the boundaries of an intonation group, while **bold** type indicates the 'tonic' syllable, that is, the one that carries the major pitch movement, in this case a falling, mid to low tone, within the intonation group. Notice how the difference in foot division differentiates between the sequence adjective + noun 'black bird' in (1) and the compound noun 'blackbird' in (2). Stresses are also (redundantly) marked, as a reminder that in each foot the initial syllable has a stress imposed upon it by its location under the stress peak at the start of the foot.

(1) ‖ 'John.saw.a | 'black | '**bird**.here | 'yes.ter.day ‖

(2) ‖ 'John.saw.a | '**black**.bird.here | 'yes.ter.day ‖

Stress, syllables, and feet, as well as tone and intonation (see 'Unphonated Sounds' section, this article) and the duration of sounds, are commonly treated under the heading of suprasegmentals or prosodic features (*see* **Prosodic Aspects of Speech and Language**).

Phonation

'Phonation' refers to various modulations imposed upon the airstream as it passes through the larynx. Phonation may therefore be defined as a laryngeal component of speech production which is neither initiatory nor articulatory in function.

Principal Types of Phonation

(a) *Breath,* producing voiceless sounds: the glottis is open (vocal folds abducted), so that the airstream passes through with minimal obstruction. This is the phonation type of voiceless fricatives such as [f], [s], [x], [h], etc.
(b) *Whisper,* producing whispered sounds: the epilaryngeal tube or 'aryepiglottic sphincter' (Esling, 1996, 1999) is constricted so that the airstream passing through the glottis becomes markedly turbulent, generating a strong 'hushing' sound.
(c) *Voice,* producing voiced sounds: the vocal folds are approximated (adducted) and set in vibration as the airstream passes through between them.
(d) *Creak:* the glottis is shortened by constriction of the epilaryngeal tube, producing glottal vibration at very low frequency with a 'crackling' sound.

A number of combinations of these phonation types are also possible. These include:

(e) *Breathy voice:* simultaneous breath and voice, that is, high-velocity airflow through a relatively open glottis, so that the vocal folds 'flap in the breeze': the phonation type of talking when very much out of breath.
(f) *Whispery voice,* or *murmur:* simultaneous whisper and voice.
(g) *Creaky voice:* simultaneous creak and voice.

In traditional articulatory phonetics, all of these phonation types are taken account of, though only the most widely used ones, voiceless and voiced, are regularly included in tables, such as the table of symbols for consonants on the IPA chart; but note that diacritics are provided for two other phonation types, for breathy voice (which could also be used to refer to whispery voice) and for creaky voice (which could refer to *harsh voice* or to other laryngealized effects) (*see* **States of the Glottis** for a full inventory of phonation types).

Unphonated Sounds As was seen above, phonation necessitates the passage of a stream of air through the larynx and the glottis (the space between the vocal folds). Consequently, those types of sound that do not entail the passage of an airstream through the glottis are, strictly speaking, 'unphonated.' These unphonated sounds include ejectives, since for them the glottis is tightly closed and has an initiatory rather than a phonatory function, and clicks, since the air involved in their production is entirely contained within the mouth. In click-using languages, the velaric closure may in fact be of the [k] type or, on the other hand, it may be a voiced [g], [ɡ̊] or [ŋ]. In such cases, the term 'voiced click' is often used, although this is not strictly accurate. The click, initiated entirely by rarefaction of air contained within the mouth, is itself unphonated, since the air used in its initiation and articulation does not pass through the larynx. The unphonated click is merely being performed against the background of a voiced sound. Voiced implosives, on the other hand, are indeed phonated, since, as observed in the section on glottalic initiation, they involve an upward (egressive) movement of air through the glottis, which sets the vocal folds in vibration. For these sounds, the glottis functions simultaneously as initiator and phonator.

Glottal stop [ʔ] is another type of sound which is strictly speaking unphonated (though often described as voiceless), the closed glottis functioning as articulator. On the other hand, for the voiceless and voiced glottal fricatives [h] and [ɦ], the glottis functions simultaneously as phonator and articulator.

Other Phonatory Phenomena

Aspiration When a voiceless sound, particularly a voiceless plosive, is followed by a vowel, for example, in the syllable [pa], the voicing for the vowel may start almost simultaneously with the opening of the lips, or, on the other hand, there may be a delay before the voicing starts, so that a short h-like puff of breath is heard between the release of the stop and the onset of voicing, [p^ha]. A short voiceless delay of this type is known as 'aspiration,' and the consonant is said to be 'aspirated.' If the voicing follows the release of the articulatory closure with virtually no delay, so that there is no audible aspiration, it is said to be 'unaspirated.' During the closed phase of the articulation of an unaspirated stop, the vocal folds are in a position of 'prephonation' (Esling and Harris, 2005), ready to spring into vibration the moment the oral closure is

released and air begins to flow upward through the glottis. During, or at the end of, the closed phase of an aspirated stop, however, the glottis is opened, so that there is a delay before the vocal folds come close enough together to be set in vibration by the airstream.

Though aspirated plosives and affricates are by far the commonest type of aspirated sounds, aspirated fricatives, and occasionally other sounds, do also occur in languages. What are called 'voiced aspirated plosives' also occur (although much less commonly than voiceless aspirated plosives), and are often transcribed as [bʱ], [dʱ], etc. For these sounds, the glottis is apparently configured for murmur or breathy voice during the stop, and the beginning (sometimes the whole) of the following vowel also has this type of phonation. There is, thus, a tendency to transcribe such sounds with the IPA diacritic for breathy voice, as [b̤], [d̤], etc.

Pitch Phenomena In the production of voice, the vocal folds vibrate at a frequency determined chiefly by the tension of the vocal folds and/or the subglottal air pressure. It is possible to vary the frequency of vocal-fold vibration over a wide range, and so to produce the auditory effect of a wide range of 'pitches.' Languages utilize pitch and pitch changes in one (or both) of two distinct ways, known as 'tone' and 'intonation.'

Tone is a distinctive pitch level or pitch movement associated with a short stretch of speech, often of syllable length, and a short grammatical unit, such as a word or morpheme. Languages utilizing pitch in this way are known as 'tone languages.' Typically, in a tone language, one word, or grammatical category, may be distinguished from another purely by tone: examples of such languages are Chinese, Thai, Vietnamese, Igbo, Yoruba, etc. (*see* **Tone in Connected Discourse**).

Intonation, on the other hand, is a distinctive patterning of pitches which can be associated with much longer stretches of speech, many syllables in length, and with potentially long grammatical units, such as clauses or sentences. These pitch patterns form intonation 'contours,' also known as 'intonation groups,' which commonly spread over a number of syllables. They signal sentence functions (e.g., statement versus question), major information points, and so on (*see* **Phonetics and Pragmatics**). (For a short example illustrating two English intonation groups, see the end of 'Other Initiatory Phenomena' section, this article.)

Register and Voice Quality 'Register' is a phonatory modification associated with a short stretch of speech, often of syllabic length. Like tone, register can be utilized to distinguish one word or grammatical category from another. The phonation types typically used in register distinctions are tentatively classified in Catford (1964). Although register is often referred to colloquially as 'voice quality,' voice quality is technically the third 'strand' of accent defined by Abercrombie (1967) and Laver (1980) as the long-term quality of a voice, largely extralinguistic. Laryngeal adjustments for phonation type play a large role in long-term voice quality, but general modifications in the quality of speech due to articulatory adjustments in the supralaryngeal vocal tract also contribute substantially to voice quality (*see* **Voice Quality**).

Articulation

As already noted, in the production of a sound, air in the vocal tract is set in motion by the 'initiation,' or airstream mechanism; the moving column of air, if it flows through the larynx, is subjected to 'phonation,' that is, it undergoes a set of complex modulations. Finally, the phonated airstream is subjected to a kind of 'final shaping,' giving rise to a sound of a quite specific type; this is 'articulation.'

In the classification of different types of articulation, a primary distinction is commonly made between 'vowels' and 'consonants.' This traditional distinction, which goes back at least to the Greeks and the Romans, is based on the syllabic function of the two classes of sound – vowels being those sounds which form syllables on their own, whereas consonants have to be combined with vowels to be 'pronounceable.' However, syllabic function is not a totally satisfactory criterion for distinguishing between vowels and consonants, and attempts have been made to base the vowel/consonant dichotomy on features of articulation; but this, too, is unsatisfactory, since no absolute articulatory boundary can be drawn between the two classes of sound. The problem of finding a differential definition for vowel and consonant is discussed at length in Pike (1943: Chap. 5) and more briefly in Catford (1977: 165–167).

In practice, however, the two classes can be kept reasonably distinct, and a quite different terminology is used for the description of members of the two classes. The reasons for this are discussed in the 'Vowels' section, later in this article. Meanwhile, the classification of consonants is considered.

Consonants are traditionally classified in terms of the location of the articulatory stricture within the vocal tract, that is, place of articulation, and in terms of other features of articulation which are commonly all treated under the general heading of manner of

articulation. In addition, in traditional articulatory phonetics, initiation type is often included under the heading of 'manner.'

Manners of Articulation

The articulatory features that constitute manner of articulation are:

(a) whether the airstream passes solely through the mouth (oral), the nose (nasal), or both (nasalized);
(b) stricture type, that is, (1) the degree of constriction of the articulatory channel (completely closed, as for 'stop' articulation, to completely open, as for 'open vowels'), and (2) whether the articulation is of a maintainable type (stop, fricative, etc.), or is of a momentary (tap) or gliding (approximant) type;
(c) whether the airstream passes along the central (median) line of the mouth, or is forced, by a median obstruction, to flow along one or both sides of the mouth ('lateral').

Although it is customary, in describing consonants, to name the place first, it is more convenient for expository purposes to start with the manner of articulation.

Principal Manners Described

The listing and description of manners of articulation follows (with some modifications) the order in which they are presented in the left-hand column of the chart of the International Phonetic Alphabet. Although not so labeled, this is, in part, a traditional list of 'manners.'

Stop In a 'stop,' the articulators come together ('approach') to form, and hold for an appreciable time, a complete closure ('hold') with buildup of positive or negative pressure behind it. On the 'release' of the hold, there is a sudden explosive efflux or influx of air resulting in a brief burst of noise. Stop is the general term for this manner of articulation, but, as noted in the 'Airstream Mechanisms Summarized' section, there are special terms commonly used for stops produced with different types of initiation: pulmonic stop is 'plosive'; glottalic egressive stop is 'ejective stop' (since there can also be ejective affricates and fricatives); glottalic ingressive stop is 'implosive'; and velaric ingressive stop or affricate is 'click.'

In the articulation of a stop, either the approach or the release may be absent, or virtually absent. For example, if one starts from a position of rest, with the lips closed, to say such a word as [pa], there is no observable approach of the articulators, though some preparatory events are probably taking place, such as the raising of the soft palate to close the entrance to the nasal cavity and some tensing of the muscles of the lips. At the end of an utterance there may be no observable or audible release of the closure. Commonly in American English, less commonly in British English, the final [p] in a word like *stop* or final [t] in *cat* may have no audible release. Thus, the only one of the three phases of a stop that is absolutely essential is, in fact, the period of closure, or hold, and this must always have a perceptible duration. This is why stop must be classified as a 'maintainable' articulation type, even though the actual noise produced, if the closure is released, may be momentary. It is primarily this feature, the maintained closure, that distinguishes a stop from a tap or flap.

The closed phase, or hold, of a voiceless plosive can obviously be maintained, in principle, for as long as one can hold one's breath. The duration of the closed phase of a voiced plosive is, however, severely limited by an aerodynamic constraint. Voicing can be maintained only so long as a stream of air is flowing upward through the glottis, keeping the vocal folds in vibration. The airflow for voicing can continue only so long as there is a pressure difference across the glottis of about 2 cm of water, or more; but as the air flows upward into the restricted space behind the articulatory stricture, the supraglottal pressure rapidly rises, eventually nullifying the necessary pressure difference. At this point, the glottal vibrations will cease and the sound will no longer be a voiced plosive.

The duration of voicing for a voiced plosive can be extended by enlarging the supraglottal cavity, chiefly by lowering the larynx, thus delaying the moment when the rising supraglottal pressure arrests the transglottal airflow. If the larynx-lowering is carried out very abruptly (and accompanied by little or no pulmonic pressure), the voiced plosive will turn into a voiced implosive: that is, the acceleration of the larynx movement, combined with reduction or abolition of pulmonic activity, converts the function of the glottis from that of mere phonator to simultaneous phonator and initiator.

Affricate An 'affricate' is a stop released into a homorganic fricative, within one and the same syllable, represented in IPA by the symbol for the stop followed by that for the fricative release, joined by a tie bar if necessary, for example, [ts], [dz], [tʃ], [dʒ], [kx], [gɣ]. If the stop and the fricative, in a close-knit sequence of this type, belong to different morphemes, they are not usually regarded as forming an affricate. Thus, in German *Blitz*, the sequence [ts] is generally regarded as an affricate, thus [blɪt͡s], but in English

bits, where [t] is the final consonant of *bit* and [s] is the exponent of the plural morpheme, the sequence [t] + [s] is not regarded as an affricate. If the stop is released into a homorganic lateral fricative, this gives, of course, a 'lateral affricate,' for example, [t͡ɬ].

Nasal Most of the time in speech, the soft palate is raised, closing the entrance into the nasal cavity, so that the air coming up from the larynx flows only out of the mouth. This is the state of affairs in the articulation of the majority of consonants and vowels, which are thus purely oral sounds; but, since this is the normal, or 'default,' state, it is not usually explicitly stated in the description of sounds. If, however, there is a complete closure at some point in the mouth, but the soft palate is lowered, the entire airstream is diverted through the nose. This gives what are called 'nasal' sounds, or simply nasals, for example, [m], [n]. Another possibility is to have the soft palate lowered but the passage through the mouth also unobstructed. In this case, air flows out of both the mouth and the nose. Sounds produced with this type of bifurcated airstream are called nasalized, for example, the French nasalized vowels [ɑ̃], [ɛ̃], as in *vent*, *vin*, etc. These sounds are also quite often referred to, less accurately, simply as 'nasal vowels.'

Trill In a 'trill,' one articulator taps repeatedly against another, usually at a frequency of between 25 and 35 Hz. A typical trill is the commonest type of Italian [r], which is similar to the *r* popularly believed to be used by Scots (though, in fact, most speakers of Scottish English and Scots dialects use a tapped [ɾ], fricative [ɹ̝], or approximant [ɹ] most of the time). Note that a trill requires a maintained posture of the articulators, the actual periodic tapping being produced aerodynamically – the airstream setting the articulator 'flapping in the breeze.'

Tap/Flap In 'tap' or 'flap' articulations, one articulator makes momentary contact with another. The contact may result from a 'flicking' movement, as in the apico-alveolar tap [ɾ], which, particularly in American English, commonly represents intervocalic [t] or [d] in such words as *latter* or *ladder*, and in British English may occur as an intervocalic variant of *r* in *very*, etc. Alternatively, an active articulator may momentarily strike against a static articulator in passing, as for the retroflex flap [ɽ] in the Hindi word [gʰoɽa] *horse*. Both tap and flap involve contact between articulators, but they differ from stop articulation in terms of the duration, and lightness, of the contact. The contact for these sounds is essentially brief, usually below 35 ms, whereas the contact for a stop usually lasts considerably longer than this, and can, of course, be maintained for a very long time. This is true of voiced stops as well as voiceless, although in this case, as noted above, the duration is aerodynamically restricted.

Fricative In the articulation of a 'fricative,' a narrow channel is formed at some point in the vocal tract and the airstream is forced through it, being accelerated in the process and becoming turbulent. This turbulence gives rise to the hissing noise characteristic of fricatives. The aerodynamics of fricatives have been studied in detail by Shadle (1990). The hiss noise is usually more apparent in voiceless fricatives than in voiced ones, since in the latter it is partly masked by the periodic sound of the voice. The hiss is still present, however, and the combination of this with voice produces the auditory effect of a 'buzz.' Typical fricatives are [f], [v]; [θ], [ð]; [s], [z]; [x], [ɣ]; etc. A distinction is sometimes made between 'flat' and 'grooved' fricatives. One can see, or rather feel, this difference, for example, by comparing English [θ] as in *thin* with [s] as in *sin*. From the articulatory (aerodynamic) point of view, it is the cross-sectional area of the articulatory channel, rather than its shape, that is important. The wide channel of [θ] does not accelerate the airstream to the extent that the narrow channel of [s] does. Sibilants are discussed further in the section on Cover Terms for Manners of Articulation.

'Lateral fricatives' are produced with a narrow articulatory channel similar to that of a fricative, but on one side (or, perhaps less commonly, on both sides) of the tongue. The commonest type are the dentalveolar voiceless and voiced lateral fricatives, transcribed [ɬ] and [ɮ], although even these are somewhat uncommon, [ɬ] occurring in fewer than 10% of the world's languages, and [ɮ] being even less frequent. The best-known example of [ɬ] is the 'll' of Welsh, as in such place names as *Llangollen* [ɬangɔɬen].

Approximant 'Approximants' are produced with an articulatory channel very slightly wider than that of fricatives. If one pronounces a prolonged and energetic labiodental fricative [v], for example, and then, while keeping the sound going, slowly and carefully slides the lower lip downward (taking care to keep the inner part of the lower lip in contact with the upper teeth), a point will very soon be reached, that is, after sliding downward no more than a millimeter or two, where the turbulent fricative buzz of [v] is replaced by the smoother, nonturbulent, sound of voice. This is the labiodental approximant [ʋ]. If, now, having reached the approximant [ʋ], one retains the articulation but devoices it, a fricative-like hiss will be heard again, only noticeably less loud than that of

the voiceless fricative [f]. This experiment demonstrates the typical difference between a fricative and the corresponding approximant. A fricative has turbulent airflow, and hiss noise, both when voiceless and when voiced. An approximant has mildly turbulent airflow and hiss noise when voiceless, but no turbulence and no hiss when voiced.

An ultra-short approximant, consisting chiefly of a glide to or away from the approximant position, is often called a semivowel. Examples are the palatal approximant [j] and the labial-velar approximant [w]. These have, or may have, exactly the same articulation as the vowels [i] and [u] respectively, which (as a moment's experiment shows) exhibit the criteria for approximants, namely nonturbulent flow when voiced, but turbulence when voiceless. The difference between [i] and [j] and between [u] and [w] is simply that whereas the approximant vowels can be indefinitely prolonged, the semivowels consist merely of a glide to and/or away from the vowel position.

'Lateral approximants' are 'ordinary' [l]-type sounds, with a slightly wider articulatory channel than that of the lateral fricatives, and hence no turbulence when voiced, which they usually are, but some turbulence when voiceless. The regular English [l] is a voiced lateral approximant. A voiceless or partially voiceless variant of it can be heard in English in the consonant clusters [pl̥] and [kl̥] in such words as 'please' and 'clean.'

The remaining manners listed on the IPA chart are 'ejective stop' and 'implosive,' both of which have been dealt with above.

Some Cover Terms for Manners of Articulation

The traditional 'manners' described above refer to rather specific and narrowly defined types of articulation. For some purposes, however, it is useful to have more general terms, each covering a number of more specific terms, thus creating a small hierarchy of terms at higher and lower ranks. One such higher-ranking division is into 'obstruents' and 'nonobstruents' (or sometimes 'sonorants').

Obstruent 'Obstruents' can be further subdivided into those that involve complete closure, 'occlusives,' and those that do not, 'nonocclusives.' There are problems with the higher rank assignment of several classes of sound. 'Nasals,' for example, are articulated with a complete closure in the mouth and, thus, might be called occlusive obstruents. However, the fact that they involve relatively unobstructed nonfricative airflow through the nose puts them into the nonobstruent class. The position of trills, flaps, and taps is ambiguous. All three classes involve articulatory contacts, but these contacts are so loose and momentary that they might qualify as nonobstruents. Moreover, these and other types of *r*-sound (e.g., untrilled approximant or fricative types of [ɹ]), together with nasals and lateral approximants, often pattern in the phonological structure of languages in ways that set them apart from the more obvious obstruents. From this phonological rather than phonetic point of view, nasals, lateral approximants, and 'r' sounds of all types are often treated as forming a class of sonorants or nonobstruents. This is not unrelated to the tradition going back to the Roman grammarians (who inherited it, with a slight change of meaning, from the Greeks) of grouping nonobstruent *l*'s and *r*'s together as 'liquids.'

Sibilant One further cover term is 'sibilant.' This term refers to fricatives of the [s] and [ʃ] types, the characteristic feature of which is that they are produced with a narrow dental, alveolar, or postalveolar articulatory channel, which accelerates airflow into a turbulent jet that strikes against the teeth, creating a turbulent wake downstream from the teeth. Note the difference, already mentioned, under Fricative, between nonsibilant [θ] and sibilant [s]. The wide, flat channel of [θ] does not accelerate the airstream to generate the high-velocity jet required for a sibilant.

Hierarchy of Manners The hierarchy of manner classes may be summarized as follows:

Obstruents:

- occlusives: stops (plosives, ejective stops, implosives) and affricates (including lateral affricates);
- nonocclusives: sibilants, and all other fricatives (including lateral fricatives);

Nonobstruents:

- nasals, liquids (i.e., all *r*-type sounds and approximant laterals), and all other approximants.

Places of Articulation

As seen in the preceeding Manners of Articulation secton, a lowered soft palate, which directs the airstream through the nose in the articulation of nasal and nasalized sounds, is traditionally treated as a manner of articulation. This leaves only the mouth, and the throat (the pharynx and larynx), as 'places of articulation.' 'Oral' places of articulation are described in the next section, followed by 'pharyngo-laryngeal' places.

Oral Articulatory Locations

Articulations in the mouth are effected by the juxtaposition of 'lower' and 'upper articulators,'

sometimes known as 'active' and 'passive' articulators – a terminology which has the disadvantage that in a few cases (e.g., when the lower and upper lips are juxtaposed) it is difficult to state with certainty which is the more 'active' articulator. The lower articulators are those attached to the lower jaw – the lower lip, lower teeth, and tongue. The upper articulators are the upper lip, the upper teeth, the whole of the roof of the mouth, and, in the case of the laryngeal articulator, the epiglottis. Each of these is a continuum, or near-continuum, of possible articulatory locations. In other words, articulations can occur, in principle, at virtually any point along each of them. For the purposes of the phonetic description of sounds, linguists identify a number of places, or zones, along each articulatory continuum, and it is usual to describe articulations in terms of these zones. At the same time, it is sometimes convenient to have more inclusive terms referring to more extensive divisions of the oral articulatory area, that is, classes at a higher rank in the locational hierarchy.

Upper Articulators The first, and most obvious, natural division of the whole upper articulatory area is that between the upper lip and the teeth, plus the remainder of the roof of the mouth. One can thus make a first division of the upper articulatory area into a 'labial' division (subdivided, when necessary, into an outer, 'exolabial,' and an inner, 'endolabial,' zone) and a 'tectal' (i.e., 'roof' of mouth) division. The tectal division can be subdivided into a front ('dentalveolar') part, and a rear ('domal') part. The dentalveolar subdivision consists of the upper teeth ('dental' zone) and the ridge behind the teeth (the 'alveolar ridge'), which can be subdivided into a front, relatively flat half (the 'alveolar' zone) and a maximally convex rear half (the 'postalveolar' zone). If one feels the alveolar ridge with the tip of the tongue, the two zones are usually apparent – though there is a good deal of individual variation in the shapes of alveolar ridges, some exhibiting much more postalveolar convexity than others. The division between the alveolar ridge and the remainder of the roof of the mouth, that is, the division between the dentalveolar and domal subdivisions, can be roughly defined as occurring at the point where the convexity of the alveolar ridge gives way to the concavity of the palate.

The rest of the domed roof of the mouth divides naturally into a front ('palatal') zone, consisting of the hard palate, and a rear ('velar') part, consisting of the soft palate, terminating in the uvula. Each of these zones is subdivided into a front half and a rear half, the palatal zone into 'prepalatal' and 'palatal' proper, and the velar zone into 'velar' and 'uvular.'

Table 2 Hierarchy of upper articulatory divisions and zones

Division	*Subdivision*	*Zone*	*Subzone*
Labial		labial	labial (exolabial/ endolabial)
Tectal	dentalveolar	dental	dental
		alveolar	alveolar
			postalveolar
	domal	palatal	prepalatal
			palatal
		velar	velar
			uvular

The hierarchy of upper articulatory divisions and zones is summarized in Table 2.

Lower Articulators The lower articulators are normally named by prefixes (labio-, dorso-, etc.) attached to the names of the upper zones against which they articulate. The lower articulators, then, are the lower lip ('labio-,' subdivided if necessary into 'exolabio-' and 'endolabio-') and the lower teeth ('denti-') and the tongue. The tongue has no clear-cut natural divisions, but for phonetic purposes it is divided into the tip or apex ('apico-') and behind that the blade ('lamino-'), which is usually taken to consist of that part of the upper surface of the tongue that lies immediately below the alveolar ridge, extending back about 1 to 1.5 cm from the tip. This definition of 'blade,' which goes back at least to Sweet (1877), is traditionally used in articulatory phonetics, though some writers have treated what is normally called the blade as part of the apex, using the term 'blade' to refer to the entire front half of the dorsal surface of the tongue behind the apex (e.g., Peterson and Shoup, 1966). The traditional usage of the term 'blade,' however, is much more convenient for phonetic taxonomy. The underside of the blade ('sublamino-') can be used in the articulation of 'retroflex' sounds. For these sounds, the apex of the tongue is raised and somewhat turned back, so that, in the extreme case, the underblade articulates against the 'prepalatal' arch, behind the alveolar ridge, giving a 'sublaminoprepalatal' articulation.

The remaining dorsal surface of the tongue ('dorso-') can be subdivided into front ('anterodorso-') and rear ('posterodorso-') halves. However, since it is normal for 'dorsodomal' articulations to be made by the juxtaposition of the appropriate part of the tongue with the upper articulatory zone that lies opposite or nearest to it, these terms are not often used. Finally, the cover term 'linguo-' can be used, when required, to refer in the most general way to articulation by the tongue.

Oral Places and Manners of Articulation Oral places of articulation can thus be fully described by

terms compounded of a prefixed designation of a lower articulator, plus the designation of an upper articulatory zone, for example, labiolabial (normally replaced by bilabial), labiodental, apicodental, laminoalveolar, dorsovelar, etc. In practice, however, it is customary to name only the upper articulatory zone, unless additional explicitness or accuracy is required for some specific purpose, such as the necessary distinction between bilabial [ɸ] and labiodental [f], and this practice is exemplified on the IPA chart.

The following is an enumeration of the principal oral articulations, basically following the place order shown on the IPA chart, but including some additional locations.

The first is 'bilabial'; in principle, all manners of articulation can occur here, and all are attested as regularly occurring in languages, except 'laterals.' Bilabial trill, though an easy sound to produce (for voiceless bilabial trill [ʙ], simply place the lips rather loosely together and blow, then add voice for [ʙ]), is rare, though known to occur in a few Austronesian languages, such as Titan and Kele in Papua New Guinea (Ladefoged *et al.*, 1977: 50) and Nias in Sumatra (Catford, 1988), and phonetically in Yi and Bai of SW China (Esling and Edmondson, 2002).

'Linguolabial' ('apicolabial') articulations are formed by the juxtaposition of tongue tip and upper lip; plosive, nasal, and fricative articulations are reported in some languages of Malekula, New Hebrides, and in Umotina, a Bororo language of South America (Ladefoged and Maddieson, 1986: 7).

'Labiodental' nasals, fricatives, and an approximant occur. The fricatives, [f] and [v], are usually distinctly 'endolabiodental'; that is, the inner surface of the lower lip covers the greater part of the upper teeth, whereas the articulation of the approximant [ʋ] may be 'exolabiodental.'

A 'bidental' ('dentidental') fricative occurs in a dialect of Adyghe (Circassian) in the northwest Caucasus. In addition, many speakers of American English articulate the [θ] of *thin* with the tongue slightly protruded between the upper and lower teeth – an articulation usually called 'interdental,' but which might be described as 'apico-' or 'laminobidental.' In British English, [θ] is perhaps more commonly articulated with the tongue tip just behind the teeth (Ladefoged and Maddieson, 1986).

The 'dentalveolar' (dental, alveolar, and postalveolar) subdivision contains a great range of possible apical and laminal articulations. On the IPA chart, a full set of 'manner' types is exemplified only for alveolars. This is because the IPA supplies diacritics for dental [̪], for example, [t̪] = dental [t], and for retracted [̱], for example, [ṯ] = retracted [t], which can be used to symbolize postalveolar [t] where necessary. In fact, a full set of dental and postalveolar articulations – plosive, nasal, trill, etc. – can occur. Rather commonly in the languages of the world, 'stops' (plosives, ejectives, and implosives), nasals, and lateral at dentalveolar locations are articulated with the apex of the tongue, hence they are 'apicodental,' 'apicoalveolar,' and 'apicopostalveolar,' but they can also be articulated with the blade, and so 'laminodental,' 'laminoalveolar,' and 'laminopostalveolar' are quite possible. Where it is necessary to distinguish between these types of articulation, the IPA again supplies diacritics.

With respect to fricatives, the alveolar sibilants [s] and [z] are very commonly laminoalveolar, though apicals are quite possible. Note that the tongue-shape for apicodental [θ] and [ð] is rather flat, creating a wider channel than that for sibilant [s] and [z]. Dental sibilant fricatives are also possible, represented when necessary as [s̪] and [z̪]. The postalveolar fricatives, [ʃ] and [ʒ], can be either apical or laminal.

Fully 'retroflex' sounds are articulated by the underblade of the tongue in juxtaposition with the prepalatal arch, behind the alveolar ridge. Probably the retroflex flap, [ɽ], is always fully retroflex, the tongue starting curled up and then shooting forward and downward, the underside of the apex and blade momentarily striking the palate on its way down. Retroflex consonants are particularly common in the languages of India. In general, the retroflex sounds of Dravidian languages such as Tamil and Telugu (*see* **Dravidian Languages**) tend to be fully retroflex (sublaminoprepalatal), while those of the Indic languages of Northern India, such as Hindi, are often little more than apicopostalveolar.

'Palatal' articulations are, in principle, sounds articulated by juxtaposition of the dorsal (especially anterodorsal) part of the tongue with the highest part of the hard palate. A full range of stops, nasals, fricatives, approximants, and laterals is possible here. However, probably because of the anatomy of the organs concerned – the convex tongue fitting into the concavity of the palate – pure dorsopalatal articulations (except for [j]) seem to be rare. In languages like Hungarian, Italian, Castilian Spanish, and French, which are all supposed to have palatal consonants ([c], [ɟ] and [ɲ] in Hungarian, [ɲ] and [ʎ] in Italian and Spanish, and [ɲ] in French), the articulation may often be prepalatal or even alveolar with a palatal modification (palatalized alveolar).

Note that on the IPA chart the places for trill, tap or flap, and lateral fricative are blank, meaning that there is no special IPA symbol for these sound-types, not shaded to indicate an articulation judged impossible. In fact, a dorsopalatal trill (or tap/flap) seems

highly improbable, though claims have been made that such a sound can be produced; but a palatal lateral fricative does occur, for example, in the south Arabian language Jibbali.

Mention should be made here of the 'alveolopalatal' fricatives, the symbols for which, [ɕ] and [ʑ], are listed under 'Other symbols' on the IPA chart. These, exemplified by Polish *ś* and *ź*, and by Chinese (Pinyin spelling) *x* [ɕ] and j [tɕ], are articulated by the front part of the dorsal surface of the tongue against the prepalatal arch (with the blade or apex of the tongue close to the postalveolar zone): they might therefore be termed 'anterodorsoprepalatal.' The traditional term, alveolopalatal, it may be noted, violates the principle enunciated above, namely that oral articulatory locations are named by prefixing a term designating the lower articulator to the name of the upper articulatory zone.

'Velar' sounds are articulated with the posterodorsal surface of the tongue making contact with the soft palate. Trills and taps or flaps are probably impossible here, but all other manners of articulation occur. Velar laterals are rare, but the velar lateral approximant [ʟ] is reported in a number of languages of New Guinea and the Chadic language Kotoko (Maddieson, 1984: 77; *see* **Chadic Languages**), and velar lateral affricates and fricatives occur in the north Caucasian (Dagestanian) language Artchi (Archi).

'Uvular' sounds are articulated with the rearmost part of the posterodorsum against the posterior part of the soft palate, including the uvula. A full range of manners of articulation is possible here, though the laterals (both fricative and approximant), are not known to occur. Of the plosives, the voiceless one [q] is about six times as common as the voiced one [ɢ]. This is no doubt because of the very small volume of air that can be contained between the uvular closure and the glottis, which renders voicing particularly difficult for uvular plosives for the reason explained earlier in the 'Stop' section.

Pharyngo-Laryngeal Articulations

These are articulations that take place in the pharynx, the part of the throat immediately behind the mouth, which includes the upper part of the larynx itself. Pharyngo-laryngeal articulations are typically a function of the 'laryngeal constrictor' mechanism, with four manners of articulation – stop, trill, fricative, approximant – modified by the parameter of larynx height. Phoneticians have called these sounds either 'pharyngeal' or 'epiglottal.'

'Pharyngeal' and 'epiglottal' articulations most commonly involve a sphincteric contraction of the upper part of the larynx, in which the aryepiglottic folds pull the back part of the larynx upward and forward to the base of the tongue against the epiglottis (Esling, 1996). As this happens, the tongue retracts and descends partially into the pharynx. This compresses the size of the pharynx in a maneuver whose physiological function is to protect the airway and efficiently seal air in the lungs. The tongue itself rarely retracts enough to close off the pharynx and cannot in any case retract independently of the laryngeal sphincter. The common variants of the Arabic throat consonants *ḥa* [ħ] and '*ain* [ʕ] are of this type. These sounds are usually described as fricatives, but the voiced member of the pair is more correctly an approximant, because it has no fricative-type hiss, though its voiceless partner is quite noisy.

The difference between what have been labeled 'pharyngeal' and 'epiglottal' articulations lies either in the height of the larynx itself or in the degree of noise and/or vibration generated. The designated epiglottal fricatives [ʜ] and [ʢ] will have either a more elevated larynx (and therefore a smaller pharyngeal cavity and higher-pitched resonances) than [ħ] and [ʕ], or more noise and/or trilling (Esling, 1999). When the laryngeal constrictor makes complete sphincteric closure, usually with the tongue retracted and the larynx elevated, an epiglottal stop [ʡ] results. Epiglottal articulations, with trilling, fricative noise, and stop modes that sometimes distinguish them from contrasting 'pharyngeal' sounds, are particularly common in Caucasian languages, such as dialects of Agul (Aghul), in Dagestan.

'Laryngeal' articulation takes place in the glottis and is thus generally termed 'glottal.' Glottal stop [ʔ], voiceless fricative [h], and voiced fricative [ɦ] occur. In the voiced glottal fricative [ɦ] the arytenoid cartilages at the rear of the vocal folds are separated, allowing passage of part of the pulmonic egressive airstream, but the forward, ligamental, part of the vocal folds is in vibration, producing voice. Both [h] and [ɦ] could thus be described as the phonation types breath (voiceless) and breathy voice (voiced). However, when they function in languages as consonants, that is, as marginal elements in the structure of syllables, they are usually described as glottal fricatives.

Modified and Double Articulations

Modified Articulations

'Modified articulations' are those involving the formation of a 'primary' stricture at some location, accompanied by a 'secondary,' more open, articulation, usually at some other location. Modified articulations

are symbolized, for the most part, by a small superscript symbol for the appropriate approximant (or fricative, if there is no appropriate approximant symbol). An example would be 'labialization' (or 'rounding'), that is, an approximation or rounding of the lips co-occurring with some other, closer, articulation, formed elsewhere, for example, labialized velar plosive or fricative [kʷ], [xʷ]. In the world's languages, labialization occurs most frequently with velars and uvulars, but also, rather surprisingly, with labials in a few languages. Apart from labialized, the four principal modified articulations are as follows.

In 'palatalized' sounds, the anterodorsum is raised toward the hard palate simultaneously with a primary articulation elsewhere. Palatalization is most common with labials, thus [pʲ], [fʲ], etc. With lingual articulations, palatalization, since it is effected by the same organ as the primary articulation, tends to shift the primary articulation. Thus, palatalized velars have the dorsovelar contact shifted forward somewhat, so that in extreme cases the articulation becomes palatal, or nearly so. In Russian, which contrasts plain versus palatalized labials and dental-veolars, unmodified [t] and [d] are apicodental, but their palatalized counterparts, [tʲ] and [dʲ], havethe tongue-tip retracted and possibly slightly lowered, so that they become laminoalveolar or even laminopostalveolar, often slightly affricated, thus [t̪sʲ], [d̪zʲ].

'Velarized' sounds have the posterodorsum raised toward the soft palate simultaneously with a primary articulation elsewhere, thus [tˠ] [dˠ]. Typically, in most types of English, /l/ at the end of a syllable is somewhat velarized ('dark l'); velarization and uvularization are also forms of the modification of 'emphatic' [tˤ] [dˤ] [sˤ] [zˤ] in Arabic.

In 'pharyngealized' sounds, the primary articulation is modified typically by stricture of the laryngeal constrictor – another form of Arabic 'emphasis,' for example, [tˤ], [sˤ], etc. This modification can also be applied to vowels. Velarized, uvularized, and pharyngealized can also be symbolized by a tilde running through the symbol for the primary articulation, thus [ɫ] = velarized or pharyngealized /l/.

For 'nasalized' sounds, the soft palate is lowered, and part of the airstream is diverted through the nose. Nasalized sounds are most commonly a modification of vowels, thus [ɛ̃], [ɑ̃], but applicable to consonants where appropriate (e.g., the Japanese 'syllabic n' in, for example, [hoɣ̃] *book*, where the final consonant is, or can be, a nasalized velar fricative or approximant). Note that, in this case, even if the oral articulation channel is of a narrow, fricative, type, so much of the airstream is diverted through the nose that the oral airflow is not turbulent.

Double Articulation

'Double articulation' means co-occurrence of two articulations of the same degree of stricture (e.g., two stops, two approximants) at different locations. Double articulations are named by hyphenated location names, thus labial-velar means 'simultaneously articulated at the lips and at the soft palate.' The IPA supplies symbols for four double articulations: [w] voiced labial-velar approximant, [ʍ] voiceless labial-velar fricative or approximant (the sound of *wh* in one pronunciation of *what*), [ɥ] voiced labial-palatal approximant, that is, the initial sound in French *huit* [ɥit], and, finally, [ɧ] voiceless postalveolar-velar fricative (simultaneous [ʃ] and [x]), the southern Swedish fricative that represents the *ti* in such a word as *station*.

Apart from these special cases, the commonest double articulations consist of the simultaneous articulation of stops at two locations, most frequently labial-velar [kp] [gb], written [k͡p] [g͡b] when the coarticulation has to be made explicit in transcription. This particular type of double articulation is often called 'labiovelar,' a term which must be avoided in a strictly systematic phonetic taxonomy in which the first half of such a compound term refers to the lower articulator. Double articulations of this type are uncommon, occurring in only about 6% of the world's languages, mostly in Africa, particularly in Niger-Kordofanian (*see* **Niger-Congo Languages**) and Nilo-Saharan languages (*see* **Nilo-Saharan Languages**).

In Europe, double articulations occur only in a few north Caucasian languages, namely Abkhaz and the now virtually extinct Ubykh, which both have labial-dental [pt], [pt'], and [bd], and Lak, in Dagestan, with coarticulated [pk], [pts], and double fricatives such as [ɸ͡x], [ɸ͡χ], etc.

Vowels

The 'Articulation' section drew attention to the difficulty of justifying, on articulatory grounds, the distinction that is traditionally made between vowels and consonants. It is clear that some vowels can be described in purely 'consonantal' terms, that is, in terms of consonantal 'place and manner' of articulation. A moment's experimentation demonstrates that the vowel [i] (approximately as in English *see*) is a palatal approximant, that is, articulated with the front of the tongue raised up close to the hard palate (hence palatal), and that the airflow is nonturbulent when the sound is voiced, but becomes turbulent when it is devoiced (precisely the criterion for an 'approximant'). In a similar way, it can easily be seen that [u] (approximately as in English *who*) is

a labial-velar approximant. Other vowels, for which the tongue is drawn well back into the pharynx and engaging the laryngeal constrictor, such as extremely retracted types of [ɔ] and [ɑ], may be described as pharyngeal or epiglottal approximants, and so on.

The great 19th-century phoneticians Alexander Melville Bell and Henry Sweet, from whom the vowel classification used in articulatory phonetics is chiefly derived, were well aware of the relationship between vowels and consonants (Bell, 1867: 75; Sweet, 1877: 51). Nevertheless, the taxonomy of vowels that they were largely responsible for developing uses a different approach. The problem is that, although some vowels, such as [i], [u], [ɑ], and other 'peripheral' vowels, can easily be classified in the 'consonantal' way, it becomes more difficult to apply the 'place and manner' classification to certain others, for example, the [æ] vowel of English *cat*. For vowels like this, the surface of the tongue is remote from both the roof of the mouth and the back of the oral vocal tract, so that the precise specification of a 'place' of articulation, and of a 'manner' in terms of stricture type, becomes problematic.

Classification of Vowels

Consequently, vowels are classified in terms of the general configuration of the tongue and the lips. It is this configuration, the shape and location of the body of the tongue, together with lip position, that determines the shape and size of the oral and pharyngeal cavities, and hence their resonant frequencies, and this, in turn, determines the quality of the vowel (*see* **Phonetics, Acoustic**).

'Lip position' is the most obvious feature of vowel articulation. The lips may be in a more or less spread or neutral position, that is, 'unrounded,' as in the production of the English vowels [i] in *beet*, [æ] in *bat*, [ʌ] as in *but*, for instance; or they may be 'rounded' to a greater or lesser extent, as for [u] in *boot* or [ɔ] in *bought*. As Bell said (1867: 16), it was the discovery that lip configuration is an independent parameter, the different lip positions being combinable with any tongue position, that was the major breakthrough leading to the establishment of the model of vowel production used throughout the 20th century.

For 'tongue position,' the general shape and location of the main mass of the tongue is approximately defined in terms of the height to which the convex body of the tongue is raised and the horizontal, back-front, location of the tongue mass.

For tongue height, by silently and introspectively saying the vowels [i], [e], [æ], approximately as in English *beet*, *bait*, *bat*, and [u], [o], [ɔ], approximately as in *boot*, *boat*, *bought*, one can obtain an impression of what is meant by 'tongue height.' The tongue is clearly raised up close to the roof of the mouth in [i] and [u], and progressively lowered as one goes down to [æ] and [ɔ]. The lowering of the tongue can be more clearly perceived if one fixates the jaw, for example, by holding the end of a pencil between the teeth, and notes the sensation of lowering and flattening of the tongue, and also the fact that in saying [i] (silently) one can feel contact between the sides of the tongue and the molar and canine teeth, but that this contact is lost as the tongue moves down.

For 'horizontal tongue position,' the body of the tongue can be pushed forward and bunched up in the front of the mouth, as for [i] or [e], or it can be drawn back in the mouth, as for [u] or [ɔ]. The difference between 'front' and 'back' tongue positions can be clearly felt, by silently and introspectively saying [i] or [e] and moving quickly to [u] or [ɔ], and then silently sliding the tongue back and forth between the front and back positions. It will be noticed that the perceived change of lip position from unrounded [i] to rounded [u] tends to mask the sensation of tongue movement. To obtain a clearer perception of the front-back tongue movement, it is useful to start from [i], slowly and carefully round the lips to approximately their position for [u], then, while retaining that lip position, slide back to [u]. When the change of lip position is thus abolished, the backward movement of the tongue can be more easily perceived.

In describing the tongue positions of vowels, reference is often made to the highest point of the convex surface of the tongue. This is merely a convenient reference point, useful in comparing tongue positions, but of no functional significance in the production of vowel sounds. Another location on the tongue surface is more important in determining vowel qualities. This is the location of the narrowest linguo-domal or linguo-pharyngeal stricture; and this, in its turn, is determined by the general location of the tongue mass as a whole, which is, in fact, what one is chiefly aware of in the silent, introspective experiments described in this section.

Cardinal Vowels

In the model of vowel production that traditional articulatory phonetics inherited from Bell and Sweet, vowels are classified in terms of the degree of 'tongue height,' 'horizontal tongue position,' and 'lip position.' These pioneers established three 'cardinal' – a term first used by Bell (1867: 15) – degrees of 'height,' namely, high, mid, and low (corresponding to the close, mid, and open of the IPA chart (**Figure 1**), with mid subdivided into close-mid/open-mid), and of 'horizontal' position, front, back, and central (originally called 'mixed'). These, together with an

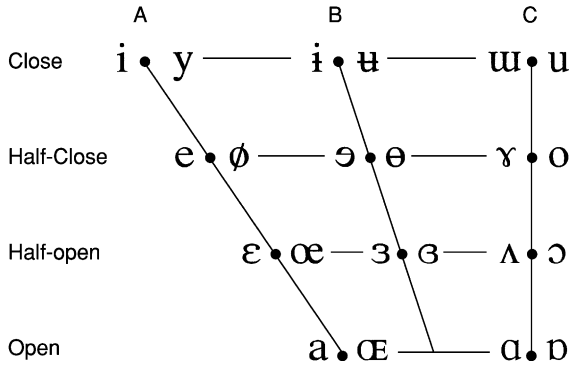

Figure 1 Cardinal vowel chart.

array of modifications, brought the total number of vowel qualities recognized by their model to 81.

Effective though the Bell-Sweet system of vowel classification was, in one respect it lacked precision: it furnished coordinates defining relative tongue positions, but provided no absolute fixed points of origin from which these could be measured. Daniel Jones (see Jones, 1922) improved the system by basing a set of eight cardinal vowels (cvs) upon two more or less fixed reference points: these were 1 [i], for which the tongue is as far forward and as high as possible, and 5 [ɑ], for which the tongue is as low and as far back (i.e., retracted) as possible.

These are two limiting points. If, while the airstream remains constant, the tongue is brought still closer to the hard palate and prepalatal arch for [i], the flow will become turbulent and the sound will thus become a palatal or prepalatal fricative. Similarly, if the tongue is pulled back further into the pharynx for [ɑ], the sound will become a pharyngeal or epiglottal fricative. Adopting these extreme vowels as key points, the set of cvs is completed by a series of (roughly) equally spaced fully front vowels, 2, 3, 4 [e, ɛ, a], and three equally spaced fully back vowels, 6, 7, 8 [ɔ, o, u], the 'equal spacing,' according to Jones, being both articulatory and auditory.

The cvs 1 to 5 [i e ɛ a ɑ] are unrounded, 6 to 8 [ɔ o u] being rounded. This distribution of lip rounding corresponds to what is 'normal' in the world's languages, where, among mid and close back vowels, rounded vowels are overwhelmingly commoner than unrounded ones. The set of cvs is completed by a set of secondary cvs, having the opposite lip positions, rounded [y ø œ ɶ ɑ], and unrounded [ʌ ɤ ɯ].

The vowel diagram on the IPA chart displays the cvs, at the points marked by dots on its periphery, plus a number of other types of vowel whose place of articulation and articulatory relationship to the cvs is shown by their location on the diagram. This commonly used vowel diagram is an easily drawn simplification of an earlier form which purported to represent with some accuracy the relative tongue positions of the cvs, derived from X-ray photographs of Daniel Jones' pronunciation of them. The IPA diagram is something of a hybrid. Its general shape roughly indicates the articulatory relations between the vowels, but the fact that the horizontal line between the close front and close back positions [i] to [u] is twice as long as the line between open front and open back [a] to [ɑ] can only be justified on an auditory/acoustic basis. It is clear from X-ray data that the articulatory distance between [i] and [u] is about the same as that between [a] and [ɑ], but the acoustic distance between [i] and [u] in terms of the frequency of the second formants of these vowels (*see* **Phonetics, Acoustic**) is about twice the distance as between [a] and [ɑ].

A phonetician trained in the auditory/proprioceptive identification of vowel qualities, and in the precise values of the cvs, can place a dot on the cv diagram showing the location of any particular vowel in relation to the cardinal vowels. This provides, for other phoneticians trained in the cvs, a fairly precise indication of the quality of the vowel in question. Even those who are not explicitly trained to use the cvs regularly make use of the general principles of vowel classification outlined here, sometimes with minor terminological variations, for example, using 'high' and 'low' (in reference to tongue position) in place of 'close' and 'open' (in reference to jaw position). See for example the illustrations of individual languages in the *Handbook of the IPA* (IPA, 1999) or in the *Journal of the IPA*.

Diphthongs

Vowels uttered as part of a single syllable may be either monophthongs (so-called 'pure' vowels) or diphthongs. Monophthongs involve no appreciable change in vowel position throughout their duration, whereas diphthongs involve a noticeable change. A diphthong is recognized as having two elements, the 'vowel nucleus,' which is clearer and more prominent, and the 'glide,' or nonsyllabic element, which is less prominent and shows a continuous change of vowel position. In IPA notation, the nonsyllabic element can be transcribed with the diacritic [̯], for example English *high* [haɪ̯], *how* [haʊ̯]. Given that the nonsyllabic part of a diphthong involves continuous change of vowel position, it is only an approximate indication of its quality; it should be taken as the direction in which the articulators move rather than as an absolute target achieved.

Modifications of Vowels

Although the three parameters of lip position and vertical and horizontal tongue position enable the

specification of most vowels with some accuracy, one must take account of some other articulatory features, which can be regarded as modifications of the basic articulation of vowels.

Among such features are two already mentioned in the 'Modified Articulations' section, namely 'nasalization' and 'pharyngealization.' In addition, there are three other modifications, for which the IPA supplies diacritics: 'advanced tongue root,' 'retracted tongue root,' (indicating essentially expansion of the pharynx by lowering the larynx and contraction of the pharynx by engaging the laryngeal constrictor), and 'rhoticity.'

'Rhoticity,' or 'rhotacization,' also known as 'r-coloring,' is a cover term used for certain modifications of tongue shape that are associated (in English, at least) with orthographic sequences of vowel + r, most typically in words such as *bird, burn, Bert*. In American English, the vowel in such words is often said to be 'retroflexed.' Retroflexion (see Oral Places and Manners of Articulation in this article) is, indeed, one possible form of rhoticity, but nearly the same auditory quality may be achieved not by turning up the apex of the tongue but by simultaneously modifying the shape of the tongue in two other ways: retraction of the tongue root into the pharynx while increasing laryngeal constriction (i.e., mild pharyngealization), and some degree of 'sulcalization' of the back of the tongue, that is, the formation of a hollow or furrow in the dorsal surface of the tongue roughly opposite the uvula.

Conclusion

There have been numerous critics of the traditional classification of vowels who claim that the tongue positions posited by the model are not borne out by X-ray data. On the whole, such criticism is exaggerated. Although numerous apparent anomalies have been pointed out, the vast majority of the hundreds of published X-ray photographs and tracings from X-rays demonstrate the validity of the model. Although acoustic definitions of vowels, in terms of the frequency of their first, second, and third formants are obviously of great value and are much used, along with articulatory descriptions, for most of the purposes of descriptive, comparative, and pedagogical linguistics, there is no useful substitute for the traditional articulatory model (see Catford, 1981).

In general, articulatory phonetics provides a model of speech production that is inclusive enough and flexible enough to allow for the description and classification of virtually any sounds that can be produced by human vocal organs and are thus potentially utilizable in speech. It does this primarily by specifying parameters – ranges of possibility, rather than narrowly defined features or classes of sounds. Thus, although linguists specify a finite set of articulatory 'zones' along the roof of the mouth, this is merely a matter of convenience, since it is clear that articulation between the dorsal surface of the tongue and the roof of the mouth can occur at any point, or more precisely (since tongue-domal contacts naturally involve an area, not a point, of each articulator) in any area, and articulatory phonetics allows for precise definition of such contact areas. One is very rarely forced to 'make do' with *ad hoc* categories when new sounds or sound combinations are found in languages. There are sufficient categories, and principles for their application, to deal efficiently with most new sound types. Thus, the principle of defining airstream mechanisms in terms of the location and direction of initiation not only permits the description of all types of initiation known to be used, but is also extensible to other minor types (Pike, 1943: 99–103). Unusual articulations, like the bidental fricatives, or linguolabials, and velar laterals (mentioned in the section on 'Pharyngo-Laryngeal Articulations') present no difficulty, because the categories are there in the model, and even where a very specific category has not previously been called for, it is generally easy to subdivide existing ones. Thus, when distinctions between inner and outer labial articulations were found to be necessary, the subdivision of the labial zone presented no problem (Catford, 1977: 146–147).

See also: Afroasiatic Languages; Bell, Alexander Melville (1819–1905); Caucasian Languages; Chadic Languages; Disorders of Fluency and Voice; Dravidian Languages; Ellis, Alexander John (né Sharpe) (1814–1890); Imaging and Measurement of the Vocal Tract; International Phonetic Association; Jespersen, Otto (1860–1943); Khoesaan Languages; Na-Dene Languages; Niger-Congo Languages; Nilo-Saharan Languages; Passy, Paul Edouard (1859–1940); Phonetic Transcription: History; Phonetics and Pragmatics; Phonetics, Acoustic; Prosodic Aspects of Speech and Language; Sievers, Eduard (1850–1932); Speech Aerodynamics; Speech Perception; Speech Production; States of the Glottis; Sweet, Henry (1845–1912); Tone in Connected Discourse; Viëtor, Wilhelm (1850–1918); Voice Quality.

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Phonetics, Acoustic

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Introduction

Phonetics is the study of characteristics of human sound-making, especially speech sounds, and includes methods for description, classification, and transcription of those sounds. Acoustic phonetics is focused on the physical properties of speech sounds, as transmitted between mouth and ear (Crystal, 1991); this definition relegates transmission of speech sounds from microphone to computer to the domain of instrumental phonetics, and yet, in studying acoustic phonetics, one needs to ensure that the speech itself, and not artifacts of recording or processing, is being studied. Thus, in this chapter we consider some of the issues involved in recording, and especially in the analysis of speech, as well as descriptions of speech sounds.

The speech signal itself has properties that make such analysis difficult. It is nonstationary; analysis generally proceeds by using short sections that are assumed to be quasistationary, yet in some cases this assumption is clearly violated, with transitions occurring within an analysis window of the desired length. Speech can be quasiperiodic, or stochastic (noisy), or a mixture of the two; it can contain transients. Each of these signal descriptions requires a different type of analysis. The dynamic range is large; for one speaker, speaking at a particular level (e.g., raised voice), the range may be −10 to 50 dB SPL (decibels Sound Pressure Level) over the entire frequency range (Beranek, 1954), but spontaneous speech may potentially range over 120 dB and still be comprehensible by a human listener. Finally, the frequency range is large, from 50 to 20 000 Hz. Though it is well known

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Phonetics, Forensic

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The term 'forensic phonetics' refers to the application of phonetic expertise to forensic questions. Forensic phonetics was a relatively new area at the beginning of the 1990s. The kind of activity that its practitioners are probably most frequently involved in is forensic speaker identification. Forensic phoneticians may act as expert witnesses in a court of law and testify as to whether or not a speech sample produced by an unknown speaker involved in the commission of a crime originates from the same speaker as a reference sample that is produced by a known speaker, the accused. Other activities in which forensic phoneticians may be engaged are speaker characterization or profiling, intelligibility enhancement of tape-recorded speech, the examination of the authenticity and integrity of audiotape recordings, the analysis and interpretation of disputed utterances, as well as the analysis and identification of non-speech sounds or background noise in evidential recordings. In addition, forensic phoneticians may collaborate with forensic psychologists to assess the reliability of speaker recognition by earwitnesses.

Speaker Recognition: Identification versus Verification

Speaker identification, whether in a forensic context or otherwise, can be regarded as one form of speaker recognition. The other form is usually called speaker verification. There are a number of important differences in the sphere of application and in the methodology employed in these two forms of speaker recognition. Speaker identification is concerned with establishing the identity of a speaker who is a member of a potentially unlimited population, verification with establishing whether a given speaker is in fact the one member of a closed set of speakers which he claims to be.

There are basically two different approaches to speaker recognition. One is linguistically oriented, the other is essentially an engineering approach. In recent years, considerable progress has been made by those taking the latter approach, culminating in the development of fully operational automatic speaker verification systems. In a typical verification application, a person seeking access to a building or to certain kinds of information will be asked to pronounce certain utterances, which are subsequently compared with identical reference utterances produced by the speaker he claims to be. If the match is close enough the speaker is admitted, if not, he is denied access.

Automatic Speaker Recognition

The success of automatic speaker verification systems has stimulated research into the application of similar techniques to the field of automatic speaker identification for forensic purposes. Although attempts in this field have been numerous, they have not so far been successful. The problem is that speaker identification, especially in the forensic context, is a much more complex affair than speaker verification. While the unknown speaker in a verification context is a member of a closed set of speakers, the suspect in a forensic identification context is a member of a much larger group of speakers whose membership is not really known and for whom no reference samples are available. Recording conditions may vary quite considerably in the identification context and speakers cannot be relied upon to be cooperative. They may attempt to disguise their voices, they may whisper, adopt a foreign accent, or speak a foreign language.

These are some of the main factors that have so far stood in the way of the development of reliable automatic speaker identification systems.

Forensic Speaker Identification

In the absence of quantitative, engineering-type solutions to the identification problem, forensic phoneticians largely rely on auditory, or aural–perceptual methods, frequently but not always combined with some form of acoustic analysis of features like fundamental frequency, or pitch, intonation, and vowel quality. Their findings are based on a detailed analysis of the accent and dialect variety used, of the voice quality and, if sufficient material is available, of any recurrent lexical, idiomatic, syntactic, or paralinguistic patterns, always allowing for the communicative context in which the various speech samples are produced and for the physical and emotional state of the speaker(s) involved. The phonetic analysis typically includes a narrow transcription of (parts of) the speech sample, based on the IPA symbols (see *International Phonetic Association*). What the forensic phonetician will be looking for in particular are speaker-specific features in areas like articulation, voice quality, rhythm, or intonation. Of particular interest here are features that deviate from the norm for the accent or dialect in question as well as features that are relatively permanent and not easily changed either consciously or unconsciously by the speaker. Of course, for such features to be amenable to forensic investigation, they not only need to be fairly frequent but also reasonably robust, so that the limitations imposed by the forensic context, such as less than perfect recording conditions and relatively short speech samples, do not preclude their investigation.

An example of a norm-deviating feature would be the regular use of preconsonantal /r/ in an otherwise non-r-pronouncing accent, or the bilabial or labio–dental articulation of prevocalic /r/, as in '*woy*' or '*voy*' for *Roy*. Features that may be fairly permanent and not easily changed are the duration of the aspiration of voiceless plosives, the frequency range at which the voice descends into creaky voice or glottal creak, assimilation of voice and, on the lexical level, the use of certain types of 'fillers' or stock phrases. In addition, individual speakers may exhibit pathological features such as stammering, inadequate breath control, lisps, or various types of defective vocalization, which may serve to distinguish them from other speakers.

Obviously, a combination of such features potentially provides strong evidence for identification. However, this approach presupposes an ability to quantify features such as voice quality, which do not easily lend themselves to quantification, as well as a knowledge of the distribution of such features in the relevant speaker population, which is not always available (*see* **Voice Quality**). As a result, forensic phoneticians have to weigh the significance of the correspondences and differences found between the speech samples under investigation, drawing on their experience and expertise as phoneticians and their familiarity with the language variety involved. So, in the absence of rigorous quantitative criteria, the forensic phonetician will frequently have to base his conclusions on an interpretation of largely qualitative data.

This means that conclusions inevitably have to be formulated in terms of probability rather than certainty, and are ideally prefaced by an acknowledgment of the nature of the testimony offered, which is that of a considered opinion, not a piece of incontrovertible evidence.

The Status of Forensic Speaker Identification

In view of the nature of the methods applied by forensic phoneticians, it is not surprising that their judgments are not always unchallenged. The most extreme position is held by those who believe that phoneticians have no special skills to identify or discriminate between speakers and that no phonetician should consequently claim to possess such skills by giving evidence in a court of law. Somewhat less skeptical are those who maintain that phoneticians do have a role to play, but only in establishing nonidentity. They argue that, in the absence of experimental evidence that no two speakers speak exactly alike, there is no real basis for 'positive' identification. Finally, there are those who believe that both identity and nonidentity can be established, but among those who subscribe to this view there is considerable variation in the degree of probability or certainty they would be prepared to attach to their conclusions.

In some countries, forensic speaker identification is somewhat controversial. This is no doubt partly due to the exaggerated claims made by those who were responsible for the introduction of the so-called 'voice print' technique, which in the 1960s and 1970s enjoyed considerable prestige in parts of the United States and in some other countries. A voice print is essentially a spectrographic representation of a speech signal. Speech sounds are complex vibrations. A spectrogram shows the relative intensity of the frequency components making up this complex vibration (*see* **Phonetics, Acoustic**). The voice print technique essentially consisted of a visual comparison of spectrograms of identical utterances produced by a known speaker and an unknown speaker to determine whether they originated from a single person.

Spectrograms may provide forensically useful information about speech signals but most phoneticians would now agree that there is little justification for the implication of reliability carried by the term voice print, which suggests that the status of voice print evidence is comparable to that of fingerprint evidence. Testimony based on modified forms of the voice print technique as practiced by certified members of the VIAAS (Voice Identification and Acoustic Analysis Subcommittee) of the IAI (International Association for Identification) continues to be accepted as evidence in some states in the United States.

There are two international organizations whose members are in one way or another involved in forensic speaker identification. In addition to the VIAAS, whose membership is largely American, there is the IAFP (International Association for Forensic Phonetics), which was founded in 1989 with the aim of providing a forum for those working in the field of forensic phonetics as well as ensuring professional standards and good practice in this area. Its membership is in fact almost entirely European.

Speaker Profiling

If there is no suspect available, forensic phoneticians and dialectologists may also be asked to produce a speaker profile on the basis of a recorded speech sample of an unknown speaker. This may include information about the criminal's sex, age group, regional and/or social background, and educational standard. The speaker profile may subsequently play a role in directing the investigative efforts of the police.

Speaker Identification by Earwitnesses

Earwitnesses may be asked to go through what is usually called a voice parade or voice line up if a suspect is available but the offender's speech has not been recorded. This essentially amounts to a procedure in which a speech sample of the suspect plus samples of five or six similar sounding speakers are recorded on audiotape and played to the earwitness, who will be asked to indicate which if any of the speakers is the offender. The proper administration of a voice parade, like that of its visual counterpart – also known as the 'Oslo confrontation' – demands that strict requirements be met, to prevent procedural errors that would raise serious doubts about any identification made and thus reduce or destroy its evidential value.

A distinction that needs to be made with respect to identifications by nonphoneticians relates to the familiarity of the earwitness with the offender's speech. If, for example, the earwitness claims the offender's voice belongs to a person the earwitness knows, the ability of the witness to recognize this voice from a number of similar voices may be tested directly, and much more rigorously, than is possible through a voice parade as described above. Some other factors that may be expected to affect recognition by earwitnesses are the amount of time elapsed between the exposure to the unknown speaker's voice and the line up, the nature of the earwitness's interaction with the unknown speaker, the amount of speech heard, and the age of the earwitness.

Intelligibility Enhancement

Intelligibility enhancement of speech recordings is undertaken to determine what is said in evidential recordings rather than to establish the identity of the speaker. Enhancement work typically involves the use of digital filtering techniques, aimed to reduce the presence of unwanted noise components in the recorded signal. The degree of improvement achieved will generally depend on the nature and intensity of the nonspeech signal. Filtering techniques may also play a role in the interpretation of disputed utterances. An analysis of the speaker's speech patterns, combined with an analysis of the acoustic information contained in the signal under investigation, may resolve the question one way or the other.

Audiotape Examination

Tape authentication and integrity examinations are conducted to establish whether recordings submitted by the police or private individuals can be accepted as evidential recordings. Questions here relate to the origin of the recording, e.g., whether the recording was made at the time and in the manner it is alleged to have been made, or to its integrity, i.e., whether the recording constitutes a complete and unedited registration of the conversation as it took place. This type of examination will usually include a visual inspection of the tape for the presence of splices or any other forms of interference; a detailed auditory analysis to localize any record on/off events or any discontinuities in the progress of the conversation or in the background noise; an electro-acoustic analysis to display and compare any transients generated by record on/off events with those produced in replication tests on the recorder allegedly utilized to make the questioned recording; and inspection of the magnetic patterns on the tape surface through the use of ferrofluids, which may provide information about record on/off events or about the size and shape of the record and erase heads. The increasing availability of computer-based digital speech processing systems has led to a situation where relatively large numbers of people have access

to equipment that can be used to make edits that are not easily detectable from a technical point of view. However, apart from technical indications, suspect recordings may also contain linguistic indications of fabrication, which may in fact escape detection by all except the forensic phonetician.

See also: International Phonetic Association; Phonetic Transcription: History; Phonetics, Acoustic; Phonetics: Overview; Speaker Recognition and Verification, Automatic; Speech Production; Voice Quality.

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Phonetics: Field Methods

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Introduction: What Is Phonetic Fieldwork and Why Do We Do It?

The primary goals of phonetic research are threefold: to document the different sounds that occur in natural languages (e.g., Ladefoged and Maddieson, 1996), to understand the acoustic and articulatory properties of these sounds (e.g., Miller-Ockhuizen, 2003), and to evaluate experimentally theories and models of phonetic and phonological structure (e.g., Bird and Caldecott, 2004). To achieve these goals, it is crucial to consider all languages spoken across the world. How is this done? In some cases, speakers can be recorded in a laboratory setting; this is practical with many languages spoken in urban areas. When speakers cannot be brought to a laboratory, however, it is necessary to conduct phonetic fieldwork, i.e., to record speech outside of a laboratory setting. Until fairly recently, conducting phonetic fieldwork has been much more limited than laboratory-based phonetic work because of restrictions on the kinds of instrumental tools that could be taken outside of a laboratory setting. Particularly techniques for measuring articulatory phonetics, such as electromagnetic articulography (EMA), magnetic resonance imaging (MRI), or laryngoscopy, cannot be used in fieldwork situations. However, technological advances have made it much easier to collect data in the field: acoustic data can be collected using compact, unobtrusive equipment such as a pocket-sized mini-disc recorder; tongue movement data can be recorded using a portable ultrasound machine; air flow and pressure data can be collected using portable equipment with a laptop computer. These new technologies have allowed phoneticians to collect data from speakers who are either unable to travel to a research institution, or who are uncomfortable working within a laboratory setting. The data collected in the field from languages that would not otherwise be studied are crucial for attaining the goals of phonetic research and, more generally, for gaining a full understanding of the range of possible phonetic phenomena in natural language.

This article describes methods used in the collection of phonetic data in the field, focusing on two areas of phonetics: acoustic phonetics and articulatory phonetics. For each of these areas of study, the relevant research methods are described and the kinds of questions addressed are discussed.

Field Methods in Acoustic Phonetics

The most common kinds of phonetic data recorded in fieldwork settings are acoustic data, based on audio recordings. Different recording modes are used, including solid state, compact disc, mini-disc, digital audiotape, and cassette. Ladefoged (2003) provided

to equipment that can be used to make edits that are not easily detectable from a technical point of view. However, apart from technical indications, suspect recordings may also contain linguistic indications of fabrication, which may in fact escape detection by all except the forensic phonetician.

See also: International Phonetic Association; Phonetic Transcription: History; Phonetics, Acoustic; Phonetics: Overview; Speaker Recognition and Verification, Automatic; Speech Production; Voice Quality.

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Phonetics: Field Methods

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Introduction: What Is Phonetic Fieldwork and Why Do We Do It?

The primary goals of phonetic research are threefold: to document the different sounds that occur in natural languages (e.g., Ladefoged and Maddieson, 1996), to understand the acoustic and articulatory properties of these sounds (e.g., Miller-Ockhuizen, 2003), and to evaluate experimentally theories and models of phonetic and phonological structure (e.g., Bird and Caldecott, 2004). To achieve these goals, it is crucial to consider all languages spoken across the world. How is this done? In some cases, speakers can be recorded in a laboratory setting; this is practical with many languages spoken in urban areas. When speakers cannot be brought to a laboratory, however, it is necessary to conduct phonetic fieldwork, i.e., to record speech outside of a laboratory setting. Until fairly recently, conducting phonetic fieldwork has been much more limited than laboratory-based phonetic work because of restrictions on the kinds of instrumental tools that could be taken outside of a laboratory setting. Particularly techniques for measuring articulatory phonetics, such as electromagnetic articulography (EMA), magnetic resonance imaging (MRI), or laryngoscopy, cannot be used in fieldwork situations. However, technological advances have made it much easier to collect data in the field: acoustic data can be collected using compact, unobtrusive equipment such as a pocket-sized mini-disc recorder; tongue movement data can be recorded using a portable ultrasound machine; air flow and pressure data can be collected using portable equipment with a laptop computer. These new technologies have allowed phoneticians to collect data from speakers who are either unable to travel to a research institution, or who are uncomfortable working within a laboratory setting. The data collected in the field from languages that would not otherwise be studied are crucial for attaining the goals of phonetic research and, more generally, for gaining a full understanding of the range of possible phonetic phenomena in natural language.

This article describes methods used in the collection of phonetic data in the field, focusing on two areas of phonetics: acoustic phonetics and articulatory phonetics. For each of these areas of study, the relevant research methods are described and the kinds of questions addressed are discussed.

Field Methods in Acoustic Phonetics

The most common kinds of phonetic data recorded in fieldwork settings are acoustic data, based on audio recordings. Different recording modes are used, including solid state, compact disc, mini-disc, digital audiotape, and cassette. Ladefoged (2003) provided

a detailed description of many of the methods used in the collection of acoustic data, including each method's benefits and drawbacks. Figure 1 illustrates an experimental setup used for recording acoustic data.

Figure 1 Example of an acoustic data collection setup: a Sony MZ-B10 portable mini-disc recorder and a Sony ECM-T115 lapel microphone.

Audio recordings provide basic acoustic information about the properties of speech sounds. These data can be analyzed using various tools, also described in Ladefoged (2003). The program Praat, created by Paul Boersma and David Weenink, is often used in phonetic data analysis. Among other things, this program displays speech visually, making it possible to extract specific kinds of acoustic information, ranging from overall pitch, duration, and amplitude measurements to acoustic properties specific to individual consonants or vowels. Figure 2 shows a waveform and spectrogram associated with the English sentence *She likes singing jazz*, as an example of what acoustic properties of speech can be depicted visually. The first display is the waveform. In the second display, pitch and amplitude curves are superimposed on the spectrogram.

Several kinds of research questions can be addressed based on acoustic data. One research area involves the prosodic structure of language. For example, Hargus and Rice (2005) have written a series of papers on prosodic structure in various Athabaskan languages; all of their work is based on experimental data collected in the field. Segmental properties have also been the focus of much phonetic work. Miller-Ockhuizen (2003) described guttural sounds in Jul'hoansi, a Khoisan language spoken in Botswana and Namibia. Subsegmental properties of speech can also be studied acoustically, such as the timing between different components of complex sounds. Bird and Caldecott (2004) provided an acoustic study

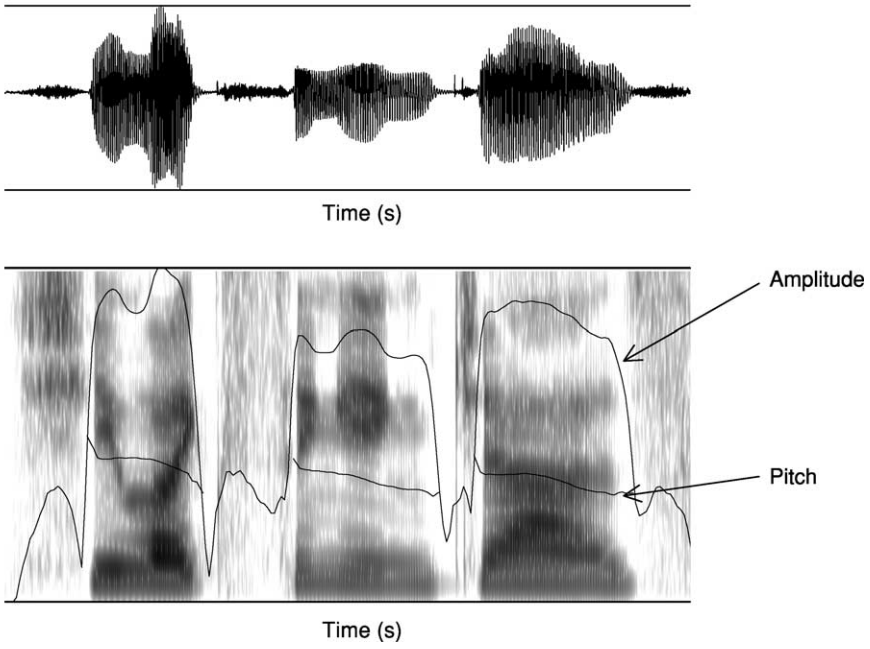

Figure 2 Waveform (top) and spectrogram (bottom) of the English sentence *She likes singing jazz*. Pitch and amplitude curves are superimposed on the spectrogram.

Figure 3 Airflow and pressure data collection setup.

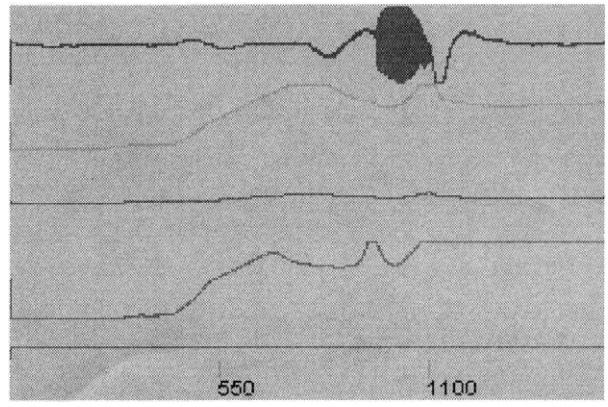

Figure 4 Airflow and pressure contours for the Navajo word [hẽs] ('to itch – future'). From top to bottom, the contours represent the acoustic waveform, oral airflow, oral pressure, and nasal airflow.

Figure 5 Ultrasound data collection setup using the Sonosite Titan portable ultrasound machine.

of glottalized resonants in St'át'imcets (Lillooet), an Interior Salish language spoken in British Columbia, Canada.

In addition to making audio recordings, it is possible to collect data on air pressure and airflow from the mouth and the nose. The system usually consists of oral and nasal masks and pressure tubes held by the speaker, along with a microphone to record sound. Figure 3 illustrates the experimental setup. The pressure tubes are connected to a system that tracks pressure and airflow, and displays data visually onto a computer screen (Ladefoged, 2003), as shown in Figure 4. Nasal airflow data are useful for answering questions on the use and timing of nasalization in different sounds. For example, based on nasal airflow data, Gerfen (2001) showed that Mixtecan has a series of nasalized fricatives that are extremely marked linguistically: they are difficult to produce and are also extremely unusual cross-linguistically.

Another area of exploration using airflow and pressure data involves different phonation types. Breathy voicing, modal voicing, and creaky or laryngealized voicing differ in the amount of airflow through the glottis. The rate of airflow through the glottis is highest for breathy voicing, and lowest for creaky or laryngealized voicing. Using airflow data, it is therefore possible to explore phonation types within a language and across languages. Ladefoged (2003) used this parameter to study Javanese, to distinguish breathy voicing from modal voicing. Phonation types can also be explored using electroglottography (EGG), a technique in which the degree of closure of the vocal folds is measured (for details, see Ladefoged, 2003).

Field Methods in Articulatory Phonetics

Until recently, the most common way of collecting articulatory data in the field was using a technique called static palatography (see Ladefoged, 2003). This technique involves having a speaker pronounce certain speech sounds after painting his/her tongue with a mixture of oil and charcoal, and observing where on the roof of the mouth the mixture has been transferred. Static palatography is particularly useful for exploring properties such as place of articulation in spoken segments that involve a complete closure between the tongue and the roof of the mouth. Anderson (2000), for example, related

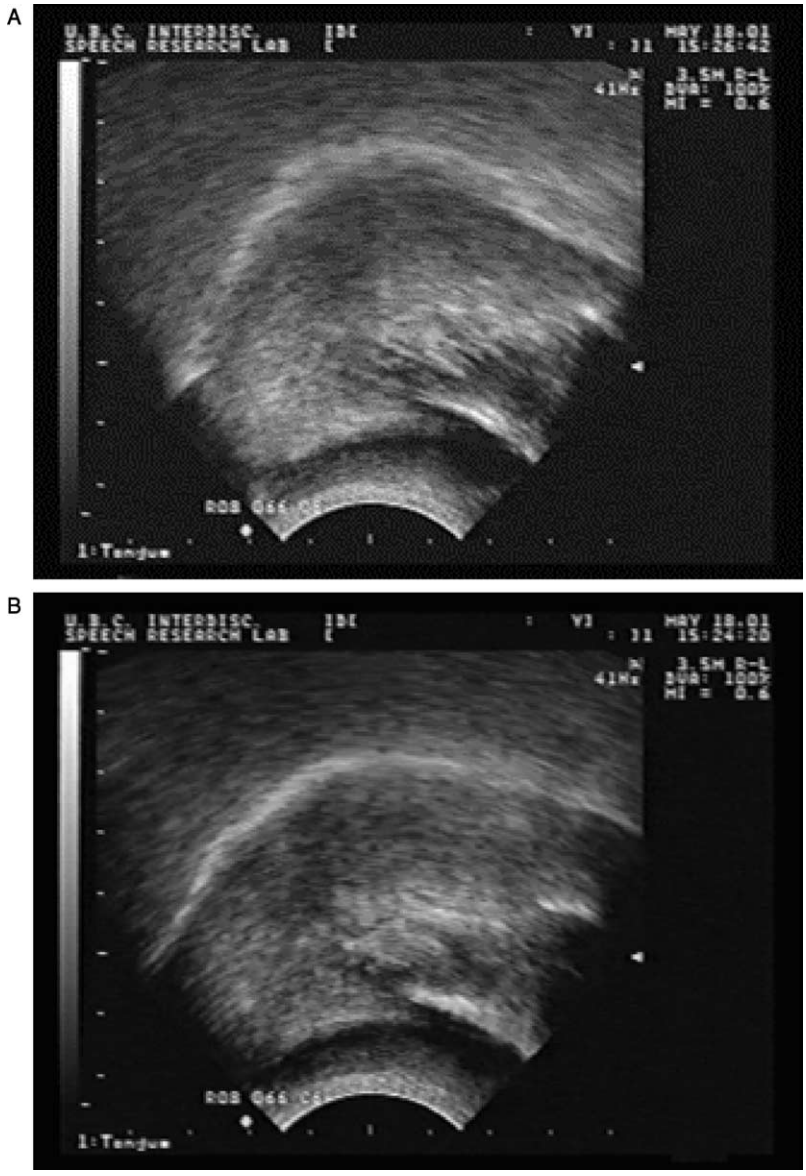

Figure 6 Midsagittal ultrasound images of Kinande, showing (A) advanced-tongue root and (B) retracted-tongue root varieties of the vowel /e/. The tongue tip is at the right of the picture, and the root is at the left. The tongue surface can be seen as the lower edge of the white curved region.

differences in articulation to various tongue positions in speakers of Western Arrente, an aboriginal language of Central Australia. One drawback of static palatography is that it requires repainting the tongue after every token uttered, which is relatively time consuming. In addition, this method does not allow for collection of data on the dynamic properties of speech production. An alternative technique used in laboratory settings is dynamic palatography, with which it is possible to track articulations across time. This technique is not practical in most fieldwork situations, however, because obtaining good results requires making a special false palate for each speaker (Ladefoged, 2003).

Ultrasound imaging is another technique for recording articulatory data in the field (Gick, 2002; Gick *et al.*, 2005a). Figure 5 illustrates the experimental setup used in ultrasound field research. Portable ultrasound machines are ideal for collecting articulatory data: they are small enough to fit into a day pack, language consultants enjoy working with them because they can see what they are producing, and the data can be used to address questions involving not only the pronunciation of individual segments, but also the articulatory timing involved in producing complex segments and sequences of segments, as well as motor planning in the production of a whole sentence. Ultrasound data are useful primarily for

observing the articulations involving the tongue; an example of the kind of data obtained using ultrasound imaging is shown in Figure 6. Although the ultrasound machines are still relatively expensive (with portable machines costing approximately $20 000 U.S.), their price has been dropping and more and more researchers are able to purchase them for linguistic research. Nevertheless, fieldwork on articulatory phonetics using ultrasound imaging is relatively new, and little published work exists based on fieldwork using the technique (McDowell, 2004; Gick *et al*., 2005b; Miller-Ockhuizen *et al*., 2005). Increasing availability of the equipment will no doubt soon provide valuable new information on articulatory phonetics.

Conclusion

A wide range of questions can be addressed using phonetic techniques; advances in technology have increasingly made it possible to collect phonetic data in the field. Data collected in field contexts, in which the researcher goes into a community and records speakers, rather than transporting them back to a laboratory setting, have opened up a whole new range of phenomena to consider, both in documenting natural language sounds and in evaluating current linguistic theory.

See also: Arrernte; Australia: Language Situation; Canada: Language Situation; Imaging and Measurement of the Vocal Tract; Laboratory Phonetics; Phonetics, Acoustic; Phonetics, Articulatory; Phonetic Classification; Phonetics: Overview; Salishan Languages; States of the Glottis.

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Phonetics: Overview

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Phonetics is the study of pronunciation. Other designations for this field of inquiry include 'speech science' or the 'phonetic sciences' (the plural is important) and 'phonology.' Some prefer to reserve the term *phonology* for the study of the more abstract, the more functional, or the more psychological aspects of the underpinnings of speech and apply *phonetics* only to the physical, including physiological, aspects of speech. In fact, the boundaries are blurred, and some would insist that the assignment of labels to different domains of study is less important than seeking answers to questions.

Phonetics attempts to provide answers to such questions as: What is the physical nature and structure of speech? How is speech produced and perceived? How can one best learn to pronounce the sounds of another language? How do children first learn the sounds of their mother tongue? How can one find the cause and the therapy for defects of speech and hearing? How and why do speech sounds vary in different styles of speaking, in different phonetic contexts, over time, over geographical regions? How can one design optimal mechanical systems to code, transmit, synthesize, and recognize speech? What is the character and the explanation for the universal constraints on the structure of speech sound inventories and speech sound sequences? Answers to these and related questions may be sought anywhere in the 'speech chain,' i.e., the path between the phonological encoding of the linguistic message by the speaker and its decoding by the listener.

The speech chain is conceived as starting with the phonological encoding of the targeted message, conceivably into a string of units like the phoneme, although there need be no firm commitment on the nature of the units. These units are translated into an orchestrated set of motor commands that control the movements of the separate organs involved in speech. Movements of the speech articulators produce slow pressure changes inside the airways of the vocal tract (lungs, pharynx, oral and nasal cavities) and, when released, these pressure differentials create audible sound. The sound resonates inside the continuously changing vocal tract and radiates to the outside air through the mouth and nostrils. At the receiving end of the speech chain, the acoustic speech signal is detected by the ears of the listener and transformed and encoded into a sensory signal that can be interpreted by the brain. Although often viewed as an encoding process that involves simple unidirectional translation or transduction of speech from one form into another (e.g., from movements of the vocal organs into sound, from sound into an auditory representation), it is well established that feedback loops exist at many stages. Thus what the speaker does may be continuously modulated by feedback obtained from tactile and kinesthetic sensation, as well as from the acoustic signal via auditory decoding of his speech.

In addition to the speech chain itself, which is the domain where speech is implemented, some of the above questions in phonetics require an examination of the environment in which speech is produced, that is, the social situation and the functional or task constraints, for example, that it may have evolved out of other forms of behavior, that it must be capable of conveying messages in the presence of noise, and that its information is often integrated with signals conveyed by other channels.

The end-points of the speech chain in the brains of the speaker (transmitter) and the listener (receiver) are effectively hidden, and very little is known about what goes on there. For practical reasons, then, most research is done on the more accessible links in the chain: neuromuscular, aerodynamic, articulatory, and acoustic. The articulatory phase of speech is perhaps most immediately accessible to examination by direct visual inspection and (to the speaker himself) via tactile and kinesthetic sensation. Thus it is at this level that speech was first studied, supplemented by less precise auditory analysis, in several ancient scientific traditions. This history of phonetics, going back some 2.5 millennia, makes it perhaps the oldest of the behavioral sciences and, given the longevity and applicability of some of the early findings from these times, one of the most successful.

In the second half of the 19th century, the instrumental study of speech, both physiologically and acoustically, was initiated, and this has developed continuously, until now some very advanced methods are available, especially ones that involve on-line control and rapid analysis of signals by computers. One of the most useful tools in the development of phonetics has been phonetic transcription, especially the near-universally used International Phonetic Alphabet (IPA). Based on the principle of 'one sound, one symbol,' it surpasses culturally maintained spelling systems and permits work in comparative phonetics and in phonetic universals (Maddieson, 1984).

In addition to classifying some of the subareas of phonetics according to the point in the speech chain

on which they focus, research is often divided up according to the particular problem attacked or to a functional division of aspects of the speech signal itself.

One of the overriding problems in phonetics is the extreme variability in the physical manifestation of functionally identical units, whether these be phonemes, syllables, or words. Theories of coarticulation, i.e., the overlap or partially simultaneous production of two or more units, have been developed to account for some of this variation. Other proposed solutions to this problem emphasize that, if properly analyzed, there is less variation in speech than appears at first: more global, higher-order patterns in the acoustic speech signal may be less variably associated with given speech units than are the more detailed acoustic parameters. Other approaches place emphasis on the cognitive capacity of speakers and hearers to anticipate each other's abilities and limitations and to cooperate in the conveyance and reception of pronunciation norms.

Another major problem is how the motor control of speech is accomplished by the brain when there are so many different structures and movements to be carefully coordinated and orchestrated – in biophysical terms, where there are an inordinate number of 'degrees of freedom.' A proposed solution is positing coordinative structures that reduce the degrees of freedom to a manageable few. Related to this issue are the metaquestions: What is the immediate goal of the speaker? What is the strategy of the listener? Is the common currency of the speaker and hearer a sequence of articulatory shapes, made audible so they can be transmitted? Or are the articulatory shapes secondary, the common coin being acoustic-auditory images? It is in this context that atypical modes of speech have significance, i.e., substitute articulations necessitated for purposes of amusement as in ventriloquism or because of organic defects in the normal articulatory apparatus.

One of the hallmarks of human speech, as opposed to other species' vocalizations, is its articulated character, i.e., that it is a linear concatenation of units such as consonants and vowels or perhaps of syllables. Most phonetic research has been done on this, the 'segmental,' aspect of speech. In parallel with speech segments, however, are other phonetic events loosely linked with them and that are less easily segmented. These are the so-called 'suprasegmentals,' including intonation, stress, (lexical) accent, tone, and voice quality. They are receiving increased research attention because they are the next frontier in phonetics (after segmental research) and because of pressures from speech technology, especially text-to-speech synthesis, to produce a theory that fully accounts for the prosodic structure of speech.

In spite of the breadth of its scope and the diversity of its approaches, phonetics remains a remarkably unified discipline.

In its development as a discipline, phonetics has drawn from a variety of fields and pursuits: medicine and physiology (including especially the area of communication disorders), physics, engineering, philology, anthropology, psychology, language teaching, voice instruction (singing and oratory), stenography and spelling reform, and translation, among others.

It remains a multifaceted discipline in the early 21st century. As suggested above, phonetics and phonology are closely allied fields, whether one views them as largely autonomous with small areas of overlap or as one field with slightly different emphases. In the present article, it is proposed that phonetics is a part of phonology: phonology's goal is to try to understand all aspects of speech sound patterning, and phonetics is one domain where it must seek its answers; other domains include psychology, as well as the study of society and culture. Phonetics is at the same time a scientific discipline that maintains its ties to physiology, psychology, physics, and anthropology by trying to acquire new knowledge about the nature and functioning of speech. It is also a discipline that has made considerable progress in applying its existing knowledge in useful ways, e.g., in telephony, in diagnostics and therapy in communication disorders, in the development of writing systems, and in teaching second languages, as well as a host of areas in speech technology and forensics. If product sales are a measure of the accomplishment of a discipline, phonetics must by this measure be one of the most successful areas within linguistics.

But despite the many seemingly diverse paths taken by phonetics, it has proven itself a remarkably unified field. Reports on work in all of these areas are welcome at such international meetings as the International Congress of Phonetic Sciences (a series begun in 1928, the last one being the 15th, held at Barcelona in 2003), Eurospeech Interspeech (the most recent being held in Lisbon in 2005), and the International Conference on Spoken Language Processing (a series started in 1990, now integrated with Interspeech). Likewise, a quite interdisciplinary approach to phonetics may be found in several journals: *Journal of the Acoustical Society of America, Journal of the Acoustical Society of Japan, Phonetica, Journal of Phonetics, Journal of the International Phonetic Association, Language and Speech,* and *Speech Communication*.

What this author thinks keeps the field together is this: on the one hand, we see speech as a powerful but

uniquely human instrument for conveying and propagating information; yet because of its immediacy and ubiquity, it seems so simple and commonplace. But on the other hand, we realize how little we know about its structure and its workings. It is one of the grand scientific and intellectual puzzles of all ages. And we do not know where the answer is to be found. Therefore we cannot afford to neglect clues from any possibly relevant domain. This is the spirit behind what may be called 'unifying theories' in phonetics: empirically based attempts to relate to and to link concerns in several of its domain, from traditional phonology to clinical practice, as well as in the other applied areas. In an earlier era, Zipf's principle of least effort exemplified such a unifying theory: the claim that all human behavior, including that in speech, attempts to achieve its purposes in a way that minimizes the expenditure of energy. Zipf applied his theory to language change, phonetic universals, and syntax, as well as other domains of behavior. In the late 20th century, there were unifying theories known by the labels of 'motor theory of speech perception' (Liberman *et al.,* 1967; Liberman and Mattingly, 1985), 'quantal theory,' 'action theory,' 'direct realist theory of speech perception,' and 'biological basis of speech,' among others. They address questions in phonetic universals, motor control, perception, cognition, and language and speech evolution. Needless to say, one of the principal values of a theory – including the ones just mentioned – is not that they be 'true' (the history of science, if not our philosophy of science, tells us that what we regard as 'true' at the start of the 21st century may be replaced by other theories in the future), but rather that they be interesting, ultimately useful, testable, and that they force us to constantly enlarge the domain of inquiry; in other words, that they present a challenge to conventional wisdom.

See also: Experimental and Instrumental Phonetics: History; Phonetic Pedagogy; Phonetic Transcription: History; Phonetics, Articulatory; Phonetics: Precursors to Modern Approaches; Speech: Biological Basis; Speech Development; Speech Perception; Speech Production; States of the Glottis; Voice Quality; Whistled Speech and Whistled Languages.

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Phonetics: Precursors to Modern Approaches

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It has often been maintained that linguistics, and by implication phonetics, only began in the 19th century, but this is far from the truth. This article will attempt to survey the development of the study of the sounds of speech and their formation, from the earliest times until approximately the end of the 19th century, excluding the Arab/Persian and East Asian traditions, which will be separately treated.

Ancient India

Certain Sanskrit treatises, written during the first millennium B.C. give an astonishingly full and mostly accurate account of the mechanism of speech, and of the way speech sounds (in this case the sounds of Sanskrit) could be classified. One reason for the existence of these remarkable treatises relates to the importance which was attached to the reading of the religious books known as 'Vedas,' using the precise canonical pronunciation handed down from earlier times. The attempt to convey this resulted in a classificatory system for speech sounds which bears a very close resemblance to that of modern phonetics. The ancient Indian interest in phonetics is not confined to these treatises. The great Indian grammarian Pāṇini frequently dealt with phonetic matters in his *Aṣṭādhyāyī*, as did later commentares (*see* **Bhartrhari**). This is in stark contrast to the virtual neglect of phonetics by the Greeks and Romans. The following account of Indian phonetics is heavily indebted to Allen (1953), which should be consulted for a more comprehensive description.

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The Organs of Speech and Articulatory Processes

The treatises contain a set of technical terms for the various parts of the vocal tract – 'articulators' (root, middle, and tip of the tongue, and lower lip) and 'place of articulation' (foot of the jaw (= velum), palate, teeth, teeth-roots, upper lips.

Two main types of processes are described: (a) those occurring in the vocal tract between the larynx and the lips ('internal'); (b) those occurring elsewhere ('external'). The first of these relates closely to the modern term 'stricture,' specifying four degrees of closure between the articulators and the place of articulation: (i) 'touching' (= closure) – resulting in stops; (ii) 'opened' – giving vowels; (iii) 'slight contact; and (iv) 'slight openness.' The last two relate to the semivowels [j, r, l, ʋ], and to the fricatives [ʃ, ʂ, s, ɸ, x, h, ɦ]. Most sources do not draw any distinction corresponding to 'close' and 'open' vowels, though some refer to contact being made in [i] and [u]. The distinction between vowels and consonants is based not only on stricture, but also on the syllabic function of vowels. The external processes are those relating to the larynx, lungs, and nasal cavity. The mechanism of voicing is for the most part poorly described in the Western tradition, at least before the 18th century. The Indian phoneticians' account, while not wholly accurate, is far superior. 'Breath' and 'voice' are distinguished according to whether the glottis is open or contracted, and there is an intermediate category between voiced and breathed, when the glottis is neither fully open nor contracted for voicing. This occurs in the Sanskrit sounds commonly transcribed as ⟨bh, dh⟩ etc. (namely, what is now called 'breathy voice,' though the existence of this category was vociferously denied by some Western scholars even as late as the 19th century).

Unaspirated and aspirated stops are distinguished by the lesser or greater amount of breath involved. Nasals are produced by opening the nasal cavity together with the appropriate articulations in the mouth, to give the nasal stops [m, n, ɲ, ɳ, ŋ], and also nasalized vowels and semivowels.

Points of Articulation

Six points of articulation are distinguished: (1) 'glottal,' or 'pulmonic,' producing [h and ɦ], whose similarity to vowels is emphasized; (2) 'velar' – 'root of the tongue' against 'root of the upper jaw' (i.e., the velum) ([k, kh, g, gh, x]; (3) 'palatal' – middle of the tongue against the palate ([c, ch, ɟ, ɟh, ɲ, j, ʃ]); (4) 'retroflex' (*mūrdhanya* – literally 'of the head' – hence the terms 'cerebral' and 'cacuminal,' common in the 19th century), producing [ʈ, ʈh, ɖ, ɖh, ɳ, ʂ]; the curling back of the tongue tip is described, and the use of the underside of it. Some sources also include [r] here but elsewhere it is described as alveolar, or even as velar; (5) 'dental' – tip of the tongue against the teeth – [t, th, d, dh, n, l, s]; (6) 'labial' – [p, ph, b, bh, m, ʋ, ɸ].

The vowel system consists of short [a, i, u] and the 'consonant–vowels' [l, r], with the corresponding long [aː, iː, uː] and [rː]. [a] and [aː] are classed as 'glottal.' Allen (1953: 59) points out that ⟨a⟩ seems to have been regarded as a 'neutral' vowel – with unimpeded breath stream through the vocal tract, like [h] – apparently equated in some sources with 'pure voice,' so that the voicing in the voiced consonants can be described as 'consisting of ⟨a⟩.' [i] and [iː] are classed as 'palatal,' and [u] and [uː] as 'labial,' from the obvious rounding or protrusion of the lips (their velar component is not mentioned, but this is true of most early vowel descriptions, especially when the vowel system is small enough not to require this distinction to be made). [r, rː] and [l, lː] are described as part vowel and part consonant, presumably from their syllabic function. Finally, the treatises distinguish the diphthongs [ai, au] (described as 'glotto–palatal' and 'glotto–labial' respectively) and the vowels [e] and [o] (originally also diphthongs), which had a quality intermediate between [aː] and [iː]/[uː].

Prosodies

Here also the Indian phoneticians are far ahead of any Western counterpart prior to the eighteenth century in paying attention to features which characterize longer stretches of speech. It is significant that the Sanskrit term *sandhi* has been adopted in modern phonetics to refer to junction features (*see* **Sandhi**). These features include modifications which take place at various boundaries – between words, morphemes, or sound-segments. At word and morpheme boundaries the treatises describe types of assimilation between final and initial segments, for example, of place or manner of articulation or of voicing, and the insertion of certain 'glides' to avoid hiatus between vowels. There is a description of the extent to which retroflexion may spread through words from a retroflex segment, and of the transitions between different types of segments, for example, the different types of stop release.

The syllable is defined as composed of a vowel with possible preceding consonant(s), and a possible following consonant if before a pause, and there are rules for syllable division. Vowel length is specified in units called *mātras* (cf. *moras*). Three distinct tone classes are distinguished; 'raised,' 'unraised' or 'low,' and 'intoned' – described by most sources as a combination of the first two, i.e., falling. The relative nature of the pitch difference indicated is clearly recognized. Allen (1953: 89–90) draws attention to

the interesting connection made by some sources with possible physiological differences: the raised tone is said to be brought about by tenseness and constriction of the glottis, and the low tone by laxness and widening of the glottis.

Greece and Rome

The Greek Philosophers

The Greco–Roman tradition in the description of speech is relatively sparse, and is based more on auditory characteristics than on articulations. The sound-elements (called *grammata* or *stoikheia*) were divided by Plato into three groups: (a) those with *phōnē* (translatable as 'sonority') – the vowels; (b) those with neither *phōnē* nor *psophos* ('noise') – the stop consonants; and (c) 'intermediate' sounds, having *psophos* but not *phōnē* – [l m n r s] and the double sounds [dz] (or [zd]), [ks], and [ps]. Aristotle renamed the third group *hēmiphōna* 'half-sonorous.' He also attributed an articulatory feature *prosbolē* ('approach,' 'contact') to groups (b) and (c).

The Stoic philosophers distinguished three aspects of the *stoikheion*: (a) the sound; (b) the symbol used to represent it; and (c) its name. These were translated later into Latin as aspects of *litera* (letter): *potestas*, *figura*, and *nomen*. Subsequent use of the word *litera*, or its equivalent in other languages is often ambiguous; sometimes its sense is not far different from that of the modern term 'phoneme' (see Abercrombie, 1965: 76, 85).

The Tekhnē Grammatikē

The *Tekhnē grammatikē* traditionally attributed to Dionysius Thrax (*see* **Dionysius Thrax and Hellenistic Language Scholarship**) in the first century B.C., retained Aristotle's terminology for the three groups, but linked groups (b) and (c) under the term *sumphōna* – literally 'sounding with (the vowels),' i.e., consonants. The stop consonants (*aphōna*) were divided into three subgroups: (a) *psila* 'smooth,' 'unaspirated' – [p t k]; (b) *dasea* 'rough,' 'aspirated' – [ph th kh]; and (c) *mesa* 'intermediate' – [b d g], said, puzzlingly, to be midway between the other two groups on the scale of smooth–rough, and not linked with larynx activity. The Greeks had only a vague notion of the mechanism of voicing. Aristotle attributes it to the air striking the trachea, and Galen later talks of it as 'breath beaten by the cartilages of the larynx' using the term *glottis* to refer to the top of the trachea.

The *Tekhnē* does not include any articulatory description of consonants or vowels, though it distinguishes long and short vowels. The category *hugra* 'moist,' used to refer to [l r m n], is later translated as 'liquid' (the origin of the term is not certain), and *sullabē* 'held together,' strictly used of consonant + vowel combinations but more loosely of vowels on their own, is the origin of the term 'syllable.' There are rules for syllable length relating to the length of the vowel and to the consonants that follow it. Tonal differences are marked respectively by acute, grave, and circumflex accents, which probably represented high, low, and falling pitches.

Rome

The Roman grammarians on the whole followed the Greek model: Latin *semivocales* (from Greek *hēmiphōna*) comprise ⟨l, m, n, r, f, s⟩ (not [w], [j], like the modern term 'semivowel'); the terms *mutae, vocales*, and *consonantes* are used for stops, vowels, and consonants respectively. The three Greek stop classes were preserved and translated as *tenues*, *aspiratae*, and *mediae*, in spite of the fact that Latin had no distinctively aspirated stops.

The Middle Ages: 'The First Grammatical Treatise'

In general there was little interest in phonetics in the medieval period. One major exception is the short work now known as the *First Grammatical Treatise*, written by an anonymous Icelandic scholar in the 12th century A.D. with the intention of reforming the Icelandic spelling system (*see* **First Grammatical Treatise**). The title refers to its place in the manuscript which contained it. The writer was clearly well versed in the Latin tradition, and familiar with the adaptation of the Latin alphabet to English.

What is striking about the work is its accurate perception of phonological relationships. In order to determine the segments which must be differentiated in the writing system, the writer contrasts words with different meanings which differ only in respect of one of their sounds. Nine distinctive vowel sounds are identified, to which are allotted the letters ⟨a, e, i, o, u, ǫ, ę, ø, y⟩; eight of these are exemplified in the set: *sar*, *sǫr*, *ser*, *ser*, *sor*, *sør*, *sur*, and *syr*, all of which have different meanings. Each of these vowels could have a long or a short value, and could be either oral or nasal. To mark this an acute accent was introduced for length, and a superscript dot for nasality. Thus, the vowel in *far* (vessel) is short and in *fár* (danger) long; *hár* (hair) has a long oral vowel, *hǎr* (shark) a long nasalized vowel. This gave 36 possible vowel distinctions. Length in consonants could be shown by capital letters: *ǫl* (beer), *ǫL* (all).

The treatise shows astonishing linguistic insight, anticipating principles more closely associated with the twentieth century. Unfortunately it was not published until 1818, and remained almost unknown outside Scandinavia for many years.

Spelling Reform

During the Middle Ages Latin had dominated the linguistic scene, but gradually the European vernaculars began to be thought worthy of attention. Dante, in his short work *De vulgari eloquentia* 'On the eloquence of the vernaculars,' gave some impetus to this in Italy as early as the fourteenth century. The sounds of the vernaculars were inadequately conveyed by the Latin alphabet. Nebrija in Spain (1492), Trissino in Italy (1524), and Meigret (*see* **Meigret, Louis (?1500-1558)**) in France (1542) all suggested ways of improving the spelling systems of their languages. Most early grammarians took the written language, not the spoken, as a basis for their description of the sounds.

Some of the earliest phonetic observations on English are to be found in Sir Thomas Smith's *De recta et emendata linguae Anglicanae scriptione dialogus* 'Dialogue on the true and corrected writing of the English language,' 1568. He tried to introduce more rationality into English spelling by providing some new symbols to make up for the deficiency of the Latin alphabet. These are dealt with elsewhere (*see* **Phonetic Transcription: History**). Smith was one of the first to comment on the 'vowel-like' nature (i.e., syllabicity) of the ⟨l⟩ in 'able, stable' and the final ⟨n⟩ in 'ridden, London.'

John Hart (d. 1574) (*see* **Hart, John (?1501-1574)**), in his works on the orthography of English (1551, 1569, 1570), aimed to find an improved method of spelling which would convey the pronunciation while retaining the values of the Latin letters. Five vowels are identified, distinguished by three decreasing degrees of mouth aperture (⟨a, e, i⟩), and two degrees of lip rounding (⟨o, u⟩). He believed that these five simple sounds, in long and short varieties, were "as many as ever any man could sound, of what tongue or nation soever he were." His analysis of the consonants groups 14 of them in pairs, each pair "shaped in the mouth in one selfe manner and fashion," but differing in that the first has an "inward sound" which the second lacks; elsewhere he describes them as "softer" and "harder," but there is no understanding yet of the nature of the voicing mechanism. Hart's observations of features of connected speech are particularly noteworthy; for example, a weak pronunciation of the pronouns 'me, he, she, we' with a shorter vowel, and the regressive devoicing of word final voiced consonants when followed by initial voiceless consonants, as in 'his seeing, his shirt, have taken, find fault.' Like Smith, he recognized the possibility of syllabic ⟨l⟩, ⟨n⟩, and ⟨r⟩ in English (otherwise hardly commented on before the 19th century). His important contribution to phonetic transcription is dealt with elsewhere (*see* **Phonetic Transcription: History**). As a phonetic observer he was of a high rank.

The Beginnings of General Phonetics: Jacob Madsen

An important phonetic work appeared in 1586, written by the Dane Jacob Madsen of Aarhus (1538–86) (*see* **Madsen Aarhus, Jacob (1538–1586)**), and entitled *De Literis* 'On Letters.' Madsen was appointed professor at Copenhagen in 1574, after some years studying in Germany. He was familiar with a number of modern European languages as well as Greek, Latin, and Hebrew, and in spite of the title of his work he was not simply a spelling reformer. The term *litera* is used in a broad sense, including the sound as well as the symbol. Moreover, he intended his work to cover the sounds of all languages; in this respect he can be described as the first to deal with 'general phonetics' and not just the sounds of a particular language. He placed considerable emphasis or direct observation, as opposed to evidence from earlier authorities, but was strongly influenced by Petrus Ramus (*see* **Ramus, Petrus (1515–1572)**), the French philosopher/grammarian, and borrows extensively from his *Scholae grammaticae* (1569). Aristotelian influence is apparent in his two 'causes' of sounds – the 'remote' cause (*guttur*, 'throat') provides the 'matter' of sounds (breath and voice), and this is converted into specific sounds by the 'proximate' cause – the mouth and the nose. The mouth has a 'movable' part (the 'active' organ), and a 'fixed' part, (the 'passive' or 'assisting' organ). The former comprises lower jaw, tongue, and lips, and the latter the upper jaw, palate, and teeth.

In common with earlier accounts Madsen divides the vowels into 'lingual' and 'labial,' remarking that their sound is determined by the varying dimensions of the mouth. He identifies three lingual vowels, ⟨a, e, i⟩, differing in mouth aperture – large, medium, and small respectively, and three labial, ⟨o, u, y⟩, having progressively smaller lip opening – ⟨u⟩ and ⟨y⟩ also have more protrusion than ⟨o⟩. Madsen does not commit himself on the tongue position of the labials (one would need a glass covering of the mouth, he says, to observe it), and thinks it unnecessary to describe it because "nature spontaneously adapts it to the sound." Few early descriptions are able to improve on this. He distinguished two varieties of ⟨e⟩ and three of ⟨o⟩ (including Danish ⟨ø⟩).

The consonants are also divided into lingual and labial. Linguals are subdivided into 'linguopalatine' and 'linguodental.' Linguopalatines, for which the tongue is in a concave shape with its tip toward the palate, are further divided into 'movable' (tip not touching the palate – ⟨s, r⟩) and 'fixed' (tip touching the palate and interrupting the airstream – ⟨l, n⟩). For the 'upper linguodentals' the tip is against the upper teeth – ⟨t, d⟩, and for the 'lower' the tongue has a convex shape, with the tip against the lower teeth, and some involvement of the inner part of the tongue. The 'lower interior' group includes ⟨h⟩ and ⟨c⟩ (= [k]), which he believed was articulated further back than ⟨g⟩ (= [g]). Madsen refutes the common assertion that ⟨h⟩ is not a letter but just a 'breath,' pointing out that it can distinguish different words, and he quotes its use in the postaspiration of vowels in Danish words such as *dah* 'then.' The 'lower exterior' group comprises ⟨j⟩ (=[j]) and ⟨g⟩. Labials are divided into 'labiodentals' – ⟨f, v⟩, and 'labiolabials' – ⟨p, b, m⟩. He believed that ⟨f⟩ had a more forceful articulation than ⟨v⟩, and was articulated further forward on the lower lip.

Madsen fails to distinguish oral and nasal sounds correctly, and leaves a number of gaps in his consonant description; for instance, he does not mention glottal stop, [ð] or [ɣ], although they occur in Danish. However, in spite of these deficiencies, his work constitutes a major landmark in the development of articulatory phonetic descriptions in the Western tradition.

The 17th Century

The upsurge of scientific investigation and the general spirit of inquiry which pervaded the 17th century led to further advances in the understanding of language and speech. There was a continuing interest in spelling reform, stimulated by the spread of literacy. Alexander Gill (*Logonomia anglica*, 1619), Charles Butler (*The English Grammar*, 1634), Simon Daines (*Orthoepia Anglicana*, 1640), and Richard Hodges (*The English Primrose*, 1644), were among the English spelling reformers, often described as 'orthoepists.' Gill is unusual in devoting a substantial section to the variations found in different dialects of English, but neither he nor the others contributed substantially to the establishment of an improved phonetic framework, though they provided valuable evidence regarding contemporary pronunciations of English.

Robert Robinson

Robert Robinson's primary aim was to help foreign learners of English. *The Art of Pronuntiation* [sic], is divided into two parts: *Vox audienda* – the description of sounds, and *Vox videnda* – ways of transcribing sounds. In spite of his youth and lack of learning (for which he apologizes), he assures the reader that his book is based on his own experience. It contains some perceptive and novel ideas.

Part 1 gives an account of the vocal organs, contrasting the *motion* of air from the lungs with the *restraint* imposed by those organs through which the air passes (cf. Madsen's 'remote' and 'proximate' causes). The diversity of sounds arises from three aspects of this restraint – its instrument (the active articulator), its place, and its manner. He divides sounds into three categories – vowels, consonants, and 'the vital sound.' This is described as 'framed in the passage of the throat.' Without it, he says, all the other parts of the voice would be 'but as a soft whispering'; we can assume be is referring to 'voicing,' but he is vague and does not understand its origin. He distinguishes ten different vowel qualities, five short and five long, but only on one dimension – place of articulation; he does not mention aperture. The consonant classification is based on three places of articulation in the mouth – 'outward,' 'middle,' 'inward'; and four manners – 'mutes' (=stop), 'semimutes' (breath through the nose), 'greater obstricts' (stricture midway between mutes and lesser obstricts), and 'lesser obstricts' (stricture midway between greater obstricts and vowels). The 'peculiar' (the lateral) is well described, and the 'breast' consonant, though described as an 'aspirate,' may refer to the glottal stop. He says it involves 'a sudden stay of motion of the breath.'

In part 2 Robinson provides a novel set of symbols, intended to convey the sounds unambiguously. There are two other interesting innovations in this part: (a) his use of a diagram depicting the palate, with indications of the tongue positions along it corresponding to his vowels; and (b) his provision of a diacritic to mark the beginning of a syllable, and another to indicate the occurrence of the aspirate. The aspirate is thus treated as a prosodic feature: its diacritic is placed above the first letter of a syllable, but according to the direction in which it points it signifies either syllable initial or syllable final ⟨h⟩. This diacritic also functions to distinguish the voiceless member of pairs such as ⟨p/b⟩, ⟨t/d⟩ which otherwise share a common symbol. Robinson mentions tonal differences, but gives no explanation of how they are produced.

John Wallis

John Wallis (1616–1703) was one of the outstanding mathematicians of his day, and occupied the Savilian Chair of Geometry in Oxford for over 50 years (*see* **Wallis, John (1616–1703)**). He was something of a polymath, and his accomplishments included skills in deciphering documents in the Civil War (1642–49),

and teaching speech and language to the deaf. It was partly because of these interests that he decided to attempt a more thorough examination of speech. His general phonetic treatise, entitled *Tractatus de Loquela* 'Treatise on Speech,' was first published in 1653 in the same volume as his influential *Grammatica linguae Anglicanae* 'Grammar of the English Language.' He claimed to have been the first to set out the "whole structure of speech systematically and in one place." This was something of an overstatement, but certainly his high international standing made his book particularly influential.

Wallis lists the vocal organs and what he believes are some of their functions: the lungs are responsible for producing greater or less strength or sonority; the trachea determines differences of pitch between different voices; while the larynx is responsible for the normal pitch variation in speech and song, through a narrowing or widening of the *rimula* 'slit' within it, and also for the difference between whisper and 'full speech' (*aperta loquela*), through a 'tremulous vibration.' The nature and function of the vocal cords were still not known at this time, and Wallis's account is as accurate as one could expect, though less perceptive than Holder's.

For the vowels he proposes three places of articulation: 'labial,' 'palatal,' and 'guttural' (a division taken over from Arabic and Hebrew grammarians). This threefold place classification may at first sight resemble the 'front' /'central'/'back' categories of Melville Bell some centuries later, but whereas Bell's three categories referred to tongue positions, Wallis's labial refers only to lip posture. Like Madsen, he does not specify tongue positions for labials, and attributes the difference between the labial vowels [u] and [y] to a difference of mouth aperture rather than to back and front tongue positions. He also omits the French and German front rounded vowels [ø] and [œ] from his inventory. The mouth aperture, too, is divided into three degrees: wide, medium, and narrow, giving a total of nine vowels which Wallis believed could account for all the vowel sounds to be heard in languages. However, he concedes that since the aperture is a continuum it can be infinitely divided.

For the consonants also he is content to limit the places of articulation to three, and he has two strictures – 'closed' (oral and nasal stops) and 'open' (continuants). To provide for the further distinctions necessary he introduces a category based on mouth aperture – 'thinner' for [s, z, x] and 'rounder' for [θ, ð, h]. In distinguishing between the members of pairs such as ⟨p/b⟩, ⟨t/d⟩, ⟨f/v⟩, he is unwilling to accept that the difference originates in the larynx, and attributes it instead to different directions of the air-stream. For ⟨f⟩, he says, it passes entirely through the mouth, for ⟨v⟩ it is equally split between nose and mouth, and for ⟨m⟩ it passes entirely through the nose. He had observed that whispered ⟨v⟩ and ⟨d⟩ are not identical with ⟨f⟩ and ⟨t⟩, but found the wrong explanation. In fact, for a whispered sound (in a technical phonetic sense) the vocal cords are brought closer together than for a voiceless sound, and this accounts for the difference perceived between the sounds.

It is rare to find these early writers on phonetics discussing the broad characteristics of different languages – what would now be called 'articulatory settings,' but Wallis has some interesting comments: "The English push forward the whole of their pronunciation into the front part of the mouth ... the Germans retract their pronunciation to the back of the mouth ... the French articulate all their sounds nearer the [hard] palate and the mouth cavity is not so wide."

In short, though not free of defects, as his contemporary Amman pointed out, Wallis presents a clear, articulatorily based description of speech which was an advance on previous classifications. The *Tractatus*, together with his account of English sounds in the first chapter of his *Grammar*, formed a valuable source, referred to in the 19th century by A. J. Ellis and Henry Sweet in their works on English pronunciation.

William Holder

Holder (1616–98), like Wallis, was a member of the Royal Society, and became Canon of Ely Cathedral and later of St Paul's (*see* **Holder, William (1616–1698)**). He shared Wallis's interest in teaching the deaf, and quarreled violently with him over the question of which of them had taught a deaf person to speak, both claiming credit for it. But it was this interest which led him to investigate speech, and to produce what is in many ways an outstanding work for its time – *Elements of Speech* (1669). He starts with a good description of the vocal organs, divided into a 'material' group (lungs, trachea, larynx, uvula, nose, arch of the palate – providing and transmitting breath and voice), and a 'formal' group (tongue, palate, gums, jaw, teeth, lips – forming the material into specific sounds). His description of the voicing mechanism is the best of his time: "the larynx both gives passage to the breath and also, by the force of muscles, to bear the sides of the larynx stiff and near together, as the breath passes through the *rimula* ['slit'], makes a vibration of those cartilaginous bodies which forms that breath into a vocal sound or voice." His 'material' organs provide the basis for four groups of sounds: breathed (i.e., voiceless) oral, voiced oral, breathed nasal, and voiced nasal.

He rejects the traditional criterion for distinguishing vowels from consonants, namely that only vowels

can stand alone: consonants, unlike vowels, involve an 'appulse' or 'approach' of the vocal organs to each other. They are divided into 'plenary and occluse' (with complete closure) and 'partial and pervious' (without closure), the occluse consonants having three places of articulation – 'labial' (p, b, m) 'gingival' (t, d, n) and 'palatick' (k, g, ng); and the pervious ones four – 'labiodental' (f, v), 'linguadental' (th, dh = [θ, ð]), 'gingival' (s, z) and 'palatick' (sh, zh = [ʃ, ʒ]), a total of 17. ⟨l⟩ is described as having either a unilateral or bilateral airstream, and Holder gives an accurate account of the balance between muscle tension in the tongue and strength of airstream to produce the trilled ⟨r⟩. The logic of his system requires him to recognize the possibility of breathed as well as voiced nasals (though he calls them "harsh and troublesome"), and also of breathed ⟨l⟩ and ⟨r⟩. He adds to these "a stop formed in the larynx," but believes that, like *h* ("only a guttural aspiration"), it is not an articulation. "If it is relaxed," he says, one gets a "shaking of the larynx" (meaning possibly creaky voice, or possibly a uvular trill). He notices some language-specific features, such as the devoicing of final consonants in German, and the greater aspiration in the *Bocca Romana* 'Roman dialect.'

Holder's system contains eight vowels, classified by place – 'guttural,' 'palatick,' 'labial–guttural' (= [w]) and 'labial–palatal' (= [y]) – and by different degrees of aperture. Again, the way his analysis is structured means that each vowel can be short or long, nasal or oral, whispered or voiced, and (exceptionally for writers of this period) he points out that lip rounding can be added to any vowel. In two of the vowels he describes larynx lowering.

Although Wallis's international reputation made his work better known. Holder presents a more accurate overall description of the formation of speech sounds.

George Dalgarno and John Wilkins

Dalgarno (1626–87) and Wilkins (1614–72) are best known for their pioneering works on universal language. However, they had some interesting contributions to make to phonetic description. Dalgarno was born in Aberdeen, but spent most of his life as a private teacher in Oxfordshire (*see* **Dalgarno, George (ca. 1619–1687)**). Descriptions of sounds are found both in the first chapter of his *Ars Signorum* (1661) and in his *Discourse on the nature and number of double consonants* (1680). He limits the sounds described to those needed for his own system, but there are some perceptive comments on structural combinations of sounds, such as the frequent occurrence of initial ⟨s⟩ in consonant clusters, and of ⟨l⟩ and ⟨r⟩ after stops in releasing clusters and before consonants in final clusters.

Wilkins was the son of an Oxford goldsmith, who became a distinguished academic and was appointed Warden of Wadham College, Oxford, and later Master of Trinity College, Cambridge and Bishop of Chester (*see* **Wilkins, John (1614–1672)**). He was one of a group of highly talented men who were founder members of the Royal Society. In his *Essay towards a Real Character and a Philosophical Language* (1668) he presents a well-organized framework for the pronunciation of his universal language, acknowledging his debt to Wallis, among others. The sounds are represented in a table, which shows the articulators involved and the various manner categories, mostly accurately distinguished. Wilkins keeps the traditional terms 'sonorous' and 'mute' for the pairs p/b, v/f etc., instead of following Wallis's analysis; however, he believed wrongly that the sonority was caused by the epiglottis. Like Holder, and unlike most other descriptions prior to the 19th century, he accepts the possibility of voiceless nasals. There are three different methods of transcribing sounds (*see* **Phonetic Transcription: History**), and some comments on the characteristics of different languages, for example: 'the Italians pronounce more slowly and majestically, the French more volubly and hastily, the English in a middle way betwixt both' (classic English compromise!).

Petrus Montanus

Petrus Montanus (Pieter Berg) is a curiously isolated figure, and appears to have been little known, perhaps because he wrote in Dutch (*see* **Montanus, Petrus (ca. 1594–1638)**). He produced a highly complex analysis of sounds entitled *De Spreeckonst* (The Art of Speech), published in Holland in 1635. The main influence he acknowledges was from Madsen, but his use of a series of dichotomies to classify the sounds, and his notion of speech as an imposition of form on matter are clearly Aristotelian. The organs of speech are divided into two types: (a) 'breathing' (lungs, trachea, and head cavities); and (b) 'forming' (throat, mouth, and nose), each type having its own muscle groups. The throat organs (or 'vessels,' as he calls them) include larynx, epiglottis, and uvula. The mouth is divided into 'inner' and 'outer'; inner includes the palate, gums, teeth, and tongue, outer consists of the front of the teeth and the lips. Palate and tongue are each subdivided from back to front, and the lips are divided into 'edge' and 'blade.' The place of articulation is known as the 'dividing door'; the cavity behind this is called the 'pipe,' and that in front of it the 'box.' The dividing door may be 'closed' or 'open,' and if open may be 'wide' or 'narrow.' A closed position gives oral and nasal stops (the nasals listed include the palatal), wide open gives

vowels and fricatives [h, s, z, f, v, x, ɣ], and narrow gives trilled ⟨r⟩ and ⟨l⟩, the 'split' letter. Voicing is produced by the 'sounding hole' in the throat, which gives a 'smooth passage' to the air, while the 'rustling hole' causes the air to be impeded at some point (presumably giving fricative noise). The sounding hole may be combined with a rustling hole. Montanus claims to distinguish 48 vowel qualities found in languages, but his terminology is complicated and sometimes hard to interpret. This remarkably detailed and sophisticated analysis deserved to win wider recognition, but remained virtually unknown for over 300 years.

Doctors and Elocutionists

By the end of the 17th century, the anatomy and physiology of the vocal organs had been reasonably well described, though some areas were still obscure, notably the mechanism of voice. This deficiency was to be rectified in the 18th century.

Conrad Amman (1669–1730)

Amman was a Swiss-born doctor working in Amsterdam (*see* **Amman, Johann Conrad (1669–1730)**). Like Holder and Wallis he had practiced teaching the deaf, and had attained some fame through his earlier work entitled *Surdus Loquens* 'The Dumb Man Speaks' in 1692, setting out his method. In the preface to his *Dissertatio de Loquela* 'Treatise on Speech' (1700) he includes a letter of appreciation directed to Wallis, who had written to Amman with comments on the earlier book. Amman was apparently not acquainted with Wallis's *Tractatus* or with any other work on the subject when he wrote his own treatise, but comments in his letter on what he (correctly) saw as deficiencies in Wallis's account. These included the restriction of the vowels to nine by his oversymmetrical 3×3 classification, and his failure to recognize the nature of what Amman calls 'mixed' vowels, namely those represented in German by ⟨ü⟩, ⟨ö⟩, and ⟨ä⟩ which Amman interpreted as mixtures of ⟨e⟩ with ⟨u⟩, ⟨o⟩, and ⟨a⟩ respectively. He makes the perceptive comment that each vowel has a certain variability (Latin *latitudo*); it may be more open or more closed, but this 'does not change its nature.' Wallis had separated [j] and [w] (as consonants) from [i] and [u], because in words such as 'ye' and 'woo' the initial segments had a closer articulation than the vowels following them. Amman, however, includes this variation within the vowels' *latitudo*, which perhaps hints at an early notion of the phoneme. He makes sensible criticisms of three aspects of Wallis's treatment of consonants: (a) the failure to mention the explosion phase of stops; (b) his explanation of the difference between pairs such as ⟨v/f⟩ and ⟨z/s⟩ as due to different directions of the airstream rather than to the presence or absence of a *sonus vocalis* (vocal sound); and (c) his analysis of the sounds [ʃ, ʒ, tʃ, dʒ] as ⟨sy, zy, tsy, dzy⟩.

Amman's own framework of description was in other respects quite similar to Wallis's. The speech organs are divided into those that produce voice and breath, and those that form articulations – a similar division to Holder's. He criticizes the traditional idea that voice is produced simply by a narrowing of the chink (*fistula*) in the larynx; there must be "a tremulous and quick undulation." He had witnessed an anatomist who claimed to produce voice from a dead man's larynx, but did not find the demonstration convincing. The larynx is described in some detail – it consists of five solid cartilages, smooth and of great elasticity, connected by ligaments and small muscles, with nerves running from it to various parts of the body, including ribs and ears. When voice is required "we breathe into the larynx muscles in such a way that they act on the cartilages and are balanced by them, resulting in an oscillatory and vibratory movement, which is conveyed to the air and to the bones of the head and makes it sonorous." He compares it to a glass, set vibrating by rubbing with a wet finger, or to the vibration of the tongue in ⟨r⟩ or in a labial trill. Pitch changes are attributed to different length and thickness of the cartilages, and also to the actions of muscles of the larynx in raising it and narrowing the chink, or lowering it and widening the chink, to give higher or lower pitch respectively. Amman noted the close link between emotion and voice quality, which he believed to come from an original "natural universal language," now virtually lost.

His account of the articulators is also more anatomical than most, including reference to the tongue muscles, and the functions of the hyoid bone and the uvula. The various articulations of vowels and consonants are fully and accurately described, with comments on problems specific to the deaf. In all it is an impressive work.

The Mechanism of Voicing: Dodart and Ferrein

Although there had been reasonably accurate descriptions of the anatomy of the larynx, notably by Casserius (1552–1616), no one had so far understood the mechanism of phonation. Some, like Holder, had come close to it, but it was not until the early 18th century that experiments were made with excised larynxes. Denys Dodart (1634–1707) and Antoine Ferrein (1693–1769) were both medical doctors. Dodart published a series of articles in the *Mémoires de l'Académie de Paris* between 1700 and 1707,

comparing the larynx to a stringed instrument. He talks about the vibration of the two 'lips' of the glottis, the change of length or of tension resulting in faster vibration and so higher pitch, and dismisses the idea that the trachea plays a significant part in pitch differences. However, it appears that when Dodart and Ferrein talk of the glottis they are referring not to the 'true' vocal folds but to the ventricular folds. In his 1707 article, Dodart drew a false analogy between the action of the vocal lips and the action of the lips in whistling (apparently he was an expert whistler), claiming that narrowing of the aperture necessarily led to a higher pitch.

In 1741, Ferrein published an article which anticipates the myoelastic theory of larynx vibration. He stated quite clearly that vibration is the essential factor, and that for this to start there must be an adduction of what he called the *cordes vocales* (the first use of this term). The larynx is defined as an *instrument à cordes et à vent* – that is, not to be classed purely either as a stringed instrument or a wind instrument. The *cordes vocales* or *rubans* are set in motion by the air (which acts like a bow on violin strings), and the vibration produces tones according to the laws of a stringed instrument. Ferrein dismissed Dodart's analogy with whistling, and maintained that changes of tension, not of aperture, cause the variety of tones. He established this through experiments using larynxes from cadavers, blowing air through them and varying their tension.

Further experimentation by Magendie (1824), Mayer (1826), and Johannes Müller (1837) confirmed much of Ferrein's vibratory theory, and correctly identified the function of the true vocal folds. Subsequent to the development of the laryngoscope by Garcia (1856) and Czermak (1858), and the use of photography (e.g., by Hermann, 1889) it became possible to produce conclusive evidence as to their mode of operation.

The Elocutionists

During the second half of the 18th century major contributions to the knowledge of human speech came from elocutionists. The demands for lessons in elocution at this time sprang from a growing awareness of the deplorable standard of public speaking and reading in churches, law courts, and in politics, and also of the advantages to be gained by speaking with a prestigious type of accent.

Two of the leading elocutionists were Thomas Sheridan (1719–88; *see* **Sheridan, Thomas (1719–1788)**) and John Walker (1732–1807; *see* **Walker, John (1732–1807)**). Sheridan had been interested in oratory and in the promotion of the study of the English language from an early age. Starting his career as an actor, he later turned to lecturing and writing on elocution. Both he and Walker produced pronouncing dictionaries of English and published descriptions of their systems of elocution, including, in particular, extended accounts of the nonsegmental aspects of speech, such as intonation, accent, emphasis, pause, and rhythm. Walker gave very detailed rules as to the intonation patterns of English, relating the various inflections to pauses and to grammatical constructions.

Joshua Steele

The most precise and detailed description of these nonsegmental aspects is to be found in *Essay towards Establishing the Melody and Measure of Speech*, published in 1775 (2nd edn. 1779) by Joshua Steele (1700–91; *see* **Steele, Joshua (1700–1791)**). Steele was asked by the President of the Royal Society to comment on certain remarks made by Lord Monboddo (*see* **Burnett, James, Monboddo, Lord (1714–1799)**) in a recently published book to the effect that tone, or pitch, had no part to play in English; accent, Monboddo had asserted, was conveyed simply by greater loudness. Having been interested for some years in "the melody and measure of speech," namely intonation and rhythm, Steele had done experiments in which he imitated intonation patterns using a bass viol. In his book he conclusively refuted Monboddo's statement, and set out his own system, far in advance of anything previously published, together with comments on it from Monboddo, who admitted his mistake.

Steele distinguished (to use his terms) 'accent,' 'quantity,' 'pause,' 'emphasis' (also called 'poise' or 'cadence'), and 'force,' that is, in modern terminology, pitch, duration, pause, salience (occurrence of the strong beat), and loudness respectively. He also provided a precise notation to indicate each of these characteristics. The duration of each syllable, and of each pause, is shown by using musical notes – semiquaver, quaver, crotchet etc., and the pitch movement by rising or falling oblique lines attached to the stalk of each note. These show the 'slides' of the voice, which he contrasted with the separate 'steps' of a musical scale. Sometimes the notes are placed on a stave, but more often they simply indicate the relative direction and extent of the pitch movement. Steele noted some of the functions of pitch change, for example, to indicate completion by a final fall, noncompletion by a rise, and degrees of emotional involvement by the extent of the movement. In some utterances it can serve simply as an embellishment, or as an indicator of regional origin. 'Emphasis' is more complex. "All speech," he says, "prose as well as poetry, falls naturally under emphatical divisions,

which I will call cadences; let the thesis or pulsation, which points out those divisions, be marked by bars, as in ordinary music." In each bar the pulsation, or thesis, is followed by an arsis, or remission. Sometimes the pulsation may fall on a pause rather than a syllable, and be followed by one or more syllables in the remission, as in the first and fifth cadences of the following:

| Of | man's | first diso | bedience, | and the | fruit
Δ ∴ | Δ ∴ | Δ . . ∴ | Δ . . ∴ | Δ ∴ | Δ

where the symbol Δ indicates the point of pulsation. Each bar, he says, is composed of combinations of syllables, or syllables and pauses, making up the same total quantity. This springs from his belief that everyone has an "instinctive sense of pulsation," which is independent of the actual sounds. The terms 'heavy' and 'light' are used to refer to this mental sensation of what is emphatic or unemphatic. The 'rhythmus' or measure of speech is the 'number of cadences in a line or sentence.' Steele dismisses the popular link between 'force' and 'emphasis.' The term 'force' refers to loudness, but he points out that emphasis in his sense frequently falls on a period of silence.

Although there are some inconsistencies in Steele's notion of emphasis, his book represents a major advance in the description of nonsegmental aspects of speech. It enabled him to make a detailed transcription of the way in which the actor David Garrick delivered the well-known Hamlet soliloquy. John Walker's theory of inflections was almost certainly influenced by his knowledge of Steele's work, and in the 19th century there were lively arguments between traditional prosodists and those who adhered to Steele's 'temporal' approach to rhythm.

Christoph Friedrich Hellwag

C. F. Hellwag (1754–1835) published his *Dissertatio physiologico-medica de Formatione Loquelae* 'Physiological–medical Dissertation on the Formation of Speech' in Tübingen in 1781. He based his account of the anatomy and physiology of the vocal apparatus on Albrecht von Haller's *Elementa physiologiae corporis humani* 'Elements of the Physiology of the Human Body' (1757–66) and on his own observations. The dissertation contains what was apparently the first example of the 'vowel triangle' as a way of representing relationships between the vowel sounds:

u ü i
o ö e
å ä
a

The vowel ⟨a⟩ is described as the principal vowel, the basis of the rest when they are placed on what he calls the 'ladder,' while ⟨u⟩ and ⟨i⟩ form the upper extremities, and the other vowels are equally spaced between these three. The transition from ⟨u⟩ to ⟨i⟩ goes through ⟨ü⟩, and that from ⟨o⟩ to ⟨e⟩ through ⟨ö⟩, just as there is a theoretical point between ⟨å⟩ and ⟨ä⟩. Between these designated points an infinite number of others can be interpolated. Hellwag asks rhetorically 'Will it not be possible to specify all the vowels and diphthongs ever uttered by the human tongue by reference to their position [on the ladder], as it were mathematically?' He says he has determined their position not only auditorily, but also by observation of their articulatory formation, and gives a very detailed and mostly accurate description of tongue and lip positions. The way coarticulation occurs between vowel and adjacent consonant is noticed and exemplified by the variation between [ç] and [x], according to whether the vowel is front or back. The relative positions of the perceived pitches of whispered vowels (i.e., the formant resonances) are specified as (from lowest to highest): ⟨u, o, å, a, ä, e, i⟩, and Hellwag remarks on the change induced in these resonances by nasality. Diphthongs can be indicated on his 'ladder' by lines joining the starting and ending points, with the implication that a series of intermediate points must be traversed.

The description of consonants is accurate but less notable than that of the vowels. It includes descriptions of labial, alveolar, and uvular trills.

Early Developments in Experimental Phonetics

Experiments were carried out, as has been outlined, during the 18th century to try to illuminate the mechanism of the larynx. There was an increasing interest in trying to imitate the action of the vocal apparatus by the use of some sort of mechanical device. Hellwag mentions a number of early attempts to produce automata, none of which had any well-substantiated success, but there were two important enterprises of this kind in the late 18th century.

Christian Gottlieb Kratzenstein

In 1779, the Imperial Academy of St Petersburg specified the following questions as topics for its annual prize: (a) What is the nature and character of the sounds of the vowels A, E, I, O, U?; (b) Could one construct a device of a kind like the organ stop called 'vox humana' which would produce exactly the sound of these vowels? The prize was won by Christian Gottlieb Kratzenstein (1723–95), Professor of Experimental Physics and of Medicine at the University of Copenhagen, a distinguished scholar, whose father was German and mother Danish (*see* **Kratzenstein,**

Christian Gottlieb (1723–1795)). His prize essay, written in Latin, was published in 1781. He starts by giving an account of the mechanism of voice production. Like some earlier writers (e.g., John Wilkins), Kratzenstein believed that the epiglottis played a major part in phonation. He gives an interesting description of the physiological formation of the vowels, with precise measurements of the relative positions of the tongue in relation to the palate, the distances between upper and lower teeth, and the lip apertures for the different vowels, together with the positions of the larynx, and correctly notes both tongue and lip positions for the rounded vowels ⟨o⟩ and ⟨u⟩. Having described the 'normal' vowel positions, he points out that it is possible to vary the distance between the teeth without changing the vowel quality.

He proceeded to construct special cavities, or tubes, for each of the five vowels to be reproduced. The equivalent of the breath came from a bellows, and the glottal (or epiglottal) tone was provided by a metal reed, except in the case of ⟨i⟩ which operated more like a transverse flute, so that the air passed over a hole. Each vowel derived its quality from the air traveling through the variously shaped tubes. It appears that the sounds produced were recognizable, but Robert Willis showed later that it was not necessary to have tubes of such complex shapes to produce the desired result.

Wolfgang von Kempelen

Kratzenstein's 'tubes' were much less versatile, however, than the machine constructed by Wolfgang von Kempelen (1734–1804), which he describes in his book *Mechanismus der menschlichen Sprache nebst der Beschreibung seiner sprechenden Maschine* 'Mechanism of Human Speech together with the Description of his Speaking Machine' (1791). Von Kempelen was a man of many parts – lawyer, physicist, engineer, phonetician, and held a high position in the government of the Habsburg monarchy (*see* **Kempelen, Wolfgang von (1734–1804)**). He first started on his project of constructing a speaking machine in 1769, so it took him over 20 years to bring it to completion. One of the things which led him to attempt it was his interest in teaching the deaf. His book is in five parts, starting with more general questions about speech and its origins, and going on to describe the speech mechanism in detail, the sounds of European alphabets, and finally his machine. The account of the speech mechanism is excellent, with numerous diagrams, and amusing interludes, such as his description of three kinds of kiss. The vowels are characterized by reference to two factors: (a) the lip aperture; (b) the aperture of the 'tongue-channel'; he specifically rules out any participation in vowel production by the nose (i.e., nasal vowels) or the teeth. Each of the two apertures is divided into five degrees; going from narrowest to widest, the lip aperture gives U, O, I, E, A, and the 'tongue-channel' aperture I, E, A, O, U. These relationships were later seen to correspond with variations of the first and second formants respectively. It is clear from what von Kempelen says that he was able to perceive pitch differences (i.e., formants) in different vowels spoken on the same note.

The machine which he eventually devised and built was the culmination of several earlier unsuccessful attempts. He describes it in great detail, with accompanying diagrams (*see* **Experimental and Instrumental Phonetics: History**) – so precisely that attempts were made later, more or less successfully, to build it again on the basis of these directions.

The sounds produced (which included 19 consonants) undoubtedly left something to be desired in their intelligibility; von Kempelen himself says that if the hearer knows what word to expect it is more likely to seem correct; otherwise one might treat it like a young child who makes mistakes from time to time but is intelligible. Nevertheless, his book represents a major contribution to phonetic description and experimental research. The theory of speech acoustics was not yet understood, but the attempt to produce a satisfactory auditory output from a machine based on an articulatory model made several steps in the right direction.

The Development of an Acoustic Theory of Speech Production

Although there had been suggestions in earlier works that the differences between vowel sounds derived from changes in the shape of the vocal tract, brought about by movements of the tongue and lips, there was no theory to account for the differences prior to the nineteenth century. Among those who played a part in laying the foundations of such a theory were the German physicist E. F. F. Chladni (1756–1827), and the British physicists Robert Willis (1800–75) and Charles Wheatstone (1802–75).

Chladni published his important book *Die Akustik* 'Acoustics' in 1802 (later translated into French as *Traité d'Acoustique*), and *Über die Hervorbringung der menschlichen Sprache* 'On the Production of Human Language' in 1824. His vowel diagram is very similar to Hellwag's, except that it is reversed vertically, and has one extra central vowel:

	a	
ò	eù	è
ó	éu	é
ou	u	i

He described the three columns in articulatory terms: ⟨a–ou⟩ (= [u]) are said to have progressively decreasing lip aperture; ⟨a–i⟩ progressively decreasing mouth cavity size; ⟨a–u⟩ (=[y]) show a decrease in both.

Willis was familiar with the work of both Kratzenstein and von Kempelen. After attempts to verify von Kempelen's methods of producing vowels using similar apparatus, he decided that the way ahead did not lie in this direction. Instead, he commenced experiments using cylindrical tubes of differing lengths, with reeds fitted into one end. He discovered that by increasing the length he could produce the vowel series ⟨i, e, a, o, u⟩, without any change to the diameter or shape of the tube in any other way. Thus, he showed that Kratzenstein's complex tubes were unnecessary. He also concluded that the vowel quality was independent of the note produced by the reed, and was due to the damped vibrations set up by reflections of the original wave at the extremity of the tube. This theory came to be known as the 'inharmonic' or 'transient' theory. Wheatstone repeated Willis's experiments, and found that there were multiple resonances. Not only would a column of air enter into vibration when it was capable of producing the same sound as the vibrating body causing the resonance, but also when the number of vibrations which it was capable of making was an integral multiple of those produced by the original sounding body – i.e., a harmonic. Thus, a quality was added to the original sound, depending on the relationship of the frequency of vibration of that sound to the resonating frequency of the column of air.

The work of Willis and Wheatstone formed the basis for the vowel theory proposed by Hermann Helmholtz (1821–94) in *Die Lehre von den Tonempfindungen* (1863). He did experiments using resonators of various sizes to simulate the effect of the coupled resonances of the vocal cavity, and concluded that vowel quality was determined solely by the resonance frequencies of the vocal cavity. This reinforced the partial tones of the sound source which corresponded to its own resonances. His explanation comes to be known as the 'harmonic' theory of vowel production. He divides the vowels into two types: (a) ⟨u, o, a⟩; and (b) ⟨ü, ö, ä, i, e⟩, type (a) being characterized by one resonance, and type (b) by two resonances. The positions of the resonances correspond very closely to modern definitions of the first two formants. These would be very close together for the vowels included in type (a), and Helmholtz presumably could not separate them from one another. In the case of type (b) he assigns one resonance to the pharynx and the other to the mouth cavity.

Helmholtz's 'harmonic' theory was contested by Hermann (*Phonophotographische Untersuchungen*, 1889), who preferred Willis's 'inharmonic' theory. However, as Rayleigh (*The Theory of Sound*, 2nd edn. 1896) pointed out, the difference between the two theories is relatively unimportant. Both held that for specifying vowel quality the resonance frequencies of the vocal cavity were essential; supporters of the 'inharmonic' theory required in addition that there should be information about amplitude and phase of all the spectral components, but in fact, for vowels, this can be predicted from the resonance frequencies. Hermann was responsible for introducing the term 'formant.'

Relatively little work was done on the acoustics of consonants before the last quarter of the nineteenth century, when through the work of Rosapelly and others, it became clear that there was a characteristic pitch associated with the transition from consonant to vowel.

Physiological Approaches to Speech in the 19th Century

Karl Moritz Rapp (1803–83)

Rapp's book (*Versuch einer Physiologie der Sprache*, 'Essay on the Physiology of Speech' 4 vols, 1836–41), though taking physiology as its starting point, was concerned particularly with tracing the historical development of languages. He was well acquainted with the pioneering work of Rasmus Rask (*see* **Rask, Rasmus Kristian (1787–1832)**) and Jacob Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**) in this field, and as well as his deep historical knowledge he brought to his work an exceptionally keen phonetic ear, and a wide knowledge of modern languages, notably French, Italian, English, and Spanish. He was a particularly harsh critic of the tendency of scholars of the time, notably Grimm, to rely unduly on the orthography in their study of speech, and this did not endear him to his contemporaries in Germany. In common with other 19th-century German scholars, including Grimm, Lepsius, and Thausing (though their interpretations varied considerably), Rapp drew an analogy between vowel sounds and colors, referring to Goethe's theory of color, which was based on the mixture of pigments. He held that just as the color gray represents an undifferentiated mixture composed of all the other colors, and can be placed in the middle of a triangle surrounded by them, so the vowel in the center of the vowel triangle is the *Urvokal*, or basic vowel, representing *unentwickelte Indifferenz* 'an undifferentiated neutral form' with respect to the distinctness of the vowels around it. In spite of the impressive scholarship which it shows, his book failed to win the recognition it deserves.

Ernst Wilhelm Brücke (1819–92)

Brücke was a distinguished physiologist and doctor who practiced in Vienna (*see* **Brücke, Ernst (1819–1891); Experimental and Instrumental Phonetics: History**). He had relatively little background in modern spoken languages, so his approach to the description of speech is not a linguistic one. He was perhaps inspired to do work in phonetics by his famous teacher Jan Purkinje (1787–1869). In his main work (*Grundzüge der Physiologie und Systematik der Sprachlaute* 'Foundations of Physiology and Taxonomy of Speech Sounds, 1856) he formulated a classificatory scheme which was intended to take in any possible class of sounds, but, unlike his contemporary Merkel, he kept the anatomical and acoustic material to a minimum. His description of the consonants is wholly articulatory in its basis, as one would expect, and is based on place and manner of articulation. He emphasizes the importance for anyone investigating language of being aware of the processes of production and not just the sounds which result from them. In the case of the vowels, however, he abandoned this approach, and attempted to class them by an acoustic criterion, based on resonances. The vowels are set out in a familiar triangular form, as follows:

$$\begin{array}{ccccccccc} & & & & a & & & & \\ & & a^{e} & & & & a^{o} & & \\ & e^{a} & & a^{œ} & & & & o^{a} & \\ e & & e^{o} & & & & o^{e} & & o \\ i & i^{u} & & & & & & u^{i} & & u \end{array}$$

The status of the two center vowels in each of the two bottom lines is not at all clear. Even less clear is the basis of the distinction made between what Brücke calls the *vollkommen gebildete* 'completely formed' vowels and the 'incompletely formed' ones, which form a further complete set of 14. Most of the vowels of English are said to fall into this category. In addition he talks of an *unbestimmte* 'indeterminate' vowel, but, like Lepsius (*see* **Lepsius, Carl Richard (1810–1884)**), finds no place for it in his triangle. Sievers (1881) (*see* **Sievers, Eduard (1850–1932)**) and others have criticized his failure to deal with anything but sounds in isolation. However, in spite of these shortcomings, Brücke was thorough and accurate in his general treatment of speech, and his exposition has an admirable clarity. He put forward two systems of notation, one roman-based andthe other nonroman (*see* **Phonetic Transcription: History**).

Carl Ludwig Merkel (1812–76)

Merkel was Professor of Medicine in Leipzig. His *Physiologie der menschlichen Sprache* 'Physiology of Human Speech' (1866) was an improved and enlarged version of an earlier work. While he shared with Brücke the same background and approach to speech description, he lacked the discrimination which enabled Brücke to present the essentials in such a relatively precise and clear form. Merkel's book contains a somewhat forbidding mass of anatomical and physiological detail in its 1000 or so pages, from which it is not easy to extract the more valuable phonetic contributions. His knowledge of foreign languages was extremely limited, and many of his observations spring from his own Saxon dialect. One of his more serious failings was his misunderstanding of the mechanism of voicing, which led him to say that no obstruent consonant has vibration of the vocal cords; hence [b, d, g] and [p, t, k] are distinguished as having respectively a closed and an open glottis. On the other hand his treatment of the nonsegmental aspects of speech, including phonotactics, rhythm, and pitch variation showed a keen observer's ear, and filled the gap which Brücke had left. He also, like Brücke, devised a nonroman transcription system, which he claims is more complete, in that Brücke omitted from his notation vowel sounds which he could not illustrate from languages, and sounds whose physiological formation he did not understand, such as the clicks of southern African languages.

Moritz Thausing (1838–84)

Thausing relied heavily on Brücke's *Grundzüge* as a basis for his own system – *Das natürliche Lautsystem der menschlichen Sprache* (1863). It is based on the postulate that sounds make up a unified system, which has its starting point in what he calls the *Naturalaut*, that is, the vowel ⟨a⟩. This, he believes, is the sound with the least articulatory interference in its mode of production, and the greatest intensity – the sound which is the earliest and easiest for humans to produce. All other sounds are departures from this, involving a greater degree of *Verdumpfung* 'dampening.' He arranges the 22 basic sounds in a hierarchical order, departing from ⟨a⟩ in three different directions, each branch containing seven 'grades' of sounds, decreasing in intensity (*Tonstärke, Schallstärke*) as they get further from the *Naturlaut*. The nasal consonants are at the extreme, being most 'colorless.' The three series are as follows: (Thausing actually arranges them on the model of a pyramid, with ⟨a⟩ at the top):

1. ⟨a o u w f p b m⟩
2. ⟨a e i j ch(=[x]) k g γ(=[ŋ])⟩
3. ⟨a l r s(=[z]) ß(=[s]) t d n⟩

The different 'grades' of sounds are subject to minor variations in quality to account for national and individual varieties. At their boundaries they merge

imperceptibly with their neighbors. The sounds can only be defined in relation to their place in this system.

Thausing acknowledged his debt to Hellwag in giving ⟨a⟩ this position of prominence. The ancient Indian phoneticians had also regarded it as basic to the other vowels. However, perhaps the most significant of Thausing's insights was not the system itself, but the notion of a hierarchy of sounds of steadily decreasing 'intensity' or 'resonance.' He emphasized that just as only one syllable has prominence (*den Hauptton*) in the word, so only one sound has prominence in the syllable. Each sound has a certain potentiality to take this prominent role in the syllable. Whether it does so or not depends not on its inherent nature, but on its position in the hierarchy relative to other adjacent sounds in the syllable. It is not only vowels in the traditional sense that can play this role, but frequently also liquids. He therefore coined the term 'sonant' to refer to this prominent sound, and 'consonant' for the non-prominent sounds in the syllable. This functional approach to the syllable in terms of the relative sonority of its components influenced Sievers's syllable theory, as he acknowledged. Thausing also put forward a new notation system (*see* **Phonetic Transcription: History**).

Félix Du Bois-Reymond (1782–1865)

Du Bois-Reymond's *Kadmus* only appeared in his 80th year, but it was the culmination of a lifetime's interest in language. He had published articles on the vowels (*Neue Berlinische Monatschrift*, 1811) and consonants (*Musen*, 1812), intended to be part of the larger work, but circumstances prevented its publication before 1862. Only encouragement from Brücke, in particular, stimulated him to complete this work. It is a comprehensive account of the acoustics, articulatory basis, and graphic representation of speech. For much of it he was dependent on earlier writers, whose influence he acknowledges – Hellwag, Chladni, Merkel, Brücke, Helmholtz, Lepsius, and others. Perhaps the most interesting aspect of his work is his vowel diagram. Instead of the triangular shape, favored by Hellwag and Chladni, with ⟨a⟩ at the top or the bottom and regarded in some sense as the most basic vowel, Du Bois-Reymond makes ⟨u⟩ and ⟨i⟩ the two extremes in the vowel sequence, with ⟨a⟩ as a somewhat movable mean between them. His diagram is semicircular, with a vertical diameter because he believed that this reflected the respective high and low resonances of ⟨i⟩ and ⟨u⟩, whereas the more usual diagram put them both at the top or bottom of a triangle (see Figure 1).

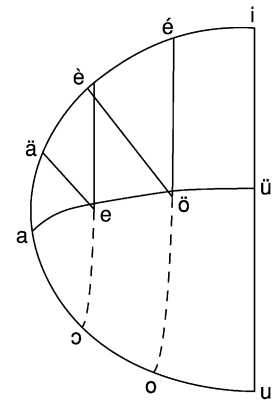

Figure 1 Vowel diagram by F. Du Bois-Reymond.

Phonetics in Britain in the 19th Century

The study and teaching of elocution continued to stimulate advances in phonetics, but another powerful stimulus was provided by concern about systems of transcription.

Alexander John Ellis (1814–90)

A. J. Ellis (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**) was responsible for laying the foundations of phonetic studies in Britain. A legacy bestowed on him early in his life made it possible for him to devote a large part of his time to study and research. He obtained a first class degree in mathematics at Cambridge, but he also had strong interests in music and in philology, and during his travels in Europe he became interested in the Italian dialects. This led him to try to devise a system of transcription to record the different sounds. In 1843, he heard about the work of Isaac Pitman (*see* **Pitman, Isaac, Sir (1813–1897)**), who had by then developed the system of shorthand which was to become world famous, and in spite of their very different backgrounds (Pitman came from comparatively humble origins, and had left school at an early age) they struck up a successful partnership, aimed at reforming English spelling. Ellis determined to make himself thoroughly familiar with the existing phonetic literature, and in his early work acknowledges a particular debt to K. M. Rapp. He acquired a good knowledge of languages, and following these early studies published *The Alphabet of Nature* (1845), and, what was effectively a substantial revision of it, *The Essentials of Phonetics, containing the theory of a universal alphabet* (1848) (printed in the Phonotypic transcription devised by Pitman and Ellis). Both of these books were intended to provide a basis for a new transcription system (*see* **Phonetic Transcription: History**). However, his most substantial work was

On Early English Pronunciation (EEP) (5 vols, 1869–89). Bell's *Visible Speech* (1867) (see below) led him to change some of his earlier ideas, though he did not adopt Bell's system as a whole. EEP was intended primarily as a treatise on the history of the sounds of English, but it contains in addition an amazingly rich collection of information on the physiology of speech and on contemporary English pronunciation, summing up the results of earlier work, both of the German physiologists, and of Melville Bell. Ellis's observations and analyses inevitably contain errors, but one can have nothing but admiration for the enormous amount of sheer hard work that went into these five volumes, the extent of his scholarship, and the fineness of the analysis of the dialectal sounds, which he records in his Palaeotype transcription. A sixth volume was planned, to provide a much-needed summary and index, but regrettably the author's death prevented its completion. In an abridged version of volume five, entitled *English dialects, their sounds and homes* Ellis used 'Glossic,' a simpler transcription, based on English orthography, instead of the more complex Palaeotype. A very readable exposition of his ideas is contained in *Pronunciation for Singers* (1877).

Alexander Melville Bell (1819–1905)

Bell was a Scot, the son of an elocution teacher, and in due course became principal assistant to his father (*see* **Bell, Alexander Melville (1819–1905)**). Between 1843 and 1870, he lectured in elocution at London and Edinburgh universities, running courses for native speakers, foreigners, and for those suffering from speech problems. This gave him a detailed knowledge of a wide variety of different sounds. After visiting the USA to lecture in 1868, he emigrated to Canada in 1870, and carried on his teaching there and in the USA, becoming an American citizen in 1897.

His most influential work was *Visible Speech, the Science of Universal Alphabetics, or self-interpreting physiological letters, for the writing of all languages in one alphabet* (1867). His idea was to provide a framework which would accommodate all the various sounds that can be produced by the human vocal organs, including even interjectional and inarticulate sounds, and a notation designed to suggest to the user the way in which the sounds concerned were formed (that is an 'iconic' notation – *see* **Phonetic Transcription: History**). Bell first advertised his system in 1864, with public demonstrations, and attempted to persuade the British government to give its support to it as a way of simplifying the bewildering inconsistencies of the English orthography, and providing "a sound bridge from language to language," but he was unsuccessful in this. However, his analysis of speech sounds, and in particular of the vowels, had a major impact on the subsequent development of phonetics, even though it was not widely known outside his own circle.

The new system was intended to identify clearly the respective parts played in determining vowel quality by the movement of the tongue, and the lips, and any other factors. Too many earlier descriptions had failed to separate out the contributions made by these various components. Bell's attention was, therefore, inevitably focused on the articulatory, and not the acoustic aspect of vowel production. He divides the vowel space into three horizontal ('back,' 'front,' 'mixed') and three vertical ('high,' 'mid,' 'low') categories. The horizontal division is defined according to the position of the raised part of the tongue in relation to the palate – mixed category involves raising both the back and front of the tongue. The vertical division relates to the height of the tongue. Each of these tongue positions can be accompanied by rounded or unrounded lips. This gives a total of 18 cardinal vowel types, to which he added a further division into 'primary' and 'wide,' making a total of 36 vowels. Bell explained primary and wide as follows:

> Primary vowels are those which are most allied to consonants, the voice channel being expanded only so far as to remove all 'fricative' quality. The same organic adjustments form 'wide' vowels when the resonance cavity is enlarged behind the configurative aperture – the physical cause of wide' quality being retraction of the soft palate, and expansion of the pharynx.

The basis for this distinction was subsequently changed by Sweet, who also changed the terms to 'wide' and 'narrow,' but it did not win general acceptance. Sweet said of Bell's classification "Bell's analysis of the vowels is so perfect that after ten years incessant testing and application to a variety of languages. I seen no reason for modifying its general framework." Bell's own diagrams of the vowel articulations suggest that his distinctions may well be based on auditory impressions rather than articulatory evidence, or perhaps on proprioceptive sensations of muscular activity.

His analysis of the consonants and prosodic features broke less new ground, though there are many interesting comments to be found in his works. The consonants are divided into four places of articulation: (a) 'lip' (labial); (b) 'point' (formed by the point of the tongue and, generally, the upper gums or teeth); (c) 'front' (formed by the front (middle) of the tongue and the roof of the mouth); and (d) 'back' (formed by the root of the tongue and the soft palate). They are further divided into four different 'forms': (a) 'primary' (narrowing without contact – fricatives); (b)

'divided' (middle of the passage stopped, sides open – laterals); (c) 'shut' (complete closure of the mouth passage – stops); and (d) 'nasal' (complete closure of the mouth, the nose passage being open – nasals). Further subdivisions of both place and form were possible, partly by using the category 'mixed,' which allowed two places of articulation (e.g., point and front), and partly by modifiers (front/back, close, open). In addition the sounds could be voiced or voiceless. In spite of the undoubted success which Bell and his pupils clearly had in using the system, his exposition of it in *Visible Speech* was far from easy to follow for those nonspecialists who had to rely purely on his some-what sparse descriptions of the sounds.

Henry Sweet (1845–1912)

Sweet was perhaps the greatest 19th-century phonetician, and had an equal, if not greater, reputation as an Anglicist (*see* **Sweet, Henry (1845–1912)**). He was one of Bell's pupils, and made himself fully familiar with the works of other British and foreign writers on phonetics such as Ellis, Merkel, Brücke, Czermak, Sievers, and Johan Storm. He was always guided by his belief that it was vital to have a firsthand knowledge of the sounds of languages, and this is reflected in his detailed studies of the pronunciation of Danish, Russian, Portuguese, North Welsh, and Swedish in the *Transactions of the Philological Society* from 1873 onward, and of German, French, Dutch, Icelandic, and English in his *Handbook of Phonetics*, published in 1877. This was his first major work on general phonetics. He emphasizes in the preface that phonetics provides "an indispensable foundation of all study of language," and deplores the current poor state of language teaching and the lack of practical study of English pronunciation in schools. "Phonetics," he says, "can no more be acquired by mere reading than music can." It must be learnt from a competent teacher, and must start with the study of the student's own speech. Bell, he believed, "has done more for phonetics than all his predecessors put together," and as a result of his work and Ellis's "England may now boast a flourishing phonetic school of its own." He criticizes the German approach to vowel description for focusing entirely on the sounds, without regard to their formation, and for the resulting "triangular arrangement of the vowels, which has done so much to perpetuate error and prevent progress." Several examples of the triangular diagram being used to indicate the relationships between vowels have been given, beginning with Hellwag. Du Bois-Reymond departed from this, and Bell's system led to the vowel quadrilateral as an alternative. However, as Viëtor points out, Bell uses a vowel triangle elsewhere, so his choice of the quadrilateral in *Visible Speech* relates more to the character of his notation than to a basic difference in interpretation of the vowel area. For a discussion of various 19th-century vowel schemes see Viëtor (1898: 41–65) and Ungeheuer (1962: 14–30).

The *Handbook* was a response to a request from Johan Storm, the outstanding Norwegian phonetician (*see* **Storm, Johan (1836–1920)**), for 'an exposition of the main results of Bell's investigations, with such additions and alterations as would be required to bring the book up to the present state of knowledge.' Sweet's *Primer of Phonetics* (first published in 1890) was intended in part as a new edition of the *Handbook* and in part as a concise introduction to phonetics, 'rigorously excluding all details that are not directly useful to the beginner.' The changes from the *Handbook* are relatively few, but he made some further changes in later editions of the *Primer*. The following brief account refers to his final system.

Sweet has a short section on the organs of speech, and then goes on to what he calls "Analysis." This starts with the 'throat sounds,' and the categories 'narrow' and 'wide' (modified from Bell's 'primary' and 'wide'). Sweet attributes this distinction not to differences in the pharynx, but to the shape of the tongue, and, unlike Bell, he applies it to consonants as well as vowels. For narrow sounds he maintains that the tongue is comparatively tensed and 'bunched,' giving it a more convex shape than for the wide sounds. He adopts Bell's classification for the vowels, but introduces a further distinction, between 'shifted' and normal vowels, giving 72 categories in all. The shifted vowels are said to involve a movement of the tongue in or out, away from its normal position (front, mixed, or back), while retaining the basic slope associated with this position, but few, if any, phoneticians have found this a satisfactory category.

The consonant classification is also based on Bell, but with some modifications. 'Lip,' 'point,' 'front,' and 'back' are retained, but a further category 'blade' is added and also 'fan' (spread), to characterize the Arabic 'emphatic' consonants. Sweet preferred to use the active articulator to define the place, rather than the passive, as in modern terminology. Bell had somewhat curiously classed [f] [v] as 'lip-divided.' and [θ] [ð] as 'point-divided' (i.e., lateral) consonants: for Sweet the first pair are 'lip-teeth,' and the second pair 'point-teeth.' He also added an extra 'form' category, namely 'trills.' Each place of articulation could be further modified forward (outer) or backward (inner), and there are two special tongue positions: 'inversion' (in later terminology called 'retroflexion'), and 'protrusion' (tongue tip extended to the lips).

His next section is entitled 'Synthesis,' and follows the example of Sievers in looking at the characteristics of sounds 'in a stream of incessant change.' These characteristics include variations in the relative force (stress), quantity, tone, and voice quality of parts of the utterance, but notably the 'glides' (a term which he borrowed from Ellis) – the transition from one sound to another. In the case of vowels, this included the aspirate on-glide ⟨h⟩ and glottal stop, as in [hat] and [ʔat]. Consonant glides accounted for the variations of voicing and aspiration in stops, e.g., between [aka], [akha], [agha], and [aga]. The final section of the *Handbook* is on sound notation and introduces his *Romic* transcription. This was subsequently revised in his article 'Sound Notation' (1880–81) (*see* **Phonetic Transcription: History**).

Sweet's work had a widespread impact on the development of phonetics in Britain and abroad. The essentially pragmatic approach which he shared with Bell and Ellis contrasted with the more theoretical approach of continental scholars. In due course the crucial importance of practical work with languages and of careful observation and recording of sounds came to be recognized by phoneticians throughout Europe. Sweet combined this practical approach with an ability to extract from the multiplicity of his phonetic observations a clear general phonetic system, and to express this system clearly and concisely. Jespersen, indeed, found him too concise, and looked for more explanation or justification for some of his statements, while admiring his 'clarity, sharp observation, and ability to grasp the central and most crucial elements, and to leave the rest on one side.' He attributes Sweet's avoidance of lengthy discussions or explanations to his concern for the nonspecialist reader, who would only be confused by discursive accounts of the background and other competing views, and sees this as a reaction to the German phoneticians, who had often gone to the opposite extreme.

Phonetics in Germany in the 19th Century

Eduard Sievers (1850–1932)

Sievers (*see* **Sievers, Eduard (1850–1932)**) published his *Grundzüge der Lautphysiologie* in 1876. He saw it as a continuation of the work of Merkel and Helmholtz, that is, as a scientific (physiological and physical) development of the study of speech. It was an advance on the previous German work, giving more attention to details of individual languages, but it was still more theoretical than practical in its approach. The second edition appeared in 1881, entitled *Grundzüge der Phonetik*. In this the influence of what was being called the English–Scandinavian School (notably Bell, Sweet, and Storm) was apparent. Sievers abandoned his previous vowel system and adopted Bell's articulatory scheme, praising the practical approach that Bell had pioneered, though he still believed that the starting point should be an analysis of individual languages, rather than a scheme encompassing all possible sounds. He put more emphasis on the phonetics of the sentence, including the glides between sounds, and the identification of the syllable. There is also an increasing emphasis on the importance of looking at the way sounds operate within a system.

By the third edition (1885) Sievers had decided to concentrate on the linguistic aspects of phonetics, because he thought it was impossible to combine this in one book with the physical and physiological aspects. The full title, *Grundzüge der Phonetik zur Einführung in das Studium der Lautlehre der indogermanischen Sprachen*, underlines his objective to provide the basis for a detailed investigation of the earlier stages of the Indo–European languages, rather than to provide a treatise on the theory and practice of phonetics. Nevertheless, he still promoted the practical articulatory approach of Bell and Sweet, and the need to study living languages (*see* **Experimental and Instrumental Phonetics: History**).

Moritz Trautmann (1842–1920)

Trautmann was not an admirer of the English–Scandinavian School. In his book, *Die Sprachlaute* 'The Sounds of Speech' (1884–86), he rejected Bell's vowel scheme because of its articulatory approach and attempted to replace it with an acoustically based analysis. However, although this is now a fully acceptable method of analyzing vowels, at that time the difficulties of identifying vowel resonances precisely were still considerable. In addition, Trautmann frequently gives very little, if any, indication of the precise vowels to which he is referring, and is content to construct a theoretical scheme with little, if any, exemplification from languages. This makes his system very difficult to follow. One of his objectives was to found a German school of phonetics, and he attempted to replace existing terminology with a new German-based one, but only a few of his terms (such as *stimmhaft*, 'voiced,' and *stimmlos*, 'voiceless') have become established.

Wilhelm Viëtor (1850–1918)

Viëtor was less of a theorist than a practical phonetician (*see* **Viëtor, Wilhelm (1850–1918)**). In this capacity he made a most important contribution to the teaching of phonetics in Germany. His *Elemente der Phonetik* 'Elements of Phonetics' (1st edn. 1884) was highly successful and was frequently republished (the 7th edn. in 1923, after his death). He was a pioneer in

the movement to improve the standards of language teaching in schools, and saw the crucial contribution that phonetics could make to this. He was also, with Passy and Sweet, one of the leading figures in the Phonetic Teachers' Association, which later became the International Phonetic Association (IPA). Viëtor for the most part accepted the practical tradition of Bell and Sweet, and provides a valuable survey of the work of his predecessors in the early part of his book.

Friedrich Techmer (1843–91)

Techmer started his academic life as a scientist, and his aim was to link together the scientific and linguistic aspects of the study of speech. He had a much wider knowledge of languages than the earlier physiologists like Brücke, and with the increasing sophistication of experimental phonetic techniques at the end of the nineteenth century the time was ripe for an overall survey, linking auditory and articulatory phonetics with the experimental approach. Techmer did a great deal to stimulate interest and research in phonetics by founding the *Internationale Zeitschrift für allgemeine Sprachwissenschaft* (IZ), which began in 1884 but ended with his death in 1891. In the first issue he gave a valuable survey of the experimental techniques being used to investigate speech, with precise definitions of German technical phonetic terms (*see* **Experimental and Instrumental Phonetics: History**), which he had introduced (more successfully than Trautmann). However, the contribution of his own work to phonetics was regrettably not as great as it promised to be. Contemporary phoneticians, such as Sweet and Storm, were particularly critical of the fact that he did not support his attempt to establish a scientific basis for phonetics with actual data from languages, and of his general lack of clarity and explanation. Techmer was highly critical of the mistakes he claimed to have detected in the works of Bell and Passy, but seems to have been unaware of the improvements made to Bell's system by Sweet. His attacks were hard to respond to because they were often phrased in general terms, without specific examples from languages to support them, though Techmer claimed that all his statements were based on personal observation of the pronunciation of individual speakers, not on theoretically possible sounds. His later works on specific languages and dialects, are better supported (for his system of notation, *see* **Phonetic Transcription: History**).

Paul Passy (1859–1940) and Otto Jespersen (1860–1943)

The excuse for linking together Passy (*see* **Passy, Paul Edouard (1859–1940)**) and Jespersen (*see* **Jespersen, Otto (1860–1943)**) in one section is that while neither of them was responsible for a major advance in phonetic theory, they both contributed very considerably to the progress of phonetics through their conviction of its importance and their practical teaching.

Both were closely involved in the founding of the IPA, and in the movement to bring phonetics into language teaching. From 1890 to 1927 Passy was Secretary of the IPA, following his brother Jean, who had been the first Secretary. Passy had a high reputation for his lectures and for the clarity of his exposition. Among his publications *Les Sons du français* (1887) is the most significant. In 1892, he won the Volney Prize for an essay entitled *Etudes de changements phonétiques*.

Jespersen's contributions to linguistics range much more widely, but phonetics was always one of his strongest interests. He met Viëtor, Ellis, Sweet, Sievers, and Passy soon after leaving university, and acknowledges a great debt in particular to Sweet, but also to the Scandinavians Thomsen (*see* **Thomsen, Vilhelm Ludvig Peter (1824–1927)**), Verner, Møller (*see* **Möller, Hermann (1850–1923)**), and Storm (*see* **Storm, Johan (1836–1920)**). He was a good mathematician, and this may have led him to propose his analphabetic system of notation in *The Articulations of Speech Sounds* (1889), which also attempted to give a more precise form and reference to phonetic terminology (*see* **Phonetic Transcription: History**). It was generally welcomed as providing objective reference points, which could be used to illuminate the competing descriptive systems of Bell, Trautmann, Sweet, and others, even though its very precision made heavy demands on the skill of the observer. His main phonetic work was published first in Danish, *Fonetik, en systematisk fremstilling af læren om sproglyd* (1897–99), and later republished in German in shorter form, *Phonetische Grundfragen* and *Lehrbuch der Phonetik* (both 1904). He was scrupulous in familiarizing himself with all the previous literature, and had searching observations and criticisms to make of them. He also produced a dialect notation for Danish, and was foremost in promoting the Copenhagen Conference on phonetic transcription in 1925, though he never adopted the IPA alphabet for his own use (*see* **Phonetic Transcription: History**).

Phonetics at the End of the 19th Century

The discipline of phonetics was firmly established by this time, in spite of inevitable differences in classificatory schemes, terminology, and systems of transcription. The major source of disagreement related to the increasing use of experimental techniques of analysis (see also *Phonetics: Instrumental, Early*

Modern 3). Laryngoscopy, kymography, palatography, and sound recording were all being employed, notably by Abbé Rousselot (*see* **Rousselot, Pierre Jean, Abbé (1846–1924)**) in Paris (*Principes de phonétique expérimentale*, 1901–08), but many phoneticians, among them Sievers, Sweet, and Jespersen, were critical of the attention being given to these techniques. They were not willing to accept results produced by machines as convincing evidence in themselves. This is understandable, in view of the comparatively crude nature of some of the devices used. Sweet's comment in his article for *Encyclopædia Britannica* (11th edn. 1911) sums it up:

> It cannot be too often repeated that instrumental phonetics is, strictly speaking, not phonetics at all. It is only a help: it supplies materials which are useless till they have been tested and accepted from the linguistic phonetician's point of view. The final arbiter in all phonetic questions is the trained ear of a practical phonetician.

The arguments went on for many years after that, and even in the late 20th century have not been fully resolved. As Kohler (1981) points out in his article on 19th-century German phonetics, there is still in many cases a division between the linguistic and the more technical or scientific aspects of phonetics, which urgently needs to be bridged in order to confirm it as a unified and independent discipline. Jespersen's hopeful words, written at the turn of the century (1905–06: 80) are worth quoting, in conclusion. After summarizing the various things that have led people to the study of speech, he goes on:

> While previously all these different men worked for themselves, without knowing very much about the others who, in a different way, were interested in the same objectives, in recent times they seem more and more to be converging, and to be making common cause with one another, so that each one in his own area is aware of the activity of the rest, and has the strong feeling, that for the building which is to shelter the science of human speech, stones must be hauled together from many different directions.

See also: Amman, Johann Conrad (1669–1730); Bell, Alexander Melville (1819–1905); Bhartrhari; Brücke, Ernst (1819–1891); Burnett, James, Monboddo, Lord (1714–1799); Dalgarno, George (ca. 1619–1687); Dionysius Thrax and Hellenistic Language Scholarship; Ellis, Alexander John (né Sharpe) (1814–1890); Experimental and Instrumental Phonetics: History; First Grammatical Treatise; Grimm, Jacob Ludwig Carl (1785–1863); Hart, John (?1501-1574); Holder, William (1616–1698); Jespersen, Otto (1860–1943); Kempelen, Wolfgang von (1734–1804); Kratzenstein, Christian Gottlieb (1723–1795); Lepsius, Carl Richard (1810–1884); Madsen Aarhus, Jacob (1538–1586); Meigret, Louis (?1500-1558); Möller, Hermann (1850–1923); Montanus, Petrus (ca. 1594–1638); Passy, Paul Edouard (1859–1940); Phonetic Transcription: History; Pitman, Isaac, Sir (1813–1897); Ramus, Petrus (1515–1572); Rask, Rasmus Kristian (1787–1832); Rousselot, Pierre Jean, Abbé (1846–1924); Sandhi; Sheridan, Thomas (1719–1788); Sievers, Eduard (1850–1932); Steele, Joshua (1700–1791); Storm, Johan (1836–1920); Sweet, Henry (1845–1912); Thomsen, Vilhelm Ludvig Peter (1824–1927); Viëtor, Wilhelm (1850–1918); Walker, John (1732–1807); Wallis, John (1616–1703); Wilkins, John (1614–1672).

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Phonological Awareness and Literacy

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There is growing empirical evidence from a variety of languages for a causal connection between phonological awareness and literacy development. Phonological awareness is usually defined as the child's ability to detect and manipulate component sounds in words. Component sounds can be defined at a number of different linguistic levels, for example syllables versus rhymes. As children acquire language, they become aware of the sound patterning characteristic of their language, and use similarities and differences in this sound patterning as one means of organizing the mental lexicon (see Ziegler and Goswami, 2005). In describing how phonological awareness is related to literacy, I will discuss three kinds of empirical data: (a) developmental studies measuring children's phonological skills in different languages; (b) developmental studies measuring longitudinal connections between phonology and reading in different languages, and (c) studies seeking to test whether the connection between phonological awareness and literacy is causal (via training phonological skills). I will argue that the development of reading is founded in phonological processing across languages. However, as languages vary in their phonological structure and also in the consistency with which phonology is represented in orthography, cross-language differences in the development of certain aspects of phonological awareness and in the development of phonological recoding strategies should be expected across orthographies.

After discussing the empirical evidence, I will conclude by showing that data from different languages can be described theoretically by a Psycholinguistic Grain Size theory of reading, phonology, and development (Goswami *et al.*, 2001, 2003; Ziegler and Goswami, 2005). According to this theory, while the sequence of phonological development may be language universal, the ways in which sounds are mapped to letters (or other orthographic symbols) may be language-specific. In particular, solutions to the 'mapping problem' of how sounds are related to symbols appear to differ with orthographic consistency. When orthographies allow 1:1 mappings between symbols and sounds (e.g., Spanish, a transparent or consistent orthography), children learn to read relatively quickly. When orthographies have a many:1 mapping between sound and symbol (feedback inconsistency, which is very characteristic of French, as in pain/fin/hein/) or between symbol and sound (feedforward inconsistency, very characteristic of English, e.g. cough/rough/bough), children learn to read more slowly. French and English are examples of nontransparent or inconsistent orthographies. My basic argument throughout this article will be that the linguistic relativity of phonological and orthographic structures is central to understanding the development of phonological awareness and reading.

Phonological Awareness in Different Languages

According to hierarchical theories of syllable structure (see Treiman, 1988), there are at least three linguistic levels at which phonological awareness can be measured. Children can become aware that (a) words can be broken down into syllables (e.g., two syllables in *wigwam*, three syllables in *butterfly*); (b) syllables can be broken down into onset/rime units: to divide a syllable into onset and rime, divide at the vowel, as in *t-eam*, *dr-eam*, *str-eam* (The term 'rime' is used because words with more than one syllable have more than one rime, for example, in *captain* and *chaplain*, the rimes are *-ap* and *-ain*, respectively. The rimes are identical, but these words would not conventionally be considered to rhyme, because they do not share identical phonology after the first onset, as do *rabbit* and *habit*, for example; this shared portion is sometimes called the 'superrime.'); and (c) onsets and rimes can be broken down into sequences of phonemes. Phonemes are the smallest speech sounds making up words, and in the reading literature are usually defined in terms of alphabetic letters. Linguistically, phonemes are a relatively abstract concept defined

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Phonological Awareness and Literacy

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in terms of sound substitutions that change meaning. For example, *pill* and *pit* differ in terms of their final phoneme, and *pill* and *pal* differ in terms of their medial phoneme. The mechanism for learning about phonemes seems to be learning about letters. Letters are used to symbolize phonemes, even though the physical sounds corresponding (for example) to the 'P' in *pit*, *lap*, and *spoon* are rather different. In all languages studied to date, phonemic awareness appears to emerge as a **consequence** of being taught to read and write. In general, prereading children and illiterate adults perform poorly in tasks requiring them to manipulate or to detect single phonemes (e.g., Goswami and Bryant, 1990; Morais *et al.*, 1979).

Studies of the development of phonological awareness across languages suggest, perhaps surprisingly, that the early emergence of phonological awareness at the level of syllables and onset-rimes is fairly universal. Children in all languages so far studied show above-chance performance in phonological awareness tasks at the syllable and onset/rime level long before they go to school. Cross-language studies do not show uniform patterns of development for phoneme awareness, however. Phoneme awareness develops rapidly in some languages once schooling commences, but not in others. Children learning transparent orthographies such as Greek, Finnish, German, and Italian acquire phonemic awareness relatively quickly. Children learning nontransparent orthographies such as English, Danish, and French are much slower to acquire phonemic awareness.

The development of phonological awareness in children can be measured using a variety of tasks. For example, children may be asked to monitor and correct speech errors (e.g., *sie* to *pie*), to select the odd word out in terms of sound (e.g., which word does not rhyme: *pin*, *win*, *sit*), to make a judgment about sound similarity (e.g., do these two words share a syllable? *hammer*, *hammock*), to segment words by tapping with a stick (e.g., tap out the component sounds in *soap* = three taps), and to blend sounds into words (e.g., *d-ish*, or *d-i-sh* to make *dish*; see for example, Bradley and Bryant, 1983; Chaney, 1992; Liberman *et al.*, 1974; Metsala, 1999; Treiman and Zukowski, 1991). However, as well as measuring different levels of phonological awareness, these tasks also make differing cognitive demands on young children. In order to investigate the **sequence** of the development of phonological awareness, ideally the cognitive demands of a particular task should be equated across linguistic level. This is even more important to achieve when comparing the development of phonological awareness across different languages.

Word	CAPTAIN	
Syllable	CAP	TAIN
Onset/rime	C AP	T AIN
Phoneme	C A P	T /e/ N

Figure 1 Psycholinguistic units in words according to hierarchical theories of syllable structure.

Unfortunately, it is rare to find research papers in which the same task has been used to study the emergence of phonological awareness at the different linguistic levels of syllable, rhyme, and phoneme. The most comprehensive studies in English are those recently conducted by Anthony and his colleagues (Anthony *et al.*, 2002, 2003; Anthony and Lonigan, 2004). For example, Anthony *et al.* (2003) used blending and deletion tasks at the word, syllable, onset/rime, and phoneme level. They also studied a large group of children (more than 1,000 children) and included a much wider age range than many studies (2–6 years). Using sophisticated statistical techniques including hierarchical loglinear analyses, and a factorial design that allowed them to investigate the order of acquisition of phonological skills, they showed that children's progressive awareness of linguistic units followed the hierarchical model of word structure shown in Figure 1. Children generally mastered word-level skills before they mastered syllable-level skills, they mastered syllable-level skills before onset/rime skills, and they mastered onset/rime-level skills before phoneme skills.

These findings with respect to sequence are mirrored by many other studies conducted in English using a variety of tasks to measure awareness of syllables, onsets, rimes, and phonemes. For example, counting tasks (in which children tap with a stick or put out counters to represent the number of syllables or phonemes in a word) and oddity tasks (in which children select the odd word out in terms of either onset/rimes or phonemes) have yielded a similar developmental picture (e.g., Goswami and East, 2000; Liberman *et al.*, 1974; Perfetti *et al.*, 1987; Tunmer and Nesdale, 1985). Counting and oddity tasks are useful for comparisons across languages, as both tasks have been used by researchers in other languages to measure syllable, onset/rime, and phoneme skills. Relevant data for syllable and onset/rime awareness are shown in Table 1. It appears that, where comparisons are possible, preschoolers in all languages so far studied have good phonological awareness at the large-unit level of syllables, onsets, and rimes. For large units, phonological awareness appears to emerge as a natural consequence of

Table 1 Data (% correct) from studies comparing syllable (counting task) and rhyme awareness (oddity task) in different languages

Language	*Syllable*	*Rhyme*
Greek[a]	98	90
Turkish[b]	94	–
Norwegian[c]	83	91[h]
German[d]	81	73[i]
French[e]	73	–
English[f]	90	71[j]
Chinese[g]	–	68

[a]Porpodas, 1999.
[b]Durgunoglu and Oney, 1999.
[c]Hoien *et al.*, 1995.
[d]Wimmer *et al.*, 1991.
[e]Demont and Gombert, 1996.
[f]Liberman *et al.*, 1974.
[g]Ho and Bryant, 1997.
[h]rhyme matching task.
[i]Wimmer *et al.*, 1994.
[j]Bradley and Bryant, 1983.

Table 2 Data (% correct) from studies comparing phoneme counting in different languages in kindergarten or early Grade 1

Language	*% Phonemes counted correctly*
Greek[a]	98
Turkish[b]	94
Italian[c]	97
Norwegian[d]	83
German[e]	81
French[f]	73
English[g]	70
English[h]	71
English[i]	65

[a]Harris and Giannoulis, 1999.
[b]Durgunoglu and Oney, 1999.
[c]Cossu *et al.*, 1988.
[d]Hoien *et al.*, 1995.
[e]Wimmer *et al.*, 1991.
[f]Demont and Gombert, 1996.
[g]Liberman *et al.*, 1974.
[h]Tunmer and Nesdale, 1985.
[i]Perfetti *et al.*, 1987 and Grade 2 children.

language acquisition. This is presumably because of speech-perceptual factors that are common across all languages using the syllable as the primary unit of phonology (see Richardson *et al.*, 2004; Ziegler and Goswami, 2005, for relevant discussion).

As noted above, phoneme awareness is heavily dependent on letter learning. Awareness of phonemes usually emerges fairly rapidly in languages with consistent orthographies, and in languages with simple syllable structure (languages based on consonant–vowel (CV) syllables. In these languages, such as Italian and Spanish, onset/rime segmentation (available prior to literacy) is equivalent to phonemic segmentation (theoretically learned via literacy) for many words (e.g., *casa*, *mama*). In Spanish and Italian, one letter consistently maps to one phoneme. Many of those phonemes are already represented in the spoken lexicon of word forms, because they **are** onsets and rimes (e.g., for a word like *casa*, the onset/rimes are /c/ /ɑ/ /s/ /ɑ/ and so are the phonemes). Children learning to read consistent alphabetic orthographies with a simple syllable structure are best placed to solve the mapping problem of mapping units of print (letters) to units of sound (phonemes).

Children learning languages with more complex syllable structures, such as German, face a more difficult mapping problem. In such languages, onset/rime segmentation is not usually equivalent to phonemic segmentation for most words. This is because most words either have codas (consonant phonemes) after the vowel (e.g., *Hand*) or complex (consonant cluster) onsets (e.g., *Pflaum* [plum]). However, for languages like German, the orthography is consistent: one letter does map to one and only one phoneme. Hence letters are a consistent clue to phonemes. The German child is still at an advantage in terms of developing phoneme awareness. The child faced with the most difficult mapping problem in initial reading is the child learning to read an orthographically inconsistent language that also has a complex syllable structure. Examples include English, French, Danish, and Portuguese. For English, onset/rime segmentation is rarely equivalent to phonemic segmentation. English has a relatively large number of monosyllables (around 4000), and of these only about 4.5% have a CV structure (see De Cara and Goswami, 2002). One letter does not consistently map to one phoneme for reading; instead one letter may map to as many as five or more phonemes (e.g., the letter A). Accordingly, phonemic awareness develops relatively slowly in English-speaking children. This is illustrated by the phoneme counting studies carried out in different languages summarized in Table 2.

The development of phoneme awareness in different languages is mirrored by the ease of acquiring grapheme–phoneme recoding skills, termed the *sine qua non* of reading acquisition by Share (1995). As pointed out by Share and many others, phonological recoding (recoding letters into sounds) functions as a self-teaching device, allowing the child successfully to recode words that they have heard but never seen before (see also Ehri, 1992). As may be expected given the preceding analysis, grapheme–phoneme recoding skills develop relatively rapidly in consistent orthographies, and relatively slowly in inconsistent

Table 3 Data (% correct) from the COST A8 study of grapheme–phoneme recoding skills for monosyllables in 14 European languages (adapted from Seymour *et al.*, 2003)

Language	*Familiar real words*	*Nonwords*
Greek	98	97
Finnish	98	98
German	98	98
Austrian German	97	97
Italian	95	92
Spanish	95	93
Swedish	95	91
Dutch	95	90
Icelandic	94	91
Norwegian	92	93
French	79	88
Portuguese	73	76
Danish	71	63
Scottish English	34	41

orthographies. This is shown most clearly by a recent study comparing grapheme–phoneme recoding skills during the first year of schooling in the countries making up the European Community (EC) at the time that the data were gathered (Seymour *et al.*, 2003). The children in the study received simple words and nonwords to recode, matched for familiarity as far as possible across orthography. Although the age of school entry varies across the EC, the success rates achieved by children in the different countries appear very closely tied to the transparency and phonological structure of the different languages. Children learning to read consistent languages with simple syllable structures (e.g., Finnish, Italian) were close to ceiling in grapheme–phoneme recoding ability. Children learning to read inconsistent languages with complex syllable structures (e.g., Danish, French, English) were not. The data from this study are reproduced in Table 3.

Developmental studies measuring children's phonological awareness in different languages allow some simple conclusions. The awareness of syllables, onsets, and rimes appears to emerge as a natural consequence of language acquisition in typically developing children across languages (note: this is not so for dyslexic children, *see* **Developmental Dyslexia and Dysgraphia**). Awareness of these large units of phonology is present by the age of around 3–4 years, long before children go to school and begin being taught to read. The awareness of phonemes does not appear to emerge as a natural consequence of language acquisition. Rather, it is an effortful consequence of reading acquisition. The rate of development of phonemic awareness varies systematically with the phonological structure of the language being learned and its orthographic consistency.

Longitudinal Associations between Phonological Awareness and Reading Across Languages

The existence of a longitudinal connection between individual differences in children's phonological awareness measured prior to schooling and their later progress in reading and spelling has been known for at least 20 years. In a seminal study in English, Bradley and Bryant (1983) demonstrated the importance of onset/rime awareness for subsequent reading development using the oddity task (e.g., which word does not rhyme: *pin*, *win*, *sit*). Bradley and Bryant gave oddity tasks to 400 preschoolers and found that onset/rime awareness was a significant predictor of their progress in reading and spelling measured at 8 and 9 years. This longitudinal correlation remained significant even when other factors such as IQ and memory were controlled in multiple regression equations. Subsequently, Maclean *et al.* (1987) reported a significant connection between rhyming skills at age 3 measured via nursery rhyme knowledge and single word reading at 4 years and 6 months. Following up Maclean *et al.*'s sample 2 years later, Bryant *et al.* (1990) reported a significant relationship between nursery rhyme knowledge at age 3 and success in reading and spelling at ages 5 and 6, even after factors such as social background and IQ were controlled.

These findings for English have been replicated by a number of other research groups. For example, Burgess and Lonigan (1998) found that phonological sensitivity measured in a large sample of 115 4- and 5-year-old children (measured by the oddity task and tasks requiring children to blend and segment compound words into words or syllables) predicted performance in both letter-name and letter-sound knowledge tasks 1 year later (called rudimentary reading skills by the authors). Cronin and Carver (1998) used an onset oddity task and a rhyme matching task to measure phonological sensitivity in a group of 57 5-year-olds and found that phonological sensitivity significantly discriminated the three different achievement levels used to group the children in terms of reading ability at the end of first grade, even when vocabulary levels were controlled. Baker *et al.* (1998) showed that kindergarten nursery rhyme knowledge was the strongest predictor of word attack and word identification skills measured in grade 2, accounting for 36% and 48% of the variance, respectively. The second strongest predictor was letter knowledge, which accounted for an additional 11% and 18% of the variance, respectively. Note that these studies of preschoolers do not typically use phonemic measures of phonological awareness. This is because phonemic

awareness is so difficult to measure in prereaders, unless it is awareness of onsets.

Studies in other languages support the research findings typical of English, with some variation. A German study using the oddity task tested children ($n = 183$) in their first month of schooling, when they were aged on average 6 years 11 months (Wimmer *et al.*, 1994). Follow-up measures of reading and spelling were taken both 1 year later and 3 years later. Wimmer *et al.* (1994) found that performance in the oddity task was only minimally related to reading and spelling progress in German children when they were 7–8 years old (the same age as the children in Bradley and Bryant's study). However, significant predictive relationships were found in the 3-year follow-up, when the children were aged on average 9 years 9 months. At this point, rime awareness (although not onset awareness) was significantly related to both reading and spelling development. A large-scale longitudinal study carried out by Lundberg *et al.* (1980) with 143 Swedish kindergartners found an earlier connection. They gave a number of phonological awareness tests, including rhyme production, phoneme segmentation, and phoneme reversal to the children in kindergarten, and examined the predictive relationships between these tests and reading attainment in second grade. Both the rhyme test and the phoneme tests were significant predictors of reading almost 2 years later. A study in Norwegian found a similar pattern of results. Hoien *et al.* (1995) reported that syllable, rhyme, and phoneme awareness all made independent contributions to variance in reading in a large group of 15,000 children. Finally, recent studies of Chinese children also report longitudinal relationships between phonological awareness and reading, even though Chinese children are learning a character-based rather than an alphabetic orthography. For example, Ho and Bryant (1997) gave a rime oddity task to 100 Chinese preschoolers aged on average 3 years 11 months. Performance was impressive, at 68% correct, and significantly predicted progress in reading and spelling 2 years later, even after factors such as age, IQ, and mother's educational level had been controlled. This study demonstrates that the predictive relationships between large units and reading are found for nonalphabetic orthographies, too.

Are Longitudinal Associations Evidence for Causal Connections?

Although the predictive relations found between early phonological awareness and later reading and spelling development are impressive, they do not necessarily mean that the connection is a causal one. Even though most of the studies described above controlled for other variables such as IQ when computing longitudinal relationships, in order to demonstrate a causal connection it is necessary to intervene directly. For example, if early phonological awareness has a direct effect on how well a child learns to read and spell, then guiding children to discover and attend to the phonological structure of language should have a measurable impact on their reading progress.

A number of studies have used research designs that included direct intervention. For example, as part of the longitudinal study discussed earlier, Bradley and Bryant (1983) took the 60 children in their cohort of 400 who had performed most poorly in the oddity task at 4 and 5 years of age, and gave some of them 2 years of training in grouping words on the basis of sounds using a picture-sorting task. The children were taught to group words by onset, rhyme, vowel, and coda phonemes (for example, placing pictures of a hat, a rat, a mat, and a bat together for grouping by rhyme). A control group learned to sort the same pictures by semantic category (e.g., farmyard animals). Half of the experimental group also spent the 2nd year of the study matching plastic letters to the shared phonological segments in words like *hat*, *rat*, and *mat*. Following the intervention, the children in the experimental group who had had plastic letter training were 8 months further on in reading than the children in the semantic control group, and 12 months further on in spelling, even after adjusting post-test scores for age and IQ. Compared to the children who had spent the intervening period in an unseen control group, they were an astonishing 24 months further on in spelling and 12 months in reading.

Similar results were found in a large study of 235 Danish preschool children conducted by Lundberg *et al.* (1988). Their training was much more intensive than in the English study, and involved daily metalinguistic games and exercises, such as clapping out the syllables in words and attending to the first sounds in the children's names. Training was for a period of 8 months and was aimed at guiding the children to 'discover and attend to the phonological structure of language' (Lundberg *et al.*, 1988: 268). The effectiveness of the program was measured by comparing the children's performance in various metalinguistic tasks after training to that of 155 children in an unseen control group. The trained children were found to be significantly ahead of the control children in a variety of metalinguistic skills including rhyming, syllable manipulation, and phoneme segmentation. The long-term effect of the training on the children's reading and spelling progress in grades 1 and 2 was also assessed. The impact of the training was found to

be significant at both grades, for both reading and spelling, although effects were stronger for spelling.

Two training studies conducted in German found a similar pattern of results to those reported by Lundberg *et al.* (1988). Schneider *et al.* (1997) developed a 6-month metalinguistic training program covering syllables, rhymes, and phonemes and gave this to a sample of 180 kindergarten children. Reading and spelling progress was measured in grades 1 and 2. Schneider *et al.* found significant effects of the metalinguistic training program on metalinguistic skills in comparison to an unseen control group, as would be expected from Lundberg *et al.*'s (1988) results. They also found significant long-term effects of metalinguistic training on reading and spelling progress, with stronger effects for spelling.

In a second study, the same research group found significant effects of the same training program on the reading and spelling progress of 138 German children assessed as being at risk for dyslexia in kindergarten (Schneider *et al.*, 2000). Prior to training, the at-risk children were significantly poorer at rhyme production, rhyme matching, and syllable segmentation than German control kindergartners, who were not thought to be at risk. This study used a nice research design in which **all** children designated at risk received training (either metalinguistic training alone, letter-sound training alone, or both together). Their progress was then compared to that of children from the same kindergartens who had never been at risk. The researchers found that the at-risk children who had received the combined training program were not significantly different in literacy attainment a year into first grade when compared to those children who had never been at risk and who had received no kindergarten training. Interestingly, the at-risk group who received letter-sound training alone, without metalinguistic training, either performed at comparable levels in later reading and spelling progress to the metalinguistic training alone group, or performed at lower levels than this group. Both groups were still significantly impaired in literacy attainment in comparison to those children who had never been at risk. This suggests that training either phonological awareness alone or training letter-sound recoding alone is insufficient. Both skills are important for early literacy acquisition, at least for children thought to be at risk of reading failure. Training one set of skills without the other will not prevent literacy difficulties.

A Psycholinguistic Grain Size Model of Phonological Awareness and Literacy

As shown by the studies reviewed above, the development of reading and spelling depends on phonological awareness across all languages so far studied. Although apparently universal, specific characteristics of this developmental relationship appear to vary with language. Of course, languages vary in the nature of their phonological structure, and also in the consistency with which phonology is represented by orthography. This variation means that there are predictable developmental differences in the ease with which phonological awareness at different 'grain sizes' emerges across orthography (and also in the grain size of lexical representations and developmental reading strategies across orthographies; see Ziegler and Goswami, 2005).

According to psycholinguistic grain size theory, beginning readers are faced with three problems: availability, consistency, and granularity of symbol-to-sound mappings. The availability problem reflects the fact that not all phonological units are accessible prior to reading. Most of the research discussed in this article has been related to the availability problem. Prior to reading, the main phonological units of which children are aware are large units: syllables, onsets, and rimes. In alphabetic orthographies, the units of print available are single letters, which correspond to phonemes, units not yet represented in an accessible way by the child. Thus, connecting orthographic units to phonological units that are not yet readily available requires further cognitive development. The rapidity with which phonemic awareness is acquired seems to vary systematically with orthographic consistency (see Table 2).

The consistency problem reflects the fact that some orthographic units have multiple pronunciations and that some phonological units have multiple spellings (as discussed above, both feedforward and feedback consistency are important; see Ziegler *et al.*, 1997). Psycholinguistic grain size theory assumes that **both** types of inconsistency slow reading development. Importantly, the degree of inconsistency varies both between languages and for different types of orthographic units. For example, English has an unusually high degree of feedforward inconsistency at the rime level (from spelling to sound), whereas French has a high degree of feedback inconsistency (from sound to spelling; most languages have some degree of feedback inconsistency). This cross-language variation makes it likely *a priori* that there will be differences in reading development across languages, and indeed there are (see Table 3, and Ziegler and Goswami, 2005, for a more comprehensive discussion). Finally, the granularity problem reflects the fact that there are many more orthographic units to learn when access to the phonological system is based on bigger grain sizes as opposed to smaller grain sizes. That is, there are more words than there are syllables, more

syllables than there are rimes, more rimes than there are graphemes, and more graphemes than there are letters. Psycholinguistic grain size theory argues that reading proficiency depends on the resolution of these three problems, which will of necessity vary by orthography. For example, children learning to read English must develop multiple strategies in parallel in order to become successful readers. They need to develop whole word recognition strategies and rhyme analogy strategies (beak-peak, Goswami, 1986) in addition to grapheme–phoneme recoding strategies in order to become efficient at decoding print. The English orthography is characterized by both feedforward and feedback inconsistency.

Conclusion

There is now overwhelming evidence for a causal link between children's phonological awareness skills and their progress in reading and spelling across languages. Indeed, the demonstration of the importance of phonological awareness for literacy has been hailed as a success story of developmental psychology (see Adams, 1990; Lundberg, 1991; Stanovich, 1992). Nevertheless, perhaps surprisingly, there are still those who dispute that the link exists. For example, Castles and Coltheart (2004) recently argued that "no single study has provided unequivocal evidence that there is a causal link from competence in phonological awareness to success in reading and spelling acquisition" (Castles and Coltheart, 2004: 77). In a critical review, they considered and dismissed studies regarded by developmental psychologists as very influential (for example, the large-scale studies by Bradley and Bryant, 1983; Bryant *et al.*, 1990; Lundberg *et al.*, 1988; and Schneider *et al.*, 1997, 2000 described in this article). This is surprising, because these studies used strong research designs whereby (a) they were longitudinal in nature; (b) they began studying the participants when they were prereaders; and (c) they tested the longitudinal correlations found between phonological awareness and literacy via intervention and training, thereby demonstrating a specific link that did not extend (for example) to mathematics.

However, the apparent conundrum is easily solved. Castles and Coltheart based their critique on two *a priori* assumptions concerning phonological development and reading acquisition that are misguided. One was that the most basic speech units of a language are phonemes (Castles and Coltheart, 2004: 78), and the second was that it is impossible to derive a pure measure of phonological awareness if a child knows any alphabetic letters (Castles and Coltheart, 2004: 84). In fact, many psycholinguists argue that the most basic speech units of a language are syllables, not phonemes. Phonemes are not basic speech units prior to literacy; indeed, letter learning is required in order for awareness of phonemes to develop. Measures of phonological awareness in preschoolers are syllable, onset, and rime measures, which can be administered as early as age 2 or 3. Phonological awareness of these units does seem to develop in the absence of letter knowledge (recall, for example, the good onset/rime skills of 3-year-old Chinese children). Taken to the extreme, however, the second assumption (that phonological awareness measures are impure once letter knowledge commences) is difficult to tackle. In alphabetic languages, it is very difficult to find preschoolers who know no letters at all. Even 2-year-olds in literate societies tend to know the letters in their names, and thereby probably know at least 4–5 letters.

Nevertheless, the balance of the evidence supports a fundamental relationship between a child's phonological sensitivity and their acquisition of reading and spelling skills. While the specific tasks and levels of phonological awareness that will best predict literacy are likely to depend on an individual's level of development, there does seem to be an apparently universal sequence of development from awareness of large units (syllables, onsets, rimes) to awareness of small units (phonemes). Within this apparently universal sequence of development, variations in phonological structure, and variations in the consistency with which phonology is represented in orthography, generate cross-language differences. The nature of these cross-language differences can be predicted *a priori* by considering the availability and consistency of phonological and orthographic units at different grain sizes.

See also: Developmental Dyslexia and Dysgraphia; Reading Processes in Adults; Reading Processes in Children.

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Phonological Change in Optimality Theory

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As has normally been the case for all major phonological frameworks, the relationship between Optimality Theory (OT) and historical phonology works both ways: OT provides new angles on long-standing diachronic questions, whereas historical data and models of change bear directly on the assessment of OT. For our purposes, it is convenient to classify phonological changes under two headings, roughly corresponding to the neogrammarian categories of 'sound change' and 'analogy':

1. In phonologization, extragrammatical phonetic effects give rise to new phonological patterns.
2. In reanalysis, a conservative grammar is replaced by an innovative grammar that generates some of the old phonological output in a new way.

In this light, one can see that phonological change raises two main questions for OT:

1. Is markedness a mere epiphenomenon of recurrent processes of phonologization, or does markedness on the contrary constrain both phonologization and reanalysis?
2. What optimality-theoretic resources best explain reanalysis: input optimization, innate biases in the ranking of output–output correspondence constraints, both, or neither?

The answers to these questions may require OT to depart significantly from the form in which it was first proposed (Prince and Smolensky, 1993). OT may need to acknowledge that markedness constraints are not innate but are rather constructed by the child during acquisition, and it may need to adopt a stratal–cyclic approach to morphology–phonology and syntax–phonology interactions.

The Role of Markedness in Phonological Change

OT asserts that speakers of natural languages know implicitly that certain phonological structures are dispreferred or suboptimal. This knowledge is represented in their grammars by means of violable markedness constraints, such as the following:

(1a) VoicedObstruentProhibition
Assign one violation mark for every segment bearing the features [-sonorant, +voice].

(1b) CodaCond-[±voice]
Assign one violation mark for every token of the feature [±voice] that is exhaustively dominated by rhymal segments.

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Particular languages impose relationships of strict dominance on a universal set of constraints CON. According to factorial typology, the class of possible natural languages is defined by all the ranking permutations of CON.

In OT, the hypothesis that CON includes constraints against voiced obstruents (1a) but not against voiceless obstruents, and against voice oppositions in the syllable coda (1b) but not in the onset, explains the statements in (2). (2a) is formulated as an absolute negative universal and (2b) as an implicational universal. Both are representative of the class of typological generalizations known as 'markedness laws' (Hayes and Steriade, 2004: 3).

(2a) No language requires obstruents to be voiced in the coda.
(2b) If a language licenses voice contrasts in the coda, then it also licenses voice contrasts in the onset.

Phonological Change and the Problem of Grounding

A major question arises regarding the fact that most of the markedness constraints posited by optimality-theoretic phonologists have proved to be grounded in phonetics. Consider, for example, the phonetic motivation of (1b). A key phonetic cue to obstruent voice specifications is voice onset time (VOT), the duration (positive or negative) of the interval between the offset of an obstruent and the first glottal pulse for a following sonorant. By definition, VOT is available only in presonorant contexts. In consequence, VOT cues are frequently absent from the coda, and so voice contrasts are less perceptible syllable-finally than syllable-initially. Thus, (1b) bans voice oppositions in an environment in which they are difficult to realize phonetically. The problem for OT is to account for this relationship between markedness constraints *qua* internal grammatical entities and the external phonetic phenomena on which they are grounded.

There have been two main types of response to the problem of grounding: diachronic reductionism and nonreductionism. Diachronic reductionists argue that markedness laws such as (2) are epiphenomena of phonetically driven changes, and that postulating markedness constraints such as (1) in the theory of grammar is therefore unnecessary. The proponents of diachronic reductionism typically adopt Ohala's (1992) model of phonologization by misparsing, in which phonological structures that pose articulatory, acoustic, or auditory difficulties suffer from higher rates of misperception and are therefore more likely to be inadvertently altered or lost in historical change. In this view, no language licenses voice contrasts in the coda while neutralizing them in the onset simply because if listeners have historically managed to parse the signal correctly in phonetically unfavorable environments (i.e., in the coda, where VOT cues are often absent), they will *a fortiori* have succeeded in phonetically favorable environments (i.e., in the onset).

Two sharply different groups of phonologists have espoused diachronic reductionism with respect to markedness. One group comprises formalist (Hyman, 2001) and radically formalist (Hale and Reiss, 2000) linguists who insist that phonology is autonomous and phonetically arbitrary, and it must accordingly be strictly separated from phonetics. The other group consists of radically functionalist phonologists and phoneticians who deny the existence of autonomous principles of phonological organization and for whom phonology emerges from phonetics in the process of language use (Blevins, 2004; Bybee, 2001). Despite their irreconcilable differences, both groups agree that the problem of grounding is fatal to OT.

Nonreductionists, in contrast, maintain that markedness constraints, even if grounded on phonetic phenomena, are nonetheless indispensable components of phonological grammar. A sizable subgroup of nonreductionists account for grounding by suggesting that markedness constraints are neither innate nor acquired by induction over the primary linguistic data but are rather constructed by the child on the basis of his or her experience of phonetic difficulty in performance (Bermúdez-Otero and Börjars, 2006; Boersma, 1998; Hayes, 1999; Hayes and Steriade, 2004). In the historical arena, some adherents of OT have opposed diachronic reductionism by advancing the argument that markedness constraints impose key restrictions on phonological changes, whether driven by phonologization or by reanalysis (Bermúdez-Otero and Börjars, 2006; Kiparsky, 2004).

Diachronic Arguments against Markedness Constraints

The reductionist critique of OT relies heavily on Ockham's razor. Reductionists contend that phonetic factors suffice to account for the dispreferred status of phonological entities such as voiced obstruents or voice features licensed by coda consonants; they see no reason for positing a cognitive representation of these factors in the shape of optimality-theoretic markedness constraints, which are therefore deemed superfluous. As noted by Bermúdez-Otero and Börjars (2006: §6.1), implicit in this argument is a crucial claim: The fact that learners acquire phonological grammars containing apparently markedness-driven

processes and complying with markedness laws is held not to raise Plato's Problem (Chomsky, 1986). Thus, diachronic reductionists follow Ohala in emphasizing the role of the parser in phonologization and downplaying the contribution of higher principles of grammatical organization. For Ohala, the conditions for phonologization arise when the parser, as it filters out noise from the phonetic signal, errs either by excess (hypercorrection) or by defect (hypocorrection). Diachronic reductionists assume that, at this point, the innovative patterns present in the distorted data delivered by the parser are incorporated into the grammar of the learner (or, for functionalist reductionists, of the adult listener) by mechanisms of induction (or 'cognitive entrenchment,' 'pattern association,' 'Hebbian learning,' etc.); see Hale (2000: 252) and Bybee (2001).

Diachronic reductionists reinforce their application of Ockham's razor with the argument that OT's factorial typology technique is empirically inadequate in that it is simultaneously too permissive (predicting unattested language types) and too restrictive (failing to allow for exceptions to markedness laws). The overpermissiveness problem concerns gaps in factorial typology. Consider, for example, *NC̥, the markedness constraint that penalizes sequences of a nasal followed by a voiceless obstruent. Permuting the ranking of *NC̥ relative to independently motivated faithfulness constraints predicts a wide range of repair strategies for NC̥ clusters, of which some are attested (e.g., postnasal voicing, nasal deletion, and denasalization) and some are not (e.g., metathesis and vowel epenthesis). The gaps, it is argued, cannot be eliminated by revising the theory of phonological representations or the composition of Con; rather, the unattested repairs are held to be impossible because they cannot arise from a phonetically driven change or series of changes (Myers, 2002).

Factorial typology is also charged with excessive restrictiveness because it fails to allow for so-called 'crazy rules' (Bach and Harms, 1972), which are claimed to violate markedness laws. The following examples have figured prominently in the debate:

1. In some dialects of English, an intrusive [ɹ] or [l] is inserted in certain hiatus contexts. This is alleged to refute OT's prediction that epenthetic segments should be unmarked (Blevins, 1997; Hale and Reiss, 2000; McMahon, 2000).
2. Lezgi exhibits monosyllabic nouns in which a long voiced plosive in the coda alternates with a short plain voiceless plosive in the onset (3). This alternation is claimed to violate the markedness law in (2a) (Yu, 2004).

(3) *Lezgi's crazy alternation*

SING	PL/OBL	
pab:	papa	'wife'
gad:	gatu	'summer'
meg:	meker	'hair'

Such phenomena are significant for two reasons. First, OT's critics contend that the existence of crazy rules shows markedness laws to be mere typological tendencies rather than strict universals. If so, explanations for markedness laws should be sought in diachronic emergence rather than in universal phonological principles such as Con: notably, universals derived by factorial typology should be exceptionless. Second, crazy rules are created by processes of reanalysis, such as rule telescoping and rule inversion. In English, for example, *r*- and *l*-intrusion are commonly assumed to have arisen through the inversion of older natural rules that deleted /ɹ/ and /l/ in nonprevocalic environments (Figure 1). Diachronic reductionism predicts this state of affairs: It is argued that markedness laws are typological tendencies that emerge from recurrent processes of phonetically driven change; reanalysis is expected not to obey markedness laws because it is not driven by phonetics but by cognitive principles governing the relationship between phonology, morphology, and the lexicon.

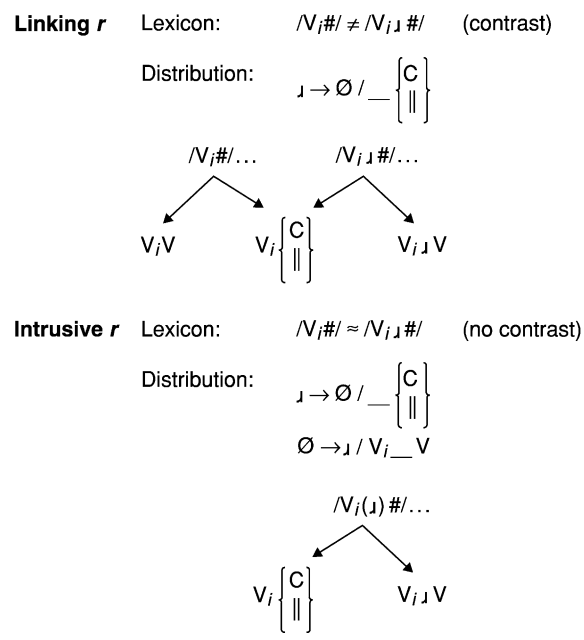

Figure 1 Linking *r* is replaced by intrusive *r* through rule inversion (based on Vennemann, 1972: §2). Phonological environments are stated segmentally in order to avoid controversial analytical commitments on syllabic affiliation. The distributional statements are merely descriptive. In stratal versions of OT, intrusive *r* can be analyzed as a two-step process, with FinalC driving insertion of [ɹ] in the environment $V_i___\omega$] at the (stem and) word level, followed by deletion of nonprevocalic [ɹ] at the phrase level.

Diachronic Arguments for Markedness Constraints

OT supporters challenge many of the basic assumptions of diachronic reductionism. Hayes and Steriade (2004: 26–27), for example, rejected Ohala's model of phonologization by misparsing, asserting instead that phonological innovations typically originate in child errors retained into adulthood and propagated to the speech community. Child errors normally reflect endogenous strategies for adapting the adult phonological repertory to the child's restricted production capabilities. It is assumed that these strategies capitalize on knowledge acquired through the child's experience of phonetic difficulty and represented by means of markedness constraints (Bermúdez-Otero and Börjars, 2006; Boersma, 1998; Hayes, 1999). Compared with Ohala's, this approach to phonologization assigns a very different, although equally crucial, role to factors related to perception: highly salient errors are less likely to be retained into adulthood or to be adopted by other speakers. In this light, consider Amahl's famous *puzzle–puddle* shift (Smith, 1973):

(4)	Adult target	Amahl's adaptation
puzzle	pʌzəl	pʌ**d**əl
puddle	pʌdəl	pʌ**g**əl

This shift was endogenous; it did not originate in misparsing because Smith showed that Amahl's phonological discrimination was adult-like. Anecdotally, a strategy such as Amahl's may well have given rise to the English word *tickle*, which is related to Old Norse *kitla* and/or Latin *titillāre* but is not now believed to be a childish mispronunciation.

On a different front, Kiparsky (2004) proposed a set of criteria for distinguishing between mere typological tendencies and strictly universal markedness laws, which admit no exceptions. Kiparsky regards (2a) as a strict universal: He rejects Yu's claim that the Lezgi data in (3) provide a counterexample to (2a), arguing that the alternating plosives in (3) derive from underlying voiced germinates. Kiparsky nonetheless accepted that explanations based on diachronic emergence are appropriate for typological tendencies. If, accordingly, Con is held accountable only for nonemergent strict universals, then gaps in factorial typology need not be fatal to OT. Along these lines, the refutation of diachronic reductionism involves two tasks:

1. To show that maintaining compliance with strictly universal markedness laws in the course of phonological change raises Plato's Problem and therefore requires the postulation of markedness constraints.
2. To show that there are no radically crazy phonological rules, understood as genuine phonological processes that violate the strict universals implicit in Con.

According to Kiparsky (2004) and Bermúdez-Otero and Börjars (2006), the fact that languages continue to comply with universal markedness laws despite constant change raises Plato's Problem. The claim rests on what Bermúdez-Otero and Börjars call the Jakobson–Kiparsky argument (Jakobson, 1929), neatly summarized in Kiparsky's (2004) dictum: "Whatever arises through language change can be lost through language change." Note that, like the neogrammarians, Ohala's theory of hypocorrection predicts that phonologization is blind: it is driven by local phonetic properties and operates without regard for its global effects on the phonological system. However, a sequence of blind changes could easily lead to the violation of a universal markedness law. To explain why this does not happen, one must postulate grammatical principles (such as optimality-theoretic markedness constraints) that block phonologization or force a reanalysis in the relevant situations.

Consider, for example, a hypothetical language with the following properties:

1. A two-way laryngeal contrast between plain and voiced obstruents
2. No closed syllables
3. Syllabic trochees and a ban on degenerate feet.

Suppose now that, historically, this language becomes subject to two phonological changes, applying in the following order: (1) a lenition process voicing plain obstruents in foot-internal position and (2) a process of apocope creating closed syllables in word-final position. The outcome of this scenario is given in Table 1. Once lenition and apocope have taken place, children are exposed to adult data in which all coda obstruents are voiced. In this situation, diachronic reductionism predicts that learners will inductively acquire the following phonotactic generalization:

(5) If an obstruent is in the rhyme, it must be voiced.

The knowledge that (5) is incorrect and, in fact, universally impossible is clearly beyond the reach of inductive cognitive mechanisms.

In OT, in contrast, the emergence of (5) is blocked because (5) is not a member of Con, nor is there a

Table 1 A diachronic scenario potentially conflicting with markedness law (2a)

1. *Initial state*	a.'ta.ta	a.'ta.da	a.'da.ta	a.'da.da
2. *Lenition*	a.'ta.**d**a	a.'ta.da	a.'da.**d**a	a.'da.da
3. *Apocope*	a.'tad	a.'tad	a.'dad	a.'dad

ranking of CON capable of replicating its effects. Even if markedness constraints are constructed rather than innate, the child will not add (5) to his or her constraint set simply because plain obstruents are easier to produce than voiced ones. In our scenario, therefore, OT predicts that learners will interpret the absence of voiceless obstruents in the coda either as a lexical fact or as a result of morphological processes that are not phonotactically driven. Notably, (5) will fail to display the properties of productive phonological generalizations, such as application to neologisms and nativized loans. In support of this conclusion, note that, as expected, Lezgi has not extended the crazy alternation in (3) to loans from Turkic, Arabic, or other Lezgian languages (Yu, 2004: §5.7).

Bermúdez-Otero and Börjars (2006: §6.5) deploy similar arguments in their discussion of *l*-intrusion in American English dialects (Gick, 1999: §3). Historically, intrusive *l* arose through the inversion mechanism shown in Figure 1. This involved the reanalysis of linking *l* patterns such as those in (6), where prevocalic [l] alternates with nonprevocalic [Ø] after /ɔː/ and /ə/.

(6a)	[dɹɔː]	[dɹɔːlɪŋ]
	drawl	*drawling*
(6b)	[kɹuːwə]	[kɹuːwəlækt]
	cruel	*cruel act*

Nonetheless, Gick reports that most dialects exhibit *l*-intrusion only after /ɔː/:

(7a)	*l*-intrusion:	after /ɔː/	*the law*[l] *is* . . .
(7b)	no *l*-intrusion:	after /ɑː/	*the bra*[Ø] *is* . . .
		after /ə/	*the idea*[Ø] *is* . . .

Since the alternations in (6a) and (6b) are entirely parallel, this restriction is unexpected: Why should linking *l* have undergone inversion after /ɔː/ but not after /ɑː/ or /ə/? The key lies in the fact that, in these dialects, the V-place features of /l/ are identical with those of /ɔː/ but different from those of /ɑː/ and /ə/. Accordingly, [l] is inserted only when it can acquire its V-place through spreading from the preceding vowel (Figure 2). Bermúdez-Otero and Börjars argue that this reanalysis transcends mere inductive generalization and therefore lies beyond the reach of the impoverished learner assumed by diachronic reductionists: Using their knowledge of markedness, children rejected highly marked [l] as an epenthetic hiatus breaker, except where its V-place features were already available in the local context. This shows that the rule of *l*-intrusion is not radically crazy and, more generally, that phonological processes (as opposed to morphological or lexical patterns) created by reanalysis are constrained by markedness.

The Role of Input Optimization in Reanalysis

The diachronic scenario outlined in Table 1 and the evidence of *l*-intrusion analyzed in Figure 2 indicate that markedness laws play a crucial role in controlling reanalysis: CON forces learners to analyze certain patterns in the primary linguistic data as being partly or wholly lexical or morphological, rather than phonological. We now consider how other components of OT contribute to our understanding of phonological reanalysis. This section focuses on OT's principles for the selection of input representations. These principles are referred to using the term 'input optimization' rather than Prince and Smolensky's (1993: §9.3) 'lexicon optimization' because the latter begs the question whether or not phonology is stratified; in a stratal model, inputs to noninitial levels need not be stored in the lexicon, although they can be (Bermúdez-Otero, 2006).

According to a long tradition of research in diachronic generative phonology, one of the main mechanisms of analogical change is input restructuring. The history of Yiddish provides a well-known example (Bermúdez-Otero and Hogg, 2003: §1.3 and references

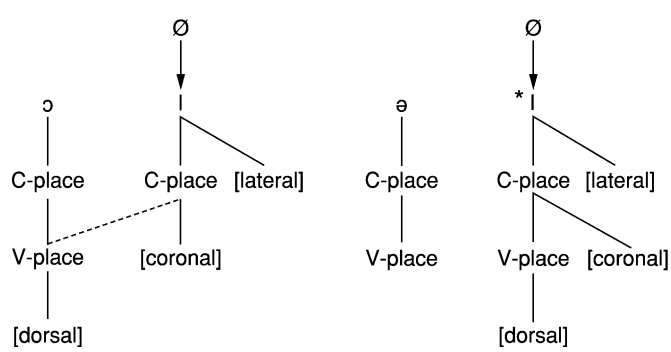

Figure 2 English /l/ is a complex segment with coronal C-place and dorsal V-place. In most American English dialects with *l*-intrusion, the insertion of [l] as a hiatus breaker is licensed by V-place sharing with /ɔː/ but blocked by V-place disagreement with /ə/. The feature geometry assumed here, with the C-place node dominating the V-place node, is standard but is not crucial to the argument.

Table 2 Yiddish: surface underapplication of final devoicing

	'day'		*'gift'*	
NOM/ACC.SG	*tac*	*tac*	*gebe*	***geb***
GEN.SG	*tages*	*tages*	*gebe*	***geb***
DAT.SG	*tage*	***tag***	*gebe*	***geb***
NOM/ACC.PL	*tage*	***tag***	*gebe*	***geb***
GEN.PL	*tage*	***tag***	*geben*	*geben*
DAT.PL	*tagen*	*tagen*	*geben*	*geben*
	before /-ə/ loss	after /-ə/ loss	before /-ə/ loss	after /-ə/ loss

therein). In Middle High German, word-final obstruents were subject to devoicing; in Yiddish, however, the alternations created by devoicing were leveled, with underlying voiced obstruents freely surfacing in word-final position.

(8)

	'day'	'days'
Old High German	*tag*	*tag-a*
Middle High German	*tac*	*tag-e*
Yiddish	*tog*	*teg*

The conditions for reanalysis were created by a phonological process of apocope that targeted final /-ə/. Apocope caused final devoicing to underapply massively in surface representations (Table 2). In (9), it is shown that a synchronic grammar could recapitulate this historical development by means of two phonological processes applying in counterfeeding order.

(9)

	SING	PL
input	/tag/	/tag-ə/
devoicing	tak	—
apocope	—	tag
output	[tak]	[tag]

Yiddish learners, however, failed to acquire such a grammar: They were unable to posit inflectional suffixes consisting of underlying /-ə/ because this vowel never surfaced.

Rule-based theories of phonology have never succeeded in delivering a satisfactory account of such instances of input restructuring. Two fundamental problems stand in their way. First, the learner's choice of input representations must be informed by the system of input–output mappings that he or she has acquired (and vice versa; Tesar and Smolensky, 2000: §5.2). However, rule-based theory has never produced an explicit formal account of the acquisition of rule systems. To do so is probably impossible because the grammar space defined by rule-based phonological models is too poorly structured to be searched effectively by an informed learner.

In rule-based frameworks, moreover, the formal demands of descriptive adequacy conflict with the empirical evidence of acquisition and change (Bermúdez-Otero and Hogg, 2003: §2.2). Rule-based theories typically rely on lexical underspecification to solve the duplication problem, which arises over the fact that the well-formedness conditions that lexical representations obey statically coincide to a very large extent with the well-formedness conditions that phonological processes enforce dynamically in the derivation of grammatically complex expressions (Clayton, 1976). Acquiring underspecified lexical representations requires a powerful learner actively pursuing a strategy of lexicon minimization. Psycholinguistic and diachronic evidence, however, suggests that learners in fact follow a conservative what-you-see-is-what-you-get strategy and require positive evidence to abandon the 'identity map,' in which inputs are identical with the corresponding outputs.

OT, in contrast, holds promising prospects for research into input restructuring because it incurs neither of these difficulties. First, the assumption of a finite CON has enabled learnability experts to devise fully formalized constraint ranking algorithms, which can be drawn upon in input selection (Tesar and Smolensky, 2000). Second, OT is an output-oriented theory in that no constraints directly evaluate input representations. Rather, the grammar must work in such a way that every possible input is associated with a well-formed output ('richness of the base'). This removes the requirement of lexicon minimization. In fact, the fundamental insight behind Prince and Smolensky's (1993: §9.3) original formulation of their lexicon optimization principle is that, when combined with minimal constraint violation, output orientation defines the identity map as the default option in input selection. Consider, for example, a constraint hierarchy $\mathcal{H}$ such that there are two potential input representations i_1 and i_2 for a given output o. Since markedness constraints refer only to outputs, the mappings $i_1 \rightarrow o$ and $i_2 \rightarrow o$ will tie on markedness; they will differ solely in terms of faithfulness violations. To achieve the most harmonic mapping, then, the learner need only choose the input representation that is closest to the output.

In the early days of OT, historical phonologists were quick to realize the advantages of input

optimization (see references in Holt, 2003a). Since then, however, progress has been halting and unsatisfactory: the theory of input selection remains underdeveloped and cannot in its current state serve the needs of historical phonologists interested in reanalysis. This theoretical stagnation has been caused partly by neglect: In strictly parallel versions of OT, once the phonologist has satisfied himself or herself (1) that the constraint hierarchy generates well-formed outputs for every possible input and (2) that there is a viable input for every output, he or she has little incentive to ask what input representation is actually selected by the learner and how, crucial though these questions are to the psycholinguist and to the historical linguist. In Stratal OT, however, the picture is rather different, and it is hoped that research in this framework will supply the want of an adequate theory of input selection (Bermúdez-Otero, 2006). In what follows I outline a few promising avenues of research.

First, it appears that the learning algorithm must be set up in such a way that children search for a single input representation for all the output alternants of each minimal grammatical unit at the current level of analysis (although, of course, the search may fail, as in cases of suppletion). Input optimization mechanisms should be allowed to come into play only when, for a given minimal unit, there is found to be more than one possible input representation meeting this requirement. Otherwise, in cases of alternation input optimization would cause the learner to store every alternant in the lexicon as a means to avoid unfaithful mappings (Prince and Smolensky, 1993: §9.3).

Several scholars have suggested that children require positive evidence from alternations in order to depart from the identity map (Bermúdez-Otero, 2003: §4.4; Bermúdez-Otero and Hogg, 2003: §2.1; Hayes, 2004). In this view, it is only when confronted with alternations such as (10a) that children acquiring German contemplate input–output mappings that violate the faithfulness constraint IDENT-[±voice] (10b):

(10a) RA:**t** RA:**d**-əs
wheel *wheel*-GEN.SG

(10b) IDENT-[±voice]
If α is segment in the output and β is a correspondent of α in the input, then assign one violation mark if α and β do not have the same value for the feature [±voice].

This assumption yields the right results in the Yiddish case discussed previously. After apocope, the phonological realization of inflectional feature complexes such as [DAT, SING] was nonalternatingly null: The learner therefore had no motivation for deviating from the identity map by positing suffixal /-ə/.

An interesting line of enquiry, however, concerns how learners may use evidence from alternations in order to detect unfaithful mappings in nonalternating items (Bermúdez-Otero, 2003, 2006; McCarthy, 2005). Exploiting the resources of Stratal OT, Bermúdez-Otero proposed a principle of archiphonemic prudence to deal with this problem. The basic idea is the following: If the learner discovers an unfaithful mapping /α/→[β] in alternating items at level l (e.g., the phrase level), then he or she is required to consider /α/ as a possible input representation for nonalternating tokens of [β] as well; if, given current constraint rankings, /α/ proves a viable input representation for some nonalternating token of [β], for example, [β_i], then the form that contains [β_i] is set aside; later in the acquisition process, the learner uses the constraint hierarchy of the next higher level (e.g., the word level) to choose among the various possible input representations for [β_i].

The principle of archiphonemic prudence presupposes an account of how learners choose among competing input representations for an alternating item, yet this is an area in which our understanding remains particularly deficient. Inkelas (1995) and Tesar and Smolensky (2000: §5.2) suggested that the faithfulness cost of each input representation is calculated by adding faithfulness violations across the entire paradigm; Tesar and Smolensky called this 'paradigmatic lexicon optimization.' This is an appealingly simple proposal, but it appears to make the wrong predictions with respect to analogical change. Consider, for example, a hypothetical situation in which there are two competing input representations i_1 and i_2 for a given noun stem N in a language with a rich case system. In addition, assume the following:

1. i_1 allows the nominative form to be derived faithfully but causes a violation of the faithfulness constraint FAITH$_1$ in the illative.
2. i_2 allows the illative to be derived faithfully but causes a violation of the faithfulness constraint FAITH$_2$ in the nominative.
3. FAITH$_1$ dominates FAITH$_2$.

In this situation, paradigmatic lexicon optimization favors i_2 since this input representation allows the higher ranked faithfulness constraint FAITH$_1$ to be satisfied. Suppose, however, that the child is in a state of transient underdetermination: i_1 and i_2 produce different outputs for case forms of N that he or she has not yet encountered in his or her trigger experience. In these circumstances, the child is vulnerable to input restructuring, potentially leading to analogical change. As we have seen, paradigmatic lexicon

optimization favors i_2, thereby creating pressure for analogical leveling from the illative to the other cases (Figure 3). We know, however, that for morphological reasons, leveling is in fact far more likely to proceed from the nominative.

To avoid this problem, Bermúdez-Otero (2003, §4.4, 2006) proposed a weaker version of input optimization, which merely requires input representations to be Pareto-optimal.

(11) *Input optimization: revised version*
(11a) Input representations must be Pareto-optimal.
(11b) An input representation is Pareto-optimal if, and only if, it has no competitor that (i) generates **all** output alternants no less efficiently and (ii) generates **some** output alternant more efficiently.

Here, input efficiency is measured in terms of the violation of ranked faithfulness constraints, as in previous formulations of input optimization. According to (11), however, two input representations are both Pareto-optimal if one input performs better than the other input in one paradigm cell but worse than the other input in a different paradigm cell. In such situations, principle (11) predicts that the choice between the two inputs will depend on morphological or lexical criteria.

input	output	FAITH$_1$	FAITH$_2$
i_1	O_a (NOM)		
	O_b (ILL)	*!	
i_2 ☜	O_a (NOM)		*
	O_b (ILL)		

Figure 3 Paradigmatic lexicon optimization (Inkelas, 1995; Tesar and Smolensky, 2000) predicts analogical leveling in the wrong direction. If the pattern of faithfulness violations across the paradigm is the paramount criterion for input selection, input i_2 will be selected, triggering leveling from the illative form. On morphological grounds, however, i_1 is far more likely to be selected, with leveling from the nominative.

Finally, a word should be said about the rise of synchronic paradigm effects. Consider, for example, the English rule of homorganic cluster simplification that maps underlying /ŋg/ onto [ŋ] in the coda. As is well-known, this process applies normally within stem-level constructions but overapplies before word-level suffixes and words beginning with a vowel:

(12) *long* [lɒŋ] normal application
longitude [lɒŋgɪtjuːd] normal nonapplication
longish [lɒŋɪʃ] overapplication
long effect [lɒŋɪfɛkt] overapplication

Stratal OT generates this synchronic paradigm effect without recourse to output–output correspondence constraints. From a diachronic viewpoint, the effect can be seen to arise through successive rounds of input restructuring at different levels in the grammar (Figure 4). There is therefore no need to stipulate innate biases in the ranking of output–output correspondence constraints (Hayes, 2004). In particular, Stratal OT correctly predicts that, synchronically, misapplication in lexical domains implies misapplication in phrasal domains (Hayes, 2000: 102). Diachronically, the theory accounts for the typical life cycle of a phonological pattern, in which its domain gradually shrinks along the way to morphologization and lexicalization.

See also: A Priori Knowledge: Linguistic Aspects; Chomsky, Noam (b. 1928); Constructivism; E-Language versus I-Language; Elphinston, James (1721–1809); Experimental Phonology; Feature Organization; Formal Models and Language Acquisition; Formalism/Formalist Linguistics; Generative Phonology; Infancy: Phonological Development; Inference: Abduction, Induction, Deduction; Jakobson, Roman (1896–1982); Lexicalization; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Markedness; Morphological Change, Paradigm Leveling and Analogy; Morphologization; Morphophonemics; Neogrammarians; Phonological

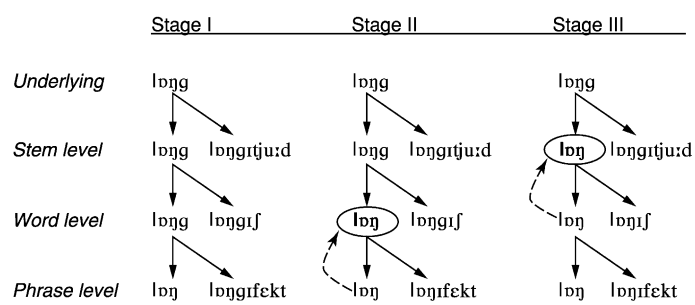

Figure 4 The life cycle of phonological patterns in Stratal OT. In the history of English, successive rounds of input restructuring at progressively higher levels in the grammar cause the domain of homorganic cluster simplification to shrink. Stage I corresponds to the formal speech of orthoepist James Elphinston (mid-18th century), stage II corresponds to Elphinston's colloquial speech, and stage III corresponds to contemporary Received Pronunciation.

Change: Lexical Phonology; Phonological Typology; Phonological Universals; Phonology: Optimality Theory; Phonology–Phonetics Interface; Reductionism; Rule Ordering and Derivation in Phonology; Sound Change: Phonetics; Sound Change; Speech Perception; Suppletion; Syllable: Typology; 20th Century Linguistics: Overview of Trends; Underspecification.

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Phonological Change: Lexical Phonology

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Although sound change was the main focus of phonological investigation in the 19th and early 20th centuries, generative phonological theory initially concentrated primarily on synchronic description and explanation. Where sound changes were dealt with at all, they were typically recast as rules in a synchronic grammar. The development of lexical phonology in the 1980s represented a partial refocusing on change, since the architecture of the model lends itself particularly well to analyzing the lifecycle of phonological processes as they enter and work through the grammar historically. Some of these organizational insights are maintained in the developing model of stratal optimality theory.

Phonological Theory and Sound Change

The essential concern of generative phonology, from Chomsky and Halle (1968) onward, is with what speakers of a language know. This prioritization leads to an absolute post-Saussurean division between synchrony and diachrony, and to an absolute focus on the former. Speech errors, dialect variation, and change all become external evidence, while the core object of enquiry is **the** synchronic system, determined by distribution and alternation and evidenced by introspection.

From the perspective of a phonologist interested in sound change, this narrowing of the field entails the problematic assumptions that phonological theory should not be concerned with explaining change, and that change cannot be used to evaluate theory. Where standard generative phonology deals with change at all, it is by reinterpreting changes as synchronic phonological rules, as Chomsky and Halle (1968) recast the historical English Great Vowel Shift as the synchronic Vowel Shift Rule. But paradoxically, envisaging a synchronic phonology as layers of historical sound changes causes problems both for synchrony and diachrony: if we are not concerned with explaining the source and development of sound changes, we end up with a rather static synchronic picture, which is not sufficiently flexible to deal with dialect differences and which brings with it increasing abstractness. A concern only with what the speaker knows, in other words, is likely to provide a model of the grammar which, at worst, is unlearnable and unknowable.

Lexical Phonology

Lexical phonology was developed in an attempt to reduce the abstractness of its standard generative predecessor, and to account better for interactions between phonology and morphology. Its architecture, however, offers the additional benefit of making a contribution to historical phonology.

Lexical phonology (Kiparsky, 1982; Mohanan, 1986; Halle and Mohanan, 1985) initially addressed relationships between morphology and phonology. For example, when adjective-forming *-ic* is added, stress on the new, derived base shifts to the right, as in underived *átom* as opposed to derived *atómic*. However, this pattern is not observed with *-ish*, so that *yéllow* and *yéllowish* both have initial stress. The solution crucially involves reviewing the function and shape of the lexicon, which had been seen as a dictionary-like list, including notes of exceptional properties of particular items. Now the lexicon becomes much more productive, incorporating morphological rules attaching affixes. These rules are interspersed with phonological ones, and the whole lexicon is divided into a series of levels, or strata. Stress rules, which build phonological structure, are taken to be located on level 1. Underived *atom* has stress added initially; *-ic* is appended; and derived *átomic* is again presented to the stress rules, which now stress the longer form differently. However, *yéllow* is not subject to level 1 morphological processes; it passes to level 2, where *-ish* is added, but by then *yéllowish* is outside the scope of the level 1 stress rules, and stress remains in the derived form where it was assigned to the underived one. Likewise, if we locate the rule of nasal deletion on level 1, we can account for level 1 derived *illegal* from [in[legal]], but level 2 derived *unlawful*, rather than **ullawful*, from [un[lawful]]. The morphological aspects of lexical phonology are discussed in much greater detail by Giegerich (1999).

This layering of lexical levels also rules out some of the worst excesses of abstractness of standard generative phonology. Kiparsky (1982) uses the example of English trisyllabic laxing, which shortens or laxes a vowel followed by two or more syllables, as in *declarative* with [æ]or *serenity* with [ɛ], as opposed to *declare* with [eɪ] and *serene* with [iː]. The laxed examples have level 1 suffixes, and we deduce that trisyllabic laxing also applies on level 1. This is confirmed by the absence of its effects in *bravery* [eɪ] or *weariness* [iː], which become trisyllabic by the attachment of level 2 suffixes, outside the scope of laxing. Furthermore, *ivory* [aɪ] or *Oberon* [oʊ], which also

retain tense vowels, cannot undergo laxing because they are trisyllabic from the start, rather than becoming trisyllabic by level 1 suffixation: this reflects the so-called derived environment condition, which specifies that structure-changing phonological processes on level 1 can apply only when they are fed by a morphological or prior phonological process. Finally, items like *camera* [æ] or *enemy* [ɛ], which surface with short vowels in the right environment, would have been good candidates in standard generative phonology for derivation by free ride through trisyllabic laxing; but in lexical phonology, since these forms are underived, they are prohibited from undergoing laxing by the effects of the derived environment condition. They must therefore be stored with short, lax vowels too, approximating the underlying and surface forms and reducing abstractness. Application of level 1 phonological rules at least is therefore restricted to cases where speakers encounter alternations, as in *declare/declarative*, *serene/serenity*, to motivate a phonological process. Even here, according at least to McMahon (2000b) and Bermúdez-Otero (1999), we should assume that the underlying form is equivalent to the surface form of the underived alternant, increasing transparency and learnability.

Lexical Phonology and Sound Change

The Neogrammarian Controversy

Connections between synchrony and diachrony are strengthened by Labov's (1972, 1994, 2001) pioneering work, which demonstrated that variation and change are inextricably connected: accepting that there are simplifications of various kinds at play, we can nonetheless claim that today's variation is tomorrow's change.

However, whereas the 19th-century Neogrammarians argued that sound change is phonetically gradual but lexically abrupt, proceeding by tiny, incremental steps but in all eligible words at once, the lexical diffusionists (Wang, 1969; Chen and Wang, 1975) saw sound change as phonetically abrupt but lexically gradual, spreading from word to word. Labov (1981) attempted to resolve this controversy by testing the two views against changes in progress, but found evidence for both, concluding that there are simply two different types of sound change. While Neogrammarian change is gradient, finely phonetically conditioned, often sociolinguistically marked, and learnable, the diffusing type is discrete, may be grammatically conditioned, and has lexical exceptions.

Although standard generative phonology has nothing to say about these different types of change, they can be modeled in lexical phonology. The phonological processes mentioned above all operated in the lexicon; but lexical phonology also recognizes a postlexical component. Postlexical processes interact not with the morphology, but with the syntax, and can apply across word boundaries, as does Tyneside weakening (Carr, 1991), which changes /t/ to [ɹ] in word-final intervocalic positions, as in *not a chance*, *put it down*, *beat it*. Postlexical rules are characteristically gradient, apply across the board without lexical exceptions, are phonetically conditioned, and can often be suspended stylistically. However, lexical processes tend to be categorical, may have lexical exceptions, are morphologically conditioned, and persist regardless of sociolinguistic factors such as formality. Kiparsky (1988) equates Neogrammarian sound changes with postlexical rules, and lexically diffusing sound changes with lexical rules. More accurately, we are dealing here with rule applications, since palatalization in English, for instance, applies both lexically and postlexically, though the different applications have different properties. Thus, while palatalization is obligatory word-internally in *racial*, it is optional postlexically in *I'll race you*, where we find variably either [sj] or [ʃ].

The Life-Cycle of Phonological Rules

The equation of two types of sound change with two types of phonological rules, however, is still a static comparison. Harris (1989) makes matters more dynamic by arguing that processes can begin as postlexical, gradient, Neogrammarian changes, but subsequently gain lexical characteristics, becoming lexical rules. Harris (1989) discusses *æ*-tensing, which operates in Philadelphia, New York, and Belfast English, for example, producing lax [æ] in *tap*, *bat*, *panel*, *ladder*, but the tense equivalent in *pass*, *man*, *manning* and *man-hours*. This process was clearly originally phonetically conditioned, operating gradiently in a hierarchy of environments with the likelihood of tensing increasing from voiceless stops, through voiced obstruents, to nasals and voiceless fricatives. However, it is now perceived categorically, and has become sensitive to morphological information, as shown by tensing in *manning* and *man-hours*. Such processes may apply on level 2, and later on level 1, where more fossilized and exception-prone processes are situated (in English, irregular inflection and Latinate affixes are typically level 1, while regular inflection and Germanic affixes are level 2). In other varieties, such as Standard Southern British English, *æ*-tensing has shifted even

further from its postlexical, Neogrammarian roots: it is no longer synchronically productive at all, but by applying differentially and increasingly unpredictably, and acquiring lexical exceptions, it has caused underlying restructuring, leading to an opposition of short /æ/ in *pat* and long /ɑː/ in *path*.

Nor is *æ*-tensing the only example. McMahon (1991) argues that the Scottish Vowel Length Rule (Aitken, 1981), which lengthens tense vowels before /r/, voiced fricatives and word or morpheme boundaries as in *leave*, *agree*, *agreed*, *fire*, *lies*, *tie* and *tied*, is a partial phonologization of the English voicing effect process, which lengthens vowels before all voiced consonants. While the voicing effect rule is again gradient, the Scottish Vowel Length Rule is categorical, sensitive to morphology, and is beginning to diffuse lexically, creating exceptions like *spider* and *viper* with long vowels in short contexts. Both short /ʌɪ/ and long /aːi/ are perhaps becoming established as contrasting members of the Scots vowel inventory.

McMahon (2000b) suggests that changes may follow two alternative life-cycle paths. Some, like *æ*-tensing, shift gradually from postlexical to lexical, gradually diffusing until they cause underlying restructuring and cease to be productive. Others, like the Scottish Vowel Length Rule, additionally neutralize a distinction (here, vowel length) as they become lexical rules. This second type may include those processes analyzed in standard generative phonology as involving rule inversion (Vennemann, 1972).

Future Work

Lexical phonology provides an appealing way of modeling the difference between Neogrammarian and diffusing sound changes, and of capturing the insight that a synchronic process developing from gradient, phonetic roots can later become a lexical process. It will then shift upward through the lexical levels, gaining exceptions and becoming increasingly bound up with the morphology and less finely phonetically conditioned, until in the end the process ceases to apply productively, leaving only an indication of its existence in underlying contrasts or redistributions. This reintegrates synchronic and diachronic phonology, showing both that phonological theory can increase our understanding of change, and of how changes become phonological processes, and that historical processes can provide useful tests of theories.

However, there remain some questions for the future. First, lexical phonology is primarily a model of phonological organization. Consequently, it can model the percolation of change through the grammar well and enlighteningly, but inevitably has less to say about the initiation of change. If many sound changes are phonetically motivated, then we must look to phonetics, and to phonological representation, to explain the initial phases. Zsiga (1997) argues that we might postulate traditional phonological features or feature geometries at the lexical level, but the gestures of articulatory phonology (Browman and Goldstein, 1986, 1991) postlexically; McMahon *et al.* (1994) suggest that gestures should be the primary unit throughout the phonology, but with different constraints on rule application at different levels. In either case, phonetic explanation needs to be integrated into the model to allow for the beginning of the cycle.

Second, although work continues in lexical phonology, we are now in a period where a different model is in the ascendancy, with the advent and development of optimality theory (A. Prince and P. Smolensky, 2004; Kager, 1999). Optimality theory replaces rules plus constraints (whether on representations or on rule applications) with constraints alone; moreover, these constraints are universal and innate, at least in the classical version of the theory (A. Prince and P. Smolensky, 2004; McCarthy, 2002). Here, all constraints evaluate all possible outputs simultaneously and in parallel, to establish the single, winning and surfacing candidate that satisfies most high-ranking constraints. Optimality theory is still under construction, and there are many areas of inclarity relevant to the analysis of sound change, not least the role of phonetics (McMahon, 2000a; and see Holt, 2003 for papers discussing the application of OT to change). Furthermore, since classical OT is strictly parallel, there is no obvious way of incorporating the valuable insights lexical phonology brings to change; but it has been suggested that partial serialism and level-ordering can be maintained in stratal optimality theory (Kiparsky, in press; Bermúdez-Otero, 1999, in press). Bermúdez-Otero (in press), for instance, argues that in this composite model we are dealing with a life-cycle of constraint rankings, which move from lower to higher levels in the grammar, driven by acquisition. Whichever theory we adopt, the most likely prospect for a solution to the many remaining problems must surely be one that attempts to reconcile evidence and questions from acquisition, change, phonetics, and synchronic phonological patterns.

See also: Phonological Change in Optimality Theory; Pragmatics: Optimality Theory; Sound Change; Sound Change: Phonetics.

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Phonological Impairments, Sublexical

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Introduction

In the present contribution to this volume, we will briefly discuss some recent work in neurolinguistic modeling that once again considers the human language cerebral system as a functional mosaic, more diffuse in its overall functional operation and slightly more parallel in its chronometry. Here, we will pay specific attention to phoneme structure and prosody – namely the units commonly referred to as tonemes. This allows us explore prosody in a very digital/analytical way, where fundamental frequency control looks to be a property of the left hemisphere. Prosody is a multifunctional dynamic, not fully right-nor left-hemisphere-specific. We will then present some analysis of recent sublexical studies of paraphasia and point to some inconsistencies and weaknesses of each, concentrating on syllable structure complexity and how that complexity and its linguistic control is extremely important in drawing finer distinctions

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among aphasic deficits – among error types as well as among aphasic types. As we will argue, it is most often the case that differently categorized aphasics (especially those who are clearly in the posterior/sensory fluent groups of Wernicke's as well as conductions and subgroupings of these) will likely produce from time to time, and certainly in differing numbers, most sublexical error types. The challenge, therefore, is to find instances of **significantly** differing quantitative groupings among the error types for different subject groupings. There is ample evidence that most studies demonstrate precisely this kind of dissociation. To this, we will simply reiterate the obvious: these statistically differing groupings within error types are qualitative in the sense of statistics, but quantitative, still, in the sense of the error types themselves. We will subsequently point out that this, in turn, is why Freud's 'continuity thesis' keeps rearing its ugly head in the study of paraphasia in brain damage and why investigators continue to allude to the slips-of-the-tongue in nonpathologically involved speakers. Lastly, we will consider some recent work in the aphasic production of neologisms, how and where they may be generated, by whom, under what circumstances, whether they involve anomia or not, and how they resolve to more recognizable language. We will pay close attention to whether or not the appearance of the neologism adumbrates a lexical block, or whether it adumbrates something that is actually quite different: the strictly phonological transformation or deformation of a form that by definition must have been retrieved at some higher level of production. Lastly, we will follow the logical predictions of neology recovery from these two accounts.

Functional Metabolic Mosaics

To begin with, we would emphasize that many of the recent findings from positron emission tomography as well as from functional magnetic resonance imaging and magnetoencephalography have provided support for theories developed long before these advances in the technology of cerebral observation: theories such as motor–sensory reverberatory circuitry and function in ongoing speech production with interconnective physiology and a left hemisphere specificity. The origins of these theories date as far back as the monograph of Karl Wernicke (1874). There is much evidence from imaging work that John Hughlings-Jackson (1866) was quite correct in his assumption that the nondominant hemisphere was actively involved in many aspects of language comprehension and that its role was increasingly observed in the resolution of aphasia. Furthermore, there now exists incontrovertible evidence from imaging for earlier motor theories of speech perception as well as for other theories that postulate the leading role that acoustic memory of one sort or another has in speech production. One can go even further into history (Hartley, 1749) for the establishment of strong motor–sensory associations in terms of 'muscle sense.' Such strong associative connections and the theories they stemmed from would certainly accord with parallel cerebral metabolic mosaics so often revealed during the production of phonological segments and during the perception of the same.

Two modern neurolinguistic investigators, David Poeppel and Greg Hickok (e.g., Hickok, 2000), have designed a model based on their own imaging work and that of others that is bilateral for comprehension, thereby bringing the nondominant hemisphere into the total picture for language perception, including more than simply prosody and pragmatics – both of which also play important roles in the overall picture of online language processing, which for them begins with the introduction of an auditory signal that very importantly spreads to both hemispheres initially and only then gets parceled out in terms of what processing of that auditory signal can remain in the right and what processing is forced to dominant hemisphere analysis, and why. In fact, it may very well be that what is being seen in the metabolism of the right hemisphere during comprehension are precisely those computations of intonation and schematic knowledge access from memory stores so crucial in our understanding of spoken language. Poeppel and Hickok are careful to chart all relevant studies that demonstrate a clear role for the nondominant hemisphere for comprehension: the Wada test, split brain studies, and single cell recordings.

Before going on, we want to emphasize that in these imaging studies what we actually see is metabolism, and only metabolism. In order to infer what may have been the work task, intricate statistical subtractions must be performed on the signal to ferret out the clutter, so to speak. The timing of events must be closely controlled as well so that we can be sure that the biochemically marked nutrients are introduced and arrive at the cerebral zones so their magnetic fields can be scanned radiographically, etc. (see Uttal, 2001 for a sober evaluation of recent scanning technology and about some of the limitations of the paradigm).

Hickok (2000) focuses upon the functional neuroanatomy of conduction aphasia and uses the right hemisphere for comprehension and the left temporal zones for the strictly phonological (with emphasis on sublexical processing) auditory element, which in turn fits into the acoustic–motor reverberatory system. Holding to previous models scaffolded on techniques

other than imaging, he suggests two types of physiological interconnectionistic routes – in short, the insula or the arcuate fasciculus, which as we have known for over 100 years courses through the opercular regions of the temporal, parietal, and frontal lobes. This, in turn, allows the Poeppel/Hickok model to again reach into preimaging models and to suggest that there are two kinds of conduction aphasias, one perhaps involving lesions in and around the supramarginal gyrus (SMG) in such a way that the lesion would extend to the operculum, thereby interfering in one way or another with smooth acoustic–motor cooperation between Wernicke's area and Broca's area. An old notion, to be sure. Lesions to the left posterior supratemporal plane (location of sound-based representations), including Heschl's gyrus (BA 41) and the planum temporale (PT), slightly inferior to the SMG, may produce a more anterior type of conduction aphasia. In any event, Hickok and Poeppel do point out that activation levels of the auditory signal, although bilateral, tend to be somewhat stronger in the left.

Other recent significant studies of the perception of phonemic elements, called tonemes, have been carried out by Jack Gandour and his colleagues. In one (Gandour *et al.*, 2000), the investigators looked at the perception of tone in speakers of three languages: Thai, Chinese, and English.

Tonemes are very short stretches of fast fluctuating fundamental frequencies over the range of a vowel production. As a simple example, the segmental stretch of a CV, such as /ma/, may have a number of differing tone patterns over the /a/, such that a 'high-falling' fundamental frequency (Fo) pattern shift will give you one word, while the /a/ with a tone pattern of 'low-rising' will give you quite another. These represent minimal phonemic pair distinctions and like minimal pair distinctions call for close, digital, and highly analytical processing skills upon the acoustic spectrum. In these kinds of studies, success on the part of the subjects depends upon the ability to **link** those analytical analyses of the perceptual system **with words** in their language. Each 'tone language' has its own set of parameters that fit to the lexicon. Linguists frequently define pitch as Fo, and therefore what is involved physically is a set of fast-changing pitches. Pitch, however, tends to avoid mention of something so communicative that it would serve as the sole element to distinguish one word from another in some languages. The term 'toneme' is therefore applied to a rapid pitch change that calls up in the minds of the listener different words. Thai and Chinese are tone languages, English is not.

The method of study was PET, and there were three to four subjects for each language. The subjects were asked to simply listen to the prosodic, fast fluctuations of Fo and to press a 'same' or 'different' button if they thought they heard the same pitch pattern or not. For tonemes, only Thai patterns were chosen for this study.

Several earlier imaging studies have shown activation in the left opercular regions of the frontal lobe, very near Broca's area, during phonemic perception. Recall that most consider both areas 44 and 45 *en toto* to be Broca's area (see Foundas *et al.*, 1998, for an extremely close and detailed neuroanatomical study of pars triangularis [45] and pars opercularis [44], using volumetric MRI). The Gandour *et al.* (2000) study now shows this for the perception of the toneme, if you will, a phoneme of prosody. All subjects showed similar metabolic mosaics for the perception of rapidly changing pitch patterns that were **non**linguistic. However, only the Thai speakers revealed a significantly added component to the mosaic of metabolism when the pitch changes matched the tonemes of Thai. They were not only perceiving the rapid pitch changes, and therefore able to press same or different buttons, they were 'hearing' words. That is to say, the perception was linguistic. And, crucially, that added metabolic zone was in the left frontal operculum. Both the Chinese speakers and the English speakers revealed similar patterns of metabolism, but no added left Broca's area metabolism.

Another equally sophisticated and significant study along somewhat similar lines is found in Hseih *et al.* (2001). Here, however, there were 10 Chinese speakers and 10 English speakers, and all were analyzed as they perceived consonants and vowels, as well as pitches (nonspeech but physically similar to tones) and tones. The general metabolic mosaic patterns were different with each group of speakers, thus providing evidence that the cerebral metabolic patterns were largely reflective of the fact that Chinese and English involve different linguistic experiences. Subjects either listened passively or were instructed to do 'same–different' responding by clicking left or right, same vs. different. Subjects still had to click in the passive condition, but they simply had to alternate from one to the other for each presentation – a mindless task involving similar digit movements.

The findings here show a task-dependent mosaic of metabolic functioning that reflects how acoustic, segmental, and suprasegmental signals may or may not directly tap into linguistic significance, with non-dominant hemisphere mechanisms activated for cues that eventually work themselves into dominant hemisphere activation. Broca's area on the left was activated for the Chinese-speaking group for consonants, vowels, tones, and pitches, while the right Broca's area was activated for English speakers on the pitch

task. Since pitch is nonlinguistic on all views for English, this finding makes sense and again shows the role of the nondominant hemisphere in processing auditory stimuli at the beginning. Those pitches are extremely rapid as well, but can be processed by the right as long as they do not tap into anything linguistically meaningful. Chinese speakers, on the other hand, appear to process temporal and spectral signals in the left, not the right. Lateral effects are not predictable for very complex processing of rapid temporal and spectral change. Pitch patterns, then, along with temporal/spectral signals for consonants and vowels, are as likely to be in right or left hemisphere for this or that language. Hsieh *et al.* (2001: 240) write, "Pitch processing is lateralized to the left hemisphere only when the pitch patterns are phonologically significant to the listener; otherwise to the right hemisphere when the pitch patterns are linguistically irrelevant." Recall that in the previous study, only the Thai speaking group showed left activation (also in and around Broca's area) for the pitches that fit to the Thai tonemic system. Chinese speakers in that study showed absolutely no left Broca's area effect. Again, Chinese **is** a tone language, but the substrate of pitches is not the same as in Thai. One further finding (among the many others that we cannot go into here) was that the Chinese group showed increased metabolism in the left premotor cortex as well as the gyral zones of Broca's area (44 and 45) on the four tasks, while only the vowel condition activated left Broca's area significantly for English speakers. The pitch condition for English speakers in this study gave rise to increased metabolism in the **right** Broca's homologue. Again, we see a picture of right and left processing for auditory input, but where that auditory processing directly connects with linguistic significance for some language, that processing will drift leftwards or otherwise be attracted to the dominant hemisphere by the strength and dominance of the language processor. Now, therefore, we have growing evidence that the left Broca's area is involved in linguistic perception. In addition to this, there is increasing evidence as well that left posterior regions are involved in linguistic production.

We witness several lines of evidence in modern neurolinguistics that strengthen the classical aphasia notion that the posterior sensory auditory cortex is in many ways directly involved in speaking. Buckingham and Yule (1987) have related the architectonic findings of Galaburda of giant Betz cells under the planum temporale in level III. Not only does this system connect with the arcuate fibers in the operculum, but these regions as well show large concentrations of acetylcholine in the left temporal lobe. Since that neurotransmitter is found as well in large concentrations in left basal ganglia in right-handed people, it is assumed that it plays a motor role as well for articulation, and thus would be well situated for such a function in the left planum. In addition, Square *et al.* (1997) speak increasingly of a 'posterior' apraxia of speech (AOS), which would agree with older theories of Liepmann (1905) and with more recent models such as the one presented by Doreen Kimura (1982). There has always been a certain amount of tension in theories of AOS as to just how much of its nature is phonetic and how much is phonological. This question would only make sense, of course, if there were a certain metric that would keep the two apart, with clearly demarcated domains that would allow for an 'interface' of the two. We have already seen a complex array of interactions between the sensory and the motor for production and perception, both functionally and neuroanatomically. The brain may very well turn out to be unable to enforce a strict compartmentalization between the two, and this would in turn lend support to the claims of certain phonologists such as John Ohala (1990) that in fact there is no such thing as a phonetics–phonology 'interface,' since the two are fully intertwined. The whole issue may turn out to be moot more than originally thought. Finally, stemming from the recent evidence for old functional notions of the arcuate fasciculus, that tract's motor–sensory mediation capacity has led to its establishment as part and parcel of a subvocal rehearsal mechanism that is crucially involved in short-term operational verbal memory.

Recent Linguistic Aphasiological Studies of Sublexical Units

Most studies of segmental paraphasias in modern terms include reference to syllable structure as well as syllable complexity. Phonotactic patterns are closely scrutinized, but the interaction between phonotactics and the sonority scale are often only loosely defined and only marginally used as a comparative analytic metric. For example, many investigators (e.g., Nickels and Howard, 2004) measure syllable complexity largely by canonical form and nothing else. An aphasic who reduced complexity of syllable structure would simply change a CCVCC to perhaps a CVC, a CV, or a VC. A simple assumption would be that a CV is less complex than a CCV. The sonority hierarchy, however, provides the aphasiologist with a more powerful way to measure syllable complexity that goes beyond phonotactics. Universal (not absolute) sonority ranking, going from least to most sonorous, is: **O**bstruent **N**asal **L**iquid **G**lide **V**owel. The distance from O to V is 4, from O to N is 1, from

N to G is 2, and so forth. Onset structures have a crescendo architecture, while coda structures have a decrescendo architecture, the vowel being the nucleus of the syllable with maximum sonority. The most powerful complexity metric is the 'dispersion' principle embedded in this theory. The calculation of dispersion is done by summing the inverses of the squared values of all the distances of all elements in the initial demisyllable (the Cs and the V). The dispersion value for an initial demisyllable, such as the /pli/ of the word /pliz/, would be the following. From O to L has a distance value of 2; from O to V has a distance of 4, while the distance from L to V is 2. The dispersion value here would be: .56. Now, note for instance, that if you measure the dispersion of the CV /yu/, you get 1/1 = 1.00, a higher value than calculated for the CCV /pli/. There is a smoother and more steady crescendo going from O, then to L, then to V. This is not the case for the /yu/. The principle prefers sequences of two segments that differ as much as possible on sonority ranking. Lower dispersion values are less marked in initial demisyllables. Sonority relates to amplitude, resonance, vocalicness, and vocal tract opening. Sharp discontinuities in these features is what is preferred: maximum contrast (see Ohala, 1992, where he stresses maximum discontinuity, which to him renders the sonority principle totally redundant, or, at best, derivative). There is very little contrast between a glide and a vowel; they are contiguous. Even more nonpreferred would be a sequence of two segments of the same sonority value, a 'flat' sequence, flat meaning that there is no crescendo nor descrescendo. Other than /s/ plus another obstruent in English, which are numerous (/s/ is often considered 'extrasyllabic' by some phonologists, and thus that problem would vanish), often processes intervene to shift the syllable structure to a more preferred situation. Often, for instance, when two vowels end up together, a glottal stop intervenes to break up that undesirable sequence.

In a recent study, Nickels and Howard (2004) used a powerful statistic to discover the crucial factor correlating with word production errors (phonemic paraphasia). They could dissociate the effects of number of segments in a word, number of syllables in a word, and the syllable complexity of the word. Admittedly, the three are often conflated in studies of paraphasia that simply put the onus on 'word length' for degree of paraphasia. Number of segments and number of syllables often intercorrelated, for instance. A greater number of syllables would allow for the possibility of more complex syllables. The authors' statistic was such that it leveled out syllable complexity, showing ultimately that only number of syllables correlated with degree of accuracy in lexical realization. The problem, of course, is that without considering sonority and its dispersion measurement, the simple use of canonical forms to measure syllable complexity is weak at best, and as we saw above, actually wrong in many of its predictions of complexity, a CV in some cases being more complex that a CCV.

Furthermore, note that not all CVs are if equal complexity. A /pa/ (OV) = .06; a /na/ (NV) = .11; a /ra/ (LV) = .25, and a /ya/ (GV) = 1.

In two recent studies by Romani and Calabrese (1998) and Romani *et al.* (2002), the principle of sonority and dispersion were closely charted in the analysis of a nonfluent patient (Romani and Calabrese, 1998), and then in the 2002 study that patient contrasted with a typical fluent paraphasic speaker, with a CT scan demonstrating a two-year-old CVA in the left temporoparietal area. The previous 1998 study had clearly shown that the nonfluent errors simplified structures clearly along the lines of predictions from sonority: more segmental transformations creating less complexity in terms of sonority and syllable simplifications that followed sonority predictions as well. In that study, Romani and Calabrese importantly emphasize that since this patient was nonfluent with great articulatory difficulty, there is reason to believe that sonority patterns are grounded in motor speech execution. Christman (1992, 1994), on the other hand, showed that neologisms in a fluent aphasic also tend to follow the patterns of sonority. Neologistic structures abide quite rigidly to the architecture of sonority, and consequently they demonstrate that the principle filters up into the phonology, or otherwise becomes phonologized. In this way, sonority in the big picture can be at work in both fluent and nonfluent aphasic production. Romani *et al.*'s (2002) fluent subject did not show such simplification tendencies and to that effect did not reveal as much influence from sonority. In general, the 2002 comparison study reported the following main differences between the nonfluent DB and the fluent MM:

1. The majority of DB's errors, but not MM's errors, gave rise to simpler syllables.
2. Most of DB's errors involved consonants; MM's did not.
3. DB's substitutions were closer to the target and were influenced by frequency.
4. DB's errors were largely paradigmatic substitutions, while MM's were more involved with linear sequencing of segments.
5. MM showed no specific tendencies toward differential errors among vowels. DB, however, made the fewest errors on /a/; /a/ is the most sonorous of the vowels, since it has the most aperture.

In addition to sonority patterns, there are metrical patterns as well, and they, too, have distinct complexity levels. The trochee pattern of Strong-Weak is the most frequent meter for two syllable words in English and is likely a very frequent rhythmic template in all human languages. Iambs are somewhat more complex, since the initial syllables are unstressed, initiation thereby being more difficult. Note that many children's deletions as well as aphasics' are focused on unstressed – and most often reduced – syllables. Goodglass (1978) was one of the first aphasia researchers to point out that utterance-initial weak stresses are abnormally difficult for many types of patients, especially the nonfluent Broca's aphasics. He extended this observation to sentence-initial unstressed function words, such as *the* in a phrase *the book is on the table*. Here he noted the extreme difficulties many Broca's aphasics had with producing the initial *the*, and thus initiating the sentence. He pointed out, however, that the patient could much more easily produce noninitial, unstressed *the*, internal to the sentence. It turns out that there is a metrical account for the differential deletability of the two *the* function words, and that the same account works as well for explaining why children who delete unstressed schwas most often delete the initial ones in words such as *banana*. Metrical feet are assigned in algorithmic fashion to a stretch of syllables or words from right to left. Details aside, *nana* gets a trochaic foot (SW), but the first syllable is not assigned a foot, and is therefore referred to as an 'unfooted' schwa. The theory now says that the second schwa is 'protected' by being within a foot unit. Of the two unstressed schwas, therefore, the unfooted one is more vulnerable to apocope. At the sentential level, a similar situation arises. Going from right to left, *table* is a trochee; *on the* is a trochee; *book is* is a trochee as well. There is no foot that can be assigned to the initial *the*, so that it is 'unfooted.' An unfooted function word such as the first article *the* in the sentence, is therefore more vulnerable than the internal *the*, which is protected by the trochaic foot domain *on the*. In the final tally, these new findings from the phonology of the syllable, of metrics, and of the suprasegmental constraints on rhythm and cadence have allowed us to better appreciate that AOS has as much to do with loss of rhythm and cadence of speech, and that they in turn cause many of the articulatory derailments seen in that syndrome. It also allows us to appreciate even further that the phonemic paraphasias of Wernicke's and conduction aphasics take place at levels much higher in the linguistic production system. Metrical and syllabic phonology have led to the postulation of frames or templates into which contents may be inserted: phonemes or words. The picture is one of empty slots within these templatic frames and the access of the contents to fill those slots. Finally, each element, structure or unit may be dissociated from any other. The syllable itself is typically considered as an encasement with slots labeled as onset, rime, nucleus, and coda and groups of segments placed there as segments in production. It is stressed that syllables themselves are not subject to productive sequencing, but rather their contents are. Levelt *et al.* (1999) constructs both phonological/syllabic frames and metrical frames. There has been a long-standing article of faith held by many psycholinguists, which claims that when phonemes move in linear ordering errors they move from and to the same syllabic constituent slots: onsets move to onset positions, nuclei move to nuclei positions and codas move to coda positions. This has been variously called 'the syllable constraint condition.' For Levelt, this constraint is overly lopsided in that according to his numbers 80% of English language slips-of-the-tongue involve syllable onsets, but these are crucially word onsets as well. According to Levelt's numbers, slips not involving word onsets, "... are too rare to be analyzed for adherence to a positional constraint" (Levelt, 1999: 21). He rules out on other principles the nucleus to nucleus observation, claiming that phonotactic constraints are operating here, since a vowel → consonant will not likely result in a pronounceable string. In addition, Levelt feels that vowels and coda consonants operate under more tightly controlled conditions whereby "... segments interact with similar segments." Phonologists have observed that there are often fewer coda consonants than onset consonants, which is especially true for a language like Spanish. The number of vowels in a language is always smaller than the total number of consonants. In any event, there is ample evidence (also see Shattuck-Hufnagel, 1987) that onsets are much less 'tied' to the syllable than are codas, which being sister nodes of the nucleus, both dominated by the rime, are much more 'glued' to the vowel of the syllable. In terms of a qualitatively different status for word onsets, there is evidence that the word onset position is significantly more involved in the phonemic carryover errors in recurrent perseveration (e.g., Buckingham and Christman, 2004).

Two new notions of the nature of segmental targets have been introduced recently. One is seen in Square (1997) with her 'movement formulae.' These are stored in posterior left temporoparietal cortex and seem very much like the centuries-old memories of articulatory procedures of Jean-Baptiste Bouillaud (1825). Targets are now understood by some as idealized gestures for sound production and that voluntary speech would involve the access of these stored

gestural engrams for articulation. Both of these conjure up theories of embodiment and both are forms of representative memory (see Glenberg, 1997 for a cogent treatment of memory and embodiment).

Goldman *et al.* (2001) have analyzed the effect of the phonetic surround in the production of phonemic paraphasias in the spontaneous speech of a Wernicke's aphasic. Through the use of a powerful statistic, the authors were able to control for chance occurrence of a 'copy' of the error phoneme either in the past context or in the future context. The idea was that there could be a context effect that caused the phonemic paraphasia to occur. Chance baselines were established, and it was found that relative to this baseline, the 'error-source' distances were shorter than expected for anticipatory transpositions but not for perseverative transpositions. That could be taken to mean that anticipatory errors are more indicative of an aphasia than perseveratory errors in that this patient seemed more unable to inhibit a copy of an element in line to be produced a few milliseconds ahead. Thus, this could be taken to support the claim that anticipatory bias in phonemic paraphasia correlates with severity. The authors also observed that many but not all anticipatory errors involved word onsets, mentioned earlier in this review as vulnerable to movement or substitution. The much larger distances between error and source for perseverations could have been due to slower decay rates of activated units whereby they return to their resting states. The patient's anterior/perseveration ratios measured intermediate between a non-aphasic error corpus and that of a more severe aphasic speaker. One troubling aspect of this study was that a source was counted in the context whether or not it shared the same word or syllable position as the error. This may represent a slight stumbling block in interpreting the findings, since, Levelt notwithstanding, it would imply that syllable position had no necessary effect. The authors, however, presented their findings with caution, especially so because some recent work (Martin and Dell, 2004) has demonstrated a strong correlation between anticipatory errors and normality vs. perseveratory errors and abnormality. It is a long-noted fact that slips-of-the-tongue in normal subjects are more anticipatory than perseverative. Perseveration is furthermore felt by many to be indicative of brain damage. Martin and Dell (2004) set up an anticipation ratio, which is obviously higher in normality through slips. They also find that more severe aphasics produce more perseverative paraphasias than anticipations, but that the ratio increases throughout recovery such that in the later stages of recovery patients produce fewer and fewer perseverations as opposed to anticipations: the anticipatory effect grows as the patients approach normality. On the logic that the improving aphasic should move in the direction of the normal subject, the anticipatory ratio should increase. It may very well turn out that the anticipatory error will ultimately serve as a metric to measure recovery over time in aphasia.

Recovery from the Production of Neologisms

The question may be, and has been, asked: neologisms: from whence? From the beginning, it was simply thought that they stemmed from a complex array of literal or phonemic paraphasias. That is, it had originally been taken as an article of faith that neologisms originated from words that had been phonemically transformed to the extent that any transparency between error and target word was obliterated. There has never been any question that this account is not a logical one, especially given the prevalence of phonemic paraphasia in fluent aphasia. Since the days of Wernicke (1874), M. Allen Starr (1889), the late 19th-century linguists, through Arnold Pick (1931/1973) and up to the present (see Buckingham, 1989), error typologies have included anticipatory errors, perseverative errors, exchanges, and substitutions of phonemes in both normal subjects (slips-of-the-tongue) and aphasics. The phonemic paraphasia theory of neology was dubbed by Buckingham (1977) as 'the conduction theory,' since conduction aphasics are marked by their phonemic paraphasias. This was the theory implied in the Boston Aphasia Exam and specifically invoked in Kertesz and Benson (1970) for the neologism. Note very importantly that this account for the production of neologisms implies, if it does not say so outright, that the problem is not with the retrieval of the word but rather with the phonological realization of that word. For this theory to hold true, the target word would presumably have to have been retrieved from the lexicon, because it must serve as the input to the component that transforms it.

Another possible account of neologisms would be to claim that straight away the patient had a word block whereby no target word would be forthcoming, and that nonetheless, the patient continued talking or stopped responding. The question then becomes, how in this circumstance could the patient produce what would then be a surrogate for or a 'masker' of the unaccessed word. By what aspects of phonetic production could the speaker produce the surrogate. The issue was introduced in modern neurolinguistic studies in Alajouinine (1956), Kertesz and Benson (1970), Buckingham and Kertesz (1976), and Butterworth (1979). Butterworth called this second account of

neology 'the anomia theory,' and suggested the metaphor of a 'random generator' as a principle device that could produce a phonetic form in light of retrieval failure.

Butterworth had studied with Freida Goldmann-Eisler (1968), who had analyzed large stretches of spontaneous speech and had looked closely at the on-going lexical selection processes online. She had noted time delays before the production of nouns of high information (i.e., low redundancy) in the speech of normal subjects. Time delays for her indicated the action of word search, and that search would obviously be a bit more automatic and fast, to the extent that the word sought was highly redundant, therefore carrying less information. Butterworth very cleverly extended his mentor's methods to the analysis of neologistic jargon stretches of spontaneous speech in Wernicke's aphasia. What he found was extremely interesting. Before neologisms that were totally opaque as to any possible target (subsequently termed 'abstruse' neologisms by A. R. Lecours (1982)), Butterworth noted clear delays of up to 400 ms before their production. Crucially, he did not notice this delay before phonemic paraphasias, where targets could nevertheless be clearly discerned, nor before semantic substitutions, related to the target. This indicated failed retrieval for Butterworth and he went on to suggest that perseverative processes and nonce word production capabilities could play a role in this 'random generator.' It was 'random' for Butterworth, since his analysis of the actual phonemic makeup of neologisms did not follow the typical patterns of phoneme frequency in English. He never implied that 'random' meant helter skelter; he knew enough about phonotactic constraints in aphasic speech. Neither did he imply that the patient actually, with premeditated intentionality, produced the surrogate. The whole issue was subsequently treated in Buckingham (1981, 1985, 1990).

Each of these accounts of neology makes different predictions concerning recovery. The conduction theory predicts that as the patient recovers, target words will slowly but surely begin to reappear. Paraphasic infiltration will lessen throughout the months and ultimately the word forms will be less and less opaque. In the endstage of recovery, there should be no anomia. The theory also predicts that the error distributions in the acute stage will produce some errors with mild phonemic transformation, others with more, others with a bit more, etc., up to the completely opaque ones, i.e., a nonbimodal distribution. The anomia theory, on the other hand, predicts a bimodal distribution with neologisms on one end and more or less simple phonemic paraphasia on the other, and few in the middle that were more severe but not enough to render word recognizability opaque. The anomia theory predicts that during recovery patients with that underlying problem will generally show fewer and fewer neologisms, gaining better monitoring capacity to note the neologisms, perhaps ultimately holding back the surrogate productions as a mark of improvement in the aphasia. It is also highly likely that as the patient improves, the perseverations will lessen (e.g., Martin and Dell, 2004). What is clearly predicted at the endstage, however, is that the anomia may very well remain, but now with more stammering, pausing, and halting. This, then, would be more in the line of what a normal speaker might do when faced with word-finding difficulties. Unhampered with additional sequelae, this is more or less what the 'pure' anomic will do.

These predictions remained untested in the clinic until Kohn and Smith (1994) and Kohn *et al.* (1996). Essentially, and more specifically in 1996, Kohn and colleagues observed and described patients who, in the acute stages of their aphasia, produced neologisms. One group recovered to mild phonemic paraphasia with no noted anomia, while the other group no longer produced neologisms in the later recovery stages. This second group of patients, when producing the neology initially, appeared to Kohn and colleagues (1996: 132) to be invoking some kind of "... backup mechanism for 'reconstructing' a phonological representation when either partial or no stored phonological information about a word is made available to the production system."

Most connectionists have an easier time with the conduction theory of neologisms and in general only provide this one account of their generation. They generally weaken in varying degrees the connection strengths between the lexical and the phonemic levels in their models, while keeping decay rates at normal levels. They can thus quite easily simulate a gamut of phonemic errors (and also they can simulate segmental slips-of-the-tongue), the more severe bordering on the opaque. Their paradox, however, would be that the simple paraphasias would not render target words opaque, and thus interlevel transparency would be maintained between word and phoneme. On the other hand, with a bit more connection weight reduction, opaque forms may begin to be produced, and to the extent they are opaque, interlevel transparency will disappear. Connectionists often make the claim that interlevel transparency reveals qualitatively different kinds of errors – or even different kinds of patients. Some have called errors that do not show between-level communication 'stupid,' while those that nevertheless reveal interlevel connectivity have been called 'smart.' Note that both kinds of patients in Kohn and colleagues' study would start out with

'stupid' errors. Neologisms have no transparency concerning some target. But, by the anomia account, the errors would remain 'stupid' even into recovery, as long as the anomia was there, unless some semantically related errors began to appear; some probably did. On the other hand, by the conduction account, the errors would start off 'stupid' but end up 'smart.' Connectionists will have to tell us whether this scenario is a puzzle for them or not. Again, most connectionist modelers opt for the conduction theory of neologisms (e.g., Gagnon and Schwartz, 1996; Hillis *et al.*, 1999). As an example of the conduction theory for neologisms in connectionist modeling, Hillis *et al.* (1999: 1820) wrote, "This proposal would account for her phonemic paraphasias (when few nontarget subword units are activated) and neologisms (when many nontarget subword units are activated)." That is to say, few phonemic errors result in simple paraphasia, where the target is not rendered opaque, while many phonemic errors result in a neologism, where the target is, indeed, rendered opaque. The problem of the neologism, however, is still with us, and especially so if we do not admit at least two error routes – perhaps even a third, but time does not permit further consideration.

Conclusions

We have considered a vast array of findings on sublexical linguistic elements, their brain locations and tight sensory–motor links. We have claimed that many new imaging studies have conjured up and vindicated several earlier theories laid down long before the modern technology before us in the neurosciences. We have seen the motor–sensory interface in the functional linguistic descriptions of phoneme level production and perception, and we have even seen that much new work with modern technology has served to sharpen our understanding at somewhat closer levels, but nonetheless has vindicated much previous thinking – back to the Haskins Labs and even further back to the classic aphasia models of the late 1800s. The focus upon the perisylvian region in the left hemisphere has not changed, and in fact there is even more growing interest in charting the anatomy and function of the arcuate fasciculus, the opercular regions, and the insula. At a slight remove from the physical system, we have discussed and compared various new findings and principles in the phonetics and phonology of segments, syllables, and meter and how they impact on sublexical processing in aphasia. Finally, we considered the enigma of the neologism and provided evidence that there are at least two quite reasonable accounts of how they may be produced and under what conditions they may appear. This leads to a consideration of how recovery from neology may take different paths as the patient improves language control. Many questions remain.

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Phonological Phrase

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Introduction

Connected speech is not just a sequence of segments occurring one after the other. It also reflects an analysis into hierarchically organized constituents ranging from the syllable and its constituent parts to the utterance (Selkirk, 1984; Nespor and Vogel, 1986). Two elements that form a constituent of a certain level have more cohesion between them than two elements that straddle two constituents of the same level. For example, in the Italian example in (1), the syllables *ra* and *men* are 'closer' together in (1a) than in (1b), and in both cases they are closer than the same syllables in (1c).

(1a) veramente
'truly'
(1b) era mente sublime
'(it) was (an) exceptional mind'
(1c) Vera mente sempre
'Vera lies all the time'

Phonological constituents reflect morphosyntactic structure in that cohesion at the phonological level often (though not necessarily) signals constituency at the morphosyntactic level.

The cues that make us perceive two units as closer together than two units of a higher order are various and both segmental and prosodic in nature. That is, a segment may undergo a change in its features within a constituent of a certain type, but not outside of it, and several types of prosodic phenomena can mark the edges of constituents. The first type of phenomenon is exemplified in (2): in some varieties of Standard Italian, an /s/ is voiced intervocalically only if it belongs to a phonological word, as in (2a) but not if it straddles two phonological words as with the compounds and the clitic groups exemplified in (2b) and (2c), respectively.

(2a) ba[z]e, ca[z]a, me[z]e
'basis, house, month'
(2b) capo[s]ezione, para[s]ole
'station-head, sunshade'
(2c) lo [s]o, dice[s]i
'(I) know it, one says'

Another example of segmental change bound to a constituent is vowel harmony, e.g., in Turkish, exemplified in (3): the last vowel of a word's stem determines the quality of all vowels of the word's suffixes, but no vowel that is external to the word.

(3a)	ev	eve	evde	evden	evler	evlerden
	'house'	'to . . .'	'in . . .'	'from . . .'	'PL.'	'from . . . PL.'
(3b)	ada	adaya	adada	adadan	adalar	
	'island'	'to . . .'	'in . . .'	'from . . .'	'PL.'	
	adalardan					
	'from . . . PL.'					

In the second type of phenomena, those that mark an edge of a prosodic constituent, can be exemplified with word stress, which in many languages occurs in a fixed position, as is seen in (4) and (5), on the basis of Turkish and Hungarian, where stress systematically falls on the last and on the first syllable, respectively.

(4) *Turkish*: arkadáš, kelebék, benlemék, sivrisinék
'friend, butterfly, to wait, mosquito'

(5) *Hungarian*: káposzta, kática, búrgonya, fékete
'cabbage, ladybird, potato, black'

The phonological phrase is one of the phrasal constituents of the phonological, or prosodic, hierarchy, and we will see that it is crucial in the signaling of syntactic constituency and, additionally, in providing cues to the value of a basic syntactic parameter. Like the other constituents of the prosodic hierarchy, it is signaled both by phenomena bound to it and by edge phenomena. These cues are used both in the processing of speech by adults, for example to disambiguate certain sentences with an identical sequence of words but different syntactic structures, and in language acquisition by infants.

The Domain of the Phonological Phrase

The domain of the phonological phrase (ϕ) extends from one edge of a syntactic phrase to and including its head. There are thus two possibilities: in languages in which the phonological phrase starts from the left edge of a syntactic phrase (X''), it ends at the right edge of the phrasal head (X). In languages in which it starts from the right edge of a syntactic phrase, it ends at the left edge of the phrasal head. These two possibilities are illustrated in (6a) and (6b), where the bold parts indicate the domain of the phonological phrase in head–complement and complement–head languages, respectively.

(6a) X''[**...**[ ]$_X$. . . . . .]
(6b) [. . . . . .**x**[ ]**...**]$_{X''}$

Is it possible to predict which of the two options is chosen for a given language? It has been proposed that it is indeed, and that it depends on the relative location of heads and complements, i.e., on the direction of recursivity of a given language: in languages in

which heads precede their complements, the first option is chosen; in languages in which heads follow their complements, the second option is chosen. The general definition of the domain of ϕ is given in (7), where C stands for clitic group, the constituent that dominates the phonological word and that includes one lexical head and all clitics phonologically dependent on it (Nespor and Vogel, 1986).

(7) The domain of ϕ consists of a C which contains a lexical head (X) and all Cs on its nonrecursive side up to the C that contains another head outside of the maximal projection of X.

Thus, in both types of languages, one edge of the phrasal head and the opposite edge of the phrase are marked prosodically. That is, prosodic cues signal either the left edge of the phrase and the right edge of the head, or the left edge of the head and the right edge of the phrase. In both languages, phonological phenomena signal a certain level of cohesion among the elements that belong to the phonological phrase. One such phenomenon in some central and southern varieties of Italian is the lengthening of word-initial consonants. Specifically, if a word starts with a consonant other than /s/ followed by a consonant, this initial consonant is lengthened if preceded by a word ending with a stressed vowel. The phenomenon takes place if both words belong to the same phonological phrase, and it does not apply if a phonological phrase boundary intervenes between the two, as exemplified in (8).

(8a) [sar[á] [f:]atto]$_\phi$ (*[f]) '(it) will be done'
(8b) [far[á]]$_\phi$ [[t]ante torte]$_\phi$ (*[t:]) '(I) will make many cakes'

In the same prosodic context, i.e., only when two words are included in one phonological phrase, in many languages, clash avoidance applies, a phenomenon that in the case of two adjacent syllables bearing word primary stress (a stress clash) destresses the first of the two, with the possible addition of a stress on a syllable to its left. This phenomenon is exemplified in (9) and (10) for Italian and English, respectively.

(9) *Italian*
(9a) [sará fátto]$_\phi$ → [sára fátto]$_\phi$ '(it) will be done'
(9b) [faró]$_\phi$ [tánte torte]$_\phi$ *[fáro]$_\phi$ [tánte torte]$_\phi$

(10) *English*
(10a) [thirteén boóks]$_\phi$ → [thírteen boóks]$_\phi$
(10b) [I introdúce]$_\phi$ [Greék books]$_\phi$ *[I íntroduce]$_\phi$ [Greék books]$_\phi$

In some languages and in specific, syntactically defined, cases, i.e., in head–complement languages, when the syntactic head at the right edge of aϕ is followed by a ϕ that exhaustively includes the head's complement or modifier, the two ϕs can be restructured into a single one. Thus, (11) contrasts with (10b) since in the first, *Greek* is a nonbranching complement of *introduce*, while in (11) it is simply part of the complement.

(11) [I introdúce]$_\phi$ [Greék]$_\phi$ → [I íntroduce Greék]$_\phi$

The same holds for complement-head languages, but in this case ϕ restructuring takes place in the other direction: the ϕ containing a head at its left edge optionally includes the ϕ containing a nonbranching complement or modifier to its left.

Phonological phrases have also been shown to undergo final lengthening in many languages (e.g., Beckman and Edwards, 1990; Wightman *et al.*, 1992; Cambier-Langeveld, 2000) and to be crucial for determining the anchoring of the tones of intonational melodies to the text (Hayes and Lahiri, 1991).

Why do we need a phonological constituent analysis into phonological phrases? Since phrasal phonological phenomena have the function of signaling syntactic structure, the alternative would be to state that certain syntactic constituents are the domain of phonological phenomena. One of the reasons to have a separate hierarchy to account for phonological phenomena is that the domains of phonological and (morpho-)syntactic constituents are not always isomorphic (Selkirk, 1984; Nespor and Vogel, 1986; Hayes, 1989; Truckenbrodt, 1999).

One reason for nonisomorphism lies in the fact that phonological structure is much shallower than syntactic structure, the second, not the former, instantiating a recursive system. In addition, a constituent in the syntactic tree can be attached at different levels. For example, the two meanings of a sentence like *I have seen the president with the binoculars* have different syntactic structures according to the level at which the constituent *with the binoculars* is attached, but only one phonological structure – hence its ambiguity.

A second reason for nonisomorphism between the syntactic and the phonological structure at the ϕ level originates in the restructuring rule: in the syntactic tree, the word *Greek* is attached in a similar way to the word *introduce* in the two sentences in (10b) and (11). Yet in one case, the two words are included in the same phonological phrase and in the other case they are not.

A third reason for nonisomorphism is the phonological constituency of closed class items that precede or follow the head in right- and left-recursive languages, respectively. Thus, in many varieties of American English, a word like *because* is not part of the nominal phrase to its right and yet it is

included in the same phonological phrase, as seen from the fact that clash avoidance takes place in (12).

(12) I came [becaúse Jóhn]$_\phi$ could not come →
. . . bécause Jóhn . . .

Besides the nonisomorphism argument, there is another reason to justify the prosodic hierarchy, and thus the phonological phrase, as a separate level of representation: the influence of syntax on phonology is restricted to just those constituents. No other domains for postlexical phonology are predicted to exist.

We can thus draw the conclusion that the phonological phrase must be a constituent of grammar because it defines a domain that is phonologically marked in many ways (of which more below), and it is not necessarily isomorphic to any syntactic constituent. It is identifiable because it is the domain of application of several phonological phenomena in different languages and, in certain cases, it disambiguates two sentences with the same sequence of words, such as those in (13).

(13a) Ho comprato delle fotografie di città [v]ecchie
'(I) bought old maps of cities'
(13b) Ho comprato delle fotografie di città [v:]ecchie
'(I) bought pictures of old cities'

The lengthening of the initial consonant of *vecchie* in the second example, where *vecchie* refers to *città* indicates that *di città vecchie* is a restructured ϕ, while its absence in the first example, where *vecchie* refers to *mappe*, idicates that *vecchie* is a ϕ on its own: it cannot restructure with the preceding word because, though nonbranching, it is not its modifier.

Relative Prominence Within the Phonological Phrase

Within each constituent of the phonological hierarchy, relative prominence is assigned to its daughter constituents: one of the constituents is marked as strong and the others as weak. That is, within each constituent, which edge is strong (i.e., most prominent, e.g., more stressed) and which is weak is defined. Thus within a foot, either the leftmost or the rightmost syllable is strong; within a phonological word, either the leftmost or the rightmost foot is strong (Liberman and Prince, 1977).

The location of the strong element dominated by the phonological phrase has been proposed to depend on the value of the head–complement parameter, i.e., on the order of words within a syntactic phrase (Nespor and Vogel, 1986). In head–complement languages, the strongest element within a ϕ is the rightmost, in complement–head languages it is the leftmost. Thus, the element dominated by ϕ that bears the main prominence is either the rightmost or the leftmost depending on the recursive side of a specific language: in right recursive languages, e.g., French, the strongest element is rightmost; in left recursive languages, e.g., Turkish, it is leftmost, as exemplified in (14) and (15), respectively (the strongest word is underlined). French and Turkish are used in the examples because these languages are similar both in word primary stress location and in syllabic complexity.

(14a) [pour <u>moi</u>] 'for me'
(14b) [la belle <u>fille</u>] 'the beautiful girl'

(15a) [<u>benim</u> için] 'for me' (me – for)
(15b) [*güzel* kadın] '(the) beautiful woman'

Prominence at this level thus signals the value of an important syntactic parameter, which defines the recursive side of a phrase: in a language like French, an utterance will be a sequence of iambs, i.e., a weak syllable followed by a strong one (or, depending on the number of words it contains, of anapests, i.e., two weak syllables followed by a strong one); in a language like Turkish an utterance will be a sequence of trochees, i.e., one strong syllable followed by a weak one (or dactyls, i.e., one strong syllable followed by two weak ones).

It should be noted that while in an unrestructured ϕ, main stress always falls on the syntactic head, this is not so in restructured ϕs. In this case, the most prominent element is either the head's nonbranching complement or its nonbranching modifier. The relative prominence within phonological phrases, thus, does not directly signal the head of a phrase, but more abstractly, whether heads are preceded or followed by their complements.

The Function of the Phonological Phrase in Speech Processing and Language Acquisition

Given that the analysis of a string into phonological phrases can, in many cases, disambiguate possibly ambiguous sentences, it is feasible that its cues are used online in the processing of speech. It has in fact been shown that the location of phonological phrase boundaries affects lexical access in experiments with English-learning infants of 10 and 13 months of age (Gout *et al.*, 2004). Infants were familiarized with two bisyllabic words and then presented sentences that either contained one of the words, or the same two syllables but separated by a ϕ boundary. While 10-month-olds do not show any preference,

13-month-olds prefer the utterance containing the familiarization words, indicating that they hear the difference between two syllables that either contain or do not contain a ϕ boundary.

Recent results with adults suggest that in French phonological phrase boundaries are used online to constrain lexical access (Christophe *et al.*, 2003). Participants' reactions were slowed down by local lexical ambiguities within phonological phrases, but not across them. Thus, a target word *chat* ('cat') was responded to more slowly in *son chat grincheux* ('his grumpy cat'), where *chagrin* is also a word, than in *son chat drogué* ('his drugged cat'), where no competitor word starts with *chad*. Instead, when the word *chat* was followed by a phonological phrase boundary, participants responded equally fast in both conditions, the condition containing a potential competitor and the one not containing any, e.g., in *chat* in [*son grand chat] [grimpait aux arbres*] ('his big cat climbed up trees') and in [*son grand chat*] [*dressait l'oreille*] ('his big cat pricked up its ears'). That is, the competitor word *chagrin* is not recognized, thus showing that phonological phrase boundaries constrain lexical access online.

Given that the rhythmic pattern within phonological phrases reflects the value of the head–complement parameter, it has been proposed that this signal might be used by infants in the bootstrapping of the syntax of their language of exposure (Nespor *et al.*, 1996): infants exposed to an iambic rhythm may deduce that in their language, heads precede their complements; infants exposed to a trochaic rhythm may deduce that in their language, heads follow their complements. The first step to show the feasibility of this hypothesis has been made in an experiment that shows that 6- to 12-week-old infants discriminate two languages solely on the basis of the location of prominence within phonological phrases (Christophe *et al.*, 2003). French and Turkish were chosen because they have a similar syllabic structure and both languages have word final stress. In addition, the sentences were delexicalized (all segments that share manner of articulation are reduced to a single place of articulation: stops to [p], fricative to [s] and so on), so that no segmental information could give a cue to the specific language. Infants discriminate French from Turkish sentences containing branching ϕs but fail to discriminate sentences containing only nonbranching ϕs, where the different rhythmic pattern at the phonological phrase level, iambic or trochaic is not realized.

See also: Phonological Words; Phrasal Stress; Prosodic Aspects of Speech and Language; Prosodic Cues of Discourse Units; Prosodic Morphology.

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Phonological Typology

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Phonological typology is a classification of linguistic systems based on phonological properties. There are four basic kinds of typology: 'areal' or 'genetic' typologies; typologies based on 'surface phonological properties'; typologies based on some 'underlying phonological property'; and 'parametric' typologies. Examples of each of these are reviewed below.

In addition, phonological typology can refer to a classification of the elements that make up a phonological system. For example, articulatory descriptors like 'velar' and 'labial' form part of a typology of speech sounds. Such a typology can be based on the surface elements of a language or on deeper constructs. These kinds of typologies are discussed as well.

Genetic and Areal Typology

A genetic typology is one based on the developmental relationships within language groups, for example, Germanic versus Slavic, or Bantu versus Indo–European. Such relationships are not in and of themselves phonological, but often coincide with phonological similarities. These similarities arise from phonological properties that stem from the common period, but also from shared innovations that occur after the languages separate. These shared innovations are a consequence of the structural pressures engendered by the phonological system created in the shared period of evolution.

For example, the Slavic languages can be distinguished as a genetic type within the Indo–European language family. The Slavic languages are characterized by a number of properties, including phonological properties. In the phonological domain, they exhibit a set of three palatalizations that applied in the common period. These palatalizations front consonants in the environment of an adjacent front vowel. The chart in Figure 1 shows the results of the three palatalizations for velar consonants adjacent to front vowels. Interestingly, some of the daughter languages have undergone subsequent palatalizations as well. For example, Russian velars before front vowels are palatalized as indicated in Figure 1.

The Germanic languages within Indo–European can also be distinguished. These languages can be characterized by the consonantal shifts underlying Grimm's and Verner's Laws. As with Slavic, many of the daughter languages have undergone subsequent similar shifts. The chart in Figure 2 shows the results of the traditional formulation of Grimm's Law for velar consonants (Proto-Indo–European > Germanic). It also shows the results of the Standard German (High German) consonant shift (Germanic > High German). Notice how the affrication of the voiceless velar partially recurs in the two shifts (k → x and k → kx/k).

Phonological typologies based on genetic relationships are thus useful in that they have led to an investigation of recurring perseverative developments like those above.

An areal typology is based on geographic proximity. Such relationships also often coincide with phonological properties. For example, many languages of the Indian subcontinent have murmured consonants, irrespective of whether they belong to the same family or not. African languages frequently have tonal contrasts. These phonological similarities are thus in some cases a consequence of common origins (genetic similarity), but in other cases they are borrowed from neighboring languages.

Surface Typology

Surface typologies are built on surface properties of phonological systems. For example, click languages are those languages that have sounds produced with a velaric ingressive airstream. Stress languages have variations in prominence marked on different syllables.

It is in the domain of phonological inventories (*see*) that some of the most intensive work has been done on surface typology. In the tradition inaugurated by Joseph Greenberg (and continued by his students), work on phonological typology has gone hand in hand with the development of phonological universals (*see* **Phonological Universals**). Investigating the

I	II	III	Russian
g → ž	g → z	g → z	g → g^y
k → č	k → ts	k → ts	k → k^y
x → š	x → s/š	x → s/š	x → x^y

Figure 1

PIE > Gmc	Gmc > HG
k > x	x > x
g > k	k > kx/k
g^h > g	g > g

Figure 2

Accent	Tone	Stress
* pata	HL pata	pata

Figure 3

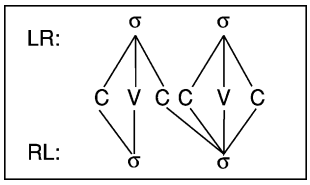

Figure 4

basic types of phonological inventories has led to universals regarding those inventories. Maddieson (1984: 69) cited the following example of a universal: 'The presence of a voiceless, laryngealized or breathy voiced nasal implies the presence of a plain voiced nasal with the same place of articulation.' This universal results from investigating the typology underlying languages with nasal consonants, which leads one to ask whether the distribution of those segments is free or whether there are restrictions that would result in an interesting typology. If Maddieson's universal is correct, then it makes sense to distinguish languages containing voiceless, laryngealized, or breathy voiced nasals from languages without those sounds. It makes sense, because languages of the former sort must necessarily have voiced plain nasals with the same place of articulation.

As a second example, consider whether languages containing the sound /q^{w,}/ (voiceless labialized ejective uvular stop) should be distinguished from languages without such a sound. If something follows from this distinction, then it makes sense to make it. Maddieson (1984) proposed the following universal: 'if a language has /q^{w,}/ it also has /q'/ and /k^{w,}/.' Such a universal motivates the basic typology.

Underlying Typology

Typologies can be built on underlying properties of phonological systems as well. For example, three basic kinds of suprasegmental systems can be distinguished underlyingly: accent, tone, and stress. Accent languages, like Japanese, mark surface pitch contrasts underlyingly with a diacritic mark associated with particular syllables (perhaps even a linked tone as in a tone language, or metrical structure as in a stress language). The surface patterns are arrived at by associating a specific melody with the diacritically marked word. Archetypical tone languages are also typified by surface pitch contrasts, but have a different underlying structure. In a tone language, the underlying representation of a word is associated with a tonal melody. Stress languages, like English, are typified by metrical structure assignment at some point in the derivation (*see* **Metrical Phonology**). However, at the surface, stresses may be realized by pitch contrasts, as in Greek, resulting in a superficial conflation of all three systems. That is, the three kinds of systems may not be distinguishable phonetically. The underlying structural contrasts are indicated with the hypothetical words in Figure 3. In Figure 3, the accent language marks a particular syllable; the tone language includes a specific tonal melody; the stress language includes no underlying specification.

Parametric Typology

One of the most exciting developments in phonological typology has been parametric typology. A parametric typology is built on parameters, which correspond to the points where languages can exhibit variation. In this respect, parametric typologies are like other typologies. However, parameters are also supposed to correspond to the particular choices that a child must make in learning his or her language. One parameter that has been proposed is directionality of syllabification. This parameter has several consequences with respect to the size of onset clusters and the placement of epenthetic vowels. Languages exhibiting left-to-right syllabification can be distinguished from those exhibiting right-to-left syllabification. The diagram in Figure 4 shows how different syllabifications are achieved when CCVC syllables are aligned from left to right and from right to left.

Another example of a parameter is headedness in metrical constituents. In most versions of the metrical theory of stress, the head of a constituent occurs on either the left or the right edge of a constituent, as in Figure 5. The *x*'s at the lower level of the hierarchy mark syllables; the *x*'s at the higher level mark headship (*see* **Metrical Phonology**). Headedness has consequences with respect to the initial assignment of stress and subsequent stress shifts that arise when a vowel becomes unstressable for some reason. As with the directionality of syllabification, headedness corresponds to one of the choices that language learners supposedly make.

Typologies of Elements

Typologies can also be applied to the elements of phonological systems. The simplest case of this is distinctive feature theory. A feature like [high] imposes a

Left-headed:	x (x x)	x (x x . . . x)
Right-headed:	x (x x)	x (x x . . . x)

Figure 5

[+high]:	high vowels, palatals, velars
[-high]:	everything else

Figure 6

classification on speech sounds as in Figure 6. The feature [high] provides for a typology of speech sounds in any language (*see* **Distinctive Features**).

Typologies have been applied to other machinery of generative grammar as well. For example, the ordering of any two phonological rules can be categorized in terms of whether the first rule creates environments for the second (feeding) or eliminates potential cases for the second (bleeding) (*see* **Rule Ordering and Derivation in Phonology**). This gives rise to a typology of ordering relationships. The rules themselves have been typologized as well: for example, lexical versus postlexical, and structure-building versus structure-changing in the theory of lexical phonology (*see* **Lexical Phonology and Morphology**).

Evaluating Typologies

In and of itself, classifying the objects of inquiry is of little interest. A typology is of use only to the extent that it aids in the construction of a theory or follows from a theory. A good typology is one where the proposed distinction between phonological systems or elements correlates with other phonological properties. Specifically, a typology is highly valued to the extent that it provides a classificatory scheme based on a multiplicity of factors as opposed to just a few.

See also: Distinctive Features; Lexical Phonology and Morphology; Metrical Phonology; Phonological Universals; Rule Ordering and Derivation in Phonology.

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Phonological Universals

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Introduction

To understand what a phonological universal is, we must first agree on what phonology is. In point of fact, much of the divergence between different views of phonological universals stems from this question.

A very simple characterization of phonology would be the study of the sound systems of language. This definition leaves a number of issues open and is therefore a reasonable – albeit ambiguous – starting point. Given this definition, a phonological universal is a statement about how sound systems may and may not vary across the languages of the world.

There have been a number of approaches to phonological universals over the history of phonology and this article surveys some of the more influential ones of the last 50 years.

Greenbergian Universals

'Greenbergian' universals are named for the work of Joseph Greenberg and his collaborators. (See, for example, Greenberg, 1978.) Here are a few examples:

1. All languages have vowels.
2. All languages have consonants.
3. No language has an apicovelar stop.
4. The presence of a voiceless, laryngealized, or breathy voiced nasal implies the presence of a plain voiced nasal with the same place of articulation (Maddieson, 1984).
5. All languages have some syllables that begin with consonants (Jakobson, 1962).
6. All languages have some syllables that end with vowels (Jakobson, 1962).
7. Nearly all languages have /i, a, u/ (Maddieson, 1984).
8. Front vowels are usually unrounded, back vowels are usually rounded (Maddieson, 1984).

Left-headed:	x (x x)	x (x x . . . x)
Right-headed:	x (x x)	x (x x . . . x)

Figure 5

[+high]:	high vowels, palatals, velars
[-high]:	everything else

Figure 6

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Introduction

To understand what a phonological universal is, we must first agree on what phonology is. In point of fact, much of the divergence between different views of phonological universals stems from this question.

A very simple characterization of phonology would be the study of the sound systems of language. This definition leaves a number of issues open and is therefore a reasonable – albeit ambiguous – starting point. Given this definition, a phonological universal is a statement about how sound systems may and may not vary across the languages of the world.

There have been a number of approaches to phonological universals over the history of phonology and this article surveys some of the more influential ones of the last 50 years.

Greenbergian Universals

'Greenbergian' universals are named for the work of Joseph Greenberg and his collaborators. (See, for example, Greenberg, 1978.) Here are a few examples:

1. All languages have vowels.
2. All languages have consonants.
3. No language has an apicovelar stop.
4. The presence of a voiceless, laryngealized, or breathy voiced nasal implies the presence of a plain voiced nasal with the same place of articulation (Maddieson, 1984).
5. All languages have some syllables that begin with consonants (Jakobson, 1962).
6. All languages have some syllables that end with vowels (Jakobson, 1962).
7. Nearly all languages have /i, a, u/ (Maddieson, 1984).
8. Front vowels are usually unrounded, back vowels are usually rounded (Maddieson, 1984).

There are a number of properties that are indicative of greenbergian universals. First, their logical structure is transparent. For example, the first universal given above can be interpreted directly as a logical restriction with universal scope, e.g., 'for all x, if x is a language, then x has vowels': $\forall x\ (L(x) \rightarrow V(x))$.

A second general property of greenbergian universals is that they usually apply to relatively superficial elements of a phonological system. For example, greenbergian universals typically – though not exclusively – refer to elements of the phonetic, not phonological, inventory. Likewise, greenbergian universals are typically not formulated over relatively abstract phonological elements like features, rules, constraints, or prosodic elements, but are typically formulated over segments or classes of segments. (The examples above that refer to syllables or phonemic inventory are thus counterexamples.)

Finally, greenbergian universals are typically arrived at on the basis of empirical typological work, rather than by deduction from some theory; they are thus more empiricist, rather than rationalist on that philosophical continuum.

All of these features are relatively uncontroversial and can be used to argue the virtues or shortcomings of this approach to phonological universals. For example, the fact that these types of universals are typically formulated to refer to superficial entities can be taken as a virtue, since the properties of relatively superficial entities are more amenable to direct examination. Thus, universals over such entities are more falsifiable. On the other hand, one might argue that universals over superficial entities are less plausible, on the assumption that surely the cognitive elements that underlie those entities and phonology generally are of a significantly different character.

Notice that the list above also includes statistical generalizations, e.g., generalizations that include qualifiers like 'nearly' or 'usually.' These obviously cannot be interpreted in the same way as absolute restrictions and are not as readily falsified. For example, a universal that says that all languages have vowels can be falsified by finding a language that has no vowels. On the other hand, finding a language that does not have /i, a, u/ does not falsify a universal that says that **most** languages have those sounds. Rather, to falsify a statistical universal, one must present an appropriate sampling of languages that violate the universal. Since the statistical universal was presumably already determined by such a sample, it follows that to be falsified, a sample of similar size or greater must be made. (Though see Bybee, 1985 for another view.) Statistical greenbergian universals are therefore troubling because they are harder to falsify.

Rule-based Universals

The advent of generative phonology in the late 1960s came with a different approach to phonological universals (Chomsky and Halle, 1968: henceforth SPE).

This approach to phonological universals can be characterized as 'rule-based' or 'formal(ist).' The theory is formalized as a notation for writing language-specific phonological generalizations, or rules. The basic idea behind the approach to universality in this theory is that the restrictions of the notation are intended to mirror the innate capabilities of the language learner. Thus, if a rule can be written with the notation, then the theory is claiming that that is a 'possible' rule. If a rule cannot be written with the notation, then it is an 'impossible' rule.

In addition, this theory posited an 'evaluation metric' whereby the set of possible rules could be compared with each other. It was thought at the time that rules/analyses that were 'simpler' in terms of the notation were more natural. They would show up more frequently in languages, and they were preferred by the language learner if more than one formalization could describe the available data.

Feature theory provides a simple example of how this theory made claims about universality. Vowel height is treated in terms of two binary-valued features: [high] and [low]. The following chart shows how these features can be used to group vowel heights in different ways in a hypothetical five-vowel system.

(1)

class	vowels	features
high	i, u	[+high]
mid	e, o	[−high, −low]
low	a	[+low]
high & mid	i, u, e, o	[−low]
mid & low	e, o, a	[−high]
high & low	i, u, a	?

Notice how this simple theory does not provide a way to group high and low vowels together, excluding mid vowels (unless we explicitly allow for disjunctive feature specification). This disparity would seem to make the prediction that, if phonological generalizations must be couched in terms of the feature theory, then we would expect to find no phonological generalizations that are restricted to high and low vowels, but not mid vowels. Things are more complex, as we'll see below.

Let's now consider the relative markedness of rules. Consider a hypothetical example like the following.

(2) [+vocalic] → [+nasal]/_[+nasal]

This rule nasalizes a vowel before a nasal segment.

(3) $[+\text{vocalic}] \rightarrow [+\text{nasal}]/_\begin{bmatrix} +\text{nasal} \\ +\text{coronal} \end{bmatrix}$

This rule nasalizes a vowel before a nasal segment that is coronal.

The evaluation metric maintains that if both analyses are consistent with some set of data that the learner will choose the first. The metric is based on a simple counting of elements in the rules. Since the first rule has fewer feature references than the second, it is preferred.

In terms of acquisition, this theory would entail that children overgeneralize, rather than overrestrict. In terms of typology, we would expect – all else being equal – that phenomena that can be described more simply using this formalism to occur more frequently than phenomena that require a more complex formal description.

In retrospect, we can see that the rule formalism is extremely powerful; it allows for an infinite number of types of rules. It also allows a language to have an unbounded number of actual rules. For example, the generalization above about vowel height can be evacuated by positing two separate rules referring to vowel height. For example, if high and low vowels are nasalized in some context, but mid vowels are not, this feature can be accommodated by making use of curly braces:

$$(4)\quad \begin{bmatrix} +\text{vocalic} \\ \left\{\begin{matrix} +\text{high} \\ +\text{low} \end{matrix}\right\} \end{bmatrix} \rightarrow [+\text{nasal}]/_[+\text{nasal}]$$

or by positing two separate nasalization rules:

$$(5)\quad \begin{bmatrix} +\text{vocalic} \\ +\text{high} \end{bmatrix} \rightarrow [+\text{nasal}]/_[+\text{nasal}]$$

$$(6)\quad \begin{bmatrix} +\text{vocalic} \\ +\text{low} \end{bmatrix} \rightarrow [+\text{nasal}]/_[+\text{nasal}]$$

These latter analyses are not as highly valued by the evaluation metric as the first one, but they are possible. Hence, the putative universal is not absolute, but a claim about acquisition and/or markedness, viz. all else being equal, language learners will **avoid** generalizations that group high and low vowels together to the exclusion of mid vowels, and such generalizations will be relatively rare crosslinguistically.

There are several other aspects of generative era universals that are worth pointing out. First, as we have seen, these generalizations tend to hold of more abstract entities, e.g., rules. While this application may be more appealing in terms of our notions of how phonological cognition might work, it does render these generalizations less falsifiable. It would seem far easier to look for a language with an apico-velar stop, than it is to find a language that has a rule nasalizing low and high vowels before a nasal segment.

Another very important aspect of generative universals of this era is that they were typically not proposed based on direct typological investigation. Rather, it was supposed that detailed examination of any single language, English in the case of SPE, would lead to reasonable hypotheses about the shape of universal grammar and phonological (and syntactic) universals.

Nonlinear Phonology

In the early 1970s, phonological theory underwent a shift, from a focus on the linear rules of SPE to a focus on richer nonlinear representations for suprasegmental phenomena, i.e., stress, tone, syllable structure, and prosodic morphology. The richer representations required for these phenomena were, in fact, later extended to account for traditionally segmental phenomena as well.

This change in the focus of phonology entailed a concomitant shift in the form of phonological universals. While previously the focus had been on the form of rules, now attention shifted to the form of representations. Here are a few examples of universals that stem from this era.

1. No-Crossing Constraint: autosegmental association lines cannot cross.
2. Sonority Hierarchy: syllables must form a sonority peak.
3. Foot Theory: stress is assigned by building from a restricted set of metrical feet.

The No-Crossing Constraint (Goldsmith, 1979) holds that tonal autosegments, elements initially representing pitches on a separate tier of representation, are linked to segmental elements via 'association lines.' That linking partially respects linear order in that the lines connecting these two strings of elements may not cross each other. Thus, the first representation below for the hypothetical word *bádàgá* is a legal one, but the second is not. (Acute accent represents a high tone and grave accent a low tone; H represents a high autosegment and L a low one.)

(7)

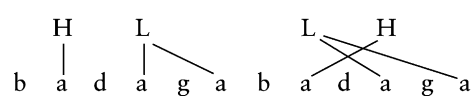

This constraint is intended as an absolute restriction on possible phonological representations. (Though see Bagemihl, 1989 for a more restrictive view of what this constraint holds over.)

The Sonority Hierarchy has been around for many years, but is elaborated in nonlinear generative terms most clearly by Steriade (1982). The basic idea is that each syllable must constitute a sonority peak, where sonority refers to the 'intrinsic loudness' of the segments involved (Chomsky and Halle, 1968). Given that segments like [a], [r], and [t] are ranked in that order in terms of their sonority, it follows from the

Sonority Hierarchy that a string like [atra] can be syllabified in either of the first two ways indicated below, but not as the third.

(8)
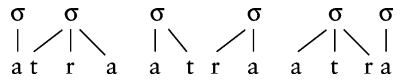

The last syllabification given would have a syllable composed of [atr] with two higher-sonority elements separated by a lower-sonority element. This instance is ruled out by the Sonority Hierarchy.

The Sonority Hierarchy is not as restrictive as one would hope. Languages differ in the sonority that they attribute to the same segments and in how elaborated the hierarchy is. In addition, languages allow for a variety of mechanisms whereby segments can be left unsyllabified or partially syllabified in peripheral positions.

Finally, the third example above is Foot Theory (Halle and Vergnaud, 1977; McCarthy, 1982; Hayes, 1981, 1995). The basic idea is that stress is assigned by building prosodic constituents across a span. For example, alternating stress in a language like English is achieved by building binary left-headed units across the word. For example, a word like *Àpalàchicóla* would be footed as below.

(9)
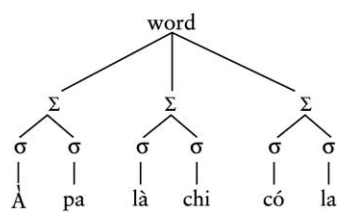

The claim for universality comes from the fact that any stress system must be described using such feet, and the fact that only a restricted set of feet is available. Metrical stress theory is a complex domain, but the basic logic is simple: there is a restrictive syntax of footing available and all stress systems should be describable using that syntax.

Nonlinear approaches to phonological universals grow out of enriched phonological representations, attention to suprasegmental phenomena, and increased typological focus. They exhibit the following properties.

First, like linear generative universals, they are rooted in a notational scheme. Typically, they are expressed as constraints that govern what a phonological representation may look like, rather than as a rule notation. Like linear SPE-style universals, the basic idea is that the notational restrictions mirror our cognitive limits in learning a phonological system. Those notational restrictions on representations thus embody phonological universals.

Second, in contrast to linear generative universals, they are arrived at through typological investigation. What constitutes a reasonable sample is quite indeterminate, however. In some cases, simply adding a new language to the set of languages discussed in the literature has been sufficient to posit new universals. In other cases, a more compendious approach is taken. For example, Hayes (1981) was a comprehensive investigation of a large number of stress systems. The latter is obviously the desideratum, though it's not clear if it is always possible (or always necessary).

Third, most nonlinear representations are sharp constraints over what is possible, rather than preferences expressed as an evaluation metric. This paradigm is clearly a step forward, as sharp universals, rather than tendencies, are of course more falsifiable.

Optimality-Theoretic Universals

Phonological universals have a rather different character in Optimality Theory (OT) (Prince and Smolensky, 1993; McCarthy and Prince, 1993).

Let's exemplify this universal with basic syllable structure. The ONSET constraint requires that syllables have onsets. The NOCODA constraint requires that syllables have no codas. These two constraints militate for unmarked syllables and interact with other constraints that militate for lexical distinctness: PARSE and FILL. (It is convenient to describe the theory before the development of 'Correspondence Theory' [McCarthy and Prince, 1995].)

In a language like English, PARSE and FILL outrank ONSET and NOCODA, allowing onsetless syllables and codas to arise when present lexically. In a language like Hawaiian, where onsets are required and codas ruled out entirely, the ranking is the other way around.

The following constraint tableau shows how this hierarcchy works for English with a word like [æks].

(10)

/æks/	PARSE	FILL	ONSET	NOCODA
☞ [æks]			*	*
[tæks]		*!		*
[æ]	*!*		*	
[tæ]	*!*	*		

Since PARSE and FILL are ranked highest, any candidate that violates one or both of them is ruled out. Consequently, ONSET and NOCODA are ranked lower, and can be violated. The upshot is that a form like [æks] surfaces as is, with a coda and without an onset.

It works the other way around in Hawaiian.

(11)

/æks/	ONSET	NOCODA	PARSE	FILL
☞ [æks]	*!	*		
[tæks]		*!		*
[æ]	*!		**	
[tæ]			**	*

Here, the ranking is the other way around. As a result, modifications to the form are preferred to violating ONSET and NOCODA, giving rise to [tæ].

Prince and Smolensky (1993) gave this analysis as an optimality theoretic derivation of what they term the Jakobsonian syllable typology, the claim that all languages have some syllables that end in vowels and some syllables that begin in consonants (Jakobson, 1962). This universal pattern follows from their account. If the only constraints that enforce markedness patterns for onsets and codas are ONSET and NOCODA, then this result will be the case.

Here, two traditional implicational universals follow from the existence of only certain kinds of constraints. Other universals follow from other aspects of OT. Recall that the basic structure of the theory is that there is a fixed set of universal constraints. All phonological variation follows from language-particular ranking of those constraints. The theory also allows for universal ranking of some constraints. Some universals follow from universal ranking of relevant constraints.

The example Prince and Smolensky used to demonstrate this syllabification is in Imdlawn Tashlhiyt Berber (Tachelhit) (Dell and Elmedlaoui, 1985). The basic observation is that syllabification in this language is subject to a principle whereby less sonorous segments prefer to be onsets and more sonorous segments prefer to be nuclei or peaks. This pattern is subordinated to other principles, e.g., medial syllables must have onsets.

The fact that sonority plays the role indicated is shown by forms like [tzMt], rather than [tZmt]. (Capital letters indicate syllable peaks.) Onsets can be simple or complex in this context and the preferred form differs in that its peak is more sonorous.

To capture these generalizations, Prince and Smolensky propose top-ranked ONSET and a set of constraints on sonority: *P/t ≫ *P/m ≫ *P/u ≫ *P/a. These constraints penalize different segments as syllable peaks. The basic idea is that these constraints are ranked by sonority with constraints against low-sonority segments as peaks outranking constraints against high-sonority segments as peaks. This captures the generalization that choice of what segments can be peaks is governed by sonority.

This explanation captures the universal that the Sonority Hierarchy governs syllabification if all constraints referring to sonority in the context of syllabification are universally ranked in this fashion. (This idea that constraints and universal constraint rankings are grounded in phonetic properties like sonority also showed up in *Grounded phonology* [Archangeli and Pulleyblank, 1994].) That is, while language variation is generally captured via constraint ranking, not all constraint ranking is free. Since constraints referring to sonority are fixed in their respective ranking, it follows that all phonological variation will respect the Sonority Hierarchy.

Summarizing the approach to universals in OT, universals of two sorts are posited: specific constraints and specific constraint rankings. These universals are based on a more typological basis, though the data that have been adduced have not been explicit language surveys. Unlike previous generative approaches, OT-style universals are **not** representational. Instead, the focus is on the form of constraints, rather than the form of representations. (This shift is an interesting swing of the pendulum in that attention has swung from rules to representations to constraints [Anderson, 1985].)

Evaluating Universals

The approaches to phonological universals reviewed above are quite varied, but we can distinguish them along the following parameters.

First, these approaches differ to the degree that they are formalized or 'notational.' Generative approaches have typically been of this sort, though they have varied in whether universals govern rules, representations, or constraints. Greenbergian universals have typically not been formal in this sense.

Second, these approaches have differed in the extent to which universals have been based on explicit typological sampling. Early greenbergian universals were based on such samples, but early generative universals were not. Over the evolution of generative phonology, there has been more and more typological basis to universals, though work like Hayes (1981) or Hayes (1995) still stands as an exception, rather than the rule. (It is interesting to compare the work of Hayes to an early paper by Hyman, 1977. The latter is a preliminary typological investigation of stress from an essentially greenbergian perspective.)

Third, approaches to universals have differed in terms of abstractness. Greenbergian universals have typically been concrete, applying to elements that are more or less observable directly. Early generative universals were applicable to more abstract entities, and thus less easily falsified on direct examination of language phenomena.

There are a number of issues that we have not addressed yet though. For example, how restrictive are different approaches to phonological universals? All else being equal, we would like our universals to limit the set of possible languages as much as possible.

Greenbergian universals are quite amenable to this sort of calculation. (See Hammond *et al.*, 1989 for more discussion of this sort of analysis.) For example, a universal that says *all* languages have some property *x* or *no* languages have that property are – in effect – 100% restrictive. All languages in any potential sample must have or not have the relevant property.

An implicational greenbergian universal is far less restrictive. Consider a universal of the following form: if a language has property *x*, then it also has property *y*. This statement is far less restrictive in that, if a language in the sample does not have property *x*, then it is irrelevant to the generalization. If we were to make the assumption that *x* is randomly distributed, we could say that such a universal is 50% restrictive.

We've already seen that, abstractness and other issues aside, the universals of early generative phonology were a lot more difficult to assess in this way. How would we assess in as theory-neutral a fashion as possible, the restrictiveness of the claim that low and high vowels cannot be grouped together into a single rule?

On the other hand, optimality theoretic universals can be assessed in these terms. For example, the fact that onsets are subject to the ONSET constraint (and no others) entails the phonological universal that Prince and Smolensky discussed: all languages have *x* (*x* = 'have some syllables with onsets').

There are two issues that we have not fully addressed yet, however. As noted above, Prince and Smolensky (1993) argued that the Sonority Hierarchy is grounded in the phonetic definition of sonority. Other authors have elevated this definition to a general claim about constraints in OT: all constraints must be grounded in phonetics (Archangeli and Pulleyblank, 1994). If such a claim can be maintained, it would add to the falsifiability of universals, but in a novel direction. A putative universal, expressed as a constraint or as a fixed constraint ranking, can be tested by constructing an appropriate languages sample or by examining the phonetic underpinnings of the proposal.

On the other hand, the proposal leaves open the following question. If some phonological fact can be explained by some phonetic fact, should the latter be formalized (redundantly) in the phonology? An alternative view would have it that phonetic explanation should be strictly separated from phonological explanation.

The other question that has been left open is what to do about statistical generalizations. We have seen examples of these in both the greenbergian and early generative frameworks. In the former, we saw universals that included caveats like 'most' or 'often.' In the latter, we saw that the effect of the evaluation metric is a preference for certain structures or patterns.

In Optimality Theory, statistical universals can surface in two ways. First, some scholars have proposed that certain constraint rankings should characterize the child language learner's initial state. These rankings would only be changed on direct experience. In the absence of relevant experience, the default rankings would persevere to adulthood (Smolensky, 1996). On such a view, all else being equal, we might expect languages consistent with the default rankings to be more frequent.

Another way that statistical universals might be expressed in OT is with a version of OT that exhibits statistical or stochastic ranking, rather than strict ranking (Boersma, 1998; Hammond, 2003). The basic idea would be that a statistical universal would be expressable by universally ranking some constraint *A* above some other constraint *B*. Since the framework exhibits statistical ranking, this relationship wouldn't be absolute, but would be probabilistic or stochastic. Such an approach makes the interesting prediction that in OT, statistical generalizations can only be captured with statistical ranking, rather than by positing certain constraints rather than others, e.g., ONSET, rather than NOONSET.

See also: Generative Phonology; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Phonological Typology; Phonology: Optimality Theory; Phonology: Overview.

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Phonological Words

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Introduction

The Phonological Word (or Prosodic Word) is located within the phonological hierarchy between the constituents defined in purely phonological terms (i.e., mora, syllable, foot) and those that involve a mapping from syntactic structure (i.e., clitic group, phonological phrase, intonational phrase, utterance). The phonological word (PW) itself involves a mapping from morphological structure onto phonological structure. (See, among others, Selkirk, 1980, 1984, 1986, 1996; Nespor and Vogel, 1982, 1986.)

The PW is motivated on the grounds that it (a) correctly delimits the domain of phonological phenomena (i.e., phonological rules, stress assignment, phonotactic constraints), (b) comprises a domain distinct from those defined in morphosyntactic terms, and (c) has consistent properties across languages. The Morphosyntactic Word (MW), by contrast, fails to meet these criteria, typically providing strings that are either too small (e.g., *the*, *a*) or too large (e.g., *re-randomizations*, *dishwasher repairman*). (See Hall and Kleinhenz, 1999 for papers addressing these issues in a variety of languages.)

Delimitation of the Phonological Word

The PW typically comprises at least a morphological stem. In addition, we must consider the place of affixes, clitics, and the members of compounds.

The Phonological Word and Compounds

While the members of compounds constitute a single MW, the phonological phenomena associated with a single member tend not to apply across the members.

Consider a phonotactic constraint of Dutch: schwa may not be preceded and followed by the same consonant, except /s/ and /n/. We thus find *eik[ə]l* 'acorn', but not **eik[ə]k*, and the derived word *sted-[ə]ling* 'city dweller' but not **kaal-[ə]ling* 'bald person'. The constraint is not observed, however, across the members of a compound (e.g., *vestibul[ə] lamp* 'hall lamp') (Booij, 1999: 57).

Similarly, northern Italian s-Voicing (SV) (i.e., /s/ → [z]/V __ [+son]) operates within a morpheme (e.g., *e[z]atto* 'exact'), and between a stem and a following derivational or inflectional suffix (e.g., *genero[z]-ità* 'generosity'; *genero[z]-e* 'generous, f. pl.'), but not across the members of a compound (e.g., **porta-[z]apone* 'soap dish') (cf. Nespor and Vogel, 1986).

Furthermore, while primary stress is assumed to be a property of a word, we often observe more than one stress in compounds (i.e., one on each member). The fact that one of the stresses is typically assigned relatively more prominence is due to a distinct stress rule operating on the entire compound, for example, the well-known compound stress rule of English, which stresses the first word (e.g., ***wáter búffalo***).

It is thus clear that each member of a compound must form its own PW.

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Phonological Words

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Introduction

The Phonological Word (or Prosodic Word) is located within the phonological hierarchy between the constituents defined in purely phonological terms (i.e., mora, syllable, foot) and those that involve a mapping from syntactic structure (i.e., clitic group, phonological phrase, intonational phrase, utterance). The phonological word (PW) itself involves a mapping from morphological structure onto phonological structure. (See, among others, Selkirk, 1980, 1984, 1986, 1996; Nespor and Vogel, 1982, 1986.)

The PW is motivated on the grounds that it (a) correctly delimits the domain of phonological phenomena (i.e., phonological rules, stress assignment, phonotactic constraints), (b) comprises a domain distinct from those defined in morphosyntactic terms, and (c) has consistent properties across languages. The Morphosyntactic Word (MW), by contrast, fails to meet these criteria, typically providing strings that are either too small (e.g., *the*, *a*) or too large (e.g., *re-randomizations*, *dishwasher repairman*). (See Hall and Kleinhenz, 1999 for papers addressing these issues in a variety of languages.)

Delimitation of the Phonological Word

The PW typically comprises at least a morphological stem. In addition, we must consider the place of affixes, clitics, and the members of compounds.

The Phonological Word and Compounds

While the members of compounds constitute a single MW, the phonological phenomena associated with a single member tend not to apply across the members.

Consider a phonotactic constraint of Dutch: schwa may not be preceded and followed by the same consonant, except /s/ and /n/. We thus find *eik[ə]l* 'acorn', but not **eik[ə]k*, and the derived word *sted-[ə]ling* 'city dweller' but not **kaal-[ə]ling* 'bald person'. The constraint is not observed, however, across the members of a compound (e.g., *vestibul[ə] lamp* 'hall lamp') (Booij, 1999: 57).

Similarly, northern Italian s-Voicing (SV) (i.e., /s/ → [z]/V __ [+son]) operates within a morpheme (e.g., *e[z]atto* 'exact'), and between a stem and a following derivational or inflectional suffix (e.g., *genero[z]-ità* 'generosity'; *genero[z]-e* 'generous, f. pl.'), but not across the members of a compound (e.g., **porta-[z]apone* 'soap dish') (cf. Nespor and Vogel, 1986).

Furthermore, while primary stress is assumed to be a property of a word, we often observe more than one stress in compounds (i.e., one on each member). The fact that one of the stresses is typically assigned relatively more prominence is due to a distinct stress rule operating on the entire compound, for example, the well-known compound stress rule of English, which stresses the first word (e.g., ***wáter búffalo***).

It is thus clear that each member of a compound must form its own PW.

The Phonological Word and Affixes

Certain affixes participate with a stem in a unified phonological way; however, others do not. The former, but not the latter, are considered part of the PW with the stem.

Consider the well-known distinction in English between the 'stress shifting' and 'stress neutral' affixes. While the former participate in word stress assignment, the latter do not. For example, stress falls on the first syllable in *cóurage,* but shifts when certain affixes are present (e.g., *couráge-ous)*. In other cases, however, additional affixes do not affect the stress of a stem (e.g., *sávage* and *sávage-ly*).

Another example is northern Italian SV, which was seen above to apply within a string consisting of a stem and following suffixes. It does not, however, apply across a prefix and a stem (e.g., **ri-[z]alutare* 'regreet'), indicating that, differently from the suffixes, prefixes must not be included in the PW.

There is significant overlap between the affixes included within the PW and the + boundary or level 1 affixes of earlier models of phonology; the excluded affixes are typically # boundary or level 2 affixes. A crucial difference between the approaches, however, lies in the ordering of affixes inherent in the earlier models since all + boundary/level 1 affixation and rules were presumed to apply before those of subsequent levels, often resulting in ordering paradoxes.

Since morphological ordering of affixes is not relevant to PW structure, such paradoxes do not arise: a string is simply subject to a given (PW) phenomenon if it is within the PW domain, and not otherwise. Consider the morphological structure of *undesirability*: $[[un[[desir]_V\ abil]_{Adj}\ ]_{Adj}\ ity]_N$. The first affix added to the stem *desire* is *-able* (=*-abil* here). This is considered a level 1 suffix since it is often adjacent to a root and is followed by other level 1 suffixes (e.g., *-ity*), although it not stress-shifting (cf. Selkirk, 1982). The next affix added is the level 2 prefix *un-*. The problem arises with the subsequent addition of *-ity*, a stress-shifting level 1 affix, which should not be permitted to follow the addition of a level 2 affix. In terms of the PW, however, this is not problematic: both *-able* and *-ity* form part of the PW with the root, while *un-* does not, yielding the phonological structure: $un[desir\text{-}abil\text{-}ity]_{PW}$. The claim inherent in this structure is that stress and any other phonological phenomena that apply to the PW domain will include the two suffixes, but not the prefix.

Similarly, paradoxes such as *transformational grammarian* (i.e., $[[transformational\ grammar]_N\ ian]_N$) are avoided. While morphologically the level 1 stress-shifting suffix *-ian* is added to the entire compound, phonologically it is simply included with the adjacent stem in a PW; the first member of the compound forms its own PW: $[transformational]_{PW}\ [grammar\text{-}ian]_{PW}$.

The Phonological Word and Clitics

While clitics, a category that includes various types of function words, are MWs, they do not exhibit the same phonological properties as PWs (cf. among others Hall, 1999). Indeed, such words tend not to constitute minimal (bimoraic) word structures, as discussed below, and they do not bear stress.

They may also exhibit different phonotactic constraints, such as the interdental fricative in English. We find the voiceless fricative at the beginning of content words, clearly PWs (e.g., *[θ]ing*, *[θ]ink*), while at the beginning of function words, at least some of which would be considered clitics, we find the voiced fricative (e.g., *the [ð↔], them [*ðE*m]* or *[ð↔m])* (cf. Booij, 1999, among others).

Since clitics do not qualify as PWs, they have in some cases been analyzed as part of the PW with the stem (e.g., Inkelas, 1989; Selkirk, 1986, 1996). Problems arise, however, where the clitics do not, in fact, participate in the phonological phenomena of the PW. For example, in Italian SV fails to apply between a stem and either a proclitic or an enclitic (e.g., **ti = [z]aluto* '(I) greet = you'; **guardando = [z]i* 'looking at = oneself', where '=' indicates the juncture between a stem and a clitic).

Slightly more complex cases arise where it appears that clitics do participate in phonological phenomena with the stem. Consider the Lucanian dialect of Italian (cf. Peperkamp, 1997). As in Standard Italian, primary stress falls on one of the last three syllables of a word. When certain enclitics are added, however, stress always appears on the penultimate syllable, regardless of the original stress of the stem and the number of clitics:

(1a)	/vín: ə = lə/	→ [vən:í = l:ə]	'sell – it'
(1b)	/rá = mə – lə/	→ [ra = m:í – l:ə]	'give – me – it'
(1c)	/man:átə = mə – lə/	→ [man:atə = mí – l:ə]	'send – me – it'

(Peperkamp, 1997: 191)

Since the enclitics participate in stress assignment, it is argued that they are part of the PW. The stress patterns are different, however, for PWs without clitics and strings with clitics. By labeling the two structures as the same type of constituent, we obscure the generalizations about Lucanian stress: (a) that word (PW) stress may not fall farther left than the antepenultimate syllable and (b) that certain types of strings with enclitics may only exhibit penultimate stress.

Thus, while clitics may participate in phonological phenomena with a stem, the phenomena are different from those observed within the PW.

Phonological Word Domain

We can now provide a simple mapping of morphological structure onto the PW:

(2) Phonological Word Domain
The PW consists of a single morphological stem plus any relevant affixes.

The crucial implications of this statement are that (a) the members of a compound form their own PWs, (b) only affixes, but not clitics, may be part of the PW, and (c) the inclusion of affixes in a PW is language-specific, determined either by systematic criteria (e.g., in Italian suffixes but not prefixes are included) or idiosyncratic marking. We must now consider the organization of these elements within the phonological hierarchy.

Geometry of the Phonological Word

Minimality and the Strict Layer Hypothesis

It has been suggested that the PW is universally subject to a Minimality Condition: it must consist of at least one foot, where a foot must consist of two moras (e.g., McCarthy and Prince, 1986, 1990), although languages such as French and Japanese also permit monomoraic words (cf. Itô, 1990; Itô and Mester, 1992).

A central principle of early models of the phonological (prosodic) hierarchy, the Strict Layer Hypothesis (SLH), led to systematic violations of the Minimality Condition. According to the SLH, a phonological constituent may only dominate constituents of the immediately lower level. Thus, the constituent 'C' that dominates the PW may only dominate PWs. This resulted in structures such as the Italian example below (cf. Nespor and Vogel, 1986). The label 'C' is used to avoid the controversy about the constituent that dominates the PW.

(2) $[[\text{ve}]_{PW}$ $[\text{le}]_{PW}$ $[\text{ri}]_{PW}$ $[\text{lavo}]_{PW}]_{C}$
CL CL Pre Stem
'(I) rewash them for you' (lit. for you – them – 're' – (I) wash)

The clitics and prefixes that are excluded from the stem's PW are each labeled as PW merely to satisfy the SLH. Since they do not exhibit the properties of PW, this results in incorrect predictions about their phonological behavior. It was thus subsequently proposed that the SLH be somewhat relaxed either by (a) permitting recursive structures or (b) allowing a constituent to skip levels and dominate items more than one level lower in the phonological hierarchy (e.g., Itô and Mester, 1992; Vogel, 1999).

Recursivity

Recursivity permits items excluded from a PW, such as those in (2), to be structured either as in (3a), forming a separate PW within a higher PW, or (3b), included serially into a higher PW.

(3a) $[[\text{ve le ri}]_{PW}\ [\text{lavo}]_{PW}]_{PW}$
(3b) $[\text{ve}\ [\text{le}\ [\text{ri}\ [\text{lavo}]_{PW}]_{PW}]_{PW}]_{PW}$

Both options yield enriched constituent structures, raising the following questions: (a) are the additional PWs independently motivated and (b) do they make correct phonological predictions?

Linguistic constituents are motivated by evidence that they share properties with other strings of the same constituent type. Thus, (3a) predicts that the PW composed of the clitics and prefix will exhibit similar properties to other PWs. In Italian, the syllable bearing primary stress must be heavy; in the case of a CV syllable, Vowel Lengthening (VL) applies (e.g., */véle/ → [vé:le]* 'sails'). Excluding the prefix from (3a), we have a similar string preceding *lavo: [[ve le]$_{PW}$ [lavo] $_{PW}$]$_{PW}$* '(I) wash them for you'. The first PW should thus be homophonous with the word for 'sails', with a long vowel in the first syllable. VL is not observed in this string, however, so labeling it a PW makes an incorrect prediction. An analogous problem arises with enclitics where we again find stress and VL on the first syllable of *vele* (4a), but not in the similar string in (4b).

(4a) $[\text{lavando}]_{PW}$ $[\text{vele}]_{PW}$ → . . . $[\text{vé:le}]_{PW}$
'washing sails'
(4b) $[[\text{lavando}]_{PW}$ $[\text{ve le}]_{PW}]_{PW}$ → . . . *$[\text{vé: le}]_{PW}$
Stem CL CL
'washing them for you' (lit. washing for-you them)

The alternative type of recursive structure introduces a different problem, as illustrated below.

(5) $[[[\text{lavándo}]_{PW}\ \text{ve}]_{PW}\ \text{le}]_{PW}$

Main stress in Italian may fall no farther left than the antepenultimate syllable of a word, with the exception of a small number of verb forms. In (5), the stem PW *lavándo* 'washing' has penultimate stress; when the first enclitic, *ve* is added, the stress becomes antepenultimate, still an acceptable word stress pattern. Adding the second enclitic *le*, however, results in a PW with stress on the pre-antepenultimate syllable, and hence a violation of the stress constraint. We could limit the stress constraint to PWs without internal PW brackets; however, this would merely be a stipulation. Moreover, if the larger PWs do not exhibit the same properties as the innermost PW, it is unclear in what way they are PWs (cf. Vogel, 1994, 1999).

A recursive structure has also been suggested for compounds: each member of the compound is a PW, and these together form a larger PW (e.g., *[[sewing]$_{PW}$ [machine]$_{PW}$]$_{PW}$)*. Again, it is not clear in what way the external PW is similar to the internal PWs since, for example, stress is assigned differently to the two types of strings (i.e., word vs. compound stress).

Phonological Word Adjoiners

Kabak and Vogel (2001) identify the elements excluded from the stem's PW as Phonological Word Adjoiners (PWAs). All PWAs share a common property: they introduce a PW boundary where they are in contact with the stem PW (i.e., *...stem]$_{PW}$ X$_{PWA}$ ... or ... X$_{PWA}$ [$_{PW}$ stem ...*). PWAs combine with the PW within the higher constituent C (i.e., Clitic Group or Phonological Phrase) and crucially predict that structures with PWAs and PWs themselves may exhibit different properties. Once a PWA is excluded from a PW, subsequent items are also excluded, as illustrated in Turkish:

(6) [giy–dir]$_{PW}$ – me$_{PWA}$ – di -niz
wear-CAUS – NEG -PAST -2 PL
'You didn't let (it) be worn.'
(Kabak and Vogel, 2001: 343)

The PW is closed before the PWA *me*. This permits the correct assignment of stress on *dir*, according to the well-known (phonological) word-final stress rule of Turkish. Complicated analyses involving exceptional stress patterns are thus avoided, and there is no increase in the richness of the phonological constituent structure.

Conclusions

It is clear that the Phonological Word, not the morphosyntactic word, is the appropriate domain for numerous phonological phenomena across languages, and within different theoretical frameworks. The examples presented here could also be analyzed in OT in terms of alignment constraints, which yield the crucial mismatch between the PW and the MW, and different constraint rankings, which permit different roles for minimality. Furthermore, the minimal (bimoraic) PW has been reported as the basis of children's early words in a variety of languages, although in languages such as French that do not require minimality, children's early words are not necessarily bimoraic (cf. Demuth and Johnson, 2004).

The cross-linguistic validity of the PW is thus clear, though questions remain regarding details of the PW's content and structure, including the roles of minimality, clitics, and recursivity.

See also: Clitics; Lexical Phonology and Morphology; Word Stress; Word.

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Phonological, Lexical, Syntactic, and Semantic Disorders in Children

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Brain Measures Common to the Study of Language Disabilities

A variety of procedures is currently used to investigate brain processes underlying language disabilities. These include functional magnetic resonance imaging (fMRI), MRI, positron emission tomography (PET), magneto-electroencephalography (MEG), and event-related potentials (ERPs). Each procedure, of course, has its strengths and weaknesses. MRI provides information concerning the morphology of brain structures, whereas fMRI monitors hemodynamic processes, such as changes in brain functions reflected during extended periods of language processing. PET operates in a somewhat similar fashion but tracks the flow of radioactive elements injected into the blood to identify areas actively engaged in a language task. MEG can detect small fluctuations in the brain's magnetic field in response to task demands, and ERPs, a portion of the ongoing EEG that is time locked to the onset of a stimulus event, can reflect rapid changes in the brain's encoding and processing of a speech sound, word, or even sentence. All procedures enable investigators to map linguistic and cognitive functions onto brain structures (Fonaryova Key *et al.*, in press).

Although studies of brain processing usually use one of these procedures, it is clear that much is to be gained from using a combination of procedures. For example, the high temporal sensitivity of ERP techniques can provide a means for determining the sequential relationships that exist between the specific areas of brain activation identified through fMRI (Georgiewa *et al.*, 2002). Moreover, convergence in source localization across fMRI, MEG and ERP procedures ensures that solutions are not biased by particular approaches but may reflect different aspects of what occur in the brain in response to stimulus input or task demands (see Hugdahl *et al.*, 1998).

In general, differences are noted in brain responses and structures for different disabilities (Harter *et al.*, 1988a, 1988b), but there are similarities across disabilities as well. Brain differences could relate to general cognitive processing differences (e.g., attention) that may be impaired in some types of disabilities (Holcomb *et al.*, 1986), or brain differences could reflect the involvement of different structures in response to task demands. Generally, brain structure and functional differences have been thought to be related to poor language function in general (Molfese and Segalowitz, 1988) and to dyslexia in particular (Eckert *et al.*, 2001; Frank and Pavlakis, 2001). Orton (1937) as well as Travis (1931) held the belief that early signs of lateralization serve to identify children at risk for developmental language disorders. More recent investigations continue to indicate that differences in cerebral asymmetry associated with atypical organization of the left hemisphere are a marker for dyslexic children (Heim and Keil, 2004). However, although reports often link hemisphere differences and language disorders, current thinking indicates that the pathology as well as the neurophysiology of developmental language disabilities are a great deal more complex than originally thought and extend well beyond the classically defined language areas of the brain (Eden *et al.*, 1996). For example, some point to the neural circuitry to account for brain organizational differences between impaired and nonimpaired children, as well as between children with different types of language disabilities (Eden *et al.*, 1996; Leonard *et al.*, 2002; Sarkari *et al.*, 2002). For example, dyslexic readers fail to exhibit the usual network of anterior and posterior brain areas over left hemisphere regions, whereas children with attention deficit hyperactivity disorder appear to have an abnormality in the prefrontal and striatal regions.

For the purposes of this present chapter, the review of brain structures and functions involved in language disabilities is limited to autism, developmental dyslexia, Down syndrome, specific language impairment (SLI), and Williams syndrome. Links between brain and behavior in these developmental disabilities are highlighted.

Autism

Autism is a neurodevelopmental disorder characterized by impairments in language, communication, imagination, and social relations (American Psychiatric Association, 1994). Estimates of occurrence in the general population range from approximately 1 in 200 to 1 in 1000 (Fombonne, 1999). Although nearly 25% of children with autism have essentially normal vocabulary and grammatical abilities (Kjelgaard and Tager-Flusberg, 2001), another 25% may remain mute for their entire lives (Lord and Paul, 1997). Many underlying language problems found in autistic children are believed to be linked to social and emotional deficits. Although the leading causes of autism

remain unknown, the interplay of multiple genes with multiple environmental factors is considered a factor (Akshoomoff *et al.*, 2002).

General Brain Imaging Results for Autism

Most imaging studies of children with autism are carried out with sedated children and thus focus on brain structures rather than functional differences (Rapin and Dunn, 2003). Even so, structural differences noted in autistic populations are often contradictory. The most consistent findings include increased cerebellar hemisphere, parieto-temporal lobe, and total brain volume. Current research findings also show that the size of the amygdala, hippocampus, and corpus callosum may differ from that of normals (see Brambilla *et al.*, 2003, for a review).

Social – Brain Difference and Autism

Neurologically, many of the social aspects of language acquisition (e.g., social orienting, joint attention and responding to emotional states of others) are tied to differences in the medial temporal lobe (amygdala and hippocampal), which is larger in autistic children than in age-matched controls (Brambilla *et al.*, 2003; Sparks *et al.*, 2002). This brain region is thought to be related to performance on deferred imitation tasks – a skill that may be important in language acquisition (Dawson *et al.*, 1998). Further, the increase in amygdala size may have consequences for important skills such as discriminating facial expressions (Adophs *et al.*, 1995; Whalen *et al.*, 1998) and joint attention (Sparks *et al.*, 2002). Both skills appear to be important for language acquisition and are often impaired or absent in autism.

Phonology and Autism

A shift in the latency of the first positive peak in the ERP (P1) and the following first large negative peak (N1) to speech sounds in typically developing children is believed to result from maturational changes related to synaptogenesis, myelinogenesis, and dendritic pruning, possibly reflecting cortical auditory system maturation (Bruneau *et al.*, 1997; Eggermont, 1988; Houston and McClelland, 1985). Findings with autistic children for these two ERP peaks are mixed: some studies report longer N1 latencies in children with autism (Dunn *et al.*, 1999; Seri *et al.*, 1999), whereas others report shorter N1 latencies with autistic children (Oades *et al.*, 1988) or no differences between autistic and control children (Kemner *et al.*, 1995; Lincoln *et al.*, 1995).

Using MEG, the N1 correlate is the M100 or N1m. Gage *et al.* (2003) found that the M100 shifted in latencies in the left and right hemispheres with age for typically developing children listening to tones but occurred only in the left hemisphere for autistic children. This neural activation was localized to the supratemporal sites, reflecting activity of the auditory cortex. Overall, children with autism also exhibited delayed M100 latencies compared to controls, indicating a fundamental difference in the auditory processing of autistic children.

Semantics and Autism

When given a semantic (meaning) categorization task, autistic children exhibit no differences in the N400 between deviant and target words, unlike age-matched controls (Dunn *et al.*, 1999). Surprisingly, autistic children's categorizing errors were not higher than controls, indicating that although the autistic children could categorize based on semantics, they could not attend to the global context and could not discern that one ending was more common than another. As a result, their brains appeared not to process out-of-category words as 'deviant.'

Many autistic children have limited word knowledge and limited comprehension of meaning in connected speech (Dunn *et al.*, 1999). Mental words, such as 'think', 'believe,' and 'know,' are rarely part of the autistic child's vocabulary (Happe, 1995), which is speculated to be caused by differences in the limbic system and as reflecting consistent with the problems of these children in processing emotional information (Dawson *et al.*, 1998).

Dyslexia

Developmental dyslexia refers to the abnormal acquisition of reading skills during the normal course of development despite adequate learning and instructional opportunities and normal intelligence. Estimates are that 5–10% of school-age children fail to learn to read normally (Habib, 2000). Dyslexia can exist in isolation, but more commonly it occurs with other disabilities, such as dyscalculia (mathematic skill impairment) and attention deficit disorder, both with and without hyperactivity. Studies of dyslexia usually indicate the involvement of left-hemisphere perisylvian areas during the reading process. The specific areas identified vary somewhat depending on the component of reading being engaged in but overall the extrastriate visual cortex, inferior parietal regions, superior temporal gyrus, and inferior frontal cortex appear to be activated.

When one examines specific skills, visual word form processing is associated with occipital and occipitotemporal sites, whereas reading-relevant phonological processing has been associated with superior temporal, occipitotemporal, and inferior frontal

sites of the left hemisphere. However, there is some variation in the scientific reports. For example, although some studies report a hemisphere asymmetry in the area of the planum temporale related to dyslexia (Frank and Pavlakis, 2001), others report no such effect (Heiervang *et al.*, 2000).

A number of studies have identified brain anatomical differences that distinguish dyslexic from normal brains (see Hynd and Semrud-Clikeman [1989] for an earlier review). For example, Eckert *et al.* (2003), using MRI scans, reported that dyslexics exhibited significantly smaller right anterior lobes of the cerebellum, pars triangularis bilaterally, and brain volume than controls. Correlation analyses showed that these neuroanatomical measurements relate to reading, spelling and language measures of dyslexia (see also Grunling *et al.*, 2004). Although earlier studies report hemisphere differences in the region of the planum temporale between dyslexics and controls, more recent studies investigating the morphology of the perisylvian cortical area in a clinical sample of children failed to find morphological differences at this locale that were associated with the diagnosis of dyslexia (Hiemenz and Hynd, 2000). Scientists have also reported differences between dyslexics and controls in the corpus callosum – the band of fibers connecting the two hemispheres (von Plessen *et al.*, 2002). These researchers reported differences in the posterior midbody/isthmus region that contains interhemispheric fibers from primary and secondary auditory cortices – a finding that converges with other reports of developmental differences during the late childhood years, coinciding with reading skill development.

General Brain Imaging Results for Dyslexia

There are general consistencies across phonological, semantic, and syntactic processing in that enhanced activation of the left extrastriate cortex is found when visuospatial, orthographic, phonologic, and semantic processing demands are placed on the dyslexic group (Backes *et al.*, 2002).

Researchers argue that variations in brain processing relate to language and cultural factors – a finding that parallels behavioral investigations of language differences. For example, using fMRI, Siok *et al.* (2004) reported that functional disruption of the left middle frontal gyrus is associated with impaired reading of the Chinese language (a logographic rather than alphabetic writing system). No disruption was found for the left temporoparietal brain regions. Siok *et al.* argue that such differences reflect two deficits during reading: the conversion of the orthography (characters) to syllables, and the mapping of the orthography onto the semantics. Both processes, the authors argue, are mediated by the left middle frontal gyrus that coordinates and integrates various information about written Chinese characters in verbal and spatial working memory (see also Eckert *et al.*, 2001; Grigorenko, 2001).

Phonology and Dyslexia

Dyslexic readers show less activation of both the temporal and the prefrontal cortex during phonologic processing (Backes *et al.*, 2002). Intriguingly, similar areas of lowered activation are seen in other populations with reading problems, reinforcing the notion that inferior frontal and superior temporal brain areas support reading skills (e.g., neurofibromatosis; see Backes *et al.*, 2002).

When magnetic source imaging (MSI) was employed during phonological tasks, Papanicolaou *et al.* (2003) reported consistent brain maps across children that differentiate between dyslexic and nondyslexic children in the left and right posterior temporal regions. Moreover, following reading interventions with the dyslexic children, brain sources shifted from the right to the left hemisphere, indicating that intervention 'normalizes' as the child's brain moves from an ineffective to a more efficient use of brain structures and pathways (Simos *et al.*, 2002; for replication, see Temple *et al.*, 2003).

MEG investigations into the perception of speech cues such as voice onset time (VOT) indicate that children with dyslexia experienced a sharp peak of relative activation in right temporoparietal areas between 300 and 700 milliseconds poststimulus onset, a point markedly later in time (~500 milliseonds) relative to normal readers. This increased late activation in right temporoparietal areas was correlated with reduced performance on phonological processing measures (Breier *et al.*, 2003). Further, there are data indicating an early relation between the perception of speech cues in early infancy and the emergence of reading disorders as late as 8 years of age (Molfese & Molfese, 1985; Molfese, 2000; Molfese *et al.*, 2005; Lyytinen *et al.*, 2003). These studies indicate that infants who go on to develop normal language skills generate ERPs over left frontal and temporal brain regions that discriminate between speech sounds, whereas ERPs collected from infants at risk for developing a reading disorder fail to discriminate between these same sounds.

In phonological related tasks such as rhyming, fMRI differences are found between dyslexic and control children (Corina *et al.*, 2001). During phonological judgment, dyslexics generated more activity than controls in right than left inferior temporal gyrus and in left precentral gyrus (see Georgiewa *et al.* [1999] for replication). During lexical judgment, dyslexics

showed less activation than controls in the bilateral middle frontal gyrus and more activation than controls in the left orbital frontal cortex. In an ERP study paralleling this study, Lovrich *et al.* (1996) reported that rhyme processing produced more pronounced group differences than semantic processing at about 480 milliseconds, with a relatively more negative distribution for the impaired readers at centroparietal sites. By 800 milliseconds, the impaired readers displayed a late positivity that was delayed in latency and that was of larger amplitude at frontal sites than that for the average readers.

When brain activation patterns were studied in dyslexic and nonimpaired children during pseudoword and real-word reading tasks that required phonologic analysis, differences were noted in posterior brain regions, including parietotemporal sites and sites in the occipitotemporal area. Reading skill overall was positively correlated with the magnitude of activation in the left occipitotemporal region – an area similarly found to discriminate between adult groups of readers and nonreaders (Shaywitz *et al.*, 2002). A similar effect was demonstrated using MEG (Simos *et al.*, 2000).

Semantics and Dyslexia

During lexical judgment, less activation in bilateral middle frontal gyrus and more activation in left orbital frontal cortex occurred for dyslexic compared to nondyslexic children (Corina *et al.*, 2001). In a related task, in which children read words and pronounceable nonwords, fMRI results detected a hyperactivation of the left inferior frontal gyrus in dyslexic children. ERPs collected from the same children converged with the fMRI findings and showed topographic difference between groups at the left frontal electrodes in a time window of 250–600 milliseconds after stimulus onset. A related study by Molfese *et al.* (in press) reported similar findings, as well as a slower rate of word processing over left hemisphere electrode sites in dyslexic children compared to normal and advanced readers.

Reading and Dyslexia

Relatively few studies have investigated brain activation when the child is reading continuous text (Backes *et al.*, 2002). One exception is a report by Johnstone *et al.* (1984), who monitored silent and oral reading, noting that reading difficulty affected the central and parietal ERPs of dyslexics but not the controls. In addition, different patterns of asymmetry were found for the two groups in silent compared to oral reading at midtemporal placements.

Down Syndrome

Down syndrome (DS) is characterized by a number of physical characteristics and learning impairments, as well as IQ scores that may range from 50 to 60. Individuals with DS typically are microcephalic and have cognitive and speech impairments, as well as neuromotor dysfunction. In addition, problems generally occur in language, short-term memory, and task shifting. Typical language problems involve delays in articulation, phonology, vocal imitation, mean length utterance (MLU), verbal comprehension, and expressive syntax. Spontaneous language is often telegraphic, with a drastic reduction in the use of function words: articles, prepositions, and pronouns (Chapman *et al.*, 2002). Language deficits may arise from abnormalities noted within the temporal lobe (Welsh, 2003). Individuals afflicted with DS commonly suffer from a mild to moderate hearing loss (78% of DS children have a hearing loss; Stoel-Gammon, 1997), which may partially account for the delay in phonological processing and poor articulation.

DS occurs in approximately 1 in 800–1,000 live births. Ninety to 95% of cases are caused by a full trisomy of chromosome 21, and 5% result from translocation or mosaicism. Considerable individual variability exists in cognitive development among those afflicted, with the greatest deficits in development observed with full trisomy–21, where specific genes have been associated with brain development, specifically the cerebellum development, and produce Alzheimer-type neuropathology, neuronal cell loss, accelerated aging, and so on (Capone, 2001). Individuals with DS commonly exhibit neuropathology resembling that seen in Alzheimer disease, with some patients showing symptoms beginning as early as age 35 years.

General Brain Imaging Results for DS

Brains of DS individuals appear to have a characteristic morphologic appearance that includes decreased size and weight, a foreshortening of the anterior–posterior diameter, reduced frontal lobe volume, and flattening of the occiput. The primary cortical gyri may appear wide, whereas secondary gyri are often poorly developed or absent, with shallow sulci and reduced cerebellar and brain stem size (Capone, 2004). MRI studies indicate a volume reduction for the whole brain, with the cerebral cortex, white matter, and cerebellum totaling 18% (Pinter *et al.*, 2001a). Hippocampal dysfunction occurs in DS (Pennington *et al.*, 2003), perhaps because of the reduced size of the hippocampus, as determined by MRI (Pinter *et al.*, 2001b), and the cerebral cortex

has fewer neurons at all cortical layers. In addition, dendritic spines appear longer and thinner than in matched controls (Capone, 2004; Seidl *et al.*, 1997). Studies using MEG indicate atypical cerebral specialization, showing a greater activation of the right hemisphere in DS when compared to normal controls (Welsh, 2002). This greater activation is confirmed by PET studies (Nadel, 2003), indicating that the brain of the DS individual is working harder to process information, although less effectively.

Brain morphology in DS does not differ dramatically from normals throughout the first 6 months of life. Delayed myelination occurring within the cerebral hemispheres, basal ganglia, cerebellum, brain stem, and nerve tracts (fibers linking frontal and temporal lobes) occurs after 6 months (Nadel, 2003; Capone, 2004). Other critical periods of brain development affected by DS include neuronal differentiation, proliferation, and organization. A reduction in neuronal number and density was noted for most brain areas examined, specifically within interneurons and pyramidal neurons. However, this differs on a case-to-case basis and has been hypothesized as a potential explanation for the spectrum of neurodevelopment impairment observed (Capone, 2004).

Phonology and DS

Research of neural function indicates that in DS there may be a delay in the development of the auditory system (Nadel, 2003). Phonological delays exhibited in DS cases are often linked to differences in anatomy and central nervous system development in DS. In addition, limits on auditory working memory and hearing may account for deficits observed in phonological processing (Tager-Flusberg, 1999).

Semantics and DS

Dichotic listening tasks involving DS children generally result in a left-ear advantage, indicating that these individuals use their right hemisphere to process for speech (Welsh, 2002). On the basis of such findings, Capone (2004) argued that difficulties in semantic processing in DS occur from a reduction in cerebral and cerebellar volume. In addition, the corpus callosum is thinner in the DS brain in the rostral fifth, the area associated with semantic communication. Welsh (2002) speculated that the thinner corpus callosum isolates the two hemispheres from each other, making it more difficult to integrate verbal information.

Vocabulary growth in DS children is delayed increasingly with age (Chapman, 2002). Studies using dichotic listening tasks report a left-ear advantage for DS, indicating that lexical operations are carried out primarily in the right hemisphere, a finding opposite to that found with normal developing children. In fact, individuals with DS who exhibit the most severe language deficits demonstrate the most atypical ear advantage (Welsh, 2002).

Syntax and DS

Children with DS exhibit a delay in syntax production that generally becomes evident with the emergence of two-word utterances, and syntax is often more severely impaired than lexical development (Chapman, 1997). Verbal short-term memory may be affected, limiting the ability to understand syntactic relations. Research on short-term memory points to hippocampal dysfunction in DS children (Pinter *et al.*, 2001a). MRI studies of adults with DS highlight the possibility that reductions in volume size observed in DS may contribute to the development of language and memory deficits. It has been hypothesized that the cause of language deficits observed in children with DS are primarily related to memory and learning and are most associated with deficits observed in the hippocampal region (Nadel, 2003).

Specific Language Impairment

It is estimated that approximately 7% of the 5-year-old population is characterized with specific language impairment (SLI), and that SLI is three times more likely in males than females. The basic criteria underlying this disorder include normal intelligence (IQ of 85 or higher), language impairment (language test score of −1.25 sd (standard deviation) or lower), no neurological dysfunctions or structural anomalies, successful completion of a hearing screening, and no impairment in social interactions. Speculations as to causes focus on the biological and environmental issues, but with no resolution. Because of the heterogeneity of the phenotype, it is difficult to study this population as a single unit (Leonard, 1998). As a consequence, results and conclusions resulting from any particular study are limited to the specific subset of SLI under study.

Phonology and SLI

A phonological processing delay exists in children with SLI, where the children have a problem distinguishing similar spoken sounds (i.e., /b/ vs. /p/) from one another, as well as show lower accuracy in processing speech sounds at rapid ISI (interstimulus intervals). Improvement occurs with age in SLI children; however, the plateau reached is still below normal levels. ERP patterns of older SLI children in comparison with same-age and younger control children show a correlation in brain wave patterns to that of the younger population in response to auditory tone

presentation. An auditory immaturity hypothesis is indicated as a basis for the delay in phonological processing in SLI. This hypothesis points to the auditory system as the basis for developmental delays found in SLI children (Bishop *et al.*, 2004). In fact, an fMRI study showed that individuals with SLI had less activation in brain regions specific to language processing as well as phonological awareness (Hugdahl *et al.*, 2004). Furthermore, MMN (mismatch negativity), a region of the ERP that is an indicator of stimulus discrimination, indicates a deficit in discrimination of CV (consonant–vowel) syllables that differ in the place of articulation in SLI children (Uwer *et al.*, 2002). Infants as early as 8 weeks of age who are at risk for SLI are already showing MMN delays in their latency response when presented with auditory speech sounds (Friedrich, 2004). These findings indicate that delays in discrimination skills are present from an early stage of development.

Semantics and SLI

Semantic abilities are problematic in SLI. Investigations into the neural substrate of these issues have made some headway in recent years. In particular, the N400 (Kutas and Hillyard, 1980), a large negative component of the ERP that correlates with semantic ability and occurs approximately 400 milliseconds after a stimulus begins, is altered in populations of SLI children, as well as in their parents. This brain component is enhanced in fathers of SLI children compared to controls in response to the unexpected ending of a sentence (Ors *et al.*, 2001). For example, the N400 response is normally larger in response to the last word in the sentence, 'The train runs on the banana' than if the final word is 'track.' Atypical N400 amplitudes also are found in children with other language deficits (Neville *et al.*, 1993). MEG studies have pinpointed the lateral temporal region as the origin of the N400 response (Simos *et al.*, 1997). Intracortical depth recordings in response to written words point to the medial temporal structures near the hippocampus and amygdala (Smith *et al.*, 1986).

William's Syndrome

William's-Beuren syndrome (WS) results from a rare genetic deficit (about 1 in 20 000 births) caused by a microdeletion on chromosome 7 (Levitin *et al.*, 2003). This genetic etiology present in WS allows researchers to identify developmental abnormalities associated with WS from birth. Characteristics of WS include dysmorphic facial features, mental retardation, and a unique behavioral phenotype (Bellugi *et al.*, 1999, 2000; Levitin *et al.*, 2003). Recently, Mervis and colleagues (Mervis, in press; Mervis *et al.*, 2003) have formulated a cognitive profile for WS by analyzing the relative weaknesses and strengths often associated with the genetic syndrome. Markers for this profile include a very low IQ and weakness in visuospatial construction, as well as strengths in recognition of faces, verbal memory, and language abilities. These findings have been replicated by other researchers (Galaburda *et al.*, 2003).

Anatomical Aspects of WS

MRI studies note anatomical differences in brain morphology in WS that include a bilateral decrease in the dorsal posterior regions in both hemispheres with an increase in the superior temporal gyrus, frontal lobe, and amygdala (Galaburda *et al.*, 2003). Schmitt *et al.* (2001a) recorded MRI images in 20 individuals with WS (age: 19–44 years) compared to 20 age- and gender-matched participants. In WS adults, the midsagittal corpus callosum was reduced in total area, and within the corpus callosum, the isthmus and splenium were disproportionately smaller. However, the frontal lobe and cerebellum were similar in size to those of controls (Schmitt *et al.*, 2001b). The decrease in volume within the corpus callosum and the parietal lobe has led many researchers to speculate that these findings could explain visuospatial weaknesses in this population (Schmitt *et al.*, 2001a; Eckert *et al.*, 2005). Other studies indicate abnormal clustering of neurons in the visual cortex (Lenhoff *et al.*, 1997). In contrast, the language strength predominately found in WS children may be caused, based on the MRI data, by the relatively unimpaired frontal lobe and cerebellum and the enlarged planum temporale (auditory region), particularly in the left hemisphere (Lenhoff *et al.*, 1997; Bellugi *et al.*, 1999, 2000).

Semantics and WS

Studies indicate that WS children are capable of semantic organization, although the onset is often delayed (Mervis and Bertrand, 1997; Mervis, in press). WS children tend to list low-frequency words when asked to complete the task (Mervis, in press). In studies of lexical and semantic processing, unique ERP patterns are recorded from WS children to auditory stimuli during a sentence completion task that includes anomaly words at the end of the sentence (Bellugi *et al.*, 2000). In general, the expected component at N400 associated with anomaly words in WS was more evenly distributed across the scalp, with no hemispheric interaction (Bellugi *et al.*, 2000). This finding is unusual, given the left-hemisphere activation common in typically developing children (Bellugi

et al., 2000). In addition, during the positive peak at 50 milliseconds, WS individuals produced an abnormally large spike. A 'smaller than normal' negative peak at 100 milliseconds and a large positive peak at 200 milliseconds can be seen in the WS population, but not within normal controls (Bellugi *et al*., 1999).

Phonology and WS

Little research has examined the neural bases for phonological processing in children with WS. A current study by Fornaryova Key *et al*. (in progress) examined the brain's response to speech syllables (/ba/ and /ga/) in eight children with WS (age: 4.03–4.64 years). The results indicate that the left hemispheric of WS children is engaged in discriminating between different speech sounds, rather than showing the lack of hemisphere differences that Bellugi *et al*. (2000) would predict. In addition, variations in the second large positive ERP component (P2) to speech sounds correlated highly with a range of language and verbal abilities, such as those needed for performance on the Matrices subtest of the K-BIT.

Syntax and WS

In normal, age-matched controls, ERP responses to nouns, adjectives, and verbs (or open-class words) tend to invoke a N400 peak in the right posterior lobe. Words like articles, conjunctions, and prepositions (or close-class words) elicit an early negativity peak in the anterior portion of the left hemisphere (Bellugi *et al*., 1999). Using ERPs to open and closed-class word stimuli, WS subjects do not display the typical evoked pattern at the N400 peak for open-class words in the right hemisphere, but instead, a negativity in the left hemisphere was found (see Bellugi *et al*., 1999). For closed-class words, the typical left-hemisphere pattern found in normal subjects is not found in individuals with WS (Bellugi *et al*., 1999). These findings indicate that the neural functional organization for syntactic processing is different for individuals with WS, even though results from MRI studies report similar frontal lobe and cerebellum sizes to matched age and sex controls (Bellugi *et al*., 1999, 2000).

Summary and Conclusion

Across the five developmental disability areas reviewed here, much is already known about the underlying neural bases for some impaired phonological processes, but exceptionally little is known concerning the neural underpinnings of other deficits involving syntactical processing. At the same time, in areas where some research is available, it is evident that language deficits are not unique to a single syndrome and do not result from the dysfunction in a single, discrete brain structure. Rather, language disorders are multidimensional and involve neural processes that arise out of complex interactions between multiple cortical brain regions, and neural pathways, as well as from genetic factors whose phenotypic expression is mitigated through dynamic environmental factors. There are, no doubt, other as-yet-unknown factors. Clearly, we are still in the earliest stages of our quest to understand the complex relationships that exist between developmental language disabilities and the brain. Lest we get discouraged, it is important to keep in mind is that we at least have begun that quest.

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Phonology in the Production of Words

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Phonological Representations in the Mental Lexicon

How are words represented in the brain? Words have a meaning and a form, and presumably these two aspects of words are represented and processed separately in different areas of the brain (for a recent overview see Indefrey and Levelt, 2004). For instance, each act of speech production is planned in advance and starts with the intention to talk about a specific 'meaning' which is to be conveyed to the interlocutor(s). Therefore, the first step in speech production is called conceptualization (Levelt, 1989). In this phase, the content of an utterance is represented as prelinguistic units or concepts. During the next step, called formalization, concepts become lexicalized, i.e., lexical entries corresponding to the concepts are retrieved. Formalization can be divided into two processes, namely, grammatical encoding and phonological encoding (Levelt *et al*., 1999). This division is based on empirical data, such as speech errors. Garrett (1975) already observed that there are at least two categories of exchange errors, i.e., word exchanges and segment (phoneme) exchanges. An example of a word exchange is ***laboratory*** *in your own* ***computer*** (Fromkin, 1971); *laboratory* and *computer* belong to different syntactic phrases, but they are of the same syntactic word class, i.e., nouns. Segment or phoneme exchanges, in contrast, typically result from the same syntactic phrase, but from words of different syntactic word classes, e.g., *our* ***queer dean*** (instead of *our* ***dear queen***; an original spoonerism). This pattern of word and segment exchanges can be explained by ssuming that word exchanges occur during grammatical encoding, whereas segment exchanges occur during subsequent phonological encoding. During grammatical encoding the syntactic structure of an utterance is specified including the syntactic word class of an individual word, but not its phonological form. That is why words of the same word class are exchanged, no matter what their phonological make up is. In contrast, during phonological encoding the words of an utterance have already been selected, i.e., their syntactic word class information can no longer influence the planning process, but their phonological form is still to be specified. During this specification segments or phonemes from adjacent words can accidentally become active at the same time, and then they can be exchanged and result in a sound error.

In the meantime, on-line experimental evidence for the division between grammatical and phonological encoding has been obtained. Schriefers *et al*. (1990) asked Dutch participants in the laboratory to name pictures while presenting them with auditory distracter words. When the distracter words were semantically, i.e., categorically, related to the target picture name (e.g., *gieter* 'watering can'), participants were slower to name the picture of a rake (*hark*) compared to an unrelated distracter word (e.g., *bel* 'bell') (see **Figures 1–3**). However, this happened only when the distracter words were presented slightly before picture onset or simultaneously with the picture onset (see **Figure 4**). When the distracter words were phonologically related to the picture name (e.g., *harp* 'harp'), however, the naming of *hark* was faster than in the unrelated control condition (see **Figures 5–7**). However, this effect disappeared when the phonologically related distracter words were presented before picture onset (see **Figure 8**).

The received account for the semantic interference effect (*hark–gieter*) is that the lexical entry *gieter* does

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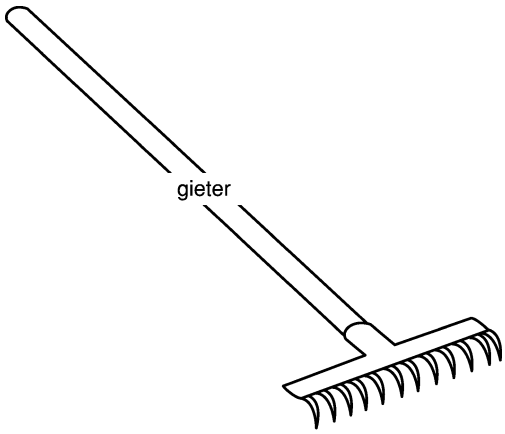

semantically related

Figure 1 Picture naming with a semantically related distracter word. Participants' task is to name the picture and ignore the word. It is known that such a situation yields Strooplike interference, i.e., participants are influenced by the distracter word when naming the picture.

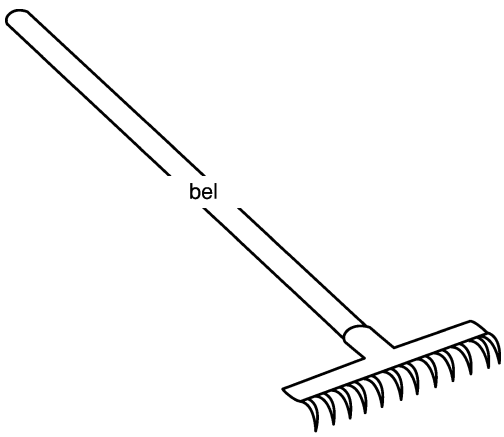

unrelated

Figure 2 Picture naming with an unrelated distracter word.

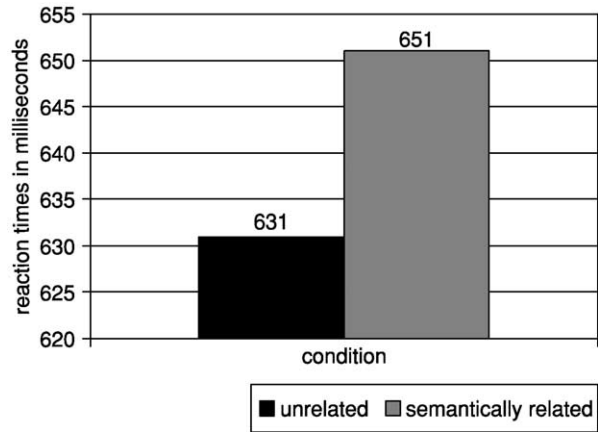

Figure 3 The semantic interference effect in speech production. Naming latencies are slower when the distracter word is semantically related to the picture than when it is unrelated. The results are taken from a study by Schriefers *et al.* (1990).

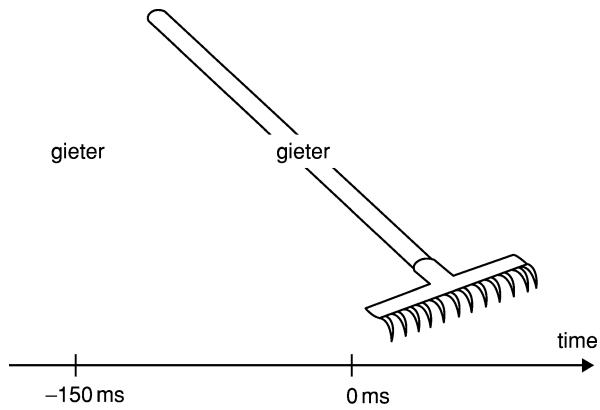

Figure 4 The time course of semantic interference in speech production. The effect occurs only when the distracter word is presented slightly (e.g., –150 ms) before picture onset or simultaneously with the picture.

not only receive activation from the auditory presentation of the distracter word, but also – via the conceptual network 'garden utilities' – from the picture of the *hark* ('rake') due to the fact that there are connections between conceptually similar entries. Therefore, *gieter* ('watering can') is a stronger lexical competitor than the unrelated distracter *bel* ('bell'), which does not receive activation from the picture of the rake (see also Levelt *et al.*, 1999: 10–11). The phonological facilitation is accounted for by assuming that the phonological distracter *harp* preactivates segments (phonemes) in the production network. The segments that are shared between distracter and target (/h/, /a/, /r/) can be selected faster when the target picture name *hark* is phonologically encoded. One can infer from this pattern that semantic-categorically related distracters have an influence on the speech production process at an earlier point in time, namely during lexical selection, than phonologically related distracter words, which only show an influence during phonological encoding (see Figure 9).

This article is about phonology in the production of words. A model of phonological encoding is provided by Levelt and Wheeldon (1994) and has been further developed since then (see Figure 10). This model describes word form encoding processes that follow the selection of a word from the mental lexicon. Once a word has been selected from the mental lexicon, it has to be encoded in a form that can finally be used to control the neuromuscular commands necessary for the execution of articulatory movements (see Guenther, 2003 for a recent overview). When accessing a word's form for phonological encoding, speakers retrieve segmental and metrical information.

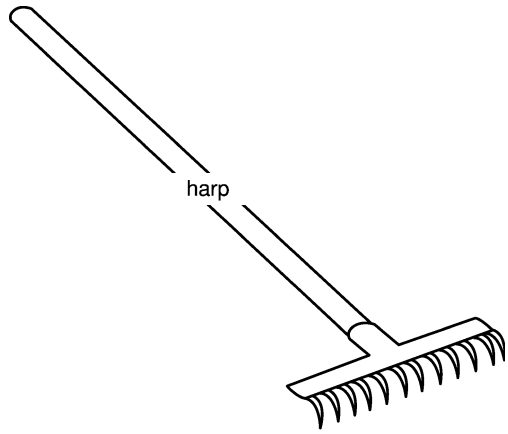

phonologically related

Figure 5 Picture naming with a phonologically related distracter word.

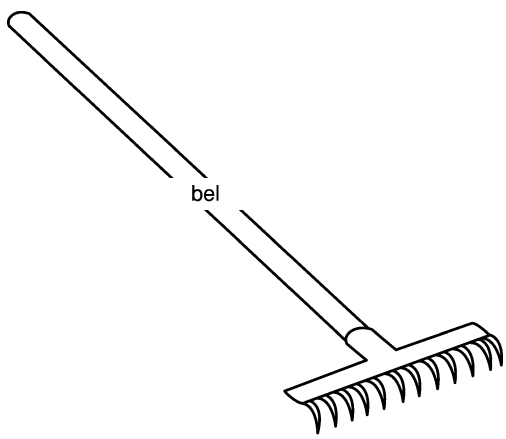

unrelated

Figure 6 Picture naming with an unrelated distracter word.

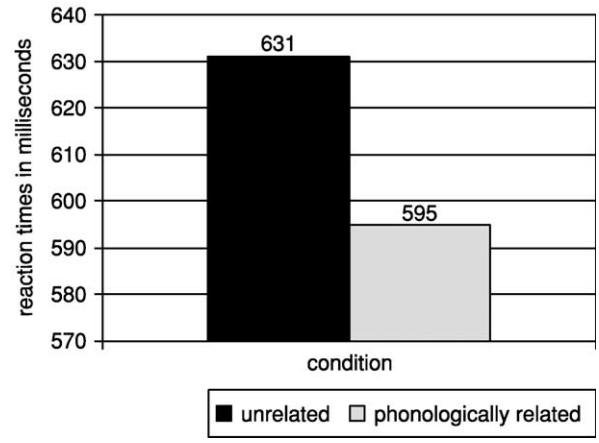

Figure 7 The phonological facilitation effect in speech production. Naming latencies are faster when the distracter word is phonologically related to the picture than when it is unrelated. The results are taken from a study by Schriefers *et al.* (1990).

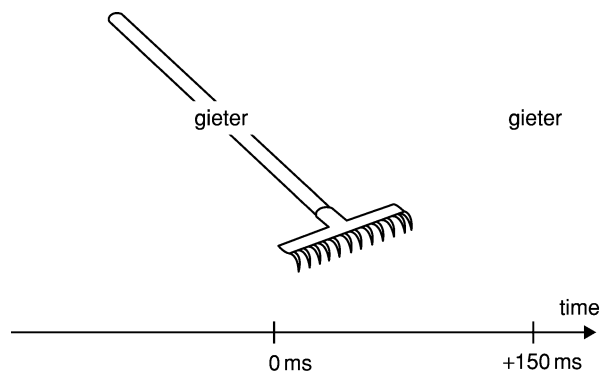

Figure 8 The time course of phonological facilitation in speech production. The effect occurs only when the distracter word is presented simultaneously with the picture or slightly (e.g., +150 ms) later than picture onset.

During segmental encoding, the segments (phonemes) of a word and their order have to be retrieved. For the word *lepel* 'spoon' this would be the segments /l/$_1$, /e/$_2$, /p/$_3$, /ə/$_4$, /l/$_5$. During metrical retrieval, a metrical frame has to be retrieved, i.e., the number of syllables and the location of the lexical stress. For the example *lepel*, the metrical frame would include two syllable slots, the first of which bears lexical stress (e.g., '_ _). Furthermore, the syllable or consonant–vowel (CV) structure of the individual syllables of the word may be retrieved (Dell, 1988; but see Roelofs and Meyer, 1998). Once the segmental and the metrical information has been retrieved, it is combined during a process called segment-to-frame association. During this process, the previously retrieved segments are combined from word beginning to end with their corresponding metrical frame. The resulting phonological string is syllabified according to universal and language-specific syllabification rules. A fully prosodified phonological word is generated, which forms the basis for the activation of syllables in a mental syllabary (Levelt and Wheeldon, 1994). Presumably, the units in the syllabary can be conceived of as precompiled articulatory motor programs of syllabic size. These motor programs may be represented in terms of gestural scores, i.e., a phonetic plan that specifies the relevant articulatory gestures and their relative timing (see Goldstein and Fowler, 2003 for a review). The final step includes the execution of these gestures by the articulatory apparatus. This results in overtly produced speech (see Figure 11).

One puzzling feature of this mechanism is why segments and metrical frame are retrieved independently from memory when both types of information are reunified slightly later. However, while this may seem puzzling when considering single, isolated word production, it is not when the production of words in context is taken into account. For instance, syllabification does not respect lexical boundaries since the domain of syllabification is the phonological word

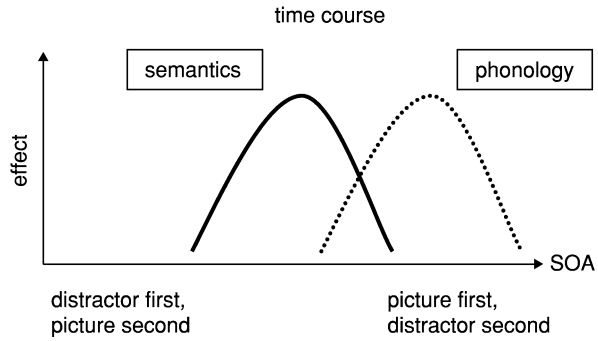

Figure 9 Schematic illustration of the time course of semantic and phonological effects in speech production. SOA = stimulus onset asynchrony.

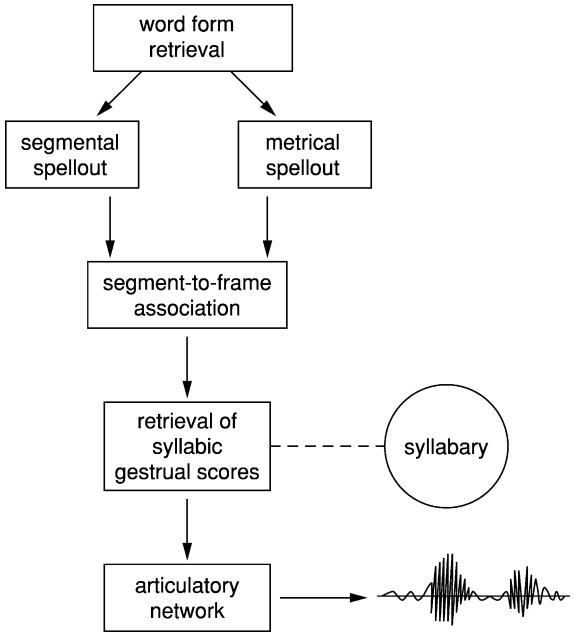

Figure 10 A model of phonological encoding (after Levelt and Wheeldon, 1994).

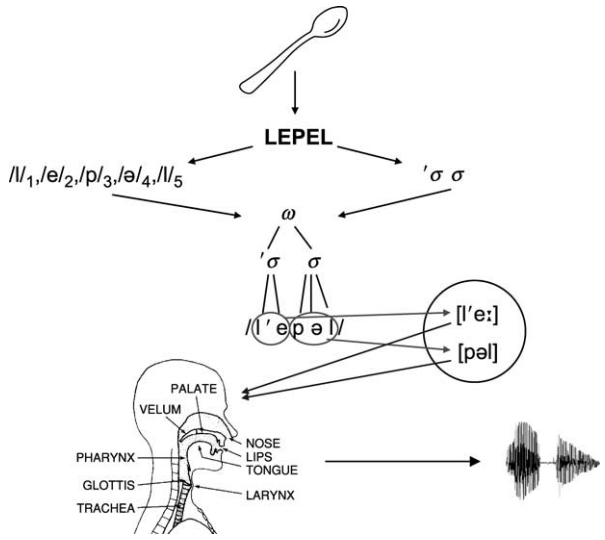

Figure 11 Example of the phonological encoding of a picture name (animated with sound).

(not the lexical word). Let us take the example of the verb *to type*. *Type* is a monosyllabic CVC word. Now consider the words *ty.pist* (someone who types; dots indicate syllable boundaries), *ty.ping* (the gerund), or the phrase *ty.pe it*. In all of these examples, the coda /p/ of *type* /taɪp/ becomes the onset of a second syllable. In the example *ty.pe it*, it even straddles the lexical boundary between 'type' and 'it.' Therefore, it is important to bear in mind that segments (phonemes) are not inserted into a lexical word frame, but into a phonological word frame. The phonological word, however, is a context-dependent unit. It can solely consist of the lexical word 'type' as in 'type faster,' or unstressed function words such as 'it' can cliticize to it as in 'type it faster,' yielding *ty.pe it* /taɪ.pɪt/. A corollary of context-dependent syllabification in speech production is that it would not make much sense to store syllable boundaries with the word forms in the mental lexicon because syllable boundaries change as a function of the phonological context. The so-called syllable position constraint observed in sound errors (i.e., onsets exchange with onsets, nuclei with nuclei, etc.) can probably not hold as an argument for stored syllable frames because it may just be a reflection of the general tendency of segments to interact with phonemically similar segments. Therefore, it makes more sense to postulate that syllables are not stored with their lexical entries (Levelt *et al.*, 1999). Rather, syllable boundaries will be generated on-line during the construction of phonological words to yield maximally pronounceable syllables. This architecture lends maximal flexibility to the speech production system in all possible contexts.

Segmental Encoding

Speech error research has been an important source of information for the understanding of segmental encoding (Shattuck-Hufnagel, 1979 for an overview). The vast majority of sound errors are single-segment errors, but sometimes also consonant clusters get substituted, deleted, shifted, or exchanged. Most often, the word onset is involved in a sound error, although sometimes also nuclei (*beef **needle*** instead of *beef noodle)* or codas (*go**d** to see**n*** instead of *gone to seed*) form part of an error. This points to the general importance of the word onset in phonological encoding (see Schiller, 2004 for more details). Some errors suggest the involvement of phonological features in planning phonological words, e.g., ***glear plue sky*** (Fromkin, 1971). In this latter example, it

seems as if only the feature [VOICE] changed position although two independent segmental sound errors (i.e., /k/ → /g/ and /b/ → /p/) cannot be excluded, either. In fact, often the target and the error only differ in one single phonological feature, and there is a tendency for more specified segments to substitute for less specified features, e.g., *documentation* → *documen**d**ation*; /t/ [−VOICE] → /d/ [+VOICE] (Stemberger, 1991). The reason for this 'addition bias' is not entirely clear. One important question which featural errors raise concerns the representation of segments during on-line processing: are segments represented as phonemic units or as bundles of phonological features?

In speech production, metalinguistic evidence (backward talking, language games, etc.) as well as speech errors (the vast majority of the phonological slips concern a single phoneme) suggest that the segment is the smallest unit of speech planning. However, as mentioned above, there are some speech errors which might imply a representation in terms of phonological features. In Levelt *et al.*'s (1999) model, the features of the segments in a syllable were accessed in parallel. Moreover, Roelofs (1999) showed that a difference in a single phonological feature (e.g., ***b**een* 'leg' [+VOICE], ***b**os* 'forest' [+VOICE], ***p**et* 'cap' [−VOICE]) is enough to spoil the so-called preparation effect (see below). This suggests that segments are planning units independent of their phonological features. However, this finding does not exclude that features may play a role in planning a word form. In fact, there are instances when subphonemic specification is required in speech production (e.g., *I scream* and *ice cream* are segmentally identical, i.e., /aɪ.skrim/), and it is as yet not clear how exactly subphonemic details can form part of the theory (see also McQueen *et al.*, 2003).

Time Course of Segmental Processing

One important question in word processing is the time course of the processes involved. For instance, does semantic processing precede phonological processing in speech production or do these two processes occur in parallel? Similarly, are the segments of a word encoded one after the other or are they encoded in parallel? It was argued above on the basis of empirical evidence (e.g., sound errors) as well as on theoretical grounds that word forms are planned in terms of abstract units called segments or phonemes. Meyer (1990, 1991) had participants produce sets of words that either overlapped in the onset phoneme (***h**ut* 'tent,' ***h**eks* 'witch,' ***h**iel* 'heel'), or in the first two phonemes (***h**amer* 'hammer,' ***h**aring* 'herring,' ***h**agel* 'hail'), or in the first three phonemes (***h**aver* 'oats,' ***h**aven* 'haven,' ***h**avik* 'hawk'), or in the final phonemes (***h**aard* 'stove,' ***p**aard* 'horse,' ***k**aard* 'map'). These were the so-called homogeneous conditions, which were compared to so-called heterogeneous conditions in which the words did not overlap at all (***h**ut* 'tent,' ***d**ans* 'ballet,' ***k**lip* 'cliff'). Reaction times were found to be faster when the beginning of the target words could be planned in advance but not when the final part could be prepared. The magnitude of this preparation effect depended on the size of the string that could be prepared, i.e., the more phonemes overlapped among the words within a set, the larger the preparation effect. Importantly, this was only true for beginning-overlap, but not for end-overlap, suggesting that the phonological planning of words is strictly sequential, i.e., proceeding in a left-to-right fashion from the beginning of words to their end. When the onset phoneme is not known, nothing can be prepared.

Wheeldon and Levelt (1995) provided additional evidence for the incremental nature of segmental phonological encoding. They required bilingual Dutch–English participants to internally generate Dutch translations to English prompt words, which were displayed via headphones. However, participants did not overtly produce the Dutch words but self-monitored them internally for previously specified segments. For example, participants would hear the English prompt word *hitchhiker* and were asked to press a button on a button box in front of them if the Dutch translation (*lifter*) contained the phoneme /t/. Thus, for *hitchhiker* participants would press the button as fast as possible, whereas for *cream cheese* (*roomkaas*) they would not. The button press latencies varied as a function of the target phoneme in the translation word. That is, participants were faster when the prespecified phoneme (e.g., /t/) was in onset position (e.g., *garden wall–**t**uinmuur*) than when it occurred in the middle (e.g., *hitchhiker–lif**t**er*) or at the end of the translation word (e.g., *napkin–serve**t***). The earlier the target phoneme occurred in the Dutch word, the shorter the decision latencies (see Figure 12). These data have been interpreted as support for the claim of rightward incremental encoding. Furthermore, these effects have been localized at the phonological word level, i.e., when segments and metrical frames are combined because metrical stress location influences the effect. Moreover, Wheeldon and Levelt (1995) observed a significant increase in monitoring times when two segments were separated by a syllable boundary. One possibility is that the monitoring difference between the target segments at the syllable boundary (e.g., *fie**t**.ser* vs. *lif.**t**er*) might be due to the existence of a marked syllable boundary or a syllabification process that slows down the encoding of the second syllable.

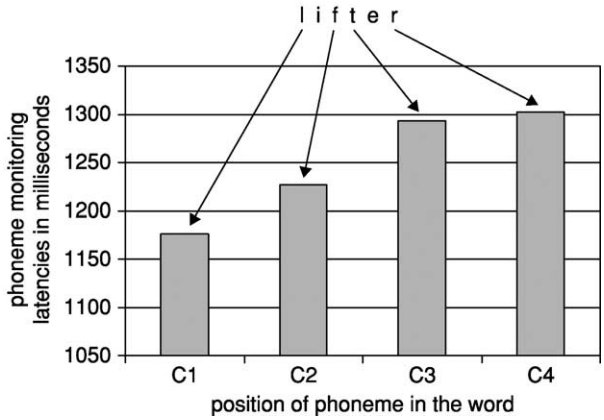

Figure 12 Mean reaction times of phoneme monitoring as a function of the position of the target phoneme in the word form. The results are taken from a study by Wheeldon and Levelt (1995).

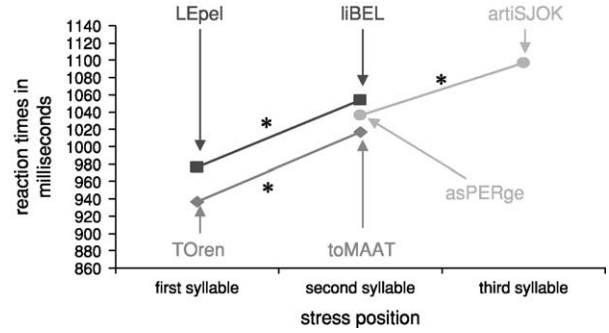

Figure 13 Summary of the stress-monitoring latencies. Depicted are the reaction times of three experiments, two with disyllabic words (example words *LEpel–liBEL* and *TOren–toMAAT*) and one with trisyllabic words (example words *asPERge–artiSJOK*) as a function of the position of the lexical stress in the picture name. The results are taken from a study by Schiller *et al.* (2005).

Metrical Encoding

Roelofs and Meyer (1998) investigated how much information about the metrical structure of words is stored in memory. Possible candidates are lexical stress, number of syllables, and syllable structure. In one experiment, for instance, they compared the production latencies for sets of homogeneous disyllabic words such as *ma.NIER* ('manner'; capital letters indicate stressed syllables), *ma.TRAS* ('mattress'), and *ma.KREEL* ('mackerel') with sets including words with a variable number of syllables such as *ma.JOOR* ('major'), *ma.TE.rie* ('matter'), and *ma.LA.ri.a* ('malaria'). Lexical stress was kept constant (always on the second syllable). Relative to a heterogeneous control condition, there was strong and reliable facilitation for the disyllabic sets but not for the sets with variable numbers of syllables. This showed that the number of syllables of a word must be known to the phonological encoding system. Hence, this information must be part of the metrical representation of words.

Similarly, the production of sets of homogeneous trisyllabic words with constant stress (e.g., *ma.RI.ne* 'navy,' *ma.TE.rie* 'matter,' *ma.LAI.se* 'depression,' *ma.DON.na* 'madonna') and variable stress (e.g., *ma.RI.ne* 'navy,' *ma.nus.CRIPT* 'manuscript,' *ma.TE.rie* 'matter,' *ma.de.LIEF* 'daisy') was measured and compared to the corresponding heterogeneous sets. Again, facilitation was obtained for the constant sets but not for the variable ones. Therefore, one can conclude that the availability of stress information is indispensable for planning of polysyllabic words – at least when stress is in nondefault position. However, CV structure did not yield an effect. When the production latencies for words with a constant CV structure (e.g., *bres* 'breach,' *bril* 'glasses,' *brok* 'piece,' *brug* 'bridge'; all CCVC) were compared to words with a variable CV structure (e.g., *brij* 'porridge,' CCVV; *brief* 'letter,' CCVVC; *bron* 'source,' CCVC; *brand* 'fire,' CCVCC), relative to the corresponding heterogeneous conditions, no difference was found, suggesting that the metrical structure speakers retrieve does not contain information about the CV or syllable structure of a word.

Time Course of Metrical Processing

To investigate the time course of metrical processing, Schiller and colleagues employed a tacit naming task and asked participants to decide whether the disyllabic name of a visually presented picture had initial or final stress. Their hypothesis was that if metrical encoding is a parallel process, then there should not be any differences between the decision latencies for initial and final stress. If, however, metrical encoding is also a rightward incremental process – just like segmental encoding – then decision latencies for picture names with initial stress should be faster than for picture names with final stress. The latter turned out to be the case (Schiller *et al.*, 2005). However, Dutch – like other Germanic languages – has a strong preference for initial stress. More than 90% of the words occurring in Dutch have stress on the first syllable. Therefore, this effect might have been due to a default strategy. However, when pictures with trisyllabic names were tested, participants were still faster to decide that a picture name had penultimate stress (e.g., *asPERge* 'asparagus') than that it had final stress (e.g., *artiSJOK* 'artichoke'). This result suggests that metrical encoding proceeds from the beginning to the end of words, just like segmental encoding (see Figure 13).

Syllables

The contribution of the syllable in the speech production process is quite controversial. Studies by Ferrand *et al.* (1996) reported a syllable-priming effect in French speech production. The visually masked prime *ca* primed the naming of *ca.rotte* better than the naming of *car.table*. Similarly, the prime *car* primed the naming of *car.table* better than the naming of *ca.rotte* (see Figure 14). This effect is a production equivalent of the syllabic effect reported by Mehler *et al.* (1981). Ferrand *et al.* (1996) concluded that the output phonology must be syllabically structured since the effect disappears in a task that does not make a phonological representation necessary, such as a lexical decision task. Furthermore, Ferrand *et al.* (1996) argued that their data are compatible with Levelt's idea of a mental syllabary, i.e., a library of syllable-sized motor programs. Interestingly, Ferrand *et al.* (1997) also report a syllable-priming effect for English. This is surprising considering the fact that Cutler *et al.* (1983) could not get a syllabic effect for English speech perception.

However, when Schiller (1998) tried to replicate the syllabic effects in Dutch speech production, he failed to find a syllabic effect. Instead, what he obtained was a clear segmental overlap effect, i.e., the more overlap between prime and target picture name, the faster the naming latencies. That is, the prime *kan* yielded not only faster responses than *ka* for the picture of a pulpit (*kan.sel*) but also for the picture of a canoe (*ka.no*) (see Figure 15).

Similar results were obtained in the auditory modality, i.e., presenting either /ro/ or /rok/ when Dutch participants were requested to produce either *ro.ken* ('to smoke') or *rook.te* ('smoked'). In fact, in the auditory modality also a segmental overlap effect was obtained, i.e., /rok/ was a better prime than /ro/ independent of the target. The failure to find a syllable-priming effect in Dutch is in agreement with the statement that syllables are never retrieved during phonological encoding (Levelt *et al.*, 1999). The syllable-priming effect found by Ferrand *et al.* (1996) in French can be accounted for by assuming that the segments in the prime are coded with their corresponding syllable structure information. For instance, the prime *pal* preactivates segments specified for syllable position in the perceptual network, e.g., p_{onset}, a_{nucleus}, and l_{coda}. Active phonological segments in the perceptual network can directly affect the corresponding segment nodes in the production lexicon. Therefore, the prime matches with the target *pal.mier*, but not with *pa.lace* because the /l/ in *pal* is specified for coda and not for onset.

The segmental overlap effect is not restricted to Dutch. When Schiller (2000) tried to replicate the Ferrand *et al.* (1997) results for English with better-controlled material, no syllabic effect was obtained but a segmental overlap effect was. These English data are interesting because in English there is phonological equivalence between corresponding syllable structures. For example, *pi* /paɪ/ matches phonologically the first syllable in *pilot* but not in *pillow*, and *pil* /pɪl/ matches phonologically the first syllable in *pillow* but not in *pilot*. Nevertheless, the prime *pil* yielded faster responses than *pi* for both *pilot* and *pillow* (see Figure 16).

Either the contribution of vowels is less important in segmental priming or consonants and vowels have different time courses of activation (Berent and Perfetti, 1995), consonants being faster than vowels

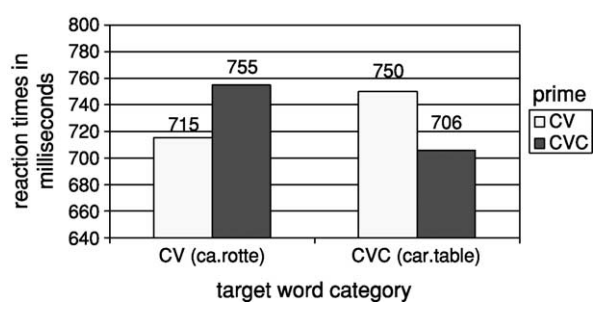

Figure 14 Mean reaction times (picture-naming latencies) per prime and target category in the Ferrand *et al.* (1996) study.

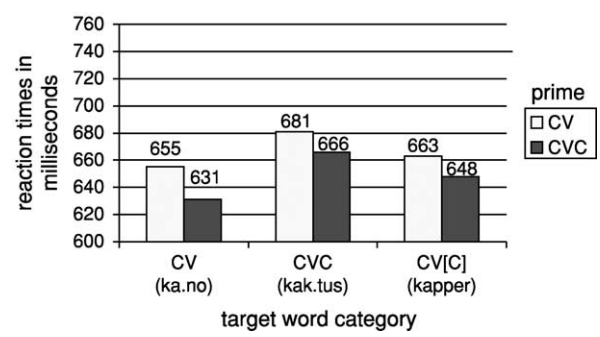

Figure 15 Mean reaction times (picture-naming latencies) per prime and target category in the Schiller (1998) study.

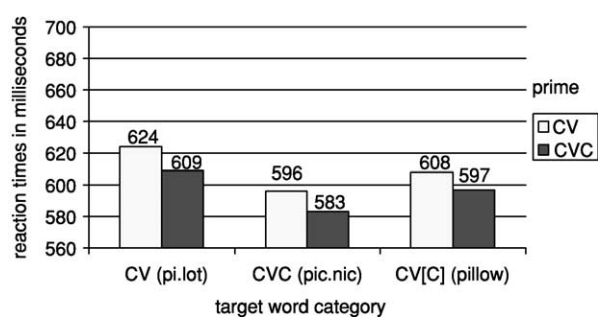

Figure 16 Mean reaction times (picture-naming latencies) per prime and target category in the Schiller (2000) study.

and therefore more effective. Further testing revealed that there is no syllable effect in Spanish, but a small segmental overlap effect (Schiller *et al.*, 2002), and no syllabic effect in French when a larger set of materials is tested (Schiller *et al.*, 2002). Taken together, these results support the idea that syllables are not retrieved, but created on-line during phonological encoding.

Mental Syllabary

The existence of a mental syllabary is a hotly debated topic. The original idea for a 'library of articulatory routines' comes from work on speech errors (Crompton, 1981; Levelt, 1989). The idea was that precompiled motor programs of syllable size could help reduce the computational load during speech production if they form the basic units of articulatory programming. This idea is attractive from a lexico-statistical point of view since the majority of the speech in Dutch (about 85%) can be produced with a minority of the Dutch syllables (only 5% of all Dutch syllables). Therefore, Levelt and Wheeldon (1994) tested this idea in an experiment comparing the production latencies of words differing in syllable frequencies. For instance, there were words in the experiment that consisted of high-frequency syllables (e.g., *bo.ter* 'butter') and words that were made up from low-frequency syllables (e.g., *gi.raf* 'giraffe') while word frequency was controlled. Results showed that words with high-frequency syllables were named significantly faster than words with low-frequency syllables, independent of word frequency. Levelt and Wheeldon (1994) took this finding as evidence for a separate store from which syllabic units can be recruited during speech production. However, syllable frequency correlates highly with segment or phoneme frequency. Therefore, the effect reported by Levelt and Wheeldon (1994) could as well be attributed to segment frequency. When segment frequency was controlled, a small set of awkward word stimuli remained and the syllable frequency effect disappeared.

Although syllables cannot be primed in Dutch, Cholin *et al.* (2004) found that syllable structure can be prepared in the planning of speech production. Syllables probably emerge at the interface between phonological and phonetic encoding. In a follow-up study, the same authors found significant syllable frequency effects in pseudoword production when segment frequency was controlled for (Cholin *et al.*, in press). This latest result strongly supports the notion of a mental syllabary that mediates between abstract phonological syllables and phonetic syllables, which are conceived of as precompiled gestural scores to control the execution of an articulatory motor program.

Summary and Conclusion

In this article, I described the role of phonology in the production of words. A model of phonological encoding was described. Certain aspects of this model, such as the role of segments and metrical frames, were discussed in more detail. It was argued on the basis of speech error and reaction time data that segments rather than phonological features play a role in production planning, while more subphonemic detail is necessary to account for the speech comprehension data. Furthermore, the nature of metrical frames was described and it was argued that segments as well as lexical stress are encoded rightward incrementally. Finally, the role of syllables in speech production was sketched and the role of a mental syllabary was discussed. It is concluded that more research on phonological processing is necessary to specify aspects of the model that are currently underspecified.

See also: Dutch; English in the Present Day (since ca. 1900); Phonology–Phonetics Interface; Speech Errors as Evidence in Phonology; Speech Errors: Psycholinguistic Approach; Speech Production; Spoken Language Production: Psycholinguistic Approach; Syllable: Phonology; Word Stress.

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Phonology: Optimality Theory

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Introduction

Optimality theory, introduced in the early 1990s (Prince and Smolensky, 1993; McCarthy and Prince, 1993a,b), offers an extremely simple formal model of language, with far-reaching implications for how language works. The formal component of each grammar consists of a ranked ordering of a universal set of constraints; this ordering is used to identify the best pairing between a given input and all potential outputs. Languages differ not by the constraints used, but by the ranking used – the constraints are universal. Depending on where a particular constraint falls in the constraint hierarchy of the language determines how roundly violated that constraint will be, because all constraints are violable. The ranking determines which violations matter for which input–output mappings (for overviews, see Archangeli and Langendoen, 1997; Kager, 1999; McCarthy, 2002, 2004).

During the 1970s and into the 1980s, phonological research centered on phonological representations. As representations were better understood, the rules relating those representations to each other seemed to

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During the 1970s and into the 1980s, phonological research centered on phonological representations. As representations were better understood, the rules relating those representations to each other seemed to

simplify and become more illuminating. However, by the late 1980s, this simplification of rules did not lead to a more viable theory of rules. Rather, in order to account for language phenomena, both rules and constraints were used. Much of phonological exploration in the late 1980s and early 1990s focused on the role of constraints in grammars (e.g., Archangeli and Pulleyblank, 1994). A separate class of research programs explored derivationless phonology (e.g., Goldsmith, 1993). Optimality theory blends these two lines of exploration, using constraints (instead of a rule-based derivation) to mediate between input and output.

Understanding the architecture of optimality theory is a prerequisite to exploring some of the many ramifications of that architecture. Throughout this article, the examples are phonological because the theory is most developed through phonological studies. However, as discussed in the closing section, optimality theoretic analyses of syntactic and morphological structure are among the extensions of the model.

Understanding the Model

The architecture of optimality theory is deceptively simple. It is shown schematically in Figure 1. Humans are equipped with a universal set of constraints (CON) stating what is possible or impossible in language. Learning a language consists, in part, of learning a ranked ordering for that set of constraints, i.e., the constraint hierarchy for that language. The correct constraint hierarchy selects the best pairing between a given input and an output candidate (CAND). An operation known as 'generator' (GEN) creates the set of output candidates from which the optimal one is selected. Candidate selection results from evaluation (EVAL), an operation that compares the various candidates to the constraint hierarchy in order to select the best match.

GEN and EVAL

GEN and EVAL are the only operations available in this theory. The function of GEN is to map the relations between any given input and the candidate set. This mapping shows correspondences between the elements of the input and the elements in each candidate. For example, with an input /abc/ and the candidate [dab], we might imagine a one-to-one mapping such that input /a/ maps to [d], input /b/ to [a], and input /c/ to [b] (these relations are shown graphically in Figure 2A). We could also imagine that the input /a,b/ maps directly to candidate [a,b], but that input /c/ has no counterpart in the candidate, and candidate [d] has no counterpart in the input (Figure 2B).

EVAL is responsible for determining the best pairing between the input and candidate set in each language. For EVAL to function in a language-particular fashion, it takes into account the input, the candidate set (i.e., the results of GEN), and the constraint hierarchy as defined for the language in question. In classic optimality theory, EVAL compares each candidate to the requirements of the highest ranking constraint (C_i) and eliminates all candidates but the candidates with the least number of violations of C_i. EVAL then examines the remaining viable candidates against the second constraint (C_j) in the language and again eliminates all but those with the least number of violations for C_j. EVAL continues through the constraint hierarchy in this fashion, eliminating candidates until only one remains, which is the optimal candidate, given the input and the constraint hierarchy. (Alternative versions of GEN and EVAL have been proposed in order to make the model finite and so to introduce the potential of psychological reality; the versions presented here are the classic functions, as introduced in the original works.)

Tableaux

Practitioners of optimality theory use two conventions for visually representing the function of EVAL for a given input. First, the candidate set is limited to those most likely to be contenders for the best match. Second, the evaluation of those candidates is depicted in a chart, called a tableau. The tableau helps to understand even relatively simple cases.

To understand how a tableau works, it is useful to start with a concrete, but limited, example: a hypothetical CON with only two conflicting constraints in it, C_i and C_j. This allows for two languages. In one language, the constraint hierarchy ranks C_i above C_j, denoted $C_i \gg C_j$, whereas in the other language, the opposite ranking holds, $C_j \gg C_i$. Assume for the moment that for a given input, GEN produces only two candidates, CAND1 and CAND2, such that CAND1

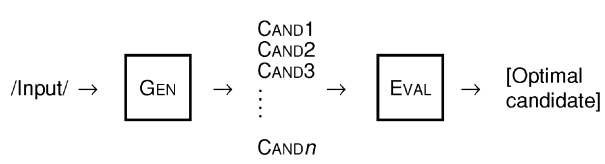

Figure 1 Schematic of the optimality theory model.

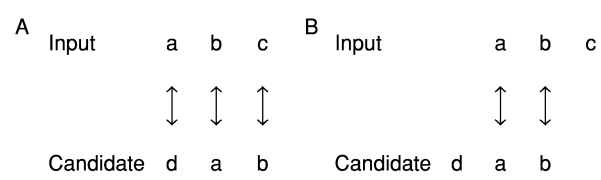

Figure 2 Possible relations between a given input and a potential candidate.

violates only C_i and CAND2 violates only C_j. A bit of thought reveals that in the first language, L1, CAND2 will be preferred, despite violating C_j. This is because C_i outranks C_j and the only competing candidate violates C_i. The opposite case holds in the second language, L2, in which CAND1 wins. The 'bit of thought' involved in working through this is aided considerably by a tableau – a visual presentation of the logic. Figure 3 shows tableaux for the two cases just described; in each case, the optimal candidate is identified with a pointing finger symbol (☞). Each tableau is arranged with the input in the top left corner and the constraints arrayed across the top from left to right (corresponding to highest ranked to lowest ranked). Candidates go in the leftmost column. Each cell then shows a pairing between a candidate and a constraint. An asterisk is put in cells corresponding to the pairing of a candidate with a constraint that the candidate violates. For example, in Language 1 (Figure 3A), the winning CAND2 violates C_j, as shown by the asterisk in the cell pairing CAND2 and C_j. The notation *! is used to identify the constraint violation that eliminates a particular candidate, i.e., a fatal violation. This occurs when there is some other candidate with fewer violations for the constraint in question. Again, in Language 1, CAND1 fatally violates the top-ranked C_i, shown by the *! in the cell pairing CAND1 and C_i.

In Language 2, CAND2 (which violates C_j) is eliminated by C_j because C_j is the highest ranking constraint under consideration; this fatal violation is indicated by *! notation. Since CAND1 does not violate C_j, it remains in the competition. Also, because there are no other candidates to consider, CAND1 is selected as the optimal candidate, despite its violation of the lower ranked C_i. The gray-shaded cells in each tableau indicate constraint–candidate pairings that are no longer relevant because a decision has already been made.

CON, the Constraint Set

The remaining component to examine is the constraint set. There are two basic types of constraints, Faithfulness constraints and Markedness constraints.

Faithfulness Constraints Faithfulness constraints evaluate the goodness of the match between the input and the candidate. A complete match is fully faithful – it violates no Faithfulness constraints: Inputs /abc/ maps to candidate [abc] in a fully faithful manner. By contrast, candidates such as [ab], [abd], and [dabc] violate some Faithfulness constraint(s). The insight into Faithfulness constraints is that languages need to be able to distinguish a variety of words. In order to do so, it is important that the constraint system have the ability to maintain differences between inputs. Without Faithfulness, all inputs would converge on the same output, because the only constraints would be Markedness constraints, which govern preferred outputs.

Faithfulness constraints formally encode the variety of ways in which there can be a match between input and candidate. Violations are incurred by mismatches. For example, there can be a mismatch because the output contains something that is not in the input; there can also be a mismatch because the output does not contain something that is present in the input (recall Figure 2). Each distinct type of mismatch is characterized by a distinct type of Faithfulness constraint (see McCarthy and Prince, 1995).

Markedness Constraints Markedness constraints are evaluated based on output candidate form alone. Each language has its own distinct sound patterns, including the syllable shapes permitted, the inventory of sounds from which words are made, and the sound sequences allowed. Markedness constraints formally define these preferred configurations. Intriguingly, taken as a group, they also reflect cross-linguistic patterns of markedness, in the sense defined in Chomsky and Halle (1968). Including Markedness constraints in CON, the universal set of constraints, directly encodes universal properties of language in the grammar of each specific language.

Summary

Universal grammar provides a set of constraints, CON, and two operations, GEN and EVAL. The language learner acquires inputs and a ranking of

A Language 1

	/Input/	C_i	C_j
	CAND1	*!	
☞	CAND2		*

B Language 2

	/Input/	C_j	C_i
☞	CAND1		*
	CAND2	*!	

Figure 3 Tableaux for two simple languages, varying by the ranking of the two constraints: in each case, the optimal candidate is identified with a pointing finger symbol (☞).

constraints, comprising the language's constraint hierarchy. The constraint hierarchy for a given language provides the ranking of Markedness and Faithfulness constraints for that language. This ranking results in interaction among the different types of constraints, which determines the shape of output forms, and so defines possible words for the language. GEN creates input/candidate pairings and EVAL uses the constraint hierarchy to evaluate those pairings to find the best match for a given input.

Consequences

Testing optimality theory against a variety of different linguistic effects shows that numerous effects follow directly from the architecture of the model. There is no need to add particular constraints, types of representations, or additional operations to the straightforward model sketched in the preceding section. This section presents a number of phonological phenomena and shows how optimality theory explains these effects through the interaction of Markedness and Faithfulness constraints (for a lucid and thorough discussion of these and other results of optimality theory, see McCarthy (2002)).

Inventories

The term 'inventory' refers to the set of sounds of a language: velar stops *k*, *g* are in the inventory of English but the velar fricatives *x*, *ɣ* are not. Quite often in phonological analysis a distinction is made between the 'underlying inventory' – the set of sounds from which lexical entries are made – and the 'surface inventory' – the set of sounds from which surface representations are made (in analyses of English, the underlying inventory typically does not include aspirated voiceless stops, yet they are part of the surface inventory).

Within optimality theory, a distinction between input and output inventories is impossible because there are no constraints on the input and so no way of encoding an 'input inventory.' The only constraints available are those in the constraint hierarchy of the language, governing the relation between input and output (Faithfulness) or the 'well-formedness' of the output (Markedness). The constraints on the well-formedness of output forms determine the sound set that is realized in the language. The absence of restrictions on the input gives rise to a concept called 'richness of the base.' 'Richness' refers to a lack of constraints and the 'base' is the set of possible inputs. Formally, the free combination of linguistic primitives produces the set of possible inputs. The wide variety of sounds available in the input is filtered through the constraint hierarchy. In particular, Markedness constraints limit the types of sounds possible in the output, whereas Faithfulness allows for a variety of sounds to surface. It is the interaction of Faithfulness and Markedness constraints that produces the inventory effect.

Consider, for example, a language without front round vowels (see Figure 4). Under optimality theory, this would be expressed by a Markedness constraint, possibly *[round, front] 'No [round] and [front] combination.' Since no front round vowels occur in the language, this would be a high-ranked constraint. Crucially, this constraint must outrank the Faithfulness constraint for one of [front] and [round], as the tableaux in Figure 4 reveal. Should a candidate contain a front round vowel, it will incur a fatal violation even if that vowel is completely identical to the input vowel. The relative ranking of Faithfulness to [front] and to [round] determines whether an input /y/ maps to [i] (Figure 4A) because FaithRound is high ranking, or to [u] (Figure 4B) because FaithFront is high ranking.

Formally, there are no limits on the input. The consequence for the practitioner of optimality theory is the need to consider very carefully all sorts of peculiar inputs, to be sure that the constraint hierarchy proposed for a language does indeed result in the identification of appropriate input–output pairings. There have been efforts to curtail this property, most notably the concept of lexicon optimization.

A

/y/	FAITH(Round)	*ROUND/FRONT	FAITH(Front)
[y]		*!	
[i]	*!		
☞ [u]			*

B

/y/	FAITH(Front)	*ROUND/FRONT	FAITH(Round)
[y]		*!	
☞ [i]			*
[u]	*!		

Figure 4 Tableaux for a language without front round vowels; the optimal candidate is identified with a pointing finger symbol (☞).

However, as McCarthy (2002: 78) pointed out, "lexicon optimization exists mainly to provide reassurance that the familiar underlying forms are still identifiable in the rich base." It is irrelevant as a principle of grammar.

Distributional Restrictions

Closely related to the concept of inventories, and handled by optimality theory in much the same way, is the notion of distributional restrictions. Distribution restrictions refer to cases in which certain sounds in a language are permitted only in certain environments. A familiar form of distributional restriction is complementary distribution. An example of this is aspirated and plain voiceless stops in English: aspirated stops are found initially and before stressed vowels, and plain stops are found elsewhere. Another type of distributional restriction is contextual neutralization: a particular distinction is eliminated ('neutralized') in a particular context. For example, English allows a wide variety of consonant clusters at the end of a syllable, but disallows a nasal-stop sequence when the two consonants have different places of articulation: *nt*, *nd*, and *mp* are acceptable, whereas *np*, *md*, and *mg* are not acceptable.

The interaction between particular types of Faithfulness and Markedness constraints readily captures these distributional restrictions. The Faithfulness constraints in question require identity between the input and the output (e.g., IDENT(voice): corresponding input and output segments have the same voicing value). The Markedness constraints involve a prohibition against a particular type of segment (e.g., OBSVOI: no voiced obstruents) and a requirement for that prohibited type of segment in a particular context (e.g., *NC(-voice): after nasals, obstruents are voiced). As shown in Figure 5, there are three interactions of interest among constraints such as these (see Pater, 1999). First, if IDENT(voice) is the highest ranked of the three, then input obstruents such as /t/ and /d/ will surface as [t] and [d], respectively, because the input value for [voice] matches the output value, regardless of context. This is simply the expected case with high-ranking Faithfulness: the two classes of obstruents occur in the same environments, as is the case with alveolars in English (*want*, *wand*).

Suppose, however, that the top-ranked constraint is *NC(-voice), prohibiting nasal-voiceless obstruent sequences. In this case, there are two outcomes, depending on the ranking of the other two constraints. When OBSVOI (obstruents are voiceless) is ranked above IDENT(voice), voiced and voiceless obstruents occur in complementary distribution, with voiced obstruents following nasals and voiceless ones elsewhere. Figure 6A shows the input /nt/, which does not faithfully survive because of the high-ranked constraint prohibiting such clusters. The other two constraints are irrelevant: the cluster [nd] surfaces. The other inputs of interest are shown in Figure 6B,C, in which either input, /t/ or /d/, is mapped to output [t] because the prohibition against voiced obstruents outranks faithfulness. Schematically, complementary distribution is characterized by Contextual Markedness ≫ Generic Markedness ≫ Faithfulness. Proponents of optimality theory note that complementary distribution is predicted simply by the existence of Markedness and Faithfulness constraints. Nothing additional needs to be added to the formal model.

The ranking Contextual Markedness ≫ Faithfulness ≫ Generic Markedness gives rise to contextual neutralization. Returning to the preceding constraint set, the relevant constraint hierarchy is depicted in the tableaux in Figure 7. The tableau in Figure 7A shows the positional case wherein, after a nasal, the voiced/voiceless distinction is neutralized to voiced obstruents. By contrast, the other two tableaux (Figure 7B,C) show that input voiced and voiceless obstruents surface without change when they do not follow a nasal. This ranking, then, produces contextual neutralization, and again, this type of sound pattern is expected, given the nature of constraint interaction (see also Wilson (2000) on contextual neutralization).

Processes and Conspiracies

One class of phenomena that might be presented as a serious challenge to optimality theory is the 'phonological process,' depicted schematically by the A → B /

A

/nt/	IDENT(voice)	*NC(-voice)	OBSVOI
☞ [nt]		*!	
[nd]	*!		*

B

/nd/	IDENT(voice)	*NC(-voice)	OBSVOI
[nt]	*!	*!	
☞ [nd]			*

Figure 5 Tableaux showing that top-ranked Faithfulness obviates lower ranked Markedness constraints; the optimal candidate is identified with a pointing finger symbol (☞).

C__D formula (Chomsky and Halle, 1968). This type of characterization of a phonological process includes an element identifying the target (A), a statement of the change (B), and a characterization of the context in which the change takes place (C__D). Optimality theory does not have the luxury of encoding processes in packages of this sort: optimality theory has only constraints with which to achieve these results. In fact, however, this is viewed as a strength of the model: optimality theory requires that the elements of the process be separated from each other. A Markedness constraint *CAD prohibits the target string 'CAD,' while separate Markedness constraints identify the preferred configuration. The implication of separating the target from the change is that languages are predicted to resolve 'CAD' in different ways. In the classic 'CAD' case, the illicit sequence maps to CBD. However, two other alternatives are possible: BAD and CAB. Under optimality theory, the interaction of constraints determines exactly what surfaces in place of the prohibited 'CAD.' For example, many languages do not allow consonant clusters (CCs) within syllables. Interestingly, as a class, these languages use different methods to handle CC sequences that could end up in a single syllable: a consonant might be deleted, a vowel might be added, or a consonant might be realized as a vowel. In each case, the Markedness constraint *CC prohibits consonant clusters within a single syllable, but the resolution depends on other constraints, such as the relative rankings of Faithfulness constraints preventing the addition or loss of a segment, or the addition/loss of certain features (for a consonant to be realized as a vowel). Optimality theory predicts a variety of resolutions to configurations that are ruled out by a high-ranked Markedness constraint, and this variety is found in languages.

Another result of the separation of processes forced by optimality theory is an account of the class of cases called 'conspiracies' in the generative literature (Kisseberth, 1970). A conspiracy is said to exist in a language when several different processes all converge on a single output configuration. This is common with syllabification, whereby epenthesis, deletion, and vowel shortening (three independent processes) all converge on maximally bimoraic syllables with no complex margins (CV, CVC, and CVV). Under optimality theory, conspiracies are characterized by high-ranking Markedness constraints that

A

/nt/	*NC(-voice)	OBSVOI	IDENT(voice)
[nt]	*!		
☞ [nd]		*	*

B

/t/	*NC(-voice)	OBSVOI	IDENT(voice)
☞ [t]			
[d]		*!	

C

/d/	*NC(-voice)	OBSVOI	IDENT(voice)
☞ [t]			*
[d]		*!	

Figure 6 Tableaux showing the same constraints as in **Figure 5**, with different inputs to show complementary distribution (voiced obstruents after nasals; voiceless obstruents elsewhere); the optimal candidate is identified with a pointing finger symbol (☞).

A

/nt/	*NC(-voice)	IDENT(voice)	OBSVOI
[nt]	*!		
☞ [nd]		*	*

B

/t/	*NC(-voice)	IDENT(voice)	OBSVOI
☞ [t]			
[d]			*!

C

/d/	*NC(-voice)	IDENT(voice)	OBSVOI
[t]		*!	
☞ [d]			*!

Figure 7 A change in the ranking shown in **Figure 6** produces contextual neutralization; the optimal candidate is identified with a pointing finger symbol (☞).

define the general properties of the language. The ranking of other Markedness and Faithfulness constraints below those top-ranked constraints serves to define exactly how the conspiracy plays out with respect to each input.

Emergence of the Unmarked

As has already been demonstrated with the preceding tableaux, even constraints that are dominated by other constraints can play a deciding role. This happens whenever the higher ranked constraint does not make a decision between competing candidates. The 'emergence of the unmarked' (McCarthy and Prince, 1994) refers precisely to this case: some Markedness constraint is sufficiently outranked, to be roundly violated in the surface forms of the language. However, when the higher ranked constraints fail to determine a single optimal candidate, the dominated Markedness constraint can cast the deciding vote, and the unmarked configuration emerges. For example, in Kinande, there are 10 vowels, 5 with advanced tongue root and 5 with retracted tongue root. There is also a harmony pattern whereby all vowels in a single word are typically either advanced or retracted. However, this harmony pattern is mediated in various ways. In one context, when all other constraints fail to select the optimal pattern, the critical factor is that the affected vowel is front: the unmarked combination [advanced, front] emerges (Archangeli and Pulleyblank, 2002). This type of sound pattern is particularly intriguing because it is an obvious and expected result of optimality theory. The interaction of Markedness and Faithfulness constraints predicts just this type of case. By contrast, it cannot be characterized as a coherent class in a rule-based derivational model.

Universals and Typology

Each Markedness constraint prefers or bans some configuration. Under optimality theory, constraints are universal. Putting these two properties of the model together means that the Markedness constraints in optimality theory express universal preferences. The model also claims that universals need not be surface true in all languages. This follows from the principles that constraints are violable and that languages vary in how the constraints are ranked in constraint hierarchies. In this fashion, optimality theory answers one question that has dogged studies of language universals: why it is so difficult to find universals that are indeed universal. Optimality theory's answer is that the constraints are universal, but they are also violable.

There is a second side to universals that often receives less attention: the universal absence of some configuration. As pointed out in McCarthy (2002: 108), "[i]f no permutation of the constraints in Con produces a language with property P, then languages with P are predicted not to exist." This does, of course, lead to a research challenge: when P is found to exist after all, does that disconfirm the theory, or does it mean that the constraints in Con are not yet the correct set of constraints?

A further result of positing a rankable Con is the claim that each different possible ranking corresponds to a possible language. In this way, optimality theory is inherently typological. This fact about the model introduces a neat way of checking a particular analysis. Suppose an analysis posits three constraints, crucially ranked $C_i \gg C_j \gg C_k$. Because constraints can be ranked differently in different languages, if these three constraints are members of Con, there should then be languages that correspond to the other possible rankings of these three constraints:

$$C_i \gg C_j \gg C_k$$
$$C_i \gg C_k \gg C_j$$
$$C_j \gg C_i \gg C_k$$
$$C_j \gg C_k \gg C_i$$
$$C_k \gg C_i \gg C_j$$
$$C_k \gg C_j \gg C_i$$

This observation is known as the 'factorial typology': for *n* constraints, freely ranked, there are *n*! possible languages. The research challenge is to check each of those possible languages to ascertain whether they are attested or, if not attested, at least appear to be feasible as human languages.

There is one caveat about the free ranking of constraints: certain phenomena, such as the sonority hierarchy, suggest that there might be some sets of constraints with fixed rankings with respect to other members of the set. Accepting fixed rankings within Con restricts the number of possible grammars somewhat but does not change the essence of the factorial typology.

Summary

This section has provided several illustrations of consequences of optimality theory, based on the essential architecture of the model. Some of these consequences show how optimality theory handles familiar phonological phenomena such as inventories, segment distribution, and phonological processes. Other consequences, such as the typological and universal effects, are perhaps more profound in that they show how optimality theory as a model

broadly encompasses aspects of language structure that are independent of a particular language. At the same time, through the rankings of the universal constraint set CON, these effects actually conspire to form each individual language.

Extensions

Optimality theory was introduced as a model of synchronic adult phonological grammar. Since the inception of the model, research has explored extending the model to better understand domains as diverse as learnability, syntax, semantics, language change, and language variation. This following sections introduce the optimality theory perspective on a few of these topics.

Learnability

The clear formal properties of optimality theory lend themselves to explorations of learnability, i.e., whether the constraint hierarchy for a particular language is learnable. Other formal aspects of the model, such as the infinite candidate set created by GEN, suggest that the grammar would be totally unlearnable: The learner would get stuck generating the infinite set of candidates for the first input attempted, let alone the morass of trying to sort out the correct ranking of $n!$ possible rankings of CON. The learnability question has been explored since the inception of optimality theory (Tesar and Smolensky, 1998; Riggle, 2004). The most successful learnability model, recursive constraint demotion, starts with the learner knowing a few important input–output pairings. An alternative that does not require such knowledge is the genetic algorithm (Pulleyblank and Turkel, 2000); this model starts with random triples, i.e., an input–output–constraint hierarchy. With each iteration, the better triples increase their chances of survival while the poorly matched triples (i.e., ones for which the input–output pairing is not selected by the constraint hierarchy in the triple) decrease their chances of survival.

Optimality theory is a model of the structure of language, but it is not necessarily a model of what people actually do when they use a language. The relation between optimality theory and psychological reality is yet to be clarified, thus discussions of learnability, and even more so of acquisition, may be somewhat premature.

Language Change/Variation

Language *variation* refers to the different forms of a language at a particular point in time, such as the many dialects and idiolects of English spoken now. Language *change* refers to the different forms of a language over time; an example would be the difference between the English of Chaucer and the English of the 21st century. Under optimality theory, both variation and change are being explored in a number of ways. A very intriguing line of thought about variation and change is the view that these effects result from the interaction between phonetic changes and Faithfulness, which impact the constraint hierarchy (Kennedy, 2003). For example, in a constraint hierarchy configured for trochaic feet, in which word-final vowels are phonetically lost, some kind of restructuring is necessary. One option would be for stress to shift; another would be that the final syllable is stressed, despite not being in a trochaic foot. The cases Kennedy discussed retain stress on the final syllable: This requires significant restructuring of the constraint hierarchy, which in turn impacts the way that reduplication works.

Challenges

Opacity is the greatest empirical challenge to optimality theory. It simply does not follow from the basic architecture of the model and, to date, there is no broadly accepted solution to the problem. Opacity, a term from derivational phonology, refers to cases where (a) it appears that a rule has applied, but should not have, or (b) it appears that a rule has not applied but should have. Examples of both types are found in the Yokuts dialects. The vowel /i/ harmonizes to [u] following [u], but not following [o]:

- Type (a): Surface strings of [...o...u...] occur where [...o...i...] would be expected (the [o] corresponds to an input long u, which lowers to a mid-vowel). The constraints inducing harmony in Yokuts refer to vowel height so that in other contexts, the [o...i] sequence can occur. The harmony constraints outrank IDENT(round) so that harmony can take place. HARMONY, a Markedness constraint, is evaluated with respect to the surface form, and [o...u] does not conform to the height restrictions and so should be eliminated as it is in other contexts.
- Type (b): In one dialect, [...u...i...] strings also surface where [...u...u...] is expected (the [u] corresponds to an input short /o/, which raises before [i]). The challenge to optimality theory is again that the HARMONY constraint is a Markedness constraint and so is evaluated on the output alone, and so is unable to distinguish the [u...i] sequence that derives from an input /o/ and therefore should be exempt from HARMONY.

Efforts to resolve the opacity challenge all share the property of introducing an additional level of representation. One type of response is to identify a

particular candidate that the winner must match in some critical way: this approach is called 'sympathy', in that the winner is sympathetic to some aspect of a nonoptimal candidate (McCarthy, 1998). Another type of response introduces additional representation overtly, by allowing multiple constraint hierarchies, thus the output of one hierarchy serves as the input to the next hierarchy. These stratal systems are strongly reminiscent of the strata or levels of lexical phonology (see Bermúdez-Otero, 2005).

The universality of CON is a significant practical challenge to optimality theory. In the practice of optimality theory, it is not uncommon to find rather specific constraints proposed that do not have clear motivation as universals. Establishing the viability of the languages predicted by the factorial typology involving these overly specific constraints is perhaps the best means of establishing them as universals.

See also: Morphology: Optimality Theory; Phonological Change in Optimality Theory; Phonological Change: Lexical Phonology; Phonology: Overview; Syntax: Optimality Theory.

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Phonology: Overview

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Phonology – What Is It About?

Phonology is that part of language which comprises the systematic and functional properties of sound in language. The term 'phonology' is also used, with the ambiguity also found with other terms used for the description of languages, for the study of those systematic features of sound in language. In this sense, it refers to a subdiscipline of linguistics. It was the first such subdiscipline in which the view of language as an object with particular structural properties was developed successfully. Phonology seeks to discover those systematic properties in the domain of sound structure, and find the regularities and principles behind it both for individual languages and for language in general. More recently, phonology has become considerably diversified and has found a number of applications.

The emphasis on systematicity in the definition above derives from the observation that behind the infinitely varying properties of each token of speech there is an identifiable set of invariant, recurring, more abstract properties. The hypothesis that such a phonological system exists is largely due to Saussure (see Saussure, 1916) and to the phonologists of the early structuralist school, both in Europe (the Prague school and the British school) and in the United States (American structuralism); see the survey by Anderson (1985).

Phonology, from its beginnings, has stood in a close, but sometimes strained, relation to the other science of linguistic sounds, phonetics. Phonetics studies the concrete, physical features of sound in language, often called speech. As the function of phonology is to make linguistic items, which are represented by rather abstract symbols, pronounceable and understandable, it is intimately related to phonetics. But while phonetics is interested in the concrete, continuously varying features of articulation, sound transmission (acoustics), and auditory perception, the subject of phonology is thought to be a set of discrete, symbolic categories which belong to the cognitive, and not the physical, domain. This distinction can be interpreted either as a rather strict and principled one, or as one which is gradual and of less importance.

The Categories of Phonology

The Phoneme

The first invariant of the categories identified in phonology was the phoneme. The discovery of the phoneme, the smallest unit of sound which causes a form to differ in meaning from other forms, can justly be identified as the origin of phonology. While the groundwork for phonology was laid in the analysis of many ancient and modern languages, around the beginning of the 20th century the work by Ferdinand de Saussure (Saussure, 1916), Jan Baudouin de Courtenay (Baudouin de Courtenay, 1972), and Franz Boas (Boas, 1889) was crucial for the formulation of the phonemic analysis in a stricter sense. This was followed in the first half of the 20th century by several important formulations of phonological theory, notably by Edward Sapir (Sapir, 1921), Leonard Bloomfield (Bloomfield, 1933), Roman Jakobson (Jakobson, 1939) and Nikolay Trubetzkoy (Trubetzkoy, 1967). A unit of sound is a phoneme if it functions to distinguish lexical items from each other in terms of meaning, and if it cannot be broken up any further in a way that other lexical units emerge. The German (Standard German) word *mein* ([maɪːn] 'my'), for example, clearly is a different word from *nein* ([naɪːn] 'no'). At the same time, neither [m] nor [n] can be split up in such a way that other words of German appear. Together with similar comparisons relating [m] and [n] to other segments of German, the so-called minimal pair just presented constitutes evidence that /m/ and /n/ are phonemes of this language.

A phoneme therefore is a contrastive structural unit of language, and is related to, but not identical with, a concrete sound. Phonemes within a language form phonemic systems, by means of the contrasts between phonemes. The nasals /m, n, ŋ/, for example, form part of the phoneme system of German, and contrast systematically with an otherwise similar subsystem, that of the voiceless consonants /p, t, k/. Seen abstractly, a phoneme is nothing but the set of such contrasts; seen more concretely, a phoneme is a class of related sounds. Phonology also aims at the study of the properties of phonemic systems, and has established many patterns and principles which hold for such systems; see, in particular, Maddieson (1984). The conception of phonemes as objects in human cognition is largely due to Sapir (1933), who argued that speakers must have mental representations of sounds, and that these mental objects cannot be identical to the concrete realizations of such phonemes.

The Phonological Features

The phoneme turns out to be an important, but not the only, category needed for the phonological description of languages. Most importantly, phonemes can be shown to function in groups which share

identifiable properties. This observation, largely due to Trubetzkoy and Jakobson, led to the formulation of a theory of distinctive features. Such features describe the classes of phonemes by assigning the same feature to all members of a class. At the same time, features define sounds (phonemes or not) and express their composite nature. Thus, a sound [p] may be assigned the feature [labial], on the grounds that closure of the lips is a crucial ingredient of this sound. The description of this sound then includes the feature [labial], and the class of labial consonants (and perhaps vowels such as [u]) is defined as the set of sounds bearing this feature.

Finally, the features can also be seen as the set of atomic units from which all larger units of sound are constructed, in all languages. In this function, the set of phonological features is part of the cognitive equipment which allows human beings to use language. In phonological theory, since the work by Jakobson *et al.* (1952), the hypothesis has been proposed that there is indeed a small set of features from which all sound segments can be built up. This feature set thus constitutes something like the set of atoms from which all larger units derive. Several sets of features have been proposed since then, most influentially that in Chomsky and Halle (1968).

Phonological Processes

Sounds, whether phonemes or not, often relate to each other in systematic ways. A first type of relation is that between a phoneme and its (possibly several) realizations. This relation can be described by means of rules which specify precisely in which way a phoneme is modified under specific circumstances, such as influence from its right-hand or left-hand neighbors. For example, a vowel will often be nasalized if standing before a nasal consonant. This approach was most thoroughly proposed by Chomsky and Halle (1968) in a rule-based phonological theory. In this theory, processes are not only those which describe the relation between a phoneme and its realizations, but also those which relate phonemes of several connected word forms. In this view, a rule is also called upon to describe the relation between the sounds in, for example, *relate* with final /t/ and *relation* with final /ʃ/ in the same morpheme, but before the suffix *-ion*. In other theories, processes of this type (often riddled by exceptions in one direction or other) are placed in a separate component of grammar called morphophonology. Thirdly, phonological processes can also be observed if language is looked at diachronically. Thus, the changes leading from the Middle English vowel system including /iː/, as in *wife* or *mice*, to the Modern English vowel system with the diphthong /ʌɪ/ in the corresponding items can be described as the result of a set of phonological processes, in this case the so-called Great Vowel Shift.

Generative phonology in the version proposed by Chomsky and Halle (1968) and in other works was strongly process oriented in giving rules a central place in the model. Phonological rules are based on features in the sense introduced above and apply to underlying forms (abstract phonemes) to derive surface forms. More recent theories, in particular declarative phonology and optimality theory, diverge from this view. Processes are now modeled not by means of feature-changing rules, but as the surface result of static constraints which put different demands on sounds under different conditions.

Prosody and Its Categories

Phonology in many recent conceptions also is a theory of phonological grouping, that is, of units of a size larger than the phoneme. The size of these groupings ranges from the small subphonemic unit (such as the atomic features) to the most comprehensive one, often called the utterance. These units are usually assumed to be hierarchically related to each other. The most widely used of the prosodic units is the syllable. It usually consists of a vowel and some flanking consonants, which may or may not be present. The principles of syllable structure largely determine what sequences of sounds are permissible in a language. Furthermore, the syllable is an important domain for phonological processes. Syllables often come in two types, stressed and unstressed, as in the English word *Piccadilly* [ˌpɪkəˈdɪlɪ], which consists of two stressed and two unstressed syllables, resulting in an alternating sequence of stressed and unstressed syllables. Groupings consisting of a stressed syllable plus any unstressed syllables are identified as members of a further prosodic category, called the foot. (Other languages display other types of feet; see Hayes, 1995 for a typology of feet.)

The example just given also illustrates that stress (also called accent) is a phonological phenomenon. It can even be phonemic in the sense of being contrastive, as in English *ímport* (n.) with initial stress versus *impórt* (v.) with final stress. Such phenomena of stress can be observed in units of several sizes. The domain of word stress is the unit called the prosodic word or phonological word, and the domain of stress in larger units is the phonological or prosodic phrase. Thus, prosodic words and prosodic phrases are other units of phonology. This hierarchy extends upwards to the intonational phrase, the domain of intonational patterns. These units also serve as the domains of phonological restrictions or processes. The phonological word, for example, is the

domain for vowel harmony in many languages, as in Hungarian or Turkish.

A further prosodic phenomenon is that of tone. Tone is the lexically contrastive use of pitch movement, as in Standard Chinese (Mandarin Chinese), where one and the same syllable can be combined with several (four) such pitch levels and movements, with the result that most of the combinations between segmental syllables and tones are different lexical items. The phenomena of stress and tone and their analysis in phonology were to a large extent responsible for developments in phonological theory which led beyond the view that a phonological representation is nothing but a string of segments (with segments built up from elementary features). Tone and stress turn out to be inherently nonsegmental in the sense that they relate to units both larger and smaller than an individual sound segment. There may be more than one tone per segment, and there may be one tone relating to more than one segment, the tone sometimes spanning a domain as large as a whole word. These observations led to a new theory of representations in phonology, called autosegmental phonology.

Phonology in Its Relation to Other Parts of Language

The relation of phonology to phonetics has been discussed in the section 'Phonology – What Is It About?' above. As the phonology of a language is the systematic use of phonetically given material, the interface between phonology and phonetics is crucial in any phonological theory. A phonological system being part of the structural system of language, which includes at least morphology, syntax, and semantics, its relation to these components of language needs to be discussed as well. In most structuralist conceptions of language and grammar, several levels of linguistic analysis must be distinguished. While the phonological level of analysis contains at least a phonemic and an allophonic level, phonology is also closely related to morphology, simply because morphemes are signs relating a meaning with a phonological form. Furthermore, the concatenation of morphemes often causes the changes identified as morphophonological above. Finally, there are often prosodic requirements on both simplex and complex words, requiring a further close interaction between phonology and morphology. Phonology relates to syntax mostly through the formation of phonological phrases and intonational phrases. By determining (at least in part) how such prosodic units are formed, syntax indirectly influences the placement of phrasal stress and intonation contours. As for semantics, the main connection to phonology is again through intonation. Intonation is constrained by phonology (through the principles governing the assignment of tonal features within intonational phrases), syntax, and semantics. The result of such constraints deriving from syntax, semantics, and phonology is often called information structure, a particular packaging and ordering of information within a sentence.

See also: Autosegmental Phonology; Chinese (Mandarin): Phonology; Declarative Approaches to Phonology; Foot; Hungarian: Phonology; Intonation; Kimatuumbi: Phonology; Phonemic Analysis; Phonological Phrase; Phonological Words; Phonology: Optimality Theory; Phonology–Phonetics Interface; Prosodic Morphology; Structuralist Phonology: Prague School; Syllabic Constituents; Syllable: Phonology; Tone: Phonology.

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Phonology–Phonetics Interface

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Sound Inventories

Much of the early work on the phonology–phonetics interface advanced perceptual and articulatory explanations for recurring patterns in segment inventories (see Ohala, 1997 for a brief history of research on the phonology–phonetics interface). In their seminal work on vowels, Liljencrants and Lindblom (1972) explored the hypothesis that vowel inventories are shaped in response to a requirement that vowels be maximally distinct from each other in the perceptual domain. They found a relatively close fit between attested vowel inventories and a perceptual model of vowel quality.

Lindblom and Maddieson (1988) built on the earlier work on vowels by incorporating an articulatory component in their account of consonant inventory construction. They hypothesized that consonants are divided into three classes according to articulatory difficulty. Within each class and starting from the most simple articulations, languages adopt sounds that are maximally distinct from each other in the perceptual domain. After a minimal threshold of perceptual distinctness is reached within each level of articulatory difficulty, an increase in inventory size requires expansion into the subspace of immediately greater articulatory complexity. Perceptual fractionation of this subspace continues until it is perceptually crowded, thereby necessitating the incorporation of sounds belonging to the next tier of articulatory complexity.

Stevens's (1989) quantal theory also appealed to a combination of perceptual and articulatory factors, arguing that /a/, /i/, and /u/ are the most common vowels cross-linguistically because they occupy regions of articulatory and perceptual stability such that variation in their articulation have only small acoustic and perceptual consequences.

The program of research on phonetic explanations for phonological patterns extends to a variety of other phenomena (see Ohala, 1997 for an overview), such as consonant assimilation (Ohala, 1990), nasalization (Wright, 1986; Ohala and Ohala, 1993), voicing patterns in obstruents (Westbury and Keating, 1985; Ohala, 1997), and vowel harmony (Ohala, 1994).

Phonetics in Generative Phonology

The recent phonology literature has witnessed renewed interest in the phonology–phonetics interface and, in many cases, has challenged the traditional generative conception of the relationship between phonetics and phonology. The generative tradition has always assumed that phonetic factors ultimately constrain certain aspects of phonology. For example, it is noncontroversial that phonological features have a phonetic basis, grounded either in acoustic (Jakobson *et al.*,1952) or articulatory (Chomsky and Halle, 1968) properties or a combination of both (Stevens and Keyser, 1989). Furthermore, sonority scales are assumed to be projected from phonetic prominence (see Parker, 2002 on phonetic correlates of the sonority hierarchy). Nevertheless, the phonetic factors claimed to underlie certain phonological properties did not fall within the purview of study of generative phonologists, as phonetics was considered to fall outside of the core grammar module. It was not until the 1980s that phonologists began to examine the phonetic properties of individual languages in order to gain insight into their phonologies. Pioneering work by Pierrehumbert (1980) and Pierrehumbert and Beckman (1988) on intonation and by Keating (1988, 1990), Cohn (1993), and Huffman (1993) on segments explored the link between feature specification and phonetic properties, adopting the hypothesis that each feature has a phonetic target value or window of permissible values and that intervening elements that are phonologically unspecified with respect to a feature owe their phonetic realization to interpolation between specified elements. To take an example from Cohn's work, a vowel that is phonologically unspecified with respect to nasality and occurs between an oral and a nasal consonant is predicted to gradually increase in nasality throughout its duration from the oral target associated with the preceding consonant to the nasal target characterizing the following consonant. This contrasts with a [+nasal] vowel, which shows a steady state peak in nasality throughout most of its duration.

Crucially, the line of research on phonetic interpolation and phonological specification adopts the traditional generative modular conception of the grammar, in which the phonetics component is fed by the phonology. As in the phonology module, a series of language-specific phonetic implementation rules were postulated within the phonetics component to account for cross-linguistic variation in phonetic realization.

Phonetics in Optimality Theory

The 1990s saw an increased fusion of phonetic and phonological research exploring the hypothesis

that phonetic factors shape phonological systems. Building on some of the insights of the natural phonology program (Stampe, 1972) and earlier phonetic research, many phonologists began to explicitly model phonetic motivations in the formal theory. This integrated version of phonetics and phonology took a complementary position to that of traditional generative grammar by building phonetic explanations directly into the formalism. The advent of Optimality Theory (Prince and Smolensky, 1993), with its hierarchically ranked well-formedness conditions, provided a suitable phonological framework for developing a phonetically informed model of phonology, termed 'phonetically driven OT' (see Hayes *et al.*, 2004 for a cross-section of works within this framework). Constraints could be grounded in principles of phonetic naturalness previously postulated by phoneticians.

The literature in phonetically driven OT has become extensive in recent years and includes both perceptual and articulatory-based accounts of various phenomena. A key feature of this body of research is that it demonstrates the nonarbitrary nature of many phonological patterns, showing that these patterns are predictable from independently known facts about articulation and perception. I discuss some of this research now.

Archangeli and Pulleyblank (1994) introduce the notion of phonetic grounding in phonological co-occurrence restrictions, arguing that commonly observed interactions between the feature [ATR] and vowel height and backness features find substantive support in phonetic facts. For example, the fact that low vowels are cross-linguistically [-ATR] is attributed to the retracted position of the tongue root during the production of low vowels. Hayes (1999) explored the articulatory basis for obstruent voicing patterns, finding that a number of voicing asymmetries are natural from an aerodynamic standpoint: Phonological voicing is most likely for places of articulation, e.g., bilabial, and contexts, e.g., postnasal, that are phonetically best suited to sustaining the transglottal airflow necessary for voicing.

Much of the work in phonetically driven OT appeals to perceptual factors. Flemming (1995) invokes a perceptual account of a number of assimilatory phenomena. Building on the theory of acoustic features advanced in Jakobson *et al.* (1952), Flemming proposes a feature set based on vowel formants to account for the assimilation data. For example, the triggering of rounding in the high front vowel /i/ preceding retroflexes in Wembawemba, an extinct Pama Nyungan language of Victoria, Australia (Hercus, 1986), does not find a straightforward explanation in acoustic terms but can be interpreted as assimilation of the third formant, which is lowered by both retroflexion and lip rounding.

Jun (1996) and Steriade (2001) examine the typology of consonant assimilation, finding asymmetries in the direction of assimilation dependent on both manner and place of articulation. Jun finds a close correspondence between assimilation patterns and the results of earlier experiments designed to assess the relative salience of different perceptual cues to consonants. Perceptual cues to consonants may be classified as internal to the consonant (e.g., closure duration, voicing, energy during the closure) or external (e.g., formant transitions for adjacent vowels, fundamental frequency values in adjacent sounds, voice-onset time, burst amplitude). For example, in consonant clusters, the consonant on the left typically assimilates to the consonant on the right rather than vice versa, owing to the greater perceptual salience of formant transitions coming out of a consonant into a following vowel relative to transitions from vowel into a following consonant (see also Ohala, 1990). Furthemore, sounds with more robust internal cues (e.g., fricatives) are less likely to assimilate than those with weaker cues (e.g., nasals and stops).

Steriade (1999) explores the perceptual basis for laryngeal neutralization, finding that the likelihood of neutralization increases as the robustness of perceptual cues to laryngeal features decreases. She showed that her cue-based approach to neutralization offers a better fit to the observed patterns than a syllable-based account in which neutralization is claimed to occur in coda position (Lombardi, 1995). For example, voicing neutralization in some languages only affects a subset of codas, those occurring in contexts that are particularly ill-suited to recovering external consonant cues, such as word-finally and before an obstruent, as in Lithuanian, or only before another consonant, as in Hungarian. Conversely, neutralization can also affect syllable onsets if the neutralized consonant occurs before an obstruent, as in Russian.

Interlanguage Phonetic Variation and Phonology

Another area of research dealing with the phonology-phonetics interface searches for correlations between language-specific phonetic properties and cross-linguistic parameterization in phonological patterns. The phenomenon of weight-sensitive stress has been a fruitful area of language-specific links between phonetic and phonological properties. The primary source of cross-linguistic variation in weight is the treatment of closed syllables. In some stress systems, such as the one found in Latin, CVC is treated as

heavy, whereas in other languages, such as Khalkha (Halh) Mongolian, CVC is light. Broselow *et al.* (1997) examined the phonetic duration of CVC syllables in languages with different weight criteria, including one (Hindi) with the CVC heavy criterion and one (Malayalam) that treats as light, in order to determine whether the duration of CVC differs according to its weight. They found that vowels are substantially shortened in CVC syllables relative to CV syllables in Malayalam but not in Hindi. Broselow *et al.* (1997) attribute the duration differences between Hindi CVC and Malayalam CVC to differences in moraic structure between the two languages: In Malayalam, a coda consonant shares a mora with a preceding nucleus, whereas in Hindi, a coda carries its own mora.

Gordon (2002) also found a close link between cross-linguistic variation in weight of CVC and language-specific phonetic properties, although his data suggests a closer correlation between weight and a measure of perceptual energy factoring in both duration and intensity than a measure of duration alone. Gordon's work also explores a slightly different relationship between phonetics and phonology than that assumed in Broselow's work. Extending the hypothesis advanced by other researchers working within the phonetically driven OT framework, he suggests that language-specific phonetic patterns are the cause of phonological variation in weight. In order to demonstrate this directionality of the phonology–phonetics relationship, he shows that interlanguage differences in phonetics are rooted in differences in another phonological property more basic than weight, syllable structure. A cross-linguistic survey of coda inventories indicates that languages with heavy CVC overwhelmingly tend to have more high-energy codas such as sonorants and voiced consonants than languages with light CVC. Gordon claims that differences in the net energy profile of CVC assessed over all CVC syllables lead to variation between languages in the weight of CVC.

Phonetics in Phonology: Synchrony or Diachrony

Despite the growing recognition among phonologists that phonetics plays an important role in phonological systems, there is disagreement about whether phonetic grounding should be modeled as a feature of synchronic phonologies or whether it is merely a historical force that shapes phonological systems over time without entering into the linguistic awareness of current speakers. Evidence for this latter position potentially comes from languages displaying phonetically unnatural properties that suggest limits to phonetic determinism at the synchronic level. For example, voicing alternations in Tswana and certain other Bantu (Bantoid) languages suggest a productive process of postnasal devoicing (Hyman, 2001) that runs counter to the cross-linguistically dominant and phonetically natural pattern of postnasal voicing (Hayes, 1999). Hyman suggests that a phonetically unmotivated constraint banning voiced obstruents after nasals accounts for this alternation, which results from a confluence of sound changes, none of which by themselves are particularly unnatural phonetically. The incorporation of this 'unnatural' constraint suggests that a synchronic model of phonology only allowing phonetically natural constraints is overly restrictive in its predictive power. On the other hand, the fact that children appear to construct systematic and phonetically informed phonologies during the language acquisition process suggests that speakers do make active use of phonetic constraints synchronically (see Hayes and Steriade, 2004 for discussion of the diachronic vs. synchronic role of phonetics in language).

Summary

There is strong evidence that phonetic factors shape many aspects of phonological systems, ranging from phoneme inventories to phonotactic constraints to prosodic phenomena such as syllable weight. These phonetic motivations have been incorporated into the formal phonological framework of phonetically driven Optimality Theory by many researchers, while other linguists have assumed that the role of phonetics in phonology is primarily diachronic rather than synchronic.

See also: Assimilation; Distinctive Features; Generative Phonology; Natural Phonology; Phonetics, Articulatory; Phonology: Overview; Quantity; Speech Errors as Evidence in Phonology; Speech Perception; Speech Production; Syllable: Typology.

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Photography: Semiotics

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Semiotic Characters of Photographic Signs

It is commonly acknowledged that their technological origin confers to photographs particular semiotic features (cf. definitions by Gubern, 1999: 56; Schaeffer, 1987: 16; Vanlier, 1983: 13–15). Unlike other kinds of visual signs, photographs are more the product of the mechanical and chemical process of impression on photosensitive material of light rays than the result of a human act of creation.

Depending on the importance accorded to the human intervention in their production, both the relationship of photographs to their referent (degree of conventionality) and the relationship of the photographic message to the code (degree of codification) are differently understood.

Degree of Conventionality

A propos of the degree of conventionality of photography, three main theoretical positions have emerged: (a) the iconic, (b) the indexical, and (c) the conventionalist position (Dubois, 1983: 26–27).

(a) The iconic position characterized the perception of photography by its first practitioners (Schaeffer, 1987: 114), for whom, in opposition to painting, the essence of photography consisted in mimesis of the real (Dubois, 1983: 26, 33). Recent approaches to pictorial semiotics restated the mainly iconic nature of photography (Gubern, 1999: 57; Sonesson, 1999). Above all, photographs are images faithfully representing objects, persons, places, or events through an objective analogy to reality.

(b) The indexical position (cf. particularly Peirce 2.281; Dubois; Schaeffer; and Vanlier) focused on the process of production of photographs: there is a physical contiguity between light rays and the photographic film, producing a mechanical imprint. Different nuances appeared among the various proposers. Schaeffer (1987: 59 ss.) defined photographs as both indexical icons and iconic indexes, thus underlining that their semiotic nature resides in the compresence of an analogic and an indexical function; however, it is the latter that constitutes the very nature, the *arché* of photography (1987: 27). According to Vanlier (1983), photographs are for sure indices (that is, unintentional imprints), but they are not always indexes (that is, intentional signs).

Between position (a) and position (b) is the work by Barthes, who defined photography as 'analogon' of reality (1961), thus stressing the iconic aspect. In Barthes (1964, 1980) reference and not analogy became the most distinctive feature of photographs, as well as their power of evidence (authentication of the existence and presence of the referent in front of the camera). The 'having-been-there' constitutes the noema of photography.

(c) Exponents of the conventionalist position – among them, besides Floch, Lindekens, and Goodman, can be counted Eco (1984), Metz (1970), and Groupe μ (1979), who held such a position in their studies on the whole category of visual signs – pointed out that the different modes and techniques that are necessarily involved in the production of photographs generate a non-transparency in respect to the real (Goodman, 1968: 15).

Both Floch (1986) and Lindekens (1971) contrasted the concept of iconicity with the concept of iconization, which defines the process of building analogy to the real accomplished by the conventional aspects present in photographs. As such, iconization introduces a gap between reality and the object represented in the photograph. The photographic analogy is only relative (Lindekens, 1971: 94).

The advent and socialization of digital photography raises again the same questions. In fact, in digital photography the decisive moment is not that of release but that of image manipulation (Berger, 1989: 76; Sonesson, 1999: 31–33); therefore, conventionality seems to become predominant.

Degree of Codification

Depending on the degree of conventionality conferred on photography, a different degree of codification is attributed to the photographic message. Barthes and Vanlier emphasized the presence of aspects of non-codification. Other authors – Floch (1986), who proposed some analysis of photographs from the point of view of structural semiotics; Lindekens (1971) and Espe (1983), who both adopted an empirical approach, and on a more general level, Metz (1970) – underlined the codified character of photography.

Barthes (1961) identified in photographs a denotative and a connotative level of signification. At the denotative level, photographs being a mechanical analogon of reality, no code mediates the relationship of the image to its referent. The connotative

level corresponds to the coding of the photographic analogon, generated by different connotation procedures (described in Barthes, 1961, 1964). Paradoxically, in photographs, on the basis of a message without a code, a connoted (or coded) message develops. A very similar position was held by Vanlier (1983).

Lindekens's study of the photographic code stressed the need to distinguish between the intended meaning (in French, *signifié*) coming from the code (the iconic sense) and the intended meaning coming from the analogon (the intended meaning of identification) (1971: 234). In front of a photograph, the most common attitude is looking at the real, thus focusing on the signified of identification (Lindekens, 1971: 231). However, a perceptual iconic substance exists in photographs, in which it is possible to identify minimal distinctive traits (the 'iconic morphemes,' Lindekens, 1971: 194), the combination of which constitutes the photographic code. The iconic sense generated by the code (Lindekens, 1971: 141–142) affects the informative meaning deriving from the photographic analogon.

Photography as Practice

Pragmatic approaches underlined the connection existing between the semiotic character of photography and its communicative use and realization. Photographs are considered texts (Eugeni, 1999: 198), the meaning of which strictly depends on their materiality and on the producer's choices (Kress and van Leeuwen, 1998), but also on their relationship to the context of use and on the dynamics of their reception.

The relationship to culture, ideology, and institutional context has been particularly explored, mainly starting from a Marxist perspective (Burgin, 1982; Sekulla, 1982; Tagg, 1982, 1988). Other approaches (Dubois, 1983; Floch, 1986; Schaeffer, 1987) focused more directly on the receivers and their process of interpretation.

Schaeffer's (1987) description of the 'pragmatic flexibility' of photographs is the most systematic one. In different communicative contexts the analogical or indexical function of photographs prevails, thus bringing the images closer to the nature of index or closer to the nature of icon (Schaeffer, 1987: 101–102). Therefore, the semiotic nature of photography strictly depends on the 'communicative norms' ruling different communicative contexts (Schaeffer, 1987: 10).

Following this perspective, the problem of the semiotic nature of photographs can be reconsidered. For different kinds of use, it is possible to identify an aspect that plays a major role in the photographic expression.

Without entering into the details of the classifications proposed by different theoreticians (Berger, 1989: 62–64; Schaeffer, 1987: 68–74; Sonesson, 1999: 14), five main domains of use of photographs can be distinguished that imply different kinds of realization: scientific domains (medicine, criminology, anthropology, restoration, archaeology, mineralogy, paleontology, astronomy, meteorology, geography, and architecture); domains of advertising, economy, and marketing; information domains; use in private life; and art photography.

Scientific Domains

The iconic and the indexical aspects play the central role in realization in the scientific domains. On the one hand, the aim of such a use of photography is to document how a given object appears in reality (e.g., architecture or archaeology, but also topophotography, allowing the visualization of our daily existential space from unusual perspectives; Zannier, 1982: 78). On the other hand, in these fields photographs aim at letting the receiver see something that human eyes cannot see without technical means (e.g., microphotography, astrophotography, and microscopic analysis in medicine).

Advertising, Economy, and Marketing

The realization of advertising posters, commercial products catalogues, fashion magazines, and some kinds of pornographic photography (photographs used in racy tabloids) is mainly iconic and (as to the interaction of images with verbal texts) symbolic. Photographs aim at showing the object itself or some of its interesting and attractive features. The indexical aspect plays no role. It is taken for granted at the point that the receiver identifies the presentation of the product and the product itself (Schaeffer, 1987: 149).

Information Domains

In these fields (comprising war, propaganda, sociological, documentary, and scandalmongering photography), photographs are consumed in illustrated publications, newspapers, magazines, and television news. The widely studied practice of photojournalism (cf. Barthes, 1961; Lambert, 1986; Schaeffer, 1987) constitutes a major example. In it, the photographic realization involves complex dynamics due to the relationship of the image with other codes (especially the verbal one) and to the problem of objectivity. The indexical and the symbolic aspects play the most important role. In fact, here photographs mainly aim at testifying to the real existence of the photographic referent. From this status of visual testimony (Schaeffer, 1987: 80) derives the problem of their

objectivity. The knowledge the receiver has of the presence in photography of an indexical aspect can produce misunderstandings as to the truth of the image (Schaeffer, 1987: 139–147; Kress and van Leeuwen, 1998). To such misunderstandings can contribute the interaction of the image with the verbal code (inducing a symbolic realization of the image): in relationship to different texts, the same photograph can be used as testimony of different (even opposed) facts or situations (Freund, 1974; Schaeffer, 1987: 81).

Photography in Private Life

The use of photography in private life arises from the common practice of creating a souvenir of moments and important steps in one's own life. Its development depended on the wide spread of literacy in the production of photographs, enabled by the efforts the photographic industry made in offering easy-to-use technology (Zannier, 1982: 207–236). The realization of this kind of photograph has a mainly iconic–indexical value. What counts are the iconic representations of persons, places, and events and the relationship with the represented object, place, or person (stressed by Dubois, 1983: 81–83; Lindekens, 1971: 232). Wedding photographs constitute an interesting case. Although they aim at faithfully (iconically) reproducing the beauty of the wedding day, they are often retouched by use of various devices to assure iconicity and the faithfulness that a natural photograph could distort (for such a procedure, cf. Lindekens, 1971: 229; Barthes, 1961).

Art Photography

The realization of art photography is intrinsically symbolic (cf. Schaeffer, 1987: 150), and in it the theme of the code is prominent. In fact, as happens in all forms of art, the elements of the form and the style (produced through photographic modes, techniques, and devices) play a major role in shaping the meaning.

See also: Barthes, Roland: Theory of the Sign; Communication: Semiotic Approaches; Context, Communicative; Eco, Umberto: Theory of the Sign; Iconicity: Theory; Indexicality: Theory; Meaning, Sense, and Reference; Media: Pragmatics; Media: Semiotics; Multimodality and the Language of Politics; Politics, Ideology and Discourse; Reference: Semiotic Theory; Truth Conditional Semantics and Meaning; Visual Semiotics.

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Phrasal Stress

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Preliminaries

The Representation of Stress

Word stress (Hayes, 1995) is the strongest stress in a prosodic word. Phrasal stress is stress assigned beyond word stress in syntactic collocations of words, such as phrases, clauses, or sentences. Some examples that are discussed in this article are shown in (1) with word stress indicated by boldface.

(1a) [Who did you meet?] The **bro**ther of **Ma**ry
(1b) [Guess what.] The **ma**yor of Chi**ca**go **won** their sup**port**.
(1c) [Who came to the party?] The **bro**ther of **Ma**ry **came** to the **par**ty.
(1d) German: [What did John do?]
Er hat Lin**guis**tik unter**rich**tet — Er hat in **Gha**na unter**rich**tet
he has linguistics taught — he has in Ghana taught
'He has taught linguistics.' — 'He has taught in Ghana.'

In examples such as these, it is felt that the (singly or doubly) underlined syllables are stressed more than the other boldface syllables in the same utterance. Among the underlined syllables, it is felt that the strongest stress of the utterances is on the element that is doubly underlined. This (singly or doubly underlined) addition to (boldface) word stress is phrasal stress (henceforth also p-stress).

The examples show an important property of the assignment of p-stress: In the words of Liberman and Prince (1977), stress is normally preserved under embedding. Syllables that show p-stress in the examples in (1) are always syllables that are independently determined to receive word stress by the rules assigning word stress in English or German. P-stress is therefore assigned in the same representation as word stress, extending the representation upward, as shown in Figure 1. Here an element with stronger stress than another one is dominated by a relatively higher grid-column.

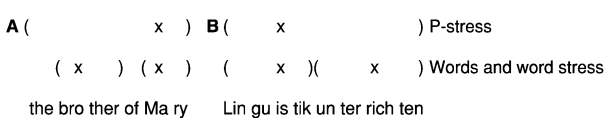

Figure 1 P-stress is assigned in the same representation as word stress, extending the representation upward.

The dual representation in Figure 1 in terms of constituents and grid-marks marking prominence has grown out of the dual theory of Liberman and Prince (1977), which employed metrical trees and grid-columns. Later arguments (e.g., Selkirk, 1980; Halle and Vergnaud, 1987) have shown that stress (as represented by the grid-columns) should be seen as tightly tied to the constituents so that a one-to-one relation between a constituent and the element with the strongest stress in it is assumed (see, e.g., the Faithfulness Condition in Halle and Vergnaud, 1987; Hayes 1995). A standard representation for this dual nature of the theory is the bracketed grid (Halle and Vergnaud, 1987). I here use the bracketed grid representation of Hayes (1995), in which the grid-mark that marks the strongest element (head) of a constituent is drawn on the same line. (Minimally different dual representations are found in, e.g., Halle and Vergnaud, 1987; Nespor and Vogel, 1986, 1989; Cinque, 1993.) The constituents are called 'metrical constituents' in accounts that make claims only about stress (Halle and Vergnaud, 1987; Cinque, 1993; Zubizarreta, 1998); in these accounts, there are in principle an arbitrary number of levels of such constituents, and they are typically thought to be directly identified with syntactic constituents.

However, the constituents are instead identified with prosodic constituents in some of the literature on phrasal phonology (Nespor and Vogel, 1986, 1989). In this literature, there are a small number of such levels, each with phonological consequences in individual languages beyond their relevance in stress assignment. The phenomena investigated in these terms have led to the conclusion that prosodic constituents at the level of the prosodic word and above (phonological phrase and intonation phrase) are systematically related to syntactic constituents but not identical to them (see also Selkirk, 1986, 1995a).

Phrasal Stress and Intonation

Stress and the prosodic/metrical constituents provide the underpinning for the assignment of intonation contours in English. In the classical and still important theory of English intonation by Pierrehumbert (1980) and Beckman and Pierrehumbert (1986), H and L tones that define the sentence melody are assigned in one of two forms:

1. As pitch accents (H*, L*, L*+H, L+H*, H*+L, H+L*). These are associated with stressed

syllables; the star marks the tone that falls on the stressed syllable.

2. As edge tones. These anchor with the edge of intermediate phrases (H-, L-) or intonation phrases (H%, L%).

These accounts of empirically observable intonation contours converge with the dual representation previously introduced: Intermediate phrase and intonation phrase are not only anchors for edge tones, but are also prosodic domains in which an element of strongest stress is defined. This element carries an obligatory pitch accent. The picture is extended to lower levels, where each accent is taken to be assigned to the strongest element of an accentual phrase. English does not have edge tones of the accentual phrase in this analysis; however, other languages such as Japanese arguably do (Beckman and Pierrehumbert, 1986; Pierrehumbert and Beckman, 1988).

How Is Phrasal Stress Assigned?

The accounts of the assignment of p-stress agree insofar they acknowledge that focus as well as the syntactic structure have a role to play in this assignment.

Phrasal Stress and Focus

Let us first consider focus on single-word constituents. Core cases of focus involve stress on the asked-for constituent in an answer sentence (*Who likes Mary?* **Bill** *likes Mary*; vs. *Who does Mary like? Mary likes* **Bill**), as well as stress by contrast with another constituent (*John likes Mary. No,* **Bill** *likes Mary*; vs. *Mary likes John. No, Mary likes* **Bill**.) As the examples show, the context in which an utterance is used may direct the main stress of the sentence to different positions. Since Jackendoff (1972), the influence of focus is modeled in the theory of grammar with the help of an abstract feature F that is assigned to a syntactic constituent. In the case of question–answer pairs, F is assigned to the asked-for constituent, thus *Who likes Mary?* [*Bill*]$_F$ *likes Mary.* In the case of explicit contrast, F is assigned to the contrasted constituent, thus *John likes Mary; no,* [*Bill*]$_F$ *likes Mary.* The focus F then has a semantic/pragmatic interpretation that relates the assignment of F to the context in which the sentence is used. At the same time, consequences of the presence of F for stress assignment are defined. Following Jackendoff (1972), the strongest stress in the sentence has to be within the constituent marked F. Thus, in *Who likes Mary?* [*Bill*]$_F$ *likes Mary*, the answer is correctly predicted to be stressed on the focused subject: [**Bill**]$_F$ *likes Mary.*

The Nuclear Stress Rule of Chomsky and Halle

Focus may be assigned to a larger constituent such as the subject of the sentence in (2a). The limiting case of this is what is sometimes called an all-new sentence and is here called a sentence with no narrow focus. An example is shown in (2b). (For concreteness, F is here assigned at the sentence level, but it depends on the theory of focus whether these sentences carry no focus or one all-embracing focus.) In these cases, F requires that the strongest stress is within F, but other rules or principles must come into play to determine where inside F (or inside the clause in (2b)) the strongest stress is assigned.

(2a)	[Who came to be party?]	[the **br**other of **Ma**ry]$_F$ **came** to the **par**ty
(2b)	[What happened?/ Guess what:]	[I **met** the **br**other of **Ma**ry]$_F$

An early proposal for English was the Nuclear Stress Rule (NSR) of Chomsky and Halle (1968). The NSR assigns stress on the right. (Its original formulation assigns stress cyclically. I return to the cyclic application later.) In (2a), then, we can say that the strongest stress must be within F, and that, within F, the NSR assigns stress in rightmost position, thus on the rightmost word *Mary.* Similarly in (2b), where F does not limit the possibilities of stress assignment in the sentence; the NSR here assigns rightmost stress, again on the word *Mary.* The two rules of stress assignment within F, and in rightmost position, make correct predictions about the location of the strongest p-stress in an English sentence for a considerable variety of cases.

Problems with the NSR

Head-Final Syntactic Structures The NSR does not generalize to languages with head-final structures in the syntax. Although it correctly predicts strongest stress on the object that follows the verb in English (3a), it cannot predict strongest stress on an (unscrambled) object that precedes the verb in Dutch and German (3b).

(3a)	[What did John do?]	He was [**tea**ching ling**uis**tics]$_F$
(3b)	[What did John do?]	Er hat [Ling**uis**tik unter**rich**tet]$_F$ he has linguistics taught

However, Dutch and German do not generally assign p-stress leftmost by a mirror-image rule of the NSR. In the structures with adjuncts in (4), the rightmost element is the strongest in both English and German, although this is the adjunct in English and the

verb in German. (See Krifka, 1984; Jacobs, 1993; on the distinction between arguments and adjuncts in German; single underlining in (4) is discussed below.)

(4a)	[What did John do?]	He was [teaching in Ghana]$_F$
(4b)	[What did John do?]	Er hat [in Ghana unterrichtet]$_F$ he has in Ghana taught

More than One Phrasal Stress in the Sentence Sentences with no narrow focus, such as [*the **ma**yor of Chicago*] [***won** their support*] show more than one p-stress, as indicated. For a case like this, a cyclic application of the NSR correctly assigns p-stress (Selkirk, 1984): In the subject [*the **ma**yor of Chicago*], the NSR assigns rightmost stress; likewise, in the constituent [***won** their support*]. When the two parts are put together, the NSR applies on the sentence level and correctly strengthens the rightmost p-stress: [*the **ma**yor of Chicago*] [***won** their support*].

Gussenhoven (1983b) observed that the NSR does not always correctly assign p-stress that is not the strongest stress of the sentence in English. In (4a), in which the verb precedes an adjunct, the verb also receives p-stress. However, in (3a), in which the verb precedes an argument, the verb does not receive p-stress. The contrast is subtle, but Gussenhoven (1983b) conducted an experiment that showed that the contrast is real.

The Sentence Accent Assignment Rule of Gussenhoven

Gussenhoven (1983a, 1992) suggested the Sentence Accent Assignment Rule (SAAR) as a solution to the problems just reviewed. The SAAR was presented as a rule assigning accent directly. For the purpose of the discussion here, the perspective of Pierrehumbert (1980), Beckman and Pierrehumbert (1986), Hayes and Lahiri (1991), and Hayes (1995) is adopted by which (phrasal) stress is assigned first and then serves as the anchor for pitch accents. The SAAR is accordingly decomposed into two steps here: (1) assignment of p-stress relative to the syntax, and (2) assignment of a pitch accent to each element carrying p-stress. Here step 1 is of primary interest.

The core of the SAAR is this: *Within a focus, every predicate, argument, and modifier must be accented* (here: receive p-stress), *with the exception of a predicate that stands next to an accented argument*. Thus, in (4), each adjunct (*in Ghana*) receives p-stress, and the verbs (predicate) also receive p-stress. In (3), the arguments (*linguistics*/*Linguistik*) receive p-stress, but in both languages the verbal heads next to the stressed arguments do not receive p-stress (*teaching*/*unterrichtet*). (Note that, in reducing the SAAR to its core, I am leaving out a part of the SAAR that, in my assessment of the empirical situation, concerns the interaction of stress assignment and movement; see Bresnan, 1971; Gussenhoven, 1992.)

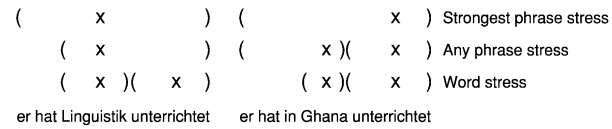

Figure 2 The rightmost p-stress in the intonation phrase is strengthened to the strongest stress.

The Strongest Phrasal Stress

The SAAR not only assigns p-stress correctly in a wide range of cases, it also provides the correct input for defining the position of the strongest stress (as made formally explicit in similar terms by Uhmann, 1991, for German; by Hayes and Lahiri, 1991, for Bengali; and by Selkirk, 1995b, for English): The rightmost p-stress in the intonation phrase is strengthened to the strongest stress. For the examples in (3b) and (4b), this is shown in Figure 2; it works similarly in *he was **teaching** in **Ghana*** and in [*the **ma**yor of Chicago*] [***won** their support*]. This suggestion is thus similar to the NSR, but it applies in the prosodic domain of the intonation phrase rather than in a syntactic domain.

A syntactically defined alternative is the C-NSR of Zubizarreta (1998). The accented elements stand in a syntactic relation of asymmetric c-command relative to one another. For example, the subject of a clause asymmetrically c-commands the object. Zubizarreta assigned stronger stress to the element lower in the chain of asymmetric c-command, thus, to the object as opposed to the subject. This suggestion makes stronger typological predictions, excluding languages in which stress is assigned leftmost in the intonation phrase. On the other hand, Szendröi (2001) argued that Hungarian is a language in which the leftmost stress in the intonation phrase is strengthened.

The Sentence Accent Assignment Rule and Depth of Embedding

Cinque (1993) took the implementation of the NSR in Halle and Vergnaud (1987) as a starting point and sought to develop a revised cyclic theory that would account for main stress on the preverbal object in Dutch and German in examples such as *Lin**guis**tik unter**rich**ten*. Cinque's idea was that the greater amount of syntactic embedding of the complement ([$_{DP}$ [$_{NP}$ [$_N$ *Linguistik*]]] vs. [$_V$ *unterrichten*]) would give rise to more cycles and thus, he postulated, to

Der **Pe**ter hat

IO [der [**Schwes**ter [des [**Freun**des [von [Ma**ria**]]]]]]

DO V [[eine [**Ro**se]] ge**schenkt**]

'Peter has given [a rose] to [the sister of the boy-friend of Maria]'

Figure 3 Making the first (indirect) object (IO) arbitrarily heavy does not prevent assignment of strongest stress on the second (direct) object (DO).

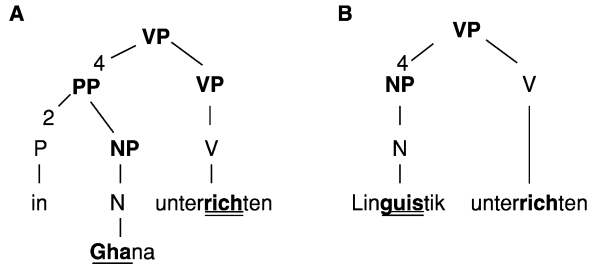

Figure 4 The application of Stress-XP to two core cases of the SAAR: (A) standard syntactic representation of a syntactic adjunct (B) standard syntactic representation of an argument next to its selecting head.

higher stress than on the following head. Cinque's theory does not seek to account for secondary stress and thus misses the generalizations captured by the two-level analysis employing the SAAR that we have seen previously. It also runs into empirical problems in cases in which we can rigorously test the claim that greater depth of embedding leads to greater stress. Thus, in German examples such as that shown in Figure 3, we can make the first (indirect) object arbitrarily heavy and the strongest stress will always be on the second (direct) object. Cinque's theory wrongly predicts that there will be a point at which the indirect object is more deeply embedded than the following constituent and then attracts main stress.

This case exemplifies a more general problem for Cinque's account: Among two XPs not contained in one another (such as subject and VP-adjunct, subject and object, VP-adjunct and object, object and object), the depth of embedding never determines which stress is the strongest. They each receive stress, but the strongest one is the rightmost p-stress, as predicted by the accounts in terms of the SAAR plus strengthening of the final one. Thus, depth of embedding does not generalize from complement-head relations to other cases as a predictor of main stress. (Cinque noticed some of the problems arising from this and proposed an addition to the theory that removes the prediction on the nonrecursive side of a syntactic head. This provision does not help in Figure 3 because the left side must be the recursive side of the German verb; otherwise, the normal object-verb configuration cannot be derived. But then a further object, as in Figure 3 is also on the recursive side of the German verb.)

The Sentence Accent Assignment Rule and Syntactic XPs

The notion XP plays an important role in a central line of research in phrasal phonology. Chen (1987) argued that in Xiamen Chinese (Min Nan Chinese) the right edge of a syntactic XP coincides with a tone group boundary, with some systematic exceptions. Building on a variety of languages, Selkirk convincingly generalized that account and argued that in some languages the right edge of XP is aligned with phonological phrase edges (for Xiamen Chinese, Chi Mwi:ni (Swahili), Selkirk, 1986; for Tohono O'odham (O'odham), Hale and Selkirk, 1987) and that in other languages the left edge of XP is aligned with phonological phrase edges (for Japanese, Selkirk and Tateishi, 1991; for Shanghai Chinese (Wu Chinese), Selkirk and Shen, 1990). The two constraints, cast in terms of Optimality Theory in Selkirk (1995a), are Align-XP,R and Align-XP,L. Edge alignment was extended to Maori by de Lacy (2003), who argued that Align-XP,L and Align-XP,R are simultaneously at play in this language, and to the Bantu languages Chichewa (Nyanja) and Kimatumbi (Matumbi) by Truckenbrodt (1995, 1999), who argued that Align-XP,R interacts with a constraint Wrap-XP that punishes dividing XPs into more than one phonological phrase.

The notion XP, which seems to independently play a central role in the syntax–phonology interface, also provides a generalization over predicates, arguments, and modifiers, with the exception of predicates next to an accented argument, in the SAAR. Thus, a more principled formulation of the SAAR that is defended in the following is: *Each XP is assigned a beat of phrasal stress*. This is the content of the constraint Stress-XP, proposed in Truckenbrodt (1995) to account for patterns of phonological phrasing in languages other than English, Dutch, and German. (It was not related to the SAAR there.) P-stress was there construed as stress on the level of the phonological phrase (Nespor and Vogel, 1986, 1989).

For the purpose at hand, the application of Stress-XP to two core cases of the SAAR is shown in Figure 4. Figure 4A is a standard syntactic representation of a syntactic adjunct: The adjunct is a phrase, and the element it adjoins to (here VP) is likewise a phrase. In this configuration, Stress-XP demands p-stress in the adjunct XP as well as p-stress in the element next to it, which is itself a phrase. (It is dominated by one of the VP nodes; this VP node, by Stress-XP, requires p-stress. See Truckenbrodt, 1999,

for more detailed discussion of adjunction structures in the syntax–phonology mapping; the matter is formally more complex, but, for the case at hand, the more detailed suggestions there have the same consequences as the simplified discussion here.) **Figure 4B** is a standard syntactic representation of an argument next to its selecting head. The argument is itself a maximal projection XP and a sister to a head, X. Here Stress-XP demands stress in the argument XP, but it does not demand stress inside of its sister, which is only a head X (here: V). Further, as long as the argument is stressed, Stress-XP is also satisfied for the VP in **Figure 4B**, which contains stress in the position of the stressed argument.

Thus, the special status of predicates next to an accented argument in the SAAR finds a simple explanation: Whereas the other categories listed in the SAAR (in particular arguments and adjuncts) are XPs, predicates next to an accented argument are heads (X) that are not affected by Stress-XP. When the predicate does not have an argument, it stands alone in its XP like the lower VP in **Figure 4A** and, thus, correctly requires stress by Stress-XP. When the argument of a verb is not accented (as in *to* [$_{VP}$ *read something*], in German [$_{VP}$ *etwas lesen*]), Stress-XP also correctly requires p-stress in the VP. In this case, the object rejects stress, so the p-stress within VP falls on the verb.

I offer a new application of a proposal of my own in this review of the literature because I believe that it is a step forward relative to the other proposals. In other accounts of p-stress, including, in particular, Gussenhoven's SAAR, Zubizarreta (1998), Büring (2001), and Selkirk (1995b), the special status of the head-argument relation is written into the rules or constraints that relate syntactic and prosodic structure. Stress-XP, on the other hand, requires no statement about the head-argument relation or about any other syntactic relations. Rather, the special assignment of stress in the head-argument configuration is derived directly from the special syntax of the head-argument configuration. This is the only case in which an XP (such as VP) contains another XP (such as the argument) and a non-XP (such as the verb). If each XP must contain p-stress, it follows that the argument XP must contain p-stress but that the head (non-XP) need not.

Stress-XP shares with Cinque's proposal the search for an account that does not mention heads or arguments in assigning p-stress. It also picks up Cinque's intuition that the presence of more structure on the side of the argument attracts stress. However, the factor that generalizes to other cases is the presence of an XP on the side of the argument, not the depth of embedding in terms of numbers of nodes. Example (5) shows how the examples discussed up to this point and some related ones are derived using Stress-XP. Brackets indicate XPs (omitting the entire sentence and omitting pronouns). Boldface brackets are XPs that contain only a single word. In these cases, that single word must contain stress by Stress-XP. With this, the higher XPs, which necessarily contain such a single-word XP, also satisfy Stress-XP and contain p-stress. (Recall that, when the lowest such XP rejects stress, as in *to* [*eat* [*something*]], stress then defaults to the head of the next higher XP, here VP. This shows that the application of Stress-XP to branching XP nodes in (5) is not vacuous.)

(5a) [the [**bro**ther [of [**Ma**ry]]]] [**Ma**ry]'s [**bro**ther]

(5b) He was [**tea**ching [lin**guis**tics]] He was [[**tea**ching] [in [**Gha**na]]]
Er hat [[Lin**guis**tik] unter**rich**tet] Er hat [[in [**Gha**na]] [unter**rich**tet]]

(5c) [the [**ma**yor [of [Chi**ca**go]]]] [**won** [their [sup**port**]]]

(5d) [the [**ma**yor]] [**won** [their [sup**port**]]]
[der [**Bür**germeister]] hat [[ihre [Unter**stü**tzung]] ge**won**nen]

(5e) [Der [**Pe**ter]] hat [[der [**Schwes**ter [des [**Freun**des [von [Ma**ria**]]]]]] [eine [**Ro**se]] ge**schenkt**]

In all cases, the last p-stress is strengthened to the strongest of the expression.

Stress-XP extends to the observation (Uhmann, 1991; Gussenhoven, 1992) that resultative predicates need not receive p-stress, whereas secondary predicates must receive p-stress: ***throw*** *one of the* ***win****dows* ***open*** (Gussenhoven, 1992) vs. ***eat*** *the* ***por****cupine* ***raw***. In a standard small clause structure of resultatives, their syntax mirrors the causative meaning, such that [$_{AP}$ [$_{DP}$ [$_{NP}$ *windows*]] *open*] is the constituent that describes the proposition being caused. In this constituent, *windows* attracts p-stress by Stress-XP, whereas *open*, not an XP of its own, does not require p-stress. The entire AP contains stress once *windows* is stressed. In ***throw*** [$_{AP}$ *it* *open*], with the pronoun *it* rejecting p-stress, we see the effect of Stress-XP on the AP. Secondary predication does not involve this thematic embedding of the secondary predicate. Here the object is in its normal object position, and the secondary predicate is an adjunct of some sort. In ***eat*** [*the* [***por****cupine*]] [$_{AP}$ ***raw***], both the object and the AP require p-stress by Stress-XP, of which the final p-stress is then strengthened.

Deaccenting and the Theory of Focus

The Alternative Semantics of Focus in Rooth and Deaccenting

Because focus has a strong effect on p-stress, some predictions about p-stress turn on the theory of the semantic/pragmatic interpretation of focus. Rooth (1992) saw a central part of the meaning of F in the selection of the focused element from a set of contextually relevant alternatives. In *Who likes Mary?* [$_F$ *Bill*] *likes Mary*, the question defines a relevant range of possible answers; schematically *John/ Bill/ . . . /Sue likes Mary*. The actual answer asserts one of these possibilities, and F highlights the part of the answer to which there are relevant alternatives, here the subject of the clause. This works similarly in *John likes Mary. No,* [$_F$ *Bill*] *likes Mary*. F marking targets that part of the second sentence to which there is a relevant alternative (*John*) in the context.

The examples of deaccenting by Ladd (1980, 1983) in (6) show that no contrast of this kind is necessary for the stress-retracting effect of focus to occur.

(6a) A: What about Fred? B: I don't like Fred.

(6b) Why don't you have some French toast?
I don't know how to make French toast.

There is no sense in which *like* in the first answer or *make* in the second answer is contrasted or otherwise juxtaposed with an alternative in some relevant way. In these cases, as Ladd noted, contextual givenness of the object seems to be enough for the stress/accent to retract to an earlier element in the clause.

Two Levels of Focus Interpretation

Is it enough to destress given elements, then? After all, in the original cases (*Who likes Mary? Bill likes Mary* and *John likes Mary. No, Bill likes Mary*) destressing of the given material *likes Mary* also correctly forces stress to retract to the subject. Schwarzschild (1999) argued that the theory must be more complex than that. Example (7a) shows deaccenting of the object because of its referential givenness in the context question. In (7b), the object is given by an antecedent in the same structural configuration. Moreover, in (7b) both the object and the first part of the answer without the object (*She praised* ____) are independently given by the context question. With all elements given in (7b), deaccenting of given elements cannot predict the correct accent position. The NSR or the SAAR might correctly predict stress in this tied situation in (7b). I add example (7c) to Schwarzschild's examples. It shows a similar case in which all elements of the answer are independently given. It establishes that the NSR and the SAAR are not directly relevant in such 'givenness ties.'

(7a) [What did John$_i$'s mother$_k$ do?]
She$_k$ praised him$_i$. (Or: She$_k$ praised John.)

(7b) [Who did John$_i$'s mother$_k$ praise?]
She$_k$ praised him$_i$. (Or: She$_k$ praised John.)

(7c) [Who did John$_i$'s mother$_k$ say praised her$_i$?]
(She$_i$ said that) he$_k$ praised her$_i$. (Or: (She$_i$ said that) John praised her$_i$.)

One conclusion we can draw is that a theory with two levels of focus is required. Such a theory was developed by Selkirk (1995b). In this theory, the absence of the feature F is interpreted as contextual givenness, and presence of the feature FOC (an F feature not dominated by another F feature) is interpreted in terms of Rooth's alternative semantics of focus. Both F and FOC affect stress. F helps account for the deaccenting cases in (6). FOC in this theory correctly allows to predicts that stress in (7b) and (7c) falls on the element asked for by the question.

In Selkirk's theory, the account in terms of the two kinds of focus, F and FOC, is integrated with a mechanism of percolation of F that accounts for the generalizations discussed in terms of the SAAR and Stress-XP. Schwarzschild (1999) showed a number of empirical problems with the mechanism of focus feature percolation. They include an argument (Schwarzschild, 1999: 171) that the default stress relation between heads and arguments is independent of the distribution of F and FOC. This is as predicted by the account in terms of Stress-XP.

Schwarzschild (1999) also explored the notion that F is interpreted as an exemption from givenness and that FOC need not be semantically interpreted, that is, that the semantics of focus need not include a requirement that the context provides alternatives to FOC. Schwarzschild's suggestions leave open many questions in regard to how his suggestions are to be combined with mechanisms of default assignment of accent/p-stress.

To connect the discussion of focus with the earlier discussion in a way that is intuitively accessible in the framework of this article, I put things together as in the following list.

1. FOC, semantically interpreted as in Rooth's (1992) theory of focus, contains phrasal stress.
2. Avoid phrasal stress on contextually given constituents.
3. Stress-XP: Each XP contains phrasal stress.
4. Strengthen the last phrasal stress of the intonation phrase.

Item 1 invokes Rooth's theory of focus, plus the requirement from Schwarzschild that FOC contain p-stress. Item 2 summarizes the prosodic effect of givenness, as discussed in this section. Both take precedence over constraint 3, which connects the syntactic structure to p-stress.

Jackendoff's requirement that the focus contain the strongest stress here comes out of item 2: A successful assignment of FOC in line with Rooth's theory will be surrounded by given material, so that item 2 forces the main stress of the intonation phrase away from the given material and into FOC. Item 1 is required for a number of examples in Schwarzschild's discussion, such as: (*John cited Mary*) *but he dissed Sue*. Here the p-stress on the verb *dissed* is assigned in connection with the alternative *cited* in the preceding clause. This is mediated by FOC, which must therefore have the effect of introducing p-stress (Schwarzschild, 1992: 170, 171).

Item 2 is formally not in line with the conceptualization, otherwise adhered to since Jackendoff (1972), that semantics (givenness) and phonology (p-stress) are not directly connected but, instead, should be mediated by focus features in the syntax. In Selkirk (1995b) and Schwarzschild (1999), this mediation is taken on by the feature F (not FOC), which is avoided in the summary list given here to keep things simple.

Pronominal Elements

Definite pronouns such as *she* and *his* and indefinite pronouns such as *something* and *someone* are XPs (DPs) but do not show the stress expected of XPs (unless narrowly focused): *Mary likes John*; but *She likes him*. *Mary likes someone*. This can be subsumed under the general requirement of destressing of given material (see item 2 of the summary list). The definite pronouns are referentially given by coreference with an element in the context (van Deemter, 1994; Schwarzschild, 1999). The indefinite pronouns *something* and *someone* can also be construed as given: Every context entails the presence of something and of someone. By the avoidance of F marking in Schwarzschild (1999) (i.e., by interpreting constituents as given as much as the context allows), these elements **can** be interpreted as given, and therefore they **must** be interpreted as given. Therefore, they must be destressed.

Summary

Phrasal stress is assigned in a representation with constituents and prominence, extending the prosodic or metrical representation of stress within the word upward. Focus and syntactic structure both have a role in shaping the pattern of p-stress in a given utterance. Contextually given elements avoid phrasal stress, and elements contrasted with alternatives seem to require phrasal stress. When focus does not interfere, a combination of two simple generalizations seems to go a long way in accounting for observed patterns: Each XP contains a beat of phrasal stress (generalizing over the core of Gussenhoven's SAAR) and the final phrasal stress thus assigned in the intonation phrase is strengthened.

See also: Focus; Intonation; Metrical Phonology; Phonological Phrase.

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Phraseology

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Introduction

The article devoted to phraseology in the first edition of the *Encyclopedia of language and linguistics* (*ELL*) reported a marked upsurge of interest in the subject over the previous 10 years among linguists, lexicographers, and specialists in language acquisition and language teaching (Cowie, 1994). The opening references in that article were chiefly to anglophone scholars, but the growing activity in the field in Britain, and to a lesser extent in the United States, owed much to a substantial, earlier body of East European work in phraseology, stretching back to the 1940s. In fact, we can see, if we examine the years – as indicated by the extensive Euralex Bibliography of Phraseology, now available on the Web – in which the most productive specialists began to publish, that scholars from throughout the USSR and from East Germany and Czechoslovakia were the dominant group in the 1960s and 1970s; that a marked growth of activity could be observed in the late 1970s and early 1980s among Austrian, Swiss and West German linguists; and that the 1980s witnessed the quickening of interest which I began by referring to: in Britain, but also in Belgium, Spain, Italy, and Scandinavia. By the end of the 20th century, something approaching a truly international body had come into being, with its own professional association, and regular meetings and publications.

There are still, of course, differences between the various regional groups as regards the fields of specialization to which they are typically attracted. Thus, while the first two groups to which I referred – and which incidentally have until recently made up the bulk of the membership of the European Association for Phraseology (EUROPHRAS) – are often drawn to historical, dialect, media, and translation studies (Palm-Meister, 2004), the British and Belgian phraseologists who are active in the field have tended to be attracted to (EFL) lexicography, the corpus-based analysis of recurrent word combinations, and the role of phraseology in language teaching and language

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acquisition (Cowie, 1998; Granger, 1998; Moon, 1998a, 1998b). Recent volumes of conference proceedings, however, suggest that the edges are becoming blurred (e.g., Burger *et al.*, 2003), and it should be noted especially that the treatment of phraseology in dictionaries of English has, since the 1980s, been a beneficiary of achievements in the categorization of word combinations pioneered in the former Soviet Union (Cowie, 1998b). It is the connection in a wider sense between phraseological research and dictionary making that will constitute the major theme of this article.

There has been a partial resolution, too, of differences of another kind. A decade ago, it was possible to refer to "the continuing influence in collocational analysis of neo-Firthian lexical theory … with its emphasis on observed frequency of co-occurrence within stated distances … in a large computerized corpus" (Cowie, 1994: 3168), in contrast to the approach based on a framework of descriptive categories that I have just referred to. These positions are not as firmly entrenched as they were then. As we shall see later, present-day phraseologists from quite diverse backgrounds acknowledge the benefits that can accrue from an approach which combines the advantages of access to large-scale corpus data and the value of recognizing, as part of the analytical process, the grammatical and pragmatic functions that are served by multiword units (Moon, 1998a, 1998b; Cowie, 1999; Kilgarriff and Tugwell, 2002; Čermák, 2003).

Progress in Description

When, in the late 1970s and early 1980s, British linguists became aware of the considerable progress already made by their East European colleagues, they were chiefly impressed by their success in identifying relevant categories and introducing appropriate criteria for their definition (Cowie *et al.*, 1983). They had recognized a major division between combinations with a pragmatic function (sometimes called 'propositions') and those with a referential function ('nominations') and were aware that the latter were ranged along a continuum, from transparent 'free combinations' at one end to relatively fixed and opaque idioms at the other. This is now part of received wisdom, though as we shall see, emphasis needs to be laid on the 'relatively' of 'relatively fixed' (Howarth, 1996). But there was some unfinished business, including the need to harmonize the sometimes conflicting analytical schemes and categories used by various individuals and 'schools.' This was one of the themes of a conference organized in Leeds in 1994 (Cowie, 1998d).

There were also a number of opportunities and challenges. Consider, first, collocations and the forms which English collocational dictionaries have taken in recent years. The most recent to appear is the result of a coming together of theoretical insights, corpus analysis, and user-sensitive design features (Crowther *et al.*, 2002). Another question on which light has been shed in recent research is the possible variability of word combinations. As Moon has helped us to realize, even the most opaque of idioms are more often subject to structural and/or lexical change – by no means always the result of creative manipulation – than we have hitherto been led to believe (Moon, 1998a, 1998b). This phenomenon has an important bearing on the description of idioms in phraseological dictionaries, and will also be explored in more detail below.

Another area in which progress has been made, in the past decade, has to do with word combinations that function at the pragmatic level, as distinct from the grammatical level. Though much work had been done earlier in Eastern Europe, and elsewhere, on proverbs as one subcategory at the pragmatic level – as much for their cultural as for their linguistic interest – there remained the challenge of such 'speech formulae' (also referred to as 'gambits') as *you know what I mean*, or *to put it another way*, which posed considerable descriptive difficulties. We shall return to these, also. (For accounts of recent work in this general area, see Arnaud and Moon, 1993; Cowie, 2001; Čermák, 2003.)

Collocations and Collocational Dictionaries

I referred, in the first edition of *ELL*, to collocations as "associations of two or more lexemes (or roots) recognized in and defined by their occurrence in a specific range of grammatical constructions." The phrase 'recognized in' is an acknowledgement of the fact that collocations are perceived, in speech or writing, as 'surface' manifestations, or realizations, of abstract composites (Cowie, 1997: 43). It is this assumption that enables us to claim that *heavy rain* and *rain heavily* are, as it were, 'collocation forms' of the same 'lexemic' collocation and to account for their evident relatedness in meaning (cf. Howarth, 1998: 168). Acknowledging the difference between the two levels is vitally important, as there is still a tendency, in the name of empirical soundness, to regard collocation forms as the proper focus of description.

A related point has to do with the importance of analyzing such combinations as *hard cash*, *fresh air*, *break someone's fall*, and *corner the market* – all 'restricted collocations' – with reference to the

syntactic constructions in which they function. In those cases the relevant constructions are attributive adjective + head noun and transitive verb + noun object. The wisdom of adopting this view has been accepted for some time by the compilers of collocational dictionaries. Indeed, one can go further and point to the precedent set by Harold Palmer and A. S. Hornby, who in 1933 published the *Second interim report on English collocations*, the first linguistically based analysis of English phraseology ever to appear, and one in which the various combinations were organized, to some degree of delicacy, according to the syntactic patterns in which they functioned (Cowie, 1998a; Palmer, 1933).

It is interesting, to return to the present, that a number of computational projects of recent years concerned with collocation extraction have made the same assumptions regarding the grammatical functions of collocations. Specialists working on the DECIDE project, for example, were concerned with the development of tools for the extraction of collocations from tagged and raw text (Grefenstette *et al.*, 1996). The DECIDE team developed tools such as morphological analyzers, part-of-speech taggers and low-level parsers – each of the tools, note, corresponding to a particular level of abstraction. The working of the parser was especially interesting. Given a sentence such as *A radiator has been fitted in the bathroom*, the parser was able to identify the semantic object of the verb (here *radiator*) even though this precedes the verb as the grammatical subject of a passive construction. It therefore overcame the obstacle to recovering the members of a collocation (e.g., *fit* + *radiator*) created by their syntactic displacement within the same sentence (Howarth, 1996).

But to return to collocational dictionaries, one need only refer to a few entries in *Selected English collocations* (*SEC*), in its first edition (Kozłowska and Dzierżanowska, 1982), to realize that grammatical function in all entries provides the basis for an overall organization whereby the user accesses each collocation first by its constituent noun, which is also a capitalized headword, and second by its verb or adjective, which appears as part of a labeled list, as in this short excerpt:

DICTIONARY
V. compile, consult, look up, produce, refer to, revise, use ~
Adj. compact, comprehensive, concise, excellent, extensive . . . ~

As the layout of that entry shows, the dictionary was designed to serve the needs of the user as **writer**, the assumption having been made that, when writing, he or she moves from the 'autonomous' noun – the 'base' – to a collocate – verb or adjective – whose selection is problematic (Cowie, 1998c).

There was, though, one problem that *SEC* did not address. Ideally, having arranged collocates according to their word class, the lexicographers should have introduced a feature designed to help the user locate a specific semantic choice (*forge*, say, as opposed to *sever* as collocates of the noun *link*). Such a device is not present in *SEC*, where the collocates are arranged alphabetically, as shown above (cf. Hausmann, 1985).

The *BBI dictionary of word combinations* (*BBI*), in both its editions, went some way towards supplying this particular need. From the entry for *help*, noun, below, it can be seen that there is structuring on two levels, syntactic and semantic. The first three numbered subsections deal with transitive verb + noun collocations, while numbers 4 and 5 are devoted to adjective + noun collocations. The allocation of the verb + noun collocations to subsections 1–3, however, is based on meaning differences. The verb collocates at 1, for example, have to do with the giving of help ('give,' 'offer,' 'provide'), while those at 2 have to do with seeking it ('call for,' 'seek'). This organizational pattern, kept up throughout *BBI*, enables the user to home in on highly specific areas of meaning, and then to make individual selections.

help I *n.* 1. to give, offer, provide ~ 2. to call for, seek ~ 3. to cry for, plead for ~ 4. a big ~ (to) . . . 5. (a) great, invaluable, tremendous; little ~

The more recent publication of the *Oxford collocations dictionary for students of English* (*OCDSE*) (Crowther *et al.*, 2002) represents a further major advance in the design of English collocational dictionaries. It owes, of course, certain of its features to its two predecessors. Like *SEC*, *OCDSE* is based on authentic, largely written material, except that in the latter case the corpus is the immensely bigger British National Corpus (BNC). Moreover, the 'orientation' of the dictionary, as earlier in both *SEC* and *BBI*, is from an independent 'base' to a dependent collocate. However, the most significant improvements made by the compilers of *OCDSE* have to do with the semantic organization of collocates within an overall arrangement that is syntactic. In the entry for 'enthusiasm,' part of which is reproduced below, there are two verbal patterns, represented as VERB + ENTHUSIASM and ENTHUSIASM + VERB, forms which convey the transitive–intransitive distinction without making too many demands on the grammatical knowledge of the user. Within the transitive subsection the collocates are broken up into semantic groupings, a feature – as we recall – of *BBI*, except that here the collocates are in bold, there are vertical strokes to

mark off the different semantic sets, and examples are introduced to illustrate some of the combinations:

enthusiasm *noun*
- VERB + ENTHUSIASM **be full of, feel, have** *Her voice was full of enthusiasm.* | **convey, express, show** *She managed to convey an enthusiasm she did not feel. . . .*
- ENTHUSIASM + VERB **bubble over/up** *trying to hide the boyish enthusiasm bubbling up inside him* | **grow** | **fade, wane, wear off** . . .

Idioms and Variability

Phraseologists commonly refer to the formal fixedness of word combinations, and especially of idioms in the strict sense. Until recently, though, it has been less widely recognized that, in some corpora, a high percentage of given multiword units including such opaque examples as *take the biscuit* or *up the anti* do not have frozen or fixed canonical forms. Working with a corpus of 18 million words, Moon (1998a, 1998b) has shown that this proportion can be as high as 40 per cent, a finding which has "serious implications for teaching, lexicography, and such matters as the automatic and computational detection of such items in corpora" (1998b: 92).

Variability differs in type and in degree. One type to which attention has been drawn is systematic, or in some cases partly so. It manifests itself as a set of formally and semantically related variants:

get your eye in
keep your eye in
have your eye in

have (no, an) axe to grind
with(out) an axe to grind

More usual, perhaps, are multiword expressions with synonymous variants. Here, it is the variants as wholes that are equivalent: the substituting lexemes are not necessarily so:

burn one's boats *vs.* burn one's bridges
hit the roof *vs.* hit the ceiling

U.S. and British speakers may prefer different variants, as in the case of *sweep something under the carpet* (U.K.) vs. *brush something under the rug* (U.S.), and indeed contrasting variants may represent different levels of formality, as witness *make a fortune* vs. *make a killing* (Moon, 1998b: 93).

Particular difficulties are caused by the treatment in phraseological dictionaries of series of variants such as *be in power*, *come into power*, and *put somebody into power*. Because of the different syntactic-semantic patterns involved (they are respectively 'copular,' 'inchoative,' and 'causative') they are treated in the *Oxford dictionary of phrasal verbs* as separate expressions, with their relatedness being shown by means of cross-references (Cowie and Mackin, 1993):

be in power [Vpr] have reached or gained (political) control. . . . → come/put into power.

The examples we have been examining have all involved lexical alternation at one structural point. However, multiword expressions are by no means unusual in which complex choices come into play at two or more places. Large-scale text corpora such as the BNC are already making an important contribution to the analysis of such items, though in some cases corpus data may raise as many questions as they answer. Consider the word combination that has as one of its possible forms the underlined portion of this example:

To lock up young car thieves is another example of <u>bolting the stable door after the horse has fled</u>.

Of the 38 instances of the phrase *the stable door* found in the BNC, 13 form part of a longer fixed stem *the stable door after the horse*, immediately preceded by one of a set of five verbs, *shut*, *bolt*, *close*, *lock*, and *slam*, and immediately followed by one from a choice of three, *bolt*, *flee*, and *steal*. It is worth noting that the first verb slot is obligatorily filled, in over half the cases by a present participle form, and that the last position is usually occupied, too, almost always by a perfective verb form, though truncated patterns such as *it's a bit like shutting the stable door* are occasionally found.

There are two questions that this evidence causes one to reflect on, apart from its helpful specificity at several points. The first is that the frequencies in initial position of *shut*, *bolt*, and *close*, at 4, 4, and 3 respectively, though tiny in a corpus of 100 million words, are intuitively satisfying and, incidentally, match the choices indicated in a phraseological dictionary based on a much smaller (written) corpus gathered by traditional methods (Cowie *et al.*, 1983). The BNC data also indicate that, whatever the choice made initially, *bolt* is by far the preferred selection in final position. (No support, incidentally, can be found in the BNC data for the alternatives suggested for end position in that same phraseological dictionary, which include [*have*] *run away*, *gone*, and *disappeared*.)

The second point has to do with the meanings of the verbs in both positions. Clearly, *shut*, *bolt*, and *close* are related in sense, and this may have prompted use of the slightly more unusual – but also semantically related – *lock* and *slam* recorded in the BNC. Here there is a difficulty, even within a corpus of 100 million words, both for the analyst and for the

theoretician tempted to build too strong a case on frequencies of occurrence. The specific problem is that faced with frequencies of no more than 4 or 3 for the verbs *shut*, *bolt*, *close*, and the evidence, as already suggested, of their semantic relatedness, it seems that their selection is as likely to be accounted for by generative processes as by repetitive use and memorization. It is arguable that, in such cases, reference to corpora should be backed up by tests designed to elicit the implicit knowledge of informants (Cowie, 2003).

Speech Formulae

As we have seen, it is now customary to recognize a distinction between 'nominations' (also called 'composites'), which function at or below the level of the simple sentence, and are divisible into idioms and collocations, and 'propositions' ('pragmatic combinations'), which are often sentences and which function as proverbs, catchphrases, and slogans (Cowie, 1998a).

Examples of the second major type are *Too many cooks spoil the broth* (proverb), *The buck stops here* (catchphrase), and *All we do is driven by you* (slogan) (Gläser, 1990, 1998). Alongside those familiar, traditional categories, of which Gläser provides a detailed description, we need to consider a class which I shall refer to as 'routine formulae' and distinguish carefully from 'speech formulae' (sometimes referred to as 'gambits') (Cowie, 2001). Then we need to ask whether those important types can be further divided. All this detailed work is of great importance for dictionary making.

Three of the expressions quoted by Gläser are *mind the step*, *many happy returns*, and *hold your horses* (Gläser, 1998: 127). These belong to the same category – they are all routine formulae. They commonly occur without any expansion or verbal reaction from another speaker – though note *please mind the step*, *many happy returns of the day*, and *hold your horses a minute* – and they function as warnings, greetings, prohibitions, and so on – that is, as various kinds of socially recurrent speech act (Moon, 1998a).

It is tempting to regard *I beg your pardon* and *you know what I mean*, which are 'speech formulae,' as belonging to the same category as *mind the step* or *good morning*. After all, the first pair, like the second, can occur as independent sentences, and all four have a speech act function. The two speech formulae are used, respectively, as an apology or request for clarification and as a check on understanding, as can be seen from the following examples:

> 'We're in trouble if it won't fit in.' '*I beg your pardon*, if it won't fit in what?'

> 'I had to have what I've wanted by hook or by crook, and I don't mean crook in a bad sense – I mean one way or another, *you know what I mean*.'

But those examples suggest crucial differences, both between the routine formulae and the speech formulae, and between the latter two. The speech formulae, as here, occur almost as often as not in a wider sentential context (which *mind the step* typically does not). Moreover, *I beg your pardon* functions chiefly as a response to something another speaker has said, while *you know what I mean*, though not a reaction to another person, serves to check that he or she has grasped the meaning of *by hook or by crook* (which is made explicit by *I mean one way or another*). The second formula thus has reference both to the listener and to the language of the speaker's own utterance (Cowie, 2001).

Although *many happy returns* and *mind the step* are addressed to a listener or reader, they are not essentially interactive: they do not require a verbal response, nor do they serve as one. Speech formulae are, by contrast, typically interactive, a distinction that calls for the setting up of a category parallel to but separate from routine formulae.

The two kinds of formulae, then, constitute separate classes; but there are internal differences, too, as we have seen. For example, the sentence that contained *I beg your pardon* served to express the speaker's response to an earlier utterance by somebody else. Yet it is by no means always the case that a speech formula is a part of a response to something another person has said. In fact, very many formulae have to do with some other kind of interaction. One example must suffice. It is a case in which the function of the formula and its position are both significant. The formula is *are you with me?* and its function is to check whether the listener is following and understanding what is said. But if the check can be applied at any moment, then the formula can appear at any point, too, even to the extent of disrupting main clause structure:

> 'It could be a car, like we've just said, but then again, I've never had a new car. It could be – *are you with me*?'

Phraseology as an Academic Subject

There is no doubt that as a result of the developments, institutional as well as intellectual, of the past decade, phraseology has now acquired the status of an academic subject (cf. Pawley, 2001). EUROPHRAS, the professional association which began with a European base and membership, is now becoming worldwide in its membership and its recognition of shared aims and interests. It may soon have its

own yearbook. It is noteworthy, too, that the subject is being taught to doctorate level in a number of universities in several countries, of which Spain is an outstanding example. As Corpas Pastor has shown in a detailed survey of research undertaken in Spain since the late 1980s, the subject has impressively established its credentials in Spanish universities (Corpas Pastor, 2003). Then, in addition to the conferences held regularly by EUROPHRAS, there have been a number of workshops organized by interest groups, e.g., Grossmann and Pantin on collocation (2003). Finally, and not least, there is wide agreement among colleagues as to what constitutes a program of academic studies in phraseology. No student textbook as yet exists that captures all the major subfields in which phraseologists are active, but we do have a number of introductory readers: Corpas Pastor (1997) for Spanish, Burger (1998) for German, and Cowie (1998d) for English.

See also: Collocations; Computers in Lexicography; Corpus Approaches to Idiom; Lexicography: Overview; Lexicon Grammars.

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Phrastic, Neustic, Tropic: Hare's Trichotomy

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The terms 'phrastic,' 'neustic,' and 'tropic' were introduced to the theory of speech acts by philosopher Richard M. Hare. Hare (1949) had compared pairs like the imperative in (1) with the declarative in (2):

(1) Keep to the path.

(2) You will keep to the path.

He concluded that (1) and (2) have the same 'phrastic,' but a different 'neustic,' which he characterized as follows:

(3) [Keeping to the path by you]$_{\text{phrastic}}$[please]$_{\text{neustic}}$

(4) [Keeping to the path by you]$_{\text{phrastic}}$[yes]$_{\text{neustic}}$

It is tempting to symbolize neustic 'please' by '!' and 'yes' by '⊢', but Hare (1970) gives us reason to compare (2) with (5) and (6).

(5) You will keep to the path!

(6) Will you keep to the path!(?)

Although (5) has the declarative form of (2), it has what Hare calls the same 'subscription' (illocutionary point) as (1). Example (6) also has the same illocutionary point, but expressed in the interrogative form. Hare (1970) introduced a third operator, 'tropic,' to capture the mood of the utterance, here identified with the clause type (*see* **Mood, Clause Types, and Illocutionary Force**). We can now translate (1)–(2) and (5)–(6) as follows:

(7) [Keeping to the path by you]$_{\text{phrastic}}$[!$_{\text{tropic}}$] [please]$_{\text{neustic}}$

(8) [Keeping to the path by you]$_{\text{phrastic}}$[⊢$_{\text{tropic}}$] [yes]$_{\text{neustic}}$

(9) [Keeping to the path by you]$_{\text{phrastic}}$[⊢$_{\text{tropic}}$] [please]$_{\text{neustic}}$

(10) [Keeping to the path by you]$_{\text{phrastic}}$[?$_{\text{tropic}}$] [please]$_{\text{neustic}}$

Hare writes, "I shall retain the term '*phrastic*' for the part of sentences which is governed by the tropic and is common to sentences with different tropics" (1970: 21); this is what Searle (1969) calls the 'propositional content' of the speech act. A "neustic has to be present or understood before a sentence can be used to make an assertion or perform any other speech act" (Hare, 1970: 22). Obviously, the inventory of neustics needs to be vastly increased beyond 'please' and 'yes' to include the extensive number of illocutionary points to which a speaker may subscribe. As we can see from (7)–(10), to share a phrastic and a tropic will not guarantee a common neustic; nor will the sharing of a phrastic and a neustic guarantee a common tropic. These three parts of a speech act are independent.

Hare (1970) uses the distinction between neustic and tropic to explain the fact that (11) makes an assertion about what time it is, but no such assertion is made by the identical sentence as it occurs in the protasis (*if*-clause) in (12), nor in the complement clause in (13).

(11) It is ten o'clock.

(12) If it is ten o'clock, then Jane is in bed.

(13) Max says that it is ten o'clock.

In each of (11)–(13) the clause 'it is ten o'clock' has the same phrastic and the same tropic, but the neustic is a property of the whole speech act.

See also: Mood, Clause Types, and Illocutionary Force; Speech Acts.

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(12) If it is ten o'clock, then Jane is in bed.

(13) Max says that it is ten o'clock.

In each of (11)–(13) the clause 'it is ten o'clock' has the same phrastic and the same tropic, but the neustic is a property of the whole speech act.

See also: Mood, Clause Types, and Illocutionary Force; Speech Acts.

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Phytosemiotics

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The term 'phytosemiotics' was coined by Martin Krampen in 1981. It appeared as the title of his article, which was the original attempt to define the action of signs or 'semiosis' in the world of plants, as contradistinguished from the animal and human realms. This seminal article undertook to show how the whole of the biosphere is subtended and unified in its interdependencies by the action of signs. As Sebeok later summarized (2001: 14), "where there is a feature to be found in the botanical world there is bound to be a complementary counter-feature in the zoösemiotic world." Krampen (1992: 217) put the matter comprehensively: "human sign production is deeply rooted in its symbiosis with plants – the meaning of human (and animal) life thus being indexically contingent on plant life." Krampen's convincing argument swiftly became part of the 20th-century mainstream development of semiotics, opening the way to a postmodern and global intellectual culture (see Deely, 1982, 2001; Deely *et al.*, 1986; Krampen, 1994, 1997, 2001; Kull, 2000; Sharov, 1998).

Since time immemorial, human beings have divided the universe between living things and inorganic substances, and have subdivided the living into humans, animals, and plants. Study of the action of signs in the specifically human world had come to be called anthroposemiotics, a term whose provenance is clear (study of the species-specifically human action of signs, from *anthropos* for human being + *semiosis*), and whose coinage traces to Sebeok (1968: 8). Earlier (Sebeok, 1963), Sebeok had coined the more generic term 'zoösemiotics' for the action of signs in animals as such, whether human or not. Krampen's coinage, thus, was key to completing the notion of 'biosemiotics,' the architectonic idea proposed by Thomas A. Sebeok (1990) that semiosis is criterial of life (see Hoffmeyer and Emmeche, 1999; Kull, 2001). The further idea that semiosis is criterial of the development of nature as a whole requires a further term, 'physiosemiotics' (Deely, 1990), to name knowledge developed from studying the 'virtual semiosis' evidenced in the development of the inorganic world prior to and preparatory for life. This implies that semiotics may ultimately provide a clearer way of accounting for what has heretofore been called simply 'evolution' (Deely, 1999). Thus, we have completed the proposal of a terminology to cover C. S. Peirce's 'grand vision' (Deely, 1996) of semiosis as an action within and between **all** the individuals and levels of nature, organic and inorganic alike, with 'semiotics' as the umbrella term generically covering all knowledge derived from study of that action.

These terms – anthroposemiotics, zoösemiotics, phytosemiotics, physiosemiotics – serve philosophically, of course, as but 'place-markers,' so to speak, for the detailed scientific study needed to make of semiotics the full intellectual reality demanded to meet the requirements of a postmodern, global civilization on planet Earth. The contribution of Krampen in filling in the vegetative sphere of phytosemiotics must be regarded as one of the major contributions to global semiotics.

See also: Indexicality: Theory; Peirce, Charles Sanders (1839–1914); Sebeok, Thomas Albert (1920–2001); Semiosis; Semiosphere versus Biosphere.

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Piaget, Jean (1896–1980)

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Jean Piaget (**Figure 1**), who was born in Neuchâtel (Switzerland) in 1896, received his Ph.D. in biology from the University of Neuchâtel in 1918 and spent the following semester studying experimental psychology, psychiatry, and psychoanalysis at the University of Zürich and two more semesters in Paris, where his research oscillated between developmental psychology, psychopathology, logic, and philosophy. In 1921, he returned to Switzerland, where he worked and lived until his death in Geneva in 1980. Over the years, he held a number of chairs (some of them simultaneously) in psychology, sociology, history and philosophy of science, and genetic and experimental psychology at several universities, among them Neuchâtel, Lausanne, Paris, and Geneva. In 1955 he founded the interdisciplinary Centre Internationale d'Epistémologie Génétique in Geneva. Piaget was a member of the Executive Council of the UNESCO and of 20 Academic Societies, held honorary doctorates from more than 30 universities, and was awarded numerous international prizes.

According to the Jean Piaget Archives (Switzerland), Piaget published "more than 50 books and 500 papers as well as 37 volumes in the series *Etudes d'Epistémologie Génétique*." This remarkable record is a mirror of the multidisciplinary nature and the extraordinary multifacetedness of his work. His exceptional ability to transcend the boundaries of developmental psychology and genetic epistemology and integrate stimuli from other disciplines inspired related work in such seemingly remote areas as

Figure 1 Jean Piaget (1896–1980). Courtesy of Universitaet Augsburg.

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Figure 1 Jean Piaget (1896–1980). Courtesy of Universitaet Augsburg.

sociology, philosophy, education, and, though to a much lesser extent, (psycho-)linguistics.

Piaget's central concern was to extend our knowledge about knowledge, its nature and the conditions of its growth. To answer the key epistemological questions *how do we know?*, *how do we acquire knowledge?*, *how does knowledge grow?*, he began to study the cognitive development of the child. But child psychology, as he pointed out in his old age, was merely a vehicle for a much more general goal:

> I was extremely happy not to appear only as a child psychologist. . . . my efforts directed toward the psychogenesis of knowledge were for me only a link between two dominant preoccupations: the search for the mechanisms of biological adaptation and the analysis of that higher form of adaptation which is scientific thought, the epistemological interpretation of which has always been my central aim. . . . To make of epistemology an experimental discipline as well as a theoretical one has always been my goal (Gruber and Vonèche, 1977: xi f.).

The interdisciplinary breadth of his oeuvre defies a comprehensive overview of all or only most of its facets. From a linguistic point of view, however, his studies of the cognitive development of the child are most relevant. Starting from the premise that all living organisms interact with the world around them, he sees the child's construction of knowledge as an active process. Newly acquired knowledge is related and adapted to earlier acquired knowledge, which is thus newly organized. Ideas (e.g., about categories as space, time, number, causality, with which Piaget was primarily concerned) have no *a priori* existence; they are neither 'given' in the child's brain nor preexisting and only to be 'discovered' or 'found' in the world. Rather, they have to be constructed or invented, though only through the child's (in early years, physical) interaction with his or her environment. This view has come to be known as constructivism and separates Piaget both from strict empiricism and radical nativism: he opposes the Kantian claim that our knowledge is essentially constituted by innate or *a priori* ideas as well as the empiricist claim that we are not born with innate ideas but acquire knowledge under the impact of our sensory or perceptual experiences with the world, which is thus directly copied. Constructivism emphasizes the child's autonomy in the active construction of knowledge (which happens in relation to the world) during the course of his or her cognitive development. Construction is a perpetual process:

> The individual and the social group are constantly in the process of constructing and reconstructing their views of the world. At a given moment, the most advanced . . . achievements in the pursuit of knowledge may play a regulatory role with regard to other achievements still to be made. But this does not give either the most advanced, or . . . the most primitive, kinds of knowledge the status of an ultimate 'reality'. . . . the only way in which we get knowledge is through continual construction, and . . . we can have no enduring knowledge without actively maintaining this process (Gruber and Vonèche, 1977: xxii f.).

The claim that the stages through which the child's cognitive development passes and their fixed order are universal is central to Piaget's theory (though often criticized because of its neglect of the specific social and cultural milieu, into which the child is set).

For the child's linguistic development, the period of representational thought (which follows the sensorimotor stage and precedes the stages of concrete and formal operations) is of paramount importance. However, in Piaget's view, language itself is only an auxiliary means of encoding thought, and linguistic knowledge is not an autonomous or even overly essential component of the child's overall knowledge. But even though he was not interested in child language (or its acquisition) *per se*, some aspects of his work fuelled a few (mostly) controversial debates in (psycho-)linguistics, notably one with Chomsky (in the late 1970s): while Piaget argues that the development of language is secondary to and dependent on the child's general cognitive development, Chomsky regards language as a specific faculty with its own developmental laws and propounds the conception of an innate universal grammar.

The Jean Piaget Archives keeps record of Piaget's substantial and still growing influence on psychology, sociology, education, epistemology, economics, and related fields.

See also: Bee Dance; Chomsky, Noam (b. 1928); Kant, Immanuel (1724–1804).

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Pictish

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Pictish was the language spoken by the Picts, inhabitants of the northeast of Scotland, roughly from the Forth-Clyde line to the Cromarty Firth, but possibly also further afield, including the Northern and Western Isles, from the early centuries A.D. until the middle of the 9th century when, as the result of the merger of the kingdoms of the Scotti and the Picti under Kenneth MacAlpine, it was replaced by Gaelic, which had reached Scotland from Ireland from approximately 500 A.D. onward. The Picts were known as *Picti* (or *Pecti*) to the Roman military, who interpreted their name in Latin terms as cognate with *pictus* 'painted'. They were referred to by the neighboring Anglo-Saxons as *Pehtas*, *Pihtas*, *Pyhtas*, *Peohtas,* or *Piohtas;* by the Norsemen as *Péttar* or *Péttir* (as in *Pétlandsfjorðr* 'the Pentland Firth'); and in Middle Welsh as *Peithwyr,* but it is not known what they called themselves. No sentence in their language has been recorded, and our main sources for Pictish are king lists, inscriptions, and, particularly, place names.

The nature and linguistic affiliation of Pictish has attracted attention for a long time, and this scholarly, and sometimes not so scholarly, pre-occupation with the language(s) of the Picts has led to a comparative neglect of other aspects of Scottish linguistic history and prehistory, especially when it comes to the analysis and interpretation of early place names. As far as Pictish is concerned, however, the fascination for its linguistic status has resulted in a large variety of theories that have been offered, and often seriously defended, right to our own time. As recently as 1998, for example, Paul Dunbavin regarded the Picts as Finno-Ugric immigrants from the Baltic coast, basing his revolutionary conclusion, among other arguments, on the apparent derivation of certain Scottish river names, mentioned by Ptolemy about 150 A.D., from certain Finnish topographic terms. Apart from the absence of any documentary reference to Finno-Ugric people in Pictland, the proposed etymologies suffer from the frequently encountered flaw in such studies, the superficial equation of spellings reported almost 2000 years ago with modern forms of words in an otherwise unconnected language.

Whereas Dunbavin used toponymic, especially hydronymic, materials to support his proposal, Harald V. Sverdrup (1995), in the course of classifying and translating Pictish inscriptions, claimed "that it can be shown . . . that [Pictish] was neither a Celtic nor an Indo-European language but was distantly related to Caucasian languages," dating the arrival of the initial

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The nature and linguistic affiliation of Pictish has attracted attention for a long time, and this scholarly, and sometimes not so scholarly, pre-occupation with the language(s) of the Picts has led to a comparative neglect of other aspects of Scottish linguistic history and prehistory, especially when it comes to the analysis and interpretation of early place names. As far as Pictish is concerned, however, the fascination for its linguistic status has resulted in a large variety of theories that have been offered, and often seriously defended, right to our own time. As recently as 1998, for example, Paul Dunbavin regarded the Picts as Finno-Ugric immigrants from the Baltic coast, basing his revolutionary conclusion, among other arguments, on the apparent derivation of certain Scottish river names, mentioned by Ptolemy about 150 A.D., from certain Finnish topographic terms. Apart from the absence of any documentary reference to Finno-Ugric people in Pictland, the proposed etymologies suffer from the frequently encountered flaw in such studies, the superficial equation of spellings reported almost 2000 years ago with modern forms of words in an otherwise unconnected language.

Whereas Dunbavin used toponymic, especially hydronymic, materials to support his proposal, Harald V. Sverdrup (1995), in the course of classifying and translating Pictish inscriptions, claimed "that it can be shown . . . that [Pictish] was neither a Celtic nor an Indo-European language but was distantly related to Caucasian languages," dating the arrival of the initial

settlers to the paleoneolithic transition before 7000 B.C. This would predate by several thousand years any other known nonmaterial evidence, including place names. It is the presumed enigmatic nature of Pictish that has led Sverdrup to the underlying readings, classification, and translation of the inscriptions.

A considerably earlier perception of Pictish as a non-Indo-European language comes from John Rhys, who in 1892, after discounting the Ugro-Finnish people (Lapps, Finns, and Estonians) and the Ligurians, felt "logically bound to inquire what Basque can do to help us to an understanding of the Pictish inscriptions." However, 6 years later he revised his own theory by making it known that he no longer thought Pictish was related to Basque but rather to be pre-Indo-European (although not as old as the neolithic or mesolithic periods) that first came under p-Celtic influence from the Cumbrians south of the Forth-Clyde line. This change of direction did not stop J. B. Johnston, maintaining in 1934 his view (first expressed in 1892) that the river Urr in southwest Scotland derives from the Basque *ur* 'water', from falling into the same trap as Dunbavin.

One of the most outspoken opponents of a Celtic interpretation of the Pictish inscriptions was the Irish archeologist R. A. S. Macalister, who in 1922 expressed the view: "The most reasonable theory about the Picts was that they were survivals of the aboriginal pre-Celtic Bronze Age people. Certainly no attempt at explaining the Pictish inscriptions by means of any Celtic language could be called successful." John Fraser, too, held in 1927 that, having arrived before the Scots and the Britons, they must at one time have spoken a non-Indo-European language, although he took into account the later influence of (Scots) Gaelic and Brittonic.

Advocates for a non-Indo-European and often specifically of an anti-Celtic designation of Pictish represented a wide, fragmented variety of linguistic affiliations. In contrast, the pro-Celtic camp was divided into two opposing groups: those who regarded it as a q-Celtic language and those who regarded it as a p-Celtic language. Following such illustrious predecessors as George Buchanan (1582) and James Macpherson of Ossian fame (1763), Francis J. Diack (1944) was one of the strongest proponents of an uninterrupted Gaelic history of Scotland from the 1st century until today; the Gaelic nature of Pictish was asserted as recently as 1994 by Sheila McGregor.

The p-Celtic school also has a respectable pedigree in William Camden (1586) and Father Innes (1729). W. F. Skene (1868) declared Pictish to be neither Welsh nor Gaelic but "a Gaelic dialect partaking largely of Welsh forms." One of the first scholars to put the p-Celtic nature of Pictish on a sound footing was Alexander Macbain (1891–1892) in his survey of 'Ptolemy's geography of Scotland'; his stance was strongly supported by W. J. Watson (1904, 1921, 1926), mainly on the basis of place-name evidence. This is also at the heart of Kenneth H. Jackson's (1955) overview of 'The Pictish language,' in the course of which he presents the first maps of linguistic Pictland based on the distribution of such place-name elements as *pett* (Pit-), *aber*, *carden*, *lanerc*, *pert*, and *pevr*. He also suggested, however, that there may have been two Pictish languages, one the language of the pre-Indo-European inhabitants, the other the Gallo-Brittonic tongue of Iron Age invaders. W. F. H. Nicolaisen acknowledged the presence of non- or pre-Indo-European place names in Pictish territory, but did not regard them as Pictish. In her repudiation of Jackson's two Pictishes, in her thorough investigation of *Language in Pictland*, Katherine Forsyth (1997), a specialist in Ogham inscriptions, mustered some very persuasive arguments against Jackson's construct and, although it is always risky to call anything 'definitive,' her conclusion that the Picts were "as fully Celtic as their Irish and British neighbors" is difficult to dispute, and it is good to see Pictish placed where it belongs beside other p-Celtic languages such as Cumbric, Welsh, Cornish, Breton, and Gaulish; by implication, the firm ascription of Pictish in this linguistic grouping adjudges the Scotti to have brought the Gaelic language with them from Ireland, a consequence of fundamental importance in a long-running debate.

See also: Cornish; Finnish; Indo–European Languages; United Kingdom: Language Situation; Scots Gaelic; Welsh.

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Pictography: Semiotic Approaches

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Introduction

The etymology of the word 'pictography' is simple: 'picto' comes from the Latin *pictus*, which is the past participle of the verb *pingere* 'to paint,' and 'graph' derives from the Greek *graphein* 'to write.' In simple terms, a pictograph is an image that denotes a word or idea. A pictograph is thus a painting or an illustration that bears a pictorial resemblance to its referent. Thus, the picture or drawing of a cat stands for or means 'cat.'

In this article, pictography is discussed in relation to the following subjects:

1. The notion of pictography as a possible stage in the development of a systematic written representation of language.
2. The semiotics of images.
3. Modern manifestations of pictography (computer icons, word games, comics, and so forth).

Writing Systems

Pictography is often discussed in relation to writing systems. John DeFrancis (b. 1911), whose critical discussion of writing systems has clarified many commonly held misconceptions about them, notes that there are at least six levels of representation of writing systems (DeFrancis, 1989: 218): pictographic, ideographic, logographic/morphemic, syllabic, phonemic, and featural. Although the purpose here is not to provide a detailed history of writing systems, it is appropriate to comment briefly on these various forms of written representations of speech. The first type of representation, pictographic, is the relevant one for this article. In his book on writing, DeFrancis (1989: 219) pointed out that pictographs are not writing, nor are they forerunners of writing as asserted by I. J. Gelb (1907–1985; Gelb, 1963: 190).

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Rather, as DeFrancis (1989: 219) stated, "[a]t the pictographic level, inadequate attention is paid to sorting out the two possible aspects of pictographic symbols, namely, that they represent either concepts divorced from sound, or sounds at one of the various levels of speech." Hans Jensen (1884–1973) called pictography 'idea writing' (Jensen, 1969: 40). Roy Harris (b. 1931) said that "[t]he term pictogram appears to be used to include almost any type of non-alphabetic symbol" (Harris, 1986: 34). In this regard, pictography is not truly writing nor is it a precursor of writing. It is simply a graphic depiction of certain objects, people, or events that have significance within a particular culture. Such events are contemporaneously interpretable by persons who have witnessed them. Subsequently, the pictograph will have to be interpreted by someone who has acquired knowledge of the events from an eyewitness or from a person who functions as the oral historian of that culture. In general, pictographs are simple drawings that encapsulate the essence of a memorable historical event that has had a significant impact on a particular community, e.g., American Indians.

DeFrancis's remaining five forms of writing may be described briefly as follows. Ideographic writing consists of symbols that represent meaning, without indicating their pronunciation (Chinese is considered ideographic). An ideographic system is partly pictographic and partially abstract. Logographic/morphemic (terms that are also associated with the Chinese writing system) writing consists of graphic symbols that represent words, whereas morphemic writing refers to various of forms of writing that break words down into their component parts. For example, *professor* consists of the components *profess* + *-or*. Syllabic writing represents whole syllables (Japanese with its two writing varieties, *hiragana* and *katakana*, is considered syllabic). Phonemic writing is writing that reflects the individual sounds of a language that is composed of consonants and vowels (Spanish exemplifies a phonemic writing system). Featural writing is writing that indicates if a sound is voiced, aspirate, vocalic, and so forth (Korean Hangŭl writing is sometimes called featural). This overview of the major writing systems is by no means complete and the reader should consult DeFrancis (1989) or Jensen (1969) for an in-depth discussion of the various world writing systems. We now consider selectively a few of the earliest manifestations of writing (Jensen, 1969: 82–122), i.e., cuneiforms, hieroglyphs, and pictographs.

Sumerian writing is called 'cuneiform' (*cuneus* 'wedge'), a term coined by the Oxford professor Thomas Hyde (1636–1703) in 1700 because of the use of wedge-shaped signs in the writing system. Knowledge of this form of writing first came to the attention of Europeans in the 17th century when an Italian traveler returned from the Middle East with some cuneiform etchings on bricks. Decipherment of the script took place over time. The Sumerian writing system is the earliest complete writing system and it served as a medium of communication for speakers of various languages. Its script functioned for many cultures over several millennia. The cuneiform system is not uniform, i.e., different languages utilized the symbols in various ways. Among the cuneiform scripts are the Sumerian–Babylonian–Assyrian form (Mesopotamia, Chaldea, Asia Minor) and the Elamitic, Old Persian, and Ugaritic forms.

Hieroglyphic writing refers to picture symbols employed in Egyptian writing. The etymology of this word is from the Greek *hieros* 'holy' and *glyphein* 'to carve.' Until more was learned about this form of writing, it was assumed that hieroglyphs were merely pictographs. Discovered by Napoleon's invading forces in Egypt in 1798, the Rosetta stone had inscriptions in hieroglyphic, demotic, and Greek. This trilingual text facilitated translation of the hieroglyphic writing system. Jean-François Champollion (1790–1832) was responsible for deciphering Egyptian hieroglyphic writing. An examination of the progression of the Egyptian writing system from a semantic one to a phonetic one shows an evolution of pictographic-like symbols (fish, bird, stone jug, and so forth) to what became alphabetic symbols. A hieroglyph can consist of two elements: (1) an ideogram that represents objects or ideas and (2) a phonogram that represents one to three consonantal sounds. Hieroglyphs usually consisted of both types of elements.

A precise chronology of the meaningful representation of visual materials is elusive and ultimately may never be known with certainty. Archaeology offers clues to the customs of previous cultures; dating of visual records (pictographs) of common and momentous historical events provides important evidence of previous customs. What compelled the cave painters of northern (Altamira) Spain and Lascaux, France to preserve their primitive milieu with paint may never be known. Those pictures, however, now offer us some notion of that prehistoric period (30 000 to 40 000 B.C.E). Other archaeological excavations from other locations worldwide provide further evidence, including paintings, sculptures, carvings, and etchings.

Jensen (1969: 24) noted two requisites for the first steps to writing: "1. Its production by an act of drawing, painting or scratching on a durable writing material, and 2. the purpose of communicating (to others or, as an aid to the memory, to the writer himself)."

Object writing is a primitive first step toward writing. It may include, for example, notched sticks, such as Australian messenger sticks with various notches, to symbolize certain information; the knotted cords, or *quippu*, of the Inca Indians; American Indian wampum belts; and the *aroko* of the Jebos of Lagos, Nigeria, which is a reed cord with various symbolic elements. Jensen used the expression 'picture-writing' to refer to paintings found in the caves of northern Spain. These are akin to contemporary icons, such as those used in signage to indicate traffic directions, prohibitions, and hazards.

DeFrancis (1989: 281) defined a pictograph as a symbol "which depicts things or actions." Pictographic symbols have two dimensions. First, they either represent concepts unrelated to speech, or they represent sounds beyond the phonemic, or single-sound, level, i.e., they represent the discourse level of speech, beyond words, phrases, and sentences. In some sense, primitive pictographs represent a narrative structure. If, however, a pictograph represents a specific level of speech beyond the phonetic level, this must be acknowledged. DeFrancis (1989: 219) noted that pictographic representation is generally not considered to be a forerunner of writing. He argued in favor of this notion because these visual symbols fail to capture the featural, phonemic, syllabic, logographic/morphemic, or ideographic level of speech. Thus, Amerindian and Yukaghir (fishers and hunters in the lower areas of the Kolyma River, near the Arctic Ocean, in the former Yakut Autonomous Soviet Socialist Republic) pictographic systems were not precursors of writing. On the other hand, Sumerian, Chinese, and Mayan pictographs are forerunners of writing because they utilized sound representation in their scheme. De Francis (1989: 220–221) corrected the commonly held misconception that Chinese is strictly pictographic. Chinese is not now pictographic because its current system of characters does not contain identifiable pictures. Nevertheless, in its earliest form, the characters represented actual objects, i.e., there is a progression from a pictographic representation to an abstract one (Jensen, 1969: 166–167). Thus, what is considered to be the most primary group of Chinese characters comprises 'picture signs.' These signs show a close resemblance between the object represented and the object. The perspective of these signs may be from the front, the side, or the top.

An exemplar par excellence of a pictograph comes from the Dakota Indian winter-count buffalo robe in Garrick Mallery's (1831–1894) volume (Mallery, 1886: plate VI) on North American Indians; the pictographs, drawn on a buffalo hide by Lone-Dog, of the Yanktonais Dakota tribe, are a record of the period from winter 1800/1801 to winter 1870/1871. The pictographic images spiral out from the center of the robe. Among the events that are recorded, to name but a few of the incidents detailed on this garment, are the outbreak of smallpox (1801–1802), depicted by a human-like figure with pock marks; a Canadian log cabin built of wood (1817–1818), depicted by a primitive shelter with a chimney and an adjacent tree; flood-related drawings of many Indians (1825–1826), depicted by round objects (heads) atop flat lines (local rivers); and an eclipse of the sun (1869–1870), depicted by stars and a black circle. All of the episodes are rendered by pictographs that include visual icons, some of which are easily understood and some of which require interpretation by eyewitnesses or the tribal historian (see **Figure 1**).

Images and Semiotics

In this section, we discuss briefly the semiotic aspects of visual signs, especially as they relate to pictography. Charles Sanders Peirce's (1839–1914) theoretical

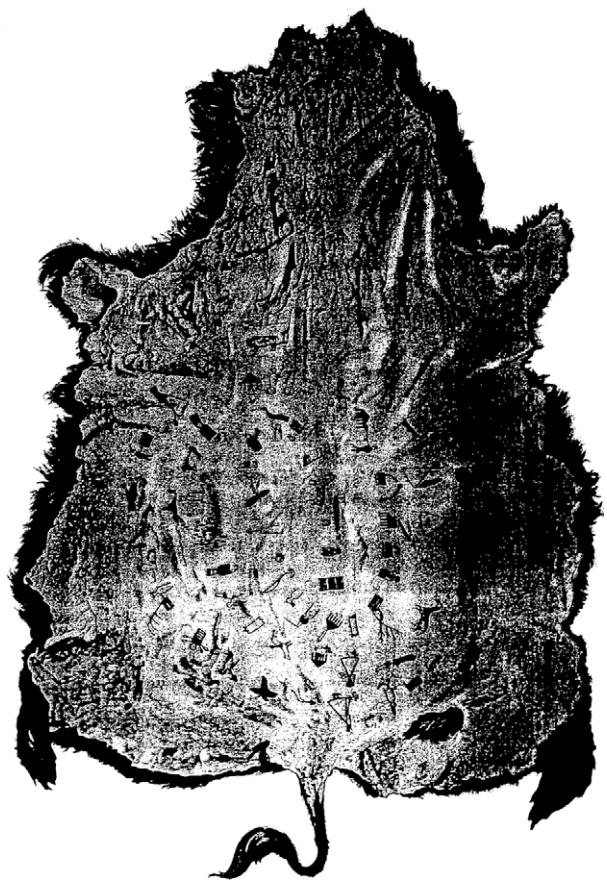

Figure 1 Lone Dog's Winter Count Before 1886. From *Bureau of American Ethnology – Annual Report 4* (1886), Plate VI. National Anthropological Archives. Smithsonian Institution Museum Support Center.

perspective of the sign has three elementary parts: (1) the *representamen* (that part of the sign that represents), (2) the *object* (the concept encoded by the sign), and (3) the *intepretant* (the meaning of the sign assigned by a person) (for a related discussion of Peirce's notion of the sign, see Danesi and Perron (1999: 72–75) and Danesi (2004: 23–33); see also Farias and Queiroz (2003)). In Peirce's system, the representamen has three components: (1) the *qualisign*, which calls attention to certain qualities of its referent (color, shape, size, and so forth), (2) the *sinsign*, which draws attention to an object in time or space (deictic pronouns such as *this* and *that*), and (3) the *legisign*, which is a conventional sign (symbols; words for concepts).

Peirce specified three ways to represent objects: (1) *icons*, which include representation by resemblance, (2) *indication*, which is gestural indication of location, and (3) *symbols*, such as green as a symbol of hope or fertility (in some cultures). In semiotic terms, Peirce employed a classification system for signs. His basic sign was the icon, which is a sense-based form of representation. These signs belong to the category of 'firstness' because they are physical substitutes for their referents. Icons arise from the cultures in which they develop, with the result that their cross-cultural manifestations may differ to a greater or lesser extent.

In recognition of the distinctive property of icons, Peirce employed the term 'hypo-icon' to mean those icons that are culturally determined. The hypo-icon refers to three basic types of icons. First, there is the image, which has a similarity of expression and content. Second, there are diagrams, which involve analogous relations. Third, there is metaphor, which involves the comparison of qualities between two objects that may not be otherwise comparable. In general, a hypo-icon may be understood by cultural outsiders with some assistance from the members of the culture in question.

Our interest here is the visual icon. The word 'icon' derives from the Greek *eikon* 'image, representation.' Marcel Danesi (b. 1946) defined an icon as a "sign that is made to resemble its referent through some form of replication, resemblance, or simulation" (Danesi, 2000: 115). 'Icon' in this article means that there is representation through resemblance. In one of their most common manifestations, icons represent people and events associated with Christianity, e.g., visual depictions of sacred persons, such as saints. In computer technology, icons represent everything visual – all that can be displayed visually on a computer screen, including icons that represent programs or commands. Technically, iconic signs may occur in any sensual modality. Thus, music and onomatopoeia are auditory icons. Perfume is used in certain societies generally as an olfactory icon to enhance the human mating process. Certain chemicals that may be used to intensify the flavor of food are gustatory signs. Finally, jigsaw puzzles are tactile icons intended to produce an ultimate visual icon. Again, our interest here is the visual icon. We now examine various contemporary examples of visual icons that serve as visual signs representative of the real-world counterparts.

A visual sign may resemble quite closely the original that it represents, as in a photograph or in a painting from the photo-realistic school of art, or it may be much less 'real,' as in the drawings of school children. As noted previously, some visual signs may be visual but not iconic, and others may be iconic but not visual (audition, taste, smell, touch). Most visual signs are iconic, though some are aniconic; 'aniconicity' is a term that was introduced by Thomas A. Sebeok (1920–2001) in an article on iconicity (Sebeok, 1979: 111; cf. Liungman, 1991: 7). Examples of aniconic signs include the symbols of a typewriter or computer keyboard, Morse code, Braille, certain traffic signs, and so forth. Aniconic signs are often used conventionally, e.g., as decorative patterns, on certain ritual clothing, and on flags. There is a tendency for iconic signs to become aniconic through a process known as deiconization or conventionalization. For example, the Chinese system of writing and hieroglyphic writing originated as visual imitations of the objects to which they refer, but they ultimately became conventionalized into symbols that stood for words or syllables (Jensen, 1969: 166–167).

Modern Manifestations of Pictography

The pictograph is a form of representation in which the sign bears a pictorial resemblance to its referent. Numerous contemporary icons have this property, and in some ways, they may be labeled as modern pictographs. In a multilingual world in which communication is immediate and global transportation is swift, the need for visual icons to convey important (if not urgent) messages becomes a necessity. Humans now try to encode this vital information with signs, colors, shapes, and other formats to convey what is hoped are universal and not culture-specific meanings, although this is quite difficult. Some examples include computer icons, emoticons, traffic signs, word games, and comics, to name but a few important examples. These modern pictographs are called 'ideograms,' i.e., they are visual signs that stand for ideas or concepts (Shepherd, 1971).

Table 1 Emoticons to indicate emotional responses

Emoticon	*Meaning*
:)	Smile
:(	Frown
:D	Big smile
._/.	Anger
>_<	Pain
;)	Wink

Table 2 Emoticons to represent people, animals, or objects

Emoticon	*Meaning*
~O-O~	Glasses
©¿©	Normal face
~o¿o~	Face with glasses
^"^	Bat
=','=	Cat
[+_+]	Robot

Computer Icons

Computers utilize icons to specify commands. Certain computer icons are, in fact, aniconic, because they are conventionalized, and usually culture specific. A quick look at the desktop of an iMac computer (Apple Computer, Inc.) illustrates this. The iMac, for example, contains a trash barrel icon (= delete), a magnifying glass icon with the English word 'Sherlock' (= a command to locate certain types of information in the system), a printer icon (= print command), and so forth. Other symbols that may appear at certain times while using this brand of computer include a bomb symbol (to indicate malfunction) and a clock face (to indicate that a command will take a certain amount of time to accomplish). These icons thus indicate certain conventionalized computer functions through visual means only.

Emoticons

Though a relatively recent phenomenon, computer-mediated communication, especially electronic mail (e-mail), is now ubiquitous. One of its aspects is the use of abbreviation to expedite the messages conveyed, in accordance with G. K. Zipf's (1902–1950) law that hypothesizes that linguistic forms tend to be abbreviated or reduced to minimize the labor required to produce them (Zipf, 1949). This occurs with acronyms, e.g., FAQ (= frequently asked questions) and ?4U (= question for you). Because computer communication is a visual medium, it also uses conventional symbols to create visual messages. It is possible to use the conventional symbols found on typewriter keys and computer keyboards to generate certain icons or pictographs. These are called 'emoticons' (emotion + icon). Scott Fahlman (b. 1948) is credited with popularizing the emoticon on the Carnegie Mellon University electronic bulletin board system between 1981 and mid-1982. This creative combination of keyboard symbols can be used to indicate the user's affective reactions to a situation. The emoticon is a conventionalized rendition of the third type of nonverbal communication that Paul Ekman (b. 1934) and W. V. Friesen (b. 1933) labeled 'affect displays.' These displays are primarily facial indicators of emotional responses to certain stimuli (Ekman and Friesen, 1969: 69–81). Such responses are a pan-cultural programmatic response to certain affect antecedents (environment, expectations, memory) and they represent happiness, anger, surprise, fear, disgust, sadness, and so forth. Because of their quasi-universal nature, they may be encoded visually through depictions of the face. Table 1 illustrates this usage. In their volume on basic and applied studies of the Facial Action Coding System (FACS), Ekman and Friesen (1978) showed that there are certain facial gestures that correspond to basic emotions. With this system, Ekman and Friesen illustrated that it is possible to measure and code facial reflexes of certain basic emotions. These affect displays appear to be universal and the primary affects include happiness, surprise, fear, sadness, anger, disgust, and interest (Ekman and Friesen, 1969: 71).

Another combination of keyboard symbols may also be used to represent a sort of primitive drawing or pictograph, to imitate the appearance of people, animals, or objects, as shown in Table 2. These configurations are recognizable drawings of people, animals, and objects and are a modern retroflex of the primitive cave paintings found in various archaeological sites. These emoticons resemble the shapes of the original subjects and they are intended to represent them, using only the repertoire of available symbols on a typical keyboard.

Wong-Baker FACES Pain Rating Scale

The use of faces to depict degrees of pain provides health care personnel and their patients with a means of specifying the amount of suffering experienced. It also provides health care providers with an objective way of treating pain effectively. The Wong-Baker FACES Pain Rating Scale provides a scale from 0 to 5 or 0 to 10 that shows line art faces with differing degrees of pain, as illustrated in Figure 2. Research indicates that simplicity is key to understanding the amount of pain experienced by children, and the faces used in the Wong-Baker FACES Pain Rating Scale are the most efficient and accurate way to obtain this

information from children, who may not have the verbal sophistication to indicate their level of pain.

Traffic Signs

Traffic signs are iconic forms that contain coded visual information about traffic regulations and related information. Unique visual signs enhance comprehension of the 'rules of the road,' and color is key to conveying certain types of information, as described in Table 3. Traffic sign shapes also provide specific information for the driver (see Figure 3). Efforts have been made to internationalize traffic signs and signals in order to provide drivers worldwide with a uniform set of regulatory signs.

Word Games

Certain word games involve pictographs or icons. The classic example of this is the rebus (Latin for 'by means of things'), which is a word puzzle in which an icon stands for a phonetic value. Thus, the picture of a bee (iconic sign) and the Arabic numeral 9 (aniconic sign) represent the English word 'benign' (see Figure 4). Another common example is the picture of a fish fin (iconic sign) plus the letter L and the symbol '&' (aniconic signs), which visually represent the word for the European nation, 'Finland.' The key to solving visual word games is to pronounce in sequence each individual word that a picture or symbol represents (see Figure 5).

Visual icons are used to create other types of word games. The well-known 'concrete poems' became quite popular in the middle of the 20th century, and many of them are to be found in Mary Ellen Solt's (b. 1920) anthology (Solt, 1968). The visual typographical format in concrete poems imitates the shape actual shape of the semantic content of the poem. The Portuguese poet Salette Tavares (1922–1991) created a good example of this type of iconography. His

Table 3 Color meaning in traffic signs

Color	*Meaning*
Red	Informs the driver of requirements that the driver must follow – 'STOP,' 'YIELD,' 'DO NOT ENTER'
Yellow	Warns the driver of road conditions and dangers ahead – 'SOFT SHOULDERS,' 'ICE'
White	Informs the driver about traffic regulations, such as speed limits
Green	Informs the driver about directions, such as exits and distances

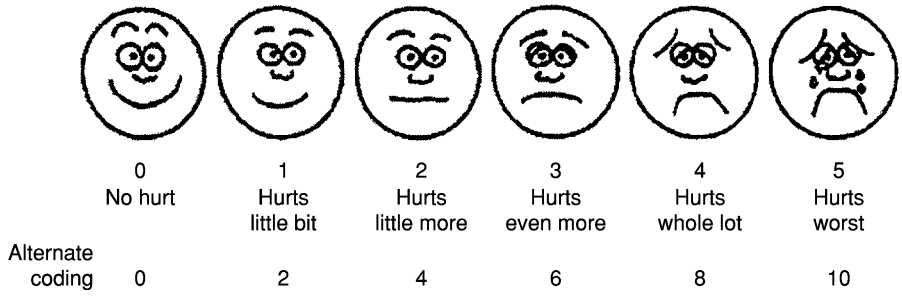

Figure 2 Wong-Baker FACES Pain Rating Scale. Reproduced with permission from Wong D L, Hockenberry-Eaton M, Winkelstein M L, and Schwartz P (2001). *Wong's essentials of pediatric nursing* (6th edn.), p. 1301. Copyrighted by Mosby, Inc., St. Louis.

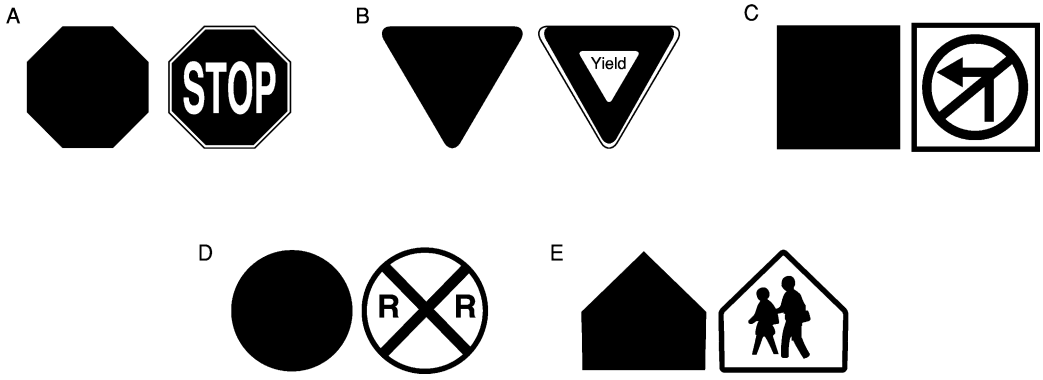

Figure 3 Shape meaning in U.S. traffic signs. (A) Octagon, 'STOP'; (B) triangle, 'YIELD'; (C) square, 'NO LEFT TURN' (square regulatory signs indicate rules that a driver must follow; superimposition of a red circle with a diagonal bar means 'NO'); (D) circle ('RAILROAD CROSSING'); (E) pentagon, 'CHILDREN CROSSING' (pentagon, or house, shape indicates a school zone).

poem, 'Arranhisso' (Solt, 1968: 190), utilizes the Portuguese word for spider (*aranha*) and its verbal derivatives (not all of which are real Portuguese words) to form the shape of a spider.

The forerunners of 20th-century concrete poetry were the emblematic poems of earlier times. One example is George Wither's (1588–1677) 'Rhomboidal dirge' (Bombaugh, 1961: 94), which has the shape of a rhomboid and is a sort of life review. Its shape reflects quite succinct recollections that represent the narrator's life. It begins and ends with the interjection "Farewell!" There is also the anonymous shape poem entitled 'A wine glass,' the verses of which create the profile of a wine goblet (Bombaugh, 1961: 93).

Figure 4 Rebus (English word 'benign'). Source: http://www.enchantedlearning.com.rhymes/topics.animals/shtml

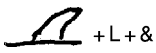

Figure 5 Rebus (English word 'Finland').

Another example, the emblematic poem by Joseph Miller (b. 1939) entitled 'If the Earth' is illustrated in Figure 6. Lewis Carroll's (pseudonym of Charles Lutwidge Dodgson, 1832–1898) 'Rat's tale' narrative (see Figure 7) in *Alice in wonderland* (1865) is an example of a mini-story that assumes the shape of its theme; this tale (a pun on the word 'tail') has the shape of a rat's tail.

Comics

Comics are sequences of related artwork. The technical designation for this narrative art form is 'lexi-pictogram.' The related sequences may be four contiguous panels in daily newspapers, or a dozen, in Sunday papers. Comic books, which are 24 to 32 pages in length, may be a single story or a collection of four different stories. Graphic novels, a relatively new phenomenon, may be several hundred pages in length, and tell full-length novelesque stories in pictures. The best qualitative example of this genre is Art Spiegelman's (b. 1948) 1992 Pulitzer Prize-winning *Maus*, a riveting tale about the Nazi concentration camps, with mice as the protagonists. Most often, comics are a combination of text and image, though some comics are completely visual, such as Jim Woodring's (b. 1952) *The Frank book*, in which the reader understands the meaning through visual

If the Earth
were only a few feet in
diameter, floating a few feet above
a field somewhere, people would come
from everywhere to marvel at it. People would
walk around it, marvelling at its big pools of water,
its little pools and the water flowing between the pools.
People would marvel at the bumps on it, and the holes in it,
and they would marvel at the very thin layer of gas surrounding
it and the water suspended in the gas. The people would
marvel at all the creatures walking around the surface of the ball,
and at the creatures in the water. The people would declare it
as sacred because it was the only one, and they would protect
it so that it would not be hurt. The ball would be the
greatest wonder known, and people would come to
pray to it, to be healed, to gain knowledge, to know
beauty and to wonder how it could be. People
would love it, and defend it with their lives
because they would somehow know that
their lives, their own roundness, could
be nothing without it. If the
Earth were only a few
feet in diameter.

Figure 6 Shape poem 'If the Earth.' Copyright by Joe Miller, 1975, Moab, Utah. Reproduced with permission.

"Fury said to
a mouse, That
he met in the
House, 'Let
us both go
to law: I
will prose-
cute *you.*–
Come, I'll
take no de-
nial: We
must have
the trial;
For really
this morn-
ing I've
nothing
to do.'
Said the
mouse to
the cur,
'Such a
trial, dear
sir. With
no jury
or judge,
would
be wast-
ing our
breath..'
I'll be
jury,'
said
cun-
ning
old
Fury;
I'll
try
the
whole
cause
and
con-
demn
you to
death'."

Figure 7 The narrative 'Rat's tale,' from Lewis Carroll's *Alice in wonderland*. The shape is emblematic of the semantic meaning.

material only. In fact, however, it is possible to describe this material verbally and to create a verbal narrative account of the reader's interpretation of the visual content. Will Eisner (b. 1911) calls comics 'sequential art' (Eisner, 1985). Since comics frequently contain text in the form of dialogue balloons emanating from the mouths of the characters (humans or animals), they are also narrative art.

Comics have been the subject of semiotic research since the 1960s. In this regard, Umberto Eco (b. 1932) analyzed visual metaphors (Eco, 1994). Likewise, Román Gubern (b. 1934; Gubern, 1972) and Fresnault-Deruelle (b. 1943; Fresnault-Deruelle, 1972) examined this form and its governing codes. Comic content and form obey certain codes, including shape and size of the panels, typeface, and pen and ink strokes, all of which are intended to reflect the mood (somber, humorous, frightful) of the narrative and the emotion (anxiety, joy, sadness) of the protagonists of the story line. Comics utilize verbal and nonverbal means to convey their messages.

Certain conventions are employed in the creation of a comic. The visual component of the comic follows a left-to-right chronological sequence with a set of visual iconic and linguistic materials. Comics consist of frames or panels that may be of equal or differing size and shape according to the action depicted. The pictorial elements include the scenario and the protagonists, whose states of mind are represented in their facial gestures and body language. Comics thus display a whole range of kinesic and proxemic behaviors through the use of distinct artistic techniques, such as mobilgrams, or motion lines, to specify direction and rapidity. The verbal component of the comic follows fairly strict codes, thus allowing the reader to understand the formalities of the medium once the meanings of the artistic techniques have been established. First, there are locugrams (speech balloons) with a connecting line to the mouth or face of the protagonist. Next is the line that envelops the locugram, the perigram, and its format depicts metaphorically the state of mind of the protagonist. Third, the psychopictogram (dream balloon) expresses the thoughts or dreams of the protagonist. Conventionalized ideograms, sometimes called sensograms, are iconic symbols that convey the emotions of the protagonist, which are culturally determined conventions; examples include the light bulb to indicate a sudden insight, or a heart with broken lines to indicate the sad outcome of a romantic relationship, and so forth. Phonosymbolism, or onomatopoetic protocol, is common in comics. The phonosymbols *Bam!* and *Wack!*, for example, represent the impact of fists in a fistfight (Chapman, 1984).

Among the techniques employed in the comic are visual perspective, parallel actions, flashbacks, and so forth. The ability to decipher the meaning of comics is culturally determined, though many of the conventions used in comics are shared in Western and Japanese cultures. Several books about comics provide excellent introductions to this medium, especially those by Davies (1995), Will Eisner (1985), Robert C. Harvey (1996), and Scott McCloud (1985).

Cartoons, found in many popular magazines, are distinct from comics because they are usually one panel in length and their content is usually political satire or commentary (Press, 1981). In addition to their function as political parody, single-panel cartoons may also simply be humorous.

See also: Comics: Semiotic Approaches; Computer-Mediated Communication: Cognitive Science Approach; Face; Iconicity: Literary Texts; Iconicity: Sign Language; Media and Language: Overview; Word and Image; Word Recognition, Written; Writing and Cognition.

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Pidgins and Creoles: Overview

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Definitions

European colonization during the 17th to 19th centuries created a classic scenario for the emergence of new language varieties called pidgins and creoles out of trade between the native inhabitants and Europeans. The term 'pidgin' is probably a distortion of English *business* and the term 'creole' was used in reference to a nonindigenous person born in the American colonies, and later used to refer to customs, flora, and fauna of these colonies. Many pidgins and creoles grew up around trade routes in the Atlantic or Pacific, and subsequently in settlement colonies on plantations, where a multilingual work force comprised of slaves or indentured immigrant laborers needed a common language. Although European colonial encounters have produced the most well known and studied languages, there are examples of indigenous pidgins and creoles predating European contact such as Mobilian Jargon (Mobilian), a now extinct pidgin based on Muskogean (Muskogee), and widely used along the lower Mississippi River valley for communication among native Americans speaking Choctaw, Chickasaw, and other languages (*see* **Mobilian Jargon**).

The study of pidgins and creoles raises fundamental questions about the evolution of complex systems, since pidgins, in particular, have been traditionally regarded as simple systems *par excellence*. The usual European explanation given for the simplicity, and lack of highly developed inflectional morphology in particular, was that it reflected primitiveness, native mental inferiority, and the cognitive inability of the natives to acquire more complex European languages. Thus, for example, Churchill (1911: 23) on Bislama, the pidgin English spoken in Vanuatu: "the savage of our study, like many other primitive thinker, has no conception of being in the absolute; his speech has no true verb 'to be'" (*see* **Bislama**).

Hampered by negative attitudes for many years, scholars ignored pidgins and creoles in the belief that they were not 'real' languages, but were instead bastardized, corrupted, or inferior versions of the European languages to which they appeared most closely related. Although scholars still do not agree on how to define pidgins and creoles, or the nature of their relationship to one another, most linguists recognize such a group of languages, whether defined in terms of shared structural properties and/or sociohistorical circumstances of their genesis. Striking similarities across pidgin and creole tense-mood-aspect (TMA) systems (*see* **Tense, Mood, Aspect: Overview**) were noted by some of the earliest scholars in the field such as Hugo Schuchardt, generally regarded as the founding father of creole studies (*see* **Schuchardt, Hugo (1842–1927)**). TMA marking became a focal point of debate among creolists as a result of the bioprogram hypothesis (Bickerton, 1981, 1984), according to which creoles held the key to understanding how human languages originally evolved many centuries ago (*see* **Evolutionary Theories of Language: Previous Theories** and **Evolutionary Theories of Language: Current Theories**). This theory led not only to an increase in research on these languages, but also a great deal of attention from scholars in other fields of linguistics, such as language acquisition and related disciplines such as cognitive science.

Classifying Pidgins and Creoles

The standard view that pidgins and creoles are mixed languages with the vocabulary of the superstrate (also called the lexifier or base language) and the grammar of the substrate (the native languages of the groups in contact) has been the traditional basis for classifying these languages according to their lexical affiliation. English-lexicon pidgins and creoles such as Solomon Islands Pijin spoken in the Solomon Islands or Jamaican Creole English (Southwestern Carribean Creole English) in Jamaica comprise a group of languages with lexicons predominantly derived from English. Haitian Creole French and Tayo, a French creole of New Caledonia, are French-lexicon creoles drawing most of their vocabulary from French. Such groupings are, however, distinctly different from the genetically-based language families established by the comparative historical method (*see*). Pidgins or creoles as a group are not genetically related among themselves, although those with the same lexifier usually are.

There is a great deal of variation in terms of the extent to which a particular pidgin or creole draws on its lexifier for vocabulary, and a variety of problems in determining the sources of words, due to phonological restructuring. Compare the lexical composition of Sranan and Saramaccan, two of six English-lexicon creoles spoken in Surinam, in what was formerly the Dutch-controlled part of Guyana. About 50% of the words in Saramaccan are from English (e.g., *wáka* 'walk'), 10% from Dutch (e.g., *strei* 'fight' < strijd), 35% from Portuguese (e.g., *disá* 'quit' < deixar), and 5% from the African substrate

languages (e.g., *totómbotí* 'woodpecker'. By contrast, only 18% of Sranan words are English in origin, with 4.3% of African origin, 3.2% of Portuguese, 21.5% of Dutch; 4.3% could be derived from either English or Dutch. Innovations comprise another 36%, and 12.7% have other origins. African words are concentrated in the semantic domains of religion, traditional food, music, diseases, flora, and fauna. Words from the other languages do not concentrate in particular semantic domains. Numbers, for instance, draw on both English and Dutch. Sranan and Saramaccan are not mutually intelligible, and neither is mutually intelligible with any of the input languages. Other languages show a more equal distribution between two main languages, such as Russenorsk, a pidgin once spoken along the Arctic coast of northern Norway from the 18th until the early 20th century. Its vocabulary is 47% Norwegian, 39% Russian, 14% other languages including Dutch (or possibly German), English, Saami, French, Finnish, and Swedish (*see* **Russenorsk**).

Many creoles, like Lesser Antillean (Lesser Antillean Creole French), a French-based creole spoken in the French Antilles, started out with a far more mixed lexicon than they possess today. Where contact with the main European lexifier was permanently terminated, as in Surinam, the lexicon retains a high degree of mixture to the present day; where such contact continued, as in the Lesser Antilles, items from the main lexifier tended gradually to replace items from other sources. Depending on the circumstances, a creole may adopt more items from the superstrate language due to intense contact. In Tok Pisin spoken in Papua New Guinea, some of the 200 German elements as well as words from indigenous languages, are now being replaced by English words. Thus, *beten* (German 'pray') is giving way to English *pre*, and Tolai (Kuanua) *kiau* to English 'egg' (*see* **Tok Pisin**).

Relationships between Pidgins and Creoles

The question of the genetic and typological relationship between pidgins and creoles and the languages spoken by their creators continues to generate controversy. Pidgins and creoles challenge conventional models of language change and genetic relationships because they appear to be descendants of neither the European languages from which they took most of their vocabulary, nor of the languages spoken by their creators. The conventional view of the languages and their relationship to one another found in a variety of introductory texts (Hall, 1966; Romaine, 1988) has been to assume that a pidgin is a contact variety restricted in form and function, and native to no one, which is formed by members of at least two (and usually more) groups of different linguistic backgrounds, e.g., Krio in Sierra Leone (*see* **Krio**). A creole is a nativized pidgin, expanded in form and function to meet the communicative needs of a community of native speakers, e.g., Haitian Creole French.

This perspective regards pidginization and creolization as mirror image processes and assumes a prior pidgin history for creoles. This view implies a two-stage development. The first involves rapid and drastic restructuring to produce a reduced and simplified language variety. The second consists of elaboration of this variety as its functions expand, and it becomes nativized or serves as the primary language of most of its speakers. The reduction in form characteristic of a pidgin follows from its restricted communicative functions. Pidgin speakers, who have another language, can get by with a minimum of grammatical apparatus, but the linguistic resources of a creole must be adequate to fulfill the communicative needs of human language users.

The degree of structural stability varies, depending on the extent of internal development and functional expansion the pidgin has undergone at any particular point in its life cycle. Creolization can occur at any stage in the development continuum from rudimentary jargon to expanded pidgin. If creolization occurs at the jargon stage, the amount of expansion will be more considerable than that required to make an expanded pidgin structurally adequate. In some cases, however, pidgins may expand without nativization. Where this happens, pidgins and creoles may overlap in terms of the structural complexity, and there will be few, if any, structural differences between an expanded pidgin and a creole that develops from it. Varieties of Melanesian Pidgin English (a cover term for three English-lexicon pidgins/creoles in the southwest Pacific comprising Tok Pisin, Solomon Islands Pijin and Vanuatu Bislama) are far richer lexically and more complex grammatically than many early creoles elsewhere. Their linguistic elaboration was carried out primarily by adult second language speakers who used them as lingua francas in urban areas. Creolization is thus not a unique trigger for complexity, and the 'same' language may exist as both pidgin and creole.

Debate continues about the role of children vs. adults in nativization and creolization. Other scholars have emphasized the discontinuity between creoles and pidgins on the basis of features present in certain creoles not found in their antecedent pidgins. They argue that ordinary evolutionary processes leading to gradual divergence over time may not be applicable to creoles. Instead, creoles are 'born again' nongenetic languages that emerge abruptly *ab novo* via a break

in transmission and radical restructuring (Thomason and Kaufman, 1988).

Origins

Because pidgins and creoles are the outcome of diverse processes and influences in situations of language contact where speakers of different languages have to work out a common means of communication, competing theories have emphasized the importance of different sources of influence. Few creolists believe that one theory can explain everything satisfactorily, and there are at least four theories accounting for the genesis of creoles: substrate, superstrate, diffusion, and universals.

Substrate

The substrate hypothesis emphasizes the influence of the speakers' ancestral languages. Structural affinities have been established between the languages of West Africa and many of the Atlantic creoles. Scholars have also documented substantial congruence between Austronesian substratum languages (*see* **Austronesian Languages: Overview**) and Pacific pidgins as compelling evidence of the historically primary role of Pacific Islanders in shaping a developing pidgin in the Pacific. Substrate influence can be seen in the pronominal systems of Melanesian Pidgin English such as the personal pronouns in Tok Pisin. The forms are rather transparently modeled after English, yet incorporate grammatical distinctions not found in English, but widely present in the indigenous languages forming the substrate.

	Personal pronouns in Tok Pisin		
	singular		plural
first person	*mi*	'I'	*mipela* 'we' (exclusive)
			yumi 'we' (inclusive)
second person	*yu*	'you'	*yupela* 'you'
third person	*em*	'he/she/it'	*ol* 'they'

Almost all Oceanic languages distinguish between inclusive (referring to the speaker and addressee(s), 'I + you') and exclusive first-person pronouns (referring to the speaker and some other person(s), 'I + he/she/it/they'). Thus, *yumi* consists of the features [+speaker, +hearer, +other] and *mipela*, [+speaker, −hearer, +other]. There are also dual and trial forms, e.g., *yumitupela* 'we two (inclusive)', i.e. [+speaker, +hearer, −other], *mitripela* 'we three (exclusive)', etc., although these distinctions are not always made consistently. As English provides no lexical forms for the inclusive/exclusive and dual distinctions or *you* plural, these are created by forming a compound from *you* + *me* to give *yumi* and *yumitupela,* and by using the suffix-*pela* ('fellow') to mark plurality in *yupela*. The third-person singular form *em* is derived from the unstressed third person singular *him* and the third person plural form *ol* from *all*.

A more controversial variant of the substrate hypothesis is incorporated into the notion of relexification, a process that applies to the words/structures of substrate language and matches them with phonological representations from the lexifier language. Haitian Creole French *gade* shares some meanings with the French verb *garder* 'to watch over/take care of/to keep', from which it derives its phonetic form, but it has an additional meaning 'to take care of/defend oneself'. The semantics of *gade* is very similar to that of the substrate Fongbe (Fon-Gbe) verb *kpón* 'to watch over/take care of/to keep/to look'. Haitian Creole French *gade* also means 'to look', while in French that meaning is expressed by *regarder.* These similarities have led some scholars to regard Haitian Creole French as a French relexification of African languages of the Ewe-Fon (or Fongbe) group (Lefebvre, 1998).

Superstrate

The superstrate hypothesis traces the primary source of structural features to nonstandard varieties of the lexifiers, and to evolutionary tendencies already observable in them (Chaudenson, 1992). According to this scenario, early plantation slaves acquired a normally transmitted variety of the lexifier directly from Europeans, but this imperfectly acquired variety was subsequently diluted over time as successive generations of slaves learned from other slaves rather than from Europeans. Creoles thus represent gradual continuous developments with no abrupt break in transmission from their lexifiers. This evidence eliminates the assumption of a prior pidgin history and accepts creoles as varieties of their lexifiers rather than as special or unique new languages. That is, there are no particular linguistic evolutionary processes likely to yield (prototypical) creoles; they are produced by the same restructuring processes that bring about change in any language. Creoles are neither typologically nor genetically unique, but 'advanced varieties' of the lexifiers.

Linguistic evidence supporting this hypothesis can be found in morphemes or constructions chosen for specific grammatical functions that start from models available in the lexifiers. Haitian Creole French *m pu alle* 'I will go' may not be a totally new and radical departure from French but could instead be derived from regional French *je suis pour aller.*

Diffusion

Another explanation for some of the similarities among pidgins and creoles is diffusion of a pre-existing pidgin.

According to this hypothesis, a pre-existing English or French pidgin was transplanted from Africa rather than created anew independently in each territory. Support for this hypothesis can be found in historical evidence that sailors diffused not only words with nautical origins from one part of the world to another, but also items that were more generally part of regional and nonstandard usage. Thus, *capsize* was probably originally a nautical term meaning 'to overturn a boat'. Today, *kapsaitim* in Melanesian Pidgin English means 'to spill or overturn anything'. Traders, missionaries, and early settlers were also responsible for diffusing certain elements. Words from Portuguese such as *savvy* (<sabir 'to know/understand', first attested in 1686) are found widely around the world. Scholars have traced the paths of diffusion of so-called worldwide features found in Anglophone pidgins and creoles from the Atlantic to Pacific (Baker and Huber, 2001). Words from indigenous languages are also widespread, e.g., African *nyam* 'eat/food' and Hawaiian *kanaka* 'person/man', a term that came to be used, often derogatorily, to refer to Pacific Islanders.

Universals

This theory actually comprises a variety of sometimes opposing viewpoints because universals have been conceived of in a variety of ways within different theoretical perspectives. Its central assumption is that creoles are more similar to one another than the languages to which they are otherwise most closely related due to the operation of universals. Although it has become fashionable to refer to a common creole syntax or creole prototype, not all creolists agree on the nature or extent of the similarities or the reasons for them. If creoles form a synchronically definable class, then there should be more similarities between Haitian Creole French and Guyanese Creole English than between Haitian Creole French and French, or between Guyanese Creole English and English. One kind of universalist claim is that creoles reflect more closely universal grammar and the innate component of the human language capacity (*see* **Linguistic Universals, Chomskyan**). Another, however, is grounded within a different notion of universals derived from crosslinguistic typology and theories of markedness (*see* **Linguistic Universals, Greenbergian**). The observation that creoles tend to be isolating languages even when the contributing languages show a different typology has a long history predating modern typological theories (*see* **Morphology in Pidgins and Creoles**). Kituba, for example, emerged almost exclusively from contact among Bantu languages that are agglutinative.

The notion of creoles as the simplest instantiation of universal grammar is at the heart of Bickerton's (1981) bioprogram hypothesis, which applies to radical creoles, i.e., those that have undergone a sudden creolization without further major superstrate influence. It is based to a large extent on similarities between Hawai'i Creole English, Guyanese Creole English, Haitian Creole French, and Sranan. Evidence from Hawai'i Creole English has been the cornerstone of the bioprogram because creolization has been more recent there than in many other cases, and because the language lacked an African substrate, yet was strikingly similar to other creoles (*see* **Hawaiian Creole English**). This similarity is explained by assuming that creoles represent a retrograde evolutionary movement to a maximally unmarked state.

Bickerton (1981) proposed a list of 13 features shared by creoles that were not inherited from the antecedent pidgins, and therefore must have been created by children as a result of the bioprogram.

1. Focused constituents are moved to sentence initial position, e.g., Haitian Creole French *se mache Jan mache al lekol* 'John walked to school'.
2. Creoles use a definite article for presupposed specific noun phrases, indefinite articles for asserted specific noun phrases, and zero for nonspecific noun phrases. Hawai'i Creole English uses definite article *da* for presupposed specific noun phrases, e.g., *she wen go with da teacher* 'she went with the teacher', indefinite article *one* typically for first mention, e.g., *he get one white truck* 'he has a white truck', and no article or maker of plurality for other noun phrases, e.g., *young guys they no get job* 'Young people don't have jobs'.
3. Three preverbal morphemes express tense (anterior), mood (irrealis), and aspect (durative) in that order, e.g., Haitian Creole French *li te mache* 'he walked', *l'av(a) mache* 'he will walk', *l'ap mache* 'he is walking'.
4. Realized complements are either unmarked or marked with a different form than the one used for unrealized complements, e.g., Mauritian Creole French (Morisyen) *il desid al met posoh ladah* 'she decided to put a fish in it' vs. *li ti pe ale aswar pu al bril lakaz sa garsoh–la me lor sime ban dayin lin atake li* 'He would have gone that evening to burn the boy's house, but on the way he was attacked by witches'.
5. Creoles mark relative clauses when the head noun is the subject of the relative clause, e.g., Hawai'i Creole English *some they drink make trouble* 'Some who drink make trouble'.
6. Nondefinite subjects, nondefinite verb phrase constituents, and the verb must all be negated in

negative sentences, e.g., Guyanese Creole English *non dag na bait non kyat* 'no dog bit any cat'.

7. Creoles use the same lexical item for both existentials and possessives, e.g., Hawai'i Creole English *get one wahine she get one daughter* 'There is a woman who has a daughter'.
8. Creoles have separate forms for each of the semantically distinct functions of the copula (i.e., locative and equative), e.g., Sranan a *ben de na ini a kamra* '(s)he was in the room.' vs. *mi na botoman* 'I am a boatman'.
9. Adjectives function as verbs, e.g., Jamaican Creole English *di pikni sik* 'the child is sick'. This function explains the absence of the copula in this construction.
10. There are no differences in word order between declaratives and questions, e.g., Guyanese Creole English *i bai di eg dem* means 'he bought the eggs' or 'did he buy the eggs?', depending on intonation.
11. Questions particles are optional and sentence final, e.g., Tok Pisin *yu tok wanem*? 'what did you say'. Question words are often bimorphemic, e.g., Haitian Creole French *ki kote* 'where' (French *qui coté* 'which side'), and Tok Pisin *wanem* 'which/what' (English *what name*).
12. Formally distinct passives are typically absent, e.g., Jamaican Creole English *dem plaan di tree* 'they planted the tree' vs. *di tree plaan* 'the tree was planted'.
13. Creoles have serial verb constructions in which chains of two or more verbs have the same subject, e.g., Nigerian Pidgin English (Pidgin, Nigerian) *dem come take night carry di wife, go give di man* 'They came in the night and carried the woman to her husband'. (*see* **Serial Verb Constructions**).

There are also many similarities in the source morphemes used by creoles to express these distinctions. The semantics of the grammatical morphemes are highly constant as are their etymologies; in almost all cases, they are drawn from the superstrate language. The indefinite article is usually derived from the numeral 'one', the irrealis mood marker from a verb meaning 'go', the completive marker from a verb meaning 'finish', the irrealis complementizer from a reflex of 'for', etc.

Support for the uniqueness of these features to creoles is, however, weakened by the existence of some of the same traits in pidgins as well as in the relevant substrates and superstrates. The relexification hypothesis argues that the typological traits of Haitian Creole French display more in common with those of the substrate language Fongbe than with French. If so, then the supposed creole typology results from the reproduction of substratum properties rather than from the operation of universals. Bimorphemic question words are also found in many of the African substrate languages, and English has *what time* 'when', *how come* 'why', etc. It is also well within the norms of colloquial French and English to use intonation rather than word order to distinguish questions from declaratives, e.g., *you're doing what*? The absence of passives may also reflect the lack of models in some of the substrate and superstrate languages.

Closer study of the particulars of individual TMA systems in creole languages has engendered increasing dissatisfaction with the bioprogram hypothesis (Singler, 1990). For one thing, the claims were originally formulated on the basis of data from creoles whose superstrate languages are Indo-European. Secondly, it is also unclear how much creole TMA systems might have changed over time after creolization. The bioprogram assumes that the creoles in question have not departed from their original TMA prototype and that the present day systems provide evidence of relevance for its operation. Thirdly, even the defining languages do not conform entirely to predictions on closer examination. The TMA system of Hawai'i Creole English is not crosslinguistically unique or even unusual; the overwhelming majority of its TMA categories are common in languages of world (Velupillai, 2003). More detailed investigations of historical evidence indicate that Bickerton's scenario of nativization bears little resemblance to what actually happened in Hawai'i (Roberts, 2000).

The typology of creoles might also be largely a result of parameter settings typical of languages with low inflectional morphology (*see* **Principles and Parameters Framework of Generative Grammar**). Thus, features such as preverbal TMA markers, serial verbs, and SVO word order fall out more generally from lack of inflections and unmarked parametric settings. McWhorter (1998) attempts to vindicate creoles as a unique typological class by proposing a diagnostic test for 'creolity' based not on specific shared structural features such as TMA markers, serial verbs, etc., but on a combination of three traits resulting from a break in transmission: little or no use of inflectional affixation, little or no use of lexical tone, and semantically regular derivational affixation. McWhorter's explanation for why these traits cluster essentially reiterates the conventional assumption that pidgins are languages that have been stripped of all but the bare communicative necessities in order to speed acquisition. Because creoles are new languages that emerge from pidgins, they have not had the time to develop many of the complexities found in other languages that have developed gradually over a much longer time period. Thus, he predicts

that features such as ergativity (*see* **Ergativity**), a distinction between alienable and inalienable possession, switch reference marking (*see* **Switch Reference**), noun class or grammatical gender marking (*see* **Gender, Grammatical**), etc. will never be found in creoles. This theory means that not only are creoles typologically unique, but also that they are the simplest languages. Those who stress the role of substrate influence and relexification, however, have argued that the reason why these features do not surface in creoles even where they are present in the substrate is because there are no appropriate phonetic strings in the superstrate to match them with.

The question of how to measure simplicity and complexity is theory-dependent and therefore controversial. McWhorter's (2001) complexity metric is based on degree of overt signalling of various phonetic, morphological, syntactic, and semantic distinctions. From this perspective, a phonemic inventory can be considered more complex if it contains more marked members than some other (*see* **Phonological Universals**). Markedness is interpreted in terms of frequency of representation among the world's languages. Ejectives and clicks are more marked than ordinary consonants because they occur less frequently. The presence of rarer sounds in an inventory also presupposes the existence of more common or less marked ones. However, there may be other dimensions of simplicity/complexity to consider, such as syllable/word structure. Much less is known about the phonology of pidgins and creoles than about their syntax and lexicon. Syntax is rendered more complex by the additional of rules that make it more difficult to process, e.g., different word orders for main and subordinate clauses. Inflectional marking is assumed to be more difficult than the use of free morphemes. However, there is no universally accepted account of syntactic rules nor an agreed theory of processing. Semantically, creoles are more transparent and adhere more closely to the principle of one form–one meaning.

There are problems with this view too, because creoles do not share their features universally or exclusively. There are examples of noncreole languages with the assumed typical creole-like features, and some examples of languages with no known creole history that are less complex than some creoles. Given that language change may also lead to simplification, some languages that are older than creoles may also be less complex than creoles. Similarities among creoles may be the result of chance similarities among unrelated substrates. Although the absence of inflection is perhaps the most often cited typological feature of creoles, it may be the accidental result of limited typological spread of the contributing languages.

Yet another interpretation of the universalist approach involves the assumption that common processes of restructuring apply in situations of language contact to produce common structural outcomes. The effects of contact may operate to differing degrees depending on the social context, e.g., number and nature of languages involved, extent of multilingualism, etc. The fact that pidgins and creoles share some structural features with each other and with other language varieties that are reduced in function such as koines, learner varieties, etc., indicates that the same solutions tend to recur to some degree wherever acquisition and change occurs, regardless of contact, but especially in cases of contact. The entities called pidgins and creoles are salient instances of the processes of pidginization and creolization respectively, although they are not in any sense to be regarded as unique or completed outcomes of them. From this point of view, pidgins represent a special or limiting case of reduction in form resulting from restriction in use.

This statement brings us back to the position that the only thing special about creoles is the sociohistorical situation of language contact in which they emerge. Even that may not be so special when we consider the history of so-called normal languages, most of which are hydrid varieties that have undergone restructuring to various degrees depending on the circumstances. Even 'normal' languages such as English have been shaped by heavy contact with non-Germanic languages and thus can be thought of as having more than one parent. If universal grammar is a mental construct, or an innate predisposition to develop grammar, then in so far as there is no psychological continuity between the mental representations of one generation of speakers of a language and the next, all grammars are created anew each generation. There will always be a certain amount of discontinuity between the grammars of parents and children, and acquisition is always imperfect. Thus, the supposed dichotomy between normal and abrupt transmission is spurious because normal transmission is in fact abrupt.

Directions for Future Research

Resolution of some of the debates about pidgins and creoles, their origins, and their relationships to one another as well as to the languages spoken by their creators is hampered by lack of knowledge of the relevant substrate languages as well as insufficient knowledge of the history of the nonstandard varieties

of European languages that formed the lexifiers. There are few detailed grammatical descriptions of pidgins and creoles available for sophisticated typological analysis. More sociohistorical research is also needed. Earlier scholarship often overstated the similarities among creoles and ignored key properties unique to individual ones.

See also: Austronesian Languages: Overview; Bislama; Congo, Democratic Republic of: Language Situation; Ergativity; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Gender, Grammatical; Guyana: Language Situation; Haiti: Language Situation; Hawaiian Creole English; Jamaica: Language Situation; Krio; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Mauritius: Language Situation; Mobilian Jargon; Morphology in Pidgins and Creoles; New Caledonia: Language Situation; Nigeria: Language Situation; Norway: Language Situation; Papua New Guinea: Language Situation; Phonological Universals; Principles and Parameters Framework of Generative Grammar; Russenorsk; Russian Federation: Language Situation; Schuchardt, Hugo (1842–1927); Serial Verb Constructions; Sierra Leone: Language Situation; Solomon Islands: Language Situation; St Lucia: Language Situation; Suriname: Language Situation; Switch Reference; Tense, Mood, Aspect: Overview; Tok Pisin; United States of America: Language Situation; Vanuatu: Language Situation.

Language Maps (Appendix 1): Maps 47, 48.

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Pike, Kenneth Lee (1912–2000)

F Robbins, Dallas, TX, USA

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Kenneth Lee Pike was born in East Woodstock, Connecticut, a country doctor's next-to-youngest child (of eight children). He studied at Gordon College in Boston, Massachusetts (Th.B. in theology and missions, 1933), and later at the University of Michigan under Charles Fries (Ph.D. in linguistics, 1942). He served for some 30 years on the Michigan faculty (1947–1977). Pike received the Distinguished Faculty Achievement award at Michigan (1966). He held the Charles C. Fries Professorship in Linguistics from l974 to 1977. He chaired the Department of Linguistics for two years (l975–1977) and served as director of the English Language Institute of the University of Michigan (1976–1977). After his retirement from Michigan he moved to the SIL center in Dallas. Pike was made Adjunct Professor at the University of Texas at Arlington in 1981.

To understand Pike the linguist, one must understand Pike the man. He considered every aspect of life related to every other aspect, in ways orchestrated by God. For Pike, there was no conflict in this perspective. His first commitment was to God, and his scholarly work was service to God – his faith and learning fully integrated.

Pike spent the summer of 1935 studying under W. Cameron Townsend at Camp Wycliffe, a small training institute in linguistics in Sulphur Springs, Arkansas (subsequently called the Summer Institute of Linguistics). Committing himself to serve the minority language communities of the world, he went with Townsend to Mexico and began to study and learn the Mixtec language of San Miguel el Grande, toward translating the New Testament. Pike's analysis of Mixtec, particularly the tone, was seminal in his whole approach to language. In 1935, Pike met Mr. Townsend's niece, Evelyn Griset. In 1938, Pike and Griset were married. They made a formidable team in both training and research in linguistics, while rearing their three children.

Pike's interests and research went far beyond linguistics, as reflected in Headland's listing (in Wise *et al.*, 2003: 13) by decades of emphases in his publications:

1940s: sounds of language: phonetics and phonemics, tone and intonation
1950s: anthropology and language in relation to culture, developing his holistic view
1960s: mathematics
1970s: grammatical analysis
1980s: philosophy.

Convinced of the need for scholarly excellence in the translation endeavor, Townsend sent Pike to study with Edward Sapir at the Linguistics Institute of the Linguistic Society of America (University of Michigan, summer 1937). Later, during Pike's 30 years on Michigan's faculty, he divided his time between the University of Michigan and SIL: directing the Summer Institute of Linguistics at the University of Oklahoma, starting other SIL schools, helping SIL colleagues around the world to analyze the languages they were studying, and encouraging them to publish the results.

Following his holistic view Pike developed 'tagmemics,' in which the *tagmeme* is a paradigmatic slot-class unit within a syntagmatic unit. Ken and Evelyn Pike co-authored *Grammatical analysis* (1972), which has been used as a tagmemics textbook in several countries.

Pike urged SIL colleagues to study at universities where theories opposed to tagmemics were taught, and to incorporate insights from all theories into whatever one they adopted. He lectured in 42 countries and studied well over a hundred indigenous languages, including languages in Australia, Bolivia, Cameroon, Côte d'Ivoire, Ecuador, Ghana, India, Indonesia, Mexico, Nepal, New Guinea, Nigeria, Peru, the Philippines, and Togo.

Pike's honors include:

Presidential Medal of Merit from the Philippines
Dean's Medal at Georgetown University
Nobel Peace Prize nominee, 15 successive years
Templeton Prize nominee, three times
Member of the National Academy of Sciences
President of Summer Institute of Linguistics (now SIL International) for 37 years
President Emeritus of SIL
President of the Linguistic Society of America (1961)
President of the Linguistic Association of Canada and the United States (1977–1978).

Pike received honorary doctorates and professorships from universities around the world, including the University of Chicago, Université René Descartes, the University of Lima, and Albert-Ludwigs-Universität in Freiburg. Not long before his death in 2000 a banquet was held in a Dallas hotel to honor Pike.

The most complete bibliography of Pike is Spanne, J. & Wise, M. R. (2003). 'The writings of Kenneth

Pike,' in Wise *et al.* (2003: 57–81). Over the period of 65 years, Pike authored and edited more than 30 books, over 200 scholarly articles, 90 articles for popular magazines, 8 poetry collections, Scripture translations, individual poems, instruction workbooks, and video and audio recordings, all reflecting his integration of faith and scholarly endeavor.

See also: Fries, Charles Carpenter (1897–1967); Phoneme; Sapir, Edward (1884–1939); Summer Institute of Linguistics; Tagmemics.

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Pima *See:* Tohono O'odham.

Pitcairn Island: Language Situation

Editorial Team

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A group of volcanic islands in the South Pacific Ocean, the Pitcairn are situated about midway between Peru and New Zealand. Although the islands show signs of a previous settlement by people presumably of Polynesian extraction, they were uninhabited when they were settled in 1790 by a group of British mutineers from His Majesty's armed ship *Bounty*. The men took with them twelve Tahitian women to be their spouses, and six Tahitian men to be their helpers. Relations among the islanders were not always of the best, the Tahitians tried to escape on a few occasions, but by 1800 all the survivors had resigned themselves to life on Pitcairn and already 24 children had been born there. Because resources were thought insufficient to sustain life on Pitcairn in the long term, the community, made up of a modest number of islanders despite the occasional arrival of new settlers, relocated twice to other islands. In 1831 all the inhabitants of Pitcairn moved to Tahiti, but the comparatively laxer customs they found there and the deficient immunity to new diseases drove the islanders back to Pitcairn. In 1856, all 194 islanders moved to Norfolk Island, a previous British penal colony by then unoccupied, but many were unhappy there and a good number of families returned to Pitcairn in the following years. Pitcairn Island has been permanently settled ever since, although the population has been fluctuating between high peaks such as the one of 1937 with 233 islanders and low peaks such as the present one with only approximately 50 inhabitants. Pitcairn Island is now a British overseas territory and English is the official language, used in all formal

Pike,' in Wise *et al.* (2003: 57–81). Over the period of 65 years, Pike authored and edited more than 30 books, over 200 scholarly articles, 90 articles for popular magazines, 8 poetry collections, Scripture translations, individual poems, instruction workbooks, and video and audio recordings, all reflecting his integration of faith and scholarly endeavor.

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A group of volcanic islands in the South Pacific Ocean, the Pitcairn are situated about midway between Peru and New Zealand. Although the islands show signs of a previous settlement by people presumably of Polynesian extraction, they were uninhabited when they were settled in 1790 by a group of British mutineers from His Majesty's armed ship *Bounty*. The men took with them twelve Tahitian women to be their spouses, and six Tahitian men to be their helpers. Relations among the islanders were not always of the best, the Tahitians tried to escape on a few occasions, but by 1800 all the survivors had resigned themselves to life on Pitcairn and already 24 children had been born there. Because resources were thought insufficient to sustain life on Pitcairn in the long term, the community, made up of a modest number of islanders despite the occasional arrival of new settlers, relocated twice to other islands. In 1831 all the inhabitants of Pitcairn moved to Tahiti, but the comparatively laxer customs they found there and the deficient immunity to new diseases drove the islanders back to Pitcairn. In 1856, all 194 islanders moved to Norfolk Island, a previous British penal colony by then unoccupied, but many were unhappy there and a good number of families returned to Pitcairn in the following years. Pitcairn Island has been permanently settled ever since, although the population has been fluctuating between high peaks such as the one of 1937 with 233 islanders and low peaks such as the present one with only approximately 50 inhabitants. Pitcairn Island is now a British overseas territory and English is the official language, used in all formal

settings, from politics to education. However, Pitcairn (Pitcairn-Norfolk), which has developed out of the English/Tahitian pidgin first used by the *Bounty* mutineers and their wives, is still used by the islanders as a second language, as it serves to strengthen group identity.

See also: Norfolk Island: Language Situation.

Pitjantjatjara/Yankunytjatjara

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Pitjantjatjara, along with its neighboring dialect Yankunytjatjara, are part of the Western Desert Language (WDL) – a vast dialect continuum located in the arid and sparsely populated central and western inland of Australia (*see* **Australian Languages; Australia: Language Situation**). The two dialects are commonly referred to jointly as P/Y. There are about 2500 P/Y speakers. Since it is still being acquired by children, P/Y counts as one of the less endangered of Australian languages.

As a typical Pama-Nyungan language, WDL is agglutinative (chiefly suffixing), with well developed systems of nominal and verbal inflection. Canonical constituent order is S (O) (PP) V, but can vary rather freely. Ellipsis of third person arguments, when the referent can be understood in context, is common. Nominal inflection is of the split ergative variety. The verbal system has eight tense-aspect-mood categories, with complex allomorphy governed by a system of four conjugational classes. Serial verb constructions (*see* **Serial Verb Constructions**) of several types, abound. P/Y has a switch-reference system in several subordinate clause types, and in coordinate constructions. Aspects of P/Y have been studied by a number of linguists. There are three major grammars and a substantial dictionary, a range of pedagogical material, and a variety of specialized linguistic studies. A wide range of vernacular texts of traditional stories, ethnoscience, and oral histories has been published locally.

Sociocultural and Historical Aspects

The similarity between the two dialects has been reinforced by shared historical experiences in the wake of European intrusion early last century, including long periods of co-residence on mission and government settlements, and, subsequently, in self-managed Aboriginal communities. Most speakers now co-reside on Aboriginal-owned lands in the northwest of the state of South Australia and adjacent areas in the Northern Territory. For a long time Pitjantjatjara was the prestige variety, because it had been adopted by missionaries at Ernabella for Bible translation and use in Christian worship, and was subsequently used in bilingual education programs in local primary schools. Lately the two dialects have been moving towards parity of esteem. Many Australian and international tourists encounter P/Y when they visit the Ulu<u>r</u>u National Park in central Australia.

Though the two dialects share about 80% vocabulary, there are a number of prominent dialect-specific words, and these form the basis of the traditional WDL system for referring to speech varieties. Pitjantja-tjara and Yankunytja-tjara are based on alternative (nominalized) forms of verbs meaning 'come/go' (suffix *-tjara* means 'having'). Northern and southern varieties of Yankunytjatjara can be termed Mulatjara and Matutjara, respectively, based on alternative forms of the adverb 'true.' In earlier times, there was a multiplicity of such terms in use. The system was highly relativistic, allowing for cross-cutting categorization and for different levels of inclusiveness, which suited the traditional mobile and dynamic social economy. These days the terms Pitjantjatjara and Yankunytjatjara have acquired more stable and 'name-like' sociopolitical functions.

Traditional P/Y culture is replete with symbolism (totemism) and religious myth. There are hundreds of Dreaming stories, songs, and ceremonies. There is a large body of traditional folktales for children. Many P/Y speech practices have parallels in the other languages of Australia. These include the existence of hortatory rhetoric (*al<u>p</u>iri*), elaborate verbal indirectness practiced with certain categories of kin (and total avoidance with others), and prescribed 'joking relationships' characterized by mock insult and abuse. There is a taboo against using the names of recently deceased persons in the presence of bereaved relatives. An auxiliary register, i.e., a special vocabulary (termed *anitji*), is used during ceremonial times.

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Structure

Phonology

P/Y has 17 consonant phonemes: see Table 1. There are five places of articulation, each with a stop and a nasal. There are two series of apicals, i.e., consonants pronounced with the tongue tip as active articulator: alveolar and post alveolar (retroflex). There is a single laminal series, with the tongue blade as active articulator. There are three vowels (*a, i, u*), each with a length distinction, though long vowels are not common and are confined to initial syllables.

P/Y phonotactics stipulate that a word must have at least two vowels, with long vowels counting as two for this purpose. Several morphophonemic rules refer to whether a stem has an odd or even number of vowels, making it convenient to work in terms of morae, with long vowels counting as two morae. Words usually start with a single consonant and never with more than one. Inside a word, CC clusters occur subject to strict limitations. Most common are homorganic 'nasal/lateral + stop' sequences. Only a very limited set of consonants (*n, ny, n, ly, r*) is permitted word-finally, and then only in the Yankunytjatjara variety. In Pitjantjatjara, consonant-final words are blocked by addition of the syllable-*pa*.

Morphology and Syntax

A number of these features are illustrated in the text extract at the end of this section.

Table 1 Pitjantjatjara/Yankunytjatjara consonant phonemes, in standard orthography (Goddard, 1985: 11)

	Apical		*Laminal*		
	Alveolar	*Postalveolar*	*Dental*	*Bilabial*	*Dorsal*
Stops	t	ṭ	tj	p	k
Nasals	n	ṇ	ny	m	ng
Laterals	l	ḷ	ly		
Tap	r				
Glides		ṛ	y	w	

Nominal Morphology

The case system includes nominative, ergative, accusative, genitive/purposive, locative, allative, ablative, and perlative cases. Typically a case-marker is applied only to the final word of an NP. Since modifiers generally follow their heads, a typical multi-word NP looks like: *wati puḷka kutjara-ku* [man big two-PURP] 'for two big men.' Like most other Pama-Nyungan languages, there is a split marking system for the core cases. For both nouns and pronouns, the nominative case is unmarked. With nouns, accusative case goes unmarked but there is a marked ergative form (with *-ngku/-lu* or a variant). With pronouns, the ergative goes unmarked but there is a marked accusative (with *-nya*). Split case-marking is sometimes described in terms of two distinct case systems: nominative-accusative for pronouns and ergative-absolutive for nouns. Aside from being less economical, such an analysis has difficulty with various complex NP constructions involving both nouns and pronouns. For example, inalienable possession constructions can bring body-parts and pronouns into a single NP, and inclusive constructions can bring names and pronouns into a single NP. For example, to say that someone hit me on the head, one uses the NP *ngayu-nya kata* [1SG-ACC head:ACC] 'me head.' To say that Kunmanara and someone else did something to someone, one uses the NP *Kunmanara-lu pula* [name-ERG 3DL:ERG].

Ergative and locative case allomorphy depends on whether the word to be marked is vowel- or consonant-final, and on whether the NP is an ordinary noun-phrase, on the one hand, or a pronoun or proper noun, on the other. Ergative is *-ngku* (common) or *-lu* (proper) with vowel-final words, and otherwise *-Tu* (where *T* is a homorganic stop). Locative is *-ngka* (common) or *-la* (proper) with vowel-final words, and otherwise *-Ta*. Genitive/purposive case is marked with *-ku* (nouns) or *-mpa* (pronouns, except for 1SG *ngayu-ku*). Locative also expresses instrumental and comitative functions; e.g., *puṇu-ngka* [stick-LOC] 'with a stick,' *untal-ta* [daughter-LOC] 'with (my) daughter.'

Pronouns distinguish singular, dual, and plural numbers (see Table 2). Most WDL dialects also

Table 2 Pitjantjatjara/Yankunytjatjara subject free pronouns (Goddard, 1996: xi)

Subject	*Singular (sg)*		*Dual (du)*		*Plural (pl)*	
First person	*ngayu(lu)*[a]	'I'	*ngali*	'we two'	*ngana*ṇ*a*	'we'
Second person	*nyuntu*	'you'	*nyupali*	'you two'	*nyura*	'you'
Third person	*palu(*ṛ*u)*	'he, she, it'	*pula*	'they two'	*tjana*	'they'

[a] The syllables in parentheses are dropped when case suffixes are added.

have enclitic or 'bound' pronouns that can be used instead of or in addition to free pronouns. They appear attached to the first phrase of a sentence, conjunctions counting as phrases for this purpose. P/Y has the following defective set – nominative/ergative: *-na* 1SG, *-n* 2SG, *-li* 1DU, *-la* 1PL, *-ya* 3PL; accusative: *-ni/-tja* 1SG, *-nta* -2SG, *-linya* 1DU, *-lanya* 1PL. Bound pronouns are not obligatory in P/Y, though they are common. There are four demonstrative stems: *nyanga* 'this,' *pala* 'that,' *nyara* 'that over there,' and the anaphoric demonstrative *panya* 'that one, you know which.'

Verbs

All WDL dialects share a similar system of tense-aspect-mood categories and four conjugational classes, though the details differ from dialect to dialect. The P/Y categories are: present, past, past imperfective, future, imperative, imperative imperfective, and characteristic. In addition, there are serial and nominalized verb forms. Each verbal category is manifested by up to four different allomorphs (e.g., imperative: *-ø*, *-la*, *-wa*, *-ra*), depending on the conjugational class. The P/Y system is economically analyzed in terms of three stem types: a simple stem which functions as a base for perfective categories, an augmented stem for imperfective categories, and an additional augmented stem for the aspect-neutral forms: see Table 3. The augmented forms were probably inflected words in an earlier stage of the language, with the present-day forms resulting from 'double-marking.'

The ø-class and l-class are open, with predominantly intransitive and transitive memberships, respectively. The ng-class and n-class are likewise predominantly intransitive and transitive respectively, but they have only a handful of basic roots each. These roots, furthermore, are the only monosyllabic verb roots in the language: n-class: *ya-* 'go,' *tju-* 'put,' *ma-* 'get'; ng-class: *pu-* 'hit,' *nya-* 'see' and *yu-* 'give' (examples from Yankunytjatjara). The overall membership of the ng-class and n-class is very large, however, because numerous verbs are formed by compounding with the basic roots or via derivational affixation. Derivational processes are sensitive to mora parity, as well as to the transitivity preference of the verb class. For example, the main intransitive verbaliser is suffix *-ri/-ari*. The derived stem belongs to the ng-class if it has an even number of morae, and to ø-class if it has an odd number of morae.

Complex Sentences

A single clause may contain more than one verb, if the subsidiary verbs are suffixed with the serial ending. It is common in narratives for clauses to contain several serial verbs, as well as the main finite verb. The grammar of serial verbs and their associated NPs and modifiers is quite complex. Typically for WDL, subordinate clauses are formed by adding case suffixes to a nominalized clause. For example, a purposive clause is formed with suffix *-ku* (identical with purposive case), e.g., *kungka-ngku mai pau-ntja-ku* [woman-ERG food bake-NOML-PURP] 'so the woman could cook food.' Inside the subordinate clause, the subject, object, and any other NPs occur with the same case-marking as they would have in a simple clause. The circumstantial clause is formed in Yankunytjatjara with suffix *-la* (one of the locative suffixes), e.g., *kungka-ngku mai pau-ntja-la* [woman-ERG food bake-NOML-LOC] 'while/because the woman cooked the food.' The Pitjantjatjara circumstantial is *nya-ngka*, which has likely descended from an earlier **-nytja-ngka* (simplification of the first of two nasal-stop clusters is common in WDL phonology). Another subordinate type is the aversive clause, which identifies an outcome to be avoided or prevented.

P/Y purposive and circumstantial clauses comply with a 'switch reference' constraint, i.e., they can only be used if the subordinate clause subject refers to a different individual to the main clause subject. If the subjects are the same, a different subordinate

Table 3 Pitjantjatjara/Yankunytjatjara verbs (Goddard, 1985: 90)

	(Ø) *'talk'*	*(l)* *'bite'*	*(ng)* *'hit'*	*(n)* *'put'*
Imperative	*wangka*	*patjala*	*puwa*	*tjura*
Past (perfective)	*wangkangu*	*patjanu*	*pungu*	*tjunu*
Imperative (imperfective)	*wangkama*	*patjanma*	*pungama*	*tjunama*
Present (imperfective)	*wangkanyi*	*patjani*	*punganyi*	*tjunanyi*
Past (imperfective)	*wangkangi*	*patjaningi*	*pungangi*	*tjunangi*
Future	*wangkaku*	*patjalku*	*pungkuku*	*tjunkuku*
Characteristic	*wangkapai*	*patjalpai*	*pungkupai*	*tjunkupai*
Serial form	*wangkara*	*patjara*	*pungkula*	*tjunkula*
Nominalized form	*wangkanytja*	*patjantja*	*pungkunytja*	*tjunkunytja*

structure is used in place of the purposive, with the 'intentive' suffix *-kitja*. An interesting feature of the intentive construction is that the clause as a whole takes an ergative suffix (*-ngku*) if the verb of the main clause is transitive, e.g., *mai pau-ntji-kitja (-ngku)* [food bake-NOML-INTENT-(ERG)] '(wanting) to cook food.' 'Actor agreement' of this kind is also found with adverbs of manner and emotion (better regarded as 'active adjectives'), and with frequency expressions.

There are three coordinating conjunctions: *ka* 'and, but,' *munu* 'and,' and *palu* 'but, even though.' Unusually for Australian languages, switch-reference operates for coordination. Normally, *ka* can only be used as a conjunction if the subject of the new clause refers to a different individual to the subject of the preceding clause; otherwise, *munu* is used. A range of free and clitic particles express illocutionary and discourse-related meanings.

Pitjantjatjara Text Extract. From *Wati Tjangarangku Iti Intiritjunanyi* "There's an Ogre Pinching the Baby!", told by Anmanari Alice. Revised edition published by NW Resource Centre, Ernabella.

Ka-l *minyma-ngku* *panya* *pata-ra*
CONTR-QUOT woman-ERG THAT.ONE wait-SERIAL
watja-nu.
tell-PAST
'Then the waiting woman told him.'

"Panya *tjangara-na* *pungku-la* *wanti-kati-ngu."*
that.one ogre-1SG:ERG hit-SERIAL leave-PROCESS-PAST
"'I killed that ogre and got away."'

Munu *"Nyangatja-na* *puli-ngka* *nyina-nyi,*
ADD this-1SG:NOM hill-LOC sit-PRES,
nyuntu-mpa *pata-ra."*
2SG:NOM-PURP wait-SERIAL
"'I've been sitting here on the hill, -waiting for you (to get back)."'

Ka *wangka-ngu,* *"Palya* *nyangatja-n*
CONTR say-PAST good here-2SG:ERG
pu-ngu. *Munu-li-nku* *a-ra-lta."*
hit-PAST ADD-1DU-REFL go-IMP-and.then
'He replied, "You did well to kill it here. Let's get out of here."'

Munu *pula* *ma-pitja-ngu* *ngura*
ADD 3DU:NOM away-go-PAST place
kutjupa-kutu.
other-ALL
'And so away they went to some other place.'

See also: Australia: Language Situation; Australian Languages; Ergativity; Serial Verb Constructions; Switch Reference.

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Pitman, Isaac, Sir (1813–1897)

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Despite his eminence as a Victorian businessman, the driving force in Pitman's life was education. His shorthand system arose from the need to equip young people with a valuable practical skill. In addition, he recognized that the irregularities and vagaries of English orthography could be a handicap to the young, and this led to his devising various reformed spelling systems for English.

He was born in Trowbridge, Wiltshire (England) on January 4, 1813. At the age of 19 he began work as a school-teacher, and his *Stenographic sound-hand*, a

structure is used in place of the purposive, with the 'intentive' suffix *-kitja*. An interesting feature of the intentive construction is that the clause as a whole takes an ergative suffix (*-ngku*) if the verb of the main clause is transitive, e.g., *mai pau-ntji-kitja (-ngku)* [food bake-NOML-INTENT-(ERG)] '(wanting) to cook food.' 'Actor agreement' of this kind is also found with adverbs of manner and emotion (better regarded as 'active adjectives'), and with frequency expressions.

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phonetically based shorthand, appeared in 1837. A second edition, entitled *Phonography*, followed in 1840. Its success, especially in educational circles, was almost instantaneous. The commercial world soon turned to it too. In 1843, Pitman was compelled to give up his teaching post in order to concentrate on the business side of shorthand and spelling reform, and in 1847 he set up the Phonetic Institute, the administrative headquarters for his publishing business in Bath.

His desire that there should be a more logical and consistent reformed spelling system for English led, in 1844, to 'Phonotypy,' the first of several reformed alphabets, some of which he devised in conjunction with Alexander John Ellis (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**).

Pitman was knighted in 1894, and died in Bath on January 22, 1897.

Although not a phonetician in the modern sense of the word, Pitman based both his shorthand and his reformed spellings on a conscious awareness of the phonemic contrasts of English. His support for phonetic and applied phonetic endeavors in Victorian Britain helped to create a climate of opinion about linguistic matters in which the work of more intellectually distinguished figures could prosper.

See also: Ellis, Alexander John (né Sharpe) (1814–1890); Phonetic Transcription: History; Phonology: Overview; Spelling Reform.

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Place Names

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Place names occupy an unusual position within linguistics in that they were often coined in languages or forms of languages that predate those in contemporary use. Although many originate as literal descriptions of the places concerned, they come to be used as lexically meaningless labels and as such are transferred easily from one group of speakers to another. This means that place names frequently survive the transition between languages when territories are taken over by new settlers, preserving evidence for successive stages of population movement and linguistic history. River names have the highest survival rate, followed by the names of other major topographical features such as hills and mountains. Settlement names are generally younger, but may still be well over 1000 years old, with minor names such as field and street names being among the most recent.

Population Movement

Hydronyms

Because of the high antiquity of river names, they represent primary evidence for population movement in prehistoric times. Parallels between ancient river names in Britain and continental Europe – as for instance the Aar in Belgium, the Ahr in Germany, the Ara in Spain, and the Ayr in Scotland, or the Isar in Germany, the Isère in France, the Iserna in Switzerland, and the Ure in England – point to an origin in a common language, sometimes referred to as 'Old European.' This in turn suggests that the earliest recorded immigrants to the British Isles – the Celts, whose arrival is estimated to a few centuries B.C. – were preceded by immigrants from the continent who brought with them an established system of hydronymy. The linguistic material has been subjected to detailed analysis in attempts to establish whether these immigrants were speakers of an Indo-European or non-Indo-European language. Proponents of the latter theory have put forward a range of suggestions, including vigorous arguments in favor of Basque (Vennemann, 1994). However, conservative scholarship continues to prefer an Indo-European origin; and the high concentration of Old European river names in an area of Europe bounded north and south by the Baltic and the Alps, and east and west by the Don and the Rhine, supports a hypothesis that this may have been the original homeland of the Indo-European speakers (Kitson, 1996).

phonetically based shorthand, appeared in 1837. A second edition, entitled *Phonography*, followed in 1840. Its success, especially in educational circles, was almost instantaneous. The commercial world soon turned to it too. In 1843, Pitman was compelled to give up his teaching post in order to concentrate on the business side of shorthand and spelling reform, and in 1847 he set up the Phonetic Institute, the administrative headquarters for his publishing business in Bath.

His desire that there should be a more logical and consistent reformed spelling system for English led, in 1844, to 'Phonotypy,' the first of several reformed alphabets, some of which he devised in conjunction with Alexander John Ellis (*see* **Ellis, Alexander John (né Sharpe) (1814–1890)**).

Pitman was knighted in 1894, and died in Bath on January 22, 1897.

Although not a phonetician in the modern sense of the word, Pitman based both his shorthand and his reformed spellings on a conscious awareness of the phonemic contrasts of English. His support for phonetic and applied phonetic endeavors in Victorian Britain helped to create a climate of opinion about linguistic matters in which the work of more intellectually distinguished figures could prosper.

See also: Ellis, Alexander John (né Sharpe) (1814–1890); Phonetic Transcription: History; Phonology: Overview; Spelling Reform.

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Settlement Names

Place-Name Structures Whereas ancient river names are often based on a single root with a derivational suffix, it is more common for European settlement names to be compound in structure, with one element (the 'generic') defining the type of place and the other (the 'qualifier') describing an aspect of it. The generic usually comes second in place names from the Germanic and early Celtic languages, but first in Celtic place names from about the 6th century A.D.; in both types, the main stress falls on the qualifier. Thus, the P-Celtic generic *aber* 'river mouth' gives place names such as ˌAber'deen 'mouth of the (River) Don,' while its Old English equivalent *mūþa* gives place names such as 'Weyˌmouth 'mouth of the (River) Wey.'

Most generics are either 'habitational,' referring to a building or group of buildings, or 'topographical,' referring to a landscape feature, although a small proportion are 'folk names,' transferring the name of a tribe to the area where they lived. Many Germanic generics are habitational, as with OE *tūn* 'farmstead, village' and the equivalent ON *býr* in place names such as Easton 'east farmstead,' and Kirkby 'village with a church.' Almost all Celtic place names, however, are topographical, as with Perth from Pictish **pert* 'wood, copse,' and Strathclyde 'valley of the (River) Clyde' from Gaelic *srath* 'valley.' The topographical nature of the names used to be taken to indicate that they were originally the names of natural features transferred to later settlements and that no genuine settlement names had survived. It is now realized that the Celtic peoples characteristically defined their settlements in terms of nearby topographical features, so that these are indeed original settlement names.

Place names introduced by European settlers in other parts of the world are sometimes commemorative, as with Carolina in America, named by French colonists in honor of Charles IX, and (Queen) Adelaide, (Charles) Darwin, and (Viscount) Melbourne in Australia. Many represent transfers of names from the mother country, as with Plymouth in America, recalling the arrival of the Pilgrim Fathers from Plymouth in England, and Perth in Australia, named for Perth in Scotland. By this means, many European place names have been replicated in America, Canada, South Africa, and Australasia.

The indigenous names that they replaced or overlaid are often based on entirely different principles. The aboriginal place names of Australia are not primarily descriptive, but relate to the mythology of the Dreaming, as with Coonowrin, one of the Glasshouse Mountains, literally meaning 'crooked neck' in allusion to an injury inflicted on the eponymous character by his father Tibrogargan for failing to take care of his mother Beerwah – both of them also names of mountains within the group. In New Zealand, Maori place names form sequences preserving the memory of important events in cultural history, such as the journeys of early explorers, including Kupe, Paikea, Tamatea and Turi; in South Africa, place names from the indigenous Khoekhoen and African languages characteristically use locative prefixes or suffixes.

Settlement Patterns The linguistic origins of place names reflect the languages of the peoples who coined them and so can be used to identify areas settled by different groups of speakers. Areas of Finnish and Swedish settlement in Finland are differentiated by place names from the two languages, while the nationalities of early European colonists in different parts of North America are revealed by place names from English, French, Russian, Spanish, and Dutch – the last, for instance, mostly in the vicinity of New York, which, as New Amsterdam, was part of the Dutch colony of New Netherland in the 17th century. In the British Isles, much research has focused on the geographical distribution of generics from different languages. The area of historical Pictland in what is now northeast Scotland is defined by over 300 place names beginning in *Pit-* from Pictish **pett* 'piece of land.' These are in complementary distribution to place names from Cumbric *cair* 'fort, stockaded farm,' so the two generics are taken to demarcate the regions inhabited by the Pictish P-Celts and the Cumbric P-Celts, respectively. Areas of Danish and Norwegian settlement in mainland Britain are defined largely through place names ending in *-by*, *-thorp*, and other reflexes of generics characteristic of Scandinavian toponymy; conversely, the remarkable dearth of such names within the historical county of Rutland suggests that this territory was excluded from the areas allocated to the Danes at the division of the Mercian kingdom in 877. The comparison of cognate generics, such as Scandinavian *heimr* 'territory' in Norway, southern Sweden, and Jutland and OE *hām* 'homestead' in England and Scotland, has been utilized to trace the movement of Germanic tribes during the Migration Period.

Place name qualifiers are also important in this respect. Those comprising tribal names generally refer to minority groups whose presence was sufficiently distinctive to contrast with the main population. Examples from England include Cummersdale (Cumbrian Britons), Denby (Danes), Englefield (Anglians), Irby (Irishmen), Friston (Frisians), Normanton (Norwegians), Saxham (Saxons), Scotby

(Scots), Swaffham (Swabians), and Walton (Britons). As with other types of source material, the evidence is often limited and must be handled with care. Place names such as Irby and Ireby may refer not to Irishmen but to Norwegians who arrived in Britain via Ireland, and although formations such as Friston and Frizington point to a Frisian presence in Anglo-Saxon England, they cannot be dated closely enough to establish Frisian involvement in the early settlements.

Settlement Chronology Because some terms were in use as place-name forming elements earlier than others – or went out of use from an earlier date – they can help establish a chronology of settlement, as for the Anglo-Saxon settlements of the mid-5th century onward. The earliest habitational terms used by the Anglo-Saxon settlers in what is now southeast England have been identified as OE *hām* 'homestead,' OE *-ingahām* 'homestead of the followers of or settlers at,' and OE *-ingas* 'people of,' yielding such place names as Egham, Gillingham, and Hastings. Other indicators of early Anglo-Saxon settlement are place names containing Latin loan words, such as Wickham from OE **wīc-hām* 'homestead associated with a Romano-British settlement' (Latin *vicus*) and Cheshunt from OE **funta* 'spring characterized by Roman building work' (Latin *fons*, *fontis*); and those referring to pagan temples or gods, such as Harrow from OE *hearg* 'temple' and Thundersley from the god Thunor. Somewhat later are place names indicative of established farming communities, such as Berwick ('barley farm'), Cheswick ('cheese farm'), and Gatwick ('goat farm') from OE *wīc* 'specialized farm,' as well as those containing qualifiers datable to the later Anglo-Saxon period, such as Scandinavian loan words and late personal names. Comparative evidence has been used to trace the course of the advance northward into what is now southern Scotland and is usefully summarized by Nicolaisen (2001: 88–108). Again, however, this evidence requires careful treatment. For instance, the distribution of place names referring to Anglo-Saxon paganism is virtually confined to southern England, so although their absence from Scotland has traditionally been taken to indicate that the Scottish settlements postdated the conversion to Christianity (c. 627), comparison with the situation in northern England suggests that this may not be axiomatic. As regards the Scandinavian settlements, the rarity of the ON generic *setr* 'dwelling' in Icelandic place names may suggest that it had gone out of use before the colonization of Iceland (c. 870), pointing to an earlier date for the *setr*-names of the Northern Isles of Scotland; alternatively, the different naming patterns may result from differences in local conditions.

Analysis of place-name structures may also throw light on chronology. The P-Celtic generic *tref* 'homestead' is found in two main areas of Scotland, occurring as a first element in the south and southwest, where it forms names such as Traprain (with Cumbric *pren* 'tree'), but as a second element in the east, where it forms names such as Capledrae (with Gaelic *capull* 'horse'). These may reflect two distinct phases of settlement, respectively post- and predating the reversal of Celtic element order during the 6th century.

Microtoponymy

Whereas the names of major settlements identify the dominant language groups within an area, minor names present a more detailed picture of the linguistic makeup of individual communities. The proportion of names from different languages reflects, at least to some extent, the mix of speakers of these languages, throwing additional light on population studies. The value of this approach is illustrated by recent work on the density of Danish settlement in eastern England (Cameron, 1996b) and on German/Slavic contact in northern Germany (Debus and Schmitz, 2001). Although it has been argued that the imposition of Scandinavian settlement names within the English Danelaw might reflect the influence of an elite minority, Cameron's analysis of the range and extent of Scandinavian vocabulary and personal names in the field names of northeast Lincolnshire supports a very heavy Danish presence within the area; while Debus and Schmitz's investigation of minor names including hybrids from the Slavic and German languages demonstrates the importance of this type of material as evidence for contact between linguistic groups.

Language Contact

Types of Communication

For a place name to survive for centuries or even millennia means that there has been an unbroken chain of communication, often involving speakers of different languages. However, names can be taken over in different ways, reflecting different types of language contact and varying degrees of mutual intelligibility. At one extreme, the place-name material may demonstrate knowledge not only of vocabulary but also of morphology. Dover in England is an Anglo-Saxon adaptation of the British name *Dubris* 'waters.' The Old English form *dofras* (c. 700) is also a plural, suggesting that the Anglo-Saxons were

sufficiently familiar with the British language to recognize and to translate a plural form. There are many counter-examples, however, where the development of folk etymologies testifies to a lack of understanding. An instance is York, from the Romano-British name *Eburaco* 'yew-tree estate,' where later spellings such as *eoforwic* (c. 1060) reflect confusion with an Old English compound 'boar farm.'

Phonological Adaptation In some instances, an existing name is preserved intact, with minor adjustments to conform to the phonetic structures of the host language. Some names in areas of Scandinavian settlement in Britain have been Scandinavianized by the substitution of /k/ for /tʃ/, as in Keswick < Cheswick 'cheese farm,' or /sk/ for /ʃ/ as in Skipton < Shipton 'sheep farm.' Contact with English has resulted in the anglicization of names from the Celtic languages of the British Isles and of many names in other parts of the world. Irish *baile* 'townland' is anglicized to *bally* in Irish place names such as Ballymena and Ballymoney; Gaelic *beinn* 'mountain' is anglicized to *ben* in Irish and Scottish mountain names such as Ben Gorm and Ben Nevis; and Dutch *hoek* 'corner' is anglicized to *hook* in place names such as Sandy Hook in New Jersey and Hook of Holland on the southwest Netherlands coast. New Zealand is an anglicized form of an earlier Dutch name *Nieuw Zeeland* 'new sea land' (replacing the original name *Staaten Landt* 'land of the States' given by the Dutch explorer Abel Tasman in 1642), and Canberra in Australia is probably an anglicized form of an aboriginal name *Nganbirra* 'meeting place.' Anglicized forms of native American names include Chicago, Connecticut, Kitty Hawk, Manhattan, Michigan, and Tennessee. Mutual influence can also occur. Contact between German and Slavic has resulted both in the Germanization of some Slavic names, as with Leipzig (Slavic Lipsk < *lipa* 'lime tree') and Dresden (Slavic Drezdzany < *drenzga* 'forest'), and in the Slavicization of some German names, as with Brno in Moravia (German Brünn < ?*Brunnen* 'spring').

Hybrid Names Hybrid names, which contain elements from more than one language, are particularly important as evidence of language contact, and in some cases of bilingualism. In northeast Scotland, extant place names from the Pictish language almost always comprise hybrids in combination with a Gaelic qualifier, testifying to a high degree of interaction between speakers of the two languages. It is uncertain, however, whether these represent place names coined by Gaelic speakers using Pictish loan words, or Pictish place names taken over and adapted by the Gaels. It is not uncommon for an existing name to be used as a qualifying element with the addition of a new generic from the host language. Again, the older name is often anglicized or otherwise altered beyond recognition, as with native American names used as qualifiers in formations such as Cape Hatteras, Potomac River, and Chesapeake Bay. The Anglo-Saxon names of many Roman towns comprise the Romano-British name with the addition of OE *ceaster* 'walled town,' as in Cirencester, Gloucester, Mancetter, Manchester, and Winchester. During the advance northward into Cumbric territory in the early 7th century, Northumbrian Angles captured and renamed the stronghold of *Din Eidyn* 'sloping-ridge fortress,' retaining the second element as a qualifier but replacing the first with OE *burh* 'fortification,' and transposing them into Germanic element order to give the place name Edinburgh. Here, some degree of understanding is reflected in the translation of Cumbric *din* 'fortress' by the equivalent *burh*. By the 12th century, however, scribal introduction of an unetymological <w> into spellings of the qualifier (*Edwinesburg* c. 1128) reflects confusion with the name of the Anglo-Saxon King Edwin, indicating that the original meaning of the name was no longer understood.

Epexegetic Compounds Epexegetic compounds also suggest limited communication. Such instances as Penhill in England, containing both the British and Old English words for hill, and Glenborrodale in Scotland, containing both the Gaelic and Old Norse words for valley, suggest that the older place name has been taken over as a qualifying element by a group of new settlers who understood it simply as a name, rather than as a meaningful description. Similar examples from Finland and Sweden are discussed by Embleton (1994–1995: 127–128).

Grimston Hybrids Many place names within the Danelaw of eastern England comprise a Scandinavian personal name with OE *tūn* 'farmstead.' From their position in relation to English-named settlements and other evidence, these are believed to represent villages taken over and partly renamed by the Danes after the allocation of land to leaders of the Danish armies during the late 9th century. Although the common place name Grimston is no longer thought to be an example of the formation, the term 'Grimston hybrid' is so well established that it continues to be used to identify this name type.

Inversion Compounds Contact between Norse and Gaelic speakers is attested by the occurrence in northwest England and southwest Scotland of 'inversion

compounds' using Scandinavian vocabulary with Celtic element order. This corpus of names has been extensively studied for the light it throws on patterns of lexical borrowing and substratum transfer, as well as on settlement history and sociolinguistics. Many problematic issues remain, however, and it is still uncertain whether the names were coined by Scandinavian, Celtic, or bilingual speakers.

Renaming

Naming is closely linked to possession, and it is not uncommon for places to be renamed to reinforce the authority of a ruling power. Historically, the political dominance of England led to the imposition of English names in other parts of the British Isles and the former colonies, just as the influence of Spain in the Basque country from the 16th century onward resulted in Spanish names for Basque places. In some instances, this renaming leads to competing forms of the same toponym, so that many Basque place names now have both Basque and Spanish spellings. Similarly, some South African place names have equivalent forms in English and Afrikaans, as with Cape Town/Kaapstad. In Ireland, renaming took place wholesale under British rule and is now being systematically reversed, with the publication of a concise bilingual gazetteer (Brainse Logainmneacha, 1989) representing part of an ongoing research program to provide Irish forms for all major place names.

Alternatively, unrelated names for the same place may survive in different languages. English speakers use the Scandinavian name Anglesey ('Ongull's island') for the island known to Welsh speakers as Môn ('mountain'), and Gaelic names are preserved in oral tradition for Irish and Scottish places now known officially by English toponyms, as with *An Gearasdan* for Fort William. Some places even have three or more names, as with the capital of the Slovak Republic, known variously by the Slovakian name Bratislava, the German name Pressburg, and the Hungarian name Pozsony.

Noncontact Situations It is so unusual for an existing place-name stratum to be wiped out completely that where this appears to have happened, the implications need to be weighed carefully. In England, the large-scale replacement of Celtic by Anglo-Saxon toponymy was at one time thought to indicate that the pre-Anglo-Saxon inhabitants had been exterminated or forced into the border areas of Scotland and Wales. This theory is no longer considered tenable as archaeological and other evidence points to the survival of a Celtic population. Indeed, some Anglo-Saxon place names, such as Walton and Eccles, contain such elements as OE *walh* 'Briton' or PrW **eglēs* 'Romano-British church' referring to British people or institutions. Efforts are now focusing on the identification of potential Celtic names previously assumed to be from Old English (Coates and Breeze, 2000). Even less trace remains of the pre-Scandinavian place names of the Northern Isles and the district of La Hague in Normandy. Again, a small number of scholars take this to reflect the extermination of the previous inhabitants, but the majority view is that the earlier Pictish population of Orkney and Shetland was enslaved or absorbed by the Scandinavian incomers, while the absence of Gallo-Romance names from La Hague may result from a deliberate policy of changing the toponymy to make it difficult for former owners to lay claim to their property. Where even the names of natural features do not survive, as with the pre-Scandinavian names on the Isle of Man, in which the only ancient river name is Douglas, the scale of immigration must have been overwhelming.

Language History

Languages and Dialects

Because place names originate in, and are transmitted through, spoken language, they often preserve evidence for forms of language that predate those in written sources. The earliest records of literary Scots date from the late 14th century, but place names from the 12th century onward make it possible to trace the development of the language during the preliterary period. Some languages and dialects are attested almost solely through place names. All that is known of the Pictish language is based on personal names, place names, and inscriptions. Neither is there any literature in the East Anglian dialect of Old English, but place-name evidence makes it possible to reconstruct distinctive features of the language. These include the use of *ǣ* rather than Anglian *ē* (<WGerm *ā*), attested in early spellings with <a> of place names such as Stratton and Stratford from OE *strēt/strǣt* 'road' (Kristensson, 2001).

Dialectology and Word Geography

Whereas many manuscripts and texts are of uncertain provenance, place names are precisely locatable and offer primary evidence for the study of dialectology and word geography. The complementary distribution of Old English terms such as *burna* and *brōc* 'stream,' *cnoll* and *cnæp* 'summit,' *pæþ* and *stīg* 'upland path' and other pairs in charter boundaries and place names from Anglo-Saxon England has been mapped and discussed by Kitson in a major

contribution to the study of dialect isoglosses (1995). As regards the Old East Anglian dialect mentioned above, place-name evidence also reveals a linguistic boundary testifying to a division between Northern and Southern East Anglian (Kristensson, 2001). Recent work on eclipsis (the mutation of initial consonants) in place names from Irish and Scottish Gaelic suggests a division between Northern and Southern Gaelic, uniting Galloway with Irish and Manx rather than with the rest of Scotland (Ó Maolalaigh, 1998). Dialectal characteristics may be retained in place names longer than in other areas of language. Examples include the use of (retroflex *l*) /ɽ/ < ON /rð/ in place names on the coast of Nordmøre in Norway in contrast to appellatival /r/, and the assimilation /l/ + C > C attested in name forms, such as Åmli < *Almhlíð* from *alm* 'elm' in Øvre Telemark in Norway (Stemshaug, 2002: 235).

Vocabulary and Semantics

The oral origin of place names also means that they preserve evidence for demotic forms of language, and for areas of vocabulary that may be represented poorly in extant literature. These include terms for indigenous flora and fauna, and for landscape features. In some instances, place names preserve vocabulary that is otherwise unattested, or attested only from a later date. In others, they reflect a wider or more subtle range of meaning than is evident from written sources. OE *pīc*, the ancestor of present-day English 'pike,' is recorded only with the meaning 'point, pointed tool,' but occurrences as a place-name generic describing pointed hills in northern England, and as a qualifier in combination with terms for water in place names such as Pickmere and Pickburn, testify to its early development as a hill term and fish name. Fieldwork is often crucial here. Most place names are still associated with their original site, so the location can be examined to establish the appropriateness of the description. By this means, recent work has identified a transferred meaning of Swedish *kil* 'tool, wedge' to refer to a wedge-shaped piece of land in place names such as Kila in Sweden, paralleled by a similar development of the West Norse cognate *kíll* in place names such as Kildale in England.

Comparative evidence is also important. An unattested ON **strjón* occurs in Norwegian place names designating good fishing places, while the cognate OE *(ge)strēon* 'wealth, offspring' occurs in similar locations in England. Examination of the corpus as a whole suggests that the toponymic usage is related to productivity. The first element of Pusk in Scotland (*Pureswic* 1209) is an unattested OE **pur*. Here, the combination with OE *wīc* 'specialized farm,' together with linguistic evidence such as comparison with present-day English dialect *pur,* suggests an interpretation 'male lamb,' which is supported by the situation of Pusk and other place names containing the same qualifier within sheep-farming country.

Topographical Vocabulary Groundbreaking work in the area of historical semantics has been carried out by Gelling and Cole (2000), throwing new light on Old English topographical vocabulary by demonstrating a high degree of lexicalization for terms previously regarded as synonyms. This finding is the result of fieldwork comparing the use of terminology for identical land formations across England. As regards OE words for 'hill,' they show that *dūn* was used for a low hill with a level summit suitable for a settlement site, whereas *beorg* referred to a hill with a rounded profile, *crūc* to one with an abrupt outline, and *hyll* to one that was neither rounded nor flat-topped. Similar precision characterizes terms for other landscape features, such as clearings, floodplain, marshland, meadow, pasture, river crossings, roads, valleys, water courses, and woodland: examples include *gelād* 'difficult river-crossing,' *holt* 'single-species wood,' and *wæsse* 'land by a meandering river that floods and drains quickly.' Research of this kind has so far focused on England, but the results of a pilot study in Scotland suggest that the approach could be applied usefully in other parts of the British Isles and elsewhere to recover further information on early topographical lexis.

Orthography and Morphology

Place-name spellings can reveal patterns of orthographic changes at different periods. Whitebaulks in Scotland, from Scots *quhite* 'white' and *bauk* 'unploughed ridge,' is recorded throughout the 16th century with spellings in initial <Quh->, replaced by <Wh-> from the mid-17th century. This change is evidently the result of anglicization, a process that also affects morphology in such Scottish place names as Hangingside ('hanging – i.e. sloping – hillside'), recorded up to 1607 with the Middle Scots present participle inflection <and> (*Hingandside* 1551, *Hingandsyd* 1564, *Hingandsyid* 1607; Scott, 2003: 25, 27). Recent work on Irish and Scottish Gaelic also emphasizes the value of place-name evidence for noun morphology (both inflectional and derivational) and its interface with phonology (Ó Maolalaigh, 1998).

Phonology

Historical spellings of place names, especially those recorded in local sources, also preserve primary evidence for phonological change. In a Scottish context,

Nicolaisen (1993) has argued that semantically opaque place names may be influenced less by standardized spelling conventions, and are more likely to reflect changes in pronunciation, than vocabulary words. Stirling is first recorded in the early 12th century as <Striuelin>, and the majority of spellings end in <n> or <ne> until the mid-16th century. A few spellings in final <ng> appear alongside them, gradually becoming more common until they take over completely from the mid-17th century. The same pattern appears in place names such as Dunfermline and Tealing, and seems to reflect a phonetic change from /n/ to /ŋ/. Similarly, toponyms from the Gaelic generic *baile* 'homestead' can help provide dating evidence for the loss of postvocalic /l/ in words such as *ball* and *wall*, as most spellings without <l> appear during the late 15th–16th century. Also significant are such place names as Falkirk, in which the medial <l> is not original but first appears in the mid-15th century, suggesting a hypercorrect spelling introduced at a time when words were known to be spelled with medial <l> despite the lack of a corresponding sound in contemporary pronunciation. Some of Nicolaisen's conclusions have been challenged: for instance, whereas he regards the development from final Gaelic *-ach* to *-o* in place names such as Aberlemno and Belmerino as evidence for the loss of final fricative /x/ in eastern Scotland, Ó Maolalaigh (1998: 38–44) argues that Gaelic *-ach* in such names may simply have been replaced by the nearest equivalent as the phonological structure of Scots did not allow velar fricatives in unstressed position. Nonetheless, Nicolaisen's approach is clearly one that would repay further research both in Scotland and elsewhere.

Onomastic Dialect

Although place names are to some extent formed from lexical items, evidence is emerging of an 'onomastic dialect' predating the splitting up of the Germanic languages (Nicolaisen, 1995). Cognate pairs of elements in the North and West Germanic toponymica, such as OE *ēa*/ON *á* 'river,' OE *hlið*/ON *hlíð* 'slope,' and OE *widu*/ON *viðr* 'wood,' support the theory of a common ancestry in a Northwest Germanic onomasticon as distinct from the lexicon. Some 36 such pairs within Old English and Old Norse are identified by Nicolaisen, as well as another 10 pairs within German and North-Frisian; subsequent scholarship has added OE *(ge)strēon*/ON **strjón* 'productive (fishing) area,' OE *lāf*/ON *lev* 'inherited property,' and ON **kíll*/Swedish *kil* 'wedge.' This makes it possible to interpret onomastic vocabulary by comparison with cognate place-name-forming elements rather than with lexical items, and also has important implications for language history. Kitson has pointed out out that some elements within the hydronymic system discussed above survive as lexical items in eastern Indo-European languages but not in European ones, indicating that "the naming system was in operation since before the eastern languages separated from the western continuum" (1996: 86).

Organizations and Place-Name Surveys

Place-name research involves both the close analysis of individual toponyms, tracing the earliest historical spellings to establish an etymology, and the comparison of corpora from different areas and time periods. The first requires detailed local and linguistic knowledge; the second, collaboration on a national and international scale. The international organization for name studies is the International Council of Onomastic Sciences, which organizes biennial conferences and publishes the journal *Onoma*. NORNA, the cooperative committee for onomastic research in the Nordic countries of Denmark, Finland, the Faroe Islands, Iceland, Norway, and Sweden, organizes regular congresses and symposia, the proceedings of which are published in the series *NORNA-rapporter*. In the British Isles, the Society for Name Studies in Britain and Ireland organizes annual conferences and publishes the journal *Nomina*.

On a national and local level, there are too many individual societies and projects to list here, but mention should at least be made of the American Name Society, which organizes annual conferences and publishes the journal *Names*, the Canadian Society for the Study of Names, which holds annual meetings and publishes the journal *Onomastica Canadiana*; the English Place-Name Society, which has to date produced some 80 volumes of the English Place-Name Survey and also publishes the *Journal of the English Place-Name Society*; the Institute of Name Research at the University of Copenhagen, which produces *Danmarks Stednavne*; and the Names Society of Southern Africa, which holds biennial congresses and publishes the journal *Nomina Africana*. So much relevant material is published in these sources that individual items have not been listed separately in the following bibliography unless directly cited above.

Place-name surveys for other parts of the British Isles are less advanced than for England, but excellent work is being carried out by – amongst others – the Northern Ireland Place-Name Project; the Place-Name Research Centre, University of Wales Bangor; and the Scottish Place-Name Society; and in Ireland

by the Placename Branch of the Department of Community, Rural and Gaeltacht Affairs.

In addition to etymological work, active steps are being taken to recover indigenous names in areas overlaid by foreign imports. The Australian National Placenames Survey aims to produce an electronic database analyzing the full corpus of both imported and indigenous names, and part of the remit of the New Zealand Geographic Board is to collect and to encourage the use of original Maori place names.

See also: Personal Names; Proper Names: Linguistic Status; Proper Names: Semantic Aspects.

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http://www.bangor.ac.uk – Place-Name Research Centre, University of Wales Bangor.

http://www.st-andrews.ac.uk – Scottish Place-Name Society.

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http://www.anps.mq.edu.au – Australian National Placenames Survey.

http://www.linz.govt.nz – New Zealand Geographic Board.

Plagiarism

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Introduction

Plagiarism is more often a violation of regulations than the law, although it is clearly implicated in copyright. Plagiarism occurs mostly within educational establishments, where the matter is normally handled by the internal disciplinary procedure of the institution. The penalties can be severe, up to and including the failure to be granted a degree, but it is relatively rare for cases to be carried beyond the confines of the establishment. Outside educational institutions, those accused of plagiarism are most likely to be prosecuted for breach of copyright, if the aggrieved author decides to pursue the case. Such cases are also relatively rare; accusations and defenses are more frequently debated in the national newspapers and journals than in courts of law.

Most accusations of plagiarism are made in relation to student work; the subject of the plagiarism usually knows nothing about the matter. That is why the common reference to 'kidnapping' a text is somewhat imprecise. The words written by the author are not removed from their original location, and the original author seems to experience no loss since the author does not see the plagiarism. For the same reason, 'borrowing' and 'theft' are equally imprecise explanations of the practice. Any sense of grievance is normally first felt by the reader, who has been misled about the true authorship of the work in question. Where such misleading is contrary to the regulations governing the production of the work, this grievance can be extended into some form of prosecution. Since this occurs most often in predominantly academic settings, the majority of the discussion below centers on the academic issues.

The Law of Copyright and the Concept of Plagiarism

A sentence such as the following is now common at the front of books published in the United Kingdom: "The author has asserted her moral right to be identified as the author of this work in accordance with section 77 of the Copyright, Designs and Patents Act 1988." This applies equally to fiction and nonfiction writing, and appears because, unless and until this is explicitly asserted, no protection for breach of this right is available. However, whether or not such an assertion has been made, the presence of one author's work in that of another author without attribution is still considered plagiarism. There is no mention of the word 'plagiarism' in the above Patents Act statement, although it is related predominantly by the moral issue of giving credit where credit is due. Copyright is designed to protect the rights of the author. Plagiarism, while certainly breaching such rights, normally has a greater impact on the reader, by presenting a misleading origin for the material that he or she is reading.

That an author has the right to be identified as such does not imply that only the author in fact created all the material in the book. In works of nonfiction this will rarely be the case, and many works of fiction contain references to material by other authors. The claim is that the author has both created some of the text, and selected and arranged pre-existing elements in such a way as to form a new and unique text. In such cases, the author of the whole work, particularly in the area of nonfiction, is expected to alert the reader to the presence of direct or indirect use of external material, and to include a list of the publications to which reference has been made at the end of the work.

A number of systems have been formalized into style guides to assist an author in compiling a bibliography, the predominant guides being *Harvard style manual for editors*, *The MLA style manual*, *The Chicago manual of style* (University of Chicago), and the *Publication manual of the American Psychological Association style guide* (APA). All these set guidelines for the contents and style of the bibliography. To avoid repetition of the same method of identification, and to acknowledge the utility of paraphrase in summing up a longer argument in a referenced work, while the bibliographical section remains consistent within any one set of conventions, the internal textual referencing is more flexible. So, for example, inverted commas to indicate quoted material are used for shorter extracts, indentation is used to show a number of sentences, and simple reference to the author or authors with no explicit marking is acceptable where accurate paraphrase of material is employed.

The following sentence illustrates the correct use of many of the standard techniques by the author Alison Johnson:

> Using Halliday's (1989) terminology for the division of vocabulary into lexical (open class) and grammatical (closed class), he raises the case of apparent "open class lexical items which have connective properties, especially ... of paraphrasing closed class connectors such as subordinates and conjuncts which are [therefore better] treated as closed class vocabulary" (Winter, 1996: 46) (Johnson, 1997: 213).

This sentence indicates clearly which element of the discussion originates with Halliday, and the concepts of open and closed classes of words. Since these are general concepts associated with Halliday, it is sufficient to identify him as their originator in the body of the text. How Winter discusses them within **his** text is indicated by the double quotes surrounding the part of the sentence so used, referenced by page and dated publication at the end. In the quote itself, two other features are used. Ellipsis indicates that material was omitted, between *especially* and *of*, so that this was not **all** that Winter said, and the square brackets indicate Johnson's interpolation of an explanatory segment into the original quote.

If we make only slight alterations to the text we can illustrate how plagiarism can occur.

> *Using Halliday's (1989) terminology for the division of vocabulary into lexical (open class) and grammatical (closed class), it is possible to identify apparently open class lexical items which have connective properties, especially of paraphrasing closed class connectors such as subordinates and conjuncts which are therefore better treated as closed class vocabulary.*

In the italicized sentence, all but one of the features of correct citation have been removed. If this was presented in a paper, Halliday would still be duly credited, but the origin of the ideas encapsulated in the correctly cited quote would be credited to the putative author. In such a case, both Johnson and Winter would be plagiarized, since neither are credited, although the main victim would be Winter, whose ideas have been absorbed entirely by the plagiarist, along with Johnson's glosses on them.

This illustrates that the rules are cast so that in the absence of any such internal indication, the reader of a work may safely assume that the remainder of the work is that of the stated author. Correct attribution assists the reader, the author, and the cited authors. A reader of a text cannot necessarily be expected to be able to identify material taken from other sources, even if he or she has read the publications from where the material was taken, and so needs the assistance of the author in separating the sources to better evaluate the material being presented. The author benefits from this convention by having his or her distinct contribution clearly identified. The quoted author benefits from the level of exactitude of quoted material being indicated, and is so protected from potential misrepresentation. A reader can refer to the quoted source in cases of paraphrase to assess whether the summary presented is in fact something like what the original author wrote. If these conventions are not followed, the reader may be misled by their absence into believing that the main author is the original source for the work of others, and accusations of plagiarism can arise.

How Different Is Work on the Same Subject?

The objection is frequently raised that work on similar topics, particularly essay questions, is bound to look more similar than different, because the students use the same reference material, and might be expected to reach similar conclusions. However, it is possible to show clear distinctions between work that is dependent on another student's work and work that is independently produced, using computer analysis of the content of student essays.

The two pie charts below show the distinctive difference in word use between two independently produced texts (Figure 1) and two dependent texts (Figure 2).

In each case, the figures represent two essays, which each answer the same question, that have been compared for content by a computer program. Figure 1 shows what a 'normal' comparison produces. The bulk of the words appear only in one text or another; the slice indicating vocabulary that is shared between the two texts more than once is smaller than the distinctive vocabulary slices, and the slice indicating words used only once is very small. Figure 2 shows what happens when two texts are dependent on each other, or make heavy use of a shared source. The pattern is completely reversed, with the vocabulary shared just once forming a substantial slice of the pie. Readers are alerted to the feature in quite a different

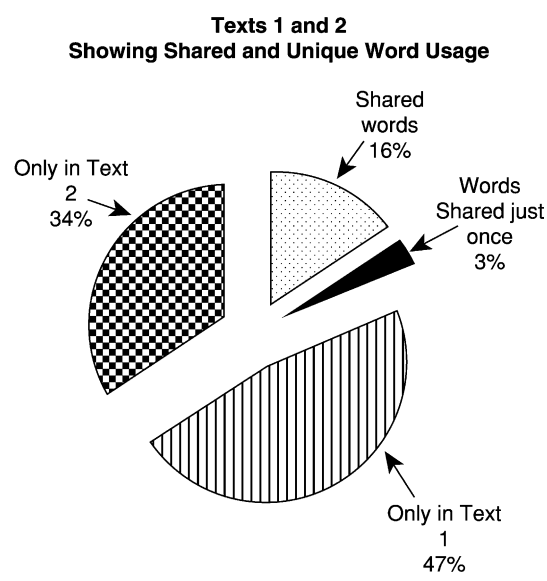

Figure 1 Independently produced essays answering the same question.

way, of course. In the independently produced texts, they read different sentences nearly all the time. In a dependent text, sentences such as those below are presented, and the reader will almost certainly remember seeing something like the sentence of Text 3 before, when encountering the sentence in Text 4, even if some time has elapsed since reading it. For example, consider the two sentences below.

> *Text 3: British history suggests that the phenomenon's of a multiracial and multicultural nation has always existed and that immigration was not just post World War Two theories.*

> *Text 4: British history reveals that it has always been a multiracial and multicultural nation and that immigration was not just a Post World War Two phenomenon.*

Text 3 is exactly what the author wrote, including the ungrammatical *phenomenon's*. The underlined words indicate the differences between the two sentences. What the reader will almost certainly not be aware of is that a number of words in these sentences occur only once in each of the texts, as shown by the boldface words below.

> *Text 3: British history suggests that the **phenomenon**'s of a **multiracial** and multicultural nation has always existed and that **immigration** was not just **post World War** Two theories.*

> *Text 4: British history reveals that it has always been a **multiracial** and multicultural nation and that **immigration** was not just a **Post World War** Two **phenomenon**.*

Further discussion of this case, with illustration of the use of computer assistance to analyze the data, can be found in Johnson (1997) and Coulthard (2004).

Normal Text Composition

This relative infrequency of word use arises from the normal distribution of words within a text. Separating content from function words allows texts of very different lengths to be compared. Figure 3 shows the relative proportions of content vocabulary occurrence in an 18th-century essay of 13 074 words. Figure 4 shows a very closely matching pattern in a 20th-century student essay of 3888 words. As can be seen, the majority of content words will only occur once (they are generally referred to as *hapax legomena*), and account for approximately 65 percent of all the content words used. The proportion of vocabulary occurring just twice (*dis legomena*) is remarkably stable over even very long texts, with the 16 percent shown on the graph varying only slightly with text length. The implications of this are that words new to the reader in the surrounding context occur throughout a text, and it is this turnover of words that keeps readers reading.

The figures in Table 1 illustrate that this is indeed broadly the case. The figure shows how many of each successive 350 words in the running text are either content or function words that occur just once in the full text. The number of content words in each segment is fairly stable, and this stability can be found in the majority of texts across groups of approximately 20 sentences such as these. At a lower level of word

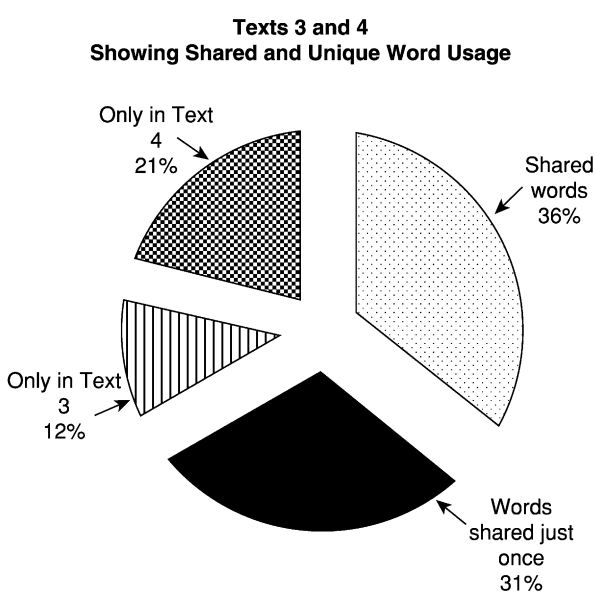

Figure 2 Two closely related essays answering the same question.

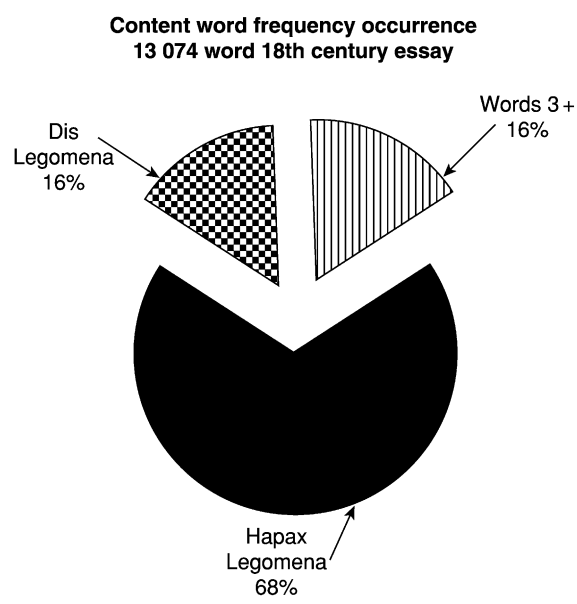

Figure 3 Eighteenth-century essay showing content word frequency of occurrence.

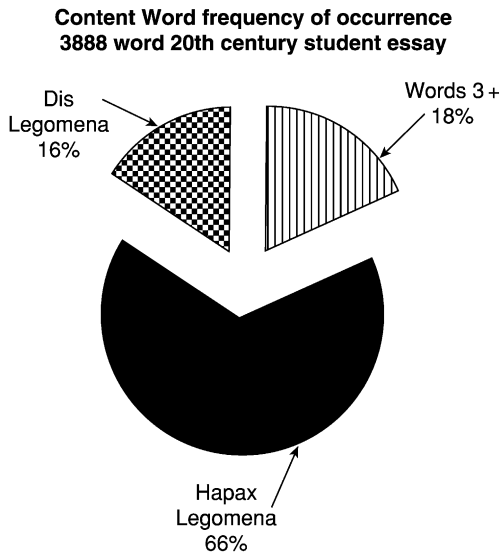

Figure 4 Twentieth-century student essay showing content of word frequency of occurrence.

sequence, local variation can be present. An extended noun group, through a multiplicity of nouns or additional adjectives, would push up both the content ***hapax*** and the content **count** in a segment, for example. What is also of interest is that some function words are also introduced throughout the text and not reused, but obviously in much lower quantities per segment.

Communicative Function of the Hapax Legomena and Dis Legomena

The *hapax legomena* and *dis legomena* also represent the original contribution of an author to addressing a common problem or presenting an argument. The texts may be different responses to an essay title, or may be two entire books on the same broad topic. When reading successive related texts, in whatever order they are read, the reader is continually encountering new words because each pair can be expected to show the pattern of shared *hapax legomena* (see Figure 1 above). So, when confronted with a text where a number of the words appear familiar, a reader is alerted to the oddity of that experience. This will be even more noticeable when, as in the sentences above, the words appear in the same sentences and in approximately the same order. Just one such sentence can alert a reader to the problem; where, as might be expected from the size of the *hapax legomena* slice in the Text 3 and Text 4 comparison in Figure 2, several sentences are involved, serious doubts as to the originality of one of the documents can arise, and collusion or plagiarism investigation is started.

Table 1 Text 3 divided into successive 350-word segments and analyzed for the Hapax occurrence of content and function words

Content hapax per 350 words	*Content count per 350 words*	*Function hapax per 350 words*
49	158	6
52	158	7
46	156	6
50	177	10
54	165	12
69	168	5
43	143	13
55	166	9
60	181	5
50	156	6

How Much Unattributed Sharing Is 'Allowable'?

In pure terms, any unattributed borrowing must be considered plagiarism, and this may be as little as one word. In considering how plagiarism comes about in the material produced by students, one observed strategy could be described as equivalent to the construction of a patchwork quilt, sewn together from fragments of material to make a new artifact. If this article now includes the sentence 'I call this patchwriting,' with no further reference, then the editors will correctly accuse this author of plagiarism, because the term was coined by Rebecca Moore Howard (Howard, 1993). An attempt to avoid the problem might make an author consider using the image of the practice as being like that of using the technique of collage, to create a picture from fragments of paper and fabric, and call it 'collagism.' The probability is that this would be considered the plagiarism of the patchwriting **idea**, because it is a representation of a similar practice with no acknowledgment of the idea. The only way in which this might be defended is if the author could demonstrate that there was no prior knowledge of the concept at the time of writing.

Such a case illustrates the problem of quantifying two texts to judge on similarity. Once plagiarism has been suspected, it is not uncommon for the amount of shared material to be identified, and, the more there is, the worse the plagiarism is considered to be. But, especially in areas where there are clear guidelines as to expected practice, such as universities, **any** occurrence that can be identified is generally considered sufficient to constitute a problem. Given that this is the case, questions relating to how much of a relationship there must be between the sentences for the source and the work under review, and how many such sentences are required to constitute plagiarism,

are very difficult to provide satisfactory answers to. While acknowledging that such questions are valid on a case-by-case basis, the general principle adopted by writers of plagiarism legislation is that case-by-case evaluation can only take place under a general acceptance that **any** uncredited work that can be discernibly traced back to a source available to a writer requires an explanation.

Detection of Plagiarism

Until the end of the 20th century, plagiarism has been detected largely by human (as opposed to computer-assisted) readers familiar with the subject area, the likely sources, and, in the case of assessing the work of students, with the expected capabilities of the writers. In such cases, the triggers for recognition can be specific vocabulary items or phrases associated with particular sources or recognition of substantial portions inserted. The most common reported alert of suspicion is of a sudden change of style within the flow of the text. This can be an unexpected improvement in clarity, the use of terminology outside the expected boundaries of reference, or the use of material that is not as fully integrated with the surrounding text as the rest of the material. The sentences below, for example, are incorrectly punctuated while containing two highly distinctive and well-contrasted sets of adjectives, marked in bold type.

> In this text, the role of the leading man Okonkwo seems to show that he values masculinity and he is rebellious, the fact that his father was lazy makes Okokwo more determined to make his way in the world that values manliness. He rejects everything that his father stood for it seems to show that he believed his father to be **idle, poor, cowardly, gentle** and interested in music and conversation. So he decides to do the opposite of everything his father was, Okonwo becomes **productive, rich, brave, violent**, and adamantly opposed to music and anything else that seems to be 'soft.'

In the eventually acknowledged source reproduced below the overlaps have been marked. The underlined words are retained intact, with modifications of the intervening words, e.g., 'seems to value' being transformed into 'values.'

> Analysis of Important Characters
> Okonkwo –

> Okonkwo, the son of the effeminate and lazy Unoka, strives <u>to make his way in a world that</u> seems to value <u>manliness</u>. In so doing, <u>he rejects everything</u> for which he believes <u>his father stood</u>.

The second part of the essay extract above, shows retention of some adjectives, marked in bold type, and the replacement or omission of others; 'wealthy' has been replaced by 'rich' and 'thrifty' omitted. Further rewriting is present in this section, with the underlined elements representing the exactly borrowed material; e.g. 'he perceives' becoming 'seems.'

> Unoka was **idle**, **poor**, **profligate**, **cowardly**, **gentle**, <u>and interested in music and conversation</u>. Okonkwo consciously adopts <u>opposite</u> ideals and becomes **productive**, <u>wealthy</u>, thrifty, **brave**, **violent**, <u>and adamantly opposed to music and anything else that</u> he perceives <u>to be 'soft</u>,' such as conversation and emotion.

As might be expected from the presence of the header, this is from a set of notes on a book, in this case *Things fall apart* by Achebe. The source is Spark Notes, a set of materials published on the Internet, primarily aimed at secondary education, so an inappropriate authority for a third-year degree-level student to be employing, even if referenced, which it was not. The major transformation is at the start of the second sentence, where sentences two and three of the source are conflated in a less than clear or comfortable fashion.

> *'He rejects everything that his father stood for it seems to show that he believed his father...'*

This form of transformation is not uncommon, although many examples are less directly related than this.

Identification of Sources

Once suspicions have been aroused about the stylistic integrity of the essay, the reader then has the problem of attempting to identify the source. This is generally a requirement in disciplinary proceedings, because it is necessary to show that the material substantially exists in the source and to indicate the extent and the manner of the incorporation of this material in unreferenced form. In cases where the reader is familiar with the relevant literature, this can be a relatively simple task, but many cases of suspected plagiarism cannot be pursued to a conclusion because the source data cannot be readily traced. It is possible to make comparisons with earlier work, but there is as yet no reliable stylistic indicator that can demonstrate that an author could not have written the words under scrutiny. Some research into provision of computer-assisted style checking is reported in Woolls (2003). Computer assistance is also available in the form of Internet search engines, where the material under suspicion can be checked for occurrence on any open Internet site. Since students are often in need of a rapid answer, it is not uncommon for the source

or sources to be readily found, since in-depth research into potential sources revealed by an initial enquiry based on the question is unlikely to have occurred. So, the most likely candidate sources are those at the top of the search list.

Native and Nonnative Speaker Differences

It should be noted that, one side effect of the stylistic issue is that nonnative speakers of the language in which the work has been presented, are frequently perceived to be at a disadvantage over native speakers employing similar incorporation strategies. This is because the improvement in expression and confidence in language use is extremely apparent, and they are most likely to use the standard sources. As such a group is also potentially one most likely to have a problem with either comprehension or transformation of the source data, this places a particular burden of responsibility on those teaching and marking to ascertain the nature of the problem before assuming deliberate plagiarism. The question of whether plagiarism can in fact be other than deliberate is addressed below.

Electronic Detection

A number of factors have resulted in the development of electronic plagiarism detection tools. The growth in class sizes has made knowledge of student style much less common, and crosscomparison much more difficult. Source material is increasingly available both within institutions, and freely published on the Internet. And more work is being produced electronically and is increasingly being collected electronically. So it has become practical to compare student work with that of their peers, and to search the Internet for material incorporated from open websites or relevant data held by the web search services.

It is impossible to be definitive about search methodologies since they are not generally revealed by their constructors. However, in the unstructured space that the Internet is, as opposed to the indexed databases employed in document retrieval systems, for example, a 'successive word' methodology is likely to be the preferred method of search. World Wide Web searching is generally performed by looking for consecutive strings of words that have been transformed electronically into distinctive patterns that can be found in other texts treated in the same way. As few as 6 to 8 words can be used in such pattern building for identification across a very large number of potential sources. If those making use of the web sources are aware of this, it is possible to attempt to defeat the search mechanism by systematically changing words throughout a text within the presumed successive word boundary. The precise nature of the operation of the algorithms is not known, however, so this may not be a fruitful concealment attempt. It is also a considerable task to prepare oneself to make amendments that are coherent and still answer the question. In any extended source use, it is probably highly likely that a consecutive word string will be left intact, and this gives a search algorithm a chance of identifying the source. What such search engines cannot deal with is that not all material available from the Internet is immediately available. Some can only be obtained on payment of a fee, either for prewritten material or to have an essay written for that fee, so the essay has no obvious antecedents.

Related problems are growing class sizes with students sharing work by email attachments, and large distance-taught groups where the electronic sources in learning material are often simply reproduced in the answers of the student. To address these issues, other software programs have been developed to compare all the work on a given task in a student group with all the others. This allows comprehensive comparison of the level of similarity not available to generalized web searchers. These programs operate using either using successive strings of words, or individual word similarity within a document. This provides assurance with regard to the independence of student work from their peers, but cannot assist in the identification of external material.

Can Plagiarism Occur and Not Be Deliberate?

Within the academic area, the relationship between plagiarism and learning how to write has been explored by Rebecca Moore Howard (1993, 1995, 1999). She argues that many students find the requirements of the academic referencing system too difficult to apply in their first years in higher education, because they have not learned to write in an academic style. This is not ignorance of the underlying expectations, but a perceived or actual inability to meet those expectations. Although able to find the sources for the task given them, they are unable to process the material sufficiently well to produce an accurate or acceptable summary to include in their essays. To reduce the amount of direct quotation that would be necessary if all their sources were correctly cited, some students adopt the policy of selecting complete sentences or sections from different sources and stitching them together with their own material. This she has called 'patchwriting,' as noted earlier. Since this leaves clear traces of the original

material, particularly in the first years in higher education, their teachers will have great familiarity with the source data, and they are frequently accused and found guilty of plagiarism for adopting this practice. Howard argues that this should be seen rather as a stage on the path to achieving academic writing standards, and is more accurately described as inadequate paraphrase, or an inappropriate use of sources. She further contends that students can be encouraged to build their way out of this practice during their course, and that it is not an acceptable part of final work assessed for a degree.

Diane Pecorari examined this view sympathetically in a Ph.D. thesis (Pecorari, 2002) and subsequent paper (Pecorari, 2003). The thesis traced the progress of nine postgraduate masters degree students through their course, with the consent and cooperation of both students and supervisors. She found that in all cases patchwriting was present to a greater or lesser extent, even though the students knew that they were being monitored and were in fact involved in the discussion process during their course. In addition, Pecorari looked at eight completed Ph.D.'s selected for their similarity in provenance to the M.A. students, and discovered that in all but one case, patchwriting was present at different levels. This implies that the practice persists beyond first-degree level. In her conclusion Pecorari (2002) comments,

> What can be concluded is that between performance and expectations a wide gap exists, one which presents a danger for every student and a disaster for the few who err, and whose errors are detected. It is in the interest of every member of the academic community to mind the gap – and try to close it.

An educational establishment has the role of student development, of which writing in an academic style is but one aspect. All higher education institutions have explicit statements of the severity with which plagiarism is viewed by the academic community, most will have examples of what is deemed to be plagiarism available for student reference, and almost all will retain the option of failure of a complete course element, or ultimately expulsion from the institution. Both Howard and Pecorari believe that this stance is unhelpful and unduly severe for institutions to take while existing to develop their students'minds. Neither denies the existence of what is defined clearly as plagiarism in much student work, but they regard the issue as one of education and prevention rather than as a disciplinary matter.

The view taken by Howard and Pecorari almost certainly represents a minority one. The mainstream position is that the rules of accurate referencing are relatively few and are clearly set down from the beginning of a student's career. Observation of these rules is a fundamental requirement to the awarding of a degree. Every student benefits at the institution, both while taking the degree course and in later life. Due to the evaluative nature of the writings of both authors, the bibliographies attached to their work can be recommended as rich sources of further reading in the field.

Conclusion

While plagiarism can be clearly defined as a departure from the convention of attribution of sources, in practice, identifying that plagiarism is present is not always an easy task, and the identification of the actual sources that have been plagiarized can be even more difficult. The growth of electronically available data, much of which will not be known to either the specialized or general reader, makes the problem of identification even greater. Electronic detection tools are only a partial solution that have limitations on the amount of available data that can be checked, and therefore the overall accuracy of a negative report. Classical plagiarism – the use of material from books – is still a practice that is employed and detecting this continues to be a problem only really accessible to a reader (human, not computer) with a broad knowledge of the topic. This problem may in the near future lend itself to computer-assisted detection as more publications become available online. At the time of writing, a combination of detection and prevention methodologies within education is the favored method for encouraging good practice.

See also: Applied Forensic Linguistics; Authorship Attribution: Statistical and Computational Methods; Computational Stylistics; Computers in the Linguistic Humanities: Overview; Corpus Linguistics; Linguistic Features.

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Planning Strategies and Production of Spoken Discourse

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Introduction

It is not surprising that, even if the primary goal of all research focused on speech planning and production is to account for spontaneous spoken language, the relationship between research on speech planning and production and the study of spoken discourse has often been difficult. This has much to do with the impossibility of direct observation of conceptualization processes and with the difficulties in achieving control over the production of speech. The creativity inherently involved in speech planning sets two counteropposing effects in motion: the less creativity is associated with a production task, the less interesting are the insights into the language production processes; the more creativity is associated with a production task, the wider is the variability in speech productions and the more difficult it is to draw conclusions from the data. As such, the historical relationship between speech production and planning research and the study of spoken discourse has been strongly affected by the choice of methodology and data in language planning and production studies.

The two research fields appeared strongly connected in the 1970s, when the analysis of error corpora collected from daily conversations (over many years) gave a large impetus to language production research. The underlying idea was that errors are not random but seem to be connected to fundamental characteristics of the speech production process (see Fromkin, 1971, 1973; Garrett, 1980; MacKay, 1972): "errors shed light on the underlying units of linguistic performance and on the production of speech" (Fromkin, 1971: 29). Thus speech error data opened a 'window' into linguistic mental processes, letting the analyst observe the processes between thought generation and its verbal articulation (Fromkin, 1973: 43).

Together with speech errors, insights on the interior mental process during the production of spontaneous spoken discourse came from garnering information about hesitations and their role in the decision-making process, primarily as markers for when planning and decision making are being made by the speaker (see, among others, Beattie, 1979).

The emphasis on dysfluencies in the early research on speech production and planning eventually was recognized as paradoxical in the effort to define the 'properly functioning' processes that allow smooth production of speech (Ferriera, 1996: 724). This, as well as the difficulty in managing data from spontaneous spoken speech, distanced the study of speech production from spontaneous spoken discourse: "Thus the ultimate models of normal speech production will try to not lie in how they account for infrequent derailments of the process but rather must lie in how they deal with the normal process itself" (Levelt *et al.*, 1999: 2). Notwithstanding the above trend, the study of errors and dysfunction in language remains even today an invaluable tool for understanding the mechanisms of language production (see, among others, Meijer, 1997).

The Speaker as Information Processor

Leading the just-mentioned trend, Levelt (1989) provides an excellent overview of major advances in the language planning and production field up to the end

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of the 1980s. Moreover, he presents a very detailed model of speaking, from planning to articulation. According to Levelt, studying speech functions and patterns of spoken interaction between speakers, although of crucial importance (in fact he starts with a qualitative analysis of a case study taken from the English conversation corpus of Svartvik and Quirk (1980)), is not enough. The primary objective is to develop a theory of speaking that can be broken down from system into subsystems or processing components with characterizations of the representations they compute.

The model is made up of four components: a Conceptualizer, a Formulator, an Articulator, and a Speech-Comprehension System. The Conceptualizer generates preverbal messages. It consists of two steps, macroplanning and microplanning. The former elaborates the communicative intention and determines the content of the speech act. The latter gives the expression to each speech act, supplying the message with an information structure that helps the addressee to infer the communicative intention. The Formulator is made up of two subcomponents: the Grammatical Encoder, which retrieves lemmas from the lexicon and generates grammatical relations, and the Phonological Encoder, which builds a phonological plan. The Articulator executes the phonetic plan. The Speech-Comprehension System allows the speaker to monitor his own productions.

Each of the above components is an autonomous specialist that transforms its particular input into its particular output. The processing is incremental. It includes both serial and parallel processing. All components can work in parallel on different bits and pieces of the utterance. Each processing component will be set into motion by a minimal amount of its characteristic input. An interesting, and still debated, issue is how small that minimal amount can be.

A central thesis in Levelt's theory is that the lexicon is a mediator between conceptualization and grammatical and phonological encoding ('lexical hypothesis'). The preverbal message activates lexical items. The syntactic, morphological, and phonological properties of an activated lexical item in turn trigger the grammatical, morphological, and phonological encoding procedures in charge of the generation of an utterance.

In the last 20 years, research by Levelt and his colleagues has generated a lively debate focused on different aspects of the theory. The more the discussion has delved into details, the stronger has been the necessity of achieving experimental control over speech production, particularly at the higher levels of sentence production. As a result, scholars have conducted research mainly using experimentally induced speech error and reaction time experiments in picture description tasks, sentence production tasks, and sentence completion tasks. In this framework, these mainly quantitative studies, taking into account different variables, were able to addressee very detailed features of the general theory.

As far as speech production is concerned, some of the more debated points at the higher levels of grammar are the incremental vs. competitive nature of grammatical encoding, the functioning of syntactic encoding concerning hierarchical relations and word order in sentence production, the nature of combinatorial information in grammatical encoding, and phrasal ordering constraints in sentence production (see Ferreira, 1996; Hartsuiker and Westenberg, 2000; Vigliocco and Nicol, 1998; Bock, 1986; Pickering and Branigan, 1998; Stallings *et al.,* 1998; Yamashita and Chang, 2001; etc.).

As far as speech planning is concerned, a much-discussed topic is how far ahead speakers plan before initiating utterances. Even if it is generally accepted that speakers prepare utterances at different planning levels in parallel while at the same time speaking, the sizes of phonological and grammatical planning units are still largely indefinite. Speech errors and hesitations provide some evidence that the clause is probably a key planning unit at the grammatical level, and that the phonological planning units probably are made up of only one or two words within a phrase. In fact, word exchange typically switches words from different phrases within the same clause (i.e., pauses are more frequent between, as opposed to within, clauses), while sound exchange typically affects words from the same phrase, often adjacent words. Yet much remains to be resolved: studies using various techniques to elicit utterances with dissimilar syntactic structures reach different results (for an overview of the problem, see Meyer, 1996: 477–481). Speakers probably employ planning units of differing sizes according to the above circumstances (see Schriefers, 1992). Therefore, the inconsistencies among the results of different research could be attributed to differences in the planning strategy of the speakers.

In the same framework, another debated issue concerns the cost of speech planning. Syntactic planning should sustain processing costs in speech production (just like any other process), but it is has been difficult to empirically observe such costs. More recently, besides hesitation in speech, this issue has been approached using syntactic priming research. The role of the conceptual planning stage has been emphasized as a source of structural priming (Heydel and Murray, 2000). Benefits in cost reduction to the speaker have been hypothesized to underlie the

motivation for avoidance of syntactic planning and encourage syntactic persistency. In the study by Smith and Wheeldon (2001), for example, an on-line picture description task is used to investigate structural priming, with the objective being to analyze the scope and cost of syntactic structure generation.

Combining Perspectives

Up to this point in all the referenced works, the strict control of planning (visually presenting the words to be used) and production (time pressure during articulation) renders generalization to natural communicative situations tenuous: the production tasks used are distinctly distant from natural production. Therefore, the experimental conclusions would be reinforced by more evidence from spontaneous natural language production. Combining observations taken from natural situations and artificial controls applied in a laboratory remains of the utmost importance to advancing production theory.

Such a combination can be seen in the paper by Branigan *et al.* (2000) that aims to connect the cost reduction hypothesis to syntactic priming by examining coordination in dialogue. Do speakers in dialogue, regardless of lexical and semantic content, have a tendency to coordinate the syntactic structures of their contributions? Branigan *et al.* have established an original experimental technique in this field called 'confederate scripting,' which allows the study of syntactic structure under controlled conditions in dialogue. Pairs of speakers took turns describing pictures to each other. One speaker (an accomplice of the experimenter) produced pre-scripted descriptions designed to systematically vary in syntactic structure. The natural production of the true experimental subject was analyzed to determine if it produced matching syntactic forms, the objective being to investigate not only syntactic persistency in dialogue but also issues such as syntactic planning. Such syntactic representations might be encoded as a component of lexical entries that are accessed during both production and comprehension.

Of certain interest to this discussion are some cross-linguistic language production studies prompted by the observation that most of what we know about the cognitive processes underlying the production of spoken utterances has come from the study of English speakers. Among them are Bates and Devescovi (1989), who contrast the structural complexity of Italian and English spoken utterances, and Holmes (1995), who compares some of the message packaging devices used by speakers of two different languages, specifically French and English. Direct comparisons of production processes between English and other languages are not common, although they are critical for models of utterance production, i.e., allowing evaluation of language-specific or language-dependent characteristics. These studies include simple comparisons of the production frequency of distinct syntactic constructions in spontaneous speech (Holmes, 1995; Bates and Devescovi, 1989) and the rates of various hesitations produced by speakers (Holmes, 1995). Three of the more interesting aspects of these studies are the choice of data-spontaneous spoken discourse, the choice of French, a presumably topic-comment prominent language, and the choice of the phenomena analyzed, such as topicalization, cleft sentence, and so forth.

From Spontaneous Spoken Discourse to Planning Strategies and Speech Production

These studies are reminiscent of the more qualitatively inclined studies begun at the end of the 1970s in the area of American functionalism that were focused on message packaging and the flow of language and thought (Chafe, 1976, 1979, 1994, 1998; Levy, 1979).

The objective of this research is to understand how a speaker's stream of thought is followed and influenced by language and how language sheds light on the nature of the thought process that lies behind it. To this end, Chafe (1979) showed silent 7-minute films to groups of different people and then interviewed them individually, asking them to describe what happened in the film. He collected a large sample of quite natural verbalizations. A qualitative analysis of the interviews gave the author the opportunity to present a model for the verbalization of recalled experience: the Flow Model. In this model, a previous vertical, hierarchical organization of thought and language is replaced and enriched by increased attention to the horizontal aspect. The role of the speaker is emphasized as being engaged in a real-time process of focusing on sequential ideas and converting these ideas, one after another, into language (see Chafe, 1979: 160–166). Chafe (1976) takes into account topicalization phenomena while introducing the notion of the topic as a premature subject based on hypotheses of how speakers organize blocks of knowledge into sentences. Chafe has continued to further refine his hypotheses (Chafe, 1994; 1998), placing even more emphasis on the role of consciousness in thought, language, and behavior. In the same framework, the fundamental thesis of Levy (1979) is that the study of discourse must be approached in terms of the mental activity of the speaker, referring to the speaking process in which the speaker is engaged.

To gather data, Levy used techniques like approaching students just as they had finished class registration to question them on why they decided to order their schedules in the manner they did. Most the cohesive properties of discourse, realized through the speaker's language resources, are best described by taking into account the speaker's mental states and process rather than the structured text: in other words, the flow of the speaker's thought process is central to understanding and explaining the flow of the discourse. Some syntactic ambiguities are not easily resolved without accounting for the role of the mental structure involved in the speaker's production of the clause. For example, reference should be seen as a strategic process in which the speaker does not merely identify a particular object but rather constructs that object by choosing among a selection of properties that are momentarily relevant (see Levy, 1979: 184–190).

Other frameworks for considering speech planning and production originate in the study of spontaneous spoken language, which shows a large amount of phenomena readily understandable when taking into account the processes involved in the generation of real texts (see, among others, Sornicola, 1979, 1981; Milano, 2004). Sornicola (1979, 1981) analyses large series of phenomena in spoken text, where real speakers in actual dialogue present deviances from that expected by 'ideal' users, demonstrating how such an approach can contribute to further modifying the concept of 'appropriateness.' The analysis of spoken discourse gives the author the opportunity to discuss in detail some remarkable concerns of linguistic theory. Milano (2004) focuses on processes of topicalization in spontaneous speech. The analysis (at different levels of abstraction) provides some insights on syntactic variation, topicalization phenomena, and characteristics of the text in which they occur.

Further integration of research on spoken discourse and speech planning and production, as well as research conducted with a shared viewpoint (the marriage of qualitative and quantitative approaches), could only serve to greatly benefit that analysis and improve the techniques employed to that end.

See also: Cognitive Science: Overview; Consciousness, Thought and Language; Discourse Processing; Hesitation Phenomena and Pauses.; Language of Thought; Pauses and Hesitations: Psycholinguistic Approach; Phonology in the Production of Words; Psycholinguistic Research Methods; Psycholinguistics: Overview; Speech Errors as Evidence in Phonology; Speech Errors: Psycholinguistic Approach; Speech Production; Spoken Language Production: Psycholinguistic Approach.

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Planudes, Maximus (1260–1310)

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Maximus Planudes was one of the most important figures in Byzantine philology, grammar, and scholarship and was one of the main representatives of the so-called 'Palaiologan Renaissance,' the prosperous period of the last two centuries of the Byzantine era. According to the latest estimates, Planudes most likely lived between 1260 and 1310. He was born in Nikomedia of Bithynia, Manuel – Maximus was the name he took when he became a monk – and was highly educated in Constantinople; his educational status was reflected in his political efficiency and, most of all, in his activity as a teacher, writer, and scholar. Before becoming a monk – the *terminus post quem* for this event is the year 1283 – he served as a manuscript copyist and secretary in the imperial administration. Planudes remained involved with politics even during his monastic life. Due to his vast knowledge of Latin, he participated in political missions; for example, he went on an embassy in Venice in 1296 under the order of the emperor. As a monk he became soon Father Superior (*ἡγούμενος*) at the Monastery of Five Saints at the foot of mountain Auxentios. Initially at the Monastery of Chora, and from the beginning of the 14th century on at the Monastery of Akataleptos, Planudes became significantly involved in teaching. His school was like a university in modern times. It was at first in the Monastery of Chora and then in the Monastery of Akataleptos.

Planudes left behind a rich and prodigious collection of writings (see Wendel, 1950 for an overview and a description of his writings). Apart from his theological works, the content of which was influenced by the unstable relationship of his period with the Roman Catholic Church, and his literary writings (poetry and prose), Planudes is also distinguished for his grammar monographs and his extensive philological studies. The latter include a series of editions and annotations of ancient Greek writers, anthologies, and collections of epigrams, proverbs, and rhetorical and scientific pamphlets (for an evaluation of Planudes' scholarly work, see Wilson, 1996: 230–241), as well as translations of Latin religious and nonreligious authors into Greek (on the importance of Planudes' translations, see Schmitt, 1968). The main body of his writings on grammar consists of the following works: (1) *Περὶ γραμματικῆς διάλογος*; (*Dialogue on grammar*; edited by Bachmann, 1828: II, 1–101), a conversation between a teacher and his pupil regarding the definition and scope of 'grammar' – that is, of philology in ancient terms – as well as topics on morphology, orthography, syntax, and semantics in relation to certain parts of speech and specific words. (2) The treatise *Περὶ συντάξεως τῶν τοῦ λόγου μερῶν* (*On the syntax of the parts of speech*; edited by Bachmann, 1828: II, 103–166), which, following an introduction on the subject matter of syntax, deals with the syntax of the article, the pronoun,

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Planudes, Maximus (1260–1310)

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Maximus Planudes was one of the most important figures in Byzantine philology, grammar, and scholarship and was one of the main representatives of the so-called 'Palaiologan Renaissance,' the prosperous period of the last two centuries of the Byzantine era. According to the latest estimates, Planudes most likely lived between 1260 and 1310. He was born in Nikomedia of Bithynia, Manuel – Maximus was the name he took when he became a monk – and was highly educated in Constantinople; his educational status was reflected in his political efficiency and, most of all, in his activity as a teacher, writer, and scholar. Before becoming a monk – the *terminus post quem* for this event is the year 1283 – he served as a manuscript copyist and secretary in the imperial administration. Planudes remained involved with politics even during his monastic life. Due to his vast knowledge of Latin, he participated in political missions; for example, he went on an embassy in Venice in 1296 under the order of the emperor. As a monk he became soon Father Superior (*ἡγούμενος*) at the Monastery of Five Saints at the foot of mountain Auxentios. Initially at the Monastery of Chora, and from the beginning of the 14th century on at the Monastery of Akataleptos, Planudes became significantly involved in teaching. His school was like a university in modern times. It was at first in the Monastery of Chora and then in the Monastery of Akataleptos.

Planudes left behind a rich and prodigious collection of writings (see Wendel, 1950 for an overview and a description of his writings). Apart from his theological works, the content of which was influenced by the unstable relationship of his period with the Roman Catholic Church, and his literary writings (poetry and prose), Planudes is also distinguished for his grammar monographs and his extensive philological studies. The latter include a series of editions and annotations of ancient Greek writers, anthologies, and collections of epigrams, proverbs, and rhetorical and scientific pamphlets (for an evaluation of Planudes' scholarly work, see Wilson, 1996: 230–241), as well as translations of Latin religious and nonreligious authors into Greek (on the importance of Planudes' translations, see Schmitt, 1968). The main body of his writings on grammar consists of the following works: (1) *Περὶ γραμματικῆς διάλογος*; (*Dialogue on grammar*; edited by Bachmann, 1828: II, 1–101), a conversation between a teacher and his pupil regarding the definition and scope of 'grammar' – that is, of philology in ancient terms – as well as topics on morphology, orthography, syntax, and semantics in relation to certain parts of speech and specific words. (2) The treatise *Περὶ συντάξεως τῶν τοῦ λόγου μερῶν* (*On the syntax of the parts of speech*; edited by Bachmann, 1828: II, 103–166), which, following an introduction on the subject matter of syntax, deals with the syntax of the article, the pronoun,

the conjunction, and the preposition. This treatise is modeled on and has as its sources Apollonius' Dyscolus work *Πεεὶ συντάξεως* (2nd century A.D.) and Priscianus' *Institutiones grammaticae* (6th century A.D.) (on the issue of sources, see Murru, 1979a, 1979b).

Despite his direct relationship with and attachment to his ancient models, Planudes succeeded in overcoming the descriptive and normative character of his contemporary grammaticography. Furthermore, he made the theoretical discussion and argumentation accessible to his Byzantine audience in a brief, precise, and contemporary form and offered, as well as promoted, a deeper study of certain issues, such as case and tense (for an evaluation of Planudes' linguistic contribution, see Robins, 1993: 201–233). With his prodigious profile and breadth of his writing, including his translations, Planudes played a crucial role in and contributed to the strengthening of the cultural and intellectual relations between the East and the West. He was a pioneer of the spirit of the humanistic movement and the Renaissance from the 15th century onwards.

See also: Classical Antiquity: Language Study; Grammar.

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Plato and His Predecessors

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Predecessors

The first attempts at explicit theorizing about language in ancient Greece occurred among the itinerant teachers known as the Sophists (late 5th century B.C.E.). Ideas about language are, however, at least implicit in some texts prior to this. Parmenides (late 6th–mid-5th century B.C.E.) famously declared the impossibility of speaking or thinking of what is not, which seems to presuppose a view of meaning as consisting in, or at least requiring, reference to something in the world. And a generation or so earlier Heraclitus drew attention to the seeming paradox that one of the words for a bow, a deadly weapon, was *bios*, which is identical in spelling with the Greek word for 'life' (DK 22B48). This remark appears to trade on the notion that one would expect a certain fitness between words and their objects. And a similar notion is apparent in the etymologizing that occurs periodically in Homer and Hesiod; for instance, Odysseus was named by his grandfather, who was angry (*odussamenos*) towards many (*Od.* 19.407), and also himself suffers the effects of the gods' anger (*Od.* 1.62).

It is, though, in the Sophistic period that language first becomes the object of sustained reflection. Several texts from this period address the question of the origins of language, sometimes in the context of a broader account of the origins of society. A consistent picture emerging from these texts is that language was devised by humans themselves, in response to the needs of early communities. It came into being through a set of decisions about what names should apply to what objects, and in that sense is conventional rather than natural. These decisions were not necessarily seen as entirely arbitrary; the Sophist Protagoras, in Plato's dialogue of that name (322a6), speaks of language as the product of a *technê*, 'skill,' analogous to building or agriculture – which implies that one set of names may be better crafted (whatever that means) than another. But still, according to this view, there were clearly many different possible and acceptable sets of names. The picture is hardly sophisticated. However, it is the first attempt in Greek thought to understand, in something like

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the spirit of a social scientist – as opposed, say, to appealing to divine fiat – how language could have come about.

The question of constraints on the naming of objects was further pursued by the Sophists in a field of inquiry known as *orthotês onomatôn*, 'correctness of names.' It is hard to reconstruct precisely what this involved, but it seems to have been concerned, in some sense, with making the fit between words and the world as good as possible; it thus shares something with the pretheoretical concerns implied by Homer and Heraclitus. Two Sophists, Protagoras and Prodicus, were especially associated with this subject. Protagoras is said to have distinguished the grammatical genders of words, and to have been willing to criticize existing genders of words as not appropriate to the nature of their objects; *pêlêx* 'helmet,' for example, should be masculine, not feminine. He also drew distinctions among what would now be called speech acts – entreaty, question, answer, and command – and was again ready to correct people's choices among these modes of discourse. Prodicus, on the other hand, was especially concerned with precise definitions of words, including precise distinctions among nearly synonymous words; reports (and parodies) of this are common in Plato and elsewhere.

Despite Protagoras's anticipation of the notion of speech acts, the overriding conception of language in this period was as consisting purely of names applying to objects. And this led to some extraordinary claims about language. Several Sophists and their contemporaries are reported to have argued that falsehood is impossible, that there is no such thing as contradiction, or both. The essential point of these arguments is that there are only two possible options: to speak the truth or not to speak at all. The connection with the naming conception of language is clear. If all language does is name, then truth can only consist of successfully naming an object or state of affairs. But in that case, there is no prospect of successfully *referring* to something, yet saying something false *about* it, or of two people successfully referring to the same object, yet saying contradictory things about it. The only alternative to successful naming – that is, truth – on this conception is unsuccessful naming; but if naming is all language does, unsuccessful naming is not genuine language at all.

One other text from this era deserves mention. The Sophist Gorgias wrote a treatise entitled *On What Is Not* (*Peri tou mê ontos*), in which, again, extraordinary conclusions were argued for, namely: (1) there is nothing, (2) even if there were anything, it could not be known about, and (3) even if it could be known about, this knowledge could not be communicated to anyone else. There is much dispute about the purpose of this production, although Parmenides is clearly in some way the target. But the third part, on the impossibility of communication, is of particular interest for the study of language. The main arguments in this part were, first, that words are wholly different types of entity from the objects that they name, and second, that the contents of any two people's minds are necessarily different. We need not suppose that Gorgias actually *believed* communication was impossible. However, it is clear that he was raising (without attempting to answer) the deep question of how words manage to refer to objects at all.

Plato

The Sophists' ideas on language form the context for the reflections on this subject by Plato (mid-420s–347 B.C.E.). In a number of dialogues, widely (though by no means universally) regarded as from early in Plato's career, Socrates and his interlocutors are shown trying to answer questions of the form "What is F?", where F stands for some significant ethical characteristic such as courage, piety, or virtue in general. This enterprise is not fundamentally linguistic; even though it is often described as a search for definitions, Socrates is not interested primarily in the meanings of terms, but in the real natures of the items that those terms refer to. Nonetheless, the search is understood to require sensitivity to how the terms in question are actually used, and in this respect it seems to owe something to Prodicus's interest in precise distinctions of meaning. Socrates in these dialogues occasionally professes allegiance to Prodicus; the professions are never entirely serious, but they are not without some basis in his actual procedure.

Plato takes up the issue of correctness of names in his dialogue *Cratylus*. Here Socrates is made to examine two opposing (and extreme) views. One view, that of Hermogenes, is that linguistic correctness is purely a matter of convention. Indeed, Hermogenes even ignores the connotations of society-wide agreement normally present in the word 'convention' (*nomos*), suggesting that each individual is free to use words in whatever manner he or she decides. Against this, Socrates argues that if one accepts a view of reality as fixed – to which Hermogenes readily assents – one cannot regard correctness in language as a matter of merely arbitrary choice. Cratylus, on the other hand, holds the view that some names are *naturally* correct and some are not; the correct ones fit the nature of the things they refer to, while the incorrect ones do not. A trivial example is that 'Hermogenes' is not Hermogenes' true name, because he is not in fact the son of the god Hermes. But it is of

course a much more difficult question what, in general, the natural fitness of names might consist in. The view explored by Socrates and Cratylus is that most names can be analyzed etymologically into a small number of 'primary names,' and that these primary names are correct in virtue of a natural resemblance between their sounds and their objects. It is not clear how far Plato means us to be attracted by this theory. Socrates finds much to admire in it. But he argues that a role for convention in language cannot be altogether excluded. He is also dissatisfied with the fact that, in the version of the theory promoted by Cratylus, the originators of these names were Heracliteans who held that everything was in a state of constant change – a view that he, Socrates, cannot accept. Whatever we are ultimately supposed to think about the theory, however, the examination of the purported etymologies occupies a large proportion of the dialogue, suggesting that Plato thinks it deserves very serious consideration. Given the history of etymologizing mentioned earlier – a history to which the discussion seems sometimes to allude – this is perhaps not surprising, however frustrating and alien this portion of the dialogue may seem to us.

Another significant point that Socrates makes in *Cratylus* is that an understanding of things is more important than, and indeed indispensable for, the optimal naming of those things. And, as *Cratylus* and other dialogues make clear, the most important things, in the mature Platonic conception, are the unchanging, purely intelligible Forms – entities such as Beauty itself or Goodness itself, as opposed to any of the particular items we might call beautiful or good. Now these Forms are not, of course, linguistic entities. But it is plausible to suppose that one of the reasons Plato had for believing in Forms was a linguistic reason. Given the difficulty of the Socratic search for answers to "What is F?" questions about the virtues, it is natural to wonder how we manage to understand and use terms such as 'piety,' 'courage,' or 'virtue' at all. Even though we seem to have no difficulty employing these terms in ordinary discourse, Socrates's attempts to pin down what exactly they refer to consistently end in failure. It might well have seemed an attractive solution to this puzzle to suppose that our understanding of such terms derives from our (no doubt incomplete) grasp of the corresponding Forms, which are only imperfectly exemplified in the world around us; if Forms are what the terms really refer to, then the Socratic search, focused as it is on ordinary instances, is bound to fail. Of course, the project of understanding the Forms is hardly less ambitious, as Plato readily concedes.

Plato also tackles the question of how falsehood (along with contradiction) is possible. And here he makes what should be considered a definitive breakthrough. In the *Theaetetus* the characters are shown struggling unsuccessfully with the question of how false judgment is possible. Socrates also proposes a model of language that involves names being 'woven together' into an 'account' (*logos*, 202b), and this seems to promise an advance beyond the Sophistic conception of language as doing nothing but naming. But the promise is not fulfilled; no linguistic items are recognized other than names, and the implications of structure present in the notion of a 'weaving together' (*sumplokê*) are not followed through. In the *Sophist*, however, Plato has the central character (a visitor from Parmenides's hometown, Elea) draw a crucial distinction between a name (*onoma*) and a 'thing said' (*rêma*): the name identifies the thing being spoken of, and the 'thing said' delivers information about it. Once this distinction is in place, it is easy to see how both true and false statements may be made about the same objects. The dialogue involves much broader discussion about the legitimacy of thinking or speaking of what is not; and the term 'speaking of what is not' regularly refers, among other things, to the speaking of falsehoods. But once the possibility of this is established (against Parmenides) in general terms, the specifically linguistic details of how falsehood is possible are established relatively quickly. The importance of moving beyond the naming conception of language can hardly be overestimated; until it was clearly understood that language does more than just naming, the study of grammar, syntax, or anything else to do with the structure of language was out of the question.

See also: Classical Antiquity: Language Study; Greek Lexicography, Classical.

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Plato's *Cratylus* and Its Legacy

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Plato's *Cratylus* is the first complete surviving philosophical inquiry into the arbitrariness of language, and arguably the greatest. Although it was long thought to have been an early work of Plato's on account of being 'merely' about language, heightened appreciation of its importance over recent decades has prompted scholars to redate it to his 'great' middle period. It takes the form of a debate among three of Plato's teachers, Cratylus, Hermogenes, and Socrates, about the correctness of words (the subject taught by Cratylus). Cratylus and Hermogenes are arguing the question within the Sophists' staple pedagogical dichotomy of *physis* 'nature' versus *nomos* 'convention.' Socrates joins them, and they invite him to adjudicate as to who is right: Cratylus, who holds that a word is correct only if naturally connected to its meaning, or Hermogenes, who thinks that any word can designate anything just as well as any other.

They begin by considering proper names, which seem obviously conventional since chosen willfully for individuals, usually by their parents – although, significantly, Plato had changed his own name (originally Aristocles) – and then proceed to common nouns, the choice of which is lost in prehistory. In both cases, Hermogenes takes the conventionalist view and Cratylus the naturalist one. But Cratylus sounds absurd in the proper-name context when he holds that Hermogenes isn't really his interlocutor's name because he isn't actually 'born of Hermes' (which would imply that he is lucky and eloquent, when in fact he is neither). And Hermogenes sounds equally absurd in the common-noun context when he holds that it would make no difference if someone referred to a man as 'horse' and to a horse as 'man.'

Socrates raises the objection that, were this latter argument the case, there would be no way of distinguishing truth from falsehood, a position taken by relativists like Protagoras but anathema to Socrates (and Plato), for whom things have a natural reality of their own that does not depend on the perception of individuals. Socrates lays out the characteristically Platonic view that the things we perceive in the world around us are not really 'real,' in the sense that they are not permanent but in flux, are not the wholes we perceive but conglomerations of atoms, and are not perceived in the same way by all of us. The table at which I am now writing was not a table 30 years ago but has been made up from what was then parts of trees, which themselves did not exist 100 years ago, and in time the table will burn or decay, its substance taking on yet another form. The meaning of the word *table*, the knowledge I have of what a 'table' is, is not this transient thing. On the contrary, actual tables are made in accordance with the *function* of a table, which requires it to have a particular shape, that of a flat top surface supported by legs.

This is what Plato calls the *idea* of a table, what defines the *ideal form* of a table. That ideal form is the true, unchanging reality. Any individual table is merely an attempt to realize that ideal form in transient matter. The meaning of the word *table* is that idea, not any particular material instantiation of it. Moreover, ideas are all that we can 'know,' since knowledge must be of permanent, unchanging things, as opposed to the perception or opinion we can have of material things. We may disagree over whether a particular table is beautiful, but we cannot *know* that it is or is not beautiful in the same way that we can know what a table is and what beauty is – although,

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actually, such knowledge is not accessible to just anyone. The Ideal Forms inhabit a heaven into which only the philosopher, the wisest of men, can see (hence the political stance of Plato's *Republic*, where the ideal ruler is the philosopher-king).

From this point on, Socrates directs all his questions to Hermogenes, with Cratylus silent until quite late in the dialogue. In response to Socrates's point about truth, Hermogenes raises a powerful objection: If truth depends on some kind of natural relationship between word and thing, how is it possible for different languages to exist? Socrates does not attempt to answer this directly (a sign of how seriously Plato took the question), but steers the dialogue off in the direction that the question demands. He asks Hermogenes about the purpose of words, and they conclude that words exist for two reasons: to discriminate among things, i.e., to pick out their *ousia*, the true essence that belongs to them alone; and to transmit that knowledge from the few who can perceive it directly to the many who cannot.

This leads Socrates to ask about the origins of the words we use, paving the way to the etymological inquiry that will form the great central bulk of the dialogue. Etymology, which in Greek means the 'study of truth,' was one of the 'sciences' based on language in which instruction was offered by Socrates's contemporaries the Sophists. The most successful and widely sought after of these was rhetoric, the art of using language in order to persuade, persuasion being the ultimate political commodity in the democracy of Athens. Just as they had no faith in democracy, Socrates and Plato disdained rhetoric as mere wordplay, not at all concerned with real knowledge. Etymology, however, had more of an appeal. It not only claimed to be the study of truth, but did offer real insights into what words meant in an earlier time, closer to the moment of their creation. The great question, Socrates says, is whether whoever made the words we use – the semimythical *nomothetes*, which also means 'lawgiver' – really perceived the true essence of the thing he was naming, and if so, whether he succeeded in the word maker's craft of *mimesis*, 'imitation' of that essence in the sounds of language. This provides, in theory at least, the answer to Hermogenes's question about how it is possible for different languages to exist unless words are purely conventional: any number of 'correct' words are conceivable to designate a given meaning as long as they capture its essence and make it plain.

As Socrates proceeds through various classes of words and their etymologies, the thesis emerges that the creation of the Greek lexicon took place under the influence of Heraclitus's doctrine that 'everything flows.' Accounts are given whereby words of a positive moral sense are traced back to roots and sounds indicating motion, while those of a negative moral sense have roots expressing immobility. But all sorts of problems ensue. Socrates points out how easy it is, when no such account suggests itself, to have recourse to some *ad hoc* explanation, such as attributing a word to foreign origin. When it comes to mimesis, he notes that *r*, a trilled consonant in Greek, seems naturally to denote motion by the very way it is produced, and indeed appears in many of the words with positive qualities that he traces back to the idea of motion – yet it does not appear in the word for 'motion' itself, *kinesis*. Socrates also cites cases of words known to have undergone sound change, which he puts down to people who "care nothing about the truth, only about how they shape their mouths." This is a swipe not just at the *hoi polloi* in general but especially at rhetoricians and the poets who along with them are banned from Plato's ideal Republic.

He finally turns back to Cratylus to discuss another fundamental problem with words being naturally connected to their meaning. Cratylus has insisted that the meaning of a 'correct' word must not only be embodied directly in the sounds of the word but also be indistinguishable from the idea of what it designates. Socrates leads him to admit that this is not in fact the nature of mimesis – if the image of something were identical to that something, it would not be an image at all but would actually have become the thing itself. Instead, the art of mimesis in language is to capture and reproduce some part of the essence of things; indeed, Socrates affirms, it is precisely in this way that a language *should* be constructed and used. But he admits, once constructed, the language passes into the hands of the many, who care only about the 'vulgar' function of communicating with their fellows, for which conventional words (not 'correct' ones in Cratylus's sense) suffice. The investigation reaches an impasse, and Socrates concludes by opining that the Greek language really was created under the Heraclitean philosophy, but that the philosophy itself is misguided; that the lawgiver did not consistently embody its principles in sound; and that, even when he did so, words have subsequently undergone change at the hands of the mob, who care only about communication and sounding nice.

As a result, the dialogue ends up rejecting the possibility that the study of language opens a path to understanding the true nature of the universe. For each word, one would first have to decide whether it was created with an eye to truth, whether that truth was properly and consistently imitated in sounds, and whether the original form of the sounds has remained

unaltered. But the first of these decisions already demands that we know what the truth is independently of the word in question – and if we can do that, there is no point inquiring further. This is clearly disappointing to Socrates, who believes that words should be naturally and deterministically bound to their meanings, but he is forced to admit that, at least as they are used for the vulgar purpose of communication, they are not in fact so bound. The way to knowledge of the truth is not therefore through the study of etymology but through the kind of dialectic inquiry that the *Cratylus* itself embodies.

This is a blinding condemnation of the futility of any language-based 'science.' Yet so intense and sustained is Socrates's attempt to disprove Hermogenes's conventionalist stance through an examination of the hidden etymological structure of words that, although his attempt is ultimately given up as unsuccessful, the dialogue nevertheless has been read for centuries as a detailed study of Greek etymology. It was even interpreted as coming down on the side of Cratylus, holding that language really is grounded in nature, when in fact it makes clear that the positions taken by both Cratylus and Hermogenes are unsustainable in isolation from one another and from deeper inquiry into the nature of word making and mimesis.

The misinterpretations are less surprising when one considers how powerful and universal is the impulse to interpret language as having a meaning far deeper than what appears on the surface. This is nowhere more true than in European culture, formed by the doctrine of a god who is Himself *logos*, the Word, the language-based and language-like intelligence that created the world and continues to order it. From medieval through modern linguistic thought we find various attempts at containing arbitrariness, for instance, by locating it in nouns only, as opposed to verbs and other more 'functional' parts of speech; in the lexicon as a whole, as opposed to grammar; in conventional signs, which are imagined as having come about as an accretion onto more original and basic 'natural' signs; in a 'universal' grammar that underlies all languages, which differ from one another only in relatively superficial particulars.

Modern secular culture has not given up its faith in language but rather has problematized and debated its centrality in various guises that can be read as reworkings of the problem outlined and investigated in the *Cratylus*. Modern linguistics is predicated upon the belief in something deeper than the actual words we speak and hear, wherein their *real* structure lies, and perhaps also their real meaning. We find this impulse in Humboldt's *energeia*, in Jakobson's functionalism, in Chomsky's universalism, and in various attempts to portray thought as conditioned by meaning, including the Sapir–Whorf hypothesis at the micro level of words, and the regimes of language described by present-day linguistic anthropologists and discourse analysts (in the wake of Nietzsche and Foucault) at the macro level of discourse. Even Saussure, with whom the modern doctrine of the arbitrariness of linguistic signs is most closely associated, taught that everything having to do with the systematic nature of languages – and languages are entirely systematic by his account – needs to be approached from the point of view of limiting the arbitrary.

The legacy of the *Cratylus* has yet to play itself out. Once linguists manage to confront the powerful challenge it puts to the whole enterprise, we can perhaps begin to approach an understanding of language complex enough to take account of how Hermogenes, Cratylus, and Socrates are actually each right and wrong, and then to formulate, for the first time, new questions that actually pass beyond the concerns of the ancient dialogue rather than endlessly recycling them.

See also: Naturalism; Nominalism; Plato and His Predecessors; Realism and Antirealism.

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Pliny the Elder (23–79 A.D.)

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C. Plinius Secundus (Plinius maior), Roman equestrian, civil servant and officer, historian, rhetorician, encyclopedist, born in Novum Comum (Como) in 23 A.D., died in 79 A.D. during the eruption of Mount Vesuvius, as reported by his nephew Pliny the Younger (*Epist.* 6.16, 6.20). Under the emperor Claudius, he was employed as an officer and financial administrator and held further administrative posts under Vespasian (for details, see König and Winkler, 1979; Serbat, 1986: 2073–2077; Sallmann, 2000: 1135–1136), but at the same time he was a very prolific author of numerous treatises on history (*De iaculatione equestri* [On the use of the throwing-spear by cavalrymen], *Bella Germaniae* in 20 books, *A fine Aufidii Bassi historiae* in 31 books), grammar and rhetoric, as well as science. Most of his works are lost or preserved only in fragments, with the exception of the monumental and encyclopedic *Naturalis historia* in 37 books (Beagon, 1992; Healy, 1999; Sallmann, 2000: 1138–1140; Naas, 2002; Murphy, 2004), which had an enormous impact on later periods (Serbat, 1986: 2170–2183), even though Pliny has frequently been criticized for the compilatory nature of his work and for his lack of original thought. Pliny the Younger, who in one of his letters compiled a catalogue of his uncle's and adoptive parent's works (*Epist.* 3.5; cf. Suetonius, *De hist.* fr. 80 Reifferscheidt), described Pliny the Elder as an untiring scholar who devoted an enormous amount of time to his multifaceted research activities.

To Pliny the Elder's grammatical, rhetorical, and biographical works belong three treatises of which only fragments have survived or which are lost: (1) *De vita Pomponii Secundi* in two books, a biography of his friend Pomponius Secundus, military commander and dramatist; (2) *Studiosus* in three books on the education of the orator, apparently soon replaced by Quintilian's *Institutio oratoria*; and (3) *Dubius sermo* in eight books, which is referred to in the preface to the *Naturalis historia* (praef. 28) and can be dated around 67 A.D. The majority (more than 60%) of the *Dubius sermo* fragments, most of which belong to Book 6, were preserved by Charisius via Iulius Romanus. It is difficult to reconstruct the work as a whole, but it can be said with some certainty that it was a collection of words and word forms whose grammatical correctness, including their orthography, was open to debate. In order to determine the status of certain forms, Pliny applied either analogy (*ratio*) or usage (*consuetudo*) as normative principles, depending on the individual case; the authority of exemplary writers (*auctoritas*), euphony (*suavitas*), and antiquity (*consuetudo veterum*) played a role for him in the discussion of linguistic norms as well (cf. Fögen, 1998, 1999). Pliny also dealt with the quality of sounds and questions of sound change. The fragments demonstrate that in his own work he often quoted passages from Varro and from C. Iulius Caesar's treatise *De analogia*. In general, he does not seem to have had the highest opinion of grammarians, as he condemned their tendency toward oversubtlety and pedantry (*Nat. hist.* 35.13: *perversa grammaticorum subtilitas*); this judgment might have been caused by his rejection of the all too strict linguistic normativism of some school grammarians.

See also: Aristotle and the Stoics on Language; Classical Antiquity: Language Study; Greece: Language Situation; Greek, Ancient; Italy: Language Situation; Language Attitudes; Language Change and Language Contact; Language Education: Correctness and Purism; Language Education: Grammar; Latin; Normativity; Norms and Correctness; Roman *Ars Grammatica*; Varro, Marcus Terentius (116–27 B.C.).

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Pluractionals (Distributives)

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Many of the world's languages have a derived 'pluractional' verb form that indicates that "the verbal action is characterized by one or another kind of multiplicity: it can happen habitually; it can be executed by a certain number of subjects; it can be applied to a certain number of objects; it can continue over a longer period of time; or it can be performed at different places" (Gerhardt, 1984: 12), e.g., Ga'anda (Chadic) [ɬax] 'tear (something)', [ɬəɬax] 'tear many things, shred'. The wide semantic range of pluractionals, which varies in detail from language to language, is evidenced in Parsons's (1981: 206) description of Hausa, namely "one actor, or a number of actors doing the same thing to a number of objects, either simultaneously or in succession; or a number of actors doing the same thing to the same object severally and/or in succession; or else one actor doing the same thing to the same object several times over . . .. With intransitive verbs it adds a notion of multitude and/or succession . . . or sometimes of distribution in space." In the linguistic literature, these verb forms are variously referred to as 'intensives,' which is semantically inexact, or 'plural verbs,' which leads to confusion with inflectional verb forms that agree in number with the subject (e.g., Dutch: 'run' *loop/loopt* [sg.] vs. *lopen* [pl.]). These forms have less often, but more appropriately, been described in terms of 'plurality of action' or simply as 'plural action' verbs. In recent years, the term 'pluractional', a lexical blend coined by Newman (1980: 13) has been increasingly adopted by Africanists, and more gradually by scholars working in other language areas. The exact distribution/prevalence of pluractional verbs is hard to determine since language-specific descriptions and terminology vary so greatly; however, it is probably fair to say that pluractionals are very common and quite widespread. For example, they are well attested in all four major phyla in Africa (Brooks, 1991), in Native American languages (Sapir and Swadesh, 1946), in Dravidian languages (Steever, 1987), in Australian languages (Dixon, 1972), and in the now-extinct Sumerian language (Steinkeller, 1979).

Generally speaking, use of pluractionals represents a free choice to express semantic plurality rather than being determined by agreement rules (see above), e.g., Bachama (Chadic) (Carnochan, 1970) [nda mbura ɗiye] *he extinguish fire* 'he put out the fire' (single action) vs. [nda mbara ɗiye] *he extinguish*.PLURACT *fire* 'he put out the fire (by going around and beating it out)'. Nevertheless, there is a natural tendency for ergative-type collocations, that is to say, pluractionals commonly co-occur with (but are not necessarily required by) plural objects of transitive verbs or plural subjects of intransitive verbs, for example:

(1) Bachama

/nda	pir	vuney/
he	*thatch*	*hut*

'he thatched the hut'

/nda	pyer	vonye/
he	*thatch*.PLURACT	*huts*

'he thatched the huts'

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/nda	pyer	vonye/
he	*thatch*.PLURACT	*huts*

'he thatched the huts'

(2) Bachama
/kəəmbəto a ɗimo/
canoe PAST *sink*
'the canoe sank'
/kəəmbyee a ɗyemo/
canoes PAST *sink*.PLURACT
'the canoes sank'

There are occasional instances, however, where pluractional usage has become grammaticalized as an agreement feature. In Kanakuru (Chadic), a handful of verbs obligatorily require pluractional agreement with plural objects (of transitive verbs) or plural subjects (of intransitives), for example:

(3) Kanakuru
/na ɗowe dow-i/
I *tie* *horse-the*
'I tied the horse'
/na ɗope donjin-i/
I *tie*.PLURACT *horse*.PL-*the*
'I tied the horses'

(4) Kanakuru
/dow-i a ɗowe-ni/
horse-the PAST *tie-it*(ICP)
'the horse is tied'
/donjin-i wu ɗope-wu/
horse.PL-*the* *they* *tie*.PLURACT.-*them*(ICP)
'the horses are tied'
(ICP = intransitive copy pronoun)

A phenomenon that is prevalent in the Chadic family is the existence of frozen pluractionals, namely verbs that are pluractional in form but for which the nonpluractional counterpart no longer exists. In some cases the original pluractional meaning is still evident to some degree; in others the special semantics of the pluractional has been bleached out, e.g., Hausa *furfura* 'barter', cf. *kirkira* 'call many or often', pluractional of *kira* 'call'; *sansana* 'smell', cf. *tuntuna* 'remind many or often', pluractional of *tuna* 'remind'; *sassabe* 'clear a farm' (with plural action implied even though the simple stem **sabe* doesn't exist); *yagalgala* 'tear to pieces' (with plural action evident even though **yagala* doesn't exist).

As with other morphological formations, pluractional derivation is accomplished by a wide variety of means; nevertheless, some patterns stand out. First pluractionals are commonly formed in iconic fashion by means of reduplication. In the Chadic language family, partial reduplication (sometimes accompanied by vowel modification) is the norm, but full reduplication is also attested. Here are some examples (with the pluractional form to the right): Bole [looɗu]/[loloɗu] 'ask'; Ga'anda [fəɬ]/[fəfaɬ] 'break'; Sha [mot]/[motot] 'die'; Lamang [sula]/[sulala] 'fry'; Hausa [tuna]/[tuntuna] 'remind', [dagura]/[dagurgura] 'gnaw'; Daba [pəz]/[pəzpəz] 'sharpen'; Margi [kutsa]/[kutsakutsa] 'shake'. Possibly related to reduplication is the use of gemination to form pluractionals, e.g., Pero [lofo]/[loffo] 'beat', [liguno]/[ligguno] 'answer'; Bole [poɗu]/[poɗɗu] 'take out', [salu]/[sasallu] 'slash'. In Kanakuru, the geminate has been reduced to a single consonant, leaving the surface pluractional formation as one of consonant hardening, e.g., [muri] (<[*muti])/[mute] (<[*mutte]) 'die', [ɗowe] (<[*(ɗope])/[ɗope] (<[*ɗoppe]) 'tie'. In Kwang, similar (but independent) degemination has resulted in pluractional formation by devoicing, e.g., [bəje]/[pəje] 'wash (something)', [gəɗe]/[kəɗe] 'disguise oneself'. Finally, languages with pluractionals often have a small number of suppletive forms, e.g., Kaje (Benue-Congo) [wrak]/[ban] 'mount, climb', [byin]/[tyey] 'give birth'; Mupun (Chadic) [ɗen]/[le] 'put', [cit]/[nas] 'beat', [ta]/[ɗoŋ] 'fall down'.

See also: Intensifiers; Reduplication; Iconicity; Natural Semantic Metalanguage; Plurality.

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Plurality

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Plural expressions may be intuitively characterized as those involving reference to multiple objects. Semantic theories differ, however, in how this intuition is worked out formally.

The most popular approach is to treat plural expressions as referring to some sort of 'plural object,' or group. That is, alongside individual objects such as people, tables, chairs, etc., we assume there are groups of such objects, and that plural expressions refer to these groups in much the same way as singular expressions refer to individuals. Just as singular noun phrases denote and quantify over individuals, plural noun phrases denote and quantify over groups; just as singular predicates hold true or false of individuals, plural predicates hold true or false of groups.

An alternative, advanced by Schein (1993) (building on earlier logical work by George Boolos) is to regard a plural term as denoting each of several individuals directly, rather than denoting the group containing these individuals. This gives the effect of treating denotation for plural terms as a relation rather than a function; it is the denoting relation itself, rather than the denoted object, which is plural. The primary advantage of this technique is that it allows a reasonable treatment of noun phrases such as *the sets that do not contain themselves*, which potentially give rise to Russell's paradox in more conventional treatments.

Among analyses that do regard plural expressions as referring to groups, the main options are to identify groups with *sets,* or with *mereological sums*. The latter choice is favored especially by those who regard sets as abstract, mathematical objects existing outside of space and time. As Link (1998) puts it, "If my kids turn the living room into a mess I find it hard to believe that a set has been at work." However, not all authors share the intuition that sets of concrete objects are themselves abstract, and in any case the issue seems more philosophical than linguistic (but see the discussion of conjoined noun phrases below).

No matter which approach is adopted, a central problem in the semantics of plurality is determining the range and distribution of readings available to sentences containing plural expressions. Sentence (1a), for example, is intuitively interpreted as predicating the property of being numerous to our problems *collectively;* no individual problem can be numerous. Sentence (1b), in contrast, requires all (or nearly all) the individual children to be asleep; the predicate applies *distributively.* Sentence (1c) seems ambiguous between collective and distributive readings, meaning either that the T.A.s together earned exactly $20 000, or that they each did:

(1a) Our problems are numerous.
(1b) The children are asleep.
(1c) The T.A.s earned exactly $20 000.

Such examples raise several issues: Are plural expressions authentically ambiguous between collective and distributive readings, or are both interpretations covered under a single, very general meaning? If there is an authentic ambiguity, is it a simple two-way ambiguity between collective and distributive readings, or are there other possibilities? What is the locus of the ambiguity: in the noun phrase, the predicate, or both?

In favor of the view that there is an authentic ambiguity, consider a situation in which there are two T.A.s, and each of them earned exactly $10 000. In this case, sentence (1c) is true. Sentence (2) is also true in this situation:

(2) The T.A.s earned exactly $10 000.

This suggests that there are two distinct figures, both of which are the exact amount the T.A.s earned: in one sense they earned $20 000, and in another sense they earned $10 000 – but this appeal to multiple senses amounts to a claim of ambiguity.

An ambiguity is also suggested by patterns of anaphora, as argued by Roberts (1991). Sentence (3a) allows the continuation in (3b) if (3a) is interpreted as predicating $\lambda x \exists y[\text{piano}(y)\ \&\ \text{lift}(x, y)]$ of the group of students as a whole, but not if this predicate is understood as applying to each student separately. (A third interpretation, in which there is some piano *y* such that the predicate *lifted y* applies to the individual students, also allows the continuation in (3b), but this does not affect the argument.)

(3a) The students lifted a piano.
(3b) It was heavy.

If sentence (3a) is unambiguous, with no formal differentiation between the collective and distributive interpretations, it is hard to see how we could capture this difference in anaphoric potential.

If there is an ambiguity, one may ask whether the fully collective and fully distributive readings are the only ones available, or if instead there may be 'intermediate' readings. Intermediate readings appear to be called for in examples like (4):

(4) The shoes cost $75.

This sentence is most naturally interpreted as meaning that each pair of shoes costs $75, not that each individual shoe costs that much, or that all the shoes together cost that much.

Gillon (1987) argues that sentences with plural subjects have as many readings as there are *minimal covers* of the set denoted by the subject noun phrase, in which a *cover* of a set A is a set C of nonempty subsets of A such that their union, $\cup C$, is equal to A, and a cover of A is *minimal* iff it has no subsets that are also covers of A; this idea is developed further by Schwarzschild (1996) and others. Under this proposal, the pragmatic context makes a particular cover salient, and the predicate is required to hold of each element of the cover. The fully distributive and fully collective readings reemerge as special cases.

However, cover-based analyses face a challenge in dealing with examples like (1c): Suppose John, Mary, and Bill are the T.A.s, and each of them earned $10 000. In this case, the predicate *earned exactly $20 000* holds of each cell of the cover {{John, Mary}, {John, Bill}}, but sentence (1c) is not intuitively true in this situation.

Whether it appeals to covers or not, an ambiguity analysis must address the issue of where in the sentence the ambiguity is located. Early treatments often seemed to take for granted that it was the plural noun phrases themselves which are ambiguous, but many more recent treatments trace the ambiguity to the predicates with which the noun phrases combine (Scha, 1984; Dowty, 1986; Roberts, 1991; Lasersohn, 1995). A standard argument for this view comes from examples like (5):

(5) The students met in the bar and had a beer.

The natural interpretation is that the students met collectively but had separate beers. This reading is easily obtained if we treat the subject noun phrase as unambiguously denoting the group of students as a whole, and treat the conjunct verb phrases as predicates of groups, with the distributive predicate *had a beer* holding of a group iff each of its individual members had a beer; the denotation of the whole, coordinate verb phrase may then be obtained by intersection. If we try to claim that the collective/distributive ambiguity is located in the subject noun phrase, however, it seems impossible to give a consistent answer as to which reading it takes in this example.

A suitable ambiguity in the predicate may be obtained by positing an implicit operator on the predicate. Link (1998) and Roberts (1987) suggest an optional operator on the verb phrase, notated "^{D}", and interpreted as $\lambda P \lambda x \exists y[y \Pi x \rightarrow P(y)]$, where Π is the relation an individual stands in to the larger groups of which it forms a part. This gives a simple two-way ambiguity, depending on whether the operator is present or not; intermediate readings may be obtained using a more complex operator which quantifies over elements of a cover (Schwarzschild, 1996). Either operator is easily generalized across types to give distributive readings for non-subject argument places (Lasersohn, 1998).

It should be noted that the lexical semantics of some predicates prevent them from participating in the collective/distributive ambiguity: a verb like *sleep*, for example, cannot apply to a group without also applying to the individual members of the group. Adding a distributivity operator in this case is redundant, and does not result in a difference in meaning.

Conversely, certain predicates apply only to groups: *gather*, for example. Such predicates do show collective/distributive ambiguities however, when applied to arguments denoting groups of groups:

(6) The tribes gathered.

Example (6) may be used to mean that each tribe gathered separately, or that all the tribes gathered together.

A good deal of work has been devoted to the relation between *conjunction* and plurality (Link, 1998; Hoeksema, 1983; Landman, 1989a; Lasersohn, 1995; Schwarzschild, 1996; Winter, 2001) because conjoined noun phrases sometimes admit collective readings, as in (7):

(7) John and Mary lifted the piano.

Such examples suggest that coordinate noun phrases may denote groups in much the same fashion as plural noun phrases. Such sentences also admit a distributive reading, which may be obtained either through the use of a distributivity operator as with other plural noun phrases, or by reducing the coordination to propositional conjunction, via a generalized conjunction operator or conjunction reduction transformation.

Conjoined noun phrases have sometimes been used to argue that semantic theory must allow reference to *higher-order groups* (Hoeksema, 1983; Landman, 1989a). This is easily accomplished in set theory, since sets may contain other sets as members: $\{a, \{b, c\}\} \neq \{\{a, b\}, c\} \neq \{a, b, c\}$, but is less straightforward if groups are modeled as mereological sums.

(8a) Blücher and Wellington and Napoleon fought against each other at Waterloo.

(8b) The cards below seven and the cards from seven up are separated.

Example (8a), from Hoeksema (1983), may be parsed in either of two ways: [[Blücher and Wellington] and Napoleon] or [Blücher and [Wellington and Napoleon]]. It is intuitively true relative to the first parse but false relative to the second, suggesting that the two parses correspond to denotations such as {{b, w}, n} and {b, {w, n}}. Likewise example (8b), from Landman (1989a), is not equivalent to *The cards below 10 and the cards from 10 up are separated*. But if reference to higher-order groups is disallowed, the subject noun phrases of these two sentences would seem to refer to the same group, namely the group containing all the individual cards as members. The opposing view that noun phrases need never refer to higher-order groups has been defended in detail by Schwarzschild (1996), who points out that the pragmatic context may make salient a particular division of the denotation into subgroups even if that denotation is first-order; correct truth conditions may be obtained if the semantics is sensitive to this pragmatically supplied division.

A number of additional issues arise in the semantics of plurality, which can only briefly be mentioned here: Certain *adverbs,* such as *together* or *separately*, seem to force a collective or distributive reading, but the exact mechanism by which they do this is a matter of some dispute (Lasersohn, 1995; Schwarzschild, 1994; Moltmann, 1997). Plural expressions share a number of characteristics with *mass terms,* suggesting a unified analysis (Link, 1998). Plural noun phrases affect the *aspectual class* of predicates with which they combine, suggesting a parallel in the domain of *events* to the structure of groups among individuals (Krifka, 1989) – a parallel also suggested by the phenomenon of *verbal plurality* or 'pluractionality' (Lasersohn, 1995). Finally, the interpretation of *bare plurals,* or plural noun phrases with no overt determiner, and particularly the alternation between the *existential, generic,* and *kind-level* readings, illustrated in (9), has attracted enormous attention; but much of this work belongs more properly to the study of genericity and indefiniteness than to the semantics of plurality *per se* (Carlson, 1980; Carlson and Pelletier, 1995).

(9a) Raccoons are stealing my corn.
(9b) Raccoons are sneaky.
(9c) Raccoons are widespread.

See also: Coordination; Generic Reference; Genetics and Language; Mass Expressions; Mass Nouns, Count Nouns, Non-count Nouns: Philosophical Aspects.

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Poetry: Stylistic Aspects

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Introduction

This article aims to discover what is special about poetry in the context of literature in general and stylistic approaches to literature in particular. What is noticeable, first of all, about the literary works that we generally call poetry is that they are, in a sense, archetypal literature. In other words, to the extent that we want to distinguish literature as an identifiable group of texts (see Jeffries, 1996), we inevitably attempt to define what makes literature different from other forms of language. And within the context of literature in this sense, we might conclude that poetry is made up of the language that is least like 'normal' language (whatever that is) and is therefore more typically literary than narrative fiction or dramatic texts. Jakobson's early identification of the 'poetic function' as one of the main functions of language underlines the importance of poetry as one of the most distinctive genres of text.

This is not to say that there is such a thing as an identifiable literary language, or that literature or poetry are actually clearly identifiable sets of texts with different stylistic norms from other texts. Most stylisticians from Jakobson onward would argue quite strongly, indeed, that the same techniques and stylistic effects are used in literature as in other text-types and genres. See Carter and Simpson (1989) for a restating of Jakobson's (1987) call to develop a stylistics of literature. Despite the determination, then, that literature was not linguistically different from other texts, the stylistic study of poetry in the early and mid-20th century took this prototypical role of poetry as its starting point and attempted to apply the techniques of the emerging discipline of linguistics to those aspects of poetic language that seemed to mark it out from other kinds of text.

In an insight allied to Jakobson's notion of poetic function, the Russian formalists also focused on the idea that literature typically makes everyday scenes, processes, and situations seem 'strange' to the reader by describing them in out of the ordinary ways. This, it is argued, causes the reader to see the world afresh, through the eyes of the poet, and thus live life more intensely, experiencing it more vividly. There have been challenges to this approach, to which I will return.

Poetry, of course, has probably existed as long as human language, and it has been studied and discussed throughout the ages and civilizations. One of the approaches to language that had an enormous influence on Western civilization was the Aristotelian approach, which Jakobson drew on in proposing a poetic function of language – one that had no other point to it than to provide a beautiful, and preferably insightful, description of some aspect of the world. This aesthetic function was juxtaposed to the much more mundane, but highly valued, functions associated with prose, including persuasion, argument, and reasoning.

The traditional approach to poetry, then, was to analyze those things about its style that were different from other texts and were also, presumably, aesthetically pleasing. These included the following:

- Figurative language: the notion that there is a clear distinction between literal language and other forms of expression, such as metaphor and metonymy, with the latter seen as derivative from and dependent on the former.
- Poetic license: the idea that poets were at liberty to alter the rules of language, including the invention of new words and expressions more freely than would be expected in other text-types.
- Economy of expression: poetry was traditionally seen as having the capacity (not always taken up, of course) to distill thoughts and ideas into fewer words than would be the case in any prose genre.
- Foregrounding: the notion that the artistry of the poem lies mainly in those features (often deviant ones) that are 'foregrounded' by virtue of differing in some way from the text surrounding them (*see* **Foregrounding**).
- Patterning: the unusual (foregrounded, and/or deviant) patterning of text, either through sound (phonology) or structure (repetition and partial repetition).
- Authorial voice: the 'norm' that in the absence of clues to the contrary, means that poems are written in the author's voice, whether or not they are in the first person. This is not true, of course, of prose fiction where even a first person narrative is not automatically assumed to be the author's voice.
- Formal structures: the structuring of poems by rhyme, meter, and stanza length has traditionally been a very tangible mark of its separateness from other genres.

The rise and development of linguistics and all the sub-branches of the discipline has led to a burgeoning range of linguistic approaches to style, all of which share the aim of making the analysis of literary style more rigorous, clearer in its methods, and more

explanatory in its power. New tools of analysis have arisen in phonology, semantics, grammar, discourse analysis, and cognitive approaches to text analysis, and all of these have been appropriated by stylisticians looking for new insights into literary language. This is true not only of poetry, of course, and many of these tools of analysis have been applied widely across many different literary and nonliterary genres. Many of the approaches in recent years have drawn upon the prototypical features of poetry listed above, though in most cases they have tried to ground them more in the linguistic descriptions that current theories and methods provide. The earliest linguistic treatment of poetic style was by Leech (1969) and was organized according to the themes listed above, but with an explicit determination to use the more rigorous and explanatory descriptive techniques of linguistics.

Here, we will try to identify the analyses that have been applied specifically to poetry, in order to see the range of possibilities of stylistic analysis of poems and to identify those features that are most typically poetic, as well as those having a wider application in general. It is also worth pointing out that poetry is still sometimes used as the convenient prototype of literature in articles on stylistics. This is partly because poems are often a convenient length for detailed analysis, and partly because it is more likely than narrative or dramatic fiction to have stretched the resources of the language in a number of new directions, giving the stylistician a lot of material to comment on in a short extract. In such articles, it may not be the claim that what is being pointed out is particularly restricted to the style of poetry. Here, then, I am attempting to restrict my scope to discussing those treatments of poetry that are concerned with its particular characteristics, though these are often, of course, shared with other text-types, both literary (e.g., dramatic texts) and nonliterary (e.g., advertising copy).

Music – The Sounds of Poetry

The 'music' of poetry is often cited as one of its main attractions. But what is it? Traditional approaches would recognize the different sound patternings that are labeled alliteration, assonance, rhyme, stress, etc., but what linguistics adds to these labels is an understanding of how these phonological patternings work. It also helps in establishing that alliteration and assonance can be linked not simply to the spellings of words, but to their sounds.

In his poem 'Robbing Myself,' Ted Hughes (1998: 165) uses the phrase 'the snow-loaded house' in a description of his visit in midwinter to the house he shared with Sylvia Plath. Here, the same vowel is used twice in quick succession, and though it would be a diphthong (/əʊ/) in some English accents, and a long vowel (/oː/) in others, including the poet's Yorkshire accent, the effect is one of a repeated resonance; it is therefore musical in a very basic sense. The effect of this repetition may be just musical – though one can often make a case for some kind of meaningful effect too. Perhaps the repeated use of the same vowel sound emphasizes the extreme nature of the snowfall? The point here is that the vowels are spelled very differently in the two words – 'o' and 'oa' – so it takes a phonetic transcription to clearly pinpoint their assonantal nature.

If phonemic transcription and phonetic understanding is used, we can see patterns that show more subtle effects than simple identity of sound. So, for example, the use of all high vowels, or plosive consonants, or long vowels and diphthongs, could be said to have certain effects which would be harder to describe accurately without the use of phonetic terminology. The description of sound symbolism and onomatopoeia, then, may benefit from the use of phonetic concepts and terminology, allowing the analyst to describe the reasons why a particular concentration of sounds could reflect the sounds or meaning being described directly. The result is a more accurate vocabulary for describing these effects than was previously available and used everyday adjectives such as 'spiky' or 'smooth.'

Maura Dooley's poem, 'Up on the Moors with Keeper' (Dooley, 1991: 66), about the Brontës, makes a distinction between the life and energy of the three sisters and the darker force that, it is implied, is Branwell Brontë, their brother. The distinction is captured not only by the semantics of the poem, but also in the phonemic structure, which contrasts light, airy sounds with darker, more ominous sounds, as in the line: "They've kicked up their heels at a dull brother." The strength of a linguistic approach to such a poem is that we do not have to leave the description dependent on adjectives like 'light' and 'airy,' hoping that our readers agree. Instead, we can make a case, based on the articulatory features of the vowels involved, that these sounds are indeed lighter (or darker) in a very tangible sense. Thus, the vowels in 'kicked' /kɪkd/ and 'heels' /hɪəlz/ (assuming a southern English accent) are front vowels and high (or closed) vowels, though the diphthong in 'heels' moves toward the centre of the mouth with the schwa. These high, front vowels tend to be higher in pitch than back or open vowels, and are regularly used in English to symbolize small, delicate, or light concepts, in both literal and metaphorical senses. The contrast here is with the 'dull brother,' whose vowels

are both either /ʌ/ or /ʊ/, depending on your accent. The poet has a southern English accent (though I only know this by chance), but the poem is about Yorkshire, and so either vowel could be relevant to a reading of the poem. The effect in both cases is one of a heavier, darker sense of foreboding, since both vowels are back vowels, and more open than /ɪ/, they both contrast with the sisters' vowels.

The sound effects described so far are features of the segmental structure of the phonology, but poetry also draws upon the suprasegmental phonology of patterns of stressed and unstressed syllables as well as the global use of rhyme schemes to create what is traditionally known as poetic form. At the most basic level, phonology can help us understand the difficulties of recognizing stressed syllables, in order to identify the metrical patterns of poetry, such as iambic pentameter, etc. Recent work in this area, however, has taken steps towards a much more comprehensive phonological account of how poetic meter works. *See* **Meter** for a detailed exposition of the linguistic description of meter.

Words

Traditionally, the choice of words in poetry has been known as diction, and this covers everything that might be included in a more linguistic account under the heading of lexical semantics. With the structures and terminology of linguistic descriptions, we can describe the texture and significance of a poem's vocabulary in terms of interwoven lexical fields; the use and creation of synonyms and opposites; unusual collocations; the relationship between hyponyms and superordinates; the use of polysemy and/or homonymy to create ambiguity and puns; and the exploitation of the readers' knowledge of a word's connotation.

Vicki Feaver, for example, bases her poem 'Ironing' (O'Brien, 1998: 261) on a set of lexical fields that together tell a story both more subtle and more revealing than the apparent surface meaning of the poem. Superficially, she describes how her ironing habits have changed over the years, as she first of all irons everything, including towels, then she irons nothing, and finally she irons only some of her personal things. What the combined force of her lexical choices achieves is to alert the reader to the symbolic force of her initial dedication (and slavery) to the domestic role she had been allocated, her rebellion against this (by not ironing) and her final reconciliation with some of the necessary chores of any human being, when she begins to iron again – but only her own clothes. One of the sets of words she uses is that relating to the configuration of materials. In her overzealous days, the iron's flex is described as 'twisting and crinkling' while the fabric is 'pressed' to a 'thinness' and she wants to 'flatten' the house. Both of these opposing processes seem to be extreme; in the case of the iron's flex, it frays, and the house is clearly destroyed by her fantasy of flattening it with an iron as big as a tugboat. In her rebellious stage, she converts to 'crumpledness,' which has a more gentle, though slightly depressing, connotation. Finally, her reincarnation as a contented and balanced user of the iron sees her making 'wrinkled' blouses 'creaseless' and 'an airy shape.' It is noticeable that this final stage of her conversion does not exactly 'flatten' the fabric of her silk blouse, but instead, makes it into a three-dimensional space into which she can fit her body.

The lexical structure of poems, then, is often very compact, and its study through the categories and terms of lexical semantics can help us to explain our insights and hunches about the way in which the poem is working at levels that do not conform to the propositional structure and literal meaning of the sentences and clauses that make it up.

Word combinations of various kinds can also be said to work at levels and in ways that cut across the surface structure of the text. Take, for example, the idea that individual verbs tend to operate in particular kinds of context. This might be described as 'selectional restrictions' in a Chomskyan approach, as 'thematic roles' in a functional approach, or perhaps as 'collocational tendencies' in a more structuralist approach. Without going into the theoretical basis of these terms and the differences between them, we might be able to accept that some verbs tend to occur with animate subjects (e.g., 'eat'), some require a 'location' in their complement (e.g., 'put') and some verbs have very specific requirements, such as needing an object to be brittle (e.g., 'snap'). One of the most widespread tendencies of poets throughout the ages has been to exploit the reader's knowledge of these restrictions on verbs by putting them into 'unacceptable' contexts. The result is often what traditional commentators would call synesthesia (the fusing of two of the human senses), may be metaphorical, and often causes personification. Carol Rumens, for example, in 'Song of the non-existent' (Rumens, 1995: 46), describes dusk as "the hour between dog and wolf," and having effectively likened the daytime to a dog and the nighttime to a wolf, she then uses the verb 'walk' not with an animate subject, but with an abstract one: 'anxiety.' The juxtaposition of the wolf as nighttime and this collocation of anxiety as the subject of 'walk' may cause the reader to fuse these two strong images into one, and we may make the anxiety that we feel at dusk into a wolf that is stalking us. Rumens uses a number of these unusual

collocations in this poem, including 'The watery city thickens, blackens,' in which she takes a verb ('thickens') with very specific requirements – a liquid subject – and puts a concrete subject ('the city') into its place. The resulting image of the city as liquid (possibly partly seen in the reflection of a river?), and as a liquid that gets thicker as it goes from dusk to darkness, is a powerful metaphor, achieved with the simplest of linguistic techniques.

Grammar

The use of grammar as a tool for creating literary meaning is perhaps more prominent in poetry than in other genres. It is difficult to know to what extent the use of poetic license to play grammatical 'games' with the reader is partly a product of our improved knowledge about the workings of grammatical structure as a result of the headway made by linguistics in the last century. It would certainly not be the role of stylisticians to attribute conscious intentions to poets in this regard. However, it is probably true to say that the grammatical playfulness that has been the hallmark of English poetry since the late 19th and early 20th centuries has kept pace with the increasing levels of knowledge and understanding about grammatical structure. Stylistics, then, has been able to use the models and theories of linguistics not only to find new perspectives on the literature of the past, but also to find tools for describing the inventiveness of contemporary literature.

The invention of new words has been a recognized part of poetic license for many centuries, and is not strictly limited to poetry (note Shakespeare's inventiveness in his plays), but might again be said to be more typically a poetic than a prosaic technique. Some poets, of course, use morphological inventiveness more than others. The contribution of stylistics to the description of such neologism is to allow definition of relationship between invented words and existing ones, and in so doing to provide an explanation for the ability of readers to decode words they have never met before.

Gerard Manley Hopkins, for example, is known for his inventions of compound words. Hopkins, writing at the end of 19th century, was a religious poet who used compounds to try to get close to describing the glory of god. For example, in his poem 'Pied Beauty' (Hopkins, 1979: 68) he is praising god for 'dappled things,' among which he numbers the 'couple-color' of certain skies and 'rose-moles' on trout seen through the water. Another early 20th century poet, e. e. cummings (1960), made a particular kind of poetic license his own hallmark in the early 20th century. He often made words change grammatical class in order to challenge our understanding of them, and in places, used our knowledge of morphological 'mistakes' to conjure up a childhood innocence or naiveté in the description of what it is like to be in love: "love is more thicker than begin" (see Jeffries, 1993: 28).

It is relatively recently in the history of poetry (perhaps only about a hundred years) that the potential for meaning that ambiguity allows has been so widely exploited. While it could be said to be a part of the potential for economy that language has, ambiguity or vagueness about grammatical structure has been a regular feature of poetry in English only since the modernists challenged our preconceptions about language, reference, and meaning.

Feminist, and particularly lesbian, poets have found this a productive area of language to explore, not least, presumably, because the challenging of given categories and boundaries is in the nature of their lives' work. Audre Lorde is one of those to make frequent use of the ambiguities available in English. One of these (for detailed discussion, see Jeffries, 1994) is the fact that an apparent list of noun phrases can either refer to a number of different referents or be interpreted as a set of noun phrases in apposition, like those we come across everyday in the newspaper ('Mr. Blair, the Prime Minister' or 'Mrs. X, the woman at the center of the scandal'). In this way, Lorde effectively causes the reader to consider the referents of her lists, to see whether the phrases are indeed coreferential, or separate – or perhaps both:

> Without contemplating last and late
> the true nature of poetry. The drive
> to connect. The dream of a common language.

In 'Origins and History of Consciousness' (Lorde, 1993: 7), we are faced with three apparently unrelated concepts: what poetry is all about, the impulse of human beings to relate to each other, and an ideal society in which people speak the same language. Of course, it is easy to see that what Lorde is doing here is setting out the three parts of a kind of trinity, which work for her as the Christian trinity works in that religion – both three and one. It is because people want to make contact that they need a common language, and this is best achieved through poetry, in Lorde's view.

One of the most exciting ways in which grammar can be exploited by poems is in using the structure, rather than the words, as an iconic representation of the meaning. This might be seen as the grammatical equivalent of sound symbolism, where the sounds directly reflect the meaning, though not always in an

echoic way. This use of the structure itself as a signifier seems to appeal to the reader's emotions at a level that is below the referential level of the vocabulary, and depends for its success on the information structure of clauses and reader expectations of the loading of different clause elements. The following example comes from Pamela Gillilan's poem 'Doorsteps' (France, 1993: 143), which describes a woman who is clearly no longer alive (perhaps a much-loved grandmother?) cutting bread and delivering the resulting slices to the tea table, and the waiting child:

> Finely rimmed with crust the soft
> halfmoon half-slices came to the tea table
> herringboned across a doylied plate.

In the context of a hungry child, the grammatical achievement here is to make the reader wait for the verb, which is the central 'pivot' of the English sentence and is not normally delayed very long. The information structure in English sentences tends to put new, and therefore longer and more complex, information towards the end of a clause, with references to shared knowledge normally being located in the early part of a clause, such as the subject. Thus, a delayed verb may result in a feeling of frustration, anticipation, or boredom, or any one of a number of possible emotions connected to waiting. Here, the frustration is compounded by the delay in reaching the head noun ('half-slices') of an unusually long subject, an effect similar to delaying the main verb. Together, these postponements of grammatical resolution mimic the child's hungry gaze as the carefully laid tea is brought to the table. Gillilan contrasts this with the present-day tendency to care less about presentation than speed and nutrition, and yet we feel some of her loss of anticipation in the structure of the sentence where she admits, "I saw away at stone-ground wholemeal." The subject is short (a pronoun) letting us get to the verb ('saw') quickly: there is no mystery involved, and none of the ritual that she is mourning the loss of.

This iconic use of structure is just another of the tools that poets may choose to use. Most poets have a particular set of 'favorite' techniques, and some use grammatical iconicity more than others. Wordsworth uses grammatical iconicity in the 'Prelude' in describing winter skating on a frozen lake. He has long, meandering sentences full of subordinate clauses where the skaters are racing around on the ice, and short sharp sentences where they come to an abrupt halt. See Jeffries (1996) for a description of this extract (*see also* **Iconicity: Literary Texts**) for more on iconicity in literature.

Text/Discourse

One of the larger shifts in linguistic emphasis in recent years has been the move toward more contextual approaches to language study, dealing with texts in larger than sentence-level units, and looking at aspects of meaning that can range over whole texts and take into account the background knowledge, experience, and current situation of both producer and recipient of a text. These discourse and text-oriented approaches have been taken up in a range of ways by stylisticians keen to find new tools to analyze their data. In the study of poetry all of them are potentially appropriate, but in order not to overlap too much with other articles in this volume, I will restrict myself here to those that have been exploited, rather than trying to take in those that could be used for poetic analysis but simply happen not to have been taken up so far.

Jeffries (2000) and Simpson (1993) both take the analysis of point of view from the field of critical discourse analysis and consider the possibilities of this approach for poetic language, Simpson asking this question in general terms, and not only in relation to poetry, and Jeffries asking a rather more specific question about point of view in Carol Ann Duffy's poetry. Point of view is an analytical technique that draws on a number of grammatical categories from functional grammar that together demonstrate the viewpoint from which a poem is written. This is much more subtle than asking whether it is in the first or second person; it involves asking questions about the transitivity, modality, and deixis of texts, in addition to considering the person in which it is written. All of these topics are covered in other articles in this volume, so here I will simply demonstrate one or two examples of the poetic use of point of view.

Douglas Dunn uses a form of modality in his poem 'The Kaleidoscope' (Dunn, 1986: 238), where he describes the habit he got into, after the premature death of his wife, of going up to her room, almost expecting her to still be there: "Might be to find you pillowed with your books." His use of the epistemic modal, 'might,' creates an interesting effect, since it is clear from the context that she is not going to be there, and so the use of a modal that questions the truth of this is shockingly apposite and emotive in showing us the narrator's sense of denial over this bereavement. In contrast, Erin Mouré (1985: 43) uses the more straightforward boulomaic modals in her poem about the desire she feels for her lesbian love to be accepted by society:

I want an age where I can turn my neck
& kiss you at dinner
among real roast beef & oranges

The use of 'want' is more direct, more outspoken, than Dunn's wistful wishful thinking.

The other main movement in stylistic analysis in recent years has been toward cognitive approaches to the style of texts (*see* **Stylistics, Cognitive**). Although poetry has again been used as the prototype of literature (see 'Introduction,' Verdonk, 1993), there are few analyses specific to poetry that take this approach. Semino (1997) is one of the few trying to deal directly with the cognitive aspects of poetic style. In doing so, she drew on Cook (1994), and others, claiming that the distinctive feature of what we call 'literature' is that it challenges, and potentially changes, the mental structures, called schemata, through which we organize our experience of the world. This potential for changing our worldview is one that she has ascribed to poems in particular, through their possibility of creating text worlds (*see* **Text World Theory**) that are at odds with our experience of the world. This view has been challenged (Jeffries, 2001) and defended (Semino, 2001), and the debate about the differences between different readers' experiences of reading a poem continues. In the meantime, it is probably generally true to say that in addition to providing aesthetic pleasure, one of the social functions of poetry is to affect our view of the world in some way.

Conclusion

In conclusion, we may return to the features of typical poetic language listed in the Introduction as having some currency in 'prelinguistics' approaches to the style of poetry and ask to what extent these features, perhaps with different terminology, remain at the heart of what poetic language is and does.

- Figurative language: Certainly interest in figurative language has grown, and not only in literary stylistics (*see* **Figures of Speech**; **Metaphor: Stylistic Approaches**). One difference of approach in recent years is to see metaphor and other tropes as much more 'normal,' because they are now recognized as common in everyday language. Metaphor has also become the center of a large research effort in cognitive stylistics, as a particular case in the investigation of how readers make meaning. Though poetry has been used for such investigations, metaphor is no longer seen as exclusively in its province.
- Poetic license: Although the term 'poetic license' is used more facetiously than in earnest these days, the phenomenon remains an important part of poetic style and has been taken to new extremes in the 20th and 21st centuries. The rules of language that can be broken by poets now include all of them, and the results can be relatively obscure or perceived as difficult by the reader. More recently, poets have perhaps seen this as a problem and have begun to stretch rules in ways that are comprehensible by readers, usually by analogy with other forms or structures in the language.
- Economy of expression: The power of poetry to say a lot in a few words has not diminished; it may even have increased. The willingness of poets to allow ambiguities, vagueness, lack of cohesion, multiple referents, etc., as well as the tendency to use every level of language from phonology to grammar in iconic ways, allows the poet to pack meaning into every sound, word, and sentence.
- Foregrounding: The recognition and enjoyment of outstanding features of poetic language remain an important aspect of poetic style, and one that is less significant in other, less economical genres. There is, however, a recognition that the background of literary language can also be significant, and that the unique voice that we recognize in many poets may be a function of smaller, repetitive features of language as much as the foregrounded ones.
- Patterning: The importance of patterning in poetry remains strong and has become perhaps more important as the rigors of poetic form have fallen away. Poets, then, will use the repeated clause, phrase, or sound to produce a kind of music that is less insistent than a regular meter or rhyme and thus may be meaningful as well as musical, in the sense that every time a writer has a free choice to make, the choice he or she makes is significant.
- Authorial voice: Robert Browning is famous for his poems in others' voices, and using a range of voices is not a new phenomenon, as any dramatic verse will testify. What is, perhaps, new is the blending and merging of voices in a single poem, which has become the hallmark of some very successful poets in the late 20th and early 21st century. Carol Ann Duffy, Tony Harrison, and others have seen the potential for this technique, which often draws on more narrative-type techniques such as free indirect style (*see* **Dialect Representations in Texts**; **Speech and Thought: Representation of**).
- Formal structures: the structuring of poems by rhyme and meter may have given way to more subtle use of line lengths, line endings, stanza lengths, and so on; but the form of poetry remains one of its distinguishing features, and layout continues in most cases to differentiate at a basic level between poetry and prose.

Poetry remains, socially and culturally, the literary genre that people both revere and to some extent fear. The reason for these apparently contradictory emotions is the same: poetry dares to do the unthinkable with language, and this can be both exhilarating and daunting.

See also: Dialect Representations in Texts; Figures of Speech; Foregrounding; Iconicity: Literary Texts; Metaphor: Stylistic Approaches; Meter; Speech and Thought: Representation of; Stylistics, Cognitive; Text World Theory.

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Pokorny, Julius (1887–1970)

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Julius Pokorny, one of the leading Celtic scholars of the 20th century, was born on June 12, 1887 in Prague as the son of a lawyer. He first studied Law in Vienna, but soon turned to philology and linguistics, and was taught mostly by Rudolf Much and Paul Kretschmer. In 1912, he obtained his doctorate with a thesis about an Old Irish text, and in 1914 he became a lecturer (Privatdozent) in Celtic Philology there. After several years of teaching at the University of Kiel, he was appointed Professor of Celtic Philology at the University of Berlin (this being the only such chair in Germany at the time) in 1920 as the successor to Kuno Meyer. Being relieved of his office in 1935 because of his Jewish descent, he succeeded in escaping Nazi Germany in 1943. From then on he lived in Zurich (Switzerland) until his death on April 8, 1970. He lectured there on Celtic studies and for a while also lectured at the universities of Bern and Fribourg. He habilitated anew in 1953 in Zurich, and beginning in 1955, he taught as an honorary professor at the University of Munich.

Pokorny became widely known, particularly for his two-volume *Indogermanisches Etymologisches Wörterbuch* (1959–69), a standard work that is unique and often referred to (though somewhat obsolete now). It had evolved by condensing and reorganizing Alois Walde's former *Vergleichendes Wörterbuch der indogermanischen Sprachen* (1927–32). His research work centered, however, on the study of the Celtic languages and mainly on Old Irish grammar, etymology, and onomastics. He achieved some success, above all, with *A Historical Reader of Old Irish* (1923), which was translated into Spanish in 1952, and with his succinct *Altirische Grammatik* (1925). He also published translations of Old and modern Irish prose and poetry.

In the book *Zur Urgeschichte der Kelten und Illyrier* (1938), he proposed that the spread of the Celts over all of Western Europe was preceded by a previous (in his terminology 'Illyrian') expansion closely related, in his view, to the urnfield culture. To support this quite daring hypothesis, he thought he was referring to conclusive archaeological and onomastic evidence. Previously, he had tried in a series of articles (1927–30) to give reasons for the similarly bold hypothesis that many characteristic peculiarities of the insular Celtic languages (especially in the syntax) would make it necessary to assume a Hamito-Semitic substratum in the westernmost part of Europe. Both these theories did not meet, however, with general approval, and in any case, the term of 'Illyrian' is out of place in this context.

For many years (1921–38 and 1954–67), Pokorny was the editor of the renowned *Zeitschrift für Celtische Philologie*. His scholarly achievements were recognized by honorary doctorates conferred on him by the universities of Dublin, Swansea, and Edinburgh.

See also: Celtic; Etymology; Irish Lexicography; Meyer, Kuno Eduard (1858–1919).

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Poland: History of Linguistics

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The beginnings of the development of Polish as a distinct language (roughly during the 9th and 10th centuries) were very difficult because of the obligatory use of Latin in official spheres of life and the widespread use of German in towns. Latin was used in jurisdiction, administration, education, and chronicles. Consequently, those spheres were closed to practically the whole population, depriving people of their basic rights. In towns the municipal law was written in German, also keeping ordinary people out of many areas of life. The Renaissance awakened awareness of national identity and began a long and hard struggle for the recognition of Polish as the official language. Those efforts are evident in the number of orthographies, grammars, (almost 100) and dictionaries (over 60) written in the ensuing two centuries.

The later development of linguistics was impeded by numerous violent political events: partitions in 1772, 1793, and 1795; the Kościuszko Insurrection (1794), uprisings in 1806, 1830, 1846, 1848, and 1863; the 1905 revolution; and the two world wars. Despite this turbulent history, not only did Polish linguistics keep pace with other developments, but some of the most pioneering research was produced under extremely adverse conditions, and since the mid-15th century Poland has had a continuous flow of scholarly production.

Orthographies and Grammars

The earliest (ca. 1440) treatise on Polish orthography, by Jakub Parkoszowic, rector of Kraków Academy, is the first grand document showing people's determination in their struggle for Polish. In the introduction to Jakub's *Treatise on Polish orthography by Jakub, son of Parkosz*, a courageous anonymous author compared the defense of language to the defense of the country, emphasizing the social character of language. He held the Church to be the main antagonist to the Polish language, defended Polish against the accusation that its use would favor the spread of heresy (in 1455 Stanisław of Pakość was accused of heresy for possession of religious texts in Polish), and demanded that official documents should be written in Polish, "in the language understandable to all." Aware of the individual character of language, he advised against word-for-word translations in favor of more idiomatic target language equivalents. It was not until 1537 that King Sigismund the Old resolved the long and often violent conflict by ordering that sermons should be given in Polish, and in 1543 he decreed that all court documents, summons, and verdicts should be written in the vernacular.

Simultaneously, townspeople struggled against the use of German. In 1464 a craftsman from Poznań wrote his appeal to the court in Polish. In 1531 Kraków guild council decided that all debates should be carried in Polish, all orders written in Polish, and privileges translated from German into Polish. The municipal law was translated from German to Polish in 1559.

The struggle for Polish met with resistance in some towns. In 1586, Toruń municipal council banned Polish private schools, and in 1591 forbade the issuing of official documents in Polish. However, the language continued to be taught to Poles and Germans in the Toruń gymnasium. The determination of Polish townspeople was supported by printers and publishers, often foreigners, who eagerly met the growing demand for Polish handbooks, orthographies, grammars, and dictionaries.

Among the more notable grammars and handbooks of the 16th and 17th centuries were Stanisław Zaborowski's *Orthographia seu modus recte scribendi et legendi polonicum idioma*... (ca. 1513), Krzysztof Hegendorfer's *Rudimenta grammatices Donati* (1527), Jan Murmeliusz's *Oratiunculae variae, puerorum usui expositae* (also 1527, with German and Polish titles. Murmeliusz, a Dutchman, was also known as Myrmeling), Jan Tucholczyk's *Institutiones grammaticae* (1533, with many rare Polish words), and Jan Mączyński's *Treatise on the Polish language* (before 1548). The first comprehensive grammar of Polish, *Polonicae grammatices institutio* by Piotr Statorius (a Frenchman, a.k.a. Stojeński), appeared in 1568. Of later works, mention should be made of Gerson Wacław Brożek's (a.k.a Broscius) *Fundamenta linguae polonicae in gratiam studiosae inventutis* (1664). The first 'law maker' of the Polish language was Onufry Kopczyński, whose *Grammar of the Polish language for national schools in three parts* (1778–1783) was influenced by Port Royal. Highly influential (by 1839 the book had been through almost 70 editions), it presented Polish grammar with elements of language theory and universal grammar. Much of the Polish grammatical terminology introduced there has been kept.

Roughly between 1850 and 1950 grammars of Polish abounded. The most popular ones, by Antoni Małecki (1863, 13th ed. 1919) and Adam

Antoni Kryński (1897), had many editions. The most important grammars in the first half of the 20th century were Stanisław Szober's *Grammar of the Polish language* (1914–1916, 2nd ed. 1923), the first grammar to focus exclusively on contemporary Polish; Henryk Gaertner's original *Grammar of the contemporary Polish language* (1931–1938); Tytus Benni, Jan Rozwadowski, Henryk Ułaszyn, Jan Łoś and Kazimierz Nitsch's *Grammar of the Polish language* (1923); Witold Doroszewski's *Foundations of Polish grammar* (1952), and Zenon Klemensiewicz's *Descriptive syntax of contemporary standard Polish* (1937).

Lexicography

One of the earliest dictionaries (around 1424) was the *Dictionary from Trento*, with 600 entries in Latin and Polish. In 1526 Murmeliusz produced *Dictionarius Murmelii variarum rerum*, the earliest printed dictionary listing Polish words, with Latin and German equivalents (revised editions appeared in 1528, 1533, 1540, 1541, and 1546; in 1615 it was published as *A dictionary of three languages*). Based on proverbs, it included around 2 600 Polish entries of unknown authorship. Further development is evident in Bartłomiej of Bydgoszcz's *Vocabularius ex Calepino, Breviloquo et Mamotrecto recollectus* (1532), which contained 4272 Polish words as equivalents of 4488 Latin entries, organized according to grammatical classes in part 1 and thematic classes in part 2 (kinship terms, names of "women of easy virtue" collected from the Bible and literature, names of bird and animal voices). In 1544 Bartłomiej provided Polish equivalents, the most extensive collection of Polish vocabulary of the first half of the 16th century, for over 11 000 Latin entries in the margins of Reuchlin's 1488 edition of *Vocabularius breviloquus*. Twenty years later appeared the first great Polish dictionary, Mączyński's *Lexicon latino-polonicum* (1564). Impressive in size – over 1000 pages in folio – it immediately replaced other dictionaries. Volume 2, *Lexicon polonico-latinum*, though ready, was not published. Remarkable in its multilingualism was Ambrogio Calepino's *Dictionarium undecim linguarum: latina, hebraica, graeca, gallica, italica, germanica, belgica, hispanica, polonica, ungarica, anglica* (1590). The most important Polish Renaissance dictionary, *Thesaurus polono-latino-graecus* (in three volumes), was compiled between 1621 and 1632 by Grzegorz Knapski, a Jesuit, and replaced Mączyński's dictionary, which had been banned by the Church for being written by a non-Catholic. Volume 1, with over 1500 pages, was Polish-Latin-Greek; volume 2, *Latino-polonicus* (1626, 840 pages) provided a Latin index to volume 1; and volume 3, *Thesauri polono-latino-graeci* (1632), listed over 1300 idiomatic and proverbial phrases. Unlike Mączyński, Knapski omitted barbarisms, colloquialisms, vulgarisms, and dialectal forms – language, and its description in dictionaries, should follow norms, and be free of foreign influences. He replaced foreign words, coining Polish neologisms based on Czech. Between 1744 and 1764 Michał Abraham Troc (Trotz) expanded Knapski's dictionary in a three-volume *Nouveau dictionnaire françois, allemand et polonais*.... In a roughly 10 0000-entry Polish-German dictionary of 1806, Jerzy Samuel Bandtkie created many words by derivation allowed by Polish rules, even if not attested in texts.

The first monolingual dictionary of Polish was prepared in six large volumes by Samuel Bogumił Linde (revised editions 1807–1814 and 1854–1860). It covered 16th- to 19th-century Polish vocabulary, arranged alphabetically. Linde included several hundred thousand citations from around 400 authors. The largest general dictionary, simply named *Dictionary of the Polish language* (ca. 280 000 entries, 8 vols), was produced between 1900 and 1927) by Jan Karłowicz, Adam Kryński, and Władysław Niedźwiedzki. The first etymological dictionary of Polish, by Aleksander Brückner, came out in 1927. The most important and methodologically the best general monolingual dictionary of Polish, also titled *Dictionary of the Polish language*, was prepared by Witold Doroszewski between 1958 and 1969. The 10 volumes with a supplement contain about 125 000 entries, with 3200 cited publications from the mid-18th to the mid-20th centuries.

Indo-European and General Linguistics

Indo-European and general linguistics in Poland began with Walenty Skorochód-Majewski, the first Polish scholar of Sanskrit, who studied the origin of the Slavs and their language as well as the customs and ways of life of the 'Hindustans' (1815), and the grammar of the ancient Scyths... "called Sanskrit, that is exact speech" (1828 and 1833). Bopp's disciple, Hipolit Cegielski, author of *On the origin of speech and particular languages* (1841), can be seen as the first Polish linguist-scholar in comparative linguistics.

Two of the greatest Polish linguists of the 19th century, whose thoughts belong to the 20th, were Jan Niecisław Baudouin de Courtenay and his student Mikołaj Kruszewski (*see* **Kruszewski, Mikolaj Habdank (1851–1887)**). Baudouin, treating language as a system, distinguished between static and dynamic aspects of language and language laws. He was the

first to consider the phoneme an abstract unit based on articulatory-physiological and acoustic representations. He postulated the primacy of grammar over phonology, and in 1881 introduced the term 'morpheme' (*morfema*).

In his works, Kruszewski foresaw the development of 20th-century structuralism. He proposed the term 'phoneme,' as opposed to 'sound,' and formulated a theory and classification of sound alternations. His associations 'by similarity' and 'by contiguity' were adopted by Ferdinand de Saussure as 'associative' and 'syntagmatic' relations respectively. Thirty years before Saussure, Kruszewski was using the terms 'signifying' and 'signified.' His law that "the richer the content of a linguistic unit, the less often it occurs in a text," elaborated later by Jerzy Kuryłowicz, is one of the fundamental principles in contemporary information theory.

Though of lesser import in the West, the work of Jan Rozwadowski – an Indo-Europeanist and Slavist – deserves to be mentioned. He formulated three important laws: (1) the binarity of language forms; (2) constant quantitative relation, (3) automatization and disautomatization.

Bronisław Malinowski (*see* **Malinowski, Bronislaw Kaspar (1884–1942)**), a functional anthropologist who spent most of his life in England, treated language as one of the institutional forms of culture, searching for the meaning of speech acts realized in order to satisfy the integrational, narrative, practical, and magical needs of people.

Jerzy Kuryłowicz (*see* **Kuryowicz, Jerzy (1895–1978)**), a diachronic structuralist, Indo-Europeanist, and theorist, is often considered to be the greatest 20th-century Polish linguist. His major contributions were in Indo-European apophony and inflectional systems (in particular, the theory of case). In 1927 he identified the source of the Hittite consonant h̲, substantiating the existence of laryngeals postulated by Saussure in 1879.

Witold Doroszewski maintained that the subject matter of linguistics is a speaking human being (*Homo loquens*), and not language-internal relations. He proposed replacing formal entities – phoneme and morpheme – by functional descriptions of sounds. He initiated bilingual studies based on the language of Poles in the United States.

Mikołaj Rudnicki, an Indo-Europeanist and Slavist, and a theoretician of psychological linguistics, focused mainly on descriptive and historical aspects of Polish. He proposed that linguistic consciousness (individual and collective) and linguistic reproductions are separate phenomena conditioning two kinds of notional images stored in the mind, the reproducing and the reproduced. Phonetic changes result from an imbalance in consciousness between the reproducing and reproduced images.

Among the most prominent linguists of the 20th century was Ludwik Zabrocki (*see* **Zabrocki, Ludwik (1907–1977)**). His research in general linguistics, comparative linguistics, psycho- and sociolinguistics, and Indo-European, cybernetic, and applied linguistics was both empirical and theoretical. Combining linguistic analysis with cybernetic methodology, he developed his own, original theory of language—codematics.

In the interwar period Kazimierz Twardowski, a logician and semantician, founded the so-called Lwów-Warsaw School which developed a logical and philosophical approach to language analysis. The main objective of the school was to present precise analyses of semantic and pragmatic aspects in relation to epistemological and psychological aspect respectively. Twardowski concentrated on the theory of concepts, and distinguished the act, contents, and objects of presentations and propositions. Alfred Tarski, a philosopher, mathematician, and logician, focused on the logic of language. He proposed the theory of semantic models based on his definition of truth and studies of logicosemantic relations between language and metalanguage. Tadeusz Kotarbiński (*see* **Kotarbinski, Tadeusz (1912–1998)**), a philosopher and logician, developed the theory of reism, reducing all categories to the category of 'things.' Kazimierz Ajdukiewicz (*see* **Ajdukiewicz, Kazimierz (1890–1963)**), also a logician and philosopher, formulated a semantic theory of language. He focused on such issues as language and cognition, the empiricist conception of language and meaning, and the conceptual analysis of meaning.

Linguistics of Polish

The development of onomastics and dialectology, very popular fields in Polish linguistics, was connected with the loss of independence during partitions, and consequently with the search for roots and the preservation of national identity. The onomastics of Polish, inspired by František Miklosich's works on Slavic onomastics, was developed by many scholars: Karłowicz, Baudouin, Brückner, Rozwadowski, Łoś, Rudnicki, Stanisław Rospond, and the most eminent scholar in the field, Witold Taszycki.

Though the study of Polish dialects goes back to Karłowicz's *Dictionary of Polish dialects* (1900–1911), systematic research began with Lucjan Malinowski's *Beiträge zur slavischen Dialektologie* (1873), followed later in important works in Nitsch and Karol Dejna.

A postscript on current linguistic research: In the last 50 years Poland has seen very productive and diverse development in generative theory, contrastive and applied linguistics, lexicography, semantics, axiological semantics, and cognitive linguistics not only within the Polish language, but in other languages as well.

See also: Ajdukiewicz, Kazimierz (1890–1963); Kotarbinski, Tadeusz (1912–1998); Kruszewski, Mikolaj Habdank (1851–1887); Kuryowicz, Jerzy (1895–1978); Malinowski, Bronislaw Kaspar (1884–1942); Poland: Language Situation; Polish; Polish Lexicography; Zabrocki, Ludwik (1907–1977).

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Poland: Language Situation

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Poland is a country in central-eastern Europe with an area of 312 685 square km, the home of 38.23 million inhabitants (as of 2002), including 37 530 thousand Polish citizens. Warsaw, the capital is a city of 1.7 million inhabitants. Poland borders on Germany, the Czech Republic, Slovakia, Ukraine, Belarus, Lithuania, Russia's Kaliningrad *Oblast'*, and the Baltic Sea. Poland is administratively divided into 16 provinces (*województwo*), 373 counties (*powiat*), and 2489 communes (*gmina*).

The 1997 Constitution of the Republic of Poland contains two articles concerning the language situation/policy:

> Art. 27: Polish shall be the official language of the Republic of Poland. This provision shall not infringe upon national minority rights resulting from ratified international agreements.
>
> Art.35: 1. The Republic of Poland shall ensure Polish citizens belonging to national or ethnic minorities the freedom to maintain and develop their own language (. . .).

The 1999 *Law on the Polish language*, which replaced the 1945 *Decree on the state language*, is to protect the Polish language as the state's official language, the nation's cultural welfare, and the expression of national identity. According to Art. 2., the rights of national minorities and ethnic groups remain intact.

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Table 1

Nationality		*Language*	
Name	*Number*	*Name*	*Number*
Armenian	262	Armenian	321
Belarusian	47 460	Belarusian	40 226
Czech	386	Czech	319
German	147 094	Gereman	196 841
Jewish	1055	Hebrew	207
Karaim	45	Karaim	–
Kashubian	5053	Kashubian	52 567
Lemkian	5850	Lemkian	5605
Lithuanian	5639	Lithuanian	5696
Roma	12 731	Romani	12 125
Russian	3244	Russian	15 657
Slovak	1710	Slovak	794
Tatar	447	–	–
Ukrainian	27 172	Ukrainian	21 055
Silesian	*172 682*	*Silesian*	*56 426*

During the 2002 official population census, 36 895 241 Polish citizens declared Polish nationality (98.31%), and 37 294 690 declared Polish as their home language (99.37%), including 36 802 514 Polish monolinguals (98.06%).

The 2005 *Law on national and ethnic minorities and regional language* officially recognizes the national minorities (those having a kin state: Armenian, Belarusan, Czech, German, Jewish, Lithuanian, Russian, Slovak, Ukrainian), ethnic minorities (without a kin state: Karaim, Lemkian, Roma, Tatar), and the regional language (Kashubian) and grants them some linguistic rights, such as the right to education in or of their mother tongues, access to mass media, the right to use names in their original version, etc.

Table 1 contains the numbers of Polish citizens declaring officially recognized minority nationalities and their respective minority or regional languages, as used at home.

Remarks

The results of the census are often questioned by the members of the minority communities, who usually quote much higher numbers of persons belonging to minorities and/or speaking a minority language.

- Karaim – according to estimates, spoken by 3 persons.
- Kashubian – not regarded as nationality, either by the community themselves or by authorities.
- Lemkian – known also as Rusyn or (Carpatho-) Ruthenian.
- Tatar – Polish Tatars ceased speaking their native language some 300 years ago.
- Jewish – individual persons speak Yiddish as their home language.
- Silesian – not recognized officially either as nationality or a separate language, in spite of the highest (by nationality) or the second highest (by language) number of declarations; regarded commonly as a dialect of Polish, it may soon follow the case of Kashubian and develop as a 'regional language.'
- Wilamowice – town in southern Poland, where an ancient ethnolect originating from Middle High German is still spoken by some 100 elderly people; not recognized officially.

In 2003 the Polish Bureau for Lesser-Used Languages was founded as an umbrella association of all minority and regional language communities.

Besides Polish, which is the officially recognized language of the Kashubian and Silesian national and ethnic minorities, the most commonly declared home languages used by Polish citizens included in 2002: English: 86 227 persons; French: 14 306; Italian: 11 389; Spanish: 3819; Dutch + Flemish: 2961; Greek: 2759; Swedish: 1620; and Arabic: 1379.

The foreign languages most widely spoken and taught are English, followed by German, Russian, French, and Spanish.

See also: Linguistic Rights; Minorities and Language; Polish; Polish Lexicography.

Polarity Items

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Words or expressions that either require or shun the presence of a negative element in their context are referred to as negative and positive polarity items (NPIs and PPIs), respectively. Familiar examples of NPIs in English are *any* and *yet*, while *some* and *already* exemplify the category of PPIs, e.g.:

(1) The cat did not find any mice.

(2) *The cat found any mice.

(3) The cat found some mice.

(4) *The cat did not find some mice.

It should be noted that (4) is acceptable when it is a denial or metalinguistic negation ('no, you're wrong, the cat did **not** find some mice'), otherwise it is odd. Many languages, perhaps all, have NPIs and PPIs, and their distribution has been the topic of a rapidly growing literature since the seminal work of Klima (1964).

Negative Polarity Items

The core research questions regarding NPIs are (1) the proper delimitation of their distribution and (2) the underlying causes of this distribution. Regarding the former question, there has been an almost continuous debate as to whether the distribution of NPIs should be viewed in syntactic, semantic, or pragmatic terms. And of course any answer to the former question will have consequences for the latter as well.

Foremost among the syntactic treatments of NPIs is that of Klima (1964), where it was noted that the environments in which polarity items find themselves at home are too diverse to treat them in terms of a dependency on (surface) negation. Instead, Klima proposed a treatment whereby the presence of a morphosyntactic feature [affective] acts as the trigger of a negative polarity item. Among the environments marked as [affective] are:

- the scope of negation (including so-called n-words, expressions such as *never*, *nothing*, *nobody*, *nowhere*, *no*, *none*, *neither*);
- complements to negative predicates such as *unpleasant*, *unlikely*, *odd*, *impossible*, *lack*, *refrain from* and many more;
- clauses introduced by *without*, *as if*, *before*;
- comparative clauses;
- questions;
- antecedent clauses in conditionals;
- restrictive relative clauses modifying universal and superlative noun phrases;
- degree complements of *too*;
- the scope of negative quantifiers and adverbs such as *few/little*, *seldom*, *rarely*, *barely*, *hardly*, *only*, etc.

No explanation was given for why these environments acted as hosts of polarity items. The feature [affective] was simply meant to ensure that they did. An important innovation due to Klima is the association of scope with the notion of c-command (or rather, 'in-construction-with,' in Klima's own terminology). An expression is in the scope of negation if all nodes directly dominating the negative operator also dominate it. It was noticed early on that the same notion could also be used for anaphoric dependencies (cf., also Progovac, 1994 for a more recent account of the similarities between anaphoric dependencies and polarity phenomena). The equation of scope with c-command, while extremely influential, is not unproblematic, though (Hoeksema, 2000).

While the work of Klima was already developing in the direction of generative semantics, using some amount of semantic decomposition to simplify the grammar, work by Seuren (1974) pushed this line of research much further, by aiming at the elimination of the feature [affective]. In Seuren's proposal, all environments could be reduced to negative clauses in a properly abstract deep structure, e.g., *few children ate any popcorn* can be reduced to the deep structure of *not many children ate any popcorn*. A problem with this line of reasoning is that not all negative clauses are actually acceptable hosts of polarity items. Thus, Linebarger (1980) has noted that *not all children ate any popcorn* is ungrammatical. Hence, the presence or absence of negation by itself is not sufficient to license polarity items. Another problem with a purely syntactic approach is that polarity items may be sensitive to pragmatic factors. For example, NPIs in questions may be more acceptable when the question is viewed as rhetorical, and not as a request for information; polarity items in conditionals may be better when the conditional is viewed as a threat, and not as a promise (Lakoff, 1969).

Ladusaw (1979), building on earlier work by Fauconnier (1975), and using the formal apparatus of Montague grammar, proposed to eliminate the feature [affective] by offering a semantic account of the licensing of polarity items. In particular, he noted that many of the contexts in which polarity items are acceptable have the property of downward

monotonicity or implication reversal. Normally, expressions may be replaced by more general ones *salva veritate*: *Jones is a phonologist* will entail *Jones is a linguist*, given that phonologists are a subspecies of linguist. Now for the negative counterpart of these sentences, the direction of the entailment is reversed: *Jones is not a linguist* entails *Jones is not a phonologist*, but not vice versa. In propositional logic, this reversal is known as *modus tollens*:

(5) $\dfrac{p \rightarrow q}{\neg q \rightarrow \neg p}$

However, in natural language, this reversal is not restricted to negation but is found among a wide variety of negative expressions. For example, *it is unlikely that Jones is a linguist* entails *it is unlikely that Jones is a phonologist*, and not the other way around. Here the negative element is *unlikely*. Similarly, *few people are linguists* entails *few people are phonologists*. (Note that if we had used the positive quantifier *many*, rather than its negative counterpart *few*, the entailment would have been in the upward direction.) In formulaic notation, letting contexts denote functions, and using '$x < y$' for the relation 'x is a hyponym of y,' we can define downward-entailing contexts as follows:

(6) Downward entailment
A function f is downward entailing if and only if for all x,y such that $x < y$: $f(y) < f(x)$.

Ladusaw's work, like that of Seuren, constitutes a step forward compared to the original proposals of Klima, but it runs into some of the same problems, such as the blocking effect caused by intervening universal quantifiers noted by Linebarger and the relevance of subtle pragmatic factors.

Another problem for any unified theory is the diversity of polarity items, which is at odds with the idea of a single licensing condition. To remedy this situation, Zwarts (1981, 1995; see also Van der Wouden, 1997) proposed a hierarchy of licensing conditions, corresponding to various classes of negative polarity items.

(7) Zwarts's Hierarchies
Hierarchy of contexts:
negation > antiadditive > downward entailing > nonveridical
Hierarchy of expressions:
superstrong > strong > weak > nonreferential

Negation is the strongest trigger, and is defined, cross-linguistically, by the laws of Boolean algebra. Not many clear-cut examples of superstrong NPIs have been identified, but Dutch *mals* 'tender, soft' is a plausible candidate, since it is triggered by *niet* 'not,' but not, for instance, by n-words:

(8) zijn opmerkingen waren niet mals
his remarks were not tender
'his remarks were harsh'

(9) *Geen van zijn opmerkingen was mals
none of his remarks were tender

Antiadditive environments are a proper subset of the downward-entailing contexts, where the following condition holds (drawn from the De Morgan laws in Boolean algebra):

(10) Anti-additivity
A function f is anti-additive iff for all x,y in its domain, $f(x \vee y) = f(x) \wedge f(y)$

Foremost among the antiadditive operators in natural language are the n-words. Among the strong NPIs identified by Zwarts is the German *auch nur*. This expression is triggered by negation and n-words, but not by weaker triggers such as *höchstens 10* 'at most 10':

(11) kein Kind hat auch nur irgendetwas gesehen
no child has even anything seen
'no child has seen anything at all'

(12) *höchstens 10 Kinder haben auch nur
at most 10 children have even
irgendetwas gesehen
anything seen
'at most 10 children have seen anything at all'

In this respect, *auch nur* differs from weaker polarity items such as German *brauchen* 'need' which are acceptable in both contexts (but not in any context that is not downward entailing):

(13) kein Kind braucht sich zu schämen
no child needs REFL to shame
'no child need be ashamed'

(14) höchstens 10 Kinder brauchen da zu sein
at most 10 children need there to be
'at most 10 children need to be present'

(15) *diese 10 Kinder brauchen da zu sein.
these 10 children need there to be

Nonveridical contexts are defined as follows:

(16) Nonveridicality
A function f is nonveridical if and only if for all propositions p: $f(p)$ does not entail p.

Clearly, negation is nonveridical, since not(p) never entails p. The same is true for downward-entailing predicates such as *impossible*, *deny*, *unlikely*, etc. However, some contexts that are not downward entailing are also nonveridical, such as the scope of intensional operators like *perhaps*. *Perhaps John is a*

linguist does not entail *perhaps John is a phonologist* (note that there is no contradiction in the sentence *John is definitely not a phonologist, but perhaps he is a linguist, nonetheless*), but equally clearly, this sentence is nonveridical: it does not entail that John is a linguist. The same is true for the complements of such verbs as *want*, *hope*, etc., for disjunctions (from *p* or *q* we cannot infer *p*). Giannakidou (1998) has identified several indefinites in modern Greek which appear in nonveridical contexts only, such as *kanenas*:

(17) Thelo na mu agorasis kanena vivlio
want SUBJ me buy.3SG any book
'I want you to buy me a book'

Nonveridicality of environments implies lack of existential import. It is likely that expressions such as *kanenas* derive their distribution from the fact that they are markers of this lack of existential import.

Positive Polarity Items

Positive polarity items are less well studied than their negative counterparts. It has been noted that they are sensitive to the presence of negation, but other negative environments appear to have no negative effect on the acceptability of PPIs (Horn, 1989; but see Van der Wouden, 1997 for a different view). For example, both *not* and *few* license the acceptability of the NPI *any*, but only *not* antilicenses its PPI counterpart *some*:

(18) I don't want any/*some cheese

(19) few of us had any/some money

Moreover, as was already noted above in connection with (4), the antilicensing force of negation disappears when negation is used to deny a prior claim or when it is used metalinguistically (Horn, 1989):

(20) I don't want **some** cheese, I want **all** cheese

The most intriguing difference between NPIs and PPIs, however, lies in their difference with respect to double negation. As was first pointed out by Baker (1970), PPIs may appear in the context of negation, provided that negation is itself embedded in a larger negative context. Compare, for example, what happens when we embed the clause in (21) in the negative context *I can't believe* __:

(21) *it is not already 5 o'clock

(22) I can't believe it is not already 5 o'clock

NPIs, on the other hand, usually do not distinguish between negative and double negative contexts (Hoeksema, 1986):

(23) we're not in Kansas anymore

(24) I can't believe we're not in Kansas anymore

Further study of PPIs is needed to see if they are as diverse in their distribution as NPIs.

See also: Indefinite Pronouns; Monotonicity and Generalized Quantifiers; Negation: Semantic Aspects; Scope and Binding: Semantic Aspects.

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Police Questioning

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In Mark Haddon's Whitbread Prize-winning novel, *The Curious Incident of the Dog in the Night-time,* the protagonist and narrator, a 15-year-old young man with Asperger's syndrome, comes across a dog killed with a garden fork. He is found by the owner holding the dead dog and the police are called. He answers the officer's first few questions with no trouble, but then he is asked why he was holding the dog. The narrator reports:

> This was a difficult question. It was something I wanted to do. I like dogs. It made me sad to see that the dog was dead. I like policemen, too, and I wanted to answer the question properly, but the policeman did not give me enough time to work out the correct answer. (Haddon, 2003: 7)

The policeman repeats the question and the boy replies "I like dogs." There then follow two more questions and then "You seem very upset by this." At this point the narrator reports:

> He was asking too many questions and he was asking them too quickly. They were stacking up in my head like loaves in the factory where Uncle Terry works. . . . sometimes the slicer is not working fast enough . . . and there is a blockage. (Haddon, 2003: 8)

He hits the policeman and is arrested. At the police station he is questioned again. People with Asperger's syndrome process language literally and tell the truth. The following exchange takes place between the police officer and the boy:

> He said, "I have spoken to your father and he says that you didn't mean to hit the policeman."
> I didn't say anything because this wasn't a question.
> He said, "Did you mean to hit the policeman?"
> I said, "Yes."
> He squeezed his face and said, "But you didn't mean to hurt the policeman?"
> I thought about this and said, "No. I didn't mean to hurt the policeman. I just wanted him to stop touching me." (Haddon, 2003: 22)

This fictional account aptly illustrates some of the challenges the interviewer faces. Accurately assessing the interlocutor's ability to process questions is not always straightforward and posing them in such a way that makes the intention clear is equally difficult. The child needs "to possess socio-cultural knowledge about question-answer sequences" and needs to "make assumptions about their interlocutors' intentions, knowledge states and beliefs" (Kremer-Sadlik, 2004: 190; *see* **Autism and Asperger Syndrome: A Spectrum of Disability**). The why question (why he was holding the dog) requires an abstract affective response that has to be reflected upon and relevant details then have to be selected. The child finds the questions too numerous, too rapid, and one of the questions is not framed as a question. In a study by Ochs and Capps of 16 families with a child with high-functioning autism or Asperger's syndrome, reported on by Kremer-Sadlik (2004), the responses to questions were classified in terms of adequate, inadequate, or ignored response. They found that 10% of the time, responses were inadequate and 15% of the time ignored, showing that only 75% of the time were the children "able to detect their interlocutors' communicative intentions and produce relevant answers that were marked as acceptable" (Kremer-Sadlik, 2004: 192). This was where interlocutors were parents with an understanding of the communicative needs of the child. This short fictional example serves to show how difficult questions are to pose and answer and why an understanding of the language of interviewing is important.

This article draws together insights from empirical research into interviewing in legal settings. It examines the institutional "talk at work" (Drew and Heritage, 1992; *see* **Institutional Talk**) in interview data and looks at how interviews produce speech acts of saying, doing, asking, telling, admitting, and denying within a narrative of an alleged criminal act (*see* **Speech Acts, Blaming and Denying: Pragmatics**). It illustrates a wide range of formal, functional, and pragmatic features in interviews with adults and children, witnesses and suspects.

Interrogation Versus Interview

The term 'interrogation' is a contested one. Shuy (1998: 12) draws our attention to the distinction made by law enforcement officers between the use of the words 'interrogation' and 'interview,' pointing out the negative connotations and bad public image attached to the former.

> Interviewers make less use of their power than do interrogators. An interview probes but does not cross-examine . . . inquires but does not challenge . . . suggests rather than demands . . . uncovers rather than traps . . . guides but does not dominate. (Shuy, 1998: 12)

By contrast:

> Interrogators make ample use of their power. They challenge, warn, accuse, deny and complain . . . are more direct . . . demand . . . dominate . . . and probe questions

Police Questioning

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In Mark Haddon's Whitbread Prize-winning novel, *The Curious Incident of the Dog in the Night-time,* the protagonist and narrator, a 15-year-old young man with Asperger's syndrome, comes across a dog killed with a garden fork. He is found by the owner holding the dead dog and the police are called. He answers the officer's first few questions with no trouble, but then he is asked why he was holding the dog. The narrator reports:

> This was a difficult question. It was something I wanted to do. I like dogs. It made me sad to see that the dog was dead. I like policemen, too, and I wanted to answer the question properly, but the policeman did not give me enough time to work out the correct answer. (Haddon, 2003: 7)

The policeman repeats the question and the boy replies "I like dogs." There then follow two more questions and then "You seem very upset by this." At this point the narrator reports:

> He was asking too many questions and he was asking them too quickly. They were stacking up in my head like loaves in the factory where Uncle Terry works. . . . sometimes the slicer is not working fast enough . . . and there is a blockage. (Haddon, 2003: 8)

He hits the policeman and is arrested. At the police station he is questioned again. People with Asperger's syndrome process language literally and tell the truth. The following exchange takes place between the police officer and the boy:

> He said, "I have spoken to your father and he says that you didn't mean to hit the policeman."
> I didn't say anything because this wasn't a question.
> He said, "Did you mean to hit the policeman?"
> I said, "Yes."
> He squeezed his face and said, "But you didn't mean to hurt the policeman?"
> I thought about this and said, "No. I didn't mean to hurt the policeman. I just wanted him to stop touching me." (Haddon, 2003: 22)

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By contrast:

> Interrogators make ample use of their power. They challenge, warn, accuse, deny and complain . . . are more direct . . . demand . . . dominate . . . and probe questions

> tend to be challenges that often indicate disbelief in what the suspect has said. (Shuy, 1998: 13)

The data drawn on in this article suggest that both roles are available to police officers and both are used. Interrogation, though, does not have to be oppressive. It is possible to challenge the account of a teenage witness or an adult suspect, using power without browbeating. In Table 1, a police officer challenges part of the account given by a teenage witness who is alleging rape. In this extract, the police officer (I) is asking (disbelieving) whether the child (C) could see a knife at a distance. (Turns are marked numerically starting at 433 in the interview.) The challenge comes in turn 435 marked by the discourse marker 'so' and made explicit in turn 441 by the metalinguistic verbal group 'trying to get at' (*see* **Discourse Markers**).

The challenge unfolds in turns 443 and 447 and culminates in a reformulation from the officer in 449 where an earlier claim made by the witness (C414 "He had a knife and he was slitting down the side of the tarpaulin") is re-presented by the interviewer for agreement. In this exchange the officer interrogates, by challenging and probing the witness account. However, the officer's use of power here can be viewed positively in that the challenge accurately identifies a problem with the child's account. The interrogation is necessary to more reliably establish the point at which the child could see the knife and to confirm that it was not at the distance the child first indicated. One of the purposes of interrogation, then, within the interview, is to gain accurate facts that can be used as evidence. In this way it is possible to use the term 'interrogate' neutrally in its sense of 'to ask questions of' or 'to examine by questions' (Shorter Oxford English Dictionary (Vol. 2): 1099). The interviewer uses questions for two purposes, as Gibbons (2003: 95) describes: for "elicitation of information" and "to obtain confirmation of a particular version of events." These have also been called genuine questions and examination questions (Dore, 1977: 149), the latter being very commonly used by teachers, where the answer is known.

Table 1 Challenging the account of a female witness who alleges rape

I 433	How did you know he had a knife?
C 434	'Cause I could see it in his hand when he was cutting down the side of the lorry.
I 435	Right. So how far away were you from the lorry?
C 436	About . . . about three times the size of this room.
I 437	Okay. You said you saw the knife. What d . . . what kind of knife did it look like at that time when you saw it?
C 438	(Big . . .)
I 439	How big do you think it was?
C 440	I didn't really see it when it was by the lorry, but I know what it looks like when he came up to me.
I 441	Okay. What I'm trying to get at is if . . . if you're a distance away, how do you know he had a knife in his hand and what w . . .
C 442	'Cause I could see the split in the tarpaulin and he wouldn't be doing it with hands.
I 443	Right. So you didn't actually see the knife. You just saw what he'd actually done . . .
C 444	He had a hand up. Just the handle in his hand and what he was doing with it.
I 445	Okay. Did you see the blade at all?
C 446	Yeah, it had a curvy bit on it.
I 447	Right. 'Cause I'm talking about from here [using map drawn by witness to indicate position]
C 448	Oh, no, not from there.
I 449	Right, okay then. So you assumed that he was cutting it with a knife at that time?
C 450	Yeah.

Interviews and interview data have been studied in a range of subdisciplines of linguistics including conversational and discourse analysis, ethnography of communication, and interactional sociolinguistics, using methods and approaches from corpus linguistics, genre analysis, stylistics, and pragmatics. The further reading reflects a range of this research. This article adopts an eclectic approach that combines the aforementioned methods and reveals how they contribute to the analysis of police interviews as a goal-focused institutional genre.

There are a number of key questions that readers may have:

- What are key features of the form, function, and structure of the police interview?
- Why is the language the way it is?
- What are the rules and roles of the talk?
- What are the questions and responses like?
- What does the interviewer do with the responses of the interviewee?
- What is the purpose and goals of the interview?

The following sections consider these questions, not in turn, but by considering key features of interviews. These are worth bearing in mind as you read. In the examples used, police officers' turns are labeled 'I' for interviewer, and suspects and witnesses are referred to as 'C' for child or 'A' for adult.

A Functional View of Interviews and Questions

A functional view of language suggests that its form and structure is the way it is because it is "doing some job in some context" (Halliday and Hasan, 1985: 10; *see* **Halliday, Michael A. K. (b. 1925)**). This means that when we look at interviews we have to consider what is being done, in what setting, and therefore

Table 2 Primary reality framing in the opening of an interview leading to the start of the secondary reality core (Based on Gibbons, 2003:142–144)

Frame	*Turn*	*Talk*
(1)	I 1	This interview is being tape-recorded. I am Detective Constable [number and name] of the [police station name] Domestic Violence and Child Protection Unit.
	I2 2	And I am Detective Constable [number and name] also from the same unit.
	I 3	There are no other police officers present. Can you give me your full name and date of birth, please?
(2)	A 4	[Two first names, surnames and dates of birth given]
(4)	I 5	Thank you, and to remind you of your entitlement to free legal advice during this interview, but you have your legal representative present here.
(1)	S 6	Yes, my name is [name given]. I'm duty solicitor tonight.
(3)	I 7	Thank you. There are no other persons present. The time now is ten to ten on [date]. We're in an interview room at [name] Police Station. At the end of the interview, [suspect's first name (SFN)] I'll give you a notice
(6)		regarding your tapes, okay? [SFN], I have to remind you
(5)		you are under caution and that you don't have to say anything unless you wish to do so, but what you say may be given in evidence. Do you understand that caution? I'm sorry, you're nodding but the tape won't pick up that you're nodding.
	A 8	Yes.
(5)	S 9	Can I just say at this point that I've advised Mr. [surname] about his rights and he's decided to exercise his right of silence throughout this interview. I'd ask you to accept the decision. Obviously you're entitled to put your questions and you'll do that . . .
	I 10	Yes.
	S 11	. . . but that's the decision he's made at this stage.
	I 12	Okay, but we'll still put some questions to you, okay?
	A 13	(No reply).
(a)	I 14	[SFN], we know that you have been living with girlfriend's [name] for the last four months. Is that right?
	A 15	Yes.

Components of primary reality frame (numbered):
Persons present (1)
Interviewee's name, address and date of birth (2)
Place, date, and time of interview (3)
Cautions:
Right to free legal advice (4)
Right to silence (5)
Procedures around recording (6)
Secondary reality:
Orientation (a)
I is principal police interviewer
I2 is second police officer
S is the suspect's solicitor
A is the adult suspect

take a pragmatic approach that looks at meaning in relation to situation and use.

At the beginning of interviews, officers are establishing rapport with child witnesses and "primary reality framing" (Gibbons, 2003: 142) with adult suspects (Table 2). According to the Memorandum of Good Practice (MOGP [1992]) that operates in England and Wales in the UK, phases of the interview relate to what is being done: rapport, free narrative, questioning, and closing. These macrofunctional elements are common to both suspect and witness interviews (with the exception of the rapport phase for suspects); both are invited (see Table 3) to give their own free narrative account of the alleged crime before being questioned.

There are, therefore, distinct phases of telling and asking. In the free narrative phase with child witnesses, or when an adult suspect is asked to give an account of the event, interviewees generally tell their story; in the questioning phase they are asked about it (although both also contain examples of the other).

At a microfunctional level, speakers produce individual speech acts of asking and telling, admitting, agreeing, confessing, and denying. Shuy (1993: xix) defines speech acts as "quite simply, the ways that people use language to get things done" and Coulthard (1985: 126) provides a list of 17 acts in interaction. Stenström (1984: 74–81) provides a finely-tuned categorization of elicitations (13 question acts <Q:request for action>) and responses (14 response acts <R:accept>) and three follow-up acts (<assent> <evaluate> <comment>), which we can use to show what is being done in an interview interaction (Table 4). Tsui (1992: 102–109) also provides a categorization of five kinds of elicitation "according

Table 3 Invitations to suspects and witnesses to give free narrative accounts

3.1	All I want you to do is . . . is tell us what took place that night (suspect interview).
3.2	Can you tell us what actually occurred shortly before you were arrested (suspect interview).
3.3	Can you say in your own words what happened? (suspect interview)
3.4	Okay you said that you're up here today to speak to us about, erm, this . . . to catch this person who raped you. Yeah? What I need you to do is tell me what happened. I know that you've told other people what happened, okay. But I don't know what's happened, right. What I want you to do is, like in a story tell me from say Friday night, Friday was it four o'clock. Tell me from Friday four o'clock, all right, evening time. Until Sunday morning. What has happened to you over those, those couple of days. Give me as much detail as you can because obviously I'll go over it again, er and, and get as much as I, I need from you, but if you can tell me as much as you can yourself, all right, and I'll just let you talk. All right, so off you go (child witness interview).

to the different responses prospected." (Speech acts are indicated with angled brackets <request>.) (*see* **Subtitling**).

Context, Audience, and Purpose as Interactional Constraints – Goals and Roles; Lay, Legal, and Therapeutic Language

Interviews take place in an institutional context, where the language of the profession comes into contact with the language of the lay public. The talk can move from interview to interrogation over the course of a number of turns, as we saw in Table 1 or from a <request for action (to tell or confess)> to a <request for confirmation>, as seen in Table 4, turns I38–I40. In this interview, the adult has invoked his right to silence but has agreed to have questions put to him. He chooses to answer some and therefore fluctuates between noncooperation and cooperation, in a way that is allowable (hence, I have modified Stenström's category of <R:evade> to <allowable evade>) without flouting Grice's (1975) maxim of quantity and the cooperative principle (*see* **Grice, Herbert Paul (1913–1988); Maxims and Flouting; Cooperative Principle**). This constrains the interviewer's manner, making open questions less appropriate and closed questions more likely to receive a response, contrary to the usual rules of interview or conversation. Many of the questions are of the <Q:confirm> type, since requests for verbal action are less likely to gain response.

In addition, in the interview extract in Table 4, the interviewee changes his "footing" (Goffman, 1981) in relation to the way the utterance is "framed"

Table 4 A speech act analysis of questions and responses according to Stenström, 1984

Participant and turn	*Utterance*	*Speech act: Q (question) R (response)*
I 26	[child A's] about 10 months, is that right?	<Q:confirm>
A 27	Yes.	<R:confirm>
I 28	And you live together at [address stated]?	<Q:confirm>
A 29	Yes.	<R:confirm>
I 30	On Wednesday [child A] was admitted to, and I believe it was the casualty department at [ABC hospital], but correct me if I'm wrong there. I'm not sure whether it was [XYZ] or whether it was [ABC hospital].	<preface> <Q:identify>
A 31	[ABC hospital].	<R:identify>
I 32	[ABC], and you actually took him there because you	<Q:confirm> (interrupted)
A 33	By myself.	<expand>
I 34	Sorry?	<Q:repeat>
A 35	By myself, yes.	<R:repeat, confirm>
I 36	You weren't happy about his condition, is that right?	<Q:confirm>
A 37	That's right.	<R:confirm>
I 38	Can you tell me what condition that was that made you think, ''I've got to get this baby to a hospital''?	<Q:request for action: tell/ confess>
A 39	I've no comment.	<R:allowable evade>
I 40	Was the baby poorly?	<Q:request for confirmation>
A 41	Yes.	<R:confirm>
I 42	Obviously poorly enough for you to be concerned?	<Q:acknowledge>
A 43	Yes.	<R:acknowledge>
I 44	Can you remember what time you took him to the hospital?	<Q:identify>
A 45	I'd say about 3 o'clock-ish.	<R:identify>
I 46	In the afternoon?	<Q:clarify>
A 47	Yes	<R:clarify>

(Goffman, 1974; *see* **Goffman, Erving (1922–1982)**). He is being interviewed in relation to alleged assault, but preserves a stance of accidental injury to the child. He rejects accusatory questions that invite confession to assault and answers only those that deal with injury. Accusation is implied in the lexical choice of the noun 'condition,' which is a medical and institutional term and implies seriousness. Similarly, the verb 'got to get' implies desperation and a guilty mind, whereas 'poorly' is a less

Table 5 The changing roles of ihe Interviewer: from institutional policespeak to therapeutic talk through *evaluation*

Institutional Policespeak (IP)	*Therapeutic Talk (TT)*	*Features of TT versus IP*
I 143 We **have to find out what's happened** to the child. That is our **major aim** as police officers.	I 149 We're here **to help you.**	Foregrounding of helping role and backgrounding of police aim of finding out what happened.
I 143 If you **wish to no-reply** like your solicitor has advised you can do. If you **wish to talk** to us and **tell us what may have happened in reply to the questions that we ask** then you have that **right to do so** also.	I 163 *It's important to you, just for you, to tell us what's happened.* You **need to get it out of your system** because at the moment from where we're sat *you're quite* ***screwed up*** *really about it all.*	Telling what happened is seen as a therapeutic act rather than a right to silence or reply under the law. Intertextual reference to the 'caution' disappears.

***Evaluation*[a] in I 163 as persuasion**

Anticipatory 'it'	*Link verb*	*Evaluative category (adjective group)*	*Thing evaluated (appositional noun group + clause)*
It	's	important	to you, just for you, to tell us what happened.
Evaluation carrier	*Link verb*	*Evaluative category (adjective group-graded)*	*Thing evaluated ('hinge' about + noun group)*
You	're	quite screwed up really	about it all.

[a]For evaluation pattern, see Hunston & Sinclair (1999: 85).

serious lay term consistent with an accidental injury sustained by a fall. The interviewer and interviewee goals are in opposition and these are emphasized by the linguistic choice and the functional analysis of the questions and responses.

Roles also change in the interview with a formally institutional start. Later, the interviewer strategically moves to a more therapeutic role. This change of roles from "policespeak" (Fox, 1993) to therapeutic talk is demonstrated in Table 5. For example, the complex subordinated grammar of policespeak with its intertextual reference to the police caution (or right to silence), in the use of the verbs 'wish' and 'to no-reply' in the first part of the interview, is replaced with "get it out of your system" in the move away from policespeak.

Shuy (1998: 122) discusses the language of the "interrogator as therapist" in his analysis of a coerced confession from Beverley Munroe in 1992 in the United States and suggests that "pretending to be sympathetic to the suspect" can be a subtle form of coercion. There is a recognizable tension, clearly, between the goals of the "police officer as a finder of facts" (Shuy, 188: 126) and of the suspect remaining silent. The police officer has, as he said, a duty to find out what happened to the child. In this case only the parents are implicated, so the officer has some justification for determination. The officer adopts a therapeutic stance in an attempt to persuade the suspect to talk. The role involves taking an evaluative stance toward the suspect, shown in Table 5 and in the following:

a. "It's **important** to you" and
b. "... you're **quite screwed up really** about it."

Hunston and Sinclair (2003: 84) identify the patterns in (a) and (b) as common in evaluation (*see* **Evaluation in Text**). Their labeling, applied to the clauses in Table 5, demonstrates that the object and carrier of evaluation is the suspect. Hunston and Sinclair comment that the adjective 'important' is among a number that "are taken by most people to indicate evaluation, simply because it is clear that their meaning is both subjective and value-laden" (Hunston and Sinclair, 1999: 83).

In example (a), the officer is persuading the suspect to see telling what he knows as important not to the officers but primarily to himself. In saying "It's important to you," the interviewer is making an assumption about the suspect's values and also using her more powerful position to assume knowledge of the suspect. This attempts to establish a powerful but intimate relationship that has not previously existed; it is a conversational gambit that demonstrates the constantly "renewing context" (Heritage, 1984) of the interview. In example (b), the officer evaluates the suspect's mental state in a form of therapeutic diagnosis, attempting to persuade him that he needs help and they can give it. There is clearly a fine line between persuasion and coercion. The suspect and his

solicitor accept the line of questioning, with the solicitor only stepping in on a couple of occasions to remind his client that he has the right not to reply.

A further change in role takes place after the interview is suspended and is recommenced when the suspect asks to talk to the officers again. The interview resumes with:

> I: You said to the custody sergeant that you want to speak to us. Tell us what you want to speak to us about.
> A: I know that I've done it, know for a fact, and I think it's me.

Here the <Q:request for action(:confess)> receives a positive response with an <R:accept(:confess)>. However, the referential 'it' is far too unspecific. The suspect has been arrested for causing grievous bodily harm (GBH) with intent to a child, under section 18 of the Offences against the Person Act 1861, which states:

> It is an offence to unlawfully and maliciously by any means whatsoever cause or inflict a wound or cause grievous bodily harm to any person with intent to do some GBH.

Precision, Definitions, and Proof

In this section I look at interview questioning in relation to the "pursuit of precision" (Gibbons, 2003: 37) and the goal of finding out what happened. Finding out what happened is not as straightforward as simply "Can you say in your own words what happened?", as may be implied by this invitation (or the others in Table 3). There is a considerable difference between what the witness or suspect considers important, relevant, or sufficient and what the police require as evidence in order to charge someone with an offence for the purpose of prosecution. This is the case even in compliant suspect interviews and interviews with witnesses, as we see in Table 1 , where the officer requires precise details about the knife that is alleged to have been used in a rape. In the case of witnesses, the interview and any resulting statement need to provide sufficient facts to establish that an offence occurred. In the case of suspects, there has to be sufficient detail to establish that an offence has been committed by the suspect.

Witnesses, in particular, have little experience of legal language in use. Police officers and other professionals involved in the judicial process have (as do other professions) "not just a specialist vocabulary, but a special way of conceiving and construing the world" (Gibbons, 2003: 36). In a suspect interview, an initial goal is to find out what happened, but then the account of the suspect has to be matched to the offence for which the person has been arrested. In Table 6, we can see how the culmination of an interview sums up the evidence evinced in relation to theft according to the Theft Act 1968 subsections 1–6. Incorporation of the words of the Act into the interview talk confirms for the speakers (and future interactants) that the offence has taken place and that the account the suspect has given has provided facts that fit the definition.

This is one of the reasons that policespeak sounds unusual to the lay person. It is a hybrid form of language that contains a clash of registers: firstly the very specific voice of legislative text that heaps precision upon precision and secondly the relatively conversational register of the interview. In Table 6, we see that at some points the officer translates the legislative language into lay language: "taken money" rather than "appropriates property," "money is not yours" rather than "property belonging to another." On another occasion, though, she inserts the legislative phrase into an otherwise conversational sentence: "Used that money as your own" as in "treat the thing as his own."

Paraphrase, near paraphrase and repetition of the legislative language is a common and necessary feature of the genre, since it confirms the offence and helps linguistically to achieve the goal of the interview. In the example in Table 6, we should also note that this way of closing the interview illustrates a single-minded, goal-focused pursuit of establishing proof. The officer has questioned the suspect for some time and sums up the interview by presenting for affirmation the offence and each subsection required for proof. The interviewee will probably not fully realize how neatly packaged the close is, or be aware of the generic discourse strategies at work, but will be aware of the more formal legal status and summing-up of it. There are dangers associated with this kind of questioning. Baldwin (1993) makes a distinction between establishing "truth or proof" in police interviewing strategies, and Hill (2003) provides a useful presentation of the misuse of confirmation questions in his analysis of an interview in the United States. He notes that: "in 212 of 340 questions the interrogators provided details to confirm or deny. In other questions, critical details were provided by the police without requesting confirmation" (Hill, 2003: 23). This creates a significant problem, since an analysis of the interview in his data reveals that the suspect "made a statement consistent with admitted culpability, but not consistent with guilty knowledge" (Hill, 2003: 41). He succinctly highlights the problem for the police who "walk a tightrope between eliciting a specific meaningful confession and not providing the crucial substance of the confession" (Hill, 2003: 41). In this section

Table 6 The incorporation of legal lexis into interview talk

Interview	*Theft Act 1968*
I: So is that the amount that you closed the account with A: Mhm. I think so. I: knowing for a while that all the monies that you've transferred from the date we've just gone through those transactions- A: Mhm. I: we're talking from the fourteenth of the second, the transactions I've just done, all the monies there, **you knew wasn't your money**? A: Yeah. I: And you've actually **stolen** it from the Skipton Building Society haven't you, that amounts to **theft**.	A person is guilty of **theft** if he dishonestly **appropriates property belonging to another** with the intention of permanently depriving the other of it; and 'thief' and '**steal**' shall be construed accordingly. (Theft Act 1968, section 1)
A: Why do you need- I: You've taken- you've **taken money** which in effect- A: Yes. I: Is **property**. A: Mhm.	Property includes **money** and all other **property**, real or personal including things in action and other intangible property. (Theft Act 1968, section 4)
I: And you've **assumed rights of ownership**	Any **assumption** by a person of **the rights of an owner** amounts to an appropriation. (Theft Act 1968, section 3)
and you've **used that money as your own**. A: Mhm. Yeah. I: Is that right? A: Yeah. I: Knowing that that **money is not yours**.	A person appropriating **property belonging to another** without meaning the other permanently to lose the thing itself is nevertheless to be regarded as having the intention or permanently depriving the other of it if his intention is **to treat the thing as his own** to dispose of regardless of the others' rights; and a borrowing or lending of it may amount to so treating it if, but only if, the borrowing or lending is for a period and in circumstances making it equivalent to an outright taking or disposal. (Theft Act 1968, section 6)
A: Yeah.	

we have seen some of the ways that substance is arrived at.

Intertextuality and Future Textuality – The Interview in the Judicial Process: From Allegation to Judgment

In the previous section, we looked at how policespeak is hybrid in form, containing elements of both conversational and legislative language, and we have also seen how the interviewer role can move from institutional policespeak to therapeutic talk. Another way of looking at this is to consider the intertextuality of the genre. Intertextuality is defined by de Beaugrande and Dressler (1981: 182) as "the ways in which the production and reception of a given text depends upon the participants' knowledge of other texts." This knowledge is mediated by "the extent to which one feeds one's current beliefs and goals into the model of the communicative situation" (de Beaugrande and Dressler, 1981: 182). There are a number of other texts and accompanying styles that feed into each participant's model of the communicative situation (shown in Table 7). This variety of texts comes into contact and affects the interview's production and reception.

For an example of intertextuality at work, we can look at Table 8 and see the officer interviewing a male suspect about the attempted murder of his girlfriend. In order to challenge the suspect's account of events, he introduces the statement of the victim's female friend, who was in the house at the time in a bedroom upstairs. This episode draws in the other text, embedding a written first-person narrative within the unfolding elicited narrative of the interview, feeding the officer's text into the suspect's knowledge, making it shared knowledge.

The interview is also crucially affected by future textuality. The tape-recorded interview, which is the complex coincidence of intertextualities, may be used as a text within the courtroom at any future trial, and this will be subject to further textualizations if the court case involves an interpreter (Berk-Seligson, 1990; Eades, 1994; Russell, 2002; *see* **Court Interpreting**). As the interview progresses and the suspect or witness understands the future status of the interview narrative, this will have subtle and dynamic effects on the text. (For example, a celebrity suspect may seek to protect his or her status for longer and resist revelation.) This gives the interview a multiple audience which is present, not present but future, and imagined. This complex intertextuality of texts,

Table 7 The complex intertextuality with other texts, participants, and styles in the communicative situation

Police Interview				
Other texts		*Other participants*	*Other styles*	
Interviewer	*Interviewee*		*Interviewer*	*Interviewee*
Past time				
Legislation: the offence and sections of the relevant Act e.g., Theft Act (date and sections) or Sexual Offences Act.		Co-supects, co-victims, witnesses with whom the suspect or witness has spoken (not present).	Lay language of conversation.	Lay language.
Interview(s) with co-suspects or witnesses (oral).	Previously textualized versions of the event, e.g., told to a parent, friend, solicitor, or social worker.		Police language: institutional talk with a specialized vocabulary, meanings, and genres, e.g., the police caution, interview, statement, etc.	Any encounters or knowledge of police language, e.g., from previous interviews or from television.
Present time				
Statements taken from co-suspects or witnesses (written).	Written record, e.g., in a diary, letter, email, or text message.	Parent, solicitor, or social worker (may be present).	Legislative language: the words of the relevant sections of the Act, e.g., ''dishonestly appropriate property . . .'' in relation to theft.	
An inferred and hypothetical reality of the event, constructed from the available facts and circumstances, e.g., an injured victim.	Personal reflection on the event resulting in a secondary version of that primary reality.			
	Previous experiencing of interviewing or fictional or imagined representational schemas the interviewee has in relation to the expected interview.			
Future time				
Future audience and context: the use of a transcript or audio recording of the interview in a courtroom.		Judge, jury, barristers, public observers, media observers, etc. (not present but future audience).		

Table 8 Intertextuality: introducing other texts into the suspect's account

I	I haven't taken all the statements I need to take. I haven't taken a statement off [victim name] for one simple reason that she wasn't in any condition although I've spoken to her. I have taken a statement off [witness female friend of victim]. There are some questions I have to put to you about what [friend] says. It does differ, I have to say, from your version of events.
A	Mm.
I	OK And what I'll do, I'll go through some of them. Perhaps I, perhaps the easiest way of me doing it is to read the statement out so we know exactly what we're talking about. We'll go from the beginning to the end.

styles, and participants is represented in Table 7. Each text in the process from allegation to judgment is intertextually related.

Narrative

We have looked at the interview as a hybrid genre and discourse type; it combines lay, police, and legislative language. There is, of course, another important generic component: narrative. The interview is largely narrative in form with free-narrative and elicited narrative sections. Drawing on narrative analysis we can say that the interview narrative conforms to Labov and Waletzky's (1997) features of spoken narrative; there is a recognizable orientation, complicating action or events with a result or resolution, and a coda. However, as Dershowitz (1996: 97) points out, "life is not a dramatic narrative." It is not necessarily logical; it is merely human experience and not a drama: "life is not a purposive narrative" (Dershowitz, 1996: 100). The interview narrative does have temporal sequence markers, though, (such as *and*, *so*, and *then*), which are present both in the suspect or witness narrative and in the questions used by the interviewer.

The function of the narrative is both "referential and evaluative" (Labov and Waletzky, 1997: 4). It refers to what Gibbons' (2003: 142) describes as the "secondary reality." The interview, the primary reality, contains the secondary-reality narrative. Reference is also made, as we have seen in Table 7, to other texts outside the primary and secondary realities: to the extratextual and intertextual realities. Labov and Walekzky's model of narrative gives evaluation a key role; without evaluation, the narrative "has no point" (Labov and Walekzky, 1997: 28). They also note that evaluation is particularly "typical of narratives of personal experience" (Labov and Walekzky, 1997: 29), from their study of fight narratives. In relation to the positioning of evaluation, they say that "in many narratives, the evaluation section is fused with the result" (Labov and Walekzky, 1997: 30), but acknowledge that evaluation is also found distributed throughout and embedded within the narrative. However, they do not look at the possibility of evaluation within elicitation. Edwards (1997: 145) picks up this oversight, and says that evaluation "will be built into what occasions [the narrative]". In interviews, the occasioning of the narrative – the crime, the interview, and the questions – is a major source of evaluation (as we have seen in Table 5). The interviewer builds it into the communicative event, resulting in evaluation provided both by the police interviewer and the suspect or witness. This makes it an interactive and coconstructed feature that may be accepted or contested, as we see in Table 9 from an assault interview.

Table 9 Contested and collaborative evaluation of narrative

I	I mean did he **look the type that were going to cause trouble**?
A	Well, no but . . .
I	'Cause other people have said that he had the stool but he **didn't have it above his head in a threatening manner, he were just holding the stool**.
A	He didn't, he'd, he'd lifted it up and that's why I jumped up and hit him before he had chance to swing it.
I	Do you **agree** that, er, you **could have just** grabbed the stool and stopped him swinging it down?
A	May be so. I don't know.
I	You, you'd be **younger and stronger** than he was, do you **accept** that?
A	Mhm, yeah.
I	I mean it, **I accept in the heat of the moment we do silly things, don't we?**
A	Mhm.
I	But **do you agree** that, erm, looking back, you should've just grabbed hold of the stool and restrained the fellow, preventing him from hitting your brother?
A	Yeah, now **I do, but it's too late now**, isn't it. It's already happened.
I	But you **admit** that, erm, you stood up and punched him in the side of the face?
A	Yeah.
I	Which caused him to lose his balance, fall backwards, bang his head, which resulted in him receiving a fractured skull in two places.
A	Yeah.
I	There was no one else involved?
A	Nobody **really**.
I	Really it's just yourself and your brother?
A	Yeah.

Both participants use the adversative 'but' to indicate disagreement. Evaluation is also evident in the interviewer's verbs 'accept, agree, admit,' which lead to an evaluation of the actions as excessive and reckless. This results in the interviewer showing how this recklessness led to the commission of the offence and how more reasonable action could have avoided it. Evaluation is a significant part of the interviewer role, although this may not be as explicit as the use of adjectives such as 'reckless,' which are commonly understood as evaluative devices. The negative semantics of 'reckless' would be more face-threatening than the positive 'accept' or 'agree.' The use of evaluative verbs is a subtler, indirect strategy and the implicit form makes it also less noticeable to the interviewee and therefore is more likely to assist in the management of a sustained interaction.

In interviews with children, police officers have a different management problem. They need to use particular support and scaffolding strategies to deal with issues of power, status, and linguistic and cognitive competence that are particularly relevant here. The child will recognize the institutional power alongside the adult and institutional status of the

Table 10 Scaffolding strategies in an interview with a 5-year-old: organizing the narrative and getting at detail

Turn	*Talk*	*Scaffolding strategy*
I 628	Yeah? Can you tell me a little bit about that then? **Can you tell me why it hurts you?**	**1. Parallelism in successive questions**
C 629	Coz it feels hard.	**2. Reinforces responses through echoing and repetition in follow-up moves**
I 630	Right, **and where does it hurt you?**	
C 631	**There**. (Indicates stomach with both hands.)	
I 632	**There**, anywhere else?	
C 633	(Shakes head.)	
I 634	No? All right, so, and that bit's your tummy, is it?	
C 635	(Nods head.)	
I 636	**So we'll just play a little game**, if I ask you, if I point to something can you tell me what you call it?	**3. Productive routine** This routine continues for 23 more turns where the following body parts are elicited in the child's own words: mouth, teeth, lips, ears, shoulders, arms, hands, tummy, bum, legs, and feet.
C 637	(Nods head.)	
I 638	Right, **so what's this? (Puts hand on head.)**	
C 639	**Head.**	
I 640	**And what are these? (Points to eyes.)**	
C 641	**Eyes.**	
I 642	**And what's this? (Points to nose.)**	
C 643	**Nose.**	
Turns 670–700 establish that boys and girls are different from each other because of their different body parts, attempting to elicit from the child her own words for the male and female genitals. This attempt continues in 700–711 below.		
I 700	Right, now **so we know boys are different to girls, don't we?**	**4. Reintroduces earlier information with so . . . to move narrative on**
C 701	(Nods head. Fiddles with hair.)	
I 702	**And** girls have boobies and boys are different because, have they got something that, that we haven't got?	**5. continues it with and . . . .**
C 703	(Nods head.)	
I 704	Yeah, **and** do you know what that is?	
C 705	(Shakes head.)	
I 706	No.	
C 707	(Shakes head.)	
I 708	Do you know what makes them different?	
C 709	(Shakes head.)	
I 710	No, right so all right then, so we know they're different anyway, don't we?	
C 711	(Nods head.)	

interviewer and at the same time will have limited linguistic competence (Walker, 1999) with which to express herself. Interviewers will need to adopt strategies that enable the collection of best evidence, while avoiding leading the child. Aldridge and Wood (1998: 125) note that "younger children are more likely to acquiesce to leading questions than are older children and adults." Asymmetries of power are not entirely negative; the interviewee's asymmetrical position is not necessarily one of powerlessness.

The process can be seen as empowering for the child in terms of the collaborative development of a difficult narrative from the child's often unsubstantial contributions, through the expertise of a skilled interviewer (Johnson, 2002: 91–92). The interviewer uses her position to maintain the interaction, control topic and relevance, and to scaffold the production of the child's narrative, as we can see in Table 10.

Interviewers play a vital role in organizing the child's narrative and eliciting important evidential detail, using strategies such as repetition, reinforcement, and productive routines that encourage the child to talk in ways that are supportive and not subjecting the child to further abuse (Brennan, 1995; *see* **Interviewing and Examining Vulnerable Witnesses**).

Summing-up Interviews

Police interrogation has been the focus of increasing research over the last decade. More often than not, though, this research has concentrated on disputed interviews where linguists have been asked to look at them for appeals (Coulthard, 1992). The interaction looked at here is not disputed and sheds light on the ways that this institutional practice makes real and evidential the story of the suspect and witness. This descriptive focus is an important part of the interface between language in use in the criminal justice system and research into linguistic practices in interaction. It draws on a broad range of linguistic theory, including

narrative, discourse analysis, pragmatics, speech acts, appraisal and evaluation systems, and theories of acquisition.

See also: Autism and Asperger Syndrome: A Spectrum of Disability; Blaming and Denying: Pragmatics; Cooperative Principle; Court Interpreting; Discourse Markers; Elicitation Techniques for Spoken Discourse; Evaluation in Text; Goffman, Erving (1922–1982); Grice, Herbert Paul (1913–1988); Halliday, Michael A. K. (b. 1925); Institutional Talk; Interviewing and Examining Vulnerable Witnesses; Maxims and Flouting; Speech Acts; Subtitling.

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Polish

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Polish belongs to the Lechitic subgroup of the West Slavic languages, together with the extinct Polabian language and Kashubian, which is often treated as a dialect of Polish (see section on dialectology). It is the native language of most of the nearly thirty-nine million residents of Poland and of a few million additional speakers living outside of Poland (primarily in the neighboring countries, but also in North America, Australia, and other areas).

Orthography

Like other Slavic languages that were historically in the cultural sphere of the Western Church, Polish uses the Latin alphabet. It did not, however, adopt the Hussite spelling reforms of the 15th century. Instead, it uses a combination of digraphs and diacritic marks in a system devised by 16th-century printers in Cracow and based in part on pre-Hussite Czech orthography. Thus, voiced and voiceless alveolar fricatives and affricates are represented, respectively, by *ż* (or *rz* when derived from an etymological *r*), *sz*, *dż,* and *cz*. The letter *ł*, which once indicated a dental lateral, now represents a labio-velar glide. For most speakers, there is no distinction between *ch* and *h*, which both represent the voiceless velar fricative; the letter *h* once indicated a voiced velar fricative. Voiced and voiceless palatal fricatives and affricates are represented, respectively, by *zi, si, dzi,* and *ci* when followed by a vowel and by *ź*, *ś*, *dź,* and *ć* otherwise. The palatal nasal has a similar double representation: *ń*/*n*. Palatalized labials (or, for some speakers, labial plus palatal glide), which occur only before vowels, are represented by *bi*, *pi*, *mi*, *wi*, and *fi*; the combinations *ki*, *gi*, and *chi* stand for fronted variants of the corresponding velars. The letter *ó* represents a high rounded back vowel derived from an etymological *o*, while the letters *ę* and *ą*, respectively, represent front and back mid-nasal vowels or their positional variants (see next section).

Phonology

The Polish phonemic inventory consists of 33 consonantal segments and seven vocalic segments. In addition to the two nasal vowels mentioned above, there are five oral vowels, the basic phonetic realizations of which are [i], [ɛ], [ɐ], [ɔ], and [u] (orthographic *i*, *e*, *a*, *o*, and *u*/*ó*). Orthographic *y* ([ɪ]) represents an allophone of /i/. The nasal vowels are diphthongal, consisting of [ɛ] or [ɔ] plus a nasal segment: the homorganic nasal consonant before a stop or affricate and a nasalized glide before a fricative. At the end of a word before a pause, the front nasal vowel loses its nasal segment; both nasal vowels do so before orthographic *l* and *ł*.

The consonants that arose from the historical palatalization of velars or from the deiotation of clusters consisting of dental stop or fricative plus glide have lost their palatal character. The historical palatalization of dental consonants, on the other hand, has given rise to a series of palatal affricates and fricatives. As in most other Slavic languages, final voiced obstruents lose voicing before pause. In obstruent clusters, both within phonological words and between words, there is regressive assimilation with respect to voicing; orthographic *rz* and *w* exceptionally devoice following a voiceless consonant within the same word. Before a word-initial vowel or sonorant, a word-final obstruent is voiced in some areas of Poland (e.g., Cracow, Poznań) and voiceless in others (e.g., Warsaw). This sandhi rule does not affect the pronunciation of prepositions, but does affect the pronunciation of consonants preceding some verbal clitics.

Word stress is normally on the penultimate syllable and can thus fall on a preposition if the following noun or pronoun is monosyllabic, e.g., *pod nim* 'under it.' Some traditional exceptions to the penultimate principle (e.g., words of Latin or Greek origin such as *gramatyka* 'grammar' with antepenultimate

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stress or certain verbal forms) are normally regularized in the pronunciation of younger speakers. Unstressed vowels are not reduced. There is a growing tendency, especially in emphatic speech, to shift stress to the initial syllable.

Morphology

Nouns distinguish seven cases (nominative, accusative, genitive, dative, instrumental, locative, and vocative), although the vocative is commonly replaced by the nominative, except in titles (e.g., *panie profesorze*, literally 'Mr Professor'). There are also no special vocative forms in the plural or for personal pronouns, and case syncretism reduces the number of distinct forms. Three genders (masculine, feminine, and neuter) are distinguished in the singular by agreement phenomena, and a masculine animate subgender can also be distinguished by its syncretism of accusative and genitive. Certain classes of semantically inanimate masculine nouns also show the accusative-genitive syncretism (e.g., names of dances, monetary units, and mushrooms: *tańczyć mazura* 'dance a mazurka'; *zapłacić dolara* 'pay a dollar'; *znaleźć borowika* 'find a boletus mushroom').

In the plural there is a binary distinction of masculine-personal (nouns referring to male human beings) and nonmasculine–personal (all other nouns); they are distinguished by the nominative endings, by agreement phenomena, and by the accusative–genitive syncretism of the former vs. the accusative–nominative syncretism of the latter. Some nouns have only plural forms (e.g., *drzwi* 'door[s]'); others are used primarily in the singular (e.g., mass and abstract nouns) but have potential plural forms, which usually acquire specialized meanings (e.g., *wino* 'wine' vs. *wina* 'kinds or portions of wine'; *miłość* 'love' vs. *miłości* 'love affairs'). Adjectives, third-person pronouns, and the past-tense forms of verbs also distinguish three genders in the singular and two in the plural.

Noun declensions are largely gender-based. The masculine and neuter declensions have most endings in common in the singular, while the two feminine declensions in the singular (for nouns ending in *-a* in the nominative singular and those ending in a consonant, i.e., with zero-ending) also share most endings. There is a class of masculine nouns ending in *-a* that follow the feminine *a*-declension in the singular; all of them refer to male human beings. In the plural, only the nominative, accusative, and genitive endings are partly gender-based; the other case endings are common for all nouns. Some case forms involve mutation of the final stem consonant, and certain case endings are dependent on the nature of that final stem consonant – whether it is 'soft' (palatal or 'historically soft,' i.e., the result of historical palatalization or deiotation) or not.

Polish verbs belong to one of two aspectual categories: perfective or imperfective. There are also some biaspectual verbs (e.g., *abdykować* 'abdicate,' *ranić* 'wound'). Perfective verbs express accomplishments or transitions; imperfective verbs express states or activities/processes. Imperfective verbs are typically unprefixed; adding a prefix perfectivizes the verb, while sometimes also adding an additional semantic component (e.g., *pisać* 'write = engage in the activity of writing'/*napisać* 'write = get something written' vs. *przepisać* 'rewrite,' *opisać* 'describe,' or *popisać* 'write a little or for a while'). There are also productive ways of imperfectivizing a perfective verb through a change in suffix and/or the stem (e.g., *przepisywać* 'engage in the activity of rewriting,' *opisywać* 'engage in the activity of describing'). Occasionally, corresponding verbs are based on different stems (e.g., imperfective *brać* vs. perfective *wziąć* 'take'), and some verbs have no corresponding verb of the opposite aspect (e.g., imperfective *mieć* 'have' or perfective *zdolać* 'manage [to do something]').

Imperfective verbs have synthetic forms for past and present tense and analytic forms for the future tense; perfective verbs form their past tense in the same way as imperfective verbs, but the forms that look like the present-tense forms of imperfective verbs normally express future tense (or, under certain circumstances, potentiality). Analytic forms expressing a pluperfect tense are rare in the contemporary language. The perfective/imperfective distinction is also present in infinitives, imperatives, and conditional/subjunctive forms. Imperfective verbs form verbal adjectives and adverbs expressing simultaneity, while perfective verbs form only verbal adverbs that express temporal precedence or subordination to the action of the main verb. Both perfective and imperfective transitive verbs form passive participles, which can be used with *być* 'be' to form passives of state (e.g., *W 1945-tym roku Warszawa była zniszczona* 'In 1945 Warsaw was destroyed [was in a state of destruction]') and with *zostać* 'become' to form passives of action (*Podczas wojny Warszawa została zniszczona* 'During the war Warsaw was destroyed [they destroyed Warsaw]').

Within the imperfective aspect, a further distinction is made between determinate and indeterminate verbs of motion. Determinate verbs designate motion in a single direction on a single occasion, while indeterminate verbs do not have those restrictions and can therefore designate repeated motion, the ability to move, etc. (e.g., determinate *iść* vs. indeterminate

chodzić). Many imperfective verbs also have derived iteratives that express repeated, often regular, actions (e.g., *grywać* 'play frequently' from *grać* 'play').

Declension, conjugation, and derivation all may involve consonant and vowel alternations, e.g., *miasto* 'city' vs. *w mieście* 'in the city'; *idę* 'I am going' vs. *idziesz* 'you are going'; *ręka* 'hand' vs. *rączka* 'little hand' or 'handle.'

Syntax

Polish word order is relatively free and is used, together with sentence intonation, to express the informational structure of the utterance. Thus, the rheme normally follows the theme in emotionally neutral speech. Pronominal and some verbal clitics traditionally follow the first stressed word in a sentence, but this is less true in current usage, especially of the particle *się*, which is historically the enclitic accusative form of the reflexive and reciprocal pronoun. The reciprocal function is still present (e.g., *znamy się* 'we know one another'), but true reflexive uses are rare (e.g., *bronić się* 'defend oneself'). The particle has assumed a variety of functions in association with verbs, and in contemporary speech it often immediately precedes or follows the relevant verb, regardless of its position in the sentence. Verbs with *się* can express, among other things, a kind of middle voice (e.g., *myć się* 'wash/wash up/get washed') and also an intransitive verb with an unaccusative subject (e.g., *lekcja się zaczyna* 'class is beginning'). In colloquial speech there is also an enclitic dative reflexive/reciprocal pronoun (*se*).

As in some other Slavic languages, *się* has acquired the function of a generic human subject, parallel to German *man* or French *on*, with third-person singular agreement; only in Polish is there the possibility of a direct object in the accusative (e.g., *tu się rzadko ogląda telewizję* 'they/people rarely watch television here'). Polish shares with Ukrainian an active verbal construction (based on a form derived from a past passive participle) used to express an action in the past performed by a definite but unspecified human actor (e.g., *zrobiono pomylkę* 'they made a mistake/a mistake was made').

First- and second-person subject pronouns are normally used only for contrast or emphasis; third-person subject pronouns are typically dropped after their first use, unless a previous theme has been reintroduced. Subject pronouns are used in non-familiar address, where the words for *you* (masculine singular *pan*, feminine singular *pani*, mixed group plural *państwo*, etc.) take third-person agreement.

Lexicon

It has been estimated that some 76% of the Polish vocabulary was either inherited from Proto-Slavic or was created within the Polish language. The earliest foreign borrowings came together with Christianity from the Czech lands and included both religious terminology and other words that reflect Czech phonology, rather than the expected Polish derivatives from Proto-Slavic (e.g., *wesoły* 'merry' instead of the expected *wiesioły*). Over the course of centuries, however, the major donor language was Latin, followed by French, Greek, and German. Italian and Ukrainian also contributed, as did Russian and English; the influence of the last two became especially strong following World War II. Currently most neologisms come from English or from Latin- or Greek-based internationalisms: a recent example of a semantic calque from English is the use of the words *niedźwiedź* 'bear' and *byk* 'bull' in the sense of stock-market pessimists and optimists, respectively.

History

The Polish language was first documented in the form of 410 personal and geographical names included in the Latin text of a 12th-century papal bull to the archbishop of Gniezno. The next century brought the first recorded complete sentence, quoted in the text of a Latin chronicle. By the 14th century continuous texts in Polish had been created, and thanks to the efforts of Cracow printers at the beginning of the 16th century, a more or less standardized language appeared. This literary language did not have a clear dialect base, since it included features characteristic of the dialects of the two early political and cultural centers, Gniezno/Poznań (Wielkopolska) in the west and Cracow (Małopolska) in the southeast. It has been suggested that because of the role of Bohemia in the Christianization of Poland, the Czech language served as a point of reference for choosing between features from the two Polish dialect areas.

Polish eventually won the competition with Latin as a literary medium (the 16th-century writer Mikołaj Rej proclaimed to the world that "Poles do not gaggle like geese – they have their own language") and also survived the assimilatory efforts of the partitioning powers of the late 18th century (Prussia and Russia). In the period since World War II, the standard language has acquired a much broader social base as well as a vastly expanded technical and specialized vocabulary.

Dialectology

The major dialect areas correspond to historical-geographic regions of Poland: Małopolska in the southeast, Mazowsze in the northeast, Wielkopolska in the northwest, Silesia in the southwest, and Kaszuby along the Baltic coast (north and west of Gdańsk). Although the Polish spoken in the pre–World War II eastern Polish territories (the so-called *kresy*, now part of Lithuania, Belarus, or Ukraine) was distinctive, it was not considered a separate dialect, but the resettlement of many speakers from that area in the territories in the west and north acquired from Germany after the War led to the creation of what are called 'new mixed dialects.' The major dialects are traditionally distinguished on the basis of their consonantism: the presence or absence of distinct dental, alveolar, and palatal consonants, and the treatment of obstruents before word-initial vowels or sonorants. The reflexes of historical long and nasal vowels and various morphological criteria are among the features used to make finer dialect distinctions. The dialects of the Kaszuby region are most different from standard Polish and from other Polish dialects, which has led some (mostly non-Polish) linguists to consider Kashubian a separate language rather than a dialect of Polish. Despite the absence of any apparent Kashubian national identity, there have been attempts to establish a Kashubian literary standard.

See also: Grammatology; Poland: Language Situation; Polish Lexicography; Slavic Languages.

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Polish Lexicography

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The creator (a German) of the first monolingual dictionary of Polish, *Słownik języka polskiego*, was Samuel Bogumił Linde. The dictionary appeared in six volumes (1st edn. 1807–1814, 2nd edn. 1854–1860). It is a non-prescriptive dictionary whose aim was to enshrine the Polish language by including it in its totality. It has 60 000 entries, German equivalents for nearly all meanings, and numerous Slavic

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See also: Historical and Comparative Linguistics in the 19th Century; Lexicography: Overview; Poland: History of Linguistics; Polish.

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Polish: Phonology

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Inventories

Polish is a typical Slavic language in the sense that it has a rich inventory of consonants and a rather simple inventory of vowels (discussed here is Standard Polish, as spoken by educated speakers of central Poland). In terms of places of articulation, Polish consonants cover the range from bilabials to velars. Noteworthy and unique to Polish is the contrast between postalveolar and prepalatal fricatives and affricates, exemplified in Example (1).

(1) kasza [kaʃa] 'porridge' Kasia [kaɕa] 'Cathie'
żar [ʒar] 'heat' ziarno [ʑarnɔ] 'grain'
czop [tʃɔp] 'peg' cios [tɕɔs] 'blow'
dżungla [dʒuŋgla] 'jungle' dziura [dʑura] 'hole'

Polish makes a distinction between soft and hard consonants. The former are palatalized (secondary articulation) or prepalatal (primary place of articulation) whereas the latter are velarized, but the degree of velarization in Polish is weaker than in Russian. Soft consonants are [−back] whereas hard consonants are [+back], and there are no neutral consonants that would be neither [−back] nor [+back]. The inventory of surface consonants is as follows:

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(2) Labials: [p p' b b' f f' v v' m m']
Dentals: [t t' d d' s s' z z' ts ts' dz dz' r r' l l' n n']
Postalveolars: [ʃ ʃ' ʒ ʒ' ʧ ʧ' ʤ ʤ']
Prepalatals: [ɕ ʑ ʨ ʥ ɲ]
Velars: [k k' g g' x x']

The underlying inventory is a subset of the phonetic inventory in Example (2). The decision with regard to what segments are underlying is a matter of analysis and the results will be different in different analyses, depending on the theoretical framework that is assumed. However, all analyses are likely to converge on the conclusion that the distinction between hard and soft consonants in the class of dentals and postalveolars is allophonic, because soft dentals and postalveolars occur exclusively before *i* and *j*. Therefore, they are derivable from hard dentals and postalveolars by surface palatalization (for discussion of this rule, see later, 'Phonological Rules' section).

Soft labials as underlying segments might be controversial. The reason is that soft labials occur exclusively before *i* and *j*. In the remaining contexts, soft labials are either depalatalized (word finally or before a consonant) or decomposed into sequences of a labial followed by [j]. The labial is then palatalized, as in *piasek* [p'jasɛk] 'sand', *pióro* [p'jurɔ] 'pen', *Piotr* [p'jɔtr] 'Peter', and *piec* [p'jɛts] 'oven'. It is conceivable (see Rubach, 1984) to derive soft labials from underlying clusters of labials and *j*, hence //pjasɛk// rather than //p'asɛk// 'sand' (double slashes are used for underlying representations, single slashes are for intermediate stages, and square brackets are for phonetic representations.) If the underlying representation is //p'asɛk//, then Polish must have a rule of decomposition: //p'asɛk// → /pjasɛk/ by decomposition and → [p'jasɛk] by surface palatalization (see Rubach, 2003).

Polish has lost the dark *l*, a change that is less than 100 years old. The historical *ł* has turned into the glide [w] in all positions of the word in the standard dialect. (The dark *l* still exists phonetically in eastern Polish.) However, the [w] that comes from *ł* behaves phonologically as a consonant; for example, it alternates with the clear *l*, as in *dał* [daw] 'he gave' and *dal-i* [dal'i] 'they gave'. Researchers are in agreement that the best analysis is to postulate the dark //ɫ// at the underlying level and posit a rule of lateral vocalization, //ɫ// → [w], applying in all contexts except those in which //ɫ// has palatalized to /l'/ (see Gussmann, 1980; Rubach, 1984; Bethin, 1992).

The surface inventory of Polish vowels includes the high vowels [i ɨ u], the mid vowels [ɛ ɔ], and the low vowel [a]. All of these vowels are also members of the underlying inventory. The semivowels [j] and [w] are derived from //i// and //u//, respectively, by rules of gliding (see Rubach, 2000).

The debate regarding the vocalic system focuses on the so-called 'yers.' These are fleeting vowels, that is, vowels that alternate with zero. The fleeting [ɛ] contrasts with nonfleeting [ɛ], making the pattern of alternation unpredictable from the surface phonetic environment (abbreviations: NOM, nominative; SG, singular; PL, plural):

(3a)	NOM SG	NOM PL
	oset 'thistle'	ost-y
	bez 'lilac'	bz-y
	kuter 'cutter'	kutr-y
	mech 'moss'	mch-y
(3b)	NOM SG	NOM PL
	gorset 'corset'	gorset-y
	zez 'squint'	zez-y
	krater 'crater'	krater-y
	pech 'bad luck'	pech-y

These data show that the distinction between the fleeting *e* (Example (3a)) and the nonfleeting *e* (Example (3b)) must be made in the underlying representation. The exact representation of this distinction has been a matter of much debate (Gussmann, 1980; Rubach, 1984, 1986). Sidestepping this problem, let us transcribe the yer vowel as //E//. Then, the occurrence of the yer as the vowel [ɛ] versus the absence of this vowel in the surface representation can be stated descriptively as follows:

(4a) Yer Vocalization: E → ɛ if either
(i) the yer is in the final syllable of the word or
(ii) there is a yer in the following syllable.
(4b) Yer Deletion: All unvocalized yers are deleted context freely.

The vocalization falling under Example (4a(i)) is exemplified in the preceding Example (3a); the vocalization falling under Example (4a(ii)) is shown in Examples (5a)–(5c) (abbreviations: DIM, diminutive; GEN, gender):

(5a) The root morpheme meaning 'louse':
wesz NOM SG wsz-y NOM PL
Vowel–zero alternation, hence the root is //vEʃ//
(5b) The diminutive suffix:
kot 'cat' kot-ek (DIM) kot-k-a
NOM SG GEN SG
Vowel–zero alternation in the suffix, hence //Ek//
(5c) The root morpheme 'louse' plus the diminutive suffix:
wesz-k-a //vEʃ-Ek-a// wesz-ek //vEʃ-Ek//
NOM SG GEN PL

The derivation for the forms in Example (5c) is now as follows:

(6)	//vEʃ-Ek-a//	//vEʃ-Ek//	
	vɛʃ-Ek-a	vɛʃ-Ek	Yer Vocalization (Example (4a(ii))
	—	vɛʃ-ɛk	Yer Vocalization (Example (4a(i))
	vɛʃ-k-a	—	Yer Deletion (Example (4b))

To conclude, the inventory of underlying vowels in Polish includes the following segments: //i ɨ u ɛ E ɔ a//.

Phonological Rules

Polish has a rich system of productive derivational and inflectional morphology, resulting in many fully regular phonological alternations. A few of the most important rules are reviewed here.

Polish stands out among Slavic languages due to its complex system of palatalization rules, including first velar palatalization, second velar palatalization, coronal palatalization, and surface palatalization (see Rubach, 1984). The first three rules affect both the manner and the place of articulation and are restricted to derived environments in the sense that they apply across morpheme boundaries, but not inside morphemes. In terms of Lexical Phonology (Kiparsky, 1982; Booij and Rubach, 1987), these are cyclic lexical rules. In contrast, surface palatalization is an allophonic postlexical rule that applies across the board, including contexts that span a word boundary.

(7) First velar palatalization, k g x → ʧ ʤ ʃ before front vowels:

bo**k** 'side'	bo**cz**-ek [ʧ] (DIM)
mó**zg** 'brain'	mó**żdż**-ek [ʤ] (DIM)
du**ch** 'spirit'	du**sz**-ek [ʃ] (DIM)

If the /ʤ/ derived by first velar palatalization is preceded by a sonorant, then it turns into a fricative (VOC, vocalic).

(8) Sprantization, ʤ → ʒ after a sonorant:
Bó**g** 'God' NOM SG Bo**ż**-e [ʒ] VOC SG
//bɔg-ɛ// → bɔʤ-ɛ/ → [bɔʒ-ɛ]

Second velar palatalization affects velar stops and is restricted morphologically, applying before the endings of the masculine nominative singular, the feminine dative/locative (DAT/LOC) singular, and the adverb suffix.

(9) Second velar palatalization, k g → ts dz before *i* or *e* of the specified suffixes:

apte**k**-a 'drugstore' NOM SG	apte**c**-e [ts] DAT/LOC SG
no**g**-a 'leg' NOM SG	no**dz**-e [dz] DAT/LOC SG

Coronal palatalization turns dentals into [− anterior] segments (see Rubach, 1984). In the class of obstruents, the dentals //s z t d// change into prepalatals [ɕ ʑ ʨ ʥ]:

(10) Coronal palatalization, s z t d → ɕ ʑ ʨ ʥ before front vowels:

głos 'voice'	głos-**ie** [ɕ-ɛ] LOC SG	głos-**i**-ć [ɕ-i] 'to voice'
wła**z** 'manhole cover'	wła**z**-**ie** [ʑ-ɛ] LOC SG	wła**z**-**i**-ć [ʑ-i] 'get into'
po**t** 'sweat'	po**c**-**ie** [ʨ-ɛ] LOC SG	po**c**-**i**-ć [ʨ-i] 'to sweat'
bru**d** 'dirt'	bru**dz**-**ie** [ʥ-ɛ] LOC SG	bru**dz**-**i**-ć [ʥ-i] 'to make dirty'

Surface palatalization affects all consonants (C) and palatalizes them in an allophonic manner, i.e., without changing the place or manner of articulation:

(11) Surface palatalization, C → C' before **i** or **j**:
pismo [p'i] 'letter'
ko**p**i-a [p'j] 'copy'
skle**p** [p] 'store'
skle**p**-**i**k [p'-i] (DIM), skle**p** **I**reny [p'#i] 'Irene's store'
skle**p** **J**anka [p'#j] 'John's store'

With regard to the alternations between voiced and voiceless obstruents, Polish exhibits a pattern that is typical for Slavic languages: it has final devoicing and voice assimilation. The latter rule is postlexical and applies not only inside words but also across word boundaries:

(12a) Final devoicing – Voiced obstruents become voiceless at the end of the word:

ko**d**-y [d] 'code' NOM PL	ko**d** [t] NOM SG
gła**z**-y [z] 'stone' NOM PL	gła**z** [s] NOM SG

(12b) Voice assimilation – Obstruents assume the value of [± voice] from the following obstruents:

pro**s**-i-ć [ɕ] 'ask'	pro**ś**-**b**-a [ʑ-b] 'request'	pro**ś** **g**o [ʑ#g] 'ask him'
chle**b**-ek [b] 'bread'	(DIM) NOM SG	chle**b**-**k**-a [p-k] GEN SG

chle**b** **p**szenny [p#p] 'wheat bread'

For a comprehensive discussion of Polish phonological rules, the reader is referred to Rubach (1984).

Syllable Structure

From the perspective of syllable structure, there are two essential observations that need to be made. First, Polish is entirely weight insensitive in the sense that it has no long vowels or diphthongs. Second, Polish does not have syllabic consonants, with the

consequence being that it admits unusually complex clusters:

(13a) Word initial:

pstry [pstr] 'gaudy'	**bzd**ura [bzd] 'nonsense'
plwać [plf] 'spit'	**lśn**ić [lɕɲ] 'shine'
krwawy [krf] 'bloody'	**rtę**ć [rt] 'mercury'
	mgła [mgw] 'fog'

(13b) Word medial:

ska**ąpstw**o [mpstf] 'meanness'	war**stw**a [rstf] 'layer'
pomyś**lny** [ɕln] 'successful'	Sie**dlc**e [tlts] (place name)
sre**brn**y [brn] 'silver' (ADJ)	m**ędrk**ować [ntrk] 'to be smart ass'

(13c) Word final:

przest**ępstw** [mpstf] 'crime'	GEN PL myś**l** [ɕl] 'idea'
mechani**zm** [sm] 'mechanism'	me**tr** [tr] 'meter'
bli**zn** [sn] 'scar'	GEN PL pleś**ń** [ɕɲ] 'mould'

These clusters present a challenge to syllabification. The basic observation is that Polish maximizes onsets, which means that vowel-consonants-vowel (VCCV) is syllabified as V.CCV, as in *bu.tla* 'bottle' and *tra.twa* 'raft' (the periods denote syllable boundaries). The maximization of onsets is constrained by the universal sonority hierarchy requiring that sonorants must be closer to the vowel than to obstruents (Jespersen, 1904). Consequently, *palto* 'coat' and *karta* 'card' are syllabified *pal.to* and *kar.ta*. The sonority relations are suspended in the class of obstruents in the sense that stops and fricatives can occur in either order in onsets and codas (Rubach and Booij, 1990a), hence *przestępstwo* 'crime' is syllabified [pʃɛ.stɛm.pstfɔ].

Polish is unusual in that it permits sonorants to be trapped in consonant clusters, in violation of the sonority hierarchy. The syllabification of such clusters is problematic for native speakers, who waiver in their judgments regarding the placement of syllable boundaries (Rubach and Booij, 1990b). This observation prompted Rubach and Booij (1990b) to analyze such sonorants as extrasyllabic and prosodified under the phonological word node (the PW node). Extrasyllabic sonorants are transparent to final devoicing and voice assimilation, i.e., these rules apply as if these sonorants were not present in the string.

See also: Poland: Language Situation; Polish Lexicography; Polish.

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Politeness

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Despite several decades of sustained scholarly interest in the field of politeness studies, a consensual definition of the meaning of the term 'politeness,' as well as a consensus on the very nature of the phenomenon, are still top issues in the current research agenda.

In ordinary, daily contexts of use, members of speech communities possess clear metalinguistic beliefs about, and are capable of, immediate and intuitive assessments of what constitutes polite versus rude, tactful versus offensive behavior. Politeness in this sense is equivalent to a normative notion

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In ordinary, daily contexts of use, members of speech communities possess clear metalinguistic beliefs about, and are capable of, immediate and intuitive assessments of what constitutes polite versus rude, tactful versus offensive behavior. Politeness in this sense is equivalent to a normative notion

of appropriateness. Such commonsense notions of politeness are traceable as products of historical developments and hence are socioculturally specific.

Scholarly definitions of the term, by contrast, have been predicated for several decades on a more or less tacit attempt to extrapolate a theoretical, abstract notion of politeness, capable of transcending lay conceptualizations and being cross-culturally valid. The theoretical constructs proposed, however, have proven unsatisfactory as heuristic instruments for the analysis of empirical data. Much of the current scholarly debate is focused on taking stock of recent critiques of past dominating paradigms and epistemological premises, and on formulating new philosophical and methodological practices based on a radical reconceptualization of the notion of politeness. The point of contention is the very possibility of survival of any useful notion of politeness, when the construct is removed from a historically determined, socioculturally specific, and interactionally negotiated conceptualization of the term.

Constructs of Politeness

The 'Social Norm View'

Politeness has been an object of intellectual inquiry quite early on in both Eastern (Lewin, 1967; Coulmas, 1992, for Japanese; Gu, 1990, for Chinese) and Western contexts (Held, 1992). In both traditions, which loosely can be defined as pre-pragmatic, observers tend to draw direct, deterministic links between linguistic realizations of politeness and the essential character of an individual, a nation, a people, or its language. Thus, the use of polite language is taken as the hallmark of the good-mannered or civil courtier in the Italian conduct writers of the 16th century (Watts, 2003: 34), or as a symbol of the qualities of modesty and respect enshrined in the Japanese language in pre-World War II nationalistic Japan.

Linguistic realizations of politeness are inextricably linked to the respective culture-bound ideologies of use; accounts, which often are codified in etiquette manuals providing exegeses of the relevant social norms, display a great deal of historical relativity.

Pragmatic Approaches

Pragmatic approaches to the study of politeness begin to appear in the mid-1970s. Robin Lakoff (1973) provided pioneering work by linking Politeness (with its three rules: 'don't impose'; 'give options'; 'make the other person feel good, be friendly') to Grice's Cooperative Principle to explain why speakers do not always conform to maxims such as Clarity (1973: 297) (*see* **Grice, Herbert Paul (1913–1988); Cooperative Principle; Maxims and Flouting**). In a similar vein, but wider scope, Leech's (1983) model postulates that deviations from the Gricean conversational maxims are motivated by interactional goals, and posits a parallel Politeness Principle, articulated in a number of maxims such as Tact, Generosity, Approbation, Modesty, Agreement, and Sympathy. He also envisages a number of scales: cost-benefit, authority and social distance, optionality, and indirectness, along which degrees of politeness can be measured. Different situations demand different levels of politeness because certain immediate illocutionary goals can compete with (e.g., in ordering), coincide with (e.g., in offering), conflict with (e.g., in threatening), or be indifferent to (e.g., in asserting), the long-term social goals of maintaining comity and avoiding friction. This so-called conversational maxim view of politeness (Fraser, 1990) is concerned uniquely with scientific analyses of politeness as a general linguistic and pragmatic principle of communication, aimed at the maintenance of smooth social relations and the avoidance of conflict, but not as a locally determined system of social values (Eelen, 2001: 49, 53) (*see* **Communicative Principle and Communication**).

Another model, proposed by Brown and Levinson in 1978, *de facto* set the research agenda for the following quarter of a century (the study was republished in its entirety as a monograph with the addition of a critical introduction in 1987).

Like Lakoff and Leech, Brown and Levinson (1987) accept the Gricean framework, but they note a qualitative distinction between the Cooperative Principle and the politeness principles: while the former is presumed by speakers to be at work all the time, politeness needs to be ostensibly communicated (ibid.: 5).

Brown and Levinson see politeness as a rational and rule-governed aspect of communication, a principled reason for deviation from efficiency (ibid.: 5) and aimed predominantly at maintaining social cohesion via the maintenance of individuals' public *face* (a construct inspired by Erving Goffman's notion of 'face,' but with crucial, and for some, fatal differences: see Bargiela-Chiappini, 2003, Watts, 2003) (*see* **Face; Goffman, Erving (1922–1982)**). Brown and Levinson's 'face' is construed as a double want: a want of freedom of action and freedom from impositions (this is called 'negative' face), and a want of approval and appreciation (a 'positive' face). Social interaction is seen as involving an inherent degree of threat to one's own and others' face (for example, an order may impinge on the addressee's freedom of action; an apology, by virtue of its subsuming an

admission of guilt, may impinge on the speaker's want to be appreciated). However, such *face threatening acts* (FTA) can be avoided, or redressed by means of polite (verbal) *strategies*, pitched at the level needed to match the seriousness of an FTA x, calculated according to a simple formula:

$$W_x = P(H, S) + D(S, H) + R_x$$

where the Weight of a threat x is a function of the Power of Hearers over Speakers, as well as of the social Distance between Speakers and Hearers, combined with an estimation of the Ranking (of the seriousness) of a specific act x in a specific culture (*see* **Face**).

Brown and Levinson compared data from three unrelated languages (English, Tamil, and Tzeltal) to show that very similar principles, in fact universal principles, are at work in superficially dissimilar realizations. The means-end reasoning that governs the choice of polite strategies, and the need to redress face threats, are supposed to be universal. The abstract notion of positive and negative aspects of face (although the content of face is held to be subject to cultural variation) is also considered to be a universal want.

The comprehensiveness of the model – in addition to being the only production model of politeness to date – captured the interest of researchers in very disparate fields and working on very different languages and cultures. One could even say that the Brown and Levinsonian discourse on politeness practically 'colonized' the field (domains covered include cross-cultural comparison of speech acts, social psychology, discourse and conversation analysis, gender studies, family, courtroom, business and classroom discourse, and so on: see Dufon *et al.,* 1994, for an extensive bibliography; Eelen, 2001: 23 ff.; Watts, 2003). Interestingly, a paper by Janney and Arndt made the point, in 1993, that despite considerable criticism of the then still dominant paradigm, the very fundamental issue of whether the universality assumption could be of use in comparative cross-cultural research went by and large unquestioned (1993: 15).

The most conspicuous criticism – paradoxically, for a model aspiring to pancultural validity – was perhaps the charge of ethnocentrism: the individualistic and agentivistic conception of Brown and Levinson's 'model person' did not seem to fit 'collectivistic' patterns of social organization, whereas their notion of 'face' seemed to serve an atomistic rather than interrelated notion of self (Wierzbicka, 1985; Gu, 1990; Nyowe, 1992; Werkhofer, 1992; de Kadt, 1992; Sifianou, 1992; Mao, 1994). Going one step further, some criticized Brown and Levinson's emphasis on the 'calculable' aspects of expressive choice (and the idea that individuals can manipulate these 'volitionally'), to the expense of the socially constrained or conventionalized indexing of politeness in some linguacultures (especially, though not exclusively, those with rich honorific repertoires; Hill *et al.,* 1986; Matsumoto, 1988, 1989; Ide, 1989; Janney and Arndt, 1993) (*see* **Intercultural Pragmatics and Communication; Honorifics**).

The Gricean framework implicitly or explicitly adopted in many politeness studies has been criticized for arbitrarily presupposing the universal validity of the maxims, and for a relatively static account of inferential processes. In particular, Sperber and Wilson's (1995) Relevance Theory recently has been adopted by politeness theorists as a way to compensate for this lack of interpretative dynamism (Jary, 1998a, 1998b; Escandell-Vidal, 1998; Watts, 2003: 201) (*see* **Relevance Theory**) and the conversational maxims have been reinterpreted as 'sociopragmatic interactional principles' (Spencer-Oatey, 2003) (*see* **Maxims and Flouting**).

Others have lamented Brown and Levinson's exclusive focus on the speaker, as well as their reliance on decontextualized utterances and speech acts (Hymes, 1986: 78), choices that similarly detract from a discursive and interactional understanding of communicative processes (*see* **Speech Acts**).

Social Constructivist Approaches

Hymes (1986) pointed out quite early on that although Brown and Levinson's model was impressive as an illustration of the universality of politeness *devices*, any useful and accurate account of politeness *norms* would need to "place more importance on historically derived social institutions and cultural orientations" (p. 78).

The scientific extrapolation of an abstract, universal concept of politeness was similarly questioned by Watts *et al.* (1992), who drew attention to the serious epistemological consequences of a terminological problem. According to these authors, the field had been too casual in overlooking the difference between mutually incommensurable constructs of politeness: a first-order politeness (politeness$_1$) derived from folk and commonsense notions, and a second-order politeness (politeness$_2$), a technical notion for use in scientific discourse. Although the latter (echoing the Vygotskyan characterization of spontaneous versus scientific concepts; *see* **Vygotskii, Lev Semenovich (1896–1934)**) can be thought to emerge from an initial verbal definition, the former emerges from action and social practice (Eelen, 2001: 33). As social practice, politeness$_1$ is rooted in everyday

interaction and socialization processes: it is expressed in instances of speech (*expressive* politeness), it is invoked in judgments of interactional behavior as polite or impolite behavior (*classificatory* politeness), and is talked about (*metapragmatic* politeness) (ibid.: 35) (*see* **Metapragmatics**).

Eelen (2001)'s watershed critique of politeness theories articulates this point in great detail and thus opens up promising new avenues of thought for researchers. The lack of distinction between politeness$_1$ and politeness$_2$ represents a serious ontological and epistemological fallacy of all previous politeness research, as it has determined the more or less implicit 'reification' of participants' viewpoint to a scientific viewpoint (the 'emic' account is seamlessly transformed into an 'etic' account). This conceptual leap fails to question the very *evaluative* nature of politeness$_1$ (ibid.: 242) and thereby conceals this 'evaluative moment' from analysis.

Empirical studies into commonsense ideas of politeness$_1$ (Blum-Kulka, 1992; Ide *et al.,* 1992) indicate that notions of politeness or impoliteness are used to characterize people's behavior judgmentally. This evaluative practice has a psychosocial dimension: individuals position themselves in moral terms *vis-à-vis* others and categorize the world into the 'well-mannered,' the 'uncouth,' etc., and a more concrete everyday dimension: it enables indexing of social identities and thus group-formation: in other words, it positively creates social realities (Eelen, 2001: 237). Politeness is said to be inherently *argumentative*: evaluative acts are not neutral taxonomic enterprises; they exist because there is something at stake socially. Moreover, carrying out an evaluative act immediately generates social effects. (ibid.: 37–38). A particularly problematic aspect of much of the theorizing about politeness is that in spite of the fact that norms are held by users to be immutable and objective (recourse to a higher, socially sanctioned reality grants moral force), and by theorists to be unanimously shared by communities, one still has to admit that the very acts of evaluation may exhibit a huge *variability*, and that this is hardly the exception.

Capturing the qualities of evaluativity, argumentativity, and variability of polite behavior requires a paradigmatic shift in our underlying philosophical assumptions. Eelen proposes to replace what he sees as a Parsonian apparatus (exemplified by "priority of the social over the individual, normative action, social consensus, functional integration and resistance to change," p. 203) with Bourdieu's (1990, 1991) theory of social practice (a proposal followed and developed by Watts, 2003). The following are some of the important consequences of this proposal.

The first is a reconceptualization of politeness as situated social action – its historicity is duly restored. Politeness is no longer an abstract concept or set of norms from which all individuals draw uniformly, but is recognized as the very object of a social dispute. Variability, resulting from the properties of evaluativity and argumentativity of politeness$_1$, ceases to be a problem for the researcher, and instead provides evidence of the nature of the phenomenon. As a consequence, even statistically marginal behavior (problematic for traditional approaches: Eelen, 2001: 141) can be accounted for within the same framework.

Second, the relation between the cultural/social and the individual is seen as less deterministic. On the one hand, the cultural is part of an individual's repertoire: it is internalized and accumulated through all past interactions experienced by an individual, thus determining the nature of that individual's *habitus* (or set of learned dispositions; Bourdieu, 1991). On the other hand, the cultural can be acted on – be maintained or challenged – to various extents by individuals, depending on those individuals' resources, or symbolic *capital*; the cultural is never an immutable entity.

This *discursive* understanding of politeness enables us to capture the functional orientation of politeness to actions of social inclusion or exclusion, alignment or distancing (and incidentally uncovers the fundamentally ideological nature of scientific metapragmatic talk on politeness, as one type of goal oriented social practice; see Glick, 1996: 170) (*see* **Discourse Markers**).

Politeness ceases to be deterministically associated with specific linguistic forms or functions (another problem for past approaches): it depends on the subjective *perception* of the meanings of such forms and functions. Moreover, in Watts's (2003) view, behavior that abides by an individual's expectations based on 'habitus' (i.e., unmarked appropriate behavior) is not necessarily considered politeness: it is instead simply *politic behavior.* Politeness may thus be defined as behavior in excess of what can be expected (which can be received positively or negatively but is always argumentative), whereas impoliteness similarly is characterized as nonpolitic behavior (on the important issue of the theoretical status of *impoliteness*, see Eelen, 2001: 87 and Watts, 2003: 5).

As sketched here, the path followed by the discourse on politeness illustrates how the struggle over the meaning and the social function of politeness is at the very centre of current theorizing. Watts adopts a rather radical position and rejects the possibility of a theory of politeness2 altogether: scientific notions of politeness (which should be nonnormative) cannot be part of a study of social interaction (normative by

definition) (Watts, 2003: 11). Others, like House (2003, 2005), or O'Driscoll (1996) before her, maintain that a descriptive and explanatory framework must include universal (the first two below) and culture/language-specific levels (the last two below):

1. a fundamental biological, psychosocial level based on animal drives (*coming together* vs. *noli-me-tangere*)
2. a philosophical level to capture biological drives in terms of a finite number of principles, maxims, or parameters
3. an empirical descriptive level concerned with the particular (open-ended) set of norms, tendencies, or preferences
4. a linguistic level at which sociocultural phenomena have become 'crystallized' in specific language forms (either honorifics or other systemic distinctions)

(adapted from House, 2003, 2005).

Future Perspectives

Although the legacy of the 'mainstream' pragmatic approaches described above is clearly still very strong (see, for instance, Fukushima, 2000; Bayraktaroğlu and Sifianou, 2001; Hickey and Stewart, 2005; Christie, 2004), the critical thoughts introduced in the current debate on linguistic politeness promise to deliver a body of work radically different from the previous one.

The future program of politeness research begins from the task of elaborating a full-fledged theoretical framework from the seminal ideas recently proposed. It must acknowledge the disputed nature of notions of politeness and explore the interactional purposes of evaluations (see, for example, Mills's 2003 study on gender, or Watts's 2003 'emergent networks'; compare also Locher's 2004 study on the uses of politeness in the exercise of power). It must articulate how norms come to be shared and how they come to be transformed; it must explore the scope and significance of variability. Relevance theory, Critical Discourse Analysis, and Bourdieuian sociology have all been proposed as promising frameworks for investigation. Empirical research that can provide methodologically reliable data for these questions must also be devised: the new paradigm would dictate that the situatedness of the very experimental context, the argumentativity of the specific practice observed are recognized as integral part of the relevant data.

Politeness consistently features in international symposia, and has, since 1998, had a meeting point on the Internet; the year 2005 will see the birth of a dedicated publication, the *Journal of Politeness Research*.

See also: Communicative Principle and Communication; Cooperative Principle; Discourse Markers; Face; Goffman, Erving (1922–1982); Grice, Herbert Paul (1913–1988); Honorifics; Intercultural Pragmatics and Communication; Maxims and Flouting; Metapragmatics; Relevance Theory; Speech Acts; Vygotskii, Lev Semenovich (1896–1934).

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Politeness Strategies as Linguistic Variables

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Although linguists have had a good deal to say about it, politeness is not just a matter of language. When people say about someone, "she is very polite," they are often referring to respectful, deferential, or considerate behavior which goes well beyond the way the person talks or writes. In Japan, for example, polite behavior encompasses bowing respectfully; in Samoan culture, being polite entails ensuring you are physically lower than a person of higher status. And in formal situations, all cultures have rules for behaving appropriately and respectfully, which include ways of expressing politeness nonverbally as well as verbally. In this article, however, we will focus on linguistic politeness and the social factors that influence its use. We begin by addressing the question 'What is linguistic politeness?'

What Is Linguistic Politeness?

Language serves many purposes, and expressing linguistic politeness is only one of them. In example 1, the main function of the interaction can be described as informative or referential. The two people know each other well, and they do not engage in any overt expressions of linguistic politeness. [Note: Specialized transcription conventions are kept to the minimum in the examples in this article. + marks a pause; place overlaps between // and /. Strong STRESS is marked by capitalization.]

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(1) Context: Two flatmates in their kitchen
Rose: what time's the next bus?
Jane: ten past eight I think

By contrast, in example 2 (from Holmes and Stubbe, 2003: 37), there are a number of features which can be identified as explicit politeness markers.

(2) Context: Manager in government department to Ana, a new and temporary administrative assistant replacing Hera's usual assistant.
Hera: I wondered if you wouldn't mind spending some of that time in contacting + while no-one else is around contacting the people for their interviews

Hera's basic message is 'set up some interviews.' However, in this initial encounter with her new assistant, she uses various politeness devices to soften her directive: the hedged syntactic structure, *I wondered if you wouldn't mind,* and the modal verb (*would*). Providing a reason for being so specific about when she wants the task done could also be regarded as contributing to mitigating the directive. Hera's use of these politeness devices reflects both the lack of familiarity between the two women, and the fact that, as a 'temp,' Ana's responsibilities are not as clearly defined as they would be if she had been in the job longer. This illustrates nicely how linguistic politeness often encodes an expression of consideration for others.

Linguistic politeness has generally been considered the proper concern of 'pragmatics,' the area of linguistics that accounts for how we attribute meaning to utterances in context, or "meaning in interaction" (Thomas, 1995: 23). If we adopt this approach, then politeness is a matter of specific linguistic choices from a range of available ways of saying something. Definitions of politeness abound (see, for example, Sifianou, 1992: 82–83, Eelen, 2001: 30–86), but the core of most definitions refers to linguistic politeness as a 'means of expressing consideration for others' (e.g., Holmes, 1995: 4; Thomas, 1995: 150; Watts, 2003). Note that there is no reference to people's motivations; we cannot have access to those, and arguments about one group being intrinsically more polite or altruistic than another are equally futile, as Thomas (1995: 150) points out. We can only attempt to interpret what people wish to convey on the basis of their utterances; we can never know their 'real' feelings. We can, however, note the ways in which people use language to express concern for others' needs and feelings, and the ways that their expressions are interpreted. Linguistic politeness is thus a matter of strategic interaction aimed at achieving goals such as avoiding conflict and maintaining harmonious relations with others (Kasper, 1990).

Different cultures have different ways of expressing consideration for others, and the most influential work in the area of linguistic politeness, namely Brown and Levinson's Politeness Theory (1978, 1987), adopts a definition of politeness that attempts to encompass the ways politeness is expressed universally. This involves a conception of politeness that includes not only the considerate and nonimposing behavior illustrated in example 2, which they label 'negative politeness' (Brown and Levinson, 1987: 129), but also the positively friendly behavior illustrated in example 3. (see also Lakoff, 1975, 1979).

(3) Context: Small talk between workers in a plant nursery at the start of the day. Des is the manager. Ros is the plant nursery worker.
Des: be a nice day when it all warms up a bit though
Ros: yeah + it's okay
Des: so you haven't done anything all week eh you haven't done anything exciting

This is classic social talk: the content is not important; the talk is primarily social or affective in function, designed to establish rapport and maintain good collegial relationships. Brown and Levinson (1987: 101) use the term 'positive politeness' for such positive, outgoing behavior. Hence, their definition of politeness includes behavior which actively expresses concern for and interest in others, as well as nonimposing distancing behavior. Linguistic politeness may therefore take the form of a compliment or an expression of goodwill or camaraderie, or it may take the form of a mitigated or hedged request, or an apology for encroaching on someone's time or space.

Politeness Theory

Brown and Levinson's definition describes linguistic politeness as a means of showing concern for people's 'face,' a term adopted from the work of Erving Goffman. Using Grice's (1975) maxims of conversational cooperation (*see* **Grice, Herbert Paul (1913–1988)**), they suggest that one reason people diverge from direct and clear communication is to protect their own face needs and take account of those of their addressees. While it is based on the everyday usages such as 'losing face' and 'saving face,' Brown and Levinson develop this concept considerably further, and they analyze almost every action (including utterances) as a potential threat to someone's face. They suggest that linguistic politeness comprises the use of interactional strategies aimed at taking account of two basic types of face needs or wants: firstly, positive face needs, or the need to be

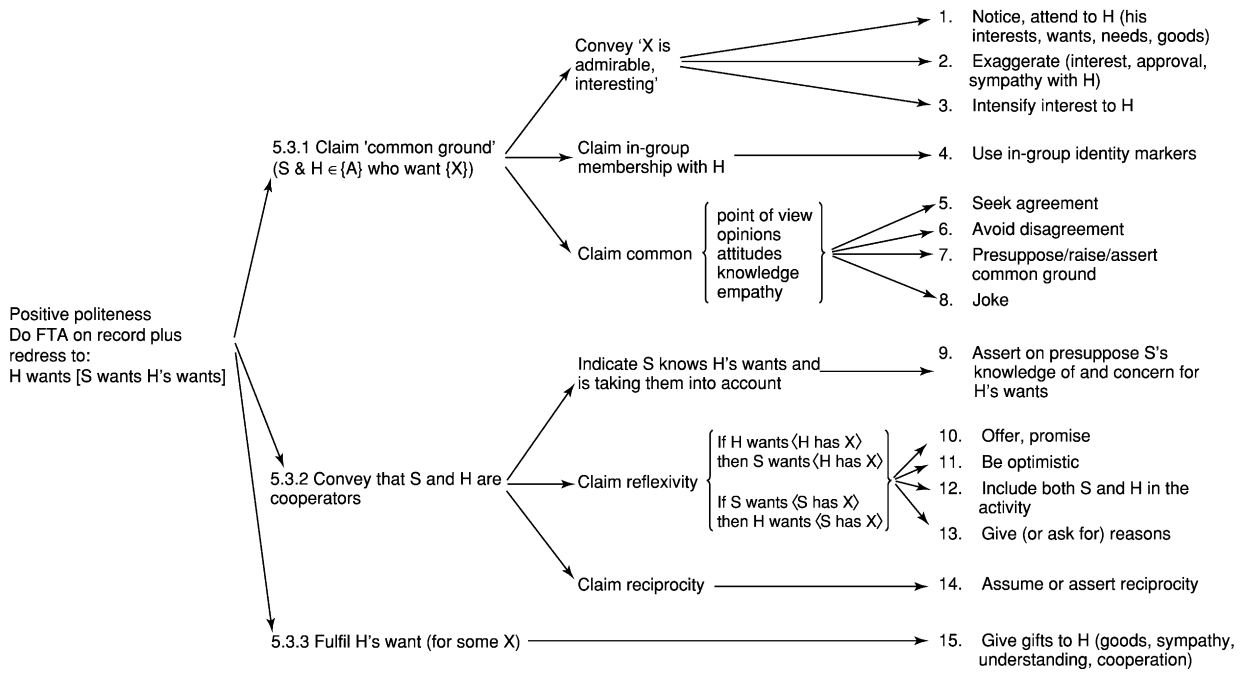

Figure 1 Chart of strategies: Positive politeness.

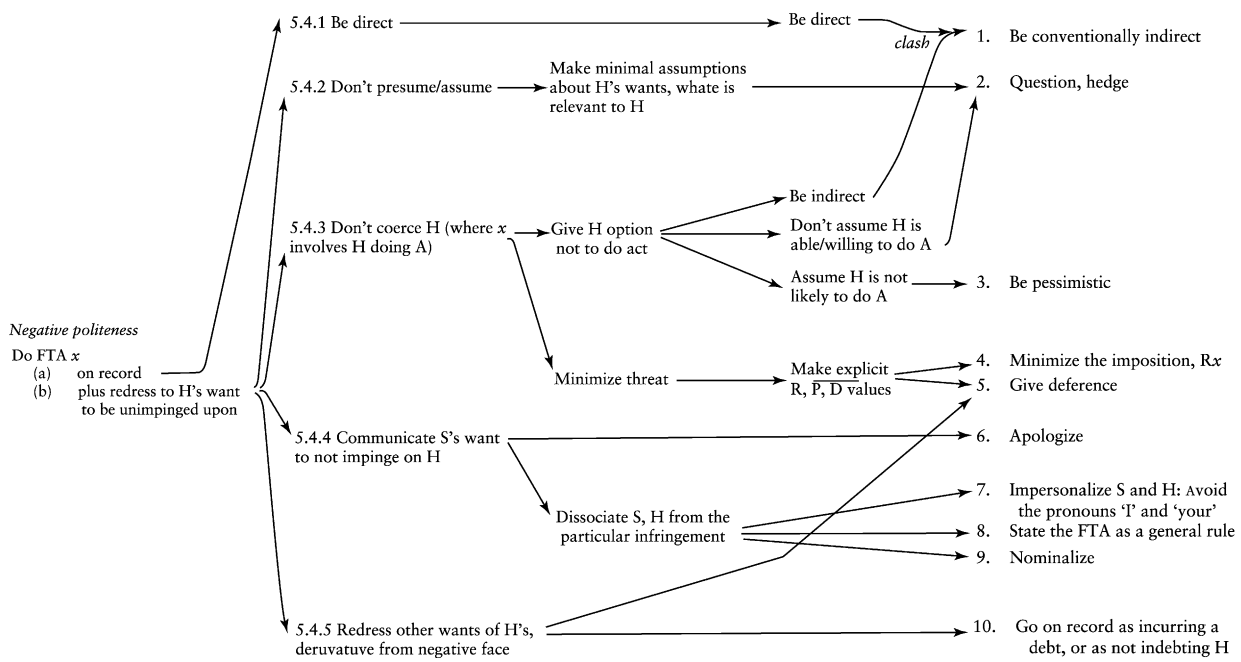

Figure 2 Chart of strategies: Negative politeness.

valued, liked, and admired, and to maintain a positive self-image; and secondly, negative face needs or the need not to be imposed upon, the need for relative freedom of thought and action, or for one's own 'space.' As illustrated in example 2, behavior that avoids impeding or imposing on others (or avoids 'threatening their face') is described as evidence of 'negative politeness,' while sociable behavior conveying friendliness (as in example 3), or expressing admiration for an addressee is 'positive politeness' behavior (Brown and Levinson, 1987) (Figures 1 and 2). Adopting this approach, any utterance that could be interpreted as making a demand or intruding on another person's autonomy may qualify as a potentially face

threatening act (FTA). Even suggestions, advice, and requests may be experienced as FTAs, since they potentially impede the addressee's freedom of action.

Brown and Levinson (1987) outline a wide range of different kinds of politeness strategies, including, as positive politeness strategies, making offers, joking, and giving sympathy, and, as negative politeness strategies, hedging, apologizing, and giving deference (see figures 3 and 4 in Brown and Levinson, 1987: 102 and 131). In support of their claims for the universality of their theory, they illustrate these strategies with numerous examples from three different languages: South Indian Tamil, Tzeltal, a Mayan language spoken in Mexico, and American and British English. Example 4 is an illustration from Tzeltal of the use of the negative politeness strategy of hedging, in the form of the particles *naš* and *mak,* to mitigate a FTA and thus render the utterance more polite.

(4) haʔ *naš* ya smel yoʔtan, *mak*
It's *just* that he's sad, *I guess*
[Final segment in naš is the sound at the beginning of 'ship']

Since this example, from Brown and Levinson, 1987: 149, like many others, is provided by them without contextual information, the reader has no way of assessing exactly why the utterance is interpretable as a FTA, a point I return to below.

Brown and Levinson do, however, recognize the importance of three fundamental sociocultural variables in assessing the relative weight of different FTAs: firstly, the social distance (D) between the participants; secondly, the power (P) that the addressee has over the speaker; and thirdly, the ranking of the imposition (R) expressed in the utterance in the relevant culture. Moreover, they note that the way these variables contribute will differ from culture to culture. Each of these components contributes to the relative seriousness of the FTA, and thus to the assessment of the appropriate strategy or level of politeness required to express the speaker's intended message. So, for example, if my son wants to borrow my car, he is likely to judge that although he knows me well (low D), I have a relatively high amount of power in our relationship (compared, say, to his relationship with his brother, though perhaps not as much as is involved in his relationship with his boss), and that he is asking a big favor (high R). He is therefore likely to select a linguistically very polite way of asking this favor, as illustrated in example 5.

(5) Context: Son to mother in the family living room
[+ marks a very short pause]
D: um mum + um do you think um I could possibly just borrow your car +
M: [*frowns*]
D. um just for a little while +
M. um well [*frowns*]
D: it's just that I need to get this book to Helen tonight

In making his request, D includes a number of negative politeness strategies in the form of mitigating devices or hedges (hesitation markers *um,* modal verb *could* and particle *possibly,* minimizers *just, a little*) as well as the positive politeness strategies of using an in-group identity marker (*mum*) and providing a reason for the request. If he had been asking for a lift or a loan for bus fare, the weight of the imposition would have been considerably less of a FTA in New Zealand culture. In cultures where cars are either more or less valuable, the imposition represented by such a request would be ranked differently; and if the requestor was an equal or superior (such as a husband in some cultures), the P variable would be reduced. Thus the theory attempts to take account of contextual and social considerations and cultural contrasts.

The following sketch by Harry Enfield illustrates how the factors D, P, and R interact in different ways with a consequent effect on the different politeness strategies evident in the way Kevin and his friend Perry speak to (a) Kevin's parents, (b) Perry's parents on the phone, and (c) each other.

Transcript 1: 'Kevin the Teenager'
Father: Thanks, mum +
Father: Kevin.
Kevin: What?
Father: Are you gonna thank your mum?
Kevin: Ugh! Deurgh! +
Father: Are you going to say thank you?
Kevin: I JUST BLOODY DID!
Mother: Forget it, Dave – it's not worth it.
Kevin: [*sighs*]
Father: Oh, this is lovely, mum [to Kevin] How's the exam today?
Kevin: Mawight.
Father: What was it today – maths?
Kevin: Ner. Nurrr. +
Father: Sorry, what did you say?
Kevin: Urgh!
P-H-Y-S-I-C-S! +
Mother: Well, we can't hear you if you mumble, Kevin! Kevin: Muh! Uh! Nuh-muh!
[*the doorbell rings. Kevin goes to answer it*]
Kevin: Awight, Perry?
Perry: Awight, Kev? 'ere – guess wot I dun at school today? I rubbed up against Jennifer Fisher an' me groin wen' 'ard!
Perry: Hmm?
Father: Hello, Perry!
Mother: Hello, Perry! How are you?

Perry: 'ullo, Mrs Patterson, Mr Patterson.
Mother: How are your mum and dad?
Perry: All right, thank you.
Kevin: Come on, Perry – let's go.
Father: Kevin?
Kevin: What?
Father: Where d'you think you're going with all that food?
Kevin: Bedroom. Snack.
Mother: Your dinner's on the table – come and finish it.
Kevin: Ugh! P-e-r-r-y!
Father: Well, Perry can join us. Now, come and sit down.
Kevin: [*snorts*] So unfair!
Mother: Now – do you want something to eat, Perry?
Perry: No thanks, Mrs Patterson.
Mother: Are you sure?
Kevin: HE JUST BLOODY SAID "NO"!
Father: Kevin. Don't shout at your mum.
Kevin: What? I didn't say anything! What? Ugh! Ugh! Ugh! Ugh!
Father: Oh, Perry – I think you've known us long enough not to call us Mr and Mrs Patterson any more.
Kevin: Eeurgh!
Father: Just call us Dave and Sheila.
Kevin: (Eeurgh!)
Mother: Is that OK, then?
Perry: Yes, Mrs Patterson +
Mother: So – what sort of music do you like at the moment, Perry?
Kevin: Eeurgh!
Mother: I think Bad Boys Inc. are rather fun.
Perry: Bad Boys Inc. suck, Mrs Patterson +
Mother: So – who do you like, then?
Perry: We only like Snoop Doggy Dog.
Mother: Oh, from Peanuts.
Kevin: Muh-eeurgh!
Kevin: Finished! Come on, Perry.
Mother: No, no, darling-you've still got pudding.
Kevin: Agh! I don't want any bloody pudding!
Mother: It's Chocolate Choc Chip Chocolate Ice-cream with Chocolate Sauce. But you don't have to have any if you don't want it.
Kevin: Mmmnnnnrrrr!
Mother: Perry, would you, er, like –
Perry: Yes please, Mrs Patterson. Please. Thank you, Mrs Patterson. Please. Thank you!
[*slight pause as the icecream is shared out*]
Father: Have you got a girlfriend yet, Perry?
Perry: Munurr!
Father: I remember I got my first girlfriend when I was about your age. Tracey Thornton. I remember our first snog. Outside the cinema.
Kevin: Eeeeuurrgghh!
Mother: I was fourteen when I had my first snog.
Kevin: [*whimpers*]
Perry: I gotta go toilet!
Kevin: YOU'RE SO BLOODY EMBARRASSING!
Mother: Why can't you be a nice, polite boy – like Perry?
[*the telephone starts ringing*]
Kevin: Ugh! WHAT? WHAT'S WRONG WI' ME? WHAT'S BLOODY WRONG WIIH' ME EH?
Kevin: Hello? Mnuh! Hello, Mrs Carter. Yes, Perry is here, yes. Oh, very well, thank you. Yes, would you like to speak to him? Please? Yes?
[*to Perry*] Perry – it's your mum.
Perry: Eek!
What? NO! I DON'T WANT TO! NO! IT'S SO UNFAIR! I HATE YOU! YOU'RE SO BLOODY EMBARRASSIN'! I HATE YOU!
Perry: I gotta go now, Mrs Patterson. Fank you
Father: Cheerio, Perry!
Mother: Bye, Perry!
Kevin: See ya
Perry: Later
Kevin: So you like him more than me do you? I HATE YOU! I WISH I'D NEVER ***BEEN BORN!***

Criticisms of Brown and Levinson's Theory

While it has been hugely influential, Brown and Levinson's theory has attracted a good deal of criticism. I here mention just a few of the most frequently cited conceptual weaknesses. See Craig *et al.* (1986) and Coupland *et al.* (1988) for valuable early critiques, and Eelen (2001) and Watts (2003) for more recent, thorough reviews of criticisms.

Firstly Brown and Levinson's theory relies heavily on a version of speech act theory that assumes the sentence as its basic unit and places the speaker at the center of the analysis. Much early work that used Brown and Levinson's model adopted this focus on the utterance: e.g., some researchers asked people to judge single decontextualized utterances for degrees of politeness (e.g., Fraser, 1978). However, it is clear that FTAs are certainly not expressed only in sentences or even single utterances. Often they extend over several utterances and even over different turns of talk, as illustrated in example 5. Meaning-making is a more dynamic process than Brown and Levinson's approach allows for, and is often a matter of interactional negotiation between participants.

Secondly, Brown and Levinson have been criticised for mixing up different types of data, and providing very little indication of its source or context. As they admit in the extensive introduction to their 1987 book, their data is "an unholy amalgam of naturally occurring, elicited and intuitive data" (1987: 11), and, moreover, readers have no way of knowing which is which. Most current researchers in the area of pragmatics and discourse analysis use naturally occurring recorded data, and they provide information about the context in which it was produced.

Thirdly, the levels of analysis of different politeness strategies are quite different. So, for instance, negative politeness strategy 3, 'Be pessimistic,' is very much more general and can be realized in a very much wider variety of ways than strategy 9, 'Nominalize,' which identifies a very specific syntactic device that can be used for distancing the speaker from the addressee. In addition, overall, negative politeness strategies involve a more specific range of linguistic devices (e.g., hedge, nominalize, avoid the pronouns 'I' and 'you') than positive politeness strategies, which seem much more open-ended and difficult to restrict.

Fourthly, context is crucial in assessing politeness, but the range of social factors which may be relevant in analyzing the weight of a FTA is much more extensive than the three Brown and Levinson identify. Factors such as the level of formality of the speech event, the presence of an audience, the degree of liking between the participants, and so on, may well affect the weightiness of the FTA, or even the judgment about whether an utterance counts as polite at all. So, for example, as Thomas (1995: 156) points out, "if you'll be kind enough to speed up a little" appears superficially to be a very polite way of saying "hurry up," but in the context in which it was produced, addressed by a wife to her husband, it expressed intense irritation. And while Brown and Levinson's rather flexible concept R might be a means of taking account of some of these additional factors, computing R clearly requires detailed familiarity with relevant sociocultural and contextual values.

Fifthly, Brown and Levinson's theory assumes an ideal and very individualistic intentional agent (labelled a Model Person) as its starting point, and has been criticised by many researchers as culturally very restricted and even Anglo-centric in basic conception (e.g., Ide *et al.,* 1992; Eelen, 2001; Watts, 2003). Asian and Polynesian societies, for instance, place a greater emphasis on public undertakings and social commitments (a point discussed further below), and are not interested in trying to figure out what a speaker intended by a particular speech act (e.g., Lee-Wong, 2000); but this is a basic requirement of any analysis using Brown and Levinson's framework. The implication of these criticisms is that a theory of politeness based on intention recognition cannot apply cross-culturally and universally.

Measuring Politeness

Brown and Levinson's very specific approach to identifying ways of expressing linguistic politeness led to a spate of empirical studies which explored manifestations of politeness in a wide range of contexts and cultures and in many disciplines, including social and cognitive psychology, legal language, communication studies, gender studies, business and management studies, second language acquisition, and cross-cultural communication. A number of these researchers attempted to use Brown and Levinson's list of strategies as a basis for quantification. Shimanoff (1977), for instance, identified 300 different politeness strategies in an attempt to compare the number of politeness strategies used by men and women in interaction. She found no sex differences but she also found that the distinction between positive and negative politeness strategies was sometimes difficult to maintain. Moreover, there was often an unsatisfactory relationship between the number of strategies used and the intuitions of native speakers about how polite an utterance is (see also Brown, 1979).

It soon became apparent that counting strategies is basically a fruitless exercise, since context is so important for interpreting the significance of any linguistic form, and, moreover, the balance of different strategies may be crucially important in assessing the overall effect of a contribution to an interaction. In the following script for the video 'Not Like This', for example, Lorraine uses teasing humor, a positive politeness strategy, to soften her criticism of Sam's inadequate checking of the packets of soap powder.

Transcript 2: 'Not Like This' *(Clip 7 from Talk that Works)*

Context: Factory packing line.

The supervisor, Lorraine, has noticed that Sam is not doing the required visual check on the boxes of soap powder as they come off the line, and she stops to demonstrate the correct procedure. [+ marks a pause; place overlaps between // and /]

1. Lor: [*picks up a box and pats it*]
2. you know when you check these right
3. you're supposed to look at the carton
4. to make sure it's not leaking
5. not like this [*pats box and looks away*]
6. Sam: oh that's that's good checking
7. Lor: /you're not going to see anything if you're like this\
8. Sam: /that's all right that's all right\ that's all right
9. Lor: oh my gosh [smiles]
10. Sam: [*laughs*] ++ [*picks up a box and gives it a thorough shake*]
11. Lor: and what's with the gloves
12. Sam: [*smiling*] don't want to get my hands dirty
13. Lor: don't want to ruin your manicure

It is clear that counting how many times she expresses the criticism (lines and 3, 5, perhaps 7) is not only tricky but also meaningless in terms of measuring the

FTA. Similarly, while it is clear that the humorous exchange between the pair functions as positive politeness, analyzing its precise relationship to the FTA and assessing the precise relative contribution of different components is very complex and ultimately pointless.

In addition, many utterances are multifunctional and assigning just one meaning to a linguistic device is thus equally misleading. We cannot know if Lorraine's question "and what's with the gloves?" (line 11) is asking for information (i.e., she is genuinely puzzled or concerned about why Sam needs to wear gloves), or if this is a preliminary tease which she follows up more explicitly in line 13. Leech (1983) also notes that utterances are often (deliberately) ambivalent, allowing people to draw their own inferences about what is intended, and even about whether they are the intended addressee. As Thomas notes, example 6 (from Thomas, 1995: 159) is a "potentially very offensive speech act (requesting people not to steal!)," but it is expressed in an ambivalent form, allowing readers to decide about the precise degree of pragmatic force, and whether it applies to them.

(6) Context: Notice in the Junior Common Room, Queens College, Cambridge
These newspapers are for all the students, not the privileged few who arrive first.

Leech's Politeness Principle

There are a number of alternatives to Brown and Levinson's approach to the analysis of politeness (see Eelen, 2001: 1–29). Some share a good deal with Brown and Levinson's approach; others provide elaborations which address some of the criticisms identified above. Robin Lakoff has been labeled "the mother of modern politeness theory" (Eelen, 2001: 2), and her work (1973, 1975) predates Brown and Levinson's (1978) substantial model by several years. However, her 'rules of politeness' (Don't impose, Give options, Be friendly) have a good deal in common with Brown and Levinson's politeness strategies. Another approach by Fraser (1990: 233) provides a very broad view of politeness: being polite is regarded as the default setting in conversational encounters, i.e., simply fulfilling the 'conversational contract.'

One of the most fully developed alternative frameworks is Geoffrey Leech's model, which was developed at about the same time as Brown and Levinson's (Leech, 1983), and which shares many of the assumptions of their approach, as well as their goal of universality, but takes a somewhat different tack in analyzing linguistic politeness. Rather than focusing on 'face needs,' Leech addressed the issue of "why people are often so indirect in conveying what they mean" (1983: 80). To answer this question, (i.e., basically to account for why people do not consistently follow Grice's Cooperative Principle and adhere to his Maxims (*see* **Grice, Herbert Paul (1913–1988)**; **Neo-Gricean Pragmatics**; and **Relevance Theory: Stylistic Applications**). Leech proposed a Politeness Principle (PP), and a set of maxims which he regards as paralleling Grice's Maxims. Leech's PP states:

> Minimize (other things being equal) the expression of impolite beliefs. . . . Maximize (other things being equal) the expression of polite beliefs (1983: 81).

So, for example, recently my niece asked me if I liked her new shoes – bright pink plastic sandals, decorated with glitter. I thought they were ghastly, but rather than saying "I think they're awful," I replied "they look really cool." The Politeness Principle accounts for my nicely ambiguous response, which was strictly truthful but minimized the expression of my very impolite beliefs about her shoes.

Leech's set of maxims is very much larger that Grice's four, and while some are very general, others (such as the Polyanna Principle) are "somewhat idiosyncratic," to quote Thomas (1995: 160). The more general ones are the maxims of Modesty, Tact, Generosity, Approbation, Agreement, and Sympathy. The Modesty Maxim, for example, states "Minimize the expression of praise of self; maximize the expression of dispraise of self." Obviously this maxim applies differentially in different cultures. In parts of Asia, including Japan, for instance, this maxim takes precedence over the Agreement Maxim, which states that agreement should be maximized and disagreement minimized. Hence Japanese and Indonesian students in New Zealand often reject a compliment, denying it is applicable to them, as illustrated in examples 7 and 8.

(7) Context: Two Malay students in Wellington, New Zealand. This interaction takes place in English.
S: eeee, nice stockings
R: ugh! there are so many holes already

(8) Context: Teacher to a Japanese student who is waiting outside the teacher's room in the corridor
T: what a beautiful blouse
S: [*looks down and shakes her head*] no no
T: but it looks lovely
S: [*stays silent but continues to look down*]

People from Western cultures, on the other hand, are more likely to allow the Agreement Maxim to

override the Modesty Maxim, and this accounts for the greater tendency among New Zealanders to agree with a compliment, although they may downgrade it or shift the credit for the object of the praise, as illustrated in example 9.

(9) M: that's a snazzy scarf you're wearing
S: yeah it's nice isn't it my mother sent it for my birthday

Leech's maxims thus provide a way of accounting for a number of cross-cultural differences in politeness behavior, as well as in perceptions of what counts as polite in different cultures and subcultures.

The main problem with Leech's approach to the analysis of politeness, as a number of critics have pointed out (e.g., Thomas, 1995; Brown and Levinson, 1987; Fraser, 1990), is that there is no motivated way of restricting the number of maxims. This means it is difficult to falsify the theory since any new problem can be countered by the development of yet another maxim. Thomas (1995: 168) suggests that the maxims are better treated as a series of social-psychological constraints on pragmatic choices, which differ in their relative importance in different cultures. Adopting this approach, their open-endedness is not such a problem.

Post-Modern Approaches to Politeness

More recently a number of researchers have adopted a post-modern approach to the analysis of politeness, challenging the "transmission model of communication" (Mills, 2003: 69), and questioning the proposition that people necessarily agree on what constitutes polite behavior (e.g., Eelen, 2001; Locher, 2004; Mills, 2003; Watts, 2003). Researchers such as Brown and Levinson (1987), Leech (1983), and Thomas (1995: 204–205) support their analyses of the interactional meaning of an exchange with evidence such as the effect of an utterance on the addressee, and by referring to metalinguistic commentary and the development of the subsequent discourse. By contrast, post-modernist researchers eschew any suggestion that the meaning of an utterance can be pinned down. They emphasize the dynamic and indeterminate nature of meaning in interaction, including the expression of politeness.

This approach emphasizes the subjectivity of judgements of what counts as polite behavior; meaning is co-constructed, and hence politeness is a matter of negotiation between participants. Adopting this framework, interaction is regarded as a dynamic discursive struggle with the possibility that different participants may interpret the same interaction quite differently.

Gino Eelen (2001) led this revolution in politeness research with his in-depth critique of earlier so-called structuralist, positivist, or objective approaches to the analysis of linguistic politeness. Following Bourdieu, he provides a detailed outline of a post-modern approach which synthesizes subjective and objective approaches by focusing on social practice. Eelen makes a fundamental distinction between what he called 'first-order (im)politeness,' referring to a common-sense, folk, or lay interpretation of (im)politeness, and 'second-order (im)politeness' to refer to (im)politeness as a concept in sociolinguistic theory (2001: 30). He also uses the term 'expressive politeness' (2001: 35) to describe instances where participants explicitly aim to produce polite language: e.g., use of polite formulae such as *please* or *I beg your pardon*. These terms, or at least the distinctions they mark, have proved useful to others who have developed Eelen's approach in different ways.

Mills (2003), for instance, uses this framework to analyze the role of politeness in the construction of gendered identities in interaction. She dismisses attempts to capture generalizations and to develop a universal theory of politeness, arguing that politeness is a contentious concept. Her approach places particular emphasis on the role of stereotypes and norms as influences on people's judgements of gender-appropriate politeness behavior. In assessing the politeness of an act you have to make a judgement of 'appropriateness' "in relation to the perceived norms of the situation, the CofP [community of practice], or the perceived norms of the society as a whole" (2003: 77; though it must be said that it is not clear how the analyst establishes such judgments, especially since post-modernists strongly critique quantitative methodology, and tend to rely on rather small data sets).

The following excerpt from the film *Getting to Our Place* illustrates the relevance of perceived norms in the interpretation of the degrees of politeness and impoliteness expressed in a particular interaction between two New Zealanders. The interaction involves the powerful and influential Sir Ron Trotter, Chairman of the Board planning the development of the New Zealand National Museum, and Cliff Whiting, the highly respected Maori museum CEO. The museum is to include within it a marae, a traditional Maori meeting house and surrounding area for speech-making, for which Cliff Whiting is responsible. At the beginning of the excerpt, Sir Ron Trotter is just finishing a statement of how he sees the museum marae as being a place where pakeha (non-Maori) will feel comfortable (whereas most New Zealand marae are built by and for Maori in tribal areas).

Transcript 3: Excerpt from the film *Getting to Our Place* [+ marks a pause; place overlaps between // and /; (...) indicates an unclear word. Strong STRESS is marked by capitalization.]

RT: but comfortable and warm and + part of the place ++ for any Pakeha who er ++ part of the (...) that we talked about in the concept of we're trying to + develop
CW: there are two main fields that have to be explored and er + the one that is most important is it's customary role in the first place because marae comes on and comes from + the tangatawhenua who are Maori ++ /to change it\
RT: /but it's not just\ for Maori
CW: /no\
RT: you you MUST get that if it is a Maori institution and nothing more.
THIS marae has failed + and they MUST get that idea
CW: /how\
RT: because
CW: /(...)\
RT [*shouts*]: we are bicultural + bicultural (talks about two) and if it is going to be totally Maori ++ and all + driven by Maori protocols and without regard for the life museum is a is a Pakeha concept

Many New Zealanders viewing this episode perceive Sir Ron's behavior as rude, and specifically comment on his disruptive interruption of Cliff Whiting's verbal contribution, and on the way Sir Ron Trotter raises the volume of his voice as he talks over the top of others. This assessment and interpretation of the interactional meaning of what is going on here draws on generally recognized norms for interaction in New Zealand society. In fact, analyses of cross-cultural differences in interactional patterns between Maori and Pakeha (Stubbe and Holmes, 1999) suggest that this disruption would be perceived as even more impolite by a Maori audience, since Maori discourse norms, even in casual conversation, permit one speaker to finish before another speaker makes a contribution. Stereotypical expectations and norms are thus an important contributing factor in accounting for different people's judgements of the relative politeness or impoliteness of particular interactions.

Focusing on common sense (im)politeness (i.e., Eelen's first-order (im)politeness), Watts (2003) also pays attention to the relevance of affect and sincerity judgments in an approach which emphasizes that politeness strategies may be used strategically and manipulatively. His particular contribution to research on linguistic politeness is a distinction between what he calls 'politic' behavior, i.e., socially constrained politeness, and strategic politeness, where the speaker goes beyond what is required (2003: 4). Politic behavior is "what the participants would expect to happen in this situation, and it is therefore not polite" (2003: 258). It is 'appropriate,' 'non-salient' and 'expectable' (2003: 256–257). Polite behavior is "behavior in excess of politic behavior" (2003: 259); it is marked behavior indicating the speaker's wish to express concern or respect for the addressee (Locher, 2004).

It is moreover an area where subjective judgements become relevant and is thus an area of dispute: "not everyone agrees about what constitutes polite language usage" (Watts, 2003: 252). As an example, Watts argues that there are alternative possible interpretations of the following contribution from a politician in a television debate: "can I come back on Mandy's point because I think this is one aspects of TVEI which has been really underemphasised tonight." He suggests that "some commentators might assess his expression 'can I come back on Mandy's point' ... as polite behavior; others might suggest ... that, far from being genuinely polite, he is only simulating politeness and is in reality currying favour with the person he is addressing or some other person or set of persons" (2003: 3). It is interesting to note that while both Mills and Watts highlight the indeterminacy of meaning, both researchers frequently assign interpretations quite confidently in discussing their examples.

Having outlined a number of approaches to analyzing politeness, and indicated some of their strengths and weaknesses, the final sections of this article discusses research on the interaction of linguistic politeness with different social and cultural variables.

Social Variables and Politeness

As the discussion has indicated and the examples have illustrated, the ways in which people express or negotiate politeness is obviously influenced by a range of sociocultural variables, including power relationships, degrees of solidarity, intimacy, or social distance, the level of formality of the interaction or speech event, the gender, age, ethnicity, and social class backgrounds of participants, and so on. Kasper (1997: 382–383) provides a very extensive list of data-based studies which investigate the relevance and the complexity in sociolinguistic and sociopragmatic research of Brown and Levinson's three social variables (P, D, R) each of which is a composite sociocultural construct. The core variationist literature, however, which pays careful attention to such social variables, and which adopts rigorous statistically-based quantitative measures (*see* **Variation and Language: Overview**), rarely explicitly addresses the expression of politeness *per se*,

though some have argued, controversially, that politeness may entail using more standard speech forms (Deuchar, 1988), and research on style offers potential insights into the interaction between formality and politeness.

Classifying women and men as members of different (sub-)cultures led to some interesting insights in language and gender research (*see* **Gender**) about the relativity of particular discourse features. So, for instance, an 'interruption' might be perceived as disruptive by one group but as supportive by another; and back-channeling or 'minimal feedback' (*mm, yeah, right*) and certain pragmatic particles (*you know, I think*) function variably and complexly as markers of (im)politeness in the usage of different social groups (e.g., Holmes, 1995). Tannen (1990), Coates (1996), and Holmes (1995), for instance, identified linguistic and pragmatic features of (respectively American, British, and New Zealand) English which were widely regarded as indicators of more polite speech, and which tended to be used more frequently in certain social contexts by middle-class, professional, and majority group women than by men from similar backgrounds.

Extending such analyses, which introduced a qualitative dimension to the analysis of linguistic and pragmatic features, the work of a number of discourse analysts further explores the influence of a range of social variables on the expression of politeness. Speech act research provides a particularly rich source of insights into the diversity and complexity of different influences on politeness. See Kasper (1997) for a summary of relevant research up to the mid–1990s. Locher (2004) examines the interaction of power and politeness in the expression of disagreements in a family, at a business meeting, and in a political interview involving President Clinton. She demonstrates that power is most usefully regarded as dynamic, relational, and contestable, and that while participants of very different statuses exercise power as well as politeness in their use of discourse in context, status tends to influence the degree of negotiability of a disagreement in an interaction, along with many other factors, including the topic's degree of controversiality, the participants' degree of familiarity with the topic, and their speaking style, cultural backgrounds, and gender. She also notes great variability in the amount and degree, and even the discursive positioning, of politeness or relational work which accompanies the exercise of power in disagreements in the interaction.

Mills (2003) also discusses the relevance of politeness as a factor in the construction of gender identity, especially in British English society. Holmes and Stubbe (2003) describe the interaction of power and politeness in a wide range of New Zealand workplaces, and Harris (2003) applies politeness theory to talk collected in British magistrates courts, doctors' surgeries, and a police station. Researchers taking this approach highlight the complexities of spoken interaction, and the importance of taking account of the differing and intersecting influences of different social factors (e.g., age, ethnicity, social class, gender) as well as contextual factors (e.g., power and social distance relations, social and institutional role, formality of the speech event, and speech activity) in accounting for the complex ways in which politeness is expressed and interpreted in the very different situations they analyze.

Cross-Cultural Analyses of (Im)Politeness

Politeness is also conceptualized and expressed very differently in different cultures (e.g., Siafanou, 1992; Kasper and Blum-Kulka, 1993; Ting-Toomey, 1994; Scollon and Scollon, 1995; Spencer-Oatey, 2000). Nwoye (1989), for example, illustrates the strategic use of euphemisms and proverbs as means of expressing face-threatening acts politely in interactions between the Igbo of Southeastern Nigeria. Using a unified theoretical framework and methodology involving discourse completion tasks which has subsequently been very influential and widely applied, Blum-Kulka *et al.* (1989) provide information on contrasting patterns in the (reported) use of politeness strategies in speech acts such as apologies and requests in a number of languages, including English, Hebrew, Canadian French, Argentinian Spanish, German, and Danish (see also House and Kasper, 1981). This approach has been applied and adapted for many different languages and with many different speech acts (e.g. Boxer, 1993; Márquez-Reiter, 2000; and many, many more).

Focusing just on Europe, Hickey and Stewart's (2004) very useful collection of papers provides information on linguistic politeness strategies in 22 European societies, ranging from Germany, Ireland, and Belgium in western Europe to Norway, Denmark, and Finland in northern Europe; Poland, Hungary, and the Czech Republic in eastern Europe; and Greece, Cyprus, and Spain in southern Europe. The papers in Bayraktaroglu and Sifianou (2001), on the other hand, focus just on Greek and Turkish but provide information on realizations of politeness in social contexts ranging from classrooms to television interviews. The role of code-switching in the expression of politeness is also relevant in cross-cultural analyses, as illustrated, for example in a study of how London Greek-Cypriot women exploit the fact that directness is more acceptable in Greek than in

English, and thus code-switch to Greek to express positive politeness in ethnically appropriate ways (Gardner-Chloros and Finnis, 2003). Greek words, phrases, and clauses are inserted in English macro-structures to soften the effect of a direct criticism, for instance, or an expression of irritation or a demand for a response is interactionally managed by shifting to Greek.

Expanding consideration to other times and cultures has led researchers to challenge some of the assumptions made about conceptions of linguistic politeness in early models. Even confining attention to English-speaking societies, there is a good deal of variation in what is included in commonsense understandings of what constitutes polite behavior. As Watts points out, understandings "range from socially 'correct' or appropriate behavior, through cultivated behavior, considerateness displayed to others, self-effacing behavior, to negative attributions such as standoffishness, haughtiness, insincerity, etc." (2003: 8–9). Nevertheless, a good deal of early research reflected a rather Western and even middle-class British English conception of politeness. These ethnocentric assumptions were often challenged by researchers from other cultures.

Researchers on Asian cultures, for instance, pointed to the importance of recognizing that in some languages, a speaker's use of certain polite expressions (and specifically honorifics) is a matter of social convention ('discernment') or social indexing (Kasper, 1990) rather than strategic choice (e.g., Ide *et al.,* 1992; Matsumoto, 1989; Usami, 2002; Mao, 1994). (Fukishima (2000) argues that social indexing is a sociolinguistic rather than a pragmatic matter and as such is irrelevant to the analysis of [strategic] politeness.) These researchers point out that Western conceptions of 'face' are very individualistic, and approaches to politeness based on such conceptions do not account satisfactorily for more socially based notions, such as the twin Chinese concepts of 'mien-tzu' (or 'mianzi') and 'lien' (or 'lian'). 'Mien-tzu' refers to "prestige that is accumulated by means of personal effort or clever maneuvring," and is dependent on the external environment (Hu, 1944: 465), while 'lien' is the respect assigned by one's social group on the basis of observed fulfilment of social obligations and moral integrity. Loss of 'lien' makes it impossible for a person to function properly within the community. "*Lien* is both a social sanction for enforcing moral standards and an internalized sanction" (Hu, 1944: 45). This is a rather different conception of face than that used in Brown and Levinson's theory, and it influences conceptions of what is considered 'polite' as opposed to required by social sanction and sociolinguistic norms.

So, for example, in some languages (e.g., Chinese, Japanese, Korean) choice of stylistic level and address forms are largely a matter of social convention or 'linguistic etiquette'; respect or deference is encoded in certain linguistic forms which are required when talking to one's elders or those of higher status, for instance. It has been argued that such sociolinguistically prescribed deference behavior must first be taken into account in assessing 'politeness' (Usami, 2002). (There is an obvious parallel here with Watts' 'polite/politic' distinction mentioned above which was formulated in part to take account of this cross-cultural issue.) So, in assessing politeness, Chinese participants, for instance, evaluate both whether an appropriate degree of socially prescribed respect or deference has been expressed, as well as the extent to which the addressee's face needs are addressed discursively in any specific interaction (Lee-Wong, 2000; Usami, 2002). Lee-Wong shows, for instance, that sociocultural values such as 'sincerity,' 'respect,' and 'consideration' are crucially involved in a Chinese speaker's perception and conceptualization of the politeness. Moreover, in such societies the discursive expression of politeness generally involves the use of avoidance and mitigation strategies (i.e., Brown and Levinson's negative politeness strategies), and even address terms are extensively used in this way.

By contrast, in communities where social relationships are not marked so formally or encoded so explicitly in the grammar or lexicon, politeness is expressed somewhat differently. Greek interactants' view of politeness, for instance, focuses around expressions of concern, consideration, friendliness, and intimacy, rather than imposition-avoidance and distance maintenance (Siafanou, 1992). Similarly, Bentahila and Davies (1989) claim that Moroccan Arabic culture places greater weight on positive politeness than does the British English culture, which often functions implicitly as the unacknowledged norm in politeness research. Overall, then, it is apparent that the area of the cross-cultural expression of linguistic politeness requires careful negotiation, with the ever-present danger of ethnocentric assumptions a constant potential minefield. Nonetheless, the burgeoning of research in this area in recent years, especially involving Asian researchers, suggests that better understandings of what is meant by linguistic politeness in different cultures are steadily being forged.

Impoliteness

Finally, a brief comment on impoliteness, which, despite being less researched, is at least as complex a matter as linguistic politeness. Watts comments that since breaches of politeness are salient, while

conforming to politeness norms goes unnoticed, one would expect impoliteness to have attracted more attention than it has. He summarizes research on linguistic impoliteness in one brief paragraph (2003: 5), encompassing research on rude or even insulting behavior in a variety of communities, including middle-class white New Zealanders (Austin, 1990; see also Kuiper, 1991).

Austin draws on Relevance Theory (*see* **Relevance Theory: Stylistic Applications**) to account for behavior perceived as intentionally rude. She introduced the useful term Face Attack Acts for what she calls "the dark side of politeness" (1990: 277), namely speech acts perceived as deliberately intended to insult the addressee. She provides a fascinating range of examples, including the following (from Austin, 1990: 282):

(10) Context: Transactional interaction between member of the business community and well-educated middle-class woman [the author, Paddy Austin].
A: Now that will be Miss, won't it?
B: No, Ms.
A. Oh, one of *those*.

Austin details the contextual inferencing which led her to interpret as an insult A's response to the information that she preferred the title Ms.

By contrast to such a subtle and indirect instance of impoliteness, one might think that swearing at someone would always qualify as impolite behavior, but there is a range of research illustrating that swearing serves many different functions and that even when addressed to another person, it may serve a positive politeness solidarity function, rather than acting as an insult (see, for example, Daly *et al.,* 2004).

Some researchers incorporate the analysis of politeness within the same theoretical framework as politeness. Indeed, Eelen (2001) and Watts (2003) use the formulation (im)politeness to signal this. Mills (2003: 124) stresses that impoliteness is not the polar opposite of politeness, but her discussion (2003: 135 ff) suggests that impoliteness can be dealt with using the same analytical concepts as those relevant to the analysis of politeness (appropriacy, face threat, social identity, societal stereotypes, community norms). So, for example, the utterances produced in the Prime Minister's Question Time in the English House of Commons do *not* qualify as impolite, despite superficially appearing as if they might, because they are generally assessed as perfectly appropriate in this context (2003: 127). Thomas (1995: 157) suggests some speech acts "seem almost inherently impolite": e.g., asking someone to desist from behavior considered very offensive; in such cases the linguistic choice made will be irrelevant to politeness judgments.

Where Next?

It seems likely that exploring what counts as linguistic impoliteness will prove a challenging area for future research. Formulating a satisfactory definition of impoliteness will certainly provide a challenge for those attempting to develop adequate theoretical frameworks, as well as providing a robust testing ground for claims of universality and cross-cultural relevance, always assuming, of course, that researchers accept these as legitimate and useful goals for future research in the area of pragmatics and politeness.

Another relatively recent development is the exploration of the broader concept of 'relational practice' (Fletcher, 1999; Locher, 2004). Both solidarity-oriented, positive politeness and distance-oriented, negative politeness are fundamental components of relational practice, and it seems likely that this will be another fruitful direction for future research in the area of linguistic politeness.

Finally, the use of different languages as strategic resources in balancing different social pressures is another area where insights into cross-cultural politeness seem likely to continue to emerge over the next decade.

See also: Gender; Grice, Herbert Paul (1913–1988); Neo-Gricean Pragmatics; Relevance Theory: Stylistic Applications; Variation and Language: Overview.

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Political Rhetorics of Discrimination

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Discrimination generally refers to the disadvantaging of a minority group by a majority group. For instance, the racist politics of the white government during the apartheid period in South Africa discriminated against nonwhites. Sexism has historically disadvantaged women in terms of wages, educational opportunities, political rights, and so on. An explicit strategy of disadvantage is not necessary for the practice of discrimination nor for the politics that leads to discrimination.

The practices and politics of discrimination are rooted in language. According to Reisigl and Wodak (2001: 1), racism manifests itself discursively: "On the one hand, racist opinions and beliefs are produced and reproduced by means of discourse; on the other hand, through discourse, discriminatory exclusionary practices are prepared, promulgated and legitimised." Therefore, to analyze discrimination it is necessary to examine those discursive practices that promote and produce discrimination. Historically, much research into prejudice and discrimination has been conducted by psychologists, who have not taken a discursive approach. Instead, they have sought to explain prejudice in terms of nondiscursive factors such as personality syndromes or internal cognitive structures. In recent years, however, discursive psychologists have been arguing that phenomena such as prejudice and discrimination are constituted by language. They have, accordingly, put the analysis of discourse at the centre of their psychological investigations (Billig, 1996; Wetherell and Potter, 1992).

The study of contemporary discrimination cannot be straightforward for a basic reason. The ideological value of tolerance is widespread in contemporary capitalist societies, so that the explicit promulgation of discriminatory politics conflicts with the generally accepted values of liberalism (Billig, 1991; van Dijk, 1993). The very term 'discrimination,' like the term 'prejudice,' carries negative connotations. Few would admit to prejudice or to discriminating against minority groups. Yet, discrimination and structured inequality continue to exist. For this reason, the topic has tended to attract critical analysts, who do not take what people say at face value but seek to examine the ideological nature of discourse (van Dijk, 1998). This means studying how discursive practices can accomplish discrimination without the explicitly acknowledged intention of actors to discriminate. In this sense, discrimination occurs behind the backs of those who practice it.

Philomena Essed (1991) provides an example of the way that discursive interaction can result in discriminatory practice without conscious intention. She examined interviews for a high-ranking civil service post in the Netherlands. The interviewer was a white male. In one interview the applicant was a well-qualified, black woman. The interviewer began asking a series of questions that reflected his assumptions, or stereotypes, about black women. For instance, he asked the applicant whether she would miss discos if she were posted abroad. The applicant became flustered in her answers. The interview then did not run smoothly and the interviewer, judging that the candidate had not performed well, did not recommend appointment. The interviewer was seemingly unaware of the extent to which his questioning had produced in a self-fulfilling way the context in which the black female candidate was seen to perform less well. No doubt, if challenged, he would have strenuously denied any prejudice. Within the logic of the situation, which his own prejudices had been instrumental in constructing, he had appointed the 'best' candidate.

The incident reveals four crucial factors about institutional discrimination: (a) discrimination typically occurs in situations of differential power; (b) the powerful actors need not possess a conscious goal to discriminate against minority group members and, indeed, they may deny that any discrimination has occurred; (c) the powerful actors are likely to consider their own actions 'reasonable' and 'natural'; (d) the actions that lead to the discrimination are typically conducted through language. In Essed's example, the discursive interaction of the interview situation was

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crucial, but the appointment itself would have required further acts of language. There would have been forms to complete, telephone calls to be made, letters to be written and so on. Thus the natural history of a discriminatory action will involve a trail of actions performed through language.

Anti-discriminatory practices require checks and controls on the use of written and spoken language. For instance, they may require that all candidates who are being interviewed for a job be asked the same questions, in order to prevent the sort of outcome described by Essed. Antidiscriminatory codes, likewise, are formed in language, even as they reflexively operate to inspect and monitor the use of language in situations of differential power. In this respect, the politics of antidiscrimination are centrally concerned with the use of language. This involves much more than monitoring the use of tabooed, insulting terms for describing minority group members.

Mainstream Western politics often maintains and reproduces the practices of discrimination without employing an overt rhetoric of discrimination, but by using complex discourses of the sort that Reisigl and Wodak (2001) describe as being 'syncretic.' This can be seen clearly in political discourses about immigration, citizenship, and asylum in Western democracies. All nation-states practice policies of discrimination with respect to citizenship. In general, nation-states are 'imagined communities' (Anderson, 1985), which are reproduced by banal forms of nationalism (Billig, 1995; Wodak *et al.*, 1999). This banal nationalism constantly uses forms of deixis in newspapers, political discourse, news reports, etc., so that 'here' is assumed to be the national homeland and 'us' the members of the imagined national community. The banal nationalism of nation-states is habitually vague about who exactly 'we' are: sometimes the particular 'we' of the nation is elided with the general 'we' of all 'reasonable people' (Billig, 1995). However, nation-states will also possess laws that enable discrimination to be practiced with precision. Typically, nation-states will have laws that discriminate between those who are permitted citizenship of the state and those who are not. Similarly, they will have laws which grant residency to some noncitizens but not others.

Political debates surrounding such legislation are particularly important in the wealthier democracies of the West, which attract a large number of potential migrants from poorer parts of the world. van Dijk (1991, 1992, 1993) has examined the detailed rhetoric of such debates within western European countries, looking at parliamentary discussions, newspaper reports, and ordinary conversations. By and large, speakers in such debates seek to justify the practice of discrimination without employing the overt rhetoric of discrimination. 'Prejudice' is to be denied or mitigated, as speakers claim for themselves an ethos of reasonableness. Those who wish to criticize outgroups might employ variants of the rhetorical device 'I'm not prejudiced but…' (Bonilla-Silva and Forman, 2000). Such an overt denial of prejudice involves two assumptions. First, it assumes the existence of 'real' prejudice. In this regard, the existence of extreme, outwardly fascist groups enables defenders of mainstream discrimination to present their own rhetoric as being unprejudiced by comparison. Second, speakers, in denying prejudice, will claim that their criticisms of minority group members are 'factual,' 'objective,' and 'reasonable,' rather than being based upon irrational feeling.

Speakers can use similar denials of prejudice and claims of reasonableness when talking about different forms of discrimination, such as sexism, racism, or religious discrimination. Additionally, each type of discrimination will incorporate particular themes, contributing to the syncretic nature of mainstream discriminatory discourse. For instance, heterosexual speakers, denying their own prejudice while supporting discriminatory measures against homosexuals, might compare the 'naturalness' of heterosexual relations with the supposed 'unnaturalness' of homosexual ones. In debates about immigration and religious difference, speakers will often employ arguments about 'culture,' depicting it as an essentially bounded entity whose integrity is threatened by the presence of residents supposedly belonging to a different culture (Blommaert and Verschueren, 1998; Malik, 1996). Discourse about immigration and nationhood is crucially underwritten by assumptions about place. 'Our' culture belongs 'here' within the bounded homeland, whilst the culture of 'foreigners' belongs elsewhere. The theme of place is particularly threatening to groups who are seen to have no 'natural' homeland, such as the Romanies today (Leudar and Nekvapil, 2000) or the Jews in the first half of the 20th century.

The upshot is a form of racism without races, which is sometimes known as 'new racism' to distinguish it from uninhibited overt racism. Discriminatory laws of citizenship will use seemingly neutral criteria (such as birthplace, citizenship of grandparents, and so on) in order to achieve patterns of inclusion and exclusion that just so happen to overlap broadly with those that might be justified by more overtly nationalistic or racist criteria. Mainstream political parties that support such laws will also support laws banning outward racial or ethnic discrimination in employment, housing, etc., as well as the expression of overt race hatred. In this way,

the practice of discrimination will exist alongside the condemnation of discrimination.

In contemporary European politics, extreme nationalist and fascist political parties, such as the Front National in France or the Austrian Freedom Party, have gained some electoral successes. In order to establish a distinctive position, these parties will need to distance themselves from mainstream conservatives and to use a more direct rhetoric of discrimination. On the other hand, they will often publicly deny that they are racist, proclaiming their own ethos as echoing the fears and beliefs of 'ordinary people' (Reisigl and Wodak, 2001). The Australian anti-immigrant candidate politician, Pauline Hanson, claimed in her maiden parliamentary speech to be "just an ordinary Australian," whose views were based "on common sense and my experience as a mother" (Rapley, 1998). Such a rhetorical move seeks simultaneously to discredit the mainstream for being out of touch with so-called ordinary people, while simultaneously justifying a direct rhetoric of 'national common sense' which is positioned as something other than prejudice.

In some extreme parties, there is conflict between the restrained rhetoric that leaders will use in public and the overt racism of the ordinary members. The leaders of some Ku Klux Klan parties in the United States now publicly disavow the use of insulting terminology and claim that their position is based upon reason, not emotional hatred. But behind the scenes, there is uninhibited racism, including racist humor that mocks the inhibitions of liberalism and directly laughs at violence against nonwhites (Billig, 2001). Fascist politicians have a tendency to distance themselves from the mainstream by using ambiguous phrases that seem to infringe and mock the norms of conventional, respectable discourse, while at the same time they disclaim any such intention. Thus, as Sartre (1948) noted over 50 years ago, the discourse of fascist leaders can have a joking quality. Sartre saw this as a sign that bigots do not genuinely believe in the literal truth of their discourse, although they pursue their beliefs with full and dangerous intensity.

See also: Conversation Analysis; Critical Discourse Analysis; Politics, Ideology and Discourse; Understanding Spoken Discourse.

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Political Speeches and Persuasive Argumentation

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Political Speech: Definition

Political speech represents relatively autonomous discourse produced orally by a politician in front of an audience, the purpose of which is primarily persuasion rather than information or entertainment.

In a traditional view, the orator is speaking face to face with his or her audience, and deals with a controversial issue (*quaestio*) in a pro–con debate, which is immediately decided. The purpose of such a speech is to convince the audience that the orator's opinions are correct and that his or her decision or advice is plausible or, at least, to persuade the audience to decide according to the orator's proposal. However, this ideal-type situation does not fit the circumstances of political speeches in parliamentary democracies, because the speeches' preconditions no longer correspond to those of antiquity. Today, electoral success has become a primary objective. An orator no longer speaks as an individual; instead, s/he is a representative of a political group or party or has another representative function.

In antiquity, the domain of deliberative oratory was limited to the distance a well-trained voice could carry. While the audience of antiquity was immediate, today the audiences are heterogeneous, and can be addressed simultaneously or sequentially, directly or through mass media. Although speeches are usually spoken in front of a live audience, they are not a typical form of face-to-face interaction and the content of the speech is not directly influenced by the audience's reaction (see Atkinson, 1984). Still, every speech is designed with a specific audience in mind, including their potentially differing views from that of the speaker.

Views through History

In antiquity, oratory was a part of rhetoric, a discipline of *ars bene dicendi* that also included the art of poetry. Beginning with Aristotle, the principal exponents of classical rhetoric have identified three basic categories of speech: deliberative (political speech), judicial (or forensic), and epideictic (or ceremonial). The deliberative genus has its origins in the political assembly, where the orator seeks to persuade or dissuade his audiences from taking action, like going to war. Judicial oratory is supposed to be used in courtroom, and epideictic oratory is the genre concerned with praise and blame and is intended primarily for ceremonial occasions (such as funerals). Political speeches, however, today invariably combine elements of all three genres.

For centuries, oratory was employed in three main areas of public life: politics, religion, and law. During the Middle Ages, the Renaissance, and the Reformation, oratory was commonly confined to the church. With the development of parliaments in the 18th century, great political orators appeared: Edmund Burke, Charles James Fox, Henry Grattan, Daniel O'Connell, William Pitt (later Lord Chatam), Richard Sheridan, William Wilberforce, and John Wilkes in England and Ireland; Patrick Henry and James Otis in the United States; and Georges Jacques Danton, Honoré-Gabriel Riqueti (count de Mirabeau) and Maximilien de Robespierre in France. Because these politicians usually spoke to men of their own class and education, their speeches were often intricate and erudite, rich in classical allusions. In the 19th century, the rise of Methodism and evangelical religions produced great preachers whose sermons, abounding with biblical allusions and appeals to the emotions, profoundly influenced the oratorical style of many politicians. Famous 19th century orators included John Bright, Benjamin Disraeli, William Gladstone, and Thomas Babington Macaulay in England; Charles Stewart Parnell in Ireland; Alphonse de Lamartine in France; Ferdinand Lasalle in Germany; Lajos Kossuth in Hungary; and Giuseppe Mazzini in Italy. Great American orators included Henry Ward Beecher, John C. Calhoun, Henry Clay, Stephen Douglas, Robert G. Ingersoll, Abraham Lincoln, Wendell Phillips, and Daniel Webster.

Categories that hardly played any role in public debate of the 19th century – such as persuasion, *docere et delectare*, orientation towards the audience, and others – were rediscovered in the first decades of the 20th century. With the rise of the Labour Party in England and the further adaptation of government to the people, delivery became less declamatory and studied. The theatrical bearings of the 18th century parliamentary debates in which alliteration, antithesis, parallelism, and other rhetorical figures of thought and of language had sometimes been carried to extremes, disappeared as a more direct, spontaneous style prevailed. As delivery habits changed, so did the oratorical language. These devices gave way to clear style and vivid imagery consonant with the idiom of the common man and later with the vocabulary of radio and television. A new trend has become more pronounced: orators change their delivery, focusing it around the catch phrase (e.g., William Jennings Bryan's "cross of gold" speech). Noted

orators in the first half of the 20th century were Bryan, Susan B. Anthony, Eugene Debs, and Woodrow Wilson in the United States; Vladimir Ilich Lenin and Lev Trotsky in Russia; and Winston Churchill and David Lloyd George in England. The dark side of rhetoric prevailed in that time, in the context of World War I and afterward: imperialistic manipulation, propaganda, smear campaigns, mass psychological indoctrination. The bombastic oratory of Adolf Hitler and Benito Mussolini, inevitably associated with their discredited political ideologies, brought grandiloquent oratory into disrepute. The advent of radio forced oratory to become more intimate and conversational, and television forced additional demands, such as visual presentation. The particular effectiveness of great oratory was movingly demonstrated in 1963 when the civil-rights leader Martin Luther King delivered his "I have a dream" speech to an audience of 200 000 people in Washington DC, and to millions more listening to him on radio and watching him on television. This speech is still considered the most influential oratory in the history of human speech recording.

Political speeches have traditionally been conceived in terms of particular discursive forms and manifestations. New approaches to political rhetoric involve consideration of discourse as symbolic and significant behavior that deals with power, "of discourse that creates community in all its complexity, of discourse that creates identity, and of discourse that creates shared definitions of reality" (Brummett, 2004). Today's political rhetoric is more imaginary, commodified (reduced to the terms of the market), local and dialectic than before; notwithstanding these changing forms, however, it carries out its ancient functions. While the imaginary in political oratory has been a staple element, commodification is a development related to the politics of capitalism and new world entertainment.

That all politics is local is a very old adage; today's political rhetoric is, however, local despite the forces that would suggest the contrary. It is local in both by offering a personally engaged, material alternative to the imaginary, and by creating the illusion of the local by stressing the personal and domestic, even at the national level. Dialectic implies that political rhetoric tends to proceed in question-answer format, or in what Fairclough (1992) calls 'conversationalization' of political discourse.

Political speeches can be categorized by the occasion (commemorative, inaugural, farewell, proposing a bill, disputing a bill), the speaker (national leader, parliamentarian, political candidate, leader of a national or international political organization), and the audience (local, national, international; immediate, TV, or combined). In that respect, presidential (and other head of state's) speeches and parliamentary debates have attracted the most attention from linguists.

In the Western world, presidential speeches represent a special discourse genre in concert with the genres of governance that include presidential inaugural addresses, state of the nation addresses, veto messages, war rhetoric, rhetoric to forestall impeachment and of impeachment, pardoning rhetoric and farewell addresses (Hart, 1987; Campbell and Jamieson, 1990). All these genres, recurring through time, become ritualistic, and their enactment becomes part of the process that establishes the presidents in their role as the symbolic, as well as real, head of state. Such repetitive acts thus familiarize the public with the organization and recognizability of the presidency while reinforcing national identity.

The rhetorical style defines a leader; in that view, discursive image-making and image-projection has received a great deal of attention. Ronald Reagan's communication style, for instance, generated a number of studies focusing on image-making, and on the institution of the U.S. presidency (Gronbeck, 1986; Geis, 1987; Holly, 1989; Campbell and Jamieson, 1990; Lakoff, 1990). Much of this discussion intends to explain Reagan's speaking style that earned him the nickname 'great communicator,' while Gronbeck asserts that Reagan established a new kind of presidential institution through an 'empty rhetoric.' On illusive rhetoric of leadership, see also Ilie (1998) and Maynard (1994).

A political leader's oratory creates both a linguistic and a sociopolitical relationship with audiences. George Bush's (Sr.) rhetoric has been seen by Hill (1999) as a dichotomous discourse of truth and discourse of theater. The discourse of truth prescribes that political talk should be a source of 'information,' while the discourse of theater takes not 'word' but 'message' as a central metapragmatic term. Message, as a set of themes deployed through performance, consists of text and talk dominated by the poetic function, encapsulated in sound bites and slogans. In Europe, politicians whose oratory has elicited interest among linguists are British parliamentarians and Prime Ministers Margaret Thatcher and Tony Blair (Atkinson, 1984; Richardson, 1985; Fairclough, 1989, 1992, 2000). Blair's image-making rhetoric has been described as an attempt to self-portray as a normal person, which is seen as a characteristic of a new-generation politician (Fairclough, 2000). Rhetoric of political leaders has also been explored in terms of production and re-reproduction of racism and nationalism (Fairclough, 1992; van Dijk, 1993; Wodak *et al.*, 1999).

Approaches to Analyzing Political Speeches

Approaches to analyzing discourse of political speeches generally look at the ways to relate the details of linguistic behavior to political behavior. Linguists are interested in the linguistic structures used to get politically relevant messages across to the addressees to achieve a specific function or goal. This can be done from two perspectives: starting from the linguistic micro-level and asking which strategic functions specific structures (e.g., word choice, a specific syntactic structure) help to fulfill; or, by starting from the macro-level, i.e., the communicative situation and the function of a text, and asking which linguistic structures have been chosen to fulfill this function. For both perspectives, discourse and discursive elements, such as text structures, form-and-meaning units, referential phrases, and the like, are regarded as manifestations of actions to perform specific functions. Some strategic functions are identified as coercion; resistance, opposition and protest; dissimulation; legitimization and delegitimization; and identity building (see Chilton and Schäffner, 1997). Another view is that every political speech is part of a larger, more extensive communicative process, and that it can be characterized as a tactical move in an overarching communicative plan (Sauer, 1997).

Due to the discursive turn in the human sciences in the last few decades, language has become a central source for analysis of social action, especially for the construction of sociopolitical realities. While textual and semantic linguistics have been applied to such analyses, the new discursive approaches take into account ethnomethodological analysis, speech act theory, cognitive linguistics, and various pragmatic approaches (see Chilton and Schäffner, 1997). It is now commonplace, even among authors who aimed for objective linguistic description, to adopt sociopolitical positions. Many have, therefore, taken an openly critical approach.

Critical discourse analysis (CDA) has developed from critical linguistics, which came into being in 1979 as a title of the synoptic and programmatic concluding chapter of *Language and control* by Fowler, Hodge, Kress and Trew. Critical linguistics is a socially directed application of linguistic analysis, chiefly using methods and concepts associated with the systemic-functional linguistics developed by M. A. K. Halliday. Its basic claims are that all linguistic usage encodes ideological patterns or discursive structures which mediate representations of the world in language; that different usages (e.g., different sociolinguistic varieties, lexical choices or syntactic paraphrases) encode different ideologies, resulting from their different situations and purposes; and that by these means language works as a social practice. Critical linguistics proposes that analysis using appropriate linguistic tools, and referring to relevant historical and social context, can bring ideology, normally hidden through the habitualization of discourse, to the surface. In this way, critical linguistics can shed light on social and political processes.

Critical discourse analysis has also acquired some analytical tools from critical rhetorical analysis in order to reconstruct the moments in which discursive practices are created, re-created, modified or take on new forms (e.g., van Dijk, 1993, 1997; Wodak *et al.*, 1999). In the discourse-historical approach within CDA, every speech is a historical event in a line of discursive events that comprise the political history of a nation, party, or a political group.

Persuasive Argumentation

Persuasion is the main objective of deliberative oratory. Persuasion is an attempt to change human behavior or to strengthen convictions and attitudes through communication. Orators seeks to correct positions of the audience that they see as being wrong and establish psychological patterns favorable to their own wishes and platform. The orator employs argument and rhetorical devices, such as evidence, lines of reasoning, and appeals that support the orator's aims.

The relationship between rhetoric and action is explicit in the traditional *officia oratoris*, or duties of a classical orator: to prove (*probare*) or instruct (*docere*), to please (*delectare*), and to stir (*movere*). Aristotle established, and subsequent rhetoricians have accepted, three modes of persuasion: *ethos*, *pathos*, and *logos*. Ethos persuades when the speech is spoken such that it draws attention to the speaker's credibility; pathos succeeds when the speech stirs the emotions; logos works through the speech itself when we have proved a truth or an apparent truth by means of the logical arguments suitable to the case in question. Only the last proof is directed to the listener's reason – the first two appeal to emotions, which classical rhetoric emphasizes in moving the audience to action.

Proponents of deliberative democracy, however, oppose introducing passions into political speeches, arguing that rhetoric thus imbued would manipulate people into an irrational consensus. More recently, however, postmodernists posit that reason itself is not neutral, but rather is a means of control and a form of coercion. For many postmodernists, no

coercion-free zone is possible within discourse. Techniques of persuasion are being marked as ethically ambivalent. Hence, one finds a recurring emphasis on reasonableness and fairness or, lately, on political correctness.

The ancient union of politics with rhetoric is distinctive for its emphasis on the former as a practical art. Whereas the modern science of politics often focuses on the economic, structural, and functional features of institutional relations associated with power, the rhetorical concern of politics historically has been with the ongoing negotiation over how we shall act and interact. Although that negotiation always involves questions of power, it is also concerned with enabling practical judgment. The 18th and 19th century thinkers, such as Giambattista Vico and Friedrich Nietzsche, challenged the authority of scientific reasoning by positing that the human world's realities and the realities of nature were composed differently, and that human world of politics could not be extricated from rhetoric because politics was constructed through language. This counterargument shifted the fundamental question of rhetoric from a dominant concern with producing persuasive appeals to a focus on universal rhetorical practices embedded in all language use and, therefore, constitutive of the human world. This shift has broadened and deepened our understanding of politics as rhetorical construction.

Historically, the study of argumentation has been motivated by an interest in improving discourse or modifying the societal effects of that discourse. Aristotle treated argumentation as a means to expose error in thinking and to shape discourse toward a rational ideal. This prompted a long tradition of the analysis of fallacies (sophisms), which Aristotle identified as argument forms that falsely appear to be sound, such as the fallacy of equivocation, a reasoning error that arises from an unnoticed shift in the meaning of terms used within an argument. But, with the invention of new forms of argumentation, such as probabilistic reasoning, spaces for new fallacies emerge, as well as new explanations when they are fallacious (van Eemeren *et al.*, 1997). This component of argumentation has been endlessly exploited in political oratory, creating an urge among linguists to take a critical perspective in an attempt to describe the fallacies and their effects on sociopolitical reality. This gave rise to linguistic-pragmatic studies of political speeches that consider faulting maxims of conversational cooperation (Fairclough, 1989, 1992; Wilson, 1990; Chilton, 1990) and cognitive approaches (van Dijk, 1993; Chilton, 2003).

The linguistic components of ideal deliberation have more elaborate equivalents in existing theories of discourse; reasoned argument, equal participation and consensus parallel the ideal speech situation proposed by Habermas (1975, 1979). Habermas (1979) argues that speakers and listeners regularly presuppose an ideal communicative exchange: discourse is "rational and truthful" participants are "free and equal" and decisions "met the unforced agreement of all those involved." Habermas's ideal speech situation aims at "rational consensus," an agreement reached solely "by the force of the better argument" (Giddens, 1985).

Politics rests on the assumption that people are heterogeneous, with differing and competing ideas, interests, and goals. It is the coming together of these competing positions that create an opportunity for political (inter)action. That language realizes social activities and that utterances derive their meaning, in part, from their relation to other utterances presupposes a view of language as dialogic. Arguments made by a speaker contain at least one counterargument. Discourse of political speech is composed anticipating an alternative or opposing point of view. By considering potential alternative views when constructing a speech, the views of others are placed in the contents of the speech and in this way play a role in jointly constructing its contents. However, since these other views are not being directly expressed by those others, they should not be primarily understood as the others' voice but as the speaker's or writer's construction, interpretation, or re-embedding the other's voice.

Most important for contemporary argumentation studies were the start toward an interactional view of argument and the move away from formal logic. These are seen as the first steps toward studying argumentation as a linguistic activity. A step further toward a functional, interactional view of argument is taken by pragmatic argumentation theories such as pragma-dialectical theory (van Eemeren and Grootendorst, 2004; Walton, 1989, 1995; van Eemeren *et al.*, 1993), which presents a model of argumentative discourse in terms of discussion procedure, offering rules for argumentative interaction and associated preconditions having to do with such things as participant abilities, attitudes, and power.

Persuasive argumentation in political speechmaking is proposed to be discussed in terms of how, why and to what effect. The aim is to identify the social, institutional and situational determinants and effects of discourse, recognizing that both determinants and discourse are mediated by the interpretive schemes and background knowledge of speakers and listeners, respectively. Among persuasive linguistic choices, the following have been studied to different degrees: vocabulary choices, including political and technical

jargon (Fowler and Marshall, 1985; Geis, 1987; Wodak, 1989; van Dijk, 1993); vague or imprecise words and phrases (Moss, 1985; Wodak, 1989; Maynard, 1994; Ilie, 1998; Dedaić, 2003a); euphemisms and disphemisms or loaded words (Edelman, 1964; Graber, 1976; Bolinger, 1982; Fawcett, 1985; Fowler and Marshall, 1985); speech acts, such as declarations, promises and warnings (Pateman, 1975; Folwer and Kress, 1979; Hill, 1999); textual pragmatics, including implicature (Richardson, 1985; Holly, 1989; Wilson, 1990; van Dijk, 1993); syntactic structures, such as complexity, generalizations, passivization, nominalization, negation or silencing of agency (Pateman, 1975; Kress and Hodge, 1979; Atkinson, 1984; Fowler, 1985; Duranti, 1990; WAUDAG, 1990; Dedaić, 2003b); rhetorical questions (Ilie, 1994); pronominal choices that indicate group identity (Maitland and Wilson, 1987; Lwaitama, 1988; Leith and Myerson, 1989; Wilson, 1990; Chilton, 1990, 2003; Johnson, 1994; Zupnik, 1994; De Fina, 1995); naming conventions (Wilson, 1990; Zernicke, 1990); textual complexity (Glendon, 1991; Pancer *et al.*, 1992); ritualistic discourse (Denton and Woodward, 1990; WAUDAG, 1990); metaphors (Edelman, 1977; Howe, 1988; Denton and Woodward, 1990; Chilton and Ilyin, 1993; Chilton, 1996); validity claims (Fetzer, 2002); unexpressed (implicit) premises (Wilson, 1990; van Dijk, 1993; Fairclough, 1995); myths, defined as "causally simple, empirically unsubstantiated (and largely unsubstantiable), explanatory theses" (Geis, 1987) (Edelman, 1964, 1971, 1977, 1988; Geis, 1987; Lewis, 1987); non-verbal elements (Graber, 1976, 1981; Mansbridge, 1983; Siedel, 1985; Atkinson, 1984; Argentin *et al.*, 1990).

Identity and Nationalism

Identity construction is fundamental to collectivization and to the emergence of nations, and has lately elicited substantial interest among linguists, especially discourse analysts. Constructing and providing identity to an audience, constitutive rhetoric, as it is sometimes called, can be understood both as a genre of discourse and as a theory for understanding rhetorical processes. As a genre, constitutive rhetoric simultaneously presumes and asserts a fundamental collective identity for its audience, offers a narrative that demonstrates that identity, and issues a call to act to affirm that identity. Constitutive rhetoric is appropriate to founding speeches, but also to social movements and nationalist political campaigns. It arises as a means to collectivization, usually in the face of a threat. As a theory, constitutive rhetoric accounts for the process of identity formation that this genre depends upon, where audiences are called to act upon an identity ascribed to them.

Among representative contemporary research, Chilton (1990) relates politeness phenomena to national (and international) phenomena, associating positive face with identity and consensus, and negative face with territorial security, freedom of action and privacy. Wodak *et al.* (1999) carry out a horizontal and vertical comparison among representative texts, identifying the leading topoi that are constructed within the discourse of political oratory to convey the message of the nation, its sameness, similarity, unity and solidarity. These topoi involve historical development of the nation – the vertical axis. In speeches of the leading Austrian political figures, Wodak *et al.* (1999) find related strategies that unify listeners (or presumed listeners) within the past, present and the future of the Austrian nation.

The Rhetoric of Non-Western Cultures

In many non-Western cultures, the understanding of rhetoric as discourse of the inseparable unity of the political and the poetic, is still the reality. Indeed, the search for the rhetoric of non-Western cultures has become a crucial scholarly and political endeavor, as people seek bases for understanding the politics – as well as the poetry – of other lands and, hopefully, bases for dialogue across tribal and national boundaries. Searching for the precepts of different cultures, the scholar realizes the extent to which Western culture has become secularized and compartmentalized. In Western culture, one may seek out a body of writing under such special rubrics as 'rhetoric,' 'religion,' 'ethics.' But in some Oriental or Middle Eastern cultures, the search may begin and end with religious thought and practices (see Johnstone 1986, 1989).

Human cultures have multitudes of ways to persuade. Thus, political oratory provides a rich arena for anthropological studies, as exemplified by Bloch's (1975) very influential collection in which accounts of oratorical practices from different parts of the world (Tswana chiefdom, Balinese village society, Malagasy society, Kenya, Maori, Mursi) often indicate the ways political power is conveyed through the speaking style of the leader [see also Kuipers (1990) for Weyewa, and Duranti (1990, 1994) for Western Samoa].

See also: Anthropological Linguistics: Overview; Argument Structure; Aristotle and the Stoics on Language; Balinese; Cognitive Linguistics; Communicative Principle and Communication; Critical Discourse Analysis;

Ethnomethodology; Expressive Power of Language; Formulaic Speech; Fowler, Roger (b. 1938); Habermas, Jürgen (b. 1929); Halliday, Michael A. K. (b. 1925); Hill, Jane H. (b. 1939); Identity and Language; Implicature; Interactional Sociolinguistics; Malagasy; Maori; Maxims and Flouting; Metapragmatics; Negation; Nominalization; Politeness; Rhetorical Tropes in Political Discourse; Speech Acts; Systemic Theory; Vagueness; War Rhetoric; Wodak, Ruth (b. 1950).

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Politics and Language: Overview

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Development of a New Field

In this overview to the section, we deal very briefly with the history of research on Language and Politics, as well as with fields that are not or are only very briefly covered in the entire section. Moreover, we propose working definitions of basic concepts fundamental to the whole field of research. Finally, we summarize some of the most important research strands according to topic-oriented questions arising out of the developments and changes in our globalized and globalizing societies.

The entries in this overview cover the most important research domains in the field of language and politics, both on a theoretical and on a methodological level. Thus, we cover aspects of classic and modern rhetoric up to more sociologically oriented methods, such as 'frame analysis,' as well as new and hybrid multimodal genres (the Internet). We also elaborate on such topics as politics and gender, ideology, discrimination, political speeches, and the representation of war.

History of Research in the Field of Language and Politics

The research on language in/and politics in the field of linguistics seems to be quite young, although rhetoric is one of the oldest academic disciplines and was already concerned with aspects of political communication in ancient times (*see* **Rhetoric, Classical**).

After World War II, Lasswell and Leites (1949) published one of the most important studies on quantitative semantics in the field of language and politics, developing approaches from communication and mass media research. The famous economist Friedrich von Hajek (1968) similarly discussed the impact of language on politics during his stay at the London School of Economics. In the same vein, research started in Central Europe, mainly in Germany, in the late 1940s (*see* **Discourse of National Socialism, Totalitarian**).

Moreover, the novel *1984* by George Orwell most certainly was a significant point of departure for the development of the entire field (*see* **Newspeak**). Of course, all this research was influenced by the massive use of propaganda in World War II and in the emerging Cold War in the 1950s.

'Political linguistics' (*Politolinguistik*) is an attempt to integrate scientific research dealing with the analysis of political discourse into an academic discipline. Klein (1998) argued that the "linguistic study of political communication" is a subdiscipline of linguistics that developed mainly in the German-speaking area since the 1950s. He cited the critical linguistic research that started in the wake of National Socialism and was conducted by Klemperer (1947) and Sternberger *et al.* (1957) as paving the way for the new discipline. Because these studies provoked criticism for being inadequate from the perspective of linguistic theory, a new methodological approach emerged in the late 1960s. It drew on various linguistic subdisciplines (pragmatics, text linguistics, media research) and primarily pragmatic theories or theoretical concepts. Organizational academic structures have developed only recently: For example, the "*Arbeitsgemeinschaft Sprache in der Politik*" was registered as a nonprofit organization in 1991 and has been organizing major conferences every two years since 1989.

Political linguistics was characterized by Burkhardt (1996) in a programmatic article as a "subdiscipline between linguistics and political science" that to a large extent still needed to be established. Its purpose was to remedy the confusion of concepts identified by him in this research field. Burkhardt proposed the use of 'political language' as the generic term comprising "all types of public, institutional and private talks on political issues, all types of texts typical of politics as well as the use of lexical and stylistic linguistic instruments characterizing talks about political contexts." It included talking about politics and political media language, as well as the so-called language of politics. Moreover, he suggested that a differentiation should be made between the 'language of politicians' and 'language in politics' as such. Burkhardt proposed the term 'political linguistics' (*Politolinguistik*) for the "hitherto nameless discipline" that was

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Development of a New Field

In this overview to the section, we deal very briefly with the history of research on Language and Politics, as well as with fields that are not or are only very briefly covered in the entire section. Moreover, we propose working definitions of basic concepts fundamental to the whole field of research. Finally, we summarize some of the most important research strands according to topic-oriented questions arising out of the developments and changes in our globalized and globalizing societies.

The entries in this overview cover the most important research domains in the field of language and politics, both on a theoretical and on a methodological level. Thus, we cover aspects of classic and modern rhetoric up to more sociologically oriented methods, such as 'frame analysis,' as well as new and hybrid multimodal genres (the Internet). We also elaborate on such topics as politics and gender, ideology, discrimination, political speeches, and the representation of war.

History of Research in the Field of Language and Politics

The research on language in/and politics in the field of linguistics seems to be quite young, although rhetoric is one of the oldest academic disciplines and was already concerned with aspects of political communication in ancient times (*see* **Rhetoric, Classical**).

After World War II, Lasswell and Leites (1949) published one of the most important studies on quantitative semantics in the field of language and politics, developing approaches from communication and mass media research. The famous economist Friedrich von Hajek (1968) similarly discussed the impact of language on politics during his stay at the London School of Economics. In the same vein, research started in Central Europe, mainly in Germany, in the late 1940s (*see* **Discourse of National Socialism, Totalitarian**).

Moreover, the novel *1984* by George Orwell most certainly was a significant point of departure for the development of the entire field (*see* **Newspeak**). Of course, all this research was influenced by the massive use of propaganda in World War II and in the emerging Cold War in the 1950s.

'Political linguistics' (*Politolinguistik*) is an attempt to integrate scientific research dealing with the analysis of political discourse into an academic discipline. Klein (1998) argued that the "linguistic study of political communication" is a subdiscipline of linguistics that developed mainly in the German-speaking area since the 1950s. He cited the critical linguistic research that started in the wake of National Socialism and was conducted by Klemperer (1947) and Sternberger *et al.* (1957) as paving the way for the new discipline. Because these studies provoked criticism for being inadequate from the perspective of linguistic theory, a new methodological approach emerged in the late 1960s. It drew on various linguistic subdisciplines (pragmatics, text linguistics, media research) and primarily pragmatic theories or theoretical concepts. Organizational academic structures have developed only recently: For example, the "*Arbeitsgemeinschaft Sprache in der Politik*" was registered as a nonprofit organization in 1991 and has been organizing major conferences every two years since 1989.

Political linguistics was characterized by Burkhardt (1996) in a programmatic article as a "subdiscipline between linguistics and political science" that to a large extent still needed to be established. Its purpose was to remedy the confusion of concepts identified by him in this research field. Burkhardt proposed the use of 'political language' as the generic term comprising "all types of public, institutional and private talks on political issues, all types of texts typical of politics as well as the use of lexical and stylistic linguistic instruments characterizing talks about political contexts." It included talking about politics and political media language, as well as the so-called language of politics. Moreover, he suggested that a differentiation should be made between the 'language of politicians' and 'language in politics' as such. Burkhardt proposed the term 'political linguistics' (*Politolinguistik*) for the "hitherto nameless discipline" that was

committed to studying political language (in the above sense).

Previous research in this field investigated, rather randomly, individual phenomena of political language. As particularly promising methods and techniques to be used for 'ideological reconstruction,' Burkhardt listed four different procedures: "lexical-semantic techniques" (analysis of catchwords and value words, of euphemisms, and of ideological polysemy); "sentence and text-semantic procedures" (e.g., analysis of tropes, of "semantic isotopes," and of integration and exclusion strategies); "pragmatic text-linguistic techniques" (i.e., analysis of forms of address, speech acts, allusions, presuppositions, conversation, argumentation, rhetoric, quotations, genres, and intertextuality); and finally 'semiotic techniques' (icon, symbol, and architecture-semiotic analysis). This catalogue of methods could be particularly useful as a checklist for the concrete task of analysts. In the future, Burkhardt suggested, political linguistics should go beyond studies critical of the present and aim at comparative analysis both in diachronic and intercultural terms so as to overcome the 'obsession' with politicians (i.e., to make not only the language of politicians but also the 'act of talking politics' the subject of study). In terms of 'bottom-up linguistics,' the voter was to become the subject of linguistic analysis as well.

As noted above, National-Socialist language, one of the important starting points for the study of language and politics, became the object of critical philological observations first by Viktor Klemperer (1947). Utz Maas was, however, the first linguist to subject the everyday linguistic practices of National Socialism (NS) to in-depth analysis: he used NS texts to exemplify his approach of '*Lesweisenanalyse*' (Maas, 1984). His historical "argumentation analysis" based on the theories of Foucault demonstrated how discourse is determined by society (i.e., in what may be termed 'a social practice').

In his detailed analysis of language practices during the NS regime between 1932 and 1938, Maas was able to show how the discourses in Germany were affected by NS ideology, which was characterized by social-revolutionary undertones. Nazi discourse had superseded almost all forms of language (practices), a fact that made it difficult for the individual who did not want to cherish the tradition of an unworldly Romanticism to use language in any critical–reflective way. Discourse in Maas's approach was understood as the result of 'collusion': the conditions of the political, social, and linguistic practices quasi-impose themselves behind the back of the subjects, while the actors do not "see through the game" (cf. also Bourdieu's notion of '*violence symbolique*').

Discourse analysis thus identifies the rules that make a text into a fascist text. In the same way as grammar characterizes the structure of sentences, discourse rules characterize utterances/texts that are acceptable within a certain social practice. The focus is not on NS language *per se,* but rather the aim is to record and analyze the spectrum of linguistic relations based on a number of texts dealing with various spheres of life in the Nazi period. These texts represent a complicated network of similarities that overlap and intersect. Therefore, it is also important to do justice to the 'polyphony' of texts resulting from the fact that social contradictions are inscribed into them. Texts from diverse social and political contexts (cooking recipes, local municipal provisions on agriculture, texts by NS politicians, and also by critics of this ideology, who were ultimately involved in the dominant discourse) are analyzed by Maas in a sample representative of almost all possible texts and genres of NS discourse; discourse is understood in the sense of linguistic 'staging' of a certain social practice.

Ehlich (1989) proposed different methodological approaches to "language during fascism," including content analyses, language statistics, historical philology, semantics, and stylistics based not only on linguistic–sociological approaches but also on 'argumentation analysis.' He stressed the central role of linguistic activity during fascism, in which verbal action was *de facto* limited to acclamation, whereas the contrafactual impression of self-motivated activity was created in a setting of mass communication. From a perspective of "linguistic pragmatics oriented towards societal analysis" (Ehlich, 1989: 31), he identified these characteristics of fascist linguistic action: the strategy of making communication phatic; the propositional reduction of communication, which in turn is closely linked to the promise of a 'simple world'; the order as another central pattern of linguistic action characterized *inter alia* by the systematic elimination of the listener's decision and consciousness and implying a "mandatory speechlessness of the addressee"; linguistic actions serving the purpose of denunciation, which become extremely common, a fact that has decisive effects on elementary linguistic actions, such as jokes entailing life-threatening risks. Given this mental terror, many people demonstrated 'conformity' in their linguistic actions as a form of self-protection, and sometimes linguistic action turned into linguistic suffering mainly expressed by silence. Against this background, only a minority managed to transform suffering into linguistic

resistance, which had to be anonymous and subversive. (*see* **Discourse of National Socialism, Totalitarian**).

Language and Politics/Language Policies/ Language Planning

The delimitation between different research areas and topics in the context of language and/in politics is by nature difficult, and the distinction between language and politics/language policies and language planning is blurred. Although this extensive area cannot be covered in detail in this section (*see* **Language Planning and Policy: Models**; **Language Policies: Policies on Language in Europe**), it does highlight some basic facts about language policies.

Language policies deal with two main areas: (1) political measures targeted at an individual language (e.g., the prohibition of certain terms), or (2) the relations among different languages and their social importance, function, relevance in international communication, etc. Measures that target usage of an individual language influence the awareness of speakers by prohibiting or making mandatory the use of special terms and phrases or through the government regulation of language use. In general, imposing such measures requires extensive political power and can be done more easily in totalitarian political systems. The homogenization of language use in terms of regulating specific vocabularies and prohibiting specific modes of expression under the NS regime offers illustrative examples: the absurd racist categorization of people as 'Jews,' 'half-Jewish,' and 'quarter-Jewish' to prepare and justify the Holocaust; the use of cynical euphemisms like 'Crystal Night' for the pogrom of November, 1938; or defining 'Aryanization' as the expropriation of Jewish property organized by the state. These examples show that there is no clear-cut distinction between language and/in politics, on the one hand, and language policies, on the other hand. Another example is the systematic avoidance of the term *assimiljacja* (assimiliation) in the former Soviet Union when describing the phenomenon of switching from a mother tongue (L1) into Russian. The phrase 'transition to the second mother tongue' (*vtoroij rodnoij jazyk*) was used instead, and thus a term with a negative connotation was replaced by one with a positive connotation (see Haarmann, 1987).

However, everyday language also shows that language and politics are two overlapping subjects, which is the focus of this article. Such terms and phrases as 'to make redundant,' 'Social Security scroungers,' 'economic migrants,' 'free-market economy,' and 'pay agreement adjustment' convey a specific approach to reality and are partly consciously created for this purpose. This also applies to word coining aimed at political correctness (Negro–black–nonwhite–colored–African–American, as well as 'ebonics' for the speech and language of African–American people). An important issue in this context is gender-neutral wording, which affects not only the vocabulary but also the morphology of a language (e.g., by inserting in German nouns a capital 'I' and adding a female ending).

Language policies pursued to reduce the impact of English on other languages are a recent development. In some countries, such as France and Poland, legislation has been adopted to prevent the spread of Anglicisms. In France, the "Act on the Use of the French Language" was passed in 1994 (Loi Toubon, Act No. 669/94 of August 1994), making the use of Anglicisms in specific contexts – at least theoretically – a punishable offense. A terminology committee at the ministerial level prepared proposals for replacing Anglicisms by words of French origin (e.g., *remue méninges* for brainstorming; *restovite* for fast food, or *bande promo* for video clip) and compiled a glossary with about 3000 terms. This measure of language planning also comes under the heading 'language and politics.' In Poland a law similar to that in France was passed in 1999; the 'Act on the Polish Language' stipulated that all names of goods and services have to be Polish. This measure can be classified as 'status planning.' The reasons given for adopting this law were the great importance of the Polish language for the national identity and the prevention *inter alia* of the 'vulgarization' of the Polish language, as the English version of this Act reads.

A second important aspect of language policies is concerned with the status and social function of languages. This area covers such issues as the social role and significance of languages or varieties of languages, language conflicts, language and identity, measures to grant specific languages used in a state, the status of an official language in the national territory, and measures to promote languages as languages of communication and foreign languages at the international level. Two different aspects of the social function of languages have to be distinguished: (1) issues regarding language policy theory and language planning (language politics), and (2) issues concerning the concrete implementation of language policy measures adopted more or less consciously (language policies).

At the national level, governments may enact language policy and language planning measures, as well as legislation concerning the role and status of

languages spoken by the inhabitants of the state (i.e., all measures concerning the standardization, use, and active promotion of these languages within and also outside the territory of the state). Even if no consciously planned measures are undertaken and if these phenomena are ignored or rejected, this *laissez-faire* policy can be classified as a language policy. Important questions relating to the status of languages include the following: Which language fulfills the function of a national language and of an official language used as a means of communication between the state and its citizens, which languages are used as languages of instruction, and which languages are taught as foreign languages?

International language policy is influenced by the status and the significance of different languages as a means of supranational and international communication; for example, as a supraregional or global language of communication or as official and working languages in international organizations, such as the UN, the Council of Europe, or NATO and in federations of states like the EU or the former USSR. Important questions in this area include the selection and use of language/s in negotiations between two or more states and the language/s of diplomacy, or of international agreements and treaties (authentic versions). Important issues in the arena of international language policy include phenomena of linguistic imperialism, the increasingly dominant role of English as an international *lingua franca*, models of supranational communication within the EU at the European level, linguistic phenomena in the wake of European labor migration, and the emergence of new allochthonous linguistic minorities in countries experiencing large waves of migration.

In the context of immigration and in connection with the increasing deconstruction of national states, with their dwindling influence on language policy, a change of paradigms in the perception of language and the state, and also language and the individual, has taken place in sociolinguistics. Individual multilingualism and social plurilingualism are now considered the standard – "monolingualism is curable," as the editors of the journal *Sociolinguistica* (Ammon *et al.*, 1997) put it. Foreign language policy (which languages are taught to what extent in which countries?) as well as measures to promote the use of languages through foreign cultural policies and cultural institutes (e.g., the British Council, *Institut Français, Goethe Institut, Istituto Cervantes*) play a crucial role in international language policy.

Discourse/Text/Politics

In this section, we first define relevant concepts and terms used in research on language and politics, then pull together the most important characteristics of significantly different approaches, and finally present some of their most important findings and studies.

Research in the field of language and politics has expanded enormously in recent years (Fairclough, 1992; Blommaert and Verschueren, 1998; Reisigl and Wodak, 2001; Wodak, 2001a; Wodak, 2001b; Gruber *et al.,* 2003; Chilton, 2004). According to the underlying specific theoretical approach, the notion of discourse is defined in many different ways. Since the 1970s and 1980s, this notion has been subject to manifold semantic interpretations. These vague meanings have become part of everyday language use, a fact highlighted *inter alia* by Ehlich (2000), who also presented specific definitions of discourse that were linked to the British, French, and German research traditions. For example, in British research, the term 'discourse' is often used synonymously with the term 'text' (i.e., meaning authentic, everyday linguistic communication). The French *discours*, however, focuses more on the connection between language and thought; that is, the "creation and societal maintenance of complex knowledge systems" (Ehlich, 2000: 162). In German pragmatics, *Diskurs* denotes "structured sets of speech acts." Other possible definitions range from a "promiscuous use of 'text' and 'discourse'" (Ehlich, 2000), as found predominantly in Anglo-Saxon approaches, to a strict definition from the perspective of linguistic pragmatics (see Titscher *et al.*, 2000).

We endorse Lemke's (1995: 7) definition, which distinguishes between text and discourse in the following way:

> "When I speak about discourse in general, I will usually mean the social activity of making meanings with language and other symbolic systems in some particular kind of situation or setting. . . . On each occasion when the particular meanings, characteristic of these discourses are being made, a specific text is produced. Discourses, as social actions more or less governed by social habits, produce texts that will in some ways be alike in their meanings. . . . When we want to focus on the specifics of an event or occasion, we speak of the text; when we want to look at patterns, commonality, relationships that embrace different texts and occasions, we can speak of discourses."

The notion of politics is also defined in many different ways depending on the theoretical framework: It ranges from a wide extension of the concept

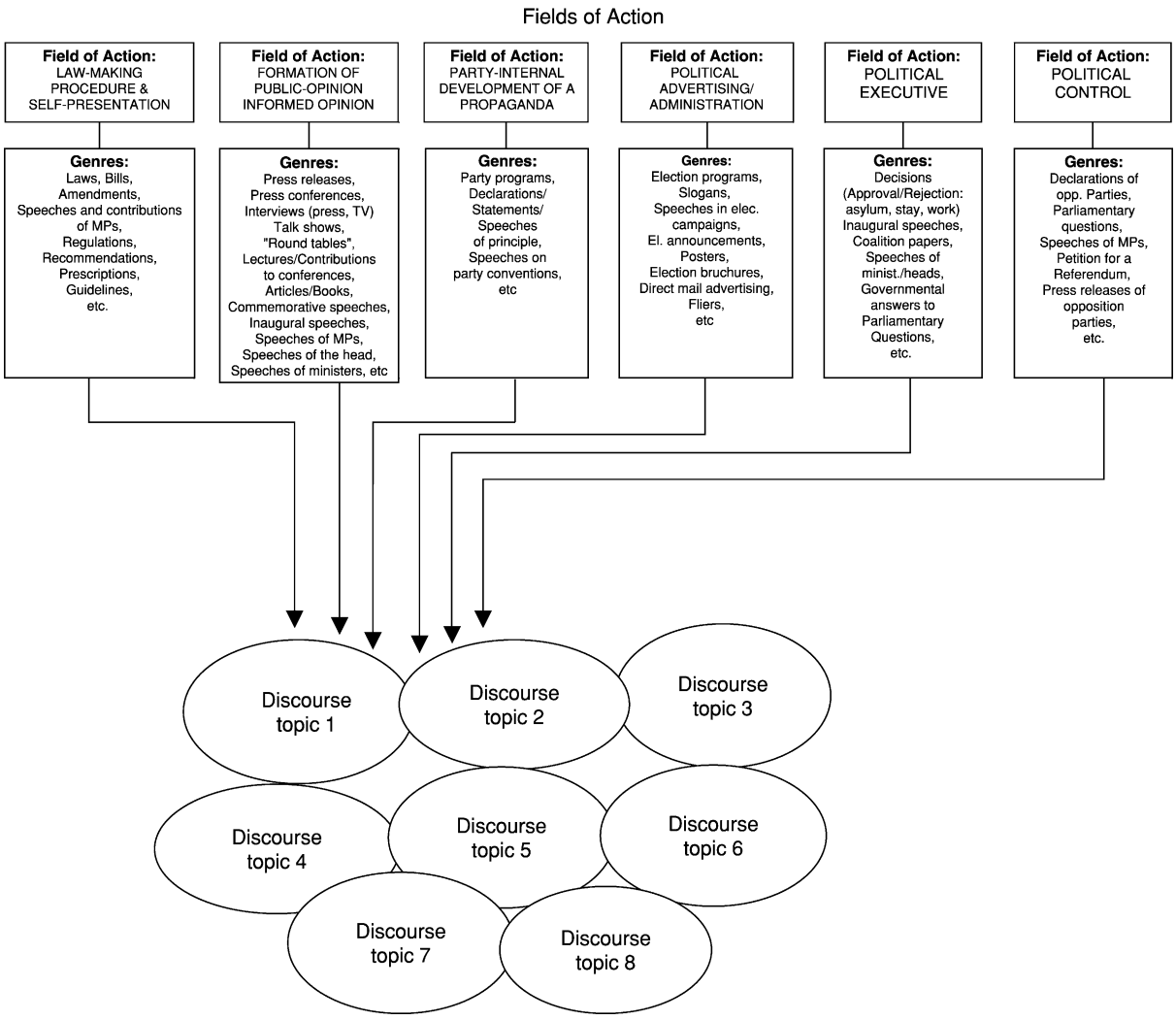

Figure 1 Selected dimensions of discourse as social practice. (From Reisigl and Wodak, 2001: 38).

according to which every social utterance or practice of the human as a *zoon politikon* is 'political' to a notion of politics referring only to the use of language by politicians in various settings and in political institutions:

> "On the one hand, politics is viewed as a struggle for power, between those who seek to assert their power and those, who seek to resist it. On the other hand, politics is viewed as cooperation, as the practices and institutions that a society has for resolving clashes of interest over money, influence, liberty, and the like" (Chilton, 2004: 3).

Chilton (2004) embraced an interactive view of politics, which cuts through both these dimensions mentioned above. This is also the perspective endorsed in this article.

Furthermore, it is important to define the political domains and the genres that are relevant in this field (in the sense of Bourdieu's theory of fields, habitus, and capitals). The most important domains are summarized in Figure 1.

The triangulatory discourse–historical approach is based on a concept of context that takes into account four levels; the first one is descriptive, whereas the other three levels are part of theories dealing with context (see Figure 2);

1. the immediate, language or text internal cotext
2. the intertextual and interdiscursive relationship among utterances, texts, genres, and discourses
3. the extralinguistic social/sociological variables and institutional frames of a specific 'context of situation' (Middle Range Theories)
4. the broader sociopolitical and historical contexts, in which the discursive practices are embedded and related.

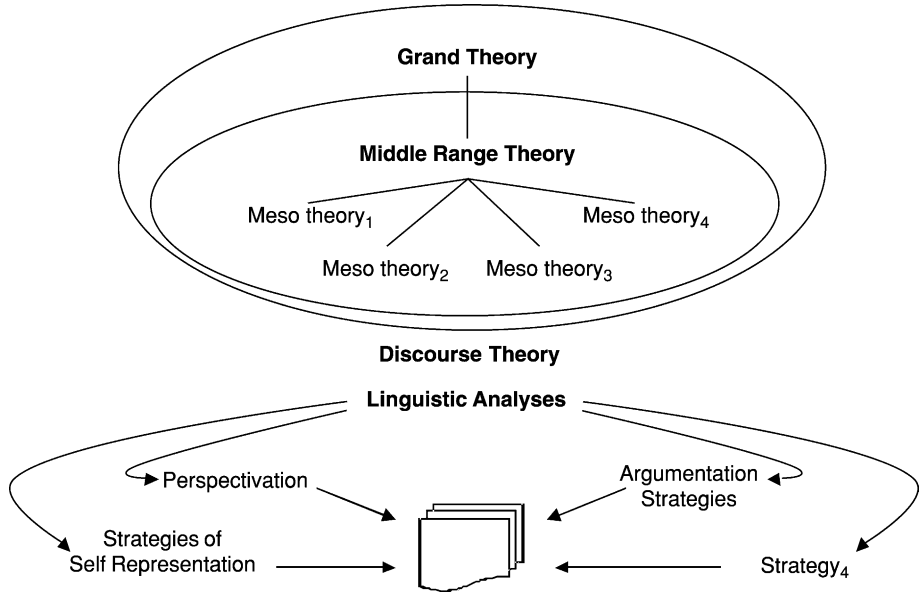

Figure 2 Levels of theories and linguistic analysis. (From Wodak and Meyer, 2001: 69).

The most salient feature of the definition of a discourse is the macrotopic, such as language policies. Interdiscursivity can be detected when, for example, an argument (taken from the discourse on immigration restrictions) is used while arguing for other policies to combat unemployment. Each macrotopic allows for many subtopics: Unemployment thus covers such subtopics as market, trade unions, social welfare, global market, hire and fire policies, and many more. Discourses are not closed systems at all; rather, they are open and hybrid. New subtopics can be created, and intertextuality and interdiscursivity allow for new fields of action and new genres. Discourses are realized in both genres and texts (*see* **Genres in Political Discourse**).

Inter/Trans/Multidisciplinarity

Research on language and/in politics is primarily inter- or transdisciplinary. The concepts 'theory' and 'interdisciplinarity' refer to the conceptual and disciplinary framework conditions of discourse–analytical research. Discourse analysis has concentrated on the process of theory formation and has emphasized the interdisciplinary nature of its research since its beginning (Weiss and Wodak, 2003). The plurality of theory and methodology can be highlighted as a specific strength of the research summarized in this overview. Chouliaraki and Fairclough (1999: 16) described the eclectic nature of critical discourse analysis (CDA) as follows:

> "We see CDA as bringing a variety of theories into dialogue, especially social theories on the one hand and linguistic theories on the other, so that its theory is a shifting synthesis of other theories, though what it itself theorizes in particular is the mediation between the social and the linguistic – the 'order of discourse,' the social structuring of semiotic hybridity (interdiscursivity). The theoretical constructions of discourse which CDA tries to operationalize can come from various disciplines, and the concept of 'operationalization' entails working in a transdisciplinary way where the logic of one discipline (for example, sociology) can be 'put to work' in the development of another (for example, linguistics)."

This statement underlines the direct connection between theory and interdisciplinarity or transdisciplinarity that is typical of discourse analysis.

The sociologist Helga Nowotny (1997: 188) outlined the concepts of inter/trans/pluri-disciplinarity briefly and very accurately:

> "Pluri(multi-)disciplinarity shows in the fact that the manifold disciplines remain independent. No changes are brought about in the existing structures of disciplines and theories. This form of academic cooperation consists in treating a subject from differing disciplinary perspectives. Interdisciplinarity may be recognized in the explicit formulation of a standardized transdisciplinary terminology. This form of co-operation is used to treat different subjects within a framework of an interdisciplinary or transdisciplinary design. Transdisciplinarity manifests itself when research across the isciplinary landscape is based on a common axiomatic theory and the interpenetration of disciplinary research methods. Cooperation leads to a bundling or clustering of problem-solving approaches

rooted in different disciplines and drawing on a pool of theories."

Current Research in Language and Politics

Some Research Dimensions

Having reviewed the relevant theoretical concepts and studies, we present here a summary of the important research issues:

- How widely or narrowly should political action (or political language behavior) be defined? Should it be restricted to the study of traditional political genres (like speeches, slogans, debates), or are all everyday actions in some way 'political'?
- What is the role of the political elites? Who determines political issues? Is it thus important to investigate the media; the rhetoric of politicians, teachers, and scholars, as well as managers; or the language used by 'men and women on the street' and their respective belief systems? This question leads to the debate about possible causalities: whether it is top down or bottom up. Do people believe what the politicians (media) tell them, or do the citizens influence the slogans in an election campaign? What about grassroots movements?
- Politics is tied to ideologies, party programs, opinion leaders, and political interests. How do ideologies and belief systems manifest themselves in various genres of political discourse? How are *topoi* and arguments recontextualized through various genres and public spaces? (*see* **Rhetorical Tropes in Political Discourse**).
- What are the main functions of political discourses? To answer this question, we have to examine strategies of persuasion, negotiation, polarization, etc. On the one hand, politics serves to find consensus and compromises and to make decisions. On the other hand, politics leads to wars and conflicts (*see* **Metaphors in Political Discourse; Political Rhetorics of Discrimination; Political Speeches and Persuasive Argumentation** and **War Rhetoric**). How do power structures influence decision-making strategies?
- Finally, what are the main settings where political practices take place ('doing politics')? How do the structures of various organizations and institutions influence political discourses?

There are certainly many more related questions, such as the influence of globalizing processes on language change or changes in political rhetoric and its functions over time (*see* **Multimodality and the Language of Politics**; Kovács and Wodak, 2003)).

Critical Linguistics and Critical Discourse Analysis and the Analysis of Political Discourses

The terms 'Critical Linguistics' (CL) and 'Critical Discourse Analysis' (CDA) are often used interchangeably. CL developed in the 1970s and 1980s, primarily at the University of East Anglia, around the work of Roger Fowler, Tony Trew, and Gunther Kress. In more recent research, it seems that the term CDA is preferred and is used to denote the theory formerly identified as CL. CDA sees "language as social practice" (Fairclough and Wodak, 1997) and considers the context of language use to be crucial (Weiss and Wodak, 2003; Wodak and Weiss, 2004). Moreover, CDA takes a particular interest in the relation between language and power. CDA research specifically considers institutional, political, gender, and media discourses (in the broadest sense) that testify to more or less overt relations of struggle and conflict (*see* **Critical Discourse Analysis**).

The shared perspective of CL and CDA relates to the term 'critical,' which in the work of some 'critical linguists' could be traced to the influence of the Frankfurt School or of Jürgen Habermas. The continuity between CL and CDA is visible mostly in the claim that discourses are ideological and that there is no arbitrariness of signs. Functional–systemic linguistics has proven to be most important for the text analysis undertaken by CL (see Halliday, 1978).

CL and CDA are rooted in classical rhetoric, text linguistics, and sociolinguistics, as well as in applied linguistics and pragmatics. The objects under investigation by the various departments and scholars who apply CDA differ, although gender issues, issues of racism, media discourses, the rise of right-wing populism, and dimensions of identity politics have become very prominent (*see* **Media, Politics, and Discourse: Interactions; Gender and Political Discourse; Newspeak; Frame Analysis** and **Political Rhetorics of Discrimination**). The methodologies used also differ greatly: Small qualitative case studies can be found, as well as large data corpora, drawn from fieldwork and ethnographic research.

CL and CDA may be defined as fundamentally interested in analyzing both opaque and transparent structural relationships of dominance, discrimination, power, and control as manifested in language. Four concepts figure indispensably in all CDA work: the concepts of critique, power; history; and ideology

(*see* **Language Ideology**; **Politics, Ideology and Discourse** and **Gender and Political Discourse**).

The notion of critique carries very different meanings: Some adhere to the Frankfurt School and others to a notion of literary criticism or to Marx's notions (see Reisigl and Wodak, 2001 for an overview). Ideology is seen as an important aspect of establishing and maintaining unequal power relations. For Eagleton (1994), the study of ideology must consider the variety of theories and theorists who have examined the relation between thought and social reality. All these theories assume "that there are specific historical reasons why people come to feel, reason, desire and imagine as they do" (Eagleton, 1994: 15).

For CDA, language is not powerful on its own: Rather, it gains power by the use powerful people make of it. Thus, CDA focuses on processes of inclusion and exclusion, of access to relevant domains of our societies. Moreover, CDA emphasizes the need for interdisciplinary work in order to gain a proper understanding of how language functions in, for example, constituting and transmitting knowledge, organizing social institutions, or exercising power.

Texts are seen as sites of struggle in that they show traces of differing discourses and ideologies ('voices' in the Bakhtinian sense), contending and struggling for dominance. Not only the struggles for power and control but also the intertextuality and recontextualization of competing discourses are closely attended to in CDA.

Different Theoretical Approaches Concerning Discourse and Politics

Fairclough set out the social theories underpinning CDA, and as in other early critical linguistic work, a variety of textual examples are analyzed to illustrate the field, its aims, and methods of analysis. Chouliaraki and Fairclough (1999) showed not only how the analytical framework for investigating language in relation to power and ideology developed but also how CDA is useful in disclosing the discursive nature of much contemporary social and cultural change. They particularly scrutinized the language of the mass media as a site of power and of struggle and also where language is apparently transparent. Media institutions often purport to be neutral in that they provide space for public discourse, they reflect states of affairs disinterestedly, and they give the perceptions and arguments of the newsmakers. Fairclough showed the fallacy of such assumptions by illustrating the mediating and constructing role of the media with a variety of examples.

van Dijk and Kintsch (1983) considered the relevance of discourse to the study of cognitive language processing. Their development of a cognitive model of discourse comprehension gradually developed into cognitive models for explaining the construction of meaning on a societal level. The notion of 'strategy' proved to be fruitful for a number of studies on language and politics (see below).

In critically analyzing various kinds of discourses that encode prejudice, van Dijk was interested in developing a theoretical model that explained cognitive discourse processing mechanisms related to the production and reproduction of racism. Most recently, van Dijk (2004) has focused on elaborating models of context and knowledge.

The Duisburg School of CDA draws on Foucault's notion of discourse, on the one hand, and Alexej N. Leontjew's "speech activity theory" (Leontjew, 1984) and Jürgen Link's "collective symbolism" (Link, 1988), on the other hand. As institutionalized and conventionalized speech modes, discourses express societal power relations, which in turn are affected by discourses. This 'overall discourse' of society, which could be visualized as a "*diskursives Gewimmel*" (literally, discursive swarming), becomes manifest in different 'discourse strands' (comprising discourse fragments of the same subject) at different discourse levels (science, politics, media, etc.). Every discourse is historically embedded and has repercussions on current and future discourse. In addition to the above levels, the structure of discourse may be dissected into special discourse vs. interdiscourse; discursive events and discursive context; discourse position; overall societal discourse and interwoven discourses; themes and bundles of discourse strands; and the history, present, and future of discourse strands. These fragments are analyzed in five steps – institutional framework, text 'surface,' linguistic–rhetoric means, programmatic-ideological messages, and interpretation – for which concrete questions regarding the text are formulated.

For example, the discourse of the so-called New Right in Germany was analyzed by Jäger and Jäger (1993), who based their research on different right-wing print media. They identified important common characteristics – specific symbols, 'ethnopluralism' [apartheid], aggressiveness, and antidemocratic attitudes – as well as significant linguistic and stylistic differences relating to the different target groups of the newspapers.

The combination of political science and political philosophy (predominantly with a strong Marxist influence) and of French linguistics is typical of French discourse analysis. Essentially, two different approaches may be distinguished.

The first is 'political lexicometry,' a computer-aided statistical approach to political lexicon developed at the Ecole Normale Supérieure at Saint-Cloud.

A text corpus (e.g., texts of the French Communist Party) is prepared. Texts are then compared on the basis of the relative frequency of specific words. One study shows, for example, how the relative frequency of the words '*travailleur*' and '*salarié*' varies significantly among French trade unions, reflecting different political ideologies; it also shows how that frequency changes over time (Groupe de Saint-Cloud, 1982).

Althusser's theory on ideology and Foucault's theory were major points of reference for the second approach in French discourse analysis, notably the work of Michel Pêcheux (1982). Discourse is the place where language and ideology meet, and discourse analysis is the analysis of ideological dimensions of language use and of the materialization in language of ideology. Both the words used and the meanings of words vary according to the position in the class struggle from which they are used; in other words, according to the 'discursive formation' within which they are located. For instance, the word 'struggle' itself is particularly associated with a working class political voice, and its meaning in that discursive formation is different from its meanings when used from other positions.

Pêcheux's main focus was political discourse in France, especially the relationship between social-democratic and Communist discourses within left political discourse. He emphasized the ideological effects of discursive formations in positioning people as social subjects. Echoing Althusser, he suggested that people are placed in the 'imaginary' position of being sources of their discourse, whereas actually their discourse and indeed they themselves are the effects of their ideological positioning. The sources and processes of their own positioning are hidden from people, who are typically not aware of speaking/writing from within a particular discursive formation. Moreover, the discursive formations within which people are positioned are themselves shaped by the 'complex whole in dominance' of discursive formations, which Pêcheux called 'interdiscourse'; however, people are not aware of that shaping. Radical change in the way people are positioned in discourse can only come from political revolution.

In the 1980s, the influence of Michel Foucault increased, as did that of Mikhael Bakhtin. Studies began to emphasize the complex mixing of discursive formations in texts and the heterogeneity and ambivalence of texts (for example, see Courtine, 1981).

An increased recognition of the contribution of all aspects of the communicative context to text meaning, as well as a growing awareness in media studies of the importance of nonverbal aspects of texts, has focused attention on semiotic devices in discourse other than linguistic ones. In particular, the theory put forward by Kress and van Leeuwen (1996) provided a useful framework for considering the communicative potential of visual devices in the media. This research is closely related to the role and status of semiotic practices in society, which is currently undergoing change because, increasingly, global corporations and semiotic technologies, rather than national institutions, are regulating semiotic production and consumption.

This emphasis on regulatory practices has led to a three-stage research approach, starting with the analysis of a particular category of texts, cultural artifacts, or communicative events; then moving to a second set of texts (and/or cultural artifacts and/or communicative events) – namely those that seek to regulate the production and consumption of the first set; and finally moving to a third set of texts, namely actual instances of producing or consuming texts (etc.) belonging to the first set. This type of work creates a particular relation among discourse analysis, ethnography, history, and theory in which these disciplines are no longer contributing to the whole through some kind of indefinable synergy or triangulation, but are complementary in quite specific ways.

In the last few years, Jay Lemke's work has emphasized multimedia semiotics, multiple timescales, and hypertexts/traversals. He extended his earlier work on embedded ideologies in social communication from an analysis of verbal texts to an integration of verbal texts with visual images and other presentational media, with a particular focus on evaluative meanings. His work has emphasized the implicit value systems and their connections to institutional and personal identity. In all this work, Lemke uses critical social semiotics as an extension of critical discourse analysis, combined with models of the material base of emergent social phenomena. His concern is with social and cultural change: how it happens, how it is constrained, and the ways in which is it expectably unpredictable (Lemke, 1995).

Lemke's newest work has developed the idea that, although we tell our lives as narratives, we experience them as hypertexts. Building on research on the semantic resources of hypertext as a medium, he proposed that postmodern lifestyles are increasingly liberated from particular institutional roles and that we tend to move, on multiple timescales, from involvement in one institution to another; we create new kinds of meaning, being less bound to fixed genres and registers, as we 'surf' across channels, websites, and lived experiences. This lifestyle is seen as a new historical development that does not

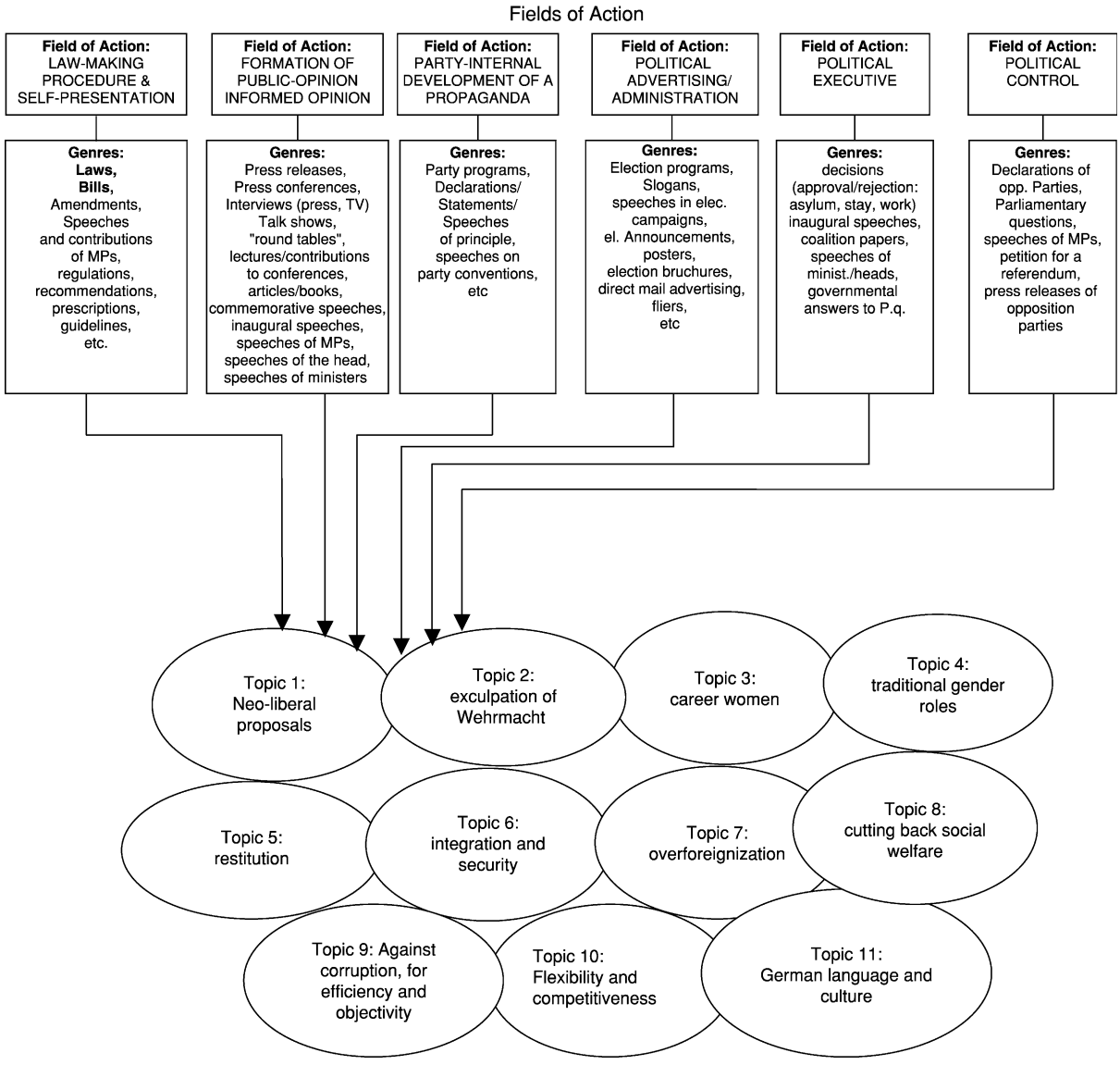

Figure 3 The discourse about the Waldheim Affair. (From Wodak, 2004: 192).

supplant institutions, but rather builds up new sociocultural possibilities on top and over them. These new lifestyles imply new forms of participation in politics as well as in the media.

The problem that Ron and Suzie Scollon address in their recent work is how to build a formal theoretical and a practical link between discourse and action. Theirs is an activist position that uses tools and strategies of engaged discourse analysis in taking action and thus requires a formal analysis of how its own actions can be accomplished through discourse and its analysis. Ron Scollon's (2001) recent work furthers the idea developed in *Mediated discourse: the nexus of practice* that practice in general is understood most usefully as many separate practices that are linked in a nexus, an overlap of topical discourses. The relations between discourse and a nexus of practice are many and complex and rarely direct. His current interest is in trying to open up and explicate these linkages through 'nexus analysis.' The focus of his recent work has been to theorize the link between indexicality in language (and discourse and semiotics more generally) and the indexable in the world. This could also be described as theorizing the link between producers of communications and the material world in which those communications are placed as a necessary element of their semiosis. Ron Scollon is applying this model of analysis to the 'discursive politics of food production and to the discourses of environmental politics.'

Table 1 Discursive strategies for positive self- and negative other-representation

Strategy	*Objectives*	*Devices*
Referential/nomination	Construction of in-groups and out-groups	Membership categorization Biological, naturalizing and depersonalizing Metaphors and metonymies Synecdoches (*pars pro toto, totum pro pars*)
Predication	Labeling social actors more or less positively or negatively, deprecatorily or appreciatively	Stereotypical, evaluative attributions of negative or positive traits Implicit and explicit predicates
Argumentation	Justification of positive or negative attributions	*Topoi* used to justify political inclusion or exclusion, discrimination or preferential treatment
Perspectivation, framing, or discourse representation	Expressing involvement Positioning speaker's point of view	Reporting, description, narration, or quotation of events and utterances
Intensification, mitigation	Modifying the epistemic status of a proposition	Intensifying or mitigating the illocutionary force of utterances

From Wodak (2001b: 73).

The study in which the discourse–historical approach was actually first developed tried to trace in detail the constitution of an anti-Semitic stereotyped image or '*Feindbild*,' as it emerged in public discourse in the 1986 Austrian presidential campaign of Kurt Waldheim (Wodak *et al.,* 1990). The discourse about the Waldheim Affair spread to different fields of political action, involving many different genres and topics. Figure 3 illustrates in simplified terms the discourse and the most relevant relationships among fields of action, genres, and discourse topics.

To illustrate this context-dependent approach, we present some of the many layers of discourse investigated in the study of the Waldheim Affair. During the 1986 election, Waldheim had at first denied active involvement with Nazism and Nazi military operations in the Balkans.

To contradict his assertion, there were documents of the *Wehrmacht* about the war in the Balkans in general, as well as documents relating specifically to Waldheim's activities there. There were also several statements and interviews with *Wehrmacht* veterans who had served with Waldheim. One step removed from these materials was the research by historians on the Balkan war in general and on Waldheim's wartime role in particular. At still another level there was the reporting in Austrian newspapers on the Balkan war, on Waldheim's past, and on historical research into the war and Waldheim's role in it. There were reports in newspapers on Waldheim's own explanation of his past; in addition, all these previously mentioned aspects were reported in foreign newspapers, especially in *The New York Times*. Simultaneously, the press releases and documents of the World Jewish Congress provided an autonomous informational and discursive source. Finally, there were statements of and interviews with politicians, as well as the '*vox populi*,' on all these topics.

Though sometimes tedious and very time consuming, such a discourse–historical approach allowed us to record the varying perceptions, selections, and distortions of information. As a result, we were able to trace in detail the constitution of an anti-Semitic stereotyped image or '*Feindbild*' of 'the others' as it emerged in public discourse in Austria in 1986.

The discourse–historical approach has been elaborated further in several more recent studies; for example, in studies on right-wing populist rhetoric, as developed by Jörg Haider and the Freedom Party in Austria on discourses about coming to terms with traumatic pasts; and on the discursive construction of national and European Identities (Wodak *et al.*, 1999; Martin and Wodak, 2003; Wodak and Weiss, 2004). Particularly, the mediation between context and text has been elaborated further (see Figure 2).

Questions of identity politics are becoming increasingly important in societies full of tensions between globalizing processes and nationalistic trends (who is included and who is excluded). Five questions have proven to be relevant for new theoretical and methodological approaches:

1. How are persons named and referred to linguistically?
2. What traits, characteristics, qualities, and features are attributed to them?
3. By means of what arguments and argumentation schemes do specific persons or social groups try to justify and legitimize the inclusion/exclusion of others?

4. From what perspective or point of view are these labels, attributions, and arguments expressed?
5. Are the respective utterances articulated overtly, are they even intensified, or are they mitigated?

To answer these questions, we are especially interested in five types of discursive strategies, which are all involved in the positive self- and negative other-presentation. We view, and this needs to be emphasized, the discursive construction of 'US' and 'THEM' as the basic fundaments of discourses of identity and difference.

By 'strategy' we generally mean a more or less accurate and more or less intentional plan of practices (including discursive practices), adopted to achieve a particular social, political, psychological, or linguistic aim. We locate the discursive strategies – that is to say, systematic ways of using language – at different levels of linguistic organization and complexity (see Table 1).

For example, when analyzing patterns of exclusion/inclusion, we have to demonstrate how certain utterances realized through linguistic devices point to extralinguistic contexts, diachronically and synchronically. Moreover, the strategies for positive self- and negative other-presentation are systematically used in constructing discourses on identity and discrimination at all levels of group formation (local, regional, national, transnational, and global).

Perspectives

Questions of identity politics are always tied to issues of difference and discrimination, as well as globalizing and localizing processes. One the one hand, we observe enormous complexity; on the other hand, we see tendencies to simplify through dichotomizing strategies. Righturing populist discourses employ *inter alia* such simplifying strategies. Ongoing research is taking these tensions, contradictions, and new tendencies into account.

See also: Critical Discourse Analysis; Discourse of National Socialism, Totalitarian; Frame Analysis; Gender and Political Discourse; Genres in Political Discourse; Language Ideology; Language Planning and Policy: Models; Language Policies: Policies on Language in Europe; Media, Politics, and Discourse: Interactions; Metaphors in Political Discourse; Multimodality and the Language of Politics; Newspeak; Political Rhetorics of Discrimination; Political Speeches and Persuasive Argumentation; Politics, Ideology and Discourse; Pragmatics: Overview; Rhetoric, Classical; Rhetoric: Semiotic Approaches; Rhetorical Tropes in Political Discourse; Stylistics; Systemic Theory; Text and Text Analysis; War Rhetoric.

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Politics of Teaching

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Introduction

This article examines the role of politics in applied linguistics and second language teaching. It begins with the traditional, mainstream understanding of the interface between politics and applied linguistics, i.e., language policy and planning, and moves from there to the rise since the 1990s of an alternative view of that interface, i.e., critical applied linguistics. The characteristics and positions of critical applied linguistics are outlined, and the major domains of applied linguistics such as international English and English for academic purposes are discussed from the perspectives of both mainstream and critical applied linguistics.

The Politics of Mainstream Applied Linguistics

Language Policy and Planning

The branch of mainstream applied linguistics inextricably tied to politics and sociopolitical relations is language policy and planning (LPP). Indeed, as Kaplan and Baldauf pointed out, LPP may be considered the *ne plus ultra* of applied linguistics in society,

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or, as they put it, "linguistics applied" (1997: 307), and Kaplan has advocated an active role for applied linguists in the sociopolitical processes of LPP (2001: 9). Possible methods of political activism include forming interest groups, attending and participating in meetings of the board of education and/or the state assembly, writing position papers, serving as professional consultants, and working to inform and affect public opinion about language-based issues, e.g., through letters to the editor or websites – in short, utilizing whatever mechanisms for influence and change that one's political system provides.

LPP deals with issues of language decision making, implementation, and evaluation at every level of society, from local to national, and these issues are always directly or indirectly political. They are directly political when local, state, or federal governments engage in formal debate and legislation in an attempt to mediate or resolve questions of language in society. But even when governments do not become formally involved in language policy, opting instead for a *laissez-faire* approach, language issues are nonetheless indirectly political because they affect the lives of individuals and groups in all but the most linguistically homogeneous societies. In addition, it may be said that government nonintervention in matters of language is itself a language policy, though a tacit rather than a formal one, and, generally speaking, as societies with histories of governmental nonintervention become increasingly heterogeneous and/or find linguistic minority groups challenging the tacit language policy, governments will feel compelled by public pressure to deal directly with matters of language policy. This has been the case in the United States, which on one hand has no formal language policy at the federal level, but on the other hand has seen local and state governments legislate English as the official language.

A look at some of the typical questions asked in LPP clearly shows their inherent sociopolitical and socioeconomic nature, involving, as they do, crucial matters of national identity, linguistic advantage, educational opportunity, social relations, political participation, and fiscal resources:

1. What is/are/should be the national and/or official language(s) of the society?
2. What is/should be the role of minority language(s)?
3. Which language(s) should be taught in schools, e.g., the national/official language only? the native language(s) of linguistic minority groups? a language of international communication, e.g., English, Spanish, French?
4. What are/should be the goals of minority and foreign language instruction, e.g., equality of status between the majority and minority languages of the society? oral communicative competence in a foreign language or literacy proficiency only?
5. When does/should instruction in the minority and foreign languages begin, how much time during the school day is/should be devoted to language instruction, and how many years does/should it continue?
6. Are there sufficient numbers of trained teachers proficient in the languages of instruction to carry out the mandated policies? What are the plans and procedures for producing trained teachers?

Researchers employ a variety of techniques to investigate questions such as these, and despite the multidisciplinary nature of LPP, which draws from fields with their own research traditions and trends, e.g., anthropology, economics, education, political science, and sociolinguistics, we can identify some of the most common LPP research methodologies (Kaplan and Baldauf, 1997; Baldauf, 2002):

1. Quantitative studies in the form of surveys and questionnaires in order to determine as accurately as possible the number of languages and dialects spoken in the society, and by how many people each one is spoken.
2. Discourse analyses of the uses and patterns of communication in the various linguistic communities, including patterns of literacy as well as speech. Discourse studies help to inform language-in-education planning for both linguistic majority and minority groups (Hornberger, 1995).
3. Historical analyses of the development, roles, and relationships of the languages in the society, since history and historical memories have a significant effect on the success or failure of LPP, e.g., Aboriginal languages *vis-à-vis* English in Australia.
4. Quantitative and qualitative studies of language attitudes among groups in the society. Attitudes need to be taken into account, particularly in language-in-education planning, in order to understand, for example, the hopes and desires of linguistic minority parents for their children, e.g., whether they want their children to be educated bilingually, or in the national/official/ dominant language of the society, and/or in a language of wider communication, such as English.
5. Longitudinal studies evaluating the processes and outcomes of LPP and language-in-education planning. Although both ideal and necessary, long-term evaluative studies in all areas of applied

linguistics, including LPP, tend to be scarce. Only with the aid of longitudinal empirical studies, however, can adjustments and improvements in policy and planning be made.

To illustrate the complex sociopolitical, socioeconomic, and sociocultural realities of LPP, the language situation of the southeast African country of Mozambique will be described in brief in the next section.

Mozambique An independent country since 1975 after nearly five centuries as a Portuguese colony, Mozambique is a highly linguistically diverse nation, with 39 languages listed in the 2004 online database of *Ethnologue: languages of the world*. Almost all are Bantu languages, but the total also includes Portuguese, Chinese, and languages of India and Pakistan. No language is spoken by a majority of the population of over 16 million.

When Mozambique became independent in 1975, Portuguese continued as the *de facto* official language, since it was already the language of government and administration from colonial history. Only in the 1990 revised version of the constitution, however, was Portuguese formally declared the official language, not only because it was already unofficially in place in that capacity but because of its perceived national unifying effect on this highly multilingual nation ravaged by 16 years of civil war. Native speakers of Portuguese constitute approximately 3% of the population, and an estimated 40% speak and understand the language at varying levels of proficiency, a percentage corresponding to the estimated literacy rate. Portuguese is the language of instruction in the public school system, with English introduced as a required foreign language at the secondary level, and French offered at the secondary level only for certain specified university majors in the humanities and social sciences.

The rewriting of the constitution in 1990 also represented a significant turning point in the official language policy of Mozambique in that for the first time the issue of the country's indigenous languages was directly addressed: "The State shall value the national languages and promote their development and their growing usage as vehicular languages and in the education of citizens" (Lopes, 1999: 104). It is doubtful whether this clause would have been included had it not been for the ongoing debates and discussions about Mozambican languages in relation to Portuguese that took place in the Ministry of Education and the Office of the Secretary of State for Culture in the 1970s and 1980s. In addition, efforts by language professionals and others committed to the recognition of indigenous languages led to a conference in 1988 called the 1st Seminar on the Standardization of Orthography of Mozambican Languages, with a report of the meeting published the following year, and the subsequent influence on the writers of the revised constitution a year after that.

The wording of the clause in the constitution suggested two courses of action: (1) the development of the indigenous languages of Mozambique in the direction of literacy, e.g., vocabulary expansion, grammar usage, standardized spelling, etc.; and (2) the development and implementation of bilingual education programs to give all language groups in the society equality of opportunity. Both implications also pointed to the need for the services of linguists and applied linguists trained in methodology, materials development, and language-in-education planning.

However, the reality of the language situation in Mozambique has presented difficulties to this day in carrying out the goals expressed in the statement of the revised constitution. According to Lopes (1999), parents of school-age children want Portuguese and English proficiency for their children, not their native Bantu languages, for they see Portuguese and English as means to upward mobility; thus, "consciousness raising and improvement of attitudes toward indigenous languages" (Lopes, 1999: 100) need to take place before bilingual education programs can be successfully implemented. In addition, Mozambique already suffers from a shortage of qualified teachers in the present Portuguese-based system, which raises a formidable obstacle, both in terms of human and fiscal resources, for the training of bilingual teachers in the indigenous languages of the country. Despite the difficulties, however, five bilingual education programs at the primary level were developed in the 1990s, as well as an adult literacy bilingual program for women. Both projects have drawn on the expertise of linguists and applied linguists for materials development and methodology, and while it is still too early to judge the outcomes of these programs, it is an encouraging sign that the indigenous languages and peoples of Mozambique are beginning to receive the official recognition and attention they deserve.

The Politics of Critical Applied Linguistics

Critical Theory

Critical applied linguistics is an alternative, oppositional approach to mainstream applied linguistics. It derives its name from critical theory, the umbrella term for the neo-Marxist-based work that originated in the 1930s at what has come to be known as the Frankfurt school, i.e., the Institute for Social

Research at the University of Frankfurt, Germany. The members of the Frankfurt school themselves called their mix of theory, research, and philosophy 'critical theory,' for their intent was to critically analyze capitalist society, culture, and Western civilization, and to find ways of making a revised form of Marxism viable. The contemporary influence of the Frankfurt school reached its height in the 1960s and early 1970s, for example with the writings of Habermas (1972), and then the focus of attention in critical theory shifted to the work of French intellectuals, such as Foucault (1980) and Bourdieu (1991).

As an umbrella term, critical theory encompasses a broad range of concepts in areas such as linguistics, philosophy, literary theory, cultural studies, legal studies, and gender studies. Despite its diversity, however, we can identify some common core words and tenets borrowed from the vocabulary of Marxism, updated by theories of poststructuralism and postmodernism, reshaped by the realities of global capitalism and postcolonialism, and shared by critical theorists in all disciplines:

1. Ideology and the status quo. Critical theory starts with the assumption that societies are based on ideology, defined as the dominant systems of values, beliefs, attitudes, preferences, and structures (social, political, economic, legal, educational, religious, etc.) in a society. What is often called culture in noncritical perspectives is subsumed under the all-encompassing term 'ideology' in critical theory, and to accept the ideology of one's society is to acquiesce to the *status quo*.
2. Critique. In accordance with its name and origins, critique is the first analytic step in critical theory, the purpose of which is to deconstruct ideology, defined by critical theorists as all foundational principles, assumptions, and models of society.
3. Problematicization, contestation, power, transformation. Critique, which analyzes, leads to problematicization, which questions and challenges, and then to contestation, which resists and opposes. What is always critiqued, problematicized, and contested is power, for power relations in society inevitably mean hierarchy, with social, political, economic, educational, racial, ethnic, or sexual privilege for some and inequality for others. The ultimate goal of critical theory is social transformation, i.e., the elimination of inequality, through the work of "transformative intellectuals" (Aronowitz and Giroux, 1993: 45), and in this, critical applied linguistics is very much an outgrowth of critical theory.
4. Discourse(s). The concept of discourse was brought to the fore by Foucault (1980), and it refers to the construction and organization of systems of knowledge, meaning, and identity. Often used in the plural to reflect their multiplicity and not meant to be limited solely to the system of language, discourses are seen as assigning and mediating social values to all aspects of human interaction, e.g., speech, writing, images, gestures. In addition, according to Foucault (1980), discourses are systems of power and knowledge, which means that not only do we construct discourses but discourses construct us as subjects in dominant or nondominant power positions. Dominant discourses, however, can always be contested, and "the counter-discourse always projects, just over its own horizon, the dream of victoriously replacing its antagonist" (Terdiman, 1985: 56).

Language Policy and Planning

Critical applied linguistics places politics at the center of its framework, but, unlike mainstream LPP, it rejects the traditional meaning of the word 'politics,' which is typically understood to be concerned with the activities and affairs of government and its associated institutions. Pennycook made the rejection explicit:

> Language policy [is] sometimes taken to represent the political focus of applied linguistics [re] governmental decisions about the use and status of languages. Yet I want to resist this view that politics has to do with policy making or with the more formal domains of politics . . . (2001: 27)

Instead, politics is generalized to become synonymous with power, a key operative word in critical theory. This expansion of the concept of politics leads to the assertion found in every critical perspective that everything is political because power, and, with it, inequality, exist in all currently constituted social and institutional relations. Thus, Tollefson (2002: 4), was critical of mainstream LPP, while also acknowledging its widespread acceptance as the norm, for "too often accept[ing] uncritically the claims of state authorities" or, in other words, for not engaging in the problematicization and contestation of linguistic power relations. For example, he did not accept the view that language policies are put into place "to enhance communication, to encourage feelings of national unity and group cooperation, and to bring about great social and economic equality" (2002: 5). Rather, he and other critical applied linguists, e.g., Luke and Baldauf (1990), argued that such assertions are merely covers for the *status quo*, and they criticize LPP for working within systems of dominant ideologies, thereby contributing to elitism,

inequality, the privileging of Western-style models of development, and the repression or even extinction ("linguistic genocide," Skutnabb-Kangas, 2000a) of multilingualism and multiculturalism.

One response by specialists in mainstream LPP to these charges has been that critical approaches critique, problematicize, and contest LPP, but do not offer workable and productive alternatives to put in their place (Fishman, 1994). Another has been that the language policies that are actually carried out in societies are seldom based on knowledgeable language planning theory, thus creating a large gap between informed analysis on one hand, and sociopolitical, socioeconomic, and sociolinguistic practices on the other. Another response has been that, while LPP methods can be improved, the underlying issues "raised by this [post-structuralist and neo-Marxist] criticism cannot be fully rectified, even were society to be entirely overturned and rebuilt. Authorities will continue to be motivated by self-interest. New structural inequalities will inevitably arise to replace the old ones" (Fishman, 1994: 98). If so, there is always the danger of exchanging one powerful group for another, particularly if the new group in power bears resentments over its former subordinate position and is eager to settle scores.

Finally, there is the concern that ideological motivations in LPP can lead to unintended negative consequences, or "unplanned language planning" (Eggington, 2002). Critical theorists who have accepted "the postmodern notion that ideologies of power inform and control every action, regardless of any attempts to create objective, or scientific, procedures in the language planning process" (Eggington, 2002: 410) are often unmindful of real world, human factors that can, and probably will, thwart an ideological course of action, to the detriment of the people it was designed to help. Eggington (2002: 410) cited the demand for "linguistic human rights" (Skutnabb-Kangas, 2000b: 22) as an example of an "ideologically driven template". Linguistic human rights takes the position that all linguistic minority children should be granted the right to learn and be educated in their parents' native languages. As Eggington pointed out, the attempts to implement this ideology in the form of bilingual education programs have proven to be largely a failure because the ideological mindset behind them failed to foresee or take into account the human elements involved, e.g., the wishes of the parents for their children, the difficulties of training sufficient numbers of bilingual teachers, and the costs of establishing, maintaining, and ensuring quality programs.

Second Language Teaching

English as an International Language Historically, applied linguistics has been linked to second language (L2) teaching; consequently, critical applied linguistics has also given considerable attention to the sociopolitical critique of L2 education, in particular the role and position of English as an international language. In mainstream applied linguistics, the global expansion of English tends to be seen as either beneficial or neutral (Crystal, 1997). The English-as-beneficial position points to the advantages of having a worldwide lingua franca for international communication, while the English-as-neutral position considers it a utilitarian phenomenon resulting from events and processes that have been decades, if not centuries, in the making – and a phenomenon that may not survive long term, as has historically been the case with other languages of wider communication, e.g., Latin.

For critical applied linguistics, English is the international language of communication not for historical and now commercial, scientific, technological, diplomatic, and travel reasons, but rather for ideological, imperialistic, hegemonic, capitalistic – in short, political – reasons (Pennycook, 1994). Viewing language as inextricably tied to power, class, and socioeconomic relations, critical applied linguists reject the idea that global English can be regarded as either beneficial or neutral. In response to the former, they ask, "Beneficial for whom?" and their answer is that only the powerful and privileged elites in the world are advantaged by international English, whereas the less powerful or powerless are increasingly marginalized by not having access to English. In response to the English-as-neutral point of view, critical applied linguists assert that there is no such thing as a neutral position, and that accepting the role of English in the world without a struggle is "an uncritical endorsement of capitalism, its science and technology, a modernization ideology, ... the Americanization and homogenization of world culture, linguistic culture, and media imperialism" (Phillipson, 1999: 274). An extension of the charge of imperialism is that in attaining linguistic dominance, English has contributed to the diminishment and death of other languages, as globalization, mediated above all through English, swallows up local cultures and languages, while educational systems throughout the world require students to study English at the expense of their local, indigenous languages.

Although English is currently the ascendant international language, indictments against the effects of its power can also be made against other major languages of the world. The dominance of Chinese (Mandarin Chinese), for example, has threatened the survival of at least 20 local languages in China. Spanish and Portuguese have contributed to the extinction or near-extinction of dozens of indigenous languages in Mexico and Central and South America. The power of Russian in Siberia has caused the disappearance of nearly all of the 40 local languages there. Moreover, Russian was so oppressively imposed on educational systems in the former Soviet Union that after its break-up one of the first acts of the newly independent eastern European countries was to replace Russian with English as a second language in the schools. And to this day France and Germany spend millions to promote French and German language and culture around the world. Whether through force of numbers, political and economic power, repressive measures, *laissez-faire* indifference, global competition, cultural marketing, or all combined, the pattern is unequivocal that the most widely spoken languages in the world have overwhelmed smaller languages in their spheres of power and influence.

This pattern is not set in stone, however, and there are indications of efforts to slow or halt the trend. As the realities of language endangerment and extinction have been increasingly publicized (e.g., by UNESCO), governments or official bodies have attempted to intervene on behalf of threatened languages through language policy and planning. For example, the European Bureau for Lesser Used Languages was established by the European Parliament in 1984 to protect the language rights of the more than 50 million people in the European Union who speak one of the 40 identified minority languages. As mentioned earlier, Mozambique as well as other African nations have worked to set up bilingual education programs in order to provide linguistic minority children with greater access to education in both their native language and the official language.

There is also the possibility that the dominance of English may become increasingly resented, and in response, the emerging condition may be the decline of global languages and the rise of regional languages, e.g., Arabic. In Africa, for example, "English is neither the only nor even the best means of communication. Throughout East Africa, Swahili is typically the first language that two strangers attempt upon meeting. In West Africa, [it is] Hausa" (Fishman, 2000: 1). Regional languages may meet the wider communicative needs of people more effectively and may provide a greater sense of identity for its speakers than any international language. Perhaps, too, replacing English with a regional language in schools could help reduce the resistance many students display to the requirement of English as a second language in countries such as Sri Lanka (Canagarajah, 1993b). If these scenarios are realized, the role of English as a world language could be narrowed to a few academic and technical specializations in which journals for international audiences would continue to be published largely in English, with abstracts translated into other major international and regional languages. "There is no reason to assume that English will always be necessary ... for technology, higher education, and social mobility, particularly after its regional rivals experience their own growth spurts" (Fishman, 2000: 2).

English for Academic Purposes In mainstream applied linguistics, English for Academic Purposes (EAP) is a branch of English for Specific Purposes that came to prominence in the 1980s in response to the academic needs of the increasing population of L2 students enrolled in universities in which English was the medium of instruction. The goal of EAP is to help prepare L2 students for university study, usually in intensive programs of limited duration. It focuses on the development and improvement of academic language skills required for effective participation in undergraduate and graduate university programs, and to the extent possible, it is tailored to meet the needs of the students enrolled in EAP classes. Therefore, the first step in EAP is a needs analysis of the students' academic goals and the types of language proficiency necessary to achieve them. Typically, EAP courses deal with (1) academic reading and the critical analysis of texts; (2) academic writing, both generally, e.g., the writing process, summarizing, paraphrasing, citing sources, and specifically, e.g., genre analysis or discipline-specific academic discourse such as the use of passive constructions in scientific and technical writing; (3) fluency and intelligibility of speech, e.g., small-group discussions, oral presentations; and (4) academic listening skills, e.g., gleaning the gist and key points of lectures. Because the intent of EAP is to help students succeed in an academic setting, it is often characterized as a practical or pragmatic approach to L2 teaching (Benesch, 1993; Santos, 2001).

In critical EAP, the pragmatism of mainstream EAP is politically critiqued from the top down, starting with institutional power relations between EAP students and the academy. Academic institutions are seen in critical EAP as inherently and inequitably hierarchical in structure, and both students and the EAP faculty need not only to be aware of the power

relations as such but also to be actively engaged in modifying their subject positions within them. Indeed, the very concept of EAP has been contested for accepting "an unproblematic relationship between English and academic purposes" (Pennycook, 1997: 257) rather than helping "students articulate and formalize their resistance [to academic requirements], to participate more democratically as members of an academic community and in the larger society" (Benesch, 2001: 61). Mainstream EAP is criticized for assuming (1) that institutional academic demands of students are the same as the academic interests of students themselves, and (2) that the appropriate goal of L2 teaching at the university level is to acculturate students to academic discourse rather than to encourage them to problematicize and work to change it.

Thus, for example, to accept needs analysis as the starting point in EAP is to risk maintaining and perpetuating institutional conditions in which subject matter courses and content are elevated to the highest status, while English is relegated to serving merely as a medium for content. Instead, critical needs analysis emphasizes the political nature of academia and deconstructs "who sets the goals, why they were formulated, whose interests are served by them, and whether they should be challenged" (Benesch, 2001: 43). Rather than a medium, English is seen as a discourse for contesting and countering existing power relations. As a replacement for needs analysis, therefore, critical EAP introduces the notion of rights analysis, which focuses on alternatives to the academic *status quo* and posits that L2 students are entitled to more rights than they are accorded in determining the nature and substance of their academic experience in the university. "**Rights** . . . high-highlight academic life as contested . . . . Rather than viewing students as initiates who must earn their place by adopting the discourse of faculty-experts, rights analysis assumes students are already members by virtue of paying tuition and taking classes" (Benesch, 2001: 62). In other words, instead of accepting as given the university's expectations of students, rights analysis emphasizes students' expectations of the university. EAP instructors are complicit in the marginalization of L2 students if they do not encourage them first to engage in a critical analysis of their positions as students *vis-à-vis* the faculty and the university, and then to exercise their rights by negotiating for change in their own academic interests.

What is also critiqued and contested is the academic discourse(s) that L2 students are typically socialized into in their EAP classes. Critical EAP challenges the academic language that L2 students are required to learn on the grounds that it also requires them to relinquish an essential part of their linguistic and social identities; more broadly, the academic knowledge they acquire in their majors or areas of specialization leads to the devaluation or destruction of the local knowledge they acquired in their native countries (Canagarajah, 1993a). In this way, dominant Western cultural traditions and knowledge threaten the survival of non-Western cultural traditions and knowledge, just as dominant languages threaten minority languages. An example of resistance to this domination can be seen today in France, where Arab language and culture is in conflict with French language and culture in the schools and the society. From the critical perspective, a resolution to the conflict is for minority groups to be encouraged "to construct alternate discourses that derive from a negotiation of the academic discourse and English [or French] language in light of their indigenous forms of knowledge, discourses, and languages" (Canagarajah, 1993a: 304). While acknowledging that educational systems might not welcome alternate discourses to academic conventions, Canagarajah argued that indigenous languages and knowledge systems should be considered equal to dominant academic discourses, and that ultimately, schools and universities will be enriched by accepting linguistic, intellectual, and academic pluralism.

The responses of mainstream EAP to the positions of critical EAP take several forms. One is that it is not L2 students themselves who are calling for challenge and change to the academic institutional structure of higher education or to the dominant academic discourses and knowledge systems; rather, it is critical educators who consider power relations paramount in all institutional arrangements and who therefore take it upon themselves to work to raise the consciousness of their students so that they are made aware of their subordinate subject positions and will act to change them. Another is that it is unrealistic and perhaps undesirable to think that the accretion of generations of knowledge and discourse that go into the development of an academic discipline can, will, or should quickly give way to the kind of linguistic and intellectual modifications proposed by critical theorists, especially when students are usually not only willing but eager to be socialized into their chosen disciplines. A third is that the very presence of a critical mass of L2 students in higher education naturally and unobtrusively promotes pluralism in academia. Influence and negotiation are a two-way street, and just as Third World students are changed by immersion in Western intellectual traditions, so are Western universities changed by the linguistic, cultural, and intellectual resources that Third World students bring to them. The changes may at first seem

minor or imperceptible, but over time they are felt and noticed, particularly in terms of language. Perhaps an appropriate analogy here is the way English as an international lingua franca has led to naturally occurring varieties such that we now talk about world Englishes – the plural signifying pluralism *par excellence*.

Adult Second Language Teaching The mainstream approach to adult second language teaching, which takes place in societies where the second language being learned and taught is the dominant/national/official language, is typically characterized as learner centered. Learner-centeredness is understood to mean that, since most adult learners have voluntarily chosen to attend language classes, their goals and desires for learning the language should be not only respected in the abstract but also acted upon by incorporating them into the syllabus and classroom practice, even in cases where the teacher may be philosophically opposed to the students' wishes, e.g., explicit instruction in grammar. Adult language learners are consulted as to (1) the content of the class based on common needs and interests, e.g., employment or housing issues; (2) the pacing of the course, i.e., when students feel they have reached a satisfactory level of understanding, proficiency, and practice for a particular concept or lesson, and are ready to move on; and (3) the degree to which the class is teacher centered, e.g., with explicit explanations, corrections, etc., or student centered, e.g., with pair work, group work, and other communicative activities.

A critical approach to adult language teaching rejects the mainstream view of learner-centered classrooms and its foundational assumption that adult learners "know what they want and what is 'best' for them, that giving learners choice is **in itself** empowering, and that the teacher should follow their lead" (Auerbach, 2000: 145). Learner-centeredness is also criticized for its unquestioning acceptance of the primacy of meeting students' needs and for implicitly supporting the ethos of opportunity and upward mobility that assumes an environment of individual choice and betterment. Instead, critical pedagogy in adult education – often called 'participatory learning,' after Freire (1970) – is based on the premise that empowerment and improvement in the lives of subordinate groups can come about only through an understanding of the inequitable power relations in society and subsequent collective action to change these oppressive conditions. Therefore, in keeping with the tenets of critical theory, the explicitly political goals of the adult language classroom, whether in Latin America, Africa, North America, or Europe, are (1) sociopolitical critique of students' lives, daily experiences, and circumstances in their communities *vis-à-vis* the dominant ideology and power relations of their societies; (2) problematicization, or Freirean problem posing, of these experiences and circumstances through critical reflection and discussion; and (3) strategies for collective social and political action to effect change through a democratic process and to try to provide marginalized groups with the means to work within their own systems for the betterment not only of their own lives but also of their communities.

In contrast to critical pedagogy at other levels of education, which has tended to avoid presenting specific pedagogical practices out of fear of becoming a prescriptive methodology, adult language teaching from the critical perspective has from the start provided examples and case studies of alternative rationales, curricula, and activities; moreover, these have been sufficiently detailed to allow interested teachers and other applied linguists to envisage what a critical classroom would actually look like in practice. Auerbach and Wallerstein (1987) were among the first to outline their work with adult ESL learners in the United States, and Auerbach (1992, 1996, 2000) has continued to present her principles and practices of participatory pedagogy. Drawing on the common issues in the lives of Latina women in Washington, D.C., Frye (1999) discussed the critical, participatory curriculum she developed for her ESL class. In Canada, Norton Peirce (1995) and Morgan (1998) gave accounts of critical approaches to teaching adult ESL in different settings in Ontario. Kerfoot (1993) described the critical/participatory curriculum and materials developed by a nongovernmental organization for adult ESL programs around Cape Town, South Africa. And two volumes (Smoke, 1998; Sauve, 2000) have been devoted entirely to programs and practices in critical adult ESL.

It is interesting to note that, alone, among the branches of critical applied linguistics, adult language teaching has received no oppositional response from the mainstream. Why this is so is a matter of speculation, but it may speak to the general lack of interest and attention, even among professionals, both to adult basic education and to adult second language programs. Public funding for the development and maintenance of such programs is almost always inadequate, and the minority and/or immigrant groups in need of adult second language classes are typically viewed by the public with indifference or even hostility. Just as the students are socioeconomically and sociopolitically marginalized, so, too, are the mostly part-time language teachers who work with them. The combination of these circumstances contribute to, if not cause, the outlier effect for adult language

education; adult second language learning and teaching seem to fly under the radar. However, it may also be that a critical/participatory approach to adult second language teaching is seen as the most appropriate for this student population, more than for any other. The sociopolitical critique of structural inequalities, the concomitant questioning of these inequalities, and the search for collective ways to work for social and political change may be the most realistic and effective way to structure adult second language classes.

Conclusion

A political, and politicized, approach to applied linguistics and second language teaching has been variously described as "applied linguistics with an attitude" (Pennycook, 2001: 177), as a series of "social visions" (Norton and Toohey, 2004: 1), and as a pedagogy that is "in your face" (Santos, 2001: 182). As a relatively recent movement that began in the late 1980s, gained momentum in the 1990s, and continues into the 21st century, it is not clear whether critical theory and pedagogy will remain an oppositional, alternative perspective or whether it will gain currency in mainstream applied linguistics. It has attracted dedicated specialists who are drawn to its hope of sociopolitical transformation and who seek ways to realize that hope through localized practices in language education.

One of the hidden dangers of a critical approach is the possibility of an activist counterresponse from its political polar opposite. Critical theory and pedagogy assume a shared **liberatory** vision; however, a shared conservative vision that is anything but liberatory is not out of the question. Indeed, Pennycook (2001: 29) touched on this very point when he acknowledged the possibility of "a potential position ... that combines conservative politics and applied linguistics." But instead of exploring the implications of such a potential, he dismissed it by saying, "Since conservatism is an anathema for my vision of critical applied linguistics ..., I do not dwell on this possibility" (2001: 29). Whether too distasteful to dwell on or not, however, the possibility remains.

Finally, when speculating on the role of critical applied linguistics in the future, it is necessary to consider such factors as the number of students in teacher preparation courses who can be won over to an overtly political approach to language teaching; whether conditions they find in language programs in which they are hired to teach allow for or are conducive to critical approaches; whether their language students are accepting of or resistant to critical classroom practice; whether alternative teaching and learning materials are available or permitted; and the degree of individual commitment to critical pedagogy even in the face of indifference or opposition. In all likelihood critical theory will continue to be espoused; the question is whether critical pedagogy will be carried out on any but a relatively small scale.

See also: Applied Linguistics: Overview and History; Critical Applied Linguistics; Language Policy in Multilingual Educational Contexts; Second Language Writing.

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Politics, Ideology, and Discourse

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Introduction

Few areas in the social sciences are as closely related as those of the study of politics, ideology, and discourse. Politics is one of the social domains whose practices are virtually exclusively discursive; political cognition is by definition ideologically based; and political ideologies are largely reproduced by discourse. In this article we examine these relationships more closely.

Ideology

The concept of ideology is often used in the media and the social sciences, but it is notoriously vague. Its everyday usage is largely negative, and typically refers to the rigid, misguided, or partisan ideas of others: **we** have the truth, and **they** have ideologies. This negative meaning goes back to Marx-Engels, for whom ideologies were a form of 'false consciousness'; thus, the working class may have misguided ideas about the conditions of its existence as a result of their indoctrination by those who control the means of production. Throughout a large part of the 20th century, and both in politics and in the social sciences, the notion of

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Politics, Ideology, and Discourse

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Introduction

Few areas in the social sciences are as closely related as those of the study of politics, ideology, and discourse. Politics is one of the social domains whose practices are virtually exclusively discursive; political cognition is by definition ideologically based; and political ideologies are largely reproduced by discourse. In this article we examine these relationships more closely.

Ideology

The concept of ideology is often used in the media and the social sciences, but it is notoriously vague. Its everyday usage is largely negative, and typically refers to the rigid, misguided, or partisan ideas of others: **we** have the truth, and **they** have ideologies. This negative meaning goes back to Marx-Engels, for whom ideologies were a form of 'false consciousness'; thus, the working class may have misguided ideas about the conditions of its existence as a result of their indoctrination by those who control the means of production. Throughout a large part of the 20th century, and both in politics and in the social sciences, the notion of

ideology continued to carry its negative connotation, and was often used in opposition to 'objective' knowledge (for histories of the notion of ideology, see, e.g., Billig, 1982; Eagleton, 1991; Larrain, 1979; for a useful collection of classical studies on ideology, see Zizek, 1994).

Originally, 'ideology' did not have this negative meaning. More than 200 years ago, the French philosopher Destutt de Tracy introduced the term in order to denote a new discipline that would study 'ideas': *idéologie*. Also, in contemporary political science, the notion is used in a more neutral, descriptive sense, e.g., to refer to political belief systems (Freeden, 1996).

One of the many dimensions highlighted in the classical approaches to ideology was their dominant nature, in the sense that ideologies play a role in the legitimization of power abuse by dominant groups. One of the most efficient forms of ideological dominance is when also the dominated groups accept dominant ideologies as natural or commonsense. Gramsci called such forms of ideological dominance hegemony (Gramsci, 1971). Bourdieu does not use the notion of ideology very much (mainly because he thinks it is too vague and has often been abused to discredit others who do not agree with us; see Bourdieu and Eagleton, 1994), but rather speaks of symbolic power or symbolic violence. It should be stressed, however, that although related, his uses of these terms are different from the (various) uses of the notion of ideology. His main interest lies in the social conditions of discursive and symbolic power, such as the authority and legitimacy of those who produce discourse.

To cut a long historical survey short, a specific concept of ideology will be used in this article, namely to describe specific, fundamental beliefs of groups of people. Our working definition of ideologies is therefore as follows: an ideology is the foundation of the social representations shared by a social group. Depending on one's perspective, group membership or ethics, these group ideas may be valued positively, negatively, or not be valued at all. That is, we do not exclusively identify ideologies with dominant groups (see also the discussion in Abercrombie *et al.*, 1980). In addition, dominated groups may have ideologies, namely ideologies of resistance and opposition. Ideologies more generally are associated with social groups, classes, castes, or communities, which thus represent their fundamental interests. The theory accounting for such ideological beliefs is complex and multidisciplinary, and may be summarized as follows (for details and many further references, see Van Dijk, 1998):

- Ideologies have both social and cognitive properties which need to be accounted for in an integrated theory.
- Cognitively, ideologies are a special kind of social belief systems, stored in long-term memory (*see*).
- Socially as well as cognitively, these ideological belief systems are socially shared by the members of specific social groups, or ideological communities (*see* **Distributed Cognition and Communication**).
- Ideologies, like languages, are essentially social. There are no personal or individual ideologies, only personal or individual uses of ideologies.
- The identity of groups is not only based on their structural properties, but also on their ideology.
- Ideological belief systems – ideologies – form the axiomatic basis of the more specific beliefs or social representations of a group, such as their group knowledge and group opinions (attitudes).
- Unlike in most traditional approaches to ideology, ideologies are not necessarily negative. They have similar structures and functions whether shared by dominant or dominated groups, 'bad' groups or 'good' groups. Thus, we may have negative as well as positive ideologies (utopias), depending on the perspective, values, or group membership of the one who evaluates them.
- Not all socially shared beliefs of a group are ideological. Thus, ideologically different or opposed groups in the same society need to have beliefs in common in order to be able to communicate in the first place. This common ground consists of socioculturally shared knowledge, which by definition is preideological within that society (although it may later or elsewhere be described as ideological knowledge).
- Thus, the traditionally problematic relationship between knowledge and ideology is resolved as follows: general, sociocultural knowledge, shared by an epistemic community, forms the common ground for all social representations of all (ideological) groups in that community. However, each group may develop specific group knowledge (e.g., professional, religious, or political knowledge) based on the ideology of the group. This knowledge is called 'knowledge' within the group because it is generally shared, certified, and presupposed to be true. For other groups, such knowledge may of course be called mere belief, superstition, or religion. In other words, beliefs that are taken for granted, commonsense, undisputed, etc. **within** a community, and shared by different ideological groups, is by definition non-ideological **within that community**.

- Ideologies embody the general principles that control the overall coherence of the social representations shared by the members of a group. For instance, a racist ideology may control more specific attitudes about immigration or affirmative action.
- Ideologically based social representations (such as feminist attitudes about abortion or glass ceilings on the job), are general and abstract. In order to relate to concrete social practices and discourses about specific events, they need to become contextualized and specified in mental models. These (ideologically biased) mental models, stored in episodic memory, are the mental constructs that control discourse, interaction, and other social practices. And conversely, it is through mental models that discourses are able to influence social representations and ideologies and reproduce these.
- Ideologies represent one of the dimensions of the social identity or self-image of groups.
- Unlike less fundamental social representations and much more than variable personal models, ideologies are relatively stable. One does not become or cease to be a feminist, socialist, or pacifist overnight. Many ideologies are acquired over many years and remain active for a lifetime of group members.
- Ideologies are structured by a social schema consisting of a number of categories that cognitively represent the major social dimensions of groups, such as their distinguishing properties, membership criteria, typical actions, goals, norms and values, reference groups, and basic resources or interests.
- Both cognitively as well as socially, ideologies develop especially as socially shared resources for intragroup cohesion and cooperation, as well as for efficient means for intergroup relations.
- Many – but not all – ideologies are relevant in situations of competition, conflict, domination, and resistance between groups, that is, as part of a social struggle. This also explains why many of the mental structures of ideologies and ideological practices are polarized on the basis of an ingroup–outgroup differentiation, typically between **Us** and **Them**, as ideological discourses also show.
- Because individual people may be members of several groups, they may participate in various ideologies. Thus, someone may be a nationalist, socialist, feminist journalist, and thus share in the ideologies of these different kinds of social and professional ideologies. Obviously, when activated (used) at the same time, in discourse or other social practices, this may sometimes lead to conflicts.
- The social practices, and hence discourses, of group members may be (indirectly) controlled by group ideologies, but are usually mediated by more specific social representations at the group level and by concrete, personal mental models at the individual level.
- Conversely, ideologies are personally acquired and socially reproduced by the social practices, and especially the discourses, of a group.
- Groups may organize the discursive acquisition and reproduction of ideologies, for instance through special forms of education, indoctrination, job training, or catechesis, and by specialized group members (ideologues, priests, teachers, etc.) and in special institutions.
- Not all group members have – nor need to have – the same level of ideological knowledge or expertise, nor need their ideological knowledge always be very explicit. Using an ideology is like being able to use a language without being able to formulate the grammar of that language. Many men are sexist and their sexist ideology may control much of their discourse and other social practices, but they need not always have explicit access to the contents of their ideologies.
- However, since many social ideologies develop as part of group relations, conflict, or domination and resistance, and hence involve ideological debate that is often published in the mass media, many group members know at least the main ideological tenets of their group – and of other groups. Indeed, when their interests are threatened they often know how and why to protect these.

These are some of the main properties of ideologies as formulated in a multidisciplinary, sociocognitive theory. Thus, ideologies are the axiomatic basis of the social representations of a group and – through specific social attitudes and then through personal mental models – control the individual discourses and other social practices of group members. In this way, they also are the necessary resource of ingroup cooperation, coordination and cohesion, as well as for the management of intergroup relations, competition, conflict, or struggle. It is only within such a theory that we are able to account for ideological discourse and other social practices, namely as being derived from ideologically based social representations, and as instantiations of social relations between groups.

More than traditional approaches, this multidisciplinary approach not only emphasizes the social and political nature of ideologies, but also their sociocognitive nature. It should be emphasized though that this does **not** mean that especially or only this cognitive dimension is important. Unlike traditional social or socioeconomic approaches, the theory emphasizes

that – trivially – ideologies have to do with **ideas** of some kind, and hence **also** need a cognitive account besides a social theory of groups and group relations, power, and interests. The point is that these different approaches need and can be integrated in one multidisciplinary theory. Hence, this approach does imply that a theory of ideology without an explicit cognitive component is incomplete: dealing with ideologies without talking about the nature and functions of socially shared ideas is theoretically unsatisfactory.

We see that ideological social practices are by definition **based** on ideologies defined as shared mental representations of some kind, in a way that might be compared with the way language use is based on a shared grammar or discourse and conversation rules. It is in this sense that ideologies as socially shared cognitive resources are fundamental for social practices, interaction and intra- and intergroup relations. Conversely, the general social functions of ideological practices must hence be represented as part of their underlying ideologies. This is one of the many reasons why cognitive and social approaches to ideology need to be integrated.

The theory proposed here accounts for both the relatively stable as well as the flexible, dynamic, changing, contextualized, and subjective aspects of ideology. The first dimension is explained in terms of relatively stable, socially shared mental representations of groups. The second dimension is accounted for by ideologically based, specific, subjective mental models of group members that control discourse and other social practices in each situation. Unlike other approaches, for instance in discursive psychology and other constructionist approaches (Billig, 1988, 1991; Potter, 1996), this theory does not attribute the flexible, subjective or contextually variable aspects of ideological practices to the nature of ideology itself, but to its uses by individual members. Again, the comparison with relatively stable – and slowly changing – grammars of natural languages, and their variable, contextualized, personal uses, suggests itself. For the same reason, ideologies are not **reduced** to their observable uses, discourses, or other social practices, but defined as members' socially shared underlying representations or resources that govern such practices. Nor do we reduce ideologies to discourses, because obviously they also control other social practices, such as forms of discrimination or violence. In sum, the theory presented here is not only multidisciplinary, but also nonreductionist.

Finally, ideologies are accounted for in sociocognitive rather than in emotional terms, because they are by definition socially shared, and in our definition of emotions, only individual persons and not groups can have, bodily based, emotions. When we sometimes speak of ideologies of hate, as is the case for racist or sexist ideologies, we are not speaking of emotions but of shared negative evaluations (opinions). Emotions are temporal, contextual, and personal, physiologically based, and cognitively interpreted events. Thus one can have and share a more or less permanent negative opinion about immigrants, but one cannot, in the strict sense of the term be permanently angry about immigrants, nor literally share an emotion with others. Thus, since ideologies are socially shared, they by definition cannot be emotional. However, their uses or applications by individual group members in concrete situations may of course trigger and be expressed as emotions. Also for this reason, it is essential to analytically distinguish between ideologies and their actual uses or manifestations in discourse, interaction, and other social practices.

Ideology and Politics

The general theory of ideology summarized above needs to be specified for the huge social field of politics, that is, for politicians, political cognition, political processes, political practices, and political discourse as characterizing political groups, such as political parties, members of parliaments, or social movements. As soon as ideologies not only have general social functions but more specifically (also) political functions in the field of politics, we will call them political ideologies. Thus, socialism is more obviously a political ideology than the professional ideology of dentists, as long as we interpret 'political' here as describing processes in the field of politics, and not as part of the fields of health care, education, or justice, among others. Thus, one way of classifying ideologies – as well as discourses – is by the social field in which they function. That is, we have political, educational, legal, religious, and health care ideologies, among others.

It is beyond the scope of this brief article to define and theorize in detail about what characterizes the field of politics (see, e.g., Goodin and Klingemann, 1996). However, apart from being defined by its prototypical participants (politicians), this field may briefly – and somewhat traditionally – be defined by:

- its overall systems (democracy, dictatorship, etc.);
- special social macro actions, such as government, legislation, elections, or decision making;
- and their micro practices, interactions, or discourses such as parliamentary debates, canvassing, or demonstrations;

- its special social relations, such as those of institutional power;
- its special norms and values (e.g., freedom, equality, etc.);
- its political cognitions, such as political ideologies.

If there is one social field that is ideological, it is that of politics. This is not surprising because it is eminently here that different and opposed groups, power, struggles, and interests are at stake. In order to be able to compete, political groups need to be ideologically conscious and organized. Few ideological groups besides political parties have programs that formulate their ideologies explicitly, and that compete for new members or supporters on that basis. Few ideologies are as explicitly defended and contested as political ideologies, as we know from the history of socialism, communism, liberalism, and so on. In other words, the political process is essentially an ideological process, and political cognition often simply identified with ideology (see Freeden, 1996; Ball and Dagger, 1999; Eatwell, 1999; Leach, 2002; Seliger, 1976).

The social organization of the field of politics, and hence of politicians and political groups, is largely based on ideological differences, alliances, and similarities. The overall organization of social beliefs as a struggle between the left and the right is the result of the underlying polarization of political ideologies that has permeated society as a whole. Elections, parliaments, political campaigns, propaganda, demonstrations, and many other phenomena of the political field are thus profoundly ideological. Debates in parliament pitch opposed political ideologies as a basis for political policies, measures, decisions, or actions. One's political identity, stances, and allegiances are not so much defined in terms of structural group membership, such as membership of a political party, but rather in terms of one's ideology. Most socialists or neoliberals do not have a membership card. The same is true for other social ideologies that have profound political implications, such as feminism, pacifism, ecologism, or racism.

Although primarily defined in sociocognitive terms, political ideologies permeate the whole political field, for example in overall systems such as democracies (based on democratic ideologies), overall acts and processes (such as government, coalition building, or elections), everyday political practices (such as parliamentary debates or demonstrations), group relations (such as domination and resistance, government, or opposition), fundamental norms and values (such as equality and independence that are constitutive categories of ideologies), as well as more specific political attitudes (for instance on legislation concerning abortion or divorce) that are controlled by ideologies.

Political Discourse and Ideology

If the political field is thoroughly ideological, then so are its political practices, and hence its discourses (among the many books on political discourse, see, e.g., Chilton, 1995, 2004; Chilton and Schäffner, 2002; Wilson, 1990; Wodak and Menz, 1990; see also the other contributions to this section). Indeed, political ideologies not only are involved in the production or understanding of political discourses and other political practices, but are also (re)produced by them. In a sense, discourses make ideologies observable in the sense that it is only in discourse that they may be **explicitly** expressed and formulated. Other political practices only implicitly show or experience ideologies, for instance in practices of discrimination on the basis of sexist, racist, or political ideologies. It is in discourse that we need to explicitly explain that such discrimination occurs "because she is a woman," "because he is black," or "because they are socialists."

Thus, it is largely through discourse that political ideologies are acquired, expressed, learned, propagated, and contested. The rest of this article will discuss these relationships between political discourse and political ideologies. Interestingly, despite the vast literature on ideology (thousands of books in English alone), there are virtually no monographs that explore the details of the relations between discourse and ideology, although many books in critical linguistics and critical discourse analysis deal with at least some aspects of this relationship (see, e.g., Fairclough, 1989, 1995; Fowler *et al.*, 1979; Fowler, 1991; Hodge and Kress, 1993; Pêcheux, 1982; Van Dijk, 1998; Wodak, 1989; Wodak *et al.*, 1987; Wodak and Menz, 1990; Wodak and Meyer, 2001).

Political Situations and Contexts

The relations between discourse and political ideologies are usually studied in terms of the structures of political discourse, such as the use of biased lexical items, syntactic structures such as actives and passives, pronouns such as *us* and *them*, metaphors or topoi, arguments, implications, and many other properties of discourse (see the references given at the end of the preceding section).

It should be emphasized, however, that discourse should be conceptualized also in terms of its **context** structures (Duranti and Goodwin, 1992). It is not sufficient to observe, for instance, that political

discourse often features the well-known political pronoun *we*. It is crucial to relate such use to such categories as who is speaking, when, where and with/to whom, that is, to specific aspects of the political situation.

Since such political situations do not simply cause political actors to speak in such a way, we again need a cognitive interface between such a situation and talk or text, that is, a mental model of the political situation (van Dijk, 1999, 2001, 2003). Such mental models define how participants experience, interpret, and represent the for-them-relevant aspects of the political situation. These specific mental models are called contexts. In other words, contexts are subjective participant definitions of communicative situations. They control all aspects of discourse production and comprehension.

Political discourse, thus, is not only defined in terms of political discourse structures but also in terms of political contexts. Thus, acting as an MP, prime minister, party leader, or demonstrator will typically be perceived by speakers or recipients as a political relevant context category in political discourse, whereas being a dentist or a doorkeeper much less so. Similarly, political contexts may be defined by special settings, featuring locations such as parliamentary buildings or events such as debates or meetings, as often controlled by precise timing, as is the case in parliamentary debates. Moreover, political discourses and their structures will only be able to have the political functions they have when they are enacting political acts or processes, such as governing, legislating, or making opposition, and with very specific political aims in mind, such as defending or defeating a bill or getting elected. And finally, political actors obviously do not participate mindlessly in political situations, but have political knowledge, share political norms and values, as well as political ideologies. Indeed, it is through this form of contextualization that we are able to link the ideologies of the participants to their discourses (Gumperz, 1982). Text or talk show ideologies discursively, but it is people, politicians, or protesters, who have ideologies – not only in this social practice or discourse, but typically also in others.

These then are some of the types of categories that make up our political context models, that is, political categories that we use to define political situations of text and talk. In the same way as discourses may be ideological when based on ideologies, the structures and practices of political contexts may also have such an ideological basis. Obviously, being an MP presupposes a parliamentary system and hence a democratic ideology, whereas being a dictator presupposes another ideology.

Obviously, these categories are culturally variable: members of parliament, prime ministers, or party secretaries are not exactly universal political participant categories. Other cultures may have their own specific political event types, political actions, participants, locations, time management, and of course their own political knowledge, attitudes, ideologies, norms, and values.

A detailed explanation of the cognitive processes involved in the way context models control political discourse is beyond the scope of this article. Suffice it to say that the information in the various categories of the (pragmatic) context model – for instance who are participating in the communicative situation – first of all controls the speech acts and other acts of the current situation. Thus, the current utterance may be defined as a political promise or as a threat, depending on the power or relationships of the participants, their political position (government or opposition, my party or your party), as well as the intentions to help or harm the recipient. Secondly, pragmatic context models control the selection of information in the (semantic) mental model that (inter)subjectively defines what participants talk **about**, such as the war in Iraq. Thus, an MP or minister addressing his or her peers in parliament will express and presuppose very different knowledge than does a politician giving a speech or an interview. Thirdly, context models control all levels of style of political discourse, such as lexical choice, pronouns, syntactic structure, and other grammatical choices that depend on how situations are defined. Thus, lexical and syntactic style in a parliamentary debate will be much more formal than an informal political meeting of party members or a propaganda leaflet. Finally, context models control the overall format or schema of political discourse, such as the formal turn-taking organization, openings and closings of a debate in parliament, the conversational structure of a political interview, the overall organization of a party program, or the layout of a political advertisement in a magazine or on a billboard. For instance, only the Speaker, as specific participant category in the British House of Commons, may open and close parliamentary sessions and debates, distribute turns, and decide when interruptions or questions will be allowed, among many other things. Thus the rules and structures of parliamentary interaction and their participants are closely related to the discursive structures of the debate being engaged in by the MPs.

Relevant for our discussion in this case is that it is especially the political ideology of the participants that not only controls much of what they say themselves, but also how they will understand other

speakers. Thus, a call to limit immigration by an extremist right wing party member will typically be heard and commented upon as racist, whereas similar proposals by left wing MPs of our own party will obviously seldom be interpreted as such.

Political Discourse and Political Ideology

If political ideologies are relevant properties of political situations, namely as being shared by participants, then how are they expressed and reproduced by the structures of text and talk?

A first question we need to deal with is whether **all** properties of political discourse are influenced by underlying ideologies. The response to that question is: obviously not, because only those properties of discourse can be influenced by ideologies that can be contextually variable in the first place. Thus, choice of more or less polite pronouns is contextually variable, whereas much of syntactic structure, such as the position of articles in front of nouns in English, is not. People of different ideologies do not have different grammars, although they use such grammars sometimes a bit differently. Sociocultural knowledge, including language, defines communities and not ideological groups. In that respect, the left or the right, socialists or neoliberals, racists or antiracists, will not speak or write very differently. This suggests that ideological differences should rather be sought in **what** people say, rather than in **how** they say it. Political ideas may be persuasively defended by the right or the left, so ideologically differences will hardly be defined only in terms of rhetoric. Thus, although there are probably political uses of discourse forms such as the use of pronouns as ingroup and outgroup markers, or rhetorical means of persuasion, it is likely that most ideological variation will be found at the levels of meaning.

In order to avoid a rather arbitrary discovery procedure of the potentially huge amount of ideologically variable structures of text and talk, it is more useful to proceed in a more systematic and theory-driven way. Thus, we have seen that ideologies often have a polarized structure, reflecting competing or conflicting group membership and categorization in ingroups and outgroups. These underlying structures also appear in more specific political attitudes – for instance racist attitudes about immigration – and ultimately in the biased personal mental models of group members. These mental models control the contents of discourse, and if they are polarized, it is likely that discourse will thus also show various types of polarization. Thus, much research has shown that ideological discourse often features the following overall strategies of what might be called the ideological square:

- Emphasize **Our** good things
- Emphasize **Their** bad things
- De-emphasize **Our** bad things
- De-emphasize **Their** good things.

These overall strategies may be applied to all levels of action, meaning, and form of text and talk. Thus, political speeches, interviews, programs, or propaganda typically focus on the preferred topics of 'our' group or party, on what **we** have done well, and associate political opponents with negative topics, such as war, violence, drugs, lack of freedom, and so on. Thus, many politicians and media associate immigrants or minorities with problems or delinquency. For decades, communism was associated with aggression, lack of freedom, and rigid ideology. Similarly, if communism is good or better than 'us' in the area of social services, health care, or education, anticommunist discourse will typically ignore or downplay such good things of its opponent.

What is true for meanings or topics also holds for form or structure: we may enhance meanings in many ways by intonation or stress, visual or graphical means, word order, headlining, topicalization, repetition, and so on. The opposite will occur when we want to downplay our bad things. Very bad things of our arch enemies – such as a terrorist attack – will thus appear on the front page, in a big article with big negative headlines, or in an emergency debate in parliament, and so on.

In other words, there are systematic means to examine discourse at various levels when looking for ways ideologies are (not) expressed or enacted in such discourse: Whenever a meaning is associated with good things, it will tend to be associated with the ingroup of the speaker, and all structural properties of the discourse may be brought to bear to emphasize such meanings. And the opposite will be the case for Others, Opponents, or Enemies.

Besides the general, combined strategy of positive self-presentation and negative other-presentation, ideological discourse structures may appear as expressions of other underlying ideology structures, and not only as an expression of the polarized relationship between (opposed) ideological groups. Thus, if identity, characteristic actions, aims, norms, values, group relations, and resources are fundamental ideological categories, we may expect that references to the contents of such categories will be prominent in the discourses of ideological group members. Thus, if people talk as group members, in terms of 'we,' and positively evaluate their own actions, norms and values, and

defend the resources or other interests of their group, then such talk will also usually be ideological. Again, such will typically be true for the meaning or context of discourse, but the ways such meanings are expressed and especially persuasively conveyed may of course also involve many formal aspects of grammar, discourse and conversation.

These are the general strategies of ideological discourse production and also a handy discovery or recognition procedure for ideological analysis of political discourse. The more detailed and subtle ideological discourse structures will be examined in a concrete example.

Examples

By way of examples, I will use some fragments from a debate in the British House of Commons on asylum seekers, held on March 5, 1997. Mrs Gorman, representative of Billericay for the Conservative Party, then still in power, had taken the initiative for this debate, which she opened with a critique of the alleged costs of asylum seekers, costs she claimed were being paid by poor old English ratepayers. Among those who opposed her was Jeremy Corbyn, of the Labour Party.

In order to enhance the usefulness of our analysis, we shall assign an analytical category to each example, and order the categories alphabetically. After the category name I shall add the domain of discourse analysis to which the category belongs (e.g., meaning, argumentation, etc.). The main point of the analysis is to show how various ideologies, especially those of racism and antiracism, are expressed in various kinds of structures. There are in principle hundreds of such categories, so we make a small selection (for details, see a more detailed ideological analysis in Van Dijk, 2000; no further references are given to the many hundreds of studies that deal with the respective analytical categories mentioned above; see Van Dijk, 1997, for a general introduction to many of these notions; for further analysis of parliamentary debates on immigration, see Wodak and Van Dijk, 2000).

Some Categories of Ideological Discourse Analysis

ACTOR DESCRIPTION (MEANING). The way actors are described in discourses also depends on our ideologies. Typically we tend to describe ingroup members in a neutral or positive way and outgroup members in a negative way. Similarly, we will mitigate negative descriptions of members of our own group, and emphasize the attributed negative characteristics of Others. Here is how Mrs Gorman describes a Romanian asylum seeker:

> (1) In one case, a man from Romania, who came over here on a coach tour for a football match (. . .) decided that he did not want to go back, declared himself an asylum seeker and is still here 4 years later. He has never done a stroke of work in his life (Gorman).

AUTHORITY (ARGUMENTATION). Many speakers in an argument, also in parliament, have recourse to the fallacy of mentioning authorities to support their case, usually organizations or people who are above the fray of party politics, or who are generally recognized experts or moral leaders. International organizations (such as the United Nations or Amnesty International), scholars, the media, the church or the courts often have that role. People of different ideologies typically cite different authorities. Thus, Mr Corbyn ironically asks Mrs Gorman whether she has not read the reports of Amnesty or Helsinki Watch.

BURDEN (TOPOS). Argumentation against immigration is often based on various standard arguments, or topoi, which represent premises that are taken for granted, as self-evident and as sufficient reasons to accept the conclusion. One of the topoi of anti-immigration discourse is that asylum seekers are a financial 'burden' for 'us':

> (2) It is wrong that ratepayers in the London area should bear an undue proportion of the burden of expenditure that those people are causing (Gorman).

CATEGORIZATION (MEANING). As we also know from social psychology, people tend to categorize people, and so do speakers in parliament, especially when Others (immigrants, refugees, etc.) are involved. Most typical in this debate is the (sub)categorization of asylum seekers into 'genuine' political refugees, and 'bogus' asylum seekers, a categorization formulated in the following ways:

> (3) There are, of course, asylum seekers and asylum seekers (Gorman).

> (4) . . . those people, many of whom could reasonably be called economic migrants and some of whom are just benefit seekers on holiday, to remain in Britain (Gorman).

COMPARISON (MEANING, ARGUMENTATION). Different from rhetorical similes, comparisons as intended here typically occur in talk about refugees or minorities, namely when speakers compare ingroups and outgroups. In racist talk, outgroups are compared negatively, and ingroups positively. In antiracist talk, we may negatively compare our country or government with loathsome undemocratic regimes. In the following example, Mr Corbyn uses an argumentative comparison with the Second World War to emphasize the plight of asylum seekers:

(5) Many soldiers who were tortured during the Second World War found it difficult to talk about their experiences for years. That is no different from the position of people who have been tortured in Iran, Iraq, West Africa, or anywhere else. (Corbyn).

CONSENSUS (POLITICAL STRATEGY). To claim or insist on cross-party or national consensus is a well-known political strategy in situations where the country is threatened, for instance by outside attack. Immigration is often seen as such a threat. Thus, Mrs Gorman insists that the current immigration law is the fruit of consensus, and hence should not be tampered with:

(6) The Government, with cross-party backing, decided to do something about the matter (Gorman, C).

COUNTERFACTUALS (MEANING, ARGUMENTATION). (*see also* **Counterfactuals**.) "What would happen, if . . ." the typical expression of a counterfactual, is often used in this debate by the Labour opposition in order to suggest that the conservatives try to imagine what it would be like to be in the situation of asylum seekers, an persuasive argumentative move that is also is related to the move of asking for empathy:

(7) I suggest that he start to think more seriously about human rights issues. Suppose he had to flee this country because an oppressive regime had taken over. Where would he go? Presumably he would not want help from anyone else, because he does not believe that help should be given to anyone else (Corbyn).

(8) If that happened in another country under a regime of which we disapproved, the British Government would say that it was a terrible indictment on the human rights record of that regime that prisoners were forced to undertake a hunger strike to draw attention to their situation (Corbyn).

DISCLAIMERS (MEANING). A well-known combination of the ideologically based strategy of positive self-presentation and negative other-presentation are the many types of disclaimers. Note that disclaimers in these debates are not usually an expression of attitudinal ambiguity, in which both positive and negative aspects of immigration are mentioned, or in which humanitarian values are endorsed on the one hand, but the 'burden' of refugees is beyond our means. Rather, disclaimers briefly save face by mentioning Our positive characteristics, but then focus rather exclusively on Their negative attributes. Hence our qualification of the positive part of the disclaimer as Apparent, as in Apparent Denials, Concessions, Empathy, etc.:

(9) [Apparent Empathy] I understand that many people want to come to Britain to work, but there is a procedure whereby people can legitimately become part of our community (Gorman).

(10) [Apparent Denial] I did not say that every eastern European's application for asylum in this country was bogus. However. . . (Gorman).

EUPHEMISM (RHETORIC; MEANING). (*see* **Taboo, Euphemism, and Political Correctness**.) The well-known rhetorical figure of euphemism, a semantic move of mitigation, plays an important role in talk about immigrants. Within the broader framework of the strategy of positive self-presentation, and especially its correlate, the avoidance of negative impression formation, negative opinions about immigrants are often mitigated, especially in foreign talk. The same is true for the negative acts of the own group. Thus, racism or discrimination will typically be mitigated as resentment or unequal treatment, respectively. Similarly Ms Gorman in this debate uses the word 'discourage' ("to discourage the growing number of people from abroad. . .") in order to refer to the harsh immigration policies of the government, and thus mitigates the actions of the conservative government she supports. Similarly, the Labour (Corbyn) opposition finds the condemnation of oppressive regimes by the Government 'very muted' instead of using more critical terms. Obviously, such mitigation of the use of euphemisms may be explained both in ideological terms (ingroup protection) as well as in contextual terms, e.g., as part of politeness conditions or other interactional rules that are typical for parliamentary debates.

EVIDENTIALITY (MEANING, ARGUMENTATION). (*see also* **Evidentiality in Grammar**.) Claims or points of view in argument are more plausible when speakers present some evidence or proof for their knowledge or opinions. This may happen by references to authority figures or institutions (see 'Authority' above), or by various forms of evidentiality: How or where did they get the information. Thus people may have read something in the paper, heard it from reliable spokespersons, or have seen something with their own eyes. Especially in debates on immigration, in which negative beliefs about immigrants may be heard as biased, evidentials are an important move to convey objectivity, reliability, and hence credibility. In stories that are intended to provoke empathy, of course such evidence must be supplied by the victims themselves. When sources are actually being quoted, evidentiality is linked to intertextuality. Here are two examples:

(11) This morning, I was reading a letter from a constituent of mine (. . .) (Gorman).

(12) The people who I met told me, chapter and verse, of how they had been treated by the regime in Iran (Corbyn).

EXAMPLE/ILLUSTRATION (ARGUMENTATION). A powerful move in argumentation is to give concrete examples, often in the form of a vignette or short story, illustrating or making more plausible a general point defended by the speaker. Concrete stories are usually better memorized than abstract arguments, and have more emotional impact, so they are argumentatively more persuasive. Of course, the right and the left each will have its own stories to tell:

(13) *The Daily Mail* today reports the case of a woman from Russia who has managed to stay in Britain for 5 years. According to the magistrates court yesterday, she has cost the British taxpayer £40,000. She was arrested, of course, for stealing (Gorman).

(14) The people who I met told me, chapter and verse, of how they had been treated by the regime in Iran – of how they had been summarily imprisoned, with no access to the courts; of how their families had been beaten up and abused while in prison; and of how the regime murdered one man's fiancée in front of him because he would not talk about the secret activities that he was supposed to be involved in (Corbyn).

GENERALIZATION (MEANING, ARGUMENTATION). Instead of providing concrete stories, speakers may also make generalizations, in racist discourse typically used to formulate prejudices about generalized negative characteristics of immigrants. Similarly, in a populist strategy, conservative speakers may generalize the negative feelings against asylum seekers:

(15) Such things go on and they get up the noses of all constituents (Gorman).

HYPERBOLE (RHETORIC). Hyperbole is a semantic rhetorical device for the enhancement of meaning. Within the overall strategy of positive self-presentation and negative other-presentation, we may thus expect in parliamentary debates about immigrants that the alleged bad actions or properties of the Others are expressed in hyperbolic terms (our bad actions in mitigated terms), and vice versa. Sometimes such forms of hyperbole are implied by the use of special metaphors, as we observe in Mrs Gorman's use of 'opening the floodgates' in order to refer to the arrival of many asylum seekers. And conversely, on the left, Labour speakers will of course emphasize the bad nature of authoritarian regimes, and like Mr Corbyn, will call them 'deeply oppressive,' and the conditions of refugees coming from those countries 'appalling.'

IMPLICATION (MEANING). For many pragmatic (contextual) reasons, speakers do not (need) to say everything they know or believe. Indeed, a large part of discourse remains implicit, and such implicit information may be inferred by recipients from shared knowledge or attitudes and thus constructed as part of their mental models of the event or action represented in the discourse. In debates about immigration, implicitness may especially be used as a means to convey meanings whose explicit expression could be interpreted as biased or racist. Thus, when Ms Gorman says that many refugees come from countries in Eastern Europe who have recently been liberated, she is implying that people from such countries cannot be genuine asylum seekers because democratic countries do not oppress their citizens (a point later attacked by the Labour opposition). And the same is true when she describes these refugees as 'able-bodied males,' which implies that these need no help from us.

IRONY (RHETORIC). (*see* **Irony**.) Accusations may come across as more effective when they are not made point blank (which may violate face constraints), but in apparently lighter forms of irony. There is much irony in the mutual critique and attacks of Conservatives and Labour, of course, and these characterize the proper interactional dimension of the debate. However, when speaking about immigrants, irony may also serve to derogate asylum seekers, as is the case for the phrase 'suddenly discover' in the following example, implying that such a 'sudden discovery' can only be bogus, since the asylum seekers allegedly knew all along that they came to the country to stay:

(16) Too many asylum seekers enter the country initially as family visitors, tourists, students, and business people, and then suddenly discover that they want to remain as asylum seekers (Shaw).

LEXICALIZATION (STYLE). At the local level of analysis, debates on asylum seekers need to express underlying concepts and beliefs in specific lexical items. Similar meanings may thus be variably expressed in different words, depending on the position, role, goals, point of view, or opinion of the speaker, that is, as a function of context features. In conservative discourse opposing liberal immigration policies, this will typically result in more or less blatantly negative expressions denoting refugees and their actions, thus implementing at the level of lexicalization the overall ideological strategy of negative other-presentation. Thus, also in this debate, we may typically find such expressions as 'economic immigrants,' 'bogus asylum seekers,' or 'benefit

scroungers,' as we also know them from the tabloid press in the UK. On the other hand, lexicalization in support of refugees may focus on the negative presentation of totalitarian regimes and their acts, such as 'oppression,' 'crush,' 'torture,' 'abuse,' or 'injustice.'

METAPHOR (MEANING, RHETORIC). (See the other articles on metaphor). Few semantic-rhetorical figures are as persuasive as metaphors, also in debates on immigration. Abstract, complex, unfamiliar, new, or emotional meanings may thus be made more familiar and more concrete. Virtually a standard metaphor (if not a topos) is the use of flood metaphors to refer to refugees and their arrival, symbolizing the unstoppable threat of immigration, in which we would all 'drown.' Thus, Ms Gorman warns for changes in the present law by saying that such changes would "open the floodgates again." Another notorious semantic realm of metaphors is to describe people in terms of (aggressive, repulsive, etc.) animals, for instance asylum seekers as 'parasites,' as does Mrs Gorman.

NATIONAL SELF-GLORIFICATION (MEANING). Especially in parliamentary speeches on immigration, positive self-presentation may routinely be implemented by various forms of national self-glorification: positive references to or praise for one's own country, its principles, history, and traditions. Racist ideologies may thus be combined with nationalist ideologies, as we have seen above. This kind of nationalist rhetoric is not the same in all countries. It is unabashed in the USA, quite common in France (especially on the right), and not uncommon in Germany. In the Netherlands and the UK, such self-glorification is less explicit. See, however, the following standard example – probably even a topos:

> (17) Britain has always honored the Geneva convention, and has given sanctuary to people with a well-founded fear of persecution in the country from which they are fleeing and whose first safe country landing is in the United Kingdom (Wardle).

NEGATIVE OTHER-PRESENTATION (SEMANTIC MACROSTRATEGY). As the previous examples have shown, the categorization of people into ingroups and outgroups, and even the division between good and bad outgroups, is not value-free, but imbued with ideologically based applications of norms and values. Thus, throughout this debate, Mrs Gorman describes asylum seekers in terms of benefit seekers or bogus immigrants. Negative other-presentation is usually complimentary to positive self-presentation.

NORM EXPRESSION. Anti-racist discourse is of course strongly normative, and decries racism, discrimination, prejudice, and anti-immigration policies in sometimes explicit norm statements about what 'we' (in parliament, in the UK, in Europe, etc.) should or should not do:

> (18) We should have a different attitude towards asylum seekers (Corbyn).

NUMBER GAME (RHETORIC, ARGUMENTATION). Much argument is oriented to enhancing credibility by moves that emphasize objectivity. Numbers and statistics are the primary means in our culture to persuasively display objectivity, and they routinely characterize news reports in the press. Arrivals of immigrants are usually accompanied by numbers, also in parliament. The same is true for the costs of immigrants:

> (19) It would open the floodgates again, and presumably the £200 million a year cost that was estimated when the legislation was introduced (Gorman, C).

POLARIZATION, US–THEM CATEGORIZATION (MEANING). Few semantic strategies in debates about Others are as prevalent as the expression of polarized cognitions and the categorical division of people in ingroup (us) and outgroup (them). This suggests that especially talk and text about immigrants or refugees is also strongly monitored by underlying social representations (attitudes, ideologies) of groups, rather than by models of unique events and individual people (unless these are used as illustrations to argue a general point). Polarization may also apply to 'good' and 'bad' subcategories of outgroups, as is the case for friends and allies on the one hand and enemies on the other. Note that polarization may be rhetorically enhanced when expressed as a clear contrast, that is, by attributing properties of 'us' and 'them' that are semantically each other's opposites. Examples in our debate abound, but we shall only give one typical example:

> (20) It is true that, in many cases, they have made careful provision for themselves in their old age, have a small additional pension as well as their old-age pension and pay all their rent and their bills and ask for nothing from the state. They are proud and happy to do so. Such people should not be exploited by people who are exploiting the system (Gorman, C).

POPULISM (POLITICAL STRATEGY). One of the dominant overall strategies of conservative talk on immigration is that of populism. There are several variants and component moves of that strategy. The basic strategy is to claim (for instance against the Labour opposition) that 'the people' (or 'everybody') does not support further immigration, which is also a well-known argumentation fallacy. More specifically in this debate, the populism strategy is combined with

the topos of financial burden: ordinary people (taxpayers) have to pay for refugees. Of the many instances of this strategy, we only cite the following:

(21) It is wrong that ratepayers in the London area should bear an undue proportion of the burden of expenditure that those people are causing (Gorman).

POSITIVE SELF-PRESENTATION (SEMANTIC MACROSTRATEGY). Whether or not in combination with the derogation of outgroups, group-talk is often characterized by another overall strategy, namely that of ingroup favoritism or positive self-presentation. This may take a more individual form of face-keeping or impression management, as we know them from familiar disclaimers ("I am not a racist, but . . ."), or a more collective form in which the speaker emphasizes the positive characteristics of the own group, such as the own party, or the own country. In the context of debates on immigration, such positive self-presentation will often manifest itself as an emphasis of own tolerance, hospitality, lack of bias, EMPATHY, support of human rights, or compliance with the law or international agreements. Positive self-presentation is essentially ideological, because they are based on the positive self-schema that defines the ideology of a group. Here is an example:

(22) I entirely support the policy of the Government to help genuine asylum seekers, but . . . (Gorman, C).

PRESUPPOSITION (MEANING). (*see* **Pragmatic Presupposition**.) Discourses are like the proverbial icebergs: most of their meanings are not explicitly expressed but presupposed to be known, and inferable from general sociocultural knowledge. Strategically, presuppositions are often used to assume the truth of some proposition when such truth is not established at all:

(23) I wonder whether the Hon. Gentleman will tell the House what mandate he has from the British people to share their citizenship with foreigners? (Gill).

VAGUENESS (MEANING). Virtually in all contexts speakers may use vague expressions, that is, expressions that do not have well-defined referents, or which refer to fuzzy sets. Vague quantifiers ('few,' 'a lot'), adverbs ('very') nouns ('thing'), and adjectives ('low,' 'high'), among other expressions may be typical in such discourse. Given the normative constraints on biased speech, and the relevance of quantification in immigration debates, we may in particular expect various forms of vagueness, as is the case for 'Goodness knows how much,' and 'widespread' in the following example:

(24) Goodness knows how much it costs for the legal aid that those people invoke to keep challenging the decision that they are not bona fide asylum seekers (Gorman, C).

VICTIMIZATION (MEANING). Together with DRAMATIZATION and POLARIZATION, discourse on immigration and ethnic relations is largely organized by the binary us–them pair of ingroups and outgroups. Thus, in order to emphasize the 'bad' nature of immigrants, people may tell horrible stories about poor nationals:

(25) Many of those people live in old-style housing association Peabody flats. They are on modest incomes. Many of them are elderly, managing on their state pension and perhaps also a little pension from their work. They pay their full rent and for all their own expenses. Now they are going to be asked to pay £35 to able-bodied males who have come over here on a prolonged holiday and now claim that the British taxpayer should support them.

The categories and examples shown above are not limited to racist or antiracist social ideologies, or to socialist or conservative political ideologies. Virtually all categories also apply to macho and feminist or pacifist or militarist ideologies and their discourses. That is, they are rather general resources that groups and their members acquire and use in order to account for and defend their ideas and social practices. Indeed, we need not learn totally new ways of ideological talk and text as soon as we become a member of or identify with another social or political group.

Conclusions

There is a close relationship between discourse, ideology and politics, in the sense that politics is usually discursive as well as ideological, and ideologies are largely reproduced by text and talk. Traditionally, ideologies are vaguely and negatively defined in terms of 'false consciousness'. In a more contemporary, multidisciplinary approach, ideologies are described in terms of the axiomatic foundation of the social representations shared by groups. Such general ideologies form the basis of more specific group attitudes, which in turn may influence group members' individual opinions, constructions or interpretations of specific events, as well as the social practices and discourses in which group members engage. In politics, ideologies specifically play a role to define political systems, organizations, movements, political practices and political cognition, all enacted or reproduced by political discourse. Underlying political ideologies are typically expressed in political discourse by emphasizing Our good things and Their

bad things, and by de-emphasizing Our bad things and their good things. Such a general strategy may be implemented at all levels of discourse. Thus, in examples from a debate on asylum seekers in British parliament we see that there are many ways ideologies may be expressed, for instance in the actor descriptions, fallacies, disclaimers, metaphors, comparisons, euphemisms, hyperboles, and so on.

See also: Context, Communicative; Counterfactuals; Critical Discourse Analysis; Distributed Cognition and Communication; Evidentiality in Grammar; Irony; Parliamentary Discourses; Pragmatic Presupposition; Taboo, Euphemism, and Political Correctness.

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Hans Jakob Polotsky was born on September 13, 1905 in Zürich, but spent his childhood in Berlin. As a schoolboy he taught himself Egyptian. He studied Semitic and (what then was called) Hamitic languages in Göttingen and Berlin. In 1929 he received his doctoral degree (in Göttingen), and embarked upon a university career. He first was a collaborator at the Göttingen institute for the critical edition of the Septuagint, specializing in the study of Biblical Coptic and Manichaean religion. In 1934 he emigrated to Palestine and became professor of Semitic languages and Egyptology at the Hebrew University of Jerusalem, where he contributed, together with Haiim B. Rosén, to the development of the Jerusalem structuralist school of linguistics. After a long and fruitful career as a university teacher, Polotsky died on August 10, 1991 in Jerusalem.

Although a specialist in Semitic languages; Egyptian and Coptic, Polotsky took a strong interest in general linguistics and was a close observer of the developments in European and American linguistics. A polyglot at home in various modern European, Semitic, and Ural-Altaic languages, he was also an excellent philologist who worked on dozens of extinct languages or language varieties. He was a follower of linguistic structuralism, and applied the techniques and methods of structuralist phonology and morphology to the study of Coptic and Egyptian. Moreover, early in his career, Polotsky elaborated a functional syntax (1944), which in several respects antedates the functional sentence perspective of the Prague school: he used a theme-rheme model, applying it to the relationship between form and content of a message. His insights into sentence structure in Egyptian, Coptic, and various Semitic languages (especially modern Syriac and modern Ethiopian dialects) were applied by a number of his students to Indo-European languages, to Modern Hebrew, and also to those languages on which Polotsky published (he also left an impressive collection of unpublished materials).

Polotsky's approach is basically a synchronic-typological one: he gives prominence to the functional study of means and strategies of formal expression and brings out patterns in the morphosyntactic organization of various languages. But he never dissociated synchrony and diachrony, and he used the results of comparative linguistics, dialectological research, and historical grammar in constant interaction with his synchronic and functional approach. Because of its focus on languages not commonly considered in structuralist and generativist work, Polotsky's work is, unfortunately, mostly ignored by general linguists outside Israel (where in 1965 he received the Israel Prize for his contribution to linguistic studies); the easiest access to it is through the *Collected papers* (1971).

See also: Ancient Egyptian and Coptic; Hebrew, Israeli; Semitic Languages; Structuralism; Syriac.

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Polysemy and Homonymy

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Polysemy and **homonymy** both involve the association of a particular linguistic form with multiple meanings, thus giving rise to **lexical ambiguity**.

Polysemy is rooted in a variety of semantic-pragmatic processes or relations through which meanings of words extend or shift so that a single lexical item (a **polyseme**) has several distinct senses. For example, *language* is **polysemous** in that it can be used to refer to the human linguistic capacity (*Language evolved gradually*) or to a particular grammar and lexis (*Learn a new language!*). The most clear-cut cases of polysemy (versus homonymy) involve **systematic** (or **regular**) **polysemy** (Apresjan, 1974), in which the relation between the senses is predictable in that any word of a particular semantic class potentially has the same variety of meanings. For example, words for openable coverings of apertures in built structures (*She rested against the door/gate/window*) are also used to refer to the aperture itself (*Go through the door/gate/window*). In **non-systematic** polysemy, the word's two senses are semantically related, but are not part of a larger pattern, as for *arm* of government versus human *arm*. Within the literature, theoretical considerations often lead authors to use *polysemy* to refer only to either systematic or non-systematic polysemy, and so the term must be approached with caution.

Homonyms, in contrast, are distinct lexemes that happen to share the same form. They arise either accidentally through phonological change or lexical borrowing, or through some semantic or morphological drift such that a previously polysemous form is no longer perceived as being 'the same word' in all its senses. *Tattoo*$_1$ 'an ink drawing in the skin' and *tattoo*$_2$ 'a military drum signal calling soldiers back to their quarters' provide a clear example of homonymy, in that the two words derive respectively from Polynesian *ta-tau* and Dutch *taptoe* 'turn off the tap' (which was also used idiomatically to mean 'to stop'). The formal identity of homonyms can involve both the phonological and the written form, as for *tattoo*. **Homophones** need only be pronounced the same, as in *tail* and *tale*, and **homographs** share written form, but not necessarily phonological form, as in *wind* /wɪnd/ and *wind* /waɪnd/. Homographs that are not homophones are also called **heteronyms**.

Polysemy and homonymy are generally differentiated in terms of whether the meanings are related or not: while polysemous lexical items involve a number of related meanings, homonyms, as accidentally similar words, do not have any semantic relation to each other. However, as discussed below, a clear distinction between polysemous and homonymous items remains difficult to draw. Nevertheless, the need to distinguish between them remains. For lexicographers, the distinction generally determines how many entries a dictionary has – homonyms are treated as multiple entries, but all of a polyseme's senses are treated in one entry. For semanticists wishing to discover constraints on or processes resulting in polysemy, weeding out the homonymous cases is necessary. For those wishing to model the mental representation of lexical knowledge, the issue of semantic (un)relatedness is similarly important.

Another definitional issue concerns the distinction between polysemy and **vagueness**, in which a lexical item has only one general sense. (Some authors refer to this as **monosemy**.) This raises the question of how different two usages of the same form need to be to count as distinct polysemous senses rather than different instantiations of a single underlying sense. For example, the word *cousin* can refer to either a male or a female, but most speakers (and linguists) would not view *cousin* as having distinct 'male cousin' and 'female cousin' senses. Instead, we regard it as vague with respect to gender. A number of different methodologies and criteria have been used to draw the line between polysemy and vagueness, but these are not uncontroversial. The distinction is also influenced by theoretical assumptions about the nature of lexical meaning; thus, demarcation of senses is one of the more controversial issues in lexical semantics.

Evidence Used in Differentiating Homonyms and Polysemes

The kinds of evidence used for differentiating polysemous and homonymous items can be roughly divided into two types: evidence regarding the relatedness of the meanings involved and evidence regarding any formal (morphosyntactic or phonological) differences in the linguistic form that correspond to the distinct senses.

The key principle for distinguishing polysemes and homonyms involves the relatedness of the meanings associated with the linguistic form: unrelated meanings indicate homonymy whereas related meanings imply polysemy. Relatedness can either be determined diachronically by establishing if the senses have a common historical origin, or synchronically – and neither method is unproblematic. The simplest

criterion for synchronic relatedness is whether or not the senses participate in the same semantic field (*see* **Lexical Fields**). On this criterion, metonymically related senses such as *bench* 'place where the judge sits' and 'the judge' are polysemous, but metaphorically related senses such as *foot* 'body part' and 'bed part' are not. Nevertheless, the two senses of *foot* here are usually considered to represent polysemy, as the more usual methodology for determining synchronic relatedness involves individuals' intuitions. Intuitive judgements of semantic relations are, however, always subjective, and it may be questioned whether people's metalinguistic reasoning about meaning relations can reflect how lexical meaning is mentally represented. Historical evidence has in its favor the fact that etymological relations are often less equivocal; but many approaches consider such evidence irrelevant to questions of mental representation, as etymological information is not part of most speakers' competence. Furthermore, diachronic and synchronic evidence can be contradictory. In some cases, despite the fact that the different senses are etymologically related, native speakers today perceive no semantic relation. Such is the case with the classic homonym *bank*; the two senses 'financial institution' and 'a raised ridge of ground' can be traced back to the same proto-Germanic origin. There are also instances where at least some speakers perceive a synchronic relation in words with no shared history. For example, *ear* 'hearing organ' and *ear* (*of corn*) are perceived by some speakers to be metaphorically related, analogous to other body-part metaphors, but in fact they have separate sources.

Formal criteria are also used to distinguish homonymy and polysemy. One criterion, adopted widely in lexicography, is that polysemous senses should belong to the same grammatical category. Thus, noun and verb senses of words such as *waltz*, derived through zero derivation (conversion), might be considered distinct lexical items, and therefore homonyms. Similarly, the potential for different plural forms for the meanings of *mouse*, 'small rodent' and 'a computer input device' (*mice* and *mouses*, respectively), could indicate that the distinct senses reflect distinct homonymous lexemes. However, the formal criterion often conflicts with the semantic criteria. One can easily see the semantic connection between *waltz* (n.) and *waltz* (v.) as part of a pattern of regular polysemy (where any noun denoting a type of dance can also be a verb meaning 'to perform that dance'), and most people appreciate the metaphorical connection between the two types of *mouse*. But for some approaches to the lexicon, any morphological differences associated with different senses of the form force its treatment as a homonym, resulting in etymologically related homonyms. The contradictions of the formal, diachronic, and synchronic semantic criteria have led some to abandon strict distinctions between homonyms, polysemes, and vague lexemes. Tuggy (1993) proposes a continuum between these categories, which relies on variable strengths of association among meanings and forms.

Theoretical Approaches to Polysemy and Homonymy

While we have so far attempted a theory-neutral definition and description of polysemy and homonymy, variability in the interpretation of these terms is often at the heart of the contrasts among theoretical approaches. The approach is often determined by the range of phenomena considered (and *vice versa*) – for instance some models define *polysemy* as equivalent to *systematic polysemy* and treat irregular cases as tantamount to homonymy.

In early generative theory, attempts were made to treat polysemy as the product of synchronic derivational processes. The lexical representation of a word would include a meaning, and further meanings could be derived via lexical rules that operate on some semantic class of words (e.g., McCawley, 1968; Leech, 1974). Leech (1974) notes that such rules are limited in their productivity, and can be seen as motivating but not predicting new senses of words. The assumption of a basic meaning from which additional meanings are derived continues as a theme in some **pragmatic** approaches to polysemy. For instance, Nunberg (1978) posits that words have lexical meanings but that they can be used to refer in various ways based on a number of conventional referring functions that allow language users to effect different sense extensions. Thus, a referring function that relates producers with their products predicts the interpretation of *Chomsky* (primary reference is to a person) as 'the works of Chomsky' in *Chomsky is hard to read*. Other theorists have taken the position that word meaning is radically underspecified in the lexicon (e.g., Bierwisch, 1983) or extremely general in sense (Ruhl, 1989) and that semantic or pragmatic factors allow for more specific interpretations in context. Such an approach is Blutner's (1998) Lexical Pragmatics, where lexical meaning is highly underspecified. Meanings are enriched by a pragmatic mechanism that specifies which particular concepts the word refers to in a particular use based on contextual factors. Such approaches erase the distinction between polysemy and vagueness.

The **generative lexicon** (Pustejovsky, 1995) is an approach to lexical semantics that emerges from computational linguistic work. Sense disambiguation

presents a key challenge for natural language processing and drives much current polysemy research. In this theory, systematic polysemy is generated by lexical rules of composition that operate on semantic components specified in the representation of lexical items (and so it could be seen as a development from the early generative approaches). The main concern is to account for regular types of meaning alternation (such as the aperture-covering alternation of *door* and adjectival meaning variation, as in *fast car, fast typist, fast decision, fast road,* etc.) in a manner that avoids the problems of simple enumeration of word senses in the lexicon and explicates the systematic nature of meaning variation in relation to the syntagmatic linguistic environment. The meaning variation of *fast*, for example, is accounted for by treating the adjective as an event predicate which modifies an event that is specified as the head noun's function as part of its compositional lexical representation.

Another significant strand of polysemy research proceeds within **Cognitive Linguistic** approaches (*see* **Cognitive Linguistics; Cognitive Semantics**). The general aim is to study the kinds of conceptual processes that motivate the multiple meanings of linguistic forms and how these meanings may be grounded in human experience. As it is argued that lexical categories exhibit the same kind of prototype structure as other conceptual categories, the relations of polysemous senses are usually modeled in terms of radial, family resemblance categories. In these polysemy networks, the senses are typically either directly or indirectly related to a prototypical sense through such meaning extensions processes as conceptual metaphor and metonymy and image-schema transformations (Lakoff, 1987). As Cognitive Linguists also assume that all of linguistic structure, including grammar, is meaningful, some work within this approach has extended the applicability of the notions of polysemy and homonymy beyond lexical semantics to grammatical categories and constructions (Goldberg, 1995) (*see* **Construction Grammar**). While most other approaches dismiss homonymy as accidental and uninteresting, the relevance of diachronic processes to meaning representation in Cognitive Linguistics means that making hard and fast distinctions between homonymy, polysemy, and vagueness is not necessary (Tuggy, 1993; Geeraerts, 1993).

Polysemy and homonymy thus represent two central notions in lexical semantics, inspiring active research interest.

See also: Cognitive Linguistics; Cognitive Semantics; Construction Grammar; Lexical Fields; Lexical Semantics: Overview.

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Polysynthetic Language: Central Siberian Yupik

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An Overview of the Central Siberian Yupik Word

Central Siberian Yupik (CSY) is a representative language of the Yupik branch of the Eskimo-Aleut family. It is spoken by over 1000 people on St. Lawrence Island, Alaska and Chukotka, Russian Far East (de Reuse, 1994; Nagai, 2004). Like all Eskimo languages, CSY is, from a typological point of view, extreme because of its high level of polysynthesis, and the fact that it is almost exclusively suffixing (Woodbury, 2002: 98). There is no compounding, and CSY has only one prefix, occurring as a lexicalized element on demonstratives. The structure of the Eskimo noun or verb word can be schematized as follows:

(1) Base + postbases^n + ending + enclitic^m

The base is the lexical core of the word; it can be followed by a number n of postbases. The value of n is between 0 and a theoretically infinite number, but $n > 6$ is quite rare. Postbases are traditionally considered derivational suffixes and combine with the base to form a new base. The obligatory ending is inflectional, marking case, number, and possession for nouns, marking mood, person, and number of subject for intransitive verbs, and marking mood, person and number of subject and person and number of object for transitive verbs. Although there are about 1200 inflectional endings for ordinary verbs (Woodbury, 2002: 81), it is not the richness of inflection that characterizes CSY as a polysynthetic language, since its inflection is not very different from that found in Latin or Ancient Greek. Enclitics, of which there are 12, can follow the ending. They are syntactic particles that form a phonological word with the immediately preceding word. The value of m is between 0 and 4. Example (2) is an analysis of a CSY word that illustrates the structure in Schematic (1) (abbreviations: V, verb; PST, past tense; FRUSTR, frustrative ('but . . ., in vain'); INFER, inferential evidential (often translatable as 'it turns out'); INDIC, indicative; 3S.3S, third-person subject acting on third-person object):

(2) neghyaghtughyugumayaghpetaallu

negh-	-yaghtugh-	-yug-	-uma-
eat	go.to.V	want.to.V	PST
-yagh-	-pete-	-aa	=llu
FRUSTR	INFER	INDIC.3S.3S	also

'Also, it turns out she/he wanted to go eat it, but. . .'.

In Example (2), only the base *negh-* and the inflectional *-aa*, are obligatory. Any or all of the other suffixes, which are postbases, can be left out. The element *=llu* is an enclitic.

Polysynthesis Illustrated by CSY Postbases

Since the postbases account for the polysynthesis of CSY, we will focus on their characteristics. A first characteristic is the full productivity of most (but not all) postbases. The five postbases of Example (2) are fully productive. So, picking between one and five postbases from the five in Example (2), it is possible to generate 30 different words. For semantic reasons, it happens to be the case that the order of elements has to be *-yaghtugh-yug-uma-yagh-pete-*. There are no clear morphological position classes to be set up in CSY. A second characteristic of some CSY postbases is recursion, as illustrated by Example (3):

(3) iitghesqesaghiisqaa

itegh-	-sqe-	-yaghtugh-
come.in	ask.to.V	go.to.V
-sqe-	-aa	
ask.to.V	INDIC.3S.3S	

'He$_i$ asked him$_j$ to go ask him$_k$ to come in'.

The postbase *sqe-* 'ask to.V' is used recursively. A third characteristic of some CSY postbases is that they can display variable order with respect to each other without resulting differences in meaning. This is illustrated with Examples (4) and (5):

(4) aananiitkaa

aane-	-nanigh-	-utke-
go.out	cease.to.V	V.on.account.of
-aa		
INDIC.3S.3S		

'He ceased going out on account of it'.

(5) aanutkenanighaa

aane-	-utke-	-nanigh-
go.out	V.on.account.of	cease.to.V
-aa		
INDIC.3S.3S		

'He ceased going out on account of it'.

Even though generally in CSY the rightmost postbase has scope over what is on the left, that principle does not seem to be working in Examples (4) and (5). These two sentences mean exactly the same thing and were uttered within three lines of each other in a story (de Reuse, 1994: 93). A fourth characteristic of postbases is that they can interact with the syntax, and attach to elements functioning as independent syntactic atoms. This is illustrated in Example (6)

Table 1 Criteria of inflection, derivation, productive postbases, and syntax

Feature	*Inflection*	*(Nonproductive) derivation*	*Productive postbases*	*Syntax*
[1] Productive?	Yes	No	Yes	Yes
[2] Recursion possible?	No	No	Yes	Yes
[3] Necessarily concatenative?	No	No	Yes	Yes
[4] Variable order of elements possible in some instances?	No	No	Yes	Yes
[5] Interaction with syntax possible?	Yes	No	Yes	Yes
[6] Lexical category changing possible?	No	Yes	Yes	Yes

(abbreviations: ABS, absolutive; 2S.S, second-person singular possessor, singular possessum; INTRANS, intransitive; PARTL, participial mood (often nominalizing in Eskimo); ABL, ablative; N, noun; 3S, third-person singular subject):

(6) Atan aangelghiimeng qikmilguuq.
ata- -n aange- -lghii-
father ABS.2S.S be.big INTRANS.PARTL
-meng qikmigh- -lgu- -uq
ABL.S dog have.N INDIC.3S
'Your father has a big dog'.

As Sadock (1980, 1991) demonstrated on the basis of parallel structures in Greenlandic Eskimo, the noun-incorporating postbase *-lgu* 'have.N' acts like a morphologically intransitive verb, and like other intransitive verbs, it can occur with a direct object in an oblique case (here the ABL). Since postbases cannot attach to inflected words, the ABL case marking cannot occur on *qikmigh-* 'dog,' but it does show up in the stranded modifier *aangelghiimeng* 'big.' This is expected, since CSY modifiers agree in case with their heads. At the syntactic level then, *aangelghiimeng qikmigh-* 'big dog' forms a phrasal constituent to which the *-lgu-* is attached.

A fifth characteristic of postbases is that they not only derive verbs from verbs (as in Examples (2)–(5)), or nouns from nouns (shown in Example (7)), but also verbs from nouns, as in Example (6), and nouns from verbs, as in Example (7). This is, of course, expected behavior for derivational morphology. Example (7) contains the verb *yughagh-* 'to pray', changing to a noun *yughaghvig-* 'church', changing to another noun *yughaghvigllag-* 'big church', and changing back to a verb *yughaghvigllange-* 'to acquire a big church' (abbreviation: 3P, third-person plural subject).

(7) yughaghvigllangyugtut
yughagh- -vig- -ghllag- -nge-
pray place.to.V big.N acquire.N
-yug- -tut
want. to.V INDIC.3P
'They want to acquire a big church.'

As noted earlier, not all postbases are productive. The postbase *-vig-* 'place to.V,' is an example of a nonproductive postbase, since it lexicalized with 'pray' to mean 'church,' and not the completely predictable 'place to pray,' i.e., any place to pray. The postbases that follow *-vig-* are completely productive. There are over 400 productive postbases in CSY, and several hundred nonproductive ones.

Productive Postbases: Neither Derivation nor Inflection?

The survey of the characteristics of productive postbases just provided casts some doubt on their status as elements of derivational morphology. Certainly, the nonproductive postbases behave like elements of derivational morphology. Regarding productive postbases, consider Table 1, a chart of criteria distinguishing inflection, (nonproductive) derivation, productive postbases, and syntax. The productive postbases, even though bound, have six features in common with syntax; they also have one (feature [6]) in common with derivation, and two (features [1] and [5]) in common with inflection. In the following explanations, the term 'elements' will be used instead of 'productive postbase' or 'words,' in order to have a term covering both morphology and syntax. The criteria of the six features are intended to show that elements such as productive postbases are syntax-like. Presumably the criteria in Table 1 are not independent of each other, but it is not yet clear which has to be derived from which.

Productivity (feature [1]) means that there are no idiosyncratic restrictions on the use of the element. Thus, its presence is conditioned by semantic plausibility only, and not by selectional restrictions. Certainly in CSY, and for many polysynthetic languages, the elements are so numerous that it is very unlikely that native speakers would have the ability to memorize the existing sequences and store them in the lexicon (Fortescue, 1980; de Reuse, 1994). Inflection,

of course, is also completely productive, but only within a paradigm. The claim is that derivational morphology is never fully productive. Since some of what is traditionally called 'derivational morphology' is productive, we are, in effect, changing the definition of derivational morphology, so that fully productive elements of derivational morphology are no longer part of it.

Recursion (feature [2]) means that the same element can potentially occur more than once within the same word (which is the case with productive postbases), or within the same sentence (which is the case in syntax), its presence again conditioned by semantic plausibility.

Concatenative (feature [3]) means that the elements are going to be in some linear order. Neither nonconcatenative morphology, such as suppletion, nor Semitic style morpheme internal change is expected to exist instead of postbases. Similarly, nonconcatenative syntax does not exist.

Variable order (feature [4]) means that, in some cases, the order of elements can be free. Just as in free word order in syntax, some productive postbases can be freely ordered, most likely constrained by pragmatic factors only. This is impossible in derivation.

Interaction with syntax (feature [5]) has to do with relationships between the productive postbases and elements of syntax. As is well known (Anderson, 1982), inflection interacts with syntax, as in agreement or case marking. Derivation does not interact with syntax, but productive postbases do interact with syntax. And obviously, syntax interacts with itself.

Lexical category changing (feature [6]) means that the element can change the lexical category in the morphology. Derivational morphology can do this, but inflectional morphology does not. Here, postbases behave like derivational morphology. In a parallel fashion, in the syntax, the addition of an element can change the phrasal category. For example, *very good* is an adjective phrase, but *very good quality* is a noun phrase.

These characteristics of Eskimo productive postbases lead us to suggest the existence of a branch of morphology, which is neither inflection, nor derivation, that we will call 'productive noninflectional concatenation,' or PNC (PNC was called 'internal syntax' in de Reuse (1992)). The term 'concatenation,' rather than 'affixation,' is used to highlight the fact that PNC can be affixal (as in Eskimo) or compounding. It is proposed that the existence of large amounts of PNC elements is a valid way of characterizing polysynthetic languages.

Consequences for a Productive Noninflectional Concatenation View of Polysynthesis for Morphological Theory

The proposal that polysynthesis can be characterized in terms of PNC has consequences for morphological theory. If it is assumed, for example, that productivity is definitional of PNC, it is necessary to account for productive affixation in nonpolysynthetic languages. Indeed, some of the affixes traditionally called derivational in Indo-European languages are completely productive, and among these productive ones, some are recursive as well. Examples of productive and recursive prefixes in English are *anti-*, as in *antiabortion*, *antiantiabortion*, etc., or, more marginally, *re-*, as in *rewrite*, *rerewrite*, etc. The diminutive suffix of Dutch, *-je*, is completely productive. The diminutive of Dutch contrasts starkly with the diminutive suffixes of French (*-et*, *-ette*), and the diminutive suffixes of English (*-ette*, *-let*, *-kin*, *-ling*), which are unproductive. As a result, *anti-*, *re-*, and the Dutch diminutive must be considered to be PNC elements, rather than derivational ones. The difference with polysynthetic languages is a quantitative one. European languages have just a few elements of PNC. Mildly polysynthetic languages (such as found in the Arawakan and Siouan families) have more than a dozen of such elements, solidly polysynthetic languages (such as found in the Caddoan and Wakashan families) have over 100 of such elements, and extreme polysynthetic languages (i.e., the Eskimo branch of Eskimo-Aleut) have several hundreds of such elements.

Within polysynthetic languages, it will also be necessary to distinguish between their nonproductive morphology (derivation or compounding) and PNC. According to Mithun and Gorbett's research (1999) on noun incorporation in Iroquoian, speakers can often tell which combinations are being used and which ones are not being used. If that is so, some of the noun-incorporating morphology of Iroquoian is not productive, and should not count for considering the language polysynthetic. Similarly, a distinction must be made, in Eskimo, between nonproductive postbases, such as *-vig-* 'place to.v,' as in Example (7), which do not count for considering the language polysynthetic, and the elements of PNC, i.e., the productive postbases, for which the question of which combinations are used or not used cannot be reasonably answered.

See also: Arabic as an Introflecting Language; Chinese as an Isolating Language; Finnish as an Agglutinating Language; Italian as a Fusional Language; Russian Federation: Language Situation; United States of America: Language Situation.

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Pomoan Languages

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The seven Pomoan languages are or were spoken north of San Francisco, in the many verdant valleys of the Coast Range mountains. (See **Figure 1**.) Especially densely populated were the large valleys through which the Russian River runs and those around Clear Lake, as were the foothills of the Coast Range in the south around Santa Rosa and Sebastopol.

Names

There was no single 'Pomo' tribe or language, although maps and authors frequently so indicate. Each of the seven languages was spoken by residents of at least one, and usually several, politically independent towns, of which some 75 are known. By 2004, these have become amalgamated into 19 distinct federally recognized tribes. Speakers of the seven languages did not have a single name for themselves or for the family of languages as a whole. The name 'Pomo,' which now has that function, was first used to refer to this family by Stephen Powers (1877: 5, 146), and has become increasingly used in the 20th century. It derives from two distinct but similar sounding Northern Pomo terms, one the name of an earlier single town (See McLendon and Oswalt, 1978 for details).

English names for the individual languages were developed by Samuel A. Barrett (1908), modeled on native systems of referring to neighboring languages. The language spoken around the modern town of Ukiah, in the center of Pomoan territory, Barrett called Central Pomo. To the north was Northern Pomo; to the northeast on the edge of the Sacramento Valley, Northeastern Pomo. To the east, on the western portion of Clear Lake, was Eastern Pomo, and southeast at East Lake and Lower Lake, Southeastern Pomo. To the south of Central Pomo were Southern Pomo, and Southwestern Pomo. This last has a native name, *k'ahšá.ya*, anglicized as Kashaya, which is now preferred.

Unfortunately Barrett, in the style of the times, referred to these seven languages as dialects, even though they are distinctly different, mutually unintelligible, languages. This has led to all seven languages commonly being thought to be mere variations of a single language. In fact, speakers of one language could not understand speakers of any of the others without a considerable period of learning, and all but one of these languages were each spoken in several dialects.

Internal Relations

Classifications of the interrelationships of these languages have been proposed by Barrett (1908: 100), Alfred Kroeber (1925: 227), Abraham Halpern (1964: 90), and Robert L. Oswalt (1964: 416). Halpern was the first phonetically competent linguist to collect data on all seven languages. He proposed two slightly different classifications based on sound shifts that he identified but never published. Oswalt (1964: 413–427) based his classification on a comparison of the 100-word lexicostatistical basic word

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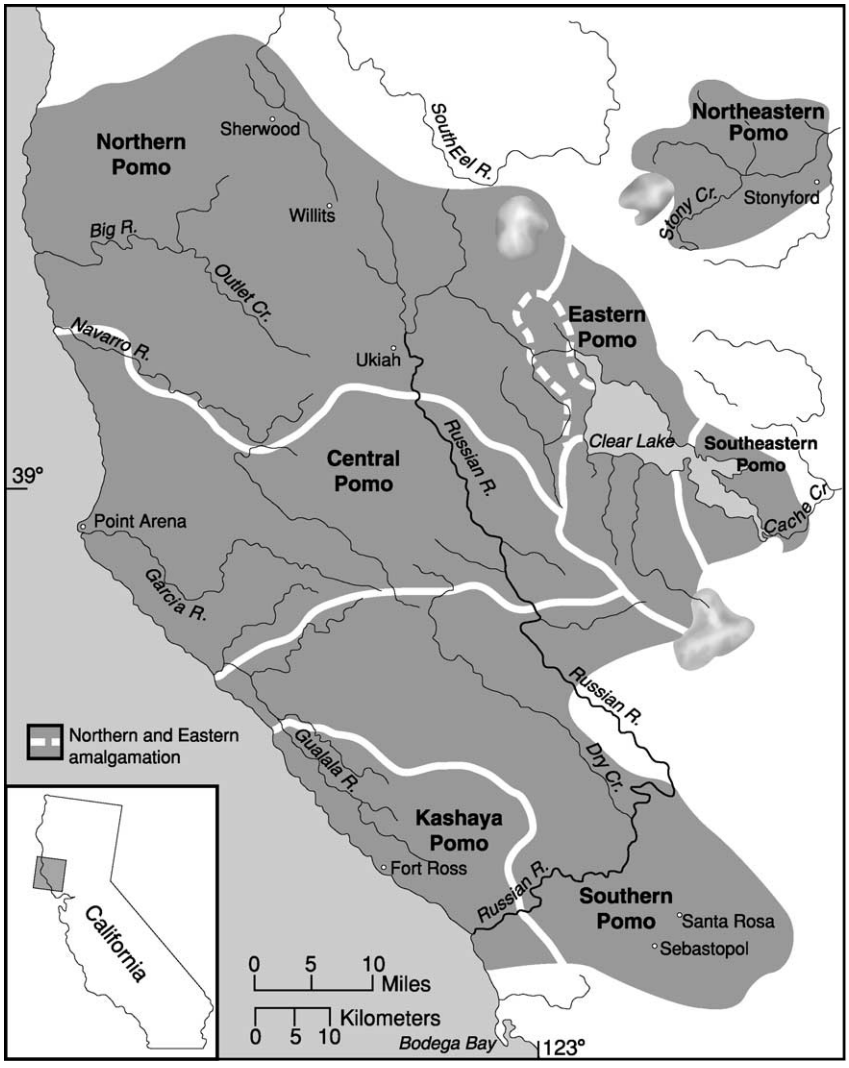

Figure 1 Probable territories of the seven Pomoan languages at the end of the 18th century around the time of first contact with Europeans. Adapted from Figure 2, p. 276 of the *Handbook of North American Indians*, California-8 (Washington, D.C.: Smithsonian Institution, 1978).

list in each of the seven languages. Halpern and Oswalt agree in identifying Eastern Pomo and Southeastern Pomo as the most divergent, and Southern Pomo and Kashaya as closely related. They differ in the position they assign the geographically isolated Northeastern Pomo, and their conception of the relationship between the three languages spoken in wide contiguous bands from the Russian River to the Pacific: Northern Pomo, Central Pomo, and Southern Pomo. (See Figures 1 and 2.)

Significant intermarriage between neighboring towns and the tradition of sending children to be raised by grandparents for extended periods resulted in more than one language being spoken in each town, and children having an easy familiarity with more than one language (McLendon, 1978b). This may have had a leveling effect on the languages in contact along the Russian River.

State of Descriptive Knowledge

As of 2004, modern linguistic fieldwork has been carried out on all seven languages, with grammars and articles published on Eastern Pomo (McLendon, 1975, 1978a, 1979, 1982, 1996, 2003), Southeastern Pomo (Moshinsky, 1974), and Northern Pomo (O'Connor, 1984, 1990, 1992). For Kashaya, an extensive unpublished grammar (Oswalt, 1961) exists, as well as articles (Oswalt, 1983, 1986, 1998). Extended field work has been carried out on Central Pomo, with various aspects of the language described in articles. (Mithun, 1988, 1990, 1993,

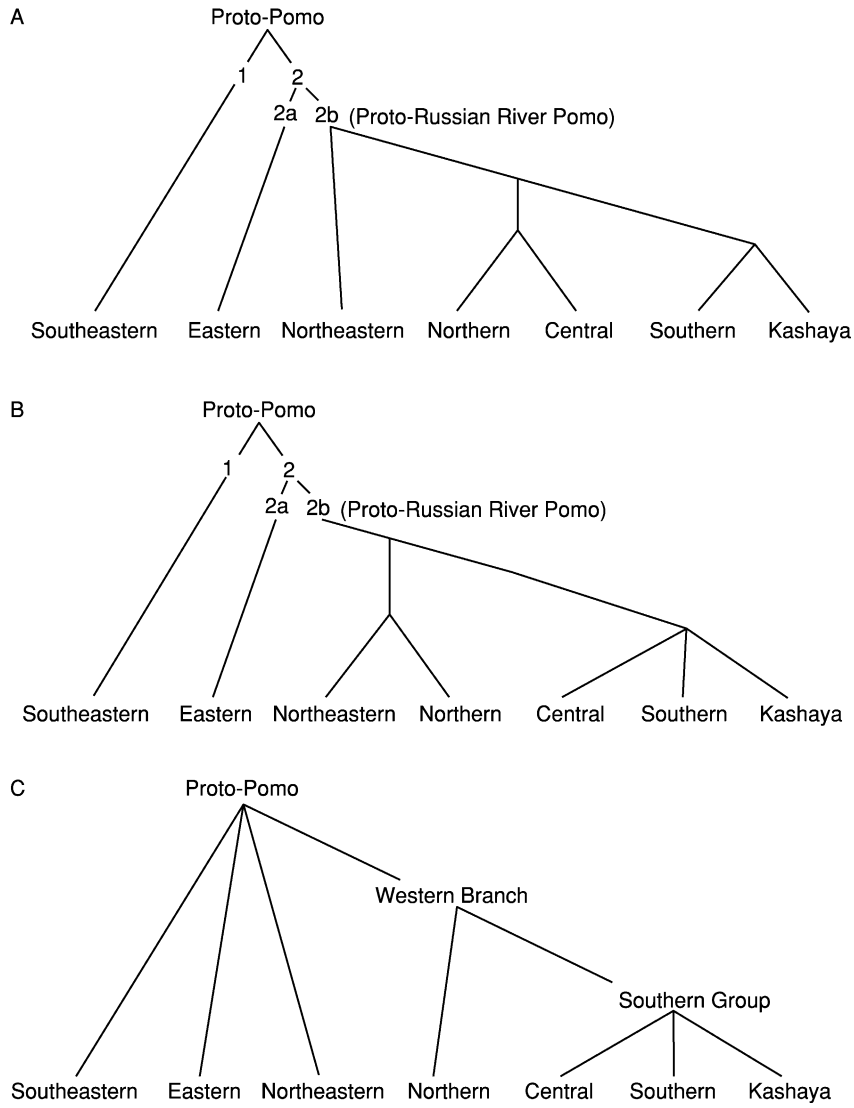

Figure 2 Proposed interrelationships between the seven Pomoan languages. A, B, Two alternative classifications proposed by A,M, Halpern, 1964. C, Classification proposed by R. Oswalt, 1964. After Figure 1, p. 275 of the *Handbook of North American Indians*, California-8 (Washington, D.C.: Smithsonian Institution, 1978).

1998). Extensive fieldwork has been carried out on Southern Pomo by Halpern and Oswalt, very little of which has been published (Oswalt, 1977 provides a text with a grammatical sketch). This is unfortunate, since a clear understanding of Southern Pomo is especially important for the reconstruction of Proto Pomo. The least amount of work, all unpublished, has been done on Northeastern Pomo, which ceased to be spoken in the middle of the 20th century. Ironically, the seven Pomoan languages began to be adequately studied and described only in the mid–20th century, just as speakers were switching to English as their primary means of communication. In 2004, this process of replacement is virtually complete, although several contemporary tribes have now initiated language revitalization efforts.

Basic Characteristics of the Pomoan Languages

Phonology

The seven Pomoan languages have far more consonants than English. Unaspirated, aspirated, and glottalized (or ejective) stops contrast at labial (*p*, *p*^{h}, *p*'), dental (*t*, *t*^{h}, *t*'), alveolar (*ṭ*, *ṭ*^{h}, *ṭ*') , palatal (*c*, *c*^{h}, *c*'), velar (*k*, *k*^{h}, *k*'), and postvelar (*q*, *q*^{h}, *q*') places of articulation, in Kashaya, Central Pomo and

Eastern Pomo (which, however lacks q^h). Compare, for example, the contrasting Eastern Pomo set: *kóy* 'sore,' *k^{h}ól* 'worm,' *ḳóy* 'in/with the stomach,' *qóy* 'swan,' *q'oy* 'nape of neck.'

Southeastern Pomo contrasts voiceless stops with glottalized ones at the same places of articulation; voiceless aspirated stops have become fricatives in Southeastern Pomo. Compare Southeastern Pomo *mfeṭ*: Eastern Pomo *nu·p^{h}ér*: Central Pomo *mp^{h}é·*: Southern Pomo *nu·p^h·é*: Kashaya Pomo *nup^{h}é·*: Northeastern Pomo *fé·*[-*ka*] 'skunk'. Southern Pomo, Northern Pomo and Northeastern Pomo have the same contrasts at the same places of articulation (except Northeastern Pomo has *f* instead of *p^h*), but lack the velar/post-velar distinction (Northern Pomo has no *č^h*). Southern Pomo, Northern Pomo and Eastern Pomo have an additional pre-palatal affricate series (*c*, *c^h*, *c'*) that pattern like stops (Northern Pomo lacks *c^h*). Kashaya and Central Pomo have only c'. All seven languages have a glottal stop.

All seven languages distinguish two voiced stops: *b* and alveolar *d*, and the fricatives: *s*, *š*, and *h*. Northeastern Pomo and Southeastern Pomo add a rare *f*, from earlier Proto Pomo *p^h. Eastern Pomo and Southeastern Pomo have a velar fricative *x*, Southeastern Pomo adds a postvelar fricative *x̣*. The sonorants/resonants are m, n, l, y, w with a rare r in Eastern Pomo. Eastern Pomo alone contrasts voiced *m*, *n*, *l*, *y*, *w* with voiceless *M*, *N*, *L*, *Y*, *W*. Compare, for example, *la·l* 'month': *La·l* 'goose.' All languages have a five-vowel system with two degrees of length.

Grammar

The seven Pomoan languages are agglutinative, with extensive, complex morphologies and striking semantic specialization. The basic morphological unit is the stem, with verbal or nonverbal function specified by inflectional suffixes and/or syntactic relations. The verb is morphologically the most complex and syntactically the most important category, being the only obligatory member of an independent clause. Verbs are composed of a stem plus a varying number of classes of suffixes that add both lexical and grammatical meaning. These suffixes specify aspects, modes, plurality, locality, reciprocity, source of information (evidentials) and various types of syntactic relations, including the continuation or change in the referent and case roles of the agent and patient of a preceding clause (often called switch-reference). The verb is last in its clause, although under certain conditions, arguments can be postposed following it.

Kashaya and Eastern Pomo have well-developed sets of what have been called instrumental prefixes with the shape CV, where V is i, a, or u. They indicate the undergoer/patient of the action, and type or manner of action, as well as the instrument. These combine with roots to form stems. In Northern Pomo, Central Pomo, Southern Pomo, and Southeastern Pomo, vowels in initial syllables are elided or assimilated, collapsing what are historically several prefixes into a single consonant, obscuring the system.

The Pomoan languages are stative-active languages, most of an unusual type that can be called fluid stative-active. That is, verbs can appear with an argument in either the agentive or the patient case, depending on the speaker's perception of the degree of control the protagonist had in the action. Thus in Eastern Pomo, one can say:

ha· c'e·xél-k-a
1SG.AG *slip/slide-PUNCTUAL-DIRECT*
'I'm sliding (as on a sled or skis, deliberately)'

or:

wi c'e·xél-k-a
1SG.Pat *slip/slide-PUNCTUAL-DIRECT*
'I'm slipping (accidentally, as on a banana peel, or patch of ice)'

Clauses are combined to describe interrelated sequences of events by affixing one of a number of so-called switch-reference suffixes that indicate simultaneity, sequentiality, causality, or contingency as well as the continuation or change of the protagonists involved and their case roles. Clauses are nominalized by affixing inflectional case marking at their end.

All seven languages identify the sorts of evidence on which an assertion is based, but they differ in the number of distinctions made and the forms used to make them. In Eastern Pomo, for example, suffixes distinguish claims based on (a) direct sensory evidence, (b) someone else's reporting, (c) inferences from circumstantial evidence, or (d) direct knowledge. Evidentials were especially elaborated in Kashaya, Southern Pomo, and Central Pomo (see McLendon, 2003 for details).

Among nonverb classes, kinship terms and pronouns always refer to human animates and are inflected for several cases: agent, patient, possessive, usually commitative, and in some languages, vocative. Personal names existed, but were not used in address or polite reference, an appropriate kin term being preferred. When kin terms were not appropriate, a small closed class of nouns referring to humans of both sexes in various age grades (boy, girl, young lady, young man, man, woman, old man, old woman), usually having suppletive plural stems, were used.

Historical Relationships

Many cognates can be found between the seven languages, demonstrating clear sound correspondences. These usually involve small shifts in sound: either adjustments in place of articulation – postvelars becoming velars, for example, or in manner of articulation – aspirated voiceless stops becoming fricatives. Much more sweeping in their effects are the prosodically conditioned syntagmatic changes that largely affect vowels in particular positions.

If one only looks at lexical comparisons, the languages seem extremely close. However, they show considerable differences in grammatical structure. When the same category exists, it is frequently expressed by a totally different, not cognate, form in the various languages. When languages have reflexes of the same morpheme, that morpheme may well behave in quite different ways or occur in different relative positions (see McLendon, 1973 and Oswalt, 1976 for details).

See also: Active/Inactive Marking; Hokan Languages; United States of America: Language Situation.

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Ponca *See:* Omaha-Ponca.

Ponka *See:* Omaha-Ponca.

Pop, Sever (1901–1961)

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Born on July 27, 1901, in Poiana Ilvei, Romania, Pop studied Romance linguistics at the University of Cluj (1919–1923), with S. Puşcariu, T. Capidan and N. Drăganu. He obtained his Ph.D. in 1925, while teaching in a business school, and received a scholarship in order to study in Paris with A. Meillet, J. Vendryes, M. Roques, A. Thomas, O. Bloch, and especially J. Gilliéron at the École pratique des hautes études. Impressed by the latter's teaching, Pop decided to devote his career to dialect research. He acquainted himself with dialects and dialect research in France, Spain, and Italy, and also established contacts with Portuguese scholars, before returning to his home country.

From 1929 to 1941 he was lecturer, then professor of dialectology in Cluj (1929–1939), Cernăuti (1939–1940), and Bucharest (1940–1941). This was a period of intensive fieldwork, linguistic and ethnographic, partly in collaboration with E. Petrovici, and under the guidance of S. Puşcariu, within the frame of activities sponsored by the Museum of the Romanian Language in Cluj. Pop's research covered Daco-Romanian, Aromanian, Megleno-Romanian, and Istro-Romanian; the results of his detailed inquiries were systematized in the first two volumes (on parts of the body and on family terms) of the *Atlasul lingvistic român* (1938a, 1942a), and the corresponding first two volumes of the condensed and reorganized version, *Micul atlas lingvistic român* (1938b, 1942b).

During World War II Pop became Director of the Romanian School in Rome, where he stayed until 1947. The changed political and religious climate in his native country forced him to become a political exile, and he accepted a visiting professorship (1948) at the University of Leuven, where he became extraordinary professor of Romance linguistics and dialectology in 1953 and where he stayed until his untimely death on February 17, 1961. In Leuven Pop published his life work, *La dialectologie*, a very well-informed and detailed overview of dialect research, in the Romance field and outside; he founded the Centre international de dialectologie générale (C.I.D.G.) and created *Orbis: Bulletin international de documentation linguistique*, a journal for dialectology, general linguistics, and linguistic bibliography. Pop published useful bibliographical volumes on linguistic questionnaires and institutes of phonetics and phonographical archives, and a volume on J. Gilliéron's life, work, and teaching. Shortly before his death he had the honor of being the president of the first international conference on general dialectology, held in Leuven and Brussels (August 1960).

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See also: Dialect Atlases; Gilliéron, Jules (1854–1926); Meillit, Antoine (Paul Jules) (1866–1936); Romanian.

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Born into a family of Russian Germans, N. Poppe attended the German Protestant high school in St. Petersburg/Petrograd and studied oriental languages at Petrograd University. His teachers were the most prominent Russian orientalists of the time: W. L. Kotwicz, B. Ia. Vladimirtsov, A. N. Samoilovich, F. I. Shcherbatskoĭ. After having graduated in 1923, Poppe worked at Petrograd (later Leningrad) University until 1941. During this time, he was also a research fellow at the Academy of Sciences of USSR (a corresponding member of the Academy since 1932) where he, since 1931, headed up the Mongolian department in the Oriental Institute.

Poppe's first publications were dedicated to Altaic languages (the Yakut, Chuvash, and Tungus languages) and to comparative Altaic linguistics. But in the second half of the 1920s, he abandoned comparative studies under pressure of the "new theory of language" by N. J. Marr (which was, at this time, in a dominate position in Soviet linguistics). His main concern became the spoken Mongolian languages. From 1926 to 1932 he undertook extensive fieldwork in Mongolia and the Asiatic part of the Soviet Union to investigate the languages and folklore of the Mongolian people. The result of this work was the first detailed practical description of spoken Mongolian (Khalkha) (Poppe, 1931). After the study of Buriat dialects Poppe published the first general survey of this language (Poppe, 1938). Another branch of his activity was the study of Mongolian written tradition: he published *inter alia* a grammar of written Mongolian (Poppe, 1937; the English version is Poppe 1954) and a survey of Mongolian texts in hP'ags-pa script of the 13th–14th centuries (Poppe, 1941; edited 1957 in English).

In 1942, during the German occupation of the Northern Caucasus, where he and his family had been evacuated to, Poppe went over to the German side and changed – as an ethnic German – his citizenship. From 1943 to 1945 he worked at the Wannsee Institute (Berlin) and other institutions subordinated to the foreign department of the Nazi intelligence service (SD-RSHA), which caused him serious problems in the first years after the war. In 1949 Poppe arrived in the United States and obtained a position at the University of Washington (Seattle), where he remained until his retirement in 1968. Continuing his work on Mongolian (see Poppe, 1951, 1970), Poppe went back to his comparative analysis of Altaic languages (Poppe, 1955, 1960, 1965). Developing the ideas of G. J. Ramstedt, Poppe provided a detailed view of the Altaic language family, including the

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Born into a family of Russian Germans, N. Poppe attended the German Protestant high school in St. Petersburg/Petrograd and studied oriental languages at Petrograd University. His teachers were the most prominent Russian orientalists of the time: W. L. Kotwicz, B. Ia. Vladimirtsov, A. N. Samoilovich, F. I. Shcherbatskoĭ. After having graduated in 1923, Poppe worked at Petrograd (later Leningrad) University until 1941. During this time, he was also a research fellow at the Academy of Sciences of USSR (a corresponding member of the Academy since 1932) where he, since 1931, headed up the Mongolian department in the Oriental Institute.

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In 1942, during the German occupation of the Northern Caucasus, where he and his family had been evacuated to, Poppe went over to the German side and changed – as an ethnic German – his citizenship. From 1943 to 1945 he worked at the Wannsee Institute (Berlin) and other institutions subordinated to the foreign department of the Nazi intelligence service (SD-RSHA), which caused him serious problems in the first years after the war. In 1949 Poppe arrived in the United States and obtained a position at the University of Washington (Seattle), where he remained until his retirement in 1968. Continuing his work on Mongolian (see Poppe, 1951, 1970), Poppe went back to his comparative analysis of Altaic languages (Poppe, 1955, 1960, 1965). Developing the ideas of G. J. Ramstedt, Poppe provided a detailed view of the Altaic language family, including the

Korean branch (split at first from Common Altaic), Turkic-Mongolian-Manchu-Tungus, which split into Turkic (with Chuvash as a separate unit), and then Mongolian and Manchu-Tungus. Poppe dedicated the last decades of his life to the study and an edition of Mongolian epic folklore (see Poppe, 1979).

See also: Altaic Languages; Marr, Mikolai Jakovlevich (1864–1934); Mongolic Languages; Ramstedt, Gustaf John (1873–1950).

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Popularizations

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The study of popularizations of specialist texts, mainly from the sciences, is an offshoot of genre analysis. The attraction of popularizations is that they allow cross-genre comparison of texts that discuss the same topic for different readerships, usually specialists and nonspecialists. The crossgenre comparison of specialist texts and popularizations also affords insights into the social construction and discursive negotiation of scientific 'facts.' Hyland (2000: 104–131) also considers relationships between expert and novice academic discourses, comparing research articles to textbooks and paying particular attention to the construction of authority in each genre.

Popularizations are characterized in opposition to specialist journals and books produced by professionals mainly for peer-group readers. Bazerman (1988) traced the historical development of specialists writing in the sciences, arguing that the form of such writing was originally conditioned by the requirement that readers should be able to replicate the experiments described. Popularizations encompass films, television documentaries and dramas, newspaper articles, and reports and features in magazines like *Scientific American* and *New Scientist,* whose readership includes nonspecialists as well as scientists whose interests extend beyond their own discipline. The shift in genre from specialist to popular text raises issues of the interaction of the various participants in the communicative events and in the linguistic construction of the scientists and their activities.

Participants and Purposes

The participants in specialist publications and popularizations are typically the specialist, the specialist discourse community, the journalist or another nonspecialist writer, and the nonspecialist readership. Scientists produce specialist texts for the peer community, although many also revise their texts for a more general readership. Alternatively, journalists act as mediators between specialists and general readers. The linguistic form of the specialist and popular texts is shaped by the different relationship that the producers have with their target readers and the function that the texts serve for writers and readers.

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Myers (1990) argues that the discourse of specialist publications is organized so as to substantiate claims to knowledge that will validate the specialist's status in the research community. In contrast, journalists' selection of specialist texts to popularize is governed by the constraints of newsworthiness. Nelkin (1995) observed that media coverage of science and technology is shaped by "myth and social drama" (p. 62). Popularizations therefore focus on subjects such as ancient and anticipated disasters, for example, the mass extinction of species, or promised technological solutions, such as the design of labor-saving robots. Popularizations, whether written by journalists or specialists, inform and entertain – but also shape public policy, for example by supporting investment in or regulation of the specialist discipline.

Popularization as Process

The process of popularization, particularly by journalists, has been variously characterized. van Dijck (1998: 9–10) describes the dominant view of popularization as 'diffusion': research findings by an elite group of geniuses are simplified and inevitably distorted by journalists in order to enlighten ignorant nonspecialists, some of whom might be resistant to change – particularly change that threatens established social norms and values. A typical example of diffusion would be the press treatment and public reception of the cloning of 'Dolly the sheep.' Biotechnological innovation triggers popular accounts that stimulate public debate on the ethics of cloning, a debate that in turn informs political regulations and access or nonaccess to further research funding. 'Diffusion' is a linear process that assumes a division between science and society, mediated by popularizations. However, more recent models see popularization as part of a nonlinear, dynamic process of translation and negotiation, whereby scientists align themselves with other social groups to contest and redefine the public meanings of scientific discoveries. This view is consistent with specialists' own contribution to popularization and dissolves diffusion's dichotomy between specialist and nonspecialist groups. As van Dijck (1998: 10) observed:

> Despite their powerful position on the discursive hierarchy, scientists have never had absolute authority over the interpretation of knowledge, and thus had to look for effective strategies to propel and defend a specific interested position [. . .]

Popularizations are therefore a forum in which specialists can attempt to form alliances and engage in negotiating the public meaning of specialist knowledge.

Narratives of Science and Nature

Popularization, then, involves the translation of research texts into more widely accessible discourses in order to negotiate the public meaning of a specialist discipline like physics, genetics, or biology. In his discussion of biology texts, Myers (1990: 142) argued that such acts of translation result in two distinct narratives, specialist 'narratives of science' and popular 'narratives of nature', which themselves assume different conceptions of scientific activity. Narratives of science, according to Myers, are linguistically organized to support claims to knowledge; for example, their discourse structures tend toward problem-solution patterns rather than chronological events. Their vocabulary and syntax emphasize 'the conceptual structure of the discipline' by, for example, preferring impersonal constructions and nominalizations that turn events into abstractions. Popular 'narratives of nature,' in contrast, take concrete phenomena rather than scientific methodology as their subject. They prefer chronological narratives to nonchronological problem-solution patterns, and their "syntax and vocabulary emphasize the externality of nature to scientific practices" (Myers, 1990: 142).

The outcomes of these different narrative strategies can be briefly illustrated by comparing the title and experimental procedures of one research article and its popularization. A research article entitled 'The paleoecological significance of an anachronistic ophiuroid community' was written by Aronson and Sues and published in a specialist volume discussing predation (Kerfoot and Sih, eds., 1987). In the same year, one of the authors, Aronson, published a popular account of this research in *New Scientist* under the title 'A murder mystery from the Mesozoic.' Both articles question why an aquatic species called ophiuroids or brittlestars, once common on the ocean floor, suddenly disappeared in the Mesozoic era, save for a few, isolated, 'anachronistic' communities.

The research article is typical of the 'narrative of science.' Its title embodies a knowledge claim – that anachronistic ophiuroid communities *are* significant to palaeoecology – and the discourse structure of the article is so arranged to support the innovative combination of studies of the fossil record with present-day predation experiments. The focus of the article is on validating the legitimacy of the research procedures; the outcome of the experiments (that a rise in predation was the cause of the near-extinction of the species) is almost a byproduct of the research methodology. In contrast, 'A murder mystery from the Mesozoic' promises and duly delivers a chronological narrative that in this case alludes to a formulaic

literary genre: there is a murder (in this case of a species of ophiuroid), clues (the fossil record and experimental results), and a dénouement that reveals the murderer (in this case, a predatory octopus).

In the specialist article, the vocabulary and syntax emphasize scientific practices rather than nature; in the popularization the reverse is true:

> *Specialist article:*
> In this chapter, we hope to demonstrate how general ideas of predation may be used to interpret the structure of an extant ophiuroid-dominated community in a Bahamian saltwater lake. Results from this living community are then used to formulate testable hypotheses concerning the structure of similar fossil assemblages.
>
> *Popularization:*
> Ecological studies tell us under what conditions brittlestar beds persist today. We can look at fossils to see how and when the number of brittlestar beds changed in geological time. By combining this information, we gain an idea of how important mass extinctions and predation were in the distant past. That is, we can begin to work out what really happened to the suspension-feeders after the Jurassic.

Both passages explain the purpose of the research. The nominal groups in the specialist article are generally abstractions: 'ideas,' 'structure,' 'result,' 'hypotheses,' and so on. The popularization also has abstractions like 'ecological studies,' 'conditions,' 'information,' 'extinction,' and 'predation,' but it focuses on concrete phenomena too: 'brittlestar beds' and 'fossils.' Crucially, the popularization glosses the significance of combining palaeoecology and ecological studies: 'to work out what really happened to the suspension feeders.' Therefore whereas the specialist article remains within the domain of inferences and hypotheses, the popularization focuses on the natural world – what really happened.'

The narratives of science and nature diverge in other respects. One key difference is in the representation of the specialist. Nelkin (1995: 17) noted that in popular esteem, "Science appears to the activity of lonely geniuses whose success reflects their combination of inspiration and dedication to their work." van Dijck (1998: 18) discussed a variety of popular stereotypes: "obsessed maniacs, arrogant hermits or unworldy virtuosos." When representing themselves in popularizations, scientists are certainly active participants in the natural world – Aronson's popular article, for example has passages in which he and a postgraduate student dive into the rough waters around the Isle of Man to view an 'immense carpet of brittlestars.' In the specialist article, there are few or no accounts of personal agency: experiments are described using passive voice, with a focus on goals rather than actors:

> *Popularization*
> To measure predation directly, I tied Ophiothrix to small weights and set them out as 'bait' at Bay Stacka.
> *Specialist article:*
> When assemblages of ophiuroids comparable in density to those in Sweetings Pond were exposed in open arenas (from which they could not escape) at a coastal site off Eleuthera, the brittlestars were completely consumed within 48 hours.

The downplaying of personal agency in specialist discourse can be explained by politeness theory. Myers (1989) argued that, in the specialist discourse community, the assumption of individual agency is a face-threatening act. The mythology of the specialist peer group demands that the community is presented as the agent that conducts research. The individual is subordinate to the group. In popularizations, however, the individual scientist is traditionally the fount of authority, and stories of personal intervention in nature (with positive or negative results) reinforce the general stereotypes.

Other salient features of popularizations are their uses of metaphor and image. Both specialist texts and popularizations use metaphor; however, as Nelkin (1995: 11) noted, "By their choice of words and metaphors, journalists convey certain beliefs about the nature of science and technology, investing them with social meaning and shaping public conceptions of limits and possibilities." van Dijck (1998: 22) concurred that metaphors are important ways in which popularizations communicate to nonspecialists information that is highly abstract or otherwise intangible. van Dijck also noted that over time the figurative impact of a metaphor may decline, resulting in a 'root metaphor' or 'conceptual archetype' (1998: 22). Some popular science writers may seek to accelerate the process, as in Richard Dawkins' (1986 [1995]: 482) description of willow seeds drifting in the air:

> It is raining instructions out there; it's raining programs; it's raining tree-growing, fluff-spreading algorithms. That is not a metaphor, it is the plain truth. It couldn't be any plainer if it were raining floppy disks.

Despite Dawkins' assertion, this *is* a metaphor, and its use is strategic. If Dawkins' readers adopt his metaphor of the computer program as a means of understanding DNA, then they also adopt his more general mechanistic beliefs about nature.

Metaphor and visual imagery combine in the ways in which popularizations represent 'seeing' (cf.

Jordanova, 1989; Lynch and Woolgar, 1990). 'Looking' is an archetypal occupation of the scientist in popular representations, where white-coated boffins are seen staring into microscopes or at computer monitors. Dawkins' discussion of willow seeds begins with him, in his Oxford home, looking through a pair of binoculars. The myth of unmediated contact with nature through 'simple' observation permeates popular representations of science and obscures the manner in which scientific concepts are often constructs of experimental procedures. Moreover, Myers (1990: 158–165) argued that the visual content of popularizations is more important than in specialist articles because it both aestheticizes scientific activity and again conceals methodological issues. Myers gives an example of a popular article on the physiology of garter snakes that includes an illustration of the pathway by which a pheronome reaches the snake's skin. Such visual illustrations "give a sense that one is seeing the organism directly, rather than through the mediation of scientific theory and experiment" (Myers, 1990: 161–2). No equivalent illustration appears in research articles on the same subject by the same writers; instead the specialist articles present arguments that present the pathway – visually presented in the popularization as fact – as strong probability. Examinations of the distribution of modal auxiliaries and adverbs confirm that popularizations are less likely to contain 'hedges' than specialist texts – again, scientific hypotheses are more likely to be presented as facts in the public domain.

Nonscientific Popularizations

Less research has been done in popularizations beyond the domains of science and technology. Partly this is because the division between specialist and nonspecialist discourse is not seen to be so absolute, for example, in humanities disciplines such as history or literature. Becher (1989) related the forms of communication across disciplines to the different communicative relations operating in their respective discourse communities. The 'urban' hard sciences, so characterized because of the high density of researchers working in narrow research areas, can rely on a considerable number of fellow specialists sharing a high level of schematic knowledge about recognized research topics and appropriate experimental procedures. The 'rural' humanities, where only a few researchers might populate any given research area, cannot rely on the same degree of schematic knowledge, and therefore often have to explain the relevance of their topic and justify the validity of their approach even to fellow specialists. Specialist discourses and popularizations, where such exist, seem to be linguistically similar: a preliminary examination of both popular and specialist history articles, for example, suggests that, except where there may be controversy about the status of the topic, authorial presence is largely absent, and the historical story appears to tell itself. However, although science is by now well represented, more work needs to be done in the specialist and popular construction of research in the humanities and social sciences.

See also: Genre and Genre Analysis; Rhetoric: History; Speech Genres in Cultural Practice; Text and Text Analysis.

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Porphyrios of Tyros (ca. 232/3–301)

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Born in Tyros, Porphyrios (whose Semitic name was Malchos, rendered in Greek as 'Basileus'; the Greek name 'Porphyrios' 'from the purple city,' i.e., Tyros, was later given to him as a surname) studied in Athens with Longinos and in Rome in the magic circle of the Neoplatonic philosopher Plotinos. A great admirer of Plotinos, Porphyrios stayed with him for five years, then went to Sicily to recover from a depression. Upon Plotinos's death he returned to Rome and dedicated himself to the editing of the latter's *Enneads*, gaining important status as a Neoplatonic philosopher. Porphyrios's philosophical work is characterized by the thesis of metaphysical monism and by the attempt to reconcile Aristotle's logic with Platonism; in matters of religion he violently attacked Christian doctrines. The date and place of his death are unknown.

Porphyrios is reported to have written some 70 works, of which only very few survive (and most of these are conserved only fragmentarily). Apart from a letter to his wife, Marcella, metaphysical aphorisms, fragments of a commentary on Ptolemy's *Harmonics* and of a *Life of Pythagoras*, parts of his 15 books *Against the Christians*, an essay on abstinence, and his biography of Plotinos, there are two utterly important philosophical texts: his fragmentarily conserved commentary on Aristotle's *Categories* (used to a large extent by Boethius, who remains our main source on its contents), and his *Isagoge*, which became a standard introduction to logic and philosophy in the Middle Ages through its Latin translation by Boethius (there are also medieval translations into Syriac, Arabic, and Armenian) and the commentaries on it by Ammonios and Boethius, which provide the basic texts for later scholastic commentaries. The *Isagoge* (literally 'the bringing in'), also known under the medieval title *Quinque Voces* ('the five words'), though linked with the commentary on the *Categories* is not an introduction to it, but rather a general introduction to basic problems and standard terminology of philosophical thinking. The synthetic treatise deals with genus, species, *differentiae*, properties, and *accidentia* (all philosophical concepts of major relevance for grammar, and also for semantic and lexicographical analysis). Although the discussion is very condensed, Porphyrios provided a standard introduction to the basic concepts of logic and language study; he also raised, but refrained from answering, the problem of the status of universals, which was to become a central topic of medieval philosophical discussions.

See also: Aristotle and Linguistics; Boethius of Dacia (fl. 1275).

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Port-Royal Tradition of Grammar

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The chief manifestation of philosophical grammar in the 16th century was the book by Julius Caesar Scaliger, *De causis linguae Latinae*. Scaliger's intent was to apply to language Aristotle's logical categories. This way of thinking about language and grammars reached its climax with the Port-Royal manuals and in particular with the *Grammaire générale et raisonée* (GGR) of Arnaud and Lancelot. However, grammars are manifestations of the societies that give them birth. The spirit and culture of the age are reflected in all aspects of intellectual pursuits, including the study of language. Seventeenth-century France prided itself with its intellect and rationality. Philosophy as well as grammatical thought at Port-Royal were closely associated with Cartesianism. Thus, the study of language was a venture in knowledge and was absolutely necessary for increasing the depth and range of one's ability to cross-reference all other subjects. Both the historical aspect and the cognitive one were interwoven. If languages are events in the history of humanity, then by implication they have connections with other events. In other words, grammatical ideas are responses, in part, to the social, religious, and political issues of the time and, in part, consequences of the works that preceded. The Port-Royal grammars and in particular the GGR of Arnauld and Lancelot is, in my opinion, a reasonable starting point for historiography to link both the history and philosophy of linguistics, the view being that the GGR marked the point in time when the study of language moved out of the prescriptive grid, based mostly on Latin and, to some extent, Greek teaching manuals, and rose to an autonomous subject based on logic and reason.

This inquiry came about as a consequence of the Reformation and the political situation in France. Up to that point, the Jesuits controlled education and religion over all of Catholic Europe for 200 years. It was at this time that the Jansenists chose not to break away from the Catholic Church, but rather tried to reform it, based on the techniques of St. Augustine. The Jansenists felt that the Church needed to get back to the teachings and philosophy of St. Augustine as it was laid out in the *Augustinus* by Jansen. The Jesuits exerted a great deal of pressure against the *Augustinus* that led to its banning in 1641. Jansen died in 1638, thus leaving the Port-Royal community to handle the controversies. It was this Jansenist movement that contributed to the fame of Port-Royal. The Port-Royalists believed that many of the social, religious, and political problems of France could be resolved through the Augustinian teachings. These clashes between the Jansenists of Port-Royal and the Jesuits who exercised both religious and political power contributed to the publicity and fame of Port-Royal. Also, since Jansenism was not favored by the government, it was naturally made popular in the salons of Paris. It goes without saying that "Having undergone spiritual regeneration, they soon discovered they were surrounded by unreconstructed, hostile forces . . . they soon discovered that the crown too was unfavorably disposed to them" (Sedwick, 1977: 195). To advance their philosophical and religious views, the Jansenists founded the petites-écoles that lasted only 22 years, but their influence far exceeded their short life. The Abbé de Saint Cyran founded the school with the purpose of training clerics. Six boys would be chosen as is indicated by the letter mentioned in Sainte-Beuve (1954: 418). However, the plan was soon changed to a school with a traditional education with a Jansenist/Port-Royal philosophy. This is important because the Port-Royal philosophy of children and children's education is the center of the teaching manuals, the GGR, and the logique (Fontaine (1696), 1887: 33; Carré, 1971: XV; Lancelot, 1968). The Jansenists believed that, as a consequence of the Fall, children's souls were possessed by the devil, and only through baptism, innocence may be restored. But since children are defenseless to the temptations, the responsibility is left to the parents and educators. Thus, education should stress reason and good judgment. The development of such thinking would fall on the methods used by the teachers. The GGR and the logique were part of the plan for the development of good judgment and clear thinking. Nicole, in the preface of the logique states "There is nothing more laudable than good sense and the correctness of the mind in distinguishing the true from the false." (Arnauld and Nicole, 1662: 5). In fact, the success of the logique continued long after the GGR. There were 49 printings in French, 13 in Latin, and nine in English. It was published two years after the GGR, but it was actually written about the same time. If one was to look at the educational materials of Port-Royal, one would conclude that Lancelot and his coauthor Arnauld and Nicole and many of the other pedagogues used incredibly advanced methods for teaching. Lancelot, an unassuming teacher at Port-Royal, taught and coauthored grammars such as *La nouvelle methode Latine*. The 'New Method' was so successful that he used the same methodology for Greek, followed by Greek Roots, Spanish, and Italian. In all his work

Lancelot pursued "the goal of devising new, less painful methods of learning a language." (Tsiapera and Wheeler, 1993: 109).

Traditionally, students learned to read and write Latin using the direct method, but the petites-écoles taught French and then Latin. The students read the Latin materials in French before going to the original. Lancelot discussed his method in a letter to de Sacy (Carré, 1887: 70). The concern with language at Port-Royal was based on the premise that the trivium – grammar, rhetoric, and dialectic – were the prerequisites for the quadrivium. By the 17th century, basic reading and mathematical skills were necessary for upward mobility into the middle classes, but for the Port-Royal the aims were much higher. The study of language led to clear thinking and good judgment. The 'New Method' of teaching that became the system used at the petites-écoles was successful for a number of reasons: (a) it greatly improved the study of languages; (b) up to this point grammars of any language were written in Latin; (c) the GGR was a scientific and philosophical treatise written in French that moved away from prescriptivism, although not altogether original. Arnauld and Lancelot combined their ideas with those of their predecessors. The 17th and 18th centuries considered it original and a change in direction. Finally, it set the precedent for grammars to be written in the vernacular rather than in Latin, which resulted in the great success of Port-Royal grammars. The grammars written before in Latin were quickly forgotten.

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Portugal: Language Situation

D G Frier

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The official language used in Portugal for all normal purposes is European Portuguese. There are very limited areas in the northeast of the country, adjacent to the border with Spain, where the indigenous form of speech is more akin to the Leonese dialect of Spanish, and one other enclave of strong Spanish influence in the Baixo Alentejo region, although the number of speakers affected is decreasing. In general terms, Portugal may be said to be linguistically one of the most homogenous countries in the world, there being no minority languages indigenous to the country, and all dialects being generally mutually intelligible. There is, however, some variation evident in dialect forms, most notably in the north of the country, as a result of both historical and geographical factors, while the two Atlantic island groups of Madeira and the Azores also show some notable differences from the standard language, which is based upon the speech of the central region between Lisbon and Coimbra.

There are no specific areas of bilingualism, although the return of migrant workers from the north of Europe and the tourist boom of recent decades in the Algarve have brought significant numbers of native or near-native speakers of other languages into permanent residence in the country. English and French are the principal foreign languages taught in Portuguese schools. Levels of illiteracy are still among the highest in Europe, although considerable progress has been made in recent years, with a government estimate of 29% of the adult population as illiterate in 1970 falling to 16% in 1985.

See also: Portuguese; Spain: Language Situation.

Language Maps (Appendix 1): Map 141.

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Portuguese

A T de Castilho

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Portuguese is the fifth most widely spoken language in the world, being spoken in Europe (Portugal), South America (Brazil), and Africa (Angola, Mozambique, São Tomé and Principe Islands, Cape Verde, and Guinea–Bissau). Approximately 168 million people speak the language, most of them in Brazil. In Portugal and Brazil, Portuguese is the native language, whereas in the other countries it is the official state language, being native for less than 20% of the population.

History

Portuguese is a Romance language, belonging, with Spanish and Catalan–Valencian–Balear (Catalan), to the Ibero–Romance subgroup (*see* **Catalan; Romance Languages; Spanish**).

It arose from Vulgar Latin, which was brought to the Iberian Peninsula between 218 and 19 B.C. Once the conquest of the peninsula was an established fact, the Romans divided the new province into two parts: Hispania Ulterior ('Farther Spain,' including Baetica and Lusitania), where Galician (*see* **Galician**) developed, and Hispania Citerior ('Nearer Spain', including Tarraconensis and Gallaecia), where various linguistic varieties, including Spanish and Catalan, developed. The two regions underwent different forms of colonization. Hispania Ulterior was colonized by the senators of the Roman aristocracy, giving rise to a conservative form of Latin. Hispania Citerior, on the other hand, was colonized by military men, leading to the development of an innovative linguistic variety. This explains in part the differences between Portuguese and Spanish.

The original Latin base was modified by contact with the Germanic tribes who dominated the peninsula from the 5th to the 7th centuries, and with the Arabic tribes who dominated two-thirds of the peninsula from the 8th to the 15th centuries. After an inevitable bilingual phase, Latin emerged victorious, being

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transformed into a peninsular Romance language after the 8th century.

Portuguese arose in the northwest of the Iberian peninsula, specifically in the County of Portucale, one of the divisions of the Kingdom of Castile. Initially, Portuguese formed a single language with Galician, although this unity was threatened with the movement of Portuguese to the south during the Reconquest.

The first texts in Portuguese can be divided into literary and nonliterary texts. The earliest nonliterary texts date from the 13th century. During the reign of D. Dinis (1279–1325), Portuguese became the official language of Portugal and was used to write legal documents. The oldest nonliterary text dates from 1214. It is the *Testamento de D. Afonso II*, the third king of Portugal. The next was *Noticia de Torto*, written between 1214 and 1216, which tells of a disagreement ('*torto*') motivated by the mismanagement of rural property.

The oldest literary texts date from the 12th century: the *Cantiga d'Escárnio* written in 1196 by Joan Soárez de Páviıa, the *Cantiga da Ribeirinha* by D. Sancho I, and the *Cantiga de Garvaia* by Pai Soares de Taveirós. Medieval Galician poetry consists of 1679 lyric and satiric poems and 427 religious compositions, written between 1196 and 1350. The prose texts consist of versions of Latin and French literature in translation, historiography, and religious and philosophical texts.

During the commercial expansion in the 15th and 16th centuries, Portuguese was taken to Africa, Asia, and America. In these regions, pidgins arose and some of these became creoles.

Portuguese pidgins were the first Romance pidgins to emerge. They developed principally in western Africa from the last quarter of the 15th century in Cape Verde, Sierra Leone, the islands of São Tomé and Principe, and Guinea–Bissau. Curiously enough, these pidgins were developed in Europe itself during the training of Africans brought to Portugal to learn the language so that they could act as interpreters for the merchants.

These pidgins gave rise to creoles throughout the world. In Africa, there are various creoles, including those of São Tomé and Principe (Angolar, Forro, Principense (Moncó), Cape Verde, and Guinea–Bissau. In Asia, the semicreole Sino–Portuguese of Macao was further influenced by Portuguese, whereas the Malayan Portuguese of Java, Malacca, and Singapore, and the Indian Portuguese of Sri Lanka, Goa, Damao, and Diu have almost disappeared. In the Caribbean, Papiamento from the island of Curaçao was relexified, and, in the late 20th century, is a creole of Spanish. And in South America from the 17th century, a group of Jews left Brazil with their slaves, taking their creole with them to Surinam (Dutch Guyana).

Characteristics of Portuguese

In both Europe and Latin America, Portuguese-speaking countries are bordered by Spanish-speaking ones; there are, however, a few differences separating the two languages. The following sentences can be used to exemplify some of these differences, as well as those between European Portuguese (EP) and Brazilian Portuguese (BP).

Portuguese: *A mulher comprou os ovos mais lindos da feira*. (1)
The woman bought the eggs most beautiful of the market.
Se tivesse mais dinheiro, levaria também para sua irmã. (2)
If (she) had more money, (she) would take (some) also to her sister.

Syntactic Characteristics

Not only EP but BP has a preferred SVO word order, as does French. Spanish, however, tends to prefer an OVS order: *Los huevos más lindos de la feria los ha comprado la mujer.*

The subject is omitted in EP (*se Ø tivesse mais dinheiro* . . .) and in Spanish (*si Ø tuviera más dinero* . . .). In BP, however, there is a tendency to repeat the subject: *se a mulher/se ela tivesse mais dinheiro* . . . .

The direct object is expressed by an NP or a clitic in EP (*A mulher comprou os ovos/A mulher comprou-os* . . .) and in Spanish (*La mujer ha comprado los huevos/La mujer los ha comprado* . . .), whereas the tonic pronoun may either be used or omitted in BP (*A mulher comprou eles/A mulher comprou Ø*).

Morphological Characteristics

The Verb Portuguese maintains the distinction between the *preterito perfeito simples* 'simple preterite' (*comprou*), used to express the perfective aspect, and the *preterito perfeito composto* 'compound preterite' (*tem comprado*), used for the imperfect aspect; the auxiliary for the compound tense in Portuguese is *ter*. There is a tendency, however, for the corresponding Spanish forms (*compró* and *ha comprado*) to have lost this distinction; moreover, the auxiliary for Spanish is *haber*. Portuguese distinguishes the *imperfeito do subjunctivo* 'imperfect subjunctive' (*tivesse*), which is a subordinate tense, from the *mais que perfeito do indicativo* 'pluperfect indicative' (*tivera*), which indicates the distant past. Spanish has lost the *imperfeito do subjunctivo*, replacing it with the *mais que perfeito do indicativo* (*si tuviera más plata*).

The Adjective The comparative degree is formed with reflexes of Latin *magis* in both Portuguese and

Spanish, respectively *mais lindos* and *más lindos*, in contrast to the French and Italian reflexes of *plus*, respectively *plus beaux* and *piú belli*.

Phonological Characteristics

Monophthongs Portuguese has seven stressed vowel phonemes: /a/, /ɛ/, /e/, /i/, /ɔ/, /o/, /u/. This contrasts with the five of Spanish, since in Portuguese the half-closed and half-open front and back vowels are used distinctively, as for example in the singular and plural of 'egg' (*ovo* /ˈovu/, *ovos* /ˈɔvus/) and in the masculine and feminine third-person pronouns (*ele* /ˈele/, *ela*/ˈɛla/).

Portuguese also developed nasal vowels with phonemic value (*lindo* /ˈlĩdu/ 'beautiful,' *lido* /ˈlidu/ 'read'); this did not happen in Spanish.

Diphthongs Spanish diphthongized the short vowels (*ŏvu* > *huevo*), whereas Portuguese did not (*ŏvu* > *ovo*), except in certain dialects. Diphthongs did develop in Portuguese when an intervocalic consonant was eliminated and two vowels within a single word became contiguous; these vowels then occur in Portuguese in words that have simple vowels in Spanish: Portuguese *mais*, Spanish *más*; Portuguese *comprou*, Spanish *compró*; Portuguese *coisa*, Spanish *cosa* 'thing'; Portuguese *dinheiro*, Spanish *dinero*.

Consonants Portuguese lost intervocalic [n] and [l], whereas Spanish retained them: *irmã/hermana* 'sister'; *dor/dolor* 'pain.'

Varieties of Portuguese

EP presents a notable lack of differentiation, with the variety of Lisbon providing the standard. The substitution of [v] for [b], the apico-alveolar pronunciation of [s] and [z], the maintenance of the affricate [tʃ], and the maintenance of the diphthongs [aw] and [ow], distinguish the dialects of the north (Trasmontano, Interamnense, Beirao) from those of the south (Estremenho, Alentejano, Algarvio). In Portuguese territory, various varieties of Leonês are also spoken: Rionorês, Guadramilês, and Mirandês.

The introduction of EP to Brazil began in the 16th century. There it came into contact with the 300 indigenous languages spoken by approximately 1 million individuals, as well as with those of some 18 million Negro slaves from the Bantu and Sudanese cultures who were brought to the country over a period of three centuries. BP went through three historical phases: (a) 1533–1654, a phase of bilingualism with a strong predominance of Tupinambá (Old Tupi); (b) 1654–1880, a phase during which Old Tupi gave way to creole varieties; and (c) after 1808, a phase involving an intense urbanization of the country, with massive immigration of Portuguese settlers and a consequent approximation of BP to EP. This last phase also marked the beginning of the distinction between rural and urban speech.

BP also presents great uniformity, although there are minor differences. The speech of the north (Amazon and the northeast) is distinguished from that of the south (Mineiro, Paulista, Carioca, and Gaúcho) by the raising of the pretonic medial vowel resulting in the production of a close vowel (*feliz* /fiˈliʃ/ 'happy,' *chover* /ʃuˈveʀ/ 'to rain') or by an open vowel (*feliz* /fɛˈliʃ/, *noturnu* /nɔˈtuʀnu/ 'nocturnal'), by the nasalization of vowels followed by a nasal consonant (*cama* /ˈkãma/ 'bed'), by the replacement of [v] with [b] (*varrer* /baˈʀeʀ/, *vassoura* /baˈsora/ 'broom'), and by the affricates /tʃ/ and /dʒ/ (*oito* /ˈoytʃu/ 'eight,' *muito* /ˈmũtʃu/ 'too much'). There is no single standard, but rather several centers and regional standards: Belém, Recife, Salvador, São Paulo, Rio de Janeiro, and Porto Alegre. In the south, BP penetrates into Uruguayan territory.

Since the 19th century, the relationship between BP and EP has been an object of attention. Two different hypotheses have been advanced: the creolization hypothesis and the parameter-change hypothesis. According to the first, BP had a pidgin phase, which gave rise to a creole; this is in the early 1990s in the process of decreolization. This hypothesis is strengthened if the written language is taken into consideration, since in schools the attempt is made to make written BP conform closely to written EP. However, an examination of the spoken language makes it impossible to suppose that there has been a change in the direction of EP, which is leading to a syntactic convergence of the two varieties. For this reason, the second hypothesis, parameter change, seems more probable. According to this, BP grammar has diverged from the grammar of EP in the following ways: (a) retention of the subject, which is omitted in EP because it is already reflected in the verbal morphology; (b) progressive loss of subject inversion, maintained in EP; (c) loss of the clitic system of the third person (retained in EP) and object omission; and (d) changes in relativization rules, with the disappearance of the pronouns *cujo* and *onde*, and the appearance of the relative pronoun without a preposition (*o livro que eu preciso* instead of *o livro de que eu preciso* 'the book I need'), as well as the repetition of the referent of the relative pronoun (*o menino que a casa dele pegou fogo* instead of *o menino cuja casa pegou fogo* 'the boy whose house caught fire'; *a casa que eu nasci lá* instead of *a casa onde nasci* 'the house where I was born'). Further studies, especially in the

area of syntax, will shed more light on the precise nature of the differences between BP and EP.

See also: Catalan; Galician; Romance Languages; Spanish.

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Possession, Adnominal

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Introduction: Adnominal Possession and Possessive Noun Phrases

The phrases *Mary's house*, *my daughter*, and *the boy's hand* exemplify adnominal possession, whereby one entity, the possessee, is represented as possessed in one or another way by another entity, the possessor. The concept of linguistic possession is difficult to define. However, for the purpose of cross-linguistic comparability, it is possible to define possessive constructions as those that can be used for referring to LEGAL OWNERSHIP (*Mary's house/hat)* or to KINSHIP relations or BODY-PART relations (*my daughter/foot*). The definition allows the reference to pertain to just one of these relations, to the exclusion of any other: languages may, thus, have several possessive constructions. In addition, in adnominal possession, the terms for possessor and possessee form one noun phrase, a possessor NP (PNP), whereby the possessee and the possessor are referred to by the head of the noun phrase and by its attribute (dependent), respectively. Adnominal possession is, thus, opposed to predicative possession, such as *Mary has a house*, and to external-possession constructions, e.g., in Swedish *Jag tittade honom i ögonen* 'I looked in his eyes' (lit. 'I looked him in the eyes') (*see* **Possession, Predicative; Possession, External**).

In the following sections, the main areas of cross-linguistic variation within adnominal possession are presented briefly, without doing real justice to the vast literature on the topic.

Form

A number of languages use juxtapositional PNPs, which lack any overt marker to specify the relation between the possessee and the possessor (Example (1)). Most PNPs, however, involve one or several construction markers to show explicitly that the possessor and the possessee are related in a specific way. Construction markers are either morphologically bound to the possessor (dependent-marking), to the possessee (head-marking), or to both (double-marking), or appear as analytic (unbound) elements. Example (1) shows juxtaposition for Singaporean Malay:

(1) pisang Ali
banana Ali
'Ali's banana'

Although the genitive case is normally identified across languages as the typical inflectional dependent-marking in PNPs (Example (2a)), labels used for the case of the possessor differ in languages in which the same case can be used for other functions as well. Some languages show the phenomenon of 'suffixaufnahme,' a term devised by Nikolaus Finck, whereby possessors in the genitive case further agree with the possessee in number, gender, and case (Plank,

area of syntax, will shed more light on the precise nature of the differences between BP and EP.

See also: Catalan; Galician; Romance Languages; Spanish.

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Possession, Adnominal

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1995). This kind of agreement is, of course, quite normal for possessive pronouns in many languages. Example (2a) shows dependent-marking for Russian:

(2a) dom Mixail-a
house.NOM Mixail-GEN
'Mixail's house'

The most common type of head-marking consists of possessive suffixes or prefixes that vary according to the person/gender/number of the possessor (Example (2b)). In some languages, e.g., in Afro-Asiatic languages, nouns used as possessees appear in a special form, a construct state, contrasted to those used in other positions, an absolute state. Ezafe-markers (known primarily from Iranian languages) appear whenever a noun combines with attributes (and are thus not only restricted to PNPs). Example (2b) shows head-marking for Hungarian:

(2b) a szomszéd kert-je
the neighbor.NOM garden-3SG.POSS.NOM
'the neighbor's garden'

Finally, the various head-marking and dependent-marking techniques can combine in double-marked PNPs, as shown in Example (2c) for Hungarian:

(2c) a szomszéd-nak a kert-je
the neighbor-DAT the garden-3SG.POSS.NOM
'the neighbor's garden'

The simplest examples of analytic PNPs involve pre- and postpositions and particles that pertain to the possessor, e.g., in Italian, *la casa di Maria* 'Maria's house' (lit. 'the house of Maria'), and may be considered the analytic counterpart of dependent-marking. As the English *'s*-marker shows, there is no strict border between adpositions and dependent-marking. Sometimes the analytic marker further agrees with the possessee: thus, in the Bantu languages, the so called associative particle (normally *-a*) takes different class prefixes in accordance with the possessee's nominal class, or gender.

A different type of analytic PNP involves 'resumptive (or linking) pronouns,' i.e., possessive pronouns adjacent to the possessee, as in the colloquial German example *dem Vater sein Buch* 'Father's book' (lit. 'Father.DAT his book'). These are often syntactically associated with the head of the PNP and may further develop into head-marking, but in some languages, e.g., in Norwegian, the resumptive pronoun has come to be associated with the dependent. There are also several minor PNP types.

The structurally different PNP types are not evenly distributed across languages. Thus, the languages in Europe preferentially use dependent-marking PNPs, the second choice being double-marked (mainly in the eastern and southeastern periphery of Europe) and prepositional PNPs (Koptjevskaja-Tamm, 2003). Globally (Bickel and Nichols, 2005a), dependent-marking and its analytic counterparts are the preferred PNP types, apart from in the Americas and Melanesia, where head-marking dominates. Juxtaposition is, in general, quite uncommon, except for combinations with kin terms and/or body-parts (see later), and the same goes for double-marking, which occurs in languages in several well-defined areas of the world.

Both word-order typologies, i.e., 'possessee–possessor' and 'possessor–possessee' (i.e., 'noun precedes genitive' and 'genitive precedes noun,' or NG and GN, to use the labels current in this connection) are found with almost equal frequency. Greenberg's (1966) original word-order correlations have been partly confirmed and partly rejected by later research. Thus, object-precedes-verb (OV) languages prefer the GN order, subject-verb-object (SVO) languages can have both GN and NG order, and all other verb-precedes-object (VO) languages prefer the order NG (for details, see Dryer, 2005). The word-order typologies GN and NG tend to occur in languages with post-positions and pre-positions, respectively, although neither typology shows significant correlation with the order between nouns and their adjectival attributes (Dryer, 1992).

Functions

As is well known, English PNPs with *'s*-genitives refer not only to LEGAL OWNERSHIP, KIN relations, or BODY-PART (person/animal) relations, but also to DISPOSAL (*Mary's office*), AUTHOR or ORIGINATOR (*Mary's poem*), CARRIER OF PROPERTIES (*Mary's cleverness*), SOCIAL RELATIONS (*Mary's neighbor*), and many other relations. Even inanimate 'possessors' are allowed in such NPs, e.g., to refer to PART-WHOLE relations (*the mountain's top*) and TEMPORAL and LOCATIVE relations (*Monday's performance*, *Stockholm's banks*). It has been suggested that the common semantic (or pragmatic) denominator in the majority of PNPs is the function of the possessors as *anchors* (Hawkins, 1991; Fraurud, 1990), or as *reference point entities* (Langacker, 1995) for identification of the head's referents. Thus, knowing who Mary is, we can identify Mary's house, daughter, foot, neighbor, etc. The exact interpretation of a particular PNP is, however, dependent on three main factors:

1. Semantics of the head (possessee) – e.g., its relationality, that is, whether it invokes a special relation to another entity, or, more generally, its 'qualia structure' (Pustejovsky, 1998) (*see* **Nouns**).

2. Ontological class and discourse status of the dependent (possessor) – e.g., whether it is human vs. animate vs. inanimate, and topical vs. non-topical.
3. Context.

Languages vary considerably in how these factors interact, particularly in regard to how many structurally different PNPs they have, what motivates the choice among those, and what relations each of them may cover.

Co-occurrence of several different possessive constructions in the same language occurs frequently. A choice among the constructions often depends on the nature of the possessee and/or on its exact relation to the possessor. The following examples illustrate for Maltese (Semitic) the opposition between inalienable (Example (3a)) and alienable (Example (3b)) possession, or the 'alienability split':

(3a) bin is-sultān id ir-raġel
son DEF-king hand DEF-man
'the king's son' 'the man's hand'

(3b) is-siġġu ta' Pietru
DEF-chair of Peter
'Peter's chair'

This opposition is often described as a semantic one, reflecting some basic difference between typically inalienable concepts and others, e.g., in their relationality (inalienable nominals have an additional argument as compared to others) or in the way their referents are conceived of (as being inherently cognitively or physically connected to other entities). However, from a cross-linguistic prospective, all of these semantic characterizations are too general. A most striking fact is that relational nouns as a whole class are never opposed to non-relational nouns in the ways that the two combine with their dependents. Typically, inalienables form a closed set, which normally includes body-part terms and/or kin terms; what is at stake here, thus, is a lexical, rather than a semantic classification.

Structurally, inalienable constructions tend to involve head-marking or juxtaposition of the possessee and the possessor nominals, whereas alienable constructions are often analytic or involve dependent-marking. The recurrent covariation of form and meaning has received various explanations. Haiman (1985: 106), for example, proposed a synchronic functional explanation based on iconic motivation, whereby "the greater the formal distance between X and Y, the greater the conceptual distance between the notions they represent." There is, however, sufficient evidence that alienability splits often arise due to grammaticalization processes that give rise to an opposition between the archaic, inalienable construction and the innovative, alienable construction (see Koptjevskaja-Tamm, 1996; Heine, 1997).

The cross-linguistically most frequently occurring alienability splits involve an opposition between one closed and one open nominal class. Multiple closed classes are also attested: e.g., Nez Perce (Sahaptian, United States) has three classes, Burushaski (isolate, India) has four classes, and Amele (Madang, Papua New Guinea) has 32 classes. Multiple classification is particularly prominent (but still rare) in Melanesia (Bickel and Nichols, 2005b). A number of languages, particularly in the Americas (Bickel and Nichols, 2005b), have obligatorily possessed nouns. As shown in Examples (4a) and (4b), in Yucatec Maya, inalienable body part terms never occur outside PNPs (Lehmann, 1996: 50, 54). Conversely, in some languages, certain nominals can never be possessed unless they take special additional morphemes.

(4a) in chi'
1SG.POSS mouth
'my mouth'

(4b) *le chi'(-tsil)-o'
DEFmouth(-ABSOL)-DIST
'the mouth'

Some languages have a system of possessive, or relational, classifiers, i.e., special elements that specify "the real-world relation that obtains between the referents" (Lichtenberk, 1983: 148) of the possessor and possessee nominals, e.g., whether an object is used for eating raw or cooked, as a plant, as a prey, etc., as in Examples (5a)–(5c). Such constructions occur primarily in Oceania: among the Micronesian languages, relational classifier systems sometimes involve more than 20 members (Lichtenberk, 1983; Bickel and Nichols, 2005b). Normally only alienable nominals require specification. The following construction is for Iaai (Austronesian, Oceanic: the Loyalty Islands) (Lichtenberk, 1983: 159):

(5a) ə -k koko
CLASS-my yam
'my yam, for eating'

(5b) nuu -k koko
CLASS-my yam
'my yam plant'

(5c) āi -k koko
CLASS-my yam
'my yam, general sense'

The frequent function of the possessors as anchors or reference point entities for identifying other entities is, probably, a functional rationale for the article-possessor complementarity in English, Swedish, Scottish Gaelic, Romani, Mordvin, and a number of other

languages, e.g., **a/*the Peter's hat* (Haspelmath, 1999; Koptjevskaja-Tamm, 2003). Thus, Haspelmath (1999: 227) claimed that such patterns are economically motivated: "the definite article can be omitted because possessed NPs have a very high chance of being definite, for semantic and pragmatic reasons." However, most languages with articles allow articles to co-occur with possessors, as in Italian *un/il mio libre* 'one of my books/my book'. The two types of possessors – those that can co-occur with articles and those that cannot – are sometimes called adjectival-genitives (vs. determiner-genitives) (Lyons, 1986). A language can occasionally have both types of genitives, e.g., *'s*-genitives and *of*-genitives in English.

Clearly, not all entities are equally good at providing clues for the identification of other entities. Accordingly, the best and most frequently named possessors are humans and easily accessible (i.e., topical or at least definite) possessors. Languages often have different PNP structures for highly topical human possessors, such as pronouns, proper names, and kin terms, and other types of possessors. On the other hand, the various roles traditionally ascribed to human possessors of non-inalienable possessees, such as LEGAL OWNERSHIP, DISPOSAL, AUTHOR or ORIGINATOR, CARRIER OF PROPERTIES, and SOCIAL RELATIONS, are normally expressed with the same structure. However, the English subjective and objective genitives in nominalizations (as in *Peter's reading of the book*) often correspond to non-possessor expressions in other languages (*see* **Nominalization**). There tend to be much stronger restrictions on non-human possessors, and particularly on inanimates as possessors, and on their possible relations to the possessee. Thus, although PART-WHOLE relations are often expressed by PNPs, languages vary considerably as to whether TEMPORAL and LOCATIVE relations (such as *this week's hottest news* and *London's highest building*) can be expressed at all within PNPs and, if so, to what extent.

Finally, in many languages, PNPs are not restricted to cases in which the possessors can be seen as reference point entities, or anchors for identification of the head's referent. In addition, a more or less similar pattern is used for expressing non-anchoring relations, in which the nominal dependent is to classify, describe, or qualify the class of entities denoted by the head, e.g., MATERIAL, PURPOSE, or DURATION, as shown for Georgian in Examples (6a) and (6b) (see Koptjevskaja-Tamm, 2002):

(6a) p̣ur-is dana
bread-GEN knife.NOM
'a/the knife bread'

(6b) okro-s beč̣ed-i
gold-GEN ring-NOM
'a/the golden ring'

See also: Articles, Definite and Indefinite; Nominalization; Nouns; Possession, External; Possession, Predicative.

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Possession, Predicative

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'Predicative possession' constructions can be defined as those constructions in which the concept of 'possession' (to be defined below) is expressed in the main predication of a clause or sentence. In this, cases of predicative possession as in (1a) contrast with cases of adnominal possession, as given in (1b) (from English):

(1a) John has a motorcycle
(1b) John's motorcycle got stolen

It can be argued that, in both of these sentences, a relation of possession is predicated between an entity that is specified as the 'possessor' (*John*) and an entity that is specified as the 'possessed' (*motorcycle*). However, it is only in the first of these sentences that this relation of possession is construed as the main predication.

The typology of predicative possession has been addressed in recent literature by several authors, notably Locker (1954), Clark (1978), Seiler (1983), Lizotte (1983), and Heine (1997). Although these authors differed somewhat in their approaches and in the range of phenomena that they discussed, a consensus opinion was that the notion of possession is in itself complex. To be specific, 'possession' appears to define a 'cognitive space' or 'cognitive domain,' which must be subdivided into three semantically cognate, but nonetheless separate subdomains. It can be argued that these three subdomains are in fact the results of differences in settings on two more general cognitive/semantic parameters, viz., 'time stability' (Givón, 1984) and 'control' (Hopper and Thompson, 1980). Thus, we can distinguish between (1) 'inalienable possession,' (2) 'alienable possession,' and (3) 'temporary possession.'

1. In inalienable possession, the relation between the possessor and the possessed object is [+time stable] and [– control]. In this case, the relation between the possessor (PR) and the possessed entity (PD) can be said to hold for an unspecified (and presumably quite extended) stretch of time. However, the PR cannot, in general, be said to be 'in control' of the PD; that is, the PR has not the power or the authority to decide on the whereabouts of the PD. Languages vary as to which possessive relationships they choose to encode as inalienable, but the core of this subdomain seems to belong to kinship relations, and part-whole relations, such as between a body and its parts. Other relations often encountered in inalienable possessive constructions are social relations (*friend, leader, name*), implements of material culture (*bow, pet, canoe, clothing*), or agents and objects of actions (see Seiler, 1983).

2. In alienable possession, the relation between possessor and possessed object must be characterized as [+time stable] and [+control]. In this case, the PR is in control of the PD, and the possessive relation is seen as unspecified as to time length. Roughly speaking, this is the domain of 'ownership' in a narrow judicial or ethical sense; it comprises those cases in which the possessive relation can be disrupted, transferred or given up by acts of stealing, borrowing, selling or buying.

3. In temporary possession, the relation between possessor and possessed object can be characterized as [–time stable] and [+control]. Again, the PR is in control of the PD in this case, but the possessive relation is seen as short-term or accidental. This domain comprises relations that may be circumscribed by phrases such as *to have on one's person, to have at one's disposal,* or *to carry with oneself*. An English example that strongly invites this temporary possessive reading would be something like *Look out! He's got a knife!*

Although there are languages like English, which use, or can use, the same type of formal encoding for all three subdomains, quite a few languages match the semantic distinctions in the domain by different formal encoding strategies. This fact has led several

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Possession, External

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External possession refers to a type of mapping from semantic relations to syntactic functions in which the possessor of a noun phrase does not form a constituent together with that noun phrase but is, instead, encoded as a separate sentence-level constituent. As a consequence, the (external) possessor is syntactically understood as an argument of the main predicate and semantically construed as a participant in the situation described by that predicate. Such mapping configurations have also been referred to as 'possessor raising' or 'possessor ascension.' External possession is opposed to (the default case of) 'adnominal possession' or 'internal possession,' in which the possessor is encoded as a sister constituent of the possessum (e.g., *I stepped on* [*Jack's* [*foot*]]).

Typical instances of external possession are the so-called *dativus sympatheticus* in continental European languages (see the Latin example in (1) from Plautus, Rudens, 274) and applicative constructions in which the verb agrees with the possessor of an object rather than agreeing with the object itself (see (2) from Tzotzil/Maya; König, 2001: 975). Sometimes, double-subject constructions in Mandarin Chinese, Korean, and Japanese are also regarded as instances of external possession (see (3) from Japanese; König, 2001: 974).

(1) nunc tibi amplectimur genua egentes opum
now you.DAT we.embrace knees needing help
'now we embrace your knees, in need of help'

(2) l-i-s-yaintas-be h-k'ob
COMPL–1.ABS–3.ERG-injure-APPL 1.POSS-hand
'he (has) injured my hand'

(3) watashi-ga atama-ga itai-tte
I-NOM head-NOM be.hurting-COMP
doushite wakat-ta-no
how guess-PERF-Q
'how did you guess that I had a headache?'

External possession is attested in all parts of the world and in most of the major language families. Languages without any clear instances of external possessor constructions are Arabic, Finnish, Hindi, Persian (Western Farsi), and Turkish, among others. English allows external possession only exceptionally (e.g., *He looked her tenderly in the eyes*). Languages with external possessor constructions differ in the conditions under which these constructions are licensed or required. Such conditions relate to both the syntactic and semantic properties of the relevant sentences and their constituents. As far as structural aspects are concerned, the syntactic function of the possessum plays an important role: external possession is most commonly found when the possessum is a direct or prepositional object, whereas it is restricted most severely when the possessum is a transitive or unergative subject. From a semantic point of view, three major tendencies can be observed: (1) the susceptibility of a possessor to be encoded externally correlates positively with its rank on the animacy hierarchy, (2) external possessor constructions are typically used when the semantic relationship holding between the possessor and the possessum is intrinsic and/or physical, and (3) external possession often requires that the main predicate must describe a situation in which the possessor is (positively or negatively) affected.

See also: Case; Possession, Adnominal; Possession, Predicative.

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Possible Worlds: Philosophical Theories

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Anyone who reads contemporary philosophy will soon encounter talk of possible worlds, and anybody who delves a little deeper will quickly discover that there are various conflicting philosophical accounts of their nature. We consider those competing accounts, but it is helpful to begin with a discussion of the ends that possible worlds are commonly made to serve.

Possible worlds made their debut on the current philosophical scene through Kripke's work on the metamathematics of modal logics, but their current ubiquity probably owes more to their relationships to less esoteric matters. We commonly express claims about what is possible by using statements that appear to assert the existence of 'possibilities,' for example, or of 'ways things might have been.' So, for instance, somebody might assert, quite unexceptionably, that 'there's a possibility that the world will end in the next 10 years.'

That habit has striking affinities with one of the characteristic principles concerning worlds, that what is possible at a given world w is what obtains at some world that is possible relative to w. Another central principle invoking worlds relates to necessity: what is necessary at a given world w is what holds at every world that is possible relative to w. That last principle in fact follows immediately from the previous one (and vice versa) on the assumption that worlds are *complete*, in the sense that each proposition is either true at a given world or false at it.

The above theses may be interpreted in numerous ways, depending upon how their talk of 'possibility,' 'necessity,' and 'possible worlds' is read. For instance, the first principle can be construed as concerning the *physical* possibilities at a given world – whatever is compatible with the fundamental physical nature of that world – so long as we restrict the 'worlds' there considered to those that are *physically* possible relative to the relevant possible world. And if we impose that restriction upon the possible worlds cited in the second principle, it can be treated as applying to physical necessities.

Another central assumption involving possible worlds is that one among them is the *actual* world, at which precisely the actual truths obtain. That assumption combines with the various readings of the earlier theses relating to possibility and necessity to yield truth conditions for a wide variety of modal statements. So, for instance, it implies that it is actually physically necessary that P just in case P is physically necessary at the actual world. But the central hypothesis relating possible worlds to physical necessities implies that P is physically necessary at the actual

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Possession, Predicative

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'Predicative possession' constructions can be defined as those constructions in which the concept of 'possession' (to be defined below) is expressed in the main predication of a clause or sentence. In this, cases of predicative possession as in (1a) contrast with cases of adnominal possession, as given in (1b) (from English):

(1a) John has a motorcycle
(1b) John's motorcycle got stolen

It can be argued that, in both of these sentences, a relation of possession is predicated between an entity that is specified as the 'possessor' (*John*) and an entity that is specified as the 'possessed' (*motorcycle*). However, it is only in the first of these sentences that this relation of possession is construed as the main predication.

The typology of predicative possession has been addressed in recent literature by several authors, notably Locker (1954), Clark (1978), Seiler (1983), Lizotte (1983), and Heine (1997). Although these authors differed somewhat in their approaches and in the range of phenomena that they discussed, a consensus opinion was that the notion of possession is in itself complex. To be specific, 'possession' appears to define a 'cognitive space' or 'cognitive domain,' which must be subdivided into three semantically cognate, but nonetheless separate subdomains. It can be argued that these three subdomains are in fact the results of differences in settings on two more general cognitive/semantic parameters, viz., 'time stability' (Givón, 1984) and 'control' (Hopper and Thompson, 1980). Thus, we can distinguish between (1) 'inalienable possession,' (2) 'alienable possession,' and (3) 'temporary possession.'

1. In inalienable possession, the relation between the possessor and the possessed object is [+time stable] and [– control]. In this case, the relation between the possessor (PR) and the possessed entity (PD) can be said to hold for an unspecified (and presumably quite extended) stretch of time. However, the PR cannot, in general, be said to be 'in control' of the PD; that is, the PR has not the power or the authority to decide on the whereabouts of the PD. Languages vary as to which possessive relationships they choose to encode as inalienable, but the core of this subdomain seems to belong to kinship relations, and part-whole relations, such as between a body and its parts. Other relations often encountered in inalienable possessive constructions are social relations (*friend, leader, name*), implements of material culture (*bow, pet, canoe, clothing*), or agents and objects of actions (see Seiler, 1983).

2. In alienable possession, the relation between possessor and possessed object must be characterized as [+time stable] and [+control]. In this case, the PR is in control of the PD, and the possessive relation is seen as unspecified as to time length. Roughly speaking, this is the domain of 'ownership' in a narrow judicial or ethical sense; it comprises those cases in which the possessive relation can be disrupted, transferred or given up by acts of stealing, borrowing, selling or buying.

3. In temporary possession, the relation between possessor and possessed object can be characterized as [–time stable] and [+control]. Again, the PR is in control of the PD in this case, but the possessive relation is seen as short-term or accidental. This domain comprises relations that may be circumscribed by phrases such as *to have on one's person, to have at one's disposal,* or *to carry with oneself*. An English example that strongly invites this temporary possessive reading would be something like *Look out! He's got a knife!*

Although there are languages like English, which use, or can use, the same type of formal encoding for all three subdomains, quite a few languages match the semantic distinctions in the domain by different formal encoding strategies. This fact has led several

(though not all) authors on the topic to single out one of the subdomains as their focus of attention. In what follows, the exposition will be restricted to typological aspects of the encoding of alienable possession. This decision is in keeping with most authors on the subject, which have (openly or tacitly) assumed that alienable possession is somehow the protoypical case of the possessive relationship.

Apart from semantic considerations, there are also formal parameters that contribute to a further delineation of the domain of possession. First, there is the distinction between 'predicative possession' and 'adnominal possession,' as illustrated in (1). As said, this article will deal with predicative possession only. Second, within predicative alienable possession, it often matters whether the noun phrase that indicates the possessed item is 'indefinite' or not. English is a language in which this parameter gives rise to two radically different encoding options:

(2a) John has a motorcycle
(2b) This motorcycle is John's

In what follows, attention will be paid only to those constructions in which the PD has an indefinite reading. Again, this decision is in concord with the practice to which most authors on the subject have adhered.

Major Types of Predicative Possession

Authors on the typology of predicative (alienable) possession do not agree fully on the number and the nature of possessive encoding types. However, at least five strategies are recognized by everybody, because they are relatively frequent and clearly identifiable.

Among these five strategies, one stands apart, in that it encodes the possessive relationship between possessor and PD in the form of a 'transitive' construction. In this 'Have-possessive,' the possessor NP and the PD function as the subject and direct object of a 'have' verb, which, in many cases, can be shown to derive from some verb indicating physical control or handling, such as *take, grasp, hold,* or *carry.* The construction has a concentration in some western branches of modern Indo-European, such as Germanic, Romance, West and South Slavonic, modern Greek, and Albanian, as well as in some, though not many, eastern Indo-European languages (Farsi). Heine (1997) reported a number of Have-cases for African language families, notably Gur and Khoisan. Furthermore, the option appears to be the norm in the Uto-Aztecan languages of Mexico. Apart from this, however, Have-possessives are only incidental occurrences in linguistic families. Although most linguistic groupings in the world allow a Have-strategy for at least some of their members, it can be demonstrated that in the large majority of genetic or areal language groupings it is not the primary, or even a prominent, encoding option for predicative alienable possession. An example of the Have-possessive, from Albanian (an Indo-European language) is:

(3) Une kam një laps
1SING.NOM have.1SING.PRES INDEF pencil
'I have a pencil' (Kacori, 1979: 30)

Opposed to the Have-possessive, the other four major types employ a strategy that is syntactically intransitive: the possessive construction has the basic form of an 'existential sentence.' Thus, all four types feature a one-place predicate with a locational or existential meaning: its usual translation can be something like *to be, to be there, to be present,* or *to exist.* The difference between them lies in the encoding of the possessor NP and the possessed NP.

In the 'locational possessive,' the possessed NP functions as the grammatical subject of the 'exist'-predicate. The possessor NP (PR) is constructed in some oblique case form, which has as its basic meaning the specification of a locational relation. Depending on the particular type of locational relation selected, it is possible to subcategorize this type into 'locative possessive' (with the PR being marked by some item meaning *at, on,* or *in*) and 'dative possessive' (with a marker *to* or *for* on the PR). The locational possessive is the prominent option in Eurasia and Northern Africa, as well as in Polynesia and the northern part of South America. A randomly chosen example (from Mongolian, an Altaic language) is:

(4) Na -dur morin bui
1SING-LOC horse be.3SING.PRES
'I have a horse' (Poppe, 1954: 147)

With the locational possessive, the 'topic possessive' shares the characteristic that the possessed NP is constructed as the grammatical subject of the existential predicate. The distinguishing feature of the topic possessive lies in the encoding of the possessor NP, which is constructed as the 'discourse topic' of the sentence. As such, the possessor NP indicates the setting or background of the sentence – that is, the discourse frame that restricts the truth value of the sentence that follows it. Its function can thus be circumscribed by English phrases such as *given X*, *as for X*, *with regard to X*, *speaking about X*, *as far as X is concerned*, and the like. Topic-possessives show a concentration in Southeast Asia, but the type is also found in West and Northeast Africa, in Austronesian and Papuan

languages, as well as in many Amerind language groups. An example (from Tondano, a language of the Philippines) is:

(5) Si tuama si wewean wale rua
AN.SING man TOP exist house two
'The man has two houses' (Sneddon, 1975: 175)

With the two other intransitive possessive types, the 'conjunctional possessive' shares the feature of containing an existential predicate. In other respects, however, the conjunctional possessive contrasts with both the locational possessive and the topic possessive. For a start, the conjunctional possessive constructs the possessor NP as the grammatical subject. An even more conspicuous feature is the encoding of the possessed NP. In the conjunctional possessive, this NP is accompanied by, and usually in construction with, a marker that can be analyzed neither as a locational item nor as an indicator of topics. Closer inspection reveals that this marker in all cases originates from an item which is, or at least has been, employed as a means to indicate **simultaneity between clauses.** Thus, we find markers that have their origin in a sentential adverb meaning *also* or *too*, in a subordinating conjunction *when/while*, or in a coordinating particle *and*. A prominent option within the conjunctional possessive is the use of the comitative marker *with* on the possessed NP, which is why the type is often referred to as the 'With-possessive' in the literature. It can be argued, however, that languages that employ this comitative marker on possessed NPs also use this marker as a means to coordinate NPs (see Stassen, 1999), so that this With-strategy can be seen as a special case of a more general conjunctional encoding format. Concentrations of the conjunctional possessive are found in sub-Saharan Africa and in Eastern Austronesian and Papuan languages. Examples include:

(6) From Daga (Papuan, South-East):
Orup da agoe den
man one slave with/too
'a man had a slave' (Murane, 1974: 303)

(7) From Sango (Niger-Kordofanian, Ubangian):
Lo eke na bongo
3SING be and/with garment
'he/she has a garment' (Samarin, 1967: 95)

In addition to these four basic types, most authors on the subject distinguish a fifth strategy, which may be called the 'genitive possessive.' The genitive possessive shares features with both the locational possessive and the topic possessive, in that the possessed NP is constructed as the grammatical subject of an existential predicate. The defining feature of the genitive possessive is the encoding of the possessor NP, which is constructed as an adnominal modifier to the possessed NP. Depending on the strategy that the language has for the encoding of such adnominal possessive NPs, the genitive possessive may involve dependent marking on the possessor NP (as in Avar), head marking on the possessed NP by means of a pronominal affix (as in Tz'utujil), both head marking and dependent marking (as in Turkish), or no marking at all (as in Lahu):

(8) From Avar (Dagestanian):
Dir mašina b-ugo
1SING.GEN car III-be.PRES
'I have a car' (Elena Kalinina, p.c.)

(9) From Eastern Tz'utujil (Mayan):
K'o jun ruu-keej n -ata?
exist a his-horse my-father
'my father has a horse' (Dayley, 1981: 200)

(10) From Turkish (Altaic, Turkic):
Mehmed'-in para -si var
Mehmed-GEN money-his exist
'Mehmed has money' (Lewis, 1967: 251)

(11) From Lahu (Sino-Tibetan, Burman):
Yô-hi câ-tu mâ cò
3PL food NEG exist
'they have no food' (Matisoff, 1973: 385)

There are, however, indications that these cases of 'genitival' possession are in fact cases of reanalysis from the locative possessive or the topic possessive, so that they do not have to be considered as a separate encoding type (Stassen, in preparation).

Transitivization

A number of languages exhibit constructions that cannot be classified straightforwardly in terms of any of the basic types. Closer inspection reveals that these cases can be rated as the results of several grammaticalization processes. The first of these processes might be called 'transitivization' or 'Have-drift,' as it consists in a process of drifting toward a Have-possessive from one of the other three basic types. Cases of Have-drift from an erstwhile conjunctional possessive commonly involve the cliticization or incorporation of the conjunctional marker into the existential predicate; the newly formed predicate then acts as a transitive verb. An example (from Ganda, a Northeast Bantu language) is:

(12) O -li -na ekitabo
2SING-be-with book
'you have a book' (Ashton *et al.*, 1954: 234)

Have-drift from topic possessives commonly involves the reanalysis of the existential *be* item as a transitive verb and the reanalysis of the possessor NP and possessed NP as the subject and direct object of that verb. The process is helped along by the fact that, in the typical case, this *be* item occupied the canonical position of transitive verbs in the original possessive construction. An example of this form of Have-drift is given in (13) (in Khási, from the Mon-Khmer family). That the process is gradual and involves various intermediate stages can be seen from the Luiseño sentences in (14): here the reanalysis of the erstwhile topic into subject seems to be under way, but the construction is not fully transitive yet.

(13) Nga don ka jaa saw
1SING have/exist ART red cloth
'I have a red cloth' (Rabel, 1961: 139)

(14a) Noo -p no -toonav qala
1SING-TOP my-basket be.INAN.PRES
'I have a basket' (Steele, 1977: 114)

(14b) Noo -n no -toonav qala
1SING-SUBJ my-basket be.INAN.PRES
'I have a basket' (Steele, 1977: 122)

Instances of Have-drift from locational possessives are not very frequent. Comrie (1989: 219–225) reported a case from Maltese, with an intermediate stage in which the possessor NP was topicalized. A similar process must have taken place in the Celtic languages Breton (see Press, 1986: 139) and Cornish (15):

(15a) Ancow a -s byth
death to-2SING be.3SING.FUT
'you will have death: you will die' (Lewis and Pedersen, 1974: 211)

(15b) Why a-s byth ancow
2SING.NOM to-2sing be.3SING.FUT death
(Lewis and Pedersen, 1974: 211)

(15c) An tekter a-s betheugh
ART beauty to-2SING be.2SING.DEP
why
2SING.NOM
'the beauty which you will have' (Lewis and Pedersen, 1974: 211)

It is tempting to view the phenomenon of Have-drift as being motivated by iconicity (Haiman, 1980). After all, the relation between PR and PD is fairly high in transitivity (Hopper and Thompson, 1980). In particular, possession implies a high degree of control of the possessor over the possessed item. Hence, languages may evolve to a situation in which this semantic transitivity is matched by formal transitivity; and the only major possessive type that is formally transitive is the Have-possessive.

Adjectivalization

In some linguistic areas, we find possessive constructions in which the PD is constructed as the predicate (or part of the predicate) and treated in the same way as predicative adjectives are treated. Thus, depending on whether predicative adjectives are 'nouny' or 'verby' (Wetzer, 1996; Stassen, 1997), the possessed NP shows up as (part of the) complement of the copula, or as (the lexical core of) a predicative verb. Examples include:

(16) From Tiwi (Australian, Tiwi):
awa mantani teraka
our friend wallaby
'our friend has a wallaby' (Osborne, 1974: 60)

(17) From Central Kanuri (Nilo-Saharan, Saharan):
Kam kura-te ku gena-nze-wa (genyi)
man big -the money -his-ADJ/with (NEG.COP)
'the big man has (no) money' (Cyffer, 1974: 122)

(18) From Guajajára (Tupi):
I -mukaw
3SING-gun
'he has a gun' (Bendor-Samuel, 1972: 162)

(19) From Yukaghir (Yukaghir):
Met e -n -je
1SING.NOM reindeer-with-1SING.PRES.INDEF.INTRANS
'I have (a) reindeer' (Jochelson, 1905: 405)

Cases like these are probably best viewed as the results of a grammaticalization process by which the possessed NP (together with its marker, if it has one) is gradually reanalyzed as the predicate of the construction. Depending on whether the possessed NP carries a marker or not, the source of such products of adjectivalization can be traced back to a conjunctional possessive or a topic possessive. The process of adjectivalization may well be fostered by the fact that in the relevant languages, the existential verb is either zero or identical to the copula.

See also: Possession, Adnominal; Transitivity: Stylistic Approaches.

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Possession, External

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External possession refers to a type of mapping from semantic relations to syntactic functions in which the possessor of a noun phrase does not form a constituent together with that noun phrase but is, instead, encoded as a separate sentence-level constituent. As a consequence, the (external) possessor is syntactically understood as an argument of the main predicate and semantically construed as a participant in the situation described by that predicate. Such mapping configurations have also been referred to as 'possessor raising' or 'possessor ascension.' External possession is opposed to (the default case of) 'adnominal possession' or 'internal possession,' in which the possessor is encoded as a sister constituent of the possessum (e.g., *I stepped on* [*Jack's* [*foot*]]).

Typical instances of external possession are the so-called *dativus sympatheticus* in continental European languages (see the Latin example in (1) from Plautus, Rudens, 274) and applicative constructions in which the verb agrees with the possessor of an object rather than agreeing with the object itself (see (2) from Tzotzil/Maya; König, 2001: 975). Sometimes, double-subject constructions in Mandarin Chinese, Korean, and Japanese are also regarded as instances of external possession (see (3) from Japanese; König, 2001: 974).

(1) nunc tibi amplectimur genua egentes opum
now you.DAT we.embrace knees needing help
'now we embrace your knees, in need of help'

(2) l-i-s-yaintas-be h-k'ob
COMPL–1.ABS–3.ERG-injure-APPL 1.POSS-hand
'he (has) injured my hand'

(3) watashi-ga atama-ga itai-tte
I-NOM head-NOM be.hurting-COMP
doushite wakat-ta-no
how guess-PERF-Q
'how did you guess that I had a headache?'

External possession is attested in all parts of the world and in most of the major language families. Languages without any clear instances of external possessor constructions are Arabic, Finnish, Hindi, Persian (Western Farsi), and Turkish, among others. English allows external possession only exceptionally (e.g., *He looked her tenderly in the eyes*). Languages with external possessor constructions differ in the conditions under which these constructions are licensed or required. Such conditions relate to both the syntactic and semantic properties of the relevant sentences and their constituents. As far as structural aspects are concerned, the syntactic function of the possessum plays an important role: external possession is most commonly found when the possessum is a direct or prepositional object, whereas it is restricted most severely when the possessum is a transitive or unergative subject. From a semantic point of view, three major tendencies can be observed: (1) the susceptibility of a possessor to be encoded externally correlates positively with its rank on the animacy hierarchy, (2) external possessor constructions are typically used when the semantic relationship holding between the possessor and the possessum is intrinsic and/or physical, and (3) external possession often requires that the main predicate must describe a situation in which the possessor is (positively or negatively) affected.

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Possible Worlds: Philosophical Theories

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Possible worlds made their debut on the current philosophical scene through Kripke's work on the metamathematics of modal logics, but their current ubiquity probably owes more to their relationships to less esoteric matters. We commonly express claims about what is possible by using statements that appear to assert the existence of 'possibilities,' for example, or of 'ways things might have been.' So, for instance, somebody might assert, quite unexceptionably, that 'there's a possibility that the world will end in the next 10 years.'

That habit has striking affinities with one of the characteristic principles concerning worlds, that what is possible at a given world w is what obtains at some world that is possible relative to w. Another central principle invoking worlds relates to necessity: what is necessary at a given world w is what holds at every world that is possible relative to w. That last principle in fact follows immediately from the previous one (and vice versa) on the assumption that worlds are *complete*, in the sense that each proposition is either true at a given world or false at it.

The above theses may be interpreted in numerous ways, depending upon how their talk of 'possibility,' 'necessity,' and 'possible worlds' is read. For instance, the first principle can be construed as concerning the *physical* possibilities at a given world – whatever is compatible with the fundamental physical nature of that world – so long as we restrict the 'worlds' there considered to those that are *physically* possible relative to the relevant possible world. And if we impose that restriction upon the possible worlds cited in the second principle, it can be treated as applying to physical necessities.

Another central assumption involving possible worlds is that one among them is the *actual* world, at which precisely the actual truths obtain. That assumption combines with the various readings of the earlier theses relating to possibility and necessity to yield truth conditions for a wide variety of modal statements. So, for instance, it implies that it is actually physically necessary that P just in case P is physically necessary at the actual world. But the central hypothesis relating possible worlds to physical necessities implies that P is physically necessary at the actual

world just in case *P* holds at every world that is physically possible relative to the actual world.

The various theses just considered are perhaps the least contentious principles featuring possible worlds (another, more contentious but widely accepted use for worlds is in providing truth conditions for counterfactual conditionals, like 'if tigers had 10 legs they would be cumbersome'). Elsewhere, contention is the order of the day. Thus some philosophers, like David Lewis, have claimed that possible worlds can be used to provide thoroughly nonmodal analyses of modal claims. But others, like Alvin Plantinga, have disagreed. And some philosophers – Lewis again, for instance – hope to reduce propositions to classes of worlds, whereas others prefer to follow Robert Adams and Arthur Prior in identifying possible worlds with special sorts of propositions, or with set-theoretical constructions based upon propositions.

There is disagreement, then, over what it is reasonable to expect from possible worlds – that is, over what we can sensibly hope to use them *for*. Those differences are echoed in the varying theories of what possible worlds are. For it is commonly held that the concept of a possible world is a *functional* one: possible worlds are those things that are fit to play certain roles in philosophical theorizing about modality and related matters. But if one philosopher thinks a certain range of roles should be filled by possible worlds, while another believes that worlds should serve a somewhat different range of roles, their accounts of which things are possible worlds may consequently diverge simply because the two philosophers have focused on groups of jobs that call for different occupants.

At one end of the spectrum, Lewis attempted to make possible worlds perform an extraordinarily ambitious range of tasks (for a comprehensive outline of Lewis's views on possible worlds, see Lewis, 1986). Lewis claimed that a possible world is a group of things that are all spatiotemporally related to one another and where each thing that is spatiotemporally related to something in the group is also among its occupants. So, for instance, the actual world contains precisely those things that stand in a spatiotemporal relation to you or me.

Lewis used his nonmodal account of the nature of possible worlds to provide wholly nonmodal analyses of modal locutions. He also followed the common practice of using talk of possible worlds in formal semantical treatments of fragments of natural language. And he identified numerous types of entities that philosophers and nonphilosophers have posited, such as properties and propositions, with set-theoretical constructions founded on possible worlds and their inhabitants. Another important aspect of Lewis's position is his denial that distinct possible worlds ever share any inhabitants. This led him to develop *counterpart theory*, according to which a statement regarding a certain individual belonging to a given possible world *w* – 'Kant had a beard,' for instance – is true in another possible world *y* just in case *y* contains a bearded entity that is sufficiently similar to Kant.

Although Lewis argued with great virtuosity that his putative possible worlds would perform the various tasks that he considered and that we ought therefore to believe that his worlds exist, some of his theory's obvious consequences are so implausible that few people have been willing to accept his conclusions. For instance, there might have been talking donkeys. So, Lewis claimed, there is a group of spatiotemporally interrelated items that includes a talking donkey. Hence, a talking donkey exists even if none *actually* exists – that is, a talking donkey exists even if we do not stand in any spatiotemporal relations to such a beast.

Lewis placed great emphasis upon his theory's provision of nonmodal analyses of modal locutions and argued that none of his view's major competitors could also provide them. But some of his opponents would distance themselves from Lewis's reductionist aims. Indeed, a significant lacuna in Lewis's case for his position is that he never provided a compelling account of why we should want nonmodal analyses of modal locutions. For unless one is already persuaded of the desirability of such analyses, one of the chief supposed virtues that Lewis claimed for his stance seems instead to be a mere curiosity.

Following van Inwagen (1986), Lewis's theory may be described as *concretist*, because his possible worlds and their inhabitants are concrete rather than abstract. Lewis's view thus contrasted with the preponderance of accounts of possible worlds, on which possible worlds are identified with paradigmatically abstract items of some kind or another. For example, Adams (1974) identified possible worlds with special sets of propositions where propositions were assumed to be a variety of abstract object; Plantinga (1974) identified possible worlds with a certain type of states of affairs, another putative type of abstract item; and Stalnaker (1976) identified worlds with a particular variety of ways things might have been, which he took to be a sort of property.

Theorists who identify possible worlds with abstract entities – *abstractionists*, to use some more of van Inwagen's terminology – need not endorse highly revisionary views concerning what concrete objects exist. That fact makes their general approach more immediately appealing than Lewis's concretism. Of course, if abstractionists are to respect our ordinary

modal opinions, they must still posit very many abstract objects; each total possible state of the world should correspond to a possible world. But we appear to accept that the abstract domain is immensely populous (we seem to believe in infinite collections of numbers, for instance), and that fact may make us jib less, perhaps irrationally, at the hefty ontologies that abstractionists require as compared to equally large concretist ontologies.

Abstractionists nonetheless have some work to do if they are to make the ontological foundations of their theories credible. Russell's discovery that the guiding principles of naive set theory are inconsistent showed that one cannot be assured that there really are abstract items answering to every intuitively appealing map of a portion of the abstract realm. Abstractionists therefore need to persuade us that the abstract things with which they identify possible worlds exist. To take a specific case, why should we believe in the abstract states of affairs that Plantinga equates with possible worlds? At the least, Plantinga should present a strong case that the conception of states of affairs that underlies his approach is consistent. Similar remarks apply to the other abstractionists mentioned earlier, Adams and Stalnaker.

As stated earlier in this article, Lewis argued that abstractionist accounts of possible worlds cannot provide nonmodal analyses of modal statements. So what can abstractionists do with their putative possible worlds? They can use them to supply truth conditions for many modal claims, for one thing, although those truth conditions may not be stated nonmodally. (On Adams's theory, for instance, the supplied truth conditions will speak of 'consistent' sets of propositions). And they can provide interpretations of those philosophical discussions, which, rather than address the question of what possible worlds are, instead take possible worlds for granted and proceed to frame modal arguments and theses by speaking of them. While those tasks may seem trifling when compared to the more spectacular reductionist uses for possible worlds proposed by Lewis, they should not be dismissed – as noted at the outset, the spread of possible worlds through recent philosophy is, after all, owed to their use in precisely those ways and not to a widespread conviction that the modal ultimately boils down to the nonmodal.

An apparently simple method, described clearly by Lewis at various points in his writings, has very often guided philosophical investigations into the nature of possible worlds: one lines up the various contending accounts; one then compares their costs and benefits; and one opts for the position that comes out best overall. But although that methodology looks straightforward, its correct application requires a prior determination of philosophical virtues and vices, and the latter task is not trivial. So, for instance, how are to decide whether Lewis's nonmodal theory of possible worlds should be preferred on that account to the modal theories frequently offered by abstractionists? And how are we to adjudicate the sometimes competing demands of commonsense modal opinion and theoretical elegance?

Those and similar questions have perhaps been a little neglected by philosophers of modality, and further investigation into their answers might breathe life into a debate that has lately looked somewhat stalled. Accounts of possible worlds proliferate, but attempts to figure out what precisely we should demand from such theories are surprisingly scarce. This would be understandable if the discussion were to manifest a high degree of well-grounded consensus on the underlying desiderata, but that condition is evidently unsatisfied: what looks like a philosophical imperative to one philosopher – the need to avoid modal primitives of one kind or another, say, or to ensure that first-order modal logic has certain inferential features – can often appear a mere fetish to another. Of course, it may be that the current debate merely reflects the fact that we cannot realistically aim for wholly satisfying answers to the sort of questions just identified; but that prognosis is a dismaying one that we should not lightly accept.

See also: Counterfactuals; Formal Semantics; Modal Logic; Montague Semantics.

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Possible Worlds: Stylistic Applications

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Possible Worlds from Logic to the Semantics of Fiction

The notion of 'possible' worlds, which can be traced back to the 17th century German philosopher Leibniz, has been used by philosophers and logicians since the late 1950s to deal with some central logical issues (including particularly the modal properties of propositions). As long as logic took the 'actual' world as its only frame of reference, it was difficult to account for the differences in the truth values of the propositions expressed by statements such as the following: (1) The earth has one moon, (2) The earth has no moon, (3) The earth has one moon and the earth does not have one moon. Clearly, (1) is true in relation to what we know about the 'actual' world, while (2) and (3) are not. However, (2) describes an alternative state of affairs that could apply to a world that differs from our actual world in some aspects of the solar system, while (3) describes a contradictory state of affairs, so that it cannot apply to a conceivable alternative to the 'actual' world. Logicians account for these differences by adopting as their frame of reference a system where the actual world is surrounded by an infinite number of possible worlds. These possible worlds are alternative sets of states of affairs that may differ from the 'actual' world in an infinite number of ways. However, to qualify as 'possible,' these worlds cannot violate the laws of mathematics (e.g., that $2 + 2 = 4$) and the logical laws of non-contradiction (two contradictory propositions cannot be true at the same time) and of the excluded middle (given two contradictory propositions, one has to be true in a given world). Within this approach, the proposition expressed by (1) above is possibly true, because it is true in the 'actual' world but may be false in a possible world; the proposition expressed by (2) is possibly false, because it is false in the actual world but may be true in a possible world; and the proposition expressed by (3) is necessarily false, because as a logical contradiction it cannot be true in any logically possible world (see Bradley and Swartz, 1979; Divers, 2002; Kripke, 1971). Philosophers and logicians who adopt a possible-worlds approach often differ quite sharply, however, in their view of the ontological status of possible worlds in relation to the 'actual' world (see Divers, 2002; Lewis, 1986).

The adoption of a possible-worlds approach in philosophy made it possible to deal adequately with the propositions expressed by sentences in fiction (e.g., "Mrs Dalloway said she would buy the flowers herself"), and about fiction (e.g., "Othello killed Desdemona"), which had previously been regarded as false or anomalous (see Doležel, 1998: 2; Pavel, 1986: 11). The truth values of such sentences can be determined not in relation to the actual world, but in relation to the possible world projected by a particular text, such as Virginia Woolf's *Mrs. Dalloway* or Shakespeare's *Othello*. The adoption of a possible-worlds approach within the semantics of fiction, therefore, better accounts for the intuitions of ordinary readers, or, as Eco (1990: 64) puts it, "reconcile[s] common sense with the rights of alethic logic." Since the late 1970s, some important work in narratology and literary theory has resulted from the application of the notion of possible worlds to the study of literature and fiction (see Allén, 1989; Doležel, 1998; Eco, 1979, 1990; Maitre, 1983; Martínez-Bonati, 1981; Pavel, 1986; Ronen, 1994; Ryan, 1991; Wolterstoff, 1980). After all, as Doležel (1998: ix) has pointed out, "[l]iterary fiction is probably the most active experimental laboratory of the world-constructing enterprise."

The possible worlds of fiction, however, are quite different from the possible worlds of logic. The latter are usually defined as maximal, complete, and abstract sets of states of affairs, which are postulated for the purposes of logical reasoning. In contrast, the 'worlds' of fiction have the following characteristics:

- They are projected by texts, and are therefore best described as semiotic or cultural constructs (e.g., Doležel, 1998: 23–24; Eco, 1979: 220–221; Ronen, 1994: 48);
- They are furnished, i.e., they are inhabited by specific entities and individuals, who are involved in specific events and states of affairs (e.g., Eco, 1990: 65; Ronen, 1994: 60);
- They are incomplete, i.e., they do not assign truth values to every conceivable proposition (e.g., it is not possible to determine the number of Lady Macbeth's children in Shakespeare's play) (e.g., Doležel, 1998: 22; Wolterstoff, 1980: 131);
- They are parasitical in relation to the actual world: unless otherwise indicated, we assume that what is the case in the actual world also applies in fictional worlds (i.e., we assume that Hamlet has two legs even if this is not mentioned in Shakespeare's play) (e.g., Eco, 1990: 75; see also Ryan's (1991: 48) Principle of Minimal Departure and Teleman's (1989) Principle of Isomorphism);
- They can be semantically unhomogeneous, i.e., they may include different domains governed by

different laws, such as a natural and a supernatural sphere (Doležel, 1998: 23; Pavel, 1986: 61);

- They can be logically impossible, i.e., they may include internal contradictions: in Robbe-Grillet's *La Maison de Rendez-vous*, for example, a particular location both is and is not the setting of the narrated events in the novel (e.g., Doležel, 1998: 163; Eco, 1979: 233–234; Ronen, 1994: 55).

The adoption of the notion of possible worlds in narratology and fictional semantics has led to advances in a number of areas that are highly relevant to the study of literary texts in general. These include particularly the definition of fiction, the development of typologies of fictional worlds and genres, the study of the internal structure of fictional worlds, and the study of plot. Much attention has also been devoted to postmodernist literature in particular. Each of these areas will be considered in turn.

The Definition of Fiction

The distinction between the actual world and an infinite number of alternative possible worlds provides the theoretical foundation for a distinction between fictional and nonfictional texts and genres. Some possible-worlds theorists define fiction in relation to readers' perceptions of the world that is projected by a particular text: If the world presented by a text is compatible with the readers' view of the actual world, they will regard the text as nonfictional; if, on the other hand, the world presented by a text clashes with the readers' view of the actual world, they will regard the text as fictional (Eco, 1979: 20; Maitre, 1983: 36). Other possible-world theorists define fiction in relation to the particular way in which worlds are projected by authors via their texts (Wolterstoff, 1980; Ryan, 1991). Ryan (1991: 21), in particular, sees the production of fiction as a type of gesture, whereby text producers shift the relevant frame of reference from a system centered on the actual world to a system centered on an alternative possible world. She therefore argues that:

> nonfictional texts describe a system of reality whose center is occupied by the actually actual world; fictional ones refer to a system whose actual world is from an absolute point of view an APW [i.e., an alternate possible world] (Ryan, 1991: 24).

These definitions of fiction do not deny, however, that the products of fiction-making can be deeply relevant to actual-world concerns, or, indeed, to our view of the actual world itself. Pavel (1986: 106) argues, for example, that "in some very significant respects our image of 19th-century France has at least partly been shaped by Balzac's works" (see also Maitre, 1983: 53).

Possible-world theorists do not always explicitly distinguish between fiction and literature, however, which may in some cases lead to imprecision or confusion. Both concepts are highly complex and fuzzy, but it is important to recognize that not all texts that are regarded as literary are also fictional (e.g., Mary Wollstonecraft's essays on women rights), and, vice versa, not all fictional texts are also regarded as literary (e.g., jokes, or nonverbal fiction such as ballets). However, there is a considerable overlap between what we regard as literary and what we regard as fictional, especially in some of the most prototypical instantiations of both categories, such as novels for example (see Ronen, 1994: 82; Ryan, 1991: 1–3; Semino, 1997: 68–70).

Typologies of Fictional Worlds

An important contribution of possible-world approaches has been to develop ways of classifying fictional worlds according to their relationship with the actual world. This often results in the development of typologies of literary genres that tend to project different kinds of text worlds.

Maitre (1983), for example, has proposed a typology of the worlds of narrative fiction that depends on the degree of distance between the projected text world and the actual world. As far as realistic fiction is concerned, she distinguishes between novels that make references to specific historical events (e.g., Tolstoy's *War and Peace*) and novels that deal with imaginary but entirely plausible states of affairs (e.g., David Lodge's campus novel). As far as fantastic fiction is concerned, Maitre distinguishes between worlds that could never be actual (e.g., those of fairy stories) and worlds that are highly implausible but that could potentially be actual (e.g., those of James Bond novels).

Doležel (1976; 1998: 113) distinguishes among four types of basic atomic stories, which are formed around one of four different modalities: stories based on the alethic modal system of possibility, impossibility, and necessity project worlds that violate the natural laws of physical possibility (e.g., fairytales and ancient myths); stories based on the deontic system of prohibition, permission, and obligation project worlds dominated by moral laws which may be respected or violated (e.g., Dostoevsky's *Crime and Punishment*); stories based on the axiological system of goodness and badness project worlds in which characters pursue their own quests or desires (e.g., romantic novels); and stories based on the epistemic

system of knowledge, ignorance, and beliefs project worlds dominated by mystery and deception (e.g., detective novels). Most actual narratives involve more than one modal system, and therefore project complex, molecular worlds. A particular case is that of dyadic worlds, which consist of two ontologically separate spheres, such as the natural and supernatural domains in Greek myths, which are dominated by different laws of possibility. Pavel (1986: 61) calls such split worlds 'salient' structures (see also Ryan, 1991: 40–41).

The most comprehensive typology of text worlds to date has been proposed by Ryan (1991). By developing the logical notion of accessibility between different worlds, Ryan arrives at a system for classifying fictional worlds that provides the foundations for a theory of genre (Ryan, 1991: 31). In logic, accessibility is equated with logical possibility, so that worlds are accessible from the actual world if they do not break the laws of logic. However, the study of fiction requires a much wider range of different types of accessibility relations, or, in other words, a range of different types of possibility. Ryan's model includes nine types of accessibility relations: *identity of properties*, *identity of inventory*, *compatibility of inventory*, *chronological compatibility*, *physical compatibility*, *taxonomic compatibility*, *logical compatibility*, *analytical compatibility*, and *linguistic compatibility* (Ryan, 1991: 32). The worlds of nonfictional texts (e.g., history books), which aim to represent the actual world, are supposed to fulfill all these different criteria. Different types of fictional worlds, however, are incompatible with the actual world in different ways. Historical novels such as *War and Peace* are incompatible with the actual world in terms of their inventory of entities (i.e., they include non-actual individuals), but are compatible with the actual worlds in all other respects. When Orwell's *1984* was first published, it broke the criterion of chronological compatibility because it was set in the future. The worlds of science fiction are also often taxonomically as well as chronologically impossible, because they include types of objects that do not exist in the actual world (e.g., spaceships that can travel to other galaxies). Similarly, the worlds of fairytales tend to be taxonomically impossible (i.e., they include entities such as fairies and unicorns), but will also be physically impossible if they include talking animals and magical transformations. Logical compatibility is violated by worlds that present two contradictory states of affairs as simultaneously true (e.g., in Robert Pinget's *Le Libera*, a character is described as simultaneously dead and alive), while analytical compatibility breaks down when the essential properties of objects are denied (e.g., via a reference to a "young old man, sitting on a wooden stone") (Ryan, 1991: 38). Finally, a world is linguistically impossible if it is described in a language that cannot be understood in the actual world, as in the case of the poem 'Jabberwocky' in Lewis Carroll's *Alice in Wonderland*.

Ryan's typology accounts for a wide variety of textually projected worlds, from those of nonfictional genres to those of postmodernist fiction and nonsense verse. It also enables analysts to classify new texts alongside existing texts and genres. The world projected by J. K. Rowling's *Harry Potter* novels, for example, is incompatible with the actual world in terms of (a) its inventory (it includes many fictional characters and does not explicitly include all historically actual entities), (b) the properties of shared objects (Harry Potter's London includes streets and buildings that are not part of actual London), (c) its physical laws (e.g., it is characterized by all sorts of magical activities and transformations), (d) its taxonomy (e.g., the presence of hippogriffs, Dementors, etc.), and, on one occasion, (e) its logical laws (in *The Prisoner of Azkaban,* Harry's recourse to time travel results in a logical contradiction, where he is in two different places at the same time, and manages to conjure a Patronus because he has already seen the Patronus being conjured in his earlier experience of the same event).

As Ryan points out, there are several further ways in which the fictional worlds associated with different genres can differ from one another. One important dimension of variation is to do with the extent to which individual worlds may be said to be incomplete. As I mentioned earlier, unlike the possible worlds of logic, the worlds of fiction do not assign a truth value to every conceivable proposition. This means, for example, that there is no answer to the famous question about the number of Lady Macbeth's children in Shakespeare's play (see Wolterstoff, 1980: 131), nor to a hypothetical question as to whether Emma Bovary had a birthmark on her left shoulder (Doležel, 1998: 22). However, fictional worlds may differ considerably in the nature and degree of the incompleteness they display. While the stories in Joyce's *Dubliners* are explicitly set in the Irish capital, for example, Kafka's story 'A Hunger Artist' does not inform the reader as to the precise locations of the protagonist's travels and death (Doležel, 1998: 171–172; see also Pavel, 1986: 105).

Another important aspect of variation in the construction of fictional worlds is to do with what Doležel (1980; 1998) calls the process of authentication of fictional entities and events. In prototypical situations, the text provides an authoritative source (such as a third-person narrator) who establishes

what exists and what happens in the actual domain of the world projected by a particular text. This often contrasts with less authoritative sources, such as characters, who may hold mistaken beliefs about the world they inhabit. In Cervantes's *Don Quixote*, for example, the eponymous character (reported in direct speech) identifies some entities as giants, while in the narration the same entities are described as windmills. Because of the contrast in authoritativeness between the narrator and the character, however, it is only the existence of the windmills that is authenticated (i.e., established as actual) in the world of the story. Doležel notes, however, that in less prototypical situations the process of authentication is often problematic, so that authentication is best seen as a matter of degree. In cases where the narrator is partly or wholly unreliable (e.g., in Kesey's *One Flew Over the Cuckoo's Nest*), or where different first-person narrators give different accounts of the same events (e.g., in Julian Barnes's *Talking it Over*), readers cannot know for certain what exactly happens, and how, in the world of the story. A more extreme challenge to authentication is posed by texts that give contradictory, but equally authoritative, versions of situations and events. In O'Henry's story 'Roads of Destiny,' for example, the main character's death is described in three different ways (Doležel, 1998: 163–164). In Doležel's (1998: 160) terms, such narratives are self-voiding. Ryan (1991: 39–40) points out three different ways in which narratives may fail to authenticate their actual domain, namely by (a) hedging or modalizing any statements about the world of the story, (b) blurring the distinction between the voices of characters and narrators, and (c) withdrawing or undermining previous narratorial statements without providing any indication of which statements the reader is supposed to believe.

The Internal Structure of Fictional Worlds

As has already become clear in the previous discussion, possible-world theorists tend to describe the complex scenarios that are projected by fictional texts as *systems* of worlds, or universes, where one world functions as the actual domain, and many other worlds count as alternative possible states of the actual domain (e.g., see Ryan, 1991: 109). These alternative possible worlds normally correspond to the wishes, goals, obligations, speculations, and fantasies of the characters who inhabit the actual domain. Building on Doležel's (1976; 1998) classification of basic stories according to four different modal systems, Ryan (1991: 114) has distinguished four main types of alternative possible private worlds within fictional universes: *Knowledge worlds* (based on the epistemic modal system and corresponding to what a character knows and believes about the world s/he inhabits); *Obligation worlds* (based on the deontic modal system and corresponding to a character's awareness of his or her moral obligations and interdictions); *Wish worlds* (based on the axiological modal system and corresponding to what a character or group of characters regard as desirable or undesirable); and *Fantasy worlds/universes* (based on the alethic modal system and corresponding to character's fantasies, dreams, and hallucinations).

This kind of account of the internal structure of fictional worlds has a number of advantages for the study of fiction and literature. As pointed out by Doležel (1976; 1998), it makes it possible to distinguish between stories that foreground different modal systems and hence different types of alternative private worlds (e.g., Knowledge worlds are central to detective stories, while Wish worlds are central to romantic stories). In addition, Ryan (1991) has shown how this approach to fictional worlds can also account for plot development and for the elusive narrative quality of tellability, namely what makes a good, aesthetically successful plot.

When there is a perfect correspondence between the actual domain and all characters' private worlds, the narrative universe is in a state of equilibrium:

> everybody's desires are fulfilled, all laws are respected, there is a consensus as to what is good for the group; what is good for the group is also good for every individual, everybody's actions respect these ideals, and everybody has epistemic access to all the worlds of the system (Ryan, 1991: 120).

In such a narrative universe, there is no need for action or change, and hence no chance for a plot to get started. For a plot to begin, there has to be some kind of conflict between two or more of the worlds that are included within a particular narrative universe (Ryan, 1991: 120). The nature of this conflict may vary (Ryan, 1991: 119ff.): There may be a conflict, for example, between the private worlds of one or more characters in the actual domain (e.g., in Shakespeare's *Othello*, Iago brings about a situation where Othello's Knowledge world clashes with the actual domain in the crucial detail of whether Desdemona has been unfaithful or not); or there may be a conflict between the private worlds of different characters (e.g., in Alessandro Manzoni's *The Betrothed*, the Wish worlds of a young man and a local nobleman clash because they want to marry the same woman). Conflict results in the need for action, and action usually changes the mutual relationships of worlds within narrative universes, leading to the

need for further action. Final resolutions or happy endings usually involve the realizations of the private worlds of the main characters (as opposed to the villains) in a particular story (e.g., a wedding may realize the joint Wish worlds of the hero and heroine). Within this approach, therefore, a narrative move corresponds to a change in the mutual relationships among the worlds that make up a particular narrative universe, and a plot is constituted by a series of successive states of the narrative universe (Ryan, 1991: 124ff.).

Ryan (1991) demonstrates her approach by discussing, among others, Aesop's classic story involving the fox and the crow, a version of which is given below:

> **The Fox and the Crow**
> A Fox once saw a Crow fly off with a piece of cheese in its beak and settle on a branch of a tree. "That's for me, as I am a Fox," said Master Reynard, and he walked up to the foot of the tree. "Good-day, Mistress Crow," he cried. "How well you are looking to-day: how glossy your feathers; how bright your eye. I feel sure your voice must surpass that of other birds, just as your figure does; let me hear but one song from you that I may greet you as the Queen of Birds." The Crow lifted up her head and began to caw her best, but the moment she opened her mouth the piece of cheese fell to the ground, only to be snapped up by Master Fox. "That will do," said he. "That was all I wanted. In exchange for your cheese I will give you a piece of advice for the future: 'Do not trust flatterers.'"

At the beginning of the story, there is a conflict between the actual domain (where the crow has the cheese), and the fox's Wish world (where he has the cheese). The fox therefore carries out a plan in order to realize his Wish world. The plan involves the expression of two pretended private worlds (see Ryan, 1991: 118): a pretended Knowledge world in which the crow is good-looking and can sing beautifully, and a pretended Wish world in which the crow sings for the fox. The crow acts on the basis of the validity of these pretended private worlds and loses the cheese. The story therefore ends with the realization of the fox's original Wish world.

This simple account of the plot of Aesop's story shows that it involves several private worlds which are alternative possible states of the actual domain: the two pretended private worlds outlined by the fox and, implicitly, a mistaken Knowledge world formed by the crow, in which the fox genuinely finds her beautiful and longs to hear her voice. Ryan (1991: 148) suggests that the tellability of stories crucially depends on the richness of the domain of the virtual within narrative universes, i.e., on the presence of a variety of unrealized possibilities, frustrated wishes, and mistaken beliefs, which may form private virtual narratives developed by the characters. This is captured by her Principle of Diversification, which states that storytellers should try to achieve a high degree of diversification among the possible worlds that form the narrative universe (Ryan, 1991: 156; see also Semino, 2003).

Other Applications to Literature and Fiction

The possible-worlds approach to literature and fiction has been traditionally applied particularly to novels and short stories (e.g., Maitre, 1983; Ronen, 1994), presumably because of their narrative character. However, a number of studies have also been concerned with drama and poetry (e.g., Eco, 1979, 1990; Martinez-Bonati, 1981; Meneses, 1991; Semino, 1997), as well as with fairy stories, myths, and a variety of other verbal and nonverbal genres (e.g., Doležel, 1998; Eco, 1979, 1990; Pavel, 1986; Ryan, 1991). The approach has been extended to new forms of narrative discourse emerging from the exploitation of computer technology, and particularly to virtual reality (e.g., Ryan, 1995a).

Postmodernist literature, in particular, has received a great deal of attention from possible-world narratologists (see, for example, Ashline, 1995; Eco, 1979, 1990; Doležel, 1995, 1998; Ronen, 1995; Ryan, 1991, 1995a, 1995b). This is because, as I have mentioned at various points, postmodernist literature tends to be characterized by logical contradictions and ontological violations that pose serious but interesting challenges to the possible-worlds analytical framework. In this respect, Ashline (1995) has proposed a useful typology of logically impossible worlds in postmodernism, which includes five types of impossibility:

1. An event is presented as both having happened and not having happened, thereby violating the logical law of non-contradiction (e.g., in Alain Robbe-Grillet's *La maison de rendezvous*, Edouard Mannerett is presented to be alive after his death has been narrated);
2. Two or more different (but equally authoritative) versions of events in the actual domain of the story are presented (e.g., hypertext fiction, and the two different endings of Fowles's *The French Lieutenant's Woman*);
3. An apparently logical world suddenly presents a paradox that involves logical impossibility (e.g., the inclusion of time travel in *Harry Potter and the Prisoner of Azkaban*);
4. The boundaries between separate ontological spheres are transgressed (e.g., the inclusion of

the reader in the text world of Calvino's *If on a Winter's Night a Traveler*);

5. Characters from separate fictional worlds are brought together (e.g., in Caryl Churchill's play *Top Girls*, Chaucer's Griselda and the woman in Brueghel's painting *Dulle Griet* have a meal with the 19th century traveler Isabella Bird, the 13th century Japanese courtesan Lady Nijo, and the 9th century Pope Joan).

According to Eco (1990: 76), such logically impossible worlds can be mentioned but cannot be constructed, i.e., they cannot be imagined and explored by readers as fully as worlds that are logically possible. All types of impossibility, however, require a certain degree of flexibility and superficiality (Eco, 1990: 76) on the part of readers, who, as Maitre (1983: 17) points out, need to focus on the intelligible features of fictional worlds without pursuing the implications of unintelligible features (such as the physiology of talking animals or the chemistry of magical transformations). As children's fiction shows, impossibilities of all kinds can be easily accepted and enjoyed by young audiences, including major violations such as the transgression of ontological boundaries (in *Winnie the Pooh* stories, for example, the characters regularly converse with the narrator).

Generally speaking, possible-world approaches tend to focus on the overall characteristics of text worlds, genres and plots, and do not normally involve the detailed linguistic analysis of texts. However, some attention is paid to linguistic features such as referring expressions and modality. In addition, notions such as authentication and the contrast between the actual domain and characters' private worlds are closely linked with textual phenomena such as mode of narration, point of view, focalization, and speech and thought presentation (see also Semino, 2003). Some studies have applied a possible-worlds approach to the study of specific linguistic phenomena, such as the presentation of hypothetical words and thoughts in narrative (Semino *et al*., 1999), free indirect discourse (Oltean, 2003), and negation in poetry (Hidalgo-Downing, 2002).

See also: Narrative: Linguistic and Structural Theories; Possible Worlds: Philosophical Theories; Speech and Thought: Representation of; Text World Theory.

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Post-Bloomfieldians

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Leonard Bloomfield is widely regarded as the principal architect of American descriptivism (or 'structuralism,' as it tends to be called by its detractors), yet many of the positions associated with the descriptivist or Bloomfieldian tradition originate with Bloomfield's successors. Indeed, the great achievement of the post-Bloomfieldians was to develop the often programmatic remarks in Bloomfield's work into a coherent framework of grammatical analysis. To the extent that the key analytical assumptions of this framework survive in generative approaches and their offshoots, contemporary formal approaches fall squarely within the post-Bloomfieldian tradition. For the sake of this survey, it is nevertheless useful to restrict attention to the group of Bloomfield's immediate successors; they include Bernard Bloch, Zellig Harris, Archibald Hill, Charles Hockett, Eugene Nida, Kenneth Pike, Henry Smith, George Trager, and Rulon Wells.

The post-Bloomfieldians established the now-familiar practice of factoring linguistic descriptions into a series of 'levels' in which simple units at one level are made up of combinations of units from the next level down. This 'Russian doll' organization, in which clauses are composed of phrases, phrases of words, words of morphemes, and morphemes of phonemes, departs significantly from the conception outlined in Bloomfield 1933. Bloomfield had interpreted the relation between a meaning-bearing morpheme and its constituent non-meaning-bearing phonemes as a model for the organization of linguistic 'signs' in general. Hence *tagmemes,* meaning-bearing units at the syntactic level, were composed of non-meaning-bearing *taxemes,* not of smaller meaning-bearing units, such as morphemes. It was the post-Bloomfieldians who replaced Bloomfield's 'fractal' conception with a model in which a linguistic analysis projected uniform part-whole relations "from morpheme to utterance," in the terms of Harris (1946).

The post-Bloomfieldians applied this general constituency-based conception first to the analysis of word structure and then to phrase and clause structure. In the domain of morphology, techniques of part-whole analysis evolved into what Hockett (1954) termed the *item and arrangement* (IA) model. The basic principles of segmentation and classification that defined this model were set out in Harris (1942) and refined in Hockett (1947). By the early 1950s Hockett was no longer satisfied by technical solutions to the shortcomings of part-whole analysis, and Hockett (1954) outlined the *item and process* (IP) model as an alternative that avoids *zero morphs, replacive morphs, subtractive morphs,* and other types of expedient units. Hockett (1967) went further in characterizing morphemic analysis in general as a shorthand description of processes of analogical extension based on exemplary paradigms and other morphological patterns. By this time, however, the IA model had jumped hosts, and was firmly established in the generative school.

Post-Bloomfieldian analyses of syntax were not quite as far along at the point that the descriptivist paradigm was superseded by the generative school. But the relatively sketchy remarks about syntax in Bloomfield (1933) had been developed into procedures of immediate constituent (IC) analysis in studies such as Wells, 1947. These techniques, in turn, formed the basis for the model of phrase structure analysis formalized in Chomsky, 1956. However, it is important to bear in mind that the goal of Chomsky's formalization was to establish the inadequacy of phrase structure analysis. This goal was achieved in part by defining phrase structure grammars in such a way as to exclude the discontinuous constituents recognized in Wells (1947) and in nearly all subsequent models of IC analysis. This might not matter quite so much if Chomsky (1957) did not criticize phrase structure analysis precisely on the grounds that "discontinuous elements cannot be handled readily within the phrase structure grammar." Like Harris (1957), Chomsky (1957) introduced transformational relations between constituent structures to overcome the putative limitations of single structures. Transformations in Harris's sense expressed static implicational relations over patterns in a corpus: e.g., that a sufficiently large corpus containing a passive would contain a corresponding active. Chomsky (1957) proposed a more dynamic interpretation on which transformations were interpreted as applying to one structure to 'derive' another.

Although part-whole analysis can, in principle, proceed in either a top-down or bottom-up fashion, the post-Bloomfieldian techniques were meant to be applied over successively larger domains, from phonemes, through morphemes, to phrases, and onto discourses. At each level a distributional analysis would define the units and classes in terms of which the analysis of the next level would be defined. The desire to obtain effective mechanical procedures of analysis led to the exclusion of considerations of meaning and to strictures against mixing levels. It is for these methodological concerns that the

post-Bloomfieldians are best known in the modern era. Yet it is only fair to mention a number of points in their defense. The first point is that the descriptivist framework grew out of a fieldwork tradition in which the search for discovery procedures was meant to address practical as well as theoretical problems. While this search may have proved unsuccessful, at least in the terms that the descriptivists framed the task, much the same can be said for the more modest task of formulating evaluation procedures to choose between extensionally equivalent generative grammars (Chomsky, 1957). The reduction of grammatical analysis to distributional analysis is also not entirely confined to the descriptivist tradition. In any model that rejects traditional definitions such as 'a noun is the name of a person, place or thing,' it is not clear on what basis, other than form or distribution, word classes are defined. On the predominantly agglutinative view of word structure adopted in IA accounts – whether descriptivist or generative – form classes are merely a type of morphological distribution class. So any approach that rejects notional definitions of categories is implicitly distributional.

Considerations of this sort do not justify all of the assumptions and practices of the post-Bloomfieldians. However, they do reinforce the essential continuity between the descriptivist and generative paradigms (which is traced in more detail in Matthews, 1993) as well as offer a useful corrective to the popular view of the post-Bloomfieldians as methodological eccentrics.

See also: Bloomfield, Leonard (1887–1949); Constituent Structure; Discontinuous Dependencies; Harris, Zellig S. (1909–1992); Hockett, Charles Francis (1916–2000).

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Postel, Guillaume (1510–1581)

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Guillaume Postel was born in Barenton, Normandy on March 25, 1510 and died in Paris on September 6, 1581.

Postel started his career as a scholar of Greek, Hebrew, and Arabic, although he later moved to missionarian and millenarian fantasies. Born in modest surroundings, he came to Paris and received his M.A. in 1530. In 1536 he joined the French embassy in Constantinople, where he spent his time studying Arabic and purchasing books. Back in Paris he became professor at Collège Royal (1538) and started lecturing on mathematics and philology. As a true humanist scholar, he was involved in quarrels and court intrigues and in 1542 had to leave his chair. He then turned from academia to religion and missionary activities. To find suitable missionaries he went to Rome, joined the Jesuits, and became a priest, but soon found obedience difficult, especially because others did not accept his views. His plans for the conversion of Asia and Africa envisioned the French king as their leader instead of the Pope. He also started to mix Judaic mysticism in his ideas. Postel's final break with the Jesuits came at the end of 1545, and he then went to Venice, concentrating on writing and Cabbalistic studies.

In 1549 Postel went to Palestine and Constantinople. Back in Paris he started millenarian preaching. This was also a period of frenzied writing: In 1551–1555 he published at least 23 books. Forbidden to teach in public, he went again to Venice and for a brief time was a professor in Vienna (1554–1555). Back in Italy he was arrested as a heretic and was

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imprisoned in Rome from 1555 to 1559. Over the next several years he traveled in France, Italy, and Germany, trying *inter alia* to win Protestants over to his ideas. In 1563 he was put into forced seclusion in a monastery in Paris, as a lunatic rather than a heretic. He was allowed to concentrate on his studies and writing and eventually to correspond and teach.

Postel was one of the first European scholars to show serious interest in Oriental languages beyond Hebrew. His observations of the similarity between Hebrew and Arabic make him a pioneer of comparative Semitic linguistics, although he also followed the traditions of Medieval Hebrew grammarians, known to him mainly through his friend Elija Levita. He strongly propagated the usefulness of Arabic studies for a successful mission and published the first printed Arabic grammar in 1538 or 1540. However, the major part of his large literary output is not related to linguistics. Through his students he influenced the Antwerpen Polyglot Bible.

See also: Arabic; Levita, Elijah (1469–1549); Renaissance Linguistics: French Tradition; Semitic Languages.

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Postmodernism

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Introduction

The epithet 'postmodern' was used with increasing frequency in the 1960s–1990s to describe postwar affluent societies and their cultural productions. The term has been used to designate both the extenuation of modernism and a novel impulse reacting against modernism, both a sociohistorical period and an esthetic trend. Postmodern conveys now stylistic tendencies, now art's relation to society; now pejorative, now meliorative assessments; now English-language cultural productions, now those of different idioms and many continents.

As of the early 1960s, new trends in American fiction dubbed postmodern by writers and critics challenged realist and modernist precepts. In literature, postmodernism manifests itself in writing that flaunts its artifice as language and text, in vibrant confrontations of elite and mass cultural forms, and in new styles that combine innovative techniques with critical realism (John Barth, Donald Barthelme, Robert Coover, Thomas Pynchon). Postmodern novels discuss their own literary devices with the reader; imitate other works or styles for playful or ironic effect; paste together bits of journalism and letters, ads and textbooks; and jumble or dissolve narrative structure, setting, and characters. The experimentalism celebrates linguistic creativity, reflects on the nature of narration, and questions the fictional status of reality, probing the links between storytelling and the official stories. Writers and critics noted commonalities with trends in literature and film already underway elsewhere in the world, including in France, Italy, Latin America, and Spain, and included these movements under the expanding umbrella of postmodernism. Emphasizing this internationalism as well as its affinities with developments in the human sciences, especially structuralism and poststructuralism, Ihab Hassan defined postmodernism as a veritable episteme characterizing the cultural sensibility of the new epoch.

Contemporaneous to the new fiction but initially separate from it, postmodernist styles emerged with great force and clarity in architecture in the 1960s: new designs revitalized modernist forms by infusing regional and classical elements. Long banned by doctrinaire modernists, the traditional features integrate

imprisoned in Rome from 1555 to 1559. Over the next several years he traveled in France, Italy, and Germany, trying *inter alia* to win Protestants over to his ideas. In 1563 he was put into forced seclusion in a monastery in Paris, as a lunatic rather than a heretic. He was allowed to concentrate on his studies and writing and eventually to correspond and teach.

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modernism's striking geometries and bold rhythms into the local environment, at least in part, and connect the novel structures to the architectural heritage. Originating in the United States and spreading throughout the globe, postmodern architectural ideas appeared in designs as well as in theoretical essays that enjoyed great influence in numerous fields and professions, especially the writings of Charles Jencks. In art, strategies subsequently associated with postmodernism played a prominent role in Pop Art and Conceptual Art, before postmodern theory became infuential in the 1980s. First photography, then painting explored strategies of 'appropriating' recognizable images in new compositions to produce quotations, collages, or ironic treatments.

A new wave of writings on postmodernism in the 1980s emphasized its definition as a historical moment and greatly developed its social and philosophical implications, further widening the scope and raising the stakes of the discussion. According to these views, the extensive postwar technological, economic, and societal changes in the West have introduced media and forms of communication radically altering human experience (Jean Baudrillard), have fundamentally transformed social structures and attitudes toward knowledge (Jean-François Lyotard), and have created a new life-world for which subjects' existing perceptual strategies no longer prove adequate (Fredric Jameson). The transformations undermine the belief systems that organized the modern world, from the Marxist faith in the coming of a classless society to the Enlightenment quest for freedom and happiness through reason. In the postmodern era, art, fiction, and even science can claim only immanent, local significations always subject to change and to debate. In the most radical postmodernist formulations, spectacles substitute for events, images replace identities, and signs in society derive from other social signs, with no grounding in reality, history, or nature. Contesting key features of such perspectives, Jürgen Habermas called for the West to rededicate itself to the Enlightenment project of emancipation.

Postmodernism became the foremost intellectual controversy of the 1980s in the human sciences and the arts, challenging disciplines and professions to re-examine how they define themselves and their objectives. The debates engaged central intellectual, esthetic, and social trends of the postwar years, including poststructuralism, Marxism, and critical theory; new information and communication technologies; and social and economic history. New essays on postmodern fiction, art, and architecture broadened and deepened the compass of postmodern studies in those fields. Postmodernism reshaped film and media studies, and revolutionized other recent and interdisciplinary fields such as women's studies, queer theory, and postcolonial studies. The discussions also intersected with examinations of what went awry with the radical political and cultural effervescence of the 1960s throughout the world, and overlapped with explorations of how to construct a 'New Left' through issues of race and ethnicity, sex and gender, ecology and the environment, and regional and local concerns (cf. Ernesto Laclau and Chantal Mouffe, *Hegemony and socialist strategy,* 1985; Stanley Aronowitz and Henry Giroux, *Postmodern education*, 1991).

As a historical period, postmodernity is coextensive with consumer society, the computer age, and global capitalism, with rock music and television, with the triumph of the image and the omnipresence of plastics. It subsumes sociologists Alain Touraine (*The Post-industrial society*, 1969) and Daniel Bell's description of "post-industrial society" characterized by, in Bell's words, "a shift from manufacturing to services," "the centrality of the new science-based industries," and "the rise of new technical élites and the advent of a new principle of stratification" (*The coming of post-industrial society*, 1973, in Sim, 2001: 196b). In a Marxist framework, postmodernity corresponds to postwar "late capitalism" dominated by multinational corporations and a globalized labor market (Ernest Mandel, *Late capitalism*, 1975). Postmodern time and space are "compressed": instantaneous emails replace letters as zapping displaces attending a performance; an urban restaurant row and the corner market reproduce globalization in microcosm (Harvey, 1989).

This article examines in greater detail three arenas in which postmodern esthetics made a particularly significant impact: fiction, architecture, and art, then studies the postmodern philosophical and social debates of the 1980s–1990s.

Fiction

In the first half of the 1960s, a number of experimental novels by new authors such as John Barth, Donald Barthelme, Joseph Heller, Thomas Pynchon, Robert Coover, and then little-known Vladimir Nabokov, introduced a new kind fiction in the United States, "a peculiar blend of dark humor, literary parody, surrealism, byzantine plots full of improbable coincidences and outrageous action, all presented in a dazzling variety of excessive styles that constantly called attention to themselves. Postmodern fiction had arrived" (McCaffery, 1986: xix). The writers deliberately distanced themselves from their well-known realist elders Philip Roth, William Styron, and John Updike, as they did from earlier masters of mimesis such as

Honoré de Balzac, Benito Pérez Galdós, and Charles Dickens. The critic Leslie Fiedler enthusiastically pointed to new authors inspired to "cross the border, close the gap" by transgressing and straddling modernism's dichotomy between high and low culture, letting fresh breezes of popular culture into their work. Upstart, populist, and playful postmodernists also appeared as a fresh alternative to the 'hieratic' and 'formalist' high modernists Paul Valéry and Marcel Proust, the early James Joyce and William Butler Yeats, Ezra Pound and Thomas Stearns Eliot, Rainer Maria Rilke and Thomas Mann (Hassan, 1982: 267).

Observing affinities between the new American fiction and ongoing trends abroad, including the Nueva Narrativa in Latin America, the neo-Baroque in Spain, the Nouveau Roman in France, and the experimental films of Akira Kurosawa, Federico Fellini, and the French Nouvelle Vague (Jean-Luc Godard, François Truffaut), writers and critics such as Ihab Hassan, John Barth, and Paul Auster defined literary postmodernism as an international phenomenon. The Nouveau Roman and certain Latin American novels of the 'boom' take apart the ingredients of the traditional narrative so systematically and self-consciously that Jean-Paul Sartre dubbed the result 'anti-novels.' Nathalie Sarraute's novels (*Tropisms*, 1939) and essays (*The age of suspicion*, 1956) utterly deconstruct 'lifelike' fictional characters with psychological depth and replace them by interwoven, disembodied voices, much like the flat, chameleon characters of American authors Ronald Sukenick and Ron Silliman. In a similar spirit, fragmentary chronicles and uncanny metaphors replace characterization or structured plot in Richard Brautigan's *Trout fishing in America* (1967). Julio Cortázar's narrative puzzle and socio-philosophical essay *Hopscotch* (1963) utterly destructures its narrative thread, chopping up the story and redistributing its pieces in apparently random order. Such narratives emphasize the active role of the reader in constituting the text, which becomes process rather than product. The frequent convergence of writer and critic in one figure – Barth and Sarraute, Alain Robbe-Grillet and William Gass – underlines the extent to which postmodern fiction self-consciously raises fundamental questions about its own procedures, uses, and purposes.

Violating high modernism's doctrine of originality, many postmodern works foreground their appurtenance to earlier texts, mimicking recognizable authors and styles, ironically invoking or playfully deforming familiar stories and genres. John Gardner's *Grendel* (1971), for example, retells the *Beowulf* epic from the perspective of the monster, as Robert Coover spins contemporary versions of *Little red riding hood* and Noah's ark in his *Pricksongs and descants* (1969). Coover, Kurt Vonnegut, and Robert Jaffe create verbal collages by incorporating fragments of news stories into their fiction. The postmodern 'text' exhibits its status as "mosaic of quotations" (Julia Kristeva), as "perpetual interweaving" (Roland Barthes) of previous works and genres, linguistic communities and individual styles. Works pastiche or parody one or more popular genres such as detective fiction and spy thrillers, science fiction and western, romance and gothic novel. Patricia Waugh studies postmodern narrative prose as 'metafiction,' literature that draws attention to its status as language and narration, genre and book, in order to question the relation between fiction and reality (1984: 2). Novels such as Doris Lessing's *The golden notebook* (1962) recount stories about writing, and contain nested within them other narratives, while in John Fowles's *The French lieutenant's woman* (1969), the contemporary narrator of the historical novel breaks into the plot, intervening in the action and dialogue. "Over-obstrusive, visibly inventing" storytellers freely break into the diegesis, while stylized layouts and innovative typography underscore the materiality of the text (Waugh, 1984: 21–22).

In many postmodern novels, experimental techniques and social commentary mesh and feed off each other in order to question how conventions are adopted, ideologies elaborated, and official histories written, at times evoking unreal or even abominable situations (Hutcheon, 1989: 71; McCaffery, 1986: xxv; cf. Waugh, 1984: 2). Santiago Colás shows that by blending metafiction and narration, dialogue and interior monologue, hallucinatory dream sequences and ekphrastic summaries of movie scenes, Manuel Puig's *Kiss of the spider woman* (1976) communicates a feel for the inconceivable horror of the violent political world of 1970s Argentina, and also imagines potential escapes and alternatives (1994: 76–99; cf. the role of magical realism in Gabriel García Márquez's *One hundred years of solitude*, 1967). Linda Hutcheon proposes as the quintessential postmodern genre a synthesis of historical fiction and self-reflexivity that she terms "historiographic metafiction": in works such as Fowles's *French lieutenant's woman* and Thomas Pynchon's *Gravity's rainbow* (1973), the "theoretical self-awareness of history and fiction as human constructs (historio-*graphic meta*-fiction) is made the grounds for its rethinking and its reworking of the forms and contents of the past" (Natoli and Hutcheon, 1993: 246; cf. Fredrick Karl's 'mega-novels'). Coover's *The public burning* (1977) inventively depicts the transformation of elections and politics into entertainment and advertising,

while 1980s cyberpunk renovates science fiction in critiquing the uniformization of global commercial culture.

Postmodern fiction variously celebrates the joy of verbal invention, questions the nature of representation, and stages the crisis of reference. The shift from literature confident in its mimetic capacities to writing that exhibits its own fictionality and highlights multiple and alternative perspectives is consonant with structuralism's contemporaneous dissection of linguistic structures and narrative conventions; it also resonates with poststructuralism's foregrounding of its own discursivity, its skepticism toward knowledge, and its critique of referentiality. In the United States, the transition also charts the declining confidence in political institutions, as the populist challenge to the hegemony of elite art resonates with the rise of protest movements and youth counterculture. Postmodern fiction moves away from modernism's epistemological and hermeneutic dramas in which subjects seek to know and understand their life-world, and raises instead fundamental ontological issues, questioning the very existence of a reality and a human subject outside of language (McHale, 1987). Characteristics attributed to postmodernism overlap with those identified with the Baroque (and to a certain extent Romanticism) as contrasted with the Classical: movement over stasis, hybrid genres versus generic purity, allegory over metonymy, excess versus mean. Precursors and kindred spirits of literary postmodernism include Franz Kafka, André Gide, the later James Joyce, Eugène Ionesco, Laurence Sterne, Jean Paul, Madeleine de Scudéry, Miguel de Cervantes, François Rabelais, and the essayist Michel de Montaigne.

Literary postmodernism has never lacked its discontents. Already in the 1960s, academics Irving Howe (the "Old Left") and Harry Levin (the "critical establishment") lamented that robust modernism had given way to the tired counterpart they termed "postmodernism," which abandoned art's high purpose and even its craft. Author John Gardner (*On moral fiction*, 1978) and Marxist critic Gerald Graff (*Literature against itself*, 1979) charge that postmodern fiction betrays its responsibilities and social potential in favor of formal games and verbal ingenuity. Jameson interprets metafiction as a symptom of the corrosive effects of late capitalism, which leaves writers unable to develop a personal style or to invent compelling new worlds, and finds postmodern versions of the historical novel incapable of evoking anything but superficial "pop history" (1991: 16, 25).

Architecture

Architecture has figured prominently in postmodernism debates: postmodern structures present clear stylistic contrasts with modern constructions, while through its practical functions, architecture poses issues in cultural politics central to postmodern debates. Modern architecture defined itself as part of the artistic avant-garde in the 1920s–1930s; in keeping with modernism in painting, sculpture, and music, it passionately asserted its formalist and experimental character and proudly attuned its forms to the esthetics of fellow initiates. Henri Le Corbusier, Bauhaus, Walter Gropius, and the International Style rejected traditional styles inherited from the past, especially their tell-tale historical or regional decorative elements, and asserted bold new structures based on universal geometric components, including square and cube, cylinder and pyramid, in harmony with the cubists and abstractionists in painting (Georges Braque, Pablo Picasso, Fernand Léger, Piet Mondrian). In music, as of the 1920s, Austrian composer Arnold Schönberg relied on formal and universal principles in developing a method founded on purely mathematical rules for combining a series of 12 tones, producing novel atonal sequences and chords radically different from established western major and minor keys, their traditional harmonies and scales, and from conventional genres and compositional principles (cf. Alban Berg, Anton Webern, Pierre Boulez). At the same time, achieving economic efficiencies of design and construction, modern architecture's simplified forms also advanced its progressive social agenda by helping to provide affordable lodging for the new urbanites generated by modernization. Yet by the 1950s, modernist architecture in the United States had exhausted both its innovative spirit and its social idealism, and had become the chic establishment look of power and success. Throughout the West, its progressive urban planning had unwittingly produced the social sterility of uniform, ghettoized high-rise modernism, recognized as an international failure (e.g., Pruitt-Igoe in St. Louis, Sarcelles north of Paris).

The architect Robert Venturi cogently articulated imaginative alternatives to doctrinaire modernism in his pioneering book *Contradiction and complexity in architecture* (1966), and in designs that juxtaposed modernism, styles native to the site, and familiar classical or other historical features. He advances key postmodernist features over consecrated modernist traits: "I like elements which are hybrid rather than 'pure'... vestigial as well as innovating ... I'm for

messy vitality over obvious unity" (Venturi, 1966: 22); to the modernist Mies van der Rohe's minimalist mantra "Less is more," Venturi retorts "Less is a bore." For his Trubek and Wislocki houses on Nantucket (1971–1972), Venturi adapted ideas from the modernist Frank Lloyd Wright, but also incorporated the 'shingle style' native to New England. The exterior of his Flynt house in Delaware combines strong modernist geometric simplicity with playfully oversized, two-dimensional cutouts of ancient Doric columns surmounted by an arched screen. Inside, an upstairs music room blends modern structure with Gothic arches that rhythm an atrium ceiling and are enlivened by decorative touches – ornamentation ostracized by classic modernism (Scully, 1988: 257–259, Figs. 526–527, 530–532). Venturi also co-authored with Denise Scott Brown and Steven Izenour the iconoclastic *Learning from Las Vegas: The forgotten symbolism of architectural form* (1972), which dared to offer an apology for the casino strip widely considered the Spam and Velveeta of urban design. The essay reverses a defining feature of modernism by construing architecture not as cutting-edge art for the cognoscenti, but as a form of popular culture with a mission to communicate with the broader public.

First dubbed 'The Classical and Vernacular Traditions' (Leon Krier), Venturi's esthetic of 'contradiction and complexity' became associated with what architects began calling 'postmodern' in the 1960s–1970s – although Venturi himself has always rejected the term. Charles Jencks's full-blown 1977 manifesto *The language of post-modern architecture* consecrated the term and the concept, while the 1980 Venice Biennial bestowed institutional recognition on the style. As of the late 1960s, numerous architects produced designs consonant with Venturi's principles, conjugating them in various tones, including Charles Moore, Aldo Rossi, and Robert Stern (cf. Frank Gehry's house analyzed in Jameson, 1991: 107–129). Neoclassical designs inspired from Barcelona Beaux-Arts and 18th-century France bring monumental character and grace to Ricardo Bofill's 1985 Le Belvedere St.-Christophe public housing project in Cergy-Pontoise outside of Paris (Scully, 1988: 266, Fig. 550). Inverting modernism's monolithic and centralized strategies, contemporary urban planning strives to disperse subsidized housing, integrating smaller units into diverse established neighborhoods. Architect Bernard Tschumi creates spaces that bring together different social subgroups and activities rather than varied historical styles: his project for the Bibliothèque Nationale de France thus integrated sports and fitness facilities into the library's grounds (cf. his Parc de la Villette in Paris).

In his 1977 manifesto, Jencks developed Venturi's ideas into principles of eclecticism and a return to historical and geographical inspiration. He elaborated Venturi's notion of 'contradiction' through the concept of **double-coding**, which he linked to the dialectic of elite and popular culture to emphasize that rather than offering mere heterogeneity or multiplicity, postmodern architecture is to stage a tension between modernism and another style such that the dominant modernist idiom is at once affirmed and critiqued, subverted and transcended. Associating his architectural ideas to other cultural trends and emphasizing its social philosophy, his 1986 *What is post-modernism?* avers that the humanistic "Post-Modernist" architecture he advocates responds to "the great promise of a plural culture with its many freedoms," thus surpassing modernism's "univalent formal system" (Sim, 2001: 79). Drawing extensively on semiotics and poststructuralism, Jencks's essays created a bridge between theory and architecture that generated extensive circulation in both directions.

At its best, postmodern architecture avoids the twin poles of slavish revivalism or gratuitous hodgepodge to stage an intelligent, critical, and at times ironic dialogue among traditions. Yet postmodern eclecticism also engendered reactionary nostalgia and collages of decontextualized styles, exemplified by Philip Johnson's AT&T building in New York, which features a three-tiered façade with Roman colonnades at the base, Chippendale pediment at the summit, and neo-classical motifs in between (cf. the historical quotations worked into Michael Graves's buildings). Venturi's reading of Las Vegas can seem to align the trend to commercialism. Certain architects and architectural critics avoid the label postmodernism, preferring to say that contemporary expressions of modern architecture correct excesses and omissions of the recent past (Scully, 1988: 257).

Art

The art and art criticism of the postmodern period react to regnant classical modernism and its canonical formulation by critics such as Clement Greenberg. For the latter, modern art must be formalist, self-referential, and medium-specific, and should privilege media such as painting and sculpture that highlight the artist's individual style, avoiding new technologies and modes of mechanical reproduction. In the middle of the last century, Greenberg, Theodor Adorno, Georg Lukács, and José Ortega y Gasset fought strenuously to free art from the tentacles of commercialism and totalitarian politics (Hopkins, 2000: 25–30; Huyssen, 1986: 197).

Artistic trends of the 1950s–1970s adumbrated key elements of what would develop as postmodernism. As of the 1960s, the Pop Art of Andy Warhol ravaged the modernist boundaries between art and mass culture in such spectacular fashion that it remains the exemplar of the strategy today. Emerging from the 1960s counterculture, Conceptual Art develops critical commentary on social practices, favors new mass media technologies such as video and photography, and creates mixed media works by integrating text prominently into its visuals. The term postmodern began to be widely used in the 1980s for and by artists who explore the ideas proposed by such theorists as Jencks and Jameson, adapt Pop and Conceptual strategies, and find inspiration for fusing formal experimentation and social engagement in Dada and surrealism, and in Marcel Duchamp's iconoclastic 'readymades,' off-the-shelf utilitarian and quotidian objects such as urinals, coat racks, and snow shovels exhibited as art.

In its introductory statement, the 2004–2005 'Stalemate' exhibit at the Chicago Contemporary Museum of Art defines "the sensibility known as postmodernism" as "the state of being in which one's sense of self is determined by fluctuating social and cultural codes such as language or media images rather than by intimate personal experiences" (Pamela Alper, curator). A number of works designated postmodern develop this idea. In *Untitled film stills*, a set of 69 self-portraits shot in the later 1970s, New York-based photographer Cindy Sherman uses clothing and accessories evoking stereotypical societal roles (e.g., housewife, film star, college coed) to present her 'self' as a creation of cultural conventions, as a plastic substance molded by social performances and personae. Furthermore, by imitating the poses, expressions, and outfits of female characters in popular movie genres, the photographs short-circuit a purely existential or social portrayal of Sherman as a woman, and instead, in postmodern fashion, refer to other cultural images and signs, asserting that "representation itself is already pre-coded (via cinematic tropes in this instance)" (Hopkins, 2000: 200, Fig. 101).

By juxtaposing a middle-aged white woman on its left TV screen, and a young African-American man on the right TV screen, the video *Good boy bad boy* in Bruce Nauman's installation *Chambre d'Amis* (1985) draws attention to the cultural constitution of identities through binary categories such as masculine–feminine, white–black, young–old, as theorized in (post)structuralism. The artificial, verb–paradigm scripts read by the two figures dramatize the construction of behavior through social codes, especially language (e.g., "I was a virtuous woman. You were a virtuous woman. We were virtuous women. This was virtue"; 2004–2005 Chicago MCA Stalemate exhibit). Postmodern heterogeneity and appropriation become particularly effective when they mobilize the cultural and historical specificity of components forming the subject's identity. Jimmie Durham's 1985 installation *Bedia's stirring wheel* thus combines Western Plains Indian iconography (e.g., beaded belts, animal skull) with generic North American cultural realia (automobile steering wheel, hub, and hubcap) to portray his Native American identity today as a bricolage of the traditional and the contemporary, of minority and dominant cultures (Hopkins, 2000: 221–222, Fig. 115; cf. Achille Bonito Olivia's 'transavantgarde,' Appignanesi, 1989: 111–113). Durham's accompanying text wryly critiques Western studies of 'primitive' peoples and the modern, imperialist drive to dominate and construct its Other as an authentic folkloric essence.

While each art form exploits specific resources and variously draws from and reacts against its own predecessors, postmodern cultural productions in the three fields studied assert multiplicity over unity and affirm particular historical, ethnic, gendered, and regional forms over abstract universals. They problematize modernism's sharp divide between high and low culture and realism's notion of mimesis, while mobilizing art to criticize society and to explore individual identity. Postmodern art and architecture have both attracted charges of commercialism: British Conceptualist photographers and critics Victor Burgin and Mary Kelly thus censure the erotic 'postmodern' billboard-style paintings and vacuum cleaner installations of Jeff Koons as uncritical commercialism (M. Newman in Appignanesi,1989: 120–122; Hopkins, 2000: 224, Fig. 117).

Postmodern Critique

Four figures played a key role in giving a new impetus and focus to postmodernism in the 1980s: the French cultural theorist Jean Baudrillard, the French poststructuralist philosopher Jean-François Lyotard, the second-generation Frankfurt School philosopher Jürgen Habermas in Germany, and the American Marxist literary and cultural critic Fredric Jameson. Their interventions and critical exchanges greatly advanced the debate in the realms of philosophy and social and political theory, eliciting important developments and responses from figures such as philosopher Gianni Vattimo, sociologist Zygmunt Bauman, cultural theorist Paul Virilio, political theorists Chantal Mouffe and Ernesto Laclau, geographer Edward Soja, and philosopher of education Henry Giroux. Together with poststructuralism as developed by Roland Barthes, Hélène Cixous, Gilles

Deleuze and Félix Guattari, Jacques Derrida, Michel Foucault, Luce Irigaray, Julia Kristeva, Jacques Lacan, and others, this new momentum in the 'postmodern controversy' exerted great influence throughout the human sciences, especially in newer fields, and encouraged interdisciplinary research. In these contexts, postmodernism designates less often a salutary moment beyond modernism, as it frequently does in the esthetic sphere. Rather, it engages an array of technological, economic, and sociocultural changes that tend to be seen in a neutral light, at best. At worst, postmodernism is considered to result from modernization's alienating effects carried to completion and excess, no longer counterbalanced within or without by opposing energies: "Postmodernism is what you have when the modernization process is complete and nature is gone for good" (Jameson, 1991: ix). Ihab Hassan summarizes the radical postmodernist conception, "the public world dissolves as fact and fiction blend, history becomes derealized by media into a happening, science takes its own models as the only accessible reality" (1982: 270). The four figures selected for closer examination here directly engaged the postmodern debates in the 1980s–1990s, proved very influential in establishing the terms of the new discussions, and provide a sampling of different stances on critical issues.

Jean Baudrillard

Jean Baudrillard's essays from the mid-1970s–1990s, translated into English as of the 1980s, contend that contemporary spectacles such as action movies and TV sports, video games and Disneyland construct a postmodern 'hyperreality' that is more powerful and compelling than everyday reality, and whose 'ecstasy of communication' remakes traditional experience and action in its image. For Baudrillard, whereas Baroque *trompe l'oeil* counterfeited reality and industrial society's identical, mass-produced commodities masked reality, postmodern cybernetic and communication technologies create their own self-replicating conditions for subjectivity, generating 'simulacra' that no longer even depend on reality. Recycling clichés and stereotypes, reproducing propaganda and advertising, bereft of transcendence and insensible to history or the natural world, postmodern signs refer not to reality but merely to other signs, in an endless circulation of appearances. Whereas production and consumption structured modern societies, the postmodern society of simulation is governed by images, conventions, and conceptual models. Politically, the failure of the modern era's two principal programs, Marxism and the Enlightenment, has rendered society incapable of becoming either a historical or political subject. Baudrillard's analysis articulates a sharp contrast between modern and postmodern societies, grants a determining role to new media and technology, confidently specifies the latter's cultural, political, and psychological consequences, and paints a wide-ranging, multi-disciplinary panorama of the new era. While few scholars cite Baudrillard as an authority today, the English editions of his works exerted enormous influence during the last two decades of the 20th century.

Jean-François Lyotard

In articles and monographs inaugurated by *The postmodern condition* published in 1979 and translated into English in 1984, Jean-François Lyotard wades into the postmodern controversy as an idiosyncratic poststructuralist. While his 1979 essay accepts the human sciences' 'linguistic turn,' it steers away from (post)structuralist models focused on the immanent analysis of language (sign, signifier), and draws instead from two other traditions, narrative semiotics and, most especially, pragmatics, particularly as formulated by Ludwig Wittgenstein in 'Philosophical investigations' (1946–1949). Rather than postulating signifieds, concepts, or referents, Wittgenstein and his followers define language directly through action and social context – and work out their own arguments in a clear expository prose. Crucially, rooted in everyday work and leisure, sociability and care of the self, Wittgenstein's 'language games' appear and disappear throughout history, vary according to milieu and individual experience, are changing and non-denumerable, and possess family resemblance but no essence. Lyotard considers Wittgenstein's philosophical pragmatics ground-breaking and decisive; anti-foundationalist, historicized, and decentralizing, this pragmatics combines with narratology to provide Lyotard with an accessible version of poststructuralism with a set toward social theory. His essay accentuates the socio-political stakes that Foucault highlights, but that had tended to remain undercurrents in deconstruction before 1980.

The postmodern condition endeavors to define the changed status of knowledge, science, and education in post-1960s Western societies. Lyotard sees the post-industrial age marked by disbelief in 'grand narratives,' or transcendent metaphysical and political systems, including the twin philosophies that fashioned education in the modern era, the Enlightenment project of democratic emancipation that inspired the development of public elementary schools throughout the West in the 19th and 20th centuries, and German idealism's dedication to knowledge and higher learning for their own sake, which engendered great universities during the same period (1979 [1984: 31–37]). Absent such overarching frameworks, Lyotard observes two sets of 'little narratives' or multifarious local,

occasional, and circumstantial strategies that shape education and research in the postmodern era: a 'performative' perspective that promotes those positive sciences and technologies that advance the wealth and power of the existing social, economic, and political system and its decision makers (37–49), and an alternative impetus that springs from grass-roots praxis, speech, and communicative interaction when they mobilize the imagination to invent new language games, or ways of thinking and acting (41, 52). In the artistic realm, Lyotard identifies this alternative, inventive mode as the ongoing modernist avant-garde: its critical distance from society and its radical experimentalism construct its esthetic object as the Kantian sublime, straining to evoke an idea that cannot yet be adequately presented. He condemns 20th-century realism as official art and dismisses Jencks's postmodernist eclecticism as commercialism (1982 text in 1979 [1984: 75–81]).

Lyotard frames his views on education and research within an overall conception of social organization. Modern and postmodern societies each evince a distinctive morphology and a concomitant mode of conflict. Modern societies invoke terror to resolve dissension and obtain consensus and thus social unity; in contrast, decentralized, pluralistic postmodern societies must negotiate 'differends': open, potential but as yet undefined zones, and incompatibilities among the many autonomous and mutually incommensurable little narratives. In the absence of higher-order models or rules, 'paralogies,' or parallelisms between little narratives on the 'same level,' must provide provisional resolution and legitimation, in which every consensus is but a moment prior to new dissent in a continuous, open-ended process (60–65; cf. *Just gaming,* 1979 and *The differend,* 1983). Lyotard's 'postmodern' recalls his essays on 'paganism,' which contrast Western monotheism (cf. 'grand narrative') with ancient polytheism, in which mortals interact with multiple gods who each enjoy limited, always renegotiated influence and jurisdiction. The clarity, breadth, and vigor of Lyotard's essays, and their conjunction of postmodernism, poststructuralism, and sociopolitical issues, have granted them great influence.

Jürgen Habermas

In his 1980 essay *Modernity versus postmodernity* (also entitled *Modernity – an incomplete project*, in Natoli and Hutcheon,1993: 91–104) and more amply in 12 lectures published as *The philosophical discourse of modernity* (1985 [1987]), Jürgen Habermas constructs modernity as the Enlightenment project of emancipation embracing all facets of culture, and characterizes postmodernism and its underlying poststructuralism as an unwise rejection of modern society and a neoconservative return to traditions. In his view, postmodernists' irrationalism and telling recuperation of the 'antimoderns' Nietzsche and Heidegger leave them bereft of an effective historical critique or utopian impulse. Habermas opposes Foucault's conflation of power and knowledge (1985 [1987: 266–293]), contests postmodernist skepticism, and animadverts upon its radical critique of totalities and progress. Rather than jettisoning the Enlightenment project, Habermas proposes to amend it in the light of the last two and a half centuries: he defines modernity's concrete humanity through antifoundationalist universalism, and proposes as its chief enabling resource a pragmatic and intersubjective 'communicative reason' (rather than individual 'instrumental reason,' 1985 [1987: 294–326]; cf. Habermas's *The theory of communicative action*, 1981). He calls for redirecting societal modernization so as to control the latter's autonomous economic and administrative systems, while emphasizing that it is prudent to remain pessimistic about the feasibility of significant social reform and of progress in general. Dismissing the products of the modernist esthetic from Charles Baudelaire to the Surrealists as "esoteric forms" created by "de-centered subjects" alienated from society, Habermas calls for cultural expressions that will reintegrate the triad of science, morality, and art, and bring them to bear upon "the enrichment of everyday life," the "rational organization of everyday social life": "Communication processes need a cultural tradition covering all spheres—cognitive, moral-practical, and expressive" (Natoli and Hutcheon, 1993: 98, 100). Habermas's close critiques provide an alternative view of modernity and modernism and draw strength from the positive, collective project he outlines.

Fredric Jameson

While he admits to being "a relatively enthusiastic consumer of postmodernism" in its architecture and photography, music and poetry (1991: 298), Jameson remains sympathetic to much of Habermas's critique of poststructuralism and postmodernist theory, even as he largely accepts Baudrillard's characterizations of contemporary society, which he reformulates in an analytical approach informed by Marxism and cultural critique, Lacanian psychoanalysis and Sartrean existentialism. In his 1983–1984 essay 'Postmodernism or, the cultural logic of late capitalism' (1991: 9–54) and in later articles collected in two books published

in the 1990s, Jameson develops his theoretical proposals in detailed analyses of buildings, films, and fiction, including contrastive descriptions of modern and postmodern cultural productions (e.g., Vincent Van Gogh's *A pair of boots* versus Andy Warhol's *Diamond dust shoes*, 1991: 6–10). His ambivalence toward postmodern cultural productions emerges in his studies of two postmodern structures, the central lobby of the 1977 Los Angeles Westin Bonaventure hotel, and the Santa Monica, California home architect Frank Gehry rebuilt for his family in 1979. The first is described as a fragmented, bewildering, and manipulative space that exceeds the capacity of the individual body to locate itself or to process its life-world perceptually and cognitively – an allegory of the subject's inability to map the new global, virtual electronic network in which it finds itself (38–45). Yet the second is depicted as a critique of late-capitalist society, and as a new spatial language that may allow its inhabitants to be comfortable in a historically original way, potentially designing a utopian mode of human interaction (107–129).

Turning postmodern suspicion and irony on itself, Jameson analyzes the stylistic, philosophical, and social characteristics widely attributed to postmodernism as indexes of problems, clues to manipulation, and symptoms of societal ills. The decentered and fragmented postmodern life-world points to the need to reconnect atomized groups – "the logic of capitalism is dispersive and disjunctive in the first place" (1991: 100), as uncertainty, indeterminacy, and ambiguity should prompt a demand for critical clarity that could enable subjects to recover greater agency and resistance (xi). Playfulness without purpose, signifiers without signifieds, and surface dynamics without depth all attest to severed vital relations that must be restored to regain access to meaning and emotional intensity. The substitution of pastiche for individual artistic style reveals the undermining of the individual and the cultural unconscious, as 'fashion-plate' faux-nostalgia in film and video betrays a lost sense of history. In methodology as in social philosophy, the cultural critic needs connections and solidarities, not pure differences and deconstruction: "it is diagnostically more productive to have a totalizing concept than to try to make one's way without one" (212). While he regretfully accepts that in the esthetic realm, the modernist avant-garde and its enriching strategy of defamiliarization are dead, Jameson's perspectives on postmodernism depend crucially on modernist attitudes and analytical concepts. His theoretical formulations and critical studies exerted great influence on English-language postmodern studies.

Conclusion

In all its phases and arenas, postmodernism has attracted fierce critics, who accuse it of irrationalism and nihilism, of gratuitous eclecticism and self-indulgent superficiality. Yet postmodernism transformed artistic expressions in literature and film, art and architecture, challenging certitudes inherited from modernism and realism. The postmodernism debates grapple with the relation of art to society and the potential political import of art, criticism, and theory; they highlight the diversity of Western societies and challenge them to open themselves wider to minorities and women. Skeptical of claims to universality and of the desire for homogeneity or oneness, postmodernists privilege the particularism of the local and the historical, and assert 'difference,' especially as inflected by gender, race, and class. In particular, knowledge is asserted to be specific to cultural norms, social forces, and individual subject positions and interests. Postmodernists affirm the conventional and constructed character of representation, and 'demystify' social and esthetic discourses claiming a natural, permanent status, from filmic and fictional realism to positivist history and anthropology. They draw attention to the role of language and visual codes, whose temporality, rhetoric, and signifiers displace the ideals of pure concepts, referents, and personal experience. Postmodern theory thus appears as a skeptical, anti-humanist, and antifoundationalist discourse, which critiques ideas, beliefs, and institutions central to modern Western civilization, from mimesis to the nation-state, from faith in reason to belief in progress, from the autonomy of the individual to the transcendence of universal values, from the free-market economy to socialist state capitalism (cf. Paul Maltby in Taylor and Winquist, 2001: 302–303). In various respects, postmodernism finds itself at loggerheads with Platonic idealism and Cartesian rationalism; with empiricists, Enlightenment philosophers, and their positivist descendants; and with the conservative humanism of a Matthew Arnold.

See also: Barthes, Roland (1915–1980); Foucault, Michel (1926–1984); Lacan, Jacques (1901–1981); Poststructuralism and Deconstruction; Pragmatics: Overview; Pragmatics and Semantics; Structuralism; Wittgenstein, Ludwig Josef Johann (1889–1951).

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Poststructuralism and Deconstruction

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'Poststructuralism' gathers together diverse figures sharing an intellectual family resemblance, including the literary and cultural critic Roland Barthes, the philosophers Gilles Deleuze and Jacques Derrida, and the philosopher and historian Michel Foucault. A number of French intellectuals informed by psychoanalysis critiqued the latter's patriarchal biases and proposed feminist alternatives, including the writer and essayist Hélène Cixous, the philosopher Luce Irigaray, and the psychoanalyst, semiotician, and literary critic Julia Kristeva. Poststructuralists rethink Marx, Freud, and Nietzsche through 20th-century concepts of language, sign, text, and the speaking subject adapted from continental structural linguists such as Saussure, Benveniste, and Jakobson. Poststructuralists remain deeply skeptical toward claims of universal truths, the possibility of representation, and the ambitions of modern science, underscoring that knowledge and experience are mediated by cultural representations, especially via language. Poststructuralism emphasizes the incidence of language, text, and the

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body, and values dynamism over stasis, multiplicity and diffusion over oneness and centeredness.

Although derived from the theoretical writing and teaching of European figures, especially French, poststructuralism *per se* developed as an intellectual current in English-speaking countries, especially in the United States where Derrida and Foucault held academic positions. Derrida's years spent at Yale catalyzed the emergence of the 'Yale critics' in literary criticism: Paul de Man, Geoffrey Hartman, J. Hillis Miller, and Harold Bloom, a heterogeneous group in itself. Similarly, at Berkeley, Foucault's collaboration with Stephen Greenblatt sparked the latter's New Historicism in literary studies. Poststructuralism became the most influential theoretical current in North American humanities during the 1970s and 80s, especially in literature, film, and new interdisciplinary fields focused on gender or on ethnicity, and continues to exert great influence today in queer theory, cultural studies, postmodern studies, and postcolonial studies. Poststructuralism has generally been perceived in France and the rest of Europe as a peculiarly North American phenomenon.

Structuralism and Poststructuralism

Poststructuralism developed much of the revolutionary impetus of structuralism even as it modulated or reacted against some of its key objectives. Like structuralists, poststructuralists assert the need to articulate an explicit theoretical approach to issues, since 'the point of view determines the object' (Saussure), and since the newness of the approach calls for methodological exposition and justification. Like structuralism, poststructuralist research crosses disciplinary borders in formulating its framework and in establishing strategic connections among areas commonly kept separate, such as language, sexuality, and politics. Maintaining structuralism's 'linguistic turn' and its foregrounding of language, poststructuralists endorse the structuralist decentering of the subject and the antihumanism associated with such a stance. In immediate reaction to the elevated status individual consciousness enjoys in phenomenology and existentialism, the (post)structural subject appears as an effect of multifarious forces within and without, notably language, the unconscious, and social structures. Structuralism's privileging of the social over the individual recedes in favor of a balance between the two instances, however.

On the other hand, poststructuralism critiques the scientific character of structuralism's project, together with its deontology of objectivity, deploying instead more speculative and interpretative modes of inquiry, at times celebrating subjectivity. Specifically, whereas linguistics served as a 'pilot science' for structuralism, philosophy filters concepts drawn from the language sciences and frames questions for poststructuralism: Nietzsche replaces Saussure as chief intellectual *éminence grise*, as Derrida and Foucault, subsequently joined by Deleuze, displace the cultural authropologist Claude Lévi-Strauss as central contemporary figures. Also counter to the cultivation of objectivity, many poststructuralists explicitly associate their project with a particular political agenda, advocating the causes of the Third World, of minorities and women, of gay rights, for example. Poststructuralism contests many of the founding traits structuralism attributed to its structures, especially totality and autonomy, giving emphasis instead to fragmentation, multiplicity, and hybridity. It sharply repudiates the universalist turn of so much of structuralism in the 1960s, asserting a historical and cultural specificity which radicalizes those of earlier structuralist research (e.g., Jakobson; cf. Althusser).

Poststructuralism adapts rather than adopts certain key structuralist moves: it upholds the Saussurean concept of difference and its founding importance, while temporalizing it, and giving it a polemical interpretation. Derrida thus shows that Western philosophical and scientific essays present speaking as prior to and dominant over writing (cf. masculine/feminine). The formalist varieties of structuralist literary criticism underpinned by linguistics give way to the rhetoric of deconstruction in literary studies inspired by the Yale critics' adaptation of Derrida.

Language, Text, and Body

Through concepts of language, text, and body, poststructuralists seek to develop a theory of the subject in society that avoids both idealism and a mechanistic materialism. Poststructuralists conceive of language as a monist syncretism of the material and the symbolic in which such variables as position in a chain, rhythm in an activity, or role within an interaction replace the mind-body duality: every signified is but a new signifier associated with a preceding signifier, which will in turn engender with yet another signifier (cf. Peirce's representamen and interpretant).

With the term 'logocentrism,' Derrida critiques the idealization of **logos** as pure reason, truth, logic, and presence, the tenacious belief that we can attain a level of thinking and existence above and outside of history and language. His 'deconstructive' readings aim precisely to show that neither metaphysics nor the social sciences can formulate their key findings using a universal organon comparable to algebra or geometry, but rather must work through a particular language such as English, Japanese, or Spanish, fram-

ing issues through metaphor and figurative language, negotiating the same etymologies and ambiguities as sonnets and jokes: "If I had to risk a single definition of deconstruction . . . : *plus d'une langue* – more than one language, no more of only one language" (1991: 241). In his landmark essay *The pleasure of the text*, Barthes highlights the materiality of language when he celebrates the sensuous delight of savoring not just the content but also the (virtual) voice inscribed in the "writerly text," its "language lined with flesh, a text where we can hear the grain of the throat, the patina of consonants, the voluptuousness of vowels, a whole carnal stereophony: the articulation of the body, of the tongue, not that of meaning" (1973 [1975: 66]). Poststructuralists such as Lacan, Derrida, and Irigaray draw attention to the signifier by the very texture and framing of their own writing: their essay reads an earlier text (Freud, Plato, Hegel, etc.); their style shimmers with puns, etymologia, and disrupted syntax; and their printed page displays variable fonts, pasteups, and novel layouts incorporating multiple texts within their text. They thus emblematically assert that any attempt at a scientific, theoretical 'metalanguage' remains caught up in language.

As language is not a mere instrument to which *homo sapiens* has recourse in order to express concepts, neither is it a simple nomenclature mapping signs to pre-existing objects in the world. Barthes in literary criticism, and the British *Screen* group in cinema studies, argue strenuously that mainstream fiction and movies' realism aim to obfuscate the medium and the conditions of their production in favor of communicating the illusion that the reader/viewer can grasp the world itself directly. This trompe-l'oeil erasure of the textual or cinematic work communicates a mystified 'reality- effect' which naturalizes a historical situation, and also comforts and reproduces the bourgeois ideology of the autonomous subject. Barthes and *Screen* theory instead tout the New Novel, New Wave cinema, and other avant-garde works which through metafiction, *mise-en-abyme,* and violations of narrative and continuity conventions draw attention to their status as linguistic or filmic product.

'Text' – etymologically 'tissue, that which is woven' – becomes a general poststructuralist term for any newspaper, poem, or book, film or song, dance performance or urban space studied as a human and cultural product mediated by multiple social symbolic systems. Similarly, Foucault studies the 'discourse' of unreason and mental illness, of criminality and sexuality throughout modern history, aiming to trace the development of social practices and cultural beliefs and expressions in reference to events, institutions, and economic structures. He argues that the institutions and methodological frameworks for developing knowledge and the criteria for evaluating truth claims necessarily arise together with the elaboration of particular structures of power and authority, and that as a result, " 'Truth' is linked in a circular relation with systems of power which produce and sustain it, and to effects of power which it induces and which extend it" (1984: 74).

Poststructuralists extend existentialists' interest in the human body, studying it as a site of signification and affect, resistance and identity construction. In the first section of her *Revolution in poetic language*, Kristeva highlights and develops the early, pre-Oedipal stages in which the infant is still psychologically one with the mother. Her analysis argues that this 'semiotic' period characterized by visual images and bodily rhythms represents a crucial experience for the child, and that its influence extends through the later stages of development in which the individual enters into the 'symbolic' realm of language, law, and patriarchy (in Leitch, 2001: 2165–2179). Although Cixous explicitly defines *écriture féminine* 'woman's writing' through gender and not sexual categories, she describes the process as one in which those zones of the woman's body that are suppressed and inhibited in society are freed to express themselves (in Leitch, 2001: 2035–2056). Susan Bordo emphasizes the role of advertising and the mass media in elaborating and popularizing the feminine ideal of the 'thin body', jeopardizing health and damaging self-esteem, fostering pathologies of bulimia and anorexia (in Leitch, 2001: 2360–2376).

The One and the Many

For poststructuralists, popular and learned notions of wholeness, unity, and totality often represent erroneous, interested, or self-satisfying images which mask variegated, conflicted, and opaque situations and events. For Lacan, in spite of ego's vision of itself as a stable whole, the subject remains different from itself, divided between presence and absence, conscious and unconscious, the latter designating, as for the surrealists, a radically 'other' site of mental activity, unspoken and unspeakable, to which consciousness enjoys no direct access, and which resists social constraint. The split subject nostalgically desires an illusory and childhood image of completeness that would reunite its past (conscious) locations to its present (unconscious) relocation. Theories of gender and ethnicity informed by poststructuralism at times celebrate multivalence, heterogeneity, and diversity. In response to the societal demand to select and perform one term of the binary masculine vs. feminine, Cixous calls instead for "Bisexuality – that is to say the location within oneself of the presence of

both sexes, evident and insistent in different ways according to the individual, the non exclusion of difference or of a sex" (1975 [1986: 85]). Through the concepts of hybridity and métissage, Homi Bhabha and Edouard Glissant valorize the multiethnicity typical of borderlands, Creole cultures, and (post)colonial spaces.

In the place of the Romantic notion of the artist's unitary *oeuvre* or the structuralist 'text-whole' closed system, literary poststructuralists view a text such as a poem or a novel as an aggregate and fragment excerpted from a larger context and 'intertext,' Kristeva's term for Bakhtin's approach to discourse: "any text is constructed as a mosaic of quotations; any text is the absorption and the transformation of another. The notion of *intertextuality* replaces that of intersubjectivity" (1986: 37). The emphasis on language and multiple cultural codes at the expense of the artist as solitary genius finds its polemical formulation in the Nietzschean 'death of the author' announced by Barthes and Foucault.

Poststructuralists critique representations of society as a totality and of history as destiny or evolution. In his introduction to *The archaeology of knowledge*, Foucault thus rejects "the categories of cultural totalities" and calls instead for a history that studies "the space of a dispersion" (cf. his later Nietzschean 'geneaology'; Foucault, 1969 [1995: 15, 10]). Similarly, his 'capillary' model of power emphasizes that rather than being centralized or personalized in the State or a CEO, power is distributed throughout virtually every member of a body, all of whom objectively participate in its activities and advance its designs.

Stasis and Kinesis

Poststructuralists view static accounts of individual and cultural phenomena as failing to account for change and variability. In contrast to Saussure's spatial definition of difference, and against his separation of synchrony and diachrony, paradigmatics and syntagmatics, Derrida proposes '**différance**' which brings together difference and deferral, fusing space and time in temporal movement. **Différance** designates the alternative to Husserl's derivation of truth and certainty from a suspended moment of presence. Whereas Saussure typically presents the sign as a static and stable dyad (e.g., two sides of a sheet of paper), poststructuralists emphasize mobility, slippage, and gaps between signifier and signified, dislocations which trace sites of free play and undecidability, as North American literary deconstructionists emphasize, and also of dissimulation, of referentiality in crisis. The poststructuralist emphasis on nurture over nature goes hand in hand with its interest in radical social change. Cixous's *écriture féminine* and her notion of writing in general, aims precisely at serving as a springboard for subversive thinking, pointing to transforming culture and society (cf. Butler, 1990; Scott,1988).

See also: Barthes, Roland (1915–1980); Benveniste, Emile (1902–1976); Foucault, Michel (1926–1984); Freud, Sigmund (1856–1939); Gender, Grammatical; Gender; Jakobson, Roman (1896–1982); Lacan, Jacques (1901–1981); Levi-Strauss, Claude (b. 1908); Marxist Theories of Language; Psychoanalysis and Language; Saussure, Ferdinand (-Mongin) de (1857–1913); Structuralism.

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Potebnja, Alexander (1835–1891)

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Alexander Potebnja (or Oleksander O. Potebnia) was a Ukrainian philosopher of language and mind, a linguist, a historian of ideas, an editor, and a publisher. Potebnja abandoned his law degree to read history and philology at the Kharkiv University, where he would later become a charismatic professor. There have been many references to his achievements and originality, as well as varying ideologically tainted references often repeated in Eastern/Western accounts in the 19th and 20th centuries. He was regarded as the most important linguist in the Old Russian Empire among the three main ones (the other two being F. F. Fortunatov and I. O. Baudouin de Courtenay). Potebnja was the inspiration for the Kharkiv School of linguistics and poetics. The Institute of Linguistics of the Ukrainian Academy of Sciences is named after him. From 1878 to 1890, Potebnja was the president of the Kharkiv Historical-Philological Society (founded in 1876 and, under Soviet rule, forced to close in 1919). He was a member of the Russian Imperial Academy of Sciences and the Czech Scientific Society. His wife, Maria Potebnja, ensured that his original manuscripts were published.

Potebnja's works were a study of the evolution of human knowledge and consciousness encoded in language. Indeed, his *oeuvre* was likened to that of Darwin. His philosophy encompassed a theory of the mind, of consciousness, of knowledge, of perception, of speech acts, of symbolic thinking, of aesthetics. Literature was included in his theory of language as part of the whole of language and its functions. He was critical of positivism. He seems to have sought to resolve the Cartesian problem of consciousness and the physical world.

Language is the subjective activity of a cognizing individual, and it exists only in speech, in the communication within a speech community that shares history and culture. Mind (*dukh* – intellect and spirit/soul) in Potebnja should be understood "in the sense of conscious mental activity," "higher order cognizing activity"(1862: 37); "language is the passage from unconsciousness to consciousness" (1862: 37). Every speech act is simultaneously an act of understanding, of objectivization, of consciousness, of interpretation of thought, of cognition (1862, 1874, 1888). He stated that many forms of thought exist and develop without language. However, there are mental activities that require language. Potebnja argued that "language is necessary for mental activity so that the mental activity can become conscious" (1862: 37). Man develops the capacities for symbolic thinking and for language concomitantly. These capacities also enable man to choose to substitute natural language for symbolic forms of thinking (e.g., in mathematics, music, the visual arts). Potebnja's works were a wide-ranging critical review of thoughts about language – by grammarians, linguists, and philosophers – from the pre-Platonic and Aristotelian traditions in both Western and Eastern Europe to the 19th century. He was well attuned to thoughts from other fields of knowledge. He regarded mathematics as fundamental for linguistics as it is for other sciences, with two underlying concepts of magnitude and form. He used a number of mathematical concepts: groups/sets, invariance (variant, invariant), zero marking, commutation, and transformation, among others. Potebnja argued that in the history of the development of knowledge, "our times are an example of the interaction of sciences and of choice of the middle way pathways: linguistics and physiology, linguistics and psychology, linguistics and history, psychology and physiology. *Il faut cultiver notre*

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Alexander Potebnja (or Oleksander O. Potebnia) was a Ukrainian philosopher of language and mind, a linguist, a historian of ideas, an editor, and a publisher. Potebnja abandoned his law degree to read history and philology at the Kharkiv University, where he would later become a charismatic professor. There have been many references to his achievements and originality, as well as varying ideologically tainted references often repeated in Eastern/Western accounts in the 19th and 20th centuries. He was regarded as the most important linguist in the Old Russian Empire among the three main ones (the other two being F. F. Fortunatov and I. O. Baudouin de Courtenay). Potebnja was the inspiration for the Kharkiv School of linguistics and poetics. The Institute of Linguistics of the Ukrainian Academy of Sciences is named after him. From 1878 to 1890, Potebnja was the president of the Kharkiv Historical-Philological Society (founded in 1876 and, under Soviet rule, forced to close in 1919). He was a member of the Russian Imperial Academy of Sciences and the Czech Scientific Society. His wife, Maria Potebnja, ensured that his original manuscripts were published.

Potebnja's works were a study of the evolution of human knowledge and consciousness encoded in language. Indeed, his *oeuvre* was likened to that of Darwin. His philosophy encompassed a theory of the mind, of consciousness, of knowledge, of perception, of speech acts, of symbolic thinking, of aesthetics. Literature was included in his theory of language as part of the whole of language and its functions. He was critical of positivism. He seems to have sought to resolve the Cartesian problem of consciousness and the physical world.

Language is the subjective activity of a cognizing individual, and it exists only in speech, in the communication within a speech community that shares history and culture. Mind (*dukh* – intellect and spirit/soul) in Potebnja should be understood "in the sense of conscious mental activity," "higher order cognizing activity"(1862: 37); "language is the passage from unconsciousness to consciousness" (1862: 37). Every speech act is simultaneously an act of understanding, of objectivization, of consciousness, of interpretation of thought, of cognition (1862, 1874, 1888). He stated that many forms of thought exist and develop without language. However, there are mental activities that require language. Potebnja argued that "language is necessary for mental activity so that the mental activity can become conscious" (1862: 37). Man develops the capacities for symbolic thinking and for language concomitantly. These capacities also enable man to choose to substitute natural language for symbolic forms of thinking (e.g., in mathematics, music, the visual arts). Potebnja's works were a wide-ranging critical review of thoughts about language – by grammarians, linguists, and philosophers – from the pre-Platonic and Aristotelian traditions in both Western and Eastern Europe to the 19th century. He was well attuned to thoughts from other fields of knowledge. He regarded mathematics as fundamental for linguistics as it is for other sciences, with two underlying concepts of magnitude and form. He used a number of mathematical concepts: groups/sets, invariance (variant, invariant), zero marking, commutation, and transformation, among others. Potebnja argued that in the history of the development of knowledge, "our times are an example of the interaction of sciences and of choice of the middle way pathways: linguistics and physiology, linguistics and psychology, linguistics and history, psychology and physiology. *Il faut cultiver notre*

jardin [quote is from Voltaire's *Candide*]. In this way we will cross-fertilize adjacent fields" (1905/1970:114).

A sophisticated theory of signs and semiotics was contained in his theories. For example, he argued that every word "consists of three elements: (i) the unity of the articulate sounds, i.e. the **external sign** of meaning; (ii) **representation**, i.e. the **internal sign** of meaning and (iii) **the meaning** itself" (Potebnja's emphasis). In his works, the term 'word' was often interchangeable with 'language' as faculty, competence. Equally, the term 'etymology' stood for what would be termed 'semantics' when the latter was coined in the last decade of the 19th century.

Potebnja argued for a separation, in an innovative way, of the inherited amalgamation of logic and language, postulating the psychological sentence in opposition to the proposition of logic (1874). His works contained both an account of the parts of speech and a history of the evolution of the Indo-European sentence – a comprehensive '*Thesaurus syntacticus*' (1874, 1888, 1941, 1958).

Children's language acquisition was an essential axiom in his theory. As a linguist has no access to how language is formed, nor is it possible to remember how one acquired language as a child, Potebnja postulated instead the observation of child language acquisition. For him the development of language in the child was a process accompanied by conscious thinking that at the same time was symbolic and was cognitive development.

His writings were characterized by a lack of jargon and by his use of memorable metaphors (e.g., triangle, shroud, spider web and weaving, chessboard). His works on linguistics were centered on Ukrainian at the time of secret Imperial Russian edicts against Ukrainian. It is worth noting that the word 'Great Russian' was used for 19th-century Russian; therefore, in Potebnja, 'Russian' should be read as 'East Slavic.'

His seminal *Thought and language* (1862) offered a critique of the earlier language theories, and he elected Humboldt as a point of departure for the development of his own philosophy and theory of language. However, he did not limit himself to Humboldt, using in addition much of the received and contemporary scholarship. He was credited with introducing Humboldt to the Old Russian Empire.

Potebnja's influence was significant among students, followers, critics, and borrowers in both the former Soviet Union and the West in such fields as linguistics, philosophy, literature, aesthetics, semiotics, psychology, music, and ethnoscience. Much of his work foreshadowed, for example, that of Sapir-Whorf, Croce, and Vossler. Vygotsky borrowed liberally from Potebnja (especially in *Mysl' i Rech, Theory of psychology of art)*, Kristeva spoke about Potebnja's role in discourse analysis and pragmatics, and Jakobson was allegedly his advocate and even gave a lecture about Potebnja at Harvard.

See also: Humboldt, Wilhelm von (1767–1835); Jakobson, Roman (1896–1982); Language Development: Overview; Language of Thought; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Weber, Albrecht Friedrich (1825–1901).

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Pott, August Friedrich (1802–1887)

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The founder of modern scientific etymology, August Friedrich Pott, was born the son of a pastor on November 14, 1802, in Nettelrede near Bad Münder. Having studied philology and philosophy at the University of Göttingen, he obtained his doctorate there in 1827 with a thesis (still deeply rooted in old-fashioned philosophical grammar) about the relations expressed by prepositions. After that he took up Indo-European studies with Franz Bopp in Berlin and became a lecturer there in 1830. He was appointed extraordinary professor of general linguistics in Halle in 1833 and promoted to full professor in 1838. He was loyal to the University of Halle until his death on July 5, 1887.

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The founder of modern scientific etymology, August Friedrich Pott, was born the son of a pastor on November 14, 1802, in Nettelrede near Bad Münder. Having studied philology and philosophy at the University of Göttingen, he obtained his doctorate there in 1827 with a thesis (still deeply rooted in old-fashioned philosophical grammar) about the relations expressed by prepositions. After that he took up Indo-European studies with Franz Bopp in Berlin and became a lecturer there in 1830. He was appointed extraordinary professor of general linguistics in Halle in 1833 and promoted to full professor in 1838. He was loyal to the University of Halle until his death on July 5, 1887.

His first major work, the two volumes of *Etymologische Forschungen auf dem Gebiete der Indo-Germanischen Sprachen* (1833–1836) is concerned with comparing the lexical stock of the Indo-European languages and, at the same time, observing the regular phonological correspondences among them. By this two-track approach he put etymology on a firm methodological basis and also founded the comparative historical phonology of the Indo-European languages. But while Pott was still alive, the subsequent development of Indo-European studies went far beyond the foundations laid by him specifically with regard to phonology, owing mainly to the progress made possible by the principles of the Neogrammarians postulating that sound laws operate without exceptions.

Quite early, and presumably under the influence of Wilhelm von Humboldt in this approach, Pott tried to familiarize himself with all the worldwide languages and language families for which he could obtain printed materials. Thus he abandoned the restriction on Indo-European languages and, being far ahead of his time, turned to truly universal linguistic studies. These studies enabled him to arrive at an overall (mainly bibliographical) survey of general linguistics that was published in the serial 'Einleitung in die allgemeine Sprachwissenschaft' (1884–1890) and in the summarily *Zur Litteratur der Sprachenkunde Europas* (1887), both of which were reprinted together in Pott (1974).

Moreover, Pott did pioneering work on the gypsies and their Romany (Romani) language, and by his *Die Zigeuner in Europa und Asien* (2 vols.) (1844–1845), he created a firm scholarly basis for such studies. He had also developed a penchant for studying modern languages such as Kurdish, Latvian, and even the Bantu languages, whose relationship he reliably documented. Pott followed Humboldt's approach toward linguistic research without linguistic boundaries by dealing with particular grammatical categories, with phenomena such as reduplication and gemination, with proper names in general, or with numerals – and especially the quinary and vigesimal systems of counting (1868). Furthermore, he published a new annotated edition of Humboldt's *Ueber die Verschiedenheit des menschlichen Sprachbaues*, with an introduction providing a comprehensive appreciation of Humboldt as a general linguist (1876).

See also: Bopp, Franz (1791–1867); Etymology; Humboldt, Wilhelm von (1767–1835); Indo–European Languages; Linguistic Universals, Greenbergian; Neogrammarians; Romani.

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Pound, Louise (1872–1958)

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Louise Pound (1872–1958) was largely responsible for making American speech and folklore respectable areas of scholarly research and writing. Born on the American frontier in Lincoln just 5 years after Nebraska achieved statehood, Pound's long and productive life was characterized by a pioneering spirit. Along with her older brother Roscoe (later Dean of Harvard Law School) and younger sister Olivia, Pound was educated at home by her mother until she could enter the University of Nebraska's 2-year preparatory school. At the coeducational state university in her hometown where Pound received a Bachelor's degree (1892) and a Master's degree (1895) and later taught for 50 years, she excelled in everything. Throughout her life, she was known in Lincoln for her energy, wit, and competitive spirit. She was in great demand as a public speaker, lecturing on British and American language, folklore, and literature to civic organizations, teachers' associations, and groups such as the American Association of University Women, on whose national board she served for years. A life-long athlete, Pound excelled in figure skating, cycling, tennis, and golf and was the first woman elected to the Nebraska Sports Hall of Fame.

Pound began advanced study of the early periods of English language and literature in the summers at the University of Chicago but soon decided that earning a doctorate in philology from a German university would be more exciting and quicker. Pound received her Ph.D. in 1900 from the University of Heidelberg after only two semesters, studying under the direction of Johannes Hoops and writing a dissertation on the comparison of adjectives in late Middle English. With a strong foundation in its linguistic and literary antecedents in Great Britain, Pound began to observe and publish on American English.

In the 1920s, when she was in her fifties, she was probably the most prominent woman academic in America. In 1921, her *Poetic origins and the ballad* disproved the commonly held belief that ballads arose communally. She served as vice president of the Modern Language Association in 1925 and president of the American Folklore Society in 1925–1927, and in 1924 supported the founding of the Linguistic Society of America. With the influential backing of H. L. Mencken, whom she had helped with revisions to his best-selling *American language*, and editorial assistance from her former student Arthur G. Kennedy, Pound founded the journal *American Speech* in 1925 and was its editor for the first 5 years. (*American Speech* is now the official journal of the American Dialect Society, published quarterly by Duke University Press.) In 1928, Pound represented the United States as one of nine delegates to a conference in London to consider establishing an International Council for English. In the 1920s, Pound began a long term on the advisory board of *American Literature*, published numerous articles, master-minded textbook projects, and taught summer school at the University of California at Berkeley, Yale University, and the University of Chicago.

In 1955, at eighty-three, Louise Pound was elected the first woman president of the Modern Language Association.

See also: Mencken, Henry Louis (1880–1956); Oral Traditions and Spoken Discourse.

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Hendrik Poutsma, one of the leading Dutch Anglicists of the early 20th century, was born in Gorredijk, the Netherlands, on December 7, 1856, the son of a headmaster of a municipal primary school. He began his career as a primary school teacher but qualified for a secondary school teaching certificate in English after a stay in England. This marked the beginning of a lifelong career as English master at a number of Dutch secondary schools. Poutsma's education and career mirror those of many early Anglicists in the Netherlands, which knew no tradition of English studies at the university level until 1886, when the first chair of English was established at the University of Groningen.

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See also: Jespersen, Otto (1860–1943); Kruisinga, Etsko (1875–1944); Sweet, Henry (1845–1912); English in the Present Day (since ca. 1900).

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Power and Pragmatics

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Introduction

Pragmatics is concerned with meaning in the context of language use. Basically, when we communicate through language we often mean more than we say; there is often a gap between speaker meaning and sentence meaning. For example, why is it that we interpret *Can you pass the salt?* as a request and not simply a question? Why do we tend to interpret *John has three children* as meaning **no more** than three children? Why, when we say *some of the boys came to the party*, do we know that **not all** of the boys came to the party? And why do we find that certain utterances are paired, such as greeting/greeting, question/answer, or request/response? Pragmatic theories attempt to explain this knowledge by seeing communication as a process of rational and reasoned interpretation, which draws not only on linguistic structure but also shared and world knowledge, cultural norms, and individual components of specific interactional contexts (see Levinson, 1983, 2000; Sperber and Wilson, 1995; Yule, 1998; Mey, 2001;

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Blakemore, 1992). The question we want to consider here is how this view of human communication is related to the operation of power in society.

Pragmatics, Power, and Language

Pragmatics is recognized as a branch of language study and in recent times the operationalization of power within, or through, the use of language in society has become a central concern of discourse analysis, sociolinguistics, and pragmatics. Textbooks are now giving specific emphasis to the area (see Mesthrie *et al.*, 2000) and there are emergent branches of study, such as critical linguistics, critical discourse analysis, or critical sociolinguistics (see Fairclough, 2001; Wodak, 1996; Talbot *et al.*, 2003), where it is the analysis of power within linguistic practices that is the core focus. The term 'critical' links these approaches closely with social theory and their central aim is to demystify the way in which language operates in society. The term 'power' is not always easily defined, however (see Thornborrow, 2001). Power can be ideological, economic, or cultural, for example, and within these confines, power can operate at a range of different levels: the social, individual, military, state-based, legal, and so on. Though all this is true, there is a general understanding that the operation of power is the ability to get an individual to behave or not to behave in a particular manner. Although this process may be realized in different ways and in different social environments, the pragmatic resources utilized may be of the same type. The problem is, of course, that not everyone has the same access to such resources, and, even when they do, not everyone has the same ability to use those resources in the same way. Hence, some individuals or groups may access or use pragmatic resources to maintain a position of power over others (Harris, 1984; Lakoff, 2000; Hutchby and Wooffitt, 1998).

Consider, for example, the act of ordering someone to do X. Parents may order a child to be quiet, an army officer may order soldiers to *march*, or a police officer may order a motorist to *stop*. Orders or commands such as *Stop!, Be quiet,* or *Quick march*, are imperative forms that function to signal a specific action or, as it is known, a 'speech act' (Austin, 1962; Searle, 1969) (*see* **Speech Acts**). Speech acts frequently have linguistic markers that indicate which act is being performed, such as *I apologize*, or *I order you to X*, but frequently the act is underlying or indirect, as in *(I order you) March!* But equally important in producing speech acts is the recognition that certain conditions hold, such as X has the authority, right, or power to order Y. In the examples above, this power condition is institutionalized within the system of parental control, within the legal system for traffic law, and within the formal authority of army hierarchy. Thus, although we can all produce orders, we do not all have access to formal roles that ensure the order is carried out. Hence, in contexts such as schools, medical encounters, or certain forms of business organizations, the power to utilize selected pragmatic resources is differentially distributed (Drew and Heritage, 1992; Bourdieu, 1991; Lippi-Green, 1997) (*see* **Institutional Talk**).

This type of control may be seen in the organization of talk in interaction. Here, there are issues of not only who can say what, but who can speak when and about what topic. Studies of the distribution and organization of taking turns at talk clearly show that in schools it is the teacher who organizes and distributes the turns at talk (Coulthard, 1977). Similarly, in the doctor's surgery, it is the doctor who is in control; it is his job to ask the questions and the patient's job is simply to respond (Wodak, 1996). In these contexts, there is an interactional asymmetry in relation to responsibility for talk organization. Indeed, in the case of either the school or the surgery, for the student or the patient to begin to ask questions or to take the lead in talking would be seen as a challenge to the power and control of the doctor or teacher.

But it need not be a specifically formal situation where such forms of control operate. Studies of gender differences have continually indicated that in mixed-gender interactions, men attempt to dominate the control of turns, access to the floor, and topic content and distribution (Talbot, 1998; Tannen, 1994). As Shaw (2000) has shown, things become even more complicated when gender and formal context are mixed. In a study of what may be termed 'illegal' interruptions in British House of Commons Proceedings, Shaw noted how male MPs made such interruptions more frequently than female MPs. Furthermore, when women MPs did carry out such actions, they were more frequently censured for this by the Speaker of the House.

Instrumental and Influential Power

The pragmatic control of turns or of specific speech actions could be seen as the use of instrumental power. Instrumental power is often formally embedded as a system of control either explicitly formulated as within the law or more subtly ingrained within what Foucault called "regimes of truth" (Foucault, 1980), that is, the control over access to certain forms of knowledge. But there is also what is seen as influential power in the operation of pragmatics,

and here this may be seen in almost all walks of life, although influential power is more often highlighted in the workings of the media, particularly in advertising, and in politics (Talbot *et al.*, 2003; Bell, 1991).

Consider a burger chain advertising statement: *where good people go for good food*. How are we meant to understand this? There is a clever juxtaposition between *good* as a moral/reflective issue and *good* as a comparative adjective of assessment. In the advertising strap line, there is an effort to get us to process the phrase *good people* and *good food* together. But why? According to Grice (Grice, 1975; see also Sperber and Wilson, 1995) what happens is that the juxtaposition of *good people* and *good food* creates an incongruity in terms of the relevance of the claim. It is incongruent, argues Grice, because communication is based an assumption of cooperation, where we try to speak the truth in a clear and concise manner as simply as is necessary to convey a message relevant to the talk. This gives one answer to our question above as to why we assume that John has no more than three children when someone says *John has three children*. If John had more or less than three children, then according to the pragmatic principles espoused by Grice, the speaker would have said so (see **Grice, Herbert Paul (1913–1988)**).

Grice does not say that his principles are rules that must always be in operation, or which must be obeyed, merely that they provide a heuristics for interpretation. Interestingly, he also suggested that when a speaker says more or less than required, is obscure, or seemingly irrelevant, this may be an indicator that they intend their hearer to look beyond the meanings of the words themselves in order to retrieve the message. In this case, the speaker may be generating a specific kind of inference referred to as a 'conversational implicature' (see Levinson, 1983). For example, if I say *John was in the room* in response to your question *Where have all the apples gone*?, this does not seem to be an answer at all. However, if you assume I am being relevant and saying as much as possible, then you will try to see my response as an answer. Perhaps in this case we both have shared knowledge that John likes to eat apples; if that was the case, you could then infer both that although I do not know who took the apples (if I did I would have said so) I believe/infer that John has taken the apples. The reason I believe this is because, as we jointly know, John really likes his apples, he was in the room, and now the apples are missing. Formally, there would be more to explain here, but the general point is that from a particular utterance we can gain more information than is readily available from sentence interpretation alone (*see* **Implicature**).

What then has the process of eating *good food* to do with the moral or other inclinations involved in being *good people*? One answer is that eating food involves choice. We often hear it said after an enjoyable meal at a restaurant that either the food or the restaurant itself, or both, was a *good choice*. Hence, eating out also involves some discernment on behalf of the customers. And those who are *good* at this get *good food*. Hence, in this case, not only can you enjoy the *good food* but you can give yourself a pat on the back as one of the *good people* capable of making a good choice.

> Good people (those who know or care) go for good food to X.

There is also a more general interpretation here, simply that this restaurant is where *good* people go for their food. Since most of us wish to think of ourselves as *good*, then this restaurant is the place to be. Both assumptions would be worked out using a similar approach. In both cases, the message is clear: if you consider yourself *good* in either (or even more) of the interpretations provided, then you should be in restaurant X.

This kind of influential power attempts to control our actions by pushing our choices in a particular direction. Since *good* may be taken in a number of ways, it expands the range of audiences that it might influence. Thus, any ambiguity is utilized for a positive purpose, as is the case with the politician before an election who says *We have no intention and see no reason at this time to raise taxes*. In this case there are two elements worthy of attention. The first is the negation of the term *intention*. If intention means one is going to do X (raise taxes), then this is denied. However, in the second part of the sentence the adverbial *at this time* marks any intention as time- and context-based. Consequently, if at a later time one does raise taxes (after being elected for example), one could not be accused of having previously misled the public.

Such time-controlled modifications are frequent in the political domain. The British Prime Minister stated, in relation to Britain's involvement in the Iraq conflict in 2004, that "At the present time, we believe, we have sufficient troops" (in Iraq). We see the use of the adverbial again, but also in this case the use of an epistemic marker of knowledge, i.e., *believe* as opposed to *know* (see Chafe and Nichols, 1986). *Believe* is weaker than *know* and may be used to 'hedge' any claims. Should future events prove against one's statement, one can always say that is what I believed at the time.

Pragmatics, as may be seen, is central to the operation of power in society. In formalized contexts, it explains acts in terms of their conditions of operation; similarly, it explains in such contexts, and others, who is expected talk when and about what. It also allows us to see how embedded inferential information may be calculated to explain specific messages and similar embedded information may be used to sidetrack us or to protect the speaker. Knowledge of pragmatics is therefore central to understanding power and its role in human communication.

See also: Critical Applied Linguistics; Grice, Herbert Paul (1913–1988); Implicature; Institutional Talk; Maxims and Flouting; Speech Acts; Speech Act Verbs.

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Pragmatic Acts

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A Philosophers' Mistake

An often heard critique of the Searlean approach to speech act theory (and, by implication, also of Austin's and Grice's; see Mey, 2001: 93–94) is that it concentrates on 'speech' to the exclusion of other phenomena (e.g., writing) that also fall into the category of 'language.' As a result of this critique, some linguists have suggested that we replace the term 'speech act' by a more 'general' one, such as 'act of language' (compare also the French distinction between *acte langagier* and *acte de parole*; German has *Sprachhandlung* as opposed to *Sprechakt*; Bühler, 1934) (*see* **Speech Acts; Grice, Herbert Paul (1913–1988); Austin, John Langshaw (1911–1960)**).

What is at stake here is more than a terminological quibble. Those who want to consider speech as different, less comprehensive than 'language' overlook the fact that all language originates in speech; writing is a later development, arising from the need to preserve the spoken word for later and remote use. However, there is a wider implication, one that is equally often overlooked by linguists and many philosophers alike. As Searle (1969: 16) remarked,

> When I take a noise or a mark on a piece of paper to be an instance of linguistic communication, as a message, one of the things I must assume is that the noise or mark was produced by a being or beings more or less like myself and produced with certain kinds of *intentions*.

In the standard philosophical approach to language, as we encounter it in works by thinkers such as Frege, Russell, Carnap, Reichenbach, Lewis, and a host of other earlier philosophers, the fundamental unit establishing and legitimating our acts of thinking and speaking is the abstract proposition, as it manifests itself in the well-formed linguistic sentence. In this approach, the user of language is conspicuously absent, and consequently so, too, are his or her intentions. For linguists such as Chomsky and his followers, the persistent problem is how to connect a certain representation of the world with a given, well-formed linguistic expression. However, people do not always necessarily think in propositions representing well-formed abstract formulae; nor do they speak in correct sentences, derived according to the rules of an abstract grammar. Regarding people's world representations, the 'intentionality' that Searle points to comprises more than just cognizing: Affect, will, ethical considerations, and so on have to be taken into consideration when we talk about 'mental states.'

Combining these different facets of human mental activity is often thought of as a process of 'addition': To a given propositional content (e.g., 'to shut the door') I can add a volitional component (as in 'I want you to shut the door'), a component of ordering (as in the imperative 'shut the door!'), a component of questioning (as in 'is the door shut?'), and so on. These additional components are then manifested by their appropriate speech acts: wanting, ordering, questioning, etc. It is this kind of thinking that is at the basis of Gazdar's (1979: 4) often quoted formula: 'Pragmatics is meaning without semantics.'

The main difference between speech act theorists such as Searle (one could also mention others, such as Austin, Ryle, and Grice) and linguists such as Chomsky is that the former include the speaker's mental state in their considerations of 'how to do things with words' (Austin, 1962). However, another problem arises here, having to do with the nature of the speech act as primarily defined (in the Searlean approach) in relation to an 'ideal speaker' (the hearer, if present, is similarly idealized). Thus, Searle's approach not only is basically speaker oriented (the hearer being thought of as a speaker who is temporarily 'out of function' – one who is listening to a speaking person in order to become a speaker him- or herself) but also, both speaker and hearer are located in some abstract, idealized universe, devoid of any relation to their actual status as language users. Even where dialogue or conversation is concerned, the question of what the speakers are saying to each other is discussed from a strictly idealized, speaker-oriented viewpoint; thus, questions as well as answers are uttered by dummies figuring as speaker/hearers (e.g., the ubiquitous 'Peter' and 'Mary'). It is in this sense that we must understand Levinson's (1983: 293) often quoted remark that there is no such thing as abstract 'questionhood' or 'answerhood': all questions and their corresponding answers originate in real-world language users. A question is always a concrete somebody's question, and an answer is always given by somebody with real expectations, needs, and obligations.

However, if this is true for questions and answers, then it must hold for other speech acting as well. There are no orders except those given by a superordinate to a subordinate. The speech act of ordering is widely different, for example, in the military than

in the family; although it is true that everywhere certain people give orders while others have to take them, the difference is in the people and their placement in society. Similarly, there are no promises except those given by a concrete 'promiser' to a concrete 'promisee,' as they are characterized by their actual living conditions, especially when it comes to understanding what a promise is about, being able to accept a promise, and so on. Also, regarding ordinary conversation, the accepted ordering sequence of the individual replies not only represents some external schema (as used in conversation analysis) but also reflects and reproduces the power structure of our society: The powerful grab the floor, whereas the weak withdraw under pressure (*see* **Conversation Analysis**).

A final aspect (partially adumbrated in the preceding) is essential to our understanding of speech acting. A speech act never comes alone but carries always with it a bevy of other acts on which it essentially depends for its success (*see* **Speech Acts and Grammar**). Some of these are strictly speech oriented, whereas others are of a more general nature and include, besides speech, those aspects of communication that often are referred to as 'extralinguistic': gestures, intonation, facial mimics, body posture, head movements, laughter, and so on. It is these inclusive acts that I call 'pragmatic acts (*see* **Pragmatics: Overview**).'

An Illustrative Case: The Irony of Irony

I now illustrate the previous discussion by adducing a classical instance of purported speech acting: the use of irony in speech. Much has been written about irony by linguists, philosophers, sociologists, computer scientists, psychologists, and others. I limit myself here to contrasting two characteristic approaches from different camps: one linguistically and philosophically oriented, and the other more geared toward a computational view (*see* **Irony**).

Sperber and Wilson, two of the best known authors writing on the subject of irony from a philosophical–linguistic standpoint, have expressed their views on the subject in a number of important contributions. Here is a typical quote:

> "Irony plays on the relationship between speaker's thought and the thought of someone other than the speaker" (Sperber and Wilson, 1986: 243).

According to these authors, the speech act of irony is, in the final instance, expressive of a purely mental process, contrasting two thoughts: the speaker's and someone else's.

In contrast to this mentalistic view of irony, others have taken the stance that irony is first of all a situational phenomenon: "Ironic language presupposes an ironic situation, either in the *hic et nunc* or . . . in the human condition at large" (Littman and Mey, 1991: 134). Specifically, a situation is ironic whenever the acting persons' explicit or implicit goals clash with the reality of their acts. For example, consider the firefighter whose smoking in bed causes the fire station to burn down: His implicit goal, to prevent fires, clashes with his explicit acting, causing a fire to break out. This 'clashing' of act and intention is not only typical for irony but also typical for all sorts of humor; cf. especially Freud's definition of humor as "a shock between two heterogeneous or incompatible worlds" (as quoted in Haverkate, 1990: 107; Freud, 1916/1948). Similarly, in Littman and Mey's (1991: 135) terminology, irony is based on a 'twist' that "appears to depend upon some relationship between (1) the actor's goals, (2) the actor's plans, and (3) the actor's state of knowledge about the likelihood of the plan succeeding."

Irony thus presupposes an ironic situation, one in which an actor's plans somehow come to naught through his or her own fault or lack of knowledge, as attested by Robert Burns's "best laid schemes of mice and men" that sooner or later all "gang agley" – most often through the actors' own doings. If we accept this view of irony, then it should be evident that the acting is a central ingredient of any kind of ironic utterance; in fact, ironic utterances are only possible within some kind of action frame, viz., an ironic situation that makes the irony possible. Irony is thus, strictly speaking, not a speech act by its own volition and authority; its quality of 'act' depends on the acting persons and their views and knowledge of the situation in which they act.

It follows that ironic utterances are not, as Sperber and Wilson (1981: 302) maintain, basically to do with speaker attitude but with the world; not principally with speaking but with acting. The distinction between 'using' an utterance and 'mentioning' it (in irony) that these authors advocate (Sperber and Wilson, 1981) thus turns out to be just as vacuous as the time-worn distinction between 'saying' and 'meaning' when applied to irony (cf. Booth, 1974). As to 'mentioning,' this is itself a case of language use and thus not essentially different from other 'use'; as such, it is situation dependent. Speech, by itself, does not act: strictly speaking, there are no speech acts since, ultimately, all speech acting crucially depends on the situation in which the action takes place. Hence, speech acts, in order to be viable, have to be 'situated,' as discussed next.

Acting in a Social Situation

Previously, I stressed the need to think of speakers and hearers as acting in a social context. In traditional linguistics, the user, when and if he or she appears on the scene (as we have seen it happen in Searle's or in Sperber and Wilson's works), is always defined as an individual speaker whose words are spoken in the abstract space of 'exemplary thinking': The utterances that are produced lack any anchoring in the societal reality and invoke a context only as needed to make (minimal) sense. Such a context is never extended beyond the immediate needs of the description; it is not one that is solidly placed in the speakers' and hearers' actual social environment, a *situated* context. Similarly, the voices that we are hearing in the constructed dialogues of linguists' examples belong to lifeless characters (e.g., the famous 'Mary' and 'Peter') and not to real, interacting persons on a common, social scene (Mey, 1994: 155) (*see* **Context, Communicative**).

Typical for the social situation is that it is a common scene – that is, a situation whose participants are on some kind of shared footing. Elsewhere (Mey, 2001: 135), I have advocated the necessity of situating our speech acts in context, especially with regard to analyzing people's conversation. The reason is that no speech act, or any conversational contribution, can be understood properly unless it is situated within the environment in which it was meant to be understood. 'Quoting out of context' is a well-known means of manipulating a conversational partner; the proper use of conversational techniques excludes such manipulation precisely in the name of good conversational behavior.

In particular, the French sociologist Jacques Rancière (1995) applied the notion of 'common scene' to the political domain. Here, politics is defined as the "battle for the common scene of understanding" (Rancière, 1995: 13) – a battle that is not merely about defining a common ground, in the sense of establishing some common definitions or some common conceptual framework, but primarily about what is understood as being common, by ruling out various kinds of 'misunderstanding' (the title of Rancière's work). The point is that such a 'ruling out' should not be conceived of as a one-sided 'ruling' (in the sense of a judge ruling some question out of order) but as an appeal to the commonly accepted rules for making and breaking a social relationship. It is here that the notion of 'social' situation becomes crucial.

Rancière's 'social scene' is more than a simple context, understood as a common platform of conversation; rather, the question that he raises concerns the underlying presuppositions making the scene possible. This possibility involves what the actors can afford, not just what they can think and cognize. Thus, the common scene is 'transcendental' in an even deeper sense than Kant's: Not only the possibility of thinking and cognizing but also the very possibility of acting is questioned. This is why Rancière's notion of common scene is so important for the theory of pragmatic acts (*see* **Kant, Immanuel (1724–1804); Pragmatic Presupposition**).

Understanding a scene depends entirely on the acting. An active understanding implies having an idea of what to do on the scene, not just of what to say or think (these latter, although important, are still subordinated to the acting). Conversely, one's understanding of others depends on understanding their acting and the role they assume on the scene. What may appear as crazy behavior outside of the theater (cf. the expressions, a 'theatrical' laugh, to assume a 'tragic' posture, or even to put on 'an act') is perfectly understandable and rational on the scene, where role and rationality depend on each other. Rational acting is to act in accordance with one's role; any acting outside of that role is irrational (besides being strictly speaking impossible if one wants to keep one's place, both as an actor on the scene and as a member of the theatrical company).

Pragmatics tries to place the common scene within society by making it clear that also on the societal scene at large (and not just in politics) a 'battle' for domination is going on. If we do not understand this battle as a struggle between the forces of society, our understanding of the common scene and its actors will be incomplete. Conversely, our acting is determined by the scene: The scene's 'affordances' (a term from psychology; Gibson, 1979) are the limits of our actions. Common affordances create a common platform for action; a lack of such affordances restricts our possibilities of acting socially. Inasmuch as our acting depends on our understanding of the scene and its affordances, the scene is only 'actable' for all actors if it has been established as common – that is, affordable for everybody and by everybody.

From the previous discussion, it is clear that not only the scene determines our acting but also, conversely, our actions determine and reaffirm the existing scene. We profess adherence to our common platform by acting within its confines, by obeying its limitations, and by realizing our possibilities. Our acting on the scene (this includes our so-called 'speech acts') is thus always a 'situated action' – that is, an action made possible and afforded by and in a particular situation. The next section explores in more detail what this has to say for the question of pragmatic acts.

The Indirect Speech Act Paradox

In the literature, one frequently comes across the following vexing question (e.g., Mey, 2001: 113, 219; Searle, 1975: 82): How to explain that our speech acts more often than not are realized by expressions having very little to do with the literal interpretation of those expressions, but rather much with their conventional interpretation?

The traditional approach to this 'indirect speech act paradox' suggests that we either rely on such expressions being understood as idioms or rely on our using certain rules of inference (Levinson, 1983: 268–272, 2000: 16) (*see* **Inference: Abduction, Induction, Deduction**). A pragmatic solution to the paradox would have to go further and specifically ask what those rules are and how they are administered. Just like other speech acts (or, generally, any way of using words to do things), the so-called indirect speech acts derive their force not from their lexico-semantic buildup but from the situation in which they are appropriately uttered. This 'situational support' rests on the assumption that every situation carries its own organizing principle. That is, the conventions and rules of society determine what is appropriate speaking behavior for a particular situation.

In early speech act theory, this led to the erroneous assumption that the preferred response was the only legal one: the so-called 'canonical' speech act, expressed by an appropriate speech act verb – promises require a verb of 'promising,' orders one of 'ordering,' and so on (Mey, 2001: 184) (*see* **Speech Acts: Definition and Classification**). Although this rigid interpretation of the principle is unacceptable (it would lead, among other things, to the rejection of indirect speech acts as 'improper'), the notion that the situation has a heavy hand in defining and determining what we say is valid. The situation, so to speak, creates the 'affordances' by which we are guided toward a correct interpretation of what we are hearing, and indeed of what we ourselves are saying (in accordance with the observation that we have not properly understood our own utterances until somebody has understood them with us – an insight due to the Danish linguist Jesper Hermann (1992)). Here, we are in touch with the very roots of speech act theory, as it was conceived by Austin (1962: 100, scare quotes as in the original), who carefully (not to say cautiously) referred to the situated utterance as "[words] to some extent 'explained' by the 'context' in which they have been actually spoken." Recall also that it was Austin's original intention to "study the total speech in the *total situation*" (Austin, 1962: 148 (italics added)).

Summing up, speech acts, in order to be effective, have to be situated. That is, they both rely on and actively create the situation in which they are realized. Thus, a situated speech act comes close to what Hymes (1964/1977) called a 'speech event' in ethnographic and anthropological studies (cf. Bauman and Sherzer, 1974): speech as embedded in an institutionalized social activity of a certain kind, such as teaching, visiting a doctor's office, and participating in a tea ceremony. In all such activities, the role of speech is prescribed; only certain utterances can be expected and will be acceptable. On the other hand, by their very acceptance of whatever is said as a situated utterance, the participants establish and reaffirm their social situation. The emphasis is no longer on describing individual speech acts (as it was for Searle and his followers) but on figuring out how a particular act of language came to be used in this particular situation and with what effect. Regarding Hymes's speech event, although the words spoken by the participants require an understanding in terms of the language used, the individual speech acts make sense only when framed in the event.

In this way, the indirect speech act paradox can be dissolved by moving the focus of attention from the words being said to the things being done. In the sense that 'indirectness' is a straight derivative from the situation, and inasmuch as all speech acting depends on the situation (with its dialectic feedback, as we have seen), one may say that in this situational sense, there are only indirect speech acts; alternatively, no speech act, in and of itself, makes any sense. *A fortiori*, there are, strictly speaking, no such 'things' as speech acts *per se*, only acts of speech in a situation. The next section provides more details.

Situated Acting: "The Body Speaks" (John Donne)

The philosophers' mistake, referred to previously, was to believe that we can explain our use of 'words in action' by referring to individual speech acts with well-defined properties, assigned in accordance with certain philosophical and linguistic criteria. We have seen how efforts to break out of this linguistic and philosophical straitjacket (such as by Searle and the post-Searleans or by the followers of Sperber and Wilson) have failed in the end. The reason is that no isolated theory of language or the mind will be able to explain the workings of the human user in a concrete situation that depends neither on the mind nor on language exclusively and that consequently cannot be expressed in terms specifically created for describing the linguistic or mental domains.

In contrast, a pragmatic approach to speech acting will, as its first and most important business, raise the question of the user's possibilities in a situation. To

use a parallel from another mental activity, vision: seeing is not a simple matter of an object reflecting itself in the mind, it is the situation that, along with the active perceptive categories, 'creates' the objects of perception in accordance with the possibilities afforded by the situation (aptly called 'affordances' by Gibson, 1979). Similarly, when we use language for communication, what we expect to hear is what we can, and actually do, understand in the situation. However, this situational 'affordability' comprises more than just the words spoken. As Charles Goodwin (2000: 1492) pointed out, in the "situated interaction" that takes place, for example, among girls playing hopscotch,

> the construction of action through talk ... is accomplished through the temporally unfolding juxtaposition of quite different kinds of semiotic resources ... through this process, the human body is made publicly visible as the site for a range of structurally different kinds of displays implicated in the constitution of the actions of the moment.

Goodwin goes on to illustrate this 'use of the body' as one through which participants in situated action make reflexive references to their speech by positioning themselves in the other participants' line of vision, using gestures not just to illustrate but also to actually execute speech acts (e.g., of asserting, contesting, and supporting). More generally, conversational 'moves' are not only realized through speaking in ordered sequences; the body may 'jump into' the conversational fray and change the course of the interaction, preempt a conversational turn, seize the floor, and the like. An act such as 'seizing the floor' is accomplished nonverbally; turn-taking is not only prefaced by, or even merely accompanied by, a body movement: The body move *is* the taking of the turn, as it is performed by dint of a "hybrid system" (Goodwin, 2000: 1516). This interaction between action and speech cannot be captured by a simplistic notion of 'speech act,' no matter how well defined. A proper label to put on those concerted actions is that of the 'pragmatic act' as the locus where all the different linguistic and semiotic structures converge and are properly ordered in communication.

Conclusion: Pragmemes and Practs

The theory of pragmatic acts does not explain human language use by starting from the words uttered by a single, idealized speaker. Instead, it focuses on the interactional situation in which both speakers and hearers realize their aims. The explanatory movement is from the outside in, rather than from the inside out: Instead of starting with what is said, and looking for what the words could mean, the situation in which the words fit is invoked to explain what can be (and is actually being) said.

The emphasis here is not on rules for use of individual speech acts but on characterizing a typical, pragmatic act as it is realized in a given situation. Adopting familiar linguistic terminology (cf. terms such as phoneme, morpheme, etc.), I call this (proto-)type of act a 'pragmeme.' Individual pragmatic acts realize a particular pragmeme (e.g., 'inciting to declare war'); we may call these 'practs.' However, since no acts ever will be completely identical (every situation in which war is declared is different from every other), every pract is also an 'allopract' – that is, a different realization of a particular pragmeme. The Israeli linguist Dennis Kurzon, who has worked specifically in the area of 'incitement,' supported this view when he said that "any utterance may constitute an act of incitement if the circumstances are appropriate to allow for such an interpretation" (Kurzon, 1998: 587; Mey, 2001: 221).

With regard to pragmatic acts, one is not primarily concerned with matters of grammatical correctness or strict observance of rules. What counts as a pract (i.e., what can be subsumed under a particular pragmeme as an allopract) depends on the understanding that the participants have of the situation and on the outcome of the act in a given context. Schematically, this can be represented as shown in **Figure 1**.

In **Figure 1**, the various abbreviations to the right have to do with textual features, such as INF for 'inferencing,' REF for 'establishing reference,' REL for 'relevance,' VCE for 'voice' (cf. Mey, 2000), SSK for 'shared situation knowledge,' and MPH (for 'metaphor'). The symbol 'M' denotes a 'metapragmatic joker' – that is, any element that directs our attention to something happening on the metapragmatic level. For instance, changing the order of the words in a sentence may tell us something about the relative importance of the transposed elements. Using the standard expression 'alleged' in a report may serve to exonerate the journalist from implicitly proffering an accusation by imputing guilt to an ('alleged') defendant in a criminal case, and so on. However, because it is impossible to catch all of these metapragmatic functions of the 'joker' under one hat, I prefer to wave my hands at terminology by simply labeling this elusive character (with homage to Fritz Lang) M for 'metapragmatic.'

In this way, the right side of the schema symbolizes the elements that are present in the textual chain (the listing is of course not complete). Regarding the column to the left in **Figure 1** it should be read as a feature matrix whose cells can either be filled or empty. If the latter is the case for all of the cells, the matrix renders the value zero (Ø).

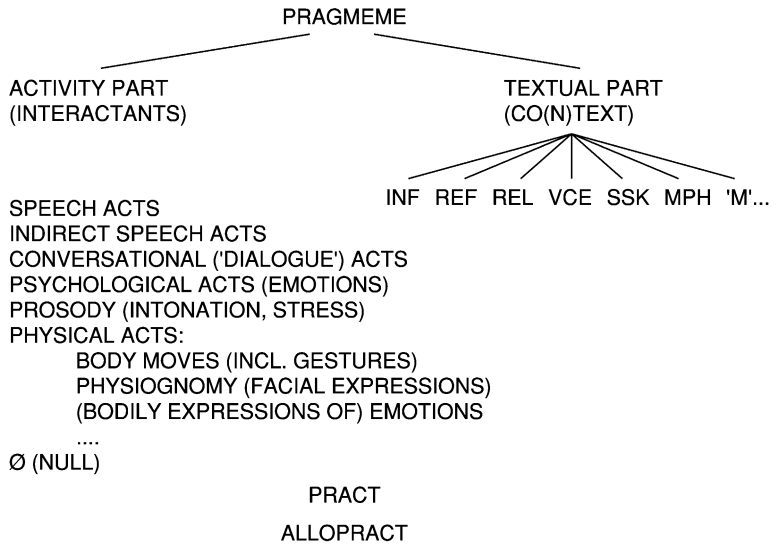

Figure 1 Pragmeme, pract, allopract. Adapted from Mey (2001: 222).

In conclusion, let me quote a contemporary Chinese pragmaticist, talking about the 'perlocutionary' effect of speech acts. Yueguo Gu (1993: 428) remarked that "perlocution is not a single act performed by S[peaker]. Nor is its effect being caused by an utterance. It involves a [rhetorical] *transaction* (italics added)." This is, *mutatis mutandis*, what the current entry has been arguing for. Like perlocutions, pragmatic acts involve minimally not only a speaker and a hearer but also, in addition, a number of other factors. When all is said (illocutionarily) and not least (perlocutionarily) done, the 'rhetorical transactions' involved in speech acting rest on the assumption of the force of the utterance. This force is pragmatic, to wit: the force of the pragmeme.

See also: Austin, John Langshaw (1911–1960); Context, Communicative; Conversation Analysis; Gestures: Pragmatic Aspects; Grice, Herbert Paul (1913–1988); Inference: Abduction, Induction, Deduction; Irony; Pragmatic Presupposition; Pragmatics: Overview; Presupposition; Speech Acts; Speech Acts and Grammar; Speech Acts: Definition and Classification.

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Pragmatic Determinants of What Is Said

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Imagine that Jack, pointing at a book on the table, utters the sentence "That is better than Jill's book." What, we might ask, is said by his utterance? Well, since the sentence contains a context-sensitive expression – the demonstrative 'that' – we know that determining what is said will require an appeal to the context of utterance to provide a referent (*see* **Indexicality: Theory**). Thus, this is one kind of pragmatic determinant of what is said by Jack's utterance. The sentence is also context sensitive in another, slightly less obvious, way: it is in the present tense, so an appeal to the context of utterance will also be needed to fix a time for Jack's claim. Finally, many theorists recently have argued that the sentence is also context sensitive in a third, much less obvious, way: for to grasp what is said by Jack it seems that we also need to know what kind of relationship he envisages between Jill and her book. Does Jack intend to say that the book he is demonstrating is better than the book Jill wrote, better than the book Jill owns, the book Jill is reading, etc? And what does he mean by 'better' here – better written, better researched, better for standing on to reach a high shelf? Surely Jack says more than merely that the book he is demonstrating is better in some respect or other than a book bearing some relationship or other to Jill, but, if so, then any such additional information can only come from consideration of the context of utterance.

Furthermore – and this is where the current case differs from that of demonstratives and tense – it's not obvious that this last type of pragmatic determinant of what is said is traceable to any overt (i.e., syntactically represented) context-sensitive element. Jack's utterance does contain the syntactically marked possessive, but *'s* certainly doesn't appear on the list of usual suspects for context-sensitive expressions. And in many cases even this degree of syntactic representation is missing. Consider an utterance of "It's raining," where what is said is that it is raining at some location, l, or "You won't die," saying that you won't die from that cut, or "Nietzsche is nicer," meaning that Nietzsche is nicer than Heidegger. Or again, consider the speaker who produces a nonsentential utterance, e.g., pointing at a child and saying "George's brother," thereby conveying that he is George's brother. In all these cases we have additional information contributed by the context of utterance yet which seems unmarked at the syntactic level.

These types of pragmatic determinant of what is said (i.e., contextually supplied information which is semantically relevant but syntactically unmarked) have come to be known as 'unarticulated constituents' (UCs). Such elements are extremely interesting to philosophers of language since they seem to show that there are problems with a quite standard conception of formal semantics, according to which the route to meaning runs along exclusively syntactic trails.

Now, as noted above, even in formal theories of meaning, like truth-conditional accounts (*see* **Truth Conditional Semantics and Meaning**), some appeal to a context of utterance must be made in order to cope with overtly context-sensitive expressions. However, the thought has been that this need not contravene the essentially formal nature of our theory, since the contextual instructions can be syntactically triggered in this case (crudely, the word 'that' tells us to find a demonstrated object from the context of utterance). Much more problematic, then, are pragmatic determinants of what is said which apparently lack any syntactic basis, for they show that context can come to figure at the semantic level regardless of whether it is syntactically called for (thus there will be no purely syntactic route to meaning).

In response to the challenge posed by UCs, advocates of formal semantics have sought to reject the idea that there are any such things as syntactically unrepresented but semantically relevant elements, claiming either that

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Abstract:

Recently, the established way of thinking about speech acts (in the tradition of Austin, Searle, Grice, and their followers) has undergone a remarkable change. From being an effort to represent human words in terms of what they 'do' (Austin), or how they can be used to produce 'speech acts' (Searle) or to generate 'implicatures' (Grice), the focus has shifted to the situation in which words are spoken and how this contributes to understanding the utterance, or even how the situation can predefine and to a degree determine what can be said. The upshot of these considerations is that we need a new theory, one that takes into account the inter- and transactional aspects of speech acting. This article proposes such a theory under the label of 'pragmatic acts' – acts that work not just by their wording but also by their being embedded in a situation in which humans act, with everything that humans bring to their interactional forum, including body movements, emotions, and so on.

Biography:

Jacob L Mey (b. 1926) is Professor Emeritus of Linguistics at the University of Southern Denmark. Previous appointments include the University of Oslo, Norway; the University of Texas at Austin; Georgetown University, Washington, DC; Yale University, New Haven, CT; Tsukuba University, Japan; Northwestern University, Evanston, IL; City University of Hong Kong; Goethe University, Frankfurt am Main; Universidade Estadual de Campinas, S.P., Brazil; Universidade de Brasília, Brasília, DF; the University of Haifa and Haifa Technion, Israel; as well as numerous other institutions of research and higher learning. His research interests concern all areas of pragmatics, with an emphasis on the social aspects of language use, the pragmatic impact of computer technologies, and the pragmatic use of literary devices. Among his publications in these areas are *Pragmalinguistics: theory and practice* (Mouton, 1979), *Whose language? A study in linguistic pragmatics* (Benjamins, 1985), and *Pragmatics: an introduction* (Blackwell, 1993; 2nd rev. edn., 2001). His most recent publication is *As Vozes da Sociedade* (*The voices of society;* in Portuguese) (Mercado de Letras, 2002). Regarding the computer-related aspects of pragmatics, a recent development is a new field, cognitive technology (CT), which he is among the first to have developed, having written and edited numerous articles and books in the area and coorganized several international conferences (together with Barbara Gorayska). The main interest of CT is to study the effects of the computer on the human mind and how the mind determines the uses we make of the computer as a tool. Among his other main interests are the theory of literature and poetics. These interests culminated (following many previous articles) in his book *When voices clash: a study in literary pragmatics* (Mouton de Gruyter, 2000). He is founder (with Hartmut Haberland) and chief editor of the monthly *Journal of Pragmatics*. He also edits *RASK: International Journal of Languages and Linguistics*. Among his edited volumes are two readers on cognitive technology (Elsevier Science, 1996 and 1999) and the 1100-page *Concise encyclopedia of pragmatics* (Elsevier Science, 1998). He holds an honorary D.Phil. degree from the University of Zaragoza, Spain. He is a member of various professional organizations, such as the Linguistic Society of America, the Copenhagen Linguistic Circle, and the International Pragmatics Association (of which he is a member of the consultative board). He is editor or member of the advisory board of a number of series and journals, such as *Pragmatics and Beyond* (Amsterdam); *Anthropological Linguistics* (Berlin); *Discourse and Society; Text, Language and Literature* (Liverpool); *Miscelánea* (Zaragoza); *Psyke og Logos* (Copenhagen); *Sémantique et Pragmatique* (Orléans); and *Cadernos de Linguagem e Sociedade* (Brasília).

Keywords:
Affordance
common sense
extralinguistic acts
intention

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1. every contextual element of what is said really is syntactically represented, even though this fact may not be obvious from the surface syntax of a

sentence (i.e., there is more to our syntax than initially supposed), or that

2. any contextual contributions which are not syntactically marked are not semantically relevant (i.e., there is less to our semantics than initially supposed).

The first of these moves is pursued by a number of theorists who argue that, if one pays proper attention to all the information given at the syntactic level, one will find that many cases of supposedly syntax-independent semantic contribution are, in fact, syntactically required (see Stanley, 2000; Stanley and Szabo, 2000; Taylor, 2001; Recanati, 2002). Now, that there is some discrepancy between surface form and underlying syntax is a well-rehearsed point. For instance, Russell's theory of descriptions invokes a clear distinction between surface form and logical form. Furthermore cases of so-called syntactic ellipsis (like the contraction in "Jack likes dogs and so does Jill," where the second sentence is held to have the underlying syntactic form "Jill likes dogs" despite its reduced verbal form) show that surface constituents may be poor indicators of syntactic elements. If this is correct, then the principle that there is more to our syntax than is apparent at first glance is independently well motivated.

Given this, there certainly seem to be cases in which (1) is an appealing response to putative examples of UCs. To give an example: someone might claim that, because an utterance of "Jack plays" can be used in one context to say that Jack plays the trombone and in another to say that Jack plays football, there must be a syntactically **un**marked, contextual contribution to the semantic content of an utterance of this kind. However, closer inspection of the syntax shows this conclusion is dubious: 'plays' is a transitive verb requiring a subject and an object and, although the argument place for an object can be left unfilled at the surface level without this making the sentence ill formed, it might be argued that the additional argument place **is** marked in the underlying syntax of the verb. Since 'plays' is a transitive verb, the competent interlocutor will, on hearing "Jack plays," expect to look to a context of utterance to discover what Jack plays, but this is precisely because she is sensitive to the syntactic structure of English in this case. Thus sometimes an appeal to an enriched syntax seems the best way to cope with putative UCs. However, there are also cases where (1) seems less compelling. For instance, in certain contexts, it seems that Jack can use an utterance of "The apple is red" to convey the proposition that the apple is red to degree *n* on its skin. Yet it is far from clear that the correct syntactic structure for color terms includes argument places for the shade, or precise manner of instantiation, of the color. Furthermore, the idea that syntactic structure can outstrip surface form at all (or at least in the ways required by [1]) has been rejected by some.

So, the opponent of UCs might seek to supplement (1) with (2), allowing that some contextually supplied information is not marked at the syntactic level but denying that such information is semantically relevant. The advocate of this kind of response wants to accept that, at an intuitive level, the speaker who utters "The apple is red" (or "You won't die," etc.) clearly does convey the contextually enriched proposition (i.e., that the apple is red on the outside, or that you won't die from that cut) but that this is an instance of speaker meaning rather than semantic ontent (*see* **Semantics–Pragmatics Boundary**). Now, whether this move is warranted in all cases is again something of a moot point. One objection might be that it is a mistake to seek to separate speaker intuitions about what is said and claims of semantic content to the radical degree predicted by this kind of move. So, for instance, it seems that the message recovered from an utterance of "That banana is green" will always be that that banana is green in some salient respect, but if this is the kind of proposition competent speakers can and do recover in communicative exchanges, shouldn't this be what semantics seeks to capture? What role could there be for a more minimal kind of semantic content (e.g., which treats semantic content as exhausted by the proposition that that banana is green *simpliciter*)? (See Borg, 2004; Cappelen and Lepore, 2005, for attempts to answer this question.) A second worry for the formal semanticist who pursues (2) is that it may undermine her claim that semantics deals with complete propositions or truth-evaluable items. For instance, take the situation where the book Jack demonstrates is better than the book Jill is reading, but worse than the book she wrote. To assess Jack's opening utterance as true or false in this situation, it might seem that we need first to determine what relationship Jack intended by his utterance of "Jill's book." Without this pragmatically determined aspect of what is said, it is argued, the sentence Jack produces is simply not truth evaluable, it doesn't express a complete proposition (cf. Recanati, 2003).

Clearly, then, although the formal semanticist can respond to the challenge of UCs with moves like (1) and (2) it is not at all obvious that these responses are sufficient. However, we should also be aware that there are problems to be faced on the other side, by the proponent of UCs, as well. One major worry is how to preserve our intuitive distinction between semantically relevant elements and elements which are only pragmatically relevant. Given the traditional

conception of formal semantics, the answer to this question was clear: something is semantically relevant if it can be traced to the syntax of the sentence, it is pragmatically relevant otherwise. Once we admit of semantically relevant but syntactically unmarked elements, however, this way of characterizing the distinction is clearly unavailable, so the proponent of UCs owes us some other account. If Jack utters "I've eaten" then it might seem plausible to claim that the semantic content of this utterance is that he has eaten breakfast today, but he might also succeed in conveying the messages that he has eaten a cooked breakfast within the last hour, or that he is not hungry, or any number of further propositions. How do we decide which elements come to figure in the supposed semantic content of the utterance, and on what basis do we rule some conveyed messages as merely pragmatic?

A further worry seems to be that, for each additional contextual contribution we introduce, this contribution is itself open to further qualification: an utterance of "That banana is green" might intuitively be contextually enriched to that banana is green on its skin, but why stop here? Does the speaker mean to say that that banana is green all over its skin, that that banana is mostly green on a particular patch of skin, or that that banana is a bit green on this bit of surface skin and to a depth of degree *n* through the skin? The problem is that, for any piece of contextual information we introduce via a UC, this piece of information is itself likely to allow for a number of different contextual qualifications or sharpenings, and we seem to lack any principled reason to disallow these further sharpenings from appearing as part of the semantic content of the utterance. Yet, without such a reason, we run the risk of being launched on a slippery slope whereby the meaning of every utterance turns out to be a proposition which is somehow 'complete' in every respect. Yet no such conclusion seems palatable: it undermines notions of systematicity for meaning and makes it completely unclear how we ever come to learn and use a language given our finite cognitive resources (*see* **Compositionality: Semantic Aspects; Compositionality: Philosophical Aspects; Systematicity**).

So, it seems there are problems on both sides of the debate here and the question of how to handle pragmatic determinants of what is said remains a vexed one. The advocate of formal semantics needs to deliver an account both of overtly context-sensitive expressions – the indexicals, demonstratives, and tense markers of a natural language – and of the more covert kinds of context sensitivity discussed here. Reflecting on the multitude of ways in which a context of utterance can apparently affect issues of linguistic meaning certainly seems to show that the formal semanticist runs the risk of undervaluing the role played by pragmatic determinants in what is said. Yet it remains to be seen whether this constitutes merely a potential oversight on her behalf (cf. Stanley, 2000; Stanley and Szabo, 2000; Borg, 2004) or a fundamental failing of the whole approach (cf. Sperber and Wilson, 1986; Carston, 2002).

See also: Character versus Content; Compositionality: Philosophical Aspects; Compositionality: Semantic Aspects; Expression Meaning versus Utterance/Speaker Meaning; Indexicality: Theory; Semantics–Pragmatics Boundary; Systematicity; Truth Conditional Semantics and Meaning.

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Pragmatic Indexing

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Indexicality is just the principle of contextualization of linguistic and other signs-in-use, seen as a component of the meaning of the occurring sign-forms. Indexicality is revealed in the way that, by degrees, linguistic and other signs point the users of these signs to the specific enveloping conditions in which they use them. Signs point to context in two ways: indexical signs link users to contextual conditions of which users have knowledge, independent of the occurrence of the particular indexical sign at issue; indexicals also link users to contextual conditions that, for those users, come into being only as a function of the occurrence of the indexical sign at issue (*see* **Context, Communicative**). For its users, the occurrence of an indexical sign is an event that, like a mathematical function, maps a context configured in a certain way into a context now configured in perhaps another way. Consider an expression, the use of which counts as an insult under particular, already mutually understood conditions. When it is directed as such to an addressee, once emerged in the interpersonal space between two people, its directed occurrence irreversibly transforms social relations so that much interpersonal work – further signs-in-use – might have to be undertaken, and things are never again quite as they were in the *status quo ante*.

The two contextualizing directions of indexicality – presupposing indexicality and creative or entailing indexicality (Silverstein, 1976; 1993) – are not, then, simply converse equivalents. They correspond to the two intuitions that sign users manifest, on the one hand about the 'appropriateness' of their messages to the momentary givens of the context as they understand them, and on the other hand about the performative 'effectiveness' of their messages in bringing about intersubjective consequences in the contexts in which they communicate. For semiotic pragmatists, empirical study of indexicality investigates how actual messages, used on specific occasions of communication, relate to norms of appropriateness and effectiveness implicitly shared by users of the various sign modalities studied (*see* **Pragmatics: Overview**). Are there norms of 'who-can-communicate-what-message-to-whom-about-whom-or-what-under-what-conditions'? Are there norms of 'what-kind-of-act-is-performed-or-event-brought-about-in-the-communication-of-certain-message-forms'? How people use signs in actual event contexts can be interpreted only in relation to such norms; that is, events of how signs occur in their contexts of use can be studied as the medium through which social relationships among actual communicators are established, maintained, and transformed relative to the norms being invoked in actual practice.

Many writers, ancient and modern, have recognized and remarked on essentially this property of signs; the whole field of rhetoric in the Western tradition, we can see retrospectively, has been focused on it (*see* **Rhetoric, Classical**). It was Charles Sanders Peirce (1839–1914) who first systematized the concept of indexicality within a more encompassing framework of the semiotic (sign-based) foundations of all epistemology and ontology (*see* **Peirce, Charles Sanders (1839–1914)**). Of all the grand – and ever unfinished – architectonic of his philosophy, Peirce's specific trichotomous distinction in which indexicality figures has been particularly influential for the analysis of cultural systems such as language. Peirce distinguished among *iconic* sign relationships (signs by resemblance or likeness to their semiotic targets), *indexical* sign relationships (signs of spatiotemporal or other contiguity, including causal connection to another object, to which they point), and *symbolic* signs (implicit sign regularities, depending on general classificatory conventions that any instance of the sign invokes in use).

Many philosophers, logicians, and other students of cognition have considered how natural languages measure up against algorithmic systems invented for formally modeling the (normative, if not actual) coherence of human inferencing (what is sometimes termed 'symbolic logic') (*see* **Inference: Abduction, Induction, Deduction**). All have therefore been obligated to treat the pervasive fact of indexicality in natural languages, as language is the recognized human instrument for referring and predicating (Reichenbach, 1947; Bar-Hillel, 1954). Such accounts have at least recognized referential deixis, the way that objects of reference can be relationally located in respect of the – indexed! – contextual conditions under which an instance of a deictic form is used and to which it therefore points (*see* **Deixis and Anaphora: Pragmatic Approaches**). That is, every human language includes paradigms of grammatical forms (such as French *celui-ci* 'this one [masc.]' and *celui-là* 'that one [masc.]') that locate an object of reference in relation to its position in the (broadly speaking) 'spatial' configuration of the triad sender (speaker)–receiver (addressee)–referent in a communicational situation. In short, the 'sense' – the presumed-upon norm of form-meaning relationship – for such a deictic is a rule for the 'appropriate' use of each instance of the form to pick out a referent that conformingly

co-occurs in the communicative context. All such systems of grammatical deixis impose upon instances of communication a kind of radial topology as a structuring principle, with various elaborations of a basic two-valued distinction ('here'-and-'there' kinds of systems), as in Latin three-valued demonstrative paradigms, and with various generalized usage beyond the merely physical arrangement of an inhabitable speech context (for example, using deictics also to track the order of introduction of referents in the grammaticized topological flow of temporally unfolding discourse; cf. English *former* vs. *latter*).

Roman Jakobson (1896–1982), Emile Benveniste (1902–1976), and Jerzy Kuryłowicz (1895–1978), however, among linguists, saw the pervasive role of indexicality in every natural language, far beyond mere deictic reference. The notion that every structure of what Saussure termed *langue*, or Chomsky termed 'competence,' was formally pervaded and functionally framed by Saussurean *parole*, or by Chomskyan 'performance,' was developed in Jakobson's seminal *samizdat* of the annus mirabilis 1957, entitled *Shifters, verbal categories, and the Russian verb* (Jakobson, 1971), in Benveniste's series of papers of the same period, reprinted in his *Problèmes de linguistique générale* (1966, 1971), and in Kuryłowicz's generalizations from historical morphosyntactic studies of the Indo-European languages, beginning with his theories of 'derivation' (1936) and culminating in his *Inflectional categories of Indo-European* (1964; cf. 1960, 1972) (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913); Chomsky, Noam (b. 1928); Kuryłowicz, Jerzy (1895–1978); Jakobson, Roman (1896–1982)**). At once, matters of context and its configuration came into view in the grammatical analysis of how people achieve even the simplest of communications in the way of grammatically formed referring and predicating: relying systematically on the minutest processing of details of context, such as role relationships of speakers, addressees, audiences, and referents, as manifested in categories of 'person'; on presumptions of prior communicational events underlying warrants for speaking, as is manifested in categories of 'evidentiality'; on differentiation of interests of speaker and addressee in the events being narrated, as manifested in the 'epistemic' differentiation of two planes of tense systems; and so forth. Peirce's concept of indexicality was, then, generalizable beyond deictic reference as such to encompass the essentially context-dependent, context-suffused character of all linguistic communication and, more importantly, of anything one might term the structural norms for the referential and predicational use of verbal signs.

In this light, it becomes clear that as modern linguistic anthropology developed by phases through an 'ethnography of speaking' (or 'of communication') (Gumperz and Hymes, 1964, 1972; Hymes, 1974; Gumperz, 1982), its concerns for the sociocultural contextualization of language use were the same as those of these European theorists of a *linguistique de la parole* (*see* **Linguistic Anthropology**). Similarly, the studies of social interaction following on the Chicago School symbolic interactionism within the discipline of sociology – Goffman's (1967, 1969, 1974, 1981), those of ethnomethodology (Garfinkel, 1967; Cicourel, 1974), and conversation analysis (Sudnow, 1972; Levinson, 1983; Duranti and Goodwin, 1992) – are readings of the flow of interactional events achieved in the course of interpersonal co-participation in linguistically mediated communication (*see* **Ethnomethodology; Conversation Analysis; Goffman, Erving (1922–1982); Interactional Sociolinguistics**). Intellectually, if not disciplinarily, it remained only to bring together all these interests to the study of actual language forms through the concept of the pervasive indexicality of the linguistic sign, and to understand the indexicality of language and its perilinguistic semiotic modes in terms congenial to the social and cultural analysis of situations of communication.

By so doing, contemporary linguistic anthropology (see Duranti, 2001, 2004; Silverstein and Urban, 1996) has been centered on the analysis of indexicality in every aspect of semiotic codes in use, and particularly of language: how does the flow of discourse, as it comes to cohesive textual form, indexically construe and construct relevant sociocultural framings of its producers (speakers, addressees, audiences, even analysts) and its denoted characters? Such framings are on the order of shared, or at least sharable, schematizations of identity (kinds of persons), of discourse genre (kinds of social occasions and events), of institutional space (kinds of allocated realms of access), and so forth. In the course of using language and such, communicative interlocutors locate themselves and others in such framings; the very forms they use among a language community's varied possibilities indexically project these framings as the understood conceptual surround of the current communication, making them relevant to its course and outcome. The way that the personnel of social interaction, as we might term them, come to be projectively located or positioned is a central part of the work of communication. Once they are so located, what goes on in the way of moving participants to new relative social locations, or of adding further, concurrent social locations to ones already presupposed, constitutes the dynamic indexical work

of conversation. It is in this sense that much of the work of social identity is achieved and clarified in conversation, making it seem that aspects of social personae, like gender, class, and ethnicity, are 'performed.' When we view the matter as one of social indexicality, however, the real issue is not the normative existence of schemata of social classification, so much as the indexical clarity – in terms of directness vs. indirectness of indexation, ambiguousness vs. discernibility, congruence vs. contradictoriness, etc. – with which particular individuals in particular kinds of interactional events come to be consequentially positioned in one or more of these frameworks. (For example, on gender as 'performed' in relation to other aspects of relational identities, see Silverstein (1985), Ochs (1992), Kiesling (2001a,b), Cameron and Kulick (2003), Eckert and McConnell-Ginet (2003), Bucholtz and Hall (2004), and Hastings and Manning (2004)).

Indeed, to a great extent, interactional moves seemingly concerned with denotational content, such as taking a contrary stand on something predicated by a conversational partner, or agreeing with the interlocutor while transforming the denoting terms of what seems to be agreed upon, are not really concerned with denotational content, or are concerned with it only residually. Rather, as conversational moves doing interactional work, such discursive contributions dynamically index what is going on; they figurate in the medium of denotational content acts of self/other repositioning within a relevant cultural framework indexically rendered 'in play' at such a point in interaction. In this way, 'other-mindedness' in respect of explicitly denoted content comes to count, implicitly and interactionally, as mutual counter-alignment of communicative participants in a social sense in a framework of identities and interests, whether momentary or with more perduring consequences of symmetric or asymmetric exclusion. All this social work, moreover, is generally accomplished only indexically, that is, entirely implicitly, and can therefore go officially unnoticed – it can even be plausibly denied – by participants, even if it materializes to indexical interpretation under the analytic lens of the student of interactional events.

See also: Chomsky, Noam (b. 1928); Context, Communicative; Conversation Analysis; Deixis and Anaphora: Pragmatic Approaches; Ethnomethodology; Goffman, Erving (1922–1982); Inference: Abduction, Induction, Deduction; Jakobson, Roman (1896–1982); Kuryłowicz, Jerzy (1895–1978); Peirce, Charles Sanders (1839–1914); Pragmatics: Overview; Rhetoric, Classical; Saussure, Ferdinand (-Mongin) de (1857–1913); Socialization.

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Pragmatic Presupposition

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Introduction

Both concepts – 'pragmatic' and 'presupposition' – can be interpreted in different ways. On the one hand, not being very remote from the intuitive, pretheoretical concept of presupposition as 'background assumption,' the concept of presupposition covers a wide range of heterogeneous phenomena (*see* **Presupposition**). Owing to the principle of communicative economy as balanced by the principle of clarity (Horn, 1984), in discourse much is left unsaid or taken for granted.

In order to clarify the concept of presupposition, some authors have compared speech with a *Gestalt* picture in which it is possible to distinguish a ground and a figure. Presuppositions are the ground; what is actually said is the figure. As in a *Gestalt* picture, ground and figure are simultaneous in speech; unlike the two possible representations in the *Gestalt* picture, speech ground and figure have a different status, for instance with respect to possible refutation. What is said, i.e., the figure, is open to objection; what is assumed, i.e., the ground, is "shielded from challenge" (Givón, 1982: 101). What crucially restricts the analogy is the fact that discourse is a dynamic process, whereas a picture is not. At the same time that an explicit communication is conveyed in the ongoing discourse, an intertwined level of implicit communication is unfolding: understanding a discourse requires an understanding of both. When communicating, we are constantly asked to choose what to put in the foreground and what in the background. Discourses and texts are multilevel constructs, and presuppositions represent (at least a part of) the unsaid (*see* **Pragmatics: Overview**).

On the other hand, the label 'pragmatic' can be used in different ways. It may refer, first, to a number of objects of study and, second, to a number of methods of analysis linked by the fact that they take into account elements of the actual context (*see* **Pragmatics: Overview**; **Metapragmatics**; **Pragmatic Indexing**; **Indexicality: Theory**). What is called 'pragmatic' may in fact be an expanded semantic object (*see* **Semantics–Pragmatics Boundary**). Generally speaking, a requirement for a truly pragmatic treatment seems to be that it is concerned more with real usages of language(s) than with highly abstract models dealing with oversimplified, construed examples. Ultimately, "what I can imply or infer, given a presupposition, depends on an active choice made in the face-to-face confrontation with my interlocutor" (Mey, 2001: 29).

The origin of the concept of pragmatic presupposition must be sought in the recognition by philosophers of language and logicians that there are *implicata* of utterances that do not belong to the set of truth conditions (*see* **Truth Conditional Semantics and Meaning**). Their starting point is the awareness that there are other relations between utterances besides that of entailment.

The definitions of pragmatic presupposition proposed in the 1970s have brought about a pragmatic rereading of a problem that was above all logical and that had not found adequate explanation in the

Kuryłowicz J (1936). 'Dérivation lexicale et dérivation sémantique.' *Bulletin de la Société de Linguistique de Paris 37*, 79–92.
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Both concepts – 'pragmatic' and 'presupposition' – can be interpreted in different ways. On the one hand, not being very remote from the intuitive, pretheoretical concept of presupposition as 'background assumption,' the concept of presupposition covers a wide range of heterogeneous phenomena (*see* **Presupposition**). Owing to the principle of communicative economy as balanced by the principle of clarity (Horn, 1984), in discourse much is left unsaid or taken for granted.

In order to clarify the concept of presupposition, some authors have compared speech with a *Gestalt* picture in which it is possible to distinguish a ground and a figure. Presuppositions are the ground; what is actually said is the figure. As in a *Gestalt* picture, ground and figure are simultaneous in speech; unlike the two possible representations in the *Gestalt* picture, speech ground and figure have a different status, for instance with respect to possible refutation. What is said, i.e., the figure, is open to objection; what is assumed, i.e., the ground, is "shielded from challenge" (Givón, 1982: 101). What crucially restricts the analogy is the fact that discourse is a dynamic process, whereas a picture is not. At the same time that an explicit communication is conveyed in the ongoing discourse, an intertwined level of implicit communication is unfolding: understanding a discourse requires an understanding of both. When communicating, we are constantly asked to choose what to put in the foreground and what in the background. Discourses and texts are multilevel constructs, and presuppositions represent (at least a part of) the unsaid (*see* **Pragmatics: Overview**).

On the other hand, the label 'pragmatic' can be used in different ways. It may refer, first, to a number of objects of study and, second, to a number of methods of analysis linked by the fact that they take into account elements of the actual context (*see* **Pragmatics: Overview**; **Metapragmatics**; **Pragmatic Indexing**; **Indexicality: Theory**). What is called 'pragmatic' may in fact be an expanded semantic object (*see* **Semantics–Pragmatics Boundary**). Generally speaking, a requirement for a truly pragmatic treatment seems to be that it is concerned more with real usages of language(s) than with highly abstract models dealing with oversimplified, construed examples. Ultimately, "what I can imply or infer, given a presupposition, depends on an active choice made in the face-to-face confrontation with my interlocutor" (Mey, 2001: 29).

The origin of the concept of pragmatic presupposition must be sought in the recognition by philosophers of language and logicians that there are *implicata* of utterances that do not belong to the set of truth conditions (*see* **Truth Conditional Semantics and Meaning**). Their starting point is the awareness that there are other relations between utterances besides that of entailment.

The definitions of pragmatic presupposition proposed in the 1970s have brought about a pragmatic rereading of a problem that was above all logical and that had not found adequate explanation in the

available semantic theories. This rereading was basically methodological (*see* **Semantics–Pragmatics Boundary**; **Pragmatics and Semantics**).

From Stalnaker's definition (1970) onward, a pragmatic presupposition was no longer considered a relation between utterances but rather was considered one between a speaker and a proposition (*see* **Propositions**). This is a good starting point, but it is far from satisfactory if the label 'pragmatic' is meant to cover more than 'semantic and idealized contextual features,' i.e., if we adopt a radical pragmatic standpoint.

Let us provisionally define a pragmatic presupposition as a '*ménage à trois*' between a speaker, the framework of his/her utterance, and an addressee. From a radical pragmatic standpoint, a substantivist view of presuppositions – i.e., what the presupposition of an utterance is – is less promising than a functional, dynamic, interactional, contractual-negotiating view; the question here is how presupposition works in a communicative exchange. The pragmatic presupposition can be considered as an agreement between speakers. In this vein, Ducrot proposed a juridical definition whereby the basic function of presuppositions is to "establish a frame for further discourse" (1972: 94; my translation). Presuppositions are based on a mutual, tacit agreement that has not been given before and that is constantly renewed (or, as the case may be, revoked) during interaction. Presuppositions are grounded on complicity.

Having been the focus of lively discussions by linguists and philosophers of language during the 1970s, presuppositions seem now to have gone out of fashion. At the time, the "wars of presupposition" (Levinson, 2000: 397) were fought between partisans of a semantic vs. a pragmatic view on the phenomenon. Another war is presently being fought with regard to another – though adjacent – territory, that of the intermediate categories covering the conceptual space between presupposition and implicature (*see* **Implicature**). The fight involves the overall organization of the different layers of meaning (and their interplay); it could be labeled the 'war of (generalized) conversational implicature,' if the latter term were neutral, rather than being the banner of the faction representing one side of the debate, namely the post-Gricean theorists (eminently, though not exclusively, represented by Levinson [2000]). The other side counts among its representatives, first of all, the relevance theorists, as represented by Carston (2002), who advance an alternative concept, called 'explicature,' that is intended to bridge the notions of encoded meaning and inferred meaning (*see* **Relevance Theory**; **Implicature**).

On the whole, the decline of the interest in presupposition as such can be understood, and partly justified, inasmuch as subtler distinctions between the different phenomena have been suggested, and a descriptively adequate typology of *implicata* is in the process of being built (see Sbisà, 1999b). The decline is less justified if the substitution is only terminological, that is, if the intuitive concept of presupposition is replaced by a gamut of theory-dependent concepts without offering any increase in explanatory power with respect to authentic data. In the latter case, it is not clear what advantages might result from the replacement of the umbrella term 'presupposition' by some other, more modish terminology. The point is, once again, the meaning we assign to the word 'pragmatic' and the object we make it refer to: either the rarefied world of construed examples or the real world, where people constantly presuppose certain things in order to reach certain goals.

Once it is clear that a radical pragmatic approach to the issue necessarily takes only the latter into consideration, the question is whether the term 'presupposition' refers to a range of heterogeneous phenomena or, on the contrary, to a particular type of *implicatum*, to which other types can be added. But even before that, we should ask whether, between the established notion of semantic presupposition and the Gricean notion of implicature (which, despite its popularity, still is under scrutiny by both philosophers and linguists), there is room for a concept like pragmatic presupposition. To answer this question, we need to say a few words on how pragmatic presupposition is distinct from the two types of adjacent *implicata* mentioned earlier: semantic presupposition and implicature.

Relation with Semantic Presupposition

The concept of semantic presupposition is relatively clear. Its parentage is accredited: Frege (*see* **Frege, Gottlob (1848–1925)** (01250)), Russell (*see* **Russell, Bertrand (1872–1970)**), Strawson (*see* **Strawson, Peter Frederick (b. 1919)**). Its lineage seems to be traceable back to Xenophanes, quoted in Aristotle's *Rhetoric* (*see* **Rhetoric, Classical**), via Port-Royal (*see* **Port-Royal Tradition of Grammar**) and Stuart Mill (*see* **Mill, John Stuart (1806–1873)**). There is substantial agreement as to its definition: the presupposition of a sentence is what remains valid even if the sentence is denied; its truth is a necessary condition for a declarative sentence to have a truth value or to be used in order to make a statement. A respectable test has been devised to identify it – the negation test. There is a list of the linguistic facts (Levinson, 1983: 181–185) that trigger the phenomenon of presupposition: thirty-one have been listed, from factive verbs

(e.g., *know*, *regret*; *see* **Factivity**) to change-of-state verbs (e.g., *stop*, *arrive*), to cleft sentences (*see* **Clefting in Spoken Discourse**).

The notions of semantic presupposition and conventional implicature (*see* **Maxims and Flouting**), as identified by Grice (who exemplified the latter with *therefore*), can be unified to a certain degree, as both depend on a surface linguistic element that releases the presupposition. The difference between semantic presuppositions and conventional implicatures is that the latter, unlike the former, are irrelevant with respect to truth conditions (*see* **Semantics–Pragmatics Boundary**). In contrast, unlike semantic presuppositions and some conventional implicatures, pragmatic presuppositions are not directly linked to the lexicon, to the syntax, or to prosodic facts (e.g., the contrastive accent in 'MARY has come'; *see* **Intonation**) but are linked to the *utterance act* (*see* **Pragmatic Acts**).

We should distinguish types of *implicata* that are recorded by dictionaries and that either are part of the semantic representation of a lexeme (*see* **Lexeme-Morpheme-Based Morphology**) or are conveyed by given syntactic or prosodic structures, from *implicata* that are independent of both dictionary and grammar: in particular, pragmatic presuppositions are triggered by the utterance and the speech act involved. They are presuppositions neither of a lexeme nor of a proposition nor of a sentence. They are presuppositions that a speaker activates through the utterance, the speech act, and the conversational or textual moves that a given speech act performs. Thus, pragmatic presuppositions concern not imperative *sentences* but orders; not declarative *sentences* but assertions; and so on. In other words, one ought to stress once more the distinction between syntactic and pragmatic functions: between them there is no one-to-one correspondence (see Lyons, 1977). The same linguistic structure, the same utterance, can perform different functions, convey different speech acts, and refer to different sets of presuppositions (*see* **Mood and Modality in Grammar**; **Pragmatics and Semantics**). The acknowledgment of a level of theorizing that goes beyond the sentence is the *sine qua non* for the analysis of pragmatic presuppositions. Pragmatic presuppositions are related to knowledge that is not grammatical but encyclopedic, that is, knowledge that concerns our being in the world (*see* **Metapragmatics**). Or, rather, they consist not in knowledge, in something that is already known, but in something that is *given as such* by the speaker, in something that is *assumed as such* and is therefore *considered irrefutable* (Van der Auwera, 1979).

Once we have recognized the semantic nature of lexical and grammatical (syntactic and prosodic) presuppositions, we should stress the connection between semantic and pragmatic presuppositions. First, the connection is of a general nature and concerns the obvious (but by no means negligible) fact that, when we are dealing not with abstractions but with real utterances, the phenomenon of semantic presuppositions becomes one of the available means by which the speaker can change the communicative situation (*see* **Communicative Principle and Communication**). If the link between, for instance, a certain lexeme and the presupposition it triggers is semantic, their analysis within an utterance and a context must face the pragmatic problem of their use and effects.

Second, on closer examination, this connection is bound up with the specific pragmatic functions performed by phenomena that can be labeled as *semantic* presuppositions. For instance, it is important to recognize the effectiveness of semantic *implicata* (lexical presuppositions, conventional implicatures, presuppositions linked to syntactic constructions such as cleft sentences, etc.,) both in the construction of texts and in the pragmatic strategies of manipulation of beliefs, or, to use Halliday's categories, both in the textual function and in the interpersonal one (*see* **Systemic Theory**; **Halliday, Michael A. K. (b. 1925)**). On the one hand, the analysis of the different types of anaphora and their functioning whenever their antecedent is not what the preceding text stated but what it presupposed, has both textual and pragmatic relevance. On the other hand, precisely because it is shielded from challenge, communication *via* presuppositions lends itself to manipulatory purposes (see Sbisà, 1999a): suffice it to compare the different persuasive effects of an assertion embedded in a factive verb (*see* **Factivity**) vs. a simple assertion (e.g., "People know that solar energy is wishful thinking" vs. "Solar energy is wishful thinking"). Having defined the semantic nature of the different types of presuppositional triggers, we should then recognize the role of pragmatics in the study of the production and interpretation of these potentially highly manipulatory *implicata*. Obviously, it is more difficult to question something that is communicated only implicitly rather than to attack something that is communicated openly, if only because what is implicit must be recognized before it can be attacked. This is attested by the highly polemical and aggressive value inherent in attacks on presuppositions; such moves always represent a serious threat for 'face' (*see* **Face**; **Mitigation**).

Relation with Conversational Implicature

The criteria put forward by Grice to distinguish conversational implicature (*see* **Cooperative Principle**; **Grice, Herbert Paul (1913–1988)**) from other *implicata* (i.e., calculability, nondetachability,

nonconventionality, indeterminacy, cancelability) have not proven to be entirely satisfactory, even when integrated with the further criterion of 'reinforceability' (Horn, 1991). In particular, the criterion of cancelability, viewed as crucial by many authors, seems to be problematic (for a discussion, see Levinson, 1983). And in any case, cancelability is linked to the degree of formality of the interaction: in unplanned speech, it is easily tolerated.

If we are satisfied with an intuitive differentiation that nevertheless uses these criteria, we can reasonably maintain that pragmatic presuppositions are oriented, retroactively, toward a background of beliefs assumed to be shared. Implicatures, on the other hand, are oriented, proactively, toward knowledge yet to be built. Besides (at least if we prototypically think of *particularized* conversational implicatures, i.e., the kind that, according to Grice, strictly depends on the actual context; see Levinson, 2000: 16), such knowledge does not necessarily have to be valid beyond the real communicative situation. Thus, in order to distinguish the two types of *implicata*, the criteria of different conventionality (presuppositions being more conventional than implicatures) and of different validity (the latter being more general in the case of presuppositions, more contingent in the case of implicatures) are called into play. Presuppositions concern beliefs constituting the background of communication. They become the object of communication (thus losing their status of presupposition) only if something goes wrong, if the addressee does not accept them or questions them, forcing the speaker to put his or her cards on the table. Implicatures, on the contrary, concern a 'knowledge' that is not yet shared and that will become such only if the addressee goes through the correct inferences while interpreting the speaker's communicative intention (*see* **Intention and Semantics**). The distinction is thus more a matter of degree than a true dichotomy, the latter, more than the former, requiring the addressee to abandon his or her laziness – the "principle of inertia," as Van der Auwera (1979) called it, i.e., the speaker's reliance on shared beliefs – and to cooperate creatively with the discourse. With implicatures, a higher degree of cooperation and involvement is asked of the addressee (the more I am emotionally involved, the more I am willing to carry out inferential work) (see Arndt and Janney, 1987; *see* **Cooperative Principle**). Presuppositions can remain in the background of communication and even go unconsidered by the addressee without making the communication suffer. Implicatures must be calculated for communication to proceed in the direction desired by the speaker.

The roles of presuppositions and implicatures, seen against the backdrop of the speaker's expectations and the discourse design, are therefore different; the former are oriented toward the already constructed (or given as such), the latter toward the yet to be constructed or, even better, toward a 'construction in progress': the former concern a set of assumptions, the latter their updating.

Presuppositions are more closely linked to what is actually said, to the surface structure of the utterance; implicatures are more closely linked to what is actually meant. Their respective degrees of cancelability also seem to be different: presuppositions are less cancelable than implicatures. This difference between presuppositions and implicatures with respect to the criterion of cancelability could be reformulated in terms of utterance responsibilities and commitment. With presuppositions and implicatures, the speaker is committed to different degrees – more with the former, less with the latter – with respect to his or her own *implicata*. Thus, a definition of pragmatic presuppositions could be formulated as 'that which our hearer is entitled to believe on the basis of our words.' In the case of presuppositions, this implicit commitment is stronger, and so, too, is the sanction, should the presupposition prove to be groundless. And the reason is that in the case of presuppositions, an attempt to perform a given speech act has been made: the linguistic devices have traced out, however implicitly, a detectable direction. The addressee is authorized to believe that the speaker's speech act was founded, i.e., that his or her own presuppositions were satisfied. A character in Schnitzler's *Spiel im Morgengrauen* implacably says to the second lieutenant who has lost a huge amount of money playing cards with him and does not know how to pay his debt: "Since you sat down at the card-table you must obviously have been ready to lose." Communicating is somehow like sitting down at the card table: presuppositions can be a bluff.

The Gricean concept of implicature can be compared to Austin's concept of perlocution (*see* **Speech Acts; Speech Acts: Definition and Classification; Austin, John Langshaw (1911–1960)**), with which it shares the feature of nonconventionality: implicature is an actualized perlocution. From the utterance 'My car broke down,' I can draw a limited number of presuppositions, e.g., 'there's a car,' 'the car is mine,' 'the car was working before,' but an indefinite number of implicatures, e.g., 'Where's the nearest garage?,' 'I can't drive you to the gym,' 'Can you lend me some money to have it repaired?,' 'Bad luck haunts me.'

Finally, an interesting relationship is the symbiosis of pragmatic presuppositions and implicatures in indirect speech acts (*see* **Speech Acts; Pragmatic Acts**): the presuppositions of the act

(preparatory conditions in particular) are stated or questioned so as to release a (generalized conversational) implicature (*see* **Implicature**).

Pragmatic Presuppositions: 'Classical' Definitions

Officially, at least, pragmatic presuppositions have had a short life. The available registry data on pragmatic presuppositions reveal the following: born 1970 (Stalnaker); died (and celebrated with a requiem) 1977 (Karttunen and Peters). The two latter authors proposed to articulate the concept of presupposition into (a) particularized conversational implicatures (e.g., subjunctive conditionals, *see* **Conditionals**), (b) generalized conversational implicatures (e.g., verbs of judgment), (c) preparatory conditions on the felicity of the utterance, (d) conventional implicatures (e.g., factives, *even*, *only*, *but*). The reader edited by Oh and Dinneen (1979) can also be seen as a *post mortem* commemoration.

Against the backdrop of the inadequacies of the concept of semantic presupposition, Stalnaker (1970: 281) introduced the concept of pragmatic presupposition as one of the major factors of the context. Pragmatic presupposition enabled him to distinguish contexts from possible worlds; it was defined as a "propositional attitude" (*see* **Context, Communicative**). In the same paper, Stalnaker (1970: 279) also said that the best way to look at pragmatic presuppositions was as "complex dispositions which are manifested in linguistic behavior." Confirming the equivalence between pragmatic presupposition and propositional attitude (*see* **Propositions**), Stalnaker (1973: 448) defined pragmatic presupposition in the following way: "A speaker pragmatically presupposes that B at a given moment in a conversation just in case he is disposed to act, in his linguistic behavior, as if he takes the truth of B for granted, and as if he assumes that his audience recognizes that he is doing so." Stalnaker's definition showed a tension between the definition of pragmatic presupposition on the one hand as a disposition to act and on the other as a propositional attitude: pragmatic terms and concepts, such as 'disposition to act' and 'linguistic behavior,' were used alongside with semantic terms and concepts, 'the truth of B' in particular. In Stalnaker's treatment (1970: 277–279), a narrow meaning of the concept of 'pragmatic' was associated with an extended meaning of the concept of 'proposition,' which was the object both of illocutionary and of propositional acts. This tension is still present and verges on a clash in Stalnaker (2002), where the most distinctive feature of the propositional attitude (which, according to Stalnaker, was constitutive of a presupposition) was defined as a "social or public attitude" (2002: 701).

Keenan, distinguishing between logical and pragmatic notions, defined pragmatic presupposition as a relation between "utterances and their contexts" (1971: 51): "An utterance of a sentence pragmatically presupposes that its context is appropriate" (1971: 49) (*see* **Context, Communicative; Context Principle**). In an almost specular opposition to Stalnaker, Keenan seemed to extend his view of pragmatics until it almost coincided with "conventions of usage," as Ebert (1973: 435) remarked. At the same time, Keenan also seemed to hold a restricted view of the phenomenon of 'presupposition,' as exemplified by expressions that presuppose that the speaker/hearer is a man/woman (sex and relative age of the speaker/hearer), by deictic particles referring to the physical setting of the utterance and by expressions indicating personal and status relations among participants (e.g., French '*Tu es dégoûtant*', literally, 'You [informal] are disgusting [male]').

Among other interesting definitions, there is the following one, offered by Levinson (1983: 205): "an utterance A *pragmatically presupposes* a proposition B iff A is *appropriate* only if B is *mutually known* by participants."

Givón's definition (1982: 100) articulated the prerequisite of mutual knowledge (*see* **Shared Knowledge**) more clearly: "The speaker assumes that a proposition **p** is *familiar* to the hearer, likely to be *believed* by the hearer, *accessible* to the hearer, within the reach of the hearer etc. *on whatever grounds*."

Some conclusions are already possible. In particular:

1. The two definitions of presupposition as semantic and pragmatic (Stalnaker) or as logical and discursive (Givón, 1982) are compatible (cf. Stalnaker, 1970: 279).
2. Logical presupposition is a subcase of discursive presupposition: "logical presupposition is [. . .] the marked sub-case of discourse backgroundedness" (Givón, 1984: 328).

One element occurs with particular frequency in the definitions – it is that of presupposition as 'common ground.' Here, the preliminary move from presupposition as propositional attitude to presupposition as shared knowledge (*see* **Shared Knowledge**), from the world of utterances to the world '*en plein air*,' was Stalnaker's (1973).

Now, both the narrow definition (presupposition as propositional attitude) and the extended one (presupposition as shared belief) involve a high degree of idealization. We are entitled to ask: What is common ground? What is shared knowledge? Is there a

different 'common ground' for different communities of speakers? And to what extent and on the basis of what kind of conjecture, even within the same community, can we speak of 'common ground'? Stalnaker (1974) realized the Platonic flavor of this notion when he gave examples of asymmetry in 'shared knowledge' (such as in his imagined conversation with one's barber). According to Stalnaker, defining presupposition in terms of common knowledge worked "[i]n normal, straightforward serious conversational contexts where the overriding purpose of the conversation is to exchange information [...] The difficulties [...] come with contexts in which other interests besides communication are being served by the conversation" (1974: 201). But what are the criteria that define a conversation as 'normal,' 'straightforward,' and 'serious'? Further, are there no other interests in play beyond those of exchanging information (such as are present in *every* conversation)?

Finally, it is worthwhile stressing that the concept of 'common ground' is effective only as a '*de jure*,' not as a '*de re*,' concept, i.e., not as something ontologically stated but as something deontically given (*see* **Modal Logic**) by the speaker (Ducrot, 1972); that is, it represents a frame of reference that the hearer is expected to accept. On the one hand, a field of anthropological, sociological, and rhetorical investigation opens up before us. On the other hand, the characterization of presupposition as shared knowledge risks being static and idealizing and contains a high amount of ideological birdlime (*see* **Anthropology and Pragmatics**; **Context, Communicative**).

Pragmatic Presuppositions as Felicity Conditions

At this point, a few further remarks are in order. First of all, the classic presuppositional model is *semantic*; even when a notion of pragmatic presupposition is invoked, what is in fact presented is no more than an analysis of some semantic phenomena. Pragmatic notions such as that of 'utterance' or 'context' (*see* **Context, Communicative**; **Context Principle**) are invoked with the main aim of avoiding the contradictions inherent in purely semantic models. The most refined treatment of pragmatic presupposition, by Gazdar (1979), did not escape this kind of contradiction. Second, an assertive model underlies the different definitions of pragmatic presupposition. A point of view centered on truth value is lurking behind allegedly pragmatic presuppositions: the concept of proposition (*see* **Propositions**) (content of an assertion, whether true or false) is the relevant theoretical unit of measurement here. But can this theoretical construct work also as the pragmatic unit of measure? In particular, can this construct adequately deal with communicative behavior? Nothing seems to escape the tyranny of propositions, from the content of the actual utterance to mental content (which, if not presented in propositional form, assumes that shape after being embedded in a predicate like 'know' or 'believe'), to a common or shared knowledge, and to the representation that a logician or a philosopher gives of that content. To what extent is the concept of proposition adequate here? Pragmatic presuppositions concern not only knowledge, whether true or false; they also concern expectations, desires, interests, claims, attitudes toward the world, fears, and so on. The exclusive use of the concept of 'proposition' is idealizing and in the long run misleading, especially when it gives rise to the restoration of the dimension of truth/falsehood as the only dimension of assessing an utterance, whereas this dimension is only one among many possible ones (*see* **Speech Acts: Definition and Classification**).

Neither is the pragmatic level homogeneous with respect to the other levels of linguistic description, such as syntax or semantics; it triggers other questions and anxieties. Pragmatic presuppositions are not a necessary condition to the truth or the falsehood of an utterance; rather, they are necessary to guarantee the felicity of an act.

Once we have abandoned the logico-semantic level of analysis, that is, once we have decided to consider the data of the real communication as our main object, the fact that Oedipus has killed his father is – prior to being an entailment or a presupposition of "*Oedipus regrets having killed his father*" – a shared knowledge common to a particular (Western) culture. "Perched over the pragmatic abyss" (Givón, 1982: 111), we feel giddy. Pragmatic presupposition could actually be God, or the autonomy of cats (of course, excepting the logicians' cats, who, as is well known, invariably remain on their mats). But here the notion of presupposition is being spread so thinly as to run the risk of becoming useless. There is, though, a narrower and more technical meaning of pragmatic presupposition that may help us build a protective wall at the edge of the abyss: it is that of pragmatic presuppositions as the felicity conditions of an illocutionary act.

Let us assume that the relevant unit for the concept of pragmatic presupposition is not the sentence nor the utterance, but the speech act in its entirety (*see* **Speech Acts and Grammar**). Pragmatic presuppositions can be regarded as felicity conditions or, if we adopt Searle's model, as constitutive rules (*see* **Principles and Rules**) of conventional speech acts (e.g., promises, requests, assertions). If a presupposition functioning as a felicity

condition of the act does not hold, the act fails. (Note, incidentally, that a failure of a presupposition has different consequences with respect to a failure of an implicature; in fact, the failure of the latter has no bearing on the success or failure of the illocutionary act).

The identification of presuppositions with felicity conditions is not a new idea: "By the presuppositional aspect of a speech communication," argued Fillmore (1971: 276), "I mean those conditions which must be satisfied in order for a particular illocutionary act to be effectively performed in saying particular sentences. Of course, we need not be concerned with the totality of such conditions, but only with those that can be related to facts about the linguistic structure of sentences." For a pragmaticist, this definition is attractive in that it underscores the need to research systematic relations between utterance function and form. However, it cannot be accepted to the extent that felicity conditions necessarily are of a heterogeneous nature (*pace* Katz, 1977), in that they involve the extralinguistic world; in other words, they concern the place where language and world meet – the communicative situation.

Toward a Pragmatic Definition of Pragmatic Presupposition

A philosophical approach to the problem of linguistic action, seen as a kind of social action, was represented by Austin's typology of infelicities (1962). This was a step forward with respect to undifferentiated notions, such as that of 'appropriateness,' often used in the definition of pragmatic presupposition. Austin's typology helped distinguish between presuppositions without which the act is simply not performed (e.g., in promising somebody something that we do not have) and presuppositions that, if unsatisfied, make the act unhappy (e.g., in promising something insincerely). There are presuppositions whose satisfaction can be seen in binary terms; in other cases, satisfaction occurs according to a scale, in the sense that the presuppositions can be more or less satisfied: the latter cases are the ones concerning the appropriateness of an act on which it is possible to negotiate (an order, however insolent, has been given; advice, although from an unauthoritative source, has been put forward, etc.). The role of nonverbal communication in the successful performance of acts has to a large extent still to be investigated: e.g., if someone offers me congratulations on my promotion, displaying a sad, long face, can I still say he or she is congratulating me (*see* **Gestures: Pragmatic Aspects**)?

In any case, the different types of infelicity help recall the substantial homogeneity of linguistic action to action: pragmatics must be connected to praxeology, to the study of actions as effective or ineffective, even before they can be considered true or false, appropriate or inappropriate (*see* **Pragmatic Acts**).

A decisive move in analyzing pragmatic presuppositions is that of connecting the typology of infelicities to empirical research on the functioning of linguistic and nonlinguistic interaction. For example, in conversation the typology can be related to the various mechanisms of repairs or, more generally, to research on misunderstandings in dialogue (for a survey, see Dascal [ed.], 1999) and on pathological communication (*see* **Psychoanalysis and Language; Conversation Analysis**). To achieve this more dynamic view of pragmatic presuppositions, it is crucial to consider presuppositions not only as preconditions of the act (e.g., as done by Karttunen and Peters, 1977) but also as effects: if the presupposition is not challenged, it takes effect retroactively. If you do not react against my order, you acknowledge my power; if you follow my advice, you accept me as an expert who knows what is best for you; if you do not question my assessment, you ascribe a competence to me (see, among others, Ducrot, 1972: 96–97).

The analysis of *implicata* still requires much theoretical and applied work. Some steps may be sketched out as follows. We can imagine the *implicata* of which pragmatic presuppositions are part, as types of commitments assumed by the speaker in different degrees and ways. The different degrees of cancelability according to which the types of *implicata* have been traditionally classified are related to a stronger or weaker communicative commitment: the speaker is responsible for the *implicata* conveyed by his or her linguistic act; if the addressee does not raise any objection, he or she becomes co-responsible for it. A decisive step is that of leaving behind the truth-functional heritage: rather than recognizing a presupposition as true, the issue is whether or not to accept it as valid.

In a pragmatic analysis of pragmatic presuppositions, it is furthermore necessary to consider the following dimensions:

1. *Sequential-textual and rhetorical* (Eco, 1990: 225). Presuppositional phenomena can be explained only by taking into account the cotextual sequential dimension (this was implicit, albeit in an idealized way, in Grice's criterion of cancelability), as well as the rhetorical dimension (which was implicit in Sadock (1978) and Horn's (1991) criterion of reinforceability). For a study of pragmatic presuppositions, it is necessary to move

from an analysis of predicates within single sentences to the analysis of textual structures in which the presupposition is one of the effects (*see* **Text and Text Analysis**). Presuppositions change the legal situation of speakers (Ducrot, 1972: 90*ff.*), that is, their rights and duties within a context that is being constructed along the way. The projection problem (see, among others, Levinson, 1983; van der Sanft, 1988) – namely, the problem of how the presuppositions of a simple sentence are or are not inherited from a complex sentence – may be reformulated in a pragmatic and textual perspective as a problem of the constraints, not only thematic, on coherence and acceptability that arise in the construction of a discourse (*see* **Discourse Semantics; Constraint, Pragmatic**).

2. *Anthropological-cultural-social*. Much work has still to be done on shared knowledge, on the kinds of beliefs that can be taken for granted within a given cultural and social group. Presuppositions are a way of building up such knowledge and of reinforcing it. The social relevance of this research, which might be profitably connected to work in the theory of argumentation (e.g., see Perelman and Olbrechts-Tyteca's classical analyses [1958]; *see* **Argument Structure**) is obvious. As Goffman (1983: 27) wrote: "[T]he felicity condition behind all other felicity conditions, [is]... *Felicity's Condition*: to wit, any arrangement which leads us to judge an individual's verbal acts to be not a manifestation of strangeness. Behind Felicity's Condition is our sense of what it is to be sane" (*see* **Social Aspects of Pragmatics**).
3. *Psychological*. The analysis of implicit communication, even if one takes care to avoid undue psychologizing, does require psychological adequacy. Just an example will clarify this point: we tend to choose those topics that are at least partially shared, that enable us to be allusive and elliptical; we produce 'exclusive' utterances that only the addressee can understand at once. In other words, we engage the maximum of knowledge shared between ourselves and (only) the addressee.

The pragmatic analysis of presuppositions is a task that, for the most part, still has to be performed. It is a truly vertiginous enterprise, yet one that cannot be abandoned if, moving beyond the logical relations between utterances, human communication is to be considered a relevant object of study.

See also: Anthropology and Pragmatics; Argument Structure; Austin, John Langshaw (1911–1960); Clefting in Spoken Discourse; Communicative Principle and Communication; Conditionals; Constraint, Pragmatic; Context, Communicative; Context Principle; Conversation Analysis; Cooperative Principle; Discourse, Narrative and Pragmatic Development; Discourse Semantics; Face; Factivity; Frege, Gottlob (1848–1925); Gestures: Pragmatic Aspects; Grice, Herbert Paul (1913–1988); Halliday, Michael A. K. (b. 1925); Implicature; Indexicality: Theory; Intention and Semantics; Intonation; Lexeme-Morpheme-Based Morphology; Maxims and Flouting; Metapragmatics; Mill, John Stuart (1806–1873); Mitigation; Modal Logic; Mood and Modality in Grammar; Port-Royal Tradition of Grammar; Pragmatic Acts; Pragmatic Indexing; Pragmatics and Semantics; Pragmatics: Overview; Presupposition; Principles and Rules; Propositions; Psychoanalysis and Language; Relevance Theory; Rhetoric, Classical; Russell, Bertrand (1872–1970); Semantics–Pragmatics Boundary; Shared Knowledge; Situation Semantics; Social Aspects of Pragmatics; Speech Acts; Speech Acts and Grammar; Speech Acts: Definition and Classification; Strawson, Peter Frederick (b. 1919); Syntax-Pragmatics Interface: Overview; Systemic Theory; Text and Text Analysis; Truth Conditional Semantics and Meaning.

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Pragmatics and Semantics

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Critical Introduction: Metatheoretical Presuppositions as Ideological Norms Constraining the Empirical Sciences of Pragmatics and Semantics

As a first approximation, pragmatics may be defined as the science of language use (*parole*) or the discursive functions of language, including its contextual uniqueness and variability (irregularities), whereas linguistics may be defined as the science of the abstract (decontextualizable) regularities that constitute linguistic structure (*langue*), including semantics as a formally encoded system of denotational meanings. This is a very general and common characterization of pragmatics and semantics that, however, may not be universally accepted by linguists and pragmaticians; among them, there is no consensus on what those fields are about, where the boundaries lie, or even whether we can or should draw boundaries (*see* **Pragmatics: Overview**). At the same time, most scholars nonetheless seem to think that the relationship between semantics and pragmatics is a primary metatheoretical issue, having direct and profound bearings on how things are done in these disciplines, that is, how we conceptualize the relationship constitutes primary principles, norms, or postulates at the metatheoretical level, explicitly or implicitly presupposed in the context of any scientific practices concerning language at the object level. Such metatheoretical presuppositions clearly constrain object-level activities and analyses (*see* **Metapragmatics**). Here, we may think of how meta-level phenomena such as Gricean maxims and frames are indexed by object-level phenomena such as floutings and contextualization cues, respectively, and relatively strongly constrain the interpretations of what is done in

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As a first approximation, pragmatics may be defined as the science of language use (*parole*) or the discursive functions of language, including its contextual uniqueness and variability (irregularities), whereas linguistics may be defined as the science of the abstract (decontextualizable) regularities that constitute linguistic structure (*langue*), including semantics as a formally encoded system of denotational meanings. This is a very general and common characterization of pragmatics and semantics that, however, may not be universally accepted by linguists and pragmaticians; among them, there is no consensus on what those fields are about, where the boundaries lie, or even whether we can or should draw boundaries (*see* **Pragmatics: Overview**). At the same time, most scholars nonetheless seem to think that the relationship between semantics and pragmatics is a primary metatheoretical issue, having direct and profound bearings on how things are done in these disciplines, that is, how we conceptualize the relationship constitutes primary principles, norms, or postulates at the metatheoretical level, explicitly or implicitly presupposed in the context of any scientific practices concerning language at the object level. Such metatheoretical presuppositions clearly constrain object-level activities and analyses (*see* **Metapragmatics**). Here, we may think of how meta-level phenomena such as Gricean maxims and frames are indexed by object-level phenomena such as floutings and contextualization cues, respectively, and relatively strongly constrain the interpretations of what is done in

the speech event in which such phenomena occur (cf. Lucy, 1993; Mey, 2001: 173–205; *see* **Maxims and Flouting**; **Constraint, Pragmatic**; **Grice, Herbert Paul (1913–1988)**). Note that such metatheoretical principles are, in social-scientific terms, evaluative norms to which the individual scientists differentially orient and against which they evaluate their behaviors; in so doing, they discursively mark their distinct group identities and constitute themselves as members of particular 'schools' (cf. Woolard and Schieffelin, 1994; Koyama, 1999, 2003; Kroskrity, 2000). Thus, these value-laden, normative conceptualizations of the relationship between semantics and pragmatics may be seen as the metalinguistic ideologizations that index the social positions and stances of particular scholars. Below, we describe the general frameworks of such ideologizations, place them in a historical context from the perspective of critical pragmatics, and examine what language users, including semanticians and pragmaticians, do with words, that is, how they (re)create their theories, disciplines, and themselves in their sociohistorical contexts (cf. Koyama, 2000b, 2001a; Mey, 2001).

Because metatheoretical conceptualizations may focus on methodological stances or the more empirical issue of how to set the boundaries of pragmatics (*vis-à-vis* semantics or 'extralinguistics,' i.e., semanticism, complementarism, and pragmaticism), we shall, for analytic purposes, deal with them separately. Starting with the former, we show the correspondences between metatheoretical conceptualizations and the sociohistorical contexts that endow them with socially interested values.

Three Methodological Stances to Pragmatics and Semantics

The Componential View

The first way to articulate the relationship concerns methodologies of, or metatheoretical stances toward, linguistic sciences. Clearly, they can be objective (deagentivized) or subjective (agentive), analytic (compositional) or synthetic (holistic), or various combinations thereof; but we may detect three ideal types in the recent history. The first of such types, best represented by the Chomskyan approach and generally characterized by objective **and** analytic attitudes, is called 'componential,' 'compartmental,' or 'modular.' It sees the linguistic sciences as analytic pursuits dealing with decomposable objects (i.e., modules) such as phonetics, phonology, morphophonology, morphology, syntax, semantics, and pragmatics, naturalistically studied by compositional methods and described independently of the particular sociohistorical contexts in which analysts are involved as social agents. Clearly, this metatheoretical stance, which underlies the organizational institutions and academic curricula of linguistics, is typical of the modern sciences coming out of Baconian natural philosophy in 17th-century England (cf. Bauman and Briggs, 2003). That is, it is the stance of the modern natural sciences (*Naturwissenschaften*), with their laws and other regularities, which try to explain empirically occurring phenomena by appealing to hypothetically idealized quasiempirical regularities ('covering laws') analytically abstracted from the total contexts of scientific activities, which are thereby decomposed into distinct fields, in our case semantics and pragmatics.

This epistemological characterization may be supplemented with a pragmatic understanding of the social and historical processes of epistemic authorization (cf. Kroskrity, 2000: 85–138). That is, the componential stance toward language is pragmatically positioned in, and presupposingly indexes, the historical context of the post-Baconian specialized sciences and, more broadly, Durkheimian 'organic society' in modernity, or the age of social specialization and the division of labor. Because the truthfulness, appropriateness, and effectiveness of any actions, including scientific ones, depend on the contexts in which they take place, this implies that the componential stance and its 'scientific' results receive their authority primarily from the post-Baconian modernization project. This project is characterized not only by social and epistemic specialization, but also by the standardizing regularization, methodical rationalization, and experimental controlling of contextual contingencies, chance happenings, and unique events, which earlier were understood as fate, epiphanies, and other phenomena originating in the heavenly universe, and transcending the sublunar, empirically manipulable space of human agency (cf. Hacking, 1990; Owen, 1994; Koyama, 2001b). Here, we must note that standardizing regularization, Saint-Simonian technocratic specialization, and Benthamite instrumental rationalization generally characterize the modern discipline of logic (or, when applied to linguistics, of formal syntax and semantics), which came to dominate American philosophy around 1900 and whose rise is precisely due to these social forces (cf. Kuklick, 1977).

The Perspectival View

The second stance is less objectivizing and more synthetic because it emerged as a critical reaction to the crisis of the Baconian sciences and the modernization project in the early 20th century. This critical reaction may be characterized as the Husserlian phenomenological movement, genealogically going back

to Hegel's totalistic dialectic phenomenology and Kant's critical philosophy and encompassing some of the early structuralists, Gestalt psychologists, and other (broadly defined) neo-Kantians who emphasized the processual nature of scientific knowledge as empirically anchored in the holistic context of human beings in their worlds, with their origin located at the *hic et nunc* of agentive experiences (cf. Jakobson, 1973). One of the critical aspects differentiating this stance from the nomothetic one of the natural sciences is the understanding of scientists and their activities as a contextually integrated part of the phenomena analyzed by the scientists themselves, here theorized as contextualized beings. Hence, the phenomenological sciences are closer to a *Geisteswissenschaft* such as Weberian interpretative sociology, in that it tries to come to grips with the dialectic fact that scientists, always already involved in their social contexts, cannot ever get rid of socially contextualized perspectives (cf. Geuss, 1981; Duranti and Goodwin, 1992). Hence, the phenomenological stance toward the linguistic sciences is characterized by a perspectival and ethnomethodological (i.e., critically agentive) understanding of such sciences, in particular the understanding that language can be studied from an objectivizing or agentive perspective and that scientific findings are largely a function of the particular methodological perspectives chosen by social agents (cf. Calhoun *et al.,* 1993; Verschueren, 1999; note the perspectivalist notion of 'seeing-as,' genealogically derived from Wittgenstein's, Nietzsche's, and Kant's epistemological focus on form, epistemology, and methodology rather than on substance, ontology, or the *Ding an sich*). In this understanding, semantics studies the linguistic phenomena that emerge when scientific agents take a deagentivizing, decontextualizing perspective, whereas pragmatics is a study of linguistic phenomena seen from the perspective of 'ordinary language users' who nonetheless critically examine **their own** linguistic activities 'from within.' Hence, pragmatics in the phenomenological tradition is a critical science **of**, **by**, and **for** ordinary language users (cf. Mey, 2001).

Here, we may note that the perspectival view is generally preferred by pragmaticians, presumably because 'perspective' is a pragmatic notion *par excellence*, whereas the componential view is preferred by semanticians. This suggests that analytic decomposition is a methodological action that displaces or suppresses perspectival indexicality, compartmentalizes linguistic sciences, and privileges (or generates) structural objects such as semantics, in opposition to pragmatics, which it relegates to the 'waste-basket' of linguistics (cf. Mey, 2001: 19–21).

The Critical Sociological View

The previously discussed methodological understanding of the sciences goes back to Kant's transcendental critical philosophy; it was the turn-of-the-century neo-Kantians, in particular, Weber, Adorno (the Frankfurt School), and other critical sociologists, who, following Nietzsche, came to squarely understand this methodological, Kantian condition of modern sciences and its consequences, especially its epistemological relativism (cf. Geuss, 1981; Owen, 1994; Mey, 2001: 315–319). More importantly, such scientists followed the critical spirit of Kantian philosophy and launched a **meta**critique of methodologically critical Kantian science and its relativism, shown to reflect and partially constitute the contextual, social condition of the age in which such science had been created, viz., modernity. In this metacritical view, what is needed is a metacritical science that can relate the critical methodological instances of Kantianism to their sociohistorical context – that is, the political-economic and other kinds of pragmatic 'reality' that have endowed these instances with plausibility, if not verity – so as to show the critical limits of methodological relativism that are inherent in its historical and societal context.

Thus, just as methodologically critical perspectivalism and its sociological metacritiques (i.e., critical pragmaticism) came out of Kantian critical philosophy, so, too, pragmatics itself and, at least in part, semantics evolved out of this philosophy. This is illustrated by the following brief excursion into the historical context in which these two fields originated.

First, we note that the term 'pragmatics' was coined by the American pragmatist Charles Morris (1901–1979), who articulated the tripartite distinction among syntax (form), semantics (meaning), and pragmatics (context), appealing to the semiotic Pragmati(ci)sm of Charles Peirce (1839–1914), which tried to base knowledge on *praxis* (actions). Peirce's Pragmati(ci)sm, characterized by the phenomenological and critical orientations of neo-Kantianism, explicitly pointed to Kant as the founder of critical sciences, primarily because Kant articulated philosophy as a **critique**, in particular of philosophy itself. Hence, post- or neo-Kantians advanced 'semantics' and 'pragmatics' as means to critically examine and articulate the foundations of modern epistemological and praxeological pursuits, respectively. More importantly, the contextual motivations for these critical sciences came from the historical conditions of the Enlightenment (or early modernity), which replaced the older schema in which *ratio* was subordinated to *intellectus* (emanating from the heavens to the sublunar human world, which was passively affected by

it) with a new schema in which reason (epistemology) came to preside over imagination, fancy, or even madness (aesthetics). This was part of the comprehensive historical shift that replaced the theocentric, religious universe of the late Middle Ages – in which the universal, catholic, and absolute truth resided in the heavens, transcending the empirical, earthly, contingent, relative, human universe – with the anthropocentric, secular universe of modernity, in which human beings became empirical and transcendental (i.e., autonomous) subjects, no longer relying on the once transcendental heavens for their existence. By the same token, philosophy became anthropocentric and relativistic too, as the sciences of, by, and for humans (cf. Foucault, 1973; Koyama, 2001b, 2003; *see* **Foucault, Michel (1926–1984)**). This transformation followed the development of commerce in Europe from the 12th–13th centuries onward, which brought together radically diverse cultures and histories, thus eventually giving rise to (1) the relativistically skeptic philosophy of Descartes, which started with doubting; (2) the speech genre of travel journals (developing into modern novels and (Alexander) Humboldtian 'natural histories,' out of which emerged modern anthropology and comparative sociology); and (3) humanism (eventually turning into philology and linguistics). The relativistic social **and** epistemic condition of modernity is correlated with the historical transfer of transcendence from the heavenly realm to the empirical realm of humans, who thus became transcendental-empirical doublets, obliged to justify themselves by means of, precisely, such metalinguistic critiques as semantics, pragmatics, and, more generally, Kantian transcendental philosophy.

Thus, modern semantics and pragmatics came out of Kantian critical philosophy and show historical characteristics of modernity, whereas philosophy (science) tries to critically examine and justify – within limits – itself because there is no longer any God (or *deus ex machina*) available to ground the human-made edifice (cf. Vico's *scienza nuova*). Post-Kantian modern semantics carries out a metalinguistic (metasemantic) critique of scientific and nonscientific languages, concepts, and (correct and literal) referential acts (cf. logical positivism, General Semantics, and the work of Ogden and Richards), whereas pragmatics (often incorporated into the social sciences, in the tradition of Durkheim, Weber, Boas, Marx, Hegel, the brothers Humboldt, Herder, and ultimately, Kant) carries out a metalinguistic (metapragmatic) critique of scientific and nonscientific discourses and other actions in the sociohistorical context of modernity and beyond. This is what the post-Kantian demand of critical science requires us to do, by reflexively examining post-Kantian sciences **themselves**, including semantics and pragmatics, and articulating their historical, cultural, social limits as shown by (1) the decontextualized, dehistoricized notion of 'truth' advanced by the semanticians who ethnocentrically assume their cultural stereotypes as universal concepts; (2) the modern anthropocentric, 'phonocentric' understanding of discourse as having its foundational origin in the *hic et nunc* of microsocial communication; and (3) methodological relativism (cf. Koyama, 1999, 2000b, 2001b, 2003).

Thus, the third, critical-sociological, view tries to transcend modern perspectivalism and methodological relativism by showing their historical limits and advancing a transcendentally ideal **total** science that attempts to integrate a legion of specialized sciences and perspectives, in particular trying to overcome the division between the theoretical (conceptual, analytic, and linguistic-structural) and the pragmatic (empirical, social, and contextual) (cf. Koyama, 2000a). This approach, which underlies Pragmati(ci)sm as a project seeking to anchor theoretical knowledge in contextualized actions, and pragmatics as a project aimed at the unification of theoretical and applied linguistics, can be called 'semiotic,' insofar as semiotics is a science that tries to integrate decontextualized and contextualized epistemic, praxeological, **and** aesthetic phenomena, separately studied by specialized sciences, under the unitary umbrella of semiotic processes anchored in the pragmatics of social actions and events. In this view, it is the socially embedded discursive interaction that contextually presupposes or even creates the variety of perspectival stances assumed by social agents such as linguistic scientists and language users. Thus, this view is less agentivist than the phenomenological one in that it tries to articulate the contextual mechanisms that give rise to agentive, perspectivalized, and ideologized accounts and uses of language. Such a 'discursive-functional' approach was advanced by Peirce, Sapir, Whorf, Jakobson, Bateson, Hymes, and other semioticians, one of the most important frameworks being Jakobson's (1960) model of the six functions of (linguistic) communication: the referential, emotive, conative, phatic, poetic, and 'metalingual' (metalinguistic, metacommunicative) functions (*see* **Jakobson, Roman (1896–1982)**). The critical significance of this framework is that it is a model of linguistic phenomena reflexively including itself (cf. Lucy, 1993; Mey, 2001: 173–205): Any linguistic theorizing or understanding, be it explicit or implicit, whether carried out by professional linguists or ordinary language users, can be characterized in terms of the metalinguistic (metasemantic and metapragmatic) functions of discursive interaction. In this model, semantics is characterized as the

metasemantic function of discursive interaction, that is, the system of the symbolic signs that discursive interactants believe exist prior to the discursive interactions in which those signs are presupposingly used to interpret the referential 'meanings' (what is said) of such interactions; on the other hand, pragmatics is equated with discursive interaction, encompassing all six functions, including the metasemantic function (to which pragmatics in the narrow sense is opposed) and the metapragmatic function, that is, the principles, maxims, norms, and other reflexive devices for textualization (framing, intertextual *renvoi*, and Bakhtinian voicing) that language users such as linguists use in order to regiment, interpret, and create referential and social-indexical meanings (i.e., effects) in discursive interactions (*see* **Principles and Rules; Dialogism, Bakhtinian**). In the next section, we articulate the relationship between semantics and pragmatics in this critical view, specifically in relation to the boundary problem.

The Boundary Problem

As has been noted, we may articulate the relationship between pragmatics and semantics in terms of the empirical boundaries between them and between pragmatics and extralinguistics. Obviously, how we distinguish semantics from pragmatics may significantly affect how we delimit pragmatics from 'the beyond,' and conversely.

Semanticism

First, as to the boundary between semantics and pragmatics, we may discern three approaches: semanticism, pragmaticism, and complementarism. Semanticism envisions pragmatics as the extension of semantically encoded yet metapragmatically characterizable categories (especially moods and *verba dicendi*, or verbs of saying), just as traditional logic has understood pragmatics (discourse) as the extensional universe onto which intensional (i.e., metasemantically characterizable) categories are projected. Naturally, semanticism is aligned with the decontextualized, analytic methodological perspective and sees language in use from the metasemantic perspective of the denotational code (linguistic structure) presupposingly used by language users, including linguistic scientists, to interpret the referential significances of discursive interactions in which they are involved as discourse participants. Hence, this approach, typically taken by the philosophers of language such as Austin and Searle, characteristically uses the method of 'armchair' introspection, in which only the presupposable (and referential) aspects of communicative processes may readily emerge. This approach generally excludes the social-indexical aspects of pragmatics, particularly as regards group identities and power relations among discourse participants and other contextual beings, inasmuch as these are **created** (vs. presupposed) in discursive interaction and only coincidentally, indirectly, or opaquely related to linguistic-structurally encoded symbols (cf. Lucy, 1992; Mey, 2001). In this approach, pragmatics is mostly reduced to metapragmatically characterizable types in what essentially is a semantic, denotational code; examples are mood/modality/tense categories, verbs of saying, pronouns, and other shifters (i.e., 'denotational–indexical duplexes'; cf. Lee, 1997) or their psychological correlates, as observed in Austin's 'performative utterances' and Searle's 'primary illocutionary forces,' allegedly underlying the perlocutionary effects regularly created by the indirect (nonliteral) use of the tokens of such types (*see* **Deixis and Anaphora: Pragmatic Approaches; Speech Acts; Austin, John Langshaw (1911–1960)**). Hence, this approach can be characterized as denotationalist, universalist, and presuppositionalist; it is based on, and expresses, a consensualist linguistic ideology adopted by the scientific agents who, like many other language users, are inclined to see only or primarily the denotationally explicitly characterizable parts of language (cf. Lucy, 1992), while their social interest is limited to seeing language *in vitro* (vs. *in vivo*), essentially consisting of a set of universal categories commonly presupposed rather than contextually created in discursive interaction (cf. Mey, 2001). Historically, this ideology derives from the 17th-century Lockean ideas about language and communication that started to prescribe and advocate, against the rhetorical practices of Scholastic disputants and the radically egalitarian Puritans, the transparently referential ('correct and literal') use of language based on the 'universal public (i.e., bourgeois) consensus' about the proper, cooperative, rational use of language that should be presupposed by 'anyone' (in reality 'Modern Standard Average Middle-Class Man'; cf. Silverstein, 1985; Bauman and Briggs, 2003).

Complementarism

Unlike semanticism, complementarism advocates the coexistence of semantics and pragmatics as 'different but equal' disciplines. Hence, it is compatible with both the compartmental and perspectival methodologies, as well as with the general ideologies of modern liberalism, relativism, and specialization. This may partially account for the current popularity of this approach, at least since the demise of the more ambitious projects of Generative Semantics and Searle's semanticism in the 1970s (cf. Koyama, 2000b) (*see* **Generative Semantics**). The approach, espoused by

mainstream pragmaticians such as Leech (1983) and Levinson (1983), has its roots in Grice, who set up the uniquely pragmatic Cooperative Principle to delimit and save the symbolic realm of logico-semantics from the caprice of contextual variability and irreducible contingency (*see* **Cooperative Principle**). As this indicates, insofar as complementarism tries to construct a kind of pragmatic theory that complements the semantic theory of decontextualized signs, it is inclined to focus on pragmalinguistics, that is, the aspects of pragmatics adjacent to and compatible with semantics, such as the universal principles, maxims, and other regularities of language use that can be fairly transparently linked to propositions and other referential categories. Thus, complementarism may be characterized as a weak version of semanticism that does not try to reduce pragmatics to semantics but attempts to create a pragmatic correlate of semantic theory, as witnessed by the affinity between Searle's semanticist doctrine of indirect speech acts and Grice's complementarist doctrine of implicature or, more fundamentally, by the referentialist, universalist, rationalist, and consensualist characteristics shared by traditional semantics and the pragmatic theories advanced by Grice and Levinson.

From Complementarism to Pragmaticism

Nonetheless, complementarism is distinct from semanticism insofar as the former advances a uniquely pragmatic principle (or perspective). This principle (or perspective) is communication, a notion that conceptualizes discursive interaction as opposed to linguistically encoded semantic categories (even though communication is still often taken as the intentional correlate of semantic categorization). This shift from decontextualized code to contextual process is also observed in the robustly pragmatic understanding of presupposition that has emerged in the wake of Karttunen's complementarist distinction between 'semantic' and 'pragmatic presuppositions' (cf. Mey, 2001: 27–29); in the discursive-functional model of communication, presupposition is a fundamentally pragmatic contextual process rather than an essential property of semantic types or their tokens. Discursive interactions indexically presuppose and create their (con)texts, yielding contextual appropriateness and effectiveness, both in the referential and social-indexical domains of discourse. The focus of pragmatics is thus on the discursive interactions that indexically create referential and social-indexical texts by indexically presupposing contextual variables, including but not limited to metalinguistic codes such as metapragmatic principles and metasemantic relationships (*see* **Presupposition**; **Pragmatic Presupposition**).

Thus, complementarism may lead to the kind of pragmaticism that tries to include semantics as a part of the all-encompassing pragmatic processes of presupposing and creative indexicality in both referential and social-indexical dimensions, involving not just ordinary language users but also linguistic scholars and including not just linguistic but also extralinguistic (sociohistorical) domains. There is, however, another, reductionist kind of pragmaticism, which is actually a variation of complementarism that narrowly limits the realm of pragmatics and exclusively deals with the part of pragmatics that correlates with semantics – the area of referentially focused pragmatic regularities. For instance, in Relevance Theory, the dialectically indexical processes of presupposing contextualization and creative textualization in discursive interactions are theorized exclusively from the referentialist perspective that tries to relate 'what is said' (referential text) to 'what is meant' (rather than to 'what is done'), the gap between the two being bridged by the ideological assumption that discursive participants universally share the rationalistic and consensualist notions of economy, cooperation, and regular and eufunctional communication (cf. Mey, 2001: 179–181). Hence, this approach excludes the vast realm of pragmatics dealing with social conflicts in group identities and power relations, as well as historically contextualized contingent happenings, which can always defeat regularities and other contextual presuppositions and create different presuppositions and texts (cf. Auer and Luzio, 1992; Koyama, 2001a) (*see* **Relevance Theory**).

Historical Contextualization of the Ideologies of Pragmatics and Semantics

Thus far, we have explored how the three methodological stances are related to how we define the disciplinary boundaries and noted the correspondence between the methodological scale, stretching from componentialism to perspectivalism to critical pragmaticism, and another scale, extending from semanticism to complementarism, reductionistic pragmaticism, and total pragmaticism. Like any ideology, this configuration of metalinguistic ideologies is also embedded in the sociohistorical context; thus, we may observe a historical drift of pragmatics from componentialism and semanticism to perspectivalism and complementarism and, finally, to total and critical pragmaticism (cf. Koyama, 2001b).

Again, let us start with Kant's critical turn, which yielded two traditions: the semantic and the social scientific (i.e., pragmatic). Whereas Kant's central concerns were '(re)cognition' and 'judgment,' behind which the problematics of 'meaning' and 'language'

were still hidden (cf. Coffa, 1991), Frege's (1848–1925) later discovery of predicate logic replaced the Kantian notion of synthetic judgment (or value) with analytic logic and the notions of 'proposition' and 'sentence,' further divided into 'force' (assertoric, interrogative, imperative, and so on) and propositional content (represented by structurally decomposable units such as the subject, predicate, and their subcategories). This led to the birth of modern semantics, as it came to be pursued by Russell (1872–1970), Carnap (1891–1970), Tarski (1902–1983), and Quine (1908–2000), as well as by the linguistic formalists of the Copenhagen and the Neo-Bloomfieldian Schools, whose impressive successes allowed the componential semantic tradition to penetrate into more empirical disciplines such as psychology and anthropology, where 'ethnoscience' came to flourish in the mid-20th century (*see* **Anthropology and Pragmatics**). Moreover, the semantic traditions of Carnap and the Neo-Bloomfieldian structural linguists, especially Harris (1909–1992), converged in Chomsky (1928–), whose generativism began to dominate linguistics in the 1960s, when the semantic tradition moved more deeply into the empirical fields, thereby giving rise to empirical semantics, as witnessed by the rise of Generative Semantics, fuzzy logic, and Rosch's prototype semantics in the late 1960s to mid-1970s, eventually congealing into today's cognitive linguistics (*see* **Cognitive Linguistics**).

Such was the evolution of the branch of the post-Fregean semantic tradition that focused on propositional content. In contrast, the other branch, focusing on 'force,' was developed by the Ordinary Language Philosophers, starting with Austin, who translated Frege's *œuvre* into English, to be followed by Searle, Grice, and others (*see* **Grice, Herbert Paul (1913–1988)**). This branch is usually called 'pragmatics,' but (as we have already seen) it is actually a kind of empirical semanticism, dealing with pragmatic matters only insofar as they can be systematically related to propositions or referential texts ('what is said'; *see* **Pragmatics, Overview**).

In the early days, modern pragmatics was dominated by Speech Act Theory and by Gricean thinking: It was practiced by extending the methodological orientations of logic and structural linguistics, with their focus on denotational regularities. In those quasipragmatic theories, contingent occurrences of actual language use were still theorized as tokens of some regular Searlean type of speech act (or speech act verb) or some Gricean postulates (principle and maxims) rather than as indexical events presupposingly contextualizing other indexical events, indexical event types (e.g., speech genres, sociolects, and dialects), and symbolic structures and contextually creating certain pragmatic effects (cf. Auer and Luzio, 1992; Koyama, 2001a) (*see* **Pragmatic Indexing**). In short, the notions of context and contextualization, which constitute the core of our pragmatic understanding, were yet to be given full theoretical significance, especially in comparison with the anthropological tradition, which, since the days of Malinowski and Sapir, has focused on the (socially situated) 'speech event' (cf. Gumperz and Hymes, 1964; Duranti and Goodwin, 1992; Duranti, 2001; *see* **Context, Communicative**). Thus, it was only in the late 1970s and 1980s, when anthropology and linguistic pragmatics began to influence one another more intimately, that the genuinely pragmatic view of 'pragmatics' as the idiographic, ethnographic, historiographic science of contextualization started to emerge. Then, it became clear that the (con)text indexed by language in use ('what is done') includes not just 'what is meant' (i.e., the part of the context that may be regularly related to 'what is said'); rather, the context of language in use is primarily captured by social-indexical pragmatics dealing with 'what is done,' that is, with the power relations and group identities of discourse participants, involving their regionality, class, status, gender, generation, ethnicity, kinship, and other macrosociological variables, indexed and actualized in microsocial speech events to entail some concrete, pragmatic, 'perlocutionary' effects (*see* **Power and Pragmatics**). The changing focus is reflected, first, in the move from the early quasipragmatic theories, which generally embraced the componential view and focused on illocutionary and other propositionally centered referential pragmatic regularities in microsocial speech events, to the next generation of more full-fledged pragmatic theories, which based themselves on the perspectival view, paying attention to the social-indexical (especially cultural) aspects of pragmatics as well. Further, the changing focus is also observed in the more recent move toward a 'total pragmatics,' with its critical view and its emphasis on the (micro- **and** macro-)contextual aspects of pragmatics. These aspects focus especially on a social-indexical pragmatics (including not just culture but also class, gender, and other sociological and historical variables) that views as its core 'what is done' (the pragmatic, *praxis*), a special subset of which is constituted by 'what is said' (referential practice) and by linguistic structure, including semantics (as presupposingly indexed in referential practice) (cf. Koyama, 2000a, 2000b, 2001a; Mey, 2001). Only then can semantics and pragmatics be united in their proper contextualization within the macrosocial historical matrix.

See also: Analytic Philosophy; Anthropology and Pragmatics; Austin, John Langshaw (1911–1960); Cognitive Linguistics; Communication: Semiotic Approaches; Communicative Principle and Communication; Constraint, Pragmatic; Context, Communicative; Cooperative Principle; Deixis and Anaphora: Pragmatic Approaches; Dialogism, Bakhtinian; Discursive Practice Theory; Foucault, Michel (1926–1984); Generative Semantics; Grice, Herbert Paul (1913–1988); Jakobson, Roman (1896–1982); Language Ideology; Linguistic Paradigms; Maxims and Flouting; Metalanguage versus Object Language; Metapragmatics; Metasemiosis and Metapragmatics; Modern Linguistics: 1800 to the Present Day; Modularity; Pragmatic Acts; Pragmatic Indexing; Pragmatic Presupposition; Pragmatics: History; Pragmatics: Overview; Presupposition; Principles and Rules; Relativism; Relevance Theory; Semantics–Pragmatics Boundary; Semiotic Anthropology; Social Aspects of Pragmatics; Speech Acts.

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Pragmatics of Reading

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Introduction

Reading is a matter of communication. Not just in the usual sense that an author has a message to communicate to a reader (a story, the description of an experiment, an opinion about an event, and so on), but the reader also communicates with the author by showing interest in the story, by ratifying the experiment described, by approving of the opinion proffered, and so on. This 'active communication' is often expressed in writing or orally (e.g., by talking about the story to others, by commenting on the experiment, or by writing a commentary to the editor of the paper or journal in which the author's opinion had appeared). Usually, though, readers 'vote with their eyes', silently, by simply sharing their

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precious time with authors and entering into a readerly relationship with them – a relationship that starts when prospective readers acquire the authors' written product (a book, scientific journal, etc.).

Prospective readers become real readers by *negotiation*. More will be said on this later; for the moment I simply emphasize the fact that negotiation involves people (here, author and reader), and essentially happens on the basis of some common *language*. Readers must be able to understand the language used by authors – not just in the sense of a common 'national' language, but also with regard to the different levels of expression and local and professional idioms. Readers' reactions are also expressed in language (internally, by 'following' authors' narrative paths, or externally, in the form of oral or written comments). Moreover, in all of this, we must not forget the environment in which both readers and authors are situated: their social *context* is what makes mutual understanding and communication possible (*see* **Context, Communicative**).

Reading, as a communicative process, relies on the presence of users in a social context – a context mediated by language. In other words, reading can be characterized as a *pragmatic* process, involving "the study of the use of language in human communication as determined by the conditions of society" (Mey, 2001: 6) (*see* **Pragmatics: Overview**).

Negotiation and Reading

In all reading, there is negotiation. Authors have to persuade readers to take the story seriously, to enter the 'fictional space' (Mey, 1994). To do this, the author ensures that whatever is said in the story will be taken at 'story value' by the readers, and that no hitches will develop in the smooth spinning of the narrative yarn. When this condition is not fulfilled, the texture of the story is disrupted: a hole appears in the narrative fabric or a 'clash of voices' occurs (Mey, 2000) (*see* **Literary Pragmatics**).

Authorial persuasion displays parallels with another kind of negotiation, the business deal: one puts certain things on the table (an offer, a counteroffer, conditions, etc.), while other matters are held back, kept 'under the table' (sometimes even after the deal is concluded). To buttress one's argumentation in the negotiation process, one must produce evidence of credibility: previous contracts, a reputation, 'goodwill', concrete enticements (such as money, again often under the table), and above all, a proof of trustworthiness based on one's credentials as a serious negotiator. These proofs can more or less subtle; less subtle are outward appearance such as the right kind of business attire; personal accouterments showing status (watch, jewelry, tie, correct hair styling including – if applicable – facial hair, etc.; even such minor things as flying the right airline in the right class can be important); the right language to bring to the negotiation table; correct manners; and most of all, a thorough knowledge of the matters to be discussed. In all this, as Dr Chester Karass incessantly admonishes us: "In business you do not get what you deserve, but what you negotiate."

There are similarities between business negotiation and creating contracts between author and reader. The author has to speak the 'right' language (in the sense of: appropriate to the occasion). That is, the narratorial voice and the voices of the characters should be balanced, both with each other and between themselves (for details, see Mey, 2000). But also, the author should be knowledgeable about what is on the narrative negotiation table: the voice of the text should be credible, as regards the factual circumstances of the narrative. Details about times and places should accord with the facts as they are familiar to both author and readers; alternatively, the details should be such that the readership can live with them for the duration of the narrative. The latter requires author and reader to negotiate, as we will see in the following.

Negotiating the Scene

The details of time and place mentioned above belong to a metaphorical 'scene.' In it, characters play their roles, and utter their lines; their scenic location in time and place makes their roles trustworthy and their voices credible. Similarly, the characters of a story have their particular roles and voices, recognized as authentic and consistent by the readership. The scene thus is both the condition for, and the result of, a successful reader-author relationship (*see* **Literary Pragmatics**).

If an author invites us into an unfamiliar scene, possibly remote from our own (as in many historical novels or in modern science fiction), negotiation is necessary to make the unfamiliar authentic: the strange world into which the author introduces us should not be unacceptably strange. We are all 'strangers in a strange land,' but we are supposed to stay inside this "ambiguous territory" (as Julio Cortázar (1985) puts it), at least during the narration, and not run away, scared by unfamiliar surroundings and technological innovations.

Often, such innovations and strange environments are projections from familiar situations and technologies which now appear distorted or exaggerated. People travel with the speed of light in *A hitchhiker's guide to the galaxy*; men have

menstrual periods in Ursula Le Guin's *The left hand of darkness*; banal objects such as eyeglasses become sophisticated prosthetic body parts able to tell the time, access databases, and orchestrate weaponry, as happens in William Gibson's *Neuromancer*; and so on. If successful, such 'defamiliarizing' features strengthen the ties between author and reader; the 'bestrangement' that occurs is a powerful factor in the negotiation discussed above.

'Bestrangement' and Reader's Role

Above, we saw how the success of a literary text depends upon readers accepting and voluntarily entering the 'scene' created by the author. One way to overcome the readership's reservations is to make the fictional world attractive by appealing to readers' sense of familiarity and normativity ("those people are just like us"). Another, far more powerful, way to intrigue readers is to make things difficult or to titillate readers with special narrative effects. Especially important is 'bestrangement', which exploits unfamiliarity and disregard for narrative conventions. It is based on a 'willful suspension of disbelief' (in Samuel Taylor Coleridge's classic formulation; 1817, 1956), an acceptable and accepted infraction of the rules as normal authorial behavior. At the same time, this infraction is what makes a 'bestranged' piece of literature interesting.

As Shklovskij put it, to see things as they are, we need to escape the 'tyranny of the ordinary,' the established ways of viewing the world as codified through language, especially its literary and poetic varieties. The phenomena of the outside world reveal their true identity only if seen with a stranger's eyes. Conversely, we may be able to grasp things as they are in themselves by transforming into strangers and outsiders. The point is to *see* the world, not just to recognize it: art re-creates our experience of the world and its objects, causing us not just to register and recognize them but to see them. Shklovskij (1917: 14; my translation) declares that "Art does this by 'bestrangement': by making things unfamiliar, by making their shapes hard to recognize and 'strange'."

The importance of changing perspective has long been recognized by visual artists. The contemporary Danish painter Per Kirkeby, writing about his 19th century colleague N. A. Abildgaard, says: "At intervals the earth has to be made flat in order that we may see clearly" (Kirkeby, 1993: 14). But the perspective has to be grounded in an acceptable context; the scene must be 'natural' (even though not necessarily naturalistic, in the common sense of the word). This includes the characters and their roles, as expressed in dialogue, both the one that is verbally expressed and the underlying, invisible subtitles that are left to the readers' imagination and co-creative activity (*see* **Dialogism, Bakhtinian**).

Negotiating the Fictional Space

Perspective and Change

How does a competent or 'versatile' (Tsur, 1992) reader deal with changes of perspective in literary texts? Three questions may be asked:

(1) What happens when an author disturbs the temporal and spatial fabric of the story?

(2) What are the author's aims in making the reader lose touch with normal, perceived reality?

(3) In what ways and to what extent does the author realize those aims?

The first question is about the technique of 'bestrangement' in fiction, as discussed above.

The second question touches on the author's need to establish the scene or fictional space as an independent world where normal relations of time and space may be suspended. The reader must see the normal reality as abnormal and the deviant reality of the fictional space as normal.

The third, more general, question deals with how a fictional space is built up by the characters playing out their roles on the fictional scene, and by the intricate interplay of the voices that express the characters' stance toward, and participation in, the fictional reality. As for the readers, they enter the fictional scene *qua* readers, and participate in the world-building by expressing themselves in a 'readerly voice,' manifesting their active cooperation in the textual process.

Disturbing Reality

The initial negotiation in the 'act of reading' (Iser, 1982) is implicit in the act of buying or borrowing a book; continuing negotiation depends on our perseverance as 'competent readers' (see Tsur, 1992; Mey, 2000).

During our reading, the implicit contract will have to be renewed: either by our continued reading, or by an explicit move. Here, we may distance ourselves from the text (physically, by discarding the book, or mentally, by losing interest or stopping reading); alternatively, we may get so involved in the story that we start inhabiting the fictional space as if it were a real one. Our 'bestrangement' may express itself in a feeling of dislocation, as when we wake up in unfamiliar surroundings and don't know where we are or how we got there. The world may have been changed

so that we see its true reality, as when we contemplate a surrealist painting.

A prime example of this process is found in a famous scene from *Anna Karenina*. Returning by train from Moscow to St. Petersburg, after the ball at the Oblonskij palace and her spectacular dance with Vronskij, Anna is reading a trashy English story about a young nobleman and his aspirations to a manor and a baronetcy. Realizing that she is getting involved in the silly story, Anna experiences a sense of shame, and closes the book.

> The hero of the novel had already started on the path toward achieving his English happiness, a baronetcy and a manor, and Anna wanted to join him in his journey toward that manor, when she suddenly realized that he ought to be ashamed, and that she ought to be ashamed likewise. But what [should] he [be] ashamed of? "And what [am] I [to be] ashamed of?" she asked herself in irritated wonder. (*Anna Karenina*, I: xxix, p. 114 in the 1962 edition; translation mine.)

Like many readers, Anna enters the 'fictional space' and participates in the novelistic life on stage. When readers 'identify' with a particular hero or heroine in a story, they do so actively, with their "whole body and deeds," as Bakhtin says. They can also give notice, and 'cancel' the reading contract, by either putting away the book, or assuming a critical stance toward it.

Anna, however, cannot escape the powerful hold of the fictional space she has entered. In the end, her identification with the hero's world, including the feeling of shame, turns out to be grounded in the real world: her burgeoning love for Vronskij, whom she then goes out to meet on the platform when the train makes the next stop.

A further, particularly gripping illustration of Anna's entering the fictional scene and participating in it, more or less against her will, comes later in the chapter. Here, Anna finds her thoughts wandering from the text she is reading, to her own, actual situation. This slipping is not simply a matter of Anna being preoccupied, having her thoughts elsewhere; rather, it is her entry into the fictional space of the novel that forces Anna into a dialogue with her own self, with her 'inner' voice, on a theme only partly suggested to us (and to her) by the text. Anna reviews her pleasant memories of the dance and of Vronskij's tender loving face. Suddenly, a new feeling surges up.

> But at the same time, at exactly the same spot in her remembering, a feeling of shame made itself strongly felt; as if an inner voice, precisely whenever her thoughts went back to Vronskij, told her: "Hot, very hot, burning." "So what of it?" – she said to herself peremptorily, sitting up in her chair. – "What on earth does this mean? Am I perhaps afraid to look this thing straight in the face? Then what of it? How should there be, how could there be, between me and this stripling officer, any other relations than I would have with any normal acquaintance?" She let out a contemptuous laugh and went back to her book, but this time she was totally unable to concentrate on her reading. She took the paper cutter and drew a line on the window pane, then put its smooth, cool surface to her cheek and could barely refrain from bursting out in cries of joy – a joy that, coming from nowhere, suddenly engulfed her. (*Anna Karenina*, I: xxix, 1962 ed., p. 114; my translation.)

Anna is overcome by a near-hallucinatory state of euphoria. At the end of the chapter, the series of intense emotional experiences culminates in her finding herself on the station platform of 'Bologov' (actually, Bologne), where her famous, and fatal, encounter with Vronskij is about to happen.

Anna's reading of her trashy novel is 'set up' (Mey, 2001: 211–212) by her circumstances after the initial meeting with her future lover. Dialoguing with the text, Anna is engaged in what I call a *pragmatic act* of reading (Mey, 2001: 252ff) (*see* **Pragmatic Acts**). This is most clearly seen in the passage above where Anna, as reader, actually is engaged in a kind of parlor game with an 'inner voice,' telling Anna that she is getting "[h]ot, very hot, burning," ever closer to discovering the true nature of her confused state of mind and lack of concentration: she is in love.

This discovery, of course, does not result from the act of reading as such. Still, the text, in its dialogic foreplay with Anna as reader, does lead up to the real thing: her textual immersion results in a sexual de- or even re-construction. Anna's hidden emotions and the recognition of her true feelings are lying in waiting just outside her novel's fictional space. As soon as she puts the book away and leaves its fictional space, having symbolically cut her textual ties by drawing a line on the compartment window with her paper-knife (a metaphoric 'text cutter'), she crosses a physical threshold by leaving the compartment and exchanging her fictional space for the real world: text for sex. It is in this real space, physically materialized as the storm-blown, snow-covered railway platform at 'Bologov', that the textually de-constructed, sexually re-constructed Anna meets Vronskij in what Bakhtin has called an "open-ended dialogue of life," with the well-known consequences that form the backbone of the dramatic plot for which Tolstoy's novel is justly famous (*see* **Bakhtin, Mikhail Mikhailovich (1895–1975)**).

Does the Reader Have a Voice?

In all this, the role of the reader, as an active participant in the building of the story world, through 'creative reading' has yet to be determined, but the reader's role presupposes a 'readerly voice' in the orchestration of the text. When discussing literary activities around text, we focus on authors but often gloss over the important role of the reader. Readers approach the text with a particular set of preconditions which, from a reader's point of view, make the text possible; there is no reader's text without a reader, because stories describe *possible* worlds, not actual occurrences: only readers can bring these possibilities into existence.

Speaking on the general conditions of novelistic work, the Czech author Milan Kundera has remarked:

> A novel examines not reality, but existence. And existence is not what has occurred, existence is the realm of human possibilities, everything that man can become, everything he's capable of. Novelists draw up the *map of existence* by discovering this or that human possibility. But again, to exist means: "being in the world." (Milan Kundera, *The art of the novel*, p. 42.)

Only through the intermediary of an actually existing reader can the text achieve *existence*. A text, taken by itself, is merely an author's product, and as such only realizes a *possibility* – one out of the many ways of 'being in the world' that a text assumes by being consumed by a reader (*see* **Literary Pragmatics**).

Certain schools of literary criticism have emphasized a so-called 'objective' approach to text understanding and analysis. In this view, the text, the whole text, and nothing but the text should be the target of our investigation (see Mey, 1994 for a critique). To see the limitations of this kind of approach (usually referred to as 'New Criticism'), consider the following passage from a contemporary novel by Jay McInerney, *Brightness falls*:

> [The talk here is about money; the context is that of the attempted hostile takeover of a New York publishing house by another firm. The manager of the threatened enterprise is speaking.]
>
> Nobody *pays* for anything anymore, that's the fucking problem. They're totally leveraged. Bridge loans, junk bonds, whatever. The money's out there. Money's cheap. The banks used to be like convent girls, you couldn't get a feel without a marriage license. Then Drexel started to practically give it away, and now they've all got red lights on over the door. (McInerney, 1992: 217; emphasis original.)

The excerpt describes the United States in the late 1980s, when the world of finance was characterized by an expanding money market with no real assets to back it up (cf. "junk bonds"). Buying something big without having the money was possible if you had "leverage," that is to say, you were able to find some of the ("cheap") money you needed, waving your hands at the rest. You could borrow the money, preferably on borrowed, or even fake, collateral. All this was because the banks had a cash glut: interest to wealthy overseas depositors had to be paid on time, so the money was "practically given away," even to less than serious borrowers.

The text is distinguished by an intricate use of composite metaphors, appealing to the (mostly) male sexual experience: 'convent girls,' 'feel,' 'marriage license,' 'red lights.' But many respectable firms became players in this risky game (such as "Drexel," the since failed Wall Street broker firm of Drexel Burnham Lambert).

The point to note here is that reading such a text requires active, understanding, co-creative readers who are at least aware of the way American males of a certain type regard their female counterparts, and where sexual activities are mainly configured in terms of finance: buying and selling, negotiating a deal, and so on. The reader's participation in the textual process is necessary for it to be understood properly, or understood at all. This is why texts from earlier periods or far-away cultures often strike us as insipid or totally opaque. Conversely, even nonfictional texts exhibit some of the same characteristics as fictional prose.

For example, Stanley Kauffman concludes a scathing movie review with the innocuous remark: "The suggestion in the title [of the film] is off target" (Kauffmann, 1973: 41). Because the reader has been informed earlier in the review that the title is *Up the sandbox* (National General, 1972), the reader is obliged to supplying the missing reference and provide the proper 'target.' This is made possible by the author's implicit appeal to the reader to identify certain common vulgar English expressions containing a propositional phrase *Prp* + *NP*, where the *Prp* in this particular case is *up*, while the *NP* is ({*the, yours,* . . . } + *N*), where *N* stands for (*Body Part* [+*Intimate*]). The competent reader will rise to the challenge posed by the author's unfinished expression, thus actively taking part in the creation of the fully fledged piece of text.

Conclusion

As Scholes (1982) remarks, we cannot add to the facts of a story (just as we normally cannot 'do' anything

with the objects in a painting or the parts of a sculpture). However, we can place the facts in their proper environment: we can extend the story into other stories, especially our own, and into the stories that we are familiar with from our reading. As Scholes says, "As semiotic interpreters we are not free to *make* meaning, but we are free to *find* it by following the various semantic, syntactic, and pragmatic paths that lead away from the words of the text" (1982: 30; italics in original).

The reader who is thus able to ''find meaning' in the text (the *Lector in fabula*, Eco, 1979)is also a *co-creator* of the text. To collaborate with the author, readers follow the "various syntactic, semantic, and pragmatic" paths that lead into as well as "away from . . . the text." Readers who can do this are competent or 'versatile.' In particular, competent readers work with the author to construct the 'fictional space' in which the characters play their roles to create, not a dead letter, but a living text re-created in the reader.

This reader-author relationship is a relation of mutual influence. If reading can be called a game, it is one in which each side's moves are affected by and affect those made by the other; it is a play in which all the players have a voice, including the reader.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Context, Communicative; Dialogism, Bakhtinian; Literary Pragmatics; Pragmatic Acts; Pragmatics: Overview.

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Pragmatics: History

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Pragmatics, the study of sign use and sign users in situations, is usually considered to be a fairly recent addition to the language sciences (*see* **Pragmatics: Overview**). The term *pragmatics* is generally said to date back to the work of the American semiotician and behaviorist Charles Morris and his distinction of the three parts of semiotics: *syntactics*, *semantics*, and *pragmatics* (*see* **Semiotics: History**). The foundations for pragmatics as a linguistic discipline are regarded as having been laid by ordinary language philosophers and speech-act theorists such as Ludwig Wittgenstein, John L. Austin, John R. Searle, and H. Paul Grice (*see* **Austin, John Langshaw (1911–1960)**, and **Grice, Herbert Paul (1913–1988)**).

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Abstract:

A pragmatic approach to reading implies an open-ended invitation to the reader to join the author in the co-creation of the story, by filling in the 'holes' that are left in the text. Just as the 'said', a speaker's explicit verbal act, in many cases is dispensable, given the listener's pragmatic understanding the 'unsaid', so too the reader's act of understanding depends not only on what is found in the actual text, but on the total context, the 'fictional scene', in which the words make sense as spoken by the 'actors'. Reading thus presupposes an active collaboration between author and reader; it is this spontaneous, but mostly unconscious 'plugging' of the textual gaps that characterizes us as competent and 'versatile' readers.

Biography:

Jacob L Mey (b.1926) is Professor Emeritus of Linguistics at the University of Southern Denmark. Previous appointments include the University of Oslo, Norway; the University of Texas at Austin, Texas; Georgetown University, Washington, D.C.; Yale University, New Haven, Conn.; Tsukuba University, Japan; Northwestern University, Evanston, Ill.; City University of Hong Kong; Goethe University, Frankfurt am Main; Universidade Estadual de Campinas, Sao Paolo, Brazil; Universidade de Brasília, Brasília; DF, the University of Haifa and Haifa Technion, Israel, as well as numerous other institutions of research and higher learning. Jacob Mey's research interests concern all areas of pragmatics, with an emphasis on the social aspects of language use, the pragmatic impact of computer technologies, and the pragmatic use of literary devices. Among his publications in these areas are *Pragmalinguistics: theory and practice* (The Hague: Mouton, 1979); *Whose language? A study in linguistic pragmatics* (Amsterdam/ Philadelphia: Benjamins, 1985), Pragmatics: An Introduction (2001). This book has been translated into Japanese, Korean, and Chinese. A recent publication is *As Vozes da Sociedade* (*The Voices of Society*; in Portuguese) Campinas, Sao Paolo: Mercado de Letras, 2002). For the new field of Cognitive Technology (CT), he has written and edited numerous articles and books and co-organized several international conferences (together with Barbara Gorayska). The main interest of CT is to study the effects of the computer on the human mind, and vice versa, how the mind determines the uses we make of the computer as a tool. Among Jacob Mey's other main interests are the theory of literature and poetics (2000). Jacob Mey is founder (with Hartmut Haberland) and chief editor of the monthly *Journal of Pragmatics* (Oxford: Elsevier Science). He also edits *RASK: International Journal of Languages and Linguistics* for Odense University Press. Among his other edited volumes are two readers on Cognitive Technology (1996, 1999), and the 1100-page *Concise Encyclopedia of Pragmatics* (1998), all published by Elsevier Science. Jacob Mey holds an honorary D.Phil. degree from the University of Zaragoza, Spain. He is a member of various professional organizations, such as the Linguistic Society of America, the Copenhagen Linguistic Circle, and the International Pragmatics Association (of which he is a member of the Consultative Board). He is Editor or Member of the Advisory Board of a number of series and journals, such as *Pragmatics and Beyond* (Amsterdam), *Anthropological Linguistics* (Berlin), *Discourse and Society*; *Text; Language and Literature* (Liverpool); *Miscelánea* (Zaragoza); *Psyke og Logos* (Copenhagen); *Sémantique et Pragmatique* (Orléans), *Cadernos de Linguagem e Sociedade* (Brasília), and others. In 1998, he was elected to the office of Vice-President of the newly founded Society for Cognitive Technology.

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By adopting this new approach to language, studied as a kind of human action, philosophers and

linguists hoped to overcome an overly narrow study of language as a closed system to be analyzed in itself and for itself, as advocated in structuralist traditions of linguistics after Ferdinand de Saussure and Noam Chomsky. Since the 1970s, pragmatics has become the focus of interest not only in mainstream linguistics, but also in communication studies, discourse analysis (including applied studies in the schoolroom or courtroom), conversation analysis, in psychology, the social sciences, artificial intelligence, and in the study of language and cognition. The study of language has therefore gradually widened its scope during the last half of the 20th century, from the *sign* to the use of signs in social situations, and from the *sentence* to the use of utterances in context.

Half a century after widening the scope of linguistics in this way, it has, however, become clear that a wider pragmatic perspective on language, social interaction, and mind had, in fact, already existed well before Austin made it popular in the 20th century (Nerlich and Clarke, 1996, 2000, where more references can be found) (*see* **Pragmatic Acts**).

This history of pragmatics will concentrate on uncovering the roots of the *different approaches to pragmatics* that one can distinguish in Europe and America: (1) the Anglo-Saxon approach which emerged from *ordinary language philosophy* with Wittgenstein, Austin, and Searle, and which has dominated the field, and which (2) developed concurrently with, but independent of, the school of *British contextualism and functionalism*; (3) the French approach, which is based on the *theory of enunciation* elaborated by Émile Benveniste; (4) the German approach (associated with the *critical theory movement* around Jürgen Habermas and Karl Otto Apel), which wants to study pragmatics as part of a general theory of (communicative) action.

These European traditions of pragmatic thinking were affiliated in various ways with the development of *pragmatism* as a new philosophy that emerged in the United States in the latter part of the 19th century, and which made the three-way split between syntactics, semantics, and pragmatics popular in linguistics, philosophy, and semiotics.

All approaches, the two Anglo-Saxon ones, the French one, the German one, and the American one, have their deeper roots in Antiquity, that is, in *rhetoric*. They are also all based, to various degrees, on Immanuel Kant's philosophy of the 'active (transcendental) subject' and on John Locke's philosophy of the 'semiotic act.'

These pragmatic modes of thought can be studied as *historical traditions*, but they can also be analyzed as *theoretical frameworks* that cluster around certain pragmatic key words:

1. Anglo-Saxon: speech act, meaning, use; meaning, intention, context, function
2. German: agenthood of (transcendental) subject, dialogue, pronouns
3. French: subjectivity, markers of subjectivity, indexicals
4. American: meaning as action, the triadic sign relation.

These four traditions should not be regarded as monolithic, unchanging, and exclusive. Since the 1970s, many approaches have developed that deal with language in use, such as, to mention just a few, the social pragmatics developed by Jacob Mey (Mey, 2001), also called *language in use* theory, the systemic-functional approach to language developed by Michael A. K. Halliday (Halliday, 1978), the various types of (critical) discourse analysis (see Mey, 1979, 1985; Beaugrande, 1996), and more recently the pragmatic and critical approach to metaphor analysis one could call the theory of *metaphor in use*.

Sources of Antagonism and Inspiration

It is generally assumed that language was studied as an *organism* in the 19th century and as a *system* in the 20th. This does not seem to leave much room for the study of language in use or in context or the study of the relationship between language and action. However, looking at disciplines adjacent to linguistics, such as various kinds of philosophy, psychology, sociology, and semiotics, one can discover that the roots of pragmatic thinking go back as far as the 19th and early 20th centuries. Inasmuch as these disciplines influenced the fringes of official linguistics, they also triggered pragmatic insights in linguistic thinking itself, especially in its reflection on meaning.

Those linguists who were interested in the meaning and use of language and not only, like the majority of their historical-comparative colleagues, in sound change, turned to an older source of pragmatic inspiration: rhetoric. Since antiquity, and since the Middle Ages as part of the trivium (rhetoric, grammar, logic), rhetoric had been part and parcel of language studies. However, in their efforts to constitute linguistics as an autonomous science, historical-comparative linguists had focused almost exclusively on the study of grammar, detaching it from the study of language in discourse (rhetoric) and from logic. By contrast, in their study of meaning and discourse, linguists and philosophers not working in the mainstream of historical-comparative linguistics made use of some of the concepts inherited from rhetoric (as for example the figures of speech, the situation of discourse, the interaction between speaker and hearer, and the

tripartition of grammar, logic, and rhetoric itself, which is at the root of many semiotic triads).

Among those who redefined and criticized the use of the concept of organism as a metaphor for the study of language, many also rejected an older philosophical theorem, namely that language represents thought (or ideas) and that only language that represents thoughts or the world is worthy of philosophical inquiry, as Aristotle had claimed in *De Interpretatione*, 17a, 1–5 (see Whitaker, 1996).

For pragmatic thinkers of all times, by contrast, language is not only there to represent true or false states of affairs, but it is used to influence others in specific ways, to communicate with others, to act upon others, and to make them act in certain ways, in other words, to change the world. This is why Austin later rejected the philosophy of language developed by those logical positivists who paid lip service to pragmatics, but still only studied statements as mapping onto states of affairs and the understanding of statements as the understanding of truth conditions. For some of the early pragmaticians, as well as for the later ones, language was also not simply a system of conventional signs for the representation of thoughts. They reflected instead on the motivation underlying the signs' sound-structure and meaning, on the 'naturalness' of language, as one would say now, and on the sources of that motivation in the speakers and the speech situation, in the uses they make of signs in situations.

Early Pragmatic Insights

In Germany, the representational theory of language was undermined in the tradition of Kant, whose theory of the active organizing powers of the mind gave the impetus for a philosophy of language based on the mental acts of the speaker/hearer, especially in the works of Johann Severin Vater, August Ferdinand Bernhardi, and Wilhelm von Humboldt, published during the first two decades of the 19th century. These thinkers gradually replaced the philosophical study of the subject-object relation by a linguistic study of the subject-subject relation, and, in doing so, they developed a dialogical approach to language. The following quote from Vater's work, in which he develops a pragmatic conception of the sign (influenced by Locke's semiotics and Johann Heinrich Lambert's philosophy of language), will demonstrate this tradition, which ends with Humboldt's study of dialogue (for more information on the Kantian tradition, see Perconti (1999).

> One can define these concepts [the sign, etc.] from the following points of view: (1) the one who signifies, (2) the one for whom one signifies, (3) the purpose of the signification, (4) the success, the reciprocation of this purpose, (5) the sign, as the means, and (6) that which is signified (Vater, 1801: 137; all translations are Nerlich's).

Compare with Humboldt:

> It is particularly relevant to language that duality has a much more important role in it than anywhere else. All speech is based on interlocution (*Wechselrede*), in which the speaker always posits the addressee as the one person opposite him, even when there are more people around. [. . .] To divide humanity into two classes, the natives and the enemies, is the basis of all primitive social bonding (Humboldt, 1963 [1827]: 137–138).

During the second half of the 19th century, the German pragmatic tradition focused even more on the role of the hearer and on language understanding in situation, possibly under the influence of the hermeneutical tradition (from Friedrich Schleiermacher to Wilhelm Dilthey).

In England, the representational theory of language was overthrown in the writings of the Scottish school of common sense philosophy, in particular the work of Thomas Reid. Reid remarked that Aristotle had been right to observe that

> besides that kind of speech called a *proposition*, which is always either true or false, there are other kinds which are neither true nor false, such as a prayer or a wish; to which we may add, a question, a command, a promise, a contract, and many others (Reid, 1872, vol. II: 692).

However, according to Reid, Aristotle had been wrong in relegating the study of these speech acts other than the proposition to rhetoric (or to the domain of what is now called the pragmatic 'wastebasket' (see Mey, 2001: 12–15):

> The expression of a question, of a command, or of a promise, is as capable of being analyzed as a proposition is; but we do not find that this has been attempted; we have not so much as given them a name different from the operations which they express (Reid, 1872, vol. I: 245).

Reid therefore developed a philosophical theory of meaning and a theory of speech acts that could accommodate these types of sentences. He stressed that, unlike statements, these other sentences are fundamentally 'social operations,' because their success necessarily depends on their uptake by others. Reid's views on language spread widely, from Scotland to England, mainly Cambridge, to the United States, and to France.

Whereas Reid had mainly focused on speech acts as social acts and thus contributed to speech-act theory *avant la lettre*, the philosopher and elocution teacher Benjamin Humphrey Smart developed a contextualist

theory of meaning as his contribution to a general theory of signs and to early pragmatics. In his *Outline of sematology: or an essay towards establishing a new theory of grammar, logic, and rhetoric* (Smart, 1831), Smart took up Locke's threefold division of knowledge into (1) *physicology*, or the study of nature, (2) *practology*, or the study of human action, and (3) *sematology*, the study of the use of signs for our knowledge, or, in short, the doctrine of signs (Smart, 1831: 1–2). His study deals with signs "which the mind invents and uses to carry on a train of reasoning independently of actual existences" (Smart, 1831: 2). For Smart, sematology (as later semiotics for Morris, and going back to the medieval trivium) had three parts: grammar, logic, and rhetoric. In all three parts, Smart makes it clear that signs do not *mean* ideas, they are *used* to mean something in *context*. He quotes the following passage from the work of the Scottish common sense philosopher Dugald Stewart, a follower of Reid:

> our words, when examined separately, are often as completely insignificant as the letters of which they are composed; deriving their meaning solely from the connection, or relation, in which they stand to others (Stewart, 1854–1860, V: 154–155).

Smart was widely read, although it seems more by thinkers working outside linguistics proper, such as Charles Darwin. The term Smart used for his philosophy of language in context, *sematology*, was later used idiosyncratically by the German psychologist Karl Bühler, but Smart's theory of signs as part of his epistemology was also continued, to some extent, by those working in the tradition of 'significs' (see more on significs below).

Locke and the opposition to Locke were also important in France. Etienne Bonnot de Condillac and the Ideologues had based their philosophy of language in part on Locke's representationalism and empiricism, and saw in language a system of signs for the representation of ideas and sensations. After the French Revolution, in which the Ideologues had been involved, and during the French Restoration, their sensualist (and therefore quasi-materialist) philosophy of language was attacked by French philosophers and psychologists of the eclectic school, such as Victor Cousin, Théodore Jouffroy, and also Maine de Biran, who drew on ideas taken from Kant's philosophy of the active spirit, as well as from the common sense philosophers in Scotland and England, such as Reid. Based on their theories and Reid's conception of social acts, Adolphe Garnier formulated, about 1850, a theory of speech acts (orders and promises, for example) which highlighted the social aspects of speech acts, that is, both the interaction between (the intention of) the speaker and (the understanding by) the hearer, and the interlocutors' social position in the context of discourse. However, Garnier's speech-act theory went almost unnoticed. It was only at the beginning of the 20th century that the legal philosopher Adolf Reinach formulated a similar, but much more elaborate, theory of speech acts, or what Reinach called, with Reid, *social acts*, based, in part, on Edmund Husserl's phenomenology. For Reinach, speech acts, such as commands, can only exist *qua* command insofar as they are not divided up into a statement or *constatation* and its performance. They are both part of *the social act* (Reinach, 1913: 708; Engl. transl. 1983: 20), similar to what Jacob Mey (Mey, 2001: 206–235) later called *pragmatic acts* (*see* **Speech Acts; Pragmatic Acts**).

The Development of Pragmatics between 1850 and 1930

Gradually, Cousin's philosophy was replaced in France by Hippolyte Taine's rationalist and positivistic psychology. In Germany, too, psychology, especially Friedrich Herbart's mathematical psychology, became more important than philosophy for the advancement of the study of the nature of language. Herbart himself proposed that language could only be understood in the context of human action in general; a view repeated (without direct reference to Herbart, but totally in his spirit) by William Dwight Whitney in the United States (who also stressed the social dimension of language as an institution), by Johan Nicolai Madvig in Denmark (who stressed the role of context and developed a theory of meaning as use), and by Philipp Wegener in Germany who studied not only language in context but also what he called the *dialogic speech-act*, and what H. P. Grice was later to call *conversational implicatures* (*see* **Implicature, Grice, Herbert Paul (1913–1988)**). Wegener analyzed, for example, (elliptical) 'statements' that function as commands:

> In the word-sentence 'my boots', the pure word-image does not trigger the representation of the facts that (1) somebody orders an action; (2) what that action is; (3) who should execute the action. All this can only be inferred from the situation and the gestures. The word-image only evokes the representation of a definite thing that the speaker has in mind as an object (Wegener, 1921: 9–10).

Heymann Steinthal, another follower of Humboldt and Herbart, and one of the most famous psychologists of language in the 19th century (read and criticized by Madvig, Whitney, Wegener, and many others), did not directly contribute to a pragmatic

theory of language, but, inspired by Steinthal's work and the Russian linguist Aleksandr A. Potebnya, developed an original theory of language and meaning based on the concept of psychological activity. (For the Russian tradition, especially Voloshinov and Bakhtin, see Nerlich (2000). *See also* **Voloshinov, V. N. (ca. 1884/5–1936); Bakhtin, Mikhail Mikhailovich (1895–1975).**)

In France, Taine's call *back to Condillac*, and his semiotic theory of signs, was heard by the linguist Michel Bréal who abhorred the widely used metaphor according to which words or meanings 'live and die' like biological organisms. Instead, he argued that

> Our forefathers of the school of Condillac, those ideologists who for 50 years served as target to a certain school of criticism, were less far from the truth when they said, in simple and honest fashion, that words are signs. [. . .] *Words are signs*: they have no more existence than the signals of the semaphore, or than the dots and dashes of Morse's telegraphy (Bréal, 1964 [1900]: 249, italics ours).

However, Bréal did not only study language as a system of signs, but also as the expression of the speaking subject, who uses language to express emotions, beliefs, wishes, and demands, that is, to accomplish speech acts. He also analyzed the traces left in speech of the speaker using language, as for example the function of markers such as *nevertheless*, *hopefully*, etc. Furthermore, like Reid and others, Bréal criticized what Austin later called the *descriptive fallacy* in linguistic thinking. Compare:

> Language is not only made to say: 'the sun shines on the countryside', 'the rivers flow into the sea'. Beyond that, language serves mainly to give expression to desires, demands, to be the expression of the will. It is this *subjective* side of language that should be studied more [. . .] (Bréal, 1877: 361–362).

The topic of the subjectivity in language was taken up by the French counterpart to Anglo-Saxon speech-act theory, viz., the theory of enunciation, as elaborated by Charles Bally, Gustave Guillaume, and Émile Benveniste and amalgamated with a theory of speech acts in the work of Oscar Ducrot. These French linguists also studied what they called the actualization of language (*la langue*) in speech (*parole*) through what Roman Jakobson, for example, called *shifters*, and Bally called *indicators*.

But Bréal not only initiated a study of subjectivity and indexicality in language, but also promoted a functionalist approach to language. Quite early on in his career, while actually introducing German historical-comparative linguistics to France, Bréal began to criticize its organicism and its way of studying linguistic forms without taking into account their function. For Bréal, as for other 'functionalists' of that time (such as Wegener), function was the primary force of language change. Forms do not change in sound or meaning all by themselves, but because they are used with a specific function by the language user in discourse and in a certain situation. Other French functionalists were the psychologists Frédéric Paulhan and Henri Delacroix, and the linguist and medical doctor Eugène Bernard Leroy. Paulhan, in particular, established an explicit theory of speech acts in the context of a theory of linguistic functions that is directly comparable to that developed by Karl Bühler in Germany (more on Bühler below). Using an example that has become commonplace in pragmatic writing, he points out that:

> [I]n order to understand the words 'it's raining', it suffices that, consciously or half-consciously, I take my umbrella with me when I want to go out. If I act in this way, I can really say that I have understood the words 'it's raining', even though I might not have associated them with any images that they represent (Paulhan, 1886: 47).

The German functionalists and speech-act theorists *avant la lettre* at the turn of the 19th to the 20th century, especially Anton Marty and Bühler, were influenced by rationalist linguists such as Whitney, Madvig, Wegener, and Bréal on the one hand, but also, on the other, by new developments in psychology, such as the descriptive psychology developed by Franz Brentano, by the psychology of Gestalt, by phenomenological psychology, as well as by developments in social behaviorism.

Bühler (who was also a great admirer of Wegener) was working in the context of the Würzburg school of psychology, and he knew the work of Marty and Edmund Husserl well. He established the most elaborate theory of pragmatics in Germany (Bühler, 1934), of which his 'organon model' was the central part. In this model, he places the linguistic sign in its context of use, bringing into the model the speaker and hearer (forgotten in the semiotic triangle popularized by Charles K. Ogden and Ivor A. Richards) and the reference to 'things' (forgotten in Ferdinand de Saussure's famous speech circuit). The organon model, depicted by a triangle overlaid upon a circle, shows that every sign is at one and the same time a symptom (indicator, index) by virtue of its dependence on the sender (whose internal state it expresses), a signal by virtue of its appeal to the recipient (whose behavior it controls), and a symbol by virtue of its assignment to the objects and states of affairs (to which it refers). And so, every sentence is at one and the same time *expression*, *appeal*, and *representation*.

These are also the three main functions of language and sign use.

This functional and semiotic theory of language was further elaborated by linguists, such as Erwin Koschmieder and Alfons Nehring, as well as by philosophers, such as Karl-Otto Apel and Jürgen Habermas. Koschmieder, also influenced by Husserl, developed one of the first theories of performatives in Germany, a theory which can be directly compared to that which was being developed on the other side of the English Channel by Austin.

As early as 1929, Koschmieder had hinted at some puzzling syntactic phenomena of tense and aspect which would lead him to postulate a new "case of coincidence" (Koschmieder, 1965 [1945]: 26–27). He discussed the Hebrew equivalent of the sentence *I hereby bless him*, and pointed out that in such examples the action arises in the very utterance, that is to say: action and utterance coincide. He also used the example (later made famous through Austin): *Hiermit eröffne ich die Versammlung* ('I hereby open the meeting', i.e., 'I declare the meeting to be opened'), and he pointed out that *Hiermit schreibe ich einen Brief* ('I am hereby writing a letter') is impossible.

A Cambridge psychologist, George Frederick Stout, working toward the end of the 19th century, was also influenced by Brentano, as well as by Herbart and by Kant. From Kant, he took the insight into the active organizing powers of the individual in understanding the world and applied it to the individual using language. Stout was opposed to English associationism as proposed for example by Alexander Bain (Bain, 1855) and John Stuart Mill, and put forward a contextualist theory of language that incorporated some principles reminding one of the later Gestalt school of psychology. He was especially interested in the context-sensitivity of the notions of subject and predicate, thereby implicitly challenging linguistic analysis in terms of logic alone. He thus contributed to the development of ordinary language philosophy in Cambridge.

The psychological work of Paulhan and Stout was appreciated by the English philosopher and philanthropist Lady Victoria Welby, whose work on "meaning" (which she called *significs*) started an English and a Dutch school of pragmatics (named 'significa'), in which not only was context important, but language use and the whole speech event (including the speaker's intention and the hearer's interpretation) were taken into account (see Schmitz, 1990).

The English school of contextualism (Sir Alan Henderson Gardiner, Bronisław Malinowski, John Rupert Firth) was partly based on the work of Welby (just as later also was Ogden and Richards' work, who, too, can be counted among the functionalists) on the one hand, and on the work of Wegener (which was much less metaphysical and more 'pragmatic' than Welby's) on the other. Gardiner wanted to analyze "acts of speech," Firth whole "speech events," and Malinowski wanted to study meaning as action. In his famous supplement (on meaning in primitive languages) to Ogden and Richard's book *The meaning of meaning*, Malinowski claimed that language is "a mode of action," especially of cooperation between people (Malinowski, 1923: 315).

The meaning of meaning also contained an extract of Peirce's work on semiotics as a direct result of Lady Welby's influence. In the early years of the 20th century, Lady Welby had corresponded with the father of pragmatism and semiotics, the American philosopher Charles Sanders Peirce. Peirce had inherited the term *pragmatisch* from Kant (in the latter's distinction between *practical* reason, that is, of the 'pure kind,' and *pragmatic* reason, that is, of the 'empirical' kind), and he knew the semiotic literature of the past well, from the Medieval philosopher Peter of Spain to Locke, Reid, and Welby. His counterpart, the pragmatist psychologist William James, by contrast, derived the term *pragmatism* from the Greek *prágma*, meaning 'practice', 'action'. And, whereas Peirce's *pragmaticism* (a term Peirce introduced to set his theory off against James's) became part of his semiotics, as a general theory of signs and of meaning, James's *pragmatism* became part of a morally based psychology and theory of truth (*see* **Peirce, Charles Sanders (1839–1914)**).

Inspired in part by some principles of pragmatism, but also by Ogden and Richards' theory of signs and symbols, as well as by developments in logical positivism and behaviorism, the American Charles Morris is well-known for his tripartition of semiotics into *semantics*, as the study of the relationship between words and the world, *syntactics*, as the study of the relationship between words and words, and *pragmatics*, as the study of the relationship between words and their users (Morris, 1938). He made this the basis for a behavioristic type of semiotics.

The problem of 'meaning,' so important to Lady Welby and the pragmatists, became the focus of philosophical thinking worldwide. This was especially the case in England where, from the turn of the 19th century until the mid-20th century, it was leading up to the 'linguistic' and then 'pragmatic' turns in the philosophy of language. Initially, philosophers, such as the Oxford philosopher and classical scholar Austin, used linguistic analysis to find philosophical clarity; later, linguists used philosophical methods, such as those advocated by Austin, to study wider aspects of language. Here one can trace a line of thought leading from Gottlob Frege to Russell and

the early Ludwig Wittgenstein (Wittgenstein I), to the later Wittgenstein (Wittgenstein II), Gilbert P. Ryle, Peter F. Strawson, Austin, H. Paul Grice, and finally to John Searle. Searle had written his Oxford D.Phil. thesis under Austin and Strawson on Frege's notion of sense and reference, and his concept of 'illocutionary force,' so central to pragmatics, can be traced back to Frege.

Pragmatism, Semiotics, and Speech Act Theory

As we have seen, many psychologists, philosophers, and linguists shared what Malinowski once called a "pragmatic *Weltanschauung*" (Malinowski, 1923: 328) at the turn of the 19th into the 20th century. They all regarded language as a mode of action and interaction. This conception was not unknown to Austin, who had read Gardiner, Morris, Peirce, and others. However, it seems that Austin neither wished to be associated with the contextualist-functionalist pragmatics developed on his doorstep (Nerlich, 1996), nor with the pragmatist, behaviorist, and semiotic pragmatics developed on the other side of the Atlantic by Morris, nor with the formal type of pragmatics developed by ideal language philosophers such as Rudolf Carnap. Austin also did not accept Morris's tripartition of semiotics into syntactics, semantics, and pragmatics; as he pointed out in 1940:

> Now the reason why I cannot say 'the cat is on the mat and I don't believe it' is not that it offends against syntactics in the sense of being in some way "self-contradictory." What prevents me saying it, is rather some semantic convention (implicit, of course), about *the way we use words in situations* (Austin, 1963 [1940]: 10; italics ours).

And,

> the supposed "ideal" language . . . is in many ways a most inadequate model of an actual language: its careful separation of syntactics from semantics, its list of explicitly formulated rules and conventions, and its careful delimitation of their spheres of operation – are all misleading. An actual language has few, if any explicit conventions, no sharp limits to the spheres of operation of rules, no rigid separation of what is syntactical and what semantical. (Austin, 1963 [1940]: 13).

It is astonishing to see that Austin does not use the term *pragmatics* in this context, as he implicitly argues for an integration of syntactics and semantics into pragmatics, being the study of the use of words or signs in the situation of a speech act.

Conclusion

Before Austin, the foundations for pragmatics had been laid by thinkers who stressed that:

- Signs are not only used for the expression of thought, but have various other functions.
- Signs have not only an intellectual but also an affective function.
- Sign use has basically three functions: representation, expression, and appeal.
- Signs can only be understood in the context of the situation in which they are used.
- Speaking is a goal-directed action.
- Signs are instruments used in the act of speech, and their use has practical effects and consequences.
- Signs are mainly used to influence others.
- Signs only function in dialogue and conversation; the reciprocity between speaker and hearer is important.
- Signs are used for the coordination of human behavior.
- Some signs are indexically linked to reality and the language users.

Rather late in the development of pragmatics are these ideas:

- Certain speech acts are self-referential.
- In saying something we are doing something.

See also: Austin, John Langshaw (1911–1960); Bakhtin, Mikhail Mikhailovich (1895–1975); Frege, Gottlob (1848–1925); Grice, Herbert Paul (1913–1988); Peirce, Charles Sanders (1839–1914); Pragmatic Acts; Pragmatics: Overview; Rhetoric: History; Semiotics: History; Speech Acts; Voloshinov, V. N. (ca. 1884/5–1936).

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Pragmatics: Linguistic Imperialism

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The study of linguistic imperialism focuses on how and why certain languages dominate internationally, and on attempts to account for such dominance in an explicit, theoretically founded way. Language is one of the most durable legacies of European colonial and imperial expansion. English, Spanish, and Portuguese are the dominant languages of the Americas. In Africa, the languages of some of the colonizing powers, England, France, and Portugal are more firmly entrenched than ever, as English is in several Asian countries.

The study of linguistic imperialism can help to clarify whether the winning of political independence led to a linguistic liberation of Third World countries, and if not, why not. Are the former colonial languages a useful bond with the international community and necessary for state formation and national unity internally? Or are they a bridgehead for Western interests, permitting the continuation of a global

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The study of linguistic imperialism focuses on how and why certain languages dominate internationally, and on attempts to account for such dominance in an explicit, theoretically founded way. Language is one of the most durable legacies of European colonial and imperial expansion. English, Spanish, and Portuguese are the dominant languages of the Americas. In Africa, the languages of some of the colonizing powers, England, France, and Portugal are more firmly entrenched than ever, as English is in several Asian countries.

The study of linguistic imperialism can help to clarify whether the winning of political independence led to a linguistic liberation of Third World countries, and if not, why not. Are the former colonial languages a useful bond with the international community and necessary for state formation and national unity internally? Or are they a bridgehead for Western interests, permitting the continuation of a global

system of marginalization and exploitation? What is the relationship between linguistic dependence (continued use of a European language in a former non-European colony) and economic dependence (the export of raw materials and import of technology and know-how)? In a globalizing world, has English shifted from serving Anglo-American interests into functioning as an instrument for more diverse constituencies? Or does U.S. dominance in the neoliberal economy constitute a new form of empire that consolidates a single imperial language?

Imperialism has traditionally been primarily concerned with economic and political aspects of dominance (Hobson, 1902). Later theorists have been concerned with analyzing military, social, communication, and cultural activities, and the underlying structures and ideologies that link powerful countries, the 'Center,' with powerless countries, the 'Periphery,' and the structure of exploitation from which rich countries benefit and poor countries suffer (Galtung, 1980). Resources are distributed unequally internally within each country, which has its own Center and Periphery, which in Marxist analysis is seen in terms of class (Holborrow, 1999) (*see* **Class Language**). Linguistic imperialism was manifestly a feature of the way nation-states privileged one language, and often sought actively to eradicate others, forcing their speakers to shift to the dominant language. It was also a feature of colonial empires, involving a deeper degree of linguistic penetration in settler countries (e.g., Canada, New Zealand) than in exploitation and extraction colonies (e.g., Malaya, Nigeria). Linguistic imperialism presupposes an overarching structure of asymmetrical, unequal exchange, where language dominance dovetails with economic, political, and other types of dominance. It entails unequal resource allocation and communicative rights between people defined in terms of their competence in specific languages, with unequal benefits as a result, in a system that legitimates and naturalizes such exploitation (Phillipson, 1992) (*see* **Minorities and Language** and **Linguistic Decolonization**).

Linguistic imperialism can be regarded as a subcategory of cultural imperialism, along with media imperialism (e.g., news agencies, the world information order), educational imperialism (the export of Western institutional norms, teacher training, textbooks, etc., and World Bank policies privileging Center languages in education systems; Mazrui, 2004), and scientific imperialism (e.g., dissemination of paradigms and methodologies from the Center, which controls knowledge about the Periphery). Linguistic imperialism may dovetail with any of these, as for instance when English as the dominant language of science marginalizes other languages, English as 'Lingua Tyrannosaura' (Swales, 1997; Ammon, 2001; Phillipson, 2002).

The mechanisms of linguistic imperialism are documented in works that link linguistics with colonialism (Calvet, 1974 refers to linguistic racism, confirming the interlocking of 19th century philology with European racist thought), relate the promotion of English in educational 'aid' to the economic and political agendas of Center countries (Phillipson, 1992), and discuss the effect of literacy on the local language ecology, including the role of missionaries (Mühlhäusler, 1996). Linguistic dominance has invariably been buttressed by ideologies that glorify the dominant language: as the language of God (Arabic, Dutch, Sanskrit), the language of reason, logic, and human rights (French over several centuries), the language of the superior ethnonational group as advocated by (imperialist racism, German in Nazi ideology), the language of modernity, technological progress, and national unity (English in much postcolonial discourse). A Ghanaian sociolinguist describes linguistic imperialism as

> the phenomenon in which the minds and lives of the speakers of a language are dominated by another language to the point where they believe that they can and should use only that foreign language when it comes to transactions dealing with the more advanced aspects of life such as education, philosophy, literature, governments, the administration of justice, etc. . . . Linguistic imperialism has a way of warping the minds, attitudes, and aspirations of even the most noble in a society and preventing him from appreciating and realizing the full potentialities of the indigenous languages (Ansre, 1979: 12).

There are studies that focus on the discourses accompanying linguistic hierarchies (Pennycook, 1994), and the ambivalent role of English in contemporary India (Rajan, 1992). English in Africa is seen as "an imperial language, the language of linguistic Americanization, a language of global capitalism, . . . creating and maintaining social divisions serving an economy dominated primarily by foreign economic interests and, secondarily, by a small aspiring African bourgeoisie" (Mazrui, 2004: 30, 40, 52), though English is simultaneously appropriated for Afrocentricity in Africa and in the United States. The tension between the need to learn English for local empowerment alongside local languages, and the adequacy of our theories for addressing these issues has been explored (Canagarajah, 1999, several contributions in Ricento, 2000) (*see* **Power and Pragmatics**).

Fishman *et al.* (1996) is an anthology on *Post-Imperial English: Status Change in Former British and American Colonies, 1940–1990*, with contributors

from many countries, who were asked to assess linguistic imperialism in each context. The editors see the need for English to be "reconceptualized, from being an imperialist tool to being a multinational tool . . . . English . . . being postimperial (as the title of our book implies, that is in the sense of not directly serving purely Anglo-American territorial, economic, or cultural expansion) without being postcapitalist in any way." Fishman, in a 'summing-up and interpretation' of the contributions to the book, correlates the status of English with hard data on the use of English in the media, education, studies abroad, technology, administration, etc., and more subjective assessments. He tabulates the degree of 'anglification' in each state. His assessment is that the "socioeconomic factors that are behind the spread of English are now indigenous in most countries of the world" and that the continued spread of English in former colonies is "related more to their engagement in the modern world economy than to any efforts derived from their colonial masters" (1996: 639). Fishman seems to ignore the fact that 'engagement in the modern world' means a Western-dominated globalization agenda set by the transnational corporations, the International Monetary Fund, and the World Trade Organization, with the U.S. military intervening whenever 'vital interests' are at risk. Although some contributors conclude that linguistic imperialism is not present, they have no difficulty in using the concept in country studies, and none question its validity or utility.

Others are more robust in distancing themselves from a linguistic imperialism approach, when reassessing the language policies of the colonial period and in theorizing about the role of English in the modern world (Brutt-Griffler, 2002) and when describing the global constellation of languages (de Swaan, 2001), on which see Phillipson (2004). English plays a supremely important role in the ongoing processes of globalization, which is seen by some scholars as synonymous with Americanization. English is playing an increasingly prominent role in continental European countries and in the institutions of the European Union, though in principle and law these are committed to maintaining linguistic diversity and the equality of the languages of the member states (Phillipson, 2003). Increased European integration and market forces are, however, potentially leading to all continental European languages becoming second-class languages. This concern has led to the advocacy of Europe-wide policies to strengthen foreign language learning, but few European states (probably Sweden and Finland are those most active) have elaborated language policies to ensure the continued strength of national languages alongside competence in English and full respect for linguistic human rights (*see* **Linguistic Rights**).

One symptom of market forces is the major effort by 'English-speaking' states to expand their intake of foreign students. Higher education is increasingly seen as a market opportunity, a sector that the British government seeks to expand by 8 per cent per year between 2004 and 2020. The British economy benefits by £11 billion directly and a further £12 billion indirectly (British Council). Over half a million foreign students attend language schools in Britain each year. The English Language Teaching business is of major significance for the British economy. These figures reveal something of the complexity of the supply and demand elements of English as a commodity and cultural force. They also demonstrate the need for the analysis of linguistic dominance to shift from a colonial and postcolonial perspective to contemporary patterns that are maintained by more subtle means of control and influence, language playing an increasingly important role in the internationalization of many domains.

Thus in the teaching and marketing of 'communication skills,' a shift from linguistic imperialism to communicative imperialism can be seen: "Language becomes a global product available in different local flavours . . . . The dissemination of 'global' communicative norms and genres, like the dissemination of international languages, involves a one-way flow of expert knowledge from dominant to subaltern cultures" (Cameron, 2002: 70). A focus on communication skills may well entail the dissemination of American ways of speaking and the forms of communication, genre, and style of the dominant consumerist culture, which globalization is extending worldwide (*see* **Intercultural Pragmatics and Communication**).

In *Empire*, Hardt and Negri (2000) draw together many threads from political, economic, and cultural theory and philosophy, and astutely unravel the role of communication in global social trends, and the ways in which language constitutes our universe and creates subjectivities. They reveal how the hegemonic power imposes or induces acceptance of its dominion. They show why it has been so important for the corporate world not only to dominate the media but also education, which is increasingly run to service the economy and to produce consumers rather than critical citizens. Linguistic dominance as such is not pursued in their book, and it is also largely neglected in social and political science. Linguistic imperialism, or linguistic dominance in the sense of the maintenance of injustice and inequality by means of language policies, is invariably connected to policies in commerce, science, international affairs, education,

culture, and the media, all of which involve material resources and attitudes, and all of which evolve dynamically.

See also: Intercultural Pragmatics and Communication; Linguistic Decolonization; Linguistic Rights; Minorities and Language; Power and Pragmatics.

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Pragmatics: Optimality Theory

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Introduction

Optimality theory (OT) starts from the idea that the products of linguistic behavior are optimal with respect to a set of criteria for a certain task. The products can be pronunciations, language expressions, recognitions (of pronounced words), understandings (of, e.g., sentences or moves), the corresponding tasks being pronouncing a word, expressing a thought, recognizing a word, and understanding the contribution of an utterance. An important insight here is that optimality need not imply a perfect fit to the criteria – something which would be impossible in the (frequent) case of conflicting criteria.

A typical theme in OT phonology and syntax is precisely the conflict between various criteria, such as those enforcing economy vs. those enforcing expressivity (*see* **Phonology: Optimality Theory; Syntax: Optimality Theory**). A similar conflict in interpretation would be that between simplicity and stereotypicality on the one hand, and the need to interpret a given message completely and coherently on the other. These criteria are in conflict by their very nature and therefore, some of the criteria are (or may be) typically violated.

Criteria (such as constraints) can be implemented in neural nets, provided they are sufficiently simple (*see* **Constraint, Pragmatic**). The nets can be combined to select optimal solutions. In OT, the combination is done by ranking the constraints and by settling the competition between candidates by giving full priority to the highest-ranking criterion. A candidate loses out to another candidate if there is a highest ranked constraint on which it does worse, while both candidates do equally well on all constraints that are ranked higher.

culture, and the media, all of which involve material resources and attitudes, and all of which evolve dynamically.

See also: Intercultural Pragmatics and Communication; Linguistic Decolonization; Linguistic Rights; Minorities and Language; Power and Pragmatics.

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The simplest view on criteria is that there is a single set of criteria applying to all languages; on this view, the criteria basically belong to the psychological conditions of the tasks involved in speaking and understanding human language. Language production is made easier if one uses shorter, less complicated structures, whereas understanding is improved by the use of longer, more complicated structures. But since production should make understanding possible, production must produce enough structure to allow understanding. This idea is at the basis of an OT-oriented typology of languages, which assumes that all human languages have the same constraints and only differ in their ranking of these constraints).

Optimality Theory and Pragmatics

Pragmatics is an obvious area of application for OT. For instance, Grice's well-known conversational maxims are naturally understood as a set of criteria on utterances; as is likewise known from the pragmatics literature, such criteria maybe violated (*see* **Grice, Herbert Paul (1913–1988); Neo-Gricean Pragmatics; Maxims and Flouting**). Conflicts of this kind are natural, since, for example, it is impossible to give all the information that is required (by the maxim of quantity) and be maximally brief (as required by the maxim of manner). Treatments of presupposition tend to be formulated in terms of preferences or defaults to get correct (or more correct) solutions to the projection problem (*see* **Pragmatic Presupposition; Projection Problem**). In relevance theory, the aim of the hearer is to maximize the relevance of the interpretation, another optimizing problem (*see* **Relevance Theory**). Discourse coherence is often treated as a matter of degree, but, again, maximizing coherence in discourse interpretation is matter of enhancing optimality.

When we look at more specific tasks such as pronoun resolution, recognizing information structure, choosing between different readings of an expression, or deciding on the rhetorical relations prevalent in a piece of text, it turns out that most of the suggested solutions to these problems rely on defaults and heuristics. Being able to reduce all of these phenomena to a small set of simple optimality-theoretical constraints would carry with it a big descriptive and theoretical gain. In addition to the possibility of simplifying and unifying pragmatics, this would also provide more insight into the psychology of the pragmatic component of the grammar, and furthermore offer the perspective of efficient implementation of some important building blocks of future dialogue systems.

It is currently hard to see where a program of this kind would lead to, or, indeed, whether it is possible at all. In an OT perspective, pragmatics has a special status. First of all, it is often impossible to state constraints that are equally meaningful for the production and for the interpretation of a text, as the two processes move in opposite directions. This may have something to do with the tradition that thinks of pragmatics as an interpretive theory: interpretation follows a process of semantic interpretation, presumably realized by compositional means (*see* **Frege, Gottlob (1848–1925); Compositionality: Semantic Aspects**). Even though this approach is less popular nowadays (a semantics that operates independently of pragmatics becoming more and more problematic), in many areas of pragmatics it is still the preferred view: a path leading from form to interpretation. For example, the constraint that prefers to interpret a 'presupposition trigger' (*see* **Presupposition; Pragmatic Presupposition**) by identifying the presupposition with the content already present in the context (by way of resolution), rather than adding the presupposition to the content, as new material (by way of accommodation) does not put any restrictions on the form of the utterance (or on its relation to the input). Presupposition triggers seem to function just as adequately in a resolution as in an accommodation approach; the intended effect is the same in both cases.

In all these respects, OT pragmatics is quite different from OT phonology and OT syntax, which are both dominated by constraints on form. Perhaps even more important is the fact that there is no indication that pragmatic constraints need to be differently ranked to account for different languages. For this reason, pragmatics may continue to be called a universal discipline, in accordance with the requirements of a typological classification of languages.

An important exception here is the class of pragmatically relevant items in a language. These can be certain kinds of anaphoric pronouns (including semantically empty, purely morphological agreement-type anaphors; *see* **Deixis and Anaphora: Pragmatic Approaches; Pronouns**); the different ways in which coherent discourse structure is built up; the kind of particles and modal verbs that a language disposes of; or the aspectual distinctions that can be made in a particular language. These factors have an important influence on the interpretation of different kinds of morphological items such as pronouns; on how we infer the existence and nature of discourse relations; on the various ways of expressing politeness; and on the central pragmatic issue of conversational implicature (*see* **Discourse Semantics; Politeness; Implicature**).

The exception makes it necessary to consider both production and interpretation (cf. above). An important hypothesis here is that of 'bidirectionality,' originally put forward by Smolensky (1996) as the simple claim that there is a single system of constraints that operates in both directions, production and interpretation; however, since the candidates are at one time the set of possible forms, but at another time the set of possible interpretations, they compete in different venues. A form–meaning pair is strongly superoptimal if and only if, in their respective competitions, the meaning makes the form win and the form makes the meaning win. Limiting oneself to cases of superoptimal production and interpretation, one may end up with a system where forms lack a meaning (because all meanings are better expressed by other forms) and meanings cannot be expressed (because all forms have better meanings). A famous example is due to McCawley (1978), who observed that, whereas the unmarked sentence (1a) below can be used to express standard ways of murdering the sheriff, the marked form (1b) forces the interpretation that the murder was unusual (e.g., Bart killed him by plugging the barrel of his gun, thus causing the gun to explode).

(1a) Black Bart killed the sheriff.
(1b) Black Bart caused the sheriff to die.

Under 'strong superoptimality,' (1a) indeed pairs with the interpretation 'simple killing,' whereas (1b) cannot be used: it always (for reasons of economy) loses out to (1a) in the production competition, just as it always (again, for reasons of economy) loses out in the interpretation competition to the stereotypical meaning associated with (1a). This situation caused Blutner (2001) to propose an alternative, called 'weak superoptimality,' where a form–meaning pair is disqualified only if it loses out to another weakly superoptimal pair. In the example, (1a) does not lose out to any competitors, so it is (at least) weakly superoptimal. In contrast, neither (1a) with the nonstandard meaning, nor (1b) with the standard meaning, are (weakly or strongly) superoptimal: both lose out when competing with the superoptimal (1a) with the standard, nonmarked meaning. That makes (1b) with the marked meaning weakly superoptimal. Weak bidirectionality is thus able to associate marked meanings with marked forms and unmarked meanings with unmarked forms, and in this way seems able to provide an explanation of the phenomenon of iconicity (*see* **Iconicity**).

Bidirectionality is a near-straightforward formalization of Grice's theory of meaning, according to which successful communication rests on the speaker's grasping the hearer's intention and vice versa: the speaker needs to take the hearer's point of view in deciding what signal to produce, and the hearer needs to take the speaker's point of view in deciding what intention to attribute to the speaker. Bidirectionality has a similar direct relationship to the neo-Gricean reconstructions of Horn (1984) and Levinson (2000) (*see* **Neo-Gricean Pragmatics**); it is therefore not surprising that one of the areas in which the bidirectionality hypothesis holds out promises of success is precisely pragmatics.

As to the part played by the bidirectionality hypothesis in language description, there are some serious problems with both strong and weak bidirectionality (an overview is found in Beaver and Lee, 2003). Other bidirectional phenomena can be understood as conventionalizations arising in language evolution; often, bidirectionality is reduced to a role in the simulation of language evolution.

Pronouns

A first optimality-theoretical study on pronouns is Bresnan's (2001) exploration of pronominal typology (*see* **Pronouns**; **Logophoric Pronouns**). Reduced realizations such as weak and clitic pronouns or agreement markers (bound or zero pronouns) (*see* **Clitics**) represent the typologically marked case, whereas the full pronoun is typologically unmarked. Reduced pronouns associate with topical antecedents, full forms with nontopical antecedents. Beaver (2004) explored the potential of OT in pronoun resolution, or the task of finding the correct antecedent for pronouns. An influential and well-studied computational linguistic approach to this problem is the model called 'centering' (Grosz *et al.*, 1985 is the original source; for a recent, much changed version, see Strube and Hahn, 1999) (*see* **Anaphora Resolution: Centering Theory Approach**). Beaver (2004), using a small system of constraints, provided a faithful reconstruction of the centering algorithm and shows that a form of restricted bidirectionality must be assumed so that the resulting system may also be successful in the production direction. Another attempt at finding an optimal pronoun resolution algorithm (not restricted to a reconstruction of the centering algorithm) is due to Bouma (2003). Mattausch (2003) gave a reconstruction of the complementary distribution of pronouns and reflexives in the development of English and was able to use the method of evolutionary OT developed by Jaeger (2003) to reconstruct the various stages the English reflexive system passed through before reaching its modern form.

Presupposition

In their study of the German particle *wieder* ('again'), Blutner and Jaeger (1999) gave a quite simple and convincing OT-based reconstruction of the presupposition theory as formulated by Van der Sandt (1992) and Heim (1983) (*see* **Presupposition**). In either theory, there are two defaults or preferences. The first preference in both theories is to identify the induced presupposition in the context of the utterance; this is called resolution. The second default prefers to add the presupposition either to the global context (Heim) or to the highest accessible context, wherever this is possible (Van der Sandt); this is called accommodation. The reconstruction has the following steps: Consistence > Resolve > Do Not Accommodate > Strength. Consistence stipulates that the current utterance does not conflict with what is known already. Resolve asks for the presence of the presupposed information at an accessible position. Do Not Accommodate forbids the addition of the presupposed information, while Strength excludes interpretations that are informationally weaker than the ones already available.

The reconstruction in the OT system improves in several ways on the earlier theories. Do Not Accommodate prefers partial resolutions to full accommodations; it does not outlaw copying presuppositions. Strength often gives a better prediction of the accommodation site than is the case in Van der Sandt's (1992) original theory. In particular, Zeevat's (2002) reconstruction allows for the exploration of particles such as *too* and their exceptional behavior in accounts of presupposition: they do not allow (full) accommodation and are obligatory in the contexts where they occur. In order to explain the latter phenomenon, one needs a 'max(F) constraint' (similar to that known from OT phonology): certain contextual relations are obligatorily marked (*see* **Phonology: Optimality Theory**). By contrast, the other phenomenon seems to allow for a bidirectional explanation: Do Not Accommodate, in a bidirectional interpretation, excludes candidate expressions that force accommodations, whenever there is a simple alternative that means the same and does not force the accommodation. In the case of particles, the sentence without the particle is always such an alternative.

The Future

Pragmatics offers a rich field for potential developments in OT. Among the possible areas for optimization one could mention the intonational phenomena studied by Blutner (2001), De Hoop (2003), and Hendriks (2003); here, much remains to be done. Another area that is waiting for an OT treatment is that of discourse structure and discourse relations. The work done by Asher and Lascarides (2003), using a mixture of optimization and default logic, would benefit from the relative simplicity of the OT architecture. Very few people have so far tried to address implicatures and explicatures in this framework; explorations by Blutner (2001) and Krifka (2002) are quite promising, though. An important new strand of research is the investigation of language change by evolutionary simulation, based on systems of OT constraints. The reconstruction of pragmatics along the lines of bidirectionality is the central concept in these endeavors, which focus on an investigation of how systems reach stability under 'pragmatic pressure.'

The phenomena investigated so far have been relatively simple, though of fundamental importance. In a wider perspective, one may hope that some day, we may be able to account for the peculiarities of human language as they arise in linguistic evolution under the influence of pragmatic pressure. Such results may still be far away, but the investigation of pragmatic problems in the light of optimality theory has laid some of the groundwork for this enterprise.

See also: Anaphora Resolution: Centering Theory Approach; Clitics; Compositionality: Semantic Aspects; Computational Linguistics: History; Constraint, Pragmatic; Deixis and Anaphora: Pragmatic Approaches; Discourse Semantics; Frege, Gottlob (1848–1925); Grice, Herbert Paul (1913–1988); Iconicity; Implicature; Logophoric Pronouns; Maxims and Flouting; Neo-Gricean Pragmatics; Phonology: Optimality Theory; Politeness; Pragmatic Presupposition; Pragmatics: Overview; Presupposition; Projection Problem; Pronouns; Relevance Theory; Spoken Discourse: Types; Syntax: Optimality Theory.

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Pragmatics: Overview

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Introduction

Traditionally, pragmatics has been considered as forming a triad with syntax and semantics (a partition originally ascribed to Charles Morris, and inspired by ideas from the philosopher Charles S. Peirce). Here, syntax is considered to be the study of the formal relations of one sign to another, while semantics studies the relations of signs to objects in the outside world. Finally, pragmatics is thought of as the relation of signs to those who interpret the signs, the users of language (Morris, 1938: 6). It is the latter part of Morris' definition that will be the guiding point of this article; however, the original restriction to signs will be relaxed, such that we now speak of communication in a very broad sense, also including nonverbal means such as gestures and body movements. The emphasis of this modern study of pragmatics is, as it was for Morris, on the user; however, the user is not thought of here as an isolated individual, but as a social animal in the Aristotelian sense: a being that is dependent on the context in which she or he lives, but at the same time is able to interact with and change that context through the use of signs – read: human language and other human communicative means.

Understanding and Misunderstanding

People talk in order to communicate. Good communication happens when speakers understand each other correctly, that is, in accordance with what the speaker means and the hearer understands the speaker to mean. When such an understanding does not occur, the communicative situation becomes one of misunderstanding rather than of understanding.

Many people (including most linguists) believe that communication, and hence understanding, depends solely on the words spoken. The famous reply to a journalist's question, "Read my lips," attributed to former U.S. President George H. W. Bush, expresses a belief in the validity of the verbal utterance as proffered by a speaker, without regard either to what the speaker may have had in mind or to the actual circumstances of the speaking and reading.

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(or actually obeys) the rules embodied in what is usually called grammar (by many linguists interpreted as "a device that will generate all the correct sentences of a language, and no incorrect ones," as Noam Chomsky and his followers have preached ever since 1957, the year in which Chomsky's first and very successful treatise on syntactic structures appeared; Chomsky, 1957). This assumption (which has survived in a number of avatars, also among nonlinguists) was publicly denounced as a fallacy soon after its first public appearance; celebrated linguists such as the late Archibald Hill, anthropologists such as Dell Hymes, and sociologists such as Erwing Goffman all were quick to point out that human communication very rarely proceeds in accordance with the strict rules of grammar. Pronouncing a correct sentence belongs in the realm of the impossible, not to say pure fantasy: real people speak in ways that are rather far away from the strictures of the grammarians, yet they are often, if not always, understood correctly (in the sense in which I used this word above).

But what happens when misunderstandings occur? What are the reasons for people's wrong apprehensions of their interlocutors' utterances? Is it the case that they do not understand the words that are spoken? Or are there deeper reasons for misunderstanding?

While it is true that understanding a message to some degree depends on a correct interpretation of the words being used, as well as on a certain respect for the usual form these words and their combinations take in any given language (not to speak of a pronunciation that is not prone to being perceived wrongly, or not at all), it remains the case that words, no matter how well chosen and correctly joined and pronounced, do not convey the entire message, or even the major portion of what we intend to say. Popular handbooks of communication and advertising often propagate the slogan that in business, the words count for 5%, the body language for the remaining 95% of your message. While this may be somewhat of an exaggeration, the point these business communication experts want to make is clear: words taken by themselves will not do the job; understanding a message is more than a verbal matter.

The French philosopher Jacques Rancière (1995) distinguishes between a simple misunderstanding (French: *malentendu*, or *méconnaissance*, i.e., a wrong understanding, or even a lack of understanding) and a misunderstanding on a deeper level (French: *mésentente*), where understanding is not only difficult, but even impossible, because there is not, and cannot be, any common platform where all the involved parties can meet. According to Rancière, this is the usual, unfortunate situation especially in politics (1995: 12–13); but also in daily life, it frequently happens that one person does not understand what the other is saying, not because the words are not clear or the phrasing ambiguous, but simply because the one interlocutor does not **see** what the other is talking about, or because she or he interprets that which the other is talking about as something entirely different. In Rancière's words,

> The cases of misunderstanding are those in which the dispute on "what speaking means" [an allusion to the seminal work by the French sociologist Pierre Bourdieu, *Ce que parler veut dire*; 1982] constitutes the very rationality of the speech situation. In that situation, the interlocutors both do and do not mean the same thing by the same words. There are all sorts of reasons why a certain person X understands, and yet does not understand, another person Y: because, while he perceives clearly what the other tells him, he also does not **see** the object of which the other speaks to him; or even, because he understands, and must understand, sees and wants to make seen, another object represented by the same words, another reasoning contained in the same argument (Rancière 1995: 13; my translation and emphasis).

It is the task of pragmatics to clarify for us what it means to 'see and not to see' an object of which the 'same words' are being used, yet are understood in different, even deeply diverging ways. Notable examples of this '(mis-)use' are found in political discourse, the very subject of Rancière's reflections: words such as 'freedom,' 'democracy,' 'peace,' and so on have over the ages been consistently and willfully misunderstood and misused in political discourse. The deeper reason for such misunderstandings is not in what the words mean (and certainly not what they originally may have meant; here, the Greek roots of the word 'democracy' and its original meaning of 'people power' provide a sad example). The way we understand a word has to do with the situation in which it is being used, and that means: a situation where speakers and hearers engage in a 'common scene' (Rancière's expression) where they meet and discuss, respecting each other's background and underlying assumptions about what exactly is common to them as actors on that scene, in a particular situation of language use.

Situations and Contexts

A situation can be roughly described as a meeting of human interactants having a common background and trying to realize a common goal. Exactly how common those backgrounds and goals are can be the subject of much dispute, and even seemingly insignificant details may generate heated controversy (such as the seating order at a conference table; enter the round table, which minimizes to a certain degree

problems of seating and precedence). The situation also comprises the various real world circumstances that either have occasioned the meeting or are material in creating its context. More broadly speaking, the notion of context may be taken as comprising all the circumstances that go into defining the backgrounds and goals of the interactants, including what has been, and is being, and possibly will be, said at a meeting. More narrowly, we may concentrate on the verbal part of the meeting and the immediate environment of the words spoken, and talk of cotext, rather than context; I will use the broader term here (*see* **Context, Communicative**).

A situational context is not just a listing of what is there and who are there: it must take into account where they, the interactants, come from, in more than one sense of the term. The background from which the interactants act and speak is decisive for their possibilities of interacting (in political meetings, this is often captured by the term 'mandate'). Moreover, a context is not just given once and for all: it is a dynamic notion in that it constantly adjusts itself to the new developments in the interaction, seen against the original background (which may then be changed itself, and a new mandate given). What people bring to the situation in the guise of presuppositions and expectations is an important, albeit often not too visible part of the context. Nevertheless, and precisely because it is not directly observable, this hidden context plays a major role in determining the possibilities and liabilities of the interactants. It would be a mistake, however, to think that bringing such presuppositions out in the open automatically furthers successful interaction; in many situations, e.g., in business transactions, the interlocutors play their cards close to their chests and rely on the tacit understanding of their backgrounds that the others hopefully have, or at least pretend to have (*see* **Pragmatic Presupposition**).

Most importantly, all situations are subject to major world constraints, which govern the interactants and keep them in line, so to speak. There are both written and unwritten rules for what can be said and done and what cannot be said or done in a situation; these rules of the game depend on the way the situation is incorporated into a larger political and social frame (e.g., labor negotiations have to abide by certain rules limiting the length of the negotiating period or the extent to which existing agreements can be changed or renounced). The power that resides in the individual interlocutors (e.g., to strike a deal, to call off a strike or lockout, to conclude an accord, and so on) is vested in them on account of their social and commercial position. An interlocutor speaks not only with his or her own voice, but repeats, or re-sounds, the Voice of the Master, i.e., the institution to which he or she belongs.

This leads us to consider the speaker's role in a situation as bound by social and other convention; any speech act (see below) that is uttered during a negotiation situation can only have the force that is allowed it, based on the speaker's social and institutional placement. Conversely, such a voicing of the situation can itself contribute to the establishment of a powerful or power-like situation; words and actions interact dialectically with contexts and situations. Consider the following case, adapted from the Swiss novelist Friedrich Dürrenmatt's short story *The breakdown* (Dürrenmatt, 1956).

In the story, a traveling salesman meets three people in the dining room of a hotel in the little provincial town where he has to spend the night because his car has broken down. For some reason, the three gentlemen seem to be happy to see him, and invite him for a late supper at the home of one of their number. During and after the meal, the conversation focuses more and more on the hosts' past occupations of attorney general, judge, and trial lawyer, respectively. In the end, the trio enacts a mock court session in which the traveling salesman (who by now has lost all sense of time and space) is condemned to the severest penalties for his past misdeeds.

What is interesting here is the way in which, by force of their earlier societal standing, the three men manage to create the illusion of a court session in which the accused ends up confessing his crimes and accepting his sentence. The relevance of Dürrenmatt's legal game is that it shows us how the law is not only embodied in institutional roles and legal language, but depends on the social environment, the context in which that language is practiced. The hapless traveler who fell into the clutches of the quasi-practicing legal trio was every bit as damned as he would have been had he been condemned by a regular court.

Societally institutionalized speech acts were among the first to be discovered by Austin (1962). The concept of the social context has been valuable not only as a classificatory criterion, but also because it makes us look at what speech acts really do, and how they are able to do what they do, as we will see below. In our example, the speech act of sentencing not only brought about a changed state of affairs (the sentenced person was supposed to go to jail), but it also (re-)created the legal system whose reality it confirmed (by the pronouncing of the sentence). Not only does the social context allow for and determine what is appropriate speech acting in the context, it is itself construed through the use of the appropriate language: societal institutions are (re-)instituted through the use of speech acts. This is the social,

psychological, and above all pragmatic significance of the practical joke perpetrated on the poor traveler in the Dürrenmatt story.

Speech and Speech Acts

Above, I mentioned John L. Austin, the Oxford philosopher, as one of the great sources of inspiration for our modern thinking on how language works, or on "how to do things with words," in Austin's own immortal formulation (1962). Austin's contribution is linked to the concept of the speech act, a use of language that not only says, but does. The idea is of course not new: many of us are familiar with the institution of the religious sacrament (such as the Christian baptism). Here, the notion that a formula (such as used in administering baptism) works in force of the words spoken ("I baptize thee"), in tandem with the action performed (letting water flow across the baptizee's head). That the sacral action is performed as denoted by the words is at the basis of the belief according to which the sacrament is effective, not by force of the sayer, but by force of the words spoken and the act done. In Catholic theology, this aspect of the action goes by the label of *ex opere operato* 'in force of the act that is performed'; in speech act theory we talk about an aspect of a speech act, the performative or perlocutionary effect, that comes in addition to the words spoken (the locutionary aspect) and the point of the act (the illocutionary aspect), which makes it into precisely this act and no other (*see* **Speech Acts and Grammar**).

For Austin, speech acts could be distinguished and neatly labeled according to their 'point' or illocutionary force: ordering, asserting, requesting, and so forth. Austin's student John R. Searle, who later went back to the United States and taught at Berkeley, systematized and extended Austin's classification of speech acts and in particular, systematized the conditions that would make a speech act legal and effective (rather than 'misfiring,' as Austin called it, e.g., when the person executing an institutional act such as a marriage ceremony does not have the necessary credentials). These felicity conditions, as they often are called, comprise such matters as the agent's sincerity (e.g., in proffering a promise), the agent's or recipient's ability to be acted upon (in our society, a person cannot be legally married a second time as long as his or her first marriage is in force), and so on. Searle's merit is to have systematized not only Austin's speech acts, but in particular to have perfected his assignment of the conditions that must be met before a speech act can be said to be valid (*see* **Speech Acts**).

But there is more to this than meet the eye (or the act). Unfortunately, Searle not only developed Austin, but in doing so technologized him (Melrose, 1996: 61–62). Searle's main interest was not how to do things with words, but how to systematize and describe the words that do those things, the speech acts as such. It may be said about Austin that he never was overly technical about his speech acts – something which earned him scorn from later speech act theorists (Mey, 2001: 117–118). In Austin's original thinking, it is the words that have to be "to some extent 'explained' by the 'context' in which they have been actually spoken" (Austin, 1962: 100; the scare quotes are Austin's own). Austin is interested in the context because he wanted to "study the total speech in the total situation" (Austin, 1962: 148), which is exactly what pragmatics is all about. Whereas Austin was doing things with words, Searle is describing acts of speech.

The Problem of the Indirect Speech Act

For Austin and many of his followers, a speech act is primarily expressed by what is called a speech act verb, that is, a verb whose main function is to signal and execute the appropriate act. For instance, when I say *I promise*, the verb *to promise* is the appropriate (sometimes called canonical) expression for this particular act (*see* **Speech Acts and Grammar**).

Early on, it was noticed that many speech acts are performed successfully without the help of the canonical verb. For instance, I can confirm a promise, or even make one, by simply saying what I'm going to do, or by uttering an affirmative reply to a question. The most outstanding example of a solemn promise (a vow) that does not use the verb *to promise* is when man and wife promise each other to be faithful and supportive *until death doth them part*. The promise is uttered by the auxiliary (or tag) verb 'to do' (a tag verb is one that repeats the tagged portion of the main verb construction, as in *Do you…? Yes I do*).

More generally, the appropriate speech act can be expressed by reference to one of the conditions that Austin and Searle stipulated as necessary for successfully performing such an act. One can, for example, inquire about a person's ability to give information or perform a task, as in *Can you tell me the time?* or *Could you close that window?* In such cases, the inquiry is understood not as a mere preliminary to a request for information or action, but as the act itself of asking for information or requesting a favor, respectively. Such acts are called indirect, since they lead the addressee to infer, from the fact that a request was formulated regarding an ability or willingness,

that the request in fact was about the object of the ability or willingness (in this case, to give out information or to close a window).

Interestingly, contrary to what seemed to be the original motivation behind classifying speech acts and speech act verbs, the indirect way of doing things with words is, in many cases, the preferred one. I have called this phenomenon the 'indirect speech act paradox' (Mey, 2001; *see* **Pragmatic Acts**); it is confirmed by observations such as that by Levinson (1983) that "most usages of requests are indirect," whereas such speech as orders are seldom, if ever, executed by the canonical verb form, the imperative mood: "imperatives are rarely used to command or request" (Levinson, 1983: 264, 275; see further Mey, 2001: 111). A particular use of indirectness in speech acting is found in the phenomenon called inferring by implicature; more on this below.

Indexing and Inferring

To get a handle on the phenomenon of inference, let's first consider the use of what linguists call deictic elements. These are words and expressions that directly refer to persons, objects, situations, etc. by 'pointing' to them, using what is called *deixis* (the Greek word for 'pointing to, indicating'; the human forefinger is called 'index' because it is our first and foremost natural pointing instrument). Thus, when I say *I* about myself, I point to the person that I am; *you* points to the person away from me, *viz.*, an actual or potential interlocutor (*see* **Deixis and Anaphora: Pragmatic Approaches**).

Most languages have a more or less elaborate system of such 'pointers' that help us identify persons and situations when we are interacting verbally and otherwise. We can refer to a book that is mine, as 'this book,' whereas a book that is yours, or in your possession, may be called 'your book' or 'that book.' But deictics have other functions as well. 'That' can also express contempt (*that son of a bitch*) or respect (*gimme that old time religion*). Moreover, such 'indexing' can happen even without my knowing or willing, as when "my speech betrays me": the language I speak reveals ('indexes') my social or local roots, as happened for St. Peter in the famous betrayal scene, after he had three times publicly denied having ever set eyes on "that man," Jesus of Nazareth (Matt. 27:70–72).

Conversely, we can use this kind of indexing to provoke a reaction in our interlocutors. For instance, using high-falutin language and 'expensive' words can create an impression of scholarship and learning. When I doctor my speech to create such a (possibly false) impression, I base myself on the hopeful assumption that people who hear this particular kind of language will infer that I indeed belong to the class of educated people (alternatively, they may infer that I am a terrible snob).

As in the case of the indirect speech acts, what is said is not the whole story. Based on my actual knowledge of the world and the input from my interlocutors, I make certain inferences, albeit indirectly and perhaps not always convincingly and/or justifiably. The main point is that we are able to communicate certain thoughts or feelings, using indirect means and relying on the common world situation (or scene) that we are part of.

We imply certain things about ourselves and the world when we use deictics and other indexicals in this way; our interlocutors are supposed to make the proper inferences in order to successfully understand us or communicate with us. That such an understanding may be wrong, or even willfully distorted, is one of the secrets of the successful mystery or detective story; the innocent reader is led down a 'garden path' of false inferences, to be suddenly confronted with the real state of affairs in a moment of truth.

As an example, consider the Argentine writer Julio Cortázar's 'Story with spiders' (*Historia con migalas*; Cortázar, 1984), in which the readers are made to believe certain things about a couple vacationing on an island in the Caribbean. The sinister impact of their activities and the relationship to their earlier exploits of the same murderous kind is hinted at in the very last lines of the narrative, when the couple is unmasked as a nefarious, female duo bent on destroying men (hence the title word 'spiders,' which contains an important, but not sufficient clue). What the author does here is to play on our implicit understanding of the language (in Spanish as in English, the default couple is male plus female), in order to have us infer the normalcy of the situation, only to shock us back into the real world when the identity of the spiders is revealed, again by the use of an indexical element: a female adjectival ending. Only then do we infer the couple's identity; the rest of the gruesome inferences are left to our imagination and our ability to put two and two together on the basis of clues provided earlier. (A complete analysis of this intriguing piece of text is given in Mey, 1992) (*see* **Literary Pragmatics**.)

Next, we will discuss a particular way of implying, and see how proper inferences may be drawn using the notion of cooperation. (On inferring vs. implying, see Thomas, 1996: 58–59).

Cooperating and Implying

A pragmatic view of language bases itself, as we have seen, on the ways speakers and hearers are able to communicate in a given situation. A very important factor in this is the speakers' willingness to enter the situation with a decision to cooperate with their partners. The Berkeley philosopher H. Paul Grice is famous for having formulated the Cooperative Principle, stating the human need for, and extent of, cooperation in conversation, a principle that he detailed further in the four so-called conversational maxims, which guide the speakers and hearers through the conversational maze in a mutually satisfying way (see Mey, 2001: 71ff) (*see* **Cooperative Principle**).

The fact that cooperation is, so to speak, built into the very marrow of conversation makes us prepared to accept what is offered in conversational exchange, as being of relevance to our needs and interests. If I ask somebody for the time of day, I take it that he or she will cooperate and tell me the time, and not make some completely ludicrous remark about the state of the world. Or, "What man of you, if his son asks him for bread, will give him a stone?" as the Gospel tells us (Matt. 7:9). Conversely, we may make our intentions clear by precisely not answering a question in the expected way, or not fulfilling a reasonable request. If the father did give his son a stone for bread, he probably wanted to tell him something about the way the world is organized: people taking advantage of each other, even cheating on each other. However, in a more subtle way I can use this indirectness to appeal to an understanding of the situation that is built into the very question, so to speak. The innocent question *What time is it?* can correctly and satisfactorily be answered indirectly by referring to an event that both interlocutors know as denoting a particular time. In my Norwegian house, where we had very little traffic on the county road passing by our house, the utterance: *The bus just went by* would be a completely happy answer to a request for the correct time: there was only one bus a day, and it passed our house at exactly 7:45 AM on its way to Oslo.

When we answered the time question indirectly, we implied a reference to something that was commonly known. Grice has extended this notion of implying to something he called (with a self-concocted term, as he admits; Grice, 1981: 184–185) an *implicature* (*see* **Implicature**). Implicatures can be thought of as infringements on conversational cooperation, by going against one or the other of the conversational maxims. One such maxim is that of relation (or relevance: my answer must have some relevance to the question asked; *see* **Relevance Theory**). When we look for a relevant feature in an answer that *prima facie* seems to have little to do with what I was asking about, the implicature is of something behind the answer.

Grice's famous example is of the uncooperative college professor who, in reply to a request for a recommendation, writes that the student in question has always attended his lectures, and is a capable English speller. By not saying anything that is relevant (e.g., in a job application for an academic position), the professor implicitly indicates that the student is not a person he wants to recommend. So what at first looked like an uncooperative answer, in the end achieves the communicative needs of the situation by implicitly providing an answer that is useful to the requester.

Or consider the case of the person (related in Mey, 2001: 78–79) who is asked for an I.D. card on entering a discotheque and remarks to the doorman that she is the mother of four. Given that the drinking age at that point of time in this particular state (Louisiana) was 18, the fact of having four children more or less precludes the speaker's being under age for the purpose of drinking. But this is not said directly; the answer is a 'flout' of the maxim of relation (what does having children have to do with drinking?), but the implicature makes this a potentially good reply. In the actual case, however, the doorman refuses to recognize the implicature, and answers by another flouting of the maxim of relevance: "Yes, and I'm the Pope's granddad" – a truly absurd assertion given the ages of the then reigning pope (Paul VI in his later years) and of the doorman (at most 25). This new flout therefore implicated an answer in the spirit of: "You can tell me what you like but I cannot believe you at face value; show me an I.D. or just leave" (*see* **Maxims and Flouting**; refer also to a recent study by Greenall, 2002).

The 'Garden Path' and 'Bestrangement'

A particular form of implying is often called the already mentioned 'garden path': an interlocutor is made to infer an implicature that is not really there (but only exists in the speaker's mind), but then is intentionally suggested as valid in order to lead the conversational partner(s) astray. The motivation for creating such implicatures can be either political, as in the anecdote below (which I have called Adam in the Garden; Mey, 2001: 258–259), or of a literary kind (as in the Cortázar example referred to earlier).

During the election campaign of 1970, incumbent Congressman Adam Clayton Powell, Jr., of the 18th Congressional District, was giving a press conference outside his opponent's headquarters at 135th Street

and 7th Avenue in Harlem, New York City. A heckler interrupted him, asking him if he was going to be present at the antinarcotics parade to be held the next day, a Saturday, "like he'd promised." To which Powell replied that of course, nothing would keep him from attending. A moment later, the heckler interrupted again, wanting to make absolutely sure that the Congressman would be present at the parade. Powell, visibly irritated, reiterated his assurance, and went on with his speech. The heckler then intervened a third time, stating that "Well, Mr. Powell, sir, you ain't gonna be at that parade, 'cause there ain't gonna be one and we never spoke of one" (Source: *Harper's Magazine*, April 1971).

If we ask ourselves what was happening on that preelection Harlem Friday, we can say that the speech acts of asking questions (by the heckler) did not presuppose the existence of a real answer. The questions were disingenuous: the person asking them was well aware of their duplicity. The technique of the garden path leads the unsuspecting listener (or reader) into a verbal trap, which is then sprung at the crucial moment. Often (as in the case above), this is done with the intention of making a fool of the listener and (for political reasons, as in this case) humiliating him or her publicly. In order to better understand this technique, one could ask questions such as what speech acts can be identified in this interchange and how the Cooperative Principle applies here (if it does at all). Another interesting question would be how one could have saved Congressman Powell from going down the path, asking in particular where he took what first wrong step, and how he could have counter speech-acted to the heckler's remarks.

In other cases (mostly in a literary context) the use of the garden path is akin to the technique of making familiar things unfamiliar, a procedure called defamiliarization or bestrangement (*see* **Literary Pragmatics**). The point here is to jolt the reader and obtain some kind of narrative shock effect; the effect is obtained by allowing the reader to make the normal inferences based on what we know about society, language, and ourselves. When we enter a room, we expect there to be windows; anything that looks like a window will be seen and perceived as such. When we read about a couple taking a vacation, our inference is that of the normal, heterosexual couple. When Cortázar, in the story referred to above, suddenly breaks into our normal world by unveiling the true character of this couple, we are suddenly confronted with another view of our society, one in which the normal couple may be a same-sex one. The garden path teaches us something about the paths that are there, as well as about paths not taken by everybody.

Situated Speech and Pragmatic Acts

On the basis of the examples given, we conclude that any speech act, in order to be successfully executed, not only has to obey the conditions laid down by speech act theorists such as Searle and Grice, but in addition must be appropriately uttered, that is, it has to respect and conform with the situation in which it is executed.

A recent controversy erupting around the Danish army contingent stationed in Iraq was provoked by the fact that one of their translators balked at rendering Danish swear words verbatim into Arabic during prisoner interrogation at the Danish contingent's headquarters. Whereas the Danish interrogating officer was of the opinion that the Iraqi prisoners ought to be roughed up a bit by among other things, verbal intimidation, including threats and swear words, the native Syrian interpreter (who had spent most of his adult life in Denmark and hence was completely familiar with typical Danish swearing behavior) refused to go ahead and use words that, in his view, not only were offensive, but also would not work in the situation. He expressed as his considered opinion that an Iraqi would attribute the use of such swear terms, when translated literally into Arabic, as offensive verbal behavior, indexing an uneducated person. It would put the speaker far below the addressee, socially and interactionally, and preclude any cooperation. Hence the technique that the Danish interrogation officer wanted to employ was not appropriate to the situation, and an inappropriate act of interrogating would elicit no proper response. The interpreter, who clearly perceived the Danish and the Iraqi attitude as situationally incompatible sent in his letter of resignation 5 weeks prior to the expiration of his term, accompanied by an explanatory letter addressed to his commanding officer. This letter was then printed in the Danish press, causing a huge commotion; a public scandal erupted, resulting among other things in the Danish interrogation officer being recalled from duty in Iraq.

As we saw in the case of the indirect speech acts, such acts receive their full potential usefulness from the situation in which they are properly uttered. What is lacking in verbal explicitation, is supplied by the implicit conditions of the situation. But conversely, the situation conditions the appropriate utterances in the sense that it enables certain utterances and excludes others, as we saw in the case of the bilingual Danish-Arabic interpreter.

Generalizing these observations, we may say that no speech act is complete, or even possible, without, and outside of, its proper situational conditions. A speech act, in order to be properly executed, has to be

situated properly. This condition comprises not just the words spoken, but the presuppositions that are inherent in a situation, such as a nationally and culturally oriented understanding of proper linguistic behavior; a familiarity with conditions leading up to, as well as away from, a situated speech act; an understanding of the individual utterer's personal and social self-image; a correct interpretation of the accompanying body language and gestures; and so on and so forth. If we take all these aspects together, we arrive at the conclusion that there are no speech acts as such (except in the treatises and grammars written by linguists) and also, that every speech act, in order to be a valid act, must be rooted in a situation that supplies it with legitimacy (*see* **Pragmatic Presupposition; Intercultural Pragmatics and Communication**).

As we have seen, this legitimacy has not just to do with speaking, but more so, maybe even mostly, with the social and situational command that one has of the situation in which the words are spoken. Already Austin, in his *How to do things with words*, had had this insight (cf. the quotation above); for him, the primordial speech act was precisely a situated one. True, Austin interpreted this situation as one of strict societally defined custom (such as institutional surroundings in a court room, a lecture hall, or a church); my interpretation expands on this by saying that every situation belongs to some institution, whether officially constituted or not, and that every act of speaking is a situationally grounded and legitimated activity (*see* **Institutional Talk**). To characterize such an activity, I have coined the term 'pragmatic act' (*see* **Pragmatic Acts**). "Pragmatic acts are pragmatic because they base themselves on language as constrained by the situation, not as defined by syntactic rules or by semantic selections and conceptual restrictions. Pragmatic acts are situation-derived and situation-constrained; in the final analysis, they are determined by the broader social context in which they happen, and they realize their goals in the conditions placed upon human action by that context" (Mey, 2001: 228).

The Pragmatic Turn

From the early 20th century on, the study of language had been defined, following Saussure, as the study of its system and structure. The methods for studying language were borrowed from the natural sciences; the rules that were assumed to govern the use of language were thought of as operating on the model of physical laws, being testable according to the prediction method: a hypothesis generates a statement about certain phenomena, and we can empirically ascertain whether or not the prediction holds. So, too, a rule in linguistics should correctly predict what happens in language, and it should be as general and simple as possible, while capturing all and only the facts.

This model of linguistic methodology (accepted by all those working in the structuralist tradition, from Bloomfield to Hjelmslev to Chomsky) was subsequently refined by the incorporation of mathematical and computational methods and techniques. Chomsky's main thesis, in particular, that a grammar of a language should be able to generate all the correct sentences of a language and none of the incorrect sentences, met with wide acclaim, and became the implicit code for much of linguistic work during the latter half of the last century.

Meanwhile, as we have seen, opposition to this mechanistic way of thinking about language arose from several quarters. Not only among the linguists, but mainly among the philosophers (Austin, Searle, and their followers) and anthropologists (Hymes, Hanks), among the sociologists and conversational analysts (Goffman, Sacks, Schegloff), the insufficiency of the standard linguistic method when it came to capture the full reality of human language use was keenly felt. Also among the literary theorists, following the rediscovery of the pioneering works of Soviet thinkers such as Bakhtin, Voloshinov, and others, the interest in the social aspects of language and its use in narration in particular became a prime factor in destabilizing the current linguistic paradigm, especially as embodied in the Saussurean distinction between *langue* and *parole* (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913); Bakhtin, Mikhail Mikhailovich (1895–1975); Voloshinov, V. N. (ca. 1884/5–1936)**). In Western Europe, where the Russian scholars, for political reasons, had been rather poorly known, the surge of anti-establishment thinking of the 1960s and 1970s (spearheaded by a return to Marx) had a great impact on what we now can see and name as the pragmatic turn in language studies (*see* **Marxist Theories of Language; Social Aspects of Pragmatics; Literary Pragmatics**).

In order to properly understand the import of this turn, let's go back to the case of speech acts, referred to above. There are basically two ways of looking at human speech activity: one is to consider the language used, the other is to look at the situation in which the language is used. Clearly, the two aspects should not be separated: there is no language use except in situations, and no situation is complete without the language that goes with it. However, in a linguistics-oriented approach we will always start out with the words, then try to "fit them to the

world," as Searle used to say. The question is then: given these words, what can they do? If I say *Open the window, please*, what is the effect of this language use on the world (including the window in question, but also myself and my interlocutors, far and near)? In this approach, I start with the language and work my way to the outside, the world. The main focus in most cases is on the language used for ordering and the conditions that accompany this speech act.

Conversely, I may start out with a given situation: a window has to be closed. The question is: What language is appropriate, given the situation? I may say *Close the window, please* to somebody nearby; but I could also say, *Isn't it a bit cold in here?*, or any other indirect speech act that will do the job (sometimes even a grunt or a significant look will be sufficient). Rather than focusing uniquely on the words, pragmatics tries to capture the situation as a whole, and work its way to the inside, where the spoken words are found. Here, the use of language, such as a speech act, is an important part, but not the only one, of the situation.

In this, as in all use of language, the main protagonist is neither the language nor the situation, but the user and his or her situational conditions. The user decides on what language to use, but does this strictly in accordance with the situational context, as we saw above. Indeed, in many situations the use of a specific, canonical speech act is probably the user's last choice. One does not say *I hereby incite you to riot* to effectuate a speech act of inciting to riot – in fact, given a situation of inciting, almost any speech act will do, as Kurzon has remarked (1996). This line of thinking has led me to believe that the indirect speech act, as it is usually described, is not the exception but the normal case: all speech acts are situationally bound and conditioned, hence to a certain degree indirect in that they depend on the situation in which they are uttered.

In other words, a pragmatic approach to speech acting, and in general to language use, moves from the outside in: given this situation, what words will be appropriate for a particular act? In contrast, speech act theory, in its classical shape, works from the inside out (as does linguistics): given these words, how can I use them in a situation? This is basically the traditional semantic problem of the meaning of words; it is solved by trying to find a context in which the words will fit, rather than by starting out with the context and determining which words or expressions will fit a particular contextual slot. Curiously, it is this latter, textually based, prepragmatic approach to linguistics that was also the ideal of a structuralist like Hjelmslev: one starts from the entire text and arrives at the text's minimal constituent units through successive analytic operations; the problem was that in this kind of analysis, the user never was taken into account.

When we speak of a pragmatic turn, it is this kind of change of direction we have in mind. It is not just that some linguists turned to pragmatics, or even turned themselves into pragmaticists by fiat or "chosen affinity" (Goethe's expression). It is the method itself that has been turned on its head (or stood on its legs, if one prefers): rather than being a language-based operation, pragmatics advocates a user- and situation-based approach. It is also here that the relationship between semantics and pragmatics can be turned from an "unhappy marriage" if ever there was one (to borrow Georgia Green's expression, when she characterized the relationship between syntax and semantics; Green, 1989) into a healthy relation of mutual respect. Thus, the pragmatic turn in linguistics can be described as a shift from the paradigm of theoretical grammar (in particular, syntax) to the paradigm of the language user. The latter notion is of particular importance for defining pragmatics, since it brings a number of observations to the same practical denominator (see below; cf. Mey, 2001: 4).

It is also in this sense that we can define pragmatics as "studying the use of language in human communication as determined by the conditions of society" (Mey, 2001: 6). For, while it is true that communication in society chiefly is practiced by means of language, still, the language users, being social animals, can only use their language on society's premises. The social order controls and conditions communication in society; society controls and conditions people's access to the communicative means, in particular the linguistic ones. Given its focus on the human use of language and other communicative means, the proper task of pragmatics is to study how those societal conditions allow and determine such a use.

The Difference that Makes a Difference

A final question needs to be answered: given that we do have this pragmatic turn, and admitting that it is the right direction to take in our study of the human use of language, a question still lingers in ours minds, *viz.*: does it really mean that much which way we look at the relation between humans and their language, inside-out or outside-in? What I would like to show in this final section is that there is a difference, and that this difference indeed does "make a difference" (using Bateson's formulation).

First off, there is the emphasis that the outside-in approach places on the social aspect of all language

use. Placing the user in focus, as I advocate in the definition given above, reflects this primordial character of pragmatics as a societally based and societally conditioned study. This is not just to say that we look at social classes or groups, and then try to figure out what kind of (different) language and dialects they speak (the classical sociolinguistic approach, as practiced by, for example, William Labov and his school (*see* **Labov, William (b. 1927)**). In pragmatics, the concern is first of all to 'read' the user as a social *siglum*, a 'sign' to be decoded in accordance with societal parameters.

One of the first questions to ask then, is not what does this utterance mean? but how come this utterance could be produced at all? (Haberland and Mey, 1977, 2002) Asking the question in this way opens up an understanding of the speaker's and hearer's "affordances" (Mey, 2001: 220–221): what can a language user afford to say/hear/understand/execute as a speech act? Clearly, as already the original speech act theorists had seen, an order in the military or some other hierarchically organized body that is issued without proper authority is null and void. But even in more mundane situations (such as asking a simple question), one has always to think of what this question represents for the person who is asked to answer. Certain items may be tabooed in a particular culture; take for instance the proper name that is given a person in the Navajo community upon attaining adulthood, a name that is not to be divulged except to those with whom one has the greatest intimacy. Similarly, the old adage *De mortuis nil nisi bene* ('Say only good things about the dead') may reflect an age-old taboo: the dead may come back and take revenge when spoken about disrespectfully. The social norm, as expressed in what we now would call a superstitious belief, allows for certain types of speech and forbids the use of others, depending on the situation.

The importance of this point of view in, for instance, a teaching situation is enormous. Getting to know the background from which one's students speak is not only important in an inner city school with a majority of Black students (and often a sizable portion of White teachers), where the curriculum is geared towards White middle class values and White middle class ways of speaking and thinking are preferred (*see* **Classroom Talk**; **Class Language**). Pragmatics is also of help when trying to avoid language clashes, or even language wars, in which we construct linguistic and social differences as the barricades from which deadly battles are fought. In perhaps less serious cases, the educational future of whole generations is jeopardized because of the teachers' lack of understanding of their pupils' social and cultural background: in Botswana primary schools, students sit in the classroom and do "safe time" without learning anything useful, as Arthur (2001) has made clear; elsewhere, misunderstood language policies are imposed without regard to the students' needs (as superbly demonstrated by Canagarajah in his discussion of the language situation in Jaffna, Northern Sri Lanka; Canagarajah, 2001).

In a broader framework, one could raise the question of whether pragmatics is useful in situations like those experienced on a daily basis in the developed countries of Western Europe, where immigrants from poorer parts of the world arrived *en masse* during the 1960s and 1970s and will continue to pose problems of acculturation for many generations to come. The problems can basically be reduced to this dilemma: should people from other cultures be politely asked (or even forced) to leave their cultural baggage behind and dress up in the hosts' cultural garb, or should they be allowed (or maybe even forced) to set up their own cultural ghettoes, where they can live and breathe the familiar air of their home surroundings?

The problem hinges on a proper (that is, pragmatic) interpretation of the term 'culture' and its epiphenomenal adjective, 'intercultural.' Such a view bases itself on a pragmatic and mainly contextual understanding of culture. On the one hand, culture, in order to flourish, has to have a cultivating environment, a context; pragmatics, on the other hand, in order to be true to its definition, has to respect the individual's choice. As to the first point, no culture belongs exclusively to any individual or group of individuals; neither can culture be freely and noncontextually moved around. A culture presupposes a cultural environment, a growth context, just as the properly conditioned soil is necessary for a successful (agri)culture. But also, pragmatics as defined above is a theory of human behavior (linguistic and otherwise), which explicitly depends on, and is conditioned by, the profile of the user. Hence we must inquire as to what in the actual circumstances is culturally feasible and pragmatically desirable for the individual as well as for the group.

A great deal of flexibility is required in order to avoid either of the two extremes: the culture-only view, where one blindly focuses on a particular culture and wishes for its perpetuation, no matter what, and the pragmatic-only view, which defines the uses of language simply from a (mostly utilitarian) user point of view: what is needed to guarantee the immigrants a not only culturally, but also economically viable existence?

Through research and practice, the field of intercultural pragmatics tries to build a bridge between the two extreme positions; it safeguards the culture as culture while attending to the needs of the users.

Here, it should be borne in mind that cultures are not absolute or eternal values; even more important is the realization that humans are humans and have human needs that neither the cultural nor the pragmatic view should be allowed to abrogate. Among these needs belongs, first and foremost, the need to self-determine one's relationship to one's culture and to the culture of the host country. As pragmatic researchers, we should consequently steer a middle course between the extremes of pious romanticism and bone-hard realism, as I have indicated elsewhere (Mey, 2004) (*see* **Intercultural Pragmatics and Communication**).

Conclusion: 'Out of the Waste Basket'

From its humble beginnings as a place where one could deposit the unsolved (and perhaps unsolvable) problems that the classical parts of linguistic studies (such as syntax and semantics, perhaps even phonology) wanted to get rid of, at least temporarily, to the present state of pragmatics as a fully fledged representative of the linguistic disciplines, not much time has elapsed.

Forty odd years ago, the famed Israeli linguist Yehoshua Bar-Hillel (1971) coined the catchy phrase that figures at the head of this section; in his opinion, pragmatics served as a temporary stop for all the things that syntax and semantics could not deal with: a kind of linguistic waste basket. Now, not so many decades later, the waste basket has served its function – I am not saying it is quite empty yet, but we have managed to upgrade the basket to a more prominent position, and accorded it descriptive and explanatory status as a recognized field of language studies.

The relationship between pragmatics and the other linguistic disciplines, especially semantics and pragmatics, may still give rise to heated dispute (cf. what is said above; *see* **Pragmatics and Semantics; Phonetics and Pragmatics**), but nobody today would deny pragmatics its place in the sun. Moreover, pragmatic studies have diversified themselves into such various fields as second language education (*see* **Interlanguage**) and educational settings in general, questions of gender-based language use and language discrimination (*see* **Gender and Language**), the intercultural dilemma of assimilation vs. ghettoization (*see* **Intercultural Pragmatics and Communication**), the struggle for linguistic rights and the fight against linguistic imperialism (*see* **Linguistic Rights; Pragmatics: Linguistic Imperialism; Linguistic Decolonization; Minority Languages: Oppression; Multilingualism: Pragmatic Aspects**), and so on. Even recent developments in the area originally known under the label of human–computer interaction have begun to recognize the impact of pragmatic thinking (*see* **Cognitive Technology; Adaptability in Human-Computer Interaction**).

What this shows is first that pragmatics is not a unified discipline in the sense that it acknowledges a unique method and focuses on only one object. Second, the diversity of the areas where pragmaticists are active is best captured if we consider pragmatics not to be an independent component of linguistics (on a line with, say, semantics or syntax) but rather as a perspective on the way we study language – a perspective that at the same time informs our study of human interaction in the direction outlined above. As the British pragmaticist Norman Fairclough has observed, the pragmatic perspective being a critical one, it examines and states "the conditions under which interactions of a particular type may occur" (Fairclough, 1995: 48) – interactions that include speech acting, conversational interaction, language use in institutional settings, the discourse of literature, the prescribed language use in schools and other official surroundings, the language of sexual oppression and counter-oppression or emancipation, the fight for linguistic rights, and so on and so forth. Fairclough continues: "such a statement cannot be made without reference to the distribution and exercise [of power] in the institution and ultimately, in the social formation," that is, in society at large. (Fairclough, 1993: 48; Mey, 2001: 320–321). On the notion of perspective, see further Haberland and Mey (1977: 21), Verschueren (1999: 7), and Mey (2001: 9–11) (*see* **Power and Pragmatics; Critical Language Studies**).

See also: Adaptability in Human-Computer Interaction; Bakhtin, Mikhail Mikhailovich (1895–1975); Class Language; Classroom Talk; Cognitive Technology; Context Principle; Cooperative Principle; Deixis and Anaphora: Pragmatic Approaches; Gender and Language; Intercultural Pragmatics and Communication; Interlanguage; Labov, William (b. 1927); Linguistic Decolonization; Linguistic Rights; Literary Pragmatics; Marxist Theories of Language; Maxims and Flouting; Minority Languages: Oppression; Multilingualism: Pragmatic Aspects; Phonetics and Pragmatics; Pragmatic Acts; Pragmatic Presupposition; Pragmatics and Semantics; Pragmatics: Linguistic Imperialism; Relevance Theory; Saussure, Ferdinand (-Mongin) de (1857–1913); Social Aspects of Pragmatics; Speech Acts; Speech Acts and Grammar; Speech Acts: Definition and Classification; Voloshinov, V. N. (ca. 1884/5–1936).

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Prague School

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The Prague linguistic circle was founded in 1926 and the Prague school, which it represented, was soon acknowledged as having systemized phonology. Its members played a crucial role in several basic branches of linguistics. A characterization of the school was presented by Vachek (1964, 1966) and by Leška (1995, 1996), see also Sgall (1997) and especially Vachek's (1960) *Dictionary,* published in English by Dušková (2003) with the inclusion of Čermák and Hajičová (2003), where relevant bibliographical data can be found. The School formulated its findings neither in a unified framework nor in a fully explicit way, but they were fruitful and still offer many substantial starting points for a systematic description of language as an essentially interactive system. Even earlier the main founder of the school, Mathesius (1911) analyzed issues of synchronic variation; having found inspiration with O. Jespersen, F. Brunot, A. Marty, and others. Ideas of the Moscow school and of the Russian formalists were brought to Prague by R. Jakobson.

The earlier prevailing Neogrammarian views, with their basically diachronic understanding of language, were changed toward what was best specified by F. de Saussure in his program of a synchronic

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Prague School

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The Prague linguistic circle was founded in 1926 and the Prague school, which it represented, was soon acknowledged as having systemized phonology. Its members played a crucial role in several basic branches of linguistics. A characterization of the school was presented by Vachek (1964, 1966) and by Leška (1995, 1996), see also Sgall (1997) and especially Vachek's (1960) *Dictionary,* published in English by Dušková (2003) with the inclusion of Čermák and Hajičová (2003), where relevant bibliographical data can be found. The School formulated its findings neither in a unified framework nor in a fully explicit way, but they were fruitful and still offer many substantial starting points for a systematic description of language as an essentially interactive system. Even earlier the main founder of the school, Mathesius (1911) analyzed issues of synchronic variation; having found inspiration with O. Jespersen, F. Brunot, A. Marty, and others. Ideas of the Moscow school and of the Russian formalists were brought to Prague by R. Jakobson.

The earlier prevailing Neogrammarian views, with their basically diachronic understanding of language, were changed toward what was best specified by F. de Saussure in his program of a synchronic

analysis of language as a system of signs (in the sense of 'sign' as a pair of 'signified' and 'signifying'), *langue,* distinguished from the use of language in discourse, *parole*. It was understood as necessary to see the collection of language phenomena as a structured whole (the structural view), i.e., as system, based on many kinds of relations or oppositions, between its units. N. Trubetzkoy's set of four types of distinctive oppositions, namely, bilateral–unilateral, proportional–isolated, privative–gradual–equipollent, and constant–neutralizable, is best known. Following de Saussure, the Prague linguists have always understood the language system in a sense similar to 'I-language,' i.e., neither as just a set of sentences, nor as a set of rules of an individual (ideal) speaker, but rather as a hierarchy of the building blocks of lexical and other complex units, with their features of different layers, which has been understood as shared by a body of speakers in general. Jakobson's general opposition of un/markedness was fundamental for the center–periphery distinction, understood as a gradual, scalar relation (see Battistella, 1995).

This structured whole, language, was understood as a functioning means of communication (the functional view). In one of the interpretations of the concept of function, functions of more or less elementary language units within complex wholes are studied, in the syntactic sense. In another understanding, 'function' is contrasted with 'means' ('tool'), and language as a whole is seen as a tool of communication. In still another sense, 'function' is opposed to 'form,' which comes close to de Saussure's binary understanding of sign. This offers a basis for understanding language as a set of levels, ordered either from meaning to expression (close to the speaker's view, stressed by Mathesius), or in the opposite direction. Thus, the levels of phonetics, phonemics, morphophonemics, morphemics, surface, and underlying syntax ('the meaning of the sentence') were established. In various discussions some of the pairs have been characterized as less fundamental than others; as for syntax, in Prague as well as elsewhere, a development from stressing surface to deposing it can be found.

Differing from the Bloomfieldian descriptive linguistics, the Praguian functionalists have also used criteria connected with oppositions intrinsic to meaning. Thus, they have been able to throw light on most different subdomains of language, from the distinction between phonetic sounds and phonemes to issues of sentence structure and linguistic meaning. Under the functional viewpoint, language was found to be of a teleonomic nature, i.e., to constitute a means–ends, or goal oriented, system as a tool serving a certain function and adapted to its requirements, i.e., to the needs of human communication. Enriching K. Bühler's approach, Jakobson (1960) distinguished six functions of language (and/or discourse), according to whether attention is primarily paid to relationships of an utterance to the context (referential function), to the speaker (emotive), to the message (poetic), to the addressee, to the communicative contact, or to the code. Jakobson's analysis of the teleonomic character of language was further discussed especially by O. Leška, M. Shapiro, F. Čermák, P. Trost, and P. Sériot. Inspired by this view, Jakobson opened new horizons in disclosing the systematic character of language development, determined by its goal-oriented nature, not just causally. The development of the intersubjective system is influenced by individual intentions of the speakers, who want to be both easily understood (avoiding too much ambiguity) and economical (reducing redundancy). Jakobson's 'therapeutic' changes restore the balance in the phonological and other subsystems, so that language can cope with the needs of communication. It remains to find means to identify the boundaries of these needs; if language behaves as a goal-oriented system, what is its regulating mechanism?

Functionalism was soon effectively applied on the two sides of the system of language concerning its minimal and maximal units, namely, handling both the nature of their sound patterns and the sentence structure in its relationships to communication. On the one hand, phonemics or phonology was created by Trubetzkoy (1939) and Jakobson as a new theory that regarded the sound patterns of languages as specific subsystems analyzed from the functional angle. The phoneme was established as the basic unit of this subsystem, the decisive criterion being that an opposition between sounds is linguistically relevant only if it serves to distinguish between semantically different words or other morphemes. In Saussurean terms, language was seen as basically consisting of a hierarchy of oppositions, and a general classification of oppositions was offered – prototypically based on markedness, binary or not, often constituting correlations, etc. On the other hand, Mathesius not only outlined a functional view of grammar (with important contributions by S. Karcevskij and others), but also devoted a concentrated effort to a structural description of the sentence understood as comprising a patterning primarily conditioned by the interactively based role the sentence plays in the context in discourse; thus, he integrated the topic–focus articulation (TFA, information structure) into the structural analysis of the sentence.

Also issues of poetic style and of the semiotics of arts were studied in close connection with the teleonomic view of language. R. Jakobson, J. Mukařovský,

and R. Wellek presented many-sided analyses of the interface between linguistics and aesthetics. These aspects of the Prague school theories, which have been of substantial impact on the theory of literature and on the semiotics of arts in many countries, cannot be pursued in detail in the present article. The relationships between linguistics and aesthetics are much looser today, although in certain domains the interface still is the object of revealing interdisciplinary studies, such as M. Červenka's analysis of functional sentence perspective (TFA) in poetry and fiction.

The approach to language as a means of human communication led to analyzing pragmatic aspects of the use of language and its varieties. Issues of stylistics, the functions and properties of standard language, 'functional languages' (comparable to what more recently has been called 'sublanguages'), other varieties of national language, and (individuating) styles were analyzed especially by B. Havránek, whose studies have been important for what preceded modern sociolinguistics and text linguistics. The intrinsic closeness of stylistics and the functional stratification of language is clearly to be seen in the complex situation of Czech, with its rich and controversial variety of the speakers' attitudes toward non-standard items in everyday speech (recently discussed by P. Sgall, F. Čermák, L. Bayer-Nerlich, and others).

Starting with the 1940s, both a considerable geographic expansion of the Prague school views and an extension of its research to most different subdomains of linguistics was achieved, although during the Nazi occupation the activities of the Prague linguistic circle were substantially restricted. R. Jakobson, who had to emigrate, found a possibility to deepen the principles of the school, applying them to fundamental issues of language structure (in part together with M. Halle), and initiating a large-scale deployment of research based on Praguian principles in the United States in the domains of Slavistics, general phonemics, and semiotics, concentrated around the journal *Word* and including the personalities of C. H. van Schooneveld, A. Martinet, L. Matějka, M. Shapiro, D. Worth, E. Stankiewicz, and many others. Also in Europe the impact of the school continued to be felt. Although scientific and personal contacts between the different parts of the continent were difficult, linguists such as J. Kuryłowicz, A. A. Reformatskij, R. I. Avanesov, P. S. Kuznecov, E. M. Uhlenbeck, M. A. K. Halliday, K. Heger, Y. Tobin, and others in different countries contributed substantially to the school's work and impact. Holenstein (1975) presented a deepened analysis of Jakobson's work. Schools of functionalist linguistics that came into existence in different parts of the world, as well as approaches of several Slovak and Czech linguists working abroad, such as A. V. Isačenko, Ľ. Ďurovič, J. Neustupný, and J. Toman, differ from each other, but nevertheless reflect Praguian views and methods to a higher or lower degree, and have substantially enriched Praguian traditions, which have found regular and broad reception in most Slavonic countries.

The development of the school in Czechia can be followed first of all thanks to various contributions and collections of articles published in the West; see Vachek (1983), Luelsdorff (1994), and Luelsdorff *et al.* (1994). The activities of the Prague linguistic circle, reassumed in 1945, were stopped at the beginning of the 1950s, but in fact, the tradition did not get lost, although the name of the circle was mentioned only rarely in Czech publications. The series of *Travaux du cercle linguistique de Prague* was virtually revived in the 1960s (thanks to J. Vachek and F. Daneš) in the shape of the *Travaux linguistiques de Prague,* which was stopped with its fourth volume after the Soviet-led invasion. In 1989 O. Leška initiated the revival of the circle, and the publication of its *Travaux;* four volumes have been published already by J. Benjamins (Amsterdam and Philadelphia, with a parallel English title: *Prague linguistic circle papers*).

A structuralist approach to the typology of language was elaborated by V. Skalička, who – inspired by the teleonomic approach, Jakobson's implicational laws, and V. Mathesius's 'characterology of languages,' – worked with probabilistic relations. As P. Sgall pointed out, a single predominant feature of each of the types can be specified, from which the probable presence of other features can be deduced and which concerns the way of expression of grammatical and derivative values (by free or bound morphemes, by alternations, and by the order of the lexical items).

The understanding of the levels of the language system was deepened especially by B. Trnka and O. Leška. Trnka's writings, which already earlier started the phonological analysis of English and contributed to a characterization of the role of structural linguistics in the thought pattern of the first half of the 20th century, were continued by J. Vachek, whose work has been equally significant for an explanation of the role of written language. I. Poldauf's inquiry into syntax (postulating a level of evaluational expression of the speaker's attitudes) and L. Dušková's analysis of the verb system confirm how fruitful a comparison of Czech and English has always been for Czech linguistics. A systematic approach to word formation (derivology) was formulated by M. Dokulil, and the morphophonemics of Czech

found a profound analysis in the writings by M. Komárek.

Most important for the fundamentals of structural syntax have been the writings of a French member of the circle, L. Tesnière, representing the first systematic elaboration of dependency (valency-based) syntax. E. Pauliny understood the valency ('intention') of the verb as being primarily linked with functions of cases. Inspired by the Saussurean opposition between linguistic (literal) meaning and cognitive content, also discussed by L. Hjelmslev, E. Coseriu, and others (not without connection with Jakobson's view of meaning invariants), M. Dokulil and F. Daneš characterized the level of 'sentence meaning' (one of the first versions of underlying syntax) as a linguistic patterning of the layer of ontological content, i.e., in recent terms, a level of interface between the system of language and the semantico–pragmatic interpretation, helping to distinguish the language system from both its underlying cognitive categorization and its semantic interpretation. The present-day theory of valency (P. Sgall, J. Panevová) is being extended from the domain of verbs to nouns and other word classes and includes a distinction between two oppositions: along with the classification of the types of dependency themselves (valency frames or grids, i.e., inner participants and 'free' circumstantials, or arguments and adjuncts), another opposition concerns the relationships between a valency grid and the (larger or smaller classes of the) head words; prototypically, but not always, an argument is obligatory, and an adjunct is optional (peripheral cases are, e.g., obligatory adjuncts, such as with *to behave somehow, to arrive somewhere*). Syntax has been studied as reflecting the impact of factors originating in everyday speech esp. by M. Grepl and P. Karlík in Brno.

The division of the sentence into topic and focus (theme and comment or rheme), based on the cognitive opposition between 'given' and 'new' information, was analyzed by Firbas (see 1992), who introduced the opposition of contextually bound and nonbound items and 'communicative dynamism' as a scale proceeding from theme proper (typically at the beginning of the sentence) to rheme proper (marked by the sentence stress), as well as by F. Daneš, A. Svoboda, and others. Attention has been paid to the issues of negation and presupposition, to which E. Hajičová added the concept of allegationas a specific type of entailment. It has been demonstrated the dichotomy is relevant for the truth conditions of the sentence (cf. e.g., *She writes her dissertation on SATURDAYS* vs. *On Saturdays, she writes her DISSERTATION.*); thus, the dichotomy is an inherent part not only of an interpretation of an utterance (sentence occurrence in a discourse), but also of the underlyingsentence structure. F. Daneš pointed out how the 'thematic progressions' relate the theme–rheme dichotomy of an utterance to its position in a discourse (the theme often being coreferential either with the rheme or with the theme of the preceding utterance). Daneš and his collaborators have contributed many-sided analyses of relationships between sentence structure and various aspects of discourse patterns.

A new support for lexical as well as grammatical inquiries has been offered by the recent progress in corpus linguistics, achieved by the build up of the Czech National Corpus, which allows for providing online information on most different properties of individual word forms, lexical items, and other units in written Czech. A complex system of semiautomatic grammatical annotation of texts from the corpus has been prepared as a basis for the Prague dependency treebank, designed by J. Hajič and others. The treebank includes a morphemic tagging, the 'analytical' or 'surface' representations (having the shape of dependency trees, the nodes of which correspond to all word occurrences, including function words and punctuation marks), and the underlying tectogrammatical representations (TRs) in the sense of FGD (see below). A difficult work aiming at a corpus of spoken Czech has started already in Prague as well as at Masaryk University in Brno.

Discussions about the arbitrary character of the linguistic signs have led to a modified form of the Saussurean tenet, taking into account a limited intralinguistic motivation. This view, reflected already in V. Mathesius's distinction of descriptive (motivated) vs. simple nomination, has been further elaborated primarily in the domain of idioms. The difference between Praguian approaches and the framework of sign-based linguistic theory as known from the Schooneveldian trends might not be that large as is sometimes believed.

One of the major controversies in the past was whether de Saussure's distinction of synchrony–diachrony is satisfactorily established. Jakobson and Trnka especially raised numerous objections against this distinction, not linking this opposition with the crucial notion of the state of language, which in each of the historical periods must have its own system.

The discussions briefly characterized above offered an appropriate basis for a fully explicit, formal, and electronically implementable formulation of the framework of language description, which, initiated by P. Sgall in the 1960s, was elaborated by the research group of theoretical and computational linguistics at Charles University, Prague (E. Hajičová, J. Panevová, P. Pit'ha, Z. Kirschner, J. Hajič, A. Bémová, E. Buráňová, and others) as functional

generative description (FGD; see Sgall *et al.,* 1986; Hajičová, 1993; Sgall, 1993); the empirical adequacy of FGD is being checked with the help of the work on PDT. FGD uses a dependency based syntax with which the underlying, tectogrammatical representations (TRs) of the sentence core have the form of dependency trees. The complex labels of the nodes of these trees indicate (a) lexical meanings, and (b) values of grammatemes, i.e., morphological categories such as tense, aspect, number, etc. The labels of edges indicate the valency slots or kinds of the dependency relation, i.e., arguments (actor, addressee, objective, origin and effect in Czech as well as in English, French, German, Russian, and other languages) and adjuncts (means, locative, manner, different directions and temporal modifications, conditions, cause, aim, comparison, etc.). Other kinds of syntactic relations are those of coordination (conjunction, disjunction, and others) and apposition. Their interplay with dependency cannot be accounted for by trees, for more than two dimensions are needed. However, the relationships of the different dimensions are strongly restricted by such conditions as that of projectivity (adjacency) and similar restrictions holding for the relationships between coordination and the two basic dimensions of the tree. Thanks to these restrictions (not relevant for the morphemic representation, which has the form of a string of morphemes and their parts), the representations can be handled by limited means; they can be denoted by a linearized version of the TRs, namely by a parenthesized string of complex symbols, which is not substantially more complex than the formulas of the proposition calculus. Thus, the core of the sentence can be understood as patterned in a way that does not substantially surpass general human mental abilities. This may help understand why the child's acquisition of language is relatively easy, being supported more by the interactivity of language use than by a complex innate mechanism.

The TRs include a specification of the topic–focus articulation, expressed mainly by an interplay of word order and sentence prosody (especially the position of the intonation center); in the TRs it is represented by the left-to-right order of the nodes, with the topic standing to the left of the focus. The systemic ordering of the complementations underlies their canonical order, which determines the degrees of communicative dynamism within the focus. Thus, if A precedes B under the systemic ordering, B can only be less dynamic than A in a sentence, if B is contextually bound, i.e., primarily belongs to the topic: compare, e.g., *We came from a small village to an industrial town* (where the *from* group belongs to the focus on one reading and to the topic on another) vs. *We came to an industrial town from a small village* (where the to group belongs to the topic on all readings). The prototypical position of such specific items as negation and particles such as *only, even, also* is such that they semantically operate on the focus. On the basis of a principled discussion, these issues have been investigated by Hajičová *et al.* (1998), together with an analysis of the relevant aspects of the semantico–pragmatic interpretation of the sentence using the framework of formal (intentional) semantics.

Prague linguists always have paid attention to issues of discourse. An utterance, i.e., an occurrence of a sentence in a discourse, has been understood as an act of *la parole* that is identified by the unity of the speaker, time, and place and may be interpreted as an elementary semiotic reaction to an impulse of some sort; its study represents the first major breakthrough into the territory of the process of communication. The theoretical approach to discourse has been connected in Prague with several other aspects of the functional structuralism, from the attention paid here to stylistics down to the teleonomic views mentioned above. Relationships between sentence structure and discourse have been discussed by Sgall, who points out that underlying representations (TRs) may only serve as a starting point for semantico–pragmatic interpretation if the reference of the individual referring items is specified, on the basis of which a proposition as a function from possible worlds to truth values is determined. The way toward discourse semantics can then be traced, especially if the notion of discourse referent is enriched in what concerns the contextual boundness of the given item. Another enrichment concerns the basis for the choice of antecedents in cases of coreference, consisting of the hierarchy of salience of the elements of the set of referents that are understood by the speaker to be easily accessible to the addressee in the given time point of the discourse. This set, called the stock of shared knowledge, displays dynamic properties, certain aspects of which have been studied by Hajičová *et al.* (1998) Further contributions devoted to the nature of communication and to different aspects and kinds of discourse, from everyday dialogue to the language of advertising, have been recently presented by F. Daneš, J. Kořenský, S. Čmejrková, J. Hoffmannová, and others.

It may be claimed that all of the notions referred to above, representing an organic and compact blend of both prewar and postwar thinking, have become international and are also being used, in varying degrees, in non-Prague milieus. Their impact may be different in different countries, but all of them seem to have remained stimuli for others.

See also: Copenhagen School; Functional Discourse Grammar; Glossematics; Information Structure in Spoken Discourse; Sgall Petr (b. 1926); Structuralist Phonology: Prague School; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Vachek, Josef (1909–1996).

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Prayer and Meditation

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Language plays a major role in prayer and meditation in all the world's religious traditions. However, there are enormous differences in what might be understood by the terms language, prayer, and meditation in different religious traditions. This article explores aspects of these understandings in a variety of religious traditions.

The earliest forms of prayer and meditation which we can investigate are those of the religious traditions of hunter-gatherer peoples whose cultures survived into modern times. Studies of cultures such as those of the Amazonian Indians have shown that activities akin to prayer and meditation form an integral part of these traditions. Indeed, it is also clear that language plays an important role in these activities, both in terms of spoken supplications to spirits and in terms of descriptions of states of spirit possession which are a feature of the religious traditions of hunter-gatherer peoples.

It is also apparent that in these religious experiences there is reversal of what might be seen as the normal role of language, to be a system of symbols by which communication about the nature of the world we live in is carried out. Instead language becomes an act through which the world is created. It could be argued indeed that this is a distinctive feature of language in prayer and meditation, language takes on the role of that which summons up the world and creates the reality in which the religious practitioner exists.

This idea of the word actually creating the world is at the heart of the Judeo-Christian tradition where it is the word of God which sets in motion the creation of the world itself. The power of the act of speech is also integral to earlier Middle Eastern religious traditions. Thus in Egyptian and Babylonian traditions, prayer forms a major part of religious activity. Indeed, the earliest written prayers may well be those from Egyptian tombs where, during the fifth dynasty in around 2400 B.C., written lists of offerings to the gods developed into written versions of prayers to the gods asking for their blessings for those who were beginning the journey into the afterlife.

See also: Copenhagen School; Functional Discourse Grammar; Glossematics; Information Structure in Spoken Discourse; Sgall Petr (b. 1926); Structuralist Phonology: Prague School; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Vachek, Josef (1909–1996).

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In a sense it is quite possible to see a development from the invocations of spirits in the religious traditions of hunter-gatherer peoples through to the notion of prayer as a form of address to a monotheistic deity in the Judeo-Christian tradition.

The development of meditation in Judeo-Christian tradition is often linked to the Essene traditions, which were desert-dwelling ascetic traditions of the Middle East. The role of language in the early contemplative practices of Christianity can be glimpsed through texts such as the Nag Hamadi texts, or the Dead Sea scrolls, as they are sometimes called. In these it is evident that contemplation of the names of God was an element in meditation practices. In the Jewish Kabbalah there is also a strong tradition of meditation on the letters of the alphabet, and on manipulating the letters of the alphabet into mantra-like focuses of concentration in meditation.

It is also perhaps in relation to these Middle Eastern traditions that one of the origins of the notion of the inherent sacredness of the written word can be glimpsed. In the context of the meditative communities dwelling in the deserts, the act of writing sacred scripture became part of the meditative life itself, and this tradition was carried on into the Middle Ages and led to the production of glorious illuminated manuscripts such as the book of Kells.

Another development of the Middle Eastern tradition of reverence for the written form of sacred texts is strongly manifest in the Islamic tradition where, due to a prohibition on the representation of human forms in sacred spaces, a tradition of calligraphy developed. Middle Eastern traditions also incorporate singing traditions, such as Judeo-Christian hymns and chants and Islamic chanting of sacred texts as performed by Muezzins when calling the faithful to pray and by Sufis when they are practicing rituals to develop altered states of consciousness.

Prayer in its origins also has much to do with sacrificial ritual and invocations within rituals. In this context it is evident that the correct form of a prayer becomes a matter of major concern, for like a spell, if spoken incorrectly, it might not have any effect, or worse still, might summon up the wrong spirit altogether.

In South Asian tradition Vedic rituals were, and are, a cornerstone of religious culture. Prayer, in the sense of the invocation of the gods, forms a vital aspect of Vedic sacrificial rituals. It was also considered that the rituals would only be effective if the prayers were recited correctly. This was vital, because in South Asian religious traditions the performance of the ritual was seen as bringing the worlds of the gods and men into alignment. If there were no sacrificial rituals performed, or they were performed incorrectly, the world, and its inhabitants, would not be looked on beneficially by the gods.

Vedic traditions were initially nonwritten, so in order to ensure that the texts were remembered correctly, elaborate training in chanting the texts was practiced. For instance, there are normally said to be four Vedas, sacred texts, and one of them is basically concerned simply with how to correctly remember and recite the other three Vedas.

To the extent we could separate out a category of prayer in Indian tradition we might also identify it with the tradition of *stotra,* verses recited in praise of particular deities. These often also include enumerations of the names of the manifold forms of particular deities in works such as the 'Thousand Names of Visnu' (*vishnusahasranama*). However, it could be argued that a feature of Indian tradition is that such works are both prayers, entreaties addressed to deities, and also meditations on deities. Indeed, the notion that we might seek to separate out prayer and meditation into two mutually distinctive categories does not spring naturally from the terms and ideas practised in South Asia.

India is also famous as one of the cultures in which meditation traditions developed. There are references in the Vedas to what appear to be meditative practices and clear accounts of meditation in the Upanishads. That language is an important aspect of meditation is also stressed, and there are descriptions of meditation upon the names of gods and of meditation on the sacred sound 'om' as being a key element in some meditation practices. 'Om' is often envisaged in India as the primal sound from which all of creation is manifest.

In the medieval period in India during the growth of the devotional cults based around loving devotion, or *bhakti,* the name of god also assumed great significance. For those who followed the path of devotion to a formless deity it became synonymous with the deity in its self. There are numerous stories that emphasize that even the utterance of part of the name of god is sufficient to form an entreaty to them for aid. For instance there is a story in the *Bhagavata Purana* about an elephant who was being attacked by a crocodile and uttered the sound 'ra' in a roar of pain, and as this is the first syllable of the name Ram it was sufficient to attract the attention of Ram who rescued the elephant from his predicament. Such stories are normally told in the context of praising the virtue of chanting the names of god. The practice of chanting the names of deities such as Krishna and Ram acts both to foster in the devotee the virtues and qualities of the deity and also to attract their attention so that they may look sympathetically on the devotee. Chanting the names of god is at once a form of prayer, a supplication to the deity, and a form of meditation.

It should be mentioned that a particular form of chanting practiced in some forms of Hindu devotional tradition is what is called the chanting of the unchanted chant, the *ajapa jap*. The practice of chanting the unchanted chant is said to lead to the cognition of the 'unstruck sound' the *anhad nad,* which is a sound which is not a sound, but rather the fundamental sound of the universe audible only to the practitioner in deep meditation.

The chanting of the names of god is also a feature of Buddhist practice. Buddhism developed in South Asia and shares in various characteristics of its practices, which are often identified with Hinduism. However, there are normally important ways in which Buddhist tradition attributes new values and significance to its practices. A common ground of ritual activity in South Asia is the practice of *puja,* the adoration of a particular deity which is invited to enter into some form of physical manifestation, such as an image, and is then worshipped by various means such as offerings of lights, incense, food, drink, and words of praise and supplication. Language is an intrinsic feature of such rituals, as without invocations and resolutions the ritual cannot begin, and without utterances honoring the spirit or deity invited, or the Buddha, it cannot be brought to completion.

Buddhist meditation traditions take various forms, in some of which language has a greater focus than in others. In insight meditation (*vipassana*) practitioners seek to identify the ways in which all phenomena are by nature without self essence, impermanent, and unsatisfactory. In such practices language is used in order to break down the elements of experience into basic phenomena, but in itself is not a subject of meditation. Likewise in calming meditations (*samatha*) practices, language is used as a tool for meditation, but is not itself an object of meditation.

It is more fruitful to look rather at Buddhist meditation practices that involve meditations on mantras of particular forms of the Buddha. These are typically found in Tantric traditions, as practiced in Tibet in the modern world. In these there is a conscious use of language as part of meditation and ritual. However, it is important to note here that, in this context, it is explicit that language must refer not only to spoken utterances, but also to bodily actions and to visual representations. A Tantra in this sense involves all the senses; it is at once a ritual, a symbolic diagram (often called a Mandala in English today), a set of texts to chant, and an oral tradition of interpretation of those texts handed down from master to disciple.

I mentioned earlier that, in an apparent inversion of the normal worldly function of language as a way of understanding the world, in prayer and meditation language becomes a way to create the world. This is perfectly epitomized in Tantric practices, in which the first stage of a Tantra is the generation of a world, a realm in which the actors play their parts, the practitioners inviting the various deities to manifest their presence. However, it is then followed by a dissolution stage, in which the world created by the ritual, through the language of sound, symbol, and action, is dissolved into the ultimate state of nothingness from which all things emerge. Finally, at the end of the ritual, the practitioners once more emerge into the conventional world in which they began the ritual.

Language is thus an integral part of prayer and meditation in the religious traditions of the world, and it is notable that it plays a key role in the way that it acts as a way in which the religious practitioner is able to summon up spirits and, in a sense, create the world itself.

See also: Bible; Glossolalia; Islam and Arabic; Judaism; Qur'an; Religion: Overview; South Asia: Religions.

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Preaching

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Although the term 'preaching' is often associated with religions descended from Sarah and Abraham, similar phenomena (sometimes with differing names and nuances) occur in many other religious movements. The following is a broadly based functional definition (Osborn, 1976: 53–54):

> Preaching is a human activity characterized by specific marks: (1) It is a sustained mode of public address, (2) dealing with a religious or ethical theme, (3) bearing witness to the faith of a community, (4) rooted in a holy tradition (a tradition defined in a sacred 'literature'), (5) occurring within an assumptive world of rationalized belief, (6) communicated through the person of the speaker, (7) employing the forms of verbal art, (8) possessing the character of immediacy, (9) intended to convert the listener, (10) conveying powers of renewal to those who hear.

To be sure, not all elements of this definition are present in every understanding of preaching. For instance, some groups regard preaching as intended less for conversion and more for teaching and nurture. Within particular religions, different groups understand preaching in different ways.

Functions and Forms of Preaching in a Sampling of Religions

In most Christian congregations, the sermon is given by a minister, priest, or other person designated by the congregation or the Holy Spirit. The content of the sermon is typically an exposition of a biblical text or Christian doctrine or a theological interpretation of a personal or social situation designed to help the congregation discern God's leading and to respond accordingly. In some churches, the sermon at the regular time of worship is designed for both nurture and conversion, whereas in many congregations the sermon is aimed primarily at building up the congregation, with evangelism (offering opportunities for conversion) taking place in other services and at other occasions.

In Judaism, as part of the synagogue service, the rabbi typically gives the sermon. The function of the Jewish sermon is indicated by the title 'rabbi,' which in Hebrew means 'teacher,' whose calling is to reinforce the identity of the community and to help the community determine how to live and witness faithfully. The rabbi often takes a text from the Bible (or the Talmud or some other significant source of religious insight) and explains the meaning of the text and its implications for today. Rabbis sometimes develop topical sermons on significant personal or cultural issues; that is, instead of focusing on a particular sacred text, the sermon focuses on the theological interpretation of a social, political, or personal issue.

In Islam, a primary responsibility of the imam (leader and teacher of the mosque) is to lead the worship of the community, called the *salat*. The imam not only calls out the ritual words but also models the physical postures that are a necessary part of the worship. The congregation follows the lead of the imam. Portions of the Qur'ān are read. The mosque typically contains a pulpit for the sermons that are given on Friday either at noon or at sunset. The Friday worship includes a preacher (*khaṭīb*), normally the imam, who gives a sermon (*khuṭbah*) that is relatively short and that explains aspects of Muslim doctrine, exhorts the congregation to faithfulness, and warns against departing from aspects of Muslim devotion and life. Preachers sometimes comment on social and political matters from the perspective of the convictions of Islam.

Indigenous religious life in Africa varies greatly from area to area and from group to group. However, many different African peoples, especially in West Africa, contain a figure often called the *griot*, who performs a function similar to preaching in the three religions previously discussed. The griot tells the stories that tell the community of the origins of the world, the emergence of the community and its genealogy, along with the purpose of the community and how to live so as to fulfill that purpose. The griot sometimes uses musical forms in narrating the community's story.

The religious lives of Buddhists, Hindus, and Confucians do not presuppose the importance of weekly congregational gatherings with a sermon that are constitutive of Christianity, Judaism, and Islam. Worship in the former religions tends to take place in smaller groups (e.g., with other members of one's household) of even individually. However, each group has moments of encounter when guidance or exhortation takes place that is similar in function to that of preaching. As the following discussion makes clear, worship within these groups can be quite diverse.

Soon after Enlightenment, the Buddha gave a discourse on meditation and Enlightenment that is sometimes referred to as a sermon. However, the heart of Buddhist worship is personal meditation that sometimes takes place at a temple. Some Buddhist groups in North America do gather for worship that

occasionally includes a sermon (usually instruction in meditation). Buddhism contains enlightened teachers whose instruction is usually given to individuals or small groups but that functions for Buddhists much like the sermon in Christianity, Judaism, and Islam. Buddhism also honors a holy person whose spiritual experience is so deep that it cannot be described in words. Indeed, the riddles of the Zen masters testify to a knowledge that is beyond communication.

Hinduism teaches that God is within every entity in the cosmos as well as transcending the cosmos. Each soul is divine. A goal of worship in Hinduism is for people not only to become aware of that divine essence but also ultimately to experience it directly. Although Hindus have temples where worship takes the form of prayer and meditative rituals, individuals engage in such actions at their own pace. Even in North America, where occasional Hindu groups do meet at specified times for worship with a more communal character, there is seldom a sermon. However, in Hinduism the guru in settings outside worship performs the function of the sermon by educating the people in the basic principles of Hinduism and in how to apply them to life. Hinduism, like Buddhism, honors the holy person who does not give instruction, but who lives a spiritual existence unaffected by the cosmos, due to community with the divine in modes that go beyond words.

Although Confucius intended not to found a religion but to teach morality and social doctrine, a religious movement grew up after him. At the heart of Confucius's teaching is the belief that the deepest moral values of the universe can be manifest in everyday courtesy and respect. Although the Confucian sage does not continue this tradition of instruction in communal worship, the sage does carry out one of the key functions of such preaching in other settings by showing how universal truth applies to current life.

Preaching in Historic Christian Movements

Preaching functions in slightly different ways in historic Christian movements. Within each of these movements, the preaching is often adapted to the particular culture of the local community. For instance, preaching in African American churches related to the historic Wesleyan movement often incorporates qualities associated with African religions. Preaching in a Reformed Hispanic congregation often manifests qualities of Hispanic life.

In the Orthodox churches, the sermon is not simply an interpretation of doctrine or the Bible but functions much like an oral–aural icon. An icon is a medium through which the congregation experiences the heavenly world. At its optimum, listening to the sermon is a means of participating in the theological reality bespoken in the sermon.

The Second Vatican Council (1963–1965) gave Roman Catholic preaching its current shape by identifying four emphases for the sermon: (1) The sermon is to be biblically based and (2) work together with the Christian year and the lectionary and other parts of the service while (3) announcing God's good news for the world (and not simply imparting moral guidance) in (4) language and style that is familiar to the people. Preachers can employ a variety of sermonic styles and can refer to their personal experience.

Like its counterpart in the Roman Catholic tradition, the sermon in the Anglican communion derives from a passage in the Bible, is integrated into its liturgical setting, is (usually) eucharistic, is kerygmatic, and is in the language of the social context. A lectionary provides the Bible content and the preacher's calling is to help the community interpret how the passage connects with motifs from the Christian year and Christian doctrine. These churches believe that the Holy Spirit manifests the Real Presence of Christ through the homily.

Lutheran sermons also focus on texts from the Bible offered by a lectionary and in the setting of the Christian year. Many Lutheran sermons begin with law, with its double indication of sin and the inability of humans to save themselves, and move to gospel, with its news of justifying grace. Lutheran preaching often also guides the community in responding to grace. Some Lutherans regard the pulpit as a combat zone between God and the devil.

The Reformed sermon is a teaching event. The preacher often indicates how God's grace is assumed in a biblical text, names ways that grace continues to work, and guides the congregation in response. Calvin spoke of a third use of the law as providing direction for life. From the Reformation into the late 20th century, much Reformed preaching was based on *lectio continua* – that is, preaching sequentially through books of the Bible.

At the time of John Wesley, sermons had become quite ornate. Wesley believed such preaching obscured the plain truth of the gospel and sought simple and direct sermons that gave the Holy Spirit optimum opportunity to work in the believer and the community. Wesleyans seek for the community to become cognizant of its need for God and of Christ as God's compassionate response. The sermon points the community toward living the sanctified life.

For Anabaptists, the sermon is typically the focal point of the hour of worship. Starting from a biblical text or theme, the preacher seeks to convict the

congregation of its sin and to awaken the desire to repent. More important, the sermon points the community to God's grace in Jesus Christ. In many Baptist congregations, the sermon concludes with an invitation to the unconverted who are present to make a confession of faith and to be immersed. The churches that began in the radical reformation add emphasis on the community keeping itself distinct from the world to maintain the distinctiveness of its witness to the world. The sermon, then, includes ways of helping the people maintain their distinctive life and witness in the large social setting.

Silence plays a major role in the worship of the Society of Friends as they wait for the Spirit to move some in the community to speak. Many Friends believe that the risen Jesus directly speaks to the community through the silence and through worshippers who are moved to speak. The risen Jesus continues directly to teach the contemporary community by means of the Spirit speaking through members. Some meetings (as congregations are called) are unprogrammed – that is, they take place in almost complete silence. Others are programmed – that is, they are more like services of worship in other Christian denominations and include a sermon as well as a significant period of silence. The sermon can be an occasion for the risen Jesus to teach the congregation.

Pentecostal worship is centered in the immediate experience of the Spirit, who fills believers and preachers with ecstasy that is often evident in speaking in tongues. Such churches believe that the Spirit moves through the preacher and the sermon. Indeed, some Pentecostal pastors so rely on the inspiration of the Spirit that they make little or no preparation for the sermon. Most Pentecostal ministers believe that the Spirit can anoint the process of sermon preparation. However, they also remain open to the spontaneous leading of the Spirit at the moment of preaching. Pentecostal preaching calls particular attention to the presence of the Spirit in the Bible and in the immediate life of the congregation and provides guidance for the congregation to respond.

Although of recent origin and existing mainly as independent congregations, Bible churches and community churches (and congregations that are known similarly) long for forms of worship and Christian life that are in harmony with simple biblical Christianity. Centered in a divinely inspired Bible, the preacher is set aside by the congregation to explain the theological meaning of the Bible and to name its implications for the present.

Within several of these historic families, there are four different contemporary theological emphases that lead to different qualities in preaching. Some preachers are evangelical or fundamentalist in theology. Believing that the Bible is divinely inspired, they see the work of the sermon as clarifying the Bible and applying its truths directly to today's world. Postliberal theology seeks to narrate today's congregation into the world of the Bible. The preacher interprets the world of today from the perspective of the biblical text. Revisionary theology explores mutual critical correlation between the Bible and the world. The revisionary preacher asks how contemporary perspectives on the world prompt the community to revise its understanding of the Bible and how the Bible urges the community to revise its understanding of the world. Liberation theology sees God's primary work as that of liberating individuals and communities from multiple (and often interlocking) forms of oppression. The liberation preacher names repressive powers, shows how God is acting to free people from them, and suggests how people can take liberating actions.

See also: Christianity, Catholic; Christianity, Protestant; Islam and Arabic; Judaism; Prophecy; Reformation, Northern European; Sacred Texts: Hermeneutics.

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Predication

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The predication relation was introduced into discourse about language by Aristotle in 'On Interpretation,' (paragraphs 5 and 6) when he defined a proposition as an instance of predication, which "asserts or denies something of something." He thus introduced into philosophical and linguistic discussion two central ideas: (a) the syntactic idea that a proposition has a binary structure, with one element, the subject, making reference to an entity and the other expressing a property, and (b) the semantic idea that asserting a proposition involves an act of asserting that an object, the reference of the subject argument, has a property expressed by the predicate. Thus, an assertion of *John is happy* is true if the denotation of the subject argument *John* has the property expressed by the predicate *is happy*.

The concept of predication played a central role in traditional grammatical discourse, and the division of a sentence into subject and predicate, became a commonplace of traditional parsing techniques. However, an understanding of what a subject and predicate actually might be waited until the techniques of modern logic and linguistics, when two questions in particular came to the center of the discussion. The first is the question of why the predication relation is so important, which could be discussed only after Frege had formulated his distinction between saturated and unsaturated linguistic entities. The second question is why one referential argument, the subject, has a privileged or distinguished position in the sentence, and progress on this point had to wait for the structural tools of modern generative syntax. This issue in fact never arose for Aristotle, since he dealt only with single-argument sentences such as *The ship sailed*, but it arises as soon as we look at sentences such as *The sailors sailed the ship*.

The major breakthrough for predication (and in fact semantics in general) came with the work of Frege at the end of the 19th century. Frege drew the distinction between saturated and unsaturated expressions. A formally unsaturated expression is an expression that contains an empty position filled by a variable, as in the mathematical expression $x + 2$, whereas a saturated expression is one that we naturally think of as denoting an object (for Frege, either an individual or a truth value). An unsaturated expression, or function, applies to a saturated expression or argument and yields a value or an output. Thus $x + 2$ applies to an argument, for example 3, to yield a value that is the denotation of the saturated expression. In this case, the value of the saturated expression $3 + 2$ is the same as the denotation of 5.

Frege saw that linguistic expressions could be analyzed in the same way. The expression *The capital city of x* can be analyzed as a function that has as its denotation, or value, a different city depending on which name replaces the variable *x*. *The capital city of Germany* denotes Berlin and *The capital city of the UK* denotes London. Similarly, a predicate such as *x is happy* can be applied to an argument expression

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such as *John* or *the boy* to yield a sentence, which has the value true or false, depending on whether or not John is or is not happy.

Frege's insight that complex expressions could be built up compositionally from simple saturated and unsaturated expressions, by a recursive process of functional application, was at the root of much progress in logic and semantics, as can be seen in the work of Montague (1970) and the formal semanticists who followed, and the work of Bar-Hillel and the categorial grammarians, all of whom focused on issues of compositionality. The issue of predication entered the syntactic discourse through the seminal work of Halliday (1967), who drew attention to secondary predicates, which were predicated of and expressed properties of local subjects, rather than sentential subjects. Halliday (1967) brought to the attention of linguists that predicative adjectives occurred with quite a limited range of meanings in constructions such as (1), and that the relation between the predicate and its local subject (in bold and italics, respectively) mirrored the semantic relation between the predicate of a sentence and the sentential subject, in the sense that if the sentence asserted was true, the subject had to have the property expressed by the predicate.

(1a) Mary painted the *house* **red**.
(1b) *John* drove the car **drunk**.
(1c) John drove *the car* **broken.**

Example (1a) is an instance of resultative predication, with the AP predicate expressing a property that the subject is asserted to have at the end of the action expressed by the verbal predicate; (1b) and (1c) are examples of depictive predication, with the AP predicate expressing a property that the subject is asserted to have while the action expressed by the verbal predicate is going on. Resultatives are typically predicated of direct object arguments, while depictives, as the examples in (1) show, may be predicated of subject or direct object arguments.

It was Edwin Williams, who in a series of papers (Williams, 1980, 1983, 1987) brought predication into the domain of generative syntax. Although there had been quite a lot of discussion around the notion of subject, Williams was the first to tie it into a discussion of the subject predicate relation. For him, the central questions were how to explain the syntactic relation of a secondary predicate to its subject (in more modern theoretical language, to explain how the predicate AP is licensed, or integrated into the structure of the sentence), how to explain why the subject argument is distinguished, and how to draw the appropriate structural parallels between secondary and main clause predicates. He argued that predication is essentially a thematic relation, and that the syntactic predication relation was expressed via the assignment of thematic roles. A lexical head assigns thematic roles to its thematic arguments, and in general all but one of the thematic arguments is assigned to an argument syntactically realized inside the projection of the thematic head. The thematic role assigned outside the projection of the head is external. Williams argued that the subject of a predicate is the argument assigned an external argument, and the primacy of the subject follows from the basic syntactic distinction between external and internal arguments. Thus, in a sentence such as (1a), assigned the structure in (2), the adjective *red* assigns a thematic role outside the maximal AP projection that it heads to *the house* and that therefore is its subject. Williams showed that this mechanism of external theta-role assignment could be used to express sentential subject predicate relations also. In (1a), *Mary* is assigned a thematic role 'agent' by *paint* outside the VP projection of the head, and is thus the subject of the whole predicate *paint the house red*.

(2)

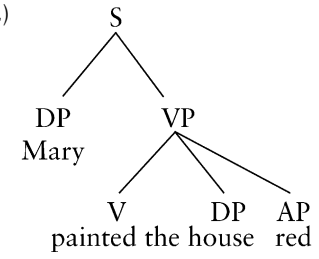

What Williams captured precisely in this account is the duality of the relation between the sentential subject and the verb: the subject is a thematic argument of the verb, but subject of the whole predicate phrase that the verb heads. Williams was not explicit about the semantic interpretation of the predication relation, but he assumes that the adicity of the lexical head (the number of thematic roles it assigns) directly reflects the adicity of a semantic relation denoted by the lexical head and that thematic role assignment is a syntactic reflection of a semantic relation. Williams was thus making implicit use of Frege's classification of linguistic objects into saturated and unsaturated. This became explicit in Williams (1987), where he presents an account of the mapping between syntactic representation and semantic representation, where he argues that unassigned thematic roles are interpreted as unsaturated variables in the semantic representation. Furthermore, argument traces (NP, or rather DP, traces) are to be analyzed as variables in the same way, and thus NP movement is ultimately reducible to the predication relation.

Rothstein (1983) and later Rothstein (1995, 2001) followed Williams in identifying predication as a

central mechanism in syntactic theory, but argued against identifying syntactic unsaturatedness with unassigned thematic roles. She argued that in order to analyze a sentence generally as an instance of a predication relation, it is necessary to recognize cases of predication that do not involve a thematic relation between the head of the predicate and the subject. This is because of the existence of pleonastics, or nonthematic subjects, examples of which are given in (3):

(3a) It seems that John will not arrive on time.
(3b) Il a été mangé trois pommes. (French)
it has been eaten three apples.
'Three apples have been eaten.'
(3c) ze meatzben Se dani meaxer. (Hebrew)
it irritates that dani is late.
'It is irritating that Dani is late.'

Rothstein argued that the Fregean saturated/unsaturated distinction is a primitive typal syntactic distinction between two different kinds of syntactic constituents: arguments and predicates. The typically referential constituents, DP and CP, are syntactically saturated and canonically serve as arguments, while the AP, PP, VP, and NP constituents are inherently unsaturated and can serve as predicates. Unsaturated constituents are typically saturated either directly or indirectly by predication (although NP arguments are saturated via determiner binding when they appear in argument position). Crucially, the syntactic relation between the pleonastic subject *it* in (3a) and the VP *seems that John will not arrive on time* is exactly the same predication relation as holds between the subject *John* and predicate *is happy* in the sentence *John is happy*. Rothstein argued that under this analysis, the distribution of pleonastic subjects in English could be completely predicted, and that the obligatoriness of the subject (expressed in Chomsky's 1982 Extended Projection Principle) could be explained. In particular, she gave an account of the obligatoriness of the pleonastic in complement position of verbs such as *consider*, illustrated in (4a), in which she argues that pleonastics appear as the subject of small clause predications, and of the optional movement of CP direct objects to subject position illustrated in (4b):

(4a) I consider it ridiculous that John is late again.
(4b) It has long been believed that the earth is flat.

In this approach, thematic subjects are just a proper subset of subjects, and thematic role assignment to subject position uses the predication relation, just as thematic role assignment to internal arguments is via Case assignment relations or prepositions. Rothstein argued that there were two different kinds of predication: primary, or clausal, predication and secondary, or adjunct, predication. The particular constraints on adjunct predication (see Rothstein, 2003) mean that secondary predicates are essentially thematic, while primary predication need not be so.

Another approach to predication, which starts from different assumptions, but has some of the same syntactic consequences as Rothstein's, is Gennaro Chierchia's. Working within the framework of property theory, he proposed treating semantic properties as having two modes of presentation, an unsaturated predicate and its individual property correlate, π. He is concerned primarily with semantic issues, in particular, how properties can be predicated of themselves, as in *Being wise is wise* or *Cheerfulness is cheerful*. In Chierchia's theory, a VP denotes a saturated property, and Inflection denotes a function from individual properties into propositional functions, which applies to a VP and yields a propositional function, independently of whether the VP requires a thematic subject. Chierchia differs from Rothstein, who claims that the VP is formally a predicate, and he does not extend his theory to deal with noninflected predicates, but both approaches have in common that the clause is structurally constrained to be an instance of predication, independent of the thematic properties of the predicate or its head. Positing a structural, nonthematic predication relation has been quite fruitful in terms of syntactic explanatoriness. The structural approach to predication has been quite productive in leading to analyses of propositional structure, in particular with respect to the distribution of pleonastics and nonthematic predicates and copula constructions.

A second direction on which predication studies have focused has been the variety and differing properties of secondary predicates crosslinguistically. As mentioned above, there seem to be two kinds of secondary predicates, resultatives and depictives, where resultatives are generally restricted to taking direct objects as their subjects, while depictives can apply to both subjects and objects. Much work has focused on the particular syntactic properties associated with different secondary predicates in different languages, for example with the structural constraints on subject predicate relations (Demonte, 1986), Case properties associated with different secondary predicates (especially in Russian, e.g., Filip, 2001), whether secondary predicates are independent predicates or form a lexical complex predicate with the verb in Germanic (Neeleman, 1994; Neelman and Weerman, 1993; Wunderlich, 1997), whether or not resultatives are truly oriented toward the direct object, (Rappaport Hovav and Levin, 2001; Wechsler, 1997; Kim, 1993), and how best to capture the semantic constraints on

their interpretations. Some of the most interesting syntactic work in recent years has emerged from the attempts to give a unified semantics for depictive and resultative secondary predicates (see, e.g., Rothstein, 2003) and work by Cormack and Smith (1994, 1999), who suggest that secondary predication should be seen as a kind of serial verb construction for languages that do not otherwise allow them. While this idea has not yet been worked out in any detail, it seems a potentially fruitful direction in which to take the syntax of predication.

See also: Complex Predicates; Propositional and Predicate Logic: Linguistic Aspects; Subjects and the Extended Projection Principle; Thematic Structure.

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Prestige, Overt and Covert

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Introduction

Most speakers of a language are aware of the fact that there is variation within even quite small speech communities (*see* **Speech Community; Labov, William (b. 1927)**). If they are aware of this variation, they are usually also aware of the fact that different variants are more (or less) appropriate in different social situations. For example, a writer in English has the option of choosing to use *show* or *demonstrate* in a text: The former is associated more with informal and/or spoken modes of delivery, and the latter is more closely associated with more formal and/or academic modes of delivery. Similarly, in Mauritius, Mauritian Creole (Morisyen) is typically used in day-to-day conversations whereas French might be used when taking out a loan at a bank and English would be used in school. Sociolinguists often call the different social contexts in which a language is used different domains and some people use the term 'key' to describe different modes of delivery.

These divisions in domain of use do not index solely the speaker's location. They also index information about the social order of the speech community. Some keys of delivery and some domains are considered to be relatively more prestigious than others. That means that some contexts are more closely tied to evaluations of status within a particular community, and the use of a variant or a language that has greater prestige may confer status on the speaker, the hearer, or both. The use of a high-prestige variant or language also reflexively reconstitutes and perpetuates the association of status and prestige with particular linguistic variants. Defining 'prestige' has been difficult in sociolinguistics, and some definitions have been criticized as being circular. We have to be careful that 'prestige' is not defined as 'a variant that has more status' if the only evidence we have for the variant being statusful is that it is used more by members of a speech community who themselves have more status (e.g., the upper class). If that is our only evidence, then we might more accurately say that we have a variable that is associated with social class rather than with prestige.

There is no deterministic relationship between how old a variable is and whether it has social prestige. Prestige forms can be either older, more conservative variants or newer innovations that are just beginning to take hold in a community. Work in Arabic speech communities highlights this point neatly and reminds us that there can be more than one locus of prestige within a speech community. Work by Abd-el-Jawad (1986) and Haeri (1997) showed that the norms of Classical (Standard) Arabic might serve as prestige targets for some speakers in a speech community while the norms of a regional vernacular variety of Arabic might simultaneously constitute the prestigious target for other members of the speech community. This gives rise to the (apparently) paradoxical situation in which different variants occur in the most formal or careful speech of different people in the speech community.

In addition, differences in what is and is not considered 'nice' in different varieties of even the same language illustrate the arbitrariness of what is considered a prestige form. New Zealanders would be quite happy to ask a stranger for directions to the *toilet*, whereas North Americans would prefer to ask for the *bathroom* or *restroom*.

Overt Prestige and the Speech Community

The notion of prestige has been central to advances in sociolinguistics. Labov identified it as a definitional characteristic of a speech community. He argued that a speech community is made up not only of people who use the same variants, but – crucially – of people who shared the same evaluations of those variants. That is, comembers of a speech community agreed on what forms were more or less prestigious or appropriate in different domains or in different modes of delivery. It is important to note that they might not be overtly aware of their shared perceptions. Labov's point about shared evaluations was made in relation to speakers' subconscious shifts in style as well as stereotypes that were more widely available for social comment. In this way, he provided a methodology for avoiding the circularity previously mentioned.

In other words, prestige forms might be widely recognized within a community of speakers, or the fact that they are prestigious might show up only in the subtle and unplanned manner in which speakers change their pronunciations of different words in different contexts and with different addressees. Most speakers of British English can tell you that it is in some sense 'better' not to drop /h/ word-initially, for example, in *house* and *hurt* (even though they may frequently do so themselves). The /h/-less forms lack prestige and are considered informal, uneducated, or even lower-class and vulgar.

On the other hand, a lot of native speakers of English are very confused about what the appropriate

form is for a coordinated object phrase, as shown in (1) (Angermeyer and Singler, 2003: 189).

(1) There's a whole world for **you and I**. Or is it **you and me**? Does anybody know?

Angermeyer and Singler found a clever experimental way of supplementing their observations of natural occurrences of these kinds of utterances. They show that the *you and I* forms occur more often when speakers are monitoring their speech than when they are speaking informally, so we would say that, for speakers of U.S. English, the *you and I* forms are perceived to be better or to have more prestige than the (prescriptively correct) *you and me* or *me and you*.

A famous example illustrating the interaction between how carefully or consciously a speaker is focusing on his or her speech and his or her use of different forms was provided by Labov's study of the New York City vernacular. He showed that speakers from all social classes used more of the (innovative) prestige variant /r/ in the artificial context of reading a word list than they did in casual speech. Figure 1 shows the frequency with which different social classes in New York City used the in-coming variant /r/ word-finally (as in *car*) or preconsonantally (as in *card*).

In casual speech, use of the /r/ variant was almost entirely restricted to the middle-middle-class speakers (SEC 9) and did not occur in any of the other classes with very high frequency (0% in SEC 0–1, 3% in SEC 2–5, and 2% in SEC 6–8). However, when reading word lists, all speakers used a lot more of the in-coming, prestigious variant, and the speakers in SEC 6–8, the lower middle class, used it most of all the groups (almost categorically at 90%). Labov found very similar patterns for variables like (r) and other changes happening well below speakers' conscious awareness, such as the raising of short (a) in *bad*, and *ask*.

Crossover Effect or Hypercorrection

Figure 1 also illustrates a phenomenon known as the crossover effect, or hypercorrection. This refers to the way that SEC 6–8 (the lower middle class) uses even more of the prestige variant /r/ when reading a word list than SEC 9 (the upper middle class) do. In general, even if we break the data down into even narrower bands of SECs, the different classes are clearly stratified with respect to their use of the (r) variable. 'Stratification' means that the results for speakers from different SECs appear to form discrete layers; in all the different speaking styles, speakers from lower SECs use fewer tokens of the prestige variant than speakers from higher SECs. However, in Figure 1, the speakers in SEC 6–8 cross over the speakers from SEC 9 in word-list style. In this style, speakers from a lower SEC use more of the prestige variants than speakers from a higher SEC. Labov suggested that speakers from the second highest SEC may be especially sensitive to the social value of linguistic variables and the social returns available to them through using particular variants. The crossover effect observed in Figure 1 is a manifestation of this heightened awareness. When members of the second highest social class are performing linguistic tasks that focus them more or less directly on language itself, they draw more often on the markers of prestige within the speech community.

The term 'hypercorrection' has also been applied to the crossover effect shown in Figure 1. Hypercorrection originally referred to situations in which speakers emend a standard pronunciation of a word

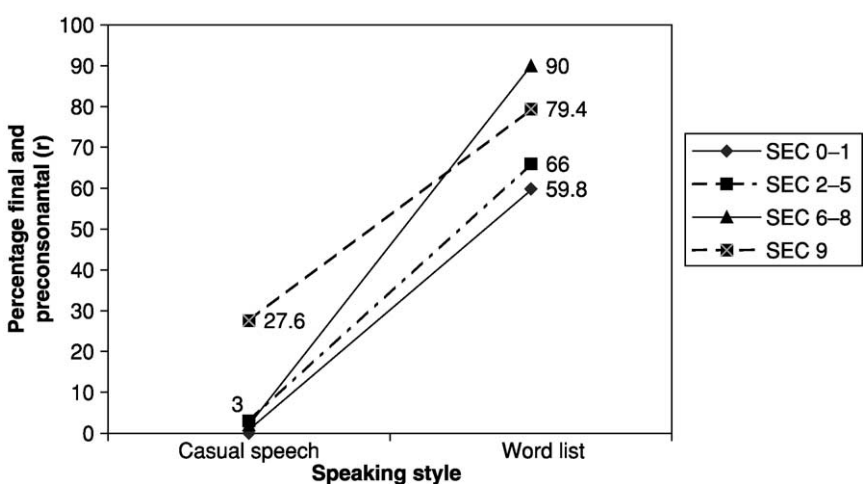

Figure 1 Frequency of use of /r/ in final and preconsonantal position in New York City in four socioeconomic class groupings. SEC, socioeconomic class; 0 = lowest; 9 = highest. (Based on Labov, 1972: Tables 9.5 and 9.6.)

because they mistakenly perceive it to be nonstandard or an error. This is often due to the imperfect learning of a new language or dialect. In some varieties of English, speakers seldom use [ɪŋ] in words such as *talking* or *choosing,* but they may still be aware that these forms are widely considered 'better' than pronunciations with the alveolar variant [ɪn]. However, because their own vernacular provides them with few models of the prestige forms, they may end up using the prestige form in places where it never occurs in any variety of English. For example, in Thackeray's (1998) *Vanity Fair,* a lower-class character is lampooned for talking about his army *Captaing* [æptɪŋ] (not [æptɪn]). What a speaker perceives to be the 'correction' of a nonstandard, or vulgar, form may produce something that is not actually attested in any native variety of English. For this reason, it is called **hyper**correction.

The lower-middle-class crossover effect observed by Labov is a little different than this because what is produced is still clearly part of the speech community's norms. The speakers' behavior can really only be called hypercorrect if we assume that social class has a strongly deterministic effect on speech. For these reasons, hypercorrection is not the best term to describe this phenomenon, and the more descriptive term crossover is to be preferred.

Covert Prestige

We have seen that speakers may be oriented to prestige norms in a speech community with more or less conscious awareness. It is also clear that people do not always use the forms that are widely recognized as being prestigious. Generally, what might be appropriate in a formal spoken or written exchange is not so appropriate when we are talking to our best friends or family. Speakers are aware that prestige is relative to different situations and addressees and know that, if they use words or pronunciations that have high prestige in formal contexts in an informal domain, they will be ridiculed or disliked. German speakers generally switch between their local vernacular dialect, with its characteristic pronunciations and lexical items, used when they are talking at home, and Standard German (*Hochdeutsch*), used when they are speaking in public or writing. Of course, the qualities of naturalness and directness that are often associated with the vernacular have their own prestige, as do the rougher, street-wise qualities that are often also associated with the vernacular. This kind of prestige can be strategically drawn on, as when politicians wants to present themselves as 'one of the people.'

This kind of alternative, local form of prestige is sometimes – wrongly – called 'covert prestige' (as opposed to the overt prestige that members of a speech community are openly oriented to). The term 'covert prestige' was originally introduced into sociolinguistics to describe a rather more subtle effect than the persistence of nonstandard or vernacular varieties. Trudgill's early work used subjective attitude tests to inform the analysis of speakers' objective performance, and he observed that some speakers recognize the overt prestige of a certain form and that they may indeed use that form more often than the less prestigious one. However, they may claim that they use the less prestigious variant. That is, their objective performance (what they say) is oriented to the wider socially prestigious form, whereas their subjective report of their performance is oriented to a local variant. Trudgill considered this mismatch between what the speakers say they do and what they actually do as evidence that some forms have covert prestige.

See also: Labov, William (b. 1927); Reflexivity in Sociolinguistics; Social Class and Status; Speech Community; Style and Style Shifting; Subjective and Objective Measures of Variation; Taboo Words; Variation in Arabic Languages.

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Presupposition

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Introduction

A presupposition is a semantic property of a sentence making that sentence fit for use in certain contexts and unfit for use in others. This property is partly based on the fact that if a sentence B presupposes a sentence A ($B \gg A$), then B entails A ($B \models A$): whenever B is true, A is necessarily also true, given the same situation referred to, in virtue of the *meanings* of B and A. Presuppositions (*P-entailments*) are thus a subclass of entailments. Entailments that are not presuppositional are *classical* or *C-entailments*. (1) illustrates a C-entailment ($\models_c$); (2a–d) illustrate P-entailments ($\gg$):

(1) Jack has been murdered. $\models_c$ Jack is dead.

(2a) Jack lives in Manchester. $\gg$ Jack exists.
(2b) Jill has forgotten that Jack is her student. $\gg$ Jack is Jill's student.
(2c) Jack is divorced. $\gg$ Jack was once married.
(2d) Only Jack left. $\gg$ Jack left.

(2a) illustrates *existential presupposition*. (2b) exemplifies *factive presuppositions* (Kiparsky and Kiparsky, 1971): the factive predicate (*have forgotten*) requires the truth of the *that*-clause. (2c) is a case of *categorial presupposition*, derived from the lexical meaning of the main predicate (*be divorced*). (2d) belongs to a *remainder category*, the presupposition in question being due to the particle *only*.

There are various differences between P-entailments and C-entailments. When $B \gg A$, A is somehow 'prior' to B, restricting the domain within which B is interpretable. Presuppositions present themselves specifically, whereas C-entailments are 'unguided' and thus lack the function of restricting the interpretation domain. This makes presupposition relevant for the cognitive aspects of linguistic information transfer.

There is also a logical difference, especially regarding *negation*, the central operator in any logic. In standard logic a sentence that is false for any reason whatsoever is made true by the preposed negation. In language, however, negation is sensitive, in default uses, only to C-entailments, leaving the P-entailments intact. Suppose (2d) is false on account of a C-entailment's falsity, for example because other people left as well. Then (3a), the negation of (2d), is true and (3b) is coherent, as expected. Not so when a P-entailment of (2d) is false, as in (3c), where the presupposition 'Jack left' is denied. (3c) is incoherent because *Not only Jack left* still presupposes that Jack left ('!!' indicates incoherence):

(3a) Not only Jack left.
(3b) Not only Jack left: other people left as well.
(3c) !!Not only Jack left: Jack did not leave.

This raises the question of the truth value of (3a) in cases where, say, Jack did not leave. In standard logic, the entailment from both (2d) and its negation (3a) to *Jack left* means that if Jack did not leave, both (3a) and (2d) are false simultaneously, which violates the Principle of Contradiction ('a sentence and its negation cannot be true or false simultaneously'). Standard logic thus rules out falsity for *Jack left*, because its falsity leads to a contradiction. This makes *Jack left* a necessary truth. But *Jack left* is, if true, contingently so. Therefore, standard logic is inadequate for presuppositions.

Many feel that this calls for a rejection of the Principle of the Excluded Third or PET ('any sentence expressing a proposition is either true or false, without any values in between or outside') and for the introduction of a *third truth value* into the logic of language. Others prefer to keep standard bivalent logic intact and seek a *pragmatic* way out in terms of conditions of use. This question is discussed in the next section.

Operational Criteria

Presuppositions are detectable ('observable') irrespective of actual token use. Like C-entailments, P-entailments can be read off isolated sentences, regardless of special context. Yet they evoke a context. (2a) requires it to be contextually given that there exists someone called 'Jack' and thus evokes such a context, asserting that he lives in Manchester; (2b) evokes a context where Jack is Jill's student, asserting that Jill has forgotten that; (2c) requires a context where Jack was once married, and asserts that the marriage has been dissolved; and (2d) requires a context where Jack left, while asserting that no one else left. This, together with the entailment criterion, provides a set of operational criteria to recognize presuppositions.

First, if $B \gg A$ then $B \models A$. The usual heuristic criterion for an entailment $B \models A$ is the incoherence of the juxtaposition of *not(A)* with B. On the whole, this suffices as a criterion. For example, (4a) does not entail, and therefore does not presuppose, (4b), because (4c) is still coherent.

(4a) Lady Fortune neighs.
(4b) Lady Fortune is a horse.
(4c) Lady Fortune is not a horse, yet she neighs.

But this criterion overkills when the entailing sentence is qualified by an epistemic possibility operator, like English *may*, as in (5a), which does not entail (5b), even though (5c) is incoherent. Epistemic possibility requires compatibility of what is said to be possible with what is given in discourse or knowledge. Therefore, if $B \models A$, then with *not(A)* in the knowledge base, *possibly(B)* results in inconsistency, although *possibly(B)* does not entail *A*. The entailment criterion can be refined, without loss of generality, by testing the (in)coherence of the juxtaposition of *possibly (not(A))* with *B*, as in (5d). Because (5d) is coherent, (5a) $\not\models$ (5b):

(5a) Jack may have been murdered.
(5b) Jack is dead.
(5c) !! Jack is not dead, yet he may have been murdered.
(5d) Jack may not be dead, yet he may have been murdered (and thus be dead).

To distinguish P-entailments from C-entailments further criteria are needed. First there is the *projection criterion*: if $B \gg A$ and *B* stands under an entailment-canceling operator like *possibly* or *not* or *believe*, *A* survives not as a P-entailment but as a more or less strongly invited presuppositional inference (>). Generally, $\mathbf{O}(B_A) > A$, where 'B_A' stands for '*B* presupposing *A*' and '**O**' for an entailment-canceling operator. In standard terminology, the presupposition *A* is *projected* through the operator **O**. The conditions under which presuppositions of embedded clauses are projected through higher operators constitute the *projection problem of presupposition*.

Projection is typical of P-entailments, as in (6), not of C-entailments, as in (7):

(6) Jill believes that Jack is divorced > Jack was once married.

(7) Jill believes that Jack has been murdered $\not>$ Jack is dead.

The projection criterion is mostly used with negation as the entailment-canceling operator. Strawson (1950, 1952) held, incorrectly, that presupposition is always preserved as entailment under negation. In his view, a sentence like:

(8) The present king of France is not wise.

still presupposes, and thus entails, that there exists a king of France, who therefore, if (8) is true, must lack wisdom. Although presupposition is, in fact, normally weakened to invited inference under negation, Strawson's 'negation test' became the standard test for presupposition. Provided the condition of 'entailment' is replaced by that of 'at least invited inference,' the test is sound.

Then there is the *discourse criterion*: a discourse bit *A and/but* B_A (with allowance for anaphoric processes) is felt to be orderly and well planned – that is, *sequential*. The condition of sequentiality is used to characterize stretches of acceptable text that have their presuppositions spelled out ('√' signals sequentiality):

(9a) √There exists someone called 'Jack,' and he lives in Manchester.
(9b) √Jack is Jill's student, but she has forgotten that he is.
(9c) √Jack was married, but he is divorced.
(9d) √Jack left, and he is the only one who did.

C-entailments and inductive inferences behave differently. When they precede their carrier sentence the result may still be acceptable, yet there is a qualitative difference, as shown in (10a,b), where a colon after the first conjunct is more natural ('#' signals nonsequential but coherent discourse):

(10a) #Jack is dead: he has been murdered.
(10b) #Jack earns money: he has a job now.

The discourse criterion still applies through projection: *A and/but* $\mathbf{O}(B_A)$ is again sequential (the entailment-canceling operators are printed in italics):

(11a) √Jack really exists, and Jill *believes* that he lives in Manchester.
(11b) √Jack is Jill's student, but she has *probably* forgotten that he is.
(11c) √Jack was once married, and he is *not* divorced.
(11d) √Jack left, and he is *not* the only one who did.

These tests reliably set off P-entailments from C-entailments.

The Logical Problem

The Threat to Bivalence

The first to see the threat posed by presuppositions to standard logic was Aristotle's contemporary Eubulides of Miletus (Kneale and Kneale, 1962: 113–117). He formulated (besides other paradoxes such as the Liar) the paradox of the *Horned Man* (Kneale and Kneale, 1962: 114): "What you have not lost you still have. But you have not lost your horns. So you still have horns." This paradox rests on presupposition. Read *B* for *You have lost your horns* and *A* for *You had horns*. Now $B \gg A$ (the predicate *have lost* induces the presupposition that what has been lost was once possessed).

Eubulides implicitly assumed that P-entailments are preserved under negation: $B \models A$ and *not(B)* $\models A$. Under PET, this would make *A* a logically necessary

truth, which is absurd for a contingent sentence like *You had horns*. To avoid this, PET would have to be dropped, very much against Aristotle's wish. Although Aristotle himself was unable to show Eubulides wrong, there is a flaw in the paradox. It lies in the incorrectly assumed entailment in the first premise "What you have not lost you still have." For it is possible that a person has not lost something precisely because he never had it.

The same problem was raised by Strawson (1950, 1952), but with regard to existential presuppositions. Like Eubulides, Strawson assumed full entailment of presupposition under negation and concluded that PET had to go. For him, nonfulfillment of a presupposition leads to both the carrier sentence and its negation lacking a truth value altogether. Frege (1892) had come to the same conclusion, though from a different angle. In a sentence like:

(12) The unicorn ran.

analyzed as 'Run(the unicorn)', the subject term lacks a referent in the actual world, though the existence of such a referent is presupposed. That makes it impossible to test the truth of (12): since there is no unicorn, there is no way to check whether it actually ran. Therefore, Frege (and Strawson) concluded, (12) lacks a truth value.

This posed a profound problem for standard logic in that the applicability of standard logic to English would have to be made dependent on contingent conditions of existence – a restriction no logician will accept. In the effort to solve this problem two traditions developed, the *Russell tradition* and the *Frege–Strawson tradition*.

The Russell Tradition

In his famous 1905 article, Russell proposed a new analysis for sentences with definite terms, like (13a). Putting the new theory of quantification to use, he analyzed (13a) as (13b), or 'there is an individual *x* such that *x* is now king of France and *x* is bald, and for all individuals *y*, if *y* is now king of France, *y* is identical with *x*':

(13a) The present king of France is bald.
(13b) $\exists x\ [KoF(x) \wedge Bald(x) \wedge \forall y\ [KoF(y) \rightarrow x = y]]$

In order to save bivalence, Russell thus replaced the time-honored subject-predicate analysis with an analysis in which the definite description *the present king of France* no longer forms a constituent of the logically analyzed sentence, but is dissolved into quantifiers and propositional functions.

The negation of (13a) should be (13b) preceded by the negation operator, i.e. (14a). However, Russell held, speakers often prefer, for reasons best known to themselves, to interpret *The present king of France is not bald* as (14b), with internal negation over 'Bald(x)':

(14a) $\neg\exists x\ [KoF(x) \wedge Bald(x) \wedge \forall y\ [KoF(y) \rightarrow x = y]]$
(14b) $\exists x\ [KoF(x) \wedge \neg Bald(x) \wedge \forall y\ [KoF(y) \rightarrow x = y]]$

This makes sentences like (8) ambiguous.

This analysis, known as Russell's *Theory of Descriptions*, was quickly accepted by logicians and philosophers of language, as it saved PET. At the same time, however, it drove logicians and linguists apart, as it defies any notion of sentence structure. Moreover, the 'uniqueness clause' in (13b), $\forall y\ [KoF(y) \rightarrow x = y]$, saying that only one king of France exists, is meant to account for the uniqueness expressed by the definite article. In fact, however, the definite article implies no claim to uniqueness of existence, only to discourse-bound uniqueness of reference. Then, this analysis is limited to definite descriptions and is unable to account for other kinds of presupposition. Factive and categorial presuppositions, and those derived from words like *all*, *still*, or *only*, fall outside its coverage.

An important objection is also that negation can only cancel presuppositions when it is a separate word (not a bound morpheme) and in construction with a finite verb. In all other cases, the negation fully preserves P-entailments. Thus, (3a), with *not* in construction with *only*, preserves the presupposition induced by *only*. Moreover, sentence-initial factive *that*-clauses preserve presuppositions even though the negation is constructed with the finite verb:

(15a) That Jack left surprised Jill $\gg$ Jack left.
(15b) That Jack left did not surprise Jill $\gg$ Jack left.

Likewise for cleft and pseudocleft sentences:

(16a) It was Jack who left / The one who left was Jack $\gg$ Someone left.
(16b) It wasn't Jack who left / The one who left wasn't Jack $\gg$ Someone left.

When cases like these, overlooked by the authors discussed, are taken into account and the logic is kept bivalent, the presuppositions of sentences like (2d) and (3a), (15a,b), or (16a,b) would again have to be necessary truths.

The same goes for:

(17a) All men are mortal $\gg$ There exist men.
(17b) Not all men are mortal $\gg$ There exist men.

In standard Predicate Calculus, however, (17a) does not entail (and thus cannot presuppose) that there exist men, whereas (17b) does, because 'not all F is G' is considered equivalent with 'some F is not G,'

which entails the existence of at least one F. Yet both (17a) and (17b) satisfy the operational criteria given earlier. Standard Predicate Calculus thus seems to fit the presuppositional facts badly.

To account for other than existential presuppositions some have proposed to change Russell's analysis into:

(18) $\exists x\ [KoF(x)] \wedge Bald(he)$

or 'there is a king of France, and he is bald'. *He* is now no longer a bound variable but an anaphoric pronoun. With a logical mechanism for such anaphora (as in Kamp, 1981; Groenendijk and Stokhof, 1991), this analysis can be generalized to all categories of presupposition. A sentence B_A is now analyzed as *A and* B_A, and *Not*(B_A), though normally analyzed as *A and Not*(B_A) with small scope *not*, can also, forced by discourse conditions, be analyzed as *Not (A and* B_A*)*, with large scope *not*. This analysis, which saves PET, is known as the *Conjunction Analysis* for presupposition.

Anaphora is needed anyway, because Russell's analysis fails for cases like (19), where quantifier binding is impossible for *it*, which is in the scope of *I hope*, whereas *I hope* is outside the scope of *I know*:

(19) I know that there is a dog and I hope that it is white.

The Conjunction Analysis, however, still cannot account for the fact that (20a) is coherent but (20b) is not:

(20a) There is a dog and it is white, and there is a dog and it is not white.
(20b) !!There is a dog and it is white and it is not white.

(20a) speaks of two dogs, due to the repetition of *there is a dog*, but (20b) speaks of only one. Yet the Conjunction Analysis cannot make that difference, because the repetition of *there is a dog* makes no logical or semantic difference for it. Attempts have been made to incorporate this difference into the logic (e.g., Kamp, 1981; Heim, 1982; Groenendijk and Stokhof, 1991) by attaching a memory store to the model theory that keeps track of the elements that have so far been introduced existentially.

Even then, however, the Conjunction Analysis still postulates existence for term referents whose existence is denied:

(21) Santa Claus does not exist.

The Frege-Strawson Tradition

Strawson (1950, 1952) was the first to oppose the Russell tradition. He reinstated the traditional subject-predicate analysis and discussed only existential presuppositions. Negation is considered presupposition-preserving. Sentences with presupposition failure are considered truth-valueless. Strawson's definition of presupposition is strictly logical: $B \gg A =_{Def} B \models A$ and *Not(B)* $\models A$. This analysis requires a *gapped bivalent propositional calculus* (GBPC), shown in Figure 1.

		∧ B			∨ B		
~A	A	T	F	*	T	F	*
F	T	T	F	*	T	T	*
T	F	F	F	*	T	F	*
*	*	*	*	*	*	*	*

Figure 1 Strawson's gapped bivalent propositional calculus (GBPC). Key: ~, presupposition-preserving negation; T, truth; F, falsity; *, unvalued.

Insofar as truth values are assigned, GBPC preserves standard logic. Moreover, * is 'infectious': when fed into a truth function it yields *. Remarkably, GBPC limits the applicability of logic to situations where the presuppositions of the sentences involved are true. The applicability of GBPC thus varies with contingent circumstances.

Wilson (1975) and Boër and Lycan (1976) side with Russell and criticize Strawson, showing examples of presupposition-canceling under negation: (22a–c) are coherent, though they require emphatic, discourse-correcting accent on *not*:

(22a) The present king of France is NOT bald: there is no king of France!
(22b) Jill has NOT forgotten that Jack is her student: Jack isn't her student!
(22c) Jack is NOT divorced: he never married!

For these authors, classical bivalent logic is adequate for language; P-entailments differ from C-entailments only pragmatically. There would be a point if (a) a pragmatic explanation were available, and (b) presuppositions were always canceled under negation. But neither condition is fulfilled. In fact, the presupposition-canceling 'echo' negation NOT of (22a–c) is impossible for cases that preserve P-entailments under negation:

(23a) !!NOT only Jack left: he didn't leave!
(23b) !!NOT all students protested: there weren't any students!
(23c) !!That Jack left did NOT surprise Jill: he didn't leave!
(23d) !! The one who left was NOT Jack: nobody left!

Likewise for the negation required with *negative polarity items* (NPIs) in assertive main clauses (NPIs are printed in italics):

(24a) !!Jack does NOT *mind* that he is in trouble: he isn't in trouble!
(24b) !!Jack has NOT come back *yet*: he never went away!
(24c) !!Jill has NOT seen Jack *in weeks:* she doesn't exist!

This analysis is thus fatally flawed.

The Trivalent Solution

One may envisage a three-valued logic, identical to standard bivalent logic but for a distinction between two kinds of falsity, each turned into truth by a separate negation operator. Minimal falsity (F1) results when all P-entailments are true but not all C-entailments, radical falsity (F2) when one or more P-entailments are false. Correspondingly, *minimal negation* ($\sim$) turns F1 into truth (T) and T into F1, leaving F2 unaffected, whereas *radical negation* ($\simeq$) turns F2 into T and both T and F1 into F1.

In Kleene's (1938) *trivalent propositional calculus*, $\wedge$ yields T only if both conjuncts are T, F1 when either conjunct is F1, and F2 otherwise. Analogously, $\vee$ yields T when either conjunct is T, F1 only if both conjuncts are F1, and F2 otherwise. The corresponding tables are given in Figure 2 (*see* **Multivalued Logics**, where the value F2 is named 'indefinite' or I). This logic preserves all theorems of standard logic when bivalent $\neg$ replaces trivalent $\sim$. Kleene's calculus lacks the radical negation ($\simeq$), but comes to no harm if it is added.

Kleene's calculus is used by some presuppositional logicians (e.g., Blau, 1978). It is empirically problematic in that it yields F1 for 'A $\wedge$ B' when either *A* or *B* is F2 whereas the other is F1, thus allowing presupposition failure in one conjunct while still considering the conjunction as a whole free from presupposition failure. This makes no sense in view of *and* as a discourse incrementer. Kleene's calculus is more suitable for vagueness phenomena with F2 as an umbrella value for all intermediate values between T and F (Seuren *et al.*, 2001).

In Seuren's presuppositional propositional calculus TPC2 (Seuren, 1985, 2001: 333–383; Seuren *et al.*, 2001) the operators $\wedge$ and $\vee$ select, respectively, the highest and lowest of the component values (F2 > F1 > T), as shown in Figure 3. Classical negation ($\neg$), added for good measure, is the union of $\sim$ and $\simeq$, but is taken not to occur in natural language, which has only $\sim$ and $\simeq$. In TPC2, F2 for either conjunct yields F2 for 'A $\wedge$ B', as required.

TPC2 is likewise equivalent with standard bivalent logic under the operators $\neg$, $\wedge$, and $\vee$ (Weijters, 1985). Thus, closed under ($\neg$, $\wedge$, $\vee$) standard bivalent logic is independent of the number of truth values

			$\wedge$ B			$\vee$ B		
¬A	~A	A	T	F1	F2	T	F1	F2
F1	F1	T	T	F1	F2	T	T	T
T	T	F1	F1	F1	F1	T	F1	F2
T	F2	F2	F2	F1	F2	T	F2	F2

Figure 2 Trivalent propositional calculus (TPC1).

				$\wedge$ B			$\vee$ B		
¬A	≃A	~A	A	T	F1	F2	T	F1	F2
F1	F1	F1	T	T	F1	F2	T	T	T
T	F1	T	F1	F1	F1	F2	T	F1	F1
T	T	F2	F2	F2	F2	F2	T	F1	F2

Figure 3 Trivalent propositional calculus (TPC2).

employed, though any value 'false' beyond F1 will be vacuous. Moreover, in both generalizations with *n* truth values ($n \geq 2$), there is, for any value $i \geq 2$, a *specific negation* N^i turning *i* into T, values lower than *i* into F1, and leaving higher values unaffected. Thus, in TPC2, N^{F1} is $\sim$ and N^{F2} is $\simeq$. Classical bivalent $\neg$ is the union of all specific negations. Consequently, in the standard system, $\neg$ is both the one specific negation allowed for and the union of all specific negations admitted. Standard logic is thus the most economical variety possible of a generalized calculus of either type.

The Discourse Approach

Presupposition is not defined, only restricted, by its logical properties:

(25) If $B \gg A$, then $B \models A$ and $\sim B \models A$, and $\sim A / \simeq A \models \simeq B$.

(25) thus specifies necessary, but not sufficient, conditions for presupposition. Were one to adopt a purely logical definition, various paradoxical consequences would follow. For example, any arbitrary sentence would presuppose any necessary truth, which would make the notion of presupposition empirically vacuous.

Attempts have been made (Gazdar, 1979; Heim, 1982; Seuren, 1985, 2000) at viewing a presupposition *A* of a sentence B_A as restricting the interpretable use of *B* to contexts that admit of, or already contain, the information carried by *A*. Such an approach creates room for an account of the discourse-correcting 'echo' function of presupposition-canceling (radical) NOT. Horn (1985, 1989) correctly calls NOT *metalinguistic*, in that it says something about the *sentence* in its scope – though his generalization to other

metalinguistic uses of negation is less certain. Neither TPC2 nor TPC1 can account for this metalinguistic property. This means that the argument of NOT is not a sentence but a quoted sentence. NOT('B_A') says about the sentence B_A that it cannot be sequentially incremented in a discourse refusing *A*.

Sequential incrementation to a discourse **D** restricts **D** to a progressively narrower section of the universe of all possible situations **U**, making the increment *informative*. Incrementation of *A*, or i(A), to **D** restricts **D** to the intersection of the set of situations in which **D** is true and the set of situations where *A* is true. The set of situations in which a sentence or set of sentences X is true is the *valuation space* of X, or /X/. For **D** incremented with *A* we write '$\mathbf{D}+A$'. $\mathbf{D}+A$ is the conjunction of **D** and *A*, where **D** is the conjunction of all incremented sentences since the initial **U**. The *sequentiality condition* requires:

(a) for any *A*, /**D**/ is larger than /$\mathbf{D}+A$/ (informativity: remember that **D** is restricted by *A*);
(b) if $B \gg A$ then i(A) must precede i(B) (not so when $B \models_c A$).

If *A* has not already been incremented prior to i(BA) it is cognitively 'slipped in,' a process called *accommodation* or *post hoc suppletion*. A text requiring accommodation is not fully sequential, but still fully coherent.

On the assumption that **D**, as so far developed, is true, any subsequent sentence *B* must be valued T or F1, because F2 for *B* implies that some presupposition of *B*, and hence **D** as a whole, is not true. This assumption is made possible by the *Principle of Presumed Truth* (PPT), which says that it must be possible for any **D** to be true. The assumption that **D** is actually true blocks the processing of a new sentence that would be valued F2 in **D**. For example, let **D** contain i(∼A). Now B_A is blocked, because *A* is valued F1 (assuming that **D** is true). But NOT('B') can be incremented and is true under PPT, as it says about *B* that it cannot be incremented.

Therefore, /**D**/ must contain situations with sentences as objects. Cognitively speaking, this is perfectly plausible, because speakers are aware of the fact that they utter words and sentences. That awareness enables them to refer back to words and sentences just uttered or expected to be uttered. Words and sentences as objects are a necessary corollary of any speech utterance. This corollary underlies the free mixing of object language and metalanguage in natural language. The prohibition issued by logicians against such mixing has no ground in natural language (Seuren, 2001: 125–130).

Natural language negation is, in a sense, ambiguous (depending on syntactic conditions) between presupposition-preserving (minimal) *not* and presupposition-canceling (radical) NOT. Many find this unacceptable, because ambiguities are normally language specific, whereas this ambiguity would appear to be universal. Yet the obvious question of what would be the overarching single meaning of the negation in all its uses has not, so far, been answered. Similar problems occur with other logical operators, especially with *and*, *or*, and *if*, as the following examples show:

(26a) Do as I say and you will be a rich man.
(26b) Don't come nearer, or you'll be a dead man.
(26c) That's awful, or should I say 'dreadful'?
(26d) Let's go home, or do you have a better idea?
(26e) If you're tired, I have a spare bed.

In the case of *not* and the other logical operators, speech act factors as well as factors of metalinguistic use play an important role. Unfortunately, the grammar and semantics of both speech acts and metalinguistic use are still largely unexplored. Horn (1985) pointed out that English *not* is often used metalinguistically, as in:

(27a) Not Lizzy, if you please, but the Queen is wearing a funny hat.
(27b) She wasn't happy, she was ecstatic!

And he classifies radical NOT with the other metalinguistic cases. However, as pointed out in Seuren (2001: 345–347), NOT, though metalinguistic, differs from the other cases in that it can only occur in construction with the finite verb (the 'canonical position'), whereas the other metalinguistic negations can occupy any position normal *not* can occur in. (28a) is coherent, with a canonically placed NOT, but (28b,c), likewise with NOT, are incoherent, as NOT is in a non-canonical position:

(28a) He did NOT only lose $500. He only lost $20.
(28b) !!NOT only did he lose $500. He only lost $20.
(28c) !!He NOT only lost $500. He only lost $20.

The question of the overall meaning description of the logical operators, in terms of which their strictly logical meaning would find a place, defines a research project of considerable magnitude – a project that has so far not been undertaken in a coordinated way.

The Structural Source of Presuppositions

The source of at least three of the four types of presupposition distinguished earlier lies in the satisfaction conditions of the main predicate of the carrier sentence. The satisfaction conditions of an *n*-ary predicate P^n are the conditions that must be satisfied

by any *n*-tuple of objects for P^n to yield truth. Thus, for the unary predicate *white* the conditions must specify when any object can truthfully be called 'white'. For the binary predicate *wash* they must specify when it can truthfully be said of any pair of objects <i,j> that '*i* washes *j*'.

A distinction is made between two kinds of lexical conditions, *preconditions* and *update conditions*. When a precondition is not fulfilled, the sentence is radically false; failure of an update condition yields minimal falsity. Fulfillment of all conditions gives truth.

The satisfaction conditions of a predicate P^n are specified according to the schema ([[P^n]] is the extension of P^n):

(29) $[[P^n]] = \{<i^1,i^2,\ldots,i^n> : \ldots(\text{preconditions})\ldots \mid \ldots(\text{update conditions})\ldots\}$
or: 'the extension of P^n is the set of all *n*-tuples of objects $<i^1,i^2,\ldots,i^n>$ such that ... (preconditions) ... and ... (update conditions) ...'.

The satisfaction conditions of the predicate *bald*, for example, may be specified as follows (without claiming lexicographical adequacy):

(30) [[Bald]] = {*i* : *i* is normally covered, in prototypical places, with hair, fur, or pile; or *i* is a tire and normally covered with tread | the normal covering is absent}

This caters for categorial presuppositions. Factive presuppositions are derived by the precondition that the factive clause must be true.

Existential presuppositions are derivable from the precondition that a specific term *t* of a predicate P^n refers to an object existing in the real world. P^n is then *extensional* with respect to *t*. *Talk about*, for example, is extensional with respect to its subject term, but not with respect to its object term, because one can talk about things that do not exist. The satisfaction conditions of *talk about* will thus be as in (31), where the asterisk on *j* indicates that *talk* is nonextensional with respect to its object term:

(31) [[talk about]] = {<i,j*> : ... (preconditions) ... | ... (satisfaction conditions) ... }

The predicate *exist* lacks any preconditions and is to be specified as nonextensional with respect to its subject term:

(32) [[exist]] = { i* | i is an object in the actual world}

A definite subject of the verb *exist* must be represented somewhere in **D**, normally in some intensional subdomain, e.g., the subdomain of things that Jack keeps talking about, as in:

(33) The man that Jack keeps talking about really exists.

The incremental effect of (33) is that the representation of the thing that is said to exist is moved up to the truth domain of **D**. This analysis requires the assumption of *virtual objects* (*see* **Virtual Objects**).

The remainder category of presuppositions, induced by words like *only* or *still*, or by contrastive accent or (pseudo)cleft constructions, looks as if it cannot be thus derived. The choice here is either to derive them by *ad hoc* rules or to adopt a syntactic analysis in terms of which of these words and accents figure as (abstract) predicates at the level of semantic representation taken as input to the incrementation procedure.

See also: Discourse Domain; Discourse Semantics; Factivity; Lexical Conditions; Multivalued Logics; Polarity Items; Projection Problem; Virtual Objects.

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Joseph Priestley (1733–1804) was an English clergyman, scientist, grammarian, educator, and political dissident. Educated as a Calvinist minister, Priestley served as pastor of several congregations in England. Throughout his career, Priestley wrote extensively on a variety of political and theological topics and usually adopted controversial views that brought him into conflict with the authorities and the public. His 1782 book, *History of the corruptions of Christianity*, for example, was publicly burned. He also supported both the American and the French Revolutions. Ultimately, persecution for his views forced him to emigrate to the United States in 1794. He died in Pennsylvania in 1804.

After a meeting with Benjamin Franklin in London, Priestley became passionately interested in scientific experimentation. He contributed important discoveries to the early development of chemistry and electricity, but he will always be remembered for being the 'discoverer' of oxygen who, however, did not recognize what he had discovered.

Through a series of ingenious experiments into the nature of combustion and the chemical properties of gases, Priestley isolated and described many of the properties of oxygen. However, he was so firmly committed to the **phlogiston theory** of combustion (which held that all objects contain a hypothetical substance called phlogiston that is released when the object burns) that he failed to recognize the importance of his discovery. When Priestley communicated the results of his oxygen experiments to Antoine Lavoisier, this French scientist understood their significance and proposed a new theory of combustion that postulated that oxygen played a crucial role (a view that is still held today). Because of this and other work, Lavoisier is considered to be the father of modern chemistry.

Priestley's contribution to the study of language consists of his textbook *The rudiments of English grammar* (hereafter REG), written while he ran a school for boys and girls and published in 1761. Priestley was seeking an effective basis for teaching reading and writing, and his experience as a schoolmaster led him to the conclusion that literacy is best achieved if it is based on the actual usage of the student. Like his writings on politics and religion, REG is characterized by liberalism and common sense. REG proposes that grammar should be determined from everyday usage, not from pronouncements by self-styled experts. While the organization of the book is somewhat traditional, Priestley's unconventional views on grammar make REG an important landmark in the history of grammatical thought.

See also: English, Early Modern.

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Primary Progressive Aphasia in Nondementing Adults

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Primary progressive aphasia (PPA) is a focal degenerative condition with decline in one or more language functions and asymmetric atrophy involving the perisylvian regions of the left hemisphere. The clinical syndrome is characterized by a slow, insidious decline in specific aspects of language functioning, with onset typically in the fifth or sixth decade of life. The earliest symptoms are often so subtle that only the patient or family members can detect them. Unlike aphasia due to stroke, the onset is not accompanied by an acute neurological event. Despite gradual worsening of language functions, nonlinguistic aspects of cognition may remain relatively intact for several years. Both a nonfluent variety leading to mutism and a fluent subtype with predominantly semantic impairment are now recognized. Although early cases of focal deterioration of language functions were described by pioneers of aphasia research such as Arnold Pick (Luzzatti and Poeck, 1991), it was Mesulam who proposed to differentiate this syndrome from Alzheimer's disease and thus revived interest in a clinical phenomenon that had been largely forgotten (Mesulam, 1982). The majority of cases reported in the literature have involved English speakers, although there have been reports of a few French-, Standard German-, Japanese-, Italian-, and Dutch-speaking patients as well.

Terminology

Mesulam initially suggested the term "slowly progressive aphasia" to characterize this form of progressive language deterioration. Subsequently, other terminologies have been proposed, including progressive aphasia without dementia, progressive nonfluent aphasia, and progressive language impairment without dementia. Currently, the most widely accepted term appears to be primary progressive aphasia (Mesulam, 2001; Kertesz *et al.*, 1994).

Clinical Features

The earliest cognitive symptoms in patients who are eventually diagnosed with PPA are most commonly related to word-finding difficulties. With progression, loss of fluency often takes place, whereas comprehension remains relatively intact. Although the majority of patients with progressive aphasia evolve into a nonfluent aphasia, a subset may also have fluent aphasia. Patients with PPA typically do not complain of memory changes during the early stages of their illness, although some patients mistakenly think of their inability to retrieve words as loss of memory. The progressive decline in speech fluency is accompanied by a similar deterioration of written language functions, and thus difficulties with spelling are frequently an early feature. Patients with PPA differ from patients with early Alzheimer's disease in that not only do they have insight into the progressive decline in their language functions, but they are also profoundly concerned and disturbed by these changes. In rare cases, the earliest symptoms may be limited to articulatory changes, which over time progress to a marked dysarthria, aphasia, and nonfluency (Selnes *et al.*, 1996; Broussolle *et al.*, 1996; Cohen *et al.*, 1993). In some patients, symptoms may remain limited to language functions for more than 10 years, whereas others progress to a more generalized intellectual decline after 2 to 3 years. Patients with PPA do not have any of the marked personality changes, or difficulties with activities of daily living or self-care, that are commonly seen in other degenerative disorders.

Linguistic and Neuropsychological Features

There may be considerable heterogeneity in the language symptoms of patients with PPA, but a slowly progressive dysnomia is by far the most common presenting symptom (Westbury and Bub, 1997; Jodzio, 1999). Some patients have significant difficulties with word retrieval in their spontaneous speech, but may perform nearly normally on standardized measures of confrontation naming, such as the Boston Naming test (Kaplan *et al.*, 1983). Naming performance is strongly determined by word frequency, and certain classes of words, such as names of flowers, animals, and vegetables, are often most vulnerable during the early stages of the illness. Patients with nonfluent PPA have been shown to have disproportionate difficulties with naming verbs, whereas those with fluent aphasia have more difficulties with nouns (Hillis *et al.*, 2004).

Comprehension of everyday conversational speech is typically well preserved during the first few years after symptom onset, although formal testing will demonstrate mild abnormalities in a significant subset of the patients. Repetition is generally spared for several years, with some studies reporting mild deficits after 8 or 9 years of progression. This suggests that

the underlying disease process does not typically involve white matter tracts during the early stages of the illness. The evolution of reading deficits shows a temporal trend similar to that of the repetition impairment, consistent with the observation that the underlying disease process tends to spare the most posterior cortical regions during the early stages of the illness (Karbe *et al.*, 1993).

The nonlinguistic features of PPA by definition emerge several years after the first language symptoms. Because performance on standardized neuropsychological measures often depends on verbal abilities, it can sometimes be difficult to separate specific neuropsychological deficits from the underlying progressive aphasia. Therefore, nonverbal measures of memory, such as the Warrington Recognition memory test, are preferable to standard verbal list-learning tests of memory. With disease progression, patterns of cognitive abnormalities consistent with executive functioning (attention/working memory; abstraction/cognitive flexibility) are often noted (Zakzanis, 1999).

Differential Diagnosis

Because the earliest symptoms of PPA are so subtle that they are noticeable only to the patient, some patients may be mistakenly thought to have a functional illness when they first approach their physicians. With progression, the language changes can be documented by careful neuropsychological testing. Performance on standard mental status screening tests such as the Mini Mental State Exam, usually remains normal, however. Additionally, normal performance on tests of memory, calculations, visuoconstruction, and executive functions will help differentiate PPA from early Alzheimer's disease. Although most patients with frontotemporal dementia do not have aphasia, subgroups with prominent early speech and language changes are now recognized. Semantic dementia is a form of frontotemporal dementia that presents with progressive loss of semantic knowledge and dysnomia (Snowden *et al.*, 1992). Motor neuron disease may also present with a nonfluent, progressive aphasia, although with a more rapid progression (Catani *et al.*, 2003). The absence of significant personality and behavioral changes may help distinguish patients with PPA from other patients with frontotemporal dementia syndrome. Patients with corticobasal degeneration may occasionally present with an initial aphasia, but subsequent development of unilateral motor symptoms or apraxia will differentiate these patients from those with PPA. Other conditions that may present with an initial isolated, progressive aphasia include Creutzfeldt-Jakob disease (Mandell *et al.*, 1989; Kirk and Ang, 1994). Other focal degenerative disorders with selective involvement of higher cortical functions include slowly progressive pure dysgraphia (Luzzi and Piccirilli, 2003), slowly progressive pure word deafness (Otsuki *et al.*, 1998), progressive prosopagnosia, and slowly progressive apraxia (Otsuki *et al.*, 1997). Although the great majority of reported cases of PPA have been sporadic, a few cases of familial progressive aphasia have been reported. Neuropathological findings in cases of progressive aphasia have been varied and do not typically correspond to any of the classic neuropathological disorders. Most of the reported cases have had diffuse or focal neuronal loss, cortical gliosis, or focal spongiform changes.

Laboratory Testing

Brain imaging with MRI is typically the first step in the evaluation of patients with PPA. This will help exclude neoplasms or other structural causes of cognitive impairment. Routine blood studies to rule out thyroid and parathyroid disease should be performed. Although rare, progressive dysarthria and dysphagia may be associated with hypoparathyroid disease (Cheek *et al.*, 1990). Serum vitamin B12, folate, and methylmalonic acid should also be included in the initial work-up. Detailed language and cognitive testing may help confirm the diagnosis, even relatively early in the disease progression (Gorno-Tempini *et al.*, 2004; Croisile *et al.*, 2003; Kertesz *et al.*, 2003).

Radiological Features

The principal radiologic feature of PPA is an asymmetric focal atrophy in the perisylvian language areas of the dominant hemisphere (Sinnatamby *et al.*, 1996). This pattern of atrophy may not become apparent, however, until the disease has progressed for some time (Figure 1). Positron-emission tomography (PET) studies of PPA have documented a heterogeneous pattern of hypometabolism involving principally the frontal, temporal, and parietal regions of the dominant hemisphere. In approximately one-third of the PET studies reported to date, bilateral abnormalities were found.

Treatment

There are no specific medical treatments currently available that will reverse or slow the progression of the language symptoms, nor are there systematic studies of the efficacy of cholinergic medications in patients with PPA. Medical treatments typically focus

Figure 1 Magnetic resonance imaging scan of a patient with a four-year history of primary progressive aphasia. The scan demonstrates an asymmetrical distribution of atrophy involving the perisylvian areas, with greater atrophy in the left hemisphere (left side of the photograph is the right side of the brain).

on the management of associated symptoms, including depression, anxiety, or agitation. These symptoms may surface during the later stages of the illness. Speech therapy is typically offered during the earlier stages, and treatment focuses on the specific language functions that are impaired. An alternative to speech therapy is the use of augmentative communication devices. These are generally useful as long as the patient's general cognitive skills are reasonably intact. No systematic trials of speech therapy have been reported for patients with PPA.

Prognosis and Complications

At present, there is no known disease-modifying treatment for the degenerative diseases that may be associated with the clinical syndrome of PPA. The long-term prognosis of primary progressive aphasia is variable. Some patients have survived for as long as 14 years, but the average length of survival after diagnosis is considerably shorter.

See also: Dementia and Language; Speech Impairments in Neurodegenerative Diseases/Psychiatric Illnesses; Speech Processes in Dysarthria.

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Primitive Languages

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The concept of 'primitive' language has a checkered history, reflecting not only our increasing understanding of the nature of language, its evolution, and its relation to human culture and cognition but also our changing mores.

Professional linguists, when confronted with the term primitive language, often react in knee-jerk fashion, saying 'There's no such thing.' To appreciate the reason for this reaction, it is necessary to acknowledge the ways in which the notion of primitive language has been subject to abuse.

The ancient Greeks believed that all the peoples surrounding them were barbarians whose languages consisted of mere babbling and grunting. Similar prejudices were entertained by many other civilizations and, indeed, have persisted into the present. A still-widespread belief among laymen today is that the languages of so-called primitive people are themselves primitive, impoverished, and incapable of fulfilling the variegated functions associated with the languages of the great civilizations: English, Chinese, and others. However, increasing familiarity with the world's languages over the past couple of centuries has solidly refuted this belief: we now know that there is no correlation whatsoever between how advanced a civilization is – for example, whether people walk barefoot through the jungle or ride spacecraft to the moon – and how rich and complex its language is. Thus, perusal of any introductory linguistics textbook will reveal bushmen languages of the Kalahari Desert with more than 100 different consonants, languages of the Amazon river basin with four or more different past tenses, depending on remoteness, and aboriginal languages of Australia with words of such structural complexity that they can convey the meaning of a lengthy sentence in English. In this sense of the term, then, there are indeed no primitive languages.

Nevertheless, going beyond such ill-informed notions and abstracting away from the pejorative connotations sometimes associated with the word, the term primitive may still be of relevance to language and linguistics in a number of ways. In general, in other domains the term primitive possesses two related senses. First, it can be used to characterize objects belonging to the distant past – for example, a Paleozoic trilobite or a Paleolithic piece of cave art. Second, for contemporary objects, it can be used to characterize them as resembling their distant-past counterparts – for example, a primitive fish such as the lamprey, or a primitive art school such as Haitian *peinture naïve*. In the latter sense, and in view of the fact that evolution typically involves a unidirectional progression from simplicity to complexity, the term primitive can also be used to characterize a present-day object as being of simpler structure than other objects of similar kind. And indeed, each of these two senses is clearly applicable also within the domains of language and linguistics.

In the former sense, the term primitive language refers to languages spoken in the distant past, either by humans or by our prehuman ancestors. There is broad consensus that 1000 years ago languages were very much the same with regard to their major design features as they are today but that 1 billion years ago our prehuman ancestors did not have language in any significant form. This raises the question of whether somewhere in the immense gap between these two dates there existed languages in some intermediate stage of evolution that might meaningfully be characterized as primitive.

One way to approach this question is to look at how animals communicate. Several species of monkeys have been reported to possess inventories of predator cries. For example, the vervet monkey has

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One way to approach this question is to look at how animals communicate. Several species of monkeys have been reported to possess inventories of predator cries. For example, the vervet monkey has

one cry for eagles, another for leopards, and yet another for snakes. Thus, such monkeys possess a communicative system containing signs associated with arbitrary meanings, an important design feature of human language. The most parsimonious account for the presence of this particular design feature in several species of monkeys and in humans is to date it back to our common ancestral primate some tens of millions of years ago, who may accordingly be said to have been in possession of a very rudimentary or primitive language consisting of a small set of simple signs.

An important distinction to be made is that between the evolution of actual languages and the evolution of the language capacity: the cognitive ability to entertain the mental representations that underlie actual language usage. Obviously, each individual contemporary language makes use of just part of man's language abilities; it is an open question to what extent the totality of today's 6000 or so languages collectively exhaust these same abilities. It is quite likely that in the past, the linguistic abilities of our prehuman ancestors constituted trailblazers opening up possibilities for actual languages that were only exploited further down the evolutionary path. That linguistic abilities may surpass actual languages is dramatically evidenced by captive apes, such as the bonobo Kanzi and the orangutan Chantek, that have proved capable of acquiring linguistic behavior far beyond that of their counterparts in the wild – for example, the ability to produce and comprehend novel combinations of signs.

An extreme position, one associated with Noam Chomsky and his followers, is that contemporary human linguistic abilities evolved *ex nihilo* in a single, gigantic leap, presumably resulting from a unique genetic mutation. One particular variant of this position associates these abilities with a mutation in the recently discovered FOXP2 gene, sometimes referred to as the 'language gene,' though its functions remain poorly understood. However, even if human linguistic abilities went straight from nothing to what they are today, actual languages probably took a variety of incremental paths over the course of time in order to make use of such abilities, passing through various stages that might meaningfully be characterized as constituting primitive languages.

A somewhat more refined position, one associated with Derek Bickerton, posits a single intermediate stage in the evolution of human linguistic abilities, referred to as protolanguage. Although representative of a past evolutionary stage, protolanguage is also manifest today in a variety of domains, including pidgins, early child language, and language use in extreme conditions. Compared with contemporary human language, protolanguage is characterized by, among other things, the absence of features such as morphological structure, syntactic categories, and syntactic recursion. Clearly, if at some stage the cognitive abilities of our prehuman ancestors were restricted to protolanguage, the actual languages that they spoke, if any, would necessarily have been much simpler than contemporary human languages, and thus worthy of the characterization as primitive.

Another way to understand the past is by working back from the present; however, it is unclear whether such methods can take us back far enough in time to be of relevance to the evolution of language. Classical historical-comparative linguistics is generally assumed to enable the reconstruction of protolanguages dating back at most 5000 to 10 000 years; accordingly, it relies crucially on the assumption of uniformitarianism, whereby the typological characteristics of hypothetical protolanguages must be identical to those of observable contemporary languages. Nevertheless, current work in diachronic linguistics has suggested the existence of a number of processes that have been argued to be unidirectional.

Perhaps the most well-known of these is the process of grammaticalization, whereby content words undergo erosion of form and meaning to become bound grammatical morphemes. On its own, the unidirectionality of grammaticalization would result in a consistent evolutionary path from isolating to inflecting to polysynthetic language types. However, there is plenty of empirical evidence that languages may, in the course of time, lose their morphology and become more isolating, due to various factors, such as phonological attrition, language contact, and others, thereby showing that changes in morphological typology may proceed in either direction.

A more serious, albeit controversial, challenge to the uniformitarian assumption is provided by the observation, due to Talmy Givón, that almost all of the well-documented cases of change in the basic word order of V(erb) and O(bject) involve a shift from OV to VO, not from VO to OV. If indeed this observation withstands the test of further diachronic investigations, then it would seem to imply that at some point in the past, the relative proportion of languages with basic OV word order was significantly higher than the roughly 50% that it is today, perhaps even reaching 100%, which would then make it possible to conclude that basic OV word order was a characteristic feature of primitive languages. At present, however, claims such as these remain very speculative.

As noted earlier in this article, the term primitive language may also be understood in a second sense, as referring to contemporary languages that bear some

kind of resemblance to languages of the distant past. Within the time scale of classical historical-comparative linguistics, there is general agreement that some languages may change faster than others, either in terms of their overall structure or with respect to particular grammatical subsystems. For example, it has been claimed that within the Semitic language family, Arabic is more conservative than Hebrew with respect to its consonantal inventory, whereas Hebrew is more conservative than Arabic with respect to certain aspects of its verbal morphology. Thus, in diachronic linguistics, the notion of conservativity may be viewed as a near-past analogue of the distant-past notion of primitive language.

Potential similarities between contemporary languages and those of the remote past may be sought in the realm of structural simplicity. As a reaction to the misguided belief that primitive people speak primitive languages, an alternative dogma has become prevalent, to the effect that all languages are of equal overall complexity. In order to maintain such equality, languages must be endowed with subtle and intricate compensatory mechanisms guaranteeing that if something is lost somewhere, something else will replace it somewhere else. One oft-cited example of such a trade-off is that in which the loss of a case marking system, for instance in Romance languages, is accompanied by the rise of fixed word order, morphological simplification thus triggering an increase in syntactic complexity. However, typological studies have shown that case marking and fixed word order are not in complementary distribution: languages may in fact have both properties, or neither. In addition, doubt has been cast on the theoretical plausibility that such holistic compensatory mechanisms apply across diverse grammatical domains. More generally, a number of recent studies have called into question the validity of the dogma that all languages are of equal global complexity, suggesting instead that there may in fact exist simpler languages and more complex ones.

If indeed some languages are simpler than others, then this could be because they have retained the simplicity of their distant ancestors or because they have shed the complexity of their more recent ancestors. One possible instance of the latter scenario is Riau Indonesian, which has been argued to be of greater overall simplicity than its hypothesized ancestral language, proto-Austronesian. Yet another potential source of simple languages is provided by the kind of radical restructuring characteristic of pidgins and creoles. Recently, John McWhorter argued that the grammars of creole languages are consistently simpler than those of noncreole languages, since as 'new' languages they have not been around long enough to accrue the kinds of grammatical complexity characteristic of other, 'older' languages. Thus, cases such as these might also merit the appellation of primitive languages, in that by dint of their overall simplicity, they presumably resemble languages of our distant past.

However, in view of its negative connotations and inherent ambiguities, it is probably advisable to eschew the use of the term primitive language in favor of other, more precise and less controversial terms.

See also: Alarm Calls; Animal Communication: Overview; Cognitive Basis for Language Evolution in Non-human Primates; Evolutionary Theories of Language: Current Theories; Genetics and Language; Non-human Primate Communication; Origin and Evolution of Language; Protolanguage; Riau Indonesian.

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Principles and Parameters Framework of Generative Grammar

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The main task of linguistic theory "must be to develop an account of linguistic universals that, on the one hand, will not be falsified by the actual diversity of languages and, on the other, will be sufficiently rich and explicit to account for the rapidity and uniformity of language learning, and the remarkable complexity and range of the generative grammars that are the product of language learning" (Chomsky, 1965: 27–28). The Principles and Parameters (henceforth P&P) framework of generative grammar attempts to fulfill this goal by postulating a specific set of general mechanisms and principles of grammar that are assumed to be part of the innate knowledge a language learner brings to the task of language acquisition – more precisely, the acquisition of a grammar of a human language. To the extent that much of a speaker's knowledge of his/her language can be derived from this system of mechanisms and principles, the need for language-particular rules of grammar diminishes – thus contributing to an explanation for the rapidity and uniformity of language acquisition. From this perspective, much of the diversity across languages can be viewed as the result of systematic differences in the way the mechanisms and principles apply to the grammars of various languages. These differences appear to fall within a restricted range of options, referred to as parameters. For example, some languages require an overt subject in declarative sentences (e.g., English and French), whereas others allow declarative sentences without overt subjects, presumably where a subject pronoun is deleted (e.g., Spanish and Italian). These options are also assumed to be determined by the language faculty, thus specified as part of Universal Grammar (UG). Within this framework, research on language variation is based on the working hypothesis that much of the apparent diversity among languages can be reduced to instances of parametric variation. This hypothesis has generated a substantial amount of promising research in the area of comparative grammar (see Jaeggli and Safir, 1989; Freidin, 1991, 1992, 1996; Baker, 1995, 2001; Rizzi, 2000).

It is worth noting that modern comparative grammar has a much more ambitious and wide-ranging goal than its 19-century predecessor. Both are concerned with establishing an explanatory basis for the relationships between human languages. The neogrammarians of the 19th century were focused primarily on relationships between languages and groups of languages in terms of common ancestry. Contemporary generative grammar is concerned with a theory of grammar that is postulated to be an innate component of the human mind/brain, a faculty that all humans share as part of their genetic identity and that guides the acquisition of language. Thus the theory of grammar establishes the relationship among all human languages – not only those that happen to be related by historical accident (e.g., common ancestry).

The P&P approach to the study of human language came into focus in the late 1970s and has evolved substantially over the past decade as basic assumptions and proposals have been subjected to a critical re-evaluation within the Minimalist Program (see Chomsky, 1995b; Freidin, 1997; and **Minimalism** in this encyclopedia). Initially, the P&P framework was based on a system of grammatical principles, formulated in terms of fundamental notions of grammatical analysis (e.g., case, agreement, binding, and government). These principles formed the core of modules (e.g., Case and government) that operated within derivations to determine the behavior of syntactic rules, the mechanisms that generate syntactic representations for linguistic expressions. They applied either to derivations (i.e., the application of rules) or to the representations constructed by derivations. Over the past decade, significant parts of this modular theory of grammar have been eliminated under minimalism. The conditions on rule application that remain are for the most part formulated in terms of principles of efficient computation, while conditions on representations have been recast in terms of economy principles that apply at the two external interfaces: Phonetic Form (PF) at the sensorimotor interface and Logical Form (LF) at the conceptual–intensional interface.

The system of grammatical principles initially proposed as the core of P&P evolved out of the study of conditions on the application of transformations, beginning with Chomsky's work on the A-over-A Principle in the early 1960s (see Chomsky, 1964) and continuing with Ross' work on island constraints (Ross, 1967, 1984) and Chomsky's extension of the conditions framework (Chomsky, 1973). One of the first important breakthroughs in modern comparative grammar came from the work of Kayne (1975) and Quicoli (1976a, 1976b), which demonstrated that certain abstract conditions on the application of transformations, postulated for the analysis of English in Chomsky (1973), also applied to some very different constructions in Romance involving clitics and quantifiers. Another crucial step in the development of the current approach was achieved with the

demonstration (Chomsky, 1976) that under Trace Theory the behavior of transformational rules followed from general principles and therefore that transformations could be stated in an optimally general form – essentially as bare elementary transformational operations (e.g., 'substitute α' or 'adjoin α to β'). Transformational rules in such general form could be viewed as rules of UG (the theory of grammar) rather than as language-specific rules of a particular grammar (or as construction specific rules [e.g., a relative clause transformation]).

The study of filters (conditions on representations) provides another major element of the initial framework (see Chomsky and Lasnik, 1977), one which raises important empirical questions regarding the status of various levels of syntactic representation. This line of research led to the realization of the central role of the notions of Case and government for the theory of grammar (due to Jean Roger Vergnaud, see Rouveret and Vergnaud, 1980), and ultimately to Chomsky's (1981) reformulation and extension of the entire theory, commonly referred to as government and binding (or GB) theory.

Chomsky (1981) related phrase structure theory and the theory of transformations in a new way. Up until this version of the theory of generative grammar, the theory of phrase structure and the theory of transformations had developed more or less independently: phrase structure rules and transformations were considered independent grammatical mechanisms, both necessary for constructing syntactic representations. By defining a notion of government in terms of the theory of phrase structure and then establishing the major role it plays in the various conditions that determine the behavior of transformations, Chomsky identified a conceptual thread that links the two theories.

During the past decade under the minimalist program, the connection between phrase structure and transformations has been reconstructed so that it is only transformations that construct syntactic representations. The new bare phrase structure theory (see Chomsky, 1995a) radically revises the notion of syntactic derivation in a way that significantly affects the organization and function of grammar under the P&P framework.

The remainder of this article sketches some of the essential parts of the current P&P framework. For an account of the preminimalist version of this framework, see Freidin (1994a).

Mechanisms for Phrase Structure Representations

Under the current P&P framework, syntactic (i.e., phrase structure) representations are constructed by a single transformational operation Merge, an adjunction operation that concatenates two syntactic objects and labels the resulting syntactic object with the syntactic category features of one of the two elements concatenated. Syntactic derivations begin with an array of lexical items selected from the lexicon, a numeration N. Merge then operates on N, constructing a phrase marker containing all the elements in N. In a derivation, lexical insertion results when Merge applies to a lexical item in N. Thus, when Merge applies to a preposition *from* and a NP *my sons* (itself constructed from the merger of two lexical elements), the result is a PP *from my sons* containing a P and a NP as constituents, where *from*, the head of the construction, projects its syntactic category P to label the new construct. The operation is constrained by an Inclusiveness Condition (1), which radically restricts the kind of syntactic objects that can be created in a derivation.

(1) Inclusiveness Condition: any structure formed by the computation (in particular, PF and LF) is constituted of elements already present in the lexical items selected for N; no new objects are added in the course of computation apart from rearrangements of lexical properties. (Chomsky, 1995b: 228)

Condition (1) prohibits the categorial distinction of levels of phrasal projection and the use of indices. Merge is further constrained under the assumption that it is a strictly binary operation and therefore there can only be two immediate constituents of any phrasal category, never more and never less.

Given Merge, every phrase in a phrase structure representation has a unique head, the element that projects its syntactic category features as the label of the phrase. The application of Merge is further constrained by the order in which a head is merged with other constituents. A complement (generally an argument of the head when the head is some form of predicate [e.g., verb, adjective, or derived nominal]) is always concatenated with the head before other kinds of constituents. A specifier is always concatenated with the phrasal projection of the head last and therefore is always an immediate constituent of a maximal phrasal projection. Adjuncts (generally modifiers) are concatenated with a head (when there are no complements) or a phrasal projection of the head after complements and before the specifier.

The application of Merge that concatenates two independent syntactic objects (lexical items from the lexicon or phrases constructed from the concatenation of lexical items) is called External Merge (EM), in contrast to the application of Merge that applies to a single syntactic phrase by adjoining a subphrase of it to the phrase itself (i.e., to its root). This latter

application of Merge, which is called Internal Merge (IM), performs movement operations as in the case of simple passive sentences.

(2) Seymour was arrested in Shanghai.

Because the subject NP *Seymour* is interpreted at LF as the object of *arrested*, it is first merged (via EM) as the object of the verb and then moved (via IM) to subject position where it is pronounced (at PF). At LF, the syntactic representation of (1) contains a copy of subject in object position.

(3) Seymour_i was [$_{VP}$ arrested Seymour_i in Shanghai]

(Although indices are prohibited under the Inclusiveness Condition [1], copies here are indicated here via coindexing as a notational convenience.) IM adjoins a copy of the object to the Tense Phrase (TP) *was arrested Seymour in Shanghai* and projects the label T, thereby creating the specifier position of TP.

IM involves only the adjunction operation, i.e. only a single elementary transformational operation. The deletion operation applies to unpronounced copies of syntactic elements only at PF (see Nunes, 2004 for a detailed discussion). It follows that grammatical transformations do not compound elementary operations (Chomsky, 1980). A syntactic element and its copies form a nontrivial chain. The elements of a chain are distinguished in terms of their contexts (e.g., in [2] where the object *Seymour* is a sister of a verb while the subject *Seymour* is a sister of a TP (*was arrested Seymour in Shanghai*).

In addition to the movement of NP to the Spec-TP position in passive constructions, IM also displaces the finite auxiliary verb in yes/no questions (4) and direct questions involving an interrogative pronoun (5), as well as wh-phrases in direct and indirect questions.

(4) Was Seymour arrested in Shanghai?

(5) In which city was Seymour arrested?

Example (5) involves three kinds of movement: (a) of an NP (*Seymour*), (b) of a head (*was*), and (c) of a wh-phrase (*in which city*). Each is performed by the same operation IM.

Given that IM is restricted to adjoining a phrase to the root, derivations cannot segregate applications of IM from those of EM, as was done in earlier versions of transformational grammar where movement transformations applied after the construction of an initial phrase marker. Thus in (3), the movement of the NP *Seymour* via IM occurs before the insertion of the complementizer *that* (the head of the Complementizer Phrase [CP]), as well as the verb *believe* and the pronoun *they*, via EM.

(6) They believe [$_{CP}$ that [$_{TP}$ Seymour_i was arrested Seymour_i in Shanghai]]

Because of this, derivations under bare phrase structure theory cannot define a canonical level of D-structure as in previous theories. Therefore, there is no level of D-structure under this theory.

Restricting the application of Merge to the root yields a version of 'strict cyclicity' (Chomsky, 1973; Freidin, 1978, 1999; H. Lasnik, personal communication, 2004), where a phrase that has become a constituent of another phrase cannot be altered by further applications of Merge (either EM or IM).

Constraints on Derivations and Representations

The operation Merge sketched in the previous section will by itself generate deviant constructions and therefore must be supplemented by further constraints to distinguish deviant from nondeviant utterances in a language. As has been demonstrated in research on dozens of languages over the past several decades, these constraints apply generally across languages. Constraints have been formulated in one of two ways, as conditions on the application of rules (i.e., on derivations) or as conditions on the representations constructed by rules. In current work, both kinds of constraints have been formulated in terms of a notion of computational economy whereby the operation of rules and the representations they generate are optimally efficient in computing the relation between sound and meaning in linguistic expressions. In essence, economy conditions prohibit superfluous steps in derivations and superfluous elements in representations.

Full Interpretation

The fundamental condition on representations, Full Interpretation (FI) (Chomsky, 1986), requires that all elements in the representations at the interface levels, PF and LF, must be fully interpretable. Thus at LF, representations must contain no phonetic material under the assumption that such material cannot be interpreted by the cognitive modules that interface with LF. Similarly, PF representations must not contain any semantic information or syntactic constructs such as nontrivial chains, which cannot be interpreted at the sensorimotor interface.

Given FI, a derivation from N to LF must contain a point where phonetic material is separated from the syntactic representation and transferred to the phonological component of the grammar that constructs PF representations. This point, called Spell-Out, roughly corresponds to S-structure in previous analyses if there is only one point in a derivation. However, if there is multiple Spell-Out (Uriagereka, 1999; Chomsky, 2001), then classical S-structure cannot be constructed.

Applied at LF, FI eliminates constructions with superfluous arguments. For example, Merge could construct the following deviant example (7) in addition to the nondeviant examples (8a, 8b).

(7) *John gave Bill a book to Mary.

(8a) John gave Bill a book.
(8b) John gave a book to Mary.

The verb *gave* will assign argument functions (θ-roles) to the three NPs in both (8a) and (8b), but only three of the four NPs in (7). It can assign the indirect object θ-role to either *Bill* or *Mary*, but not to both. Therefore one of these NPs will not have a θ-role at LF, in violation of FI.

Case phenomena in languages are also governed by FI under the assumption that Case features are superfluous (hence uninterpretable) at both LF and PF and therefore have to be eliminated in the course of the derivation from N to LF. This can be illustrated with the following paradigm.

(9a) It is likely that he will graduate in June.
(9b) He is likely to graduate in June.
(9c) *It is likely he/him to graduate in June.

In (9a), the nominative Case pronoun *he* is the subject of the verb *graduate* and the matrix subject is the pleonastic element nonreferential *it*, which has no θ-role. The predicate adjective *likely* is a one-place predicate that assigns its single θ-role to the clausal complement *that he will graduate in June*. In (9b) the clausal complement of *likely* is infinitival rather than finite and the NP that is interpreted as the subject of the infinitival clause (*he*) has moved via IM to the subject position of the main clause. This movement is from a position that is assigned a θ-role to one that is not. This movement is obligatory because when it does not occur, as in (9c), the result is deviant. The difference between (9a, 9b) and (9c) is that the pronouns in the former occur in a position where they are licensed, whereas neither pronoun in the latter is licensed in that position. Once a Case feature is licensed it can be eliminated from the derivation and therefore will not show up at LF or PF. If it is not licensed, then it shows up at LF and PF in violation of FI. This analysis generalizes to overt NPs that do not show overt morphological Case (e.g., substitute the name *Adam* for the pronouns in [9] and the same result obtains), and therefore concerns a notion of abstract structural Case, which plausibly plays no role at PF (in contrast to overt morphological Case).

This analysis generalizes to the analysis of simple passives as discussed above. Thus compare (2) with the deviant (10).

(10) *It was arrested Seymour in Shanghai.

The pleonastic nonreferential *it* occurs in a non-θ-position and is licensed for Case as the subject of a finite clause. In contrast, *Seymour* occurs in a θ-position. Assuming that the reason the NP *Seymour* moves in (2) is to get to a Case-licensed position and thereby eliminate its Case feature, then the object position of a passive predicate must not be licensed for Case, in which case the NP *Seymour* violates FI at LF and PF because it still has whatever abstract Case feature it brings from the lexicon.

The abstract structural character of Case licensing can be more sharply illustrated in languages with more complex Case phenomena than English. Consider the following paradigm from Icelandic.

(11a)	Jóni	batnaði	veikin		
	John-DAT	recovered-from	the-disease-NOM		
(11b)	Ég	tel [$_{TP}$	Jóni	hafa	batnað	veikin]
	I	believe	John-DAT	to have	recovered-from	the-disease-NOM
(11c)	[$_{CP}$ að [$_{TP}$	PRO	batna		
		PRO-DAT	to-recover-from		
		veikin]]	er venjulegt		
		the-disease-NOM	is usual		
(11d)	*[$_{CP}$ að [$_{TP}$	Jóni	batna		
		John-DAT	to-recover-from		
		veikin]]	er mikilvægt		
		the-disease-NOM	is important		

Although the verb *batna* ('recover from') selects a dative subject as a lexical property, (11c) illustrates that the null subject PRO can satisfy this requirement even though it has no phonetic content. Yet as (11d) shows, lexical satisfaction of the Case requirement is not sufficient since the lexically Case-marked NP cannot have phonetic content. The subject of the infinitive in (11d) is not structurally licensed for Case, in contrast to (11b) where the dative NP occurs in an 'exceptional Case-marking' context governed by the matrix verb *tel*. In (11b), the element that determines the actual morphological Case is distinct from the element that licenses abstract Case. Such examples demonstrate the need to distinguish morphological Case assignment from abstract structural Case licensing (see Freidin and Sprouse, 1991). Both requirements must be satisfied in order to remove uninterpretable Case features from the derivation.

The FI account of obligatory movement can be extended to wh-movement (i.e., movement to Spec-CP position) under the assumption that the head C contains a formal syntactic feature, which is uninterpretable and therefore must be eliminated in the course of the derivation. In (12), for example, the wh-phrase moves from a Case-marked object position to Spec-CP, which is Case-less.

(12a) Which books did you borrow?
(12b) [$_{CP}$ [$_{NP}$ Which books]$_i$ did$_j$ [$_{TP}$ you did$_j$ borrow [$_{NP}$ which books]$_i$]]

It is also a movement from a θ-position to a non-θ-position. Since the movement must be overt (i.e., show up in PF), the formal feature involved must be uninterpretable at both LF and PF and therefore must be eliminated before Spell-Out.

In some languages (e.g., Chinese), wh-phrases do not move in overt syntax. Instead they move after Spell-Out i.e. covertly in LF (see Huang, 1981/1982). The covert movement of wh-phrases is also motivated by FI under the assumption that a wh-phrase constitutes a quasi-quantifier and as such must bind a variable created by movement at LF. Otherwise the quantifier without a variable to bind, a case of vacuous quantification, is uninterpretable. Presumably, Chinese lacks the formal feature that forces overt wh-movement.

Agreement features on verbs are also formal syntactic features that are considered uninterpretable at PF and LF and therefore can trigger a violation of FI unless they are eliminated before Spell-Out. If the agreement features on finite T enter the derivation unvalued and are then valued by the agreement features of the head of Spec-TP, then unless an NP is merged in that position, the agreement features of T remain unvalued and violate FI at the interfaces. Thus it follows from FI that a finite clause must have a syntactic subject, even in languages where the subject is absent at PF. Thus agreement features on verbs can also be considered as a trigger for NP-movement.

Whether this analysis can be extended to cases of improper movement as in (13) is not as clear.

(13a) *He is likely will graduate in June.
(13b) *[$_{TP}$ he$_i$ is likely [$_{TP}$ he$_i$ will graduate in June]]

When the pronoun *he* is first merged in the complement clause, it values the agreement features of the complement T. It is generally assumed that once a NP values the agreement features of one T, it cannot value the agreement features of another. Assume this to hold whether or not the NP is frozen in place after agreement applies. Then the agreement features on matrix T in (13) will remain unvalued, in violation of FI.

Not all improper movement cases involve a violation of FI. In (14), movement is from the subject of a finite clause to the subject of an infinitival clause.

(14a) *It is easy he to believe has written a book.
(14b) *it is easy [$_{TP}$ he$_i$ to believe [$_{TP}$ he$_i$ has written a book]]

The pronoun *he* moves from a Case-marked to a Case-less position. The Case features of the pronoun and the agreement features of the finite T are all eliminated from the derivation, so the result does not violate FI. However, notice that the uninterpretable Case and agreement features were eliminated prior to the movement of the pronoun.

One way to account for the deviance of (14) is to prohibit movements between two θ-positions by restricting the number of θ-roles a chain may have to one (see Freidin, 1978; Chomsky, 1981). An alternative is to prohibit the movement itself on the grounds that it is unmotivated by any grammatical factor, in contrast to legitimate phrasal movements. Since the pronoun *he* is both licensed for Case and assigned a θ-role in its initial position as subject of the complement of *believe*, there is no motivation for it to move further. From this perspective, movement is viewed as a 'last resort' to save a derivation from violating FI. Any movement that fails to meet this criterion is superfluous and therefore ruled out on general grounds of computational efficiency.

Locality of Movement

In addition to constraints on when and where a phrase must move and when it may not move, must also specify 'how far' a movement can be. Although IM has the capability of moving a constituent indefinitely far away from its EM position, actual movement phenomena in languages demonstrate that certain syntactic boundaries may not be crossed; in effect, IM may not move a constituent 'too far' away. Thus movement operations are bounded within a particular syntactic domain. Compare, for example, the long-distance wh-movement in (9a), where the wh-phrase is interpreted as the verbal object in a clause (analyzed here as a Tense phrase (TP) contained in a Complementizer phrase [CP]) that is itself embedded in three other clauses, to the much shorter but impossible movements in (15b) and (15c).

(15a) [$_{CP}$ who$_i$ did [$_{TP}$ you say [$_{CP}$ that [$_{TP}$ Mary knows [$_{CP}$ that [$_{TP}$ Bill told Sam [$_{CP}$ that [$_{TP}$ Rachel admires who$_i$]]]]]]]]
(15b) *[$_{CP}$ who(m)$_i$ did [$_{TP}$ [$_{NP}$ your interest in who(m)$_i$] surprise Mary]]
(15c) *[$_{CP}$ what$_j$ did [$_{TP}$ John wonder [$_{CP}$ [$_{PP}$ to whom]$_i$ [$_{TP}$ Bill gave what$_j$ [$_{PP}$ to whom]$_i$]]]]

In contrast to (15a), the movement in (15b) is intraclausal rather than interclausal and the movement in (15c) only crosses one clause boundary instead of many.

The boundedness of IM can be accounted for in terms of a general principle of grammar that designates certain categories as bounding categories and

sets a limit for bounding categories that may be crossed in a single-movement operation. This limit is fixed in UG at one bounding category. Two syntactic positions are said to be subjacent to one another if they are separated by no more than one bounding category. The principle for bounding, the Subjacency Condition, has the effect of prohibiting a single movement that crosses more than one bounding category.

(16) Subjacency Condition
Movement can only be to a subjacent position.

This principle can be formulated as a condition on chain links, in which case it constitutes a condition on representations rather than a condition on the application of rules (see Freidin, 1978; Browning, 1991). Alternatively, it has been argued that the Subjacency Condition must be formulated as a condition on the application of the movement rule (see Lasnik and Saito, 1984, 1992). Assuming the bounding categories for Subjacency are NP and TP, (16) rules out (15b) and (15c). To account for (15a), it is assumed that wh-movement operates locally when it can, so that *who* moves successively through each of the intervening Spec-CP positions, thereby avoiding a Subjacency violation. The condition applies more generally to many other constructions involving movements across two NPs or across two TPs (see Freidin, 1992 for discussion and references). As a condition on representations, it applies at S-structure (see Freidin and Lasnik, 1981 for discussion) and therefore is incompatible with the multiple Spell-Out analysis mentioned above.

Bounding effects appear to vary across grammars. In some idiolects of Italian, it is possible to extract a relative pronoun out of an indirect question (see Rizzi, 1982).

(17) il mio primo libro, $[_{CP}$ che$_i$ $[_{TP}$ credo $[_{CP}$ che$_i$ che $[_{TP}$ tu sappia $[_{CP}$ $[_{PP}$ a chi$]_j$ $[_{TP}$ ho dedicato che$_i$ $[_{PP}$ a chi$_j]]]]]]]$ me è sempre stato molto caro
'my first book, which I believe that you know to whom I dedicated, has always been very dear to me'

The sentence is well formed even though the movement between two trace positions crosses two TPs. This suggests that TP is not a bounding category in this idiolect of Italian. Nonetheless, a bounding effect occurs in Italian when a single movement of *che* crosses two CPs, as in (18).

(18) *il mio primo libro, $[_{CP}$ che$_i$ $[_{TP}$ so $[_{CP}$ $[_{PP}$ a chi$]_j$ $[_{TP}$ credi $[_{CP}$ che$_i$ che $[_{TP}$ abbia dedicato che$_i$ $[_{PP}$ a chi$_j]]]]]]]$ me è sempre stato molto caro
'my first book, which I know to whom you believe that I dedicated, has always been very dear to me'

If CP is taken as a bounding category for this idiolect of Italian, then the second and final movement of the relative pronoun *che* violates Subjacency. Similar phenomena pointing to the same conclusion can be found in French and Spanish (see Sportiche, 1981 and Torrego, 1984). Thus the choice of TP vs. CP as a bounding category for Subjacency constitutes one parameter of UG. If both TP and CP are chosen as bounding categories, then Subjacency would prohibit interclausal *wh*-movement. Some languages (e.g., Russian) prohibit this kind of *wh*-movement, a fact that would follow from bounding theory if both TP and CP were bounding categories for Subjacency in these languages.

The Subjacency analysis remains the most general and perhaps the clearest account of syntactic island phenomena (i.e., construction from which the movement of constituents is prohibited). However, it may well be that the Subjacency Condition constitutes a false generalization, as have several other important proposals in the history of generative grammar. Moreover, the stipulation of bounding categories is essentially descriptive rather than explanatory and the principle itself is not easily interpreted in term of economy.

More recently, other analyses have been proposed that cover some of the empirical range of the Subjacency Condition. Chomsky (1993) proposes an economy principle that derivations involve the shortest steps (the Minimal Link Condition; see also Chomsky, 1995b), which prohibits (15c) on the grounds that the movement of *what* to the matrix Spec-CP is not the shortest movement possible because the movement from Spec-CP to Spec-CP is shorter. Chomsky (2001) proposes that subparts of derivations (phases) become inaccessible to further computation because they are transferred to PF and LF when complete. Details aside, under this proposal, *what* in (15c) would be inaccessible for movement because it is not at the edge of the CP phase. The proposals are problematic given that the movements they prohibit for English appear to be possible in several Romance languages (e.g., as in [17] above). Whether there is an alternative to the Subjacency analysis of locality with the same empirical coverage remains to be determined.

Binding Theory

Movement is not the only process that creates relations between pairs of positions within a sentence. Anaphoric expressions also create such relations via the interpretive link to their antecedent. Languages contain two types of anaphoric expressions: those that require the presence of an antecedent in the

same sentence, called bound anaphors (i.e., reflexive pronouns and reciprocal expressions, henceforth anaphors), and pronouns (including anaphoric epithets like *the bastard*), which can occur in a sentence without an antecedent. Binding theory is concerned in part with the conditions under which anaphors and pronouns can be linked to an antecedent. (For more detailed discussion see Freidin, 1986; Lasnik, 1989; Koster and Reuland, 1992; and Chomsky and Lasnik, 1993.)

Bound Anaphors Formally, an antecedent binds an anaphoric expression when the anaphor is a constituent of the phrase that is merged with the antecedent (i.e., its sister). The paradigm for anaphors in (19) illustrates that all possible binding relations are not licit. (Again coindexing is used here and in what follows as a notational convenience.)

(19a) simple sentence
we$_i$ help each other$_i$
(19b) finite clause complement:
(19b.i) *we$_i$ expect [$_{CP}$ (that) [$_{TP}$ each other$_i$ will win]]
(19b.ii) *we$_i$ expect [$_{CP}$ (that) [$_{TP}$ Mary will help each other$_i$]]
(19c) infinitival complement:
(19c.i) we$_i$ expect [$_{TP}$ each other$_i$ to help Mary]
(19c.ii) *we$_i$ expect [$_{TP}$ Mary to help each other$_i$]

While all the anaphors in (19) are bound, only those in (19a) and (19c.i) are properly bound. Proper binding of anaphors falls under a principle of grammar, referred to as Principle A of the binding theory, which is given schematically in (20).

(20) Principle A: an anaphor must be antecedent-bound in a local domain δ.

(20) constitutes a principle of UG which, by specifying the local domain δ, is instantiated in the grammar of a particular language as binding condition A.

The local domain for anaphors in English is the domain of an accessible SUBJECT, where SUBJECT stands for a syntactic subject or the agreement element associated with the head of finite TP (given that specifier-head agreement between a syntactic subject and the head T is mandatory in finite clauses). Any syntactic subject is accessible to an anaphor if it binds the anaphor. Thus (19a) and (19c.i) satisfy Condition A because the only accessible subject in each example is the main clause subject to which the anaphor is bound. In (19b.ii) and (19c.ii), the complement subject is accessible to the anaphor, but the anaphor is antecedent-free (i.e., not bound by an antecedent) in the domain of this 'subject'. Therefore, these examples violate Condition A. In (19b.i), the agreement element of the sentential complement constitutes an accessible SUBJECT and in that domain the anaphor is antecedent-free in violation of Condition A. (The precise formulation of the local domain δ for English is somewhat more intricate; see Chomsky, 1986; Freidin, 1986, 1992 for details.)

Cross-linguistically, we find some variation in the local domain *δ* for Condition A. In Korean, for example, the binding domain for reciprocals is that of any c-commanding NP. Thus within a single clause, a direct object may create a binding domain for the object of a PP in VP, as illustrated in (21) (from Hong, 1985).

(21) kitil-i [$_{NP}$ John-kwa Mary]-lil
they-NOM John and Mary-ACC
sero-eke sogehetta
each other-to introduced
they$_i$ introduced [$_{NP}$ John and Mary]$_j$ to each other$_{\{*i,j\}}$

In the corresponding English example, either the subject or the direct object may be the antecedent of the reciprocal. Hence the binding domain for reciprocals in Korean is more restricted than that of English. This indicates that the binding domain for Principle A is subject to parameterization. (See Freidin, 1992: Chap. 7 for a more detailed discussion of parameterized binding.)

Pronouns In contrast to bound anaphors, which must be antecedent-bound within a certain domain, pronouns cannot be bound within certain domains. The paradigm for pronoun binding corresponding to (19), given in (22), illustrates a complementarity between bound anaphors and bound pronouns where a bound anaphor can occur, a bound pronoun may not.

(22a) simple sentence
*the politician$_i$ voted for him$_i$
(22b) finite clause complement:
(22b.i) Clara$_i$ expects [$_{CP}$ (that) [$_{TP}$ she$_i$ will win]]
(22b.ii) Clara$_i$ expects [$_{CP}$ (that) [$_{TP}$ Sam will help her$_i$]]
(22c) infinitival complement:
(22c.i) *Clara$_i$ expects [$_{TP}$ her$_i$ to help Sam]
(22c.ii) Clara$_i$ expects [$_{TP}$ Sam to help her$_i$]

Thus pronoun binding is accounted for by a principle of grammar complementary to Principle A, referred to as Principle B of the binding theory.

(23) Principle B: a pronoun must be antecedent-free in local domain δ.

As with Principle A, Principle B is instantiated in the grammar of a particular language as binding condition B by specifying the local domain δ. As with anaphor binding, this domain varies across

languages. For example, pronoun binding in the Icelandic sentence corresponding to (22c.ii) is not possible.

Given the complementarity of anaphors and bound pronouns illustrated in (19) and (22), it would appear that the specification of the local domain for pronoun binding is identical to that of anaphor binding. Although this complementarity holds for binding within TP and across TP boundaries, it collapses with respect to binding across NP boundaries, as examples (24–25) illustrate.

(24a) they$_i$ never discuss [$_{NP}$ each other's$_i$ work]
(24b) they$_i$ never discuss [$_{NP}$ their$_i$ work]

(25a) every man$_i$ heard [$_{NP}$ a story about himself$_i$]
(25b) every man$_i$ heard [$_{NP}$ a story about him$_i$]

These examples show that the domain statement for Condition B in English cannot be identical to that of Condition A, since if it were, then (24b) and (25b) should be unacceptable on a par with (22a) and (22c.i), contrary to fact.

These examples show that NP constitutes a binding domain for pronouns and the paradigm in (22) shows that TP constitutes another binding domain with one exception – (22c.i) – where the matrix verb governs the complement subject across TP. One property that NP and TP share in common is that they both constitute domains in which predicates (e.g., verbs and derived nominals) may discharge their θ-roles (θ-domains, or complete functional constructs [in the terminology of Chomsky, 1986]). Example (22c.i) shows that the binding domain for pronouns is not the minimal θ-domain containing the pronoun, but rather the minimal θ-domain of the matrix verb, which is implicated in Case licensing of the pronoun. (For further discussion of the representation and interpretation of pronoun binding, see Lasnik, 1989.)

Universally, a pronoun cannot be anaphoric on an antecedent when it is in a structural binding relation to the antecedent (i.e., it is merged with a phrase that contains the antecedent), as in (26).

(26) *she$_i$ expects [$_{CP}$ (that) [$_{TP}$ Sam will help Clara$_i$]]

Example (26) can never be interpreted as a sentence about two people. Note that this is not a matter of the pronoun preceding its antecedent since (27) has the same linear property but not the same interpretive restriction.

(27) His professor praised John in class.

Example (27) can be interpreted as a sentence about two people as well as a sentence about three. The constraint that accounts for the impossibility of the interpretation represented in (26) is designated in the literature as Principle C.

Conclusion

The material covered in this article is merely a sketch of some of the central topics being investigated within the principles and parameters framework. Ongoing research extends the empirical coverage of various subtheories, including parametric variation across languages. Current work also explores a number of promising alternative analyses for various parts of the theory. As in any area of rational inquiry, no assumption is immune to critical inquiry.

For further discussion of these and other topics within this approach to generative grammar, see van Riemsdijk and Williams, 1986; Lasnik and Uriagereka, 1988, 2005; Lasnik, 1999, 2003; Freidin, 1992; Epstein and Hornstein, 1999; and Epstein and Seely, 2002 among many others. Many of the topics under investigation have a long and rich history in generative grammar of the past half century: see Newmeyer, 1986; Freidin, 1994b for an historical account.

The principles and parameters framework of generative grammar attempts to establish the common biological basis for all the world's languages. The current work in comparative grammar illuminates the human language faculty as an intricate computational structure of the human mind that is unique to the genetic endowment of our species. In this way work in contemporary comparative grammar continues to make a major contribution to the emerging cognitive science enterprise.

See also: Binding Theory; Chomsky, Noam (b. 1928); Control and Raising; Long-Distance Dependencies; Minimalism; Transformational Grammar: Evolution; X-Bar Theory.

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Principles and Rules

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The concept of 'rule' and 'principle' is perhaps as venerable as the study of language practices. The view that one particular variety of language is inherently more valuable contributes to the formation of prescriptive rules in relation to grammar, vocabulary, and pronunciation. The 18th century witnessed the need to standardize, to codify English, whose uniformity was promoted in the interest of the newly created union (Crowley, 1996) and whose imposition throughout the British Isles became part of what Leith (1997: 151) calls "internal colonization". On the other hand, China at the turn of the 20th century experienced the need to break loose from the rules and conventions of classical Chinese as it tried to vernacularize its language as part of its modernization effort to create a new language of modernity and progress (Gunn, 1991).

In contemporary linguistics the term 'rule' assumes a new meaning, one that should not be confused with prescriptive rules. According to Noam Chomsky (1957), the rules of language are syntactic and generative, because language is both rule governed and predictable. Chomsky further distinguished the rules of grammar from principles of grammar – the latter do not generate sentences, but act as a set of tests that a sentence must pass to be part of a given language (1986).

However, meaning often defies both predictability and testability, especially when it becomes extralinguistic, and when well-formedness transcends syntax. Instead of focusing on rules of grammar, be they prescriptive or generative, language philosophers and pragmatists focus on "the total speech act in the total speech situation" (Austin, 1962: 149), on rules that either regulate (preexisting) language behavior or create or define new forms of language behavior (Searle, 1969), and on pragmatic principles that can account for the use of language as determined by societal conditions (Mey, 2001). For example, Grice (1975, 1989) developed the cooperative principle, whereby anyone who has a rational interest in participating in talk exchange is expected to be cooperative, to make his or her contribution as required. The cooperative principle, which for Grice is assumed to be in force all the time, and which has been faulted because it elides interpersonal, intercultural power dynamics, subsumes the conversational maxims of quantity, quality, relation, and manner (Grice, 1989: 26). What has to be underscored is that we comply with the maxims as much by flouting them as by honoring them – hence we can mean more than or other than what we say.

Brown and Levinson (1987) turned their attention to politeness principles, proposing that there is a public-self image that we all want to claim and protect – one that consists of the want to be stroked (positive face) and the want to be left alone (negative face). These two competing wants and their concomitant claims for universality have spawned a large body of work on politeness pragmatics. Leech (1983) offered his own principle of politeness, which is predicated upon the notions of cost and benefit, and directness versus indirectness; he further offered a number of subprinciples to account for stylistic aspects of expression. And like Horn (1984), who tried to reduce Grice's conversational maxims, Sperber and Wilson (1995) contended that what is only required for the hearer to work out the speaker's intended message is the principle of relevance, because we humans turn our attention to what seems most relevant to us automatically.

While the formulation of pragmatic principles has greatly extended the scope of linguistics, pragmatic principles themselves do not equip language users with the means to reflect upon the conditions under which they use, or fail to use, language. Metapragmatic principles seek to promote metadiscursive awareness and to account for those underlying forces that, be they local or crosscultural, motivate or constitute particular pragmatic principles (Mey, 2001). This kind of self-reflectiveness becomes central to cultivating critical language awareness, to facilitating an emancipatory use of language (Fairclough, 1989), and to forever asking ourselves: "Whose language are we using?" (Mey, 1985).

See also: Chomsky, Noam (b. 1928); Cooperative Principle; Critical Discourse Analysis; Grice, Herbert Paul (1913–1988); Maxims and Flouting; Metapragmatics; Politeness; Relevance Theory.

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Printing and Typewriting

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Mammals, amphibians, reptiles, and birds have been leaving their marks in the soft earth for several hundred million years. In the broadest sense of the word, that is printing. For purposes of this article, however, printing is narrowly defined as the physical replication of written language through prefabricated masters. The earliest known examples of printing in this sense are the imprints of stone seals bearing short inscriptions, usually with accompanying illustrations. These survive in substantial numbers from Mesopotamia, Egypt, and the Indus Valley, and some are close to 5000 years old. (The oldest known Chinese seals are more recent.) The printing of extended texts did not apparently occur until the invention of paper, in Hàn dynasty China (1st century B.C.).

Almost as soon as it was available, paper was used in making rubbings from stone inscriptions. In China between the 1st and 9th centuries A.D., a number of lengthy philosophical and literary texts appear to have been engraved on stone at government expense expressly for this purpose. (This is in marked contrast to the widespread custom of engraving governmental and military proclamations: a class of texts that have seldom, if ever, been copied by the populace for independent study.)

During the Táng dynasty (618–907 A.D.) and possibly somewhat earlier, extended texts, with and without illustrations, were also carved in relief on slabs of wood to serve as printing plates, and the prints were made, again, by rubbing. The method was used to print calendars, charms, and paper money, as well as books. The earliest substantial and dependably dated example known at present is a copy of Kumarajiva's Chinese translation of the Diamond Sutra, printed from seven large wooden plates in the year 868.

Making rubbings from hand-carved wooden plates – xylography, as it is called – remained the primary method of printing in China through the end of the 19th century. To this day, a printing plate or form (that is, a set of pages ready for the press) is known in Chinese as **bǎn** (板 or 版), meaning board or plank, and the most popular fonts of type for many literary purposes are still **sòngtǐ** (宋体): squarish characters based on the woodcut glyphs of the Sòng and later dynasties, rather than **kǎitǐ** (楷体), or characters based directly on the action of the Chinese brush (**Figure 1**).

If a text is carved in a slab of wood and the slab is sawn up into sections, each bearing a single character, you have what is known as movable type: individual glyphs in material form that can be endlessly rearranged into different texts. **Huóbǎn** (活板), the Chinese term for movable type, does in fact mean 'flowing plank' or 'living plank.' In all but its most cursive forms, Chinese script is admirably suited to this concept, because every character is conceived as occupying the same rectangular space. Every piece of type in a Chinese font can therefore be exactly the same size and mechanically interchangeable with every other. The difficulty is that the number of characters required to set any lengthy Chinese text is very large. Even the most rudimentary font needs 5000 to 6000 characters. More serious fonts run from 20 000 to 60 000. That hurdle notwithstanding, movable type was invented in China toward the middle of the Sòng dynasty (around the year 1040) and has never

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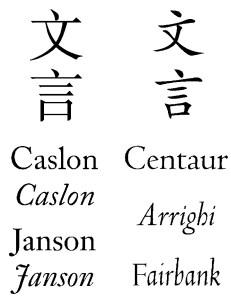

Figure 1 The phrase *wényán*, 'literary language,' set in two different fonts of Chinese type. The **sòngtǐ** (宋体 'Sòng style') font, on the left, is based on Sòng, Míng and Qing dynasty characters carved by hand in wood. The **kǎitǐ** (楷体 'model style') font on the right is based on brushwritten characters of the Wèi and Jìn dynasties. *Sòng* fonts are in some sense comparable to Baroque fonts for the Latin alphabet (e.g., Caslon and Janson). They are considerably removed from their handwritten origins but have a long and firm association with the printed book. **Kǎi** fonts are closer in their way to Renaissance Latin fonts and their recent revivals (e.g., Centaur, Arrighi, and Fairbank), which clearly show their scribal roots.

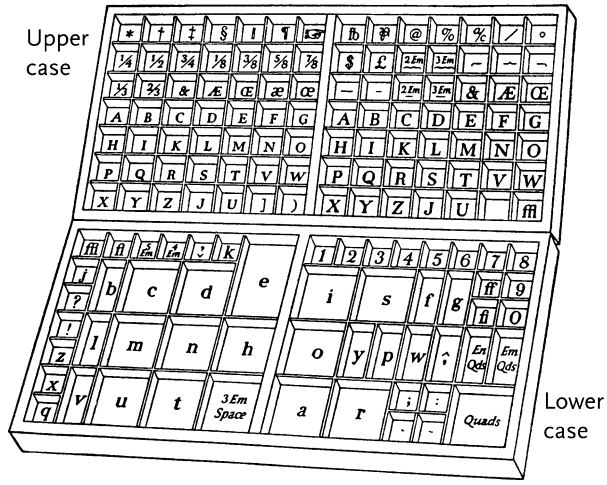

Figure 2 A pair of English cases, racked up for hand composition. (After Chappell & Bringhurst, 1999.) There are 54 compartments in the lower case, 98 in the upper. The small compartments along the top of the upper case are differently used by different compositors, depending on their needs and the makeup of the font.

ceased to be used. Movable type was also employed in Korea by the early 13th century, when Korean was still written in Chinese script. Yet the labor of making and using it is so great that movable metal type has remained only a secondary method of printing Chinese.

The technology of papermaking traveled westward across Asia and reached Europe at the end of the 12th century. Xylography may have come soon after, but the earliest certain example found thus far is a bodhisattva-like image of St. Christopher captioned with a woodcut Latin couplet and dated 1423. The block was probably cut and printed in southern Germany.

There is no explicit evidence that examples or even rumors of Asian movable type reached 15th-century Europe, but by the 1440s several Europeans were aware of the idea and were actively at work on the implicit technical problems. The first of these to succeed was Johannes Gutenberg.

At first glance, the shift to movable type looks far less daunting in the Latin alphabet than it does with Chinese script, because the total number of characters required is so much smaller. The technical problems are magnified, however, because Latin letters vary in width. If letters are cast in metal, the mold must also be adjustable in width, and when text is corrected – an m exchanged for an n, for example – spatial adjustments must be made in the surrounding text. Even when no corrections are required, justifying paragraphs (that is, evening the margins, in keeping with the practice of the scribes) requires finicky spatial adjustments in every line.

Scribal justification was a highly developed skill in 15th-century Europe. It involved the selective use of abbreviations and ligatures, minute adjustment of the widths of individual letters, and the spacing of letters and words. To replicate this feat in metal type, Gutenberg cast, for the 42-line Bible (completed about 1455), a font of type six times the size of the alphabet itself. Gottfried Zedlar, who analyzed this font exhaustively at the beginning of the 20th century, found it to consist of 290 different characters. Twenty-four of these were basic lowercase letters; 24 were capitals; five were punctuation marks; the remaining 237 were abbreviations, ligatures, variants, and alternate castings differing slightly in width. Eighty percent of the font, in other words, consisted of accessories required only to justify the lines and give an even texture to the page.

As typecasting and printing spread through the European world and its colonies, larger fonts were cut to accommodate other languages and other scribal traditions. Most cursive Greek fonts, for instance, included far more ligatures than Latin fonts. At the same time, there was pressure to simplify justification, by relying far more on variation in the spaces between words than on variant forms and scribal abbreviations. Over time, hundreds of different cases and lays (that is, arrangements of type in the case) evolved to meet the needs of hand compositors. Some have preferred to set from paired cases, with majuscules and small caps in the upper case, minuscules in the lower case. Others have preferred single cases, which generally lack provision for small caps. The arrangements shown in Figures 2 and 3 are typical, but by no means universal, for compositors working in English.

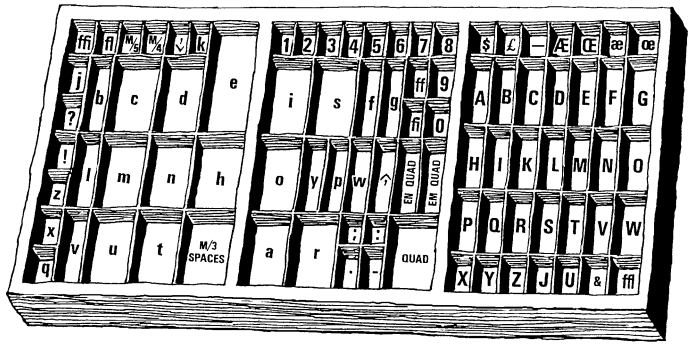

Figure 3 Typical lay (arrangement) of a California job case, which has 89 compartments in all. In essence, this is a standard English lower case with a tray of capitals attached to the right side. ('Job' or 'jobbing', in 19th-century argot, means advertising and commercial rather than literary typesetting. Job cases were built for so-called 'jobbing faces', which routinely lacked small caps.)

In Europe toward the end of the 18th century, printing entered a period of accelerating technological change, driven by the urge to print more and print it faster. Beginning in the 1770s, wooden presses were replaced with presses partly made of iron. Presses made entirely of iron were introduced in 1800. Within the space of a few years, power-driven presses, papermaking machines, and the stereotype process were introduced. (Stereotyping is a means of casting one-piece replicas of entire pages of hand-set type and is especially useful for reprints and long runs on motorized iron presses, which quickly wear type out.)

Before the end of the 19th century, there were keyboard-operated typesetting machines, web presses (which print on a continuous roll of paper) and perfecting presses (which print both sides of a sheet or roll at once). Through the use of these devices, large parts of the world were increasingly immersed in a sea of printed language.

Writing itself was not immune to this epidemic of technological change. Several 18th-century engineers attempted to build a typewriter, though no one succeeded in bringing one to market until 1874. The first machines to be sold included a keyboard very similar to the QWERTY layout used today, but they could type in capital letters only, and the typescript could be read only after it was removed from the machine. Shift-key machines, which typed both caps and lowercase, appeared in 1878. By the mid-1880s, typists could see the text as it was typed. The familiar manual typewriter of yore was essentially complete by 1900, and it was only at this date that touch-typing became the professional norm.

Electric typewriters – first attempted in the 1870s – were widely used by the 1950s. The once-famous IBM Selectric, whose easily interchangeable fonts made it possible to type on a single machine in multiple alphabets (Latin and Hebrew, or roman and italic, for example), first appeared in 1961 and reigned supreme until displaced by the computer. (Indeed, Selectric typewriters were once employed as interface devices for some mainframe computers.)

While typewriters matured into electric and then electronic form, the printing press was radically transformed through marriage to the camera.

Lithography is a printing process based on chemical rather than physical distinctions between foreground and background, or inked and inkless areas. The printing surface is not necessarily stone (as the name implies), but it is necessarily smooth. Thus lithography, unlike letterpress, yields a perfectly two-dimensional result. The method was developed toward the end of the 18th century and proved immediately useful for printing illustrations and sheet music. In the 20th century, when printers could transfer text and images photographically onto a printing plate, high-speed lithography became the dominant means of printing anything and everything on paper. And for lithographic printing, physically movable type is unnecessary. Photographic images of letters are all that is required. So in the mid 20th century, phototype machines, whose fonts are made of film instead of metal, became the primary means of setting text.

The typesetting and printing industries had barely adjusted to this change when phototype and photolithography were also swept aside in favor of digital technology. In the world of the personal computer, printing has become, for the first time, something everyone can do. The process now involves primarily the electronic manipulation of coded information, yet the visible result remains what it has been for 1200 years: prefabricated letters rendered in ink on sheets of paper.

See also: Typography.

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Priscianus Caesariensis (d. ca. 530)

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Priscian lived and taught in Constantinople (late 5th–early 6th centuries) as shown by his panegyric *De laude Anastasii imperatoris*. He must have been dead in 527, when his pupil Flavius Theodorus finished copying the *Institutiones grammaticae*, dedicated to *Iulianus consul ac patricius*, a philo-Anastasian epigrammatist.

The 18 books of *Institutiones grammaticae* (*Ars* in the manuscripts) established Priscian, along with Varro and Donatus, as a pillar of Latin grammar, especially for the innovations introduced by books 17 and 18, written following the Greeks Apollonius Dyscolus and Herodian, who had investigated Greek grammar from a morphosyntactic point of view. Priscian knew the western and eastern tradition of Latin grammar and tried reorganizing it with Greek in the background and a mass of examples (provided by Flavius Caper, 2nd century A.D.) that give evidence of the modifications of language. He maintained that one should follow practice on the basis of tradition.

It is possible to give a partial chronology of his works; to judge from cross-references, the *Institutio de nomine et pronomine et verbo* and the *Partitiones duodecim versuum Aeneidos principalium* were written after the *Institutiones*, whereas the *De figuris numerorum*, the *De metris Terentii,* and the *Praeexercitamina* were written together on the advice of Symmachus (consul in 485, killed in 525 A.D.), as shown by the dedicatory epistle. These last works fitted well with Symmachus's cultural program, which regarded the union of the Greek and the Latin elements as a winning team against the nationalist tendencies that perceived the united empire as something alien. The *Institutio de nomine* is the smaller sister of the *Institutiones* and – typologically speaking – is a '*regulae* type' grammar, a grammar that considers one or more parts of speech, focusing on classification and examples, but without quotations, different from the '*Schulgrammatik* type,' which explained each part of speech and its accidence and went on to illustrate the peculiarities of language with examples taken from the authors. This treatise won a wide popularity in the early Middle Ages, providing an essential morphological basis and complementing Donatus's grammar based on genders. It was ideal for people who needed to understand the Bible but no longer had Latin as their mother tongue. The *Institutiones,* on the other hand, reached their

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See also: Classical Antiquity: Language Study; Grammar, Early Medieval; Kilwardby, Robert (?1215-1279); Peter Helias (12th Century A.D.); Rhetoric: History; Varro, Marcus Terentius (116–27 B.C.).

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Private Language Argument

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The private language argument is the strand of Ludwig Wittgenstein's later work (in particular, 1953: §§ 243–315) in which he endeavored to demonstrate the impossibility of a language that only one person could understand – or, at any rate, as Wright (1986) suggested, that only one person could have *reason to believe* he or she understood. Early commentators, although divided over the argument's cogency, regarded it as perhaps the most powerfully subversive weapon in Wittgenstein's armory. Fashions have changed, however, and nowadays few philosophers seem to agree even on so much as whether the argument exists and, if it does, how it works. Critics satirize the legendary argument as a kind of perpetually elusive 'Philosopher's Stone' of woolly-minded pragmatism, and even Wittgensteinians tend nowadays to downplay the significance of any single *argument*, preferring to emphasize themes expounded by Wittgenstein in the surrounding passages (see Hacker, 1986; McDowell, 1989; McGinn, 1997).

The Argument's Target

Wittgenstein's interest is probably not linguistic *per se*: his intention is to attack a general conception of mind, usually labeled Cartesian. According to this picture, introspection affords thinking subjects an especially direct, observational access to their own mental states, whereas their access to the mental states of others is indirect and theoretical – a matter of inference from their behavior. This conception seems particularly compelling in regard to sensations and other phenomenal experiences.

Wittgenstein invites us to consider a subject – let us call him *PD* (Private Diarist) – who undertakes to name various types of sensations and record their occurrences in a diary. Cartesianism would seem to suggest that, to inaugurate names of sensation-types in this way, it would suffice for PD simply to "speak, or write the sign down, and at the same time ... concentrate ... attention on the sensation – and so, as it were, point to it inwardly" (Wittgenstein, 1953: § 258). The Cartesian conception also seems to suggest that subjects other than PD could have no reason to believe they understood these terms, so that a language containing them would be *private* to PD in the sense intended. By arguing that such a language is impossible, then, Wittgenstein attacks the Cartesian conception of mind that underpins it.

The Cartesian conception continues to dominate our intuitive, 'pretheoretical' view – at least of those mental states that enjoy a distinctive phenomenology. This alone ensures that it really matters whether there is a cogent private language argument. However, before addressing that question, it is also worth briefly considering which contemporary theories – of philosophy, psychology, linguistics, and so on – are threatened by the argument. Wittgensteinians frequently bemoan the widespread infection of mainstream theory in these disciplines by Cartesianism, but although there are reasonable general grounds for this complaint, it is actually quite difficult to find theories that are threatened by the private language argument *per se*.

The 'representational theory of mind' that underwrites much recent work in cognitive science and linguistics might seem the most obvious candidate. Indeed, Fodor (1975) has provocatively placed himself on the firing-line on its behalf. According to the representational theory, cognition involves the

highest level of diffusion during the Carolingian Renaissance, when scholars were ready for the classical grammatical model. The *Partitiones* is a didactic work in the footsteps of the Greek grammatical analysis of the sentence higher level students had to deal with. A didactic aim also produced the translation of the *Periegesis* by Dionysius (1087 hexameters).

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manipulation of symbols that, like linguistic expressions, enjoy representational contents, yet that are private in the sense that those contents are not determined by anything like public conventions or criteria. As is discussed below, there is an interpretation of the private language argument that would place the notion of contentful symbols that are private in this sense in its sights, but it is not the most plausible interpretation. Meanwhile, we can already see that there is no *prima facie* tension between the representational theory and the argument's conclusion. For one thing, Fodor did not suppose that representations' contents are conferred by anything like acts of introspective ostension. Even more to the point, an advocate of the representational theory is entitled to insist that there could be good (empirical) reasons to suppose that two subjects enjoyed representations with the same content (and so to suppose that, in a sense, subjects 'understood' the same representations).

Much more vulnerable to challenge are the 'direct reference' theories of 'phenomenal concepts' recently defended by Loar (1997), Chalmers (2003), and others. The key idea here is that subjects enjoy concepts of the phenomenal qualities of their own conscious experiences whose contents are exhausted by their references. Some of these theorists suggest that such concepts are inaugurated through acts of introspective demonstration, and given the distinctive semantics they are proposed to enjoy, it is difficult to see how such concepts could fail to be private in something like the sense at issue here.

Supplementary Strands

Most of Wittgenstein's remarks in the passages generally considered to contain the private language argument do not directly address the issue identified above as central, but instead are concerned with the meanings of expressions used in public languages to talk about sensations and other mental states.

Wittgenstein held quite generally that understanding an expression is a matter of knowing and following rules that regulate how it is used in various language-involving activities – 'language games' – in which speakers participate. One thing Wittgenstein did in these passages is to emphasize the third-person uses of (public language) sensation terms. Understanding words like 'toothache' and 'pain' involves, *inter alia,* knowing what kinds of behavioral criteria sanction their third-person attribution. Therefore, at any rate, that understanding cannot be just a matter of demonstrative first-person acquaintance with pains, as a thoroughgoing Cartesian might assume. Of course, a Cartesian might reply by conceding the point about public language sensation terms, but insisting nonetheless on the possibility of distinct, privately inaugurated terms lacking third-person applications altogether.

Elsewhere in these passages, Wittgenstein made characteristic proposals to the effect that what seem superficially to be assertions may in fact be speech acts of other kinds: warnings, exclamations, 'performatives,' etc. One example is his suggestion that utterances involving (public language) sensation terms can be used to express sensations, rather than to describe them: "Here is one possibility: Words are connected with the primitive, the natural, expressions of the sensation and used in their place" (§1953: 244). Considering sentences that might seem to articulate the most fundamental features of sensations, such as 'Sensations are private,' Wittgenstein suggested that these are used to express the rules that govern the terms involved, rather than to make substantial assertions: 'Sensations are private' is comparable to "One plays patience by oneself"' (1953: § 248). These points are interesting and important; however, even if Wittgenstein is right that apparently indicative sentences featuring public language sensation terms can have these nonassertoric uses, this does not refute the Cartesian's basic belief in the possibility of a different language, in which he can privately make assertions about his own sensations.

Rules and Communities

Why, then, does Wittgenstein repudiate the possibility of a private language? His basic contention seems to be that a subject who undertook to inaugurate names for sensation-types he experiences by defining them through introspective demonstrations would not succeed in imbuing the names with genuine meaning – even 'for himself.' Yet, why not?

One point Wittgenstein makes is that, normally, inaugurating a new name requires a lot of background "stage-setting" (1953: § 257) of a kind unavailable here. For example, parents' ability to name their children depends on a background of conventions concerning the roles played by persons' names in the various language-games in which they feature. However, the Cartesian is likely to respond that PD might instate 'private conventions' of suitable kinds. Whether this is possible is really just the question at issue, so Wittgenstein owes more of an argument than is provided by a catalogue of differences between the private and public cases.

Just such an argument seems to be offered in this famous passage:

> I impress on myself the connexion between the sign and the sensation. – But 'I impress it on myself' can only mean: this process brings it about that I remember the connexion *right* in the future. But in the present case I have no criterion of correctness. One would like to say: whatever is going to seem right to me is right. And that only means that here we can't talk about 'right' (1953: § 258).

Suppose that PD experiences a sensation and attempts demonstratively to label the type of sensation it represents as 'S.' If 'S' is to be genuinely meaningful, there must be a difference between PD's later (1) correctly applying it to a sensation that really is of the same type as the first, and his (2) misapplying it by mistakenly applying it to a sensation that is really of a different type. Wittgenstein's contention seems to be that no such distinction can be sustained in this case, because PD has no 'criterion of correctness' to go on independent of his own inclinations. The question the Cartesian will want to press, however, is precisely why such a criterion must be in this way independent. The argument should not be based on an assumption that PD's judgments about whether a certain sensation is of the same phenomenal kind as the one he previously labeled 'S' are *unreliable* – that is on a general skepticism about PD's memory – for such an assumption would, once again, simply beg the question against the Cartesian.

As we saw above, Wittgenstein holds that linguistic understanding involves knowledge of rules regulating the use of terms. A striking feature of such knowledge seems to be its generality, because understanding a term involves the ability to use it in many different kinds of situations. He is particularly preoccupied with the question of how the contents of rules can be in this way general and, yet at the same time, apparently constitute objects of conscious awareness: things that speakers can "grasp in an flash" (1953: §138). Some commentators maintain that Wittgenstein proposes to resolve this tension by, in effect, denying that meanings really are objects of conscious awareness and by holding that a speaker's linguistic understanding is in the end simply a matter of her using terms in the same ways as other members of her linguistic community. According to this view, the patterns of use upon which members of a speech community converge engender 'criteria' of correct use that are in large measure independent of the judgments of individual members. Thus, in this picture, linguistic expressions generally are governed by criteria of correctness independent of individual speakers' impressions, and Wittgenstein's injunction that 'S' would be meaningful only if – *per impossible* – it could be so governed is just a special case of this general doctrine. Notice furthermore that if representation in general rests on this kind of communal convergence, then the private language argument threatens the representational theory of mind, as well as the Cartesian position discussed here.

The trouble with this interpretation of the private language argument is that the general 'communitarian' conception of rule following and meaning on which it rests is implausible. Moreover, commentators generally reject its attribution to Wittgenstein. (Wright (1980) explored the communitarian interpretation in detail and offered some defense. Kripke's (1982) notorious interpretation may be considered a version of the communitarian one, its distinctive spin being the meaning-skepticism that Kripke also attributed to Wittgenstein. See Baker and Hacker (1984) and McDowell (1984) for forceful arguments against both the view and its attribution to Wittgenstein.)

Radical Evidence-Independence and the 'Theory Response'

I have argued that, although the 'supplementary strands' of Wittgenstein's discussion highlight numerous important contrasts between ordinary public language sensation terms and the names that PD undertakes to introduce, these considerations do not motivate Wittgenstein's contention that PD *cannot* imbue the latter with genuine meaning. There is an influential conception of rule following and meaning that does provide such a motivation, but it is widely rejected, both as a theory of meaning and an interpretation of Wittgenstein. In this final section, I describe a different way to defend Wittgenstein's insistence that PD cannot inaugurate a meaningful term in the manner considered.

The crucial issue is that the Cartesian conception seems to imply that PD's beliefs about whether a current sensation is of the type he earlier labeled 'S' could be correct or incorrect, even if no evidence bearing on the matter were available. Commitment to this possibility implies an extremely strong form of realism or 'evidence-independence' both about the sensations at issue and also (this is often overlooked) the intention – the baptismal 'undertaking' – in terms of which PD is proposed to have inaugurated 'S'.

Advocates of the argument are often accused of resting illicitly on a verificationist and/or behaviorist assumption, and it is true that verificationism (in respect of mental states) and behaviorism are at odds with this radically realist picture. However, it is not necessary to subscribe to either of those views to feel uncomfortable about the degree of evidence-independence to which the Cartesian realist seems committed here. The Cartesian holds not only that

there may be truths about whether a sensation that PD has is of the type he earlier labeled 'S', for which there is no conclusive evidence, but also that such truths may obtain in the absence of any evidence whatsoever – even of the entirely nonbehavioral, introspective kind associated with the Cartesian notion of privileged introspective access. Wittgensteinians, such as Wright (1991), have argued forcibly that this degree of evidence-independence is more than our ordinary psychological notions – particularly those of intentions – can bear. Consider, for example, the idea that a subject *believes that goldfish are highly dangerous*, even though after careful reflection, she is convinced that she does not believe that, and even though all of her behavior – recorded over as long a temporal interval and in as much detail as you like – demonstrates no inclination whatsoever to avoid goldfish, to protect her loved ones from them, etc. If this idea seems absurd, then it looks as though we should also reject the radical evidence-independence of baptismal 'undertakings' to which the Cartesian seems committed.

Actually though, there is a way to question whether the Cartesian needs to be quite as rampantly realist as this. I have been working with the assumption that the only 'criterion of correctness' PD can apply is his own introspectively grounded impression of whether a current sensation is like the one he baptized 'S.' Yet, suppose PD has reflected on his sensations enough to formulate (in his private language) theories about them, concerning, for example, which types of sensations tend to cooccur during given temporal intervals and which not. Blackburn (1984) and others have suggested that commitment to well-confirmed theoretical hypotheses of this kind could give PD reason to disregard a phenomenal appearance at odds with it, just as a scientist might disregard the appearance of an experimental result at odds with accepted theory. If this is right, then PD might reasonably judge that an earlier application of 'S' to a sensation had been in error, even though his impression at the time had been that it was just like the one he initially associated with the term. This 'fallibilist' Cartesian can hold that there can be evidence of (sincere) misapplication (or indeed, of (sincere) correct application) of terms in a private language and so avoid commitment to the degree of evidence-independence described above.

The 'argument from radical investigation-independence' is the most formidable version of the private language argument, and the 'theory response' represents the most promising rejoinder. However, the response has not been developed in the kind of detail a conclusive adjudication would require. Wright (1986) delved deeper than most, arguing that the response depends on the assumption that PD's 'theory' satisfies various formal constraints that theories codifying patterns of cooccurrence and non-cooccurrence of sensations of given types over given temporal intervals are very unlikely to satisfy. However, the Cartesian is likely to hope that even if Wright is correct about theories of this particular, rather rarefied sort, a more general integration of private phenomenal concepts into a subject's thinking might engender a structure that does satisfy those constraints. (For some recent critical reaction to Wright (1986), see Bain (2004) and Byrne (in preparation).) As things stand then, the issues surrounding Wittgenstein's famous argument remain almost as open as they were a half-century ago.

See also: Concepts; Intention and Semantics; Mentalese; Ordinary Language Philosophy; Philosophy of Mind; Realism and Antirealism; Rules and Rule Following; Verificationism.

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Problem–Solution Patterns

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Problem–solution patterns are recurrent combinations of clause relations (qv) that function together in such a way that they are perceived as having an existence independent of the relations out of which they are constructed. The classic problem–solution pattern has the components Situation–Problem–Response–Result–Evaluation, with the Situation being optional and the Result and Evaluation elements being available for conflation; there are, however, other variants, which are usefully discussed and illustrated in Jordan (1980) as they occur in factual reporting. The defining elements are the Problem (an aspect of the Situation requiring a Response) and the Response, which may be reported, projected, or recommended.

An instance of a Problem–Solution pattern is the following fabricated miniature narrative, used for illustrative purposes in Winter (1976):

(1)	I was on sentry duty.	(Situation)
	I saw the enemy approaching.	(Problem)
	I opened fire.	(Solution)
	I beat off the enemy attack.	(Positive Result, with implied Positive Evaluation).

Most linguists (e.g., Winter, 1976; Jordan, 1980, 1982, 1984; Crombie, 1985; Stein and Glenn, 1979) have used the term 'Solution'; Hoey (1979, 1983, 1986, 2001) used the term 'Response' rather than 'Solution' because the former term does not carry any implications of success. Stein and Glenn included an extra element, that of Plan, between Problem and Solution/Response.

Problem–solution patterns were perhaps first identified by Monroe Beardsley (1950) in the course of his work on practical logic, though they can be traced back under different terminology to Greek philosophy. The first linguists to discuss them as a text-organizing device may have been Young and Becker (1965), who saw problem–solution as a kind of paragraph structure, along with Topic–Restriction–Illustration. Unfortunately, their yoking the pattern to the paragraph inhibited their ability to develop their insight, since there is no special association of the pattern with paragraph structure or paragraph boundaries. Van Dijk (1977) referred in passing to the pattern as did Grimes (1975); Hutchins (1977) provided a fuller account in connection with the organization of scientific texts, relating the pattern to the work of semioticians such as Greimas (qv) (1966).

The structure of oral narrative developed by Labov (qv) (Labov and Waletzky, 1967; Labov, 1972) identifies in oral narratives the following stages: abstract–orientation–complication–action–evaluation–result. This structure has close parallels with the problem–solution pattern, with there being approximate matches between orientation and Situation, between complication and Problem, and between action and Response and an exact match between result and Result. (Despite the shared label, however, Labov's category of evaluation is rather different from Evaluation in the problem–solution pattern.) Another linguist interested in narrative structure, Robert Longacre, characterized narrative as having at the notional level the structure: aperture–setting–inciting moment–developing conflict–climax–denouement–final suspense–closure. His category of setting roughly approximates the Situation and developing conflict is close to that of Problem; climax and denouement, however, are much wider than Response and Result and/or Evaluation (Longacre, 1976, 1983, 1989).

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Problem–solution patterns are instances of what have been termed 'culturally popular patterns' (Hoey, 2001), 'generalized schema' (Graustein and Thiele, 1987, Hoey, 2001), or 'larger clause relations' (Winter, 1977, 1994) and grew out of the largely unpublished work of Winter (e.g., 1976) and his associates. Although some linguists such as Bonnie Meyer (1975) and the story grammarians typically treat problem–solution as a text structure, the pattern has more often been seen as a strategy available to writers, rather than as a structural requirement. As such, it can be manipulated or left incomplete, depending on the genre and domain in which the text is being produced. One of the most important features of the pattern, described in some detail in Jordan (1984), is that its elements can be attached to participants within the text or outside it; Jordan referred to the result as 'people patterns.' Thus, in the fabricated examples above, the Problem belongs to the narrator labeling himself as 'I'. The Response is likewise attributed to the narrator and the narrator also reports and evaluates the Result. These attributions can be spread around, however, as in the following fabricated variant of the 'sentry duty' example:

(2) John and Jack were on sentry duty.
John saw the enemy approaching.
Jack opened fire.
Their prompt action successfully routed the enemy.

Here the Problem is identified by John but implicitly belongs to both men, the Solution/Response is attributed to Jack, and the Positive Result and Evaluation emanate from an anonymous narrator.

A Positive Result or Evaluation brings a Problem–Solution pattern to an end. A Negative Result or Evaluation also can do so, but only if the Negative Result is irreversible, as in the following version of John and Jack's story:

(3) John and Jack were on sentry duty.
John saw the enemy approaching.
Jack opened fire.
But the enemy shot them both dead.

When a Result or an Evaluation is negative but not irreversibly so, the pattern is felt to be incomplete (Hoey, 1983, 2001) as the following indicates:

(4) I was on sentry duty.
I saw the enemy approaching.
I opened fire.
This only made them angrier.

In such a case, the pattern can be said to recycle, and a further Solution/Response will be expected. Hoey (1983) noted that the recycling results in three types of multilayering: chained multilayering, where the negative Result of a Response leads to a new Problem; spiral multilayering, where the negative Result and/or Evaluation leads to a further attempt to solve the original Problem; and progressive multilayering, where the Result of a Response is partly positive and partly negative and the subsequent Response is an attempt to solve what remains of the Problem. This last type of pattern is particularly associated with scientific writing, whereas the previous two are associated more with fictions.

The fact that elements of the pattern may 'belong' to participants within the narrative permits more complex narratives to be constructed. Thus, the famous tale of Red Riding Hood, in one of its tellings, reports the Wolf as having the Problem of being hungry. His Response is to attempt to trap Red Riding Hood. This in turn becomes a Problem for Red Riding Hood. Her Response comes from outside in the form of a convenient woodcutter and this provides the Wolf with an irreversible Negative Result (he is killed).

Problem–Solution patterns have been defined broadly (e.g., Jordan, 1984) or narrowly (e.g., Hoey, 2001). Those who favor broad characterization of the main categories of the pattern can point to the simplicity of the system they operate. For them, a number of rather different kinds of initiating report may function as the statement of Problem. Those who favor narrow characterization of the categories point to the greater precision that arises from such characterization. For these linguists, the different kinds of initiating report warrant different labels. Thus, Hoey talks of Goal–Achievement patterns, such as:

(5)	I was on sentry duty.	(Situation)
	I wanted to capture the enemy sentry post.	(Goal)
	I opened fire when they were not looking.	(Means)
	I succeeded in capturing their post.	(Positive Result with Positive Evaluation)

of Opportunity-Taking patterns, such as:

(6)	I was on sentry duty.	(Situation)
	I saw the enemy were asleep.	(Opportunity)
	I opened fire.	(Taking)
	I captured their lines.	(Positive Result)

of Gap in Knowledge-Gap Filling patterns, such as:

(7)	I was on sentry duty.	(Situation)
	I did not know where the enemy were.	(Gap in Knowledge)
	I opened fire.	(Attempt at Filling)
	I could tell where they were from the noise that they made running for cover.	(Positive Result)

and of Desire Arousal–Desire Fulfillment patterns, such as:

(8) I was on holiday.	(Situation)
I saw a beautiful woman and fell in love with her.	(Desire Arousal)
I asked her to marry me.	(Attempt to fulfill Desire)
She accepted and we have been happily married for 60 years.	(Positive Result with. . .) (. . .Positive Evaluation).

All of these patterns permit a Situation, require a Response of some kind, and are brought to a conclusion with a Positive Result and/or Positive Evaluation (or an irreversible Negative Result and/or Evaluation), otherwise getting recycled. These shared features are an argument for treating them as variants of a single pattern.

On the other hand, each of these patterns has its own characteristic signaling system, whereby the pattern's presence is indicated by the writer to his or her readership. The signals of the Problem–Solution pattern are discussed in Hoey (1979, 1994), drawing on Winter (1977) in particular. Examples can be found in italics in the following fabricated example:

(9) I was on sentry duty *when* I suddenly saw a vast force of the *enemy* approaching. Not sure *what to do*, I *decided to* open fire, *hoping thereby* to *prevent* them coming any closer. *Happily*, this had the *requisite effect* and *disaster* was *averted*.

The signal *when* indicates a Situation; *enemy* and *disaster* indicate Problem; *what to do*, *decided to*, *thereby, prevent*, and *averted* are all signals of Solution/Response; *hoping*, *decided to* (again), and *requisite* point to a Plan (as in Stein and Glenn's 1979 version of the pattern); *effect* signals Result; and *requisite* (again) and *happily* signal that it is Positive (from the point of view of the narrator).

The signals of Goal–Achievement and the other patterns overlap but do not coincide with the signals of Problem–Solution, and those for Desire Arousal–Desire Fulfillment are significantly different, with the most important signals being those of positive evaluation and physical perception (*beautiful, sparkling eyes, strong jaw,* etc.). This might be seen as an argument for treating the patterns separately.

However we treat the patterns, we must take care not to assume that they inhere in the text; as with clause relations (qv), they are the product of the interaction between reader and text and therefore a pattern perceived by one reader may be different from that perceived by another. (Rowley-Jolivet, 2004, has indeed shown that problem–solution patterns can be found in the visual presentations of conference speakers in the hard sciences.) A key factor in the variation among the readers that can occur is the presence of evoking signals of the patterns. The signals just mentioned for the Desire Arousal–Desire Fulfillment pattern are culture specific. One reader may see *sparkling eyes* or *strong jaw* as a signal of Object of Desire, but another may see nothing in such descriptions. Likewise with regard to the problem–solution pattern, for perhaps the majority of readers the words *giant wave* will signal a major Problem, whereas for a few (surfers, for example) it might signal Opportunity. They are also, as the label insists, culturally popular, which means both that texts are not required to make use of them and that not every culture will favor the same patterns. Although work in contrastive rhetoric has touched on the ways that cultures might differ, there is still much to do to determine which patterns are favored in different cultural traditions.

See also: Discourse, Narrative and Pragmatic Development; Discourse Semantics; Evaluation in Text; Genre and Genre Analysis; Interactive Fiction; Narrative: Linguistic and Structural Theories; Schema Theory: Stylistic Applications; Text and Text Analysis; Text World Theory; Texts: Semiotic Theory.

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Production of Vocalizations in Mammals

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Introduction

Mammals are an ancient and diverse lineage of vertebrates, and because humans are mammals, the study of mammalian vocal production provides a crucial context for understanding the evolution of human speech and singing. Conversely, from an acoustical and physiological viewpoint, the best understood mammalian vocalization is human speech, so theories and techniques from speech science have played an important role in increasing our understanding of the vocal production system (VPS) of other mammals. Despite a long tradition of believing that human vocal production is somehow highly distinctive from that of other mammals, converging data demonstrate that humans are using a relatively ordinary mammalian VPS to speak or sing. Indeed, in the context of the diversity of mammalian vocalizations that include ultrasonic sounds high above our hearing range (e.g., from bats or rodents) and infrasonic vocalizations far below it (e.g., from whales or elephants), along with a wide range of fascinating anatomical adaptations such as giant larynges or air sacs, humans appear decidedly normal. What is quite unusual is the way we use this apparatus, particularly our capacity for vocal imitation, and the motor control underlying human vocal production. However, even this skill is shared by a few other mammal groups.

This article provides an overview of mammalian vocal production, attending both to themes (aspects of vocalization shared by most mammals) and to variations (unusual adaptations appearing in isolated groups). I adopt a comparative, evolutionary viewpoint, beginning by emphasizing that mammals are an ancient lineage (Carroll, 1988). The ancestors of mammals, the synapsids or mammal-like reptiles, were a diverse and successful group before the evolution of dinosaurs. The earliest true mammals arose simultaneously with early dinosaurs in the late Triassic, approximately 210 million years (MY) ago. The best known of these early mammals is *Morganucodon*, a small shrew-like mammal (approximately 3–10 cm long), preserved in numerous fossils on several continents. With the rise of the dinosaurs, however, mammals entered a long twilight. For 150 MY, dinosaurs dominated the world, and mammals eked out a peripheral existence, small in size and few in number. Some mammal groups survived the massive extinction event ~65 MY ago, at the end of the

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Production of Vocalizations in Mammals

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Introduction

Mammals are an ancient and diverse lineage of vertebrates, and because humans are mammals, the study of mammalian vocal production provides a crucial context for understanding the evolution of human speech and singing. Conversely, from an acoustical and physiological viewpoint, the best understood mammalian vocalization is human speech, so theories and techniques from speech science have played an important role in increasing our understanding of the vocal production system (VPS) of other mammals. Despite a long tradition of believing that human vocal production is somehow highly distinctive from that of other mammals, converging data demonstrate that humans are using a relatively ordinary mammalian VPS to speak or sing. Indeed, in the context of the diversity of mammalian vocalizations that include ultrasonic sounds high above our hearing range (e.g., from bats or rodents) and infrasonic vocalizations far below it (e.g., from whales or elephants), along with a wide range of fascinating anatomical adaptations such as giant larynges or air sacs, humans appear decidedly normal. What is quite unusual is the way we use this apparatus, particularly our capacity for vocal imitation, and the motor control underlying human vocal production. However, even this skill is shared by a few other mammal groups.

This article provides an overview of mammalian vocal production, attending both to themes (aspects of vocalization shared by most mammals) and to variations (unusual adaptations appearing in isolated groups). I adopt a comparative, evolutionary viewpoint, beginning by emphasizing that mammals are an ancient lineage (Carroll, 1988). The ancestors of mammals, the synapsids or mammal-like reptiles, were a diverse and successful group before the evolution of dinosaurs. The earliest true mammals arose simultaneously with early dinosaurs in the late Triassic, approximately 210 million years (MY) ago. The best known of these early mammals is *Morganucodon*, a small shrew-like mammal (approximately 3–10 cm long), preserved in numerous fossils on several continents. With the rise of the dinosaurs, however, mammals entered a long twilight. For 150 MY, dinosaurs dominated the world, and mammals eked out a peripheral existence, small in size and few in number. Some mammal groups survived the massive extinction event ~65 MY ago, at the end of the

Cretaceous, which wiped out the dinosaurs and many other groups. The surviving mammals then entered a phase of explosive adaptive radiation during the Cenozoic or 'Age of Mammals.' These early modern mammals quickly diversified into virtually all available niches, and by 55 MY ago all orders of extant mammals had evolved. Thus, despite the recency of mammalian dominance, the mammalian lineage itself is surprisingly old: more ancient than either birds or anurans (frogs and toads), the other large groups of highly vocal vertebrates. Thus, some basic traits of the mammalian vocal communication system (such as extra middle ear bones and laryngeal morphology) developed long ago, in the shadow of the dinosaurs.

Basic Themes in Mammal Vocal Production

All tetrapods (amphibians, reptiles, birds, and mammals) inherit from our common ancestor three key components: (1) a respiratory system with lungs; (2) a larynx that acts primarily as a quick-closing gate protecting the lungs, and often secondarily to produce sound; and (3) a supralaryngeal vocal tract that filters this sound before emitting it into the environment. Most mammals, amphibians, and reptiles have continued to use this system for vocalization, whereas birds and cetaceans (whales and dolphins) have developed novel vocal production mechanisms. The functioning of the basic mammalian VPS can be understood within the theoretical framework of the myoelastic-aerodynamic and source/filter theories developed by speech scientists (Titze, 1994).

The lungs and attendant respiratory musculature provide the pressure and air stream powering phonation. In primitive air-breathing vertebrates, the lungs were inflated by rhythmic compression of the oral cavity or 'buccal pumping,' a relatively inefficient system. Inspiration by active expansion of the thorax evolved later, powered originally by the intercostal muscles (in the common ancestor of reptiles, birds, and mammals). Mammals alone evolved a muscular diaphragm, which is a very efficient air-pumping system (Liem, 1985). Phonation is typically powered by passive deflation of the elastic lungs or, in some cases, by active compression of the intercostal and abdominal musculature. Phonation can also be powered by an inspiratory air stream (e.g., in donkeys or chimpanzees, and occasionally in ingressive human speech).

The trachea is protected by a larynx in all tetrapods, derived from the gill bars of our fish ancestors. Once our common tetrapod ancestor became terrestrial, gills were no longer useful, and their remains provided the 'spare parts' from which evolution built the larynx. This structure primitively includes sphincter-like musculature and a pair of bar-like cartilages that can be separated (for breathing) or pushed together (to seal the airway) (Negus, 1949). Although the larynx can support a wide variety of vocalizations, its function as a protective gateway remains primary. Expiration through the partially closed larynx creates a turbulent hiss, perhaps the most primitive vocalization, which virtually all tetrapods (and mammals) can produce. Very primitive mammals, such as the egg-laying echidna, can hiss. Phonation became possible after the innovation of elastic membranes within the larynx, termed 'vocal cords' in frogs and vocal reptiles (geckos, crocodilians) and 'vocal folds' in mammals. The mammalian vocal folds are unique in that they generally include within them a 'vocalis' or thyroarytenoid muscle, which results from the incorporation of additional gill bars (which make up the thyroid cartilage) and their attendant musculature (Schneider, 1964).

Although our knowledge of animal phonation is still limited, phonation in nonhumans seems to follow the principles of the myoelastic-aerodynamic theory of human phonation (Titze, 1994). The airflow from the lungs sets the vocal folds into vibration, and the rate of vibration is passively determined by the size and tension of these tissues. Vibration at a particular frequency does not typically require neural activity at that frequency. Thus, relatively normal phonation can be obtained by blowing moist air through an excised larynx in many species. However, cat purring relies on an active tensing of the vocal fold musculature at the 20 to 30 Hz fundamental frequency of the purr (Frazer Sissom *et al.*, 1991). During phonation, the movements of the vocal folds can be periodic and stable (leading to tonal sounds) or highly aperiodic or even chaotic (e.g., in screams); though such aperiodic vocalizations are rare in nonpathological human voices, they can be quite important in mammalian vocal repertoires (Fitch *et al.*, 2002).

Sounds created by the larynx must pass through the air contained in the pharyngeal, oral, and nasal cavities, collectively termed the supralaryngeal vocal tract or simply 'vocal tract.' Like any column of air, this air has mass and elasticity and vibrates preferentially at certain resonant frequencies. Vocal tract resonances are termed formants (from the Latin *formare* 'to shape'): they act as filters to shape the spectrum of the vocal output. Because all tetrapods have a vocal tract, all have formants. Formant frequencies are determined by the length and shape of the vocal tract, and large animals have long vocal tracts and low formants. Mammals are able to control the

configuration of the vocal tract. Raising the larynx into the nasal cavity, and sealing it with the mammalian epiglottis and velum, allows mammals to breathe through the nose while swallowing liquid through the mouth, an ability that is very useful during suckling (Crompton *et al.*, 1997). Most mammals normally breathe in this position, exclusively through the nose. However, by varying the position of the larynx during vocalization, mammals can change the configuration of their vocal tract, producing nasal sounds (through the nostrils), oral sounds (through the mouth), or a combination of the two. Because the nasal passages are convoluted and filled with spongy absorptive tissue, nasal sounds are much quieter than oral sounds. Cineradiographic data indicate that loud sounds are thus produced through the mouth in all mammals studied thus far (e.g., dog barks, goat bleats, pig squeals, or monkey chatters), but some soft sounds (e.g., dog whines or pig grunts) are produced through the nose (Fitch, 2000b). Thus, the lowering of the larynx into the oral cavity to produce loud sounds appears to be a homologous trait shared by most mammals.

Finally, the motor neurons controlling the vocal production system are located in the cranial nerve motor nuclei and appear to be quite conservative and shared among mammals (Jürgens, 1998). The larynx is supplied by the recurrent and superior laryngeal nerves, branches of the vagus nerve, and their motor neurons are located in the nucleus ambiguus in the brainstem. The muscles controlling the vocal tract are supplied mainly by the hypoglossal and facial nerves, with motor neurons in the corresponding motor nuclei. In all mammals tested, including humans, vocalization can be elicited via electrical stimulation of the periacqueductal gray region of the midbrain.

In summary, mammalian vocal production is based on a rather conservative tetrapod vocal production system composed of lungs, larynx, and vocal tract. The basic anatomy and function of this system are shared by humans, down to the details of laryngeal anatomy and innervation. Derived traits, shared by mammals but different from other tetrapods ('mammalian synapomorphies'), include a diaphragm for efficient ventilation of the lungs, complex vocal folds that include a vocalis muscle, and an ability to lock the larynx into the nasal passages with an epiglottis and velum. Most mammals lower the larynx into the oral cavity during loud vocalizations, thus assuming a vocal tract posture resembling that used during human speech. Thus, the primary traits differentiating human speech or song from vocalization in other mammals appear to be at the level of central neural control rather than peripheral anatomy.

Variations in the Mammalian Vocal Production System

Laryngeal and Source Modifications

Because the length of the vocal folds determines the lowest frequency at which the folds can vibrate (Titze, 1994), and long folds are thus able to produce lower frequencies, one might expect that a low fundamental would provide a reliable indication of large body size. This is indeed true if we look across a large range of species (August and Anderson, 1987): mice have high fundamentals relative to dogs, and elephants very much lower. However, from an anatomical viewpoint, the size of the larynx is not tightly constrained by body size. Thus, a huge larynx has independently evolved in many mammal species, probably in response to selection for low-pitched voices. For example, in howler monkeys (genus *Alouatta*), the larynx and hyoid have grown to fill the space between mandible and sternum, giving these small monkeys remarkably impressive low-pitched voices (Kelemen and Sade, 1960). The most extreme example of laryngeal hypertrophy is seen in the hammerhead bat *Hypsignathus monstrosus*, in which the larynx of males expands to fill the entire thoracic cavity, pushing the heart, lungs, and trachea down into the abdomen (Schneider *et al.*, 1967). A similar though less impressive increase in larynx dimensions is observed in human males and is responsible for their voice change at puberty (Titze, 1989). Even without greatly enlarging the larynx, a transformation of the vocal folds into massive vocal pads in large cats (Hast, 1989) and other mammals makes the production of very low-pitched roars possible in some large mammals.

Not surprisingly, the lowest pitched voices are possessed by the largest animals, which can produce infrasound (sounds with fundamental frequencies below the range of human hearing). Because low frequencies can travel further than high frequencies in some environments, infrasonic vocalizations probably represent the most widely broadcast animal signals in existence. Elephants produce and hear extremely low frequency 'rumbles' and other infrasonic vibrations (Langbauer *et al.*, 1991). In certain environments (e.g., open savannah with temperature inversions), such sounds are able to carry more than 10 km, leading to unusually large vocally mediated communication networks in African elephants. However, even these long-distance communication systems are dwarfed by those of the large baleen whales, which are the largest animals to have ever lived. Both fin whales and blue whale males (*Balaenoptera physalis* and *B. musculus*) produce low-frequency vocalizations with 20 Hz fundamental frequencies (Croll *et al.*, 2002), and under ideal conditions a

vocalization from a single animal can fill an entire ocean basin (Payne and Webb, 1971). The mechanism by which these low-frequency sounds are produced is unknown, but baleen whales possess a large larynx with a massive vocal fold and a laryngeal sac that allows air recirculation, making it possible that the aerodynamic/myoelastic theory applies even to these infrasonic vocalizations.

At the opposite end of the frequency spectrum, some rodents, primates, and bats can produce ultrasonic vocalizations with fundamental frequencies of 40 kHz and higher (Suthers and Fattu, 1973). Adaptations of the middle ear and cochlea allow most mammals to hear high frequencies (above 10 kHz) that are inaudible to birds or reptiles; the ability to produce sounds at those frequencies creates a 'private' communication channel for small mammals. This ability may have played a crucial role in the evolution of hearing and vocal production in early mammals during the Mesozoic, when birds and dinosaurs would have been the top predators. This 'private' channel is still exploited today by many rodents, particularly in courtship and mother–pup communication (Sales and Pye, 1974). Ultrasound is put to much more specialized use by echolocating bats, where the short wavelengths of ultrasonic vocalization make them ideal for picking out details from small objects (Griffin, 1958). The ultrasonic production mechanism has been best studied in bats, which have a highly specialized vocal membrane that extends upward from the vocal folds; when this membrane is cut experimentally, the bat becomes unable to produce ultrasonic calls (Novick and Griffin, 1961). Similar membranes exist in nonhuman primates, and the function of such membranes has been modeled computationally using the same principles as human speech (Mergell *et al.*, 1999).

Echolocation evolved independently in another group of mammals, the toothed whales (odontocete cetaceans, e.g., dolphins, porpoises, killer whales, and sperm whales). However, the broadband click-like echolocation signals used by these marine mammals are produced by a novel mechanism, the nasal bursae, which is unique to this group and still imperfectly understood (Cranford *et al.,* 1996). This complex organ system is present in all odontocetes studied, is housed in the nasal passages, and appears to require air movements to power vocal production, but can produce sound without emitting air so it must involve a system for air recirculation. It is unknown whether the nasal bursa system also produces the communicative whistles used by some odontocetes, e.g., bottlenosed dolphins, *Tursiops truncates*. Because whistles and clicks can be produced simultaneously, it remains possible (but unproven) that clicks are produced by the nasal complex, whereas whistles are produced at the larynx (Evans and Prescott, 1962).

Vocal Tract Modifications

Because the vocal tract in mammals rests within the confines of the head, and skull size and body size are tightly linked (Fitch, 2000c), the formant frequencies of the vocal tract provide a possible indicator of body size. Large animals generally have long vocal tracts and low formants. Together with demonstrations of formant perception by nonhuman mammals (Sommers *et al.*, 1992), this suggests that formants may have provided a cue to body size in primitive vertebrates (Fitch, 1997) and thus represent an ancient aspect of vocal communication. However, once a perceptual link between formants and body size was established, it becomes possible to break the anatomical link between vocal tract length and body size, lengthening the vocal tract and thus duplicating the formants of a larger animal. Some intriguing morphological adaptations have arisen to elongate the vocal tract (presumably resulting from selection to sound larger). Elongations of the nasal vocal tract are seen in the long nose of elephants or male proboscis monkeys. Vocal tract elongation can also be achieved by lowering the larynx; this is seen in extreme form in red deer, *Cervus elaphus*, which retract the larynx to the sternum during territorial roaring (Fitch and Reby, 2001). Similar descended larynges have evolved repeatedly in separate mammal groups, including koalas and all big cats. Again, a similar change occurs in human males at puberty: the larynx descends slightly to give men a longer vocal tract, and lower formants, than same-sized women (Fitch and Giedd, 1999). Vocal tract elongation has also evolved separately in several nonmammal groups, e.g., tracheal elongation in birds (Fitch, 1999) or the impressive nasal crests of hadrosaur dinosaurs (Weishampel, 1981). Thus, the descended larynx of humans, a perennial topic of discussion in language evolution (Lieberman, 1984; Fitch, 2000a), is just one of many convergent adaptations among disparate vertebrate taxa that elongate the vocal tract.

Another interesting set of vocal tract modifications is found in echolocating bats. Echolocating bats are divided into oral and nasal emitters, and many of the nasal emitters have evolved elaborate 'nose leafs' that function to form the echolocation signal into a focused beam of sound (Suthers and Fattu, 1973). The bat can thus point its echolocation signal at a target of interest, like the beam of a flashlight. In the paca, a large South American rodent, the zygomatic arches are hollow and ballooned outward, but the acoustic significance of this is unknown (Hershkovitz, 1955). Other interesting modifications of the nasal region

include the dulaa of male camels (*Camelus dromedarius*), which is an elastic extension of the velum that is blown out through the mouth like a large wet balloon during mating vocalizations (Arnautovic and Abdul Magid, 1974), or the similar extension of the nasal septum blown out through the nostrils during mating displays of the male hooded seal (*Cystophora cristata*) (Terhune and Ronald, 1973).

A final class of vocal tract modifications, vocal air sacs, is very widespread among mammals but still very poorly understood from an acoustic viewpoint. Air sacs appear to have evolved independently among many different taxa, in a bewildering variety of locations. For instance, many primates have air sacs attached directly to the larynx (Hewitt *et al.*, 2002); in many well-known primates (e.g., chimpanzees, baboons, macaques, howler monkeys) the laryngeal air sac fills a modified balloon-like hyoid bulla (Negus, 1949). The function(s) of these air sacs remains imperfectly understood; the only experimental study on primate air sacs documented decreased loudness of calls when they were punctured (Gautier, 1971). Primate air sacs are of particular interest with reference to the evolution of human vocalization, because all of our great ape cousins possess laryngeal air sacs, suggesting that our ancestors had air sacs and we have lost them in our recent evolution (Fitch, 2000a). Other groups that possess laryngeal air sacs include viscachas, seals, the baleen whales, in which the air sac probably serves in air recycling (Hosokawa, 1950) but perhaps also plays a role in coupling sound production to the environment, and bats, in which tracheal and nasal air sacs play a role in the production of echolocation signal (Suthers *et al.*, 1988). This great diversity of air sacs suggests multiple functions. More research will be necessary to understand the function of air sacs in those species that possess them before the significance of their loss in human evolution can be properly evaluated.

Neural Modifications

Humans share the basic innervation patterns and cranial motor nuclei described above with other mammals. However, humans are unusual among mammals, and unique among primates, in our ability to learn new vocalizations after hearing them produced (vocal imitation or vocal learning). Complex vocal learning abilities are also found in seals, cetaceans, and perhaps bats (Janik and Slater, 1997). A possibly unique characteristic of humans that may at least partially underlie this capacity is provided by the direct connections between motor cortex and vocal motor neurons, found in humans but not other primates (Jürgens, 1998). Thus, whereas vocal control in most mammals appears subcortical, humans can exert cortical control as well (for discussion see Jürgens, 1998). Unfortunately, little is currently known about the neural basis of vocal control in other mammalian vocal imitators, like dolphins, whales, and seals, to know whether similar neural specializations underlie vocal learning in these other lineages.

Another recently discovered change in neural control of vocalization in humans is more peripheral: MacLarnon and Hewitt (1999) found that modern humans have a larger thoracic vertebral canal than other primates, presumably linked to greater control over the muscles that have motor neurons in this area (intercostals and abdominals, but not the diaphragm). Because this is a characteristic that can be measured in fossils, this character provides an exciting possible cue to the timing of increased vocal control in the evolution of the human lineage. MacLarnon and Hewitt found that early *Homo erectus* (= *Homo ergaster*) had a thoracic cavity similar in size to that of chimpanzees or earlier hominids and concluded that increased breathing control involved in speech occurred no earlier than later *Homo erectus*.

However, it is important to realize that these changes are equally, if not more, relevant to singing. Sundberg (Sundberg, 1987) has convincingly argued that singing requires finer respiratory control than that necessary for speech. In normal conversational speech, the rate of airflow is approximately 0.2 L/s (0.1–0.3 L/s) and approximately 2 L tidal volume is utilized. With no involvement of the intercostals, and simple passive lung deflation, this would give 10 s of normal speech. But speakers normally breathe every 5 s. In contrast, phrases over 10 s are common in song, and singers often use nearly all of their approximately 5 L vital capacity. Furthermore, much greater subglottal pressures are generated during singing than speech (30–70 cm water relative to 6–15 cm water in normal speech). Most importantly, the finer control over amplitude and pitch required in singing leads to singers using all available muscles (including both sets of intercostals, the diaphragm, and the abdominal muscles), whereas speakers typically use only one set of intercostals for compensatory maneuvers during speech. Thus, an increase in fine respiratory control would seem to be more important in singing (where maintaining a constant subglottal pressure for consistent amplitude and pitch is a necessity) than in speech (where pitch is in any case varying continuously over a wide range).

Summary

In conclusion, mammals are an ancient lineage, and the approximately 4000 species of mammals have

developed a wide and fascinating range of vocal adaptations. Some of these, like a permanently descended larynx or the capacity for complex vocal learning, have evolved in parallel in humans and in other species. Others, like the air sacs attached to the larynx in all of the great apes, were lost in human evolution, but their significance is still poorly understood. Still others, such as ultrasonic and infrasonic vocalization, are far more extreme and indeed exceed human auditory perceptual capacities. Human adaptations for vocalization, including both speech and singing, thus take their place among a wide variety of similar vocal adaptations in mammals.

See also: Alarm Calls; Animal Communication: Overview; Animal Communication: Vocal Learning; Bats: Communication by Ultrasound; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Marine Mammals; Development of Communication in Animals; Non-human Primate Communication; Vocal Production in Birds.

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Productivity

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Introduction

Speakers of a language coin new words on the basis of other words or word-forming elements on a daily basis. For example, English speakers turn adjectives such as *blue* into nouns by adding the suffix *-ness*, yielding *blueness*, or form compounds by joining existing words, as in *computer screen*. Some of these words may eventually make it into the common vocabulary of the speakers, but many newly coined words are never more widely used.

Word-formation processes are to a large extent rule governed, but one observes that some of these processes (or affixes) are quite often used to coin new words, whereas others are less often used or not used at all for this purpose. For example, it seems that no new noun can be formed in Modern English with the help of the suffix *-th* (as in *depth* or *length*), whereas the nominal suffix *-ness*, which is similar in function, is found very often in new formations (cf. *eco-friendliness*, first attested in 1989, *Oxford English dictionary* (*OED*)).

In this sense, some morphological rules are called productive and other rules unproductive or less productive. Given the differences in productivity among different rules, several theoretical and empirical problems need to be addressed. First, what makes a given rule productive or unproductive? Second, how can the productivity of a given rule be measured and what mechanisms are responsible for the variability in the productivity of morphological processes? Third, should productivity be regarded as a theoretical primitive, i.e., a nonderivable property of word-formation rules, or an epiphenomenon, i.e., a property that results from other properties of the rule in question?

In the following, we first look at different definitions and measurements of productivity, then turn to the psycholinguistic mechanisms influencing the productivity of word-formation rules, and finally discuss pragmatic and structural restrictions on productivity.

Defining Productivity: Qualitative and Quantitative Approaches

One important theoretical question concerning the nature of productivity is whether productivity is a quantitative or a qualitative notion. Some scholars have argued that productivity is of a qualitative nature and that a process or an affix thus either has this property or not. Others view productivity as a gradual phenomenon, which means that morphological processes are either more or less productive than others and that completely unproductive or fully productive processes mark only the end-points of a scale.

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Productivity

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Introduction

Speakers of a language coin new words on the basis of other words or word-forming elements on a daily basis. For example, English speakers turn adjectives such as *blue* into nouns by adding the suffix *-ness*, yielding *blueness*, or form compounds by joining existing words, as in *computer screen*. Some of these words may eventually make it into the common vocabulary of the speakers, but many newly coined words are never more widely used.

Word-formation processes are to a large extent rule governed, but one observes that some of these processes (or affixes) are quite often used to coin new words, whereas others are less often used or not used at all for this purpose. For example, it seems that no new noun can be formed in Modern English with the help of the suffix *-th* (as in *depth* or *length*), whereas the nominal suffix *-ness*, which is similar in function, is found very often in new formations (cf. *eco-friendliness*, first attested in 1989, *Oxford English dictionary* (*OED*)).

In this sense, some morphological rules are called productive and other rules unproductive or less productive. Given the differences in productivity among different rules, several theoretical and empirical problems need to be addressed. First, what makes a given rule productive or unproductive? Second, how can the productivity of a given rule be measured and what mechanisms are responsible for the variability in the productivity of morphological processes? Third, should productivity be regarded as a theoretical primitive, i.e., a nonderivable property of word-formation rules, or an epiphenomenon, i.e., a property that results from other properties of the rule in question?

In the following, we first look at different definitions and measurements of productivity, then turn to the psycholinguistic mechanisms influencing the productivity of word-formation rules, and finally discuss pragmatic and structural restrictions on productivity.

Defining Productivity: Qualitative and Quantitative Approaches

One important theoretical question concerning the nature of productivity is whether productivity is a quantitative or a qualitative notion. Some scholars have argued that productivity is of a qualitative nature and that a process or an affix thus either has this property or not. Others view productivity as a gradual phenomenon, which means that morphological processes are either more or less productive than others and that completely unproductive or fully productive processes mark only the end-points of a scale.

Productivity as a Qualitative Notion

The term 'productivity' as broadly defined in morphology textbooks refers to the property of an affix or a morphological process to give rise to new formations on a systematic basis (cf., for example, Adams, 1973: 197; Bauer, 1983: 18; Spencer, 1991: 49; Plag, 2003: 44). Such a definition may suggest that productivity is an all-or-nothing property of morphological processes. Following Corbin (1987), Bauer (2001) advocated such an approach, dividing productivity into two distinct phenomena, one of them qualitative, the other quantitative in nature: availability and profitability. A morphological process is available if it can be used to produce new words. "Availability is a yes/no question: either a process is available or it is not" (Bauer, 2001: 205). Profitability, on the other hand, is a quantitative notion and refers to the extent to which a morphological process gives rise to new pertinent formations.

The most problematic point concerning availability is the notion of 'morphological process' (or often called 'word-formation rule') itself. Given a set of apparently morphologically related words, it is not always clear whether one can in fact speak of a word-formation rule. In general, a rule is assumed if there is a sufficient number of regular form-meaning correspondences across a larger set of words. The theoretical status of such patterns is, however, controversial. Proponents of analogical models of word formation argue that traditional 'rules' or 'processes' are just a larger set of words that are related to one another by analogy (e.g., Becker, 1990, or, more recently, Skousen *et al.*, 2002). And analogy is also used to coin words on an individual, idiosyncratic basis. In a purely qualitative approach to productivity, an unproductive process could not give rise to new formations at all. However, supposedly unproductive processes sometimes do yield new formations, because speakers use existing derivatives to form new words by way of proportional analogy (cf. *greenth*). The problem with such rare coinages is where to draw the line between productive and unproductive processes. It is unclear how many such analogical formations would be needed to make a process productive (in the sense of 'available').

In view of these problems, a different line of research has abandoned the qualitative notion of productivity and has turned instead to the problem of how to determine exactly the profitability of word-formation processes. Different measures have been developed by which the productivity (here, profitability) of processes can be assessed, according to which completely unproductive and fully productive processes are conceived of as end-points on a continuum of productivity.

Productivity as a Quantitative Notion

As early as 1948, Bolinger explicitly put forward the idea that productivity is a probabilistic notion, defined as "the statistical readiness with which an element enters into new combinations" (p. 18). Since then, a number of productivity measures that try to mathematically model the notion of productivity have been proposed.

A widely used measure is the number of attested types (i.e., different words) with a given affix at a given point in time, for example, by counting the number of pertinent forms in an unabridged dictionary. This measure, however, is indicative of past rather than of present productivity. Thus, there may be many existing pertinent words, but present-day speakers may not use the process any more to coin new words. For instance, the nominalizing suffix *-ment* (*entertainment, punishment,* etc.) occurs in many established words of English, most of which entered the vocabulary between the mid-16th and the mid-19th centuries (e.g., Bauer, 2001: 181). Today, the suffix has ceased to be productive. Another case in point is the verb-forming suffix *-en* (as in *blacken, strengthen*, etc.), which is attested in numerous words, but hardly any of them were coined after 1900 (Plag, 1999: 98).

Aronoff (1976) proposed to calculate the ratio of actual to possible words as an index of productivity. The term 'actual word' designates existing established words, and 'possible word' refers to all words that – if formed – would be morphologically well formed according to the pertinent word-formation rule. The higher Aronoff's index, the higher the productivity of a given rule. A major weakness of this index is that it makes wrong predictions for extremely productive and completely unproductive processes. For example, for highly productive affixes such as *-ness*, the number of potential words is, in principle, infinite, which yields a very low productivity index. Unproductive rules such as *-th* nominalization pose the problem that the ratio of actual to possible words is very hard to calculate. If one considers all actual words with this suffix as possible words, the ratio equals 1, which, counterfactually, would indicate full productivity. Alternatively, if the number of possible words with this suffix is considered zero, the index cannot be computed at all.

A more promising way of determining the productivity of an affix is counting those derivatives that were newly coined in a given period, the so-called neologisms. By applying this measure to different periods of time, one can even show how productivity changes over time. Assessing the number of neologisms in a given period is, however, methodologically problematic since there is no established way of

keeping track of all the words appearing (and disappearing) within a given period of time. Scholars therefore usually rely on unabridged historical dictionaries such as the *OED*, which aim at giving thorough and complete information on all words of the language. For example, between 1900 and 1985, 284 new verbs with the suffix *-ize* were listed with their first attestations in the *OED* (Plag, 1999: Chap. 5), which is an indication of the productivity of this process. Unfortunately, unabridged historical dictionaries such as the *OED* are not available for the great majority of the world's languages, which seriously undermines the usefulness of this type of measure. Furthermore, the power of the dictionaries as a tool for measuring productivity should not be overestimated, because of the unavoidable lack of systematicity in the sampling procedure. For instance, the number of *-ness* neologisms listed in the *OED* for the 20th century ($N = 279$; Plag, 1999: 98) roughly equals the number of *-ize* neologisms, although *-ness* is generally considered much more productive than *-ize* (e.g., Plag *et al.*, 1999; Hay and Baayen, 2002). In view of the problems involved with dictionary-based measures (even if a superb dictionary such as the *OED* is available), Harald Baayen and his collaborators (1993, *et seq.*) have developed some corpus-based productivity measures, which all rely on the availability of very large electronic text corpora.

One corpus-based measure is the number of types (type frequency V), which differs from the first dictionary-based measure only in that it is calculated on the basis of a representative language sample.

To estimate current instead of past productivity, Baayen developed measures that rely heavily on forms that occur only once in a corpus, the so-called hapax legomena (or simply 'hapaxes'). In very large corpora, hapaxes tend to be unfamiliar words to the hearer or reader. The crucial point is that unfamiliar complex words can nevertheless be understood if there is an available word-formation rule. This rule then allows the decomposition of the newly encountered word into its constituent morphemes and the computation of the meaning of the derivative on the basis of the meaning of the constituents. Productive processes are therefore characterized by large numbers of low-frequency words and small numbers of high-frequency words. The many low-frequency words keep the rule alive, because they force speakers to segment the derivatives and thus strengthen the existence of the affix. Unproductive morphological categories will, in contrast, be characterized by a preponderance of words with rather high frequencies and by a small number of words with low frequencies.

Coming back to hapaxes, we can state that it is among the hapaxes (versus words that have a higher frequency) that we can expect the highest proportion of neologisms (Baayen and Renouf, 1996; Plag, 2003). In other words, the number of hapaxes of a given morphological category correlates with the number of neologisms in that category. Many hapaxes are indicative of many neologisms and hence of the productivity of the rule in question.

The size of the corpus is of crucial importance for this measure. If the corpus is too small, hapax legomena will tend to be well-known words of the language. With increasing corpus size, however, the proportion of neologisms among the hapax legomena increases, and it is precisely among the hapax legomena that the greatest number of neologisms appears. The number of hapaxes is therefore an important measure for estimating the productivity of a morphological process.

Based on the number of hapaxes, the probability of encountering new formations can be computed as follows. Baayen's 'productivity in the narrow sense' is calculated as the ratio of the number of hapaxes with a given affix and the number of all tokens containing that affix. This ratio represents the probability of finding a hitherto unattested word (i.e., 'new' in terms of the corpus) among all the words of that category. Equation (1) formalizes this (P is the 'productivity in the narrow sense', n_1^{aff} is the number of hapaxes with a given affix, and N^{aff} is the number of all tokens with that affix):

$$P = \frac{n_1^{\text{aff}}}{N^{\text{aff}}}. \tag{1}$$

A large number of hapaxes leads to a high value of P, indicating high productivity. Large numbers of high-frequency items lead to a high value of N^{aff} and hence to a small value of P, which indicates low productivity.

If one applies the different measures proposed above to a set of affixes, one can observe that the ranking of affixes differs according to the type of measure used. For example, the values provided in Plag *et al.* (1999) or Plag (2002) indicated that some suffixes that score comparatively high for one measure may score comparatively low for another measure.

Crucially, such apparent discrepancies are not a sign of the inadequacy or uselessness of these measures, but show that each measure highlights a special aspect of productivity. Compare, for example, the adverb-forming suffix *-wise* and the nominal suffix *-ness* (see Table 1).

-Wise has a small number of types V and a small number of hapaxes n_1, which indicates that the suffix is not used very often, neither in terms of different derivatives nor in terms of new formations.

Table 1 Productivity measures for *-wise* and *-ness*, taken from Plag *et al.* (1999)

	V	n_1^{aff}	N^{aff}	P	OED *neologisms*
-wise	183	128	2091	0.061	12
-ness	2466	943	106957	0.0088	279

Nevertheless, among all tokens with that suffix (i.e., N^{aff}), the number of hapaxes is quite high, leading to a high value of productivity in the narrow sense P. This is a sign of the suffix's potential to be easily used for the coinage of new forms, if need be.

The suffix *-ness*, on the contrary, scores very high in terms of type frequency V and also has many *OED* neologisms. Its P value is, however, significantly lower than that of *-wise*, because many *-ness* words are also quite frequently used (e.g., *happiness*), leading to a large number of tokens N^{aff} and thus an overall decrease of P.

The quantitative measures are subject to another important factor, the type of genre the data are taken from. Statements about productivity are usually not qualified with regard to this factor, although it is well known that certain affixes are more commonly found in certain types of text than in others. In a large-scale corpus-based study of the effect of written versus oral genres, Plag *et al.* (1999), for example, showed that, in general, derivational affixes are less productive in spoken than in written language. Schneider (2003) demonstrated that the productivity of diminutives varies according to kinds of speech act.

To summarize, a number of different measures have been developed to assess the productivity of word-formation rules. Each measure brings to the fore different aspects of morphological productivity and involves special methodological problems of data sampling and analysis.

Psycholinguistic Aspects: Productivity and the Mental Lexicon

Having established the productivity of a morphological process, a number of new questions arise. First, how do speakers know whether a process can be used to coin new words or not? In other words, what do productive processes have in common that unproductive processes do not have? And which properties of affixes give rise to different degrees of productivity? Answers to these questions are provided by recent psycholinguistic research into the nature of complex words. The central point of this research with regard to the nature of productivity is that the productivity of an affix is a reflection of the storage and processing of the complex words containing this affix.

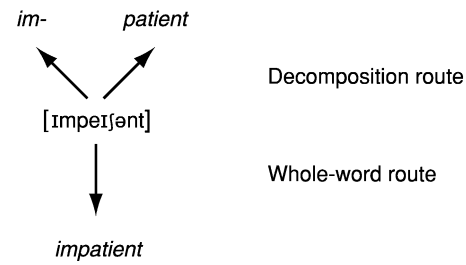

Figure 1 Schematic representation of decomposition route vs. whole-word route in storage and access, with the prefixed derivative *impatient* as an example.

In current models of morphological processing, morphologically complex words can be stored and accessed in two ways: by direct access to the whole-word representation (the so-called 'whole-word route') and by access to the individual morphemes, involving the decomposition of the complex word (the so-called 'decomposition route') (see McQueen and Cutler, 1998, for an overview). According to some models, the two routes work in parallel in competition; in other models, only one route is applied at a time, depending on the kind of word. The two routes are schematically shown in Figure 1.

Whether a given word prefers one route over the other crucially depends on frequency. More specifically, the degree of decomposability of a given word depends on the relative frequency of the derived word and its base (Hay, 2001, 2003). Relative frequency is defined as the quotient of the frequency of the derived word to the frequency of its base:

$$f_{\text{relative}} = \frac{f_{\text{derivative}}}{f_{\text{base}}}. \qquad (2)$$

Usually, the base is more frequent than the derived word, so that the relative frequency is smaller than unity. For example, *detectable* has a frequency of 281 in the BNC, whereas its base, *detect*, has a frequency of 3,083, giving a relative frequency of 0.0911. Similarly, *loadable* has a frequency of 36 compared to a frequency of 5,797 for its base, *load* ($f_{\text{relative}} = 0.0062$) (values taken from Plag, 2002: 308). Only very few *-able* derivatives have a base that is more frequent than the derivative, for example, *deplorable* ($f_{\text{relative}} = 1.088$) or *comfortable* ($f_{\text{relative}} = 1.046$). Such a profile of relative frequencies is characteristic of productive morphological processes, for psycholinguistic reasons. In those cases where the base is much more frequent than the derivative, the base has a very strong representation, or high 'resting activation', in the mental lexicon, such that the representation of the base is much stronger than that of the derived word. This leads to a decomposition bias, since due to its high resting activation, the base will

be accessed each time the derivative enters the system. If, in contrast, the derived word is much more frequent than the base, there is a whole-word bias in parsing, because the resting activation of the base is lower than the resting activation of the derivative.

If in a morphological category there is a large preponderance of derivatives with a decomposition bias, the pertinent affix will have a strong representation and will therefore be readily available to the speaker to be used in new combinations. If, on the other hand, there is a large proportion of derivatives with a whole-word bias, the affix will not be readily available for the creation of new forms.

This reasoning finds support in empirical investigations by Hay and Baayen (2002, 2003). These studies showed that relative frequency patterns correlate with other properties of morphological categories: low relative frequency correlates with high productivity and high semantic and phonological transparency. As discussed above, productive morphological processes are characterized by a large number of low-frequency words (i.e., many hapaxes, if we speak in terms of corpora). Thus, productive processes have a preponderance of words with low relative frequencies, whereas less productive morphological categories are characterized by a preponderance of words with higher relative frequencies. Hay and Baayen (2002) investigated the segmentability of 80 English affixes and came to the conclusion that the more morphologically decomposable forms with a given affix are in the lexicon, the more productive that affix will be. Increased rates of parsing obviously lead to increased productivity.

A high proportion of decomposable words has another important effect: semantic and phonological transparency. The correlation between transparency and productivity has been established in many earlier publications (e.g., Aronoff and Schvanefeldt, 1978; Anshen and Aronoff, 1981; Cutler, 1981). The basic idea is that productive processes tend to have many semantically and phonologically transparent forms, i.e., forms whose semantics can be inferred on the basis of the meaning of the constituent morphemes and whose sound structure is characterized by a low degree of phonological integration of affix and stem. Productive categories are semantically transparent, because their derivatives favor the decomposed route, and decomposed storage strengthens the individual semantic representations of the constituent morphemes. This leaves little room for semantic drift and opacity, which frequently arise under whole-word access and storage. The relationship between phonological transparency and productivity is further substantiated in Hay and Baayen (2003), who investigated the phonotactics at the morpheme boundaries of the 80 affixes from their (2002) study. According to Saffran *et al.* (1996a, 1996b) or McQueen (1998), it can be assumed that speakers rely on phonotactics for the (pre-)processing of morphologically complex words and tend to posit morphological boundaries inside phoneme transitions that rarely occur inside monomorphemic words. For example, the phoneme combination /df/ (as in *dread-ful*) is extremely rare inside monomorphemic English words and its occurrence in any word will therefore strongly facilitate decomposition in speech perception. In contrast, combinations that are highly frequent inside morphemes, for example, /tɪ/ (as in *tip* or *instruct-ive*), will not facilitate decomposition. Since it can be assumed that decomposition in speech perception leads to decomposed storage, decomposed forms in the lexicon should lead to productivity. Hence, we expect there to be a relationship between the junctural phonotactics of an affix and the productivity of that affix. Those affixes that create a phoneme transition at their morpheme boundary that facilitates segmentation should be more productive. Hay and Baayen indeed found a significant correlation between the kind of junctural phonotactics of an affix and that affix's productivity. The more illegal the phonemic transitions created by an affix are, the more productive that affix tends to be. Thus, the phonological make-up of an affix (and thus the kind of juncture it creates) contributes probabilistically to the likelihood of decomposition and therefore to the degree of productivity.

In conclusion, it can be stated that the productivity of a morphological process can be explained in psycholinguistic terms as a syndrome of properties, with parsability, relative frequency, and semantic and phonological transparency as important factors. The productivity of an affix results, among other things, from quite complex processing factors, among which semantic and phonological transparency are also structurally determined. The semantic and phonological structures of affixes and their derivatives codetermine the processing and storage of these forms in the way outlined above. The significant role of structural factors in influencing – and constraining – productivity is the subject of the next section.

Productivity Restrictions

For a word to be coined, it must somehow be useful to the speaker who creates it. No matter which function a particular derivative serves in a particular situation (labeling, syntactic recategorization, or expression of an attitude; see Plag, 2003: 59–60), intended usefulness crucially constrains the formation of new complex words. However, not all potentially useful words

are actually created and used, which suggests that other restrictions must be at work as well. There is thus a distinction to be made between the general possibility of a new word to be formed and the opportunity to use the new word in actual speech. The former is constrained by structural factors, the latter by pragmatic factors.

Pragmatic Factors

The rise and fall of affixes such as *mini-* or *-nik* are prime examples of the fact that extralinguistic developments in society, often referred to as 'fashion', make certain elements desirable to use and therefore productive.

A pragmatic requirement that originates in what was called 'usefulness' above is the nameability requirement: concepts encoded by derivational categories are rather simple and general and typically may not be highly specific or complex. A classic example of such an improbable morphological category was given by Rose (1973: 516): "grasp NOUN in the left hand and shake vigorously while standing on the right foot in a 2.5 gallon galvanized pail of corn-meal-mush" is unlikely to occur in any language as the particular meaning of a denominal verbalizing affix.

Structural Factors

Structural factors influencing productivity concern the traditional levels of linguistic analysis, i.e., phonology, morphology, syntax, and semantics. The pertinent restrictions can be classified either as general principles affecting all processes or as process-specific restrictions.

Rule-specific restrictions demand the presence of certain properties in the base or in the derived word. Phonological constraints, to begin with, can make reference to segmental or prosodic structure, sometimes in rather intricate ways. For example, the verb-forming English suffix *-ify* attaches only to monosyllables, to words stressed on the last syllable, and to words stressed on the penultimate syllable and ending in /ɪ/.

An example of a morphological constraint can be seen with rival nominalizing suffixes in English. Every verb ending in the suffix *-ize* can be turned into a noun only by adding *-ation*. Other deverbal nominal suffixes, such as *-ment*, *-al*, and *-age*, are ruled out by this morphological restriction imposed on *-ize* derivatives (cf., for example, *colonization* versus **colonizement, *colonizal* or **colonizage*). This is a case of a base-driven restriction, since it is the base (the *-ize* verb) that demands a certain affix (*-ation*) be attached and rules out the attachment of other suffixes with the same function. Both base-driven and affix-driven restrictions seem to be necessary to account for the combinability of affixes and stems.

Semantic restrictions may also operate on bases and on derivatives. For example, derivatives in *-ee* (*employee*) must denote sentient entities, to the effect that *amputee* cannot refer to an amputated limb (see, for example, Barker, 1998 for detailed discussion).

One of the most commonly mentioned types of restriction is that referring to syntactic properties. The adjectival suffix *-able* normally attaches to verbs (as in *readable*), but not, for example, to adjectives. Another example is the nominal suffix *-ness*, which standardly attaches to adjectives (as in *fondness*), but not to verbs. Recently, the pervasiveness of such syntactic restrictions has been questioned, however (e.g., Plag, 2004).

Turning from rule-specific to more general restrictions, the notion of blocking features prominently (see Plag, 1999: Chap. 3 and Bauer, 2001: 126–143, for a discussion of other general restrictions that have been proposed in the literature). Token blocking refers to the impossibility of forming a potential regular form due to an already existing synonymous word. For example, **arrivement* is blocked by *arrival*, or **stealer* by *thief*. In contrast, type blocking refers to the impossibility of applying one rule if there is another pertinent rule (for example, *-ness* and *-ity* suffixation).

One important aspect of token blocking is that, contrary to earlier assumptions, not only idiosyncratic or simplex words (such as *thief*) can block productive formations (such as **stealer*), but that stored words in general can do so. In order to be able to block a synonymous formation, the blocking word must be sufficiently frequent. The higher the frequency of a given word, the more likely it is that the word will block a potential rival formation. Idiosyncratic words as well as regular complex words may block other forms if and only if the blocking word is stored.

Type blocking has been said to occur when a certain affix blocks the application of another affix (e.g., Aronoff, 1976). The crucial idea underlying the notion of type blocking is that synonymous rival affixes (such as *-ness, -ity,* and *-cy*) apply in a more or less restricted domain. The most unrestricted affix is the so-called general case (in our example *-ness*), whereas affixes with a more restricted domain are the so-called special cases (*-ity* or *-cy*). Type blocking would occur when the more special affix precludes the application of the more general affix, which is thus an instance of Panini's law or the elsewhere principle. However, type blocking cannot accurately account for the patterning of the data. For example, Aronoff (1976: 53) claimed that derivatives with nominal

-ness are ill formed in all those cases where the base adjective ends in *-ate, -ent*, or *-ant*, hence, the contrast between supposedly well-formed *decency* and supposedly ill-formed **decentness*. This account is, however, problematic. Riddle (1985) has shown that *-ness* and its putative rivals *-ity* or *-cy* are not really synonymous, so that blocking could – if at all – occur only in those cases where the meaning differences would be neutralized. In general, *-ness* formations tend to denote an embodied attribute, property, or trait, whereas *-ity* formations refer to an abstract or concrete entity. Hence, *-ity* and *-ness* lack the prerequisite for type blocking, synonymy. Another problem is the status of forms such as *decentness*. This form is listed, for example, in *Webster's third new international dictionary of the English language* and *Roget's II: The new thesaurus*, and an Internet search provided 322 occurrences, which indicates that *decentness* is not at all ill formed. Furthermore, the general case *-ness* is not systematically curtailed by *-ity* or *-cy*, as shown by the many attested doublets (e.g., *destructiveness–destructivity, discoursiveness–discoursivity, exclusiveness–exclusivity,* all from the *OED*). The final problem with putative cases of type blocking is that it is often impossible to distinguish them from token blocking. Thus, putative avoidance of *decentness* could be a case of token blocking, since the word *decency* is part of the lexicon of many speakers, and hence capable of token blocking.

In summary, type blocking as a general factor constraining productivity is to be rejected. Token blocking, however, is a relevant principled mechanism that restricts the productivity of affixes by preventing the formation of complex rival synonymous forms.

Conclusion

The productivity of a word-formation process can be defined as its general potential to be used to create new words and as the degree to which this potential is exploited by the speakers. Productivity can be assessed by various measures, both corpus-based and dictionary-based. Productivity emerges from the mental lexicon as the result of parsability, relative frequency, and semantic and phonological transparency. Apart from constraints on processing and usage, structural constraints also play an important role in restricting productivity. Possible words of a given morphological category must conform to very specific phonological, morphological, semantic, and syntactic requirements, which impose limits on productivity. Finally, in addition to rule-specific restrictions, the general mechanism of token blocking prevents complex words from being formed if a synonymous word is already available in the speaker's mental lexicon.

See also: Compound; Lexicalization; Lexicon, Generative; Morphology and Language Processing; Word Formation.

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Projection Problem

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The projection problem was considered the central problem in presupposition theory during the early 1970s. After that, it was realized that it is automatically accounted for in terms of a wider theory of presupposition and discourse semantics.

The projection problem is posed by the behavior of presuppositions of embedded clauses. The property of presuppositions to be sometimes preserved through embeddings, albeit often in a weakened form, is called *projection*. The projection problem consists of formulating the conditions under which the presuppositions of an embedded clause (a) are kept as presuppositions of the superordinate structure, or (b) remain as an invited inference that can be overruled by context, or (c) are canceled.

Let sentence *B* presuppose sentence *A* ($B \gg A$); then *B* also semantically entails *A* ($B \models A$). Now, when B_A (*B* presupposing *A*) is embedded in a larger sentence *C*, then either $C \models B_A$ or $C \not\models B_A$. When $C \models B_A$, then $C \gg A$. That is, when B_A is entailed (or presupposed) by its embedding clause *C*, then *C* inherits the presuppositions of B_A. For example, (1a) $\gg$ (1b) and (1c) $\models$ (1a). Therefore, (1c) $\gg$ (1b):

(1a) Susan got her money back.
(1b) Susan had lost her money.
(1c) Susan managed to get her money back.

The operator *and* is the only exception. When a conjunction is of the form 'A and B_A' (the first conjunct expresses the presupposition of the second), B_A is entailed, yet *A* is not presupposed. Thus, although (1a) $\gg$ (1b) and (2) $\models$ (1a), (2) $\not\gg$ (1b), but it is still so that (2) $\models$ (1b):

(2) Susan had lost her money and she got it back.

Entailment is thus 'stronger' than presupposition in the sense that entailments are properties of sets or series of sentences, whereas presuppositions are properties of single sentences.

When $C \not\models B_A$ (and hence $C \not\gg B_A$), then, in all cases but one, $C \not\models A$ (and hence $C \not\gg A$). The one exception is negation: (3a) $\gg$ (3b) and (3c) $\gg$ (3b), even though, obviously, (3c) $\not\models$ (3a):

(3a) Only Jim laughed.
(3b) Jim laughed.
(3c) Not only Jim laughed.

This answers question (a), except for the behavior of *and* and *not*.

When entailment is lost *A* often remains an *invited inference* of *C* ($C > A$). When $C > A$, the suggestion is that *A* is true if *C* is true, but the inference can be overruled by contextual factors. Moreover, when $C > A$, *A* followed by *C* makes for an orderly bit of discourse, just as when $C \gg A$. Presuppositions thus differ from other entailments, which are never kept as invited inferences across nonentailing embeddings. Thus, (4a) $\gg$ (4b) and (4c) $\not\models$ (4a), but (4c) $>$ (4b).

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This inference is overruled in (4d), which says that Harry wrongly believes that he has a son, and that this (nonexistent) son lives in Kentucky:

(4a) Harry's son lives in Kentucky.
(4b) Harry has a son.
(4c) Harry believes that his son lives in Kentucky.
(4d) Harry has no son, but he believes that he has one and that this son lives in Kentucky.

In the case of *if* the antecedent clause may express the presupposition of the consequent clause. In such cases, the presupposition is canceled, as in (5a). Similarly for *or*: one disjunct may cancel the presupposition of the other, as in (5b):

(5a) If Harry has a son, his son lives in Kentucky.
(5b) Either Harry has no son, or his son lives in Kentucky.

Not is again problematic in that it normally lets presuppositions project as invited inferences, but occasionally as full presuppositions, as in (3c), and occasionally also cancels them altogether, as in (6), which contains the positive polarity item *hardly* (positive polarity items only allow for a higher *not* if some presupposition is canceled):

(6) Bob does NOT hardly feed his dog: he doesn't even have one.

This gives an idea of what is involved in the questions (b) and (c). None of the proposals made in the literature has been able to offer a principled account of the projection properties of presupposition.

The first proposal was made by Langendoen and Savin (1971), who proposed that presuppositions are always maintained as such through embeddings, which is observationally inadequate. A more sophisticated theory was proposed by Karttunen in various publications. Observing that projection properties depend on the embedding operator, he distinguished between *plugs*, *holes,* and *filters*. Plugs are operators that always cancel presuppositions and invited inferences. Holes are operators that always let them through, either as presuppositions or as inferences (e.g., *believe*). Filters sometimes let them through and sometimes do not (e.g., *not*, *if*, *or*). He did not succeed, however, in formulating adequate conditions for the three classes, in particular the filters. It is now generally agreed that though Karttunen's work focused attention on these phenomena, it was too taxonomic and failed to provide a satisfactory solution.

The second main approach is Gazdar (1979). Here, presuppositions are brought together with entailments and implicatures into one system of hierarchically ordered cancellation conditions. The notion of entailment is classical, and so is the logic administering it. In principle, all implicatures and presuppositions are deemed to 'survive' through embeddings, unless there is a conflict, in which case selective canceling ('filtering') takes place. Implicatures and presuppositions of the smallest possible sentential structures are spelled, respectively, 'im-plicatures' and 'pre-suppositions.' Only when they have made it to the surface, through all embeddings, is the spelling 'implicature' and 'presupposition' (without hyphen) used.

Im-plicatures are scalar or clausal. Scalar im-plicatures are of the kind familiar in pragmatics: an expression *e* occupying a position on a semantic scale *s* generates the scalar im-plicature 'not stronger than *e*'. Thus, *Some men died* has the scalar im-plicature K(not all men died) – read as 'for all the speaker knows, not all men died.' Clausal im-plicatures are generated by sentences *A* containing as a subpart some clause *B* such that *A* entails neither *B* nor $\neg B$. The im-plicature is then of the form $P(B) \wedge P(\neg B$, 'P' standing for the epistemic possibility operator (Gazdar, 1979: 58–59). Thus, *Nob thinks that Bob is brave* clausally im-plicates P(Bob is brave) $\wedge$ P(Bob is not brave). A pre-supposition is an implicature that is also semantically entailed. A presupposition, as a property of a possibly complex sentence, may or may not be entailed.

The filtering mechanism works as follows. Given a sentence *A* an inventory is made of its eventual entailments (**E**), of its accumulated im-plicatures (**I**), and of its accumulated pre-suppositions (**P**). If **E** contains contrary entailments, *A* is uninterpretable. If some $\mathbf{e} \in \mathbf{E}$ is incompatible with any $\mathbf{i} \in \mathbf{I}$ or $\mathbf{p} \in \mathbf{P}$, **i** or **p** is canceled and *A* remains interpretable in all contexts compatible with **E**. If some $\mathbf{i} \in \mathbf{I}$ is incompatible with some $\mathbf{p} \in \mathbf{P}$, **p** is canceled and **i** remains. Mutually incompatible im-plicatures or pre-suppositions cancel each other. Entailments thus take precedence over im-plicatures and im-plicatures over pre-suppositions. For example, 'if A then B' generates the im-plicature $P(A) \wedge (P(\text{not-}A) \wedge P(B) \wedge P(\text{not-}B)$, all four being admissible knowledge states. If *B* presupposes *A*, the pre-supposition K(A) is canceled by the incompatible im-plicature P(not-A).

Gazdar was among the first to stress the relevance of presupposition for an incremental theory of discourse semantics. Given a context (i.e., a set of propositions) **C**, a newly presented sentence *A* is incremented to **C**, thus creating a new context **C′** for a following sentence. Eventual presuppositions (including invited inferences) are incremented to **C** prior to their carrier sentences (Gazdar, 1979: 132). Incremented propositions are considered linked by *and*. When $\mathbf{C} \wedge A$ is inconsistent, *A* is uninterpretable

in **C**. When **C** is incompatible with some $\mathbf{i} \in \mathbf{I}$ or $\mathbf{p} \in \mathbf{P}$ ($A \not\models p$), then **i** or **p** is filtered out and *A* loses that implicature or pre-supposition in **C**. This incremental aspect of Gazdar's theory is an extension of the filtering mechanism to any context **C**, as the same results are obtained by conjoining *A* with (the sentences expressing) the propositions in **C**.

A more unifying view is obtained when the principles of Maximal Unity (MaU) and Minimal Size (MiS) are assumed for **D**s. MaU entails a maximal leveling of information through the subdomains of a discourse domain **D**. MiS entails that what has been incremented must not be doubted again. MaU ensures that besides what is explicitly incremented in a subdomain $\mathbf{D_n}$, $\mathbf{D_n}$ also contains all information previously stored in higher domains, including the commitment domain $\mathbf{D_o}$, provided $\mathbf{D_n}$ remains consistent. This *downward percolation* allows the use of discourse addresses and increments from higher domains in lower domains. The counterpart of downward percolation is the *upward percolation* of presuppositions from lower to higher domains unless stopped by inconsistency with either explicitly stored information or available background (scenario) knowledge. Thus, in (4c) MaU generates the invited inferences that Harry has a son and that there is a place called 'Kentucky.' The invited inference that Harry has a son is blocked in (4d) because the higher domain says that he has no son.

Some subdomains are subject to the requirement that they be themselves incrementable to their superordinate domain. The subdomain created by epistemic *may*, for example, require that what is said to be possible is a proper potential increment to $\mathbf{D_o}$, and must thus be consistent with $\mathbf{D_o}$, but not already contained in it. Likewise for the discourse-splitter *or* and the hedger *if*. 'A or B' is incremented as two alternative subdomains 'A' and 'not-A and B.' Both alternatives must be incrementable to $\mathbf{D_o}$. This condition automatically blocks the projection of (4b), 'Harry has a son,' from the disjunction (5b): if (4b) were added to $\mathbf{D_o}$ the first alternative would not be incrementable. Analogously for conditionals, as in (5a): there is no invited inference that Harry has a son because if there were, it could not be doubted again by *if* in virtue of MiS.

And is primarily a discourse-incrementer; its being a truth function is derived from that (which explains why *and* does not like to stand under negation). $A \wedge BA$ does not presuppose (or invite the inference) A because if it did, *A* would have to be incremented twice, which would violate MiS.

Not(BA) normally preserves the presupposition *A* as an invited inference, because *BA* under *not* must have the right papers for the current **D**. Yet *not* is special. First, it is not allowed over positive polarity items and is required by negative polarity items. Then, it preserves the full entailing presupposition in all cases where it occurs in 'noncanonical' position (for English, not in construction with the finite verb, as in (3c) above) and also when it stands over clefts or pseudoclefts, and when a factive *that*-clause stands in front position as in (7), which fully presupposes that Janet's brother was arrested:

(7) That her brother was arrested did not surprise Janet.

There also is a presupposition-canceling metalinguistic NOT, which says of its argument sentence *BA* that it does not fit into **D** because *A* clashes with **D**, as in (6). This NOT requires heavy accent, must stand in canonical position, and allows for positive polarity items, like *hardly*. How *not* and NOT relate to each other is still a matter of debate.

Gazdar's analysis can thus be perfected and be seen to follow from a postulated mechanism of discourse incrementation.

See also: Anaphora: Philosophical Aspects; Discourse Domain; Discourse Semantics; Polarity Items; Presupposition.

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Pronouns

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According to the traditional definition (from the Web version of Webster's 1913 dictionary), a pronoun is "[a] word used instead of a noun or name, to avoid the repetition of it. The personal pronouns in English are I, thou or you, he, she, it, we, ye, and they."

Pronouns are a special case of the more general linguistic category 'proforms,' i.e., (semantically empty or nearly so) function words that replace (lexical content-bearing) syntactic units of a particular category. In the case of pronouns, the units in question are NPs or modifiers of the head noun in an NP, i.e., adjective phrases, quantifiers, or determiners. Even the most prototypical personal pronouns can be said to fit this definition if we say that the replaced NPs are the names of the speaker(s) or addressee(s), etc., (as implied in the Webster definition), or possibly expressions like 'the speaker(s),' etc.

Since Latin grammar – whence the term 'pronoun' (*pronomen*) originates – categorizes nouns and adjectives as special cases of 'names' (*nomina*), it is not surprising that 'pronouns' and 'promodifiers,' too, are considered to form one part of speech.

Hence, pronouns form a quite heterogeneous class of words. The most prototypical members of this class are the personal pronouns, among which are normally counted also possessive (corresponding to English *my* ~ *mine*, *her* ~ *hers*, etc.), reflexive (e.g., *themselves*), and reciprocal (e.g., *each other*) pronouns. Depending on the language and grammatical tradition, at least the following other kinds of pronouns are also commonly recognized:

- demonstrative pronouns, which identify or specify a noun. The number of spatial distinctions made varies among languages, but at least 'here' (near speaker) and 'there' (away from speaker) is commonly found, yielding the English opposition *this* ~ *that* (*see* **Demonstratives**).
- relative pronouns, which form relative clauses, i.e., clauses serving as modifiers in the NP.
- interrogative pronouns; '*wh*-items'; used to ask questions (*see* **Semantics of Interrogatives**).
- indefinite pronouns, which form a very heterogeneous group, prototypically encompassing items expressing indefinite reference (such as English *something*, *anything*, *nothing*), but commonly also taken to include quantifiers such as *many*, *every*, generic pronouns such as German *man* 'one, you (impersonal),' and relational expressions such as *other*, *same* (*see* **Indefinite Pronouns**).

Sometimes the corresponding proadverbs (or 'pronominal adverbs') are grouped together with pronouns in grammars, i.e., interrogative pronouns such as English *who* and *what*, are considered as being of a kind with interrogative adverbs like *where*, *when*, and *how*.

Pronouns are function words, which means that they constitute a closed word class, with a small set of members. In many languages, the text frequency of pronouns is high, and consistent with this frequency, pronouns tend to have a fairly simple phonological structure, normally one or two syllables with simple consonants or consonant clusters, although longer and more complicated pronouns do exist, as do word-formation patterns restricted to pronouns (and pronominal adverbs), such as Swedish/English *någonting/something* ~ *anything* ~ *ingenting/nothing*, or multi-word pronouns, like Swedish *den här* 'this' ~ *den där* 'that'; Swedish/Polish *vad som helst/byle co* 'anything (whatsoever)' ~ *vem som helst/byle kto* 'anybody (whosoever).'

The prototypical function of pronouns is a 'signpost-like' one: A pronoun serves to identify referents, not by describing or naming them, but by 'pointing them out,' as it were. There are two kinds of identification often distinguished in the literature, 'deictic' and 'phoric.' A deictic pronoun (or a deictic usage of a pronoun) refers directly to something in the world: If I say *He did it!* pointing at a man standing next to me, I am using the personal pronoun *he* deictically. A phoric (usage of a) pronoun, on the other hand, provides an index to some part of the discourse in which it occurs; it 'corefers' rather than refers (hence this indexing mechanism is often called 'coreference' in the literature). The phoric uses of pronouns are demonstrative and personal pronouns used to refer to complete predications (as in *He admitted that he did it. **This** means that I am innocent.*), and reference to lexical NPs elsewhere in the discourse: reflexive and reciprocal pronouns used intrasententially, and, most prototypically, 'anaphoric' (the pronoun comes after the lexical NP, called the *antecedent*) and 'cataphoric' (the pronoun anticipates the lexical NP) reference. Whereas a full NP will pick out its referent by describing it lexically (e.g., *the house on the hill*), a phoric pronoun will provide as much structural information as is needed and allowed by the grammar of the language, so that the listener can pick out the intended NP in the discourse. As a consequence, phoric pronouns will often be capable of richer inflectional expression than nouns. That this capability should be so seems quite natural in the case of agreement features, such as gender/noun class, number, and occasionally posture and spatial position and

movement. Thus, in the Swedish sentence *Tallriken föll i golvet och* ***den*** *gick sönder* 'The plate fell to the floor and **it** broke,' the phoric pronoun *den* 'it' is nonneuter singular, and given only this sentence as context, it can only refer to the likewise nonneuter singular NP *tallriken* 'the plate,' but not to the neuter singular NP *golvet* 'the floor,' which would have required the use of the phoric pronoun *det* 'it (neuter sg)' instead. We should note at this point, that lexical NPs, too, are often used anaphorically; especially common is the anaphoric use of a hyperonym (more general term) of the antecedent NP, a mechanism that provides a natural starting point for the grammaticalization of general nouns into pronouns (see below) (*see* **Anaphora, Cataphora, Exophora, Logophoricity**).

However, pronouns tend to express other grammatical features as well as express them to a higher degree than nouns. Thus, in the continental Scandinavian languages Danish, Norwegian-Bokmål (Norwegian, Bokmål), Norwegian-Nynorsk (Norwegian, Nynorsk), and Swedish, in English, in French, and in Macedonian, and many other languages, personal pronouns are inflected for case (subject, direct object, dative), a category completely lacking in nouns in those languages. This tendency is less easily explained by the need for discourse-internal reference, but may be a natural stage on the way toward the grammaticalization of phoric pronouns as agreement affixes on verbs. It has been noted, for example, that in some languages, such as Tuscarora (an Iroquoian language spoken in North America), sometimes called pronominal argument languages, lexical NPs – neither expressing case nor showing syntactic function by word order – behave like loose adjuncts to clauses, rather than full syntactic arguments of the verb, a role usurped, as it were, by agreement morphemes (prefixes in Tuscarora), which express case and coindex any lexical NPs by agreement features.

In some languages, subject pronouns express the category of 'switch reference,' where the form of the subject pronoun shows if the subject of the current (dependent) clause is the same as in the preceding (main) clause (SS), or a different one (DS), as in the following two examples from Diyari (Dieri) (Australia):

(1) nhulu nganthi pardaka-rna warrayi,
he-ERG meat-ABS bring-PART AUX
thanali thayi-lha
they-ERG eat-SS
'He brought the meat for them (him and others) to eat'

(2) nhulu nganthi pardaka-rna warrayi,
thanali thayi-rnanthu
eat-DS
'He brought the meat for them (others) to eat'
(From Wiesemann, 1986: 458)

Further, pronouns – both deictic and phoric – often express such features as distance (from speaker and/or addressee), visibility, and politeness/social distance (between speaker and addressee, and between speaker and persons mentioned).

Compared to nouns and adjectives, pronouns tend to have more irregular and often highly characteristic inflectional patterns.

How many persons personal pronoun systems express varies between languages. A very common system has three persons (first, second, third) in two numbers (singular and plural), for a total of six person/number slots in the paradigm. Often, a dual number is found in addition to singular and plural, increasing the number of person/number combinations to nine. Some personal pronoun systems have trial number, and a quadral number exists at least in Sursurunga, an Austronesian language spoken in Papua New Guinea. In nonsingular nonthird-person forms, the distinction between inclusive and exclusive forms is often encountered, as in Huallaga Quechua (Quechua, Huánuco, Huallaga) *noqakuna* 'we, excluding you, the addressee(s)' ~ *noqanchi:* 'we, including you, the addressee(s).'

One of the more elaborate person systems described is that of Ghomala' (Ghomálá'), a Bantu language spoken in Cameroon, evidencing free subject forms of personal pronouns encoding the following persons and combinations of persons:

1sg, 1sg + 2sg, 1sg + 3sg, 1pl + 2sg, 1pl + 2pl, 1pl + 3sg, 1pl + 3pl, 1pl
2sg, 2sg + 3sg, 2pl + 3sg, 2pl + 3pl, 2pl
3sg, 3sg + 3sg, 3pl
1sg + 2sg + 3sg, 1pl + 2sg + 3sg, 1pl + 2pl + 3sg, 1pl + 2pl + 3pl

It is not always easy to formulate necessary and sufficient criteria for distinguishing pronouns from other linguistic categories. Pronouns share many characteristics both with nouns and with agreement clitics and affixes. This feature becomes especially clear in cross-linguistic and typological studies, where the same function that is accomplished with pronouns in one language utilizes some other mechanism in another language. If verbs in some language show rich agreement morphology (encompassing one or more core arguments of the verb), pronouns may be used mostly for emphasis. Where agreement morphology is missing, as in Swedish, pronouns may be required even with argumentless verbs (analogous to expletive *it* in English): ***Det*** *blåser* '**It** blows (= there is a wind/the wind is blowing),' cf. the Finnish version of the same utterance: *Tuulee* 'Blows,' with no pronoun at all, only third-person singular agreement morphology on the verb. Similarly, a prepositional phrase containing a pronoun NP in English may instead be

expressed with an adposition–possessive affix combination in some other language, e.g., Hungarian *neked* (*nek-ed* 'DATIVE–2SG') 'to you,' cf. *[az] embernek* (*ember-nek* 'man-DATIVE') 'to [the] man' and embered (*ember-ed* 'man–2SG') 'your man.' This difference means that the text frequency of pronouns (at least phoric pronouns) will vary widely among languages, depending on structural factors such as the ones just cited.

Further, linguists have noted that core argument pronouns seem to appear with different frequencies, depending on their grammatical function. One proposed generalization concerns the form of core argument NPs in languages, stating that lexical A(gents) – i.e., typically subjects in transitive clauses – will tend to be avoided, i.e., A will tend to be expressed by a pronoun or nothing (zero anaphora). This generalization means that there should be a tendency for overuse of pronouns (or only agreement morphology) in the A role across languages. For example, examining a traditional narrative in Kinnauri (a Tibeto-Burman language spoken in northern India), comprising a total of 420 clauses containing altogether 293 A arguments, we find that only about one-fifth, or 19% of the A arguments are in the form of lexical NPs, and the remainder are expressed by zero anaphora (73%) or pronouns (8%).

Students of grammaticalization have noted a frequently occuring grammaticalization pathway from nouns over pronouns and clitics to agreement morphology, as well as a partial pathway from demonstrative pronoun over third-person independent pronoun, clitic pronoun, and finally agreement suffix. However, it should be mentioned here that there are other sources for agreement morphology as well, and not only pronouns.

The noun component of indefinite or polite/honorific personal pronouns is often still discernible, e.g., *-thing*, *-body* in English indefinite pronouns, Swedish/German generic *man* (<*man/Mann* 'man'), Polish (nominative forms) *pan* (masc.sg.) ~*pani* (fem.sg.) ~*panowie* (masc.pl.) ~*panie* (fem.pl.) ~*państwo* (mixed gender pl.) 'you (polite)' (<'lord(s) ~lady(/ies) ~lordship'). Even though nominally a closed functional category, pronouns are subject to rather quick diachronic change, compared to other functional categories, resulting in even fairly closely related languages showing considerable differences in their pronoun inventories. Here, the first- and second-person personal pronouns are least susceptible to change, whereas third-person personal pronouns are renewed a bit more often (cf. English *he* ~ *she* with *er* ~ *sie* in closely related German; cf. also English *they,* which is a recent loan from Scandinavian), and the indefinite pronouns, finally, seem to show the most rapid turnover over time.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Demonstratives; Indefinite Pronouns; Semantics of Interrogatives.

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Proper Names: Linguistic Status

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Introduction

Texts are full of names, yet comparatively little attention has been devoted by linguists to their study as linguistic items. Names, especially place names and personal names, are studied more often as historical items, in which linguistic scholarship plays an ancillary role. This may be because it is assumed that there is little to say about the role of names in the system and structure of a language. However that may be, there is much to be said about sociolinguistic and pragmatic aspects (see, e.g., Allerton, 1987; Alford, 1988), while the morphological history of names can shed light – or at least sidelights – on the development of a language, its dialects, and its language contacts (*see* **Personal Names** and **Place Names**).

Words and Names

How are names different from words? Words typically pick out objects and events in the world by virtue of particular attributes, according to which they are assigned to the category designated by the word. If some animate entity is referred to as a *dog*, it may be assumed to have doglike properties; e.g., it will be a domestic animal that has a tail and barks. This is because the word *dog* is semantically content-full. Names, on the other hand, are semantically empty. They identify individuals directly. They function as interface points between language as system and particular individuals in the world. There is nothing semantic about the name *Scruff* or *Rover* that would justify any assumption about whether the bearer is a dog, a cat, a human, or a city (all of which may be named entities). It is not the case that a name given to a dog necessary implies that the bearer has doglike properties. Names are conventional identifiers; their bestowal on individuals is an arbitrary linguistic act.

Nevertheless, probabilistic inferences are regularly and often correctly drawn on the grounds of morphology, syntagmatic context, and onomastic convention. A linguistic item that ends in *-ton*, used in an English context, is most probably a place name. However, if it occurs with an honorific title (*Mr.*, *Ms.*, *Dr.*) or with a forename, then it almost certainly names a human individual. If it occurs as subject of the verb *bark*, it most probably names a dog; if it occurs as the subject of the verb *canter*, it is most probably a horse.

Personal names identify human beings individually rather than by group or function. Place names (*see* **Place Names**) perform the same function for locations, while other kinds of proper names include names of businesses, names of pet animals, names of individual works of art, works of literature, films, and other cultural artifacts. It is sometimes supposed that words denoting products are names, but from a linguistic point of view they are more like common nouns, even when spelled with an initial capital letter. English *Mars bar* is a countable noun and denotes a set of entities; *Persil* is a mass noun denoting a mass of soap powder.

Rigid Designators and Individuals

Kripke (1972) argued that a name is a 'rigid designator' that picks out an individual regardless of his, her, or its attributes. For example, if biblical researchers were able to demonstrate that none of the statements made in the Bible about Jonah were true (i.e., he never went on board a ship, was never thrown overboard by his shipmates, was never swallowed by a whale, never went to Nineveh, and never preached the word of God), we would say, 'Oh, we have discovered something new about Jonah,' not 'Oh, he was not Jonah at all, he must be someone else' or 'He was not Jonah, so we must use another name for him.' Following Kripke, several linguistic philosophers, e.g., Putnam (1975a, 1975b), have applied this logic to nouns denoting classes of entities, such as *lemon*, *tiger*, and *water*. However, the question of the extension of rigid designators from individuals to classes is not uncontroversial, and anyway, it is beyond the scope of this article.

The Lexical Status of Personal Names

It is a commonplace that from a synchronic point of view, proper names have no meaning. The etymological meanings of *Patrick* 'nobleman', *Johnson* 'son of John', and *Bradford* 'the broad ford' are simply irrelevant from the point of view of the use of these words in ordinary contexts. These are historical matters, discussed separately in the articles on personal names and place names. Proper names of all kinds (**Personal Names**, **Place Names**, business names, product names) have reference but no semantics. They are the means by which speakers of a language identify individuals and anchor their language (as a system) to the physical and conceptual universe in which they live. Indeed, the facility to say something about individuals may be regarded as a design feature of language.

Certain names, e.g., *Shakespeare*, *Einstein*, *IBM*, *Whitehall*, have a role in the culture to which

speakers of a language collectively subscribe. To be a speaker of English and not know who Shakespeare was is to be a speaker of an extremely impoverished version of it. As a matter of fact, *Shakespeare* is quite a common surname in the West Midlands of England, but from the point of view of users of English as a whole, only one Shakespeare is relevant as a cultural reference point. In other cases, more precise identification is found to be desirable, so that for example the poet *Matthew Arnold* (1822–1888) is regularly referred to by both given name and surname, distinguishing him from other important Arnolds, such as his father, the educationist *Thomas Arnold*, or the 20th-century composer *Malcolm Arnold*.

The traditional distinction between words and names has been responsible for some confusion in the selection of entries for those dictionaries that have a policy of omitting names but including words, with occasionally bizarre results – for example, the definition of *Christ* as an interjection (a word) with no mention of the founder of the Christian religion (a name). Many modern dictionaries reject the semantically based distinction between words and names as a principle for the selection of entries, and take the view instead that the lexicon is a 'cultural system of reference' (Mathiot, 1973) and that therefore a dictionary should aim to be a collective cultural index to a language. This principle implies that a dictionary should include names as well as words, insofar as the former are part of the common knowledge of users of the language.

Vocative and Referential Uses of Names

Different classes of proper names are used in different ways. Names of people and names of domestic animals have two primary functions, *vocative* (when used without syntax, e.g., 'John!') and *referential* (when used with syntax, e.g., 'John said nothing'). The vocative is normally reserved for entities that have cognition, i.e., people and pets. Place names and business names have only *referential* functions. (However, there are exceptions – for example, an artifact may be apostrophized with a vocative, as in Wordsworth's poem beginning "Spade! With which Wilkinson hath tilled his lands . . . .")

The referential function is sometimes loosely described as deictic, but Anderson (2003), describing the grammatical status of proper names within notional grammar (Anderson, 1997), commented that names should not be classified as deictics. He argued that proper names are "nondeictic sources of primary identification." In this system, names are assigned, within a notionally based universal system of syntactic categories, to the category DETERMINATIVE, along with pronouns and determiners. Unlike pronouns and determiners, however, names are "inherently neither definite nor indefinite, nor are they interpreted as nonspecific."

A name cannot be used to predicate something about someone or something. Names do not denote properties. 'She is Jane' identifies an individual; it does not predicate anything about that individual. Apparent exceptions, for example (1), (2), and (3), are not uses of names as identifiers in the normal way but rather transferred uses of names to invoke a category (wise men, resolute women, scientific geniuses, as the case may be) by mentioning a stereotypical member of it, one that has the most salient characteristics of the category.

(1) He is a veritable Solomon.

(2) She is a bit of a Maggie Thatcher.

(3) He is no Einstein.

The determiners and modifiers used in these contexts signal that the names stand for a category rather than an individual.

Syntagmatics of Proper Names

The syntagmatic aspects of proper name usage are largely language-specific. In English, many kinds of proper names (in contrast with *common nouns*) are distinguished by such features as an initial capital letter, use without a determiner, and other syntagmatic features, but these differ according to what kind of entity the name refers to (see Algeo, 1973). Sørensen (1958, 1963) proposed a more extensive inventory of syntactic tests—use with modifiers, use with determiners, conditions under which pluralization is possible, relationship to personal pronouns, etc.—but unfortunately his study, like that of Algeo, was limited to English.

Language-specific differences may be illustrated by just a few of the different uses of the definite article with personal names in different languages. In Greek, but not in English or Italian, a determiner is used before a personal name in all normal referential contexts. In French, but not in English, a determiner is normally used if an adjective is interposed (*le petit Jean*, as opposed to *John*). In German, a determiner before a personal name in a referential context (e.g., *der Franz*, as opposed to *Franz*) is optional; when used, it typically signals informality in register. In English, French, and German (among other languages), names of cities, mountains, lakes, and certain other kinds of locations are used without a determiner, while names of rivers, oceans, and seas are used with the definite article.

Languages differ as to the ways in which a human being is addressed or referred to. These differences are a matter of cultural conventions governed by linguistic norms. Different levels of formality in name use, ranging from hypocoristics (pet forms such as *Bill*) to a person's full name, complete with honorifics, parallel register differences in the wider vocabulary. A study of the pragmatics of register differences in names and titles, with examples chosen mainly from English, Polish, and Russian personal names, can be found in Wierzbicka (1992).

Protocols of Personal Names

In most societies nowadays, personal names consist of two basis elements: a given name chosen at or soon after birth for a child and a second name, the surname or family name, which the child inherits automatically, indicating his or her parentage, family, or clan membership. This two-name structure is now the norm in most societies throughout the world. In many places, older systems are adapting themselves to it; so, for example, an Arabic patronymic or locative name, or a Pakistani honorific such as Begum 'honored lady', may be treated as if it were a Western surname.

A number of variations, exceptions, and additional forms are found, even within societies that use the standard binomial system of personal names. For example, in Europe, as a child grows into adulthood and joins the mainstream of society, any of a variety of hypocoristics (pet forms) may be bestowed on him or her by his or her parents, friends, or schoolmates (*see* **Nicknames**). Subsequently, at the other end of the formality scale, honorifics are acquired in the course of progress through life and education or inheritance (*Mr.*, *Ms.*, *Dr.*, *Sir*). These are normally used with the family name alone (e.g., *Mr. Kelly*, *Herr Schmidt*), but in occasional formal or facetious contexts, they are used with the given name(s) as well (e.g., *Mr. Timothy Patrick Kelly*). There are also variations on conventional nomenclature. In close-knit small communities, for example in rural Ireland, a local doctor may be known as '*Dr. Pat*', coupling an honorific with a hypocoristic form of the given name, while in Britain, at least until about two decades ago, directors of a family firm whose directors all shared the same surname would be known by a combination of an honorific and the given name, e.g., '*Mr. Walter*', '*Mr. Ian*', '*Sir William*'. In French, appellatives can be formed by combining an honorific with a term denoting profession or status, governed by the definite article (e.g., *Monsieur le Maire*, *Madame la Présidente*). In German, the honorific *Doktor* (*Dr.*) is regarded as part of a person's name, and an academic who has acquired not one but two degrees of doctor of philosophy may be known by both of them, e.g., *Herr Professor Dr. Dr. Klein*. Each language and subgroup has its own complex set of protocols governing name use. Different levels of formality are equivalent to different registers in word use.

In some societies, remarkably arcane protocols govern the use of personal names and honorifics among a very small social group (typically, an aristocracy). For example, in England an individual may bear the official name *Percy Wyndham Fotheringay, Earl of Swadlincote* and be known to his friends as *Pooh*. (The example is fictitious, illustrating general principles rather than mentioning a particular individual.) *John, Lord Russell* is to be distinguished in terms of status from *Lord John Russell*. The former would be a lord in his own right, with the 'honor' of Russell, while the latter bears *Lord* only as a courtesy title, because his father is an earl. The official name of such an individual may change dramatically in middle life on the death of a parent or other honor-holding relative, as when the *Marquis of Tavistock* suddenly becomes the *Duke of Bedford* on the death of his father, the previous holder of the superior honor. Some aristocrats bear many honors, depending on the accidents of patronage, heredity, and history. A single individual may be a prince, a duke, a viscount, an earl, and a baron, all rolled into one. The protocols are governed by heraldic officers at the Colleges of Arms in England, Scotland, and Ireland. They date back to the Middle Ages, are associated with colorful pageantry and heraldic symbolism, and are gradually disappearing in today's meritocratic and egalitarian society.

See also: Nicknames; Personal Names; Place Names; Proper Names: Philosophical Aspects; Proper Names: Semantic Aspects; Register: Overview; Rigid Designation.

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Proper Names: Philosophical Aspects

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What Are Proper Names?

Intuitively, we can think of proper names as linguistic 'tags.' In the terminology of John Stuart Mill (1843), although proper names denote, they do not connote; they do not 'imply attributes.' For instance, when a speaker uses the name 'Kripke' to refer to the famous philosopher, he or she does not thereby imply anything about Kripke; he or she simply refers to the man. This intuitive construal of proper names is helpful insofar as it provides a rough idea of what philosophers are theorizing about when they claim to be theorizing about 'proper names.' Nevertheless, Mill's characterization is not uncontroversial for reasons discussed later.

Two Central Issues: Meaning and Reference

Proper names raise two central philosophical questions. First, what is the meaning of a proper name? What (in other words) is its contribution to the meanings of the sentences in which it occurs? 'Vienna' presumably contributes something to the meaning of 'Vienna has great pastries.' What exactly does it contribute? Second, how does a proper name refer? How (in other words) does it 'attach to' its bearer? When I say that 'Rumsfeld is in the news again,' the subject term of the sentence I utter 'picks out' a certain Donald Rumsfeld, thereby enabling me to talk about him. What makes this possible? Some philosophers (including Frege, 1892/1962) believe that an answer to the first question will yield an answer to the second. Let us therefore begin with the first question.

Theories of Meaning

Since the rise of analytic philosophy in the early decades of the 20th century, two theories of meaning have dominated the literature on proper names: Millian and description theories. Description theories are motivated largely by their ability to handle the very sorts of cases that prove problematic for Millian theories. Let us therefore begin with the latter.

Millian Theories

According to Millian theories, the meaning of a name is simply its bearer. In other words, a name contributes its bearer (and only its bearer) to the meaning of any sentence in which it occurs. Thus, Vienna itself is what 'Vienna' contributes to the meaning of 'Vienna has great pastries.' Such theories are called 'Millian' after John Stuart Mill, who (as noted previously) famously claimed that proper names denote but do not connote. Thus, insofar as such expressions can be said to 'mean' anything at all, they mean what they denote.

Contemporary Millians, and philosophers of language generally, often prefer to talk in terms of the 'proposition expressed,' where this is understood as meaning (roughly) what is said by the literal utterance of a sentence. Thus, 'Vienna' is said to contribute Vienna itself to the proposition expressed by any sentence in which that name occurs. Vienna is said to be the 'semantic value' of the name. In this way, Millians can avoid the odd-sounding claim that names 'mean' what they refer to. Names do not 'imply attributes'; they do not 'connote.' In that sense of meaning, names do not mean anything at all. Their semantic function is simply to denote and their denotations are what they contribute to the proposition expressed. Recent advocates of Millianism, both of whom talk in this vein, include Nathan Salmon (1986) and Scott Soames (1987).

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A central virtue of Millianism is its intuitive plausibility. Intuitively, 'Dick Cheney' refers to Dick Cheney without thereby characterizing him in any way. This taglike feature of proper names appears to be what distinguishes such expressions from much of the rest of meaningful language. Ask someone what 'Tucson' means and you might well get a puzzled look followed by (something like) "It doesn't really 'mean' anything, it's the name of a city in Arizona!" In contrast, you might well get a response to a question about the meaning of 'city.' It means (you might be told) something like 'metropolitan area.'

The central objections to Millianism concern special cases that the theory seems unable to accommodate: cases involving identity sentences, propositional attitude attributions, and 'empty' names (names without bearers). These are the very same cases that provide the central motivation for description theories.

Description Theories

Description theories (associated with Frege, Russell, and, more recently, Searle) claim that the meaning of a proper name is the descriptive or (more generally) conceptual content with which it is associated. For Frege (1892/1962), this associated content (which he called 'sense') is the 'mode of presentation' of the object referred to by the name. It represents the speaker's 'take' or perspective on the name's referent. For others (e.g., Russell, 1912/1917) the associated content is said to be a matter of what the speaker 'has in mind' when using a name. Description theorists sometimes talk as though associated content can be captured via a single description, one shared by members of the linguistic community at large (Russell, 1905, 1919). Yet both Frege (1892/1962) and Russell (1912/1917) acknowledged that the associated content could vary from speaker to speaker. For Russell (1912/1917), and perhaps for Frege as well, such content could even vary for an individual speaker over time. According to contemporary descriptivist Searle (1958, 1983), to the extent that the sense of a proper name can be captured linguistically, it is captured by a 'cluster' of descriptions the individual speaker associates with the name.

The virtues of description theories have been much touted in the philosophical literature. Specifically, such accounts appear to solve a variety of puzzles that can be illustrated by the following sentences:

(1) Hesperus is Phosphorus.

(2) Alice believes that Samuel Langhorne Clemens has a funny middle name.

(3) Sherlock Holmes lives on Baker Street.

(4) Santa Claus does not exist.

Sentences such as (1) are known as 'identity sentences,' sentences such as (2) are known as 'propositional attitude attributions' (because they attribute an attitude, such as belief or doubt, to an agent). Sentences (3) and (4) contain 'empty' names, and the latter is known as a 'negative existential' because it denies the existence of something.

Sentences such as these are puzzling on the assumption that Millianism is true. Suppose the meaning of a proper name is simply its bearer. Then (1), if true, is trivially true, and (2) is synonymous with (5):

(5) Alice believes that Mark Twain has a funny middle name.

Whereas (3) is meaningless (due to a subject term without a bearer), (4) is nearly contradictory: If the subject term is meaningful (if it has a bearer), the sentence is false. Intuitively, however, all of this is mistaken. (1) is both true and informative, and (2) and (5) are not synonymous because the former might be true while the latter is false. (3) is meaningful and (4) is not only meaningful but also true. How can this be? Suppose we construe the meaning of a proper name as the descriptive content with which it is associated. Then proper names are, in effect, descriptions. Consistent with this general picture, let us adopt the following stipulations: 'Hesperus' means 'the brightest star in the evening sky,' 'Phosphorus' means 'the brightest star in the morning sky,' 'Samuel Langhorne Clemens' means 'my eccentric neighbor Sam,' 'Sherlock Holmes' means 'the famous London detective featured in the Conan Doyle stories,' and 'Santa Claus' means 'the jolly bearer of Christmas gifts who lives at the North Pole.' Given these assumptions, we can explain the informativeness of (1), the fact that (2) and (5) mean different things, the meaningfulness of (3), and the truth of (4). To see this, one need only substitute for the proper name the description that captures the name's associated content (e.g., 'The brightest star in the evening sky is the brightest star in the morning sky'). The resultant sentences arguably have the same meaning properties as the original sentences – a fact that lends credence to descriptive accounts of proper names. (For details, see Frege (1892/1962) and Russell (1905), the latter of which contains Russell's analysis of the sorts of sentences that result when a proper name is replaced with a definite description.)

Contemporary Millians (including Salmon, 1986) are not impressed by the description theorist's analysis of sentences such as (1)–(5) and have responded that their own theories can easily account for the intuitive data. The basic idea is to claim that the intuitions surrounding such sentences are the result of mistaking what a speaker might communicate by

their utterance with what the sentences themselves literally express (which is just as Millianism claims). Moreover, description theories of meaning are not problem-free. For instance, if a name '*N*' means what some description 'the *F*' means, then why doesn't '*N* is the *F*' (e.g., 'Cheney is the current U.S. vice president') sound as trivial (in 2004) as 'bachelors are unmarried'? (For this and other problems, see Devitt and Sterelny, 1999.)

Theories of Reference

Some philosophers have thought that description theories of meaning can be extended to account for reference. These philosophers advocate description theories of reference, the *locus classicus* of which is Frege's (1892/1962) 'On sense and reference.' Such theories are no longer as popular as they once were. Since the 1970's, causal theories of reference have provided an attractive alternative to description theories. The causal theory (as originally sketched by Kripke in a series of lectures later published as *Naming and necessity* (Kripke, 1980)) arose in large part out of dissatisfaction with description theories. Let us therefore begin with description theories of reference.

Description Theories

According to any such theory, the referent of a proper name is determined by the descriptive content with which it is associated; in other words, the referent is whatever 'satisfies' the associated content. According to some philosophers (Russell, 1905, 1919), the descriptive content can generally be captured linguistically; others (Searle, 1983) disagree. (Here, differences between versions of description theories of meaning are mirrored.)

The motivation for description theories is both intuitive and methodological. Ask a speaker to what he or she is referring when he or she uses a particular name and the speaker will likely provide a description in response. Ask me to what I am referring when I talk of 'Mount Everest' and I might well respond with an appropriate description, such as 'the tallest mountain in the world.' Such intuitive considerations at least suggest that a proper name (as used by a speaker) refers to its bearer in virtue of that entity's satisfying some descriptive criterion associated with the name. The theory also has a clear methodological virtue when coupled with a description theory of meaning. In this way, a single phenomenon (associated conceptual content) explains both meaning and reference.

The central objections to the theory include the following two, both from Kripke (1980). First, a name can refer uniquely to its bearer even if the associated descriptive content is satisfied by more than one object/individual. 'Cicero' refers uniquely to the famous Roman orator also known as 'Tully' even if the associated descriptive content is simply 'a Roman orator.' This suggests that something more than (or other than) associated descriptive content is needed to determine reference. Second, a name can refer to its bearer even if the associated descriptive content is uniquely satisfied by some other object/individual. 'Einstein' refers to the famous German physicist even if the associated descriptive content (e.g., 'the inventor of the atomic bomb') describes someone else (Oppenheimer). This suggests that something other than descriptive content determines reference. (For further objections to the description theory, see Devitt and Sterelny, 1999.)

Many philosophers (but not all, including Searle, 1983) have viewed Kripke's objections to description theories of reference as decisive. As a result, other theories have been developed, including, most notably, causal theories of reference, the first of which was sketched in Kripke's (1980) *Naming and necessity.*

Causal Theories

A causal theory of reference claims that the link between a name and its bearer is (at least generally) causal in nature. Following Devitt and Sterelny (1999), one can think of such theories as (ideally) having two components: a theory of reference 'fixing' and a theory of reference 'borrowing.' The former explains how a name first gets attached to a certain entity; the latter explains how members of the linguistic community at large are subsequently able to use the name to refer to that entity. So construed, causal theories are easily illustrated. My daughter has a Chihuahua named 'Cocoa.' When she first brought him home, she decided to call him 'Cocoa' because of his chocolate color. She proceeded to call him 'Cocoa,' and Cocoa he thereby became. Reference was accordingly 'fixed' and all those present at the initial applications of the name thereby acquired the ability to use the name. The ability was acquired in virtue of having perceived (and thus been causally affected by) these initial applications. My daughter subsequently told her friends about her Chihuahua (using his name to do so) and thereby enabled those same friends to refer to him via 'Cocoa.' In this way, the causal (perceptual) chain of communication, originating in the initial applications of the name, is extended. My daughter's friends can extend the chain further, enabling still others to refer to Cocoa via 'Cocoa,' simply by using his name in their (attentive) presence. Reference is thereby 'borrowed.'

Although reference is generally causal on this picture, exceptions are acknowledged. It is uncontroversial that there are proper names whose reference is fixed by description. As Kripke (1980) noted, when 'Neptune' was introduced into the language by the astronomer Leverrier, its reference was stipulated to be 'the planetary cause of Uranus's orbital perturbations.' (See Evans, 1979, for a discussion of such 'descriptive' names.)

A central virtue of causal theories is that they avoid the problems of description theories. They claim, in effect, that associated descriptive content is irrelevant to reference. A second (no less important) virtue is that such theories provide a simple and intuitive answer to the question, 'How does language attach to reality?' In a word: causality. (See Devitt and Sterelny, 1999, for details.)

Nevertheless, causal theories are not without their problems. Gareth Evans, in his classic paper 'The causal theory of names' (1973), presented a telling objection to the theory, as originally sketched by Kripke. According to Evans, the causal theory fails to account for the fact of reference change. As Evans pointed out, 'Madagascar' once referred to a portion of the African mainland, but now it refers to the island. Evans argued that the causal theory cannot explain how such changes could occur. (But see Devitt and Sterelny, 1999, for a compelling rejoinder.) In developing an alternative that accounts for reference change, Evans was led to a hybrid theory, one that combines elements from both descriptive and causal theories.

Hybrid Theories

According to Evans's hybrid theory, a name refers to the dominant causal origin of the descriptive information with which it is associated. The intuitive pull of the theory is easily illustrated. Suppose a tattered and centuries-old manuscript is discovered. On its cover is emblazoned the name 'Melford Bibbins.' The manuscript is widely discussed among academics, and its author, known to all as 'Melford Bibbins,' becomes famous for his controversial philosophical views. Intuitively, the individual being referred to is the author of the manuscript, even if it turns out that 'Melford Bibbins' was the name of the scribe to whom the author dictated his work. Evans's theory gets it right: the author of the manuscript is the causal origin of the descriptive information associated with the name and thus the name's referent. The scribe is not the referent, although he is (by hypothesis) the individual at the origin of a causal chain that began with the introduction of the name 'Melford Bibbins' into the language. It would be a mistake to suppose that reference can be explained here via associated descriptive content. Suppose that such content (*the proponent of such-and-such crazy philosophical views*) misconstrues the author's actual views but coincidentally describes precisely the views of some unknown hermit living somewhere in the Appalachian Mountains. In such a case, the author of the manuscript (the intuitive referent of the name) does not satisfy the associated content. Nevertheless, he is arguably the causal origin of that content insofar as he produced the work that generated it.

Devitt and Sterelny (1999) also advocated a hybrid theory. They claimed that reference fixing, to be successful, must involve a conceptual element. If you see a rock but think it is a tortoise and attempt to dub it 'Slow Poke,' reference fixing fails. They called this the 'qua-problem' and solved it by supposing that in order to fix the reference of a name, the speaker must have an accurate (if general) concept of the intended bearer.

Other Expressions

Philosophers often appeal to other expressions in developing their theories of proper names. They do so for (at least) two reasons: to clarify their theories and to provide methodological motivation for those theories. When a contrast is observed, clarification is generally the motivation. When a similarity is noted, promotion of the theory's generality is often the motivation.

Definite Descriptions

Definite descriptions are expressions of the form 'the *F*,' such as 'the current vice president of the United States.' How do these expressions compare with proper names? Millians generally argue they are importantly different: descriptions refer via satisfaction (or 'denotation'). Names refer directly, not in virtue of associated descriptive content. (For this reason, Millian theories are sometimes referred to as 'direct reference' theories.) Russell, in contrast, argued that proper names are 'disguised' definite descriptions and thus subject to the quantificational rendering provided by his theory of descriptions (1905). Frege (1892/1962) similarly treated definite descriptions as semantically of a piece with proper names, claiming that both sorts of expressions have their reference determined by their associated conceptual content (or 'sense').

Natural Kind Terms

Natural kind terms are terms that refer to kinds of things found in nature – 'water,' 'tiger,' and 'lemon' being stock examples. How do these expressions

compare with proper names? Kripke (1980) suggested that these expressions are much like proper names: their reference is not determined by any associated conceptual content but by causal chains of the sort that link proper names to their bearers. These same ideas were developed by Putnam (1975) and later and in greater detail by Devitt and Sterelny (1999).

See also: Proper Names: Semantic Aspects.

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Proper Names: Semantic Aspects

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What Is a Proper Name?

Proper names are terms for denoting specific individuals or individual groups, with personal names being the most typical. In every society each person has at least one personal name, and in large technological societies, a family name as well.

Proper Names and Proper Nouns

In some languages, e.g., English, some classes of proper names, such as personal given names and certain place names, can be syntactically distinguished from common nouns by the absence of a determiner and plural, such as *Ann Smith* rather than *the Ann Smith*. In other languages, like German, proper names may be preceded by the definite article, as in *die Anna, der Hans* and Spanish *La Señorita Lopez*. Family names in English are often used with the plural and article, such as *the Smiths live here*. Certain classes of place names typically occur with articles, for instance rivers, *he lives near the Mississippi River*. Moreover, even with singular personal names, there are productive rules for treating such expressions as classes as in *I know three Ann Smiths. Which Ann Smith are you talking about?* There are also productive rules for converting proper names referring to specific individuals into common nouns: *Ann Smith is more of a Florence Nightingale than a Marie Curie*.

Personal Name Inventories

Most languages have an inventory of given personal names. In English and other European languages, these items have no meaning. In some case a meaningful etymon might be found, but speakers are not generally aware of this. Names for children are selected according to the parents' preferences, or perhaps a child is named after someone else in the family. However, in some societies, names are taken from the common vocabulary, and that meaning constrains

compare with proper names? Kripke (1980) suggested that these expressions are much like proper names: their reference is not determined by any associated conceptual content but by causal chains of the sort that link proper names to their bearers. These same ideas were developed by Putnam (1975) and later and in greater detail by Devitt and Sterelny (1999).

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the name use. For example, in Japanese *Kazuhiko*, meaning 'firstborn,' is a possible name for the first-born son. Among the Akan of Ghana, children are given names based on the day of the week of their birth (Boadi, 1984). *Kofi,* 'born on Friday,' is an example, as Kofi Annan was born Friday, April 8, 1938. Among the Gengbe, also know as Mina, spoken in southern Togo, there is a specific name for each son and daughter born to a woman, based on birth order. For example, *Poovi* is the name given to the fifth daughter.

Gender-Specific Names

Most names are gender specific. Tanz has identified three common patterns: (a) names may be gender specific and phonologically unrelated to a corresponding name of the other gender, such as *Thomas* or *Susan.* (b) A masculine name can serve as a stem to which feminine suffixes can be added; from *Paul* can be formed *Paula, Paulette,* and *Pauline*. Often the feminine suffix occurs on common nouns as well, as French *-ette* or Japanese *-ko*, meaning 'little.' (c) A name can be formed from a neutral stem to which both masculine and feminine suffixes are added, as in Latin, where feminine *-a* and masculine *-us* could be added to most name stems, for example, *Claudia, Claudius,* and *Julia, Julius*. The fourth potential pattern of adding a masculine suffix to a feminine name, e.g., **Susanus,* does not occur. Sometimes the gender specificity of a name may shift, but the direction is from masculine to feminine. *Shirley* was formerly a man's name but is now a woman's name.

In some languages, e.g., Chinese, personal given names are taken from the common vocabulary, and gender specificity can be found here as well, with boys' names taken from words with meanings of strength and courage and girls' names taken from words for beauty and gracefulness (Tanz, 1982).

Change in Name Popularity

Lieberson (2000) examined the changing fashions in first names given to girls and boys in the United States and in Britain, and other European countries. Until the end of the 19th century, naming customs were stable, and there was little change in the names given to infants or to the naming principles, such as naming the oldest son after the father. Then new names started to appear among the most popular names, and this trend accelerated. Lieberson found that *Mary* was among the top 10 most popular girls' names from 1906 through 1969 and was the most popular name for 27 of those years in California, but it is no longer popular. *Jennifer* did not appear in the top 100 names until 1952, appeared in the top 20 in 1965, and from 1970–1982 was the most popular name for girls; it still remains popular. *Kelly*, however, was in the top 20 only from 1970 until 1975.

Boys' names are more conservative. *John, James, Michael, David, Robert*, and *William* have remained in the top 10 during the 20th century in California. Yet there has been considerable change in naming boys as well. *Eric* and *Jeffrey* were in the top 20 first in 1965, but dropped out by 1980.

Nicknames

One subclass of personal names is nicknames, and in English there are three primary principles of nicknaming. First of all, a nickname can be constructed from the common vocabulary where a word selected is appropriate for the specific individual. For example, a person with red hair might have *Red* as a nickname, or a short person might be called *Shorty.* Nicknames are often used ironically, however, so *Shorty* might be given to a very tall person. In Australia, *Blue* is a common nickname for red-headed males. The second nicknaming principle is a conventional relationship between names and nicknames, though this relationship is many-many rather than one-one. Conventional nicknames for *Elizabeth* are *Betty, Bess*, and *Liz*; for *Robert* they are *Bob, Rob, Bobby,* and even *Bert*. However, *Bobby* is also a nickname for *Roberta* and *Barbara*. The line between formal given names and nicknames is obscured because many nicknames are used as legal names. In the southern U.S. states it is common to name boys *Jimmy* or *Bobby.* The third principle, which overlaps with the second, is to add the diminutive suffix *-y* or *-ie* to the name or to part of the name: *Annie, Maddy,* and *Keithy* are nicknames for *Ann, Madeleine* and *Keith* respectively.

Personal Names for Roles

Some names function as generics, often as vocatives. Examples are *George* for a railway porter in a sleeping car in American English, *Maria* for a female street peddler in Mexico, and *Mack* in addressing a stranger (e.g., *Hey, Mack, you forgot your card*). Generic names are also used to make general reference more concrete, as in *She'll go out with any Tom, Dick, or Harry who asks her.* Names like *John Doe* and *Jane Doe* are used in court cases in the United States to protect the identities of those involved.

Proper Names That Shift to Common Nouns

The shift from proper nouns to common nouns is not unusual, especially where the common noun denotes something associated with the name, for example, something invented by that person (*shrapnel,*

sandwich), or named in honor of someone, like the bakery products *bismark* and *napoleon*. This shift is productive. One can call someone a *Rembrandt*, a *Shakespeare*, or a *Beethoven* to imply that he or she is a great artist, writer, or composer, presumably in any style. However to call someone a *Picasso* or a *Schoenberg* is likely to suggest an artist or composer of a particular style, e.g., cubist art and atonal music.

Names for Things Other Than Persons

Although the most salient things that receive proper names are individual people and places, other things are named as well, generally individual creatures and objects that are identifiable and important. Included in this category are domestic animals, especially pets; important architectural objects like large buildings, bridges, and highways, and in some places, houses; swords (in heroic epics), important events such as wars, and important weather phenomena like hurricanes. Many of these things are named by words and phrases taken from the common vocabulary, but they are proper names, nevertheless. Alternative expressions that might be equally appropriate are not the correct names. For example, the *Franco-Prussian War* and the *War of 1812* could have been called the *War of 1870* and the *Franco-English War*, but these latter names are wrong. In each of these domains there are conventions or at least patterns of naming, which vary across cultures (see Carroll, 1985).

Animal Names

Names for cats and dogs tend to be single words, compared to names for racehorses, which tend to have two or three names. Cat and dog names are commonly drawn from the stock of human first names (e.g., *Fred*), from descriptions (*Fluffy, Smoky*), or after famous people (*Cleopatra, Plato*). Names with ethnic associates are found for breeds from specific places. A German shepherd might be called *Hans* and a Russian wolfhound *Boris* (see Taggart, 1962). There is a small inventory of dog names: *Spot, Rover, Fido*, which are found in cartoons. Racehorses have names that connote speed and winnings, such as *Lucky, Lucky, Lucky* or *Winning Streak*.

Names for Rock Bands

Names of rock groups are often unconventional, sometimes even outrageous and offensive. A large class of names deal with death, such as the *Grateful Dead, The Dead Kennedys, Overkill, Slayer, Suicidal Tendencies*, *Death Cab for Cutie*, and the *Trail of Dead*. Other common categories are drugs (*Pot Leaf, Alcoholica),* dangerous animals (*King Cobra, Scorpions*) weapons (*U–2),* abnormality (*Misfits, Atrophy*, *Brain Damage* and *Disturbed*) and a variety of other negative and/or weird names, like *Widespread Panic, the New Pornographers*, *Puddle of Mudd*, and the *Goo Goo Dolls.*

Street Names

Street names follow patterns that vary from country to country. In the United States streets are typically named after famous people, geographical features, trees, presidents, places (cities, states, and islands), numbers and letters. They are not named after dates for important events, however, a practice that is common in Mexico. When numbers or letters are used, they conform to numerical order (of whole positive integers) and the order of the alphabet.

Brand Names

Brand names are often considered to be a subclass of proper names because they are written with capital letters, but syntactically they act like common nouns: for example, *He used to buy only Buicks, but now he has a Chevrolet*. Semantically, they do not refer to unique individuals but to classes of objects or to mass substances. However, brand names are like proper names in that they are consciously and carefully selected, and moreover, unlike personal names, they can be copyrighted so that no one else can use them. Names for automobile makes and models provide an interesting domain. In the United States popular sources for cars are names for animals associated with strength, speed, and grace (*Cougar, Lark, Falcon*), attractive places, especially resort areas (*Biarritz, Riviera, Monte Carlo*), astronomical objects (*Comet, Pulsar, Galaxy, Mercury*), meteorological objects (*Tempest, Cyclone, Duster*), and racetracks (*Grand Prix, Le Mans, Daytona, Sebring*).

Brand names are one of the few areas of the vocabulary where words are coined from scratch, and names like *Xerox*, based on Greek *xeros* (ξηός) 'dry' (copying) and *Kodak* with eye-catching spelling appear. Firms are also careful to select appropriate sounding names, drawing on principles of sound symbolism (Bolinger, 1980).

Alternative Names

Actors and singers sometimes take stage names (Lieberson, 2000: 6):

Stage names	Original Name
Woody Allen	Allen Konigsberg
Fred Astaire	Frederick Austerlitz
Tony Bennett	Anthony Benedotto

Victor Borge	Borge Rosenbaum
Joan Crawford	Lucille LeSueur
Doris Day	Doris van Kappelhoff

Often stage names were used to avoid the prejudice connected with the ethnicity of the original names or to make the stage name sound more attractive or maybe just shorter. Virginia Patterson Hensley took the stage name Patsy Cline. Alice Cooper (originally Vincent Furnier) chose an inappropriate name (genderwise), but heavy metal rock bands, like their names, are often deliberately unconventional. Many performers go by only one name: Cher, Madonna, Prince, Ann-Margaret, Hildagard.

Writers like George Eliot and Georges Sand presumably chose masculine *noms de plume* to avoid the prejudice against women writers of their time.

Place names may be changed for political reasons. St. Petersburg, Russia, was renamed Leningrad in 1924 and then returned to its earlier name in 1991 after radical political changes. The central African country and river called the Congo were renamed Zaire from 1971 under the dictatorship of Mobutu Sese Seko, but the earlier name was restored after he was ousted from power in 1997.

Cognates and Translations

Given names of name inventories in various languages have cognates, names whose phonology differs because of independent sound changes in the different languages. Latin *Petrus* became *Peter* /ˈpiˈtə/ or /ˈpiˈtɚ/ in English, *Pedro* /ˈpɛdro/ in Spanish, and Pierre /pjɛˈʁ/ in French. Place names, too, are different because of sound change. English *Vienna* and *Paris* are *Wien* /vijn/ in German and /paˈʁi/ in French, respectively.

Different languages/cultures have different traditions in translating names. The U.S. president's residence, the *White House*, is translated into French as *La Maison Blanche* and German as *Weisshaus*. But in Japanese, it is only transliterated into Japanese orthography. In English, Chinese place names like *Forbidden City* and *Temple of Heaven* are translated, whereas *Tiananmen* meaning 'heavenly peace' remains *Tiananmen Square*.

Movie titles are not necessarily translated, and when they are, translations are not always literal. The German film *Der Krieger und die Kaiserin* was translated into English as *The Warrior and the Princess*, although *empress* is the standard equivalent of *Kaiserin*. At other times completely different titles are chosen, which although related to the movie, are unrelated to the original title. The American film *Truth and Dare*, for example, appeared in Austria as *In Bett mit Madonna*, while *Calamity Jane* has the French title *La Blonde du Far West*.

Philosophical Aspects of Names

Philosophers of language have been especially interested two questions: (1) What is the meaning of a proper name? and (2) What is the mechanism by which a proper name refers? With respect to (1), some philosophers deny that names have any sense, whereas other claim that the meaning of a name is what it refers to. As for (2), there are two well-known approaches: the causal theory and the description theory. The causal theory (Kripke, 1980; Devitt, 1981) says that a name refers to its bearer by virtue of a causal chain of communication that originates typically in a perceptual dubbing of an individual or object, exceptions being nonexistent names like *Minerva* or *Sherlock Holmes*). The descriptive theory (Russell, 1905; Searle, 1960) links names with descriptions, but not necessarily with any unique description. There are also hybrid theories.

Recanati's position draws on the virtues of both positions. Although he basically takes the nondescriptive position, he says that when an object is known only by its description, as say *Jack the Ripper*, we may anticipate that that the object will come to be known in a more direct manner (1993: 183). Proper names in thought or in encyclopedia entries, however, may indeed be presented descriptively, but there is no unique or constant mode of presentation.

The causal theory works best for naming people we know or know of and can identify, such as Martin Luther King, for whom we can imagine an entirely different history. The descriptive theory is most suitable when the referent has not been identified, or for names and individuals whose existence has been questioned, such as Homer or Moses. The descriptive theory is also appropriate for fictional characters in art and literature (*see* **Proper Names: Philosophical Aspects**).

Once one moves beyond personal names and looks at names for products, businesses, and organizations, then the meaning of the words used in the names becomes relevant. In such cases, the appropriateness of the name is constrained by the meaning.

See also: Proper Names: Philosophical Aspects.

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Prophecy

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Prophets have been known by many titles (e.g., *shaman* [Tungus], *nābîʾ* [Hebrew], *muḫḫû* (Akkadian), *prophētēs* [Greek]) and in diverse cultures, both ancient and modern. These religious figures who speak or act on behalf of a deity have often been distinguished from other types of intermediaries (e.g., priests or diviners), though such distinctions often blur. Prophets functioned at various places in a society. They could address both governmental and religious officials as well as private individuals. Moreover, they could function at either the center or the periphery of a society.

The behavior of prophets could result in the creation of literature (oral and/or written), the most well known of which is preserved in the Hebrew Bible. Other important exemplars derive from ancient Mesopotamia (both the Old Babylonian and Neo-Assyrian periods). Such literature may stem either from the hand of the prophet or from another person, sometimes an epigone. Literature reflecting the activity of prophets occurs in both prose and poetry. Important biblical examples of the former include the divination chronicle (Zech. 1:18–21), vision report (Zech. 1:18–21), biography (Jer. 37–44), legend (2 Kings 4:1–7), symbolic action report (Isa. 20:1–6), commissioning report (Jer. 1:4–10), and prophetic historiography (Isa. 36–39).

Poetic texts are particularly prominent in biblical prophetic literature. They are of two basic types: divine oracle, in which the deity speaks in the first person (e.g., Jer. 8:18–19), and prophetic saying, in which the prophet speaks about the deity in the third person (e.g., Isa. 27:3). Ancient prophets often appropriated forms of discourse from within their societies. Amos apparently knew the language of ancient legal systems and formulated oracles that included both an indictment and judgment. Amos 2:4 charges the audience with religious malfeasance whereupon Amos 2:5 offers a sentence of national destruction. Prophets could also adapt traditional forms of speech in new and ironic ways. Amos 5:1–3 uses the vocabulary and poetic style of a funeral to inveigh against the society of ancient Israel.

Study of prophetic literature has proceeded in diverse ways:

1. Early critical scholarship focused on the question of what portions of biblical prophetic literature constituted the *ipsissima verba* of an individual prophet. Those portions not deemed to be genuine were viewed as of minimal significance. More recently, scholars have analyzed the formation of the literature, recognizing that the final form of prophetic texts reflected the social and religious

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realities of a later period as well as the conditions in which the utterances were initially spoken.
2. Scholars continue to compare prophetic texts of one culture with those from other settings. For example, recent publication of Akkadian texts attests the preserving of more than one oracle on a clay tablet. Such practice marks the transition from archival preservation of one oracle to the creation of prophetic literature, i.e., the arranged composition of multiple oracles and sayings. Such compositions are observable in both biblical and extrabiblical texts.
3. Study of the rhetorical and literary features of prophetic texts is currently of great interest, particularly as such study has been informed by new understandings of Hebrew poetry.

See also: Akkadian; Bible.

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Propositional and Predicate Logic: Linguistic Aspects

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Introduction

Logic is defined by two key notions, entailment and calculus. More precisely, a logic is a calculus for the derivation of entailments. Entailment is a relation between assertive sentences or, rather, between propositions expressed by assertive sentences. (Henceforth, the term 'sentence' is used for 'assertive sentence.') Entailment for sentences is defined as follows:

> A sentence or a set of sentences P **entails** a sentence Q (P⊨Q) just in case whenever P is true, Q must of necessity also be true, on account of the meanings of P and Q – that is, for analytical reasons.

There is an immediate complication, however. Strictly speaking, it is not sentences that are true or false but, rather, their utterance tokens and their underlying propositions. It is impossible to say whether the English sentence *Jack arrived late* is true or false as long as the person called *Jack* and the time referred to are not specified. The vast majority of natural language sentences are occasion sentences in the sense that they contain a number of parameters that must be given specific values in the world spoken about before there can be talk of truth or falsity. The values for such parameters in one sentence together we call the 'key' of the sentence in question. Only a properly keyed sentence can function as an utterance token with a truth value. It is true that there are sentences, called 'eternal sentences,' that can do without a specific key, such as *all humans are mortal*. These are to be considered marginal cases whose key is the universe as a whole. Starting with Aristotle, the logical tradition has preferred to avoid the complications caused by the keying condition and has, in principle, developed logics only for eternal sentences. Only recently has there been a greater awareness that such a limitation is not fruitful.

Since the vast majority of sentences are occasion sentences, the entailment relation, when defined for sentences, must be defined *modulo key* – that is, with reference values kept constant. Under this condition it can be said that *Jack has been killed* entails *Jack is dead* because it is in the meaning of the predicate *be killed* that whoever has been killed is of necessity dead. Propositions, by contrast, if taken to be token occurrences of mental acts in which a property is assigned to one or more objects, are keyed by definition and thus do not need the *modulo key* condition. The analyticity condition remains unchallenged: When a proposition P entails a proposition Q, it does so in virtue of the cognitively defined meanings of the predicates in any linguistic expressions of P and Q.

The analyticity condition must be clearly distinguished from other conditions that justify the drawing of a conclusion. For example, *Jack was shot in the heart* does not entail *Jack died* because, even though Jack's death is a direct consequence of his being shot in the heart, this is not a semantic but a physical

realities of a later period as well as the conditions in which the utterances were initially spoken.
2. Scholars continue to compare prophetic texts of one culture with those from other settings. For example, recent publication of Akkadian texts attests the preserving of more than one oracle on a clay tablet. Such practice marks the transition from archival preservation of one oracle to the creation of prophetic literature, i.e., the arranged composition of multiple oracles and sayings. Such compositions are observable in both biblical and extrabiblical texts.
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consequence, brought about not by the semantic description of the predicates in question but by physical causation. To be able to draw the corresponding conclusion we need world knowledge, not knowledge of the language.

Most entailments are *intuitive* in that they are based on speakers' knowledge of their language. Some entailments, however, can be made *formal* in that they can be computed with the help of a calculus. When that is the case, we have a logic. Every logical system distinguishes between its logical constants and its variables. In propositional calculus, for example, the logical constants are the words *and*, *or*, *if*, and *not* and the variables range over linguistically expressed propositions. In standard first-order predicate calculus, the logical constants are those of propositional calculus plus the words *all* and *some*, and the variables range over predicates and individuals. The logical constants define the calculus.

The notion of logic was discovered in Plato's Academy, mainly by Aristotle (384–322 B.C.E.), who began as a student and later became a prominent member of the Academy. He discovered that the negation word *not* functions differently according to whether the subject term is or is not quantified. The sentence *Plato does not live in Athens* is true whenever *Plato lives in Athens* is false, and vice versa, the former sentence being equivalent to 'it is not true that Plato lived in Athens.' Here, the negation is full sentential, or external, negation. But in, for example, *some Greeks do not live in Athens,* the negation cannot be external because both this sentence and *some Greeks live in Athens* can be true at the same time. The difference is that in the latter pair of sentences the subject term is quantified, whereas in the former pair it is a referring expression. Apparently, in sentences with a referring expression as subject term it makes no truth-conditional difference whether the negation is external or internal, but in sentences with a quantified subject term it does. This discovery intrigued Aristotle and some of his fellow students. It eventually resulted in what is now known as Aristotelian-Boethian Predicate Calculus (ABPC), a form of predicate logic due in the first place to Aristotle but remodeled (and to some extent spoiled) by later commentators, especially the Roman-Christian philosopher Boethius (ca. 475–524 C.E.).

Predicate Calculus

ABPC, like standard modern logic, is restricted by a few overarching principles. First there is the *Principle of Contradiction*, which says that no sentence can be true and false at the same time. Then comes the *Principle of Bivalence*, which says that every sentence is either true or false, with nothing in between and no further truth values. A further restriction, applying throughout, is the *Principle of Extensionality*, which restricts the applicability of logic to really existing, actual objects, eliminating all virtual objects (*see* **Virtual Objects**), such as Sherlock Holmes or the Golden Mountain, which have been thought up by creative minds.

Table 1 Boethius's sentence types

A: All *F* is *G*	**E**: All *F* is not-*G* ≡ No *F* is *G*
I: Some *F* is *G*	**O**: Some *F* is not-*G* ≡ Not all *F* is *G*

The Principle of Contradiction seems firmly rooted in cognition and language, but the other two principles, although universally accepted nowadays, are open to doubt. Presuppositional phenomena, in particular, strongly suggest that the Bivalence Principle does not fit the facts of language (*see* **Presupposition**). And the Principle of Extensionality is clearly inadmissible in any logico-semantic analysis of human language, which quantifies with equal ease over actual and virtual objects (*see* **Virtual Objects**). This last complication is allowed to rest in the present context.

Under the principles given, the (external) negation *not*, or ¬, is a toggle between truth values: if P is true, ¬P is false, and if ¬P is true, P is false; ¬¬P is equivalent to P (¬¬P ≡ P). P and ¬P are called Contradictories. Given the principles mentioned and the definition of *not* (¬) just given, it follows that when P ⊨ Q, then ¬Q ⊨ ¬P – an entailment schema known as *Contraposition*.

As regards ABPC specifically, Boethius distinguished four sentence types, the types **A** and **I** (from Latin *affirmo* 'I affirm') and **E** and **O** (from Latin *nego*, 'I deny'), defined as in Table 1 (the variables *F* and *G* range over predicates). ABPC is then defined by the following entailment schemata. Sentences of type **A** entail sentences of type **I**, and those of type **E** entail those of type **O**. Formally: **A** ⊨ **I** and **E** ⊨ **O**. These are known as the *subaltern entailments*. Moreover, both **I** and **O** entail 'there is at least one *F* – an entailment known as *existential import*. Given the entailment **A** ⊨ **I**, it follows that **A** and ¬**I** cannot be true simultaneously, although they may be false together: they are *contraries*. Aristotle himself added the entailments from *some F is G* to *not all F is not-G* and from *all F is not-G* to *no F is G* (Kneale and Kneale, 1962: 57). However, his later commentators, especially Boethius, went further and added the converses of these two entailment schemata: from *not all F is not-G* to *some F is G* and from *no F is G* to *all F is not-G,* thereby creating the now standard *conversions* that allow conversion of *all* into *some,* and vice

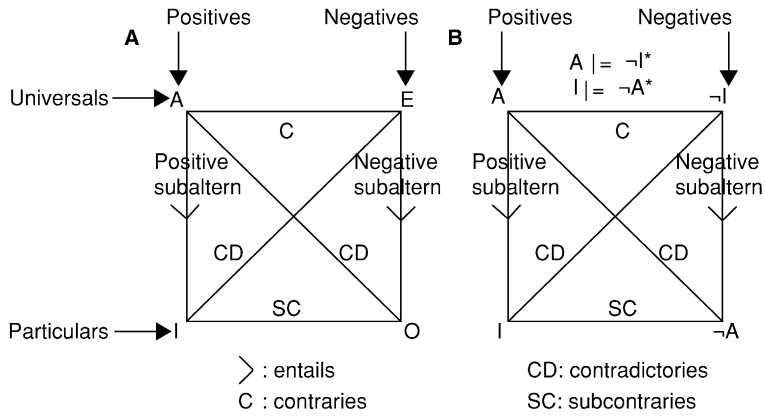

Figure 1 (A) ABPC and (B) AAPC represented as Squares of Oppositions.

versa, provided both an external and an internal negation are added (or removed). Now *all F is G* and *no F is not-G*, and *some F is G* and *not all F is not-G* are equivalent. With the conversions added, it follows that **I** and **O** cannot be false together, although they can be simultaneously true; they are subcontraries.

ABPC is known in the traditional form (due to Boethius) of the *Square of Oppositions*, shown in Figure 1A. Aristotle's original system, called Aristotelian-Abelardian predicate calculus (AAPC), is shown in Figure 1B (the asterisk stands for internal negation: **A*** is *all F is not-G*; **I*** is *some F is not-G*).

It is important to insist on the difference between ABPC and AAPC because ABPC contains a logical fault that is absent in AAPC. This fault becomes visible when we consider a world (such as ours) without any mermaids. In such a world, the sentence *all mermaids swim* must be either true or false, owing to the Bivalence Principle. If it is true, *some mermaids swim* must also be true (subaltern), from which it follows, contrary to fact, that there are mermaids (existential import). But if it is false, then *not all mermaids swim* is true and entails (by conversion) *some mermaids do not swim*, which likewise entails (by existential import) that there are mermaids, again contrary to fact. Therefore, *all mermaids swim* can be neither true nor false when there are no mermaids, which violates the Bivalence Principle. The problem with ABPC is, thus, that it cannot deal with situations in which the *F*-class is null: only when the *F*-class is nonnull are the subaltern entailments applicable. This goes against the very notion of logic because entailments are valid not in virtue of world contingencies but in virtue of meanings. This logical fault is called *undue existential import* (UEI).

To repair this fault, standard modern predicate calculus (SMPC) was developed by mathematical logicians such as Boole, Frege, Peano, and Russell during the late 19th and early 20th centuries. SMPC is indeed free from this, or any other, logical fault and is now universally accepted as the one and only sound predicate calculus, which must be embodied in human language if that can lay claim to logical soundness. This deeply ingrained belief, however, is unwarranted.

To see what is at issue it is useful to go back into history. That ABPC is logically faulty was not entirely unknown to medieval philosophers. Peter Abelard (1079–1142), in particular, had seen the fault and restored Aristotle's predicate logic to its original form (hence the name AAPC; see Seuren, in preparation). Yet his (and Aristotle's) way of avoiding UEI was never taken up by the logical tradition, which stuck to the faulty Boethian system until the advent of modern logic. Had the tradition been more attentive, it would have seen not only that the Aristotelian-Abelardian system is logically sound but also that it has much greater logical power than SMPC. This question is worth unraveling.

Despite its long tradition, the Square of Oppositions is not a very good way of representing ABPC because it expresses neither the conversions nor the role of internal negation. A better representation is shown in Figure 2A, where the symbols **E** and **O** have been eliminated in favor of external (¬) and internal (*) negation. The analogous representation of AAPC is given in Figure 2B. Figures 2A and 2B show two logically isomorphic triangles, each with the vertices **A**, **I**, and ¬**I**, one with and one without the internal negation. In each triangle, the three logical relations are entailment, contradiction, and contrariety. The figures differ in that Figure 2A has the conversions, whereas Figure 2B has the one-way entailments of AAPC, and AAPC lacks the relation of subcontrariety.

A *valuation space representation* (Van Fraassen, 1971) shows why logical relations hold. The valuation space (VS) /P/ of a sentence P is the set of situations, in the universe of situations **U**, in which P is

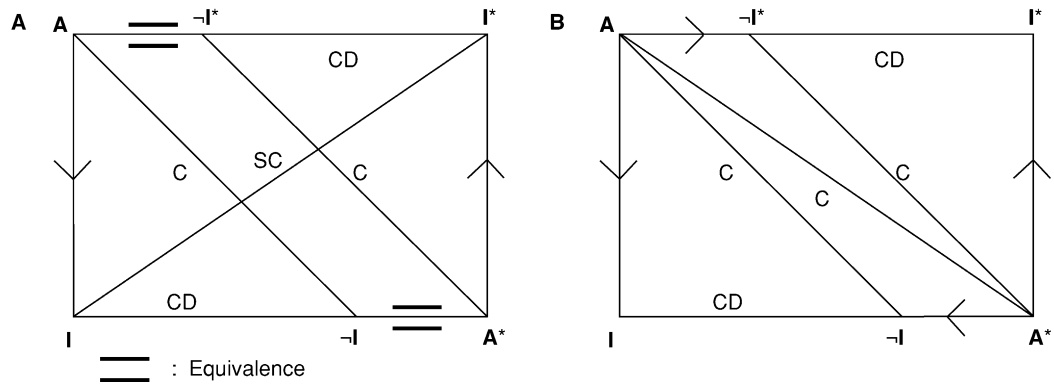

Figure 2 Improved representations of (A) ABPC and (B) AAPC.

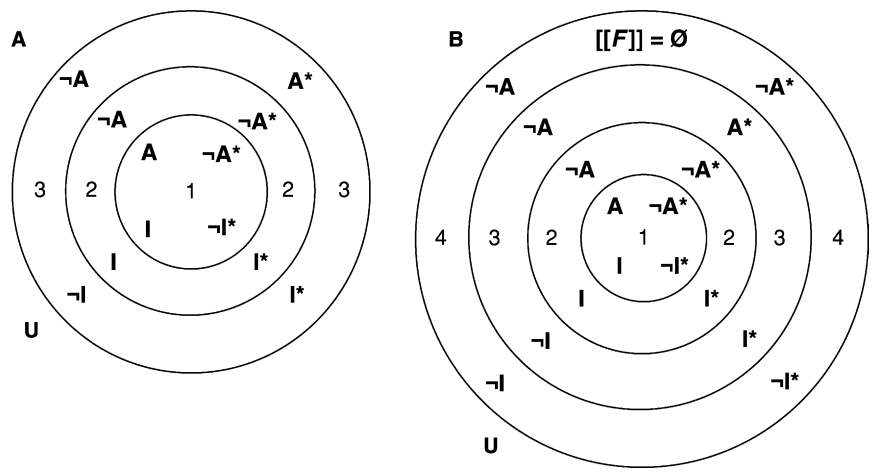

Figure 3 The VS models for (A) ABPC and (B) AAPC.

true (*modulo* key). Logical relations can be read from VS models:

When /P/ ⊆ /Q/, P ⊨ Q.
When /P/ = /Q/, P ≡ Q.
When /P/ ∩ /Q/ = Ø, P and Q are contraries.
When /P/ ∪ /Q/ = **U**, P and Q are subcontraries.
When /P/ ∩ /Q/ = Ø and /P/ ∪ /Q/ = **U**, P and Q are contradictories.

ABPC is represented in Figure 3A and AAPC in Figure 3B.

ABPC lacks a space for cases in which the extension of the *F*-predicate is null ([[*F*]] = Ø), which makes its applicability dependent on the contingent condition that [[*F*]] ≠ Ø, but AAPC has space 4 for the situations in which [[*F*]] = Ø. In these situations, the four sentence types, **A**, **I**, **A***, and **I*** are all deemed false.

The VSs of the eight sentence types are read from Figure 3 as shown in Table 2. In both systems, the subalterns hold from **A** to **I** because {1} ⊆ {1,2}, and from **A*** to **I*** (or, for AAPC, ¬**A**) because {3} ⊆ {2,3} (or {2,3,4}). But AAPC lacks the subaltern from ¬**I** to **I*** because {3,4} ⊈ {2,3}. The conversions do not hold in AAPC because ¬**I*** ⊭ **A**, as {1,4} ⊈ {1} and ¬**I** ⊭ **A***, as {3,4} ⊈ {3}. The contraries have remained intact in AAPC, except for the pair ¬**I** and ¬**I***, because {3,4} ∩ {1,4} ≠ Ø. Subcontrariety between **I** and **I*** has been lost in AAPC because {1,2} ∪ {2,3} ≠ **U**.

SMPC presents a solution to UEI based on a direct interpretation of *all* as set-theoretic inclusion and of *some* as set-theoretic intersection: *all F is G* is interpreted as [[*F*]] ⊆ [[*G*]], and *some F is G* as [[*F*]] ∩ [[*G*]] ≠ Ø. When [[*F*]] = Ø, *all F is G* is true because the null set Ø is included in any set. **A** and **A*** sentences are thus taken to be true when [[*F*]] = Ø, which allows the conversions to remain intact. This solution, which depends on the interpretation of *all* as inclusion and of *some* as intersection, may be convenient for the logic of mathematics but lacks any linguistic necessity. Given Boolean algebra and standard set theory, we are free to interpret *all* and *some* in different terms. For example, *all* may be defined as yielding truth on condition that [[*F*]] ⊆ [[*G*]] and that [[*F*]] ≠ Ø. This, in fact, appears to correspond more closely to the way the meaning of *all* is defined in natural language than the simple condition that [[*F*]]

Table 2 VS Models of eight sentence types

ABPC		*AAPC*	
/**A**/	= {1}	/**A**/	= {1}
/**I**/	= {1,2}	/**I**/	= {1,2}
/**A***/	= {3}	/**A***/	= {3}
/**I***/	= {2,3}	/**I***/	= {2,3}
/¬**A**/	= {2,3}	/¬**A**/	= {2,3,4}
/¬**I**/	= {3}	/¬**I**/	= {3,4}
/¬**A***/	= {1,2}	/¬**A***/	= {1,2,4}
/¬**I***/	= {1}	/¬**I***/	= {1,4}

$\subseteq [[G]]$, which fits the facts of language badly. The VS model of SMPC is as in Figure 4.

This shows that almost all entailment relations are lost: the subalterns are gone, as are the contraries and subcontraries. All that has remained is the contradictories and the conversion equivalences. This makes SMPC extremely impoverished compared with either ABPC or AAPC.

It also makes SMPC redundant for the use of language because, when $[[F]] = \emptyset$, the truth value of all eight sentence types considered follows automatically from the theorems of standard set theory. This is so because, for any sets X and Y, $X \subseteq Y$ when $X = \emptyset$, and $X \cap Y = \emptyset$ when X or Y or both equal $\emptyset$. When the class of situations where $[[F]] = \emptyset$ is excluded from SMPC, the truth value of the eight sentence types becomes contingent on circumstances, which makes the corresponding sentences informative. Because the logic that results when the situations where $[[F]] = \emptyset$ are eliminated is identical to ABPC, natural language has a functional interest in ABPC. Such an elimination affects only the semantics of *all*: **I** and **I*** sentences are unaffected by the condition that $[[F]] \neq \emptyset$. It follows that if ABPC can be upheld without the logic becoming unsound, the information value of expressions containing the quantifier *all* will be greatly enhanced. The question is whether natural language can manage to maintain ABPC while keeping its logic sound.

In general, if the semantic description of certain words turns out to be such that they allow for a logical calculus, then that calculus is the logic of language. To find out what the logic of language amounts to, we should, therefore, investigate the meanings of possible logical constants and see what calculus results. For predicate calculus, the logic of language is thus defined by the linguistically given lexical meanings of the words *all*, *some,* and *not*.

It seems that language has outsmarted the logicians by making sentences context-sensitive, using the device of presupposition (*see* **Presupposition**), which restricts the informative use of sentences to consistent contexts, in which the presuppositions of the

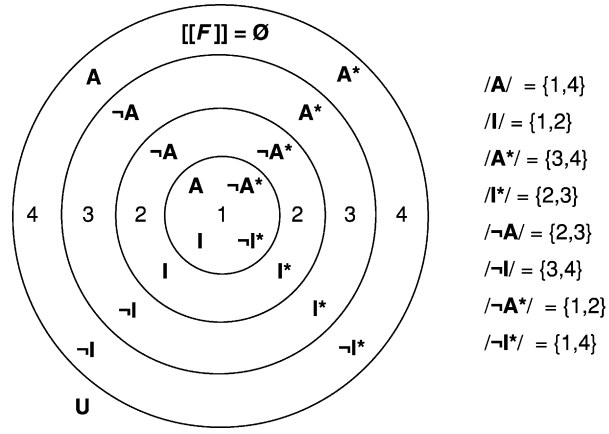

Figure 4 The VS model for SMPC.

sentences in question are stored as preliminary information. The truth of a sentence co-depends on the truth of its presuppositions as stored in the embedding context. If they are not all true, the sentence is false in a special way, called 'radically falsity,' which implies the falsity of at least part of the embedding context and, hence, the futility of the sentence itself in that context. Radical falsity (F2, written as $\simeq$) constitutes a third truth value in addition to truth (T) and minimal falsity (F1, written as $\sim$; *see* **Multivalued Logics**). Thus, if the lexical meaning of *all* is made to incorporate the condition that $[[F]] \neq \emptyset$ as a precondition for informative use in a consistent context, ABPC is allowed to apply again in full force, but only within the confines of a situation in which $[[F]] \neq \emptyset$. In situations that do not satisfy that condition, the use of *all* will result in radical falsity. Although no such provision is required for the lexical meaning description of *some*, as previously mentioned, **I** and **I*** sentences are still radically false when $[[F]] = \emptyset$ because the *Principle of Extensionality* amounts to the presuppositional requirement of actual existence for the reference values of the terms of the *G*-predicate. This *presuppositional predicate calculus* (PPC) is represented in Figure 5, where the bold circle delineates the area of applicability of traditional bivalent ABPC. Space 4 is useful not only as a logical safety net but also in speech to mark a sentence as being unfit for the current discourse. This is done with the help of the radical negation NOT, emphatically accented, which makes itself useful in language as a metalinguistic discourse corrector, as in *all mermaids do* NOT *swim; there* ARE *no mermaids!*

It thus seems that SMPC should be rejected as a candidate for the status of 'logic of language.' This in itself is a momentous conclusion given the almost universal, yet false, belief that no other consistent predicate logic is possible. There is, however, a redeeming feature. Had it not been for SMPC, the

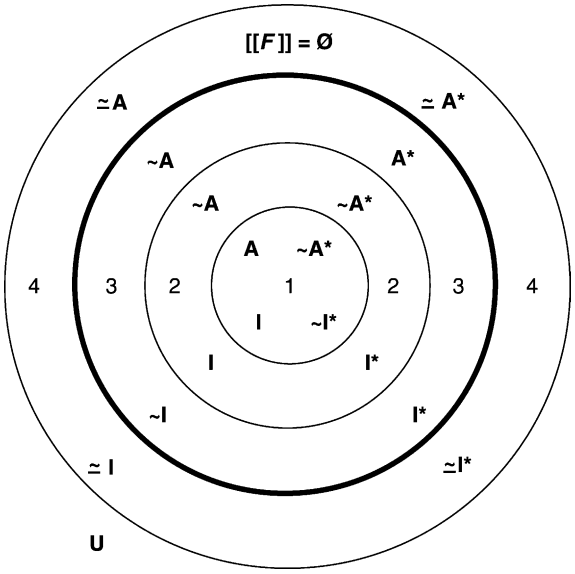

Figure 5 The VS model for PPC.

logical language of predicate calculus ($L_{PC\text{-}Peano}$) in which it is formulated would not have existed. After a first unsuccessful attempt at a logical language in Frege (1878), PL_{PC} was created by Giuseppe Peano around 1900 and adopted by Alfred Whitehead and Bertrand Russell in their *Principia Mathematica* of 1910–1913. Since then, $L_{PC\text{-}Peano}$ has become the stock in trade of all logic.

The main innovation of $L_{PC\text{-}Peano}$ consisted in the introduction of separate symbols for *all* (∀) and *some* (∃) as variable binders in propositional functions. A propositional function is a propositional sentence in $L_{PC\text{-}Peano}$ with at least one term missing – that is, filled by a variable. Thus, if Bald(Jack) is a propositional sentence with a truth value, Bald(x) is a propositional function that will be true or false when a value is filled in for the variable x. Quantifiers such as ∀ and ∃ are a further way of turning a propositional function into a propositional sentence. The universal quantifier ∀ turns a propositional function into a sentence with a truth value, in that it requires for truth that any arbitrary value for x (within the defined range of x) will yield truth. The existential quantifier ∃ produces truth when at least one value for x yields truth. A sentence such as *All humans are mortal* is rendered in $L_{PC\text{-}Peano}$ as (1a), and *Some humans are mortal* is rendered as (1b). The symbol → stands for the material implication 'if . . . then', and ∧ stands for the conjunction 'and'. Both full propositional sentences and propositional functions can be negated and placed under any binary propositional operator.

(1a) $\forall x(\text{Human}(x) \rightarrow \text{Mortal}(x))$
('for all x, if x is human, x is mortal')

(1b) $\exists x(\text{Human}(x) \wedge \text{Mortal}(x))$
('there is an x such that x is human and x is mortal')

Example (1a) is true when any arbitrary value for x makes it true. If the value of x is not human but, say, a tree, then the whole implication is automatically true. If for all *human* values of x it turns out that they are also mortal, then (1a) is true. Falsity for (1a) can thus be brought about only by one or more values for the variable x that are human but not mortal – so-called counterexamples. For the truth of (1b), it is required that there be at least one x such that x is both human and mortal.

$L_{PC\text{-}Peano}$ makes it possible to treat sentences with more than one argument term and to quantify each such term. Thus, a sentence such as *Every boy gave some present to some girl* can be rendered as (2) (disregarding tense):

(2) $\forall x(\text{Boy}(x) \rightarrow \exists y(\text{Present}(y) \wedge \exists z(\text{Girl}(z) \wedge \text{Give}(x, y, z))))$
('for all x, if x is a boy then there is a y such that y is a present and such that there is a z such that z is a girl and x gives y to z')

For the analysis of quantification in natural language sentences, however, this 'translation' method is now widely considered inadequate, mainly because it cannot be used for quantifiers such as *most* or *half*. For this reason, Barwise and Cooper (1981) decided to adopt the notion of *generalized quantifier*, introduced in Mostovski (1957). The actual logic, in the sense of a system of entailment schemata, is not affected by this innovation, which is merely syntactic. In the syntax of this modified logical language $L_{PC\text{-}Mostovski}$, a quantifier is a binary higher order predicate – that is, a binary predicate over sets, not over individuals. Instead of writing (1a) and (1b), we now write (3a) and (3b), respectively; (2) is now rendered as (3c):

(3a) $\forall x(\text{Human}(x), \text{Mortal}(x))$
('the set of humans is included in the set of mortals')

(3b) $\exists x(\text{Human}(x), \text{Mortal}(x))$
('there is a nonnull intersection of the set of humans and the set of mortals')

(3c) $\forall x(\text{Boy}(x), \exists y(\text{Present}(y), \exists z(\text{Girl}(z), \text{Give}(x, y, \text{to } z))))$
('the set of boys is included in the set of those individuals a such that for each a there is a nonnull intersection of the set of presents and the set of objects b such that there is a nonnull intersection of the set of girls and the set of persons that a gives b to')

$L_{PC\text{-}Mostovski}$ fits both the syntactic and the semantic facts of language remarkably well and is now widely

used in philosophical, semantic, and logical studies of language. It is important to realize that the syntax of a logical language is to a large extent independent of the precise semantics of the quantifiers and the negation: The language may stay the same while the semantic description of the operators involved varies, and vice versa. The main question regarding the logic of language is now no longer the syntax of the logico-semantic 'translations' of sentences because $L_{PC\text{-}Mostovski}$ has so far proved adequate. The main problem still outstanding is, rather, the precise semantic description of whatever logical constants are detected, in particular the words *not*, *all*, *some*, *and*, *or*, and *if*. (*May* (*can*) and *must* are likewise plausible candidates for the status of logical constants in a modal logic, and other candidates may yet be discovered.) So far, the syntax of $L_{PC\text{-}Mostovski}$ has proved highly successful not only as regards the expression of the logical properties of propositions, but also for the purpose of relating its expressions to surface sentences in natural languages. It has vastly extended the scope of the logical analysis of natural language sentences and is probably the greatest contribution made by modern logic to the logico-semantic analysis of natural language.

Propositional Calculus

In propositional calculus, the most current logical constants are *not*, *and*, *or*, and *if* ... *then*. The variables, say *P*, *Q*, *R*, ..., range over propositional sentences. Propositional calculus was developed in the Greek world by Stoic philosophers during the 3rd and 2nd centuries B.C.E. (Łukasiewicz, 1934). *Not* is standardly symbolized as ¬ and is the bivalent truth-value toggle described here. *And* is standardly written as ∧, *or* as ∨, and *if* ... *then* as →. The semantics of these constants (operators) is usually given in terms of the truth tables shown in Figure 6.

Strictly speaking, the material implication operator → is superfluous because $P \rightarrow Q \equiv \neg P \vee Q$. Yet it is usually specified as a separate operator rendering natural language *if* ... *then*. That it does not do so has been known for two millennia, yet it continues to figure in logic textbooks as a translation of *if* ... *then*.

Of greater logical importance is the fact that the logic of *and* and *or* is isomorphic with the logic of *all* and *some* in ABPC. When $P \wedge Q$ stands for **A**, $P \vee Q$ for **I**, $\neg P \vee \neg Q$ for **A***, and $\neg P \vee \neg Q$ for **I***, there is full isomorphism. The following notation is used:

AND: $P \wedge Q$	**OR**: $P \vee Q$
¬AND: $\neg(P \wedge Q)$	**¬OR**: $\neg(P \vee Q)$
AND*: $\neg P \wedge \neg Q$	**OR***: $\neg P \vee \neg Q$
¬AND*: $\neg(\neg P \wedge \neg Q)$	**¬OR***: $\neg(\neg P \vee \neg Q)$

Propositional calculus can now be represented as the Square of Oppositions of Figure 7A. The VS model for propositional calculus is as in Figure 7B, which is isomorphic with Figure 3A. The 'conversions' in predicate calculus correspond to the *De Morgan's laws* in propositional calculus; they convert ∧ into ∨ and vice versa, provided both an external and an internal negation are added (or removed): $\neg(P \wedge Q) \equiv \neg P \vee \neg Q$, and $\neg(P \vee Q) \equiv \neg P \wedge \neg Q$.

It has often been observed that the universal quantifier is somehow related to *and* and the existential quantifier to *or*. This relation is usually spelled out by saying that *all F is G* is equivalent to '$G(f_1) \wedge G(f_2) \wedge G(f_3) \wedge \ldots$', and that *some F is G* is equivalent with

A

P	¬P
T	F
F	T

B P ∧ Q

Q:	T	F
P: T	T	F
F	F	F

C P ∨ Q

Q:	T	F
P: T	T	T
F	T	F

D P → Q

Q:	T	F
P: T	T	F
F	T	T

Figure 6 Standard truth tables for ¬, ∧, ∨, and →.

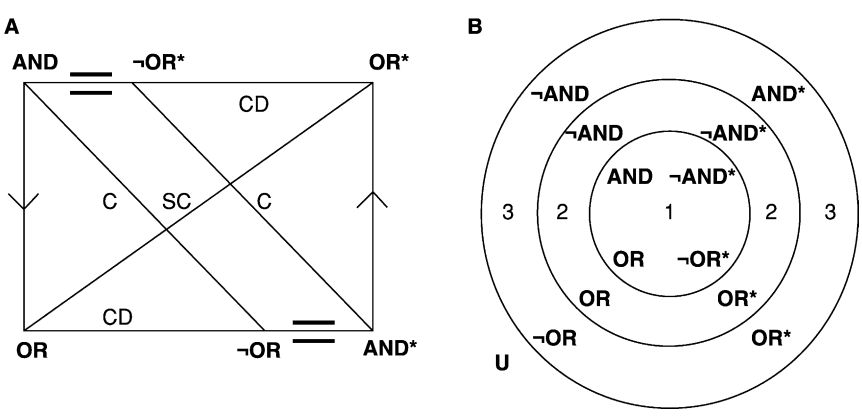

Figure 7 (A) Square and (B) VS model for standard propositional calculus.

A

P	~P	≃P
T	F1	F1
F1	T	F1
F2	F2	T

B

P ∧ Q			
	Q:	T	F1	F2
P:	T	T	F1	F2
	F1	F1	F1	F2
	F2	F2	F2	F2

C

P ∨ Q			
	Q:	T	F1	F2
P:	T	T	T	T
	F1	T	F1	F1
	F2	T	F1	F2

Figure 8 Truth tables for Presuppositional Propositional Calculus (PPC).

'$G(f_1) \vee G(f_2) \vee G(f_3) \vee \ldots$', until all members f_n of $[[F]]$ have been enumerated. Yet this is only so if $[[F]] \neq \emptyset$. If $[[F]] = \emptyset$ there will be neither a conjunction nor a disjunction of its members. In general, since ABPC was rejected in favor of SMPC, which had its logic reduced to the conversions, the obvious parallelism of $\forall$ with $\wedge$ and of $\exists$ with $\vee$ has been more of an embarrassment than of a help to logicians. Yet, if ABPC can be restored to its traditional position, the isomorphism of ABPC with propositional calculus will be a reason for looking further into logical systems with such properties as ABPC and propositional calculus have in common.

Unlike ABPC, propositional calculus is not logically faulty. It does not need a fourth space because there is no null class to cater for. Yet it can be made trivalent so as to cater for presuppositions (Seuren *et al.*, 2001). The minimal, presupposition-preserving negation ($\sim$) toggles between T and F1 and yields F2 in cases of presupposition failure. The radical presupposition-canceling negation ($\sim$) yields T only in cases of presupposition failure and yields F1 otherwise. (The standard negation $\neg$ is equivalent with the disjunction of minimal and radical negation: $\sim P \vee \simeq P \equiv \neg P$.) Conjunction ($\wedge$) selects F2 over F1 and T, and F1 over T; disjunction ($\vee$) selects T over F1 and F2, and F1 over F2, as shown in Figure 8.

When the logic of language is seen as being defined by the semantic descriptions of the logical constants involved, an entirely new perspective on logic emerges, one that has so far hardly been explored.

See also: Aristotle and Linguistics; Extensionality and Intensionality; Multivalued Logics; Presupposition; Virtual Objects.

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Propositional Attitude Ascription: Philosophical Aspects

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Paradigmatic **propositional attitude ascriptions** (in English) are sentences of the form **A V**s **that S,** where **A** is a singular definite noun phrase referring to a rational agent, **S** is a sentence, and **V** is a propositional attitude verb. Paradigmatic propositional attitude verbs include 'believe', 'doubt,' 'realize,' 'hope,' 'regret,' etc. Such verbs refer to **intentional mental states** with **representational content**, where this content can be evaluated for truth or falsity, and thus can be identified with a **proposition**. (What are sometimes called *verbs of saying*, e.g., 'say,' 'deny,' 'announce,' are closely related to, but typically distinguished from, propositional attitude verbs.) Because propositional attitude verbs refer to intentional states with propositional content, it is natural to endorse a **relational analysis** of propositional attitude ascriptions: an assertion of 'John hopes that Mary won' says that the referent of 'John' bears the mental relation (or *attitude* in Russell's 1940 terminology) referred to by 'hopes' toward the proposition expressed by the complement clause 'that Mary won.' Similarly, an assertion of

A

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F1	T	F1
F2	F2	T

B P ∧ Q

	Q:	T	F1	F2
P:	T	T	F1	F2
	F1	F1	F1	F2
	F2	F2	F2	F2

C P ∨ Q

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'John doubts that Tom is happy' says that John bears a different relation, viz. doubting, toward a different proposition, viz. that Tom is happy.

Analytic philosophers have been, and continue to be, concerned to formulate an adequate semantic analysis of propositional attitude ascriptions for several reasons. One reason stems from philosophers' desire to understand the nature of mental states. What is, e.g., a belief? Is the existence of beliefs compatible with **physicalism**? If not, then should we be **eliminativists** about mental states, and deny that they really exist, or should we reject physicalism in favor of some sort of **dualism**? How can a mental state **represent** things as being a certain way? i.e., what is it for one entity to be **about** another? Does having a belief require one to instantiate some sort of internal representational state (as **cognitivists** claim), or is it merely a matter of being disposed to behave in various ways (as **behaviorists** claim)? Whatever view one adopts toward these broader philosophical issues concerning the nature of mental states must be compatible with an adequate semantic analysis of how we talk about such states.

Another reason, perhaps the principle reason, philosophers are concerned with propositional attitude ascriptions stems from the close relationship between natural language and thought, and the apparent **compositionality** exhibited by both. What we can think is what is expressed by utterances of declarative sentences; if what we think are **thoughts**, and if what is expressed by utterances of declarative sentences are propositions, then what we think are propositions. Moreover, philosophers have argued that in order to explain the **productivity, interpretability,** and **systematicity** of language, and thus thought, some sort of **principle of semantic compositionality** must hold for language, and thus thought (see Frege (1914) and Davidson (1965) for appeals to productivity and interpretability. See Evans (1982) and Fodor (1998) for appeals to systematicity. Frege also appealed to compositionality to explain the **unity of the proposition**. See Frege (1891 and 1892b). Consequently, many analytic philosophers have endorsed some version of the following **principle of semantic compositionality**:

> The proposition expressed by a sentence S in a context c is a function of (i) the **logical form** of S, and (ii) the **semantic values** invoked by S in c.

(The relativization to context is necessary to account for sentences containing **context sensitive** words.) The reason that philosophers interested in language and thought have been especially concerned with propositional attitude ascriptions is that these sentences provide apparent counterexamples against this otherwise well-motivated principle; this is known as the **opacity** problem for attitude ascriptions. The focus of my remarks here will be on the opacity problem and influential proposals for its solution.

Consider the classic case of the hapless ancient astronomer: He used 'Hesperus' to refer to the first heavenly body to appear at dusk, and 'Phosphorus' to refer to the last heavenly body to disappear at dawn. But he did not realize that these names are coreferential; they both refer to Venus. Now consider the following attitude ascriptions:

(1) The astronomer believed that Hesperus was visible at dusk.

(2) The astronomer believed that Phosphorus was visible at dusk.

Given the astronomer's ignorance of the identity of Hesperus and Phosphorus, (1) is true and (2) is false. But that (1) and (2) differ in truth value is at least an apparent counterexample to the compositionality principle: If it is granted that (1) and (2) have the same logical form, and that the semantic value contributed by a word is its referent, then, given that 'Hesperus' and 'Phosphorus' are coreferential, semantic compositionality seems to require that (1) and (2) express the same proposition, and thus cannot differ in truth value. The opacity problem is sometimes called *substitution failure*: in (1) 'Phosphorus' cannot be substituted ***salva veritate*** for 'Hesperus.' Linguistic environments in which coreferential terms cannot be substituted ***salva veritate*** are known as **opaque**, as opposed to **transparent**, contexts.

Responses to the opacity problem can be divided into **conservative** proposals and **radical** proposals. Conservative proposals attempt to preserve the principle of semantic compositionality by somehow explaining away the apparent counterexamples. Conservative proposals can be subdivided into **semantic** conservative proposals, which appeal to the **meanings** of expressions to explain away the apparent counterexamples, and **pragmatic** conservative proposals, which appeal to how expressions are **used.** In contrast to conservative proposals, **radical proposals** accept the apparent counterexamples provided by attitude ascriptions, and thus reject the principle of semantic compositionality and offer alternative conceptions of semantics in its place.

To propose a **semantic conservative solution** to the opacity problem, then, is to provide an account of semantic values, and how they are invoked and combined, which preserves the above principle of compositionality yet explains why, e.g., (1) and (2) express different propositions. If the datum that (1) and (2) express different propositions is granted, and it is granted that (1) and (2) have the same logical form, then the general strategy one must adopt is clear: one

must argue that (1) and (2) somehow invoke additional, extrareferential, semantic values. Semantic conservative proposals all have this general strategy in common; where they differ is over **what** they take the requisite additional semantic values to be, and over **how** attitude ascriptions invoke different such additional semantic values.

The first, and probably most influential, semantic conservative proposal was presented by Frege (1892a). Indeed, Frege was the first to clearly formulate the opacity problem, and most subsequent work on the problem is a development of, or response to, Frege's seminal paper. A key feature of Frege's proposal is the thesis that words embedded in the complement clauses of attitude ascriptions **shift referents**; when words occur embedded in such **opaque** contexts, their semantic values are not their 'ordinary referents,' but are instead more finely individuated entities, which Frege called 'indirect referents.' Frege posited abstract objects he called **senses** to serve as indirect referents. A sense of a word is alleged to be a 'mode of presentation' of the referent of the word (if the word has a referent). To return to the hapless astronomer, Frege would say that the referent, Venus, is presented to the astronomer in two different ways; one of these ways is the sense of 'Hesperus,' and the other is the sense of 'Phosphorus.' The astronomer fails to recognize that Hesperus is Phosphorus because he fails to realize that these different modes of presentation are in fact modes of presentation of, or ways of thinking about, the same referent. If it is granted that 'Hesperus' and 'Phosphorus,' though coreferential, nonetheless express different senses, then, because of referent shifting, (1) and (2) invoke different semantic values. And consequently, that these sentences express different propositions, and have different truth values, is no threat to semantic compositionality.

Many theorists endorse Frege's thesis that words embedded in the complement clauses of attitude ascriptions shift referents, yet, influenced by broader philosophical commitments, they reject senses, the abstract objects Frege posited to serve as indirect referents. Other sorts of entities posited to serve as indirect referents include **intensions** (Montague, 1974), sentences (Carnap, 1946), and **mental representations** (Fodor, 1978). All theories which allow for referent shifting, however, face a common difficulty: As Quine (1956) noted, attitude ascriptions are ambiguous (or at least context sensitive). For some utterances of attitude ascriptions, what is relevant for determining truth conditions is simply the referent of an embedded word, rather than the word, or some other sort of indirect referent. And for these so-called ***de re*** utterances of attitude ascriptions, Frege's referent shifting thesis is inappropriate. But, as Frege noted, for other, so-called ***de dicto***, utterances of attitude ascriptions, it seems that something other than the referents of embedded words is relevant for determining truth conditions. It is now widely accepted that in different contexts the same attitude ascription (sentence type) can express different truth conditions; in particular, some utterances of, e.g., the type of (1) are ***de re*** (or **transparent**), while other utterances like (1) are ***de dicto*** (or **opaque**).

The recognition of the context sensitivity of attitude ascriptions has led philosophers to add complexities to the semantic conservative strategy. Quine (1956) proposes that, if propositional attitudes are to be countenanced at all, propositional attitude verbs ought to be treated as ambiguous between a **relational** (***de re***) sense, and a **notional** (***de dicto***) sense. More recent proposals build on Carnap's (1946) theory, and identify indirect referents not with words, but with abstract structures composed of both words and their ordinary referents (relative to a context) combined. These Carnap-inspired theories attempt to account for the context sensitivity of attitude ascriptions by allowing what is necessary for an agent to hold the relevant mental relation to the combined entity to vary across contexts (see Richard, 1990 and Higginbotham, 1991).

Thus far, I have reviewed semantic conservative proposals that follow Frege in maintaining that words in complement clauses of attitude ascriptions shift their referents; where the proposals discussed thus far have differed from each other concerns **what** the additional semantic values are. Other semantic conservative proposals, however, disagree with Frege not only concerning **what** the requisite additional semantic values are, but they also reject Frege's referent shifting thesis. An early alternative to Frege's indirect reference strategy was proposed by Russell (1919). Russell's proposal preserves the simple idea that semantic values are **always only** ordinary referents, but he achieves this result at the cost of allowing the **logical form** of a sentence to differ significantly from its **surface form**. According to Russell, what appear to be referring terms, e.g., 'Hesperus' and 'Phosphorus,' are merely abbreviations for "denoting phrases" composed of quantifiers and unpronounced genuine referring terms; Russell called these posited unpronounced genuine referring terms "logically proper names." According to Russell then, despite appearances, Venus is not the referent of any genuine referring term in the logical form of either (1) or (2). Rather, the apparent names 'Hesperus' and 'Phosphorus' abbreviate denoting phrases comprised of different, noncoreferential, logically proper names. Thus, that (1) and (2) express different propositions is

not a counterexample to semantic compositionality, because, according to Russell, the sentences invoke different semantic values. (Not surprisingly, Russell never presents a full reduction of an apparent name into a denoting phrase comprised of logically proper names.)

A more recent proposal similar in spirit to Russell's is the "hidden indexical" analysis (see Schiffer, 1977 and Crimmins, 1992). This proposal maintains that the additional semantic values required for distinguishing the propositions expressed by utterances of (1) and (2) are the referents of 'hidden' – phonologically unrealized – indexical items that are somehow present in the logical form, but not in the surface form, of the sentence. Crimmins takes the posited hidden indexicals to refer (in contexts) to "mental particulars," token mental representations that, similar to Frege's senses, are ways of thinking of ordinary referents. The hidden indexical analysis thus does not deny that, e.g., Venus is a semantic value invoked by both utterances (1) and (2), because Venus is the referent of both 'Hesperus' and 'Phosphorus.' But that such utterances express different propositions is nonetheless not a counterexample to semantic compositionality because the presence of hidden indexicals allows the utterances to invoke different mental particulars as 'unarticulated' semantic values.

Another influential semantic conservative proposal that rejects referent shifting is Davidson's (1968) "paratactic" analysis of indirect speech. Davidson proposes that an indirect speech report with the surface form 'A said that S' has the logical form of **two** sentences: first, 'A said **that**,' and second, 'S.' The word 'that' in the first sentence is interpreted as a **demonstrative**, and in an utterance with the surface form 'A said that S,' the demonstrative refers to the subsequent **utterance** of 'S.' Thus, in Davidson's proposal, the additional semantic value invoked by an utterance of an indirect speech report is the very act of uttering the sentence embedded in the complement clause. According to Davidson's proposal, an utterance with the surface form 'A said that S' is true just in the case the agent referred to by 'A' performed an utterance that is relevantly similar to the referent of 'that,' where this referent is the **utterance** of the embedded 'S.' Davidson applied his analysis only to indirect speech reports, but others, such as Lepore and Loewer (1989), have extended Davidson's analysis so that it applies to attitude ascriptions.

Whereas semantic conservative proposals accept that, e.g., (1) and (2) express different propositions and attempt to reconcile this datum with the principle of semantic compositionality, **pragmatic conservative proposals** reject the datum and thereby undermine the apparent counterexample to semantic compositionality. According to pragmatic conservative proposals, (1) and (2) do not present a counterexample to compositionality because, despite our pretheoretic judgments to the contrary, they do not express different propositions, and they do not differ in truth value. Support for this seemingly implausible strategy comes from two principle sources: First, there are influential arguments due to Kripke (1972) and Kaplan (1977) in support of the **thesis of direct reference**, according to which the only semantically relevant feature ever associated with some terms – names, demonstratives, and indexicals being the paradigmatic cases – is the referent of the term. The thesis of direct reference thus entails that, e.g., utterances (1) and (2) express the same proposition. Second, there is Grice's (1975) distinction between **what is said** by an utterance and **what is merely implied** by an utterance. According to Grice, **what is said** is the domain of **semantics** and thus must conform to the compositionality principle, while **what is implied** is the domain of **pragmatics**, and thus need not conform to the principle. According to the pragmatic conservative strategy then, utterances (1) and (2) semantically say the same thing, but they pragmatically imply different things. And our pre-theoretic judgment that utterances (1) and (2) say different things is a result of our naively conflating **semantically expressed** information with **pragmatically implied** information. Pragmatic conservative proposals are developed by Salmon (1986) and Soames (2002).

In contrast to **conservative proposals** which attempt to preserve semantic compositionality by somehow explaining away the at least apparent counterexamples posed by attitude ascriptions, **radical proposals** accept the counterexamples and reject semantic compositionality. Given the fundamental role that the principle of compositionality has played in semantics and analytic philosophy generally, a theorist who endorses a radical proposal must provide an alternative conception of what it is to provide a semantic analysis. Moreover, this alternative conception must be at least compatible with the phenomena of **productivity**, **interpretability**, and **systematicity**. One sort of radical proposal falls within the broader movement known as **Radical Pragmatics**. Radical Pragmatics is characterized by the thesis that the linguistic meaning associated with an utterance underdetermines what is said by the utterance; i.e., knowing the logical form of an utterance and knowing the referents of all the words (or other relevant features) does not suffice for determining what is said by the utterance; in order to arrive at something truth-evaluable, additional processing is required. **Relevance Theory,** as proposed by Sperber and Wilson (1986), is a

paradigmatic example of Radical Pragmatics. Thus, from the perspective of Radical Pragmatics, it is not particularly problematic that utterances (1) and (2) express distinct truth conditions. A version of Radical Pragmatics is applied to attitude ascriptions in Bach (1997).

Another sort of radical proposal falls within the broader movement known as **Dynamic Semantics**. According to Dynamic Semantics, the semantic content of a declarative utterance is not a truth–evaluable proposition, but rather linguistically encoded general instructions (i.e., a 'context change potential') for updating the set of beliefs shared between the speaker and his audience (i.e., the 'common ground'). To determine **what is said** by an utterance, one must apply the linguistically encoded general instructions to the set of shared beliefs. Thus, **what is said** depends not only upon the logical form of the uttered sentence and the semantic values of the words in it, but also upon what the shared beliefs of the speaker and his audience happen to be. A paradigmatic example of Dynamic Semantics is **Discourse Representation Theory,** as proposed by Kamp and Ryle (1993). Because utterances (1) and (2) encode different instructions for updating sets of shared beliefs, **what is said** by such utterances (relative to the same set of shared beliefs) can differ. Thus, from the perspective of Dynamic Semantics also, it is not particularly problematic that such utterances are interpreted as expressing distinct truth conditions. This sort of dynamic approach is applied to the phenomenon of opacity in Asher (1993).

See also: Functional Discourse Grammar; Indexicality: Philosophical Aspects; Metaphysics, Substitution Salva Veritate and the Slingshot Argument; Semantic Value.

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Propositional Attitudes

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Talking about people's states of mind is difficult for various reasons. The most interesting from the linguistic point of view is the problem of the identity of meaning between the clause uttered by a reporter about someone's state of mind and the sentence that the holder of this state would use to express it. Such reports are normally composed of a *that*-clause expressing a proposition toward which the attitude is held and an assignment of an attitude such as belief, doubt, or fear to a person, as in (1).

(1) Tom believes that Peter Carey is a great novelist.

Conceiving this standard form to express a relation between a person and a proposition, Bertrand Russell called such states propositional attitudes, and the term has remained in common philosophical and linguistic parlance ever since, in spite of the fact that the problem of the object of propositional attitudes (variously regarded as a proposition, sentence, thought, constituents of a proposition, etc.) is still widely disputed in the literature.

Reporting on people's beliefs gives rise both to theoretical and practical problems. In other words, it is interesting not only from the semantic and pragmatic point of view but also from the perspective of an average language user who wishes to make an accurate statement. For example, if the believer utters (2), the reporter may have doubts whether the believer understands the statement or merely repeats a half-understood astronomical statement. Alternatively, the reporter may not be in a position to report on the belief faithfully and with understanding, due to not knowing what the statement is about.

(2) Red giants become white dwarfs.

These discrepancies between the knowledge base of the believer and that of the reporter, as well as the practical difficulty with assessing how much the believer actually knows about the referent, lead to common problems with belief ascription.

Another problematic case is when the believer is referentially mistaken and uses a name or description that does not refer to the intended individual. In (3), the believer may have, for example, Pablo Picasso, a Spanish painter, in mind:

(3) The best Italian painter painted this picture.

Moreover, belief can also be ascribed on the basis of nonlinguistic evidence. Sentence (4) can be uttered of someone carrying an umbrella on a sunny day:

(4) He believes it is going to rain.

In practice, the reporter assumes that the believer has a clear idea what or who he or she is talking about. However, if there are reasons for doubt, the reporter has to assess all the relevant contextual information before making a report in order to make the report valid.

In the philosophy of language, it has been widely assumed that propositional attitude reports are ambiguous between the transparent reading and the opaque reading. Sentence (5a) has two semantic interpretations, (5b) and (5c), that correspond to the wide and narrow scope of the existential quantifier, respectively.

(5a) Tom believes that the king of France is bald
(5b) $\exists x\ (KoF(x)\ \&\ \forall y\ (KoF(y) \supset y = x)\ \&\ Bel_T\ Bald\ (x))$
(5c) $Bel_T\ \exists x\ (KoF(x)\ \&\ \forall y\ (KoF(y) \supset y = x)\ \&\ Bald\ (x))$

In these examples, Bel_T stands for 'Tom believes that' and *KoF* stands for 'king of France' (see also Russell, 1905, 1919; Quine, 1956; Neale, 1990). When the reporter means (5b) by (5a), he or she ascribes to Tom a belief about a particular, known individual (*de re*). When he or she means (5c) by (5a), the reporter says that Tom believes in the existence of the king of France and ascribes to him a certain property (*de dicto*). The reading in (5b) is transparent and in (5c) opaque, for the reasons to become clear in what follows. However, these logical forms cannot express the complexities of belief ascription. When Tom is referentially mistaken and the reporter is aware of it, he or she may substitute a correct description or name, as in (5d), where *KoS* stands for 'king of Sweden'.

(5d) $\exists x\ (KoS(x)\ \&\ \forall y\ (KoS(y) \supset y = x)\ \&\ Bel_T\ Bald\ (x))$

So, there does not seem to be a strict ambiguity here from the perspective of utterance interpretation. Nor do the logical forms here capture the extent of the problem with the varieties of *de re* and *de dicto* beliefs and *de re* and *de dicto* (roughly corresponding to transparent and opaque) reports. The interpretations of (5a) have to resort to pragmatics. But before venturing into pragmatic processing, let us focus on the logical form that is the starting point for the application of such processes.

The *de re*/*de dicto* distinction has to be kept apart from the distinction between factive and nonfactive attitudes and factive and nonfactive attitude verbs. Factives are verbs that give rise to a proposition whose truth entails that the proposition expressed by the *that*-clause is itself true. For example, *A knows that p* entails that *p* is true. Nonfactives,

such as *believe* or *think*, do not require that the embedded proposition be true. Moreover, verbs such as *wish* or *imagine* are sometimes said to belong to a third category, called counterfactives (or contrafactives), in that they can be construed as entailing the falsity of the embedded proposition. Nonfactives, in particular the verb *believe*, have been the most widely studied of all. This is because *de dicto* nonfactive reports do not, by definition, carry the truth entailment of the embedded proposition and hence express various degrees of detachment from the proposition.

That-clauses in belief reports pose semantic problems because their content has to be evaluated in an intensional (nonextensional) propositional attitude context. In such contexts, substituting a coreferential term in the embedded clause may lead to a change of the truth value. This problem has traditionally been discussed in the literature as the nonapplicability of Leibniz's Law. Leibniz's Law states that two things are identical with one another if they are mutually substitutable, preserving the truth of the sentence. In Leibniz's formulation, quoted after Frege, "*Eadem sunt, quae sibi mutuo substitui possunt, salva veritate*" (Frege, 1892/1997: 570). This law also has a more general claim, dubbed in the literature the identity of indiscernibles: If things have all properties in common, then they are identical and they are one thing. Now, when we apply this law to belief reports, we talk about the substitutivity of terms or expressions rather than 'things.' To rephrase the law: If all that can be said of one thing can be said of another, then it is said about one thing in two guises. In addition, Leibniz's Law has been applied to attitude contexts in a more recent version that is in fact due to Quine and that states that, if things are identical (i.e., they are one), then they have all properties in common. This law is dubbed the indiscernibility of identicals. In other words, if we take one object described in two different ways, whatever can be said about it under one guise can also be said about it under the other guise. In other words, again, if A and B are identical, then anything that is true of A is also true of B:

$$\forall x \forall y (x = y \supset (F(x) \supset F(y)))$$

In talking about attitudes, we follow here the common practice and adopt this version of the law, allowing for its extension to the indiscernibility of identicals and remembering that this was not Leibniz's original intent.

Belief reports are thus nonextensional (intensional) contexts in which Leibniz's Law does not hold. However, they are also sometimes called hyperintensional, in that expressions that can be substituted for one another in other intensional (e.g., modal) contexts cannot always be substituted in attitude contexts. Such expressions have the same intension and, yet, are not substitutable. For example, coreferential proper names are substitutable in modal contexts but not in attitude context. Alternatively, instead of the category of hyperintensionality, we can distinguish degrees to which the guise under which a belief is held contributes to the semantics, as it is developed next.

Now, coming back to (5b) and (5c), we can see that Leibniz's Law of substitutivity *salva veritate* does not work on the opaque (5c) reading. In (5b), on the contrary, the discourse is about a particular known individual and this reading is transparent to substitutions of coreferential terms. In order to preserve compositional semantics, it has been suggested, among others, that we have to establish under which mode of presentation (sense or guise) the object referred to is known to the believer. For instance, (6) and (7) may or may not express the same proposition (i.e., may or may not have the same informational content), depending on the modes of presentation that belong to the believer's knowledge base:

(6) Bernard J. Ortcutt is an honest citizen.

(7) The man in the brown hat is an honest citizen.

The speaker of (6) may not consent to believing (7) because her or she may not know that the description in (7) refers to the same individual. So, the core point in discussing attitude reports is to agree on what reference is in such nonextensional contexts and how to use this notion of reference in the semantics. The failure of substitutivity of coreferential expressions suggests that we have to either abandon compositional semantics or incorporate contextual information into semantic theory.

Various solutions have been suggested. According to Frege (1892), the role of reference in intensional contexts is taken by sense, that is, by an objective equivalent of a mode of presentation. Next, the *that*-clause can be taken to refer to a sentence rather than a proposition (see e.g., Bach, 1997). Quine (1956) postulated degrees of intensions for quantifying into such contexts. More recently, there have been various suggestions to incorporate the mode of presentation into the logical form, stemming from the hidden-indexical theory (Schiffer, 1992, 1996), developed also in Crimmins and Perry's (1989) and Crimmins's (1992) 'notion', which is an unarticulated constituent of the proposition. These are sometimes understood as a covert *so* as in *A so-believes that* . . . or *so-labeled* as in *A believes that B, so-labeled, Φs* (Forbes, 1990, 1997). Jaszczolt (1999, 2000) proposed degrees of

semantic significance of the mode of presentation, depending on the default or nondefault status of the interpretation of the attitude report. The literature also offers ample constructive criticism of the Fregean direction (Salmon, 1986; Soames, 1987; Donnellan, 1989; Recanati, 1993; Clapp, 1995, 2000). At the other end of the spectrum, neo-Russellian approaches (e.g., Salmon, 1986; Soames, 1987, 1995) denied the contribution of the mode of presentation to the semantics of attitude reports. Instead, the semantic content of a sentence is a singular proposition. Richard (1990, 1995) suggested that the verb *believe* is indexical, thereby making the verb contextually sensitive. Larson and Ludlow (1993) proposed composites of linguistic forms and extra-linguistic objects, called by them interpreted logical forms. In this way, they captured the relevance of the actual expression that is used to refer in the sentence. Stanley (2000) suggested that all the contextual factors that affect truth conditions can be traced to the elements in the syntactic structure and that, therefore, there are no unarticulated constituents. Finally, if we extend the category of attitude verbs to include *say* followed by a *that*-clause, there is Davidson's (1968–1969) paratactic account in which a demonstrative *that* refers to an utterance. Davidson advocated a semantic innocence view, according to which an expression in an attitude report contributes exactly what it does in nonintensional contexts.

Now, neo-Russellians respected semantic innocence but denied the semantic significance of modes of presentation. Intuitively, what they said is that, although substitutivity in attitude reports does not **seem** to hold, **in fact** it does: Substitution does not affect the truth value. On the other hand, hidden-indexical theorists could only preserve semantic innocence when they gave up compositionality. Hidden indices, standing for modes of presentation, have no counterpart in grammar, and hence the meaning becomes noncompositional. Be that as it may, some form of mode of presentation is indispensable in talking about propositional attitudes and attitude reports. Even if we attempt to do without it in semantic representation, it appears in pragmatics. Or, more commonsensically plausible, it comes from pragmatics but intrudes in the semantic representation of attitude reports. How much this mode of presentation contributes to the proposition expressed is the focus of ongoing discussion. In Schiffer's hidden-indexical theory mentioned, belief is a three-place relation among the believer, the proposition whose structure can be taken into account, and a mode of presentation under which the person believes this proposition. In (9), Φ^*m is a type of mode of presentation determined by the context, and <> indicate the intensions (see Schiffer, 1992: 503).

(8) Ralph believes that Fido is a dog.

(9) $(\exists m)\,(\Phi^* m \;\&\; \mathrm{Bel}\,(\mathrm{Ralph}, \langle \mathrm{Fido}, \mathrm{doghood}\rangle, m))$

This opens up new problems: (1) What information falls under Φ^*m, (2) where does it come from, and (3) why is Φ^*m conceived of as a constituent of the logical form of sentences? Here two general answers are available: Contextual information included in the mode of presentation can contribute to the propositional form of an utterance (contextualism), or contextual information functions separately from the proposition, as implicatures (anti-contextualism; Recanati, 1994). Although it is commonly accepted that this contextual information is needed in reporting on beliefs, the theoretical question remains as to whether it contributes to the truth conditional representation. Such modes of presentation may be too detailed, too fine-grained, yet **some** contextual information that pertains to the identification of the belief may be semantically relevant (see Jaszczolt, 2000). To conclude, two important issues still remain in the focus of discussion: (1) Does pragmatic information figure in specifying what the speaker believes, and if so, to what extent; and (2) where does the boundary lie between the semantic representation and the pragmatic information? Both questions are directly related to the issue of the semantics/pragmatics interface and the existence of salient default interpretations.

Now, it has to be pointed out that the ambiguity of reading of attitude reports is engendered even by proper names and even where substitutivity is not the case. In the puzzle presented by Kripke (1979), the problem of reporting on beliefs involves the principle of translation (if a sentence in one language is true, its translation into another language is also true) and the principle of disquotation (if a speaker assents to 'p', then he believes that 'p'). Pierre, a speaker of French who lives in France, holds a belief about a certain city unknown to him, called Londres, that it is pretty. His belief, uttered in (10), can be reported on as in (11).

(10) Londres est jolie.

(11) Pierre believes that London is pretty.

Next, Pierre moves to London and acquires a belief expressed by him in (12), while still holding (10).

(12) London is not pretty.

Kripke does not offer a solution. But it seems that in order to avoid contradiction, we have to accept that proper names have some semantically

significant mode of presentation that comes with the belief. Or we have to anchor the proper names to real or imagined objects, as was done in Discourse Representation Theory (Asher, 1986; Kamp, 1990). All in all, the content and the semantic status of the mode of presentation seem to be the key to the puzzles surrounding attitude ascription.

See also: Default Semantics; Discourse Representation Theory; Frege, Gottlob (1848–1925); Implicature; *De Dicto* versus *De Re*; Proper Names: Semantic Aspects; Quine, Willard van Orman (1908–2000); Russell, Bertrand (1872–1970); Semantics–Pragmatics Boundary; Sense and Reference: Philosophical Aspects.

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Propositions

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When an English speaker utters the sentence 'Snow is white' and a French speaker utters the sentence 'La neige est blanche,' there is a clear sense in which they have both said the same thing. Moreover, given that they both intend sincerely to express their beliefs by uttering these sentences, there seems a clear sense in which they both believe the same thing. Philosophers call this thing that both have said and that both believe a *proposition*. The declarative sentences we utter and write down are said to have propositions as their linguistic meanings and to express those propositions. Two or more sentences (in the same language or in different ones) can have the same proposition as their meaning – that is, they can express the same proposition – just as different numerals (e.g., the Arabic numeral '4' and the Roman numeral 'IV') can designate the same number, namely four. Moreover, propositions are supposed to be the contents of many of our mental states, such as belief, knowledge, doubt, supposition, memory, desire, intention, and so on. Russell (1903) called these mental states "propositional attitudes."

Roles Played by Propositions

The notion of a proposition has played, and continues to play, important roles in the philosophy of logic, philosophy of language, and philosophy of mind. Three of those roles have been mentioned already: Propositions are the linguistic meanings of the sentences we utter or write down, they are the contents of our sayings when we utter or write down those sentences, and they are the contents of our thoughts. Propositions are commonly thought to have other important functions as well. They are often taken to be the "primary bearers" of truth and falsity, in the sense that the sentences we utter and the beliefs we have are true or false only derivatively in virtue of the propositions associated with them being true or false. Propositions are also said to be the primary bearers of modal properties, such as necessity, contingency, possibility, impossibility, and so on. And logical relations, such as consistency, inconsistency, and entailment, are said to hold between or among propositions.

It is a good question whether any single notion of a proposition can play all these roles at once. Sentences containing indexicals, for example, cause difficulties in this regard, for they seem to suggest that the linguistic meaning of a sentence may differ from the proposition it expresses. When I say 'I'm hungry,' and when you say 'I'm hungry,' there is a sense in which our respective sentences have the same meaning; but it also seems clear that they express different propositions, one about me and the other about you. Conversely, when I say 'I'm hungry' and you say, addressing me, 'You're hungry,' we seem to have said the same thing – that is, expressed the same proposition, a preposition about me – but uttered sentences with different meanings. In light of this, Kaplan (1989) has distinguished between the *character* (roughly, linguistic meaning) and the *content* (proposition expressed) of a sentence. Whether any single notion of a proposition can play all these different roles depends very much on what propositions are taken to be. So what then are propositions exactly? What are these entities, propositions, that we assert and believe and that are true or false and necessary or contingent?

Propositions as Abstract Entities

The history and development of the concept of the proposition are a long and complex story (Gale, 1967); but contemporary accounts derive most

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Propositions as Abstract Entities

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immediately from Frege's attack on psychologism and the *fin de siècle* revolt against idealism inaugurated by Russell and Moore (Frege, 1892a, 1918; Moore, 1899; Russell, 1903; Hylton, 1984). The core of this shared account is the idea that propositions are mind-independent, extralinguistic abstract entities akin to numbers, mathematical functions, and sets.

This core idea subsequently came under persistent attack by Quine (1960, 1986) who viewed propositions (and other 'intensional' entities such as properties and relations) as 'creatures of darkness' owing to the alleged lack of any criteria for individuating them, as well as their essential involvement with what Quine (1951) deemed the obscure and suspect notions of meaning and synonymy. In the service of his sparse desert ontology, Quine proposed to replace abstract propositions with concrete sentences (propositions are really just unnecessary 'shadows' of sentences anyway, to invoke Wittgenstein's metaphor) or, more accurately, with mathematical sequences of word-tokens that have been uttered or inscribed at some time (Quine, 1960). However, neither Quine's relentless critique of propositions as abstract entities nor his replacement of them with sentences has been widely accepted. Moreover, despite Quine's closely related attack on modal notions, such as necessity and possibility, the rise of modal logic and modal metaphysics continued unabated and accorded a central place to propositions construed as abstract entities. The seminal work of Kripke (1972) was instrumental in turning the tide against Quine.

Let us then turn to the most popular contemporary approaches to the nature of propositions as mind-independent, extralinguistic abstract entities. As we shall see, there has been some lack of clarity about whether theories of propositions are theories about what propositions *are*, ontologically speaking, or whether theories of propositions are theories about how they should best be represented or modeled in a formal semantic theory.

Two Approaches: Structured and Structureless Entities

Generally speaking, theories of propositions can be divided into two sorts. The first takes propositions to be certain kinds of structured entities with components standing in various relations to each other, with the structure of the entities roughly mirroring the structure of the sentences that express them. The second takes propositions to be structureless entities. The structureless approach invokes the notion of a "possible world," borrowed from the new model theory for modal logic developed in the 1950s and 1960s, known as "possible worlds semantics." A possible world is a "way things could have been." The idea is that a proposition is a set of possible worlds (the set of worlds at which the proposition is true), or equivalently, a proposition is a function (in the mathematical sense) from the set of possible worlds to the set of true values.

That the possible-worlds approach to propositions treats propositions as structureless is easily seen. Consider the sentences 'Russell is not alive and Frege is not alive' and 'It is not true that either Russell is alive or Frege is alive.' These sentences have very different structures: the first is a conjunction of two negations, and the second is a negation of a disjunction. Yet, they are true in the same possible worlds because they are logically equivalent. According to the possible-worlds approach, both sentences therefore express the same proposition.

According to the structured approach, however, these two sentences express different propositions because in the structured approach a proposition is not individuated in terms of the possible worlds in which it is true, but rather in terms of the constituents that make up the proposition. On this account, a proposition is a structured entity composed of parts, where the parts and the order of composition more or less mirror the parts and order of composition of the sentences that express the proposition.

Two Structured Approaches: Russellian and Fregean

There are, broadly speaking, two types of structured theory, the first deriving from Russell (1903) and the second from Frege (1892a), which are distinguished from each other by what they take the constituents of propositions to be. According to the Russellian (or "neo-Russellian") approach, the constituents of the propositions we assert and believe, and to which truth and falsity and modal properties belong, are the objects, properties, and relations that our assertions and beliefs are about: desks, trees, other people, and other everyday objects. According to the Fregean approach, propositional constituents are rather 'senses' or 'modes of presentation' (or concepts or 'ways of thinking') of the objects, properties, and relations that our saying and thoughts are about: modes of presentation of desks, trees, and other people. There are also combination views, according to which propositional constituents are both the things our sayings and thoughts are about and modes of presentation of those things.

On the Russellian view, propositions are identified with ordered pairs of *n* objects and an *n*-place relation: $<<x_1, \ldots, x_n>, X^n>$. The proposition that Maggie is cooking is thus identical with the ordered

pair: <Maggie, cooking>. The Fregean view identifies propositions with ordered pairs of *n* modes of presentation (of objects) and an *n*-place mode of presentation (of a relation): $<<m_1, \ldots, m_n>, M^n>$. Here, $m_1, \ldots, m_n$ are modes of presentation of $x_1, \ldots, x_n$, and M^n is a mode of presentation of X^n. The proposition that Maggie is cooking, for the Fregean, is thus the ordered pair: <mode of presentation of Maggie, mode of presentation of cooking>.

A third view, which combines Russellian and Fregean elements, has it that the propositions we believe contain both the items our beliefs are about and modes of presentation. For example, we might believe or assert 'quasisingular propositions' (Schiffer, 1978; Recanati, 1993) that contain objects, properties, and relations, as well as modes of presentation of all these things: $<<<x_1, m_1> \ldots <x_n, m_n>>, <X^n, M^n>>$. According to this view, when Tom believes Maggie is cooking, the proposition he believes is identical with the ordered pair: <<Maggie, mode of presentation of Maggie>, <cooking, mode of presentation of cooking>>. It is possible, of course, to hold that sometimes we believe one type of proposition (e.g., a Rusellian one) and sometimes we believe another type (e.g., a quasisingular one), depending on the situation and context in question. For present purposes, however, the important point is that propositional constituents are either objects, properties, and relations or modes of presentation of these things (often just called *concepts* of them – though this contemporary use of the term 'concept' should be distinguished from Frege's very different use of that term). And the propositions we believe – if there are such things – are composed out of such items in some way or another.

Ontology or Semantics?

So far, we have been speaking as if both the structureless and structured accounts of propositions were accounts of what propositions are. If this is correct, then, on the structureless account, what we assert when we assert a proposition and what we believe when we believe a proposition is a set or a function. Similarly, according to the structured accounts, to assert or to believe that Maggie is cooking is to stand in a relation to an ordered set. On the face of it, this does indeed seem very implausible (Bealer, 1998). Moreover, it is hard to understand how ordered sets could be true or false or necessary or contingent. These set-theoretic constructions just do not seem to be the kinds of things that can have the properties that propositions are supposed to have.

The structured position suffers from another problem too: *which* ordered set is the proposition that Maggie is cooking? Taking the Russellian approach as an illustration, is it <Maggie, cooking> or is it <cooking, Maggie>? There seems no way to determine (nonarbitrarily) which ordered set a certain proposition is (Bealer, 1998; Jubien, 2001). This general difficulty of reducing abstract objects, such as numbers, to sets is due to Benaceraff (1965).

In light of this, it seems best to take the structureless and structured approaches as rival ways of representing propositions in a formal semantic theory and not as accounts of what propositions are. Whether or not this is an adequate response to the foregoing objections, it is evident that, even interpreted as proposals about how to represent propositions, each approach is still not without its problems.

A Problem for the Structureless Approach

The structureless account appears to face what seems to be a devastating objection, stemming from the fact that it implies that all necessarily equivalent propositions are identical. Since the sentences 'A sister is a female sibling' and 'A brother is a male sibling' are true in all possible worlds, they express the same proposition. But, these sentences obviously have different meanings and thus seem to express different propositions. Moreover, if belief is a binary relation between a subject and a proposition, and a proposition is a set of possible worlds, then, for any necessarily equivalent propositions P and Q, if S believes P, then it follows that S believes Q. So, for example, if Maggie believes that $5 + 5 = 10$, she must then believe that arithmetic is incomplete, since both these things are true in every possible world. Valiant efforts have been made to mitigate these counterintuitive consequences (Stalnaker, 1984), but none has achieved widespread acceptance.

The very structurelessness of propositions on the possible worlds account means that propositions are not "fine grained" enough to serve as the objects of attitudes and the meanings of sentences. There are just not enough to go around on the possible worlds account. (Another approach to this problem, within the possible worlds framework, found in the work of Lewis (1972) and Montague (1974), invokes "structured intensions" and derived from Carnap's (1956) notion of "intensional isomorphism types.")

Problems for the Structured Approaches

The majority of philosophers, then, adopt a structured approach, either a Russellian one or a Fregean one. Turning first to the Russellian representation of propositions, it is evident that it is able to distinguish among necessarily equivalent propositions. The

propositions expressed by the sentences 'Sisters are female siblings' and 'Brothers are male siblings' have different constituents and are therefore distinct. So the Russellian manages to achieve a certain fineness of grain in its representation of propositions. It is a matter of controversy, however, whether his representation of propositions is fine enough. For the Russellian, the sentences 'George Eliot is a novelist' and 'Mary Anne Evans is a novelist' express the same proposition, because the parts of each sentence (e.g., the proper names and predicates) refer to (and are true of) the same things, and it is these same things that form the constituents of the propositions that each expresses. Now, whether or not we want to say that these sentences have different meanings, it has seemed to some philosophers that we do want to say that someone could believe George Eliot is a novelist without also believing that Mary Ann Evans is a novelist (even though George Eliot is Mary Ann Evans). In other words, belief content – and cognitive content more generally – seems to be extremely fine-grained. Importantly, cognitive content seems to be more fine-grained than a representation – using only the worldly objects, properties, and relations that our thoughts are about, can cope with. Since, for the Russellian, the two aforementioned sentences express the same proposition, and belief for the Russellian is a relation between a subject and a proposition, it follows that it is impossible for the two sentences 'Ralph believes that George Eliot is a novelist' and 'Ralph believes that Mary Ann Evans is a novelist' to differ in truth-value. Philosophers of a Fregean bent, however, argue that they can differ in truth-value – that such a difference in truth-value is required, for example, to explain the linguistic and nonlinguistic behaviour of agents – and that the Russellian theory must therefore be wrong. Russellians have offered systematic replies to these arguments (Salmon, 1986; Soames, 1987; Braun, 1998) but the debate remains open.

The Fregean conception of propositions exhibits perhaps the finest grain and is thus able both to distinguish among necessarily equivalent propositions (like the Russellian account but unlike the unstructured possible world account) and to allow for a difference in truth-value between the two foregoing belief sentences. Because the constituents of propositions are modes of presentation (or concepts or "senses") of the things that our beliefs are about, and modes of presentation are many-one related to these things, there will be many more modes of presentation than the things they are modes of presentation of; and so the requisite fineness of grain necessary for distinguishing between the propositions expressed by the sentences 'George Eliot is a novelist' and 'Mary Anne Evans is a novelist' will be achieved. Since these two sentences express different propositions due to their different conceptual constituents, it is possible for a person to believe the proposition expressed by one but not to believe the proposition expressed by the other.

This extra fineness of grain is bought at a certain cost, however, for it seems that the propositional grain is perhaps now too fine for propositions to play the role of the linguistic meanings of sentences. Arguably, since, for example, 'attorney' and 'lawyer' are synonyms, the sentences 'Lawyers are wealthy' and 'Attorneys are wealthy' are synonymous, that is, have the same meaning. They should therefore express the same propositions (if propositions are supposed to be the meanings of sentences). Yet, it seems possible for a person to believe that lawyers are wealthy, but to doubt whether attorneys are, indicating for the Fregean that the two sentences express different propositions. If the linguistic meanings of sentences are more coarsely grained than the cognitive contents of thoughts according to the Fregean, it is not clear whether a single thing – a proposition – can play both roles.

The Fregean theory is also incomplete in a way that the Russellian theory is not, and this takes us back to the ontological question of what propositions *are*, as opposed to the question of how best to represent them. The Russellian has a clear account of what the constituents of propositions are: the ordinary objects, properties, and relations that our thoughts and sayings are about. For the Fregean, however, the constituents of propositions are sense or modes of presentation or concepts of the things that our thoughts and sayings are about. Yet, what are these modes of presentation, these senses? All attempts to say what they are have been subjected to powerful and sustained criticism, and for this reason it is not clear whether the Fregean theory can ever be completed (Schiffer, 2003).

However, just because the Russellian has an account of what propositional constituents are does not mean that the Russellian theory is complete. For the Russellian theory suffers from the lack of any account of what binds propositional constituents together to form a unity, rather than a loose collection of unrelated parts. How is a proposition distinguished from a mere *list* of items? Frege (1892b) himself held that the key to this question was to be found in the nature of the propositional constituents themselves: At least one of them is always "incomplete" or "unsaturated" and is "completed" or "saturated" by the other constituents, which are themselves already complete or saturated. Russell (1913) struggled heroically for many years, indeed decades, to solve this

"binding" problem or "the problem of the unity of the proposition" (a problem first stated by Plato in *The sophist*) without ultimate success. Contemporary Russellians, however, have been more concerned with the construction of formal semantic theories that invoke model-theoretic representations of propositions than with the metaphysical question of what binds or glues propositional constituents together into a propositional unity. This difficult and ancient question is once again beginning to receive the attention it deserves (Gaskin, 1995; King, 1995; Jubien, 2001; Gibson, 2004).

See also: Character versus Content; *De Dicto* versus *De Re*; Frege, Gottlob (1848–1925); Intention and Semantics; Modal Logic; Objects, Properties, and Functions; Propositional Attitude Ascription: Philosophical Aspects; Propositional Attitudes; Quine, Willard van Orman (1908–2000); Russell, Bertrand (1872–1970); Sense and Reference: Philosophical Aspects; Truth: Primary Bearers.

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Propp was a Russian folklorist and literary formalist, whose monograph *The morphology of the folktale* (originally published in Russian in 1928, the English version only appearing in 1958) led him to be acclaimed as one of the pioneers of structuralist analytical methods applied to texts, alongside Lévi-Strauss (*see* **Levi-Strauss, Claude (b. 1908)**) and Jakobson (*see* **Jakobson, Roman (1896–1982)**). By adaptive application of methods more familiar in distributionalist linguistics, Propp sought to identify the elemental constituents, and the variant means of their combination, of a corpus of 115 Russian folktales. What emerges is a grammar of the folktale, in which Propp's counterparts of the VP and NP are event and character. He isolates just 31 fundamental, action-developing events (called 'functions') in the tales, notwithstanding the fact that those core events might have rather different surface realizations in different stories. For example, his function no. 14 is 'the hero acquires the use of a magical agent,' but many different things in different tales might constitute 'the hero,' 'a magical agent,' and the process of acquiring. Furthermore, while different tales contain any number of the 31 functions, their order of occurrence, in all tales, was unvaried. The functions operate upon just 7 basic recurring character roles ('villain,' 'hero,' 'helper,' 'princess,' etc.); these roles may be combined in a single individual (e.g., one person may be both 'helper' and 'princess'), or a particular role might be filled by several individuals (a gang of thieves fills the 'villain' role). The entire project is avowedly reductive and oriented to plot alone (it is silent on questions of characterization, tone, style, symbolism, and so on). It has given rise to a number of computerized story- and fairytale-generators and to many critical applications to film. Some of the particular interest in the *Morphology* lies in the fact that it was one of the earliest systematic demonstrations of what could be done with a corpus of actually occurring texts, using resolutely structuralist-distributionalist methods; it points both to the achievements and the limitations of that kind of abstracting formalism applied to material so laden with cultural and psychological meaning as the folktale. In these and other respects (the possibility of event-sequence transformations; the merits of abstraction and generalization), reactions to the *Morphology* provide striking parallels to some of the critical reception given to transformational-generative grammar in the 1960s.

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Prosodic Aspects of Speech and Language

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Introduction

A speech sound, just like any sound in general, can be characterized by three characteristics:

- its quality or timbre
- its length
- its loudness

If the sound is periodic (i.e., voiced), then it can also be characterized by:

- its pitch height

These four characteristics refer to auditory impressions, which can be related to the three acoustic dimensions:

- time
- intensity
- frequency

The three acoustic dimensions can be visualized by means of a spectrogram, as in **Figure 1**, which shows a spectrogram for the English word far /fa:/. All acoustic analyses in this article were obtained by means of the excellent free software Praat (Boersma and Weenink, 1992–2005).

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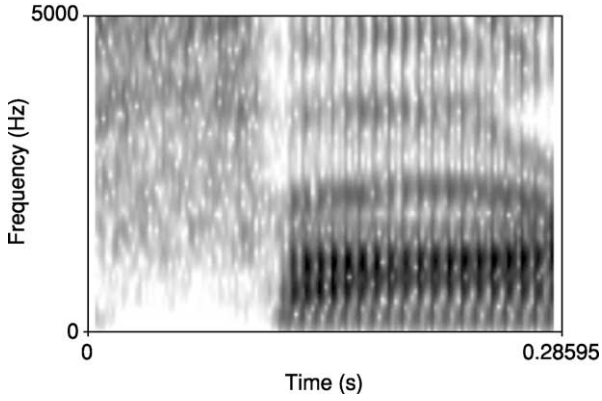

Figure 1 Spectrogram of the English word 'far' /faː/.

The spectrogram is a three-dimensional representation of a sound showing the distribution of energy (on a scale going from white to black) at different frequencies (vertical scale) as a function of time (horizontal scale).

These acoustic dimensions can be used in turn to define four parameters, which are essentially responsible for the four auditory characteristics listed above:

- Voice quality or timbre is related to the distribution of energy in the spectrum.
- Length is related to the duration in seconds (s) of the sound.
- Loudness is related to the intensity in decibels (dB) of the sound.
- Pitch, for voiced sounds, is related to the fundamental frequency in periods per second or Hertz (Hz).

In Figure 1, the consonant /f/ is unvoiced and consequently has no fundamental frequency, whereas the vowel /aː/ is voiced and has a measurable fundamental frequency.

Of these four parameters, the spectral characteristics are the most complex and naturally are exploited the most in creating lexical items in different languages. Thus the difference between *four* /fɔː/ and *far* /faː/ comes from a different distribution of energy in the spectrum of the vowel, while the difference between *far* /faː/ and *car* /kaː/ comes from a different distribution of energy in the spectrum of the consonant (Figure 2).

The other three parameters – duration, fundamental frequency, and intensity – are often referred to as prosodic or suprasegmental parameters. All languages make use of these parameters for nonlexical purposes, characterizing the way in which the individual words are combined into larger speech units and the relative prominence of the different words as well as more paralinguistic characteristics related to the expression of affect.

The prosodic parameters also contribute to the lexical identity of words in many languages.

Duration is exploited through the lexical characteristic of quantity in languages like Finnish where /taka/ /takka/ /taakka/ /takaa/ /takkaa/ /taakkaa/ all have distinct meanings (back-, fireplace, burden, followed by the partitive case for the same three words) (Figure 3).

Fundamental frequency is exploited through the lexical characteristic of tone in languages such as Vietnamese, where /ma/ with: (a) high level tone, (b) rising tone, (c) glottalized rising tone, (d) low falling tone, (e) falling-rising tone, and (f) glottalized falling tone all have distinct meanings ('ghost', 'mother', 'horse', 'maize', 'tomb', 'young rice plant', respectively). It is also exploited through the characteristic of pitch accent in languages such as Japanese where /'hanadesu/, /ha'nadesu/ and /hanadesu/ or /'hasidesu/, /ha'sidesu/, and /hasidesu/ all have distinct meanings ('it's Hana' [= name], 'it's a flower', 'it's a nose', 'it's chopsticks', 'it's a bridge' and 'it's an edge', respectively).

Intensity is related to the lexical characteristic of stress in languages such as Russian where /'muka/ and /mu'ka/ have different meanings ('torment' and 'flour', respectively).

The relationship between the auditory characteristics and the acoustic parameters is, however, not quite so simple as the preceding description might seem to imply.

Quantity often entails spectral characteristics as well as mere duration. English is a good example of this since what can be, and often has been, described as a phonological distinction between long and short vowels in English (i.e., /iː/ vs /ɪ/, /uː/ vs /ʊ/) involves in most dialects a difference in voice quality so that the 'long' vowels might be transcribed more narrowly as diphthongs /ɪi/ and /ʊu/, as can be seen from the spectrogram of the phrase 'two weeks' in Figure 4, where the diphthongued nature of the two 'long' vowels /uː/ and /iː/ is clearly visible.

Tonal distinctions can also be more complex than simple variations of fundamental frequency and often combine differences in voice quality such as breathy or creaky voice as well as intensity differences. Thus, the third of the six tones in Vietnamese listed above is like a glottalized version of the second one (Figure 5).

Stress, finally, is a complex combination of all four parameters since stressed vowels are generally more intense, longer, less centralized, and have a distinctive fundamental frequency pattern. In the Russian words /'doma/ (house [accusative singular]) and /da'ma/ (house [nominative plural]), both are written 'дома', but when the stress is on the second syllable

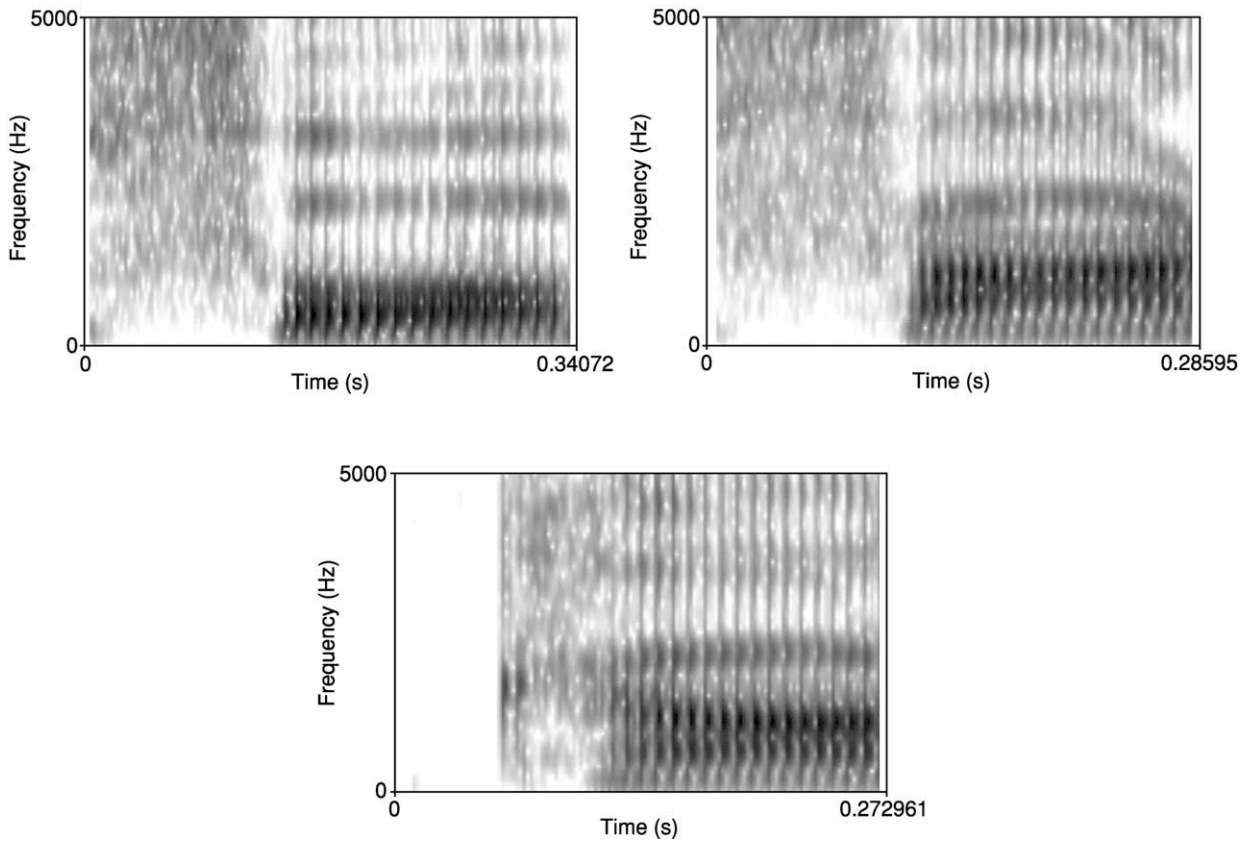

Figure 2 Spectrograms of the words 'four' /fɔ:/, 'far' /fa:/ and 'car' /ka:/.

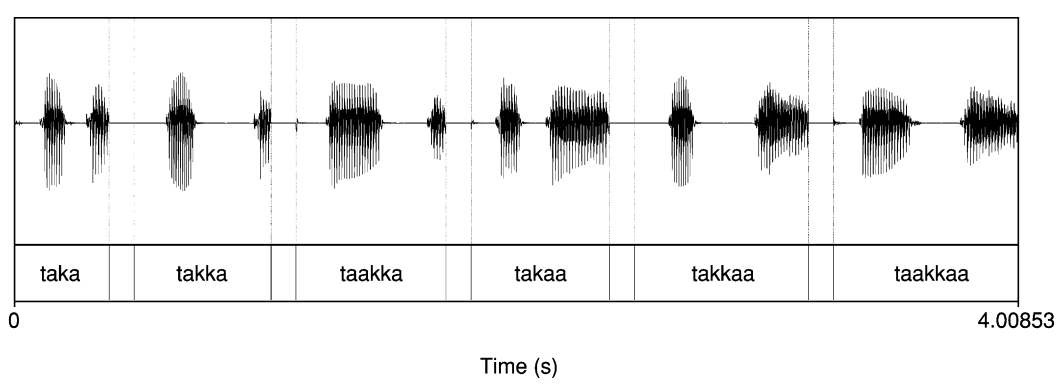

Figure 3 'Taka', 'takka', 'taakka', 'takaa', 'takkaa', 'taakkaa'. Illustrating distinctive quantity for vowels and consonants in Finnish (see text).

this brings about a change of vowel quality of the first vowel that is an essential cue to the place of stress.

The way in which prosodic characteristics have been lexicalized in different languages is consequently not a simple one-to-one mapping between the three prosodic parameters of length, pitch, and loudness and the phonological categories of quantity, tone, and accent.

The rest of this article will be concerned with the nonlexical characteristics of the prosodic parameters of length, pitch, and loudness.

Length

Many languages do not possess any lexical distinction of quantity. This is the case with modern standard French, even though some conservative speakers today maintain what was once a more productive distinction between long and short vowels (as in: *mètre* /mɛtʁ/ 'meter' vs. *maître* /mɛːtʁ/ 'master'). Even these speakers, however, will tend to resort to the short vowel in words like *naître* or *paître* where there is no minimal pair to maintain the opposition. Even in

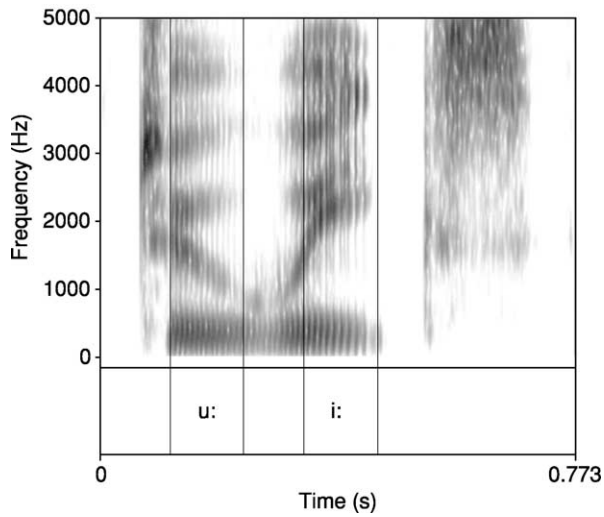

Figure 4 Spectrogram of the English phrase 'two weeks' /tu:wi:ks/ showing the diphthonged nature of the vowels /u:/ and /i:/.

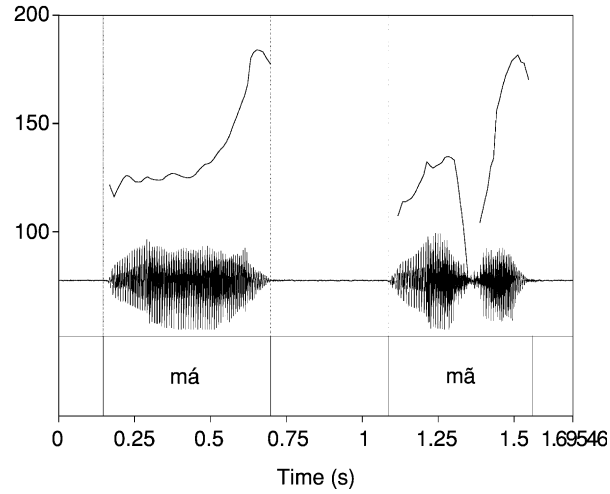

Figure 5 Rising tone and glottalized rising tone in Vietnamese: má 'mother' and mã 'horse'. The figure displays (top) the fundamental frequency (F0) expressed in Hz and (below) the waveform for each word.

languages like French, which do not possess lexical distinctions of quantity, it is possible to find distinctive differences of quantity in connected speech. Thus, it is possible to find in French connected speech minimal pairs for quantity both for consonants:

Il part tôt. /ilpaʁto/ (he leaves early)
vs.
Ils partent tôt. /ilpaʁtto/ (they leave early)

and for vowels:

Il a battu le chien. /ilabatyləʃjɛ̃/ (he beat the dog)
vs.
Il a abattu le chien. /ilaabatyləʃjɛ̃/ (he killed the dog)

Although these 'long' consonants and vowels in French are represented here as a sequence of two consonants or two vowels, there is nothing phonetically to distinguish them from the same sequence of phones with a 'long' consonant or vowel so that they could equally well be transcribed: [ilpaʁt:o] and [ila:batyləʃjɛ̃].

Intrinsic Duration

According to Klatt (1987), the nature of the phoneme is the biggest single factor influencing segmental duration. This has an effect in two ways.

First, the mean duration of /w/, for example, may be intrinsically only half the length of, say, /ʃ/.

Secondly, some phonemes are intrinsically more compressible than others. Different compressibility has been treated by expressing the variability in terms of a relation between an intrinsic duration and a minimum duration, as suggested by Klatt (1987). Another approach (Campbell, 1992) has been to normalize duration, by subtracting the mean of the phoneme class and dividing the result by the standard deviation of the same class. Since such normalization procedures assume that the measurements are normally distributed, it is often the logarithmic values of duration that are used, since it has been shown that the log distribution of segmental durations is closer to a normal distribution than is the raw distribution in milliseconds.

Rhythm: Stress Timing, Syllable Timing, and Mora Timing

Different distributions of the duration of individual speech sounds can give rise to different auditory impressions of rhythm in different languages. In particular it has been claimed that languages exhibit a property of isochrony, which can be defined as the organization of speech into chunks that are perceived to be of equal, or at least equivalent, duration.

Pike (1945) suggested that two types of rhythm can be found in languages: syllable-timed rhythm, where syllables give the impression of being of equivalent duration, and stress-timed rhythm, where it is the stressed syllables that are perceived as occurring at regular intervals, whatever the number of intervening unstressed syllables. Abercrombie (1964) claimed that this corresponds to a universal typological distinction and that all languages can be classified into one of two rhythmic classes: syllable-timed languages (such as English, Russian, and Arabic) and stress-timed languages (such as French, Telugu, and Yoruba). Ladefoged (1975) proposed to add a third rhythmic class, that of mora-timed languages, for languages such as Japanese and Tamil where the

rhythm is determined by units smaller than the syllable, known as morae, something like short beats in music. In Japanese, for example, open syllables with short vowels, like /na/ or /i/ are said to contain one mora, whereas closed syllables like /nan/ or syllables with long vowels like /i:/ are said to contain two morae. The following minimal pairs are distinguished by the fact that the second expression in each case contains one mora more than the first:

nado (and others)	nando (how many times)
shite-imasu (I'm doing it)	shitte-imasu (I know)
ie (house)	iie (no)

Almost embarrassingly, however, this neat typological distinction of three rhythmic classes has not stood up very well to empirical investigation.

Among a number of experimental studies questioning the validity of this typological distinction, Roach (1982), for example, measured the standard deviation of syllable durations for about 2 minutes of spontaneous unscripted recordings by speakers of each of the six languages mentioned above and found no evidence that the languages classified as stress-timed exhibited any more variability of syllable duration than the languages classified as syllable-timed. He also measured the duration of interstress intervals for the six speakers (measuring the duration from the onset of each syllable that appeared to be stressed until the onset of the next one within the same intonation unit). This duration was expressed as a percentage of the duration of the whole intonation unit to compensate for any possible effects of change of tempo (see below). The results of this, contrary to what would be predicted by the typological distinction, showed – if anything – a greater variability in the duration of the interstress intervals for the so-called stress-timed languages than for the so-called syllable-timed languages. There was, furthermore, no evidence that the duration of interstress intervals was any less correlated with the number of syllables that they contained for the stress-timed languages than for the syllable-timed languages.

A recent study (Ramus *et al.*, 1999) built on the fact that psycholinguistic studies had shown that young infants, including newborns, can discriminate between sentences taken from their own language and sentences taken from a language belonging to a different rhythmic class, but not between sentences from languages of different rhythmic classes.

The authors proceeded to attempt to identify what they claimed were "correlates of linguistic rhythm in the speech signal." Using recordings of five different sentences spoken by four speakers for each language, they first segmented the sentences into 'vocalic intervals' and 'consonantal intervals,' defined as portions

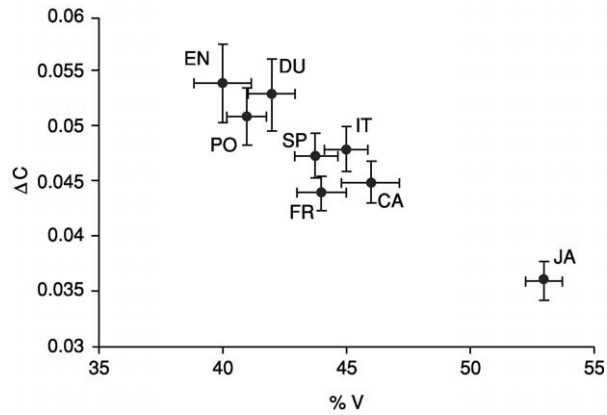

Figure 6 Duration of vocalic intervals as percentage of duration of sentence (%V) and standard deviation of consonantal intervals (ΔC) for eight languages: English (EN), Dutch (DU) and Polish (PO), Spanish (SP), Italian (IT), French (FR) and Catalan (CA), and Japanese (JA), showing how the languages group into stress-timed, syllable-timed, and mora-timed rhythmic classes. Figure from Ramus *et al.*, 1999.

of the speech signal containing, respectively, sequences of only vowels or only consonants. Thus, a phrase such as 'next Tuesday on' /nekstju:zdeɪɐn/ would be segmented into alternating consonantal and vocalic intervals as follows: /n – e – kstj – u: – zd – eɪɐ-n/. They then calculated two parameters, %V, the sum of the durations of the vocalic intervals expressed as a percentage of the total duration of the sentence; and ΔC, the standard deviation of the consonantal intervals within each sentence. They showed that these two parameters made it possible to separate the three rhythmic classes quite well, as can be seen from Figure 6.

It must, however, be said that the claim that this analysis reflects correlates of linguistic rhythm 'in the speech signal' is slightly misleading. The measurements rely on a prior linguistic segmentation of the signal into phonemes and a classification of the phonemes into consonants and vowels. Neither of these operations are purely acoustic. It might then be wondered whether the parameters represented in Figure 6 are an image of the rhythm of the utterances themselves, or of the rhythm of the **text** of the utterances, as had been suggested by Dauer (1983). Indeed it seems likely that a similar discrimination can be obtained if, instead of the duration of each vocalic or consonantal interval, we measure simply the number of phonemes in that interval, as illustrated in Figure 7, which shows the number of vowel phonemes expressed as a percentage of the total number of phonemes and the standard deviation of the number of consonant phonemes in each consonant interval for five comparable sentences in English and French.

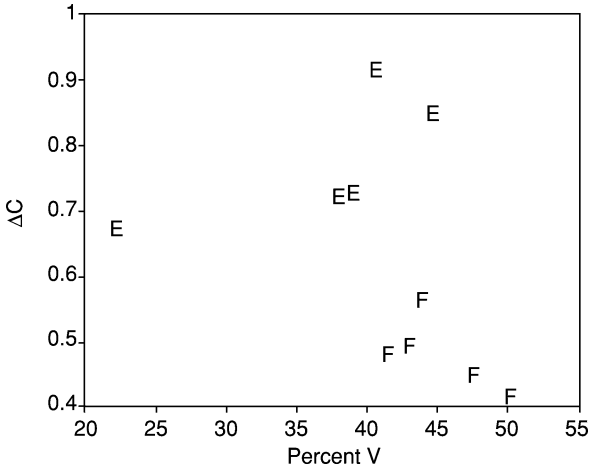

Figure 7 Percentage of vowel phonemes (%V) and standard deviation (ΔC) of number of consonants in each consonantal interval for five sentences in English (E) and French (F).

This figure shows that English and French seem fairly well distinguished on the basis of the phonological structure of utterances without any reference to the speech signal. It seems possible, then, that what Ramus *et al.*'s metric is doing is little more than counting the relative number of consonants and vowels in the different languages. A lower percentage of English phonemes are vowels than in French and the number of consonants in consonantal intervals is more variable in English than in French.

Of course, Ramus *et al.*'s claim is precisely that children derive such information about the phonological structure of their native language from the acoustic data.

For other recent attempts to define an objective metric reflecting rhythmic classes, including work trying to establish such metrics directly from the acoustic signal, see papers in the special session on *Prosody and Linguistic Typology* in Bel and Marlien, 2002.

Suprasyllabic Prosodic Constituents in English

To illustrate the complexity of the study of rhythmic structure, this section will be essentially devoted to a number of analyses of rhythm in English, although presumably all the questions raised here could be applied to the study of the rhythmic structure of any language.

Abercrombie (1964) suggested that stressed syllables, in stress-timed languages, joined with any following unstressed syllables to form a rhythmic unit that he called the foot. This is sometimes referred to today as the stress-foot to distinguish it from the rather different concept of metrical foot used in autosegmental and metrical phonology. In the rest of this section, reference to the foot will be to Abercrombie's definition: each foot starts with a stress and contains everything up to, but not including, the next stress (Abercrombie, 1964: 217).

Abercrombie made two strong and, in fact, quite controversial claims about the foot. Firstly, he stated specifically that the foot does not take into account word boundaries: a phrase such as 'It's almost impossible' would be grouped into feet as follows

/ ɪts | ɔ:lməʊstɪm | pɒsɪbəl /

where (|) corresponds to the foot boundary; the initial phonemes /ɪts/, under this analysis, do not belong to a foot.

The second claim made by Abercrombie was that the relative quantity of syllables in a foot in English is not directly dependent on either vowel quantity or on stress. Abercrombie distinguished three types of disyllabic feet. In the first (short-long, or type A) found in words such as *shilling* or *never*, the stressed syllable (with a short vowel and no final consonant) is metrically shorter than the unstressed syllable. In the second type (equal-equal, or type B), found in words such as *greater*, *firmly*, or *matches*, the stressed syllable (with a long vowel and/or final consonant) is metrically of equivalent length to that of the unstressed syllable. Abercrombie finally distinguished a third type, (long-short, or type C) in expressions such as *Grey to*, *tea for*, which owes the short nature of the unstressed syllable to a word boundary occurring before it.

This second claim seems to be in complete disagreement with most writers who have worked on speech synthesis in a number of different languages and who take it as an axiom that phonemes in stressed syllables are intrinsically longer than phonemes in unstressed syllables.

Klatt (1987), for example, included among his 11 rules for predicting segmental duration a rule of unstressed shortening, which stated that unstressed segments are considerably shorter and more compressible than stressed segments. Similar claims have been implemented into a considerable number of speech synthesis systems for different languages, as summarized in Campbell (1992) for example, as well as in a number of papers in Benoit *et al.* (1991) and van Santen *et al.* (1997).

Other writers have claimed that word boundaries play an important role in the determination of the rhythmic structure of utterances. Jassem (1952), for example, proposed a narrow rhythm unit for English, which, just like the foot, starts with a stress, but, unlike the foot, ends at the following word boundary. Any syllables not part of a narrow rhythm unit, according to Jassem, form an anacrusis, which is pronounced "as quickly as possible." The phrase 'It's

almost impossible' in Jassem's model has a structure like:

/ (ɪts) | ɔ:lməʊst (ɪm) | pɒsɪbəl /

where the phonemes in parentheses are those of the anacrusis.

Like Abercrombie, Jassem suggested that the duration of phones is not directly affected by the stressed/unstressed nature of the syllable, but that the duration of the unit is spread out more or less equally among the phones, with a certain degree of compression so that a unit containing six phonemes, for example, would be longer than one with only three phones but not twice as long.

Campbell (1992) presented a model in which the duration of phones is determined by a two-level hierarchical rhythmic structure consisting of feet and syllables. In this model, the duration of the syllable is determined by the number of syllables in the foot and the duration of the phoneme by the number of phonemes in the syllable. Contrary to both Jassem and Abercrombie, Campbell also claimed that stressed syllables are intrinsically longer than unstressed syllables.

Recent work carried out in our research group (Bouzon and Hirst, 2004; Bouzon, 2004) has attempted to test some of these different hypotheses on a large (5.5-hour) corpus of spoken British English (Auran *et al.*, 2004). In order to compare results for different phonemes, following Campbell, the raw phoneme duration was normalized using the mean and standard deviation of each phoneme class. The raw phone duration was replaced by the z-score calculated as

$$z_p = \left[d_p - \mu_p\right]/\sigma_p$$

where d_p is the raw duration of the phone, μ_p is the mean duration, and σ_p the standard deviation for the phoneme class.

Results from this analysis seem to show that, as predicted by Jassem, word boundaries **do** play an important role in the rhythmic structure of English. They further suggest that, contrary to Campbell's findings, there is no specific compression at the level of the syllable so that all other things being equal, a syllable containing four phonemes will be twice as long as a syllable containing only two. The most surprising result was the confirmation of Jassem's prediction that once we know whether a given phone belongs to an anacrusis or to a narrow rhythm unit, and in the latter case once we know the number of phones in that unit, the fact that the phone occurs in a stressed or an unstressed syllable has no specific effect on its duration.

Work on rhythmic structure across languages is clearly a promising field for future research, particularly with the possibility of taking into account large corpora of authentic speech data.

Tempo

At an even higher level than that of the rhythmic unit or the foot, changes in relative duration of speech segments can be observed corresponding to longer-term portions of utterances. In this case, such changes are usually referred to as changes in tempo, or speaking rate.

One obvious question about tempo that springs to mind is: Are some languages spoken more quickly than others?

Roach (1998) addressed precisely this question. Many listeners seem to have fairly consistent intuitions that, for example, Italian and French are spoken faster than, say, Dutch and German. Roach's study gave positive results for this when the speaking rate was measured in syllables per second. When the same data were measured using phonemes per second, however, the differences between languages turned out to be nonsignificant. The apparent faster speaking rate of Italian and French simply reflects the fact that Italian and French syllables have, on average, fewer phonemes than German or Dutch syllables.

It is interesting to compare this result with that of a study by Pfitzinger (1998) on the perception of German rhythm by native speakers. Subjects were asked to classify a number of utterances from fastest to slowest. A fairly high agreement was found across subjects. The resulting classification was well correlated with both phonemes per second and syllables per second and an even better correlation was found by taking into account both rates. An explanation of this could perhaps be that an increase in phones per second must correspond to a higher degree of activity on the part of the speaker. By contrast, since there is ample evidence that vowel onsets correspond to a particularly salient feature of a syllable, an increase in the number of vowel onsets per second is likely to produce an impression of greater speed. This asymmetry between production and perception is perhaps the explanation for listeners' judgments concerning the relative tempo of the different languages reported above.

Loudness

The perceived loudness of a speech signal is obviously correlated with its intensity, which is not difficult to measure. Of all the prosodic parameters, however, loudness is probably the least well understood and certainly, for this reason, the least researched. The

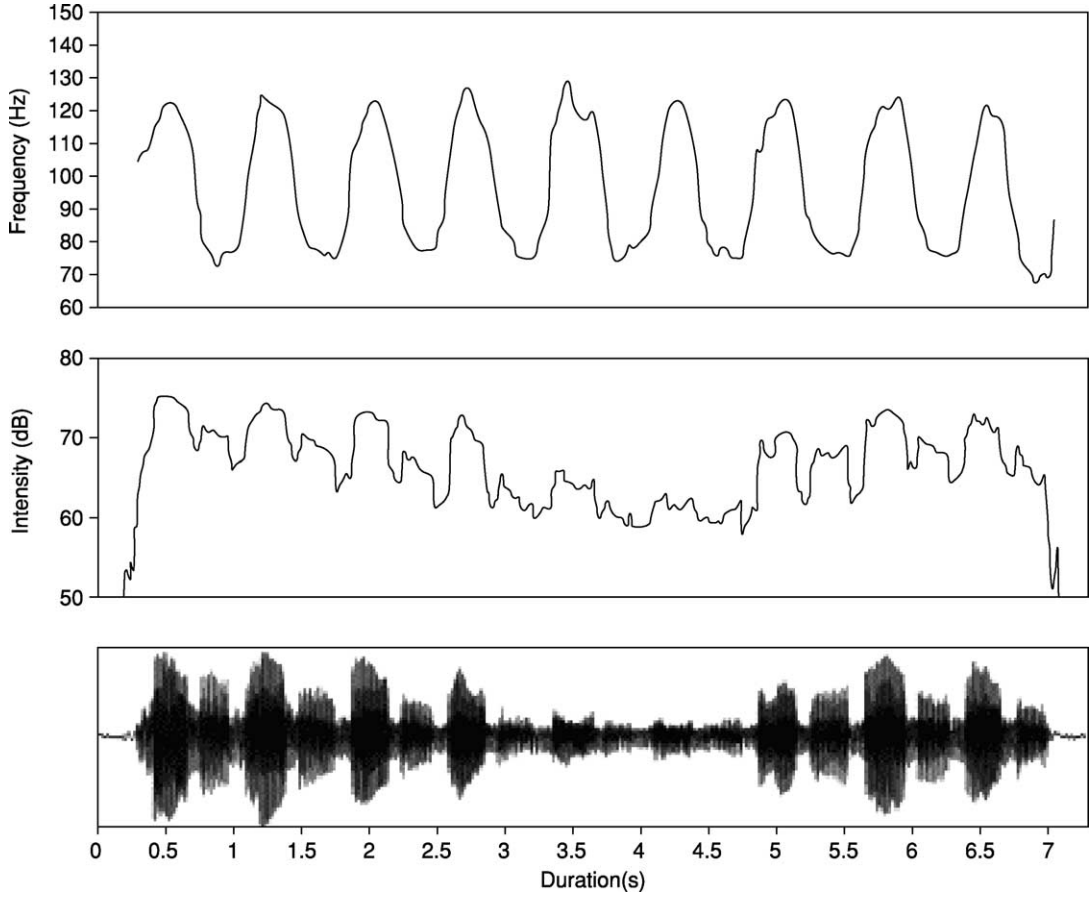

Figure 8 A sequence of nonsense syllables /'mama'mama'mama . . ./ (18 syllables in all) pronounced with the speaker at first facing the microphone and then turning round in a complete circle.

main reason for this is that the intensity of sounds varies considerably as a function of the distance between the microphone and the sound source. This is usually counteracted in experimental subjects by placing the subjects at a fixed distance from the microphone and asking them not to move too much. In normal everyday speech, of course, this is not possible and there are consequently considerable fluctuations in the intensity of the signal that reaches a listener's ears. To illustrate this, Figure 8 shows the fundamental frequency, intensity, and wave form of a sequence of nonsense syllables /'**mama**'**mama**'-**mama** . . ./ (18 syllables in all) pronounced while the speaker starts off facing the microphone and then turns around in a complete circle so that in the middle of the recording he is completely turning his back to the microphone.

As can be seen from this figure, the fact that the speaker turns his back to the microphone has no effect on the detected F0. The effect on the intensity, however, is quite drastic, with a drop of more than 10 dBs from the first stressed syllable to the sixth. This drop is considerably more than the difference between the stressed and the unstressed syllables. Since speakers in everyday life do move around while they are speaking and do even turn away from their listeners, it is obvious that raw intensity by itself is not a very robust cue for loudness. Facts like these led many phoneticians, such as Fry (1958) and Bolinger (1958), to conclude that the major cue for accent in English was pitch excursion, with duration as a secondary cue, and that intensity played only a very minor role. More recent work (Sluijter, 1995) has shown that stressed vs. unstressed syllables are marked not by a global increase in intensity but by an increase in the intensity of higher frequencies. Since the ratio of the intensity of higher vs. lower frequencies is a relative measure, this would remain robust despite variation of global intensity such as that illustrated in Figure 8. This effect, variously known as spectral tilt, spectral balance, or spectral emphasis, obviously opens new perspectives for the analysis of loudness as a distinctive characteristic of speech. There is, however, as yet no generally accepted standard measure of this characteristic, although various measures that have been proposed are the difference

between the first harmonic (H1) and the third formant (A3) or the difference between the first and second harmonics (H2–H1); for a recent overview of these measures, see Heldner (2003).

Pitch

Besides its role in lexical categorization by distinctive tones and pitch accents, the pitch height of voiced speech sounds seems to be fairly universally used to indicate a rather large number of characteristics of speech. These include, on the more linguistic end of the scale, categories of prominence (focus and emphasis) and syntactic or semantic grouping. The relation of prosody to grouping, despite considerable discussion, is still somewhat controversial. For some authors, there is a clear relation between prosodic boundaries and syntactic structure since the boundaries regularly occur at the left edge of syntactic constituents. For others, the boundaries are taken to delimit semantic rather than syntactic units (Hirst, 1998).

On the more pragmatic end of the scale, pitch is used to communicate utterance modality i.e., statements vs. questions, finality vs. nonfinality, etc., although once again there is considerable disagreement among authors as to the syntactic, semantic, or pragmatic nature of such distinctions. The nearly universal tendency to associate final lowering of pitch with statements and final raising of pitch with questions is contradicted by a number of languages that do not systematically use a final rise for questions (e.g., Danish, Finnish, and Western Arabic; Hirst and Di Cristo, 1998), although in such languages, questions are often associated with a global raising of pitch or an incomplete final lowering. There are, furthermore, languages and dialects where a default declarative utterance is regularly produced with a final rise. These include certain varieties of Scandinavian languages as well as a number of urban dialects of the northern United Kingdom (e.g. Newcastle, Glasgow, Belfast, Liverpool, Manchester, etc.). There is, however, to my knowledge, no language that has been reported as systematically associating a final fall with a question and a final rise with a statement.

Another fairly universal tendency is to associate a gradual lowering of pitch with cohesion and conversely a raising or resetting of pitch with a change of topic or a syntactic/semantic boundary of some kind. In many phonetic studies, this lowering effect has been referred to in general as declination. It has been argued, however (Connell and Ladd, 1990) that there are several different processes that have been put together under the same label.

The first of these is a phonologically conditioned lowering, which has traditionally been called downdrift by linguists working particularly on African tone languages (Hyman, 1975). In Bambara (Mali), for example (Bird *et al.*, 1977), the second syllable with a high tone in an utterance will normally be pronounced on a slightly lower pitch than the first when they are separated by a syllable with low tone. Thus in:

sìsé nà kúmà
'Sisse is going to talk.'

the syllable /kú/ will be slightly lower than the syllable /sé/. In fact, if the second high tone is pronounced on the same level as the first, this will give the impression of a prosodic boundary as in:

sìsé | nà kúmà
'Sisse! Come and talk!'

That this lowering is not simply a continuous function of time can be seen from the fact that a sequence of syllables with high tones like:

jírí té
'it's not a tree'

will all be pronounced on more or less the same level.

A phonologically distinctive lowering, traditionally called downstep, can also be illustrated by the following from the same language:

jírí ↓té
'it's not the tree'

where the slight lowering of the final syllable – indicated here by the symbol (↓) – serves as a definite marker for the preceding noun.

Many phonologists make a clear distinction between conditioned lowering, or downdrift, where there is an intervening low tone, and distinctive lowering, or downstep, where there is no intervening low tone. Others prefer to call both types of lowering downstep.

A third type of lowering is that of final lowering where the final part of an intonation unit is lowered more than would be expected from normal processes of downdrifting.

The fourth type of lowering, called declination, is a systematic continuous function of time and which, unlike the other types, is not triggered by any particular tonal configuration or context. This temporal declination is often assumed to be related to physiological constraints and can be best observed in languages like English that can have a falling pitch on a nonfinal syllable followed by a number of syllables on a low pitch.

Measuring F0

The relation of pitch to acoustic properties is relatively straightforward since the pitch height of a speech sound is rather directly related to the frequency of vibration of the vocal folds. This is traditionally measured on a linear scale as the number of periods per second, or Hertz (Hz). Many phoneticians, however, prefer to use a logarithmic scale that captures the broad generalization known as the Weber-Fechner law, which states that the magnitude of a sensation is directly proportional to the logarithm of the magnitude of the stimulus. This is the reason why many studies use a scale of semi-tones (sts) since a semi-tone corresponds approximately to a just noticeable difference in the pitch of two adjacent speech sounds and it is of course familiar as the interval between two adjacent keys on a piano (including both black and white keys). A more appropriate unit, less tied to the cultural tradition of Western classical music might have been the octave (8ve) subdivided, like all scientific units, into thousandths or millioctaves, (m8ves). The formula for calculating octaves from Hertz is:

$$8\text{ve} = \log2(\text{Hz})$$

Octaves can be simply converted into semitones or millioctaves by multiplying by 12 or 1000, respectively.

A number of other scales have been proposed at various times as being more appropriate for measuring the frequencies of speech sounds. These include the Mel scale, the Bark scale, and more recently the equivalent rectangular bandwidth (ERB) scale (Hermes and van Gestel, 1991). All these can be directly calculated by the Praat program.

If we plot these scales against the linear scale, in a range from 50 to 500 Hz, we obtain the curves shown in Figure 9. As can be seen, the scales can be ordered as follows:

$$\log(\text{Hz}) > \text{ERB}(\text{Hz}) > \text{Bark}(\text{Hz}) > \text{Mel}(\text{Hz}) > \text{Hz}$$

The ERB scale is consequently intermediate between a linear and a log scale but closer to the log scale than either the Bark or Mel scales.

Quantitative Models of Pitch

The search for an appropriate scale for measuring fundamental frequency has been one part of a systematic attempt, in particular by researchers from Holland ('t Hart *et al.*, 1990), to develop a model of the way in which pitch is **perceived**. This was done by stylizing raw fundamental frequency patterns as a sequence of straight lines, such that when the stylized frequency is used to resynthesize the utterance, the result is judged to be perceptually equivalent to the original intonation pattern.

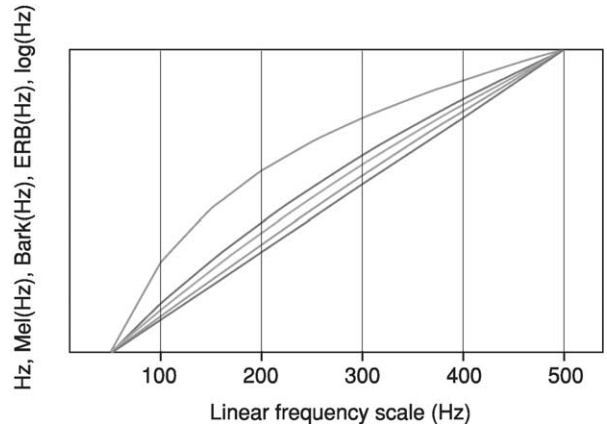

Figure 9 Comparison of different scales for measuring the pitch of speech sounds. The linear frequency (horizontal axis) is compared to four other scales (vertical axis), scaled so that the beginning and end of the curves correspond to 50 and 500 Hz, respectively. The top curve corresponds to the log of the Hz, followed by the ERB, Bark, and Mel transforms. The lowest scale is the linear scale in Hertz.

Another approach to modeling pitch has been to attempt to model the way in which pitch is **produced** by speakers. In particular, work by Fujisaki and his colleagues has applied a model of pitch production (Fujisaki, 1983) to a large number of languages, including several tone languages, analyzing a fundamental frequency curve as consisting of a basic phrase curve with a sequence of accent curves superimposed on it.

A third approach has been to develop acoustic models that are neither directly models of speech perception nor of speech production, but which are compatible with both. In the Momel algorithm developed in our laboratory in Aix-en-Provence (Hirst *et al.*, 2000), the raw fundamental frequency curve is factored into two components, a micro-prosodic component, which is conditioned by the segmental nature of the individual speech sounds, and a macro-prosodic component, which corresponds to the underlying laryngeal gesture. This corresponds to the observation (Nooteboom, 1997) that we do not perceive the observable discontinuities of raw pitch patterns unless they are longer than about 200 ms, "as if human perception unconsciously bridges the silent gap by filling in the missing part of the pitch contour" (Nooteboom, 1997: 644). Similarly, the irregularities introduced by the voiced portions of the microprosodic component (i.e., during the voiced consonants) are not perceived as contributing *per se* to the overall pitch pattern of the utterance.

The macroprosodic component is modeled as a sequence of target points linked by a quadratic spline

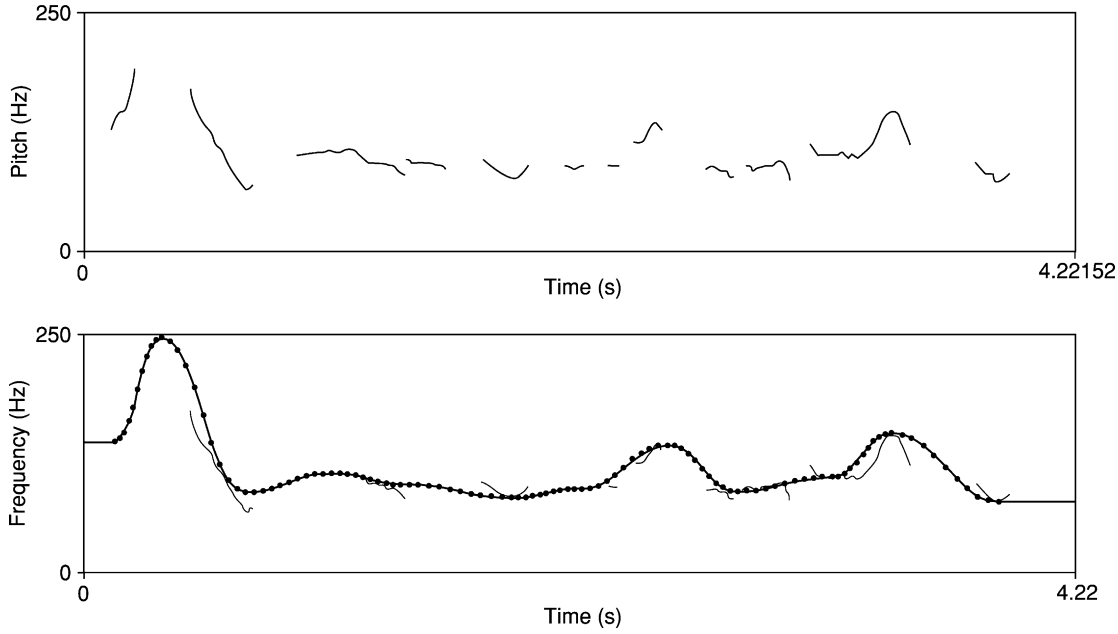

Figure 10 Fundamental frequency curve (top panel) of the sentence 'Every Thursday I have a programme here on Radio 4 called ''Employment'' '. In the bottom panel, the same curve is displayed together with the smooth continuous modeled curve calculated by the Momel algorithm.

function, which basically is the simplest mathematical function that meets the two criteria of continuity and smoothness observed when, for example, a speaker hums the intonation of an utterance or reiterates the pattern on a sequence of sonorant segments such as *mamama* or *lalala*.

Figure 10 illustrates the analysis of a sentence in English using the Momel algorithm.

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I would like to thank colleagues who kindly supplied me with sound files to illustrate this chapter: Martti Vainno (Finnish), Pierre Durand (French), Nobuaki Minematsu (Japanese), Irina Nesterenko (Russian) Tranh Nguyen (Vietnamese). The English examples are taken from the Aix-Marsec and Eurom1 corpora.

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Prosodic Cues of Discourse Units

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Discourse Units in Scripted vs. Unscripted Speech

Before addressing the question of which prosodic features cue which units in spoken discourse, it is necessary to determine whether we are talking about scripted or unscripted discourse. Scripted, or preformed, discourse is prototypically monologic, one-way communication, whereas unscripted discourse is more likely to be produced spontaneously, often in interactive communication. Depending on the circumstances in which discourse is produced and processed, the nature of speakers' units varies dramatically. In scripted discourse, of which the lecture, public speech, and news broadcast are prototypical, the speaker is animating a text that has been drafted in advance. Although an occasional off-the-cuff remark may be inserted, this kind of discourse is typically cast in a written-language mode intended to be read aloud. Consequently, its textual units are units of written grammar (e.g., the sentence and the paragraph). When read aloud, these grammatical units are often homomorphic with prosodic units such as the 'spoken sentence' or the 'spoken paragraph' – units created by characteristic patterns of pitch, loudness, and timing (including pause). In performance, skilled readers may depart from a one-to-one correspondence between printed and spoken units for rhetorical or aesthetic reasons. With unskilled readers, however, such departures are more likely to result from improperly learned 'reading intonation.' Children must be taught how to intone texts meaningfully. The skill does not come naturally nor are all readers equally adept at rendering a written text orally (Esser, 1988).

Unscripted discourse, in contrast (if we take everyday conversation as its prototype), is produced as part of a two-way communicative event in which several parties (two or more) take turns speaking. The units of unscripted discourse revolve around the turn, flexibly constructed so as to be adaptable to the contingencies of interaction (Selting, 2000). They involve speech produced and processed online in a spoken-language mode, and prosodic features including

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pitch, loudness, and timing (rhythm and speech rate) are an integral part of their formatting. The prosodic features used in everyday conversation are not consciously taught but are instead acquired along with communicative competence (Couper-Kuhlen and Selting, 1996a). In contrast to 'reading intonation,' for which there is generally a single acknowledged standard, prosodic formatting in unscripted discourse displays variety-specific features.

Scripted Speech or Read-Aloud Texts

The Spoken Sentence

The spoken sentence, despite its name, is not in the first instance a syntactic unit but rather a prosodic one. Its beginning is signaled by high pitch, or a high tone, on the first accented syllable of an intonation phrase and its end by a falling tone starting on or from the last accented syllable of an intonation phrase and reaching a low point in the speaker's voice range (Wichmann, 2000). Canonically, the first and last accents in the spoken sentence, together with other intervening accents, form a pitch line that gradually descends, or declines, throughout the unit (Couper-Kuhlen, 1986). A similar line of declination has been postulated for amplitude (Laver, 1994). Spoken sentences may consist of one or more intonation phrases or tone groups; if there are several, the groups must be linked by a single declination line for pitch and amplitude.

Spoken sentences do not always correspond to the syntactic/orthographic sentence. The same prosodic patterns are used to render titles, headings, and often, in news broadcasts, the first noun phrase of a news item. Moreover, final adverbials and other nonfocal information in the sentence may be articulated with utterance-final rises, and falls-to-low may occur within a sentence (e.g., at the end of a main clause or at other points where the sentence could be possibly complete but is not). When spoken sentences consist of more than one intonation phrase or tone group, the groups are typically made to cohere by suppressing the height of the first accented syllable and any preceding unaccented syllables at the beginning of subsequent groups ('onset depression') (Wichmann, 2000). This tonal sandhi between the end of one group and the beginning of the next serves as an iconic cue to the cohesion that holds between the parts of the spoken sentence.

The Spoken Paragraph

Just as the written sentences of a text are, as a rule, grouped into written paragraphs, so spoken sentences tend to group into spoken paragraphs or paratones (Yule, 1980). However, whereas written paragraphs are conceptual or topical units, paratones are first and foremost prosodic in nature. Like spoken sentences, they have high pitch at the outset ('high pitch reset'), but the pitch on their first accented syllable is extra high. Any unaccented syllables before the first accent also tend to be high. The peak on the first pitch accent at the beginning of a paratone regularly comes late with respect to the core of the syllable. In extreme cases, it does not show up until the following syllable (Wichmann, 2000). The end of a paratone is cued by extra-low pitch, close to the speaker's baseline, and frequently by a noticeable pause (Couper-Kuhlen, 1986).

In addition to these boundary cues to the spoken paragraph, there is some indication that its constituent parts, the spoken sentences, are linked internally via an overriding declination line. This so-called 'supradeclination' appears to define a global envelope within which more local pitch variation – in conjunction with information structure and rhetorical text relations – occurs (Wichmann, 2000).

Unscripted Speech or Talk-in-Interaction

The Turn-Constructional Unit

Regarding the discourse units created spontaneously in talk-in-interaction, conversation analysts have argued that the smallest of these is the turn-constructional unit (TCU) (Sacks *et al.*, 1974). TCUs are grammatical constituents of varying size – word, phrase, clause, or sentence – that are used to implement communicative actions. Whether a given word is a lexical TCU or is part of a phrasal, clausal, or sentential TCU is cued by its prosodic formatting. If it forms a prosodic contour of its own – an intonation phrase or tone group – it is likely to be a TCU; if it does not, it is more likely to be a fragment of one. Occasionally, sentential constructions are produced with more than one intonation phrase; in this case, the single intonation phrase marks only a fragment of a TCU. TCUs thus require three kinds of completion: syntactic, intonational, and pragmatic. Within their context of occurrence, they form a possibly complete syntactic structure, a possibly complete intonational structure, and at the same time a possibly complete pragmatic action (Ford and Thompson, 1996).

Once produced, TCUs can still be extended – grammatically, intonationally, and pragmatically – should circumstances require it (e.g., if no response from an interlocutor is forthcoming; Ford *et al.*, 2002). This phenomenon has been called 'incrementing' (Schegloff, 1996, 2001). Increments are bits of speech tacked on the end of a prior TCU that are

grammatically dependent on it. They in essence re-complete the prior unit and provide another occasion for possible turn transition. Often, increments are also prosodically dependent on the prior unit: They re-do or reshape its phonetic contour, they are fitted to it in terms of pitch range and placement, and they have loudness, tempo, and articulatory characteristics analogous to it. The prosodic shape of increments thus cues their syntagmatic relationship to the TCU that they are continuing (Walker, 2004).

The Turn

Turns-at-talk may consist of one or more than one TCU. In the latter case, they may be planned as such from the outset or they may become multiunit over time (e.g., when interlocutors decline to take over the floor and the current speaker continues to talk; Schegloff, 1982). Whether a turn is transition-ready or not – that is, whether or not the talk has reached a transition-relevance place (TRP), a place in talk where the floor may legitimately shift to another speaker – is often cued prosodically. Research has shown, however, that the prosody of turn delimitation is specific to the variety of English being spoken (Local *et al.*, 1985, 1986; Wells and Peppé, 1996). Whereas, for instance, both Tyneside and Ulster varieties appear to deploy rallentando and decrescendo over the last foot or two of a unit, with a swell of loudness and lengthening on the final accented (and lexically stressed) syllable, in London Jamaican there is no rallentando or descrescendo and only the very last (often lexically unstressed) syllable of the unit has a narrow fall with creaky voice. For English varieties with so-called stress timing, it appears to be the shape of the accent that projects an upcoming TRP. In the West Midlands, for instance, one type of TRP-projecting accent regularly falls on a syllable with centering vowel quality and is lower, louder, and longer than surrounding syllables; accents that lack these features do not appear to project that the turn is about to end (Wells and Macfarlane, 1998).

Some multiunit turns arise because speakers suppress possible floor transition at the end of a TCU and rush into the next one ('rush through'; Schegloff, 1982, 1996). In these cases, prosodic features cue what the speaker is doing. The end of the first unit tends to lack the rallentando and final lengthening associated with prosodic completion. The first syllables of the new unit are likely to come earlier than expected based on the speaker's rate of speech so far. There is also often a sudden break in pitch and volume levels between the end of the first unit and the beginning of the next. Yet in a kind of phonetic sandhi, selected articulatory features from the first unit may encroach onto the new one (Local and Walker, 2004).

The Sequence

Sequences arise through the pursuit of courses of action in talk-in-interaction. A sequence consists minimally of a single adjacency pair – an initiatory turn and a corresponding response turn – such as greeting–return of greeting, question–answer, and assessment–second assessment. Sequences can, however, be expanded through presequences, insert sequences, and postsequences (Schegloff, 1995). Although sequences are structured through action, there are various prosodic cues to their emerging structure. In standard English, for instance, second pair-parts are normatively integrated with first pair-parts rhythmically. This means that the timing of the first accented syllable of the second pair-part is expected to be synchronized with the timing of the accented syllables at the end of the first pair-part. In other words, the regular delivery of the final accented syllables at the end of a first turn establishes a metric according to which the onset of the second turn is timed (Couper-Kuhlen, 1991, 1993). Departures from the local rhythmic metric (e.g., a next speaker coming in too early or too late with respect to the beat established in prior talk) cue various sorts of contextually interpretable problems in talk (Auer *et al.*, 1999). An ongoing rhythmic beat established in a first turn and continued and/or modified in subsequent turns is thus a hallmark of a coherent sequence in talk: series of turns engaged in a single course of action 'hang together' rhythmically in time.

Series of turns within a sequence are also fitted to one another in terms of pitch and loudness. Second pair-parts are, as a rule, never louder than first pair-parts (Goldberg, 1978). Their overall pitch range, typically reflected in the height of the first accented syllable, tends to be no higher than that of the corresponding first pair-part. That is, in terms of both pitch and loudness, series of turns within a sequence create an overriding declination line (supradeclination), with first turns in a larger sequence typically beginning high and loud and subsequent turns gradually lowering the pitch and volume settings (Schuetze-Coburn *et al.*, 1991). This type of declination is all the more remarkable in that it is jointly constructed and coordinated across speakers. Turns that begin a new sequence are cued as such by having high pitch from the outset (i.e., on both the first accented and any preceding unaccented syllables) (Couper-Kuhlen, 2001, 2003). Turns that extend a sequence under way begin in a fashion that reflects their continuing status. Their initial pitch and volume levels are fitted to those

of prior talk: these turns are thus cued as continuing on from something already begun rather than beginning something new (Couper-Kuhlen, 2004).

Conclusion

One of the advantages of prosodic cues to units in both scripted and unscripted spoken discourse is that they are produced and processed as speech or talk emerges. Of course, information concerning the structure of discourse can be conveyed in so many words (i.e., metalinguistically): "I'm beginning a new sentence" or "This is a new paragraph." However, it is most efficiently conveyed when produced simultaneously with the speech to which it refers. The cueing of structural units prosodically has numerous value-added effects. In discourse that is scripted and read aloud primarily for aesthetic or entertainment purposes (e.g., poetry reading and talking books), it allows for a layer of interpretative meaning above and beyond that suggested through lines, stanzas, and/or sentences and paragraphs. In unscripted interactive discourse, cueing with nonverbal means provides for a measure of indeterminacy, which in turn facilitates *in situ* negotiation.

See also: Conversation Analysis; Prosodic Aspects of Speech and Language; Speech; Spoken Discourse: Types.

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Prosodic Morphology

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The phrase 'prosodic morphology' (hereafter, PM) refers to a theory and to a class of phenomena to which that theory is applied. The theory of PM deals broadly with the relationship between phonological and morphological structure, particularly restrictions on the size and shape of words, stems, and morphemes. This article presents an overview of the theory of PM and its applications.

The Theory of Prosodic Morphology

PM is a theory of how morphological and phonological determinants of linguistic form interact. The theory focuses on understanding how prosodic structure impinges on certain kinds of morphology, such as reduplication and infixation. In McCarthy and Prince (1986/1996, 1990a), three essential claims are advanced about PM:

(1) Principles of PM
  a. Prosodic morphology hypothesis
     Templates are defined in terms of the authentic units of prosody: mora (μ), syllable (σ), foot (Ft), phonological word (PWd).
  b. Template satisfaction condition
     Satisfaction of templatic constraints is obligatory and is determined by the principles of prosody, both universal and language-specific.
  c. Prosodic circumscription
     The domain to which morphological operations apply may be circumscribed by prosodic criteria as well as by the more familiar morphological ones.

A template is a restriction on the size and shape of an affix, stem, or word. According to the prosodic morphology hypothesis (1a), all such restrictions must be stated in prosodic terms. Since templates are defined prosodically, satisfaction of templates (1b) is determined by the same principles that govern prosodic structure generally, such as foot binarity (see (4) below). Circumscription (1c) is a mechanism for delimiting a prosodically defined portion of a word to which a morphological process is then applied; it is important in the analysis of infixation and other phenomena. In short, templates and circumscription must be stated in terms of the vocabulary of prosody and must respect the well-formedness requirements of prosody.

These principles are intended to address a fundamental explanatory goal: to reduce or eliminate the descriptive apparatus that is specific to particular empirical domains such as reduplication and instead derive the properties of those domains from general and independently motivated principles. Claims (1a, b, c) assert that prosodic theory is where these independent principles are to be found. Indeed, the goal of independent explanation is more important than the principles, and subsequent work has pursued the same explanatory goal while departing from these principles in certain respects. Some of this later work is reviewed below.

On the morphological side, the theory of PM incorporates few assumptions. The morphological constituents root, stem, and affix form a labeled bracketing, essentially along the lines of Selkirk's (1982) word-syntax. Most work in PM adopts a view of morphology that is morpheme-based, under the broad rubric of item-and-arrangement models, though the implementation of prosodic circumscription in McCarthy and Prince (1990a) is process-based.

On the phonological side, prosodic morphology presupposes the prosodic hierarchy in (2) (cf. Selkirk, 1980).

(2) Prosodic hierarchy

Phonological word	PWd
Foot	Ft
Syllable	σ
Mora	μ

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On the phonological side, prosodic morphology presupposes the prosodic hierarchy in (2) (cf. Selkirk, 1980).

(2) Prosodic hierarchy

Phonological word	PWd
Foot	Ft
Syllable	σ
Mora	μ

The mora is the basic unit of syllable weight; in the most common syllable-weight typology, short open syllables such as *pa* are monomoraic, and long-voweled or closed syllables like *pa:* or *pat* are bimoraic.

The metrical foot typology assumed in PM is based on Hayes (1987, 1995) and McCarthy and Prince (1986/1996). The typology, given in (3), uses the notations L for a monomoraic (or light) syllable, H for a bimoraic (or heavy) syllable, and σ for a syllable of unspecified weight.

(3)	Iambic foot	Trochaic foot	Syllabic foot
	LH	H, LL	$\sigma\sigma$
	LL, H		

The basic foot typology does not include degenerate feet, those consisting of a single light syllable (if the foot is iambic or trochaic) or a single syllable (if the foot is syllabic). The general condition on foot form in (4) expresses the markedness of degenerate feet.

(4) Foot Binarity
Feet are binary under syllabic or moraic analysis.

The advent of Optimality Theory (Prince and Smolensky, 2004) has had a significant influence on the development of the theory of PM. In Optimality Theory, constraints on linguistic forms are ranked and violable. Constraint violability turns out to be an extremely useful concept in PM, as some of the analyses below will show.

Word and Stem Shape Restrictions

The prosodic hierarchy and foot binarity, taken together, derive the key notion of a minimal word (Broselow, 1982; McCarthy and Prince, 1986/1996; Prince, 1980). According to the prosodic hierarchy, any instance of the category phonological word must contain at least one foot. By foot binarity, every foot must be bimoraic or disyllabic. By transitivity, then, a phonological word must contain at least two moras or two syllables.

The grammatical significance of word minimality is determined by constraints on the interface between morphological and prosodic structure. In nearly all languages, every lexical or content word – that is, every member of the open classes noun, verb, and adjective – corresponds to a phonological word. Therefore, if phonological words are minimally binary, lexical words will be observed to have a minimum phonological size. In some languages, not only lexical words, but also the stems embedded in them must correspond to phonological words and may be subject to binarity requirements as well.

Both of these minimality effects can be illustrated with data from Axininca Campa (Ashéninca Pichis) (Arawakan, Peru). In this language, word-final vowels are shortened (5a), but not in monosyllables (5b) (Payne, 1981; Spring, 1990).

(5) a.	/sampa:/	sampa	'balsa'	cf. no-sampa:-ti 'my balsa'
	/sawo:/	sawo	'case'	cf. no-sawo:-ti 'my case'
vs.	/sima/	sima	'fish'	cf. no-sima-ni 'my fish'
b.	/mi:/	mi:	'otter'	cf. no-mi:-ni 'my otter'
	/so:/	so:	'sloth'	cf. no-so:-ni 'my sloth'

Final vowel shortening is blocked in monosyllables by the joint effects of the three constraints mentioned: every lexical word corresponds to a phonological word, so 'otter' has the phonological structure $[mi:]_{PWd}$; every phonological word contains a foot as its head, so 'otter' has the foot structure $[(mi:)_{Ft}]_{PWd}$; and feet are binary, so $*[(mi)_{Ft}]_{PWd}$ is ruled out.

Axininca Campa also shows word-minimality effects at the level of the stem. Before certain suffixes, monomoraic roots are augmented by adding the syllable *ta*, thereby making them bimoraic, as shown in (6).

(6)	Root	Morphological structure Prosodic structure
	/na/	$\{\{\{na\}_{St}$ piro$\}_{St}$ a:nts^{h}i$\}_{St}$ $[[(nata)_{Ft}]_{PWd}$ pirota:nts^{h}i$]_{PWd}$
	/t^{h}o/	$\{\{\{\{\{t^ho\}_{St}$ RED$\}_{St}$ wai$\}_{St}$ ak$\}_{St}$ i$\}_{St}$ $[[(t^hota)_{Ft}]_{PWd}$ t^hotawaitaki$]_{PWd}$

(Glosses: 'to carry well', 'has continued to kiss more and more')

Under standard assumptions about word syntax, affixed forms are bracketed into recursive stem structure, and the most deeply embedded stem is the root. Before suffixes such as *-piro* or reduplicative -RED, that innermost stem must correspond to a phonological word. For reasons already given, phonological words are minimally bimoraic. Monomoraic roots such as /na/ or /t^{h}o/ are not big enough to support a properly footed phonological word, so epenthetic *ta* must be added. Taken together with the observations about the lack of vowel shortening in monosyllables, this shows that word minimality can both block and trigger phonological processes.

Axininca Campa also illustrates how Optimality Theory can contribute to the understanding of PM. The suffixes that induce augmentation of a preceding

monomoraic root are exactly those that begin with consonants. Suffixes that begin with vowels in underlying representation do not trigger augmentation: /{tʰo}$_{St}$ aːntsʰi/→ *tʰotaːntsʰi*, **tʰota.aːntsʰi*, **tʰotataːntsʰi* 'to kiss'. The reason for this difference lies in constraint interaction. In Optimality-Theoretic terms, the relationship between stems and phonological words is expressed by a ranked, violable constraint on the prosody–morphology interface. This constraint can be called ALIGN-STEM (for details, see McCarthy and Prince, 1993a). ALIGN-STEM is satisfied by [(*nata*)$_{Ft}$]$_{PWd}$ *piro* because the suffix *-piro* is immediately preceded by the right edge of a phonological word. But ALIGN-STEM is violated by *tʰotaːntsʰi* because the alternatives, [(*tʰota*)$_{Ft}$]$_{PWd}$ *aːntsʰi* and *[(*tʰotat*)$_{Ft}$]$_{PWd}$ *aːntsʰi*, violate the constraint ONSET, which prohibits the vowel-initial syllable *aːn*. The interaction of ONSET and ALIGN-STEM through ranking is shown in (7).

(7) ONSET >> ALIGN-STEM

/{tʰo}$_{St}$ aːntsʰi/	ONSET	ALIGN-STEM
a. ☞ tʰotaːntsʰi		*
b. [(tʰota)$_{Ft}$]$_{PWd}$ aːntsʰi	*!	
c. [(tʰotat)$_{Ft}$]$_{PWd}$ aːntsʰi	*!	

To sum up, augmentation in Axininca Campa is a response to word-minimality requirements that derive from the prosodic hierarchy and foot binarity. Presuffixal augmentation further calls on a constraint on the morphology–prosody interface, ALIGN-STEM, that imposes phonological-word status on the stems to which suffixes are attached. Constraint interaction through ranking is crucial in explaining why consonant-initial suffixes induce augmentation and vowel-initial suffixes do not. The consonant-initial/vowel-initial dichotomy is purely descriptive; the real difference is between suffixes like *-piro* that can satisfy both ONSET and ALIGN-STEM versus suffixes such as *-aːntsʰi* that can satisfy one or the other of these constraints, but not both. As these constraints are ranked in (7), ONSET prevails: vowel-initial suffixes are not preceded by stems that are also phonological words, and so there is no need for augmentation.

Templatic Morphology

In some languages, restrictions on the size and shape of words or stems are used to mark morphological distinctions. This phenomenon is called templatic, template-mapping, or root-and-pattern morphology.

The best attested type of templatic morphology is subtractive: nicknames and the like are formed in many languages by mapping the full name onto a minimal-word template. Descriptively, all of the segments of the original name are discarded, leaving only enough to make a single metrical foot, the minimal phonological word. Some examples appear in (8).

(8) a. Central Alaskan Yupik Eskimo (Central Yupik) (A. Woodbury, personal communication)

Name	Proximal Vocative
aŋukaʁnaq	aŋ ∼ aŋuk
nupiʁak	nup ∼ nupix/nupik
aŋivʁan	aŋif

b. Japanese (Poser, 1990)

Name	Hypocoristic
ti	tiː-ʧan
ʃuːsuke	ʃuː-ʧan
taizoo	tai-ʧan
kinsuke	kin-ʧan
midori	miː-ʧan ∼ mit-ʧan ∼ mido-ʧan

c. English

Name	Nickname
Mortimer	Mort, Mortie
Cynthia	Cynth, Cindy
Marjorie	Marge, Margie
Angela	Ange [æñʤ], Angie,
Edward	Ed, Eddie, *but* *Edwie
Abraham	Abe, Abie, *but* *Abrie
Jacqueline	Jackie, *but* *Jacquie (=[ʤækwiː])

The stress system of Yup'ik (8a) is based on the iambic foot, and the truncated names exactly match the expansions of the iambic foot that are consistent with foot binarity (see [3]). The template in Yup'ik, as in the other two languages, is the minimal word (MinWd). Though Japanese (8b) does not have a stress system, there is abundant evidence from various quarters in support of trochaic feet (Ito, 1990; Poser, 1990), and the hypocoristic nicknames consist of a single heavy syllable or two light syllables, which are the licit expansions of the trochee. English (8c) also has trochaic feet, and English nicknames typically contain a single heavy syllable, to which the diminutive suffix *-ie* may be added. In accordance with the template satisfaction condition (1b), the mapping of a name to the minimal-word template respects independently motivated restrictions on prosodic structure in English. That is why **Edwie* and **Abrie* are ill formed: the suffix *-ie* is external to the MinWd template, and **Edw* or **Abr* are not possible monosyllables.

Though nickname formation is rather limited in scope, root-and-pattern morphology is an utterly pervasive feature of some morphological systems, particularly in the Afro-Asiatic family, but also in various Penutian languages such as Miwok (Southern

Sierra Miwok), Yokuts, and Takelma. These systems are all rather complex and difficult to summarize briefly, but it is possible to get a general feel for the mode of analysis by a brief glance at one of them.

The shapes of canonical noun stems in Arabic illustrate some basic principles (McCarthy and Prince, 1990b). (A noun stem is canonical if it has a broken plural, a concept to be explained below.) The permitted noun stems are summarized in (9), classified according to syllabic structure with an example of each type.

(9) a. H b. LL c. LH d. HL f. HH
bahr badal wazi:r ka:tib, ʤa:mu:s,
xanʤar ʤumhu:r
'sea', 'substitute', 'vizier', 'writer', 'buffalo', 'dagger', 'multitude'

All patterns are well represented in the Arabic lexicon, with hundreds of examples of each.

The classification of nouns in (9) according to the syllable-weight patterns assumes final consonant extrametricality, which is independently motivated in Arabic. With the extrametrical consonant set aside, the shapes of these noun stems range from a lower bound at the bimoraic minimal word (H or LL) to an upper bound at the maximal disyllable HH. These observations can be expressed in terms of prosodic conditions on noun stems:

(10) a. Minimally bimoraic b. Maximally disyllabic
$\text{Stem}_N = \text{PWd}$ $\text{Stem}_N \leq \sigma\sigma$

Because the morphological category Stem_N is equated with the phonological word, a Stem_N must contain a foot, under the prosodic hierarchy (2), and so it is minimally bimoraic, as required by foot binarity (4). The maximality condition is a natural one under general considerations of locality, which impose an upper limit of two on rules that count (McCarthy and Prince, 1986/1996). The minimality and maximality conditions define a family of templates in Arabic, with each member of that family available for particular morphological functions in the nominal system. This shows that the fundamental structural properties of root-and-pattern morphological systems can and should be characterized in prosodic terms.

Reduplication

In reduplicative morphology, a copy of a root or stem is mapped to a template. According to (1a, b), the reduplicative template must be defined and satisfied in accordance with prosodic principles.

A cursory survey of reduplicative templates across languages finds only a limited array of options. Total reduplication (11a) copies the entire root or stem, regardless of its size. Of the types of partial reduplication, the largest is disyllabic (11b), with a template consisting of a single foot or a minimal word. Monosyllabic templates can be heavy (11c) or light (11d); the smallest monosyllabic template is the core syllable, which consists of a single onset consonant and a vowel (11e).

(11) a. Indonesian total reduplication

rumah	rumah-rumah	'house/pl.'
ibu	ibu-ibu	'mother/pl.'
lalat	lalat-lalat	'fly/pl.'
harian	harian-harian	'newspaper/pl.'

b. Diyari (Dieri) minimal word reduplication (Austin, 1981)

ŋama	ŋama-ŋama	'to sit'
kanku	kanku-kanku	'boy'
kuɭkuŋa	kuɭku-kuɭkuŋa	'to jump'
tʲilparku	tʲilpa-tʲilparku	'bird species'

c. Ilokano (Ilocano) heavy syllable reduplication (Hayes and Abad, 1989)

kaldíŋ	kal-kaldíŋ	'goat/pl.'
púsa	pus-púsa	'cat/pl.'
ʤjánitor	ʤjan-ʤjánitor	'janitor/pl.'
kristʃjáno	kris-kristjáno	'Christian/pl.'
trabáho	ʔag-trab-trabáho	'to work/is working'

d. Ilokano light syllable reduplication (Hayes and Abad, 1989)

bunéŋ	si-bu-bunéŋ	'buneng/carrying a buneng'
ʤjáket	si-ʤja-ʤjáket	'jacket/wearing a jacket'
pandilíŋ	si-pa-pandilíŋ	'skirt/wearing a skirt'
dʒjánitor	ʔagin-dʒja-dʒjánitor	'janitor/pretend to be a janitor'
trabáho	ʔagin-tra-trabáho	'to work/pretend to work'

e. Sanskrit core syllable reduplication (Steriade, 1988)

pat	pa-pát-a	'fly/perf.'
prat^h	pa-prát^h-a	'spread/perf.'
mna:	ma-mná:-u	'note/perf.'
stamb^h	ta-stamb^h-a	'prop/perf.'

The template for total reduplication (11a) is the unmodified phonological word, PWd. This template is as flexible in size as words themselves are, so it elicits complete and exact copying of the word to which it is attached. The foot or minimal word, MinWd, whose role as nickname template has already been discussed, also shows up as a rather common reduplicative template (11b). The various monosyllabic templates (11c–e) are differentiated by syllable weight and onset complexity. Sanskrit (11e)

permits complex onsets in roots but not in the reduplicative affix; the consonant that is reduplicated is the less sonorous member of the cluster (*p* is less sonorous than *r* and *t* than *s*), or else the first when they are equal sonority.

The role and status of the template satisfaction condition (1b) in reduplication can perhaps best be appreciated by applying recent developments in Optimality Theory (McCarthy and Prince, 1993b, 1994, 1995a, 1999). Reduplication is a matter of reconciling the often competing demands of markedness constraints and MAX-BR. (MAX-BR requires *max*imal copying of the *b*ase's segments by the *r*eduplicative morpheme.) MAX-BR always militates in favor of copying more, whereas prosodic markedness often favors copying less. The ranking of these markedness constraints relative to MAX-BR is therefore crucial in determining the extent of reduplicative copying (*see also* **Morphology: Optimality Theory**).

Sanskrit will serve to illustrate this mode of analysis. Basic language typology shows that onset clusters are marked c – for example, although some languages permit onset clusters, no language literally requires them, and some languages prohibit them outright. There is, then, ample foundation for positing the syllable markedness constraint *COMPLEX-ONSET. In languages without onset clusters, *COMPLEX-ONSET must dominate some input-output faithfulness constraint, such as MAX-IO, which prohibits deletion. (MAX-IO requires *max*imal preservation of the *i*nput's segments by the *o*utput.) Sanskrit, however, allows onset clusters, so the ranking of these two constraints is the other way around. But Sanskrit bans onset clusters from the reduplicative affix, even at the expense of less than perfect copying. Example (12) provides an explanation for this difference:

(12) MAX-IO >> *COMPLEX-ONSET >> MAX-BR

/RED+druv/	MAX-IO	*COMPLEX-ONSET	MAX-BR
a. ☞ du-druv		*	**
b. dru-druv		**!	*
c. du-duv	*!		*

With this ranking, *COMPLEX-ONSET limits the reduplicative affix to unmarked structure at the expense of less complete copying. But where faithfulness to the input rather than completeness of copying is at stake, MAX-IO prevails. This allows the language as a whole, outside the reduplicative affix, to have complex onsets.

Axininca Campa supplies another example. Suffixing reduplication makes a complete copy of a consonant-initial root (13a), but it skips over the first syllable of a vowel-initial root (13b).

(13) a. kawosi-kawosi 'bathe'
t^{h}aːŋki-t^{h}aːŋki 'hurry'
kint^{h}a-kint^{h}a 'tell'
b. osaŋkina-saŋkina 'write'
osampi-sampi 'ask'

Total copying of vowel-initial roots would produce a vowel-initial syllable, which is a violation of ONSET. Since this outcome is avoided, ONSET must dominate MAX-BR in Axininca Campa (see [14]).

(14) ONSET >> MAX-BR

/osaŋkina + RED/	ONSET	MAX-BR
a. ☞ osaŋkina-saŋkina		*
b. osaŋkina-osaŋkina	*!	

This example is of particular interest because it shows that the basic typology of reduplication in (11) is incomplete. Even total reduplication can be limited by the force of markedness constraints.

The broader theme emerging from examples such as Sanskrit and Axininca Campa is that template satisfaction can be affected by any markedness constraint if it is ranked appropriately. The bolder and therefore more interesting hypothesis is that the 'template' is a purely derivative notion: it is a description of a reduplicative pattern that emerges from constraint rankings like those in (12) and (14). In other words, templates are not primitives of morphological and phonological description, as they were in the original conception of PM theory. Rather, the work of templates is done by markedness constraints such as *COMPLEX-ONSET and ONSET, all of which are independently motivated on language typology. Through ranking, these constraints can affect reduplicative or other templatic structures in a language without affecting the language as a whole. The hypothesis just sketched and the research program in support of it are known as Generalized Template Theory (McCarthy and Prince, 1994, 1995a, 1995b, 1999).

Prosodic Circumscription

There is one remaining aspect of PM theory to discuss: prosodic circumscription. The base to which a morphological operation is applied is usually a grammatical category such as root, stem, or (morphosyntactic) word. The result is ordinary prefixation or suffixation. Under prosodic circumscription, though, a morphological operation is applied to a base that is a prosodically delimited substring within the

grammatical category. The result is often some sort of infix, though there are many applications of prosodic circumscription extending beyond infixation. The explanation and examples below are drawn from McCarthy and Prince (1990a, 1995b).

Ulwa (Sumo Tawahka) (Misumalpan, Nicaragua) presents a remarkably clear case of infixation by prosodic circumscription. The possessive in Ulwa is marked by a set of infixes located after the stressed syllable of the noun, as shown in (15a, b) (Hale and Lacayo Blanco, 1989).

(15) a. Possessive paradigm

sú:lu	'dog'
sú:kilu	'my dog'
sú:malu	'thy dog'
sú:kalu	'his/her dog'
sú:kinalu	'our (excl.) dog'
sú:nilu	'our (incl.) dog'
sú:manalu	'your dog'
sú:kanalu	'their dog'

b. Further examples

bás-ka	'his hair'
kí:-ka	'his stone'
ás-ka-na	'his clothes'
saná-ka	'his deer'
amák-ka	'his bee'
sapá:-ka	'his forehead'
siwá-ka-nak	'his root'
aná:-ka-la:ka	'his chin'
arák-ka-bus	'his gun'

Ulwa has iambic feet assigned from left to right. An iambic foot consists of a single heavy syllable or a sequence of two syllables, the first of which is light (3). Therefore, stress falls on the first syllable if it is heavy (*sú:lu*, *ásna*), otherwise on the second syllable. The location of the possessive morphemes, then, is immediately after the first or main-stressed foot of the word.

The fundamental idea in prosodic circumscription theory is that the Ulwa possessive morphemes are actually suffixes, but suffixes on the prosodically circumscribed initial foot within the Ulwa noun stem. The central element of prosodic circumscription theory is a parsing function Φ(C, E, B), which returns the prosodic constituent C that sits at the edge E of the base B. The function Φ factors B into two parts: the kernel B:Φ is the part that satisfies the constraint (C, E), and the residue B/Φ is the rest of B. With '*' standing for the relation between the two factors (normally left- or right-concatenation), the identity in (16) holds.

(16) Factoring of B by Φ
B = B:Φ * B/Φ

There are two main types of prosodic circumscription, positive and negative. In positive circumscription, the B:Φ factor serves as the input to a morphological operation. Call that operation O(X). Then O:Φ – the same operation, but conditioned by positive circumscription of (C, E) – is defined as in (17).

(17) Positive prosodic circumscription
O:Φ(B) = O(B:Φ) * B/Φ

That is, to apply O to B under positive prosodic circumscription is to apply O to B:Φ, concatenating the result with B/Φ in the same way that the kernel B:Φ concatenates with the residue B/Φ in the base B. In this way, the operation O:Φ inherits everything that linguistic theory says about O, except its domain of application.

In Ulwa, the factor returned by Φ is a foot at the left edge, so the Ulwa possessive is characterized as O:Φ(Ft, Left), where O is a morphological operation that can be called 'Suffix POSS.' For example, the factoring of *karásmak* 'knee' is shown in (18).

(18) O:Φ(karásmak) = O(karásmak:Φ) * karásmak/Φ
= O(karás) * mak
= karás-ka * mak
= karáskamak

The initial iambic foot *karás*, rather than the whole noun, functions as the base for suffixation of the possessive morpheme. With words consisting of a single iambic foot, such as *bas* or *ki:*, the infixes are authentic suffixes because B and B:Φ are coextensive.

The Arabic broken plural and diminutive present another example of positive prosodic circumscription. In Arabic, the productive plural formation and the diminutive are expressed by imposing a LH iambic foot on the singular noun stem. Singular nouns come in diverse shapes, but this iambic template affects only a portion of the noun. The affected portion of the singular is italicized in the first column of (19), as is the iambic portion of the plural and diminutive in the second and third columns.

(19)

Singular	plural	diminutive	
*ħuk*m	/*ħaka:*m/	*ħukaj*m	'judgment'
*ʕina*b	/*ʕana:*b/	*ʕunaj*b	'grape'
dʒazi:r-at	/*dʒaza:*wir/	/*dʒuzaj*wir/	'island'
*ʃa:γ*il	*ʃawa:γ*il	*ʃuwajγ*il	'engrossing'
dʒa:mu:s	*dʒawa:*mi:s	*dʒuwaj*mi:s	'buffalo'
*dʒun*dub	*dʒana:*dib	*dʒunaj*dib	'locust'
*sul*tˤa:n	*sala:*tˤi:n	*sulaj*tˤi:n	'sultan'

Underlying representations are written in virgules for those forms undergoing additional phonological processes that obscure some of the effects of the morphology.

Plural and diminutive morphology have characteristic effects on word shape, vowel quality, and appearance of the glides *w* and *j*. Prosodic circumscription is responsible for the word shape, which is therefore the

focus of attention here. Descriptively, plurals and diminutives have both invariant and varying properties of word shape. The invariant is the initial LH sequence, which has been italicized in (19). The varying portion of the plural and diminutive ranges from a single consonant (e.g., the final *m* of *ħukajm*) to a heavy syllable plus a consonant (e.g., the final *miːs* of *dʒuwajmiːs*). The shape of the varying portion is determined by the corresponding singular stem: it matches the unitalicized portion of the singular (e.g., the *m* of *ħukajm* matches the *m* of *ħukm* and the *miːs* of *dʒuwajmiːs* matches the *muːs* of *dʒaːmuːs*).

This division into invariant and varying portions is a consequence of prosodic circumscription. The italicized portion of the singular is the positively circumscribed domain, a trochaic foot, which is also the minimal word of Arabic. This string, the kernel of prosodic circumscription, is mapped onto a LH iambic template, which realizes the plural and diminutive morphology. The residue of circumscription, which varies in size depending on the singular, is simply attached unchanged to the templatic portion. Thus, the morphological operation O is mapping to an iambic template, and the circumscriptional function is Φ(MinWd, Left).

In positive prosodic circumscription, as we have seen, the kernel of the Φ-parse is submitted to the morphological operation O. Negative prosodic circumscription is fully symmetrical: the residue of the parse is submitted to the morphological operation. The negatively circumscribed operation O/Φ(B) – the application of O to the base B minus some edge constituent – is defined in (20).

(20) Negative prosodic circumscription
$$O/\Phi(B) = B{:}\Phi * O(B/\Phi)$$

Except that it is defined in operational terms, this is essentially equivalent to representational extrametricality in metrical phonology. To apply O to B under extrametricality is simply to apply O to B/Φ, concatenating the result with B:Φ in the same way that the residue B/Φ concatenates with the kernel B:Φ in the original base B.

A common type of infixing reduplication requires negative circumscription of an initial onsetless syllable, one that starts with a vowel rather than a consonant. An example of this comes from Timugon Murut (Austronesian, Malaysia), as shown in (21) (Prentice, 1971).

(21)	bulud	bu-bulud	'hill/ridge'
	limo	li-limo	'five/about five'
	abalan	a-ba-balan	'bathes/often bathes'
	ompodon	om-po-podon	'flatter/always flatter'

The reduplicative template in Timugon Murut is a light syllable. It copies material of the base, minus an initial onsetless syllable, if any. It can therefore be characterized as O/Φ(σ_V, Left), where σ_V is a temporary expedient for referring to onsetless syllables and O stands for the operation of prefixing the reduplicative morpheme. Applied to the final example in (21), this schema yields the result in (22).

(22)
$$\begin{aligned} O/\Phi(\text{ompodon}) &= \text{ompodon}{:}\Phi * O(\text{ompodon}/\Phi) \\ &= \text{om} * O(\text{podon}) \\ &= \text{om} * \sigma_\mu\text{-podon} \\ &= \text{om} * \text{po-podon} \\ &= \text{ompopodon} \end{aligned}$$

The morphological base *ompodon*, minus its initial syllable *om*, functions as the prosodically circumscribed base to which the operation of prefixing a σ_μ template applies. Crucially, it is the residue of circumscription, rather than the kernel, that is the target of the morphological operation. When the initial syllable has an onset, as in *bulud*, the kernel of circumscription is empty, and the entire base *bulud* is the residue to which the reduplicative template is prefixed.

Prosodic circumscription unifies a range of phenomena that are sensitive to phonological subdomains, including operations that target a constituent, as in Ulwa, and those that exclude a constituent, as in Timugon Murut. The theory of PM situates circumscription within broader principles of phonology and morphology, thereby contributing to the explanatory goals of the enterprise. But Timugon Murut also discloses some limits of prosodic circumscription theory. One problem is that the onsetless syllable is not a legitimate prosodic constituent – on the contrary, it is a *defective* prosodic constituent. So its role in Timugon Murut circumscription is inconsistent with principle (1c), which says that only recognized constituents can be employed in circumscription. A more serious problem is that infixes with the same locus of placement as Timugon Murut's are always reduplicative in known cases. Reduplicative infixes that go after an initial onsetless syllable but are otherwise prefixed are not uncommon, yet ordinary, non-reduplicative infixes never have exactly this distribution. Cross-linguistically, then, there is an interactional effect: positioning an affix after an initial onsetless syllable is dependent upon the affix's being templatic and reduplicative rather than segmentally specified. Circumscription theory cannot explain this, because it formally divorces the placement of an affix (which is determined by the arguments of Φ) from the structural nature of the affix (which is determined by the operation O). Research on PM within Optimality Theory has sought to address these and other problems (*see* **Morphology: Optimality Theory**).

Positive and negative circumscription are essentially symmetrical mechanisms for defining the base of a morphological operation within a larger word. More loosely connected to the theory of circumscription is the theory of prosodic delimitation, which applies in situations where minimal and supraminimal bases are subject to different morphological operations. For example, in Dyirbal (Pama-Nyungan, Australia) (23), disyllabic and longer bases take different allomorphs of the ergative suffix (Dixon, 1972), while in Axininca Campa (24), bimoraic and longer bases take different allomorphs of the 'possessed' suffix:

(23)

Noun stem	Noun+ergative	
yaʈa	yaʈa-ŋgu	'man'
yamani	yamani-gu	'rainbow'
balagara	balagara-gu	'they'

(24)

mi:	no-mi:-ni
sima	no-sima-ni
ʦʰimi:	no-ʦʰimi:-ti
mana:nawo	no-mana:nawo-ti
mi:	no-mi:-ni
'otter/my otter'	no-mi:-ni
sima	no-sima-ni
'fish/my fish'	

In Dyirbal, the generalization is that the ergative suffix takes the allomorph *-ŋgu* with disyllabic bases (=MinWd), and the allomorph *-gu* with longer bases. In Axininca Campa, the possessed suffix is *-ni* with minimal, bimoraic bases and *-ti* with longer ones. A minimality criterion partitions the lexicon into two sets, and suffixal allomorphy is determined by this partitioning. The suffix alternations in both languages are truly allomorphic, since they do not reflect any systematic phonological pattern.

Prosodic delimitation, like positive prosodic circumscription in Arabic, calls on Φ(MinWd), but it puts the result to different use. Specifically, prosodic delimitation partitions the lexicon into those bases where B:Φ, the Φ-circumscribed kernel of B, is identical to B, and those where B:Φ is less than B. This special sense of Φ, designated Φ′, is a partial function defined as in (25).

(25) Delimitation of B by Φ′
Φ′(B) = B if B = Φ(B); otherwise, Φ′(B) is undefined

Under this formalization, suffixation of *-ŋgu* or *-ni* to minimal bases is regarded as the special, prosodically delimited case. Suffixation of *-gu* or *-ti* is regarded as a default, applicable whenever Φ′(B) is undefined (because B is greater than minimal).

The Dyirbal ergative, for example, consists of two morphological operations. One is 'Suffix *-ŋgu*', restricted prosodically by Φ′(MinWd). The other is prosodically unrestricted 'Suffix *-gu*', which is applicable elsewhere. If Φ′ returns a value, in accordance with (25), then *-ŋgu* is suffixed, since the target form is a foot/minimal word. But if Φ′ returns no value at all, then 'Suffix *-ŋgu*' cannot apply, and the default suffix *-gu* is provided instead. In general, a default operation need not be specified; in other languages, the responses to blocking of the prosodically delimited morphological operation are quite diverse, ranging from complete failure (in Kinande (Nandi) noun reduplication (Mutaka and Hyman, 1990) to zero affixation (in the Maori imperative; Hohepa, 1967) to syntactic periphrasis (in the English comparative). Such matters are outside the purview of prosodic circumscription theory.

In summary, three types of prosodic circumscription are subsumed under the parsing function Φ, which applies to define a prosodically delimited base within some morphological base. There are alternative ways of characterizing a prosodic base without Φ (McCarthy, 2000; McCarthy and Prince, 1993a, 1993b). Nonetheless, it seems clear that a notion akin to the prosodic base, common to all types of circumscription, must play a role in the analysis of phenomena such as those discussed here.

See also: Affixation; Arabic as an Introflecting Language; Foot; Metrical Phonology; Morphology: Optimality Theory; Reduplication; Subtraction; Syllable: Phonology; Syntax of Words; Template Morphology.

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Proto-Algonkian Phonology and Morpho-Syntax

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In 1925 Leonard Bloomfield reconstructed the common ancestor of the four best-attested Algonkian languages of the day – Fox (Meskwaki) [Mesquakie], Plains Cree, Menominee [Menomini], and Southern Ojibwa. These four languages, chosen by an accident of history, together retained reflexes of most of the important phonological and morphological distinctions of Proto-Algonkian. After work by Michelson (1935), Voegelin (1941), and Siebert (1941) established this unexpected fact, Bloomfield (1946), still drawing largely on examples taken from Fox, Cree, Menominee, and Ojibwa, sketched a description of Proto-Algonkian phonology and morphosyntax.

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In 1925 Leonard Bloomfield reconstructed the common ancestor of the four best-attested Algonkian languages of the day – Fox (Meskwaki) [Mesquakie], Plains Cree, Menominee [Menomini], and Southern Ojibwa. These four languages, chosen by an accident of history, together retained reflexes of most of the important phonological and morphological distinctions of Proto-Algonkian. After work by Michelson (1935), Voegelin (1941), and Siebert (1941) established this unexpected fact, Bloomfield (1946), still drawing largely on examples taken from Fox, Cree, Menominee, and Ojibwa, sketched a description of Proto-Algonkian phonology and morphosyntax.

Table 1 Consonant clusters of Proto-Algonkian

	p	*k*	*t*	*č*	*s*	*š*	*θ*	*r*	*m*
p/k	—	—	ʔt	ʔč	ʔs	ʔš	ʔθ	ʔr	Hm[a]
h	hp	hk	ht	hč	hs	hš	hθ	hr[b]	
m/n	mp	nk	nt	nč	ns	nš	nθ	nr	
č	čp	čk							
s	sp	sk							
š	šp	šk	št[b]						
θ	θp	θk							
r	rp	rk							

[a]The reconstruction of the only cluster with *m* as second member is a guess; this cluster could equally well be *hm* as *ʔm*. The capital *H* in *Hm* substitutes for 'ʔ or *h*.'
[b]The reconstructions *hr* and *št* are each supported by only a single set of cognates.

Bloomfield's description, with a few emendations, has been confirmed and expanded by subsequent work on the history of the Algonkian language family.

Sound Inventory

Proto-Algonkian had eight vowels, two semivowels, and twelve consonants (eleven consonants phonemically). The vowels were short *i*, *e*, *o*, *a* and long *i:*, *e:*, *o:*, *a:*. The semivowels were *w* and *y*. The consonants were *p*, *t*, *č*, *k*, *s*, *š*, *m*, *n*, *θ*, *r*, *h*, and ʔ. Of these, ʔ existed in Proto-Algonkian only as an allophone of *p* and *k*.

The consonant clusters of Proto-Algonkian are given in Table 1. The first member of the cluster is listed in the column at the left, and the second member of the cluster is listed across the top of the table.

Note that in Proto-Algonkian nasals assimilate to the place of articulation of a following stop, and that the stops *p* and *k* reduce to ʔ before another consonant.

Meussen (1959) pointed out that ʔ was most likely the reflex of *p* and *k* as first member in a cluster. Pentland (1979) and Goddard (1994) argued for a trilled or tapped *r* in place of Bloomfield's *l*. Pentland (1979) first suggested the existence of *çp* as we as *çk*. Goddard (1994) argued for *sp*, *sk* in place of Bloomfield's *xp*, *xk* and *rp*, *rk* in place of Pentland's implied *çp* and Bloomfield's *çk*. Goddard (1974a) proposed the reconstruction *Hm*, a consonant cluster based on cognate sets missing from Bloomfield's analysis. In other respects, the reconstruction of the sound inventory of Proto-Algonkian is identical to that proposed in Bloomfield (1946).

Phonotactics and Morphophonology

Proto-Algonkian words began with a short vowel (other than *i* and *o*), a long vowel, or a simple consonant (other than *h*). Consonant clusters occurred postvocalically, exclusively. Semivowels (*w* and *y*) occurred intervocalically or after a consonant or consonant cluster.

Phonetically, all vowels were separated by a consonant, consonant cluster, or semivowel, and long vowels in word-final position were shortened by phonological rule. Vowel sequences produced by inflection or derivation were altered by phonological rule. Except that Goddard (1979: 72) first noted that initial syllables of Proto-Algonkian words excluded *o* as well as *i*, these observations date back to Bloomfield (1946).

In Proto-Algonkian, then, if we take V to represent any vowel, C any consonant, and G either semivowel, initial syllables had the shape V, CV, or CGV, with the additional restrictions that V could not be *i* or *o* and C could not be *h*. Medial and final syllables had the shape CV, CGV, CCV, CCGV, or GV, with restrictions on which consonant clusters could occur. Bloomfield also suggested that word-final long vowels were automatically shortened in Proto-Algonkian, but this has subsequently been shown not to be the case. See for instance Goddard (2003).

In inflection and derivation, a short vowel juxtaposed to a long vowel was typically deleted. A *y* semivowel was inserted between juxtaposed long vowels. The sequence *wo:* was replaced by *o:*; *wy* was replaced by *w*; *ti(:)* by *či(:)*; and *θi(:)* by *ši(:)* (Bloomfield, 1946).

In addition to a small number of regularly conditioned phonological rules, our reconstructions of Proto-Algonkian must include a large number of morphologically conditioned phonological rules. In some cases, attractive explanations of these rules have been put forward. For instance, Pentland has suggested that Pre-Proto-Algonkian contained both glottalized and plain series of consonants, and that the loss of the glottalized series caused a phonologically conditioned umlaut, *a:* → *e:* before glottalized consonants, to become morphologically conditioned umlaut: *a:* → *e:* before certain morphemes (see Pentland, 1999.) In other cases, the original conditioning factors of Proto-Algonkian morphophonology are still completely obscure. Proto-Algonkian appears to have run to contractions (a propensity which many of the daughter languages inherited). Bloomfield attempted to account for the various contractions of the sequence *awe* by suggesting that it contracted to *a:* before *t*, *k*, *s* and to *o:* before other consonants. The sounds *t*, *k*, and *s* form a somewhat ill-assorted phonetic class, and, in fact, Bloomfield's rule failed to hold up to further scrutiny. For the time being, we're left with having to list the individual cases where Proto-Algonkian *awe* contracted to *a:*,

contracted to *o:*, or failed to contract at all. Similarly, we must list the individual cases where *aye* contracted to *a:*, contracted to *e:*, or failed to contract.

In addition to morphophonological rules that affected both derivation and inflection, Proto-Algonkian had morphophonological rules that affected derivation but not inflection. At one extreme was the fairly regular rule (with a few marked exceptions) that a morpheme ending in a consonant or semivowel was separated from a following consonant by connective *i*. At the other extreme was a rule with a few marked instances: a tiny handful of morphemes beginning in *a:* or *e* triggered a process that replaced *ta:* and *te* by *sa:* and *se* (Bloomfield, 1946).

Word Formation

Proto-Algonkian words inflected as nouns, inflected as verbs, or were uninflected particles.

Nouns, verbs, and particles in Proto-Algonkian were either simple or complex. Complex nouns, verbs, and particles included one or more extra particles, termed prenouns if they attached to a noun, preverbs if they attached to a verb, and preparticles if they attached to a particle. Morphophonologically, these prenouns, preverbs, and preparticles behaved as independent words; morphosyntactically, they behaved as parts of the same word. In some cases, entirely distinct words, phrases, and even sentences intruded between the segments of such compound words.

Nouns, verbs, and particles in Proto-Algonkian formed diminutives (a process that affected the ends of stems), and verbs, particles, and a few nouns were reduplicated (a process that affected the beginnings of stems). These processes can be partially but not entirely reconstructed for Proto-Algonkian.

Noun Formation

Many Proto-Algonkian noun stems were single, unanalyzable morphemes. Other noun stems were more or less transparently composed from more than one morpheme. So, for instance, the noun stem *ši:ʔši:p-* 'duck' was a single morpheme, but the noun stem *erene ʔšip-* 'standard duck, mallard' was composed of a morpheme *eren-* meaning 'ordinary, plain' and a morpheme *-eʔšip* meaning 'duck'. Both *eren-* and *-eʔšip* occurred in other combinations. (Examples taken from Bloomfield, 1946.)

Bloomfield called the initial part of a stem the root, the final part of a stem the final suffix, and the medial part of a stem (if any) the medial suffix. In modern Algonkian terminology, stems are made up of initials, medials, and finals.

In Bloomfield's analysis, all noun stems consisted of at least an initial and a final. Bloomfield proposed phonetically null finals for noun stems such as *ši:ʔši:p-*. If the phonetically final element in a noun occurred elsewhere as a verb medial, as in the case of *šenkwa:skw-* 'pine tree' (*-a:skw-* 'tree' occurred as a medial in numerous verb stems), he analyzed the stem as an initial *šenkw-* plus a medial *-a:skw-* plus a null final.

Most modern Algonquianists would treat *ši:ʔši:p-* as an unanalyzable noun stem and *-a:skw* as a noun final with an independent life as a verb medial. In that case, it is possible to say that a Proto-Algonkian noun consisted at most of an initial and a final.

Initials and finals might themselves be complex. Many Proto-Algonkian initials and finals were transparently derived from noun stems or verb stems.

Bloomfield drew an important distinction between abstract finals, which merely indicated which grammatical category a stem belonged to, and concrete finals, which conveyed both grammatical and lexical information. Initials and medials in Proto-Algonkian were always more or less concrete. However, the internal structure of an initial, a medial, or a concrete final might contain an abstract part; for instance, the abstract *-w* that derived an initial from an animate intransitive verb stem.

Proto-Algonkian had a contrast between dependent and non-dependent noun stems, discussed in greater detail below. It also had contrasting sets of demonstratives, which constituted a morphologically and syntactically distinct class of inflected nouns.

Particle Formation

Particles formed a diverse class. However, most were composed of initial and final elements, and many were derived from nouns or from verbs.

Verb Formation

There were few unanalyzable verb stems in Proto-Algonkian. Verb stems were typically composed of an initial and a final, or an initial, a medial, and a final, or an initial, a medial, and two or more finals. Bloomfield made a distinction between primary and secondary derivation: in primary derivation, a final attached to an initial or an initial plus a medial; in secondary derivation, a final attached to a fully-formed verb stem.

Proto-Algonkian had a host of secondary finals. Among these were finals that derived applicatives from intransitive verbs; finals that derived ditransitives from ordinary transitive verbs; and finals that derived intransitive reflexives, reciprocals, passives, and middles from transitive or ditransitive verbs.

An interesting feature of Proto-Algonkian derivation was that intermediate stages of derivation did not necessarily have an independent existence.

This fact was duly noted by Bloomfield, who observed that the morphologically well-formed but semantically odd intransitive stem *wi:tapi-* 'sit with' is not attested in any Algonkian language, whereas two of its derivatives, transitive *wi:tapim-* 'sit with' and intransitive *wi:tapinke:-* 'sit with an indefinite person or people' (from derived transitive *wi:tapim-* plus a detransitivizing suffix *-ke:*) are widely attested.

Many initials, medials, and finals that were not derived from noun stems or verb stems nonetheless had a complex internal structure. Special terminology is required in these cases. Bloomfield employed the terms postradicals, premedials, postmedials, and prefinals to describe these sometimes obscure subparts of stems. So, for instance, the finals *-ači*, *-aten* in verb stems such as *kepači-*, *kepaten-* 'freeze solid' are made up of a concrete prefinal *-at-* 'freeze' and an abstract final *-i-* or *-en-* indicating which stem class the verb stem belongs to: intransitive taking an animate subject in the case of *-i-*, and intransitive taking an inanimate subject in the case of *-en-* (examples taken from Bloomfield, 1946).

Verb finals came in sets of as many as four: animate intransitive finals, which formed intransitive verbs taking an animate object; inanimate intransitive finals, which formed intransitive verbs taking an inanimate object; transitive animate finals, which formed transitive verbs taking an animate object; and transitive inanimate finals, which formed transitive verbs taking an inanimate object.

A special class of Proto-Algonkian morphemes which occurred both as verb initials and as preverbs added a valence to a verb stem. The valence then required a complement. For instance, Proto-Algonkian initial *taθ-*, preverb *taši* meant 'there'. Any verb *taθ-* or *taši* appeared in had to have a locative complement, which also had to precede its valence-bearer in the clause.

Noun Inflection

Unpossessed, nonvocative, nonlocative nouns in Proto-Algonkian inflected for number, gender, and prominence.

Number was singular or plural.

Gender was animate or inanimate. Grammatical gender is of course not entirely predictable: as Bloomfield observed, Proto-Algonkian marked 'raspberry' and 'calf of the leg' as animate but 'strawberry' and 'thigh' as inanimate.

Prominence (marked on animate nouns only) was proximate or obviative. A proximate third person is the most interesting third person in the universe of reference; an obviative third person is a person eclipsed by some proximate third person in the universe of reference. The strict rule of prominence in Proto-Algonkian nouns was that an obviative noun could be possessed by a proximate or obviative person, but a proximate noun could only be possessed by a non-third person.

Possessed, nonvocative, nonlocative nouns in Proto-Algonkian inflected for number, gender, prominence, and type of possessor.

The prefix *we-* attached to nouns possessed by a third person possessor. The prefix *ke-* attached to nouns possessed by a second person singular, second person plural, or inclusive possessor. The prefix *ne-* attached to nouns possessed by a first person singular or exclusive possessor. (Inclusive is English 'we' meaning 'I and you (and others)'; exclusive is English 'we' meaning 'I and other(s) but not you.')

Nouns possessed by a plural, obviative, or indefinite possessor took a suffix in addition to a prefix. Nouns possessed by a second person plural or third person plural possessor took the suffix *-wa:w*; nouns possessed by an inclusive possessor took the suffix *-enaw*; nouns possessed by an exclusive possessor took the suffix *-ena:n*; nouns possessed by an obviative third person took the suffix *-iriw*; nouns possessed by an indefinite possessor took the suffix *-inay*.

Many nouns also took a possessive marker *-em*. This suffix preceded the plural or obviative possessor marker, if any.

Certain noun stems in Proto-Algonkian required possession and never occurred unpossessed. These dependent noun stems contrasted with non-dependent noun stems, which could occur both possessed and unpossessed. Prominent classes of dependent nouns were kinship terms and terms for body parts.

Some dependent nouns, such as terms for body parts, could form non-dependent derivatives. These derivatives took a prefix *me-* to indicate indefinite possession by a human, or the ordinary third person prefix *we-* to indicate indefinite possession by an animal.

Vocative nouns took a vocative suffix which inflected as singular or plural. Vocative nouns could also inflect for a first person possessor.

Locative nouns took a locative suffix. They could inflect for any kind of possessor.

Some of the possibilities for Proto-Algonkian noun inflection are given in Table 2. The *-em* included in the possessed forms has a lexicalized pattern of occurrence: it was obligatory with some possessed Proto-Algonkian nouns, optional with others, and impermissible with still others.

Bloomfield originally reconstructed *-ena:n* for the inclusive possessive marker as well as the exclusive possessive marker. He reconstructed *-eliw* for the

Table 2 Proto-Algonkian noun inflection

Unpossessed noun		*Possessed noun*	
vocative sg.	—e	*1 sg.*	ne—eme
vocative pl.	—etwike	*exclusive*	
animate proximate sg.	—a	*2 sg.*	ke—ema
animate proximate pl.	—aki	*2 pl.*	ke—emwa:waki
animate obviative sg.	—ari	*inclusive*	ke—emenawari
animate obviative pl.	—ahi	*3 obviative*	we—emiriwahi
inanimate sg.	—i	*3 sg.*	we—emi
inanimate pl.	—ari	*3 pl.*	we—emwa:wari
locative	—enki	*indefinite*	we—eminay + enki[a]

[a] This combination was subject to contraction.

obviative possessor marker, and gave no reconstruction for the indefinite possessor marker. He treated locative nouns as particles (locative nouns behaved in some respects like particles, and in some respects like nouns), and made no mention of possessed vocative and locative nouns. In other respects, our basic understanding of Proto-Algonkian noun inflection is unchanged since Bloomfield's 1946 sketch.

See Goddard (1979: 86–87) for a discussion of *-ena:n* and *-enaw* and *-eliw* versus *-iliw* (here *-iriw*). See Goddard (1995: 125–126) for a discussion of Proto-Algonkian *-inay*.

Verb Inflection

Three Orders of Moods

All Proto-Algonkian verbs inflected for mood. In addition, animate intransitive (AI) verbs inflected for an animate subject. Intransitive inanimate (II) verbs inflected for an inanimate subject. Transitive animate (TA) verbs inflected for an animate or inanimate subject and an animate object. Transitive inanimate (TI) verbs inflected for an animate or inanimate subject and an inanimate object.

Some verbs of Proto-Algonkian that inflected as transitives (TIs, in every case) behaved semantically as intransitives. Based on the evidence of his four core daughter languages, Bloomfield also reconstructed Proto-Algonkian verbs that inflected as intransitives but behaved semantically as transitives. As it happens, the Proto-Algonkian ancestors of these verbs – animate intransitive verbs, in shape – sometimes inflected for objects as well as a subjects. More on this below.

Ditransitives, like other Proto-Algonkian TAs, inflected for a subject and for a single object (the indirect object or goal). A special suffix attached to ditransitive stems to mark the existence of the second object, but gave no information about its person, number, gender, or prominence.

Proto-Algonkian verbal inflection fell into three orders of moods, distinguished by three types of inflection: a set of independent order moods, a set of conjunct order moods, and an imperative mood.

The independent order moods inflected with prefixes and suffixes. The conjunct and imperative moods inflected with suffixes only.

All moods marked prominence. The strict rules of prominence in Proto-Algonkian verbs were: (1) two third persons indexed on the same verb differed in rank; (2) cases of a low-ranked person acting on a high-ranked person were marked as inverse transfers of action.

Proto-Algonkian verbal inflection distinguished three degrees of prominence for animate third persons (proximate, obviative, and secondary obviative), and two degrees of prominence for inanimate third persons (proximate and obviative). Inanimates juxtaposed to animates were not marked for prominence. Obviatives juxtaposed to non-obviatives were never marked as secondary obviative. Obviatives juxtaposed to non-third persons are sufficiently rarely attested in the daughter languages that we may guess they were rare in Proto-Algonkian as well; in any case, we are unable to reconstruct a full set of forms for these transactions.

The three orders of moods treated inverse transactions differently. The imperative mood did not permit inverse transfers of action. The independent order marked as inverse all cases of an indefinite subject acting on a non-third person, a third person acting on a non-third person, an obviative acting on a proximate, a secondary obviative acting on primary obviative, and an inanimate acting on an animate. The conjunct moods marked as inverse cases of low-ranked third persons acting on high-ranked third persons: an obviative acting on a proximate, a secondary obviative acting on a primary obviative, and an inanimate acting on an animate third person.

The basic ingredients of these observations about Proto-Algonkian verb inflection were first laid out in Bloomfield (1946). However, Bloomfield originally proposed five orders of moods, two of which (the prohibitive and interrogative) were subsequently reanalyzed as belonging to the conjunct order. Also, the intransitive and ditransitive second object marker was first reconstructed by Goddard (1974b).

Independent Order Moods

In Proto-Algonkian, in addition to the two kinds of prominence marking already mentioned – proximate/

Table 3 Partial paradigms for the Algonkian independent indicative

	TA objective direct	*TA objective inverse*	*TA objective inanimate subject*	*TA you-and-me*
	-3s, -3's	*3s-, 3's-*	*0(')s-*	
1s	ne—a:wa	ne—ekwa	ne—ekweni	ke—i (2s-1s)
2s	ke—a:wa	ke—ekwa	ke—ekweni	ke—iHmwa (2p-1s)
3s	we—a:wari	we—eko:ri (3's-3s)	we—ekweni	ke—iHmena (2-1p)
1p	ne—a:na:na	ne—ekwena:na	ne—ekwena:ni	ke—eθe (1s-2s)
12	ke—a:nawa	ke—ekwenawa	ke—ekwenawi	ke—eθeHmwa (1s-2p)
2p	ke—a:wa:wa	ke—ekowa:wa	ke—ekowa:wi	ke—eθeHmena (1p-2)
3p	we—a:wa:wari	we—ekowa:wari (3's-3p)	we—ekowa:wi	
	TA absolute direct	*TA absolute inverse*	*TA absolute passive*	*TA absolute inanimate subject*
	-3, 3	*3*	*X-*	*0(')-*
1s	ne—a		ne—eko:Hmi	ne—ekwi
2s	ke—a		ke—eko:Hmi	ke—ekwi
3s	—e:wa (3s-3')	—ekwa	—a:wa	—ekwiwa
1p	ne—a:Hmena		ne—eko:Hmena	ne—ekwiHmena
12	ke—a:Hmena		ke—eko:Hmena	ke—ekwiHmena
2p	ke—a:Hmwa		ke—eko:Hmwa	ke—ekwiHmwa
3p	—e:waki (-3')	—eko:ki	—a:waki	—ekwiwaki
	TI objective	*TI absolute*	*AI*	*II*
	-0(')s	-0(')		
1s	ne—a:ni	ne—a	ne—	—wi (0s)
2s	ke—a:ni	ke—a	ke—	—wari (0p)
3s	we—a:ni	—amwa	—wa	—riwi (0's)
1p	ne—a:na:ni	ne—a:Hmena	ne—Hmena	—riwari (0'p)
12	ke—a:nawi	ke—a:Hmena	ke—Hmena	
2p	ke—e:wa:wi	ke—a:Hmwa	ke—Hmwa	
3p	we—e:wa:wi	—amo:ki	—waki	

obviative marking of third persons in transitive and intransitive verbs, and inverse marking of certain transitive verbs – the independent order distinguished two types of objects for transitive verbs. Goddard (1979: 87–88), invoking the evidence of the daughter languages that preserved both sets of independent inflection (not found in Fox, Cree, Menominee, but with relics in Ojibwa), suggested that in Proto-Algonkian the objective set was used in clauses where the verb had a definite noun or pronoun as object, while the absolute set was used in clauses where the verb had an indefinite noun as object or (in the case of AIs and objectless TIs) had no object.

The Independent Indicative Mood

Partial paradigms for the independent indicative mood are given in Table 3. Table 3 is adapted from Goddard (1967). Most of the forms involving an obviative participant or a third person plural participant have been omitted from this table, as have object-agreement forms for AIs. See Pentland (1999) for a much fuller treatment of independent inflection that reaches some different conclusions.

First person singular and first person exclusive are represented as 1s, 1p; second person singular and plural as 2s, 2p; second person unspecified for number as 2; inclusive as 12; third person animate proximate singular and plural as 3s, 3p; third person animate obviative singular as 3's; third person animate obviative unspecified for number as 3'; third person inanimate proximate singular and plural as 0s, 0p; third person inanimate obviative singular and plural as 0's, 0'p; third person inanimate singular unspecified for proximacy as 0(')s; third person inanimate unspecified for number or proximacy as 0(''); indefinite as X.

Note that most of the independent inflections involved both a prefix and a suffix. The prefix was *ke-* if there is a second person participant in the verb, *ne-* if there was a no second person but a first person participant in the verb, and *we-* for transitive objective inflections if there was no non-third person participant in the verb. Intransitive and TA absolute inflections took no prefix, and intransitive 1s and 2s forms took no suffix.

The intransitive suffixes for the Proto-Algonkian independent order consisted of a person marker. The person marker was null for singular non-third person subjects, *-w* plus the appropriate noun ending for third person subjects, *-Hmena* for 1p and 12, *-Hmwa* for 2p.

Table 4 Partial paradigms for the Algonkian conjunct subjunctive

AI		*TA direct (theme sign a:)*		*TA you (theme sign eθ)*	
1s	—a:ne:	*1s-3s*	—ake:	*3s-2s*	—eθke:
2s	—ane:	*1s-3'*	—emake:	*3s-12*	—eθankwe:
1p	—a:nke:	*2s-3s*	—ate:	*3s-2p*	—eθa:kwe:
12	—ankwe:	*1p-3s*	—akente:	*1s-2s*	—eθa:ne:
2p	—e:kwe:	*12-3s*	—ankwe:	*1p-2s*	—eθa:nke:
3s	—te:	*2p-3s*	—e:kwe:	*1p-2p*	—eθa:nke:
3p	—wa:te:	*3s-3'*	—a:te:	*1s-2p*	—eθakokwe:
3'	—rite:	*3p-3'*	—a:wa:te:	*X-2s*	—eθenke:
X	—nke:	*X-3*	—ente:	*X-12*	—eθenankwe:
		X-3'	—emente:	*X-2p*	—eθena:kwe:
II				*0(')-2s*	—eθke:
0	ke:			*0(')-12*	—eθankwe:
0'	rike:			*0(')-2p*	—eθa:kwe:
TI (theme sign am)		*TA me (theme sign i)*		*TA (inverse theme sign)*	
1s-0(')	—ama:ne:	*3s-1s*	—ite:	*3'-3s*	—ekwete:
2s-0(')	—amane:	*3s-1p*	—iyamente:	*0(')-3s*	—ekwete:
1p-0(')	—ama:nke:	*2s-1s*	—iyane:	*0(')-3'*	—ekwerite:
12-0(')	—amankwe:	*2p-1p*	—iya:nke:		
2p-0(')	—ame:kwe:	*2p-1s*	—iye:kwe:		
3s-0(')	—anke:	*X-1s*	—inke:		
3p-0(')	—amowa:te:	*X-1p*	—inamenke:		
3's-0(')	—amirite:	*0(')-1s*	—ike:		
X-0(')	—amenke:	*0(')-1p*	—iyamenke:		

In addition, an obviative marker *ri* preceded *w* in the marking for inanimate obviative subjects.

The transitive suffixes in Table 3 consist of a theme sign followed by person markers. The theme sign was *-a:* or *-e:* for TA direct (high-on-low) transfers of action, *-ekw* for inverse (low-on-high) transfers of action, *i* for second person acting on first person, *-eθ* for first person acting on second person, *-a:* or *-e:* for TI objective transfers of action, and *-a:* or *-am* for TI absolute transfers of action. The person markers were in some cases again null for singular non-third person participation in the verb, *-w* plus an appropriate noun ending for third person participation in the verb, *-Hmena* for 1p and 12 participation in the verb, *-Hmwa* for 2p participation in the verb. In other cases, plural participation in the verb was indicated by the same morphemes used for plural possessor marking of nouns: *-wa:w*, *-enaw*, *-ena:n*.

The paradigms in Table 3 look strikingly different from those given in Bloomfield (1946). However, most of the changes can be traced to Goddard's reconstruction of the opposition between absolute and objective inflections for TAs and TIs. The evidence of the Eastern Algonkian languages that Bloomfield had little access to – Munsee and Unami Delaware, Mahican, and Western Abenaki [Abnaki, Western] – provided a solution for the confusing divergence of forms exhibited by Bloomfield's stock four languages. Note that Table 3 also exhibits the minor substitution of *r* for Bloomfield's *l*.

Other Independent Moods

The independent indicative mood is the best-established mood of the independent order. We know that Proto-Algonkian had other independent moods, but we know little about them. All the lesser independent moods inflected much like the independent indicative, but with a suffixed mood marker added to every form. Goddard (1979) observed that both the independent and conjunct orders of Proto-Algonkian seem to have included a mood marked by *-(e)pan* and another mood marked by *-(e)san*. The *-(e)pan* moods may have been perfective or preterite and the *-(e)san* moods may have been imperfective or present, but the exact nature of the contrast is difficult to determine on the basis of the available evidence. See Goddard (1995) and Pentland (1999) for a discussion of these moods.

Conjunct Order Moods

The conjunct order moods inflected with suffixes combined in some cases with modification of the first element of the word ("initial change"). The person markers of the conjunct order differed drastically from those of the independent order.

The Conjunct Subjunctive Mood Partial paradigms for the conjunct subjunctive are given in Table 4. Again, many of the forms involving obviatives and plurals are omitted.

Note that the basic conjunct inflection is exclusively suffixing. The subjunctive mood was chosen to illustrate the conjunct paradigms because the mood marker for the best-attested mood of the conjunct order (conjunct indicative, for Bloomfield; aorist, for Goddard) is word-final *-i*. Word-final *-i* inconveniently triggers palatalization in suffixes ending in *-t*. By contrast, the mood marker for the subjunctive, observable in every form in Table 4, is a non-palatalizing word-final *-e:*.

The intransitive suffixes for the Proto-Algonkian conjunct order consisted of a person marker followed by a mood marker. The person marker was *-a:n* for 1s, *-an* for 2s, *-a:nk* for 1p, *-ankw* for inclusive, *-e:kw* for 2p, *-t* or *-k* for third person animates, *-k* for inanimates, and *-(e)nk* for the indefinite. Animate plurals inserted a marker *-wa:* before or after the third person marker; animate and inanimate obviatives inserted a marker *-ri* before the third person marker.

Transitive inanimate suffixes for the conjunct order consisted of a theme sign *-am*, followed (potentially) by a 3p marker *-wa:* or an obviative marker *-ri*, followed by one of the same set of person markers used in conjunct AIs and IIs, followed by a mood marker.

Transitive animate suffixes for the conjunct order consisted of a theme sign followed by a person marker or person markers followed by a mood marker. The direct theme sign *-a:* indicated the presence of an animate third person object (in other than inverse situations. Also, note that *-a:* dropped before a vowel: cf. Goddard, 1979: 110); the theme sign *-eθ* indicated the presence of a second person or inclusive object; the theme sign *-i* indicated the presence of a first person object; the inverse theme sign indicated a low-on-high third person-on-third person transfer of action. As can be seen from Table 4, the principles governing the exact choice of person marker, and the insertion of suffixes marking animate plural, obviative, inanimate, and indefinite involvement, were quite complex.

The basic inventory of conjunct inflections was established by Bloomfield (1946). However, nearly all the inanimate-subject and indefinite-subject forms were supplied by Goddard (1979). There is dubious or entirely insufficient evidence for many of the 3p and obviative forms which ought to round out these paradigms. And again, *r* has been substituted for Bloomfield's *l*.

Other Conjunct Moods A large number of conjunct moods can be confidently reconstructed for Proto-Algonkian. Among these are the aorist and the subjunctive, which have already been mentioned; the prohibitive, future imperative, and potential, which Bloomfield originally assigned to a prohibitive order; the interrogative, which Bloomfield originally assigned to an interrogative order; the changed conjunct, which employed the same mood marker as the aorist but also altered the initial vowel of the verb (instituting initial change); the iterative, which employed its own mood marker – basically, the inanimate plural version of the aorist and changed conjunct marker – along with initial change; and a large host of aorist or interrogative participles, marked by modified nominal endings and by initial change. See Bloomfield (1946) and Goddard (1979) for a brief discussion of these moods.

Table 5 Partial paradigm for the Algonkian imperative

	AI		*TA*
2s	—ro	*2s-1s*	—iro
2p	—ko	*2p-1s*	—iko
		2-1p	—ina:nke
	TI	*2s-3*	—i
2s-0(')	—anro	*2p-3*	—ehko
2p-0(')	—amoko		

The Imperative Mood

A partial paradigm for the imperative is given in Table 5.

Note that the imperative inflection is exclusively suffixing, and that the person markers are entirely different from those of the independent and conjunct orders.

The imperative paradigm given in Table 5 is taken directly from Bloomfield (1946). (Note that Bloomfield's *o* could be *we*.) The subject is second person in every case; the object is first person, animate proximate third person, or inanimate third person. In many of the daughter languages, these second person subject forms exist alongside inclusive subject (hortative) and third person subject (optative) forms. However, as of this date, there is no agreed-upon reconstruction of these forms for Proto-Algonkian. See Goddard (1979) for a brief discussion of the hortative imperatives.

See also: Algonquian and Ritwan Languages; Cree.

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Proto-Bantu

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Introduction

The Bantu languages are spoken in an area south of an imaginary line drawn from central Cameroon to southern Somalia, covering roughly a third of the African continent. They constitute the largest individual language grouping in Africa, and comprise anywhere between 300 to 600 distinct languages.

The rather remarkable structural similarities among the large majority of the Bantu languages have since long been recognized, and often also exaggerated. Thus, unfortunately, the label 'Bantu' has oftentimes been used as if it referred to one single language.

The relatively close internal affinity of the Bantu languages was already recognized during the 18th century by some of the early missionaries. The first major comparative work on the Bantu languages was done by Wilhelm Bleek during the second half of the 19th century. His work was soon followed by others, most notably Carl Meinhof, whose philological legacy for Bantu studies can hardly be underestimated. Most of his publications on comparative Bantu have stood the test of time fairly well.

If one name should be singled out in the modern era of Bantu historical linguistics, it would have to be that of Malcolm Guthrie, whose contributions to comparative Bantu started in the 1940s, and eventually culminated in his *magnum opus*, the four-volume *Comparative Bantu* (1967–1971). This has become one of the most widely referred- to titles in the entire field of Bantu studies (historical or otherwise). It contains a number of things which are of interest to the comparative/historical linguist. There is a list of some 700 suggested Proto-Bantu roots, a huge amount of proposed sound changes linking forms in individual Bantu languages with Proto-Bantu, a history outline for the development of the Bantu languages (although this particular part is severely outdated by now), and many other things. Two of the volumes are taken up by systematic collections of various lexical and grammatical items based on form–meaning similarities. These are organized in some 2500 'comparative series' (as Guthrie called them), each preceded by a starred form. Somewhat confusingly, however, these starred forms were not offered as reconstructions, even though they have generally been treated as such by many Bantuists.

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languages are further subclassified into groups (labeled with digits in tens). This has yielded unique labels for individual Bantu languages. Thus, for instance, Kikongo (Kongo) is referred to by the code H16 (= zone H, group 10, language 6), Zulu by S42, Swahili by G42, etc. Guthrie's zones and groups have a strong geographic bias, while their values as historically valid groupings range from good to none at all. Thus, it is a referential classification, first and foremost.

Proto-Bantu Sounds

The sound system of Proto-Bantu is by most accounts a simple one. There were seven vowels (which can/could be either short or long) and some 10-plus consonants. In addition, there were likely two tones, high and low.

In the Bantu literature, high vowels **i* and **u* are occasionally referred to as 'superhigh' or 'superclose,' and the symbols <i̧> and <u̧> respectively are commonly used. Similarly, **ɪ* and **ʊ* are often represented by the symbols <i> and <u> respectively (see Table 1). The assumed phonetic values of the high vowels were presumably nothing extraordinary, however, so they seem best represented by the standard IPA symbols. Most modern Bantu languages have vowel systems differing from the original Proto-Bantu one. Even some of the modern seven-vowel systems seem to have gone through some minor restructuring (see Hyman, 1999). While seemingly only a handful of languages have developed more complex vowel systems, many Bantu languages (in particular the large majority of languages spoken below the rain forest area) have instead developed five-vowel systems by merging the two highest series of vowels, **i* = **ɪ* and **u* = **ʊ*.

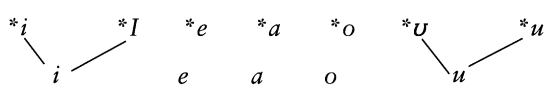

Minimal pairs based on vowel length alone include, for instance, **bàbá* 'wing' vs. **bààbá* 'father.' It has been suggested that, as in many modern Bantu languages, only short vowels were possible word finally, while only long vowels were allowed before prenasalized consonants; or rather, "we cannot demonstrate any quantity opposition in Proto-Bantu word-finally or preceding a nasal complex" (Meeussen, 1972: 2).

Proto-Bantu has been reconstructed as a two-tone language, employing high and low. Minimal pairs based on tonal profile alone include, for instance, **kádá* 'crab' vs. **kádà* 'ember(s), charcoal' (see Greenberg, 1948).

Table 1 Reconstruction of the Proto-Bantu vowel system

**i* ⟨i̧⟩		**u* ⟨u̧⟩
**ɪ* ⟨i⟩		**ʊ* ⟨u⟩
**ɛ∼e* ⟨e⟩		**ɔ∼o* ⟨o⟩
	**a* ⟨a⟩	

Table 2 Three reconstructions of the Proto-Bantu consonant system

Carl Meinhof (1932)			
m	*n*		*(ŋ)*
p	*t, t^j*		*k, k^j*
β			*ɣ, ɣ^j*
w	*l, l^j*	*j*	
Malcolm Guthrie (1967–1971)			
m	*n*	*ɲ*	*ŋ*
p	*t*	*c*	*k*
b	*d*	*ɟ*	*g*
		j	
Achille Meeussen (1967), currently favored			
m	*n*	*ɲ*	*(ŋ)*
p	*t*	*c∼s*	*k*
b	*d∼l*	*j∼z∼j*	*g*
mp	*nt*	*ɲc*	*ŋk*
mb	*nd*	*ɟ*	*ŋg*

The reconstructed Proto-Bantu consonants (see Table 2) form a relatively simple set, comprising three or four nasals and eight plosives, which latter can also be prenasalized. The lack of fricatives in the currently favored reconstruction(s) may look odd at first sight, but languages without fricatives (on a phonemic level) do exist, albeit they seem to be unusual. However, the plosives **c*, **ɟ*, and **d* are thought to have had the alternative (allophonic) nonplosive realizations **s*, **z* (or **j*), and **l*, respectively. In general, fricatives and affricates in the modern Bantu languages can usually be derived from historical plosives by way of a process commonly known as spirantization (see below).

Important Sound Changes

A number of important sound changes have been established for various subregions of the Bantu area.

Meinhof's rule (also known as the Ganda law) deletes the plosive of a nasal + plosive-commencing syllable when this is immediately followed by another nasal (+plosive)-commencing syllable. It can be schematized as follows:

$$\text{NCVN(C)V} \rightarrow \text{N(N)}\tilde{\text{V}}\text{N(C)V}$$
$$(\text{C} = \text{plosive})$$

In Ganda, for instance, an underlying /n-lima/ 'I cultivate' realizes as [nnima] (cf. Proto-Bantu **-dìm-*),

Table 3 Spirantization (frication) involving high front vowels (adapted and simplified from Hyman, 2003)

*pi	>p^hi	>pfi		>fi
		>psi	>tsi	>si
*bi	>b^hi	>bvi		>vi
		>bzi	>dzi	>zi
*ti	>t^hi	>tsi		>si
*di	>d^hi	>dzi		>zi
*ci	>c^hi			>si
*ji	>$ɟ^h$i			>zi
*ki	>k^hi	>ksi	>tsi	>si
*gi	>g^hi	>gzi	>dzi	>zi

while /en-ganda/ 'clan' (preceded by a noun class marker) is realized as [eŋŋãnda] (cf. *ŋgàndá).

The Kwanyama law affects medial *mb-/nd-* commencing syllables by eliminating their nasality in contexts where these are immediately preceded by nasal + plosive-commencing syllables. It can be stated as follows:

NCVndV → NCVdV
NCVmbV → NCVbV
(C = plosive)

Thus in Kwanyama, where this sound change was first attested, we find *ongobe* 'cattle,' which derives from *ŋgòmbè.

Dahl's law, found in the eastern Bantu area, is a dissimilation process changing voiceless [k] to voiced [g] when the following syllable begins with a voiceless consonant. Thus, schematically it would look like this:

kVC̥V → gVC̥V

In Gikuyu, where Dahl's law is still productive, an underlying /kekombɛ/ 'cup' is realized as [gekombɛ]. Historical traces of Dahl's law can be found in Jita, where *òkwìigútá* 'be full, satiated' derives from *-*ɟíkʊt-*.

One of the most widespread sound changes, and which has affected a multitude of the Bantu languages below the forest area (though by no means all), goes by the name of spirantization (also known as frication). This has caused historical plosives to 'deplosivize' in contexts where they have been immediately followed by the high vowels *i and *u (or *i̯ and *u̯, in Bantuist jargon). Thus their modern reflexes are either affricates, fricatives, approximants, or even zero (see Table 3). Examples of spirantization effects abound across the Bantu area, as in the following examples from Swahili:

-fika 'arrive' ← *-*pìk-*
-fisi 'hyena' ← *-*píkí-*
-vuma 'roar' ← *-*dùm-*
-vunja 'break' ← *-*búɲ-*

It should be noted, however, that "while such frications occur frequently throughout the Bantu zone, there is considerable variation. Not only can the exact reflexes differ, but so can the environments in which they occur" (Hyman, 2003: 54).

It should here be noted that none of the sound rules discussed in the literature on Bantu languages have been much use in establishing an overall subgrouping of the Bantu languages (for which see below).

Lexical Reconstructions

Currently there exists a database with some 10 000 reconstructed Proto-Bantu words (not roots). This collection is commonly referred to as BLR3, which stands for *Bantu Lexical Reconstructions 3* (Bastin *et al.*, 2003), and is available as a searchable database on the Internet. The first version was compiled by Achille Meeussen in 1969 at Tervuren, Belgium, while a computer-readable second version dated 1998 is still distributed as a FileMaker file via the Comparative Bantu Online Dictionaries website.

The contents of BLR3 comprises the collected efforts of more than 100 years of reconstruction work by Carl Meinhof, Lilias Homburger, Walther Bourquin, Joseph Greenberg, Achille Meeussen, Malcolm Guthrie, Yvonne Bastin, André Coupez, and many others (see Table 4). The actual number of unique roots in BLR3 is much lower than 10 000. The current version recognizes 1400 unique roots with an additional 3000 derivative and/or variant forms. The rest are uncategorized/unsorted as yet. Many of the starred items have modern reflexes covering a wide geographical area, and can presumably also be projected back to Proto-Bantu. Presently, this adds up to some 1200 reconstructed items. Most of the entries, however, have highly restricted geographical distributions and may thus represent post-Proto-Bantu forms.

The semantics of many reconstructed items and their relationships with each other still need some amount of work. Schadeberg (2002) exemplified some of this ongoing work, and proposed a semantic chain comprising *-*kòt-* 'stoop, be bent' → *-*kòt-* 'be old' → *-*kòté* 'old man' → *-*kòtà* 'chief,' and thereby also showed how order can be brought to an otherwise unsorted collection of lexical reconstructions.

Grammatical Reconstructions

The grammar of Proto-Bantu was most likely very much like that found in most modern Bantu languages, which entails a basic word order of subject–verb–object, a complex noun class system with an elaborate agreement morphology, a set of so-called verbal extensions (see below), and so on. Many

Table 4 Selected Proto-Bantu reconstructions (BLR3) with wide-spread reflexes

Proto-Bantu	*Balundu*[a]	*Gweno*[b]	*Tswana*[c]
VERB ROOTS			
**-bòd-*	*-bɔ-*	*-bòà*	*sèbɔ̀dú*
'be rotten'	'rot'	'rot'	'rotten thing'
**-dáad-*	*-nàŋk-* (?)	*-làa*	*-lála*
'lie down, sleep'	'lie down, sleep'	'sleep'	'lie down'
**-kám-*	*-ám-*	*-káma*	*-gáma*
'squeeze, wring'	'squeeze'	'squeeze, milk'	'milk'
**-ɲo-*	*-nwá-*	*-ɲwá*	*-nwà*
'drink'	'drink'	'drink'	'drink'
**-tɔ́m-*	*-dóm-*	*-rúma*	*-róma*
'send'	'send'	'send'	'send'
NOUN ROOTS			
**-ɟàdà*	*-cà*	*ndʒà*	*tlàlà*
'hunger'	'hunger'	'hunger'	'hunger'
**-ɟánà*	*-ánà*	*mwánà*	*ngwàná*
'child'	'child'	'child'	'child'
**-ɟícò*	*-ɪ̀ɔ*	*rɪ́θò*	*lèítlhó*
'eye'	'eye'	'eye'	'eye'
**-kángà*	*-kánkà*	*ŋgáŋgà*	*kgákà*
'guinea fowl'	'guinea fowl'	'guinea fowl'	'guinea fowl'
**-ɲàmà*	*-àmà*	*ɲàmà*	*nàmà*
'animal, meat'	'meat, animal'	'meat, animal'	'meat'
**-ntʊ̀*	*-tʊ̀*	*mndú*	*mòthò*
'person'	'person'	'person'	'person'
**-pácà*	*-áà*	*mbáθà*	*lèfátlhà*
'twin'	'twin'	'twins (animals)'	'twin'

[a]The Balundu data comes from Kuperus (1985).
[b]The Gweno data comes from Philippson and Nurse (2000).
[c]The Tswana data comes from Snyman *et al.* (1990).
The original orthography is slightly changed here.

of the relevant Proto-Bantu grammatical morphemes have been offered reconstructions by Carl Meinhof (1948), Achille Meeussen (1967), and others.

In modern Bantu languages, we can usually find some 10 to 20 noun classes (genders). These are overtly realized as prefixes on nouns and a variety of agreement markers elsewhere, both in and outside the noun phrase. Twenty or so noun classes and their associated nominal prefixes are usually accepted for Proto-Bantu (see Table 5), but adding all putative suggestions made in the literature, the total might run up to 30, or even beyond.

As the noun class prefixes are simultaneously markers of grammatical number (where relevant), they usually pair into singular/plural pairings. The full set of possible pairings has not been reconstructed, however, as there exists, besides a central chunk of similarities, a wide variation in the modern Bantu languages.

Table 5 The Proto-Bantu noun class system[a]

Noun class	*Noun prefix*	*Assumed semantics*[b]
1	**mʊ̀-*	Humans
1a	*ø-*	Kin, personified animals
2	**bà-*	Plural of class 1
3	**mʊ̀-*	Trees, plants, inanimates
4	**mì-*	Plural of class 3
5	**ì-*	Miscellaneous, augmentatives
6	**mà-*	Plural of classes 5, 11, 14, 15
7	**kì-*	Things, artifacts, augmentatives
8	**bì-*	Plural of class 7
9	**ɲ̀-*	Animals
10	**ɲ̀-*	Plural of class 9
11	**dʊ̀-*	Long thin things
12	**kà-*	Small things, diminutives
13	**tʊ̀-*	Plural of class 12
14	**bʊ̀-*	Abstracts, mass nouns
15	**kʊ̀-*	Infinitives, some body parts
16	**pà-*	Locatives (near, explicit)
17	**kʊ̀-*	Locatives (remote, general)
18	**mʊ̀-*	Locatives (inside)
19	**pì-*	Diminutives
23	**ì-*	Locative (unspecified)

[a]The morphemes are given here as they are reconstructed by Meeussen (1967). The numbers derive from a commonly used numbering system in Bantu studies that has been devised for easy reference when comparing differing forms across several languages. (Numbers 20, 21, and 22 are used for a set of classes that have since been delected from the Proto-Bantu inventory.)
[b]The assumed semantics given here are only rough indicators. all noun classes usually include small or large amounts of miscellaneous nouns.
Reconstructed singular/plural pairings 1/2, 1a/2, 3/4, 5/6, 7/8, 9/10, 11/6, 11/10, 12/13, 14/6, 15/6.

It is usually possible to associate individual noun classes with semantic parameters. For instance, nouns referring to humans are commonly categorized in a class deriving from Proto-Bantu class 1 (see Table 5). Even though there are many language-specific idiosyncrasies in terms of noun class semantics, some general tendencies can be found. These crosslinguistic similarities are often projected back to the semantic makeup of the Proto-Bantu noun class system. One of the most widely cited contributions in this area was presented by Chet Creider and Peter Denny in the mid-1970s (see Denny and Creider, 1986). They reconstructed a noun class system in which an initial distinction is made between mass nouns and count nouns. The latter are then subdivided according to various configurational and shape-related features, such as 'animate' vs. 'artefact,' 'solid' vs. 'outline,' 'extended' vs. 'nonextended,' etc. Thus, nouns belonging to Proto-Bantu class 5 are semantically characterized by being units (singular) of nonextended, solid figures, such as **-bádà* 'spot, freckle,' **-béèdè* 'breast,' **-bʊ̀bì* 'spider,' and others. The system that emerges from this model is a very

well-organized one, and it may be worth pointing out that no modern Bantu language exhibits such a neat system, even though the basic tendencies are there in most of them.

The morphological makeup of a Proto-Bantu verb probably looked like this (see Meeussen, 1967):

NEG + SUBJ + NEG/TAM + OBJ + ROOT + EXT + SUF

The above formula is a simplified version of what is possible in most modern Bantu languages. (Not all slots are obligatorily filled, and some may have multiple contents, especially the medial NEG/TAM slot.) Besides agreement markers for subject (SUBJ) and, optionally, object (OBJ), there are slots also for one or several tense–aspect–mood (TAM) and/or negation (NEG) markers. In addition, the verb root may be suffixed with a so-called verb extension (EXT), which in one way or another affects the semantics of the root (see more below). All Proto-Bantu verbs are reconstructed with a final consonant (e.g., -CVC-), and as the phonotactic rules of the Bantu languages require vowel-ending words, a final suffix (SUF) usually consisting of a single vowel, most commonly *-*a*, is required to fulfill the morphological makeup.

The complex paradigm of assumed agreement markers that must have existed in the Proto-Bantu grammar has also been reconstructed. While some modern Bantu languages allow for several object markers to appear simultaneously, it is unclear whether or not this was possible in Proto-Bantu. Possibly it was, but we do not know. The first and second person pronominal markers have been reconstructed as follows: 1SG **ǹ-* (SUBJ)/**-ǹ-* (OBJ), 1PL **tʊ̀-/*-tʊ́-*, 2SG **ḱ-/*-kʊ̀-*, and 2PL **mʊ̀-/*-mʊ̀*. The third person pronominals comprise distinct markers for each individual noun class. With a few exceptions, these are segmentally identical to the noun class prefixes but appear here generally with high tones instead of low tones. The reflexive marker **-í-*, appearing in the OBJ slot, is used for all persons and classes.

As for TAM markers, there is still much work to be done. In modern Bantu languages, tense-aspect markers often consist of short (C)V syllables. Thus, form–meaning similarities simply due to change is a high-risk factor. Meeussen (1967) suggested a whole range of Proto-Bantu TAM markers, such as the preverbal markers for the negative **ká-/*tá-* and **-tá-/-tí-*, the recent past tense **-a-*, the preterite or remote past **-á-*, the conditional **-ngá-*, the persistive **-kí-*, as well as suffixes for the past/perfect **-ide*, the indicative (or rather, 'mood neutral') **-a*, the subjunctive **-e*, and others.

In modern Bantu languages, there is widespread use of so-called verb extensions. Many of these have also been reconstructed for Proto-Bantu, for instance, the passive **-ib(ʊ)-*, the applicative/dative **-ɪd-* (or **-ɪl-*), the causative **-(ic)i-*, the reciprocal **-an-*, the stative **-am-*, the reversive/separative **-ʊk-* and **-ʊd-* (or **-ʊl-*), impositive **-ik-*, and others. In BLR2/3, one can find numerous reconstructed words containing one or other of these extensions, as in the following examples:

**-báb-ʊk-* 'be singed/burned' ← **-báb-* 'singe, burn'
**-còk-ʊd-* 'pull out' ← **-còk-* 'poke in, put in'
**-dáad-ɪk-* 'invite, convoke' ← **-dáad-* 'lie down, sleep, spend night'
**-dàg-an-* 'promise each other' ← **-dàg-* 'promise, foretell'

The following examples illustrate some of the word class-changing derivational suffixes reconstructed for Proto-Bantu:

**-ɟíb-ì* 'thief' ← **-ɟíb-* 'steal'
**-kúm-ì* 'rich person' ← **-kúm-* 'be honored, be rich'
**-cèk-ò* 'laughter' ← **-cèk-* 'laugh, joke'
**-ɟímb-ò* 'song, dance' < **-ɟím* 'dance, sing'
**-bîɪ-p-* 'be bad' ← **-bîɪ-* 'bad'
**-néne-p-* 'be big' ← **-nénè* 'big'

Grammatical morphemes in modern Bantu languages originate in lexical items by way of so-called grammaticalization. In the overwhelming majority of cases, their lexical sources must be placed at a stage long before the presumed existence of Proto-Bantu. However, one clear example of a Proto-Bantu lexical item that has grammaticalized in a few modern languages involves the word for 'child,' which in Proto-Bantu presumably was comprised of the noun class marker **mʊ̀-* prefixed on a root **-ɟánà*. This word has reflexes in most modern Bantu languages and appears often as *mwána* (Gweno), *ngwána* (Tswana), or something similar. In some Bantu languages, this word has grammaticalized into a diminutive marker, such as *mʊ̌-* (Ngombe) or *mwa-* (Makhuwa), via the construction 'child = small' + NOUN.

Subgrouping of the Present-Day Bantu Languages

There is no accepted subclassification of the Bantu languages, at least none that can claim any historical validity (see Nurse, 1994–1995). It has proven extremely difficult to establish a stable internal structure of subgroups based on shared innovations, regular sound changes, lexicostatistics, or whatever. One persistent problem is the many apparent diffusion phenomena.

Somewhat frustratingly, while "smaller regional studies have sometimes been hailed as the appropriate stepping stones towards the reconstruction of PB . . . they are often disappointing since the reconstructed

intermediate proto-language all too often very closely resembles PB' (Schadeberg, 2003: 159). In fact, the only currently used classifications are largely or entirely referential ones, especially that originally devised by Malcolm Guthrie in the late 1940s (see Guthrie, 1967–1971).

Lexicostatistics has been widely used in Bantu historical studies. Unfortunately, the results from different sources are usually inconsistent with one another. The more languages are included, the more difficult the results are to interpret. The merits and demerits of lexicostatistics (or its older version, glottochronology) has been an ongoing saga in linguistics ever since it was first presented by Morris Swadesh in the late 1940s. Despite the troublesome and often unreliable results it yields, the method keeps being used due to its relative simplicity.

Historical Scenarios: 'the Bantu Expansion'

Even though our understanding of the historical subgrouping of the Bantu languages is not too impressive, we can nonetheless say a bit about the history and development of the Bantu languages, or more particularly their speakers.

There have been two main controversies regarding the history of the Bantu languages. The first concerns place of origin, while the second concerns their spread over what is now the Bantu area. The former issue has by now been settled, the latter has not.

During the late 1940s, Joseph Greenberg suggested a place of origin somewhere along the southern Cameroonian/Nigerian border (see Greenberg, 1972), which is what everybody seems to agree with today. An opposing theory was advanced by Malcolm Guthrie (1962), and soon also Roland Oliver (1966), who located the birthplace of the Bantu languages in the south of the present-day Democratic Republic of the Congo. They came to this conclusion based on the erroneous assumption that the origin of a language group is likely to be where there is the least amount of linguistic diversity. Nowadays, it is a standard assumption that it is in fact the other way around, which was the line of reasoning Greenberg had used when he made his proposal.

As for the dispersal of the Bantu languages, no generally accepted theory has yet surfaced. Clearly, they have dispersed over a large area, but the debate continues over the issue of how exactly this dispersal happened, and why.

Early authors depicted a rapid spread of people who invaded, conquered, and extinguished everything that came in their way (see Johnson, 1919–1922). This idea of a swift, conquering (and violent) mass of people eventually became known as 'the Bantu expansion,' and it figures prominently in the early European literature on the Bantu languages and their speakers. In modern times, most (if not all) efforts at reconstructing the historical scenario concerning the dispersal of the Bantu languages have combined various bits and pieces of archaeological, anthropological, and linguistic evidence.

In fact, the descriptions of 'the Bantu expansion' have changed over time. During the mid-1960s, Roland Oliver observed that the speakers "must have expanded very rapidly indeed in order to have achieved such a wide geographical dispersion along with such a small degree of linguistic divergence" (Oliver, 1966: 362). He saw the main cause for this in a massive population growth, fueled by a "food-producing revolution" (1966: 363), mainly through the introduction of grain crops, wheat and barley.

During the 1970s, another theory took over when David Phillipson suggested a correlation between the dispersal of the Bantu languages and the spread of Iron Age culture, as deduced from, in particular, various forms of ceramic artifacts. "Although general correlation between the spread of the Bantu languages and that of Iron Age culture in what is now Bantu Africa, is almost certainly an oversimplification, it seems to be holding up reasonably well" (Phillipson, 1976: 65).

Since the 1980s, Jan Vansina has set out to dispel what he sees as myths about 'the Bantu expansion.' He completely rejects the correlation between Iron Age culture and the Bantu languages. Instead, the spread of the Bantu speakers/languages happened long before the Iron Age. He depicts an original dispersal from present-day southern Cameroon/Nigeria to the areas around the Great Lakes in (noncoastal) east Africa. Eventually they came to occupy much of the rain forest area, from where the languages diversified into a western and an eastern group, slowly dispersing southwards. The entire process was a slow one, and it involved "many successive Bantu dispersals rather than a single continuous expansion" (Vansina, 1995: 190). The main cause of these dispersals was the growth of a farming culture. "Three dynamics must be considered here: the initial adoption of rudimentary farming, the intensification of farming during a long subsequent formative period until farming had become the main source of food and, finally, later innovations in mature farming systems" (Vansina, 1994–1995: 17) (see **Figure 1**).

All historical scenarios rely on a mixture of archaeological, anthropological, and linguistic evidence. The linguistic data used has varied from time to time. Roland Oliver relied on Malcolm Guthrie's ill-advised ideas about where the birthplace of the

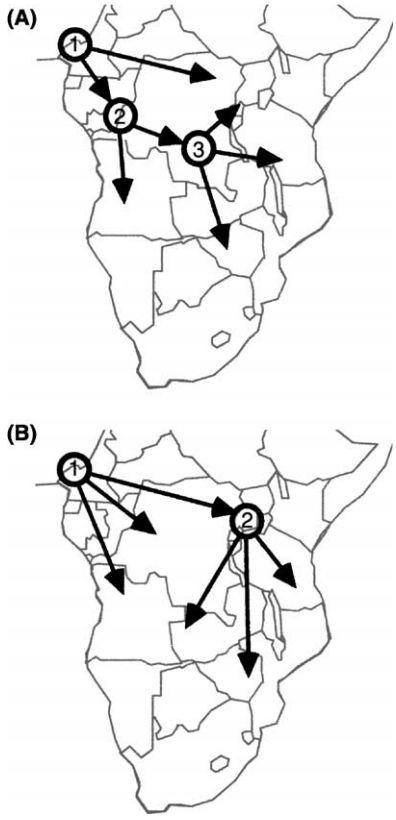

Figure 1 Two possible historical scenarios for the dispersal of the Bantu languages. (A) Adapted from Heine *et al.* (1977). (B) Adapted and simplified from Vansina (1995).

Bantu languages might lie. David Phillipson relied on lexicostatistical calculations made by Heine *et al.* (1977), while Jan Vansina has relied on more up-to-date lexicostatistical studies made at Tervuren (see Bastin *et al.*, 1999).

Thus, to summarize, virtually all Bantuists today agree that Proto-Bantu was spoken some 3000 to 5000 years ago, somewhere in southern Nigeria/Cameroon. From there, the Bantu languages subsequently spread and diversified into the areas where they are found today. However, the explanations for this spread/dispersal/expansion are undecided on the issue of whether it was a caused by a food-producing revolution, knowledge of iron smelting, or a slowly growing farming culture.

Proto-Bantu Culture

In the early 1970s, Edgar Polomé (1975) analyzed the then available reconstructed Proto-Bantu vocabulary, and summarized what could be said about the original Proto-Bantu speakers and their culture. More recent sources, such as the BLR3 database, can further allow us to deduce (with some caution) much interesting information about Proto-Bantu culture. The Proto-Bantu examples given below are ones which have widespread reflexes in modern Bantu languages (though not, of course, in every single one).

The Proto-Bantu vocabulary points towards a savanna culture. Words for animals and insects abound, e.g., **-còkó* 'monkey sp.,' **-kímà* 'monkey sp.,' **-címbá* 'wild cat,' **-gòì* 'leopard,' **-kíá* 'antelope sp.,' **-pàda* 'impala,' **-cíndí* 'squirrel,' **-pʊ́kʊ̀* 'rat, mouse,' **-bébá* 'rat sp.,' **-kòcʊ́è* 'rat sp.,' **-pʊ́ngʊ́* 'eagle,' **-kʊ́àdí* 'francolin,' **-ɟíbà* 'pigeon,' **-ògù* 'elephant,' **-gùbʊ́* 'hippopotamus,' **-gàndʊ́* 'crocodile,' **-bʊ́dʊ́* 'monitor lizard,' **-cátò* 'python,' **-píḍɪ* 'puff adder,' **-búbì* 'spider,' **kʊ́ngá* 'eel,' and more.

They kept cattle (**-gòmbe* 'cattle', **-tàngá* 'cattle post'), goats (**-bʊ́dì*), pigs (**-gʊ̀dʊ́bè*), chicken (**-kókó*), and they hunted with javelins/spears (**-túmò*, **-gòngá*), as well as bow (**-táà*) and arrow (**-gúí*). They also built traps (**-támbò* 'trap, net,' **-tég* 'set trap') and caught fish (**-cúí* 'fish,' **-dób-* 'fish with line,' **-dóbò* 'fishhook').

Whoever spoke Proto-Bantu was familiar with agriculture (**-bìad-* 'plant, sow,' **-ḍ̀ ɪm-* 'cultivate (esp. with hoe)', **-cìd-*'grind'), including various food products such as cereals (**-bèdé* 'sorghum, millet'), beans (**-kʊ́ndè*), bananas (**-kòndè*), and much else. The fig tree (**-kʊ́ɟʊ̀*) is said to be the only known name for fruit trees.

Among their many useful tools, we can find axes and hoes (**-còká* 'ax,' **-témò* 'hoe, ax,' **-jʊ̀ndó* 'hammer, anvil, axe, iron'). Whether or not the Proto-Bantu knew iron smelting and/or used iron tools, as might be implied by a reconstruction like **-gèdà* 'iron, iron thing', seems to be an unresolved issue presently. Many of the suggested iron-related reconstructions can be derived from words with non-iron-related meanings, for instance, **-tádè* 'iron ore, iron, wire', which may derive from **-tádè* 'stone' (see Schadeberg, 2003: 159).

Their food was fried/roasted (**-káng*) or cooked/boiled (**-ɟìpɪk-*). They made and used baskets (**-tʊ́ndʊ́*), clay pottery (**-bʊ́mb-* 'mould pottery'), canoes (**ɟátò*), and many other useful things. They also made use of alcoholic beverages (**-dògù* 'wine, beer', **-kòdʊ* 'become intoxicated'), played music (**-gòmà* 'drum,' **-ḍ̀ ɪmbà* 'lamellophone'), and danced and sang (**-bín-*, **-ɟímb-*).

Final Words

The above text has aimed to familiarize the reader with some of the current state of affairs regarding Proto-Bantu studies. For advanced technical details and specific literature recommendations, the interested reader is suggested to read the most recent and

up-to-date handbook on the Bantu languages, aptly titled *The Bantu languages* (Nurse and Philippson, 2003a). Much of the information and some of the examples above derive from the many excellent contributions in there.

See also: Africa as a Linguistic Area; Bantu Languages; Bleek, Wilhelm Heinrich Immanuel (1827–1875), and Family; Greenberg, Joseph H. (1915–2001); Guthrie, Malcolm (1903–1872); Meeussen, Achille Emile (1912–1978); Meinhof, Carl Friedrich Michael (1857–1944).

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error. The conceptual mistakes inherent in this and other 'revolutionary' approaches to Uralic studies were discussed by Juha Janhunen (2001).

See also: Altaic Languages; Areal Linguistics; Reconstruction, Morphological; Reconstruction, Syntactic; Uralic Languages.

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Proto-Indo–European Morphology

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General

Proto-Indo–European (PIE), like its earliest daughters (Hittite, Vedic Sanskrit, Avestan, Greek, Latin, etc.) was a highly inflected language. It is important to emphasize this fact in view of the many ways in which our view of PIE morphology has changed since the 1960s. For much of the 20th century, the burning questions in IE linguistics lay in the area of phonology, as scholars struggled to determine the number and character of the laryngeal consonants assignable to the protolanguage. It was only later, with the emergence of a consensus on laryngeals and the development of new methods of linguistic and philological analysis, that the 20th-century revolution in IE phonology began to spill over into morphology. Here the result was an even more radical rethinking of the traditional picture. The 'new look' of PIE morphology differs profoundly from the classical account by Brugmann (b. 1849) and newer works in the Brugmannian tradition. But attempts to portray PIE as a 'simpler' (i.e., less morphophonemically complex) language than its daughters have proved misguided.

The basic architecture of PIE was like that of any early IE language. The subject of a sentence stood in the nominative case and agreed with its verb in person and number; the verb was also marked for diathesis or 'voice' and for a variety of tense-aspect and modal categories. Nominal (i.e., substantival and adjectival) stems distinguished gender as well as case. An assortment of derivational processes allowed the formation of nominal and verbal stems from roots or simpler derived stems. Suffixation and ablaut, typically accompanied by movement of the accent, were the commonest devices for marking inflection and derivation. Prefixation as such was virtually unknown, but nouns and verbs combined freely with local particles (preverbs) in ways that tended to lead to the emergence of true prefixes in the daughter languages.

Although PIE distinguished sharply between nominal and verbal stems, a few generalizations can be stated for both. At the heart of every PIE noun or verb (pronouns are discussed separately) was a root. PIE roots were characteristically monosyllabic complexes of the form $*(s)C_1(C_2)EC_3(C_4)$-, where the symbols C_1, C_2, etc., stand for consonants and E stands for a variable vowel. All roots ended in a consonant; traditionally reconstructed preforms such as **dhē-* 'put' and **stā-* 'stand' are now known to have ended in a laryngeal (**dheh$_1$-*, **steh$_2$-*). Whether all roots also began with a consonant is less clear but often assumed. Certain consonant combinations (e.g., plain voiced stop + plain voiced stop; voiceless stop + voiced aspirate, in either order) were disallowed within a single root, a fact that may shed light on the prehistory of the PIE stop system. Some roots, such as **trem-* and **tres-*, both meaning 'tremble,' and **dreh$_2$-* or **drem-*, both meaning 'sleep,' seem originally to have contained an internal morpheme boundary. A boundary is obvious in cases such as **h$_2$u̯eks-* and **h$_2$eu̯g-* 'increase, grow,' where the final **-s-* is known to be an obsolete stem-formative.

Roots combined with one or more optional suffixes to form stems. PIE suffixes were of two canonical types, thematic and athematic. Thematic suffixes were of the form $*\text{-}(C_1)(C_2)(C_3)e/o$-, where the final element, called the thematic vowel, was realized as

*-*e*- or *-*o*- depending on the character of the following suffix or ending. Athematic suffixes were of the form *-(C_1)(C_2)(E)C_3(C_4)-; the more elaborate such morphemes resembled roots. Many suffixes, especially the longer thematic ones, can be analyzed into simpler constituents. Thus, for example, the instrumental suffix *-*tre/o*- clearly consists of a reduced form of the agent-noun marker *-*ter*- followed by the minimal thematic suffix *-*e/o*-.

Most roots and many athematic suffixes could appear in more than one ablaut grade. Ablauting roots and suffixes are conventionally cited in the *e*-grade (*$steh_2$-, *$h_2\underset{\smile}{u}eks$-, *-*ter*-, etc.; a small minority of roots had *-*a*- for *-*e*-). *e*-grade roots and suffixes alternated in principle with *o*-grade, zero-grade, and, less frequently, *ē*-grade and *ō*-grade (= lengthened-grade) versions of the same morphemes. All five possibilities can be seen in the suffixal second syllable of the Greek words for 'father': *e*-grade *-*ter*- in ACC SING *patér-a*; *o*-grade *-*tor*- in ACC SING *eu-pátor-a* 'having a noble father'; zero grade *-*tr*- (antevocalic) and *-*$t\underset{\circ}{r}$*- (anteconsonantal) in GEN SING *patr-ós* and DAT PL *patrá-si* (< *-*$t\underset{\circ}{r}si$), respectively; *ē*-grade *-*tēr*- in NOM SING *patēr*; and *ō*-grade *-*tōr*- in NOM SING *eu-pátōr*. As even these few examples suggest, ablaut was morphologically, not phonologically, regulated in PIE. Every athematic stem was associated with one of a limited number of ablaut/accent patterns that speakers learned when they acquired PIE as their native language. Ablauting stems had 'strong' and 'weak' variants, each proper to specific positions in the paradigm. In the case of the uncompounded word for 'father,' the strong stem was *ph_2-*tér*- (cf. Gk. ACC. SING. *patér-a*) and the weak stem was *ph_2-*tr'* (GEN SING *patr-ós*).

Thematic stems presented fewer complexities. Here, although the material preceding the thematic vowel might theoretically appear in any ablaut grade or combination of ablaut grades, there was no alternation within the paradigm. Thus, for example, the related PIE words *$\hat{g}\underset{\circ}{n}h_1$-*té/ó*-'born' and *$\hat{g}énh_1$-*te/o*- 'thing born, child' formed a minimal pair, the first with zero grade and the second with *e*-grade of the root *$\hat{g}enh_1$- 'be born.' But both words inflected in the same way, adding the case endings to the thematic vowel and maintaining the vocalism of the root syllable unchanged.

Other PIE morphological processes were reduplication and infixation, both almost wholly confined to the verb, and compounding, confined to the noun.

Nominals

Nominal Inflection

The categories of PIE declension were gender (masculine, feminine, and neuter), number (singular, dual, and plural), and case (nominative, accusative, genitive, dative, instrumental, ablative, locative, and vocative; there is in addition some evidence for an allative or directional). Not all the possible combinations of gender, number, and case corresponded to distinct forms. There were many recurrent syncretisms. The dative and ablative plural were always alike, so were the nominative and vocative plural; the nominative, accusative, and vocative dual; the dative, ablative, and instrumental dual; and the nominative and accusative of neuters in all three numbers. Neuters had the further oddity that the NOM-ACC PL form, as an old collective, took singular agreement (cf. Gk. *tà zṓa trékhei* 'the animals (NUNT PL) run,' with 3 SING *trékhei* for expected 3 PL *trékhousi*). Many stems, even when employed adjectivally, made no formal distinction between masculine and feminine, a fact that has been taken to suggest that the masculine : feminine contrast grew out of a pre-PIE 'animate' category.

Table 1 Reconstructed nominal endings

	Singular	*Plural*	*Dual*
NOM	*-*s* (*-*Ø*)[a]	*-*es*	*-h_1(*e*)
ACC	*-*m*	*-*ms*[b]	= NOM
NOM-ACC NEUT	*-*Ø*	*-h_2	= *-ih_2
GEN	*-(*é*)*s*[c]	*-*oHom*[d]	*-*Heu(s)*?[e]
DAT	*-*ei*	*-*bh(i)os* (late)[f]	*-*bh(i)*- (late)[g]
INSTR	*-(*é*)h_1[h]	*-*bhis* (late)[i]	= DAT
ABL	= GEN	= DAT	= DAT
LOC	*-*Ø*, *-*i*[j]	*-*su*	*-*Heu*
VOC	*-*Ø*	= NOM	= NOM

[a]*-*s* was lost with compensatory lengthening in sequences of the type *-*VR-s* ('Szemerényi's Law').
[b]Exceptionally segmentable as acc.sg. *-*m* + *-*s*.
[c]*-*es* when accented, otherwise *-*s*.
[d]**H* = unknown laryngeal, probably *h_1 or *h_3.
[e]Uncertain.
[f]Like the other *bh*-endings (see notes *g*, *i*), only reconstructible for the IE phase following the separation of Anatolian (and Tocharian?) from the rest of the family. The earlier DAT PL ending may have been *-*os*.
[g]See note *f*. What followed the *-*bh*- is unclear.
[h]*-*éh*$_1$ when accented, otherwise *-h_1.
[i]See note. The earlier ending may have been *-*is*.
[j]*-*i* was a particle, optionally added to the properly endingless LOC. SG.

The nominal endings themselves were mostly portmanteau morphs, each one standing for a case + number combination without any clear segmentation into case and number components. The forms can be reconstructed as shown in Table 1.

How the declensional system worked in detail can be seen from the singular and plural forms of the nouns *$g^{\underset{\smile}{u}}$*ó*$\underset{\smile}{u}$-(strong stem; weak stem *$g^{\underset{\smile}{u}}$*é*$\underset{\smile}{u}$-) 'cow' (FEM) and (singular only) *$d\underset{\smile}{i}$*é*$\underset{\smile}{u}$- (strong stem; weak

Table 2 Declensional system

	Singular		*Plural*
NOM	*g^{u}ṓu-s*[a]	*di̯ṓu-s*[a]	*g^{u}óu̯-es*
ACC	*g^{u}ṓ-m*[b]	*di̯ḗ-m*[b]	*g^{u}ṓ-ms*[c]
GEN	*g^{u}éu-s*[d]	*diu̯-és*	*g^{u}éu̯-oHom*
DAT	*g^{u}éu̯-ei*	*diu̯-éi*	*g^{u}éu-bh(i̯)os*
INSTR	*g^{u}éu-h_1*	*diu̯-éh$_1$*	*g^{u}éu-bhis*
ABL	= GEN	= GEN	= DAT
LOC	*g^{u}ḗu̯(-i)*[e]	*di̯éu̯(-i)*	*g^{u}éu-su*
VOC	*g^{u}éu*	*di̯éu*	= NOM

[a]With analogical lengthening taken from *r*- and *n*-stem cases like *ph_2-tḗr < *-tér-s.
[b]Cf. Ved. *gā́m, dyā́m*. Phonologically regular from *g^{u}óm-m, *di̯ém-m < *g^{u}óu̯-m, *di̯éu̯-m.
[c]See note b; by inner-PIE sound change from *g^{u}óu̯-ms.
[d]Cf. Avestan *gaoš*.
[e]*-*ē*- theoretically expected but unattested.

stem *diu̯-) 'sky, Father Sky' (MASC), as shown in Table 2. The strong cases in PIE declension were the nominative, accusative, and vocative; everything else was weak. (The LOC SING, was based on a secondarily strengthened form of the weak stem.) The words for 'cow' and 'sky' were root nouns, formed without a derivational suffix. Such nouns could belong to one of several different ablaut types: in addition to the *o : *e type represented by *g^{u}óu̯-/*g^{u}éu̯- (cf. also *pód-/*péd-'foot,' *dóm-/*dém-'house,' etc.) and the *e : *zero type represented by *di̯éu̯-/*diu̯-′ (cf. also *léuk-/ *luk-′ 'light,' etc.), there is evidence for a type with stable *ē*-vocalism, seen, for example, in *h_3rḗĝ- 'king(let).'

Suffixed athematic nouns, including a large number in which the suffix was simply a frozen constituent of the stem with no remaining synchronic function, likewise displayed a variety of ablaut patterns. At least five underlying types can be distinguished:

- **Acrostatic I**, with fixed accent and *o : *e ablaut in the root syllable and fixed zero grade in the root syllable. Examples: *nók^{u}-t-s*, GEN *nék^{u}-t-s* 'night' (FEM); *dór-u-Ø*, GEN *dér-u-s* 'wood' (NEUT); *u̯ód-r̥-Ø*, GEN *u̯éd-n̥-s* 'water' (NEUT.; an '*r*/*n*-stem,' with *-*n*- substituting for *-*r* in the oblique cases).
- **Acrostatic II**, with fixed accent and *ē : *e ablaut in the root syllable and fixed zero grade in the root syllable. Examples: *mḗn-i-s*, GEN *mén-i-s* 'anger' (FEM); *sḗd-s-Ø*, GEN *séd-s-s* 'seat' (NEUT); *Hi̯ḗk^{u}-r̥-Ø*, GEN *Hi̯ék^{u}-n̥-s* 'liver' (NEUT).
- **Proterokinetic**, with accented *e*-grade root and zero-grade suffix in the strong stem, and zero-grade root and accented *e*-grade suffix in the weak stem. Examples: *mén-ti-s*, GEN *mn̥-téi-s* 'mind, thought' (FEM); *g^{u}ḗn < *g^{u}én-h_2*, GEN *g^{u}n-éh$_2$-s* 'woman' (FEM, but with *-Ø for *-*s* in the NOM SING); *$h_1$néh$_3$-mn̥-Ø*, GEN *h_1n̥h$_3$-mén-s* 'name' (NEUT). It was a peculiarity of this type that the non-neuter NOM PL was weak: *mn̥-téi̯-es* 'thoughts,' *g^{u}n-éh$_2$-es* 'women.'
- **Hysterokinetic**, with zero-grade root and accented *e*-grade suffix in the strong stem, and zero-grade root and zero-grade suffix in the weak stem, with accented endings. Examples: *ph_2-tḗr*, GEN *ph_2-tr-és* 'father' (MASC); *uks-ḗn*, GEN *uks-n-és* 'ox' (MASC); *si̯uH-mḗn*, GEN *si̯uH-mn-és* 'thread' (MASC).
- **Amphikinetic** (or holokinetic), with accented *e*-grade root and *o*-grade suffix in the strong stem, and zero-grade root and zero-grade suffix in the weak stem, with accented endings. Examples: *pént-oh$_2$-s*, GEN *pn̥t-h$_2$-és* 'path' (MASC); *dhéĝh-ōm*, GEN *dhĝh-(m̥)m-és* 'earth' (MASC); *u̯ék̂-ont-s*, GEN *uk̂-n̥t-és* 'willing' (MASC).

This classification is 'ideal' in the sense that the theoretically expected distribution of ablaut grades was susceptible to analogical leveling, sometimes within PIE itself. Thus, for example, the proterokinetic abstracts in *-*tei*- mostly generalized the zero grade of the root throughout the paradigm (cf. Ved. nom. *matís*, GEN *matés* 'thought,' Lat. *mēns, mentis*, Go. *-munds*, Lith. *mintìs*, pointing to regularized *mn̥-tí-/*mn̥-téi-); the neuter abstracts in *-*es*-, likewise originally proterokinetic, eliminated ablaut even more extensively (cf. Ved. NOM *jánas*, GEN. *jánasas* 'race', Gk. *génos, géneos*, Lat. *genus, generis*, pointing to stabilized *ĝénh$_1$-os*, GEN *ĝénh$_1$-es-es*). By the period of the individual daughter languages, the original system of ablaut/accent types had broken down into a system of *i*-stems, *u*-stems, *r*-stems, and so on, each corresponding to a distinct paradigm.

Thematic nouns, or '*o*-stems,' fused the case ending with the final vowel of the stem. In a few cases the ending itself was anomalous, probably borrowed from the declension of demonstrative pronouns. Table 3 lists typical the examples *h_1éḱ-u̯e/o-'horse' (MASC.) and *i̯ug-é /ó-'yoke' (NEUT) (the dual is omitted). Stems of this type, with their stable ablaut, fixed accent, and easy combinability with endings of every shape, became extremely productive in late PIE and the daughter languages.

Nominal Derivation

The parent language employed both external and internal derivational processes – the former modifying the derivational base by adding a suffix, the latter modifying the base by changing its ablaut/accent pattern. In practice, it is not always easy to tell the two apart. Thus, a suffix of the general form *-(*e*)*u*- made both acrostatic nouns of the type *krót-u-/*krét-u-

Table 3 Thematic noun ending

	Singular		*Plural*	
NOM	**h₁ékʷos*	**i̯ugóm*	**h₁ékʷōs*[a]	**i̯ugéh₂*[b]
ACC	**h₁ékʷom*	**i̯ugóm*	**h₁é kʷoms*	**i̯ugéh₂*
GEN	**h₁ékʷos(i̯o)*[c]	**i̯ugós(i̯o)*[c]	**h₁ékʷoHom*	**i̯ugóHom*
DAT	**h₁ékʷōi*[d]	**i̯ugōi*	**h₁ékʷobh(i̯)os*	**i̯ugóbh(i̯)os*
INSTR	**h₁ékʷoh₁*	**i̯ugóh₁*	**h₁ékʷōis*[e]	**i̯ugóis*[c]
ABL	**h₁ékʷoh₂ed*[f]	**i̯ugóh₂ed*[f]	= DAT	= DAT
LOC	**h₁ékʷoi*[g]	**i̯ugói*[g]	**h₁ékʷoisu*(?)[h]	**i̯ugóisu*(?)[h]
VOC	**h₁ékʷe*	**i̯uge*(?)[i]	= NOM	= NOM. ACC

[a] **-ōs* = **-o-es*.
[b] With the collective ending **-h₂*.
[c] **-os* (i.e., **-o-s*), the original ending, is found in Hittite; the particle **-i̯o* was added later.
[d] **-ōi* = **-o-ei*.
[e] An apparently pronominal ending; segmentation unclear.
[f] The only place in the PIE nominal system where the ABL SG is distinct from the GENSG
[g] Trisyllabic.
[h] Or **-osu*?
[i] Uncertain.

'power' (= Ved. *krátu-*) and proterokinetic adjectives of the type **krét-u-/*kr̥t-éu-* 'strong' (= Ved. *kratú-*, Gk. *kratús*). The latter, from the point of view of the later IE languages and perhaps late PIE itself, was a *u*-stem adjective, representing a productive class characterized by proterokinetic **-eu-* (cf. **gʷérh₂-u-/*gʷr̥h₂-éu-*'heavy,' **h₁u̯ér-u-/*h₁ur-éu-* 'broad', etc.). In origin, however, **krét-u-/*kr̥t-éu-* was clearly an internal derivative of the noun **krót-u-/*krét-u-*, the change in form from acrostatic to proterokinetic inflection being associated with the change in meaning from 'power' to 'having power, strong.' Many similar cases are known, including, for example, the agent nouns in **-tér-/*-tr-'* (hysterokinetic) and **'-tor-/*-tr-'* (amphikinetic), based on proterokinetic action nouns in **'-tr̥ /*-tén-* (e.g., **déh₃-tr̥* (NOM SING) 'act of giving, gift' ⇒ **dh₃-tḗr*, **déh₃-tōr* 'giver' < *'having a gift' (= Gk. *dotḗr*, *dṓtōr*)); and the quasiagent nouns in **'-mon-/*-mn-'* (amphikinetic), based on proterokinetic action nouns in **'-mn̥-/*-mén-* (e.g., **séh₁-mn̥*⇒(NOM SING) 'sowing, seed' (= Lat. *sēmen* 'seed') ⇒ **séh₁-mō* <***-mōn* 'sower, seed god' < *'having seed' (= Lat. *Sēmō*)).

Internal derivation of this type had two other main functions in PIE – to form neuter collectives from neuter singulars (e.g., **u̯ód-r̥* (acrostatic NOM-ACC. SING 'water' ⇒ **u̯éd-ōr* <**-or-h₂* (amphikinetic NOM-ACC. 'plural') 'mass of water'), and to allow existing nominal stems to stand in second position in possessive ('bahuvrihi') compounds (e.g., **ph₂-tḗr* (hysterokinetic NOM SING) 'father' ⇒ **h₁su-p(é)h₂-tōr* (amphikinetic NOM SING) 'having a noble father.' There is reason to believe that these latter two functions were an outgrowth of the first ('X' ⇒ 'having X'). In all three cases the formal implementation was the same: acrostatic inflection was replaced by proterokinetic or amphikinetic, proterokinetic inflection was replaced by hysterokinetic or amphikinetic, and hysterokinetic inflection was replaced by amphikinetic. The amphikinetic type stood at the end of the derivational chain; amphikinetic stems had no formally distinct internal derivatives.

Partly because of the role of internal derivation, any attempt to itemize the PIE suffix inventory must be somewhat arbitrary. Even the shortest list of productive athematic suffixes, however, would include the following:

- *i*-stems. Abstract nouns (acrostatic) and adjectives (proterokinetic) in **-(e)i-*; abstract nouns (proterokinetic) in **-t(e)i-*.
- *u*-stems. Adjectives (proterokinetic) in **-(e)u-*; abstract nouns (proterokinetic) in **-t(e)u-*.
- *r/n*-stems. Abstract nouns and concretized action nouns (proterokinetic) with collectives (mostly amphikinetic) in **-u̯(e)r/n-*, **-s(e)r/n-*, **-t(e)r/n-*.
- *r*-stems. Agent nouns (hysterokinetic, amphikinetic) in **-t(e)r-*; derived feminines in **-s(e)r-*.
- *n*-stems. Individualizing and delocatival nouns and adjectives (hysterokinetic, amphikinetic) in **-(e)n-*; possessive adjectives (amphikinetic) in **-H(e)n-*; abstract nouns (proterokinetic) and adjectives, often substantivized (hysterokinetic, amphikinetic), in **-m(e)n-*.
- *nt*-stems. Possessive adjectives, often specialized as participles (mostly hysterokinetic, amphikinetic) in **-(e)nt-*; possessive adjectives (hysterokinetic, amphikinetic) in **-(e)nt-*; possessive adjectives (hysterokinetic, amphikinetic) in **-u̯(e)nt-*, **-m(e)nt-*.
- *s*-stems. Abstracts and concretized action nouns (proterokinetic) with possessive adjectives (hysterokinetic) and collectives (amphikinetic) in **-(e)s-*; comparative adjectives (amphikinetic) in **-i̯(e)s-*; perfect participles (amphikinetic) in **-u̯(e)s-*.
- *h₂*-stems. Abstracts, collectives, and feminine derivatives of thematic stems (apophonically invariant) in **-h₂-*; feminine derivatives of athematic stems (proterokinetic) in **-i̯(e)h₂-*.

Thematic stems present complexities of their own. An echo of internal derivation can be detected in the contrast between **tóm-e/o-* (Gk. *tómos*) 'act of cutting, a cut' and **tom-é/ó-* (Gk. *tomós*) 'cutting, inflicting cuts,' with suffixal **-e/o-* paralleling the **-(e)u-* of the derivational series **krót-u-/*krét-u-/*kr̥t-éu-*. A separate suffix **-e/o-* formed adjectives of appurtenance, as in **dei̯u̯-é/ó-* 'belonging to the sky, god' (: **di̯u̯-*'sky'), with the ablaut strengthening of the root known as *vr̥ddhi*. Longer PIE thematic

Table 4 Demonstrative suppletive paradigm

	Singular			*Plural*		
	Masc.	*Fem.*	*Neut.*	*Masc.*	*Fem.*	*Neut.*
NOM	**so*	**seh₂*	**tód*	**tói*	**téh₂es*	**téh₂ (*tói)*[a]
ACC	**tóm*	**téh₂m*	**tód*	**tóms*	**téh₂(m)s*[b]	**téh₂ (*tói)*[a]
GEN	**tósi̯o*	**tési̯eh₂s*	**tósi̯o*	**tóisoHom*	**téh₂soHom*	**tóisoHom*
DAT	**tósmōi*	**tési̯eh₂ei*	**tósmōi*	**tóibh(i̯)os*	**téh₂bh(i̯)os*	**tóibh(i̯)os*

[a] **tói* was the PIE form, remade to **téh₂* (''**tā́*'') after the separation of Anatolian from the rest of the family.
[b] With loss of the **-m-* by inner-IE sound change.

suffixes, all probably composite in origin, included **-i̯e/o* (adjectives of appurtenance, e.g., **h₁éḱu̯-i̯e/o-* 'equine'), **-re/o-* (possessive adjectives based on root nouns, e.g., **h₁rudh-ré/ó-* 'having redness, red'), **-ne/o-* (verbal adjectives and adjectives of appurtenance, e.g., **pl̥h₁-né/ó-* 'full'), and many others. The highly productive suffix **-te/o-*, in isolation a source of verbal adjectives and participles (e.g., **ḱlu-té/ó-* 'heard, famous'), combined with the comparative suffix **-i̯(e)s-* to yield **-is-te/o-*, used to form superlative adjectives. Every older IE language except Hittite presents a characteristic proliferation of thematic suffixes, each with its regularly formed feminine in **-ā-* (i.e., **-e-h₂-*).

Pronouns and Other Declinables

The PIE personal pronouns were highly idiosyncratic. Unlike nouns, in which the major formal division in the paradigm separated the nominative and accusative from the weak cases, the basic split in the paradigm of the personal pronouns came between the nominative and the other case forms. Thus, the first-person singular pronoun was **(h₁)eĝóh₂* or **(h₁)eĝh₂óm* in the nominative but **méh₁/*me* (ACC), *ménе/*moi* (GEN), and **méĝhi/*moi* (DAT) in the other forms (cf. Eng. *I* vs. *me, my*). The situation was similar in the first-person plural (NOM **u̯éis* vs. OBL **nos-*, **n̥s-*; cf. Eng. *we* vs. *us*) and second-person plural (NOM **i̯úHs* vs. OBL **u̯os-*, **us-*), and only slightly less anomalous in the second-person singular (NOM **túH* vs. OBL vs. OBL **te-*, **tu̯e-*). The second-person singular forms were paralleled outside the nominative by the forms of the reflexive pronoun **s(u̯)e-*.

In lieu of proper third-person pronouns, PIE employed the demonstrative elements **(h₁)e/o-*, **(h₁)ei-*, **se/o-*, and **te/o-*. Of these, the last two were associated in a single suppletive paradigm, part of which can be reconstructed as shown in Table 4. The formal separateness of the animate NOM SING forms, recalling the separate nominative of the personal pronouns, is an obvious archaism. Other visible marks of the pronominal declension were the NOM-ACC neuter ending **-d*, the appearance of 'stem extenders' such as **-smo-* in the DAT SING and **-s-* in the GEN PL, and the appearance of a 'plural stem' in **-oi-* running through most of the most of the masculine and neuter plural forms. These features recurred in the inflection of the interrogative and indefinite **kᵘé/ó-/*kᵘí-*, the relative **Hi̯é/ó-*, and bimorphemic formations of the type **kᵘó-tere/o-* 'which of two' and **(h₁)é-ne/o-* 'that one there.'

The complexities of PIE nominal stem formation and declension can be seen in microcosm in the cardinal numerals. Of these, 'one' through 'four' were fully inflected adjectives of a variety of formal types, where as most of the remaining numerals through '10' were indeclinable adjectives ('eight' was a thematic dual). The decades and hundreds were nouns, all ultimately based on the internal and external derivatives of the underlying stem **déḱm̥t-*'decade' (cf. **u̯úh₁-(d)ḱm̥t-ih₁* '20' (= 'two decades'), **tríh₂-(d)ḱomt-h₂* '30' (= 'three decades'), **(d)ḱm̥t-ó-m* '100' (= 'tenth (decade),' etc.).

Verbs

Verbal Inflection

The PIE verb was inflected in the singular, dual, and plural for categories of tense and aspect, voice, and mood. The most basic tense/aspect contrast was that between the present stem, with imperfective aspectual value, and the aorist stem, with perfective value. Many, although by no means all, verbal roots formed stems of both types. From the present stem were formed two tenses – a present tense in the narrow sense, which represented the verbal action (or process or state) as taking place in actual or general present time, and an imperfect tense, which represented the action as taking place in the past. The aorist stem, prevented by its perfective meaning from being used with the sense of an actual ('here and now') present, formed the basis of the aorist tense, which usually functioned as a perfective preterite. A third type of stem, the perfect stem, underlay the perfect tense and its past-time counterpart, the pluperfect. In origin,

Table 5 Finite verb endings

		Active		*Middle*	
		Primary	*Secondary*	*Primary*	*Secondary*
SIM	1	**-mi*	**-m*	**-h₂er*	**-h₂e*
	2	**-si*	**-s*	**-th₂er*	**-th₂e*
	3	**-ti*	**-t*	a)[a] **-or*	**-o*
				b) **-tor*	**-to*
PL	1	**-mes*, **-mos*(?)[b]	**-me*(?)[b]	**-medhh₂r*	**-medhh₂*
	2	**-te*[c]	**-te*	**-dh(u)u̯or*[d]	**-dh(u)u̯e*[d]
	3	**-(é)nti*	**-(é)nt*	a) **-(ē)ror*(?)[e]	**-(ē)ro*
				b) **-ntor*	**-nto*
DU	1	**-u̯es*, **-u̯os*(?)[f]	**-u̯e*(?)[f]	**-u̯edhh₂r*(?)[g]	**-u̯edhh₂*(?)[g]
	2	**-th₂es*	**-tom*	**-th₂. . .r*(?)[h]	**-t-*(?)[h]
	3	**-t-*(?)[i]	**-teh₂m*	**-t. . .r*(?)[h]	**-t-*(?)[h]

[a]For the difference between the (a) and (b) sets of third-person middle endings see below.
[b]With uncertain vocalism; **-mos* may have been the unstressed variant of the primary ending.
[c]There is also limited evidence for a primary ending **-th₂e*.
[d]Alternatively reconstructible as **-dhuHor*, etc.
[e]The PIE status of the **-ē-* is unclear, and the final **-r* is nowhere directly attested.
[f]See note *b*. The characteristic consonantism of the 1 DU was **-u̯-*, but here and elsewhere the influence of the 1 PL. makes an exact reconstruction impossible.
[g]See note *f*.
[h]Conjectural.
[i]Nothing beyond the initial consonant can be determined.

Table 6 Verb conjugation

		Present	*Imperfect*	*Present*	*Imperfect*
SING	1	**gʷhén-mi*	**gʷhén-m̥*	**dhugh-h₂ér*	**dhugh-h₂é*
	2	** gʷhén-si*	**gʷhén-s*	**dhugh-th₂ér*	**dhugh-th₂é*
	3	**gʷhén-ti*	**gʷhén-t*	**dhugh-ór*	**dhugh-ó*
PL	1	**gʷhn̥-més*	**gʷhn̥-mé*	**dhugh-médhh₂r*	**dhugh-médhh₂*
	2	**gʷhn̥-té*	*gʷhn̥-té* (**gʷhén-te*?)	**dhugh-dh(u)u̯ór*	**dhugh-dh(u)u̯é*
	3	**gʷhn-énti*	**gʷhn-ént*	**dhugh-rór*	**dhugh-ró*

however, the perfect was a type of present, the specific function of which was to denote the state resulting from the completion of a process (e.g., 3 SING PERF **memón-e* 'has in mind' vs. 3 SING AOR **mén-to* 'brought to mind'). The evolution of the perfect from a pure stative to a resultative preterite along the lines of Eng. *I have seen* was in part a post-PIE development.

There were two voices or diatheses, traditionally called active and middle (or mediopassive) and marked by separate sets of personal endings. The two were not always opposed; many roots and stems had only active or only middle forms. When they did contrast, the middle signaled the involvement of the subject in the verbal action, either by giving it an intransitive, reflexive, or processual reading or by introducing a semantic element of self-interest (cf. Ved. *yájate* (MID) 'sacrifices for oneself' vs. *yájati* (ACT) 'sacrifices for someone else'). There was no passive as such, although a passive often evolved from the middle in the daughter languages.

Apart from the indicative mood, PIE had a subjunctive, an optative, and an imperative. The subjunctive and optative both marked an action as unrealized, the subjunctive with a hint of wish or expectation, the optative with a note of doubt or contingency. The two were formed similarly – each inserted a mood sign between the stem and endings – and their distribution was partly complementary, the optative serving as a kind of preterite to the subjunctive. The imperative had no mood sign, but employed special endings.

The majority of finite verbal forms were made with either the active endings or the middle endings. Both sets had 'primary' and 'secondary' variants – the former used in categories with present time value (hence, preeminently the present indicative); the latter used elsewhere. The endings themselves had the forms shown in Table 5. The primary endings were for the most part built from their secondary counterparts by adding a further element – the deictic particle **i* in the most salient active forms and the deictic particle **r* in the middle. The difference between the two pairs of middle endings in the third person was originally chronological: **-o(r)* and **-(ē)ro(r)* are older than **-to(r)* and **-nto(r)*, which arose under the influence of the corresponding active forms. In the synchrony of late PIE, the choice of the one set or the other was partly determined by stem type. When the two sets contrasted, the forms in **-o(r)*/**-(ē)ro(r)* had intransitive value, whereas those in **-to(r)*/**-nto(r)* were usually transitive and self-benefactive (cf. Ved. *gr̥ṇā́ti* < **-ti* 'praises,' *gr̥ṇīté* < **-tói* (**-tór*) 'praises (from self-interest),' *gr̥ṇé* < **-ói* (**-ór*) 'is praised').

The mechanics of conjugation are illustrated in Table 6 with the present and imperfect active of **gʷhén-* (strong stem; weak stem **gʷhn-*') 'strike, slay' and the present and imperfect middle of **dhugh-*' (apophonically invariant) 'yield, produce' (the dual is omitted). The 'strong' positions in the verbal paradigm were the three persons of the active, sometimes joined, depending on specific category and stem type, by other forms. Middles showed no inner-paradigmatic ablaut but were formed from the weak stem of the corresponding active when such an active existed. The poorly attested third person singular middle corresponding to **gʷhén-ti* 'slays' was thus **gʷhn-ór* 'is slain'; the third-person singular active corresponding to **dhugh-ór*, if there had been one, would have been **dhéugh-ti*.

By late PIE times, the imperfect and other preterital tenses were preceded in narrative contexts by a particle known as the augment, probably originally a sentence-connective conjunction (**é-gʷhen-m̥* 'I slew' < *'and then I slew,' etc.). The augment, when present, combined more closely with the verb than adverbial preverbs of the type **pró* 'forth' and **ní* 'down', which were still separate words (cf. **ní* (...) *gʷhen-mi* 'I strike down,' **pró* (...) *dhugh-or* 'gives forth,' etc.). Univerbation of the verb with a preceding element was a persistent trend in the IE family, being favored by the fact that finite verbs were enclitic in main clauses.

The mood sign of the optative was an athematic suffix **-i̯éh₁-* / **-ih₁-*, which was added to the weak stem of the corresponding indicative and followed by the secondary endings (cf. 3 SING **gʷhn̥-i̯éh₁-t*, PL **gʷhn-ih₁-ént*; 3 SING **dhugh-ih₁-ó*, PL **dhugh-ih₁-ró*). The subjunctive marker was a suffix **-e/o-*, identical to the thematic vowel; it was added to the *e*-grade form of the stem and accompanied by the primary thematic endings (3 SING **dhéugh-e-tor*, PL **dhéugh-o-ntor*). In the imperative the second person plural and dual forms used the secondary endings (2 PL **gʷhén-te*, **dhugh-dh(u)u̯é*), but the second person singular had special endings – **-dhi* or zero in the active (**gʷhn̥-dhí*, **gʷhén*) and perhaps **-o* in the middle (**dhugh-ó?*). The third person imperative added a particle to the corresponding secondary endings, probably **-u* in the active and **-om* in the middle (**gʷhén-t-u*, **gʷhn-ént-u*; **dhugh-ōm*, **-rōm* < **-o-om*).

gʷhén-/ *gʷhn-'* and **dhugh-'* were root presents. Root presents of the alternative 'Narten' type showed **ē* : **e* ablaut and fixed accent on the root (3 SING **stḗu-ti* 'praises,' PL **stéu̯-n̥ti*), with accented *e*-grade rather than zero grade in the middle (3 SING **stéu̯-or*, etc.). There were also root aorists, formally similar to the imperfects of root presents. The majority of present and aorist stems, however, were characterized by an overt formative – a suffix, an infix, or reduplication. Interestingly, none of the inherited suffixes that served as tense/aspect markers in PIE displayed paradigmatic ablaut. Most PIE verbal suffixes were thematic (-e/o-*, **-i̯e/o-*, **sk̂e/o-*, **-ei̯e/o-*, etc.) and hence ablaut-free. The commonest athematic suffix was **-s-*, which formed both '*s*-presents' and '*s*-aorists'; characteristically, these showed ablaut of the root syllable (cf., e.g., 3 SING AOR **prḗk̂-s-t* 'asked,' MID **prék̂-s-to*) but not of the **-s-* itself. The unique example of a tense/aspect marker that **did** display ablaut was the nasal infix **-n(é)-*, which figured in presents of the type **i̯u-né-g-ti*: **i̯u-n-g-énti* 'yoke, join' (: **i̯eug-*) and **k̂l̥-né-u-ti* : **k̂l̥-n-u̯-énti* 'hear' (: **k̂leu-*); from **k̂l̥-n(é)u-* was extracted the quasi-suffix **-n(é)u-*, which played a descriptively important role in late PIE. Reduplicated formations included the athematic present type represented by **dhé-dheh₁-ti* (**-dhoh₁-?*): **dhé-dhh₁-nti* 'put, make' (: **dheh₁-*) and **dé-deh₃-ti* (**-doh₃-?*): **dé-dh₃-nti* 'give' (:**deh₃-*).

Table 7 Perfect and pluperfect

Perfect		*Pluperfect*	
Singular	*Plural*	*Singular*	*Plural*
1 **me-món-h₂e*	**me-mn̥-méH(?)*	**me-món-m̥*	**me-mn̥-mé(*-mén-?)*
2 **me-món-th₂e*	**me-mn-ó(?)*	**me-món–s*	**me-mn̥-té (*-mén-?)*
3 **me-món-e*	**me-mn-ḗr (*-ŕ̥)*	**me-món-t*	**me-mén-r̥s*

In addition to presents and aorists of these types, the PIE verbal system included forms that patterned functionally as actives but inflected with endings related to those of the middle. Here belonged in the first instance the perfect, originally a kind of reduplicated present with **o*: *zero* (for older **o* : **e*) ablaut, but already a formally and functionally distinct category in late PIE. The perfect and pluperfect active of the root **men-* 'bring to mind' presented a mixture of familiar and unfamiliar-looking forms, as shown in Table 7. Almost all perfects were conjugated like **me-món-/ *me-mn̥-'*, including the irregularly unreduplicated **u̯óid-/ *u̯id-'* 'know' (: **u̯eid-* 'see, catch sight of'). Internal reconstruction suggests that the pre-PIE ancestor of the perfect was a kind of middle, with an ancestral version of the middle endings. As the parent language evolved and the perfect ceased to be synchronically identified as a middle, its endings escaped the formal innovations (replacement of 3 SING **-e* by **-o*, replacement of 3 PL-**ḗr/ *-r̥* by **-(ē)ró*, etc.) that affected those of the middle proper. The perfect endings thus became, in effect, positional variants of the active endings. When the need arose for a set of 'secondary' perfect endings to mark the pluperfect, the active secondary endings were quite naturally exploited for this purpose (**memón-m̥*, **-s*, **-t*, etc.).

The perfect was not the only category that employed endings of the *h₂-e* series in an active function. Present formations that used perfect like endings included root presents with **o* : **e* ablaut (e.g., **mólh₂-* 'grind'), reduplicated presents with *i*-reduplication (e.g., **pí-bh₃-* (< **-ph₃-*) 'drink'), and denominative factitive presents in **-h₂-* (e.g., **néu̯e-h₂*-'make new'). There were also *h₂e*-conjugation root aorists, which, like the corresponding root presents, had **o* : **e* ablaut (e.g., **lógh-/ *légh-* 'lie down'). As a rule, the *h₂e*-conjugation mode of inflection remained clearly recognizable only in Anatolian. Apart from the perfect, the only direct trace of active

h_2e-inflection that survived into the non-Anatolian branches of the family was the first-person singular primary thematic ending **-o-h_2* (> Lat. -*ō*, GK. -*ō*, etc.), representing older **-o-h_2e*. Table 8 shows the present and imperfect active of the stem **bhér-e/o*-'bear.'

The appearance of **-o-h_2* for the expected **-o-mi* was thus a significant archaism. The thematic modal forms – in particular, the optative in **-oih_1-* (i.e., **-o-* + **-ih_1-*) and (apart from the 1 SING) the thematic subjunctive in **-ē/ō-* (i.e., **-e/o-* + **-e/o-*) – took the normal active and middle endings.

Most of the nominal forms of the PIE verb – active participles in **-(e)nt-*(NOM SING MASC **g^{u}hn-ónt-s*, **stéu̯-n̥t-s*, **bhér-o-nt-s*), perfect participles in **-u̯(e)s-*(NOM SING MASC **u̯eid-u̯ós*), and verbal adjectives (passive participles) in **-té/ó-* (NOM SING MASC **k̂lu-tó-s*) – have already been briefly mentioned. Middle participles, formed to present, aorist, and perfect stems alike, were marked by the phonotactically aberrant suffix **-m$h_1$ne/o-* (NOM SING MASC **dhugh-m̥$h_1$nó-s*, **bhér-o-m$h_3$no-s*, etc.). There was no well-developed system of infinitives; with the exception of a single inherited type based on the suffix **-dhi̯e/o-*, the forms that function as infinitives in the IE daughter languages are case forms of verbal nouns that became true infinitives in the dialectal period.

Verbal Derivation

The derivational morphology of the PIE verb was less complex than that of the noun. The basic organizational unit, as is still the case in Sanskrit, was the root. From the root were formed, first, a nucleus of one or more present and/or aorist stems that expressed the lexical meaning of the verb and, second, a more peripheral set of derivatives – desideratives, iteratives, causatives, and so on – that modified the lexical meaning in predictable ways. Not all roots, as already noted, formed both a present and an aorist. Many roots that made a root present lacked an aorist; this was the case, for example, with basic lexical items such as **$h_1$es-*'be,' **$h_1$ei-*'go,' **k̂ei-*'lie,' **u̯es-* 'wear,' **bher-* 'bear,' aoristic counterparts of which were supplied by other roots (**bhuH-* 'become,' **g^{u}em-* 'go,' etc.). Roots that made a root aorist, on the other hand, normally formed a present as well. In such cases the present was usually 'characterized,' either by a nasal infix (e.g., 3 SING AOR **i̯éug-t* 'yoked,' **k̂léu-t* 'heard': 3 SING PRES **i̯u-né-g-ti*, **k̂l̥-né-u-ti*; the commonest pattern), by reduplication (AOR **dhéh_1-t* 'put, made,' **stéh_2-t* 'stood (up)' : PRES **dhé-dheh_1-ti*, **stí-sth_2-e*), by the suffix **-i̯e/o-* (AOR **mén-to* 'recalled,' **bhóudh-e* 'awoke' : PRES **mn̥-i̯é-tor*, **bhudh-i̯é-tor*), or by any of a number of other suffixes (**-sk̂e/o-*, **-i-*, **-u-*, etc.). Evidence for a simple kind of internal derivation is provided by pairs of the type PRES **legh-ór* 'lies (down)' beside AOR **lógh-e*.

In addition to the root aorist, the other conspicuous aorist formation was the 'sigmatic,' or *s*-aorist. In its classical form, with **ē* : **e* ablaut and a fully sigmatic active and middle, the *s*-aorist was actually an early post-PIE creation; it never developed fully in Anatolian and Tocharian. But in the branches where the *s*-aorist established itself, it became enormously productive, serving, *inter alia*, as the aorist of choice for roots that made simple thematic presents (e.g., PRES **u̯éĝh-e-ti* 'conveys,' **dhég^{u}h-e-ti* 'burns' : AOR **u̯éĝh-s-t*, **dhḗg^{u}h-s-t*) and supplying aorists to derived presents that originally had no aorist at all.

The outer tier of the PIE verbal system consisted of the desiderative, iterative, causative, and other specially nuanced presents built to verbal roots and of denominative presents built to preexisting nominal stems. The most important suffixes underlying these formations were the following:

- **-éi̯e/o-*. Iteratives and causatives with *o*-grade of the root (e.g., **k̂lou̯-éi̯e/o-*'proclaim, cause to be heard').
- **-sk̂é/ó-*. Iteratives, inchoatives, and (secondarily) causatives, with zero grade of the root (e.g., **h_1s-sk̂é/ó* - 'be (habitually)').
- **-s-*(**-h_1s-* after liquids and nasals), **-s-e/o-*, **-s-i̯e/o-*. Desideratives, tending to evolve into futures in the daughter languages (e.g., **sḗd-s-* 'wish to sit').
- **-i̯é/ó-*(**-i-i̯é/ó-*, **-e-i̯é/ó-*, **-eh_2-i̯é/ó-* ('**-āi̯é/ó-*'), **-eh_1-i̯é/ó-* ('**-ēi̯é/ó-*'), etc.). Denominatives with the meaning 'be/become/wish to be/act like X' (e.g., **uksn̥-i̯é/ó-* 'act like a bull, be strong').
- **(-e)-h_2-*. Denominatives with the meaning 'make X,' built exclusively to thematic stems (e.g., **néu̯e-h_2-* 'make new').

A characteristic of such secondary stems was that they were exclusively presents; there were no desiderative, iterative, or denominative aorists and only the barest beginnings of a causative aorist based on the PIE reduplicated aorist (type **u̯é-uk^{u}-e-t* 'said'). Each branch of the family thus had to work out its own solution to the problem of how to provide its secondary presents with extrapresential tense forms.

Table 8 Perfect and imperfect

Present		*Imperfect*	
Singular	*Plural*	*Singular*	*Plural*
1 **bhér-o-h_2*	**bhér-o-mes*	**bhér-o-m*	**bhér-o-me*
2 **bhér-e-si*	**bhér-e-te*	**bhér-e-s*	**bhér-e-te*
3 **bhér-e-ti*	**bhér-o-nti*	**bhér-e-t*	**bhér-o-nt*

See also: Indo–European Languages; Proto-Indo–European Phonology; Proto-Indo–European Syntax; Reconstruction, Cultural; Reconstruction, Morphological; Reconstruction, Syntactic.

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Proto-Indo–European Phonology

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The first attempts at reconstructing the Proto-Indo–European sound system took place in the mid-19th century. A rapid series of discoveries that culminated in the crystallization of Neogrammarian methodology in the 1870s and 1880s not only revolutionized the understanding of the language family but also ushered in true scientific study of language change. These discoveries allowed Indo–Europeanists gradually to free themselves from the belief that PIE was little different from Sanskrit, long held to be the most archaic and most perfect Indo–European (IE) language. By the close of the 19th century, the picture of PIE phonology that had been achieved was similar to what is generally accepted nowadays.

The subject of PIE phonology is as vast as the following survey is brief. In the interest of presenting as many of the basic facts as possible, the discussion of individual reconstructions has been kept to a minimum and the complete bodies of evidence for them can only be alluded to here and there. Although most of the claims in this article are not controversial, our picture of PIE is not set in stone and there are various competing minority views. Fuller elaborations of them and related issues may be found in the specialized sources listed in the bibliography.

Consonants

The PIE consonant inventory consisted mostly of stops, of which there were 15, distributed among five places of articulation (bilabial, dental or alveolar, palatal, velar, and labiovelar) that each had voiceless, voiced, and voiced aspirated varieties. In addition, the language possessed the nasals *m* and *n*, the liquids *l* and *r*, the sibilant fricative *s*, the glides *y* and *w* (more often written *i̯* and *u̯*), and three so-called 'laryngeals' of disputed phonetic character (see later discussion).

Stops

The stop inventory is shown in **Table 1**, using traditional notation. (Commonly used alternate notations are *ḱ, ǵ, ǵh* for the palatals; $k^{\underset{\smile}{u}}$, $g^{\underset{\smile}{u}}$, $g^{\underset{\smile}{u}}h$ for the labiovelars; and b^h, d^h, etc., for the voiced aspirates.) The voiced aspirates, still preserved as a class in most Indo–Aryan languages, are thought to have been voiced stops with murmur or breathy voice. A fourth series of stops, voiceless aspirated *ph*, *th*, *kh*, and so on was posited in earlier scholarship to account for correspondences such as Skt. and Gk. perfect indicative active second-person singular *-tha*; these are now generally regarded as post-PIE developments, although attempts to resuscitate this series for PIE still appear from time to time (e.g., Elbourne, 1998).

Space does not suffice for listing all the correspondence sets on which these reconstructions are based, but a few sample sets (themselves not exhaustive) are given here for illustration:

- For **p*, descendants of PIE **ped-* or **pod-* 'foot' (Luvian *pāta-*, Skt. *pad-*, Gk. *pod-*, Lat. *ped-*, Eng. *foot*, Tocharian A *pe*).
- For $*k^w$, descendants of $*k^wi$- or $*k^wo$- 'who' (Hitt. *kuiš*, Skt. *kás*, Gk. *tís* [dialectal *pís*], Lat. *quis*, OE *hwā*, Lith. *kàs*).

Table 1 PIE stop inventory

	Labial	*Dental*	*Palatal*	*Velar*	*Labiovelar*
Voiceles	p	t	*ḱ*	k	k^w
Voiced	b	d	ǵ	g	g^w
Voiced aspirated	bh	dh	ǵh	gh	g^wh

See also: Indo–European Languages; Proto-Indo–European Phonology; Proto-Indo–European Syntax; Reconstruction, Cultural; Reconstruction, Morphological; Reconstruction, Syntactic.

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Voiced	b	d	ǵ	g	g^w
Voiced aspirated	bh	dh	ǵh	gh	g^wh

- For the palatal velar *ĝ, descendants of *ĝonu, *ĝenu 'knee' (Hitt. *gēnu*, Skt. *jā́nu*, Gk. *gónu,* Lat. *genū*, Arm. *cownr*, OE *cnēo*).
- For the voiced aspirate *bh, the well-represented root *bher- 'bear, carry' (Skt. *bhárāmi*, Gk. *phérō*, Lat. *ferō*, OIr. *biru*, OE *bere*, all meaning 'I carry'; OCS *berǫ* 'I take').

In most branches, the voiceless and plain voiced stops remained intact (an important exception is Germanic, where they became, respectively, voiceless fricatives and voiceless stops by the sound change known as Grimm's law; note ***f**oot* and OE ***c**nēo* in the preceding paragraph). The voiced aspirates lost their aspiration in most branches, but in Greek they lost their voicing (as in Gk. *phérō*, phonetically [pʰɛrɔː]), and in Italic they often became fricatives (as in Lat. ***f**erō*).

The Velars and the 'Centum/Satem' Distinction The palatals, velars, and labiovelars are generally referred to collectively as 'velars' (also 'dorsals or 'tectals'). Whether the palatals were genuine palatal stops or simply palatalized velars as in Eng. *kin, keep*, Russ. *russkij* is not entirely clear. It is possible that the palatals and plain velars were once allophonic variants of one another, given that the plain velars are particularly commonly represented before the back vowel *a*. However, we cannot make do with only two phonemic series of velars for the stage of PIE directly preceding its breakup. First, there are three separate velar correspondences in practically identical phonetic environments in such cognate sets as shown in Table 2. Second, it was demonstrated (Melchert, 1987) that the Anatolian language Luvian contains three separate reflexes of the three series (***k**išammi-* 'combed' < ****k**es-*, *z**i**ya-* 'lie' < ****k̂**e̯i̯-o-* (*z* = [ts], ***k**uiš* 'who' < ****k**ʷis*). Several other branches, especially Albanian, have also been argued to preserve three reflexes in certain environments (for an overview, see Tischler, 1990).

But in general, outside Luvian, the three velar series have merged to two, or, in the case of Tocharian, only one. (The situation in Tocharian is actually more complicated in that there is a goodly residue of forms containing inherited labiovelars that show evidence of labialization, meaning probably that the labiovelars remained distinct from the other two series at least in some dialects.) In some branches (Greek, Italic, Celtic, Germanic, Tocharian), the palatals merged with the plain velars, whereas elsewhere (Indo–Iranian, Armenian, Balto–Slavic, and perhaps Albanian) it was the labiovelars that merged with the plain velars, leaving the palatals distinct (the latter developing subsequently into sibilants or affricates). Branches undergoing the first of these developments are termed 'centum' branches, whereas those undergoing the second are called 'satem,' after the Latin and Avestan words for 'hundred' (*centum* and *satəm*, respectively, where the initial consonant is from PIE *k̂-).

Table 2 Velar correspondences

Greek	*Sanskrit*	*Gloss*
kré(w)as	**k**rávis-	'gore'
klé(w)os	**ś**rávas	'fame'
príatai	**k**rīṇā́ti	'buys'

It is unclear whether the centum/satem distinction is simply a useful descriptive shorthand for what were (often parallel) independent developments in different branches, or represents a genuine deep dialectal division within IE. The latter view found support in the geographical distribution of the branches that were known to the first several generations of Indo–Europeanists: all the centum branches were located as a group, generally west of the satem languages. The discovery of Tocharian and Anatolian in the 20th century has rendered the issue much more controversial. Aside from the obvious complications introduced by the Luvian facts already discussed, the location of the probably centum Tocharian is problematic because it is farther east than any other branch. A further problem is posed by Balto–Slavic, which, although nominally satem, has numerous centum reflexes as well. Because of these difficulties, some scholars feel that the centum/satem distinction is meaningless for IE dialectology. But there are ways of salvaging the traditional hypothesis, and the issue remains unsettled.

The Glottalic Theory The stop inventory in the standard model has had detractors. The most well-known alternate view is the so-called glottalic theory, developed independently by the then-Soviet duo Tamaz Gamkrelidze and Vyacheslav Ivanov and by the American linguist Paul Hopper (see Hopper, 1973; Gamkrelidze and Ivanov, 1984). These researchers and their followers have sought to reinterpret the plain voiced stops as glottalized voiceless stops. This reinterpretation supposedly has the advantages of producing a typologically more natural stop inventory, of accounting for the co-occurrence restriction in IE roots whereby no root may contain two plain voiced stops, and of accounting for the near-absence of roots containing *b (= *p' in their system; this is the one consonant most commonly missing from glottalic inventories). But in spite of a not insignificant following for a time, the glottalic theory has not won widespread acceptance. There is no direct comparative evidence for glottalized consonants in reconstructible

PIE (although this, of course, does not preclude an earlier stage from having had them), which also means that positing them needlessly complicates the subsequent phonological histories of most of the branches. A few languages have recently been shown to have sound systems typologically similar to PIE's (e.g., Javanese, Madurese (Madura), and the Bario dialect of Kelabit in Sarawak), so the claim that PIE was typologically unnatural can now be seriously questioned. Finally, the consonant **b* was not absent from PIE, but merely rare, which tells us nothing definite about its anterior history.

Resonants and **s*

The nasals *m* and *n* and liquids *l* and *r*, collectively termed 'resonants' in IE studies, shared the ability to form syllabic allophones (notated *m̥ n̥ l̥ r̥*) when occurring between two nonsyllabics (e.g., **tn̥tos* 'stretched,' **u̯l̥kʷos* 'wolf') or between nonsyllabic and word boundary (e.g., **u̯odr̥* 'water,' **m̥ĝh₂* (PREF) 'greatly'; an *h* with a subscript number following is one of the 'laryngeal' consonants discussed below). Similarly the two glides, *y* and *w* (or *i̯* and *u̯*), were in complementary distribution with the high vowels *i* and *u*; syllabic *i* and *u* occurred between nonsyllabics or between a nonsyllabic and word boundary (e.g., **nizdos* 'nest,' **peri* 'around,' **h₂usōs* 'dawn,' **upo* 'under'), and nonsyllabic *i̯* and *u̯* occurred adjacent to a vowel (e.g., **i̯aĝ-* 'worship, sacrifice,' **h₂u̯eh₁-* 'blow,' **neu̯os* 'new'). The nasals, liquids, and glides are therefore usually grouped together in IE studies under the label 'resonants.'

The syllabic resonants usually did not survive as such into the attested daughter languages, but typically developed epenthetic vowels (as Lith. *vilkas* 'wolf' < **u̯l̥kʷos*) or, in the case of syllabic nasals in Indo-Iranian and Greek, lost their nasality (thus, Vedic Skt. *tatás* 'stretched' < **tn̥tos*, Gk. *aga-*'greatly' < **m̥ĝh₂-*). But **r̥* survived intact into Indo–Iranian and prehistoric Greek (as evidenced by the metrical shape of certain words in the Homeric epics). The 'long' syllabic resonants are discussed later.

When the glides are the second element of diphthongs, notational practice fluctuates between writing them as syllabic or not (*ei/ei̯*, *au/au̯*, etc.); the notation *ei, au,* and so on is used here.

The single IE sibilant *s* was allophonically voiced to *z* before voiced stops, as in **nizdos* 'nest,' underlyingly **ni-sd-o-* '(where the bird) sits down' (with *-sd-* from the root **sed-* 'sit') > Russ. *gnezdo* (with later addition of *g-*), Eng. *nest*.

Laryngeals

Discovery We come now to the final set of consonants, dubbed 'laryngeals.' They were discovered by the young Ferdinand de Saussure, who in a brilliant monograph published when he was only 21 (Saussure, 1878) deduced their former existence from close analysis of morphophonological behavior of different classes of words. At the time, no IE language was known that actually preserved these sounds as consonants. Saussure theorized that there were two such sounds, which he termed 'sonant coefficients' (*coéfficients sonantiques*); his immediate followers, Hermann Möller (Møller) and Albert Cuny, expanded the number to three, which is now the standard accepted inventory. The term 'laryngeal' was not applied to them until 1911, by Möller, who borrowed it from Semitic linguistics.

It is usually averred that the laryngeal theory was not vindicated until 1927, over a decade after Saussure's death, when Jerzy Kuryłowicz discovered that the newly deciphered Hittite language contained a consonant (transliterated *ḫ*) appearing in many of the places for which Saussure had predicted a 'sonant coefficient.' Although this discovery was, of course, important (and dramatic) and provided us for the first time with consonantal reflexes of the laryngeals, in fact nearly all the advances in laryngeal theory both before and after Kurylowicz (1927) have flowed from material in Greek and Indo–Iranian, not Anatolian, and the theory had already assumed essentially its modern form by the 1910s (see especially Cuny, 1912). Even without Anatolian, in other words, the evidence for laryngeals in PIE is extremely strong.

That the laryngeals were consonants is certain (and was proved by Cuny), and that they were fricatives practically so. But precisely which fricatives is a matter of debate; for this reason, they are usually written algebraically as h_1, h_2, h_3, or with any of several alternate notations such as $ə_1$, $ə_2$, $ə_3$; H_1 H_2 H_3; and, in older literature, *E, A, O*. (According to a widely followed hypothesis, h_1 = [h] or [ʔ], h_2 = [ħ], and h_3 = [ʕ].) A capital *H* or, in older notation, schwa (ə) is used as a cover symbol for a laryngeal that cannot be identified more precisely, as in the root **bhuH-* 'be.' Although the usually accepted number of laryngeals is three, minority competing views have posited as few as one to as many as 15 or more.

Effects and Reflexes of Laryngeals The reconstruction of the laryngeals is supported by both direct and indirect evidence; here the latter is presented first. The indirect evidence consists in the effects the laryngeals had on neighboring sounds, particularly short vowels. A laryngeal following a short vowel disappeared while compensatorily lengthening the vowel: **dheh₁-*'place' > **dhē-* (as in Gk. *títhēmi* 'I place,' Eng. *deed*); **pih₂u̯on-* 'fat, fertile' > **pīu̯on-* (as in Vedic Skt. *pīvan-*). The second and third laryngeals

also had the property of 'coloring' an adjacent (short) *e* to *a* and *o*, respectively: ****h₂ent-*** 'front, forehead' > ****h₂ant-*** (> Hitt. *ḫant-*); ****steh₂-*** 'stand' > ****stah₂-*** > ****stā-*** (as in Lat. *stā-re* 'to stand'); ****h₃erbh-*** 'change status' > ****h₃orbh-*** (> Hitt. *ḫarp-* 'move from one (social) sphere to another,' Lat. *orbus* 'orphan'); ****ĝneh₃-*** 'know' > ****ĝnoh₃-*** > ****ĝnō-*** (as in Gk. *gignóskō* and Lat. (*g*)*nō-uī* 'I know'). As the last set of examples illustrates, coloring happened irrespective of whether the laryngeal preceded or followed the *e*. (An adjacent long *ē* apparently resisted coloring, a phenomenon known as Eichner's law, Eichner, 1973; examples include Hitt. *meḫur* 'time' < **mēh₂u̯r̥*, from the root **meh₂-* [> **mā-*] seen also in, e.g., Lat. *mā-ne* 'at an early time.')

The direct reflexes of the laryngeals are of two kinds, consonantal and vocalic. Only the Anatolian languages preserve uncontroversial consonantal reflexes, as in Hitt. *ḫant-* and *ḫarp-*; corresponding to the former, note also Cuneiform Luvian *ḫant-* and Lycian *xñt-*. In these two examples, a laryngeal is preserved prevocalically; but postvocalic laryngeals were often preserved as well, as in Hitt. *paḫš-* 'protect' < **peh₂s-*(cf. Lat. *pās-tor* 'shepherd') and Lyc. first-person singular PRET *a-xã* 'I did' < **-h₂om*. This, together with some other evidence especially from Indo–Iranian, shows that, whereas coloring had already happened within PIE, loss and compensatory lengthening either partially or completely postdated the breakup of the protolanguage.

In the non-Anatolian languages, the only sure direct reflexes of the laryngeals are vocalic. Between nonsyllabic sounds, the laryngeals became 'vocalized,' meaning either they had syllabic allophones like the resonants or developed prop vowels. (The latter scenario means that the vocalic reflexes are technically not direct reflexes of the laryngeals but only of the prop vowels.) The vocalized laryngeals are preserved in most branches, usually as short vowels, typically *a* (as in PIE ***ph₂ter-**> Lat. *pater*, Old Ir. *athir*, Arm. *hayr*, Eng. *father*), but also *i* (Skt. *pitár-*) and, in the case of Greek, a unique and extremely valuable 'triple reflex': *e* from vocalized ***h₁** (e.g., *thetós* '(having been) placed' < ***dʰh₁tos**), *a* from ***h₂** (e.g., *patér-* < ***ph₂ter-**), and *o* from ***h₃** (e.g., *dotós* 'given' < ***dh₃tos**). Whereas most languages that have vocalic reflexes of vocalized laryngeals have them only between consonants, the laryngeals were vocalized also word-initially before vowels in Greek, Armenian, and the fragmentarily attested Phrygian (e.g., ***h₂nēr*** 'man' > Gk. *anḗr*, Arm. *ayr* (earlier ***anir**), Phryg. *anar*; ***h₁regʷo-*** 'darkness' > Gk. *Érebos* 'Underworld'). Again, only Greek has a triple reflex here; Armenian and Phrygian have only *a-* and do not consistently show word-initial reflexes at all. In the other (non-Anatolian) branches, only indirect evidence of such laryngeals is found, especially the lengthening of preceding vowels in compounds (e.g., Skt. *sūnára-* 'having good men' < ***h₁su-h₂ner-o-**); otherwise, they disappeared without a trace.

Claims have been made that laryngeals sometimes 'hardened' into stops, typically velars, as in the Italic feminine agent–noun suffix *-trīc-* (< PIE ***-trih₂-**) and in the Armenian word for 'fish,' *jowkn* (perhaps < ***ĝhdhuH-**). These outcomes are controversial and only sporadically attested.

Laryngeals have also been used to explain the voiceless aspirated stops, mentioned previously. A second laryngeal frequently aspirated a following voiceless stop, as in Skt. *vétt**h**a* 'you (SING) know' < ***u̯oid-th₂e**, cf. Gk. (*w*)*oī**st**ha*.

Long Syllabic Resonants Older scholarship posited for PIE a set of long syllabic resonants, *m̥̄, n̥̄, r̥̄, l̥̄*. These are now understood to have been sequences of regular syllabic resonant plus laryngeal (cover symbol *R̥H*). Different outcomes are attested for different branches, including resonant plus long vowel (e.g., Lat. *strātus* 'spread out, strewn' < ***str̥h₃tos**), long vowel plus resonant (Skt. *pūrṇá-* 'full' < ***pl̥h₁no-**), vowel–resonant–vowel (Gk. *bálanos* 'acorn' < ***gʷl̥h₂-no-**), and long vowel (Skt. *yātar-* 'husband's brother's wife' < ***i̯n̥h₂ter-**). Again only Greek distinguishes reflexes of the different laryngeals in these sequences; thus, compare Lat. (*g*)*nātus* 'born' with Gk. *-gnētos* 'born' < ***ĝn̥h₁tos**, Lat. *strātus* with Gk. *strōtós* < ***str̥h₃tos**. In Baltic, the outcome was ultimately a vowel plus resonant with acute intonation (as in Lith. *pìlnas* 'full' < ***pl̥h₁no-**, where the grave mark represents acute intonation); a syllabic resonant that was not followed by a resonant resulted in circumflex intonation (as in Lith. *vìlkas* 'wolf' < ***u̯l̥kʷos**). Acute intonation in Baltic can therefore serve as confirmatory evidence for the prior existence of a laryngeal.

Vowels and Suprasegmentals

Vowels and Diphthongs

PIE possessed five short vowels, *i*, *e*, *a*, *o*, *u*, and the corresponding long vowels *ā*, *ē*, *ī*, *ō*, *ū*. The daughter languages typically preserve the high vowels *i* and *u* intact (e.g., ***tri-** 'three-' in Skt., Gk., Lat., and Gaulish *tri-*, ***upo** 'under, below' in Skt. *upá*, Gk. *hupó*, Lat. *s-ub*). The mid and low back vowels *o* and *a* merged in several European branches: to *a* in Germanic and Baltic (e.g., ***ok̑tō** 'eight' > Germ. *acht*, Lith. *aštuonì*) and to *o* in Slavic (Old Church Slavonic *osmĭ*, cf. ***nas-** 'nose' > OCS *nosĭ*). Indo–Iranian merged all three nonhigh vowels to a vowel transliterated

a (phonetically [ə] in Indic, [æ] in Iranian); analogously, the long nonhigh vowels merged to *ā*.

Combinations of nonhigh vowel plus high vowel formed the diphthongs *ei*, *ai*, *oi*, *eu*, *au*, *ou*, *ēi*, *āi*, *ōi*, *ēu*, *āu*, *ōu*. These are best preserved in Greek (e.g., Gk. *leípō* 'I leave' < **leik^w-*, *teúkhō* 'I build' < **dheugh-*, *poinḗ* 'payment, penalty' < **k^{w}oin-*, DAT SING (FEM) *-āi* < **-āi*); note also Skt. LOC SING (*u*-stem) *-āu* < **-ōu*, Old Latin *duenōi* 'for a good man' with DAT SING from **-ōi*.

The long vowels have been the subject of some controversy since the advent of laryngeal theory. As previously discussed, the laryngeals lengthened a preceding short vowel when they disappeared; this fact has caused a number of specialists to reinterpret many (or, in extreme cases, most or all) long vowels as originally sequences of short vowel plus laryngeal. Most researchers take a middle path, recognizing that some long vowels must have been primes (especially the *ē* and *ō* that root vowels could assume in the lengthened ablaut grades). There is dispute, however, concerning the reconstruction of specific lexemes.

With the high long vowels *ī* and *ū*, this issue is particularly troublesome because there are genuinely few examples in which a laryngeal is not implicated. Controversy thus surrounds the proper reconstruction of words such as **ĝhdhūs* 'fish' and **h$_3$bhrūs* 'eyebrow,' in which there are no independent morphological or comparative reasons for positing a laryngeal (aside from, e.g., the controversial velar in Armenian *jowkn* 'fish' mentioned previously).

Stress and Accent

The attested daughter branches show two accentual systems. In one, represented by Italic, Celtic, Armenian, and Albanian, the accent is stress-based and is either fixed (as in the unvarying word-final stress of Armenian) or varies in a predictable fashion (as in Latin, where antepenults are stressed unless the penult is heavy). The other system is characterized by a pitch-accent whose position is mobile, that is, generally not predictable on the basis of phonological criteria. This system is characteristic of Indic, Greek, and Balto–Slavic and was also true of pre-Germanic at least as late as the operation of Verner's law (discussed next). Either prehistoric or synchronic mobility of the accent is also recoverable for Anatolian, Iranian, and Tocharian. The nature of the Vedic Sanskrit pitch accent (low-rising on the accented syllable) is comparable with that of Ancient Greek, and it has been plausibly argued (although it is not assured) that Verner's law in Germanic, in which certain onsets of interior accented syllables were voiced, was the result of a reanalysis of the low pitch on these onsets as voicing (voiced consonants have lower pitch than voiceless ones). The combined evidence of this phonological characteristic of Vedic, Greek, and Germanic, together with the shared trait of having nominal and verbal paradigms in which the position of the main stress moved in lockstep with changes in ablaut (as Anatolian, Iranian, and Tocharian also point to), guarantee for PIE a mobile pitch-accent system as well.

Not all words in PIE had a lexical stress. A variety of unstressed words can be reconstructed (e.g., **k^{w}e* 'and,' **(e)me* 'me (ACC SING)') that most likely were clitics prosodically dependent on preceding stressed words. Comparative evidence suggests that certain forms of the copula (**h$_1$es-* 'be,' whence Lat. *est,* Eng. *is*) were clitics as well. From the accentual behavior of verbs in Vedic (where main-clause verbs are written without accent marks unless fronted to clause-initial position), Greek (where they are stressed in a similar fashion to chains of clitics), and Germanic (where certain verbs do not participate in alliteration in verse, unlike fully stressed words), it is commonly thought that verbs in PIE were unstressed or clitics. But with very few exceptions, verbs do not diachronically undergo phonological reduction as clitics do. It is likelier that verbs were fully stressed underlyingly (as they are in Vedic and elsewhere) but, for independent and quasiuniversal reasons having to do with information content, frequently were acoustically less prominent or destressed.

Phrasal Prosody

The prosodic organization of phrases in PIE was probably similar to that of modern languages. Clitics formed clitic groups with neighboring fully stressed words; they may have also grouped together into clitic chains near the beginnings of clauses, as in Anatolian, Indo–Iranian, and Greek. The specific rules that licensed cliticization and that governed the interaction of phonological phenomena (e.g., external sandhi and cliticization) with syntactic phenomena (e.g., movement) cannot yet be determined, but work on this topic in the daughter languages proceeds apace (e.g., Hale, 1990) and will no doubt yield insights into the prosodic organization and prosody–syntax interface of PIE itself (*see* **Proto-Indo–European Syntax**).

Phonological Rules

Internal Changes

Internal Sandhi Regressive voicing assimilation caused the devoicing of plain voiced stops before voiceless consonants (e.g., **h$_2$eĝ-to-* 'led, driven' > **h$_2$eḱ-to-*, **h$_1$ēd-si* 'you (SING) eat' > **h$_1$ēt-si*) and the voicing of voiceless stops and *s* before voiced

stops (e.g., *-pd- (a form of *ped- 'foot') < *-bd- in Younger Avestan *fra-bd-a-* 'front of the foot,' *ni-sd-o- > *ni-zd-o- 'nest').

In Indo–Iranian, by a process known as Bartholomae's law, a cluster consisting of a voiced aspirate followed by a voiceless stop underwent progressive, rather than regressive, voicing assimilation, and the aspiration was realized at the end of the cluster. Thus, Vedic Sanskrit *labh-tá- 'deceived' became *labh-dá- and finally *labdhá-*. A PIE date for this change has been alleged by several scholars, but the alleged traces of it outside Indo-Iranian are few and far between, and the matter is disputed.

Clusters consisting of two dentals developed an epenthetic sibilant between them. The full sequence *-tst-* is preserved in Anatolian (e.g., Hitt. *ezzazzi* (phonetically /etstsi/, from earlier */etsti/) '(s)he eats' < PIE *h_1ē**tsti** < *h_1ē**d-ti**-). In the other branches, the cluster underwent simplification, either by losing the sibilant (Ved. *átti* '(s)he eats') or the first dental (e.g., Avestan *vista-* 'known,' Gk. (*w*)*istós,* both < *u̯itsto-< *u̯id-to-), or by becoming *-ss-* (e.g., Lat. *pas-sus* 'suffered' < *pat-to-, Germ. *gewiss* 'certain' < *(-) u̯id-to-).

A labiovelar stop was delabialized next to *u*. The standard example is Gk. *boukólos* and Welsh *bugail* 'cow-herder' from *g^wou-kolos, where *-kolos is delabialized from *k^wolos (root *k^wel- 'to move about, cultivate, herd') after the *-u-* of *g^wou- 'cow.' Contrast this with Gk. *ai-pólos* 'goatherd,' with *p* the regular outcome of expected *k^w.

Internal Simplifications and Losses Geminates appear to have been avoided in PIE. A geminate *ss* was simplified to *s*, as in the second-person singular *$h_1$esi 'you are' < *$h_1$es-si, reflected in Ved. *ási*, Gk. *eĩ* (< *eï < *ehi < *esi). Geminate dentals arising from dental-plus-dental sequences were, as previously seen, broken up with an epenthetic sibilant.

Certain compounding and reduplication processes appear to have resulted in loss of laryngeals in the second compound member. The exact description of this change is as yet unclear, but examples include Gk. *neognós* 'newborn,' with *-gnos* from *-ĝnos rather than *-ĝn̥$h_1$os (root *ĝenh$_2$- 'beget') and, from the same root, Gk. *gígnomai* 'I am born' < *ĝi-ĝn-o- rather than *ĝi-ĝn̥h_1-o-. Laryngeals were probably subject to loss in other environments as well, although analogical change has often made the evidence difficult to work with.

It has been reasonably speculated that the prehistoric origin of the IE zero-grade (the form of a root when it drops its ablauting vowel, as in *sd- 'sit' in *ni-sd-o- 'nest') was the syncope of the ablauting vowel when not under the word-stress. However, because some stressed zero-grades are securely reconstructible (e.g., *h_2ŕ̥tḱos 'bear'), this must have happened well before the stage of PIE directly reachable by reconstruction.

Syllabification

Words were syllabified from right to left. The usual rules applied: Single consonants between vowels were syllabified as onsets, and word-internal consonant clusters were split between adjacent syllables. It is possible that *muta cum liquida* clusters (e.g., *tr, kl*) were syllabified as onsets, but the evidence from the daughter languages is contradictory. A sequence of two or more segments that had both syllabic/vocalized and nonsyllabic allophones (i.e., high vowels, resonants, or laryngeals) were syllabified from right to left as alternately syllabic and nonsyllabic. Thus, for example, *h_1n$h_3$mnbhi- 'with names' was syllabified *h̥$_1$.nh̥$_3$.mn̥.bhi- (> pre-Gk. *enomaphi, Gk. ultimately *onómasi* after subsequent changes).

But sometimes the expected output of these rules was undone by morphological analogy. For example, one of the present stems of the verbal root *i̯eug-, *i̯ug- 'yoke' was *i̯ung- rather than expected **iu̯n̥g-; the last form, if it ever existed, was replaced by a form that more closely resembled the root form *i̯ug-. In addition, there were dialectal differences: The feminine suffix *-ih̥$_2$ was syllabified as *-i̯h̥$_2$ (> *-i̯a) in Greek and Tocharian but as *-ih$_2$ (> *-ī) elsewhere. These may represent the generalization of different external sandhi variants.

The presence of a morphological boundary is also the likely reason why derivational morphemes such as the privative prefix *n̥- 'un-' remained syllabic even before vowels; instead of being realized as a nonsyllabic *n-*, it was rather realized as *n̥n-, with a nasal stop acting as a transition between the two syllabics. This is the source of the *-n-* in, for example, Skt. *anudrá-* and Gk. *ánudros* 'without water' from (morphological) *n̥-ud-ro-.

According to the principle known as Sievers's law, syllable weight affected the realization of clusters ending in glides: a cluster -Ci̯- or -Cu̯- was broken up to -Ci i̯- -Cu u̯- if the preceding syllable was heavy and if the glide began the last syllable of the word. Thus, Gothic *haírdeis* 'shepherd' comes from *herdijas, by Sievers's law from *herdjas (vs. *harjis* 'army' with no epenthesis, pre-Germanic *har-jas). An analogous epenthesis in word-initial clusters, called Lindeman's law, is treated in later discussion.

Phonotaxis

Consonant Clusters Word-initial consonant clusters were mostly subject to familiar constraints imposed by one or another version of the Sonority Sequencing Principle. In the main, consonants were sequenced in

order of increasing sonority, with most combinations of stops or *s* and resonants licensed. Certain ones are not found, perhaps accidentally, such as *g^whl-*. Sequences of resonant plus stop were common word-initially but, by the usual rules, did not form a tautosyllabic cluster (e.g., **m̥ĝh₂-* 'greatly'). Laryngeals were also common word-initially before resonants (or, much less commonly, stops), but it is not entirely clear how these were pronounced. As previously noted, in Greek, Armenian, and Phrygian, such laryngeals were vocalized; but in all the other branches they disappeared, suggesting that they could also be nonsyllabic. Probably the vocalized and nonvocalized pronunciations were sandhi variants depending on the final sound of the preceding word, with the vocalized variants generalized in some dialects.

Certain stop-plus-stop onsets were also allowed, in particular the so-called 'thorn clusters,' which (according to current understanding) consisted of a dental and a velar (in other, mostly earlier, views, one of the consonants was thought to be the fricative *θ* or *þ* (thorn)). These clusters have a rather bewildering variety of outcomes in the daughter languages: uniformly *kṣ* in Sanskrit, dental plus velar in Hittite and Tocharian, velar plus dental in Greek and Celtic, and single consonant elsewhere. Examples include **h₂r̥tk̑os* 'bear' (> Hitt. *ḫartaqqaš* (*-taqq-* phonetically /-tk-/), Skt. *ṛ́kṣaḥ*, Gk. *árktos*, Lat. *ursus*); **d^hĝ^{h}em-* 'earth' (> Hitt. ***takn-*** (phonetically /dgn-/); Cuneiform Luvian (*īn-*)***zagan*** 'in the earth' (phonetically /-tsk-/ or /-dzg-/), Melchert, 2003; Skt. ***kṣam-***; Toch. A ***tkam̨***; Gaulish ***xt****onio-* 'earthling, human' (phonetically /γd-/); Lat. ***humus*** 'ground'); and ******dhg^{wh}****(e)i-* 'waste away, perish' (> Skt. *ákṣita-* 'imperishable,' Gk. *áphthitos* 'imperishable,' Prakrit *jhīṇa-* 'wasted away'). Aside from thorn clusters, the only other word-initial stop-plus-stop cluster known for PIE is *pt-* (in derivatives of **pet-* 'fly').

There were also onset clusters consisting of three consonants. Almost all of these consisted of *s* plus stop plus resonant (e.g., **spreg-* 'scatter,' **splend-* 'glow'). The remaining triple clusters are scattered but typically have internal *-s-* or initial laryngeal (or both), as in the onomatopoetic root **pster-* 'sneeze,' in singular present optative stems such as **h₁si̯eh₁-* (root **h₁es-* 'be'), and in derived presents such as **h₁s-sk̑e-* (phonetically */h₁sk̑e-/) from the same root.

Co-occurrence Constraints within Roots Roots were of the general shape *CeC*, where *C* is a consonant. Certain classes of consonants could not co-occur within the same root: voiced (either plain or aspirated) and voiceless stops (type **bet-*, **bhet-*; with initial *s-*, however, it was allowed, type **steb-*, **stebh-*), voiced aspirates and voiceless stops (type **bhet-*; again, **stebh-* was allowed), and two plain voiced stops (type **bed-*). Exceptions, such as **ped-* 'foot,' are known but rare.

Under the glottalic theory, the last of these restrictions would in fact be a restriction against the co-occurrence of two glottalized stops in one root, a restriction known from a variety of language families having such consonants. As noted earlier, it is not impossible that an early stage of pre-PIE had glottalized consonants and that the co-occurrence constraints date to that time, but this is not provable.

External Sandhi

A few word-final sound changes are ascertainable for the protolanguage. Final clusters consisting of resonant plus *s* lost the *s* with concomitant lengthening of the preceding vowel (Szemerényi's law), as in NOM SING **ph₂tēr* 'father' < **ph₂ters*. Word-final combinations of *u̯* and a nasal behaved somewhat similarly, losing the glide with compensatory lengthening of the preceding vowel (Stang's law): ACCUS SING **g^woum* (**g^wou̯m*) 'cow' > **g^wōm* (> Ved. *gā́m*, Gk. (Doric) *bõn*), and likewise ACCUS SING **di̯eu̯m* 'sky, Sky-god' > **di̯ēm* (> Ved. *dyā́m*, Gk. *Zẽn* 'Zeus'). This latter change is interesting in its violation of the usual rules of syllabification, where we would expect ***g^wou̯m̥*, ***di̯eu̯m̥*, just like in ACCUS SING **podm̥* 'foot' (> Gk. *póda*).

Word-final *-n* was lost after *ō*: **k̑u̯ōn* 'dog' > ** k̑u̯ō* > Ved. *-śvā́*, OIr. *cú,* Lith. *šuõ*, Hitt. *kuwaš* (with later addition of the regular NOM SING suffix *-š*); the *n* has been restored in Gk. *kúōn*. Note also the various *n*-less Latin nominative singulars of the type *homō* (Old Latin stem *homon-*) 'man' and *legiō* (stem *legiōn-*) 'legion.' Contrast Gk. *humḗn* 'membrane' < **sumēn*, with retained *-n*.

Voicing contrasts were probably neutralized word-finally in PIE. Word-initial sandhi phenomena are barely known; one that deserves mention is Lindeman's law, whereby word-initial consonant clusters ending in a glide (as in **di̯ēus* 'sky,' **k̑u̯on-* 'dog') were broken up by an epenthetic vowel homorganic with the glide (> **di̯ēus*, **k̑uu̯on-*) when the syllable ending thepreceding word was heavy. Sometimes the disyllabic variant was generalized, as in Gk. *kúōn* 'dog.'

Our knowledge of PIE phonology is in some respects gratifyingly detailed, but in others still only partially developed. The ongoing refinement of our methods will surely continue to add to the complexity of the picture, answering some old questions while raising new ones.

See also: Indo–European Languages; Proto-Indo-European Morphology; Proto-Indo–European Syntax; Reconstruction,

Cultural; Reconstruction, Morphological; Reconstruction, Syntactic.

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Proto-Indo–European Syntax

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Introduction

Methodological Preliminaries; Definition of Terms

Reconstructing the syntax of a proto-language presents the historical linguist with special challenges. Phonological and morphological systems involve the alteration and manipulation of discrete units (phonemes and morphemes, respectively) that combine to form other discrete units (words) that are, to a large extent, memorized and therefore transmitted whole from generation to generation. Information about the phonological and morphological rules is therefore transmitted along with them. But syntactic rules operate to combine words into larger units (phrases and sentences) that ordinarily are not memorized, but constantly generated on the fly through recombination.

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Cultural; Reconstruction, Morphological; Reconstruction, Syntactic.

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It is by now a well-established fact, though one whose ramifications are not always fully or consistently appreciated, that the transmission of grammars

across generations is discontinuous. Learners do not have direct access to the grammars (linguistic knowledge-states) of other speakers, but only to their output (the primary linguistic data). Grammars are created afresh in each individual on the basis of the outputs to which the individual is exposed. Since there can be more than one possible algorithm for generating any given linguistic string, learners' grammars may turn out to be different from the grammars of those around them; any differences are due to reanalysis of the primary linguistic data and the deduction of a different rule or rules from the rules in the source grammar.

The distinction between underlying rules and outputs – deep structures and surface structures, simply put – is a critical consideration for determining what it means to 'reconstruct syntax.' Unfortunately, this distinction is often ignored, especially with respect to the issue around which arguably most work in Proto-Indo-European (PIE) syntax has centered since the Chomskyan revolution and the study of linguistic universals: basic word-order. This term can refer to several very different things, including the statistically most frequent surface word-order, pragmatically neutral surface word-order (which may or may not be statistically the most frequent), and the order of the elements of a clause in their base positions in deep structure (assuming that there is one such order for any given language). In many PIE syntactic studies, there has been a parallel lack of precision in the use of the term 'syntax' itself: for the generative linguist, the term applies properly to the underlying syntactic rules in the grammar that must be deduced from the behavior of surface structures; for many other researchers, however, the term applies to the surface structures themselves. In the strict sense of syntax as a system of rules that places phrasal and clausal constituents in specific structural positions, word order is not syntax, but a by-product of it.

Thus 'reconstruction of PIE syntax' should strictly refer to the reconstruction of the underlying syntactic rules of PIE. Such an enterprise, however, may seem to be an exercise in futility, since underlying syntactic rules are normally deduced from surface word-orders, yet practically no surface word-orders can be reconstructed for PIE and no native speakers of either PIE or its ancient daughters are left whose intuitions can be used to test theories against. As we will see in the following survey, however, the situation is not quite so dire.

The general inconsistencies of methodological approach noted above also play out in the syntactic study of the ancient daughter languages. Much more work needs to be done on establishing theoretically sophisticated analyses of the underlying syntactic rules of Greek, Latin, and their sisters before much progress can be made on figuring out what sorts of systems they could ultimately be reanalyses of. Linguistic reconstruction involves not only the reconstruction of proto-languages, but also the reconstruction of history, as it is part of the comparative linguist's task to account for the development of the daughter languages. (One must 'reconstruct forwards' as well as reconstructing backwards.) Unfortunately, our understanding of the mechanisms of syntactic change – what sorts of syntactic reanalyses are possible during grammar acquisition – is very much in its infancy, in spite of some progress in the last few decades. A proper theory of the development of the syntax of the Indo-European (IE) languages is therefore not yet attainable.

Our picture of the syntax of the oldest daughter languages in the family is incomplete not only by virtue of the absence of native speakers, but also by virtue of the nature of the texts that **are** preserved. Many ancient IE societies preserved only those texts having cultural significance, such as sacred texts, laws, myths, poetry, and the like. The language used in these genres often departs widely from ordinary speech. For some languages (even one as familiar as Latin) we are much better informed about high literary styles than we are about colloquial ones. Different styles and registers are characterized in part by different syntax, which means it is important to compare the syntax of sentences in identical genres across the family (e.g., Hittite and Latin legal language).

This correspondence of different syntax with different style or genre can be very useful. The Homeric epics evince both verb–object and object–verb word orders with great frequency. But in a semantically well-defined subset, word-orders are often found to be less varied; for example, proverbs and other traditional sayings in Homer are almost always object–verb. Proverbs and their syntactic properties in Homer can then be compared with proverbs in cognate traditions, and it turns out they share strikingly similar features in syntax and expression (Watkins, 1976). Since proverbs are traditional and can preserve archaic or otherwise exceptional constructions, they are especially useful data for syntactic reconstruction.

Care must be taken with respect to translation literature, which forms an important part of the corpus especially of Gothic (where a translation of the New Testament provides almost our entire extant corpus), Classical Armenian, and Old Church Slavonic. The translators of some of these texts stayed slavishly faithful to the word-order of the original, rendering their translations syntactically unidiomatic, in some cases apparently to the point of ungrammaticality.

The rapid development of syntactic theory over the past several decades, natural in a new field, has the disadvantage of rendering work that is beholden to a particular framework either quickly obsolete or controversial for other theory-internal reasons. In this article, we will therefore eschew adherence to a specific syntactic framework; specialists can easily translate the syntactic categories and positions referred to here into whatever schema best suits their purposes. Most of the illustrative examples below are drawn from Fortson (2004), Chapter 8.

History of the Field

Works on IE syntax in the 19th and first half of the 20th century often dealt with the use and behavior of morphological categories (nominal case, verbal mood, etc.), rather than with issues of word-order. The most famous exception is Wackernagel (1892), introducing the observation (now known as Wackernagel's law) that unstressed particles of various kinds usually appeared as the second element in their clause in the older IE languages (see Wackernagel's Law, below). Jacob Wackernagel and his contemporary Berthold Delbrück laid the foundations for historical PIE syntax with these and other studies.

Not much new work was undertaken in the intervening decades between their work and the Chomskyan revolution. In the 1960s and 1970s, researchers such as Winfred Lehmann and Paul Friedrich wrote several works on the clausal word-order of IE languages (including Lehmann, 1974 and Friedrich, 1975) – work that consisted in the main in statistical tallyings of the relative orders of different sentential constituents. These approaches have mostly been abandoned; see, for a well-known and important critique, Watkins (1976). Among the flaws in these studies was not recognizing that word-order is not equivalent to syntax, and that it is often the exceptional word-orders, especially those found in frozen phrases, rather than the word-orders that are commonest and generated by productive rules, that shed the most light on the syntactic history of a language. This important principle – reconstruct on the basis of exceptions – is of course also known from historical morphology.

Lehmann and Friedrich's works were influenced primarily by research into language universals, such as that of Joseph Greenberg. Simultaneously, some Indo-Europeanists were starting to incorporate Chomskyan generative syntactic models into their work. This has continued to the present day. Important works of this kind include those of Mark Hale on the syntax of clitics in Vedic Sanskrit (e.g., Hale, 1987) and Andrew Garrett on Anatolian clausal syntax (e.g., Garrett, 1990, 1992). A large number of articles on diachronic syntax within a generative framework have, however, been less than satisfying in that they present analyses that simply restate the data couched in theoretical terms (as, for example, a resetting of a parameter).

Critical for the advancement of the field are not simply good and sophisticated theoretical descriptions of synchronic facts, but diachronic explanations rooted in philologically ascertainable distributional patterns from surviving texts.

Phrasal Syntax of PIE

Noun Phrases

The daughter languages differ with respect to the relative order of adjectives (or dependent genitives) and head nouns within noun phrases. Typically adjectives precede their nouns in Hittite, Vedic, and Germanic, and follow them in Italic and Celtic; but within each of these languages there are exceptions that were sometimes lexically, at other times pragmatically, induced. In all these languages, however, and surely in PIE itself, adjectives agreed with their head nouns in gender, number, and case.

The ancient PIE languages allowed for the separation of nouns from their modifiers by one or more intervening elements, as in Cuneiform Luvian *alati awienta Wilušati* 'they came from steep Wilusa' Keilschrifttexte aus Boghazköy (KBo or KuB) 4.11:46); Greek *ándra moi énnepe Moũsa polútropon* 'tell me, Muse, of the resourceful man' (*Odyssey* 1.1), Latin *magnā cum laude* 'with great praise,' and Armenian *zyoys hatanem kenacʿ* 'I cut off *the hope of life*.'

Prepositional Phrases

In PIE, it is frequently averred that adpositions, adverbs, and preverbs were not separate categories. This is not likely to be true in any but the most superficial sense, given that these categories reflect rather different underlying syntactic behaviors. The statement is based in part on comparative evidence suggesting that preverbs had not yet univerbated with verbs, but were (partially? entirely?) free to occupy the same diversity of structural positions that is assumed for other adverbial elements. By the time of the oldest attested daughter languages, however, distinctions can be made between the behavior of these three types of words, at least in many cases (though not in all). Adpostions in Anatolian and Vedic are almost entirely postpositional (e.g., Hittite *šuḫḫi šēr* 'on the roof,' Vedic *jánāṁ ánu* 'among men'); the other languages either show a mix of pre- and postpositions (as in Avestan and Sabellic), or have almost entirely prepositions, sometimes with traces of postpositional use (e.g., Greek *toutṓn péri* 'about these things' and Latin *mēcum* 'with me'). Preverbs in Anatolian and

Indo-Iranian, and not infrequently in Homer, are still separate words: Old Hittite *š-aš šarā URU-ya pait* 'and he went up to the city' (KBo 22.2 rev. B 17' [Zalpa tale]; URU is a Sumerian word and, by convention, transliterated in capitals), Vedic *abhí yó mahinā́ dívaṃ Mitró babhū́va sapráthāḥ* 'Mitra the renowned who is superior to heaven by his greatness' (Rigveda 3.59.7), Greek *edētúos eks éron hénto* 'they put aside desire for food' (*Iliad* 1.469). (In classical philology, separation of preverb from verb is called tmesis, a misleading term since it is based on the point of view that the invariant univerbation of Classical Greek is the norm, whereas in fact separation of the two is historically original.)

By the time of the earliest attestation of the other languages, the preverbs had mostly become genuine prefixes, inseparable from their verb. However, in Celtic, Gothic, and residually in Archaic Latin, clitics could intervene between preverb and verb; e.g., Old Irish *atdom-indnastar* 'that **I** be brought' (Milan glosses 39[d]13), Gothic *frah ina ga-u-hva-sehvi* 'He asked him **if** he saw **anything**' (Mark 8:23). The 'separable prefixes' of German and Dutch may well be a direct continuation of the PIE situation, although this is not certain.

Syntactic analysis of these data must bear in mind that not all cases of separation of preverb from verb are structurally identical. The Avestan clause *apa vā yasāiti* 'or takes (it) away' (Yasna 11.5) begins with a preverb (*apa*) that is separated from its verb only because it must act as the host for the postpositive clitic conjunction vā 'or'. This is to be contrasted with e.g., *pairi uši vāraiia*ϑβəm 'cover (their) ears' (Yasht 1.27), where *pairi* 'around' has been fronted to clause-initial position for emphasis or contrast.

Syntax of the Clause

The Position of the Verb

It is usually claimed that PIE tensed clauses were verb-final. This claim rests on less secure comparative evidence than is usually admitted, however. Of the ancient IE languages, only Hittite is, under the most rigorous use of the term, strictly verb-final: in texts of all genres, the verb is always the last word in a clause except when it is fronted to clause-initial position for emphasis or contrast, or (very rarely) another constituent is right-extraposed to come after the verb. Latin is often described as a verb-final language, but a glance at any page of even ordinary Latin prose reveals a greater variety of possible positions for verbs (at least on the surface) than in Hittite, though verb-final clauses are considered normal. (One widely used Latin grammar puts it quite bluntly: "But the so-called normal arrangement is really rare" [Hale and Buck, 1903: 337].)

In many other styles there is considerably greater freedom. Again, to come to coherent grips with these data it is necessary to define what is meant by 'verb-final' – whether the term is supposed to refer to surface orders or underlying ones; and there is no one-to-one match between surface and underlying orders. A Latin clause like *eratque et bonus vir et innocens* 'and he was both a good and innocent man' (Cicero, *Brutus* 179) has the verb *erat* at the outset, but it may in fact be in clause-final position underlyingly if the complement *et bonus vir et innocens* has been heavy-NP-shifted rightward out of the verb phrase and the clitic conjunction-*que* has been moved by 'prosodic flip' or a similar process to the right of the left-most remaining constituent (the verb) in order to have a proper host to its left. Other analyses are possible as well, of course, which is why solving these issues has proved so vexing. It seems at any rate premature to make any claims concerning the word-order of clauses in PIE.

Like many of its descendants, both ancient and modern, PIE surely possessed nominal sentences, that is, those without an overt linking verb, of the type Old Persian *manā pitā Vištāspa* 'my father (is) Vištāspa' (DSf 12–13), Latin *tū coniūnx* 'you (are) his wife' (Vergil, *Aeneid* 4.113), Tocharian A *tsraṣiñ waste wrasaśśi* 'the strong (are) the protection of creatures' (Puṇyavantajātaka 2), and Russian *on russkij* 'he (is) Russian.'

The older IE languages are unanimous in their testimony that verbs agreed with their subjects in person and number. The most important exception is found in Anatolian, Old Avestan, and Greek, where neuter plural subjects take singular verbs, as in Hittite *apē-ya uddār* (neut. pl.) *QATAMMA lagāru* (sing.) 'let also those words fall over likewise' (KUB 2.3 iii 21–22; *QATAMMA* is Akkadian), Old Avestan yā (neut. pl.) *zī vāuuərəzōi* (sing.) 'the things which have been perpetrated' (Yasna 29.4), and Greek *hóssa te phúlla* (neut. pl.) *kaì ánthea* (neut. pl.) *gígnetai* (sing.) *hōrēi* 'as many as the leaves and the flowers that appear in their season' (*Iliad* 2.468). But this exception is only an apparent one from the PIE point of view: neuter plurals were originally collectives, and as such acted as singulars.

The possessive adjective **su̯o-* 'own' has syntactic peculiarities that may be mentioned at this juncture. While usually labeled a reflexive, **su̯o-* had broader usage than simply referring back to the subject of a sentence, as it could also be cross-indexed with newly introduced discourse material or to an older topic that has been just reintroduced. An example of the former from Sanskrit is Rigveda 8.2.7 *tráya índrasya*

sómāḥ sutā́saḥ santu devásya své kṣáye sutapā́vnaḥ 'Let the three somas be pressed for the god Indra in the soma-drinker's **own** house' (soma was the sacred intoxicating drink of ancient Hindu ritual). Here the possessive *své* refers not to the grammatical subject (*tráya . . . sómāḥ* 'the three somas') but rather to the soma-drinker (*sutapā́vnaḥ*). See recently Vine (1997) and references therein to earlier scholarship.

Movement Processes

The ancient IE daughters all have evidence for syntactic movement rules that shifted elements leftward to landing-sites at or near the front of a clause. Commonly seen, for example, is fronting of the verb to clause-initial position (topicalization) for emphasis or contrast: Hittite *ḫalziššai-wa-tta* DINGIR.MEŠ-*aš attaš* ^{D}*Kumarbiš* 'Kumarbi, the father of the gods, is calling you' (KUB 33.122 ii 11); Old Avestan *sraōtū sāsnā̊ fśəŋ́ḫiiō suiiē taštō* 'Let the bondsman (?), fashioned for benefit, hear the teachings' (Yasna 49.9); Armenian *erknēr erkin erknēr erkir* 'In labor was heaven, in labor was earth' (Movsēs Xorenacʿi 1.31). Existential verbs, verbs of speaking, and imperatives tend to be topicalized, as in Latin *est in cōnspectū Tenedos nōtissima fāmā īnsula* 'within sight there is a most famous island, Tenedos' (Vergil, *Aeneid* 2.21–22). Apparently topicalization of the verb happened frequently enough in some areas that its verb-initial word-order became reanalyzed as unmarked, as notably in Insular Celtic. But topicalization could cause any element to be fronted, e.g., from Hittite, *irma-šmaš-kan* dāḫḫun 'sickness I have taken away from you' (KBo 17.1 i 12'), *ammel-ma tarnumar ŪL pāi* 'but my release he won't give' (KBo 32.15 iii 16), *šarā-kan namma eḫu* 'come up again!' (KUB 33.84+ iv 11'). It is reasonable to suppose that topicalization was a syntactic process in PIE.

The cross-linguistically familiar process known as WH-movement (movement of an interrogative, or WH-word, towards the beginning of a clause or sentence) has also been posited for the proto-language on the basis of comparative evidence. Both topicalization and WH-movement were possible in the same clause, with the topicalized element (underlined in the following examples) preceding the WH-moved element (boldfaced), as in Hittite *ammuqq-a* ***kuit*** *ḫarkun* 'And also (that) **which** I had' (Apology of Hattusili III, iv 69) and Vedic Sanskrit *jātám* ***yád*** *enam apáso ádhārayan* '**when** the craftsmen held him, just born' (Rig Veda 3.2.7). Since, according to one commonly held analysis, WH-movement moves an element into the complementizer position and is responsible for the placement of subordinating conjunctions and relative pronouns as well as WH-words, topicalization around the complementizer slot produced word-orders not found in English. The details differ from language to language; in Latin, for example, all the words in a subordinate clause save one could appear before the subordinator. (It is still uncertain what the syntactic rules were that generated such word-orders.)

Wackernagel's Law

Jacob Wackernagel in 1892 published a lengthy study of clausal word-order in IE, in which he made the observation, now enshrined as a 'law' with his name, that unstressed clitic particles preferentially appeared second in their clause. Thus from, e.g., Sanskrit the unstressed object pronoun *tvā* 'thee' appears second in *ā́ tvā mántrāḥ kaviśastā vahantu* 'Let the spells recited by the poets lead you hither' (Rigveda 10.14.4), and in Greek the connective particle *dé* 'and, but' is second in the formulaic Epic line *ẽmos d' ērigéneia phánē rhododáktulos Ēṓs* 'but when early-born, rosy-fingered Dawn appeared' (*Iliad* 1.477 and passim). It has since been learned not only that the process is not limited to IE, but that within IE the term really covers at least three separate processes that all conspire to place different classes of left-leaning unstressed elements second within their clause most of the time (Hale, 1987).

Under this more modern account of Wackernagel's law, a distinction must be made between enclitics that have scope over a single word or constituent (word-level clitics), those that conjoin or disjoin sub-clausal constituents or whole clauses (sentence-connective clitics), and those that have scope over a whole clause or sentence (sentential clitics). Word-level clitics are often emphasizing particles, e.g., Hittite *-pat* (as in *nu-wa-za apun-**pat** eši* 'occupy **only** that (land)' [KUB 14.1 obv. 19]), or set the word to which they are attached in contrastive focus (e.g., Vedic *cid* in *pra-cyāváyanto ácyutā* ***cid*** 'the ones who move **even** unmovable things' [Rigveda 1.85.4]). Such particles obviously appear second in their clause only if the word they are attached to happens to come first in its clause. This is also true of sentence-connective clitics, typically words for 'and' and 'or' (e.g., *ca* 'and' in Vedic *ágna índraś* ***ca*** 'o Agni **and** Indra' [Rigveda 3.25.4], or *-ue* 'or' in Latin *silua alta Iouis lūcus**ue** Diānae* 'the high forest of Jupiter **or** the grove of Diana' [Vergil, *Aeneid* 3.681]; note that here the clitic has scope over a whole phrase and is attached to the first word within that phrase). The sentential clitics include various sentential adverbs, as well as the clitic personal pronouns. (IE languages typically distinguish between a set of fully stressed personal pronouns and a set of unstressed clitic forms.) Multiple sentential clitics can occur within a single clause,

forming chains, as famously in Hittite, e.g., *ḫaššuš-ma-wa-šši-za-kan*, where the four sentential clitics (added to *ḫaššuš-ma* 'but the king') are *-wa* (quotative particle), *-šši* (3rd sing. pronoun, dative), *-za* (reflexive particle), and *-kan* (modal particle). Here of course there is no question of strict 'second-position' placement, but note that the first particle in the chain is attached to the first available phonological host (the topicalized noun *ḫaššuš* 'king' plus the contrastive particle *-ma*).

Subordinate Clauses

Typical of IE relative constructions are the following, where the relative clause precedes the main clause and where the relative pronoun is picked up by an anaphoric pronoun in the main clause: (Sanskrit) ***yéna*** *imā́ víśvā cyávanā kr̥tā́ni* ... ***sá*** *janāsa índraḥ* (Rigveda 2.12.4) '(The one) **by whom** all these things have been made to shake ... **that**, people, (is) Indra'; (Greek) ***hós*** *ke theoīs epipeíthētai*, *mála t' ékluon* ***autoũ*** (*Iliad* 1.218), '**Whoever** obeys the gods, they listen **to him** as well'. Nominal antecedents often appear within the relative clause itself, agreeing in case with the relative (literal translations usually render such relatives as adjectives), as in Latin ***quem*** *agrum eōs uēndere herēdemque sequī licet*, ***is*** *ager uectīgal nei siet* (*Sententia Minuciorum,* CIL I^2 584.5) 'the field **which** (literally, which field) they are allowed to sell and pass to an heir, **that** field may not be taxable'.

As with subordinate clauses in general, the relative pronoun (or adjective or adverb) need not be the first word in the clause, but can be preceded by a topicalized element. In Hittite, definite relative clauses were obligatorily preceded by a member of the clause, while indefinite relative clauses began with the relative: thus *kuiš ḫaššuš āki* 'whichever king dies' is distinct from *ḫaššuš kuiš āki* 'the king who dies.' Second position of the relative became fixed in Insular Celtic, where the relative pronoun (fossilized as **yo*, uninflecting) appears either after the verb or between it and the preverb, e.g., Old Irish *ní latt aní ara-rethi* (Würzburg Glosses 6^b22) 'it is not yours that which you assail' (*ara-rethi* < **are-yo retesi*, where **are-* is the preverb). Gaulish, a Continental Celtic language, had the same uninflected relative, cliticized to the verb (e.g., *dugiionti-io* 'who serve', *toncsiíontío* 'who will swear (?)'), and in Baltic, the same relative stem (**i̯o-*) was affixed to adjectives to render them definite, e.g., *-ji* in Lithuanian (accus. sing.) *naũjąjį vařdą* 'the new name.' This reanalysis of the relative as a definiteness marker occurred also in Iranian; it is the source of the Modern Persian *ezāfe* construction, as for example in *ketāb-e naw* 'the new book', etymologically 'book which (is) new.' The antecedents are already in Old Persian, e.g., *karā hya manā* 'my army', literally 'army which (is) mine.' This example incidentally shows how the relative also came to be reanalyzed as a possessive marker (another function of the modern *ezāfe* construction), a reanalysis that has been recently mooted also for Carian (a fragmentary language of southwest Turkey and Egypt still imperfectly understood but recently recognized as Anatolian): *świnś upe arieś-χi ted* (M30) 'stele of Świn, father of Arie,' where *arieś-χi ted* literally means 'of Arie who (is) the father' (with -χi continuing the other PIE relative pronominal stem, **k^wi-*; see Hajnal in Crespo and García-Ramón, 1997).

The 'Phonology-Syntax Interface' of PIE

Abundant studies, especially from the 1980s on, have shown how syntactic structure and operations (movement in particular) can be reflected by the behavior of surface phonology. (For an overview see Inkelas and Zec, 1990.) Standard examples from English include lack of ability to cliticize *is* (i.e., contract it to 's) in structures of the type *I don't know who he is/*he's*, where the raising of the complement *who* out of the verb phrase blocks cliticization of the verb; its cliticization, though on the surface phonologically dependent on the preceding word, appears to require syntactically the presence of an *in-situ* complement.

Syntactic rules that have an effect on the phonological organization of sentences (i.e., on sentence prosody) are evidenced typically at the edges of prosodic domains. According to typical models, sounds are organized hierarchically into ever-larger groupings, or domains, starting with the mora or syllable, continuing through the word and clitic group, and ending with the clause or sentence (or utterance). Each such unit is the domain of a set of phonological rules. Since the edges of prosodic domains typically correlate with the edges of words, the behavior of cliticization and external sandhi phenomena have been especially extensively investigated for the clues they provide about the workings of underlying syntactic machinery.

As an example, in Greek, unaccented particles receive an accent if they occur before another such particle, as in the string *eí poú tís tina* 'if ever anyone (nom.) anyone (acc.)' (Thucydides 4.47), where the first three particles are normally unaccented when standing alone. However, in the phrase *doulíāi per en phrení* 'even in bondage in the mind' (Aeschylus, *Agamemnon* 1084), the unstressed enclitic particle *per* does not get accented in spite of occurring before the unaccented proclitic preposition *en*; the reason is that *per* and *en* do not belong to the same prosodic domain, but to different clitic groups, [*doulíāi per*]

and [*en phrení*]. *The accentuation rule therefore applies only to particles within the same clitic group*.

We are fortunate that Greek orthography provides us this piece of evidence of prosodic domain formation. The writing systems of the other ancient IE languages are of varying accuracy with regard to sandhi rules and similar phenomena. Sanskrit orthography is exceptional in recording numerous subphonemic details not normally represented in writing systems. The Hittites were quite meticulous in inserting spaces between words, but ran clitics together with their phonological hosts (or with other clitics in the frequent sentence-initial clitic chains) with no word breaks in between, indicating that these clitics united with their hosts as single phonological words. In Greek and Latin, it is often inscriptional remains that are the most valuable for extracting this kind of information, as standard orthography was heavily phonemic (especially in Latin) and suppressed the representation of most external sandhi phenomena. Thus a normatively spelled Latin sequence like *quod per* 'because through…' is sometimes spelled *quot per* on inscriptions, indicating word-final devoicing before an initial voiceless consonant.

Some authors modified existing orthographic systems in order to convey greater phonetic detail than was usual. In the Old High German writings of Notker Labeo, accents were placed on stressed words; definite articles were written without an accent before a non-branching noun phrase, but were written with an accent otherwise. This means that proclisis of the article was dependent on the syntactic 'heaviness' of the following noun phrase, a characteristic widely known for its numerous effects on other aspects of sentence construction as well, such as word-order.

Additional information can be gotten from metrics. Many of the classic texts in older IE languages are in poetry. Poetry is frequently mischaracterized as a repository of entirely artificial and unregulated grammatical excesses, but close study reveals that the syntax of poetic language is no less rule-governed than the syntax of prose. (One needs, to be sure, to differentiate between 'poetic grammar' and other grammars.) The Greek and Roman meters reveal numerous facts about prosodic domain-construction that are reflected in the allowable mapping of particular linguistic sequences onto metrical templates. For example, in several iambic and trochaic meters, a heavy syllable could be substituted for (resolved) by two light syllables, but only if the syllables belonged to the same word; the only allowable exception to this was if one of the light syllables was a clitic. Clearly a word-break between two fully stressed words was too great a prosodic boundary for the two short syllables to be comfortably equivalent to a single heavy syllable.

These are just some of the phonology–syntax effects that have been observed for the ancient IE languages, and it is reasonable to suppose that similar ones were characteristic of PIE itself. We have as yet little insight into the diachrony of prosodic systems, so it will be some time before we can confidently reconstruct any of these sorts of facts for the protolanguage. However, given that several clitics in the daughter languages are cognate and can be projected onto PIE (e.g., Sanscrit *ca*, Greek *te*, Latin *-que* 'and' from PIE $*k^we$), we know that PIE had clitics, which means it had clitic groups, and since the prosodic behavior of clitic groups does not vary widely or randomly among languages, it is reasonable to suppose that clitic groups in PIE were much the same as they are in languages of today. The same was surely true of other prosodic domains as well.

See also: Indo–European Languages; Proto-Indo-European Morphology; Proto-Indo–European Phonology; Reconstruction, Cultural; Reconstruction, Morphological; Reconstruction, Syntactic; Wackernagel, Wilhelm (1806–1869).

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Protolanguage

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It is essential to distinguish the term 'protolanguage' from the protolanguages reconstructed for the various language families of the world, e.g., Proto-Indo-European or Nostratic. These, if they existed, would be full-fledged human languages with a time depth of thousands (at most, a few tens of thousands) of years. Protolanguage is the hypothesized predecessor of all modern human languages, with a time depth measured in hundreds of thousands (perhaps millions) of years.

While the idea that language may have passed through more primitive stages has been around a long time, the first clear formulation of the protolanguage hypothesis appeared in Bickerton (1990). Several lines of argument supported the hypothesis. Language was unlikely to have emerged with all its modern complexity, so a more primitive antecedent was intrinsically plausible. Chomsky (1980) distinguished between the conceptual and the computational aspects of language (roughly, lexicon and syntax); evidence from early-stage pidgins (Bickerton, 1981) and early child language suggests that these two aspects are dissociable and that words (or manual signs) can be strung together without any syntactic structure. Early-stage pidgins in particular provide strong evidence, since these are spontaneously developed by adults with a fully developed language faculty but insufficient exposure to any potential common language for mastery of its syntax. The experience of speakers who have tried to acquire a first language after the critical period (such as Genie; see Curtiss, 1977) and who have consequently been unable to acquire full syntax suggests that protolanguage is more robust than modern human language, and might therefore be phylogenetically older. Finally, apes under instruction (Terrace *et al.*, 1979; Savage-Rumbaugh, 1986) have been able to acquire lexical items; however, without further explicit instruction (beyond passive exposure), they can also string such items together to form elementary, unstructured propositions.

What caused protolanguage to emerge? Early accounts focused on cooperative hunting or toolmaking, but since many animals hunt cooperatively and since toolmaking can be conducted or even taught (and indeed, among preliterate peoples, generally is) simply through observation and imitation, few researchers support such proposals nowadays (Gibson and Ingold, 1993; Hurford *et al.*, 1998). Currently, the favorite pressure is one that involves some form of social interaction, whether 'Machiavellian intelligence' (attempts to outwit and dominate other group members; see Humphrey, 1976), gossip as a substitute for grooming (Dunbar, 1996), or the development of a 'theory of mind' – the ability to realize that contents of another's mind need not be the same as one's own (Povinelli, 1996; Worden, 1998).

However, while many primates (certainly all the great apes, our nearest relatives) have an advanced social intelligence, employ Machiavellian strategies, and possess at least the rudiments of a theory of mind, no other species has even the most rudimentary language. This makes a strong biological argument against any 'social intelligence' approach, since a unique adaptation suggests an equally unique selective pressure. Since experiments with apes (Premack, 1976; Savage-Rumbaugh, 1986) have shown they can be trained to use languagelike systems, why did not 'social intelligence' pressures select for language in them, too?

An account based on foraging patterns (Bickerton, 2002) avoided these problems. The only other species with communication systems able to convey objective information are ants and bees. These, like humans (but unlike other apes), foraged under fusion-fission conditions (larger groups dividing into smaller units to cover areas large enough for group survival). Under such conditions, exchange of information becomes vital. Humans (but not apes, with smaller

Proto-Ugric

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Definition

Proto-Uralic (or Proto-Finno-Ugric) is the protolanguage underlying the Uralic language family (also known as the Finno-Ugric language family). Since the genetic relationship between the Uralic languages is a fact established beyond doubt by the methods of comparative linguistics, Proto-Uralic may be understood as a fully developed and relatively homogeneous natural language, which was once spoken by an actual Proto-Uralic speech community in a limited geographical region, the Uralic homeland. Since, however, no written documentation is available for Proto-Uralic, and since even the earliest historically documented forms of the modern Uralic languages and branches (Hungarian, Permic, Finnic) date back less than 1000 years, the details of the Proto-Uralic lexical and grammatical structure remain hypothetical and can only be approached by the method of linguistic reconstruction. On the other hand, the Uralic comparative corpus is large enough to allow a fairly detailed picture to be created of Proto-Uralic. By applying the method of internal reconstruction to the Proto-Uralic reconstruction it is possible to reach even deeper time levels, which may be termed Pre-Proto-Uralic.

Mechanism of Breakup

The Uralic language family comprises nine relatively separate major branches, which are distributed in a wide trans-Eurasian belt from Scandinavia (Fennoscandia) and the Baltic region through European Russia to western and southern Siberia, as well as, historically, to northern Mongolia and the Baikal region. The documented branches are, from west to east: (1) Saamic (Saami), (2) Finnic (Baltic Finnic), (3) Mordvinic (Mordvin), (4) Cheremissic (Mari), (5) Permic, (6) Hungaric (Hungarian), (7) Mansic (Mansi), (8) Khantic (Khanty), and (9) Samoyedic. Although all these nine branches are unmistakably descendants of Proto-Uralic, the mechanism of the actual breakup of the Uralic protolanguage is open to two different interpretations, which differ in their definition of the relationships between the nine major branches.

In a linear model (comb model), all the major branches (or most of them) are understood as genetically equal, implying that Proto-Uralic was a relatively diffuse and widely dispersed entity from which the modern branches immediately derive. In a hierarchical model (family tree model), the Uralic branches are assumed to constitute a hierarchy of basically binary (in some cases ternary) relationships which, in the most commonly accepted interpretation, become increasingly deep towards the east, suggesting that Proto-Uralic had a compact core area in the east, from which it started its expansion in a westward-branching pattern.

Levels of Reconstruction

In the hierarchical (family tree) approach to the breakup of Proto-Uralic (which is here preferred, see Figure 1), it is normally postulated that the line of deepest genetic division within the Uralic family goes between Samoyedic (branch 1, in the east) and the rest of the family, also known as Finno-Ugric (branches 2 to 9, in the west). The Finno-Ugric branch, in turn, forms a hierarchically organized network of accumulative (sub)branches. Altogether, at least six genetically relevant levels of reconstruction can be distinguished, including the level of Proto-Uralic. A problem with the hierarchical model is that some of the deeper levels of reconstruction, notably the level of (actual) Proto-Finno-Ugric, turn out to be difficult to distinguish from Proto-Uralic itself, especially as far as phonological and morphological innovations are concerned. This is one of the reasons why the term 'Uralic' is often replaced by the more traditional term 'Finno-Ugric' (or 'Finno-Ugrian'). The hierarchical structure of the Uralic family is, however,

1.	Proto-Uralic	
1.1.	Proto-Samoyedic	(1)
1.2.	Proto-Finno-Ugric	
1.2.1.	Proto-Ugric	
1.2.1.1.	Proto-Khantic	(2)
1.2.1.2.	Proto-Mansic	(3)
1.2.1.3.	Proto-Hungaric	(4)
1.2.2.	Proto-Finno-Permic	
1.2.2.1.	Proto-Permic	(5)
1.2.2.2.	Proto-Finno-Volgaic	
1.2.2.2.1.	Proto-Cheremissic	(6)
1.2.2.2.2.	Proto-Finno-Mordvinic	
1.2.2.2.2.1.	Proto-Mordvinic	(7)
1.2.2.2.2.2.	Proto-Finnic	(8)
1.2.2.2.2.3.	Proto-Saamic	(9)

Figure 1 The levels of reconstruction in Uralic.

clearly visible in the lexical corpus, which allows a reasonably unambiguous division to be made between the two equal entities of Proto-Samoyedic and Proto-Finno-Ugric.

Principles of Reconstruction

Since Samoyedic and Finno-Ugric are, in the hierarchical approach, defined as the two main branches of the Uralic family, any feature that can be verified as Proto-Uralic has to be attested in both Samoyedic and Finno-Ugric. This circumstance has two consequences which have a potentially distorting effect on Proto-Uralic reconstructions. First, due to the greater internal diversification (and greater reconstructible depth) of the Finno-Ugric branch, the total Finno-Ugric comparative corpus is much larger than the available Samoyedic corpus. This means that, inevitably, many of the features reconstructible only for Proto-Finno-Ugric, but not attested in Samoyedic, may still derive from Proto-Uralic. Secondly, some of the features shared by Samoyedic with only the eastern branches of Finno-Ugric (especially Khantic, Mansic, and Hungaric, collectively termed Ugric) need not derive from Proto-Uralic, since they can also be due to shared post-Proto-Uralic areal innovations. In practice, however, the number of features shared only by Samoyedic and eastern Finno-Ugric seems to be relatively small, while the bulk of the currently known Proto-Uralic comparative corpus is based on material shared by Samoyedic and western Finno-Ugric (especially Finnic and Saamic). Although partly due to a bias in the research tradition, this situation also has a linguistic background, in that western Finno-Ugric and Samoyedic represent the two conservative margins of the Uralic area, while eastern Finno-Ugric (notably Ugric and Permic) represent the more innovative center of the language family. This is especially evident in details of syllable structure and segmental phonology, but also in morphology and lexicon.

Time Depth

The depth of Proto-Uralic can be roughly estimated on the basis of the size of the Uralic comparative corpus. Although Samoyedic and Finno-Ugric share a substantial amount of grammatical substance, the number of shared lexical elements that can be unambiguously reconstructed for Proto-Uralic is much smaller than the comparative corpus of most other major language families in Eurasia, including Indo-European. Importantly, the reconstructible Proto-Uralic lexicon does not contain words pertaining to agriculture or pastoralism, and the single item pointing to metal technology (**wäckä* 'metal, copper') seems to be a Eurasian *Wanderwort* that may have spread among the individual branches of Uralic in the post-Proto-Uralic period, or it may have primarily denoted native metal (copper or meteoritic iron) prior to the development of metalworking technology. By contrast, there are several Proto-Uralic words referring to a culture of hunters (**yïngsi* 'bow', **nyïxli* 'arrow') and gatherers (**pesä* 'nest', **muna* 'egg', **mura* 'berry'), who may also have known fishing (**kala* 'fish'). This would strongly suggest a Neolithic or Mesolithic cultural context. The absolute dating of Proto-Uralic depends, however, on how distant the speakers of Proto-Uralic were from the centers of post-Neolithic cultural innovation. Reasonable estimates would place Proto-Uralic at a depth of 5000 to 8000 years before the present.

Homeland

The method of linguistic paleontology suggests that Proto-Uralic was spoken in a boreal environment where several species of both European and Asian coniferous and deciduous trees grow together (**koxyi* 'birch', **jïxmi* 'bird cherry', **kaxsi* 'fir/spruce', **sïksi* '*Pinus cembra*'). The seasonal differences of the climate (**sungi* 'summer', **sada* 'rain', **lomi* 'snow') had given rise to technological adaptations (**suksi* 'ski', **suxi-* 'to row'). In conventional understanding, these criteria allow the Proto-Uralic homeland to be placed in the forest zone at the border between European Russia and Siberia, most probably in the southern Urals (hence also the name of the Uralic language family). This location also more or less corresponds to the linguistically postulated line of deepest genetic division, between Samoyedic and Finno-Ugric. However, the areal and demographic dominance of the European branches of Finno-Ugric has stimulated attempts to place the homeland further to the west, most commonly in the Middle Volga region, but even as far west as the Baltic region. Alternatively, a broad homeland, compatible with the linear model of internal taxonomy, has been proposed. Evidence for the various proposals has been sought from archaeological and, more recently, human genetic material, as well as from verified or alleged areal contacts with other language families, especially Indo-European. Even so, the basic arguments favoring a geographically compact and relatively eastern homeland have not been convincingly rejected.

Genetic Status

Proto-Uralic represents the ultimate node of genetic taxonomy that can be reached by the methods of

diachronic linguistics on the basis of the Uralic comparative corpus. Beyond Proto-Uralic, several higher-level relationships have been proposed with other language families and linguistic complexes, notably Indo-European, Altaic, and Paleo-Siberian. The external connection that has found most support among comparativists is the one linking Uralic with Yukaghir(ic), a Paleo-Siberian family in northeastern Siberia. The Uralo-Yukaghir hypothesis would fit well into the westward-branching pattern of the Uralic family, leaving Yukaghir(ic) as an additional easternmost (Para-Uralic) branch of the macrofamily. Unfortunately, the substantial evidence quoted in favor of this hypothesis, as well as of all other long-distance comparisons based on Uralic material, is insufficient to prove a genetic affinity. The only significant circumstance that links Uralic materially with other language families is the system of personal pronouns (1pl **m-*, 2pl **t-*), which is shared not only with Yukaghir(ic), but also with Indo-European, Turkic, Mongolic, Tungusic, and Kamchukotic (Chukchee-Kamchadal). This detail has never been satisfactorily explained, but it may have an areal and/or typological, rather than a genetic, background.

Areal Position

From the areal point of view, the Uralic language family is best characterized as a member of the trans-Eurasian Ural-Altaic belt, which also comprises the so-called Altaic complex in central and northeastern Asia, viz., Turkic, Mongolic, and Tungusic, as well as, more loosely, Korean(ic) and Japonic (Japanese-Ryukyu). The common features of all these language families are manifested in their general properties at various levels of grammatical structure (phonology, phonotactics, morphology, morphosyntax, syntax, discourse), and they seem to have been present already in the corresponding protolanguages, including Proto-Uralic. By contrast, neither Indo-European nor any of the Paleo-Siberian entities, including Yukaghir(ic), can be said to represent the Ural-Altaic language type. This suggests that Proto-Uralic was areally connected (either directly or indirectly) with the ancestral forms of the languages of the Altaic complex, a conclusion that is best compatible with the assumption of an eastern homeland of Proto-Uralic. Within Uralic, also, the strength of the Ural-Altaic features diminishes toward the west and north, suggesting the structural influence of other typologies.

External Contacts

The Ural-Altaic typology of Proto-Uralic suggests the presence of a prehistoric contact network, which extended from Uralic towards the area of the Altaic complex in the east. Depending on where exactly Proto-Uralic was spoken, this contact network may also have included other language families. Unfortunately, apart from the typological indicators, there are no uncontroversial traces, such as loanwords, of any protolanguage-level contacts between Uralic and other language families, including those of the Altaic complex. Contacts with Indo-European in the south and west, as reflected in the cultural vocabulary of all Uralic languages, seem to have begun only in the post-Proto-Uralic period separately for Samoyedic and the individual branches of Finno-Ugric. It is, however, likely that the Uralic family, during the post-Proto-Uralic period of expansion, has covered an unknown number of non-Uralic (subsequently extinct) languages and language families, which must have left traces in the structure and substance of the modern Uralic languages, especially in the west (the Baltic region) and north (the Arctic belt).

Syllable Structure

The two basic syllable types that can be reconstructed for Proto-Uralic are the open syllable (C)V and the closed syllable (C)VC. Syllables with an initial vowel (zero consonant) were permitted only in word-initial position. Pronominal roots and a few auxiliaries (such as the copula and the negative verb) were of the simple monosyllabic structure (C)V, while all significant word stems seem to have been of the disyllabic structure (C)V(C)CV, to which suffixal elements of the types -C and -(C)CV(-) could be added. As a result, consonant clusters were possible only at syllable boundaries, while both word initially and word finally only single consonants were permitted. No phonologically distinctive suprasegmental features can be reconstructed for Proto-Uralic, but there are indications that the disyllabic structure (C)V(C)CV functioned as the basic rhythmic unit, characterized by nondistinctive initial stress. The most common suprasegmental feature in the modern Uralic languages is the quantitative correlation of vowels, but in the light of the comparative evidence it is invariably of a secondary origin.

Segmental Phonology

The Proto-Uralic system of segmental phonemes is generally assumed to have had 10 distinctive vowels (Table 1) and around 17 consonants (Table 2). The vowels were organized into palatal-velar pairs, comprising two low vowels (**a*, **ä*), two mid-high vowels (**o*, **e*), two high rounded vowels (**u*, **ü*), and two high unrounded vowels (**ï*, **i*). In the consonant

Table 1 The Proto-Uralic vowel paradigm

*u	*ï	*ü	*i
*o			*e
*a			*ä

Table 2 The Proto-Uralic consonant paradigm

*p	*t	*c	*k
	*ts		
	*d	*j	*x
	*s		
*m	*n	*ny	*ng
	*r		
	*l		
*w		*y	

system, the stops and the nasals were divided into labials (*p, *m), dentals (*t, *n), palatals (*c, *ny), and velars (*k, *ng). The palatal stop has mainly continuant reflexes in the modern languages and may already in Proto-Uralic have been pronounced as a palatal continuant. There were also two liquids (*r, *l), two glides (*w, *y), and a dental continuant obstruent (*s). In addition, there was an affricate (*ts), which has mainly retroflex reflexes in the modern languages and is often reconstructed as a retroflex affricate or stop.

Finally, there were three consonants which are perhaps best classified as spirants (*d, *j, *x). The reconstruction of these segments is difficult due to the variety of their reflexes in the modern languages, with the important exception of one marginal branch (Saamic). Generally, the dental and palatal spirants (*d, *j) have merged with the systems of stops, liquids, and glides, while the velar glide (*x) has mostly no segmental trace at all. Not surprisingly, the velar (or postvelar or laryngeal) glide is the most controversial segment of the Proto-Uralic reconstruction. It is nevertheless a necessary tool for explaining certain phonotactic and prosodic phenomena in the modern languages, including the so-called primary vowel length in the Finno-Ugric branch, which seems to reflect the presence of an original syllable-final velar spirant (*Vx/_CV).

Phonotactics

Due to the limited size of the Proto-Uralic corpus, it is not always possible to make a clear distinction between systematic phonotactic features and accidental gaps. Some phonotactic restrictions can, however, be reconstructed. Most importantly, there seem to have been only two distinctive vowels in noninitial syllables, a low (or full) vowel (*a) and a high (or reduced) vowel (*i). Systematic restrictions pertaining to consonants seem to have included the exclusion of the velar nasal (*ng) and one of the liquids (the vibrant *r) from the word-initial position. Several specific restrictions seem to have concerned the spirants. None of the spirants (*d, *j, *x) is attested as the second component of a cluster, and the dental and velar spirants (*d, *x) are not attested in word-initial position. In intervocalic position, the velar spirant (*x) can only be reconstructed before the high vowel (*i) in a structural type (*Vxi) which has yielded monosyllabic reflexes in almost all branches. Evidence of geminate consonants is available only for the labial stop (*pp).

Morphophonology

The low vowel of noninitial syllables (*a), but not necessarily the high vowel (*i, also written as *e), is conventionally assumed to have been governed by palatovelar vowel harmony, valid both for word stems and for suffixes. Vowel harmony is synchronically present in many, though not all, branches of Uralic, especially in the west (Finnic) and east (Samoyedic), but also in the center (Hungarian). However, vowel harmony seems to be a relatively unstable phenomenon, which has appeared and disappeared separately in several individual Uralic languages. Even if it may have represented an actual phonetic tendency in Proto-Uralic, it cannot be reconstructed as a phonemic phenomenon. The same is true of the so-called consonant gradation, involving the alternation of strong (long) and weak (short) varieties of medial consonants (especially stops) in three marginal branches of Uralic (Saamic, Finnic, and Samoyedic). Both vowel harmony and consonant gradation are probably best seen as convergent tendencies, which have received a phonemic status only separately in the languages and/or branches concerned. Both phenomena have apparently been triggered by the pattern of initial stress inherited from Proto-Uralic. A third feature conditioned by stress is the so-called consonant stem formation, which involves the loss of a stem-final second-syllable (unstressed) high (or reduced) vowel (*i) before suffixal syllables beginning with a single consonant (*VCi-CV → *VC-CV). Derivational relationships such as *pidi- 'to be long/high'/*pid-kä 'long/high' suggest that consonant stems may have had a phonemic status already in Proto-Uralic.

Morphological Typology

Proto-Uralic is traditionally reconstructed as an almost perfectly regular agglutinative language, in

which the principal method of morphological marking was suffixation, used both for inflexional and derivational purposes. The regularity of Proto-Uralic may, however, be partly due to the distorting effect of the comparative method, which does not allow irregularities and morphophonological alternations to be traced to the protolanguage. In the actual Proto-Uralic language, agglutination may therefore have been accompanied by true morphophonological alternations, including flective features later lost in the modern languages. A flective feature that has occasionally, though erroneously, been reconstructed for Proto-Uralic is vowel ablaut (a nontransparent system of paradigmatic vowel alternations), which is synchronically present in a single eastern branch of Uralic (Khantic). However, even if Proto-Uralic cannot be shown to have contained nonagglutinative features, such features are likely to have been present in Pre-Proto-Uralic, and traces of them can possibly still be detected by an analysis of the Proto-Uralic lexicon and grammar by the method of internal reconstruction.

Parts of Speech

Nouns and verbs were distinguished in Proto-Uralic by separate sets of morphological markers, corresponding to the systems of nominal declension and verbal conjugation. The morphological class of nouns included also pronouns, numerals, and spatials (spatial nouns, used also as postpositions). Nouns could be turned into verbs (denominal verbs) and vice versa (deverbal nouns) by using derivative suffixes. There are, however, indications that the distinction between nouns and verbs was less clear in Pre-Proto-Uralic. This is particularly evident from the fact that several subsets of suffixes (the number markers, the personal markers, many derivative suffixes, and even some case endings) seem to have occurred with both nominal and verbal stems. Also, Proto-Uralic had a considerable number of ambivalent (noun–verb) stems of the type **pala* 'bite'/**pala-* 'to bite'. In some cases, the verbal function of an ambivalent stem seems to have conveyed an adjectival meaning (static verb), as in **pilmi* 'darkness, shadow, cloud'/**pilmi-* 'to be dark'.

Number and Case

The Proto-Uralic nominal paradigm (Table 3) comprised three numbers and at least six cases. The full case paradigm, which can be reconstructed only for the singular, comprised three general grammatical cases: the unmarked nominative; the genitive in **-n* and the accusative in **-m*; and three local cases: the locative in **-na*, the ablative in **-ti*, and the dative in **-ng*. The genitive had a double role, in that it was used both adnominally in its genitival function (possessive attribute) and adverbially as an instrumental (modal adverb). Additionally, at least two other modal forms, the caritive in **-kta* and the translative in **-ksi*, functioning as cases in some modern languages, can be traced back to Proto-Uralic. For the plural, only the basic form in **-t* and one oblique form (connective) in **-y* can be reconstructed, while the dual in **-kV-* (possibly from the numeral **käktä* 'two') may have lacked marked case forms altogether. The dual is attested only on the western and eastern margins of the Uralic family (Saamic, Ugric, Samoyedic), and its reconstructive status remains somewhat controversial in the details.

Table 3 The Proto-Uralic nominal paradigm

Singular	nominative	**-Ø*	basic form
	genitive	**-n*	possessor / instrument
	accusative	**-m*	object
	locative	**-na*	location
	ablative	**-ti*	movement from
	dative	**-ng*	movement to
Plural	nominative	**-t*	plurality
	connective	**-y*	plural possessor / object
Dual	nominative	**-kV-*	duality

Personal Markers

The exact shapes of the Proto-Uralic personal pronouns are virtually impossible to reconstruct, though the singular 1st and 2nd person pronouns may have been **min* and **tin* respectively, while the 3rd person pronoun may have had the structure **sVn*. The corresponding plural and dual pronouns had the same initial consonants, but were modified by paradigmatic vowel alternations and/or suffixation. There are indications that the plural pronouns may have incorporated the regular nominal plural marker (**-t*), but the dual pronouns (if present in the protolanguage) may have had a suffix different from the regular dual marker. From the suffixal use of the pronouns, two sets of morphological personal markers had arisen already in Pre-Proto-Uralic (Table 4). The markers of the one set may be characterized as basically predicative (predicative personal endings), since they referred to the subject of a finite verb, while the markers of the other set may be called possessive (possessive suffixes), since they indicated the possessor of a noun. Evidence from the eastern branches of the Uralic family (Ugric, Samoyedic) suggests, however, that the predicative markers could also be attached to nouns to indicate the subject of a nominal

Table 4 The Proto-Uralic personal markers

		Predicative /subjective	*Possessive /objective*
Singular	1	**-m*	**-mi*
	2	**-t / *-n*	**-ti*
	3	**-Ø*	**-sa*
Dual	1	**-mV-*	**-mV-*
	2	**-tV-*	**-tV-*
	3	**-kV-*	**-sV-*
Plural	1	**-ma-t*	**-ma-t*
	2	**-ta-t*	**-ta-t*
	3	**-t*	**-sa-t*

predicate (nominal predicative conjugation), while the possessive markers could be attached to verbs to refer to the subject of a transitive verb with a 3rd person definite or specific object (the so-called objective conjugation of verbs). Formally, the two sets may have been distinct only in the singular 1st and 2nd persons, which show more basic suffix shapes in the predicative set, and in the 3rd person forms, which in the predicative set take the number markers of the nominal declension instead of actual pronominal markers. A reconstructional problem is posed by the 2nd person singular marker, which in Samoyedic and one of the Finno-Ugric branches (Permic) seems to be based on an aberrant shape of the personal pronoun (**n-*). The 2nd person pronoun in these branches is of the regular type (**t-*), on which the dual and plural personal endings are also based. Corresponding aberrant pronouns of the 2nd person (**n-*) are actually attested in two Siberian branches of the family (Mansic and Khantic, areally united under the label Ob-Ugric), but their diachronic status is unclear.

Tense and Aspect

The plain stem of the verb, conjugated in persons, formed in Proto-Uralic a basic paradigm of predicative forms, which may have functioned either as a general present-future tense (as in Saamic and Finnic) or as an aspectually dependent temporally ambiguous unmarked aorist (as in Samoyedic), which would have referred to either a present tense (for imperfective verbs) or an immediate past tense (for perfective verbs). Other aspectual contents in Proto-Uralic seem to have been expressed by derivative suffixes (deverbal verbs), while other temporal forms were based on the predicative use of the nominal forms of the verb. Detailed reconstruction of the temporal-aspectual system of the protolanguage is impossible due to the functional variety of the reflexes of the individual markers in the modern languages. This may suggest that the system was not stabilized in Proto-Uralic.

Nominalization of the Verb

In spite of the presence of ambivalent stems functioning as both nouns and verbs, the dominant method of nominalizing verbs in Proto-Uralic was by suffixation. The nominal forms of the verb were morphologically nouns (with the forms of the nominal declension), but syntactically verbs (with the complements of the verb). Functionally, they may be characterized as both participles (actor forms) and infinitives (action forms), with no reconstructible distinction. The nominalizing suffixes, of which a large variety can be reconstructed, appear to have formed sets in which a single suffixal consonant (most typically **p*, **t*, **c*, **k*, **m*, **y*) could occur with three different vocalic structures: with a low vowel (**-Ca*), with a high vowel (**-Ci*), or with no vowel at all (**-C*). For most of these suffixes, only a very general nominalizing role can be reconstructed, but in the individual Uralic languages they typically appear with clear-cut functional distinctions. When used predicatively and conjugated in persons, they have also served as the basic source of finite temporal-aspectual and modal markers in all Uralic languages. One of the most obvious examples of this is the imperative paradigm, which seems to have been grammaticalized already in Proto-Uralic on the basis of one of the nominalizing consonants with two different vocalic structures (**-k/*-ka-*). In the imperative paradigm, the (inherently unmarked) 2nd person singular reference (**-k*) was exceptionally formed without an actual personal marker. Otherwise, nominalizing suffixes without a personal marker (but with number markers) are widely attested in the function of 3rd person forms of various finite subparadigms in the modern Uralic languages.

Adverbialization of the Verb

Adverbial case forms of the nominal forms of the verb probably occurred already in Proto-Uralic in converbial (gerundial) functions, indicating various types of subordinated predication. Only one such structure, the verbal caritive in **-mV-kta* 'without doing' and the corresponding nominal derivative (negative participle) in **-mV-kta-ma*, can be concretely reconstructed for Proto-Uralic. In addition, there is evidence that the plain verbal stem (without a nominalizer) could also take case endings, notably the instrumentally used genitive ending (**-n*), to mark a subordinated predicate (modal converb).

Negation

An important typological feature of Proto-Uralic (shared in the Ural-Altaic context with Tungusic) was the presence of the negative verb **e-*, which functioned as the syntactic main verb in all negative constructions. The negative verb took the regular verbal markers of predication and nominalization, while the semantic main verb to be negated stood in an invariant nominalized form termed the connegative (formally identical with the 2nd person singular imperative in **-k*), e.g. **kanta-m* 'I carry' : **e-m kanta-k* 'I do not carry'. The connegative is synchronically a feature of the marginal branches of the family (Saamic, Finnic, Samoyedic), but the verbality of negation is generally well preserved also in the other branches (with the exception of Hungarian).

Sentence Structure

The Proto-Uralic word order may with little ambiguity be reconstructed as having been of the Ural-Altaic head-final type, with the arguments preceding the verb (SOV) and with all attributes preceding the head noun (GAN). Embedded structures (relativization) and subordinate clauses were expressed with the help of nominalized verbal forms, with case endings functioning as the principal linkers between the components of the complex sentence. The agent–patient relation was indicated by the nominative–accusative strategy (with an unmarked nominative and marked accusative), but the presence of an apparent suffixal element in what would seem to have been the basic forms of certain personal pronouns (the singular pronouns **mi-n*, **ti-n*, **sV-n*, and the interrogative pronoun **ke-n* 'who') might point to a system of agent marking (possibly ergative) in an earlier stage of Pre-Proto-Uralic. An idiosyncratic syntactic feature that can be reconstructed for Proto-Uralic is the lack of accusative marking in the object of a 2nd person singular imperative predicate. In such sentences, the unmarked object could also be analyzed as the subject of a nominalized verbal predicate (formally unmarked for person).

Lexicon

In addition to a considerable paradigm of relatively unambiguous morphological and derivative markers as well as a smaller number of phonologically unstable pronominal roots and auxiliaries, the currently known Proto-Uralic lexicon comprises fewer than 200 fully satisfactory etymologies. Apart from the items of basic (apparently Neolithic) cultural vocabulary and some geographically diagnostic (boreal) botanical and climatic terms, the common lexicon comprises words pertaining to the natural elements (**weti* 'water'), topography (**toxi* 'lake'), astronomy (**kïxi* 'moon'), anatomy (**cilmä* 'eye'), physiology (**elä-* 'to live'), sensations (**päywä* 'warmth'), emotions (**peli-* 'to fear'), kinship (**ïppi* 'father-in-law'), and social interaction (**mexi-* 'to give'). The small number of Proto-Uralic etymologies diminishes considerably the prospects of distant comparisons with other language families, including Yukaghir(ic), Indo-European, and the Altaic complex. Few Proto-Uralic items have credible look-alikes in other language families, allowing them to be regarded as possible Eurasian *Wanderwörter* (an example is **nimi* 'name'). Importantly, although the Finno-Ugric languages share basic numerals up to six, only two numeral stems (**käktä* 'two', **witi* 'five/ten') are shared with Samoyedic and can be reconstructed for Proto-Uralic. All higher numerals (including seven) in the modern Uralic languages are either borrowings (mainly from Indo-European) or internal innovations (often etymologically transparent). The scarcity of the native numeral stock is another important argument in favor of an early dating for Proto-Uralic.

History of Research

Although the genetic unity of the Finno-Ugric languages was established already in the late 18th century, the connection between Finno-Ugric and Samoyedic was first seriously postulated by the Finnish ethnolinguist M. A. Castrén in 1845, and definitively demonstrated only by Heikki Paasonen in 1912–1917. Relevant questions pertaining to the emergence of the Uralic concept and the early development of Uralic comparative studies were discussed by G. J. Stipa (1990). The traditional Proto-Uralic lexical corpus was summarized in the etymological dictionary published under the editorship of Károly Rédei (1986–1988). A more advanced reconstruction of Proto-Uralic became possible only after further progress had been made in the internal diachronic analysis of the Samoyedic branch. The current principles of Uralic language comparison and Proto-Uralic reconstruction were discussed by Daniel Abondolo (1998). A critically evaluated and up-to-date database of Uralic diachronic phonology and lexicology was presented by Pekka Sammallahti (1988), whose corpus has most recently been complemented by corrections and fresh etymologies by Ante Aikio (2002). In spite of the obvious solidity of the Uralic language family, the prehistorical validity of Proto-Uralic was questioned by Angela Marcantonio (2002), who argued that the small size of the Proto-Uralic corpus allows an excessive margin of statistical

error. The conceptual mistakes inherent in this and other 'revolutionary' approaches to Uralic studies were discussed by Juha Janhunen (2001).

See also: Altaic Languages; Areal Linguistics; Reconstruction, Morphological; Reconstruction, Syntactic; Uralic Languages.

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Proto-Indo–European Morphology

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General

Proto-Indo–European (PIE), like its earliest daughters (Hittite, Vedic Sanskrit, Avestan, Greek, Latin, etc.) was a highly inflected language. It is important to emphasize this fact in view of the many ways in which our view of PIE morphology has changed since the 1960s. For much of the 20th century, the burning questions in IE linguistics lay in the area of phonology, as scholars struggled to determine the number and character of the laryngeal consonants assignable to the protolanguage. It was only later, with the emergence of a consensus on laryngeals and the development of new methods of linguistic and philological analysis, that the 20th-century revolution in IE phonology began to spill over into morphology. Here the result was an even more radical rethinking of the traditional picture. The 'new look' of PIE morphology differs profoundly from the classical account by Brugmann (b. 1849) and newer works in the Brugmannian tradition. But attempts to portray PIE as a 'simpler' (i.e., less morphophonemically complex) language than its daughters have proved misguided.

The basic architecture of PIE was like that of any early IE language. The subject of a sentence stood in the nominative case and agreed with its verb in person and number; the verb was also marked for diathesis or 'voice' and for a variety of tense-aspect and modal categories. Nominal (i.e., substantival and adjectival) stems distinguished gender as well as case. An assortment of derivational processes allowed the formation of nominal and verbal stems from roots or simpler derived stems. Suffixation and ablaut, typically accompanied by movement of the accent, were the commonest devices for marking inflection and derivation. Prefixation as such was virtually unknown, but nouns and verbs combined freely with local particles (preverbs) in ways that tended to lead to the emergence of true prefixes in the daughter languages.

Although PIE distinguished sharply between nominal and verbal stems, a few generalizations can be stated for both. At the heart of every PIE noun or verb (pronouns are discussed separately) was a root. PIE roots were characteristically monosyllabic complexes of the form $*(s)C_1(C_2)EC_3(C_4)$-, where the symbols C_1, C_2, etc., stand for consonants and E stands for a variable vowel. All roots ended in a consonant; traditionally reconstructed preforms such as **dhē-* 'put' and **stā-* 'stand' are now known to have ended in a laryngeal (**dheh$_1$-*, **steh$_2$-*). Whether all roots also began with a consonant is less clear but often assumed. Certain consonant combinations (e.g., plain voiced stop + plain voiced stop; voiceless stop + voiced aspirate, in either order) were disallowed within a single root, a fact that may shed light on the prehistory of the PIE stop system. Some roots, such as **trem-* and **tres-*, both meaning 'tremble,' and **dreh$_2$-* or **drem-*, both meaning 'sleep,' seem originally to have contained an internal morpheme boundary. A boundary is obvious in cases such as **h$_2$u̯eks-* and **h$_2$eu̯g-* 'increase, grow,' where the final **-s-* is known to be an obsolete stem-formative.

Roots combined with one or more optional suffixes to form stems. PIE suffixes were of two canonical types, thematic and athematic. Thematic suffixes were of the form $*\text{-}(C_1)(C_2)(C_3)e/o$-, where the final element, called the thematic vowel, was realized as

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Protolanguage

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It is essential to distinguish the term 'protolanguage' from the protolanguages reconstructed for the various language families of the world, e.g., Proto-Indo-European or Nostratic. These, if they existed, would be full-fledged human languages with a time depth of thousands (at most, a few tens of thousands) of years. Protolanguage is the hypothesized predecessor of all modern human languages, with a time depth measured in hundreds of thousands (perhaps millions) of years.

While the idea that language may have passed through more primitive stages has been around a long time, the first clear formulation of the protolanguage hypothesis appeared in Bickerton (1990). Several lines of argument supported the hypothesis. Language was unlikely to have emerged with all its modern complexity, so a more primitive antecedent was intrinsically plausible. Chomsky (1980) distinguished between the conceptual and the computational aspects of language (roughly, lexicon and syntax); evidence from early-stage pidgins (Bickerton, 1981) and early child language suggests that these two aspects are dissociable and that words (or manual signs) can be strung together without any syntactic structure. Early-stage pidgins in particular provide strong evidence, since these are spontaneously developed by adults with a fully developed language faculty but insufficient exposure to any potential common language for mastery of its syntax. The experience of speakers who have tried to acquire a first language after the critical period (such as Genie; see Curtiss, 1977) and who have consequently been unable to acquire full syntax suggests that protolanguage is more robust than modern human language, and might therefore be phylogenetically older. Finally, apes under instruction (Terrace *et al.*, 1979; Savage-Rumbaugh, 1986) have been able to acquire lexical items; however, without further explicit instruction (beyond passive exposure), they can also string such items together to form elementary, unstructured propositions.

What caused protolanguage to emerge? Early accounts focused on cooperative hunting or toolmaking, but since many animals hunt cooperatively and since toolmaking can be conducted or even taught (and indeed, among preliterate peoples, generally is) simply through observation and imitation, few researchers support such proposals nowadays (Gibson and Ingold, 1993; Hurford *et al.*, 1998). Currently, the favorite pressure is one that involves some form of social interaction, whether 'Machiavellian intelligence' (attempts to outwit and dominate other group members; see Humphrey, 1976), gossip as a substitute for grooming (Dunbar, 1996), or the development of a 'theory of mind' – the ability to realize that contents of another's mind need not be the same as one's own (Povinelli, 1996; Worden, 1998).

However, while many primates (certainly all the great apes, our nearest relatives) have an advanced social intelligence, employ Machiavellian strategies, and possess at least the rudiments of a theory of mind, no other species has even the most rudimentary language. This makes a strong biological argument against any 'social intelligence' approach, since a unique adaptation suggests an equally unique selective pressure. Since experiments with apes (Premack, 1976; Savage-Rumbaugh, 1986) have shown they can be trained to use languagelike systems, why did not 'social intelligence' pressures select for language in them, too?

An account based on foraging patterns (Bickerton, 2002) avoided these problems. The only other species with communication systems able to convey objective information are ants and bees. These, like humans (but unlike other apes), foraged under fusion-fission conditions (larger groups dividing into smaller units to cover areas large enough for group survival). Under such conditions, exchange of information becomes vital. Humans (but not apes, with smaller

ranges, more abundant food supplies, and group-foraging patterns) would thus have been driven to exploit a substrate common to many relatively large-brained species, a rich conceptual structure whose units could be symbolized by sounds or manual gestures or both. With such a substrate in place, few if any neurological adaptations were needed for protolanguage to launch. The well-known fact that all languages can add freely to their vocabulary would then derive from properties of this conceptual-structure substrate, which is unbounded; moreover, this would have applied from the earliest stages of protolanguage, clearly distinguishing the latter from the closed-set, genetically based communicative systems used by all other animals.

Was protolanguage signed or spoken? Since Hewes (1973), numerous writers (e.g., Armstrong *et al.*, 1995; Corballis, 2002) have proposed an initial signed language. Two things can be said about this: first, there is no compelling evidence either way, and second, it is unclear whether the question has any importance. Most serious evolutionary issues, such as what caused protolanguage to emerge in just one species or what structural features distinguished it from modern human language, remain unanswered however this particular debate is decided. It is possible, indeed likely, that the earliest protolanguage mixed manual signs with vocal utterances – whatever worked communicatively would have been good enough.

The notion that some form of protolanguage preceded full human language is widely accepted. However, its precise nature remains controversial. For many writers, it was merely the first in a series of stages leading to full language (Pinker, 1994; Jackendoff, 2002); for others, no stage intervened between protolanguage and the earliest fully syntactical language, though grammatical morphology might not have developed immediately. Moreover, there has been considerable disagreement about the content and composition of protolanguage.

Slobin (2002) disputed evidence for protolanguage's lack of structure drawn from early child language on the grounds that children learning inflected languages (Turkish or Inuktitut (Inuktitut, Eastern Canadian), for example) acquire morphosyntactic structures in the earliest stages of acquisition. This is true but irrelevant. No inflected language preceded protolanguage, *ex hypothesis*; therefore, there were no morphosyntactic structures to be learned; the telegraphic speech produced before age 2 by children acquiring uninflected languages remains a highly probable approximation to prehuman protolanguage. Slobin also questioned evidence from trained ape productions, on the grounds that a trained ape "is sampling from an existing language" (2002: 378). This is untrue; most apes received examples from a made-up 'language' that can only be described as 'pidgin signed English.' Lexical items in this 'language' may have been modeled in structured utterances, but no syntactic structure was explicitly taught, and apes put the items together in ways that owed little to the models offered.

Hurford (2003) proposed that in earlier forms of language (and even in some modern human languages), there were no proper names. He used the philosophical argument that proper names imply certainty about the identity of their referent, and nonhuman creatures (presumably including hominids) cannot achieve such certainty, being easily fooled by imitations. But since words represent concepts rather than real-world entities, whether animals can be easily deceived about identities is irrelevant. If a nonhuman has the concept of an individual, that concept can be named, and no real-world misapplication of the name will affect its obvious utility. Directly contradicting Hurford is the fact (which he did not mention) that trained apes systematically distinguish between common and proper nouns, applying the latter uniquely to particular individuals with whom they regularly interact, even though the common/proper distinction was never explicitly taught.

Another limitation proposed for protolanguage is absence of verbs. According to Carstairs-McCarthy (1999), the fact that language as we know it distinguishes between sentences and noun phrases is surprising, and protolanguage could have consisted of nominalized phrases only. His claim is tied to a derivation of modern (sentential) syntax from the acoustic syllable, discussion of which would take us too far from the topic of this article. However, a verbless protolanguage seems intrinsically implausible. In modern languages, countless nouns are derived from verbs, and there are regular processes for such derivations. Conversely, vanishingly few verbs are derived from nouns, and these (e.g., *boycott*, *xerox*, *table* – as in *table a resolution*, etc.) are derived by no regular process and are almost always historically recent. This hardly suggests that nouns are evolutionarily older than verbs. Also, while most of the first words children learn are nouns, there are always a few verbs among them, and apes seem to learn verbs (with actions as referents) as easily as nouns (with entities as referents).

The most radical proposal regarding protolanguage is that the units it comprised were holophrastic rather than synthetic. This proposal, most thoroughly developed by Wray (2000, 2002), is implicit in the work of computer modelers and was explicitly endorsed by Arbib (2004) for different reasons. Wray's proposal drew support from those who believe

language is continuous with prelinguistic call systems. Units in these are best 'translated' as holophrases: 'I'm-higher-than-you-in-the-pecking-order,' 'Look-out-a-predator-is-approaching,' 'I-want-to-mate-with-you.' Wray proposed that protolanguage increased the number of such units until they imposed an excessive memory load. The holophrases were then decomposed on the basis of phonetic similarities.

Suppose, to quote Wray's own example (2000: 297), "if, besides *tebima* meaning *give that to her*, *kumapi* meant *share this with her*, then it might be concluded that *ma* had the meaning *female person + beneficiary*." This ignores the possibility that the syllable *ma* would also occur in many cases with no reference to either females or beneficiaries. The only alternative possibility is, if anything, still more damaging to Wray's case; if *ma* occurred only where female beneficiaries were involved, the holophrastic protolanguage would merely disguise a medium already fully synthetic. However, in the likelier case that *ma* sometimes occurred where a female + beneficiary reading was possible, but sometimes not, how would the hearer deal with the second set of cases?

Other problems involve the hidden assumption that a holophrase has only one synthetic equivalent (i.e., *kumapi* has to be interpreted by all speakers as equivalent to *share that with her* rather than to *let her take it*, minus the beneficiary reading, or *don't be so selfish*, minus both the beneficiary and feminine readings, either of which would be equally valid in most if not all contexts of use). Still further arguments against a holophrastic protolanguage can be found in Tallerman (2004).

Consequently there seems no compelling reason for adopting any alternative to a synthetic protolanguage with a categorially complete, if severely limited, vocabulary of items roughly equivalent to modern words but lacking both sophisticated phonology and consistent syntactic structure. However, the question of when protolanguage emerged merits a brief consideration, since any adequate account of it must eventually be integrated into the overall evolution of *Homo*. The wide range of estimates in the literature (from the australopithecine era to the emergence of our own species) suggests that at this point there are inadequate constraints to determine dates. Much depends, too, on the nature of the initial selective pressure. If this was scavenging (as suggested earlier in this article) the likeliest time of onset would be around 2 million years ago, placing the emergence of protolanguage at around the time of the speciation event that produced *Homo erectus*. Although there have been claims that australopithecines may have had some rudimentary form of language, this seems unlikely in view of their small brain sizes and the absence from the archaeological record of any artifacts they might have produced. On the other hand, delaying the emergence of protolanguage until our own species appeared suggests an unduly narrow window for the emergence of the entire suite of modern human language properties. Moreover, certain aspects of *Homo erectus*'s behavior, such as the use of fire, suggest (though it can be no more than a suggestion) that the latter species may have used some kind of linguistic medium. Thus, both the earliest and the latest dates suggested for protolanguage emergence can probably be dismissed, although any firm conclusions must await further investigation.

Clearly, at this stage of our knowledge, even the existence of protolanguage cannot be more than a plausible conjecture. Indeed, it is difficult to imagine what scientific evidence – short of cloning a *Homo erectus* from bone marrow DNA – would definitively indicate that protolanguage did exist. However, since protolanguage would have been sandwiched between some kind of primate call system and fully syntacticized modern human language, it is always possible that further study of animal communication and/or the syntax of natural languages will shed light on the initial stages. Pending such illumination, the notion of a protolanguage remains plausible, useful, and congruent with current knowledge, providing a sharper focus, as well as a productive stimulus, for thinking about the earliest stages of human language.

See also: Cultural Evolution of Language; Evolution of Syntax; Evolutionary Theories of Language: Current Theories; Evolutionary Theories of Language: Previous Theories; Origin and Evolution of Language.

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Prototype Semantics

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Imagine that you are asked to give a definition of the word *fruit*, such that, on the basis of your definition, a person would be able to use the word appropriately, that is, to refer to all and only the things that are called 'fruit.'

There are, broadly speaking, two ways in which you might approach the task. One approach would be to enquire what it is that all members of the fruit category have in common, in contrast to everything else that is 'not-fruit.' As a matter of fact, it turns out to be quite difficult to characterize the common essence of 'fruit.' For example, it would not do to define fruit as 'the seed-bearing part of a plant,' since the definition would encompass chestnuts, tomatoes, and pumpkins, which would not normally be described as fruit. You might try to improve the definition by including such aspects as the fact that the 'seeds' are surrounded by a fleshy part that is edible, in a raw, cooked, or dried state; that the edible part is 'usually sweet'; that it is 'often eaten as dessert'; and so on. Notice, though, that these latter aspects, though certainly typical of fruit, are by no means defining of the category. It would not be a contradiction to speak of a 'bitter fruit,' or of a 'poisonous' or 'inedible fruit.' Mention of these typical aspects does, however, raise the possibility of an alternative way to define the word, namely, in terms of its most typical exemplars. On this approach, apples and pears would be good examples of fruit, whereas tomatoes and olives would have marginal, or unclear, status within the category.

In a remarkable series of papers publishing during the mid-1970s, and summarized in Rosch (1978), the psychologist Eleanor Rosch presented experimental results that demonstrated that the categories designated by words such as *fruit* may indeed be understood in terms of 'good examples,' or 'prototypes,' whereby entities are assimilated to the category on the basis of their similarity to the prototype, rather than through their sharing of a set of common, defining features. The model was initially explored using the example of color words. The concept of 'red,' for example, would be understood, not as that segment of the color spectrum that is labeled 'red,' but in terms of a 'focal red,' a 'good example' of red, with other shades being called *red* to the extent that they are close to the focal color. The model was extended to other everyday words such as *weapon*, *vehicle*, *furniture*, *toy*, and *bird*. For example, we have a fairly clear

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picture of what a prototypical bird looks like; it would be a small, flying songbird, such as a robin or a sparrow, rather than a turkey, ostrich, or penguin. If asked to draw a picture, or to form a mental image of 'a bird,' it is the prototypical bird that we would envisage.

Rosch and her colleagues developed the prototype concept on the basis of several kinds of data:

- when asked to judge entities according to how good an example they are of a category, people, on average, tend to agree on their rankings;
- when asked to give examples of a category, people tend to name prototypical examples first;
- when asked to judge the truth of a statement of the kind 'An X is a Y,' where X is a potential member of category Y, people respond faster to the extent that X is a more prototypical member of Y;
- When reasoning or drawing inferences about a category, people tend to refer to properties of prototypical exemplars, rather than to properties shared by all members of the category.

Rosch's work was popularized among linguists largely through the work of Lakoff (1987), Taylor (1989), and Geeraerts (1989). The prototype notion was not, however, completely new in linguistics. Independently of Rosch's work, Ross (1973) had argued that some nouns were 'nounier' than others, in that some exhibited the full range of noun-like properties and others exhibited fewer noun-like properties, whereas Labov (1973) had demonstrated prototype effects (though they were not so called) for the concepts 'cup,' 'bowl,' and 'vase.'

Not surprisingly, when taken up by linguists, the prototype notion was applied primarily to the study of word meaning – nouns in the first instance, but also words of other lexical categories, such as verbs and prepositions. Thus, Coleman and Kay (1981) showed that prototypical instances of 'tell a lie' involve making a statement (1) that is factually incorrect, (2) that is believed by the speaker to be factually incorrect, and (3) with the intention of deceiving the hearer. Statements that exemplify only two, or even only one, of these features were judged to be correspondingly less good examples of 'tell a lie.' The prototype concept has since been found to be useful in many other areas of linguistics, for example, in the study of meaning change, in the characterization of lexical and syntactic categories, and in phonology.

The notion of categorization by prototype has become a distinctive feature especially of cognitive semantics. There are, nevertheless, a number of contentious issues associated with the notion.

1. First, there is disagreement about what, exactly, the prototype is. Some have argued that it is an actual member of the category. Thus, we might say that the bird prototype **is** a robin. Others have argued for a more abstract characterization. For example, the bird prototype would consist of the conjunction of the typical features of birds – ability to fly, nest-building, etc. Alternatively, the prototype could represent the statistical average of the category members. Thus, the prototypical bird would be of average size, average predacity, etc. Yet another approach would be to claim that the prototype is the 'default' category member – the member that is activated in the absence of more specific information. Thus, on learning that a person has purchased 'furniture,' you would infer, in the absence of information to the contrary, that he or she had been buying tables, chairs, and beds, not clocks, lamps, and footstools.

2. Whereas 'prototype effects' (that is, speakers' judgments concerning how good an example an entity is of a category) are easy to elicit, it is less clear why certain members of a category should have this privileged status. One proposal is that prototypical instances are encountered more frequently or are culturally more salient. An alternative would be to adopt a more 'structuralist' approach, whereby the prototype maximizes the distinctiveness of a category vis-à-vis its neighboring, contrasting categories. Thus, the fruit prototype maximizes the distinctiveness of fruit vis-à-vis contrasting categories, such as 'vegetable' and 'nut,' whereas the bird prototype maximizes the distinctiveness of birds vis-à-vis land and sea creatures.

3. Prototype effects give internal structure to a category, in that some members are considered better examples of the category than others. This aspect of prototype structure is often referred to as degree of representativity, or goodness-of-example ratings. Sometimes – though not always – degree of representativity goes with fuzziness of category boundaries. Thus, 'red' merges, at its boundary, with 'orange' – there are boundary colors that are genuinely difficult to categorize as either red or orange. Similarly, there are receptacles that are ambiguous vis-à-vis the categories 'cup' and 'bowl,' or 'cup' and 'vase.' But prototype categories do not necessarily have fuzzy boundaries. A Pekinese may not be a prototypical dog, but it is a dog nonetheless, not a 'dog to a certain degree.' The category 'dog' does not merge with other categories at its boundaries. The need to distinguish goodness-of-example ratings from category fuzziness is illustrated by the example of categories such as 'odd number.' The category is well defined, yet some odd numbers, such as 3, are judged to be more representative of the category than others, such as 447 (Armstrong *et al.*, 1983).

4. Although knowledge of the category prototype may be an important aspect of knowing the meaning

of a word, word meaning cannot be equated with knowledge of the prototype. To know that robins are prototypical birds does not define the word *bird*, nor is this knowledge sufficient to guarantee appropriate usage of the word. A speaker needs to know how far, and in what ways, the category can be extended. It can be extended to encompass ostriches, penguins, and kiwis, but not to include bats, grasshoppers, and airplanes.

5. The nature and status of the prototype can vary according to the kind of word in question. For example, natural kind terms (that is, words that designate categories supposedly given by nature, such as *bird*, *mammal*, *gold*) presumably appeal to a defining essence (such as DNA, anatomical structure, chemical composition, as the case may be) that clearly circumscribes the category. Since the average language user may not be able to access the defining essence, appeal must be made to typical, observable, and stereotypical properties (such as yellow color in the case of gold or giving birth to live young in the case of mammals). Prototype effects can arise because such recognition procedures may be unreliable (think of the platypus – an egg-laying mammal). On the other hand, nominal kind terms (which are susceptible to an analytic definition), such as *vehicle* and *toy*, are liable to be much more fluid in their range of application and are likely to display both goodness-of-example effects and category fuzziness, not least because the terms used in the definitions (such as 'for children to play with' in the case of *toy*) may themselves exhibit prototype effects. It should, however, be borne in mind that even nominal kinds may have a clear-cut definition imposed on them, for example, by bureaucrats, lawmakers, and 'experts' in various fields. Thus, alongside the everyday understanding (with its prototype structure) of what constitutes an 'adult,' there exists the bureaucratic definition of a person above a specific age (in many countries: 18).

6. The prototype notion has been extended and applied to the analysis of polysemy. Irrespective of whether *bird* is used in reference to a robin or an ostrich, we should probably want to say that *bird* has the same sense in both cases; the fact that *bird* can be applied to different kinds of creatures does not in itself entail that the word is polysemous. But if you speak of a person as a 'rare bird,' or when (in what is now perhaps somewhat dated British slang) males refer to attractive young females as 'birds,' we should probably want to say that *bird* is being used in different senses, i.e., that the word is polysemous. For a polysemous word, one sense can often be regarded as 'central,' from which the others are derived, e.g., by processes of metaphor or metonymy. Although one sense may be regarded as the 'prototype,' it must be remembered that each of the senses of a polysemous word is itself liable to have a prototype structure. The application of the prototype notion to polysemous words is, however, complicated by the fact that it may be difficult to determine which of the senses is in fact 'the prototype.' For example, is the 'static' sense of *over*, exemplified in *The lamp hangs over the table*, the basic sense, or should we accord this status to the dynamic sense, exemplified by *The cow jumped over the moon*?

Despite these problematic aspects, the prototype concept continues to play an important role in linguistic analysis, especially in the study of word meaning, not least because it offers an alternative to the view that categories must always be defined in terms of a set of necessary and sufficient conditions for category membership. For many – perhaps, even for most – words in common usage, a definition in terms of a 'core' meaning, instantiated in each of a word's uses, simply does not work.

See also: Cognitive Semantics; Color Terms; Polysemy and Homonymy; Stereotype Semantics.

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Provençal *See:* Occitan.

Proxemics

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Introduction

An intrinsic feature of social contact rituals involves the maintenance of specific zones that people perceive as meaningful. The study of such zones now falls under the rubric of 'proxemics,' a word derived from the Latin *proximus* 'near' and the suffix *-emics*, in analogy with such terms as 'phonemics' and 'morphemics' in linguistics. The term thus betrays a connection to linguistic notions as the basis for studying and describing interpersonal zones, which involve knowing how close to stand to someone during social interaction on the basis of age, degree of familiarity, gender, etc.

Proxemics was founded by the American anthropologist Edward Twitchell Hall (1914–) in the late 1950s and early 1960s (1959, 1963a, 1963b) after his systematic study during World War II, when he served in the US Army in Europe and the Philippines, of the zones people maintain. Hall came to realize that failures in intercultural communication arose typically from unconsciously coded differences in the ways that members of different cultures perceived interpersonal distances and in the ways they acted within them. Hall developed proxemic methodology throughout the 1960s and 1970s (1959, 1963a, 1963b, 1964, 1966, 1968, 1974, 1976, 1983). Using American culture as his test case, he showed how it is possible to measure and assess critical interpersonal zones.

In 1963, Hall defined proxemics broadly as "the study of how man unconsciously structures microspace – the distance between men in conduct of daily transactions, the organization of space in his houses and buildings, and ultimately the layout of his towns" (Hall, 1963b: 1003). A year later, he limited its purview somewhat to "the study of the ways in which man gains knowledge of the content of other men's minds through judgments of behavior patterns associated with varying degrees of proximity to them" (Hall, 1964: 41), which he restricted further a few years later to the study of "the interrelated observations and theories of man's use of space as a specialized elaboration of culture" (Hall, 1966: 1).

Hall's proposal to study the distances people maintain between each other has led to a large body of data on this aspect of social behavior. Most of the data shows that interpersonal zones are measurable with statistical accuracy, varying predictably and systematically according to age, gender, and other social variables (e.g., Segaud, 1973; Loof, 1976; Pinxten *et al.*, 1983; and Watson and Anderson, 1987). Today, proxemics is a robust area of research pursued by all kinds of social scientists (Mehrabian, 1969, 1972, 1976; Sundstrom and Altman, 1976; Canter, 1977; Moles and Rohmer, 1978; Harper *et al.*, 1978; Argyle, 1988; Lawrence and Low, 1990; Niemeir *et al.*, 1998). Hall did not explicitly use semiotic notions to study proxemic behavior, but his whole outlook and framework are, *de facto*, semiotic in nature. The inclusion of proxemics as a branch of nonverbal semiotics started with Eco (1968: 344–349) and Watson (1970, 1974).

The Proxemic Paradigm

The study of proxemic behavior consists of three general components (Hall, 1966; Watson, 1974): (1) spatial dimensions, (2) levels of interpretation of these dimensions, and (3) physical features of spaces. Each one consists of three subcomponents, called 'micro,' 'meso,' and 'macro.' 'Microspace' is the immediate physical environment constituting a sphere of privacy, 'mesospace' is the next zone that is within the person's reach but that falls outside the privacy sphere, and 'macrospace' refers to the larger social spheres, including settlements, cities, and beyond. The three levels of interpretation are called 'infra,' 'pre,' and 'micro.' The infra level is rooted in our 'biological past' (Hall, 1966: 95), involving our innate sense of territoriality as the guiding force in establishing boundaries. The pre level is rooted instead in inborn sensory (tactile, visual, etc.) perceptions of space that crystallize over time into culture-specific codings of space. Those are interpreted at a micro level. The three physical features are called 'fixed,' 'semi-fixed,' and 'dynamic.' Fixed features include such things as walls and territorial boundaries, semi-fixed features are mobile elements such as curtains and screens, and dynamic features are those such as vehicles that can vary in certain spaces.

Territoriality

Animals reside in territories that they have appropriated as their own, or in some negotiated arrangement with other animals, so that they can procure shelter, alimentation, and habitation. This applies to humans as well. But, unlike other species, humans also manifest a compulsion to ascribe social meanings to the territories in which they are located as groups.

Biologists define 'territoriality' as: (1) an innate survival mechanism that allows an animal to gain access to, and defend control of, critical resources such as food and nesting sites that are found in certain habitats, and (2) the instinctive need of an animal to procure a safe boundary around itself. The Austrian zoologist Konrad Lorenz (1903–1989) was among the first scientists to identify and document the patterns animals display in marking territoriality. Such patterns, he proposed, were an important part of an animal's repertory of survival strategies, as critical in evolutionary terms as its physiological endowments. Lorenz also suggested that human aggression and warfare were explainable as residual territoriality impulses – a controversial theory that gained widespread popularity through a best-selling book written in 1966 by Robert Ardrey, generating a heated debate in academia and society at large on the nature and origin of human aggression. The notion of territoriality in human life continues to receive much support because of its intuitive appeal – intrusions into appropriated territories (e.g., into one's home, car, etc.) are indeed perceived typically as signals of aggression, in the same way that a cat, for example, would likely react aggressively to another cat intruding upon the boundaries it has proclaimed by urination.

The main implication to be derived from the work on territoriality is the fact that we all need to maintain a boundary around ourselves for our protection and sanity. Hall was among the first to see the relevant social implications of this, and thus to investigate the proxemic patterns people establish and maintain between each other when interacting. He noted that these could be measured very accurately, allowing for predictable statistical variation, and that the dimensions varied from culture to culture. In North American culture, Hall found that a distance of under six inches between two people was perceived as an 'intimate' distance; while a distance at from 1.5 to 4 feet was the minimum one perceived to be a safe distance. Intruding upon the limits set by this boundary causes considerable discomfort. For example, if a stranger were to talk at a distance of only several inches away from someone, he or she would be considered rude or even aggressive. If the 'safe' distance were breached by some acquaintance, on the other hand, it would be interpreted as a sexual advance.

Factors

Once the levels and features are determined, Hall posits eight factors as significant in proxemic behavior. These are:

1. Postural-sex identifiers (standing vs. sitting, male vs. female)
2. Sociofugal-sociopetal orientation factors (face-to-face, back-to-back)
3. Kinesthetic factors (distances of body parts, from reaching to contact)
4. Touching factors (from caressing and holding to no contact)
5. Visual factors (gazing, looking away, looking directly into the eyes)
6. Thermal factors (whether radiated heat is detected or not)
7. Olfaction factors (detection of odor or breath)
8. Vocal factors (loudness of voice, tone of voice).

As in linguistics, the idea of scientifically studying interpersonal zones involves two levels: (1) the actual physical description of the factors used *in situ*, known as 'proxetic' description (in analogy with 'phonetic' description), and (2) the analysis of how these relate to each other structurally, known as 'proxemic' analysis (in analogy with 'phonemic' analysis). The relevant 'proxemes' are determined by comparing them and contrasting them to each other within the broader framework of an interaction.

Interpersonal Zones

Overall, Hall found that there are four main types of zones: 'intimate,' 'personal,' 'social,' and 'public.' Hall further subdivided these into 'far' and 'close' phases. For American culture, he found these to be as follows: (1) intimate distance (0 in.–18 in.), (2) personal distance (1.5 ft.–4 ft.), (3) social distance (4 ft.–12 ft.), and (4) public distance (12 ft. and beyond).

At intimate distance, all the senses are activated and the presence of the other person or persons is unmistakable. The close phase (0 in.–6 in.) is an emotionally charged zone reserved for love-making, comforting, and protecting; the far phase (6 in.–18 in.) is the zone in which family members and close friends interact. Touch is frequent at both phases of intimate distance. Personal distance is the minimum comfortable distance between non-touching individuals. In the close phase (1.5 ft.–2.5 ft.), one can grasp the other by extending the arms. The far phase (2.5 ft.–4 ft.) is defined as anywhere from one

arm's length to the distance required for both individuals to touch hands. Beyond this distance the two must move to make contact (e.g., to shake hands). In essence, this zone constitutes a small protective space. Social distance is considered non-involving and non-threatening by most individuals. The close phase (4 ft.–7 ft.) is typical of impersonal transactions and casual social gatherings. Formal social discourse and transactions are characteristic of the far phase (7 ft.–12 ft.). This is the minimum distance at which one could go about one's business without seeming rude to others. Public distance is the distance at which one can take either evasive or defensive action if physically threatened. Hall noticed that people tend to keep at this distance from important public figures or from anyone participating at a public function. Discourse at this distance tends to be highly structured and formalized (lectures, speeches, etc.).

Conclusion

Semiotically, zones are signs that are governed by 'body codes' that also regulate bodily orientation (*see* **Kinesics**). If someone is standing up at the front of an audience, he or she is perceived as more important than those sitting down. Speeches, lectures, classes, musical performances, etc. are oriented in this way. Officials, managers, directors, etc. sit behind a desk to convey importance and superiority. Only their superiors can walk behind the desk to talk to them. To show 'friendliness,' the person behind the desk will have to come out and sit with his or her interlocutor in a different part of the room.

The study of such proxemic behavior has made it obvious that physical environments and the features within them are perceived as signifying structures. This is the reason why proxemics is now considered to be largely a branch or subfield of semiotics and is included in basic textbooks in the field (e.g., Nöth, 1990; Danesi and Perron, 1999).

See also: Biosemiotics; Body Language; Communication: Semiotic Approaches; Kinesics; Nonverbal Communication; Space: Semiotics.

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Proximatives

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The proximative is a grammatical verbal category meaning a temporal phase located close before the initial boundary of the situation described. This category does not, as a rule, figure in standard grammatical descriptions. Where the expression of an action imminent to happen (the proximative) is mentioned at all, it is usually considered a peripheral, modal use of the relevant construction. In the languages where the proximative happens to be recognized as a particular verb meaning regularly linked to a particular linguistic structure, it is considered an idiosyncratic verb construction rather than a grammatical category in its own right. An exception to the common practice is Comrie (1976: 64–65), who has noted the proximative and has moreover acknowledged that the form in question expresses a grammatical distinction. The first work in which a case was built for the cross-linguistic validity of the proximative as a full-fledged grammatical category is Heine (1992).

Note that many languages have only lexical means to express the meaning of an action imminent to happen. Spanish, for instance, has the metaphorical expression *estar a punto de* 'be on the point of' for the proximative notion:

(1) Spanish
El concierto esta a punto de empezar.
the concert be.3SG.PRES at point of start.INF
'The concert is about to begin.'

In the cases where the proximative is a grammaticalized category, the most frequent historical sources for the proximative structure involve constructions with the lexemes *want*, *love*, *come to*, *near* (Romaine, 1999; Heine and Kuteva, 2002):

(2) Swahili (Bantu, Niger-Congo)

(2a) ngoma i- na- taka ku- pasuka.
drum C9- PRES- want INF- split
'the drum is about to split'

(2b) mvua i- li- taka ku- nyesha.
rain it- PAST- want INF- rain
'it was about to rain' (Heine, 1994)

In past contexts, the proximative comes close to the avertive (meaning 'was on the verge of V-ing but did not V'), which was also identified as a category in its own right only very recently (Kuteva, 1998; Heine and Kuteva, 2002). There are both semantic and morphosyntactic reasons, however, for keeping these two categories apart. Semantically, the proximative is a purely aspectual category (involving the notion of imminence), whereas the avertive is an aspectual-temporal-modal category (involving the notions of imminence, pastness, and counterfactuality at the same time). Morphosyntactically, whereas the proximative can be used in both past and nonpast contexts, the avertive can only be used in past contexts.

See also: Counterfactuals; Grammaticalization.

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Psychoanalysis and Language

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The Other

Language is central in psychoanalysis inasmuch as free association is the main rule in the treatment of neurosis, and psychosis is considered a particular disease of language. Hence, Sigmund Freud (1856–1939) underlined the importance of language in his work on dreams (*Die Traumdeutung*), on the psychopathology of everyday life (*Zur Psychopathologie des Alltagslebens*), and on the joke (*Der Witz und seine Beziehung zum Unbewussten*). As these works stress, the dimension of truth is not in the spoken word, but exists on another scene, as Freud has shown us, principally through his occupation with the joke. It is the other scene which gives sense to the joke, because this sense does not exist in the joke's spoken words.

The truth is unspoken. This is particularly the case in the famous 'slip of the tongue', which gives access to an unknown knowledge located on another scene, or in 'the Other', as the French psychoanalyst Jacques Lacan (1901-1980) later was to name it. The truth exists at the Other's location; this location is another name not only for the unconscious, but also for the intersubjectivity that determinates it, as the case of the joke underlines: the effect of the joke cannot be separated from the other(s) listening to it. This also means that language cannot be understood as something inhabiting, or placed in, the brain, as cognitive theories of language or a cognitive therapy presume it to be. Nor is it regulated by these theories' so-called 'mental schemes', but by the relationship between the subject and the Other. This Other is never a concrete instance, even though it may be localized by, e.g., identifying linguistic codes, or by listening to the subject's speech. While every subject is determined by its being localized, the Other remains outside of it, not being a subject.

It follows that the subject is divided between what it says, and the way its words are addressed. This can be seen in the difference between an utterance and its enunciation, as illustrated by the famous sentence: "I lie," whose normal interpretation underlines that, inasmuch as the I is lying ("I lie"), the sentence itself must be false, which means that the I cannot tell the truth regarding its own lying and that consequently, the sentence either is pure nonsense or produces an unsolvable paradox. However, it is possible to make a distinction between the *utterance* in which the I is lying, and its *enunciation*, as coming from another place (the Other's), where the I is telling the truth. The former I is the I of the utterance, while the latter is the I of the enunciation; it is a linguistic element called a 'shifter' (*see* **Deixis and Anaphora: Pragmatic Approaches**), but here understood in a psychoanalytic, not a strictly linguistic framework.

The same can be seen in the technique of free association. In the analysis, the subject (in this case, the neurotic subject) is requested to say everything that comes to mind, even though it may seem unessential or even stupid. Through free association, the subject is supposed to be able to escape from the superego and its censorship. However, the associations are not really free, because they are determined by the subject's unconscious (that is, by the other scene), or, in Lacanian terms, by the Other.

The truth of the subject's words (or signifiers, as Lacan says), comes from the Other, which is both included in, and at the same time outside of, the enunciated signifiers. Hence, the subject receives its own message from the Other, but of course not directly the way it is said, but in a form that both precedes and follows the message. Lacan puts it this way: the subject receives its own message in an opposite form from the Other (cf. Lacan, 1955–1956: 47).

Among other reasons, this is also why Lacan stresses that the words which the subject uses must not be understood as elements of meaning, but as signifiers. If there is a meaning in those elements, it is constituted as such only after they have been enunciated. The importance of the signifiers is not necessarily to be found in their meaning (virtual or otherwise), but in the fact that one signifier represents the subject to another signifier (one of Lacan's canonical statements; see, for example, Lacan, 1964: 180f). Sometimes, a chain of signifiers can be connected to a special signifier and thereby create a particular signification. Such a connection is also indicated in Lacan's notion of the *point de capiton* (cf. below); as we will see, the main importance of the subject's work is not in the dimension of meaning, but in the desire.

Desire, Metonymy, and Metaphor

The notion that one signifier represents the subject to another signifier stresses the fact that the subject in language constitutes a kind of hinge in the signifier chain between two or more of its signifiers. By himself, the subject is empty, because his very act consists in putting signifiers together, starting from a place where there is nothing, viz., the empty space(s) between the first, second, third, ... etc., signifier. This act does not lend any substance to the subject; it only provides him with a position that has no

content. However, the very act of putting the signifiers together is also what Lacan defines as *desire*. Desire is not only the movement in a chain of signifiers produced by the subject: the very movement is established by the subject's desire. The desire thus represents a 'sliding' of the signifiers; the subject resides in the interval from which this sliding takes place.

Lacan points out two fundamental functions of the signifiers' work: to wit, metonymy and metaphor (cf. Lacan, 1957). The names for both these functions have their origins in classical rhetoric, (*see* **Rhetoric, Classical**) but Lacan restricts the first – metonymy– to cover the displacement in the chain of signifiers, where this displacement is determined by the subject's desire. In other words, desire itself is defined by the metonymic displacement in the signifiers (*see* **Metonymy**). Regarding the second function, metaphor, Lacan, in accordance with a certain understanding of classical rhetoric, defines this function as a replacement – more precisely as a replacement of one signifier by another (*see* **Metaphor: Psychological Aspects**). However, the replaced signifier does not disappear forever, but continues to exist in the unconscious or in the preconscious. The analysis may reveal such replaced signifiers in, e.g., the subject's free associations.

This way of considering metonymy and metaphor also provides an interpretation of Freud's thoughts about displacement and condensation in dreams (Freud, 1900). According to Freud, the manifest dream has a latent level, which is censured by the subject's superego. The subject therefore has no direct access to the latent elements of the dream, but can unfold these in the analysis by first telling the dream and then associating about it. Between the latent and manifest levels of the dream, Freud locates different functions of a linguistic kind which allow the unconscious to make its way up toward the conscious, thus avoiding the superego's censorship. One of these functions is *displacement*: a latent dream element can be displaced to another, which the censorship then allows to be manifested. Thus, a sexual wish with regard to someone who is not allowed by the superego to function as a sexual object can be displaced toward a person who is acceptable to the superego. Lacan's term for such a displacement is precisely 'metonymy' (Lacan does not limit the use of this notion to dreams, but also employs it to characterize desire, as we saw above).

Another function of the dream, as identified by Freud, is *condensation*. By this, Freud means that one manifest dream element can be seen as a 'condensation' of different, latent dream elements. For example, the image of a given person in a dream can consist of different smaller images of other persons. The person in question is thus condensed out of several other persons. Such a condensation can also be seen as a meeting of different chains of signifiers, where the 'knot' of the meeting place constitutes a particular metaphor.

The importance of the dream work lies neither in the latent nor in the manifest dreams taken by themselves, but in the work that goes on between the two levels, in particular with regard to wishes, which show up in the 'cracks' between the dream levels. These wishes follow the logic of language when they try to pass by the censorship, *in casu*: the logic of metonymy and metaphor. (Lacan sees these wishes as 'desire', as already noted).

The idea that dreams act according to the logic of language is in accordance with Freud's saying that the dream is the 'royal road' to the unconscious. But Lacan goes a step further, and says that the unconscious is structured as a language (1957–1958: 474). Lacan conceives of metaphor as another way of defining certain dream mechanisms; more generally, metaphorical mechanisms are not limited to dreams, but encapsulate the entire linguistic process, as it determines the subject's position in language.

Even though this conception is similar to an understanding of metaphors current in classical rhetoric, the emphasis for Lacan is on the way the metaphoric act orients the subject and its desire. The metaphor not only replaces another signifier, but also stops the otherwise infinite chain of signifiers. In this sense, the metaphor weights a certain orientation of the desire, enabling the signification connected to the chain. It constitutes a kind of 'This is it' experience or, in Lacan's words, a *point de capiton* (lit.: 'one of the buttons that keep the fabric of the couch together'); it needs scarcely to be said that the discovery of such a button often will lead to rather big surprises (Lacan, 1955–1956: 303).

Take for example the case of the patient who, having talked for a long time about how great her father is and having used all kinds of superlatives to confirm his greatness, suddenly exclaims: "He is monstrous." The word 'monstrous' gives a whole new meaning to the earlier signifiers in the chain. Of course, the word 'monstrous' can be taken as a merely replacing the noun phrase 'very kind' (as in "He is very kind"), and thereby add weight to the father's kindness. However, 'monstrous' also says something more: either the father is too 'kind', and for this reason has not been able to put any bounds on the role played by to the near-almighty mother in the patient's life, or the subject suspects that behind all this kindness, something dangerous is lurking: "My father is very kind, but perhaps, underneath

all his kindness, he is rather terrifying and aggressive." Such a reorientation of the patient's attitude to the father (or: the parents) can bring in a new perspective.

Psychosis

In the case of psychosis, which is one of the main areas of work in Lacanian psychoanalysis, metaphor has a particular role to play. Often, the psychotic subject suffers from a metonymically determined and displaced desire; being situated in a language environment (the signifier chain) where there are neither boundaries nor borders, his ability to create metaphoric supports or dividers is severely reduced. To use Lacan's picture: there are no real *points de capiton* in the psychotic subject's language. Being overwhelmed by language, he cannot locate any space in between two or more of the signifiers, and consequently cannot reach the other to communicate. The intervals between the first, second, third, etc., signifiers seem to disappear, and this effaces the position of the subject. Instead of being a communicative tool, language acts like a kind of infinite metonymy, which not only disables the subject in its attempt to communicate with the other, but also deprives it of its possible orientation in desire.

The psychotic subject does not inhabit the language, but is inhabited *by* language. Or, to use a famous sentence from the world of literature, one could describe the psychotic linguistic experience with the words: "Language is a virus from outer space" (W. S. Burroughs). One of the main therapeutic potentials in working with a psychotic subject is hence to establish metaphors providing weight and orientation to the desire, thereby also setting some limits to the overwhelming language.

For the psychotic subject, the situation is particularly difficult, being determined by the conditions of entrance (or, rather, the lack of entrance) to language. Instead of accepting language (cf. the Freudian *Bejahung*), the subject has foreclosed it, as Lacan remarks (1959). The place of psychosis relative to language has never been well established, which means that it assumes the characteristics of a language 'disease', the psychotic subject not being able to express itself in language. Hence, it is common to see, in some cases of psychosis, that the so-called 'shifters' (see above), for example, I/you, now/then, or here/there, do not function, which often results in the psychotic subject's feeling alone with his speech. The subject is not oriented in the space and time of the discourse, nor as to his linguistic relationship to the other. The person is not able to delimit what is outside the language, namely the *jouissance* (see below). Freud also uses the term 'primal repression' to describe this failed access to language by which the primal, limiting repression says No to the limitless *jouissance* (cf. Freud's notion of *Verdrängung*).

Jouissance

When we talk about desire and language, we necessarily must stress yet another aspect connected to these concepts. Even though the (neurotic) subject is constituted in and by language (as this is manifested through desire, the signifier chain, and thought), its placement in, and confinement through, language prevents it from having a direct connection to its body. This can be seen by a particular, psychoanalytic interpretation of Descartes' formula *Cogito, ergo sum*: "I think, therefore I am." For psychoanalysts, the comma between "I think" and "therefore I am" is rather important, as it underlines the division between being and language: the place where the subject thinks is also the place where it (in particular its body) is not. The signifiers can perhaps name the body, but they are not the body. The name and the named are not the same. By its entrance into language, the subject leaves a part of itself outside itself: language does not comprise its entire being (this is true for all language users, but of course the 'entrance' does not function in the same way in the case of psychosis; cf. above). Thought and speech are only a part of the human's being, the rest of it falls outside language.

This also means that experiences connected to the body can overwhelm the subject. Freud's ideas about sexuality and its problematic status in our lives underscore this. Sexuality causes problems because it disturbs the subject's thinking and desire in language. This is also why Freud caused such an uproar by talking about sexual problems in Vienna more than a century ago. However, the uproar was not so much due to its location in time and place, which was still marked by the Victorian moral code and its strong repression of sexuality, as to the place of sexuality within, and its relationship to, the subject's own body.

The thought/body division, as manifested in the Cartesian comma, marks the fact that the subject *is* not its body, but *has* it. Having it, the subject can also lose it, or be alienated from it by the subject's very act of being constituted in language. The existence of the subject in language has the form of an alienation, as it is merely assigned a place between two signifiers, which it cannot use as instruments as it pleases, but only put together according to a certain logic of language. Furthermore, this logic does not include the body, which by definition is placed outside language. Hence, an early childhood experience of sexuality connected to the body manifests itself as something

alien to it, as it cannot be properly worded, thus making the sexual experience essentially strange and traumatic for the child as subject.

Sexuality is not limited to the genital organs and the erogenous zones connected to the drives (anus, mouth, ear, and eye), though this is often thought to be the case. This is why Lacan uses the term *jouissance* ('enjoyment') to define this strange feeling concerning the body, the drives, genital sexuality, and other bodily functions. The subject is not responsible for the *jouissance*, but for its response to it. In itself, a *jouissance* touching the body, but without making the connection to language, is traumatic. A *jouissance* happening outside the reach of language cannot be controlled; the lack of response to *jouissance* undermines the subject's linguistic place, and naturally the subject tries to defend itself against this trauma.

The Neurotic Defense

Neurosis can be seen as a rather successful defense against the trauma outlined above, as it precisely develops symptoms by way of language. This is clearly seen in the case of hysterical symptoms such as frigidity, vaginal problems, or cases of temporary paralysis having no bodily or neurobiological causes. In paralysis, the traumatic experience of the body in its repressed *jouissance* is displaced (cf. metonymy), or converted to a part of the body that is different from the original part which gave rise to the *jouissance*. Hence, the bodily hysterical symptom is due to, and constituted by, a compromise between the repressed and displaced *jouissance* and language.

The paralyzed, hysterical subject is prone to think: "I do not want to have this strange sexual feeling, let me get rid of it." However, the repression does not succeed (it never does!); instead, it manifests itself in the paralysis, which contains two different, contradictory aspects: one is to get rid of the enjoying body, and the other the impossibility of doing this. In the case of hysteria, the repression of enjoyment connected to the erogenous zone is displaced to another part of the body, which then becomes erogenous, even though it was not originally. The subject protects itself against its own disappearance; the anxiety about this is caused by the bodily feeling that denies the subject its place in language. The same happens in cases of epilepsy, or in hysteria-related fainting spells, in which the sexual feeling is displaced in a way that includes the whole body. Both epilepsy and fainting mark the return of the *jouissance* that formerly was connected to particular parts of the body (the sexual or erogenic zones): while the former enjoyment was located in a single part of the body, these two phenomena affect the whole body. While unconsciously trying to defend itself against bodily enjoyment via these two phenomena, the subject only 'succeeds' in this effort by having itself (at least momentarily) wiped out by another *jouissance*, taking possession of the whole body.

In cases of obsession, by contrast, the neurotic defense attempts to get rid of *jouissance* by excluding the very body. The obsessional (often socially isolated) person is constantly suffering from worries; such thoughts, while they prevent *jouissance* from happening, also, but unintentionally, provide the subject with a special language-based enjoyment. Often the patient does not realize that there is no way to control the body, to preempt its functions, or to keep it from manifesting itself. This becomes clear when we look at the subject's relationship to the bodily function of excreting. The feces can only go one way, which shows the limits of bodily control. No wonder, then, that the obsessional subject often has problems having to do with the anal drive.

However, in neurosis there exists – in contrast with the often defenseless psychotic situation – a specific, linguistically determined defense mechanism aimed at limiting *jouissance*; these mechanisms are borne out by what happens in hysteria and obsession. In hysteria, by way of language, the sexual experience is converted to another bodily symptom, while in obsession, it is repressed (or effectively hidden) by the mind's massive control of the body: truly 'mind over matter'.

The Psychotic Defense

That said, desire in neurosis also functions as a kind of defense against the unlimited *jouissance*. Contrary to what is the case in psychosis, the metonymic 'slide' in language that we have defined earlier allows the neurotic subject to escape the disturbing *jouissance*. The psychotic subject, on account of its problematic placing itself in language, does not have the same linguistic possibilities of defending itself against *jouissance*. Being itself uncontrolled and without bounds, *jouissance*, whenever it occurs, seems to throw the subject off balance, making it lose its self-control and its bearings. In paranoia, one of the main forms of psychosis, this is often manifested as the subject imagining being forced by another subject to undergo *jouissance*, and thereby destroying it. For example, this other subject may be a man (or even God), who wants the male subject to change his sex, to become a woman, so the man (or God) can have intercourse with it. The psychotic subject is forced by this particular other to become a woman, which of course has some very terrible consequences for the subject. In

this way, approaching the sexual act or other kinds of *jouissance* may eventually lead to the destruction of the subject; alternatively the other may be interpreted as a persecuting and highly dangerous man (or, as the case may be, God).

In schizophrenia, the body is fragmented and non-coordinated. While in normal cases, the language allows the subject to interpret and perceive its body as a more or less coordinated whole (despite its necessary and unavoidable alienation through language), the schizophrenic subject experiences the body as being dissolved upon its being invaded by the unlimited *jouissance*. A patient once told me how her eyes moved to the back of her head, or how she became transparent, or disappeared, when too many people in her environment looked at her. Nor is she able to recognize herself in photos. She is not able to regard her body as a whole body, nor does she recognize the image of her own body. Another patient told me about a dream in which he was making love to the [singer] Madonna, when suddenly, her sex changed from vagina to penis and his own penis got stuck in the middle. While the paranoiac subject mainly places the *jouissance* in the relationship to a persecuting other, the schizophrenic locates it in its own, dissolved body.

The Real

The relationship between language and psychoanalysis cannot be limited to language or speech alone just because the latter two stand in a special relationship to the body and enjoyment. Psychoanalysis works in and through language; nevertheless, it also concerns the *jouissance* that happens outside of language. Not only that, but the work of psychoanalysis in and through language precisely addresses that which escapes language. Lacan has a specific name for this: the *Real*. The Real is not the designated reality, for example a certain thing, as it is referred to through language; it is that which language cannot possibly grasp. This includes the body, which can be named, but cannot be reduced to signifiers or names. The Real concerns the limits of language.

Even though language, from a purely empirical point of view, may seem to be unlimited (we can always say something more or something new), language does contain a limit: language cannot grasp itself. This fact can only be approached from a logical point of view (actually, an instance of Russell's famous paradox, by which no set can be a member of itself).

Let's assume we have a set X, whose members are the elements of a language: $x_1, x_2, \ldots, x_n$. Let's further assume a relation of 'grasping', G; G(y,z) is read as 'y grasps z'. (Intuitively, this may be understood as 'y reflects on z, makes a statement about z', and so on). If any linguistic element xi is to grasp X, it cannot be a part of X, but must be understood as an xi′, grasping X: G(xi′,X). But since xi′ is also a linguistic element, it must be part of X, thereby creating a new set, X′, containing the original elements of X, plus xi′. Now if we want to grasp this new set X′, we must posit a third element, xi″, and so on *ad infinitum*. Every time we get a term which is meant to grasp the language, this term is not included in the language itself: no language or signifier can grasp itself. From a psychoanalytic point of view, this impossibility defines the Real, in that it constitutes the limits of language.

For the subject, this limit shows up in the bodily *jouissance*, whereas the act of putting signifiers together is a way to avoid the Real: it is also, as we have seen, an act determined by desire. Enjoyment, or *jouissance*, is the effect that accompanies the subject's approaching the Real; in contrast, anxiety is what overcomes the subject upon its return to language. This can be illustrated by the case of the drunken subject who gets enjoyment from being drunk, but is struck by anxiety the day after. The same can happen to a schizophrenic subject, who can enjoy sexual intercourse, but then suddenly is struck by anxiety upon feeling his/her body fall apart. These two examples underline the importance in psychoanalysis of working with language, and with the way it limits itself in the subject's relationship to the Real.

Discourse

Lacan further delineates the relationship between language and the Real in his theory of the four discourses (Lacan, 1969–1970). Here, it is only possible to present certain aspects connected to the first of these four, the master discourse (the three others being the hysterical discourse, the analytic discourse, and the discourse of the university). The master discourse contains four elements: S1 (the first signifier, also called the master signifier); S2 (the second signifier, also called knowledge); $ (the divided subject); and object *a* (which will be defined below). The relationship between these four elements is constituted by Lacan's well-known definition: the signifier (S1) represents the subject ($) to another signifier (S2); in Lacan's notation:

$$\frac{S1}{\$} \rightarrow \underline{S2}$$

The first signifier, S1, opens the discourse, while at the same time constituting the discourse as relatively closed (for instance, one does not use the same expressions about the body in medical and in obscene

discourse). In itself, S1 is empty; its function is to unlock a linguistic field (the discourse) while at the same time closing it off to what is outside the field. S1 creates an opening toward a discourse, but it is also inconsistent and ignorant, because its function is limited and its knowledge exists only in S2. However, by fulfilling this limited function, S1 makes it possible for the subject to find the other signifier (S2), which then establishes the knowledge in the discourse. A military order – 'Attack' – constitutes such an S1; the soldiers react to this first signifier, as they must, in accordance with the possible knowledge of the attack situation that is available in the second signifier. The same applies to a great number of contexts that similarly depend on a master-signifier; among these is the unconscious which, according to Lacan, by and large is organized on the pattern of this master discourse.

However, *jouissance*, too, plays a role in the discourse inasmuch as this is constituted as a linguistic field, guaranteed, but also limited by S1: S1's function is to restrict what otherwise could lead to unlimited bodily *jouissance*. While constituting the linguistic field, S1 at the same time constitutes (implicit and explicit) parts of the discourse falling outside of the field (as we have seen in our discussion of *jouissance* and the Real). Such is for example the case for discourse in the classroom, where the students are not supposed to fight while being taught.

Here, the language of the discourse does not cover all aspects of the linguistic acts. A person may say either too little or too much (the latter being the case in the famous 'slip of the tongue'). And even in the classroom, where for example fighting during classes is forbidden, students can always make drawings on their papers, rather than paying attention to the teacher, or whisper to their friends.

The master discourse – here the lesson – leaves open the possibility of an enjoyment which is not unlimited (as is the fighting in the schoolyard, or the bodily *jouissance* outside of the discourse). This kind of enjoyment, which happens within, and stems from the discourse, is called the 'more-to-enjoy' (or 'surplus enjoyment') by Lacan; he also names it 'object *a*'. Object ('little') *a* is a surplus produced by the discourse, even though it falls outside the relationship between S1 and S2. In Lacan's notation, it looks like this:

$$\frac{S1}{\$} \rightarrow \frac{S2}{a}$$

As we see, S1, the master signifier, and S2 are placed above the dividing line (hence the name 'master discourse'), while the subject and the object *a* are placed under the line, thus symbolizing the dividing spread of the signifying process in metaphor and metonymy, and the ban on *jouissance*.

In this discourse, furthermore, the master signifier is located at the place of the agent. The agent addresses itself to another, who is to produce knowledge (cf. the military order 'attack', given to the soldiers by the officer). The discursive roles (or 'places') are named, respectively:

$$\frac{\text{The agent}}{\text{The truth}} \rightarrow \frac{\text{the other}}{\text{the product}}$$

The dividing line signals a barrier of exclusion between the upper and lower levels, meaning that the agent, when uttering S1, does not know the subject below the line (*$*), who is included in the discourse. In our example, the officer giving orders does not worry about the subject underneath the line: his own unconscious; neither is he worried about the other's (the soldier's): the latter simply obeys orders by producing the knowledge necessary for the attack. The example also underscores the intersubjective as well as the intrasubjective character of discourse.

A clinical example of the intrasubjective aspect of this discourse is observed in obsession, where the superego (S1) functions as the agent commanding the subject (*$*) to control his bodily functions, including the anal one. Here, the subject obeying this order is also the other, who produces the necessary knowledge (S2) necessary for executing the order. In this particular case, the order is rather tall, because no matter how much knowledge we produce, we can never control the body completely (as is well attested by the various 'slips' of stool and tongue). But insofar as the obsessional person succeeds in controlling his bodily *jouissance* outside of the discourse – that is, outside of S1 – he or she succeeds in observing at least some of the set limits. Unfortunately, however, there is a surplus, object *a*, which is produced by the discourse: in this case the stools, which do not always obey the tall order of control.

To recapitulate: in the logic of the discourse, S1 constitutes the discourse for the subject (*$*) by opening it toward S2 and limiting it with respect to the Real outside of language. At the same time, it sets object *a* as surplus enjoyment, 'the-more-to-enjoy'. While in neurosis, the discourse is stable, in psychosis, there is no discourse with a stable character, even though psychotic subjects for shorter or longer periods of time may appear stabilized in a given discourse. However, as soon as the psychosis breaks out, the discourse will break down. Hence, while the neurosis is situated in a given discourse, the psychosis is outside the discourse and its dynamics, even though it is possible to locate a desire in some psychotic subjects.

See also: Deixis and Anaphora: Pragmatic Approaches; Jakobson, Roman (1896–1982); Lacan, Jacques (1901–1981); Metaphor: Psychological Aspects; Metonymy; Rhetoric, Classical.

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Psycholinguistic Research Methods

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Psycholinguistics aims to uncover the mental representations and processes through which people produce and understand language, and it uses a wide range of techniques to do this. The preferred psycholinguistic method is to carry out a controlled experiment. This means that the researcher manipulates an independent linguistic variable to control some aspect of language processing and then measures the effect of the manipulation on a dependent variable of interest. For example, consider an experiment aimed at discovering the influence of the age of acquisition of a word (independent variable) on the time it takes an adult to identify that word (dependent variable). The psycholinguist would construct two lists of words, one containing words learned early in life, the other containing words learned later in life, and then measure the effect of age of acquisition (the independent variable) on the time to identify the word (the dependent variable). To make sure that the independent variable is the real cause of any effect observed in the dependent variable, the experimenter needs to carefully control that variable. For example, in the above experiment it is important to make sure that age of acquisition is not confounded with the length of the word or its citation frequency, because we know that longer words and low frequency words take longer to read.

Once the experiment has been run with a sufficient number of participants and a sufficient range of linguistic materials, the data is analyzed statistically. This usually involves taking the average of the values of the dependent variable (response latencies) for each value of the independent variable (each list of words acquired at different ages) and establishing whether the differences associated with the different values of the independent variable are statistically reliable. It is now standard in psycholinguistics experiments to test that the effects hold true both across the range of participants used in the experiment and across the range of linguistic materials used in the experiment.

Because the psycholinguist is interested in the dynamics of language processing, an important distinction is drawn between **on-line** techniques, which measure variables that tap into language processing as it happens, and **off-line** techniques, which measure variables related to the subsequent outcomes of processing. In practice, on-line and off-line techniques compliment each other, with off-line techniques used to determine the outcome of interpretation and on-line techniques used to determine its time course.

Another major distinction between psycholinguistic techniques relates to the nature of the dependent variables they measure. Some experiments have behavioral dependent variables, such as those associated with a reader's eye movements while reading, others have neurophysiological dependent variables such as those associated with electrical brain activity produced while listening to a sentence. The article first considers behavioral methods and then related neurophysiological methods. It starts with methods for the study of spoken and written language comprehension, and then methods for studying language production and dialogue.

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Behavioral Methods

Common Assumptions Underlying Behavioral Methods

Although there is a wide range of behavioral psycholinguistic methods, most depend upon the same basic assumptions. One important assumption concerns how measurements of the time to carry out a task relate to inferences about complexity of processing. Whether the timed response be an eye movement or the time to answer 'yes' or 'no' to a question, it is assumed that the complexity of the mental process is reflected in the response latency. For example, if a reader takes longer to read the fragment "... raced past the barn fell" when it is part of the sentence "the horse raced past the barn fell" than the sentence "the horse that was raced past the barn fell," this is taken to reflect greater complexity in the syntactic analysis of the former than the latter. This assumption is used when interpreting results from most on-line techniques.

A more sophisticated timing methodology investigates the trade-off between speed to respond and accuracy of that response. This is called a **speed accuracy trade-off** (**SAT**) method. With SAT, participants are required to make some response to a linguistic stimulus as soon as they hear a tone, presented at different intervals after the presentation of the stimulus. When the interval is short, participants tend to make many errors, and when sufficiently long, they become completely accurate. So plotting response latency and accuracy across the range of tone intervals gives an unbiased measure of the rate at which the task can be carried out. SAT techniques have been used to assess the rate at which different kinds of lexical, syntactic, and semantic processing occur. Although it is considered a particularly refined technique for establishing processing rates, it has the disadvantage that many thousands of trials have to be run to produce a clear SAT profile, and this will mean that there will have to be many examples of each kind of material used. So there are only a limited number of issues that can easily be investigated with SAT.

Another important assumption underlying many behavioral methods concerns the interpretation of priming effects. **Priming** techniques measure the effect of having previously processed a **prime** item on the subsequent processing of a **target** item. The prime might be a word with a particular form or meaning or it might even be a whole sentence with a particular syntactic structure. The rationale behind priming techniques is that any influence of prime on the subsequent processing of the target must reflect some relationship between the mental representations of prime and target items. Typically, when a prime boosts the interpretation of the target (e.g., by speeding up the recognition of the target item), this is taken as evidence that there is something in common between the representation of target and prime. For example, if a person is quicker to decide that *giraffe* is a word having just read the word *tiger* than having just read the word *timer*, then it is assumed that this is due to the closer semantic relationship between *tiger-giraffe* than between *timer-giraffe*. On the hand, when it hinders the interpretation of the target – this is called **negative priming** as opposed to **positive priming** – this is taken to reflect some conflict between the representations of prime and target. Priming techniques are particularly useful for establishing the relationship between different linguistic representations used during processing and are widely used in conjunction with a number of behavioral or neurophysiological measures.

It is beyond the scope of this article to describe all the behavioral techniques that have been used in psycholinguistics. Instead, the article concentrates on techniques that have had a major impact on the field.

Behavioral Methods for Spoken Language Comprehension

Cross-modal Priming A common priming technique used to tap into spoken language comprehension is what is called **cross-modal priming**. In cross-modal priming the prime item is usually a word embedded in a spoken sentence or text used to prime a target item presented in written form, which is why it is called cross-modal. Consider the problem of working out how listeners resolve ambiguous words. Cross-modal priming can indicate the immediate interpretation of an ambiguous word, such as *bug*, in contexts that promote either one or other meaning of the word (e.g., 'insect' or 'listening device'). As participants listen to *bug* in the different contexts, they are presented with a written word (ANT or SPY) or a nonword (AST) and have to decide as quickly as possible whether the target is a word or not (this is called **lexical decision**). The question of interest is whether lexical decision of the targets ANT and SPY is boosted by hearing the prime *bug* in the different contexts. It turns out that when the visual target is presented immediately after hearing the prime in either context it promotes lexical decision for both targets. So this indicates that both interpretations ('insect' and 'listening device') are immediately activated irrespective of the disambiguating context. However, if the visual target is presented at a slightly later point (about 200 ms after the prime), only the target related to the contextually appropriate interpretation (i.e., ANT for 'insect' or SPY for 'listening device') is

primed. Cross-modal priming therefore indicates that all meanings of ambiguous words are accessed immediately on encounter, but then only the contextually appropriate meanings are retained as comprehension proceeds.

Cross-modal priming has been used to investigate many aspects of spoken language comprehension. These include influences of prior discourse context on lexical processing, resolution of anaphoric references (e.g., pronouns), and morphological analysis. The technique has the advantage that it can tap into spoken language comprehension as it occurs and often uncovers aspects of processing of which the subject is completely unaware, such as in the ambiguity experiment described above.

The Gating Technique Another technique for establishing when listeners interpret words in relation to information in the speech stream is **gating**. The gating procedure involves presenting increasingly long fragments of speech and measuring when listeners can interpret the speech appropriately. For example, if you want to know at what point a listener can accurately recognize the word *cathedral*, you can present them with the spoken fragments /ca/, /cath/, /cathe/ , /cathed/ . . . and record the listener's judgements for each fragment. The shortest fragment that can be correctly identified defines the point at which there is sufficient information in the speech for identification. This technique can be used to estimate the earliest point at which the listener could identify a word and so make it possible to test whether this predicts the recognition time for that spoken word.

The Visual World Paradigm One of the most effective on-line measures is **eyetracking** (recording the precise pattern of eye fixations during comprehension). Because visual attention is strongly controlled by where a person is currently looking, eyetracking can be used to indicate what a person is attending to at any point during comprehension and for how long they attend to it. The technique can either be used for reading research (see below), in which case the focus of attention corresponds to the words being looked at any time or it can be used to measure which part of a scene a participant attends to as they interpret spoken utterances about that scene. The latter technique is usually referred to as the **visual world paradigm**. A classic example of the use of this technique is in determining how listeners deal with syntactic ambiguities that arise during comprehension. For example, participants listen to instructions that are initially consistent with two syntactic analyses while they view a scene containing a small number of objects. They might be asked to *Put the frog on the napkin in the box* when there is either one or two frogs in the scene. Analyses of eye movements demonstrate that viewers look at the frog which is on a napkin more if there is also a frog that is not on a napkin than if there is no other frog present. From this it can be inferred that the visual context drives syntactic disambiguation (i.e., it supports the reading in which *on the napkin* syntactically modifies *frog* rather than being a syntactic argument of *put*) at an early stage in processing.

The visual world paradigm has been used to investigate a wide range of issues in spoken language comprehension. These include lexical access, resolution of anaphoric pronouns, development of strategies for semantic and syntactic processing, language development, and even language processing in dialogue. It offers a precise indication of when listeners integrate information from a linguistic utterance with that in the visual world and tends to show that comprehension is both incremental and immediate in relation to most levels of linguistic analysis.

Behavioral Methods for Written Language Comprehension

There are a variety of techniques that tap into the time course of written language comprehension.

Self-paced Reading One class of techniques is **self-paced reading**. The reader determines the rate at which written material is presented and the experimenter records the rate of presentation. A reader might be required to pace himself or herself sentence by sentence, phrase by phrase, or word by word. For example, in the word-by-word procedure, a word is presented, and as soon as the reader has understood it, he or she presses a key to trigger presentation of the next word. The sequence is then repeated until all the text has been read and the time to read each word is recorded. This kind of technique has been used to study syntactic analysis, discourse comprehension processes and in particular resolution of anaphors. It gives a good indication of when a reader encounters difficulty in comprehension, but is limited according to the size of linguistic unit being presented. Whereas larger units such as whole sentences can be read at a normal rate during self-paced reading, smaller units like words tend to be read much more slowly in self-paced reading tasks. Hence, when the technique has high on-line resolution (e.g., when word by word), it also interferes most with the normal reading process. This is not a problem with the eyetracking technique described below.

Rapid Serial Visual Presentation (RSVP) A slightly different technique for presenting written language

uses what is called **rapid serial visual presentation** (**RSVP**). With RSVP, readers see sequences of words in the center of a computer screen presented at a fixed fast rate. The experimenter then has the reader carry out an additional task, such as identifying a word in the sequence or trying to recall the sequence of words, which indicates how comprehension is limited by the rate of presentation. This technique has been used to investigate lexical, semantic, and syntactic processing. Like word-by-word self-paced reading, RSVP may well interfere with normal language processing.

Eyetracking During Reading The least interfering on-line behavioral technique for written language comprehension is eyetracking. During reading, the eye moves in a systematic way. There are brief **fixations** in which gaze stays on the same letter interspersed with fast movements called **saccades** during which the gaze moves to another letter or word of the text. For a skilled reader, 9 out of 10 saccades move the gaze from left to right to sample new material from the text, whereas 1 out of 10 saccades return the point of gaze to previously read material (these are called **regressions**). The duration of fixations and the length and direction of saccades (i.e., forward or backward movement of the gaze) directly reflect the ease or difficulty of the reading process. Furthermore, they indicate the precise word in the text that is causing reading difficulty because attention is only given to the word currently fixated.

The limited span of attention during reading can be demonstrated using the **moving window** technique in which a computer program controls dynamically the window of text presented to the reader as a function of where they are fixating. For example, with an asymmetric 12-letter window, the 4 letters to left and the 8 letters to the right of where the reader is fixating will be displayed as normal, whereas all the remaining text will be converted into random letters. The window of text together with its surround of random letters then changes as the point of fixation changes. One can reduce the size and form of the text window and measure when it begins to affect reading rate. It turns out that normal reading is quite possible when the window only contains the word currently fixated plus the first three letters of the next word on the line. However, there is a proviso that the material around the window must retain the spaces between the words in the original text. When the window arrangement is reversed so that the window contains random letters and the surround contains the normal text, readers encounter difficulty. With a reverse window of only 11 letters in width, reading becomes almost impossible.

Moving window studies indicate that readers only take in information from a limited region of text at any time during reading. This means that any extra time spent fixating the region must reflect processing difficulty associated with that region of text or previously fixated regions of text not completely processed but still held in memory.

Eyetracking has been used to study a wide range of linguistic processes, including lexical access, resolving lexical ambiguities, syntactic analysis, and various discourse processing phenomena, such as anaphora resolution. It is particularly effective in determining precisely when the reader makes a decision about some aspect of the linguistic input during sentence or discourse processing. For example, when presented with the sentence *We like the city that the author wrote unceasingly and with great dedication about* readers spend longer fixating the verb *wrote* as compared with the same verb in the fragment *We like the book that the author wrote unceasingly and with great dedication about*. This shows that readers immediately attempt to integrate each word of the sentence with the prior discourse and hence they detect the temporary anomaly produced by *wrote* in the first but not in the second sentence.

Eyetracking is a particularly effective technique because it does not interfere with the normal process of reading. A similar claim is made for some neurophysiological techniques such as ERP, described later.

Behavioral Methods for Spoken Language Production

Until the last decade, language production was not a central topic in psycholinguistics. This was partly because researchers did not have on-line methods for studying production in properly controlled experiments. This meant that the pioneering research on language production depended on off-line techniques, such as the study of speech errors. However, more recent work in language production has been influenced by on-line techniques. We consider both kinds of technique below.

Analysis of Speech Errors Speech error data has been used to draw many interesting conclusions about the nature of language production. For example, it was observed that substitution errors (e.g., saying *if **I** was done to that* rather than *If that was done to **me***) tend to always involve the same syntactic classes (e.g, the pronouns *me* and *that*). Also, as the example shows, the lexical substitution does not always involve a syntactic substitution. Otherwise, the error would have produced *If **me** was done to that*.

Such findings provide evidence that in production, words are chosen before they are strung together to make up an utterance and that this occurs before the words are marked for syntactic case.

Speech errors have been used to argue for an overall organization of speech production into separate message planning, lexical and grammatical assembly, and phonological processing components. There have also been some attempts to develop techniques to elicit speech errors experimentally by priming the errors in a similar fashion to that used in tongue twisters. Many of the conclusions drawn from the analysis of speech errors have been supported by results from more recent on-line techniques such as picture naming.

Picture Naming A particularly influential on-line technique for studying language production is to measure the time it takes participants to name pictures of objects or events. **Picture naming** is commonly combined with some form of priming task (see next section). It can also be combined with other techniques such as eyetracking to give a more precise indication of how words are accessed during language production. For example, a researcher might want to know whether speakers wait until they have all the words available before they start to articulate the first word in an utterance. To find out, the researcher could have participants name two pictured objects *A* and *B* in a phrase of the form *A and B*. If the time to start articulating the name of *A* is unaffected by the time to access the name for *B* as indicated by the time to articulate *B* in isolation, then the researcher can conclude that the speech articulation process begins before both word forms have been accessed. In fact, the evidence supports this conclusion.

Priming Techniques in Language Production An important issue in language production concerns the extent to which utterances are formulated incrementally one unit at a time according to different levels of representation (semantic, syntactic, and phonological). Priming techniques have been used to address this and other related questions. For example, at the phonological level words could be assembled for articulation either as complete packages or incrementally as sequences of distinct phonological units. A so-called **implicit priming** technique has been developed to test this. The participant has to learn sets of pairs of words, such that when given the first word in the pair he or she names the second word as quickly as possible. Crucially, in one condition the second words always share the same first syllable (e.g., single-loner, place-local, fruit-lotus), whereas in the other condition they do not (e.g., single-loner, signal-beacon, captain-major). The question is whether participants can use the implicit prime of the shared first syllable to speed up articulation. It turns out that they can, and more interestingly, the implicit priming only works for the first syllable in the word. When given a comparable list in which the second syllable of the second word is shared (e.g., single-murder, place-ponder, fruit-boulder), there is no articulatory benefit.

There are also techniques for studying priming at the syntactic level in production which use a variant of the picture naming procedure. A typical study might involve participants describing a sequence of pictured events using a verb indicated at the bottom of each picture. Interleaved between these descriptions, the participant checks descriptions they hear against another series of pictured events. By using ditransitive verbs such as *give*, which take either prepositional objects (*give the picture to Mary)* or double objects (*give Mary the picture*), it is possible to study syntactic priming independent of semantic priming. The question is whether having just heard *The sailor gave the banana to the nun* participants are more likely to describe their next picture as *The clown handed the book to the pirate* than *The clown handed the pirate the book*? It turns out that they are.

Behavioral Methods for the Study of Dialogue

As with language production, it is only quite recently that psycholinguists have begun the experimental investigation of language processing during dialogue. Again there is what has sometimes been called the problem of exuberant responses. Because dialogue is inherently spontaneous, how can the experimenter exert the control required for a sound experiment?

One way around this problem is to set up a task that controls what interlocutors can talk about. One such task is the **referential communication task**. One participant is required to describe a series of arbitrary visual patterns such that their partner who is able to reply can identify each pattern from the set that they have been given. This technique has been used to investigate how feedback from the listener affects the nature of subsequent references made by an interlocutor. More complex dialogue tasks have had conversational partners describe routes on a map or positions in a maze as part of some other cooperative activity. More recently, researchers have started to record interlocutors patterns of eye movements while carrying out some version of the referential communication task. In this way, it is possible to combine aspects of the visual world paradigm with those of the interactive referential communication task.

Neurophysiological Methods – ERP, fMRI, and MEG

Techniques for measuring the neurophysiological correlates of language processing have recently increased the psycholinguist's methodological armory. Three particular measurement techniques have been used. The first measures electrical activity at the scalp using **electro-encephalography** (**EEG**) to produce what are called **event-related brain potentials** (**ERPs**). The second measures changes in brain blood flow associated with neural activity using **functional magnetic resonance imaging** techniques (**fMRI**), and the third measures changes in magnetic fields associated with the electrical activity in the brain using **magneto-encephalography** (**MEG**). Each technique has its own advantages and disadvantages as a psycholinguistic tool.

fMRI signals give precise information about the area in the brain associated with the particular activity, so fMRI has proved useful for neurolinguistic investigation. The disadvantage with the technique for psycholinguistics is that it is not good for establishing the time course of the neural activity. This is because it takes time for the neural activity to produce changes in the blood flow. By contrast, ERPs provide precise information about the time course of the neural activity, but it is difficult to establish the source of the activity. This is because the ERP signal is affected by all sorts of irrelevant factors such as the thickness of the skull or interactions between signals from different areas of the brain. Finally, the most recently developed technique, MEG, offers good localization with similar temporal resolution to ERP. Nevertheless, like ERP signals, MEG signals are only sensitive to activity in neural structures with particular orientations, and neither technique is easy to apply when there is contemporaneous motor activity, such as eye movements or articulation during speech.

The most influential psycholinguistic research to date has tended to use ERP because it is both relatively cheap to run ERP experiments and the technique offers similar temporal resolution to that of behavioral measures such as eye tracking. This article concentrates mainly on the use of ERPs, but it will also say something about the use of MEG.

Event-related Brain Potentials (ERPs)

ERPs are derived from measurements of small changes in voltage at different points across the scalp. They are called **event-related potentials** because they are analyzed in relation to the onset of a triggering event. For instance, to derive an ERP that reflects word identification processes, the experimenter presents a word on a computer screen and measures the changes in scalp voltage from the point at which the word was presented. This process is then repeated over a number of trials. Because the data from each trial will contain irrelevant electrical activity, the experimenter takes the average potential across the set of related trials. In this way, the irrelevant 'noise' information can be filtered out. What remains is an ERP waveform with identifiable peaks and troughs of voltage. These peaks and troughs are taken to reflect the activity of bundles of nerve fibers in particular parts of the brain.

In practice, ERP researchers try to identify the characteristic peaks and troughs and establish how they might relate to concurrent processing. One well-established peak is called the **N400**, which corresponds to a negative component of the wave occurring approximately 400 ms. after presentation of the word that triggers it (it is a peak because ERP researchers conventionally plot negative values upward and positive values downward). The N400 has been associated with processes of conceptual or semantic integration of words into their sentential contexts. For example, when you measure ERPs elicited by the words *eat, drink,* or *cry* in the context "The pizza was too hot to *eat/drink/cry,*" then the N400 is larger for *cry* than *drink* and larger for *drink* than the contextually appropriate *eat*. This pattern is consistent with the idea that the N400 reflects conceptual integration (with *eat* being integrated into the sentence better than *drink*) as well as semantic integration (*drink* is semantically related to *eat* whereas *cry* is not).

Another characteristic trough is called the **P600** (a positive change occurring about 600 ms after the triggering word). Unlike the N400, the P600 has been associated with syntactic integration processes. For example, the word *was* when presented in the ungrammatical sentence *The doctor forced the patient was lying* produces a much larger P600 than *was* in the sentence *The doctor thought the patient was lying*. Because these two wave forms, N400 and P600, seem to reflect different kinds of processing, ERP can be used to establish the precise time course of these different processes. So ERP complements other on-line measures such as eyetracking, which do not differentiate between different kinds of psycholinguistic processes in this way.

ERPs have been used to address a wide range of questions both about early stages of lexical processing and more general syntactic and semantic processes in language comprehension. It is best suited for the study of processes that immediately follow presentation of the triggering stimulus because the ERP signal becomes increasingly noisy over time. This means that it is not such a good technique for studying such things as syntactic re-analysis or integration of a sentence into the discourse context.

Magneto-encephalography (MEG)

MEG has only recently begun to be used in psycholinguistics. MEG has some of the advantages of both fMRI techniques and EEG techniques because it enables precise source localization like fMRI and has fine temporal resolution like ERP. It also complements ERP. Whereas ERP electrical signals can only be picked up from nerve bundles that are in particular orientations with respect to the surface of the brain, MEG magnetic field signals can be picked up from nerve bundles that are orthogonal to those giving ERP signals. For these reasons, many researchers are particularly optimistic about MEG as a psycholinguistic method used together with ERP.

One particularly interesting application has been using MEG to establish the relationship between neural representation and linguistic form. The technique depends upon what has been called **mismatch negativity**. It was observed that as the same items are repeatedly presented to subjects, so the MEG signature associated with their processing is automatically reduced (probably because of neuronal habituation). However, when a new item is presented, the signal returns to normal. This happens irrespective of any behavior on the part of the subject. Mismatch negativity can therefore be used to establish the degree to which different items are processed in the same way. The greater the resumption of the activity (i.e., mismatch negativity), the more different the neurological processing of the new item. In this way, mismatch negativity can be used in a similar fashion to priming techniques to explore the neurological representation of different aspects of a linguistic stimulus.

Summary and Conclusion

Psycholinguistic techniques differ according to the kind of variables measured and the extent to which they tap into language processing as it happens. Behavioral measures, such as eyetracking, and neurophysiological measures, such as ERP, are particularly effective for measuring the time course of language comprehension. For language production studies, picture naming and priming techniques have been especially effective.

See also: Dialogue and Interaction; Evoked Potentials; fMRI Studies of Language; Magnetoencephalography; Psycholinguistics: Overview; Reading Processes in Adults; Speech Errors: Psycholinguistic Approach; Spoken Language Production: Psycholinguistic Approach.

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Psycholinguistics: History

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Our faculty for language has intrigued scholars for centuries. Yet most textbooks assume that psycholinguistics has its origins in the late 1950s and 1960s, and that nothing of note contributed to its evolution before then. In some respects this is true, in that it was only then that psycholinguistics began to proliferate as an identifiable discipline within the psychology literature. This proliferation was marked by the founding in 1962 of the *Journal of Verbal Learning and Verbal Behavior* (which subsequently, in 1985, became the *Journal of Memory and Language*). Why the original journal was so titled, and why its title presents us with a historical paradox, will become clearer as this review unfolds. The review's purpose is to consider how the present-day state of the art evolved. In so doing, it will touch briefly on ancient Greek philosophy, 19th century neuroscience, 20th century psycholinguistics, and beyond. It will

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consider approaches to the brain as practiced in both ancient Egypt and modern neuroscience. It will be necessarily selective, in order to make some sense of the historical developments that contributed to psycholinguistic science.

From the Ancient Egyptians to the Greek Philosophers

The earliest to write about language and the brain were the ancient Egyptians – the first to write about anything at all. A catalog of the effects of head injury (and injuries lower down the body also) exists in what is now referred to as the Edwin Smith Surgical Papyrus, written about 1700 B.C. The writer (believed to have collected together information spanning perhaps another 1000 years before) referred there to what is presumed to be the first recorded case of aphasia – language breakdown following brain trauma. However, the Egyptians did not accord much significance to the brain, which unlike the other organs of the body, was discarded during mummification (it was scraped out through the nose). They believed instead that the heart was the seat of the soul and the repository for memory, a view largely shared by the Greek philosopher Aristotle (384–322 B.C.) – a somewhat surprising position to take given that he was a student at Plato's Academy and that Plato (427–347 B.C.) believed the brain to be the seat of intelligence.

Plato was possibly the earliest to write at length on language (where others may have spoken, but not written). Certainly, his writings were the most influential with respect to the philosophy of language and the question 'what does a word mean?' Plato, in his *Republic*, considered the meaning of words in his Allegory of the Cave (as well as in *Cratylus*). In this allegory, a group of prisoners have been chained all their lives within a cave. All they see are the shadows of objects cast upon a wall by the flames of a fire. They experience only those shadows (in much the same way that we can only experience the results of our sensory percepts), and their language similarly describes only those shadows. Plato noted that when using a word, the prisoners would take it to refer to the shadows before them, when in fact (according to Plato), they would refer not to objects in the shadow world, but (unbeknown to the prisoners) to objects in the real world. Thus, for Plato (and a host of more contemporary philosophers, from Frege to Puttnam), the true meaning of a word – its reference – is external to the person who, by using the word, is attributing meaning to it. But why should it matter what a word refers to?

The *psycholinguistic* endeavor is to uncover the mental processes that are implicated in the acquisition, production, and comprehension of language. Just as psychology is the study of the control of behavior, so psycholinguistics is the study of the control of linguistic behavior. A part of any psycholinguistic theory of mental process is an account of what constitutes the input to the mental process – that is, what information is operated upon by those processes. While Plato was of course correct that the form of the real-world object dictates the form of the sensory image presented to the allegorical prisoner, the mental processes involved in that prisoner's use of language can operate only on mental derivatives of that sensory image. There may be properties of the real-world object (such as color, texture, and density) that are not represented in their shadow-forms, and thus mental processes that might otherwise (outside the cave) develop sensitivity to those properties need never develop such sensitivities if constrained to living a life inside the cave. But while the shadows would not permit the distinction between, say, a tennis ball and an orange, the *contexts* in which the shadows were experienced, or their names heard, *would* distinguish between the two – mental sensitivities would develop, but they would not necessarily be grounded in the perceptual domain. These distinctions, between the actual world and our *experience* of the world, and between an object or word and the *context* in which that object or word might occur, led other philosophers, most notably Wittgenstein in his *Philosophical Investigations*, to propose that the meaning of a word is knowledge of its use in the language – that is, knowledge of the contexts in which it would be appropriate to utter that word, where such knowledge is shaped by experience. We return to this theme when we consider in more detail the more recent history (and possible future) of psycholinguistics.

The Earliest Empirical Studies

The pre-history of psycholinguistics (up until the 19th century) was dominated by philosophical conjecture. The term *dominated* is used loosely here, as there was no *systematic* and ongoing questioning of the relationship between mind and language, or indeed, brain and language – there was no *community* of researchers asking the questions. But modern-day psycholinguistics is dominated not by philosophy (although it had its moments), but by experimental investigations that measure reaction times, monitor eye movements, record babies' babbles, and so on. Its prehistory lacks such experimentation. This is not to say that no experiments were performed. Certainly, there were isolated cases, generally of a kind that would not

be tolerated in the modern age. Indeed, one of the most widely replicated studies (if one is to believe the historians) is a study that was carried out on at least three and possibly four independent occasions between the 7th Century B.C. and the 16th Century A.D. In each case, some number of babies were apparently brought up in isolation (except for carers who were either mute, or instructed not to speak), with the aim of the experiment being to discover what language, if any, the children would grow up speaking. The results varied. The Egyptian Pharaoh Psamtik (7th C.B.C.) was credited by Herodotus with discovering that they spoke Phrygian. The Roman emperor and German king Frederick II (1194–1250 A.D.) carried out a similar study, but all the infants died. King James IV (1473–1513 A.D.) is supposed to have performed a similar experiment on the island of InchKeith, although it is likely that this study never in fact took place (the fact that the children are reported to have emerged from their isolation speaking Hebrew is one reason to doubt the truth of the story). And finally, Akbar the Great (1542–1605), the grandfather of Shah Jahan who built the Taj Mahal, similarly failed to discover man's 'natural language' (although there is some suggestion that in this case, the infants acquired a form of signed language inherited, in part, from the infants' carers).

The 19th Century Emergence of the Cognitive Neuropsychology of Language

The first *systematic* studies of the relationship between language and brain were conducted in the 19th century. This is probably the earliest point in the history of psycholinguistics from when a *progression* of studies can be traced, with one author building a case on the basis of earlier studies coupled with newer data. The protagonists at this time were Gall, Boulliard, Aubertin, Broca, Wernicke, and Lichtheim, to name a few. None of them would be described as 'psycholinguists,' but to the extent that their work (like modern-day *cognitive neuroscientists*) informed accounts of the relationship between brain and language, they are no less a part of the history of psycholinguistics than are the linguists, philosophers, psychologists, and cognitive scientists who have influenced the field through their own, sometimes radically different, perspectives.

Franz Gall is perhaps better known for his work on phrenology, but he believed that language function was localized in the anterior parts of the brain. His student Jean Boulliard collected clinical evidence in support of Gall's theory, and in turn, Boulliard's student Ernest Aubertin did the same. It was at a meeting in April of 1861 that Aubertin made his beliefs plain: If a case of speech loss could be found that was not accompanied by a frontal lesion, he would give up his (and his intellectual forbearers') belief in the localization of language. In the audience was Paul Broca, after whom are named Broca's aphasia and, within the left frontal lobe, Broca's area. Broca was struck by Aubertin's empirical challenge, but at the same time realized that craniology (Gall's lasting influence on his students) could not provide the proof that was required to establish a link between language loss and cerebral localization – only anatomical inspection of the brain could do that. Coincidentally, within a few days he was presented with a patient suffering from speech loss who died a few days after that. Broca's postmortem analysis of this patient's brain (and the damage to what is now referred to as Broca's area), coupled with earlier observations made by Marc Dax (on right hemiplegia and its correlation with speech loss), but published at the same time, established the anatomical validity of the localization hypothesis. About 10 years later (in 1874), Carl Wernicke published his work on 'sensory aphasia' (deficits in the comprehension of language). This work was considerably enhanced by Wernicke's student Ludwig Lichtheim who, in 1885, produced a schematic (cf. a 'model') of how three interlinked centers in the brain are implicated in aphasia: Broca's (the 'center of auditory images'), Wernicke's (the 'center of motor images'), and a diffusely located 'concept center.' Lesions to each of these areas, or to the connections between them, produce different kinds of aphasias. Most interesting of all, his schematic enabled him to predict disorders that had not yet been described. This ability of a conceptual 'model' to make as yet untested predictions is a theme we shall return to.

The Early 20th Century Influence of Behaviorism

By the end of the 19th century, the study of language began to change, as did the study of psychology more generally. Interest in the psychology (as opposed to *philosophy*) of language shifted from being primarily (or even solely) concerned with its breakdown to being concerned also with its normal use. Wilhelm Wundt in *Die Sprache* (published in 1900) stressed the importance of mental states and the relationship between utterances and those internal states. William James similarly (at least early on) saw the advantages of introducing mental states into theories of language use (see his 1890 *Principles of Psychology*, in which several contemporary issues in psycholinguistics are foreshadowed). But the early 20th century was a turbulent time for psycholinguistics (as it was for psychology): J. B. Watson argued that psychology should be concerned with behavior

and behavioral observation, rather than with consciousness and introspection (the Wundtian approach). And whereas Wundt had argued that a psychology of language was as much about the mind as it was about language, behaviorists such as J. R. Kantor argued against the idea that language use implicated distinct mental states. For Kantor, the German mentalist tradition started by Wundt was simply wrong. Even William James turned away from Wundtian psychology. Thus, the behaviorist tradition took hold.

The late 19th and early 20th centuries were a time of great change in linguistics, too. The 19th century had seen the emergence of the Neogrammarians, a group that studied language *change*. They were interested in how the sounds of different languages were related, and how within a language, the sounds changed over time. They were less interested in what a language 'looked like' at a particular moment in time. This changed at the beginning of the 20th century when Ferdinand de Saussure brought *structure* into the study of language. He introduced the idea that every element of language could be understood through its relation to the other elements (he introduced *syntactic* distinctions that are still central to contemporary linguistics). In the 1930s, the Bloomfieldian school of linguistics was born, with the publication in 1933 of Leonard Bloomfield's *Language*. Bloomfield reduced the study of language structures to a laborious set of taxonomic procedures, starting with the smallest element of language – the *phoneme*. In doing so, Bloomfield firmly aligned the linguistics of the day with behaviorism. And just as behaviorism eschewed mental states in its study of psychology, so the Bloomfieldian tradition eschewed psychology in its study of language. The study of language was firmly caught between the proverbial rock and a hard place – between behaviorism on the one hand and taxonomy on the other. Mental states were, the argument went, irrelevant – whether with respect to psychological or linguistic inquiry.

The behaviorist tradition culminated (with respect to language) with B. F. Skinner's publication in 1957 of *Verbal Behavior*. Here, Skinner sought to apply behaviorist principles to verbal learning and verbal behavior, attempting to explain them in terms of conditioning theory. Verbal behavior (and *Verbal Behavior*) proved to be the final battleground on which the classical behavorists and the mentalists would clash.

The Mid-20th Century and the Chomskyan Influence

In 1959, Chomsky published a review of Skinner's *Verbal Behavior*. He argued that no amount of conditioned stimulus-response associations could explain the infinite productivity or systematicity of language. With Chomsky, out went Bloomfield, and in came mental structures, ripe for theoretical and empirical investigation. Chomsky reintroduced the mind, and specifically mental representation, into theories of language (although his beliefs did not amount to a theory of psychological process, but to an account of linguistic structure). So whereas Skinner ostensibly eschewed mental representations, Chomsky apparently proved that language was founded on precisely such representation. Some later commentators took the view that the Chomskyan revolution threw out the associationist baby with the behaviorist bathwater. Behaviorism was founded on associationism. Behaviorism was 'out,' and with it, associationism. Symbolic computation was 'in,' but with it, uncertainty over how the symbolic system was acquired. It was not until the mid-1980s that a new kind of revolution took place, in which the associationist baby, now grown up, was brought back into the fold. The intervening 20 years were typical teenage years – full of energy, punctuated by occasional false hopes that nonetheless proved essential to the maturation process.

Two years before his review of *Verbal Behavior*, Chomsky had published *Syntactic Structures*, a monograph devoted to exploring the notion of abstract grammatical rules as the basis for generating sentential structure. According to Blumenthal in his 1970 account of the history of psycholinguistics, Chomsky's departure from the Bloomfieldian school was too radical for an American publisher to want to publish a lengthy volume that Chomsky had written outlining the new approach, and only Mouton, a European publisher (and presumably more sympathetic to the tradition that Chomsky was advocating) would publish a shorter monograph based on an undergraduate lecture series he taught at MIT. In fact, this is not quite accurate (N. Chomsky, personal communication); Chomsky had indeed written a longer volume (subsequently published in 1975), and it is true that initial reactions to the manuscript were negative (but, according to Chomsky, not unreasonable), but *Syntactic Structures* was not a compromise brought about through Chomsky's search for a publisher; he had not, in fact, intended to publish it. Instead, Cornelis van Schooneveld, a Dutch linguist and acquaintance of Chomsky's who was visiting MIT and happened to edit a series for Mouton, suggested that Chomsky write up his class notes and publish them. This he did, and modern linguistics was born. Psycholinguistics became caught up, almost immediately, in its wake.

Chomsky's influence on psycholinguistics cannot be overstated. He drew an important distinction

between 'competence,' or the knowledge we have about a language, and 'performance,' the use of that language (a distinction that was reminiscent of Saussure's earlier distinction between *langue* and *parole*). Both, he claimed, arise through the workings of the human mind – a mind, which furthermore is innately enabled to learn the structures of human language (although not everyone agreed with the arguments for a language acquisition device akin to a mental organ – a concise summary of the counterarguments was written by Bates and Goodman (1999)). It is perhaps surprising that against the backdrop of *Syntactic Structures* and Chomsky's *Review of Skinner's Verbal Behavior*, a new and influential journal dedicated to research into the psychology of language should nonetheless, in 1962, give itself a title (the *Journal of Verbal Learning and Verbal Behavior*) that firmly placed it in the behaviorist tradition.

From Linguistic Competence to Psychological Performance

Chomsky's theories of grammar were theories of competence, not performance. And yet, his work on *transformational grammar* initiated a considerable research effort in the early 1960s to validate the psychological status of syntactic processing (the construction of representations encoding the dependencies between the constituents of a sentence). Many of these studies attempted to show that perceptual complexity, as measured using a variety of different tasks, was related to linguistic complexity (the so-called Derivational Theory of Complexity). However, whereas the syntactic structures postulated by transformational grammar did have some psychological reality, the devices postulated for building those structures (e.g., the transformations that formed a part of the grammatical formalism) did not. It soon became apparent that the distinction between competence and performance was far more important than originally realized – the linguists' rules, which formed a theory of competence, did not make a theory of psychological process.

Subsequently, the emphasis shifted toward examination of the psychological, not linguistic, mechanisms by which syntactic dependencies are determined (a process referred to as *parsing*). In a seminal paper published in 1970, Thomas Bever pointed out that in cases of ambiguity, when more than one structure (i.e., dependency relation) might be permissible, there appear to be consistent preferences for one interpretation rather than another. This consistency appeared to hold not only across different examples of the same kind of ambiguity, but across different people, too. Thus, despite the grammaticality of '*the horse raced past the barn fell*' (cf. '*the car driven past the garage crashed*'), the preference to interpret '*raced*' as a main verb (instead of as a past participle equivalent to '*driven*') is so overwhelming that the sentence is perceived as ungrammatical (and the preference is then said to induce a 'garden path' effect). Evidently, grammaticality and processability are distinct mental phenomena.

On the Influence of the Digital Computer

The 1970s saw enormous growth in psycholinguistics. Advances were made across a wide range of phenomena, including the identification of both printed and spoken words, the reading process, sentence comprehension (with much of the emphasis on the resolution of ambiguities of the 'garden path' kind), and the mental representation of texts. Whether there was a 'spurt' in the number of publications is contentious, because although there undeniably was such a spurt, the whole of psychology experienced the same rapid growth. It would be wrong, however, to attribute all this advancement to the influence of Chomsky. The demise of behaviorism played a part (and certainly Chomsky played a part in that demise), but so did the advent in the 1950s of the digital computer. The 'mind-as-computer' metaphor had a subtle but pervasive influence on both psycholinguistics and the study of *cognition* generally. Computer programs worked by breaking down complex behaviors into sequences of simpler, more manageable (and hence more understandable) behaviors. They relied on *symbol manipulation* and the control of *information flow*. They distinguished between different levels of explanatory abstraction (the high-level programming language, the assembly code, and the flow of electrical currents around the hardware). And perhaps most important of all to the empirical psychologist, they enabled novel predictions to be made that might not otherwise have been foreseen had the 'model' not been implemented in full; complex interactions among the components of a program were not easy to foresee.

The influences of the digital computing revolution were felt in different ways. Some were direct, with researchers building computer simulations of mental behavior (in the growing field of *Artificial Intelligence*, several language 'understanding' programs were written, some of which are still relevant 35 years later – e.g., Terry Winograd's SHRDLU program written in 1968–1970). Other influences were indirect, coming to psycholinguistics via philosophy. One such example was Jerry Fodor's Modularity of Mind hypothesis (from 1983). One simplified interpretation of

this hypothesis (it was interpreted in different ways by different researchers) was that there are two alternative ways of theorizing about the mind: one is to assume it is incredibly complex and that multiple sources of information interact in multiple ways, and the other is to assume that it can be broken down into a number of modules, each of which performs some particular function and is 'blind' to the workings of the other modules (perhaps taking as input the output of one or more of those other modules). Fodor argued that certain aspects of cognition were modular (the input systems), and certain others were not (central processes). This hypothesis had considerable influence in psycholinguistics, and for a time (the mid-1980s to early 1990s), hypotheses were evaluated according to whether they were modular or not. There seemed little agreement, however, on where one drew the boundaries (for example, was spoken language recognition a part of an input system? If it was, how could 'higher-level' knowledge of the context in which the language was being interpreted influence the modular and encapsulated recognition process? – Some argued it could not, while others argued it could). It was about this time, in seeming opposition to the trend toward *symbolic computation*, that a new computationally motivated approach to cognition emerged in the mid 1980s, apparently eschewing symbolic computation *and* modularity.

The Late 20th Century Emergence of Connectionism: Statistical Approaches to Language

In 1986, David Rumelhart and Jay McClelland published *Parallel Distributed Processing*. This edited volume described a range of *connectionist*, or *neural network*, models of learning and cognition, and marked a 'coming of age' for connectionism. It was, for many researchers in psycholinguistics, their first introduction to a wide range of research in this emerging field. Of particular interest were the facts that 'knowledge' in connectionist networks is encoded as patterns of connectivity distributed across the neural-like units, and 'processing' is manifest as spreading patterns of activation. These networks can learn complex associative relations largely on the basis of simple associative learning principles (based primarily on work published in 1949 by Donald Hebb, a student of Lashley's). Various algorithms exist to set the 'strengths' of the connections between the units automatically, so that a given input pattern of activation across some set of units will spread through the network and yield a desired output pattern across some other set of units. Indeed, multiple input-output pairings can be learned by the same network. Importantly, and in contrast to the ideals of the behaviorist traditions, neural networks can develop internal representations.

Several connectionist models had profound effects on developments in psycholinguistics. TRACE, for example, developed by McClelland and Jeff Elman in the 1980s, was a model of spoken word recognition that formed the focus of empirical research for a good 20 years after its inception. But TRACE did not learn anything – it was hardwired. An extremely influential model that *did* learn by itself was described by Elman (1990), who showed how a particular kind of network could learn the dependencies that constrain the sequential ordering of elements (e.g., phonemes or words) through time. In effect, it learned which kinds of word could follow which other kinds of word (hence, it was a *statistical model*, because it encoded the statistics of the language it was trained upon). Interestingly, it developed internal representations that appeared to resemble grammatical knowledge; words that occurred in similar sentential contexts came to evoke similar internal representations (that is, internal patterns of activity when the word was presented to the network) – and because words of the same grammatical category tend to occur in the same sentential contexts, different 'clusters' of words emerged, with each cluster representing a different category of word.

Not surprisingly, the entire connectionist enterprise came under intense critical scrutiny from the linguistics and philosophy communities, not least because it appeared to reduce language to a system of statistical patterns, was fundamentally associationist, nonmodular, and eschewed the explicit manipulation of symbolic structures (because the internal representations that emerged as a result of the learning process were not symbolic in the traditional sense). Within the context of the symbolic-connectionist debate there developed what became perhaps one of the longest surviving disputes in contemporary psycholinguistics; between those that believe that word formation (e.g., the formation of 'walked' from 'walk,' 'ran' from 'run,' and 'went' from 'go') is driven by knowledge of *rules* and *exceptions* to those rules, and those who believe it is driven by *statistical regularity* (which can apparently capture, in the right model, both the regularly and irregularly formed words). The debate shows little sign of abating, even 20 years later.

Critics notwithstanding, statistical approaches to language (both with respect to its structure and its mental processing) are becoming more prevalent, with application to issues as diverse as the 'discovery' of words through the segmentation of the speech input, the emergence of grammatical categories, and even the emergence of meaning as a consequence of

statistical dependencies between a word and its context (cf. Wittgenstein's views on the meaning of words). Empirically also, the statistical approach has led to investigation of issues ranging from infants' abilities to segment speech and to induce grammar-like rules to adult sentence processing. The reason that such approaches have proved so appealing is that statistics are agnostic as to the nature of the real-world objects over which the statistics are calculated – thus, the fundamentally same algorithm can be applied to sequences of phonemes, words, or sentences. Their implementation within a neural network is similarly agnostic – the same network and the same algorithms that enable that network to induce the appropriate statistics can be applied to many different domains. Connectionism opened up experience-based learning to a range of psychological domains, not just the linguistic domains. And experience-based learning was attractive not least because it required fewer assumptions about the existence of innately specified domain-specific faculties (and in a multi-authored volume published in 1996, Jeff Elman teamed up with a variety of developmental psychologists to argue that connectionism was attractive precisely because it enabled a new perspective on how innate constraints on learning and neural structure might be an important component of human language acquisition (Elman, 1996)).

Neural networks can be criticized for being (among other things) too unconstrained – they can, in principle, do more than might be humanly possible – but the opposite criticism, that they are too small and do not necessarily 'scale up' is another criticism that is often heard. Neural networks as currently implemented are just the 'medium' on which are offered up the statistics. To misuse a common adage, the proof will be in the pudding, not in the plate that serves it up. There is little doubt, from the historical perspective, that although the emergence of connectionism has offered a powerful theoretical tool, its emergence has also polarized sections of the psycholinguistic community, between 'connectionists' on the one hand, and 'symbolists' on the other. This polarization is not unique to psycholinguistics, however, but pervades the study of cognition more broadly. And as if to further muddy the theoretical waters, the beginning of the 21st century has seen renewed interest in yet another (no less controversial) paradigm – one that grounds language (and cognition) in action.

The Early 21st Century and the Grounding of Language in Action and the Brain

Traditional theories in cognition suppose that the job of the perceptual system is to deliver to the cognitive system a representation of the external world. The job of the cognitive system is then to reconstruct, mentally, that external world. This reconstruction subsequently forms the basis for 'commands' sent to, for example, the motor system. Cognition thus mediates between perception and action. An alternative approach, termed 'embodied cognition,' is that cognition and action are encoded within the same representational medium. Cognition is thus rooted in the same motoric and sensory representations that support interaction with the external world. Or, put another way, cognition is grounded in the same neural substrates that support sensory-motoric interaction with the external world. One consequence of this view is that language, a component of cognition, should, like the other components of cognition, be studied in the context of (i) the interactions it causes between the hearer and the world, and (ii) the neural substrates that support those interactions. Coincidentally, the 1990s saw a boom in research into the neural substrate of language, in part due to the increased availability of neuroimaging technologies (predominantly *PET* and *fMRI,* with *EEG* and more recently *MEG* also proving influential). It also saw increased research into the relationship between language and action. Taken together, these two streams of research provided increasing evidence for embodied cognition.

With respect to imaging, a variety of studies demonstrated what Lichtheim had alluded to a century earlier – that concepts are not represented in some discrete location within the brain, but are distributed across different regions. For example, words whose meanings implicate tool use (e.g., 'hammer') activate regions of the brain responsible for controlling motoric action (during the use of the tool) and other regions involved in the recognition of object form (during perception of the tool). Color words (e.g., 'yellow') and words referring to non-manipulable artefacts (e.g., 'house') do not activate motoric areas to the same extent, but they do activate regions close to those implicated in form perception and, for color words, color perception. Importantly, there is no single region that is primarily active; rather, words and concepts activate complex patterns of activity that are distributed and overlapping within different parts of the brain that are known to have (other) motoric and sensory functions. The meanings of (at least some) words do appear, then, to be grounded in those neural substrates that support sensory-motoric interaction.

About the same time that increased attention was focusing on neuroimaging, new techniques for studying language and its effects on *action* were also being developed. One of these involved the monitoring of eye movements as participants listened to

commands to manipulate objects in front of them, or as they listened to descriptions of events that might unfold within the scene before them (one can view language-mediated eye movements as central to the relationship between language and action, because eye movements signal overt shifts in attention, and because attention to something necessarily precedes (deliberate) action upon it). It was found that eye movements were closely synchronized with processes implicated in both spoken word recognition and sentence processing, and that much could be gleaned about what kinds of information were recruited at what point during a word or sentence in order to interpret the unfolding language with respect to the scene in front of the participant (it is not without some irony that in L. N. Fowler's famous Phrenology bust, from about 1865, the faculty for language is located just below the left eye). Another technique involved measuring motoric responses to different kinds of linguistic stimuli – for example, words or sentences referring to movements toward or away from the body were found to interfere with responses in a judgment task (e.g., 'does this sentence make sense?') that involved moving a finger toward or away from a response button. A range of studies, some involving TMS (Transcranial Magnetic Stimulation – a method for either temporarily stimulating or suppressing a part of the brain, such as parts of motor cortex) have confirmed this motoric component to language comprehension.

It is noteworthy, with respect to the embodiment approach to cognition, that some of its basic tenets have been around since the earliest days of (contemporary) psycholinguistics. Winograd's SHRDLU program, for example, viewed the meaning of a word such as 'place' or 'lift' as that part of the program that caused placing or lifting – language comprehension within that program was grounded in sensory-motoric representation – and as such, SHRDLU followed in the Wittgenstinian tradition of treating meaning as use. Similarly, it is noteworthy that although most of the neuroimaging of language has been carried out independently of theories of embodied cognition, much of the work converges on the same theme – that aspects of language are represented in the same representational substrates that control our sensory-motoric interactions with the external world.

Epilogue

And that, broadly speaking, is where the field is now. In the space available, it is impossible to document all the trends that have influenced contemporary psycholinguistics, and which have influenced not just what kinds of language behavior we study (e.g., language breakdown, normal language use, ambiguity resolution, and so on), but also how we study those behaviors (through studying aphasis, neuroimaging, language-mediated eye movements, and so on). And we have still to see the full influences of connectionism, statistical learning, embodied cognition, and the neuroscience of language. What we can be sure of is that the boundaries between the study of language and the study of other aspects of cognition are wearing thinner (the eye movement research mentioned above is at the interface of language and vision, for example). No doubt there are already developments in 'neighboring' fields of study (e.g., the computational sciences and non-cognitive neurosciences) that will also have an impact, but have yet to emerge as quantifiable influences on psycholinguistics. For example, researchers are already using computational techniques coupled with detailed neuroanatomical research on the neural structure of the brain to attempt to understand the kinds of 'computation' that distinct parts of the brain may be capable of. Such research promises greater understanding of the brain's ability to learn, represent, and deploy language. And although the history of psycholinguistics is relevant to understanding where the field is today, perhaps of greater interest is where the field will be tomorrow.

Acknowledgments

This article is a substantially expanded version of a short, 1500-word section on the history of psycholinguistics that appeared as part of a broader review of issues in psycholinguistics (Altmann, 2001). The reader is referred to this paper for in-depth review of (some of) the topics that constitute the field of psycholinguistics. The author would like to thank the publishers of this article for donating his fee to the charity Médecins sans Frontières, and Silvia Gennari for advice on topics ranging from Plato to neuroimaging.

See also: Cognitive Science: Overview; fMRI Studies of Language; Human Language Processing: Connectionist Models; Human Language Processing: Symbolic Models; Language, Visual Cognition and Motor Action; Modularity of Mind and Language; Psycholinguistics: Overview; Sentence Processing.

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Psycholinguistics: Overview

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Emergence of Psycholinguistics in the Late 1950s and 1960s from the Chomskyan Revolution

Although the study of language has been part of psychology from its earliest years, including for example in the work of Wilhelm Wundt, the father of psychology, a distinct field of psycholinguistics emerged in the late 1950s largely in response to the impact of Chomsky. In the preceding decades, notably in the United States, psychology had been dominated by the behaviorist approach of researchers such as B. F. Skinner. They treated language as a form of verbal behavior, which, like all other behavior, they believed was governed by simple stimulus–response associations. Chomsky demonstrated the shortcomings of the behaviorist approach in explaining the productivity of language and its complexity, and his work, notably *Syntactic structures* (1957), provided a major impetus for a new kind of psychological investigation of language. This was driven by an interest in the mental representation of language in general and syntactic structures in particular (*see* **Psycholinguistics: History**).

Psychology since the demise of behaviorism has again been concerned with understanding the way that people accomplish various information-processing tasks. In the field of psycholinguistics this means a concern with the cognitive processes by which a string of sounds in an utterance, or marks on a page, are processed to identify individual words and sentences, and how this emerging structure becomes mentally represented as a meaningful concept. The goal of this process is to derive models that account for how people achieve this so rapidly and successfully, given what we know about the general limitations of human cognitive processing. To oversimplify: the psychologist is concerned with **how** the linguistic units are processed and represented; the linguist is concerned with the description of the structures that emerge from any such processes.

Research Topics in the Early Years of Psycholinguistics

In its early years psycholinguistics reflected the concerns of linguistics and the central role of syntax. Psychologists such as Miller and Isard (1963) showed that the syntax influences the way people interpret sentences, and even how many words people can remember from a string of words that make no sense. More words are remembered from a 'sentence' like 'Accidents carry honey between the house' than from strings with no syntactic structure such as 'On trains hive elephants the simplify.' The focus on

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syntax and its importance in language processing led many psycholinguists to try to test the psychological reality of Chomsky's theory of generative grammar. Experiments were designed to explore the notion that when people process sentences, what they are doing is retrieving the deep syntactic structure as described in Chomsky's transformational grammar. So initially, a number of studies seemed to show that the relative ease or difficulty with which a reader or listener could process a given sentence was directly related to its syntactic complexity. Chomsky's kernel sentences, equivalent to active affirmative declarative sentences, were recalled most easily and processed most quickly, while sentences including one or more transformations such as negative or passive forms were more difficult to process. These kinds of study led to the so-called derivational theory of complexity. This was superseded as it became clear that the results of many of the studies that apparently provided support for this purely syntactic view of how people process sentences could also be accounted for by the influence of semantic factors. Although sentence processing remains one of the most significant topics in psycholinguistics, the range of language phenomena that are studied has broadened considerably since the early 1960s. The assumption that the role of psycholinguistics is to demonstrate the psychological validity of any particular syntactic theory has also been overtaken.

Models of Sentence Comprehension

Many of the models of sentence comprehension that have been developed in psycholinguistics try to elucidate the cognitive processes that are involved when a reader or listener interprets a sentence. There is considerable experimental evidence that sentence comprehension is incremental, that is, that an interpretation is built up on a moment-by-moment basis from the incoming linguistic information. The evidence for this incremental processing is particularly striking in the way listeners recognize spoken words (see below), which are often identified before all the acoustic information has been heard.

Even in written language processing we have clear signs of the incremental nature of linguistic processing. This is illustrated by the difficulties most readers have with sentences like the following: 'The horse raced past the barn fell' (Bever, 1970). This is known as a garden path sentence, because nearly all readers interpret this **while** they are reading, with 'raced' as an active verb and so expect the sentence to end after 'barn.' They do not realize that the sentence could have an equivalent interpretation to 'The horse that raced past the barn, fell.' The incremental way that sentences seem to be interpreted by readers or listeners is a major source of potential ambiguities of interpretation. Many sentences in a language have potentially more than one interpretation as they are processed, yet the reader or listener is usually not aware of any problem in arriving at one clear interpretation of a sentence.

The cognitive architecture that underpins such an achievement has been a source of much debate in psycholinguistics. Some researchers have held that in the frequent cases where more than one analysis of a sentence is possible, the reader or listener computes all possible analyses in parallel. The difficulty of garden path sentences has led others to propose serial models, where it is assumed that a single analysis is computed and corrected later if this is needed. Models have been proposed to account for the empirical evidence on sentence-processing difficulties. These often involve various versions of parallel analyses, where candidate analyses are only active for a brief period of time or are ranked according to frequency in the language or plausibility with the context. One of the most influential of these accounts is the constraint-based model of MacDonald *et al.* (1994). The weightings attached to each candidate analysis are based on the frequency of a syntactic structure in the language, the plausibility of the words in the sentence to their assigned syntactic roles, etc. So this model is an example of an interactive model where many different sorts of information, syntactic, semantic, pragmatic, contextual, and frequency, can all play simultaneous roles by activating alternative interpretations of the incoming linguistic information. In models of this type, semantic factors can override syntactic processing biases. This model is attractive to psychologists for a number of reasons. It is amenable to modeling by connectionist approaches (*see* **Cognitive Science: Overview**) and it avoids the problem of having to base cognitive processes on syntactic rules, which for psychologists appear to change arbitrarily with changes in linguistic theories.

In contrast, one of the other most influential models of sentence processing is the garden path model (Frazier, 1979). This uses only syntactic principles in its initial stage. An analysis is computed based on two syntactic preferences, the most important being the principle of minimal attachment, the other being the principle of late closure. The first principle means that the parsing of the sentence that produces the simplest parse tree, with fewest nodes, takes precedence. So a sentence like 'Mary watched the man with the binoculars' is usually interpreted to mean that Mary (not the man) was using binoculars. According to Frazier's interpretation of phrase structure rules, this interpretation involves one node fewer than the alternative and so demonstrates the principle of minimal

attachment in action. This principle takes precedence over the principle of late closure. This is the preference to attach incoming materials to the current phrase or clause. This latter principle is used to explain the preference for interpreting sentences like 'John said he will leave this morning' to mean that the phrase 'this morning' relates to the verb 'leave,' not the verb 'said.'

As part of the ongoing debate about the adequacy of different models of the parsing process there has been an active discussion in the experimental literature over several years about the extent to which semantic factors can override or guide the analysis of syntactic structure. This has been explored in several studies focusing on the ease or difficulty with which sentences containing reduced relative clauses can be processed. Several studies have tested how people interpret sets of sentences like the following:

(1a) The defendant examined by the lawyer turned out to be unreliable.
(1b) The defendant that was examined by the lawyer turned out to be unreliable.

(2a) The evidence examined by the lawyer turned out to be unreliable.
(2b) The evidence that was examined by the lawyer turned out to be unreliable.

Sentences like (1a), which contain a reduced relative clause, are more difficult to process than their equivalent full relative clause (1b). Readers initially treat 'examined' as a main verb whose subject is 'the defendant.' They then have to reanalyze this garden path when they reach the phrase 'by the lawyer.' The argument is the extent to which structurally similar sentences (e.g., [2a]) cause readers to have equivalent processing problems. This is what might be expected from a purely syntactic view of parsing. In contrast, in an interactive constraint-based model, the semantic implausibility of interpreting an inanimate noun such as 'evidence' as the subject of the verb 'examined' should protect the reader from the need to reanalyze an initial incorrect syntactic structure.

Trueswell *et al.* (1994) seemed to show just such a pattern. This was considered powerful evidence in support of interactive constraint-based models of sentence processing. More recently, Clifton *et al.* (2003) have challenged the evidence that semantic factors override syntactic processing in the initial stages of parsing. They used more sophisticated techniques for monitoring and analyzing eye movements to determine the processing difficulties experienced by readers. They found that reduced relative clauses caused disruption to processing, irrespective of the semantic plausibility of the relationship between the apparent subject and main verb. Semantic factors, however, influenced how quickly the readers **recovered** from their wrong analysis of the syntax of the sentence. Clifton *et al.* (2003) stressed that the key thing for psycholinguistic models of sentence processing is not whether the data on processing reduced relative clauses support garden path or constraint-based models. They claim that the important goal is to develop parsing models that deal both with the task of creating structure and evaluating the structure that is created.

Although there have been numerous studies of sentence processing conducted by psycholinguists over the decades, the vast majority of these have focused on how readers interpret written sentences. A few studies have tackled the issue of how listeners use the cues in spoken language during parsing. Minimal attachment strategy can be shown to be overcome by the prosodic cues in real spoken sentences. Similarly, the principle of late closure, which can cause syntactic ambiguities in written sentences, can be less problematical in spoken materials because of clear prosodic cues to the intended interpretation. Even the apparent errors in spoken sentences, such as the disfluency 'uh,' can have an impact during the parsing process. Bailey and Ferreira (2003) presented sets of sentences to listeners such as the following:

(3a) Sandra bumped into the busboy and the uh uh waiter told her to be careful.
(3b) Sandra bumped into the busboy and the waiter uh uh told her to be careful.

These sentences are ambiguous up to the point when the listeners hear 'told.' 'Sandra' could have bumped into 'the busboy' or 'the busboy and the waiter.' Yet the listeners who heard the materials most often interpreted sentences like (3a) to mean that 'the waiter' was the subject of a new clause, i.e., that it was the subject of the verb 'told.' This shows that disfluencies can systematically influence the way listeners parse incoming sentences. The same effect was observed when the interruption was not a disfluency but an environmental sound such as a telephone ringing.

Speech Production and Speech Errors

These studies represent a welcome aspect of the broadening of the psycholinguistic research agenda to include more consideration to the production and comprehension of spoken as well as written language. The study of speech disfluencies is one part of this. Speech disfluencies encompass a range of phenomena, including pauses in speech such as silences, filled pauses, and fillers such as 'uh' and 'um,' as well as speech errors such as slips of the tongue, spoonerisms, and malapropisms. When we speak we aim to

produce a grammatically well-formed utterance with no noticeable hesitations. Yet this ideal delivery cannot always be achieved. It is estimated that around 5% of words in speech are disfluent in some way. Yet these disfluencies are not random in their patterns of occurrence. Even the similar-sounding disfluencies 'uh' and 'um' have been shown to have systematic contexts of use. Speakers use 'uh' before a short delay in their speech production but use 'um' before a more significant delay. Speakers seem to become disfluent because they are experiencing some kind of problem in planning and producing their utterance. Speakers have been found to pause more before unpredictable words, suggesting they might be experiencing word-finding difficulties. Speakers also pause more at the start of an intonation unit, which suggests that pausing is related to the speech-planning process (*see* **Pauses and Hesitations: Psycholinguistic Approach**).

Speech errors have also been studied by psycholinguists, who have classified them according to the assumed units of processing and types of mechanism involved in their production. For example, speech errors can relate to the phonemic features of the word, the syllabic structure, or the phrase or sentence being produced. This is illustrated in one of the famous errors reportedly produced by Dr Spooner in the 19th century when rebuking one of his students: 'you have tasted the whole worm' when he presumably intended to say 'you have wasted the whole term.' Here the initial phonemes are swapped but the rest of the morphemic and syntactic structure of the target utterance is preserved. Errors of this type became known as 'spoonerisms' as a result.

The kinds of error that occur can tell us a good deal about how speech is produced. Speech errors are very varied. They can reflect many different linguistic levels. Errors can involve the sounds of the words involved, for example saying 'the lust list' for 'the lush list.' They can relate to the intended words in a phrase, 'the pin of a head' being said in place of 'the head of a pin.' Errors may also focus on the semantic relations of the intended words, so a speaker may produce 'I like berries with my fruit' rather than 'I like berries with my cereal,' among many other forms of errors.

Some types of errors, however, do not occur and these patterns of occurrence and nonoccurrence have been used to help understand the speech production process. Content and function words are not substituted for one another and indeed substitute words are usually the same part of speech as the intended target word. When the wrong sound is produced, however, the substituted phoneme seems to have no grammatical relation with the intended target sound. The spacing between the errors is also informative for models of production. Errors of word substitution usually involve words that are a phrase apart. Yet sound errors seem to relate neighboring words. This sort of evidence has been used by several researchers to develop general models of the speech production process (*see* **Speech Errors: Psycholinguistic Approach** for more details).

Speech Recognition

Psycholinguists have also been concerned with exploring the processes involved in speech perception. Jusczyk and Luce (2002) summarized over 50 years of research on this topic. They described key research issues in the domain as understanding invariance, constancy, and perceptual units. In speech there are no invariant acoustic features that map directly to corresponding phonetic segments. The acoustic properties of sounds vary widely depending on the surrounding linguistic context. To make matters even more complex for the listener, there is also wide variability in the way phonetic segments are produced by different speakers depending on age, sex, and individual speaker characteristics. It is not even easy to determine what are the basic perceptual units that listeners use to recognize speech. Some research studies seem to suggest the phoneme as the basic building block of perception while others show advantages of the syllable over the phoneme. Conversational speech is therefore a very variable signal that does not even provide clear cues to boundaries between words. Yet understanding words in speech is an effortless and successful process for listeners with normal hearing. How is it done?

One of the key research challenges for psycholinguists was therefore to produce models of spoken word recognition. One of the most influential models is the Cohort Model (Marslen-Wilson and Welsh, 1978; Marslen-Wilson, 1989). In this account, when a listener hears an initial sound, all the words known to start with that sound become activated. This cohort of candidate words is gradually whittled down to a single word, as more acoustic information is processed and candidate words are eliminated. An important feature of the model is the uniqueness point. This occurs when the listener has heard enough acoustic information to reduce the cohort to a single candidate, i.e., there are no other words known to the listener with that particular sequence of phonemes. Syntactic and semantic context from the surrounding discourse can also play a role in rejecting potential candidate words. In later versions of the model, this can only occur after the uniqueness point, though in earlier versions, context could also be used to eliminate possible words before the uniqueness point. The

recognition point occurs when a single item remains in the cohort. This may be before the end of a word.

One of the strengths of the model is the way it can account for the speed with which spoken word recognition often occurs, often occurring before the word offset. In later versions of the model the activation of candidate words is a graded process. Candidate words are not completely eliminated as acoustic information accumulates, but rather they have their activation level reduced. This can rise again if later acoustic information matches a rejected candidate word. This is important, as one of the problems of conversational speech is that individual words or phonemes are often not articulated clearly and the listener must be able to recover and recognize words whose initial sounds were mispronounced or misheard in a noisy environment.

The main competitors to speech recognition models are various connectionist accounts, notably Trace (McLelland and Elman, 1986). This is a connectionist or parallel distributed processing (PDP) account of spoken language processing. In such models researchers were attempting to produce computational models of language processes which were inspired by what was known about the structure and processes of the human brain (*see* **Cognitive Science: Overview**). In spoken word recognition models, this meant that the feature units were simple units with dense series of interconnections, which processed by sending many messages in parallel. Such structures were developed as analogous to the neural architecture of the brain with its many nerves and interconnections.

The Trace model has three layers of units, corresponding at the lowest level to features, then at the next layer to individual phonemes, then at the top layer to complete words. All have dense arrays of interconnections between them, which like nerve pathways can be excitatory or inhibitory. The connections between levels are excitatory and connections within levels are inhibitory. Connections between levels operate in both directions, so both top-down and bottom-up processing can occur. The connectivity of Trace means that evidence is boosted and plausible hypotheses about the possible words emerge strongly. So a feature such as voicing will energize the voice feature units. These will then transmit activation to all the voiced phonemes at the phoneme level, which will in turn activate all the words that begin with these phonemes. At each level the activated units inhibit competitors at the same level, so reducing possible competitors. A word is recognized when in the end a single active unit remains.

Trace is a very interactive model. It gives context a bigger role in recognition than the cohort model. As a computational model it has the virtues of specificity. Trace models can be built and simulations run and then compared with the experimental data from human listeners. These comparisons have generally shown that Trace can cope with some of the problems of variability in production of features and phonemes, can account for the context effects on spoken word recognition that have been reported in the literature, and can cope with the kind of degraded acoustic input that is so typical of real conversational speech. The main criticisms that have been leveled at Trace concern the large role that context is given, which may be an overstatement of how this operates in human recognition. The other limitation is the less than elegant way that the time course of speech recognition is modeled, with duplication of the levels and nodes over successive time periods.

Other connectionist models have also been developed. Despite the competing architectures of the models, there is general agreement on key aspects of the speech recognition process. This involves activation of multiple candidate words, followed by competition among those known lexical items that share a similar sound profile; these processes have to be able to cope with less than ideal acoustic input and deliver perceptions of words very rapidly (for further details *see* **Speech Recognition: Psychology Approaches**).

Discourse Processing

The gradual broadening of the psycholinguistic research agenda has not been limited to the inclusion of speech alongside written language. Psycholinguists have also shown a growing interest in the processes involved in the interpretation not just of single sentences, but of complete texts. One of the first psychologists to explore the complexities of this process was Bartlett (1932). In his research on the way people remembered and reproduced stories that they had heard, he highlighted key research themes in discourse processing that are still current research topics. Bartlett noted how quickly the surface form of the story is lost and an individual's own interpretation of the text is what is remembered. He introduced the concept of a 'schema,' which was used when readers recalled a narrative. This consisted of an organized set of information based on prior experiences that is used in interpretation and recall. The interpretation of a narrative that is retained consists of a mix of input from the text and from schemata. In some of Bartlett's studies, British students listened to North American folktales. When asked to recall the stories accurately, strange narrative details relating to the activities of ghosts were unconsciously altered and supplemented

by details from the participants' world knowledge, so that the recalled version of the stories became more coherent by conventional Western standards.

More recently, a growing body of psycholinguistic research has been addressing the challenges of how readers build up a coherent mental representation to create a sense of the narrative world. One of the key concerns of psycholinguistic studies of text or discourse processing is the problem of inferences. Since Bartlett's seminal studies, it has been known that readers expand on what is in the text by drawing inferences based on their knowledge of the world. But what are the time course and limits of such inferencing? Many studies have been concerned with addressing such questions. Experimental studies have shown that some inferences seem to be made automatically **as** we read a text while some are made **later** to resolve apparent problems or inconsistencies. This was demonstrated in a study by Sanford and Garrod (1981), who presented readers with pairs of sentences such as the following:

(4a) Mary was dressing the baby.
(4b) The clothes were made of wool.

(5a) Mary was putting the clothes on the baby.
(5b) The clothes were made of wool.

The participants read the second sentence just as quickly in both cases. This suggests that verbs such as 'dress' cause readers to automatically draw the inference concerning 'clothes.' In contrast Haviland and Clark (1974) found that some inferences took a small but significant amount of time during reading. In their experiment they used pairs of sentences like the following:

(6a) Harry took the picnic things from the trunk.
(6b) The beer was warm.

(7a) Harry took the beer from the trunk.
(7b) The beer was warm.

They found that sentences like (6b) took longer to read than (7b), because the readers had to make the backward inference that the beer was part of the picnic supplies.

Researchers wished to determine the limits on the kinds of inferences which are made immediately and automatically and which are made later. Clearly, there must be limits on the amount of background knowledge readers activate and one of the research goals is to understand what these limits are and the cognitive processes which support this. Models have been developed that attempt to specify the way inferences are made and the way coherent mental representations are derived from texts. (For a fuller account of inferencing *see* **Coherence: Psycholinguistic Approach**).

Although there are significant differences between the models, there are several agreed features of how discourse processing operates in terms of the way readers update their mental representations of a text, the way some information is held in the foreground of processing while others is background, and the way that certain inferences are drawn automatically to maintain a coherent account of the text. For details of the various models of discourse processing that have been proposed (*see* **Discourse Processing**).

Reading as a Developmental and Educational Process

Before an interpretation of a written text can be made, the words on the page have to be read. Although apparently effortless for the skilled adult reader, the processes of identifying letters, recognizing words, and thus distinguishing the meaning conveyed in even a simple sentence, are complex. One key to unraveling how this is accomplished has been to study readers' eye movements. These have been shown to be very systematic and to consist of three main types: short forward movements of around 6–9 letters called saccades, which last on average 20–50 ms; backward movements called regressions; and the pauses or fixations when the readers' eyes rest on a word for around 250 ms.

Rayner and colleagues have shown there are consistent patterns in these movements (see e.g., Rayner, 1998). When reading more difficult texts, fixations grow longer, saccades grow shorter and regressions become more frequent. Even within a single text, readers will spend more time fixating relatively uncommon words compared to familiar ones. Eye movements are designed to keep the middle of our visual field, where our vision is best, aimed at new areas of interest. However, we are able to distinguish quite a lot of information within a single fixation. A skilled adult reader of English will usually be able to identify 15 letters to the right of the fixation point but only three or four letters to the left.

When children begin to learn to read they fixate words for longer than skilled readers. They also have a shorter perceptual span than adults, which means that in a single fixation they are able to identify fewer letters. Gradually these patterns approach those of adults as reading proficiency increases. The typical English reader's asymmetric perceptual span starts to appear in most young readers within a year of starting to learn to read. This seems to reflect the left-to-right nature of reading English, as readers of Hebrew, which is read right to left, show the opposite pattern in their perceptual spans. Like much of psycholinguistics, the study of skilled reading has largely

been the study of skilled English reading but more recently interesting studies have been conducted on other languages, notably on nonalphabetic scripts such as Chinese and Japanese. (*see* **Reading Processes in Adults** for more details).

Visual Word Recognition

One aspect of the reading process has received a great deal of research attention in psycholinguistics: the process of visual word recognition. A whole set of phenomena have been identified in the processes of recognizing written words. These include the process of priming. Words are recognized more quickly if they have been read previously. This is known as repetition priming. Words are also recognized more quickly if a word of similar meaning has just been presented, so 'butter' is recognized more quickly if 'bread' has just been read. This is known as semantic priming. Priming can also occur between words which do not seem to have a direct semantic relationship, such as 'music' and 'kidney,' which are linked by an intermediate word 'organ,' which was not presented to the readers.

Other phenomena which researchers have identified in word recognition include the fact that words which are common in the language, such as 'road,' are recognized more quickly than similar words that are less common, such as 'rend.' This word frequency effect is a strong influence on recognition speeds, with even fairly small differences in word frequency influencing reaction times. It is the most robust effect in studies of word recognition, appearing in many different studies using a wide variety of research methods.

These and other phenomena about how words are recognized have been used to develop a variety of models of word recognition. These can be grouped into families of related accounts. Some of the proposed models are direct access models, where perceptual information goes straight to feature counters or units. Other accounts propose that perceptual information is used to trigger a search through the mental lexicon, that is, the stored representation of all the words known to the reader.

One of the best-known serial search models was proposed by Forster (1976). In this account, the perceptual input is used to build a representation of the word to be recognized which is then checked in two stages by comparisons with a series of access files, which are analogous to the cards in a library index system. Once an input string is matched to an access file it is then linked to the master files, analogous to the books on the shelf, which contain the full lexical entries for each word. The files are organized to speed up the process of word recognition, with groups of files being arranged in bins that contain similar words. Within a bin, files are organized by word frequency. The details of the model are described to account for the observed features of the recognition process. For example, there are cross-references between master files that would support semantic priming. Despite these features it is not clear that this kind of serial search model can convincingly account for the speed with which words are recognized. It has also been criticized as being based on a rather dated analogy with the cognitive system as a digital computer rather than as a neural system.

Very recently, however, Murray and Forster (2004) have published an account of a series of word recognition studies that are claimed to show strong support for the serial search model. They claim that the structure within bins, notably the **rank** ordering of words within a bin in terms of frequency, accounts for the pattern of experimental results on word frequency effects more parsimoniously than alternative direct access models.

More popular models of word recognition involve direct access from the sensory information to the lexical units. One of the most influential of the early accounts of this sort was the Logogen Model (Morton, 1969). In this model, perceptual information, either from visual or auditory analysis, feeds directly into the logogen system. This consists of a series of units, logogens, which represent known words. Logogens act as feature counters and when a logogen has accumulated sufficient evidence to reach a threshold it fires. A word then becomes available to the output buffer, is recognized, and can be articulated. The logogens receive input from the cognitive system as well as the sensory input routes and so the resting threshold of the logogen can be varied by, for example, prior experience of a word, or from the sentence or discourse context. Common words with which an individual has had a lot of prior experience will have a lower threshold and will fire with less sensory input and hence be recognized more quickly. Similarly, words that are highly predictable from context will also have their thresholds raised and so will be recognized rapidly.

The Logogen Model has been used as the basis of computational models of word recognition, notably the interaction activation model (IAM) proposed by McLelland and Rumelhart (1981). This was one of the early connectionist or PDP accounts of language processing. Researchers were trying to produce computational models of language processes which were inspired by what was known about the structure and processes of the human brain (*see* **Cognitive Science: Overview**). In word recognition models, this meant that the feature units were simple units with dense series of interconnections, which processed by sending

many messages in parallel. The IAM consisted of three layers of units, corresponding at the lowest level to the visual features of letters, then at the next layer to individual letters, then at the top layer to complete words, all with dense arrays of interconnections between them, which like nerve pathways could be excitatory or inhibitory. The model was able to account for a wide range of experimental observations on word recognition. (For more details *see* **Word Recognition, Written**.)

Models of this type have become very widely used in psycholinguistics to explore a wide variety of language processes. This trend towards testing computational models against the existing experimental literature in a way that can link to new insights about the neural processes involved in language and cognitive processes is a popular approach in current psycholinguistics.

Dialogue and Gesture

In parallel to this concern with understanding the cognitive processes and the possible neurological architecture involved in language processing has been a growing interest in language processing in context. This means not only the growth in studies of how extended texts are processed but also a developing field of psycholinguistic studies of interactive language use. These studies have focused on language in its natural setting, interactive dialogue.

Dialogue represents the most ubiquitous form of language use. As young children, we learn to use language through dialogues with our parents and caregivers. Even educated adults spend a great deal of their time in conversations with family, friends, colleagues. Spoken dialogue is still used to obtain many forms of goods and services. In the many nonliterate cultures in the world dialogue is the main or only form of linguistic interaction.

Yet till recently dialogue received rather little research attention in psycholinguistics. One of the challenges for psycholinguists who wished to study dialogue was to derive methods of exploring the phenomenon which would produce testable and generalizable research questions and findings. One experimental method which has been used to allow the study of comparable dialogues from many pairs of speakers is the referential communication paradigm, developed by Krauss and Weinheimer (1964). In this, pairs of speakers are presented with an array of cards depicting abstract shapes. The speakers have to interact to determine which card a speaker is referring to at a given point in the dialogue. These early studies revealed key aspects of dialogue, including the way that over the course of a dialogue, the lengths of descriptions of even complex and abstract stimuli become much shorter and more concise. The interaction between the speakers was found to be crucial in this process. If this interaction was disrupted the speakers were not able to reduce their descriptions to the same extent.

Later studies on referential dialogues were conducted by Clark and colleagues. In one influential paper, Clark and Wilkes-Gibbs (1986) developed a collaborative model of dialogue. From studying many pairs of speakers engaged in dialogues, they highlighted the way speakers work together through their contributions to dialogue to arrive at a shared and mutual way of referring to things they wish to discuss. This means that the speaker and the listener both take responsibility for assuring that what has been said is mutually understood or 'grounded' before the dialogue proceeds.

In this view of dialogue, speakers follow the principle of collaborative effort and try to minimize their overall effort in arriving at an agreed description. This is done iteratively over a number of turns of speaking, often with each speaker contributing part of the description. This process makes use of the opportunities and limitations of spoken dialogue in a way that highlights its differences from written language. In text, the writer can take as much time as is needed to produce a description that she thinks the reader will understand. In dialogue, however, the speaker is under time pressure, as conversation rarely allows long gaps in which to plan an utterance. The speaker therefore has to produce an immediate description and may not be able to retrieve the most appropriate description or judge what way of describing a referent will be interpretable by the listener. The advantage of dialogue, however, is that the speaker and the listener can work together to refine or clarify the speaker's initial description till they both share a common understanding.

The highly collaborative nature of this process is reinforced in two key studies by Clark and colleagues. Clark and Schaefer (1987) showed how contributing to dialogue is characterized by two phases. Each time a speaker wishes to make a contribution, they produce a stretch of speech that is the content of what they wish to contribute. This is called the presentation phase. They then require an acceptance phase, in which their listener gives evidence of understanding the previous contribution. So the dialogue involves two activities: content specification and grounding, that is attempting to ensure that both speakers understand the content sufficiently for their current conversational purposes.

The importance of the ability to actively contribute to the dialogue interaction was demonstrated in a

study Schober and Clark (1989). Using the referential paradigm they had pairs of speakers complete the task. An additional participant was included in each interaction who overheard everything that was said but did not take part in the dialogue. This overhearer had a much harder time trying to identify the intended referents of the descriptions than the conversational participant, despite having the same pictures and having heard everything that was said. The suggested explanation is that the descriptions were not grounded for the overhearers. They had no chance to collaborate and ensure that they understood each description as it emerged during the dialogue.

So there is clear evidence that dialogue is an interactive and collaborative process that involves speakers and listeners attempting to cooperate and achieve mutual understanding. The detailed mechanisms that underpin these general processes of adaptation to the interlocutor are now the focus of a good deal of psycholinguistic study. There is some controversy over the extent to which speakers are able to adjust and adapt their output to their listener's needs. In terms of the forms of referring expressions chosen by speakers there is evidence of adjustment to the listener's general level of knowledge of the domain. When it comes to adjusting the intelligibility of their articulation, speakers seem to be largely egocentric. They reduce the clarity of their word production in terms of what is familiar to them as speakers rather than modeling their listeners' needs. The time course of adaptation is also debated, with some studies showing speakers initially produce utterances from their own perspective but later monitor their listeners and adapt. Other studies show listener adaptations from the start of speaking (for more details *see* **Dialogue and Interaction**).

As language processing is studied in more natural contexts of use, it becomes clear that speakers and listeners do not just communicate using the verbal channel. Visual signals from the mouth, face, hands, and eyes are all important features of communication. Researchers have begun to explore the way the visual channel is used by speakers and listeners and the relationship between verbal and visual signals.

More generally, in a dialogue, what we say, how much we say, and even the clarity of the way the words will be spoken have all been shown to change when speakers do or do not have access to visual signals. So speakers who can see one another need to say less to complete a task, use more gestures, can exchange turns of speaking more smoothly, and articulate their words less than when they cannot see one another.

The important role of visual signals in the perception of speech and how these are integrated with acoustic information is a fascinating research area. This was highlighted in a seminal study by McGurk and MacDonald (1976). They demonstrated that when a listener hears a phoneme such as 'ba' while watching a face mouthing 'ga,' the sound which is heard is a fusion 'da.' This is a powerful illusion that occurs even with knowledgeable listeners/viewers and has been demonstrated with young babies (*see* **Audio-visual Speech Processing**).

The role of visual signals in the production and comprehension of more extended stretches of discourse has also been the subject of considerable study. From studies of conversation and storytelling, the important role of gestures and their relationship to the accompanying speech has been established. For some kinds of gestures there is a close temporal relationship with the accompanying speech. Listeners also seem to fuse information presented visually and verbally. If they are told a story by a speaker who uses speech and gesture and are then asked to retell the story later, information originally presented by gesture, such as the speed of an action or the manner of leaving, is often relayed in speech and vice versa (for more information **Gesture and Communication**).

Future Directions in Psycholinguistics

Several trends seem apparent in psycholinguistics. Some of these seem to be the result of improvements and developments in the research methods available to psycholinguistics. One is an increased interest in detailed investigations of language in richer, more naturalistic, contexts. New research techniques such as improved methods of tracking a speaker or listener's eye movements mean, for example, that studies of dialogue, or the relationship of a speaker's production to the surrounding context, can be studied with the precision that used to be only possible in studies of isolated word recognition or sentence processing.

Improvements in the ease and accessibility of various brain-imaging techniques mean that these are being used not only as contribution to our understanding of the neural substrate of different language processes. Techniques such as ERP (event-related brain potentials) can now be used more and more as means to explore the precise time course of language processing. Newer techniques such as MEG (magneto-encephalography) are beginning to offer psycholinguists not just good information about the temporal patterns of language processing but also detailed information about the location of associated

brain activity. (For more information *see* **Psycholinguistic Research Methods**.) The growing interest in the neural substrates which support language processing has received a major boost from the development of these new forms of brain imaging.

The interest in how to build neurologically plausible models was of course one of the drivers behind the expansion over the last 20 years in connectionist models of language. These have made a major contribution to our understanding of how a wide variety of language processes, such as spoken or written word recognition, might operate and be learned. The challenge in the future will be to see whether connectionist models can be implemented for more extensive language processing, such as text comprehension or contribution to dialogues. The way such models can or cannot be scaled up to simulate more complex language processing will be one of the key challenges for the next few years.

In the future psycholinguistics will also need to address its undoubted Anglocentric bias. The vast majority of studies of language processing are in fact studies of English language processing. In a number of areas a few studies are emerging which consider other languages but this effort needs to be greatly increased. Over the last 50 years psycholinguistics has expanded dramatically and made considerable progress in understanding a wide variety of language processes. With new research techniques and a more balanced research portfolio in terms of the languages studied and the research efforts applied to production as well as comprehension, spoken as well as written language, future progress seems assured.

See also: Audio-visual Speech Processing; Cognitive Science: Overview; Coherence: Psycholinguistic Approach; Dialogue and Interaction; Discourse Processing; Gesture and Communication; Pauses and Hesitations: Psycholinguistic Approach; Psycholinguistic Research Methods; Psycholinguistics: History; Reading Processes in Adults; Sentence Processing; Speech Errors: Psycholinguistic Approach; Speech Production; Speech Recognition: Psychology Approaches; Word Recognition, Written.

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Psychosis and Language

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Several psychiatric disorders are included under the broad definition of psychosis. The most common disorders are schizophrenia (which is prototypical of the psychoses), schizophreniform disorder, schizoaffective disorder, and delusional disorder (APA, 1994). These other psychotic disorders share some distinctive features with schizophrenia (e.g., a schizoaffective disorder is a disturbance in which a mood episode and characteristic symptoms of schizophrenia occur together). Furthermore, an array of psychiatric and medical conditions also presents with psychotic attributes and is often characterized by presenting typical symptoms of schizophrenia.

The contemporary consensual definitions of schizophrenia and most common psychotic disorders of the *Diagnostic and statistical manual* have resulted from more than 100 years of conceptual work. The current criteria for schizophrenia derive from the early works of Emil Kraepelin (1899), Eugen Bleuler (1911), and Kurt Schneider (1957).

Background History of the Contemporary Diagnostic Criteria for Schizophrenia, Autism, and Asperger's Syndrome

Emil Kraepelin meticulously described the symptoms of schizophrenia, which he named *dementia praecox*, referring to the disruption of emotional and cognitive features as well as to the deteriorating course of the disorder. He also tentatively proposed a pathophysiological localization, suggesting that abnormalities in the frontal lobe would be the substrate of problems with reasoning and volition, whereas abnormalities in the temporal lobe would be the substrate of delusions and hallucinations (Kraepelin, 1899).

In his conception of schizophrenia, Eugen Bleuler emphasized the importance of a formal thought disorder (disorder of associations or 'splitting'). To overcome the limitations of Bleuler's approach in the observation of the disorder, the concept of thought disorder was transformed into problems of language and communication behavior in the work of Andreasen (1979) and into disorganized speech in the criteria for schizophrenia in the *Diagnostic and statistical manual of mental disorders* (4th edition) (DSM-IV) (APA, 1994).

In the mid-20th century, Kurt Schneider (1957) described the primary disorders of the experience of thought representing the current core features of the positive symptoms. This characterization is known as the Schneiderian First-Rank symptoms, which include hearing voices speaking one's thoughts aloud, hearing voices arguing about oneself, hearing voices commenting on one's actions as they are occurring, having bodily sensations imposed from outside, attributing one's feelings to external sources, experiencing one's drives as originating from powerful outside forces, moving and acting as a result of external controls, having one's thoughts withdrawn from the mind, having one's thoughts inserted into one's mind, broadcasting of thoughts, and attributing special personal significance to one's perceptions. Schneider's symptoms were thought to be pathognomonic signs, any of which was strongly indicative of a schizophrenic disorder.

Psychosis is not a unitary concept. The 'psychotic' designation is often applied to symptom presentation that may vary considerably, both biologically and behaviorally. The wide variety of psychiatric and medical conditions that present with 'psychotic' features attests to the heterogeneity of psychotic disorders. It is now recognized that schizophrenia is at least clinically a heterogeneous disorder (Ragland, 2003), and this characteristic necessarily has an impact on the presentation of language and speech impairments that may arise from that condition.

The heterogeneity of autism is also so well acknowledged (Eigsti and Shapiro, 2003) that the term autistic spectrum disorder (Rapin and Dunn, 2003) is frequently used to describe the different extents of severe functional deficits in sociability, communicative language, imaginative play, and range of interests that principally characterize this condition as per the DSM-IV (APA, 1994).

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Asperger's syndrome (AS) is a less severe syndrome of the autistic spectrum disorder, presenting with repetitive and stereotyped behaviors and severely altering social interactions (APA, 1994). As opposed to autism, there is no developmental delay in language in early childhood (DSM-IV). Nonetheless, communication abnormalities do exist in this condition (Frith, 2004; Rapin and Dunn, 2003).

Language Impairment in Schizophrenia, Autism, and Asperger's Syndrome (Neurodevelopmental Psychotic Disorders)

DeLisi (2001) reported in a review of English literature on language and speech disorders in adults with schizophrenia that several aspects of language comprehension and production were impaired in patients with chronic schizophrenia compared to patients with bipolar psychosis, their nonpsychotic siblings, or controls. Patients with schizophrenia had problems with speech comprehension, semantics (misuse and misrepresentations of words, and neologisms), syntactic complexity (only with speech), and language lateralization, and they demonstrated a paucity of speech, reduced verbal fluency, reference failures (i.e., when the speaker incorrectly infers that what he or she is referring to has been clearly stated), personal disorganization, and social alienation. They also produced more intrusions and showed a hyperpriming effect in lexical and semantic priming task paradigms (DeLisi, 2001). A recent meta-analysis involving 13 studies confirmed the impairment of verbal fluency and further showed that semantic fluency was significantly more disrupted than lexical fluency in patients with schizophrenia (Bokat and Goldberg, 2003).

Early studies examining language in verbal children on the autistic spectrum described speech abnormalities such as unusual word choices, pronoun reversal, echolalia, incoherent discourse, unresponsiveness to questions, aberrant prosody, and lack of drive to communicate. Persistent lack of speech in some individuals was attributed to the severity of their autism and mental retardation rather than the possible inability to decode auditory language. More recent clinical studies of unselected children with autism demonstrated that language deficits of preschoolers can be divided into two types: those that involve reception and production of phonology and syntax, and those that involve semantics and pragmatics (Rapin and Dunn, 2003).

The vocabulary of children later diagnosed with Asperger's syndrome is generally described as precociously adult, containing words not normally used by children (Frith, 2004). Adolescents and adults with AS have been found to show more pragmatic problematic responses in interactional conversation than the control group (Adams *et al.*, 2002; Frith, 2004), and adults with AS have been found to show a preference for written over spoken communication (Frith, 2004).

The Neuropsychological Model

Different explanatory approaches were proposed over the years with regard to the disorders of speech and language in schizophrenia and autistic spectrum disorders. In the first approach or the neuropsychological model, the disturbances in speech and language are caused by a cognitive impairment in schizophrenia other than language, such as deficits of attention and working memory (Thomas *et al.*, 1996; Tracy, 1998), of initiation, planning, and self-monitoring of action (Frith and Done, 1988; Kircher and Leube, 2003), of organization of information (Ragland *et al.*, 2003), and of the 'theory of mind' (TOM) (Frith, 1994; Sarfati, 2000). All of these cognitive impairments are consistent with a frontotemporal dysfunction central to the neurodevelopmental disorder hypothesis suggested by Weinberger (1987) with regard to the origin of schizophrenia.

The impairment of speech comprehension, reference failures, and decreased syntactic complexity of speech were found particularly related to working memory and attention problems in schizophrenia (Thomas *et al.*, 1996; for reviews, see DeLisi, 2001; and Tracy, 1998). Frith (1994), on the other hand, suggested that many signs and symptoms of schizophrenia can be explained by an alteration of processes underlying the TOM. According to this hypothesis, patients with schizophrenia would lack the ability to represent beliefs and intentions, i.e., other people's mental states. This deficit would translate into difficulties in social relations and communications, and into stereotyped behaviors. Paranoid delusions and auditory hallucinations would thus be the consequences of this problem of attribution of intentions and inferences (Frith, 1994). Several recent studies demonstrated the inability to represent intentions and beliefs that were inserted in indirect speech or scenarios, as well as the inability to understand humor (especially mental jokes), in individuals with schizophrenia. Patients with persecution and reference delusions, hallucinations, and negative symptoms as well as having paucity and incoherence of speech were significantly more impaired on these TOM paradigms than patients with passive ideas, those in remission, and controls (for a review, see Sarfati, 2000; Pickup and Frith, 2001). However, the alterations of the theory of mind have been

found to be less severe in schizophrenia than in autism (Pickup and Frith, 2001).

Individuals with autism and Asperger's syndrome were found to be particularly impaired on TOM tasks, and these deficits were related to their severe difficulties with pragmatic speech and communication (Frith, 2004; Martin and McDonald, 2003). However, these findings remain controversial (Martin and McDonald, 2003).

The Connectionist Model

In the second explanatory approach, the authors following the 'Bleulerian' tradition of thought disorder studied alterations in the semantic networks using a connectionist model with the event-related potentials (ERP) N400 (for reviews, see Kumar and Debruille, 2004; McCarley *et al.*, 1999). Connectionism usually represents words as networks of interconnected nodes. Whereas previous connectionist models assumed one-to-one representation between a word and a node, current distributed models of representation involve various aspects of words such as the orthographic, semantic, and phonological components, each represented by corresponding sets of nodes. The principal feature of nodes is that they are organized into local networks and activated in parallel such that a word activates (or primes) a local network of related associates. Cued-recall word paradigm studies showed that subjects with schizophrenia present with an overactivation of strongly connected semantic networks and an underactivation of weakly connected semantic networks, whereas the size of semantic networks is normal. Thus, this connectivity abnormality is likely to be a preferential processing of the strongest (dominant) association, with the neglect of preceding contextual information (see McCarley *et al.*, 1999, for a review). These findings are supported by the results of research using lexical and semantic priming, which have built up considerable evidence suggesting that schizophrenia thought intrusions and derailments in discourse arise from the hyperactive functioning of semantic networks or 'hyperpriming' (for reviews, see Kumar and Debruille, 2004; McCarley *et al.*, 1999; Tracy, 1998), especially during the acute psychotic state (Gouzoulis-Mayfrank *et al.*, 2003).

The data gathered at the level of functional neural systems using the ERP N400 confirmed the previous findings. The N400 is a negative waveform that develops between 300 and 500 ms after word onset. All meaningful words elicit an N400, and the amplitude of this waveform is usually much greater in response to words that are unexpected in a given context. It is thus hypothesized to reflect processes involved in contextual integration, which is a central feature of language comprehension (Kumar and Debruille, 2004). Patients with schizophrenia and schizotypical personality disorder demonstrated significantly reduced N400 amplitude, when compared to controls, to the target words that were related or associatively linked with the first words in word-pair lexical decision tasks. These data corroborated the overactivation of strongly connected semantic networks (McCarley *et al.*, 1999). In addition, many studies have documented N400 evidence supporting contextual abnormalities in schizophrenia (Kumar and Debruille, 2004; McCarley *et al.*, 1999), and preliminary evidence suggests the same abnormalities in autism (Rapin and Dunn, 2003).

The Evolutionary Model

In the third approach, the evolutionary model, a disturbance in the uniquely human aspects of language, following the failure of hemispheric dominance for language, is central to the genetic etiology and clinical presentation of schizophrenia (Berlim *et al.*, 2003; Crow, 1997; DeLisi, 2001). Crow especially hypothesized that an anomaly in the sex chromosomes (protocadherin XY in the Xq21.3/Yp region of homology) is the origin of the lack of brain asymmetry in schizophrenia (Crow, 1997; Berlim *et al.*, 2003). In support of this theory, the First-Rank Symptoms (FRS) symptoms were positively correlated with speech disorder and loss of normal cerebral asymmetry as measured by reduced right-hand preference in patients with schizophrenia (Ceccherini-Nelli and Crow, 2003; Verdoux *et al.*, 2004). However, the failure to find genetic linkage for psychosis on chromosome X tends to invalidate the theory (see Berlim *et al.*, 2003, for a review).

Conclusion

A number of explanatory models may be mandatory to understand the mechanisms of speech and language disorder in schizophrenia since it has a heterogeneous clinical presentation (Ragland, 2003) for which several subtypes of language impairment may exist.

In autism, social and cognitive disorders alone cannot provide an appropriate explanation for the range of language deficits, since pure linguistic problems (semantics, comprehension, and production of phonology and syntax) seem to exist with a pathophysiological substrate (Rapin and Dunn, 2003). Only in the case of Asperger's syndrome does the neuropsychological model of an alteration of the theory of mind seem somehow to explain the pragmatic language impairment to a more satisfying degree. However, data on this particular topic remain controversial and thus require replication (Martin and McDonald, 2003).

See also: Delirium and Language; Dementia and Language; Schizophrenia and Language.

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Psychotherapy and Counselling

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Psychotherapy, the talking cure, aims at restoring the client's mental health and solving problems of identity, personality, relationships, and mental well-being. Its cognate practice, counseling, is seen by many to essentially aim at the same: "both activities aim to alleviate human suffering, solve problems, and help people live a more satisfying life" (Dryden and Feltham, 1996: 2; cf. Feltham, 1995). The practices of therapy and counseling, and the related activities and processes, happen via discourse. They are based on complex institutional arrangements and processes and are informed by concepts and theories of the human mind, relationships, and social problems, as well as philosophies of the human condition and various rules and ideals regarding the appropriate practices through which solutions to problems can be found. Whichever ways these arrangements, concepts, and ideals guide the actual practices of the talking cure, it necessarily, and usually solely, takes place via particularities of talk and interaction between clients and institutional helpers.

Due to the deep connectedness of psychotherapy to talk and interaction, measurement of the outcome of therapies is met with great methodological problems. The definitions of mental problems and recovery differ in different therapies, and problems are caused by the effect of the competence and other personal qualities of the therapist and from the difficulty in eliminating the placebo effect. It has been claimed that the effects of therapy can be offered by any sympathetic recipient. Even researchers that do not take this extreme view have pointed out that the interaction between the participants of therapy and the match between them are essential in terms of the outcome of psychotherapy. Therapeutic help, then, necessarily relies on resources of mundane interaction. The talking cure may occur, not only within therapeutic institutions, but also between laypersons, in friendships, in families, and in institutional encounters at the fringes of the therapeutic institutions. At issue is what constitutes therapeutic help as a particular kind of discourse and how therapeutic interventions are carried out as achievements of language use and interaction (*see also* **Social Construction and Language**; and **Institutional Talk**).

Since Freud started his work of psychoanalysis, case studies have been a central approach for understanding the process of therapeutic help. Seminal studies of language and interaction in therapy are also based on case studies – in-depth analyses of single sessions – but unlike Freud, whose cases were based on the analyst's postencounter accounts, studies of discourse make use of recordings of therapeutic encounters. Labov's and Fanshel's (1977; *see* **Labov, William (b. 1927)**) 'comprehensive discourse analysis' presented an overall synthesis of a recorded therapy session between 'Rhoda,' an anorectic young woman, and her therapist. Combining the analysis of speech acts and paralinguistic features within topical episodes, the authors 'expanded the text' of what is actually said in the tapes, using their own understanding of the entire session and of the speaker's intentions, as well as the therapist's playback comments. As a result, they provided a detailed reading of what actions are performed in the therapy session and how the therapist works with the client's resistance and mitigation of her 'true' feelings. This book is a seminal work as an application of linguistic discourse analysis to therapeutic discourse, and it presents a comprehensive arsenal of linguistic categories for observing discourse.

Empirical research on interaction and language in therapy and counseling has since the 1970s profited from another type of research setting, namely, that of accumulating empirical observations of linguistic resources and interactional patterns, systematically used by practitioners and their clients when carrying out therapeutic or counseling tasks. Such an approach to the empirical, observation-based study of interaction, used in conversation analytic research (Drew and Heritage, 1992; *see* **Conversation Analysis**; **Conversational Analytic Approaches to Culture**; **Medical Discourse: Doctor–Patient Communication**; and **Ethnomethodology**), has identified various systematic patterns, linguistic or interactional resources and devices in a number of encounters, thus rendering them comparable within and across settings. From such a point of view, the approach in Labov's and Fanshel's study is problematic (Levinson, 1994; Potter, 1998). The main argument in conversation analysis, adopted also in some recent versions of discourse analysis (Edwards and Potter, 1992; *see* **Critical Discourse Analysis**), is that interaction should be observed as it unfolds, in real time, and that the analyst of discourse or talk should examine the resources and devices that the participants use and make public to understand each other in a turn-by-turn fashion. Thus, instead of expanding the transcribed talk by attempts to read into the analysis the intentions or emotional states of the speakers, one should examine the way that participants design their turns of talk in the interaction and treat these moves as selections that reveal speakers' social

orientations both to the action and to the setting at hand (*see* **Meaning, Procedural and Conceptual**).

Since Labov's and Fanshel's work, there has been an expansion in the study of language and interaction in institutional settings. Psychotherapy and counseling as forms of the 'talking cure' have become more diverse, and an increasing interest has emerged in the empirical study of interaction also within psychotherapy process research (Siegfried, 1995). Conversation and discourse analytical research in social sciences and linguistics has increased knowledge of how patterns of interaction and linguistic resources construct institutional encounters between providers of therapeutic help and their clients and how therapeutic or counseling aims and related ideologies are 'talked alive' in interaction (Peräkylä, 1995; Morris and Chenail, 1995; Silverman, 1997; Arminen, 1998). The results of this research can be grouped under four central themes, the first of which focuses on the way in which help-seekers talk about their problems, and the other three deal with interactional devices used by the professionals.

Descriptions and Stories of Troubles

Psychotherapies, as well as many forms of counseling, are based on the clients' narratives of themselves and their lives. The starting point of the encounter – and a series of encounters – is how the client understands her or his life and problems. The problems that clients bring to the helpers are presented and shaped into shared objects of action, first by the clients' narratives. Harvey Sacks, the founder of conversation analysis, noted in one his lectures how we routinely identify distinct, institutional forms of discourse by comparing them to mundane practices. He quoted Freida Fromm-Reichmann's recommendation to the good psychiatrist: to become one, one must learn to listen to the patient carefully and to not be reminded of one's own experience in the process (Sacks, 1995: Vol. I, 764–772; *see* **Sacks, Harvey (1935–1975)**). Sacks noted how listening to another speaker – the social demonstration of listening – in everyday conversation is, actually, characterized by the very opposite of this rule. We show that we are listening, and hearing the appropriate moral relevancies of the story, by the very kind of second (occasioned, touched-off) stories we choose to tell.

A form of therapy that is completely based on storytelling, narrative, and this kind of 'demonstrated' understanding is the mutual help in Alcoholics Anonymous (AA). The sharing of monological stories and responding to others' stories through 'second stories' (i.e., narratives that are presented as occasioned by prior stories and demonstrate similarity to them) constitute the essential interactional resource by which the recovery from alcoholism (or other addictions) is accomplished (Arminen, 1998). Sharing of personal stories, thus, constitutes the therapeutic device and practice. In the openings of the monological contributions in an AA meeting, there is a strong tendency to refer to other speakers' contributions and thereby to show that one's topic is occasioned by a previous speaker's topic. Claiming similarity of experience, and demonstrating this similarity through providing an occasioned story, are therapeutic practices by which AA members share their experiences, maintain sobriety, and construct their identities as recovering alcoholics.

Arminen's study also provides for the way in which the distinct, formal turn-taking order (1998: 49–79) is oriented to and maintained by the participants and how that too becomes the vehicle for therapeutic sharing. In the formal turn-taking order of AA, each speaker is entitled to one monological turn that is supposed to be about one's own experience, and other speaker's turns are not countered or challenged. This format, with some variation, is known also in group therapy settings where the participants orient to the expectation to share and identify with one another's experiences, although in settings where a professional is involved, he or she typically has different speaking rights than the clients.

AA monologues are biographical descriptions about alcoholism, finding mutual help in AA, and maintaining sobriety. They are narratives that are presented from the speaker's perspective and about the speaker's personal experience. References to other speakers are used so as to indicate sharedness of experience, and disagreements between speakers are subtly embedded into these references without overt countering. Edwards's (1995) analysis on talk in couples counseling provides a very different angle to the way in which client's talk is constructed for particular therapeutic purposes. He showed how clients talk about relationship troubles (couples speaking about each other in each other's presence), presenting overtly disagreeing versions of their troubles to the counselor, whose task it is to receive these versions impartially in order to find solutions to the problems. Edwards first identified a number of linguistic resources by which the speaker may describe another's person's action as 'scripted,' that is, as stemming from a routine that reveals that person's dispositions. He also showed how couples design these descriptions, or blamings, so that they carefully attend to their partner's counterdescriptions. Thus, as Edwards pointed out, they are very much aware of each other's countering versions and design their own versions so as to undermine them and defend their own version.

There is a 'rhetorical symmetry' between countering versions of relationship troubles: Jack is portrayed as 'jealous,' whereas Jill is portrayed as 'flirty.'

Asymmetries in Therapeutic Discourse

One of the major sources for asymmetry – i.e., systematically different speaking rights of different participants – in institutional interaction is that, typically, it is the professional that determines the agenda for the encounter, though it may remain opaque for the client. Therefore, it is often a shared orientation of both participants that the professional will guide the client along the agenda, ask relevant questions, and draw proper conclusions about the material the client provides, with respect to the therapeutic approach at hand. Thus, in classical psychoanalysis, the patient's talk is listened to as containing layered meanings: the associative links, slips of tongue, contradictory elements, dreams, and other such features, conveyed in talk, are treated as revealing to the analyst evidence of the patient's unconscious conflicts, which constitute relevant foci for therapeutic work. On the other hand, a solution-focused brief therapist would listen to the clients' talk, searching mainly for cues to practical solutions and avoiding focusing on the problems or their reasons.

Asymmetry in tasks and speaking rights is tightly intertwined with differing access to knowledge. Only the clients know what they experience. On the other hand, the therapist is the expert on how one might become cured or healed – how one may come to feel or function better. It is the client's mind and experience that is the focus of both participants' attention. Labov and Fanshel (1977) introduced a distinction based on the relationship between a description of a state of affairs and the kind of knowledge participants are taken to have of it. Thus, an A event is biographical or experiential information of the speaker's that he or she has privileged access to, while others do not. A B event is a description of a matter of another speaker's experience or life, and the speaker thereby has limited access to it. This is a crucial distinction in therapeutic and counseling discourse and a widely quoted concept even outside Labov's and Fanshel's own approach. It has proved to be a central analytic dimension also for conversation analysts, under the title of 'ownership of experience' (Peräkylä and Silverman, 1991). Although the clients are in the authoritative position toward their own experience, the therapists or counselors construct interpretations in which they typically attempt to reshape the meaning of these experiences and renegotiate the nature of the clients' problems. Thus, the talking cure is necessarily characterized by clients' talk on A events, whereas therapists and counselors must often address B events in their talk.

As Jörg Bergmann (1992; *see also* **Medical Discourse: Psychiatric Interviews**) has pointed out, in the practice of treating mental problems, morality and medicine become intertwined. Treating or easing mental pain involves medical aspects of diagnosis, symptoms, and cure, as well as social and existential issues of what constitutes a good life, a sustainable and respectable social identity, and good life choices. Bergmann analyzes psychiatric discretion and various 'discreetly exploring utterances': fishing for information rather than asking directly, using 'litotes' expressions ('running around not so completely dressed' vs. 'running around naked'), mitigators, and euphemisms. These are viewed as practices of discreet exploration.

However, demonstrations of discretion also mark the delicately approached issue as a difficult and morally loaded one. Thus, devices of discreet talk elicitation that offer the floor for the client to talk about her or his problems and express her or his concerns are the very same devices that hint that issues that need to be approached so delicately are necessarily socially difficult ones. Responding to such elicitations leads the client to talk under the auspices of such 'veiled morality,' and as Bergmann showed, not all psychiatric patients are willing to do this. "Discreetly exploring utterances are extremely vulnerable to being heard by the recipient in moral terms and may therefore trigger uncontrollable, interactionally disastrous social situations" (Bergmann, 1992: 157).

One of the most studied conversational phenomena in therapeutic discourse is the professional's formulation of the client's talk. Heritage and Watson (1979) studied how speakers can display an understanding of what has been said in the prior talk or what has been accomplished through the talk. In a formulation, the speaker explicates, paraphrases, or summarizes what the prior talk has meant or amounted to, presenting a gist or an upshot of it. As it suggests the meaning of another person's talk, it calls for a reaction from that person, who has the privilege to confirm or reject the formulation. Furthermore, formulations always transform what has been said, selecting some aspects and deleting others. This makes formulations interesting in terms of institutional talk, where the work of summarizing and transforming the prior talk is carried out for particular, institutional reasons. The professional performs actions through which institutional agendas – institutional tasks and institutional reasoning – are implemented.

Hak and DeBoer (1996) suggested that formulations can 'democratize' institutional interaction, since it is through them that the professional can show the

client some of the reasoning that guides the procession along the agenda and thereby avoid a hidden agenda. Formulations have also been examined as a device for professional power. They can be used to shape the therapy client's initial trouble descriptions toward a 'treatable' or 'therapeutically relevant' problem. In a case study of a single first session, Kathy Davis (1986) made a much cited statement about the professional power used by the therapist. She pointed out that the therapeutic reformulation, arrived at during the first encounter at the beginning of therapy, was the result of a wealth of work on the therapist's part. Davis showed how the therapist formulated the patient's talk as evidence of a particular kind of behavior, made this behavior the focus of the talk, and repeatedly offered it to the client. Davis's feminist reading of the (male) therapist's individualization of the (female) client's problems – instead of contextualizing her problems socially – highlights the salience of this conversational device to the implementation of institutional agendas (*see* **Gender and Language**). Therapists' formulations are rich in 'institutional flavor.'

Formulations are also used to deliver the professional's evaluations, conclusions, or 'diagnostic' understandings of the client's situation. Couples counselors use what Derek Edwards (1995) called script formulations. They formulate a couples' situation in ways that treat the participants as having expressed their true concerns, avoiding placing the blame on either of the clients alone and showing that their trouble is, itself, scripted: a pattern that affects both parties and one that can be dismantled and for which a solution can be sought. Alternatively, in classical psychoanalysis, formulation is one of the conversational formats by which psychoanalytic interpretations are prepared for and delivered (Vehviläinen, 2003; *see* **Psychoanalysis and Language**). The analyst may use formulations to imply that what he or she claims about the patient is essentially based on what the patient her- or himself has said, while adding to it material that originates from another context. Thus, the analyst is able to, for instance, combine materials of a dream and its 'associations' (i.e., tellings occasioned by it) and imply that together these materials reveal an underlying (unconscious) pattern of the patient's mind. Formulations, then, serve as a device for reading unconscious content into the patient's talk and presenting this 'reading' to the patient.

Most professionals in institutional professional–client encounters, in fact, exercise the 'formulating power' – the power to draw conclusions about the material elicited from the client and to make these conclusions 'stand for the record' in the interaction. What is unique to therapeutic settings is the professional's power to read into the patient's talk a 'subtext' – often with reference to the unconscious layers of the client's mind (Peräkylä, 2004).

'Determining Who the Client Is' as the Counselor's Institutional Task

Psychotherapy may be viewed as a form of 'facilitated introspection,' resulting in a new reading of the client's situation and experience. Counseling – sharing essentially the same aims of helping and easing suffering – usually aims at dealing with more practical and clear-cut problems, transitions, crises, or choices, such as career, unemployment, or illness issues. Furthermore, depending on the institution that provides the counseling, the professional will typically orient to other aims than mere facilitation of introspection or self-reflection, for instance, influencing the matching of student counselees with appropriate subjects of study in college counseling, delivery of information or advice on safe sex, finding realistic solutions to unemployment, or promoting university students' self-directedness.

In many counseling settings, such as college counseling, the counselor's tasks involve categorizing work with respect to who the client is. The process of determining the counselee's institutional identity ('an Asian female math major'), then, has consequences for how the counseling process proceeds. Various studies have been conducted on encounters in college and university counseling in the United States, examining how identities are maintained and created in the counseling encounter – not only those of the counselor and the counselee, but also other social identities, such as gender and ethnic identities or academic identities such as 'math major.' In this setting, constructions of 'who the student (client) is' may have particular consequentiality in terms of the outcome of the counseling.

Erickson's and Schultz's (1982; *see also* **Interactional Sociolinguistics; Critical Applied Linguistics; Cultural and Social Dimension of Spoken Discourse;** and **Communicative Competence**) seminal microethnography of American college counseling suggested that college counselors have a gatekeeping role: along with advice, they can also "grant or withhold permission for the student to enter or continue a particular course of study" (Erickson and Schultz, 1982: 20). Erickson and Shultz pointed out that the counselor's work is essentially about defining, through the counseling interview, who the student is. The study used videotapes of encounters along with participants' commentaries on the tapes. The authors studied various phenomena such as verbal and nonverbal contextualizing cues or the rhythm of speech, identifying

several interactional features that are likely to affect the way that individuals experience one another and their encounter, and the ways in which these experiences are related to the social (especially ethnic or speech community) identities of the participants (*see also* **Doctors and Patients in Multilingual Settings**). One of their main arguments was that communication styles, and situationally defined comembership in a social category (speech community or other), have consequences for the friendliness of the encounter and the amount of personal attention and help that the student receives (see also He, 1995; *see* **Speech Community**; and **Identity and Language**). These studies provided evidence that college counseling, indeed, functions as a gatekeeping activity, in addition to facilitating and becoming an advocate for the student's own aspirations. They also showed that the local management of social identities – ethnicity and various locally invoked comemberships – influences the counselor's gatekeeping and the outcome of counseling.

The Ownership of Experience, Professional's View, and Client-Centeredness

Another important set of counseling studies deals with HIV or AIDS counseling and guidance in Great Britain and the United States (Peräkylä, 1995; Silverman, 1997; Kinnell and Maynard, 1996). In HIV counseling, the aim is to deliver information about HIV and AIDS, to advise people about safe sex, and, thus, to prevent transmission of HIV. Furthermore, the purpose of counseling is also to help people cope with their HIV- or AIDS-related fears and problems. Due to this double function, the issue of expert knowledge has a central role, but there is also a concern over how to create a space for the client's perspective and how to design the interaction so as best to serve the client in whatever situation he or she is in. The overarching themes in these studies are talk elicitation and dilemmas of advice giving.

The talking cures rest on the clients' descriptions of how they view their experience and problems. The core task of therapists and counselors, therefore, is to elicit such descriptions from the client. The practical concern is to engage clients in talk about their own lives, from their own perspective, and often about delicate issues such as sexual behavior or fears connected with HIV. Discreet exploration, studied by Bergmann (1992) in the context of psychiatric interviews, is prominent in many counseling settings and reported by many researchers. Devices of professional caution are typically used so as to downgrade the epistemological status of descriptions of issues that are 'owned' by the recipient. This means that professionals speak cautiously and tentatively on matters that concern the client's experience and display in their talk that their knowledge is not authoritative.

Peräkylä and Silverman (1991; Peräkylä, 1995) have examined this issue in a setting in which counseling involves not only clients but also their partners or family members. These counselors have adopted the 'Milan School Family Systems Theory,' which is a therapeutic theory about individuals and their problems as located in networks of relationships or 'family systems.' The counselors use a particular interviewing technique to engage clients and their significant others in discussions about various issues. The authors show how all participants orient to the particular relationship that persons have to those experiences they 'own' (Peräkylä and Silverman, 1991) and how counselors use particular techniques to invoke ownership of experience and thus elicit client talk (Peräkylä, 1995).

In circular questioning, used in family systems therapy, one of the clients is asked to describe the experience of another. Peräkylä, who has studied the interactional dynamics of implementation of this practice in HIV counseling, showed that both clients and counselors orient to the owner of the experience having the privileged participation status and authoritative position to confirm other descriptions of her or his experience. The pervasiveness of the notion of ownership of experience accounts here for the persuasive force of circular questioning. When, for instance, a client's partner describes what he or she sees as the client's 'greatest concerns regarding the test results,' it is up to the client, as the owner of the experience, to confirm or disconfirm those views. The conversational phenomenon at work here was first identified by Anita Pomerantz (1980, see also Bergmann, 1992) and termed by her as 'telling my side' as a device for 'fishing' for information. Describing our view on issues that we have only limited access to is a way to invite the one with authoritative access to disclose his or her version. Peräkylä's work shows how this device takes on a double force, used by the counselor in a circular interview setting.

Peräkylä (1995; see also Buttny, 1996) also described strategies that counselors use to engage the clients in talk about 'dreaded' issues (death, dying, or loss), among them the use of hypothetical questions that are ideally positioned after a dreaded scenario has already been hinted at in the conversation.

The focus on the client's perspective also affects issues of advice giving in HIV counseling, and it does so from two different angles. First, in certain counseling settings it may be viewed as important to give advice without implying its direct relevance to the

recipient. Such a case is HIV pretest counseling, where advice may be designed as neutral, general information (Silverman, 1997) – information that 'we give everyone in this institution.' This constitutes a way of delivering information about HIV and AIDS without having to ask the client to disclose personal information on delicate issues such as sexual behavior and without the implication that the recipient of advice is HIV positive.

Second, at issue is how advice, based on expert knowledge, can be designed so that it would be aligned with the advisee's perspective. Advice giving has been a central focus in studies of counseling interaction (Kinnell and Maynard, 1996; Silverman, 1997; Vehviläinen, 2001). Advice is a central task of the counselors, while it involves the problematics discussed above. Advice contains a normative dimension and a recommendation toward a course of action that the advice giver prefers, and it is given with the expectation that the recipient will treat it as relevant, helpful, or newsworthy and accept it. Advice giving implies that the adviser has knowledge or insight that the advisee lacks. Thus, it positions the participants asymmetrically. Therefore, advice giving is, inherently, a potentially problematic activity.

Within health care and counseling, research has identified sequences where the professional elicits the client's perspective prior to giving the expert view. This is done so as to fit and align the professional's perspective with that of the client and to minimize resistance. For instance, Maynard (1991) identified a 'perspective display series' in which doctors ask for the recipient's view prior to delivering diagnostic news to parents of children who have been diagnosed as having developmental difficulties (*see also* **Medical Discourse: Doctor–Patient Communication**). Heritage and Sefi (1992) found that when advising mothers of infants during home visits, British health visitors used questions to approach and develop a potentially problematic issue prior to giving advice regarding the problem.

Such 'stepwise' entry to advice has been identified in many counseling settings as well, and it has been shown to facilitate the uptake of advice, minimize resistance, and enable the counselor to design advice so as to take into account the client's perspective (Silverman, 1997; Kinnell and Maynard, 1996); it has also been shown to legitimize advice in a setting where directive advice is not considered appropriate and to give the counselor's advice argumentative strength that has pedagogical relevancy in an educational counseling setting (Vehviläinen, 2001; *see also* **Classroom Talk**).

This practice of advice giving deals with, on the one hand, the dilemma of simultaneous orientation to the importance of the client's own perspective and experience and, on the other hand, maintenance of the authority of the professional's perspective. This issue is particularly prominent in counseling. Counseling practices entail an inherent contradiction: clients should be 'empowered' and their self-directedness increased. At the same time, counseling often has other aims that contradict these ideals and put the professional in the position of an authority.

Although therapy and counseling are, ideologically, seen as modes of facilitating the client's own healing, introspecting, or problem-solving, many researchers of therapeutic interaction view it as an art of persuasion (Davis, 1986; Buttny, 1996). Indeed, many psychotherapies work from the basis of a notion of denial – the clients may not be conscious of, or willing to face, what are taken to be the true reasons of their problems. Thus, the professionals take upon themselves the task of bringing about a change in the way in which the clients see themselves or their problems.

See also: Classroom Talk; Communicative Competence; Conversation Analysis; Conversational Analytic Approaches to Culture; Critical Applied Linguistics; Critical Discourse Analysis; Doctors and Patients in Multilingual Settings; Ethnomethodology; Gender and Language; Identity and Language; Institutional Talk; Interactional Sociolinguistics; Labov, William (b. 1927); Meaning, Procedural and Conceptual; Medical Discourse: Doctor–Patient Communication; Medical Discourse: Psychiatric Interviews; Psychoanalysis and Language; Sacks, Harvey (1935–1975); Social Construction and Language; Speech Community.

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Puerto Rico: Language Situation

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Speaking of language in Puerto Rico is different from speaking of the language situations of Puerto Ricans. Owing to consistent migration to and from the continental United States and owing to the island's control by the United States since 1898, the Puerto Rican community extends well beyond the Caribbean. The 2000 U.S. Census reports a total Puerto Rican population in the continental United States of 3 406 178. On the island, the population figure is 3 623 392. However, the island is not solely populated by individuals of Puerto Rican descent. This diversity contributes a measure of linguistic diversity to the island even as Puerto Rican island society is overwhelmingly and securely Spanish speaking. The census reports that 85% of the population on the island of Puerto Rico above the age of 5 speaks Spanish. Roughly 55% speak English to varying degrees. However, 14% of the population speaks only English and approximately 1% speaks other languages as well. Apart from Puerto Rican Spanish, four other countries contribute significant numbers: the Dominican Republic, Cuba, Mexico, and Spain. Smaller groups come from Colombia, Venezuela, and Panama. One may also find social networks in which Haitian Creole, Chinese, Arabic, Japanese, and French are spoken. Many of these speakers also speak a dialect of Spanish or English as a second language. Nonetheless, this diversity is not represented in either the media or education where Spanish and English predominate. Public schooling is in Spanish, with English taught as a second language.

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Private schooling provides a wider range of language options. Owing to the lengthy colonial relationship with the United States, debate about the future of Spanish and English is highly charged. Any discussion of language policy, teaching, or planning entails issues of Puerto Rican identity, either personal or political.

Puerto Rican Spanish, as in other Spanish-speaking Caribbean countries, historically derives from the Andalusian and Canary Island regions of Spain. Prior to the arrival of the Spanish, the indigenous peoples spoke Taíno, a variety of Arawak. However, the Taíno people died within 50 years of European settlement. They left behind multiple place names (Mayagüez, Humacao) and other vocabulary for plants, animals, musical instruments, weather events, or household objects and spaces: *maní* 'peanut', *guaraguao* 'hawk', *güiro* 'percussion instrument', *huracán* 'hurricane', *hamaca* 'hammock', *batey* 'patio'. English has also provided a sizable number of borrowings, many of which are found in other dialects as well. Consider *closet*, *béisbol*, *sandwich*, and *family room*. There is some regional variation on the island, with a major division occurring between the west and the east. This variation includes vocabulary, some features of pronunciation, and, perhaps, an important quantitative difference, though more research is needed. Being a null subject language, Spanish provides speakers with the option of expressing subjects as pronouns, lexical noun phrases, or null subjects as in *yo camino* 'I walk' or *camino* '__ walk'. Generally, Puerto Rican Spanish shows a relatively high frequency of subject pronoun expression. Moreover, (non)-specificity of reference for second person subjects correlates with differing frequencies of pronominal expression. Yet speakers from the central region around Lares appear to have a distinctly lower frequency of pronominal expression, similar to dialects from Spain. This differs from findings for the major city of San Juan. Other quantitative sociolinguistic research finds evidence of age, gender, class, network, and stylistic patterning for phonological variables such as aspiration/deletion of syllable-final /s/, spirantization/deletion of intervocalic /d/, velarization of syllable final /n/, neutralization of syllable final /l/ and /r/, assibilation of /rr/, a weakening of /č/ toward /š/, spirantization of /y/, and variable raising of unstressed word final /e/ and /o/.

Two syntactic variables also show social and stylistic patterning. One involves the variable fronting of subject pronouns in wh-questions as in *¿Qué tú dijiste?* 'What did you say?' The other involves alternation between three strategies for expressing a direct quotation. Research on both syntactic variables suggests change in progress.

One final note: contrary to many public expressions of concern that English has influenced or corrupted Puerto Rican Spanish, no sociolinguistic research has clearly documented any English-induced changes in the phonology or syntax of the language.

See also: United States of America: Language Situation.

Punctuated Equilibrium and Language Change

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The theory of 'punctuated equilibrium' was originally developed by Nils Eldredge and Stephen J. Gould as an alternative to gradual Darwinian evolution in biology. In their model, evolutionary change occurs rapidly among small, peripheral populations, which may later spread out over a larger geographical area, obliterating other populations and creating what appear to be breaks in the fossil record. The alternative, 'phyletic gradualism,' assumes that species mutate gradually over large interconnected populations. Punctuated equilibrium is controversial in evolutionary biology and has met with differing levels of acceptance in the literature.

Many researchers have adapted punctuated equilibrium to their own fields. In linguistics, it seems to have been first taken up first by Thurston (1987) and later by Heath (1998). Thurston is particularly concerned with notions of gradual versus abrupt change. Heath argues that equilibrium is defined by isolated monolingualism, while periods of punctuation involve intense contact. The most commonly quoted application of punctuated equilibrium, however, is in several works of R. M. W. Dixon, most notably in *The rise and fall of languages*. His view differs from both Thurston's and Heath's. Dixon's formulation will be considered from here on. In developing his model Dixon sought to explain several pieces of data and to correlate types of linguistic change with different types of sociocultural events.

Under Dixon's model, language change (and history in general) is assumed to be characterized by long periods of stasis (or 'equilibrium') and much shorter periods of 'punctuation'. Language groups are assumed to have coexisted for most of human

Private schooling provides a wider range of language options. Owing to the lengthy colonial relationship with the United States, debate about the future of Spanish and English is highly charged. Any discussion of language policy, teaching, or planning entails issues of Puerto Rican identity, either personal or political.

Puerto Rican Spanish, as in other Spanish-speaking Caribbean countries, historically derives from the Andalusian and Canary Island regions of Spain. Prior to the arrival of the Spanish, the indigenous peoples spoke Taíno, a variety of Arawak. However, the Taíno people died within 50 years of European settlement. They left behind multiple place names (Mayagüez, Humacao) and other vocabulary for plants, animals, musical instruments, weather events, or household objects and spaces: *maní* 'peanut', *guaraguao* 'hawk', *güiro* 'percussion instrument', *huracán* 'hurricane', *hamaca* 'hammock', *batey* 'patio'. English has also provided a sizable number of borrowings, many of which are found in other dialects as well. Consider *closet*, *béisbol*, *sandwich*, and *family room*. There is some regional variation on the island, with a major division occurring between the west and the east. This variation includes vocabulary, some features of pronunciation, and, perhaps, an important quantitative difference, though more research is needed. Being a null subject language, Spanish provides speakers with the option of expressing subjects as pronouns, lexical noun phrases, or null subjects as in *yo camino* 'I walk' or *camino* '__ walk'. Generally, Puerto Rican Spanish shows a relatively high frequency of subject pronoun expression. Moreover, (non)-specificity of reference for second person subjects correlates with differing frequencies of pronominal expression. Yet speakers from the central region around Lares appear to have a distinctly lower frequency of pronominal expression, similar to dialects from Spain. This differs from findings for the major city of San Juan. Other quantitative sociolinguistic research finds evidence of age, gender, class, network, and stylistic patterning for phonological variables such as aspiration/deletion of syllable-final /s/, spirantization/deletion of intervocalic /d/, velarization of syllable final /n/, neutralization of syllable final /l/ and /r/, assibilation of /rr/, a weakening of /č/ toward /š/, spirantization of /y/, and variable raising of unstressed word final /e/ and /o/.

Two syntactic variables also show social and stylistic patterning. One involves the variable fronting of subject pronouns in wh-questions as in *¿Qué tú dijiste?* 'What did you say?' The other involves alternation between three strategies for expressing a direct quotation. Research on both syntactic variables suggests change in progress.

One final note: contrary to many public expressions of concern that English has influenced or corrupted Puerto Rican Spanish, no sociolinguistic research has clearly documented any English-induced changes in the phonology or syntax of the language.

See also: United States of America: Language Situation.

Punctuated Equilibrium and Language Change

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The theory of 'punctuated equilibrium' was originally developed by Nils Eldredge and Stephen J. Gould as an alternative to gradual Darwinian evolution in biology. In their model, evolutionary change occurs rapidly among small, peripheral populations, which may later spread out over a larger geographical area, obliterating other populations and creating what appear to be breaks in the fossil record. The alternative, 'phyletic gradualism,' assumes that species mutate gradually over large interconnected populations. Punctuated equilibrium is controversial in evolutionary biology and has met with differing levels of acceptance in the literature.

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Under Dixon's model, language change (and history in general) is assumed to be characterized by long periods of stasis (or 'equilibrium') and much shorter periods of 'punctuation'. Language groups are assumed to have coexisted for most of human

history without a great deal of social or natural disruption. During such periods of 'equilibrium,' languages slowly change, largely by borrowing from one another. In this way traits can diffuse across an area. Thus, during these equilibria, local as well as larger linguistic areas are created, cross-cutting boundaries of 'genetic' families. As a consequence, languages that are not genetically related (i.e., though the inheritance of linguistic material forms a common ancestor) may nonetheless come to share considerable material.

The long periods of equilibrium are interspersed with much shorter periods of 'punctuation.' Punctuation could be caused by several factors, either natural or manmade. The introduction of new technology, invasion, mass migration, fire, or flood are some examples of punctuation. It is only in times of punctuation that recognizable language splits occur, of the kind well modeled by a family tree and of the type usually thought of as indicative of genetic relationships.

According to Dixon, equilibrium has been the natural state for most of the world's languages for most of human history, while the family tree model is applicable only in the time following a punctuation and language spread. Thus (in Dixon's model) languages change at different rates at different times, but the rate is loosely tied to whether the language is in a state of punctuation or equilibrium. Languages in equilibrium will "converge to a common prototype"(Dixon, 1997: 71); that is, they will tend to continue borrowing lexical items and grammatical structures until they reach approximately 50% in common (first proposed in Dixon, 1970; see Dixon, 1972 for a more accessible formulation). According to Dixon, any lexical or grammatical component of a language can be borrowed, although languages tend to borrow vocabulary more easily than grammatical items. However, he states that there is no universal that basic vocabulary is borrowed less than nonbasic vocabulary. Therefore, adjacent languages that have little in common are likely to have come into contact relatively recently.

The model is based on some empirical observations and some negative evidence. Firstly, if languages had diverged at the rate of the Indo-European or Austronesian families over the last 100 000 years, we would expect to find many more languages than the 6500 or so that are spoken today (more than 10^{34}, Dixon calculates). That rate of change cannot be constant across all language families at all times. Secondly, the 'standard model', or the 'family tree model,' seems to approximate the linguistic situation much better in some parts of the world than in others. Dixon frequently uses Indo-European and Austronesian as examples of families where the method succeeds, and Australia as a paradigm case of where the method fails. Finally, punctuated equilibrium provides a way to link together nonlinguistic events and their reflections in the linguistic record, thereby 'explaining' why some areas of the world have proven difficult to model using the family tree.

Fundamental for punctuated equilibrium is that the family tree model of linguistic relationship is only applicable in a period following a punctuation; at other times, Dixon argues, there has been so much diffusion between adjacent languages that borrowing clouds any recognizable splits. He argues that this is the case in some parts of the world, particularly Australia, where linguistic relationships are difficult to model on a family tree. Thus, he draws the inference that macro-families such as 'Nostratic' are misguided for rather different reasons from what is normally supposed; while most people reject reconstructions of 'Nostratic' because of the paucity of recurrent correspondence sets and the difficulty and uncertainty of comparing proto-languages (see, for example, Campbell, 1998), Dixon primarily rejects it because beyond the recent spread and split of Indo-European languages, the family tree model is not applicable.

Punctuated equilibrium has been enthusiastically endorsed in some quarters because it provides a way of tying hypotheses about language relationships to technological innovations. Work by Colin Renfrew and Peter Bellwood has been prominent in this regard. For example, they link the spread of the Indo-European language family to the spread of agriculture (arguing for the spread of agricultural technology as a major punctuation). Bellwood uses similar arguments for the spread of the Austronesian family in Asia.

Despite the enthusiasm for punctuated equilibrium among some prehistorians, historical linguists have been quite critical of the model, and support for punctuated equilibrium as an explanatory model of linguistic prehistory seems largely confined to archaeologists. Criticisms have been focused on the underlying assumptions of the model (for example, that linguistic and nonlinguistic events can be directly correlated), the data adduced as evidence, and the model's application to particular families and parts of the world.

Let us first consider criticisms of the architecture of the model. Dixon does not overtly distinguish in the model between the languages of the 'punctuators' and those of the 'punctuatees' (that is, speakers of languages who cause a punctuating event versus those who suffer one). Both the punctuator and the punctuatee speakers/languages are undergoing punctuation, but with different effects. 'Punctuator'

languages, for example, can show substratum influences (see, for example, the development of a set of retroflex consonants in Indic languages); thus, language contact and convergence is not the province of equilibrium situations alone. Many cases of convergence are actually the result of (in Dixon's terms) short-term punctuation, and not long-term equilibrium.

Secondly, not all punctuations result in family-tree-like splits. Turkic languages, for example, would seem to be a good example of a family undergoing 'punctuation'. Yet the internal relationships between Turkic languages are very complicated and are the subject of ongoing dispute (see, for example, the discussions by Schönig, 1997 or Tekin and Ölmez, 1995). The Indo-European family itself is not nearly as clear-cut as Dixon argues, as seen by debate on the status of higher-order subgroups such as Italo-Celtic, Greek-Indo-Iranian and the date of the splitting off of Germanic.

Others have argued that punctuated equilibrium oversimplifies language contact. Watkins, for example, provides illustration of cases from Anatolia where 'regular' family-tree-like changes and language contact are going on at the same time. He sees no reason for separating areal developments and genetic developments, because the two occur concurrently. Dixon's notion of equilibrium assumes symmetrical borrowing patterns as the norm (that is, the convergence of two languages by mutual borrowing); it is known from many studies in the literature that accommodation need not be symmetrical (see, for example, Heine and Kuteva, 2001 and Thomason and Kaufman, 1988).

Just as Eldredge and Gould's punctuated equilibrium was an alternative to a received theory, so too Dixon aimed to provide an alternative to a set of standard assumptions, in this case, the comparative method and the family tree model. Although Dixon challenges the applicability of the family tree model to certain language families, he does not challenge the principle of the regularity of sound change or the applicability of the comparative method in broad terms. Dixon's arguments against the comparative method and the relative advantage of punctuated equilibrium are misplaced. The comparative method is based on the assumption that internal language change is regular, and that regular, systematic correspondences between languages are meaningful and highly unlikely to be due to chance. Furthermore, sound change is usually highly regular, and exceptions require further investigation (such as loanword analysis, dialect interference, back-borrowing). Nor does the comparative method necessarily lead to the drawing of a family tree for the languages under analysis. The comparative method can still be used, for example, within linguistic areas and in the analysis of loanwords. For an Australian example, see work by Harold Koch on loanwords between Arandic languages and Warlpiri.

Dixon further criticizes the comparative method because it will overgenerate in some cases. For example, if a change occurs in all the languages of a group independently, the change may well be reconstructed to the ancestor of the group, giving the false appearance of a common innovation (in the absence of evidence from relative chronology). We cannot reconstruct states for which we have no evidence. This is, of course, a weakness of the comparative method; however, it is a problem with all reconstructions of the past – if evidence has been obliterated, we cannot see it, no matter what the method used, be it carbon-dating, stratigraphy, thermo-luminescence, punctuated equilibrium, or glottochronology. This is not a valid criticism of the comparative method *per se*, it is a fact of making hypotheses about prehistory.

Finally, some comments are warranted on the application of punctuated equilibrium to Australia, as it is one of the few areas of the world where the model is claimed to have empirical support. Punctuated equilibrium has found little support among historical linguists working on Australian languages, as there is a considerable amount of evidence contradicting Dixon's model (see, for example, the papers in Bowern and Koch, 2004).

Dixon assumes that Australian languages have been evolving largely *in situ* from a period shortly after the initial settlement of the Australian land mass, probably around 60 000 years ago. His reasons are partly to do with origin myths (cf. Dixon, 1996) and partly because, as he states, if Proto-Australian had been spoken only a few thousand years ago, the split and expansion would have happened rather recently, and a family tree model should be applicable. One set of languages, called the Pama-Nyungan family, is taken to be an archaic diffusion area, with few genetic groups. In contrast, most other Australianists prefer a model under which speakers of Pama-Nyungan languages spread out across most of Australia, their movement perhaps governed by climatic change at the end of the Pleistocene (that is, more than 50 000 years later than Dixon's claim). Under this view, we can infer nothing about initial dispersal from the current distribution of languages. There is considerable archeological evidence for site abandonment and resettlement in various parts of the continent, for continual 'punctuations' (in Dixon's terms) caused by climatic variation, and for population movement.

Linguistics and biology have long borrowed metaphors, terminology, and ideas back and forth.

Punctuated equilibrium has proved appealing to those who wish to link types of linguistic change to events in prehistory; however, correlations in events and linguistic outcomes are elusive. Several areas in the world would appear to be counterexamples to the principles of punctuated equilibrium and the flagship case, Australia, is perhaps not as immune to reconstruction by traditional methods as Dixon has suggested. It remains to be seen how durable a framework punctuated equilibrium can be for linguistic prehistory.

See also: Austronesian Languages: Overview; Comparative Constructions; Indo–European Languages; Turkic Languages.

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Punctuation

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'Punctuation' refers to various systems of dots (Latin *punctus*) and other marks that accompany letters and other glyphs as part of a writing system. Although there is a certain overlap among the various kinds of marking, punctuation proper should be distinguished from diacritic marks, which are intended as modifications of individual letters (e.g., *ö ő å í è ç š ū ñ ŋ̊*) and are often simply considered to be part of the letter they appear on, like the dot on the Latin lower case *i* or the ear on Vietnamese *ơ ư*, as well as from logographs, which are simply one-glyph representations of lexical items (e.g., @ # $ % &). Several other common glyphs, such as the slash, indicating alternation (*and/or*), or the asterisk *, indicating some special qualification like a footnote or ungrammaticality, are intermediate between these categories, but are not considered true punctuation. This article will consider only punctuation marks that appear separately from other written glyphs and have no lexical reference.

The modern suite of punctuation marks includes the period ⟨.⟩, comma ⟨,⟩, colon ⟨:⟩, semicolon ⟨;⟩, left and right parentheses ⟨( )⟩ (and other brackets, square ⟨[ ]⟩ and curly ⟨{ }⟩), interrogation and exclamation marks ⟨? !⟩ (bracketed with their inverses ⟨¿ ¡⟩ in Spanish), dashes of several lengths ⟨- – —⟩, single and double quotation marks ⟨'"« »"'⟩, and the apostrophe or raised comma ⟨'⟩ (not to be confused with the prime mark ⟨′⟩, which is a diacritic).

This suite, with minor variations, is in use today in practically all alphabetic writing systems in the world, and many nonalphabetic ones, with a set of uses that is remarkably similar across languages. In this regard, punctuation may be considered a supralinguistic representational system, like Arabic numerals. Unlike Arabic numerals, however, punctuation is of recent adoption (Shakespeare's punctuation, for instance, is quite different from that of Modern English); it is subject to great individual variation (like handwriting, or spelling before the introduction of printing); and there is no consensus as to how it should be used (though there is no shortage of prescriptivist fulmination, all incomplete and contradictory in one way or another; e.g., Truss, 2004). Thus, it must also be considered a representational system that is still in the process of being standardized, and may not in fact ever achieve standardization.

Punctuation has several uses, one of which is to mark the boundaries of certain structural constituents of written language, identifying them as units and separating them from other textual units. The simplest example of this is the space that appears between words in English and most other alphabetic writing systems. This is a fairly recent innovation in writing: classical Latin and Greek writing, for instance, did not leave spaces between words, and modern Thai still does not. Another example is the use of a period to mark the end of a grammatical sentence. (The convention of starting the first word of a sentence with a capital letter may be considered part of punctuation, spelling, diacritic marking, or even grammar, depending on how one defines each term; in any event, letter case distinctions are also of recent origin in European writing, dating, like spelling standardization, from the widespread establishment of printing.)

Another use of punctuation is to indicate textual relations between higher-level constituents such as phrases and clauses that are not obvious from the syntax. An example of this kind of usage is the semicolon in English. The semicolon is a full stop in terms both of intonation (it is aurally indistinguishable from a period) and grammar (it follows a complete sentence). But, as Thomas (1979) put it, "The semicolon tells you that there is still some question about the preceding full sentence; something needs to be added." Another example is the colon, which must be followed by some unit that constitutes an 'extension' of the constituent preceding the colon: a list of examples, a clause defining it, or simply its name.

Still another use – indeed, the original use – of punctuation is to provide some indication of the intonational and rhythmic intentions of the writer, as the written words indicate the lexical and grammatical intentions. For instance, the comma in English is often claimed to represent an intonation sequence of *mid-low-high-mid*, like the one used in counting: *fifty-one, fifty-two, fifty-three, fifty-four* ⋯. Punctuation serves, to those who follow this theory, to represent the 'authorial voice,' and guide conventions for reading aloud. This applies to English only, and should not be considered to apply to other languages, such as German, where the rules for punctuation are specifically governed by syntactic considerations.

Since much if not most reading (and writing) takes place without any aural stimulus at all, there is considerable doubt as to the empirical (not to speak of the epistemological) nature of this representation. The most authoritative modern studies (Nunberg, 1990; Nunberg *et al.*, 2001) have taken the position that "it is not clear what explanatory purpose would be served by saying that punctuation 'transcribes' [such inner voices], particularly when, as with colons

or parentheses, they have no actual correlates in ordinary speech" (Nunberg, 1990: 15).

However, the vast individual differences in punctuation of English suggest that writers use a multitude of contradictory rules in their punctuation; and that there is no reason to expect this situation to change soon.

See also: Description and Prescription.

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Punic *See:* Phoenician.

Punjabi

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Introduction

Punjabi is a modern Indo-Aryan language spoken in primarily two South Asian countries: India and Pakistan and also in countries outside South Asia (the United Kingdom, Canada, Malaysia, Indonesia, Singapore, Fiji, United Arab Emirates, Kenya, South Africa, and other countries). The name Punjabi (also spelled Panjabi) is derived from Punjab, the land of five rivers (the Jehlam, the Ravi, the Chanab, the Vyas, and the Satluj).

Approximately 50 million people speak Punjabi as either a first or second language. It is the official language of the state of Punjab in India. Although the official language of Pakistan is Urdu, it is spoken as a native language by just 8% of the population; the majority native language is Punjabi, spoken by approximately 60% of the population. Punjabi is ranked among the top 20 most widely spoken languages in the world.

With the partition of the Indian subcontinent came the partition of the State of Punjab. So massive was the migration in 1947 that it is viewed as the greatest migration in the history of humanity. About 10 million people were uprooted from both sides of what is now India and Pakistan. Consequently, the population of the Punjabi-speaking area underwent radical reorganization, which had and continues to have an impact on the language in term of norms, multiple identities, and language standardization.

History and Literature

Punjabi, which is a descendant of the Sanskrit language, belongs to the Indo-Aryan language family. It has been in use as a literary language since the 11th century. Punjabi has three distinct historical stages: Old (10th–16th centuries), Medieval (16th–19th centuries), and Modern (19th-century to the present). The most important treatise of the Old Punjabi is *A:di grantha*, the sacred scripture of the Sikhs.

Varieties and Dialects

In addition to the national varieties, Punjabi has several regional, religious (Hindu, Sikh, and Muslim), and socioethnic varieties. The four regional varieties of Eastern Punjabi are as follows:

1. Majhi, the standard variety, is spoken in the districts of Amritsar and Gurdaspur.
2. Malwi is found in the districts of Bhatinda, Ferozpur, Ludhiana, the western parts of Patiala and Sangrur.

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2. Malwi is found in the districts of Bhatinda, Ferozpur, Ludhiana, the western parts of Patiala and Sangrur.

3. Doabi is spoken in the districts of Jallandar, Kapurthala, and Hoshiarpur.
4. Powadi is dominant in the district of Ropar, and the eastern parts of Patiala and Sangrur.

There are four additional traditionally recognized dialects of Punjabi (Rathi, Ludhianwi, Patialwi, and Bhattani), whose status as independent dialects is subject to dispute. Lahanda (also called Saraiki and Multani), which is classified as Western Punjabi by Grierson (1916), is questioned by language authorities. The Saraiki, Hindoko, and Pothohari (also called Patohari, Pothwari, Putohari, Pothohari, Mirpuri Punjabi) language movements in Pakistan assert the three varieties as three separate languages in their own right rather than as three dialects of Punjabi (see Rahman, 1996 for details).

Writing Systems

Punjabi is written primarily in three scripts: Gurmukhi, Perso-Arabic, and Devanagari. Sikhs often write Punjabi in Gurmukhi, Hindus in Devanagari, and Muslims in Perso-Arabic, called Shahmukhi. Punjabi written in Gurmukhi is the official language/script of the Indian state of Punjab. In addition to these three scripts, Punjabi is also recognized for its business scripts, such as LaNDa, Mahajani, and Baniyakar. These scripts, although now dying, are particularly noteworthy not only for their telegraphic and 'shorthand' characteristics employed in clerical and business domains, but also as a secret code.

Phonology

Punjabi has four notable phonological features.

First, Punjabi is the only modern Indo-Aryan language that has developed tonal contrasts.

- The low tone / `/ is characterized as low-rising tone.
- The high tone / ´/ is characterized as a rising-falling tone.
- The mid tone / -/ is never represented by the accent mark since it is predicted by rules of redundancy.

The following examples reflect the phonemic status of the level tones:

/kàR/ 'chisel'
/kaR/ 'bottom'
/káR/ 'boil.'

Although tones are phonemic, none of the three scripts (Gurmukhi, Devanagari, and Perso-Arabic [Shahmukhi]) have any symbol or accent mark to identify tones; instead voiced aspirated consonant symbols are used, which reflect either the older (Eastern) Punjabi or modern Western Punjabi pronunciation. Thus, there is a close correlation of voiced aspirates (e.g., of languages such as Hindi) and the Punjabi tones.

Second, Western Punjabi still retains the original Indo-European (1500 B.C.) distinction between aspirated and unaspirated consonants, which results in a four-way contrast, as shown in the following examples:

ka:l 'time'
kha:l 'skin'
ga:l 'cheek'
gha:l 'to put into'

In Eastern/Standard Punjabi, this four-way contrast is reduced to a three-way contrast: unvoiced unaspirate, unvoiced aspirate, and voiced unaspirate. The voiced aspirates yield tones.

Third, it has the feature of retroflexion in its consonant inventory,

Ta:l 'to put off'
ta:l 'pond'

The retroflex consonant is transcribed as the capital T. In addition to the retroflex stop, Punjabi has a fricative, flaps, and a lateral.

Fourth, geminates are another distinctive feature of Punjabi. All consonants except N, L, R, y, h, and w may be geminate (doubled). Gemination is represented by the *addak/adhak* sign in Gurmukhi.

The inventory of distinctive segments of standard Punjabi is as follows. The symbol (·e) indicates the sounds that occur in Perso-Arabic words (Table 1).

Glottal h appears only in the word-initial position.

Punjabi vowels may be oral or nasal. The distinction is phonemic: *ga:* 'sing' and *gã:* 'cow' (Table 2).

Stress

Although stress (meaning loudness) is not a prominent feature of Punjabi, it seems that its existence cannot be denied. Stress can distinguish between grammatical categories such as nouns and verbs, as in:

Nouns	Verbs
galaa 'neck'	ga**laa** 'cause to melt'
talaa 'sole'	ta**laa** 'cause to fry'

The stressed syllable is shown in bold. However, stress is not usually distinctive in Punjabi. Therefore, in general, whether one places stress on the first syllable or on the second, the meaning will not be affected. For example, the meaning of the word *suNa:* 'heard' will remain unchanged whether one places stress on the first syllable or the second. Therefore, Punjabi is

Table 1 Consonants

		Labial	*Dental*	*Retroflex*	*Palatal*	*Velar*	*Back velar*
Stop	Unvoiced unaspirate	p	t	T	c	k	(q)
	Unvoiced aspirate	ph	th	Th	ch	kh	
	Voiced unaspirate	b	d	D	j	g	
	Nasal	m	n	N	ñ	ŋ	
Fricative	Unvoiced	(f)	s	sh		(x)	
	Voiced		(z)			(G)	
Flap	Voiced unaspirate		r	R			
	Voiced aspirate			Rh			
Lateral			l	L			
Semivowels			w(v)		y		

Table 2 Vowels

	Front	*Central*	*Back*
High	i:		u:
	i		u
Mid	e		o
	ai	a [schwa]	au
Low		a:	

often characterized as a syllable-timed language like French, where the syllables are pronounced in a steady flow, resulting in a 'machine-gun' effect.

Morphology

Word formation in Punjabi primarily uses prefixes and suffixes to define inflectional and derivational word classes. Nouns are generally inflected for number, gender, and case. There are two numbers, singular and plural; two genders, masculine and feminine; and three cases, simple, oblique, and vocative. The oblique forms occur when a noun or a noun phrase is followed by a postposition. Nouns are inflected according to their gender and word-final sound, as exemplified by the three paradigms given in Table 3.

Adjectives are primarily of three types:

1. Simple adjective, such as *canga:* 'good';
2. Derived adjectives employing various parts of speech such as nouns: *marda:na:* (from *mard* 'man') 'masculine,' adverbs: *manda:* 'slow' (from *mand* 'low'), and from agentive/adjectival particle *va:la:* e.g., *dilli: va:la:* (from *dilli:* 'Delhi' *va:la:* '-er') 'from Delhi';
3. Participial adjectives: *caldi:* 'moving,' *nasda:* 'running.'

Adjectives can be used both attributively (immediately placed before nouns) and predicatively (immediately placed before verbs). Simple, Participial, and *va:la:* adjectives are of two types, inflected and uninflected. Inflected adjectives agree with their following noun in number, gender, and case; they end in morpheme *-a:* (e.g., *canga:* 'good'), which changes to *e* for masculine plural and masculine oblique (*cange*), *-ii* for feminine singular (*cangi:*) and *-iã:* for feminine plural nouns (*cangiã:*). Uninflected adjectives (not ending in *-a:*) remain unchanged.

Although the case system of pronouns is essentially the same as that of nouns, pronouns have more case forms than nouns. Case relations are essentially carried out by means of postpositions. Personal pronouns are similar to their English equivalents; however, there are no gender distinctions (like *he* and *she* in English) (Table 4).

Adverbs and postpositions are invariant, except for the genitive postposition, which behaves like an inflected adjective. The postpositions mark case relations and adverbial functions.

Verbs

There are three tenses in Punjabi: present, past, and future. The tenses are formed by the suffixation process. Verbs are inflected for number, gender, and person.

ó a:-nd-a: ai.
he come-PRES-MASC. Sing is
'He comes.'

ó aa-iyaa.
he come-PERF.MASC.Sing.
'He came.'

ó aa-e-g-aa
he come–3Sing-FUT-MASC. Sing
'He will come.'

In addition to simple verbs, Punjabi has two categories termed 'conjunct' and 'complex' verbs. The class of conjunct verbs is usually derived adding *karnaa* 'to do' or *hoNaa* 'to be' to noun, adjective, pronoun, or adverb, for example:

Table 3 Punjabi noun paradigms

Case	*Paradigm I: masculine nouns ending in* −a: *(e.g.,* muNDa: *'boy')*		*Paradigm II: masculine nouns not ending in* −a: *(e.g.,* a:dmi: *'man')*		*Case*	*Paradigm III: all feminine nouns (e.g.,* kuRi: *'girl')*	
	Singular	*Plural*	*Singular*	*Plural*		*Singular*	*Plural*
Direct	muNDa:	muNDe	a:dmi:	*a:dmi:*	Direct	kuRi:	kuRiyã:
Oblique	muNDe	muNDiã:	a:dmi:	a:dmiã	Oblique	kuRi:	kuRiyõ
Vocative	muNDe	muNDio	a:dmi:	a:dmio	Vocative	kuRi:	kuRio

Table 4 Punjabi pronoun paradigms

	1st Person		*2nd Person*		*3rd Person*	
	Singular	*Plural*	*Singular*	*Plural*	*Singular*	*Plural*
Direct	mãi	asĩ:	tu:	tussi:	ó	ó
Oblique	mã	sa:	tãi	tvà:	ó	ónha:
Genitive	mera:	sa:Da:	tera:	tuvà:Da:	óda:	ónha:da:

kamm 'work,' kamm karNa: 'to work'

canga: 'good,' canga: hoNa: 'to recover'

tez 'fast,' tez karNa: 'to speed up'

Complex verb: likh 'write', laiNa: 'to take'-→ likh laiNa: 'to write' (for one's own benefit)'

Punjabi is also sensitive to stative/active and volitional/nonvolitional distinction; these four types of distinction are denoted by morphologically related verbs:

khulNa: 'to be opened,' kholNa: 'to open'

TuTNa: 'to be broken,' toRna: 'to break'

Causative verbs are derived by adding *-a:-*, for the simple causative, and *-wa:-*for the double causative, to the stem of the verb.

Compounding is an integral and very productive process of word formation in Punjabi. The noun-noun compounding involves twelve types of compounding. For example, *kha:Na:* 'eating' and *pi:Na:* 'drinking' can be compounded into *kha:N-pa:N* 'life style.'

From the viewpoint of morphological complexity, Punjabi can be classified as an agglutinating language. Derivation of words takes place by the addition of suffixes to simple or derived stems of major word classes. The process of prefixation is almost exclusively used with nouns and verbs, other word classes rarely participate in this process. The process of suffixation is equally productive with both nouns and verbs.

Syntax

Punjabi is a Subject Object Verb (SOV) language with relatively fixed word order. Interrogative or other sentence types do not introduce any changes in word order. In topicalization and focus structure, however, phrases occurred in marked position, usually initial. It is primarily a head-final language. The verb generally agrees with the subject. In transitive perfective sentences, the third person subject is marked with the *ne* postposition, and the verb agrees with the direct object. As a rule of thumb, the verb never agrees with any constituent, which is marked with a postposition.

Any sentence can be negativized by placing the negative particle *nahii* 'not' in the preverbal position. Punjabi is a Pro-drop language. In the following sentence, the subject can be dropped.

nahĩ: a:-e-g-a:
not *come–3Sing-FUT-MASC. Sing*
'(he) will not come.'

Language Contact

Punjabi borrows from Sanskrit, Persian, Arabic, Hindi-Urdu, and recently, English.

See also: Arabic; Canada: Language Situation; Fiji: Language Situation; Hindi; India: Language Situation; Indonesia: Language Situation; Kashmiri; Kenya: Language Situation; Malaysia: Language Situation; Pakistan: Language Situation; Persian, Modern; Sanskrit; Singapore: Language Situation; South Africa: Language Situation; United Arab Emirates: Language Situation; United Kingdom: Language Situation; Urdu.

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Punning

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The irresistible urge of humans to play metacommunicatively upon any means of communication (especially language) has given rise to the near-universal pastime of punning. From another point of view, puns can be said to originate in the fact that humans (despite many philosophers' assertions to the contrary) cannot (or even will not) always speak unequivocally. Puns are a kind of playful handling of lexical items whose similarities in surface structure are contrasted with differences in deep, semantic structure. The principle of similarity/affinity that is at work here is equally important in rhymes and alliteration, spoonerisms, and folk etymology, as well as in irony and metaphors: "every metaphor contains a pun" (Huizinga, 1956: 12) (*see* **Irony**; **Metaphor: Psychological Aspects**).

The phonemic constellations that allow us to produce puns, both on the auditory level and (chiefly in languages that allow for orthographic irregularity, such as English) on the level of writing, are intrinsically language specific and therefore almost never accessible to translation. Punning is the skilled and creative native speakers' privilege and hallmark and consequently none of the foreigner's business.

Homophonous similarity functions with or without graphemic variation. The following are some examples:

(1) "How is bread made?" – "I know that", Alice cried eagerly, "you take some flour . . ." "Where do you pick the flower?" the White Queen asked . . . – "Well, it isn't picked at all", Alice explained: "it is ground . . ." – "How many acres of ground?" . . . (From Alice in wonderland; flour : flower)

(2) "if so 'tis the will of Whose B. Dun" (from Finnegan's wake, Joyce, 1975: 518).

In this case, the relative pronoun *whose* figures as part of a (homophonous, 'created') proper name (*Whose*).

Here is a psychological joke, in German, that was popular during World War II:

(3) First psychiatrist: "Heil Hitler!"
Second psychiatrist: "Heil du ihn!"
('Hail to Hitler!' – 'Heal him yourself!')

The joke stems from the fact that German *heil* can mean either 'hail' or 'heal'. In this example, moreover, we see how punning may transcend the boundaries of word categories, here noun versus verb.

A Turkish-based pun:

(4) 'Do you know the name of Michael Jackson's brother?'
'It's sikeceksin [djeksin]'

Here, Turkish *sik-* 'fuck' + suffix *–ecek* 'future' + pronominal ending 2.SING *-in* 'you' would be translated as 'you are going to fuck'. Thus, the proper name (*Jackson*) is played off against the grammatical suffixes *-(e)cek-sin*).

Finally, a Russian example:

(5) СПАСИТЕ НАШИ ШУТИ/АУШИ
spasite naši šuti/duši
'save our paunches/souls'

Here, the pun plays on the phonetic similarity of the Russian words for 'paunches' and 'souls'.

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Sometimes, an aggressive undertone is noticeable in puns (more often than not, this represents an assault on a taboo, as in 'All men are cremated equal'). The aggression may not always be manifest: German *Familienbande* may be read as either 'family bonds' or 'family gang'.

Because they are predominantly interactive, puns (like those who deliver them, the punsters) depend on their audiences for their effect. The readiness on the recipients' part to take upon themselves the task of disambiguating obvious norm abuses and ambiguities is a *sine qua non* for enjoying the (possibly surprising) new insights arising from the punster's artful endeavor, just like what happens in satire: here, the alternate understanding of a pun has its highest effect if the pun borders on antonymy (*see* **Antonymy and Incompatibility**).

Although normal, everyday ambiguity can be said to be characteristic of all words and idioms (in this, seemingly replicating the inscrutability of reality itself), there have been conjectures and suggestions concerning not only the pun's jocular, but also its presumed cognitive potency, i.e., its mantic/divinatory effectiveness. Especially in cosmogonies and mythologies, but also in certain styles of literary and even scientific writing, the belief in the creative energy of puns, as revealing relations between words and their referents in reality, has been productive since time immemorial (cf. the portentous homonymy of *malum* ('apple(-tree)') and *malum* ('bad') in the punning context 'God planted a *malum* in Paradise').

Surrealist poetry (André Breton) and drama (Georges Ionescu) illustrate this belief in words as dictating thought (cf. also the surrealists' *écriture automatique,* 'automated writing'). Similarly, the great English 19th-century poet Gerard Manley Hopkins oeuvre "progresse[s] by double meaning" (Redfern, 1984: 74).

Overall, puns play a considerable role in literary products of different description, ranging from poetry (including limericks) all the way to commercial texts used in advertising. Imagery in dreams is another area where paronomastic maneuvers prevail; however, the 'logical' puns in dreams are not meant or taken as joking language, but as expressions denoting (subconscious or surreal) facts (*see* **Psychoanalysis and Language**). Finally, one may note that the propensity to punning varies in accordance with the stylistic conventions prevalent in different eras; thus, periods such as the Baroque or Romanticism (not to forget the times of Shakespeare) have excelled in punning in comparison to earlier or later times.

See also: Antonymy and Incompatibility; Irony; Metaphor: Psychological Aspects; Psychoanalysis and Language.

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Puşcariu, Sextil (1877–1948)

G Price

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Sextil Puşcariu, one of the dominant figures in Romanian linguistics, was born on January 4, 1877 at Braşov in Transylvania, then under Hungarian rule. Like many Romanians of his generation, he pursued his university studies and began his research career in Western Europe. At the University of Leipzig (where he obtained his doctorate in 1899 for a dissertation on diminutive suffixes in Romanian), he studied under the Indo-Europeanist and Neogrammarian, Karl Brugmann (*see* **Brugmann, Karl (1849–1919)**), and, among others, under Gustav Weigand, who was already working on Romanian. Among his later teachers were, in Paris, Gaston Paris and Jules Gilliéron (*see* **Gilliéron, Jules (1854–1926)**) and, in Vienna, a specialist in Balkan history, Konstantin Jireček, and the eminent Romance philologist, Wilhelm Meyer-Lübke (*see* **Meyer-Lübke, Wilhelm (1861–1936)**). In 1904 he was appointed to a lectureship at the University of Vienna and in 1906 became professor of Romance philology at the University of Cernăuţi (Tchernowitz) in the Bucovina, then still part of Austria. After the reunification of Transylvania with Romania at the end of World

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War I, Puşcariu moved to Cluj where he was appointed as the first Rector of the Romanian-language university and where he was to spend the rest of his career.

At Cluj, he founded the distinguished research institute *Muzeul limbii române* ('The Museum of the Romanian Language') and launched, and for many years edited, its journal, *Dacoromania*.

His interests were wide ranging (including *inter alia* the study of early Romanian literature), but it was in the fields of Romanian lexicography, linguistic geography, and dialectology (his first published work, dating from 1898, was an article on the dialect of the upper Olt valley) that he was most influential. Having published in 1906 the first (and only) volume of a Romanian etymological dictionary, he was entrusted in 1908 with the editorship of the Romanian Academy's dictionary (roughly comparable with the *Oxford English Dictionary*) of which three volumes appeared in his lifetime (the work is still not complete). Also still incomplete is the impressive linguistic atlas of Romania that Puşcariu launched and edited and of which three volumes appeared in his lifetime. Together with three collaborators (Bartoli, Belulovici, and Byhan) he published a three-volume study (including, *inter alia*, a volume of texts, a grammar, and a bibliography) of the now almost extinct Istro-Romanian dialect of northwestern Croatia. Only the first two volumes appeared (the second of them posthumously) of his projected general descriptive and historical study of the Romanian language. He died at Cluj on May 5, 1948.

See also: Brugmann, Karl (1849–1919); Gilliéron, Jules (1854–1926); Meyer-Lübke, Wilhelm (1861–1936); Romanian.

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Putnam, Hilary (b. 1926)

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Hilary Putnam (b. 1926) is one of the most influential philosophers of language of the 20th century. He made outstanding contributions to the study of language and linguistics through his work in philosophy of language and philosophy of mind; in addition, his work is significant in other areas of philosophy, such as philosophy of science. He was active in protests against the Vietnam war and in associated political movements.

Putnam received a Ph.D. from the University of California at Los Angeles in 1951 and then taught at Northwestern, Princeton, and MIT. He became part of the philosophy department at Harvard in 1976, later becoming the Walter Beverly Pearson Professor of Mathematical Logic, and remained there until he retired in 2000. His most important articles are collected in the three volumes of his *Philosophical papers*.

In philosophy of mind, Putnam is important as a founder of functionalism, the idea that mental states are defined in terms of their relations to the environment, other states, and behavior (Putnam, 1967). This perspective on the mind was important for the development of cognitive science, as it helped validate thinking of the mind as a kind of computing device, with the possibility of the same mental states existing in different physical systems. In later years, Putnam criticized his earlier functionalist views in a number of ways.

In philosophy of language, Putnam argued that meaning is not determined solely by the internal mental states of speakers, but instead crucially involves a relation to the external environment (Putnam, 1975a). He famously argued for this point with his 'Twin Earth thought experiments.' In these, one imagines an individual with exactly the same internal mental makeup as someone on Earth, but existing on a planet that differs from Earth only in that some aspect of the environment, say water, is replaced by a different substance with the same macroscopic properties. For such an individual, it's obvious that

War I, Puşcariu moved to Cluj where he was appointed as the first Rector of the Romanian-language university and where he was to spend the rest of his career.

At Cluj, he founded the distinguished research institute *Muzeul limbii române* ('The Museum of the Romanian Language') and launched, and for many years edited, its journal, *Dacoromania*.

His interests were wide ranging (including *inter alia* the study of early Romanian literature), but it was in the fields of Romanian lexicography, linguistic geography, and dialectology (his first published work, dating from 1898, was an article on the dialect of the upper Olt valley) that he was most influential. Having published in 1906 the first (and only) volume of a Romanian etymological dictionary, he was entrusted in 1908 with the editorship of the Romanian Academy's dictionary (roughly comparable with the *Oxford English Dictionary*) of which three volumes appeared in his lifetime (the work is still not complete). Also still incomplete is the impressive linguistic atlas of Romania that Puşcariu launched and edited and of which three volumes appeared in his lifetime. Together with three collaborators (Bartoli, Belulovici, and Byhan) he published a three-volume study (including, *inter alia*, a volume of texts, a grammar, and a bibliography) of the now almost extinct Istro-Romanian dialect of northwestern Croatia. Only the first two volumes appeared (the second of them posthumously) of his projected general descriptive and historical study of the Romanian language. He died at Cluj on May 5, 1948.

See also: Brugmann, Karl (1849–1919); Gilliéron, Jules (1854–1926); Meyer-Lübke, Wilhelm (1861–1936); Romanian.

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the word 'water' would refer to the substance existing on Twin Earth, and not to water. But since the individual and his twin on Earth by hypothesis have the same internal mental makeup, this shows that meaning is not a purely internal matter.

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Putonghua *See:* Chinese.

Q

Qatar: Language Situation

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Main Languages

The official language is Classical Arabic (Standard Arabic), while a diglossic situation exists with colloquial Arabic (Gulf Spoken Arabic) as the spoken medium. A long-standing link with Baluchistan and the Muslim populations of India means that many members of the older population have some knowledge of Baluchi (Balochi) or Urdu. Equally their trading links with Iran make Persian (Farsi) understood to various levels by many people. There are also considerable immigrant populations of different levels of antiquity from Persia and Baluchistan. None of these languages have any official status although Urdu was widely spoken in the police and armed forces at an earlier period.

Spoken Arabic Dialect

Historically, before the oil period many of the population mixed a seafaring life with a herding and agricultural one. The wealth of the country depended on pearling in previous centuries, while the town of Zubara flourished for 20 years as the main trading center of the Gulf in the late 18th century. The spoken dialects therefore show links with Central Arabia and with the coastal areas and Iran. Dialect is here mainly a marker of ethnic affiliation and in a very general sense one can distinguish the following:

1. The speech of Najdi clans who arrived since the 17th century, exemplified by the rulers, the Āl Thāni; also other Ma'āḍīd and the Hawājir and Nu'aim, who are sometimes grouped among the 'Utūb of the northern Gulf States;
2. The speech of the Hwilah, Arab groups who had moved to the Persian coast at an earlier period, but moved back since the 17th century. Similar also is the speech of other Persian populations of some antiquity;
3. The Āl Murrah bedouin, many of whom moved into Qatar over recent centuries, but retain a dialect akin to that of Najrān in Saudi Arabia.

See also: Arabic; United Arab Emirates: Language Situation.

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Qimhi, David (1160–?1235)

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David Qimhi (1160–?1235) was an outstanding Jewish biblical commentator, grammarian, and lexicographer, and the son of an illustrious family of grammarians (he was the son of Joseph Qimhi, author of two grammatical treatises, *Sēfer ha-zikkārōn* 'Book of remembrance' and *Sēfer gālūy* 'Open book', and brother to Moses Qimhi, author of the short grammar *Mahălakh šĕvīlē ha-da'at* 'Course of paths to the knowledge'). After the invasion of Andalusia by the Almohades in 1148, his father moved first to northern Castile and then to Provence. Qimhi was born and lived in Narbonne, where he worked as Hebrew teacher. In matters of the Hebrew language, he was a disciple of his older brother Moses, and in his works he continued the traditions of his family. By the time Qimhi started writing, major advances in research by scores of Spanish Jewish grammarians (10th–12th centuries) had been achieved. The main goal of this school was to improve understanding of the Hebrew bible. For this purpose, they adopted comparative Semitics as a method and produced a significant number of monographs devoted to particular topics. Since most of the works of this school were written in Judeo-Arabic, they were known predominantly to Jewish scholars of Muslim countries and unknown in Western Europe.

Qimhi wrote in Hebrew. His major work, in addition to an immensely popular commentary on the entire bible, was a large compendium, *Sēfer ha-mikhlōl* ('Book of perfection') which was divided to two books. The first was a grammar (which is usually called *Ḥēleq ha-diqdūq* or *Sēfer ha-mikhlōl*, i.e., 'Grammar's part' or 'Book of perfection') on phonology, morphology and syntax; the second was *Ḥēleq ha-'Inyān*, or *Sēfer ha-šŏrāšīm* ('Contents' part' or 'Book of roots', i.e., a dictionary). Both of these parts enjoyed tremendous popularity among Hebrew scholars and were printed already in the initial period of printing (the dictionary, since ca. 1469; the grammar, since 1532) and reprinted many times, especially the dictionary.

His minor grammatical works include *'Ēṭ sōfēr* ('The scribe's pen'), a grammatico-massoretic treatise about vocalization, cantillation, and rules of biblical orthography, that was known for long time in manuscripts, but published for the first time only in 1864; and a grammatical work, *Pētaḥ dĕvāray* ('Opening of my words'), a work of unclear attribution that some scholars ascribe to Qimhi.

To the particular Qimhi's innovations, one has to assign his classification of vowels, recognition of the *dāgēš lene* (i.e., variation of phonemes b/v, g/gh, d/dh, k/kh, p/f, t/th), discussion of assimilation of consonants, fixing the verb at the center of the grammar, treatment of verb formations, distinguishing of the *wāw* consecutive from the *wāw* conjunctive, and legitimizing of postbiblical developments. Qimhi systematized and completed linguistic study of the bible in the Middle Ages. He more than others is responsible for the formulation of principles of the grammar of the Hebrew language.

Qimhi's ingenious summary of 200 years of study of biblical Hebrew, and clear and systematic exposition of the material, made his works the authoritative reference of Hebrew linguistics. They were used for instruction and reference, commentated and popularized by later Jewish linguist Elijah Levita (*see* **Levita, Elijah (1469–1549)**), and they became a foundation for the study of biblical Hebrew by Christian Hebraists in the 15th and 16th centuries. Even Wilhelm Gesenius and his followers relied heavily on both Qimhi's grammar and dictionary.

See also: Gesenius, Wilhelm (1785–1842); Hebrew Lexicography; Levita, Elijah (1469–1549).

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Quakerism

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Within the Radical Reformation of 17th-century England, the Religious Society of Friends (also known as Quakers) stands out for its connecting of speech and language to authentic and direct communication in their faith and practice. Friends opposed manipulations of language for ulterior reasons or coercive purposes. Central to their concern was the teaching of Jesus: "Let your yes be yes, and let your no be no."

Within their first generation (1652–1691), Friends opposed several leverage-related uses of language in Britain. Because *creedal expressions of faith* separated right believers from others on formalistic grounds, Friends testified that faithfulness to Christ and the Gospel are better measured by one's authentic religious experience and transformed life. Putting one's commitments in one's own words has greater authenticity and meaning than conforming to prescribed language. Likewise, rather than resorting to *directive liturgical words and patterns of worship*, Friends argued that the focus of the worshiper should be on the object of worship: God. In seeking to preserve authenticity of religious belief and expression, Friends not only sought to counter dead formalism, they also sought to challenge lively formalism – pointing instead to the inspiring activity of the Holy Spirit in the lives of believers.

Friends also opposed the manipulative use of language within society. Where *flattery* and *high-sounding platitudes* had become common means of social exchange, Friends refused to use titles and the more elevated plural 'you' for second-person singular references, substituting it with the more intimate 'thee' and 'thou'. Friends also refused to *swear loyalty* to the king, church, or nation. Most famous is William Penn's expulsion from Oxford in 1661 on the basis of his refusal to swear an oath of loyalty. A third convention challenged by Friends was the required *swearing to tell the truth* before a court of law. Friends cited Jesus's instructions not to swear either by heaven or by earth as the basis for their testimony, and they sought to let their 'Yes' mean yes and their 'No' mean no in the common ventures of life. In all these instances, integrity over image was the leading conviction, and Friends sought to make words an extension of authentic intention rather than manipulative rhetoric.

These convictions lend themselves to applications. In *worship*, Friends seek to exercise vocal ministry as led by the Holy Spirit within the gathered meeting. The prepared messenger is elevated over the prepared message, and women as well as men are welcome to speak. The personal testimonial is valued as an experiential account of one's pilgrimage in the Light, and the devotional journal has become a classic means of narrating one's story as a witness to divine grace and faithfulness. *Plain language and direct speech* continue as testimonies of Friends, and Friends largely forego the use of titles. *Inclusive language* is likewise employed by Friends, and they also disavow strong language, as it functions to yoke what is sacred or vulgar to rhetorical ploys. If the truth of a claim is insufficient, no one is helped by representing it otherwise. Truth-seeking, truth-finding, and truth-communicating are matters of first importance for Friends.

Modes of communication by Quakers are many. The sermons and pamphlets of early Friends are numerous, as are Friends journals over more than three centuries. Indeed, Quaker women have served as preachers and writers in addition to men, and for more than one reason Friends have been called 'Publishers of Truth.' Silence and plainness, however, should not be regarded as an obverse kind of informal formalism. Rather, they create the space to focus on the Divine Presence and Reality above all else. If there were a means of conveying the reality of the Spirit in physical means, Friends would testify that this locus of expression is *incarnational*. Christ is held to be sacramentally present in the gathered meeting for worship (Matt. 18:18–20), and his work is communicated to the world most effectively by means of the changed and changing lives of those who know his will and are responsive to it. These Jesus calls his "friends" (Jn. 15:14ff.). Thus, for Friends, the communicative venture endeavors to connect the divine source of Truth with that which is open to it in others. George Fox (*Journal*, 1656) put it this way:

> Let all nations hear the word by sound or writing. Spare no place, spare not tongue nor pen, but be obedient to the lord God and go through the world and be valiant for the Truth upon the earth . . .. Be patterns, be examples in all countries, places, island, nations, wherever you come, that your carriage and life may preach among all sorts of people, and to them; then you will come to walk cheerfully over the world, answering that of God in every one.

See also: Bible, English; Christianity, Catholic; Christianity, Protestant; Communication: Semiotic Approaches; Epistemology and Language; Inspiration and Revelation; Prayer and Meditation; Preaching; Prophecy; Ritual and Religious Language; Silence; Speech and Language Community; Testimony.

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Quantifiers: Semantics

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During the past 25 years, our empirical and mathematical knowledge of quantification in natural language has exploded. We now have mathematically precise (if sometimes contentious) answers to questions raised independently within generative grammar, and we are able to offer many new generalizations. We review these results here. For extensive overviews, see Westerståhl (1989), Keenan (1996), and Keenan and Westerståhl (1997). Some important collections of articles are van Benthem and ter Meulen (1985), Reuland and ter Meulen (1987), Gärdenfors (1987), Lappin (1988), van der Does and van Eijck (1996), Szabolcsi (1997), and from a mathematical perspective, Krynicki *et al.* (1995).

The best understood type of quantification in natural language is that exemplified by *all poets* in *All poets daydream*. We treat *daydream* as denoting a property of individuals, represented as a subset of the domain E of objects under discussion. Quantified Noun Phrases (NPs) such as *all poets* will be treated as denoting functions, called 'generalized quantifiers,' which map properties to truth values, True (**T**) or False (**F**). For example, writing denotations in boldface, **all poets** maps **daydream** to True (over a domain E) if and only if the set of poets is a subset of the set of objects that daydream. Interpreting Dets (Determiners) as functions from properties to generalized quantifiers, we give denotations for many quantifiers in simple set theoretical terms. We write $X \subseteq Y$ to say "X is a subset of Y," $X \cap Y$ for "X intersect Y," the set of objects that lie in both X and Y; $X - Y$ for the set of objects in X that are not in Y, and $|X|$ for the number of elements in X.

(1a) **ALL**(A) (B) = **T** iff $A \subseteq B$
(1b) (**THE TEN**) (A) (B) = **T** iff $|A| = 10$ and $A \subseteq B$
(1c) **NO**(A) (B) = **T** iff $|A \cap B| = 0$
(1d) **SOME**(A) (B) = **T** iff $|A \cap B| > 0$
(1e) **NEITHER**(A) (B) = **T** iff $|A| = 2$ & $|A \cap B| = 0$
(1f) (**FEWER THAN TEN**) (A) (B) = **T** iff $|A \cap B| < 10$
(1g) (**ALL BUT ONE**) (A) (B) = **T** iff $|A - B| = 1$
(1h) **MOST**(A) (B) = **T** iff $|A \cap B| > |A - B|$

To test that the definitions above have been properly understood, the reader should try to fill in appropriately the blanks in (2).

(2a) (**AT LEAST TWO**) (A) (B) = **T** iff ____
(2b) **BOTH**(A) (B) = **T** iff ____
(2c) (**AT MOST FIVE OF THE TEN**) (A) (B) = **T** iff ____
(2d) (**LESS THAN HALF THE**) (A) (B) = **T** iff ____

We concentrate on NPs of the form [Det + N], but we should point out three further classes of generalized quantifiers denoting NPs: first, lexical NPs, notably proper nouns such as *John* and *Mary*; second, boolean compounds in *and*, *or*, *neither* . . . *nor* . . . and *not*, as in *Neither John nor Mary* (came to the party), *Sue and some student* set up the chairs, *not more than two students* attended the lecture. And third, NPs built from Dets that combine with two Nouns to form an NP (Keenan and Moss, 1985; Beghelli, 1993): *more students than teachers* (signed the petition), *exactly as many students as teachers* signed, etc. The interpretation of *more* . . . *than* . . . is given by:

(3) For all properties A,B,C (**MORE** A **THAN** B) (C) = **T** iff $|A \cap C| > |B \cap C|$

The reader may want to write out the definitions of two place Dets such as **FEWER** . . . **THAN** . . ., **TWO MORE** . . . **THAN** . . . , **TWICE AS MANY** . . . **AS** . . . , **THE SAME NUMBER OF** . . . **AS** . . .

Standard Quantifiers: Some Linguistic Generalizations

We consider cases where the quantifier semantics sketched above has proven enlightening in formulating linguistic generalizations. As a first case, observe that in (4a) the presence of *ever*, called a 'negative

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Standard Quantifiers: Some Linguistic Generalizations

We consider cases where the quantifier semantics sketched above has proven enlightening in formulating linguistic generalizations. As a first case, observe that in (4a) the presence of *ever*, called a 'negative

polarity item (npi),' is ungrammatical; in (4b) it is fine.

(4a) *Some student here has ever been to Pinsk.
(4b) No student here has ever been to Pinsk.

Similarly *any* in *No child saw any birds on the walk* is an npi, not licensed in **Some child saw any birds on the walk*. **The linguistic query:** Which NPs in contexts like (4) license npi's? To within a good first approximation, the answer is given by the Ladusaw-Fauconnier Generalization (Ladusaw, 1983): *The NPs which license npi's are just those which denote decreasing (order reversing) generalized quantifiers*. A generalized quantifier F is *decreasing* iff whenever $A \subseteq B$ then if $F(B) = \mathbf{T}$ then $F(A) = \mathbf{T}$. **No student** is decreasing since if all As are Bs ($A \subseteq B$), then if no student is a B, it follows that no student is an A (otherwise that student would also be a B, contrary to assumption). In contrast, **some student** is not decreasing: perhaps all As are Bs and there are many students among the Bs but they all lie among those that are not As. The reader can verify that the following NPs are decreasing and do license npi's: *fewer then five students*, *less than half the students*, *not more than two students*, *neither John nor Bill*, *no student's doctor*. In contrast, NPs such as *John*, *more than five students*, *most poets*, *either John or Bill*, *some student's doctor* are not decreasing and do not license npi's. Keenan and Szabolcsi (*see* **Boole and Algebraic Semantics**) point out that standard negation is also a decreasing function, and it also licenses npi's: **John has ever been to Pinsk* vs. *John hasn't ever been to Pinsk*.

Our first generalization also illustrates that whether an NP of the form [Det + N] is decreasing or not is decided by the Det. So if *no student* is decreasing then, so is *no child*, *no professional acrobat*, etc. since they all have the same Det. Similarly if *some student* is not decreasing, then neither is *some child*, *some professional acrobat*, etc., Many linguists refer to the expressions we call NPs as DPs ('Determiner Phrases'), in part because significant properties of the entire expression, such as whether it is decreasing or not, is decided by the choice of Det. (But other properties, such as whether the expression is animate, feminine, or satisfies the selection restrictions of a predicate, are determined by the N. #*Every idea laughed* is bizarre, since ideas aren't the kinds of things that can laugh and changing the Det does not improve matters: #*Some idea laughed*, #*Most ideas laugh*).

As a second generalization, consider how we may characterize the NPs that are *definite* (plural) in the sense that they may grammatically replace *the poems* in *two of the poems*. Some such NPs are *the ten poems*, *these (ten) cats*, *John's (ten) students*. Some NPs that are not definite (plural) in this sense are: *no poems*, *every cat*, *most students*. Again, to within a first approximation, we may say that the definite plural NPs are those of the form [Det + N], where (in each domain) Det denotes a function f that satisfies:

(5) For all A, either $f(A)(B) = \mathbf{F}$; all B, or for some $X \subseteq A$, $f(A)(B) = \mathbf{T}$ iff $X \subseteq B$.

To illustrate the idea, **(John's ten) (students)** maps each set **B** to **F** if John does not have exactly ten students; if he does, then it maps a set B, such as **daydream in class** to **T** iff the property of being a student-which-John-has is a subset of B. See Barwise and Cooper (1981) and Matthewson (2001) for further discussion.

The two generalizations adduced so far are semantic characterizations of syntactic phenomena. For purposes of defining the class of well-formed expressions in English, we need to know which NPs license npi's in the predicate and which may occur naturally in the post *of* position in partitives. Most approaches to generative grammar desire a purely syntactic definition of these classes. Our observations do not rule out such definitions. Indeed, they provide a criterion for whether a proposed definition is adequate or not. Still, at the time of writing, we have no explicit syntactic definition of these two classes of NPs.

A third problem comparable to our first two is to characterize those NPs that occur naturally in *Existential There* (ET) contexts, as in (6).

(6a) There are/aren't *more than ten boys* in the room.
(6b) *There are/aren't *most boys* in the room.

This problem has vexed generative grammarians since Milsark (1977). See Reuland and ter Meulen (1987) and Keenan (2003). Part of the problem is that affirmative declarative Ss of the form in (6) have a variety of uses, with different uses seemingly allowing different NPs. For example, in so-called 'list contexts' (Rando and Napoli, 1978), ET sentences admit definite NPs such as *the bus* in *How can I get to UCLA from here? Well, there's always the bus, but it doesn't run very often*. But mostly these uses are not preserved in negative or interrogative Ss. Putting aside uses limited to affirmative declarative Ss, Keenan (2003) supports that NPs that occur freely in ET contexts are ones built from Dets that denote a certain kind of 'conservative' function. A Det is, standardly, **conservative**, or as we shall say here, **conservative on its first argument**, if it satisfies (7a), stated more generally in (7b).

(7a) Det poets daydream iff Det poets are poets who daydream
(7b) $D(A)(B) = D(A)(A \cap B)$

To see that *most but not all* is conservative, for example, check that *Most but not all poets daydream* and *Most but not all poets are poets who daydream* always have the same truth value. Indeed, the second sentence seems redundant, with the predicate just repeating information already contained in the Noun argument.

The formulation in (7b) says that in evaluating the truth of D(A) (B), we may limit the predicate argument B to those of its elements that occur in A. In this sense, then, we shall say that D is CONS1, 'conservative on its first argument.' And we support:

(8) **Cons** in general Dets denote CONS1 functions

Cons is a new generalization, not one that arises directly in response to a query from independent linguistic study. It is surprisingly strong. Given a domain E with n elements, Keenan and Stavi (1986) show that for $k = 4^n$ there are 2^k functions from pairs of properties to {**T**,**F**}. Only $2^{k'}$ of these functions are **Cons**, where $k' = 3^n$. So in a domain with just two individuals, there are $2^{16} = 65\,536$ maps from pairs of properties to truth values, only $2^9 = 512$ of which are conservative! So **Cons** rules out most logically possible denotations for Dets. Here is a simple non-conservative function, F: F(A) (B) = **T** iff |A| = |B|. Clearly F({a,b},{a,c}) = **T**, but F({a,b},{a,b} ∩ {a,c}) = F({a,b}{a}) = **F**, so F fails **Cons**.

Now, mathematically it makes sense to ask whether there are Dets that are conservative on their second, predicate, argument. Such Dets would denote functions D satisfying D(A) (B) = D(A ∩ B) (B), where we can limit the As we consider to those that lie in B. Many natural classes of Dets fail CONS2. For example, **universal** Dets, such as *all*, *all but ten*, *every . . . but John*. It might be false that all poets daydream, but it must be true that all poets who daydream daydream. So *all* is not CONS2. Also not CONS2 are **definite** Dets, such as *the*, *the ten*, *these (ten)*, *John's (ten)*; and **proportional** Dets, such as *most*, *half (of) the*, and *not one . . . in ten*. But there is one large class of Dets that are CONS2. They include the *intersective* Dets, ones whose values just depend on which objects have both the Noun property and the Predicate property. For example, *some* is intersective since the truth of SOME(A) (B) is decided just by checking A ∩ B (verifying that it is not empty). Let us define:

(9) D is *intersective* iff for all A, A′, B, B′ if A ∩ B = A′ ∩ B′ then D(A) (B) = D(A′) (B′)

So intersective Ds are ones 'invariant' under replacement of A and B with other arguments A′ and B′ provided the intersection of the pairs of arguments remains unchanged. Note that, an intersective D is necessarily CONS 1: since A ∩ B = A ∩ (A ∩ B) we infer D(A) (B) = D(A) (A ∩ B). And since A ∩ B = (A ∩ B) ∩ B, we have that D(A)(B) = D(A ∩ B)(B), and so intersective Dets are CONS2. In fact:

Theorem D is intersective iff D is CONS1 and CONS2 (Keenan, 2003)

An important special case of intersective Dets are **cardinal** ones, whose values depend on the cardinality of A ∩ B, such as *at least n*, *more/fewer than n*, *at most n*, *approximately n*, *between n and m*, *several*, *a dozen*, *just finitely many*, and *infinitely many*. And we now answer our third query (Keenan, 2003):

(10) NPs which occur freely in Existential There contexts are (boolean compounds of) ones built from CONS2 Dets.

'Boolean compounds' here just refers to NPs built by conjunction, disjunction, and negation. For example, *There are at least two dogs and not more than five cats in the garden* is fine since *at least two dogs* and *more than five cats* both occur in ET contexts.

Example (10) predicts that NPs built from intersective Dets occur in ET contexts, and this is correct: *Aren't there between five and ten students in your class*? *Was there no student (but John) in the building*? etc. (Note that **no . . . but John** treated as a Det is intersective, as *No A but John is a B* is True iff A ∩ B = {John}, that is, the only A that is a B is John). Similarly, the universal, definite, and proportional Dets noted earlier are predicted not to occur freely in ET contexts since they fail CONS2, and this is correct: **Weren't there all/most/the students in the class*?

Are there are CONS2 Dets that fail to be intersective? By the theorem, they would have to fail to be CONS1, and so rather rare. But there are two candidates: NPs of the form [only/mostly N], such as *only poets*. Interpreting *only* as a Det yields ONLY(A) (B) = **T** iff B ⊆ A. For example, *Only poets daydream* is true iff everyone who daydreams is a poet (but there may be poets who don't daydream). Clearly ONLY thus defined is CONS2, since ONLY(A ∩ B)(B) = **T** iff B ⊆ A ∩ B, iff B ⊆ A. So (10) predicts the well-formedness of *There weren't only poets at the party*, which is correct.

A last case covered, unexpectedly, by (10) are NPs built from comparative Dets like *more . . . than. . .* which combined with two Ns to form an NP. Each N property is a conservativity domain. To evaluate whether *More students than teachers daydream* we must consider both the students who daydream and the teachers who daydream. But not only are comparative NPs conservative on their two N arguments; they are intersective, in fact, cardinal. To decide whether more As than Bs have C, we need only check |A ∩ C| and |B ∩ C|, verifying that the

former is greater than the latter. Thus, (10) predicts that cardinal comparatives should occur in ET contexts, and they do: *Weren't there more students than teachers at the party*? (We can also compare predicate properties, as in *More poets drink than smoke*, in which case only the single N property is a conservativity domain).

A fourth linguistic generalization is given in (11), where 'lexical' means 'not syntactically derived.'

(11) Lexical NPs are monotonic, and lexical Dets build monotonic NPs.

A monotonic NP is one that either denotes a decreasing function (already defined) or an increasing one, where a generalized quantifier F is **increasing** iff whenever $A \subseteq B$ then if $F(A) = \mathbf{T}$ then $F(B) = \mathbf{T}$. Lexical NPs, principally proper nouns (*John*, ...) and pronouns (*he*, *she*, ...), are easily seen to be increasing: to paraphrase Aristotle, if all poets daydream and Paul is a poet then Paul daydreams. The reader may verify that *all/some/most/the five/my/John's cats* are all increasing, so lexical Dets usually build increasing NPs. But *no* and *neither* build decreasing ones. The only slightly doubtful case are NPs built from bare numerals, such as *two poets*. The NP is increasing if *two* is understood in the sense of *at least two*; it is not monotonic if understood as *exactly two*. We find the *at least two* reading the most natural because in some cases that is clearly what is intended, as in *Are there two free seats in the front row*? Additional information from context can be invoked to force the *exactly two* reading. Our last generalization in this section is (12):

(12) Natural Language Dets are Domain Independent

In practical applications, such as in database theory (Abiteboul *et al.*, 1995), it is important to know what the domain of objects is that properties under consideration are subsets of. It would be more accurate (van Benthem, 1984) to treat NPs, for example, as functions that associate with each possible domain E a generalized quantifier over E, a function associating with each subset A of E a truth value. Similarly Dets associate with each E a function mapping subsets of E to generalized quantifiers over E. But (12) says that the value a Det denotation D assigns to a pair A, B of properties cannot depend on the choice of underlying domain (as long as A and B are subsets of that domain). This (seemingly vacuous) constraint entails, for example, that natural languages could not present a Det *blik* defined by: *Blik As are Bs* is True iff the number of non-As is two. The truth value of such an S would vary with the domain: if $A = \{a\}$ and $E = \{a,b,c\}$ then it is True, but if $E = \{a,b\}$ it is False.

To close this section, we note that our treatment of NPs and Dets enables us to specify precisely certain traditional, if informally given, classes of expressions. We note two cases. First, the linguistic literature on quantification usually builds heavily on the specific quantifiers *some* and *all*, which we have already defined. But now we can see that they represent two quite general classes of Dets: the *Existential* ones, including *some*, are just those that denote intersective functions, as defined in (9). The *Universal* Dets are those that denote cointersective ones, as defined in (13).

(13) D is *co-intersective* iff for all A, B, X, Y if $A - B = X - Y$ then $D(A)(B) = D(X)(Y)$

Thus, whether a cointersective function D is True of a pair A,B is decided just by checking $A - B$. To see that ALL is cointersective observe that, as defined, $ALL(A)(B) = \mathbf{T}$ iff $|A - B| = 0$. (ALL BUT TEN) (A) (B) $= \mathbf{T}$ iff $|A - B| = 10$, etc. Our approach also enables us to see that proportionality Dets such as *most*, *half*, *more than one ... in ten*, etc., are more complicated than either intersective or cointersective Dets, because their truth at a pair A, B of properties depends on both $A \cap B$ and $A - B$.

Secondly, most of the Dets discussed in the linguistic literature are ones with a 'logical' or 'mathematical' sense: *some*, *every*, *most*, *most of the ten*, *not all*, *most but not all*, *between a third and two thirds of the*, etc. But we have also countenanced a few which are more 'empirical', such as *my*, *John's ten*, *no ... but John*, etc. (see Keenan, 1996). Can we say in precise terms what the distinction is? We can. The logical' Dets are those that are invariant under permutations of the elements of the underlying domain E. A permutation of E is simply a one-to-one function from E onto E. If h is such a function and A a subset of E, then by h(A) is meant $\{h(x) | x \text{ in } A\}$. And we say that a generalized quantifier F is *permutation invariant* (PI) iff for all A, all permutations h of E, $F(A) = F(h(A))$. A Det function D is PI iff for all A,B and all permutations h, $D(A)(B) = D(h(A))(h(B))$. Note that, for any $X \subseteq E$, X and h(X) always have the same cardinality. So the 'logical' quantifiers are those that cannot distinguish between properties A, A′ of the same cardinality (and whose complements, $E - A$ and $E - A'$ have the same cardinality when E is infinite). One computes, then, that Dets such as *some*, *every*, *most*, *most of the ten*, *not all*, *most but not all*, *between a third and two thirds of the* always denote PI functions, whereas ones like *my*, *John's ten*, etc., do not.

Some Non-Standard Quantifiers

We begin by considering the interpretation of the quantified NPs already discussed when they occur as

objects of transitive and ditransitive verbs: *John envies all movie actors*, *He gave most of his teachers several presents*. Many semanticists regard these uses as illustrating a 'type mismatch.' To interpret the object NP in *John interviewed every applicant* we apparently need to treat it as a function mapping a binary relation (**interview**) to a property, but we are already committed to interpreting NPs as maps from properties (unary relations) to truth values (zero-ary relations). But in fact there is no problem here at all. We know exactly what property *interviewed every applicant* denotes. It is the set of objects x such that 'x interviewed every applicant', that is, such that **every applicant** is true of the *set* of objects that x interviewed. In the last phrase, we are applying the generalized quantifier **every applicant** to a set – which is exactly how we have already been interpreting NPs. So the value that an NP denotation assigns to a binary (ternary, . . .) relation is determined by the value that it assigns to sets (properties). So the solution to the 'type mismatch' problem is to treat NPs as directly denoting functions mapping n+1-ary relations to n-ary ones in such a way that their values at $n > 1$-ary relations are determined by their values at the unary relations. Here is the solution for binary relations. Keenan and Westerståhl (1997) give the general statement. We write aR for {b|aRb}, the set of objects that a stands in the relation R to.

(14) A type <1> function F over a universe E maps each subset of E to a truth value and each binary relation R over E to a subset of E by: $F(R) = \{a|F(aR) = \mathbf{T}\}$.

Clearly, then, each generalized quantifier uniquely determines a type <1> function; all we have done is add more objects (binary relations) to its domain. So the interpretation of an S with two quantified NPs is given compositionally, as in (15).

(15a) No politician kissed every baby
(15b) (**no politician**) ((**every baby**) (**kissed**))

Note that, (15b) means 'No politician has the property that he kissed every baby,' the object narrow scope (ONS) reading of (15a). In fact, (15a) does not have an object wide scope (OWS) reading, on which it would mean that every baby has the property that no politician kissed him. But some Ss with two quantified NPs do present such ambiguities, a matter of much concern to linguists (Szabolcsi, 1997). *Some editor read every manuscript* has an ONS reading, representable analogously to (15b), on which it means that there is an editor with the property that he read every ms. But it also has a OWS reading, on which it means that every ms has the property that some editor read it – so the editors may vary with the manuscripts. An easy use of variable binding operators (VBOs) allows us to represent the less accessible OWS reading by:

(16) (**every manuscript** x) ((**some editor**) (**read** x))

The use of VBOs has distracted us from the fact that the range of logically possible interpretations of nonsubject NPs is vastly greater than of subject NPs. Given a universe E with more than one element, there are many more functions from binary relations to properties than there are from properties to truth values. And natural languages provide the means for denoting some of these. To see this, we need a way to test functions H from relations to properties to see if they are possibly extensions of functions from properties to truth values. Here is such a test, given first by example, where we test X:

(17a) If John praised exactly the people who Bill criticized then John praised X iff Bill criticized X
(17b) If $aR = bS$ then $a \in F(R)$ iff $b \in F(S)$

For example, *most of the Peter's students* passes the X test in (17a). Given the truth of the *if*-clause, we infer that *John praised most of Peter's students* and *Bill criticized most of Peter's students* have the same truth value. (This is hardly surprising; the NP we are testing occurs as a subject of a P1 and thus is interpretable as a generalized quantifier.)

But consider now the reflexive pronoun *himself*. It fails the test. Imagine, for example, that the *if*-clause is true and that John praised just Sam, Frank, Bill, and Sue. Then those are just the people that Bill criticized, so *Bill criticized himself* is true, but *John criticized himself* is false. Hence, there is *no* function from properties to truth value that takes exactly the value on binary relations as **himself** does. That is, reflexives represent an increase in logical expressive power. Moreover *himself* is not unique here; all (nontrivial) referentially dependent NPs in object position are logically new in this sense. This includes ones like *everyone but himself*, *both himself and the teacher*, *everyone smarter than himself* (as in *John criticizes everyone smarter than himself*) in which the NP must be referentially dependent, as well as NPs like *his mother* where it simply may be dependent. It is the dependent interpretation where it is new.

The increase in logical expressive power afforded by nonsubject NPs is far more extensive than instantiated by the referentially dependent NPs. They are not functions of type <1>, but they can be correctly interpreted as functions from binary relations to sets, (just not ones that extend appropriately a generalized quantifier). But the sort of dependency in (18) cannot be handled in a comparable way:

(18) Different people like different things

The weakest truth conditions of (18) are easy to state: for any two (different) people x and y, the set of things that x likes is not identical to the set that y likes. And we know (Keenan, 1996) that over any domain with several people and things, there are *no* type <1> functions F and G such that for all binary relations R, F(G(R)) is true iff different people stand in the relation R to different things. Similar claims hold for other Ss which involve comparing different object sets with different choices of subject argument: *John and Bill support rival political parties*, *Rosa and Zelda date men who dislike each other*, etc. In fact, the same claim holds even when the comparison is not one of difference: *All the students answered the same questions on the exam*, *They wore the same color necktie*, etc. Speaking very informally, we can say that the combination of subject and object expressions in these Ss place conditions on the relation denoted by the transitive verb which are inherently 'relational,' not expressible as independently statable conditions on each argument. To state this more explicitly, let us define:

(19) A function H from binary relations to truth values is said to be of type <2>. Such a function is type <1> *reducible* iff there there are type <1> functions F,G such that for all binary relations R, H(R) = F(G(R)).

Then what we are saying above is that the type <2> functions expressed by (Different people, different things), (John and Bill, rival political parties), etc., are not type <1> reducible. Thus, they are not expressible as the composition of two generalized quantifiers, and so are logically new. Some additional examples are induced by the *else-else* construction in (20), the *which-which* construction in (21), reciprocal objects in (22), and predicate anaphors in (23). For further examples, see Keenan (1996).

(20) John didn't praise Bill but everyone else praised everyone else.
John praised Bill but no one else praised anyone else.

(21) John doesn't know which students answered which questions on the exam.

(22) The students were shouting at each other.

(23) John read more books than Bill (did).

In sum, we have a list of expression types that are not type <1> reducible, but we do not know precisely what type <2> functions are expressible. All of them (over finite E)?

Thus, much remains to be discovered even in English, the language in which quantifiers have been the most extensively studied. And we are really just beginning to study quantification in less well known languages (Bach *et al.*, 1995; Matthewson, 2001) as well as in contexts other than that of NPs and Dets, the most prominent here being temporal and event quantification, using adverbial quantifiers, as in *Matt always/often/occasionally/seldom/rarely/never visits museums on weekends* (de Swart, 1996).

Answers to Exercises
(**AT LEAST TWO**) (A) (B) = **T** iff $|A \cap B| \geq 2$
BOTH(A) (B) = **T** iff $|A| = 2$ and $A \subseteq B$
(**AT MOST FIVE OF THE TEN**) (A) (B) = **T** iff $|A| = 10$ and $|A \cap B| \leq 5$
(**LESS THAN HALF THE**) (A) (B) = **T** iff $|A \cap B| < |A|/2$

See also: Boole and Algebraic Semantics; Formal Semantics; Monotonicity and Generalized Quantifiers.

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Quantity

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In many languages, quantity has a contrastive function. In languages of this type, certain segments behave phonologically as if they really are two segments. These segments contrast with qualitatively identical segments that behave phonologically as single segments. An example of a language with a quantity contrast among vowels, as well as consonants is Luganda (Ganda). This is illustrated by the following words, taken from Katamba (1989).

(1)

phonological form	phonetic realization	
/kula/	[kula]	'grow up, IMP.'
/kuula/	[ku:la]	'uproot, IMP.'
/ta/	[ta]	'release, IMP.'
/tta/	[t:a]	'kill, IMP.'

In the majority of these languages, the phonological contrast between double (geminate) segments and single segments is phonetically implemented as a contrast between segments with greater duration versus segments with shorter duration. One of the languages where this is the case is Luganda, as shown by the examples above. This should not be taken to mean that in these languages a geminate segment is always phonetically longer than a corresponding single segment by a fixed amount of time, since there are many factors that influence phonetic duration. Some of the more important phonetic factors are the following: all else being equal, lower vowels are longer than higher vowels (Lehiste, 1970); vowels in open syllables are longer than vowels in closed syllables (Maddieson, 1985); vowels preceding voiced consonants are longer than those preceding voiceless consonants (Chen, 1970); vowels preceding fricatives are longer than vowels preceding stops (House, 1961); stressed vowels are longer than unstressed ones (Beckman *et al.*, 1992). Given these complicating factors, it can happen that a phonological geminate is realized with only little more phonetic length, or even less phonetic length, than a phonologically simple segment.

In almost all cases, the quantity contrast is binary. Apparent examples of ternary contrasts can almost always be reduced to a binary contrast by one of the phonetic tendencies listed above. Thus, in Estonian the third consonantal quantity is really a phonologically geminate consonant that is phonetically lengthened in a stressed syllable (Lehiste, 1966; Prince, 1980). Another, particularly convincing case is KiKamba (Kamba). Roberts-Kohno (1995) shows that in this language, the multiple quantity degrees attested on vowels can be reduced to a binary contrast by a system of phonetic lengthening rules. Yet apparently not all multiple quantity degrees can be reduced to a binary contrast. Ladefoged and Maddieson (1996) agree with Hoogshagen (1959) that Mixe is a language with a ternary quantity contrast on vowels.

In the classical generative literature (Chomsky and Halle, 1968), quantity was represented with the binary feature [long]. It soon became clear that this representation is wrong because it cannot capture the most fundamental property of geminate sounds, which is that they behave as a sequence of two single segments with respect to many phonological phenomena. This general phenomenon can take many specific forms. Some of the most frequent

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Quantity

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In many languages, quantity has a contrastive function. In languages of this type, certain segments behave phonologically as if they really are two segments. These segments contrast with qualitatively identical segments that behave phonologically as single segments. An example of a language with a quantity contrast among vowels, as well as consonants is Luganda (Ganda). This is illustrated by the following words, taken from Katamba (1989).

(1)

phonological form	phonetic realization	
/kula/	[kula]	'grow up, IMP.'
/kuula/	[ku:la]	'uproot, IMP.'
/ta/	[ta]	'release, IMP.'
/tta/	[t:a]	'kill, IMP.'

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In the classical generative literature (Chomsky and Halle, 1968), quantity was represented with the binary feature [long]. It soon became clear that this representation is wrong because it cannot capture the most fundamental property of geminate sounds, which is that they behave as a sequence of two single segments with respect to many phonological phenomena. This general phenomenon can take many specific forms. Some of the most frequent

instantiations involve tonal processes, foot structure, and syllable structure.

From a tonological point of view, geminate segments are often identical to a sequence of two segments. In Hausa, for instance, a falling tone can only appear in a syllable containing two segments (neglecting prevocalic consonants). Quite typically, it can also appear in syllables with a long vowel, and in a syllable with a short vowel followed by a long consonant. This indicates that long segments (vowels and consonants) are phonologically geminates; they count as a sequence of two segments. The following examples are taken from Newman (1995). In these examples, the first syllable has a falling tone; the second syllable has a high tone.

(2) mântáa 'forget'
yâaráa 'children'
shâddáa 'latrine'

Similar patterns are attested in many languages. Thus, Kenstowicz (1994) demonstrates that, from a tonal point of view, in Makua (Makhuwa) a long vowel behaves as a sequence of two syllables with short vowels. Furthermore, Kenstowicz (1970) demonstrates that in Lithuanian long vowels and short vowels followed by a tautosyllabic consonant can have the same tone patterns. Similar arguments have been presented in Woo (1969).

Also with regard to foot structure, long vowels and consonants form a natural class with a sequence of two segments. Thus, in the weight-sensitive feet, the even moraic trochee, the uneven moraic trochee, and the iamb, a foot's unstressed syllable must be light (Hayes, 1995). Very often this entails that this syllable may not contain two segments, counting from the vowel. Quite typically, it also implies that no long vowels or long consonants may be located in the foot's unstressed syllable. One of the many languages where this pattern is attested is Latin. This language has an uneven trochee that is built at the right side of a word, neglecting the final syllable, which is extrametrical. Thus, in Latin the following words are well formed, because the foot's unstressed syllable (the penult syllable) satisfies all conditions. In these examples, taken from Hayes (1995), foot structure is indicated with brackets.

(3) inimi:(kíti)a 'hostility'
(símu)la 'similate-2 SG.IMP'
do(mésti)kus 'belonging to the house'

On the other hand, in the following words stress may not be located on the antepenult syllable. If it could, the unstressed syllable of the foot would contain a heavy syllable. The stress must therefore be located on the penult syllable.

(4) orna(mén)tum 'equipment'
a(mí:)kus 'friend'
mi(tél:)a 'head band'

Again these facts show that a sequence of two segments, such as *en* in *ornamentum*, patterns with long vowels and consonants, indicating that they constitute a natural class.

Syllable structure also indicates that long segments should be treated as geminates phonologically. In many languages, there is an upper limit to the number of segments located in one and the same syllable. In Dutch, for instance, a short vowel may be followed by maximally two consonants in the same syllable, neglecting the coronal consonants *t* and *s*. In this language, a syllable's maximal size is three segments, one could say (neglecting the segments preceding the vowel). Typically, a long vowel may be followed by just one consonant in the same syllable. This is expected if long vowels are treated as geminates. Under this assumption, a long vowel occupies two positions in the syllable, so that there is room for just one other segment (cf. Trommelen, 1983 and van der Hulst, 1984; cf. van Oostendorp, 1995 for an alternative). The following examples illustrate the complementary distribution between long vowels and consonant clusters in Dutch.

(5) ram 'ram'
ramp 'disaster'
raam 'window'
*raamp

Similar effects can be found in many other languages. Japanese, for instance, allows maximally two segments in a syllable (neglecting the prevocalic consonants) (Itô, 1986; Vance, 1987). Typically, long vowels cannot be followed by a consonant in the same syllable.

All these phenomena have led phonologists to the conclusion that the feature [long] is wrong. It must be replaced by a representation that can express the fact that long segments behave as two segments. The first, obvious attempt was to represent a long segment as a sequence of two identical segments, as in Kenstowicz (1970). It is clear, however, that this cannot be correct either. The reason is that there are also many phenomena indicating that long segments do **not** behave as a sequence of two segments. To give one example: in many languages a sequence of two adjacent vowels is not allowed. Yet, it can happen that these languages do allow long vowels. One such language is Luganda (Rosenthall, 1994). In this language, it even is the case that, under the appropriate circumstances, a sequence of two vowels is changed into a long vowel. This unambiguously shows that long segments can be very different from a sequence of two

segments. The following illustrative examples are taken from Rosenthall (1994).

(6)

underlying structure	phonetic realization	
/ka+oto/	[ko:to]	'fireplace-DIM'
/ka+ezi/	[ke:zi]	'moon-DIM'

A way out of this dilemma was proposed in Clements and Keyser (1983). Inspired by McCarthy (1979), they propose that a long segment is a single segment linked to two positions on a timing tier. Schematically (and slightly simplifying) long segments have the following structure:

(7) long vowel long consonant

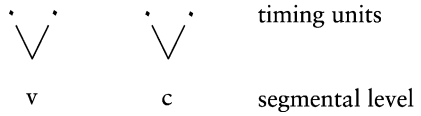

These representations can elegantly explain the hybrid nature of long segments. Their geminate character is expressed at the level of the timing units. At that level they occupy two positions. However, at the segmental level they are just one single element. This can explain why there are phenomena that do not treat long segments as geminates.

With the help of these representations, certain frequently occurring processes could easily be explained that were very puzzling from the perspective of the feature [long]. Some of the more important phenomena are compensatory lengthening, prenasal-consonant lengthening and postconsonant-glide lengthening. Compensatory lengthening is a process whereby a segment is lengthened if a neighboring segment is deleted (Hayes, 1989). The following example is from Turkish and it is taken from Sezer (1986).

(8) ovmak ~ o:mak 'rub, INF'

In terms of timing units, it is quite easy to understand what happens. The segment *v* is (optionally) deleted, but its timing unit is left behind. This is then filled by the vowel.

(9)

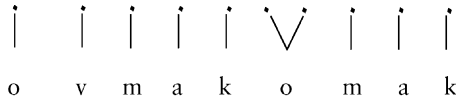

In prenasal-consonant lengthening, a nasal segment is moved from a closed syllable to the onset of the next syllable (Clements, 1986). Again, the moving segment leaves its timing unit behind. The vacated timing unit is then filled by the neighboring vowel. The following illustrative examples are from Luganda.

(10)

/ku + linda/	[kuli:^{n}da]	'to wait'
/ba + ntu/	[ba:^{n}tu]	'people'

At the level of the timing units, this change can be expressed in the following way:

(11)

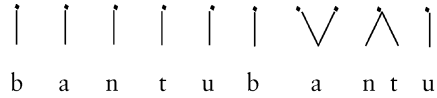

Another frequent phenomenon involving timing units is postconsonant-glide lengthening. This is a process whereby a high vowel is moved to the onset, where it is realized as a glide. Again the vacated timing unit is filled by the neighboring vowel. The following examples are again from Luganda. They are taken from Clements (1986).

(12)

/li + ato/	[l^{y}a:to]	'boat'
/mu + oyo/	[m^{w}o:yo]	'soul'

In terms of the timing units, the following changes take place:

(13)

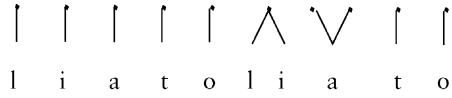

All these phenomena have in common that they cannot be explained with the feature [long]. In the case of postconsonant-glide lengthening, for instance, it is difficult to understand why a vowel is changed from [−long] to [+long] when the high vowel preceding it is syllabified in the onset position. There is no natural connection between the movement of the high vowel and the change from [−long] to [+long]. In terms of timing units, however, the connection is clear, as explained above: the moving segment leaves its timing unit behind.

The interest of processes such as compensatory lengthening, prenasal-consonant lengthening and postconsonant-glide lengthening can hardly be underestimated. Not only do they show that the feature [long] is highly problematic, they also provide independent motivation for the representation of quantity in terms of linking relations between two levels, the segmental level and the level where timing units are located.

This hypothesis has also served as an explanation for two important properties of geminate consonants, integrity and inalterability. Integrity refers to the fact that a geminate consonant typically does not allow epenthesis in between its two timing units. Guerssel (1978) shows that the Ait Segrouchen dialect of Berber (Middle Atlas Berber) has a rule that epenthesizes a schwa after the first consonant in a series of three consonants. However, this rule does not apply in a form such as /ddlu/ 'she covered,' showing that a geminate consonant blocks the rule.

Inalterability refers to the fact that many processes that apply to short segments do not apply

to corresponding geminate consonants. Tiberian Hebrew is a famous example of a language where geminate consonants exhibit inalterability effects. In this language, velars, labials, and nonemphatic consonants spirantize in postvocalic position (Elmedlaoui, 1993). However, spirantization does not apply to a geminate consonant. This is illustrated by the following examples (taken from Elmedlaoui, 1993):

(14)	Causative Perfect	Basic Perfect	
	[zik:e:r]	[za:xar]	'remember'
	[kip:e:r]	[ka:φar]	'cover'

Many explanations of integrity and inalterability have been based on the doubly linked representation of geminates. According to some proposals, integrity would follow from the fact that epenthesis in the domain of a geminate violates one of the fundamental principles of autosegmental phonology: association lines should not cross (Goldsmith, 1976). To see this, consider what would happen if a vowel were inserted in our Berber example /ddlu/ ('v' represents a vowel').

(15)

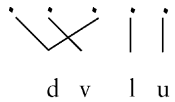

Epenthesis would necessarily have to break the lines connecting the segmental level of the geminate with the level of its timing units. Since this is not allowed, epenthesis is not possible (Goldsmith, 1990).

Inalterability has been explained by conditions governing the interaction between rules and representations (Hayes, 1986; Schein and Steriade, 1986). Recent theories, in particular Optimality Theory, can no longer work with these conditions, for the simple reason that they no longer recognize rules. Interestingly, it has been revealed in a number of publications that these rule conditions are empirically wrong anyway, because they make incorrect predictions as to the class of processes that exhibit inalterability (Inkelas and Cho, 1993; D. Churma, personal communication). According to Churma, inalterability only holds universally in the domain of lenition. This generalization cannot be captured by conditions on how rules interpret representations. Accordingly, researchers have sought to explain inalterability along entirely different lines. Kirchner (1998) proposes that the behavior of geminates with respect to lenition phenomena is to be understood in terms of avoidance of articulatory effort. Thus, geminate stops tend not to undergo lenition for the simple reason that lenited geminates, i.e., geminate continuant consonants, require more articulatory effort. Independent evidence for this hypothesis, according to Kirchner, comes from the crosslinguistic distribution of geminate consonants; languages with geminate obstruents overwhelmingly have geminate stops. That is, there are (almost) no languages with geminates fricatives without the corresponding geminate stops (Kirchner admits that there are two exceptions in Maddieson, 1984: Greenlandic and Iraqw). It should be noted that in Kirchner's explanation, the geminate representation of long consonants does not play a crucial role; long consonants could just as well be represented as [+long].

Two further problems concerning geminate segments should be mentioned. The first concerns the phonetic interpretation of doubly linked segments. According to some researchers, it is not always the case that phonological geminates are realized phonetically as long segments. Thus, Ségéral and Scheer (2001) show quite convincingly that in Somali certain consonants behave as if they are geminates, although they are phonetically short. The 'ambisyllabic' consonants of Dutch provide another argument for the hypothesis that phonological geminates are not necessarily phonetically long segments.

In Dutch closed, penult syllables normally attract stress (van der Hulst, 1984). Interestingly, words with a lax vowel in the penult syllable also attract stress, as shown by a word such as *gorílla*. Both phenomena find a uniform explanation if it is assumed that in words such as *gorílla* the intervocalic *l* is really a geminate, as suggested by Dutch orthography. But that is only possible if we are willing to accept that phonological geminates are not always phonetically long, because in Dutch the consonants in intervocalic position following a lax vowel are definitely short. If we admit this possibility, then we have the following relation between phonetically long segments and phonologically geminate segments. While it is presumably true that phonetically long segments always have a geminate representation in phonology, the reverse does not hold; phonologically geminate segments are not always phonetically long.

There is another problem that still has not been solved. It was soon discovered that there is something fundamentally wrong with timing units. To understand why timing units are problematic we have to consider compensatory lengthening again. We have seen that in Turkish in a word such as *ovmak* the *v* can optionally be deleted and that this deletion process is accompanied by the lengthening of the preceding vowel. Interestingly, deletion is not always accompanied by vowel lengthening. In a word like *ovar* 'rub, AOR,' for instance, the *v* can be deleted, but if that happens the preceding vowel is not lengthened. How can words such as *ovmak* be distinguished from words such as *ovar*, such that consonant

deletion leads to vowel lengthening only in the former type? In terms of timing units, the answer is not obvious. In fact, there is no reason why the vowel should not lengthen after the deletion of the consonant in a word such as *ovar*. This is shown in the following representation.

(16)

Hayes (1989) tried to solve this problem with the help of moraic structure. According to Hayes, segments that trigger vowel lengthening after deletion are associated with a mora, whereas the consonants that are not accompanied by vowel lengthening after deletion are not linked to a mora. In this theory, the two Turkish examples can be distinguished as follows (the status of the word-final consonant in terms of moraic structure has not been made explicit):

(17)

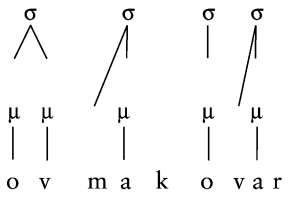

In *ovmak* the *v* is linked to a mora. If it is deleted its mora is left behind. This mora can be the target for the vowel. In *ovar*, on the other hand, nothing is left behind if the consonant is deleted, so there is no target for the vowel. This is shown in the following representations.

(18)

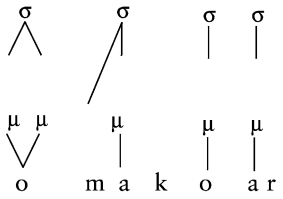

One of the major predictions of this theory is that the loss of onset consonants can never be accompanied by lengthening, because onset consonants are never moraic.

With the replacement of timing units by moras, geminate vowels can be represented straightforwardly as one segment linked to two moras, as shown in the representation of *[o:mak]*. Now, the problem that still has not been solved concerns the representation of geminate consonants in terms of moraic structure.

One possibility would be to say that geminate consonants have a mora. In this view gemination of consonants is expressed in terms of double linking between a single segment and a mora plus an adjacent syllable (at least in most cases). Interestingly, this representation explains many integrity and inalterability effects, as shown in Inkelas and Cho (1993). In their analysis, these effects are a consequence of the fact that phonological processes do not apply to geminate consonants, because, if they would, they would lead to the loss of a mora. This is not allowed.

In the moraic theory of geminate consonants, the Latin word *mitella* (cf. above) would have the following representation.

(19)

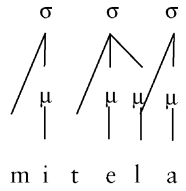

This theory, proposed in Hayes (1989), predicts that geminate consonants **always** contribute to weight, because weight is expressed in terms of moraic structure. According to many phonologists, this is highly problematic. Languages do exist where geminate consonants do not contribute to weight (Selkirk, 1990; Tranel, 1991; Baker, 1997; Hume *et al.*, 1997). The argument presented by Hume *et al.* is particularly revealing. They show that Leti has a minimal word condition that requires lexical words to be minimally bimoraic. Leti also has geminate consonants in word-initial position. Now, if geminates were moraic, then it is predicted that Leti has words of the forms [c:v], because these words would satisfy the minimal word condition. In fact, Leti does not have these words. This is a problem for the moraic theory of geminates, according to the authors. To solve this problem, they propose to express gemination in terms of root nodes; a geminate consonant is a segment with two root nodes.

(20)

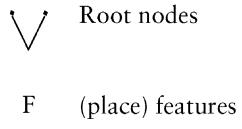

The first root node may or may not be linked to a mora. This is determined on a language-particular basis. In Latin it is, which explains why in this language geminates attract stress. In Leti it is not, according to Hume *et al.* (1997) The latter assumption explains why Leti does not have words of the structure [c:v]. These words do not satisfy the minimal word condition, because in this language geminates do not have a mora. This can be shown with the following representation.

(21)

Davis (2003) proposes an alternative solution, allowing him to maintain the moraic theory of geminates. He suggests that the initial geminates of Leti are extraprosodic. He shows that this is independently motivated by the phonotactics of this language. In word-initial position, Leti allows for almost any possible sequence of two consonants. There are no sonority restrictions on this sequence. This indicates that Leti has an extraprosodic position at the beginning of a lexical word. The structure of geminate consonants is an aspect of phonological quantity that is still not entirely clear.

See also: Feature Organization; Syllabic Constituents.

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Quechua

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The name Quechua (also Quichua or Runa Simi) is used for a group of closely related Amerindian languages or dialects, spoken in parts of the Andean states of Argentina, Bolivia, Colombia, Ecuador, and Peru. Although Quechua is traditionally referred to as a language and its local varieties as dialects, substantial local differences often prevent mutual intelligibility. Estimates for the total number of Quechua speakers vary between 7 and 10 million, although the lower number seems to have a firmer statistical basis. In Peru, the number of Quechua speakers ranges between 3 and 4 million; in Bolivia there are about 2 400 000 speakers. Geographically, the Quechua language area does not form a continuum; it is interrupted by large hispanophone and Aymara-speaking regions.

Linguistic reconstruction suggests that, at the end of the first millennium A.D., Quechua was widely spoken along the coast and in the mountains of central Peru with possible extensions into the southern and northern Andean parts of that country. Toward the end of their expansion, at the end of the 15th century, the rulers of the Inca empire adopted as their language of administration a variety of Quechua, referred to by the Spanish conquerors as *La lengua general del Inga* ('The general language of the Inca'). The Incas contributed to the spread of Quechua into outlying areas of their empire (highland Ecuador, northwestern Argentina) by an active policy of forced migrations (*mitimaes*).

The name Quechua came into use in the second half of the 16th century. It was probably derived from the term for temperate altitude zones situated at about 10 000 feet or from the name of a province and ethnic group in the present-day department of Apurimac. The first grammar of Quechua, by Domingo de Santo Tomás, dates from 1560. During most of the colonial period, the Spanish authorities stimulated the use of Quechua as a language of colonization and evangelization, introducing it to the detriment of many local languages into areas where it had never been used before. A new standard language was created, soon to be replaced as the language of indigenous prestige by the Quechua dialect of the former Inca capital Cuzco. The early 18th century brought a period of Quechua cultural revival and literary activity. It came to an end around 1770, when cultural and linguistic repression by the Spanish rulers initiated the decline of the Quechua language that has continued until recently. In spite of stimulating measures, such as the official recognition of Quechua as a second national language in Peru (1975), the prospects of Quechua have hardly improved.

From a historical and genealogical point of view, Quechua has no proven external relatives. There are phonological, structural, and lexical similarities with the neighboring Aymaran (also called Jaqi or Aru) languages, which indicate a protracted period of interaction between the two groups. Most of these similarities, which also include more than 20% of shared lexicon, do not extend to other languages in the area. The similarities between Quechua and Aymaran have often been interpreted as proof of a common origin (the Quechumaran hypothesis). However, practically all the similarities can be attributed to convergence, making it difficult to distinguish between borrowed and inherited material (*see* **Aymara** and **Andean Languages**).

Internally, the Quechua family is subdivided into two main groups. The first group (Quechua I or Central Peruvian Quechua) is located in the Andes of central and central northern Peru. One of its most

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Internally, the Quechua family is subdivided into two main groups. The first group (Quechua I or Central Peruvian Quechua) is located in the Andes of central and central northern Peru. One of its most

vital dialects is Ancash Quechua, but many other Quechua I dialects are close to extinction. The second group (Quechua II) comprises the dialects spoken in southern Peru (Ayacucho, Cuzco, Puno), some dialects in northern Peru (Cajamarca, Ferreñafe, Chachapoyas, Lamas), and all the Quechua dialects spoken in Bolivia (Apolo, Cochabamba, Potosí, Sucre), Ecuador (Highland and Eastern Lowlands Quichua), Argentina (Santiago del Estero, Jujuy), and Colombia (the Ingano dialect in Caquetá and Nariño). The largest numbers of Quechua speakers use the Ayacucho, Cuzco, and Puno dialects; Bolivian Quechua; and Ecuadorian Highland Quechua.

Quechua phonology varies according to dialect, but is generally simple. The vowel system consists of three vowels (*a*, *i*, *u*), the high vowels being lowered to (*e*, *o*) next to a uvular consonant. An additional distinction between long and short vowels is found in Quechua I. Stops are generally voiceless. There is a contrast between velar and uvular stops, although the latter have become fricative in many dialects. Some dialects preserve a distinction between palatal and retroflex affricates. Glottalized and aspirated stops are found in the dialects bordering on Aymara (Cuzco, Puno, Bolivian); aspirated stops are also found in Ecuador. In most dialects, stress is predictably located on the penultimate syllable or mora. Quechua word structure does not allow sequences of consonants within a syllable.

Quechua has an agglutinating structure mainly based on suffixation; there are no prefixes at all. The morphology is complex, but regular. (Ecuadorian and Colombian Quechua have a much simplified morphology in relation to the other Quechua dialects.) Words containing as many as eight consecutive suffixes are not exceptional. Verb-final order is obligatory in dependent clauses, and it is the preferred constituent order in full sentences. In noun phrases, all modifiers precede their heads, except for relative clauses in some dialects.

Nouns can be marked for case, number (plural), and person of possessor. The overall structure of the language is nominative-accusative. Objects must be marked for accusative case, unless they precede a nominalized verb. Plural marking on nouns is optional, although not infrequent. In the southern Quechua II dialects, both the number of a nominal referent and of its possessor can be indicated morphologically. The pronominal system and the personal paradigm include a distinction between inclusive and exclusive first-person plural.

Verbs in Quechua exhibit a rich derivational morphology, including causative, applicative, reflexive, reciprocal, desiderative, and several other options; they are also marked for tense, mood, aspect, speaker orientation ('hither'), personal reference (including the inclusive-exclusive distinction), and number (of subject and/or object). Personal reference not only includes a specification of the subject but also of a direct or indirect object, provided that the latter is a participant in the speech act. In the area of personal reference, tense, and mood, several portmanteau suffixes occur.

Nominalization and direct verbal subordination play a central role in Quechua morphosyntax. Different types of dependent clauses are obtained by combining nominalized verbs with specific case markers. Nominalization is also used to form relative clauses. Subordinated verbs encode a system of switch-reference (i.e., they indicate whether or not the subject of the dependent clause coincides with that of the main clause).

Sentential affixes or enclitics are used to indicate evidentiality (assertion, hearsay, conjecture), topic-comment structure, interrogation and negation, inclusion ('also'), (non-)completion ('already,' 'yet'), emphasis, and several attitudinal functions.

See also: Andean Languages; Argentina: Language Situation; Aymara; Bolivia: Language Situation; Colombia: Language Situation; Ecuador: Language Situation; Peru: Language Situation.

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Queer Talk

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Queer Language and Queer Linguistics

The word 'queer' has been used in a variety of ways (see McConnell-Ginet (2002) for a detailed discussion). In the early 20th century in the United States, the term queer was used as a term of self-reference (or identity category) for homosexual men who adopted masculine behavior (Chauncey, 1994: 16–18). By the 1970s, 'queer' had been appropriated by heterosexuals as a pejorative and ceased to be used as a term for self-reference by homosexual men. In the late 1980s and early 1990s, a political activist organization known as Queer Nation attempted to reclaim 'queer' as a general term for sexual and gender minorities. The term was subsequently taken up in academic writing in the emerging field of queer theory, an extension of theoretical work in feminist theory that deals with issues of sexuality, sexual identity, and gender identity. The term queer has since been used in different and often conflicting ways. As originally used in queer theory, the term queer was not intended as an identity label to refer to a particular externally defined group. Queer theorists rejected terms such as 'gay' or 'lesbian' as inherently exclusionary and argued that identity categories marginalize individuals who are not prototypical members of a given identity category. The use of 'queer' was intended as a means of rejecting identity labels by proposing a term that referred to all individuals who were marginalized in some way by heteronormativity, the social norms associated with hegemonic heterosexuality. Thus, 'queer' includes (but is not restricted to) all sexual and gender minorities. In this usage, the actual membership in a 'queer' community is left intentionally vague because 'queer' is defined not in terms of who belongs but in terms of what queers react against. Thus, the common denominator for queers is their marginalization and exclusion rather than being unified by some common identity or shared social practices. The 'queering' of academic disciplines was proposed as a means of turning attention toward those individuals who had been traditionally marginalized in social theory. By focusing on individuals who are not prototypical members of traditional (etic) identity categories, queer theory attempts to gain insight into the normative forces that underlie social practice. Research that falls within the realm of queer linguistics does not always deal with speakers who are gay, lesbian, or transgendered but may deal with speakers who are marginalized in other ways, as with Mary Bucholtz's (1999) research on the language of self-proclaimed 'nerds.'

Within linguistics, this use of 'queer' has been adopted by those working in 'queer linguistics' (Barrett, 1997, 2002; Bucholtz and Hall, 2003, 2004; Hall, 2003; Livia and Hall, 1997a) in an attempt to adopt and amend proposals from queer theory into a framework for the study of language. Although 'queer' within queer linguistics was intended to refer to queer theory (rather than any community of actual queers), this use of 'queer' has been criticized primarily on the grounds that it does not refer to any externally definable social group (Kulick, 2000; Leap, 2002). In contrast to sociolinguistic frameworks focusing on norms of language variation that categorize individuals into speech communities based on etic identity categories, queer linguistics assumes that speech communities are prototype categories that do not have clearly definable boundaries. The field of queer linguistics emphasizes the language practices at the margins of traditional approaches in order to examine how membership in particular speech communities is negotiated and contested (Bucholtz and Hall, 2003, 2004). Central to queer linguistics is the view that the indexical meanings associated with linguistic variables are performative in that they may create both speaker identities and social contexts. By using particular linguistic variables, speakers may associate themselves with (or in opposition to) particular identity categories and norms for the interpretation and use of indexical meanings (Bucholtz and Hall, 2003, 2004) (*see* **Pragmatic Indexing**).

In usage outside of academic writing, the term queer is often used as a cover term to refer to gay, lesbian, bisexual, and transgendered people. However, recent usage suggests that in public discourse 'queer' may be shifting toward use as an androcentric generic, similar to 'man' or 'gay' (Cohen, 2002). Rather than attempt to discuss the language of a hypothetical group of queers, the remainder of this article focuses on studies that have been central in the development of queer linguistics, including gay and lesbian language use, transgendered language, and the role of language in maintaining heteronormativity.

The Study of Gay Male and Lesbian Language

The study of gay male ways of speaking first emerged in the early 20th century (see Cameron and Kulick (2003) for a summary of the history of this research). During this period, male homosexuality was understood largely in terms of gender expression, and men

and women who displayed normative gendered behaviors were not generally considered homosexual, even if they engaged in sexual acts with members of their own sex (Chauncey, 1994). Early work typically viewed homosexuality as a psychological disorder and usually involved collecting lexical items from the 'secret' argot of homosexual men. Because gay male language was seen as a byproduct of deviant sexuality and gender expression, research focused primarily on sexual vocabulary and the alternative use of gendered language, such as the use of female pronouns and feminine proper names by gay men. During this period, the language of lesbians received much less attention, given the centrality of effeminate men in prevalent understandings of homosexuality.

In the years before and after World War II, views of homosexuality shifted so that 'gay' identity was understood in terms of sexual practices rather than gender expression. It was during this period of research that current debates about gay and lesbian language began to emerge. Whereas some linguists saw gay male and lesbian language as a unique form of cultural expression, others viewed gay and lesbian 'argot' as a result of oppression and marginalization. Those who favored assimilation and believed that gay men and lesbians should differ from heterosexuals only in terms of sexual practice viewed homosexual 'slang' as a byproduct of oppression against homosexuality.

After the Stonewall riots in New York in 1968 and the passage of the 1967 Sexual Offences Act in the United Kingdom, the gay and lesbian civil rights movement began to gain ground. During the 1970s, research on gay male language continued to focus primarily on lexical items and gender crossing. Building on the 'ethnic model' of the civil rights movement, linguists typically viewed gay male language as a basic component of gay and lesbian culture. During this period, scholars such as Bruce Rogers (1972) and Julia Penelope Stanley (1970) collected extensive vocabularies of lexical items that were typically seen as reflecting the unique cultural identity of gay and lesbian speakers. Some scholars, however, continued to view gay and lesbian language as a secretive argot (Farrell, 1972).

The first major collection of research specifically examining gay and lesbian language was *Gayspeak* (Chesebro, 1981). This collection laid out many of the debates that had been building in the field and continue into more recent research (Barrett, 2003). Hayes (1981) argued that 'gayspeak' was an authentically gay way of speaking that differed from heterosexual language in three particular contexts: the 'secret setting,' the 'social setting,' and the 'activist-radical setting.' In the secret setting gay men use particular forms of language to convey their sexuality to one another without making their sexuality known to heterosexuals who might hear their conversation. Painter (1981) also described this type of covert communication among lesbians. In the social settings, Hayes described the use of specific vocabulary and discourse styles associated with contexts in which all participants were gay, whereas the activist–radical setting referred to the language of the gay and lesbian civil rights movement. In responding to Hayes, Darsey (1981) questioned the existence of gayspeak, arguing that the structures described by Hayes were not unique to gay or lesbian communities. Like earlier scholars who believed that the unique elements of gay language resulted from resistance to social stigma, Darsey argued that gay male language was not particularly different from the language used by other marginalized groups.

The debate between Darsey and Hayes resurfaced in response to the work of William Leap (1996). Leap followed Hayes in arguing for an authentically gay male language, gay men's English, that differs from the language of heterosexuals. Leap described gay men's English largely in terms of norms for interaction such as the use of cooperative discourse. Kulick (2000) followed Darsey in claiming that none of the structures described by Leap are unique to gay men and, therefore, gay men's English does not exist. However, Leap openly admitted that his view of gay men's English is restricted to a specific subset of gay men, namely white middle-class men in the United States. Leap argued that although gay men's English does not reflect the language of all gay men who speak English, it is an important marker of gay identity for many speakers and has spread to other groups of gay men with the globalization of Western views of homosexuality (Leap and Boellstorff, 2004).

Work in queer linguistics proposes an alternative to this argument (Barrett, 1997; Queen, 1997), arguing that although the linguistic structures of gay and lesbian language overlap with the speech of other social groups, it is more likely that the distinctive character of gay and lesbian language might be found in the ways in which those structures are combined (instead of the structures themselves). For example, Harvey (1998, 2000) analyzed what he called 'camp talk' as a set of rhetorical devices that produce a style that indexes gay male identity. Harvey argued that camp talk involves four basic linguistic strategies: paradox (the juxtaposition of contradictory or conflicting meanings), inversion (the reversal of the expected meanings of signs, such as the use of 'she' to refer to a man), ludicrism (utterances that highlight ambiguity or indeterminacy in meaning), and parody (forms that exaggerate stereotypes about speaker

orientation). In Harvey's analysis, the linguistic structures involved are not uniquely gay, but the way in which particular structures are combined serves to index gay male identity.

Structural Aspects of Gay Male and Lesbian Language

Although current views of homosexuality distinguish gender expression from sexual orientation, stereotypes of gendered language use continue to play an important role in the perception of speech as 'gay' or 'straight.' Several studies have examined the linguistic features stereotypically associated with gay male or lesbian speech (see Jacobs (1996) for a review). Although some of this research suggests that these features may be used by listeners in perceiving speech as gay or straight, researchers have found no direct correlation between these forms and actual use by those who identify as gay or lesbian. The phonetic aspects of speech that are stereotypically perceived as 'gay male' in English include hyperstandard pronunciation, such as longer duration of sibilant fricatives and /l/ (Crist, 1997), a longer voice onset time for voiceless aspirated stops, and the release of word-final stops (Podesva *et al*., 2002). Also, a wider intonational pitch range is often associated with stereotypical gay-sounding speech (Gaudio, 1994; Smyth *et al*., 2003). In contrast, stereotypes of lesbian speech include a narrow pitch range and 'flat' intonation patterns (Moonwomon, 1997; Queen, 1997).

These stereotypes of gay male and lesbian speech often reflect stereotypes of gendered language use. This is the case, for example, with syntactic and lexical variation. Gay male speech is often viewed as having hyperstandard speech and using lexical items stereotypically associated with women, whereas lesbian speech is often associated with male stereotypes, such as nonstandard or working-class speech and the use of obscenities. Although these features do no reflect actual usage by gay men and lesbians, speakers may use these linguistic stereotypes to convey sexual orientation in specific contexts. Livia (1995), for example, demonstrated how literary representations of lesbians rely on stereotypes of 'men's language,' including limited responses, avoiding expressions of emotion, and the use of sexually explicit vocabulary. A number of research questions remain largely unexplored, including a more detailed understanding of when and how these stereotypes are exploited by gay men and lesbians, whether or not (and how) they might be used by speakers who identify as bisexual, and the various indexical meanings listeners associate with specific variables that have been associated with stereotypes of sexual orientation.

Gay and Lesbian Lexicons

Most early studies of gay male and lesbian language use focused on 'homosexual slang,' or the lexical items unique to gay and lesbian communities. A number of researchers have published lexicons of terms used in gay and lesbian communities (Baker, 2002a; Cory, 1965; Legman, 1941; Stanley, 1970; Rodgers, 1972). Many early researchers viewed gay and lesbian vocabulary as a mechanism for dealing with the stigma of homosexuality. Some viewed gay/lesbian slang in a positive light, holding that unique vocabulary was a survival strategy creating a social space in which being homosexual was acceptable. Others viewed the gay/lesbian vocabulary as a negative result of social marginalization that continued to exclude gay men and lesbians from larger society, whereas others argued that gay vocabulary was not simply a mechanism for dealing with stigma but that it was a means of defining social roles in gay and lesbian communities (Kulick, 2000). As is common in research on homosexual language, these studies typically gave comparatively little attention to lesbian vocabulary.

The most well-known and structurally distinct gay male language variety was Polari (Baker, 2002b) used in the United Kingdom. Polari evolved from a variety of sources, including Lingua Franca as used by English sailors, the language of those working in the entertainment industry, Cockney rhyming slang, and the language of prostitutes. Although Polari contains some unique syntactic patterns (Baker, 2002b: 52–56), the primary difference between Polari and other varieties of English is the use of a unique vocabulary. The vocabulary of Polari, however, is unique among gay/lesbian varieties in that it is so extensive as to be unintelligible to the majority of English speakers, as in the following example (Baker, 2002b: 53):

Polari:	varda the naff hommie with nante pots in the cupboard
Translation:	look at this unsightly wretch with the appalling dentistry

Use of Polari has declined dramatically since the 1960s. The lack of knowledge of Polari among younger speakers leads Baker (2002b: 109–111) to conclude that Polari is a dying language.

The decline of Polari is related to the shift in understandings of homosexual identity from being based primarily on difference in gendered behavior to being based on sexual attraction and behavior. The culmination of this shift in the gay and lesbian civil rights movement led to a period in which gay male identity was typically conveyed through behaviors that reflected a unique form of masculinity rather than

through stereotypical 'feminine' behavior (Levine, 1998). The backlash against camp or feminine behavior during the 1970s and early 1980s led to a similar decline in the use of many gay male lexical items in the United States. The rejection of in-group language that was viewed as feminine did not, however, end the use of in-group forms of communication but led to the formation of new systems of in-group communication. For example, in the 1970s the 'hanky codes' emerged in the 'clone' community in the United States. The hanky codes involved the use of colored bandanas in one's back pocket as a way of signaling preferences for particular sexual acts. For example, light blue signified a preference for oral sex, whereas dark blue signified anal sex. Bandanas worn on the left side indicated a preference for being the active partner (or 'top'), whereas those worn on the right side indicated a preference for being the passive partner ('bottom') (Levine, 1998: 65–66).

Gay Male and Lesbian Discourse

Given that grammatical features associated with gay and lesbian language seem to be related to stereotypes rather than actual usage, a number of linguists have focused on gay and/or lesbian norms for structuring discourse and conversational interaction instead of the use of particular linguistic structures (McIlvenny, 2002). Studies of both gay male and lesbian discourse have tended to focus on the collaborative nature of gay and lesbian interaction. Although collaborative discourse is certainly not unique to gay or lesbian speakers (*see* **Cooperative Principle**), some linguists have argued that gay men and lesbians use cooperative norms for interaction as a means of asserting a shared identity based on sexual orientation. The most distinctive aspect of this cooperative discourse is the assumption of shared cultural knowledge associated with sexual orientation. Studies have highlighted the role of cooperative discourse in the affirmation of both gay male (Leap, 1996) and lesbian (Morgan and Wood, 1995) identity as well as the role of cooperative discourse in asserting shared identity between gay men and lesbians (Queen, 1998a, 1998b). In a detailed study of crosssex conversation between gay men and lesbians, Queen (1998b) found that although speakers used language to form a unified identity as homosexuals based on shared cultural knowledge, gay men and lesbians also used structures stereotypically associated with gendered conversational styles. Although an assumption of shared cultural knowledge may be important in particular contexts, it is not the case that all gay or lesbian interactions are necessarily 'cooperative.' For example, several studies have examined the genre of verbal dueling and the use of ritual insults among gay men (Goodwin, 1989; Murray, 1979; Read, 1980).

Another aspect of gay and lesbian discourse that has received a great deal of attention is the ways in which gay men and lesbians convey sexual orientation to one another through the use of conversational implicature (*see* **Implicature**) (Hayes, 1981; Leap, 1996; Liang, 1999; Painter, 1981). As with cooperative discourse, this use of implicature is not uniquely gay or lesbian but relies on the assumption of shared knowledge of gay or lesbian cultural norms as a means of conveying sexual identity. Speakers may use implicature to convey homosexual orientation such that the actual meaning ('I am gay/lesbian') can only be inferred if the listener has some prior knowledge of gay/lesbian culture. Such a use of implicature allows gay and lesbian speakers to reveal their sexual orientation to one another without necessarily revealing themselves to heterosexuals involved in the same conversation. A speaker might, for example, respond to a question about how one spends his or her free time by referring to spending time in a particular neighborhood with the understanding that only other gay men or lesbians will recognize that neighborhood as a center of gay/lesbian culture. Similarly, before the use of the term 'gay' became widely recognized as meaning homosexual, men might have used the word to convey their sexual orientation to one another with the assumption that heterosexual listeners would not likely understand that the word referred to sexual orientation, as in the following example from Hayes (1981: 46):

> Mr. X: You certainly have a colorful tie.
> Mr. Y: Yes, I really like gay apparel.

Another aspect of gay and lesbian discourse is the use of particular verbal genres such as ritual insults or verbal dueling. The most widely studied genre associated with gay and lesbian speakers is the 'coming out story.' 'Coming out (of the closet)' refers to the act of revealing one's homosexual identity. There are competing notions of what exactly it means to be 'out' (i.e., openly homosexual), and one may be 'out' in particular social contexts and 'not out' in others (Zwicky, 1997). Studies of coming out stories in a variety of local communities have found strikingly similar structure in the genre (Liang, 1997; Maher and Pusch, 1995; Wood, 1997, 1999). Coming out narratives typically include the following stages (Liang, 1997):

1. Recognition of the processual nature of coming out
2. Coming out to self
3. Coming out to other

As with concepts such as cooperative discourse or the use of implicature to convey sexual identity, the coming out story is founded on assumptions of shared knowledge of gay and lesbian cultural norms. One common feature of studies of gay and lesbian discourse is the critical role of a shared sexual identity in establishing cultural norms for language use.

Transgendered Language

The term 'transgender' is an umbrella term for individuals who display behavior patterns typically associated with the opposite sex, including transsexuals, drag queens/kings, and transvestites. Transsexuals are those who believe that the sex they have been assigned based on physical appearance does not correspond to their psychological and social experience. Some transsexuals undergo sex-reassignment surgery to repair the dichotomy identity vs. biology. In terms of language, transsexuals typically attempt to adjust their speech patterns to reflect normative expectations of gendered use of language. For male-to-female (MTF) transsexuals, language is a central component in changing one's gender identity. MTF transsexuals typically adopt stereotypes of gendered language use and may undergo speech therapy in order to sound more feminine. The move toward stereotyped 'women's language' typically involves raising the pitch of one's voice, using a wider range of intonation patterns, speaking more softly, and using lexical items stereotypically associated with women's language. Although research on MTF transsexuals almost always includes a linguistic component, the language of FTM (female-to-male) transsexuals receives very little attention. This is often explained by the fact that the testosterone taken by FTM transsexuals thickens the vocal chords, lowering a speaker's pitch. Thus, it is often assumed that learning to speak 'like a man' is not a problem for FTM transsexuals. However, the lack of attention given to FTM speech is also tied to an ideology in which men's language is unmarked with respect to women's language (Kulick, 1999).

Although the language of transsexuals is typically seen as reproducing stereotypes of gendered language, other forms of transgendered language seem to center around undermining these stereotypes. Drag queens (gay men who dress in women's clothing) often use stereotyped women's language, but often mix stereotypically masculine forms into their feminine speech. African–American drag queens, for example (Barrett, 1998, 1999), typically juxtapose linguistic forms that stereotypically index identities that are in opposition. For example, a speaker may use stereotyped feminine 'ladylike' speech mixed with obscenities or juxtapose language that indexes a white middle-class identity with forms from African–American English. Although the use of feminine speech for MTF transsexuals is an attempt to change general speech patterns in all situations throughout one's life, the use of feminine speech for drag queens is temporary and highly dependent on social context.

Descriptions of linguistic forms that index a speaker's gender have noted transgendered speech in a variety of languages. A number of Native American languages contain grammatical elements described as corresponding to the gender of a speaker. Most of the descriptions note that there are 'exceptional' speakers who sometimes use the forms corresponding to the opposite gender (Hall, 2003). Detailed research on Lakhota (Trechter, 1999) suggests that use of gender-marked elements by members of the opposite sex does not simply convey a transgendered identity. Rather, the meaning of gendered elements is highly dependent on context and may convey personal attributes other than gender. Hall and O'Donovan (1996) also found that Hindi-speaking *hijras* use grammatical gender marking to convey a variety of indexical meanings. Whereas hijras generally use forms marked as feminine for self-reference, they use masculine forms when foregrounding positive personal attributes associated with masculinity (e.g., owning a home or being trustworthy). Rudes and Healey's (1979) study of the uses of 'he' and 'she' by gay men in the United States also found that gendered pronouns were associated with particular indexical meanings. Although 'she' was used in positive references to physical attractiveness, most uses of 'she' were associated with negative attitudes toward the referent.

An important insight of this research has been the confirmation that the indexical meanings associated with gender are indirect (Ochs, 1992). Even in languages in which particular linguistic structures have been assumed to be direct markers of speaker gender (e.g., Lakhota or Hindi), these structures do not necessarily directly refer to speaker (or referent) gender. Rather, the structures associated with gender index particular social attributes, stances, or personality traits that are in turn associated with cultural assumptions about the particular attributes that are associated with masculine or feminine behavior. For example, Eckert (2002) noted that in American English, the release of word-final stops has been associated not only with the speech of gay men (Podesva *et al.*, 2002) but also with indexing 'Jewish speech' and the identity of female nerds. Rather than directly marking a given sexual identity or gender, released final stops seem to index something like "articulateness" (Eckert, 2002: 102). The relationship between indexical meanings and social categories is not direct,

but it is negotiated through indexing attributes that may in turn be associated with social categories.

Language and Heteronormativity

A final aspect of queer language is the role of language in maintaining heteronormativity, or the social norms that enforce hegemonic (compulsory) heterosexuality and marginalize gay, lesbian, or transgendered speakers. Although there is no *a priori* reason to assume that there is any relationship between norms for gendered behavior and sexual orientation, it is clear that speakers (and often researchers) assume some relationship between gender and sexuality. This research has transformed the field of language and gender (*see* **Gender and Language**) into the field of language, gender, and sexuality (Bucholtz, 2004). Speakers may refer to sexual orientation as a means of performatively asserting gender identity and vice versa (*see* **Heterosexism and/in Language**).

Cameron (1997) examined the way in which a group of heterosexual male college students use references to homosexuality to convey masculine gender identity. Cameron examined a conversation in which the men discuss 'gay' classmates at length. The most important aspect of Cameron's analysis is the fact that some of the 'gay' classmates are clearly heterosexual (one is described as constantly "hitting on girls"). The men are able to assert a masculine identity by distinguishing themselves from a classmate who they depict as homosexual (and hence effeminate). The actual sexual desires of the 'gay' classmates have little relevance to the interaction, and the discussion of sexual orientation is primarily used to construct masculine gender identity. Cameron's study demonstrates that linguistic references to sexual identity may be entirely divorced from actual sexual desires or sexual practices (Bucholtz and Hall, 2004).

Studies have also examined the reverse phenomenon, in which gender identity is used as a means of asserting sexual identity. Peebles (2004) examined the language in an ex-gay ministry in the United States. Ex-gays are evangelical Christians who have (or continue to) experienced same-sex attraction (and may have identified as gay or lesbian) but who attempt to transform their sexual identity to that of heterosexuals based on their religious belief that homosexuality is morally wrong. The transformation to a heterosexual identity revolves around negotiating and acquiring new norms for gendered behavior. The ex-gays in Peebles's study view the transformation as one of adopting some aspects of traditional normative gender behavior while questioning other aspects of stereotypical masculine or feminine behavioral norms (including norms for language use). Peebles's research demonstrated the inverse of Cameron's study, showing that sexual identity may be expressed through markers of gender identity.

Conclusion

The field of language and sexuality is a very recent phenomenon and its emergence has involved much debate (Bucholtz and Hall, 2004; Campbell-Kibler *et al.*, 2002). The focus on marginalized speakers in queer linguistics has resulted in new perspectives on the ways in which speaker identities are conveyed through language. In particular, the assumption that there are 'gender-exclusive' forms of language (i.e., structures used only by males or only by females) is no longer tenable given this attention to speakers who have generally been classified as 'exceptions' (Hall, 2003). However, much additional research is needed before we can begin to fully understand the relationship between language and sexual and gender identities.

See also: Anthropology and Pragmatics; Cooperative Principle; Gender; Gender and Language; Gender, Sexuality and Language; Heterosexism and/in Language; Identity and Language; Identity in Sociocultural Anthropology and Language; Implicature; Indexicality: Theory; Pragmatic Indexing; Social Aspects of Pragmatics; Sociolinguistic Crossing; Speech Acts; Variation in Native Languages of North America.

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Question Answering from Text, Automatic

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Question answering (QA) is a natural language processing application (*see* **Natural Language Processing: Overview**) in which, given a question in plain natural language and a document collection, the computer system delivers an exact answer (i.e., without spurious text) to that question based on the document collection. The following examples are illustrative:

Question: How many people live in Los Angeles?
Answer: 3 912 200
Question: Who was Bach?
Answer 1: Johann Sebastian Bach, German baroque composer and organist, 1685–1750. One of the greatest . . .
Answer 2: Carl Philipp Emanuel Bach . . .
⋮
Answer 6: Edward Bach, British medical microbiologist, 1880–1936 . . .

General QA systems are open domain, i.e., there are no restrictions on the question type or topic. Answers can range from simple entities, such as names and quantities, to highly structured responses. Practical systems typically provide a ranked list of answers with some form of justification, e.g., with relevant extracts and references to the document(s) used to generate the answer. QA document collections range from local text files to the entire World Wide Web. QA is more than a document search (*see* **Document Retrieval, Automatic**) in that it does not just return a list of documents, but rather returns exact answers. QA also differs from 'frequently asked question' (FAQ) matching systems that map a user question to one or more closely matching questions in a list of pre-answered questions.

Advanced QA systems are highly complex in that they typically involve many underlying technologies in natural language processing, including parsing (*see* **Parsing: Statistical Methods**), semantic analysis, named-entity recognition (*see* **Named Entity Extraction**), coreference resolution (*see* **Anaphora and Coreference Resolution, Statistical**), information retrieval, ontologies, paraphrasing, inferencing, and text generation. Widespread research in open-domain QA started in the late 1990s with significant new U.S. government funding and was fostered by the introduction in 1999 of a QA track at each international Text Retrieval Conference (*see* **Text Retrieval Conference and Message Understanding Conference**) at the U.S. National Institute of Standards and Technology (NIST), resulting in rapid advancements in the field, including evaluation standards, a large increase in publications, and strong performance improvements. The major components of a QA system are question analysis, information retrieval, and answer generation.

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Question Analysis

The initial question analysis serves to identify the type of answer, the type of question, and/or a list of search terms or strings. Knowing the type of answer can help greatly to reduce the space of possible answers. For the question *How tall is Mt. Everest?*, for example, the answer type would be *distance quantity*, possibly augmented with a heuristic range of typical value ranges that would eliminate any unreasonable values, such as *3 inches*. Answer types also support answer generation in helping to find the precise boundaries of the answer.

Answer-type detection patterns generally go beyond the surface form of a question, requiring a parse tree for a higher level of abstraction. Advanced QA systems support hundreds of answer types. For such answer types to be useful, the QA system must not only extract them from the question, but also must recognize them in text with answer candidates. Successful QA systems therefore critically rely on large and high-quality ontologies (such as WordNet; *see* **WordNet(s)**) and named-entity and quantity recognizers. Here are a few more examples of questions along with their classification:

Definition questions: What are invertebrates?
Why–famous questions: Who was Jane Goodall?
Abbreviation expansion: What does NAFTA stand for?
Date: When did the *Titanic* sink?
Temperature quantity: How hot is the core of the Earth?
Proper university: What is the most expensive university in the United States?
Noun phrase: What does the Peugeot company manufacture?

The granularity of answer types will vary from question to question. Though the question *How tall is Mt. Everest?* has a clear and narrow answer type (*distance quantity*), a question such as *What did Socrates say before he died?* leaves the range of possible answer types wide open. It can be useful to leave the answer type somewhat disambiguated, such as for the question *How long was Desert Storm?*, for which it might be safe to predict automatically an answer that is a *distance quantity* or a *temporal quantity*, but for which the final choice might be difficult without having a good understanding what type of thing *Desert Storm* might be. This is often unproblematic, because other components of a QA system will tend to eliminate of unreasonable type answers.

Another important function of question analysis is to identify question terms that will be useful for the document search. For a question such as *In what year did Columbus discover America?*, a good QA system will identify the question words *In what year* and auxiliaries such as *did* as much less likely to occur in a text passage containing the correct answer. Some systems build a ranking of search terms that are likely to be useful, and start a search by querying an information retrieval component over an initial set of question words. If search results turn out to be too numerous, the set can be augmented, and if there are too few results, question terms can be dropped. Some QA systems also offer a spelling-checking and correction capability.

Synonyms and Paraphrasing

Questions and the sentences that answer them often differ in words and structure, even to the point were there is no word overlap at all. The question *Who is the leader of France?* is not answered by the sentence *Henri Hadjenberg, who is the leader of France's Jewish community, endorsed confronting the specter of the Vichy past*, even though it contains all question words together and in order, but it is answered by *Bush later met with French President Jacques Chirac*, even though there is no word overlap at all.

To increase the chances of finding a good answer, a QA system will often substitute question terms with synonyms, drawing on resources such as WordNet. In the question *When did the United States buy Alaska?*, the word *buy* could be replaced by *purchase* or even the more general *acquire*, resulting in an good match with *The United States purchased Alaska in 1867*. Question reformulation is, however, not limited to single words. Advanced QA systems will paraphrase entire sentences. The question *What's the price of a Volkswagen Beetle?* can be recast as *How much does a Volkswagen Beetle cost?* In order to achieve this, the QA system will draw on a paraphrase resource that will assert the equivalence of *What's the price of X?* and *How much does X cost?*, possibly restricting the syntactic and semantic category of any X. Such resources can be built either by hand or automatically. Manual efforts are feasible for question answering because a relatively small class of question types tends to account for a relatively large number of questions that people tend to ask, and for any such question type, a limited number of paraphrases will account for a relatively large number of successful paraphrases. Human intuition and time, however, have their limits, and some of the best patterns might not immediately come to mind on introspection. Consider, for example, questions such as *When was Mozart born?* One successful approach in learning useful paraphrases is to look for text passages for a few

examples of key question terms ('Mozart') along with their known answers ('1756'), or 'Einstein'/'1879.' A paraphrase harvester would look for common patterns, including question and answer terms, and then statistically identify patterns that link the two frequently. In a subsequent phase, the system might use question terms and pattern candidates to find answers and then rank the patterns according to how reliable their results are for known answers. Such an approach would not only find the obvious *X was born in Y* pattern, but also the very productive pattern *PERSON (YEAR–YEAR)*, as in *Mozart (1756–1791)*.

A simple type of paraphrasing that is nevertheless very helpful is syntactic transformation. A question such as *When did the Titanic sink?* can be mapped to *The Titanic sank when?* or even to *The Titanic sank on what day?* Using a search engine to locate documents containing the string *The Titanic sank on* will tend to deliver very focused results. Classic paraphrasing and syntactic transformations can easily be combined, so that a question such as *How did Gandhi die?* might be paraphrased as *Gandhi died from what?*, *Gandhi committed suicide?*, *Gandhi was assassinated by who?*, and many more. As would be expected, many paraphrases will not yield any answers, but one good strike is often sufficient. Note that paraphrases of a sentences do not necessarily fully preserve the meaning, but might be more specific. An answer to the specific question (*Gandhi was assassinated by who?*) will also be an answer to the more general question, which can be viewed as a form of inference. Note that questions are not always questions in a strict syntactic sense. The query *Name the countries on the UN Security Council* has to be understood as a question, as does the even more terse *Countries on the UN Security Council*.

Identifying the type of question can be very important, even if the answer cannot be narrowed down to a specific semantic or syntactic type. QA systems often contain specialized submodules to deal with specific types of questions, such as biography questions (*Who was Bach?*), causal questions (*Why is the dollar so weak?*), and conversion questions (*How much is 20°C in Fahrenheit?*).

Information Retrieval

The better the question analysis, the easier it will be for a search engine such as Google or a traditional information retrieval (IR) module to deliver useful answer candidates. Besides the techniques already mentioned, QA systems also often employ classical IR techniques such as stemming and eliminating stop words. Consider the following example:

Question: Which languages does Putin speak?
Paraphrase resource (one of several relevant sections):
:anchor-pattern 'SOMEBODY 1 speaks LANGUAGE 2.'
:can-be-inferred-from 'SOMEBODY 1 is fluent in LANGUAGE 2.'
Paraphrases:
Putin speaks <which language>?
Putin is fluent in <which language>?
Search engine calls (selection):
Putin speaks
Putin is fluent in
Putin speaks (*set of words as fallback*).
Search engine results (selection):
Putin speaks of new world order.
Putin speaks with university students.
Mr Putin is fluent in English and German.
Answer: Putin is fluent in **English and German**.

Another approach is to preprocess a document collection or, in the case of very large document collections such as the World Wide Web, at least part of the collection. An index of words is often augmented by an index of more general types, such as *distance quantity*, *proper country*, or *component of a weapon of mass destruction*. An index supporting the last two types would make it much easier to find passages that might answer a question such as *Which countries have sold biological warfare agents during the past 5 years?* To take preprocessing even a step further, some systems actively scan through large collections of texts, mining facts that are then stored in databases, which can then later be used to answer certain types of questions very quickly by drawing on a precompiled cache of answers.

Answer Selection and Generation

After a search engine returns a set of documents, a QA system first has to narrow down the text space by identifying shorter passages, of a few sentences, that contain a sufficiently high concentration of question terms, and also to make sure that the passage includes phrases of the proper answer type. QA systems then proceed to apply deeper natural language processing techniques such as parsing. To select the proper answer to the question *Who killed John F. Kennedy?*, the QA system cannot always solely rely on matching words without context, as the two following answer candidate sentences illustrate:

1. Belli's clients have included *Jack Ruby*, who killed John F. Kennedy assassin Lee Harvey Oswald, and Jim and Tammy Bakker.
2. On Nov. 22, 1963, the building gained national notoriety when *Lee Harvey Oswald* allegedly shot

and killed President John F. Kennedy from a sixth-floor window as the presidential motorcade passed the site.

A simplistic system might prefer the answer from sentence 1, *Jack Ruby*, because the answer is closer to the question search terms *killed* and *John F. Kennedy*, but a system that parses both question and answer would prefer the answer from sentence 2, *Lee Harvey Oswald*, because it satisfies matching semantic relations for both the predicate and logical subject (*kill*, *who/Lee Harvey Oswald*) and for the predicate and logical object (*kill, John F. Kennedy*).

Semantic relation matching can also be viewed as 'proving' an answer by mapping both the question and answer into some sort of logical form and then using 'theorem proving' techniques to establish the validity of an answer. Both approaches require parsing, and both gain robustness by not necessarily requiring that all relations match. This can be implemented by awarding points rather than by requiring strict matching of all parts of a question, or by 'relaxing' a proof by allowing the system to drop parts of a clause. Another critical component of a good QA system is coreference resolution. To answer the question *Where is the Finsbury Park mosque?* using the text passage *Finsbury Park mosque has been called the hub of Islamic extremism in Britain. It is located in northern London,* the confidence in the answer *northern London* is greatly increased by identifying *Finsbury Park mosque* as the antecedent of *It*. Similarly, in order to better support follow-up questions such as *Who is the leading producer of diamonds?* (*De Beers*) – *Who owns the company?*, a system needs to resolve *the company* as referring to *De Beers*. Another important type of resolution involves relative time expressions, as in *Johnny Carson died Sunday of complications from emphysema*, in which *Sunday* needs to be resolved to an absolute date based on the date of the article.

QA systems often eliminate some bad answers by using a set of answer filter heuristics. An example of such a heuristic is to prefer answers that contain something substantially novel. For the question *Where in Austin is Barton Springs?*, this would clearly rule out the answer *Austin*. The heuristic can theoretically backfire in trick questions such as *What condiment is made from mustard seed?*, but it is generally quite helpful. Other heuristics eliminate answer candidates with kiss-of-death modifiers such as a negation adverb, or modifiers such as *second* in *second tallest*, when these modifiers do not also occur in the question. Furthermore, answers generally need to be specific enough, e.g., need to include a proper noun for location questions, and questions themselves generally do not make for good answer material.

Structured answers are not only useful for ambiguous questions such as *Where is the Taj Mahal?*, which might refer to the architectural masterpiece in India or to the casino of the same name in Atlantic City, New Jersey, but can also be helpful to allow the user to skip over a whole cluster of incorrect answers, or to better gauge how many different documents might support the same answer, thereby increasing confidence in its correctness in a quantitative way.

Justification

Practical QA systems justify their answers with relevant extracts and references to the document(s) used to generate the answer. Such justification is important to show that an answer is indeed correct and to let the user know how current and reliable the source is and how strongly the answer is corroborated by other sources. The context of an answer also often provides additional information that a user might find useful.

Answering Questions from Nontextual Resources

Some questions do not lend themselves very well to textual search:

- What is 105°F in Celsius?
- How much is 40 million Euros in U.S. dollars?
- What does AWACS stand for?
- How do you say 'thank you' in Czech?
- When is Easter next year?
- What is the current time in Moscow?

Based on a relatively limited number of patterns, a QA system can identify special question types, such as quantity conversion, and a few types of calendar and time questions. Rather than proceeding with an information retrieval step, the QA system would call a special function with proper arguments or would refer to specialized Websites that perform tasks such as conversions between different currencies. Calls to such Websites might include arguments extracted from the question, such as the source currency amount and target currency unit, so that the Website will deliver the specific answer that the user was seeking. In other cases, the system might be able to map a question to a table lookup or database query, including dictionaries, factbook tables, WordNet definitions, and abbreviation lists.

Research Directions

Besides work to further improve critical components of QA systems such as parsers, named-entity taggers,

and ontologies, recent research has focused on increasingly automating the acquisition of knowledge and query reformulation patterns, combining results from different QA approaches, decomposing complex questions into simpler ones, and then building the overall answer from pieces of information from different sources or even different types of resources (such as natural language text and structured knowledge bases). Other challenges include interactive question answering, whereby a user would navigate a context-conscious system gradually toward an answer, and cross-lingual question answering, in which answers are retrieved from documents in a language different from the language of the question.

See also: Anaphora and Coreference Resolution, Statistical; Document Retrieval, Automatic; Information Extraction, Automatic; Machine Translation: Overview; Named Entity Extraction; Natural Language Processing: System Evaluation; Parsing: Statistical Methods; Text Retrieval Conference and Message Understanding Conference; WordNet(s).

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Antonio Quilis Morales was born in Larache (Morocco), on September 3, 1933. He obtained his undergraduate degree and his doctorate in Arts (Romance philology) at the Complutense University of Madrid. He received an Extraordinary Award, given to the top few students in a Spanish university graduating class, for both degrees, with his doctorate thesis being *El encabalgamiento en la métrica española*.

Beginning in 1960, he collaborated with the CSIC (Superior Council of Scientific Investigations). At first, he was the temporary Head of the Phonetics Section and the Phonetics Research unit, and after that he became an occasional collaborator, a scientific collaborator (1962) and a scientific researcher (1966). From 1963 he was the head of the Phonetics Department. Regarding his career as a phonetician, and following the advice of his Spanish tutor, Rafael de Balbín, Quilis was trained in Strasbourg by Georges

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Straka and then he founded the first experimental phonetics laboratory in Spain, where he worked for more than 40 years and where he updated the research that Tomás Navarro Tomás had taken over at the beginning of the 20th century.

He began teaching at the University of Madrid in 1967 as an assistant professor of Spanish. In 1970 he obtained the Chair in the historical grammar of Spanish at the University of Seville. One year later, he won the Chair in history of Spanish at the University of Valladolid. In 1975 he became chair of Spanish at the Universidad Nacional de Educación a Distancia (UNED), where he worked until his retirement in 2003. There, he was head of the Spanish Department and Dean of the College of Arts. In 1993, he was awarded the Medal of the UNED for his outstanding work.

Apart from his teaching experiences in Spain, he was a visiting professor in many universities and research centers in Europe and the Americas. In addition, he taught Spanish to teachers from the Philippines (for 22 years) and teachers from Latin America (for 42 years) in the Institutes of Hispanic Culture and Latin-American Co-operation. Professor Quilís also delivered more than 60 conferences in universities and research centers around the world and supervised more than 40 doctoral theses during his career.

Without any doubt, the most well-known scientific work by Quilis is in the field of phonetics. Some of his books, with many editions, are: *Fonética acústica de la lengua española* (1981), *Tratado de fonología y fonética de la lengua española* (1993), *Curso de fonética y fonología españolas para estudiantes angloamericanos* (1964) (with Joseph A. Fernández), *Principios de fonología y fonética españolas* (1997), and *Comentario fonológico y fonético de textos* (1985). From his experimental work we can highlight the reasoning of instrumentation through hypotheses based on theoretical patterns (see Cerdà, in press). Furthermore, he worked in forensic phonetics, applied mostly to voice identification, and was considered to be the foremost Spanish specialist in voice identification. Moreover, as an expert in legal voice identification, he organized and taught several forensic phonetics courses to teams of police scientists.

Together with phonetics, he worked in Hispanic dialectology; he carried out enormous fieldwork, traveling around the world and collecting extraordinarily valuable material. From 1985, with Manuel Alvar, he co-ordinated the work on the *Atlas Lingüístico de Hispanoamérica*, a continent-encompassing, analytical atlas. The scope they wanted to achieve with the data obtained was twofold: to solve problems such as the establishment of dialectal zones in Latin America, and to supply language information from wide areas of this continent that were under research. Although the atlas is not yet finished, complete fieldwork has been done in 14 countries, such as Puerto Rico, Cuba and Panama.

He studied the Spanish of the Philippines, Micronesia, and Equatorial Guinea, and in 1992, he began managing the preparation of the *Atlas Lingüístico Nacional del Ecuador* together with Celia Casado. Concerning the dialectology of the Iberian Peninsula, he led the study of educated speech of Madrid for many years.

Professor Quilis worked, furthermore, in other philological fields, such as metrics, publishing *Métrica española* (1969) stemming from his doctoral thesis; language history (*Historia de la lengua española*, 1976); and linguistic historiography (*Antonio de Nebrija: gramática de la lengua castellana*, 1980). He also worked in lexicography; first-language teaching; interference in the speech of immigrants' children; the comparison of Spanish with other languages; speech therapy; and the study of several languages, such as Chamorro, Nugunu (Cameroon), Tagalog and the Portuguese of Brazil.

Starting in 1965, he was a collaborator with the Centre de Philologie et Littératures Romanes at the University of Strasbourg, a member of the Orden Civil de Alfonso X El Sabio and, since 1966, a participant on the executive committee of a project to study the educated speech of the principal cities of Latin America and the Iberian Peninsula. He was president of the Spanish Linguistics Society between 1974 and 1978, honorary member of the Philippine Academy of Language, Conseiller du Bureau de la Société de Linguistique Romane, full member of the Instituto de Estudios Madrileños, and honorary member of the Sociedad Española de Lingüística (2000). He was given the Inventor-Innovator Award of the journal *Mundo electrónico* (1983), received the Medal of the Hankuk University of Foreign Studies in Seoul (1984) and, in 1999, received the Gran Cruz de la Orden de Alfonso X el Sabio. Since 2000, he had been the editor of the *Revista de Filología Española*.

Professor Quilis died in Madrid on December 8, 2003, a few weeks after retiring and with a large number of projects to accomplish. His life was entirely dedicated to the teaching and research of Spanish, as we can see in his nearly 300 publications and his more than 70 contributions to scientific congresses, all of them elaborated tenaciously and regularly throughout his academic career.

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Willard van Ormand Quine (1908–2000) was the Edgar Pierce Professor of Philosophy, Emeritus, at Harvard University. Quine was one of the major figures in American logic and wrote several standard texts on the subject. While not a linguist, Quine came from the Logical Positivist School of logic and philosophy, which sees philosophy in terms of language use. The logical positivists have exerted a substantial influence on modern linguistics, not on grammar *per se*, but on their emphasis on the structure of thought and notions such as Wittgenstein's 'language games.'

Logic since Frege has developed along symbolic lines. Logical abstraction developed so that the structure of thought could become clearer upon examination. This meant that the effects of language, which was seen as a significant problem, needed to be eliminated. Previous schools of logic, such as Aristotelian syllogistic, also recognized the potentially deleterious effects that language could have on logical thought. Rather than eliminating natural language, they sought to limit the harm by limiting the admissible language and strictly defining the form of expressions.

Twentieth-century symbolic logic became a powerful tool by becoming semantic free. However, a simultaneous development, often among the same groups that were developing predicate calculus, examined the use of language in philosophy and everyday thought. As such, a tension developed between pure logic and the philosophy of language. Quine is a good example of that tension.

Quine's major contribution to the philosophy of language was *Word and object* (1960). We can see the effects of logical positivism as early as the dedication to Rudolph Carnap, a major figure in the development of logical positivist language theory. Quine begins his treatise by examining sense data. Quine asserts that "there is no justification for collating linguistic meanings, unless in terms of men's dispositions to respond overtly to socially observable stimulations" (Quine, 1960: ix). He briefly examines language learning, acknowledging that words are learned "in context" (1960: 13) but ignoring context for the rest of the book. While Quine did not say so explicitly, he treats learning a collection of words as equivalent to learning language. His idea seems to be that since sentences, the basic units of language, are structured collections of words, language can be logically divided into words and structure, with the units of structure (something like grammar) being a smaller collection than the lexicon. Structure is somehow 'basic' to the human; words are learned. In his later *Philosophy of logic*, Quine claimed that to have learned a language, one must have learned its grammar; vocabularies may differ from person to person but the grammar remains

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the same. "For it is only lexicon, not grammar, that registers differences in background from speaker to speaker; and the logical truths stay true under all lexical substitutions" (Quine, 1970: 101).

Word and object is primarily about the theory of reference. Quine looks at translation as a way of examining reference. By 'translation,' he does not strictly mean the translation between languages, although that is included in his discussion. 'Translation' means, primarily, reducing our sense stimuli to language. Note that Quine was influenced by Skinner and often used 'verbal behavior' as a neutral term. *Word and object* was written shortly after Skinner's *Verbal behavior* and the controversy that Chomsky's review of that book created. Read carefully, Quine comments unfavorably on Chomsky's criticisms. Be that as it may, Quine created a famous thought experiment, sending a linguist to the 'darkest archipelago' to learn a hitherto unknown tribe's language without the aid of an interpreter. Quine admitted that this situation is unrealistic but postulated it as a way of elucidating his discussion of translation. While in the field with an informant, the linguist sees a rabbit scurry by and hears the informant utter "gavagai." The linguist begins his study by equating 'gavagai' roughly with 'rabbit.' While this may seem straightforward, Quine notes that it is not, because the informant may not strictly mean 'rabbit' but, perhaps, 'white rabbit,' 'Lo, the rabbit,' or some other variant. Quine claims that the linguist should not equate words to each other but should assign words to equivalent stimulations. He notes that the utterance might be affected by what temporally proceeds or follows the stimulation. Because of this, reference is not a simple philosophical or linguistic problem.

Much of the rest of the book can be seen as a detailed discussion of the problem of reference. Quine does not delve significantly into the linguistic aspects of reference but builds a theory of reference on logical foundations. In passing, Quine dismisses discussions of many types of sentences that would be of interest to linguists and focuses almost entirely on sentences that could be reduced to logical propositions, i.e., sentences that are either logically true or false.

At the end of the book, Quine briefly sets out his notion of 'semantic ascent.' Returning to the problems that natural language poses for logic and philosophy, Quine questions Carnap's claim that philosophical questions are ultimately questions of language, i.e., questions about what is, and not "questions about extralinguistic reality" (Quine, 1960: 271). Quine asks why this should be true of only philosophical questions and not theoretical ones. Discussing unicorns is a discussion about something that doesn't exist; he notes that a discussion of points, miles, and other such mathematical devices is also a discussion about things that do not exist. Yet we recognize these discussions as being different. The difference is caused by 'semantic ascent,' which he calls a 'manoeuvre.' "The strategy of semantic ascent is that it carries the discussion into a domain where both parties are better agreed on the objects (viz. words) and on the main terms concerning them"(Quine, 1960: 272).

Quine presented the linguist with standard logical thought. His system of logic was standard. His comments on reference were standard. They were not the result of examining a linguistic corpus but of developing a theory of logic. Quine believed that logic and grammar are paramount. Natural language and human communication as we know it are built upon these foundations and are ultimately reducible to them.

See also: Carnap, Rudolf (1891–1970); Chomsky, Noam (b. 1928); Frege, Gottlob (1848–1925).

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Quintilian (ca. 30–98 A.D.)

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Quintilian's is arguably the most famous name in the history of rhetoric. Born in Calagurris, modern Cahorres, near Barcelona, around 40 A.D. and educated in Rome by the rhetorician Domitius Afer and may be – the information is somewhat suspect – the grammarian Quintus Remmius Palaemon, he returned to Spain and so distinguished himself in the courts that Galba, the Roman provincial governor, took Quintilian with him when he entered Rome as emperor in 68 A.D. There Quintilian achieved unparalleled success as an orator and teacher of rhetoric: his clients included Queen Berenice of Egypt and his students, Pliny the Younger; he amassed considerable wealth and fame; he was the first professor to earn a salary from the imperial treasury; he was appointed tutor to Domitian's nephews, whom the emperor was training to succeed himself; and his *magnum opus* and only extant work, the *Institutio Oratoria*, written after his retirement from teaching in 88 A.D., remains the classic text on rhetoric and the education of orators. His young, beloved wife and their two boys died young, and Quintilian himself died around 96 A.D.

The 12 books of the *Institutio Oratoria* describe Quintilian's ideal educational program designed to produce a master orator, beginning with the child in the cradle and continuing until the "good man skilled in speaking" retires from the public forum. Paradoxically, the two most famous sections of the *Institutio* deal with grammar and literature, in books 1 and 10, respectively. Quintilian's sketch of the grammatical curriculum (I.4-9) in Roman education is the earliest and most comprehensive account of grammar in its entirety in either the Roman or the Greek world and is therefore of crucial importance for the history of linguistics. Quintilian's sketch may be ideal rather than actual, but it does compare favorably with literary references in Juvenal and Seneca.

Grammar is both linguistic (*recte loquendi scientia*) and literary *(poetarum enarratio)*; grammatical education therefore encompasses both speaking and writing and begins with phonetics and the alphabet. It proceeds to the word level and treats derivation, the parts of speech, declension and conjugation, and ambiguous words. (Quintilian understands rhotacism but not declensional or conjugational affiliations, enumerates several different competing systems of *partes orationis*, and avers that the instrumental ablative is neither a true Latin ablative nor a true Greek dative.) The grammarian then addresses the vices and virtues of speech; Quintilian's description of barbarisms and solecisms is especially noteworthy. Principled linguistic behavior is a matter of reason, antiquity, authority, and usage. The sketch concludes with literary matters: orthography, reading (aloud, of course), figures, style, historical and mythological minutiae, and composition exercises. The organization of Quintilian's grammatical account in the *Institutio Oratoria*, especially its tripartite arrangement (phonology, morphology, *vitia virtutesque orationis*), therefore looks quite like that of a much later *ars grammatica* and suggests that the Roman *ars* had already assumed or was in the process of assuming its canonical form.

See also: Classical Antiquity: Language Study; Varro, Marcus Terentius (116–27 B.C.).

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Quirk, Professor The Lord Charles Randolph (b. 1920)

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Professor Randolph Quirk (Figure 1), a British grammarian and linguist, was born in the Isle of Man, educated at University College London (UCL) and received a B.A., an M.A., a Ph.D., and a D.Litt. there. He was a lecturer in English (1947–1952) at UCL; a reader in English Language and Literature (1954–1958) and a Professor of English Language (1960–1968) at the University of Durham; and a Quain Professor of English Language and Literature at UCL (1968–1981). In 1972, he chaired a Government Committee of Enquiry in Speech Therapy Services for the reform of training of speech therapists in the UK. He also served as the Vice-Chancellor of the University of London (1981–1985), as a member of the board of the British Council (1983–1991), as Chairman of the British Library advisory Committee (1984–1997), as President of the British Academy (1985–1989), and as Trustee of the Wolfson Foundation (1987). He was awarded the CBE in 1976, knighted in 1985, and made a life peer in 1994.

Professor Quirk's scholarly activities span a wide-ranging set of topics in English language and related subjects, for example: grammar in general, descriptive grammar, phonology, morphology, vocabulary, and syntax of English, including Old, Middle, and Modern English; editions of Old Icelandic texts; the language of Dickens and Shakespeare; teaching of English; mother-language and foreign-language teaching; lexical studies of English; the role of English as an international language; and English-language usage, including Old English varieties of English.

Figure 1 Professor The Lord Charles Randolph Quirk (Baron Quirk of Bloomsbury).

In the context of English-language usage, Professor Quirk was the founder of the Survey of English Usage (1959) and directed this research project until 1981. The research aimed at collecting, compiling, and analyzing a corpus of written and spoken language used by adult native speakers of British English. Professor Quirk also developed techniques for eliciting usage and attitude to usage by the speakers that the participants of the survey applied. The data collected in this corpus has enabled many researchers worldwide to produce various analyses and to carry out various experiments; many publications have ensued.

Professor Quirk, in collaboration with other grammarians, published two major reference grammars: *A grammar of contemporary English* (Quirk *et al.*, 1972) and a major compendium, *A comprehensive grammar of English language* (Quirk *et al.*, 1985). In addition, he wrote *A communicative grammar of English* and *A university grammar of English* (1973) (published in a shorter version in the United States as *A concise grammar of contemporary English*). Professor Quirk's team includes Sidney Greenbaum, Greffrey Leech, and Jan Svartvik; they started their work on grammars in the 1960s and planned to produce a series of grammars. Their *Communicative grammar of English* (Leech and Svartvik, 1975): "looks at the whole grammar from a semantic and communicative viewpoint" (1985: v).

A comprehensive grammar of English language (1985) was described by the authors as the culmination of their joint efforts. It also represented an advancement of the research into the grammatical structure, description of English, and the developments in linguistic theory as pursued by many scholars around the world. The contents page offers an insight into the eclectic theoretical approach adopted by the authors. The first chapter contains (1) a description of the current state and status of the English language, (2) a section of grammar and study of language, and (3) a comprehensive description of the varieties of English used both by an individual and by English speech communities. The second part of Chapter 1 'Grammar and the study of language' (1.12 to 1.18) is a statement of what grammarians mean by

'grammar' and defines the scope of descriptive grammar. Grammar was understood in the sense of the inclusion "of both SYNTAX and that aspect of MORPHOLOGY (the internal structure of words) that deals with INFLECTIONS (or ACCIDENCE)" (1985: 12). The authors explained that there are various types of grammar organization and commented that they did not want to state that phonology is independent from grammar, as the two are interdependent, that there is a difficulty in drawing a borderline between grammar and semantics and pragmatics. They were not concerned with theoretical matters. They stated: "Our general principle will be to regard grammar as accounting for constructions where greatest generalization is possible, assigning to lexicology (and hence beyond the scope of this book) constructions on which least generalization can be formulated" (1985: 15).

The second chapter of *A comprehensive grammar of English language* offers a 'Survey of the English Grammar,' outlines the structure of the English sentence, and aims to provide a general introduction and introduce concepts and categories necessary for the whole grammar.

The other chapters represent an innovative approach to descriptive grammar and include the description of the grammatical categories and parts of speech, phrases, and sentence structure and function. The chapter 'Theme, Focus, and Information Processing' (1985: 1353–1420) contains prosodic and grammatical aspects, postponement, existential sentences, emotive emphasis, and reinforcement. The last chapter, 'From Sentence to Text,' offers pathways to text analysis by describing the context of the notion of text and the connective and grammatical devices that can be employed, as well as features of pragmatics, semantics, and grammar with illustrative examples. There are three appendices: (1) word formation, (2) stress, rhythm, and intonation, and (3) punctuation.

A comprehensive grammar of English language has an added interest in that it represents an innovative development in terms of approaches to grammar writing with the conceptual framework that underlies the process. Equally, it contains a thorough record of the state of the English language (the common core), with its varieties and styles, in the second half of the 20th century.

The grammatical works of Professor Quirk have been used for native-language speakers and very broadly for the teaching of English as a second and/or foreign language throughout the world. Teacher training courses for EFL (English as a foreign language) teachers everywhere regard the study of his grammatical works as an essential component of their teacher education programs. Histories of ideas in linguistics have not yet pursued research into the heritage of this grammarian.

Professor Quirk is a crossbencher in the House of Lords. He was married to Jean Williams (they divorced in 1979; she died in 1995) and has two sons. He has been married since 1984 to Gabriele Stein.

See also: English in the Present Day (since ca. 1900).

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Qur'an

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Muhammad received his first revelation at the Cave of Hira' near Mecca on Ramadan 17th, 610 C.E. "Read!" was Gabriel's order to him, who replied, "I cannot read." He repeated his answer "I cannot read" to Gabriel's second order. However, he replied, "What can I read?" to Gabriel's more terrible third command. Gabriel then said:

> "Read: in the name of your Lord Who Created.
> "Created man from a clot.
> "Read: And it is your Lord the Most Beautiful
> "Who taught by the pen,
> "Taught man that which he did not know." (Q. 96: 1–5).

Subsequently, Muhammad received his respective Meccan (610–620) and Medinan (620–632) revelations – known as the Qur'an, whose language serves as Muslim ritual language. At least five times a day, Muslims everywhere recite the Arabic Qur'an in their prayers, making it the language that unifies Muslims. Indeed, the Muslim world holds International Qur'anic Reciting Contests in which may be found competitions in Memorizing the Qur'an and Reciting the Qur'an (the latter stresses the beauty and music of Qur'anic recitation).

Because Muhammad was 'illiterate' (*ummī*) and lived in an illiterate society, the Qur'an's eloquence was a miracle. It would have been impossible for him, Muslims argue, to have composed this beautiful Book. However, al-Nazzam (d. 835), a leading philosopher of Mu'tazilism (Islamic rationalism), disregarded the Qur'an's eloquence as a miracle. If it were not for the fact that God had not prevented the Arabs from doing so, they would have been able to imitate and even surpass the literary style of the Qur'an. This theory of God's intervention he called *al-ṣarfa*, and it was the *ṣarfa* itself and the Qur'an's information about the hidden that constituted Muhammad's miracles. If the *ṣarfa* were a miracle, Muslims criticized al-Nazzam, the challenge of the Qur'an would be quite meaningless, whereas the divine text made the challenge increasingly easier. This is in reference to the Qur'an's challenge to human beings in 17: 88 to produce its like. If they were unable to compose something that equaled the entire Qur'an, the Scripture challenged them to produce ten chapters (Q. 11: 13 and 14) and even a single chapter (Q. 2: 23–24 and 10: 38). Because the challenge was not fulfilled, Muslims made it a miracle of the Qur'an.

The second dimension of the miraculous nature of the Qur'an is it speaks about later events and later discoveries. In Q. 10:92, for example, we are informed that God "preserves the dead body of Pharaoh for posterity." The story of his body was completely unknown to 7th-century Arabia, yet, miraculously, the French archeologist Victor Loret discovered the dead body of this Pharaoh in the Valley of the Kings (Luxor, Egypt) in 1896. Indeed, his body was intact when the archeologist Elliot Smith took off the mummy's wrappings on July 8, 1970. As for the Qur'an's information about the not yet discovered, one can point to the passage: "We send the winds *lawāqiḫ* (that fertilize) . . ." (Q. 15: 22). Fertilization (*liqāḫ*: singular of *lawāqiḫ*), for ancient commentators of the Qur'an, was pregnancy. They therefore interpreted the winds as containing clouds or the rain within the clouds. This interpretation was of little significance because the wind just moves the clouds from place to place – it does not contain them. However, modern botany has discovered that plants such as grain, orange, and pomegranate trees need fertilization for their production, and that fertilization often occurs through the winds. When blossoms ripen, their seeds are released and spread by the winds, so that they fall on other flowers.

There are many other examples of the Qur'an's containing information about knowledge discovered only recently. Many of his contemporaries accused

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There are many other examples of the Qur'an's containing information about knowledge discovered only recently. Many of his contemporaries accused

Muhammad of being crazy for relating unproven scientific information, but God firmly insisted that he was not crazy (Q. 68: 1 and 81:22) and that he communicated only revelation (Q. 53: 2–3). Modern Muslim thinkers call the Qur'an's hidden scientific information the 'scientific miracle' in the sense that they point to scientific discoveries to prove that the Qur'an was God's words and not Muhammad's, as it would have been impossible for the latter to possess such advanced knowledge unless it came from God. Because it is not a book of science, but a divine guidance, the Qur'an expresses its scientific miracles in theological and moral paradigms, as is the case with the aforementioned verse, which ends in "but you are not the keepers of its store" (Q. 15: 22). It addresses emotion, reason, and heart, and, therefore, the common people and experts at the same time.

It has been shown that the language of the Qur'an exhibits some striking instances of balance, with some word pairs showing exactly equal numbers of occurrences. For example, we have antonyms as follows:

Word	Antonym	No. of occurrences of each
al-ḫarr ('heat')	*al-bard* ('cool')	4
al-ḫāya ('life')	*al-mawt* ('death')	145
al-kufr ('disbelief')	*al-īmān* ('belief')	17
kufr ('disbelief')	*īmān* ('belief')	8
al-nafʿ ('advantage')	*al-fasād* ('drought')	50
al-rahba ('fear')	*al-raghba* ('courage')	8
al-ṣāliḥāt ('good actions')	*al-sayyi'āt* ('evil actions')	167
al-ṣayf ('summer')	*al-shitā'* ('winter')	1
al-ṭuma'nīna ('quiet')	*al-ḍayq* ('anxiety')	13

We also have synonyms:

Word	Synonym	No. of occurrences of each
al-'aql ('reason')	*al-nūr* ('enlightenment')	49
al-ḍālūn ('those who go astray')	*al-mawt* ('death')	17
al-ḫarth ('tilling of ground')	*al-zirā'a* ('agriculture')	14
al-jahr ('publicity')	*al-'alāniyya* ('publicity')	16
al-qur'ān (the Qur'an)	*al-waḥy* ('revelation') and *al-islām* (Islam)	70
al-'ujb ('pride')	*al-ghurūr* ('impostor')	27

We also have pairs denoting antecedent and consequence:

Antecedence	Consequence	No. of occurrences of each
al-bukhl ('avarice')	*al-ḫasra* ('regret')	12
al-fākhisha ('shameless')	*al-ghadab* ('anger')	26
al-infāq (giving alms)	*al-riḍā* ('devoutness')	73
al-kāfirūn ('unbelievers')	*al-nār* ('hellfire')	154
al-zakā ('purity')	*al-baraka* ('blessing')	32

The Qur'an does not conform to standard notions of poetry, either, as it has its own rhyme schemes. Chapter 49, for example, uses different rhymes, as verses 1, 3, and 5 end in 'm' (*mīm*), whereas verses 2, 4, and 6 end in 'n' (*nūn*). However, verse 7 ends in n instead of m, whereas verse 8 concludes with m instead of n. Then it changes its pattern yet again, as verses 9, 10, and 11 end in n. This absence of a coherent scheme is characteristic of most of the verses that follow in this part of the chapter. The Qur'an even introduced something that puzzled even Muhammad's contemporaries, for some of its chapters begin with isolated letters. Thus, chapters 38 and 50 begin with one single letter – Ṣ (Ṣād) and Q (Qāf), respectively – whereas chapters 20 and 36 are referred to by their opening letters – Ṭ-H (Ṭā'-Hā') and Y-S (Yā'-Sīn), respectively. Chapter 68 opens with the letter N, but it is usually called The Pen instead of N. Thirteen chapters of the Qur'an begin with the same two letters, i.e., letters Ḥ-M (Ḥā'-Mīm) – chapters 40, 41, 42, 43, 44, 45, and 46 – whereas chapters 20, 36, and 27 start with Ṭ-H (Ṭā'-Hā'), Y-S (Yā'-Sīn), and Ṭ-S (Ṭā'-Sīn), respectively. Chapters 10, 11, 12, 14, and 16 of the Qur'an start with the letters A-L-R (Alīf-Lām-Rā'); Chapters 2, 3, 29, 30, 31, and 32 with the letters A-L-M (Alīf-Lām-Mīm); and Chapters 26 and 28 with the letters Ṭ-S-M (Ṭā'-Sīn-Mīm). Chapter 7 begins with the four letters A-L-M-Ṣ (Alīf-Lām-Mīm-Ṣād). Finally, chapter 19 (Maryam) starts with the five letters K-H-Y-'A-Ṣ (Kāf-Hā'-Ya'-'Ayn-Ṣād). All chapters that bear names of prophets open with letters, except for chapter 47 (Muhammad). Likewise, every single chapter of the Qur'an should begin with a reading of the *basmalla* (In the name of God, the Most Merciful, the Most Beneficent), but it is prohibited to recite it at the start of the chapter 9 (Repentance).

Instead of being restricted to specific literary rules, the Qur'an introduced different literary styles. It, for example, uses short but comprehensive sentences like the verse 2: 179 "wa fi-l-qiṣāṣ ḥāya" (there is life in *qiṣaṣ* – a sentence to a killer) to satisfy the most

eloquent thinkers, who insist that the best sentence is the shortest but most comprehensive. This style, called *ījāz qisār* (making less words but more meanings), is the best kind of *ījāz*, for to express the same meaning otherwise would require more words, such as "if a murderer is murdered, the punishment will prevent others from killing." This process will result in people's lives being saved. However, the Qur'an's eloquence, for Ibn Hazm in support of al-Nazzam, was not a miracle. He even dismissed such a notion as an act of disbelief because it contradicts the Qur'an 4: 150–151. These verses require absolute belief in the entire Qur'an, so that the belief in certain verses as evidence of the Qur'an's divine eloquence amounts to disbelief of the same in other verses. In this way, Ibn Hazm tried to transpose the Qur'an's language from an Arab mindset to an Islamic one.

Sarfa, after all, had its roots in the Mu'tazilite concept of the createdness of the Qur'an, a theory that Caliph al-Ma'mun used to unify his divided empire. Both al-Amin and al-Ma'mun were sons of Caliph Harun al-Rashid, but by different mothers: Al-Amin by an Arab mother, and al-Ma'mun by a Persian one. The elder al-Amin ruled the Abbasid Empire on the death of their father in 809, whereas al-Ma'mun became governor of the eastern provinces of the Empire. Al-Amin's Arab advisers encouraged him to eliminate his half-brother, resulting in a civil war (809–813) that al-Amin lost. One of al-Ma'mun's policies as a newly installed Caliph was to impose his unifying ideology of mihna (inquisition): every official of the Abbasid Empire had to declare his acceptance of the createdness of the Qur'an. Because the Qur'an is created, the new ruler might not need the Arab ulama to interpret it because it is a 'secular' book, while attracting the support of non-Arab segments of his subjects. Theologically, he implied that the Qur'an was parallel to Jesus: both were created. Under the leadership of Ahmad ibn Hanbal (the founder of Hanbalism), however, al-Amin's supporters condemned al-Ma'mun's theory as unbelief. In its place, they proposed Ibn Hanbal's concept of the eternity of the Qur'an. The createdness of the Qur'an lasted until the Caliph al-Mutawakkil (r. 847–861) replaced it with Ibn Hanbal's theory. This 'orthodox' ideology was called Sunnism in contrast to Mu'tazilism.

In 1774 Ibn 'Abd al-Wahhab revived Hanbalism under the pretext to call for a return to the Qur'an and Hadith. By contrast, Ahmad Khan started his Neo-Mu'tazilism – known as Islamic modernism – in India right after the 1857 abortive Mutiny. Unlike Ibn 'Abd al-Wahhab, Khan believed that Gabriel was not an ambassador who brought the messages of God to Muhammad. Khan also rejected Shah Wali Allah's theory of 'speech of God,' i.e., that Muhammad received the ideas from God and reformulated them in his own words, as God, for Khan, poured both the contents and words of the Qur'an to Muhammad's heart. In his 'the Prophet's mind,' Fazlur Rahman believes that Muhammad received only ideas from God and reformulated them in his own terms, whereas Hassan Hanafi differentiates between theory of prophecy and hermeneutics. The former deals with the vertical communication between God and Muhammad: Gabriel dictated the words of God to him who in turn dictated them to the inscribers of revelation immediately at the time of their utterance so that they have been preserved in writing until today. This constitutes the verbatim language and ideas of the Qur'an, since Muhammad was a passive transmitter. However, hermeneutics deals with the verbatim revelation horizontally, as it interprets the Qur'an after its transmission and recording. Interpreters, including Muhammad, are active. The occasions of revelation, however, indicated the human need for solutions to contemporary problems, to which the Qur'an responded. Therefore, the occasions of revelation are 'secular,' as they represented the priority of human thought over revelation.

See also: Arabic; Arabic Linguistic Tradition; Inspiration and Revelation; Islam and Arabic; Orality; Poetry: Stylistic Aspects; Sacred Texts: Hermeneutics; Variation in Arabic Languages.

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R

(R) as a Variable

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All sounds are variable, but some are more variable than others. Does **hyper**-variation mean a greater disposition for sociolinguistically relevant conditioning, or, alternatively, a tendency for relatively greater noisiness in the distribution of unconditioned variants? Whatever the case, there should clearly be a special interest in the sociolinguistic systemization of those sounds that are so unusually prone to variation that it is difficult to capture them within a simple articulatory and acoustic definition. Such is the case with the sociolinguistic variable (R).

About three-quarters of languages have at least one /r/ phoneme (Maddieson, 1984), but since the class of rhotic sounds is widely acknowledged to be very varied, the definition of /r/ must be flexible, and the definition of 'rhoticity' is rather heterogeneous and perhaps even somewhat arbitrary (Ladefoged and Maddieson, 1995). The fundamental problem arises from the tension between a simple phonological claim that "language L has a phoneme /r/," the fact that /r/ tends to be an isolated phoneme rather than a member of a larger natural class, and the astonishingly nondeterministic correspondence between an /r/ and the crosslinguistic range of possible phonetic exponents involved. Moreover, some of the phonetic sounds concerned (e.g., velar fricatives) behave systematically as nonrhotics in other languages. Indeed, pedagogic texts often rely on such correspondences to teach pronunciation (e.g., the sound of French /r/ is like the sound at the end of the Scottish pronunciation of 'loch'). The use of the wrong /r/ sound can create the impression of a very strong foreign accent for those learning standard varieties, but tolerance in the face of idiosyncratic variation and/or the acquisition and use of sociolinguistically conditioned variation seems to be the norm among native speakers.

Although variability is even more characteristic of vowels, vowels occur as members of a larger system and can freely, in time, change phonological identity as they change phonetic quality from one location to another. However, the single label /r/ is used for a much wider and emptier phonetic space. We can thus understand John Walker's rather pejorative-sounding opinion from 1791 that in English /r/ is "the most imperfect of all the consonants" (Harris, 1994: 230).

Nevertheless, there are some grounds to identify rhotics as a natural class. First, a number of phonetic sounds can be and have been classed as **exclusively** rhotic, especially (nonlabial) trills and retroflex approximants. Second, diachronic change can be seen to affect the phonetic characteristics of rhotics without leading to their loss as a contrastive element, giving rise to wide crosslinguistic variation in the form of the same rhotic in related languages. In Western Europe, for example, cognate words can employ alveolar or uvular trills, as well as labials, dentals, alveolars, velars, uvulars and labiodentals (fricatives and approximants), and even vowels. These various forms (apart from the last: cf. Barry, 1995) are usually regarded as the result of phonetically superficial and not phonologically meaningful changes. Third, structurally conditioned allophony and variability of the /r/ within a single language reinforce the correspondence of heterogeneous phonetic variants to the same phoneme. Analogous to the diachronic situation, the phonological system of a single language can lead us to postulate a single phoneme /r/ (superficially being voiced or voiceless, fricative, tap, or approximant). Fourth, sociolinguistic conditioning of variation in a rhotic is common within a language. Fifth, developmental data often show a range of exponents of /r/ from infancy into adulthood.

It is important to understand the descriptive phonetic nature of rhotic variation, though we need not worry here about the deeper question of why such an apparently disparate set of sounds is related (see Ladefoged and Maddieson, 1995; Barry, 1997). Without some phonetic preliminaries, it is hard to appreciate an understanding of sociolinguistic conditioning of (R) in any particular situation, and, moreover, it is hard to see the extent to which any findings may transfer from that situation to another with the

'same' variable (R): such a comparison may make very little sense. The next section, therefore, is a review of the wide range of phonetic variation of rhotics. It should be clear that /r/, because it is prone to vary in many and subtle ways, should both be an opportunity and a challenge to variationists. Then the ground will be clear to move on to more concrete detail of sociolinguistic variable (R), mainly in the context of British English.

What Can Be an /r/?

In general, the label /r/ seems to be applied to oral lingual sonorant consonants unless they are specifically palatal, lateral, or labial. It is hard to avoid the feeling that /r/ is therefore something of an 'elsewhere' category. If it were not for the fact, mentioned above, that it is often possible to provide phonological, sociolinguistic, diachronic, or acquisitional justification for the establishment of the category, it would be tempting to acknowledge '/r/' to be a rather meaningless label. For phonological theories favoring underspecification and featural analysis, the problem is to choose an appropriate abstract feature for /r/, derive common and uncommon aspects of its phonological behavior from this abstract specification, and then explain why the phonetic realization of this abstract /r/ is both systematic and arbitrary. For theories positing highly detailed mental representations, the problem is to explain how an abstract category /r/ is formed from articulatory and acoustically diverse input.

From the point of view of discussing the phenomenon of rhoticity, however, '/r/' or '(R)' are labels as good as anything else, so long as we recognize the descriptive and theoretical limitations arising from the use of this convenient international phonetic alphabet or orthographic symbol.

In looking for a more realistic description of rhotic sounds, we should refer first to Lindau's influential acoustic crosslinguistic study of rhoticity (Lindau, 1985) and to the excellent Ladefoged and Maddieson (1995: Chapter 7). Lindau's starting points were, on the one hand, the heterogeneity in the phonetic characteristics of /r/ crosslinguistically and its allophonic heterogeneity, and on the other, the phonological homogeneity of the distribution of /r/ and of the effects of /r/ on neighboring segments, especially vowels.

In looking at about a dozen phonetic types of /r/ from multiple speakers of four Indo-European languages and in a more varied range of seven West African languages, Lindau demonstrated some of the similarities and differences that can be found for some common rhotic sounds. The phonetic details are relevant to an understanding of rhoticity in itself, and as a pointer to the type of fine differences that can be learned and therefore function sociolinguistically. For example, the ways in which uvular and apical trills are distinguishable acoustically do not seem much clearer than the ways in which apical trills can differ. With respect to the spectral patterns of the trills, the third spectral peak is quite low in Chicano Spanish, but "other forms of Spanish from Argentina, Colombia, and Mexico display a much higher third spectral peak than the Chicano Spanish, indicating a more dental place of articulation. The low third spectral peak in Chicano Spanish may be due to influence from English" (Lindau, 1985: 161). Thus, it is clear how the broadest detail for an /r/ may be adequate for phonological researcher, but even a relatively careful '[r]' or '[ɹ]' may be too coarse to indicate the existence of variation within a dialect or community: "even in languages where a possible realization is a trill, not all speakers use a trill, and the speakers that do, have tap and approximant allophones as well as the trill" (Lindau, 1985: 161). In her sample of trilling languages, about half the speakers produced trills. Spanish, with a tap-trill contrast, had a high proportion of phonetic trills, whereas only three of 10 Swedish speakers produced trills. This could have a phonological cause – namely that Swedish has only one rhotic phoneme – or a phonetic one, such as uvular trills being less easy than alveolar ones to produce consistently. Similarly, "taps are not produced in the same way in different languages, nor are they always produced in the same way by different speakers of the same language" (Lindau, 1985: 161). Ladefoged and Maddieson (1995) presented numerous further examples from a wide range of languages.

Lavoie (2001), in a highly detailed study of Mexican Spanish (and American English), also found some speaker variation, particularly in how weakened the trill was in a weak (nonprestress) position, but also a great deal of positional and random variation. She calculated variation in the trill and tap phonemes with respect to their manner of articulation. The Spanish tap phoneme was very variable in manner, while the trill was more consistent.

Further subtle variations are possible and can be observed. For example, in many languages, prepausal trills may be more or less devoiced. Greater or lesser amounts of epenthesis can occur between consonants and a following tap or trill, leading even to changes in the syllable count. And, of course, they may be in a rich variety of positional variation with nontrills.

Approximant /r/ is, of course, even more open to variation. It may be smooth, vocoid, and friction-free, indicating a constriction no tighter than that found in vowels and glides, and therefore characterized by

formant transitions of rapidly changing or fairly static character, largely depending on the vowel context and syllable position of the /r/. A retracted or retroflex approximant will have long transitions flanking it, particularly between it and a preceding high or front vowel, and these transitions can become like a diphthongization of the preceding vowel and help cue the presence of /r/ as much as reaching the target does. Thus a retroflex target can be replaced by a centering diphthong, and a correspondence between /r/ and schwa is established. Nonhigh vowels may, on the other hand, coalesce with /r/ and can result in a rhoticized vowel.

For approximant /r/, typically the third formant is lowered, compatible with pharyngeal and/or postalveolar constrictions (Stevens, 1998). Indeed, these two constrictions have been observed in many articulatory studies, often together with lip rounding, which serves to lower both the second and third formants. Thus, we begin to see that approximant /r/ may be produced with multiple constrictions, or that alternative constrictions can be used, giving rise to broadly similar acoustic output. Articulatory complexity and flexibility are therefore characteristic of /r/ and perhaps are among the sources of its tendency toward variation and change.

While anterior approximant /r/ can also be rather fricated, frication is a more typical characteristic of non-trilled uvular and velar /r/. They range widely in the degree of noise and devoicing. Finally, the anterior lingual configuration of a postalveolar approximant /r/ can vary between basically retroflex or bunched configurations.

In sum, there is no natural articulatory or acoustic class that is easy to define; nor is there a set of sounds (however constituted) that can be said to be exclusively rhotic. Taps and flaps can also be variants of stops, laterals, or nasals. A fricative may be the phonetic realization of a phonological rhotic but may also be, of course, a fricative. And while pharyngeal or labial /r/s seem to exist, more often than not, approximants in those regions are not classed as rhotics without further systematic reasons to do so. Lindau's conclusion that rhotics exhibit a Wittgensteinian familial resemblance remains the key insight to take into any sociolinguistic study of (R).

Sample Studies of (R)

English is not unusual in having an /r/, in having only one rhotic phoneme, or in having stronger and weaker variants of it in relatively predictable phonological contexts. Indeed, in the Germanic context it is one of a number of languages (German, Dutch, Danish, Swedish) with both rhotic and nonrhotic dialects. The so-called r-less or nonrhotic dialects do not lack an /r/ altogether. Rather, /r/ is, in broad terms, missing from syllable codas in nonrhotic dialects. Like vowel variation, (R) in the English-speaking world can therefore a useful variable for the sociolinguist and indeed has appeared in a number of studies, including foundational work in the field (Labov, 1966; Labov, 2001). Although the focus here is on accessible reports of English variation, we should note that there are a few very large-scale studies in other languages that specifically address (R). A fair bit of work has been done on Dutch, most notably the ongoing 'Hema' project under the direction of van Hout, Van de Velde and Zonneveld (cf. Sebregts *et al.*, 2003). (See also the attached multimedia materials collected in collaboration with Sebregts.) For French, there is a major project 'La phonologie du français contemporain: usages, variétés et structure' under the direction of Durand, Laks and Lyche (cf. Delais-Roussarie and Durand, 2003). (See also Chevrot *et al.*, 2000; the hard-to-obtain Van de Velde and van Hout, 2001; and a successor volume in preparation; Gordon, Campbell, Hay, Maclagan, Sudbury and Trudgill, 2004; Hay and Jannedy, forthcoming, with more on (R) in New Zealand.)

The situations in North America, Scotland, and Ireland are rather different from the situations in other English-speaking regions. They are predominantly rhotic systems in which rhoticity is associated with prestige or standard speech. Elsewhere, however, nonrhotic speech tends to be the standard. It is useful, therefore, to examine the systems found for (R) in the British Isles, for example, since it is not only representative of both directions of variation, but the locations are also close enough that there is likely to be some tension and mutual influence. Variation in the United Kingdom is long-standing, as is evident in, for example, the *Survey of English dialects* and sources therein (Orton and Dieth, 1962a, 1962b; Upton and Widdowson, 2004). Walker (1791) noted alveolar and uvular trills and even nonrhoticity in London, where the /r/ was "sometimes entirely sunk" (Harris, 1994: 231).

Sociolinguistic studies of /r/ are concerned with phonetic variation in /r/, variation in the phonotactic distribution of /r/ (and other segments conditioned by /r/), and, crucially, the interaction between the two. Loss of coda /r/ ultimately means vocalization and leads to an expanded vowel system and/or mergers. The loss of coda /r/ results diachronically from progressive phonetic weakening of more consonantal productions until the productions are at first similar to vowels, then merged with them. Exactly how the reduction in the phonetic rhoticity of /r/ interacts with

an increasingly merged set of vowels before /r/ is still unclear, but it is likely that breaking, in which the vocalic transitions into /r/ gain in salience, is often involved (Wells, 1982; Barry, 1995).

Yet different rhotic accents of English can have larger or smaller vowel inventories before /r/, making /r/ responsible indirectly for yet more variation. For example, while some rhotic American accents merge 'Mary,' 'merry,' and 'marry,' rhotic Scottish accents tend to preserve these distinctions, as well as keeping 'horse' and 'hoarse' distinct. Scottish English has perhaps the fewest number of vowel mergers before a phonetically consonantal /r/; this makes it a particularly interesting accent for internal reasons, as well as on account of its social and geographic proximity to nonrhotic Standard Southern British English. In Scotland, many speakers of Standard English have a basic 12-vowel system and merge only /ɪ/ and /ʌ/ before /r/ ('fir' and 'fur').

Even in rhotic accents, weak syllables are apt to lose /r/, especially before a consonant word internally ('surprise,' 'forget') or in frequently used word-final sequences ('other than'). In Scotland, the general phonotactic profligacy of coda /r/ attests to the survival of a more strongly consonantal coda /r/ than many other British varieties, but one that is, nevertheless, beginning to weaken from the coda into the nucleus structurally, as it has weakened phonetically in previous generations. The (contextually devoiced) trill or tap so consciously caricatured by Scots themselves as well as by outside observers seems largely gone, having being replaced by an approximant among younger and less vernacular speakers. Variation as a result of structural factors is common too. A speaker may have a lingual approximant /r/ (retroflex or alveolar) generally in onsets, but affricates in /tr/ and /dr/ clusters, and a tap in labial clusters such as /br/. Emphatic stress can result in a higher frequency of occurrence of taps and trills.

Recent sociolinguistic research in Scotland has shown how /r/ varies, and by implication how it is changing phonetically and socially. It may be, indeed, that such work reveals the early stages of the change toward phonological nonrhoticity. It is far from obvious that this is a simple change from above under the influence of Standard Southern British English. Such a change has been predicted among professionals and laypeople alike, given the high degree of nonrhoticity among children of English incomers, who tend to be middle class, causing loss of /r/ through contact. Such direct influence has been particularly obvious to many informal observers of middle-class speech in Edinburgh, in which Scottish Standard English shades off into clearly English-influenced accents (see Romaine, 1978).

It is therefore most important that a quite different and surprising behavior was confirmed by Jane Stuart-Smith's variationist examination of the English of Glasgow, the largest city in Scotland. Glasgow accents are stigmatized by Scots and non-Scots alike due to its strong Scots vernacular character, and Glaswegians display a great range of variation as a consequence. In Stuart-Smith's fieldwork (undertaken in 1997), 32 speakers were studied, bisected into groups of male and female, younger (13 or 14 years) and older (40 to 60 years), and working and middle class. Both spontaneous and word list speech was collected. In Stuart-Smith (2003) the results were compared to two previous important datasets collected by Macaulay (in 1973) and Macafee (in 1984–1985), which provide real-time support for Stuart-Smith's apparent time study, and to previous variationist work with more of a focus in Edinburgh by Romaine in the 1970s and by Speitel and Johnston in the 1980s, both of whom provided some earlier indication of variation in (R), including vocalization in working-class speakers (e.g., Romaine, 1978; Johnston, 1997).

The important point about this work is that the situation is far more complex than might be expected. While nonrhoticity has been spreading slowly across the United Kingdom for centuries, although perhaps more slowly than generally thought (Gordon *et al.*, 2004), rhoticity has seemed relatively secure and prestigious in Scotland. On the other hand, phonetic weakening of /r/ to an approximant in Scottish Standard English is extremely widespread. Indeed, although it is typical of a phonological or phonetic variable like (R) to be gradient, the behavior here is approaching categoricalness.

The 1997 Glasgow study made it clear that there has been both a loss of postvocalic phonetic rhoticity and phonetic variation in the realization of /r/. While nonrhotic patterns are **not** particularly evident in middle-class speech, the same cannot be said for working-class speech. Unsurprisingly, the range of variants transcribed is large. Common variants include central approximants, retroflex approximants, alveolar taps, retroflex taps, and vowels. Less common variants include alveolar trills and uvular fricatives.

First, Stuart-Smith reported an analysis of /r/ in all positions in the word list data, plus a 10% sample of the spontaneous speech. In the read speech, working-class girls formed a group on their own that was statistically distinct from all middle-class groups. Their main characteristic was a complete avoidance of retroflex approximants and heavy use of vocalization for coda /r/. Additionally, tendencies were noted across read and spontaneous speech. Younger and older working-class women seemed to differ,

while young working-class women resembled young working-class men. They both vocalized a great deal and avoided retroflex approximants. For all speakers, alveolar taps were well-represented, but trills and retroflex taps are almost absent.

Second, Stuart-Smith presented a more detailed study (all spontaneous data for all subjects in addition to the word list data) of coda /r/ and its vocalization. It was examined with respect to various phonological subenvironments. Preconsonantal and word-final /r/ were examined separately, and the latter was subdivided into two independent groups, namely stress (/r/ in a lexically stressed versus unstressed syllable) and structure (prepausal, preconsonantal, and prevocalic).

The extensive number of phonetic variants were allocated into what I will call rhotic, vocalic, intermediate, modified vocalic, and rhoticized vowel categories. In general, middle-class speakers used a rhotic consonant, while working-class speakers used a far wider range of variants. The working-class teenagers, particularly the girls, favored vocalization. The polarization of the young working class and the other groups was most evident in the stressed prepausal position, for here vocalization was found at high levels for boys and girls alike. However, preconsonantally (e.g., 'card'), the working-class girls favored a plain vowel, but the working-class boys favored a modified (velarized) vowel. In unstressed prepausal syllables, the use of plain nonrhoticized vowels by the girls was almost categorical. This suggests the girls may have been closer to the merger of r-ful and r-less words and to phonological nonrhoticity, and were furthest from the rather homogeneously rhotic middle-class speakers. The use of modified vowels by the boys may have been the result of the preservation of velar, pharyngeal, or other dorsal secondary articulations, due ultimately to the gesturally complex nature of some speakers' approximant /r/. But since those who vocalized most tended to use plain vowels, those reflexes of /r/ may well have been evidence of a stage in the weakening of /r/, in which speakers' outputs contained a gesturally reduced but still identifiable /r/.

Future research will hopefully reveal the extent to which (R) is like other variables, both consonantal and vocalic, in Glasgow, as well as how the changes in /r/ have arisen and been transmitted.

A further issue brings us back to the problem of the phonetic variability of rhotics in the first place: the nature of the hard-to-discern articulatory underpinning of /r/. Instrumental acoustic analysis can help to uncover subtle sociolinguistic patterning, but in the case of (R), another technique may be able to shed more light on such questions – namely, articulatory ultrasound. The technique is noninvasive and offers great opportunities for use in the analysis of spontaneous speech and in large-sample studies. See the associated multimedia files for examples of Dutch and Scottish speakers.

Ultrasound can provide tongue-surface movies of the midsagittal section of the tongue and can clearly reveal different articulatory strategies for anterior approximant /r/, even without detailed analysis. The multimedia files provide examples of two young adult middle-class speakers from the Edinburgh area with acoustically similar formant structure for /r/, and impressionistically similar /r/, have different underlying articulations. One has a retroflex or alveolar approximant with a tip-up articulation and, it seems, with no accompanying pharyngeal gesture. The other has a bunched or tip-down production with a clear postalveolar constriction and a pharyngeal constriction. It may be that the use of modified-vocalic productions of /r/ in the 1997 Glasgow data indicate a posterior constriction, too. A stratified multisubject study with acoustic and ultrasound analysis is certainly feasible, whereas other articulatory techniques would be far more invasive and probably incompatible with unmonitored spontaneous speech.

In nonrhotic areas of the United Kingdom, one of the major phonological phenomena in English can be observed, namely 'r-sandhi' ('linking-r' or 'intrusive-r'). Despite its high frequency of use, the nonetymological aspects of intrusive-r are perhaps responsible for a certain amount of conscious awareness of the phenomenon and resultant social and stylistic variation. Foulkes (1997) conducted the first large sociolinguistic study of the phenomenon (in Newcastle-upon-Tyne and Derby), although other research has examined the phenomenon in prestige and broadcast English. In Newcastle, linking-r and intrusive-r were less common than in more southerly accents and were associated with middle-class speakers. The frequency of linking-r use among young working-class speakers was only approximately 40 percent, compared to about 80 percent of older middle-class speakers. The rate of intrusive /r/ use in working-class speech was only about 20%. Interestingly, style did not behave in this study in the way that it is normally assumed to work: middle-class speakers used **more** intrusive-r in word list reading than in spontaneous speech.

Another topic of much interest, especially in nonrhotic Britain, is the recent increase of strongly labiodental productions of /r/ (Foulkes and Docherty, 2000). A few decades ago, an adolescent or adult with such a variant would be seen as having an idiosyncratic or even pathologically delayed production (with some very specific sociolinguistic exceptions), whereas recent research revealed that, increasingly, a significant minority of young adults can be found

with labiodentals. Indeed, it is by no means an infrequent characteristic of younger professional broadcasters in the United Kingdom. Recent informal observation of nonbroadcasters interviewed on United Kingdom radio and television suggested that between 25 and 50 percent of speakers used a labialized /r/ at least some of the time, at least as judged by this retroflexed, rhotic, and Scottish listener. This impression echoes Peter Trudgill's 1983 Norwich data (Trudgill, 1988), where few subjects with clear labiodentalization could be said to use it ubiquitously or consistently strongly.

Intervocalic /r/ behaves rather differently from prepausal or preconsonantal /r/. Intervocalic position is a rhotic position, but may be prosodically weak, particularly if it follows a stressed syllable and precedes an unstressed syllable. So loss of intervocalic /r/ sometimes occurs (and see also loss of prevocalic /r/ in weak syllables, e.g., 'pretend'), but it is likely to be differently distributed than plain nonrhoticity. In England and the United States, high-frequency forms like 'very' can be found with an almost monosyllabic pronunciation, and in more formal lexis, such as 'heroin,' the /r/ may be merely a hiatus between the vowels with no percept at all of a consonant. In England, this type of production seems particularly common among users of labial /r/. It marks the phonetic low-point of rhoticity, in which /r/ can appear as even less than a schwa or vowel offglide, namely as a hiatus between syllables. Since nonrhotic English did not previously permit sequences of nonhigh vowel plus vowel (this being the trigger for r-sandhi), such ultimate weakening of /r/ to hiatus does not (yet) cause any mergers in those accents.

Labiodental /r/ provides yet more evidence of how phonetically heterogeneous the class of rhotics can be. With heavily labialized /r/, bilabial trills corresponding to the clusters /br/ and /pr/ can even be found.

Acoustic analysis by Mark Jones (personal communication) and my own ultrasound analysis show that 'labiodental' /r/ is at an end of a phonetic gradient that even in its most extremely labialized forms is quite distinct from /w/, that it is favored in labial contexts, and that it may be a result of the boosting and early onset of the labial gesture that is already present in approximant lingual /r/ in the United Kingdom. In other words, postalveolar and pharyngeal lingual gestures may still be present in a 'labiodental' /r/, functioning to distinguish /r/ from labial-velar /w/.

As an aside, in the 1997 Glasgow study (Stuart-Smith, 2003) no labialized /r/s were found outside labial contexts, and informal observation suggests that these variants appear only sporadically in rhotic and nonrhotic Scottish adults. Labialized /r/ and nonrhoticity are, however, somewhat in evidence in child development in Scotland, as they are in the United States. However, such productions are not common, or at least were not so in the late 1960s, as evidenced by a large (510 subjects) standardized study (Anthony *et al.*, 1971) of children aged 3.0 to 5.6. Out of 510 productions, labialized /r/ was more common in /br/ (32 tokens in 'bridge,' 26 in 'toothbrush') than /str/ (22), /kr/ (18), or /tr/ (16). However, in /θr/, nonlabialised /r/ was very common, even after [f] (225 tokens). Only 15 tokens were [fw], and another nine were labial. Initial /r/ ('red') was only 86% 'correct' (i.e., trill, tap, or lingual approximant) by 5;6. Overall, 25 productions were [w], 12 were [vɹ], six were [ɥ], three were [ʋ], and three were [βɹ]. Medial /r/ ('garage') was labialized in 38 tokens. Finally, nonrhoticity in a weak syllable ('soldier' and 'birthday') was so common that absence of /r/ was not even counted as an error.

Foulkes and Docherty (1999) collected reports from a number of sociolinguistic studies on urban varieties throughout the United Kingdom and discussed the various phenomena affecting /r/ with reference to in a number of cities. Focusing mainly on nonrhotic varieties, the following were observed. Labial forms of /r/ were found in London (where they are a long-time variant), Norwich, Milton Keynes, Reading, Hull, Newcastle, and Derby. In nonrhotic Newcastle, the standard approximant /r/ was supplemented by taps in intervocalic position, and the local Northumbrian 'burr' ([ʁ]) was rare and found only in rural areas. Generally, nonrhoticity and intrusive-r were the norm for accents with labialized /r/, especially among the young. In nonrhotic Derby (see also Foulkes, 1997), linking-r was categorical and intrusive-r present in about 55% of possible contexts, with no sociolinguistic patterning. In Sheffield, Cardiff, and Sandwell, the norms were non-rhoticity, a lingual approximant /r/ realization, and intrusive-r. Finally, it was noted that other phonological changes could increase the number of environments in which intrusive-r can operate. As well as after vocalized /l/ or before dropped /h/, reductions of full vowels to schwa resulted in intrusive-r, so words like 'window' varied, depending on whether a reanalysis of the final vowel as /ə/ had occurred, and the infinitive 'to' was also rather variable in its conditioning of an intrusive-r. Sandhi was particularly common in combined forms like 'gonna' and 'wanna.' Finally, in London, monophthongization of vowels in the MOUTH and GOAT classes may also have fed intrusive-r.

In North America, a primarily rhotic continent, a number of foundational and influential sociolinguistic studies have addressed (R) (see Wolfram and Schilling-Estes, 1998). It should first be noted that

taps and trills are uncommon in North America, presumably because an alveolar tap or flap is used for /t/ and /d/ in just those environments in which tapped /r/ is likely in British English, and although the mechanisms are not identical, if a tap were used in 'berry,' it might merge with 'Betty.' Tapping of /t/ and /d/ is not normally regarded as a rhoticization in the United States, and there appear to be no grounds, at present, for viewing it as such.

Nonrhoticity in American English originally reflected the accents of some of the early settlers from the British Isles. Recent changes, including the movement of large numbers of southern nonrhotic speakers to cities in rhotic areas, have meant that non-rhoticity is not only a geographical variable but also reflects ethnicity and class. Nonrhoticity in some urban settings is characteristic of speakers of African–American vernacular English (AAVE), and there, rhoticity can act as a socioeconomic marker, but unlike the United Kingdom, where nonrhotic speech is associated with prestigious varieties. Within the African–American community of Detroit, (R) exhibits gradual stratification, so that while only about 20 percent of upper middle-class speakers are nonrhotic, this figure climbs to approximately 70 percent for the lower working class, in a linear manner.

In New York, the social meaning of rhoticity has shifted in the previous half-century. Older speakers exhibit little class-based stratification, but younger speakers identify rhotic speech as more prestigious than nonrhotic speech. This is the converse of the British situation (at least, the English situation) as well as the converse of Southern Hemisphere varieties (Gordon *et al.*, 2004). So, nonrhoticity in the United States is beginning to be associated with rural and lower-class speech. This does not mean there are not pockets of prestigious nonrhoticity in the United States, and indeed specific locations have older upper-class nonrhotic speakers. The New York adoption and then loss of nonrhoticity as a prestige form are both, as it happens, 'change from above,' though separated by a couple of centuries and with reference to different prestige dialects: nonrhotic British English and rhotic American English, respectively. The Irish English of Dublin shows a similar pattern, in which the local vernacular is weakly rhotic but middle-class speech is strongly rhotic (Hickey, 1999).

In Philadelphia (Labov, 2001), the ethnic distribution of rhoticity is also finely drawn. Nonrhotic speech is characteristic of the African–American population (about 40% of the population), but it also appears to have been an indicator of Italian ethnicity, an effect that is in decline in apparent time. Unstressed (R) can often be nonrhotic across Italian and non-Italian communities, whereas in stressed syllables, the distribution of nonrhoticity is more complex, being more ethnically determined and prevalent in older speakers.

Finally, rhotic accents acquire extra /r/ in contact with nonrhotic varieties. Thus words such as 'theater' and 'idea' can contain an /r/ in rhotic varieties like Scottish English, since speakers interpret the [iɔ] diphthong as corresponding to /ir/, and weak final syllables that are subject to /r/ sandhi can be reinterpreted as involving an /r/ (hence 'feller' versus 'fellow'). These forms are generally lexical oddities, but their use is likely to be sociolinguistically distributed.

In general, then, it seems that vernacular or nonstandard varieties of English in the United Kingdom are driving more variation and change in a number of variables, including (R), than the prestige varieties of Scotland and England. Urban vernacular forms seem to be either on parallel paths of internal change, or influencing each other, to the extent of substantial change – even vocalization – of /r/ appearing in younger working-class speakers in the largest city in Scotland in remarkably large numbers.

See also: Gender; Laboratory Phonetics; Labov, William (b. 1927); Phoneme; Phonemic Analysis; Phonetics, Articulatory; Prestige, Overt and Covert; Sandhi; Scots; Sociolect/Social Class; Sound Change; Speech Errors as Evidence in Phonology; Variation and Language: Overview; Vernacular.

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Radical Interpretation, Translation and Interpretationalism

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Donald Davidson's idea of **radical interpretation** gets its inspiration from W. V. Quine's account of **radical translation**. This article will deal first with Quine's view and then Davidson's before turning to the **interpretationalism** of Davidson's views and criticisms of thereof.

Radical Translation

W. V. Quine is generally suspicious of such mental notions as belief, intention, and meaning, preferring an austere behaviorist account of language use. Quine imagines a field linguist attempting to compile a **translation manual** that would pair sentences of her own language with sentences of a language wholly unlike any she has ever encountered, unaided by dictionaries or local interpreters. In this scenario of **radical translation**, the linguist has access only to the bodily behavior of the speaker and to those objects and events that are manifest in the local environment. The best pragmatic procedure for the radical translator to follow, thinks Quine, is to try to correlate the speaker's utterances with their proximal stimuli – "surface irritations" (Quine, 1960: 22) of sensory receptors. If a given stimulus–say, that produced by a rabbit–can be correlated with a given utterance on one occasion – say, 'Gavagai!' – then the translator must try to reproduce similar stimuli in order to see whether they provoke similar utterances (find some more rabbits and point them out). Or, better, the translator may on various stimulus-occasions, similar and different, repeat the speaker's original utterance in the hope of eliciting terms for assent and dissent (point to

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rabbits and rutabagas alike, asking, 'Gavagai?'). With a firm working hypothesis about these terms in hand, she may proceed to pair sentences of the speaker's language with sentences of her own language, according as they seem from her perspective to have the same **stimulus meanings** – that is, roughly, to be prompted by the same sorts of events and objects. Hypotheses concerning assent and dissent may, of course, meet with disconfirming evidence, forcing the translator to begin anew with another hypothesis. But by following this procedure, Quine thinks, the field linguist can expect eventually to translate **observation-statements** – reports on observable occurrent events or states of affairs. By applying a **principle of charity**, which counsels the translator not to assume wanton irrationality on the speaker's part, she may also hope to translate logical terms, such as 'not,' 'and,' and 'or,' since a rational speaker is unlikely to affirm each conjunct of a conjunction ('Roses are red' and 'Violets are blue') without also affirming the conjunction ('Roses are red, **and** violets are blue'). Efforts to take radical translation further to relatively nonobservational sentences – such as 'Electrons have negative charge' or 'Incest is an abomination' – will rely on the formulation of **analytical hypotheses** regarding how to parse the speaker's utterances into words and other subsentential components. However, Quine contends, there will always be rival systems of analytical hypotheses, any of which will be as pragmatically successful as the other for purposes of compiling a workable translation manual. Translation is thus indeterminate, but Quine thinks that the lessons of radical translation apply with equal justice to our attempts to converse with our colinguists and to our learning of our own language. Having learned the language already, we find the procedure of interpreting our fellow speakers and ourselves as familiar as can be, but in neither case do we have any more evidence to go on than is available to the field linguist. It follows, thinks Quine, that meaning itself is no more determinate than translation (*see* **Indeterminacy, Semantic**).

Radical Interpretation

In the work of Donald Davidson, radical translation is transmuted into **radical interpretation**. The two notions differ in at least three important respects. (1) Whereas the former notion rests on methodological behaviorism, the latter does not. (2) Whereas radical translation aims to compile a translation manual for the language under study, radical interpretation aims to formulate and test, as part of a general theory of interpretation for a speaker, a core meaning theory for the speaker's language, which will describe the finite vocabulary of the language and show how that vocabulary can be combined using a finite set of recursive rules to produce any sentence in the language. Knowledge of such a theory would supposedly "suffice" (Davidson, 1984: 172; 1986: 438) for understanding the speaker, but is not necessary (1984: 125; 1986: 438). (3) Whereas radical translation relies on the principle of charity methodologically to argue for the translatability of logical connectives, radical interpretation applies this principle generally as something like a necessary condition of the very possibility of interpretation (Ramberg, 1989: 77). These points need elaboration.

(1) Quine focuses on terms for assent or dissent "because they suggest a behaviouristic test," but Davidson has no such commitment to behaviorism (Davidson, 1984: 231). He criticizes Quine's preoccupation with proximal causes of sensory stimulation, arguing that Quine slips back into a Cartesian model of the mind as isolated from the world, thereby exposing himself to both an "old-fashioned skepticism of the senses" (Davidson, 1990: 74) and a relativism about truth that arises from the fact that no two individuals share the same patterns of sensory stimulation (1990: 76). Translation even of observation sentences, which Davidson does not distinguish sharply from theoretical sentences (2001: 149) can be assured to work only if the interpreter focuses on macroscopic objects and events in a world shared by interpreter and speaker – marmots and mangoes, instead of photons striking nerve endings. In order to locate the source of the speaker's sensory stimulations, we need, says Davidson, three patterns of similarity from one occasion to another: the similarity I find in my experiences, the similarity the speaker finds in her experiences, and the similarity that I find in the speaker's responses to her experiences (2001: 119). The interpreter must "correlate his own responses and those of the speaker by reference to the mutually salient causes in the world of which they speak" (1990: 78) – a process Davidson analogizes to '**triangulation**' (2001: 105). (See 'Interpretationalism' below for more on this process.)

(2) The notion of translation does not by itself, thinks Davidson, give a plausible account of meaning for the speaker's language. A better account would have to show systematically how "the meanings of sentences depend upon the meanings of words" (2001: 17) if a speaker's capacity to understand and produce a potential infinity of novel and banal utterances is to be represented (*see* **Compositionality: Philosophical Aspects**). Drawing on the formal logical work of Alfred Tarski (1949), Davidson proposes that we begin the task of interpretation by taking as basic the attitude of holding a sentence true (or false). Then, having identified the sentences a speaker holds

true, we must formulate hypotheses about what finite vocabulary and what rules of syntax are operating in the speaker's language, and what rules of satisfaction are descriptive of the various predicates in the language. (A rule of satisfaction tells us what things satisfy a given predicate – roughly, of what things that predicate is true. It tells us which are the blue things or the koalas, for example.) Such a procedure provides a "model" (Davidson, 1986: 438) of what we commonly do when interpreting a speaker, though we cannot be plausibly said to **know** any such theory of interpretation (1986: 438). What exactly this means has occasioned some puzzlement (see Dummett, 1975, 1976; Schiffer, 1989: 116–117).

(3) This procedure requires that we be able to identify which sentences a speaker holds true, but this by itself will not tell us what those sentences mean. If we knew what the speaker believed in the circumstances, then that would give us some substantial clues concerning what she means by her sentences. However, our surest way of identifying what a speaker believes is by first knowing what her words mean. To escape this endless circle, Davidson appeals to the principle of charity, which, in his formulation, has it that we should "assume general agreement on beliefs" (1984: 196) and "try for a theory that finds [the speaker] consistent, a believer of truths, and a lover of the good (all by our own lights, it goes without saying)" (1980: 222). This is not a principle that we choose simply in order to avoid making our speaker sound "silly" (Quine, 1960: 59). Rather, "charity is forced on us" (Davidson, 1984: 197) if we are to be in a position to interpret our speaker **at all**.

Davidson believes that meaning- and attitude-attribution are holistic by nature. There is no sense to the idea of attributing a belief to a creature unless one attributes "a world of further beliefs to give it content and identity" (Davidson, 2001: 98) and likewise no way of assigning meaning to a sentence in isolation from assignments of meaning to other sentences (1980: 239). Such holism entails the possibility of reassigning meaning and content, so long as one makes compensating adjustments elsewhere in the attributed set of background meanings and beliefs. Thus Davidson allows for an indeterminacy of interpretation that is the "semantic analogue of Quine's indeterminacy of translation" (1984: 225), but as a consequence of his broader application of the principle of charity, he believes that "the range of indeterminacy is less than Quine thinks it is" (1984: 228). What indeterminacy remains is, in Davidson's view, comparable to the possibility of adopting different scales of measurement for the same objective phenomenon, much as we may measure temperature on the Fahrenheit or Celsius scales (1984: 154, 225; 1980: 257; 2001: 145). Additionally, Davidson regards it as a facet of linguistic competence that one has "first person authority" (2001: 3) concerning the meanings of one's own words and the contents of one's own thoughts. So, unlike Quine, he does not think radical interpretation "begins at home" (Quine, 1969: 46) (though it might begin next door when one interprets one's colinguists).

Interpretationalism

Davidson's account of radical interpretation is readily coupled to a view about meaning and intentional content known as **interpretationalism**. Much as Quine maintains that translation is prior to meaning and not vice versa, as we might have thought prereflectively, Davidson contends that there is no fact concerning what a speaker's words mean or what the contents of her intentional attitudes are apart from the possibility of their meaning or content being attributed by an interpreter. This is because, as we saw briefly above, interpreting a speaker requires identifying the mutually salient causes of her verbal behavior. Any link in the causal chain extending from a publicly observable object to the surface irritations of her sensory organs could, on some account, be identified as the cause if the speaker is left to try to interpret herself. From a third-person point of view, however, what seems explanatory of the speaker's behavior is her pattern of responses to public objects, to which we also respond. "It takes two points of view to give a location to the cause of a thought, and thus to define its content" (Davidson, 2001: 212–213).

Criticisms of Radical Interpretation and Interpretationalism

Critics of interpretationalism may accuse it of an implausible instrumentalism about the mental (Davidson, 2001: 70; Hookway, 1988: 181), according to which intentional attitudes are no more than convenient fictions that we employ when trying to predict and explain the behavior of a rational creature. Furthermore, interpretationalism seems to lead to a vicious regress, since one's possession of meanings and intentional attitudes requires being interpreted by another, whose intentional attitudes, in turn, must be derived from the interpretations of a third, and so on (Heil, 1998: 131). Similar criticisms are made of Daniel Dennett's "intentional stance" (1971; 1987) – see Putnam, 1987: 15–16; Rudder-Baker, 1989: 305 – a variety of "selective instrumentalism" (Dennett, 1987: 72), which Dennett distinguishes from "interpretationism" (1987: 15) and "classical

instrumentalism" (1987: 71). Davidson (2001: 82) thinks that Dennett confuses the question of whether intentional attitudes are entities with the question of whether there are correct answers about what intentional attitudes anyone has. But Davidson replies here that his account is no more instrumentalist than are systems of measurement (2001: 74–75). The fact that we can measure temperature differently in Fahrenheit or Celsius does not show that no objective phenomenon is being measured; Dennett makes a similar response to the parallel criticism of his view (1987: 34). And the apparent regress arises only if we fail to see practices of interpretation as coming into being gradually and socially, producing interpretative communities "once they reach an appropriate level of sophistication" (Heil, 1998: 153).

Critics have doubted Davidson's ability to account for the meanings of sentences that, intuitively, are neither true nor false, such as interrogatives and imperatives, and, perhaps more seriously, of such sentences as direct and indirect quotations and attributions of intentional attitudes. (Tarski himself thought that his treatment of truth, from which Davidson borrows, could not be applied to natural languages.) Davidson has long recognized that there are programmatic challenges of this sort for his view to meet (1984: 35–36) and has taken an optimistic view of his chances, viewing the problems as a series of puzzles to be dealt with by an active research program (see the various essays in Davidson, 1984), though many critics remain pessimistic (Glock, 2003: 159–165; Schiffer, 1989).

Davidson's use of the principle of charity has also been criticized on a number of grounds. Some think it smacks of cultural imperialism, forcing us to construe cultural others as like their interpreters in all essential respects (MacIntyre, 1985). Davidson may respond that meaningful disagreement requires a broad background of agreement and that cultural difference cannot even be recognized without starting with something like the principle of charity (1984: 196–197; 2001: 39–41, 148–149). Some critics have suggested that charity is not sufficient for interpretation, since we have reason not to attribute what we take to be true beliefs to a speaker if it would be mysterious how she came to hold such a belief (Grandy, 1973: 445), and have proposed in its place a "principle of humanity" (Grandy, 1973: 443) according to which we should attribute beliefs that we would find it reasonable to hold in the speaker's position. Davidson has responded with attempts to clarify the principle of charity (1984: xvii, 136) and with a proposal to distinguish two principles, Coherence and Correspondence (2001: 211). Others contend that it is shared behavior, not merely agreement in beliefs, that makes interpretation possible and that successful interpretation can thus succeed in the absence of charity (Glock, 2003: 194–199), but although such behavioral commonality may not be premised in the principle of charity, Davidson seems to agree that it is of central importance (2001: 128–129, 212–213), and the difference here is **perhaps** one of emphasis.

See also: Compositionality: Philosophical Aspects; Indeterminacy, Semantic; Paradoxes, Semantic; Truth: Theories of in Philosophy.

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Radio: Language

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Radio is one of the most accessible, most flexible, and cheapest forms of mass communication, providing entertainment and news to millions of people all over the world primarily through the broadcast voice. Voice or talk introduces, describes, and fills in between music tracks while on talk radio the broadcast is dominated by continuous talk: chatter, interviews, gossip, public information, news, sport, education, drama, and comedy. Because of the dominance of the voice and the wide variety of uses for which the medium is employed, radio provides an important area for language analysis, particularly in those areas that give primacy to the social and political context of language use and its discursive organization, i.e., sociolinguistics, pragmatics, (critical) discourse analysis, and conversation analysis. For these areas of research radio language provides the raw materials with which to explore the linguistic and discursive methods of communicative competence and meaning production for a mass overhearing, and largely remote, audience, as well as the dynamics of interpersonal interaction within the intersection between public and private realms of communication.

One of the most interesting things about radio is that, although produced for a remote mass overhearing audience, the language is oriented toward creating a sense of intimacy between the presenter and listener. The disembodied remote talk, promiscuously broadcast to anyone with a radio, attempts to generate both the sense that the listener is being addressed directly by the presenter and also that the listener is part of a listening community. Indeed the radio is often perceived as being a 'friend' with the voice giving comfort, company, and even hope. This sense of intimacy and informality is generated through linguistic forms and as such offers a rich resource by which to examine not only the way language is used as mass communication, but also the way it generates and sustains the uniqueness of the medium (Bell, 1991).

Speak Easy

While there are similarities between television and radio, such that both are designed for a mass overhearing audience and both must attend to the diversity of the potential audience, unlike television or indeed the Internet, radio is a purely aural medium where no visual cues and codes are available and where the voice or sound must carry all the information that is to be conveyed. In the early days of radio, emphasis was necessarily given to clarity of voice, given the relatively crude technology. With improvements in technology and the growing awareness of a diverse audience, an informal conversational style, more like chat or gossip (Coupland, 2001), was incorporated into newer stations, especially after the launch of pirate stations such as Radio Caroline. However, while speech styles on radio may occupy different positions displaying both formal and informal codes, interestingly, the most informal style of speaking still contains many formal characteristics. The most casual of talk on radio, e.g., the music DJ or magazine program chat, is noticeably more fluent, precise, and orderly than ordinary spontaneous speech encounters and is also run to a precise time while covering the information deemed necessary for that broadcast. Because of the apparent 'restriction' of radio to sound, more emphasis is given to clarity of expression, delivery, and style of address, and, according to Crisell (1994), this style draws upon a combination of both oral and literary linguistic codes. Although the oral tradition on radio is very strong in that it relies upon being heard rather than seen, the fact that radio output is largely scripted and therefore premeditated lends itself to literary codes that involve thinking out the language, structure, and direction before delivery. As Ervin Goffman, one of the pioneers in the study of radio language, points out,

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Radio: Language

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Radio is one of the most accessible, most flexible, and cheapest forms of mass communication, providing entertainment and news to millions of people all over the world primarily through the broadcast voice. Voice or talk introduces, describes, and fills in between music tracks while on talk radio the broadcast is dominated by continuous talk: chatter, interviews, gossip, public information, news, sport, education, drama, and comedy. Because of the dominance of the voice and the wide variety of uses for which the medium is employed, radio provides an important area for language analysis, particularly in those areas that give primacy to the social and political context of language use and its discursive organization, i.e., sociolinguistics, pragmatics, (critical) discourse analysis, and conversation analysis. For these areas of research radio language provides the raw materials with which to explore the linguistic and discursive methods of communicative competence and meaning production for a mass overhearing, and largely remote, audience, as well as the dynamics of interpersonal interaction within the intersection between public and private realms of communication.

One of the most interesting things about radio is that, although produced for a remote mass overhearing audience, the language is oriented toward creating a sense of intimacy between the presenter and listener. The disembodied remote talk, promiscuously broadcast to anyone with a radio, attempts to generate both the sense that the listener is being addressed directly by the presenter and also that the listener is part of a listening community. Indeed the radio is often perceived as being a 'friend' with the voice giving comfort, company, and even hope. This sense of intimacy and informality is generated through linguistic forms and as such offers a rich resource by which to examine not only the way language is used as mass communication, but also the way it generates and sustains the uniqueness of the medium (Bell, 1991).

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> although ordinary talk is full of technical faults that go unnoticed as faults, broadcasters seem to be schooled to realize our cultural stereotypes about speech production, namely, that ordinarily it will be without influences, slips, boners, and gaffes i.e., unfaultable. (Goffman, 1981: 240)

While the fluency and precision of radio broadcasting emanates from the largely scripted nature of the talk, there is also an orientation to animate or personalize many of the scripts and thereby hide the preprepared text while delivering it in a style that is seemingly spontaneous (Goffman, 1981; Scannell, 1996; Crisell, 1994).

Scripted Spontaneity

In the early days of radio it was relatively easy to identify radio language as scripted by the measured tone and formal style; today, however, radio is much more diverse in types of delivery (Crisell, 1994). Between the many various programs there are gradations of script and spontaneity from talk that is presented as fully scripted, for example, 'program announcing' or 'newsreading,' through scripted talk designed to appear unscripted, for example, drama, to talk that is largely unscripted except for running order and time schedule, such as radio phone-in programs or DJ talk. Because there are no visual cues or clues available for the listener to discern when a script is being used or what type of script is being delivered, there are often noticeable verbal signals that work to separate or mark out that what is coming next is to be heard as scripted speech. An upcoming news program, for example, will often be preannounced, "and now the news read by . . ." or "the news today is read by . . . ." This preannouncing not only separates the news from the previous program but also indicates that the news is different from the previous program. The news bulletin employs a more formal style than the speech that surrounds it and this also indicates that the words spoken, the content of the script, are not the words of the speaker but of the news department or news organization. By separating the news bulletin from the rest of the programme and by hearably 'reading' the script the news is presented as fact without journalist interpretation and so able to resist routine accusations of bias directed at prominent news and current affairs programmes. In other types of programming, such as community broadcasting or local radio, the presenter may work to hide the presence of a script by including ad-libs, comments aside or (deliberately) making mistakes with the equipment to 'highlight' their being amateur and incapable of even following 'the' script. Thus while the newsreader works to distance him or herself from the words spoken through a neutral and even delivery, the use of extemporaneous comments, ad-libs, and asides serve to locate the talk not only as spontaneous, as 'live,' but as the presenter's own words (Goffman, 1981). The premeditation of the script then belies the apparent spontaneity of delivery, serving to hide the linguistic work of the DJ, whose professionalism is to sound ordinary to the listeners.

Of course language, specially through talk and banter, is important to individual presenters in order to create a sense of intimacy, spontaneity, and in the end personality, but a further significant aspect is in developing a style or voice which identifies or fits in with the general character of the radio station. Martin Shingler and Cindy Wieringa suggested that

> whilst each programme will obviously require a different mode of speech – different in terms of tone, pitch, pace and accent – the station will aim to establish an overall mode of speaking to which all its presenters will, to a greater or lesser extent, conform whilst broadcasting on that station. (Shingler and Wieringa, 1998: 33)

Although a definitive 'radio voice' is not identifiable or even desirable, individual stations work to promote a particular and predictable style of speech code by which they can be identified. While the parameters of a particular station's speech character may include RP, regional, and even international voices the range within those styles will also include informal, authoritative, preachy, humorous, subversive, gossipy styles and a huge range in between (Shingler and Wieringa, 1998).

Mass Media and Intimacy of Radio Language

Because of the diverse range of speech styles, with the predominant being scripted informality, radio creates an enigma for questions concerning the nature of institutional power and how institutions define themselves through language. The fact that the language of radio is largely informal would seem to indicate an inherent contradiction between the style of radio and the institutional situation from which the speech emanates. The radio broadcast originates from one place, is delivered to a remote other and is designed for a mass overhearing audience, thus placing it within the institutional communicative framework (Scannell, 1996). However, the language, speech, and talk would seem to be designed around a direct intimate code of address usually found in copresent 'ordinary' or mundane interaction. Thus the voice of radio, the defining feature of the institution, is a contrived display of ordinary intimate conversation. Hutchby (1996) identified this

paradoxical linguistic feature within the interplay between host and caller on radio phone-ins as 'intermediate talk,' suggesting that the phone-in works at the intersection between the institution and public discourse, while Shingler and Wieringa (1998) proposed that the term can be applied more broadly to the character of most radio speech, in that it is institutional but more often sounds mundane. For Scannell (1996) this trend towards a conversational style was the logical evolution of a medium beginning to understand its audience, while for Fairclough (1998) the 'conversationalization' of media language involves a pseudoinformality and synthetic personality deliberately hiding the ideological power of the institution.

While it is clear that radio includes an eclectic and diverse combination of styles and voices, studies of radio language tend to fall into a number of major areas centered around programs such as phone-ins, DJ talk, drama and comedy, and news and current affairs. Not only does research in these broader categories provide insight into language use and style but specific areas of research are also able to explore the social and political organization of media language. Radio phone-ins, for example, can be used to highlight the tension between institutional discourse and ordinary conversation by raising questions around the role of public-access media, especially how entertainment is generated and political and institutional power exercised through language. The tension between public and private discourses is also found in the pseudosynthetic personality of the music DJ ad-libbing from the script to create or foster a more personal relationship with the listener. The linguistic codes and potential of the blind medium are explored in studies of drama and comedy where non-visual imagination is capitalized upon within the boundaries of a particular station's language policy. In discussions of news broadcasting the line between editorial comment and the trusted voice of authority for news broadcasts is part of the continual debate over what type of voice is suited to newsreading, whether it should be male or female, regional or international, etc., and also the unique strengths radio has developed upon in order to remain a viable news service in the face of television and the Internet.

Radio Drama and Comedy

Although it may seem an inherent limitation of the medium, the production of drama, serials, adaptations of classic books, and even light entertainment and comedy are some of the best things radio does. On the one hand the low production costs of radio means it is suited to experimentation and the commissioning of new talent, but on the other, the lack of a visual environment has meant that drama and light entertainment have become adept at using the medium to its best effect. Writers and producers working within the confines of the medium incorporate a number of features around what Crisell (1994: 146) referred to as 'transcodification,' replacing one set of visual codes with auditory ones. Whereas in visually based drama characters can enter and be present without being referred to, characters on radio cannot be part of the play without their presence being indicated in some way. In the face of this, radio drama and comedy has developed a method which involves announcing or indicating to the audience that a character is present. As well as descriptions of the action, such as 'look out, he's got a gun . . .,' 'noticings' such as 'isn't that Bob over there . . .' become essential to the listener's understanding of the flow, direction, and copresence within the drama. Although talk plays a major part, sounds and effects are also used but unlike a visual medium, where objects can make their presence felt by making a noise such as a seagull's cry or a train's whistle and can continue their presence when even when silent, the action, noises, and sounds within radio drama are indexical to the moment and only gain meaning through the immediate context in which they exist or are placed verbally. While this may involve, for example, the sound of sea wash giving context to the setting of the play at the beginning, sounds that occur within the production must also be fixed at the moment they are heard. As Crisell (1994) pointed out, the rustling of recording tape could be heard as a dress rustling, walking through leaves, unwrapping a parcel, or indeed the rustling of recording tape, and that while ballpark meaning can be gleaned from the context of the play, the sound gains its fixed meaning through the words surrounding the noise. Not 'seeing' may cause some limitation of the play's contextual environment, but one of the benefits of this is that without visual or indeed expensive technical features radio can place the action in any place it chooses as well as move the action between places at lightning speed.

One of the early, and still according to many the best, programs that exploited the possibilities afforded by the medium of radio was *The Goon Show*. *The Goon Show*, a series of comedy sketches written by Spike Milligan, was broadcast on the BBC from 1951 to 1960 and within each show the cast weaved a web of highly fantastic contexts and events. Through the 'blindness' of radio they were able to invent anything within a world where the laws of nature were untethered and constantly warped into an innovative canvas of infinite possibilities.

The language exploited the ephemeral nature of radio, where the fast-paced shift between places as diverse as the Wild West, the South Pole and even up a trouser leg (Crisell, 1994) combined with the 'appearance' and 'disappearance' of objects and characters, creating a surreal world where literally anything could and indeed did happen, and often between breaths. At the time this quick-fire fantastic world, where naming something brought it to life or describing something created an imagined place, would not have been possible on TV and indeed even now would cost an enormous amount of money and time.

While language and sound are important in radio drama, a further aspect of interest to language study is at the basic level of the word. Word selection within a particular play is an issue bound up with institutional politics, the reputations of the station and the playwright, dramatic realism, and listener credibility. Lewis (1992: 15) characterizes the disparate pulls and dimensions around word choice as a tug-of-war where words require careful scrutiny to avoid offense, or rather, as Goffman points out, the possibility of giving offense to others (Goffman, 1981: 244). For, apart from some words absolutely banned, the debate over which are permissible becomes a battle between the writers, producers, and management, the time of day, and on what station the drama is to be broadcast. In light of this, words have the potential to become politicized and even censured because of what might cause offense. Radio drama and comedy, or 'light entertainment,' provides a fascinating exploration into the sensitivity of words to perceived others as well as providing some of the most fertile development ground for drama and comedy, some successfully transferring to television, some not. While television provides a window on the world, radio provides a glass by which to listen to the lives of the people in the next room.

News and Current Affairs

Although radio news revolutionized international communication, coming of age during times of crisis and war, long gone are the days of the family crowding around the wireless set to hear the latest news from the voice of authority. Today television news is the choice for evening viewing, and together with the growing influence of the Internet it provides instantaneous pictures from around the world. However, while television dominates the evening and home daytime schedule, it is still radio and radio news that we invite into the innermost sanctum of our home, listen to from under the duvet in the morning, in the bathroom (even in the shower), in the car, at work, and on the way home. News remains a force of radio broadcasting, particularly the internationally renowned broadcasts of the BBC World Service, Radio Australia, Voice of America, etc. While the linguistic style of radio has changed over the years, employing a more localized, personality-based method (Scannell and Cardiff, 1991; Leitner, 1983), the voice of radio news continues to be reminiscent of the conviction expressed by Lord Reith, the first Director General of the BBC, that using regional accents would alienate or be unintelligible to the public, and of his observation that the technology was suited for the male voice. For Reith the higher-pitched female voice was considered more akin to gossip, rumor, hysteria, and irrationality rather than being heard as conveying the weightiness deemed appropriate for newsreading. And while female news presenters are now commonplace, they still tend to lower their voice when reading the news because the microphone was originally developed for the male voice and works best at lower pitch (Dyson, 1994). Radio news also tends to employ a relatively simple linguistic code similar to Basil Bernstein's restricted code, which utilizes 'colloquial terms, contains much redundancy and is oriented towards the phatic' (Crisell, 1994: 87).

The status of 'difference' attached to the news broadcast on radio is not only noticeable in the measured style and tone of delivery but also through its marked separation from other programs. The news is 'announced' before it arrives ('and now we go to the news') and then the audience and DJ are taken to another place, the newsroom, to have the news 'read' to them. Alternatively the news may be brought to the audience by the newsreader coming to the program from the 'newsroom.' Various commentators have observed the similarities between news stories and formal narratives (Bell, 1991). Higgins and Moss (1982), however, took this further and suggested news has the theatrical resonance of radio drama, where, without visuals, the spoken word and description must fill in the necessary information for the listener. Furthermore, they suggested radio news discourse sets up a dramatic frame around a series of familiar events with an expected cast of characters, which appear on cue acting in character and inviting the audience to boo, hiss, and cheer as they go through the motions. The analogy might be more akin to a soap opera rather than a play, though, for as Jaworski *et al.* (2003) suggested, news stories are often ongoing and devote a large amount of time to speculation about what might happen next within the story from the characters as well as from the 'narrator,' and so providing speculation as to the next installment.

While the soaping of news ('news-tainment') is a trend noticeable across news production, in the face of the increasing challenge from other news providers radio has managed to develop its strengths of availability, speed, and flexibility. Radio is able to cross international and political borders and broadcast to potentially millions of people without need of expensive or scarce satellite receivers, computers, or televisions, or indeed literacy. Also in terms of wider news values, radio is able to steal a march on other media. Because of radio's relatively low production costs and without the need for the technology and access required for television broadcasts, radio news can set up and broadcast quickly from a given location. In this way one of the advantages that radio news has over print and to some extent over TV is **immediacy**, the holy grail of news production and number one on the news values list, being first on the scene and first to report the latest happenings. Radio news can respond quickly to events and can get to them, set up, and broadcast before TV news. Moreover, the 'blindness' of the medium works to its advantage with early-morning interviews or news gathering, as all that is needed is a telephone or a radio car from which to conduct an interview. The journalist may give a report whilst getting breakfast ready or the politician might give an interview from his or her armchair. In this way radio news in some senses has the advantage of being 'blind' because although language must be used to convey all the information, the absence of visuals means it cannot, and so does not have to, produce images to accompany a story.

DJ Talk

While most analysis of radio language focuses largely upon stations dominated or dedicated to talk, Martin Montgomery's work (Montgomery, 1986) examined the genre of popular music radio and specifically the talk of the DJ between music tracks. Talk that occurs between music is often seen as a way to fill time although research demonstrates that, far from being a simple space filler, the talk is often constructed through a complex interpersonal dynamic using various discourse and conversational features. Connecting with some of the themes mentioned above, DJ talk is of the style of the lone voice broadcasting to an unseen overhearing mass audience attempting to create a sense of intimacy and community with the audience.

Thus, of particular note to Montgomery was the ability of the DJ to employ linguistic and discursive structures within an extended monologue, with which is created and sustained a sense of both copresent conversation and intimacy with the audience, or rather audiences. Rather, Montgomery demonstrated that DJ talk reveals an orientation to, through design for, any number of audiences, through identification of individuals or groups (both 'in' and 'out' groups) as well as the ability to shift discursive positions by using different registers.

This is done by foregrounding the interpersonal, for example by DJs commenting on the informality of address between themselves and listeners; by creating social deixis through direct address to individual members or identifiable groups of the audience, such as "hello to those listeners in Edinburgh" or "Sarah Jones, happy birthday to you"; by simulating copresence through the use of response-demanding utterances such as greetings or interrogatives; and by the use of expressives indicating a psychological state of mind when interjecting or giving comment from a written text, such as when reading the horoscopes (Montgomery, 1986). DJ talk, then, goes to the heart of much of the discussion around public and personal language where the everyday conversational structures, methods, and routines hide a premeditated construction in which the script provides the basis from which the DJ through ad-libs and asides addresses a number of different audiences, excludes others, and creates a sense of community.

Radio Phone-ins

The phone-in would seem particularly well suited to radio as the format is based on the remote listening audience being invited to phone the program and air their views on the world from wherever they are. The callers to these shows do not need any special technical equipment and do not need to be in a specific place; they can even be in the car 'on the side of the road' using a cell phone. Because of this 'access by anyone' the phone-in creates an egalitarian sense where anyone can have their say, as well as building an intimate environment around the listeners of a community centered on the host as someone the listeners can 'know' as personable, engaging, interested in their views, sometimes controversial, but above all on the side of the 'ordinary' person in the street. While for most countries the phone-in or talkback has marginal influence on wider society, acting more as a talking shop or gripe conduit, in others, for example Australia, Hong Kong, and the United States, the talkback hosts command an influential political position sometimes far beyond their TV counterparts.

The neat suitability of this type of program for radio is highlighted in instances where television attempts the same thing. In television the need for visual accompaniments often means a studio with a noticeably unseen caller, sometimes indicated by a dot on a map, speaking into the void of the studio with

the host nodding into the camera. For TV the center of the discussion becomes the studio, where the view is an animated host. On radio, however, the host goes to the caller and the coziness of phone and radio is reinforced through a linguistic sleight of hand by which the host whisks the listener around the country or city, to the place of the caller by simply saying 'and now let's go to . . . .' We are then transported to the front room of the caller, sitting with them as they give their opinion on the day's hot topics. While the supposed value to the radio station of phone-in programs lies in the opportunity to be seen as giving an avenue for listener feedback as well as demonstrating that there is in fact an audience listening, for linguistics the interest lies in the intersection between lay and professional practice found in radio phone-ins (Hutchby, 1996). As phone-in programs are usually live they cannot be scripted and therefore provide a valuable insight into radio language as the presenter responds to a particular caller on air.

The discursive organization of radio phone-ins is often around a debate format, within individual calls or entire programs, where either the host invites callers to discuss a particular topic of the day or callers select their own newsworthy topic. In some of these the host takes a neutral stance, displaying a challenging though impartial attitude to callers' opinions through an explicit shift in position according to that of the particular caller. In that sense, while spontaneous, the talk adheres to a formal structure oriented to by both host and callers. While neutrality is the goal of some phone-in programs, creating deliberate antagonistic positions is the goal of others. Here again, though, the structures by which the caller gets onto the air, the speed with which their position or opinion is initially given, and the way their interaction is controlled display a linguistic structure managed moment by moment by the host. Indeed, this management by the host ends with the ultimate control over the talk through the potential of the cut-off button. The host's job is to generate entertainment from a complete stranger they cannot see and to do so within a very short time frame. Because of this the structure used to introduce a caller onto the program becomes crucially important to the flow of the call and ultimately the success of the presenter as a phone-in host. Although the presenter and the caller have never met or spoken to each other before being on air, the caller must be brought onto the program, introduced to the listening audience and given a slot to start giving their opinion. Within this sequence the host may minimize or even exclude the possibility of greeting sequences, allowing more time for more callers. This can be seen in the example below, where the host structures the introduction in order to provide a routine amount of information about the caller, bring the caller off air to on air, and offer a first-pair part to a topic-oriented question, thus making the caller's first utterance a response to the question about the topic.

> Host: Betty Robins from Birmingham, what's your opinion on this?
> Betty: Well, I would just like to say. . .

The host's question then leaves no sequential slot for the caller to give a greeting but rather to go straight onto the reason for their call (Fitzgerald and Housley, 2002). As Hutchby (1996) pointed out, this sequential position also always places the host in a response position and so able to choose which aspect of the caller's opinion to debate and how to debate it. The host, then, is able to exercise control over the callers through the introduction but also to generate entertainment through this sequential organization by adopting a contrastive organization offering alternatives to the caller's stance. While the control of sequence enables contrasting positions to be adopted, the host can also draw out features of identity to further this contrastive debate organization. The relationship between language, identity, and knowledge is used by the host to generate a sense of who can speak on what topic (Hester and Fitzgerald, 1999). This legitimizing of a caller's stance often relies upon strategic positioning through social and topical identification in order to be heard as credible. This provides a interesting area for research into language and identity as callers cannot be seen and so they must verbally construct their status, identity, position, and hence credibility, in real time within a short time span. Phone-ins provide an avenue into the social organization of language, identity, and power through the routine acts of presenting, seeking, and negotiating which identity is salient and affords interactional space for knowledge displays and can hence be heard as a credible witness.

See also: Accent; Codes, Elaborated and Restricted (Bernstein); Communicative Competence; Conversation Analysis; Critical Discourse Analysis; Identity and Language; Institutional Talk; Language and Dialect: Linguistic Varieties; Limits of Language; Media: Analysis and Methods; Media and Language: Overview; News Language; Pragmatics: Overview; Register: Overview; Sports Broadcasting; Television: Language.

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Radulphus Brito (ca. 1275–1320)

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Radulphus Brito (also Radulphus Reginaldi Britonis and Raoul le Breton in French) was born c. 1270–1275 in Ploudiry, a tiny village in the old diocese of Léon situated c. 7 miles east of Brest, Finistère, Brittany, France (hence his naming as 'de Plebe Dyriaco' in the university records). Starting in 1296 he taught as a Master of Arts in Paris, where he also acquired his doctorate in theology in 1311–1312 and served as a provisor to the Sorbonne from 1315 to 1320, possibly the year of his death.

Radulphus was a prolific writer in many subjects: grammar, logic, philosophy, theology, and even mathematics and astronomy, and he commented on the Aristotelian corpus, on Porphyry and Boethius. His logico-grammatical sophisms and his specific understanding of the abstract and concrete first and second intentions brought him fame as a logician, and his conception of *modi significandi* in his commentary on the so-called *Priscianus minor*, the syntactical part of Priscian's textbook *Institutiones grammaticae* (books 17 and 18), made him a leading speculative grammarian (cf. Enders, 1980). Thus he influenced the work of another important Modist, viz. Thomas of Erfurt.

Most of Radulphus' work is still unedited (cf. Pinborg, 1980: 15–19). Deuffic (2002) gathers remarks on the extant manuscripts and lists the literature on Radulphus from 1850 to 2001.

See also: Thomas of Erfurt (fl. 1300).

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Radulphus Brito (ca. 1275–1320)

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Radulphus Brito (also Radulphus Reginaldi Britonis and Raoul le Breton in French) was born c. 1270–1275 in Ploudiry, a tiny village in the old diocese of Léon situated c. 7 miles east of Brest, Finistère, Brittany, France (hence his naming as 'de Plebe Dyriaco' in the university records). Starting in 1296 he taught as a Master of Arts in Paris, where he also acquired his doctorate in theology in 1311–1312 and served as a provisor to the Sorbonne from 1315 to 1320, possibly the year of his death.

Radulphus was a prolific writer in many subjects: grammar, logic, philosophy, theology, and even mathematics and astronomy, and he commented on the Aristotelian corpus, on Porphyry and Boethius. His logico-grammatical sophisms and his specific understanding of the abstract and concrete first and second intentions brought him fame as a logician, and his conception of *modi significandi* in his commentary on the so-called *Priscianus minor*, the syntactical part of Priscian's textbook *Institutiones grammaticae* (books 17 and 18), made him a leading speculative grammarian (cf. Enders, 1980). Thus he influenced the work of another important Modist, viz. Thomas of Erfurt.

Most of Radulphus' work is still unedited (cf. Pinborg, 1980: 15–19). Deuffic (2002) gathers remarks on the extant manuscripts and lists the literature on Radulphus from 1850 to 2001.

See also: Thomas of Erfurt (fl. 1300).

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Rajarajavarma, A. R. (1863–1918)

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A. R. Rajaraja Varma, also known as *Kēraḷa Pāṇini*, is famous for being the author of a work called *Kēraḷa Pāṇinīyam*. According to K. N. Ezhuthachan (1974: 254), this "most important grammatical work in Malayalam has not been surpassed by other works since its publication in 1896, and especially after its revised edition in 1917." The author was a grammarian of Sanskrit and Malayalam, and composed books in both languages. From 1911 onward, he was the Head of the Language departments of the Mahajara's College in Trivandrum. In the preface to the second edition (quoted here from the 1999 English translation by C. J. Roy), written one year before his death, he starts by stating that there are two ways to compile a grammar, first, an 'inferential' (*abhyūhika*) way, where one has to "observe closely [...] the basic units of the language at a particular period and arrive at certain conclusions" and second, a 'historical' (*āgamika*) way, where one has to "trace the history of the language from its origin, find out the changes it had [...] and formulate rules to suit them." Opposing these two methods, he states that "the former is easier" but "the latter is more useful," and that "if grammar is to be treated as a science, it should be historical." He even goes to the extent of comparing inferential grammar with 'dictatorship' and historical grammar with 'democracy.' Using this general frame, he then explains that the 1896 edition of his grammar, written "out of childish inquisitiveness," was at the same time inferential and historical, that the only thing really common between it and the new book, mostly based on lectures he gave in the classroom, was the title. He then proceeds to give a list of works that were "of maximum use." This list includes, among others: Caldwell's Comparative Grammar of Dravidian languages (*see* **Caldwell, Robert (1814–1891)**), the medieval Tamil grammar called Naṉṉūl (*see* **Tamil Linguistic Tradition**), the *Malayāḷā [Bhāṣā] Vyākaraṇam* by H. Gundert (1814–1893), from whom he borrowed examples and the 14th century *maṇipravāḷa* grammar called *Līlātilakam*.

See also: Caldwell, Robert (1814–1891); Gundert, Hermann (1814–1893); Panini; Tamil Linguistic Tradition.

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Ralph of Beauvais (fl. 1175)

L Kaczmarek, Borgholzhausen, Germany

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Little is known about the life of the Englishman Ralph of Beauvais (known to his contemporaries as Radulfus Bellovacensis or Belvacensis), who in the 1130s came to France to study under Abelard (d. 1142) and later took over teaching at the Cathedral School of Beauvais for the rest of his career. Ralph died in France after 1180. Hunt (1980) and Kneepkens (1991) have gathered what can be reconstructed about him from historical sources.

Ralph of Beauvais' work on grammar survives in two texts (edited by Kneepkens in 1982 and 1991, respectively) that cannot be grouped as commentaries or textbooks: the *Glose super Donatum*, which is a commentary on Aelius Donatus' 4th-century elementary grammar textbook known as the *Ars minor*, and the *Liber Tytan*, which expands on lines taken from Lucan, Ovid, and Virgil, among others. There are strong doctrinal relations of these works (see the Indices Locorum) to the anonymous Priscian gloss commentary known as *Promisimus* (now edited in Fredborg, 1999) and to the rather elementary *Verba preceptiva*.

Like other conservative-oriented grammarians from the 12th century such as William of Conches and Peter Helias, Ralph of Beauvais was interested in explaining constructions from the texts of classical authors. What he had to say about the concept of government deserves a second look. He makes use of the terminology of *regere* and *exigere*, the concepts of which he differentiates on syntactical and semantical grounds.

Although he never tried to sell originality in linguistic theory, Ralph was held in high esteem as a thorough grammarian and influential school teacher. Since the findings of Hunt (who even assumes a 'school' of Ralph of Beauvais), some of his pupils and followers have been identified, viz. Petrus Hispanus (non-papa), Robert Blund, and Robert of Paris. The 13th-century speculative grammarian Michael of Marbais criticizes aspects of the theories held by Ralph.

See also: Marbais, Michel de (fl. 1255); Peter Helias (12th Century A.D.); Petrus Hispanus (ca. 1210–1276); William of Conches (ca. 1080–1154).

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After graduating in linguistics and comparative philology at the University of Florence and holding several teaching positions in Germany, Paolo Ramat was appointed full professor of Germanic Philology at Cagliari and Pavia in 1971, and as full Professor of Linguistics at Pavia in 1974. He has held numerous posts as guest professor at universities in Germany, France, Czechoslovakia, and the United States, and has also served as President of the International Society of Historical Linguistics. He has held several prominent positions in national and international scientific societies, such as at the Congrès International de Linguistique and as representative of the Consiglio Nazionale delle Ricerche at the European Science Foundation. Ramat has also played a prominent role in several European-based research initiatives, such as the EUROTYP project.

Ramat is primarily a historical and comparative linguist, with his work firmly embedded in a wide vista encompassing cultural theory and archeology. He has published extensively on a broad range of European languages, ranging from Frisian to Greek, and has shared this interest with his wife, Anna Giacalone Ramat, with whom he coauthored a number of seminal studies in this area, centering on Indo-European languages. Ramat has analyzed a range of structures from the typological point of view, such as sentence adverbs, relative sentences, negation, and auxiliaries. Ramat's historical-linguistic orientation is linked to a theoretical interest in typology and universals. He has argued in favor of local, rather than holistic, typology. A related pursuit is the nature of linguistic categories, where he has argued for a coalescence of both formal (syntactic and morphosyntactic) and semantic criteria. From such a perspective, the traditional 'parts of speech' appear to be well-founded candidates for universal categories. He has also taken issue with current grammaticalization theory, with its axiom of the unidirectionality of grammaticalization. He has argued that there are several cases that suggest the existence of the opposite route, with grammatical items developing into full lexical items, suggesting a complementary line of development and a spiraling development as a better representation of linguistic development. Paolo Ramat's work has had a major impact (not only) in European historical linguistics.

See also: Grammaticalization; Indo–European Languages.

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Ramstedt, Gustaf John (1873–1950)

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From the very beginning of his life, Gustaf John Ramstedt, as the child of a Swedish family in Finland (which belonged at that time to the Russian Empire) was acquainted with a multilingual and multiethnic situation that stimulated his early interest for different languages and cultures. He studied Latin, Greek, Hebrew, and Sanskrit at the University of Helsinki. In 1895, he finished his studies and worked for two years at the Finnish high school in Turku as a teacher of Swedish.

In 1898, Otto Dooner, a university professor of Ramstedt's and president of the Finno–Ugrian Society, invited him to Helsinki to start a wide-ranging program of investigation of Uralic and Altaic languages. In the course of this project, Ramstedt undertook, between 1898 and 1912, several journeys through the Russian Empire to Mongolia and Chinese Turkestan. He started his field studies with a Uralic language, Mari (Cheremis), near the Volga River (cf. Ramstedt, 1902), but his subsequent activity was dedicated to Altaic languages. In his dissertation, Ramstedt used Mongolian (Khalkha Mongolian) data collected during his first visit to Mongolia in 1898–1901 (Ramstedt, 1903). Later he studied another Mongolian language, Kalmyk (Kalmyk-Oirat; Ramstedt, 1909–1919) and compiled a Kalmyk dictionary, which was for a long time the main source for this language (Ramstedt, 1935). Ramsted investigated the Turkic languages in Northern Caucasus, and in 1903 he traveled to Central Asia up to the Afghan border to study Mogholi, a Mongolian language of a small isolated ethnic group in Afghanistan. His report was the first scientific description of this language (Ramstedt, 1906). During these journeys Ramstedt not only studied the spoken languages, but also collected different written sources, contributing to the study of the Old Turkic epigraphy (cf. Ramstedt, 1918). In 1906, Ramstedt became associated professor for Altaic languages, and in 1917, professor extraordinarius of Altaic philology at the University of Helsinki.

In 1919, Ramstedt's scientific career was interrupted by the intrusion of political events into his life. The young Finnish Republic (Finland proclaimed its independence in 1917) had to build up its foreign policy but possessed no professional diplomats. As an esteemed Orientalist, Ramsted was nominated the first Finnish diplomat in eastern Asia, the Finnish chargé d'affaires in Japan, where he stayed till 1929. Ramstedt used his time in Japan to continue his linguistic work: he studied Japanese and above all Korean, which became from this time on one of his main concerns. Ramstedt's *A Korean grammar* (1939) was a significant step in the study of this language.

After his return to Helsinki, Ramstedt resumed his academic activity at the university and in the Finno–Ugrian Society (he was president of the society from 1944 to 1950). He taught courses on Asian languages, including Mongolian, Kalmyk, Korean, Japanese, and Manchu. However, his main interest was dedicated to the comparative study of Altaic languages. He started his activity in this field quite early (cf. Ramstedt, 1907), but initially Ramstedt was quite cautious as to the point of genetic relation of Altaic languages, stating rather the fact of affinities between them. Later he was more and more convinced of the genetic (not only typologic or contact) unity of Altaic languages (cf. Ramstedt, 1912). The analysis of Korean led him to a conclusion that this language is a part of the Altaic family. Ramstedt did not exclude the possibility that Japanese is also an Altaic language, but stated that this question "can not yet be clarified" (Ramstedt, 1952–1966 I: 14). For decades, Ramstedt analyzed the phonetic and grammatical correspondences within the Altaic family; sometimes he had to clear the subgrouping of languages in one branch of the language family, cf. his investigation on the position of Chuvash among Turkic languages (Ramstedt, 1922). Ramstedt was the first linguist to transform a vague idea about the original unity of the huge linguistic area from the Volga river to the Pacific Ocean, including Turkic, Mongolian, Manchu, and Korean languages, into a strong scientific concept. His main work in Altaic linguistics was a comparative grammar of Altaic languages, published posthumously (1952–1966). Ramstedt's scientific heritage was voluminous, and publications, carrying his name, appeared for a long time after his death (cf. Ramstedt, 1973–1974; 1982). N. Poppe named Ramstedt "the real founder of modern Mongolian linguistics and Altaic comparative studies" (Poppe, 1965: 83), and this statement was endorsed by the common opinion of linguists.

See also: Altaic Languages; Korean; Mongolic Languages; Poppe, Nikolai Nikolaevich (1897–1991).

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Ramus, Petrus (1515–1572)

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Pierre de la Ramée, a French humanist, mathematician, and philosopher, better known as Petrus Ramus, is credited with having introduced formalism in linguistics and has sometimes been hailed as a precursor of modern structuralism.

He was born in Cuts (Vermandois) in 1515. He evinced his hostility to the Aristotelian and scholastic tradition in his M.A. thesis (1536), which brought about the disapproval of the Sorbonne. He nevertheless became a professor in the Royal College (*Collège de France*) in 1551, after being the Principal of the *Collège de Presles* (1545). Embracing the Reformation (1561), he had to give up his professorship, which he resumed after the Amboise peace treaty, from 1663 to 1567. After touring Switzerland and Germany (1568–1570), he went back to Paris, where he was assassinated in the massacre of St. Bartholemew (August 26, 1572).

Ramus's linguistic thought, which constantly evolved, has been described as 'prestructuralist,' because it is essentially founded on the study of variation and distribution of word forms, and not on semantic criteria. After dividing the contrasting areas of grammar, dialectic, and rhetoric, Ramus, claiming Plato's authority, exclusively used dichotomy in analyzing linguistic material, which led him to reduce the traditional distinctions between several terms in binary oppositions. While he set down his theory in his *Scholae grammaticae*, Ramus also wrote grammars of Latin, Greek, and French (the latter with reformed spelling). Breaking away from Latin tradition, he refused the then-used expression 'parts of speech' (*partes orationis*) and classified words (*uoces*) into two categories (declinable or indeclinable), which, once redistributed, produced four categories, associated in pairs: nouns-verbs, adverb-conjunctions. Establishing such wide word classes and so few syntactic rules enabled him to avoid recategorizing words from one class into another, but compelled him to acknowledge that their associations were constantly disrupted. Ramus gathered those disruptions under the name of 'anomalies,' giving up the usual system of figures of construction (Colombat, 1993: 196–208). In 1572 Ramus introduced the Latin system of cases into his French grammar, previously built on a study of how the forms were arranged, which shows the failure of a purely formal grammar (Chevalier, 1968).

Influenced by Rudolph Agricola and collaborating with Omer Talon, Ramus carried out a redistribution of the fields between dialectic and rhetoric; regarding

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Influenced by Rudolph Agricola and collaborating with Omer Talon, Ramus carried out a redistribution of the fields between dialectic and rhetoric; regarding

the latter, he intended both to evince a creative opposition to the received texts of antiquity and to promote the French language (Meerhoff, 1986).

The extreme formalism of Ramus may set him apart in the history of linguistics. Ramism has nevertheless left deep marks, and has particularly influenced Sanctius, Port-Royal, and North European grammarians.

See also: Port-Royal Tradition of Grammar; Sanctius, Franciscus (1523–1600).

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Ranquel *See:* Mapudungan.

Rask, Rasmus Kristian (1787–1832)

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Rasmus Kristian Rask was one of the triumvirate of 'mighty monosyllables' (alongside Franz Bopp and Jacob Grimm), credited with instigating the historical-comparative approach, which would dominate serious language study throughout the 19th century. While Rask's name is invariably mentioned alongside Grimm and Bopp, his work as a whole is not as well known to historians of linguistics as that of the other two, and the sheer breadth of what he achieved in his short lifetime is not fully appreciated, at least in part because he insisted on writing in Danish. The Danish language was, by his own admission, Rask's greatest love, and he worked tirelessly to give Danish greater prestige, for example by devising a new orthography for the language and creating a set of Danish rather than Latin-based linguistic technical terms. However, he published only one Danish grammar as such, the 1830 *Grammar of the Danish language for the use of Englishmen*.

Rask is best known in linguistics for his pioneering studies of Old Norse and Old English, two key languages for the study of Germanic philology, and the 1811 *Vejledning til det Islandske eller gamle Nordiske Sprog* was the first historical grammar of an Indo-European language. Rask was more of a comparer than a historian of languages, however, and he wrote an extraordinary number of studies of different languages, many of them pioneering, in order to compare their forms. A glance through the bibliography of his published work alone (Rask, 1932/1935, III: 337–385)—and the list of unpublished writings runs to a further 79 pages (Bjerrum, 1968: 515–594)—reveals, for example, studies of English, Spanish, Frisian, Sámi (Saami Inari), Greenlandic (Inuktitut, Greenlandic), Pali, and numerous other, chiefly Indo-European, languages besides. In several cases, such as the Sámi grammar of 1832 and an 1828 grammar of the Kwa language Gã (spoken in Ghana [formerly the Danish-colonized Gold Coast]), he was working with material presented in earlier grammars.

Rask had a brilliant mind and a prodigious talent for analyzing and systematizing languages, but he did

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See also: Bopp, Franz (1791–1867); Danish; English, Old English; Grimm, Jacob Ludwig Carl (1785–1863); Kwa Languages; Norse and Icelandic; Saami.

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Valentin Ivanovič (Ivanovich) Rassadin was born in Pskov (the Russian Federation) in 1939. He is a Russian scholar, specializing in phonetics, dialectology, lexicology, etymology, and comparative studies of the Mongolian and Turkic languages of Mongolia and Siberia.

Rassadin was educated at the University of Leningrad (present St Petersburg), where he studied Mongolian languages and mastered his knowledge of Modern and Old Turkic languages. After his graduation, Rassadin worked as an interpreter in Mongolia for a year and later took up postgraduate courses in Turkic languages at the University in Novosibirsk. He received his M.A. for his thesis titled 'Lexicon of the modern Tofa language' in 1967 and his Ph.D. for his dissertation 'The Tofa language and its place in the system of other Turkic languages' in 1983. During a span of little less than 20 years between the two degrees, Rassadin's scholarly achievements were considerable and received wide recognition.

In his investigations, he fully recognized the importance of fieldwork in linguistic analysis. He gathered data firsthand from native language bearers during his numerous field trips in Russia, Mongolia, and China. In his books and papers, Rassadin made a point of describing and theorizing only on the basis of firsthand material. In line with this, he researched the historical phonetics of the Byrjat (Buriat) language, the systematic description and comparative studies of unexplored Burjat dialects, and the impact of Mongolian languages on Siberian Turkic languages.

Rassadin emphasized the importance of a descriptive approach to language, both in its own right and as a necessary preliminary to historical and comparative linguistics, based on contemporary, medieval, and old Mongolian and Turkic languages.

Rassadin's great contribution to Turkology is his research on the modern Tofa (Karagas) language, which has continued for more than 30 years. Tofa is a Siberian Turkic language that did not have any records and existed only in its oral form within a small community of reindeer breeders, who numbered 720 in 1989. Not only did Rassadin present a scholarly description of the language but he also created its written form and rules of orthography. Owing to Rassadin's research, the Tofa language was introduced into primary education in the Sayan region in 1990. Tofa teachers and children use ABCs and grammar books written by Rassadin.

During his first field trips to Burjatia (the Oka region) in the 1970s, he gathered linguistic material of another Siberian Turkic language, Sojot, considered to be extinct. As with Tofa, Rassadin created a system of writing for the Sojots, wrote ABCs and grammar books for their schools, and compiled *A Sojot–Burjat–Russian dictionary.* Thus, he both saved the language and tried to revive it.

Rassadin is also known as a translator of O. Böhtlingk's book *Über die Sprache der Jakuten* into Russian (1989).

Under his guidance, 30 scholars obtained their masters' and four their doctorate degrees. Rassadin has received many honors, including election to the Academy of Sciences (Russia, Finland), the title of Honored Scientist of Burjatia and the Russian Federation, the Russian Order of Friendship, and the Burjat Medal of Aldar solo. Rassadin has held various posts

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Rassadin's great contribution to Turkology is his research on the modern Tofa (Karagas) language, which has continued for more than 30 years. Tofa is a Siberian Turkic language that did not have any records and existed only in its oral form within a small community of reindeer breeders, who numbered 720 in 1989. Not only did Rassadin present a scholarly description of the language but he also created its written form and rules of orthography. Owing to Rassadin's research, the Tofa language was introduced into primary education in the Sayan region in 1990. Tofa teachers and children use ABCs and grammar books written by Rassadin.

During his first field trips to Burjatia (the Oka region) in the 1970s, he gathered linguistic material of another Siberian Turkic language, Sojot, considered to be extinct. As with Tofa, Rassadin created a system of writing for the Sojots, wrote ABCs and grammar books for their schools, and compiled *A Sojot–Burjat–Russian dictionary.* Thus, he both saved the language and tried to revive it.

Rassadin is also known as a translator of O. Böhtlingk's book *Über die Sprache der Jakuten* into Russian (1989).

Under his guidance, 30 scholars obtained their masters' and four their doctorate degrees. Rassadin has received many honors, including election to the Academy of Sciences (Russia, Finland), the title of Honored Scientist of Burjatia and the Russian Federation, the Russian Order of Friendship, and the Burjat Medal of Aldar solo. Rassadin has held various posts

at the Institute of Mongol, Buddhism and Tibet Studies. In 1992, he founded a new Department of Central Asian Philology at the University in Ulan-Ude.

At present, Rassadin is Chair and Professor of the Department of Central Asian Philology and Senior Researcher at the Institute of Mongol, Buddhism and Tibet Studies in Ulan-Ude. He has published more than 130 books and papers.

See also: Böhtlingk, Otto Nikolaus (1815–1904); Mongolic Languages; Turkic Languages.

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Rastafari Language

V Pollard, Kingston, Jamaica

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The language of Rastafari is one of a small number of codes created to serve the specific needs of a particular group. Labeled variously 'I-ance,' 'I-yaric,' 'Rasta Talk,' and 'Dread Talk,' it is the expression of the philosophy of a socioreligious movement that emerged in Jamaica in the 1930s in response to a social reality that placed the poor, black man at the bottom of the society. That man saw himself as dispossessed, pressed down economically and socially by the establishment. The language that evolved reconstructed English words so as to represent him accurately. So, for example, pressed 'down' by society he refused to label his condition 'oppressed,' a word whose direction, in the logic of English, is 'up.' He created the word 'downpressed.' The process for this transformation was one of many processes English words were made to undergo.

In the reconstruction of words, the sound /ai/ 'I' became a particularly significant sound. English, the major lexifier of all language in Jamaica, would see little relationship between *I* (ego) and *eye* the organ of sight. In the code of the Rastafari, however, where sound is paramount, the relationship between the two is close and obvious. Any word from English easily becomes a new word in Rastafari 'wordology' by changing the initial syllable to *I*. So, for example, *vital*, which describes food that is good for the body, becomes *Ital*.

Nettleford (1976: vii) described Rastafari as "one of the most significant phenomena to emerge out of the modern history and sociology of Plantation America." Later, quoting Theodor Adorno, Nettleford commented that "Social protest manifests itself in language change. For defiance of society includes defiance of its language" (Nettleford, 1978: 18). Dread Talk reflects the impact of the Rastafari movement on the Jamaican speech situation and it shares the movement's significance.

Today the language of Rastafari has spread not only beyond the group to the wider Jamaican society but also beyond the boundaries of Jamaica to the international community thanks to the music of Reggae and the lyrics of that music on the tongues of outstanding musicians like Bob Marley and Peter Tosh. There are communities of Rastafari not only in other Caribbean islands and in England and the United States, where large numbers of Jamaicans live, but also, for example, in Brazil, Japan, Italy, New Zealand, and Ghana.

Within Jamaica, the language has moved from being the language of a dispossessed minority to being a code in more general use. What could hardly have been predicted is that the words would become absorbed into the formal/official language of

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the island, although literary publications, particularly poetry, had long been using them as a means of invoking the presence of the Rasta man. Here is an excerpt from a recent editorial in a local daily:

> Mr. Latortue preferred to trod heavily and talk loudly and to embrace convicted killers and human rights abusers and current coup leaders and to declare them heroes and freedom fighters. (Editorial, *The Daily Observer*, Monday, June 7, 2004)

Trod is a word frequently used by Rastas, not as a past tense form but as a replacement for *tread* meaning 'walk', 'leave', 'go'.

Sometimes subtly, sometimes less so, the language of Rastafari has made itself a part of all Jamaican language.

See also: English, African American Vernacular; Jamaica: Language Situation; Pidgins and Creoles: Overview.

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Rational Analysis and Language Processing

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The Project of Rational Explanation

The biological and social sciences frequently aim to provide rational explanations for the phenomena they study. In biology, rational explanations typically are grounded in evolutionary theory – rational outcomes are presumed to be selected by natural selection (McNamara, Houston, and Collins, 2001). In the social sciences, rational explanations typically are framed by reference to motives and goals of social agents, as formalized in rational choice theory (Elster, 1986). To the extent that language is viewed as a biological or social phenomenon, it seems natural to apply rational explanation to attempt to understand why language processing, and indeed language itself, has the structure that it does. Attempts to provide explanations of this kind have been widespread, although piecemeal, from the earliest attempts to study language systematically. Here, we organize the discussion using a specific framework for constructing rational explanations, the methodology of rational analysis developed by the cognitive psychologist John Anderson. We outline the approach in the next section, and illustrate it in three domains of language processing in the next. Finally, we consider the future prospects for rational approaches to cognition.

Rational Analysis

Cognitive science, including the cognitive science of language processing, has focused on descriptions of the representations and processes involved in cognitive behavior. Anderson (1990) argued that a complementary project, that of providing explanations for these processes and representations, had been neglected. His methodological starting point, paralleling those in biology and the social sciences, was that cognitive phenomena can be explained as optimally adapted to achieving some goal, given specific environment and computational constraints. Specifically, his methodology of rational analysis has six steps:

1. Specify the relevant goals of the cognitive system
2. Create a simple formal model of the environment in which the agent operates
3. Make minimal assumptions about the computational constraints on the agent
4. Derive optimal performance in achieving the goal, given the environmental and computational constraints
5. Test the predictions from step 4 against empirical results
6. Iterate, to bring predictions and empirical results into line, where required.

This methodology has since been successfully applied across a wide range of cognitive domains, including memory, reasoning, categorization, search, and language processing (see Anderson, 1990; Oaksford and Chater, 1999). Note that, in this approach, rational explanation is not *a priori*. Rather, it requires making three types of empirical hypothesis (steps 1–3) about the cognitive system; and these hypotheses may be subject to independent empirical test. At step 4, these hypotheses are combined with mathematical analysis (typically, but not necessarily, from probability theory

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and statistics) to provide rational predictions. Note that step 4 may sometimes be too strong – focusing on optimal performance may not be appropriate, particularly when similar levels of performance may be obtained in different ways. In these circumstances, rational analysis is likely to be less useful. Note, also, that the steps of the analysis will not typically be represented by the cognitive system – so that, for example, goals typically will not be available to introspection. The rational explanation of cognitive processes, including language processing, may therefore be no more consciously available to language users than the principles of aerodynamics are available to a bird that exploits them (Marr, 1982).

Illustrations

We consider three case studies of rational analysis, relevant to language processing, ranging from the lexicon, to parsing, and language acquisition.

The Lexicon and Lexical Access

We begin in a simple setting. Suppose that one goal of the cognitive system is to encode information using the minimal amount of phonological material. Suppose that we assume that, to a first approximation, an utterance consists of a sequence of conceptually (although not acoustically) discrete words. Our assumption about the environment is trivial: that phonological information is transmitted sequentially; and we ignore cognitive limitations. One consequence of these observations is that frequent words should be assigned less phonological material than infrequent words. Indeed, according to information theory (*see* **Information Theory**), word length should be inversely proportional to log frequency. Zipf (1949) observed that this qualitative relationship is approximately true – although there are many exceptions (e.g., short, low frequency words such as *sot*). We may, moreover, ask more generally about why it is that words have different frequencies at all – Mandelbrot (1953) provides an information-theoretic argument, which predicts the known frequency relationship, Zipf's Law – that the log rank position of a lexical item (where items are ranked by frequency) is negatively linearly related to its absolute log word frequency (*see* **Zipf, George Kingsley (1902–1950)**).

Let us consider the goal that the cognitive system seeks not merely to pack in as much information as possible into the speech signal but also to allow this information to be decoded incrementally, as fast as possible. Making this precise could take a number of forms – but it rules out, for example, highly efficient codes frequently used in engineering, in which the sequential structure of a signal is scrambled and unscrambled to compress it most efficiently. Thus, we may speculate that the cognitive system does not use these methods because unscrambling can only begin once an entire chunk of linguistic material has been received. We have established that discrete informational units may be appropriate – this is one motivation for using reasonably discrete words in the acoustic signal (this issue is orthogonal to the question of compositionality of the underlying – unscrambled – linguistic representation; although a rational analysis based on the need for the ability to create a large number of messages from a relatively small number of components can readily be envisaged).

Consider now, the process of lexical access. Suppose that recognizing words involve a competitive search in a mental lexicon (this proposal, at step 3, could be made precise using many different computational models, ranging from serial search to many different parallel models). The degree of confidence that a lexical item has been identified correctly should depend on the amount of linguistic evidence for that item, and the prior belief that the item will occur (the rational justification for this comes from Bayes's theorem, from probability theory). Thus, other things being equal, we should expect frequent lexical items to be identified especially quickly, and with more degraded speech input. We should also, more generally, expect word identification to be more successful for predictable versus unpredictable linguistic material, under degraded conditions, because the prior belief in the correct word will be high in these circumstances. Similar arguments can be made to explain semantic priming (e.g., Lund, Burgess, and Atchley, 1995) – that semantically related words facilitate each other's identification. Finally, notice that our rational constraint that the cognitive system aims to identify words as rapidly as possible will automatically imply that words are recognized at their uniqueness point (i.e., at the point in speech at which no other word fits the context), which is also observed (Marslen-Wilson and Welsh, 1978).

Rational analysis in this, and any other area, can be challenged and extended. For example, rich constraints from articulatory phonology may affect which strings are appropriate for words; the need for redundancy may be required to explain the prevalence of rich and partially language-specific phonological constraints; and the frequency distribution of sublexical units may be important (e.g., Brown, 1998).

Syntactic Ambiguity Resolution

The syntactic structure of languages is massively locally ambiguous. For example, a fragment such as *John*

realized may be viewed as consistent with a complement clause, such as *that his goals were unattainable* or an object *his goals*. Let us assume that the goal of the language processor is incremental interpretation (step 1); the 'environment' is simply highly locally ambiguous natural language (step 2); and suppose that the cognitive system is constrained to consider parses serially (step 3) – this assumption is particularly controversial, and might be modified by psycholinguists who believe that the parser can consider several parses in parallel.

How should a serial parser decide which locally ambiguous reading to choose? If the parser cannot recover from mistakes, then a natural rational analysis will conclude that the most probable reading should be chosen at each point. The virtue of this approach is that it leads to the greatest probability of a globally correct parse. A consequent issue is how the most probable reading is estimated – a natural approach is to use corpus frequencies of the relevant structures, given relevant lexical items (e.g., comparing the frequencies of the different readings for the specific verb *realized*). According to this type of analysis, the parser will presume that *realized* takes a complement clause. This approach is consonant with likelihood-based models of parsing (Jurafsky, 1996), although some approaches of this kind assume limited parallelism.

If, however, we take into account the fact that the parser can abandon incorrect hypotheses, and adopt previously discarded alternatives, then the picture is different. Specifically, suppose that the probability of correcting a mistake depends on how early that mistake is detected. Then there will be a tendency not merely to favor parses that are probably right but also parses that, if wrong, can rapidly be rejected. Consider two possible continuations of our example sentence, exemplifying each type of parse:

John realized (that) his shoes were muddy

John realized his goal of running a 4 minute mile

If *realized* is construed as a transitive verb, then this hypothesis can typically rapidly be rejected (e.g., as soon as *that* is encountered; or at the next noun phrase, here *his shoes*, because so few noun phrases are appropriate objects for *realized*). Hence, recovery from this error may be possible. Conversely, if *realized* is interpreted as taking a complement clause, it typically will only be rejected much later, and typically at the end of the sentence. This is because the complement-clause interpretation, even when incorrect, cannot quickly be ruled out – for example, *John realized his goal of running a 4 minute mile* . . . could continue . . . *was unattainable*. Thus, a serial (or limited parallel) parser with recovery may rationally choose parses that make highly specific (and hence quickly falsified) initial parses, even when these may not be the most probable. A detailed rational analysis embodying this viewpoint is given in Chater, Crocker, and Pickering (1998); see also Pickering, Traxler, and Crocker (2000) for relevant psycholinguistic evidence.

Language Learnability

For our final example, we briefly consider the problem of language acquisition, in which methods of rational analysis, of varying degrees of formality, have been widely used (*see* **Formal Models and Language Acquisition**). A classic perspective on the problem is that the goal of language acquisition is to correctly distinguish all and only the acceptable strings of natural language (step 1), that the environment consists of a finite set of positive linguistic data only (i.e., children are not given labeled negative data – i.e., ungrammatical sentences, labeled as such); and this data is generated by some universal computational procedure (e.g., transformational syntax) (step 2); and the cognitive system learns using some computable procedure (step 3). In this framework, Gold's (1967) theorems indicate that there is no optimal procedure (step 4) that can reliably attain this goal in the limit. This result can be viewed as evidence that innate constraints must guide language acquisition (e.g., Pinker, 1979). By contrast, a different rational analysis might take a different idealization – e.g., revising step 1 so that the goal is a high probability of correct grammaticality judgements, and revising step 2, so that the language is generated by a phase structure grammar (e.g., Horning, 1969). Given these modifications, step 4 can be carried out – there is an optimal procedure for learning, without recourse to innate language-specific information. Moreover, some theorists might argue that the appropriate goal is prediction or comprehension, or production, rather than learning grammaticality judgements at all (Rohde and Plaut, 1999). The question of the appropriate rational analysis for language acquisition is a rich one (e.g.., MacWhinney, 2004); and will depend on the empirical defensibility of the assumptions in steps 1–3, as well as the ability to accommodate rational analysis to predicting detailed data on language acquisition (steps 5–6).

Prospects

Rational explanation of language processing is attractive yet relatively undeveloped. It is attractive because it promises to explain why specific cognitive mechanisms are as they are; and it aims to explain empirical phenomena in a way that abstracts away from specific

algorithmic implementation. Nonetheless, rational analysis must be pursued in parallel with studies of computational mechanism, the linguistic environment, and empirical data on language processing – these all feed into the construction of a rational explanation of any aspect of language processing. It seems inevitable that questions of *how* language, and language processing, work will inevitably be entwined with questions of *why* they are as they are. The methodology of rational analysis provides a useful framework for answering these latter questions.

See also: Formal Models and Language Acquisition; Information Theory; Parsing: Statistical Methods; Psycholinguistics: Overview; Sentence Processing; Word Recognition, Written; Zipf, George Kingsley (1902–1950).

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Wolfgang Ratke was born in Wilster, Germany, on October 18, 1571. He studied at Rostock University and, from 1603 to 1610, taught in Amsterdam. In 1612 he presented a famous *Memorandum* (Memorial) at the election of the Holy Roman Emperor in Frankfurt, in which he offered to show how "Hebrew, Greek, Latin and other languages may be easily learned and disseminated, even in a short space of time, both to young and old." From 1614 to 1622, Ratke worked – less than successfully, it must be said – on innovative school projects in Augsburg, Köthen, and Magdeburg; from 1622 onward, he concentrated on his encyclopedic program. He died in Erfurt on April 27, 1635.

Ratke's program was dictated by his encyclopedic concept of education, which he saw as a solution to the social and political problems associated with the Thirty Years' War. It was probably conceived as a Lutheran alternative to the curricular program of the Roman Catholics and the Reformed Church.

Ratke realized early the importance of the native language as both a medium of instruction and a foundation for teaching other languages. He identified the same problem as Henry VIII and Mulcaster – the multiplicity and diversity of grammars and ways of teaching. But whereas Henry prohibited the use of all grammars in schools except one (Lily and Colet,

algorithmic implementation. Nonetheless, rational analysis must be pursued in parallel with studies of computational mechanism, the linguistic environment, and empirical data on language processing – these all feed into the construction of a rational explanation of any aspect of language processing. It seems inevitable that questions of *how* language, and language processing, work will inevitably be entwined with questions of *why* they are as they are. The methodology of rational analysis provides a useful framework for answering these latter questions.

See also: Formal Models and Language Acquisition; Information Theory; Parsing: Statistical Methods; Psycholinguistics: Overview; Sentence Processing; Word Recognition, Written; Zipf, George Kingsley (1902–1950).

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Ratke's writings include a set of small universal grammars for five languages, printed in Köthen, and uniform in terminology, classification, scope, size and type. Each volume consists of a universal grammar written on and in the language concerned, and a section 'Special Properties,' detailing its attributes and values.

Although Ratke's program was only fragmentarily realized, the logic of his scheme made him an important innovator in many areas to do with language. In particular, Ratke's writings on German constitute significant landmarks in the history of German grammar writing (Ising, 1959), while his inductive approach through texts anticipated reforms in foreign-language teaching.

See also: Mulcaster, Richard (1532–1611); Second and Foreign Language Learning and Teaching; Sonnenschein, Edward Adolf (1851–1929); Viëtor, Wilhelm (1850–1918).

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Raumer, Rudolf von (1815–1876)

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Raumer is important as a representative of the transitional period in linguistic studies in Germany between the style of orthography-based philology associated with, for example, Jacob Grimm, and the work in the 1870s and thereafter of the Neogrammarians (*Junggrammatiker*), with their emphasis on the need to use knowledge of phonetics and modern dialectology for an understanding of the processes of linguistic change.

Raumer was born in Breslau (now Wrocław) on April 14, 1815. His parents were Karl Ludwig Georg von Raumer (1783–1873), a geologist and educational historian, and Friederike Reichardt (1790–1869). He died in Erlangen on August 30, 1876.

He attended secondary schools in Nürnberg and Erlangen. His university studies of classical and German philology were divided between Erlangen (1832–1834) and Göttingen (1834–1836). Among his teachers were the classical philologist and historian Friedrich Christoph Dahlmann (1785–1860) and Jacob Ludwig Carl Grimm (1785–1863). (Raumer's family and the brothers Grimm were friends.) He graduated from Erlangen in 1839, and for his *Habilitation* the following year he wrote a dissertation on Roman constitutional history (1840). He remained at Erlangen for the remainder of his life, teaching Germanic languages and history (particularly the history of Germany). From 1852 onward, he was Professor of German Language and Literature there.

Raumer's intellectual interests encompassed not only the history and contemporary state of German (e.g., 1848), but also religion and philosophy. Thus, another of his early works was a study of the

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Raumer correctly identified the importance of a standardized orthography of German as one of the significant markers of the growing political unity of Germany over the centuries. The later formal codification of German orthography in 1880 was based mainly on the proposals that he had put forward (1876a).

He was the first of the relatively few 19th-century comparative linguists to consider the question of a possible relationship between Indo–European and Semitic, and argued, from admittedly a limited set of data, that there was some evidence to indicate a common ancestor for both language families (see particularly 1864, 1876b).

Unlike his teacher Jacob Grimm and many other linguists of the first half of the 19th century, Raumer recognized the need to use insights from phonetics in evaluating evidence for sound changes – hence, the importance in historiographical terms of his very first publication, on aspiration and sound change (1837). This is a farsighted account of how a phonetic, rather than simply an orthographic, perspective can elucidate questions about the nature of sounds at earlier periods in a language. Much of his argument is based on data from Sanskrit and Classical Greek.

See also: Germanic Languages; Grimm, Jacob Ludwig Carl (1785–1863); Neogrammarians; Semitic Languages; Spelling Reform.

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Raymundus Lullus (ca. 1235–1315)

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[Ramón Lull/Llull] (**Figure 1**) was born in Palma, in Majorca, between 1232 and 1236, and died in Tunis in 1315. The *doctor illuminatus* was a philosopher, poet, and theologian mainly concerned with the conversion of the infidels and with the symbolic permutations of his *Ars Generalis Ultima* (*Ars Magna*), which he considered as a way of finding truth. Lull's *Ars magna* influenced the philosophy of Cusanus, was later discussed by Leibniz in his *Dissertatio de arte combinatoria* (1666), and was extended by Athanasius Kircher. Lull is also known as the first medieval philosopher who wrote in the vernacular (Catalan), thus even preceding Dante or Meister Eckhart.

Lull was born into a wealthy family that was well-acquainted with court life. Until the age of 30, he lived hedonistically as a courtier of King James of Aragon. When he was 30, a vision of the crucified Christ compelled him to leave his family to become a hermit and finally a tertiary of the Order of St. Francis. As a result of his conversion, Lull decided to pursue three principal aims: (1) becoming a missionary and accepting martyrdom, (2) writing a book to convert the infidels, (3) founding monasteries in which the languages of the infidels were to be taught for missionary purposes. Having spent his youth in

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a land where three religions converged (Christianity, Islam, and Judaism), Lull seemed to be the right person for this task. But being a gifted autodidact rather than a scholar, Lull focused on learning Latin and Arabic for almost a decade. At the age of 40, a divine illumination at Mount Randa (Majorca) ordered him to write a book against the errors of the infidels; this order was accomplished by writing the *Ars magna*, the most outstanding of Lull's 292 works. The *Ars Magna* is similar to a logical 'machine,' in which subjects and predicates of theological propositions are arranged in geometrical figures. By different forms of permutations, it is possible to gain affirmative or negative propositions and to have insight into the true nature of things. This combinatorial system, which included concepts, figures, and their permutations, was much inspired by Cabbalistic mysticism; it was also close to Galenus' conception of the four temperaments and to his astrology. In many of his treatises, Lull tried to apply his *Ars magna* to a huge variety of topics, such as philosophy, theology, law, medicine, physics, astrology, astronomy, and so forth. Since his illumination at Mount Randa, Lull had been traveling across Europe to propagate his *Ars* and to pursue his missionary activities. On his last sojourn in Tunisia, he was first sentenced to death and then banished. Legend has it that he was even lapidated. Lull died on a ship sailing from Northern Africa back to Majorca.

Although Lullism attracted an enthusiastic following for several centuries, it was also criticized for its sterility, e.g., by Swift in *Gulliver's travels*. Nevertheless, Lullism's deep impact on universal language projects is undeniable.

See also: Leibniz, Gottfried Wilhelm (1646–1716); Universal Language Schemes in the 17th Century; Vernacular.

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Reading and Multiliteracy

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A rich vein of articles and books has recently offered new perspectives on reading and literacy, invoking such terms as 'multiliteracies' and 'multiple literacies.' In this piece, I will signal some of the debates and concepts in this emerging field, with particular reference to New Literacy Studies (NLS), both in terms of theoretical perspectives and of their implications in schooled contexts, as theorists and practitioners address the tensions and possibilities that arise when students and teachers apply such innovations to curricula and classrooms. While 'reading' has generally been seen in educational contexts as about

Figure 1 Raymundus Lullus. Painted by Klause Froese, Berlin, 2004. Reproduced with permisssion.

a land where three religions converged (Christianity, Islam, and Judaism), Lull seemed to be the right person for this task. But being a gifted autodidact rather than a scholar, Lull focused on learning Latin and Arabic for almost a decade. At the age of 40, a divine illumination at Mount Randa (Majorca) ordered him to write a book against the errors of the infidels; this order was accomplished by writing the *Ars magna*, the most outstanding of Lull's 292 works. The *Ars Magna* is similar to a logical 'machine,' in which subjects and predicates of theological propositions are arranged in geometrical figures. By different forms of permutations, it is possible to gain affirmative or negative propositions and to have insight into the true nature of things. This combinatorial system, which included concepts, figures, and their permutations, was much inspired by Cabbalistic mysticism; it was also close to Galenus' conception of the four temperaments and to his astrology. In many of his treatises, Lull tried to apply his *Ars magna* to a huge variety of topics, such as philosophy, theology, law, medicine, physics, astrology, astronomy, and so forth. Since his illumination at Mount Randa, Lull had been traveling across Europe to propagate his *Ars* and to pursue his missionary activities. On his last sojourn in Tunisia, he was first sentenced to death and then banished. Legend has it that he was even lapidated. Lull died on a ship sailing from Northern Africa back to Majorca.

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Reading and Multiliteracy

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A rich vein of articles and books has recently offered new perspectives on reading and literacy, invoking such terms as 'multiliteracies' and 'multiple literacies.' In this piece, I will signal some of the debates and concepts in this emerging field, with particular reference to New Literacy Studies (NLS), both in terms of theoretical perspectives and of their implications in schooled contexts, as theorists and practitioners address the tensions and possibilities that arise when students and teachers apply such innovations to curricula and classrooms. While 'reading' has generally been seen in educational contexts as about

decoding and much of the policy literature follows this line (cf. Snow, 1998), those researching literacy from a social practice perspective offer a broader interpretation of reading as well as of literacy that has profound implications for classroom practice.

Such reconceptualization begins from the problematizing of what counts as literacy at any time and place and asks 'whose literacies' are dominant and whose are marginalized or resistant. This query entails the recognition of multiple literacies, varying according to time and space but also contested in relations of power. To address these issues ethnographically, literacy researchers have focused on 'literacy events' and literacy practices,' the latter representing an attempt to handle the events and the patterns of activity around literacy but to **link** them to something broader of a cultural and social kind: part of that broadening involves attending to the fact that in a literacy event, we have brought to it concepts, social models regarding what the nature of this practice is and that make it work and give it meaning. This reconceptualizing of literacy has produced a wealth of 'ethnographies of literacy' (cf. Street, 1984, 2001; Barton, 2000; Baynham, 2004). The strength and significance of this approach and this considerable literature is attested by a recent spate of critical accounts that have addressed some of the problems that they raise, both in general and, more specifically, for educational applications.

An apt place to begin is with the contestations over the terms 'multiple literacies' and 'multiliteracies.' The notion of multiple literacies was coined in the early 1980s (Street, 1984) in order to make a contrast with a reified autonomous notion that dominated the field at that time, which assumed that there was only one thing called 'literacy' – which had a big 'L' and a little 'y': which was singular and autonomous in the sense that it was a factor that independently had effects on other things. The idea of multiple literacies, then, was an important construct in challenging that autonomous singular literacy: literacies vary according to cultural contexts and uses and what is taught in schools as 'the' literacy is only one variety among many.

The concept of multiliteracies that has been put forward by the 'New London Group' (NLG) (Cope and Kalanztis, 2000) refers not to multiple literacies, associated with different cultures or contexts, but to multiple forms of literacy associated with different channels or modes, such as computer literacy or visual literacy. Kress (1997), a member of the NLG, has criticized the further extensions of multiliteracy into, for instance, political literacy, or emotional literacy, thereby using the term as a metaphor for competence. The NLG are more interested in channels and modes of communication that can be referred to as 'literacies.' For Kress, multiliteracy signals a new world in which the reading and writing practices of literacy are only one part of what people are going to have to learn in order to be 'literate' (Kress and van Leeuwen, 1990). They are going to have learn to handle the icons and the signs, the Word for Windows package with all its combinations of signs, symbols, boundaries, pictures, words, texts, images, etc. The extreme version of this position is the notion of 'the end of language' – that somehow we are no longer talking about language in its rather traditional notion of grammar, lexicon, and semantics, but rather semiotic systems that cut across reading, writing, speech, into all these other semiotic forms of communication. This collection, then, is what is signaled by the term 'multiliteracies': a rather different approach from that entailed by the 'multiple literacies' view outlined above.

These approaches are currently being debated not only in terms of the boundaries of the concepts but also in terms of broader theoretical and methodological issues. In terms of theory, for instance, Brandt (2002) recently commented on 'the limits of the local' evident, she believes, in the ethnographic approach to multiple literacies. She argues that NLS ought to be more prepared to take account of the relatively 'autonomous' features of literacy without succumbing to the autonomous model with its well-documented flaws: this approach would involve, for instance, recognizing the extent to which literacy does often come to 'local' situations from outside and brings with it both skills and meanings that are larger than the emic perspective favored by NLS can always detect. This recognition, of course, is exactly what many educationalists would argue regarding the relationship between local literacy practices and those of the school. Likewise, Collins and Blot (2002) were concerned that, while NLS has generated a powerful series of ethnographies of literacy, there is a danger of simply piling up more descriptions of local literacies without addressing more general questions of both theory and practice. They proposed the terms 'texts power and identities' as a basis for comparative generalization, building on the descriptive capacity of the lenses offered by NLS to engender a more powerful set of generalizations about the uses and meanings of literacy practices. Those lenses were themselves sharpened by a number of contributors to an edited volume *Situated literacies* (Barton *et al.*, 2000). Gee, for instance, located the situated approach to literacies in relation to broader movements towards a 'social turn' that he sees as a challenge to the behaviorism and individualism that NLS has also pursued. Maybin, in the same volume, also links NLS to wider strands of social-critical

work, offering a way of linking Foucauldian notions of Discourse, Bakhtinian notions of intertextuality, and work in Critical Discourse Analysis with the recognition from NLS of "the articulation of different discourses [as] centrally and dynamically interwoven in people's everyday literacy activities." Bartlett and Holland (2002) likewise proposed an expanded conception of the 'space of literacy practices,' drawing upon innovations in the cultural school of psychology, sociocultural history, and social practice theory. They are particularly concerned to harness NLS to broader concerns with identity and suggest three concepts: figured world, artifacts, and identities in practice. As with the other papers and books, they build these extensions and developments upon the basic tenets of NLS, using ethnographic case studies of literacy in practice.

Another update and extension of NLS is to be found in Hornberger's edited volume (2002) in which authors attempt to apply her conception of the 'continua of biliteracy' to actual uses of reading and writing in different multilingual settings: 'biliteracy' is defined as "any and all instances in which communication occurs in two (or more) languages in or around writing" and is described in terms of four nested sets of intersecting continua characterizing the contexts, media, content, and development of biliteracy. A number of the authors, as in the Martin-Jones and Jones (2001) book, drew out the links of NLS to such multilingual settings. Peter Freebody's recent account of the different ways in which 'Critical Literacy' has been construed (Freebody, forthcoming) offered a further, critical perspective on NLS and its implications for education. He argued that the meanings of CL vary according to both "focus and method of study on the one hand and, on the other, the disciplines that have developed these approaches." Thus:

- Linguists have generally taken the text as a semiotically structured object, to be the prime unit of focus of critical literacy;
- Sociologists have generally focused on how language uses signal as the operation of social formations such as race, gender, and class, and how these formations in turn give shape to how we read, write, look, talk, and listen; and
- Anthropologists have taken cultural practices and the ways that different literate representations variously implicate and afford these.

Being rooted in anthropological approaches, although perhaps recently focused more in ethnographic methods from a range of sources, New Literacy Studies can be seen to focus more on practices than on texts and more on fine-tuned processes of identity construction than on gross categories of class, race, and gender. However, all three approaches would probably agree with Freebody's general characterization of CL as concerned "with giving access to texts, transforming sociopolitical processes and" – most crucially for NLS – "developing the practical understanding that people are educated to become variously the objects and subjects (both the topics of and the readers and writers) of a selected tradition of representing reality in public and official forms." How such traditions are constructed and reproduced and how individuals and social groups are inserted into them is a central focus of NLS – taking nothing for granted with respect to literacy and the social practices with which it becomes associated.

The effects of these critical engagements is that NLS is now going through a productive stage of theory building that first establishes and consolidates many of the earlier insights and empirical work, and second builds a broader and perhaps less beleaguered field of study that can appeal beyond the specific interests of ethnographers on the one hand and educationalists on the other, to those engaged in more general issues of identity, power, and textuality. The next stage of work in this area, then, is to move beyond simply theoretical critiques of the autonomous model of literacy and to develop positive proposals for interventions in teaching, curriculum, measurement criteria, and teacher education in both the formal and informal sectors, based upon these principles. It will be at this stage that the theoretical perspectives brought together in the 'New Literacy Studies' will face their sternest test: that of their practical applications to mainstream education. In a recent edited volume (Street, 2005), a number of authors took on this challenge and attempted to follow through such practical applications of the NLS approach, in terms of the links between such theoretical debate and the work of teachers in school addressing literacy issues. Likewise, Hull and Schultz (2001) built upon the foundational descriptions of out-of-school literacy events and practices developed within NLS, to return the gaze back to the relations between in and out of school, so that NLS is not seen simply as 'antischool' or as interested only in small scale literacies of resistance. They want to use the understandings of especially children's emerging experiences with literacy in their own cultural milieus to address broader educational questions about learning of literacy and of switching between the literacy practices required in different contexts. This issue was also addressed in current research by Baker, Street, and others applying literacy theory to the understanding of numeracy practices in and out of school (Baker and Street, 2004; Baynham and Baker, 2002).

Meanwhile, Larson's edited volume (2001) addressed the relationship between current policy initiatives that stress a more decontextualized view of literacy and the approaches indicated here, including NLS and 'critical' perspectives: the authors demonstrated the problems with the dominant narrow approach and attempted to construct more meaningful solutions. This theme was developed further in a forthcoming volume, *Framing literacies* (forthcoming), in which Larson and Marsh attempted to reconnect what we know about literacy learning to what we do. The book took three prominent theoretical frameworks, New Literacy Studies, Critical Literacy, and Sociocultural Theory, and illustrated what these frameworks look like in real case examples, articulating how the frameworks discussed work together to construct rich and complex contexts for literacy learning and progressive frameworks for research. Another volume in this genre, edited by Rowsell and Pahl (forthcoming), also attempted to make links explicitly between theory and educational practice. At a theoretical level, they attempted to combine the multiliteracies and the multiple literacies positions: "To meet the demands of our changing communicational landscape, we need to adjust our notion of literacy and its implications on how we produce texts in multiple settings, at different times, by different sets of actors." At the same time, they want to follow through the implications of this production for pedagogy and curriculum, and the authors in their volume provided examples of actual classroom practice where such shifts can be identified. The same two authors (Pahl and Rowsell, 2005) have also written a book for classroom teachers offering a practical guide to applying New Literacy Studies within primary, secondary, and family literacy contexts. It aimed to offer ways to rethink, redefine, and redesign language and literacy in the classroom to meet the contemporary needs and skills of students.

All of these initiatives, then, make considerable demands on both theorists and practitioners in the area of language and education in general and of literacy and reading in particular, challenging dominant views of each term and its applications. From this perspective, reading is now located in the broader field of literacies, and the understanding of literacies is in turn contested between approaches from ethnography, critical theory, and sociocultural views of language and learning. Whichever position one takes in this fast moving field, it will no longer be possible to envisage either reading or literacy in the simple, unidimensional ways that have dominated schooling until now.

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Reading Processes in Adults

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To most adults, reading seems like a simple task. However, there are many different component processes involved in reading which make it quite a complex skill. In order to understand written text, such as a short story, letters must be identified, words must be recognized and assigned meaning, the words must be strung together to form the meaning of the sentence, and the sentence must be understood in the context of all of the other sentences that have occurred before it in the text. Therefore, although reading seems quite easy to us, it is because we have had much practice at all of the various components involved in reading. The story is very different for beginning readers and people with reading disabilities.

All of the components involved in reading are important to investigate in order to understand how the process works and how the skill develops. For example, many researchers are interested in the processes involved in word recognition. They therefore may examine how the letters (orthography), sounds (phonology), or meaning (semantics) of words contributes to the reading process. Likewise, other researchers study how sentences are processed or how a written discourse is understood. Many of the important components of reading and reading comprehension are addressed in other articles in this encyclopedia. By understanding the details associated with each component, a clear picture of the processes involved in reading begins to emerge. It is therefore important to understand reading processes in adults for the sake of understanding how the complex processes that make up reading are coordinated. A pioneer in reading research, E. B. Huey (1908), once remarked that understanding what skilled readers do when they read could easily represent a major achievement in psychological science. But it is also important to understand what skilled readers do so that what they do can be used to inform the teaching of reading to children and people with various reading disabilities (see Rayner *et al*., 2001, 2002).

Experimental Tasks and Reading

There are many experimental tasks available to researchers to study the different components involved in reading. For word recognition, researchers often use tasks that present a word in isolation on a computer screen and require a participant to make some type of response. Three such tasks will be briefly described. In the lexical decision task, letter strings are presented and participants must decide whether or not the letter string makes a word in their language. The time it takes participants to make their decision, and also the percentage of errors that they make, are then analyzed as a function of the variables being manipulated in the study. In a naming task, participants are presented with words and are asked to name them as quickly as possible, and the latency to name the word is recorded as the dependent measure. Also, semantic categorization tasks are sometimes used. In this task, a participant must say whether an exemplar (such as *shirt*) belongs to a particular category (such as *clothing*). A major criticism of these types of task is that the degree to which the tasks approximate normal reading can be questioned. When people read text silently to themselves, they do not encounter words out of context and they do not have to make a response to a word; they simply have to read it and understand what it means.

If a researcher is interested in studying how sentences are processed, they use other types of task. For example, participants might be presented with a sentence and be asked to simply read it and sometimes answer questions about it. The sentence may be presented all at once, in smaller subsections (such as a clause or phrase), or word by word. The presentation of the words in the sentence may be controlled by the participant (self-paced reading) or controlled by the experimenter (rapid serial visual presentation or RSVP). Researchers examining the processes involved in understanding longer texts tend to use similar methods. As with the tasks above, there are criticisms

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of these techniques as well. For example, in most of these tasks once a word, phrase, or sentence has been read, it disappears from the screen. This is unlike normal reading, where people can reread text at their own rate.

By recording readers' eye movements as they read sentences or short texts, all of the processes involved in reading can be examined in a more natural way. Eye movements are recorded through the use of an eye tracker which interfaces with a computer. Participants read material on a computer screen, as they would normally read. Sometimes, they are asked questions about the text. Eye trackers come in all varieties. Some of them use an infrared beam of light to record the eye's position in the text. These eye trackers are very precise and require a participant's head to remain very still. Newer eye trackers record readers' eye movements with a small camera attached to a cap or headband that the reader wears. By recording readers' eye movements, it is possible to study all aspects of reading, including word recognition, sentence processing, and discourse processing. The eye movement literature has provided a wealth of knowledge regarding how reading occurs. The rest of this entry will be devoted to what we have learned about reading from studying eye movements.

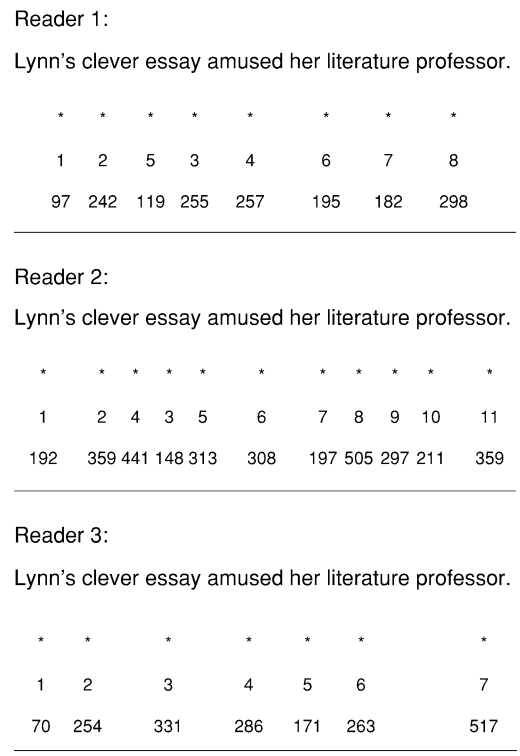

Figure 1 Eye movement data from three different college-age readers on the same sentence. For each reader, the asterisk indicates eye position. Directly underneath the asterisk is the fixation sequence. Underneath the sequence number is the fixation duration for that particular fixation.

Basic Facts about Eye Movements in Reading

In order to understand how reading occurs, it is important to explore how eye movements contribute to the reading process. While people have the impression that their eyes move continuously through text, only pausing on difficult parts occasionally, this is not the case. Instead, the eyes alternate between a series of pauses (called fixations) and eye movements (called saccades) while reading. On average, fixations last roughly 200 to 250 ms, although there is variability. Also, the average saccade length when reading English is roughly six to nine character spaces and lasts approximately 20 to 50 ms. Vision is mostly suppressed during saccades so information is extracted only during fixations during reading (see Rayner, 1998 for more details).

During normal reading, people move forward in text 85% to 90% of the time. The remaining 10% to 15% of the time is devoted to regressions, that is, moving the eyes back in the text. To date, the factors that lead to regressions are not very well understood. However, it is clear that regressions can be caused either by comprehension difficulties or error in where the eyes landed (called oculomotor error). One special type of regression is called a return sweep. This is a right-to-left eye movement (when reading English) that occurs when the eyes move from the end of one line of text to the beginning of the next line of text (Rayner, 1998).

As mentioned above, there is variability in the average length of fixations (called fixation durations), saccade size, and regression rates. As the difficulty of the reading material increases, saccade size tends to decrease, fixation durations increase, and more regressions are made. The skill of the reader also affects eye movement characteristics, with less skilled readers showing longer fixation durations, more regressions, and shorter saccades.

There is also variability in these measures within a reader. Figure 1 illustrates this point by showing the eye movement patterns on a single sentence for three college-age readers. In this experiment, participants were simply asked to read sentences for meaning and answer a question on them occasionally. For a person reading a single sentence, it is not uncommon to see fixation durations from less than 100 ms to over 450 ms. Much of this variability is due to how easy or difficult the currently fixated word is to recognize. For example, if a word is not familiar (e.g., *steward*), people will fixate it longer than if a word is very familiar (e.g., *student*). In addition, saccade sizes can range from one

character space to over 14 character spaces. However, long saccade sizes typically only follow regressions (see Rayner, 1998 for more information).

Most of the research to date on eye movements during reading has been done with English and other alphabetic languages. The kinds of summary statements that we made above generally hold true across the different languages. However, other writing systems obviously exist that are basically nonalphabetical in nature (such as Japanese and Chinese). There is now a lot of interest in crosscultural differences in how eye movements interact with the specific type of writing system. One apparent generalization is that the nature of the writing system obviously has big effects on the eye movements. For example, Chinese readers don't move their eyes as far in each saccade (so the forward saccade is about 2.3 characters for Chinese) as do readers of alphabetic languages. Readers of Hebrew also don't move their eyes forward (where forward means to the left since they read from right to left) as far as English readers do. This again falls out from the fact that Hebrew is more densely represented on the page (so it takes fewer letters to write a sentence in Hebrew because, for example, the vowels are systematically deleted in the orthography for skilled readers). Nevertheless, it appears to be the case that when characters or words are converted into 'idea' units, the amount of time it takes to read a given sentence is relatively constant across languages. Our expectation is that the next few years will see a considerable increase in the number of crosscultural studies examining the eye movements of skilled readers in different countries.

Measuring Cognitive Processing during Reading

There are a number of measures that can be obtained from the eye movement record. Some of these have become standard. First, it is important to point out that depending on the purpose of the experiment (i.e., whether it is investigating word recognition, sentence processing, or discourse processes), the regions of interest may vary. Many researchers use eye movements to examine how individual words are recognized. Thus, in these studies the word is the region of interest. When this is the case, the typical measures are as follows:

- First fixation duration: The duration of the first fixation on the word irrespective of how many fixations the word receives.
- Single fixation duration: The first fixation duration on the word if and only if the word received a single fixation the first time it was read.
- Gaze duration: The sum of all fixations on a word before the reader moves their eyes from the word. This is probably the most reported measure.
- Go-past time: The sum of all fixations on a word and the sum of any fixations spent rereading the text prior to the word before the reader moves their eyes to the right of the word.
- Total fixation duration: The sum of all fixation durations on a word, including time spent rereading the word after the reader left the word.

In addition to these measures, other measures such as the probability of skipping a word are often reported. In order to get a good idea of what is happening in reading, as many measures as possible are examined in the eye movement record. Different measures can highlight the differing time course of certain variables (for example, an effect may have an early but lasting effect and influence all measures, or it may be a later effect and only show up in total fixation duration when rereading is taken into account). While these measures deal with a single word as the region of interest, analogous measures also exist for cases when the region of interest is many words.

The Perceptual Span in Reading and the Use of Parafoveal Information

When we read, not all letters and words on a line of text can be seen with the same clarity. A line of text can be divided into three regions based on acuity limitations. The foveal region comprises 1° to the left and right of fixation and has the best acuity; here letters can be identified easily. The parafoveal region comprises the 4° to the left and right of the foveal region. In this region, acuity is not as good and it is more difficult to identify letters than when they are in the foveal region. Finally, the peripheral region is everything outside of the foveal and parafoveal regions. Acuity in this region is very poor (acuity differences are due to the anatomical make-up of the retina and the distribution of rods and cones). Thus, one of the main purposes of eye movements in reading is to bring information (i.e., the words being read) inside the foveal region, where it can be most easily identified.

Much research has been devoted to identifying how much information can be obtained on a single fixation during reading (i.e., the perceptual span in reading). In order to answer this question, techniques were invented in which experimenters could manipulate the amount of information available to the reader based on where the person was fixating (called the eye-contingent display change technique). In this

Normal text:

```
Fixation 1: Lynn's clever essay amused her literature professor.
                     *
Fixation 2: Lynn's clever essay amused her literature professor.
                          *
```

Moving window technique

```
Fixation 1: xxxx'x clever xxxxx xxxxxx xxx xxxxxxxxxx xxxxxxxxx.
                    *
Fixation 2: xxxx'x xxxxxx essay xxxxxx xxx xxxxxxxxxx xxxxxxxxx.
                          *
```

Foveal mask technique

```
Fixation 1: Lynn's xxxxxx essay amused her literature professor.
                   *
Fixation 2: Lynn's clever xxxxx amused her literature professor.
                          *
```

Boundary technique

```
Fixation 1: Lynn's clever zcawp amused her literature professor.
                    *
Fixation 2: Lynn's clever essay amused her literature professor.
                          *
```

Figure 2 Examples of three eye-contingent display techniques. In each panel, the asterisk indicates the eye position.

section, we will outline the techniques that have been used to address this question and then briefly summarize the main findings from experiments using these techniques.

Eye-Contingent Display Change Paradigms

There are three main types of eye-contingent display change techniques (see Figure 2 for examples). The first kind is called the moving window technique (McConkie and Rayner, 1975). In this paradigm, there is a window of text (the size of which is specified by the experimenter) around a person's fixation that is intact. The remaining text outside of the window is usually replaced by random letters or Xs. The window moves with the reader's eyes. If the window is large enough, the reader is not disturbed by the random letters outside of the moving window. Conversely, if the window is too small, the reader will be significantly slowed down by the lack of useful information outside of the moving window.

The foveal mask technique (Rayner and Bertera, 1979) is basically the opposite of the moving window. In this technique, wherever a reader fixates is replaced by a mask (usually of Xs). The text outside of this mask is intact. Therefore, with this technique, readers only have access to letters in their parafovea.

Finally, the most widely used eye-contingent display change technique is the boundary technique (Rayner, 1975). In this technique, there is an invisible boundary specified in the text. When the reader's eye crosses that boundary, a word (or nonword) that was originally displayed changes into a target word. Since the display change occurs during a saccade (when vision is suppressed), readers do not notice this change. The time spent reading the target word can be computed as a function of the type of preview that was available. By manipulating the type of preview, experimenters can explore what type of information readers extract from their parafovea.

Findings from the Eye-Contingent Display Paradigms

Studies using the eye-contingent display change techniques have demonstrated several findings about the perceptual span during reading. First, the perceptual span extends roughly 15 character spaces to the right of fixation (see, e.g., McConkie and Rayner, 1975; Rayner and Bertera, 1979). The perceptual span is also asymmetric, in that it extends further to the right than to the left. The perceptual span extends three or four character spaces to the left, which usually only comprises the beginning of the word being fixated (see, e.g., Rayner *et al.*, 1980a). Interestingly, this is only true for readers whose languages are printed from left to right. Readers of Hebrew (which is printed right to left) have the reverse asymmetry in

their perceptual span. Thus, it appears that the asymmetry is due to attention, as opposed to the visual system itself (Pollatsek *et al.*, 1981).

While the perceptual span extends 15 or so characters to the right of fixation, words cannot necessarily be identified that far out into the parafovea. Instead, studies suggest that the word identification span is roughly half the size (7 or 8 characters) of the perceptual span to the right of fixation (see, e.g., Underwood and McConkie, 1985). Outside of the word identification span, readers only gain rough information about letter shape and word length. Both the size of the perceptual span and the word identification span can be modulated by the text being read. For example, if the word that is fixated is difficult, less information about the parafoveal word is obtained (see, e.g., Henderson and Ferreira, 1990). In addition, the span varies based on the language that is being read. Readers of languages such as Chinese and Japanese have smaller spans (see, e.g., Ikeda and Saida, 1978) due to the fact that each character in these languages contains more information than in a language such as English.

Experiments using the boundary technique have shown that information gained about a word to the right of fixation (i.e., the parafoveal word) is subsequently used to speed identification of that word once it is fixated. Boundary change experiments have manipulated the similarity of the preview word and the subsequently fixated target word in order to identify what types of information are accessed from a parafoveal word. According to these experiments, information about the first few letters of an upcoming word is utilized during reading (see, e.g., Rayner *et al.*, 1980b). This information seems to be in the form of abstract letter codes, since changing the case of letters on each fixation does not significantly disrupt reading behavior (see, e.g., McConkie and Zola, 1979). Also, Pollatsek *et al.* (1992) found that phonological information is gained from the parafovea during reading. To date, no researcher using the boundary change technique has found evidence for parafoveal usage of morphological or partial semantic information (see, e.g., Lima, 1987; Rayner *et al.*, 1986). Note, however, that semantic information is sometimes obtained from the parafovea, as not all words are fixated. When words are skipped, their meaning was presumably accessed in the parafovea and no fixation was necessary on the word (short function words are skipped more often than content words).

Developmental Trends in Eye Movements

Table 1, which is a summary adapted from Rayner (1998), illustrates the developmental changes that take place in eye movement behavior during reading. It shows the average fixation durations, number of fixations per 100 words, and percentage of regressions made. As can be seen, as a reader becomes more skilled, they have shorter fixation durations, fewer fixations overall, and also more regressions. The lesser number of fixations is mostly due to the fact that readers are less likely to refixate words (i.e., make more than one fixation on a word) as they become more skilled. In addition, saccade length increases as beginning readers get more skilled (see Rayner, 1998 for more details). Rayner (1986) also demonstrated that the perceptual span of beginning readers is significantly smaller than that of skilled readers. Thus, beginning readers do not obtain as much information from parafoveal vision as skilled readers. This may be related to the fact that beginning readers undoubtedly find the text they are currently fixating difficult, and as mentioned above, less parafoveal information can be used, even by skilled readers, when the word currently being fixated is difficult (Henderson and Ferreira, 1990). Interestingly, it only takes roughly 1 year of reading education for beginning readers to show the asymmetry in their perceptual span that skilled readers show.

Table 1 Characteristic of eye movements during reading as a function of grade level

Grade level	*Fixation duration (ms)*	*Fixations per 100 words*	*Frequency of regressions %*
1	355	191	28
2	306	151	26
3	286	131	25
4	266	121	26
5	255	117	26
6	249	106	22
Adult	233	94	14

Models of Eye Movements during Reading

Since studying eye movements has been so important to understanding the process of reading, it is not surprising that there have been many attempts to model eye movements in reading. A thorough review of these models is not in the scope of this chapter (an interested reader should consult Reichle *et al.*, 2003). However, it should be noted that most models of eye movement control in reading can be broken into two general classes. One of these classes views eye movements in reading to be driven basically by low-level oculomotor factors while the other views eye movements as being primarily driven by cognitive factors.

So how do these models differ? There are two decisions that have to be made while reading. One decision is where the reader should fixate next and the other is when they should fixate next (i.e., when they should leave the currently fixated word). Proponents of both types of models agree that the where-decision is driven by low-level factors such as word length information. However, proponents of the oculomotor models believe that the when-decision is also driven by low-level factors, such as whether the fixation landed in a nonoptimal position on the word. On the other hand, proponents of the cognitive models believe that the when-decision is driven by the cognitive processing of the word that is currently being fixated. There is now much research that demonstrates how factors associated with the text being read (such as word familiarity, as mentioned above) significantly affect fixation duration. This lends support to the cognitive models of eye movements in reading.

Conclusions

In this article, we have primarily provided information regarding the importance of studying eye movements in understanding the reading process. By studying eye movements, researchers have demonstrated how important parafoveal information is to the reading process, the amount of information that can be processed at one time in reading, and changes in eye movements during development. Also, there is much evidence that supports the fact that variability in eye fixation in reading is due to the properties of the text that is currently being fixated. By designing clever experiments, eye movement research can elucidate what factors affect word recognition and the processing of sentences, and also how people process and represent information while reading. The knowledge that is gained by these types of experiment is useful in that it (1) provides information on how one of the most complex skills that humans have learned works, and (2) provides practical information on how to more effectively teach reading.

See also: Reading Processes in Children.

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Reading Processes in Children

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When people think about children's reading and reading acquisition, they usually think of learning to read words. However, the real purpose of reading lies in deriving meaning from the text, and this aspect of children's reading is covered later in this article. There is a large body of research into how children acquire reading skills, and this article is necessarily very selective.

The first section outlines the reading-related skills that children acquire early in their reading careers, and considers which, if any, of these skills are prerequisites for the development of reading. The second section gives an account of some important aspects of the development of reading skills, and in the final section comprehension is considered, both its normal development and comprehension difficulties. The majority of the research on children's reading and reading development concerns children's learning to read in an alphabetic orthography, usually English, and that bias is reflected in this article.

The Development of Word Reading

Ways of Reading Words

There are different ways in which words might be deciphered, and some or all of these ways might be used (to a greater or lesser extent) as children learn to read and, indeed, by skilled readers (see Ehri and Snowling, 2004). The first way – to *decode* words to sound by applying knowledge about how written symbols (*graphemes*) map onto spoken units (*phonemes*) – relies on the *alphabetic principle* of written English. Decoding requires that the reader first parse the written word into its constituent graphemes (which do not necessarily correspond to letters). This process is sometimes called segmentation. The phonemes that correspond to the graphemes then need to be allocated, and the resulting string of phonemes *blended* to produce the equivalent spoken word. One problem with decoding is that phonemes are not discrete entities (because of the issue of *coarticulation*), and so getting from a string of phonemes to the spoken word requires a leap of faith, or at least a little flexibility and imagination. Because phonemes cannot be said in isolation, only approximations to the underlying phonemes can be derived. Thus, the phonemes /c/ /a/ /t/ will never produce the word *cat*, however rapidly they are pronounced, without some distortion. Another issue, one that is particularly problematic in English because of its notorious irregularity, is that graphemes do not map onto phonemes in a regular and systematic manner. Nevertheless, English is not so irregular as is sometimes assumed, particularly when higher-order, context-specific rules about pronunciation are taken into account. For instance, the rule about the pronunciation of word-initial c is quite regular and depends on the vowel that follows. So, despite the apparent problems with the use of grapheme-to-phoneme correspondence rules, methods of teaching reading that are based on this principle – so-called *phonics* methods – have consistently been shown to outperform other methods (National Reading Panel, 2000). A more advanced form of decoding, one that blends into the next method of decoding we outline, is to consider larger chunks of words as the unit of analysis. Thus, a more mature reader who has greater orthographic knowledge (knowledge of spelling patterns) will be able to apprehend familiar clusters in words, such as typical verb endings (*-ed*, *-ing*), affixes and highly familiar spelling patterns (e.g., *ight*, *ake*).

The second way to decipher words is by *analogy* with other, already known words. Thus, if a reader knows the words *cake*, *bake*, and *lake*, he or she may well be able to infer the pronunciation of an unknown word, such as *fake*, by analogy between the *rimes* of these words. In single-syllable English words, the pronunciation of rimes is much more regular than that of phonemes, so attention to rime units can help during reading development, though there is considerable debate about the stage at which such units are helpful to children (see, e.g., Ehri and Robbins, 1992; Goswami, 1986).

A third way to decipher words is by *prediction from context*, perhaps with the help of some partial word cues, such as initial letter. Some authors have claimed that use of context is the main way of reading in adults, particularly in irregular orthographies, such as English, and is the way children learn to read (see, e.g., Goodman, 1976). Prediction, however, cannot account for how most words are read, because words cannot be guessed accurately even by skilled readers (for striking examples, see Gough and Wren, 1999). The available evidence suggests that contextual cues are more likely to be used by readers to monitor the process of reading (i.e., to correct errors after words have been 'recognized') than to play a significant role in initial word decoding.

A fourth way to read words (and one that is usually associated with skilled reading rather than developing reading) is to recognize the word 'by sight' or from

memory. This is often referred to as *sight word reading*. When words are very familiar, readers can recognize them at a glance, and the pronunciation and meaning of the word will immediately come to mind. However, as we shall see later, this way of reading does not imply that the word is recognized as an unanalyzed 'visual pattern.'

Stage and Phase Models of the Development of Reading

Various models have attempted to give an account of the stages or phases that children go through as they learn to read. In general, such models propose that the child progresses from reading words as unanalyzed wholes to taking more analytic approaches in which he or she uses grapheme-to-phoneme mappings and orthographic knowledge. For instance, an early model (Frith, 1985) proposed three stages:

1. A *logographic* stage, in which the child recognizes familiar words as visual patterns, using salient visual features. Untaught words cannot be identified but might be guessed from context.
2. An *alphabetic* stage, in which the child learns and uses grapheme-phoneme mappings to decipher unknown words and to read nonwords.
3. An *orthographic* stage, in which the child learns the conventions and higher-order rules of the orthography and identifies words by making use of orthographic units larger than graphemes, without recourse to grapheme-phoneme conversion.

Frith also applied her model to spelling development and to the understanding of dyslexia. She argued that different types of developmental dyslexia can be understood as arising because the children who have particular types of reading disability become 'arrested' at a certain stage of reading development.

More recent models of reading development have suggested that it should be viewed as the progression through overlapping phases, rather than discrete stages, and have also made more explicit the difference between early recognition of words as visual patterns and skilled 'sight word' recognition. Ehri (1999; for a summary, see Ehri and Snowling, 2004) proposed a phase theory to describe the progress of reading development. Ehri preferred the idea of a phase, rather than a stage, in reading development, because she regarded phases as less stringent ways of characterizing periods of development and also because her theory differed from stage theories in that overlap between phases was envisaged, rather than the sequential progression that is intrinsic to stage theories. Ehri distinguished between four phases in learning to read words: (a) a *prealphabetic* phase, (b) a *partial-alphabetic* phase, (c) a *full-alphabetic* phase, and (d) a *consolidated-alphabetic* phase. The prealphabetic phase characterizes the period when children have very little knowledge of the alphabetic system. Thus, they remember words by using salient visual cues, such as remembering the word yellow has 'two sticks in the middle,' or the sign for McDonald's has 'two arches and is red.' This phase is similar to Frith's logographic stage. In the partial-alphabetic phase, as the name suggests, children have some partial knowledge of the alphabetic principle and so will be able to use some of the letters in words – typically first letters – to help themselves remember the identity of those words. Because only partial cues are being used, a child in this stage might think that any short word beginning with the letter d says *dog* and will typically confuse similar words (e.g., *horse* and *house*). In the full-alphabetic phase, the reader will know the major grapheme-phoneme correspondences in the writing system and will also have developed a sufficient level of *phonemic awareness* to segment words into phoneme units (phoneme segmentation). As a result of these skills, the reader will be able to read new words by decoding them and will also have the ability to approximate the spelling of words. An important aspect of this phase is the child's developing ability to read independently – i.e., to translate unfamiliar printed words to their spoken equivalents by phonological recoding (or 'decoding'), rather than having to be told what they are. This important development has been referred to as a self-teaching mechanism (e.g., see Share, 2004). The idea behind this mechanism is that each successful identification of a new word provides the reader with the opportunity to acquire the word-specific orthographic information that is important in visual word recognition. In the consolidated-alphabetic phase, the child will have acquired knowledge of larger units and of context-dependent spelling patterns. In this phase, readers are able to use a variety of different strategies (including developmentally prior ones, such as using grapheme-phoneme correspondence rules) to decipher unfamiliar words. They will, for instance, be able to read words by analogy with other words, will be aware of familiar spelling patterns and their pronunciation (e.g., *wr-, thr-, -ight, -ing*), will know about exception words, such as *island*, *pint*, and *colonel*, and will be aware (at least implicitly) of contextual constraints on pronunciation of graphemes, such as the pronunciation of c depending on the vowel that follows (consider how you would pronounce the nonwords *cibe*, *cort*, *cyne*, and *culf*). In this phase, much of the knowledge is likely to come from experience of reading, rather than through explicit teaching.

In general, these levels are closely linked to age and years of schooling, but in principle they need not be. Children and even adults may fail to progress to the higher phases if they do not develop a good working knowledge of the alphabetic and orthographic principles of their language. More recently, Frith's idea that developmental disorders of reading arise because children get 'arrested' at an earlier stage of development has been shown to be too simplistic. It is more likely that a stage or phase theory will capture the *predominant* difficulties associated with particular types of developmental disorder. Reading disorders are outside the scope of this article, but further discussion of this topic can be found in Ehri and Snowling (2004).

One important thing to note about stage and phase models of reading is that the 'sight word' reading of the skilled reader is a far more sophisticated mechanism than the logographic reading of the beginning reader. The beginning reader will be able to recognize a restricted set of words by using limited cues, whereas the skilled sight word reader will have a wealth of information about a written word coming in simultaneously – information at many levels (graphemes, rimes, analogies, etc.). Neither is it the case that the decoding phase can be skipped. Some have suggested that decoding to sound is simply a distraction for the child and can even be harmful in the development of fluent word recognition. However, from a self-teaching perspective, decoding of words is crucial in order for the child to form well-specified and complete orthographic representations of words.

The way in which children approach initial reading is not likely to be invariant, and may depend crucially on how they are taught, on what skills they have available to them, and on what language they are learning to read in: for instance, children who begin reading with some phonological skills in place may not go through a logographic stage at all (see Stuart and Coltheart, 1988), and children who are learning to read in German (which is more orthographically transparent than English) may proceed more rapidly to the full-alphabetic phase (see, e.g., Wimmer and Hummer, 1990).

Reading Comprehension

The Development of Comprehension Skills

There is relatively little research on the development of children's reading comprehension and currently no developmental model of reading comprehension. In this section, we outline some of the important component skills for comprehension and how they develop (not necessarily in a reading context). A longer review of the development of comprehension and comprehension-related skills can be found in Oakhill and Cain (2003).

It seems reasonable to assume that once children have learned to decode with a reasonable level of efficiency, comprehension will follow automatically, since children learning to read have for some years been understanding the spoken language. In general, reading and listening comprehension are highly correlated, particularly when decoding differences are small (i.e., the correlation tends to increase with age, as children become more proficient decoders). However, Garton and Pratt (1998) have suggested that children's listening comprehension may not always be as good as it seems from their everyday spoken interactions. The context in which spoken language is understood provides many cues to meaning (e.g., facial expression, tone of voice and intonation patterns of the speaker, as well as gestures), and such factors may give the impression that a child's understanding of spoken language is better than it perhaps is.

Although there is usually a strong association between listening comprehension and reading comprehension (at least in older children and adults), this relation might arise because tests of listening comprehension usually involve oral presentations of passages designed for reading. There are reasons that beginner readers in particular might have comprehension problems that are specific to reading. First, written language typically makes use of syntactic constructions and vocabulary that may not be well-known to children from their spoken interactions (see, e.g., Scott, 2004). The 'language of books' is a specific language register with which children may not be familiar – particularly if they have not had many books read to them before and as they begin to read. In addition, written language demands the integration of information across extended tracts of discourse in a manner that spoken language usually does not (and, of course, the text cannot be interrogated in the way that an unclear speaker can). Second, young children may be so engrossed in the word-decoding aspect of reading that they do not have sufficient spare cognitive capacity to carry out comprehension processes. As children get older and their decoding skills improve, they are likely to have more resources to devote to comprehension. Indeed, it has been shown that in the later primary school years, comprehension ability replaces decoding ability as the most important predictor of overall reading level (Curtis, 1980). In the remainder of this section, consideration is given to comprehension processes where there is likely to be some overlap between written and spoken language understanding. It should be borne in mind, however, that some of the processes may be more

difficult to carry out in the case of written text, for the reasons given earlier.

Understanding a text can be viewed as a constructive process that results in a coherent and integrated representation of the state of affairs described: a representation that is often referred to as a *Mental Model* (e.g., Johnson-Laird, 1983) or a *Situation Model* (Kintsch, 1998). In order to construct such a representation, the reader needs to engage in a number of processes; thus, many different skills may contribute to text comprehension. The reader needs to derive and integrate the meanings of the individual words, sentences, and paragraphs. He or she also needs to identify the key ideas in or themes of the text. To understand a story, for instance, the main characters and their motives, and the plot of the story, need to be determined. Inferences must be made to fill in information that is left implicit in the text. In addition, skilled readers reflect on what they are reading – for example, what the main points are and whether or not the readers' emerging model of the text makes sense. By monitoring their comprehension in this way, readers can identify when they need to make an inference to fill in missing details and can take corrective action, such as rereading, when comprehension fails. In efficient text comprehension, many of these processes will be going on in parallel.

We next review work that has explored the development of three skills specifically associated with the construction of the meaning-based representation of a text – namely, inference making, metacognition and comprehension monitoring, and understanding text structure. One factor that we will consider in relation to the development of these three reading-related skills is working-memory capacity. Working memory refers to the system used to store and manipulate information simultaneously (Baddeley, 1986). Children's working-memory capacity increases with age, together with gains in text comprehension (for a review, see Cain, 2005). The cognitive resources available to readers will affect how well they can engage in the processes needed to set up and develop their representation of a text's meaning. Thus, working-memory capacity may be a limiting factor in the development of good text comprehension.

Inference Making The construction of a meaning-based representation of a text involves going beyond the literal content of the text through the generation of inferences to make links and to fill in missing details. Inference has many roles in comprehension: it can be used to establish referential coherence, causal antecedents to events, and characters' emotional reactions (see, e.g., Graesser *et al.*, 1994). In general, inferences can be distinguished into two main types: coherence and elaborative. Coherence inferences are necessary, in that they require that information explicitly provided in the text be integrated and/or that information from general knowledge be incorporated with information in the text itself, to establish local cohesion between adjacent clauses or to establish global coherence between different events, actions, and states in a text. Elaborative inferences embellish information in the text, but they are not strictly necessary to understanding. In effective and efficient comprehension, the emerging mental model of the text will be used to indicate where such gaps in comprehension occur and act as a signal to the reader that an inference is needed.

Developmental studies show that young children are able to make the same inferences as older ones. They are also sensitive to the necessity of the inference; for example, they do not make unlimited numbers of elaborative inferences, and they make a greater number of necessary inferences than purely elaborative ones. However, younger children do not make as many relevant inferences as older children.

Several factors may limit younger children's ability to generate inferences. Many inferences rely on knowledge of the world, and there is a good deal of evidence that prior knowledge influences both comprehension and memory for text in children. One possibility is that young children fail to generate inferences because they lack the relevant knowledge. In one study, however, it was shown that between 6 and 15 years of age, the ability to make inferences developed *independently* of the influence of knowledge (Barnes *et al.*, 1996). Thus, young children's difficulties with inference making cannot be attributed solely to general knowledge deficits. Strategic reading behavior may also play a role in the generation of inferences. Young children may lack the knowledge about how and when to make inferences. Indeed, children can be trained to use cues and to generate questions that promote the production of crucial inferences, which, in turn, facilitates their comprehension of the text. A third possibility is that young children's inference-making skills are limited by their developing working-memory capacity. The available processing capacity of this memory system will limit the ability to integrate information within the text and to incorporate general knowledge to fill out implicit details.

An important issue is whether inferences are generated as the text is read or later, perhaps when prompted by a question. Most research on children's inference making has assessed their ability by use of memory measures, such as question-answering or recognition tests. As a result, we know little about which inferences children make on-line – *as they are*

reading – and how age and reading ability might affect this process. The available data suggest that by the age of 9 years, children slow down while reading key sentences that require an inference to be made – an indication that they are engaging in inferential processing during reading.

Metacognition Metacognition about reading concerns knowledge about the purpose, goals, and processes of reading and the regulation of reading. An overview of different types of metacognitive skills, and their relation to reading ability, can be found in Westby (2004).

Knowledge about reading. A popular way to assess children's knowledge about reading is simply to ask them questions, sometimes by describing hypothetical situations that they may have experienced and asking them what they would do. When interviewed, young children often demonstrate a lack of awareness that they need to make sense of the text and are more likely to report that reading is about 'getting the words right.' It is not surprising that beginner readers place a greater emphasis on word-reading accuracy than comprehension, because to them the former is likely to be the more salient and/or emphasized feature of reading. Thus, young children's reading ability might be limited in part because their view of the purpose of reading is different from that of older children.

Comprehension monitoring. Comprehension monitoring concerns the understanding of connected prose. It is usually assessed by a reader's ability to detect inconsistencies in text, such as made-up words, scrambled sentences, contradictory sentences, or statements that conflict with external information (world knowledge). These error-detection tasks require readers to evaluate their understanding of the text. Although there is a general tendency for comprehension monitoring to improve with age, the extent to which it is demonstrated can be affected quite dramatically by aspects of the task.

Younger children are often unable to detect that crucial information is missing from a text and do not seem to realize when a text does not make sense. However, they are able to detect some errors. For example, young children are better at detecting lexical inconsistencies – made-up words – than internal inconsistencies, where two pieces of information in the text contradict each other. The instructions given to the child can also influence performance. Children are more likely to report problems when they are forewarned of them or if the task is given gamelike qualities (that is, the children are asked to pretend they are editors or detectives). They are also more likely to report a lack of understanding when the criteria are made explicit, for instance when they are required to assess whether or not instructions work compared with when they have to select their own criteria, as is the case when they are looking for inconsistencies in text. Thus, the standards used by children to detect errors improve with age.

Age-related improvements on error-detection tasks may also be related to children's developing information-processing capabilities. Their monitoring difficulties are more pronounced when the anomalous pieces of information are nonadjacent and have to be integrated across several lines of text; this indicates that working-memory capacity may play a role. In addition, effective comprehension monitoring cannot take place unless the reader has acquired the ability to integrate propositions to construct a coherent representation of a text. Thus, successful comprehension monitoring may be linked to good inference-making skills and vice versa.

Self-regulation of reading. A skilled reader needs knowledge about reading strategies: how to read for different goals and purposes. In contrast to young children, older readers appreciate that someone might read a story differently if their goal is to remember the story word for word than if the goal is to remember its meaning. Readers also need to possess the appropriate strategic knowledge so that they can take corrective action when failures in comprehension are detected. Knowledge about effective repair strategies improves with age. Thus, young children's reading ability might be limited by their restricted knowledge about the goals and purposes of reading and about specific reading strategies.

Understanding Text Structure A central element in comprehension is understanding how the ideas in a text are related to produce an interpretation of the text as whole. Explicit awareness about text structure and the expectations engendered by certain common features of text may be useful aids for readers, helping them to invoke relevant background information and schemas to facilitate the integration of the different ideas in a text. This integration will depend on many skills and abilities, such as inference making, but an important one is the ability to appreciate which are the main ideas in a text (what it is about) and to understand how it is structured. The majority of research with developing readers has focused on understanding of narrative structure, because this is the form of text that young readers are most familiar with.

The ability to identify the main ideas in a text has been described as the "essence of reading comprehension." Young readers have difficulties in recognizing the central theme or main ideas, and even 12- and

13-year-olds sometimes find it hard to discriminate between relevant and irrelevant detail in a text. As children develop, not only do they get better at selecting the main point in a story; they also change their minds about what sort of information is most important. In addition, they expect certain types of information to occur in stories, and they add important details when retelling stories that were missing key elements, so that the retold story conforms to the story as they expected it to be. Similarly, if a story is told with the events out of order, children often restore it to a more normal order when they retell it.

One way to assess children's understanding of narrative structure is to get them to tell stories themselves. Children's narratives become more coherent with age, and there are age differences in the type of structural framework used to place events within a narrative. Preschoolers tend to tell character or temporally bound narratives, but by 8–10 years of age, children produce more sophisticated event sequences that are causally related and integrated (for a review of children's developing sensitivity to logical structure and knowledge of what makes a good story, see Baker and Stein, 1981).

Knowledge about the information provided by structural elements of stories, such as titles and the beginnings and endings of stories, develops throughout middle childhood. Story comprehension could be impaired by a child's not knowing how to use this information. Titles and introductory information act as context setters, guiding the reader or listener to slot events into structures and schema representations. Additionally, knowledge about the purpose of endings may be important, because endings often summarize the main points of the story and relate the events together.

Some of the storytelling difficulties experienced by young children may be attributable to problems with planning their narratives, perhaps because of memory limitations, rather than a lack of knowledge about narrative structure. When narrative production is supported by a sequence of pictures, many preschoolers are able to construct stories containing episodes that are causally related. It is also probable that some of the developmental gains in knowledge about story conventions and structural coherence are facilitated by literacy experience. Children with several years' experience of reading and listening to stories simply have had more exposure to story conventions and well-formed stories than preschoolers. It is also likely that as children acquire knowledge and use goal plans to interpret everyday events, they become more adept at constructing coherent, integrated representations of such events (whether they be actual or fictional).

Reasons for Comprehension Failure

We now consider the nature and the source of difficulties experienced by children with specific reading comprehension difficulties – i.e., children who have developed age-appropriate word-reading skills but whose reading comprehension skills lag behind. Studies of such children have consistently found that about 8–10% of children in mainstream education can be classified as having such problems (Yuill and Oakhill, 1991), similar to the proportion of children having problems with word reading (Snowling, 2000) (though, of course, the proportion will vary according to the precise definition of what constitutes a sufficient lag in comprehension). There are probably as many sources of reading comprehension difficulties as there are contributory skills. Here we review the evidence that reading comprehension difficulties arise because of deficits in three broad areas: the word level, sentence level, and text level (for a review of this area, see Cain and Oakhill, 2003).

The first view considered is that text comprehension problems arise because of difficulties at the word level. Slow or inaccurate word reading may affect comprehension because it uses up limited processing capacity that is necessary for text comprehension processes such as inference and integration (Perfetti, 1985). However, there is no evidence to date that children who have developed accurate word-reading skills have subtle deficits in their word-reading speed or the automaticity of their word recognition. Similarly, examination of the phonological processing skills of poor comprehenders have not revealed any weaknesses (see, e.g., Cain *et al.*, 2000).

Another word-level skill that may affect text comprehension is vocabulary knowledge. It is one of the best predictors of reading comprehension, and a tempting interpretation of the high correlations is that having a poor vocabulary limits reading comprehension. Some poor readers (those who have both weak word reading and comprehension) have impoverished vocabulary knowledge. However, it is possible to identify children with age-appropriate vocabulary and word-reading skills who experience a severe comprehension deficit. Furthermore, procedures for increasing vocabulary knowledge do not always lead to gains in comprehension level, and simply knowing the meanings of the words in a text does not ensure good comprehension. Thus, a complex relation between vocabulary and comprehension is apparent. One possibility is that reading comprehension and vocabulary may be related indirectly by a third factor, such as the ability to learn from context. A deficit in learning from context may not only impede vocabulary development but also affect the ability to use context to generate inferences and thus lead to comprehension difficulties.

A second view is that comprehension problems arise at the sentence level of processing. Knowledge about syntactic forms is necessary to work out the meanings of sentences in a text, so it is not surprising that early syntactic skills predict later reading ability. There is also evidence that children who start out as good readers might demonstrate reading comprehension difficulties later on, when their word-reading skills enable them to read books that contain increasingly complex sentence structures. However, not all poor comprehenders demonstrate deficits in syntactic knowledge. Clearly, (implicit) knowledge about syntactic forms is necessary to comprehend particular grammatical constructions and, thus, might be expected to be related to comprehension level. Syntactic skills may help children to detect and correct reading errors and, thus, enhance comprehension monitoring (the topic of comprehension monitoring is considered later in this section). However, there are a number of issues of interpretation relating to the research in this area: for instance, the extent to which associations between grammatical awareness and reading are mediated by differences in working memory and decoding, and the direction of the relation between syntactic skills and reading comprehension development (for a further discussion, see Bowey, 1994).

A third view is that poor comprehenders' problems arise because of difficulties beyond the word level and the sentence level, that is, at the discourse level of processing text. Many studies indicate that good and poor comprehenders matched for their word-recognition skills differ in the three components of comprehension related to comprehension development – namely, inference making, metacognition and comprehension monitoring, and understanding text structure. Poor comprehenders generate fewer inferences than good comprehenders, and their difficulties cannot be attributed to differences in general knowledge. Poor comprehenders also are poor at monitoring their understanding of text, demonstrate impoverished knowledge about reading strategies, and exhibit difficulties in the production of coherent and integrated narratives. It is possible that processing deficits limit their ability to execute the skills central to meaning construction. Indeed, poor comprehenders do poorly on measures of working-memory capacity. However, when differences in working-memory capacity are controlled for, skills such as inference making and comprehension monitoring explain comprehension level over and above memory. Thus, a working-memory deficit does not appear to fully explain poor comprehenders' difficulties with the discourse-level skills that enable skilled readers to construct coherent, meaning-based representations of text.

To date, much of the research on poor reading comprehension has used a crosssectional design: good and poor comprehenders, usually matched for chronological age, word-reading ability, and vocabulary knowledge, are compared on the measure of interest. These studies tell us about the things that poor comprehenders have difficulties with, but they do not tell us anything about the *causes* of poor comprehension; they can inform us only about correlations between skill deficits and text comprehension difficulties. For example, children may fail to adequately understand text because they are poor at making inferences. Alternatively, they may be poor at generating inferences because their poor reading comprehension experience has presented few opportunities to develop this skill. Recent investigations have begun to address the issue of causality by using comprehension-age match designs (which are analogous to reading-age match designs), training studies, and longitudinal work, wherein the progress of the children is followed over a number of years (for examples, see Cain and Oakhill, 2003). These research designs enable us to draw some conclusions about the most plausible direction of the relations between component skills and reading comprehension.

See also: Coherence: Psycholinguistic Approach; Discourse Processing; Phonological Awareness and Literacy; Reading Processes in Adults.

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Realism and Antirealism

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Realism and antirealism in semantics can take a variety of forms, which are catalogued at the conclusion of this article. First, since realism looks like a metaphysical doctrine, it is necessary to set out how it relates to semantics. Some have claimed that since realism and antirealism concern metaphysics, they have little to do with semantics, truth, meaning, or reference. Michael Devitt and Kim Sterelny argue that realism has two components: it is a doctrine about what exists and a doctrine about the nature of that existence. The realist about commonsense physical objects claims that they exist and that the nature of their existence is to exist independently of the mind. Devitt and Sterelny contrasted this realism with idealism: the view that while ordinary physical objects exist, their nature is to exist 'in the mind' in such a way that their existence is mind dependent (1999: 234–235). These doctrines, Devitt and

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Sterelny argued, have nothing to do with semantics, for they can be stated without reference to semantic vocabulary such as 'meaning' or 'truth' (1999: 239). They position themselves as opposed to Michael Dummett, who has argued that the most illuminating way is to see them as implicitly hinging on differences in the theory of meaning (Dummett, 1978, 1991, 1992, 1993).

Realism does have two components, an existence component and one concerning the nature of that existence. Given this, antirealism, with regard to some range of entities, also has two forms. One denies existence. This is the antirealism of the atheist. The other denies mind independence, resulting in idealism and constructivism. In both cases, Dummett's contention, that the debate about what exists can be illuminated by seeing it as concerned with meaning and truth, appears correct. The traditional debate between idealists and realists arose from the skeptical questions posed by René Descartes in his *Meditations*. There Descartes wondered whether we know anything. Since in order to have knowledge one must have true beliefs, we could say that he wondered whether any of his beliefs were true. Descartes assumed that if his beliefs were true, they were made true by a reality that existed independently of him. Yet since he had access to that reality only through his 'ideas,' the question arose as to whether those ideas corresponded to anything, or were, like dreams, mere illusions. The idealists solved Descartes' radical skeptical problem by rejecting the gap between ideas and reality. The existence of the ideas themselves was taken to make our beliefs true. Formulated thus, the traditional distinction between realism and idealism can be seen to hinge on a dispute over what makes our beliefs true. Since it is all one whether we pose the skeptical problem directly for beliefs or think of it in terms of the sentences that express those beliefs, the metaphysical problem lends itself to a semantic formulation (Dummett, 1992: 132–134).

In his early writing, Dummett thought that the way to tackle the issue that divided realists from antirealists was to tackle the notion of truth directly, for he accepted, with Ludwig Wittgenstein, that the sentence is the smallest unit with which one can make a move in the language game and that therefore the notion of truth for sentences was primary (Dummett, 1973: 192–196). Looked at from the point of view of truth for sentences, the realist/antirealist debate hinges on whether truth is independent of us or is simply ideal warranted assertibility. A realist will say that truth is objective and independent of anything we do, but the price to pay for this is that there is no compelling reply to the skeptic. Also, if truth has nothing to do with our holding sentences true, it can play no role in an account of the meaning of those sentences and is in danger of becoming an ungraspable we know not what. If, however, we want an account of truth that is central in a theory of meaning – which is a theory of what we know when we understand sentences – truth should be something we can grasp. Hence, Dummett analyzed truth in terms of warranted assertibility. As a result the principle of bivalence, which says that every meaningful assertoric sentence is either true or false, is given up. For there are sentences that are not justifiably assertible, yet it is not the case that we can confidently say that they are false, that is, that they will never be assertible. When the argument for antirealism directly concerns the notion of truth for sentences, it leads to questioning bivalence and the adoption of intuitionistic logic. But there are other arguments for antirealism that have a different character.

One variety of antirealism points to various speech acts that we can perform other than making truth-assessable statements. It claims that some sentences with which speakers appear to be making statements are not really descriptive utterances. So the possibility of a realist account of the truth of sentences for some area of discourse is excluded, because the discourse is not fact stating. The position of the expressivist in ethics, adopted by A. J. Ayer, is the paradigm of this form of antirealism (Ayer, 1946: 107). Like error theorists, who are discussed later in this article, expressivists suggest that we are in error about the actual semantics of our utterances. For them the realist's error lies in thinking that sentences of the disputed class describe facts.

Yet another issue divides realists about universals from nominalists. Like the realist about the physical world, the realist about universals at first appears to be making a metaphysical claim. It is that universals, as well as particulars, exist independently of us. As with realism about material objects, this claim can be seen to hinge on issues concerning that in virtue of which sentences are true. In order for the sentence 'The rose is red' to be true, one needs more than the mere existence of the particular rose being referred to. One needs it to be the case that the rose is red. If one understands this in terms of the rose instantiating the property of redness, one may be led to postulate the existence of universals, which are what general terms such as 'red' pick out. The nominalist, however, denies that one needs to explain the function of both singular and general terms by assigning a reference to them. According to Quine, for instance, singular terms refer, but predicates express their meanings; it is merely grammatical confusion that leads us to represent predication as a relation between two entities (Quine, 1970: 66–67).

The dispute over the existence of universals shows that not all forms of the realism/antirealism debate directly concern the notion of truth. What is at issue is often a question of the reference, or otherwise, of the subsentential parts of sentences. But these analyses flow naturally from questioning the nature of truth. Aristotle thought that both singular terms and general terms function by referring to, or picking out entities. Singular terms refer to objects; general terms refer to universals. On this model, a simple subject-predicate sentence is a string of names that is true just in case the object referred to by the singular term instantiates the universal referred to by the general term (Aristotle, 1984: 25–27). Bertrand Russell, puzzled by the meaningfulness of singular terms that fail of reference, proposed that in the vast majority of cases we can analyze names and definite descriptions, which appear to refer to objects, as really only involving descriptive phrases and quantifiers. 'The rose on my table is red' is then true just in case there is a unique thing that has the property of being a rose on my table as well as the property of being red (Russell, 1956). Dummett suggested that this is a move in the direction of antirealism (Dummett, 1991: 325). It is a semantic analysis that allows for the reduction of objects to bundles of properties.

Russell's analysis of singular terms can be used to illustrate the way in which antirealism often takes a reductionist form. In 1904 Alexius Meinong proposed that 'The golden mountain is golden' is true in virtue of the subsistence of a nonexistent golden mountain to which the singular term 'the golden mountain' refers. Russell, objecting to a category of nonexistent existents, proposed that we reformulate the true sentence as saying that if anything is a golden mountain, it is golden. Russell was by no means an idealist, but in denying the existence of a referent of 'the golden mountain,' he went against the first component of a realist attitude to golden mountains. Similarly, the physicalist, being an antirealist about thoughts, will have to explain away the apparent truth of sentences such as 'The terrifying thought stopped him in his tracks.' A radical antirealist of the eliminativist slant might deem this sentence literally false. Alternatively, it could be treated as neither true nor false, because it is ill formed. But a reductionist antirealist with regard to thoughts will offer a paraphrase. This might take the form 'Neurons playing the functional role of a warning of danger fired and stopped him in his tracks.' Here the truth of the sentence involving an apparently nonreferring term is accounted for by offering a translation from which it is absent.

Both deeming some sentences neither true nor false because of failures of reference, and offering reductionist paraphrases, constitute forms of antirealism of the broadly error-theoretic type. Error theory received its classic formulation in the work of Mackie (1977). The error theorist usually accepts that there is some range of sentences, typically sentences about physical things, for which the realist semantics holds. But the error theorist argues that we are led into error when we assume that the sentences of some other class share the same semantic structure. Mackie argued this for ethical statements. We are inclined to think of the semantic structure of the sentence 'Charity is good' as analogous to 'Christ is good.' If we accept the Aristotelian semantics sketched earlier in this article, this will involve thinking of charity as a kind of abstract object that instantiates the universal goodness. But these are queer kinds of entity. It is unclear how we have epistemological access to them, and it is arguable that we have been led to postulate their existence by an erroneous extension of the semantics of statements about physical objects. Adopting a version of this approach, Hartry Field argued, against the mathematical Platonist, that statements of mathematics that appear to involve truth grounded in reference to numbers really do no such thing and should not be deemed either true or false (Field, 1980: viii). When a person is persuaded on error-theoretic grounds that a realist semantics for some class of sentences is mistaken, but nevertheless wants to save the appearance of truth and falsehood for sentences of this class, he or she is characteristically forced to offer a reductionist account.

We can now construct a brief catalogue of forms of realism and antirealism. Global realism would treat all sentences realistically, and an ultra-global realist would accept not just classical logic but also the Aristotelian semantics according to which all singular terms refer to objects, while general terms refer to universals. Almost no philosopher is a global realist, and global antirealism is equally rare. Disputes arise in many areas. Platonists in mathematics oppose error theorists and constructivists; realists about mental entities oppose eliminativists and various forms of reductionist; realists about theoretical entities oppose instrumentalists; realists about commonsense material objects oppose phenomenalists and idealists; realists about possible worlds oppose ersatz theorists; realists in ethics oppose subjectivists, expressivists, and error theorists; realists about the past oppose presentists; and realists about the future oppose antirealists, for whom the future does not exist. Reductionist antirealism cannot be global, since it always involves a class of sentences interpreted realistically that provides a reduction class. Yet not all antirealism is reductionist. In the case of antirealism about the

future, there is a direct intuition that future-tense sentences are not now either true or false. Antirealists may deem some class of sentences to be nondescriptive, or descriptive but not involving a realist notion of truth. Among those who accept realist truth, there are those who analyze truth in terms of the existence of objects and universals, and others who take an antirealist attitude toward either objects or universals.

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Empty Names; Nominalism; Objectivity in Moral Discourse; Reference: Philosophical Theories; Semantic Value; Verificationism.

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Reconstruction, Cultural

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One of the main tasks of historical and comparative linguistics is reconstruction – the recreation, to the best of our abilities, of a linguistic situation at some point in the past. Using broad knowledge of tendencies in language change and employing above all the justly famous and powerful technique known as the Comparative Method (the classic account remains Meillet, 1925), scholars are able to explain with some precision the closely linked matters of linguistic evolution and relationship, specifically how a given language has evolved from its linear predecessor and how the language in question is related to other tongues that are not part of the same line but whose own histories show that they once intersected with it. Most work concentrates on phonology and morphology since sounds and smaller combinations of sounds are in a certain obvious sense the easiest units of language to deal with; the reconstruction of syntax is, however, playing an increasingly large role in linguistic research.

But it is important not to forget semantics and pragmatics: since speech exists in the first place for communication, coming to terms with the meaning of the reconstructed morphemes and words is an evident desideratum. While this may sound straightforward, interpreting the lexical evidence that emerges from historical and comparative linguists' occupation with formal matters of phonology and morphology is often not at all easy: semantic change is very much a matter of (human) tendencies rather than (scientific) rules (see, e.g., Fortson, 2003), relying on cultural situations and norms that may be hard for outsiders to fathom, especially outsiders who are looking back on a bygone civilization. It is true that even some phonological changes can seem non-evident unless taken apart and examined very closely, but in historical semantics, the 'surprise factor' is always there. Without an understanding of culture-specific religious and legal rituals, for example, it is not possible to explain why there should be a morpho-phonological relationship between the English words *blood* and *bless* (the verb originally meant 'consecrate with blood') or exactly how the Latin word *testis* (← **trit(j)o-sth$_2$-o-*, literally 'standing as third') could have come to mean in the first place 'witness' and then also 'testicle' (see Katz, 1998).

Whatever one may think of the Sapir-Whorf hypothesis, there is clearly some sort of relationship between worldview and linguistic expression, and the goal of cultural reconstruction (sometimes known as

future, there is a direct intuition that future-tense sentences are not now either true or false. Antirealists may deem some class of sentences to be nondescriptive, or descriptive but not involving a realist notion of truth. Among those who accept realist truth, there are those who analyze truth in terms of the existence of objects and universals, and others who take an antirealist attitude toward either objects or universals.

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Empty Names; Nominalism; Objectivity in Moral Discourse; Reference: Philosophical Theories; Semantic Value; Verificationism.

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Reconstruction, Cultural

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One of the main tasks of historical and comparative linguistics is reconstruction – the recreation, to the best of our abilities, of a linguistic situation at some point in the past. Using broad knowledge of tendencies in language change and employing above all the justly famous and powerful technique known as the Comparative Method (the classic account remains Meillet, 1925), scholars are able to explain with some precision the closely linked matters of linguistic evolution and relationship, specifically how a given language has evolved from its linear predecessor and how the language in question is related to other tongues that are not part of the same line but whose own histories show that they once intersected with it. Most work concentrates on phonology and morphology since sounds and smaller combinations of sounds are in a certain obvious sense the easiest units of language to deal with; the reconstruction of syntax is, however, playing an increasingly large role in linguistic research.

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Whatever one may think of the Sapir-Whorf hypothesis, there is clearly some sort of relationship between worldview and linguistic expression, and the goal of cultural reconstruction (sometimes known as

linguistic paleontology) is to use language and etymology to gain access to the way people talked about their environment. Forms in related languages may lead scholars to reconstruct proto-words for 'fish' and 'loom', but it requires more than a reckoning of sounds and morphemes to determine with any degree of plausibility just what species of fish speakers were referring to or exactly what kind of instrument they actually used for weaving. There is of course an important difference between fish and looms, namely that the one is natural, the other man-made. When scholars speak of cultural reconstruction, they frequently mean to encompass both. Perhaps largely because of the inordinately great role that the evidence of words for kinds of fish and trees – especially the salmon (Diebold, 1985 gives a salutary account) and the beech (see, e.g., Friedrich, 1970: 106–115) – has played in scholars' highly controversial attempts to specify the homeland ('Urheimat') and early migrations of the Indo-Europeans (see, e.g., Mallory, 1989), the reconstructed vocabulary of the natural world has historically figured more prominently than words for items of material and intellectual culture. My emphasis in what follows is on the latter, as well as (in part on account of my own limited competence) on Indo-European peoples. (Most textbooks on historical and comparative linguistics rely heavily on Indo-European evidence, but two good ones that do not and that do discuss cultural reconstruction are Crowley, 1997, whose examples come mostly from Australia and the Pacific, and Campbell, 2004, who stresses the languages of the Americas.)

In the earliest days of scientific linguistics, the relationship between proto-language and proto-culture was taken for granted (Jacob Grimm, for example, was interested as much in what it meant to *be* German as in what it meant to *speak* it), but the rise of Neogrammarianism in the late 19th century led to a heavy emphasis – still not overcome – on formal methodology and the view that the concomitant investigation of cultural questions (the so-called 'Wörter und Sachen'-approach, championed most of all at that time by Otto Schrader: see especially Schrader, 1907 and 1917–1929) was at best the poor stepsister. (It is telling that there is no chapter on cultural reconstruction in the latest compendium of research on historical linguistics, Joseph and Janda, 2003.) The situation is slowly changing, though the adherence of certain scholars to repugnant ideological (racist or nationalistic) interpretations of linguistic data has not helped raise the status of reconstructive work in academia (see, e.g., Lincoln, 1999). As for the relative status of linguistic techniques vis-à-vis others in the reconstruction of prehistory (Day, 2001 provides a fine synthesis), it remains to be seen what will come of the widely publicized and aggressive battles between linguists and archaeologists (Blench and Spriggs, 1997–1999 is a very useful collection, especially in this context volume 2 [1998], subtitled *Correlating archaeological and linguistic hypotheses*) and now also geneticists and evolutionary biologists (see, e.g., Gray and Atkinson, 2003, whose time-scale nearly all linguists consider impossible).

Cultural reconstruction is above all part of the history of ideas, a way into the metaphors people live and lived by: that we *surf the web*, for example, and that the Navajo call corn *naadą́ą́'*, literally 'enemy-food', because they learned of it from the Pueblo and that early Indo-Europeans personified evening as 'the shrouded one' because in their mythology, the sky got dressed at the end of the day (see Janda, 2000: 200–211 and Katz, 2000). Coming to grips with the nuances of words is often essential for determining the pragmatic fulcrum of semantic change and, more generally, provides a good window onto a culture's organization and values: what it does with the natural materials found in the environment; how it functions sociopolitically and economically at both the micro (family) and the macro level (society as a whole); what its legal and religious systems are; and how it expresses itself artistically. (The most remarkable works that cover all these topics are Benveniste, 1969 and the papers collected in Watkins, 1994: volume 2; see also Buck, 1949, Gamkrelidze and Ivanov, 1984: volume 2, and Mallory and Adams, 1997 [plus Zimmer, 1999], as well as the good summary accounts in Watkins, 2000: vii–xxxv and *passim* and Fortson, 2004: 16–47.) Let us briefly consider each of these areas in turn.

It is largely uncontroversial that the Proto-Indo-Europeans were an agricultural people who plowed (*h_2erh_3-: Latin *arāre*, whence English *arable*) their fields (*$h_2e\hat{g}$-*ro*-: Latin *ager*, as well as English *acre*; a derivative of the root *$h_2e\hat{g}$- 'drive'), cultivated grains (probably at least wheat or barley, though precise linguistic reconstructions are difficult), bred cattle (*g^w*ow*-: Latin *bōs* and English *cow*) and other livestock (*$pe\hat{k}u$-: Latin *pecū* and, interestingly, English *fee* [< Old English *feoh*, in effect 'valuable four-legged property']), made ample use of dairy products (a variety of words can be reconstructed more or less precisely, including the predecessor(s) of Latin *lac* and English *milk*), and spun (*(s)*neh*$_1$-: Latin *nēre*; cf. also English *needle*) wool (*$h_{2/3}w\underset{\circ}{l}h_1$-*neh*$_2$-). Questions about the use of native animals, vegetables, and minerals that generate somewhat more excitement concern two related matters: the domestication of the horse and the invention of the wheel and evolution of the chariot. The distribution of the preform *k^we-$k^wl(h_1)$-*o*-across the Indo-European languages

(e.g., English *wheel* and Tocharian B *kokale* 'chariot'), coupled with some archaic features that appear to be part of the paradigm's accentual pattern, makes it virtually certain on linguistic grounds that the Proto-Indo-Europeans had at least this one word for 'wheel', a derivative of the root *$k^w el(h_1)$- 'turn' (a second widespread word is based on the root *ret-'run'). This is interesting for a number of reasons, not least because the description of the Proto-Indo-Europeans' world sketched in the first sentence of this paragraph suggests a late Neolithic society of the 4th millennium B.C., which is precisely when we find the first archaeological evidence for wheels (ca. 3300 B.C.), an invention that would, not very surprisingly, have been referred to in the first instance with a wholly transparent neologism (see Fortson, 2004: 38). The place and date of the domestication (*$demh_2$-: Latin *domāre* and English *tame*) of the horse (*$h_1e\hat{k}wo$-: Latin *equus*, whence English *equine*) is more controversial still, and it must suffice here to state that there is possible evidence for tamed horses in Eurasia around 3500 B.C.

Indo-European society was certainly patriarchal and patrilineal (its kinship system is generally thought to have originally been more or less of the Omaha type, but see Hettrich, 1985 for an interesting dissent); accordingly, we know more about men's exploits than women's, though E J W Barber (see, e.g., Barber, 1991) has deftly reconstructed the linguistic and material world of 'women's work', the production of textiles. The self-designation of the Proto-Indo-Europeans is unfortunately not wholly clear and neither are the oldest words for 'clan', though it is good to remember that civilizations the world over frequently call themselves simply 'The People' (e.g., Navajo *Diné*), which is roughly the meaning of the reasonably widespread preform *$teuteh_2$- of, for example, *Dutch* and *Deutsch* (the German word for 'German'). The leader of the tribe was the *$h_3rē\hat{g}$- 'king' (built to the root *$h_3re\hat{g}$- 'straighten; rule'), a word preserved in Latin *rēx* and found in such Germanic names as *Richard* (< Old High German *Rīco-hard* 'strong in rule'), not to mention *Theodoric* and *Dietrich*, which, indeed, both go back precisely to a compound of *$teuteh_2$- plus *$h_3rē\hat{g}$-, 'people's king'. An issue that has exercised scholars for the past couple of generations is the utility of Georges Dumézil's 'trifunctionalism' as a model of Proto-Indo-European society. According to Dumézil (see, e.g., Dumézil, 1958), free males belonged to one of three classes: kings and priests (first function), warriors (second), and farmers and other commoners (third). The linguistic and philological evidence for this – and for its wider application to divinities – remains disputed.

Because legal and religious texts tend cross-culturally to be repositories of linguistic archaism, it is *a priori* likely that investigating the language of a number of such documents will tell us a great deal about the proto-culture in question. The vocabulary of Indo-European law ('that which is laid down' < *legh- 'lie, lay', a root that some believe also lies behind Latin *lēx*) has not yet received as much attention as it deserves, but it seems likely that the principal words for 'law' were *jows (cf. Lat. *iūs* and the compound *iū-dex* 'judge', literally 'law-pronouncer') and one or more derivatives of the root *d^heh_1- 'put', as in Classical Greek *$t^hémis$*, Vedic Sanskrit *dhā́ma-*, and English *deed* and *doom* (which originally meant 'judgment', witness *doomsday*). It is noteworthy (see Watkins, 1995: 434, with n. 5) that the very first attested Indo-European word that has come down to us is a 19th-century B.C. borrowing into Old Assyrian of (pre-)Hittite *išḫiul* 'contract' (a derivative of the verb for 'bind'). Recent work on Greek and Indic marriage by Stephanie W Jamison (see, e.g., Jamison, 1999) has added considerably to our understanding of Indo-European legal rights and responsibilities, including – remarkably – those of women. As for religion (Latin *religiō* is probably etymologically 'that which binds (-*lig*-)', a derivative of *$lei\hat{g}$-), the Proto-Indo-Europeans were polytheistic, with the head, or 'father' (*ph_2ter-), of the gods – addressed in the vocative as Vedic Sanskrit *dyàuṣ pítar*, Greek *Zeû páter*, and Latin *Iū-piter* (i.e., Jupiter) – the deification of the bright sky, *djew-. It is worth noting that the Latin word *deus* (as in '*dei*-fication') is a derivative of this same root, whereas Greek *$t^heós$* (as in 'poly-*the*-istic'), like also Latin *fēstus* (whence our word *festival*), goes back to *d^heh_1s-, which may well be an extension of the root for 'put' noted above. The English word *god*, incidentally, probably derives from *$\hat{g}^hew$- 'pour' and refers to the spirit immanent in a tumulus, perhaps a *kurgan*, the Eurasian burial mound that some archeologists, notably Marija Gimbutas, associate with the Proto-Indo-Europeans (see Watkins, 2000: 31, resuming an argument made in 1974; Kupfer, 2004 presents a different and to my mind less convincing picture of the details). Our knowledge of Proto-Indo-European religious culture has recently been greatly expanded in two surpassingly brilliant books by Michael Janda (Janda, 2000, 2005).

Finally, there is verbal art, a cover term that subsumes a range of genres in which stunning archaisms and delightful new turns of phrase are woven together in a special way. In Proto-Indo-European society, the poet (for whom there is no single reconstructible designation) was one of the most highly regarded figures, and thanks to two profoundly influential

works, Schmitt, 1967 and Watkins, 1995, and the further research they have inspired (e.g., Matasović, 1996), the nuances of what is usually called 'Dichtersprache' are becoming ever more apparent. It is clear that at least some metrical and strophic forms found in the individual daughter languages go back to Proto-Indo-European times and that certain artful techniques were part of the repertoire of bards who told tales, which then became the myths of the separate Indo-European peoples (see, e.g., Puhvel, 1987) – of the beginning of the world and of glory in battle and of fights against monsters. For comments on the advances in and pitfalls of attempting to reconstruct the details of the genre of epic in Proto-Indo-European, see Katz, 2005; the inherited tradition of riddles is the subject of Katz, forthcoming.

Cultural reconstruction in effect puts history back into historical linguistics, and this is a difficult business, for it involves expanding formal linguistic methods into the larger and messier world of realia, of real life as it is and was once lived. Still, once we acknowledge the simple truth that real human beings spoke the languages that we are doing our best to reconstruct, it becomes part of our job as linguists to take account of, and reconstruct as best as we can, the circumstances in which these languages were used and under which they developed.

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Reconstruction, Morphological

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Introduction

The reconstruction of the morphology of a protolanguage is beset with certain difficulties that do not attend the reconstruction of phonology. Peeling back the layers of historical change and undoing them – the essence of reconstruction – is in principle easy when the changes are regular and exceptionless, as is the case with sound change (at least under the Neogrammarian model). Morphological change, as is well known, is quite a different kettle of fish; however, the usual characterization of it as entirely irregular is perhaps too strong, and depends on where one seeks to localize a given change and how one defines 'morphological change' in the first place.

Certain changes called morphological change are in fact lexical changes, that is, they result in a change to individual items in the lexicon and do not affect the morphological system of the language. (Even a lexical change that removes from the language the last remaining example of a once-productive morphological process has merely erased all evidence that such a process once existed; since the process was no longer productive anyway, the morphological system was unaffected by the word's disappearance. An example of such a case is the dialectal English generalization of *was* throughout the preterite paradigm of the verb *be* that removed the last example of the once-common distinction between the singular and plural in the preterite.) The 'morphological system' will be, for convenience, here defined as the sum total of elements and rules needed for derivation and inflection. Examples of changes that are often called morphological changes but whose effects are typically lexical in scope include analogy, paradigm leveling and split, folk etymology, false segmentation (of the type [*a*] *nadder* > [*an*] *adder*), double-marking, back-formation, contamination, and taboo deformation. As lexical changes, they are by definition unpredictable and irregular, and their effects can greatly obscure morphological history (as well as phonological history).

When the effects of these changes cause a learner to reanalyze part of the data as reflecting a morpheme or rule that was not present in the source grammar, then the learner's morphology will come to be different from the morphology of the source grammar and true morphological change will have occurred. A true morphological change, involving (for example) a new morphological rule, is in fact 'regular' in that it affects in the same way all the members of whatever class or category it applies to. (The class may be small and limited in number, or it may be open, as is the case with the nouns to which the *s*-plural rule applies in English.)

Once a new productive rule enters the language, it will usually erase traces of earlier rules that applied to the same forms. But it is to be expected that the morphology of the most frequent lexemes in a language will have the least opportunity of being overlooked by a learner, and that these items will stand the best chance of surviving in the face of morphological change. For this reason, irregular forms – those that are not generable by the productive morphological rules of a language – are highly represented among a language's most frequent items. These exceptions are therefore a valuable source of information about

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Introduction

The reconstruction of the morphology of a protolanguage is beset with certain difficulties that do not attend the reconstruction of phonology. Peeling back the layers of historical change and undoing them – the essence of reconstruction – is in principle easy when the changes are regular and exceptionless, as is the case with sound change (at least under the Neogrammarian model). Morphological change, as is well known, is quite a different kettle of fish; however, the usual characterization of it as entirely irregular is perhaps too strong, and depends on where one seeks to localize a given change and how one defines 'morphological change' in the first place.

Certain changes called morphological change are in fact lexical changes, that is, they result in a change to individual items in the lexicon and do not affect the morphological system of the language. (Even a lexical change that removes from the language the last remaining example of a once-productive morphological process has merely erased all evidence that such a process once existed; since the process was no longer productive anyway, the morphological system was unaffected by the word's disappearance. An example of such a case is the dialectal English generalization of *was* throughout the preterite paradigm of the verb *be* that removed the last example of the once-common distinction between the singular and plural in the preterite.) The 'morphological system' will be, for convenience, here defined as the sum total of elements and rules needed for derivation and inflection. Examples of changes that are often called morphological changes but whose effects are typically lexical in scope include analogy, paradigm leveling and split, folk etymology, false segmentation (of the type [*a*] *nadder* > [*an*] *adder*), double-marking, back-formation, contamination, and taboo deformation. As lexical changes, they are by definition unpredictable and irregular, and their effects can greatly obscure morphological history (as well as phonological history).

When the effects of these changes cause a learner to reanalyze part of the data as reflecting a morpheme or rule that was not present in the source grammar, then the learner's morphology will come to be different from the morphology of the source grammar and true morphological change will have occurred. A true morphological change, involving (for example) a new morphological rule, is in fact 'regular' in that it affects in the same way all the members of whatever class or category it applies to. (The class may be small and limited in number, or it may be open, as is the case with the nouns to which the *s*-plural rule applies in English.)

Once a new productive rule enters the language, it will usually erase traces of earlier rules that applied to the same forms. But it is to be expected that the morphology of the most frequent lexemes in a language will have the least opportunity of being overlooked by a learner, and that these items will stand the best chance of surviving in the face of morphological change. For this reason, irregular forms – those that are not generable by the productive morphological rules of a language – are highly represented among a language's most frequent items. These exceptions are therefore a valuable source of information about

earlier morphological rules in a language, and gave rise to the oft-repeated maxim that morphological reconstruction proceeds on the basis of exceptions.

Following this maxim does not immunize the reconstructivist from pitfalls, however, and it is to these that we now turn.

Reconstructing on the Basis of Exceptions

Synchronic innovatory morphological processes with diachronic implications include primarily analogy, an imprecise (and sometimes over-invoked) term that will be used here for convenience to cover any extension of a morphological process to a lexeme to which it previously did not apply. Forms are innovated daily in this way; some of them get picked up by other speakers, make it into the historical record, or both.

Since analogy involves the extension of synchronically productive morphological processes, any and all forms produced by productive processes can be suspected of being historically recent creations, generated on the fly by individual speakers. ('Productive' is used here in its broadest sense, to describe any process that can be analogically extended.) If two related languages have a particular productive process in common (say, the *-s* plural of English and German), the presence of cognate or identical forms exhibiting that process (e.g., English pl. *sofas*, German *Sofas*) in no way guarantees that the languages' ancestor had those forms too (we would not want to reconstruct a Common West Germanic paradigm **sofa, *sofas*). It is only when cognate forms are found exhibiting the same synchronically **unproductive** process that cognacy of both the process and the forms can be entertained. Thus, the equation of *is/were* with German *ist/waren*, evincing identical and unpredictable suppletion, strongly suggests common inheritance of the two paradigms.

Even here, though, one can be led astray by parallel independent developments. The equation of English *mouse/mice* with German *Maus/Mäuse* is good prima facie evidence for a Common West Germanic word for 'mouse' that formed its plural by umlauting, except that we know on independent grounds that umlaut happened well after the breakup of Common West Germanic, and additionally spread to German only some time after it had run its course in English. Without such knowledge, however, the comparative method would dictate the reconstruction of an umlauting paradigm for proto-West Germanic, since in both English and German, umlaut is not a regular and predictable process of forming plurals.

Similarly, one of the ways of forming a perfect in Latin involved changing a root vowel *a* or *ā* to *ē* or *e*, as in the 1st person singular perfects *ēgī cēpī fēcī stetī dedī* from (infin.) *age-re cap-ere fac-ere stā-re da-re*. Latin's relative Oscan had this process too, as exhibited by *hipid* (historically **hēbēt*), the 3rd person singular perfect subjunctive of the verb corresponding to Latin *habeō* 'have.' A perfect **hebuī* or **hēbī*, not attested for Classical Latin, was analogically created at some point in the pre-Romance period, because certain forms of the Italian simple past (1st sing. *hebbi*, 3rd sing. *hebbe*, 3rd pl. *hebbero*) continue a perfect stem with an *ĕ*. If all we had at our disposal was Oscan *hipid* and Italian *hebbi, hebbe* (plus a knowledge of the sound changes), we would probably be tempted to reconstruct **hĕb-* as this verb's perfect in the common ancestor of Italian and Oscan, namely Proto-Italic. (Students of these languages will know that the data are being fudged a bit here for illustrative purposes; the long-vowel perfects like *ēgī* are historically quite different from the short-vowel perfects like *stetī*.) Conservatively, we are licensed to project only the *a/e* pattern onto Proto-Italic, rather than (without external evidence) the exhibition of that pattern by a particular lexeme. And the pattern itself can only be projected onto the protolanguage if it cannot be shown to be independently innovated in its daughters.

When cognates are compared across several languages and some of the cognates are morphologically peculiar in their traditions and others are not, if the morphological peculiarities are comparable, then the simplest hypothesis is that they are inherited and the other languages have regularized the peculiarities. A well-known example of this concerns the reconstruction of the Proto–Indo–European word for 'daughter-in-law,' a feminine noun that has the expected feminine paradigm in **-ā-* in some languages (e.g., Sanskrit *snuṣā́*, Old English *snoru*, Old Church Slavonic *snŭkha*) but an unexpected *o*-stem paradigm in others (*o*-stems are usually masculine or neuter; e.g., Greek *nuós*, Latin *nurus*, Armenian *now* [genit. *nowoy*]). Since there is no reason for speakers to have remodeled an inherited *ā*-stem feminine as an exceptional *o*-stem feminine, the *o*-stem forms are surely inherited, and the *ā*-stem forms independent regularizations.

Less clear-cut, of course, are cases where determining what is regular and what is irregular is a whole task unto itself. Perfects of the Latin 3rd conjugation were built with a multitude of different formations, essentially all of which underwent some analogical spread at one time or another. The class was closed – practically no new verbs during the Classical period entered the 3rd conjugation – meaning there is little evidence for which, if any, of these formations was a default for the class. Comparisons between 3rd-conjugation perfects and cognate forms in other

Indo-European languages must therefore be made carefully, with as detailed an understanding as possible of the histories of the different classes.

The dictum to reconstruct on the basis of exceptions also invites caution for another reason, namely that exceptional forms themselves are not necessarily more archaic, and can lead the linguist astray in the absence of more detailed data. The history of the perfect plural stem in Sanskrit is a good case in point. Perfects of roots of the shape *CaC* were formed in Sanskrit by reduplicating the root-initial consonant; thus to *par* 'fill' was formed *pa-par-*, the singular perfect stem. The dual and plural perfect stem was formed in the same way but with absence of the root vowel, hence *pa-pr-*, with an internal consonant cluster. As a result of sound changes, the prehistoric dual/plural perfect stems **sa-sd-* (root *sad* 'sit'), **ya-ym-* (root *yam* 'extend'), and **ya-yt-* (root *yat* 'stretch') became *sed-, yem-, yet-*. The resulting pattern singular *sasad-:* plural *sed-*, *yayam-: yem-*, *yayat-: yet-* was gradually extended to other roots.

A linguist looking at this stage of Sanskrit (a bit anterior to the earliest attested stage), simply going by the raw numbers where perfect plural stems of the type *papr-* outnumbered those of the type *sed-*, might decide that the *sed-* forms, being exceptional, were older. In this case, though, they are the rising upstarts. A look at a later stage would reveal a different situation. By the time of the Rigveda (the earliest Sanskrit text), ten *CaC*-roots that originally formed their perfects with reduplication in the plural stem have taken over the *sed-* pattern (e.g., *pec-* to the root *pac* 'cook'), in most cases completely ousting reduplication, and an equal number preserve reduplication; by the later Classical stage, the number of roots preserving reduplication had been reduced to five (Whitney, 1889: 284–285). The linguist looking at late prehistoric Sanskrit would obviously need to consider other factors than raw numbers in order to come to the correct conclusion.

Morphotactic Comparison

Cognate languages sometimes agree in having identical rules for the concatenation of derivational or inflectional morphemes (morphotactic rules), but without cognacy of the actual morphemes (as in Siouan languages). In such instances, some linguists have been tempted to apply the comparative method to the morphological templates (the sequences of fixed positions taken by the morphemes), and claim that the templates are inherited even if there has been innovation in the morphemes themselves. (An analogy in the lexical domain would be to claim that a protoparadigm was suppletive for a particular word if the daughter languages show suppletion in that word but with different suppletive forms, such as Russian *let* 'years' [genit. pl.], *god* [sing.] compared to Polish *lata* [pl.], *rok* [sing.].)

How valid the results of such comparison are is a somewhat vexed question. Under traditional understanding, morphological reconstruction cannot operate without cognate morphemes to compare; and certainly if the goal is to reconstruct the morphological inventory of a parent language, comparison of morphotactics alone is bootless. Additionally, since inflectional morphemes are positioned by syntactic rules, what is really being compared in this scenario is the syntactic systems of two cognate languages. In either case, little information about the morphology of the protolanguage can be gleaned.

Similar situations occur outside the realm of concatenative rules, as when two cognate languages share the same case-system but different case-endings. The two Tocharian languages have, between them, seven innovated nominal cases, the endings of three of which (comitative, allative, and ablative) are not cognate. Does one then reconstruct for Proto-Tocharian the existence of those three desinential categories for Proto-Tocharian in the absence of cognacy of the morphemes themselves? Clearly the answer is no, since if one posits this system, the development from it to the attested Tocharian languages would entail the loss and replacement of all three original endings (either all of them in one language, or some of them in one language and the rest in the other). More likely, Proto-Tocharian had a collection of postpositions, some of which underwent independent but parallel grammaticalization in its two daughters.

Convergent evolution must not be overlooked as a source of morphological similarity. The two unrelated Caucasian languages Georgian and Udi (the former is Kartvelian, the latter Lezgian [Northeast Caucasian]) have the same preverb–plus–verb template, in which an agreement marker intervenes between preverb and verb, but the two systems have entirely different sources within their respective families (Harris, 2003). From within a single family, the Slavic languages have a category of animacy in nominal paradigms, whereby accusatives of animate nouns have the same endings as the genitive, rather then the 'regular' accusative (of inanimates). Each Slavic language today has a different system. In Russian, all noun classes participate in it; in Novi Serbo-Croatian, only *o*-stems do. In Old Church Slavonic, which was fairly close to reconstructed Common Slavic, this morphosemantic feature was extremely limited – to the accusative singular in *o*-stems. The system has therefore expanded in each Slavic language independently and partly along parallel lines; if Old Church Slavonic were

not attested, we would likely reconstruct too much of it for Common Slavic (S. Thomason, personal communication).

Internal Morphological Reconstruction Based on Allomorphy

The synchronic establishment of underlying morphemes on the basis of allomorphic alternations is essentially the same thing as the internal reconstruction of a language's morphological history. To take a simple example, Latin has various present active infinitive formations, exemplified by *amāre* 'to love,' *movēre* 'to move,' *capere* 'to take,' *audīre* 'to hear,' *esse* 'to be,' *velle* 'to want,' *ferre* 'to carry.' We can isolate a suffix *-re* in the first four forms, but the last three forms exhibit a doubling of a consonant followed by *-e*. Examination of other forms in the paradigms of these three verbs reveals the verb stems to be *es-*, *vel-*, and *fer-*, indicating that the infinitive suffix began with a consonant that assimilated to the preceding consonant. Other evidence from the language reveals that the consonant for all these forms was once *s*, which was rhotacized to *r* between vowels (hence *amāre*, *movēre*, etc.); remained following another *s* (*es-se*); and assimilated to a preceding liquid (whence *vel-le, fer-re*). From this evidence, we can reconstruct **-se* as the pre-Latin present infinitive active suffix. (Additional evidence would allow us to refine the reconstruction to **-si*.)

Some forms of allomorphy are not so simple, and involve what has often been called a subtraction morpheme. In French, for example, there is no way to predict that the feminine of /mi/ 'sent' (passive participle) requires the addition of /-z/ while the feminine of /fri/ 'fried' requires /-t/, and the feminine of /ʃo/ 'cold' requires /-d/. One can analyze this alternation with the following rule: derive the masculine from the feminine by deleting the final consonant of the feminine. But many linguists doubt that such rules actually exist; they have proposed an alternate rule for the French data, namely, posit the final consonant as underlyingly present in the masculine forms, and then posit a morphophonological rule that deletes the final consonant. This does not involve actual subtraction of an element from one category to form another category, but allows both forms to be independently derived from a single underlying form. However, under either of these scenarios, there is a serious problem: a French speaker would be unable to form the feminine of an adjective to which he or she only knew the masculine. Various varieties of French, in fact, have reanalyzed one of the possible consonants coming at the end of feminines as a default feminine marker (for example, [-z] in the case of Northern French). Speakers thus, clearly analyzed the feminines as derived from the masculines and, from the pool of distinctive differences between the two, latched onto one as the default.

Cases like this are quite common, and they typically come about in the same way: sound changes eliminate the final sound or syllable from one set of forms but not from another set where it was protected by additional derivational or inflectional material. The history behind the French facts is well known: what synchronically appears as a derivational suffix (in this case, /-z/, /-t/, or /-d/) is in reality the old stem-final consonant. At an earlier stage, the masculines were /miz/, /ʃod/, and /frit/, while the feminines were /mizə/, /ʃodə/, and /fritə/; /-ə/ was the feminine suffix. In time, deletion of word-final stops produced the masculines /mi/, /ʃo/, and /fri/, and subsequently word-final schwa deletion produced the feminines /miz/, /ʃod/, and /frit/. For a more detailed discussion of the process with other examples, see the important study by Hale (1973).

The synchronic French data allow one to reconstruct the whole history except for the phonetic shape of the original feminine suffix (all that can be said for sure, based on the evidence presented above, is that there was one that was added to the stem-final consonant). A more difficult situation exists in Hawaiian, where the verb form known as the passive is formed with the suffix [-ʔia] in almost all verbs, with a small handful of exceptions where the consonant is something other than a glottal stop. Faced with these facts, a lucky soul might hit upon the idea that *-ia* (which is what the variant suffixes have in common) was the original suffix, and the consonant preceding it was an old stem-final consonant that had been deleted in other forms where it would have been word-final; but other analyses are also possible without additional evidence (such as [-ʔia] is innovatory and one of the exceptional variants was the original suffix). The truth is that [-ʔia] was generalized in the same way that [-z] was generalized as a feminine marker in Northern French (only [-ʔia] has spread much, much more widely than [-z].

Syncretism

All reconstruction is limited by the available evidence. Syncretism, the collapse of inflectional systems (such as case-systems) due usually to a combination of phonological and analogical factors, can obliterate evidence of original inflections. The modern Romance languages, for example, have lost all the Latin case distinctions in nouns, and the few fossilized remnants would not suffice to recreate any full Latin paradigm (e.g., from French, the place-name

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The preservation of relic forms through semantic specialization (essentially the process known as Kuryłowicz's Fourth Law of Analogy), leading to their being learned as separate lexical items not part of the paradigms of the words that they were originally inflections of, is necessary for any kind of internal reconstruction of inflectional changes such as gain or loss of case-endings, paradigm leveling, and paradigm split. In Latin, a *v* (also written *u*) was lost between a consonant and *u*, leading to allomorphy in some nominal and adjectival paradigms; but this *v/u* was restored, so that what should have been, e.g., nominative singular *ecus* 'horse,' genitive *equī*, was restored to *equus equī*, and what should have been *parus* 'small,' genitive *parvī* was restored to *parvus parvī*. The restoration erased the effects of the sound change, but luckily for scholars, forms like *parum* 'too little,' originally the accusative singular (from *parvum*) which was specialized as an adverb, remained because, due to their separation from their original paradigm, they escaped the restoration of the *-v-* and provide evidence for the leveling that must have taken place elsewhere.

The above survey has touched on some of the problems that attend morphological reconstruction. Readers interested in a listing of the different available procedures should consult the carefully laid-out material in Koch (1996).

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Reconstruction, Syntactic

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Syntactic reconstruction has not figured prominently in historical linguistic investigations, as can be surmised from the fact that the index of the recent 881-page *Handbook of historical linguistics* (Joseph and Janda, 2003) lists just seven pages, all in the same article, where it is discussed. As Fox observes, "Syntactic reconstruction is a controversial area … scholars working within the framework of the classical Comparative Method have been far less successful in applying their methods here than in the case of phonology or even morphology" (1995: 104; see also Jeffers, 1976). And in discussing this topic elsewhere, Fox does not point to any methods other than the Comparative Method that have offered promising results (1995: 104–109, 190–194, 250–253, 261–270).

Efforts to reconstruct syntax can be traced at least as far back as 1893–1900, when Delbrück (as cited in Lehmann, 1992: 32) reconstructed OV word order for Proto-Indo-European. By far the most ambitious early effort at reconstructing syntax is Schleicher's 'Proto-Indo-European fable', which was considered a rash enterprise even in those pre-Neogrammarian times (1868; as cited and translated in Jeffers and Lehiste, 1979: 107):

Avis akvāsas ka
'A sheep and horses'

avis, jasmin varnā na ā ast, dadarka akvams, tam, vāgham garum vaghantam, tam, bhāram magham, tam, manum āku bharantam.

avis akvabhjams ā vavakat: kard aghnutai mai vidanti manum akvams agantam. Akvāsas ā vavakant: krudhi avai, kard aghnutai vividvant-svas: manus patis varnām avisāms karnauti svabhjam gharman vastram avibhjams ka varnā na asti.

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Tat kukruvants avis agram ā bhugat.

> 'A sheep on which there was no wool saw horses, one drawing a heavy wagon, another a great burden, and another carrying a human quickly.
> The sheep said to the horses: The heart feels anguish seeing the man driving the horses.
> The horses said: Listen, sheep, the heart feels anguish having seen the man, the master, make the wool of sheep into warm clothes and there is no wool for the sheep.
> Having heard that, the sheep turned away into the field.'

Even aside from the fatal flaws instantly evident to any modern Indo-Europeanist (or, for that matter, to any of the Neogrammarians of the 1870s) – most notably the Sanskrit-like phonology, especially the vowel system, which no one now believes to be possible for Proto-Indo-European (PIE) – Schleicher's fable struck Indo-Europeanists as so unpromising that hardly anybody since then has felt confident enough to reconstruct even a short discourse for Proto-Indo-European (in spite of a few proposed 'updates' of Schleicher's fable, e.g., one by Hermann Hirt in 1938, as cited in Jeffers and Lehiste, 1979: 108). The problem, after the phonology is corrected, is that PIE syntax is too poorly understood to justify constructing PIE sentences. But the issue of whether syntax can be reconstructed at all recurs in the literature of historical linguistics.

Two waves of interest in the topic, one of them widely considered abortive and the other current and growing, account for most of the research. The first wave, which crested in the 1970s, was based on the famous typological morphosyntactic generalizations first presented in Greenberg, 1963. These generalizations focused in particular on clusters of morpheme orderings that tended to appear together as a bundle – for instance, OV word order with postpositions, Adjective-Noun, Determiner-Noun, Relative-Noun, and other word-order patterns. A language in which all the statistically predominant ordering patterns appear together is said (in this view) to be typologically consistent. The fundamental argument relevant to typologically-based syntactic reconstruction is that inconsistencies in ordering patterns, especially as reflected in minor patterns in restricted environments, reflect older consistent patterns, providing a means of reconstructing the earlier morpheme-order patterns. When evidence for certain patterns is lacking (for instance because of the absence of texts in an attested ancient language), the existing orderings, e.g., Noun-Adjective, are used to infer other orderings, e.g., VO word order. In other words, the typological clustering of the various ordering patterns provides directionality of syntactic change and thus permits the reconstruction of earlier syntactic orders.

The most prominent proponent of this approach to syntactic reconstruction is Winfred Lehmann (e.g., 1973, 1974, and see also 1992: 238–240); Lehmann views typologically 'inconsistent' languages – that is, languages that violate Greenberg's ordering generalizations – as predictably transitional, en route to consistency. The entire typological approach to syntactic reconstruction is sharply criticized in Watkins, 1976, with a focus on Lehmann, 1974. Watkins laments the fact that (as he sees it) "the rebirth of Indo-European syntax has taken place in the bed of Procrustes" (p. 305), that "[s]yntax is now viewed as coterminous with word order" (ibid.), and that the approach "elevates some of Greenberg's extremely interesting quasi-universals to the dubious status of an intellectual strait-jacket . . ." (p. 306). He also presents arguments against specific predictions of the typological approach, such as the fact that some typologically 'inconsistent' languages have apparently remained 'inconsistent' for many centuries.

A partly comparable search for universal principles that might lead to valid syntactic reconstruction is Givón's much-cited dictum, "Today's morphology is yesterday's syntax" (1971: 413). Like Lehmann, Givón claims that clues to earlier word-order patterns are to be found in relics, specifically, for Givón, in the order of morphemes in words – the crucial assumption being that processes of cliticization and then affixation of formerly independent words must have fossilized the original relative ordering of the words. This approach too has been sharply criticized (see e.g., Comrie, 1980 and Harris and Campbell, 1995: 199ff.). One empirical problem for the claim is that affixes sometimes change positions in the word relative to other affixes and even relative to the stem, and clitics sometimes change position when they turn into affixes. A major reason for the widespread skepticism about all approaches to syntactic reconstruction that focus on reconstructing word-order patterns is hinted at in one of Watkins' objections: not only is there much more to syntax than word order, but it is also impossible to know, from surface word order alone, the nature of the grammar that produced that word order. So, for instance, a dominant SVO sentential word-order pattern in one language might result from a grammar that specifies SVO word order, but in another language it might result from a verb-second rule.

The search for universals that would permit the establishment of a firm directionality in syntactic change, and thus a sure means of syntactic reconstruction, is continued in some of the research on grammaticalization, and this research goes well beyond word-order studies. Still, proposals of universality have not met with general acceptance. See, for instance, Harris and Campbell (1995: 336–338) for a criticism of claims that certain morphosyntactic changes are predictably unidirectional. Many

linguists, including Harris and Campbell themselves, would agree that a weaker sense of directionality might prove useful in syntactic reconstruction, in the same way that probabilities are used in phonological reconstruction: all things being equal, one would reconstruct **p* rather than **b* for an intervocalic *p : b* correspondence, because intervocalic voicing is more common, and more likely on phonetic grounds, than intervocalic devoicing. Some (not all) of the proposed universals of morphosyntactic change would meet this 'more probable' criterion.

The recent upsurge of interest in syntactic reconstruction is much less homogeneous than the typological approach of the 1970s. Perhaps the most cited recent contribution to the debate, both in its own right and as a stimulus to further research (much of which offers opposing views), is Harris and Campbell's Chapter 12, 'Reconstruction of syntax' (1995: 344–376). Harris and Campbell's approach is criticized in Lightfoot, 2002a, and the discussion is continued in a follow-up exchange (Campbell and Harris, 2002; Lightfoot, 2002b). The two most difficult issues, for syntactic reconstruction in general as well as in these articles, concern the problem of identifying syntactic correspondences in related languages and the problem of directionality. Neither issue is new, but the former in particular has received more attention recently than in (for instance) the 1970s (but see Watkins, 1976).

The crux of the correspondence problem is articulated by Werner Winter (1984: 622–623, and see also the discussions in Harris and Campbell, 1995: 345–353 and Rankin, 2003: 201–206): "Sentences are formed, not learned; morphemes and simple lexemes are learned, not formed." The difficulty is that application of the Comparative Method requires elements that show recurring correspondences in both form and meaning, and in practice this has always meant reconstructing proto-language features on the basis of cognate morphemes – that is, morphemes in two or more daughter languages that are descended from the same morpheme in their shared parent language. The method has been spectacularly successful in the reconstruction of individual morphemes, both words and affixes, and of phonological features abstracted from the reconstructed morphemes; reconstruction of partial morphological patterns has also been carried out successfully, especially where analogic changes that have transformed some daughter-language paradigms are fairly transparent. But purely syntactic structures – those which, unlike constructions that are anchored by such morphemes as the question particle used in the formation of yes/no questions in some language families – offer no cognate morphemes to base a reconstruction on.

As a means of overcoming this difficulty, Harris and Campbell propose the concept of **syntactic correspondence**. Although they acknowledge that "syntax has nothing quite like the duality of patterning (double articulation) in phonology" (1995: 349), they argue that sentences in related languages can be considered to correspond if they mean the same thing and if the grammatical morphemes that are crucially relevant to the structure point under consideration are cognate (p. 349), and if they are "responses to identical or essentially identical stimuli in two stages of a language" (p. 350). This last notion – that identical stimuli can be predicted to produce linguistically equivalent utterances – seems at best overoptimistic; it is surely not supported by psycholinguistic evidence. Harris and Campbell also emphasize that their goal "is to establish correspondence patterns, not corresponding sentences" (p. 350), so in fact their proposal is that there are cognate sentence patterns, not cognate sentences *per se*.

Crucially, they argue for the existence of regularity in syntactic change, equivalent to the regularity hypothesis for phonological change (pp. 326 ff.) – but with a sense of regularity, namely "rule-governed and non-random" (p. 326), that differs sharply from the sense in which phonological change is hypothesized to be regular. An analogic change that levels a morphophonemic stem alternation in an inflectional paradigm is regular in Harris and Campbell's sense, but it is not directly comparable to the concept of regular sound change that has guided applications of the Comparative Method for over a century: regular sound change is form-based only, while analogic change is both form- and meaning-based (as seen, for instance, in certain analogic leveling processes in Serbo-Croatian that affect noun declension but not adjective declension – Thomason, 1976). The morphosyntactic changes discussed by Harris and Campbell in this context are presumably driven by analogy, not by sound change. Another major problem that arises for Harris and Campbell's notion of cognate sentence patterns is the same as a problem noted above for the typological approach to syntactic reconstruction: the same syntactic output in two different languages might well be produced by quite different grammars.

A different line of research aimed at reconstructing syntax focuses on the implications of changes in parameter settings (e.g., Roberts, 1998; Longobardi, 2001; compare the critical discussion in Lightfoot, 2002a: 127–130). But until an approach based on parameter settings is worked out in more detail, including specific examples, the idea is difficult to assess.

Can any safe general conclusions be drawn about the feasibility of syntactic reconstruction? Perhaps.

There is fairly widespread agreement that syntactic identity in all the daughter languages – for instance SOV word order – permits the reconstruction of that pattern in the parent language, and nobody (as far as I know) has recommended that all efforts to reconstruct syntax should be abandoned because they are hopeless. On the contrary, a cautious optimism is widespread and seems justified. Watkins, for instance, argues for the possibility of reconstructing poetic formulas of two and three words – and therefore bits of proto-language syntax – where the formulas are cognate morpheme by morpheme in the daughter languages (1995). Pires and Thomason (forthcoming) argue that, at least at relatively shallow time depths, the Comparative Method can sometimes be used successfully to reconstruct morphosyntactic constructions, for instance the Proto-Romance future (using a deliberately restricted data set for testing purposes); here the analysis rests on shared cognate morphemes, on directional probabilities (clitic-to-affix is more likely than affix-to-clitic), and on drift (independent clitic-to-affix changes in several languages). The prospects seem to be dimmer for successful syntactic reconstruction where the constructions under comparison are not expressed at least in part by cognate morphemes and where there is no identity in all the daughter languages. Certainly proposals that don't meet at least one of these criteria are all highly controversial at present.

See also: Comparative Constructions; Morphological Change, Paradigm Leveling and Analogy; Syntactic Constructions.

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Recovery of Language after Stroke or Trauma in Adults

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Introduction

Research efforts in the realm of recovery from aphasia have generally been directed toward (a) identification of salient neurologic and anagraphic factors predictive of recovery, (b) investigation of recovery mechanisms associated with different lesion sites, etiologies, and aphasia symptom clusters using modern imaging techniques, (c) determination of the relative roles of the two cerebral hemispheres in recovery, and (d) explication of the role of behavioral and pharmacological treatments in facilitating recovery from acute, subacute, and chronic aphasia. Current thought on these topics will be discussed herein. Space limitations prohibit discussions of attention, memory, and motor speech recovery, even though deficits in attention and memory may underlie some symptoms of aphasia and even though improvements in all of these domains may parallel and, to some extent, perhaps explain, individual differences in recovery from aphasia (Crosson, 2000a, 2000b; Haarman and Kolk, 1991; Kolk, 1995; Kolk and Weijts, 1996; Tseng *et al.*, 1993). Discussion will focus on recovery from classic acquired aphasia (e.g., that which is associated with CVA or focal trauma) in monolingual speakers rather than recovery from the 'nonacquired' (progressive) aphasias arising from degenerative disease (Kertesz *et al.*, 1994; Mesulam, 1982; Weintraub *et al.*, 1990) or neoplastic proliferation. Recovery phenomena in bilingual speakers with aphasia or in those with crossed aphasia will also not be addressed, though readers are encouraged to investigate these phenomena (cf. Paradis, 2000; Paradis and Goldblum, 1989).

It should be noted that while many acquired aphasic syndromes have been identified and studied in modern research, aphasia is nevertheless a somewhat individualized disorder of impaired information processing, specific to that subsystem of cognition serving language (Davis, 2000; Porch, 1994, 2001). Recovery from acquired aphasia has been thought to depend on a variety of neurological factors, including type of aphasia, severity of initial aphasia, site of neurological lesion, extent of neurological lesion, time postonset, etiology, and presence of concomitant disorders (Basso, 1992). A variety of anagraphic or personal factors such as the age, gender, handedness, and psychosocial characteristics of affected individuals also influences the speed and extent of recovery (Basso, 1992; Hemsley and Code, 1996; LaPointe, 1999). An important additional factor influencing aphasia resolution is the type, frequency, and intensity of speech–language treatment received (Basso, 1992; Carlomango *et al.*, 2001; Weiller *et al.*, 1995). Research in recovery supports the notion of language as a well-distributed function with some localizable aspects, illustrates the limitations of aphasia typologies in capturing recovery phenomena, and establishes the superiority of neurological (vs. anagraphic) factors as those most predictive of recovery. It also pushes the recovery envelope beyond conventional limits by providing evidence for neural reorganization and functional improvement in chronic aphasia when intensive treatment paradigms are applied (Hillis and Heidler, 2002; Pulvermuller *et al.*, 2001).

Aphasia: Localized and Distributed

Aphasia has been defined as "a selective impairment of the cognitive system specialized for comprehending and formulating language, leaving other cognitive capacities relatively intact." (Davis, 2000: 16–17). It is an acquired disorder of language processing arising most often in adults as a consequence of cerebrovascular accident (CVA) or 'stroke' in the language-dominant hemisphere of the brain's cerebral cortex or subcortex (Benson and Ardila, 1996; Brown, 1980; Davis, 2000). There are many types of aphasias, and their symptoms are somewhat predictable from basic principles of brain–language organization. These principles establish that there are strong relationships between normal mental functions (such as language, attention, and memory) and either localized regions of the brain or collections of reciprocal, highly parallel neural networks that are widely distributed across brain regions (Chollet and Weiller, 2000; Howard *et al.*, 1992; Kertesz, 1991; Mesulam, 1990).

Distributed neural networks are comprised of interconnected neurosynaptic circuits, some elements of which may be distant, but all of which converge on local nodal processing zones that are crucial for network operations (Mesulam, 1990). Wernicke's area (minimally Brodmann Area 22 but see Bogen and Bogen, 1976), a region of the cerebral cortex in the superior temporal gyrus of the dominant language hemisphere (the left cerebrum in most individuals) is one such nodal region for the distributed circuitry dedicated to the auditory comprehension of language (Mesulam, 1990). This area also plays an important role in semantic and phonological processing (Kertesz, 1991). Broca's area (typically Brodmann

Areas 44–45), a region of the cerebral cortex in the posterior, inferior area of the third frontal convolution of the dominant language hemisphere, is another nodal region whose function is essential for motor speech planning/programming (Mesulam, 1990; Van der Merwe, 1997), for some forms of semantic processing, and for some aspects of syntax construction and interpretation (Kertesz, 1991). Wernicke's and Broca's regions are frequently coactive during language processing (Van der Merwe, 1997) and, when damaged, frequently lead to distinctly different but persistent symptoms of aphasia. Damage to the more widely distributed elements of the auditory comprehension or syntactic processing circuitries may also impair the adequacy of those functions but usually not to the extent that is found when damage to the nodal (Wernicke's or Broca's) zones occurs (Mesulam, 1990).

Other important speech and language processing circuits support those associated with Wernicke's and Broca's areas and yield aphasic outputs when damaged. Individual differences notwithstanding, strokes involving large portions of the frontal language cortex (especially Broca's area, or zones anterior–superior to or deep to Broca's area), and/or portions of the basal ganglia typically cause the so-called 'nonfluent' types of aphasia such as Broca's aphasia, transcortical motor aphasia, mixed transcortical aphasia, global aphasia, and striato-capsular aphasia (Benson and Ardila, 1996; Goodglass and Kaplan, 1983; LaPointe, 1997). These disorders may vary somewhat in severity and symptomatology, but as a group they are characterized by nonfluent speech, relatively few phonemic paraphasias (sound substitutions, omissions, additions, or misorderings), difficulty accessing content words (particularly verbs), and disturbed comprehension and production of complex syntactic forms. Sentence production is usually described as telegraphic or agrammatic, lacking intact syntactic constituent structures and characterized by the omission of free and bound grammatical morphemes (Berndt, 1998; Caplan, 1987, 1992; Kean, 1985; Kearns, 1997).

Strokes involving posterior cortical language zones (especially Brodmann Areas 22, 37, 39, 40) and/or the thalamus, on the other hand, frequently cause the more 'fluent' aphasias such as Wernicke's aphasia, transcortical sensory aphasia, conduction aphasia, anomic aphasia, and thalamic aphasia (Benson and Ardila, 1996; Goodglass and Kaplan, 1983; LaPointe, 1997). These disorders frequently are identified by impaired auditory comprehension, severe word-finding deficits (particularly for nouns), copious production of phonemic paraphasias and neologisms, and syntax production deficits characterized by substitutions (more often than omissions) of free and bound grammatical morphemes (Benson and Ardila, 1996; Buckingham, 1989; Caplan, 1987, 1992; Christman and Buckingham, 1989; Gonzales-Rothi, 1997; Simmons-Mackie, 1997). Recovery from aphasia is an incremental process characterized by a reduction of symptoms and an improvement in language comprehension, production, or integration.

Discussions of recovery from aphasia frequently link physiological and behavioral concepts, inadvertently suggesting that localizing and/or measuring changes in the activity of normal and lesioned brain areas is akin to localizing and/or assessing improvements in normal and disordered mental functions. John Hughlings Jackson (1874), however, cautions otherwise (Kertesz, 1991) as do Chollet and Weiller (2000: 587) who note that, "... recovery corresponds to improvement of clinical function in patients and not necessarily to any changes in cerebral activation patterns as they can be observed with modern neuroimaging techniques." It is therefore important to be careful in the attribution of causality to any of the neurological changes accompanying functional improvements in aphasia. It is a *sine qua non* in the philosophy of science that 'correlation' does not and cannot mean 'causation.' Despite this caveat, a thriving line of research suggests that neural reorganization and reduction in aphasia symptoms may correlate even in patients with chronic aphasia (Pulvermuller *et al.*, 2001).

While there are correlations between specific brain areas and associated linguistic functions, there is sufficient functional overlap or redundancy in distributed language processing networks to permit several different neural structures to perform a particular operation on different occasions (Kertesz, 1991). One such occasion may be when brain damage provides an opportunity for nonnodal, or even latent, circuits to assume (albeit less efficiently) the function of a damaged network (Chollet and Weiller, 2000) during recovery. Localizing function is perhaps least controversial for nodal brain areas but even then, functional localization is not fixed because the brain retains some plasticity or capacity for reorganization across the lifespan (Brown, 1980, 1982; Chollet and Weiller, 2000). The extent to which portions of nodal zones can recover function, the extent to which distributed (nonnodal) network circuitry can continue a function, and the extent to which nondedicated or formerly nonparticipatory circuits can assume new functions comprise some of the issues investigated in the research on the neural mechanisms underlying recovery from aphasia.

Recovery: A Continuous Phenomenon

A Framework for Understanding Recovery

Recovery from acquired aphasia is evident when language processing skills improve to levels beyond those extant immediately after the onset of stroke. Recovery is therefore defined operationally in behavioral terms and cannot be directly attributed to specific changes in poststroke neurophysiology (Chollet and Weiller, 2000; Porch, 1994, 2001). Porch (1994: 175) described aphasia from this kind of cybernetic perspective, arguing that neurological insults reduce the brain's ability to,

> "store, switch, and monitor, and to do the many other steps necessary for the brain to receive, assimilate, and send information. Since these processes cannot be observed directly, they must be assessed by exposing the patient to standard tasks . . . and then the clinician, by carefully noting the response characteristics of the patient, can make inferences about the relative efficiency of various 'brain circuits.'"

This approach views aphasia less as a loss of morphosyntactic, semantic, and phonological knowledge per se and more as a disorder of an individual's ability to accurately, responsively, completely, promptly, and efficiently utilize the computational processes underlying language processing (Porch, 1994, 2001). Computational failures of these kinds lead to the types of linguistic errors (e.g., semantic or phonemic paraphasias, agrammatic or paragrammatic syntax), comprehension deficits, response delays (e.g., long or short, filled or silent latencies), and unintelligible utterances (e.g., neologisms) that characterize the aphasias. In this paradigm, recovery is observed when language tasks are processed more accurately, responsively, completely, promptly, and efficiently than they were previously. Therapeutic improvement is accomplished by repeatedly stimulating damaged language systems with performance tasks that are challenging but achievable (Porch, 1994, 2001; Schuell, 1974). The assumption underlying this approach is that when damaged neural networks are properly stimulated, repeated activation of those networks ultimately increases their internal activation strength, in consequence yielding faster and more accurate language processing over time. Many current models of parallel language processing in artificial intelligence systems support this conclusion (cf. Martin and Dell, 2004), but the precise nature of the brain–language interface remains elusive. To the extent that the cybernetic metaphor can be extended to actual neurological activity, however, this remains the fundamental principle underlying recovery from aphasia.

As Kertesz (1988) affirms, aphasia is a dynamic disorder, a disorder in evolution. When aphasia is viewed as a constellation of symptoms, with each symptom moving along an independent recovery continuum over time, it is not surprising that chronic symptom profiles may differ significantly from acute symptom profiles. Aphasia taxonomies are problematic for representing the nature of change underlying aphasia recovery, because their use suggests that aphasic speakers somehow metamorphose from one type of aphasia to another (from Global to Broca's type, for example). A more logical conceptualization is that initial poststroke phenomena such as edema and diaschisis compromise the function of multiple local and distant circuits within the language processing network, and across related networks, yielding numerous initial symptoms that may not persist over time. Diaschisis, the state of 'shock' into which hypoperfused neurons enter after a brain injury, spreads along neuroanatomical pathways away from an initial site of lesion, reducing function in the many brain areas that may be served by those pathways (Chollet and Weiller, 2000). Cerebro-cerebellar connections, for example, allow damage to the cerebrum to suppress metabolic function in remote cerebellar locations. Although the relationship between diaschisis and aphasic symptoms is not fully understood, it is suspected that as edema and diaschisis resolve during the process of spontaneous recovery, some initial symptoms of aphasia will disappear (Cappa, 2000). As language processing networks are stimulated through use, a number of neural mechanisms may contribute to improved processing over time. As Rosenbek *et al.* (1989) note, however, a core of aphasia symptoms will persist in most individuals.

The principle that local neural networks participate in larger-scale networks is consistent with the observation that diverse lesion sites (affecting diverse neural networks) can yield similar symptoms (e.g., naming is mediated redundantly across right and left peri-Sylvian cortex, as well as across some subcortical structures, so anomic behavior arises unsurprisingly from lesions to multiple cortical and subcortical sites). Individual differences in language network configurations may be genetically coded, may reflect neural reorganization following cortical injury, may depend on the age at which a language was learned, and may depend on an individual's gender, handedness, or intrinsic learning style. Individual differences suggest the likelihood that identically located lesions across individuals may not yield identical symptom complexes, and suggest the converse as well – that different lesion sites across individuals may occasionally yield similar symptom complexes (Kertesz, 1991). These factors confound the study of recovery

in aphasia, making it difficult to match subjects in group studies, but also making it difficult to generalize findings from single subject studies where an individual subject has been his own control. These methodological difficulties, combined with the ambiguities inherent in typology change over time, make it difficult to compare studies of recovery. Nevertheless, a review of the recovery literature suggests that there are some factors that can reliably predict recovery from aphasia.

The Aphasia Recovery Curve

The classic recovery curve in aphasia can be described as one of gradual inclination and progressive deceleration within the first year postonset (Porch, 1994, 2001). Although there is little agreement as to the exact time course for recovery, the greatest improvement in language function is generally seen within the first three months postonset (Kertesz, 1988). Although some have suggested that little change in language function will occur past that time (Basso, 1992), recent studies suggest otherwise (Pulvermuller *et al.*, 2001). Recovery plateaus are generally apparent within six months to one year postonset. The parallel of the aphasia recovery curve with that of spontaneous (biological) recovery has prompted numerous aphasia treatment studies (Basso, 1992), many of which suggest that language recovers best in response to purposeful, intensive stimulation, whether delivered by educated professionals or caregiving significant others. Other studies, however, have shown that many patients with aphasia recover functional language even without directed intervention (Basso, 1992).

Different recovery mechanisms may be at work at different overlapping 'stages' of the recovery continuum. While neural reorganization can occur soon after stroke, especially with peripheral or small cortical lesions (Chollet and Weiller, 2000; Merzenich *et al.*, 1983; Coq and Xerri, 1999; Jenkins and Merzenich, 1987; Jenkins *et al.*, 1990; Weiller *et al.*, 1992). Hillis and Heidler (2002) suggest that this, together with the learning of compensatory strategies, is more likely a mechanism associated with later stages of recovery from aphasia. They further suggest that it is the reperfusion of surviving (but nonfunctional) ischemic tissue surrounding an area of infarct (i.e., reperfusion of the 'ischemic penumbra') that probably accounts for early resolution of aphasic symptoms, even in severe cases, during the first few (1–3) days following stroke. To test this premise, Hillis and Heidler (2002) investigated early recovery of lexical-semantics (reflected via spoken word comprehension) in 18 patients with aphasia secondary to posterior left hemisphere stroke. They hypothesized that if initial hypoperfusion of Wernicke's area causes poor word comprehension, speedy reperfusion of that area should accompany improved comprehension soon after stroke.

Patients meeting the criteria for lexical-semantic deficit (10 men, 8 women, all right-handed, mean age 61 years) were assessed once with magnetic resonance imaging techniques of perfusion-weighted imaging (PWI) and diffusion-weighted imaging (DWI) at Day 1 of stroke onset and again at Days 2–5 (mean Day 3) postonset. Perfusion levels of ten anterior and posterior left hemisphere cortical zones (Brodmann Areas 10/11, 18/19, 20, 22, 37, 38, 39, 44, 45) were evaluated on each assessment. Lexical-semantic tasks (word comprehension and production) were given on Day 1 and at follow up. Thirteen of the eighteen subjects demonstrated early recovery of lexical-semantics. All 13 of these subjects showed a corresponding statistically significant reperfusion of Area 22 (Wernicke's area) to the exclusion of the other Brodmann areas studied. None of the five subjects with poor lexical-semantic recovery demonstrated reperfusion of Wernicke's area. This double dissociation, and in the coincident absence of evidence for neural reorganization in subjects studied, suggests a crucial role for reperfusion of an ischemic penumbra (in this case, Wernicke's area), in early recovery of lexical-semantics in aphasia.

Hillis and Heidler (2002) argued that whereas rapid neural reorganization has been documented in the sensory cortex following peripheral limb amputation and in the sensory-motor cortex following small focal lesions, less rapidity is observed when cortical lesions are large and/or when damaged functions (such as lexical-semantic processing) are complex and widely distributed. They suggested that in most cases of aphasia, recovery can be characterized as a three-stage process mediated by different neurological mechanisms and benefiting from different approaches to intervention. The first, acute, phase of recovery occurs during the first few days after stroke and is characterized primarily by reperfusion of the ischemic penumbra and/or reduction of diaschisis (Cappa, 2000). Intervention at this stage of recovery is best managed medically with input provided to patients and families from speech-language pathologists who can share information and counseling with regard to the nature of recovery from aphasia. The second or subacute stage of recovery may begin several days after onset and continue for months or even years. Neural reorganization is thought to account for most aspects of recovery at this stage and rehabilitation efforts are directed toward the provision of intensive therapies for language stimulation.

The third or chronic stage of recovery follows the completion of neural reorganization and probably involves the establishment of new pathways to link language processing zones that have become functionally disconnected as a consequence of stroke. In the chronic phase of recovery, speech-language intervention may yield improved behavioral outcomes in motivated patients who receive intensive daily treatment and/or who are receptive to learning compensatory strategies for managing compromised language skills (Hillis and Heidler, 2002; Pulvermuller *et al.*, 2001). As Hillis and Heidler, (2002: 893) noted, "These stages are likely overlapping, in that one language function might be recovering in one stage, while another language function is recovering in another stage, in the same individual." This phenomenon explains why some patients initially diagnosed with one type of aphasia, such as Wernicke's or conduction aphasia, may eventually recover to another type such as anomic aphasia, the residual symptom profile apparent when, for example, initial auditory comprehension problems, phonemic jargon, and verbal repetition deficits improve but aphasic word finding difficulties persist (Simmons and Buckingham, 1992).

Neurologic Factors in Aphasia Recovery

Mechanisms of Recovery

The mechanisms of neurological change during recovery from stroke are thought to contribute to recovery from aphasia, although the degree of causality remains unclear (Cappa, 2000; Cappa *et al.*, 1997). Chollet and Weiller (2000) described four mechanisms of cerebral reorganization made apparent from a decade of poststroke neuroimaging studies: spontaneous neural reorganization, recruitment of remote brain areas (including the cerebral hemisphere contralateral to the site of stroke), extension of specialized areas into neighboring cortex, and increased neurological activity in lesioned areas. Spontaneous neural reorganization in stroke patients can be observed with Positron Emission Tomography (PET) as changes in patterns of cerebral metabolism (increased and/or decreased) relative to patterns exhibited by normal controls (Weiller *et al.*, 1992). Metabolic changes unrelated to diaschisis can be observed soon after stroke onset and may account for the rapid improvement seen in the postacute phase of recovery from aphasia (Chollet and Weiller, 2000). PET studies have provided some evidence that the right hemisphere (remote to lesioned left temporal cortex) is activated during language processing in patients with good (vs. poor) recovery from Wernicke's aphasia (Weiller *et al.*, 1995), although studies have also shown that some normal, nonaphasic individuals show right hemisphere activation during similar language tasks (Frackowiak, 1997). With regard to cortical extension, it has been well-documented that lesions to motor pathways and the motor cortex can influence the activity of undamaged motor zones. Cortical areas that have become underactivated because of limb paralysis, for example, may become rededicated to the function of remaining intact limbs or other moveable structures that are represented nearby on a cortical motor map (Cohen *et al.*, 1991; Nudo *et al.*, 1996; Weiller *et al.*, 1992; Weiller *et al.*, 1993; Pons *et al.*, 1991). Finally, with regard to increased activity of nonspared cortical areas, evidence suggests that, at least with regard to the hierarchically organized motor system, damage to lower-order structures leads to increased compensatory activity of associated higher-order structures in the system. It is interesting to speculate that a highly integrated but nevertheless hierarchically conceived language system (cf. Brown, 1982) might show much the same pattern of neural reorganization after stroke.

This observation is consistent with Melulam's assertion that distributed activation networks can demonstrate spontaneous learning and is certainly consistent with the work of Mazzoni and colleagues (1992), who were able to quantify spontaneous recovery from aphasia in 45 first-time stroke patients. Assessments of oral and written expression, as well as auditory–verbal and reading comprehension were conducted at 15 days postonset, one month postonset, three to four months postonset, and six to seven months postonset.

Mazzoni *et al.*'s (1992) findings across subjects, in summary, were the following:

1. Oral comprehension recovery began early at two weeks postonset, continued throughout the first year after stroke, and was independent of initial aphasia type, severity, or size of lesion. Reading comprehension was maximal within the first month postonset.
2. Recovery rates for expression were slower than for comprehension and differed according to aphasia type. Fluent aphasias showed uniform improvement from two weeks postonset onward; nonfluent aphasias began to improve only at the three to four month poststroke period. Apraxia of speech may have confounded results in the latter group.
3. Fluent patients and all patients with moderately severe aphasias improved significantly in all four language modalities (verbal expression, listening comprehension, reading, writing). Nonfluent

patients and those with initially severe aphasias showed limited improvement in verbal expression and no recovery of written language.

4. Patients with small lesions of moderate size showed significant recovery across modalities. Patients with moderately sized lesions improved in all modalities except written expression. Patients with large lesions only showed improvement in auditory comprehension.

Their main conclusions were that (1) the dominant language hemisphere has good potential for assisting with auditory comprehension but not verbal expression, and that (2) the posterior site of lesion correlates with increased aphasia severity, which in turn predicts poor recovery. Because auditory comprehension deficits frequently characterize the posterior aphasias, the findings of Mazzoni and colleagues present aphasiologists with a conundrum for future study.

The Role of the Contralateral Cortex in Recovery

There are many approaches to measuring the role of the cerebral hemispheres in the recovery from aphasia. According to Cappa and Vallar (1992), the most widely used physiological approach to lateralization studies is examination of auditory evoked potentials to linguistic stimuli. Thomas *et al.* (1997) suggested that electroencephalography (EEG) provides a reliable and robust method for assessing changes in lateralization of language functions during recovery, and Cappa (2000) noted the important role that Positron Emission Tomography (PET) and functional Magnetic Resonance Imaging (fMRI) technologies have played in recent aphasia studies. Recovery research varies across a number of important factors, including subject characteristics (e.g., subject age, language, etiology), numbers of subjects per study, type of aphasia examined, nature of symptoms tested, stage of recovery studied, and method of brain assessment used, among others. This variety creates difficulties in the comparison of findings across studies, but there are nevertheless some general (occasionally conflicting) conclusions that can be drawn about the role of the two cerebral hemispheres in recovery from aphasia. They may be summarized as follows: right-hemisphere activity in areas homologous to damaged left-hemisphere zones is frequently observed early in recovery for both anterior and posterior language zones. In later stages of successful recovery, increased activity in damaged left-hemisphere zones, with concommitant diminution of right-hemisphere activation, is often apparent, especially in frontal language areas (Thomas *et al.*, 1997). With temporal-parietal damage, however, a pattern of persistent right-hemisphere activation, even amidst increased left-hemisphere activity, is frequently present in aphasic patients regaining auditory comprehension and semantic processing skills (Thomas *et al.*, 1997; Weiller *et al.*, 1995). At the very least, these principles suggest the desirability of ipsilateral recovery after left-hemisphere damage, but they do not clarify the role of contralateral hemisphere activity during recovery from left-hemisphere damage (Cappa, 2000).

It has been suggested that novel right-hemisphere activity subsequent to left-hemisphere aphasia reflects a variety of possible favorable and nonfavorable behavioral and/or neurological phenomena including, (a) compensatory language processing activity via activation of latent language-capable circuits, (b) disinhibition of the contralateral cortex resulting in 'maladaptive' functional reorganization, and (c) recruitment of additional cognitive resources (attention, memory) to those normally needed for language processing (Belin *et al,*, 1996; Cappa, 2000; Thomas *et al.*, 1997; Weiller *et al.*, 1995).

The work of Papanicolaou and colleagues (1984, 1987, 1988) has shown that chronic aphasics (with LH language dominance) show a larger right-hemisphere response to language stimuli than do either normals or right-hemisphere impaired subjects. Computerized Axial Tomography (CAT) and regional blood flow studies conducted by Knopman (1984) have shown increased and extensive activation of the right-hemisphere cortex during listening tasks at six months (compared to three months) postonset for aphasic speakers who had sustained damage to the left temporoparietal cortex and who still presented with partial deficits in auditory comprehension. Conversely, their subjects whose left-dominant auditory association cortex was spared and who had recovered completely from initial auditory comprehension deficits, showed the predicted left posterior pattern of activation for listening tasks. These findings indicated that for the latter subject group, early comprehension impairments and their resolution were most likely due to disruption and then recovery of ipsilateral neural networks distant to the focal site of lesion. For the former subject group, however, structural damage to left hemisphere local networks dedicated to auditory comprehension precluded recovery of function by that region. Partial functional recovery in their case depended upon assumption of function by capable and diffuse, but less efficient, neural networks in the contralateral hemisphere.

When these studies are compared with those evaluating recovery of frontal function, and in particular, recovery of speech fluency (Vallar *et al.*, 1988), it would seem that the undamaged left- rather than the right-hemisphere cortex is primarily responsible for recovery from nonfluent aphasia (and perhaps

associated speech apraxia). This conclusion is supported by the work of Thomas *et al.* (1997) whose EEG studies of eleven patients with Broca's and Wernicke's aphasias showed an initially right-hemisphere activation pattern in Broca's aphasia shifting with increased recovery to a left-hemisphere frontal pattern. Their patients with Wernicke's aphasia, on the other hand, showed a permanent right-hemisphere shift for tasks in which all patients (fluent and nonfluent) had to search for synonyms to orally presented nouns. Other case studies, however, such as those conducted by Thulborn and colleagues (1999), cited MRI findings to suggest that nonfluent Broca's and fluent Wernicke's aphasias both recover auditory comprehension skills via increased and persistent activation from right-hemisphere homologous zones. Again, differences in subject and methodological variables may account for differences in findings across recovery studies.

The time course for assumption of function by the nondominant cortex for lexical-semantic tasks is not known, although the work of Demeurisse and Capon (1991) has suggested that significant right-hemisphere activity can be observed at three months postonset and Thulborn *et al.* (1999) have suggested that it can be detected at three days poststroke. Bushnell *et al.* (1989) have determined by Single Photon Emission Computerized Tomography (SPECT) analysis that extensive left-hemisphere hypoperfusion at one month postonset correlates inversely with degree of recovery at three months postonset. Interestingly, a SPECT study of subcortical aphasia by Vallar *et al.* (1988) has shown that reduced left-cortical hypoperfusion correlates with poor language recovery, suggesting that hemispheric mechanisms mediate recovery from subcortical, as well as cortical, aphasias. Cappa and Vallar (1992) suggest the superiority of Positron Emission Tomography (PET) scanning as the method of choice for investigating neurological correlates of recovery, but cite PETs limited availability as problematic.

One study that challenges the aforementioned conclusions about cortical neurophysiology and recovery, however, has employed PET technology to evaluate whether improvements in auditory comprehension can be linked to improvements in right or left temporoparietal regional glucose metabolism after stroke. Metter *et al.* (1992) evaluated eight right-handed male subjects who sustained single vascular lesions (sites not given), who had no previous histories of stroke, and who originally presented a variety of mild to severe aphasias. Each patient was scanned twice, first at one month postonset, and again at no sooner than six months postonset. Results showed that six of the eight patients showed improved left-hemisphere temporoparietal glucose metabolism, although the amount of improvement varied across subjects. The highest metabolism rates were found for Wernicke's regions rather than for parietal zones in the six improved subjects. Increased glucose metabolism was also observed in these subjects across the right-hemisphere cortex, with increased metabolism of the right-temporoparietal cortex correlating significantly with left homologous zones. Metabolic findings correlated closely with improved scores on the *Western Aphasia Battery* (WAB) (Kertesz, 1982). Assuming (cautiously) that metabolic change over time may reflect change in brain function, Metter *et al.*'s (1992) findings support the general hypothesis that recovery of comprehension is dependent on recovery of, and/or assumption of function in, the left and right posterior cortex. The contributions of left- and right-hemisphere recovery may not be independent, but may, "interact in such a way as to facilitate the recovery of comprehension" (Metter *et al.*, 1992: 357).

Ansaldo *et al.* (2002) concur that both cerebral hemispheres contribute to recovery from aphasia, though not necessarily at the same time nor to the same degree. In a case study of a young woman with Broca's aphasia secondary to a left fronto–parietal hematoma, Ansaldo and colleagues examined the role of the right and left hemispheres in the processing of nouns and verbs of high and low imageability. A computer-driven lexical decision lateralization task allowed the experimenters to determine that by four months after the onset of Broca's aphasia, the right hemisphere participated more than the left in the comprehension of highly imageable nouns and verbs. By eight months postonset, the right hemisphere was additionally active in the recognition of low imageability words. By a year postonset, however, no distinct lateralization pattern was apparent; the left and right hemispheres participated equally in lexical decision tasks, and oral expression began to show considerable improvement as well. The authors suggest that, in accordance with findings by Karbe *et al.* (1998), right-hemisphere compensatory activity is needed less over time as impaired left hemisphere processing slowly improves (see Cao *et al.*, 1999). Results also point to the recovery of the left-hemisphere Broca's area in the improvement of verbal expression.

If verbal expression depends on sufficient amounts of left-hemisphere frontal cortex for recovery, then large lesions will yield initially severe nonfluent aphasias that will not ameliorate; if large lesions destroy significant amounts of left temporoparietal cortex, the potential for recovery of auditory comprehension is good with right hemisphere assumption of function. However, among even the most severe of

nonfluent aphasias, global aphasia, different recovery profiles can be seen (Ferro, 1992). In a CAT study of 54 Portugese, right-handed, firsttime stroke patients, Ferro (1992) showed that five different lesion locations yielded acute global aphasia: (1) large fronto–temporo–parietal lesions, with or without subcortical extension, (2) anterior, suprasylvian, frontal lesions with or without subcortical damage, (3) large subcortical infarcts, (4) posterior, suprasylvian, parietal infarcts, with or without subcortical extension, and (5) a double lesion composed of a frontal and a temporal infarct. Although patients with lesions from the first location tended to have initially more severe aphasias than patients with the other four lesion loci, language and neuropsychological profiles conducted at one month postonset revealed similar functional profiles across all five groups. By six months postonset, recovery profiles revealed that (1) patients with the first type of lesion had the poorest prognosis, retaining global aphasia and showing limited improvement, (2) patients with lesion locations 2, 3, and 4 showed variable degrees of recovery, improving to Broca's or transcortical aphasia or showing only anomic or speech apraxia deficits, (3) patients with exclusively deep lesions had the best prognosis and some with subcortical and anterior infarcts recovered completely, and (4) patients with lesion location number 5 showed only modest improvement (Ferro, 1992: 427). Ferro noted that while other anatomical sites may also yield global aphasia, his groupings were notable for the similarity of symptoms across groups and the differential recovery patterns identifiable by group, despite the diversity of lesion sites. Ferro (1992) specifically addressed the compatibility of his findings with those of Mesulam (1990), whereby anatomically diverse lesions to a large-scale distributed network, such as that subserving language, are quite capable of yielding transient and relatively similar-looking dysfunctions of the whole network. Further, unless the system sustains massive damage, or damage to a completely dedicated (or modular) local component, recovery should be expected if sufficient stimulation is provided to the damaged processing system.

Anagraphic Factors in Aphasia Recovery

With regard to anagraphic, or personal history, factors, Basso (1992, 2003) suggests that handedness, gender, and even age are not significant prognostic factors. In her recent text *Aphasia and Its Therapy*, Basso (2003: 192) examines the factors influencing recovery and states that, "To my knowledge, no study has tackled the problem of the possible influence of personal factors (age, sex, handedness, and educational level) on the effect of rehabilitation. However, they have been studied in relation to spontaneous recovery and . . . we can safely conclude that the most recent investigations have not demonstrated that they have an important role in recovery (for a review, see Cappa, 1998)." Part of the difficulty in establishing the positive contribution of personal factors to recovery is that it is difficult to isolate them as causative influences in recovery studies. There may be an interaction, for example, between age, aphasia type, and severity of aphasia. An interesting demographic reviewed by Coppens (1991) reveals that Wernicke's aphasia (a frequently severe aphasia associated with poorer recovery than Broca's aphasia (Kertesz, 1988)) is linked more often to older individuals, whereas Broca's aphasia occurs more frequently in younger patients. Although the reason for this remains unclear, common sense would suggest a generally poorer prognosis for older patients due to the increased likelihood of concomitant disease in that population.

The Role of Rehabilitation in Recovery

There appears to be some direct evidence that neural reorganization and functional recovery from aphasia are linked, particularly when reorganization is induced by language rehabilitation training. Further, it appears that neural changes can occur and be detected within minutes of training. Musso and colleagues (1999) studied four stroke patients with auditory comprehension deficits and left hemisphere Wernicke's aphasia in order to address these issues. Assessments of auditory comprehension skills (using a short form of the *Token Test*) were obtained during each of 12 consecutive PET scans, after each of which patients underwent intensive eight-minute language comprehension training sessions. Training-induced improvements on *Token Test* performance were noted across scanning sessions and were correlated with increased activity of the posterior portion of the right superior temporal gyrus and the posterior portion of the left precuneus in subjects studied, suggesting a role for the right hemisphere in recovery from left hemisphere Wernicke's aphasia.

It should be noted that the language training activities used by Musso *et al.* (1999) included five different comprehension tasks presented in varying order and at increased levels of complexity on successive training trials. Tasks required patients to perform actions with objects, to match pictures with objects, to evaluate the semantic correctness of sentences, to evaluate the phonological correctness of sentences, and to match pictures with descriptive sentences. The training tasks tapped into a number of the

component linguistic processes and input/output modalities (e.g., auditory, visual, tactile) involved in language comprehension, processes whose supportive circuitries are normally distributed across many regions of the left and right cerebral hemispheres (especially with regard to semantics). The increasing complexity of the assessment and training tasks across time also placed considerable demands on patients' attention and memory systems, some aspects of which are thought to be mediated by the right hemisphere. Musso and colleagues raise an important point as they interpret their findings: the right-hemisphere activity they recorded might reflect that hemisphere's contribution to language comprehension *per se*, or it might reflect its role in short-term verbal memory (Paulesu *et al.*, 1993), a deficit in which may contribute to aphasic language comprehension impairments (Wilson *et al.*, 1989; Wilson *et al.*, 1995; Hermann, 1992). It is also difficult to know whether the increase in posterior right-hemisphere activity during repeated testing really reflects right-hemisphere activation or left-hemisphere inhibition of right-hemisphere activity, a point that emphasizes the complex nature of language processing across disparate brain areas (Thomas *et al.*, 1997).

Important advances in the treatment in chronic aphasia suggest renewed hope for individuals in whom fluent or nonfluent aphasia has persisted beyond six months postonset. A novel treatment approach dubbed Constraint-Induced Movement Therapy ('CI therapy') has been shown to be effective in improvement of poststroke limb motor skills (Duncan, 1997; Leipert *et al.*, 2000) and may have beneficial application in aphasia rehabilitation. Constraint-induced therapy appears to foster neural reorganization in impaired limbs. Soon after stroke, there is frequently a decrease in the cortical representation of limbs having paralyzed or disused muscles; restraining intact limbs while forcing impaired limbs to perform premorbid functions seems to yield an improved representation of damaged limbs and facilitate neuroplastic changes associated with improved use of those structures (see Liepert *et al.*, 2000 for review).

Part of the beneficial effect of CI therapy for improvement of motor skills may be attributed to the brief but intensive structure of the therapy design (e.g., restraint of a nonaffected limb for 90% of waking hours across 12 days of treatment, 8 days of which also included six hours of behavioral training in the use of the nonrestrained affected limb) (Leipert *et al.*, 2000). While the application of this model to aphasia rehabilitation is somewhat awkward, it has proven useful in the few studies conducted to date. One of the most compelling of those studies was conducted by Pulvermuller *et al.* (2001) with 17 right-handed (three premorbidly ambidextrous) aphasic stroke patients who were monolingual speakers of German. Patients had sustained focal lesions in the territory of the middle cerebral artery; most were diagnosed with Broca's aphasia but four patients exhibited Wernicke's aphasia and three patients exhibited other types of aphasia (transcortical, conduction, and anomic types). The 17 predominantly male subjects with aphasia were randomly assigned to either a constraint-induced treatment group (N = 10; five with moderate aphasia, three with severe aphasia, two with mild aphasia; six with Broca's aphasia, two with Wernicke's aphasia, one with transcortical aphasia, one with anomic aphasia; mean age = 55.4 yrs; mean time postonset = 98.2 months) or a conventional treatment group (N = 7; four with moderate aphasia, one with severe aphasia, two with mild aphasia; four with Broca's aphasia, two with Wernicke's aphasia, one with conduction aphasia; mean age = 53.9 yrs; mean time postonset = 24.0 months). Both treatment groups received the same total amount of therapy time, although the delivery structure was organized differently per group: the CI therapy group received 3–4 hours of speech–language therapy per day for 10 days (mean hours of treatment = 31.5), whereas the conventional treatment group received an equivalent number of treatment hours (mean = 33.9) distributed across 3–5 weeks.

The treatment approach used with the CI group was similar to that of the PACE (Promoting Aphasics' Communicative Effectiveness) method (for a description, see Davis and Wilcox, 1985), where speakers must communicate effectively across a barrier about a hidden referent (picture or object). Importantly, and unlike the conventions of PACE therapy, patients with aphasia in the CI group were required to use only verbal communication, the modality that was most difficult for them after the onset of aphasia. They were required to perform systematic massed practice of speech acts that were extremely difficult for them, and they were not allowed to use compensatory techniques or other communicative modalities that would more easily allow them to exchange information. Patients assigned to the conventional treatment group received intervention described by Pulvermuller *et al.* (2001) as a syndrome-specific standard approach to aphasia rehabilitation based on classic principles established by Hildred Schuell (1974) and targeting skills in naming, verbal repetition, sentence completion, following instructions, and conversation.

The results of the Pulvermuller *et al.* (2001) study revealed that subjects in the CI treatment group performed significantly better on a posttreatment

administration of the *Aachen Aphasia Test* (Huber *et al.*, 1983) than did the subjects in the conventional treatment group. The CI subjects also appeared to have a greater improvement in everyday communication skills than did subjects in the conventional treatment group. This finding was particularly intriguing given that the subjects in the CI treatment group had, on average, exhibited chronic aphasia for almost four times the average duration of that of the conventional treatment group. It is not often the case that patients with moderate-severe aphasia improve so rapidly during the course of treatment. More typical is the Pulvermuller *et al.* (2001) finding for the subjects in the conventional treatment group, where no significant gains in language performance were apparent during therapy posttesting.

Pulvermuller and colleagues (2001) were careful to note that the design of their study did not allow them to determine whether the most beneficial treatment factor for patients in the CI group was the massed practice component, the constraints on responding to treatment stimuli, or the apparent communicative relevance of the therapeutic tasks. They did suggest, however, that the combination of all three may stimulate neural mechanisms underlying brain plasticity, heretofore suppressed by learned nonuse of verbal language, to aid recovery even in people whose aphasia had lasted, on average, eight or more years. Whether these results can be generalized to other patient populations (such as those who are older) is not known.

New behavioral treatment paradigms such as constraint-induced therapy or computer-assisted interventions (Aftonomos *et al.*, 1997) give hope to individuals with chronic aphasia – those who have traditionally been advised that recovery stops after six months to a year postonset. Another exciting trend with the potential to improve recovery is the pharmacological management of acute, subacute, and chronic aphasia, especially when such potentially useful medications as piracetam, bromocriptine, and dextroamphetamine, among others, are combined with speech–language therapy. The following recent sources provide more information on this topic: Bragoni *et al.* (2000), Deberdt, (1994), Greener *et al.* (2001), Huber (1999), Muller and von Crammon (1994), Troisi *et al.* (2002), Walker-Batson *et al.* (2001).

Conclusion

Research investigating the mechanisms of recovery in aphasia proceeds from several different and occasionally overlapping lines of evidence: neuroimaging studies, lateralization studies, and treatment studies. Each approach provides a unique perspective on the reemergence of language function after stroke, but some conclusions can be drawn from findings across various types of studies. Basso (1992) acknowledged the interdependence of lesion site and size with aphasia type and initial severity, and suggested the superiority of initial severity for predicting aphasia prognosis. She noted that traumatic aphasia generally has a better prognosis than vascular aphasia, and that among vascular etiologies, hemorrhage generally predicts the poorest recovery.

Whereas improvement can generally be predicted for aphasic speakers as a group, it is relatively difficult to predict recovery for individual patients, especially during the acute (two weeks postonset) period of illness; findings are mixed as to whether outcome severity can be predicted well during the acute phase of aphasia (Wallesch *et al.*, 1992). Initial communication ratings for spontaneous speech may be more reliable than semantic, syntactic, or phonological factors in outcome prediction: poor initial communication abilities may predict poor recovery, because impaired communication suggests the presence of other limbic, reticular, and/or cognitive deficits that, if present, would exacerbate an aphasia.

Initial severity of aphasia (past the two-week post-stroke milestone) nevertheless remains the single most reliable predictor of aphasia recovery. With respect to lesion site, although it is tied to aphasia type, it generally has more influence on initial severity than on the degree of ultimate recovery (Basso, 1992). Mohr *et al.* (1978) and Brunner *et al.* (1982) have suggested that lesions relegated solely to Broca's area most often create transient and moderate aphasia, whereas lesions to Wernicke's cortex are associated with severe and persistent aphasia. Posterior extent of lesion appears to influence initial severity, and thus long-term outcome, regardless of whether lesion sites are focused in the frontal or temporal–parietal cortex (Basso, 1992). Findings from Ludlow *et al.* (1986) concur, illustrating that of 39 patients with traumatic Broca's aphasia, those whose initial lesions extended farther posteriorly remained aphasic 15 years post-onset while those whose lesions extended more anteriorly had fully recovered. It is tempting to conclude that because posterior extension usually impacts auditory comprehension, recovery of comprehension must lag behind expression. However, the opposite appears to be the case. According to Basso (1992: 345) "... a higher percentage of patients improve in comprehension than production and ... in oral than in written language."

Mesulam (1990) reminds us that Broca's and Wernicke's type aphasias each have associated receptive and expressive deficits. So regardless of aphasia type, we should expect expressive deficits to outlast

deficits in comprehension simply because the active formulation and expression of language is a more complex cognitive exercise than that which is needed for comprehension (Mazzoni *et al.*, 1992). Why, then, should lesions that extend farther into the posterior auditory associative cortex yield initially more severe and ultimately more persistent aphasias than those that extend into the motor cortex?

The answers to this and other questions related to aphasia recovery are not known, but they may ultimately be found in studies of poststroke brain neurophysiology that examines the differential contributions of the dominant and nondominant language cortex (and subcortex) to language recovery. Studies investigating the nature of neural reorganization after stroke and research defining the specific role that speech–language rehabilitation plays in recovery from subacute and chronic aphasia will provide important advances in our understanding of recovery from aphasia.

See also: Aphasia Syndromes.

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Recursion

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A recursive structure is one in which a constituent dominates another instance of the same syntactic category. Recursion is an important notion in linguistic theory, playing an important role in accounting formally for linguistic creativity. All human languages have recursive properties, and some human thought processes are also recursive. Some linguists claim that recursion is the main defining property that makes human language different from the communication systems of any other species.

In (1) is a small set of recursive rules (the arrow '→' stands for 'can consist of').

(1a) X → Y
(1b) X → X Z

What makes these rules recursive is that X is the output of (1b) and also the input to (1a) and (1b). The rules state that an X can consist of a Y (1a) or an X followed by a Z (1b). These rules characterize any of the sequences in (2).

(2a) Y
(2b) Y Z
(2c) Y Z Z
(2d) Y Z Z Z

In fact, they account for any sequence that contains a Y followed by any number of Zs from zero upward, that is to say an infinite set of sequences. Recursion in human languages is more extensive than this, and so is the creativity of human language.

The creativity of human language can be demonstrated in at least two ways. First, by producing an utterance that it is unlikely that anyone has ever heard before but that speakers of a language will understand, such as (3):

(3) Billy hoped that the runner bean that symbolised the human language faculty hadn't been knocked off the mantelpiece when he adjusted the souvenir from his surfing holiday in Shetland.

Second, by considering specific ways in which sentences seem to be endlessly expandable, illustrated in (4).

(4) Keith said that Billy thought that this was the book that annoyed the linguist who surprised the psychologist when he said that recursion was the most important defining property of human language.

Example (4) involves two distinct recursive processes, each of which provides a means for generating an infinite set of sentences in English. First, we can embed strings within other strings, using verbs that report speech or thought, such as *say* or *think*. We could, for example, create yet another sentence by adding *Sylvia wondered whether* at the front of (4) to give us (5).

(5) Sylvia wondered whether Keith said that Billy thought that this was the book that annoyed the linguist who surprised the psychologist when he said that recursion was the most important defining property of human language.

This process could, of course, be repeated again and again.

Second, we can embed clauses inside noun phrases ('*the book that annoyed…*'). We could expand (4) still further by adding *the chapter that was in* before *the book* to give:

(6) Sylvia wondered whether Keith said that Billy thought that this was the chapter that was in the book that annoyed the linguist who surprised the psychologist when he said that recursion was the most important defining property of human language.

One of the most important insights of Chomsky's approach to linguistics was the observation that language made 'infinite use of finite means' (Chomsky, 1965: 8, quoting von Humboldt, 1836a: 221 and

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One of the most important insights of Chomsky's approach to linguistics was the observation that language made 'infinite use of finite means' (Chomsky, 1965: 8, quoting von Humboldt, 1836a: 221 and

1836b: 91) and that this fact could be captured in terms of formal rules of grammar that were recursive. A small set of recursive rules for language is illustrated in (7). ('S' stands for 'any sentence', 'NP' stands for 'any noun phrase', 'VP' stands for 'any verb phrase', 'V' stands for 'any verb', 'Art' stands for 'any article', 'N' stands for 'any noun'. The arrow '→' stands for 'can consist of'.)

(7a) S → NP VP
(7b) VP → V NP
(7c) NP → Art N
(7d) VP → V S

Rule (7a) says that a sentence can consist of a noun phrase followed by a verb phrase. Rule (7b) says that a verb phrase can consist of a verb followed by a noun phrase. Rule (7c) says that a noun phrase can consist of an article followed by a noun. Assuming the existence of just the article *the*, the nouns *man* and *woman*, and the verb *saw*, rules (7a), (7b), and (7c) characterize just the four sentences in (8).

(8a) The man saw the man.
(8b) The man saw the woman.
(8c) The woman saw the man.
(8d) The woman saw the woman.

Rule (7d) says that a verb phrase can consist of a verb followed by a sentence. Since a sentence can now contain a verb phrase that itself contains a sentence, our rules now characterize an infinite set of sentences, including (assuming the existence of an extra verb *thought*) those in (9).

(9a) The man thought the woman saw the man.
(9b) The woman thought the man thought the man saw the man.
(9c) The man thought the man thought the man thought the woman saw the man.

The actual rules of the grammar for an actual language will be much more complicated than this, but this is enough to show how a Chomskyan grammar using recursive rules can characterize the grammaticality of an infinite set of sentences. In this way, the rules characterize the fact that language makes 'infinite use of finite means.'

A related, but distinct, notion in linguistics is the notion of 'iteration.' It is sometimes suggested that recursion and iteration are the same thing, but technically they are distinct. An iterative process is illustrated in (10).

(10a) He was very happy
(10b) He was very very happy
(10c) He was very very very happy

Here the word *very* is being repeated for emphasis, but this is not true recursion. One piece of evidence that this is not true recursion is that *very*, which combines only with adjectives or adverbs, cannot be used in a recursive structure with other degree words that combine only with adjectives or adverbs, as in (11). (The asterisk '*' indicates an ungrammatical expression.)

(11a) *too very happy
(11b) *very too happy
(11c) *as very happy
(11d) *very as happy

It is not only human language that is recursive. We can also entertain thoughts that contain other thoughts. I might think, for example, that you think that I think that Fred thinks. . .and so on. Work with primates (Tomasello and Hare, 2003) has suggested that they can represent recursive thoughts, but only to a limited degree. So it is possible that our ability to handle recursion is one thing that marks us as different from other species and that this was significant in the development of human language. Perhaps Hauser *et al.* (2002) have taken the strongest view on this, suggesting that recursion is the one key defining feature of language seen as a mental faculty.

See also: Chomsky, Noam (b. 1928); Evolution of Syntax; Evolutionary Theories of Language: Current Theories; Sentence Processing.

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Reductionism

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In philosophy, the term 'reductive' is applied to any attempt to explain a complex phenomenon entirely in terms of simpler, or more clearly understood, phenomena. Reductionism is therefore the doctrine that explanations should involve, or be reduced to, the simplest and the fewest elements possible. Proponents of reductive theories claim that they allow systematic explanations of theoretically problematic entities. Opponents argue that, by concentrating on selective aspects of a complex phenomenon, reductionism can result in unjustified oversimplifications in comparison to more holistic approaches.

Within the philosophy of language, there have been various attempts to explain meaning in terms of other, arguably more theoretically tractable, systems. Accounts of linguistic meaning in terms of logic, for example, could be described as reductive. These include the logical notation proposed by Gottlob Frege, the verificationism of the Vienna Circle, and the truth theories elaborated by Alfred Tarski and Donald Davidson.

One of the major debates in mid-20th-century linguistics, Noam Chomsky's response to behaviorism, centered on a particular type of reductionism. Behaviorism draws on a reductive theory of mind, in that it explains apparently complex mental phenomena with reference only to behavior established by reinforced responses. In his 1957 book *Verbal Behavior,* B. F. Skinner argued that the acquisition and use of language could be explained in terms of conditioned behavior. In his review of this book, Chomsky argued that it was only by vastly oversimplifying the facts of language that Skinner was able to exclude any reference to mental phenomena; when the true nature of language, including creativity, was taken into account, it was clear that it could not be reduced to the observable behavior of speakers.

Reductive impulses can, however, be traced in Chomsky's own account of language. Concentrating on language as a mental phenomenon, Chomsky explains it as an innate faculty, an inherent part of human nature, and therefore ultimately a matter of biology. Criticism has been voiced, for instance within the movement of 'integrational linguistics,' of this attempt to reduce the linguistic to the biological. Chomsky's insistence that the mental structure of language is the only legitimate focus of linguistic study has further been dismissed as an attempt to reduce the intricacy of human communication to a narrowly grammatical system. Chomsky's defenders argue that his theories do not attempt to explain all of human communication, a prohibitively complex undertaking, but only the core linguistic component of it.

Reductive approaches are to be found throughout present-day linguistics, and indeed the general ambition within many branches of linguistic theory is to explain complex sets of facts by means of a restricted number of entities and methods of combination. For instance, phonology explains the diversity of speech sounds of a particular language by means of a limited number of phonemes. Syntax explains the infinite possibility of sentences for any language in terms of a finite set of words and grammatical rules. Indeed, it could be argued that at least some degree of reductionism is an inevitable precondition for any explanatorily successful theory.

See also: Behaviorism: Varieties; Behaviorism: Varieties; Chomsky, Noam (b. 1928); Frege, Gottlob (1848–1925); Holism, Semantic and Epistemic; Integrational Linguistics and Semiology; Logic and Language: Philosophical Aspects; Tarski, Alfred (1902–1983); Truth: Theories of in Philosophy; Verificationism.

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Reduplication

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Reduplication is a morphological word formation process in which some portion of a word is doubled. Total reduplication doubles the entire word or stem, as in Indonesian noun pluralization (e.g., *buku* 'book,' *buku-buku* 'books'; Cohn, 1989); partial reduplication doubles some phonologically characterized subpart of the word or stem, as in Agta (Central Cagayan) noun pluralization (e.g., *takki* 'leg,' *tak-takki* 'legs'; Marantz, 1982).

Reduplication is often semantically iconic, conferring, for example, plurality on nouns; intensity or attentuation on adjectives; and pluractionality, iterativity, progressivity, intensity, or attenuation on verbs. Reduplication (especially when partial) can also be found with less iconic and quite diverse semantic or morphological functions, including noun-to-verb derivation, verb-to-noun derivation, intransitivization, subject agreement, and possessive marking. Works surveying crosslinguistic reduplicative semantics include Moravcsik (1978), Kiyomi (1993), Regier (1994), and Niepokuj (1997).

Reduplication has attracted the greatest attention in the theoretical literature for the light it sheds on morphology, phonology, and their interface. Most discussion focuses on partial reduplication, which varies widely both within and across languages.

Morphology

Reduplication can be the sole marker of a morphological category, as in Indonesian and Agta noun pluralization, or it can be a required concomitant of particular affixes. In Roviana, for example, the derivation of instrumental or locational nouns from verbs is marked simultaneously by reduplication and the suffix *-ana*; thus *ha^{m}bo* 'sit' nominalizes as *ha^{m}bo-ha^{m}botu-ana* 'chair' (Corston-Oliver, 2002: 469). The reduplication co-occurring with *-ana* serves no distinct semantic function of its own.

The literature offers several points of view as to whether reduplication should be classified morphologically as affixation or compounding. Many researchers have adopted the proposal by Marantz (1982) that all reduplication, whether partial or total, is the affixation of a phonologically skeletal morpheme. Lacking a segmental substance of its own, the reduplicative skeleton is fleshed out by copying the segmental content of the base of affixation and associating the copied segments to the reduplicative skeleton (see Figure 1). For total reduplication, Marantz

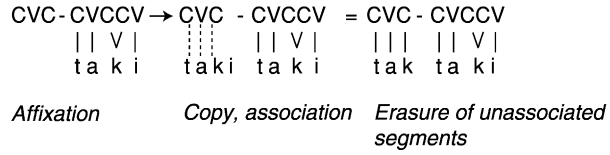

Figure 1 Reduplication as the affixation of a phonologically skeletal morpheme.

proposes the affixation of a segmentally empty morpheme that can accommodate all of the copied segments, regardless of number; subsequent work by McCarthy and Prince (1986) suggests instead the affixation of a prosodic word constituent (see later discussion).

An alternative view sees reduplication not as phonological copying, driven by a skeletal affix, but as morphological doubling, namely the requirement that a given morphological subconstituent occur twice in the same word; the difference between total and partial reduplication lies in whether or not one of these copies is phonologically truncated. As morphological doubling, reduplication is more structurally similar to compounding than to affixation; it is a subtype of compounding in which the two members must mean the same thing. In support of this view, Inkelas and Zoll (2005) cite cases of synonym compounding and 'divergent allomorphy,' in which the two copies can differ in their morphological and phonological makeup as long as their meanings are identical. In Ndebele verb stem reduplication, for example,

lim-il-e
'cultivate for/with (subjunctive)'

lim-a-lim-il-e
'cultivate for/with (subjunctive), here and there'

the stem *lim-il-e* reduplicates as *lim-a* + *lim-il-e*, where the *-a* appearing in the first copy is a semantically empty suffix that is used elsewhere in the language but is not present in *lim-il-e* (Sibanda, 2004).

Recent work in Optimality Theory has appealed to both the affixation and compounding analyses of reduplication; Generalized Template Theory holds that some cases of partial reduplication should be viewed as affixation, whereas reduplication, as well as some types of partial reduplication, should be viewed as compounding (McCarthy and Prince, 1994; Urbanczyk, 1996).

Phonological Shape of Partial Reduplicants

In a seminal article, Moravcsik (1978) observed that partial reduplication does not, in general, seem to duplicate some existing phonological constituent

(e.g., syllable) of the base, regardless of its segmental makeup. Rather, partial reduplicants tend to have their own invariant overall shape. The typology of possible shapes has been a major topic of discussion in the literature. McCarthy and Prince (1986) contributed the observation that the range of possible reduplicant shapes mirrors the range of patterns that are found in truncation: Both reduplicative and non-reduplicative truncation make use of the constituents in the prosodic hierarchy, namely mora, syllable, foot, and prosodic word. Total reduplication requires only that the reduplicant be a prosodic word, with no upper limit on its size. Partial reduplication occurs when the reduplicant is required to be a mora, syllable, or foot, and the base happens to be long.

A recent topic of discussion in the literature has been the duplication of single segments (e.g., Hendricks, 1999). In Spokane, for example, the repetitive infix *-e-* occurs inside a word-initial consonant cluster, for example, /*e-* + *šl'n'tén'*/ → *š-e-l'n'tén'* 'I cut it up repeatedly'; when the word begins with a CV sequence, however, the infix is prefixed, and the word-initial consonant is copied to its left, for example, /*e-* + *n'íč'n'tx*^{w}/ → *n'*-e-*n'íč'n'tx*^{w} 'you kept cutting' (Bates and Carlson, 1998: 655). Single-segment copying differs in at least two ways from more canonical reduplication patterns: (1) It does not involve a constituent of the prosodic hierarchy, (2) it has no parallel in truncation, and (3) it is typically motivated on purely phonological grounds rather than realizing a morphological category. For these reasons, it has been suggested that single-segment duplication should be considered a phonological operation, whereas reduplication is a morphological process (Yu, 2003; Inkelas and Zoll, 2005).

Phonological Reduction in Reduplicants

A second major phonological generalization about partial reduplicants is that they are often structurally reduced. In an influential crosslinguistic survey, Steriade (1988) found that partial reduplicants often reduce vowel length contrasts, simplify consonant clusters, or collapse quality distinctions among vowels or consonants. For example, initial syllable reduplication simplifies consonant clusters in Sanskrit (*krand* → *kan-i-krand* 'cry out'; Steriade, 1988) and Tagalog (*ka-trabaho* → *ka-ta-trabaho* 'just finished working'; McCarthy and Prince, 1986). Steriade's finding that partial reduplicants are often structurally unmarked relative to their bases underlies the Base-Reduplication Correspondence Theory (BRCT) approach to reduplication developed within Optimality Theory by McCarthy and Prince (1995). In BRCT, the phonological correspondence between the reduplicant and base (FAITH$_{BR}$) not only provides the reduplicant with phonological substance but also actively enforces surface phonological identity between the copies. If FAITH$_{BR}$ is top-ranked, the reduplicant and base will not differ; if a markedness constraint is ranked above FAITH$_{BR}$, the reduplicant will be phonologically unmarked relative to the base. The consonant cluster reduction in Sanskrit and Tagalog reduplicants would follow, on this approach, from the ranking *COMPLEX-ONSET » MAX-C$_{BR}$.

Markedness reduction of this kind appears to be specific to partial reduplication; it is virtually unknown in total reduplication, with the exception of tone, which often fails to reduplicate (Downing, 2005).

Fixed Segmentism in Reduplication

Although rarely, if ever, reduced in overall markedness, total reduplication is often subject to the kind of fixed segmentism termed Melodic Overwriting (McCarthy and Prince, 1986), in which part of the copy is supplanted by a fixed segmental string. In Kolami echo reduplication, for example, the initial portion of the first syllable of the second copy is replaced by *gi*, for example, *kota* → *kota-gita* 'bring it if you want to' (Emeneau, 1955). Melodic Overwriting is an extreme case of affixation accompanied by reduplication, as previously mentioned, the difference being that in Melodic Overwriting, the affix competes with the reduplicant for surface position. Although the superimposed material is usually at one edge, it can also be medial; in Amele irregular iterative reduplication, for example, all vowels in the copy are replaced: *bala-doʔ* → *bala-bulu-doʔ* 'to tear and scatter', *ʔaʔagan-eʔ* → *ʔaʔagan-ʔuʔugun-eʔ* 'to talk sporadically in sleep' (Roberts, 1991). Siroi adjective pluralization exhibits replacement of a medial consonant with /g/, which has the further unusual property of occurring in both copies: *maye* → *mage-mage* 'good (pl.)' (Wells, 1979). Melodic Overwriting is more common in total reduplication than in partial reduplication.

Phonological Opacity in Reduplication

The phonological aspect of reduplication that has been the focus of the most intense discussion in recent years is opacity. Although phonologically opaque alternations are known to occur outside of reduplication as well, they have attracted special attention in reduplication, perhaps because they are especially prevalent there; the terms 'underapplication' and 'overapplication' are generally used only for reduplicative opacity. Most instances of reduplicative opacity occur in partial reduplication.

In Javanese, for example, /a/ raises to [ɔ] when word-final (Horne, 1961: 70). Raising is not expected in forms such as *medja-medja-ku* 'my tables,' in which an /a/-final stem is both reduplicated and suffixed because neither /a/ is word-final. When reduplication occurs without suffixation, however, raising occurs in both copies: *medjɔ̯-medjɔ* 'tables.' Raising is transparent in the second, word-final, copy but overapplies, opaquely, in the first.

One popular take on reduplicative opacity is that it results from the pressure for the reduplicant and base to be phonologically identical on the surface (Wilbur, 1973); this pressure can foil the transparent application of phonological alternations that might otherwise disrupt base-reduplicant identity. Wilbur's identity principle underlies McCarthy and Prince's BRCT theory.

Kiparsky (2000) took a broader view, attributing opacity within and outside reduplication to stratal interleaving, not to a reduplication-specific identity imperative. According to Kiparsky, opacity results when the phonology of one morphological stratum (e.g., word-level) obscures the phonology of an earlier stratum (e.g., stem-level). This effect is easily seen in cases such as Chamorro, in which final-CV reduplication (*buníta* → *buníta-ta* 'very pretty'; *mági* → *mági-gi* 'nearest') obscures an otherwise very regular pattern of stem-penultimate stress (e.g., *karéta* 'car,' *karetá-hu* 'my car') (Topping, 1973). In a model such as Kiparsky's, Chamorro reduplication is a word-level process, whereas penultimate stress assignment is stem-level.

See also: Affixation; Compound; Inflection and Derivation; Morphology: Optimality Theory; Prosodic Morphology; Word Formation.

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Reference: Philosophical Theories

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What Is Reference?

Reference is the relation that obtains between a use of a linguistic expression and what it stands for or denotes. Philosophical theories of reference aim to explain this relation. They address questions such as: Can we specify necessary or sufficient conditions for a use of an expression to single out some particular referent? What makes it the case that a sequence of marks or noises refers to what it does? What grounds the conventional word-referent relations that we take for granted in the unreflective course of linguistic communication?

Reference is a fundamental concept within the subdiscipline of philosophical inquiry that studies language and thought. It is intimately tied to some other core concepts, such as meaning, truth, and representation, and it lies at the root of various general philosophical issues. To cite a few illustrative examples (some of which are discussed later): [1] there is a venerable tradition of using data about referring expressions to support metaphysical and epistemological conclusions about their referents, running at least from Aristotle's *Categories* through to many influential 20th-century works; [2] the ancient problem of nonbeing – cf. Plato's *Parmenides* for a classic discussion, and Lewis (1986) for discussion of some contemporary variants – is in part a problem about reference to nonactual, or nonconcrete, objects; [3] reference plays a central role in some of the most provocative and broad-ranging recent work in philosophy, including in particular the varieties of externalist arguments spurred by Kripke (1972) and Putnam (1975).

Proper names take center stage in debates about reference, as names are explicitly introduced to refer to specific individuals. Other much-discussed, basic cases of reference include uses of demonstratives (such as 'that duck') and indexical pronouns ('she') to refer to individuals which the speaker currently has in mind. Beyond these paradigm cases, though, there is not much uncontested ground. For example, there are long-standing debates over whether definite descriptions – expressions of the form 'the F' – should be classified as referring expressions (for discussion, *see* **Descriptions, Definite and Indefinite: Philosophical Aspects**).

In addition to such differences of opinion, there also are significant differences of usage. In its strictest sense, 'reference' applies only to the relation between singular terms (such as names and pronouns) and what they are used to single out. On this usage, 'reference' names the simplest sort of word-object relation; and whatever the semantic relations are, precisely, that are involved in, say, general terms ('justice') or predicates ('is tall'), they are distinct from reference. In a broader sense of the term 'reference,' any expression that makes a difference to the truth-conditions of sentences in which it occurs thereby has a referent – general terms refer to universals, predicates refer to properties, and so on. So, in the former, strict sense of the term, the theory of reference is more or less co-extensive with the study of the semantics of singular terms, whereas, in the latter, broad sense, the business of the theory of reference is to assign semantic values to all independently meaningful expressions.

There also are differing views as to whether the term 'reference' just applies to language-world relations, or whether mental phenomena, such as concepts, also should be said to refer. On the one hand, some treat 'reference' as a two-place relation between a representation and what it represents, and so take the term to apply in kind to (at least) word-world and concept-world relations. In this inclusive sense, all thought or talk about something in particular involves reference to it. On the other hand, there are those who hold that there are important differences between referring to something and thinking of it, and so restrict to the term 'reference' to language-world relations. Their point is not so much to deny that the problems of word-reference and of concept-reference are intimately related – that is true on virtually any approach to the relation between language and thought. Rather, their point is that referring is something that speakers do in the course of performing speech acts, not something that words themselves do. These theorists hold that the fundamental notion in the theory of reference is *speaker's reference* – an irreducibly four-place relation involving a speaker, an expression, an audience, and a context.

For comprehensiveness, I will use the term 'reference' in a fairly broad, inclusive sense. For brevity, I will concentrate on uses of words, and I will treat reference as a two-place relation between a use of a word and its referent. Given these preliminaries and assumptions, the central problem for a theory of reference is to come up with a true, informative account of what the 'R' stands for in the schema:

[Ref] 'X' refers to Y if 'X' stands in relation R to Y

Descriptivism

Descriptivist Theories of Reference

Even though philosophical problems that turn on the notion of reference are more or less as old as philosophy, the development of theories of reference – of explicit attempts to articulate how it is that terms reach out to their referents – does not occur until the seminal semantic work of Frege and Russell. (Some might argue that the idea theorists of the early Modern period had a theory of reference – *see* **Ideational Theories of Meaning** for discussion.) Down different avenues, Frege and Russell both defend descriptivist views about reference, and their views dominated the scene for most of the 20th century.

Descriptivists take the definite description ('the tallest woman in Mongolia', 'the millionth car to roll off this assembly line') as the paradigm for understanding the word-object referential link. The relation between descriptions and their referents is relatively straightforward: the term expresses an identifying condition, and designates whatever (if anything) uniquely satisfies that condition. In its most general sense, 'descriptivism' names the view that this is how reference works, that words refer to specific things by expressing an identifying condition which singles out the referent. For starters, then, let us characterize the core tenet of a descriptivist theory of reference as follows:

> [D] 'X' refers to Y if Y satisfies the descriptive condition expressed by 'X'

There are more specific variants of descriptivism, which just apply to a distinctive category of terms, as opposed to making claims about reference in general. (For example, Lewis (1970) develops a descriptivist approach to theoretical terms.) The most common usage of 'descriptivism,' though, specifically designates an approach to ordinary proper names. According to this view, names such as 'Aristotle' or 'Romania' hook onto and express information about something in particular, akin to descriptions, by expressing a uniquely identifying condition and designating whatever satisfies the condition. This approach to ordinary proper names is the kernel in common among Frege's and Russell's otherwise rather divergent views about reference.

Frege's and Russell's Versions of Descriptivism

In their earliest work, Frege and Russell both espoused referentialist views of meaning, according to which the meaning of an expression is whatever it is to which the expression refers. However, they came to believe that referentialism must be rejected or modified, because two terms can have the same referent but differ in meaning.

Frege's signature example concerns the names 'Hesperus' and 'Phosphorus.' According to the lore, the Evening Star (the brightest heavenly body in the evening sky at certain times of the year) was baptized 'Hesperus,' whereas the Morning Star (the brightest body in the dawn sky at certain times) was baptized 'Phosphorus'. With the growth of astronomical knowledge, it turns out that Hesperus *is* Phosphorus, and that is not a star at all but the planet Venus. Frege and Russell agree that pairs of sentences such as the following differ in meaning:

1a. Hesperus is Hesperus.
1b. Hesperus is Phosphorus.
2a. The ancient Babylonians believed that Hesperus is visible in the evening.
2b. The ancient Babylonians believed that Phosphorus is visible in the evening.

However, because these sentences are constructed from co-referential parts, the referentialist view is committed to treating them as synonymous.

Frege (1892) concludes that, in general, the meaning of a term is not just its referent. Instead, every significant linguistic expression is associated with a sense that determines its referent. The sense specifies the condition that must be met in order to be the referent, which clearly differ for the cases of 'Hesperus' and 'Phosphorus.' Co-referential expressions can have distinct senses, and expressions need not have an actual concrete referent to have a sense. Thus, on Frege's view:

> [D, Frege] 'X' refers to Y if Y satisfies the sense 'X' expresses

This type of view is called 'mediated' or 'indirect' reference. The link between word and referent is *indirect* because there is something *mediating* the word-referent link. On this approach, any referential relation involves three terms: [1] a sign or symbol, [2] its sense, and [3] the referent picked out by the sense. (Note that there may be no actual entity to serve as term [3] – as in the case of, say, 'Santa Claus' or 'Pegasus.' However, such cases still fit with the general picture, as the names express a sense that specifies the condition that must be met to count as the referent.) (*see* **Sense and Reference: Philosophical Aspects** for more on Frege's view.)

Russell rejects Frege's views, arguing that the postulation of intermediaries between word and referent creates rather than solves problems. Russell's view is premised on a firm distinction between the following two sorts of term: "(1) a *name*, which is a simple symbol, directly designating an individual which is

its meaning, and having this meaning ... independently of all other words; (2) a *description*, which consists of several words, whose meanings are already fixed, and from which results whatever is to be taken as the 'meaning' of the description" (1919: 283). (Following Russell [1918], I'll call the former 'logically proper names.') Concerning logically proper names, Russell is a direct reference theorist, an unrepentant referentialist. Reference is *direct* in that there is no third term mediating the word-referent relation. The meaning of a logically proper name is its referent.

However, for the reasons illustrated by (1a–b) and (2a–b) above, Russell argues that ordinary proper names (such as 'Hesperus' or 'Aristotle') belong in the category of descriptions, not of logically proper names. He holds that it is not possible for co-referential logically proper names to differ in meaning – "For the name itself is merely a means of pointing to the thing ... so that if one thing has two names, you make exactly the same assertion whichever of the two names you use ..." (1918: 245). In contrast, descriptions (such as 'the inventor of bifocals' and 'the first Postmaster General of the US') can differ in meaning while describing the same referent. Russell concludes that, since ordinary proper names are subject to the phenomena illustrated by (1a–b) and (2a–b), they are really just disguised or abbreviated descriptions – "Common words, even proper names, are usually really descriptions" (1911: 253). Thus, Russell also espouses a form of descriptivism:

> [D, Russell] For any ordinary proper name 'N', 'N' refers to Y if Y satisfies the description 'the F' which the speaker has in mind in uttering 'N'

Differences Between Descriptivist Views

Despite the fact that Frege and Russell both espouse descriptivist accounts of ordinary names, their approaches to reference are quite far apart. On Russell's direct reference view, there must be some primitive cases in which it is impossible to have sameness of referent but distinctness of meaning. He holds that we must be directly acquainted, and not just indirectly linked via descriptions, with the referents of some of our terms. (Otherwise "... we get the conclusion that we know nothing at all about ..." the referents of our terms, as Russell puts the point in a letter to Frege [reprinted in Frege (1980: 169)].) So, apart from, and more fundamental than, his views about ordinary names, Russell espouses an acquaintance-based theory of reference:

> [A] 'X' refers to Y if Y is the entity with which the speaker is acquainted that the speaker intends to single out by uttering 'X'

(It is crucial to Russell's view that acquaintance is *immediate*, in that for any co-referential pair 'X'-'X*,' one cannot be acquainted with their referent and yet judge that X is distinct from X*.) Russell holds that one can only use a logically proper name to refer to something to which one is directly acquainted (1918: 201). Furthermore, even in the case of a description, one can only understand a description if one is acquainted with the meanings of the terms of which it is composed (1911: *passim*) – i.e., to understand the term 'the tallest woman in the room', one must be acquainted with the meanings of 'tallest,' 'woman,' 'room,' and so on.

According to Russell, one needs to fall back on something like [A] in order to address questions that are subsequent to, and more fundamental than, a commitment to some version of [D]. In effect, [D, Russell] reduces the ordinary-naming-relation to the description-relation; but still, according to Russell, we do not yet have a theory of reference. In order to explain how 'the tallest woman in the room' expresses the specific identifying condition that it does, one needs an account of the referents of its primitive parts – i.e., a theory of reference for 'tallest,' 'woman,' and so on. Furthermore, this account had better not just appeal to more descriptions, or else we are not getting anywhere. So, Russell holds that [D] needs to be supplemented, if we are to have an account of how our utterances get hooked up to particular referents.

This problem never seems to have bothered Frege; and yet it is not clear whether this is an oversight. (Perhaps Frege's senses are relevantly different from Russell's descriptions; perhaps the moral is that a direct-reference-descriptivism needs to be supplemented by something like [A], whereas an indirect-reference-descriptivism does not.) In any case, it can be argued that [D] is not yet a theory of reference, because it presupposes, rather than explains or grounds, reference. To help oneself to some specific Y as that which satisfies the descriptive condition expressed by 'X,' so this Russellian allegation goes, is to beg the very question that a theory of reference ought to answer.

No such worry applies to [A]. Acquaintance is a clear and distinct answer to the fundamental question of reference. However, it puts rather tight constraints on reference. By 1918, Russell's insistence that one must be immediately acquainted with something in order to refer to it lead him to the view that only 'this', used to refer to current sense impressions, qualifies as a referring expression. Subsequent theorists have found this unacceptable, and so reject Russell's tight restrictions on reference.

For decades, work in the theory of reference consisted largely of the development of other variants of

descriptivism (cf. Searle [1958]; Strawson [1959]). However, some deep criticisms of descriptivism emerged in the 1970s, which lead to another major wave of original work in the theory of reference.

Antidescriptivism and the Causal-Historical Theory of Reference

Problems With Descriptivism

Kripke (1972) is the most thorough and influential critic of descriptivism, whereas Donnellan (1970), Putnam (1975), and Kaplan (1977) also develop important criticisms. Three widely discussed problems with descriptivist theories of names are known as the modal problem, the epistemic problem, and the semantic problem.

To illustrate the modal problem, take any proper name (say, 'Aristotle') along with descriptions that are true of its referent ('the most famous of Plato's students,' or 'the teacher of Alexander'). Consider the differences in truth-conditions of the following:

1. Aristotle had brown hair.
2. The most famous of Plato's students had brown hair.

Even if (1)–(2) actually agree in truth-value, they need not have. Had things gone differently (and, say, Aristotle died young, or went into commerce), then the truth-values of (1)–(2) could vary independently – i.e., each might have been true while the other is false. A similar contrast could be drawn using virtually any name-description pair, and many take this phenomenon to indicate a deep difference between names and descriptions.

To illustrate the epistemic problem, if 'Aristotle' meant something like 'Plato's most famous student,' then the following would be self-evident to anyone who understands it:

3. Aristotle is Plato's most famous student.

This consequence is false, as (3) is not at all trivial or self-evident. Again the point generalizes, having nothing to do with this specific example; and the putative upshot is that names like 'Aristotle' are not equivalent in meaning to any particular descriptions.

The semantic problem is that speakers may be competent to use a name even if the descriptive conditions they associate with the name does not suffice to single out the referent. That is, one might just think that 'Aristotle' names some famous Greek guy (or perhaps even confuse Aristotle with Heraclitus), but yet nonetheless one could still refer to Aristotle by uttering 'Aristotle'. Again, the conclusion seems to be that there are important differences between reference by name and the satisfaction of descriptive conditions. (*see* **Proper Names: Philosophical Aspects** for discussion.)

Collectively, these three problems are widely thought to spell the end for descriptivist accounts of names. (This is not unanimous, however – cf. Searle [1983] and Bach [1987] for descriptivist replies.) Kripke (1972) and Putnam (1975) develop similar problems for some varieties of general terms. Still other, related problems for descriptivism are raised by indexicals – even if satisfactory descriptivist accounts could be given for some terms, it is not plausible to hold that all reference is descriptive, as is shown by cases like 'It is quiet here now' (cf. Kaplan [1977]).

The Causal-Historical Theory of Reference

The critics of descriptivism put forth a different picture of reference, knows as the causal-historical theory. Originally, the theory is only developed for proper names (cf. Donnellan [1970]; Kripke [1972]) and natural kind terms (cf. Kripke [1972]; Putnam [1975]). However, there have been attempts to fashion more general, comprehensive views of reference along these lines (for discussion, see Stalnaker [1997]; Devitt and Sterenly [1999]).

The crux of this picture is that certain expressions refer to certain things in virtue of a causal-historical relation between word and object, initially fixed during a dubbing or baptism and propagated from there to subsequent speakers, who implicitly defer to that initial dubbing in using the expression to refer. The view has it that descriptivists are wrong to demand that, in order to significantly use a term, speakers are required to have an identifying description of its referent. Rather, once a word-referent convention is in place, all that is required in order to use the term to refer is a deferential intention to comply with the convention – i.e., the (implicit) intention to use 'X' to refer to what others have used 'X' to refer to. On this approach, reference depends not simply on what the speaker thinks, but also on certain factors external to the speaker's head, factors pertaining to the speaker's linguistic community and to the environment in which the expression in question evolved. The basic idea is:

> [CHT] 'X' refers to Y if 'X' stands in the right sort of causal-historical relation to Y

(*see* **Causal Theories of Reference and Meaning** for more detail).

Many of Russell's successors have worked to loosen the tight restrictions on his notion of reference, by replacing acquaintance with something more broadly applicable and accessible. The [CHT] is a

significant step forward in this direction. It is an externalist theory of reference. Internalist views of reference hold that reference is fully determined by the intrinsic content of the speaker's head; externalists deny this. Externalists hold that two speakers could be in the same mental state and utter the same sounds, but nonetheless their utterances have different referents – because of differences in the histories of how the words reached them, or of differences in the environments to which they are causally connected. (For discussion, *see* **Externalism about Content**.)

Intuitively, reference is a relation involving (at least) a speaker, an expression, and a referent; externalists hold that it is a mistake to think that the nature of this relation could be fully characterized by analyzing only one term of this relation (i.e., the intrinsic content of the speaker's head). Most theorists who articulated views about reference prior to the [CHT] (including Frege and Russell) are commonly characterized as internalists. In the wake of the [CHT], though, externalism about reference has become the norm. Most subsequent theorists agree that the [CHT] makes a progressive step forward, in giving some of the weight in determining reference to the extrinsic relations in which speakers stand to other speakers and to their environments.

The [CHT] led to a resurgence of interest in the notion of direct reference. Many take the arguments against descriptivism to apply to all indirect reference theories, and so to make it plausible that the meaning of a term is just its referent. In addition, many see a complementary fit between the causal-historical chain of transmission story about reference and the direct reference approach to the question of meaning or content. (*see* **Proper Names: Philosophical Aspects** for discussion.)

Problems With the Causal-Historical Theory

There are many problems with the causal-historical theory of reference. For instance, Evans (1973) points out that some words have in fact changed their referents over time, even despite the deferential intention to preserve the convention in question, and argues that the [CHT] cannot account for this phenomenon. For another example, Searle (1983: 249) offers as a *reductio* of the theory the putative consequence that his utterances of 'Aristotle' might refer to a barstool in Hoboken "if that is what the causal chain happened to lead to." To cope with these and other problems, many have sought to defend hybrid views, which aim to combine the strengths while avoiding the weaknesses of [D] and [CHT] (cf. Evans [1973, 1982]).

More generally, though, the [CHT] leaves important questions unaddressed. One problem concerns specifying exactly what should count as 'the right sort of causal-historical relation'. As Stalnaker (1997: 543) puts it: "Causal connections are ubiquitous . . . there are a great many individuals causally implicated in [any] use of [any] name. . . . . A proper causal theory of reference would have to specify just what sort of causal connection is necessary and sufficient for reference, and that is a notoriously difficult demand." Kripke (1972: 96) is explicit that he is not offering a reductive analysis of reference: "When the name is 'passed from link to link', the receiver of the name must, I think, intend to use it with the same reference as the man from whom he heard it, . . . [T]he preceding account hardly *eliminates* the notion of reference; on the contrary, it takes the notion of intending to use the same reference as a given." (Cf. Kaplan's [1990] discussion of the point that the intention to preserve reference is not itself a causal notion.) Here we see why the [CHT] is open to the allegation that it begs the key question in the theory of reference, by helping itself to successful reference. Critics allege that it boils down to the relatively toothless claim that: 'X' refers to Y if everyone else has used 'X' to refer to Y.

Of course, the [CHT]'s developers recognize the need for a separate story about what determines reference in the first link in a causal-historical chain of transmission. However, their remarks about baptisms or dubbings fall far short of a comprehensive account. (Cf. Devitt and Sterenly's [1999] discussions of the 'qua'-problem for a sense of some of the relevant unfinished business.) So, while most agree that the [CHT] provides a better picture than [D], it has yet to be fleshed out into a specific, comprehensive theory of reference.

Skepticism, Naturalism, and Minimalism About Reference

Some influential thinkers are skeptical about the prospects of coming up with a satisfactory theory of reference. Chomsky (1993), for instance, argues that the debates about reference are hopelessly flawed because they presuppose an implausible, unscientific conception of language. The precise import of Chomsky's complaints is unclear, though. In particular, and explicitly, they do not apply to the relatively concrete and tractable notion of speaker's reference (i.e., a four-place relation between speaker, expression, audience, and context).

Quine (1960) is perhaps the most influential skeptic about reference, arguing that there are no determinate facts about reference, no objective thing to be

gotten right. Quine takes this conclusion (which he calls the 'inscrutability of reference') to be an instance of the general point that theories are underdetermined by evidence – i.e., for any finite set of data, there are an infinite number of distinct theories that are consistent with, and could purport to explain, the data. In the case of reference, the claim is that, for any finite set of evidence about a given speaker, there are a number of distinct word-referent assignments that are compatible with it. (To take one of Quine's central examples, no data will tell us whether a given speaker is using 'rabbit' to refer to rabbits, to time-slices of rabbits, to undetached rabbit parts, and so on.) There is no principled way of deciding between these competing assignments; and hence, there is no determinate fact of the matter as to what words are used to refer to. From here, Quine draws pessimistic conclusions about the scientific credentials of such notions as reference.

Many aspects of Quine's approach have been criticized. Still, much subsequent work on reference is addressed to Quine's underlying challenge of explaining reference within the ontology and methodology of the natural sciences. This is known as the demand for a naturalistic theory of reference, and a number of candidates were proposed in recent decades.

One such candidate is another causal theory of reference – also called the 'information-theoretic' approach (cf. Stampe [1977]; Dretske [1981]; Fodor [1990]). The general idea is that information is a species causal co-variance, that for a word 'X' to mean something Y is for tokens of 'X' to reliably indicate Y. As applied to reference, the view comes to something like:

[CT] 'X' refers to Y if Y tends to cause or bring about tokens of 'X'

However, in addition to inheriting some of the general worries about [CHT], [CT] is subject to counterexamples. For almost any word-referent pair 'X'–Y, it is not difficult to find conditions in which things distinct from Y tend to cause 'X's, and conditions in which Y does not tend to cause 'X's. Despite ingenious work to patch things up, the consensus seems to be that this type of causal theory can only succeed in delivering an account of reference that accommodates our intuitions about the normativity and determinacy of reference by smuggling in intentional, semantic notions, and thus by helping itself to reference and forgoing naturalism. (For discussion see Loewer (1997), and **Causal Theories of Reference and Meaning**.)

Another naturalistic approach to reference is the teleological theory, whose most thorough proponent is Millikan (1984). The idea here is that:

[T] 'X' refers to Y if it is the function of 'X's to indicate Y

Here 'function' is a familiar notion from evolutionary biology – roughly, X's function is what X does, that explains why X exists. However, this theory, too, has serious troubles accounting for the normativity and determinacy of reference (cf. Fodor [1990]; Loewer [1997]). Although teleological considerations afford a compelling story about why agents like us have developed the capacity to refer, it is a long way from there to specifying necessary or sufficient conditions for determining the referent of a given use of a word.

Another reaction to this long and sordid history is the minimalist (or 'deflationary') approach (cf. Horwich [1998]; Field [2001]). Minimalists hold that reference is simple, not reducible to anything more fundamental. (Minimalism about reference is often conjoined with minimalism about truth – *see* **Truth: Theories of in Philosophy** for discussion.) Our meaning what we do by 'refers' consists entirely in our inclination to accept disquotational schemas – 'Aristotle' refers to Aristotle, 'Romania' refers to Romania, and so on – and there is nothing else to be said, by way of necessary or sufficient conditions. Rather, all that should be said is something like:

[M] 'X' refers to X

[M] is of course no definition: reference is not reduced to, or explained in terms of, anything more basic. However, one conclusion that is fairly well supported by the failed attempts to define reference is that such a reductive analysis may well be unattainable. To some extent, it is a matter of taste whether one classifies minimalist views as theories of reference or as a variety of skepticism about reference.

Even if there is something right about the minimalist approach, though, [M] hardly seems to illuminate the content of the concept 'reference.' Furthermore, there are specific objections to minimalism (cf. Loar [1995]; Loewer [forthcoming]). For example, it is not clear that there could be a satisfactory minimalist account of indexical expressions. (That is, the disquotational line on 'Aristotle' and 'Romania' does not carry over smoothly to 'I' or 'here.') Because these are core, basic cases of reference, this might point to something deeply suspect about minimalist views.

Summary

The fundamental problem in the theory of reference (given our preliminary assumptions) is to come up with a true, informative account of what the 'R' stands for in the schema:

[Ref] 'X' refers to Y if 'X' stands in relation R to Y

Work in the theory of reference largely consists of disputes between two camps, descriptivists and causal-historical theorists:

[D] 'X' refers to Y if Y satisfies the descriptive condition expressed by 'X'

[CHT] 'X' refers to Y if 'X' stands in the right sort of causal-historical relation to Y

Descriptivists tend to be internalists, and descriptive reference is mediated or indirect, whereas the causal-historical theory is externalist and more friendly to direct reference. As we have seen, though, whereas [D] and [CHT] are major players in the semantics of proper names, both are – albeit from different directions – open to the allegation that they presuppose rather than explain or ground reference.

Bracketing off reference via descriptive conditions and reference via deference to causal-historical chains (as well as the hybrid views), there are at least four other basic answers to the fundamental question of reference (respectively, acquaintance, causation, teleology, and minimalism):

[A] 'X' refers to Y if Y is the entity with which the speaker is acquainted that the speaker intends to single out by uttering 'X'

[CT] 'X' refers to Y if Y tends to cause or bring about tokens of 'X'

[T] 'X' refers to Y if it is the function of 'X's to indicate Y

[M] 'X' refers to X

The problem with Russell's version of [A] is that it is incompatible with the platitude that reference is a tool used in the intersubjective communication of information – i.e., acquaintance is a private subjective affair, but reference is not. However, there is a recent resurgence of interest in the notion of acquaintance, and it promises to avoid some of these problems. [CT] and [T] have certainly not been ruled out, but counterexamples have yet to be satisfactorily addressed. (Note that it is indicative that there are two causal theories on this short-list – most philosophers concede that causal relations between speakers and their environments have to play a fundamental role in a satisfactory theory of reference.) Proponents of [M] also have some specific problems to account for, over and above its general tendency to elicit the atavistic impulse that the question of reference has not really been addressed.

Much philosophical work continues on these problems, and these debates are not in danger of conclusive resolution any time soon.

See also: Causal Theories of Reference and Meaning; Descriptions, Definite and Indefinite: Philosophical Aspects; Direct Reference; Empty Names; Externalism about Content; Ideational Theories of Meaning; Meaning, Sense, and Reference; Proper Names: Philosophical Aspects; Reference: Psycholinguistic Approach; Reference: Semiotic Theory; Reference: Stylistic Aspects; Referential Relations in Spoken Discourse; Saussure: Theory of the Sign; Sense and Reference: Philosophical Aspects; Truth: Theories of in Philosophy.

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Reference: Psycholinguistic Approach

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Language can be used as a means of communication because (some of) its elements have meaning. But what is 'meaning' and what is communicated? These questions are complex, and have not always been carefully considered in psycholinguistics. Since the late 1970s, however, there has been a growing agreement that one thing – not the only thing – that is communicated is information about situations in a world. Sometimes that world is the real world, as in news broadcasts or conversations about what happened last night. Sometimes it is a fictional world, for example in novels and short stories, and sometimes it is an abstract domain, as in many articles in this encyclopedia. Communication about situations is primarily associated with literal meaning (and knowledge-based inferences from literal meaning), which is considered to be largely compositional. Communication therefore depends on mental representations of situations.

Situations comprise individuals with properties, and relations among those individuals. Some of those relations make up events, states, and processes (sometimes called, as a class, eventualities). These latter also stand in relations to one another, such as cause and effect. To convey information about situations, it is necessary to convey information about their component parts. To do so, it is necessary to refer to individuals, properties, and eventualities.

Reference is one kind of 'meaning of meaning,' though it is perhaps not the most obvious one. Another kind of meaning is sense, or connotation. The distinction between sense and reference, and the connection between them, was made explicit by the logician Gottlob Frege in the late 19th century. Frege was unimpressed by natural languages, and sought to construct a logically well-behaved language in which he could describe the logical foundations of mathematics. In this *Begriffschrift* (conceptual notation), meaning is compositional: The meaning of a complex expression is determined by the meanings of its parts and their method of (syntactic) composition. Sense (*Sinn*) corresponds roughly to conceptual content (or mode of presentation, as Frege sometimes put it). Reference (*Bedeutung*) is what an expression stands for (in any possible context of use). 'The morning star' and 'the evening star' are two modes of presentation of the planet Venus (expressions with different senses). In the real world, the two expressions have the same reference (or referent in more modern English parlance), Venus itself. Ideally, both sense and reference are compositional.

In ordinary language, it is natural to think of noun phrases, such as 'John,' 'the table,' and 'the book I lent you last week,' as expressions that refer to particular people or objects, at least when those expressions are used in appropriate contexts. However, in Frege's view, every expression has a sense and a reference. In particular, sentences have truth values (true or false) as their referents. Mathematical statements are either true or false. In everyday language, the truth of a sentence depends on the context in which it is used. Whether it is true that 'John is tall' depends on which John is being talked about. The other base point of Frege's system is the proper name, in an extended sense. In arithmetic, for example, '2' is a proper name for the number two. Proper names have objects as their referents. In the case of '2,' that object is an abstract object (Frege was a Platonist).

For Frege, and many 20th-century philosophers and logicians inspired by his work, objects (or entities) and truth values are the two basic semantic types. Montague (see Thomason, 1974), for example,

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For Frege, and many 20th-century philosophers and logicians inspired by his work, objects (or entities) and truth values are the two basic semantic types. Montague (see Thomason, 1974), for example,

who made the first detailed attempt to apply broadly Fregean ideas to natural language, followed Frege on this point. However, it has more recently been suggested (e.g., by Parsons, 1990) that eventualities and properties are basic semantic types (rather than derived types, as Montague and Frege claimed). For example, a property such as 'is an even number' is, for Frege, a function from objects to truth values (it maps 2 to true and 3 to false, for example).

Frege focused on proper names as expressions that refer to objects. What about expressions such as 'the bag,' often referred to as definite descriptions in the philosophical literature? Informally, it is natural to consider such expressions as referring to objects. However, a tradition going back at least to Bertrand Russell considers that definite descriptions are not referring expressions at all, but rather quantifier expressions used to state (in the case of a singular definite description) that there is one and only one entity that has a certain property. Thus, Russell was able to claim that 'the present King of France is bald' is false, if France has no king, because it asserts that France has one and only one present king.

Psychological Issues

The ideas presented so far may seem far removed from psychological considerations. However, if all expressions have (a sense and) a referent, and the sense and reference of complex expressions can be built up compositionally, word identification plus syntactic analysis can form the basis for semantic interpretation in language comprehension.

As has already been noted, natural languages do not behave like logical languages of the kind Frege studied. In mathematics, '2' always means the number two. In English, 'John' may be John Smith on one occasion and John Brown on another, even in the same text. Likewise, Russell's 'the present King of France' is an atypical definite description. There is only one France, and if a country has a king, it only has one. A more typical definite description, such as 'the cold cup of tea' will have different referents in different contexts (and no referent in many contexts).

Language is used in context. Part of the context, particularly in spoken language, is the nonlinguistic context in which the language is used. Another part is the linguistic context – what has been said or written so far. From a psycholinguistic perspective, what is crucially important is the mental representation of the context, whether linguistic or nonlinguistic, which mediates language understanding. This claim should not be mistaken for the idea that language refers to the mental representation rather than the real world. Rather, the claim is that, from a psychological perspective, language use must be regarded as mediated by mental representations.

Situation Models

Given the idea that language conveys information about situations in the real world, or fictional or abstract worlds, the relevant mental representations must represent those situations. Such representations are called situation models or mental models. Mental models must contain elements corresponding to the basic building blocks of the world (entities, properties, eventualities, truth values, or whatever) and there must be computationally tractable methods for constructing them. A single clause usually presents an eventuality, whose type is determined by the verb. Entities are typically introduced by noun phrases in various syntactic positions and playing various thematic roles. Local 'who did what to whom' information can be constructed compositionally. Relations between eventualities are sometimes indicated explicitly, for example by the use of connectives such as 'but,' 'because,' and 'however.' Sometimes they are implicit and can only be computed by using background knowledge.

Psycholinguists have not paid a great deal of attention to questions about what different types of expression refer to. They have assumed that local 'who did what to whom' information is computed, perhaps with reference to background knowledge, and then integrated (again perhaps using background knowledge) with other bits of 'who did what to whom' information from elsewhere in the text.

Coordination between Speakers

One issue that has been investigated in psycholinguistics is how speakers coordinate with one another to ensure successful reference. When a speaker talks about an object or a writer writes about one, the addressee must correctly identify the object being talked about if communication is to be successful. In many cases nonverbal context plays a crucial role in such coordination: speaker and addressee are looking at, or handling, the same object, for example, while talking about it. However, not all cases are so straightforward. Johnson-Laird and Garnham (1980) identified some very general considerations that help to determine successful reference, for example whether an addressee will recognize that a particular description (e.g., 'the man I met last night') refers to a particular person. More recent work on dialogue has found that while speakers may not consider the knowledge that they share with their addressee (common ground) when initially planning an utterance (Horton and Keysar, 1996), under normal discourse

conditions utterances often ultimately reflect the common ground between an speaker and hearer (Clark, 1996). Furthermore, over successive turns in a dialogue, interlocutors will coordinate the use of different expressions, converging on a single means of referring to a particular object (Garrod and Anderson, 1987).

Anaphoric Reference

Another issue that psycholinguists have looked at in some detail, and perhaps the major question about reference that they have concerned themselves with, is that of second and subsequent reference to the same entity, via pronouns or other anaphoric expressions. One piece of 'who did what to whom' information might be that John sent a letter to Jill and the next piece might be that he hoped she would receive it the next day. To an English-speaking reader it will be obvious that 'he' is John, 'she' is Jill, and 'it' is the letter that John sent to Jill. However, it is not apparent just from the form of the expressions 'John' and 'he' that they refer to the same person and, indeed, in many contexts they would not, for example (1).

(1) John confessed to Bill because he offered a reduced sentence.

Anaphora is not confined to coreferential noun phrases, though such cases are the most commonly studied in psycholinguistics. As well as identity of reference anaphora, there is identity of sense anaphora, which includes most uses of indefinite pronouns, as in (2), and some uses of definites, for example in 'paycheck' sentences such as (3).

(2) John has eaten a big bowl of vanilla ice cream and now Judy wants some.

(3) The man who gives his paycheck to his wife is wiser than the man who gives it to his mistress.

Here, 'it' is a paycheck, but not the one that was referred to in the first part of the sentence. Furthermore, not all anaphora is nominal. English, in particular, is rich in verbal anaphors, such as the verb phrase ellipsis in (4).

(4) I have always wanted to travel to China and next summer I am going to.

Verbal anaphors are typically identity-of-sense anaphors, and many of them are ellipses in the technical sense of Sag and Hankamer (1984): what is elided or replaced by a verbal anaphor must have an exact counterpart in the surrounding, usually preceding, text.

Another issue is that some uses of definite noun phrase anaphors, and in particular pronouns, are analyzed as bound variables, and not as referential expressions, as for example in (5).

(5) Every dog loves its owner.

However, the parallel between (5) and (6) suggests that they should, perhaps, be treated similarly, which they are in theories such as discourse representation theory (Kamp and Reyle, 1993).

(6) Fido loves his owner.

Psychological accounts of anaphoric reference are concerned with the mental mechanisms, representations, and processes that underlie the production and comprehension of anaphoric reference. They must be informed by linguistic accounts of how and when different types of anaphoric expression can be appropriately used. However, they must also be subject to empirical tests in psychological studies generating standard types of psychological data. Linguists describe the morphosyntactic properties of anaphoric expressions, such as gender and number marking on definite pronouns, which affect their interpretation. They also describe syntactic constraints on the interpretation of pairs of noun phrases as (possibly) coreferential, for example through the principles of binding theory. At a higher (discourse) level, attempts have been made to specify constraints on the form that anaphoric noun phrases should take. Some researchers have considered the accessibility or givenness of the antecedent (e.g., Ariel, 1990; Gundel *et al.*, 1993) to account for when particular forms are required or permissible, and we shall return below to other accessibility- or focus-based accounts of the form of referring expressions. Others have considered the discourse function of anaphoric forms in order to account for their use, including the purpose of particular forms, such as the demonstrative 'this X' to refer to antecedents currently out of focus, and overspecific forms (e.g., a proper name when a pronoun would be sufficient for identification) to shift discourse topic (e.g., Vonk *et al.*, 1992).

The most straightforward kind of reference is to people, animals, and objects. It therefore seems likely that reference to such objects is mediated by representations in which those people, animals, and objects are represented. Mental models (or situation models) are representations of this kind. People talk about situations in the real world or in imaginary worlds or abstract domains, and mental models of these situations can be used to guide the selection of referring expressions, and can be constructed and modified in response to the comprehension of referring expressions. There must, therefore, be a set of procedures for generating referring expressions from mental models and for generating and modifying mental models on the basis of referring expressions. In addition, items can

be represented in mental models on the basis of perceptual information.

On one view, once an item is represented in a mental model, anaphoric expressions might make direct contact with their representations in comprehension, which need not be tied to the particular linguistic expression used to introduce them. Sag and Hankamer (1984) proposed that definite pronouns and other deep or model-interpretive anaphors worked in just this way. They also proposed that many verbal ellipses were indeed ellipses, and had to be interpreted by effectively copying part of a fairly superficial representation (Logical Form, in their view) of a piece of nearby text. Garnham *et al.* (1995) showed that, at least when a pronoun is fairly close to its antecedent, the linguistic form of the antecedent expression does affect the interpretation of definite pronouns. However, this could be because mental models contain information about how their elements have been or might be referred to. Garnham and Oakhill (1987) have also shown that the interpretation of ellipses can be influenced by an underlying mental model, in a way not allowed for by Sag and Hankamer. Another line of evidence supporting the idea that anaphoric expressions take their meaning via mental representations of objects rather than linguistic descriptions of those objects comes from the study of indirect reference in which the referent of an anaphor is not explicitly mentioned in previous text, as in (7).

(7) James tried to write to Alison many times, but always tore them up in the end.

In this case, a previous antecedent trigger ('write'; Cornish, 1999) makes the referent ('letters') available for anaphoric reference ('them') by allowing it to be represented in the mental model of the text. If reference depended on the literal text then such indirect reference would be impossible; however, some researchers have reported it to be relatively common (Yule, 1982).

Perhaps the most important factor in anaphoric reference is focus. As we mentioned earlier, in natural languages, unlike the logical languages studied by Frege and others, the interpretation of referring expressions is often highly context dependent. A simple definite description such as 'the bird' is referentially highly indeterminate out of context, but in a particular text or conversation it can readily be used to refer to a particular individual bird. Because mental models are specific to individual texts, they help to explain this fact. However, in a text of any length an expression such as 'the bird' might refer to different individuals on different occasions, suggesting that mental models are partitioned and that different sets of individuals are more salient at different points in the text. Furthermore, depending on the particular local structure of the text, an individual that could be referred to as 'the bird' might be more appropriately referred to as 'it' or 'Joey' or 'the parrot or 'the large bird.' Attempts to explain these facts, both from the point of view of production, or selecting appropriate referring expressions, and from the point of view of comprehension, or how difficult certain referring expressions are to interpret in different contexts, are usually discussed in terms of the accessibility, prominence, or focus status (in the psychological, rather than linguistic sense) of the antecedent.

The work of Grosz, Sidner, and others (see especially Grosz and Sidner, 1986) has led to the distinction between global and local focus. Global focus is related to episode structure (Anderson *et al.*, 1983), or more generally to that of discourse segments and their relations to one another. As Sidner (1983) and others have pointed out, in narratives and other texts about people, protagonists are important in determining focus, though Grosz and Sidner subsume such effects under more general principles. Anderson *et al.*'s (1983) episode structure effects are linked to the status of protagonists, as is the finding that proper names produce a stronger focusing effect than definite noun phrases.

Local focusing is particularly important in determining which recently mentioned people (or things) would preferentially be referred to pronominally. Centering theory is a theory of local focusing that has been developed within Grosz and Sidner's framework. It is couched as a theory of how attention shifts within a discourse segment. It identifies, within any utterance, a set of forward-looking centers, or things likely to be rereferred to in the upcoming discourse. It also identifies one backward-looking center, which is the current (local) topic, and which should be the same as one of the forward-looking centers of the previous utterance.

Centering theorists have made various attempts to specify when references should be pronominal. An early view, which focused on the idea that the backward-looking center should be pronominalized (particularly if it picks up the highest ranked forward-looking center of the previous utterance), led to a series of experiments by Peter Gordon and his colleagues on the repeated name penalty (Gordon *et al.*, 1993 and later work), a difficulty in comprehension caused by repeating a proper name or a common name rather than using a pronoun. Gordon found empirical evidence for this effect, particularly for anaphors in syntactic subject position, and when there was not a shift of center. However, later versions of centering theory have, on empirical

grounds, relaxed the pronominalization rule to say merely that if any of the forward-looking centers of the previous utterance are pronominalized in the current utterance, the backward-looking center of the current utterance must be pronominalized.

A different approach to focusing, and the way it affects anaphoric reference, is found in Amit Almor's (1999) informational load hypothesis (ILH), which is founded more directly in psychological research than is centering theory. The ILH asks: what factors make a particular form of anaphoric reference easy or difficult to process, given the context in which it occurs and, in particular, given what its antecedent is? According to Almor, three factors are important: the focus status of the antecedent, whether the anaphor adds new information about its referent, and the informational load of the antecedent–anaphor pair. From the examples he considers, Almor appears to be investigating local focus, and in his experimental work he focuses items using wh- and it-clefts, which are thought to mark contrastive focus. Informational load is the crucial new concept in this hypothesis and it is defined in terms of the conceptual distance between antecedent and anaphor, with conceptual distance taken to be positive when the antecedent is less specific that the anaphor ('... the bird ... the robin ...') and negative when it is more specific ('... the robin ... the bird ...'). Thus, for anaphors that are less specific than their antecedents, informational load decreases (by becoming more negative) as conceptual distance increases. Informational load can be justified if the antecedent is not in focus, as it helps to reactivate the representation of the antecedent. Indeed, previous work by many researchers supports the idea that increased overlap between an antecedent and its category anaphor aids in anaphor resolution, with more typical antecedents (e.g., robin) for a given category (e.g., bird) leading to faster processing times for the anaphor compared to atypical antecedents (e.g., ostrich). However, when the antecedent is in focus the increased information load produced by semantic overlap is not justified. According to Almor, informational load arises because semantic overlap in working memory produces an interference effect, just as phonological overlap does, and this interference competes with the facilitatory effect of semantic overlap just described. Thus, the ILH leads to the surprising prediction of an inverse typicality effect in anaphor resolution for focused antecedents. Since 'ostrich' is conceptually more distant from 'bird' than 'robin' is, the pair '... the ostrich ... the bird ...' has a lower (more negative) informational load than '... the robin ... the bird ...,' and the former pair should be easier to process. With clefted antecedents, Almor reports this result.

In our own lab we have failed to replicate this result consistently with a typicality manipulation, though we have shown it in a category hierarchy, where the conceptual distances are clearer ('...the cobra...the reptile...' is easier than '... the snake ... the reptile ...'). However, we have been unable to find evidence for semantic interference in working memory.

In describing the ILH, Almor does not discuss the effect of multiple possible antecedents for an anaphor. However, potential antecedents that turn out not to be antecedents ('Phil' in [8], for example) affect anaphor resolution.

(8) Jack threw a snowball at Phil, but he missed.

Gernsbacher (1989) showed that once an anaphor was resolved, the nonantecedents were suppressed, and that, for pronouns at least, this process took some time. Garrod *et al.* (1994), however, suggested that pronouns could be resolved immediately if they referred unambiguously to focused main characters.

The ILH tries to provide an integrated account of the ease of processing of noun phrase anaphors of various types. In this respect it differs from previous work, which has tended to produce lists of (apparently independent) factors that affect the ease of interpreting anaphoric reference. One such factor is the distance between a noun phrase anaphor and its antecedent, which is particularly important in the case of pronouns. However, it is likely that foreground or focus interacts strongly with this factor, since material intervening between a pronoun and its antecedent is likely to shift the focus away from the antecedent. A related issue is the interaction of distance and working memory, or how near is 'near'? Ed O'Brien (e.g., 1987) has emphasized the need to distinguish between potential antecedents that are still likely to be represented in working memory and those that are not.

Another factor that has been investigated in the case of pronoun resolution in particular is implicit causality. When a pronoun occurs in a statement of an explicit cause following the description of an interpersonal event, the interpretation of the pronoun can depend on the verb used to describe the interpersonal event. For example, in (9) 'he' is likely (though not certain) to be taken to refer to Bill, whereas in (10) it is likely to refer to John.

(9) John blamed Bill because he...

(10) John called Bill because he...

Garnham *et al.* (1996) suggested that this effect might be a focusing effect, but found no evidence in favor of this view. Rather, it appears, in the comprehension of a completed sentence, to reflect how easy it is to integrate the information in the 'because' clause

with the information in the main clause. Thus, a complete sentence such as (11) is easier to process than a sentence such as (12).

(11) John blamed Bill because he had been careless.

(12) John blamed Bill because he needed a scapegoat.

Implicit causality effects may be an example of the use of world knowledge in the interpretation of pronouns, as indeed may the more general effect of the coherence relations between clauses or sentences, which as we mentioned above are often signaled by connectives, on anaphor resolution.

Other factors that have been found to influence anaphor interpretation are more formal, and are possibly used as fallback strategies when content-based strategies fail. These strategies include parallel function (taking the referent of an anaphor to be the item in the preceding clause that plays the same grammatical role as the anaphor in its clause), and preference for syntactic subjects or first-mentioned items in preceding clauses as antecedents for anaphors in the current clause (though preferences for syntactic objects have also been reported, often depending on the prosodic stress given to the anaphor). Parallel function effects are strongest when the syntactic parallelism between the clauses is strongest. They are interesting because they are difficult to accommodate in both centering theory and Almor's ILH.

The strongest evidence for an overall preference for (unaccented) pronouns to be taken as referring back to an antecedent when it has been mentioned first compared to other possible antecedents comes from probe word tasks (Gernsbacher and Hargreaves, 1988). However, there is evidence that this preference may be an artifact of the testing procedure.

While these factors have been proposed independently of more general theories such as centering theory and the ILH, many of them could be taken up under the notion of focus within these theories. For example, centering theory proposes that an utterance's forward-looking centers are partially ordered to reflect which ones are most likely to be referred to again. This ordering may be based on factors such as syntactic position (indeed, the highest ranked forward-looking center has often been assumed to be the grammatical subject of the sentence). In the ILH, such factors also affect focusing.

Finally, it should be noted that while syntactic considerations undoubtedly influence reference, the reverse can also be true: there is evidence that syntactic processing is influenced by referential considerations. In a story about two women, the noun phrase 'the woman' is likely to be referentially indeterminate. So, although a 'that' clause is preferentially interpreted as a complement clause rather than a relative clause, if a postmodifier is needed to disambiguate a reference, this preference may be overridden, even in initial parsing (Altmann *et al.*, 1992).

Summary and Conclusions

A psycholinguistic perspective on reference focuses on the mental representations and processes that underlie people's ability to use language, both as speakers and writers and as listeners and readers. Mental representations mediate references to things in real, imaginary, and abstract worlds. Linguistic and philosophical analyses bring to light some of the complexities that psychological theories must take account of.

A major concern within psycholinguistics has been to explain second and subsequent anaphoric references to the same person or thing. A variety of factors have been identified as influencing this process, and more recently the more unified approaches of centering theory and the informational load hypothesis have been suggested. These approaches are best located within a mental models framework that stresses the importance of representations of situations in the world as mediating language processing.

See also: Anaphora, Cataphora, Exophora, Logophoricity; Coherence: Psycholinguistic Approach; Dialogue and Interaction; Discourse Processing; Meaning, Sense, and Reference; Montague Semantics; Psycholinguistics: History; Psycholinguistics: Overview; Reading Processes in Adults; Reference: Philosophical Theories; Reference: Semiotic Theory; Reference: Stylistic Aspects; Referential Relations in Spoken Discourse; Saussure: Theory of the Sign; Sentence Processing.

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Reference: Semiotic Theory

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Frege's Legacy

Classical theories of reference assume a strong connection between a sign, its meaning, and its reference. A word connected to a particular object embodies a description containing a rundown of the object's properties. This is to say that a word possesses the capacity to evoke in the mind a cluster of properties that serve to specify the nature of the object to which the word refers. Knowing the meaning of a sign is knowing how it refers, and knowing how it refers is presumably knowing truth – all of which can easily land one in a vicious circle.

Gottlob Frege simplified this formula. He drew a distinction between 'sense' (*Sinn*) and 'reference' (*Bedeutung*). Sense is grasped when a sign is understood, and this sense determines its reference. Frege is often regarded as the prime initiator of 'logicism' – the wedding of logic and mathematics, with the former hopefully becoming the patriarchal repository of all thought and the latter the queen of the sciences. This grand project called for a divorce of signs in general

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and most particularly of arithmetical signs from 'psychologism.' The idea was to purify language, to rescue it from the swamp of semantic muck into which it had presumably wandered, and to use it against itself in elevating it to clarity and precision. According to Frege and all kindred thinkers, if language could be liberated once and for all time from vagueness, ambiguity, and sticky generalities, it could become a respectable instrument of unequivocal thought. It could be used to paint a faithful 'picture' of any and all meaningful states of affairs. In other words, by 'logicizing' language, its weaknesses could be strengthened, its blemishes could be erased, and future mistakes could be avoided. From the Olympian reaches of the highest rooftops, the world could eventually be seen from a detached God's eye view.

So, the task Frege set for himself by way of this 'sense/reference' distinction was monumental: to establish a method for determining linkages between the objective world and its representation in signs. Equality of meaning of different signs referring to the same object became the watchword. The dilemma was that Frege's grand game plan involved rendering two virtually incompatible domains virtually equivalent: language, on the one hand, and the furniture of the world, on the other. Frege argued that, although two signs with the same reference – *Venus*, for example – could have two senses (the 'morning star' and the 'evening star'), two signs with the same sense could not enjoy the luxury of different reference.

By way of definitions, the 'intension' (sense) of a sign consists of the conception of the sign, irrespective of that to which it refers. 'Extension' (reference) consists of the things to which that conception refers. Intension used in this context must be distinguished from 'intentionality,' a phenomenological term entailing the property of consciousness whereby it refers to or intends an object. The intensional object is not necessarily existent, but can be merely what the mental act is about, whereas extension presumably involves the 'real' furniture of the objective world.

Thus, 'Venus is Venus' is a tautology. In contrast, 'That star up there in the dark expanse is Venus' is not. It bears reference, extension. 'The evening star is Venus' has both reference and sense, intension. However, 'The morning star is Venus' also sports reference and sense. Reference is one ('Venus'), but sense is two ('evening star,' and 'morning star'). Yet, Frege assured us that no problem exists inasmuch as we specify 'reference' to objects in the physical world, so it is still smooth sailing toward clear and distinct thinking and meaning. Apparently, the relations between Frege's signs and the world are not characterized by symmetry, but by asymmetry. However, this problem was in a manner of speaking pushed under the rug, for the sign's intension (sense) was highlighted somewhat at the expense of extension (reference), and language itself, that apparently ubiquitous partner to mind, held the trump card. This outcome is what we might have expected, since Frege stacked the deck from the beginning.

More questions arise: do sentences impart any information regarding their presumed objects of reference (*Venus*, *morning star*, *evening star*), or simply about the signs themselves ('Venus,' 'morning star,' 'evening star')? If the latter is the case, then why do we like to be comforted by the soothing idea that 'reference' is fixed while meanings may suffer alterations? If meanings change, how can signs actually 'refer to' the same things in the world? If signs do not necessarily refer to the same things but to variable 'semiotic entities,' then do the 'real' things of the world actually make much difference regarding meaning? Can meanings be something found in things referred to, or are meanings embodied within their respective signs? Or in the final analysis, do words hook onto worlds?

The dilemma coiled within Frege's project soon became obvious. No real feeling and thinking mortal could expect to survive in the Fregean desiccated world that afforded absolute purity of expression. If all fuzzy edges could somehow be smoothed for all time, then eventually even the artist's brush would run dry, the musical score would contain no notes, the dance troupe would be paralyzed, the poet would be condemned to silence and the blank page, and science would find itself suffering from interminable catatonia.

Actually, the demarcation between Frege's 'object' and 'reference' is quite tenuous. It seems safe to say that the idea of 'reference' is not coterminous with the percept and concept of a 'referent.' More adequately stated, it entails the act of referring, or better, the act of interrelating. Once the act has occurred, an 'object' then bounds onto the scene, which is now the incorporation of what is in the Fregean tradition called the sign's 'reference.'

Referential Paradise Lost?

In addition to Bertrand Russell's critique of Frege, Willard V. O. Quine upended the Fregean dream of clear and distinct reference with his 'inscrutability of reference' thesis. Quine *qua* lay physicist conceded that, in point of epistemological footing, physical and mental objects differ only in degree: Both interact with our general conception of things as cultural posits (1953). Yet, he placed greater stock in physical objects than he did in, say, Homer's gods. Physical objects are epistemologically superior to purely

mental constructs insofar as they have in the past proved more efficacious as a device for ordering the flux of experience. Lest our confidence run rampant, however, we are reminded that physicalism provides us with no guarantee.

Quine argued that not only does sense not determine reference but that sense is itself indeterminate, as is reference. In his classical example, a field linguist overhears "Gavagai!" from the mouth of a native informant when a rabbit is sighted scurrying through the bushes, and the linguist cannot know whether the word means 'rabbit,' 'undetached rabbit parts,' or 'a rabbit space-time stage.' Because each of these phrases has different extensions, reference to 'Gavagai!' remains radically indeterminate. If this holds true of someone else's language, it is also true of one's own language when one is conversing with a fellow language user. How is one to know if the other person is using her words in the same manner one would be prone to use them? Quine's elaborate argument leads to the conclusion that we must give up the idea that we can refer determinately to that of which we think we speak. However, we are left with a queasy feeling. Quine wrote quite convincingly about the indeterminacy of reference; however, he did so by talking about 'rabbit,' 'rabbit parts,' and 'rabbit stages' as if his words enjoyed some sort of reference or other. Indeed, the very assumption that we cannot refer determinately to the furniture of our world presupposes that we can somehow refer by the fact of our talking about the furniture of our world when claiming we cannot refer to the furniture of our world. In a manner of putting it, the indeterminacy of reference cannot be said, yet we can apparently say it.

What is Quine's solution? Bite the bullet and concede that the very idea of reference is meaningless. Saving grace can be had, Quine has told us, if we have a background language against which to gauge the meanings of the words in the target language. The sentence, "Gavagai!" refers to rabbit in what sense of 'rabbit?' kick-starts a regress, and we need a background language as a fulcrum point to regress into so that the regress will not continue unabated. The background language gives words in the target language sense, if only relative sense: sense relative to the background language. Demanding determinate reference would be like quantum physics demanding *both* determinate position *and* velocity, rather than *either* position *or* velocity relative to a given frame of reference – the background language. So, we acquiesce to our mother tongue, take words at face value, and do the best we can with what we have.

Yet, why, we might ask, should we have faith in our mother tongue?

A Retreat into Imaginary Worlds and Language in Search of an Answer

Historically, extension has been supposedly upfront and stalwart, intension uncertain and anemic. However, Quine claimed that both are inscrutable. Of course, within the parochial confines of our own language, extension continues to seem more reliable than intension. However, this is not necessarily so: The empirical determinacy of extension, through time, cannot even be guaranteed within our own language. Thus for Quine, and, more recently from another vantage point, that of Jacques Derrida (1973), there is no experience that can provide data with which a statement can be absolutely verified. There are no data, because there is no absolute 'immediacy' or 'presence.' This lack renders the meaning of the most basic of statements such as "That raven is black" simply undecidable, for such statements do not refer instantaneously to some independent empirical entity in the 'real' world. We can do no more than gather up an unruly collection of unfixed meanings and muddle along. Reference is ultimately imaginary, or at most it is a linguistic act.

Most Fregeans of a positivist bent contended that, regarding imaginary constructs or fictions, there can be no meaningful concern for reference or truth. Recently, a new generation of language philosophers and literary theorists has undertaken the analysis of reference in fiction; their efforts often have been governed by contrived explanations of the difference between normal reference and the presumably aberrant, abnormal practice of reference to nonexistent objects. Literary theorist Thomas Pavel (1986), for example, argued that there *is* reference to fictional worlds, whether the 'objects' contained within them exist in the 'real' world or not and whether they are possible or impossible 'objects.' He brandished his idea that normal and marginal referential practices are different in degree rather than in kind because they display many identical characteristics: Fictional reference is by no means a logically strange activity, but rather is a close cousin to our conventional manner of making reference. Although at one point Pavel admitted to a 'complex and unstable' relationship between texts and worlds and between the 'real' world and fictional worlds, he suggested a deep-seated, tacit human assent toward 'textual realism'; this is rooted in our very nature to the degree that we tend to compensate for the lack of referential immediacy "by the strength of our ontological commitments," for we confidently "regard our worlds as unified and coherent, our fits of ontological prodigality notwithstanding" (Pavel, 1986: 73).

The notion of imaginary or fictive reference as a linguistic act tends to historicize reference, to render it a matter of language conventions: How we use our words determines that to which they refer. This is also to assume that extension enjoys no necessary priority over intension. Richard Rorty (1982) also historicized reference. Our ancestors, he wrote, believed in many things that do not really exist – they are purely intensional objects the likes of which we label 'unicorns,' 'werewolves,' 'mermaids,' and such. Ordinarily, we tend patronizingly to dismiss these hapless predecessors; they were steeped in prejudice and superstition. Century after century, they failed to name the 'real,' whereas we somehow would like to believe we are finally getting things right. However, Rorty argued that the traditional notion of reference provides no axiom by means of which to solve the problem of our ancestors invariably being wrong while we are largely right. On so doing he referred to three senses of 'refer.'

Hilary Putnam's (1990) 'opaque' A-reference is commonsensical: It involves things we refer to not by 'metaphysical realism' but by the very act of thinking we are referring to them (including nonexistent entities), which is what Putnam termed 'internal realism.' 'Transparent' B-reference is of the Bertrand Russell type in the sense that only what exists can be referred to, the technical use of the term generally being limited to linguistics and philosophy (or, in Putnam's words, 'metaphysical realism'). C-reference entails something like what Thomas Pavel (1986) called 'mixed sentences.' The statement, 'Jove's thunderbolts are actually electrical discharges from the clouds,' includes both our misguided ancestor's A-reference ('Those are Jove's thunderbolts') and our own enlightened and presumably superior B-reference ('Those are nothing but electrical discharges from the clouds'). The question Rorty asked is: How was perennial ancestral error suddenly seen as error by means of its alteration to produce an apparent truth? The best we can do is to assume our ancestors did the best they could, expect the same of ourselves, and trust our descendants will do likewise.

If we apply Rorty's notion to the idea of fictive worlds and their interpretation by successive communities of literary addicts, we might surmise that the *Don Quixote* our ancestors read 'referred' to a relatively limited fictive space, the borders of which were expanded with subsequent readings by future readers. Consequently, our *Don Quixote* world is exceedingly vast in comparison with that of our ancestors. In this vein, previous readings of Cervantes's masterpiece actualized a certain part of the potential representing the novel's fictional universe, whereas current readings are capable of actualizing a greater portion. But are they? Our ancestors' form of life had myriad facets, many of which are not known to us or are simply no longer accessible to us. Of course, our readings are contextualized within the numbing complexity of our contemporary milieu, in addition to our awareness of intertextual implications. Yet, our ancestors had their own access to the intricately woven fabric of their oral tradition, as well as the literary works of their day, some of which we have relegated to the attic. Do not readings separated by vast expenses of space and time become radically distinct? Can there be a set of criteria for determining the magnitude of textual fictive space?

In view of these difficulties in conceptualizing an ontological framework for fictions, one might tend to concur with Rorty that over the long haul reference is pointless. All we need is the common sense notion of 'talking about' – A-reference – according to which the criterion for what a statement is 'about' is, in varying degrees of approximation, whatever we think we are talking 'about.'

Our Fallible Limitations

Yet, perhaps Rorty's commonsensical talking 'about' some-*thing* and therefore merely talking and somehow getting along swimmingly is tantamount to Pavel's counsel that we minimize indeterminacy of reference and the incompleteness of all worlds by gracefully acknowledging their complexity and risking "the invention of a completeness-determinacy myth." The example of *Don Quixote* is once again evoked. Our venerable Hidalgo reads the world around him according to novels of chivalry, regardless of empirical evidence disproving his hypothetical framework. However, in a sense his hypothesis is correct. After all, he manages to succeed "in the detailed construction of a coherent, if precarious and incomplete, world version" (Pavel, 1986: 111).

Granted, Cervantes's hero packed his universe into the Procrustean bed of 16th-century prose. In so doing, he read fiction as if it referred to the real, serving as a warning to all readers, whether they are engaged in reading the text of the universe or the universe of texts. A certain 'referential fallacy' surfaces here. Regarding our present-world version as the field of reference, which we would by and large like to take as 'real,' there is no guarantee that we somehow got things right. Therefore, if in the sense of Karl Popper (1963), confirmation is inevitably failed refutation, we must go on being wrong with the idea that in the long run somehow we will be able to succeed. Regarding our textual worlds offering up their points of reference to us, which we take to

be fictions and 'irreal' and perhaps at their best 'real' by proxy, no matter how complete our interpretation may take us, there will always be some way to take it a mite further. Either way, pinning our words and signs onto whatever imaginary or physical world or worlds lie before us is at worst inconsistent and at best it remains an incomplete project. This 'referential fallacy' is not of the Umberto Eco (1976) sort (for a critique of Eco's argument against the notion of reference, see Ponzio, 1993; Knuuttila, 2003).

Alternatives Emerge

In a last-ditch effort to salvage the idea of reference, we have the 'causal theory,' which at the same time delivers a death certificate to any and all attempts to derive reference from a description of the object of a word's properties or attributes.

The causal theory says words, and all signs for that matter, refer to the furniture of the world in terms of historically determined causal chains involving that furniture and our linguistic – and general semiotic – representations of them. This theory demands nothing less than the condition by means of which one part of the world is semantically related to another part. This is a tall order indeed, and it can place us in a quandary. How many possible causal chains are there for a particular sign and its representation? One culture's, and even one person's, causal chain is another culture's or person's falsity, absurdity, nonsense, or merely silliness. What a causal theory needs is a corollary of counterfactuality; a causal theory must specify reference in conditional terms: What would be the case were certain causal relations to inhere?

Now enter Donald Davidson (1990). Davidson tossed 'reference' into the trash bin of misused concepts. He would like to convince us that reference, whether intensionally or causally construed, cannot support the entire conceptual weight of a theory of interpretation. He alluded to Alfred Tarski's (1956) theory of truth, the paradigm case for which is his T-sentence: '"Snow is white" if and only if snow is white.' The Tarskian assumption has it that truth is explicable in terms of reference. With respect to the T-sentence, truth is determined by inspection of the object of reference; truth is explicable in terms of reference.

However, Davidson, in disagreement with Tarski, had no use for such a correspondence theory of truth. He abandoned reference altogether, but held tight to the idea of truth. Availing himself of the 'Principle of Charity,' he argued that truth for one human speaker and truth for another human speaker will always have enough in common for them to find common ground and so they will be able to communicate. Truth, in other words, is a matter of belief, and belief is somehow dependent on the nature of the world. Since the world is a certain way, one speaker cannot interpret another speaker as believing that the world is any way other than the way it is. This is to imply, it would seem, that a human language is a language only on the premise that it can be translated into – and thus interpreted by – another human language. Translation is tantamount to interpretation, and interpretation arises out of beliefs regarding what is true and what is not true, regardless of what might be taken as reference. Fortunately for us, human speakers in the Davidsonian theory will be more rational than irrational, more logical than illogical with respect to their beliefs about the world.

All this is to take the furniture of the world as not some fixed collection of things out there that are waiting for words properly to be slapped onto them. Yet, speakers usually take the world, their world, for what it is, as if it were quite fixed. Davidsonian theory also takes human speakers as generally correct, and any error or disagreement is dependent upon their general correctness. The problem is that error and with it disagreement are not merely possible but actual, for whatever is known of the world is incomplete, and if presumably complete, then it will often be inconsistent. However, there will always be alternatives from which we stand to learn something more.

This brings us once again to Putnam. Putnam's meaning is neither in the mind, nor the sign, nor the conduit of information flow between signs and speakers and speakers, nor in the thing to which the sign presumably refers. There is no God's eye view of a fixed world replete with mind-independent objects, acts, and events. Signs do not by their nature hook onto things; neither do they correspond to things. Neither does mind create the hooks or establish the correspondence. Rather, "The mind and the world jointly make up the mind and the world" (Putnam, 1981: 55). If we can speak of reference at all, it is reference with respect to the interdependent, interrelated interaction among mind, sign, and world, within the whole of all contexts, both actual and possible, and past, present, and expected in the future. We must take the world, our world, as objective ('external,' 'real,' 'mind-independent'), for it is the only world we have for the moment; yet, we must acknowledge that it could always be taken for something slightly to radically different, so it is 'ideal' ('internal,' 'mind-dependent'). Now, how can we hope to integrate this assertion with the notion of reference?

Reference within the Triadic Concept of the Sign: Peirce

Frege's 'sense' embraced the notion of understanding, and understanding a language cannot be divorced from knowledge. So a theory of knowledge would seem to be in question. In this manner, a theory of sense should be a component of a general theory of knowledge, and knowledge in this respect should involve the idea of 'truth.'

This is not entirely the case, however. The Fregean reference of a name implies the bearer of that name, the object. To know 'reference' is to know the object, but not necessarily to know the 'truth' of the object. Knowledge of objects, acts, and events is not tantamount to knowledge of the 'truth' of those objects, acts, and events. It is, rather, knowledge of the linguistic use of words that interrelate with those objects, acts, and events. 'Sense,' it would seem to follow, is a matter of understanding how those words are used. This linguistic manner of distinguishing between sense and reference serves to liberate us from a psychological interpretation of meaning and from worry about the ontological status of sense and the objects, acts, and events of reference.

Then, do sense and reference give us a way of recognizing or identifying objects, acts, and events as the bearers of sense and reference? If that is the case, then where are interpretation and understanding: in those very objects, acts, and events; in the words or signs used; in sense and reference; or in the medium carrying those words? Obviously, Frege discarded psychologism, so interpretation and understanding are not in the head. He also had little need for ontology, so they are not in the objects, acts, and events. Neither are they exclusively within the words or signs nor in the communicative meaning (marks on pages or sound patterns in the air). Interpretation and understanding come about within the sentential context; 'The morning star,' 'The evening star,' for example (McDowell, 1993). Yet, such understanding involves words and things; it is basically a dyadic affair, as are the majority of the theories of reference that have popped up since Frege.

That much said, briefly consider Charles S. Peirce's concept of the sign, which is indelibly triadic. Peirce's sign consists of a 'Representamen' (akin to what usually goes by the name 'sign'), an 'Object' (a 'semiotic entity' as some physical object, act, or event is perceived, conceived, or imagined), and an 'Interpretant' (roughly comparable to the interpretation or meaning of the sign emerging from Frege's 'sense'). However, in the Peircean sense an Interpretant, once at least tentatively understood, can then become a sign in its own right. The same can be said for the Object

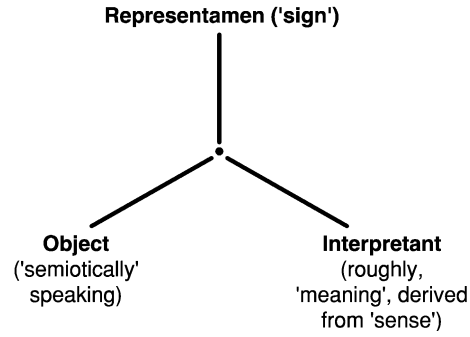

Figure 1 Peirce's conception of the three-dimensional tripodic sign.

as it is 'semiotically' perceived, conceived, or imagined by some interpreting agent. In this manner, neither reference nor meaning is fixed, for signs are processual.

Thus, Figure 1 depicts a three-dimensional tripod, not a triangle. The tripod illustrates that each sign component interrelates with its pair of companions in the same way they interrelate with each other and with it. Where are reference and the referent located? The question reveals the problem. There is no location. There is only interdependent, interrelated, interactive triadicity. So, where do sense, meaning, interpretation, and understanding take place? Once again, there is a problem with language. They do not 'take place,' for there is no specifiable 'place.' Interpretation, meaning, and understanding are not in the head; the signs; the objects, acts, and events; or in the communicative medium. They are in the entire context, which includes body and mind (*bodymind*) of the semiotic subject or agent. Moreover, they are always becoming something other than what they were becoming – this feature puts them within the now gently flowing, now undulating, now bucking and unruly semiotic stream of Peirce's process philosophy.

How can one account for this apparently disorderly universe of reference and meaning making? In the first place, understanding a language and other sign uses, sense and reference, and meaning making does not necessarily entail explicit knowledge of some theory. The knowing semiotic agent implicitly knows how to make meaning with the tacit assumption that sense and reference are somehow in the meaning making and so gets on with the task with no further ado. There is hardly any demand for describing and explaining what is done. It is just done because the semiotic agent knows what to do and does it. At the same time, because the agent does not ordinarily use nor needs to use some hard-rock theory, rules for doing what she does cannot help but suffer virtually imperceptible to radical jerks, shifts, and upheavals

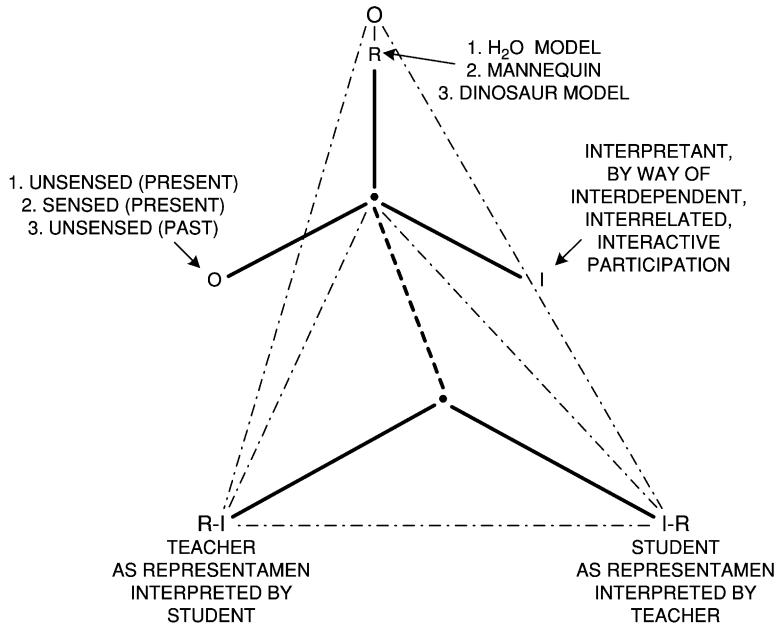

Figure 2 The sign or Representamen given three different ways, creating a 'tripodulation.'

along the way. Thus, what she does is processual and ever changing. Everything changes in her semiotic world except change itself. How so?

Unstable Semiotically Engendered Worlds

Figure 2 gives us the sign or Representamen as either (1) a model of the H_2O molecule in a high-school chemistry class, (2) a mannequin in front of a class for the purpose of studying human anatomy, or (3) a dinosaur model before a group of fifth-grade students. The respective objects – and presumably, the means of reference and the referents – of the signs are (1) unempirical in the unaided concrete sense, yet theoretically existent; (2) empirical, and shared by the entire class; and (3) unempirical, and nonexistent in the present, yet theoretically empirical with respect to human observers in the past.

The teacher in each case has the task of rendering the sign meaningful in terms of some referent, whether unseeable without elaborate equipment, evident to the senses, or presumably seeable by some semiotic agent living in the remote past. To complete this task, she must become a sign, because her students interpret her while they interpret her words and her assortment of extralinguistic signs. At the same time, each student and the collective body of students become signs, because she interprets them through the array of nonverbal cues, questions, and comments she receives from them. In this broader, more inclusive sense, the original signs (1), (2), and (3) become semiotic Objects while the teacher and students become Representamens and Interpretants for one another. So we have two tripods, with the inclusion of the sign makers and sign takers. Put in another way, we have a 'tripodulation' of what Donald Davidson (1990) called 'triangulation' in the process of bringing semiotic agents into the equation (Pagin, 2001). The upshot is that reference and referents are of hardly any account if we simply consider meaning to reside exclusively in the word, the sentence, or the entire text. Reference, referents, interpretations, meanings, and understanding are holistic affairs. They require entire contexts. There is no clear-cut demarcation between time and place here. Everything, everywhere, in the past, the present, and the future, to a greater or lesser degree come into play.

This is to say that signs, reference, referents, interpretations, meanings, and understanding, as well as the agents of understanding, are all involved in a coparticipatory process. The participatory semiotic universe entails interdependence, interrelatedness, and interaction in the widest sense. It is much like one of physicist John Archibald Wheeler's examples illustrating his notion of what he calls the 'participatory universe.' Wheeler offered the example of three baseball umpires (1980). One says, "I sees 'em the way they are" (a naive realist or referential causality theorist). Another rebuts, "I says 'em the way I sees 'em" (a perspectivist, who believes sense determines reference). The third umpire, somewhat more cautiously observes, "They ain't nothing 'til I sees 'em" (a process philosopher coparticipating with signs and their meanings). Our third umpire will have no truck with

anything less than the inclusion of herself, ecologically, within the whole of what is becoming (as illustrated in Figure 2). As she becomes, so also everything becomes; everything is always in the process of becoming something other. Indeed, "reference is rather a process than an entity, something that needs to be accomplished every time anew" (Knuuttila, 2003: 109).

Reference is always there, for the making and taking, like all signs. For, the semiotic object, like the semiotic agent herself, is nothing more and nothing less than a sign among signs.

See also: Meaning, Sense, and Reference; Reference: Philosophical Theories; Reference: Psycholinguistic Approach; Reference: Stylistic Aspects; Referential Relations in Spoken Discourse; Saussure: Theory of the Sign; Sense and Reference: Philosophical Aspects.

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Reference: Stylistic Aspects

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Introduction

The analysis of referring expressions is a major aspect of stylistic analysis because such items determine the way in which entities are described as a story, poem, or play develops, including everything from the major characters to background details. Referring expressions are generally of most stylistic interest when they break the usual patterns in the language, since then they may be used for special effects, for purposes such as highlighting thematic points, creating plot ambiguity, providing a juxtaposition of different perspectives, and representing the style of thinking of characters.

This article examines the stylistic use of reference items from four angles. The first section discusses how theories of mental representation are necessary to explain how readers use their knowledge and make inferences to interpret referring expressions, particularly 'shorthand' forms such as pronouns. The second section examines lexical density, the extent to which referents are referred to by full lexical noun phrases or pronouns, and focuses on cases where there is textual or psychological underspecification. The third section examines how switches between different types of referring expression can create perspective shifts and address shifts. The last section looks at cases of 'displaced' reference, where a writer evades mentioning a referent or refers to something by a seemingly inappropriate designation.

The examples in this article are all taken from narrative texts. Stylistic analyses of referring expressions in poetry and drama can be found in Semino (1997) and Culpeper (2001), respectively.

Knowledge, Inference, and the Interpretation of Reference Items in Texts

A major new area within stylistics is cognitive stylistics, which examines how readers use their knowledge and ability to make inferences to interpret the wording of texts. The interpretation of referring expressions is a key topic of study in cognitive stylistics, as it is in the fields of psychology and artificial intelligence, since 'shorthand' forms such as pronouns provide an indication of how much knowledge a reader needs to bring to a text and what types of processing need to be carried out. This type of approach is radically different from early text models such as Halliday and Hasan's (1976) work on cohesion, which assumed that pronouns were generally interpreted by the reader looking back in the text for an antecedent. Halliday and Hasan's explanation was challenged by Brown and Yule (1983), who argued that if the referent was changing state then an anaphoric search for an antecedent would yield a reference to an out-of-date mental representation of the entity. This places the emphasis on mental modeling rather than simply on what items are present in the text itself. Another challenge to the cohesion approach is the argument that pronouns can be interpreted even when there is no antecedent (see Emmott, 1997, 1999), as shown in Examples (1)–(5) below. These examples demonstrate that different types of knowledge and inference are needed to make sense of the texts. Examples (1) and (2) show the use of schema knowledge (e.g., Schank and Abelson, 1977; see Semino, 1997 for a summary of schema theory and how it has been used in stylistics research). In Example (1), we can infer that if the setting is a hospital, then it is likely to be the medical staff who have washed the patient's hair (although this also requires the assumption that it is the patient who is being discussed here).

(1) Rebus went to the hospital, sat with Rhona. The room, so familiar to him now, was an oasis where calm and order reigned, where each hour of the day brought its comforting rituals.
"**They**'ve washed her hair," he said.
"She's had another scan," Rhona explained.
(Rankin, *The Hanging Garden*, p. 303)

In Example (2) we can again use our schema knowledge to infer that 'they' refers to the builders about to demolish the building, overriding the recent plural noun 'people' which is the only potential human and plural antecedent in the immediately preceding text.

(2) It was as if [Rebus] reached out his hand and plucked possibilities from some tree or bush, expecting people to swallow them. The one time she'd worked with him before – a body found in Queensbury House, just as **they** were readying to knock most of it down [...]
(Rankin, *The Falls*, pp. 312–313)

In addition to schema knowledge, readers need to draw on their text world knowledge (Werth, 1999; see also Emmott, 1997), which is an accumulation of information about the world described by a particular text, including details about the characters, the relations between them, locations in the story, etc. In Example (1), we might guess that 'she' is the patient, but the character can only be fully identified as

the character Samantha if the reader has the text world information that Samantha, daughter of Rebus and Rhona, is the only main female character in this story who is a patient in the hospital. Example (1) sets up a new scene in a previously established location. Alternatively, readers may be required to return to earlier scenes in which events are still ongoing. In Emmott (1997), I provide examples of cases where a reader sets up a 'contextual frame', which comprises knowledge of which characters are together in a particular location at a particular point in time. If the narrative moves on to another frame, then returns to the first frame, it is not necessary to present antecedents for all the characters since the same group can be assumed to still be together. Hence, the 'They' in Example (3) can be interpreted as referring to Jim and Peter, even though only Jim is mentioned. The reader simply needs to recall the earlier scene in which these characters were present in a contextual frame (this 'frame recall' being signaled by the unusually explicit scene indicator 'Housebreaking, Part Two') and make the assumption that Jim is still with Peter.

(3) Housebreaking, Part Two

Jim stopped the car half a block away from the house. "If only the god-damned lights didn't go off." **They** were both looking at the building's blank façade, the curtainless windows behind which no figure moved, no candle shone. (Straub, *Ghost Story*, p. 279)

In the above examples, trigger words, such as the word 'hospital' in Example (1) and the scene indicator in Example (3), provide the means for cueing the relevant text world knowledge. However, in certain cases, a referent is so pervasive in the narrative as a whole that no overt trigger word is necessary (see Wales, 1996: 45 for a similar discussion). In Example (4), the main story up until this point is about the characters' search for a van which they think that their friend Bertie might be able to provide. Although the van has not been mentioned recently, it is still highly salient and when Bertie offers to show them something, the most likely referent is a van.

(4) Bertie opened the gate and nodded at them to get up.
–Come on till I show yis **somethin**'

* * *

It was filthy. He'd never seen anything like it. They walked around it. (Doyle, *The Barrytown Trilogy: The Van*, p. 449)

The pervasiveness of a referent can also be due to the centrality of a particular character in the thoughts of the focalizer. In Example (5), the 'He' mentioned here is not the only male character in the story and there is no trigger phrase to identify the referent, but the focalizing character's obsession with one particular man and her reaction at this point can lead the reader to infer who the male pronoun refers to.

(5) [I] started to walk quickly along Cardamom Street where I could pick up a taxi to the hairdresser's. I stopped dead in my tracks and the world blurred. My stomach gave a lurch. I felt as if I was about to double up.
He was there, a few feet from me. (French, *Killing me Softly*, pp. 19–20)

Stylistic examples of this type challenge traditional anaphoric theory since they show that interpretation of a pronoun is possible without an antecedent and they also raise questions about the distinction between deixis and anaphora (Cornish, 1996; Wales, 1996; Emmott, 1995, 1997, 1999). Examples of interpretable antecedentless pronouns also give an indication of the type of information that needs to be drawn on by readers and hence indicates how schema knowledge and text world knowledge are used while reading a story or other types of text.

Lexical Density and Underspecification

Another major topic in stylistic research on reference is lexical density. Linguists have suggested scales of accessibility (Ariel, 1990) and different degrees of cognitive status (Gundel *et al.*, 1993) to account for the form of a referring expression that is most likely in a particular cognitive environment. Hence, full lexical noun phrases and names are more likely when there are several possible referents or when a referent has not been mentioned for some time. Conversely, pronouns are more likely when a referent has been recently mentioned and when there is no risk of ambiguity.

For special stylistic uses, a writer may sometimes increase the lexical density in a reference chain to achieve special effects, as in the following three examples.

(6) After I'd prepared **our evening meal**, I cooked **our evening meal** and washed up after **our evening meal**. I didn't eat much of **our evening meal** because I was then sick of the sight of it. (Harpwood, *Tea and Tranquillisers: The Diary of a Happy Housewife*, cited and discussed in Ariel, 1990: 200)

(7) [. . .] she'd babbled on and on to **Libby** (it was Aunt **Libby** who had got her through that time, **Libby** with her cool cloths and her aspics, **Libby** who had stayed awake with her all night [. . .], **Libby** who had never left her side, **Libby** who had saved her) [. . .] (Tartt, *The Little Friend*, p. 8)

(8) And **Mother**? Ah. **Mother**.
Mother sang. **Mother** rocked her sometimes, rocked without her sometimes. **Mother** stayed at home with Mozart, swollen as a sow. **Mother** played. **Mother** played. (Galloway, *Clara*, pp. 26–27)

In all these cases, there is no potential for ambiguity, so the repetition is not for the purposes of clarifying which referent is intended. Instead, the repetition serves rhetorical purposes, highlighting a particular entity. The interpretation depends on the context and may be strongly negative, as in Example (6), or strongly positive as in Example (7). The repetition in Example (7) may have some contrastive force, suggesting that Libby performed this role rather than someone else. The word 'Mother' in Example (8) may also be contrastive (e.g., in relation to what the father did) or may emphasize the intense nature of the relationship. Such words can also serve thematic purposes (see Emmott, 2002 for a thematic interpretation of the repeated use of the word 'woman' in D. H. Lawrence's 'The woman who rode away').

At the opposite end of the scale, the lexical density in a reference chain may be decreased, leading to a greater use of pronouns than expected and/or the use of vague lexical terms. Although these forms may be interpretable by the reader using knowledge and inferences (as described in the first section), low lexical density can also lead to underspecification. The term 'underspecification' relates to cases where either the text itself is unclear ('textual underspecification') or a reader's mental representation is unclear (psychological underspecification), or both. Psychological underspecification may result directly from textual ambiguity, but it is also common for a reader's mental representation to be underspecified because he or she has misinterpreted a text or has not engaged with it fully (see Sanford and Sturt, 2002 for a survey of relevant psychological work on shallow depth of processing). Stylisticians are most likely to study cases where psychological underspecification is due to textual underspecification, since in those cases the ambiguous references in the text can be studied using the tools of textual analysis.

Textual underspecification is central to many literary texts since it can facilitate plot twists and convey the confused or limited perspectives of specific characters. One of the most famous examples of ambiguity in literature is Henry James's *The Turn of the Screw*. The whole story is built on ambiguity since the new governess in a household thinks she has been seeing a male ghost, but readers of the story have always been unsure whether they are reading a supernatural tale or a story about a young woman who has an overactive imagination. In the following extract, the use of the textually underspecified 'he' creates confusion in a conversation between the housekeeper, Mrs Grose (who may know more than she admits), and the new governess, the addressee at the beginning of the extract. It is unclear whether the 'he' relates to the master or to someone else, although Mrs Grose's choice of tense ('he *did*,' 'he liked everyone') and her subsequent clumsy late specification of the referent might support the governess's interpretation that it was not really the master whom she was initially referring to. This extract comes from early in the story before the governess's first sighting of the supposed ghost, so at this point the reader and the governess can only feel a sense of unease that all may not be quite as it seems (prompted by several other comments that hint that there is some mystery relating to the previous governess's death). In retrospect, however, we can see the possibility that Mrs Grose might have been referring to the dead Peter Quint, whom the governess now believes to be a ghost.

(9) "The last governess? She was also young and pretty – almost as young and almost as pretty, Miss, even as you."
"Ah then I hope her youth and her beauty helped her," I recollect throwing off. "**He** seems to like us young and pretty!"
"Oh, **he** *did*", Mrs Grose assented: "it was the way **he** liked everyone!" She had no sooner spoken indeed than she caught herself up. "I mean that's ***his*** way – the master's."
I was struck. "But of whom did you speak first?"
She looked blank, but she coloured. "Why of ***him***."
"Of the master?"
"Of who else?"
There was so obviously no-one else that the next moment I had lost my impression of her having accidentally said more than she meant [...] (James, *The Turn of the Screw*, pp. 130–131, James' italics)

In *The Turn of the Screw*, the ambiguity is never resolved and this uncertainty is the whole point of the story. Alternatively, textual underspecification can also lead to garden path effects, where one interpretation of a stretch of text is heavily prompted, then this interpretation is retracted and replaced with another. This happens in Example (10), the context being that just before this passage the main characters, Nazneen and Chanu, have seen the September 11th, 2001 attacks in the United States live on television. In the paragraph immediately before Example (10), Chanu has warned Nazneen of his worries that the attacks might lead to a backlash against the Muslim community. Nazneen then overhears the conversation in the following example in a local shop:

(10) Four men leaned over the counter, studying a paper so closely that when they looked up she almost expected their eyeballs to be smudged with newsprint.
"**It's** very serious," said the eldest [...] (Ali, *Brick Lane*, p. 368)

At first Nazneen thinks that her husband should be there to discuss the world events with these men, since he has been heavily affected by the September 11th attacks. Suddenly, however, she realizes that the 'It' refers not to the situation following the September 11th attacks, but to a local strike of garbage disposal workers. The double-take of both the character and, in consequence, the likely double-take of the reader provide an ironic perspective on the gap between Nazneen and these men in the local community, and also offer a comment on the fact that the frustrations of everyday life continue even in the wake of such major world events.

Within stylistic studies, many of the classic examples of textual underspecification are cases where a particular 'mind-style' (Fowler, 1986/1996) is presented, reflecting limits in the perception of characters due to such factors as young age, madness, limited mental capacity (Leech and Short, 1981), and the viewpoint of Neanderthal man (Halliday, 1971). Often such texts provide vague descriptions that do not immediately identify referents fully, reflecting the failure of the characters to comprehend what they are perceiving. Nevertheless, there are often sufficient clues in the text for a reader to be able to draw on his or her schema knowledge to identify a particular situation or activity and thereby to appreciate what it is that these characters are failing to understand (see Bransford and Johnson, 1972 for psychological work on these types of underspecified texts). Hence, a reader can build an adequately specified mental representation of the scene, albeit one that might take rather longer to construct than usual. Example (11) provides an illustration of this type of textual underspecification in which Monica Ali uses a vague description to reflect the mind-style of Nazneen, who has recently arrived in London from Bangladesh for an arranged marriage. Nazneen is watching television, but lacks the relevant schema knowledge and she does not speak sufficient English to understand the television commentary.

(11) **A man in a very tight suit (so tight that it made his private parts stand out on display)** and **a woman in a skirt that did not even cover her bottom** gripped each other as an invisible force hurtled them across an oval arena. [...] The couple broke apart. They fled from each other and no sooner had they fled than they sought each other out. Every move they made was urgent, intense, a declaration. The woman raised one leg and rested her boot (Nazneen saw the thin blade for the first time) on the other thigh [...] (Ali, *Brick Lane*, p. 36)

The mention of the boot with the thin blade is presumably sufficient to indicate to the reader that Nazneen is watching an ice skating programme (if the reader has not already guessed this) and her husband shortly afterwards confirms this by teaching her the English words 'ice skating.' The ice skating is crucial to the story because it not only shows Nazneen's mind-style at this early stage in her marriage, but because ice skating then runs as a theme throughout the book. Ice skating provides an example of the glamor that is lacking in Nazneen's marriage, but also, at the very end of the story, as Nazneen herself skates in her sari at a local ice-rink, provides a symbol for the extent to which she has integrated into Western society and yet still retains her cultural identity.

A similar type of effect is created in the same book in the following underspecified description, which requires readers to draw on their knowledge of world events to interpret the scene.

(12) "Oh God," Chanu says. "The world has gone mad."
Nazneen glances over at the screen. The television shows **a tall building** against a blue sky [...] A thick bundle of black smoke is hanging outside **the tower**. It looks too heavy to hang there. An aeroplane comes in slow motion from the corner of the screen. It appears to be flying at the level of **the buildings**. Nazneen thinks she had better get on with her work.
"Oh God," shouts Chanu. [...]
The scene plays over. [...] The aeroplane comes again. The television shows it again and again. [...]
The scene switches. "The Pentagon," says Chanu. "Do you know what it is? It's the *Pentagon*."
The plane comes again and again. (Ali, *Brick Lane*, pp. 365–366, Ali's italics)

Although it is not explicitly stated, most readers will presumably be able to identify the first scene as the attacks on the twin towers of the World Trade Center, even before the mention of the Pentagon makes it clear that this is a description of the September 11th attacks. Our schema knowledge can enable us to identify the references to the buildings and can also clarify the description of the events, which blurs what actually happened with the repeated replays on television. Again, Nazneen's failure to understand the English television commentary makes her dependent on her husband to explain the significance of what she is perceiving.

Underspecification can also be used to create a sense of suspense and/or drama when introducing a major participant at a key moment in the plot.

The underspecification can capture our attention and lead us initially to wonder who is being referred to before gradually disclosing the identity of the individual, as in the following example.

(13) Then **someone** walked in. **Someone Rebus knew**. **Dr Colquhoun** (Rankin, *The Hanging Garden*, p. 231)

This is quite different from the use of indefinite pronouns to refer to a participant who is so minor that they do not need to be identified, as in the example below:

(14) The news conference took place at the Big House, with a live feed to the inquiry room at Gayfield Square. **Someone** was trying to clean fingerprints and smears from the TV monitor with a handkerchief, while others tilted the blinds against the afternoon's sudden burst of sunshine. (Rankin, *The Falls*, p. 43)

The difference here seems to be due to the fact that in Example (13) the text combines underspecification with an indication that the identity of the referent is significant (due to the repetition and the fact that we are told that it is 'Someone Rebus knew'), whereas in Example (14) the 'Someone' appears to be simply an incidental participant in the context (a 'scenario-dependent character' in Sanford and Garrod's [1981] terms).

At moments of high drama, the technique of gradual disclosure can be accompanied by the shocked reaction of the characters, which highlights the fact that the unidentified entity is of particular significance, as in the appearance of the shark in the example from *Jaws* below:

(15) **Something** caught his eye and made him turn to the left. **What he saw** sucked from him a throaty grunt [. . .]
"Jesus Christ!" said Brody.
No more than ten feet off the stern, slightly to the starboard, was **the flat conical snout of the fish**. (Benchley, *Jaws*, p. 233)

As in Example (13), the way in which the text lingers on the unidentified entity in Example (15) ('Something caught his eye,' 'What he saw') draws the reader's attention toward it. The pseudo-clefting in 'What he saw . . .' also adds linguistic emphasis. In cases of this type, graphical features such as italics, sentence fragmentation and unusual paragraph indentations can provide signals that may attract the reader's attention toward the indefinite reference and highlight its significance (see Emmott *et al.*, 2003 for a stylistic discussion of examples with graphical highlighting).

Referential Shifts: Changes in Perspective and Terms of Address

Referential shifts allow changes in perspective, which can be of key stylistic importance in many literary texts. Within narratology, there has been particular interest in switches from main narrative into the thoughts of the characters (e.g., Leech and Short, 1981; Fludernik, 1993; Bal, 1997; Toolan, 2001). In streams of consciousness fiction, third and first person pronouns can alternate as the narrative levels switch between an omniscient narrator describing a character and the internal focalization of that character. The following examples from Joyce's *Ulysses* illustrate this type of switch in relation to Stephen Dedalus's and Leopold Bloom's thoughts, respectively. In each case, the third person pronouns and first person pronouns are coreferential.

(16a) **He** halted. **I** have passed the way to aunt Sara's. Am **I** not going there? Seems not. (p. 46)

(16b) On the doorstep **he** felt in his hip pocket for the latchkey. Not there. In the trousers **I** left off. Must get it. (p. 59) (Both examples from Joyce, *Ulysses*)

This type of juxtaposition can lead to a clash of different views. In the example below, the text contrasts Nazneen's brutally honest assessment of a situation with the initial more neutral view.

(17) **They** had never, in all those years, been invited back. And **we** were never invited in the first place, Nazneen reminded herself. (Ali, *Brick Lane*, p. 245)

Immediately preceding this quotation, Nazneen's husband, Chanu, has spoken of an earlier incident in the novel when he and Nazneen visited Dr. Azad's house, without indicating that they arrived uninvited. The initial statement of Example (17) also fails to acknowledge this fact, but the switch into the first person shows the double-take of Nazneen as she challenges the presupposition of the previous sentence.

For linguists, there is particular interest in reference shifts where the shifts break the usual expectations of traditional grammars. This applies to switches from definite to indefinite, since we would normally expect references to remain definite once definiteness has been established. Du Bois (1980) provides a classic analysis of this issue in relation to the famous *Pear Stories* film, showing that late indefinite references to the central boy in the film are due to perspective shifts (see also Sanders, 1994). Hence the sense of indefiniteness can be attributed to the focalizing character's knowledge state, not the reader's knowledge state. These perspective shifts can be of different types. In

Example (18), the identity of 'a girl' is unknown to the focalizing character, Stella, but the reader has ample background knowledge to infer that this must be a character who has appeared in the previous chapter.

(18) [Stella] came face to face with **a girl** standing uncertainly on the threshold. In one hand she carried a steaming saucepan, from which protruded the top of a feeding bottle. Her face appeared to be exceedingly dirty, and she carried her other arm in a sling. (Mitchell, *The Token*, p. 62)

Sanders (1994: 97–99) provides a subtly different example (from a Dutch translation of the story about Ruth in the Bible) in which the indefiniteness is probably due to a temporary lack of recognition since a character has fallen asleep and awakened to find 'a woman,' whom he supposedly knows, lying there. Example (19) below is rather different since both the reader and Mark must know that 'a woman' denotes Martha, for Mark has gone to her room with the intention of speaking to her.

(19) Mark made a visit to Martha's room [. . .]
"Do you mind if I come in?" He switched on the light [and as he did so he remembered all the previous times he has entered this room, going back to his childhood in the house].
He took hold of the present, where **a woman in a red housecoat, with untidy hair**, sat by a dark window [. . .] (Lessing, *The Four-Gated City*, pp. 202–203)

Here the indefiniteness provides a sense of distance in the relationship between characters, a technique used repeatedly in the novel to give a defamiliarizing effect (Shklovsky, 1965) to the scene.

In addition to these perspective changes, shifts in terms of address can signal changes in the social relations between characters. A considerable amount of work on this topic has been done by stylisticians working on drama texts, since address is of obvious significance in the dialogue medium of drama. Culpeper (2001: 193–199) summarizes work in the field, looking particularly at the switches in 'you' forms and 'thou' forms in Shakespeare's plays (drawing on Brown and Gilman's [1960] theoretical framework), arguing that they can have social and pragmatic significance, including indicating positive or negative emotions at specific points in a play.

Terms of address forms can also be significant in narrative, as in the following example in which the thoughts of Nazneen (in italics) filter into the direct speech of her husband Chanu to challenge his recollection of earlier events.

(20) '[Chanu] raised a finger and his voice. ''But **Azad** said, not in so many words, that I had done something underhand. I told him, 'Look **Azad** *(I was there! Don't you remember? I was there, and you always call him* ***Dr****)*, I asked you to sign my petition [. . .]'. . . .]" (Ali, *Brick Lane*, p. 75, Ali's italics)

Second person pronouns have attracted a great deal of interest in narratology (e.g., Bal, 1997; Fludernik, 1995, 1996, 1998), since they challenge the traditional notion of the narrator and seem likely to intensify the involvement of the reader. The following examples show second person narration which, in the full text, is interspersed between first person narration.

(21a) If **you** did something once when you were twenty, and if **you** realized at that moment that it was the happiest moment of **your** life, then that in itself is a crushing thought to have. **You** will never be happier. (p. 2)

(21b) Evelyn Cotton is my heroine. If **you** were living in this world, she might be **yours**. As it is, **you** have only read her books and seen her on **your** television. **You**, as the public, love her or hate her. (p. 2)

(21c) In the mean time **you** are married. **You** have children and **you** make money. For twenty-three years, each time **you** penetrate your wife **you** are trying to recall that once with Evelyn Cotton. Each of **your** children was conceived while **you** thought about Evelyn Cotton [. . .] (p. 2)

(21d) Now, her arms and legs are wrapped around **you**. Her belly slides softly across **yours**, trapping small bubbles of air between them. Her chin is dug into **your** clavicle. The rhythms of her voice that used to haunt **you** every night are rushing past **your** ear [. . .] (p. 22) (All examples from Ronan, *The Men who Loved Evelyn Cotton*)

In Example (21a), the narrator, having described an affair in his youth in the first person, switches to what seems to be a generic 'you' form. In Example (21b), the possibility of the generic 'you' entering this text world is discussed and the fictional Evelyn Cotton is assumed to have a status in the addressee's own world. In Example (21c), there is a stronger identification between the narrator and the supposed addressee with events in the narrator's life being attributed to the addressee (although this may still be hypothetical, covered by the 'if' of Example (21a) that precedes this example). In (21d), an extract that is preceded by both I-narration and also you-narration of the types shown in Examples (21a) and (21c), the addressee is suddenly placed directly in the love-making scene with Evelyn Cotton, hence challenging the usual separation of the worlds of the characters and the reader suggested by text world theorists such as Werth (1999).

Referential Displacement

Transitivity Analysis

Stylisticians have made extensive use of models of transitivity from mainstream linguistics in their studies of referring expressions in texts, particularly using Halliday's work (e.g., Halliday and Matthiessen, 2004). Many stylistic studies have shown how agency can be displaced, drawing attention away from the role of a particular referent in a sequence of events in order to show how a character fails to understand the agency underlying events (often in the representation of a restricted mind-style) or how responsibility is evaded by a character (e.g., Halliday, 1971; Leech and Short, 1981). Examples (22a) and (22b) demonstrate this type of displacement at a plot-central moment in the story. Here, years after the events being described, the I-narrator confesses for the first time her role as murderer of the two women, Karen and Anethe. The text does not explicitly state that the I-narrator hits these women with the chair and axe, respectively, but clearly if the I-narrator is holding the chair and the axe in each case and we are then presented with the specified consequences, we can assume that she is responsible. Although agency can be inferred, the fact that it is not openly stated can be taken to reflect the mind-style of the protagonist, reflecting her refusal to come to terms fully with her actions in spite of her confession.

(22a) [I] gripped that chair-back so hard my knuckles whitened.
Karen staggered two or three steps under **the blows from the chair** and, twisting around, turned towards me [...] A small exclamation escaped me, as I stood there with the chair in my hands. (pp. 233–234)

(22b) [...] I did extend my hand, but I did not reach [Anethe]. She did not move, and neither then could I.
It is a vision I have long tried to erase, **the axe in the air**. Also as well the sight of blood soaking the nightgown and the snow. (p. 235) (Both examples from Shreve, *The Weight of Water*)

Physical and/or mental incapacity can also be signaled by displacing agency. In the following example, the displacement reflects the false perspective of the drunk focalizer, for it is his perception that is affected, not the room that is moving.

(23) **The room** began to rise upwards from the right-hand bottom corner of the bed [...] He threw back the covers and sat on the edge of the bed, his legs hanging. **The room** composed itself to rest. After a few moments he swung his legs back and lay down. **The room** lifted. (Amis, *Lucky Jim*, p. 61)

In the above examples, agency is elided for major stylistic reasons, but the same type of effect can also be achieved for reasons of economy of presentation in relation to minor descriptive details, as shown in the two examples below:

(24a) Here came **the scallop shells** [...] (Lessing, *The Four-Gated City*, p. 38)

(24b) **The brandy** he had ordered arrived. (Rendell, *Going Wrong*, p. 172)

Here readers need to use their restaurant schema knowledge (Schank and Abelson, 1977) to override the literal meaning of the statements and attribute agency to a waiter rather than to the food and drink. These examples are of less stylistic interest than Examples (22a) and (22b), but Examples (24a) and (24b) nevertheless show how references to the actions of minor characters can be attenuated in order to put the main emphasis on the major characters in the story.

Mental Spaces

Another type of displaced reference has been identified by Fauconnier (1994) in his mental space theory. This work shows how a reference item may be used that, if read literally, could be seen as inappropriate. However, in context, the reference item can be used for economy of presentation and/or special stylistic effect.

In Example (25), the Questioner uses a classic type of metonymy, referring to the images of the children directly by the names of the children. When Nazneen holds the pictures, the names represent the photographs as physical objects and the usage is arguably a little more unusual. The stylistic effect of the metonymy is to increase the sense of Nazneen's empathy with the children.

(25) The Questioner held up another photograph. "Some more Iraqi children. Mashgal, Adras and Misal. All under one year [...]"
Nazneen relinquished **Nassar** and she held **Mashgal, Adras and Misal**. (Ali, *Brick Lane*, p. 282)

The following example is much more unusual and hence might be perceived as highly marked stylistically. In this case, the reference to Nazneen's sister refers to a letter the sister has written. Due to Nazneen's enforced move to Britain, the letter is the only contact that Nazneen has or is likely to have with her sister. Hence the letter is symbolic of the way that the sister's correspondence has taken over the role of the sister herself.

(26) Nazneen went into the bedroom and, from the modest seclusion of the underwear drawer, unveiled **her sister**. (Ali, *Brick Lane*, p. 265)

Example (27) shows another classic type of displaced reference across temporarily distinct mental spaces. In such cases, a narrator's perspective can lead to the use of a designation that postdates the events being described, in this case because the narrator is referring to her mother as a child, hence before she was a mother.

(27) **My mother** and her younger sister would loiter near the closed office door until shooed away. (Atwood, *Significant moments in the life of my mother*, p. 12)

The same type of apparent inappropriateness of designation is seen in Example (28), where a narrator recreates events that previously occurred in the life of the dead owner of the narrator's mountaineering ice-axe. If we were to take the text literally, then clearly the animacy of the dead man would be nonsensical, but this is nevertheless a common way of seeing the events from the perspective of the current narrator, for whom 'the dead man' is the most appropriate designation.

(28) They were all merry, and **the dead man** particularly so, when they left the pub and headed for the bus [...]

They went upstairs in the bus – for **the dead man** smoked heavily [...]

The dead man was a gangster, in double-breasted suit and Homburg hat which suited his rascality. He was ill [...] (Mitchell, *Dead man's ice-axe*, pp. 66–67)

More stylistically unusual are the following passages from a different story by the same author. In this case, the focalizing characters suddenly realize that a man who had been assumed to be dead is actually alive.

(29) [They] looked at **the body** which lay amidst the piles of equipment and cans. At **the corpse** whose eyes were open, blinking, and whose breathing could be discerned at its throat. Neither of the two spoke, but waited for **the dead man** to do so. (Mitchell, *A friend of the family*, p. 40)

In Examples (29) and (30), the reference items become incongruous as 'the dead man' opens his eyes and begins to speak:

(30) "You were in a coma. We think you had an attack of oedema at altitude. He brought you down, saved your life. [...]"

She distanced herself from the other, leaving him to explain to her husband what had happened.

"Did you get to the top?" continued **the corpse**. "Yes? Good man!" (Mitchell, *A friend of the family*, p. 40)

The continued references to the character being dead reflect how the two observing characters, the 'dead man's wife and his climbing partner, struggle to readjust their perception of the situation. The referring expressions are also deeply ironic since this episode follows on immediately after a discussion in which the wife takes the opportunity of her widowed status to proposition the climbing partner and suggest that he steps into the 'dead man's shoes.

The above examples show the range of uses of displaced references, from everyday economy of expression to heavily plot-significant items. Within cognitive linguistics, detailed examination of this type of phenomenon has been carried out in relation to narrative texts by Sanders (1994), Oakley (1998), and Dancygier (2005) using Fauconnier's mental space theory and the more recent blending theory of Fauconnier and Turner (2002).

Conclusion

Although not exhaustive, the above discussion summarizes some of the major issues in the stylistic study of reference. The main emphasis in stylistics has generally been on the form of referring expressions, particularly where there are shifts in use throughout a text (as described in the last three sections). The knowledge and inferences needed to interpret referring expressions have also received particular attention in recent years, as part of the mental modeling approach within cognitive stylistics (as discussed in the first section).

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See also: Accessibility Theory; Articles, Definite and Indefinite; Deixis and Anaphora: Pragmatic Approaches; Discourse Anaphora; Generic Reference; Indefinite Pronouns; Meaning, Sense, and Reference; Mind Style; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Narrativity and Voice; Pronouns; Reference: Philosophical Theories; Reference: Psycholinguistic Approach; Reference: Semiotic Theory; Referential Relations in Spoken Discourse; Saussure: Theory of the Sign; Schema Theory: Stylistic Applications; Stylistics; Stylistics, Cognitive; Text World Theory; Transitivity: Stylistic Approaches.

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Referential Relations in Spoken Discourse

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The Problem of Anaphoric Distribution in Discourse

The term 'reference' refers to the relation existing between a sign and an entity in the world. An act of reference is the activation of a textual referent within discourse, that is, the evocation of an entity in the world through a linguistic expression within discourse.

All languages have lexical, morphosyntactic, and prosodic means to refer to entities in the world and to signal the relations existing between referential expressions within discourse. At least two prototypical categories of referential expressions can be identified: descriptors, i.e., forms with autonomous semantic content that allow for the representation of their referents; indexical expressions, i.e., forms without autonomous semantic content that function as instructions for the singling out of referents in the discourse model. In oral discourse, indexical expressions can belong to either the linguistic level – pronouns, inflectional morphemes – or the paralinguistic level – hand/head/eye movements. The latter have not yet been the subject of comprehensive studies, but future research will undoubtedly confirm their importance. For example, Ozyurek (2000) shows that speakers in a group codify space so as to contrast the space internal to the group – which refers to entities and information belonging to shared knowledge – with the space external to the group – which refers to nonshared knowledge. In other words, it is possible to create spatial file labels to which one can refer by modifying the direction of one's gestures and eye or head movements. An analogous phenomenon is found in signed languages, where the direction of one's movements is used to identify the referents of anaphoric and deictic expressions (Metzger and Bahan, 2001).

Both the speaker's choice of referential expressions and their interpretation on the part of the addressee are subject to morphosyntactic, semantic, and pragmatic constraints that vary across languages and may differ in their strength. In the case of oral discourse, we will discuss here what Huang calls "the problem of anaphoric distribution in discourse," that is "how to account for the choice of a particular referential/anaphoric form at a particular point in discourse" (Huang, 2000: 302).

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Cognitive Approaches: Referring as an Identifying Strategy

The best-known linguistic/philosophical and cognitive studies into how referential relations are expressed (see Reinhart, 1983; Givon, 1990; Huang, 2000) rest on the following assumptions:

1. The primary communicative aim underlying the use of linguistic expressions is that of transferring information, i.e., increasing the amount of shared knowledge.
2. Referential expressions function as file labels under which information is stored. In other words, they function as shared starting points for building up discourse.
3. All information is understood against the background of the context shared by the speech participants (Olson, 1970). Such a context, in the case of spoken discourse, includes:
   a. general and individual knowledge;
   b. the concrete situation in which discourse takes place;
   c. a mental image of the ongoing discourse (or discourse model), which is made up of the inferences, presuppositions, and implicatures generated by discourse.

Each speaker's amount of knowledge is not stable but changes as discourse proceeds. Further, at any instant, some piece of knowledge can be the object of discourse while other pieces of knowledge may remain in the background and not be brought up for discussion. At any single time t_n of discourse, a piece of knowledge in each speaker's discourse model can be (see Levelt, 1989; Lambrecht, 1994; Gundel *et al.*, 1993 for related scales concerning the degree of activation and identifiability of referents):

1. accessible or inaccessible (i.e., stored or not stored);
2. active or inactive (i.e., present in or absent from the speech participant's state of attention at time t_n);
3. focused (i.e., whether it is the object of discussion at time t_n or not).

The discourse model, including stored knowledge and its degree of activation at a given time, is not exactly the same for different speech participants. In other words, speech participant p_a's discourse model and its representation by a different speech participant p_b may not coincide. Consequently, any piece of knowledge related to discourse can:

1. be regarded as being shared or not shared;
2. actually be shared or not shared.

For any transfer of information to be successful, the addressee needs, as a consequence of the speaker's utterance, to integrate the information found in the utterance into her discourse model according to the speaker's intentions. The speaker should therefore select referential expressions so as to allow the addressee to identify their referents and link them to the relevant pieces of contextual information. In particular, the use of referential expressions should be conducive to signaling the degree of accessibility and activation of their textual referents within the ongoing discourse so that the addressee can recover their referents from her own discourse model.

Differences among cognitive models primarily involve the identification of the parameters deemed necessary to define the accessibility and degree of activation of referents at a given time in discourse. In Givón's model (1983, 1990), the study of referential expressions is linked to the notion of topicality, which had already been a feature of Prague School functionalism and is now reformulated in cognitive terms (Givón, 1990). Thanks to numerous typological and interlinguistic studies focusing, in particular, on narrative texts (both oral and written), a great many parameters have been identified that allow us to measure the accessibility and relevance of a topical referent. These parameters can be syntactic (e.g., the subject role), semantic (e.g., animacy, agentivity, definiteness), textual (e.g., the protagonist role, knowledge shared between participants, recurrent and/or recent mentioning, absence of competing referential values, referential continuity). The resulting model for the use of referential devices is basically an iconic one (Figure 1).

Based on similar premises is Klein and von Stutterheim's model (1987), which was integrated with Quaestio theory and used in the ESF project (see Perdue, 1993) to describe how referential movement, especially in narratives, is built in language learners' varieties.

The diagram in Figure 1 applies to both oral and written discourse. However, oral and written discourse

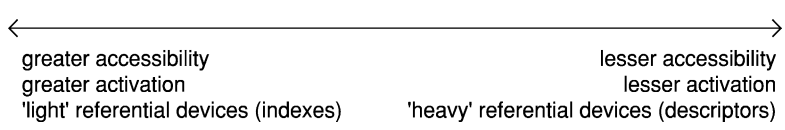

Figure 1 Accessibility, activation, and referential means.

can use different means to signal the information status of referents. Alternatively, they can make use of the same devices, albeit with differences in frequency. Givón (1983) identifies as typical features of oral discourse the use of dislocation and that of presentative structures.

Nonactive referents are activated in discourse by way of 'heavy' devices, such as descriptors and morphosyntactic strategies suited to introducing nonidentifiable or nonactive referents. Once activated, the textual referent functions as a file label and can be retrieved subsequently from the discourse model through 'light' referential means. In the following example (Givón, 1983), the referent *Frenchman* is introduced through the presentative structure *there was a* . . . as well as a descriptor. Later on, it is retrieved through the pronoun *he*. Specifiers help to signal the degree of identifiability and activation: example (1) illustrates the use of the demonstrative determiner to signal referential identifiability (*these big ranchers*, *this BLM land*). This device is very common in spoken language, where the signaling of referential status seems to be usually emphasized.

(1) [a man telling the story of his family as they arrived in New Mexico]
And my dad did lease some, ah, 'course BLM had land and they had it all leased to these big ranchers. And there was a Frenchman up south of Grants, ol' Juan Yarty. He had worlds of sheep. And he had all this BLM land that was around us down here . . . and he raised sheep, you know

Referents available in the shared spatiotemporal environment will be activated in discourse through light referential devices, ellipses, or linguistic or paralinguistic deictic indexes, possibly in conjunction with definite descriptions. Similarly, in order to refer to the speaker and addressee, specific indexical expressions will be used, namely the first person and second person pronouns:

(2) [conversation on how to do the washing, from the LIP corpus (LIP, 1993)]

C:	Questo	blu	Filippo	tu	questo	come
	this	blue	Filippo	2sing	this	how
	lo	mett-i	nell'	acqua	basta	
	it	put-2sing	in the	water	that's it	

'This blue one, Filippo, what would you do with you? Would you just put it into the water?'

(3) [on the bus]

B:	Scend-i	alla	prossima?
	get off-2sing	at the	next

'Are you getting off at the next (stop)?'

(4) [conversation between two colleagues, A and B; colleague C walks past them as the conversation unfolds]

A:	Dev-o	ancora	sempre	parlar-gli
	Must-1sing	still	always	talk-(to)him

[nodding in the direction of C]
'I haven't talked to him yet'

Referents that are assumed to be accessible on the basis of the knowledge shared by the speech participants can be activated by using light referential devices:

(5) [two acquaintances, a few days after President Kennedy's assassination, quoted in Schlegoff, 1996: 451]
Is he still alive?

(6) [student A to his flatmate B as the latter comes back from an exam that A was aware of]
A: How did it go?

Similar premises are also Sacks and Schlegoff's (1979) starting point. They claim that the use of referential expressions in interactions result from two simultaneously operating principles:

1. the principle of expressive minimization
2. the principle of referential identification

In other words, the speaker should use the most economical expression that allows the hearer to identify a referent. The novelty of Sacks and Schlegoff's study lies above all in the texts they chose to analyze. They focused on dialogic conversation within the conversation analysis model. Dialogic conversation shows how strategies mediating between the two principles work as the conversation unfolds (*Survey of English usage*, cited in Huang, 2000: 321):

(7) 1. B: and he said well I'm sorry ((you know)) we don't' cater for this you'll just have to change you timetable
2. or work at home ((so)) I said this just means I shall do half as much work # ((and)) he/ said 'very well #
3. A: /[k] 'who said 'this#
4. B: the/secretary#*.*of the/'school#
5. A: */'m#*/ who's 'that@
6. B: /George 'Fornby#

Recipient A's failure to recognize the intended referent (see line 3 and, later on, line 5) triggers interactional repair mechanisms. Speaker B's need to guarantee the referent's identifiability forces him to progressively resort to less economical expressions (see lines 4 and 6).

Conversation Analysis Approaches: Referring as a Communicative Move

A few studies underline the need to combine the iconic model with the view of texts as hierarchically structured entities, especially with respect to the notion of continuity. In other words, continuity and discontinuity should not simply be evaluated in relation to the linearity of a text but, rather, with respect to its structure. Heavy linguistic devices are claimed to be typically used for referential purposes at the beginning of a new chunk of text ('locally initial' reference according to Schlegoff, 1996). Light linguistic devices are used for referential purposes within a chunk of text ('locally subsequent' reference according to Schlegoff, 1996). This suggestion, which has been developed within the conversation analysis model, has in part validated the iconic model. Light forms turn out to be used within adjacency pairs and in sequences of related adjacency pairs as 'series' or 'postelaborations' (see Sacks and Schlegoff, 1979; Fox, 1987; Schlegoff, 1996).

However, the choice of referential expressions itself contributes to the structuring of discourse, which, in keeping with the conversation analysis model, is not viewed as having been fixed in advance but rather as being coconstructed by the speech participants (discourse structure is not objective but reflexive in Schlegoff's [1996] opinion). A heavy device can be used for a linearly close and active referent in order to signal the end of a sequence or the opening of a new one (Schlegoff, 1996: 452).

(8) 1. Mark: So (') you da:ting Keith?
2. (1.0)
3. Karen: 'Sa friend.
4. (0.5)
5. Mark: What about that girl 'e use tuh go with fer so long.
6. Karen: A:lice? I [don't-] they gave up.
7. Mark: [(mm)]
8. (0.4)
9. Mark: (°Oh?)
10. Karen: I dunno where she is but I-
11. (0.9)
12. Karen: Talks about 'er evry so o:ften, but-I dunno where she is.
13. (0.5)
14. Mark: hmh
15. (0.2)
16. Sheri: Alice was stra::nge,
17. (0.3) ((rubbing sound))
18. Mark: Very o:dd. She usetuh call herself a pro:stitute, ='n I useteh-(0.4) ask 'er if she wz gitting
19. any more money than I: was.

In (8), Sheri's use of the NP *Alice* (line 16) to refer to an active referent that has just been mentioned signals her intention to open a new communicative sequence (of a narrative type) where such a referent is construed as a topic, after Mark's similar attempt (which began in 5) was repeatedly rejected by Karen (lines 6, 10, 12) (see Schlegoff, 1996: 452).

Conversely, light forms can also be used in sequences where a turn is not linked to immediately adjacent turns but rather to previous turns so as to reopen a communicative move (Fox, 1987: 30):

(9) 1. A. Oh my mother wannduh know how's yer grandmother.
2. B. hhh Uh:: (0.3) I don'know I guess she's aw-she's awright she went to the uh:: hhospital again tihda:y,
3. A. Mm-hm?
4. B. hh t! hh A:n:: I guess t'day wz d'day she's supposetuh find out if she goes *i*n ner or not.=
5. A. =Oh. Oh::.
6. B. Becuz they're gonna do the operation on the teeuth duct.
7. -f//fi:rs]t. Before they c'n do t//he cataracts.
8. A. Mm-mh,
9. A. Right.
10. A. Yeah,
11. B. hhh So I don'know I haven:'t yihknow, she wasn' home by the t-yihknow when I left'fer school tihday.=
12. A. =Mm hm,
13. B. Tch! hh So uh I don't kno:w,
14. (0.3)
15. B. En:=
16. A. =°M//hm
17. B. Well my aunt went with her anyway this time,
18. A. Mm hm,
[
19. B. My mother didn't go.
20. A. Mm hm,
21. B. t! hhh But uh? I don'know = She probably haf to go in soo :n though.

In the sequence in (9), *she*, in line 21, is to be linked to *grandmother*, which was introduced in line 1. The return pop is signaled, alongside the use of the pronoun, by combined strategies such as the repetition of lexical material from the turn we are being linked to (between lines 4 and 21) and is repeatedly announced by the repetition *I don't know*. Referring takes place thanks to a light form despite the presence of competing referents that are linearly closer (i.e., *my mother*, line 19; *my aunt*, line 17). The use of a light form in line 21 allows the turn to be tightly linked to the turn in lines 2–4 as an elaboration of the latter (being

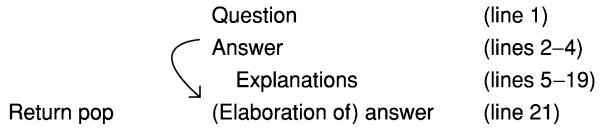

Figure 2 Structure of return pop (ex. 9).

the answer to the question in line 1). The sequence in (9) has therefore the structure shown in Figure 2.

Fox (1987) has also pointed out the existence of some correlations between the choice of referential expressions and communicative moves. A referential expression is typically repeated in order to restart, to repair an overlap, or to make an other- or self-correction, possibly functioning as an objection and signaling disagreement (Jones and Beach, 1994, quoted in Schlegoff, 1996: 444):

(10) 1. Therapist: I see so they remember that you flunked first grade and even though you're in third grade they call you a flunking first grader?
2. Son: But I don't flunk I didn't flunk Mom didn't want me to pass cause I missed too much school
3. Therapist: Oh she [wanted you to make=
4. Son: [Right
5. Mother: =No::
6. Son: .hh But y[ou didn't [
7. Mother : [Mom [Mom made a trade with the school if they would . . .

In (10), the speaker of line 7 designates herself as *Mom* to signal disagreement with what was said in line 2. The repetition of the full NP is here an instance of a typical procedure by which one's own disagreement is pointed out.

Phenomena that may turn out to be problematic if only the notion of referential continuity is invoked can also be explained as communicative moves. They include the repetition of a full NP referent in topic position in Chinese question/answer pairs (Huang, 2000: 307):

(11)

C1.	A:	Na	ta	fuqin	gan
		uhm	3sing	father	do
		shenme	ne		
		what	Q		
C2.	B:	Ta	fuqin	zai	daxue
		3sing	father	in	university
		li	jiaoshu		
		LOC	teach		
C3.		Ø	jiao	guwen	
			teach	Classical Chinese	

'A: Uhm what is his father doing'
'B: His father teaches in a university. (He) lectures on Classical Chinese'

The repetition of the topic in (11), which is unwarranted in terms of activation and identification needs, corresponds to a move of acceptance of the topic on the part of the addressee.

Socioethnographic Approaches: Referring and 'Other Activities'

Socioethnographic studies of referential expressions within a Gumperzian and Goffmanian framework have shown that the selection of referring devices is linked, among other things, to strategies that define, signal, and manage the social identities brought into the interaction by the participants, as well as being related to the participants' attitude toward each other, the ongoing discourse and the mentioned referents.

This point had already been made by Schlegoff (1972: 81) and observations along these lines can also be found in the studies mentioned so far. Schlegoff (1996) observes that in service encounters the opposition between singular and plural in the first and second persons signals whether speaker and addressee are referred to as individuals or stand for institutions, respectively (see *Calls to an emergency hot line*, Whalen and Zimmerman, 1990):

(12) Caller: uh: this iz uh:da g .h Knightsuv Columbus Hall. . .
.hh we had some uh women's purses uh stolen. . .

(13) Caller: Yes sit uh I go' a couple guy:s over here ma:n they thin bunch uh wi:se

Such an alternation has an identifying function not with respect to the referent's identity but rather in relation to his or her social role in the interaction.

It has also been observed that person alternations are related to an increase in involvement. A case in point are the different reactions ensuing in Italian doctor–patient dialogues from the use of the third person singular (politeness form) vs. the first person plural (involvement form):

(14) [doctor to patient]

Allora,	come	st-a?	vs. Allora,	come	andiamo?
So	how	stay-3sing	So	how	go.1pl

'So, how are you then?' vs. 'So, how are we doing?'

One more example is the use of the third person in place of the first and second persons in baby talk and in emotive language in general (this use is probably iconic in the former case since baby talk in its first stages ignores the deictic use of first and second persons; see Schlegoff, 1996):

(15) [grandmother to granddaughter]

Lo	dà	un	bacio	alla
It	give.3sing	a	kiss	to the

nonna questa bella bambina?
grandmother this nice girl
'Will this nice little girl give her granny a kiss?'

Name-dropping is one more case in point. It consists in using a referential expression that is immediately identifiable only to a restricted number of persons. This results in evoking a relation of affinity or closeness between the speaker and the mentioned referent and, at the same time, in having the addressee either excluded from or included in such an exclusive circle of friends:

(16) [gossip writer in a television feature]
We went to George's [George Clooney's] to ask him about his latest film.

Greater attention to the social and ritual aspects implicit in the use of referring devices has been paid in the analysis of allocutives and of person referring expressions (in particular those referring to speaker and addressee). Brown and Gilman (1960) regard the different options available in many languages in their allocutive systems as a means for speech participants to manifest the relations existing between them in terms of power and solidarity. For example, a few Indo-European languages use an alternation between persons to refer to a speech participant. The use of the second person singular conveys a short distance in terms of solidarity and/or power, while other forms (e.g., the third person in German, Spanish, and some varieties of Italian; the second person plural in French and some varieties of Italian) signal greater distance along either or both of the axes. Japanese has been extensively studied in this connection since it has a rather complex system for the selection of referring expressions, with respect both to speaker and addressee and to third persons. This system expresses both the relative status of speaker and addressee and that of the speaker in relation to the object or person that is being talked about (see Ide and Yoshida, 1999). Nevertheless, the exact role played by each component (power, solidarity, degree of involvement) as well as their interaction remain, to a large extent, to be defined more accurately.

A promising line of research involves studies seeking to explain how referring mechanisms are selected on the basis of politeness strategies (Brown and Levinson, 1978) or face-saving moves. In his discussion of personal reference, Murphy (1988) points out the need to study in an integrated fashion how all the relevant parameters (i.e., speaker, addressee, referents, and bystanders) interact with each other. The *Rule of polite reference*, which Murphy (1988) proposes for personal reference, is expressed in terms of face-saving devices for both speaker and addressee.

When in a polite, cooperative conversation, the speaker chooses a referring expression:

1. that the speaker and addressee mutually believe that the addressee can use to pick out the referent uniquely;
2. that expresses a defensible speaker–referent relationship;
3. that is not more desirable than the addressee–referent relationship; and
4. that is consistent with the addressee's view of an appropriate speaker–referent relationship.

Nevertheless, Murphy himself observes that the politeness explanation is not sufficient to describe all possible reasons behind the selection of referring expressions. Some data seem to suggest, for example, that speakers try to avoid offending their addressees even if this may not cause any loss of social image. Orletti (1992) also agrees that this approach cannot explain all cases of selection of referring expressions and offers some examples that seem to demand that more components be brought to bear on this issue (Orletti, 1992: 327).

(17) [TV discussion on AIDS between Aiuti, Donat Cattin, and De Lorenzo; Ferrara is the chairman]

1. Ferrara: Sentiamo l'opinione dell'onorevole
Let's hear the opinion of the MP
Francesco De Lorenzo=
Francesco De Lorenzo
2. Donat Cattin: = E' un onorevole, ma è il
(he) is an MP but is the
presidente dei medici
president of the doctors
infettivologi, che
specialized in infectious diseases, who
sono i principali protagonisti
are the main protagonists
rispetto alla malattia
(with) respect to the disease
3. Ferrara: Adesso present-o ai
now introduce-1sing at the
telespettatori l'onorevole De Lorenzo,
TV viewers the MP De Lorenzo,
preg-o la regia
beg-1sing the control-room
di inquadrar-lo
to put.on.screen-him
4. Aiuti: E' in pensione da vent'anni
(he) is in pension since twenty-years
5. Donat Cattin: E' il presidente
(he)-is the president
dell'Associazione medici
of.the-Association doctors
infettivologi=
specialized in infectious diseases
6. Ferrara: Non facciamo polemiche personali,
not make arguments personal,
prof. Aiuti, per cortesia (.)
professor Aiuti, for courtesy
Onorevole De Lorenzo, lei è
MP De Lorenzo, 3SG.FEM is
attualmente il presidente della
currently the president of-the
commissione nazionale per la lotta
commission national for the fight

all'AIDS ed è stato sottosegretario
at the AIDS and has been undersecretary
alla Sanità ed è un deputato liberale
at the Health and is a deputy liberal

'Ferrara: Let's hear what an MP, Francesco De Lorenzo, thinks.'
'Donat Cattin: He's an MP but is also the president of the specialists in infectious diseases, who are the main players in this area of research.'
'Ferrara: Let me now introduce Mr De Lorenzo, MP. Could we put him on screen, please?'
'Aiuti: He retired 20 years ago.'
'Donat Cattin: He's the president of the Association of the specialists in infectious diseases.'
'Ferrara: Please, let's not get personal, Prof. Aiuti. Mr. De Lorenzo, you are the current president of the national committee on AIDS prevention and were undersecretary of the Health Department and are a Liberal MP'

In (17), the conflicting denominations used by the participants (Aiuti, Donat Cattin, and Ferrara) to identify De Lorenzo do not satisfy any referential needs. Nor do they reflect differences in how politeness is being handled. In part, they arise from the need to identify their referent's role in a way that is the most appropriate to the ongoing discourse. This need, however, fulfills a more general function, that of strengthening or weakening the referent's role as an argument in favor or against the discussants' diverging opinions. Furthermore, the conflict over the correct denomination of a third referent allows or forces the participants to define their own roles in the discussion. While Donat Cattin is in favor of De Lorenzo's line, Aiuti is against it. Finally, Ferrara has the strategic role of chairman, which includes, among other things, the power to decide which denomination should be used (see line 6).

In sum, socioethnographic approaches seem a promising field of research but must still be explored in depth. As they have often focused on how single referents are selected rather than on how referential chains are dealt with, it is not possible to compare them to the cognitive and conversation analysis studies cited so far. Further, the current lack of a common analytical model makes it difficult to summarize their results.

A Pragmatic Account

Despite differences in their goals and in the proposed models, the various approaches illustrated so far have some points of contact that bring the pragmatic dimension to the fore. Among them are (a) the recognition that the problem of anaphoric distribution in discourse may be profitably studied as a function of the speaker's communicative goals and (b) the recognition that it may be useful to include a recipient-oriented perspective into any descriptive model of the speaker's communicative goals. The latter implies that the speaker, by selecting a specific referring device, tries to achieve a desired effect in relation to the hearer's discourse model.

It may therefore be very useful to discuss the points made above as well as the various principles illustrated so far in the light of the Gricean pragmatic principles of conversational logic. A similar proposal is explicitly put forward by Huang (2000) and can be found in various passages in Schlegoff (1996), which invoke Gricean principles.

Fundamentally of Gricean origin is the idea that the "why that now" principle is "an omnirelevant issue for parties to talk-in-interaction" (Schlegoff, 1996: 439). That is, the idea that the addressee's interpreting activity arises from his or her attempt to understand the reasons behind the use of a given expression on the part of the speaker. On the basis of this principle, Schlegoff concludes that the speaker's primary aim as he uses a certain linguistic expression is to let the addressee understand his intentions behind the use of such an expression. In other words, the rationale guiding the selection of referring expressions is to be found in their ability to generate inferences regarding the speaker's intentions in the addressee's mind.

According to Huang (2000), the cognitively-oriented 'iconic' principles of anaphoric interpretation, which aim at effort minimization and result maximization (whereby the expected result is the addressee's ability to recognize the intended referent), can be regarded as instantiations of the principles of conversational logic in the realm of the encoding of referential relations. Huang proposes a series of principles of anaphoric interpretation (see Huang, 2000: 215), which derive from the Gricean maxims and the cooperation principle (as revised by Levinson, 1995).

Interactional exchanges in particular highlight the principles to which both speaker and addressee adhere in order to achieve their common goal. For instance, the repair mechanisms triggered by difficulties in the identification of a referent illustrate how the speaker progressively adapts to the hearer's knowledge state in conformity with the Informativeness Principle.

Huang's model, like cognitive models in general, focuses mainly on the goal of identifiability. Nevertheless, a Gricean pragmatic model (see the Gricean-based Relevance Theory, Sperber and Wilson, 1986) can also be invoked to explain phenomena contradicting such a goal, namely name-dropping. In that case, the Manner Rule seems to be flouted since the speaker does not use the most direct expression to guarantee identifiability. However, according to the general Relevance Principle of 'why that now' (or to the Cooperative Principle, in a Gricean perspective), the addressee tries to find out the reasons behind the

speaker's use of a certain expression, although we should keep in mind that its occurrence may not be motivated on grounds of the goal of identifiability but, rather, may be linked to the speaker's construal of her own social image and to how social roles define the relation between speaker and addressee.

In sum, a Gricean pragmatic approach can be a useful common background for the various lines of enquiry into the use of referential expressions presented here. It is of crucial importance, however, to view the 'logical behavior' of speakers in conversation not simply as aiming at the successful transfer of information (as is argued in cognitive-oriented approaches) but also as involving the construal and management of social relations between the speech participants (as well as other dimensions that have been explored even to a lesser degree).

See also: Conversation Analysis; Cooperative Principle; Deixis and Anaphora: Pragmatic Approaches; Discourse Anaphora; Gesture and Communication; Honorifics; Meaning, Sense, and Reference; Politeness; Reference: Philosophical Theories; Reference: Psycholinguistic Approach; Reference: Semiotic Theory; Reference: Stylistic Aspects; Relevance Theory; Saussure: Theory of the Sign; Topic and Comment.

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Referential versus Attributive

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Donnellan's Contrast

Consider two utterances of the same sentence, S:

S: Smith's murderer is insane.

The first utterance, $U(S)_{ATT}$, is prompted by the speaker's discovery of Smith's savagely mutilated corpse roasting on a spit, with no culprit in evidence. The second, $U(S)_{REF}$, is prompted by an observation years later of a defendant, Jones, seen cross-eyed and frothing at the mouth as he climbs into the dock on trial for Smith's murder. As it happens, the real killer, Robinson, goes free and is perfectly sane (his crime notwithstanding) while Jones, though falsely charged, is as mad as he looks. Many find it natural to suppose that the speaker of $U(S)_{ATT}$ has said nothing correct about anyone while the speaker of $U(S)_{REF}$ has said something correct about Jones, even if perhaps she has used the wrong words to do so. This is an example of the contrast between what Keith Donnellan labels – misleadingly on some views – attributive and referential uses of definite descriptions. Here is Donnellan's own characterization of the contrast:

> A speaker who uses a definite description attributively in an assertion states something about whoever or whatever is the so-and-so. A speaker who uses a definite description referentially in an assertion ... uses the description to enable his audience to pick out whom or what he is talking about and states something about that person or thing .... [T]he definite description is merely one tool for doing a certain job – calling attention to a person or thing – and in general any other device for doing the same job, another description or a name, would do as well. In the attributive use, the attribute of being the so-and-so is all important, which it is not in the referential use (Donnellan, 1966a: 285).

Attempts to account for how the contrast arises lie at the heart of work on the nature of the semantics/pragmatics boundary. This entry looks at the origins of Donnellan's distinction in his criticism of Russell's theory of descriptions, and then considers two approaches to the contrast, one that treats it as pragmatic in origin and the other that treats it as a genuinely semantic distinction.

Donnellan's Use of the Contrast against Russell

Donnellan introduced the distinction with a view to undermining Russell's theory of definite descriptions (Russell, 1905, 1919). Russell argued that the surface form of (1) below is misleading. It has an underlying logical form that, when interpreted, delivers the truth condition set out in (2):

(1) 'The fish jumped'

(2) An utterance of the sentence in (1) is true if and only if $\exists x$ ((x is a fish & $\forall y$ (y is a fish $\rightarrow x = y$)) & x jumped)

Definite descriptions, in other words, are non-namelike: nothing in the underlying logical form of sentences containing them corresponds to an object referred to by 'The fish.' (Russell also held that ordinary names are non-namelike in this respect too, but that is another matter.) By denying that the semantic function of definite descriptions is to pick out a single object in order then to say something about it, Russell hoped to solve a variety of puzzles. For example, it became possible to explain how a definite description can be used meaningfully even when less than one (as in (3)–(4)) or more than one (as in (5)) contextually salient object satisfies the description; or how identity statements made using definite descriptions can be informative as in (6) when an equivalent name would not be (as in (7)).

(3) 'The king of France is bald': false but meaningful.

(4) 'The king of France does not exist': meaningful and true.

(5) 'The woman in the magician's box has been sawn in half': false but meaningful.

(6) 'The author of the Waverley novels is Walter Scott': true and informative.

(7) 'Walter Scott is Walter Scott': true but uninformative.

From Russell's perspective, these cases are puzzling only if one assumes that the entire semantic function of a phrase of the form 'the ...' is to single out an object that uniquely satisfies the property expressed by '...', in order then to say something about it with the rest of the sentence. If truth conditions are instead assigned along the pattern in (2), these examples cease to be troublesome.

According to Donnellan (1966a), Russell's theory copes adequately with $U(S)_{ATT}$ but not with $U(S)_{REF}$. It assigns the same truth conditions to both utterances:

> An utterance of S is true if, and only if, $\exists x$ ((x murdered Smith & $\forall y$ (y murdered Smith $\rightarrow x = y$)) & x is insane)

Intuitively, $U(S)_{REF}$ would need to be withdrawn if Jones were in fact sane, while $U(S)_{ATT}$ would not be affected; and Robinson's mental health is irrelevant to

$U(S)_{REF}$ despite being highly relevant to $U(S)_{ATT}$. Donnellan took these intuitions, and others elicited by similar cases (e.g. 'Who is the man drinking a martini?' asked of someone who is in fact drinking water) to refute Russell's theory, at least in so far as the latter was intended to give a comprehensive account of definite descriptions.

It is unclear whether Donnellan thought his distinction had a pragmatic or a semantic origin. The fact that he takes it to refute Russell suggests he took it to be semantic. Russell's theory was, after all, a theory of the semantics of definite descriptions, not of their pragmatics. But he persistently talks of *uses* of definite descriptions, and at one point even writes explicitly that

> [. . .the] grammatical structure of the sentence seems to me to be the same whether the description is used referentially or attributively: that is, it is not syntactically ambiguous. Nor does it seem at all attractive to suppose an ambiguity in the meaning of the words; it does not appear to be semantically ambiguous. (Perhaps we could say that the sentence is pragmatically ambiguous: the distinction between roles that the description plays is a function of the speaker's intentions.) (Donnellan, 1966a: 297)

It is possible that Donnellan's position, further developed in Donnellan (1968), is just that no pragmatic theory is available to complement Russell's semantic theory in such a way as to explain referential uses as well as attributive ones. In that case, even if there is no semantic ambiguity, Russell's semantic theory would have to be rejected. But a more likely explanation of the contrary indicators in his paper is the primitive understanding of the semantics/pragmatics boundary at the time.

Whatever we take Donnellan's own view to be, most reactions to his contrast can be classified according to whether they treat the difference as semantic or as pragmatic. Some treat his contrast as a difference in use alone, while others claim the difference in use is a symptom of a genuinely semantic ambiguity. Pragmatic approaches are now slightly more popular, but the only genuinely uncontroversial claim to be made in this area is that reflection on Donnellan's contrast has forced everyone to be clearer than they were about what the semantics/pragmatics distinction actually is (*see* **Semantics–Pragmatics Boundary**). In what follows I will outline two paradigmatic treatments, one from each camp.

Pragmatic Treatments (Kripke)

Kripke's role as a critic of Russell's theory of reference is well known (Kripke, 1980), so it might seem

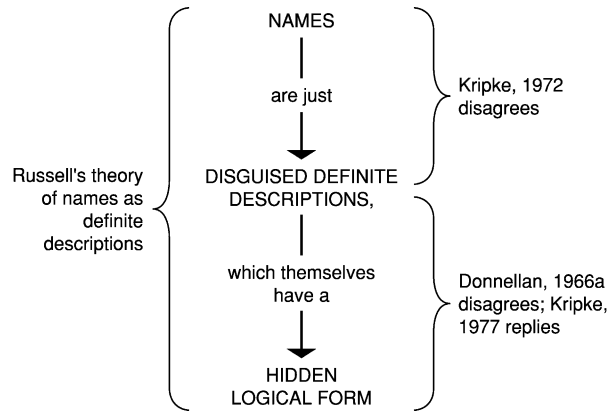

Figure 1 Russell's theory of names as definite descriptions.

surprising that in this context he is Russell's defender. The explanation is simple: Russell's theory of descriptions has two components. On the one hand, and as detailed above, he claimed that definite descriptions have a complex logical form that is not easily read off from their surface structure. But he also claimed that ordinary names are in fact disguised definite descriptions (Figure 1). After all, the same puzzles that his theory of the logical form of descriptions is supposed to solve arise equally for ordinary names, so this is a natural extension. In *Naming and necessity*, Kripke rejects the claim that ordinary names are covert definite descriptions but leaves Russell's treatment of definite descriptions as such largely unchallenged. In Kripke (1977) he defends Russell, against Donnellan's criticism at least.

Kripke's response to Donnellan is methodologically elegant (1977: 3c). He imagines a population that has a language like English but, stipulatively, it has a Russellian semantics for definite descriptions. He then asks whether the contrast between referential and attributive uses of definite descriptions would arise in such a population. It would, he argues. Indeed, Kripke suggests, if speakers of this language did not use 'The F is G' at all, but instead used 'there is an F, identical with anything that is F, and it is G,' an analogue of Donnellan's distinction would still arise. They would use this sentence when they wished to attribute G-ness to something they, mistakenly, believed to be the unique possessor of F-ness. Kripke infers from this that existence of Donnellan's contrast *among speakers of English* does not undermine the claim that English definite descriptions have the semantics Russell says they do.

Kripke's position can be explicated using a famous example due to Paul Grice (1975: 33). A letter of reference for an academic position contains the following evaluation of a weak candidate:

> Mr X's command of English is excellent, and his attendance at tutorials has been regular. Yours, etc.

The referee is damning the candidate with faint praise. But in other contexts the sentence could be used without any negative insinuation. This possibility hardly shows that the sentence itself is semantically ambiguous, having a faint-praise sense and a neutral sense. Likewise, Donnellan's contrast does not, according to Kripke, show that S itself is semantically ambiguous. (Grice's own views on Russell's theory are in his 1989 title; see also Neale, 1990: 78; section 3.5.)

The challenge with all pragmatic theories is to provide more than a hand-waving demonstration of how the relevant phenomenon arises systematically from a feature of the conversational context rather than a feature of syntax. Kripke's derivation is based on a distinction he introduces between speaker's referent and semantic referent, which is itself a special case of Grice's distinction between what a speaker means 'on an occasion,' a matter of their intention, and what the expression means 'timelessly.' Roughly, the identity of the semantic referent for a particular use of a referring expression is governed by the conventional rules of the speaker's language or idiolect. These semantic rules establish a condition that something must meet in order to be the referent of the expression whenever it is used. The speaker's referent is what she wishes to talk about and which, so she will typically believe, meets the conditions for being the semantic referent of the expression she therefore uses in an effort to satisfy this wish. Much of the time semantic referent and speaker's referent will be the same entity. But if for example the speaker is mistaken in believing, of the object she wishes to talk about, that it meets the condition for being the semantic referent of the expression she uses, then the two can be distinct.

Using this distinction, Kripke explains how Donnellan's phenomenon would arise in a language stipulated to assign Russellian truth conditions to definite descriptions. The contrast would emerge out of a distinction between two kinds of wishes its speakers could have when using a definite description. One kind of wish would be to talk about the semantic referent as such, no matter which object that should turn out to be. Another kind of wish would be to say something about a specific object, where use of the definite description would fix the audience's attention on that object whether or not the object is in fact the semantic referent. Kripke claims that this difference in wish would not affect the identity of the semantic referent.

These considerations do not show that English is a Russellian language, with 'the F is G' suffering from no lexical or structural ambiguity. They are compatible with its being the case that some utterances of this sentence are true just in case there is a unique F and it is G, while others are true just in case *an entity the speaker has in mind is uniquely F* is G. But in the absence of independent evidence, Kripke thinks the default assumption should be the simpler one: definite descriptions have a unitary, Russellian semantics. In support of this claim that the no-ambiguity position should be the default, he notes that there is something slightly awkward about describing $U(S)_{REF}$ as true . . . about describing the utterance of $U(S)_{REF}$ as strictly true, even if it manages somehow to convey a true proposition.

Semantic Treatments (Wettstein)

Kripke in effect throws down a challenge: show that the difference in use has semantic significance. Wettstein (1981) takes up that challenge. However, his understanding of the attributive/referential distinction differs importantly from Donnellan's. In Donnellan's original examples of referential use, the object referred to fails to be a unique satisfier (in the context) of the descriptive element of the definite description. If all examples were like this, and the existence of a semantic distinction depended on the intuition that such examples were true, the semantic ambiguity thesis would be in trouble. According to Wettstein, Donnellan could and should have illustrated the referential use using only examples in which the object the speaker intends to refer to **is** a unique satisfier (in the context) of the descriptive element of the definite description. So suppose now that Jones *is* guilty, and no one else is. Wettstein takes the distinction between $U(S)_{REF}$ and $U(S)_{ATT}$ to consist in a difference in the proposition the sentence semantically expresses on each occasion. The proposition expressed by sentences containing a definite description can have either of two structures, he holds. In referential uses, the proposition is singular. That is, among its constituents, and corresponding to the definite description, is a single object – Jones, say. In attributive uses, the proposition has a general or quantificational structure so that Jones is not a constituent of the proposition. These two propositions are distinct even though the single object must be the unique satisfier of the description for the singular proposition to be true. So Wettstein sees no need to follow Donnellan (as he is often interpreted) in making the further claim that referential uses can be correct even if the referred to object is not the unique satisfier of the description. This further claim is far more tenuous (Kripke, 1977; Lockwood, 1975; Wiggins, 1975).

This clarification of the distinction undermines a widespread reason for denying there is any semantic ambiguity, but it does not show that there is one. Wettstein argues for the positive thesis by noting that referentially used descriptions express a determinately true or false proposition, despite being 'incomplete.' Thus it is possible to utter (8) truly despite there being more than one table in existence.

(8) 'The table is covered in books'

How is determinacy achieved in the face of incompleteness? According to Wettstein, standard Russellian answers fail. A typical answer would be to say that the incomplete description is tacitly completed in some way. For example, 'table' in (8) is elliptical for (9).

(9) 'table in the north-east corner of the kitchen at 36 Richmond Way in Harwich, England'

Wettstein responds that how the description is completed is itself indeterminate. It could equally have been (10).

(10) 'table beside the kitchen window at 36 Richmond Way in Harwich, England'

The same table satisfies each description uniquely, but the descriptions are nonetheless distinct. So no general proposition is uniquely determined. The determinacy of incomplete referential uses *can* be explaining by supposing that definite descriptions function, like demonstratives, to pick out some contextually and conversationally salient table, Wettstein adds. But explaining the determinacy this way has too high a cost for Russellians: the proposition semantically expressed would need to be singular.

Developments

Not everyone has found this argument convincing (see Soames, 1986, Salmon, 1982, Wettstein, 1983, and Reimer, 1998, for discussion). But there are other kinds of argument in favour of interpreting the contrast as semantic. In a different paper Donnellan himself argued for the ambiguity thesis by considering the behavior of descriptions inside modal operators:

> Consider the ambiguity of the counterfactual sentence: "If the President were the author of 'On Denoting,' we would not be in Vietnam." This may be construed as a sentence about Johnson, but there is a second reading on which it is not about him. If it is construed as being about him, then the relevant identity statements give rise to legitimate substitutions; otherwise not. On either reading, the sentence as a whole is non-truth functional, because counterfactual. The ambiguity is not to be explained by supposing that 'the President' refers to Johnson in both cases but that in one case the sentence ascribes a property to him but on the other reading it does not. Rather, on one reading 'the President' does not refer to Johnson at all (Donnellan, 1966b: 687)

Important to the resolution of the issue is the observation, ignored here for brevity, that the referential/attributive contrast may apply to other expressions, including indefinite descriptions, demonstratives, and perhaps even pronouns and names. (For further arguments favouring the semantic position, see Devitt, 1981: 2.5–2.7, 1998, 2004, and Devitt and Sterelny, 1999.)

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Dthat; Proper Names: Philosophical Aspects; Semantics–Pragmatics Boundary.

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Reflexivity

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Reflexivity is a term variously applied to certain properties of the grammatical systems and lexical forms of language, to the meanings of such forms, to the mental or cognitive capacities of language users, to the textually formed discourses that users create, to states of agentive consciousness of people acting in social situations, and to the special case of researchers as agents seeking to understand social behaviors such as the use of language in society.

Reflexivity as a grammatical phenomenon indicates the referential identity or equivalence of two grammatical terms, generally propositional arguments, of a clause-sized grammatical phrase. The prototype is the relationship of grammatical subject to grammatical object, revealed in English *-self* reflexive pronouns, but indirect reflexives (Takelma), reflexive possessors of nominals (Slavic languages), cross-clause reflexives (Inuit), etc., also are found.

Reflexivity is a lexical phenomenon, in that certain words of a metalinguistic sort, terms denoting or describing phenomena in language itself, are examples in the real world of the very phenomenon. Conceptualizing metalinguistic reflexivity, some logicians devised a special terminological contrast, (German) *autologisch* (English: *autological*, also *homological*) vs. *heterologisch* (*heterological*) for a logical predicate, particularly an adjective, denoting a property true of the metalinguistic form itself; hence English *short* is a (relatively) short word form of one syllable, and autological, while *long*, of similar form, is heterological. A large number of the Indian grammatical terms for describing derivational phenomena of Sanskrit, now applied more widely as standard technical terms, are themselves examples of the phenomenon denoted, e.g., *tat* + *puruṣa-* (literally, 'that'+'man') denotes the class of compound stems composed of modifier (here, the stem of a third person anaphor) plus modified; thus *tatpuruṣa-* is itself a tatpuruṣa compound (meaning 'his person').

Reflexivity is, as well, a fact of denotational usage. Among the grammatical and lexical categories of languages, the token-reflexives, or shifters (*see* **Deixis and Anaphora: Pragmatic Approaches**), or indexical-denotational forms, are pervasive and universal. Most obviously, these include the paradigms of personal deictics such as French singulars *je/moi/me/mon* and *tu/toi/te/ton*, the referents of which can be located only when one can identify the individual who is communicating with the instance, or 'token,' of the form, and the individual to whom the instance or token has been directed. The reference of such forms reflexively depends on the actual role inhabitance in the communicative event in which a token is used. Not only nominal – functionally referential – but pervasive verbal – hence, predicational – categories show token reflexivity of this sort; rules of token-reflexivity underlie the language structure and its anchoring to specific contexts of communication as experienceable events.

Reflexivity, for some writers, also means having a conceptual capacity to communicate token-reflexively, that is, having a metacommunicative intentionality, whether conscious or, to varying degrees, unconscious. Deploying token-reflexivity in respect of community or group norms for communicating, so that language use is appropriate to particular contextual conditions and effective in bringing about contextual conditions, presumes such a reflexive, or 'metapragmatic,' level of cognition (*see* **Metapragmatics**). This is most transparently revealed in explicit primary performative utterances, where reflexively used forms (such as the Kiksht (Wasco-Wishram) metapragmatic verb/root -pg̣na- in yamupg̣na 'diálax̣' 'I-name/pronounce-you 'Diáiax.'') token- reflexively describes as true of the event in which it is used, the effective (i.e., causally consequential and successful) act of which the very utterance of the formula with its token consists. Such possibly performative effects of

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any utterance whatsoever – as much constructing as construing the world-as-denoted – are a constant concern of reflexive constructivism as an epistemological stance.

In the study of cultural texts , e.g., in literary and media criticism, reflexivity is the quality of signaling a metapragmatic relationship of a text to its genre conventions and intertextual field of comparison. An art work thematically depicting 'doing art'; advertisements that quote or spoof other advertisements or that imply with a wink that addressees know this is one; a film that sets up a scene that is diagrammatically like a famous earlier one, etc. – these all show textual reflexivity, and, by interpretative inference, reveal that the communicators – senders and receivers – too, probably have the metapragmatic agentive consciousness to formulate and understand the reflexive message.

Reflexivity is, increasingly, becoming an important concept in research methodology in the social and behavioral sciences, as well as in contemporary humanistic fields. Originally seen as merely a source of potential bias or error against which positivist social and behavioral science had to struggle, we now recognize the researcher's own reflexive metapragmatic consciousness and inevitable actual participant status in any contexts of research on humans. This makes all research a dialectical process of moving, reflexively, back and forth between 'objective' and inductive accounts of data in a research context, on the one hand, and on the other, a metapragmatic analysis of the communicative situation in which such data arise to and for the researcher.

See also: Deixis and Anaphora: Pragmatic Approaches; Metapragmatics; Reflexivity in Sociolinguistics.

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Reflexivity in Sociolinguistics

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In pragmatic theory, 'reflexivity' labels the ways language inevitably refers to itself (Jakobson, 1960; Silverstein, 1979; Lucy, 1993; Taylor, 2000). The reflexive function of language is easiest to see in overtly metalinguistic genres such as dictionaries and usage guides, but every utterance is potentially normative, providing a model for one way utterances can sound and be structured and how recurring forms can be linked with recurring functions.

Variationists' own discourse is reflexive. People who interact and identify with one another may tend to talk alike, but 'dialects' and 'varieties' are artifacts of the ways sociolinguists talk about talk. If we ignore the reflexivity of our work, we risk mischaracterizing its value, which is greater in illuminating processes of social identification and linguistic change than in describing 'varieties' or 'dialect areas.' Our choices about what to study and the claims we make about it are always liable to prescriptive, normative interpretation, as claims about what 'authentic' dialect speakers do. If we ignore this when we talk about our work to the people we study, we risk mystifying or offending them.

The talk of the people we study is also reflexive. Laypeople have their own ways of describing varieties of speech (Preston, 1989). Folk-linguistic categories and boundaries are reflected, modeled, and created in activities involving explicit talk about talk, such as folk dictionaries or interactive dialect websites (Johnstone and Baumgardt, 2004). This also happens in metalinguistic activities that foreground the social meanings of linguistic features less explicitly, such as momentarily assuming an exaggerated accent (Schilling-Estes, 1998). Such activities may feed into the sociolinguistic processes that lead to change.

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Acknowledging the reflexivity of variationist discourse and the discourse variationists study requires methodological reflexivity in a more general sense: systematic self-reflection about how researchers' ways of talking about things constrain what they are likely to see.

See also: Jakobson, Roman (1896–1982); Language Ideology; Metasemiosis and Metapragmatics; Reflexivity.

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Reformation, Northern European

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Introduction

The Reformation began in 1517 as a protest by the German monk Martin Luther against abuses within the Catholic church. It ultimately resulted in the emergence of the various Protestant traditions alongside the Catholic church in Europe, but it also had profound cultural consequences, changing the way both the vernaculars and the 'sacred' biblical languages (Latin, Greek, and Hebrew) were perceived, taught, and studied.

Translations of the Bible into the Vernacular Languages

A central tenet of the Reformation was the primacy of biblical authority, and the belief that ordinary people should be able to read the Bible in their own language. In Scandinavia, the New Testament was translated into Danish in 1524, into Swedish in 1527, and into Finnish in 1551. The full Bible was translated into Swedish in 1541, and into Icelandic in 1584. In England (where Wycliffe had produced a handwritten translation as early as the 1380s), William Tyndale's translations were printed from 1525 to 1531. Martin Luther's German Bible translation (the New Testament, 1522, the full Bible, 1534) was far from the first printed (the first appeared in 1466) but enjoyed massive influence. Written in an idiomatic, lively, and highly readable High German, it was cited as the model of good language use throughout Protestant Germany for centuries to come. Johannes Clajus's *Grammatica Germanicae Linguae* (1578) – the most influential German grammar well into the 17th century – claims in the first edition to be based on the German language *ex Bibliis Lvtheri Germanicis et aliis eivs libris collecta* 'taken from Luther's German Bible and others of his books.' So great was the authority of the Lutheran High German Bible that it was widely used in churches and schools throughout Northern Germany, even though these areas in fact spoke the radically different Low German dialects and had to learn High German as a foreign language. Ultimately, High German would replace Low German altogether in the north as the language of schooling, church, and administration.

In the Low Countries, the Protestant provinces of the north, which had successfully rebelled against the rule of the Catholic Spanish, ordered the first translation of the Bible into Dutch directly from Greek and Hebrew sources in 1618/19. The so-called *Statenvertaling* (literally 'States' translation'), printed in 1637, was the work of a committee of representatives of all the provinces, who sought a supraregional form of the language, avoiding any linguistic forms which were restricted to certain dialect areas. The language of the *Statenvertaling*, used in churches and schools, had considerable influence on the further development of Dutch linguistic norms. In Scandinavia, the Reformation likewise provided the key incentive to turn Swedish and Danish (also used in Norway) into written languages, and languages of

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education and administration (where Latin and Low German had previously been used).

Codifying the Vernacular: Early Orthographies, Grammars and Dictionaries of the Vernacular Languages

The spread of literacy among ordinary people, so important to the Reformation, was made possible by the spread of printing with movable type in Europe (traditionally said to have begun in Germany in the 1450s). Together, printing and the growth of a reading public led to an increased interest in standardizing the vernacular – first its spelling, later its grammatical forms too. The earliest text to call itself a German grammar, Valentin Ickelsamer's *Teutsche Grammatica* (c. 1534), is less a grammar in our sense than a primer to teach reading and writing, concentrating largely on spelling and pronunciation. It builds on a tradition of earlier primers and guides for printers (the anonymous *Schrylfftspiegel,* 1527, Kolroß' *Handbüchlin tütscher Orthographi* in 1530, Fabian Frangk's *Orthographia Deutsch,* 1531, Meichßner's *Handbüchlin gruntlichs berichts, recht vnd wolschryben,* 1538), all of which sought greater uniformity in spelling according to the principle 'write as you speak.' In the Low Countries, Lambrecht's *Néderlandse spellinghe* (1550) was followed by a number of other orthographies, all published in the south (today's Belgium). It was based on Lambrecht's own Ghent dialect, but allowed for other spellings reflecting the pronunciations of other dialects – for instance, not just *geen*, but also *gein* or *gien* for 'no, none.' The first attempt at a supraregional Dutch spelling norm, Pontus de Heuiter's *Nederduitse orthographie* (1581), advocated a phonetic and maximally economic spelling, for instance, preferring the spelling *ic* or *ik* to the usual *ick*. The leaders of the Danish Reformation adopted a Danish orthography already elaborated by the printer Christiern Pedersen (1480–1554), which was largely accepted from the 1530s onwards. (Efforts to codify the spelling of the other Scandinavian languages are not found until the 17th century.) In England, where spelling practice reflected a jumble of habits brought in by Norman copyists, etymological spellings, and false etymological spellings, there were various attempts at more or less radical reforms. John Hart, influenced by the attempts of Louis Meigret to introduce phonetic spelling in French, hoped to restore the one-to-one relation between sounds and letters in *An Orthographie* (1569) and *A methode or comfortable beginning for all the unlearned* (1570); Thomas Smith's proposals in his *De recta et emendata linguae anglicanae scriptione* (1568) were more moderate.

The high value attached by Protestantism to the biblical word in translation, supported too by the humanist impetus that had begun in Italy with the so-called *questione della lingua* and spread north to France, Spain, and Portugal, raised the perceived value of the vernacular languages. Indeed, Luther's insistence on translating the Bible according to sense rather than literally, and on following German idiom, reflected this new-found confidence in the value of the vernacular in its own right. The vernaculars now came to be seen as amenable to systematic study no less than Latin, and in the latter part of the 16th century humanist grammars of German, English, and Dutch began to appear just as they had for the Romance vernaculars some decades earlier. In Germany in particular, attempts to establish a shared written language also reflect the beginnings of a cultural patriotism, a reaction to the political disunity caused by the Reformation. Grammars and textbooks were also produced for practical purposes, finding a ready market of learners who needed languages for travel or trade. Jacques Bellot (England) is just one example of several French Protestant refugees who earned their living by teaching in England, the Netherlands, Switzerland or Germany, and who published texts for learning French in the 16th century; in Germany, Brücker's (1620) primer of German may, in turn, have been written to help the French- and Dutch-speaking Reformed refugee communities who had been allowed to settle in Frankenthal in the 16th century.

The first grammars tried to show that the vernaculars in question were **equal** to Latin by showing that they were **similar** to it, forcing the vernacular into the straitjacket of Latin grammar. The most influential of the early German grammars, Clajus (1578), maintains six cases as in Latin (German, in fact, only marks four). In England, Bullokar's *Bref grammar for English* (1586), printed using his own reformed spelling, maintains that English shares four genders and five cases with Latin, though Bullokar concedes that in English four of the five cases are identical in form. The Dutch *Twe-spraack vande Nederlandse letterkunst* (1584) – published under the aegis of the Amsterdam *Rederijkerskammer* (approximately 'language society') – likewise maintains six cases. It is more innovative, though, in its treatment of verb conjugation, identifying five groups according to the pattern of changes in the stem vowel in present, preterite, and participle, a schema that reflects observation of the Dutch language rather than any Latin model. Innovative too was its attempt to find vernacular equivalents for Latin grammatical terminology. At around the same time, the Belgian mathematician Simon Stevin (1548–1620) also coined native equivalents for the terminology of mathematics and physics

in his *De Beghinselen der Weeghconst* [...] ('The principles of weighing [...],' 1586) to show that the vernacular was no less capable of expressing scientific concepts than Latin. Many of his coinings become established in Dutch, and his efforts also influenced the most important 17th-century German language theorist, Schottelius. In England, numerous treatises on terminology reflect a similar preoccupation with making scientific knowledge more accessible – the best-known, though not the first, promoter of this idea was Francis Bacon (1561–1626).

Pedagogical Reform and the Study of Latin

The first German grammars (Albertus, 1573, Ölinger, 1574, Clajus, 1578), aimed in part at foreigners wishing to learn German, are in Latin. But both Bullokar's *Bref grammar* and the Dutch *Twe-spraack* are written in the vernacular itself, for they aimed to fulfill a different part of the humanist program – reforming the teaching of Latin in schools. Understanding the grammar of the native language was simply a step towards learning Latin; indeed the *Twe-spraack* does not move far beyond basic spelling and writing, since after this, pupils moved on to Latin. The 16th century also saw numerous new grammars of Latin written by humanists keen to improve the pedagogy of Latin. Increasingly these exploit the potential of the new technology of printing, using visual effects such as tables rather than running text to present paradigms, and different fonts for Latin and German – they assume that young learners will see the book themselves, rather than learning by rote from their master. The Latin grammar (1526) of the Reformation humanist Philipp Melanchthon not only became the standard text for use in schools in Protestant Germany, but was also widely used in Scandinavia and Russia, and served as a model for many grammars of the vernaculars.

Learning to Compare: Studies of the 'Sacred' Languages

Luther based his Bible translation not just on the Latin Vulgate translation of Jerome, but also on the original texts in Greek and Hebrew. In him, and in his close associate and advisor Melanchthon, the Reformation met the humanist ideal of careful textual interpretation on the basis of original sources, which meant, in turn, careful study of those original languages themselves: Latin, but also increasingly Greek and to some extent Hebrew. The spread of systematic study of Hebrew among Christian scholars began with the *De rudimentis hebraicis* (1506) of Reuchlin (1455–1522); in Calvinist Switzerland Hebrew instruction was gradually introduced in some theological colleges; within the Catholic tradition, Jesuit institutions across Europe also began to include Hebrew in the curriculum. Important concepts from the ancient grammatical traditions of Semitic (Hebrew and Arabic) now came to be applied in European linguistic study – in particular, the classification of sounds according to their place of articulation, and the notion of the **root** of a word. The idea of the root was to be adopted fruitfully by Schottelius (1663) in his groundbreaking analysis of German word formation.

The encounter between theology and humanist language study is most obvious in the *Harmonia Linguarum* ('Language harmony,' 1602) of the Hebraicist Elias Hutter, who presents parallel texts of the Bible in Latin, Greek, and Hebrew, alongside German. Cruciger's (1616) language harmony aimed to show that German is ultimately derived from Hebrew, but via Greek and Latin, by making explicit comparisons between the four languages. Indirectly, then, the comparisons of these languages in the service of biblical scholarship led to a more comparative approach to language study and to questions about genetic relationships among languages. (In a parallel development, the medieval Latin vernacular vocabularies were often expanded from the 15th century on into plurilingual dictionaries, which invited comparison of several **living** languages at once.)

The Vernaculars and the Question of the Original Language

Growing confidence in the worth of the vernacular sometimes took a faintly mystical turn. Luther claimed that some words could be expressed more perfectly in German than in any other language, in a passage from his *Sendbrief vom Dolmetschen*, 'On Translating. An Open Letter' (1960 [1530]: 192): "I do not know whether this word liebe ['dear, beloved'] can be said in Latin or other languages with such fullness of sentiment, so that it pierces and rings through the heart, through all the senses, as it does in our language." In his *Teutsche Grammatica* (c. 1534), Ickelsamer even suggested that German words contained hidden meanings like those that Jewish scholars found in their Cabbalistic studies of Hebrew.

Such beliefs that the words of one's own vernacular express meanings more perfectly than any other were often linked in the 16th and 17th centuries to patriotic arguments about which vernacular was closest to the original, Adamic language – for surely the words that Adam used to name the world around him originally expressed their meaning perfectly, as, for

instance, the Swiss Old Testament professor Bibliander (c. 1504–1564) had reasoned in his *De ratione communi omnium linguarum et literarum commentarius* ('Commentary on the common rational basis of all languages and letters,' 1548). The Flemish scholar Joannes Goropius Becanus (1519–1572/3) was one of the first to apply such arguments to 'prove' that his vernacular – Dutch – was the oldest language. He segmented proper names gleaned from history so as to resemble words in Dutch, to show that Dutch is the simplest language, whose monosyllabic words are found in the more complex lexemes of other languages, which must, therefore, be derived from Dutch. Though Becanus's fanciful etymologies were much derided, he stands at the head of a pan-Germanic tradition of efforts by scholars such as the Fleming Adrianus Schrieckius (1560–1621), Dutchman Abraham van der Myle (1563–1637), the Swedes Georg Stiernhielm (1598–1672) and Olof Rudbeck (1630–1702), or the German Justus-Georg Schottelius (1612–1676) to show that the ancestor of the Germanic languages was closer to the original language of mankind (whether that is taken to be Hebrew, or assumed to have been lost at the tower of Babel) than any other European vernacular (and therefore by implication superior to them). Such efforts reflect an increasing awareness of language change and an interest in language history, though it is not until the 18th century that the question of the origin of language(s) could be addressed without attempting to accommodate the biblical account of the Adamic language and the confusion of tongues at Babel.

Conclusion

The Reformation applied the humanist ideal of close philological study to the original Biblical texts, and exploited the technology of printing to disseminate translations of these texts into the vernacular for a broad readership. As the perceived value of the vernaculars increased dramatically, the slow process of their codification and standardization began. Meanwhile detailed study and comparison of the 'sacred' languages with one another and with the vernaculars provided a basis for studies of the genetic relationships between languages and of language change. But it is Gesner's *Mithridates* (1555), already giving samples of 22 languages and listing a great many more, that prefigures the expansion of the linguistic horizon well beyond the languages of Europe and the Bible in the centuries to come.

See also: Early Historical and Comparative Studies; Hebrew Linguistic Tradition; Origin of Language Debate; Renaissance Linguistics: French Tradition; Renaissance Linguistics: Spanish Tradition; Scandinavia: History of Linguistics.

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Register Variation: Core Grammar and Periphery

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Introduction

Cross-Linguistic Variation: Principles and Parameters

Generative syntax attempts to capture both linguistic invariance and cross-linguistic variation by means of the theory of Principles and Parameters (*see* **Principles and Parameters Framework of Generative Grammar**). Principles express universal constraints, whereas parameters define and delimit the space of variation. Principles are rigidly fixed. For instance, X-bar theory (*see* **X-Bar Theory**) is a set of principles to constrain the internal structure of constituents that can be formed in the syntax. Each parameter offers a choice between two settings, which correspond to a particular set of syntactic properties. Depending on the parameter setting, a language will or will not display certain syntactic properties defined by the parameter. Some parameters are briefly illustrated in the next section.

The core grammar of a language is a system that is determined by the interaction of universal principles with the parameter settings for that language. The output of the core grammar is grammatical sentences of the language.

Registers and Language-Internal Variation

In specific registers of language use, we may come across an output that deviates from that of the core grammar, containing sentences that, in terms of the core grammar, are ungrammatical (Zwicky and Zwicky, 1982; Biber, 1995). The status of such register-related 'deviant' data is not entirely clear. We might wish to maintain that any deviant data are strictly ungrammatical and should be dealt with as usage (see Newmeyer, 2003: 700–702, for the difference between grammar and usage). However, the register-related deviant patterns are not chaotic; they can be seen as the product of different 'peripheral' grammatical subsystems of the language, specific to the particular register (see Chomsky, 1981: 8–15).

In this article, first, we show that the syntactic properties associated with particular registers should probably not be interpreted as resulting from parameter resettings. Rather, in some cases at least, register-specific data that deviate from the output of the core grammar can be seen as the result of the relaxation of one or more constraints of the core grammar. Next, we discuss register-related variation in English. (For discussions of register variation, see Zwicky and Zwicky, 1982; Janda, 1985; Biber, 1995; Barton, 1998; Horsey, 1998.)

Parameters: Some Examples

The Pro Drop Parameter

The pro drop parameter determines whether the pronominal subject of a finite sentence may routinely be deleted in a given language. In terms of the X-bar format in **Figure 1**, the sentence is conceived of as a projection of the inflection of the verb (I) (*see* **X-Bar Theory**).

The pro drop parameter is the basis of the difference between languages such as Italian (1a), in which a subject pronoun can be deleted, and those such as

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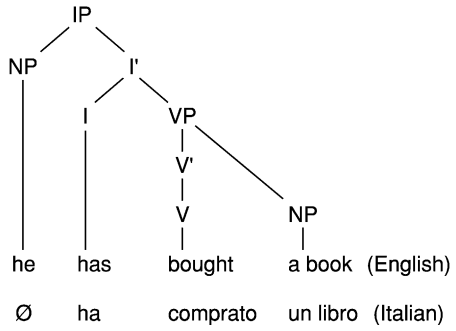

Figure 1 X-bar format.

English (1b), in which it cannot be deleted (Jaeggli and Safir, 1986; Rizzi, 1986).

(1a) Parla inglese
(1b) *Speaks English

The Italian sentence (1a) is understood as if it contained a subject. This can be shown by means of examples such as (1c) in which a reflexive pronoun *se stesso* ('himself') takes as its antecedent the understood subject of *parla* (*see* **Binding Theory**).

(1c) Parla sempre di se stesso.
Speak.PRES.3.SING always of himself
'He always speaks about himself.'

Various analyses of this have been put forward. It is sometimes proposed that the subject in such cases is a nonovert underspecified pronoun (*pro*) whose content is recovered through the agreement of the verb (cf. Rizzi, 1986). Alternatively, it has been proposed that the agreement inflection of the finite verb itself functions as a subject (see Alexiadou and Anagnostopolou, 1998). A third possibility is to assume that a pronominal subject can be deleted if the agreement inflection on the finite verb duplicates all its grammatical features. As can be seen, these accounts of the positive setting of the pro drop parameter tend to relate the phenomenon to some property of the verbal agreement. The agreement paradigm of the Italian finite verb is rich. The finite inflection has a distinct form for each person/number combination (*parlo*, *parli*, *parla*, *parliamo*, *parlate*, *parlano*, 'speak,' present tense). In the deletion account, for instance, rich agreement inflection allows the deletion of the subject pronoun because the feature content of the deleted subject can be recovered through the inflection. Thus, the pro drop parameter is set positively. For English, the parameter is set negatively; the finite inflection is 'poor,' with minimal variation for person and number (*speak*, *speaks*). Thus, the finite inflection does not duplicate the features of the subject and the content of a deleted subject is not recoverable through the verbal inflection. (For discussions of the correlation between inflection and the pro drop phenomenon, see Jaeggli and Safir, 1986; Alexiadou and Anagnostopolou, 1998).

It is assumed that a parameter underlies a cluster of properties. For instance, the different settings of the pro drop parameter are at the basis of the contrasts between English and Italian illustrated in examples (2)–(4). As shown by (2), Italian weather verbs such as 'rain' do not have an overt expletive subject, whereas English weather verbs must have an expletive subject, *it*. The examples in (3) show that a definite lexical subject may follow the verb in Italian, an option unavailable in English. Questioning the subject of a subordinate clause in Italian (4a) is compatible with the presence of the subordinating conjunction *che* 'that,' whereas the English analog in (4b) is unacceptable. Example (4b) is rendered grammatical by omitting the subordinating conjunction *that*.

(2a) Piove.
Rain.PRES.3.SING
'It is raining.'
(2b) *Esso piove.
It rain.PRES.3.SING
(2c) It is raining.
(2d) *Is raining.

(3a) Arriva Gianni.
(3b) *Arrives John.

(4a) Chi credi che abbia telefonato?
Who think.PRES.2.SING that have.SUBJ.3.SING telephoned
'Who do you think has phoned?'
(4b) *Who do you believe that has phoned?

Subject Omission in Finite Clauses in English

Although English does not routinely allow the subjects of finite clauses to be deleted, one type of finite clause may lack an overt subject (Wilder, 1994). This is illustrated in (5a).

(5a) [I am very upset] and [Ø will not talk to him any more].

In (5a) the subject of the first clause is realized by the pronoun *I*. In the conjoined sentence, the subject is implicit (represented by Ø). The understood subject of the second conjunct is syntactically active. It can, for instance, serve as an antecedent for reflexive elements:

(5b) [I am very upset] and [Ø will pour myself a drink].

The content of the deleted subject in the second conjunct is not recovered through rich verbal inflection – *will* carries no marking of person and number inflection. In English coordinated structures, the subject of

the immediately preceding coordinated clause, here *I*, allows the content of the deleted subject of the second conjunct to be contextually recovered.

Even though it is clear that an understood subject is associated with the second of the coordinated clauses, and even though interpretively this understood subject would seem to correspond to an overt pronoun, the understood subject in English coordinated structures cannot be equated with the deleted subject pronoun of the pro drop languages. In coordinate structures, subject ellipsis is only possible if the subject occupies the left edge of the clause (Wilder, 1994). Compare the paired examples in (6)–(9), in which the (b) examples violate the left-edge constraint on ellipsis:

(6a) I think that John is very nervous and [(he) will immediately pour himself a drink].
(6b) I think that John is very nervous and <u>that</u> [*(he) will immediately pour himself a drink].

(7a) He was angry but [(he) would probably try not to show it].
(7b) He was angry, but [<u>would</u> *(he) show it?].

(8a) John likes Mary but [(he) cannot stand her sister].
(8b) John likes Mary but [<u>Mary's</u> <u>sister,</u> *(he) cannot stand].

(9a) The book will be entertaining but [(it) may not be very innovative].
(9b) The book will be entertaining but [<u>very innovative</u> *(it) won't be].

The left-edge constraint does not restrict subject deletion in the pro drop languages:

(10a) Penso [<u>che</u> Maria tornerà presto].
Think.PRES.1.SING that Maria come back.FUT.3.SING soon
e [che Ø mi dirà tutto]
and that Ø me tell.FUT.3.SING everything
'I think that Maria will come back soon and will tell me everything.'
(10b) **Tornerà** Ø presto?
Come back.FUT.3.SING Ø soon
'Will he/she come back soon?'
(10c) [**questo libro**, Ø non lo voglio].
This book, Ø non it want.PRES.1.SING
'This book, I don't want.'
(10d) [**intelligente**, Ø non lo è].
Intelligent, Ø non it is.PRES.3.SING
'Intelligent, he is not.'

Furthermore, in Italian coordinated clauses the understood subject of the second conjunct need not be coreferential with that of the first conjunct. In (10e) the subject of the first conjunct is understood as the atmospheric subject (English weather *it*); in the second conjunct the subject is understood as *io* 'I.'

(10e) Ø faceva freddissimo e Ø
Ø make.PAST.3.SING very.cold and Ø
avevo perduto i miei guanti.
have.PAST.1.SING lost the my gloves.
'It was very cold and I had lost my gloves.'

Left-edge ellipsis in coordination, a property of the core grammar of English, is thus different from the subject deletion displayed in pro drop languages.

Argument Omission and Topic Drop

Several languages routinely allow the deletion of arguments (both subjects and objects) when these refer to contextually salient entities (discourse topics). The phenomenon is sometimes referred to as 'topic drop.' The examples in (11) illustrate object omission in Portuguese (Raposo, 1986: 381).

(11a) o Manel guardou Ø no cofre
Manuel kept Ø
da sala de jantar.
in.the safe of.the room of dining
'Manuel kept it in the dining room safe.'
(11b) eu disse ao António que pedise
I said to Antonio that ask.SUBJ.3.SING
ao Manel que guardasse
to Manuel that keep.-SUB.-3.SING
Ø no cofre da sala de jantar.
Ø in.the safe of the room of dining
'I told Antonio that he should ask Manuel to keep it in the dining-room safe.'

Other languages with topic drop are Chinese (Mandarin Chinese; Huang, 1984), German (Ross, 1982; Huang, 1984), Japanese (Hasegawa, 1984–1985), KiNande (Nandi; Authier, 1988), and Spanish (Campos, 1986). Although it has not been established clearly which property of the languages in question allows topic drop, English clearly does not routinely allow it (see also Li and Thompson, 1976; see Tomioka, 2003, for an alternative interpretation of some null arguments in Japanese and in Chinese).

Register Variation

Although the core grammar of English does not routinely allow the deletion of either subjects or objects, both types of deletion are attested in specific registers. Subject deletion is attested in informal variants of spoken English as well as in abbreviated written registers, of which the prototypical illustration is the diary register. Object deletion is typical of various kinds of instructional writing (*see* **Ellipsis**).

Register-Based Subject Omission in English Finite Clauses

Examples The examples in (12) illustrate subject deletion in written English (example (12a) is from a

published diary), and those in (13) illustrate subject deletion in informal spoken English. In these examples, a referential subject is deleted.

(12a) "Dinner rather strained - . . . Ø Went to Wigmore Hall but found the concert was at the Grotian - Ø walked there" (Smart, 1992: 15)
(12b) Ø wish you were here.
(12c) Ø serves four. (recipe)

(13a) Ø wonder what he will do next.
(13b) how much money do you need? Ø can't say really.
(13c) Ø doesn't look too good.

Nonreferential (or 'expletive') subjects can also be deleted. (Sentence (14a) is an attested example from a diary in which the expletive pronoun *it* is deleted; (14b) and (14c) are from the literature on subject deletion.) In (14b), the nonreferential pronoun *it,* which is in construction with a sentence-final clause, is deleted; in (14c), existential *there* is deleted.

(14a) "[Ø] Rained in the night, wind, rain and hail." (Smart, 1995: 27)
(14b) Ø won't be too difficult to reconstruct his argument. (Thrasher, 1977: 44)
(14c) Ø isn't much we can do about it. (Thrasher, 1977: 44)

The Nature of the Understood Subject In the register-specific examples, the deleted subject remains syntactically active. The subject can, for instance, be the antecedent of a reflexive:

(15) Ø walked for hours all by myself.

The register-related variation might at first sight be interpreted as the result of a language-internal resetting of the pro drop parameter, the positive setting of which is responsible for the deletion of the subjects of finite clauses in languages such as Italian. This would mean that while the parameter is set negatively in the core grammar of English, peripheral subsystems might arguably have a positive setting for the parameter. A closer inspection of register-specific subject deletion shows this hypothesis to be empirically inadequate. Subject deletion in English abbreviated registers is more constrained than subject deletion in finite clauses in Italian.

First of all, in the relevant registers in English, finite clauses with deleted subjects must be root clauses, that is, clauses not dominated by another clause. Even in the colloquial or abbreviated register, the following constructed examples in which a subject of an embedded clause is deleted are judged as unacceptable (see also the later discussion of differing judgments for written registers).

(16a) *Think that Ø made a few valiant sallies - . . . *Remember that Ø went to Wigmore Hall - *recall how Ø walked there.
(16b) *Wonder what Ø will do next.
(16c) *Must admit Ø can't say really.
(16d) *Think Ø won't be too difficult to reconstruct his argument.

In root environments, subject deletion is a left-edge phenomenon. It is only allowed when the subject, if present, would have been the leftmost constituent in the root clause:

(17a) *Will Ø see her again?
(17b) *Never have Ø worked so hard at any book.
(17c) ***The next book**, Ø think of calling *Basic grammar.*
(17d) ***Happy with these results**, Ø wasn't.

In pro drop languages, subject deletion is possible in contexts in which English register-related subject deletion is ungrammatical. These contexts include subordinate clauses (10a), root interrogatives (10b), sentences with topicalized arguments (10c), and sentences with topicalized predicates (10d).

The positive setting of the pro drop parameter in Italian and similar languages correlates with a postverbal position being available for a definite subject. In English registers allowing subject deletion, a definite subject cannot occur postverbally (18a). In the registers concerned, the extraction of an interrogative subject across the subordinating conjunction *that* leads to ungrammaticality (18b), whereas such extraction is possible in pro drop languages (4).

(18a) *Has telephoned Louise.
(18b) *Which readers should I expect that – will like my book?

This leads to the conclusion that although the deleted subject in the abbreviated register seems similar to the deleted pronominal subject in Italian finite clauses, the empirical evidence militates against analyzing the phenomenon in terms of a resetting of the pro drop parameter.

An alternative analysis is that the deletion of the subject in the diary register is the result of topic drop. The deletion of referential subjects would offer interpretive support for this point of view because these subjects refer to discourse topics. However, this proposal is problematic because nonreferential subjects can also be deleted (14). Being nonreferential, such subjects cannot be argued to 'refer' to discourse topics (see Haegeman and Ihsane, 2002, and the references cited there). Furthermore, the objects of subordinate clauses may be affected by topic drop (11b), whereas subject deletion is a root clause phenomenon. Finally, English registers displaying subject deletion in finite

Table 1 Conditions on subject deletion

	Core grammar	*Register-specific grammar*
Recovery by subject of adjacent conjunct	+	−
Left-edge constraint	+	+

Table 2 Variable conditions on subject deletion

	Core grammar	*Register 1*	*Register 2*
Recovery by subject of adjacent conjunct	+	−	−
Left-edge constraint	+	+	−

clauses do not display object deletion, which would be surprising if the phenomenon were analyzed as an instantiation of topic drop.

Core Grammar and Periphery: Relaxing the Coordination Constraint on Null Subjects The most promising approach to register-related subject deletion at the moment seems to be to treat the phenomenon in parallel with subject deletion in coordinated finite clauses (see Wilder, 1994). Subject deletion in a coordinated finite clause is subject to two conditions: (1) the deleted subject must be identical to the subject of the immediately preceding conjunct and (2) the deleted subject must be in the left-edge position. Register-related subject deletion can be seen as an extension of left-edge subject deletion in which the requirement of identity with the subject of the first conjunct is abandoned. The difference in the grammatical systems underlying language-internal variation is summarized in Table 1. The register-specific system is characterized by one or more relaxations of conditions of the core grammar. The 'deviant' output resulting from these relaxations belongs to the 'periphery' (Chomsky, 1981).

More Subject Omission Depending on the degree of relaxation of the core conditions of the grammar, the outputs of some register-related grammars will be more 'deviant' than others. The variation in the extent of subject deletion in English finite clauses illustrates how register-related grammars may vary in the degree of deviance of their outputs.

The register of note taking (Janda, 1985) and some recent fictional diary styles display a type of subject omission in English finite sentences that is no longer constrained by the left-edge condition. The following examples are taken from *Bridget Jones's diary*, a fictional diary:

(19a) Was worried that [Ø] might split. (Fielding, 1996: 227)
(19b) Start to wonder whether [Ø] am really good friend. (Fielding, 1996: 261)
(19c) Give all clothes which [Ø] have not worn for two years or more to homeless. (Fielding, 1996: 3)

Many native speakers reject such sentences even for the diary register, in which left-edge null subjects are routinely allowed. But other (mainly British) speakers have started to produce such sentences in the context of abbreviated registers, a mode of writing that has probably developed in the context of electronic communication (see Haegeman and Ihsane, 2002).

Observe that the more liberal subject deletion in these registers does not provide evidence for a resetting of the pro drop parameter. The relevant registers systematically fail to display the other properties associated with the positive setting of the pro drop parameter discussed previously, such as postverbal definite subjects (3) and subject extraction across *that* (4).

The registers with more liberal subject deletion seem to be the product of a further relaxation of the constraints on subject deletion. Subject deletion in the more conservative diary writing is made possible by a grammatical system in which the recovery condition on left-edge ellipsis of subjects has been relaxed but in which the left-edge condition is maintained. Generalized subject deletion in note-taking and recent fictional diary writing is the output of a subsystem in which the left-edge constraint on ellipsis has also been relaxed (see Table 2).

Other Register-Related Peripheral Phenomena

Object Deletion and Instructional Writing As is the case for subject deletion, object deletion is not routinely allowed in English. Still, the phenomenon is attested in specific registers. The most obvious illustration is recipes, in which objects that are contextually recoverable are routinely deleted. The phenomenon is also found in other types of instructional writing:

(20a) Peel and slice apples thinly. Sprinkle Ø with ½ teaspoon salt and rub Ø in with hands. Chop the coriander leaves coarse. Mix everything together and stir Ø well. Set Ø aside for 30 minutes after mixing Ø.
(20b) Serve Ø chilled.
Handle Ø with care.
Keep Ø away from children.

In the recipe text in (20a), the deleted direct object, represented by Ø, is recovered from the immediate context. In the instructions in (20b), the referent of the understood direct object is located in the nonlinguistic context: it is the item on which the text is

written. The object deletion illustrated in such examples might be analyzed as a kind of topic drop, as discussed previously. But, again, register-related object deletion is not the same phenomenon as topic drop. Register-related object deletion seems to be restricted to imperative sentences, which lack an overt subject. In finite sentences with overt subjects, object deletion becomes ungrammatical (Massam, 1989; Massam and Roberge, 1989). No such constraint governs topic drop; see (11).

(21a) You peel and slice the apples thinly. *You sprinkle Ø with ½ teaspoon salt and rub Ø in with hands. You chop the coriander leaves coarse. *You should mix everything together and stir Ø well. *You should set Ø aside for 30 minutes after mixing Ø.
(21b) *You must serve Ø chilled.
*You should handle Ø with care.

Omission of *be* Subject omission and object omission are not the only instances of register-related ellipsis. It has been noted that function verbs such as copula *be* and auxiliary *be* are often left unexpressed in specific abbreviated registers, such as diary writing or newspaper headlines.

(22a) John in hospital.
(22b) Mary working on a new book.
(22c) Prime Minister accused by feminists.

Although in a number of languages the copula may indeed be absent (e.g., Hebrew and Russian; Doron, 1983; Greenberg, 2002), copula ellipsis is not routinely available in English finite clauses. Compare English (23b) with the Hebrew example in (23a) (Greenberg, 2002: 268):

(23a) Rina xaxama
Rina wise.
'Rina is wise'
(23b) *Rina wise.

On the other hand, both the copula *be* and auxiliary *be* can be absent in nonfinite contexts in English:

(24a) With [John in hospital], we cannot do the show as planned.
(24b) With [Mary working on a new book], things are difficult.

In (24) the preposition *with* is associated with a complement in which a predication relation is established between a subject and a predicate without there being an overt linker. In the core grammar of English, this pattern is restricted to nonfinite contexts. The grammar of English abbreviated registers and headlinese seems to be characterized by a relaxation of the constraint on *be* omission; as a result of this, it can be extended to root clauses.

Determiner Ellipsis in Headlinese English headlines display the phenomenon of article deletion. The following is from Stowell (1997).

(25a) Old man finds rare gold coin.
'An old man has found a rare gold coin.'

This type of deletion is, again, not unconstrained. Stowell (1997) showed that there is a right to left dependency, in that a NP may lack an article provided that NPs to the left of it also lack the article.

(25b) An old man finds a rare gold coin.
(25c) *An old man finds rare gold coin.

Stowell showed that, in configurational terms, what is at stake is not a left to right relation but a c-command relation (*see* **Command Relations, X-Bar Theory**).

Register Specific Adult Grammars and Language Acquisition

Abbreviated registers of English, such as headlinese, diary writing, recipe texts, and instructional writing, are characterized by a marked increase in the application of deletion, giving rise to utterances that are not acceptable in the neutral register but that are routinely attested in the specialized registers. Apart from the intrinsic interest of the empirical data, the study of the grammatical properties of the abbreviated registers is also relevant to the study of language acquisition. The high degree of ellipsis found in English abbreviated registers finds an analog in the ellipsis that characterizes the early production of children acquiring English as a first language. Example (26a) illustrates ellipsis of the auxiliary *be*, (26b) illustrates determiner ellipsis, and (26c) illustrates subject ellipsis in the speech of young children.

(26a) Lois coming (Kathryn, 21 months; Radford, 1990: 71)
(26b) Paula play with ball (Paula, 18 months; Radford, 1990: 72)
(26c) Want paint (Ludy, 20 months, Radford, 1990: 216)

There is a vast literature on the nature of the early language production of children and on the question of how it should be related (if at all) to the target adult system. In one line of research, an attempt is made to maximize the relation between the early production of children and the adult grammar. This approach explores the similarity between the early production of children and the output of the register-related adult grammar (see Hyams and Wexler, 1993; Friedemann and Rizzi, 1999). The child grammar could be seen as

exploiting a range of options that, although unavailable in the core grammar of the language, are available in register-related periphery.

See also: Binding Theory; Command Relations; Ellipsis; Principles and Parameters Framework of Generative Grammar; X-Bar Theory.

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Register: Dictionaries

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'Variety' Labeling in English Monolingual Dictionaries

'Register' is one of a number of terms used by British and American lexicographers to denote a particular kind of limitation on the use of a word or phrase. This article will describe the ways in which the term is, or has been, understood, and indicate how it functions in various dictionaries as part of a scheme of labels by means of which various types of usage restriction are indicated. The focus will be chiefly on British learners' dictionaries of the 1970s and later.

The first systematic attempt by British dictionary makers to define 'register' for language-teaching purposes, including EFL dictionary making, was made in the early 1960s. The definition of 'register' and related key terms owed much to a group of Edinburgh linguists who were attempting at the time to elaborate a theory of language varieties (Halliday *et al.*, 1964). The term 'register', however, had been defined in a linguistic sense earlier, in 1956. The subentry in the *Oxford English Dictionary* (*OED*2, 1989) is as follows:

register, *n.*[1]

d. *Linguistics*. A variety of a language or a level of usage, *spec*. one regarded in terms of formality and choice of vocabulary, pronunciation, and (when written) punctuation, and related to or determined by the social role of the user and appropriate to a particular need or context.

In the words 'a level of usage, *spec*. one regarded in terms of formality' and 'determined by the social role of the user' can be seen support for one particular meaning of the term. This is illustrated by a quotation from the linguist G. N. Leech (dated 1966), which states that "varieties of English distinguished by use in relation to social context are called *registers*" (*OED*2, 1989). This is not, however, the sense in which the term was used by Halliday and his colleagues. For them, 'register' was an inclusive term that referred to variation in language that was attributable to **any** situational factor, and not social role alone. "Language varies as its function varies; it differs in different situations. The name given to a variety of language distinguished according to use is 'register'" (Halliday *et al.*, 1964: 87). The group then went on to recognize three subcategories of register: (a) 'field of discourse,' including technical subjects such as biology or mathematics; (b) 'mode of discourse,' the written or spoken medium of the language activity; and (c) 'style of discourse,' or the relations between the participants. (Here we are back with the *OED* definition of 'register.')

Some confusion was introduced by another Edinburgh colleague, J. C. Catford, who followed his colleagues in his use of 'style' and 'mode,' but idiosyncratically used 'register' to signify 'variety related to the wider social role being played . . . at the moment of utterance' (Catford, 1965: 85). Moreover, as another quotation (dated 1977) from the same *OED* entry suggests, Peter Strevens moved in a different direction: "they probably know the term *register* – a variety related to a particular use of the language, a particular subject or occupation" (s.v. 'register', *OED*2), where 'a particular use of the language' is vague and where 'a particular subject or occupation' suggests that a register is a language variety related to a technical or occupational area or field. This use was to influence later dictionary practice, as was the original *OED* sense.

Register in the Learners' Dictionaries of the 1970s

The labeling scheme in the *Oxford Advanced Learner's Dictionary* (*OALD*) continued to have shortcomings in the early 1970s inherited from earlier editions. This can be shown by examining the list of labels and abbreviations on the inside cover of *OALD*3 (1974). These were given the headings 'stylistic values' (cf. Halliday *et al.*, 1964) and 'specialist English registers,' where it will be noted that 'register' is given the meaning later ascribed to it by Strevens. (Here are listed such specific technical fields as 'aerospace,' 'finance,' and 'engineering.') Under the heading 'stylistic values' were included 'formal' and 'colloquial' (cf. 'informal'), which were arguably particular values along a scale of register (Cowie, 1999: 165; cf. Stein, 1979: 5).

The compilers of the *Longman Dictionary of Contemporary English* (*LDOCE*, 1978) developed a broad framework of highly specific category labels to be attached to words that were in some way restricted in their use. These included terms relating to technical field (thus, 'law,' 'medicine'), and the kinds of occasion on which the words might be used (thus, 'fml,' 'infml'). There is, though, no mention of the general categories (such as 'field' or 'register') to which such specific designations might belong.

Register and Field Labeling in Dictionaries of the 1980s

Those more general categories were more clearly identified in dictionaries of the late 1980s, particularly in *LDOCE*2 (1987) and *OALD*4 (1989). In the 'full guide to using the dictionary' in *LDOCE*2, sets of related specific labels are drawn together under a description of what they have in common. There are, though, no general labels as such:

> Labels showing situations in which words are used . . .
> *infml* informal . . .
> *fml* formal . . .
> *sl* slang (*LDOCE*2, 1987: F46).

In *OALD*4 five major categories are distinguished according to use. However, each category is given an appropriate general label: 'currency,' 'region,' 'register,' 'technical field,' and 'evaluation' – relating respectively to date of use, country or area of use, special relationship between speakers, use in a specialist field, and speaker attitude. Here, it will be seen, 'register' reverts to its original sense.

See also: Lexicology.

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Register: Overview

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Introduction

Native speakers of a language choose among different words and grammatical structures depending on the communicative situation. For example, we do not use the same words and structures to write an academic term paper that we would use when talking to a close friend about weekend plans.

Researchers study the language used in a particular situation under the rubric of 'register.' 'Register' is used here as a cover term for any language variety defined by its situational characteristics, including the speaker's purpose, the relationship between speaker and hearer, and the production circumstances.

Speech and writing can be considered as two very general registers. The most obvious difference between the two is the physical mode of production. In addition, spoken discourse is often interactive and speakers often do not plan their language ahead of time. In contrast, written discourse is usually not interactive. In fact, writers are usually addressing a large audience, rather than a single reader. However, writers can plan and revise the text as much as they want. The final written text includes only the revised and edited language (*see* **Pragmatics of Reading**).

At the same time, there are many more specified spoken registers. For example, a formal lecture is very different from conversation: it is carefully planned ahead of time, it is addressed to a large audience, it will probably not be interactive, and the speaker will usually want to communicate information about the world rather than telling us a lot about him- or herself. Similarly, there are many specific written registers. For example, e-mail messages are very different from textbooks: e-mails are not always edited or revised carefully; they probably will be written to a single person, who will respond; and they may talk about the personal feelings and activities of the writer (*see* **E-mail, Internet, Chatroom Talk: Pragmatics**).

Different cultures recognize different registers. One way to figure out the registers in a culture is to list the text categories that have names, such as 'letters,' 'textbooks,' 'e-mail messages,' 'newspaper articles,' 'biographies,' 'shopping lists,' 'term papers,' 'novels,' and

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> Labels showing situations in which words are used . . .
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so on. However, registers can be defined at any level of generality, and more specialized registers may not have widely used names (see Biber, 1994). For example, 'academic prose' is a very general register, whereas 'methodology sections in experimental psychology articles' is a much more highly specified register.

Registers differ in their situational characteristics. They are planned to different extents, interactive to different extents, and addressed to different kinds of audiences. They also have different topics, and they are written with different goals or purposes.

Registers are identified by 'nonlinguistic' or 'situational' characteristics, such as the setting, the audience, interactiveness, and extent of planning. There have been numerous studies that describe the situational parameters that distinguish among registers (see, e.g., Crystal and Davy, 1969; Hymes, 1974; Brown and Fraser, 1979; Duranti, 1985; Biber, 1994). Several situational characteristics are identified in most of these frameworks, including the participants (including their relationships and their attitudes toward the communication); the setting (including factors such as the extent to which time and place are shared among participants and the level of formality); the channel (or mode) of communication; the production and processing circumstances; the purpose of communication; and the topic. A register can be defined by a particular combination of values for any (group) of these situational characteristics (*see* **Situation Semantics**).

Although registers are defined in situational terms, they can also be described in terms of their typical linguistic characteristics. This is because linguistic features serve important communicative functions and therefore tend to occur in registers with certain situational characteristics. For example, first- and second-person pronouns (*I* and *you*) are especially common in conversation. These linguistic features are associated with the normal situational characteristics of conversation: speakers in conversation talk a great deal about themselves, and so they use the pronoun *I* a lot. They are also interactive, talking to another individual person, and so they also use the pronoun *you* a lot (*see* **Pronouns**).

There are many studies that describe both the situational and linguistic characteristics of a particular register. These are often highly specialized registers, such as sports announcer talk (Ferguson, 1983), note-taking (Janda, 1985), personal ads (Bruthiaux, 1994), and classified advertising (Bruthiaux, 1996). Many register studies have also been carried out within a Hallidayan functional–systemic framework (see, e.g., Halliday, 1988, and the collection of papers in Ghadessy, 1988, which include descriptions of written sports commentary, press advertising, and business letters) (*see* **Halliday, Michael A. K. (b. 1925)**). Several studies adopting this approach have been concerned with school-based registers and their implications for education generally (see, e.g., Martin, 1993). The academic journal *English for Specific Purposes* publishes articles that describe the characteristics of specialized registers, providing the foundation for more focused curricula for the teaching of English as a Foreign Language (*see* **Languages for Specific Purposes**).

In addition to the study of individual registers, many studies have made comparisons across registers, studying the patterns of 'register variation.' Register variation is inherent in human language: a single speaker will make systematic choices in pronunciation, morphology, word choice, and grammar, reflecting a range of situational factors. The ubiquitous nature of register variation has been noted by a number of scholars, such as Ure: "each language community has its own system of registers . . . corresponding to the range of activities in which its members normally engage" (1982: 5); Ferguson: "register variation, in which language structure varies in accordance with the occasions of use, is all-pervasive in human language" (1983: 154); or Hymes: "no human being talks the same way all the time . . .. At the very least, a variety of registers and styles is used and encountered" (1984: 44).

Comparative register analyses are important for two major arenas of linguistic research: (1) linguistic descriptions of lexical and grammatical features, and (2) descriptions of the registers themselves. With respect to traditional lexical and grammatical descriptions, register studies have shown that functional descriptions of a grammatical feature are generally not valid for the language as a whole. Rather, characteristics of the textual environment interact with register differences, so that strong patterns of use in one register often represent only weak patterns in other registers. For register descriptions, a comparative register perspective provides the baseline needed to understand the linguistic characteristics of any individual register.

Register differences can exist at any linguistic level. The following sections discuss some of these differences at the lexical, grammatical, and lexico-grammatical levels. Then, I return to the description of registers and the overall patterns of register variation.

Lexical and Grammatical Differences among Registers

One analytical approach that has been especially productive for studying register variation is corpus-based analysis, with its emphasis on the representativeness

of the database, and its computational tools for investigating distributional patterns across registers and across discourse contexts in large text collections (see McEnery and Wilson, 1996; Biber *et al.*, 1998; Kennedy, 1998; Meyer, 2002; and Hunston, 2002 for introductions to this analytical approach) (*see* **Corpus Linguistics**). The *Longman grammar of spoken and written English* (LGSWE; Biber *et al.*, 1999) applies corpus-based analyses to show how any grammatical feature can be described for both its structural characteristics and its patterns of use across spoken and written registers. The analyses in the LGSWE are based on texts from four registers: conversation, fiction, newspaper language, and academic prose. Although these are general registers, they differ from one another in important ways (e.g., with respect to mode, interactiveness, production circumstances, purpose, and target audience). The analyses were carried out on the Longman Spoken and Written English (LSWE) Corpus, which contains ca. 40 million words of text overall, with ca. 4–5 million words from each of these four registers. Selected analyses from the LGSWE are used in the following sections to illustrate the systematic lexical and grammatical differences found across registers.

Lexical Differences across Registers

Probably the most obvious linguistic difference among registers is word choice. For example, in conversation we rely heavily on vague nouns with general content – such as *stuff* and *thing* – whereas these nouns are rarely used in registers such as textbooks or newspaper editorials.

In fact, the most common words in each word class show sharp differences among registers. Table 1 shows some of the contrasts between the common verbs, adjectives, and adverbs used in conversation versus the words belonging to the same lexical categories used in academic prose.

Similar differences could easily be identified for other registers. In part, these differences reflect the different topics and communicative purposes typically associated with a register. However, these differences can also reflect conventional associations of particular words with particular situations of use.

Grammatical Differences across Registers

Although they are not as easily noticed, grammatical differences among registers are as pervasive as lexical differences. The descriptions in the LGSWE show that nearly any grammatical feature will be distributed in systematic ways across registers. Tables 2 and 3 contrast some of the most important distinctive grammatical characteristics of conversation versus academic prose.

Table 1 Selected common verbs, adjectives, and adverbs in conversation versus academic prose

Conversation	*Academic prose*
Verbs	
Get	Produce
Go	Provide
Come	Obtain
Make	Form
Take	Describe
Say	Develop
Know	Require
Think	Occur
See	Involve
Want	Include
Adjectives	
Big	Same
Little	Different
Old	Important
Good	Necessary
Nice	Difficult
Sure	Possible
Right	Likely
Adverbs	
Just	Often
Really	Usually
Too	Especially
Pretty	Relatively
Real	Particularly
Like	Generally
Maybe	Indeed

Source: Based on LGSWE (Biber *et al.*, 1999: 512–513, 517, 561–562).

Many of the grammatical features typical of conversation listed in Table 2 reflect a heavy reliance on verbs, adverbs, and pronouns instead of complex noun phrases. These features result in the dense use of short, simple clauses. However, it also turns out that several dependent clause features are much more common in conversation than other registers. These are mostly complement clauses controlled by verbs, especially *that*-clauses (the complementizer *that* is frequently omitted in these structures). These features are often used to express 'stance' in conversation: the controlling verb expresses the stance, and the complement clause contains the new information, for example, *I just think [it's cool]* or *I know [what you're talking about]*.

The typical characteristics of conversation can be contrasted with the typical features of academic prose. Three different word classes are especially prevalent in academic prose: nouns, adjectives, and prepositions. Overall, these grammatical classes are more frequent in academic prose than in other registers, but there are many related specific features that are especially characteristic of academic prose (e.g.,

Table 2 Grammatical features that are especially common in conversation

Feature	*Pattern of use*
Verbs and verb phrases	
Verbs, overall	Verbs are much more common in conversation than in informational written registers (almost 1/3 of all content words in conversation are lexical verbs) (p. 65, 359)
Mental verbs	Mental verbs (e.g., *know, think, see, want, mean*) are more common in conversation (p. 366, 368)
Modal verbs	Modal verbs are also much more common in conversation than in the written registers, especially *can, will, would* (p. 486 ff.); semimodal verbs (such as *especially, have to*, (*had*) *better*, (*have*) *got to, used to*) are common only in conversation (p. 486 ff.)
Tense and aspect	ca. 70% of all verb phrases in conversation are present tense (p. 456 ff.); the progressive aspect (verb + *-ing*) is common in conversation (and fiction) (p. 462 ff.)
Adverbs	
Simple adverbs	Most common in conversation (pp. 540–542)
Adjectives used as adverbs	Common only in conversation, e.g., *It's running real good* (pp. 542–543)
Adverbs of 'stance'	Most common in conversation, especially *really, actually, like, maybe* (pp. 859, 867–871)
Pronouns	
Personal pronouns	Most common in conversation, especially *I, you, it* (pp. 92, 235, 237, 333–334)
Demonstrative pronoun *that*	Extremely common only in conversation (pp. 349–350)
Simple clauses	
Questions	Common only in conversation (p. 211 ff.)
Imperatives	Common only in conversation (pp. 221–222)
Coordination 'tags'	Common only in conversation, e.g., *or something* (but note the use of *etc.* in writing) (pp. 116–117)
Dependent clauses	
Verb + *that*-clause	Most common in conversation, especially *think, know, guess*, + *that*-clause (pp. 668–670, 674–675); overall, over 80% of all *that*-clauses in conversation omit *that* (pp. 680–683)

Source: Based on a survey of LGSWE (Biber *et al.*, 1999). Page numbers refer to specific pages in the LGSWE.

nominalizations, noun phrases with multiple modifiers). In contrast, verbs overall are much less common in academic prose than in other registers, although there are specific verb categories that are especially common in academic prose (e.g., copula *be*, existence verbs, derived verbs, and passive voice verbs). Similarly, there are specific categories of adverbs and adverbials (e.g., linking adverbials) that are especially common in academic prose. Table 3 lists some of the major grammatical features that are especially common in academic prose.

A comparison of the typical linguistic characteristics of conversation and academic prose reveals several unanticipated differences, showing how empirical register analyses can run counter to our prior expectations. One of the most surprising differences relates to the use of dependent clauses, contradicting the widespread belief that academic prose is more 'complex' than conversation and that dependent clauses are therefore especially common in academic prose. Rather, empirical register studies have shown that only some dependent clause types are common in written registers and that specific clause types have their own distributions among registers. For example, finite relative clauses are much more common in writing than in conversation, but they are most common in newspaper writing and fiction rather than in academic prose. However, relative clauses with the relative pronoun *which* are most frequent in academic prose. Nonfinite relative clauses (*-ing* clauses and *-ed* clauses) are also most common in academic prose (although they are frequently found in newspaper writing as well) (*see* **Media: Pragmatics**).

Other dependent clause types turn out to be more common in speech. For example, many complement clause types are much more common in conversation than in academic prose (see Table 2). These complement clauses often serve important stance functions in conversation (e.g., *I think that…; I don't know what…; I want to…*), making them an especially frequent and important part of everyday interactions. Only one major type of complement clause is especially characteristic of academic prose: extraposed clauses controlled by adjectives (e.g., *It is possible that…, It is important to…*). Adverbial clauses have a different distribution across registers, being most common overall in fiction. However, conversation also uses adverbial clauses to a slightly greater extent than academic prose (and conditional clauses are especially common in conversation). Only one subtype of adverbial clause is especially frequent in academic prose: concessive clauses.

Table 3 Some grammatical features that are especially common in academic prose

Feature	*Pattern of use*
Nouns and noun phrases	
Nouns, overall	Approximately 60% of all content words in academic prose are nouns (p. 65)
Pronouns	Nouns are much more common than pronouns in academic prose, especially in object positions (pp. 235–236); as to specific pronouns, such as *this* and generic *one*, they are much more common in academic prose (pp. 349–350, 354–355); *this* is used for immediate textual reference, whereas *one* is used for generic rather than specific reference
Plural nouns	Much more common in writing than in conversation; most common in academic prose (pp. 291–292)
Nominalizations	Much more common in academic prose, especially nouns formed with -*tion* and -*ity* (pp. 322–323)
Definite article *the*	Much more common in writing than in conversation; most common in academic prose (pp. 267–269)
Demonstratives	Most common in academic prose; especially *this* and *these* (p. 270, 274–275)
Modifiers	60% of all noun phrases in academic prose have a modifier (p. 578)
Adjectives	
Adjectives, overall	Adjectives are much more common in academic prose than in conversation or fiction (pp. 65, 506)
Attributive adjectives	Much more common in academic prose (pp. 506, 589)
Derived adjectives	Much more common in academic prose, especially adjectives formed with -*al* (pp. 531–533)
Verbs and verb phrases	
Copular verbs *be, become*	Most common in academic prose (pp. 359–360, 437–439)
Existence verbs	Much more common in writing than in conversation; most common in academic prose (e.g., *include, involve, indicate*) (pp. 366, 369, 419)
Verbs with inanimate subjects	Common only in academic prose (e.g., *this quotation shows; the test sequence proves*) (pp. 378–380)
Derived verbs	Most common in academic prose, especially verbs formed with *re*- and -*ize* (pp. 400–403)
Passive voice	Much more common in academic prose, especially the 'short' passive (without *by*-phrase) (pp. 476–480, 937–940)
Adverbs and adverbials	
Linking adverbials	Most common in academic prose, especially *however, thus, therefore, for example* (e.g.) (pp. 766, 880–882)
Purpose and concessive adverbials	Most common in academic prose (*in order to, so as to, even*, *(al)though, albeit*, etc.) (pp. 784, 786, 820–821, 824–826)
Dependent clause features	
Relative clauses with the relative pronoun *which*	Most common in academic prose (pp. 609–612)
Noun + *that*-complement clause	Most common in academic prose (e.g., *the fact that* . . .); frequent head nouns are *fact, possibility, doubt, belief, assumption* (pp. 647–651)
Abstract noun + of + *ing*-clause	Most common in academic prose (e.g., *methods of assessing error*); frequent head nouns are *way, cost, means, method, possibility, effect, problem, process, risk* (pp. 653–655)
Extraposed clauses	Most common in academic prose, especially *that*-clauses controlled by the adjectives *clear*, (*un*)*likely*, and (*im*)*possible* (e.g., *it is likely that* . . .), and *to*-clauses controlled by adjectives (e.g., *it is important to* . . .) (pp. 672–675)
ing-clauses controlled by adjectives	Most common in academic prose (e.g., *capable of, important for/in, useful for/in*) (p. 749)
Concessive adverbial clauses	Most common in academic prose (and newspapers) (pp. 820–825)
Other features	
Prepositions	Most common in academic prose (p. 92)
Of-phrases	Much more common in writing than in conversation; most common in academic prose (pp. 301–302)
Stance noun + *of*-phrase	Most common in academic prose, especially *possibility of, value of, importance of, problem of, understanding of* (pp. 984–986)
Dual-gender reference	Common only in academic prose (*he or she, his or her, he/she*) (pp. 316–317)

Source: Based on a survey of the LGSWE (Biber *et al.*, 1999). Page numbers refer to specific pages in the LGSWE.

Overall Patterns of Register Variation: The MD Approach

As noted above, a complementary research goal is to describe the general characteristics of a register and the overall patterns of register variation in a language. Despite the fundamental importance of register variation, there have been few comprehensive analyses of the register differences in a language. This gap is due mostly to methodological difficulties: until recently, it has not been feasible to analyze the full

range of texts, registers, and linguistic characteristics required for comprehensive analyses of register variation. With the availability of large on-line text corpora and computational analytical tools, such analyses have become possible. (*see* **Computational Lingustics: Overview**).

The multidimensional (MD) analytical approach was developed for the comprehensive analysis of register variation, to discover and interpret the patterns of linguistic variation among registers in a corpus of texts (see, e.g., Biber, 1988). Early researchers in sociolinguistics (e.g., Ervin-Tripp, 1972; Hymes, 1974) argued that linguistic features work together in texts as constellations of co-occurring features (rather than as individual features) to distinguish among registers. Although this theoretical perspective is widely accepted, linguists lacked the methodological tools required to identify these co-occurrence patterns before the availability of corpus-based analytical techniques. MD analysis provides these tools, using automatic corpus analysis to analyze the quantitative distribution of numerous linguistic features across the texts and text varieties of a corpus and multivariate statistical techniques (especially factor analysis) to identify the co-occurrence patterns among features.

The dimensions identified in MD analysis have a linguistic basis, but they are interpreted functionally. The linguistic dimension exhibits a group of features (e.g., nouns, attributive adjectives, prepositional phrases) that co-occur with a markedly high frequency in texts. These co-occurrence patterns are interpreted to assess their underlying situational, social, and cognitive functions. For example, the frequent co-occurrence of first-person pronouns, second-person pronouns, hedges, and emphatics in conversational texts is interpreted as reflecting directly interactive situations and a primary focus on personal stance and involvement (*see* **Mitigation**).

Biber (1988) identified five main dimensions of variation in a general corpus of spoken and written registers. He used factor analysis to identify the groups of linguistic features associated with each dimension (i.e., the linguistic features that co-occur in texts with markedly high frequencies). The co-occurring groupings of features on each dimension reflect distinct functional relations, indicated by the interpretive labels for each one: *Involved versus informational production, Narrative discourse, Situation-dependent versus elaborated reference, Overt expression of persuasion*, and *Impersonal style*. Biber (1988: Chap. 6–7; 1995: Chap. 5–7) and Conrad and Biber (2001: Chap. 2) provided detailed justification for these interpretations based on the shared communicative functions of the co-occurring linguistic features on each dimension plus the distribution of registers along each dimension.

MD analyses of register variation in English have been carried out by numerous researchers focusing on a wide range of specific research questions. The papers by Atkinson, Burges, Connor-Linton, Conrad, Helt, Shohamy, Reppen, and Rey (all included in Conrad and Biber, 2001) provide a sampling of MD studies by U.S.-based scholars.

Early MD studies investigated the synchronic relations among spoken and written registers in English (e.g., Biber, 1988), whereas later studies focused on diachronic register variation (e.g., Biber, 1995; Biber and Finegan, 1989a), more specialized discourse domains (e.g., Biber *et al.*, 2002; Conrad, 1996, 2001; Connor and Upton, 2003), and the patterns of register variation in other languages (e.g., Kim and Biber, 1994 on Korean; Biber and Hared, 1992 on Somali). Biber (1995) synthesized these studies to investigate the extent to which the underlying dimensions of variation and the relations among registers are configured in similar ways across languages.

Conclusion

This article has surveyed the kinds of situational and linguistic differences that distinguish among registers. Registers differ with respect to a wide array of situational characteristics, relating to purpose, topic, physical setting, production circumstances, and the relations among participants. These situational differences are associated with important linguistic differences at the lexical, grammatical, and lexicogrammatical levels. Furthermore, corpus-based analytical techniques can be employed to identify the linguistic co-occurrence patterns that regularly occur in texts from different registers, providing the basis for comprehensive analyses of register variation.

All language users adapt their language to different situations of use. It would be nearly impossible to spend an entire day using only one register – only having casual conversations, or only reading a newspaper, or only writing an academic paper. Rather, switching among registers is as natural as human language itself. Consequently, the study of register variation is not a supplement to the description of grammar, discourse, and language use; rather, it is central to these enterprises.

See also: Corpus Linguistics; E-mail, Internet, Chatroom Talk: Pragmatics; Genre and Genre Analysis; Halliday, Michael A. K. (b. 1925); Languages for Specific Purposes; Media: Pragmatics; Mitigation; Pragmatics of Reading; Pronouns; Situation Semantics; Variation in Second Language Acquisition.

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Gladys Amanda Reichard was born in Bangor, Pennsylvania on July 17, 1893. Raised in a Quaker household that valued education, she taught elementary school for six years before entering college. Reichard's passion for language became clear even in her undergraduate years at Swarthmore College, where she studied Latin and classics, completing her B.A. in 1919. That same year, she enrolled in the doctoral program in anthropology at Columbia University, where she began her studies in Native American languages under the direction of the eminent early Americanist, Franz Boas. After completing her masters degree in 1921, Reichard began her teaching career at Barnard College the same year, a

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position she kept until her death in 1955. In 1923, Reichard completed her doctorate in anthropology under the guidance of her mentor, Pliny Earle Goddard, himself the first person to earn a doctorate in linguistics in the United States (at UC Berkeley in 1904). In 1951, Reichard was promoted to the rank of full professor at Barnard College. She is best known for her descriptive studies of Native American languages, and for her groundbreaking work on Navaho (Navajo) language and culture.

In the summer of 1922, Reichard traveled to northwestern California, where she cut her teeth as a linguist by writing a descriptive grammar of Wiyot, a highly endangered language remembered by only a handful of speakers at the time. Initially, Reichard's interest in Wiyot was piqued by Sapir's controversial proposal that Wiyot may be related to the Algonquian languages of the Plains and American northeast, a hypothesis that demanded solid linguistic evidence. With support from the Anthropology department at the University of California, Berkeley, Reichard completed her fieldwork by the spring of 1923, publishing the results in her 1925 monograph, *Wiyot grammar and texts*. Considering that modern phonemics had not yet been conceived, Reichard's treatment of Wiyot phonology is surprisingly accurate, presenting both a fair portrait of the phonetic inventory and a sensitive treatment of rules for combining sounds, such as assimilation and elision. Throughout the grammatical sketch, Reichard copiously illustrates all stems and affixes with the paradigms she elicited from informants, a characteristic later found in all of her linguistic work. True to the cultural model advocated by the early Boasian linguists, Reichard devoted equal attention to Wiyot vocabulary and narrative, compiling a 30-page dictionary and collecting nearly 50 texts on traditional folklore and mythology. Today, Reichard's book continues to be of value to linguists and community members striving to revitalize the language. Unfortunately, even Reichard's meticulous study did not resolve the Algonquian question at the time, a problem that was not adequately addressed for decades to come (see Haas, 1958). On the strength of her descriptive grammar, Reichard was awarded her Ph.D. in 1923.

After teaching for several years at Barnard College, Reichard returned to the field to document the Coeur d'Alene language of Idaho over the summers of 1927 and 1929. Her mentor, Boas, who was eager to include a sketch of Coeur d'Alene in his *Handbook of American Indian languages* (Reichard, 1938), secured generous support for both trips. Upon arrival on the reservation, Reichard was fortunate to encounter a consultant named Dorothy Nicodemus, one of the few surviving monolinguals. Nicodemus's daughter-in-law, Julia, provided translations. To Reichard's great fortune, Dorothy's grandson, Lawrence Nicodemus, had a rare gift for analyzing the grammatical categories of Coeur d'Alene, his native language, which Reichard recognized and encouraged. With assistance from these gifted consultants, Reichard assembled the materials for a grammatical sketch and collection of narrative texts, which she published in 1938 and 1947, respectively.

The following summer, Reichard embarked on an ambitious research project aimed at documenting the traditional Navaho religious life. She sought to conduct the study purely in the Navajo language, for the sake of capturing the fine shades of meaning so easily lost in translation, especially when relying on interpreters. Starting in 1930, Reichard began living with a Navaho family during the summers, where she could immerse herself in the language around the clock, while attending local religious ceremonies. By 1939, she had lived in this family setting for over three years total, while also teaching writing to adult speakers at the Hogan School on the reservation. By immersing herself in the language, Reichard sought to distinguish herself from other linguists of her era, such as Sapir and Hoijer, whom she sharply criticized for not speaking their field languages fluently in a natural cultural setting. Yet, like Sapir and Boas, Reichard also encouraged native speakers to begin the process of documenting their native languages on their own, often incorporating native observations into her own studies.

Reichard's sustained work among the Navajo, which she continued for over a decade, led to the crowning achievements of her career, namely, the publication of her 2-volume ethnographic masterpiece, *Navajo religion: a study in symbolism* in 1950, followed by her authoritative reference *Navajo grammar* in 1951. Throughout *Navajo religion*, Reichard drew extensively on native terminology to clarify key concepts in traditional life, providing detailed translations of actual Navajo words for ceremonies, mythical personages, illnesses, and symbols, with supplementary examples from stories, songs, and religious narratives. Her grammar, which was meant to accompany the ethnography, began with a sensitive treatment of tone and morphophonemic processes, before progressing to a sophisticated analysis of the verb template, a formidable challenge even in terms of contemporary linguistics. Throughout the grammar, Reichard illustrated her observations with many detailed examples and paradigms while concluding the work with lengthy sections on syntax and usage, which were rare before the 1960s. As a byproduct of her work on Navajo vocabulary, Reichard also left an unpublished manuscript on file at the archives of the

University of Northern Arizona, which contained the outline of an ethnographic dictionary.

Reichard remained exceptionally active in service over the course of her career, taking secretarial positions with several major professional organizations, including the American Ethnological Society (1924–1926), the American Folklore Society (1924–1926), and the New York Linguistic Circle (1945–1947). In 1940, she accepted a position as the interim editor of the *Journal of American Folklore*, and in 1945 she served on Section H of the American Association for the Advancement for Sciences.

See also: Boas, Franz (1858–1942); Hoijer, Harry (1904–1976); Navaho; Sapir, Edward (1884–1939).

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Reichenbach, Hans (1891–1953)

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Hans Reichenbach was born on September 26, 1891, in Hamburg, Germany, and died on April 9, 1953, in Los Angeles. His mentors included Ernst Cassirer, David Hilbert, Max Planck, Max Born, and Albert Einstein. Reichenbach earned his degree in philosophy at Erlangen in 1915 and published his dissertation on probability 1 year later. He nearly died during World War I on the Russian front but was able to attend Einstein's Berlin lectures in 1917–1920 on the theory of relativity. He gained a faculty position at Polytechnic (Stuttgart) in 1920 and in 1926 a chair in Berlin. He fled Germany when Hitler rose to power and taught at Istanbul until 1938, when he moved to the United States to finish his career at the University of California at Los Angeles.

Reichenbach's most important contributions in the philosophy and logic of natural language systems had to do with the problematic relation of meaning and truth. His most important contribution was the verifiability theory of meaning. In 1938, he published his thesis that the discovery of meanings to be associated with the conventional symbols of a language is dependent on the valid connection of those symbols with empirical facts. He disagreed with Bertrand Russell, who argued that meanings had to be discovered prior to the possibility of discovering any true representations. Reichenbach insisted that the discovery of meaning was dependent rather on prior discovery of certain truthful representations of known facts. Reichenbach agreed with Ludwig Wittgenstein's (1922) principle of testability as prerequisite to the meaningfulness of any sentence, and both disagreed with Russell. They insisted that truth is more basic than meaning. Reichenbach was greatly influenced by Einstein, who remarked that "everything depends on the degree to which words and word-combinations correspond to the world of impression" (1941/1956: 111).

Reichenbach (1947) provided the first serious effort by a logician other than C. S. Peirce to attempt a logical analysis of ordinary language. Throughout his life, he continued to explore Einstein's relativity as applied to conceptions of space, time, and the experience of empirical events. As a result, Reichenbach's writings inevitably probed the riddle put forth by Lev Vygotsky (1934/1962): What is the relation between language and thought? Reichenbach's best

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guess was his theory of probability linking experience to language through testable propositions.

See also: Russell, Bertrand (1872–1970); Vygotskii, Lev Semenovich (1896–1934).

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A pioneer in pidgin and creole studies, John E. Reinecke was relatively alone and isolated in promoting the study of Hawaiian Creole English (HCE) and other 'marginal languages.' In line with his involvement with the Hawaiian labor movement, Reinecke advocated the elevation of pidgins and creoles to the status of proper scientific object, just as he felt workers should be given their proper due. Reinecke's work on creole languages was interrupted by a long break of 20 years when he was banned from teaching because of his political activities.

Reinecke's politics came from a rather hardscrabble life beginning with a childhood as one of five children born to a tenant-farming family in Kansas. His education began in a one-room school house. The young boy soon began thinking of other places. He raced through whatever books were available and achieved acquired reading skills far beyond his years but could not go to high school in the next town because he was too young. His somewhat chaotic reading in his first years of college, coupled with his life experiences, led him to socialism, a political orientation later strengthened by his contacts with the exploited workers of Hawaii, whom he was soon to encounter as he indulged the urge to travel.

Reaching California early in 1926 and Hawaii by the end of the year, Reinecke found his new home. Although he traveled elsewhere, Hawaii was where his heart and scholarly interests lay. Reinecke's first period of productivity began with a survey of English on the island of Hawaii, resulting in his 1935 master's thesis, 'Language and dialect in Hawaii' (published in 1969). What was important about this first study was his adopting the perspective of the HCE speaker. Typically the view adopted was that of the Standard English speaker, the variety of the people in power, not the actual speakers of the variety.

In writing this thesis, Reinecke realized how little he (and the world) knew about such languages and conducted a remarkable survey as part of his dissertation. Sociologically oriented, his well known Ph.D. thesis appeared in 1937 as 'Marginal languages: a sociological survey of the creole languages and trade jargons,' a ground-breaking major work.

Reinecke's second period began with his being befriended by Stanley Tsuzaki, a specialist in contact languages at the University of Hawaii, who convinced Reinecke to re-enter the field. Together they produced *English in Hawaii: An Annotated Bibliography*, "the first scholarly bibliography of a creole" (Gilbert 1987: viii). Reinecke attended the first world conference on pidgin and creole languages (Mona, Jamaica, 1968) and soon became well known in the fledgling field. The two of them and others then produced *A Bibliography of Pidgin and Creole Languages* in 1975. From 1976 to 1982 Reinecke edited the first and only publication devoted to pidgin and creole studies at the time, *The Carrier Pidgin*, and in that publication continued to augment and update the 1975 bibliography that he and others had produced.

In 1975 Reinecke and his wife accepted an out-of-court settlement for the multiple civil rights' violations they had experienced, and thus received some compensation for their years of mistreatment. Up until the end of his life in 1982, Reinecke was involved with the Oral History Project at the University of Hawaii.

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As member of the editorial board and then editor-in-chief of the monumental *Chicago Assyrian Dictionary*, Erica Reiner emerged as a leading Assyriologist, with a thorough and profound knowledge of the textual-philological underpinnings of the discipline. This was further corroborated by her masterly editions of texts, ranging from religious (*Šurpu*) to astrological (*Inuma Anu Enlil*). But alongside these major achievements, she embraced a theoretical interest in the interpretation of the data that would have been considered iconoclastic were it not for the position of strength from which she was proposing it. The year 1966 was a landmark date in this respect: that is when her *A linguistic analysis of Akkadian* appeared in print.

Born in Hungary on August 4, 1926, Reiner studied first in Paris, where she earned a diploma in Assyriology from the Sorbonne (1951), and then moved to Chicago, where she completed her studies with a Ph.D. in Assyriology from the Oriental Institute of the University of Chicago (1955). She became an assistant professor there in 1956, John A. Wilson Professor in 1973, and John A. Wilson Distinguished Professor in 1983, the same year in which she also became editor-in-charge of the *Chicago Assyrian dictionary,* serving from 1973 to 1996, the longest tenure in this position during the project's eight decades.

She has recorded the long history of the dictionary project in her book *An adventure of great dimension* (2002). This is a remarkable account of events and personalities, written with the consummate skill of a historian and at the same time with the first-hand experience of a participant. Her insight and candor make for fascinating reading and allow a fresh new understanding of the forces that shaped one of the great lexicographical accomplishments of the 20th century. From the point of view of linguistics it is particularly significant because it highlights, in ways at times frankly dramatic, the confrontation between overarching theoretical concerns and the practical demands of logistic needs. She was a principal in both venues, as the most advanced theorist in the discipline and as the one responsible for the actual publication of the dictionary, nine volumes of which were prepared for publication under her tenure, out of 26 planned for the whole series. In fact, in a most interesting autobiographical self-disclosure, she relates how her linguistic vocation, so to speak, was rooted in a very early bitter disappointment resulting from a sharp criticism of the early stages of the dictionary, which contributed to her ever greater concentration on things 'grammatical' (2002: 72).

A linguistic analysis of Akkadian aimed at establishing a method of inquiry as much as at presenting a substantive body of data. It was a groundbreaking publication in 1966, and it remains so to this day. It accomplished two major goals. The first was to show how transformational grammar could be applied to a dead language, i.e., one whose carriers are no longer extant (there are no living speakers whose competence may be tapped). The second was to show Assyriologists how the application of general principles of analysis could bring greater clarity to what was otherwise perceived as a congeries of data whose coherence derived primarily from the philological accuracy of the underlying documentation. Its impact on the field has been limited, and that in the decades that followed its appearance there has been more lip service to its claims than a real confrontation with its substance. But this is mainly a reflection on the discipline, which is still largely rooted in a Neogrammarian mode. If anything, this proves even more abundantly how much ahead of her time Reiner was when the book appeared.

She revisited the subject in a brief but powerful general overview of Akkadian studies published four years later in *Current Trends in Linguistics* (1970), and dealt with a number of specialized topics in a series of articles that elucidated important concepts, especially with regard to phonemics and its relationship to the writing system. She also published an Elamite grammar (1969, written in 1960) that was groundbreaking in another sense, namely as the most thorough descriptive presentation of the language, which it remains to this day. This work exhibits an exemplary blend of philological accuracy and theoretical precision (even elegance), and serves as a textbook case of how strict adherence to method can help to elucidate raw data, especially in a case like Elamite,

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where these data are very scanty – for instance, in her treatment of syntax, where even the definition of sentence boundary is problematic (1969: 93).

Reiner's other major contribution has been toward a proper interpretive understanding of Akkadian literature, particularly with regard to a formal criteria of analysis. In this area, she has provided not a theoretical synthesis, but rather a how-to demonstration that applies carefully defined principles to specific individual texts. Her 1978 'Die akkadische Literatur' contains insightful, if brief, pointers at problems to be solved and pathways that may be followed, though it does otherwise primarily deal with plot and character in the texts analyzed according to their genre, which leads to occasional interesting comments on the notion itself and on pertinent classification criteria. Only in the case of the so-called Wisdom Literature does Reiner provide a more detailed formal analysis of specific stylistic mechanisms, in particular with regard to the structure of the stanza of a given text.

The same approach is more fully developed in her 1985 work *Your thwarts in pieces*, an anthology that embodies a system. Through a highly polished critical analysis of a number of texts, Reiner defines a series of formal mechanisms that almost add up to a systematic *ars poetica Mesopotamica*, something which, she rightly stresses, was never formulated by the Mesopotamians themselves and thus can only be attained through a rigorous articulation of demonstrable recurrent patterns. This she does in a masterly way for texts in prose and poetry, so that this slender volume may well be considered the best presentation yet of Mesopotamian literature *qua* literature (rather than as textual philology). With great subtlety, she identifies a whole series of devices, such as fronting, inversion, and marking in word order (sometimes supported by graphic devices on the tablets); foregrounding in a poem's literary structure (i.e., the identification of thematic pivots around which the structure revolves); the economy of the salient points that undergird the plot and more sharply define the characters (with diachronic comparisons where possible) and, conversely, of plain filler motifs; explicit markers that signal a subdivision into discrete units formally identifiable as sections, stanzas, distichs, 'antiphonic groups,' or the like; the patterned recurrence of unexpected grammatical sequences; spelling patterns that may contribute to define a metrical scheme; the impact of metaphors; compositional devices such as parallelism and concatenation; sound patterns that bracket noncontiguous segments. Thus it is that her linguistic sophistication serves her in good stead in her effort to understand the deeper levels of meaning, i.e., to achieve and share a controlled "literary competence." It is remarkable how the formal analysis she proposes and practices contributes to nurturing that "loving immersion" in a text, that "poetic feeling" about which she speaks elsewhere as a parallel to the "linguistic feeling" that one can develop even vis-à-vis a dead language and its literature.

See also: Akkadian; Lexicography: Overview; Transformational Grammar: Evolution.

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Reinhart, Tanya

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Tanya Reinhart is a professor at Tel Aviv University in Israel and the University of Utrecht in the Netherlands. She is a prominent figure in formal syntax and semantics, discourse analysis, and linguistics and literature.

She received her B.A. in philosophy and Hebrew literature (1964–1967) at the Hebrew University in Jerusalem, her M.A. in comparative literature and philosophy (1967–1969) from the same university, and her Ph.D. in linguistics from the Massachusetts Institute of Technology (1972–1976). Her dissertation, *The syntactic domain of anaphora*, supervised by Noam Chomsky, is a major contribution to the fields of syntax and semantics. In this work, she defines syntactic domains of coreference and c-command, which were the basis for all generative studies on coreference in the framework of the Extended Standard Theory during the 1970s and the 1980s.

In her 1983 book *Anaphora and semantic interpretation*, within the Chomskian framework of the autonomy of syntax and interpretative semantics, she argues that anaphora restrictions obey general syntactic conditions on all interpretative rules, including sentence-level linguistic rules. She claims that these syntactic conditions reflect properties of the processing ability of the mind. She departs from her dissertation in that she abandons noncoreference or disjoint-reference rules in favor of the semantics of anaphora because this distinction is needed to distinguish between pragmatic coreference and bound anaphora, since only the latter is restricted by sentence-level rules. Later on, in her 2000 paper, 'Strategies of anaphora resolution,' she claims the traditional distinction between binding and coreference should be modified to differentiate between binding and covaluation. While α Argument-binds β iff α is the sister of a λ-predicate whose operator binds β, covaluation is an interface strategy. Covaluation is a relation between two elements that are not bound, but have the same value (α and β are covalued iff neither Argument-binds the other and they are assigned the same value). Covaluation is available regardless of the referential status of the antecedent, and shows up also in quantified contexts. Covaluation is independent from the computational system.

Lately Professor Reinhart has been analyzing the syntax and semantics of the thematic system of verbs. She has also researched the acquisition of syntax in children. In her 1999 study on the acquisition of stress shift and focus in children, she found that computing the focus obtained by stress shift requires constructing a comparison set in a similar fashion as coreference in children. In the case of stress shift, there is no evidence that children have general problems acquiring it, but there is a 50% range of performance when stress shift applies. This was predicted by the processing cost hypothesis in tests on coreference, which predicts a 50% performance in children between the ages of 3.8 and 4.6.

See also: Chomsky, Noam (b. 1928); Coreference: Identity and Similarity; Operators in Semantics and Typed Logics; Word Order and Linearization.

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Reinisch, Simon Leo (1832–1919)

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Simon Leo Reinisch (known as Leo) was born in Osterwitz, Austria, on October 26, 1832, and died on December 24, 1919, in Lankowitz, Austria. He was the fifth of nine children born to Josef R. Reinisch and Elisabeth Spieler, who were Styrian peasants. In 1846 Reinisch began *Gymnasium* in Graz, and he enrolled at the University of Vienna in 1854. While in Vienna, he studied the history of the ancient Middle East, with an emphasis on Egypt, and learned to read hieroglyphics. After completing his studies in 1857, Reinisch worked briefly as a scribe – an amanuensis – at Vienna's university library. He received a doctoral degree from the University of Tübingen in 1859, and completed postdoctoral studies back in Vienna in 1861 with a thesis entitled 'The history of the Orient in ancient times with reference to Egypt.' In 1865–1866 the emperor Maximilian sent Reinisch to Egypt for the first time. Reinisch's stay in Egypt proved fruitful, as he collaborated on translating inscriptions with historian Robert Rösler and Egyptologist Richard Lepsius (*see* **Lepsius, Carl Richard (1810–1884)**). At Maximilian's request, Reinisch also catalogued all of the artifacts he saw in Miramar. During Reinisch's expedition to Egypt, his benefactor Maximilian, who had been emperor of Mexico since 1864, called upon Reinisch to become director of Mexico's main archaeological museum. Once in Mexico, in the short period before Maximilian's execution in 1867, Reinisch made a thorough study of the region's languages and prehistory. Reinisch also collected copious textual and archaeological material for Maximilian in both Egypt and Mexico, since the emperor hoped to display a wide range of ethnographic objects in Austrian and Mexican museums (Anders, 1987).

Habsburg emperor Franz Josef named Reinisch Professor of Egyptology at the University of Vienna in 1868; he was then promoted in 1873. The older he grew, the more Reinisch dedicated himself to linguistics instead of history, teaching the former much more frequently than the latter. Still, even when he was a young university student in Vienna, Reinisch had always insisted that philology was crucial for the study of history, and for him it remained so. Reinisch was also a comparativist, interested in how the far-flung languages he had learned were interrelated. For this reason, Reinisch believed that grammar should rest at the center of any comparative philological studies, because its structure was the surest key to divining relationships among languages. Reinisch considered the so-called 'Hamitic' languages to have the same structure as the Semitic and Egyptian ones, and held that they could furthermore be linked to the Indogermanic language family; moreover, he maintained that all of these were likely related to Bantu and Nigritic languages (Duchâteau, 1987; Böhm, 1987; Reinisch, 1873). Reinisch was also concerned with the cultural aspects of language research, and was careful about correlating linguistic and ethnographic phenomena (Anders, 1987). An expert in North African languages, Reinisch traveled to the Sudan and Eritrea in the 1870s and 1880s to research Cushitic languages, and he is counted today as the founder of Cushitic studies. Unlike many pre–World War I Africanist linguists, Reinisch, who was a religious Christian, was not a missionary, but he did translate the Gospels into Bilin (Bilen) and Qara (Jibbali). Even though Reinisch became Rector and then Dean of the University of Vienna in the 1890s, he continued to be actively involved in linguistics, and was one of three editors of the *Wiener Zeitschrift für die Kunde des Morgenlandes*. He also published Adolf Schleicher's Somalian texts after Schleicher's death, when they otherwise would have remained hidden (Schleicher, 1900; Jungraithmayr and Möhlig, 1983). Reinisch retired from academia in 1902, when he was also given emeritus status and received a medal from his university colleagues honoring his lifelong scholarly achievements (Duchâteau, 1987).

See also: Lepsius, Carl Richard (1810–1884); Mexico: Language Situation; Semitic Languages; Somali.

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Reisig, Karl (1792–1829)

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Christian Karl Reisig, born November 17, 1792 in Thuringia, was an outstanding professor of classical philology who taught in Jena (1817–1820) and Halle (1820–1828) before his early death on a study trip to Venice on January 17, 1829. He studied under Gottfried Hermann in Leipzig (1809–12) and Christian Heyne in Göttingen (1812–13), completing his doctorate in 1817 after a three-year stint in the Saxon army. He published several works on Aristophanes's comedies, but is primarily remembered today for his *Vorlesungen über lateinische Sprachwissenschaft* (1839), which were compiled and edited from his hieroglyphic lecture notes by his student Friedrich Haase.

Reisig's *Vorlesungen* are divided into three volumes, *Etymologie, Lateinische Semasiologie oder Bedeutungslehre*, and *Lateinische Syntax*, of which only the second is traditionally considered, when Reisig is remembered at all, in determining his historical significance. He is most often remembered in the context of semantic history (e.g., Gordon) as the inventor of the word 'semasiology' and for having introduced semantics as an independent discipline, a third component of grammar next to etymology and syntax. Based solely on Reisig's second volume, his investigation of meaning is typically construed as being limited to historical semantic shifts, a reading that was influenced by Reisig's successors/editors, Haase and Heerdegen (Schmitter, 1985: 646; Nerlich, 2001: 1598).

However, Schmitter (1985) reviews all three volumes to reveal a much broader, more complete conception of meaning in Reisig's work, incorporating both diachrony and synchrony. Diachronically, Reisig emphasizes the need to determine not only successive meanings of the same word, but also the logical relationship between these meanings that motivated the changes. Reisig discusses idea assocations typical of semantic shift, including metaphor, metonymy, and synecdoche, raising them to the status of logico-rhetorical laws of semantic change (Nerlich, 2001: 1597). Synchronically, the logical relationship between connected, 'synonymous' concepts must be determined in order to establish the precise meanings of words (Reisig's 'synonymologie'). Thus, word meaning consists not only of a 'concept' but also of age, style, register, and so forth. The 72-page introduction to Volume I contains Reisig's 13 principles of language and its study, including general linguistic rules based on Kant's categories of understanding (*see* **Kant, Immanuel (1724–1804)**) (Schmitter, 1985: 652).

Reisig's immediate successors, especially Haase and Heerdegen, criticized his overly broad conception of meaning as having little to do with semasiology, which, they believed, should be limited to the denotative meanings of individual words. Other followers included Albert Agathon Benary, Oskar Hey, and Max Hecht. In the theory of semantic fields today, and in Coseriu's (*see* **Coseriu, Eugenio (1921–2002)**) theory of lexical solidarities, we see the reemergence of ideas that were central to Reisig's conception of meaning (Schmitter, 1985: 660).

See also: Coseriu, Eugenio (1921–2002); Kant, Immanuel (1724–1804).

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Johann Jacob Reiske was born on December 25, 1716 in Zörbig, Germany. After spending four years at the *Waisenhaus* (orphanage) in Halle undergoing a somewhat unprofitable high school education, he entered the University of Leipzig in 1734, at the age of 17. Formally enrolled to study theology, he did not attend any classes, devoting his time instead to learning Greek, Hebrew, and Arabic on his own. After five years, he left Leipzig for Leiden, hoping to increase his knowledge of Arabic with the help of manuscripts available only in Leiden and Amsterdam. While he was forced to work many hours for his livelihood – mostly by copying manuscripts and offering private lessons – he took courses in Arabic with Albert Schultens (1686–1750) and in Greek with Tiberius Hemsterhuis (1685–1766). After four years in Leiden, he began, at the advice of Schultens, to study medicine and obtained a doctor's degree in 1746 without ever practicing medicine. He returned to Leipzig that year. Again he had to make his living by taking on odd jobs only marginally related to his interests and exceptional capabilities. His appointment to a professorship in Arabic in 1748 brought no relief, because the remuneration was less than adequate and ceased to be paid after some years. Even upon his election to principal of the Nicolai School in 1858, his economic situation did not substantially improve, because the administrative work severely curtailed the available time to do what he liked best – preparing materials in Oriental and classical languages for publication (see Bibliography).

In spite of overwhelming adversities, his enormous productivity never abated. In Arabic studies, he created an innovative approach – that earned him the distinction of being called 'recht eigentlich der Begründer der arabischen Philologie' (Foerster, 1889: 131) – in that his major interest in Arabic was not motivated primarily by linguistic or theological concerns, but by his desire to evaluate Arabic as a language and culture in its own right. His extraordinary status, having mastered two scientific areas, the Arabic and the Greek, and being 'der erste Arabist und einer der ersten, wenn nicht der erste Gräcist des 18. Jahrhunderts' (Foerster, 1889: 131), is acknowledged by numerous distinguished personalities, including Herder, Theodor Mommsen, Heinrich L. Fleischer, and Lessing.

The greater part of Reiske's misfortune was caused by his difficult personality. He often managed to offend those people who wanted to be supportive. His marriage to Ernestine Christine Müller (1735–1798) in 1764, on the other hand, proved to be the most beneficial occurrence of his entire life. He had taught her to become a competent classical scholar in her own right, but all through her married life she selflessly contributed to the advancement of his projects and helped him realize his full potential. After his death (August 14, 1740), she completed and published many of his manuscripts that had been left unfinished. Meusal (1811) provides the most complete Reiske bibliography.

See also: Herder, Johann Gottfried (1744–1803).

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Relational Network Grammar

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Relational network grammar (RNG) is a more general label for the linguistic theory that used to be known as stratificational grammar (SG). The latter originated in the late 1950s when Sydney Lamb combined a version of Bloomfieldian structuralism with ideas from Hjelmslev's Glossematics. RNG now operates with a much looser conception of stratification and has also undergone a considerable broadening of its goals. Even SG itself was never content to concentrate on 'competence' to the exclusion of 'performance,' preferring instead to provide an account of language that can be used to model the processes of speech production and comprehension. However, besides this feature of the theory, referred to now (Lamb, 1999: 293) as the requirement of 'operational plausibility,' two further requirements have been added: those of 'developmental plausibility' and 'neurological plausibility' (1999: 293) – i.e., that a realistic theory should (a) provide a plausible account of how the proposed linguistic system can be learned, and (b) be compatible with what is known about the brain from neurology and cognitive neuroscience. The remainder of this article is divided into four sections. The first section presents details of SG; the second discusses language as a network of relationships; the third mentions the relationship between complex lexemes, constructions, and syntax; and the fourth expands on operational, developmental, and neurological plausibility.

Stratificational Grammar

Tactics vs. Realization

The Bloomfieldian model of language of Hockett (1955: 14) contained three central subsystems: phonology, grammar, and morphophonemics. The phonology and grammar crucially incorporated a mechanism for specifying possible combinations of phonemes and morphemes respectively. In the case of phonology this was referred to as the 'phonotactics,' and the '-tactics' part of this term formed the basis of such later coinings as 'morphotactics,' 'lexotactics' and 'semotactics.' Hockett's (1955) 'grammar' subsystem was in effect a morphotactics. The morphophonemic subsystem, on the other hand, had a different function, in that it characterized the representation – or 'realization' – of morphemes in terms of phonemes, and therefore formed a bridge between grammar and phonology. Hockett's (1955) model was equivalent to a two-stratum SG.

One of the two main features that SG derived from Glossematics was its concern with 'content' as well as 'expression' (Hjelmslev, 1961: 47–60, 66–67, 70–72). This entailed an immediate increase in the number of strata recognized. (For the other main feature from Glossematics, see 'A Network of Relations' below.) During the 1960s, 1970s, and 1980s, the number of strata posited was under continuous review, but the four-stratum model of **Figure 1** was commonest (Gleason, 1964; Lamb, 1964, 1971). Evidence in support of stratal distinctions was of two kinds, tactic and realizational. Tactic evidence will be discussed in 'Independent Patterning' below. Realizational evidence consisted in identifying examples of the same

Relational Grammar and Arc-Pair Grammar

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Overview

Relational Grammar (RG) is a generative framework developed in the 1970s and 1980s. The framework was first developed by David Perlmutter and Paul Postal and presented to the linguistic community in a seminar at the 1974 LSA Summer Institute in Amherst, Massachusetts. As the name indicates, Relational Grammar gives theoretical primacy to GRAMMATICAL RELATIONS (GRs), such as SUBJECT, DIRECT OBJECT, etc. Transformational Grammar defined tree-theoretic primitives and derived GRs in terms of tree relations – e.g., SUBJECT was defined as 'NP daughter of S'. The premise of RG was that a good deal of grammatical phenomena is better analyzed directly in terms of GRs, without the intermediate step of tying the GRs to constituency.

RG was one of several generative frameworks that emerged as alternatives to Standard Transformational Grammar in the late 1970s and early 1980s. As such, it participated in a fertile literature that explored the roles of theoretical constructs such as GRAMMATICAL RELATIONS, CONSTITUENT STRUCTURE, and MONO-versus MULTI-STRATAL representations (for example, see several contributions in Jacobson and Pullum, 1982). As noted above, RG granted a primitive status to GRs; in addition, like Transformational Grammar, it was MULTI-STRATAL; that is, it defined a clause structure in a series of strata that expressed the relational structure of the clause at different points of analysis. Hence, RG defined INITIAL, INTERMEDIATE, and FINAL strata in a manner that was similar to Transformational Grammar's DEEP, INTERMEDIATE, and SURFACE structures. Unlike the DERIVATIONAL Transformational Grammar, however, RG developed into a REPRESENTATIONAL framework. Other frameworks of this period include EXTENDED STANDARD THEORY/GOVERNMENT AND BINDING THEORY (GB – constituent-based, multi-stratal), GENERALIZED PHRASE STRUCTURE GRAMMAR (GPSG – constituent-based, mono-stratal), and LEXICAL-FUNCTIONAL GRAMMAR (LFG – both constituent- and relationally based, mono-stratal, multi-level).

Research in RG is characterized by close attention to empirical detail from a wide variety of languages. The goal of much of this work was to establish an inventory of relational structures in natural language and tease apart universal aspects (LAWS) from language-particular instantiations (RULES). Some of this work marshaled RG analyses of natural language data to argue in favor of the use of GRs as primitives (e.g., Perlmutter and Postal, 1983c), as well as the multi-stratal characteristic of the framework (e.g., Perlmutter, 1982).

Arc-Pair Grammar (APG) (Johnson and Postal, 1979) seeks to formalize the laws and rules of RG more rigorously. In addition, it posits the theoretical devices of SPONSOR and ERASE (see below) – these allow for a more precise characterization of relational structures, and increases the empirical coverage of the framework.

While there was considerable RG research activity in the 1980s, work in this framework had essentially ended. Nevertheless, significant empirical, analytical, and theoretical generalizations uncovered in RG work have had a profound influence on the nature of linguistic research from a wide array of theoretical perspectives.

Relational structures are defined in RG through RELATIONAL NETWORKS (RNs). An RN is a set of ARCS, each of which defines a relationship between linguistic elements. For example, the English sentence in (1) might have the RN in (2):

(1) The agent bought the house.

(2)

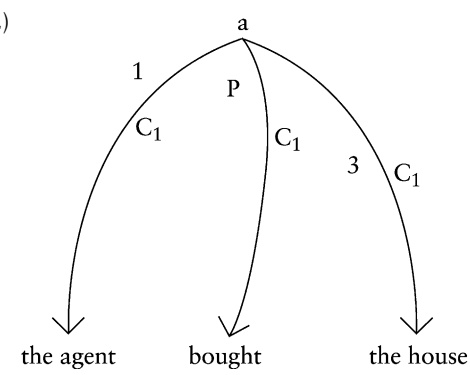

The RN in (2) consists of three arcs; each indicating a relationship between a clausal element 'a' with a phrase. For example, one arc shows that the phrase *the agent* bears the subject relation ('1') to clause 'a'; another indicates that *bought* bears the predicate relation ('P'), and the third represents *the house* as bearing the direct object relation ('2'). Thus, the definition of an arc must include its tail (in these cases the clause 'a'), its head (*the agent*, *bought*, or *the house*), and a grammatical relation. RG defines a finite set of

universal grammatical relations, represented by their corresponding RELATIONAL SIGNS (R-SIGNS), some of which are given in (3):

(3) Some Grammatical Relations (GRs)

GR	*R-sign*
subject of	1
direct object of	2
indirect object of	3
benefactive of	Ben
instrumental of	Instr
locative of	Loc
chômeur of	Chô

Arcs that bear the 1 R-sign are referred to as 1-arcs; those that bear the 2 R-sign are called 2-arcs, etc.

In addition to the tail, head, and grammatical relation, the arcs in (2) also specify a COORDINATE (in each case, 'c_1'). This indicates at which strata the head bears the specified relation to the tail. Because the RN in (2) shows only one stratum, the coordinates are the same for all three arcs. The RN in (5), which corresponds to the passive example in (4), shows a less trivial use of coordinates:

(4) The house was bought by the agent.

(5)

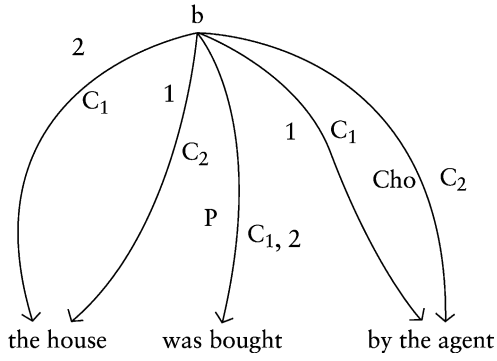

The RN in (5) shows five arcs. Again, the tail of each arc is the clausal node 'b'. However, in (5) *the house* heads two distinct arcs – a 2-arc and a 1-arc. Notice that these arcs have distinct coordinates – c_1 and c_2, respectively. This represents the claim that *the house* is a direct object at the first (INITIAL) stratum, but a subject at the second (and in this case, FINAL) stratum. This aspect of the RG analysis of passive recalls the Standard Theory treatment where the Surface Structure subject of a passive clause corresponds to a Deep Structure object. An alternative representation of the relational network in (5) is given in (6). This STRATAL DIAGRAM brings the strata into focus. Note that in a stratal diagram, the arrow headed by *the house* actually represents two distinct arcs (the two arcs headed by *the house* in 5).

(6)

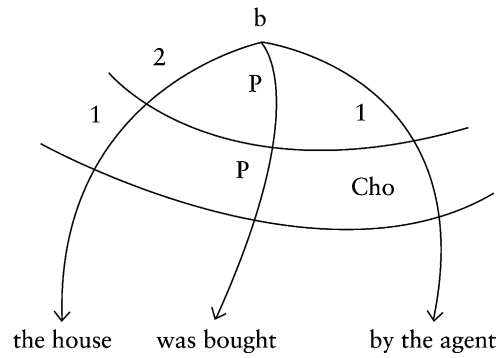

The mechanism by which *the house* heads two distinct arcs is that of REVALUATION (in this case ADVANCEMENT). Revaluations are sanctioned by rules, such as the PASSIVE rule in (7):

(7) Passive is the rule . . . that sanctions the existence of a 1-arc for a nominal N_a in stratum c_{k+1} of a clause node C, where N_a heads a 2-arc in stratum c_k of C, and where there is some nominal, N_b, which bears a 1-arc in stratum c_k. (Perlmutter and Postal, 1983c: 18)

The rule in (7) is part of a universal inventory of relation-changing operations. Languages may include a subset of these rules. Thus, while the choice of a passive operation is language-specific, the characterization of Passive (and other relation-changing phenomena) is part of a universal set of possible relation changes. This aspect of RG foreshadows aspects of both Construction Grammar (language-particular grammars choose certain constructions) and Optimality Theory (there is a universal inventory of grammatical principles – in this case, relation-changing operations).

The rule in (7) requires that the clause contain a 1-arc at the same stratum as the 2-arc that advances. Note that in (5) there are two arcs headed by *by the agent*. At stratum, c_1, *by the agent* heads a 1-arc. At stratum c_2, it heads a Cho-arc. The CHÔMEUR relation (named for the French term for 'unemployed') is borne by elements whose GR has been taken over by another element.

RG posits two universal laws that contribute to the final-stratum chômeur status of the *by the agent*: the STRATAL UNIQUENESS LAW and the CHÔMEUR LAW. The former, formulated in (8), guarantees that no stratum will have more than one 1-arc, 2-arc, or 3-arc (these R-signs label the TERM RELATIONS – i.e., 'subject of,' 'direct object of,' and 'indirect object of').

(8) Stratal Uniqueness Law
Let 'term' be a variable over the class of term R-signs, that is, '1', '2', and '3'.
Then: If arcs A and B are both members of the c_k stratum (*b*) and A and B are both $term_x$ arcs, then A = B. (Perlmutter and Postal, 1983b: 92)

The Stratal Uniqueness Law guarantees that when *the house* advances to subject, *the agent* must assume some other GR. The fact that this other GR is chômeur is dictated by the Chômeur Law:

(9) Chômeur Law
If an RN contains arcs of the form $[Term_x(a,b)/\langle_{cu}c_k c_y\rangle]$ and $[Term_x(c,b)\langle_{ck+1}c_z\rangle]$, then it contains an arc of the form $[Cho(a,b)\ \langle_{ck+1}c_w\rangle]$. (Perlmutter and Postal, 1983b: 96)

The Chômeur Law ensures that when an arc assumes a GR already borne by another arc (OVERRENS, in APG terminology), the latter arc must assume the chômeur GR. Thus, when the initial 2-arc in (5) advances to become a 1-arc, the original 1-arc must assume the chômeur relation.

An additional RG Law limits the chômeur relation to situations where an arc is overrun:

(10) Motivated Chômage Law
An RN containing an arc of the form $[Cho(a,b)\langle_{ci}c_w\rangle]$ also contains distinct arcs of the form $[Term_x(a,b)\langle_{cu}c_{i-1}\rangle]$ and $[Term_x(c,b)\langle_{ci}c_z\rangle]$. (Perlmutter and Postal, 1983b: 99)

Together these laws constrain the class of legal RNs where relation changes create new term arcs. If the new term arc comes in conflict with an existing term arc, the latter must assume the chômeur relation; this is the only way a Cho-arc can come about.

Major Contributions of RG

Research in the RG framework has influence in both its cross-construction and cross-linguistic emphasis. The following sections will briefly survey five construction types where RG has made important contributions.

Passive

Perlmutter and Postal's 1977 *BLS* paper "Toward a Universal Characterization of Passivization" (revised and republished as Perlmutter and Postal, 1983c) showed the cross-linguistic value in conceiving of cyclic phenomena in terms of grammatical relations rather than in terms of constituent structure-changing transformations. The transformational approach, as assumed under Standard Theory, moves an NP from a VP-internal position to become the NP daughter of S. In addition, it must specify a morphological change on the verb and somehow demote the original NP daughter of S – e.g., to a post-verbal PP in English. The problem with this approach is that it requires a wide variation in the formulation of passive from language to language. While in English, the basic SVO word order requires leftward movement of the VP-internal NP and rightward movement of the original NP daughter of S, other languages will require different movements. These differences must be hardwired into the transformations themselves. Furthermore, many of these differences are predictable from the basic word order facts of the languages. The following examples illustrate some of these cross-linguistic differences:

(11) *English – SVO*
a. Louise reviewed that book. (active)
b. That book was reviewed by Louise. (passive)
(Perlmutter and Postal, 1983c: 3)

(12) *Turkish–SOV*
a. Hasan bavulu açtı. (active)
Hasan suitcase-ACC open-PST
'Hasan opened the suitcase.'
b. Bavulu (Hasan tarafindan) açıldı. (passive)
suitcase (Hasan by) open-PASS-PST
'The suitcase was opened by Hasan.'
(Perlmutter and Postal, 1983c: 4–5)

Notice that in addition to word order differences, these examples illustrate morphological differences in passives (copula + participle in English vs. verbal suffix in Turkish), as well as different strategies for marking the nominal that corresponds to the active subject (preposition in English vs. postposition in Turkish).

Perlmutter and Postal point out that, cross linguistically, passive constructions have two crucial characteristics:

(13) a. A direct object of an active clause is the (superficial) subject of the 'corresponding' passive.
b. The subject of an active clause is neither the (superficial) subject nor the (superficial) direct object of the 'corresponding' passive. (Perlmutter and Postal, 1983c: 9)

The RG analysis sketched above captures these generalizations directly; a 2-arc advances, yielding a 1-arc; this new 1-arc overruns the original 1-arc, putting it *en chômage*. The cross-linguistic differences in passives follow from general language-particular word order facts and different morphologies.

While modern syntactic frameworks adopted analyses of passive that avoided the missed generalizations

of the Standard Theory account, the RG analysis was among the first to do so.

Unaccusatives

The UNACCUSATIVE HYPOTHESIS is probably the best-known contribution of RG research. In the mid–1970s, David Perlmutter and Paul Postal began discussing the possibility that intransitive clauses bifurcate into those where the superficial subject is also an underlying subject (UNERGATIVES) and those where it is an underlying object (UNACCUSATIVES). While there was some precedent for this style of analysis in transformational and earlier literature, theirs was the first explicit formulation of this account for purely intransitive predicates. The RG analysis of this contrast is illustrated in (14):

(14)

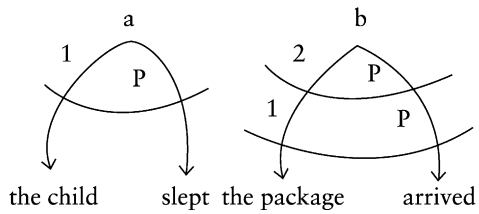

Notice that the 2 to 1 advancement in (14b) creates a final 1-arc. Had this advancement not occurred, the clause would lack a final subject. RG posits the following law to prohibit clauses that lack final subjects:

(15) Final-1 Law
If there is a c_k stratum of *b* and no c_{k+1} stratum of *b*, we say that the c_k stratum is the 'final' stratum of *b*.
Then: if *b* is a basic clausal node, the final stratum of *b* contains a 1-arc. (Perlmutter and Postal, 1983b:100)

Unaccusative Advancement is, then, one way to rescue an RN from violating the Final-1 Law.

The best-known evidence for the unergative/unaccusative contrast comes from Dutch impersonal passives and a cluster of phenomena in Italian. The former evidence was presented in Perlmutter (1978); in this work he proposes the following universal law:

(16) The 1-Advancement Exclusiveness Law
In a relational network in which A and B are neighboring 1-arcs (i.e., 1-arcs with the same tail), if A is an advancee arc, B is *not* an advancee arc. (Perlmutter, 1978: 166)

The effect of this law is to disallow more than one advancement to subject in a given clause. Since unaccusatives involve 2–1 advancement and so do passives, the prediction is that passives should be disallowed with unaccusative predicates. Setting aside certain complications stemming from the difference between PERSONAL and IMPERSONAL passives, this prediction is borne out in the following contrast from Dutch:

(17) a. Er wordt door hem altijd gedubd. *unergative – passive ok*
'It it is always thought deeply be him.'
b. *Er werd door de kinderen in Amsterdam gebleven. *unaccusative – passive* *
'It was remained by the children in Amsterdam.' (Perlmutter, 1978: 168–169)

The evidence for unaccusativity in Italian was presented in talks by Perlmutter in the late 1970s. Some of these arguments were published in Perlmutter (1983a), but a full treatment of the phenomena was not published until Perlmutter (1989). In the meantime, these ideas were developed in two 1981 dissertations (published as Rosen, 1988; and Burzio, 1986, respectively); in Burzio's work, the RG analysis was translated into a configurational Government and Binding framework.

The best-known Italian phenomena tied to the unergative/unaccusative contrast comes from the fact that perfect constructions with intransitive predicates bifurcate into those that use the auxiliary *avere* 'have' and those that use *essere* 'be':

(18) a. Giorgio *ha (*è)* lavorato. *unergative*
'Giorgio worked.'
b. Giorgio *è (*ha)* sparito. *unaccusative*
'Giorgio disappeared.' (Perlmutter, 1989: 64)

The bifurcation of intransitives in terms of auxiliary selection correlates closely with a number of other properties, including the possibility of certain participial constructions and partitive *ne*-cliticization.

The Unaccusative Hypothesis has been influential in theoretical syntax. Unaccusative constructions have been explored in a wide variety of languages and have joined constructions such as Passive and Raising as standard aspects of syntax. Nevertheless, there have been attempts to derive some of the effects associated with unaccusativity from lexical semantic and aspectual factors (e.g., Bresnan and Zaenen, 1990; and Levin and Rappaport Hovav, 1995). Regardless of the ultimate fate of the Unaccusative Hypothesis, the clusters of phenomena associated with it have been the subject of intense research since its conception.

Inversions

Just as the Unaccusative Hypothesis distinguishes final 1s on the basis of their initial stratum GR, the INVERSION analysis bifurcates the class of final 3s. These phenomena were originally discussed in Harris'

1976 dissertation (see also Harris, 1984). She adopted the term INVERSION from the traditional grammatical literature on Georgian. In Georgian, a class of predicates can have superficial datives that, nevertheless, exhibit behaviors associated with subjects. For example, they are able to antecede subject-oriented reflexives, as in (19):

(19) Galas turme daurçmunbia
Gela-NOM apparently he-convinced-him-EV
tavisi tavi.
self's self-NOM
'Apparently Gela (has) convinced himself.'
(Harris, 1984: 267)

In addition, these datives (INVERSION NOMINALS) can trigger number agreement – another property generally limited to subjects.

Under the inversion analysis, an inversion nominal heads an initial 1-arc, and demotes to become a 3-arc. To satisfy the Final-1 Law, a new 1-arc must be introduced – if the clause has a 2-arc at the stratum preceding inversion, it might advance (and the clause will be unaccusative):

(20)

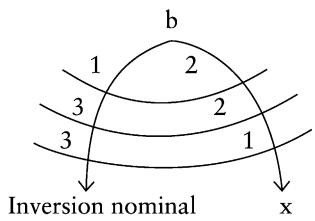

Inversion constructions have been proposed for a wide variety of languages – often associated with psychological predicates. For example, Perlmutter (1984) argues that a class of predicates in Italian determines initial 1-arcs that advance to 3. He argues for the notion WORKING-1; i.e., an element that heads a 1-arc at some stratum and a final term-arc (i.e., a 1-, 2-, or 3-arc). In this way, subject behaviors, such as the ability to antecede reflexives and control into adjunct clauses, can be associated with a natural class – the class of nominals that are subjects at some stratum but not put *en chômage*. Notice that this type of analysis crucially relies on the multi-stratal character of the framework.

There have been two challenges to the inversion analysis. One, presented in Anderson (1984), reanalyzes the Georgian inversion nominals as dative-marked subjects. That is, he challenges the final 3-hood of these elements. Anderson speculates that other putative inversion constructions might be subject to a similar analysis. Indeed, such dative-subject analyses have been common for a number of languages (e.g., Belletti and Rizzi's 1988 account of Italian psychological predicates (Belleti and Rizzi, 1988)). Moore and Perlmutter (2000) address this issue in the context of Russian. In Russian there are two distinct constructions that might be analyzed as having dative subjects: infinitival clauses with overt (dative) arguments and constructions that were previously analyzed as inversion constructions. Moore and Perlmutter argue that the former are true dative subject constructions, but the latter are not; the two constructions contrast in several key ways.

The other challenge to the inversion account maintains the superficial object status of the inversion nominal, but dispenses with its initial subjecthood. This is common in LFG accounts, because of the mono-stratal character of the framework. The subject behaviors of the inversion nominal are tied to another level of representation. For example, Alsina (1996) attributes such properties of certain Catalan nominals to the elements' high position at ARGUMENT STRUCTURE – a level that is based on semantic roles.

Again, the RG inversion analysis provided a productive tool to investigate a class of constructions that is widely attested cross linguistically.

Impersonals

In traditional grammar, IMPERSONAL CONSTRUCTIONS are those where the verb lacks usual agreement with a subject. Often there is an overt pleonastic subject, as in the French example in (21a), or no visible subject at all, as in the Spanish example in (21b):

(21) a. Il est arrivé trois femmes. *French*
'There arrived (SG) three woman.'
b. Se vende tortillas. *Spanish*
'One sells (SG) tortillas.'

Work in RG extends the class of impersonals to include some cases where the verb does agree with some nominal – usually when the nominal occurs in what is not the usual subject position. For example, Perlmutter (1983a) analyzes post-posed subjects in Italian, such as the example in (22), as instances of impersonal constructions:

(22) Sono rimasti dei profughi ungheresi nel paese.
'There remained (PL) some Hungarian refugees in the country.' (Perlmutter, 1983a: 142)

Perlmutter argues that the superficial subject of (22) is a silent pleonastic (SILENT DUMMY); this dummy element enters the RN at a non-initial stratum, overrunning another element; hence, *dei profughi ungheresi* heads a final Cho-arc. The notion BROTHER-IN-LAW is defined as that which holds a dummy and the element it overruns. Some languages, e.g., Italian, but not French, exhibit BROTHER-IN-LAW AGREEMENT – the ability of a verb to agree with the brother-in-law of a dummy that is a final 1. Under this

account, an impersonal construction is defined as one whose final subject is a dummy. A partial RN for (22) is shown in (23):

(23)

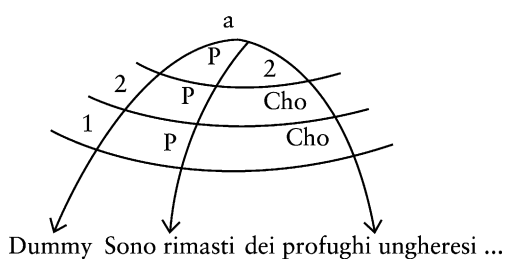

Notice that the predicate in (23) is unaccusative – it has an initial 2-arc and no initial 1-arc. Perlmutter argues, on the basis of *ne*-cliticization, that *dei profughi ungheresi* does not advance to 1 in (23). Rather, the dummy enters as 2-arc and then advances to 1 (satisfying the Final-1 Law). Three laws limit the distribution of dummies: the Active Dummy Law (dummies must put some nominal *en chômage*), the Nuclear Dummy Law (dummies may enter as either 2-arcs or 1-arcs), and the Dummy Demotion Ban (dummies may not demote).

Other impersonal constructions discussed in Perlmutter (1983a) include IMPERSONAL PASSIVES, IMPERSONAL INVERSIONS, and IMPERSONAL UNERGATIVES. In this last case, the dummy enters as a 1-arc, putting the initial-1 *en chômage*.

Impersonal constructions have been the focus of intense research outside of RG; in particular, the analog of brother-in-law agreement (and the related issue of the Case of the overrun element – BROTHER-IN-LAW CASE in RG terms) has been central in later Principles and Parameters and Minimimalist work (e.g., Lasnik, 1995). As in RG accounts, the issue of possible links between pleonastic elements and their brothers-in-law (ASSOCIATES) is explored.

One aspect of the RG account that has been controversial has been the existence of silent dummies, because these are silent elements without semantic content. Given the Final-1 Law, silent dummies are mandated in any clause that does not have another final-1. A similar theoretical motivation exists on other frameworks that assume the equivalent of the Final-1 Law (e.g., the EXTENDED PROJECTION PRINCIPLE (EPP) in GB and the SUBJECT CONDITION in LFG). Perlmutter and Zaenen (1984) provide empirical arguments for silent dummies from a dialect contrast in Dutch, and Perlmutter and Moore (2002) do the same for Russian.

Nevertheless, impersonal constructions without overt expletives have been sometimes cited as a challenge for the Final-1 Law. For example, Babby (1989) argues for subjectless impersonals in Russian and Ukranian. Blevins (2003), working in an HPSG framework, argues for a similar position for a number of Finnic, Baltic, and Slavic languages. Finally, McCloskey (2001) proposes that silent dummies are present in some languages (e.g., Romance languages), but are absent in Irish. Thus, the issue of silent dummies and the Final-1 Law – brought into focus in RG research – remains an important topic of syntactic investigation.

Cross-Clausal Constructions

The preceding sections surveyed four constructions that are generally associated with relation changes in simplex clauses. RG has also been influential in its treatment of cross-clausal phenomena.

Perlmutter and Postal (1983a) discuss the types of RAISING CONSTRUCTIONS (ASCENTIONS) and propose the RELATIONAL SUCCESSION LAW (1983a: 53). This requires that a raisee take on the GR that was borne by the clause itself – e.g., raising from an object clause will result in an object raisee, raising from a subject clause results in a subject.

Another cross-clausal domain in which there has been considerable RG research involves UNION CONSTRUCTIONS. Often associated with causative or perception verbs, these clauses typically exhibit both bi- and mono-clausal characteristics. The RG approach to these phenomena involves a rule of CLAUSE UNION that raises all the arcs of an embedded clause into a matrix clause. Influential RG papers in this area include Aissen and Perlmutter's 1976 *BLS* paper (expanded in Aissen and Perlmutter, 1983), which examines CLITIC CIMBING in Spanish; Gibson and Raposo (1986), which explores principles that govern the GRs that the raises arcs assume under Clause Union; and Davies and Rosen (1988), which develops an alternative, mono-clausal, treatment of Clause Union.

APG

Given the DERIVATIONAL nature of Standard Theory, one might view RG as an alternative derivational framework, differing from Standard Theory only in the primitive status of GRs. Indeed, the stratal diagram representation invites such an interpretation – one might view each stratum as derived from the preceding one. However, RG relies on a REPRESENTATION interpretation; while the strata are ordered, laws and rules have access to the entire representation. For example, conditions that are stated in terms of Working-1 are necessarily META-STRATAL; that is, they take into account whether an element heads a 1-arc at any stratum. Thus, RG represented one of the first

representational, constraint-based frameworks. ARC PAIR GRAMMAR (APG) (Johnson and Postal, 1979) takes this aspect of RG as fundamental. It defines RNs corresponding to the sentences of a language in set-theoretic terms and states both laws and rules as truth-conditional statements that limit the class of possible sentences. Furthermore, the language-particular rules in APG negatively limited the class of possible sentence types. Rather than specifying that a particular language has a dative-shift rule (3 to 2 advancement, in RG terms), it assumes that all languages allow this sentence type, unless a rule specifically prohibits it. This foreshadows an aspect of Optimality Theory, which assumes a universal set of markedness constraints.

APG posits two primitive relations between arcs: SPONSOR and ERASE. Sentences are represented by PAIR NETWORKS (PNs), which resemble RG RNs, augmented with representations of the sponsor and erase relations; (24) shows a pair network for the passive clause in (4):

(24)

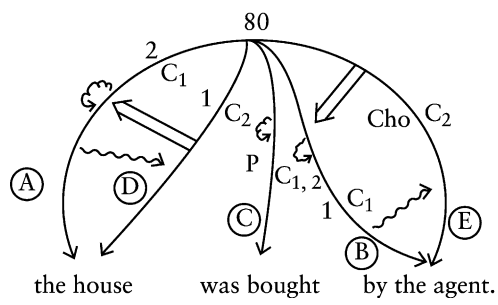

The curly arrows represent the sponsor relations; e.g., the initial 2-arc sponsors the final 1-arc. The double arrows represent the erase relation; e.g., the final 1-arc erases the initial 1-arc. All arcs must have sponsors; the initial arcs sponsor themselves and non-initial arcs have sponsors distinct from themselves. All arcs that are not phonologically realized must be erased. Thus, the set of unerased arcs corresponds roughly to the RG final stratum.

Formally, the PN is defined as an ordered pair; the first member consists of the sponsor relation (the set of sponsor/sponsoree pairs), and the second member is the erase relation (the set of eraser/erasee pairs). Hence, the PN in (24) is defined more formally in (25):

(25) $\langle\{\langle A,A\rangle,\langle B,B\rangle,\langle C,C\rangle,\langle A,D\rangle,\langle B,E\rangle\},$
$\{\langle D,A\rangle,\langle E,B\rangle\}\rangle$

Aside from providing a more rigorous version of RG, APG expands into empirical domains that were not the focus of most RG work. For example, APG makes use of the sponsor and erase relations to develop an account of anaphora and prepositional phrases. In the former case, two arcs headed by the same element may COSPONSOR an anaphoric arc. Only one of the two is erased by the anaphoric arc (REPLACED); the other remains as the anaphor's antecedent.

Aside from Johnson and Postal (1979), which provides detailed analysis of a wide range of constructions, major works cast in APG include Postals's treatments of passives (Postal, 1986) and Aissen's APG analysis of Tzotzil (Aissen, 1987).

Conclusion

Although work in RG and APG had virtually ceased by the 1990s, RG work has had a profound effect on theoretical linguistics. Many aspects of the framework foreshadowed later developments in other frameworks and clearly delineated several persistent theoretical issues (e.g., derivation versus representation, mono-versus multi-stratality, grammatical relations as primitive elements, universal versus language-specific principles, rule- versus constraint-based grammars). Furthermore, one finds other frameworks adopting analyses that are similar to those previously presented in GR terms (e.g., various implementations of the Unaccusative Hypothesis). In addition to these theoretical and analytical contributions, RG research made a significant empirical contribution. While cross-linguistic research was always a hallmark of generative approaches, RG was particularly good at producing detailed accounts of a wide range of languages. Much of the data originally collected and analyzed by RG practitioners has become part of the collective consciousness of theoretical linguistics.

See also: Passives and Impersonals; Unaccusativity.

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Grammaticalization

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Grammaticalization (also 'grammaticization') is generally regarded as a process by which linguistic elements (lexical, pragmatic, and sometimes even phonetic items) change into constituents of grammar, or by which grammatical items become more grammatical in time. Examples are the development of auxiliaries from lexical verbs, or prepositions from nouns; the development of inflections from free adpositions; and the change of word-orders that signal pragmatic meanings, like theme or rheme, into grammatical word-orders that signal the syntactic cases of subject and object. Furthermore, it includes the functionalization/grammaticalization of phonological or prosodic features, such as palatalization and initial mutations to distinguish different cases; number and gender in Irish; or a particular tone taking over the function of a nominal classifier in Chinese. The whole concept of grammaticalization can be characterized as the diachronic process and the synchronic state of coding of grammatical categories, such as case, number, gender, tense, aspect, mood, etc. (for a general reference work cf. Hopper and Traugott, 2003).

It is widely assumed that linguistic items historically go through the following stages:

(1) free lexical unit > function word > affix > zero

The change from free lexical units to function words builds up periphrastic, or analytical, constructions. In a further step, synthetic structures can develop via cliticization, or affixation. Here simple agglutination

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Relational Network Grammar

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Relational network grammar (RNG) is a more general label for the linguistic theory that used to be known as stratificational grammar (SG). The latter originated in the late 1950s when Sydney Lamb combined a version of Bloomfieldian structuralism with ideas from Hjelmslev's Glossematics. RNG now operates with a much looser conception of stratification and has also undergone a considerable broadening of its goals. Even SG itself was never content to concentrate on 'competence' to the exclusion of 'performance,' preferring instead to provide an account of language that can be used to model the processes of speech production and comprehension. However, besides this feature of the theory, referred to now (Lamb, 1999: 293) as the requirement of 'operational plausibility,' two further requirements have been added: those of 'developmental plausibility' and 'neurological plausibility' (1999: 293) – i.e., that a realistic theory should (a) provide a plausible account of how the proposed linguistic system can be learned, and (b) be compatible with what is known about the brain from neurology and cognitive neuroscience. The remainder of this article is divided into four sections. The first section presents details of SG; the second discusses language as a network of relationships; the third mentions the relationship between complex lexemes, constructions, and syntax; and the fourth expands on operational, developmental, and neurological plausibility.

Stratificational Grammar

Tactics vs. Realization

The Bloomfieldian model of language of Hockett (1955: 14) contained three central subsystems: phonology, grammar, and morphophonemics. The phonology and grammar crucially incorporated a mechanism for specifying possible combinations of phonemes and morphemes respectively. In the case of phonology this was referred to as the 'phonotactics,' and the '-tactics' part of this term formed the basis of such later coinings as 'morphotactics,' 'lexotactics' and 'semotactics.' Hockett's (1955) 'grammar' subsystem was in effect a morphotactics. The morphophonemic subsystem, on the other hand, had a different function, in that it characterized the representation – or 'realization' – of morphemes in terms of phonemes, and therefore formed a bridge between grammar and phonology. Hockett's (1955) model was equivalent to a two-stratum SG.

One of the two main features that SG derived from Glossematics was its concern with 'content' as well as 'expression' (Hjelmslev, 1961: 47–60, 66–67, 70–72). This entailed an immediate increase in the number of strata recognized. (For the other main feature from Glossematics, see 'A Network of Relations' below.) During the 1960s, 1970s, and 1980s, the number of strata posited was under continuous review, but the four-stratum model of Figure 1 was commonest (Gleason, 1964; Lamb, 1964, 1971). Evidence in support of stratal distinctions was of two kinds, tactic and realizational. Tactic evidence will be discussed in 'Independent Patterning' below. Realizational evidence consisted in identifying examples of the same

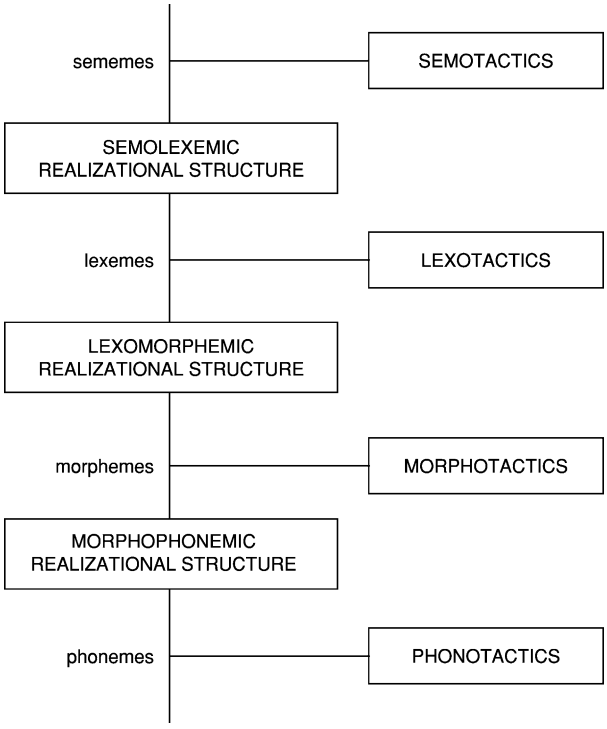

Figure 1 A four-stratum stratificational grammar.

realizational relationships at different levels of the content-to-expression dimension. Thus 'composite realization' is illustrated both by *bet* (realized as the phoneme sequence /b/ + /e/ + /t/) and by *understand* (realized as the morpheme sequence *under* + *stand*) – the first involving morphophonemic structure, the second lexomorphemic structure. Similarly, the alternation between *a* and *an* (as in *a lemon* vs. *an orange*) involves the same relationship as that between *although* and *despite* (as in *although he was tired* vs. *despite his tiredness*) – the former morphophonemic and the latter semolexemic.

Independent Patterning

It is generally accepted that language exhibits 'duality' of patterning (Hockett, 1958: 574–575), and the claim that phonotactic patterning is independent of syntactic patterning is therefore uncontentious. Similarly, other approaches than SG have also treated syntax and morphology as separate modules. Less obvious, perhaps, is the claim that syntax and semantics involve separate tactic patterns – the lexotactics and semotactics (whose smallest constituents are 'lexemes,' or lexical items, and 'sememes'). The nature of the difference between them can be indicated particularly clearly in relation to sentences that describe a change of location. Such sentences may contain a 'source expression,' a 'path expression,' and a 'goal expression':

(1) We drove from York over the Pennines to Manchester.

However, what is involved here is not a syntactic distinction between three kinds of prepositional phrases (PPs) but a semantic distinction that cuts across syntactic categories such as 'preposition' and 'verb.' In (1) the goal expression *to Manchester* is realized as a PP, but there are goal expressions also in (2) and (3) – realized as *enter the stadium* and *appear*, respectively:

(2) The first runner is just about to enter the stadium.
(3) Suddenly a rabbit appeared from behind the hedge.

Similarly, 'means of locomotion' is a semantic rather than a syntactic category, and the same means of locomotion constituent that is realized in the verb *drive* in (1) is realized as the PP *by car* in (4). Moreover, sentences such as (5) demonstrate that the means of locomotion constituent is optional. A verb, on the other hand, is obligatory in such sentences – cf. (6).

(4) We went to Manchester by car.
(5) From here I shall go straight home.
(6) *We to-ed Manchester by car.

Further light is thrown on the distinction between lexotactics and semotactics (a) by sequences of PPs and (b) by examples of prepositions governing a PP rather than a noun phrase. The difference in structure between (directional) *from York over the Pennines to Manchester* and (locative) *in a box under the table near the window* is characterized in the semotactics, and this leaves the lexotactics free to generate arbitrary sequences of PPs without regard to their semantic structure. The difference in grammaticality between *from behind the door* and **from to the door* is, again, a matter of their semotactic structure, which means that the lexotactics can be maximally general and allow any preposition to govern any PP.

A Network of Relations

Tactic Networks

The view of language as a network of relations was present in Saussure (1949: 170) but was even more prominent in Hjelmslev (1961: 23), from where it was taken into SG. Lamb's network notation was based on Halliday's notation for systemic networks (Lamb, 2004: 32–33). To introduce the notation, we may take a simple phrase structure grammar (PSG) and convert it into network form. The PSG in (7) represents a highly simplified fragment of English lexotactics, incorporating some of the information about PPs discussed in 'Independent Patterning' above.

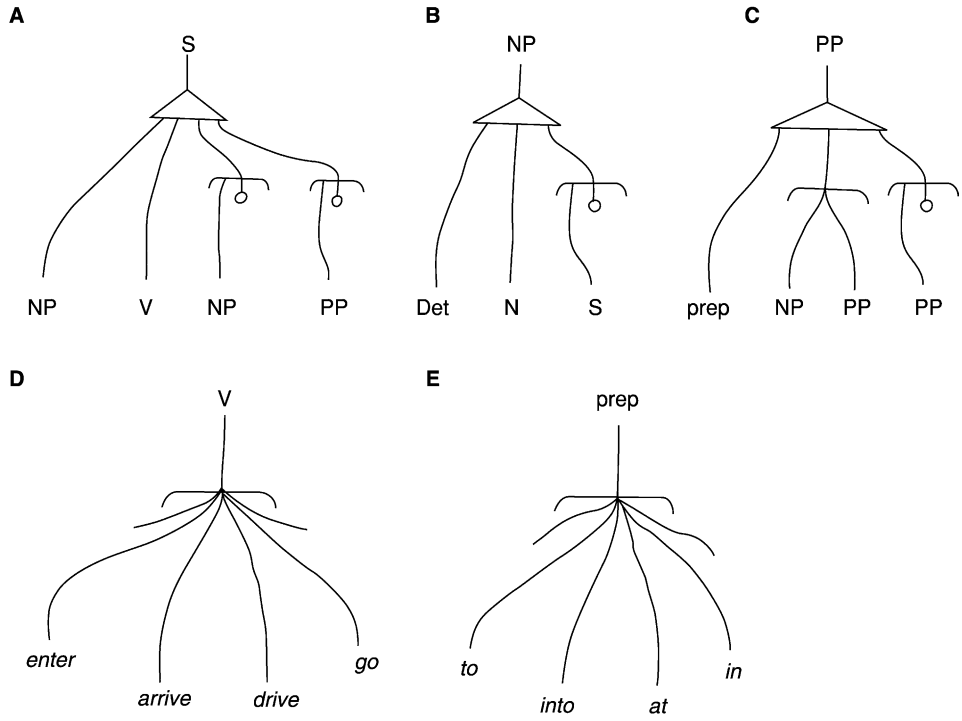

Figure 2 Separate networks corresponding to the five PS rules in example (7).

(7) S → NP V (NP) (PP)
NP → Det N (S)
V → {*enter*, *arrive*, *drive*, *go*, . . .}

$$\text{PP} \rightarrow \text{prep} \left\{ \begin{matrix} \text{NP} \\ \text{PP} \end{matrix} \right\} (\text{PP})$$

prep → {*to*, *into*, *at*, *in*, . . .}

Figure 2, parts (**A**)–(**E**), converts each of the five rules of (7) into the form of a separate network, in which triangular nodes – symbolizing the AND relationship – represent the S, NP, and PP constructions, and the remainder of the nodes are examples of the OR relationship. The ANDs are, specifically, downward ordered ANDs, i.e., they branch in the downward direction and the left-to-right sequence of the lines on the 'plural' side of the node represents the order in which the constituents in question occur. The ORs are also all downward nodes. Two of them – see parts (**D**) and (**E**) – represent the categories V and prep, and they are unordered – i.e., the lines on the plural side of the node, representing members of the category, connect to the same point. There is one further unordered OR – in part (**C**) – representing the choice between a NP and a PP as object of a preposition. The remainder of the downward ORs in Figure 2 represent the optionality of some constituent, i.e., there is a choice between the constituent in question and zero. Moreover, the zero alternative is treated as the default option, which is selected unless the other possibility takes precedence over it. The default option, in this case the line ending in a small circle (representing zero), is shown as the continuation of the line from the 'singular' side of the node. The other line from the plural side is offset from the center of the node. This type of OR node is an ordered OR but the ordering is one of priority, or precedence, rather than sequence.

Comparison of parts (**A**) and (**D**) in Figure 2 reveals two occurrences of the symbol 'V,' indicating that one of the four lines at the bottom of (**A**) is in fact the same line as the one at the top of (**D**). This can be made explicit by connecting the top of network (**D**) to the appropriate place at the bottom of network (**A**). In the same way, the 'prep' line at the top of network (**E**) can be connected to the corresponding line at the bottom of (**C**). The symbols 'V' and 'prep' are then redundant. It is customary to write them alongside the relevant lines in the diagram to aid a reader in interpreting it (see Figure 3). However, the combined network conveys the same information whether these labels are present or absent. The crucial labels are those on the lines at the outer edges of the network, since these indicate where it belongs in some even larger network.

The situation with regard to the symbols 'S,' 'NP,' and 'PP' requires the use of a new type of node, an upward unordered OR. Corresponding, for instance, to the 'NP' at the top of Figure 2(**B**), there are two occurrences of 'NP' at the bottom of (**A**) and one occurrence at the bottom of (**C**). While (**B**) represents the internal structure of an NP, (**A**) and (**C**)

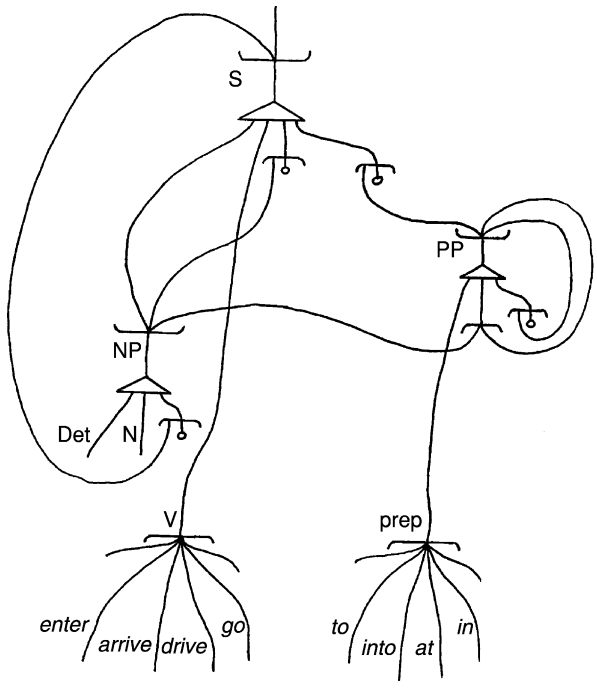

Figure 3 The combined network corresponding to Figure 2 (**A**)–(**E**).

together show three separate functions of an NP. Figure 3 – which results from connecting together all five networks of Figure 2 – therefore incorporates an upward OR above the line labeled 'NP,' with lines connecting to the three slots in question. Any given NP is functioning **either** as the subject of a sentence, **or** as the object, **or** as the object of a preposition. In a similar way, there are upward ORs also above the 'S' and 'PP' lines in Figure 3.

Integrating Tactics and Realization

Figure 4 integrates the lexotactics of Figure 3 with fragments of realizational structure corresponding to particular members of the categories V and prep. The diagraming convention for the realizational structure is that meaning is located at the top and speech at the bottom. Tactic patterns are thought of as horizontal and as intersecting with the realizational structure. This is why the lexotactics is drawn on its side in Figure 4, compared with Figure 3. The diamond-shaped nodes in Figure 4 are used where lines in the realizational structure intersect with the lexotactics. They are a special kind of AND node; the lexeme *into*, for instance, has a particular meaning (indicated in the upper half of the diagram) **and** a particular pronunciation (shown, in part, in the lower half of the diagram) **and** a particular lexotactic distribution (see further Lockwood, 1972: 55–58).

The realizational structure in Figure 4 makes use of two additional types of node. An unordered upward AND indicates that a particular combination of sememes is realized in a particular way lexemically, e.g., that the combination of 'locative' and 'interior' may be realized as the lexeme *in*. An unordered downward AND is used to show that the phoneme /n/ , which occurs in *enter* and *in*, is realized as a (simultaneous) combination of the phonological components /Apical/ and /Nasal/.

Other tactic patterns could be added to Figure 4. For instance, a semotactics would specify the distribution of sememes such as 'goal,' 'locative,' and 'interior' – showing, for instance, that 'goal' is related syntagmatically to 'source' and 'path'; that source, path, and goal expressions all contain a locative expression; that locative expressions may themselves incorporate a directional expression, as in (8); and that 'interior' is related paradigmatically to such sememes as 'surface,' 'anterior,' and 'posterior' (see further Bennett, 1975: 132–176; 1997: 135–140).

(8) The ticket office is through that archway.

A morphotactics and phonotactics could also be added at appropriate levels of the lower part of Figure 4.

Further Properties of the Overall Network

Adopting the 'looser conception of stratification' that was referred to in the introduction, the view that language has a fixed number of strata was abandoned in favor of the view that some parts of a linguistic system may be stratified to a greater extent than others. What now seems fundamental is merely the broad three-way distinction between the phonological, lexicogrammatical, and conceptual systems.

The conceptual system forms a bridge between linguistic structure narrowly defined and the various perceptual systems. The concept 'cat,' for instance, is connected not only to the lexeme *cat* in the linguistic system and to other concepts representing information about cats, but also has connections to visual, auditory, and tactile perception. A person's knowledge of cats includes knowing what they look like, what sounds they make, and what their fur and claws feel like. Consideration of the perceptual systems forces a reassessment of the bottom-to-top dimension of linguistic structure. At the 'bottom' of linguistic structure are the separate interfaces with the world for speech perception and phonetic articulation. These are at the lowest level of the linguistic structure. There are also interfaces with the world for the various perceptual modalities, e.g., the retina of the eye; and just as there are higher (more abstract) levels of linguistic structure, so also there are higher levels of the perceptual systems. Concepts integrate the linguistic structure with the perceptual systems, and are

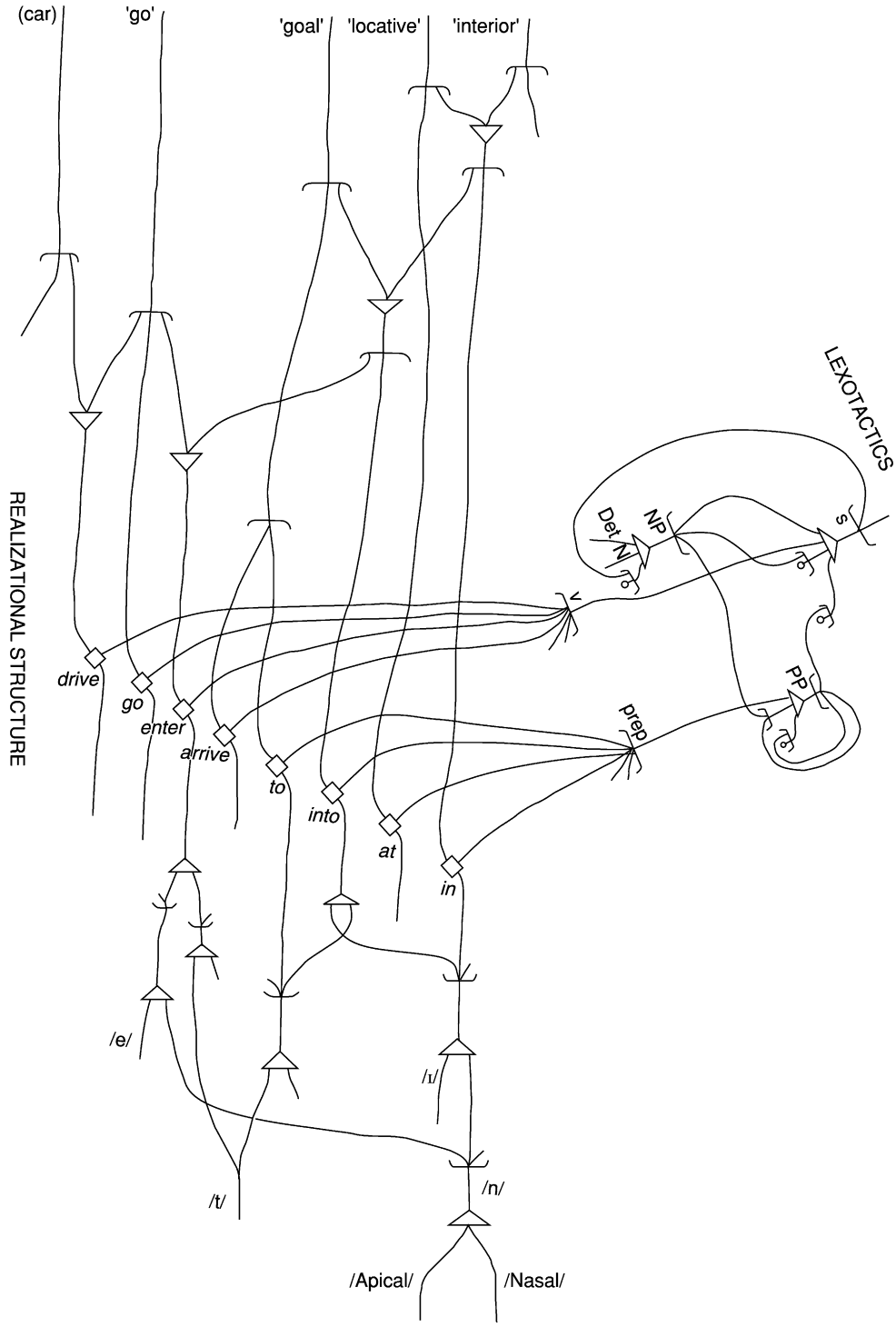

Figure 4 Integrating a fragment of lexotactics with some realizational structure.

therefore at the top of each – in which case the whole cognitive structure may be thought of as forming an arch (Lamb, 1999: 121–125).

A 'nection' (formed from the word 'connection,' and described as the "first significant level of organization above that of the elementary relations" [Lamb, 1984: 76]) is a configuration of lines and nodes with one line – called the 'nection center' – connecting the singular side of one node to the singular side of another node. (For a more technical definition, see Lamb, 1999: 72–77.) It branches in two directions and, in the realizational structure, has a content-oriented side and an expression-oriented side. (The same is true, in fact, of nections in tactic

patterns – see 'Complex Lexemes, Constructions, and Syntax' below.) As examples of nections we may consider one configuration of nodes and lines from near the bottom of Figure 4 and another from near the top. Near the bottom there is a nection corresponding to the phoneme /n/. The unordered downward AND below the nection center shows the composition of this phoneme as a particular bundle of phonological components; and the unordered upward OR above the nection center has connections on its (upper) plural side corresponding to occurrences of the phoneme /n/ in particular morphemes. Near the top of Figure 4 there is an unordered upward AND from which lines travel upwards towards the sememes 'locative' and 'interior'; and the line on the singular (= lower) side of this upward AND connects also to the singular (= upper) side of an ordered downward OR. One line from the plural side of this OR node represents the default realization of the combination of sememes in question – as the lexeme *in*. The other line leads towards nections corresponding to semantically more complex lexemes such as *into* and *enter*.

Nections are the relational or cognitive units corresponding to Saussure's 'signs' (Lamb, 1987, 2004: 415–424) – but with the proviso that, rather than there being just a single level of signs, linguistic structure is made up of a whole hierarchy of signlike relationships, in which the content side of the lower-level nections involves connections upwards towards conceptual structure rather than meaning as such.

Complex Lexemes, Constructions and Syntax

Besides the independently existing lexemes *happy* and *-ness*, the lexicon of a typical speaker will also contain a higher nection for the complex lexeme *happiness*: "any two things that occur consistently together are likely to become associated" (Lamb, 1999: 271). Moreover, "it is repeated use rather than degree of idiomaticity that determines presence or absence of a higher-level lexical nection" (Lamb, 1999: 165). Admittedly, many complex lexemes are idiomatic to a greater or lesser degree, e.g., *kick the bucket*, *at the end of the day*; however, many complex lexemes are nonidiomatic fixed expressions. Some complex lexemes are also quite complex syntactically, e.g.: *no laughing matter*; *the truth of the matter is…*; *take…for granted*; *If it ain't broken, don't fix it*. Occasionally a complex lexeme comes into existence on the basis of relatively few occurrences if it attracts enough attention, e.g., *the mother of all battles* (the English translation of something said in Arabic by Saddam Hussein). Such an expression may then be the model for parallel expressions, as when a pilot who witnessed a particular meteor described it as *the mother of all meteors* – at which point we are dealing with a "mutable lexeme" (Lamb, 1999: 264–265): *the mother of all* <THING>*s*, i.e., a complex lexeme that contains a variable constituent. Other mutable lexemes may contain two or more variables, e.g., *you don't have to be a* <X> *to* <Y> *that* <ASSERTION> (where *brain surgeon* and *understand* would be obvious values for X and Y). The limiting case is that of a construction in which all the constituents are variable, e.g., the 'caused motion' construction illustrated by *Frank sneezed the tissue off the table* (Goldberg, 1995: 152–79), where it is the schema of the construction as a whole that conveys the 'caused motion' interpretation.

Construction grammar (e.g., Goldberg, 1995; Kay and Fillmore, 1999) has provided detailed analyses of a wide range of constructions, and has shown which syntactic and semantic properties of an idiomatic construction are peculiar to that construction, and which properties are contributed by more general constructions of core grammar. By contrast, RNG has had relatively little to say about constructions. However, the notion of constructions fits naturally into the RNG framework. In a relatively early discussion of language as a system of signs, Lamb (1984: 80–85) advocated general recognition of constructional meanings and posited connections towards conceptual structure in both the realizational structure and tactic patterns. More recently, Lamb (2004: 298–317) discussed the role of constructions in the child's acquisition of syntax and concluded, *inter alia*, that syntactic knowledge is associated with individual lexical items (rather than general categories) and is widely distributed, among thousands of separate items.

Whereas Lamb (1984: 80–85) used unordered upward AND nodes in indicating the constructional meanings of particular tactic configurations, Figure 5 uses a DIAMOND node – for easier comparison with the nections for lexemes that feature in Figure 4. The DIAMOND nodes in Figure 4 are all located at the bottom of the lexotactics, on lines corresponding to individual lexemes such as *enter*, *arrive*, *to*. The nodes in question have connections at top left (towards conceptual structure), at bottom right (towards phonology and phonetics), and at top right (into the lexotactics). As an example of a tactic nection we may consider the NP nection from Figure 4. This consists of the configuration of nodes and lines which shows the (highly simplified) internal structure of a NP together with the alternative functions it fulfils within the lexotactics. Assuming that some part of the meaning of a NP comes from the construction

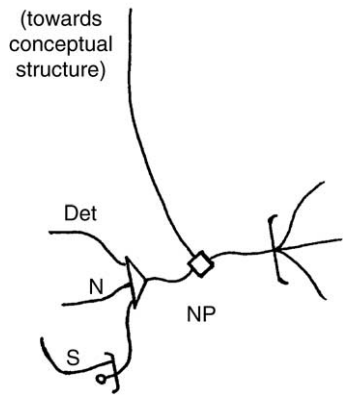

Figure 5 The NP connection in the lexotactics.

as a whole rather than its internal constituents, its connection towards conceptual structure can be shown as in Figure 5. The DIAMOND in question has a connection at top left (towards conceptual structure) and at top right and bottom left to higher and lower in the tactics. There is a connection at bottom left rather than bottom right, because the meaning in question is realized as the NP construction rather than as an individual lexeme with a particular phonological representation. Such DIAMOND connections may be situated at any appropriate place in a tactics, even at the top if the largest construction specified by the tactics has its own constructional meaning.

Operational, Developmental and Neurological Plausibility

Operational Plausibility

The information in a linguistic system is crucially utilized in the processes of speech production and comprehension; and a major advantage of RNG is that it represents linguistic knowledge in a form in which it can be directly operated on. This involves the activation of the network by signals, which (broadly speaking) travel downwards for production and upwards for comprehension. Various kinds of linguistic evidence provide insights into necessary properties of the signaling. Lamb listed 13 (2004: 331–335), of which three will be briefly mentioned here: slips of the tongue, prototype effects, and an example of "on-line cognitive processing in conversation."

Dell and Reich (1980) summarized what is known about slips of the tongue from extensive analysis of data; and then discussed the findings of their RNG computer simulation of how slips might arise in the speech production process. The simulation replicated the major varieties of slips found empirically and their relative frequencies, e.g., that anticipation errors outnumber perseveration errors. It also mirrored the interaction between the 'lexical editing effect' and speaking rate. Specifically, errors resulting in words outnumbered errors resulting in nonwords at the slowest speaking rate, but at the fastest speaking rate errors resulting in nonwords were much more frequent. The simulation used a range of values of 'activation' in the network and allowed some proportion of the signal at a given node to spread to all neighboring nodes (both above and below the node in question) at each successive time step. At the slower speaking rates, such 'spreading activation' reverberates between word nodes and their constituent phoneme nodes, making the sequence of phonemes in question more likely to occur in the output. By contrast, the activation of a sequence of phonemes that lacks a corresponding word node tends to die away over time and such a sequence is therefore less likely to occur in the output. At the faster speaking rates, there is less time for such reverberation to take place, and consequently less time to edit out nonword strings of phonemes. Another important feature of the model is the notion of 'competition': wherever at some point in the production process two or more items are competing to occur, the one with the higher or highest level of activation is chosen. Finally, the model suggested a number of testable predictions.

Nections for concepts, e.g., the concept 'cup,' are connected to nections representing their individual properties. In production (as opposed to comprehension), the concept 'cup' is activated, and the lexeme *cup* may be used, if enough of the more important properties of cups are present in the speaker's situational context. In this case the activation of the nection for the concept 'cup' exceeds its threshold value. The set of properties of cups, and their relative importance, varies to some extent from speaker to speaker, since people may have had different experience with cups – e.g., some speakers may not have encountered Japanese handleless porcelain cups. Shape and function are in general very important, i.e., cups taper towards the bottom and are typically used for drinking. 'Having a handle' is characteristic – though, quite apart from the Japanese cups mentioned above, there is a correlation between 'having a handle' and material, in that plastic cups from a drinks machine do not have a handle. It is assumed that all such information is represented in the cognitive networks of individual speakers. Moreover, connections for individual properties are of varying strengths depending on their relative importance (Lamb, 1999: 208); and "those properties which are most often experienced in connection with a category will become ever more salient" (1999: 226). This is because "the pathways of the brain are like pathways through a meadow or field or jungle – the more they

are used the easier they become to use again" (1999: 179). This means that the network automatically accounts for prototypicality phenomena without any additional theoretical equipment (1999: 226). It responds more strongly and rapidly to prototypical members of a category than peripheral ones, because they activate the most and the strongest connections to properties.

Example (9), reported by Lederer (1987), is an actual courtroom exchange:

(9) Attorney: *Mrs. Jones, is your appearance here this morning pursuant to a deposition notice which I sent to your attorney?*
Witness: *No. This is how I dress when I go to work.*

Summarizing Lamb's (1999: 202–203, 2004: 334–335) discussion of (9), the important details are that (a) *appearance* is ambiguous and (b) the witness chooses the wrong sense, because (c) she was probably already concerned about how she looks and (d) the phrase *pursuant to a deposition notice*, being no doubt unfamiliar to her, probably did not generate much activity in her conceptual system.

The above three kinds of evidence suggest that the signaling system needs: (i) to make use of spreading activation and the notion of competition (which in turn imply different degrees of activation); (ii) to operate with connections of different strengths and threshold values that nodes need to reach before they "fire"; and (iii) to allow linguistic processing to be affected by (weak) signals representing a speaker's general beliefs and concerns. This last factor is involved also in so-called Freudian slips (Dell and Reich, 1980: 23) and in 'unintended puns' (Reich, 1985).

In addition, definitions need to be provided for the various kinds of node that feature in the networks of Figures 2–5, so that signaling passes through the network in the appropriate way. Lamb's (1999: 77–83, 97–102, 134–136, 249–251) general approach involves replacing the earlier notation (which is now referred to as 'compact notation') by a more precise and explicit 'narrow notation,' designed to reveal the internal structure of nodes. Figure 6 provides a very simple example of a nection using compact notation and the corresponding two nections in narrow notation. Compact notation was always regarded as bidirectional. However, the nection in part (**A**) of Figure 6 needs to behave differently in the downward and upward directions; and this fact is made explicit in (**B**) and (**C**), where (**B**) is for 'downwards' and (**C**) for 'upwards.' The two types of nodes occurring in the narrow notation of Figure 6 (**B**) and (**C**) are referred to as the 'branching node,' drawn as a tiny solid circle, and the 'junction,' drawn as a larger hollow circle. In both directions, for this example, signals enter the

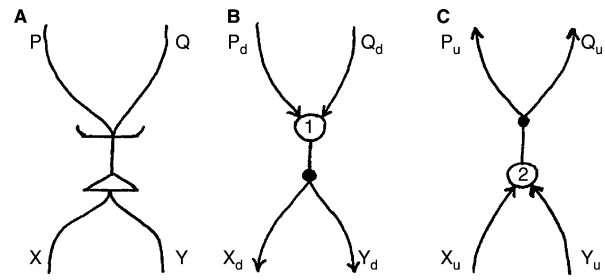

Figure 6 (**A**) A simple nection in compact network notation. (**B** and **C**) The corresponding downward and upward nections in narrow notation.

nection via a junction and leave via a branching node. The branching node of Figure 6 (**B**) behaves in the same way as that of (**C**), sending out activation along all the available lines – despite the fact that the one in (**B**) corresponds to an AND in (**A**) whereas the one in (**C**) corresponds to an OR. When activation travels through an OR node from the singular to the plural side, it behaves like an AND node, because at the OR itself there is no way for it to know which line to take, the choice between the alternatives being determined further along (Lamb, 1999: 68–69).

The earlier discussion of the concept 'cup,' and concepts generally, invoked the notion of a 'threshold node.' For a concept to 'fire,' in the production direction, enough of its properties need to be activated. The node is a compromise between an AND and an OR, in that it allows some combination of properties to be present but does not require them all to be present (Lamb, 1999: 153–156). In the narrow notation, the AND and OR nodes of the compact notation are treated, in the plural-to-singular direction, as special cases of the threshold node and represented as a junction with a particular threshold value – 1 for the OR, and for the AND a value equal to the number of lines on the plural side of the node. In Figure 6(**B**), as soon as activation reaches the junction along **one** of the lines 'P_d' or 'Q_d,' it continues on downwards to the branching node leading to 'X_d' and 'Y_d.' In Figure 6(**C**), on the other hand, activation has to reach the junction along **both** 'X_u' **and** 'Y_u' before it may proceed upwards to the branching node leading to 'P_u' and 'Q_u.'

Other nodes are rather more complex than those of Figure 6(**A**). One proposal for the ordered OR involves using an 'inhibitory connection' to block the default line when the conditions for the precedence line are activated (Lamb, 1999: 80–81). Ordered AND nodes need to specify sequencing of constituents, which requires keeping activation alive for a while and then turning it off. Coming up with proposals that work is by no means trivial – see Lamb (1999: 97–101, 135–136, 249–251).

Developmental Plausibility

The 'operational' vs. 'developmental' distinction is broadly equivalent to 'using' vs. 'building' a relational network. However, the comprehension process involves not just recognizing lower-level linguistic nections but also adding structure to the listener's cognitive network by way of integrating newly acquired information into the existing body of knowledge (Lamb, 1999: 196–199, 2004: 277–297).

RNG assumes that the network of the linguistic system starts out containing a vast number of latent nections, each of which has a large number of latent connections to other nections (Lamb, 1999: 321–322). Learning consists in recruiting nections for particular functions by strengthening a subset of their connections to other nections. Many of the connections that get established in this way are local within a particular part of the linguistic system. However, long-distance connections are also needed in, say, the recruitment of a nection for integrating particular conceptual and perceptual information (1999: 176–179).

Neurological Plausibility

RNG's view of language as a relational network is compatible with the neural network structure of the cerebral cortex. Secondly, the learning hypothesis in 'Developmental Plausibility' above is compatible with the fact that no new neurons are formed in the human brain after birth (Lamb, 1999: 322). Thirdly, the fact that phonological production is controlled from Broca's area of the brain, whereas phonological perception is located in Wernicke's area, suggests that there are separate phonological systems for production and perception. In general, though, previously determined properties of linguistic data have suggested predictions about the brain, rather than that properties of the brain were built into RNG from the outset. Areas of convergence between RNG and neuroscience include: unidirectional signaling, thresholds, inhibitory (as well as excitatory) activation, and degrees of activation. As for nection–brain correspondences, Lamb has hypothesized that a nection might correspond to a bundle of several cortical 'minicolumns' (2004: 322). As further advances take place in neuroscience, aided by improvements in brain-imaging techniques, RNG hopes to remain at the forefront of cooperation between the two fields.

See also: Construction Grammar; Glossematics; Hjelmslev, Louis Trolle (1899–1965); Post-Bloomfieldians.

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Relations and Functions

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Functions and other relational notions play a role in linguistic theory at various levels of grammatical organization.

In many linguistic theories (e.g., Relational Grammar, Systemic Grammar, Functional Grammar, Lexical-Functional Grammar, and Word Grammar), a grammatical description of a sentence distinguishes between a constituent's form (its syntactic category) and its syntactic function, such as SUBJECT or OBJECT. The grammatical function of a constituent classifies it in terms of its relation to other elements and determines various aspects of its syntactic behavior, such as the position that it occupies and whether it enters into syntactic processes such as agreement, passivization, and reflexivization. For example, in English, the constituent that functions as the SUBJECT of a sentence typically precedes the verb and – in a tensed clause – agrees with it.

The syntactic functions of a constituent must be distinguished from its semantic function, which defines the participant role (such as Agent, Theme, Patient, Source, or Goal) that it plays in the state of affairs expressed by the sentence. Thus, in both (1) and (2), the constituent *John* has the semantic function of Patient. But in (1) it is the OBJECT of the sentence (realized postverbally), while in its passive counterpart (2) it is the SUBJECT (and hence realized preverbally).

(1) Susan fired John.

(2) John was fired (by Susan).

Indeed, in a theory based on grammatical functions, processes such as passivization or reflexivization make direct reference to functions. In Lexical Functional Grammar, for example, passivization involves a remapping between participant roles and grammatical functions: while in active sentences the Agent is mapped to the syntactic function of SUBJECT and the Patient to that of OBJECT, the latter participant role is mapped to the syntactic function of SUBJECT in the passive voice (while the Agent either remains unexpressed or is mapped to an oblique form – a *by*-phrase in English). When the Patient role is mapped to the SUBJECT function, it shows up in the canonical position for SUBJECTS, as shown in (2).

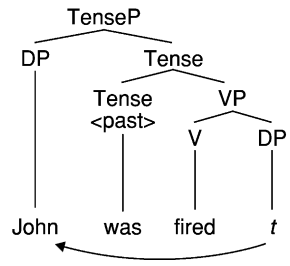

Figure 1 Movement.

By contrast, in a theory of grammar that lacks grammatical functions or similar relational concepts, such as Government and Binding theory, the participant role of Patient is mapped to the same structural position in both (1) and its passive variant in (2). This implies that *John* in (2) originates as the complement of the verb and undergoes movement to the position occupied by *Susan* in (1), as in Figure 1.

There is also a more technical, mathematical interpretation of 'function' and 'relation' that plays a role in formal semantics. A mathematical relation maps elements of one set to elements of another. A relation may be one-to-one (e.g., plus–1), many-to-one (e.g., born-of) or one-to-many (e.g., mother-of). A mathematical function is a restricted kind of relation that is either one-to-one or many-to-one, but not one-to-many.

See also: Binding Theory; Lexical Functional Grammar; Systemic Theory; Transformational Grammar: Evolution.

Relative Clauses

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Definition

The relative clause (RC) can be defined as a modifying clause. The following semantic types of clausal modification are usually distinguished. The so-called restrictive RCs modify a nominal whose semantic function consists in establishing a set of entities referred to as the domain of relativization (Keenan and Comrie, 1977; Keenan, 1985). The RC identifies a certain subset of this domain. For example, in (1)

(1) the dog [(that/which) you saw] belongs to John

the domain of relativization is established by the modified noun *the dog*, whereas the RC indicated here with square brackets restricts this semantic

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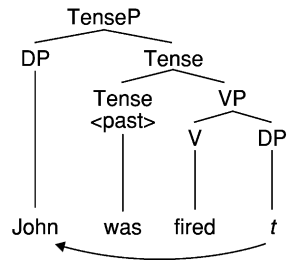

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the domain of relativization is established by the modified noun *the dog*, whereas the RC indicated here with square brackets restricts this semantic

domain by specifying which dog is meant. Since the restrictive RC narrows the concept associated with the modified noun, it serves the purpose of identifying the entity.

By contrast, nonrestrictive (or appositive) RCs do not serve for identification and do not restrict the reference of the nominal they modify. An example is (2).

(2) John, [who is a good teacher], got a new job

In (2) the speaker assumes that the addressee can identify the referent of the modified noun *John*. The purpose of the RC is to provide further background information about an entity whose reference is independently established.

Restrictive RCs are crosslinguistically more common than nonrestrictive ones: there are no languages with only nonrestrictive RCs, but the reverse is not true. Most languages do not show significant distinctions in the surface expression of restrictive and nonrestrictive headed relatives, although they may differ prosodically: nonrestrictives normally involve an intonational break, as is also typical of appositions and parentheticals. In English nonrestrictives, unlike restrictives, do not allow the complementizer *that* or a zero complementizer, may not stack or attach to certain quantified heads, and differ with respect to the licensing of negative polarity items. In some languages, restrictive and nonrestrictive clauses have a consistently different surface structure. For example, in Persian the suffix-*i* can only be hosted by the head of a restrictive relative. In Somali the nonrestrictive clause is preceded by the conjunction *oo*, whereas the restrictive clause is not.

Some authors (Carlson, 1977; Grosu, 1994; Grosu and Landman, 1998) additionally distinguish a third semantic type of RC, amount or degree relatives, exemplified in (3).

(3) we will never be able to recruit the soldiers [that the Chinese paraded last May]

The RC in (3) is said to contain a phonetically null element designating a quantity or amount, so that the clause can be paraphrased as *as many soldiers as the Chinese paraded last May.* At least in English, degree relatives show restrictions in the determiners and relativizers that combine with them, and differ from restrictives in their stacking possibilities.

The definition of the RC given above is essentially functional. From a syntactic viewpoint, the prototypical RC construction consists of a head and a modifying part. The referent of the head is involved in the situations expressed both by the main clause (*The dog belongs to John* in (1)) and by the modifying clause. Restrictive RCs are headed by common nouns, whereas nonrestrictive RCs can modify personal pronouns and proper nouns, see (2). By contrast, nonrestrictives are generally unavailable for nominals combined with negative and indefinite determiners.

Certain types of clauses functionally comparable to prototypical RCs may not have an obvious syntactic head. Depending on one's analysis, they are either headless or contain a phonologically empty head (see below). Some examples of apparently headless relatives are provided in (4).

(4a) [whatever you say] is wrong
(4b) he arrived late, [which I didn't like]

Such clauses serve for concept formation rather than identification and are referred to as free relatives. The domain of relativization is the class of objects of which it makes sense to assert the RC. With respect to their external syntax, free relatives fulfil a number of syntactic functions, not necessarily limited to modifying a noun. Example (4b) shows that the domain of modification may correspond to the whole clause (*he arrived late*).

Although the modifying part of the relative construction expresses a proposition, it does not necessarily have a clausal status, so in this sense the term 'relative clause' may be misleading. In a large number of languages, RCs are structurally deranked in that they do not fully resemble main/independent clauses and demonstrate some degree of nominalization. In particular, participial constructions in European languages such as *the book written by me* conform to the functional definition of the RC but are not clauses from a syntactic viewpoint. Some languages have no clear distinction between RCs and attributive modification, so that RCs and what can be referred to as adjectives show identical patterns.

All or most languages exhibit RCs of some kind. Possible exceptions are provided by languages such as Walbiri, which has a fairly general subordinating construction that allows several readings. When it contains an argument coreferential to a noun in the main clause, it can modify this noun, but it also expresses adverbial subordination, e.g.,

(5) ŋatʲlu-ɭu-ɳa yankiri pantuɳu
I-ERG-AUX emu speared
[kutʲa-lpa ŋapa ŋaɳu]
CONJ-AUX water drank
(a) 'I speared the emu that was drinking water.'
(b) 'I speared the emu while it was drinking water.'

In other words, there is no clausal construction the sole semantic purpose of which would consist in modification.

Typology

RCs exhibit remarkable structural diversity across languages and have played a prominent role in linguistic typology. The crosslinguistic taxonomy of RCs is based on three commonly accepted diagnostic criteria used for classification.

First, RCs are classified according to the syntactic relationship between the RC and its semantic head. A RC that does not form a syntactic constituent with the modified nominal is adjoined to the main clause. For example, if the Walbiri sentence (5) in the reading (5a) is to be analysed as a RC, the semantic head 'emu' and the RC do not form a larger NP. Instead the clauses are only loosely joined together. The common type of adjoined RCs are the so-called cor(r)relative constructions where the modified noun is represented as a full noun phrase both inside and outside the RC, as in the following example from Hindi.

(6) [jis a:dmi ka kutta bema:r hai],
CORELATIVE man GEN dog sick is
us a:dmi ko mai ne dekha
that man OBJ I ERG saw
'I saw the man whose dog is sick (lit. Which man's dog is sick, that man I saw)'

In (6) the noun that determines the domain of relativization ('man') is present inside the RC accompanied by the correlative marker *jis*. At the same time, it is referred to by a full anaphoric NP in the main clause.

If a RC forms a constituent with the modified nominal, it is syntactically embedded. Embedded RCs are by far the most frequent type and are divided into externally headed and internally headed. In externally headed clauses the modified noun is located outside the RC and forms a larger NP with it. If the RC follows the external head as in (1), the respective clause is called postnominal. If the RC precedes the external head, it is prenominal. The prenominal RC is illustrated by the following Finnish example.

(7) [minun teke-mä-ni] villatakki
I.GEN make-PART–1SG sweater
'the sweater (that) I made'

As has been shown in a number of typological works (Greenberg, 1963; Mallison and Blake, 1981; Keenan, 1985; Dryer, 1991), the position of the RC with respect to its external head largely correlates with the basic word order patterns of the language. Generally speaking, verb-initial and verb-final languages favor postnominal and prenominal RCs, respectively. Verb-medial SVO languages are more similar to verb-initial than to verb-final languages, as far as RCs are concerned: they prefer postnominal relatives. Thus, as already noticed by Keenan (1985: 143–144), there is a general crosslinguistic tendency in favor of postnominal RCs over the prenominal ones. In fact, in Dryer's (1991) material prenominal RCs are less common even in verb-final languages. There are various explanations of these patterns of word order in the typological literature, mainly referring to processing considerations (e.g., Kuno, 1974; Mallison and Blake, 1981; Dryer, 1992).

Internally headed RCs are found in such (predominantly verb-final) languages as Hittite and Bambara, as well as in Indic, Tungus, Hokan and Quechuan languages. In internally headed RCs, the modified noun is located inside the RC itself. Consider (8) from Udihe.

(8) si anda-i ŋene:-ni
you friend-2SG went-3SG
[bi ag'a-i xoton-du bagdi:-tigi-ni]
Ibrother–1SG city-LOC living-LATIVE-3SG
'Your friend went to the city where my brother lives.'

In (8) the semantically modified noun is 'the city.' It is located within the RC shown in brackets and hosts the Locative case marker indicating its syntactic role in the clause. As in other languages with internal relatives, there is evidence that the RC is actually a NP: in (8) the verb of the RC is nominalized and takes the Lative case which expresses the syntactic relation between the modified noun and the main clause.

The second common criterion of classification concerns the so-called grammatical function recoverability strategy, i.e., the indication of the modified noun in the RC. Four basic strategies are nonreduction, pronoun retention, relative pronouns, and gapping. Nonreduction involves a full NP which appears in the RC in its regular position and with the regular syntactic marking. This strategy is typical of internally headed RCs and exemplified in (8). In contrast, in externally-headed RCs the modified noun appears in a somehow reduced form.

Pronoun retention involves the use of a personal pronoun (sometimes called a resumptive pronoun in this function) inside the RC. The pronoun is coreferential with the head nominal and is syntactically marked to reflect the role of the head nominal in the RC, as in (9) from Gilbertese.

(9) [te mane are oro-ia] te aine
the man that hit-him the woman
'the man whom the woman hit'

This type sporadically occurs in non-standard English, e.g., *this is the road that I know where it leads*.

In the relative pronoun strategy the modified noun is represented in the RC by means of special pronouns, which are normally related to demonstratives and/or interrogatives. In (1) the relative pronoun *that* represents the external head *the dog*. This strategy is typical of most European languages but quite infrequent crosslinguistically. Unlike resumptive pronouns, which largely appear in the position the respective NP would occupy in the clause, relative pronouns have a distinct position of their own. There is a strong tendency for them to be located at the left periphery of the RC, although Keenan (1985: 151) points out that in a Bantu language Luganda they are prefixed to the clause-final verb. Relative pronouns are typically case-marked to encode the role of the head noun in the RC and may agree with the head noun in such features as number and gender. Case agreement – although very infrequent – is also attested in some languages.

The gapping strategy exemplified in (7) is the least explicit, as the head noun corresponds to a syntactic gap within the RC. This type is very widespread in the languages of the world. As there is no overt encoding of the role the head noun plays within the RC, the interpretation of the RC must rely on semantic and pragmatic clues, at least in languages in which the word order is relatively free. Example (7) can be understood unambiguously because the RC verb 'make' has the obligatory patient argument and it is not expressed within the RC itself. So the meaning of the syntactic gap can be recovered. But consider the following example from Khanty

(10) a:sʲe:-m joxt-əm xatl
father–1SG arrive-PART day
'the day when my father arrived'

In (10) the relativized noun is not an argument of the RC verb, so for the interpretation of the RC one must appeal to a general knowledge of the world: the most likely relation between the event of somebody's arriving and a day is temporal. In some cases the gapped RC may remain ambiguous, as in (11) from Imbabura Quechua.

(11) kan ʃamu-ʃka llajta-ka
you come-NOM town-TOP
'the town you are coming to/from'

The third parameter of classification is related to the syntactic status of the relativized noun within the RC. Keenan and Comrie (1977) have shown that a language can have several relativization strategies and their distribution is not random. They suggest the following now widely accepted hierarchy of grammatical functions, referred to as the Accessibility Hierarchy. The sign '>' here means 'is more accessible to relativization.'

(12) subject > direct object > indirect object > oblique argument > possessor > object of comparison

The first claim is that each relativization strategy covers a continuous segment on the hierarchy as a target of relativization. For example, there may be a language where one strategy is used to relativize subjects and direct objects, whereas another strategy is used to relativize the indirect object, oblique, possessor, and object of comparison. In fact, English is exactly such a language: the relative pronoun *who* serves to relativize subjects and direct objects, while for the relativization of lower positions on the hierarchy the relative pronoun has to combine with a preposition or take the oblique form *whose*. However, no language is predicted to use one strategy to relativize, for example, subjects and obliques, and another strategy to relativize direct objects and possessors. The second claim is that accessibility to relativization is progressively higher on the left periphery of the hierarchy. If a language can relativize a given position on the hierarchy, then it can relativize all positions to the left. All languages – or at least all languages that have RCs – have a strategy to relativize subjects. Many languages relativize only subjects and direct objects, for instance Kinyarwanda, whereas others, such as Tamil, relativize the three highest grammatical functions. The further one descends the hierarchy, the harder it is to relativize; the object of comparison being the least accessible function. Thus, in French and German all grammatical relations are relativizable, excluding the object of comparison.

Although subsequent work has demonstrated that hierarchy (12) may be refined in various ways (Maxwell, 1979; Lehmann, 1986), and that it seems to have exceptions (as also was acknowledged in the original proposal) in their essence Keenan and Comrie's conclusions remain largely unchallenged.

The three parameters of classification discussed above are not independent but exhibit systematic crosslinguistic correlations. First, the position of the RC with respect to the head correlates with accessibility to relativization. Adjoined RCs (and to a lesser extent internal RCs) typically allow relativization of the largest range of syntactic functions. Prenominal RCs are normally more constrained in their application than postnominal RCs: they relativize fewer grammatical functions and these are located on the left periphery of the hierarchy. Second, the strategy to represent the modified noun within the RC interacts with the position of the

clause. There is a significant quantitative difference between prenominal and postnominal RCs with respect to the pronominal representative of the modified noun within the clause. Postnominal RCs exhibit greater diversity and typically use either resumptive pronouns or relative pronouns. In fact, these strategies are mainly confined to postnominal RCs (Keenan, 1985: 151). In prenominal RCs pronouns representing the head noun are fairly rare, although not impossible, the most frequent strategy being gapping. In a similar manner, the recoverability strategy interacts with accessibility to relativization. When a language exhibits both pronoun retention and gapping, there is a great likelihood that the former is used lower down the hierarchy. Languages in which pronominal strategies are applied to subjects when gapping is applied to lower grammatical relations are not attested.

Various explanations have been provided for these correlations. Comrie (1989: 163) suggests a general functional principle that the more difficult a position is to relativize, the more explicit expression it needs for a successful recovery of information. The three reduced strategies of representing the head noun within the RCs can be ranked in the following way (cf. Song, 2001: 227).

(13) gapping > relative pronoun > pronoun retention

The sign '>' here means 'is less explicit than.' The lower grammatical relations are less accessible to relativization, so more information is required for the processing of the RC. Hierarchy in (13) predicts that pronoun retention is favored in this instance. In contrast, relativization of a higher grammatical relation need not be explicit and therefore allows gapping. An additional consideration is that pronoun retention and relative pronouns in prenominal RCs involve backward anaphora, i.e., an anaphoric pronoun preceding the coreferential NP. Backward anaphora is heavily constrained for processing reasons; therefore, pronominalization is dispreferred in prenominal RCs.

By contrast, Lehmann (1984, 1986) argues that the patterns described above are explainable by the notion of nominalization (desententialization). Nominalization is the reduction of sentential properties and acquisition of nominal properties that may characterise a dependent clause to a greater or lesser degree. It correlates inversely with the achievement on the Accessibility Hierarchy and with the representation of the head noun within the RC. The more strongly the RC is nominalized, the fewer grammatical functions it can relativize and the less likely it will allow the full representation of the head noun. Adjoined RCs are not syntactically embedded and show no signs of nominalization: they do not involve nonfinite verbs and do not exhibit word order patterns characteristic of subordinate clauses. This type is also the most explicit in that the relativized noun is not marked in any distinctive way to indicate its status as the head of the RC: it is represented by a full NP and takes the regular grammatical form. In contrast, prenominal RCs tend to be strongly nominalized: they make use of various nonfinite forms that show tense-aspect-mood and agreement reduction and exhibit some similarity to simple attributes, such as the participle in the Finnish example (7). The representation of the modified noun reduces to a gap. Such clauses are typically used to relativize higher grammatical relations, for example, the subject and the direct object in Finnish. Finally, postnominal and internal RCs tend to show intermediate degrees of nominalization across languages.

Some Theoretical Issues

The variety of RC types addressed in the previous section raises the following question: is there such a notion as a universal relative construction in Universal Grammar and if so, what are its properties? There are two competing approaches to the analysis of RCs in the theoretical literature on syntax, which differ according to their view on where in the structure the modified nominal originates and what its syntactic relation is to the RC.

In the more standard account, the RC is adjoined to the higher projection of the modified nominal (e.g., Jackendoff, 1977: 169ff.; Chomsky, 1977, 1981). For example, the RC in (1) corresponds to the following structure:

(14) $[_{DP}$ the $[_{NP}$ $[_{NP}$dog$_j$] $[_{CP}$ that you saw t_j]]]

The head of the relative is base-generated outside the RC and may be linked to the RC-internal relative phrase through some kind of interpretive mechanism (Chomsky, 1977; Safir, 1986). The RC is taken to be projected from a relative complementizer, which may be overt, as in (14), or covert. In the absence of a complementizer or a relative phrase the clause contains a null operator, i.e., an empty version of the overt relative pronoun. In theories that do not allow for null elements, the RC is projected from the highest verb (e.g., Sag, 1997).

The semantic difference between restrictive and nonrestrictive clauses is said to be reflected in the syntactic configuration. Because a restrictive RC is interpreted within the scope of the determiner and the c-command relation is usually thought to reflect the semantic scope, the restrictive RC is analysed as

adjoined to NP, as in (14). By contrast, nonrestrictive RCs are not interpreted within the scope of the determiner and are placed higher than restrictives, namely, in the determiner phrase (DP). However, there also are suggestions in the literature (e.g., Fabb, 1990; Grosu and Landman, 1998) that nonrestrictives do not form a constituent with the head and are not syntactically integrated into the host sentence. They are similar to parentheticals in that the relation between the head and the RC holds at the level of discourse and is usually signaled by intonational concord.

The position of the relative with respect to its external head is determined by the parametric variations in adjunction sites: left or right adjunction. An alternative proposal by Fukui and Takano (1998) is based on the assumption that only left-adjunction is allowed in the grammar. The ordering between a RC and its external head is due to the absence or presence of the determiner node D and the subsequent movement of N to D, which derives postnominal RCs. When D is not available and consequently N-to-D raising does not take place, the RC clause is head-final. These authors further attempt to provide a theoretical explanation for the typological observation that prenominal RCs disfavor relative pronouns: in such clauses a relative pronoun would not be c-commanded and properly bound by the external head.

The internally headed RCs are handled under adjunction analysis by means of various theory–internal mechanisms involving the external null head element at some point in the derivation. For example, Speas (1990) argues that in Navajo internally headed RCs the head is moved at Logical Form to the clause–external position, whereas Cole (1987) proposes that an internal RC is headed by a null pronominal coreferential with an internal head.

Under the alternative approach more recently developed in Kayne (1994), the RC is a syntactic complement of the determiner head of the DP rather than an adjunct. Given the binary branching hypothesis, the modified noun then cannot function as the complement of the determiner. Kayne proposes that it is generated internally to the RC from where it raises to the specifier of the respective CP, so (1) can be structurally represented as in (15).

(15) $[_{DP}$ the $[_{CP}$ $[_{DPj}$ dog] [that you saw t_j]]]

RCs with relative pronouns involve an additional raising of the modified nominal NP to the position of the specifier of the respective DP headed by a relative pronoun.

Evidence in support of the raising analysis mainly comes from two areas, the binding of variables and the interpretation of idioms. In (15) the modified nominal contains an anaphor that is bound by the embedded subject.

(16) the [[picture of himself]$_i$ that John saw t_i]

Because anaphors must be c-commanded by their antecedents, the well-formedness of (16) is expected if the raised head originates inside the RCs and is reconstructed in the trace position at some point of the derivation. Quantifier scope works in basically the same way. Thus, there is syntactic interaction between the subconstituents of the head nominal and the subconstituents of the RC. Furthermore, under the assumption that idioms form a constituent, idiom chunks must be interpreted internally to the RC.

(17) the [[headway]$_i$ that John made t_i]

In (17), the idiomatic reading of *headway* is only available if *headway* appears as a complement of the verb inside the RC.

The raising hypothesis appears fruitful in providing a unified approach to various relativization strategies not available under the adjunction analysis. On Kayne's suggestion, external and internal RCs are given essentially the same structure and differ only according to the overt/covert movement parameter: in internally headed RCs raising is covert. In a similar vein, the raising analysis assumes no major difference between restrictive relatives and free relatives, as free relatives are analysed as CP complements of a phonetically null determiner and are internally headed (cf. Groos and van Riemsdijk, 1981; Grosu, 1994). The distinction between restrictive and nonrestrictive relatives is reduced to different configurations at the level of the Logical Form. Bianchi (1999) also extends Kayne's raising proposal to account for correlative constructions.

However, raising analysis faces a number of further empirical questions (see its critique in Borsley, 1997, and a useful overview of relevant problems in Alexiadou *et al.,* 2000), so deciding between the two approaches is a difficult task. It is also conceivable that the variety of relative constructions cannot be captured by a uniform structure. Crosslinguistically RCs behave remarkably differently with respect to reconstruction effects and long-distance relations, which may argue for the existence of different strategies to derive relative constructions in Universal Grammar, whereas each specific language only chooses a subset of the available structures (cf. Bhatt, 2002; Sauerland, 2002).

RCs play an important role in more general theoretical discussions such as, for example, the nature of syntactic extractions and the locality of movement. Since the earliest days of generative grammar they provided evidence for the existence of the

so-called syntactic islands, i.e., structures that ban *wh*-movement. One of the islands formulated as the Complex NP Constraint prohibits extractions from clauses dominated by a NP, including RCs and NP-complements. This constraint, as well as other islands, follows from the more general Subjacency Condition introduced later in Chomsky (1981, 1986). It maintains that *wh*-movement operates in successive cycles and always lands in the closest Specifier of CP position. The movement cannot cross more than one blocking node such as DP or IP in English. For instance, in (18)

(18) *which country$_i$ did [$_{IP}$ he write [$_{DP}$ a book [$_{CP}$ which$_j$ [$_{IP}$ t$_j$ was about t_i]]]]

the movement of *which country* crosses at least a DP and an IP and so violates Subjacency. These insights were further developed in much subsequent work which relies on the basic idea that extractions must be local, cyclic, and sensitive to syntactic islands.

Another area where the analysis of RCs has proved to be of a more general importance is grammatical relations. Keenan and Comrie's Accessibility Hierarchy provides strong support both for the notion of subject and its privileged status in grammar as the highest point on the hierarchy. Evidence from the facts of relativization suggests that the notion of subject is applicable to languages in which the subject shows no strong association with particular semantic role(s). Languages such as Malagasy have heavy constraints on relativization: only subjects can be relativized. Relativization of oblique semantic relations is achieved by means of a rich voicing system, which serves to promote the respective argument to subject, so that relativization can apply. The existence of subject in languages with ergative alignments has been a matter of some controversy, but the relativization data rather shows that the notion of subject is associated with the absolutive, which corresponds to the single argument of intransitive verbs or the secondary argument of transitive verbs. This situation is attested in Dyirbal, so Keenan and Comrie (1977: 84–85) argue that in this language the subject relation encompasses absolutive arguments to the exclusion of the ergative primary arguments of transitive verbs. The latter can be relativized only after the original transitive clause is detransitivized via antipassivization.

Because in languages such as Kinyarwanda only subjects and direct objects are relativizable, Accessibility Hierarchy provides further evidence for the existence of lower grammatical relations. However, there are alternative suggestions concerning the nature of relativization. According to some authors, the most important condition is that the speakers must be able to infer a plausible relation between the head and the modifying clause (Comrie, 1998, 1999). In the following example from colloquial English

(19) a cake where you don't gain weight

no syntactic relation holds between the head noun and the RC. In other languages, for example Japanese or Basque, such RCs are regular, and it is not immediately obvious whether the extraction analysis would necessarily work for them. Because structural reasons do not seem to be sufficient to formulate relativization constraints, Matsumoto (1997) proposes an analysis of Japanese RCs based on the semantic frame that the predicate suggests. A similar problem is presented by languages where relativization of genitives/possessors is sensitive to semantico-pragmatic appropriateness, e.g., Chamorro and Tsez. In sum, it remains to be seen to what extent relativization patterns are explainable by purely syntactic constraints, formulated either in terms of grammatical relations or structural configurations, or whether they are more pragmatic in nature.

See also: Long-Distance Dependencies; Nominalization; Noun Phrases; Relative Clauses in Spoken Discourse.

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Relative Clauses in Spoken Discourse

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Introduction

This article focuses on relative clauses in unplanned spoken language. Unplanned speech is produced by speakers of standard and nonstandard varieties alike, and most of the relative clause types examined below are found in both standard and nonstandard English. In fact it may be impossible to establish a boundary between spoken standard and spoken nonstandard in English or any other language (see Comrie, 1999). The relative clause constructions that do belong to geographical nonstandard varieties will be clearly signaled.

Examples (1a–d) give very common types of relative clause in unplanned spoken English:

(1a) the book I read
(1b) the book I found the picture in
(1c) the book that I read
(1d) the book that I found the picture in

The relative clauses *I read* and *I found the picture in* are next to the head noun *book*, or linked to it by *that*. (1a, b) are contact relative clauses. Examples (2a–d) give the corresponding wh- relative clauses:

(2a) the book which I read
(2b) the book in which I found the picture
(2c) the book which I found the picture in

Which links the relative clause to the head noun. Prepositions either precede the wh- word, as in (2b), or are at the end of the clause, as in (2c). If the head noun is human, as in *the girl who helped me*, the wh-word is 'who.' In formal writing 'whom' is the form used if the wh- word is the object of a verb or preposition in the relative clause, e.g., *the girl whom I met*, *the girl to whom I lent that book*; 'whose' is used if the wh- word refers to a possessor: *the girl whose car I borrowed*.

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Which links the relative clause to the head noun. Prepositions either precede the wh- word, as in (2b), or are at the end of the clause, as in (2c). If the head noun is human, as in *the girl who helped me*, the wh-word is 'who.' In formal writing 'whom' is the form used if the wh- word is the object of a verb or preposition in the relative clause, e.g., *the girl whom I met*, *the girl to whom I lent that book*; 'whose' is used if the wh- word refers to a possessor: *the girl whose car I borrowed*.

(1a–d) are typical of unplanned speech; the construction in (2b) is almost absent from unplanned speech. Relative clauses with 'whom' and 'whose' are likewise absent. (2a, c) do occur in unplanned

speech, but rarely. Biber *et al.* (1999: 610) found that contact relative clauses were proportionately most common in conversation. Miller and Weinert (1998) found no relative clauses introduced by 'whom' or 'whose'; Biber *et al.* found a miniscule number of relative clauses with 'whom' and an even smaller number with 'whose.'

(1a–d) and (2a–c) exemplify integrated relative clause syntax. In (2) the wh- word overtly links the relative clauses to their head nouns; 'who,' 'whom,' and 'whose' signal the role of the wh- word in the relative clause. In (1c, d) *that* links the relative clauses to the nouns they modify but there is a second, covert, link: there is a gap in each relative clause which can be filled in with invented examples such as *the book I read which* and *the book I found the picture in which*. (1a, b) also have gaps; compare *the book I read it*.

Relative Clauses with Resumptive Pronouns

The above invented examples parallel a frequent construction in unplanned spoken English.

(3a) I'm one of these people that **I** don't like surprises [conversation]
(3b) it's something that I keep returning to **it** [radio discussion]

(3a, b) contain resumptive pronouns, shown in bold. Resumptive pronouns occur in simple relative clauses; in (3a) *I* is even the grammatical subject. Some analysts have suggested that resumptive pronouns offer a way of solving planning difficulties with syntax. This is true but it is not their *raison d'être*, as (3a, b) show.

Instead of 'whose,' unplanned speech typically has the ordinary possessive pronouns 'his,' 'her,' 'their,' etc., as in (4):

(4a) if you've got some eggs you're not sure about **their** age here's a useful test [cookery program on New Zealand television]
(4b) the man that **his** wife died [cited in Murray, 1873]

In formal writing (4a) would be *if you've got some eggs about whose age you're not sure here's a useful test*. This version is difficult to process; speakers have to construct a relative clause beginning with a complex prepositional phrase, *about whose age*, and listeners have to interpret it. (4a) introduces the eggs – *if you've got some eggs*; the next chunk has the word order of ordinary main clauses – *you're not sure about their age*. The listener merely has to pick up the reference of *their*. The shadow pronoun construction enables speakers to avoid complex relative clauses in which the relative pronoun is an oblique object or a possessive.

Relative Clauses with Subject Gaps

Let us return to (1a) and the missing object – see the invented example *the book I found the picture in which*. Where the missing piece is the subject of the relative clause, the construction is described as unacceptable: **the student came to see me yesterday was worried about the exam*. However, a number of spoken constructions do allow a subject gap, as in (5):

(5a) we had this French girl came to stay [conversation]
(5b) my friend's got a brother used to be in the school [conversation]
(5c) there's some of us look on the absence of planes with utter joy, old boy [Giles cartoon, London *Daily Express*, July 30, 1978]

(5a–c) were used to assert the existence of an entity – *this French girl*, *a brother*, *some of us*, but nonpresentational examples occur such as *the man lives there is a nice chap*, in which *lives there* is a relative clause with the subject missing. This example seems on the borderline between standard and nonstandard and it is not yet known how frequently the construction occurs or whether it is even counted in computer scans of digital corpora.

Relative Clauses Weakly Linked to Their Antecedent

Gaps and items such as 'that,' 'which,' 'who,' 'what,' and 'as' integrate the relative clause and the noun it modifies into a tightly organized noun phrase. In contrast, many examples of relative clauses in unplanned speech are very loosely integrated with the head noun. Examples are in (6).

(6a) you have a little keypad down here **which** you can use your mouse to click on the keys [university finance officer at seminar]
(6b) the tourists are sent to hostels **which** many of them are fire hazards [radio]
(6c) there are parkas **that** you can take the lining out and wear it on its own [quoted in the *New Zealand Herald*, October 25, 2003]

In (6a) the clause *you can use your mouse to click on the keys* provides information about the keyboard but, as will be shown below, there is doubt as to whether *which* is a relative pronoun. The clause *you can use* . . . is a complete clause; there are no gaps. (6b) has the same properties. In (6c) the clause *you can take the lining out and wear it on its own* provides information about a certain type of parka and *that* can be analyzed as a subordinating conjunction.

Examples such as (7) make it difficult to decide on the analysis of (6a, b).

(7) you can leave at Christmas if your birthday's in December to February which I think is wrong like my birthday's March and I have to stay on to May **which** when I'm 16 in March I could be looking for a job

When I'm 16 in March . . . does not modify a noun and is not a relative clause. *Which* in bold connects two pieces of discourse, the piece dealing with dates for leaving school and the piece about looking for a job. (6a) too can be seen as two pieces of discourse linked by *which*; that is, *you can use your mouse to click on the keys* is not a relative clause, and similarly for (6b). It is possible that in (6c) *that* is not a subordinate conjunction but a discourse linker. (The change from pronoun to conjunction is well attested in Indo-European.)

In contrast to the above examples, formal written language offers far more complex relative clauses. The examples in (8) illustrate the point.

(8a) the hospital admitted several patients that month, for all of whom chemotherapy was the appropriate treatment

(8b) we read several government reports the gold lettering on the covers of which was admired by all the officials

Finally, we refer to infinitival relative clauses. These can be simple, e.g., *she is not a person to rely on*, or complex, e.g., *she is not a person on whom to rely*. The type *on whom to rely* is very rare in unplanned speech. English has reduced relative clauses, as in *the book lying on the table* or *the book written by my colleague*. This construction too is rare in unplanned speech but frequent in writing.

Relative Clauses in Other Languages

The English data have parallels in many other languages. The resumptive pronoun structure is widespread, as in the Italian example below – see Fiorentino (1999). (Resumptive pronoun in bold.)

(9)

questa	benedetta	riforma	che	se	**ne**
this	blessed	reform	that	self	of-it
sta	parlando	da	secoli		
stands	speaking	from	centuries		

'this blessed reform that people have been speaking about for centuries'

Unplanned spoken Italian and French offer examples of unintegrated relative clauses like those in (6). In (10), from Fiorentino (1999), the conjunction *che* links the relative clause to *mondo* and the preposition *sopra* governs neither a relative nor a resumptive pronoun.

(10)

La	terra	non	il	mondo	è	quello
the	region	not	the	world	is	that-thing
che	noi	teniamo	i	piedi	sopra	
that	we	hold	the	feet	on	

'the local region and not the world is what we have our feet on'

Example (11) shows a spoken Russian construction which is not found in written Russian. The first clause, *kotorye mal'chiki lomaiut*, sets up the referent and the second clause, *on vsekh zabiraet*, provides extra information about the referent.

(11)

kotorye	mal'chiki	lomaiut	on	vsekh	zabiraet
which	boys	break	he	all	catches

'he catches all the boys who vandalize things' (Lapteva, 1976)

Spoken relative clause constructions ease the production and interpretation of utterances in real time. Resumptive pronouns make possible the same word order in relative clauses as in main clauses; one clause identifies the referent and another clause supplies extra information as in (11). Complex constructions occur in written language; speakers have minimal time to plan, while writers have time to plan and edit.

The spoken relative clause structures are not new; Fiorentino (1999) traces the Romance constructions to Late Latin. The construction probably predates Late Latin but took time to appear in written texts. One hypothesis is that the structure arose out of discourse, as exemplified in the German example in (12):

(12)

und	jetzt	hat	er	ein	Mädchen
and	now	has	he	a	girl
die	ist	alles	andere	als	schön
she	is	all	else	than	pretty

'and now he has a girl who is anything but pretty'

The 'relative clause' is introduced by *die*, which functions as definite article or personal pronoun. Here it is a personal pronoun pointing at a female person. Were it a relative pronoun with *Mädchen* as its antecedent, the required form would be 'das.' In subordinate clauses in German the finite verb is at the end of the clause; here it is in second position – *ist*. That is, (12) consists of two main clauses linked by the fact that they are juxtaposed and that *die* picks up the referent of *ein Mädchen*.

Restrictive and Nonrestrictive Relative Clauses in Unplanned Speech

Traditionally, a distinction has been drawn between restrictive relative clauses, which help to identify a referent, and nonrestrictive relative clauses, which merely add extra information, as in *the book, which*

I didn't buy after all, turned out to be useless. Non-restrictive relative clauses are rare in unplanned speech and recent work suggests that speakers actually use relative clauses for three purposes, to describe, confirm, or identify referents (see Weinert, 2004).

To sum up, spoken relative clauses are central in research on spoken and written language, on the distinction between the grammatical resources of languages and their users, and on typology.

See also: Configurationality; Norms and Correctness; Relative Clauses; Syntactic Constructions.

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Relativism

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The philosophical term 'relativism' covers any belief that some type of judgment is necessarily dependent on the particular point of view from which it is made. Moral relativism is the view that judgments of right and wrong are always relative to the value system of an individual making the judgment. In the work of Franz Boas, this led to cultural relativism – the argument that moral judgments vary between different social groups, and that it is not appropriate to claim that any one such group has a 'better' moral code than any other. Truth-relativism claims that statements are only ever true or false from the point of view of some way of understanding the world, relative to an individual, a society, or even a whole species.

Proponents of relativism argue that it acknowledges the fact that our judgments are necessarily influenced by our system of perception or by social conditioning. Opponents often cite what they see as unacceptable consequences. Relativism in ethics leads to moral nihilism, or the claim that there can be no objective moral absolutes and, therefore, that it is impossible to deprecate any form of behavior if it is acceptable to the individual performing it. Truth-relativism can be seen as having unacceptable consequences for logic. If A believes that 'p is true' and B believes that 'p is false,' there can be no contradiction between the beliefs of A and B, since each is true, relative to the individual.

Relativism had a profound effect on the study of language in the 20th century. Moral relativism is apparent in the claim that statements of right and wrong can only ever be contingently, never absolutely, true. Even more forceful is the verificationist claim that all the statements of ethics are strictly meaningless, because they cannot be objectively verified. For instance, A. J. Ayer argued that a sentence such as 'stealing is wrong' fails to express any proposition; it merely reports a personal, emotional response to stealing. Most significantly, much of structural linguistics draws on relativist arguments. Saussure argued that language is a necessary precursor to thought, or to a full understanding of reality. This leads to the claims of linguistic relativism, or relativity, that the particular language an individual learns determines that individual's worldview. Coupled with the structuralist belief that human languages share a level of complexity but otherwise differ radically from each other, linguistic relativity leads to the belief that the worldviews implicit in different languages can vary without limit, and therefore that the way speakers of one language understand the world may be radically different from the way speakers of another language do. This view found fullest expression in the claims of Benjamin Lee Whorf that different languages provide speakers with different 'isolates' of meaning, and that these determine how speakers understand reality, or what is 'true' for them. Although the more extreme claims of linguistic relativity are generally now seen as untenable, this idea continues to have a strong

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Relevance Theory

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Relevance theory (henceforth RT), a cognitive theory of human communication developed by D. Sperber and D. Wilson, was fully described in their 1986 book (Sperber and Wilson, 1986, 2nd edn., 1995), but it really emerged in the late 1970s and early 1980s as a cognition-centered alternative to Grice's cooperation-ruled explanation of human communication (see Wilson and Sperber, 1981). Since then, it has been a highly influential theory in pragmatics producing a good number of studies backing it up, criticizing it, or applying it to different pragmatic research areas (see Yus, 1998; Wilson and Sperber, 2002a; and RT Bibliography).

The main assumption of the theory is that human beings are endowed with a biologically rooted ability to maximize the relevance of incoming stimuli (including linguistic utterances and other communicative behavior). Relevance is not only a typical property of external stimuli (e.g., utterances), but also of internal representations and thoughts, all of which may become inputs for cognitive processing. The pursuit of relevance is a typical aspect of the mental activity of human beings, always geared to obtaining the highest reward from the stimuli that they process. This biological endowment is the result of the evolution of the architecture and complexity of the human mind and part of a general human ability to meta-represent one's and other people's thoughts and intentions: "As a result of constant selection pressure towards increasing efficiency, the human cognitive system has developed in such a way that our perceptual mechanisms tend automatically to pick out potentially relevant stimuli, our memory retrieval mechanisms tend automatically to activate potentially relevant assumptions, and our inferential mechanisms tend spontaneously to process them in the most productive way" (Wilson and Sperber, 2002a: 254). Together with another uniquely human cognitive endowment, the ability to metarepresent one's and other people's thoughts and intentions, this tendency to maximize relevance allows us to predict what information is likely to be relevant to other people and what interpretive steps might be involved in its processing, and therefore allows for the manipulation of other people's thoughts.

Basic Claims

Four statements can summarize this theory (Wilson, 1994: 44): (a) the decoded meaning of the sentence is compatible with a number of different interpretations in the same context; (b) these interpretations are graded in terms of accessibility; (c) hearers rely on a powerful criterion when selecting the most appropriate interpretation; and (d) this criterion makes it possible to select one interpretation among the range of possible interpretations, to the extent that when a first interpretation is considered a candidate matching the intended interpretation, the hearer will stop at this point.

These statements can be broken down into a number of basic claims, as summarized below.

Code versus Inference

Unlike the so-called **code model** of communication, according to which messages are simply coded and decoded, Sperber and Wilson favor an **inferential model** in which decoding plays a minor role compared with the inferential activity of the interpreter. Within this approach, the decoding of utterances underdetermines their interpretation and serves rather as a piece of evidence about the speaker's meaning. Verbal communication does involve the use of a code (i.e., the grammar of the language), but inference plays a major role in turning the schematic coded input into fully propositional interpretations.

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One of the most interesting contributions of RT is, precisely, the claim that there is a wide gap between the (coded) sentence meaning and the (inferred) speaker's meaning, which has to be filled inferentially. Comprehension starts at the context-free identification of the utterance's logical form, which is then enriched to yield explicit information (**explicatures**) and/or implicit information (**implicatures**) (*see* **Implicature**).

A Post-Gricean Theory

Sperber and Wilson acknowledge the filiation of RT from Grice's view of communication, but there are several aspects in which they depart from Grice. This is the reason why we can call RT a post-Gricean theory (*see* **Neo-Gricean Pragmatics**), a theory that takes the Gricean approach to communication as a mere starting point, as opposed to neo-Gricean theories which stay much closer to Grice's cooperative principle and its maxims (*see* **Grice, Herbert Paul (1913–1988); Cooperative Principle; Maxims and Flouting**) Several points deserve explanation:

1. One of the major contributions by Grice was to underline the role that intentions (roughly defined as mental representations of a desired state of affairs) play in human communication. His emphasis on the expression and recognition of intentions laid the foundations of the inferential model of communication. Crucially to Grice, the hearer explains the speaker's communicative behavior by identifying the underlying intention, a typically human form of mind-reading activity. However, Sperber and Wilson do not agree with the complex schema of human reasoning that Grice proposed for the derivation of implicatures.

   Sperber and Wilson also point out that Grice's emphasis on the role of intentions corroborates the fact that communication can exist without the need for a code. All that the communicator has to do to communicate a thought is to get the addressee to recognize his/her intention to convey it.

   Sperber and Wilson distinguish two levels of intention: **informative** (an intention to inform the hearer of something) and **communicative** (the intention to inform the addressee of that informative intention). In inferential communication, the identification of the informative intention is done through the identification of the communicative intention, the process being activated by verbal ostensive communication, in which it is clear to both speaker and hearer (**mutually manifest** in Sperber and Wilson's terminology) that the speaker has the (metarepresentational) intention to communicate something. Unlike other forms of information transmission, 'ostensive inferential communication' involves both types of intention, and is achieved by ostensively providing an addressee with evidence that helps him/her infer the speaker's meaning.
2. RT explains the hearer's inference of the (intended) speaker's meaning from the coded sentence meaning by resorting to another central claim suggested by Grice: that ostensively communicated utterances automatically generate expectations that activate the hearer's search for the speaker's meaning. But whereas Grice explained these expectations in terms of the assumption by hearers that speakers were observing the cooperative principle and its maxims, within RT these expectations are explained in cognitive terms (basically proposing the existence of a Cognitive Principle of Relevance), without reliance on a cooperative principle.
3. For Sperber and Wilson, no maxims, in the Gricean sense, are required for the explanation of communication. This is especially evident in the case of the Maxim of Quality (roughly, 'tell the truth'), which Grice proposed for the explanation of figurative language and irony. Sperber and Wilson have shown that people are normally 'loose' when they speak and only on very specific occasions do they intend their utterances to be regarded as literally true. In addition, Sperber and Wilson propose that all uses of language, whether loose (metaphor, hyperbole, etc.) literal can be addressed with a single explanatory framework based on general expectations of relevance.

Two Principles of Relevance

Initially, Sperber and Wilson proposed one Principle of Relevance to account for the fact that an act of 'ostension' carries a guarantee of its eventual relevance, but in the Postface to the second edition of their book (Sperber and Wilson, 1995: 260ff.), they propose that we can distinguish a broad **cognitive principle of relevance**: "human cognition tends to be geared to the maximisation of relevance," as well as a narrower (**communicative principle of relevance**: "every act of ostensive communication communicates a presumption of its own optimal relevance"; 1986: 158), the latter being the main focus of analysis within pragmatics. But the former is important, too, because it stresses the fact that we are biologically geared toward processing the most relevant inputs available. In addition, it is this evolved disposition that allows for the prediction of the mental states of others, which is crucial in human communication.

The communicative principle involves a definition of optimal relevance comprising two parts: (a) The ostensive stimulus is relevant enough for it to be worth the addressee's effort to process it; and (b) The

ostensive stimulus is the most relevant one compatible with the communicator's abilities and preferences (Sperber and Wilson, 1995: 267, 270). As Wilson and Sperber (2002a: 257–258) correctly point out, communicators "cannot be expected to go against their own interests and preferences in producing an utterance. There may be relevant information that they are unable or unwilling to provide, and ostensive stimuli that would convey their intentions more economically, but that they are unwilling to produce, or unable to think of at the time." All this is covered by clause (b) of the definition of optimal relevance, which states that the ostensive stimulus is the most relevant one "that the communicator is WILLING AND ABLE to produce" (Sperber and Wilson, 1995: 258).

Assessing Relevance: Cognitive Effects versus Processing Effort

Unlike what is the case in 'static' pragmatics, which foregrounds the importance of context but somehow takes it for granted or is merely interested in dissecting, as it were, its elements, Sperber and Wilson's theory views the context as a dynamic, mental entity made up of a subset of the person's assumptions about the world; it is this subset that is accessed in the search for relevance. Often several extensions of context are required to arrive at an optimally relevant interpretation, but as soon as one interpretation is found to be satisfactory, interpretation stops and no other interpretive hypotheses are considered: "When a hearer following the path of least effort finds an interpretation which satisfies his expectations of relevance, in the absence of contrary evidence, this is the best possible interpretive hypothesis" (Wilson and Sperber, 2002b: 605).

The aforementioned Communicative Principle of Relevance predicts a basic procedure for hearers when hypothesizing about contextual extensions required for the interpretation of a verbal stimulus: to consider interpretive hypotheses in order of accessibility (following a path of least effort) and to stop when they arrive at an interpretation which satisfies the expectations of relevance raised by the stimulus itself. Relevance, then, is a matter of balance between the interest that the utterance might provide (in terms of so-called 'positive cognitive effects') and the mental effort that obtaining this interest demands.

Relevance is a characteristic of an input to the human cognitive processes which, when processed in a certain context, yields positive cognitive effects. Because there are too many possible stimuli to which we can pay attention, our cognitive architecture is designed to allocate our processing effort in such a way that benefit is maximized. Hence, relevance has to do with the improvement of the person's knowledge; this can be achieved either by adding new information, by revising existing assumptions, or by yielding new conclusions resulting from the combination of old and new information (in this case **contextual implications** are generated) (*see* **Context, Communicative**).

The definition of relevance of an input to an individual involves two clauses: "(a) everything else being equal, the greater the positive cognitive effects achieved in an individual by processing an input at a given time, the greater the relevance of the input to that individual at that time; and (b) everything else being equal, the smaller the processing effort expended by the individual in achieving those effects, the greater the relevance of the input to that individual at that time" (Wilson and Sperber, 2002b: 602).

Current Issues and Open Debates

The Explicit/Implicit Distinction

One of the key differences between Grice's model and Sperber and Wilson's lies in the demarcation of explicit and implicit communication. For Grice, **what is said** involved little inference, mainly reduced to disambiguation and reference assignment, while all the inferential load was laid upon the derivation of implicatures, the latter being obtained **after** an interpretion reduced to the literal meaning has been found inappropriate, in a so-called **dual-stage processing**. Sperber and Wilson reject this view and favor a more adequate, **mutual parallel adjustment** of explicit content – explicatures – and implicit import – implicatures – during interpretation, and with no preconceived sequential arrangement.

Within RT, explicitly communicated information not only demands as much contextualization as do implicatures, but also covers aspects of communicated meaning which Grice included in the term implicature (e.g., the so-called **generalized conversational implicatures**, most of which are now pictured as explicit information, see Levinson, 2000; Carston, 2002).

In addition to implicatures, Sperber and Wilson propose two types of explicitly communicated information: the basic-level **explicature**, and the **higher-level explicature**. The latter also includes the speaker's attitude (*to regret that* . . . *to be happy that* . . . etc.) or a higher-order speech-act schema (*to be asking that* . . . *to be ordering that* . . . etc.). Both explicatures and implicatures allow for degrees (i.e., strong and weak explicatures/implicatures), depending on the addressee's responsibility for their derivation and the amount of mental processing required.

Other notions used by other authors in the definition of explicit information, for instance **literal meaning** or **what is said,** are put into question by Sperber

and Wilson, because these do not play any useful role in the study of verbal comprehension: "even when a literal meaning is available, it is not automatically the preferred interpretation of an utterance. In fact, literalness plays no role in our account of language comprehension, and nor does the notion of what is said" (Wilson and Sperber, 2002b: 586). This is because, among other reasons, hearers commonly derive loose interpretations rather than purely literal ones: "hearers have no objection to strictly false approximations as long as the conclusions they bother to derive from them are true. In fact, they might prefer the shorter approximations to their longer-winded but strictly true counterparts for reasons of economy of effort" (Wilson and Sperber, 2002b: 598).

Whereas Bach (1994) has proposed a third term, **impliciture**, half-way between explicatures and implicatures, other authors, such as Vicente (2002), reject this blurring of the explicit/implicit dichotomy. The term 'impliciture' covers several cases which would fit into Sperber and Wilson's notion of explicature, basically being completions of the semantic representation of the sentence (e.g., 'The table is too wide' [to go through the door]) and nonliteral uses of sentences in which no constituent is being used nonliterally, what Bach calls **standardized nonliterality** (e.g., (said to a person who has cut himself) 'You are not going to die' [from this cut]).

Conceptual and Procedural Encoding

One of the most interesting lines of research within relevance theory is the one that differentiates between **conceptual meaning** and **procedural meaning**. Wilson and Sperber (1993: 10) summarize this dichotomy as follows: "inferential comprehension involves the construction and manipulation of conceptual representations; linguistic decoding feeds inferential comprehension; linguistic constructions might therefore be expected to encode two basic types of information: concepts or conceptual representations on the one hand, and procedures for manipulating them on the other."

Most words encode concepts, but some words give instructions as to how conceptual representations are to be manipulated and hence encode procedural meaning. Blakemore and her followers applied the notion to connectives (Blakemore, 1987) and discourse markers (Blakemore, 2002), which constrain the inferential phase by indicating the kind of inferential process that the hearer should go through (hence reducing the eventual overall effort) in the subsequent stretch of discourse. In recent research, the list of procedural items has been extended to cover nonverbal elements such as intonation (*see* **Meaning, Procedural and Conceptual**).

Ad hoc Concept Formation

The notion of *ad hoc* concept construction is one of the latest developments of relevance theory in the area of figurative language (especially metaphors), which has also been extended to the analysis of how concepts in general are processed (cf. Carston, 2002; Pilkington, 2000).

The traditional relevance–theoretic account of figurative language relies on the assumption that there is an interpretive resemblance between the coded concept and the intended thought. And we can say the same about the whole utterance whose propositional form resembles the propositional form of the communicator's thought (Pilkington, 2000: 90). From this viewpoint, the interpretive resemblance between, for instance, a coded metaphor and the thought which it resembles would lead to the hearer's derivation of stronger/weaker implicatures.

Within an alternative account of utterance interpretation, it is claimed that the metaphor provides a new *ad hoc* concept for the proposition expressed by the utterance (instead of favoring the derivation of implicatures) (*see* **Metaphor: Psychological Aspects**). Encyclopedic entries would be explored in such a way that an increase in the *salience* of a number of assumptions is created, providing an encyclopedic entry for the new concept (Pilkington, 2000: 95-96; for 'salience,' see Giora, 2002). They are *ad hoc* "because they are not linguistically given, but are constructed online in response to specific expectations of relevance raised in specific contexts. There is a difference then between *ad hoc* concepts, accessed by a spontaneous process of pragmatic inference, and lexicalized concepts, which are context-invariant" (Carston, 2002: 322).

Mutual Knowledge versus Mutual Manifestness

Sperber and Wilson reject the traditional notion of mutual knowledge because it generates an endless recursion (A knows that p, B knows that A knows that p, A knows that B knows that A knows that p, and so on). Instead, they propose the notion of **mutual manifestness** (see Sperber and Wilson, 1990). What is 'manifest' is what one is capable of inferring or capable of perceiving, even if one hasn't done so yet. The sum of all the manifest assumptions is the person's **cognitive environment**. A set of assumptions manifest to several individuals constitutes their shared cognitive environment. When it is manifest to all the people sharing a cognitive environment that they share it, then, this is a **mutual cognitive environment**, made up of mutually manifest assumptions. Communication is a matter of making certain

assumptions mutually manifest to both speaker and hearer.

Several authors have criticized the notion of mutual manifestness. For example, Mey and Talbot (1988) point out that what Sperber and Wilson do is to send mutual knowledge out at the front door and then let it in at the back, disguised as 'mutually manifest assumptions.' For these authors, cognitive environments are not distinguishable from mutual knowledge; thus, Sperber and Wilson appear to be using the same concept that they want to abandon. To my knowledge, neither Sperber and Wilson nor their critics have been persuaded to abandon their differing claims on mutuality.

Communicated and Noncommunicated Acts

One of the most underdeveloped areas within relevance–theoretic research is the relationship between RT and speech acts. In short, Sperber and Wilson (1986: 244–246) distinguish between communicated and noncommunicated acts. The former depend on the addressee's perception that a certain speech act has been performed (e.g., admitting, promising, thanking), while in non-communicated acts, communication does not depend on the identification of a particular speech act (e.g., predicting, warning, suggesting). In this case, successful communication lies in the hearer's recovery of adequate cognitive effects from the utterance with the aid of context and in the recovery of the speaker's intentions.

In a recent paper, Nicolle (2000) has argued against the existence of noncommunicated speech acts in the RT sense. Examples of noncommunicated acts (such as the act of warning in "The path is slippery here") are reconsidered by Nicolle in social terms, and their influence on the interlocutors' social environments implies that they also have to be communicated: "the recovery of information relating to social relations is an essential element of the comprehension process. When the recovery of such information depends on the identification of a particular speech act, that speech act is by definition a communicated act" (Nicolle, 2000: 239).

Irony and the Notion of Echo

In Wilson and Sperber (1992), the authors conceptualize irony in **interpretive** terms. An ironic utterance is an interpretation of another thought, utterance, or assumption that it resembles and which the speaker attributes to a different speaker or to himself/herself at another time. Ironic utterances are echoic, that is, they simultaneously refer to an attributed thought – or utterance, or assumption – and express an attitude to it. More specifically, the speaker's attitude toward what is echoed has to be dissociative. This dissociation may apply to either the proposition expressed by the utterance, or to some effect that is generated by that utterance.

Several authors have commented upon this proposal. For instance, in some of the papers collected in Carston and Uchida (1998) it is claimed that irony can be nonechoic. In their reply, Sperber and Wilson (1998) maintain that although most utterances cannot be understood as echoic (i.e., there is no accessible representation that they might be taken to echo), an utterance has to be echoic to be interpreted as ironical (*see* **Irony**).

Modularity

Initially, Sperber and Wilson adopted the view of the mental architecture of the mind proposed by Jerry Fodor in the early 1980s: several modules feeding a central processor with specific information.

Modules are evolved, special-purpose mental mechanisms, typically automatic, informationally encapsulated, and domain-specific. For instance, the language module is only (and automatically) activated by verbal stimuli, feeding the central processor with a schematic logical form which then has to be enriched inferentially.

Over the last few years, this view of the mind has changed within RT (and also within evolutionary psychology), especially concerning the structure of the central processor, which is also regarded to be modular (Carston, 1997; Sperber and Wilson, 2002; Wilson, 2003). The most important module, specifically a submodule of the general 'theory of mind' ability, is **the pragmatic module**, which also exhibits qualities typically associated with modules. For example, this pragmatic module is biologically endowed, only activated by a specific type of information (ostensively communicated information), and constrained by its own principle: the Communicative Principle of Relevance.

Relevance Theory as Asocial

RT has been criticized for being hyperindividualistic and for avoiding the social aspects of communication (Mey and Talbot, 1988). Sperber and Wilson (1997: 147) acknowledge that they have concentrated on the inferential activity of the individual, but inferential communication is **also** essentially social: "Inferential communication is intrinsically social, not just because it is a form of interaction, but also, less trivially, because it exploits and enlarges the scope of basic forms of social cognition. Right or wrong, this is a strong sociological claim." Although Sperber and Wilson have not studied uses of communication to

convey information about the social relationship between the interlocutors, they do not mean to deny its importance, or to express a lack of interest in the issues or the work done; they merely feel that, at this stage, they can best contribute to the study of human communication by taking it at its most elementary level, and abstracting away from these more complex (socially connoted) aspects (Sperber and Wilson, 1997). Hence, for them, although "so far, the contribution of relevance theory to the study of human communication has been at a fairly abstract level . . . it seems to us to have potential implications at a more concrete sociolinguistic level" (Sperber and Wilson, 1997: 148).

A proposal by Escandell-Vidal (2004) aims at integrating inferential and social issues in terms of principles and norms, respectively, and as part of a domain-specific picture of mental activity. The mind operates according to principles that are in charge of obtaining fully propositional interpretations from coded stimuli. When dealing with norms, the mind is engaged in both a long-term and a short-term task. The short-term one analyzes and categorizes incoming information, and the long-term task builds up and updates socially accepted behavior.

Empirical Evidence

A common criticism of RT is that it is highly speculative, predicting without empirical evidence the mental procedures and interpretive steps the human mind goes through in human communication. Obviously, we are dealing with an object of study, the human mind, which is highly complex and still largely unexplained.

Sperber and Wilson (2002: 143) acknowledge that in much pragmatic research, there is a certain reluctance to get down to experimentation. However, relevance theorists have been particularly eager to combine theoretical issues with all the possibilities of testing provided by the careful use of linguistic intuitions, observational data, and the experimental methods of cognitive psychology (see Wilson and Sperber, 2002b: 607, note 7 for references). Recent research has aimed at an empirical explanation of central claims of the theory. For instance, Van der Henst and Sperber (2004) review various experimental tests of the two Principles of Relevance. They claim that the hypothesis that hearers spontaneously rely on a relevance-guided interpretive procedure can be experimentally tested either by intentionally manipulating the effort required to process a stimulus or by changing the order of accessibility of several competing interpretations for the same stimulus. Another possible test is a manipulation of the effect factor by making a specific interpretation more or less likely to satisfy the expectations of relevance.

Other studies have focused on other possible areas of RT-based empirical research. Among them we can underline the ones on the Wason selection task. For example, Sperber *et al.* (1995) tested how participants derive implications from conditional statements in order of accessibility, stop when their search for relevance reaches an adequate balance of cognitive effects and processing effort, and select cards on the basis of this interpretation. The authors were able to manipulate the effort and effect factors by varying the content and context of the conditional statement, so as to elicit correct or incorrect selections at will (cf. Wilson and Sperber, 2002a: 279).

The plausibility of a Gricean maxim of truthfulness to explain human communication has also been tested (Van der Henst *et al.,* 2002). These authors showed that when people ask a stranger the time in the street they get, as a reply, "a time that is either accurate to the minute or rounded to the nearest multiple of five, depending on how useful in the circumstances they think a more accurate answer would be" (Wilson and Sperber, 2002b: 598), regardless of whether the people asked have (accurate) digital watches. These rounded answers are not strictly true, but they are easier for their audience to process.

Applications

RT has been applied to a number of research areas, among which we can distinguish the following.

1. **Grammar.** For RT the interest lies in how grammatical attributes constrain the choice of a candidate interpretation. In this sense, the grammatical arrangement of utterances plays an important part throughout this cognitive contextualization. From this point of view, several aspects of grammar have been addressed, including connectives (often within a conceptual/procedural account), conditionals, modals and modality, adverbs and adverbials, mood(s), tense(s), the article, etc.
2. **Humor.** Within a relevance–theoretic approach, humor is no longer a property of texts and, instead, what we need to characterize are the audience's mental processes in the interpretation of humorous texts.

   Underlying this approach to humor lies the premise that communicators can predict and manipulate the mental states of others. Knowing that the addressee is likely to pick out the most relevant interpretation of the joke (or some part of it), the humorist may be able to produce a text that is

likely to lead to the selection of an accessible interpretation, which is then invalidated at some point. In Yus (2003), for instance, it is claimed that in many jokes the initial part has multiple interpretations, which are graded according to their accessibility. The hearer is led to select an overt (i.e., relevant) interpretation of this part of the joke. Suddenly, the hearer notices that the subsequent part has a single covert interpretation which is eventually found to be the correct one (and the one providing a coherent interpretation to the whole text) and which humorously surprises the hearer (*see* **Humor in Language; Accessibility Theory**).

3. **Media discourses**. RT has also been successfully applied to the interpretation of media discourses, including films, newspaper headlines, comics, Internet discourse, and advertising. The last one is probably one of the most extensive applications of the theory. The control over the amount of information provided, the predictability of consumers' responses, and the calculation of the effort required to process information, all typical features of the strategies by the advertisement makers, can easily be analyzed using a relevance–theoretical approach (see Tanaka, 1994).
4. **Literature**. Several studies have applied RT to literary discourse (Pilkington, 2000 is an example). Within an RT approach, literariness has to be analyzed as cognitive effects triggered by textual stimuli, involving special mental processes which, through a relevance-driven cognitive exploration, result in the marginally increased salience of a wide range of assumptions (Pilkington, 2000: 189). Because in literature it is more difficult (if not impossible) to make assumptions mutually manifest, a greater load of responsibility is laid upon the reader in extracting the intended (or, alternatively, his/her own) interpretation of the text, plus whatever feelings and emotions are associated with the comprehension of the text.
5. **Politeness**. This is a typical social feature of communication that somehow appears not to suit the individual-centered approach within RT (*see* **Politeness**). However, several studies have attempted an explanation of politeness in relevance–theoretic terms. For instance, politeness has been explained within RT as a verbal strategy compatible or incompatible with the background expectations about the current relationship holding between speaker and hearer, thus leading to different relevance-oriented interpretive paths (see Jary, 1998).
6. **Translation**. In RT-bases studies such as Gutt's (2000), there is a tendency to exploit the idea of resemblance between the intended interpretations of utterances. (For an account of relevance–theoretic applications to translation, *see* **Translation: Pragmatics**.)

Concluding Remarks

In RT, Sperber and Wilson propose a coherent cognitive account of how the human mind proceeds when attempting to select a plausible interpretation of ostensively communicated stimuli. They rely on the hypothesis that a biologically rooted search for relevance aids human beings in the inferential enrichment of typically underdetermined coded texts and utterances resulting in fully propositional interpretations.

The theory has provided insights in several debates in pragmatics and cognitive science and has been applied to a good number of research areas. Undoubtedly, RT will continue to stir fruitful intellectual debates on the explanation of human communication.

See also: Accessibility Theory; Cognitive Science and Philosophy of Language; Communicative Principle and Communication; Context, Communicative; Cooperative Principle; Grice, Herbert Paul (1913–1988); Humor in Language; Implicature; Intention and Semantics; Irony; Maxims and Flouting; Meaning, Procedural and Conceptual; Media: Pragmatics; Metaphor: Psychological Aspects; Modularity of Mind and Language; Neo-Gricean Pragmatics; Politeness; Shared Knowledge; Social Aspects of Pragmatics; Speech Acts: Definition and Classification; Translation: Pragmatics.

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Relevance Theory: Stylistic Applications

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Relevance theory (Sperber and Wilson, 1995) is a theory of pragmatics that differs from its Gricean predecessors in proposing a cognitive account of communication. It holds that in the understanding of any spoken or written utterance, the audience must both decode linguistic material and make inferences about what the speaker or writer intended to communicate. Two principles of relevance guide us in making these inferences. The first principle of relevance leads us to focus on information that is most relevant in our environment. The second principle of relevance is a communicative principle in which every ostensive act of communication advertises itself as worth attending to. As hearers/readers, we use these principles to derive the most relevant possible interpretations of utterances. In this technical sense, an interpretation is optimally relevant when it achieves the greatest possible number of contextual effects for the least processing effort. Contextual effects, according to the theory, might involve strengthening an existing assumption, weakening or eliminating an existing assumption, or introducing a new assumption.

Poetic Effects

In relevance theory, poetic utterances such as those containing a creative metaphor are said to achieve their effects through making available to the hearer/reader a wide array of weak implicatures. In processing this kind of utterance, the hearer/reader will explore and make connections between encyclopedic entries attached to concepts, accessing just enough of the range of available weak implicatures to make the processing effort worthwhile. A difference between

ANNEX Relevance-theoretic research published in Elsevier journals (available on the Internet for subscribers)

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Relevance Theory: Stylistic Applications

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Relevance theory (Sperber and Wilson, 1995) is a theory of pragmatics that differs from its Gricean predecessors in proposing a cognitive account of communication. It holds that in the understanding of any spoken or written utterance, the audience must both decode linguistic material and make inferences about what the speaker or writer intended to communicate. Two principles of relevance guide us in making these inferences. The first principle of relevance leads us to focus on information that is most relevant in our environment. The second principle of relevance is a communicative principle in which every ostensive act of communication advertises itself as worth attending to. As hearers/readers, we use these principles to derive the most relevant possible interpretations of utterances. In this technical sense, an interpretation is optimally relevant when it achieves the greatest possible number of contextual effects for the least processing effort. Contextual effects, according to the theory, might involve strengthening an existing assumption, weakening or eliminating an existing assumption, or introducing a new assumption.

Poetic Effects

In relevance theory, poetic utterances such as those containing a creative metaphor are said to achieve their effects through making available to the hearer/reader a wide array of weak implicatures. In processing this kind of utterance, the hearer/reader will explore and make connections between encyclopedic entries attached to concepts, accessing just enough of the range of available weak implicatures to make the processing effort worthwhile. A difference between

poetic effects and other types of effect is that the hearer/reader is largely responsible for which particular implicatures will be derived, so interpretation is both diffuse and indeterminate.

Metaphor and Metonymy

In the relevance theory account, metaphor works by making available at least two concepts that the hearer/reader will explore, to find or construct common ground between them. Metaphor is said to be a type of 'loose use' in which the relationship between what is described and the words, and therefore concepts, used to describe it is non-identical. A distinction between this and other approaches is that relevance theory does not see metaphor as a 'non-literal' trope of language. Loose use is also at work in non-literary communication (e.g., rounding up a salary in conversation, rather than giving a precise figure), and so the relevance theory account has no need to posit an awkward and uneconomical two-stage process of interpretation in which the hearer/reader is said to abandon a literal interpretation in favor of a figurative one. Pilkington (1992, 2000) gave detailed relevance theory analysis of examples of metaphor in literary texts, among them the one in the final lines of 'Digging,' by Seamus Heaney:

> Between my finger and my thumb
> The squat pen rests. I'll dig with it.

Pilkington's analysis argued that contexts activated earlier in the poem, among other things, establish digging as a family tradition, and a worthy, productive occupation requiring stamina and application, and that these contexts are available and can be used to make a rich interpretation of the 'writing is digging' metaphor. Pilkington was careful to point out that other assumptions associated with digging may be accessed; in fact, it is crucial to the relevance theory account that the available assumptions that might contribute to the interpretation of a metaphor could not be definitively listed. What is important is that in a successful interpretation, a reader has a large number of conceptual addresses to explore for encyclopedic information around 'digging' that might relate to writing in an interesting and rewarding way. Further relevance theory discussion of metaphor is given in Vicente (1996).

Papafragou (1996) took a similar view of metonymy, arguing that the relevance theory approach has advantages over the Lakoff and Johnson (1980) model in which individual metonymic expressions are said to instantiate larger, culturally determined cognitive frameworks for metonymy, such as 'place for event.' Papafragou suggested that the Lakoff and Johnson model is one of cognitive structure, whereas the relevance theory model is one of cognitive process, and claimed that particularly creative and poetic metonymic expressions are dealt with better in the relevance theory model. The metonymic expression 'the saxophone has the flu,' in which 'the saxophone' stands metonymically for the saxophone player, is said to allow for the derivation of a range of weak implicatures about the saxophone player that would be unavailable in paraphrase. Papafragou also discussed the conventionalization of metonymic expressions, arguing that full conventionalization may lead to semantic change; the metonymic expression becomes coded, so losing its poetic effects. Because semantic change occurs over time, Papafragou concluded that there are likely to be intermediate cases between creative and lexicalized metonymies.

Interpretive Use

Relevance theory distinguishes between interpretation and description (Sperber and Wilson, 1995). An utterance interpretively resembles a thought, which may be either interpretive or descriptive. Descriptive thoughts represent states of affairs in the world, whereas interpretive thoughts resemble other thoughts or utterances. The notion of interpretive use is central to the relevance theory approach to irony, in which a speaker is said to use interpretively, or echo, a thought that she/he does not necessarily hold as a true (descriptive) state of affairs in the world, but that is attributed or attributable as a descriptive thought, and possibly utterance, to another real or imaginary person. At the same time as echoing another's thought in this way, a speaker using irony communicates an attitude of dissociation toward the proposition expressed by the utterance. For example, on leaving the cinema after seeing a film that she believes was terrible, Ruth says "Great film" to her companion. If she is successful, her companion will understand that Ruth is using the utterance interpretively, echoing the view perhaps of the film company, film director, people who worked on the film, the cinema management who decided to show the film, the viewers who may have enjoyed the film, etc., and is at the same time dissociating herself from this view. The attitude communicated toward an echoic utterance can vary along a continuum from endorsement to scathing dissociation.

MacMahon (1996) has explored the notion of interpretive use in relation to literature, arguing that it is a powerful explanatory concept in the consideration of how literature communicates through the use of voice. In an analysis of Robert Browning's 'My last duchess,' MacMahon showed that the dramatic monologue allows the poet to dissociate from

the utterances of a sinister and threatening fictional speaker in a way that has much stronger effects than would an attempt to convey the same sentiments in a descriptive way. This analysis suggested that part of the strength of these effects relies on the embedded communicative situation between the imagined speaker, a 16th-century duke, and his silent hearer. The fictional duke skillfully makes available a complex set of implicatures, including the suggestion that he arranged for the death of his late wife, to intimidate his hearer, and the reader to some extent experiences the same intimidating effects. Elsewhere MacMahon (2001) explored the possibility of viewing less obvious examples of poetry as interpretive use, considering the communication of fluctuating attitudes of dissociation and endorsement toward different voices, and suggesting that the use of poetic form and the present tense might indicate dissociations from assumptions held by the self in the past or at some time, but not all of the time.

Fabb (1997) made a similar, though briefer, reference to literary free indirect discourse as interpretive use of this kind, and Wilson (2000) located interpretive use, including literary examples of free indirect discourse, within recent theories of metarepresentation as an evolved cognitive capacity.

Literary Form

Alongside his discussion of metaphor, Pilkington (2000) developed the relevance explanation of poetic effects with reference to sound patterning and epizeuxis. His claim for sound patterning such as rhyme schemes was that lexical choices become to some extent predictable within a rhyming text, and that this results in less effortful psycholinguistic processing, leaving more time, as with metaphor, for lengthy exploration of encyclopedic entries associated with the lexical concepts made more easily accessible by the rhyming words. Examples of epizeuxis such as *Oh! Absalom, my son, my son* are similarly said to redirect the hearer to lexical concepts already activated, inviting further derivation of weak implicatures.

Fabb's work on literary form (2002) made innovative use of relevance theory in suggesting that forms such as sonnethood and the line in poetry may be inferred on the basis of sometimes conflicting textual evidence. For example, while we might hold the assumptions that a sonnet has 14 lines and is in iambic pentameter, a poem of 15 lines, most but not all of which are in strict iambic pentameter, is likely to be understood as resembling a sonnet. Fabb argued that this kind of resemblance is another instance of interpretive use, since there is a loose, non-identical relationship between the text and the abstract notion of sonnethood. How strongly we infer sonnethood will depend on the degree of resemblance between the poem and our abstract notion of the form, thus sonnethood (and other verse forms) may be strongly or weakly communicated, and this again coincides with the relevance theory notion that poetic effects depend on the communication of a range of potential weak implicatures. If the poem also exhibits features of other forms, such as the quatrain, the diversity of weak implicatures is complex and causes aesthetic tension, a quality central to literary communication in Fabb's analysis. A similar argument is made for the communication of the line in poetry, wherein types of evidence include rhyme, meter, parallelism, punctuation, alliteration, syntax, and layout. These aspects of a poem may also provide conflicting implicatory evidence for lineation; aesthetic tension may, for example, be achieved through syntactic parallelisms running over layout line boundaries.

Constable's approach (1998) called into question the argument that poets carefully structure their work in order to communicate a particular range of implicatures, and, while Constable accepted the relevance theory focus on intentionality in accounting for other types of communication, he raised problems with using the same approach for dealing with metrical and rhyming poetry. His empirical work on versification suggested that meter and rhyme schemes severely restrict lexical choices available to the poet, and that this restriction results in a more random generation of implicatures than might be expected in other relevance theory accounts.

Reading Literature and Authorial Intention

Clark's work (1996) showed how relevance theory might explain possible interpretations of a short story and, like Fabb, explored the ways in which conflicting textual and contextual evidence makes literary implicatures indeterminate and inconclusive. He drew attention to the possibility that different inferences may be drawn in superficial or lengthier, deeper readings of literary texts, and made a distinction between implications and implicatures, showing that some of the complexities of reading a literary text, in this case prose fiction, involve implications within the text's fictional world being interpretable as implicatures in the communicative act between author and reader.

Intentionality in literary communication is a focus of Mackenzie's work (2002), in which it is argued that reading literature involves a suspension of the usual constraint that interpretations should derive only those implicatures that can reasonably be assumed

to have been intended by the speaker. Mackenzie argued that in the reading of literature, the search for relevance to the reader takes precedence over the assumption of communicative intentions, hence the possibility of widely divergent readings of the same text.

See also: Approaches to Translation: Relevance Theory; Human Reasoning and Language Interpretation; Implicature; Intention and Semantics; Literary Pragmatics; Metaphor and Conceptual Blending; Metaphor: Stylistic Approaches; Narrativity and Voice; Neo-Gricean Pragmatics; Pragmatic Determinants of What Is Said; Pragmatics of Reading; Propositional Attitudes; Relevance Theory; Semantics–Pragmatics Boundary; Terracini, Aron Benvenuto (1886–1968).

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Religion and Literacy

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The influence of religion on the spread of literacy has frequently been significant. It was the stated aim of many missionaries, for example, particularly Christian and Buddhist, to provide the means whereby as many people as possible could read sacred texts in their own language. In order to be able to provide people with texts in the vernacular, they were thus in many cases the first to devise scripts for languages that had previously never been written down. Among notable early Christian examples are Wulfila (Ulfilas), who designed the Gothic script (4th century C.E.); Mesrop, who invented the Armenian alphabet (5th century C.E.); and the Greek monks Cyril and Methodios, who invented what later came to be known as the Cyrillic alphabet (9th century C.E.), in which Russian and other Slavic languages are written. In Africa, the earliest extant Bantu text, a Kongo translation of a catechism, was published in 1624 by a Jesuit missionary, and in North America the Puritan John Eliot devised a writing system for the Massachuset language, in which a complete Bible was published in 1663. A Korean translation of the Bible by the Scottish missionary John Ross (1842–1915) was a major factor in the success of the indigenous Korean alphabet in use today.

The earliest Buddhist missionaries to China, Japan, and Central Asia translated their texts into the vernacular with the same zeal as the Christians. The first Chinese translations of Buddhist texts date from as early as the 2nd century B.C.E., and in the 4th century C.E., under the direction of Kumarajiva (344–413), perhaps the greatest of the Buddhist translators, a Translations Bureau was established, employing between 500 and 800 people. The entry of Buddhism into Japan led to the Chinese writing system's being adopted there by the 6th century C.E. and also to the evolution around 800 C.E. of a distinctive Japanese writing system, from which the modern kana syllabaries are derived. It was Buddhist missionaries who invented the Tibetan script in the 7th century C.E., and subsequently the Tibetan priest Phagspa, under the patronage of Kublai Khan (1214–1294), who designed the first Mongol script.

The invention of printing, crucial to the spread of literacy, was likewise in many cases closely connected with religion. In China and Japan the earliest use of

to have been intended by the speaker. Mackenzie argued that in the reading of literature, the search for relevance to the reader takes precedence over the assumption of communicative intentions, hence the possibility of widely divergent readings of the same text.

See also: Approaches to Translation: Relevance Theory; Human Reasoning and Language Interpretation; Implicature; Intention and Semantics; Literary Pragmatics; Metaphor and Conceptual Blending; Metaphor: Stylistic Approaches; Narrativity and Voice; Neo-Gricean Pragmatics; Pragmatic Determinants of What Is Said; Pragmatics of Reading; Propositional Attitudes; Relevance Theory; Semantics–Pragmatics Boundary; Terracini, Aron Benvenuto (1886–1968).

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Religion and Literacy

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The influence of religion on the spread of literacy has frequently been significant. It was the stated aim of many missionaries, for example, particularly Christian and Buddhist, to provide the means whereby as many people as possible could read sacred texts in their own language. In order to be able to provide people with texts in the vernacular, they were thus in many cases the first to devise scripts for languages that had previously never been written down. Among notable early Christian examples are Wulfila (Ulfilas), who designed the Gothic script (4th century C.E.); Mesrop, who invented the Armenian alphabet (5th century C.E.); and the Greek monks Cyril and Methodios, who invented what later came to be known as the Cyrillic alphabet (9th century C.E.), in which Russian and other Slavic languages are written. In Africa, the earliest extant Bantu text, a Kongo translation of a catechism, was published in 1624 by a Jesuit missionary, and in North America the Puritan John Eliot devised a writing system for the Massachuset language, in which a complete Bible was published in 1663. A Korean translation of the Bible by the Scottish missionary John Ross (1842–1915) was a major factor in the success of the indigenous Korean alphabet in use today.

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woodblock printing was in the mass reproduction of religious texts, including one million copies of certain Buddhist prayers and charms, printed by imperial order in 770 C.E., and the Diamond Sutra, the earliest printed book to have survived (868 C.E.). The role of the Christian church in the development of printing in Europe was no less significant. The first type-printed documents in Europe were a set of Papal Indulgences (Mainz, 1454), and the first complete printed book was the celebrated Gutenberg Bible (c. 1455). From the 16th century on, the dissemination of printed vernacular versions of the Bible, together with the writings of Martin Luther and other Reformers, was undoubtedly an important factor in the spread of literacy in Europe, even to the lower orders of society. The first document to be printed in the Americas was a catechism printed in the Nahuatl language in Mexico City in 1539, and it was Jesuit missionaries who introduced printing with movable metal type into Japan in 1590.

In Jewish tradition, the written form of Hebrew scripture was always important. According to biblical legend, parts of the Hebrew Bible were originally "written on tablets of stone with the finger of God" (Exodus 31:18; cf. 1 Chronicles 28:19) or copied by ancient Israel's leaders (e.g., Deuteronomy 17:18; Joshua 8:32). The earliest Jewish term for the Jews' sacred text is *ha-katub* 'the written' (*sc.*, word, verse, passage), from which the term 'scripture' (Latin *scriptura*) is derived, and the centerpiece of synagogue architecture is the sacred ark containing scrolls of the Torah. Reading and writing – and not only Hebrew, the sacred language of Judaism – have thus from ancient times been very high on the agenda of Jewish educators. The first text on which the ancient rabbis' children practised their reading skills, we are told, was the biblical book of Leviticus, partly because it has a high proportion of familiar, everyday words like 'hoopoe' and 'griddle,' rare in other books of the Bible, and partly because the repetition characteristic of ritual codes can be pedagogically helpful.

The Reformers' emphasis on individual judgment and the ability to read for oneself contributed much to the spread of literacy. Two notable precursors of the Reformation, John Wycliffe (1330–1384) in England and Jan Hus (c. 1369–1415) in Bohemia, for example, did much to make vernacular translations available as widely as possible. The vernacular version of the Bible by William Tyndale (c. 1494–1536) was written in a language so close to common speech that even "a boy that driveth the plough" could understand it. Through King James's Authorized Version of 1611, which was heavily dependent on it, Tyndale's Bible had an inestimable influence on the English language. One might refer also to the lasting impact of Dante Alighieri (1265–1321) and Martin Luther (1483–1546) on two other European languages. It was due to Dante that Latin, hitherto the only literary language there was and one with a very restricted readership, gave way to an "illustrious vernacular" that was to become the everyday language of the Italians. Luther, more explicitly religious than Dante, also wrote in a language accessible to all, and his writings, especially his German Bible, left an indelible mark on the style and vocabulary of the German language.

In the 20th century, the Summer Institute of Linguistics, founded in 1934, together with its sister organization, the Wycliffe Bible Translators, and the United Bible Societies (an association with member societies in more than 100 countries), contributed significantly to the study and teaching of countless languages worldwide, most of them known till recently only in oral form and many of them spoken by only a relatively small number of people. It is in fact a stated goal of these missionary or quasi-missionary organizations to assist local government and private agencies in establishing literacy programs suited to local conditions and needs. In this they are following a well-established tradition going back to pioneers like the Quaker Hannah Kilham (1774–1852), who set up West Africa's first vernacular literacy program, in Sierra Leone. Under the leadership of such distinguished linguists as Kenneth Pike (1912–2000) and Eugene Nida (1914–), the Summer Institute has produced, not only translations of the Bible into hundreds of languages worldwide, but also grammars, dictionaries, and textbooks. By means of painstaking field research, the application of the most up-to-date linguistic theory, and the employment of native speakers, the Institute aims to ensure that its efforts related to literacy are of the highest quality and as effective as possible.

In some cases, religion has had the opposite effect and actually been an obstruction to ordinary people's access to the skills of reading and writing. The religious establishment in medieval Europe, for example, sought to prevent ordinary people from reading the text of the Bible in the vernacular. Jan Hus was burned at the stake in 1415, and William Tyndale was executed in 1536. The terms 'Church Latin,' 'Church Slavonic,' and the like embody an exclusivist attitude toward reading and writing skills, and before the Reformation the role of the priest in Catholic and Orthodox countries as a general rule contributed little to the spread of literacy among ordinary people. Much effort was invested instead in beautiful though expensive alternatives to literacy education, such as stained glass windows.

A similar situation existed in India, where the scripts in which Sanskrit and Hindi are written were known

as Brahmi 'divine' and subsequently Devanagari 'the script of the city of the gods,' and reading and writing were for centuries mainly the preserve of specially trained cultic personnel. Even after the invention of writing in ancient India, priority in the Hindu religion, in a situation exactly the reverse of that in Judaism, was always given to oral tradition, meticulously handed down from generation to generation by extraordinary feats of memory. The use of written texts in ritual was actually condemned. In ancient Persia the Zoroastrian priests likewise taught that their sacred text, the Avesta, believed to contain the actual words of their founder, should never be written down. According to Julius Caesar, in *Gallic war* 6.14, this was also a characteristic of the Druids, who did not want their sacred literature to be read by outsiders. A significant factor in both these examples of religious opposition to the use of writing was probably that neither the Zoroastrians nor the Druids ever had a special sacred script associated with their sacred texts, as had the Jews (Hebrew), Muslims (Arabic), Hindus (Devanagari), and Sikhs (Gurmukhi).

The spread of Islam throughout Africa and Asia is another example of the negative effect a religion can have on the spread of literacy. Since Arabic was the language in which the word of God was revealed, Muslim law forbade the translation of the Qur'an into the vernacular and vigorously promoted the teaching of Arabic in preference to any other language. There were translations such as those into medieval Persian and Ottoman Turkish, but these never acquired the same status or authority as did Luther's German Bible or the Authorized Version. Thus students at the Qur'an schools, which sprang up wherever Islam was to be found, normally learned to read and write Arabic, with varying degrees of success, before they were able to read or write in their mother tongue.

The dominance of Arabic and, in particular, the Arabic script throughout the Islamic world, not least as an exquisite form of decoration on mosques and other buildings, unique in the history of religion, undoubtedly restricted the use and development of vernacular scripts. The Arabic script was adapted, not always very successfully, for virtually every language associated with Islam. As well as the obvious examples of Persian, Urdu, and Ottoman Turkish, languages at one time written in a modified form of the Arabic script include Spanish (13th century), Malay (14th century), and Hausa (18th century). There are several interesting exceptions in which the pervasive influence of the Islamic religion on vernacular literacy was checked. The Christians of the Syriac Orthodox and Maronite churches from the 13th century wrote Arabic in a form of the Syriac script known as Garshuni. Bengali Muslims use a script similar to Sanskrit, in preference to the Perso-Arabic script employed by the vast majority of Muslims in South Asia. Under Kemal Atatürk (1881–1938), Turkey abandoned the Arabic script in favor of an adaptation of the Roman writing system that is a much simpler and more effective medium for the Turkish language.

The latest UNESCO statistics (see Table 1) show that in those areas of the developing world where the influence of Islam and in particular the Arabic language was most profound, that is to say, the Arab States, Sub-Saharan Africa, and South and West Asia, the total rates of illiteracy are consistently 10–20% higher than in East Asia or in Latin America and the Caribbean. Certainly many other factors are

Table 1 Youth literacy and illiteracy by region

Youth literacy rate (15–24) (%)						*Youth illiterates (15–24)*				
1990			*2000–2004*			*1990*		*2000–2004*		
Total	*Male*	*Female*	*Total*	*Male*	*Female*	*Total (000)*	*% F*	*Total (000)*	*% F*	*Country or territory*
84.3	88.2	80.1	87.6	90.9	84.0	156 430	62	136 710	63	World
99.2	99.2	99.2	99.4	99.4	99.3	332	49	304	50	Countries in transition
99.7	99.7	99.6	99.7	99.7	99.7	471	51	354	49	Developed countries
80.9	85.8	75.8	85.2	89.3	81.0	155 627	62	136 052	63	Developing countries
66.6	77.3	55.3	78.2	84.4	71.8	14 203	66	12 946	64	Arab States
98.3	99.2	97.4	98.8	99.3	98.3	1023	75	790	69	Central and Eastern Europe
97.7	97.8	97.7	98.3	98.3	98.3	281	50	257	50	Central Asia
95.4	97.2	93.6	97.8	98.2	97.4	17 383	68	7446	58	East Asia and the Pacific
92.7	92.7	92.7	95.5	95.2	95.9	6351	50	4589	46	Latin America and the Caribbean
99.7	99.7	99.7	99.8	99.8	99.8	310	49	203	49	North America and Western Europe
61.5	71.1	51.0	72.3	81.5	62.5	87 276	61	79 344	65	South and West Asia
67.5	74.8	60.2	76.6	81.0	72.3	29 603	61	31 135	59	Sub Saharan Africa

Reproduced from *Education For All. The Quality Imperative.* (EFA Global Monitoring Report 2005). UNESCO 2005. Statistical Annex. Table 2. Adult and Youth Literacy. http://www.efareport.unesco.org/

involved, and generalizations are dangerous, but it does appear that, in those areas where Buddhist and Christian missionaries had the most impact on language, that is to say, in Europe, North and South America, and East Asia and the Pacific, their efforts to enable as many people as possible to read and write in the vernacular have left a lasting legacy.

See also: Bible; Bible, English; Bible Translation into Lesser-Known Languages; Christianity, Protestant; Cultural Evolution of Language; Islam and Arabic; Religion: Overview.

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Religion: Overview

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Introduction

Religion is the conviction that there is more to the universe than can be immediately apprehended by human sensory means and that communication with that 'more' is feasible and desirable. One of the principal means of this communication has been human language, and this article aims to give (1) a brief account of the part that language can play in this and (2) a guide to other, more specific, articles in the encyclopedia.

Several aspects of life impel the human race toward religious approaches: desire for success in hunting animals, efforts to provide food by raising animals or growing plants, and the need to be kept from danger (predators or natural disasters). One of the strongest motivations toward religious thought and action is the desire to understand and account for phenomena that are especially frightening.

Language and the 'Numinous'

In unusual circumstances, humans have always experienced strange, particularly vivid emotions, including awe, fascination, and sometimes an awareness of forces outside their immediate observable environment. For example, in the Hebrew scriptures (Exodus 3.2–3) Moses sees a bush that is on fire but that does not get burned up: by this means, Moses' mind is focused on God, who can then speak to him.

Such circumstances are most frequently threatening, such as the danger of our own death, pain and suffering, the death of someone close to us, being alone for longer than usual, or calamitous weather conditions. Theologians have coined the term 'numinous' to refer to such experiences. The 'numinous' may sometimes also include more positive feelings: escape from the threat of death, recovery from illness, being reunited with our loved ones, and victory in battle.

One element in religion is the attempt to come to terms with the numinous, to describe the strange experiences to other human beings and to explain them. In many cases, unseen extrahuman forces (gods, spirits, angels) are assumed to be at work. We are then faced with two related tasks: (1) How can the unseen be apprehended? (2) How can the experiences be shared with others?

To assist in both these tasks, humans bring in the most highly developed human communication system, language. Animal communication appears to be limited to what can be directly observed (hunger, mating, defense of territory, perceived threats), whereas human language can cope with a far wider range of situations.

The distinctive properties of human language are generally taken to arise from the structure of the human brain and the way it functions (*see* **Cognitive Science: Overview; Anatomical Asymmetries versus Variability of Language Areas of the Brain**). These properties make it possible for human beings to speak of the unseen (even to construct systems of the unreal or the impossible).

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On the other hand, it is generally agreed that unseen forces and higher beings and concepts referred to by practitioners of religions must in some sense **transcend** human language and therefore cannot be exhaustively described or apprehended with full adequacy in terms of human language.

It is interesting to ask **how far** language is adequate for this task. To what extent does language give reliable results in this task? To this question different groups of people have given different answers, even groups of people within the same religious paradigm. Extreme mystics have sometimes taken the view that God completely transcends human language, whereas fundamentalists insist on the total authority of the written words of their scriptures.

Maintaining Religious Traditions as Languages Change

The words by which people approach and address their deities soon acquire a very special status in their communities. It is often the case that in order to be effective in influencing deities or other forces, these words must be **pronounced** in an accurate fashion. As the community's language undergoes changes and the old pronunciation is left behind and forgotten, this requirement begins to give rise to problems.

Believers, and especially priests or other leaders who are charged with conducting worship and ceremonial events, need to learn the old pronunciation, and this often requires the mastery of considerable technical detail by both learners and teachers. Written accounts of such technical detail have often proved to be of great value to linguists of later ages in their study of dead languages.

For instance, one of the first known detailed descriptions of the pronunciation and grammar of a language is Pānini's 'Eight Chapters' on the Sanskrit of the Vedas (*see* **Panini**; **Phonetics: Overview**), written at approximately the middle of the first millennium B.C. This work attempted to teach accurate pronunciation of the (archaic) Sanskrit language to the priests of the religion, enabling them to discharge their liturgical functions appropriately. Pānini has been described as 'the greatest grammarian of all time' (J. F. Staal), and his work has been described as 'one of the greatest monuments of human intelligence' (L. Bloomfield).

At the same time, the **ideas** expressed by the religious words (spoken or written) used by a community become authoritative. Before writing is available, these ideas are passed on from generation to generation by word of mouth. When writing becomes available, written documents come into being. Typically, often after a considerable period of discussion, decisions are made conferring canonical authority on certain selected religious writings, and in this way sacred scriptures arise (*see* **Bible**; **Judaism**; **Qur'an**).

This authority often goes hand in hand with the claim that a superhuman agency must have been at work guiding the writer in producing the document. Accounts are sometimes given of the 'how' of such guidance: these may range from passing brief comments, as, for example, Peter's statement in the Christian scriptures (2 Peter 1:21) that prophets 'spoke from God as they were carried along by the Holy Spirit,' to whole books written on the subject (for a fuller account, *see* **Inspiration and Revelation**).

Translation and Interpretation of Religious Texts

An alternative way of ensuring that religious texts continue to be understood when their language is no longer the mother tongue of the community is to make and use translations.

The process of translation raises a number of complex issues (*see* **Translation: History**; **Translational Equivalence**). Translations of religious scriptures are not exempt from such complications (*see* **Bible, English; Bible Translation into Lesser-Known Languages; Bible Translations: Ancient Versions; Qur'an**).

In particular, translation often forces a choice between equally possible interpretations of the original text. For example, in Hebrew and Greek (as in English) no distinction is recognized between 'inclusive we' (= 'I and you (and possibly others)') and 'exclusive we' (= 'I and others but not you'). Other languages, such as Tagalog (Philippines), have an obligatory distinction between these two categories, and the Bible translator must choose one or the other. Sometimes, of course, the context makes it clear whether the Hebrew or Greek 'we' is inclusive or exclusive, but there are occasions when either is equally probable; in these cases, the translation is forced to be more specific than the original text.

Translation brings into focus the problems of how texts are to be interpreted (*see* **Sacred Texts: Hermeneutics**). Groups within a religion may espouse specific interpretations and rule out others; certain interpretations may be characterized as departures from the norm ('heresies'). Authoritative texts may be written with the specific aim of defining limits of what can legitimately be said within a religion.

Languages and Varieties of Languages That Attain Religious Importance

Some languages become of paramount importance in the practice of certain religions (*see* **Islam and**

Arabic; Sanskrit; Hebrew, Biblical and Medieval; Christianity, Catholic; South Asia: Religions). In some cases, it is claimed that the language central to the religion is 'the language that God speaks' (*see* **Islam and Arabic**); then, translation into another language may be viewed as a dilution or demeaning of the message conveyed by the document in the original language (*see* **Qur'an**).

On occasion, a particular language that is not that of the original scriptures may be accorded special status within a religion: Latin in the Catholic Church is a good example (*see* **Christianity, Catholic**). For over 300 years, the English of the King James Version of the Bible had similar status within Anglican and other English-speaking churches (*see* **Bible, English**).

Special jargon or a distinctive way of speaking often becomes associated with a particular religious group (*see* **Quakerism; Rastafari Language; New Religious Movements**).

Religious Interaction between Communities

Religious customs typically go beyond the worship and liturgical customs. Ethical dealing, both within a community and between communities, is enjoined by all the great religions. In such cases, binding principles of behavior must be set out in words. Children or converts begin to learn these principles by learning the words.

Although peaceful interaction between religious communities is often the 'official policy' of the religions concerned, in practice religious differences are only too likely to lead to conflict, sometimes war. The unrest in Northern Ireland, for example, has focused on the religious differences between Catholics and Protestants. The divide between Orthodoxy (Serbs) and Catholicism (Croats) (compounded by the presence of a Muslim community) has again recently exerted its dire influence on the former Yugoslavia. South Asia has seen a great deal of conflict between Hindus and Muslims, and some between Hindus and Sikhs. Indeed, in some cases where one religious group undergoes conquest, its religion may be obliterated altogether.

Social divisions or enmity on grounds of religion often arise within a single language community: in Northern Ireland, for example, despite wide-ranging differences in religious vocabulary, Catholics and Protestants have English as a common language. Serbo-Croatian (Serbo-Croat) is generally held to be a single language, despite religious vocabulary differences and a difference in writing system (Serbian uses the Cyrillic alphabet, Croatian the Latin one). In South Asia, Hindi (the language most typically associated with Hinduism today, and written with the Devanagari syllabary) and Urdu (the language of most Moslems, and written using the Arabic writing system) share the same syntax; some scholars would argue that in essence they still form a single language (though others would say that the extensive lexical and morphological borrowing into Urdu from Western Farsi (Persian) and Standard Arabic (Arabic) has changed the language sufficiently to make it distinct from Hindi).

Specific Religions

The main religions are sometimes treated in this encyclopedia in individual articles (*see* **Judaism**). Quite often, however, the religions of a particular region can with advantage be studied together, because of their mutual influences (e.g., *see* **China: Religions; South Asia: Religions; Melanesian Religions**). Conversely, some religions require separate articles for different forms of the religion (e.g., *see* **Christianity, Catholic; Christianity, Protestant**), or for different geographical regions (*see* **Christianity in Africa; Islam in Southeast Asia**).

Some religiously important languages are treated in separate articles (*see* **Arabic; Islam and Arabic; Aramaic and Syriac; Hebrew, Biblical and Medieval**) whereas others are discussed under the heading of the religion concerned (for Church Latin *see* **Christianity, Catholic**).

Types of Language Use in Religions

Some religions, particularly those without written records or norms, may exhibit homogeneity of linguistic style across all linguistic contexts; in such cases, it might be straightforward to speak of 'a single type of religious language' within the language concerned. But in many cases, it is not so simple: the Jewish scriptures show a vast range of (sometimes overlapping) styles: myth, narrative, law, prophecy, poetry. In many religions, written liturgical forms are normally elevated in style, often veering toward the archaic; statements of doctrine and academic theological writings share features such as consistent use of technical vocabulary with scientific writings. In contrast, private prayer is much more likely to reflect everyday usage. Particular modalities of religious activity may exhibit their own stylistic features (*see* **Prayer and Meditation; Preaching; Prophecy**).

Utterances in a religious context may on occasion fall clearly outside the range of human languages actually known by the speakers. Ecstatic utterance is not unknown as a religious practice; neither is speaking in a language not already known by the

speakers (as on the day of Pentecost; cf. Acts 2). Either of these may become in some way institutionalized in the religious practice (*see* **Glossolalia**).

Thus, the term 'religious language' is, if intended to cover the language of all religious activities, something of a misnomer. However, it is nowadays used as a technical term covering, on the one hand, discourse about religion, including theological writing and statements of doctrine, and, on the other hand, discussion of how metaphorical expressions should be interpreted in religious texts (*see* **Religious Language**).

See also: Arabic; Aramaic and Syriac; Bible; Bible, English; Bible Translation into Lesser-Known Languages; Bible Translations: Ancient Versions; China: Religions; Christianity and Language in the Middle Ages; Christianity, Catholic; Christianity in Africa; Christianity, Protestant; Cognitive Science: Overview; Glossolalia; Hebrew, Biblical and Medieval; Inspiration and Revelation; Islam and Arabic; Islam in Southeast Asia; Judaism; Latin; Melanesian Religions; Myths about Language; New Religious Movements; Panini; Phonetics: Overview; Prayer and Meditation; Preaching; Prophecy; Quakerism; Qur'an; Rastafari Language; Religious Language; Ritual and Religious Language; Sacred Texts: Hermeneutics; Sanskrit; South Asia: Religions; Translation: History; Translational Equivalence; Zoroastrianism.

Religious Language

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What Is Religious Language?

The term 'religious language' is, if intended to cover the language of absolutely all religious activities, something of a misnomer.

Religions without written records or norms might conceivably exhibit homogeneity of linguistic style across all linguistic contexts; in such cases it would be straightforward to speak of 'a single type of religious language' within the languag'e concerned. But few religions are that simple: the Jewish scriptures (*see* **Bible**; **Judaism**) show a vast range of genres, including myth, narrative, law, prophecy, and poetry. In many religions, written liturgical forms are normally elevated in style, sometimes poetic, often veering towards the archaic; statements of doctrine and academic theological writings share features such as consistent use of technical vocabulary with scientific writings; while the language used in private prayer is much more likely to reflect the usages of everyday language. Particular modalities of religious activity may exhibit their own stylistic features (*see* **Hymns**; **Prayer and Meditation**; **Preaching**; **Prophecy**).

In common parlance 'religious language' is often taken to mean liturgical language. However, in scholarly contexts, the term has nowadays most often been used to cover (a) discourse about religion (including academic theological writing and statements of doctrine), and its relation to other types of discourse, and (b) discussion of how religious texts should be interpreted. This article will be mainly concerned with the former area, with principal emphasis on Christianity; the latter is the subject of another article (*see* **Sacred Texts: Hermeneutics**).

Theological Discourse, the Nature of God, and Early Christianity

As early as Plato (427–347 B.C.), thinkers began to realize that a great deal of theological discourse (spoken or written) was necessarily based on analogies and figures of speech, and hence needed to be interpreted with great caution. Discourse about unobservable entities must perforce use many of the same linguistic elements (on the levels of syntax and vocabulary) as discourse about observables. And yet on the level of meaning (semantics and pragmatics), we cannot always expect this parallel between unobservable entities and observables to carry through totally; we must face the question of how far figures of speech, and analogies between the observable and the unobservable, may be pressed.

The early Christian Fathers were well aware of the difficulties in this area: in the words of Clement of Alexandria (ca. 150–215 A.D.), "we only reach in a measure to the conception of God, knowing not what He is, but what He is not." (There is a sense in which this prefigures the teaching of Saussure (1857–1913) (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913)**) that linguistic elements are defined, not in terms of their positive properties, but negatively, in terms of their distinctness from other linguistic elements.)

In spite of this caution, Christian thinkers have expended a good deal of effort on the attainment of maximum accuracy and precision in discourse about God. Not surprisingly, this area has been the one of most difficulty in Christian theological discourse.

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In spite of this caution, Christian thinkers have expended a good deal of effort on the attainment of maximum accuracy and precision in discourse about God. Not surprisingly, this area has been the one of most difficulty in Christian theological discourse.

Two topics in particular occupied the attention of the early Fathers: the Trinity – 'Three persons in one God' – and the Person of Christ – 'Two natures (human and divine) in one individual.'

Also in spite of this caution, in their quest for accuracy and consistency with the sacred text of the New Testament, the Fathers were not slow to characterize certain theological discourse as being erroneous; those who held the views expressed in such discourse were excluded from the main body of the church. Christianity has perhaps gone further than any other religion in its attempts to formulate an exact understanding of God in this way.

Jewish thinkers (*see* **Hebrew, Biblical and Medieval; Judaism**) have adopted a much more pragmatic view of the nature of God than Christians and have generally been more ready to live with paradoxes, contradictions, exaggerations, and even jokes, in what is said about God. It is worth noting that Muslims have in general sought to avoid difficulties of this kind by refusing to be drawn into discussions of the nature of God (*see* **Qur'an; Islam and Arabic**).

From the 2nd to the 5th century A.D., generally accepted Christian teachings on the nature of God were codified in a number of creeds – formulae agreed on by General Councils of the bishops of the church as representing the facts of God's nature. Clearly, it is consistent with logic that **trust in** a person should be based on **facts known about** that person; the very earliest Christian creed 'Jesus is Lord' asserted the **fact** of Jesus' divinity, and **trust** in him as Master. Christian faith has always required a response on both levels, but one result of insisting on increasingly detailed creeds was that the 'personal trust in the work of Jesus' aspect of faith became less important, while the 'acceptance of creedal forms' became more important. For example, the Athanasian Creed (the last of the series of creeds) incorporates anathemas ('Without doubt he shall perish everlastingly') against the person who will not accept the technical definitions of the Trinity and the Person of Christ.

Interestingly, although the 16th-century Reformers strongly wished to reassert the importance of faith as 'personal trust in Jesus,' the mainstream movements of the Reformation, such as Lutheranism, Calvinism, and Anglicanism (*see* **Christianity, Protestant**), left these creeds entirely unchallenged. The major areas under dispute at the Reformation were: the balance between the authority of Scripture and the authority of the church traditions, the relationship between 'faith' (trust in God) and 'works' (moral living), methods of church government, and the use of vernaculars in worship and Christian discourse.

On the other hand, there were 'fringe' movements, e.g., Unitarianism, which **did** challenge the creeds on matters like the Trinity and the Person of Christ. Such movements often resurrected views of God that had originated very early in the church's history and then been rejected by the Fathers as heretical.

The Enlightenment and Theological Discourse

During the Enlightenment (18th century), Unitarian approaches were further developed, resulting in the philosophical approach known as Deism. This view accepted the idea of a universe brought into being by a Creator, but rejected all supernatural notions, including revelation and the possibility of a personal relationship between a human being and God. Creeds, based as they were on sacred texts held to have been revealed, had no authority.

This period also saw the rise of modern criticism – many teachings that in earlier ages had generally been held to be factual were subjected to much more stringent questioning, and even doubt. Questions of authorship and genuineness were raised about sacred texts. Principles that had been discovered to hold in other fields began to be applied in the religious and theological sphere. Texts that had hitherto been held to be inspired by God, and therefore unique, were shown to share linguistic and formal properties with non-inspired texts. Historical, philological and literary methods could appropriately be applied to these sacred texts just as to other texts.

Modern Philosophy and Theological Discourse

In the first half of the 19th century, Auguste Comte (1798–1857) propounded the philosophical view of Positivism. Comte saw the human race of his time as ready to progress beyond a theological and metaphysical basis for thought to an outlook in which 'positive' (i.e., observable) factors were to take priority over unobservable in providing explanations for the universe and its phenomena. He urged that only studies resting on observable facts were worthy of consideration as science. His influence was such that in the later 19th century, a serious conflict of aims and methods was perceived between religion and science.

In the 20th century, philosophy, especially in Great Britain, became particularly concerned with the contribution of language to the philosopher's enterprise. Some of the answers that had been suggested by earlier philosophers were perceived as deficient, because many of the questions that had been posed in reaching those answers had been expressed linguistically in ways that were misleading. These misapprehensions could often be corrected by a careful

examination of the language in which questions and answers were couched. This approach is often referred to as 'analytical philosophy.'

In their heyday (the 1930s), the Vienna Circle philosophers styled themselves 'Logical Positivists,' holding that all philosophical and scientific statements were to be verified with reference to observable phenomena only. All language that dealt entirely with unobservable entities was therefore, strictly speaking, meaningless. This verdict held for all metaphysical discourse including religious language and the language of ethics.

For a while, British analytical philosophers espoused this strict form of Logical Positivism. In the 1940s and 1950s, however, it became clear that being so strict was too sweeping a conclusion. It was realized that even scientific statements did not always lend themselves to conclusive verification. For any universal statement to be completely verified, every possible instance (conceivably a nonfinite number of them) would have to be investigated: "if it is recognized that such general propositions of law are designed to cover an infinite number of cases, then it must be admitted that they cannot, even in principle, be verified conclusively" (Ayer, 1946: 37).

Falsifiability, rather than verifiability, was then suggested as the *sine qua non* of meaningfulness. A hypothesis would be shown to be false if its predictions were not borne out by observable facts. If, after many comparisons of predictions with observed facts, no discrepancies between them were recorded, it could be assumed that there was a high probability of the hypothesis being true. But there would never be any possibility that the hypothesis could be conclusively proved to be true, since it might be falsified by the very next trial.

However, just as for verification, in order to falsify any universal statement, every possible instance would have to be investigated. Hence it was agreed that problems facing theologians and metaphysicians are not different in kind from those facing scholars in various other disciplines.

It was thus possible in the 20th century to build some kind of philosophical basis for religious and theological language; for an indication of how this could be done, see Ramsey (1957).

Other Problematic Areas of Theological Discourse

Problems for theological discourse that arise in speaking of the being and nature of God (see above) are not the only difficulties. Among others, probably the most complex and disturbing is how to account for the problems of suffering – how to answer questions like: "Why does God not respond to real and urgent need by doing the good things that he could do, and that would effectually meet that need?", 'How is it that there are so many exceptions to the principle that "God protects all who trust in him"?' or "If someone suffers greatly, have they sinned against God?" A further problematic field is the question of human free-will: "How far is the human will truly free?", "Does God intervene in the workings of his creation?" and "How are human beings to cooperate with God?"

See also: Analytic Philosophy; Blessings; Christianity, Protestant; Figurative Language: Semiotics; Hebrew, Biblical and Medieval; Hymns; Inspiration and Revelation; Islam and Arabic; Judaism; Logic and Language: Philosophical Aspects; Metaphor: Philosophical Theories; Philosophy of Language, Medieval; Prayer and Meditation; Preaching; Prophecy; Qur'an; Sacred Texts: Hermeneutics; Saussure, Ferdinand (-Mongin) de (1857–1913); Thought and Language: Philosophical Aspects; Translation and Genre: Sacred Texts; Verificationism.

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Remediation of Language Disorders in Adults

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Since the reports of Paul Broca in 1861 and 1865 and Carl Wernicke in 1874, there has been a long-standing interest in the nature of aphasia and the relationship between language and the brain. Yet, interest in language remediation in adults grew slowly, and it was only after World War II that most treatment strategies and techniques were developed (Basso, 2003). Today, there are many approaches to language rehabilitation for adults with acquired aphasia, and it is this heterogeneity that poses a challenge for practicing clinicians who must select the appropriate treatments for their patients.

There have been several attempts to categorize the numerous approaches to language remediation in adults. Based on a literature review of articles that were published in five major journals and that spanned approximately 20 years (1971–1991), Horner and colleagues (1994) identified six models of aphasia treatment, each of which are discussed below. Similarly, Basso (2003) presented a taxonomy of approaches to aphasia rehabilitation and their theoretical underpinnings. Basso's classification, which was based on historical trends in the latter half of the 20th century, closely agrees with the categories identified by Horner *et al.* (1994). Yet any taxonomy is a simplification – it is not always clear where one approach ends and another begins, so some therapies may be consistent with more than one approach. For example, Horner and colleagues note that of the articles they reviewed, the majority (21.7%) used a hybrid approach or multitheoretic approach. Other language therapies may not fit into any of the approaches, particularly when therapies from different countries worldwide are considered (Holland and Forbes, 1993). Nevertheless, the following six categories serve as a guide to the rich and varied treatments for aphasia. Selection of treatments occurs with consideration of patient-specific factors such as type, severity, and chronicity of the aphasia, the presence of associated impairments, and the patient's communication environments.

Taxonomy of Language Remediation Approaches

1. The Stimulation-Facilitation Approach is a term that is often used synonymously with Hildred Schuell, who proposed and supported this approach (Schuell *et al.*, 1964; Duffy and Coelho, 2001). It is based on the philosophy that, in aphasia, language is not lost, but rather cannot be accessed. Aphasia is considered to be unidimensional in nature so individuals with aphasia differ only in terms of severity, not in type of aphasia. Therefore, language rehabilitation can be essentially the same for all patients. Since the auditory modality is of prime importance in language processing and is also a key area of deficit in aphasia, treatment involves repetitive, intensive auditory stimulation. The auditory stimulation, which is designed to elicit a maximum number of responses, is sometimes paired with stimulation in other modalities. Error responses are not corrected but are followed by additional stimulation, which, if adequate, is likely to elicit a correct response.

2. In contrast to the premise that aphasia is unidimensional, proponents of the Modality Model view language as modality-bound, with aphasia being characterized as a modality-specific performance deficit that may involve one or more modalities. The goal of treatment is to remediate the specific input or output modalities, singly or in combination. One way that this can be accomplished is by systematically pairing weak and strong modalities to 'deblock' impaired performance. This principle can be applied regardless of the specific modality that is being treated. For example, when confrontation naming is difficult, repetition may be used to help the patient produce the correct response; then immediately after deblocking has occurred through the use of repetition, the target response may be accessed in the previously inaccessible modality (i.e., confrontation naming) (Weigl, 1961, cited in Basso, 2003).

Luria's functional reorganization approach, which has widely influenced aphasia research and therapy, is consistent with the modality model (Horner *et al.*, 1994). According to Luria (1963, 1970), when brain tissue is destroyed, its original function cannot be restored to its previous form but can be performed by means of a partially new neural organization. Therapy is therefore directed towards reorganization and transfer of the function to other brain structures or functional systems. With intersystemic organization, new functional systems are created through the use of other undamaged links, and the impaired function is carried out at a different level of the same functional system, either at a lower and more automatic level or at a higher and more voluntary level. Precise identification of which modalities are damaged and which are preserved makes it possible to develop and implement different training procedures.

3. The Processing Approach is based on the cognitive neuropsychological models of normal language

processes that have been developed for specific language tasks such as reading, spelling, naming, or sentence production (Hillis, 2001). These information processing models assume that a complex cognitive function consists of a system of distributed and interconnected modules or mental representations that allow for processing of different types of information in cascade fashion. The representations and processes do not necessarily correspond to locations in the brain, but reflect functional components of a cognitive operation. Rehabilitation begins for each individual patient with identifying which cognitive processes and representations underlying the language task are impaired and which processes and representations are intact. For example, the task of reading words aloud involves the graphemic input lexicon, while repetition of words involves the phonological input lexicon. However, both tasks involve the semantic system and the phonological output lexicon. By comparing performance across tasks, inferences about the integrity of these cognitive processes can be made. Treatment then focuses on either the remediation of the impaired cognitive processes, compensation via the intact cognitive processes, or both. The primary contribution of the Processing Approach is that it guides the choice of interventions; however, it does not provide direct motivation for specific treatment strategies (Hillis, 2001). There are many studies, mostly single case descriptions, in which cognitive analyses have been used to focus treatment; examples can be found in Hillis (2002).

4. Several treatment approaches are based on the premise that the minor hemisphere (i.e., the hemisphere that is nondominant for language) has specific abilities, such as visual-spatial, affective-prosodic, and paralinguistic abilities, that can be used to facilitate communication. Melodic Intonation Therapy (MIT) is perhaps the best known of these treatment approaches (Sparks, 2001). It is a hierarchically structured program that uses intonation and rhythm to increase the patient's ability to independently produce high-probability phrases and sentences. The steps of MIT range from intoning a melodic line and hand tapping to answering questions using drilled phrases and sentences. Other remediation approaches that are consistent with the Minor Hemisphere Mediation Model utilize drawing as a communicative function (Lyon, 1995) and encourage humor within the therapy session (Simmons-Mackie, 2004).

5. The Linguistic (Neurolinguistic) approach is based on the principle that language has an internal organization that can be described by a specialized system of rules. In aphasia, there is disruption of lexical-semantic, syntactic, and/or phonologic performance. Treatment therefore focuses on restoring language performance, using neurolinguistic principles that are specific for each linguistic impairment. For example, the Sentence Production Program for Aphasia (Helm-Estabrooks and Nicholas, 2000) systematically trains syntax using a story completion format. Selection of syntactic structures was based on a study of agrammatism that identified a hierarchy of difficulty across 14 grammatical constructions, with imperative intransitive statements being the easiest and future tense statements the most difficult. Another sentence-production training program, Cuing Verb Treatments, is based on the notion that the verb is the central constituent in sentence structure (Loverso *et al.*, 1986, cited in Thompson, 2001). In this approach, verbs are presented as the central core of the simple active sentence; patients are trained to produce the verb and, in response to a wh-question cuing strategy, also specific sentence constituents (usually noun phrases) that are assigned to various thematic roles by the verb (e.g., agent, theme).

Based on aspects of formal linguistic theory and neurolingusitic research and consistent with Chomsky's conceptual framework, Thompson and colleagues have developed a series of treatment strategies that use the underlying canonical form of complex sentences to improve sentence production (Thompson, 2001). Procedures target the underlying linguistic representations of sentences rather than treating the surface representation that is manifested in word order. Subjects are taught to recognize the verb, its arguments, and the arguments' thematic roles in active declarative forms of noncanonical sentences. Instruction concerning the movement of various sentence constituents are provided, and subjects are taken through the proper movement to derive the surface form of target sentences such as wh-questions. Additional morphemes required in the surface form of various sentences are provided and inserted into sentence frames. Once the noncanonical form is derived, subjects are required to orally produce them.

6. In the Functional Communication or Pragmatic approach, therapists are not interested in the accuracy of the linguistic message but focus on the patient's ability to communicate the intent of the message. Communication involves more than just speaking and understanding – it reflects the application of pragmatic rules and the ability to use language in a context. Therefore, treatment includes compensatory strategies for circumventing communication breakdown as well as strategies for communication breakdown repair. One of the best-known pragmatic approaches is PACE (Promoting Aphasic's Communicative Effectiveness) (Davis and Wilcox, 1985). In the PACE technique, four major treatment principles have been delineated in an attempt to incorporate rules of

natural communication into semi-structured treatment: the clinician and patient participate equally as senders and receivers of messages; the interaction incorporates the exchange of new information between clinician and patient; patients freely choose the channels through which they will communicate, such as words, gestures, drawing, or any other communication device; and the clinician's feedback is based on the patient's success in communicating the message. Extending treatment into natural communication settings and ensuring a positive communication environment through partner training, removal of environmental barriers to participation, and conversational supports are also consistent with a functional approach (Kagan, 1998; Lubinski, 2001).

Biological Approach to Language Remediation

As we acquire new knowledge about aphasia and brain-behavior relations, additional approaches to treatment that are not easily categorized with the present taxonomy are emerging. For example, Small (2004) has advocated for a biological model of aphasia rehabilitation, in which the goal of remediation is to alter brain anatomy and physiology so that language function can be restored. In order to effect the necessary neural changes, both novel biological treatments and speech-language treatment are necessary. While the biological treatment stimulates or repairs the injured brain area, language treatments are provided to retrain the new circuitry and integrate it with the preserved, existing tissue.

Intervening in the biology of the brain will have direct effects on language recovery. Pharmacotherapy is the most frequently used biological therapy for aphasia. To date, the effects of three groups of neurotransmitters on language deficits in aphasia have been investigated: dopamine agonists such as bromocriptine (Gupta and Mlcoch, 1992; Gupta *et al.,* 1995); dextro-amphetamine and other agents that affect catecholamine systems (Walker-Batson *et al*., 2001); and the nootropic agent, piracetam (Huber *et al.,* 1997). While its mechanism is not fully understood, it has been suggested that piracetam exerts its effect by improving cognition through cholinergic and excitatory amine neurotransmission (Huber *et al.,* 1997). While pharmacotherapy is not yet proven, Small (2004) suggests that it has promise, but only when accompanied by concommitant language therapy.

Another example of a biological therapy for language remediation in adults is repetitive transcranial magnetic stimulation (rTMS) (Martin *et al.,* 2004). Based on the premise that overactivity of the right hemisphere language homologues may be maladaptive and interfere with, rather than promote, aphasia recovery, rTMS was applied to the right hemisphere to reduce its cortical excitability. Preliminary results obtained in four individuals with chronic nonfluent aphasia indicated improved picture naming following 10 sessions of rTMS. Other types of cortical stimulation techniques and even neural transplantation may, in the future, provide promise – especially when linked with intensive language treatment (Small, 2004).

Treatment Efficacy and Effectiveness

Any discussion about language remediation in adults must also address the basic question of whether aphasia treatment works. To date, the historical record of clinical outcomes for treatments of aphasia is extensive (Cherney and Robey, 2001). Over time, experimental methodologies in the field of aphasia have improved (e.g., measuring the change in communication behavior from pre-test to post-test; controlling for time post onset; setting clear exclusion and inclusion criteria to establish homogeneous groups; introducing no-treatment control groups using deferred treatment groups; random assignment; and controls on the type(s), amount, and duration of treatment), so that findings have become less ambiguous and support the conclusion that treatment for aphasia is both efficacious and effective. While there are relatively few randomized clinical trials of aphasia treatment (Greener *et al.*, 2000), over 100 single-subject aphasia treatment studies have appeared in the literature. In addition, meta-analyses applied to the aphasia treatment literature have concluded that aphasia treatment is effective (Greenhouse *et al.*, 1990; Whurr *et al.*, 1992; Robey, 1994, 1998). The latter meta-analyses (Robey, 1994, 1998), based on 21 studies and 55 studies respectively, have suggested several other conclusions, such as:

- recovery of treated individuals was, on average, nearly twice as extensive as the recovery of untreated individuals when treatment was begun before 3 months post onset
- treatment brought about appreciable gains, even when begun after 3 months post onset
- treatment brought about large effects even in individuals with severe aphasia
- treatment exceeding 2 hours of treatment per week brought about greater treatment effects.

Future research in the area of language remediation for adults is likely to focus on the development of new and innovative treatments that are theoretically based and demonstration of their efficacy and effectiveness, using rigorous scientific methodologies.

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Remediation of Language Disorders in Children

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Disorders of language in children involve an inability to use the rules of form (syntax, morphology, phonology), content (semantics), or pragmatics (contextual use) to understand or produce messages. Rather than solely focusing narrowly on the disorder, the educationalist's remit encompasses the whole child's complex interaction with the environment, society, and culture. Remediation as such is only a partial goal.

Language disorders become significant when they result in serious disadvantage, particularly in learning and consequently in economic, social, emotional, and/or physical well-being. They range in severity from no recognizable receptive or expressive language, qualitative disorders where language is bizarre or meaningless, through to language delay, and interrupted or partial loss. Atypical language may occur in isolation or in a constellation of other factors. The overall effect will depend on the type and degree of language disorder, the age of onset, when identified, and the quality of intervention.

Despite more than 5% of the world's child population experiencing communication impairment serious enough to require specialist assistance, many children, particularly those in developing countries, do not have access to basic medical care, such as having their hearing or vision assessed and adequate prosthetic devices prescribed. Consequently many mild communication problems that could easily be rectified in childhood are left unattended, to assume debilitating proportions in adult life. At the global level, enormous inequalities occur in the types and quality of intervention available and this inequality is evident even in the wealthiest countries, especially those with indigenous populations.

Theories to explain how a child acquires language have helped shape program design for children with language disorders (Owens, 2005). Early 20th century studies concentrating on language form and learning theory gave rise to behaviorism (Skinner, 1957), a theory based on the assumption that all behavior including language is learned. With nurture the principal driving force, children learn language through modeling, imitation, practice, and selective reinforcement. Language problems, the result of faulty reinforcement, are therefore corrected by rearranging environmental events to provide more appropriate reinforcement. Behaviorist approaches tend to be considerably successful in limited, structured clinical tasks, but are much less successful outside that narrow context in achieving communicative competence in the real world. Nevertheless, behaviorism remains an important ingredient in contemporary program design, especially in clinical settings and with children with severe to profound communication disorders, because it can be highly structured and unambiguous.

Chomsky's (1957, 1965; *see* **Chomsky, Noam (b. 1928)**) syntactic model of psycholinguistics argued that the child has an innate predisposition to use linguistic rules, particularly those of syntax. Language users generate sentences using what he referred to as a language acquisition device. In this theory, nature is paramount. Bloom (1970) narrowed the nurture–nature gap by contending that language development is predicated upon cognitive development and therefore semantics, not syntax, is regarded as being more important. Her semantic-cognitive model of psycholinguistics concluded that the child requires an active, sensorimotor involvement with the environment in order to employ language to encode existing knowledge. Dore (1974), Bruner (1975; *see* **Bruner, Jerome (b. 1916)**) and Halliday (1975; *see* **Halliday, Michael A. K. (b. 1925)**) all stressed the importance of social exchange as the motivation behind language acquisition. They argued that language is both acquired and learned through the facilitative social interactions between caregiver and child. This emphasis on pragmatics and communicative purpose enabled interventionists to widen their approach by simultaneously considering both language training and learning context.

Sociolinguistic theorists consider a potentially larger communication unit, the discourse. Many differences observed among children's communication, previously thought to be disorders or incorrect language use, are merely differences that relate to the child's social and cultural background (Heath, 1986). Discourse analysis provides another level of insight into how language and context are intertwined.

The most far-reaching international change in the treatment of language disorders in children has been educational inclusion (McCormick *et al.*, 2003). At a micro-level, inclusion is about the inalienable human right of a child to attend their local school with same aged peers and to be catered for there in ways that match identified needs. Many countries have enacted this right into legislation, thereby providing hope to those who have been excluded from mainstream society because of their inability to communicate.

(This has been all too common in the developing world.) At the macro-level, inclusion has transformed service provision by shifting the locus of control out of individual disciplines, such as speech language pathology and special education, into the mainstream arena.

The resultant, eclectic, broad-focus, inclusive approach has the potential (if properly resourced) to cater much more effectively for the diverse needs of individual children with language disorders, in the most culturally responsive ways possible. Transdisciplinary collaboration, where team members work together without traditional rigid specialization boundaries to assume roles that are determined by the prioritized communication needs of the child, has emerged as the preferred style of interaction. Team composition may change as the child grows but most often comprises the child (whenever possible), the parents or guardians, the speech language pathologist, educators (both regular and special), and other providers according to the particular needs and age of the child. Transdisciplinary teams use a written program planning document to collaborate in assessment, planning, and implementation. In the United States, for children aged from birth to 3 years, it is the Individualized Family Service Plan (IFSP), for school-aged children the Individualized Education Program (IEP), and for those 14 years or over, the Individualized Transition Plan (ITP), which prepares the student for independent, yet well integrated, adult community living. At an international level, documents such as the IFSP, IEP, or ITP facilitate ongoing collaboration. Desired learning outcomes are chosen by the child whenever possible.

For the speech language pathologist, inclusion has meant a move from clinic based one-on-one-therapy to also working in the child's day-to-day environment, such as in the child's home, out in the community, and in the classroom. It has similarly meant a move from solely relying on standardized psychometric assessment to inform the instruction/intervention process, to employing more naturalistic assessment measures (*see* **Classical Tests for Speech and Language Disorders**). The focus away from objectivity alone to encompassing more holistic approaches has brought considerable benefits, but also considerable challenges, as it is dependent upon the adequate provision of resources (human, material, and temporal).

Together with inclusion, another equally important international development has been the emergence of early intervention. Early intervention involves the provision of specialist services to very young children deemed to have environmental, biological, and/or established risks of developing communication disorders, with the goal of minimizing risks and maximizing future potential. An example of this is early cleft palate surgery accompanied by speech therapy and family support. Researchers have identified key factors that may hinder children's language development or predispose them to developing language disorders. By identifying and treating these critical factors as early as possible, reductions occur in both the number of children displaying long-term difficulties and the severity of these difficulties (Bailey *et al.*, 2001). Much early intervention focuses on promoting facilitative parent–child interactions. Through the IFSP, team members ensure the provision of ongoing high-quality programs. Instead of being marginalized, involving family members in the decision making frames them as part of the solution, not part of the problem, as in the past. Involving families in language intervention whenever possible is a highly effective strategy, which is supported by research and legislation.

Mostly intervention approaches involve a strong emphasis on early intervention, inclusion, and collaboration. They are then further tailored to fit the particular needs of individual students as elucidated above. The following section specifically considers children with hearing impairment, intellectual disability, profound multiple disabilities, impairments in communication and social reciprocity, and specific language impairment.

For children with hearing impairment, the screening of newborns ensures early identification and allows for the immediate provision of state-of-the-art technology, such as hearing aids, cochlear implants, and extensive speech language therapy. The earlier the provision, the better the outcome with spoken language and overall education (Tobey *et al.*, 2003). The three major approaches to teaching communication are oral communication, total communication (a simultaneous combination of both spoken and signed-first language), and the bilingual-bicultural approach (where the child learns the sign language of the local deaf community and its culture). This approach particularly suits deaf children of deaf parents. As no sign language has a written form, deaf children must learn a sound based language to become literate and to promote community inclusion.

Children with intellectual disability experience delays in language development with the delay roughly matching the severity of their impairment. Once again, intervention is best when it begins early, is a natural part of the child's world, involves learning by doing, and is concrete rather than abstract. Intervention follows normal developmental guidelines, involves lots of repetition and overlearning, with new information regularly highlighted and explicitly taught (Owens *et al.*, 2002). Particular attention must be given to help the child generalize language

skills. For children with profound multiple disabilities, augmentative or alternative communication (AAC) systems may be required (Mirenda, 2003). Augmentative systems support speech and language, whereas alternative systems provide substitutes. These can be either unaided such as speech reading and gesture, which require expert knowledge; or aided such as communication displays that consist of objects, photographs, words, numbers, or symbols; or electronic devices such as teletext captioning, voice recognition, and output communication aids; or amplification systems such as FM hearing aids. Although there are a number of different programs available, one that can be used by families and educators alike is a hybrid approach that combines aided-language stimulation with naturalistic language strategies and incidental teaching (Cafiero, 2001).

Impairments in communication and social reciprocity such as Autism Spectrum Disorders or Pervasive Developmental Disorders require ongoing intense early intervention that involves family members. Systematic intervention that builds on the child's strengths, focuses on pragmatic aspects of communication, and teaches for generalization is also recommended. A popular but demanding program, Applied Behavior Analysis, uses the child's interests to guide target selection and activities, thereby increasing the likelihood for skill generalization (Campbell, 2003). Grandin (2004) claims she employs a fivefold synergistic approach to manage her own autism consisting of learning social skills, micro-doses of medication, daily intense physical aerobic exercise, a gluten-free diet, and psychoeducation involving mentors to help her gain increased understanding and control of her own abilities.

Children with specific language impairment form a heterogeneous group who experience problems associated with phonology, morphology, syntax, semantics, and pragmatics. They do not have any identifiable disabilities, making it a diagnosis of exclusion. These children are usually late talkers, have delayed language development, and often experience literacy problems once they start school, hence the connection with learning difficulties. Often they miss out on early intervention because they have not been identified early enough and similarly miss out on early support in school for the same reason. Six popular clinical language intervention approaches are: imitation, modeling, focused stimulation, conventional recasting, expansion, and scaffolding (Leonard, 1988; Bernstein and Tiegerman-Faber, 2002). In the classroom, strategies employed include behavioral approaches, metacognition, reciprocal teaching, self-instructional training, focused instruction in reading and written expression, co-operative learning, peer tutoring, parents as teachers, microcomputers, and training in social skills.

In conclusion, the gradual shift in emphasis historically from attending to speech disorders to attending to language disorders (including those that relate to speech) has paralleled a change in focus from oral language to literacy (Neuman and Dickinson, 2002) and from a concentration on the disorder to thinking about the whole child in complex interaction with the environment, society, and culture. Early intervention, educational inclusion, and family involvement using transdisciplinary collaboration are core strategies in the context of which therapy is provided for children with language disorders. Remediation is one arm of therapy but more important is the child's happiness and well-being. Therapy is by committed specialist teams that also include the child and the child's family. It is holistic and culturally sensitive. Technology is an important and developing adjunct. Communication support is a human right.

See also: Autism and Asperger Syndrome: A Spectrum of Disability; Bruner, Jerome (b. 1916); Chomsky, Noam (b. 1928); Classical Tests for Speech and Language Disorders; Disorders of Fluency and Voice; Down Syndrome; Halliday, Michael A. K. (b. 1925); Language Development in Blind Children; Language Development in Deaf Children with Hearing Parents; Language Disorders: 19th Century Studies; Language Disorders: 20th Century Studies, Pre-1980; Language Education of the Deaf; Remediation of Language Disorders in Adults; Specific Language Impairment; Williams Syndrome.

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Renaissance Linguistics: French Tradition

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Linguistic description of French was unknown in France before the 16th century. The first works relating to the grammar of French were written in England, starting from the mid- to late-13th century and settling into a set group of texts (dialogues, orthography, morphology, lexicon) by the end of the 14th century. The most complete grammar of French and one of the best dictionaries of French available before 1600 was John Palsgrave's *Lesclarcissement de la langue françoyse* (1530; see Kibbee, 1991).

In France, the study of French got a later start, beginning only in the 1530s after Geoffroy Tory's appeal to bring French under the control of rules (in the *Champ fleury*, 1529). This motivation emphasized morphology more than syntax, and evolved into a tradition of grammatical description continued by Louis Meigret (1550), Robert Estienne (1557), and Ramus (Pierre de la Ramée; 1562 and 1572). A parallel tradition of grammars for the learning of French as a second language developed in France and the Low Countries, with Jean Pillot (1550),

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Jean Garnier (1558), Gabriel Meurier (many works, starting from 1553), and Antoine Cauchie (1570). The study of the French lexicon developed in a flourishing dictionary tradition, although it remained during the 16th century a tradition of bilingual dictionaries, primarily French–Latin (Robert Estienne, continued and amplified by his understudies), with some French–Greek works (Budé and Henri Estienne). Collections of real and imagined etymologies (Perion 1555, Trippault 1580, H. Estienne 1565 (Book III), and Guichard 1610) added an historical component to the lexical field. These reference works provided the raw material for a lexical debate focusing on the acceptable expansion of vocabulary, primarily through introduction of dialectal and archaic words and the creation of neologisms. It involved translators, lexicographers, lawyers, and men of letters, featuring Du Bellay and Ronsard from the literary perspective, as well as Henri Estienne, Abel Mathieu, and many others from a more linguistic background.

A lively orthographic debate raged at the midpoint of the 16th century, pitting proponents of univocity (one letter should equal one sound) against conservators of etymological spelling. Meigret and Ramus led the charge of the reformers (religious as well as orthographic) and the movement largely died with them. (Meigret died ca. 1558; Ramus in the St Bartholomew's Day massacre of 1572.)

The subjective essays on French often drew on all these traditions. The evaluation of the vernacular attempted to define the 'naive puissance' of French, those features of French that distinguished it from its rivals, both ancient and modern. Henri Estienne, in his diatribes against Italian (especially 1578 and 1579), is the best-known polemicist for the French language, a tradition that continues to this day (but usually outside linguistic circles).

Morphology and Syntax

The grammarians of the 16th century started from the grammatical categories developed in the Greco–Latin tradition (especially Priscian and Donatus). This tradition is strong in the description and classification of morphology, less so in the description of syntax. Already in the 1520s, Robert Estienne published guides to the conjugation of French verbs and declension of nouns, manuals designed to help translators accurately render Latin into French. Thus, his grammar (1557) lists three different ways of forming the pluperfect 'conjunctive,' using the forms that, in the 21st century, would be called the past conditional, the pluperfect subjunctive, and the pluperfect indicative. The three are distinguished only by the conjunction used at the beginning of the clause, but because each can be used to translate the Latin pluperfect subjunctive, they are grouped in one category. Because these efforts did not describe French on its own terms, the first descriptions of French frequently included such categories as 'optative' mood in the verb conjugations and full six-case nominal and pronominal declensions. Applying such categories to French required grammarians to turn to semantic rather than morphological definitions of grammatical features, a move that paved the way for more abstract mentalist grammars in the 17th century.

Syntax in these grammars was generally limited to questions of agreement. Peculiarities in popular usage (e.g., *j'aimons*) were universally condemned, whereas the agreement of the past participle was a point of contention between the latinizing grammarians (Dubois) and those who felt more constrained by usage. Syntactic arguments were often invoked to resolve problems of morphological classification, particularly by Meigret and Ramus, but syntax in its own right held less interest for the grammarians of the 16th century than did morphology.

Jacques Dubois (Sylvius; 1489–1555)

The first grammar of French published in France was the *Isagoge in linguam gallicam* (1531), written by Jacques Dubois, a Picard physician whose medical writings were far more successful. It is divided into two parts, the *Etymologica* and the *Grammatica Latino–gallica*. The first part is an inventory of Latin–French letter correspondences, in which Dubois took no notice of the effect of context. Thus, he noted that Latin ⟨a⟩ can end up in French as ⟨a⟩, ⟨e⟩, ⟨i⟩, ⟨o⟩, ⟨ou⟩, ⟨ea⟩, ⟨ai⟩, or ⟨au⟩ without specifying in which contexts each of these changes took place.

In the grammar, Dubois sought to put French under the control of rules by reestablishing some parts of Latin usage that French had abandoned. His grammar followed the linguistic categories of Donatus and explained how Latin forms are rendered in French. As he considered the differences between French and Latin 'corruptions,' he sometimes recommended the substitution of Picard forms and practices for those of Paris, finding that his native dialect was closer to Latin. Meigret attacked the *Isagoge* for its failure to observe and follow usage, whereas Robert Estienne condemned its dialectal features. It was never reprinted.

Louis Meigret (?1500–?1558)

Louis Meigret, born into a well-known Lyons family, was an active translator, proponent of orthographic reform, and the author of the *Tretté de la grammere*

françoeze (1550), a much stronger effort in the description of French than the work of Dubois. It opened with a description of the sounds of French, a study at profited from his attempts at orthographic reform. Because of the radical reforms he proposed, he was forced to consider sounds rather than letters, a major advance that was largely ignored once the orthographic question was settled in favor of more traditional spelling. The rest of the grammar is devoted to the eight parts of speech, with the article (definite article only) inserted before the section on nouns. Meigret leaned toward semantic definitions of grammatical categories, but he did invoke morphology to deny the existence of neuter gender and nominal declension in French.

Robert Estienne (1503–1559) and Henri Estienne (1531–1598)

Robert Estienne's *Traicté de la grammaire françoise* (1557) is a catalogue of French morphology, derived in part from his earlier guides to conjugation and declension and in part from the works of Dubois and especially Meigret. Estienne admitted in his preface that the complaints about the orthography of Meigret's *Tretté* inspired his own efforts. Estienne's grammar is remarkable only for the clarity of its layout, testimony more to his skills as a printer than to his skills as a grammarian. Robert Estienne deserves much greater recognition for his lexicographic work (see the discussion on lexicography).

Robert's son, Henri, wrote the *Hypomneses de gallica lingua* (1582) as a supplement to his father's grammatical work, adding a long description of sounds and devoting the last 60 pages to assorted problems in syntax and semantics, including changes in meaning between preposed and postposed adjectives and various aspects of article usage. Although hardly complete, these often rich commentaries ventured into new areas in the description of French.

Ramus (Pierre de la Ramée; 1515–1572)

Ramus was an ardent opponent of scholastic philosophy, which earned him the enmity of conservative Catholic theologians at the Sorbonne. He wrote widely on philosophical, rhetorical, and grammatical questions, treating Latin and Greek grammar in the 1550s before writing the *Gramere* (1562), which he revised and transformed into traditional orthography in the *Grammaire* (1572). His basis in philosophy led Ramus to question methodological practices in grammatical description, and he made significant innovations in his insistence on using formal distinctions and complementary distribution to define grammatical categories. This organizational consistency, however, led to many grammatical inconsistencies.

The *Gramere* was divided into two parts, like Dubois's work: etymology and syntax. Etymology included the description of sounds and derivational and inflectional morphology. The strict application of his formalistic approach forced him to consider synthetic comparatives (e.g., *meilleur*) in the first part, and analytic comparative (*plus beau*) in the second. The confusion in the definition of moods led him to reject the category altogether. The basic information included in these works was taken mainly from Meigret. In the second edition, inspired by Henri Estienne's *Traicté de la conformité du langage françois avec le grec* (1565), Ramus pleaded for French grammar to be considered on its own terms, not in the light of Latin, but it was precisely his own reliance on Latin models that led him astray in many of his arguments.

Orthography and Pronunciation

Pronunciation *per se* was rarely dealt with directly in French treatises of the 16th century. Instead, grammarians concentrated on the relationship between letters and the sounds they represent. The reformers insisted on a principle of strict univocity (one letter = one sound), whereas conservatives found a variety of reasons to maintain traditional spelling. Still, in debating the merits of different spelling systems, the grammarians had to confront real issues in the description of the French sound system, such as the lack of orthographic symbols to represent the French sounds that did not exist in Latin (e.g., [ʃ], [ʒ], [z], [v], nasal vowels, schwa, etc.).

Toward the end of the century, the most significant efforts in the description of the French sound system came in works destined for foreign learners of French. Jacques Bellot (fl. 1580–1590), a native of Caen who taught French in England, developed a crude descriptive method for describing point and manner of articulation in phonetics. Claude de Sainliens (Hollyband; ?–1597), whose *French Schoolemaister* (1573) and *Frenche Littelton* (1576) remained basic texts for teaching French to English speakers well into the 17th century, offered a strong defense of traditional orthography in his *De pronuntiatione linguae gallicae* (1580), although he used diacritics to mark silent letters. Théodore de Bèze (1519–1605) wrote his excellent study *De francicae linguae recta pronuntiatione tractatus* (1584) for German-speaking students in Switzerland.

The orthographic debate was launched by Tory's *Champ fleury*, in which the printer from Bourges noted the variety of pronunciations represented by

the letters ⟨e⟩ and ⟨c⟩. Tory inspired an unknown author from Abbeville (Picardy) to compose the *Tres utile et compendieux traité de l'art et science d'orthographie gallicane* (1529), a work that proposed a more conservative (i.e., more Latinate) spelling in order to better distinguish homonyms. Dubois followed this line of reasoning when he proposed that *lisons* (from *lire*) be written *ligons* because in Latin there is a ⟨g⟩ (*legamus*). To accommodate French pronunciation and Latin etymons, Dubois experimented with some new symbols, such as ⟨ꝑ⟩ for the /s/ in *lisons*. In the same year as Dubois's treatise (1531), Tory introduced the use of the cédille. In 1533 appeared the *Briefve doctrine pour deuement escripre selon la proprieté du langaige francoys*, possibly written by Clément Marot. This work tried to regularize the use of various diacritics in French, including the apostrophe, grave and acute accents, cedilla, circumflex accent, and the diaeresis. Many of these innovations were incorporated into the last section of Etienne Dolet's *La Maniere de bien traduire d'une langue en aultre. D'advantage. De la punctuation de la langue Francoyse. Plus, Des accents d'ycelle* (1540).

Louis Meigret, Guillaume des Autels (1529–1581), and Jacques Peletier du Mans (1517–1582)

Louis Meigret also reacted quickly to Tory's appeal, composing a manifesto for orthographic reform (*Traité touchant le commun usage de l'escriture françoise auquel est debattu des faultes et abus en la vraye et ancienne puissance des letres*) and a sample text in his new orthography (his translation of Pliny the Elder). However, his reforms were considered too radical, and these works, written around 1531, were not printed until 1542 and 1543, respectively, and then only after they had been put into more standard orthography. A second edition of the treatise appeared in 1545. After some minor reforms were incorporated into Meigret's translation of Cicero (1547), the real breakthrough occurred in 1548, with the publication of Meigret's translation of Lucian's *Philopseudes*, printed entirely in Meigret's reformed orthography by Christian Wechel. This translation inspired responses from Jacques Peletier du Mans (*Dialogue de l'orthografe e prononciacion françoeze* and *Apolojie à Louis Meigret Lyonnais*, 1550) and Guillaume des Autels (*De l'antique escriture de la langue française et de sa poesie, contre l'orthographe des Maigretistes* (1548; published at the behest of Philippe Le Brun under the pseudonym Glaumalis de Vezelet). Peletier du Mans had already published (1545) in the introduction to his translation of Horace a letter outlining his sympathetic but cautious views on orthographic reform. To these critics, Meigret responded with his usual venom, in the *Défenses de Louis Meigret touchant son orthographie française contre les censures et calomnies de Glaumalis de Vezelet et de ses adhérents* and *La response de Louis Meigret à l'Apolojie de Jacques Peletier* (both 1550). Des Autels fought back with his *Replique de Guillaume des Autels aux furieuses defenses de Louis Meigret* (1551), which Meigret parried with the *Reponse de Louis Meigret à la dezesperée repliqe de Glaomalis de Vezelet, transformé en Gyllaome des Aotels* (1551).

Meigret identified three problems with French spelling: *superfluité* (letters that are not pronounced), *diminution* (sounds pronounced that are not reflected by letters), and *usurpation* (one letter is pronounced like another). By far the most common offense against reason in French orthography is the first, a weakness Peletier du Mans was willing to attack. However, he opposed most changes designed to remedy the second and third types of orthographic heresy (according to Meigret), which required more radical changes of habit.

The conservatives, represented by des Autels, argued that traditional spelling clarified the diachronic relationships between etymons and contemporary words, as well as the synchronic relationships between words of the same family. The maintenance of these etymological letters also helped foreigners learning French, presumably because they would already be conversant with Latin. Second, no spelling system could represent all the varieties of pronunciation: Each person would spell differently. Third, as pronunciation changed from period to period, spelling would be in a constant state of flux. These arguments, aided by the inertia of a literate public unwilling to master a new system, won the day, and spelling reform ever since has limited itself to minor points (e.g., the acceptance in 1835 of the spelling *-ais* for the imperfect endings). Meigret himself was forced to abandon his reformed orthography by printers who preferred profit to reason; the last translations he composed were printed in traditional orthography.

Ramus, Honorat Rambaud (fl. 1580), and Laurent Joubert (1529–1583)

In the last part of the 16th century, some appeals for reformed orthography continued to be heard – Ramus in the first edition of his *Gramere*, Rambaud in the *Declaration des abus que l'on commet en écrivant, et le moyen de les éviter et représenter naïvement les paroles* (1578), and Joubert in the *Dialogue sur la Cacographie fransaise* (a supplement to his *Traité du ris*, 1579). Rambaud went so far as to create a whole new alphabet of 52 characters that,

although simplifying sound–letter correspondences, complicated all other aspects of reading. Joubert's dialogue blamed the confusion in French spelling on Germanic influence, which, according to him, encouraged clusters of consonants (e.g., *prebstre*) lacking in the other Romance languages. By the end of the century, orthographic theory and practice had settled down into a somewhat reformed position: The exaggerated etymological letters had been dropped, but many unpronounced letters, in particular ⟨s⟩ in word-final and preconsonantal position, remained.

Lexicography

All the dictionaries relating to French in the 16th century were bilingual dictionaries, but the amount of information about the French words increased steadily, approaching French definitions of French words. That stage was finally reached with Nicot's dictionary (1606). As Latin word-lists, such as Alexander Neckham's *De ustensilibus* and John of Garland's *Synonyma* (12th century), grew into large manuscript dictionaries, such as Giovanni Balbi's *Catholicon* (14th century), the French glosses to these works became more and more informative about the vulgar language. The humanists, however, were repulsed by the medieval Latin additions to these dictionaries. Robert Estienne's work as a lexicographer grew out of his printing business, where he produced scholarly editions of newly discovered or newly collated Latin manuscripts. As the number of such editions grew, and as the translation of those editions into French became a more popular and more profitable enterprise for the printing world, the quantity and quality of French lexicography improved.

Robert Estienne's Latin and Latin–French dictionaries served as the lexicographic model for dictionaries produced all over Europe, establishing the selection of words included, the examples provided, and the order followed. The words had to be found in classical authors, the examples, where possible, in editions Estienne himself produced. Estienne replaced the topical organization preferred in most earlier dictionaries with an alphabetic organization that simplified the use of dictionaries as a reference tool.

The first Estienne-produced dictionary, the *Thesaurus linguae latinae* (1531), already included French equivalents, which were expanded in the 1536 edition. In 1538, he published his first fully bilingual dictionary, the *Dictionarium latino–gallicum* (Latin–French), which he reversed in 1539 to produce the *Dictionnaire françois–latin*. Estienne expanded this work, numbering about 9000 entries to 13 000 entries in the 1549 edition. A major step toward the creation of a French–French dictionary was the inclusion of French words drawn from 16th-century French authors in the 1549 edition. The work was reissued in 1564 by Thierry and in 1573 by Jean Nicot (1530?–1600), and the French was added to or replaced by German, Dutch, and English in a number of lexicographic works published abroad. Thus, Estienne's dictionaries had a great influence on lexicography and on the teaching of the French language across Europe. Furthermore, within France, they served to stabilize French vocabulary and standardize forms as they remained the principal lexical reference works until the dictionary of the *Académie française* (1694).

History of the French Language in the 16th Century

In the 16th century, the history of the French language served as primary evidence in the history of French institutions. The history of those institutions was itself crucial to the debate on the role of the monarchy, which in turn related to the Wars of Religion. French clearly had close affinity to Latin, and thus to Italian and Spanish. However, humanist admiration for Greek, Reform interest in Hebrew, and concurrent bursts of celtomania and xenophobia led to theories about the origin of the French language that resolutely pursued the implausible.

The thesis that French had Greek origins was supported by a number of Classical and biblical sources (Léon Trippault provided a summary in an appendix to his *Celt hellenisme, ou etymologic des mots francois tirez du graec. Plus. Preuves en general de la descente de nostre langue*, 1580). Many historians of French claimed that the Gauls spoke Greek or some closely related language. In this way, native gallican interests could be allied with the most prestigious of the ancient languages (and opposed to Italian/Latin). This linkage took on political significance in works, such as François Hotman's *Franco–gallia* (1573), in which evidence from diachronic linguistics was adduced to provide an historical basis for elected, constitutional monarchy and customary law, as opposed to divine-right absolute monarchy and Roman law.

At the same time, other scholars sought to establish links between Hebrew and French. Guillaume Postel (*Linguarum duodecim characteribus differentium alphabetum, introductio, ac legendi modus longè facilimus*, 1538) provided a basis for this work, which received occasional mention in the works of Joachim Perion (*Dialogorum de linguae Gallicœ origine, eiusque cum Grœca cognatione, libri quatuor*,

1555) and Trippault, and culminated in Estienne Guichard's *L'harmonie étymologique des langues hébraïque, chaldaïque, syriaque, en laquelle par plusieurs Antiquitez et Etymologies de toute sorte se demonstre evidemment que toutes les langues sont descendues de l'Hébraïque* (1610).

Such historical evidence was necessarily impressionistic, generally based on word-lists of fewer than 500 entries (Joachim Perion, Léon Trippault). The dangers of basing such conclusions on small lists of words led the more linguistically sophisticated Henri Estienne to argue not for a Greek origin of French, but rather closer affinity between constructions of modern French with ancient Greek (*Traicté de la conformité du langage françois avec le grec*, 1565). Even in these small word-lists, many of the etymologies were erroneous, for greater emphasis was placed on semantic similarity than on regular sound (letter) changes. One or two similar letters and a plausible story relating the meaning of French and Greek words were enough to establish the etymological link.

As the 16th century wore on, the flaws in this method became apparent. Abel Mathieu (*Devis de la langue françoyse*, 1559; *Second devis et principal propos de la langue françoyse*, 1560) established that many of the legitimate etymologies relating French to Greek words were words only recently introduced into French, in the wave of neologisms that accompanied the translation of Classical works into French. This theme was picked up by Etienne Pasquier (*Recherches sur la France*, 1560) and Claude Fauchet (*Recueil de l'origine de la langue et poesie françoise*, 1581), who first traced the history of medieval French literature. The absence of the supposedly Greek words in those texts helped destroy the myth of the Greek origins of the French language. Equally important, a new attitude toward etymology, insisting on methodical links between letters rather than on subjective impressions based on a limited portion of the complete lexical corpus, and a recognition of the difference between Vulgar Latin and Classical Latin, improved the accuracy of historical speculation. Jacques Bourgoing, counselor to the king, demonstrated the usefulness of the comparative method to correct the errors of the grecophile etymologists in his *De origine usu et ratione vulgarium vocum linguœ Gallicœ, Italicœ, & Hispanicœ, libri primi sive A, centuria una* (1583), thus setting the foundation for 17th-century historical work, such as Ménage's *Les origines de la langue française* (1650).

Subjective Appreciation of Language

The establishment of standard languages and the competition for preferred status among the modern languages in the 16th century inspired a number of observations, both within grammatical works and in special volumes dedicated to the subject, concerning the relative merits of European languages. Works, such as Du Bellay's *Deffence et illustration de la langue françoyse* (1549) and Ronsard's *Abrégé de l'art poétique* (1565), served this purpose on the literary side, whereas Henri Estienne provided the most pointed remarks from a more linguistic frame of mind (*Deux dialogues du nouveau langage françois italianizé*, 1578; *Project du livre intitulé de la precellence du langage françois*, 1579). The authors of such comments directed their attacks not only at competing vernaculars (especially Italian), but also at 'nonstandard' forms of their own language. Early in the century, dialectal forms were viewed approvingly as enriching the word stock of French, but as religious intolerance grew in the period of the Wars of Religion so too did linguistic intolerance. Meigret attacked what he labeled the 'effeminate' usage of the court, as well as the Picardisms of Dubois, only to be attacked himself for dialectal features of his native Lyonnais. Picard, Gascon, and Norman pronunciation were noted and rejected in orthographic and pronunciation texts, and a number of other dialects were noted (disapprovingly) in dictionaries. Thus, the stage was set for the linguistic absolutism of Malherbe, Vaugelas, and Bouhours in the 17th century.

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Renaissance Linguistics: Spanish Tradition

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The origin of Spanish Renaissance linguistics can be traced to Italy in the 1440s to the work of Lorenzo Valla (1407–1457). His ideas, goals, and methods decisively influenced early Spanish humanism. One of Valla's goals was the recovery of Classical Latin, rescuing it from what he perceived as the clumsiness and corruption of Medieval and Church Latin. Recovery of the language of Cicero and Virgil would make possible the rediscovery of Classical learning. Valla also wanted to discredit the canon of medieval grammarians and the scholastic philosophers who had provided the intellectual basis for medieval thought. Valla's tool to achieve both goals was philological exegesis (the use of grammar, rhetoric, and history to establish the validity of part or all of a text), which was not of his invention but which he developed and perfected (*see* **Philology and historical Linguistics**).

Humanist questioning of Medieval Latin texts presented a problem for the Church, since much of Church doctrine had resulted from readings of those texts. The Church was also troubled by humanism's rejection of scholastic philosophy because it served as the base for medieval theology. The resulting conflict between the Church and humanism greatly affected grammatical studies during the Renaissance, to some degree everywhere in Europe but particularly in Spain.

During the early Renaissance an interest in 'vernacular humanism' paralleled the interest in 'Classical humanism.' The concern with correct usage of Latin was transferred to the vernacular languages, and it led to the writing of both grammars and treatises on the merits and values of these languages. For Spanish, one of these treatises deserves special consideration, the *Dialogo de la Lengua* (1535; written in Naples, first published in Madrid in 1737) by Juan de Valdés (ca. 1495–1541). It is an attempt to do for the Spanish language what Pietro Bembo (1470–1547) had done for Tuscan (Italian) in his *Prose della Volgar Lingua* (1525). The development of national states and the need for a unifying official language added to interest in the study of the vernaculars.

Early humanists were not interested in explanatory theories of grammar; their objective was to describe the language of the great figures of Classical antiquity, not to explain the nature of language and how it worked. Moreover, the theoretical approach to language with which they were familiar, speculative grammar, had been developed within Aristotelian scholasticism, which they rejected. However, toward the end of the first half of the 16th century, when the goals of the humanist movement had been achieved, interest in theory again developed. With regard to linguistics, the Renaissance can be divided into two major periods. The first one is dominated by descriptivism and the second one by an interest in explanatory theories of language and grammar. In Spanish Renaissance linguistics one finds the same two periods, the second one beginning toward the 1580s. Each period in Spain was dominated by one major figure, Nebrija and Sanctius, respectively. Those

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topics of Spanish linguistics that overlap the previous temporal division will be treated separately.

The Early Renaissance in Spain

Lorenzo Valla's ideas and methods spread to Spain quickly, earlier than to other areas of Europe. This is partially explained by the Spanish (Aragonese) presence in Italy. In 1440, Valla, while acting as secretary of Alfonso V of Aragon, wrote *Declamatio de Falso Credita et Ementita Donatione Constantini*, in which he first used the philogical method to expose as fraudulent the document used by the Church to claim the Italian territories of the former Roman Empire. Obviously, this favored Alfonso's claim to territories in Italy.

A more important factor was Antonio de Nebrija's humanistic training in Italy. In 1463, at age 19, Nebrija left the University of Salamanca to continue studying at the Spanish College in Bologna. He spent 7 years in Italy studying the ideas and methods of humanist philology. When he returned to Spain in 1470, Nebrija had become a devoted follower of Valla.

Antonio de Nebrija (1444–1522)

Antonio (also Elio Antonio) de Nebrija (or Lebrija, for his place of birth in southern Spain) dominated the early Renaissance in Spain through the volume, quality, and diversity of his work. He was the first to cover all the fields and languages of interest to early humanism. He wrote grammars of Latin (including a 1486 version in Castilian for Queen Isabella) as well as one of Castilian. He also wrote bilingual dictionaries of Latin and Castilian, and studies on the orthography and pronunciation of Classical Latin, Greek, and Hebrew. Nebrija also wrote dictionaries of Latin legal and medical terminology, a book on history and archeology of Spain, and other diverse works, including poetry composed in classical Latin.

Nebrija's first major work, *Introductions Latinae* (Salamanca, 1481) appeared while he was teaching at the University of Salamanca. It was an immediate success; by the time of its author's death the book had gone through at least 50 editions or printings in Spain and abroad. After Nebrija's death, the *Introductiones* was published several times during the 16th century in France and Italy. An English translation of the 1486 Castilian version appeared in England in 1631. In Spain, the *Introductiones* was the most popular text for teaching Latin until the 18th century. Its success was determined mostly by its didactic nature. Nebrija was an admirer of the Latin (Byzantine) grammarian Priscian, but he realized that Priscian wrote for students whose first language was Latin, whereas he wrote for students with no knowledge of Latin when they arrived in school; the book was the first one consciously written for students of Latin as a second language.

His dictionaries, Latin–Spanish (1492) and Spanish–Latin (ca. 1495), were models of lexicography; they represented a complete break with the medieval tradition in this kind of work. His Spanish grammar, *Gramática de la Lengua Castellana* (Salamanca, 1492), was the first complete one for a modern language. It includes books (sections) on syntax and on Spanish for foreigners, in addition to the traditional sections on orthography, pronunciation, prosody, and morphology. Rather than simply adapting and translating from Latin, Nebrija in the *Gramatica* developed a new grammatical terminology for Spanish.

In 1502, Nebrija joined the group set up in Alcalá by Cardinal Jiménez Cisneros to publish a polyglot Bible, but he abandoned Alcalá when Cisneros forbade changes in the Medieval Latin version. On returning to the University of Salamanca he tried to publish a list of biblical errors deriving from a poor knowledge of Latin, Greek, and Hebrew, but the Grand Inquisitor prohibited the publication and ordered Nebrija to surrender the list, which he did. Nebrija's problems with the Church and the Inquisition had no grave consequences, but only because of his friendship with the leaders of the Spanish Church and with the Spanish monarchs Ferdinand and Isabella. Later grammarians would not find dealing with the Inquisition as easy.

Nebrija spent his last years as a professor at the University of Alcalá, which had been founded by Cardinal Cisneros. In recognition of the importance of Nebrija's scholarship and continuing productivity, Cisneros said in the decree of appointment that the Spanish grammarian would draw a salary whether he taught or not.

Other Descriptive Grammars

Several grammars on Spanish were published before 1580, but only one in Spain proper, Baltasar Sotomayor's *Grammatica* (1565), which compares Spanish and French to facilitate the learning of the latter. Four were published in the Spanish territories of the Low Countries, in Amberes (Antwerp), or Lovaina (Louvain), all to facilitate the learning of Spanish. Two are anonymous (1555 and 1559), but the authors of the others were Gabriel Meurier and Cristobal Villalón (both 1558). Meurier's includes French as well as Spanish, whereas Villalón's is the best of this whole group. Two grammars appeared in Italy during this period, those of Giovanni Mario Alessandri

(1560) and Giovanni Miranda (1565). None is comparable in intent or content to Nebrija's.

Latin grammars were published by Bernabé de Busto (Salamanca, 1533) and Bachiller Thamara (Antwerp, 1550), both in Spanish, but only four works on the Classical languages written during this period, all by the same author, deserve consideration, and only because the author, Francisco Sánchez de las Brozas (usually referred to in Spanish as 'el Brocense' and in other languages as 'Sanctius') is the major figure of the second part of the Renaissance in Spain. Two of his introductory textbooks on Latin were published in Lyon in 1562; another one, written in Spanish, was published in Spain in 1576. Sanctius published an introductory Greek grammar in Antwerp in 1581. His major work, the *Minerva*, is discussed later.

Certainly worthy of mention is the work on Amerindian languages done by Spanish missionaries in the New World. They had composed by 1571 five grammars of Mexican languages (one of Tarasco and four of Nahua) and one of the Quechua of Peru. All had attached vocabularies in the local language and Spanish. This was achieved while there were many modern European languages, English and German among them, for which full grammars had not yet been written.

The Late Renaissance in Spain

Descriptive grammars of Spanish continued to appear during the second part of the Spanish linguistic Renaissance; many of them, by authors of other nationalities, were published abroad, in England, France, Germany, and Italy. Of those published in Spain the only one worthy of mention is Bartolomé Jiménez Patón's *Instituciones de la Gramática Española* (Baeza, 1614).

The first dictionary of Spanish, by Sebastián de Covarrubias (1539–1613), the *Tesoro de la Lengua Castellana o Española*, was first published in Madrid in 1611. Covarrubias included archaisms, neologisms, loan-words (many of Amerindian origin; e.g., *canoa* 'canoe' and *hamaca* 'hammock'), and vulgarisms, labeling them as such. Definitions are usually precise and concise but complete, except when dealing with terms related to history, geography, the arts, religion, mythology, or the exotic. The entries for the latter resemble those of the medieval encyclopedic treatises, as do many of his often incorrect etymologies. The book, however, is of great value for its documentation of the lexicon of the period and for the interpretation of the writings of Covarrubias's contemporaries.

Sanctius (1523–1600)

Francisco Sánchez de las Brozas (Sanctius or 'el Brocense') was born in western Spain but spent his early life in the service of the Portuguese court. After returning to Spain at age 20 he dedicated himself almost entirely to the academic life. He studied at the Universities of Valladolid and Salamanca, and in 1554 he became a *praeceptor* 'lecturer' at the Trilingual (Latin, Greek, and Hebrew) College of the latter university. In 1573, he obtained the Chair of Rhetoric and later those of Greek and Latin, all at Salamanca. In addition to those books mentioned previously, he wrote treatises on rhetoric, philosophy, and theology, as well as translations and editions of literary works.

In 1584, Sanctius was ordered to appear before the Inquisitorial Tribunal in Valladolid, reprimanded for his textual interpretation, and warned that future errors would be severely punished. In 1593, the year of his retirement from the university, he was again investigated by the Inquisition. Sanctius died before the end of his trial and was denied burial honors. The Inquisition's preoccupation with Renaissance philology and grammar is evident from the pejorative use of the word *gramático* 'grammarian' during the trial when addressing Sanctius. This explains why Sanctius (and later Correas) never wrote a treatise on grammatical theory, on linguistics as such. His ideas on the subject have to be culled from a book that is in appearance nothing more than a study of Latin grammar, *Minerva: seu de Causis Linguae Latinae* (Salamanca, 1587).

Sanctius's approach to grammar and language can be placed in the same mentalist, rationalist tradition of medieval speculative grammar that developed the ideas first posited in Aristotle's *Peri hermeneias*. The full title of his *Minerva* shows that he acknowledged a debt to Julius Caesar Scaliger's (1484–1558) *De Causis Linguae Latinae* (1540); his influence on the Port-Royal grammarians was expressly recognized by one of the authors (Claude Lancelot) of the *Grammaire Generale et Raisonnee* (1660).

There are, however, major differences between Sanctius and those who precede or follow him. Sanctius is the only one to postulate an underlying structure that is syntactic rather than semantic in nature, as well as the only one to postulate a grammatical or syntactic system rather than a purely logical one. He constantly justify what he says by referring to *grammaticae ratio* 'grammatical system or logic.' His underlying structure not only includes elements that must be understood as deleted from the surface but also includes grammatical forms that, as Sanctius shows, are essential at that level but cannot appear in the surface. In the *Minerva*, the perfect grammari-

an is defined as one who in Cicero's or Virgil's books will identify which words are nouns, which are verbs, as well as other matters that concern only grammar, even if he does not understand the meanings of the words. Not until much later can one find a statement that so clearly upholds the autonomy of grammar. Sanctius did not develop a system of rules to relate his two levels of syntactic structures, but the *Minerva* is closer to modern generative grammar than any other work written before the 20th century.

Other Theoretical Grammarians

Two other Spanish grammarians of the 17th century showed a major interest in grammatical theory, Correas and Caramuel. The former applied and developed the ideas of Sanctius, and the latter represented a return to late medieval grammatical thought.

Gonzalo Correas (1571?–1631) was born in the same area of western Spain as Sanctius. Correas taught Greek and Hebrew at the University of Salamanca. He published grammars of Greek, Latin, and Spanish (and a now lost one on Hebrew); edited and translated Classical works; compiled a collection of Spanish proverbs and popular sayings; and composed some minor poetry in Greek, Latin, and Spanish. In his time he was very well-known for several treatises proposing the radical reform of Spanish orthography.

Correas was the most important follower in Spain of the author of the *Minerva*. Like Sanctius, Correas never wrote a linguistic treatise as such. His ideas on grammatical theory and universal grammar appear in the *Arte Grande de la Lengua Castellana*, an excellent and lengthy grammar of Spanish finished in 1626 but not published until the 20th century, and in the *Trilingüe de Tres Lenguas* (Salamanca, 1627), which includes grammars of Spanish, Latin, and Greek – all written in Spanish. Correas held that grammar (i.e., syntax) was for the most part common to all languages, and he made use of this idea in writing the *Trilingiie*. In his treatment of syntax he closely follows Sanctius.

Juan Caramuel y Lobkowitz (1606–1682) was a bishop who subscribed to the ideas of Scholasticism. His only book on grammar, the *Grammatica Audax* (Frankfurt, 1654), dealt with Latin. He was a follower of the medieval *Modistae* and their speculative grammar, particularly of Thomas of Erfurt, whose *De Modis Significant sive Grammatica Speculativa* (ca. 1305) was at the time attributed to J. Duns Scotus (Caramuel claimed to be a follower of Duns Scotus). Caramuel's *Grammatica* anticipates the semantic and logical position of the authors of the Port-Royal grammar.

The Preoccupation with Orthography

The first treatment of the writing system of Spanish appears in Enrique de Villena's *Arte de Trovar*, completed in 1433. It is an interesting work, but it should be studied in the context of the Middle Ages rather than here. The first to treat this subject in the Renaissance was Antonio de Nebrija in his 1492 *Gramática de la Lengua Castellana* and later in his *Reglas de Orthographia en la Lengua Castellana* (Alcalá de Henares, 1517). Nebrija was perfectly aware of the difference between letter and sound of language; in the *Reglas* he very clearly stated that a letter is nothing but a mark or figure through which a sound of language is represented. In the same book, he said that humans can make an infinite number of sounds, but that each language has a limited number of specifically linguistic sounds, showing his awareness of what modern linguistics calls 'phonemes.'

Writing after the invention of printing, Nebrija shared with many of his contemporaries the preoccupation with the standardization of orthography, to the point of suggesting that the standardized form be enforced by royal decree. Spelling, Nebrija said, should show a one-to-one relationship between letters and sounds; both in the *Gramatica* and in the *Reglas* he insisted on requiring that one write as one speaks and vice versa. Nebrija proposed the reform of Spanish orthography to make it adjust to the previous ideal of biuniqueness. This concern with the correspondence between speech sounds and letters was shared up to the late 20th century by most Spanish grammarians.

The most interesting proposals for spelling reform during the later Renaissance are those of Mateo Alemán, a major literary figure whose *Ortografia Castellana* (Mexico, 1609) reflected the changes that had taken place in Spanish pronunciation since Nebrija's time, and those of Gonzalo Correas, whose *Nueva i Zierta Ortografia Kastellana* (Salamanca, 1624) and *Ortografia Kastellana Nueva i Perfeta* (Salamanca, 1630) reflect in their titles some of the changes he proposed.

Historical Linguistics

As stated previously, during the early Renaissance vernacular humanism ran parallel to Classical humanism, very often in the same author. Proponents of the merits of the vernacular languages were familiar with the mostly mythological histories of Latin and Hebrew and felt the need to give a similar historical background to their own languages. Nebrija, in the introduction to his Spanish *Gramática*, gave a nutshell history of the Spanish language; he correctly

saw Castilian as developing from the 'corruption' of Classical Latin. Since he perceived the latter as the most perfect of languages, claiming it as the ancestor could not but enhance Castilian, even if corruption was the link between the two. The idea, essentially correct, was embraced by grammarians and authors of treatises on language during most of the 16th century. However, perception of Spanish as an imperial language, spoken by the rulers of the Low Countries, most of Italy, and immense territories in the New World, Asia, and the Pacific Ocean, made scholars desire an even more illustrious beginning for the language. Spain was not in this alone; most of Europe was making fantastic claims for the particular vernacular of each country.

In this context, in 1588, 'relics' were found in Granada, among which were manuscripts supposedly dating from the first century A.D., some written in Latin and others in Castilian. Some of the documents in Castilian were attributed to St. Cecil, disciple of St. James the Apostle, patron of Spain. Until the end of the 17th century, when the Vatican declared that the relics were false, they served to validate claims that Castilian developed independently, rather than being a 'corruption' of Latin, and was at least as old as the latter. The first history of the Spanish language, Bernardo José de Aldrete's (1560–1641) *Del Origen y Principio de la Lengua Castellana O Romance que Oi se Usa en Espana*. (Rome, 1606), was written to combat this so-called 'theory of early Castilian.' José de Aldrete, although he himself was a member of the clergy, published his book in Rome to avoid conflict with the Spanish Church and Inquisition. For the same reason, rather than questioning the authenticity of the relics, he said that the documents were written in Spanish not because the language was spoken in the first century A.D. but because St. Cecil had worked the miracle of writing in a language that would not exist until 1000 years later. By giving a miracle as an alternative explanation, José de Aldrete obviously hoped to safeguard his work from attacks by the Church. José de Aldrete's book is more modern than any written on historical linguistics up to the end of the 18th century.

Dialects and Sociolects

A number of the grammarians working with the vernaculars during the Renaissance noted the geographic and social variety occurring in those languages. As early as 1535, Juan de Valdés in his *Diálogo de la Lengua* said that there were many varieties of Castilian because it was spoken in many regions, each region having vocabulary items and pronunciation that were peculiar to it. He pointed out two reasons for this variety: diversity of realms and contact with speakers from neighboring regions. In his *Del Origen y Principio*, Bernardo José de Aldrete devoted an entire chapter to dialects, calling them by that same name. José de Aldrete stated that there are as many dialects of one same language as there is geographic diversity. He pointed to differences between rural and urban speech. He stated that there is diversity even within a city, if it is large enough, as well as between speakers from lowlands and mountains in rural areas.

Sebastian de Covarrubias's *Tesoro* is the first Spanish dictionary that gives a definition of dialect. It is, Covarrubias stated, that which is peculiar to each language, through which we distinguish the speech of Old and New Castile, of Andalusia, and of other regions, where, even though the same Castilian language is spoken, there are different manners of pronunciation and of forming vocabulary; also, all other nations have these same differences that distinguish people from one province from those of another. Covarrubias often noted the regional and social usage of the words he defined.

Gonzalo Correas, in his *Arte grande*, called for a standard or norm – that of pure Castilian. This notwithstanding, he criticized some aspects of the language in Castile. Throughout the book, he discussed regional differences, those that are morphological or syntactic as well as those that occur in pronunciation and vocabulary. He even recognized social variety, indicating that this occurs because of age, social class, sex, profession or occupation, and rural or urban condition. More important, Correas stated that each social variety, each sociolect, was as valid within its context as any other, specifically indicating that the linguistic style of the court and nobility was only one part of each language, other styles being just as good and as elegant for their speakers and circumstances.

Dialectology and sociolinguistics did not come into their own until much later. However, modern linguists will not find fault in the previously discussed ideas of the Spanish Renaissance concerning geographic and social variety.

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Louis Marie Joseph Renou, the famous French Indologist, was educated in Paris. In 1914, the war interrupted his studies, and eventually he spent 2 years as a prisoner of war. After the war, he continued Indological studies under Sylvain Lévi (also, later, Meillet, Bloch, and Foucher) and graduated in 1920. Following the example of Bergaigne, he concentrated on Vedic studies, though he originally also pursued Greek studies (P. Chantraine was his close friend). He received his Ph.D. in 1925 in Paris. In 1925 he succeeded F. Lacôte as professor of Sanskrit at Lyon but returned soon, in 1928, to Paris to succeed L. Finot at École Pratique des Hautes Études. In 1936 he succeeded A. Foucher as professor of Sanskrit at Sorbonne and, in 1946, P. Pelliot at Académie des Inscriptions et Belles-Lettres. He was visiting professor in Pune (India) in 1948–1949 and at Yale in 1953. In 1954–1956 and in 1959, he was director of Maison Franco-Japonaise in Tokyo.

Louis Renou was one of the greatest scholars of the Veda and of Indian grammatical tradition, but he was also interested in classical Sanskrit poetry. As a Vedist, he followed the example of Bergaigne, Oldenberg, and Geldner in attempting to interpret Vedic texts in their Indian context and as whole works. He was much engaged in grammatical and semantic studies. His major works include the unfinished translation and commentary of the Rigveda (*Hymnes et prières du Veda* [1938]; *Hymnes spéculatifs du Véda* [1956], and several volumes of the series *Études védiques et paninéennes*), three grammars, a manual of Sanskrit grammatical terminology, and the editions-*cum*-translations of *Pāṇini*, *La Kāśikā-vṛtti* (together with his pupil Y. Ojihara), and the *Durghatavṛtti*. Renou's *Bibliographie védique* (1931) was a basic tool of research; the work was later continued by R. N. Dandekar in Pune.

Renou was a popular teacher who even in his teaching concentrated on Sanskrit, leaving comparative linguistics to A. Minard. As a structuralist, Renou studied the different forms and genres of Sanskrit literature, including aesthetics and philosophy. Often he also discussed questions of religion, especially of Vedic ritual. He wrote several popular introductions and translated classical Sanskrit literature. He was one of the authors of the still-standard Sanskrit–French dictionary, and with Jean Filliozat he edited and to a large part wrote a massive introduction to classical Indian civilization (1949–1953). An important part of his large production was published as articles, often quite long, especially in the *Journal Asiatique*, many of which are now published in two collections (Renou, 1978, 1997).

See also: Sanskrit.

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Reported Speech: Pragmatic Aspects

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Every speech event involves a speaker, who usually commits him- or herself to its propositional, functional, and evaluative contents. But we can also refer to utterances of others and report what they said, wrote, meant, or thought. Reporting, a metalinguistic act, may be done through quoting (direct speech, *oratio recta*), paraphrasing (indirect speech, *oratio obliqua*) or in other ways and can relate to every aspect of an utterance. It is a powerful communicative strategy, whose different pragmatic functions are conventionalized (e.g., as a way of characterizing speakers rather than reproducing their utterances) or merely rhetorical (Roncador, 1988).

Multifunctionality of Reported Speech

Reported speech is multifunctional on several levels. On a very general level of establishing social order through talk, speakers report in order to display their understanding both of what occurred during a previous conversation and how it fits into the current communicative event. On a more pragmatic level, and with different degrees of authenticity and correspondence with the reported speech event, the reporter may simultaneously relate the propositional and functional content of the reported discourse, its contextual and situational environment, the way in which it was presented, and the speaker's (and/or the reporter's) emotional state and attitudinal stance.

Evaluative Functions

Evaluation is the central pragmatic function of reported speech. It can be related to its three main components: the source (who is responsible for the reported proposition), the reporting expression (referring to the source's saying), and the reported proposition(s) (what is reported).

The Source

Descriptions and qualifications of the source can be used strategically by speakers with the aim of influen-

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Reported Speech: Pragmatic Aspects

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Every speech event involves a speaker, who usually commits him- or herself to its propositional, functional, and evaluative contents. But we can also refer to utterances of others and report what they said, wrote, meant, or thought. Reporting, a metalinguistic act, may be done through quoting (direct speech, *oratio recta*), paraphrasing (indirect speech, *oratio obliqua*) or in other ways and can relate to every aspect of an utterance. It is a powerful communicative strategy, whose different pragmatic functions are conventionalized (e.g., as a way of characterizing speakers rather than reproducing their utterances) or merely rhetorical (Roncador, 1988).

Multifunctionality of Reported Speech

Reported speech is multifunctional on several levels. On a very general level of establishing social order through talk, speakers report in order to display their understanding both of what occurred during a previous conversation and how it fits into the current communicative event. On a more pragmatic level, and with different degrees of authenticity and correspondence with the reported speech event, the reporter may simultaneously relate the propositional and functional content of the reported discourse, its contextual and situational environment, the way in which it was presented, and the speaker's (and/or the reporter's) emotional state and attitudinal stance.

Evaluative Functions

Evaluation is the central pragmatic function of reported speech. It can be related to its three main components: the source (who is responsible for the reported proposition), the reporting expression (referring to the source's saying), and the reported proposition(s) (what is reported).

The Source

Descriptions and qualifications of the source can be used strategically by speakers with the aim of influen-

cing the hearer's judgment of the reliability of what is reported.

Credentializing Giving high credibility to one's source (credentializing) is a means of giving high credibility to the reported proposition(s) (Stubbs, 1986; Fairclough, 1988; Hunston, 2000). In general, speakers pursuing this technique assume that the more reliable and credible (in other words, the more expert) the source is portrayed as, the more reliability will be attached to the content of the reported speech by the hearer. This technique also includes references to well-known, universally accepted authorities, as in *As Chomsky reminds us, "revolutionary new ideas appear infrequently"* (Haiman, 1989: 137). The qualification of the source may include further evaluation by means of attributive adjectives, as in *The noted educationalist A. H. Halsey has claimed that p* (Stubbs, 1986: 3).

Power and Solidarity Descriptions of sources can also be varied according to degrees of intimacy and distance. In studies on naming practices, the difference between referring to partners by first name (FN) and by title and last name (TLN) is related to the notions of intimacy and power (*see* **Power and Pragmatics**). Assuming that this practice can be transferred to ways of referring, reference to FN seeks to establish intimacy with and/or powerlessness of the referent, whereas reference to TLN establishes the referent as distant and/or powerful. Such references again involve the speaker's evaluation of the source, an evaluation that may be transferred to the evaluation of the reported proposition.

Labeling If sources are not explicitly identified by their names, labels are often employed to refer to them; such labels may be potentially evaluative. In newspapers, references to unspecified sources, experts, officials, professionals, etc., are extremely frequent. Labels like these are highly indeterminate in their referential meaning but imply more reliability than do other semantically vague labels (*a woman, a man*). The labels suggest that there was some well-founded reason for the journalist's consulting the reported speaker, namely that she or he is an authority on the matter. They imply the reliability of sources without having to identify them. Metonymy can be used to a similar effect, implying authority and/or reliability without mentioning named speakers (e.g., metonymic references to countries, institutions, etc.) (*see* **Metonymy**).

Paralinguistic Information Paralinguistic descriptions of the source's presumed emotional state, or of his or her manner of speaking may also have an impact on the hearer's evaluation of the source and the reliability of the reported proposition(s). Consider this example: *A downcast Mr. Trimble said that the evidence given to him by the commission was insufficient* (*Daily Telegraph* 11/22/03).

Explicit Evaluations Whereas the above-mentioned evaluations of sources are more or less implicit, explicit evaluations of the source may also be employed as a means of influencing the presumed reliability of reported propositions. Thus, labels with negative or positive connotations (*terrorists, fanatics, resistance fighters*), premodifying adjectives (*callous, racist, intelligent, cultivated*), or other explicit means of evaluation may be employed in order to credentialize or discredentialize sources.

The Reporting Expression

The other main way of evaluating the reliability of reported propositions is by virtue of the reporting expressions used. The most well-known are reporting verbs such as *say, state, claim*. But there are also reporting nouns (*disclosure, claim*), adjectives (*alleged, reported*) and prepositions (*according to*). Such expressions may communicate degrees of speaker agreement, as well as positive and negative evaluations.

Degrees of Speaker Agreement As has often been pointed out, reporting expressions may be neutral as to whether the speaker agrees with the reported proposition (*say, write*), positive/supporting (*X has rightly pointed out, proven, shown*) or negative/skeptical (*claim*, *pretend*) (Hunston, 2000; Thompson and Yiyun, 1991). By varying their use of such reporting expressions, speakers can again try to influence the hearers' perception of the reported proposition.

Positive and Negative Evaluations Like descriptions of sources, certain reporting expressions can also (more or less) explicitly trigger hearers' evaluations. Clayman (1990) has shown that the use of reporting verbs that refer to the discourse process invites hearers to make evaluative inferences about sources. Verbs such as *concede, admit*, for example, can imply that the source did not speak voluntarily and may prompt hearers to ask why; verbs such as *refuse, decline* indicate that the source did not in fact answer a question and may again prompt hearers to ask why. Similarly, illocutionary verbs that do not refer to the discourse process may be employed for purposes of evaluation. Whether someone *quips, jokes* and *promises* or *threatens*, *mocks* and *vows* can crucially influence hearers' interpretations. Combinations with

adverbs can enhance or neutralize negative reporting expressions (*he reluctantly admitted that* vs. *he frankly admitted that*). At the more explicit cline of evaluation, we can posit the use of reporting expressions that are almost unequivocally evaluated as negative (*boast, brag*). In making explicit the illocutionary force of speech acts, speakers thus signal their own evaluative stance toward the reported discourse and may predispose readers' interpretation (Fairclough, 1988). (Of course, even if the reporter faithfully reports the illocution of the speaker's utterance, the act is merely mentioned, not performed.) (*see* **Speech Acts; Mood, Clause Types, and Illocutionary Force**).

The Reported Proposition(s)

The last component of reported speech discussed is the reported proposition, with a focus on the different types of reported speech (i.e., direct speech, indirect speech, etc., and narrative reports of speech acts as distinguished by Leech and Short, 1981). Besides serving as résumés, abstracts, or conclusions of the reported speech, these types fulfill a gamut of pragmatic functions. Direct speech is generally regarded as highly reliable, because it purports to report the original speaker's actual choice of words, and hence functions pragmatically to lend reliability to the discourse (except when used as an expression of irony or "mocking mimicry"; Haiman, 1995). Indirect speech, on the other hand, does not claim to represent the original speaker's actual use of lexicogrammar, focusing on the ideational rather than the interpersonal meaning of reported propositions (*see* **Systemic Theory**). In spoken discourse, indirect speech is therefore often employed to clarify, to provide clear factual information to hearers (Mayes, 1990). In fiction, the "loss of . . . vivid, colloquial, partisan and engaged lexis" renders the narration "more 'neutral' and formal" (Toolan, 2001), resulting in greater distance between the reader and the characters. In free indirect speech the voices of the original speaker and the reporter are not as clearly demarcated as in direct speech: the two levels of discourse are merged (Fairclough, 1988) (*see* **Literary Pragmatics**). Consequently, free indirect speech (FID) is a powerful instrument in mystifying what could be called, with an allusion to Goffman, principalship (Fairclough, 1988) (*see* **Goffman, Erving (1922–1982)**). In fiction, FID is a characteristic of modernist stream-of-consciousness writing and serves a "strategy of . . . alignment, in words, values and perspective, of the narrator with a character" (Toolan, 2001), which may convey the speaker's irony or empathy (Toolan, 2001; Leech and Short, 1981). Narrative reports of speech acts, finally, may be regarded as the most evaluative, in that they consist wholly of the speaker's interpretation of an utterance or utterances she or he has heard. Since the speaker reports the occurrence of a speech act without mentioning its meaning, hearers have no possibility whatsoever to double-check the reporter's interpretation of the original speaker's words.

Social Functions

The choice of reported speech can be a means of establishing, maintaining, and securing social relations. By deciding what to report and how to report it, the reporter indicates different degrees of evaluative and social closeness or distance, of familiarity and formality, of politeness and respect (*see* **Politeness**). This may be achieved by verbal (including prosodic) and also nonverbal means (gestures, mimics, etc.), which originate with the reporter or else accompany the reported utterance (*see* **Gestures: Pragmatic Aspects**). (Rather than using *verba dicendi et sentiendi*, verbs related to 'body language' as in *She frowned/shrugged/smiled: '. . .'* can be used.) (*see* **Parentheticals**).

Textual Functions

Regarding textual functions, direct quotations can be used to dramatize and highlight important elements in a narrative (Mayes, 1990; Fairclough, 1988). In fiction, they are associated with a "scenic showing of pace, enhanced focus on the specificity and detail of an interaction" (Toolan, 2001), in short, "vivid and engaging" (Toolan, 2001) narration. Indirect speech seems less vivid and colorful, and narrative reports of speech acts appear to be often used when speakers do not want to transmit the actual words of the reported speaker, e.g., for purposes of abridging and summarizing.

Future Research

Many aspects of the pragmatics of reporting speech allow room for future research. A starting point could be the exploration of cross-cultural as well as genre-specific differences. Further research could investigate the connection between reporting speech and reporting thought as well as the relation between reported speech and notions such as evidentiality (Chafe and Nichols, 1986), commitment (Stubbs, 1986) and evaluation (Thompson and Ye, 1991).

See also: Addressivity; Gestures: Pragmatic Aspects; Goffman, Erving (1922–1982); Literary Pragmatics; Metonymy; Mood, Clause Types, and Illocutionary Force; Narrativity and Voice; Parentheticals; Politeness; Power and Pragmatics; Pragmatics of Reading; Speech Acts; Systemic Theory.

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Representation in Language and Mind

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Languages are human artifacts used for a variety of purposes, most notably, communication. Mental states, such as beliefs, desires, intentions, hopes, and fears – the so-called 'propositional attitudes' – are internal states of organisms that are, typically, both effects of external conditions (and other mental states) and causes of behavior. Languages and states of mind are said to 'represent' – they can be about things other than themselves. They can even represent nonexistent states of affairs, such as, for example, Superman's working at the *Daily Planet*. One might wonder how it is possible for linguistic objects – utterances and inscriptions – and states of mind, both of which are physically realized, to represent, i.e., to have meaning or content. And one might wonder how a particular linguistic object or a particular mental state represents what it does. In virtue of what fact, for example, does a thinker's mental state mean *it will be raining soon*, rather than $2 + 2 = 4$? This tangle of issues is known as the 'problem of intentionality'.

The Relationship between Language and Thought

It is plausible that representation in language and representation in thought are related. A speaker's utterances typically express his or her thoughts. One can both think and say that it will be raining soon. Perhaps the limits of language are the limits of thought. Many theorists have found plausible the hypothesis that we can only think thoughts that can be expressed in public language. In any case, a theory of representation should explain how language and thought are related.

Several general strategies for explaining representation in language and mind are possible:

1. Mental representation might be construed as basic or fundamental, and the representational properties of utterances and inscriptions explained in terms of the mental states (beliefs, intentions, and

See also: Addressivity; Gestures: Pragmatic Aspects; Goffman, Erving (1922–1982); Literary Pragmatics; Metonymy; Mood, Clause Types, and Illocutionary Force; Narrativity and Voice; Parentheticals; Politeness; Power and Pragmatics; Pragmatics of Reading; Speech Acts; Systemic Theory.

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Several general strategies for explaining representation in language and mind are possible:

1. Mental representation might be construed as basic or fundamental, and the representational properties of utterances and inscriptions explained in terms of the mental states (beliefs, intentions, and

so on) of speakers, hearers, writers, and readers. We shall call such theories 'mind-based' theories.

2. Linguistic meaning might be taken as basic and the meanings of mental states explained in terms of the thinker's linguistic capacities. We shall call these theories 'language-based' theories. They have the apparent consequence that nonhuman animals and prelinguistic humans do not have representational mental states – in other words, they do not literally have thoughts.
3. Neither thought nor language is construed as basic, though there may be some explanatory relations between aspects of each. We will call theories of this third type 'non-reductive' theories.

Mental Representation as Basic

The most popular theories of representation are mind-based, construing mental representation as basic and linguistic meaning as derivative of it. This explanatory strategy follows the program set out by Paul Grice in his seminal 1957 paper, 'Meaning'. Grice provides an analysis of a speaker's meaning something by an utterance on a particular occasion in terms of the speaker producing an utterance with a set of complex intentions to produce certain states of mind in hearers. Grice's analysis takes for granted the propositional attitudes of speakers and hearers. The question, then, is how these mental states acquire their meaning.

Some theorists of mind construe mental representation as itself language-like. Thought, they claim, takes place in an inner language or code (*see* **Mentalese**). Propositional attitudes, in this view, are relations to internal sentences. But whether or not the language-of-thought hypothesis is true, a theory of mental representation requires an account of how propositional attitudes acquire their meaning. And if the account is to serve as the basis for an explanation of representation in public language, then it must not presuppose public language meaning.

Mind-based theories are typically 'naturalistic': they aim to explain the intentionality (meaning, aboutness) of a subject's mental states in terms of non-semantic and non-intentional properties of those states. The intuition behind the naturalistic constraint is clear. An adequate account of intentionality – one that dissolves the air of ontological strangeness surrounding it – should explain it in terms compatible with the broader conception of nature provided by the natural sciences.

Information-Based Theories

Physical systems carry information about the external conditions that impinge on them. The number of rings in a tree's trunk reliably varies with the number of growing seasons; hence the tree's trunk carries information about, or represents, the age of the tree. Exploiting this general phenomenon, 'information-based' semantic theories take the meaning of a mental state or structure to be determined by the cause of its tokening in certain specifiable conditions. For example, a mental structure means *cat* if it is reliably caused by the presence of cats.

Mental states not only represent; they can occasionally **misrepresent**. Information-based theories have trouble accounting for misrepresentation. If a given mental structure is reliably caused by the presence of cats, then it is likely to be (reliably) caused by other things in less than optimal conditions, for example, by small dogs on a dark night. Since small dogs on a dark night are among the reliable causes of the structure, then, according to the theory, it means *cat or small dog on a dark night*. Rather than misrepresenting a small dog on a dark night as a cat, the mental state genuinely represents its disjunctive cause. Misrepresentation does not seem possible.

Proponents of information-based theories have attempted to solve the so-called 'error problem' by levying additional conditions on the circumstances in which a mental state's meaning is determined by the cause of its tokening. (See, for example, Fodor's 1990 account, which requires for a mental structure X to mean *cat* not only that it be reliably caused by cats, but also that if any non-cats cause X, then non-cat's causing X are **asymmetrically dependent** upon cats causing X; that is, non-cats would not cause X unless cats did, but not vice versa.) Whether these modifications handle the error problem without raising further difficulties is a matter of some dispute.

Teleological Theories

According to 'teleological' semantic theories, the meaning of a mental state or structure is determined by its biological function, i.e., that for which it was selected. (See Millikan, 1984, for the most developed proposal of this sort.) A variant of the error problem arises for theories that attempt to ground representation in biological function. A simple example makes the point. A frog will snap its sticky tongue at any fly moving in its vicinity. Some state of the frog's visual system represents the fly, but is the meaning of this state *fly*, *food*, or – given that the frog will react identically to any small dark object moving in its visual field – *small dark moving thing*? An appeal to the biological function of the frog's internal state will

not settle the issue, as there seems nothing to choose among describing the function of the state as *detecting flies,* as *detecting food* (given that flies are the only available food), or as *detecting small dark moving things* (given that almost all small dark moving things in the frog's vicinity are flies and hence food). A similar sort of indeterminacy is likely to plague efforts to establish the meaning of states of more complex systems, such as humans. The notion of biological function seems too coarse an instrument to determine representational content.

Conceptual Role Theories

'Conceptual role semantics' (CRS) is the most popular theory of mental representation. Versions of CRS have been developed and defended by philosophers, cognitive psychologists, and (under the guise of 'procedural semantics') computer scientists. (See Block, 1986, for a general defense of CRS.) According to CRS, a mental state means what it does in virtue of its causal role in the subject's mental life. What determines that a mental structure means *cats are furry* is the structure's role in perception, deductive and inductive inference, deliberation, action, and so on. Tokenings of the structure tend to be caused by the presence of furry cats and to cause one to conclude that if something is not furry then it is not a cat. The causal role of a structure meaning *dogs are needy* involves appropriate relations to dogs and instantiations of the property *neediness*.

A problem for CRS arises from the fact that a mental state's meaning is determined by the totality of its connections to perceptual stimuli, behavior, and other mental states. In this view, all of a subject's beliefs involving a concept contribute to its meaning. However, no two people have exactly the same beliefs involving any concept. If I believe that bats are scary but you do not, then, according to CRS, our 'bat-concepts' are different. Consequently, our beliefs involving our respective bat-concepts, even such core beliefs as each of us would express by the words 'Bats are mammals,' have different content. A consequence of the holistic determination of meaning is that no two subjects will share any concepts or any beliefs.

A proponent of CRS might try various maneuvers to mitigate the effects of holism. It is surely implausible to count every belief as contributing equally to the meaning of a concept. CRS needs some notion of **semantic importance** to distinguish the beliefs that contribute heavily to the meaning of associated concepts from those that do not. Whether such a notion can be spelled out without appeal to semantic or intentional notions – that is, without violating the naturalistic constraint – is an open question.

Constraints on a Theory of Mental Representation

In addition to accounting for the possibility of misrepresentation, and not leading to an unacceptable holism, a theory of mental representation must satisfy a 'cogency condition': the interpretation of a subject's mental states licensed by the theory must, by and large, make sense. The theory must not license an interpretation that makes the subject wildly irrational. The status of the cogency constraint is a matter of some controversy. Some philosophers (for example, Davidson (1984)) have thought it 'constitutive' of the intentional framework that thinkers are, by and large, rational. Others have thought only that, as a matter of empirical fact (perhaps because they are products of evolutionary adaptation), thinkers are typically rational.

An adequate theory of mental representation must also account for the fact that thought is fine-grained. The theory should explain how a thinker can believe that Cicero was a Roman orator but fail to believe that Tully was a Roman orator, even though "Cicero" and "Tully" are names for the same individual. This is known as 'Frege's problem'. Finally, as noted above, a theory should explain how thinkers can have thoughts about nonexistent objects or states of affairs, such as Superman's working at the *Daily Planet*.

Linguistic Representation as Basic

Norms-Based Theories

Language-based theories typically explain mental representation in terms of social practices governing overt speech (see, for example, Brandom, 1994). In this view, the social practices that confer meaning on utterances involve norms governing the correct use of certain expressions and the appropriate consequences of such uses. A given utterance-type justifies (that is, permits) certain other utterances and excludes certain others. A speaker who utters 'There is a dog' is committed to the assertion *There are some dogs* and to the denial of *There are no dogs* and is taken to be so committed by others. The relevant norms govern the actions of speakers and hearers, where action is not to be understood as presupposing intentional thought, but rather as behavior shaped by communal practices of conforming and censuring, what Brandom (1994) calls 'the game of giving and asking for reasons'. It is the communal practice of subjects' taking each others' performances as 'correct', 'incorrect', 'entitling', or 'excluding' other performances that confers meaning on these performances, and, derivatively, on the subjects' states of mind. The norms governing

these practices make intentionality of both speech and thought possible.

An account of this sort will succeed only if notions of 'correctness', 'entitlement', 'commitment', and so on, can themselves be understood in non-intentional and non-semantic terms. If we must presuppose that the relevant performances – both the utterances themselves and others' attitudes toward these utterances – are meaningful, if, for example, we must presuppose that these performances either involve the use of antecedently meaningful expressions or consist in actions produced with certain intentions in mind, then their meaningfulness does not reside in, or result from, the conforming and censuring practices themselves. The project fails if the social practices that supposedly confer meaning cannot be explained without presupposing that the performances governed by these practices have meaning. It is not obvious that this explanatory burden has been discharged.

A Non-Reductive Proposal

A non-reductive construal of the norms-based project is possible. One might see the task of articulating the structure of the norms governing overt speech as exposing how the intentionality of thought and the (public) norms governing overt speech are intimately connected. Such an account would aim to show that we cannot understand representation, in either language or thought, without a notion of inference, that is, without the idea of certain claims entitling or justifying others. (This idea is a cornerstone of the CRS developed by Wilfred Sellars.) On this construal, the project is an attempt to work out the interconnections between language and thought, without taking either as basic.

See also: Mentalese.

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Researching Naturally Occurring Speech

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Defining the Issue

Perhaps the most important challenge for linguists who study language in its social context is to devise a methodology that allows them to record the everyday linguistic behavior of their informants, i.e., the casual, unmonitored speech that normally occurs outside of the sociolinguistic interview (Labov, 1966, 1972a). However, the typical sociolinguistic interview is an unnatural speech event – interviews are often set up in advance; many of the conversations are between fieldworkers and interviewees and not among the interviewees themselves; and in most cases the fieldworker, who is often a stranger to the interviewee and to the community itself, controls the topics and conversational turns. Moreover, the presence of an observer (a fieldworker with a recording device) creates an unnatural context for informal conversation, resulting in what Labov (1966) referred to as the 'observer's paradox' (the skewing of linguis-

these practices make intentionality of both speech and thought possible.

An account of this sort will succeed only if notions of 'correctness', 'entitlement', 'commitment', and so on, can themselves be understood in non-intentional and non-semantic terms. If we must presuppose that the relevant performances – both the utterances themselves and others' attitudes toward these utterances – are meaningful, if, for example, we must presuppose that these performances either involve the use of antecedently meaningful expressions or consist in actions produced with certain intentions in mind, then their meaningfulness does not reside in, or result from, the conforming and censuring practices themselves. The project fails if the social practices that supposedly confer meaning cannot be explained without presupposing that the performances governed by these practices have meaning. It is not obvious that this explanatory burden has been discharged.

A Non-Reductive Proposal

A non-reductive construal of the norms-based project is possible. One might see the task of articulating the structure of the norms governing overt speech as exposing how the intentionality of thought and the (public) norms governing overt speech are intimately connected. Such an account would aim to show that we cannot understand representation, in either language or thought, without a notion of inference, that is, without the idea of certain claims entitling or justifying others. (This idea is a cornerstone of the CRS developed by Wilfred Sellars.) On this construal, the project is an attempt to work out the interconnections between language and thought, without taking either as basic.

See also: Mentalese.

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tic behavior toward norms of correctness as a result of the mere presence of a fieldworker). As a result, the interview itself creates a situation where obtaining the most casual speech styles is difficult at best.

Approaches to Fieldwork

Community Fieldworkers

Over the past four decades sociolinguists have designed varying approaches to fieldwork in an effort to mitigate the effects of the observer's paradox. Because the social and ethnic barriers between fieldworkers and informants are often cited as key factors that could affect stylistic variation, one popular approach has been to use fieldworkers who are either community members, ethnically similar, or in the best scenario, both. Labov (1972b) was one of the first researchers to use same-race community members as fieldworkers to record the use of African American Vernacular English (AAVE) by adolescents in Harlem. Wolfram (1974) in Mississippi, Wolfram, and Christian (1976) in Appalachia, and most recently Rickford and McNair-Knox (1994) in East Palo Alto have all used similar fieldwork strategies.

While differences in data from community and non-community members have not been systematically investigated (although recent work by Bell, 2001 touches on this issue), Rickford and McNair-Knox (1994) have tested the hypothesis of same-race fieldworkers through a quantitative comparison of the use of five African American Vernacular English (AAVE) features by an urban African American teenager in interviews conducted by both an African American and an Anglo fieldworker. They show that the teenager's use of AAVE features is significantly higher in the interview conducted by the African American fieldworker, and conclude that the race of the interviewer accounts for this discrepancy.

Research by Cukor-Avila and Bailey (2001), however, suggests that other factors, including interview context and familiarity of the interview participants, might have influenced Rickford and McNair-Knox's results. For example, when the African American fieldworker recorded her interview her teenage daughter, who went to the same school as the interviewee, accompanied her. These two young women functioned as a kind of peer group during the interview. In contrast, the Anglo fieldworker, who had not previously met the teenager, was the only person present during the interview. Cukor-Avila and Bailey's data from parallel interviews with rural Texas speakers show that when interview context and familiarity of the interview participants remain constant, there is no significant difference in the use of AAVE features for two female speakers (one teenage and one elderly) when interviewed by African American community members and when interviewed by an Anglo fieldworker who had spent several years in the community. In fact, the only statistically significant difference they found was in the use of invariant *be* by the teenage girl who used it more frequently with the Anglo fieldworker. Their results suggest that any effects the race of the interviewer might typically have on vernacular use can be minimized when fieldworkers have spent time in the community and are familiar with community norms (see discussion below).

Peer Group Recordings

Another strategy frequently used by fieldworkers to reduce the effects of the observer's paradox is to record subjects in peer group contexts. Labov *et al.* (1968) used this strategy in conjunction with a community fieldworker in interviews conducted with African Americans and Puerto Ricans in New York City. Blom and Gumperz (1986), Cheshire (1982), Eckert (1989), Wolfram and Schilling-Estes (1996), and Childs and Mallinson (2004) have all systematically incorporated interviews with peer groups into their fieldwork. They used groups that 'self-select,' and, like Milroy (1987a,b), interviewed these groups in places where they naturally congregate. Fieldwork in Philadelphia (Labov, 1984) extended the community fieldworker approach with the addition of a set of question modules designed to control the topics of conversation. Fieldworkers can often manipulate topics in order to direct the conversation to subjects that lead to more spontaneous speech. This strategy has also been used to create conversational contexts for interviewees to use targeted forms, e.g., *be*+V+*ing,* as in *She be tellin' me what to do an' I don't like it,* for AAVE speakers (Bailey and Maynor, 1987, 1989). (For a criticism of this strategy, see Wolfram, 1987.)

Ethnographic Fieldwork

Sociolinguists have also incorporated the techniques of participant observation used by ethnographers (cf. Geertz, 1973; Spradley, 1980; Schieffelin, 1979; Eckert, 1989) into their fieldwork. In an ethnographic approach fieldworkers:

- Invest a substantial amount of time in a community. They delve deeply into a community by visiting there frequently over an extended period of time (or by living there), and by participating in everyday community activities.
- Document and record the everyday language of a community in its cultural context.

- Capture actual linguistic interaction rather than surrogates for interaction.
- Continually evaluate observations of and information gathered from community members, thereby allowing the linguistic data to be interpreted within the context of the cultural behavior and knowledge of the community.

Participant-observation may be one of the best ways to reduce the effects of the observer's paradox and to document the linguistic interactions of community members with each other, rather than with fieldworkers. This is because the more time fieldworkers spend in a community interacting with residents on a daily basis, the more they will be trusted and the less they will be perceived as outsiders. Both Baugh (1983) and Dayton (1996) have made effective use of participant-observation in their studies of AAVE speakers in Los Angeles (Baugh) and Philadelphia (Dayton); however, they typically did not tape their observations. Thus, their data are limited to the observations they could make on the spot and record on note cards shortly thereafter. As is shown in the examples below, informal conversations can be taped within the context of ethnographic fieldwork.

An Ethno-Linguistic Approach to Fieldwork

What follows is an overview of an approach to fieldwork that is both ethnographic and linguistic. This approach was developed during the course of a longitudinal study in the rural Texas community of Springville (the name of the community and the names of informants mentioned in the examples below are all pseudonyms), designed to document linguistic variation and change in rural Southern speech over time (see Cukor-Avila, 1995; Cukor-Avila and Bailey, 1995; and Bailey and Cukor-Avila, forthcoming for a complete discussion of the history of Springville and the methodology of the Springville project). The approach applies insights from ethnography to sociolinguistic fieldwork and demonstrates how sociolinguists can shift the focus of study to the community itself, consequently allowing the recording of people as they normally interact with each other on a daily basis. More specifically, this approach records people in normal sites of linguistic interaction with one another rather than with fieldworkers, talking about topics that they normally talk about and involved in the kinds of speech events they normally participate in.

The Community of Springville

Springville is a contemporary relic of the plantation agriculture that developed during tenancy and was typical of the post-Civil War South; in fact, many of the community's approximately 150 residents either worked as tenant farmers or are their descendents. Most of the land and almost all of the houses are owned by one woman, who also owns the only store in town. She maintains financial control over much of the community – many residents borrow money from her and purchase items from the store on credit, reconciling their tabs on the first of the month after she cashes their government checks.

The significance of the store for the residents of Springville is not unique. The country store in the post-Civil War South played a major part in shaping the lives of rural people and served as the foundation for the economy of the New South (Ayers, 1992).

The role that the store plays in Springville was the most important consideration in the development of the field methods used throughout the project. The store is not only the principal place of business in the community, but more importantly, it is also the primary community hangout. It provides a meeting place for people to gossip, watch soap operas, eat lunch, read their mail, or simply just pass the time. This is especially true on days when rainy weather prevents people from working in the fields.

The Springville Project

The Springville Project relied on three techniques to ameliorate the effects of the observer's paradox:

1. Multiple interviews with informants.
2. Interviews in which informants interacted with each other rather than or in addition to fieldworkers.
3. The use of community fieldworkers.

Most fieldworkers know that subsequent interviews with informants usually produce more unguarded conversations and speech more like that used when no fieldworker is present. The Springville Project applied this observation as an organizing principle: people were interviewed as many times as possible, not only over a period of years (for longitudinal purposes), but also within the same year (to increase the familiarity between interviewer and interviewee). What made this approach possible, of course, was the extensive amount of time that fieldworkers Patricia Cukor-Avila and Guy Bailey spent in the community. Cukor-Avila's daily visits to Springville over a two-month period and frequent return visits by both Cukor-Avila and Bailey over the years have provided

many opportunities for additional interviews. The effects of subsequent interviews can be dramatic, as Texts 1 and 2 below demonstrate.

Multiple Interviews Over Time

Text 1 was recorded July 12, 1988, and is the first interview Cukor-Avila conducted with Vanessa, an African American female born in 1961.

Text 1

CA: What time do you, what time does the store open? Like what time do you work from?
V: I come at eight an' get off at four thirty.
CA: Uh huh. So what do your kids do while they're at home? What do they do during the daytime when they're not in school?
V: Well they jus' got outta summer school an' they jus', they haven' been doin' too much of anything but layin' aroun' watchin' TV an' fussin' an' fightin' an' callin' over here for me. [laughs]
CA: Oh yeah you can hear 'em I bet.
V: Yeah.
CA: So what kinda' stuff do they fight over? Now lemme see now, tell me who's the oldest? The boy or the girl?
V: The girl.
CA: An' then the next one is . . .
V: Is the boy an' the girl.
CA: Uh huh, so who fights with who?
V: It be, it be mostly the baby fightin' with the oldes' girl. She jealous. She always want things to go her way. An' when it don't she wanna fight 'em. So it's the baby always wanna fight.
CA: Uh huh. So what about the boy? What does he play, referee?
V: Yeah, he do. He uh, he's, he's like the man of the house. He watch over them an' when they get to fussin' too much he get on 'em. He keeps 'em in order.

Recorded shortly after Cukor-Avila first met Vanessa, the text reflects classic interview style and follows a simple question/answer format, with Vanessa answering all of the questions but providing little elaboration. While the interview (and even this short text) includes a number of vernacular features, no one would argue that it reflects the everyday speech that Vanessa uses when no fieldworker is present. A second interview recorded a week later demonstrates the advantages of follow-up interviews. Vanessa's responses are much more elaborate, and she provides an unsolicited narrative on a rather personal topic. It is more like the everyday speech that the fieldworkers had observed Vanessa using with other Springville residents.

The next passage, recorded nine years later, (March 13, 1997) after many visits with Vanessa, is less like an interview and more like a conversation between two friends. The interviewee feels free to change and initiate topics, and she assumes that the fieldworker has a repository of shared knowledge regarding the characters in the narrative. Both Vanessa's language and her linguistic interactions are much like what she had been observed using on numerous occasions with friends and family in Springville.

Text 2

V: They some nuts. I can't stan' 'em. I had to go over there an', an', an' uh with my gun an' trip out on them about her.
CA: What? What happened?
V: R called me one night an' she say, "Aunt V," she say, "I'm tired of them runnin' over P."
Say it was C tried to jump on her firs' an' then the sisters an' then the mama was cussin' her out. I told R about it that night an' P was over here. I say, "This is it." I say, "I'm fit to go over here an' 'front these people an' let them know that she got somebody that love her an' if they keep messin' with her I will shoot 'em."
So I got my gun. They say, "We ain' gonna let you go by yourself."
So B, R, an' P went with me. I went over there an' knocked, I knocked on the door. An' they say, "Who is it?" I say, "It's Vanessa." "Come in." I say, "No I'm not comin' in. Yall come outside." So she opened the door. I say, "Lookie here. I'm tired of yall messin' with my child. If, if you don't want her here or she's not welcome around here I'll take her home with me right now."
I said, "But yall not gonna keep runnin' over her an' keep fightin' her an' keep cussin' her because I will shoot you. An' I'm not gonna play with yall. An' the nex' time that I hafta come out here by my child I'm comin' an' I'm gon be ready to do somethin' to all of yall." Ohhh they were scared. And uh, an' I was sayin', "If you don't like what I'm sayin' come on out here an' we can jus', we can do whatever we gotta do tonight an' get it over with."
Ohhh they were scared Patricia. They closed the door on me an' I asked P. I said, "P. do you wanna come home?" [mimics] "No." I say, "You so crazy." I said, "But you gonna cry an' you gonna wish you hada came home with me." An' sure enough in a month time she came home. I say, "I'm not gonna put up no more with yall's junk." An' everytime they see me they still scared of me.
I wasn' playin' with 'em. I was tired of it. An', an' I, I guess they kep' doin' her wrong

because you know they, I guess they felt like that nobody, you know, she didn' have nobody to care about her an' stuff. I wen' an' let them know that's my child an' you're not gonna keep doin' her wrong. Uh huh.

Peer Group Interviews

As useful as multiple interviews with informants are for ameliorating the observer's paradox, they still involve an interviewer talking to an interviewee. Linguists have frequently used group interviews as a mechanism for creating situations in which informants talk to one another. Group interviews have been used most often with teenagers and adolescents (cf. Labov, 1968, 1972b), but the Springville Project extended this mechanism to adults and used it as an organizing principle for fieldwork. Moreover, the priority of the Springville Project was recording naturally occurring groups rather than groups brought together by the fieldworkers specifically for an interview. Multiple interviews, an ethnolinguistic approach to fieldwork, and the frequent presence of the fieldworkers in the community were crucial in identifying and recording these naturally occurring groups.

Text 3, which is from an interview with two African American males born in 1913, is an example of a recording with a naturally occurring peer group, while the circumstances that led to the interview illustrate how interviews such as these come about. Cukor-Avila first met Wallace in July 1988 while she was interviewing another Springville resident. During the course of that interview Wallace, who was selling vegetables, drove up, was introduced to Cukor-Avila, and joined in the conversation. Cukor-Avila and Bailey subsequently interviewed Wallace individually on five occasions over the next three weeks. Wallace then invited them to his house for a home-cooked barbecue dinner; unbeknownst to them, he had also invited his best friend, Reggie. Text 3 is from the two-hour interview recorded on that occasion (August 17, 1988). As this excerpt about Hurricane Carla suggests, the interview consists primarily of conversation between Wallace and Reggie – of two friends talking to one another rather than to the fieldworkers (CA, GB).

Text 3

R: Yeah. I was jus' gettin' outta work here when it was ol' Carla.
W: Boy it was rough down here, it was rough.
R: Sure I mean.
W: All cars.
R: You oughta seen Galveston.
W: All cars, all cars all off in the ditch.
R: You oughta seed Galveston.
CA: There probably wasn't much of it huh.
R: That great big ol' steel, them brick, stone houses, rock houses, brick homes, an' some of them buildings out there with that steel in it that wide. It jus' double it up like that.
W: I went, I went up here to look at this here in Waco that time R was heading up there . . . .
R: I bet you I went up there twice.
W: The man had said, "Shoot ain' no way in the world." I said, "Well what you think about that?" Man them railroads, rail, it jus' bent 'em double. An' that rail, that bridge that go across the river – it tore it up.
R: That man told me in Waco – I went up there twice up there – an' them guys told me they was sittin' where, jus' like this house sittin' on concrete blocks or cedar block, had long left there. An' he said they frigidaires was in the air like paper.
W: Well I was sittin' over there on the railroad. I was workin' on the railroad up there. I had a sister over there. It blowed all her stuff away. An' then see they wouldn' let us come in there, over there, 'cause they had done got all them soldiers from, from Killeen up there. They wouldn' let us come there. I couldn' get no further to the river. The further they let us go. They wouldn' let us go over there.
GB: That was in Waco. There was a big tornado up there?
W: That was in Waco.
R: Yeah man. Went right down the street, an' when it got to the courthouse it just parted.

Addressing the Observer's Paradox

Group interviews such as in Text 3 provide significant amounts of speech between Springville residents, but the interviewers nevertheless remain part of the interview context. The ultimate goal of sociolinguistic fieldwork, however, is to diminish the role of the interviewer and allow informants to interact with each other, as they would normally do if the fieldworker were not present. An important component of Labov's model of stylistic variation (i.e., the consequences of the amount of attention paid to speech) was the creation of contexts within the casual interview situation that would elicit spontaneous speech, a style used in excited, emotionally charged conversations when informants would be the least likely to pay attention to their speech (Labov, 1972a). These contexts include remarks to

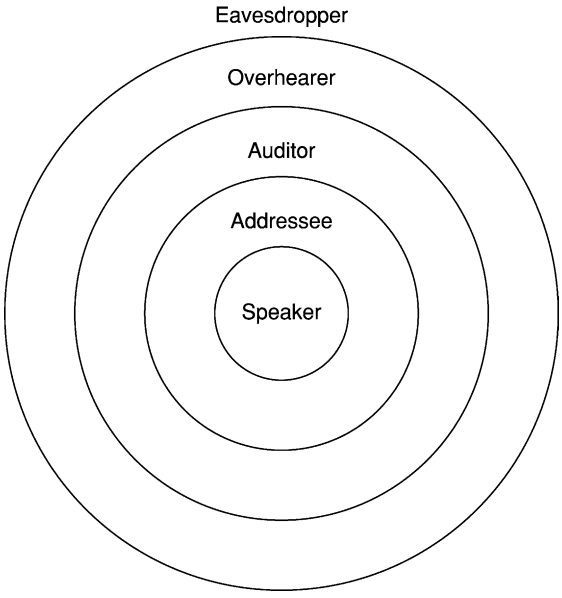

Figure 1 Interlocutor roles (adapted from Bell A (1984). 'Language style as audience design.' *Language in Society 13,* 145–204 with permission of Cambridge University Press).

the interviewer outside of the formal interview itself; speech to third parties who happen to intrude on the interview; speech not in direct response to questions (i.e., digressions); discussions of childhood games and rhymes; and responses to danger of death questions.

Labov's techniques for eliciting spontaneous speech styles were a key advance in sociolinguistic field methods. Subsequent variation research, however, has suggested that not all of these strategies successfully create contexts for the most casual speech. Milroy (1987a), for example, suggests that fieldworkers have no way of ensuring the intrusion of third parties or even of systematically getting comments outside of the formal interview context. Moreover, the use of danger of death questions is often inappropriate – such was the case for her informants in Belfast.

An alternative conception of style defines stylistic variation as a direct consequence of speakers' linguistic accommodation to the people who are listening to them – of a shift toward the interlocutors' speech. As a result, stylistic or intraspeaker variation should be analyzed in light of the speech of a speaker's audience since it is the speech of the audience that provides both the impetus for variation in the first place and also the target for accommodation. Bell's audience design theory produces a model that can be perceived of as a series of concentric circles, as in Figure 1. The further away in audience role interlocutors are, the less effect they will have on intraspeaker variation and thus on the degree of accommodation.

Bell's approach to style provides a scheme for understanding how the observer's paradox works. As Table 1 shows, the concepts from audience design can be adapted to estimate the effect that a fieldworker might have on intraspeaker variation (or style shifting). In individual interviews, the staple of sociolinguistic methodology, the fieldworker is the addressee; in addition, the fieldworker is often an outsider to the community and frequently a member of a different social class or ethnic group. In peer group interviews the role of the fieldworker shifts from addressee to auditor and the peers become the addressees as group members primarily interact with each other and not with the fieldworker. This is clearly shown in Text 3 above.

Site Studies

The third interview situation, site studies (see Text 4 below), provides a context where the fieldworker is a participant-observer (cf. Geertz, 1973; Spradley, 1980) rather than a 'ratified participant' (Bell, 1984, 2001) at community gathering places. Moreover, the fieldworker becomes an overhearer to interactions where peers are the primary addressees and auditors (see Table 1). Site studies represent a strategy for ameliorating the observer's paradox because the focus of the fieldwork is not on the speech of individual informants, but on the speech used at strategic sites of linguistic interaction over a given period of time (Cukor-Avila and Bailey, 1995). Many of the recordings during the initial phase of the Springville fieldwork in 1988–1989 were done at the Springville Store, the main gathering place in the village, where Cukor-Avila was hanging out on a daily basis. Over time she became friends with people from the community and gained their trust, and soon the interviews became closely intertwined with the day-to-day business of the store and began to include a wide range of unsolicited linguistic interactions, including teasing, arguments, jokes, business transactions, and the routine conversations that make up much of Springville's linguistic activity. Cukor-Avila was able to record these conversations between community members because they arose naturally while she was talking to people in the store.

Text 4, which is an excerpt from a site study recorded at the Springville Store in August 1988, provides examples of this type of interaction. These texts also illustrate three main features of site studies: (1) the rapid and natural ways that interlocutor roles change, (2) the rapid and natural ways that topics change without input from the fieldworker, and (3) the occurrence of embedded and parallel conversations (shown in italics in the transcripts).

Table 1 Typical audience structure of different types of fieldwork

Audience design	*Addressee*	*Auditor*	*Overhearer*	*Eavesdropper*
Individual interviews	Fieldworker	———	———	———
Peer group interviews	Peers	Fieldworker	———	———
Site studies	Peers [fieldworker]	Peers [fieldworker]	Fieldworker/peers	[Fieldworker]
Community fieldworker	Interviewee/peers	Peers	———	———

Text 4

R: Me an' my girlfrien' walkin' one night, walkin' . . . [RB and S overlap]

RB: YThat's the same one you an' M. saw ain' it?

S: Yeah that's the one they say an' then M. tol' me he ain' tellin' the truth. Same way I tell him firs'. [SR walks up],. Mr. Stan!

RB: Howdy Mr. Stan.

SR: What's, what's goin' on, the riff?

S: The riff. Nothin' but the riff. Get a sodie water. O.K., uh, we'll be down here all day I 'magine. [laughs]

R: [continues his story] An' uh, we were walkin' along there talkin'. Then cross the railroad track. All at once grabbed me a stick. "Hey boy, what you standin' on me for?" "Don' you see that man you walkin' into?" She mean it. She could see him.

S: But she seen him?

R: Uh huh.

S: Man. Wooo. Now I knew I was seein' things which I thought was a ghost. But when you come to realize that it, it don' be nothin' but a bush [L. overlaps]

L: That you see in the road.

S: . . . or, or somethin' that, that, you know, that you haven' seen.

R: I know, I know some guy – that be years ago – about six young guys, you talkin' about young men. Well they had a meetin' that day in the church at night. There was this crazy German in the church. Along in them days you didn' have no uh, lightnin' paper. You had to use newspaper. People goin' to church an' they'd throw the paper down side of the road an' it blowed up aroun' in some piles that was about that high. An' them guys walkin' to the church that night an' the wind's blowin'. An' that paper come an' blowed up aroun' that stuff. They looked at [unintelligible]. Everyone of 'em had a gun. They emptied that, them guns in that paper an' BOOM! [S laughs and overlaps R] Newspaper blowed up aroun' in piles an' stuff . . .

S: An' that's all it was?

R: Uh huh.

S: You see that, that's what I'm talkin' about here. A person eyes can fool you.

R: Oh yeah.

S: Oh, they can fool you.

R: But I ain' gonna let mine fool me.

S: [to P.] Hey lover, where you goin'?

P: To wash my hands.

S: [to FW] You didn' know that she was a lover did you? [laughs]

R: My eyes ain' never fooled me but one time. That time I tell you I, that man come down on me.

S: Uh huh.

R: Well it didn' fool me then. An' I've no doubt what it was.

S: Well it, it was a real man?

R: No. It wasn' nothin' but a large snake standin' up in the fiel'. M shot it for me walkin' jus' like it was [S laughs/overlaps]

S: Hey. Well one night I did the same thing. I run from a, a stump. It started off, started off about this high. It was humped over like that. I run till I jus' run myself to death. An' the nex' day I went back by there. I said, "I'm gonna see what was that." An' it was jus' a ol' tree they had cut off high.

A: Tell the reason why you were runnin'.

S: Shit. Girl I was runnin'. See I was doin' somethin' I don' have no business to know with. You know that! [everyone laughs] Thought I had got caught an' I was runnin' like the devil. An' the nex' day I come back by there. I said, "You know a man'd kill hisself for nothin' wouldn' he." 'Cause if somein' got in my way I'd run over it. An' you know you can run a long ways when you're scared. You can move an' never get tired.

A: Specially when you somewheres where you ain' s'posed to be.

S: Yeah I was where I wasn' s'posed to be. [laughs] I didn' do it no more neither. I got scared. That scared me good! I said, "Ohh." I ain' gonna tell yall what I said but I sure was cussin' boy. I said, "Hot dog got caught!"

In Text 4, Cukor-Avila is an auditor and an overhearer; S directly addresses her in an aside. Moreover, because Cukor-Avila is not an interviewer but a participant in a community activity, she does not control the floor (i.e., does not determine who speaks), nor does she control the topics. The natural, everyday flow of linguistic interaction that typically takes place at the store develops. There are also two embedded conversations within this excerpt. The first one occurs when R attempts to begin his story but pauses while RB and S have a short conversation in which others at the store are not ratified participants. The second one occurs when S flirts with P, who passes by on her way to the bathroom. (Flirting and teasing are common speech acts in the store; this episode is typical).

While embedded conversations such as these are typical of the everyday linguistic interaction at the store, parallel conversations among different sets of interlocutors are just as common. In these situations, one group of interlocutors carries on a conversation independently of, and sometimes even unaware of, another group that is carrying on a conversation. Oftentimes lulls in one group's conversation allow members to overhear part of another group's conversation and occasionally to make comments across groups. Moreover, people occasionally move back and forth between groups, there is fluid shifting of topics and interlocutor roles, and unsolicited narratives occur.

Conclusion

Site studies allow fieldworkers to become overhearers rather than addressees, and they create contexts in which speech outside of the interview situation becomes the norm rather than the exception. In addition, site studies provide a unique cultural and linguistic window on a community by allowing fieldworkers access to witness, participate in, and record speech events typically absent from sociolinguistic interviews. As Text 4 demonstrates, the focus on a strategic site of linguistic interaction, rather than on individuals or groups of people, makes it possible for fieldworkers to record the natural linguistic interactions of community members with each other, rather than with the fieldworkers.

While site studies certainly do not eliminate the observer's paradox, they can substantially ameliorate it. Because the sites themselves are a natural part of the community and the recordings made at the sites are of natural speech, these recordings, coupled with recordings from individual, peer group, and community fieldworkers (preferably over time), can provide sociolinguists with a broad range of data for both qualitative and quantitative linguistic analysis.

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Respect Vocabulary in Austronesian

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In a number of Austronesian languages, speakers replace everyday vocabulary with a special set of words in order to show respect for addressees and/or referents. This phenomenon fits under the broader rubric of honorifics; the term 'honorifics', however, includes not only the use of respect vocabulary, but also morphosyntactic adjustments to speech, including special pronouns, affixes, and verb forms (*see* **Honorifics**). Furthermore, the term is traditionally used in descriptions of non-Austronesian languages of East and South Asia, e.g., Japanese, Korean, Tibetan, and Thai. A well-known (and well-studied) exception, however, is Javanese, an Austronesian language spoken in Indonesia that has an elaborate honorific system (Errington, 1988; Geertz, 1960; Uhlenbeck, 1970). Vocabulary substitution is part of the Javanese honorific system; for example, the everyday word for 'rice' *sega*, is replaced by the word *sekul* in the more formal speech styles. Similarly, the respect word *tindak* 'go out' replaces the non-honorific verbs *mangkat, késah*, and *lunga*, which also mean 'go out' (Errington, 1988).

Within the Austronesian family, respect vocabulary has been reported in Polynesia (Samoan, Tonga, East Futuna, Wallisian, and previously Hawaiian, Tahitian, and, with a reduced lexicon, Niue), Micronesia (Namoluk, Ponapean (Pohnpeian), and formerly Kusaie (Kosraean), Marshallese, and Palauan), Indonesia (Alune, Bali, Javanese, Madura, Nuaulu (North and South), Sangihé (Sangir), Sasak, Sunda, and Tetun Terik (Eastern Tetun)), the Loyalty Islands (Dehu and Nengone), Fiji and Rotuma, and Madagascar (the southern dialects of Malagasy) (Blixon, 1969; Florey and Bolton, 1997; Fox, 2005; Grimes and Maryott, 1994; Nothofer, 2000; van Klinken, 1999; and Verguin, 1957).

Samoan serves as an example of how respect vocabulary is employed in a Polynesian language. In Samoan, about 450 respect words (called *'upu fa'aaloalo*) are substituted for everyday terms when the speaker addresses or refers to chiefs or orators (Milner, 1961). For instance, the ordinary word *fale* 'house' is replaced by *maota* when referring to the house of a chief, whereas it is substituted with *laoa*

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when speaking of the house of an orator. At times, word choice also depends on the rank of the chief or orator. For example, *sāunoa, fetalai,* and *vāgana* replace the ordinary verb *tautala* 'speak' for chiefs, orators, and high orators, respectively. In some cases, one respect word substitutes for two or three related common terms. For instance, the respect word *fofoga* replaces *gutu* 'mouth', *isu* 'nose', and *mata* 'eye'. Sometimes the respect word also has a surprisingly different everyday meaning, e.g., the term *'ele'ele* is both the respect word for 'blood' and the ordinary term for 'dirt'. Words borrowed from English into Samoan (e.g., *naifi* 'knife') tend to be considered ordinary (not respect) terms. Samoan also has formulaic expressions that indicate respect. For example, the expression used when a high chief dies is *'ua pa'ū le māsina* 'the moon has fallen' (Milner, 1961; Schultz, 1980).

Going beyond Milner's (1961) analysis of the Samoan vocabulary of respect, Duranti (1992) showed that factors other than the status of the addressee/referent trigger the use of respect words. For example, respect words are more likely to be employed (1) during (rather than before or after) a *fono*, i.e., a formal village meeting attended by chiefs and orators, (2) when speaking as a chief or orator rather than as an ordinary individual, (3) when referring to an individual as a chief or orator rather than as a sibling, for example, and (4) when coercing the addressee to behave in a chiefly manner, i.e., with generosity and/or restrained demeanor. As Duranti pointed out, by using respect words in these ways, the speaker is creating context by means of respect terms and expressions rather than merely reacting to elements in the given context (see also Uhlenbeck, 1970).

Tonga, a Polynesian language closely related to Samoan, employs two degrees of respect vocabulary, one for nobles and the other for the king or God. For example, the common word for 'eat', which is *kai*, is replaced by *'ilo* when addressing or talking about nobles, and by *taumafa* when addressing or referring to the king or God. Likewise, the respect words *pekia* and *hala* substitute for the everyday word *mate* 'die' when addressing or referring, respectively, to nobles and the king or God (Churchward, 1953). As these and the preceding examples suggest, respect words often refer to items, states, or activities that are part of or very close to the revered individual, e.g., body parts, homes, family members, names, desires, health, and bodily activities. Respect words mitigate the disrespect that would be shown to someone held in high regard by talking about such personal matters.

Individuals, no matter how high their rank, use ordinary (and not respect) words when they refer to themselves or their possessions. In addition, some languages have self-abasement or humbling forms. For example, the Samoan first-person singular pronoun *'ita* (as opposed to the ordinary *a'u*) reflects self-disparagement on the part of the speaker. Of related interest, Keating (1997, 1998, 2000) showed that Ponapean (Micronesian) has not only self-abasing forms, but also other-lowering forms.

Lexical replacement of respect words for everyday vocabulary also occurs in the context of addressing in-laws in the northern islands of Vanuatu. Alex Francois (personal communication) reported that speakers of the Austronesian language Mwotlap (formerly called Motlav), which is spoken in the Banks Group, employ three strategies when addressing or referring to their in-laws: they use pronouns or kinship terms rather than personal names; they employ dual rather than singular pronouns; and they make use of an honorific register called *hohole map* 'talk respectfully' (etymologically, 'talk heavy'), which involves replacements for 100–200 lexical items in particular, but also some morphosyntactic adjustments. Similar 'avoidance languages' exist in the Australian aboriginal languages Dyirbal (Dixon, 1972) and Guguyimidjir (Haviland, 1979a,b), which have been referred to as 'mother-in-law language' and 'brother-in-law language', respectively. The respect shown in these avoidance languages, rather than being for a person of high status, is for the in-law relative, with whom there is a ban, by taboo, against having a close relation. (*see* **Honorifics**, for more on the Australian avoidance languages, as well as humbling forms, and Javanese honorifics.)

See also: Austronesian Languages: Overview; Australian Languages; Context, Communicative; Formulaic Language; Honorifics; Javanese; Samoa: Language Situation; Tonga: Language Situation.

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Reuchlin, Johann (1455–1522)

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This accomplished jurist and linguist pioneered the study of Hebrew at the turn of the 16th century in the Christian West and helped establish a philological approach to language and texts within European universities. Inspired by the Italian humanists Marsilio Ficino and Giovanni Pico della Mirandola, Reuchlin was drawn to Hebrew by an interest in Jewish esoteric mysticism, the Kabbalah. He further determined that Hebrew literacy would be advantageous to Christian theology because God had revealed himself in that language in the Old Testament. He also suggested that if Christians knew the Hebrew texts better, Jews could be more effectively converted. He composed several works to encourage Hebrew literacy among Christian scholars: a Hebrew lexicon and grammar, *De rudimentis hebraicis* (Pfortzheim, 1506); the Hebrew text of the Seven Penitential Psalms with Latin translation and commentary, *In septem psalmos poenitentiales* (Tübingen, 1512); and a handbook on accents and spelling, *De accentibus et orthographia linguae hebraicae* (Hagenau, 1518).

Reuchlin's interest in the Kabbalah and the Talmud, a collection of Jewish laws and traditions from Late Antiquity and the Early Middle Ages, drew him into one of the most celebrated controversies of the period. The so-called Reuchlin Affair had implications for the study of Hebrew as well as for the humanist curricular reform at the universities and for the Lutheran Reformation. In 1509 a baptized Jew, Johann Pfefferkorn, obtained the permission of the emperor to confiscate and destroy Jewish books for being offensive to Christianity and a hindrance to the conversion of Jews. A wary archbishop of Mainz,

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the leading prelate in Germany at the time, consulted with several leading theologians and jurists, including Reuchlin, who condemned the indiscriminate destruction of these books, arguing that very few of the Jewish texts in question were heretical and that the emperor was legally obliged to protect Jewish life and property. The emperor consequently rescinded his order. But Pfefferkorn opened what became a lengthy exchange of polemical letters with Reuchlin, accusing him of Judaizing. Reuchlin responded, accusing Pfefferkorn of boorish stupidity. Reuchlin further belittled scholastic theologians who claimed to work from the Bible without facility in Hebrew. After some 10 years of mutual denunciations, Reuchlin was convicted of Judaizing and nominally fined. Nonetheless, he had through this very process become one of the most celebrated intellectuals in Europe. Afterwards, he moved to Tübingen, where he taught Greek and Hebrew at the university and took the Augustinian cowl. He died in 1522.

The significance of the Reuchlin affair and its implications for other tensions in German society cannot be overstated. The dispute itself sheds light on a distinction concerning the tolerance of Christian intellectuals for Judaism that is fine but crucial for the period: on the one hand, Reuchlin condemned the ignorant anti-Semitism of Pfefferkorn and his allies that would lead to the indiscriminate destruction of valuable, ancient scholarship. On the other hand, Reuchlin's opposition to the destruction of these books was not born out of any love for Judaism and the Jews *per se*, but rather out of a sectarian Christian admiration for philological learnedness typical of and central to Renaissance humanism north of the Alps. This controversy became the neuralgic point for two additional controversies that were to prove shattering to German society: first, the Reuchlin affair became a rallying point for German humanists and scholastic theologians in their battle against each other over control of German education, and second, Luther and his circle saw the Reuchlin affair to be a foreshadow of their own battles against the dominant scholastic model of theology practiced within the German church and academy.

See also: Luther, Martin (1483–1546); Reformation, Northern European.

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Réunion: Language Situation

Editorial Team

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The French Overseas Department of Réunion consists of an island in the southern Indian Ocean, between Madagascar and Mauritius. Réunion, together with the neighboring islands of Mauritius and Rodrigues, was known to early travelers and the islands were recorded by the Portuguese in 1512. They came under the influence of the French, and in 1764, Réunion became a French colony. Following the Napoleonic wars, Britain assumed control over Mauritius, Rodrigues, and the Seychelles, while Réunion remained French. During the mid-19th century, the island became an important stop-over port on the

the leading prelate in Germany at the time, consulted with several leading theologians and jurists, including Reuchlin, who condemned the indiscriminate destruction of these books, arguing that very few of the Jewish texts in question were heretical and that the emperor was legally obliged to protect Jewish life and property. The emperor consequently rescinded his order. But Pfefferkorn opened what became a lengthy exchange of polemical letters with Reuchlin, accusing him of Judaizing. Reuchlin responded, accusing Pfefferkorn of boorish stupidity. Reuchlin further belittled scholastic theologians who claimed to work from the Bible without facility in Hebrew. After some 10 years of mutual denunciations, Reuchlin was convicted of Judaizing and nominally fined. Nonetheless, he had through this very process become one of the most celebrated intellectuals in Europe. Afterwards, he moved to Tübingen, where he taught Greek and Hebrew at the university and took the Augustinian cowl. He died in 1522.

The significance of the Reuchlin affair and its implications for other tensions in German society cannot be overstated. The dispute itself sheds light on a distinction concerning the tolerance of Christian intellectuals for Judaism that is fine but crucial for the period: on the one hand, Reuchlin condemned the ignorant anti-Semitism of Pfefferkorn and his allies that would lead to the indiscriminate destruction of valuable, ancient scholarship. On the other hand, Reuchlin's opposition to the destruction of these books was not born out of any love for Judaism and the Jews *per se*, but rather out of a sectarian Christian admiration for philological learnedness typical of and central to Renaissance humanism north of the Alps. This controversy became the neuralgic point for two additional controversies that were to prove shattering to German society: first, the Reuchlin affair became a rallying point for German humanists and scholastic theologians in their battle against each other over control of German education, and second, Luther and his circle saw the Reuchlin affair to be a foreshadow of their own battles against the dominant scholastic model of theology practiced within the German church and academy.

See also: Luther, Martin (1483–1546); Reformation, Northern European.

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route to India, as well as an important sugar producer, but the opening of the Suez canal in 1870, and competition on the sugar market from Caribbean islands, led to economic decline. Shortly after World War II, Réunion became a French Overseas Department, and is as such a member of the European Union. In 2004, Réunion also joined the Common Market for Eastern and Southern Africa.

Being a part of France, the official language of Réunion is French. However, the most widely spoken language is Réunion Creole French, which is used by more than 90% of the 766 000 strong population. Urban dialects of Réunion Creole are closer to French, while popular dialects show more influence from African, in particular Bantu languages. Archaic forms of Réunion Creole are spoken in the mountainous interior of the islands, where early settlers had to move when their land was taken by larger sugar plantations, while the basilect is spoken by Indian, African, and mixed speakers in the coastal lowlands.

Like Mauritius, Réunion is home to a significant Indian community, speaking Tamil (120 000 speakers) and Gujarati. Other languages on the island include Chinese, Malagasy, and Comorian.

See also: France: Language Situation; Mauritius: Language Situation; Pidgins and Creoles: Overview.

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Reversing Language Shift

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Language shift is symptomatic of much larger-scale social processes which have brought about the global village phenomenon, affecting people everywhere, even in the remotest regions of the Amazon. Some linguists estimate that as many as 60% to 90% of the world's 6800-some languages may be at risk of extinction within the next 100 years. Language shift may be thought of as a loss of speakers and domains of use, both of which are critical to the survival of a language. The possibility of impending shift appears when a language once used throughout a community for everything becomes restricted in use as another language intrudes on its territory. Usage declines in domains where the language was once secure, e.g., in churches, the workplace, schools, and, most importantly, the home, as growing numbers of parents fail to transmit the language to their children. Fluency in the language increases with age, as younger generations prefer to speak another (usually the dominant societal) language.

Reversing Language Shift

To understand how to reverse language shift, we must first understand how languages are maintained. Language shift and death occur as a response to pressures of various types (social, cultural, economic, and even military) on a community. The term 'reversing language shift' (RLS) was proposed by Fishman (1991) in order to provide theoretical foundations of assistance to communities wishing to counteract forces leading to shift. The achievement of intergenerational transmission in the context of stable diglossia, where each language has its own domains of use, constitutes the heart of Fishman's conception of RLS.

Using Fishman's (1991) schema of X to refer to the language undergoing shift and Y to refer to the language replacing X, we can represent the process of shift in this formula: $X \rightarrow Xy \rightarrow XY \rightarrow xY \rightarrow Y$. We can represent RLS as its mirror image, a kind of role reversal, where X reclaims the domains it has lost to Y: $Y \rightarrow Yx \rightarrow YX \rightarrow (yX) \rightarrow (X)$.

XY and YX represent stable diglossia. X and Y appear in upper case to indicate that diglossia is stable; each language has its own set of functions and space without threatening the other. Lower case (Xy, xY, Yx, yX) symbolizes that x or y is dominated by the other language. Bilingualism without diglossia tends to be transitional and the predicted outcome of such situations is language shift (Fishman, 1967: 36). From Fishman's perspective, the future of minority languages would be problematic without sharp functional compartmentalization of codes and without the most stubborn maintenance of voluntary boundaries between the dominant and minority language speakers and their cultures.

The last two stages of RLS are in parentheses to indicate that RLS does not necessarily mean going back to a stage where X reclaims the majority of domains (i.e., yX). Nor is it the case that all X-men

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Stage 8	Most vestigial Xish users are socially isolated and Xish needs to be reassembled from their mouths and memories and taught to demographically unconcentrated adults
Stage 7	Most Xish users are a socially integrated and ethnolinguistically active population but are beyond child-bearing age
Stage 6	The attainment of intergenerational informal oralcy and its demographic concentration and institutional reinforcement
Stage 5	Xish literacy in the home, school and community, but without taking on extra-communal reinforcement of such literacy
Stage 4	Xish in lower education that meets the requirements of compulsory education laws
Stage 3	Use of Xish in the lower work sphere (outside the Xish neighborhood/community) involving interaction between Xmen and Ymen
Stage 2	Xish in lower governmental services and mass media but not in higher spheres of either
Stage 1	Some use of Xish in higher level educational, occupational and media efforts (but without the additional safety provided by political independence)

Figure 1 GIDS (Graded Intergenerational Disruption Scale) (adapted from Fishman, 1991: 88–109).

(to use Fishman's terminology) will come to speak X as their native language, as they did in the past. It most certainly does not entail returning to monolingualism in X.

Figure 1 summarizes the eight-point GIDS (graded intergenerational disruption scale) introduced by Fishman (1991) to characterize the extent to which a particular language (X) is endangered by assessing the extent to which transmission has been disrupted. It is intended as a heuristic device to assist communities in targeting their efforts to specific activities needed at each point of the scale. This follows from Fishman's view that language maintenance is not "a global 'total language' task," but rather a "functionally specific process which must be tackled on well-chosen, functionally specific grounds" (Fishman, 1991: 65).

GIDS can be further divided into two sets of four stages. The first set, comprising stages 8–5, is characterized as "RLS on the 'weak side': in pursuit of diglossia," and the second set, comprising stages 4–1, is termed "RLS on the strong side, or transcending diglossia in search of increased power-sharing" (Fishman, 1991: 396, 401). RLS on the weak side aims primarily to establish intergenerational transmission, whereas RLS on the strong side aims to introduce the minority language into various institutions. Stage 6 is the crux of RLS because only intergenerational transmission secures maintenance. Stages 8–6 are labor intensive rather than cost intensive in that they depend on the ability of individuals and communities rather than external agencies such as governments or education systems.

One of the most frequent mistakes activists make is to attempt to reverse the diglossic hierarchy by promoting the minority language in the domains now dominated by the majority language. What often results from active intervention to reverse language shift is a reversal of domain distribution in X and Y, with a decrease in the use of X at home and in private domains, and an increase in its use in public, formal domains such as government, education, etc. The net result is that X is forced to compete with Y in virtually all domains. Fishman (1991: 54–55) compared the distribution of Basque and Spanish in 1957 and 1987, noting that over this 30-year period there was a decrease in the use of Basque at home and in private domains, while there was a slight increase in the use of Basque in public, formal domains such as government, education, etc. In Wales too, where Welsh has been introduced in public domains where it used to be excluded, e.g., public administration and education, its previous dominance in other critical domains such as the home, and even the chapel in some areas, has been weakened. The family is no longer the main agency of language reproduction. It has been largely replaced in this role by education. More children are learning Basque through the education system than are learning it at home as a native language. Among the youngest sectors of the population, those who have learned Basque as a second language already outnumber native Basque speakers. The same is true of many other cases. The maintenance of more or less stable rates of bilingualism over recent decades in Ireland has been due more to the capacity of the schools to produce competent bilinguals than to

the capacity of the bilingual community to reproduce itself (Ó Riagáin, 1997).

Other Paradigms for Reversing Language Shift

Fishman's conception of RLS is narrowly focused in its specific aims at the same time as it is broad in scope. Its focus is narrow in the sense that everything that does not lead to the restoration of intergeneration transmission is merely camouflaged failure and amounts to biding time (Fishman, 1991: 86, 399). Its scope is broad in that RLS involves nothing short of cultural reconstruction and community building through the threatened language (Fishman, 1991: 17). As Fishman (2001: 452) put it more recently, "RLS is concerned with the recovery, recreating and retention of a **complete way of life**, including both non-linguistic as well as linguistic features."

Nettle and Romaine (2000: 79, 179) observed that the first causes in language loss are not themselves linguistic. Where language use changes, there is an underlying social upheaval which may have environmental, economic, or political causes. The preservation of a language in its fullest sense ultimately entails the maintenance of the group who speaks it, and therefore the arguments in favor of doing something to reverse language death are ultimately about preserving and sustaining viable communities.

Criticisms of the stable diglossia model as the key to RLS have noted that insofar as the diglossia that Fishman is so concerned to stabilize is in effect a symptom of the unequal balance of power between languages, diglossia is something to be overcome rather than to be attained. It may be more realistic to recognize King's (2001: 26) distinction between RLS and language revitalization, which can be understood as not necessarily attempting to bring the language back to former patterns of familial use, but rather to bring the language forward to new users and uses. In doing so, however, we must not deceive ourselves that the efforts directed at the latter will restore intergenerational transmission. There may be an increase in users and uses of language without intergenerational transmission. Spolsky (2003: 554–555) proposed that in addressing the question of success or failure of Maori efforts we need to 'desynonymize' a number of terms often used interchangeably. He prefers the term 'regeneration' for activities that increase the status and salience of a language, and reserves 'revitalization' for the restoration of intergenerational transmission. His perspective on Maori sees it not as an instance of language loss followed by attempts to reverse language shift, but as the continuation of a long process of negotiation of accommodation between Maori and English. Indigenous voices which have begun to make themselves heard in this arena are often angered at the suggestion that their language is dead, or that it is endangered and may die, and they resent such pronouncements and predictions from linguists, however well intentioned (see Quinn, 2001).

Fishman (2001: 461) himself warned of the dangers of arriving at conclusions by overemphasizing a limited pool of historical experience. He observed that "most RLS theories and efforts are byproducts of European indigenous minority problems." Linguistic theory, like most scientific disciplines, is grounded in Western models rather than in indigenous epistemologies. He acknowledges the need for a general and more inclusive RLS theory. The ideological bias of his own model of RLS privileges intergenerational transmission, a fact that is not unconnected with the special status traditionally accorded within linguistic theory to native speakers.

See also: Endangered Languages; Ethnolinguistic Vitality; Identity and Language; Language Maintenance and Shift; Migration and Language; Minorities and Language.

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Rhaeto Romance

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Since Th. Gartner (1883), the term 'Rhaeto-Romance' has been associated with the Romansh dialect of Graubünden, Switzerland; the Ladin dialects of the Dolomitic Alps in South Tyrol, Italy; and the Friulian dialects around Udine, spoken at the northern and eastern border of the Italian speaking area, at the frontier of the German and Slovene areas. Before Gartner's time, these three dialectal territories had been linked, though under another name (Ascoli, 1873) or with no name yet (Schneller, 1870). The term 'Rhaeto-Romance,' however, had already been used before Gartner to describe the Romansh dialects of Graubünden (Diefenbach, 1831) and in 1938 this term even became the constitutional designation for these dialects in Switzerland. The term therefore is not used with consistency.

The language territory of Romansh is part of the canton Graubünden, an administrative subdivision of Switzerland. The first coherent written evidence is a testimony of a witness from a record written in Latin in 1389. The first longer text was written in 1527, but it has survived only in later copies. In the 16th and 17th centuries, different books of exclusively confessional content were published. They were the starting point for four different regional written standards: the two Engadine written standards Puter and Vallader as well as two different Surselvan variants, a catholic one and a protestant one, that were united at the beginning of the 20th century. In the meantime, however, another regional standard had emerged: Surmeiran. To these standards, Sutselvan was added in the first half of the 20th century. This fragmentation, along with the topographic conditions that hardly allowed for direct contact between the different regions, was the reason why the dialects developed separately, so that a certain acclimatization is actually necessary to assure the supra-regional understanding.

In the constitution of Graubünden, Romansh was put on an equal footing with German and Italian, the two other cantonal languages of Graubünden, already in 1880. It was, however, never extensively used as a language of administration, especially as the lack of a uniform written standard for the Romansh meant that in each case, two regional written standards had to be used for administration. In the schools of the language territory, in which Romansh is usually the only language of instruction until the third form, all five regional written standards are used, though Sutselvan is used in only one school. In 1938, Romansh was granted the status of a national language, but not of an official language. There have also been attempts to create a uniform written standard for the entire Romansh territory, e.g., in 1864 the *Romonsch fusionau,* which failed however, and more recently the *Rumantsch Grischun* (1982), which is accepted on federal as well as cantonal level as a language of administration.

In the 2000 census, the number of speakers who indicated Romansh as main language amounted to only 27 038 in Graubünden and 35 095 in Switzerland; there are 40 168 in the canton (60 651 in Switzerland) who still use the language in at least some domains (family, school, etc.). Although the number of Romansh speakers has remained surprisingly stable since the first comparable census in 1880, its portion of the population of the canton of Graubünden has decreased from 40% to 14% (main language) and 21% (domain language). Even in some territories previously Romansch dominant, the Romansh speakers have nowadays become a minority. Sutselva and Upper Engadine are in fact falling out of use.

The language territory of Dolomitic Ladin is nowadays divided among three Italian provinces: Bolzano (Gadera Valley, Gardena), Trentino (Fassa), and Belluno (Ampezzo, Livinallongo). The first known text dates from 1631, but until the end of the 19th century very little was written in Ladin and only a few books were published. Towards the end of the 19th century, Ladin was used more frequently in writing, but between 1915 and 1948 the efforts for the written use of Ladin were restrained for political reasons. Fragmentation occurred between 1923 and 1927 under fascist rule and was intended to weaken Ladin, accompanied by other measures to suppress this language. In 1948, Ladin was given special status in Bolzano and Trentino. The Ladins of Ampezzo and Livinallongo (Belluno) did not receive a similar Special Statute.

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In connection with the introduction of Ladin in schools and partly also in the administration, different regional written standards were developed, first for the Gardena Valley (Gardenese). This written standard was first also used in the Gadera Valley, which later (1970) went its own way (Badiot). Somewhat later, a regional written standard was also developed in the Fassa Valley (Fassan). It is taught in school too, though only the basics. Also for Ampezzo (Ampezzan) and Livinallongo (Fodom), regional written standards were developed. There use is restricted, as in these regions Ladin is not taught in schools. Since 1988, there have been efforts to develop a uniform written standard for all Ladin speakers, the *Ladin Dolomitan*. The dialectal differences are not as big as in Swiss Romansh; the territory of Dolomitic Ladin is much more compact than the Swiss Romansh territory, although topographic barriers also make contacts difficult.

There's no reliable data on the number of speakers of Ladin. They are included in official statistics only in the province Bolzano; in the other territories they still count as speakers of Italian. In the province Bolzano, 18 736 inhabitants consider themselves as Ladins and in eight communities, the Ladins still have large majorities of between 82% and 97% (2001). With regard to the population of the province of South Tyrol, however, this amount represents only slightly more than 4%. According to estimates, the Ladins are also a majority in the other communities in their territory, with exception of Ampezzo. It is estimated that the total of Ladin speakers amounts to 27 000–30 000.

The Comelico and Cadorine dialects are sometimes associated with Ladin. Recent dialectometrical research, however, does not seem to confirm this affiliation.

The language area of Friulian is situated in the northeast of Italy, in the provinces Pordenone, Udine, and Gorizia, and reaches from Forni Avoltri to just outside Trieste. In the west, the borders of the linguistic frontier to the Venetian dialects are fluid; a transitional zone can be discerned. Already in 1336, the language appears in a coherent text and in the second half of the 14th century, the texts become more frequent. The two oldest poems also date from the 14th century. In Friuli, the art of poetry starts at the beginning of the 16th century and already in one of the first sonnets, *In laude de lenghe furlane* 'In praise of the Friulian language' by Girolamo Sini, writing in Friulian is a topic. This first great age of Friulian literature came to a halt under the influence of Venetian; from 1420 to 1797 Friuli was under Venetian rule. In the 19th century, however, the literary activity was taken up again and has continued until today. Contrary to Swiss Romansh, this reinterest has not led to the development of regional written standards, although Friulian dialectal regions exist: western Friulian, central Friulian, also called east-central Friulian, and Carnic Friulian in the north. Since 1963, Friuli is part of the autonomous region Friuli-Venezia Giulia.

The dialectal differences in Friulian are, however, smaller than in Dolomitic Ladin and in Swiss Romansh, and the mutual understanding assured at all time. There are, however, certain tendencies to use one supra-regional variety in literature, namely the central Friulian of the region around Udine, also called 'common Friulian.' These tendencies, however, are not significant and have been contradicted by opposing tendencies reconsidering the use of the local dialect also as literary language. Since 1985 systematic efforts have been made to create a uniform Friulian written standard. These became particularly urgent as efforts were made to use Friulian in school, on a voluntary basis though, which was rendered possible by the minority law in 1999. Based on this use of the language in a new domain an official orthography was sanctioned the same year and seems to be well on the way.

The number of speakers of Friulian can once again only be based on estimates, as it has not been recorded statistically either. In the actual language territory, it has been estimated at about 600 000, to which 300 000 from outside the territory should be added. The total of speakers of Friulian in the region Friuli-Venezia Giulia would thus amount to about 50%. In any case, Friulian certainly has a sufficiently large number of speakers not to be considered an endangered language. The actual use of the language, however, still seems to be limited to a great extent to the family. It is also to be considered that Friulian has to compete with another Romance language, Italian, contrary to Romansh in Graubünden and Ladin in the Dolomitic Alps, which live in competition with German.

The summing up of these three linguistic areas under the term 'Rhaeto-Romance,' which happened

in the second part of the 19th century, was mainly based on some phonetical (e.g., maintenance of *Cl-*) and morphological (e.g., maintenance of *−s* in the plural and in the 2.sg.pl.) particularities that mainly distinguish these linguistic areas from the adjacent northern Italian dialects. This differentiation was questioned beginning in 1912 (Salvioni) in connection with the changing political situation and the rise of the national states, first and foremost by Italian scholars. The scientific part of the discussion was mainly about the importance of the common features of the three speech communities. These common features were then contrasted with similar features in the neighboring Italian dialects. In the 1980s, thanks to the newly developing dialectometry, this discussion has been resumed on a scientifically more solid basis. Electronic data processing of enormous amounts of material allowed comparison, and it became possible to show that the Rhaeto-Romance linguistic area, based on the maps of the *Dialect Atlas of Italy and Southern Switzerland* (AIS). At the time of the recording of the AIS, northern Italian dialects clearly differed from each other on the one side, but on the other side, they presented significantly more common features (Goebl, 1984). Friulian, however, differed less with its surrounding northern Italian dialects than Swiss Romansh or Dolomitic Ladin. The results of the AIS have recently been confirmed and refined with data, collected since 1985, of the *Atlant linguistich dl ladin dolomitich y di dialec vejins* (ALD). The detailed interpretation of these results, however, is pending.

In any case, since the 17th century there are no direct frontiers between these three linguistic areas anymore. It is to be noted, however, that all three language areas use their own regional written standards, even though these can by far not cover all written domains, which strongly distinguishes them from the bordering northern Italian dialect regions.

See also: Indo–European Languages; Switzerland: Language Situation.

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Rhetoric, Classical

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The notion of 'classical rhetoric' is normally associated with the Western tradition of a structured system of teaching public speaking and writing skills that was developed in ancient Greece; taught in Roman, medieval, Renaissance, and early modern schools; and, with certain variations, is still in use today (Golden *et al*., 1993/1976; Enos, 1996; Bizzell and Herzberg, 2001). According to Corbett and Connors (1999), the classical tradition of rhetoric extends from the fifth century B.C.E. down to the close of the eighteenth century C.E. The changing roles that rhetoric has played in politics, social life, and education may account for the emergence of several rhetorical systems and schools of thought.

We are now experiencing a revival of rhetoric, that restores the dignity it had under Aristotle, for whom rhetoric, poetry, philosophy, and science were indissolubly linked. Rhetorical theory provides, in interde-

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We are now experiencing a revival of rhetoric, that restores the dignity it had under Aristotle, for whom rhetoric, poetry, philosophy, and science were indissolubly linked. Rhetorical theory provides, in interde-

pendence with other social structures and means of communication, elaborate ways to reconstruct reality and to participate in structuring socio-political relations (Booth, 2001/1974; Kennedy, 1999/1980; Covino and Jolliffe, 1995; Herrick, 2001). A major point of departure in exploring rhetoric is the rhetorical role played by language as a conceptualizing and persuasive tool, as a means of communication, and as a bearer of values (Dumarsais, 1825/1730; Fontanier, 1968/1830; Perelman and Olbrechts-Tyteca, 1969; Groupe μ, 1976/1970; Barthes, 1988).

The Origins of Rhetoric

Rhetoric developed under Greek democracy in the fifth century B.C.E. and has since been used as the systematic practice of persuasive communication strategies in crucial areas of social life, such as public affairs, civil disputes, law courts, and education. A major prerequisite for the development of rhetoric was the establishment of constitutional democracy in Greece, which required the participation of ordinary citizens in the decision-making process to a degree not existing in other literate cultures.

According to standard scholarly accounts (Clark, 1957; Bryant, 1968; Vickers, 1988; Enos, 1993; Enos, 1995; Kennedy, 1994; Kennedy, 1999/1980; Murphy and Katula, 1995; Foss *et al.*, 2001), the art of rhetoric originated in Syracuse with Corax of Sicily (around 467 B.C.E.), who was the teacher of Tisias, a fellow Sicilian. It is assumed that Corax and/or Tisias authored the first *technē* (rhetorical handbook). Although judicial rhetoric developed in Syracuse, it was Athens that became the leading center for displays of oratory. In Athenian courtrooms, the procedure was for each side (plaintiffs and defendants) to be allotted a given amount of time to present their own case. The speaker had to demonstrate credibility, use persuasive arguments, and keep the jury interested.

A competing approach to the technical teaching of rhetoric was introduced during the mid- to late fifth century B.C.E. through the practices of the Older Sophists (Jarratt, 1991; Mailloux, 1995; Poulakos, 1995; Grimaldi, 1996; Vitanza, 1997). The Sophists (the best known of whom are Protagoras, Gorgias, and Isocrates) were mostly non-Athenian Greeks who could not participate directly in the politics of Athens and who acted as itinerant orators and teachers of rhetoric. Their status as outsiders raised distrust, and their approach was discredited for a number of reasons. First of all, they tended to see all language use as rhetorical and rhetoric as knowledge building, whereas different communities and traditions might see things differently. Second, their students were supposed to learn rhetoric primarily by imitating exemplary speeches, whereas Greeks traditionally thought that such virtues could not be taught. Third, as several scholars of classical rhetoric (Cole, 1991; Schiappa, 1991; Schiappa, 1999; Robb, 1994; Cassin, 1995) have pointed out, the fifth century B.C.E. was a period when Greece underwent a transition from a predominantly oral culture to an increasingly literate culture, which must certainly have left its imprint on the heated intellectual debates concerning the role of rhetoric.

In his book *Rhetoric*, Plato's student Aristotle was the first to organize the description of rhetoric, treating it as the counterpart of dialectic. He systematized deductive logic, and his ideas influenced Western thinking. Out of the five canons of rhetoric, he placed invention, or the discovery of lines of argument, at the very center of the rhetorical enterprise. Aristotle's genius with respect to rhetoric lay in his ability to incorporate all the situational elements occurring during the speaking situation: speaker, language, and audience during an oration. He was first to observe that speaking circumstances fall into three genres: forensic, deliberative, and epideictic (see section 'The Three Genres of Rhetoric', below). Aristotle's systematic account of rhetoric dominated rhetorical thought during the Middle Ages and beyond.

Roman rhetoricians, such as Cicero and Quintilian, drew largely on Greek rhetoric. The pseudo-Ciceronian *Ad Herennium* appears to be a representative Roman text in that it is essentially Greek in content and Roman in form. Much of the work by Roman writers is prescriptive, providing guidelines for using the basic rhetorical tools. Cicero distinguishes the five canons of rhetoric as a five-part structure of speeches: introduction, narration, statement of position, refutation, and conclusion (see section 'The Five Canons of Rhetoric' below). Although Cicero wrote two important handbook-style treatises, *De inventione* and *Topica*, he laid greater emphasis on his big dialogues on rhetoric, *De oratore* and *Orator*. Subsequent medieval traditions of rhetoric generally stressed the manuals. By contrast, Renaissance traditions favored the dialogues.

Living in the relative stability of the early Roman Empire, rather than during the political turbulence of the late Republic, as did Cicero, Quintilian did not have to justify the place of rhetoric. He developed the teaching of Cicero further and extrapolated it in a practical way. His aim was to train citizen-orators for the law courts and public life; the ideal was to be a good man skilled in speaking (*vir bonus dicendi peritus*). Quintilian's *Institutio oratoria* is considered the fullest rhetorical treatise in Latin; it sets forth a complete theory of invention, arrangement, style, memory, and delivery. This explains why it

became an important source of ideas on education throughout the Middle Ages.

Rhetoric underwent a decline with the fall of the Roman Empire and the decay of its heirs, the medieval institutions, to resurface only with the humanists during the Renaissance. It was subsequently challenged by such philosophers as Peter Ramus and John Locke and temporarily displaced by the rise of science and positivism. Rhetoric was, however, increasingly used in the democracies that emerged from the American and Western European bourgeois revolutions, which enabled it to be reborn once again and gradually secure an ever more outstanding position in modern society.

Defining Rhetoric

Today, more than 2000 years after the emergence of rhetoric and rhetorical thinking, scholars are still grappling with the intricate issues of its definition. Since rhetorical inquiry concerns human agents, symbol communication systems, and audiences, there are overlaps with related scholarly disciplines, such as linguistic pragmatics, argumentation theory, anthropology, psycholinguistics, and sociolinguistics, to name but a few.

It seems justifiable to agree with Scott (1972) that "any definition of rhetoric that is taken as once-and-for-all is apt to be gravely misleading," since any definition will only partly cover its wide range of uses. He suggests that any definition of 'rhetoric' will be, itself, a rhetorical use of language. At the same time, such a claim appears to contain its own contradiction: the claim that any definition of 'rhetoric' is a product of its rhetorical circumstances presupposes a basic definition of rhetoric.

The term 'rhetoric' is derived from the Greek *rhêtorikê* ('art/technique of a public speaker', from *eirein* 'to say, speak'), the earliest occurrences of which are among the followers of Socrates and more specifically in Plato's dialogue *Gorgias*. It is used there, somewhat pejoratively, to describe the technique of a public speaker or politician. The definition of 'rhetoric' as 'the art of persuasion' is the most common, although more nuanced definitions have often been provided. For Plato, rhetoric was "the art of winning the soul by discourse" (*Gorgias*). Aristotle made a point of distinguishing between rhetoric and persuasion. According to him, rhetoric "is the faculty of discovering in any given case the available means of persuasion" (*Rhetoric* 1.2.1). On a more programmatic note, Cicero regarded rhetoric as the eloquence able to persuade one's fellows of the truth of what they had discovered by reason (*De inventione*). These definitions point to a dualistic nature of rhetoric. On the one hand, 'rhetoric' is a skill used for a major purpose: to persuade. On the other hand, 'rhetoric' is the study and application of systematic reasoning, structuring, and communicating strategies.

Although rhetoric in Greece and Rome was primarily taught as an art of persuasive speaking or writing, it was widely recognized that rhetorical techniques were also employed in imaginative compositions not explicitly intended **to persuade** an audience to adopt some action or belief (although that might be present as a subtext), but aimed at an aesthetic effect, **to give enjoyment** to an audience or **to demonstrate the imaginative and linguistic skills** of the speaker or writer. Accordingly, the definition of rhetoric as the 'art of persuasion' might easily be extended to the 'art of effective expression'.

The Three Genres of Rhetoric

The main occasions for public address in classical Greece were in the law courts, in political assemblies, and on ceremonial occasions at public festivals. Aristotle (*Rhetoric* 1.3) outlined three different genres of rhetoric according to the role of the audience that is addressed: 'forensic' or 'judicial', 'deliberative' or 'political', and 'epideictic' or 'demonstrative'.

The target of 'forensic rhetoric' is an audience that is asked to make a decision about the justice or legality of an action in the past (e.g., trial speech). This genre was fully developed as a result of Greek constitutional democracy, whereby male citizens were required to speak on their own behalf in prosecution/defense in the courts of law. The goal was to persuade and ultimately to win.

The target of 'deliberative rhetoric' is an audience that is asked to make a decision about the advantages and disadvantages of a future action (e.g., a political decision). The function of deliberation in traditional societies is the achievement of consensus: not

Table 1 The three genres of rhetoric

Genres of rhetoric	*Temporal orientation*	*Means*	*Ends*	*Audience*
Deliberative	Future	Exhort and dissuade	Expedience, the dis/advantageous	Decision maker (legislator/voter)
Forensic	Past	Accuse and defend	The just and the unjust	Decision maker (judge/jury)
Epideictic	Present	Praise and blame	The noble and the shameful	Spectator

the acceptance of the view of a majority, but rather explicit or tacit unanimity, since it was felt that lack of unanimity was a threat not only to leaders but to the maintenance of a well-functioning democratic society.

The target of 'epideictic rhetoric' is an audience that is not required to make a decision, but to pass a judgment about an individual's character or deeds. This genre was regarded by Aristotle as a speech of praise or blame (funeral orations, anniversary speeches) that is concerned with what is honorable or dishonorable. Such speeches are connected with some ceremony meant to enhance traditional values.

As illustrated in Table 1, each of the three genres of rhetoric can be distinguished by its distinctive temporal orientation, means of persuasion, purpose, and the type of audience action called for.

The Five Canons of Rhetoric

According to Greek and Roman rhetoricians, five stages, called 'canons', needed to be followed in planning, structuring, and delivering a speech (the former terms are Greek and the latter Latin): *heuresis* or *inventio* 'invention'; *taxis* or *dispositio* 'arrangement'; *lexis* or *elocutio* 'style'; *mnēmē* or *memoria* 'memory'; and *hypokrisis* or *actio/pronuntiatio* 'delivery'. Each canon concerns a specific aspect of the process and production of discourse. While they may be laid out in a linear fashion, suggesting that discourse production is a linear process, rhetorical experience suggests that they are in fact recursive and interrelated activities.

'Invention' involves the search for adequate ways to present the information and to identify the arguments. It is tied to the rhetorical appeal of *logos*, being oriented to **what** an author would say rather than **how** this might be said.

'Arrangement' involves the organization and adjustment of the parts of a presentation in a coherent structure. In ancient rhetoric, arrangement referred solely to the order to be observed in an oration, but the term has broadened to also include large-scale discourse.

'Style' deals with rendering the contents in an appropriate and effective style. If invention addresses **what** is to be said, style addresses **how** this will be said. The concept of 'levels of style' comes essentially from the Roman rhetorical tradition, in which style was typically divided into three broad categories: high or grand, middle, and low.

'Memory' involves the deliberate use of mnemonic devices to remember the order of ideas and arguments in the speech. Typically, memory has to do only with the orator, but it invites consideration of how the audience will retain things in mind.

'Delivery' involves a good control of the vocal modulation and effective gestures that establish 'ethos' and 'pathos' appeals. It originally referred to oral rhetoric in a public context, but it concerns the presentation of both oral and written discourse.

The Three Rhetorical Appeals

With respect to invention, Aristotle and later rhetoricians made a distinction between 'artistic' and 'nonartistic' means of persuasion or rhetorical appeals. Nonartistic appeals are such things as the testimony of witnesses, written documents, and oaths that have been taken by litigants: they are 'used', but not 'invented'.

The artistic appeals in classical rhetoric are 'logos', 'ethos', and 'pathos'. Logos, or rational appeal of the message, is expected to provide the audience with good and sufficient reasons to believe and to act. Ethos, or ethical appeal (the character and authority of the communicator), should provide sufficient guarantee for the credibility of the message. Pathos, or the emotions conveyed in the message, should be powerful enough to engage audiences in terms of their own experience. As rhetoricians since Aristotle have convincingly shown (Bryant, 1973; Kennedy, 1999/1980; Corbett and Connors, 1999; Foss *et al.*, 1991), logos, ethos, and pathos are complementary in that they activate specific sides of the listener's mind and emotions to varying extents. The rhetorical appeals provide the audience with reasons and evidence for accepting or rejecting the beliefs, ideas, and feelings presented by the speaker.

Logos refers to the reasoning process of the speaker, whose claims are conveyed by means of two reasoning techniques, i.e., 'inductive' and 'deductive'. In Western rhetorical theory, inductive argument uses 'paradigms' that support a proposition by implying a universal conclusion from experience, which need not be expressed. Deductive argument involves the use of a rhetorical syllogism, called 'enthymeme'; it is usually probable, though not a certainty, and it tends to assume one premise that is unexpressed.

Another universal feature of logos is the use of *topoi* ('places' or 'topics'). There are two main categories of topics: 'common topics' and 'specific topics'. Common topics are strategies of argument applicable to many subjects and include definition, division of the question, and argument such as from the greater to the lesser, from cause to effect (or the opposite), and showing that something is possible or important (or the opposite). The other kind of topoi, 'specific topics', are appropriate to a particular subject.

Ethos was regarded by Aristotle as evidence that the speaker was to be trusted. For Aristotle, a speaker's ethos is persuasive when the speech demonstrates (1) *phronēsis* 'practical wisdom and common sense', (2) *arētē* 'moral virtue', and (3) *eunoia* 'goodwill toward the audience'. Later rhetoricians, such as Cicero, recognized, however, that there were other forms of ethos that regularly were involved in a speech. For example, a speaker might appeal to the moral character of the audience. In judicial rhetoric, the ethos of the opponent and of witnesses was often an issue. Ethos also has a nonartistic form – something that is brought to the occasion – such as the authority of the speaker, known to the audience from his/her position or previous actions.

Pathos was regarded by Aristotle as the emotion of the hearers aroused by a speech that moved them to accept what the speaker said. Cicero reconsidered the Aristotelian theory of ethos and pathos by reconceptualizing them as degrees of emotion: 'ethos' became thus an expression of moral character and of the gentler emotions associated with moral character, such as friendliness or pity; 'pathos' was regarded as the expression of strong emotions, such as anger or outrage. The nature and intensity of emotional appeals are generally influenced by culture and time. Rhetorical as well as pragmatic linguistic scholarship has shown that, for example, a statement that is amusing or conventional in one culture may be outrageous or insulting in another. Moreover, characteristics such as age, gender, and social status affect the pathos, or emotional impact, on different members of one and the same audience.

Classical Rhetoric in Postmodern Times

The 20th century, and especially the last 20 years, have seen a revival of rhetorical thinking in many disciplines also outside the university subject called 'rhetoric'. This is the result of a growing awareness that rhetoric permeates our thinking processes as well as our motivation to act. There is thus a rhetoric of science, a rhetoric of philosophy, a rhetoric of art, etc. The skill and theory of rhetoric involve a persuasion to feel and a persuasion to act. The relationships between reasoning, interpretation, and persuasion are being reconsidered and reevaluated in terms of meaning co-construction, emotional involvement, and ethical implications (Welch, 1990; Poulakos, 1993; Kastely, 1997; Gross and Walzer, 2000; Booth, 2004).

The study of rhetoric in postmodern times needs to examine critically how classical rhetorical issues have been theorized diachronically and synchronically and how the art and skill of rhetoric have been practiced in different times and places, by men and women (Lunsford, 1995; Glenn, 1997; Sutherland and Sutcliffe, 1999; Bizzell, 2000; Donawerth, 2002). The traditionally assumed distinctions between the roles of orators, audiences, and messages need to be challenged and examined critically to understand the rhetorical connections and disconnections between the communicative strategies associated with the ancient past and those emerging from the postmodern present.

See also: Aristotle and Linguistics; Quintilian (ca. 30–98 A.D.); Rhetoric: History; Rhetoric: Semiotic Approaches.

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Rhetoric: History

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Rhetoric is the systematic analysis of human discourse for the purpose of identifying useful precepts for future discourse. Since it deals with human thought and expression, it has been linked through the centuries with psychology, philosophy, ethics (both private and public), and education.

Aristotle's Rhetoric

Rhetoric originated in ancient Greece, primarily in Athens, and was connected with a rising democracy that placed a premium on the speaking ability of each individual citizen. Even the philosopher Plato wrote on rhetoric, notably in his *Phaedrus*. The first major effort at a comprehensive theory of public speaking, however, was made by Aristotle in his *Rhetoric* (before 322 B.C.E.). He defined rhetoric as the faculty of observing in any given case the available means of persuasion. Aristotle named three types of orations: political, forensic, and epideictic (occasional). He declared that the object of rhetoric, persuasion, is achieved through the use of three 'proofs': *ethos*, the credibility of the speaker; *pathos*, the emotions of the audience; and *logos*, the arguments used. The main types of arguments are the example and the enthymeme, a rhetorical syllogism; Aristotle provided 28 sample 'topics' or lines of argument on which enthymemes can be based. He began Book Three by stating that it is not enough to know what to say; the speaker must also know how to say it. The subsequent discussion of style noted that the foundation of good style is correctness of language; at the same time Aristotle called for 'distinctiveness' of language, achieved through use of such devices as metaphors.

Interestingly, Aristotle's *Rhetoric* had very little influence in antiquity or the Middle Ages, becoming influential only after its translation into Latin in 1475 in Renaissance Italy.

Roman Rhetoric

Aristotle died in 322 B.C.E. We know very little about the development of rhetorical theory between that date and the emergence of a homogenous set of rhetorical doctrines shortly after 100 B.C.E. Though these ideas are embodied in his *De inventione* and six other rhetorical works of Marcus Tullius Cicero (105–43 B.C.E.), in the anonymous *Rhetorica ad Herennium* (c. 87 B.C.E.), and in the *Institutio oratoria* (95 C.E.) of Marcus Fabius Quintilian, the concepts are so similar in all these works that it seems fair to describe this common body of rhetorical doctrine as a 'Roman' rhetoric. It laid out five 'parts of rhetoric': (1) invention, the discovery of valid or seemingly valid arguments that render one's case plausible; (2) arrangement, the distribution of these arguments in a proper order; (3) style, the fitting of the proper language to the invented matter; (4) memory, the firm mental grasp of matter and words; and (5) delivery, the control of voice and body in a suitable manner. This theory of 'five parts' dominated Western rhetoric at least until the early 20th century and is still important today; its longevity is due at least in part to the fact that it is a natural progression of composition.

Roman invention included both 'topics' (as in Aristotle) and 'issues' or the points to be resolved in a controversy. In arrangement, the Romans specified a sequence of six parts of the oration itself: introduction, narration of background, partition (or outline of the case), confirmation, refutation, and peroration (conclusion). Style is identified under three levels – plain, middle, and grand – with distinction (*dignitas*) to be achieved through the use of 'fig-

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ures.' Book Four of the *Rhetorica ad Herennium* is the first to name 64 figures, divided into figures of speech and figures of thought, that were to become a standard for nearly two millennia; 10 of the figures of speech (e.g., metaphor, metonymy) later went under the name of 'Tropes.' So dominant was this set that this fourth book was often copied separately in the Middle Ages and Renaissance. The *Rhetorica ad Herennium* is also the first rhetorical treatise to offer a section on memory, involving the use of mental backgrounds into which mental images of remembered things can be placed. Delivery calls for the speaker's regulation of his voice, facial expression, and gestures.

The Roman educator Quintilian in his *Institutio oratoria* (95 C.E.) not only reinforced all these doctrines but outlined a systematic training program in grammar, literature, and rhetoric that set an educational standard followed for nearly 2000 years in Europe and America.

By the end of the classical period, then, a large number of sophisticated rhetorical concepts had been identified and combined into a well-coordinated, effective Roman system. In fact, some modern scholars, such as Brian Vickers and George A. Kennedy, evaluate later rhetorical developments according to the rate at which they accord with classical rhetoric.

Medieval Rhetoric

The Roman concept of 'seven liberal arts' – which included the subjects of grammar, rhetoric, and dialectic – was introduced into the Middle Ages by encyclopedists such as Martianus Capella, Isidore of Seville, and Cassiodorus. These encyclopedists offered highly condensed abstracts of rhetorical lore, usually without examples. They were, however, a main source of knowledge about rhetoric for many in the Middle Ages. The copying of Ciceronian rhetorical texts, especially his *De inventione* and the anonymous *Rhetorica ad Herennium* generally ascribed to him, continued throughout the Middle Ages; these were often accompanied by glosses or commentaries – usually a sign that the texts were used for teaching in schools. It is important to note that during the Middle Ages, rhetoric was taught in what we would call secondary schools, rather than in universities.

Aristotle's *Rhetoric* was copied often in Latin translation, but not used as a rhetoric text; instead it was typically included in manuscript collections on moral philosophy.

The original rhetorical treatises composed during the Middle Ages fall into three categories, each a separate rhetorical genre. The first, developed in the 11th century, was the *ars dictaminis*, or art of letter-writing. Basically this art took the Ciceronian pattern of six parts of an oration and set up a five-part format for writing a letter: salutation (based on the social level of writer and addressee), introduction, narration, petition, and conclusion. Many of the 300 surviving dictaminal manuscripts are accompanied by model letters. All are in Latin. The second genre, the *ars poetriae* or art of writing poetry, was in teaching practice, the art of writing both verse and prose. The *Poetria nova* (c. 1210) of Geoffrey of Vinsauf was the most important of the six major Latin works that appeared between 1170 and 1280. Relying heavily on the *Rhetorica ad Herennium*, including the use of all 64 figures from the fourth book of that text, Vinsauf laid out a Ciceronian pattern for the composition of verse and prose. The fact that it survives in 200 manuscripts indicates that the book was enormously popular. It is important to note that in the Middle Ages poetry (and some prose) was meant to be read aloud, so the application of Ciceronian rhetorical principles to poetry was not as unusual as it might seem to modern readers. All the authors of the *ars poetriae* were grammarians, and in fact one of them, John of Garland in his *De arte prosayca, metrica at rithmica* (after 1229), tried to establish a linguistic base for all language use.

The third medieval rhetorical genre was the *ars praedicandi*, or art of preaching.

The medieval oral sermon shared some of the characteristics of the ancient oration, but the circumstances were quite different. Persuasion was not the objective, since the congregation consisted of people already committed to Christianity. Consequently, the emphasis was on explanation and reminders of the text of the Bible. More than 300 separate 'arts of preaching' appeared between approximately 1200 and 1500, following a basic format of elaborating on a 'theme' (usually a passage from Scripture). The theme was divided into parts (usually three), each part was then redivided, and each of these parts was 'amplified' or 'proved' in a variety of ways. Some commonly used means of amplification were the exemplum (narrative example), authority, reasoning, etymology, allegory, and metaphor. Despite the oral nature of the sermon, the treatises seldom discuss delivery.

The Renaissance

Two factors led to an explosion of interest in rhetoric in early modern Europe. One was the recovery of all the ancient rhetorical works of Greece and Rome, most of which had not been known during the Middle Ages. For example, the complete text of Quintilian's *Institutes of oratory* was discovered in Switzerland in

1417, and Greek texts were brought to Italy from places such as Constantinople for study by humanist scholars.

The other factor was the advent of printing. A staggering number of rhetoric texts were printed between 1465 and 1700: Lawrence D. Green and James J. Murphy have identified 3842 titles by 1717 named authors and 120 anonymous authors, produced in 310 printing towns by 3340 printers and publishers.

It is obviously impossible to summarize all the developments during this period, but some important features are the application of classical rhetoric to preaching, the attack of the new empirical science on the epistemological assumptions of classical rhetoric, the rise of 'general rhetoric' (an amalgam of Greek and Roman sources), and the gradual democratizing of rhetoric from an elite Latin to a popular vernacular art. One particular development, though, is important enough to note. The French university master Peter Ramus, following the lead of Rudolph Agricola's work on logic, declared in 1543 that Aristotle, Cicero, and Quintilian were all wrong about rhetoric. He assigned Invention and Arrangement to dialectic, leaving only Style and Delivery to rhetoric (and leaving Memory out as a separate part). Ramus was immensely popular, especially in Protestant countries, and had great influence in colonial America as well. Walter J. Ong has calculated that 1400 editions of his and his followers' works were printed. The resulting controversy between Ramists and Ciceronians lasted well into the next century.

Modern Rhetoric

Since 1700, rhetoric has gone from being an integral part of education and civic life to an ignored or even opposed entity today. Some even believe that rhetoric today is so diluted in its efforts to be all-encompassing that it is difficult to identify the core of the subject. But there has been no single climactic event to which this change can be assigned. Of course, there have been many variations of basic rhetorical theories and there have been differences in emphasis on one part of rhetoric or another. For example, the so-called 'elocutionary movement' of the 18th century in works by authors such as Thomas Sheridan and Gilbert Austin focused on pronunciation and other aspects of delivery. The Scotsman George Campbell argued in his *Philosophy of rhetoric* that to achieve persuasion rhetoric must address four 'faculties' of the mind – the understanding, the imagination, the passions, and the will; he also declares scientific linguistics to be the foundation of rhetoric. The 'belletristic movement' linked rhetoric, literature, and 'taste,' as marked in books such as the influential *Lectures on rhetoric and belles lettres* (1793) of the Scotsman Hugh Blair. Another Scottish development, linked to growing demands for socially advancing education, was the application of rhetoric to writing – a movement that was to affect pedagogy in the United States. The 19th century philosopher Friedrich Nietzsche declared that language is rhetoric, because it can express only opinion, not knowledge; consequently 'truth' can be seen as a linguistic social agreement rather than objective fact. In the opinion of rhetorical historians Patricia Bizzell and Bruce Herzberg, Nietzsche anticipates themes developed by 20th-century rhetoricians such as I. A. Richards, Richard Weaver, and Chaim Perelman, as well as philosophers Michael Foucault and Jacques Derrida. Finally, the application of the methods of social science to discourse analysis in recent years has produced a field of 'communication' markedly different from a rhetoric relying on thought and on perceptions by individuals.

At the beginning of the 21st century, then, rhetoric is like the multistream delta of a long river that spreads its central channel into a variety of channels. This is perhaps, not surprising, after such a long history.

See also: Aristotle and Linguistics; Quintilian (ca. 30–98 A.D.); Rhetoric, Classical.

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Rhetoric: Semiotic Approaches

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Introduction

'Rhetorics' is a polysemic word. All the meanings connected with it fall into two major groups: in the first one, rhetorics is regarded in a narrower and more traditional sense, in relation to verbal texts; in the second one, rhetorics is treated in a more universal and modern sense, in relation to expressing any information (e.g., visual rhetorics). It is nevertheless clear in both cases that rhetorics operates with signs and therefore fits completely into the framework of semiotics. Consequently, we could regard rhetorics simply as part of semiotics and semiotics as the ground for rhetorics. On the other hand, Charles Sanders Peirce distinguished three aspects of semiotics (Peirce identified semiotics with logic): speculative grammar, speculative critic, and speculative rhetoric (Peirce, 2.93). Thus, it is rhetorics rather than semiotics that proves to be a more general and basic knowledge. Attention needs to been drawn to the dangers of terminological amorphousness resulting from the nondistinction of rhetorics and metarhetorics; in order to avoid this, we will further speak of rhetoric phenomena when we refer to the object level, and of rhetorical phenomena when we refer to the metalevel.

Different treatments of rhetorics within the semiotic framework complicate the matter even more, since there is no clarity even in the approaches, not to mention the basic concepts. The researchers proceeding from the Peircean tradition drew attention to the fact that the most important tropes – metaphor and metonymy – are clearly related to the **icon**ical and **index**ical signs (Jakobson, 1956, 1980; Shapiro and Shapiro, 1976). Saussure's disciples, on the other hand, used the concepts and methods of structural linguistics and text grammatics to describe rhetoric phenomena, which gave rise to different directions of structural rhetorics (e.g., Dubois *et al*., 1970), as well as to deconstructional rhetorics, which was in clear opposition with both traditional and structural rhetorics (e.g., de Man, 1986). An entirely different approach to certain rhetoric phenomena (above all, metaphor and irony) developed within the framework of analytical philosophy (cf. Searle, 1979); from the cognitive linguistics evolved the "everyday rhetorics" (Lakoff and Johnson, 1980). To this, Paul Ricoeur's hermeneutical approach to metaphor (Ricoeur, 1975) and a whole range of *ad hoc* linguistic, philosophical, and poetical treatments of different tropes and figures should be added. Some approaches focus on the rhetoric structure of the text; others focus on characterizing different styles, movements, or genres; yet others, on describing different figures and tropes (primarily metaphor) or on solving problems related to the transfer of meaning, etc. At first sight, all this presents an ambiguous picture of the landscape of contemporary rhetorics.

Before we discuss the semiotic aspects of rhetorics, it is necessary to determine what rhetorics is as a whole – or, to be more specific, what is the field where the phenomenon of rhetorics emerges – and second, how and to what extent the semiotical analysis could approach it.

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Before we discuss the semiotic aspects of rhetorics, it is necessary to determine what rhetorics is as a whole – or, to be more specific, what is the field where the phenomenon of rhetorics emerges – and second, how and to what extent the semiotical analysis could approach it.

Ancient Rhetorics

Human nature is universal: in different cultures independently of one another evolves congeneric knowledge related to astronomy, geometry, physics, medicine, etc. The existence of linguistic and poetic doctrines is also rather universal. Against this background, rhetorics has an unusual history: it originated in the specific settings of the Ancient Greek civilization, and all the subsequent rhetorical schools and traditions have derived from this source. No other ancient culture has developed anything that could be likened to classical rhetorics. This fact is even more remarkable as rhetorical matter is unspecific: all rhetoric phenomena can be entirely distributed among grammar, stylistics, poetics, and logic. Thus, most *rhetoric figures* and *tropes* have analogues in Persian, Arabic, Indian, as well as Chinese poetical traditions. Moreover, for instance Aristotle, within the Greek tradition itself, discusses the same phenomena in his *Rhetorics* and *Poetics*. The differences between these lie not in the matter but in the purpose: the aim of the poetic text is catharsis; that of the rhetoric text, to convince a listener.

The specific setting that made possible the rise of rhetorics in the European civilization involved the liberation from tyranny and the establishment of democracy in Athens and the restoration of usurped land to its legal owners. In a culture with no written ownership acts, the oral public word became the main tool in the settlement of disputes, and, above all, legal disputes. Rhetorics as an art of speech grew out of the practical needs of democratic institutions (republic, public political competition, freedom of speech, public justice); court and political speeches became the most important rhetoric genres.

Of course, Greek culture was not the only one where the art of public speech was fostered: Japanese, Chinese, and Muslim cultures present remarkable examples of this kind. Nevertheless, the corresponding fields cannot be really compared to ancient rhetorics, as in their case we are rather dealing with poetics, speech etiquette, etc. Rhetorics needs freedom and competitive public debate in the condition of equality of debate partners; speakers enter the contest where their only resources and weaponry are words and the skill of using them.

Even those schools of rhetoric that were primarily oriented toward ornamental style (the Asian school) – or those that claimed, similarly to Gorgias and in the spirit of Sophists, that they could prove anything – pursued the right influence of speech, i.e., they proceeded not from the semantic but from the pragmatic notion of truth. Thus, Gorgias compares his speeches to *pharmakon* ('drug') that a speaker uses to take his listener to a desired state of mind. In any case, ancient speech practice usually regarded ornaments as tools, not as an aim *per se*. It is informative to compare Greek rhetorics with Sanskrit poetics, since both evolved from the same Indo-European tradition. In the older stratum of the Sanskrit poetics (which has been preserved in Bhamaha's and Dandi's treatises of the 7th and 8th centuries) the central concept is *alankara* ('ornament'), which is comparable to the Greek *schema* ('figure'). The aesthetics of *alankaras* is very simple: the more ornaments there are and the more complex the constructions they form, the higher is the aesthetical value of an utterance. The later Indian tradition focused on the concept of *dhvani* (Anandavardhana's *Dhvanyaloka,* 9th century), which is not easy to translate: it is a hidden image, not expressed through words. Although the mechanistic doctrine of *alankaras* differs radically from the spiritualistic teaching of *dhvani*, both are entirely different from the Greek concept of rhetorics, where *schemata* do not have a sovereign value and every meaning can be expressed through word.

As it became an independent discipline, rhetorics had to define and position itself in relation to other branches of learning. Rhetorics opposed poetics as a skill of verbalizing real events against the skill of verbalizing fictional events; rhetorics opposed dialectics as an art of monological speech against the art of dialogue; rhetorics opposed logic as an art of expressing one's thoughts against the art of thinking (according to Aristotle, rhetorics is something like applied logic; logic which uses syllogisms is an art of proving, rhetoric is an art of persuasion, instead of syllogism it uses *soriteses* consisting of *enthymemata*), etc. Already by the 5th century B.C., there had emerged an intuitive notion of truth that could be termed the *rhetorical ideal*. According to this ideal, thinking, speaking, and acting form an inseparable complex: it is possible for a human being to develop and formulate his or her thoughts and ideas properly (the sphere of logic), to express them properly (rhetorics), and, in accordance with these, to act properly (justice). In the Roman Republic, rhetorics became even more connected with truth and justice; i.e., Cicero treated such 'hermeneutical' problems like the use of torture during the interrogation. Rhetorical ideal, which provided a foundation for the European mentality, prevailed at least until the 18th century and applies to some extent today. The rhetorical ideal was based on the intuition that the road to truth is the straightest of all possible roads and has to be followed in one's thoughts, words, and actions. An outstanding 17th-century pedagogue, Jan Amos Komensky, started his treatise *Orbis sensualium pictus* (1658), which was

intended to be a textbook, with a definition of wisdom: "*recte intellegere, recte agere, recte eloqui*" ("to comprehend properly, to act properly, to speak properly"). It is important to emphasize that an initial conception of rhetorics treated it as the art of speaking the truth.

Classical rhetorics consisted of five subdivisions: (1) invention (*heuresis*, *inventio*), (2) arrangement (*taxis, dispositio*), (3) style (*lexis*, *elocutio*), (4) memory (*mneme, memoria*), (5) delivery (*hypokrisis*, *pronuntiatio*). These subdivisions formed a logical whole, but at the same time their sequence marked an ideal succession of rhetoric activities that corresponded to the rhetorical ideal: the logical sequence expresses itself on the operational level.

During the Roman Empire, public speech lost its social role related to the seeking and expressing of truth. This diminished greatly the relevance of the first and, to a large extent, the second subdivision. The spread of the written word reduced the importance of also the fifth and especially the fourth subdivision. In contrast, the significance of the third subdivision had been increasing since the Hellenistic period. In the Middle Ages, the field of rhetorics was divided in two: the first, speculative rhetorics, became essentially a part of scholastic philosophy, which focused on the classifications of figures and tropes. As a practical oratory, rhetorics retained its relevance in sermons, forming the sphere of homiletics.

At the same time, already in the late antiquity but especially in the Middle Ages, rhetorics started to interfere with poetics, above all with regard to written texts. Rhetorics became the teaching of prose. It is interesting that even Dante and Petrarca in their Italian prose attempted to follow instructions for *cadentia* at the ends of periods. Consequently, at least for the early humanists, the Latin speech rhythm codified by Cicero became the general principle of style for written language. The decline of scholastic philosophy and the secularization of culture inevitably led to the crisis of rhetorics.

The first criticism of rhetorics evolved in the context of rationalism and especially of the philosophy of enlightenment. The crisis of rhetorics was inseparably connected with the crisis of (Aristotelian) logic. For instance, in Molière's play *The would-be gentleman* (1670), the teacher of logic and rhetorics is presented as a charlatan. For Molière, Rousseau, and others, rhetorics came to mean the art of lying; truth required no skills. Interestingly enough, the crisis of rhetorics stemmed also from the rhetorical ideal (the purpose of speech is to approach the truth); only the notion of rhetorics changed: it was now regarded as an art of evasion.

The rhetorical ideal survived the classical rhetorics; we can come across its reflexes in the modern Western civilization in such different spheres as analytical philosophy, which advanced the notion that telling the truth is a simpler and more logical way of speaking than lying, and the assessment of utterances with the help of a lie detector, a practice based on the presumption that the organism of a lying person undergoes psychosomatic changes.

Ancient Semiotics and Rhetorics

Although the first treatise devoted to semiotics – *Cratylus* by Plato – had by the 5th century B.C. already been written, semiotics as a discipline and even the word 'semiotics' was then unfamiliar. In antiquity, rhetorics as a branch of knowledge was not related to the semiotics of that time. *Cratylus* focused on the problem of the motivation of sign without relating this to the art of speech. In *Phaedrus* we encounter both semiotical and rhetorical issues, but these were not brought together.

Probably the first to use the term 'semiotics' was a doctor and medical theoretician, the developer of the Hippocratic tradition Galen (2nd century A.D.); he employed it to refer to symptomatology – in modern terms, diagnostics. It should be emphasized that such treatment of semiotics has no connection with rhetorics. Ancient (medical) semiotics belongs to the sphere of what Carlo Ginzburg calls "the evidential paradigm."

It could be said that this paradigm is in direct opposition to the spirit of rhetorics: the basis of rhetorics is the skill of speaking the truth and a notion that truth is simple and logical, while telling the truth can be governed by *a priori* fixed rules; semiotics, on the other hand, studies indirect signs to find out the unsaid truth and takes roundabout routes – one and the same disease can have different symptoms.

To modern semiotics, however, rhetorics is the closest of all the ancient spheres of knowledge. Many problems of contemporary semiotics (denotation, the relationship between name and description, etc.) found their first treatment precisely in ancient rhetorics. In addition, there are clear correlations between the principal dimensions of semiotics and the main subdivisions of classical rhetorics: the syntactical approach reveals itself in arrangement and partially also in style; the semantical approach can be observed both in invention and in style – in the case of invention, we are dealing with strong, referential semantics; in the case of style, with weak, significative semantics; the pragmatic approach manifests itself in memory and pronunciation.

Structural Rhetorics

The crisis of rhetorics lasted until the middle of the 20th century, when structural linguistics rediscovered tropes and figures. A central figure of structural rhetorics was Roman Jakobson, who linked different tropes with art forms and schools on the one hand and with different cognitive processes on the other hand. These phenomena had never before been related to rhetorics, which therefore meant a substantial expansion of the field of rhetorics; at the same time, Jakobson reduced the whole subject matter of rhetorics to two tropes, metaphor and metonymy, and treated these as universal semiotic mechanisms. Metaphor is the basis for the mechanisms of romanticism and poetry; metonymy, for that of realism and prose. According to Jakobson, the grounds for metaphor and metonymy could be found in the structure of natural language, in its two axes. The axis of combination (syntagmatics, in Jakobson's words) was the basis of metonymical relations; the axis of selection (paradigmatics), that of metaphorical relations. Since according to Jakobson the mechanism of poetry lay in the projection from the axis of selection onto the axis of combination – which led to the organization of sequences in verse according to the principle of equivalence – it is clear why verse is dominated by metaphor. However, in the case of prose, we are dealing with pure sequence, which creates a basis for the predominance of metonymy.

All this, in turn, correlates on the one hand with the difference between visual and acoustic signs and on the other with the functional asymmetry of the brain. Comparing fine arts and music, Jakobson called attention to the fact that the first is governed mostly by the principle of iconicity – i.e., the signifier is motivated by the signified, and so-called abstract art based on arbitrary signs is always problematic. At the same time, in music the situation is reversed: music employs predominantly arbitrary signs or symbols, and so-called concrete music based on icons (e.g., the sound of a cuckoo) and indexes (e.g., the whistle of a train as a sign of journey) – even if it does not cause displeasure – is clearly a different kind of music. Jakobson concludes that visual and acoustic information differ in principle: for some reason our eyes prefer to trust icons, but our ears tend to trust symbols. Visual signs represent space, and the principles of space are symmetry and similarity – i.e., equivalence. Acoustic signs represent time; their principle is sequence. Again, all this is related to the functional asymmetry of the brain. The subdominant (usually right) hemisphere is oriented toward visual information and its metaphorical treatment; although the prevailing sign type is icon, indexes belong to this sphere as well. The dominant (usually left) hemisphere is oriented toward acoustical information, metonymy; the prevailing sign type is symbol.

Yuri Lotman drew on Jakobson's approach but made some important additions and elaborations. First of all, Lotman argued that the sphere of rhetorics cannot come into being on the basis of only one (e.g., natural) language: rhetoric phenomena emerge when at least two semiotically different languages collide. Already the basic concepts of rhetorics – 'image,' 'figure,' etc. – have clear connotations of the visual sphere. Lotman drew attention to the fact that a large number of metaphors are related to the visual semantics, but visuality alone is not sufficient: visual information has to be transmitted by verbal means. Thus, metaphor is a translation from the language operating with visual signs into the verbal language. These languages have different semiotic statuses: visual codes are mimetic, are founded on iconicity, and are continual, while verbal codes are discursive, are discrete, and are founded on symbolism. Even when a metaphor or a metaphorical epithet is not related to a visual image (e.g., 'sweet dreams'), we are still dealing with the recoding of iconic information by means of symbols. The above is characteristic of the traditional sphere of rhetorics, but Lotman recognized the possibility of a reverse situation as well: information encoded with a symbolic code can be transmitted through an iconic code. This way visual symbols are formed, and here too we can speak of different tropes – e.g., visual metaphor and metonymy. While verbal images come into being through the transmitting of visual messages by verbal means, visual images emerge through the transmitting of verbal messages by visual means.

Structural Rhetorics and Text Theory

Independently of Jakobson, but simultaneously with his work of solving rhetorical problems with the help of modern linguistic and semiotic methods, the peripheral areas of linguistics developed a contact with topics that traditionally belonged to the sphere of rhetorics. As late as the middle of the 20th century, linguistics still considered the sentence to be the maximum unit of language (Émile Benveniste even presented special arguments in favor of this view). But by 1952, Zellig S. Harris demonstrated that syntactic relations between constituents cross the sentence boundaries. From this observation evolved text linguistics, one of the leading areas of linguistics during the years 1970–1980. Within the field of text linguistics, different tendencies can be discerned. There were authors who, in the spirit of Harris,

confined themselves to purely formal textual parameters, such as (a) anaphoric repetitions (in contrast to classical rhetorics, which held that anaphora could occur only at the beginning of a colon or a period, text linguistics understood anaphora in a much wider sense: as any lexical repetitions in different syntactic sections); (b) substitution of lexemes with pronouns in consecutive sentences; (c) grammatical restraints that exceed sentence boundaries (Gasparov, 1971). Other authors examined syntactic relations between sentences in a wider semantic and pragmatic context (Van Dijk, 1972, 1981). Pragmatic aspects come in, in connection with describing the communicative structure of the relations between sentences.

It has been observed that sentences join into a coherent text according to a certain rule: what is the rheme in a previous sentence becomes the theme in the next. In contrast to Harris, who operated mainly with the terms of sentence structure, in such an approach the main element becomes text as a communicative whole. Although text theorists seldom refer to classical rhetorics, they deal with similar problems. The structure of a coherent text is based on repetitions on different levels, and the majority of rhetoric figures and tropes (anaphora, epistrophe, symploce, alliteration, parallelism, antithesis, simile, etc.) follow the same principle. When we look at a text as a whole, we can see that the use of tropes forms a definite system in the text. For example, if a text contains many metaphors, it is likely to also have plenty of similes and epithets. If metonymies prevail, synecdoche and irony tend to appear frequently as well.

The Semantic Foundations of Structural Rhetorics

Already Roman Jakobson in his study of tropes paid close attention, in the spirit of the Prague Linguistic Circle, to semantic elements smaller than words. This made it possible for us to be considerably more specific than the ancient teaching of tropes as figures of thought. For example, when we speak of transferred meaning in the case of metaphors, it is clear that what is transferred is not the whole meaning of the word but only a part of it. Different models of structural rhetorics approached the problem of the figurative meaning differently. For instance, if we proceed from the concept of semantic fields, we can represent meaning as space in the topological sense. In such a case, metaphor can be described as an intersection of two semantic fields, and the more distant the meanings are, the stronger the effect of the metaphor is. Greater influence, however, was gained by an approach based on the componential analysis of meaning. If we picture the meaning of a word as a matrix of markers and distinctors (to use the terms of Jerrold J. Katz and Jerry A. Fodor), the metaphorical expressions can be described as constructions where the *vehicle* projects one or several of his markers onto the *tenor*.

An important role in the description of language-semantic mechanisms of metaphor has been played by Uriel Weinreich (1966). He demonstrated that semantic syntax is not based on only one operation (as Katz and Fodor assumed), an operation that could be called "linking of meanings," but that there exists at least one more relationship – 'nesting,' in Weinreich's vocabulary. Thus, if we represent the meaning of a word in the form of a matrix, we have to accept the possibility that the matrix contains another matrix as its component. In addition, he argued that rules of semantic syntax could be formulated more effectively if we assumed that the matrices of meaning might contain lacunae in which the components of meaning could be nested. Different operations produce different tropes. Linking creates epithets: for instance, linking the meaning 'ball' with the component 'red' produces the expression 'red ball.' However, it must be added that this mechanism characterizes only modern epithets oriented toward creating new information; archaic epithets, on the contrary, are pleonastic, utterly redundant. For instance, in the expression 'round ball,' roundness is not linked to the meaning 'ball' but instead extracted from it. Metaphor, on the other hand, is created as a result of nesting. Unlike Katz and Fodor, Weinreich does not regard expressions like "a rock is dreaming" as having a conflict in semantic syntax: 'rock' [– *alive*] cannot be joined to 'dreaming' [+ *alive*]; 'dreaming' is nested in 'rock.' A classification of different rhetoric tropes and figures deriving from componential analysis was proposed by Groupe μ (Dubois *et al.*, 1970).

Pragmatic Rhetorics

The various branches of structural rhetorics differed substantially in their purposes from the classical rhetorics. All of the new branches are occupied with the structure of text, not its effect, and therefore the approaches of both Roman Jakobson and Groupe μ pertained more to the field of poetics than to that of rhetorics. Speech act theory, together with the adjacent fields, can be regarded as an attempt to revive, with the tools of modern philosophy, the rhetorical ideal, according to which *plan*, *construction*, and *activity* form an inseparable unity and at the same time a natural sequence. John L. Austin, regarding language activity, joins the first two (plan and con-

struction) under the name "locutionary speech act," names the third one (action) "illocutionary act," and adds to these *consequence*, under the name "perlocutionary act." (Classical rhetorics was not concerned with the effect of speeches, but it is clear that the principle of perlocutionarity derives from the spirit of rhetorics, which regards speech as a responsible activity.) For example, John Searle's discussion of metaphor from the perspective of speech act theory represented the return of the aims of classical rhetorics. At the same time, in comparison with that of classical rhetorics, Searle's approach was clearly much more limited – of all the tropes and figures, he paid attention only to metaphor and irony (it has often been questioned whether the latter should be regarded as a trope at all).

Searle's approach was above all characterized by his position that metaphor is not a figure of thought obtained by the joining of words but rather an utterance. Furthermore, Searle argued that such a phenomenon as figurative meaning does not and cannot exist at all: words and sentences mean what they mean. The phenomenon of metaphoricality emerges not in words but in their use and, hence, not in the field of semantics but in pragmatics. Searle proposed the following hierarchy: direct speech acts, indirect speech acts, metaphor, irony. Metaphor emerges when the sentence meaning diverges from the utterance meaning. Searle distinguished between simple and complex metaphors: in the first case, the relationship between a sentence and an utterance is one-to-one; in the second case, several utterances correspond to one sentence. However, in both cases the utterance meaning can be inferred from the sentence meaning.

The rhetorics based on the speech act theory is the complete opposite of George Lakoff and Mark Johnson's "everyday rhetorics": whereas Searle accepted only the literary meaning, for Lakoff and Johnson the figurative word use was basic. Lakoff and Johnson's approach resolutely dismissed the traditional teaching of metaphor, which rested on an assumption that there exists a neutral, nonfigurative speech that an author embellishes with figures and tropes. They pointed out that there is no such thing as a neutral, nonmetaphoric background in language: common speech is full of metaphors, but speakers and listeners usually do not notice them, since they live by them. Lakoff and Johnson demonstrated that metaphors are not accidental semantic curiosities; rather, they have a systemic nature that has a great influence on the speakers' worldview. One of Lakoff and Johnson's examples concerned speech activity. The metaphorical expression "argument is war" forms an entire linguo-cultural paradigm that treats different aspects of argument in terms of warfare. Although it seems that the relationship between the approaches of Searle and of Lakoff-Johnson is antagonistic, they complement each other substantially. Speaking cannot be totally controlled by reason and entirely imposed by discourse and culture. The processes described by Searle and Lakoff-Johnson form two opposite poles in the continuum of speech activity. Russian philosopher Mikhail Bakhtin raised an analogical problem in his work *Toward a philosophy of the act* (1919–1924), Bakhtin's doctrine was named the rhetoric of act. Act is not any deed, but only a meaningful and responsible one – i.e., it changes *status quo*, and an agent takes a full responsibility for it. The speech act theory is very close to Bakhtin's views.

Rhetorics and Semiotics of Culture

From the viewpoint of the semiotics of culture, two levels of rhetorics should be distinguished: implicit rhetorics as a strategy of generating texts (on this level, rhetorics is a cultural universal), and explicit rhetorics (or rhetorics in the direct sense of the word) as a teaching of generating texts. The semiotics of culture, especially the semiotics of culture of the Tartu-Moscow school, is characterized by an an extended understanding of text: text is a vehicle not only of verbal but of any kind of information; text is a signal that an addresser sends to an adressee, and in the positions of both the sender and receiver, there can appear individuals and social groups as well as whole cultures. In this sense it is possible to regard, for example, ballets, commercials, chess games, election campaigns, and wars as texts. Every such text has its own grammar, stylistics, and rhetorics. From the viewpoint of cultural typology, each culture displays its own clear rhetorical characteristics. The Western European rhetorical ideal is simplicity and straightforwardness, based on Cratylean understanding that things have their right names and speech activity is controlled by reason. It is interesting that although the expression "the beginning of wisdom is to call things by their right names" is attributed to Confucius, in Chinese and in Far Eastern speech practice in general, there prevail indirect speech strategies and an idea that many different roads lead to truth. Such understanding permeates different strata of culture: for instance, we can see how the rules of rhetorics are reflected in the art of warfare. The metaphor "argument is war," analyzed by Lakoff and Johnson, is effective in different cultures; at the same time, it reflects the important characteristics of these cultures. While European warfare, which developed from the ancient model, focuses on two main opera-

tions – attack and defense – in the Chinese art of warfare, the central role is played by the roundabout maneuver; the highest art of warfare lies not in the battle but in avoiding the battle: "The skillful leader subdues the enemy's troops without any fighting; he captures their cities without laying siege to them; he overthrows their kingdom without lengthy operations in the field" (Sun Tzu, *The Art of War*). The differences between the Greek and the Chinese arts of war reflect the leading strategies in the speech etiquettes of these cultures. Whereas the Greek orator and military leader both build their argumentation resp. military forces following ideal forms (e.g., in Plato's case, the ideal for both rhetorics and warfare is geometry) with the aim of destroying the opponent's argumentation resp. military forces, the Chinese art of war follows the prevailing rule of Chinese speech etiquette, according to which the speaker (especially when the speech is directed to an equal or a superior) cannot express the message explicitly: a speech act is considered successful if the adressee receives the information without the speaker's having expressed it directly – the problem is solved without a debate (Jullien, 1995).

It would be an extreme oversimplification to link two rhetoric strategies rigidly with geographical parameters of different cultures: we come across both mechanisms in the East as well as in the West; what becomes decisive is their proportion. Even in the context of Western European culture, H. Paul Grice's maxims of conversation and Searle's treatment of speech acts should be characterized as a utopian ideal picture that is never achieved in a real communication. Yuri Lotman pointed out that in Europe, different periods are dominated by different rhetoric strategies, but unlike Jakobson, he refrained from straightforwardly associating them with Romanticism and realism. For example, mannerist literature and the speech practices of marginal groups in the era of Romanticism (the parlance of English dandies, the language of French precious ladies, etc.) are clearly oriented toward indirect speech acts, the use of descriptions instead of naming: these are exactly the aspects that attract the attention of a European in the Far Eastern speech etiquette.

See also: Discourse Anaphora; Irony: Stylistic Approaches; Irony; Metaphor and Conceptual Blending; Metaphor: Psychological Aspects; Metaphors in English, French, and Spanish Medical Written Discourse; Metonymy; Poetry: Stylistic Aspects; Rhetoric, Classical; Rhetoric: History; Speech Acts, Literal and Nonliteral; Style; Taboo, Euphemism, and Political Correctness; War Rhetoric.

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Rhetorical Structure Theory

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Introduction: What is Rhetorical Structure Theory?

Readers feel that natural texts are coherent and well structured, and that texts achieve rhetorical goals of various kinds. There is also wide agreement that subparts of texts are related to one another in various ways. Understanding these relationships can be seen as an important aspect of having understood a text at all, but linguistic accounts of these uncontroversial phenomena are still limited. Rhetorical Structure Theory (RST) is one of the most significant theoretical and practical advances that has been made in recent times toward making it possible to analyze this kind of structure linguistically. RST seeks to explain the coherence of text by describing how each individual component of a text contributes to the communicative goals of the text as a whole. To do this, RST employs a set of rhetorical relations. These are in principle open-ended, but in practice rather narrowly constrained. An RST analysis, then, progressively deconstructs a text into its smaller component parts. Crucially, because what is being captured is not just a structure but a relationship, each subcomponent itself has (at least) two parts. In every relation, one of the subparts is seen as the most important, or nuclear, component at that level in structure. The other subparts, called satellites, are subservient to the part identified as the nucleus. Each complex of subparts taking part in the relationship is described according to a set of rhetorical relations defined by the theory. A complete analysis then consists of a single hierarchical rhetorical structure defined by rhetorical dependency links between structural siblings and composition between parts and their subparts. The smallest parts of the structure are called units and correspond directly to portions of the analyzed text.

A text is seen to be coherent and 'well-formed' according to RST when it is possible to construct at least one single overarching hierarchical rhetorical structure for the text as a whole. This structure must obey the organizational principles set out by RST, most important of which are the conditions that RST places on the rhetorical relations that must be used to relate contiguous parts of the text, or text spans. Most natural texts will allow at least one complete analysis. Uncovering that analysis – i.e., making the rhetorical relations involved explicit – can be a significant aid toward understanding how the text achieves the effects that it does.

RST has been used successfully for a variety of tasks, ranging from linguistic text interpretation to computational applications in language production and automatic analysis.

The Origins of RST

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Rhetorical Structure Theory

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Introduction: What is Rhetorical Structure Theory?

Readers feel that natural texts are coherent and well structured, and that texts achieve rhetorical goals of various kinds. There is also wide agreement that subparts of texts are related to one another in various ways. Understanding these relationships can be seen as an important aspect of having understood a text at all, but linguistic accounts of these uncontroversial phenomena are still limited. Rhetorical Structure Theory (RST) is one of the most significant theoretical and practical advances that has been made in recent times toward making it possible to analyze this kind of structure linguistically. RST seeks to explain the coherence of text by describing how each individual component of a text contributes to the communicative goals of the text as a whole. To do this, RST employs a set of rhetorical relations. These are in principle open-ended, but in practice rather narrowly constrained. An RST analysis, then, progressively deconstructs a text into its smaller component parts. Crucially, because what is being captured is not just a structure but a relationship, each subcomponent itself has (at least) two parts. In every relation, one of the subparts is seen as the most important, or nuclear, component at that level in structure. The other subparts, called satellites, are subservient to the part identified as the nucleus. Each complex of subparts taking part in the relationship is described according to a set of rhetorical relations defined by the theory. A complete analysis then consists of a single hierarchical rhetorical structure defined by rhetorical dependency links between structural siblings and composition between parts and their subparts. The smallest parts of the structure are called units and correspond directly to portions of the analyzed text.

A text is seen to be coherent and 'well-formed' according to RST when it is possible to construct at least one single overarching hierarchical rhetorical structure for the text as a whole. This structure must obey the organizational principles set out by RST, most important of which are the conditions that RST places on the rhetorical relations that must be used to relate contiguous parts of the text, or text spans. Most natural texts will allow at least one complete analysis. Uncovering that analysis – i.e., making the rhetorical relations involved explicit – can be a significant aid toward understanding how the text achieves the effects that it does.

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Table 1 A list of RST relations

Subject-matter relations	*Presentational relations*	*Multinuclear relations*
Circumstance	Antithesis	Contrast
Condition	Background	Joint
Elaboration	Concession	List
Evaluation	Enablement	Restatement
Interpretation	Evidence	Sequence
Means	Justify	
Nonvolitional cause	Motivation	
Nonvolitional result	Preparation	
Otherwise	Restatement	
Purpose	Summary	
Solutionhood		
Unconditional		
Unless		
Volitional cause		
Volitional result		

Mann and Thompson observed that certain sequences of textual material appeared to suggest additional assertions over and above those explicitly made in the text itself (Mann and Thompson, 1986). For example, in the textual sequence in (1), we need to see that the two sentences are related in some way in order to understand why they have been said:

(1) He explains things well. He'll make a good teacher.

In particular, unless we can see that an additional assertion of the form in (1a) is being made, we will not have understood the text:

(1a) Because he explains things well, I think he'll make a good teacher.

What we understand in understanding (1) is that the first sentence is being given as evidence for the statement made in the second sentence.

We can readily find sequences where other relations between the parts need to be posited in order to explain the coherence of combinations of linguistic units. For example, in the text extract in (2), we need to posit a relationship of reason between the two sentences.

(2) The lorry veered off the road. The brakes had failed.

In addition, both of these relationships are quite different from the kind of temporal sequence that we find between sentences in a simple narration. These kinds of relations were identified and catalogued by Mann and Thompson as a move toward understanding how texts 'mean' in addition to the basic or propositional content of the individual sentences, even when there is no explicit linguistic marker of the relation being expressed. These 'implicit assertions' are necessary for both speaker and hearer: a hearer must uncover them in order to understand why sentences are being placed together, and a speaker relies on a hearer uncovering them in order to understand the message.

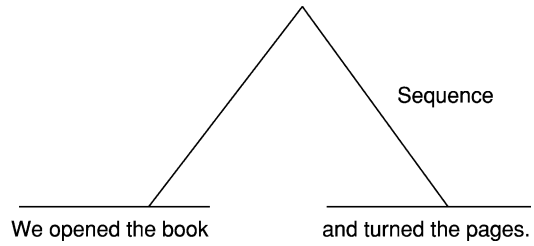

Figure 1 Symmetric relation: sequence.

These kinds of relationships can hold at any level in the text; they are not exclusively relations between individual sentences. This leads to the necessity for a recursive definition of rhetorical structure – that is, text segments in which rhetorical relations of particular kinds are being employed can themselves, as aggregates, take part in rhetorical structures at higher levels. RST does not relate the individual sentences themselves, but the rhetorical intent of the discourse portions over which the rhetorical relations hold – and this can correspond to individual sentences, units smaller than sentences, and larger units taking in more extensive portions of a text.

Mann and Thompson carried out a detailed examination of the kinds of rhetorical relationships and corresponding rhetorical structures needed to carry out text analysis of texts of any kind. They based this examination initially on a corpus of several hundred texts drawn from a variety of text types. The result was a collection consisting of around 20 relations sufficient for covering the texts they investigated. These relations, now termed classical RST, are set out and defined in detail in several papers, most prominent of which are Mann and Thompson (1986, 1988) and Mann *et al.* (1992). Although Mann and Thompson explicitly stated this list of relations to be open-ended, it has in fact proved very stable over the years. However, occasional evidence has been found for further rhetorical relations that were not included within the original set, and so most researchers now accordingly work with what is called the extended RST set, which now includes around 30 relations. A list of these relations is shown in Table 1.

As intended by Mann, the framework was soon taken up for computational systems, particularly for automatic text generation. The theory has also been taken further by text linguists, who have applied it

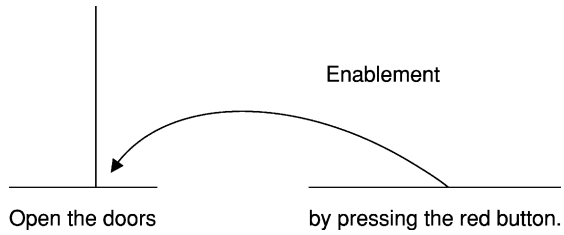

Figure 2 Asymmetric relation: enablement.

to a wider range of texts than the original starting point of Mann and Thompson. The extended RST list has also been validated across several languages; contrastive RST analyses have been performed, for example, for Dutch (Abelen *et al.*, 1993), Chinese (Chinese, Mandarin) (Marcu *et al.*, 2000), French, Portuguese, and German (German, Standard) (Delin *et al.*, 1996), Spanish (Taboada, 2004) and a host of other languages. RST therefore continues to be an active area of research into text organization.

Although primarily developed for the analysis of written texts, there have also been attempts to apply RST in the analysis of dialogue (cf. Fawcett and Davies, 1992; Maier and Sitter, 1992; Daradoumis, 1995). Martin (1992) criticized RST from this perspective, arguing that the deep structural embeddings that RST requires do not align well with the kind of clause combining observable in spontaneous speech. This continues to be an active area of debate.

Definitions

We gave an informal indication of the structure of an RST analysis above. We need to refine this somewhat for a full definition of RST. First, there are two kinds of rhetorical relations: asymmetric relations, where one of the related rhetorical units is singled out as the rhetorical head, or nucleus, and symmetric relations, also termed multinuclear, where all of the related units are of equal status. Examples of multinuclear relations are Contrast, which draws a relation between two elements – we cannot say that one of these elements is then more important than the other, it is precisely the function of the contrast to present them both – and Sequence, which orders an arbitrary number of elements in a temporal or other organizational sequence – again, we cannot pick one of these out as being more essential than the others.

In Figure 1, the symmetric relation of Sequence is shown. In this relation, the nuclei have identical status. The notation is standard in RST analysis, showing each relevant text span surmounted by a line showing its extent. The straight lines emerging from the text spans show that each span is analyzed as a nucleus.

The relation in Figure 2, which shows an example of a relation called Enablement, is an asymmetric relationship. The nucleus is still indicated by a straight line – vertical now – while satellites and their link with the nucleus to which they relate are shown by an arc.

The importance of a nuclear element is defined in terms of its contribution to the rhetorical goals of the text as a whole. Within RST, these goals are intended to correspond with the intentions of the speaker. A nuclear element cannot be removed from a text without damaging its coherence, whereas satellites can often be removed without compromising overall coherence (i.e., the text would still be perceived as attempting to fulfill the same broad communicative function).

The rhetorical relations themselves are defined in terms of applicability conditions; these are the rules that make up each relation and form a valuable guide to the analyst in explaining what is meant by each relation and how to select which one to use in a given context. Each relation defines:

- a set of conditions that must hold of the nucleus
- a set that must hold of the satellites
- a set of imputed conditions that must hold of the nucleus and satellite combination
- a specification of the effect that is achieved with the rhetorical relation on the hearer/reader.

The conditions are usually expressed in terms of the beliefs, intentions, and desires of the speakers and hearers. RST also considers the effect intended by the speaker/writer in using a relation.

For a good example of a relation definition, we can revisit the RST relation of Enablement. An example of a minimal text fragment involving Enablement can be seen in the sentence:

(3) Open the doors by pressing the red button.

In (3), the reader is told to do something, but is also told (in the 'by' phrase) how to do it. This is an example of Enablement, which relates the action to be performed to some subsidiary information that enables it (i.e., that makes the performance of the action easier or possible). It would also have been possible to present the information in two wholly separate clauses – 'Open the doors – press the red button.' for example. The relation definition is made up of four slots, as follows:

- Conditions on the nucleus (N): N identifies some action that it is possible for the reader/hearer (H) to perform and which is, at the point in time at which the relation is given, 'unrealized.'

- Conditions on the satellites (S): S identifies some information that improves the H's ability to carry out the action identified in N.
- Conditions on the N+S combination: H comprehending S increases H's potential ability to perform the action in N.
- The effect of the relation: H's potential ability to perform the action in N increases.

Rhetorically, then, Enablement sees the action to be performed as the nucleus and the subsidiary information as satellites. We can see this with the current example by leaving out the enabling information 'by pressing the red button.' The main purpose of the text fragment appears to be that the hearer open the doors; this remains even when the enabling information is omitted. A generally useful way of viewing the nucleus–satellite relationship is therefore to say that the satellites increase the range of situations where the rhetorical force covered by the nucleus will be successful. In the current example, if the hearer knows how to open the doors anyway, then the enabling information may be safely omitted. But in situations where the hearer does not know this, the rhetorical force will fail without the satellites being present.

All of the rhetorical relations employed within RST are defined in this manner. A full list can be found in the definitive report of Mann and Thompson (1988), extracts from which, including the full relation definitions, are given on the RST website (see references). An almost exhaustive survey of the current state of the art in RST, the applications that are being pursued, references to RST analyses for a broad range of languages, as well as discussions of problems and issues, is available in two papers by Taboada and Mann (2005, 2006).

An analyst approaches a text through applying the relation definitions progressively, decomposing the text into ever-finer segments. Which relation to choose is determined by a good understanding of the applicability conditions (the information in the four slots seen above in the Enablement relation). Importantly, the applicability conditions must respect which discourse segments have been selected as nuclear and which as satellites. Sometimes it is possible to find situations where the conditions hold, but the nuclearity assignment would be wrong; this is sufficient to rule out the applicability of the relation considered. Moreover, when combining an RST fragment into a larger structure, it is the effect of the N+S combination that must be taken into consideration as a possible nucleus or satellite for the next level 'up.' In this way, the combination of structures into larger hierarchical structures is made to enforce a rhetorical consistency of purpose for a text as a whole.

The smallest piece of text that can participate in rhetorical relationships, the text span that is the finest level of rhetorical structure, is left open for the analyst to decide. Mann and Thompson deliberately allow this to vary depending on the purposes for which an analysis is undertaken. It may be fixed as sentences, as grammatical clauses, or as entire paragraphs, just as, in grammatical analysis, the analyst can decide how fine he or she needs the analysis to be. For English, a typical analytic decision is that the relations should apply to grammatical clauses but not within clauses. This may not be appropriate for all languages, however, because what may well be a grammatical clause in English could be a smaller grammatical unit in another language. Examples discussed here from the text type of instructions include the following contrasting pair from English and German:

(4a) Twist the top until it locks.
(4b) Drehen Sie den Deckel bis zum Anschlag.

What in the English version appears as a grammatical dependent clause ('until it locks') is in the German version a prepositional phrase ('bis zum Anschlag'). Therefore, either the text spans for the rhetorical analysis must include at least prepositional phrases for German or the two corresponding sentences must receive differing rhetorical analyses – which may be unsatisfactory, given their very similar purpose. The exact positions taken on this issue in the literature vary; an extensive discussion was given by Grote (2004).

There are still many questions concerning how a body of rhetorical relations such as those proposed in RST are to be best identified, defined, and represented. Since the original collection of relations was presented as a simple set, many subsequent researchers concerned themselves with the question of just how large this set might need to become – in one collection, Maier and Hovy (1993) presented over 300 'rhetorical relations' in a classification hierarchy. Moving in the other direction, Sanders *et al.* (1992) focused attention on four contrasting features for describing coherence relations and investigated these in terms of their psychological effects. Combining features then gives rise to particular rhetorical relations. One of these features, which they termed the basic rhetorical relation, concerns causality (i.e., whether two consecutive discourse segments are related in the world by causality or not). Here, Sanders *et al.* were able to demonstrate clear psychological effects that differentiate reliably between several distinct classes of relations. Reliability varied, however, across

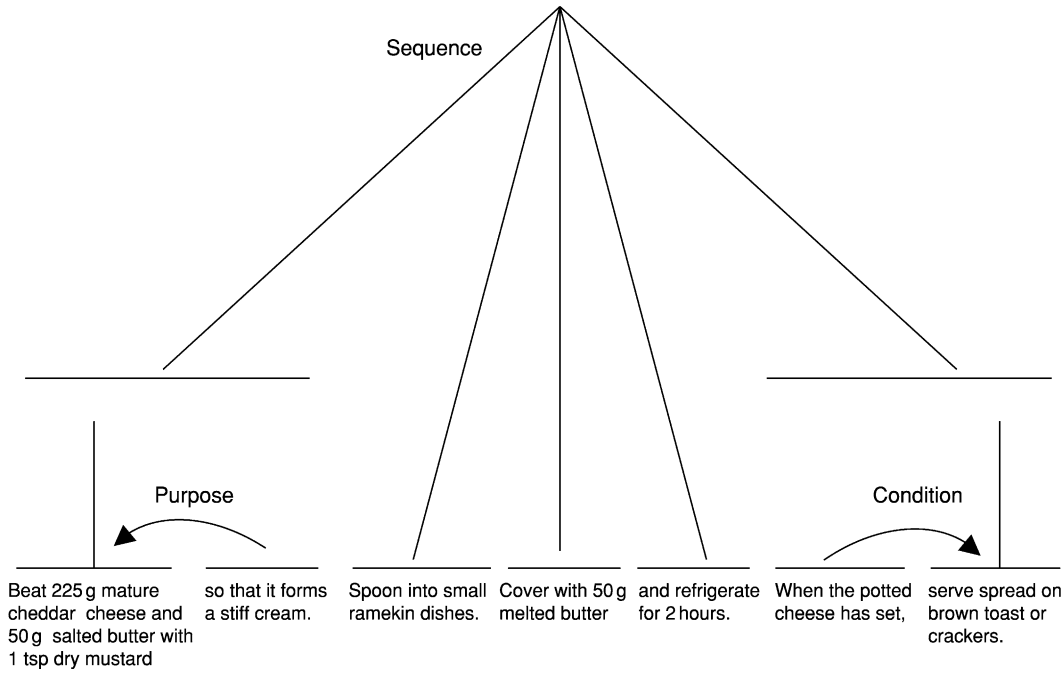

Figure 3 RST analysis of recipe for potted cheese.

the features considered, and so further work has subsequently investigated these issues more closely.

RST has been criticized because it only allows one rhetorical relation to hold between discourse segments. Some authors, e.g., Moore and Pollack (1992) and later Maier and Webber and colleagues (Maier, 1996; Webber *et al.*, 1999), argued that this particular RST constraint needs to be relaxed. Moore and Pollack suggested a solution by distinguishing between two main types of relations among those posited by Mann and Thompson – subject-matter and presentational relations. Subject-matter relations are those that take their applicability conditions from the states of affairs being described; presentational relations are dependent on the particular rhetorical argument being pursued by the writer/speaker. Moore and Pollack suggest that these two different types of relation should be allowed to hold at the same time.

In a move in some ways similar to the use of features by Sanders *et al.* mentioned above, Bateman and Rondhuis (1997) argued that rhetorical relations are not atomistic theoretical constructs at all, but bundles of features. They proposed that these features can be drawn from the three kinds of meanings commonly proposed in systemic–functional linguistics (see, e.g., Halliday and Matthiessen, 2004), thereby adding 'textual' meaning (concerned with nuclearity choices) to the 'ideational' (subject-matter) and 'interpersonal' (presentational) meanings already suggested by Mann and Thompson's original account. This solves the multiple simultaneous relations problem by moving simultaneity to the features that hold rather than needing to maintain individual and separate rhetorical relations in the rhetorical structure.

An Example of RST Analysis

In this section, we give a very short worked example of text analysis according to RST. We take a simple recipe as indicative of the kind of analytic decisions and rhetorical relationships employed. The recipe is as follows:

> Potted Cheese
> Beat 225 g mature cheddar cheese and 50 g salted butter with 1 tsp dry mustard so that it forms a stiff cream. Spoon into small ramekin dishes. Cover with 50 g melted butter and refrigerate for 2 hours. When the potted cheese has set, serve spread on brown toast or crackers.

As many recipes do, this recipe consists of a set of sequential steps. These are represented in RST as a Sequence relation. However, there are two steps that are slightly more complex than the others. In the first, a beating action is carried out *so that it forms a stiff cream*. This clause tells the reader why the beating is done, and is recognized in RST as a Purpose relation. In the second, the instruction is to *serve* only *when the potted cheese has set*. Because the *when* clause places a condition on when the action can be done, RST recognizes this as a Condition relation. So as well as

taking part in the Sequence relation, these elements are themselves complex. The diagram in Figure 3 shows the full RST analysis of the recipe text.

Relations to Other Levels of Linguistic Description

RST is intended to cover the domain of linguistic description to do with 'text structure.' However, it is also necessary that this domain be related to other areas of linguistic description. One systematic problem haunting text linguistic accounts of many kinds has been that it is difficult to draw conclusions about what a particular text structure says about possible or impossible grammatical, lexical, and semantic expressions. This also has repercussions for the reliability of a text analysis; if it is not possible to state the observable linguistic signs of a text structural analysis, then it is possible to suggest several plausible analyses and hard to decide between them. RST does not position itself on this issue particularly clearly. While it is possible to posit a rhetorical relationship between elements without any supporting linguistic marker such as a discourse connective, it is much clearer positive evidence for a relation if an explicit marker is present.

In some cases at least, enough explicit evidence can be gleaned from texts to allow an RST analysis to be produced automatically. Marcu (2000a) followed this approach in considerable detail. Speakers also give explicit intonational signals that correspond to quite subtle distinctions in the rhetorical structure – in particular to structural embedding and nuclearity (see den Ouden, 2004). Nevertheless, it seems unlikely that fully automatic RST text analysis can ever be infallible. RST analysis explicitly draws on judgments of intention and belief, and reasoning about these is notoriously difficult to do automatically.

There are also situations where an RST analysis overlaps with analyses at other levels of linguistic description. For example, whenever an RST analysis is suggested for combinations of clauses, the relationships involved might also be described purely on the basis of grammar. For example, what, in RST terms, might be considered a Purpose relationship between a rhetorical nucleus and a satellite might, in terms of grammar, be seen as a purposive adverbial clause. There is probably little sense in asking which of these analyses is the 'correct' one; it simply depends what the analysis is trying to achieve. The fact that structural signaling can take place at either level has been studied in detail for clause combining by Matthiessen and Thompson (1989). The relationship with lower levels of grammatical structure may also be considered: Martin (1992) looked at how conjunctive semantic relations find linguistic realizations inside clauses and even within nominal and prepositional phrases, while Bateman and Rondhuis (1997) looked at the relationships between differing levels of abstraction in rhetorical organization in general.

Sometimes when an RST analysis is possible, it still seems less than useful to do so. An example offered by Mann and Thompson is that of analyzing a letter. There are segments of the letter, such as the address of the addressee, that of the sender, the date, the place where it was written, the salutation ('Dear Ms Smith'), the sign-off ('Yours in haste'), etc., which are normally part of letters but whose rhetorical linkage is weak. One could provide a rhetorical analysis, but for the most part it seems more appropriate to describe the textual structure involved as a generic structure for this particular text type. As such, it is similar to a partly frozen idiom that allows only limited innovation; the original rhetorical motivations (if any) of the organization have been lost, and one is left with a generic template of how instances of such text types are constructed.

The benefits of RST analysis obviously diminish progressively as one moves away from the central area for which RST is intended to operate. Carrying out analysis in terms of RST and other levels of description may, however, be useful when we are considering aspects of linguistic change, of the emergence of new grammatical configurations or generic text structures. Here, the kind of motivations that we obtain from the rhetorical level of description can indeed be useful indicators of reasons for change.

Applications of RST

As explained above, the first application of RST was in computational linguistics. Mann had been searching for an account of text structure that would be amenable to computational formalization, and with RST he succeeded. Two approaches to automatic text generation using RST were developed independently at the Information Sciences Institute; one by Hovy (1988) was essentially bottom-up, in that a collection of data was 'structured' in order to produce a well-formed RST tree; the other, developed by Moore and Paris (1988), interpreted the applicability constraints in the RST relation definitions as plan operators, i.e., methods for achieving goals that could be performed using the top-down hierarchical planning paradigm well-established in Artificial Intelligence (AI; see Sacerdoti, 1973). A detailed description of these uses of RST was given by Hovy (1993), while computational introductions were given, for example, by Bateman and Zock (2003)

and Vander Linden (2000). Essentially, production of a text starts with a communicative goal to be achieved, and the planning process successively refines this goal according to a library of plans into 'smaller' goals until an appropriate granularity for expression through rhetorical relations and unitary propositions is reached. The result is then a completed RST tree with constraints attached to all the leaves concerning the content and form of the linguistic material that is to be generated there, resulting in a specification for a well-formed text that realizes all the rhetorical goals. The approach was subsequently adopted in several large-scale natural language generation projects and for several languages (see, e.g., Rösner and Stede, 1992; Delin *et al.*, 1994); multilingual results have also fed into new accounts of contrastive pragmatics (Delin *et al.*, 1996).

RST subsequently became the approach to text planning most widely adopted in automatic text production but was not considered for text interpretation due to the perceived subjectivity – and therefore unreliability – of RST analyses. This changed substantially with the work of Marcu and colleagues (Marcu, 2000a; Marcu *et al.*, 2000), which sought to produce RST analyses of text automatically, drawing on a broad basis of surface linguistic cues. This could then be used for summarization of texts in the manner suggested by O'Donnell (1997), where successively removing deeply embedded satellites naturally results in shorter texts without impairing text coherence. Marcu (2000b) provides a book-length discussion of the issues and methods of RST-based automatic summarization and some of the problems of the approach.

A further development arising out of the use of RST for automatic text production was the extension to consider the creation of multimodal documents. The underlying intuition here is that, just as segments of a text contribute to that text's coherence in systematic and specifiable ways, segments of a multimodal document, involving pictures, diagrams, and texts, could also be related in an analogous manner. Such an extended RST approach involving relationships between text, diagrams, and pictures was set out by André and Rist (1993). This basic approach was subsequently adopted by a number of researchers and also used for computational implementations of document production systems. Perhaps surprisingly, little of the original RST specification needed to be changed in these efforts, although some more recent and detailed investigations of the differences between RST for texts and RST for multimodal documents have modified this view somewhat. Bateman *et al.* (2004) showed, for example, that it is necessary both to extend the kinds of relations that are involved when we are relating parts of a document that are realized in different 'modes' and to consider the influence of the (at least) two-dimensional representational medium (e.g., the page or screen) rather than the one-dimensional medium of language assumed by RST (see also Henschel, 2002). Applications for the analysis and critique of multimodal documents, particularly of page layout and design, are one result of such studies (Delin and Bateman, 2002).

A further and very recent proposal for an application of RST is for driving speech synthesis. In a series of detailed empirical studies, den Ouden (2004) shows that fine details of intonational delivery of texts read aloud correlate significantly with the RST analyses of those texts. These details include speed of delivery as well as intonational phrasing. It is then suggested that incorporating a responsiveness to the RST structure of a text would contribute to the naturalness of any synthesized speech for the text.

Finally, RST also continues to be influential both in linguistic approaches to investigations of text structure and in psycholinguistic attempts to validate or refine such approaches. Particularly important for the former are approaches that combine RST with aspects of information structure (Chiarcos and Stede, 2004; Taboada, 2004) and with interclausal coherence/cohesion when linearising a rhetorical structure in text (Bateman, 2001). For the latter, RST has offered a number of variables for more systematic investigation: nuclearity, structural embedding, and type of rhetorical relation are all clear claims of an RST analysis that can be subjected to empirical study. A range of investigations and theoretical discussion are presented by den Ouden (2004).

Compared with more traditional text linguistic approaches to describing and motivating text structure, RST can be distinguished by the detail given both to the methodology pursued when constructing an analysis and to the level of detail of the resulting analyses. The definitions of the individual rhetorical relations and the structural schemata in which they can be embedded significantly constrain analysis results. In studies carried out by den Ouden and colleagues (den Ouden *et al.*, 1998; den Ouden, 2004) it has been found that trained annotators reliably produced compatible RST analyses independently of one another; the rhetorical structures produced agreed most with respect to their segmentation and attribution of nuclearity, and less concerning the identity of individual relations. Detailed combinations of RST with other, more recent and formally specified

linguistic approaches to text organization such as Asher and Lascarides's Segmented Discourse Representation Theory (SDRT; Asher and Lascarides, 2003) or Discourse Tree Adjoining Grammars (e.g., Webber *et al.*, 1999) remain to be done but would no doubt be highly beneficial for subsequent research in text structure in general.

See also: Clause Relations; Coherence: Psycholinguistic Approach; Cohesion and Coherence: Linguistic Approaches; Connectives in Text; Discourse Markers; Discourse Markers; Discourse Parsing, Automatic; Discourse Processing; Discourse Representation Theory; Discourse Semantics; Functionalist Theories of Language; Human Language Processing: Symbolic Models; Human Reasoning and Language Interpretation; Natural Language Understanding, Automatic; Particles in Spoken Discourse; Rhetoric: Semiotic Approaches; Speech Acts and Artificial Intelligence Planning Theory; Speech Acts: Definition and Classification; Speech Synthesis: Prosody; Summarization of Text, Automatic; Symbolic Computational Linguistics: Overview; Writing and Cognition.

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Rhetorical Tropes in Political Discourse

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Classical Rhetorical and Actual Characterization of Tropes

The Greek substantive 'tropós,' originally meaning 'turn' or 'direction,' is derived from the verb 'trépein,' which signifies 'to turn (over/round).' The classical rhetorical term encompasses all figures of speech that involve a turn of meaning (i.e., a linguistic transference from one conceptual sphere to another). Conventionally, tropes are considered to be conventionalized means of expression of so-called 'improper speech' or 'nonliteral speech,' which is characterized by a (poetically) licensed difference between the 'ordinary' literal and the 'extraordinary' intended meaning of a speech. This tropological theory of deviation

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or substitution is nowadays often criticized for mistakenly assuming that tropes are deviations from linguistic normality and can thus simply be replaced by 'proper' expressions or phrases. However, tropes are, in fact, very common in 'everyday language,' and there is no such thing as an original *verbum proprium* or *substituendum* that perfectly corresponds to the trope (cf., among others, Kienpointner, 1999: 66–68).

In contrast to other figures of speech (e.g., figures of repetition like anaphora, epiphera, alliteration, assonance, consonance, and parallelism), tropes are said to be more closely related to content than to form or structure. Concerning the relationship between what is said or written and what is meant, Heinrich Lausberg (1990a: 64–79) distinguishes between two types of tropes.

Tropes of shifting boundaries ('Grenzverschiebungstropen') consist of moving the borders of neighboring semantic fields or the borders within one and the same semantic field. These tropes are determined by a relationship of inclusion or (factual) contiguity between what is said or written and what is meant. They are, accordingly, divided into two subcategories. Periphrasis, litotes, hyperbole, emphasis, antonomasia, and synecdoche are assigned to the first subcategory. They are constituted by shifting the boundary within a semantic sphere. The second subcategory involves a relationship of adjacency. It is prototypically represented by metonymy.

The second type of tropes is labeled 'leaping tropes' ('Sprungtropen'). In comparison to tropes that involve shifting boundaries, leaping tropes are grounded on a 'leap' from one semantic sphere to another sphere that is not adjacent to the first one. Traditionally, metaphor, allegory, and irony are taken as leaping tropes. Their intended meaning is to be found in a semantic domain that clearly differs from what is actually said or written. In concrete rhetorical analyses, a neat distinction between the two types of tropes – as well as between the single tropes allocated to these two types – is not always feasible, as simultaneous tropic membership of specific linguistic realizations is not unusual (see Fontanier, 1977; Morier, 1989; Lausberg, 1990a, 1990b; Groddeck, 1995; Plett, 2001, for various proposals to classify tropes; see Goossens, 1995, for multiple tropic membership, discussed with the example of 'metaphtonymy,' the simultaneous combination of metaphor and metonymy).

Antique rhetoric ascribes primarily an ornamental function to tropes. It considers them to be deviations from ordinary language for the sake of adornment. This view of tropes as purely decorative linguistic appendices that are 'added' to the linguistic raw material in the rhetorical production stage of elocution to give glamour to one's speech has widely been overcome by a reassessment that sees language as basically tropic. Nowadays, it is almost commonplace in modern rhetoric, linguistics, language philosophy, and cognitive science that all areas of language are pervaded with tropes, and that tropes, like metaphors, metonymies, and synecdoches, function as elementary cognitive principles that – often unconsciously – shape and structure human perception and thinking. Tropes are no longer exclusively associated with the stage of elocution; rather, they are also related to the stage of *inventio* and, of course, to processes of the speech's reception or apperception.

Political Discourses

The contention of the tropes' pervasiveness in language holds also for the realm of political language, which – generally speaking – evolves in a tension between the preservation and transformation of power relations, public decision making, and problem solving, as well as political order. Many names of political institutions and 'collective' political actors have their origin in metaphorization and metonymization (e.g., 'government,' 'parliament,' 'minister,' and 'ministry'). Political discourses are full of tropes related to the three political dimensions of form (i.e., polity, the basic order related to political norms, institutions, system, and culture), content (i.e., policy, the policy-field-related planning and acting concerning the identification of political problems, the development and implementation of political programs, and the evaluation and correction of their implementation), and process (i.e., politics, the political competition related to the conflicts between political actors and to the achievement of followers and power). In all fields of political action – within and across which discourses manifest themselves – politicians employ these figures of speech as effective rhetorical means of constructing, representing, and transforming political 'reality,' as well as a means of political persuasion.

'Fields of action' (cf. Girnth, 1996) may be understood as "places of social forms of practice" (Bourdieu, 1991: 74) or, in other words, as frameworks of social interaction (Reisigl, 2003: 148). The spatiometaphorical distinction among different fields of action can be understood as a differentiation between various functions or socially institutionalized aims of discursive practices. Among the political fields are the law-making procedure; the formation of public attitudes, opinions, and will; the party-internal formation of attitudes, opinions, and will; the interparty formation of attitudes, opinions, and will; the organization of international and (especially) interstate relations; political advertising; the political executive and

administration; and the various forms of political control (for more details, see Reisigl, 2003: 128–142). A political 'discourse' about a specific topic may have its starting point within one field of action and proceed onward through another one. In this respect, discourses and discourse topics 'spread' to different fields and discourses. They cross between fields, overlap, refer to each other, or are in some other way sociofunctionally linked with each other (Reisigl & Wodak, 2001: 36 f.).

In the given context, 'discourse' is to be seen as topic-related concept that, among others, involves argumentation about validity claims such as truth and normative validity, as well as pluri-perspectivity constituted by the discursive participation of various social actors who assume different points of view (Reisigl, 2003: 92; for a mono-perspectivist conceptualization of 'discourse,' see Fairclough, 1995: 14). Discourses represent semiotic social practices that are both socially constitutive and socially constituted. A political discourse about a particular topic can be understood as a complex bundle of simultaneous and sequential interrelated linguistic acts. These manifest themselves within, and across, the above-mentioned fields of political action as thematically interrelated and problem-centered semiotic (e.g., oral or written) tokens, very often as 'texts' that belong to specific semiotic types (i.e., textual types or genres), which serve particular political purposes (see Reisigl & Wodak, 2001: 36).

Rhetorical tropes fulfill many different purposes in political discourses, especially in regard to positive political self-presentation and negative political other-presentation. With respect to the ideational metafunction of language, these tropes help to 'invent' or construct a political 'reality' (e.g., via incorporating metaphors or allegories like the boat or ship metaphor/allegory, referring to a state), to reduce complexities by simplistic categorization and imaginary representation of political 'reality' (e.g., via color metaphors referring to alleged human 'races'), to vivify, personify, and illustrate abstract or unclear political ideas (e.g., via personifications and other animalizing metaphors), to selectively foreground specific traits of political entities or 'reality' sectors (e.g., via particularizing synecdoches), and to background or hide specific political aspects, actors, or actions (e.g., via metonymies that represent persons by place names).

With respect to the interpersonal metafunction of language, these tropes are employed to promote the identification with single or 'collective' political actors (e.g., leaders, parties, states, or nations), as well as with their political aims and ideologies (e.g., via the heart metaphor relating to a specific nation-state within a confederation of states); to promote in-group solidarity (e.g., via family or kinship metaphors, such as the androcentric metaphor of brotherhood), referring to the imagined community of a nation or of politically united nations; to support out-group segregation and discrimination (e.g., via deprecating animalizing metaphors like parasite, rat, and vermin); to create a feeling of security by suggesting stability and order (e.g., via construction metaphors like house, referring to a state); to create a feeling of insecurity by suggesting chaos, disorder, danger, and threat (e.g., via flood or wave metaphors referring to immigrants); to justify, legitimize, or delegitimize specific political actions or their omission (e.g., via metaphors of gain or cost relating to the consequences of a specific action or omission of action); and to mobilize political followers to perform specific actions which can culminate in physical or military aggression, such as war (e.g., via instigating militarizing metaphors or rape and monster metaphors relating to 'the enemy'). Some of these functions will be elaborated on in greater detail in the following section.

Toward a Tropology of the Political

For a long time, analysis of political language has merely been carried out as a side job both on the part of political scientists interested in issues of language and on the part of linguists interested in political issues. As a consequence, the respective studies in linguistics and political science have frequently been amateurish with respect to theory, methods, and methodology. This critique also relates to the study of tropes in political discourses. Linguistic, and especially rhetorical, approaches often have suffered from politological ignorance and did not venture beyond a positivist identification and enumeration of figures of speech, as well as a very general characterization of the persuasive or manipulative potential of single tropes, especially of metaphors. The analyses of tropes in political science did, however, often not exceed everyday linguistic triviality when selectively looking at 'linguistic images' with political significance.

A remedy for the many shortcomings in the area can be found in a transdisciplinarian politolinguistic approach that tries to connect and synthesize rhetoric, linguistic discourse analysis, and political science. Such an approach should theoretically rely on actual concepts in political science, as well as on rhetorical and discourse analytical categories such as those outlined in the 'Classical Rhetorical and Actual Characterization of Tropes' and 'Political Discourses' sections. With respect to the topic in question,

politolinguistics should build a 'tropology of the political' (i.e., a theory of tropes that systematizes and explains the political and linguistic functions or purposes of tropic language in polity, policy, and politics; for a first sketch, see Reisigl, 2002, and Reisigl, 2003: 237–258). In what follows, this tropology is outlined with the example of three of the four so-called 'master tropes' (see Burke, 1969: 503–517); that is to say, with the example of metaphor (including personification and allegory, the latter being conceived as continuous, expanded metaphor), metonymy, and synecdoche (including antonomasia as a special form of synecdoche). The fourth alleged 'master trope,' irony, will be dropped, as its character is very different from that of the three basic tropes. In contrast to metaphor, metonymy, and synecdoche, irony is much more heterogeneous. It often involves the prosodic, gestural, or facial-expressive dimension of language, which enables one to recognize that what has been said is not to be taken literally, but ironically. To explicate the complex character of irony would go beyond the scope of this introductory article.

In addition, in the present context, for reasons of limited space, no attention can be paid to other linguistic occurrences traditionally also apostrophized as 'tropes.' Periphrasis, litotes, hyperbole, and emphasis are – as is irony – much more heterogeneous than metaphor, metonymy, and synecdoche. As rhetorical phenomena, they do often derive from the three basic tropes or manifest themselves in manifold tropic ways. Periphrasis, for instance, can linguistically be realized as antonomasia (which is characterized as a descriptive phrase standing for an individual to be identified with a proper name or, conversely, as a proper name standing for a general character trait), synecdoche, etymology (which is based on the principle of 'nomen est omen'), metaphor, allegory, metonymy, euphemism, *descriptio* and *definitio*, and so forth (Plett, 2001: 91). However, some of these other 'tropes' frequently involve linguistic dimensions that are not genuinely related to tropes, such as the so-called 'trope of emphasis,' for example, which comprises numerous phonological, morphosemantic, and syntactic characteristics that are not to be seen as tropic qualities (Reisigl, 1999: 197–199). To take into consideration all these various aspects and their complex interplay would be beyond the scope of this overview.

Metaphors

Of all tropes, metaphors certainly receive the most attention in the analysis of political discourses. Many studies have been carried out in the last decades that focus on metaphorical speech in different political and historical contexts (cf., among many others, Lakoff, 1991, 1992; Chilton & Ilyin, 1993; Chilton & Lakoff, 1995; Schäffner, 1995, 2002; Chilton, 1996; Semino & Masci, 1996; Böke, 1997, 2002; Musolff, 2000; El Refaie, 2001; Klein, 2002; Panagl & Stürmer, 2002; Stürmer, 2002).

Theoretically, metaphors can be understood as 'impertinent predications' (Ricœur, 1986), in the sense that an expression is semantically incompatible with the context of meaning in which the expression is uttered. Metaphor establishes a similarity between two different semantic domains. As it "is a device for seeing something *in terms of* something else" (Burke, 1969: 503), it is most closely connected with the question of perspectivation.

Many different types of metaphor occur in political discourses. Some metaphors transform inanimate 'objects' into animate ones, whereas others transform animate 'objects' into inanimate ones. Some metaphors predicate onto animate 'objects' the quality of other animate 'objects,' whereas others predicate onto inanimate 'objects' the quality of other inanimate 'objects.' Some transform abstract entities into concrete ones that are sensually perceivable, and others merge different human senses synesthetically or into catachresis (cf. Plett, 2001: 101–104). Many metaphors in political discourses transfer aspects from the economic to the political domain, and many from the domain of private life and family life onto public life and 'collective actors.' Various metaphors project elements from the domains of sports onto the political domain. All these and many other metaphorical types (including those that will be mentioned in the following explications, which for the most part are also to be found in Reisigl & Wodak [2001: 58–60]), should be taken into consideration by an elaborated phenomenology of metaphors in political discourses.

Personifications or anthropomorphizations are metaphors that bring together and link two different semantic fields, one with the semantic feature (−human), the other bearing the semantic feature (+human) (cf. Lakoff & Johnson, 1980: 34). Personifications are rhetorically used to give a human form, to humanize inanimate objects, abstract entities, phenomena, and ideas. They play an important role in animating imagined 'collective subjects' – as, for example, 'races,' 'nations,' 'ethnicities,' 'states,' 'state unions,' and many other political 'collective' actors (cf. Goodwin [1990] for the question of 'engendered' nations). Their apparent concreteness and vividness often invites hearers or readers to identify or to feel solidarity with or against the personified political entity.

In addition to personifications, there are many other forms of metaphors that are important in referentially and predicationally constructing in-groups and out-groups in politics and polity, whether they are imagined as 'races,' 'nations,' 'ethnicities,' 'states,' and 'tribes' or as specific 'racialized,' 'national,' 'ethnic,' or 'religious' majorities or minorities. Many of these metaphors function as 'collective symbols.' Very often, they are simultaneously used both as metaphors and representative synecdoches (cf. Gerhard & Link, 1991: 18).

In discourses about 'races,' 'nations,' and 'ethnicities,' these metaphors and synecdoches, but also the respective metonymies, are almost always connected with specific dychotomic, oppositional predications that can form networks of semantic isotopes that help politicians to polarize and divide the world of social actors into 'black and white' and into 'good and bad.' The most frequent and conspicuous of these predications to 'real' or imagined social actors and political systems that serve positive self-presentation and negative other-presentation are those of singularity/uniqueness/distinctiveness or individuality, of identity or similarity, of collectivity, of difference, of autonomy/independence, of heteronomy/dependency, of continuity, of discontinuity, of (social) inclusion, of integration, of union or unity, of (social) cohesion, of (social) exclusion, of fragmentarization, of multiplicity, and of dissolution.

Apart from these rather abstract identity-related attributions realized by metaphors, 'national,' 'racial,' and 'ethnic' stereotypes or 'characters' are predicated on the basis of metaphors, relying on the collective symbolic concepts of materiality and body; of material status (e.g., the thermostatic status of 'warm' versus 'cold') and states of matter (solid, fluid, and gaseous); of material qualities like weight ('heavy' versus 'light'); of spatiality, spatiodynamics, and temporality ('fast,' 'fast-moving,' 'ephemeral,' 'persistent,' 'tenacious,' 'lively,' 'mobile,' 'flexible,' 'slowly,' 'inert,' and 'lethargic'); and of the five sensorial concepts of visuality ('fair,' 'pale,' 'clear,' and 'transparent' versus 'dark,' 'gloomy' 'obscure'), audibility ('harmonious' versus 'loud' and 'noisy'), tactile sensation ('hard' versus 'soft'), olfactority ('nice-smelling' versus 'stinking'), and taste ('tasteful' versus 'tasteless').

Racializing, nationalizing, and ethnicizing metaphors of spatiality are primarily ordered around the symbolically and evaluatively loaded binary oppositions of 'internal' versus 'external' or 'internality' versus 'externality,' of 'height/top' and 'up' versus 'bottom' and 'down/low,' of 'foundations/ profundity/ ground' versus 'bottomlessness,' of 'superficiality' and 'flatness' versus 'depth,' of 'center' versus 'periphery/margin,' and of 'boundary,' 'limit,' and 'extension/expansion' and 'spreading' (see Mayr & Reisigl, 1998).

Metaphors of 'racial,' 'national,' and 'ethnic bodies' and 'materiality' are often also derived from naturalizations; that is, from meteorologizations, geologizations, and biologizations. To the latter belong, in addition to the personifications already mentioned (both nongendered and gendered), animalizations (of both sexes) and florizations.

Taking the example of German and Austrian discourses about migrants and 'racialized,' 'national,' and 'ethnic' minorities, the most frequent and stereotypical metaphors employed in the negative construction or identification of social actors and in the negative predicational qualification of them, of their migration, and of the alleged effects of immigration are the following (see Böke, 1997, 2002; Gehard & Link, 1991): *natural disasters*: immigration/migrants as avalanches or flood disasters; *dragging/hauling*: illegal immigration as dragging or hauling; *water*: immigration/migrants as a water-course/current/ flood that has to be 'dammed'; *fire*: alleged effects of immigration/conflicts between 'racialized, 'nationalized,' or 'ethnicized' groups' as a smoldering fire; *thermostatics*: effects of immigration as pressure within the pot and conflicts between 'racialized, 'nationalized,' or 'ethnicized' groups' as bubbling; *plants and fertile soil*: migration and effects of migration as transplantation/repotting,' uprooting, (alleged) causing of social conflicts as seeding; *genetic material*: cultural and social traditions and 'heritage' as genetic material; *growth/growing*: increasing immigration and increasing conflicts as growing; *pollution and impurity*: intergroup contacts, exchanges, and relations as pollution and impurity; *melting*: intergroup contacts, relations, exchanges, and assimilation as melting; *body*: 'racialized,' 'nationalized,' 'ethnicized' groups are metaphorically ascribed 'collective (racial, national, ethnicity) bodies,' outgroups are metaphorized as 'foreign bodies' or alien elements; *blood*: immigration as bleeding white or bloodletting of the imagined 'collective bodies,' intergroup relations as blood impurity; *disease/infection*: immigration/migrants as an epidemic, intergroup contacts and relations as an infection; animals/animal-owning: immigrants/minorities as parasites, as 'attracted like the moths to a flame,' as herded together; *war/fight/military*: immigration as military activity/invasion; *goods/commodities and exchange of goods*: migration as import and export of workers/workforce, migrants as 'freight'; *food*: 'good/ welcome immigrants/minorities' versus 'bad/ unwelcome immigrants/minorities' metaphorized as the wheat that has to be separated from the chaff;

vehicle/boat/ship: effects of immigration as overcrowded boat; and *house/building/door/gateway/bolt*: the ingroups' (e.g., 'national') territory as house or building, and stopping immigration as bolting the door. All of these metaphors are employed in discourses about migrants and migration as implicit argumentation schemes (i.e., as implicit and often fallacious conclusion rules that serve to legitimise discrimination; cf. Pielenz, 1993). The persuasive function of these metaphors may be exemplified with the metaphors of avalanches and flood. The two metaphors suggest that 'If something (e.g., immigrants) is an avalanche or flood, it should be avoided or prevented.' The implicit argumentation function of all the above-mentioned conceptual metaphors is explicable by corresponding if-then schemes.

The suggestive force of metaphors can be so strong as to motivate metaphorologists like Lakoff to contend that 'metaphors can kill' (Lakoff, 1991). In view of animalizing metaphors such as 'rat,' 'parasite,' and 'vermin,' referring to Jews during the National Socialist dictatorship, and implying that if somebody is a harmful vermin, rat, or parasite, he or she should be exterminated, such a metonymical assertion does not appear to be an exaggeration.

The tension between the preservation and transformation of political order, problem-solving, and power relations becomes clearly manifest in the area of metaphorical language. Just to offer a few hints: static metaphors, metaphors of incorporation as well as space and container metaphors seem to be favored if questions of polity, policy, and politics are a matter of consolidation and preservation, whereas destructive and (re)building metaphors, as well as dynamic metaphors (e.g., metaphors of movement and journey), indicate (intended) political transformation. Metaphors with negative connotations implying standstill are employed to evaluate preservation negatively (e.g., 'fossilization of political structures'). Metaphors with negative connotations implying political change are employed to evaluate transformation negatively (e.g., 'dismantling of political infrastructures').

Metonymies

Metonymies (from the Greek: 'renaming,' 'name change') are constituted by a shift involving two semantically (and materially, causally, or cognitively) adjacent fields of reference: a name of a referent stands for the name of another referent, which semantically (abstractly or concretely) adjoins the referent of the name (cf. Morier, 1989: 749–799; Lausberg, 1996: 292–295; Groddeck, 1995: 233–248; Plett, 2001: 98–100).

Depending on the relationship between the two neighboring conceptual fields, one can, among other things, distinguish between the following metonymies: (1) the name of a product or effect stands for the cause or author/creator ('The racist book [standing for its author] provoked many enraged reactions.'); (2) the name of a cause or author/creator stands for the product or effect ('The new Clinton [standing for the new book authored by Clinton] is a best-seller.'); (3) the name of an object stands for the user of the object ('The cars [standing for their drivers] pollute and endanger the environment more and more.'); (4) the name of a container stands for the container's content ('Bush used to drink several glasses [standing for the alcoholic liquid the glasses were filled with] every day.'); (5) the name of a place (e.g., a state/country, town, city, district, or village) stands for the person or persons living at the place ('Italy is not willing to accept more refugees.'; 'Haider says what Austria thinks.'); (6) the name of a building stands for the person or persons staying, working, imprisoned, and so forth, there ('The White House decided to attack Iraq.'; 'The concentration camp Dachau was liberated in 1945 on May 2nd.'); (7) the name of a place stands for an action performed at the place or an event located at the place ('Auschwitz must never ever happen again.'); (8) the name of a person stands for the country or state in which the person is living ('Cooperation is important because we are too small to allow disharmony in vital areas of our country.', as the former Austrian foreign minister, Wolfgang Schüssel, said on 15 May 1995, in his speech commemorating the fiftieth anniversary of the signing of the international 'Austrian State Treaty.'); (9) the name of a person or of a group of persons who have lived in the past stands for a person or a group of persons who are living in the present ('We already fought against Prussians' imperialism centuries ago.'); (10) the name of a time, time period, or epoch stands for the persons living in the time, time period, or epoch ('The twentieth century has seen the most extreme political developments in human history.'); (11) the name of an institution stands for (responsible) representatives of the institution ('The government proposes a more restrictive asylum act.'); (12) the name of an institution stands for actions performed within the institution or events that take place in the institution ('The Second Austrian Republic has almost always been described as a history of successes.'); and so on.

As one can see from examples 1, 3, 5, 6, 7, 10, 11, and 12, metonymies enable speakers and writers within all of three political dimensions to conjure away responsible, involved, or affected actors (whether victims or perpetrators) or to keep them in

the semantic background. Example 9 illustrates how a nationalist identification with the past manifests itself by the usage of the 'historical we.' Example 2 realizes the strategy of metonymic personalization, which aims to stress the focus on a single politician. Example 8 illustrates the strategy of metonymic concretizing and personifying (please note the doubled tropic membership) that aims to promote political identification and solidarity. Example 4 finally shows a very conventional type of metonymy, which in the specific context, could also be read as euphemistic circumlocution of Bush's former alcoholism.

Metonymies of the type 'place name for persons' seem to be among the most frequent ones in political discourses. They often realize the strategy of presupposing intragroup or intra-'collective' sameness or similarity (see Wodak *et al.*, 1999: 43). Such an assimilating or homogenizing function is, however, also fulfilled by synecdoches and specific metaphors.

Synecdoches

Synecdoches (from the Greek: 'understanding one thing with another') are turns of meaning within one and the same semantic field: a term is represented by another term, the extension of which is either semantically wider or semantically narrower (cf. Morier, 1989: 1159–1175; Lausberg, 1990b: 295–298; Zimmermann, 1989; Groddeck, 1995: 205–220; Plett, 2001: 92–94). According to the direction of representation, two types of synecdoches are distinguished (cf. Plett, 2001: 92–94).

The particularizing synecdoche is constituted by a representative relation that consists of a semantically broader concept standing for a semantically narrower concept. The three main subcategories of this type of synecdoches are *pars pro toto* (i.e., the part stands for the whole: 'Hitler [representing Nazi Germany] was finally defeated.'), *singularis pro plurale* (i.e., the singular stands for the plural, forms a 'collective singular': 'The Swiss is industrious.'), and *species pro genus* (i.e., the species stands for the genus: 'The refugee doesn't have a penny to her name ['penny' stands for 'money'].').

The generalizing synecdoche is established by a semantically broader concept that represents a semantically narrower one. The three principal subcategories of generalising synecdoches are *totum pro parte* (i.e., the whole stands for the part: 'Denmark is world champion.' [this synecdoche is also a metonymy]), *pluralis pro singulare* (i.e., the plural stands for the singular: 'We [representing a single person like a queen or a state's president; cf. *pluralis maestatis* or *pluralis modestiae*] hereby enact a general amnesty.'), and *genus pro specie* (i.e., the genus stands for the species: 'Mankind has not learnt anything from history.').

In political discourses, the particularizing synecdoche, just like the generalizing synecdoche, is a means of referential annexation, assimilation, and inclusion. Particularizing synecdoches like the 'foreigner,' the 'Jew,' and the 'American' serve stereotypical generalization and essentialization, which refer in a leveling manner to a whole group of persons. In languages like German, Italian, and French, these are almost always realized in their masculine grammatical form.

Lakoff & Johnson (1980: 38) have introduced – as a special conceptual synecdoche – the synecdoche of the 'controller for controlled' type –, in which leaders, people in power, rulers, and so on stand for the persons who are actually carrying out an action (e.g. 'Bush bombarded Baghdad.'; see also the first synecdoche example). The use of this form of particularizing synecdoche is a central feature of all 'monumentalist historiography' (Nietzsche, 1985) that hides social actors behind their leaders if speakers and writers judge them to be historically insignificant. Even if one does not assume, as do Lakoff and Johnson (1980), that the synecdoche is a special form of metonymy, it seems equally plausible to allocate the type 'controller for controlled' to the category of metonymy.

The crucial role of synecdoches in polity, policy, and politics has not yet been recognized adequately, even though there are first attempts to grasp the political relevance of this trope (see, for instance, Palonen [1995], who analyses party names like 'The Greens' as synecdoches), and even though Kenneth Burke stated more than 35 years ago that every act of social representation and every theory of political representation involves the trope of synecdoche, if "some part of the social body (either traditionally established, or elected, or coming into authority by revolution) is held to be 'representative' of the society as a whole" (Burke, 1969: 508).

Burke's observation may serve as a starting point for a general conceptualization of the relationship between synecdoche and political representation. Synecdochic representation is a basic political principle wherever more stands for less, or less stands for more. Several factors determine whether or in what way a political system of representation is organized democratically: Who is entitled to be a political representative, and who decides on the question of who

will be a representative (active and passive right to vote)? What does the procedure of political authorization to be a representative look like (direct or indirect democracy)? Under which conditions and when can the relationship of representation be dissolved or confirmed (representation for a set time)? To what extent are representatives bound to those who are represented (free or imperative mandate)?

There are different levels of political representation, which can be differentiated when looking at political systems. On the highest level, there are to be found, according to the political system, imperators, kings and queens (monarchy), states' presidents and chancellors (republic and democracy), or dictators (totalitarian dictatorship). Depending on the level of representation, one and the same politician is more or less representative. That is to say, at a lower level of integration, a politician (e.g., a party leader) may represent all members of a specific group or political organization, whereas she or he just represents a minority at a higher level of the system (e.g., in the case that the party is a very small one). These dynamics become very complex in modern democracies, and all the above-mentioned determinants have to be taken into consideration by a tropological model of political representation (for more details, see Reisigl, 2003: 252–258).

Until now, an elaborated tropology of the political does not yet exist, although a developed politolinguistic theory of tropes that scientifically and fruitfully connects rhetoric, linguistic discourse analysis, and political science is an urgent desideratum. Only such a transdisciplinarian approach is capable of systematizing and explaining the many different political and linguistic functions of tropic language in polity, policy, and politics in a differentiated way that does justice to the complex topic in question.

See also: Cognitive Science: Overview; Concepts; Creativity in Language; Figures of Speech; Irony; Metonymy; Rhetoric, Classical; Thought and Language: Philosophical Aspects.

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Rhyme

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Introduction

The *Concise Oxford English Dictionary (COED)* defines 'rhyme' as "identity of sound between words or verse-lines extending from end to last fully accented vowel." The final words of the final couplets in (1) and (2) from Shakespeare's *Sonnets* are thus examples (1) of a 'masculine' rhyme because it involves just one syllable, and (2) of a 'feminine' rhyme because it involves two (with three and even four syllable rhymes also being possible, though unnamed by any gender):

(1) For thy sweet love rememb'red such
wealth brings,
That then I scorn to change my state with
kings. (29, 13–14)

(2) But day doth daily draw my sorrows longer,
And night doth nightly make grief's length
seem stronger. (28, 13–14)

The entry also lists the idiomatic phrase 'imperfect rhyme', and illustrates it with the rhyme of *love* and *prove*, also found as a final couplet in Shakespeare's *Sonnets*:

(3) But since he died and poets better prove,
Theirs for their style I'll read, his for his
love. (32, 13–14)

Finally, the dictionary entry adds that in English prosody specifically, the identity cannot extend further back from the end of the line than the last fully accented vowel. However, that does occur in some final couplets of Shakespeare's *Sonnets*, as in (4):

(4) Then will I swear beauty herself is black,
And all they foul that thy complexion
lack. (132, 13–14)

And rhymes that don't involve the last stressed vowel also occur, as in (5), at least assuming the contemporary stress pattern on *mónument*, a point to which we return below:

(5) And thou in this shalt find thy monument,
When tyrants' crests and tombs of brass
are spent. (107, 13–14)

Even these few familiar examples show, then, that while certainly conveying a common understanding of rhyme, this definition excludes from its scope even choices the most canonical English poet has made to fulfill what is taken as a defining requirement of the most canonical (and eponymous) form of English poetry – that a Shakespearean sonnet end with two rhymed lines.

At the other end of the spectrum, the *American Heritage Dictionary, second college edition (AHD)* defines rhyme simply as "correspondence of terminal sounds of words or of lines of verse." This succeeds in encompassing all the couplets of (1)–(5) within its scope, as well as more exotic examples we will see below. But it does so partly by being vague: one might well wonder, for example, what exactly is meant by 'correspondence', or by 'terminal'.

These two definitions and their respective hazards represent the Scylla and Charybdis that any account of rhyme must navigate – exactly the same faced by accounts of other linguistic forms such as relative clauses or the intonational patterns of questions. The description must be broad enough to encompass the full range of structures having a plausible and significant claim to be instances of the form, and at the same time it must be narrow enough to exclude imaginable similar structures that in fact seem not to occur. In addition to the usual methodological controversies about how to achieve such a description, however, an added difficulty for rhyme is that in one of its central meanings at least – that which takes rhyme to be a characteristic of verse – it is not simply a naturally occurring form but rather a product of highly self-conscious, artful behavior designed to create specific expressive effects.

Nonetheless, approaching the description of rhyme as fundamentally a problem of linguistic form finds substantial justification. To begin with, we can observe that both definitions agree that rhyme is a relationship between linguistic entities of some kind; melodic figures passed from violins to viola to cello in a string quartet may have identical or corresponding structures, but they do not rhyme, except perhaps metaphorically. Any description of rhyme and its variant forms is thus inevitably at least partially a linguistic description. Still, the genuinely linguistic part of the description might be limited; a description of the crossword puzzle, for example, must necessarily be partially linguistic, depending on reference to linguistic entities like the word, but it must also involve other significant properties that have no role in language, such as whether a word is represented horizontally or vertically, or how many letters it is spelled with. As it happens, however, what research there has been so far into rhyme from an explicitly linguistic point of view suggests that the relationship to language is quite a fundamental one; systematically, growth in our understanding of language has yielded corollary insights into rhyme.

In fact, even before getting into any details of such descriptions, fundamental properties of language allow rhyme to be delimited further in important ways. First, the references to sound in both definitions suggest that the relationship is a phonological one. That distinguishes rhyme from at least one other closely related verse form that has sometimes been called rhyme, syntactic parallelism (Wimsatt, 1954). At the same time, it also allows rhyme to be recognized in sign languages, which have phonology that is not manifested in sound.

Furthermore, phonology itself is held to be organized along two quite distinct dimensions – *rhythm*, involving syllables, stress, phrasing, and so forth, and *melody*, the qualitative characteristics that define individual segments, such as the features that make an [s] different from a [z] or a [t] or an [n], or an [i] different from an [e] (Liberman and Prince, 1977; Goldsmith, 1979). Given this distinction, it seems clear that rhyme necessarily involves a relationship based on linguistic melody: *simple* and *border*, for example, have similar phonological structures in virtue of their rhythmic shapes, yet they do not rhyme in English; we will see below that this is not merely a prescription, even an intuitively acceptable one, but rather a description based on an empirical claim that poets do not seem to use such pairings to fulfill their rhyme schemes. While the family of verse forms based on rhythmic repetition has long been given the common name of poetic 'meter', rhyme clearly joins such forms as alliteration, assonance, and consonance in forming a family crucially based on melodic relationships. These are sometimes collectively called 'sound-patterning', but because it is not clear in what sense rhythm is not sound, except in the sense referred to earlier in which phonology in general is not sound, these forms might usefully be given an alternative common name such as poetic 'harmony' as proposed by Gostusky (1969), because they involve structured relationships among the component parts of linguistic melodies.

Both definitions also take rhyme to be a relationship between ends. It is this that distinguishes them from at least one of these other poetic harmonies, alliteration, which by definition relates melodies at beginnings, such as the [d]'s at the beginnings of the words *day, daily, draw* (and perhaps also *doth*) in (2) above.

Finally, we can assert without any argument beyond common experience, because it will be developed much more fully below, that the nature of the relationship, somewhere between the *COED*'s 'identity' and the *AHD's* 'correspondence', involves some kind of likeness – like all verse forms, rhyme is a form of repetition.

These considerations give, then, as a starting point, a somewhat revised version of the capacious definition given by the *AHD* of rhyme as minimally a relationship of likeness between final linguistic melodies. So far, however, this revision does little to address the vagueness of the original. In fact, we will see that the best way to do that seems to be not to define rhyme more narrowly, but rather to articulate the specific sources of the variation found in rhymes across languages and across individual poets' practices. In a useful article modestly purporting merely to bring some order to the chaos of overlapping terminology used for rhyme and other harmonic forms, Rickert (1978) identifies three distinct sources of variation: where the language involved in the relationship is located in a text, exactly which segments in those locations are constrained by the form, and exactly what degree of similarity those constraints require. The first two specifications, we will see, can jointly answer the question of what exactly is meant by 'final' in our definition, and the third will answer the question of what exactly constitutes a 'likeness', our compromise between 'identity' and 'correspondence'. Thus, the range of possible answers to these three questions can generate a typology of rhyme, and it is around them that the following discussion is organized.

What makes these questions of particular interest to linguists is the theoretical question to which we referred briefly earlier, the question of the extent to which the range of possible answers might itself be constrained by linguistics. For example, building on the perspective of Jakobson (1960), Kiparsky (1973, 1987) articulated a substantive hypothesis, already latent in much inquiry into rhyme, that the structures in terms of which poetic forms are defined are precisely those that also figure in grammar. In particular, he suggested that rhyme bears significant resemblances to reduplication. If this is correct, we would expect answers to our questions to make reference to linguistic entities such as word boundaries, syllable nuclei or back vowels, but not, for example, to 'important' words, or even, as is often assumed to be the case, to spelling. Of course, the issue is complicated by the fact that the hypothesis defines other poetic forms too, such as metrical feet and lines, which are likewise linguistic in the sense of being defined in reference to linguistic entities but are not part of ordinary language and to which descriptions of rhyme must plainly make reference. Perhaps more cautiously, then, we can say, especially in light of the artistry with which rhyme is created as noted above, that answers to our questions that refer to linguistic entities define rhymes that are natural, either directly, referring to structures of ordinary language, or indirectly, referring to specifically poetic forms that themselves are natural in this way; poets may

or may not also create rhymes that are defined in other ways and that are thus definably artificial. In any case, this interesting theoretical question is far from settled, nor is there even that much in the way of rigorous description of rhyme available against which to test it. On the contrary, even for such a well-documented poetic tradition as that of English, in many ways the study of rhyme is in its infancy, rich with open research questions.

Finally, a word is in order about the methodology that has shaped linguistic inquiry into rhyme. First, the question of what does or does not rhyme is essentially a question about an individual poet's competence in exactly the sense that term has within linguistics: knowledge that governs intuitions about well-formedness, whether conscious or unconscious, codified or not. That competence may also be complex in the same ways as other linguistic knowledge can be, encompassing differences according to genre and purpose or period of composition, just as speakers may control different registers, and their languages may include various dialects. Generalizations about rhyme must therefore always be understood as essentially claims about commonalities across individual competences.

Second, the best and usually only evidence for a poet's intuitions about rhyme is his or her actual practice. As Kiparsky (1973) noted, answering the question of what counts as a rhyme for a poet is really only possible to the extent that it is possible to identify a rhyme scheme – a pattern in which rhymes recur in some arrangement that is sufficiently predictable that it is possible to assert that two items that seem rather different nonetheless must rhyme in the poet's estimation because the scheme he or she has created calls for them to, and because there is no reason to think the scheme has simply been abandoned. For example, it is the claim that the Shakespearean sonnets discussed earlier share a rhyme scheme of 'ababcdcdefefgg' that motivates the insistence that rhyme must be defined for Shakespeare in such a way as to account for the fact that for him, all of the pairings in (1)–(5) are evidently rhymes. Kiparsky's term for this is that the rhyme is 'obligatory' as opposed to 'optional', the same distinction drawn between the more traditional terms 'structural' and 'ornamental'. It is always worth bearing in mind, however, that 'obligatory' is also relative to different languages, periods, and genres; as Fabb (2002) noted, the interpretation of a scheme as obligatory is essentially a pragmatic inference that a poet has in fact committed him or herself to producing a rhyme at a certain point, and as such it is both contextual and fallible in all kinds of ways. In fact, the questions of what rhyme schemes occur in poetry and how exactly we come to perceive them are thus fascinating and open in themselves, but also in many ways beyond the bounds of linguistics proper, even as assumptions about them underpin linguistic investigation.

In what follows, then, we return our attention to the narrower question of the form of rhyme and some recent attempts to offer precise descriptions of particular rhyme practices, clarifying their relationship to aspects of phonological structure and exploring parallel phenomena in grammar itself. The illustrations will be drawn mostly from English because the data from English can be presented with the most confidence, but it should be emphasized that key concepts are drawn from work on not only English but also Finnish, Irish, Turkish, Hebrew, French, German, Dutch, Romanian, and many other languages, as indicated in the bibliography.

The Location of Rhymes

We have said that rhyme is by definition final, a melodic likeness between ends; but our first question is, ends of what? As we will see, the question does not necessarily have a simple answer: the hierarchical organization of both linguistic rhythm and verse structure makes available a rich variety of constituents whose ends are in principle available for defining rhymes, and are in fact combined in various and sometimes complex ways by different poets.

In the canonical case of perfect rhyme illustrated in (1), the rhymes occur at the ends of metrical lines. By definition, a metrical line has a rhythmic structure just as all language does as part of its phonological structure that consists of its parse into such entities as syllables (σ), feet (ϕ), words (ω), phrases (Φ), etc., in what is inspiringly but somewhat confusingly called its 'metrical phonology' (*see* **Metrical Phonology**). But a line of metrical verse also has a (poetic) metrical structure, a parse that shows its phonological rhythmic structure to satisfy whatever additional constraints define the meter. The metrical parse is thus closely related to the phonological parse, but also in principle is distinct from it. One way of modeling meter that makes the distinction particularly vivid is through a metrical template that defines some abstract rhythmic structure together with a set of correspondence rules that define mappings of the rhythmic structure given by the phonology into that template (*see* **Meter**). For iambic pentameter, for example, the meter of the example in (1), the template has been argued to be that in (7), consisting of five rising feet, each composed of a weak position (W) followed by a strong one (S), with these feet grouped in turn ambiguously into two rising cola, which are grouped finally into a line:

(7)

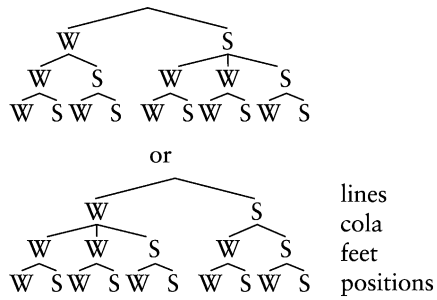

The iambic pentameter of Shakespeare's *Sonnets* includes the constraint that there is one syllable in each position, and (8) shows the language of the lines in (1) mapped into the template in accordance with that constraint and others (such as a constraint that stressed syllables of polysyllabic words like *remembered* be mapped into strong metrical positions). The template is shown fully for this first example, but abbreviated thereafter; and the rhythmic structure of the language is likewise partially represented just this once to give the basic idea:

(8)

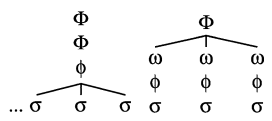

a. For thy sweet love rememb'red such wealth brings,

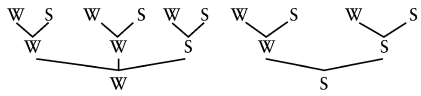

b. That then I scorn to change my state with kings,

W S W S W S W S W S

The interest of this for rhyme is that when language is mapped into the template in this way, and so defined as metrical, it is in a sense also defined as having two ends, each in its turn definable at a variety of levels: there is the end of the template – the final strong position, foot, colon, etc. – as well as the end of the language mapped into it – its final syllable (σ), foot (ϕ), word (ω), phonological phrase (Φ) etc.

In lines like those in (8), the end of the language coincides with the end of the template in what is called a 'masculine ending', whence the term 'masculine rhyme' for rhymes between lines of this type. It is therefore possible to locate the rhymes in either the final syllables of the lines, or the final strong positions of the lines, without particularly needing to attend to any potential distinction between the two. But this is by no means the case for all rhymes. Even for these simple masculine rhymes, note that once the role of meter in locating rhymes is properly articulated, it is no longer necessary or even correct for accounts of rhyme in verse to locate rhymes in terms of a last accented vowel, at least not for Shakespeare's *Sonnets*. Rhymes like that in (5) that rhyme a stressed syllable with an unstressed one in what is sometimes called a 'tangential rhyme' can be seen when scanned as in (9) to follow from exactly the same characterization as rhymes like those in (8) as located in the final syllables, which are those in the final strong positions:

(9) And thou in this shalt find thy monument,
w s w s w s w s w s
When tyrants' crests and tombs of brass are spent.
w s w s w s w s w s

In fact, it seems quite possibly generally true that stress does not matter to well-formedness in rhyme directly, but only indirectly through its contribution to meter – whence the confinement of rhyme to melodic likeness suggested earlier. Note that this predicts that vowel length, too, might well be generally irrelevant to well-formedness in rhyme. But at the same time, further research might well turn up a practice that exploits this distinction between metrical and rhythmic structure in genuinely locating rhymes in syllables containing last accented vowels, rhyming *spent* in (9) for example with *entity,* but not with *monument*.

Meters also allow non-coincidence of the end of the language of a line and the end of a template. In a metrical version of phonological extrametricality, for example, the iambic pentameter of Shakespeare's *Sonnets* allows an optional additional unstressed syllable ('<>') line-finally, as in the scansion of (2) in (10), traditionally called a 'feminine ending', and whence the term 'feminine rhyme' for a rhyme between two lines of this type:

(10) But day doth daily draw my sorrows longer,
w s w s w s w s w s <>
And night doth nightly make grief's length seem
w s w s w s w s w
stronger.
s <>

In the common case illustrated here, the location of the likeness that defines the rhyme begins in the syllable in the final strong position, as in the rhymes in (1), but continues through the end of the language of the line.

In English, it is most common for masculine lines to rhyme with masculine lines and feminine with feminine, but these are not the only possibilities. There are also what are called 'androgynous' rhymes in which the two line types are mixed. Shakespeare's *Sonnets* include at least one possible rhyme of this type, and his plays include other clear examples. In the 'b's' of the 'abab' quatrain in (11a), scanned in (11b), the syllable in the strong position of the feminine line does not figure in the rhyme: as it does not in the couplet in (12a), scanned in (12b).

(11a) For when these quicker elements are gone
In tender embassy of love to thee,
My life being made of four, with two alone
Sinks down to death, oppressed with
melancholy; (45: 6,8)

(11b) In tender embassy of love to thee,
w s w s w s w s w s
Sinks down to death, oppressed with melancholy;
w s w s w s w s w s <>

(12a) Quite overcanopied with luscious woodbine,
With sweet musk-roses and with eglantine
(A Midsummer Night's Dream [italicized]
2.2.251-2)

(12b) Quite overcanopied with luscious woodbine,
w s w s w s w s w s <>
With sweet much-roses and with eglantine
w s w s w s w s w s

Instead, the syllable that the final one of the masculine line is like is the extrametrical syllable in the feminine line. The meter thus defines what counts as the line, but the end of it that is relevant to rhyme is the end of the language mapped into the template and not the end of the template itself.

Conversely, in another type of androgynous rhyme sometimes called 'apocopated' (but perhaps overdue to be revised to something more like 'drag queen' rhyme so that the nameless adventurous structures in (12), those feminine lines behaving as if they were masculine, can be recognized as 'drag king' rhymes), it is the extrametrical syllable that does not figure in the rhyme. The likeness holds instead between the syllables in the final positions, regardless of what follows them. An example (for which I am indebted to Michael Ferguson) is the rhymes of the mixed iambic pentameter and tetrameter couplets of James Merrill's *The Octopus* as in (13), scanned in (14) (on the assumption that the iambic pentameter of this poem differs from Shakespeare's *Sonnets* in allowing two unstressed syllables in a single weak position, (*see* **Meter**):

(13) There are many monsters that a glassen surface
Restrains. And none more sinister

(14) *There are* many monsters that a glassen surface
w s w s w s w s w s <>
Restrains. And none more sinister
w s w s w s w s

Finally, these possibilities suggest that even when both lines are feminine, some poets might rhyme only the syllables in the final metrical positions, or only those that are final in the language, or mix the two.

Nor is extrametricality the only source of complexity in locating rhymes. The foregoing are examples of what is called 'end-rhyme', which in spite of rhyme being always an end phenomenon, is not redundant, because it refers specifically to the rhymes being located at ends of lines, when they might be at ends of other constituents. 'Internal rhyme', another special case noted by the *COED*, refers generally to rhymes in which at least one partner is not final in the line. Internal rhyme can be as systematic as end rhyme, and also as complex. One relatively straightforward example might be the rhyme between *sed* and *med* in the third line of the stanza of the Middle English *Cuckoo song* in (15), which can be characterized as a rhyme of the final syllable (or position) in the line with the final syllable (or position) in the first colon of the same line:

(15) Sumer is i-cumen in –
Lhude sing, cuccu!
Groweth sed and bloweth med
And springth the wude nu.
Sing, cuccu!

Medieval Irish included a variety of stanzaic forms defined by both end rhyme schemes and internal rhyme schemes, including systematic rhymes between the ends of certain lines and the ends of the first cola or even in some cases the first words of the succeeding lines, as in the rhymes of *amra* and *fagla*, or *elta* and *Cerca* in (16), examples from Murphy (1961) for which I am indebted to Eve Sweetser (and in which the nature of the likeness defining the rhymes will be discussed more fully below):

(16) Anmchaid Osraigi amra
cáini fagla flathrígi
drecon bruthmar bruithe elta
mac Con Cerca cathmíli.

Some of these internal rhymes, it should be noted, deepen the question of exactly what is a line. Why, for example, should a line like the third one in (15) be counted as one long line with internal rhyme rather than as two short ones with end rhyme? Should rhyme perhaps be seen as capable of creating lines, rather than simply marking ends of ones defined by meter? After all, meter is not the only way of defining a linguistic entity that has an end. Is rhyme ever based on the ends simply of phrases, or of sentences? In modern poems that define lines only visually through page-layout, do rhymes occur at ends whose definitions bypass considerations of language and meter entirely? The scope for complex relationships arising through rhyme from diverse ways of defining ends, while not without limits, is far greater than standard accounts of rhyme have tended to acknowledge. Poets have found these complexities, and linguists and critics are just beginning to catch up: Shoptaw (2004), for example, has recently argued that some

of Dickinson's poems involve 'counter-lineation', in which visual and metrical lines pointedly and significantly diverge, and interlocking rhyme patterns are defined over both.

And of course, internal rhymes are not necessarily systematic at all; in a quatrain like that in (17) from another of Shakespeare's *Sonnets*, the most that can be said of its abundant internal rhymes is that they are final in the words involved:

(17) *Will* will fulfill the treasure of thy love,
Aye, fill it full with wills, and my will one.
With things of great receipt with ease we prove,
Among a number one is reckoned none: (135, 5–8)

In sum, then, we can say that rhyme is indeed a relationship of likeness between ends, and that it is only possible to speak of a rhyme scheme if it is possible to specify which ends in some systematic way. At the same time, the rich range of constituents made available by language and meter – let alone by nonlinguistic structures such as page layout – provide a surprisingly complex and varied range of possible structures whose articulation and delimitation raise many interesting open questions for a theory of rhyme.

The Domains of Different Rhyme Types

The question of what is final involves not just where what is 'final' actually ends, but also where what is final starts – or put another way, over exactly what domain, measured how, likeness must hold in order to define a rhyme. Here again, there is a wide range of imaginable possible answers, and the specifically linguistic character of rhyme emerges in the extent to which the rhymes poets actually use are best characterized through reference either to linguistic constituents or to metrical constituents closely modeled on them.

In the example in (1) of a 'perfect' masculine rhyme, the language that is alike matches neatly the portion of the syllable actually called the 'rhyme' on analogy to the verse form. One fairly standard description of the internal structure of the syllable is that represented in (18), with the first segment in the nucleus being the most sonorous one, hence in most English syllables the first vowel. On this analysis, *brings* and *kings* would have the syllable structures in (18a,b), and hence identical syllable rhymes:

(18)

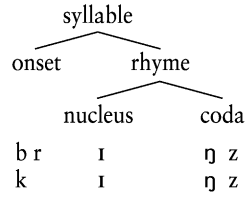

However, because in English at least, poets mix such rhymes quite freely with feminine ones, and in the latter the entire syllable succeeding the one in the strong position normally matches as well, as in (2, 10), this resemblance turns out to be rather less useful to a description of rhyme than might be expected. Rather, what the internal structure of the syllable seems to delimit is the beginning of the domain over which likeness holds (Holtman, 1996). The form of rhyme in which what is matched runs from the nucleus of some specified final syllable through its coda and on to some specified end, then, is the form known as 'full rhyme'. In many ways, taking both these monosyllabic masculine and polysyllabic feminine rhymes into account, what the domains resemble is the portion of a foot from its head on, with the metrical strong position defining that head; but given the complexity we have just seen regarding potential distinctions between metrical and rhythmic structure, the question of exactly what the domain of likeness is in polysyllabic rhymes clearly requires more research and careful formulation, especially involving traditions in which polysyllabic rhymes are the norm, such as Irish, as seen in (16) above.

Another significant form of rhyme involves less than the syllable rhyme, and that is 'slant rhyme'. In slant rhyme, syllable nuclei are irrelevant to well-formedness; only final consonants need bear any likeness to one another, as in the 'a' rhymes of *spoke* and *Lake* in the first 'aabb' stanza of Yeats's *Under Ben Bulben* in (19):

(19) Swear by what the sages spoke
Round the Mareotic Lake
That the Witch of Atlas knew
Spoke and set the cocks a-crow.

Here, too, there are interesting questions about how exactly to describe the form linguistically. First, it should be noted that it is only final consonants and not entire syllable codas that are alike in slant rhyme, at least in English; the form provides no evidence for the coda as a constituent. For example, in the stanza from Yeats's *Sailing to Byzantium* in (20), the 'abababcc' rhyme scheme is satisfied by the rhyme of *unless* and *dress* with *magnificence*:

(20) An aged man is but a paltry thing,
A tattered coat upon a stick, unless
Soul clap its hands and sing, and
louder sing
For every tatter in its mortal dress,
Nor is there singing school but studying
Monuments of its own magnificence;
And therefore I have sailed the seas
and come
To the holy city of Byzantium.

A second interesting question involves rhymes such as that of the second couplet in (19), in which no final consonants are present. In English, there seem to be two distinct traditions. One is represented by Yeats's practice, in which the vowels must be either both back, as in the rhyme of *knew* and *crow* in (19), or else both front as in, for example, the rhyme of *I* and *utterly* in *Easter 1916* (13–15). Since non-low tense vowels in English always end their articulation with glides sharing their features [± back], Yeats's rhyme seems to recognize the presence of final glides in apparently open syllables and to require that they be alike. In the other tradition, however, vowel-final rhymes observe no such constraint, as in, for example, Plath's rhyme of *go* and *lie* in the 'abcacb' scheme of *All the dead dears*:

(21) And to sanctuary: usurping the armchair
Between tick
And tack of the clock, until we go,
Each skulled-and-crossboned Gulliver
Riddled with ghosts, to lie
Deadlocked with them, taking root as cradles rock.

The latter case is, as observed by Kiparsky (1973), exactly parallel to the well-known pattern in Germanic alliteration, whereby initial consonants must match each other to satisfy the form, but initial vowels can match any other vowel; it is also in harmony with claims that no final glides are present in underlying representations of simple tense vowels (Chomksy and Halle, 1968). The simultaneous existence of the tradition represented by Yeats, however, suggests that there are open questions about the best way to model both practices and to represent the structures of the relevant syllables in English.

A final form of melodic repetition that is arguably a form of rhyme is 'assonance'. Assonance is the reverse of slant rhyme: in assonance, nuclei must bear a likeness to one another, but the consonants following them need not. One argument for treating assonance as a form of rhyme is that, although not as common as full rhyme or slant rhyme, it is used to instantiate schemes defined over line ends, as in some medieval French romances or in Dylan Thomas's *Fern Hill*, where assonances like *green* and *leaves* or *climb* and *eyes* and *light* instantiate an 'abcddabcd' scheme (Zwicky, 1976):

(22) Now as I was young and easy under the
apple boughs
About the lilting house and happy as the
grass was green,
The night above the dingle starry,
Time let me hail and climb,
Golden in the heyday of his eyes,
And honored among wagons I was prince
of the apple towns
And once below a time I lordly had the
trees and leaves
Trail with daisies and barley
Down the rivers of the windfall light. (1–9)

Here, the existence of phonological tiers that represent only vowels may be key to understanding assonance as a form of rhyme that can genuinely be said to be based on language that is final in some sense.

In sum, the domains over which the likenesses that define rhymes hold are not necessarily constituents. Conversely, certain linguistic constituents whose existence has been posited do not necessarily define rhyme types. At the same time, however, it seems that the demarcation of the domains of likeness is a matter of linguistic structure, either directly, or indirectly through metrical structure, insofar as their beginnings are the beginnings of well-defined constituents, rather like the domains posited by prosodic morphology (McCarthy and Prince, 1996).

It is also worth noting that it is sometimes suggested that rhymes are defined not just by required likeness, but also sometimes by required difference; the *COED*, for example, as mentioned earlier explicitly asserts that in English the likeness must not continue (moving back in the line) beyond the nucleus of the first syllable to include its onset, and some accounts of rhyme by linguists have attempted to model this constraint (Holtman, 1996; Yip, 1999). However, for English at least, this seems better understood as an evaluative prescription (possibly reflecting rejections of French rhyme in which such likenesses are actually highly valued) than as a systematic practice that a description of rhyme must account for; in (4) earlier, for example, we have already seen a counterexample, and Oras (1955) has argued that rhymes of just this type have been used in English throughout the tradition.

Partial Likenesses in Rhymes

Perhaps the richest question of all that rhyme poses for linguistics is that of what, exactly, counts as a sufficient likeness for a rhyme. It has long been recognized that in any of the earlier forms, sometimes the likeness that defines a rhyme involves mere similarity rather than complete identity. In one of the most influential articulations of the relevance of linguistics to the study of rhyme, Zwicky (1976) pioneered the explicit description of differences allowed in rhymes through reference to distinctive features, which was pursued further by Golston (1997) and others. Focusing on the rhymes of English rock lyrics,

Zwicky describes a form he calls 'rock rhyme', which is a full rhyme in the sense given earlier of requiring likeness from the nucleus in the final strong position, but which – alongside other special structures discussed further below – allows matched segments to differ by a single distinctive feature in any position. Thus in the 'abcbdefe' scheme of Bob Dylan's *Masters of war* in (23); in the first stanza, *desks* rhymes with *masks,* whose vowels [ɛ] and [æ] differ in the latter being [+low], while in the 'ababab' scheme of *Ballad of Hollis Brown*, in the third stanza in (24), *sleeve* rhymes with *breathe*, whose [v] and [ð] differ in the latter's not being [+labial]. And both the nuclei and the coda consonants differ (by [± back] and [± labial], respectively) in the rhyme of *guns/bombs* in (23):

(23) Come you masters of war
You that build all the guns
You that build the death planes
You that build the big bombs
You that hide behind desks
I just want you to know
I can see through your masks

(24) Your baby's eyes look crazy
They're a-tuggin' at your sleeve
Your baby's eyes look crazy
They're a-tuggin' at your sleeve
You walk the floor and wonder why
With every breath you breathe

Crucially, Zwicky argues that the rhyme of *sleeve* and *breathe* in (24) is not assonance, because across the whole song, the final consonants are not free as they are in genuine cases of that form, as in (22), but rather subject to the feature-based constraint on similarity he identifies. By the same reasoning, the rhyme of *desks* and *masks* in (23) is not slant rhyme, because across the song, the nuclei do not vary without limit – they vary only within the scope of the posited constraint. Put another way, full rhyme, slant rhyme, and assonance are defined just as discussed above by the different domains they impose constraints on – final nuclei and what follows, final consonants alone, or final nuclei alone, respectively – the question of whether those constraints require complete identity is in principle a separable one. If the constraints do not require complete identity, but do require some similarity that is statable in a systematic way, that becomes an argument for the inclusion of even differing segments within the domain of required likeness, and the rhyme may be termed 'partial'.

As Malone (1993, 1987) has pointed out, the general phenomenon Zwicky noted of the likenesses that define rhymes being satisfied by partial rather than complete identity is in fact not at all confined to rock lyrics but appears throughout the English tradition as well as in the rhyme traditions of other languages. When the practices of individual poets and traditions are considered separately, however, it is not as clear that Zwicky's definition of similarity as a single-feature difference is ever the best way to characterize the operative constraints. Rather, these seem to take a wide (though not limitless) variety of possible forms that submit to a wide (though not limitless) variety of explanations involving linguistic structure in a somewhat different way.

Perhaps the most familiar source of rhymes involving similarity rather than strict identity with a linguistic explanation is differences in pronunciation. An audience in one dialect may perceive only similarity where a poet composed a strict identity in another. For example, the assonance of *Fern Hill* in (22) is realized at one point by the pairing *barns/calves*, in which the vowels are different in many American dialects but not in Thomas's Welsh dialect. A particularly complex version of this question arises when describing the poet's dialect is itself a problem of historical reconstruction. For example, the question of whether Shakespeare's vowels are really different in quality in his rhymes of *prove/love* in (3) or even in stress in *monument/spent* in (5) is simultaneously a question about his rhyme practice and about his dialect, in that any reconstruction of his pronunciation must take into account the possibility that partial rather than complete identity may have sufficed for a rhyme, just as much as any account of his rhyme practice must take into account the possibility that these rhymes were strictly identical in his dialect (Kökeritz, 1953; Hanson, 2002). For it is clear that even partial rhymes that have their origins within the tradition in changed pronunciations cannot necessarily be claimed to have been complete at their moment of composition in the dialect of every poet who has used them; whatever their pronunciation in Shakespeare's dialect may have been, rhymes like *love/prove* persisted in being composed in English long after their vowels' qualities had undeniably diverged. It has sometimes been argued that such partial rhymes have continued to be used productively simply because the original usage has established them as conventional pairings, an approach commonly taken to both the many slight differences occurring, for example, in the vowels of English full rhymes and the differences in the consonants in Zwicky's rock rhymes, modeled as they often are on blues sung by musicians in whose dialects certain final consonants were deleted (Kiparsky, personal communication). But such accounts of historical origin do not preclude the possibility that the form in which they persist is not arbitrary pairings but grammatical generalizations (Hanson, 2002). In general, then, the influence

of dialect variation over both time and place remains an important open question in the study of virtually every poet's rhymes.

Another explanation for partiality in rhymes of linguistic interest involves the question of at what level of representation the relevant correspondence holds. An influential hypothesis put forth by Kiparsky (1968, 1972), that identities that appear only partial on the surface actually are complete in underlying representations, has been shown to explain rhyme patterns in a variety of languages (see, for example, Malone (1982, 1988) on Turkish or Malone (1983) on Hebrew). This hypothesis might even be illustrated for English by a simple case such as the rhyme of *monument/spent* in (5). Even if, as suggested earlier, the difference in the stress of their final syllables is irrelevant to the well-formedness of the rhyme, there remains the issue that, at least in contemporary pronunciation of these words, there is also a difference in the quality of their vowels, [ə] and [ɛ]. But when the final syllable of *monument* is stressed as in *mònuméntal*, the vowel that surfaces as ə in *monument* surfaces as ɛ instead; hence we may hypothesize that that vowel is ɛ underlyingly, and that that might therefore be the vowel figuring in the rhyme.

There is no question, however, that all partial likenesses in rhyme can be reanalyzed as complete in either of these ways. On the contrary, in some traditions, the partial likenesses that are allowed in rhyme are even codified. In Irish, for example, consonants are grouped into classes, any member of which can count as the same as the others for purposes of rhyme. One class, for example, is the 'k class' of the voiceless stops [p], [t], and [k] (spelled 'c'); and another is the 'l class' of voiced fricatives together with what are called 'weak sonorants', hence [v] (sometimes spelled 'b' or 'bh'), [ð] (sometimes spelled 'd' or 'dh', [γ] (sometimes spelled 'g' or 'gh'), [β] (sometimes spelled 'm' or 'mh') and [m], [n], [l] and [r]. In the internal rhymes mentioned in (16) earlier, then, which are polysyllabic rhymes, *amra* (a[βr]a) and *fagla* (fa[γl]a) rhyme because their medial consonants belong to the same succession of classes, as do those of *elta* (e[lt]a) and *Cerca* (ce[rk]a). A question of interest for the relationship of rhyme to linguistics is that of in what sense classes of this type are natural classes from a phonological point of view and what role they have in the language's ordinary grammar. In Irish, these classes used in rhyme do figure in the grammar, for example, as either targets or results of rules of lenition (Eve Sweetser, personal communication; Malone, 1987; Murphy, 1961.

And even without being codified in such a way, phonologically systematic partial rhymes emerge in other traditions. In English, for example, surprisingly many poets systematically allow consonants that differ in voice to nonetheless count as rhyming (Frawley, 1984). It is sporadic and historically debatable in some early texts, as in the particularly haunting rhyme of *glass/was* from Shakespeare's *Sonnets*:

(25) Then were not summer's distillation left
A liquid prisoner pent in walls of glass,
Beauty's effect with beauty were bereft,
Nor it nor no remembrance what it was. (5, 12)

But it is pervasive and undeniable in many other poets' practice, such as Pinsky's slant rhyme translation of Dante's *Inferno*, which regularly matches not only [s] with [z] but also [t] with [d], [f] with [v] and [ʃ] with [ʒ], as in his stanzas of "aba bcb cdc .." *terza rima* in (26) (Hanson, 2003):

(26) a. "A different path from this one would be best
For you to find your way from this feral place,"
He answered, seeing how I wept. "This beast,
The cause of your complaint, lets no one pass
Her way – but harries all to death. Her nature
Is so malign and vicious she cannot
appease (I 71–75)

b. It seemed it might never stop; behind it a train
Of souls so long that I would not have thought
Death had undone so many. When more than one
I recognized had passed, I beheld the shade
Of him who made the Great Refusal, impelled
By cowardice: so at once I understood (III 47–52)

c. Who set it there?" He said: "It should be clear:
Over these fetid waves, you can perceive
What is expected – if this atmosphere
Of marsh fumes doesn't hide it." Bow never drove
Arrow through air so quickly as then came
Skimming across the water in a little
skiff (VIII 11–16)

d. You will be brought to shore by another way."
My master spoke then, "Charon, do not rage:
Thus is it willed where everything may be
Simply if it is willed. Therefore, oblige,
And ask no more." That silenced the grizzled jaw
Of the gray ferryman of the livid marsh, (III 76–81)

Other common partial matches in English involve nasals that differ in place, as in Dylan's rhyme of *guns* and *bombs* in (23), or another of Pinsky's in (27):

(27) If it should please you, stop a moment here.
Your way of speaking shows that you
were born
In the same noble fatherland: there where
I possibly have wrought excessive harm."
This sound erupted from a coffer of stone –
I drew back toward my guide in my alarm. (X 22–27)

And as in Irish, these equivalences in rhyme invite phonological inquiry into why these particular partialities should be used. The discounting of voice in rhyme in English, for example, can be related to the neutralization of voice distinctions in codas in English that leads to alternations like that between [s] and [z]

in the plural (as in *cat*[s] but *dog*[z]) or [t] and [d] in the past (as in *bark*[t] but *meow*[d]) (Hanson, 2003). This, in turn, can be related to a more general diminution of the perceptibility of the voicing contrast in final position, as suggested by Steriade (forthcoming). Even in English, however, not all poets allow the same partially similar segments to count as alike in rhyme; Dickinson, for example, allows rhymes of obstruents that differ in place, a pairing not used by Pinsky that suggests that different poets partition the phonological space in different ways.

In sum, some partiality in what counts as a likeness is actually the rule rather than the norm in at least some poetic traditions, and, it should be emphasized, is available in all rhyme forms, for example, in full rhyme, just as much as in slant rhyme or assonance. Such partiality may have a variety of sources, but in all cases, the question of how the specific partialities poets use are related to linguistic structure seems a fruitful and worthy avenue of study on a poet-by-poet basis in a wide range of languages.

Subsequence

A final complexity in rhyme also noted by Zwicky for English rock rhymes, but seeming to have far wider applicability as well as significant linguistic interest, is 'subsequence'. On Zwicky's description, subsequence is the presence in one rhyme partner of a segment not matched in the other; an example again from *Masters of War* is the final [z] in *eyes* not present in its rhyme partner *fly* in the 'abcbdefe' scheme in (28), while the extra [t] in *fleet'st* compared to its partner *sweets* in (29) shows a similar structure in an 'abab' quatrain from Shakespeare's *Sonnets*:

(28) You that never done nothin'
But build to destroy
You play with my world
Like it's your little toy
You put a gun in my hand
And you hide from my eyes
And you turn and run farther
When the fast bullets fly

(29) Make glad and sorry seasons as thou fleet'st,
And do what e'er thou wilt, swift-footed Time,
To the wide world and all her fading sweets:
But I forbid thee one most heinous
crime: (19, 5–8)

Subsequence seems, however, to be somewhat more constrained than Zwicky's description allows, and in ways that point to interesting possible explanations for it in relation to syllable structure (Golston, 1997). Golston observed that in Dylan's rhymes, subsequent segments can be argued to be always final, and also always coronals. This seems to hold true for many other English poets as well; allowing a final extra [s] or [z] is widespread, with some poets also allowing an extra [t] or [d], and in some complex cases involving feminine endings, possibly even an extra [n]. Why should such structures count as rhymes? Golston related the phenomenon to observations by Borowsky (1986) and others that English syllable rhymes normally permit only three segmental positions (with long vowels counting as two), thus allowing for example *sneak* ([ɪnk]) or *ink* [iŋk] but not **sn*[iŋk]. Final coronals, however, are allowed in excess of this constraint, as in *fiend* ([ind]) or *fierce* ([irs]), suggesting that the final coronals may be external to the syllable rhyme, perhaps incorporated instead as an appendix as in (30):

(30)

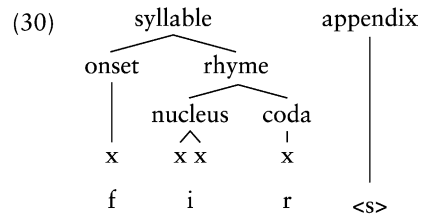

Furthermore, among all the coronals, [s/z] has been argued to be peripheral to syllable structure on different grounds, including its being excepted from the universal constraints that the sonority of segments should decrease or at least remain level across a coda as in the [rs] of *fierce*, rather than increasing as it does in, for example, the [ks] of *sphinx* (Harris, 1994). The proper analysis of these linguistic phenomena is debated; but in any case it is clear that subsequence in rhyme provides an at least partially parallel phenomenon whose description and explanation awaits research.

Resemblances to Reduplication

We have up to this point considered rhyme as a verse form that both as a whole and in individual poets' practices seems to bear systematic relationships to the phonology of ordinary language. Nothing in the description of the phenomenon we have developed so far, however, confines rhyme to verse; in fact, neither does either dictionary definition with which we began, because both allowed for rhyme simply at 'ends of words'. It is, in fact, perfectly reasonable to speak even more generally of words whose syllables rhyme, whether in the manner of full rhyme as in *picnic* or *claptrap*, or slant rhyme in *riffraff*, or even of apocopated rhyme in, say, a phrase like *a very married pair.*

The relationship of rhyme to ordinary phonology that has probably been of the most interest to linguists, however, is not sporadic rhymes, whether

intentional or not, or even the influence of rhyme on vocabulary development; but rather the fully systematic grammatical process of reduplication. Kiparsky's suggestion, with which we began, that the linguistic structures that figure in verse are fundamentally the same ones that figure in grammars, offered parallels with reduplication as its evidence (specifically, parallels between alliteration in Germanic verse and Gothic past tense formation). A few linguists have developed the parallel in fruitful and extensive ways, including Holtman (1996), Yip (1999), and, with reference specifically to language acquisition, Inkelas (2003). It seems quite likely that understanding such issues as the polysyllabic rhythmic structures onto which melodies are copied in reduplication, or melodic simplifications implemented in copying, will illuminate answers to the basic question of why poets count what they do as rhymes.

Conclusion

The interest of rhyme for linguistics may be a matter of its form alone, but the consequences of description and explanation of its forms reach beyond linguistics into literary criticism and theory. In the interpretation of poetry, one of the most vexing questions is that of the nature of the contribution forms make to meaning, or more generally to aesthetic effect – not just the legitimacy of arguments from one to the other, but even the legitimacy of positing the existence of such forms to start with, especially in the face of the evident variation they exhibit. While linguistic investigation of rhyme by no means settles these philosophical questions, attention to it expands enormously our awareness of the range of phonology that seems available to give rise to aesthetic effects, both in modulation across obligatory rhyme schemes (Lanz, 1931) and in relationships forged by optimal ones (Wimsatt, 1954). The project should thus be of interest to literary critics and linguists alike.

See also: Meter; Metrical Phonology; Poetry: Stylistic Aspects; Semantics of Prosody.

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Rhythm

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Definition

Rhythm is the perception of a pattern of alternation between prominent and nonprominent prosodic elements. In a linguistic context, rhythm is mostly discussed in the domains of stress patterns and verse metrics. Rhythm is deeply involved in the shape of stress systems, stress being probably the only phonological category that has a rhythmic distribution (Hayes, 1995: 25). The rhythmic character of stress distribution is evident, for example, in six-syllable words, in which stress will tend to occur on every other syllable (σσσσσσ or σσσσσσ). No language will assign stress to three adjacent syllables in such a word (*σσσσσσ or σσσσσσ). Furthermore, it is natural to view the categories of linguistic stress (the binary prosodic feet) and their distribution in words as part of the linguistic manifestation of rhythmic structure. In spoken language, rhythm also comes up in conjunction with rhythmic adjustments of different kinds (destressing, stress shift, addition of stress). The pattern of regular alternation is thought of as prototypically rhythmic, but the notion of rhythm is more inclusive than that in linguistics, especially when we extend the focus to verse metrics. In meter, less symmetric patterns, such as those found in the verse of Sappho, would also qualify as rhythmic, provided they occur with some regularity. Thus, rhythm could be defined as an arrangement of prominent and nonprominent prosodic elements that can be perceived as a regular pattern.

Rhythmic structure is hierarchical and it has been represented both as tree structure and grid structure in the phonological literature. In the following grid structure, hierarchy is coded as different heights of the columns, reflecting level of prominence. This would be a typical rhythm of a song or nursery rhyme (example from Hayes (1995: 26)).

```
(1) x                                                   x
    x                   x                               x                   x
    x       x           x           x                   x       x           x           x
    x   x   x       x   x       x   x       x           x   x   x       x   x   x       x
    This        old         man                         he          played      one,
    he          played      knick-      knack           on          my          thumb,      with    a
    knick-      knack       pad-    dy  wack,           give    your dog    a   bone,
    this        old         man         came            rol-        ling        home.
```

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```
(1) x                                                   x
    x                   x                               x                   x
    x       x           x           x                   x       x           x       x
    x   x   x       x   x       x   x       x           x   x   x       x   x   x   x   x
    This        old         man                         he          played          one,
    he          played      knick-      knack           on          my              thumb,      with    a
    knick-      knack       pad-    dy  wack,           give    your    dog     a   bone,
    this        old         man         came            rol-            ling            home.
```

Rhythmic structure strives toward even spacing at all intervals of repetition. Thus, feet tend to yield alternating rhythm, as in Example (2). Phrasal stresses, too, tend to be evenly spaced, even though the number of unstressed syllables vary (see later, Example (9)). If the distance becomes too long, new, rhythmically motivated stresses will occur. Rhythmic structure also exhibits synchronization of beats at all levels, as in Example (1) (downward implication). Thus, a syllable receiving phrasal stress will also carry a word stress and will be the head of a foot. Representationally, this means that high grid marks are always on the top of a column. These properties are all testable through ordinary experience, i.e., 'tapping' in response to rhythm and sensing what is natural and what is not.

Eurhythm

Alternating rhythm is unmarked, and unmarked rhythm is optimal in language. Optimal rhythm, or eurhythm, is to some extent attained by virtue of the canonical shapes of linguistic feet as iambic (. x) or trochaic (x .). Sequences of iambs or trochees will inevitably instantiate alternating rhythm:

(2) Iambic:	(. x)	(. x)	(. x)	(. x)
	σ σ	σ σ	σ σ	σ σ
Trochaic:	(x .)	(x .)	(x .)	(x .)
	σ σ	σ σ	σ σ	σ σ

Eurhythm is attained also by adjustment processes of various kinds. There are two prototypical nonrhythmic contexts (so-called arrhythmies) to which languages typically show a reaction: clash and lapse. Clash is the situation whereby two prominences are adjacent at some level. The specification of what counts as a clash and a lapse may vary according to language (Nespor and Vogel, 1989). The typical reaction to clash is the reduction of the lesser stress, as in the following cases from Swedish:

(3) 'kvar-ˌskatt → 'kvar-skatt
'residual tax'
tull-ˌpack-ˌhus-ˌkarl-s-ˌlag→
'tull-pack-ˌhus-karl-s-ˌlag
'customs packing house men's team'

In the second example, the resulting rhythm ('*tull-pack-ˌhus-karl-s-ˌlag*) is regularly alternating, by virtue of every other stress being retained. Lapse – the situation when the distance between stresses is too great – is resolved by the insertion of a rhythmic prominence somewhere between the stresses, as in the following example from Italian (Nespor and Vogel, 1989: 86):

(4) Giánni non ce lo dá → Giánni non cè lo dá
'Gianni does not give it to us.'

Resolution of clash and lapse involves the deletion and addition of stress beats. In principle, the combination of those two processes will also describe the process of stress shift. So-called iambic reversal (the rhythm rule, stress retraction) of English is one example of this:

(5) thìrtéen mén → thìrteen mén

Clash resolution by stress shift respects the hierarchical level at which stress clash occurs. This can be brought out in a grid representation (Prince, 1983):

(6)
```
        x                   x                 *          x
  ←   (x)   x         (x)   x             (x)    x
x     x     x         x     x     x       x     x     x
x   x x x   x         x   x x x   x       x   x x x   x
achromatic lens  →  achromatic lens     achromatic lens
```

As seen, the stress shifts to the next prominence on its own level, rather than just to the next syllable, which would create an ill-formed grid structure. Example (6) also illustrates the fact that rhythmic adjustment need not be triggered by a clash in the narrowest sense, since in this example, an unstressed syllable comes between the clashing ones.

The picture that emerges is one in which the linguistic feet encode the basic rhythmic property of alternation, and linguistic rules adjust the distribution of stress in connected speech. The upshot is an approximation of equally spaced prominences. However, the feet and the adjustment rules are not enough to achieve even spacing.

Rhythm in the Speaker and Listener

Rhythm does not arise simply as a function of the sheer distribution of phonological prominences in a linguistic structure. It also arises by virtue of the execution of the prosody of a linguistic structure, wherein the distribution of stresses can be made more even by the regulation of speech tempo. Furthermore, the interpretation of auditory impressions goes some way toward creating rhythm. The tendency to adjust the distance between stresses is typical of languages such as Swedish or English, and it is supremely clear in verse metrics:

(7) x . x . x . . x
Humpty Dumpty sat on a wall

x . x . x . . x
Humpty Dumpty had a great fall

(8) x . . x . . x . . x . . x . . x .
Sjung, o guidinna om vreden som brann hos peliden Akilles
'Sing, O goddess, the anger of Achilles son of Peleus'

x . x . . x . . x . . x . . x .
Olycksdiger till tusende kval för akajernas söner
'that brought countless ills upon the Achaeans.'

In each of these verse samples, a nursery rhyme and the first two lines of the Iliad in a Swedish translation, the stresses are equally spaced, despite the fact that the number of unstressed syllables between them varies.

We find the same phenomenon in spoken language, but here the isochrony is more approximate. In the following example, taken from Engstrand (2004: 205) there are four stress groups, containing radically different numbers of syllables:

```
(9)  .    x . .  .    .    x  .  .    x    .    x
     σ |  σ σ σ  σ    σ |  σ  σ  σ |  σ    σ |  σ
     Och | tjejerna kom och | skrek att det | brann som | fan
     'And the-girls came and shouted that it burnt like hell.'
```

In the actual pronunciation of this utterance, the groups are of roughly equal length, which means that the syllables of the first group are pronounced much faster than are those of the third and fourth. Regulations in speech tempo also affect the very application of rhythmic adjustment rules. Indeed, in slow and careful speech, adjacent stresses might not induce the sense of clash, and in fast speech, some syllables may be suppressed altogether.

The degree of isochrony varies depending on structural properties of the language, such as phonotactics, quantity system, and gradation (Strangert, 1985). Indeed, there is a traditional notion that languages could be categorized as syllable timed or stress timed (e.g., Abercrombie, 1967), the idea being that some languages would strive toward equal distance between syllable peaks (Italian, Spanish), whereas other languages would strive toward equal distance between stresses (German, English). In an influential paper, Dauer (1983) showed that rhythm in the languages in her sample were all stress based, acoustically, and that they come differently close to isochrony. In fact, the evidence for acoustically even spacing is quite weak. Perceptually, however, things are different. Perception may give a rather strong sense of isochrony even when the physical correlate is quite uneven, and it might also allow for the impression of syllable timing. The findings of Dauer show that it is possible to retain stress as the single phonological unit in language that has a rhythmic distribution. Syllables do not form the base for rhythm, and neither do other linguistic categories. Also, it is clear that phonological rules pertaining to stress apply so as to create even, rather than uneven, rhythm, as we have seen.

Grouping: Iambic/Trochaic Law

Beside its role in the rhythm of spoken language, perception is also crucially implicated in the derivation of linguistic feet – that is, grouping, from basic input to rhythm. The empirical finding among stress systems in languages is that iambic systems tend to have long syllables in the prominent position of the foot, whereas trochaic systems tend to have short syllables in the same position. Stated differently, there seems to be a bias to have uneven quantity in the two positions of an iamb, but even quantity in the positions of a trochee. There is a perceptual base for this, known in phonology as the iambic/trochaic law, which builds on the insights of psychological experiments on rhythmic grouping (see Hayes, 1995: 79, and references therein):

```
(10) – ´ – ´ – ´ – ´ –      →  – (´ –) (´ –) (´ –) (´ –)
     – — – — – — – — –      →  (– —) (– —) (– —) (– —) –
```

If the input varies in intensity, people will tend to group the inputs in units with initial prominence, viz., trochees. If the input varies in quantity, the inputs will be grouped as iambs, with final prominence. Beyond foot structure, there are phonological rules of lengthening and shortening in iambic and trochaic systems, respectively, that work in the direction of optimizing the pattern in accordance with Example (10) (see Mester, 1994).

Meter

In spoken language, rhythmic properties are essentially automatic. In poetic meter, prosodic properties of the language become codified. Unmarked properties may be enhanced, as in the isochrony of the nursery rhymes shown in Examples (1) and (7). However, in many styles of verse, it is considered crude to overstate the rhythmic pattern in the manner done in nursery rhymes, and rhythm is instead signaled more subtly. One exponent for this in the English tradition is blank verse, in which none of the metrical positions actually requires of the syllable filling it that it be either stressed or unstressed. Similarly, meter can be consciously made to deviate from the unmarked. Indeed, any verse tradition containing more than one meter must have less marked meters in it. Classical Greek meter is traditionally considered a quantitative system, based on long and short syllables, but it explores arrhythmic properties such as clash and lapse in the construction of meter. Thus, for dactylic meter, the essential rhythmic property is one clash per metron, and for iambic meter it is one lapse per metron. Interestingly, clash and lapse are not very strong constraints in the language, and it would seem that this is what makes it possible to explore these arrhythmies in the verse tradition (Golston and Riad, 2000). For languages without stress, e.g., Japanese, we expect that they should have very little in the way of rhythmic phenomena in both language and verse. The verse types used in Japanese (haiku, tanka), which count moras but exhibit no sensitivity

to prominence, certainly seem to support this conclusion (Kozasa, 2000).

See also: Meter; Metrical Phonology; Poetry: Stylistic Aspects; Rhyme; Rhythmic Alternations; Semantics of Prosody.

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Rhythmic Alternations

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Introduction

Rhythmic alternation is a principle of linguistic organization that operates at the level of sound structure and is rooted in the cognitive organization of auditory events. As an organizing cognitive principle, rhythmic alternation grants cohesion to temporal spans, by virtue of propelling the regularity of event sequencing from past to future. This general cohesive role also characterizes rhythmic alternation in linguistic constituencies. Rhythm has a specific organization in terms of beat structure, detected in language as well as in other cognitive domains that are crucially dependent on the time dimension. According to studies of the rhythmic structures in music (Cooper and Meyer, 1960; Lerdahl and Jackendoff, 1983), as well as investigations of linguistic rhythm (Liberman, 1975; Liberman and Prince, 1977; Hayes, 1995), auditory stimuli are construed as beats, and a sequence of beats is further construed as a sequence of groups of beats with recurring group internal structure. In its turn, group internal structure is manifested as greater prominence conferred on one of the group members, typically the first or last, thus yielding an alternating pattern.

Studies of the cognitive properties of rhythm have reported on the general conditions for the emergence of rhythmic alternation (Fraisse, 1978; Woodrow, 1951). According to Woodrow (1951: 1232), "[b]y rhythm, in the psychological sense, is meant the perception of a series of stimuli as a series of groups of stimuli. The successive groups are ordinarily of similar pattern and experienced as repetitive." Trochaic grouping tends to be perceived when the sequence consists of equidistant auditory events alternating in loudness, whereas iambic grouping emerges when alternating sounds are longer in duration, or are followed by a longer pause. The optimal temporal interval for rhythmic grouping is relatively small, to facilitate the perception of a group as a whole, that is, as a single perceptual event. These findings about the general cognitive properties of rhythm elucidate the nature of rhythmic patterning in language.

The Scope of Rhythmic Alternation in Language

Rhythmic alternation in linguistic constituents is most directly evidenced in alternating stress patterns. Phonological theories have captured the basic aspects of rhythm by representing both grouping and prominence (Halle and Vergnaud, 1987; Halle and Idsardi, 1995; Hayes, 1995; Prince, 1990). Thus, in Example (1), each syllable of *Mìssissíppi*, which has an alternating stress pattern, corresponds to a beat (line (a)), with the first and third beats more prominent than the second and fourth (line (b)), and the third beat more prominent than the first (line (c)). Beats are represented by the symbol x, groups are identified by parentheses, and degrees of prominence are captured by the height of the beat column.

```
(1) (c)     (           x     )
    (b)     (x          x     )
    (a)     (x    x)    (x    x)
            M ì s s i   s s í p p i
```

However, rhythmic alternation in language is constrained in several ways. Whereas domains such as

to prominence, certainly seem to support this conclusion (Kozasa, 2000).

See also: Meter; Metrical Phonology; Poetry: Stylistic Aspects; Rhyme; Rhythmic Alternations; Semantics of Prosody.

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Rhythmic Alternations

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Introduction

Rhythmic alternation is a principle of linguistic organization that operates at the level of sound structure and is rooted in the cognitive organization of auditory events. As an organizing cognitive principle, rhythmic alternation grants cohesion to temporal spans, by virtue of propelling the regularity of event sequencing from past to future. This general cohesive role also characterizes rhythmic alternation in linguistic constituencies. Rhythm has a specific organization in terms of beat structure, detected in language as well as in other cognitive domains that are crucially dependent on the time dimension. According to studies of the rhythmic structures in music (Cooper and Meyer, 1960; Lerdahl and Jackendoff, 1983), as well as investigations of linguistic rhythm (Liberman, 1975; Liberman and Prince, 1977; Hayes, 1995), auditory stimuli are construed as beats, and a sequence of beats is further construed as a sequence of groups of beats with recurring group internal structure. In its turn, group internal structure is manifested as greater prominence conferred on one of the group members, typically the first or last, thus yielding an alternating pattern.

Studies of the cognitive properties of rhythm have reported on the general conditions for the emergence of rhythmic alternation (Fraisse, 1978; Woodrow, 1951). According to Woodrow (1951: 1232), "[b]y rhythm, in the psychological sense, is meant the perception of a series of stimuli as a series of groups of stimuli. The successive groups are ordinarily of similar pattern and experienced as repetitive." Trochaic grouping tends to be perceived when the sequence consists of equidistant auditory events alternating in loudness, whereas iambic grouping emerges when alternating sounds are longer in duration, or are followed by a longer pause. The optimal temporal interval for rhythmic grouping is relatively small, to facilitate the perception of a group as a whole, that is, as a single perceptual event. These findings about the general cognitive properties of rhythm elucidate the nature of rhythmic patterning in language.

The Scope of Rhythmic Alternation in Language

Rhythmic alternation in linguistic constituents is most directly evidenced in alternating stress patterns. Phonological theories have captured the basic aspects of rhythm by representing both grouping and prominence (Halle and Vergnaud, 1987; Halle and Idsardi, 1995; Hayes, 1995; Prince, 1990). Thus, in Example (1), each syllable of *Mìssissíppi*, which has an alternating stress pattern, corresponds to a beat (line (a)), with the first and third beats more prominent than the second and fourth (line (b)), and the third beat more prominent than the first (line (c)). Beats are represented by the symbol x, groups are identified by parentheses, and degrees of prominence are captured by the height of the beat column.

```
(1) (c)     (           x     )
    (b)     (x          x     )
    (a)     (x    x)    (x    x)
            M ì s s i   s s í p p i
```

However, rhythmic alternation in language is constrained in several ways. Whereas domains such as

music demonstrate a cognitive capacity for groupings at multiple hierarchical levels of rhythmic structure (Lerdahl and Jackendoff, 1983), rhythmic constituency in language is fairly shallow. Hierarchical rhythmic organization in language is highly restricted and mainly follows from the hierarchical organization of the linguistic constituents that serve as potential domains for rhythmic patterning. Likewise, whereas the cognitive capacity for manipulating groups with more than two members, and with more elaborate internal organization, is evidenced in domains other than language (Fraisse, 1978), rhythmic patterns in language tend toward simple, binary groupings, as in Example (1). In fact, precisely because such alternating patterns are relatively simple, they can equally well be represented by the so-called grid structure, which lacks explicit grouping (Prince, 1983; Hayes, 1984, 1995; Selkirk, 1984; Gordon, 2002), as illustrated in Example (2). Representations in Examples (1) and (2) have identical prominence structures yet differ in how the regular alternation of prominent beats is formally executed. In Example (2), an alternating pattern is secured by invoking principles such as eurhythmy, a requirement for an even distribution of stresses, which should be neither too close to each other nor too far apart. That is, neither adjacent stressed syllables, or clashes, nor adjacent unstressed syllables, or lapses, are permitted:

```
(2) (c)                x
    (b)      x         x
    (a)      x    x    x    x
           M ì  s s i  s s í  p p i
```

Ternary groupings, while rare, have also been evidenced among alternating stress patterns. In these systems, stressed syllables alternate with intervals of two unstressed syllables. Phonological analyses either admit ternary groupings into the set of possible group types (Halle and Vergnaud, 1987; Levin, 1988), or posit binary groups separated by an additional unstressed syllable (Hayes, 1995), or posit grid structures with a special license for lapses (that is, adjacent unstressed syllables) (Elenbaas and Kager, 1999; Gordon, 2002).

Patterns of Rhythmic Alternation in Word Phonology

Rhythmic alternation belongs to the range of possible phonological patterns for expressing prominence relations within words. Rhythmic alternation is most directly manifested in stress systems, which provide an abundance of relevant cases and set the scope within which this organizational principle is manifested in human language. However, rather than being a general property of word stress, rhythmic alternation characterizes only those stress systems that permit more than one stress within the word domain. Moreover, alternating patterns are not restricted to stress, and are encountered in other word prominence systems as well. Groupings in either stress or non-stress alternating patterns are subject to the same principles, rooted in the cognitive aspects of rhythmic alternation.

Alternating Patterns of Stress

Crucial in the classification of stress systems is the prosodic unit that serves as the basic rhythmic beat. Units that naturally emerge in this role are the mora and the syllable, both members of the prosodic hierarchy (Hayes, 1981, 1995; Halle and Vergnaud, 1987; Kager, 1995; and the references cited in these works). The syllable is the optimal candidate, due to its stable internal constituency and the high sonority of its nucleus. There are, however, two independent issues relevant for beat selection: which unit serves as a phonetically realized beat, and which serves as a beat for the purposes of computing an alternating pattern. Empirical evidence points at the syllable as the phonetically realized beat, but stress in general, and its alternating patterns in particular, can be computed with either the mora or the syllable taken as the basic beat. The two classes of stress systems, syllabic and moraic, are further subclassified into those with trochaic (left-dominant) or iambic (right-dominant) grouping. This yields four types of stress systems. Three of those, syllabic trochees, moraic trochees, and moraic iambs, are amply exemplified in Hayes (1995) and Kager (1995). Syllabic iambs present a special case and are addressed here.

Regular rhythmic alternation is most readily exhibited in systems of syllabic trochees. An alternating pattern can be computed either from left to right, as in Example (3), or from right to left, as in Example (4). Stressed syllables are marked as ó, with no distinction between primary and secondary stress, since both degrees of stress are equally relevant for rhythmic alternation.

Syllabic trochees: left-to-right:

```
(3) (ó o)
    (ó o) (ó)
    (ó o) (ó  o)
    (ó o) (ó  o) (ó)
    (ó o) (ó  o) (ó  o)
```

Syllabic trochees: right-to-left:

```
(4)  (ó o)
      o (ó o)
     (ó o) (ó o)
      o (ó o) (ó o)
     (ó o) (ó o) (ó o)
```

In Example (3), based on languages such as Icelandic, Hungarian, or Maranungku (Hayes, 1995), rhythmic alternation proceeds from left to right. Note that in words with an odd number of syllables, the final group is not binary, but for this very reason, stress alternation is regular. Systems minimally departing from Example (3) (e.g., Pintupi; Hayes, 1995) lack stress on the final syllable. As a result, words with an odd number of syllables have adjacent weak beats, as in (ó o) o and (ó o) (ó o) o, with a disruption of the alternating pattern at the right edge. In Example (4), based on languages such as Warao or Cavineña (Hayes, 1995), rhythmic alternation proceeds from right to left. Systems minimally departing from Example (4) are those in which word-initial syllables attract stress, yielding adjacent weak beats in words with an odd number of syllables, as in (ó o) o (ó o). This is the so-called initial dactyl effect (described in Prince (1983), Cohn (1993), and Hayes (1995), among others).

Alternation in stress systems that take the mora as the basic beat is of a less robust nature. In this case, the alternating pattern is computed over moras, yet stress is realized on syllables. Crucially, regular alternation at the level of moraic groupings need not be realized as regular alternation at the level of syllables. Groupings into moraic trochees include two light syllables ($ó_L$ o_L), or one heavy syllable ($ó_H$). However, whereas forms with all light syllables will exhibit perfect stress alternation, forms that combine light and heavy syllables may not, as in ($ó_H$) ($ó_L$ o_L) ($ó_H$), wherein stresses on the first two syllables clash (e.g., Fijian; Hayes, 1995). Likewise, groupings into moraic iambs include two light syllables ($ó_L$ o_L), one heavy syllable ($ó_H$), or a light followed by a heavy (o_L $ó_H$). In this case, again, a stress clash may arise at the level of the syllables, as in ($ò_H$) ($ò_L$ o_L) ($ó_H$), even though alternation at the level of the mora is perfectly regular (e.g., Asheninca; Hayes, 1995).

The Trochaic/Iambic Law

Alternating patterns are well attested for three out of four grouping types – for all, that is, other than the system of syllabic iambs. Only a single case of what appear to be syllabic iambs (Weri) is listed in Hayes (1981). Hayes (1995) eliminated syllabic iambs from the set of possible groupings, thus introducing an asymmetry into the system and motivating it by the general cognitive properties of rhythmic alternation. According to Woodrow (1951: 1233), "with equal temporal spacing, a regularly recurring, relatively greater intensity exerts a group-beginning effect, and a regularly recurring, relatively greater duration a group-ending effect." In other words, alternation in intensity produces trochaic grouping, and alternation in duration produces iambic grouping. These asymmetric grouping tendencies are evidenced in music (Cooper and Meyer, 1960: 10) and, according to Hayes (1995: 79–82) and Prince (1990), are also evidenced in rhythmic patterns in language.

Groupings in the two moraic systems exhibit a crucial asymmetry of the predicted sort: trochaic groupings, ($ó_L$ o_L), ($ó_H$), are even, and iambic groupings, (o_L $ó_L$), ($ó_H$), (o_L $ó_H$), may be uneven (Hayes, 1995; Kager, 1995; Prince, 1990). There is no (o_H o_L) trochaic grouping; in fact, systems of moraic trochees exhibit so-called trochaic shortening, as in Fijian (Hayes, 1995), reinforcing the strong preference for even trochees. Moreover, (o_L o_H) appears to be the preferred iamb, as evidenced by numerous cases of iambic lengthening, the effect of which is to eliminate feet of the (o_L $ó_L$) shape and reaffirm the preference for uneven iambs (Hayes, 1995). However, in the syllabic systems, all syllables are treated as equals, and as a result, all groups are even. Because of the preference for uneven iambic groupings, syllabic systems are inconsistent with iambic grouping. The strong theoretical position is that syllabic iambs are either highly disfavored (Prince, 1990) or are eliminated from the system (Hayes, 1995). It should be noted, however, that Gordon's (2002: 522) broad survey of syllabic stress systems included eight cases of syllabic iambic groupings, thus strengthening the empirical basis for positing this type of stress alternation.

Other Alternating Patterns in Word Phonology

Though most directly, and predominantly, manifested in stress systems, rhythmic alternation is not entirely restricted to them. Equally relevant, though not as well attested, are rhythmic alternations in phenomena other than stress, such as vowel length or vowel quality, which ultimately belong to the phonological devices for expressing degrees of prominence. Interestingly, clear cases of this type are characterized by moraic groupings. Three such cases are presented here. The Creek language exhibits covert rhythmic alternation: the place of tonal accent is computed by virtue of left-to-right iambic grouping, yet only the rightmost iambic group is phonologically marked by tone (Hayes, 1995). Next, Chickasaw exhibits rhythmic lengthening that in no obvious way relates to stress, and affects every second light syllable computed from left to right (Munro and Willmond, 1994; Hayes, 1995). Finally, Old Church Slavonic has an alternating pattern defined by Havlík's law, exhibited by high lax vowels (Isačenko, 1970). When two open syllables, both containing high lax vowels, are adjacent, the first one is lowered to a mid-vowel. Moreover, grouping proceeds from right to left: in words with only high lax vowels, lowering takes effect in every

even-numbered syllable from the end. In sum, cases of rhythmic alternation unrelated to stress provide strong evidence for full integration of rhythmic alternation into the inventory of possible phonological patterns.

Rhythmic Alternation in Phrasal Domains

Though the domain of rhythmic alternation is word-sized for only a subset of languages characterized by stress, any language with word stress could potentially exhibit rhythmic distribution of stresses within phrasal domains. Moreover, though rhythmic alternation at the word level is subject to a tight phonological organization, inter-stress intervals in the phrasal domain are under looser phonological control. This is in part because regular distribution of stress in phrasal domains crucially depends on word size. However, though there is no evidence for clearly defined groupings comparable to those at the word level, phonological regularizations of phrasal rhythm do occur, as in the well-studied case of the 'rhythm rule' in English (Liberman and Prince, 1977; Hayes, 1984, 1995; Selkirk, 1984; Kager and Visch, 1988; and references therein). As illustrated in Example (5), stress in *thirtéen* shifts leftward when followed by a stronger stress, resulting in an alternating rhythmic pattern. Rhythmic alternation is represented here with grids, first introduced by Liberman and Prince (1977) to accommodate this type of rhythmic adjustment:

```
(5)          x          x
       x     x     x    x
     x x     x     x x  x
  thirteen men→thirteen men
```

Crucially, stress shifts leftward only if there is an appropriate landing site: stress will only shift onto a syllable with secondary prominence. However, rhythmic adjustments of this type are not mandatory, but, rather, point at a strong tendency toward eurhythmy – that is, toward rhythmic alternation – in phrasal domains. Comparable rhythmic effects have been observed in German (Kiparsky, 1966) and Dutch (Kager and Visch, 1988), as well as in Polish, Italian, and Greek (Nespor and Vogel, 1989) (for additional cases, see Hayes (1995)).

The Phonetic Realization of Rhythm

In studies of speech rhythm, a well-known proposal is the division of languages into two rhythmic types: stress timed and syllable timed (Pike, 1945; Abercrombie, 1967). In the former type, stressed syllables occur at equal time intervals, and in the latter type, all syllables occur in such fashion. Thus, the former type is characterized by stress-based isochrony, and the latter by syllable-based isochrony. Note that the assumed isochronous intervals provide a basis for an alternating rhythm only in stress-timed languages.

Phonetic studies have refuted this sharp division. Dauer (1983) failed to identify differences in the duration of inter-stress intervals between Spanish, classified as a syllable-timed language, and English, a stress-timed language. Moreover, Wenk and Wioland (1982) demonstrated that French, presumably a syllable-timed language, is not characterized by an increase of word duration proportional to the number of syllables. However, though there is no clear case for isochrony at the level of production, it has been found that there is a strong tendency toward isochrony at the perceptual level: inter-stress intervals tend to be perceived as more isochronous than what would be expected from their actual durations (Lehiste, 1977; Scott and Isard, 1985). A further important finding is that perception of the isochrony of inter-stress intervals is stronger within, than across, linguistic constituents (Donovan and Darwin, 1979). In sum, phonetic studies of rhythm have identified inter-stress intervals as intervals that tend to be perceived as such, though not necessarily recurring with relatively stable durations. Yet, this rhythmic alternation is evidenced only in a fairly weak sense.

See also: Foot; Meter; Metrical Phonology; Phrasal Stress; Poetry: Stylistic Aspects; Rhyme; Rhythm; Semantics of Prosody; Word Stress.

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Riau Indonesian

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Riau Indonesian is the variety of colloquial Indonesian spoken by the inhabitants of the Indonesian province of Riau, which encompasses parts of east-central Sumatra plus a large number of adjacent smaller islands. Riau Indonesian is one of many distinct local varieties of colloquial Indonesian spoken throughout the archipelago, such as, for example, Jakarta Indonesian. The population of Riau province, numbering close to 5 million people, is linguistically and ethnically heterogeneous. Although the indigenous population is mostly Malay, a majority of the present-day inhabitants are migrants from other provinces, speaking a variety of other languages. Riau Indonesian is acquired as a native language by most or all children growing up in Riau province, whatever their ethnicity. It is the language most commonly used as a lingua franca for interethnic communication, and, in addition, it is gradually replacing other languages and dialects as a vehicle for intraethnic communication.

Riau Indonesian is quite different from Standard Indonesian, a language familiar to many general linguists from a substantial descriptive and theoretical literature. Riau Indonesian is also distinct from a set of dialects generally referred to as Riau Malay, used in Riau province by ethnic Malays, primarily for intraethnic communication. In addition, Riau Indonesian is distinguished from another set of Malayic dialects spoken by various indigenous peoples in Riau province (Orang Asli, Orang Sakai, Orang Akit, Orang Hutan, and Orang Laut). Finally, Riau Indonesian is also different from the variety of Malay/Indonesian sometimes referred to as 'Bazaar Malay,' which is used by the ethnic Chinese residents of Riau province when speaking to non-Chinese, and by the non-Chinese when speaking to the ethnic Chinese. Thus, the sociolinguistic situation in Riau province is one of great complexity: speakers of Riau Indonesian are often fluent in several other varieties of Malay/Indonesian, as well as in other languages, such as Minangkabau and Javanese.

From a general typological perspective, Riau Indonesian is a strongly isolating language, with no inflectional morphology and relatively little derivational morphology or compounding. It is also a

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From a general typological perspective, Riau Indonesian is a strongly isolating language, with no inflectional morphology and relatively little derivational morphology or compounding. It is also a

language with very flexible word order. Perhaps the most striking feature of Riau Indonesian is the pervasiveness of underspecification, i.e., the absence of obligatory overt grammatical expression for a wide variety of semantic categories, including number, definiteness, tense, aspect, thematic role, and ontological type. On the basis of these characteristics, Riau Indonesian has been argued to have a simple grammar, lacking much of the machinery central to most grammatical theories. Syntactically, it is said to have a single open syntactic category, that is to say, no distinction between nouns, verbs, adjectives, and prepositions, or between lexical categories and phrasal ones. Semantically, it is claimed that when two or more expressions are combined, the meaning of the combination is usually associated with the meanings of the constituents in a vague and underspecified fashion.

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Malay; Primitive Languages; Word Classes/Parts of Speech: Overview.

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Ivor Armstrong Richards, a British literary theorist, critic, poet and educator, was born in Cheshire, United Kingdom, in 1893. He was educated at Clifton College in Bristol. Originally, he read history but changed to moral sciences at Magdalene College graduating in 1915. After recovering from tuberculosis, he decided to study medicine but was invited to teach at the new English School (faculty) at Magdalene College in 1919, where he stayed until 1939. He traveled and taught throughout the world, especially in China and Japan. In 1944, he became a professor in the Department of Education at Harvard University, where he taught until 1963. He maintained his contacts with Magdalene College and returned to Cambridge in 1974. He died in Cambridge in 1979.

In 1918, he met Charles Kay Ogden (1889–1952), beginning a cooperation in philosophical linguistics. In 1957, Ogden wrote about the circumstances in which they met and how they discussed some of the controversies that were debated in *Mind* and particularly on how quickly Richards and Ogden produced an outline for *The meaning of meaning*.

In 1922, *The foundations of aesthetics* was published by Richards, Ogden, and James Wood (painter). In this work, there is a discussion of beauty that was treated more comprehensively in *The meaning of meaning*: it contains 16 senses of the word 'beauty' examined psychologistically. Ogden was a student of and was influenced by the heritage of the thoughts of Lady Victoria Welby (Gregory) (1837–1912), an independent scholar. In the late 19th century, she published papers on meaning, 'significs', in *Mind* and *The Monist*. Lady Welby started the 'signific movement' especially through the *Signifische Kring* in The Netherlands in 1917, when she met the Dutch poet and psychotherapist Frederik van Eeden (1860–1932), and she would later announce a Welby prize for original ideas on meaning that led to the development of Basic English. She was also active in the Vienna Circle and, of necessity, was influenced by the ideas that migrated to Vienna. Lady Welby also corresponded with C. S. Peirce (1839–1914). Lady Welby's thoughts influenced both Richards and Ogden.

In 1923, Ogden and Richards published *The meaning of meaning. A study of the influence of language upon thought and of the science of symbolism*. This work made the authors very famous. For example, Bertrand Russell and Edward Sapir discussed and adopted this book as standard university reading text. In this work, they investigated the role that words play on thought, the symbolic and emotional functions of meaning, and they sought to improve the incipient behaviorism. Their semiotic triangle – thought or reference, symbol, and referent – has been disseminated among the various language sciences. The manner by which they described the relation between symbol and referent has been criticized within the discussions of theory of meaning. One of the perceived failures is that their model fails to account for the cognitive component of human communication. Richards also argued that human thought is metaphoric in this work.

language with very flexible word order. Perhaps the most striking feature of Riau Indonesian is the pervasiveness of underspecification, i.e., the absence of obligatory overt grammatical expression for a wide variety of semantic categories, including number, definiteness, tense, aspect, thematic role, and ontological type. On the basis of these characteristics, Riau Indonesian has been argued to have a simple grammar, lacking much of the machinery central to most grammatical theories. Syntactically, it is said to have a single open syntactic category, that is to say, no distinction between nouns, verbs, adjectives, and prepositions, or between lexical categories and phrasal ones. Semantically, it is claimed that when two or more expressions are combined, the meaning of the combination is usually associated with the meanings of the constituents in a vague and underspecified fashion.

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Malay; Primitive Languages; Word Classes/Parts of Speech: Overview.

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Richards regarded himself as a philosopher with interests in psychology, and his earliest papers were on aesthetics published in *Athenaeum* in 1919: 'Art and science,' 'Emotion and art,' 'Four fermented aesthetics,' and 'The instruments of criticism: expression.' At Magdalene College, he lectured on literary criticism (novel) and theory of criticism. He developed courses on practical criticism using his method of 'close reading' and courses on Samuel T. Coleridge, rhetorical theory, and British moralists.

He stated that poetry, which often stood for literature or art in his arguments, was central to everything, and soon he became a theorist of the arts. He was very interested in the effect that reading had on the minds of readers: He argued that each literary work read modified the person who read it. In 1925, he published *Principles of literary criticism*, which he had started writing in 1923. In this work, he aimed to place the arts at 'the forefront of all values' because he regarded arts as "the supreme mode of communication," as he wrote in a letter to D. E. Pilley (November 19, 1923). He intended to demonstrate the value of poetry within the context of the contemporary psychological framework. The norms and practices of science hindered the ability of man to read and write poetry, according to Richards, who aimed to reinstate poetic expression or discourse. In his 1926 *Science and poetry* (revised in 1935), he introduced 'pseudo-statements' (misinterpreted then as 'false statements') as poetic utterances that do not need to be judged for truth conditions as does a scientific statement. Because he was interested in improving the reading skills of the university students, he dedicated much effort to this end, which resulted in the publication of *Philosophy of rhetoric* in 1936 and *Interpretation in teaching* in 1938. He stated that he rejected Aristotelian and other traditional rhetoricians' thought and argued that rhetoric should be "a philosophical inquiry into how words work in discourse." He applied these principles to Mencius, the Chinese philosopher, while he was traveling in China. He learned some Chinese, developed a simplified form of literal translations, and his study was published in 1932 as *Mencius on the mind: experiments in multiple definition*.

Richards moved away from literary discussion after publishing *Practical criticism* and turned to educational theory and language teaching. By 1931, he returned to the ideas of a system of simplified language, Basic English, with Ogden. This led him to produce a list of 850 words with which almost all communicative needs can be expressed. He dedicated the rest of his life to this enterprise. He promoted world literacy. In his cooperation with Christine M. Gibson, he pioneered the use of audiovisual media resources to the teaching of English as a foreign language. His works represent an important chapter in the history of language teaching methodology in general and specifically in English.

See also: Literary Theory and Stylistics; Ogden, Charles Kay (1889–1957); Peirce, Charles Sanders (1839–1914); Russell, Bertrand (1872–1970); Sapir, Edward (1884–1939).

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Richter, Elise (1865–1942)

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Elise Richter was born March 2, 1865 in Vienna and died June 21, 1943 in Theresienstadt (now Terezín, Czech Republic). Richter was one of the leading figures of Romance philology and phonetics in the 20th century. Having enjoyed the benefits of private education, she was the first woman in Austria who passed the *matura* and one of the first three women who were allowed to study at the University of Vienna. Richter was the first female student at the department of Romance philology, where she studied with Adolf Mussafia (1835–1905) and Wilhelm Meyer-Lübke (1861–1936). She was awarded a doctorate in 1901. Her dissertation *Zur Entwicklung der romanischen Wortstellung aus der lateinischen* (1903) was inspired by Meyer-Lübke's *Grammatik der romanischen Sprachen* (1890–1902). It was also Meyer-Lübke who encouraged Richter to apply for a *Privatdozentur*. In 1903 she presented her habilitation *Ab im Romanischen* to the Philosophical Faculty at Vienna. Richter tried to demonstrate that the Latin preposition *ab* is still present in several prepositions in Romance languages (Italian: *da*, French: *à*, Spanish: *a* etc.). In 1907, the Ministry confirmed the *venia legendi* and appointed Richter as the first female *Privatdozent* in Austria and Germany. Being a woman, she never became *ordinaria*, but due to her generally acknowledged competence she became *extraordinaria* in 1921. As a result of the annexation of Austria by Germany in 1938, Richter was forced to resign because of her Jewish origin. In 1939, the International Federation of University Women offered some financial support to Elise and her sister Helene, had they agreed to immigrate to England. But Elise Richter refused to leave her home country ("*Alte Bäume verpflanzt man nicht*"). In 1942, she was deported to the concentration camp Theresienstadt, where she died on June 21, 1943.

At an early stage in her writings, Richter developed an independent method of research and exceeded her mentor Meyer-Lübke in originality. Her article *Die Rolle der Semantik in der historischen Grammatik* (1909) showed her independent manner of thinking as she applied the Neogrammarians' achievements (especially the *analogy*) to the field of semantics, which until that time had been considered as a domain separate from grammar. Richter's research was particularly focused on the historical development of Romance languages. In *Der innere Zusammenhang in der Entwicklung der romanischen Sprachen* (1911), Richter explained the development of Romance languages from Latin as a result of a change in word-order. In her attempt to incorporate psychological aspects into her research on syntax and semantics, she adopted the conceptions of Wilhelm Wundt and Karl Vossler, but she never succumbed entirely to Vossler's idealism.

Richter also made important contributions to phonetics (a domain included in her teaching duties), particularly to experimental phonetics. Stimulated by her Vienna colleague Trubetzkoy, Richter became a pioneer of phonology in Romance languages.

In many of her writings, Richter embedded her research within a larger context, including general linguistics, German linguistics, Romance literature, etc. Most of Elise Richter's innovative work has had a remarkable influence on the subsequent development of linguistics.

See also: Meyer-Lübke, Wilhelm (1861–1936); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Vossler, Karl (1872–1949); Wundt, Wilhelm (1832–1920).

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Dr. John Rickford is Martin Luther King Jr. Centennial Professor of Linguistics and director of African and Afro–American Studies at Stanford University. He was born in Georgetown, Guyana, and has degrees from the University of California Santa Cruz (B.A., 1971) and the University of Pennsylvania (M.A., 1973; Ph.D. 1979). His work focuses on the history and current use of Caribbean Creoles and of African–American Vernacular English (AAVE), with particular emphasis on the development of variationist sociolinguistic methods, debates about the creolist and anglicist roots of AAVE, and the educational implications of linguistic analysis (the latter often in conjunction with his wife, Dr. Angela Rickford). Other important contributions have included the call for new approaches to class analysis in sociolinguistics, studies of ethnicity as a sociolinguistic barrier, sociolinguistic analyses of style, and articles about the ethical obligations of social scientists. He has published 10 books and over 70 articles, some of the most influential of which are listed in the following bibliography.

In 1996, after the Oakland school board's widely and heatedly discussed decision to recognize the vernacular of African–American students in an Ebonics instruction program, Dr. Rickford engaged in countless public discussions with academics, teachers, churches, professional associations, and journalists on the ways that widespread knowledge of the structure and history of AAVE can improve the success of African–American students in the language arts. This work was recognized by the Linguistic Society of America with its Linguistics, Language, and the Public award, and by the American Anthropology Association with its Anthropology in Media award. *Spoken soul: the story of black English* (2000), a book written with his son, journalist Russell John Rickford, demonstrates his flair for offering an accessible introduction to AAVE, and also includes an insightful overview of the debates around the Oakland school board decision. It is the 2002 winner of an American Book Award. A talented and award-winning teacher, John Rickford is known for exciting the interest and developing the skills of undergraduate and graduate students by creating numerous opportunities for them to engage in original, collaborative research, and for devoting generous amounts of time to mentoring junior scholars.

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Right Node Raising

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The term 'right node raising' refers to a coordination construction in which the right end of the first conjunct (i.e., the 'target') is not expressed, creating an information gap. The gap is resolved at the end of the last conjunct, where the missing part of the first conjunct is expressed overtly, as shown in Example (1). Here and in all subsequent examples, the target appears in square brackets; the information gap in the first conjunct is indicated by an underline (_):

(1) Sarah baked _, and Louise devoured [five pancakes].

Right node raising (RNR), a term due to Postal (1974), describes an analysis that assumes the target, which must be phonetically and grammatically identical in both conjuncts, to raise 'across the board' (ATB) to a right-adjoined position above the coordination. Raising is indicated by coindexed traces (*t*) in the base position (**Figure 1**). This analysis of RNR, which is found in Postal (1974, 1998), Williams (1990), Larson (1990), and Sabbagh (2003), among others, is referred to here as the 'raising analysis.'

An alternative analysis of RNR dispenses with literal raising of the target and assumes that the target is syntactically present in its base position in both conjuncts, but is phonetically empty in the first one (**Figure 2**, the 'phonetic analysis'; see Wexler and Culicover (1980), Wilder (1997), and Hartmann (2000)).

A third possibility to analyze RNR is to allow the target to be multiply dominated by two nodes at the same time. In this view (**Figure 3**), the target occupies several syntactic positions but is pronounced only in the rightmost position of the clause; this is the analysis of McCawley (1982, 1988), Blevins (1990), and Steedman (1985).

There has been a long-standing debate in the linguistic literature as to which of the three analyses is the most appropriate one. In the following discussions, some of the arguments that have been brought up to strengthen the phonetic analysis, in preference to the raising analysis, are given. This presentation does not intend to reproduce all aspects of the still ongoing debate; rather, it merely aims to give an impression of the kinds of constructions and arguments to be considered when investigating RNR.

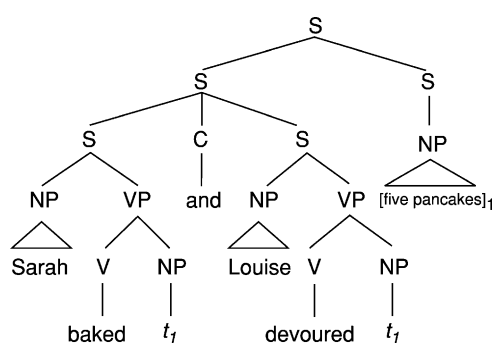

Figure 1 The raising analysis.

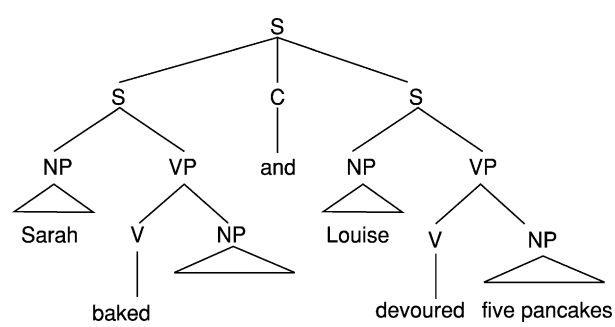

Figure 2 The phonetic analysis.

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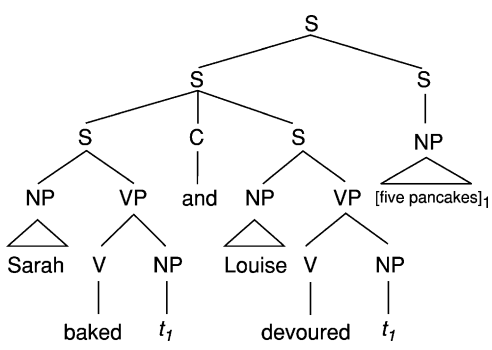

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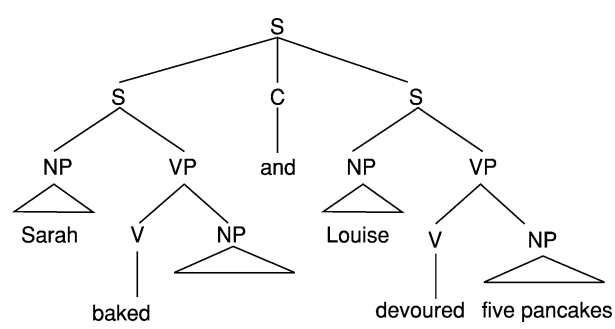

Figure 2 The phonetic analysis.

Considered in turn are the constituency of the target, the absence of locality restrictions in RNR, the interpretation of the alleged traces, and the scope effects between elements of the target and the remnant conjuncts.

The first argument in favor of the phonetic analysis and against the raising analysis concerns constituency. Movement (including rightward movement) is generally restricted to one syntactic constituent. The target in RNR, however, can either contain several constituents, i.e., a noun phrase (NP) and a prepositional phrase (PP), as in Example (2a) (Abbott, 1976), or it can be a nonconstituent, e.g., as the head of a noun phrase (Example (2b)). This deviation from regular movement has led several researchers to the assumption that RNR cannot be raising (e.g., see Gleitman, 1965; Abbott, 1976; Williams, 1978; van Oirsouw, 1983, 1987).

(2a) Smith loaned _, and his widow later donated [a valuable collection of manuscripts to the library].
(2b) Louise likes yellow _, but Sarah prefers pink [shirts].

The following German examples also show clearly that RNR does not respect constituency. In German, prepositions may not stay behind if the complement of the preposition is displaced. This holds for leftward movement of the complement (Example (3a)), as well as for rightward movement (Example (3b)). Example (3b) illustrates heavy-NP-shift of a noun phrase originating in the complement position of the preposition *über* 'about'. The ungrammaticality of both examples indicates that German disallows preposition stranding. As shown in Example (3c), heavy-NP-shift is possible if no preposition is stranded in the midfield (*t*, trace of movement; DAT, dative):

(3a) *[$_{NP}$Dem Tisch]$_1$ sitzt Louise [$_{PP}$auf t_1].
the.DAT table sits Louise on
(3b) *Auf dem Empfang wurden wir [$_{PP}$über t_1] informiert [$_{NP}$das sehr reichhaltige Angebot an erlesenen Speisen und Getränken]$_1$.
at the reception were we about informed the very varied collection of selected dishes and drinks
(3c) Auf dem Empfang wurde uns t_1 serviert [$_{NP}$ ein sehr reichhaltiges Angebot an erlesenen Speisen und Getränken]$_1$.
at the reception was us.DAT served a very varied collection of selected dishes and drinks
'At the reception, we were served a very varied collection of selected dishes and drinks.'

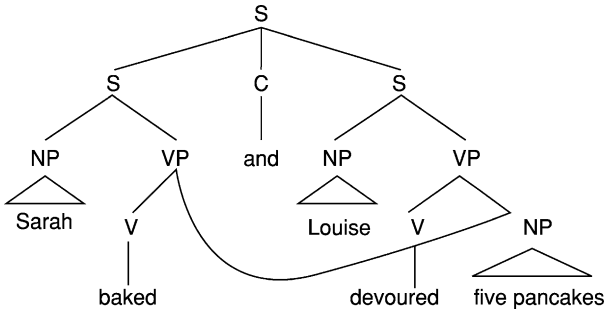

Figure 3 The multidominance analysis.

As Example (4) shows, a preposition may strand in German RNR (Hartmann, 2000: 58), and the same holds for Irish (see McCloskey, 1986). This fact strongly suggests that RNR does not involve rightward ATB movement of the target:

(4) Louise sitzt auf _, und Sarah sitzt unter [dem Tisch].
Louise sits on and Sarah sits under the table
'Louise is sitting on, and Sarah is sitting under the table'.

The second argument corroborating the phonetic analysis shows that RNR does not obey well-known locality restrictions. It has been shown that targets may be contained within syntactic islands. Wexler and Culicover (1980), Goodall (1987), and Phillips (1996) argued that RNR freely violates the *wh*-constraint: in Example (5a) (Wexler and Culicover, 1980: 299), the target is contained in a *wh*-clause, which usually represents an island for movement. Neijt (1979: 44) claimed that the target may be part of a complex NP (Example (5b)), known to disallow extraction of constituents contained therein. Thus, RNR does not seem to be restricted by typical locality constraints:

(5a) Mary knows a man [$_S$who buys _], and Bill knows a man who sells [pictures of Fred].
(5b) Alfonse discussed [$_{NP}$the question of which rice _], and Mary discussed the question of which beans [we would eat].

The references compare RNR only with leftward movement, but since movement to the right considerably differs from movement to the left, the comparison must include RNR and clear instances of rightward movement, in order to make the argument valid. It can be argued that extraposition (= movement to the right) may not violate the coordinate structure constraint. In Example (6a), the PP *to the swimming pool* is extraposed out of the first conjunct of a coordinated verb phrase (VP), resulting in an ungrammatical sentence. In RNR (Example (6b)), on the other hand, the coordinate structure constraint

does not seem to be violated: although the PP *to school* originates in a coordinated VP, it can function as an RNR target. This would be unexpected if RNR were an instance of rightward ATB movement:

(6a) *Louise [$_{VP}$[$_{VP}$goes t_1] and [$_{VP}$reads a book]] [$_{PP}$to the swimming pool]$_1$.
(6b) Louise [$_{VP}$[$_{VP}$had coffee] and [$_{VP}$walked _]], but Sarah overslept and ran [to school].

The third argument is semantic in nature. It concerns the interpretation of traces. If RNR did involve movement, the traces of the alleged raising operation would be expected to be referentially identical. In other words, the target should refer to one and the same referent in both conjuncts. As Example (7b) shows, this expectation is not borne out (the argument is made for German in Klein (1993)):

(7a) What$_1$ did Louise buy t_1 and Sarah read t_1?
(7b) Louise bought _, and Sarah read [a novel].

In Example (7a), the *wh*-object is moved across the board to the sentence-initial position. The unique interpretation is that Louise and Sarah bought and read the same item. This reading is not predominant in the RNR sentence (Example (7b)), in which the novel bought by Louise and the novel read by Sarah may differ. Referential identity of the target is clearly excluded in Example (8); here, six goals were scored altogether, not three (unless they played against each other, of course!):

(8) Real Madrid scored _, and Bayern München got [three goals].

Since ATB movement obviously triggers referential identity of the moved constituents in both conjuncts, RNR in Examples (7b) and (8) cannot be derived by ATB movement, as assumed by the raising analysis. The phonetic analysis, on the other hand, captures the facts correctly.

The final argument presented here concerns scope effects. The raising analysis wrongly predicts that the target should be outside the scope of any element contained in the remnant conjuncts. However, the target appears not to have moved when variable binding, negative polarity licensing, and binding theory are considered (see Levine, 1985; Phillips, 1996; Hartmann, 2000). Phillips (1996: 53) argued that a quantifier may bind a pronoun contained in a target. This is possible only if the target is not attached higher in the tree than the quantifier is, given that the quantifier must take scope over the pronoun in order to bind it. As indicated by the indices, a bound reading of the pronoun is possible:

(9) Everyone$_1$ liked _, and at least one person$_1$ loved [the paper he$_1$ had been asked to review].

It is known that negative polarity items must appear in the scope of some negative element. According to the raising analysis, a negative polarity item in a target should be excluded, since the raised target is outside of the scope of the coordinated structure. This expectation is not borne out, as illustrated by Example (10) (Phillips, 1996: 53):

(10) Nobody enjoyed _, and few people even liked [any of the talks on RNR].

Finally, Levine (1985: 496) pointed out that the ungrammaticality of Example (11) cannot be explained if the target raises to some right-peripheral position, thereby bleeding the illicit binding of the referential expression *Mary* (contained in the target) by the pronoun *she*. The phonetic analysis offers a natural account for the ungrammaticality of Example (11), assuming that the target does not move:

(11) *I know that she$_1$ said _ and I happen to agree [that Mary$_1$ needs a new car].

To summarize, the aforementioned arguments all corroborate the phonetic analysis, which assumes that the target does not move, as first noted by Wexler and Culicover (1980). As has been indicated herein, these arguments represent only some aspects of an interesting and still open debate.

See also: Binding Theory; Coordination; Island Constraints.

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Rigid Designation

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Introduction

Rigidity is a semantic notion. Semantics studies the relationships between expressions in a language and (typically) extralinguistic items. Examples of semantically interesting features are the relationship between the name 'George Bush' and Bush, the individual to which it refers; the relationship between the sentence 'George Bush is a liberal' and falsehood, its truth value; and, at least in some views, the relationship between the definite description 'the President of the United States' and Bush, the individual it denotes.

The task of a semantic theory is not that of immediately assigning the aforementioned features to the appropriate expressions. For instance, that the sentence 'George Bush is a liberal' is to be assigned falsehood depends not only on the semantic traits of the expressions under analysis, but also on obviously extrasemantic facts having to do with Bush's political convictions. By the same token, that the *denotatum* of 'the President of the United States' is George Bush, rather than John Kerry or myself, also depends on extrasemantic facts having to do with the results of the latest presidential election. For this reason, the aim of a semantic theory is that of presenting *relativized* assignments of semantic features. For instance, what our theory may conclude is that 'George Bush is a liberal' is true with respect to all and only those parameters that provide a positive reply to the query about Bush's leftist tendencies, and that 'the President of the United States' denotes Bush with respect to all and only those parameters with respect to which Bush won the presidential elections. According to a customary approach, parameters of this type may be understood as possible worlds. In a more complex framework, the *relata* appropriate for semantic evaluation may include, together with possible worlds, a temporal parameter: for instance, 'the President of the United States' may denote Bush with respect to a given possible world and a certain time, but Bill Clinton with respect to that world and another time span.

Let me refer to the semantic features for the aforementioned expressions as their semantic value: so, the semantic value of a sentence (with respect to a possible world and/or a time) is its truth value (with respect to that world and that time); the semantic value of a definite description (with respect to a possible world and/or a time) is its *denotatum* (with respect to that world and that time); and so on. In general, and leaving momentarily aside a few interesting complications, an expression is rigid with respect to a parameter k if it has the same semantic value across all

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*k*s. For instance, an eternally true sentence is temporally rigid: its truth value is constant across all times. Since in what follows I leave temporal considerations out of the picture, I employ the expression 'rigid' *tout court* as alluding to constancy of semantic value across possible worlds.

Names and Rigidity

Two kinds of singular designators, namely names and definite descriptions, have been singled out as paradigmatic of the rigid/nonrigid divide. As I hinted, typical definite descriptions such as 'the President of the United States' are nonrigidly associated with distinct *denotata* with respect to different possible worlds. But proper names such as 'George Bush' apparently rigidly persist in referring to Bush with respect to all possible worlds (or, at least, all possible worlds in which Bush exists; more on this *caveat* later). For instance, if you are interested in evaluating 'George Bush is wise' with respect to a counterfactual scenario as dramatically different from the actual world as you may like, what you need to consider is whether, given the collection of individuals that are wise in that scenario, Bush is one of them (see Kripke, 1980).

One possible source of confusion must be cleared from the outset: what is at issue is not the question of who happens to be called 'George Bush' in the scenarios under consideration: that in some merely possible world certain expressions may be endowed with a different meaning, and certain names may be used to refer to alternative individuals is of no relevance for our purpose. Similarly irrelevant is the possibility that, in our actual employment of 'George Bush', different individuals may be referred to by that name type.

Types of Rigidity

I wrote that typical definite descriptions behave nonrigidly. This does not entail that there may not be rigid definite descriptions. For instance, 'the positive square root of four' denotes the number two with respect to any possible world and is thus a rigid designator. It seems clear that this expression's rigidity derives not directly from its semantic behavior, but from the modal perseverance of the mathematical world. The description 'the positive square root of four' interacts with the parameter with respect to which it is evaluated as any other description would: a certain condition is being put forth, in this case that of being the positive square root of four, and an individual is selected on the basis of its ability to satisfy that condition. The description is, in a sense, semantically available for a nonrigid profile. Its rigidity is a result not of its semantic behavior, but of the response that alternative possible worlds provide: one and the same item, the number two, is inevitably being offered as the description's *denotatum*.

Saul Kripke refers to descriptions such as 'the positive square root of four' as rigid only *de facto*. Expressions such as proper names, namely expressions whose semantic profile presumably guarantees their rigidity, are classified as rigid *de jure* (Kripke, 1980). Note that in this understanding of the *de facto*/*de jure* distinction, not all rigid descriptions are rigid merely *de facto*. For instance, the description 'the actual President of the United States' rigidly refers to a certain individual by virtue of its semantic behavior, in particular by virtue of the meaning of the indexical expression 'actual' (see Kaplan, 1977; Lewis, 1970).

Thus far, I rested satisfied with the notion that a rigid expression has a constant semantic value across possible worlds, and, in particular, that a rigid designator designates the same individual with respect to any possible world in which that object exists (Kripke, 1980; see also Kaplan, 1977). When it comes to the decision about an expression's semantic value with respect to possible worlds in which that object fails to exist, two options may be entertained. In the terminology from Salmon (1981), a designator is **persistently** rigid iff it designates its *designatum x* with respect to any world in which *x* exists and designates nothing with respect to any world in which *x* does not exist. On the other hand, a designator is **obstinately** rigid iff it designates *x* with respect to every possible world, regardless of whether *x* does or does not exist in it.

Rigidity has played an important role in one of the central semantic debates during the seventies and eighties, having to do with descriptivist views of customary proper names, such as, presumably, Frege's and Russell's. If proper names are rigid but typical descriptions are not, so the story goes, proper names may not behave in the manner descriptivists envisage. (For a critical discussion of a descriptivist reply, to the effect that proper names are associated with rigid descriptions, see Salmon, 1981; Soames, 1998.) Other important themes linked to the notion of rigidity have to do with the hypothesis that natural kind terms, such as *tiger* or *gold*, also behave rigidly (see Kripke, 1980; for a detailed discussion of the difficulties in extending the classic definition of rigidity to kind terms, see Soames, 2002). Finally, the idea of rigidity and the distinct but related notion of direct reference occupy center stage in the semantic analysis of indexical expressions. (On the relationships between rigidity and direct reference, see Marti, 2003.) For instance, an indexical singular term such as *I* rigidly refers (with respect to a given context *c*) to

the agent of *c*, that is, at least in typical instances, to the person who is speaking. The notion that indexicals such as *I* behave rigidly, even though they are associated with a descriptive meaning, plays a crucial role in the classic arguments for the distinction between meaning and content or, in David Kaplan's classic vocabulary, between *character* and *content* (see Kaplan, 1977; Lewis, 1980).

See also: Descriptions, Definite and Indefinite: Philosophical Aspects; Indexicality: Theory; Modal Logic; Possible Worlds: Philosophical Theories.

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Ritual and Religious Language

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Definition and Varieties

The concept of ritual language presupposes a concept of ritual, a category beset by numerous definitional problems. At times it appears that the category of ritual has become a holding-area for all those forms of behavior to which we cannot attribute any utilitarian value. This has led both to confusion over the definition of ritual, and to a common pejorative evaluation of ritual as meaningless, as illustrated by the modern history of the theorization of this category. There is a line of influence that extends from Reformation polemics against traditional Catholic liturgical practices to 19th- and early 20th-century anthropologies characterizing magic as a survival from primitive culture (Tylor, 1903), as well as a mistaken theory and praxis outmoded by science (Frazer, 1951). Later sociological interpretations recovered a positive value for rituals by emphasizing the role that these play in constructing, reinforcing, and contesting the dynamics of social groups (Durkheim, 1965; Gluckman, 1954; Turner, 1977; Bourdieu, 1977; Lincoln, 1994). Due to their emphasis on social dynamics, and despite their frequent application of structuralist analysis to ritual processes, such interpretations have generally paid little attention to the specific forms of ritual language. However, other scholars have emphasized the performative or pragmatic dimensions of ritual (Tambiah, 1985), and occasionally conducted sophisticated semiotic analyses of ritual language (Sebeok, 1964; Silverstein and Urban, 1996). Taking all of these approaches into account produces a more coherent theory of ritual language.

There exist numerous terms for different types of ritual language. Each culture of course has its own terms. Common English terms are 'spell,' 'charm,' 'incantation,' 'chant,' 'prayer,' and 'glossolalia.' More recent, theoretical terms include 'performative utterance' (Austin, 1975), 'speech act' (Searle, 1969), and 'indexical icon' (Silverstein, 1993, 1998; Silverstein and Urban, 1996). Although by no means exhaustive, this list is representative, and it indicates some of the important variations among types of ritual language. Spells and chants are often formulaic and invariant, whereas glossolalia and certain forms of prayer are, at least ostensibly, spontaneous and improvised. Some forms of ritual language aim to achieve obviously practical objectives, whereas others, including some forms of prayer, do not. Historically, these very distinctions have informed some attempts to distinguish 'good' rituals from 'bad' or superstitious ones. During the Reformation, for example, Puritans objected to repeated and formulaic prayers, as well as to any form of magic. Perhaps the most common concept of ritual language, however, is a verbal formula of magical or at least pragmatic

the agent of *c*, that is, at least in typical instances, to the person who is speaking. The notion that indexicals such as *I* behave rigidly, even though they are associated with a descriptive meaning, plays a crucial role in the classic arguments for the distinction between meaning and content or, in David Kaplan's classic vocabulary, between *character* and *content* (see Kaplan, 1977; Lewis, 1980).

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effect. Therefore, the problem of how to understand claims for the efficacy of ritual, including its ability to bring about real-world objectives through the manipulation of words and other objects, looms large in any discussion of ritual language. This problem is underscored by the still prevalent pejorative designation of ritual, especially magic, as 'mumbo jumbo' or 'hocus pocus.'

Following Redfield (1956), a distinction can be made between the ritual languages of 'great' or civilizational and 'little' or folk traditions. (This parallels a similar distinction between 'official' and 'folk' traditions, except that official traditions are not always 'great' or civilizational.) Of course, both types can coexist within a single society. The distinction between these types of ritual language can have important consequences in defining social groups. (See 'Sociological Dimensions of Ritual Language' below.) There are broader resemblances among the ritual languages of some of the great traditions that distinguish them from those of most folk traditions. The verbal formulas or mantras of the Sanskritic tradition of Hindu Tantra in South Asia bear more resemblance to the spells of the Greek Magical Papyri, or to Kabbalistic formulas, than they do to Bengali folk mantras, despite greater geographical and cultural proximity to the latter. The main distinction from folk spells consists in the development of a more elaborate code, represented by increasingly intricate linguistic patterns, as exemplified by the extended palindromes of some Greek and Sanskrit spells. Such devices, which are difficult or impossible to recognize in an oral tradition, may reflect in part an increased reliance on writing, as well as the presence of esoteric traditions necessary for the elaboration of a code, although this last feature is of course also present in many oral traditions.

The distinction between oral cultures and cultures in which writing or printing has become dominant as a mode of communication is of great importance for ritual language. There is some evidence that the critique and decline of certain forms of ritual language may be associated with writing. The importance of poetic formulas as mnemonic devices and aids to performance in oral cultures has been recognized in recent decades (Lord, 1960). It has been argued further that writing not only replaces poetry as a technique of cultural transmission, but may even lead to a new, skeptical episteme critical of the irrationality of poetry (Havelock, 1963; Goody, 1977). The connection between poetry and ritual or magical language is sometimes reinforced in these critiques, making these issues relevant to an account of ritual language. (See 'Historical Dimensions of Ritual Language' below.)

Nonritual Religious Language

Although the focus of this article is primarily on ritual language, other types of religious language are properly described here in relation to ritual language. In religion as in every other domain of human culture, language plays a central role as the most important means of communication, a fact recognized in many religious traditions. Some well-known examples are the creation of the world through the power of God's speech in the Hebrew Book of Genesis, the identification of Jesus as the Word of God in the Christian Gospel of John, and the various cosmogonies developed in Hinduism from Vedic times onward in which speech is the agent or instrument of creation (Padoux, 1990). Many religious traditions acknowledge the power of the word by the formation of canons (Smith, 1982), especially of the written variety called scripture. Although canon and codification are broader phenomena that have also been associated with modernity and colonialism, the specifically religious conflict between the Peoples of the Book and the idolaters had special significance for the historical development of ritual languages. (See 'Historical Dimensions of Ritual Language' below.)

Myth is another subcategory of religious language that has received much attention from linguists and anthropologists, especially following Lévi-Strauss's application of structuralist linguistic theories to myth. The fact that myths are a form of language, whereas ritual comprises a range of behaviors not limited to the verbal, may explain why structuralist analyses of ritual came later than those of myth. The identification of myth and ritual as fundamental categories of religion has precipitated a number of theories concerning the relation between these categories. The so-called myth and ritual school developed the idea that myth derives from and attempts to explain a preexisting ritual complex. On the other hand, Eliade (1954) argued that myth describes the actions of the gods or ancestors at the beginning of time, and that ritual refers to myth as the archetype for human actions in the present. As illuminating as these interpretations occasionally are, it is important to note that many rituals are largely independent from myth, and *vice versa*.

Structure and Function of Ritual Language

For purposes of analysis, it is useful to separate the structural or formal aspects of ritual language from their functional aspects or pragmatic effects, although the goal is to arrive at a better understanding of the

contribution of form to function. The formal differences of ritual from ordinary language were described in great detail by Malinowski in his study of Kiriwinian (Trobriand Islands) spells (Malinowski, 1935). These spells exhibited a "coefficient of weirdness" that came from their use of archaisms and apparently meaningless forms, onomatopoeias, repetitive and rhythmic chanting, extensive metaphors, and allusions to myth. Malinowski argued that many magic words were 'meaningless,' but also that the various stylistic features of spells somehow supported the "creative metaphor of magic," or the belief that ritual is able to bring about its intended result. Working in part from the same data, Tambiah (1985) argued for the persuasive or performative function of a number of these stylistic features. However, his model emphasized the semantic figures, especially the metaphors and metonyms, of ritual language, rather than its rhythmic form. It is this latter feature that raises what might be called the 'abracadabra problem': how do we explain the prevalence in ritual language of so many apparently nonsensical, repetitive sounds, as evidenced not only in numerous ritual traditions (e.g., the Ephesian Words beginning *aski kataski*. . . found in many Greek spells, and the Hindu Tantric seed (*bīja*) mantras such as *hrīm klīm śrīm*), but also in pejorative terms such as 'mumbo jumbo'? The dismissal of such forms as meaningless (e.g., by Staal, 1996) does not account for their frequency of occurrence in ritual language. For any particular term such as 'abracadabra' or 'hocus pocus,' one may be able to provide a probable etymon of which the magical word is a corruption. However, this does not explain how, as actually used in ritual discourse, such magic words function.

One possible explanation for such stylistic features is that they serve primarily to differentiate ritual from ordinary language. This hypothesis accords with one of the fundamental insights of linguistic structuralism: namely, that any distinction in the value of a linguistic sign depends upon an associated distinction in its form. The principle of binary opposition discovered by Saussure may also serve at the level of genres to distinguish ordinary language, on the one hand, from poetry, literature, or ritual discourse, on the other. Indeed, the thesis that poetry represents simply a deviation from ordinary language has been articulated within structuralist poetics. This thesis is paralleled within ritual studies by Bell's emphasis on techniques or strategies of ritualization that serve to differentiate ritual from ordinary discourse or behavior (Bell, 1992). These theories may account for the fact that many forms of ritual language are incomprehensible to their hearers and even, on occasion, their speakers. In such cases, it is not any semantic content, but rather the formal differences of the ritual medium that constitute its message. The preservation of the mass in Latin long after that language had ceased to be a vernacular, and the dissemination of Sanskrit mantras in transliterated rather than translated form as far as Japan, reflect a more basic strategy to distinguish ritual from the mundane or profane, as well as to conserve the prestige of origins, and to create mystery.

An objection to such theories is that they fail to explain the prevalence of poetic repetition and other particular devices, including metaphor and metonymy, in the ritual languages of different cultures. If ritual were only a matter of constructing difference, then any deviation from ordinary language would do, and we should expect randomness in the variety and distribution of stylistic features in ritual language. What we often find instead is an extreme form of the poetic function as defined by Jakobson (1960): a projection of equivalence into the sequence of language, manifested as versification, rhyme, semantic repetition, etc. These devices are especially prevalent in magic. What explains this phenomenon?

Silverstein has shown that ritual performance often constitutes an indexical icon, in which forms of repetition or resemblance in the text of a ritual increasingly point to their context. This is similar to the mechanism of (nonverbal) sympathetic magic, which, as theorists from Tylor and Frazer onward have noted, interprets a relation of similarity (metaphor, icon) or contiguity (metonym, index) between the ritual and its intended result as a causal (indexical) relation (cf. Leach, 1976). Just as repeatedly poking a pin into the left arm of a voodoo doll is supposed to bring about a corresponding injury in one's intended victim, or pouring water on the ground is supposed to bring rain from the sky, the poetic imitation in ritual language is supposed to point beyond itself to bring about a real-world result. In the case of many folk charms, the accumulation of rhythmic sound appears to be the mechanism by which ritual language increasingly signals its intended result. An example is "Rain, rain, go away/Come again some other day." Resemblances (icons) on the phonetic level of the text of the ritual reinforce the ritual as a signal (index) of a goal in its context: in this case, the cessation of rain (cf. Sebeok, 1964).

As compared with such folk charms, the mechanism of Hindu Tantric mantras is more complex. Mantras often are made effective (*siddha*) by being converted into palindromic diagrams of several processes of creation, including the cosmogony conceived as a cycle of evolution and involution, and sexual reproduction (Yelle, 2003). Ritual performance of the mantra both imitates and instantiates the creative power of speech as the source of the cosmos. Syllables of special power

called seeds (*bīja*) surround the central portion of the mantra, which often declares its real-world goal, such as subjugating an enemy. By verbally tracing the sequence of creation, the mantra leads up to and indexes this real-world goal, symbolically bringing it into existence.

Such examples suggest that at least some types of ritual language do not operate by reinforcing a difference between ritual and ordinary language, but rather by attempting to overcome any difference or gap between ritual language and its context of use. Ritual tries to construct a language that is directly connected to, and even capable of influencing, reality. This hypothesis appears to account for two additional devices found in ritual language. Many spells enumerate an entire paradigm class, which may be a set of objects such as body parts (cf. Tambiah, 1985), but also a set of rhyming words or, in the case of Tantric mantras and Greek spells, all or a portion of the sound system or alphabet. Such extreme forms of repetition augment ritual language as an indexical sign of its goal. This pointing function is further illustrated by so-called counting-out spells which, by counting from ten down to zero (or, in the case of some Greek spells, removing all of the letters of the spell one by one), signal the end and accomplishment of the spell.

These examples suggest a different evaluation of the relation between 'emic' (culture-internal) and 'etic' (comparatively cross-cultural) theories of performance or pragmatic function. From an emic perspective, the forms of poetic imitation employed in ritual language appear to construct a language that bears an especially close indexical relation to nature. However, from an etic or outsider's perspective, such devices serve primarily to construct a persuasive illusion of a perfect and effective language.

These considerations require us to reevaluate what is meant by ritual performance. In recent decades, following Austin's definition of a performative utterance and Searle's refinement of this with the notion of a speech act, the theory that ritual is a form of performance has gained broader currency (Tambiah, 1985). Austin's original concept has been applied to many cases, including magic, to which it did not on its own terms claim to extend. This is of course not a reason for automatically dismissing such applications. However, it is a reason for revisiting the concept of a performative, especially as applied to ritual.

Austin recognized that many utterances accomplish something through the simple fact of their being uttered. Statements such as "I christen this ship" or "I thee wed" do not merely **say** something, but **do** something. Linguists would agree that such statements have pragmatic and not merely semantic value. To this extent, Austin's concept of a performative represents a valuable corrective against the semantic bias of much modern philosophy, with its emphasis on propositional content. As we have seen, a similar semantic bias also informs many interpretations of ritual language as meaningless.

However, there are a few problems with Austin's theory. First, his concept of performance or pragmatic function is too restrictive. If the conditions of its use are fulfilled, a performative utterance accomplishes something through the mere act of utterance: mutual promises may themselves constitute a valid legal contract. On the other hand, many rituals, especially of the magical variety, point to some real-world goal, such as the beginning or cessation of rain, something that may or may not occur automatically upon the completion of the ritual. The fiction may be that ritual achieves these goals *ex opere operato*, but the reality is otherwise. The concept of performativity or pragmatic function must be broadened, if applied to such cases, to allow that ritual sometimes performs by constructing a persuasive illusion of efficacy.

A second problem with Austin's theory is that he omitted any account of the contribution of poetry to ritual performance. In his view, performatives, like other ceremonial doings, were purely conventional in form, formulaic. On the contrary, we have already seen that many types of ritual language employ poetry in order to augment if not to bring about the performative or pragmatic function of ritual. Some historical roots of Austin's neglect of the poetry of ritual are examined below.

Sociological Dimensions of Ritual Language

Ritual languages may not be distributed evenly within a society. Like other ritual techniques, they are often the property of particular social groups. Individuals who are not members of these groups may be denied training in the techniques of ritual performance, or access to the cultural code that permits the full comprehension of the ritual, or even the opportunity to observe a ritual performance. Esotericism results whenever there is a deliberate and sufficiently rigorous restriction of access to ritual to an in-group of initiates. Public rituals, of course, may also reinforce divisions within the social order. Proprietary rituals have a role in defining social groups, for example in male and female ritual societies. In some cases, the rituals with the greatest cultural prestige – those of the 'official' tradition(s) – are reserved for male practitioners, and women may develop expertise in other, folk rituals, such as trance, mediumship, possession, and witchcraft, which are understood to exist at a less

important level of the social structure. In Catholicism the performance of the sacraments is reserved for ordained males. In Hindu Tantra, there are numerous prohibitions against the use of the sacred syllable 'om' by women or servants (*śūdras*, the lowest division of the social order), who are instead enjoined to substitute some other syllable. Given the symbolic significance of 'om' as the primordial utterance of the first man, which ushered in creation, these ritual injunctions also encode the idea that women and lower-class individuals should be denied access to sacred, effective speech: they are made (ritually) voiceless.

Sometimes ritual languages may be used not to reinforce the social order, but to contest one's position within, or criticize, or even overthrow that order. Examples are Radcliffe-Brown's joking relationships and Gluckman's rituals of rebellion (Radcliffe-Brown, 1952; Gluckman, 1954). Such rituals are often just a way of blowing off a little steam. Moreover, Bloch (1989) pointed out that the more stereotyped, formalized, and scripted ritual discourse becomes, the more it tends to reinforce conventional authority, by rendering deviation from the script in performance less likely. However, even rigidly scripted rituals may get out of hand. Lincoln's account of the discursive construction of authority allows for just such occasions of corrosive discourse. These accounts raise difficult questions of agency, or of the relation between individuals and social structures. Bourdieu's concept of habitus as the flexible cultural structures that both condition individual responses, and are susceptible to strategic manipulation by individuals, seeks to address this fundamental issue.

Questions of agency and intentionality are also of paramount importance in connection with such rituals as trance, mediumship, and possession, where there is a displacement or denial of the ritual practitioner's agency. Perhaps the most well-known example of ritual language of this sort is glossolalia, in which the Holy Spirit speaks through the practitioner in what is understood to be an unscripted performance. Even these 'spontaneous' forms, however, are learned social behaviors that exhibit phonological constraints reflecting the natural languages of their users (Samarin, 1972; Goodman, 1972).

Relation between Verbal and Other Modes of Ritual

Earlier tendencies to focus on myth, due its linguistic medium and consequent assumed meaningfulness, to the relative neglect of certain nonverbal forms of ritual are now in the first stages of reversal. More attention is now being given to such media as dance. However, these studies have to contend with a basic defect of ethnographic method: the lack of any system of notation of bodily movement that is both accurate and widely used. This parallels the problem of recording and interpreting the special modes of pronunciation or chanting of ritual language. Although tape recordings can capture such forms in the raw, there is still a significant difficulty in the recognition and interpretation of their distinctive features from analytic study of notated transcripts.

Certain stylistic features, such as imitation, appear to transcend the divide between the verbal and nonverbal modes of ritual. Aristotle noted that the modes of imitation (mimesis) are different in different arts: in music, rhythm and harmony would be the modes employed (*Poetics* 1.1), whereas in painting, color and line would presumably be the relevant modes. The concept of mimesis itself has been traced to the ritual dances that formed the basis of Greek tragedy (Koller, 1954), which suggests that the original forms of imitation were not verbal at all, but gestural. The use of imitation in the nonverbal dimensions of ritual was documented already in Frazer's account of sympathetic magic. As previously described, ritual language often uses poetic imitation in a similar way. The Hindu Tantric womb sign (*yonimudrā*), which iconically depicts the embrace of the womb, is a gestural equivalent and substitute for the verbal enveloping of the mantra with magic syllables. Both types of icon diagram basic processes of creation, including sexual intercourse. In such cases, verbal and nonverbal forms of ritual behavior may carry an identical meaning and pragmatic function. The fact that certain semiotic patterns transcend the divide between language and movement reinforces the conclusion that movement shares with language a cultural and cognitive basis.

Ritual frequently coordinates verbal and nonverbal behaviors through superimposition, simultaneity, and sequencing. The entextualization of the ritual performance (cf. Silverstein and Urban, 1996) constructs a diagram or diagrammatic icon in which speech and movement are fused and reciprocally imitative. For example, in Hindu Tantra, the syllables of the mantra may be laid out on the body of a ritual practitioner, or visualized as moving back and forth within the body, as a representation of the processes of creation otherwise verbally diagrammed by the mantra when spoken.

If the same functions may be served alternatively by either verbal or nonverbal modes of ritual, then why should the coordination of these modes be so frequent? One of the characteristics of ritual is that it builds in redundancies that attract attention or otherwise heighten the communicative force of its message. These redundancies may occur not only within but

across semiotic modes. Bloch (1989) has suggested further that the accumulation of "symbols, song, dance, and features of articulation" within ritual discourse is a way of enhancing its formality and consequent reinforcement of traditional authority.

Historical Dimensions of Ritual Language

The historical or diachronic dimensions of ritual language have received less systematic consideration than its structural or synchronic dimensions. This is in part due to the emphasis within modern linguistics on the study of language as a holistic system. Saussure famously drew a distinction between the system of a language (*langue*) and its instantiation in speech events (*parole*). Yet whether modern students of language choose to focus on the former or, especially through real-time discourse analysis, the latter, the end result is the same: historical transformations in linguistic practices and emic theories of language are largely left out of account.

This neglect presents a particular problem for the understanding of ritual language. One important historical development in linguistic practices is a diminution, within certain domains of certain cultures, of the poetic forms and pragmatic functions associated with ritual. We must be careful here to replicate neither the nostalgic associations of pre-modern folk culture with poetry promulgated by some Romantics, nor the triumphal evolutionary accounts of the replacement of magic by science advanced by early anthropologists. However, there is a great deal of evidence that, at some point in the past, the nexus of poetry and magic was more prominent than it is now. Grimm's study of poetic parallelisms in early Germanic law affords some examples (Grimm, 1957). Rhythmic formulas such as "unbidden and unbought," or "to have and to hold," were common in early English law as well, where they contributed to the binding force of many vows, oaths, and declarations. What happened to such formulas and the mode of ritual that they represented? One answer is that post-Enlightenment modernity has emphasized literalism, or plain speaking and the semantic content of language, at the expense of both poetry and magic. Poetry has been reduced to a mode of entertainment, and few people believe in what goes for magic these days. The semantic bias has reinforced the view of ritual as meaningless. However, these are only observations, not explanations.

One explanation that attempts to account for the perceived decline in formalized ritual is Tambiah's concept of "ritual involution." The very features that contribute to the performative aspects of ritual, such as increased formalization, over time may lead to a rejection of that ritual as rigid and empty. Certainly both attitudes toward ritual formalization—positive and negative—may be observed. However, Tambiah's concept provides no diagnosis of the conditions that would result in one attitude rather than the other, diametrically opposed attitude being adopted. Moreover, he has framed ritual involution largely as a subjective rather than as an historical process, despite the fact that the pejorative evaluation of ritual as stereotyped and meaningless is especially prominent in modernity, and must therefore be given an historical explanation.

Another explanation, mentioned at the outset of this article, builds from recent studies on the effects of the transition from an oral culture to one based on writing (Havelock, 1963; Goody, 1977). According to what we may call the literacy hypothesis, poetry was necessary in oral culture as a mnemonic device. Writing not only replaced this function of poetry, but introduced an emphasis on literal meaning and a skepticism regarding certain modes of rhetoric. However, such theories do not fully explain why the obsolescence of poetry as a mnemonic technique should have led to such pejorative evaluations. Nor do they account for the fact that, in the prime example addressed by the literacy hypothesis, that of ancient Greece, the focus of such criticisms was on the persuasive rather than the mnemonic function of poetry. The persuasive or rhetorical function of poetry established its association with magic for both the sophists and their opponents, the philosophers (see Gorgias, *Helen*; Plato, *Republic*, Book 10). As we saw, it is this crucial nexus of poetic form and persuasive function that characterizes many rituals.

Apart from ancient Athens, another important moment in the development of ritual language occurred during the Reformation. The Protestant emphasis on the literal interpretation of a canon of scripture, and on translation into the vernacular, led to the demise of certain older liturgical forms. This represented not merely a modern rationalization of religion, but also a recrudescence of certain ancient Jewish and Christian religious ideas, including especially the prohibition against idolatry. Christ prohibited the use of "vain repetitions" in prayer (Matt. 6:7, Authorized Version [1611]). Some Puritans associated this prohibited practice with the worship of idols, especially for magical purposes, and with attempts to persuade the deity rhetorically (e.g., Calvin's *Institutes*; Matthew Henry's *Commentary*). They applied this prohibition against repetitive or formalized prayers employed by Catholics and also by the established Church of England. Thomas Cranmer, the author of the *Book of common prayer* (1549), explained in his

introduction to that work that he sought to eliminate many superstitious rituals, including "vain repetitions," from the liturgy. Although he did not go as far as some Puritans would have liked, one consequence of his effort was that more poetic versions of the marriage oath disappeared. For example, the wife's promise "to be bonour and buxom at bed and at board" was replaced by the now familiar "to love, cherish, and to obey." The sole remaining rhythmic (as opposed to semantic) parallelism was the declaration "to have and to hold," an old formula of ownership attested in both English and German law. Although the critique of "vain repetitions" had not been applied directly against such rhythmic formulas in the marriage vow, it contributed to a literalism that ultimately caused the demise of these formulas, as well as of Latin as a ritual language. The irony is that Austin's own prime example of a performative—the declaration "I do" (sic) during the marriage ceremony—unwittingly continued this repression of the poetry of ritual, by failing to acknowledge the historical context and development of the marriage oath.

As in ancient Greece, the literacy hypothesis appears to account for some of these developments. It has been suggested that the poetic devices of early English law served a mnemonic function in an oral culture. The Reformation, leading to the *Book of common prayer*, reflected not the discovery of alphabetic writing as in ancient Greece, but instead a culture of printing based on the technological innovation of movable type in 15th-century Europe. The result in each case was similar: an increase in literacy, and in literalism. However, in each case these developments were facilitated not only by writing, but also by polemics against the nexus of poetic form and persuasive function constituted in ritual.

It is important to recognize that religion stands on both sides of this debate over ritual language, both as the matrix for traditional rituals and as the source of certain criticisms of these rituals as idolatry. A survey of the development of linguistic empiricism in Britain reinforces this conclusion. Following Francis Bacon's (1561–1626) attack on "idols of the marketplace," John Locke (1632–1704) excoriated the habit of "taking words for things," or inferring from the existence of a name to the existence of the thing named. Jeremy Bentham's (1748–1832) critique of such "fictions" drew explicitly on religious prohibitions against idolatry. Among the fictions he sought to proscribe were ritualized oaths used in the courtroom. As late as the second half of the 19th century, Friedrich Max Müller's (1823–1900) theory of myth as a "disease of language" still reflected such criticisms of verbal idolatry. Nor were these developments confined to England. In colonial India, the gospel verse against "vain repetitions" was used to proscribe the repeated chanting of mantras. These polemics influenced the religious literalism of such Hindu Reformers as Rammohun Roy (1772?–1833) and Dayananda Sarasvati (1824–1883), who championed the canon of the Vedas against such forms of idolatrous ritual.

In conclusion, a brief historical survey of certain developments regarding ritual language underscores the need to consult both historical and anthropological data when proposing a theory of ritual language. As linguists, we must be concerned not only with the elaboration of a neutral science of the laws of language, but also with the legislations of language made by particular cultures at particular times, that determine which among the possible forms and functions of language will be permitted or prohibited.

See also: Glossolalia; Literacy Practices in Sociocultural Perspective; Performance in Culture; Religion and Literacy; Ritual and Religious Language.

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Ritwan *See:* Algonquian and Ritwan Languages.

Robins, Robert Henry (1921–2000)

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Robert Henry Robins, known as Bobby to his friends and colleagues, is best remembered for his *A short history of linguistics*, which was originally published in 1967 and entered its 4th and final edition in 1997. Robins was a great advocate for the study and teaching of the history of linguistics, and while he contributed to research in a number of areas of linguistics, it was the study of the history of the discipline that formed the backbone to his life's work. His 1951 book *Ancient and medieval grammatical theory in Europe with particular reference to modern linguistic doctrine* grew out of a series of lectures he was persuaded to give by J. R. Firth at Birkbeck College, London, in 1950. Later historiographical work extended to studies of the London School, of which he was himself a part, the 16th-century grammarian of English William Bullokar, the 18th-century philosopher of language, Étienne Bonnot de Condillac, the 18th-century orientalist Sir William Jones, and the 19th-century Neogrammarians, as well as to reflections on the nature of the subject itself. In his last book (Robins, 1993) he returned to the classical interests with which he started.

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See also: Bullokar, William (c. 1531–1609); Condillac, Etienne Bonnot de (1714–1780); Firth and the London School; Firth, John Rupert (1890–1960); Jones, William, Sir (1746–1794); Modern Linguistics: 1800 to the Present Day; Neogrammarians; Western Linguistic Thought Before 1800.

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Role and Reference Grammar

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Role and Reference Grammar (RRG) (Van Valin, 1993a, 2005; Van Valin and LaPolla, 1997) grew out of an attempt to answer two basic questions: (i) what would linguistic theory look like if it were based on the analysis of languages with diverse structures such as Lakhota (Lakota), Tagalog, and Dyirbal, rather than on the analysis of English?, and (ii) how can the interaction of syntax, semantics and pragmatics in different grammatical systems best be captured and explained? RRG takes language to be a system of communicative social action, and accordingly, analyzing the communicative functions of grammatical structures plays a vital role in grammatical description and theory from this perspective. It is a monostratal theory, positing only one level of syntactic representation, the actual form of the sentence. The overall organization of the theory is given in **Figure 1**.

Central Concepts of the Theory

Clause Structure

RRG rejects the standard formats for representing clause structure (grammatical relations, X-bar syntax), because they are not universal and hence necessarily impose aspects of structure on at least some languages where it is not appropriate. The RRG conception of clause structure, the layered structure of the clause (LSC), is made up of the nucleus, which contains the predicate(s), the core, which contains the nucleus plus the arguments of the predicate(s), and the clause. Syntactic arguments occurring in the core are referred to as core arguments, and they may be direct or oblique. Direct core arguments are those not marked by an adposition, in languages such as English and German, or those marked by direct cases (nominative, accusative, dative or ergative, absolutive, dative) in case-marking languages like Russian or Dyirbal. Oblique core arguments are marked by adpositions or oblique cases, e.g., instrumental and locative. Modifying each level of

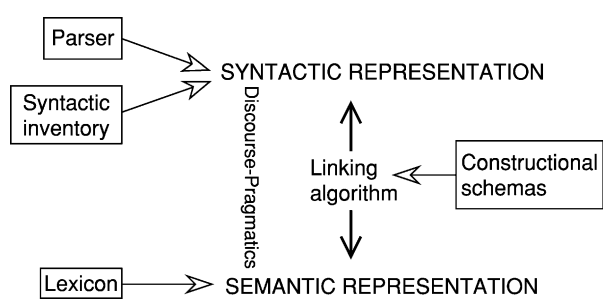

Figure 1 Organization of role and reference grammar.

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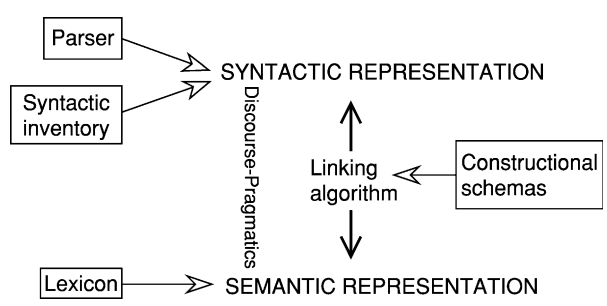

Figure 1 Organization of role and reference grammar.

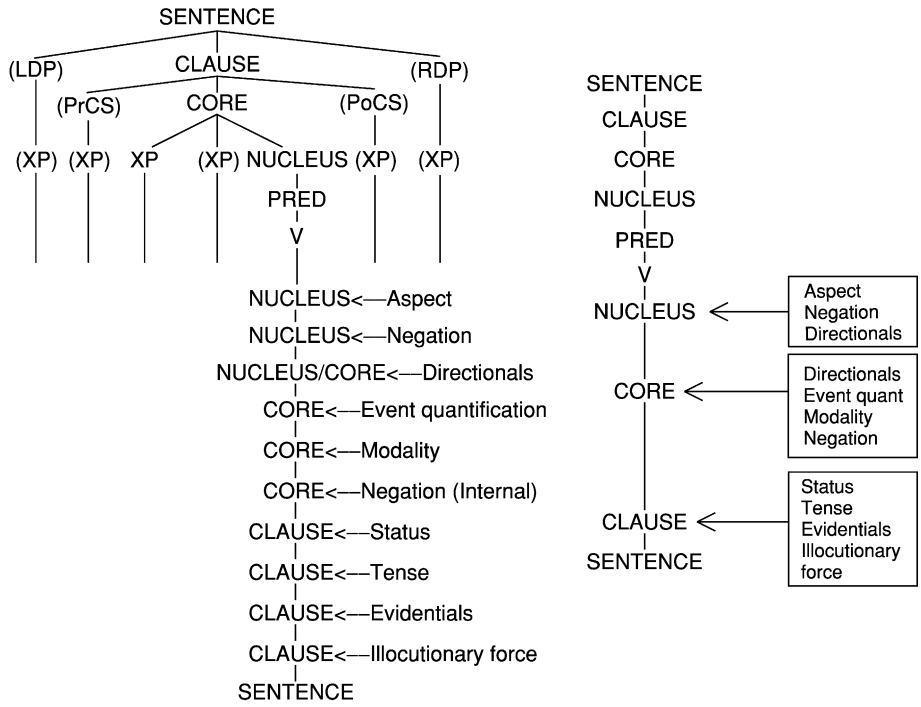

Figure 2 The layered structure of the clause.

the clause is a periphery, which contains adjunct modifiers, both phrasal (PPs or clauses, modifying the core and clause) and nonphrasal (adverbs, modifying all three layers). These aspects of the LSC are universal.

Some language have a precore slot (PrCS), which is the position of WH-words in languages such as English and Icelandic, and a left-detached position, (LDP), which is the position of the preclausal element in a left-dislocation construction. In addition, some verb-final languages have a postcore slot (PoCS) (e.g., Japanese; Shimojo, 1995), and some languages also have a right-detached position (RDP), which is the position of the postclausal element in a right-dislocation construction. Each of the major layers (nucleus, core, clause) is modified by one or more operators, which include grammatical categories such as tense, aspect, modality, and evidentiality. The LSC applies equally to fixed word-order and free word-order languages, to head-marking and dependent-marking languages, to languages with and without grammatical relations. It is assumed that noun phrases and adpositional phrases have a comparable layered structure; operators in the NP include determiners, quantifiers and adjectival and nominal modifiers. In the formal representation of the LSC, operators are represented in a distinct projection of the clause from the predicates and arguments (the constituent projection). This is presented in Figures 2–5. In Figure 2, the peripheries have been omitted from this diagram for the

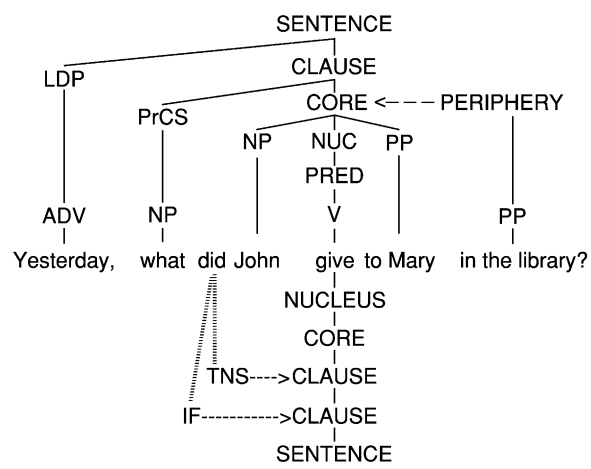

Figure 3 The LSC in English.

sake of simplicity. In Figure 3, *did* is labeled both tense and IF in the operator projection, because the position of the tense operator signals illocutionary force in English: core-medial tense signals declarative IF, core-initial (precore) tense signals interrogative IF, and the absence of tense in a matrix core signals imperative IF.

The operator projections of the clause have been omitted in Dyirbal (Dixon, 1972) and Lakhota examples. The Dyirbal and English sentences in Figure 4 are translations of each other. The lines connecting the determiners to the head nouns are the operator projection within the NP, analogous to the operator

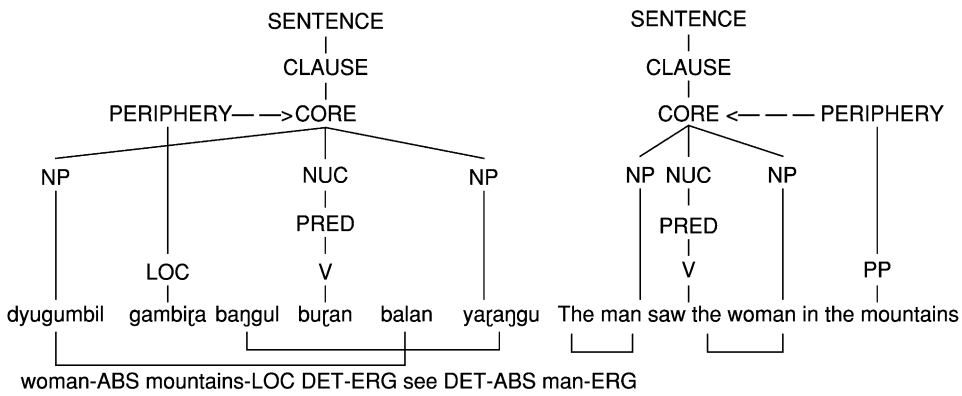

Figure 4 The LSC in Dyirbal and English.

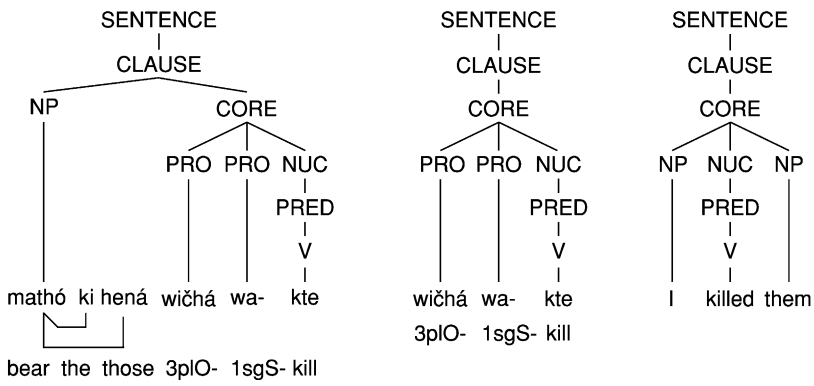

Figure 5 The LSC in Lakhota (head-marking) and English (dependent-marking).

projection within the clause, as in Figures 2–3. In head-marking languages such as Lakhota, the bound pronominals on the verb are considered to be the core arguments; overt NPs are within the clause in apposition to them. Note that despite the differences between the three languages in Figures 4–5, comparable structural relations, e.g., core argument and peripheral adjunct, are represented in the same way. It should be noted that these representations are not abstract, unlike relational networks or functional structures; they are intended to be concrete, in the sense that they should represent the actual form of the sentence, including the linear sequence of its constituent elements and their morphological properties. The representation may be abstract with respect to phonology or morphophonology, e.g., the output could be in terms of abstract morphophonological units rather than concrete phonetic ones.

Representations of constituent projections such as these should be viewed as syntactic templates, the inventory of which in a language constitutes an important component of its grammar. It may be termed the syntactic inventory and complements the lexicon.

The three central components of the LSC also turn out to be the three fundamental building blocks of complex sentences in human language. The unmarked pattern for the construction of complex sentences involves combining nuclei with nuclei, cores with cores, clauses with clauses, or sentences with sentences. These are called levels of juncture in RRG, i.e., nuclear juncture, core juncture, clausal juncture, and sentential juncture. Sentential junctures are complex constructions made up of multiple sentences, while clausal junctures involve sentences containing multiple clauses. Examples of nuclear junctures from French, English, and Mandarin Chinese are given in (1) and the representation of (1a) is in Figure 6. Justifications for these structures can be found in Van Valin (2005).

(1a) Je ferai manger
1sg make.FUT eat
les gâteaux à Jean.
the cakes to John
'I will make John eat the cakes.'
[two nuclei, *faire* and *manger*, in a single core]

(1b) John forced open the door.
[two nuclei, *push* and *open*, in a single core]

(1c) Tā qiāo pò le yī ge fànwǎn
3sg hit break PRFV one CL bowl
'He broke (by hitting) a ricebowl.'
[two nuclei, *qiāo* 'hit' and *pò* 'break', in a single core] (Hansell, 1993)

Core junctures involve two or more cores (which may themselves be internally complex) in a clause.

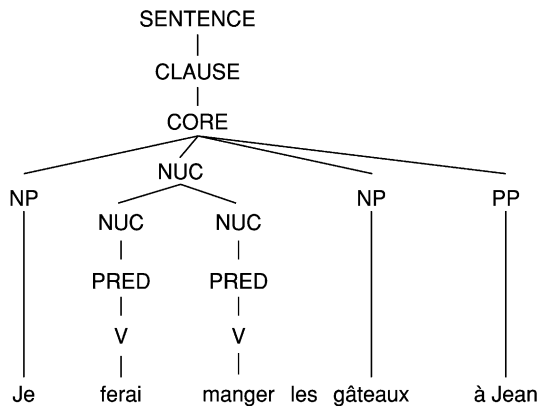

Figure 6 The structure of (1a).

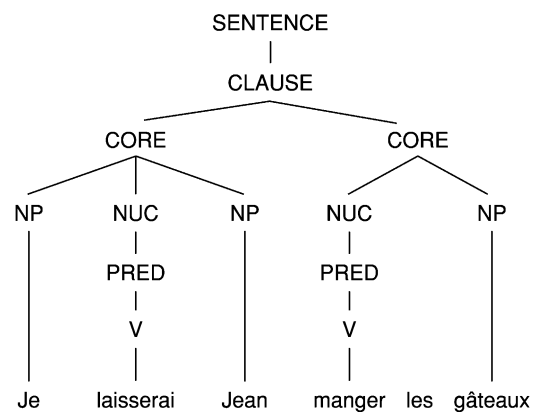

Figure 7 The structure of (2a).

Examples from French, English, and Mandarin are given in (2), and the structure of (2a) is presented in Figure 7. In this type of core juncture, the two cores share a core argument; sharing a core argument is defined formally in terms of the linking algorithm mapping syntactic and semantic representations into each other.

(2a) Je laisserai Jean manger les gâteaux.
1sg let.FUT John eat the cakes
'I will let John eat the cakes.'

(2b) I ordered Fred to force the door open.

(2c) Tā jiāo wǒ xǐe zì
3sg teach 1sg write characters
'She teaches me to write characters.'

Of equal importance in the RRG theory of complex sentences is the set of possible syntactic and semantic relations between the units in a juncture; the semantic relations are discussed in a related article (*see* **Semantics in Role and Reference Grammar**). The syntactic relations between units are called nexus relations in RRG. Traditionally, only two basic nexus relations are recognized, coordination and subordination. Subordination is divided into two subtypes, daughter subordination and peripheral subordination. They are illustrated in Figure 8.

The embedded clause in the first sentence is a daughter of the core node, while in the second the embedded clause is an adjunct in the periphery modifying the core.

In addition to distinguishing two types of subordination, RRG, following Olson's (1981) analysis of clause linkage in Barai (a Papuan language), posits a third nexus type: co-subordination, which is an essentially tight, dependent coordination. The dependence is operator dependence; that is, in co-subordination, the units obligatorily share one or more operators at the level of juncture. In the Mandarin example in (2c), aspect obligatorily has scope over both nuclei,

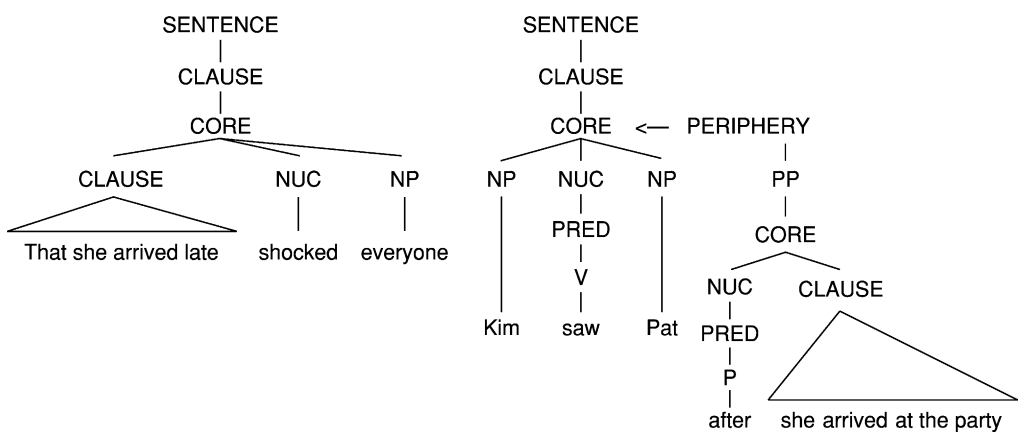

Figure 8 Daughter and peripheral subordination at the core level in English.

and therefore the nexus is co-subordination. This is represented as in Figure 9.

The following examples from Turkish (Watters, 1993) illustrate obligatory operator sharing and the lack of it in Turkish core co-subordination and coordination, respectively. The term 'coordination' here is being used for an abstract linkage relation referring to a relationship of equivalence and operator independence at the level of juncture. It is distinct from conjunction, which is a construction type of the general form X conj Y, which may be one of the formal instantiations of coordinate nexus (Figure 10).

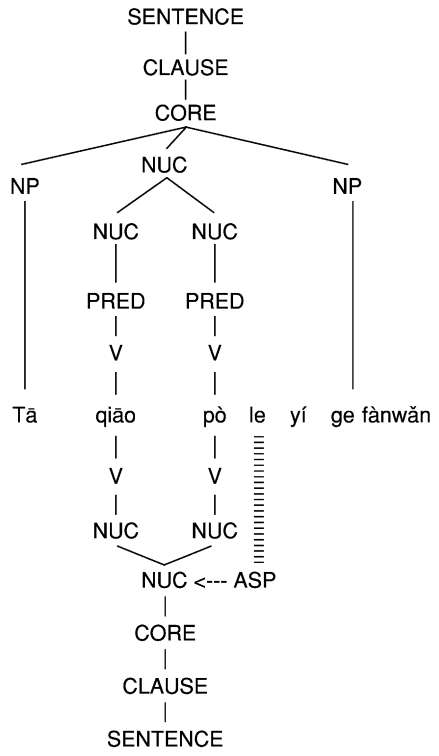

Figure 9 Nuclear co-subordination in Mandarin.

(3a) Core co-subordination
Gid-ip gör-meli-yiz.
go-CMPL see-MODAL-1pl
'We ought to go and see.'

(3b) Core coordination
Müzik dinle-yerek, uyu-yabil-ir-im.
musiclisten-CMPL sleep-MODAL-AOR-1sg
'While listening to music, I can sleep.'

In (3a), the modal operator *-mElI-* 'ought' has scope over both cores, and therefore the nexus is co-subordinate; in (3b), on the other hand, the modal operator *-yAbIl-* 'able' has scope only over the final core, hence coordinate nexus. The following sentences from Kewa (Franklin, 1971) are a minimal triple for the three nexus types at the clause level.

(4a) Coordination
Nipú ípu-la pare
3sg come-3sg PRES but
ní paalá na-pía
1sg afraid NEG-be.1sg PRES
'He is coming, but I am not afraid.'

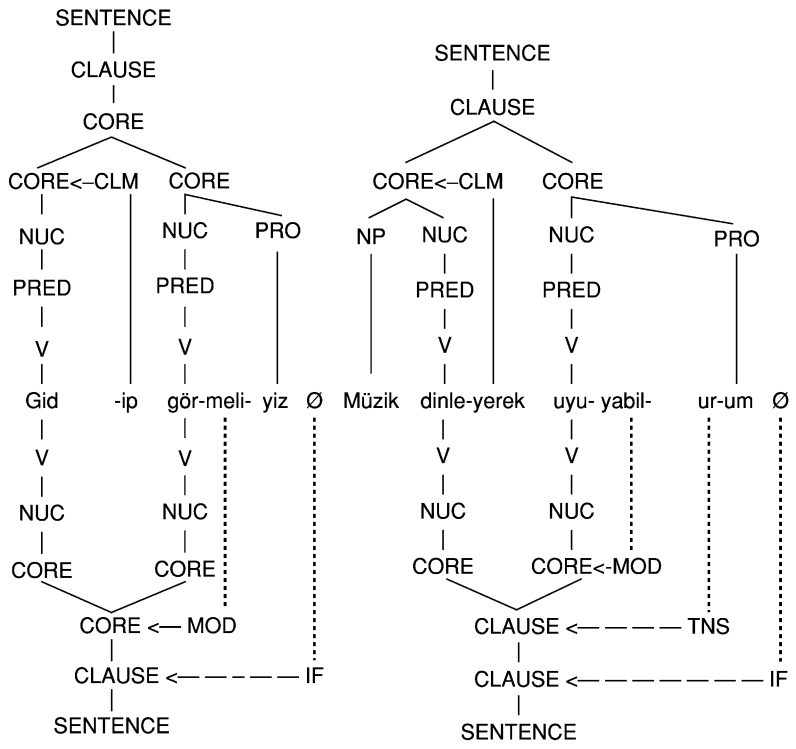

Figure 10 Turkish core junctures.

(4b) Co-subordination
(Ní) Épo lá-ri épa-wa
(1sg) whistle say-SIM.SS come-1sgPAST
'I whistled while I came,' or 'I came whistling.'

(4c) Subordination (peripheral)
(Ní) Épolá-to-pulu
(1sg) whistle say-1sg PRES-CAUSAL
irikai épa-lia
dog come-3sg FUT
'Because I am whistling, the dog will come.'

The four levels of juncture combine with the three nexus types to generate eleven possible complex sentence types; there is no sentential co-subordination, because there are no sentence-level operators, hence no possible operator sharing. In addition, both subtypes of subordination are possible at the clause, core, and nuclear levels. Not all of them are instantiated in every language. English, for example, has all except for nuclear subordination and coordination. The juncture-nexus types found in a language may be realized by more than one formal construction type; for example, both *Mary sat playing the guitar* and *Robin tried to open the door* instantiate core co-subordination, while both *For Sam to leave now would be a mistake* and *Lisa's losing her job shocked everyone* instantiate core subordination in English. The juncture-nexus types may be ordered into a hierarchy in terms of the tightness of the syntactic link between the units. This is given in Figure 11.

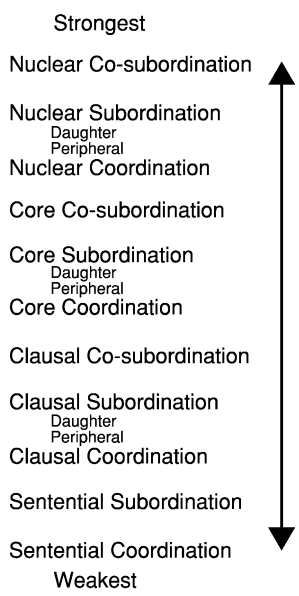

Figure 11 Interclausal syntactic relations hierarchy.

Semantic Structure

see **Semantics in Role and Reference Grammar.**

Focus Structure

The issue of the distribution of information in clauses and sentences was not addressed in early work in RRG, and Lambrecht's (1994) theory of focus structure has been integrated into RRG. Focus structure is the grammatical system that serves to indicate the scope of the assertion in an utterance in contrast to the pragmatic presupposition, and it is vital to the RRG analysis of many grammatical phenomena, e.g., constraints on pronominalization (Van Valin and LaPolla, 1997: Sect. 5.6), the interpretation of quantifier scope (Van Valin and LaPolla, 1997: Sect. 5.5; Van Valin, 2005: Sect. 3.6), the origin of VPs in languages that have them (Van Valin, 2005: Sect. 3.5), and extraction restrictions (Van Valin, 1995, 1998; Van Valin and LaPolla, 1997: Sect. 9.5; Van Valin, 2005: Sect. 7.6). An innovation in RRG is the distinction between the potential focus domain (PFD), i.e., the syntactic domain in the sentence where focus may fall, and the actual focus domain, i.e., the part that is focused in a particular sentence. Languages vary in terms of how the PFD is restricted, both in simple sentences and in complex sentences, and this variation underlies important grammatical

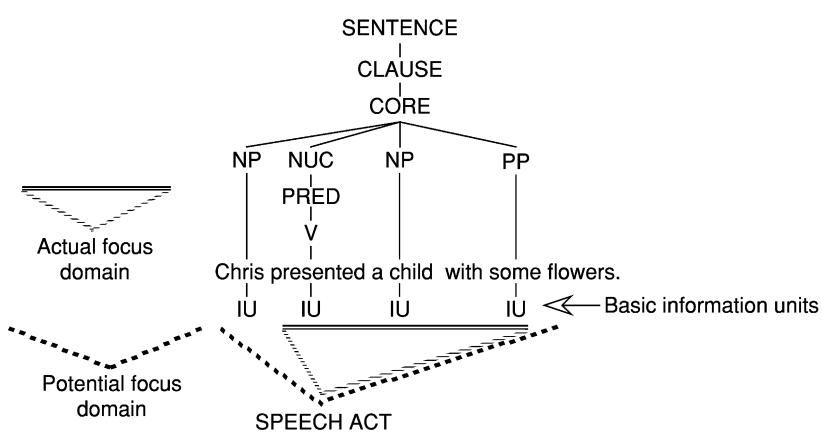

Figure 12 Predicate focus construction in English.

differences across languages (Van Valin and LaPolla 1997: Sect. 5.3, 1997: Sect. 7.6). The focus structure of an utterance is represented in a distinct projection of the clause from the operator and constituent projections; this is exemplified in Figure 12 for a predicate focus construction in English. Predicate focus is Lambrecht's term for the traditional topic-comment structure with a topical subject and a focal predicate; IU stands for basic information unit.

It is possible to represent all three projections in a single representation, as in Figure 13.

Grammatical Relations and Linking

In the earliest work on RRG, it was argued that grammatical relations such as subject and direct object are not universal and cannot be taken as the basis for adequate grammatical theories. In place of these notions, RRG employs the notion of privileged syntactic argument (PSA), which is a construction-specific relation and is defined as a restricted neutralization of semantic roles and pragmatic functions for syntactic purposes. The other arguments in a clause are characterized as direct or oblique core arguments; there is nothing in RRG corresponding to direct or indirect object.

PSAs may be characterized functionally as controllers or pivots. These two functions are exemplified in (5) and (6).

(5a) The tall man$_i$ hit William$_j$ and then ___$_{i/*j}$ ran away.
CONTROLLER PIVOT

(5b) William$_i$ was hit by the tall man$_j$ and then ___$_{i/*j}$ ran away.
CONTROLLER PIVOT

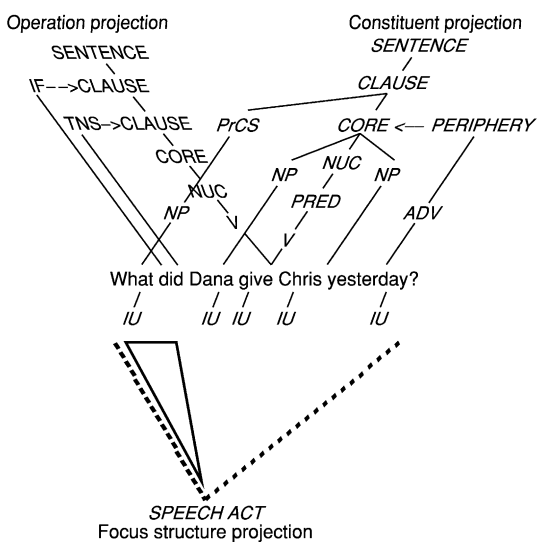

Figure 13 Clause structure with constituent, operator, and focus structure projections.

(6a) Bill persuaded the tall man$_i$ [___$_i$ to visit Sam].
CONTROLLER PIVOT

(6b) The tall man$_i$ was persuaded by Bill [___$_i$ to visit Leslie].
CONTROLLER PIVOT

Pivots are canonically the missing argument in a construction, as in (5) and (6), while controllers prototypically supply the interpretation for a pivot. It should be noted that there can be pivots without controllers, e.g., the extracted element in an extraction construction, and controllers without pivots, e.g., agreement controllers. A further contrast is highlighted in (5) and (6), the contrast between syntactic and semantic pivots and controllers. In the construction in (5), the controller is the first NP in the core, the traditional subject, regardless of its semantic function, whereas in the construction in (6), the controller is the undergoer argument, regardless of its syntactic status. Hence the controller in (5) is a syntactic controller, while the controller in (6) is a semantic controller. The types of pivots and controllers that the constructions of a language have are typologically very significant.

The linking system relating semantic and syntactic representations is summarized in Figure 14. Syntactic functions such as PSA and direct core argument represent the syntactic pole of the system, while logical structures represent the semantic pole. In every language with grammatical relations, there is an accessibility to PSA hierarchy for multiple-argument verbs; it is the Actor-Undergoer hierarchy interpreted from the Actor end, i.e., arg of DO > 1st arg of **do**′ > 1st arg of **pred**′ (x, y) > 2nd arg of **pred**′ (x, y) > arg of **pred**′ (x). In syntactically accusative constructions in languages such as English and German, the highest ranking argument is the default choice for PSA, whereas in syntactically ergative constructions in languages such as Dyirbal, it is lowest ranking argument that is the default choice. That is, in a syntactically accusative construction the unmarked choice for the PSA of a transitive verb is the actor, with the undergoer being a marked choice possible only in a passive construction. On the other hand, in a syntactically ergative construction, the unmarked choice for the PSA of a transitive verb is the undergoer, with the actor being a marked choice possible only in an antipassive construction. With an intransitive verb, the hierarchy is irrelevant, as the single macrorole functions as PSA regardless of whether it is actor or undergoer. It should be noted that in most languages the highest ranking argument is not the default choice for PSA but the only choice; such languages lack voice systems. (See Van Valin and LaPolla, 1997: Sect. 6.5)

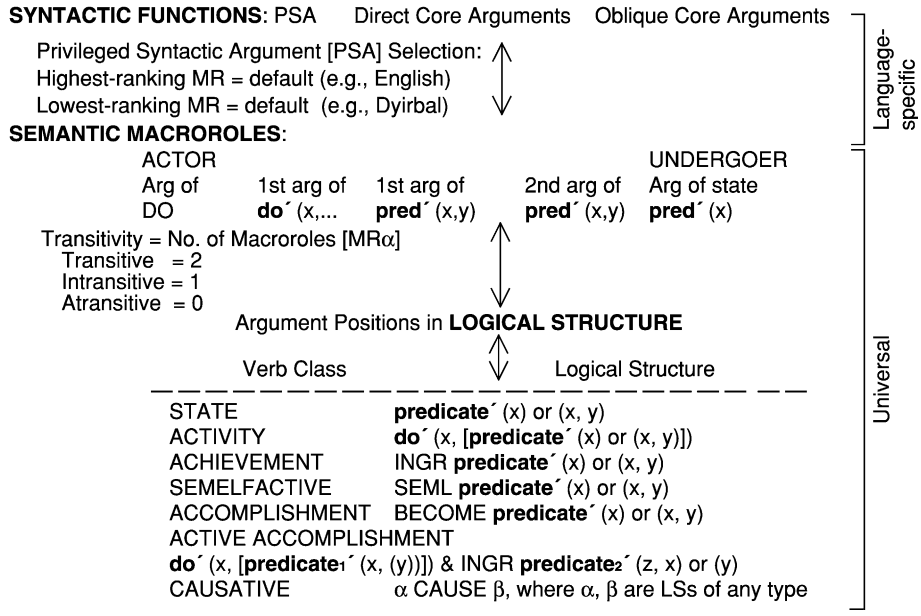

Figure 14 RRG linking system.

An important consideration in PSA selection is whether it is restricted to macrorole arguments or not. In some languages, e.g., German and Dyirbal, only actor and undergoer arguments can function as the PSA of a construction; nonmacrorole direct core arguments can never function in this way. In others, e.g., Icelandic and Georgian, nonmacrorole direct core arguments can be selected to serve as the PSA of a construction. This contrast is seen most clearly in the status of dative NPs: in German they can never be true subjects, while in Icelandic they can.

Logical structures, macroroles and the hierarchy linking them are discussed in **Semantics in Role and Reference Grammar.** This part of the system is universal, in that there is very little cross-linguistic variation; this is the domain of lexical processes, as mentioned in that chapter. Where languages differ substantially is how macroroles and other arguments link into the syntax.

The reason the arrows in Figure 14 are double-headed is that the linking system works both from semantics to syntax and from syntax to semantics. A theory that could describe the linking from semantics to syntax only could be part of a language production system, but it would not be adequate for a comprehension system. In such a system, the parser, as an idealization, would take the input and produce a structured syntactic representation of it, identifying the elements of the layered structure of the clause and the cases, adpositions, and other grammatically relevant elements in the sentence. It is then the grammar's job to map this structure into a semantic representation, as the first step in interpreting it, and this is where the syntax → semantics linking algorithm is required. The details of the linking algorithms are given in Van Valin (2005).

Most of what counts as syntax in many theories, e.g., case assignment, agreement, and WH-movement, is handled in RRG in terms of the syntactic phase of the linking. The analysis of reflexivization in RRG follows the approach in Jackendoff (1992) and states the constraints for core-internal (clause-bound in other theories) reflexivization at the LS level, not with respect to the syntactic representation. RRG treats constructions as an important part of syntax, and they are represented in terms of constructional schemas. Cross-constructional and cross-linguistic generalizations are captured in terms of the general principles and constraints that constitute the linking algorithms, e.g., the Actor–Undergoer Hierarchy, the layered structure of the clause, and the PSA selection hierarchy. Only the idiosyncratic, language-specific features of constructions are represented in constructional schemas, which include syntactic, morphological, semantic and pragmatic (focus structure) information.

The linking in a WH-question in English is illustrated in Figure 15; the subscripts ACV and ACS stand for activated and accessible, and they refer to different cognitive statuses that a referent of the element may have; cf. Lambrecht (1994).

Constraints on WH-question formation and other extraction constructions are explained in terms of the interaction of focus structure and syntax, in particular in terms of restrictions on the potential focus domain (Van Valin, 1995, 1998, 2005).

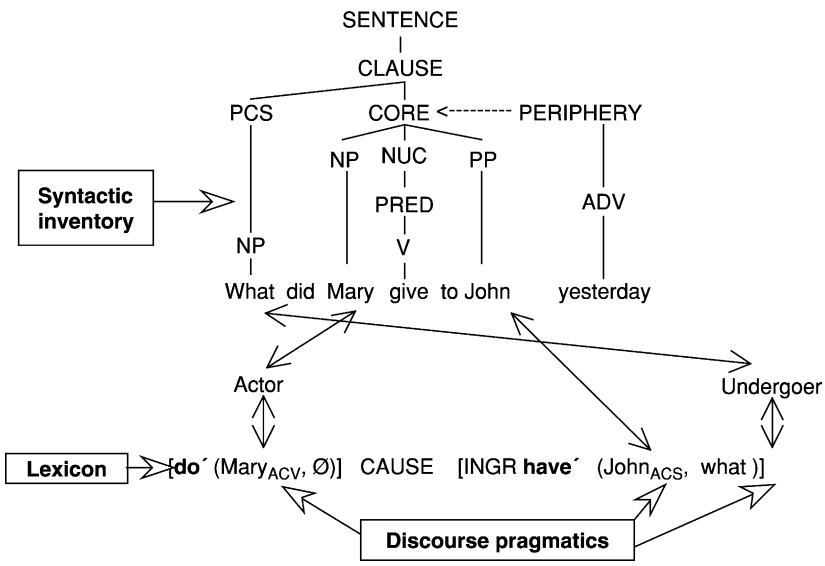

Figure 15 Linking syntax and semantics in a simple sentence in English.

Some Implications of RRG

RRG illustrates one possible answer to the questions stated at the beginning, and it shows that it is possible to have a rigorous, typologically sensitive grammatical theory that takes semantics and pragmatics as central features.

With respect to cognitive issues, RRG adopts the criterion of psychological adequacy formulated in Dik (1991), which states that a theory should be "compatible with the results of psycholinguistic research on the acquisition, processing, production, interpretation and memorization of linguistic expressions" (Dik, 1991: 248). Van Valin (2004) relates RRG to psycholinguistic models of production and comprehension, and Bornkessel *et al*. (2004) provide an explanation for certain experimental results regarding German language processing using RRG. Guest (2003) presents a parser based on RRG that can parse a range of syntactic structures in both English and Dyirbal. Kailuweit *et al*. (2003) and Butler (2004) propose implementations of the RRG semantics-to-syntax linking algorithm for French and English, respectively.

The RRG approach to language acquisition, sketched in Van Valin (1991, 1994) and Van Valin and LaPolla (1997), rejects the position that grammar is radically arbitrary and hence unlearnable, and maintains that it is relatively motivated (in Saussure's sense) semantically and pragmatically. Accordingly, there is sufficient information available to the child in the speech to which it is exposed to enable it to construct a grammar. For example, Braine (1992) shows how a conception of clause structure very much like the layered structure of the clause could be constructed developmentally by the child. Rispoli (1991a, 1991b, 1994) shows how the lexical representations in RRG and the conception of grammatical relations could be learned. Bowerman (1990) provides evidence in favor of the view that rules linking syntactic and semantic representations of the type summarized in Figure 15 are learned, and Weist (1990) shows how the RRG theory of grammatical relations provides an explanation for the pattern of development of grammatical relations in children learning Polish. Weist *et al*. (2004) shows the importance of *Aktionsart* for the understanding of the acquisition of verbs. Van Valin (1994, 1998) puts forward an account of how some of the constraints on linking between syntactic and semantic representations in complex sentences (i.e., subjacency) could be learned. Certain otherwise problematic facts about the acquisition of WH-questions are explained in terms of RRG in Van Valin (1998, 2002). Van Valin (2001) explores the predictions made by the theory of clause linkage and presents evidence from seven languages in support of them.

See also: Clause Structure in Spoken Discourse; Grammatical Relations and Arc-Pair Grammar; Information Structure in Spoken Discourse; Semantics in Role and Reference Grammar; Subordination.

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Relevant Website

http://linguistics.buffalo.edu/research/rrg.html – the RRG web site, which contains dissertations, theses and papers in pdf format for downloading.

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Romaine's research and publications span several areas such as sociolinguistics, language acquisition, bilingualism, and language loss. She has written an introductory textbook in the area of sociolinguistics, *Language in society* (1994), now in its second edition. Her chapter on sexism and language was expanded into the monograph *Communicating gender* (1999).

Romaine has conducted sociolinguistic research in the United Kingdom and in the Pacific region. She did fieldwork in Scotland on the language of working-class children. She has also done research in the area of bilingualism and language loss among the Punjabi speakers in England. Her textbook *Bilingualism* (1989; 2nd edition, 1995) relates much of her findings in these areas along with her work with language groups in Papua New Guinea. She has also written the book *Pidgin and Creole languages* (1988). Recently she has done research on Hawaiian Creole English. A sample of her work in this area can be found in a book she edited with John Rickford entitled *Creole genesis, attitudes and discourse* (1999).

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See also: Bilingualism; Language Acquisition Research Methods; Pidgins and Creoles: Overview.

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Roman *Ars Grammatica*

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The Roman *ars grammatica* comprises Roman grammatical works written between the 3rd and the 6th century A.D. They are all intended as textbooks in the schools or as handbooks for teachers. The majority consists of descriptions of Latin morphology focusing on the word classes ('parts of speech'), but many of the works also include treatments of phonology, metrics, and stylistics. The standard textbooks of the Roman *ars grammatica* (especially Donatus's two grammars from the 4th century A.D.) were to form the basis for grammar teaching and grammar writing in Europe for more than a thousand years.

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The Roman *ars grammatica* comprises Roman grammatical works written between the 3rd and the 6th century A.D. They are all intended as textbooks in the schools or as handbooks for teachers. The majority consists of descriptions of Latin morphology focusing on the word classes ('parts of speech'), but many of the works also include treatments of phonology, metrics, and stylistics. The standard textbooks of the Roman *ars grammatica* (especially Donatus's two grammars from the 4th century A.D.) were to form the basis for grammar teaching and grammar writing in Europe for more than a thousand years.

Background

The term *ars grammatica* means 'the art of grammar' and is a translation of Greek *technê grammatikê* with the same meaning. It is also likely that the Roman *ars grammatica* originated from the Greek genre (*see* **Dionysius Thrax and Hellenistic Language Scholarship**), but owing to the lack of surviving Greek grammatical texts and the dating problems within Greek linguistics, the exact nature of the connection between the two grammatical traditions remains unclear.

Just as in the Greek world, the Roman grammatical textbooks are designed for providing a metalanguage and a method for analyzing those literary texts (mainly metrical texts like the works of Homer and Virgil), which were used as the principal textbooks in the schools. Gradually, however, the textbooks became more linguistic, and literary considerations faded into the background. There are two likely reasons for this development:

1. The increasing divergence between the spoken and written language created a need for teaching a standardized literary language in the schools.
2. The establishment of an organized school system combined with a professionalism among the teachers, who preferred a fixed curriculum.

The works labeled *ars grammatica* cover a wide variety of subjects and approaches to language and are, in comparison with the few reminiscences of Greek school grammars from antiquity, impressive both in quantity and quality. The extant grammatical texts, however, represent but a part of the Roman grammatical literature. We have numerous references in Roman literature to grammarians otherwise unknown to us or to grammars now lost. Furthermore, the names of the authors of many of the extant works are unknown or uncertain (cf. Kaster, 1988). In some cases a grammar is falsely attributed to an otherwise famous person known to have written an *ars grammatica* (e.g., Remmius Palaemon) or to a well-known person (e.g., St Augustine). It was common for the grammarians to copy each other extensively, often without acknowledging their sources.

The Roman Grammarians

The first extant *ars grammatica* is the work in three books by Marius Plotius Sacerdos (3rd century A.D.). The work is badly organized and apparently starts with prepositions and verbs (the manuscript is fragmentary in the beginning). After the parts of speech have been discussed, there is an extensive treatment of the ablative case and a possible seventh case in Latin. The second book is devoted to syllable quantity and phonotactic matters as well as to a classification of stems and words according to their final sounds and syllables. The third book is entirely devoted to metrics.

The African grammarian Flavius Sosipater Charisius (4th century A.D.) wrote an extensive *ars grammatica* in five books, which treats morphology (including an extensive classification of words into inflectional classes), stylistics, and metrics and which also includes a short description of the letters and their pronunciation, a list of synonyms, a list of words with different genders in Greek and Latin, and so forth. A characteristic feature of Charisius's work, and one which is unique in the *ars grammatica* tradition, is that on most controversial points he quotes extensively the views of other authors (many of them otherwise unknown). To some extent, his grammar is a compilation of early Roman grammatical literature.

Diomedes (4th or 5th century A.D.) wrote an *ars grammatica* in three volumes, which in many respects follows the arrangement of Sacerdos, except that the second book contains just a short sketch of phonology and then treats stylistics and poetical matters, including cases of correct and incorrect Latin.

The most influential Roman grammarian of the 4th century was Aelius Donatus, who wrote two grammars: *Ars minor* and *Ars major.* The *Ars minor* only treats the word classes and is written as a dialogue between the teacher who asks and the pupil who answers. The *Ars major* also includes a short phonology and aspects of correct and incorrect Latin. *Ars major* contains 21 chapters (of these topics only 7–15 are covered by the *Ars minor*).

The *ars grammatica* attributed to Marius Victorinus (4th century A.D.) illustrates another type of *ars grammatica*. Victorinus discusses in his preface what grammar should be and stresses the literary aspect of his grammar and its importance for literary studies, but limits his treatment to phonology, orthography, and metrical aspects of the syllable. A similar approach is found in the *ars* attributed to Atilius Fortunatianus (4th century A.D.?), which is mainly a book on metrics, but which in the beginning contains some short chapters on vowels, consonants, and syllables. Victorinus also wrote a short elementary *ars* in the form of questions and answers (a format that apparently started with Dontus's *Ars minor* and which became very popular in late antiquity and the Middle Ages), but which unlike Donatus' *Ars minor,* contains a lot of Greek examples.

Consentius (date uncertain) and Phocas (5th century A.D.) both limited their *artes* to the noun and the verb. Consentius also wrote a separate treatise about grammatical and stylistic errors.

The teaching of grammar beyond the elementary stage usually consisted in the teacher's reading a paragraph from a grammar and then commenting on it. Some teachers published their commentaries, thereby creating a new grammatical genre demonstrating the versatility and originality of Roman linguistics. Most influential were the commentaries on Donatus's *Ars major* by Marius Servius Honoratus (4th century A.D.) and by Pompeius (5th century A.D.). Pompeius represents a semantically oriented approach to grammatical analysis, which already can be found implicit in Servius (on whom Pompeius, to a large extent, based his work) and Phocas, and which became central in Priscian and medieval linguistics.

In contrast to the monolingual Greek grammar, Latin grammar was bilingual, covering both Latin and Greek. Many authors of an *ars grammatica* neglected Greek, however, and had no Greek examples in their texts (e.g., Donatus, Sacerdos) while others (e.g., Charisius, Diomedes, and Priscian) extensively compared their analysis of Latin with Greek and quoted Greek examples. Two authors also wrote contrastive studies. Ambrosius Theodosius Macrobius (ca. 400 A.D.) analyzed differences and similarities between the verb in Latin and Greek, focusing on verb morphology, while Dositheus (4th century A.D.) wrote a bilingual *ars grammatica*.

Priscian (*see* **Priscianus Caesariensis (d. ca. 530)**) represents both the culmination and the end of Roman linguistics. He became one of the most influential grammarians in history, and his impressive work, the *Institutiones grammaticae* in 18 books, goes far beyond what other Roman grammarians had aimed at or achieved.

The Roman *Ars Grammatica* – An Attempt at a Synopsis

The Roman grammatical tradition was a very versatile and multifaceted one characterized by continuity and development. On the one hand, there is the formally oriented elementary school grammar tradition exemplified by Donatus's two grammars and by numerous similar grammars, mostly by unknown authors. This tradition is undoubtedly very uniform, and the differences between the various grammars are relatively small. With the collapse of the Roman Empire there was a general decline in higher education and centers of learning in Western Europe. Donatus's elementary textbooks or Christianized versions of them became the basis for elementary teaching of Latin in Western Europe (Holtz, 1981).

In a situation where the language of the pupils was either very divergent from the norms of classical Latin or another language altogether, these books may also have been the most suitable ones available. But in the classical Roman educational system, where the language of the pupils was quite close to the written language and where the main purpose of grammar teaching was to help the pupils to acquire a necessary metalanguage for reading and analyzing poetical literary texts, grammars like those of Victorinus and Fortunatianus must have been much more instrumental.

Other grammars (e.g., those of Sacerdos, Charisius, Diomedes, and Priscian) and the commentaries on Donatus cover a number of different genres, topics, and theoretical approaches. Usually they include, besides the basic morphological part, a treatment of metrical matters, phonology (especially syllable quantity), orthography, and a comparison of Latin and Greek.

A characteristic aspect of the Roman grammatical tradition is the extensive treatment of stylistic matters, including statements concerning 'correct' and 'incorrect' Latin. Much space was devoted to establishing principles for correctness of language and to asking whether structural uniformity of paradigms, language usage, and/or the authority of the best authors should be the decisive criterion in cases of doubt.

While in the beginning the grammarians used a mixture of semantic and formal morphological criteria in their analysis and classification of Latin morphology, Donatus established a purely nonsemantic approach, which became dominant in the elementary *ars grammatica*. Among other grammarians, however, a more semantically oriented approach emerged, culminating in Pompeius, Phocas, and Priscian, who laid the foundation for the philosophical approach to language analysis in the Middle Ages.

Most authors had their favorite theme(s); for instance, the *Instituta artium* spuriously attributed to Probus concentrates on the comparison of adjectives. Another popular topic was the analysis of the Latin case system. Not only had Latin one more case than Greek (namely, the ablative), but also the semantic and partly morphological heterogeneity of the ablative (originating from three Indo-European cases, viz. instrumental, locative, and ablative) led some grammarians (e.g., Sacerdos and Diomedes) to discuss the position of the ablative and to ask whether the ablative was, in effect, one or two cases.

While the phonology (i.e., letters and their pronunciation and syllable quantity) and the morphology with its numerous paradigms and lists of examples are based in most instances on data without sources and probably to a large extent on the author's introspection (Priscian is an exception), stylistic and metrical matters are usually well-documented with quotations from the main Latin poets (very rarely prose writers), especially Virgil and Horace.

The most important aspect of the Roman *ars grammatica* is that it formed the grammatical metalanguage and, above all, the structural arrangement for elementary and advanced grammars and textbooks for language teaching in Western Europe for more than 1000 years. Even today many grammars have clear echoes of Donatus.

See also: Dionysius Thrax and Hellenistic Language Scholarship; Priscianus Caesariensis (d. ca. 530).

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Romance Languages

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The Romance languages are those that have developed from the spoken Latin of the early Middle Ages. In this sense one can claim that Latin is not dead; about a quarter of the world's population still speak it; but it has acquired several new geographically based names (Spanish, Portuguese, French, Italian, Romanian, Catalan, Occitan, Sardinian, Galician, Rhaeto-romanic, here listed roughly in descending order of number of speakers). These are for political reasons considered to be separate 'Romance' languages, but there is still essentially one dialect continuum overlaid by the several artificially extended standards. Apart perhaps from Romanian, the location and history of whose earliest speakers is still controversial, the definitive divergence into separately identifiable languages should be dated to no earlier than the 9th century, and in several cases later.

Reconstruction

There are two main kinds of evidence for the Romance (spoken Latin) that existed before the separate languages diverged: surviving written texts and the results of 'reconstruction.' Hall and others have reconstructed a hypothetical 'Proto-Romance' on the basis of the later Romance languages; features they have in common are taken to have existed in their ancestors. As compared with 'classical' Latin, this Proto-Romance contains, for example, no neuter nouns, no ablative cases, no datives and genitives outside pronouns, no synthetic passives or futures, no adverbs in *-iter*, no phonemic length distinctions in vowels, no originally final consonants other than alveolars, and no velar consonants before front vowels other than those that were originally labiovelar. On the other hand, the evidence of modern Romance languages suggests that their base included extended uses of prepositions (particularly *ad* and *de* to replace inflectional nominal suffixes); analytic passives with auxiliary *esse* + tense-indeterminate participles; extended use of grammatically reflexive *se* with passive meaning; analytic futures (and 'conditionals') formed with the infinitive + *habeo*; new analytic perfects (including future perfects and pluperfects) formed with activized participles + *habeo*; extensive use of *ille* and *ipse* with the functions of the definite article; many diminutives in *-iculum* and other affixed forms (such as *adiutare*, rather than *iuvare*, as the base of Port *ajudar*, Sp *ayudar*, Cat *ajudar*, Fre *aider*, Italian *aiutare*, Romanian *ajuta*, etc.); the use of preposed *magis* or *plus* instead of comparative *-ior*; palatal affricates and semivowels; and much new vocabulary from, in particular, Germanic sources.

Texts

This reconstructed language is not very much like that of the surviving written texts of the time. Janson described reconstruction and textual analysis as two different key-holes through which one can look into the same large room, for the rules of correct writing did not change, and 'mistakes' are rarely attested. Most texts were written on perishable wax tablets or papyruses; the extant versions are usually later

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manuscript copies prepared by scribes who had specific instructions to 'correct' their originals according to the arcane and eventually archaic rigidities of the Imperial grammarians. Texts without such distortions are few; Adams has published some letters and drafts, and Våånånen's study of the Pompeii *Graffiti* revolutionized the discipline by showing how 'incorrectly' nonscholars wrote in 79 A.D. Even these texts, however, are obviously not phonetic transcriptions of actual speech. From painstaking statistical analyses of surviving inscriptions (mostly on tombstones), whose textual details cannot be 'corrected,' Herman has concluded that Imperial spoken Latin was evolving but also converging, with new features starting in one place becoming eventually attested anywhere. Some further progress is made by studying borrowings from spoken Latin into, for example, Irish, Welsh, Berber, Albanian, and Greek.

Divergence

Wide variation arose, but this need not imply mutual unintelligibility. Many historians, textual critics, philologists, sociolinguists, and historical linguists currently view early Medieval Romance Europe as a single lively speech community, where almost everyone could understand old-fashioned written texts when read aloud (McKitterick, 1990, Wright, 1991). These were not 'Dark' Ages. Early Medieval speakers rarely made metalinguistic distinctions that we take for granted now, neither diatopic (between French, Spanish, etc.) nor diastratic (between Romance and Medieval Latin). The latter distinction was probably imported from Germanic-speaking areas, where vernacular Germanic and official Latin *grammatica* were unrelated and self-evidently different languages; conscious distinctions between separate Romance languages became widespread only after the fashion for inventing distinctive writing systems in different areas, which began experimentally in 9th-century eastern France but generalized only in the 12th and 13th centuries. Indeed, to some extent the speech of the central Romance area is still mutually intelligible, given goodwill and clarity from those in the conversation; peripheral languages, such as Romanian, Portuguese, and French, are rarely intelligible elsewhere.

See also: Catalan; French; Italian; Occitan; Portuguese; Rhaeto Romance; Romanian; Spanish.

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Romani

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Definitions

Romani (referred to by its speakers as *řomani čhib* 'the Romani language' or *řomanes* 'in a Romani way') is the only Indo-Aryan language spoken exclusively in Europe, as well as by emigrant populations in the Americas and Australia. The language is often referred to as 'Gypsy'; it is important, however, to distinguish between Romani, which is the fully fledged, everyday family and community language spoken by the people who call themselves *Řom*, and secret or in-group vocabularies employed in various parts of the world, including in Europe, by other populations of peripatetics or so-called service-nomads. There is nevertheless some interface between the two phenomena: in some regions of Europe, especially the western margins (Britain, the Iberian peninsula, Scandinavia), Romani-speaking communities have given up their language in favor of the majority language but have retained Romani-derived vocabulary as an in-group code. Such codes, for instance *Angloromani* (Britain), *Caló* (Spain), or *Rommani* (Scandinavia) are usually referred to as *Para-Romani* varieties.

In the absence of reliable census figures, the total population of Romani speakers can only be estimated, at anywhere upwards of 3.5 million. The largest concentrations of Romani speakers are in southeastern and central Europe, especially Macedonia, Bulgaria, Romania, and Slovakia. Romani has traditionally been an oral language, and in more traditional communities there is even opposition to codification attempts or other public use of the language, which is viewed as having protective functions. The overwhelming trend, however, since the early 1990s has been toward codification of the various dialects at local or regional levels. The language is now used in local media, on numerous Internet sites, as a medium of correspondence (especially electronic), and in some countries even as a medium of school instruction.

History

The earliest attestation of Romani is from 1542, in Western Europe. Our understanding of the language's historical development is therefore dependent on reconstruction and comparison with other Indo-Aryan idioms as well as with the contact languages. In phonology, Romani shares a number of ancient isoglosses with the Central branch of Indo-Aryan, most notably the realization of Old Indo-Aryan *r̥* as *u* or *i* (Sanskrit *śr̥ṇ-* Romani *šun-* 'to hear') and of *kṣ-* as *kh* (Sanskrit *akṣi* Romani *j-akh* 'eye'). In contrast, however, to the other Central languages, Romani preserves a number of dental clusters (Romani *trin* 'three', *phral* 'brother'; cf. Hindi *tīn*, *bhāi*). This led Turner (1926) to assume a Central origin of Romani, with subsequent migration to the Northwest before the reduction of the relevant clusters took place. A northwestern migration is of course well in line with an utlimate migration out of India and on towards Europe. Further support for Turner's theory comes from the domain of verb morphology, where Romani follows the exact same pattern as Northwestern languages such as Kashmiri or Shina in its renewal of the past-tense conjugation through the adoption of oblique enclitic pronouns as person markers (*kerdo* 'done' + *me* 'me' > *kerdjom* 'I did'). Proto- or pre-European Romani was thus a kind of Indian hybrid: a central Indic dialect that had undergone partial convergence with northern Indic languages. Although the retention of dental clusters would suggest a break with the Central languages during the transition period from Old to Middle Indo-Aryan, the overall morphology of Romani indicates that the language participated in some of the significant developments leading toward the emergence of New Indo-Aryan (such as the reduction of the nominal case system to a two-way opposition, nominative vs. oblique, and grammaticalisation of new, postposed case markers). It would appear therefore that Proto-Romani did not leave the Indian subcontinent until late in the second half of the first millennium CE. Romani is among the most conservative New Indo-Aryan languages in retaining a full consonantal present conjugation, as well as consonantal oblique nominal case endings. Typical phonological developments that characterize Romani among the Indo-Aryan languages are the devoicing of aspirates *bh, dh, gh* to *ph, th, kh*, the shift of medial *d, t* to *l*, of short *a* to *e*, of inflectional *-a* to *-o*, of initial *kh* to *x*, and of the retroflexes *ḍ, ṭ, ḍḍ, ṭṭ, ḍh* etc. to *r* and *ř*.

The subsequent development of the language was strongly influenced by its contact languages. Romani borrowed lexicon and some grammatical vocabulary from Iranian languages and Armenian. The heaviest impact on Early Romani (European Romani, between the 10th and 13th centuries C.E.) was of Byzantine Greek. Apart from numerous lexical loans, phonemes, and grammatical vocabulary, Romani adopted Greek inflectional morphology in nouns and verbs, which remain productive with loan vocabulary from subsequent European contact languages (see below). Greek

also had a strong impact on the syntax of Romani, triggering among other things a shift to VO word order and the emergence of a preposed definite article.

The sound system

Romani dialects generally preserve an aspirated set of voiceless stops *ph, th, kh* as well as *čh*, alongside *p, t, k, č* and *b, d, g, dž*. Nasals are *m* and *n*, fricatives are *f, v, x, h, s, z, š,* and in some dialects also *ž*, and there is an affricate *c* [ts]. All dialects have *l* and *r*, and some also retain *ř*, which is realized as either a uvular [ʀ], a long trill [rr], or in some dialects a retroflex [ɽ, ɻ]. Palatalization of consonants, either distinctive or nondistinctive, is common in the Romani dialects of eastern and southeastern Europe. The vowel system consists of *a, e, i, o, u*, with addition in some dialects of a central vowel *ə* or *ɨ*. Western European dialects of Romani tend to show vowel length distinctions. The phoneme inventory of individual dialects usually accommodates additional phonemes from the respective contact languages in lexical loans. Conservative stress in Romani is on the final inflectional segment of the word, though a number of affixes remain unstressed, among them the vocative ending, agglutinative (Layer II) case endings (see below), and the remoteness tense marker. Dialects in Western and Central Europe often show a shift of stress to earlier positions in the word.

Morphology

Nominal forms

Romani nominal morphology is inflectional, with some agglutination. There are two genders,masculine and feminine, and two numbers, singular and plural. Mass nouns often allow omission of overt plural marking. The principal inflectional alternation in the noun is between two 'basic' or Layer I cases, nominative and oblique, in the singular and plural. The different patterns of alternation constitute declension classes. Romani declension classes are sensitive to gender, to the phonological shape of the stem, and to etymology, with European loans taking Greek-derived case endings. Basic inherited declension classes are presented in Table 1.

Individual dialects show various patterns of analogies among the different classes. Loan declension classes typically have Greek-derived inflection endings *-os*, *-o*, *-is*, or *-us* (masculine) and *-a* (feminine), with a variety of plural endings such as *-i*, *-e*, *-ides*, *-uri* and more. The oblique stem serves as the base for further (Layer II) agglutinative case formation, with the endings *-te/-de* (locative and prepositional), *-ke/-ge* (dative), *-tar/-dar* (ablative), *-sa(r)* (instrumental and comitative), and *-ker-/-ger-* (genitive). As in other Indo-Aryan languages, the genitive agrees with the head noun (*čhav-es-ker-o phral* 'the boy's brother,' *čhav-es-ker-i phen* 'the boy's sister'). The oblique without a Layer II extension serves as the case of the direct object ('accusative') with animate nouns.

Table 1 Basic ikeoclitic declension classes

	Sg. nominative	*Sg. oblique*	*Pl. nominative*	*Pl. oblique*
Masculines in $-o$	*čhav-o* 'boy'	*čhav-es-*	*čhav-e*	*čhav-en-*
Masculines in $-\phi$	*phral* 'brother'	*phral-es-*	*phral-a*	*phral-en*
Feminines in $-i$	*řomn-i* 'woman'	*řomn-ja-*	*řomn-ja*	*řomn-jen-*
Feminines in $-\phi$	*phen* 'sister'	*phen-a-*	*phen-a*	*phen-en-*

Adjectives usually take vowel endings that agree with the vocalic case-endings of the noun (*mir-o dad* 'my father,' *mir-i daj* 'my mother'). Demonstratives usually show a four-term system, encoding both proximity/remoteness (or, rather, presence in the situation vs. the discourse context), and general/specific (disambiguation), e.g., *adava, akava, odova, okova*. Interrogatives are cognate with other Indo-Aryan languages (*kon* 'who,' *kaj* 'where'), with *so* 'what' serving as the base for several derived forms (*savo* 'which,' *soske* 'why,' *sode* 'how many,' etc.). Indefinite markers are often borrowed from the respective contact languages.

Verbs

Valency is a central feature of Romani verb morphology. It is expressed through direct affixation to the verb root. The productivity, however, of individual valency markers varies among the dialects. Typical valency-increasing markers are *-av-*, *-ar-*, *-ker-*, and valency-decreasing markers are *-jov-* and *-áv-*. They derive verbs from other verb roots, as well as from nouns and adjectives. Borrowed verbs carry loan verb extension or adaptation markers, based on Greek-derived tense/aspect affixes such as *-iz-*, *-in-*, *-is-*, sometimes in combination with valency affixes (e.g., *-is-ar-*, *-is-ker-*).

The default stem (root with derivation marker) serves as a non-perfective aspect. The plain form of the nonperfective serves as a present/subjunctive. A tense/modality extension *-a* marks the present/indicative, the future, or conditional, depending on the dialect. A perfective aspect (also 'aorist' or 'simple past') is formed by attaching a perfective extension (derived from the Middle Indo-Aryan participle extension *-t-*) to the root of the verb

(e.g. *ker-d*-'did'). The choice of perfective extension depends on the numerous perfective classes, which are sensitive to the root phonology as well as to valency and semantics.

There are two person conjugations: The present conjugation (1sg *-av*, 2sg *-es*, 3sg *-el*, 1pl *-as*, 2/3pl *-en*) continues the Middle Indo-Aryan set of present concord markers. There are two inflection classes in the present (nonperfective), distinguishing vocalic and consonantal roots (*xa-s* 'you eat,' *kam-es* 'you-want'). The perfective conjugation, which follows the perfective extension, derives from late Middle Indo-Aryan enclitic pronouns (1sg *-om*, 2sg *-al/an*, 3sg *-as*, 1pl *-am*, 2pl *-an/-en*, 3pl *-e*).

Both the present and the perfective may be extended by a remoteness marker *-as/-ahi/-ys/-s* that is external to the subject concord marker, indicating the imperfect/habitual/conditional (with the present) or the pluperfect/counterfactual (with the perfective).

Syntax

Romani stands out among the Indic languages through its Europeanized, specifically Balkanized syntax. Word order is VO, with variation between thetic (continuative) VS and categorical (contrastive) SV. Local relations are indicated by prepositions. Adjectives and determiners generally precede the noun, as does the definite article (which agrees with the noun in gender, number, and case). Relative clauses are postposed, and often introduced by a universal relativizer *kaj* < 'where.' Clauses are generally finite. Adverbial clauses are introduced by conjunctions, usually derived from interrogatives. Romani distinguishes between factual and nonfactual complex clauses. Modal, manipulation, and purpose clauses are introduced by a nonfactual conjunction *te*, as are conditional clauses. Epistemic complements are introduced by *kaj*, which is often replaced by a borrowing from the respective contact language.

Dialect diversity

Dialect differentiation in Romani appears to have emerged largely in situ, following the dispersal of groups from the Balkans into western and northern Europe, from around the 14th century onward, and their settlement in their present locations, during the 16th-17th centuries. There are two major diffusion centers of innovations: in the southeast, especially the northern Balkans, and in western-central Europe, especially Germany. Typical of the western-northern dialects are prothesis of *j-*, simplification of *ndř* to *r*, loss of adjectival past-tense in intransitives (*gelo*, *geli* > *geljas* 'he/she went'), and retention of *-n* in the abstract nominalizer *-ipen/-iben*. In the central regions, *s* in grammatical paradigms is often replaced by *h*. Individual regions show distinct developments in morphological paradigms, especially demonstratives, 2/3pl perfective concord markers, and loan verb markers. Especially these latter isoglosses justify the current classification into the following dialect groups: Balkan (with a subgroup 'Black Sea Coast'), Vlax (Transylvannia and adjoining regions), Central, Northeast (Baltic-Northrussian), and Northwest (German-Scandinavian).

See also: Aelfric (fl. 987-1010); Armenian; Balkans as a Linguistic Area; Domari; Dravidian Languages; Hindi; Indo–Aryan Languages; Iranian Languages; Kashmiri.

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Romania: Language Situation

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The central feature of the language situation in Romania, as in several other countries of Central and Eastern Europe, such as Bulgaria and Poland, is the existence of stable minority-language communities within the geographical confines of what would otherwise be a relatively homogeneous nation state. Any description of the situation must take into account the historical tensions among the various ethnic or national groups, the post-war Communist government's efforts to create a strong centralized administration, and the still uncertain political future.

The broad outlines of the situation are straightforward. The only official language is Romanian, spoken as a first language by approximately 88% of the

(e.g. *ker-d*-'did'). The choice of perfective extension depends on the numerous perfective classes, which are sensitive to the root phonology as well as to valency and semantics.

There are two person conjugations: The present conjugation (1sg *-av*, 2sg *-es*, 3sg *-el*, 1pl *-as*, 2/3pl *-en*) continues the Middle Indo-Aryan set of present concord markers. There are two inflection classes in the present (nonperfective), distinguishing vocalic and consonantal roots (*xa-s* 'you eat,' *kam-es* 'you-want'). The perfective conjugation, which follows the perfective extension, derives from late Middle Indo-Aryan enclitic pronouns (1sg *-om*, 2sg *-al/an*, 3sg *-as*, 1pl *-am*, 2pl *-an/-en*, 3pl *-e*).

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The broad outlines of the situation are straightforward. The only official language is Romanian, spoken as a first language by approximately 88% of the

population (1977 census figures). The standard language is essentially uniform throughout the country, having been established as a standard only in the 19th century, though there is a fair amount of variation in nonstandard rural speech. Standard Romanian is the language of administration and virtually all higher education. During the Communist period, members of the national minorities (referred to by the Romanian phrase *popoarele conlocuitoare*, lit. 'co-inhabiting peoples') were expected to learn Romanian in school, and virtually all did so. However, there were provisions for the extensive use of minority languages in primary and secondary education, publishing, broadcasting, and the arts – provisions comparable to those made by other Communist governments in post-World War II Eastern Europe. Wherever the ethnic composition of the population warranted it, newspapers and books were published in minority languages, and schools and state-supported theatres in minority languages were established.

Romania's current territory is traditionally divided into three provinces: Wallachia (Rom. *Ţara Românească*) to the south, Moldavia (Rom. *Moldova*) to the east, and Transylvania (Rom. *Transilvania* or *Ardeal*, Hung. *Erdély*, Ger. *Siebenbürgen*) to the north and west on the continental side of the Carpathian Mountains. The two main groups of minority language speakers, Hungarians and Germans, are concentrated in Transylvania, which has a long history as a semi-independent feudal state. As early as the 14th century, the Transylvanian nobility was almost exclusively Hungarian, whereas the military and merchant classes in the developing cities were in many cases German. The peasantry was by no means entirely Romanian, but most Romanians were peasants. Romanian nationalist movements were active during the late 18th and 19th centuries, when Transylvania was part of the Austro-Hungarian Empire, and in 1920, the province was awarded to Romania under the Treaty of Trianon. The catalogue of wrongs arising from this complex history is both substantial and tended carefully by all the groups concerned.

There are Hungarians living throughout Transylvania. They represent some 8% of the population of Romania as whole, but in certain areas of the province, they constitute a substantial majority. They do not regard themselves as Romanian. Hungarian remains in active use almost everywhere – in the officially supported contexts discussed above, and in shops and on unofficial (but not official) signs. The Germans, by contrast, are restricted to scattered settlements in and around the cities in the south of the province (e.g., Sibiu, Ger. *Hermannstadt*) and various rural communities, especially in the Banat (the far western area around Timzişoara). At the time of the 1977 census, the Germans made up 1.2% of the population of Romania as a whole, but under the terms of an agreement with West Germany, a substantial proportion of the German population emigrated during the 1980s, and it is not clear whether the German-speaking communities will survive for much longer.

Throughout the country, there are small populations of speakers of other languages, including Serbian, Ukrainian, and Romany (Romani). Together, they constituted 2.8% of the population in 1977. In addition, there is a large population of Romanian speakers in the former Soviet Republic of Moldavia (the eastern half of the historical province of Moldavia), now generally known in English by its Romanian name Moldova. During the Soviet period, 'Moldavian' was written in the Cyrillic alphabet and treated as a separate language. The orthography has since reverted to that of standard Romanian.

Toward the end of the Ceauşescu regime, many of the provisions for minority languages were dismantled, in what members of the minority communities saw as deliberate Romanianization. This perception may be exaggerated: Ceauşescu's policies (in particular, the destruction of villages and the 'systematization' of their displaced inhabitants in 'agro-industrial complexes') often affected ethnic Romanians as well. Nevertheless, the Romanian nationalist bent to Ceauşescu's policies was unmistakable, and nationalism remains a powerful force in post-Communist politics. It is difficult to predict how it will affect the language situation in the coming decades.

See also: Hungary: Language Situation; Moldova: Language Situation.

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Romanian

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The Romanian (alternatively spelled Rumanian, Roumanian) language is a member of the Romance languages and is a continuation of Eastern Latin, spoken in the Roman province of Dacia and surrounding areas which were colonized by the Romans led by the emperor Trajan from 106 A.D.

The Eastern Latin spoken in this area by Roman soldiers and colonists along with presumably assimilated local tribes underwent numerous influences after the Roman legions abandoned the northernmost areas in 271 A.D. The first major influence was undoubtedly provided by the indigenous Dacian–Thracian–Illyrian inhabitants of the area, although only a few undisputed words from that source remain. A. Rosetti mentions some 88 Indo-European but pre-Latin terms whose existence in both Romanian and Albanian suggests a substratum as the source for these words in both languages, e.g., *barză* 'stork,' *bucurie* 'happiness,' *mănz* 'colt,' *mos* 'old man'; cf. Albanian *bardhë* 'white (FEM),' *bukuri* 'beauty,' *mëz* 'colt,' *moshë* '(old) age.' It is likely that some of Romanian's morphosyntactic structure, especially that shared with the non-Romance Balkan languages, also comes from this pre-Latin substratum, but the complete lack of textual evidence leaves these possibilities in the realm of speculation.

The longest and most consistent influence was that of the Slavs, who began to migrate across this territory to the south as early as 400 A.D. and who remain neighbors on three sides of present-day Romania. Several other migrations of peoples crossed the territory of today's Romania between the departure of the Roman legions and the appearance of the modern Romanian people, but little or no linguistic traces of the Goths, Huns, Gepids, Avars, *et al.* remain.

This early Romanian soon (perhaps as early as the 10th century) began to split, first into four dialects which later tended to become languages in their own right: the principal one in terms of numbers is termed Daco-Romanian, spoken primarily north of the Danube. The second largest division is called Aromanian (Macedo Romanian) and is currently spoken in pockets of southwestern Bulgaria, Macedonia, Albania, and northern Greece. The other two are quite limited in extent: Megleno Romanian is confined to an area in southeastern Macedonia and adjacent northern Greece, and Istro Romanian is limited to eight localities in Istria in modern Croatia.

Daco-Romanian is now called Romanian and is the single national language among the four with approximately 25 million speakers worldwide. It shows, in addition to the Slavic mentioned above, the influences of prolonged contact with Hungarian, Turkish, and early modern Greek. More recently, from the 19th century onwards, Romanian has been subjected to a kind of re-Latinization, both from the strong influence of French and from the international European vocabulary largely based on Latin and Italian.

The first preserved texts in Romanian date from the end of the 15th and beginning of the 16th centuries. The oldest dated text (1521) is a letter to Neacsu of Câmpulung.

Although some texts from as early as the 16th century are written in the Latin alphabet, which is the norm today, until 1860 the official alphabet was Cyrillic. Most of the letters have approximately their general European values, but there is some use of diacritics that should be noted, namely *î*, *â*, *ă*, *ţ*, *ş*. Phonetic equivalents are given where necessary in brackets in Tables 1 and 2.

Romanian symbolizes diphthongs with pairs of vowels, e.g., *iu*, *ia*, *ea*, *ua*, *oa* and *ai*, *au*, *ou*, *ui*, but one can seldom be certain from the spelling alone. See the website of the Romanian Academy Center for Artificial Intelligence for a complete inventory of multiple vowel combinations.

In contrast to the practice of some of its immediate neighbors, there is no final devoicing of consonants as

Table 1 Vowels

	Front	*Central*	*Back rounded*
High	i	î (â) [ɨ]	u
Mid	e	ă [ə]	o
Low		a	

Table 2 Consonants

	Bilabial	*Labio-dental*	*Dental*	*Palato-alveolar*	*Dorso-velar*
Stops	p b		t d	ch [k'] gh [g']	c [k] g
Affricates			ţ [c]	c [č] g [ǧ]	
Fricatives		f v	s z	ş [š] j [ž]	h
Nasals	m		n		
Lateral			l		
Trill			r		

Table 3 Morphophonemics

underlying forms	*mes-ə mes-e*	*fet-ə fet-e*	*mer-u mer-e*	*per-u per-i*
1. breaking	mea̯sə – –	fea̯tə – –	– – – –	– – – –
2. backing	mea̯sə – –	fəatə	məru – –	pəru – –
3. coalescence	masə mese	fatə fete	– – – –	– – – –
4. drop final /u, i/	– – – –	– – – –	mər mere	pər per'
normal spelling	masă mese	fată fete	măr mere	păr peri

in Bulgarian and Russian and no contrastive vowel length as in Slovak, Hungarian, and Serbian (Serbo-Croatian). Rather, Romanian forms a bridge between Serbian and Ukrainian in terms of final voiced obstruents.

The two palatal velars are disputed as separate from the dorsovelars in phonology but are clearly different on the morphophonemic plane. They represent an interesting progression from Latin 'cl' and 'gl' in words such as *cheie* 'key' and *gheaţă* 'ice.' Intentionally omitted from the chart are the palatalized variants of most consonants that, according to some analyses, occur word finally before the final (voiceless?) [i], for example in the second person singular present forms of the verb, e.g., *tu plimbi* 'you stroll,' *vezi* 'you see,' *scoli* 'you arise.'

Word stress in Romanian is basically penultimate, but only if one counts final (mostly silent and, in the case of /u/, mostly unwritten) /i/, /u/ as a syllable (the stressed vowel is given in bold type): *plecare-pleacă-plecând*, *venire-vine-venind*, *miere*. There are several exceptions to this generalization including many borrowings, e.g., through Turkish: *baklava*, *sarma*, *cafea*, and the majority of the infinitive forms, which are also stressed on the final syllable: *veni*, *citi*, *pleca*, *turna*, *putea* (historically, of course, the infinitive had a final syllable '-re'). Other exceptions include the classic Latin deviations based on heavy syllables as in *industrie* and words of specific morphological categories with stress fixed on a certain ending, such as the imperfect tense: *plecam*, *plecai*, *pleca*, etc. Note that the addition of the masculine genitive definite article /-u-lui/, the feminine definite plural article /-i-le/ or the 'multisyllabic' plural desinence /-uri/ does not cause movement of the stress: *marfă*, *mărfuri*. Thus it is not truly penultimate, only dominantly so, since one must proceed from a hypothetical base form of the word and include several classes of exceptions.

From a morphophonemic point of view, Romanian is quite complex. Space limitations will not allow a complete treatment here, but an illustration of this complexity may be seen in the singular and plural forms of words such as *masă*, *mese* 'table(s)'; *fată*, *fete* 'girl(s)'; *măr*, *mere* 'apple(s)'; *păr*, *peri* 'hair(s),'

Table 4 Verbal forms with root in /e/

present 1st sing.	văd	învăţ
present 2nd sing.	vezi	înveţi
present 3rd sing.	vede	învaţă
conjunctive 3rd sing.	să vadă	să înveţe

where only by beginning with a root with the front vowel /e/ may one predict all the forms of any one word. The three rules that are involved are illustrated in Table 3.

Rule 4 brings up some other complications such as the phonetic interpretation of consonants preceding the final 'dropped' /-i/, but it can be seen that, at least for inherited Latin vocabulary, these rules will predict the surface phonetics of many forms. Compare (given here in the normal orthography) the various forms of the verbs *a vedea* 'to see' and *a învaţa* 'to learn' with the same stressed root vowel /e/, i.e. /véd-/, /ɨnvéc-/ (see Table 4).

It can be seen that the same rules allow the derivation of all the verbal forms if we add the 'flip-flop' rule, namely, in the conjunctive-subjunctive the present third singular ending /–e/ goes to /–ə/ and vice versa. Thus *el pleacă* 'he leaves' becomes *el o să plece* while *el crede* 'he believes' becomes *el o să creadă*.

It should be noted that the stressed schwa is a feature that is often included among the features of the so-called Balkan Sprachbund. There are characteristics (merging of the genitive and dative, tendency to lose the infinitive, development of a postpositive definite article, repetition pronominally of the direct object) in several areas of the grammar that Romanian shares with languages clearly not of Romance origin such as Bulgarian, Macedonian, Albanian, and dialectal areas of Serbian and modern Greek.

Most noticeable in differentiating Romanian from the rest of Romance is the postposed definite article, which takes several forms but is basically singular *-a*, plural *-le* for feminines and singular *-l*, plural *-i* for masculines (with a special category of neuter that generally takes the masculine article in the singular and the feminine in the plural; examples in Table 5).

In the noun phrase the same definite article is attached to the first element in the phrase: *un prim pas* 'a first step,' *primul pas* 'the first step.'

Unlike the rest of Romance, although they have been whittled down to just two (plus a vocative that has almost disappeared), Romanian still maintains nominal case distinctions. Among Romanian scholars there is a tendency to name them nominative-accusative and genitive-dative after the functions of each case; see Table 6 for some examples.

Table 7 gives two verbs illustrating the basic verbal categories: *a intra* 'to enter' and *a face* 'to do.' There are, in addition to the present tense, two ways to form the future, and a variety of past tenses, including the compound past, the imperfect, the perfect and the pluperfect. Again it is instructive to consider the dropped final high vowels /u/, /i/ as morphological formants of the first and second persons singular in the present tense, both for purposes of word accent and for various other phonological alternations. The forms are given in standard orthography.

There are two general types of regular verb, one with base + back vowel and the other with base + plus front vowel, and with this information plus sets of personal endings all of the conjugations of a given verb may be produced. I chose here the verb *a intra* since it gives justification for the otherwise phantom ending /-u/ of the first person singular for a-verbs and both first singular and third plural for e-verbs (also true for i-verbs, which are not illustrated here).

All other verbal formations (except for the conjunctive-subjunctive future with *o să* plus the present, discussed above with the flip-flop rule) are synthetic, relying on either the short infinitive or the past passive participle: thus the future is *voi*, *vei*, *va*, *vom*, *veţi*, *vor* plus the infinitive (*voi intra*, *vei intra*, etc.), and the conditional is *aş*, *ai*, *ar*, *am*, *aţi*, *ar* also with the infinitive (*aş intra*, *ai intra*, etc.); while the compound past uses *am*, *ai*, *a*, *am*, *aţi*, *au* plus the past passive participial form (*am intrat*, *ai intrat*, etc.), and the past conditional also uses it after the same auxiliary as the conditional, adding the verb *fi* 'to be' (*aş fi intrat*, *ai fi intrat*, etc.). One further verb form is the past subjunctive, which does not conjugate and has a single fixed auxiliary *să fi* with the past passive participle (*să fi intrat* for all persons). There is also a 'future in the past' with *fi*.

Table 5 The definite article

Feminine	*Masculine*	*Neuter*
o doamnă *a lady*	un domn *a gentleman*	un os *a bone*
doamna doamnele	domnul domnii	osul oasele
o masă *a table*	un pom *a tree*	un lucru *a thing*
masa mesele	pomul pomii	lucruri lucrurile
o carte *a book*	un perete *a wall*	un scaun *a chair*
cartea cărţile	peretele pereţii	scaunul scaunele

Table 6 Cases

Gender	*Article*	*Nom-Acc Singular*	*Gen-Dat Singular*	*Nom-Acc Plural*	*Gen-Dat Plural*
Feminine	Indefinite	casă *house*	case	case	case
	Definite	casa	casei	casele	caselor
Masculine	Indefinite	bărbat *man*	bărbat	bărbaţi	bărbaţi
	Definite	bărbatul	bărbatului	bărbaţii	bărbaţilor
Neuter	Indefinite	lemn *wood*	lemn	lemne	lemne
	Definite	lemnul	lemnului	lemnele	lemnelor

Table 7 Verb tenses

	1st sing	*2nd*	*3rd*	*1st plur*	*2nd*	*3rd*
Present	intru	intri	intră	intrăm	intraţi	intră
	fac	faci	face	facem	faceţi	fac
Imperfect	intram	intrai	intra	intrăm	intraţi	intrau
	faceam	faceai	facea	faceam	faceaţi	faceau
Simple perfect	intrai	intraşi	intră	intrarăm	intrarăţi	intrară
	făcui	făcuşi	făcu	făcurăm	făcurăţi	făcură
Pluperfect	intrasem	intraseşi	intrase	intraserăm	intraserăţi	intraseră
	făcusem	făcuseşi	făcuse	făcuserăm	făcuserăţi	făcuseră

See also: Balkans as a Linguistic Area; Romania: Language Situation; Romanian Lexicography.

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Romanian lexicography has its roots in the 16th century, when the first Slavic-Romanian dictionaries where compiled, mainly to support translation of religious texts. The following century, Slavic was increasingly replaced by Latin or Romance languages (especially Italian) and by 1700 the first Romanian-Latin dictionary was compiled, *Anonymus Caransebiensis* (containing more than 5,000 entries). At first, Romanian dictionaries had circulated only as manuscripts. The first printed dictionary (four languages) appeared in 1825—*Lexiconul de la Buda* (*Lesiconul românesc-latinesc-unguresc-nemţesc*)—as a joint effort of the 'Şcoala Ardeleană' scholars. This is considered to be the starting point for the modern Romanian lexicography. In 1870 and 1879 Al. Cihac published (in French) the two volumes of his etymological dictionary *Dicţionarul etimologic dacoromân*.

The Romanian Academy, founded in April 1866, developed plans for a large dictionary of Romanian "as complete and rational as possible, to become a guide to the language" (Sala and Dănăilă, 1997). A first attempt was made in 1869, when A. T. Laurian and I. C. Massim started work on *Dicţionarul limbei române*, containing words of Latin origin, and *Glossariul*, containing words of foreign form and of uncertain origin. The two volumes, with 50 000 entries, appeared in 1873 and 1877 respectively, but were roundly criticized for excessive Latinizing of the Romanian language. However, this dictionary has the undeniable merit of being among the first dictionaries to use the principle of multiple etymologies. In 1884 editorship of the dictionary passed to B. P. Hasdeu, who produced three volumes (1887 and 1893) of the well-known *Etymologicum magnum Romaniae*, covering letters *A* and *B* (up to *bărbat*). Continuation of the task was assigned in 1897 to A. I. Philippide who, with his team, completed the dictionary up to the word *de*. When the 'Dictionary Commission' of the Romanian Academy asked for the removal of several neologisms, Phillippide gave up the task (1905) and his partial dictionary was never published.

The "*Dicţionarul limbii române/Dicţionarul Academiei*" (DLR/DA) in its present form, was started by S. Puşcariu. He and his team in Cluj worked for 43 years and published, in several fascicles, the letters *A*, *B*, *C*, *D* (up to *de*) *F*, *G*, *H*, *I*, *Î*, *J*, and *L* (up to *lojniţă*), altogether 3075 pages, containing about 60 000 words and variants. Puşcariu died in 1948, but his work was continued in Bucharest at the Institute of Linguistics, headed by Iorgu Iordan. Unfortunately, the work was interrupted in 1952 on the grounds that a general dictionary for use by ordinary people was

See also: Balkans as a Linguistic Area; Romania: Language Situation; Romanian Lexicography.

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Romanian Lexicography

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much more important. *Dicţionarul limbii române literare contemporane* (DLRLC) was intended to answer this demand and under the coordination of D. Macrea and E. Petrovici it was compiled, based on DLR/DA, and published in 1955–1957. The four volume dictionary, containing 48 000 headwords, hardly achieved its original goal of being an ordinary people's dictionary. A shorter version (all citations removed, but about 1500 new entries added) was published in 1958 as *Dicţionarul limbii române moderne* (DM).

DLRLC and DM were superseded by the *Dicţionarul explicativ al limbii române* (DEX) published in 1975, followed in 1988 by *Supliment la Dicţionarul explicativ al limbii române* (DEX-S). This dictionary, containing 56 569 entries (words and variants) is the bestselling *Dictionary of Romanian* (Vintilă-Rădulescu, 2002). The second edition (1996), republished in 1998, eliminated some inconsistencies, corrected several definitions, and added almost 9000 entries. Since August 2004 it has been publicly available on line.

Compilation of the most representative Romanian lexicographic work, represented by the DLR/DA, was resumed in 1959 at the Linguistic Institutes in Bucharest, Cluj, and Iaşi and the new series of DLR fascicles began to be published in 1965. By 2004 32 volumes had been published, listing more than 175 000 headwords and variants, with more than 625 000 meanings and about 3 200 000 citations. Between 2001 and 2004 DLR has been published in an updated and shortened version (only four volumes) as *Micul Dicţionar Academic* (MDA). To meet the size restriction, MDA discarded the citations and sources, and used a very compact encoding of lexical information.

Romanian lexicography has produced many other types of dictionaries, both monolingual and multilingual: dictionaries of neologisms, orthography, pronunciation and morphology, etymology, synonyms, antonyms, terminology, encyclopedic dictionaries, and regional and dialectal dictionaries.

See also: Academies: Dictionaries and Standards; Etymology; Lexicography: Overview; Romania: Language Situation; Romanian; WordNet(s).

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Relevant Website

http://dexonline.ro – The second edition of DEX.

Ronjat, Jules (1864–1925)

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Jules Ronjat, an amateur scholar, was born in 1864 in Dauphiné (France). He was closely bound up with Provençal authors such as the Nobel Literature Prize-winner Frédéric Mistral, whom he considered the greatest authority on the Occitan language, and the other Felibrige poets, as well as his Romanist colleagues Camille Chabanneau, Emil Levy, Albert Dauzat, etc. His work was influenced by French Romanist linguists such as Gaston Paris, Father Pierre-Jean Rousselot, and Maurice Grammont. He earned his Doctorat-ès-Lettres in 1913 from the Sorbonne for his theses *Essai de syntaxe des parlers provençaux modernes* and *Le développement du langage observé chez un enfant bilingue*. In his later years he taught as a *privat-docent* at the University of Geneva.

In his reviews in the *Revue des langues romanes*, he made, as did Grammont, a critical appraisal of the linguistic geography practiced by Jules Gilliéron and his followers. As denoted by the title ('*istorique*') of his first thesis, *Essai de syntaxe des parlers provençaux modernes*, he was a champion of spelling reform

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Ronjat established 19 main features of Occitan: 11 of them are phonetical, 5 morphological, 1 syntactical, and 2 lexical. On this basis, he found 7 linguistic distinctions between Occitan and Spanish, 8 with Italian, 12 with Franco-Provençal, and 16 with French. He is mainly remembered by Occitan speakers and specialists for his knowledge of all Occitan dialects. Despite the title ('Provençal' spelling), his study on the Occitan spelling applies to the analysis of Occitan pronunciation and rules.

In his second thesis on bilingual acquisition, *Le développement du langage observé chez un enfant bilingue*, undertaken due to the suggestion of Grammont, he studied the linguistic development of his bilingual child, whose mother was German, and put into practice the linguistic recommendation of Grammont: 'one language, one person.' This work is now recognized as a forerunner of contemporary research on bilingual acquisition (see, for example, the CHILD Project).

See also: Bilingualism and Second Language Learning; Occitan; Romance Languages; Syntax of Words.

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Rorty, Richard (b. 1931)

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Richard Rorty was born October 4, 1931, in New York City. His parents were Trotskyites, and his early ideas were imbued with a Marxism that he later outgrew. Rorty is known as a pragmatist, a social commentator, and a public intellectual. One writer has chosen the term 'post-philosophical' to describe his work (Rumana). A precocious intellectual, Rorty enrolled at the University of Chicago when he was 15 and received his Ph.D. from Yale in 1956. While teaching at Wellesley and Princeton, Rorty read deeply in Carnap, Tarski, and Reichenbach. By this time, many Anglo-American philosophers were trying to read and understand the later Wittgenstein.

One of Rorty's early contributions to philosophy was an edition of essays by philosophers entitled *The linguistic turn* (1967/1992) that runs to some 400 double-columned pages. His introduction, 'Metaphysical difficulties of linguistic philosophy,' is often cited. One part of the collection is composed of essays on the thesis that philosophical questions are questions of language; another is composed of problems of ideal-language philosophy, and a third of ordinary language philosophy. Wittgenstein here is the 800-pound gorilla who couldn't be represented because his estate doesn't allow his work to be excerpted.

Representative of Rorty's mature work is his book *Philosophy and the mirror of nature* (1979). A critique of epistemology is contained in its earlier parts, of the notion inherited from the past that it is a combined development of the ideas of mind, knowledge, and of earlier philosophy itself. This critique leads in later work, such as *Truth and progress* (1998), to the characteristic doctrine of epistemological behaviorism, by which Rorty maintains that knowledge is constrained only by conversational constraints. Hence the notion of philosophy as an edifying conversation. The roots of epistemological behaviorism Rorty finds in Dewey and in Wittgenstein's critique of representation – the idea that all knowledge is found represented in the mind and is communicable from mind to mind. A further consequence is a denial of any possibility that the nature of the world constrains us to speak in certain ways. This view is reminiscent of the Nietzschean critique of language by which all language is metaphor, or 'fiction which is dependent on fictions.'

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See also: Carnap, Rudolf (1891–1970); Davidson, Donald (1917–2003); Putnam, Hilary (b. 1926); Quine, Willard van Orman (1908–2000); Reichenbach, Hans (1891–1953); Romanian; Tarski, Alfred (1902–1983).

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Alexandru Rosetti was born in Bucharest on October 23, 1895. After graduating in 1920 at the University of Bucharest he spent eight years in Paris where he studied under Meillet, Rousselot, and Gilliéron (*see* **Meillit, Antoine (Paul Jules) (1866–1936); Rousselot, Pierre Jean, Abbé (1846–1924); Gilliéron, Jules (1854–1926)**), among others and obtained his doctorate in 1926 for a thesis on Romanian historical phonetics. He returned to Romania in 1928 to take up a post at the University of Bucharest and in 1932 was promoted to the rank of professor. In 1938 he succeeded his former teacher, Ovid Densusianu, in the chair of the Romanian language which he was to occupy until his retirement in 1965. He maintained throughout his long life his preoccupation with phonetics, both historical and theoretical, and directed (1963–1969) the Center for Phonetic and Dialectal Research in Bucharest. His authoritative history of the Romanian language up to the 16th century, which was first published in six parts (1938–1966), was revised in one volume, taking it up to the 17th century, in 1968 (3rd edn., 1986). He also made important contributions to general linguistic theory, in particular with his book (1943) tackling the problem of defining the 'word' as a linguistic entity. He founded and edited the periodical *Bulletin linguistique* (1933–1948) and later, when existing journals were discontinued and replaced by others after the communist regime took full control of the country in 1948, edited at various times the periodicals *Studii şi cercetări lingvistice; Fonetică şi dialectologie; Revue roumaine de linguistique*; and *Cahiers de linguistique théorique et appliquée*. In the 1930s he was closely associated with King Carol II and was editorial director (1933–1945) of the Royal Foundation for Literature and Art. He succeeded, however, in coexisting with the post-1948 communist regime (he was, indeed, one of the foundation members of the Academy of the Romanian People's Republic which replaced the Romanian Academy in that year), but (unlike some others) without compromising his intellectual probity. He outlived the regime by two months and one of his last acts, after the overthrow of Nicolae Ceauşescu in December 1989, was to call for the full restoration of the Institute of Phonetics, which, like various other institutions, had been downgraded. This was done and, after his death in Bucharest on February 27, 1990, the Institute was renamed after him. (Bibliographies of his writings up to 1965, 1975, and 1980, respectively, may be found in Rosetti, 1965, 1975, 1980.)

Apart from his academic activity, Rorty is engaged as a public intellectual and activist. This engagement is launched on an anti-essentialist basis. The intellectual or philosopher combines a realization of the contingency of his or her own vocabulary with the goals of reducing suffering and cruelty. The vehicle of activism is not argument, which has been rendered void by the pragmatist critique of reason, but a redescription or realignment of vocabularies in a continuing conversation. Here Rorty distinguishes himself from any radicalism that seeks to detect hitherto unknown reasons for social ills as a warrant for removing them. It is significant that most of Rorty's work is achieved in conversation with linguistic and analytic philosophers such as Wittgenstein, Quine, Sellars, Davidson, and Putnam.

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Alexandru Rosetti was born in Bucharest on October 23, 1895. After graduating in 1920 at the University of Bucharest he spent eight years in Paris where he studied under Meillet, Rousselot, and Gilliéron (*see* **Meillit, Antoine (Paul Jules) (1866–1936); Rousselot, Pierre Jean, Abbé (1846–1924); Gilliéron, Jules (1854–1926)**), among others and obtained his doctorate in 1926 for a thesis on Romanian historical phonetics. He returned to Romania in 1928 to take up a post at the University of Bucharest and in 1932 was promoted to the rank of professor. In 1938 he succeeded his former teacher, Ovid Densusianu, in the chair of the Romanian language which he was to occupy until his retirement in 1965. He maintained throughout his long life his preoccupation with phonetics, both historical and theoretical, and directed (1963–1969) the Center for Phonetic and Dialectal Research in Bucharest. His authoritative history of the Romanian language up to the 16th century, which was first published in six parts (1938–1966), was revised in one volume, taking it up to the 17th century, in 1968 (3rd edn., 1986). He also made important contributions to general linguistic theory, in particular with his book (1943) tackling the problem of defining the 'word' as a linguistic entity. He founded and edited the periodical *Bulletin linguistique* (1933–1948) and later, when existing journals were discontinued and replaced by others after the communist regime took full control of the country in 1948, edited at various times the periodicals *Studii şi cercetări lingvistice; Fonetică şi dialectologie; Revue roumaine de linguistique*; and *Cahiers de linguistique théorique et appliquée*. In the 1930s he was closely associated with King Carol II and was editorial director (1933–1945) of the Royal Foundation for Literature and Art. He succeeded, however, in coexisting with the post-1948 communist regime (he was, indeed, one of the foundation members of the Academy of the Romanian People's Republic which replaced the Romanian Academy in that year), but (unlike some others) without compromising his intellectual probity. He outlived the regime by two months and one of his last acts, after the overthrow of Nicolae Ceauşescu in December 1989, was to call for the full restoration of the Institute of Phonetics, which, like various other institutions, had been downgraded. This was done and, after his death in Bucharest on February 27, 1990, the Institute was renamed after him. (Bibliographies of his writings up to 1965, 1975, and 1980, respectively, may be found in Rosetti, 1965, 1975, 1980.)

See also: Gilliéron, Jules (1854–1926); Meillit, Antoine (Paul Jules) (1866–1936); Rousselot, Pierre Jean, Abbé (1846–1924).

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Rousseau, Jean-Jacques (1712–1778)

D Droixhe

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Rousseau's *Essai sur l'origine des langues* mixes in a paradoxical way favorite topics of the 18th century and passionate – but also hesitating – intuitions about the politics of language.

The *Discours sur l'origine de l'inégalité* (1755) stresses the *embarrassments* of the question of the origin of language (*see* **Origin of Language Debate**), in a manner reminiscent of Frain du Tremblay (*Traité des langues*, 1703). Two types of conclusions were deduced: (a) this question is unsolvable and the efforts of such a great mind are typically vain (Kant; *see* **Kant, Immanuel (1724–1804)**; Nietzsche, etc); (b) there is an absolute solidarity between language and society, from which some authors will infer a sort of linguistic revelation related to a fixed political order.

According to Rousseau, the *Essai sur l'origine des langues* was 'a fragment of the *Discours sur l'inégalité*, cut out for being too long and irrelevant.' In so far as the chapters of the *Essai* dealing with the 'politics of language' offer ideas differing from the *Discours*, it has been supposed that they give an earlier, immature state of Rousseau's thinking. The contrary was also argued: the passage 'cut out' would in fact be dealing with the polemic which opposed to Rameau's theory of harmony Rousseau's ideas about the 'melodic' musicality of Italian, supposedly lost by French and more suitable to opera.

Rousseau's complexities or contradictions about language can be traced back to the picture of the origins given in the *Discours*. Speech arises amid 'singing and dancing – true children of love and leisure.' 'The best singer or dancer, the one who was the most beautiful, strong, skilful, or eloquent became the most esteemed; and it was the first step towards inequality, and towards vice at the same time.' An idealistic, sentimental conception of language is combined – at least in a dialectic tension – with a critical and materialistic approach associating language with the rise of social damage. Words appear in an 'order radically heterogeneous to the natural one,' endowed with an 'irreducible autonomy and originality.' Modern criticism has stressed the fact that the birth of a real language is described as it took place in historical times, and then seems to be separated from the very principle of 'origin' (Starobinski, 1990).

The link between speech, passion, and singing, based on a climatology opposing the 'northern languages' to the south, is partly borrowed from Condillac's genesis of human arts and polemically directed against his giving a prominent part to material needs (*see* **Condillac, Etienne Bonnot de (1714–1780)**). Any paradisiac beginnings of man are revoked in the *Essai*, as well as a linear development of language, which seems to have more complex origins. The ages of the 'hunters' ('bloodthirsty barbarians') and of the 'shepherds' are characterized by social division and they are supposed to prepare the rise of a real civil language appearing with agriculture. On one side, the experiment of mutual help – which required some communication – seems to participate at each level in the transcending of animal selfishness towards the accomplishment of man's social nature. On the other, the *Essai* puts a critical emphasis on the depravation of urbane language, which became a cold and courteous instrument of oppression.

The first signs were 'primitive metaphors' (*see* **Metaphor: Philosophical Theories**). This 'preromantic' topic, perhaps stemming from Vico, found its full rationality in sensualist philosophy, which sees words as dynamic and culturally signifying 'images' of the world, working on reality to give it some sense, just as

See also: Gilliéron, Jules (1854–1926); Meillit, Antoine (Paul Jules) (1866–1936); Rousselot, Pierre Jean, Abbé (1846–1924).

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metaphors transform things and designations by adding new meanings. This paved the way for Humboldtian relativism.

The *Discours de l'inégalité* had the provocative sharpness of a reference pattern opposing ideal to reality. The *Essai* produced a more complex picture which introduced violence and economical rationality of history into the origins of language, lost some of its critical power and left the genetic problem unsolved. It is understandable that Rousseau did not publish his 'scribble' (edited posthumously in 1781), while he was personally experimenting with the failures and ambiguous nature of language, always oscillating between individual and community (*Emile*), and the regeneration of a style challenging the heat of natural communication.

See also: Condillac, Etienne Bonnot de (1714–1780); Kant, Immanuel (1724–1804); Metaphor: Philosophical Theories; Origin of Language Debate.

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Rousselot, Pierre Jean, Abbé (1846–1924)

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Rousselot was born on October 10, 1846 in Saint-Claude (Charente region) to a rural family. He received a classical education at the seminary in Richemont, then at Angoulême, and was ordained priest in 1970. He first studied Latin and Greek phonetics before turning to dialectology. Planning to complete a doctoral thesis under the supervision of Gaston Paris, he conducted surveys in the Limousin region in order to determine the borders of *langue d'oc* and *langue d'oïl* (names of the two principal groups of medieval French dialects, named after their respective words for 'yes'), but suddenly fell seriously ill. While he was being looked after, mainly by his mother, in his village, he wrote down the phonetic differences in the provincial dialect used by the various members of his family. His observations, combined with the laboratory methods of articulatory recording and acoustic analysis designed by physiologists Marey and Rosapelly, enabled him to defend his thesis in 1891: *Les modifications phonétiques du langage étudiées dans le patois d'une famille de Cellefrouin* (The phonetic modifications of language, studied in the provincial dialect spoken by a family in Cellefrouin). This work is a diachronic analysis of a variety of *oïl* as spoken by three generations of the same family, from the point of view of physiological phonetics and acoustics as far as those perspectives are relevant to the description of language change. He advocates distance from written language forms and urges dialectologists to study 'the living speech' from oral sources, to take into account such features as 'thought over,' 'instinctive,' 'ideal' and social characteristics (age, place of birth, language habits, etc.) In the first issue of the *Revue des patois gallo-romans* (1887–1892), which he co-edited with Jules Gilliéron, he published an important 'Introduction to the study of provincial dialects.' He developed his instrumental, physiological, and physical analysis of sounds in a treaty that was considerably enriched between the first manuscript, which was awarded the Volney Prize in 1896, and the last edition (*Principles of experimental phonetics*). After he taught at the Institut Catholique de Paris in 1882, Michel Bréal created for him an experimental phonetics laboratory in connection with his Chair of Comparative Literature at the Collège de France. It was only in 1922 that Rousselot obtained a teaching position, and then a chair in experimental phonetics that he was to keep only one year.

Rousselot put phonetics at the service of medicine. Together with Dr Marcel Natier he founded the Institut d'Orthophonie et de Laryngologie and the journal *La Parole* (1899–1904). He did applied research on various subjects (nose, ears, throat, larynx, stuttering, etc.). He also played a founding part in the fields of didactics and foreign language teaching. He applied his subject to orthoepy in courses given at the Alliance Française in Paris (*Centre de correction des accents étrangers*, Centre for Correction of Foreign Accents, founded in 1897) as well as in Germany, and through the publishing of the *Précis de prononciation française* (Handbook of French pronunciation), which he wrote with his nephew Fauste Laclotte. He also published a series of articles on teaching through eyesight, after a (phono-technical) method based on

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graphical lines recording organic activity (*La Parole*, 1901, 1902).

Although he contributed to bringing phonetics, dialectology, physics, and physiology closer together, Rousselot suffered from a lack of recognition while he was alive. He was not able to impose his methods either in the institutions for which he had conducted his research (music and drama academies, language institutes, clinics) or in higher education. When he died (in Paris, on December 16, 1924), his chair at the Collège de France was turned into a chair of histo-physiology, and most of the phonetic equipment was recovered by the Institut Catholique. His system of phonetic transcription – a direct competitor of the IPA – is still used, though by French specialists in Romance languages.

See also: Bréal, Michel Jules Alfred (1832–1915); Gilliéron, Jules (1854–1926); Volney, Constantin-Francois Chasseboeuf, Comte de (1757–1820).

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Rozwadowski, Jan Michał (1867–1935)

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Jan Michał [Jordan] Rozwadowski was born in Czarna, near Tarnów (at that time Austro-Hungarian Galitia), on December 7, 1867. He died on March 14, 1935, on the train, on his return from Warsaw following a lecture in Cracow. Rozwadowski had held a Professorship in Comparative Grammar at the Jagiellonian University, and his first philological training began in Cracow with Latin and Sanskrit. In 1890, he passed an exam entitling him to teach in an elementary school, and a year later he received his Ph.D. To study linguistics, he applied for a scholarship in Germany in 1891, and again in 1894. His academic experience was enriched through the lectures, *inter alia*, of the Slavicist A. Leskien, the Germanist H. Hirt, and the phonetician E. Sievers, in Leipzig.

Rozwadowski primarily took part in seminars conducted by K. Brugmann, under whose supervision he wrote several works, including his *Habilitationsschrift* (reviewed later on by J. N. Baudouin de Courtenay), defended as *Questiones grammaticae et etymologicae*, in conjunction with a lecture on the causes of change of word meaning in the summer of 1897. As an Indo-Europeanist and Slavicist, he made his name known through numerous works relating to almost all domains of the sciences of language: descriptive phonetics, the history of sound changes and lexical borrowings, dialectology, word formation and inflection, etymology and semasiology, syntax and stylistics, and toponomastics. Some of his works dealt with historical documents of the Polish language, Polish onomastics and phonetics, and some with the localization of the homeland of Slavs and Indo-Europeans. He also discovered some regular rules in the language in general.

First, Rozwadowski formulated – in opposition to W. Wundt, who claimed that extra-linguistic objects are usually named after one unique feature – the law of bipartition stating that the base of every language product consists of two parts: a distinguishing component pertaining to its semantic aspect; and an identifying component pertaining to its formal aspect. Second, he formulated the law of quantitative development of a language, stating that the phonetic and semantic difference between pairs of linguistic products must present a constant quantity: when it diminishes under this measure, one of the products, as independent, disappears; when it augments above this quantity, a new independent product comes into existence. Finally, Rozwadowski formulated the law of disautomatization, stating that the principal cause of evolution in linguistic creativity, just as in cultural creativity, is a constant need for the refreshment of an emotional factor being used up through automatization.

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Rozwadowski, Jan Michał (1867–1935)

Z Wąsik, Adam Mickiewicz University, Poznan, Poland

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Jan Michał [Jordan] Rozwadowski was born in Czarna, near Tarnów (at that time Austro-Hungarian Galitia), on December 7, 1867. He died on March 14, 1935, on the train, on his return from Warsaw following a lecture in Cracow. Rozwadowski had held a Professorship in Comparative Grammar at the Jagiellonian University, and his first philological training began in Cracow with Latin and Sanskrit. In 1890, he passed an exam entitling him to teach in an elementary school, and a year later he received his Ph.D. To study linguistics, he applied for a scholarship in Germany in 1891, and again in 1894. His academic experience was enriched through the lectures, *inter alia*, of the Slavicist A. Leskien, the Germanist H. Hirt, and the phonetician E. Sievers, in Leipzig.

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learn more about the relevant features of culture and the psychical development of man, to undertake the following three tasks which appeared to him to be urgent, namely:

1. to describe all linguistic categories and the structures of all languages of the world as constituents of general grammar;
2. to arrange systematically and notionally all possible lexical entries, derived from all languages of the world into a general lexicon, with their etymological explanations and semantic values; and
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Dealing with semantics in its relation to grammar, Rozwadowski argued that semantics is not to be placed in the same dimension with the disciplines describing other systems of language, such as phonetics, inflection, derivation, and syntax. The same is not to be said, as he claimed, with reference to the word morphology, because every language product, constituting a unity of form and meaning, might be considered either from the point of view of morphology or from the point of view of semantics.

On the 40th anniversary of his scholarly activity he was honored by a two-volume *Festschrift* (*Symbolae grammaticae in honorem Ioannis Rozwadowski*. Kraków, 1927–28); among its contributors were M. Rudnicki, J. N. Baudouin de Courtenay, H. Pedersen, A. Sommerfelt, M. Vasmer, and J. Vendryes. Important for the history of general linguistics are the following works of Rozwadowski in particular: 'Semazjologia, czyli nauka o rozwoju znaczeń wyrazów. Jej stan obecny, zasady i zadania'. *Eos 9*, 1903, 17–111; *Wortbildung und Wortbedeutung*, 1904; *O zjawiskach i rozwoju jezyka*, 1921; *Studia nad nazwami wód słowiańskich*, 1948. Most of his monumental publications have been edited in the form of 'Selected writings' (*Wybór pism*, 1–3, 1950–1960).

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Rule Borrowing

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An ongoing debate in historical linguistics revolves around the general question of borrowability: are there constraints that bar certain kinds of linguistic features from being transferred from one language to another in language contact situations? Historical linguists are in general agreement that the most common, and most easily identified, interference features are words. There is also general agreement that new phonological, morphological, and syntactic rules can enter a language as a side effect of lexical borrowing. For instance, the inherited English stress rule was simple: stress the first syllable in the word. Massive lexical borrowing from French after the Norman Conquest of 1066 destroyed this simple rule for the lexicon as a whole, replacing it, on one account, with a complex rule that is supposed to account for both native and borrowed English words: stress the penultimate vowel in the word if the final vowel is lax and is followed by no more than one consonant, but stress the last vowel in the word if that vowel is tense and/or is followed by more than one consonant (Chomsky and Halle, 1968: 70). But those who believe in the existence of this rule do not believe that the rule itself was borrowed from French, because French has no such stress rule; instead, those who accept(ed) Chomsky and Halle's English stress rule would argue that it was abstracted by English speakers from the lexicon as enriched by thousands of French loanwords.

Similarly, English speakers who pluralize the borrowed noun phrases *poet laureate* and *court martial*

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as *poets laureate* and *courts martial*, maintaining the Noun-Adjective word order of the source language, are not applying a rule that was borrowed **as a rule** from French or Latin; they are merely using a borrowed singular phrase and a plural phrase that was borrowed separately, even if (for some speakers) such formations currently have the status of a minor rule. Occasionally we find analogic extensions that provide evidence for speakers' innovative application of a rule abstracted from borrowed lexical items. So, for instance, borrowed Latin singular forms such as *alumnus, bacillus, stimulus* and the corresponding borrowed Latin plurals *alumni, bacilli, stimuli* have given rise to a minor English rule for plural formation in foreign-seeming nouns, and this rule has been extended to words which, like *octopus*, never had such a plural etymologically. Some English dictionaries give alternate plural forms *octopuses* and *octopi* for this noun, but not the etymologically expected *octopodes*. (The word is originally a Greek compound comprising *octo-* 'eight' and *pous, pod-* 'foot'; it does not contain the Latin noun suffix *-us* that usually corresponds to a Latin plural suffix *-i*.)

For processes like these, there is no controversy. What is involved is lexical borrowing followed by the abstraction of a rule from the individually borrowed lexical items, not rule borrowing *per se*. The genesis of the rule takes place in English and the rule is created by English speakers; it does not enter English as part of the borrowing process. Before moving on to examples for which a process of rule borrowing itself might be proposed, we need a definition of 'rule.' For this purpose, the ideal definition will not be theory-internal, but will instead be maximally inclusive. Trask (1993: 245) offers a definition that works well: a rule is:

> any statement expressing a linguistically significant generalization about the grammatical facts of a particular language, especially when formulated within the formalism of some particular formal description . . .

This definition covers not only traditional generative rewrite rules but also lexical generalizations, Optimality Theory 'constraints,' and other generalizations that typically lack arrows in graphic representations. The topic of this article is thus language change through the transfer of generalizations from one language to another.

A slightly less obvious example is found in Asia Minor Greek, which has borrowed massively from Turkish in all grammatical subsystems – lexicon, phonology, morphology, syntax, and (though the most comprehensive source of information, Dawkins, 1916, does not provide many examples) lexical semantics. The most-affected Greek dialects have a vowel-harmony rule that matches the Turkish rule closely, applying both to Turkish loanwords and to native Greek vocabulary. This could easily be another instance of a rule abstracted from borrowed lexicon and then extended to native words, analogous to (but more systematic than) the analogically extended Latin-origin English plurals in *-i*. But the picture is complicated by the fact that the vowel harmony rule is inconsistently applied, even in Turkish loanwords: the word *ǰuván-us* 'a youth' is a Turkish loanword (though ultimately it comes from Persian), and its plural in Asia Minor Greek is *ǰuván-iri*. This plural form would violate the Turkish vowel harmony rule, according to which (among other things) a suffix-initial vowel must agree in the feature [back] with the last vowel of the stem (Dawkins, 1916: 47, and see also the discussion in Thomason and Kaufman, 1988: 218). Elsewhere, however, the same dialects contrast front-vowel and back-vowel plural suffixes in native vocabulary, e.g., *kléfč-iri* 'thieves' vs. *ártup-uri* 'men', as well as in borrowed Turkish words. Inconsistencies of this type suggest that bilingual Greek speakers might possibly have borrowed the rule itself, independent of the loanwords that would have provided evidence for it. (The relevant speakers would presumably have been primarily members of the Greek speech community, because speakers with Turkish as their first language were much less likely to know Greek than vice versa.) Dawkins (1916: 68) makes an observation that hints at manipulation, probably unconscious, by bilinguals who regularly spoke Turkish in addition to Greek:

> The fullness with which the vowel harmony is observed clearly depends on how far the individual speaker is accustomed to talk Turkish and has the Turkish ear for these distinctions . . . It [is] more or less prevalent and thorough in proportion as more or less Turkish is spoken alongside of the Greek dialect.

A search for cases of rule borrowing turns up all too many indeterminate examples for which, as with vowel harmony in Asia Minor Greek, a case could be made for or against a process of rule borrowing. One type of indeterminacy is delayed-action syntactic change that ultimately, but not immediately, results from the borrowing of a grammatical morpheme. An especially clear example is the ongoing change in noun-phrase coordination in Siberian Yupik (Menovščikov, 1969: 128, and see also Thomason and Kaufman, 1988: 55–56). The starting point was the Yupik suffixal construction, with the comitative suffix *-łju* 'with' ([1a] below). Then the conjunction *inkam* 'and' was borrowed by Yupik speakers from the Paleosiberian language Chukchi and used in double-marked coordinate constructions (1b). Finally,

the native Yupik suffixes were dropped and NP coordination was expressed solely by the borrowed conjunction (1c) (all three sentences in example 1 mean 'on the tundra live birds and beasts').

(1a)	Nunivaɣmi	kijaχtaqut	tɨɣiɣat-ɬju	qawaɣɛt-ɬju.
	on.the.tundra	*live*	*beasts*-COM	*birds*-COM
(1b)	Nunivaɣmi	kijaχtaqut	tɨɣiɣat-ɬju	ɨnkam	qawaɣɛt-ɬju.
(1c)	Nunivaɣmi	kijaχtaqut	tɨɣiɣat	ɨnkam	qawaɣɛt.

But the historical sequence of events described here is inferred, not actually attested: Menovščikov found all three constructions in use in Siberian Yupik. The hypothesized sequence is of a common type, with double marking – here, the comitative suffixes on the nouns plus the borrowed coordinate conjunction – as a transitional stage between the original construction and the final construction containing only the innovative form (regardless of whether the innovation is expressed by native or borrowed material). Menovščikov does not, unfortunately, say which speakers used which variants (so that we cannot know whether, for instance, the oldest speakers used only constructions like [1a] and the youngest speakers only constructions like [1c]), but it still seems reasonable to posit a historical transition corresponding to (1a)–(1c).

The important point in the present context, however, is that the borrowed conjunction arguably had at first only a minor impact on the language's syntactic structure, when it was inserted into coordinate NPs as in (1b). The more significant structural change, abandonment of the comitative suffixes entirely, happened some time after the initial borrowing: that is, even if the historical transition was not sharply marked by a temporal separation between the three variants in (1), constructions like (1c) surely appeared later than constructions like (1b). But in that case, the end-stage rule – NP coordination via conjunction alone – was not itself borrowed from Chukchi; only the lexical item, with part but not all of its structural baggage, was borrowed. Even if Yupik speakers moved to the stage represented by (1c) as a result of continuing fluent use of Chukchi, we still cannot prove that the rule itself was borrowed.

Comparable examples are reported from other contact situations, for instance Pipil (a Uto-Aztecan language closely related to Nahuatl) in contact with Spanish in El Salvador, as reported by Harris and Campbell (1995: 147–149, citing Campbell, 1987, 1985). In particular, new relative clause constructions have been innovated in Pipil that make use of the relative marker *ke*, a borrowing from the Spanish relative marker *que*. But since the Pipil examples, like the Siberian Yupik example, begin with lexical borrowing, they cannot be considered indisputable instances of rule borrowing.

Another type of indeterminate example is one in which a rule is lost, not gained, under the influence of another language that lacks the rule. For instance, just as the Indo-European language Asia Minor Greek (partially) adopted a vowel harmony rule under the influence of Turkish, so certain dialects of the Turkic language Uzbek lost their inherited vowel harmony rule under the influence of Indo-European, specifically the Iranian language Tadzhik (Menges, 1945; Comrie, 1981: 65–66). But although this change obviously alters the phonological rule system of the relevant Uzbek dialects, it is not evident that 'rule deletion' is a plausible candidate for a borrowed rule. Examples like these, then, will also not provide evidence that rule borrowing is possible.

Yet another type of contact-induced change that is problematic for claims of rule borrowing is one in which, although the receiving language does change significantly under the influence of the source language, both of the resulting constructions existed in the receiving language before the source language influenced it. In such cases, the change is in the frequency and/or the distribution of a pre-existing construction; it is not a case of adopting a completely new rule. Asia Minor Greek again offers an example. In the most-affected dialects, the inherited Greek definite article has been almost entirely lost, but it is retained in the accusative case, the only place in Turkish grammar in which definiteness is expressed morphologically (Dawkins, 1916: 46, 87). This dramatic alteration in the morphosyntax of the Greek article is certainly due to Turkish influence; it cannot be coincidence that the article has come to be used always and only where Turkish employs an accusative case suffix, namely, to mark a definite object. It is also evident that what has been borrowed into Greek is the pattern of definiteness marking, because there is no borrowed Turkish morpheme and Greek retains its inherited morphosyntactic means of expressing definiteness. Still, from the viewpoint of Greek structure, the change is in frequency (much reduced) and distribution (greatly restricted) of article usage. Skeptics who prefer to believe that rule borrowing is impossible will therefore reject examples of this sort on the grounds that no entirely new category has appeared in Greek.

A final type of change that is indeterminate from the perspective of rule borrowing is a process through which the receiving language does indeed get a new rule as a result of influence from the source language, but the new rule is not identical to the source-language rule. The question here is whether it is reasonable to talk about rule borrowing when (in effect) only part of a rule has been borrowed. Interference in Ethiopic Semitic languages from Cushitic languages

whose speakers shifted in large numbers to Semitic provide two relevant instances of morphosyntactic borrowing. The Semitic languages that were most heavily influenced by Cushitic have replaced the inherited Semitic rules for expressing two morphosyntactic categories by Cushitic rules, but only partly. In both cases, the grammatical morphemes themselves do not change; they were and are native Semitic affixes. First, the inherited Semitic formation of the nagative perfect consisted of a verbal prefix; Cushitic, in sharp contrast, expresses the negative perfect by means of a verbal suffix. Ethiopic Semitic uses a prefix-Verb-suffix construction, combining the Semitic prefix with a copy as a suffix. The resulting construction is neither purely Semitic nor purely Cushitic. The addition of the suffix to the negative perfect construction is obviously due to Cushitic influence (and this analysis is supported by the existence of a wide range of Cushitic features introduced into Ethiopic Semitic), but the end result is not identical to the equivalent Cushitic construction. Second, the inherited Semitic formation of the causative also consists of a verbal prefix. The relevant Cushitic languages form the causative with a doubled verbal suffix. Ethiopic Semitic forms the causative with a doubled prefix – maintaining the placement of the causative affix but adopting the Cushitic pattern of doubling the affix.

Examples of this general type, where the end result of interference (especially in typologically congruent grammatical subsystems) differs both from the original receiving-language structure and from the corresponding source-language structure, are easy to find in phonology. One striking example is the development of a stress pattern, in a dialect of Croatian spoken near the Hungarian border, that is unique in all of Serbo-Croatian. According to Pavle Ivić (1964), the fixed penultimate stress rule of this dialect arose when Hungarian speakers shifted to the local Croatian dialect and failed to acquire the complex prosodic system, including its free (phonemic) stress, Instead, they apparently assumed that stress was fixed, as it is in Hungarian. But, realizing that it was not fixed on the first syllable, as in the Hungarian rule, they settled on a kind of average stress placement, on the penult. As in the Ethiopic Semitic example, here too there is no doubt that interference brought about the change; but the result, though clearly the adoption of a rule, is not the adoption of the same rule as in the source language.

All these indeterminate examples provide a rather clear indication of what sort of example would be a **non**controversial instance of rule borrowing. The ideal example would involve no lexical transfer – that is, although there might be lexical transfer from the same source language to the same receiving language, borrowed morphemes would be unconnected to the proposed transferred rule. In addition, the proposed rule borrowing should result in identical rules in source and receiving language. Fortunately, the ideal case is not hard to find.

There are two main types of contact-induced structural change that frequently involve little or no lexical transfer. First, in cases of language shift, the receiving language is altered as a result of imperfect learning of its structures by shifting speakers; in such a case, especially if the shifting group has lower social, economic, and/or political status than the original target-language speech community, lexical transfer may be minimal. In any case, unless the shifting group is especially prestigious, phonological and syntactic interference features will predominate. By contrast, when imperfect learning is not a factor, i.e., when the initiators of the changes are fluent bilinguals in the source and receiving languages, lexical borrowing is (almost?) always by far the most common type of interference. (For discussion of this distinction, see Thomason and Kaufman, 1988; Van Coetsem, 1988; Thomason, 2001: Chap. 4.) Second, in dialect borrowing, where both lexicon and structure of the source and receiving languages overlap to a very great extent, structure is often transferred without morphemes. The same is true of interference between very closely related languages.

One example in the latter category is an innovative phonological rule in dialects of certain K'ichean languages of the Mayan family that are in intimate contact with Mayan languages of the Mamean branch of the family. This is a dissimilation rule that palatalizes velar stops when there is a uvular later in the word (Campbell, 1998: 74). A morphological example that also belongs in this category is found in the Serbo-Croatian dialect of Hvar, as described by Hraste (1935: 17–25). In the 1930s, elderly speakers of the dialect still used their inherited pattern of syncretism in the oblique plural noun cases of *o*-stem nouns, according to which the genitive/locative plural suffix *-ih* was opposed to a dative/instrumental plural suffix *-ima*. But under the influence of Standard Serbo-Croatian, younger Hvar speakers had replaced this pattern with the Standard one, in which the genitive plural suffix is unique to the genitive and opposed to a single dative/instrumental/locative plural suffix. But only the distribution of the suffixes changed; the original Hvar suffixes remained *-ih* and *-ima*, in partial contrast to the Standard Serbo-Croatian genitive plural *-a*: vs. *-ima*. In other words, only the syncretism rule has been borrowed.

A morphological example resulting from shift-induced interference led to the emergence of the

so-called 'second genitive,' a partitive case, in Russian. Although old interference from Uralic languages in Proto-Slavic is controversial, in part because of the paucity of Uralic loanwords (which, however, is actually characteristic of shift-induced interference; see Thomason and Kaufman, 1988: 238–251 for discussion of Slavic/Uralic contact), more recent shift-induced interference from shifting Uralic (probably Finnic) speakers to Russian is not. One generally agreed-on instance is the development, in the singular of *o*-stem nouns, of a partitive construction alongside the inherited genitive construction. The partitive, or second genitive, case suffix *-u* is native to Russian; it was originally the genitive singular suffix of a now-vanished noun class that was parallel to the *o*-stems. The genitive case suffix *-a*, which used to fulfill partitive as well as other 'genitive' functions in the *o*-stems (as did *-u* in the other noun class), is also native. The preservation of the *-u* suffix and its restructuring into a partitive suffix is due to imperfect learning of Russian by shifting Uralic speakers whose native language(s) had such a distinction. As a result, Modern Russian distinguishes phrases such as *čaška čaj-u* 'cup of tea' (literally 'cup tea-PARTITIVE') from phrases like *cena čaj-a* 'price of tea' (literally 'cup tea-GENITIVE').

Examples of this general type can easily be multiplied. Another typical set of examples comes from the Indic language Shina, which has acquired a sizable number of morphosyntactic features from shifting Burushaski speakers (the examples in this paragraph are all from Lorimer (1937), and other examples may also be found there). No transferred morphemes relevant to these constructions are found in Shina; the patterns must therefore have entered Shina as patterns, not via abstraction from lexical items. Among Lorimer's examples are plural verb agreement with an interrogative pronoun; a singulative suffix derived from the numeral for 'one' and ordered in a suffix string as in Burushaski; and a discourse feature, used in narratives, in which a sentence begins with the verb of the preceding sentence, in the infinitive form and with an oblique case suffix (dative in Burushaski and the accidentally homophonous locative in Shina).

All the evidence that rules can be transferred from one language to another leaves a vital question unanswered: by what process(es) is rule transfer implemented? Crucially, this question pertains to the innovation itself, not to the spread of an innovation through a speech community. A focus on the individual's innovation rather than the group's adoption of an innovation separates the analytic issues addressed here from issues typically studied in (socio) historical linguistic investigations, e.g., those of Labov (1994: 45) and Hopper and Traugott (1993: 38); both of these passages are cited in Hale, 2003). Of course both the innovation and the spread of a change must fit into a single overall picture of linguistic change; but the innovation seems a reasonable place to start, because all the proposed constraints on rule borrowing (and other kinds of contact-induced change) are aimed, ultimately, at the issue of (im)possible innovations, not of (im)possible spread.

A focus on the individual's innovation in accounting for linguistic change is preferred by many historical linguists, but it is especially prevalent among generativists. If, as generative historical linguists tend to believe (see, e.g., Hale, 2003; Lightfoot, 2003), children are the sole agents of language change, and if all change occurs during first-language acquisition as the result of a difference between "the grammar generating the primary linguistic data (PLD) used by an acquirer and the grammar ultimately constructed by that acquirer" (Hale, 2003: 345), then it is difficult to see how most kinds of contact-induced change – in particular shift-induced interference, which requires imperfect second-language learning – could occur at all. This is especially true given another assumption common among generativists, namely, that adults cannot change the grammar they internalized during first-language acquisition.

There is good evidence that children who are growing up bilingual create grammatical constructions that fall under the rubric of rule borrowing, at least from a retrospective viewpoint. One of the most striking examples in the literature is in Queen's research on a group of schoolchildren who grew up bilingual in Turkish (their parents' language) and German (the main language of the community) (Queen, 1996, 2001). These children received input from both languages for first-language acquisition, and that input included a Turkish clausal intonation pattern and a German clausal intonation pattern that performed the same syntactic function. Queen found that the children dealt with the competition between these patterns by incorporating both of them into both their languages and introducing a functional distinction between them – analogous to the preservation in English of the old past tense *hung* of the verb *hang* after the appearance of the analogically formed innovative past tense *hanged*, with a novel semantic distinction introduced between the two past tense forms (roughly, *hanged* for executing people by hanging, *hung* for hanging anything other than a person). Significantly, neither Turkish- nor German-speaking adults in the community noticed the innovation in either language, which suggests that the innovations were nonsalient. The process itself seems akin to rule borrowing, but with a difference: cases of rule borrowing, both the clear ones and the indeterminate ones,

involve one-way transfer of rules from one language to another, not a process through which competing structures are retained in both languages. And children's bilingual first-language acquisition *per se* is very unlikely to lead directly to anything that looks like shift-induced interference, because failure to learn target-language structure is characteristic of second-language acquisition, not of first-language acquisition.

In other words, adults, or at least people beyond the age of first-language acquisition, must play a role in rule borrowing. Some generativists have claimed that adults can only add a few minor rules or other features to their language (e.g., Chomsky and Halle, 1968: 251), and that the grammar internalized in early childhood does not change at all. Aside from Queen's results, many, most, or all of the innovations discussed in this article first arose in adults' speech. The status of innovations in adults' speech is a matter of vigorous debate, but this issue need not be settled here. Whatever the status of borrowed rules may be in an innovating adult's speech, they must comprise part of the adult's linguistic knowledge, because they are used systematically. They will therefore form part of the input to the next generation of language acquirers in the speech community, and so the innovation is integrated into the community's language. But the innovators are not the first-language acquirers but the adults who implement the borrowing. Rule borrowing proceeds, then, either as partial activation of one of a bilingual adult's languages while he or she is speaking the other language (see, e.g., Grosjean and Soares, 1986) or as a carryover from the first language of someone who is trying to learn, because he or she is shifting to, a target language. (This set of options is oversimplified, but space does not permit exploring more subtle distinctions here.) In all cases, of course, the innovation will not become a change in the language until and unless other speakers innovate in the same way and, eventually, learn the innovation from the original innovators. But the innovation itself, in this as in most cases of contact-induced language change, appears to originate in adult speech.

Finally, a bibliographical note. The literature on rule borrowing is not rich – or rather, many examples are discussed in the literature, but the topic of rule borrowing itself is not often addressed directly. The present article is based largely on Thomason (in press); other treatments of the topic are Campbell (1976), for phonology, and Harris and Campbell (1995: Chap. 6), for syntactic borrowing.

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Rule Ordering and Derivation in Phonology

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The goal of phonological theory is the discovery of generalizations. In classic generative phonology, generalizations are stated as rules, which are formalized in terms of distinctive features. Rules derive surface (phonetic) representations from underlying representations. This process, called derivation, will be illustrated by looking at a fragment of Polish phonology. The idea is to discover several different rules and to see how they interact with each other.

At the level of phonetic representation, Polish is known to have the so-called nasal diphthongs, which are sequences of a nasalized vowel followed by a nasal glide. For instance, the word *wąsy* 'moustache' is pronounced [vɔ̃w̃sɨ], where the macron over the vowel and the glide means [+nasal]. Nasal diphthongs occur only before fricatives. This distributional generalization must be somehow reflected in the grammar of Polish. A widely accepted analysis (see, for instance, Gussmann, 1980, and Rubach, 1984) is to treat nasal diphthongs as derivable from underlying oral vowels and the nasal consonant //n//. (Note: I use double slashes for underlying representations, single slashes for intermediate stages, and square brackets for phonetic representations.) In this analysis, *wąsy* comes from the underlying //vɔnsɨ//. The //n// is turned into [w̃] by Nasal Gliding.

(1) Nasal Gliding: n → w̃ before fricatives.

Note: this and the other rules below are stated schematically in an informal way in order to sidestep the problem of which of several existing distinctive feature theories should be used.

Nasalized vowels are also limited distributionally: they occur before the nasal glides [w̃] and [j̃]. (The latter will not be discussed here.) This generalization is captured by Vowel Nasalization.

(2) Vowel Nasalization: V → Ṽ before nasal glides.

The underlying //vɔnsɨ// is turned into the phonetic [vɔ̃w̃sɨ] by applying Nasal Gliding and Vowel Nasalization.

(3) //vɔnsɨ//
vɔw̃sɨ Nasal Gliding
vɔ̃w̃sɨ Vowel Nasalization
[vɔ̃w̃sɨ]

This derivation is completed by applying Stress Assignment, a rule of Polish that puts stress on the penultimate vowel of the word. The phonetic representation is thus [vɔ̃w̃sɨ], where the stressed vowel has been bolded.

Let us now analyze how the rules deriving [vɔ̃w̃sɨ] are related to each other. Notice that the stage in the derivation at which Stress Assignment applies is irrelevant: Stress Assignment could apply as the first or as the second or as the last rule in (3). Such ordering relations between rules are termed nonaffecting, i.e., the rules are in a **nonaffecting order**. The relation between Nasal Gliding and Vowel Nasalization is different. If the rules applied in the reverse order, the surface output would have been [vɔ̃w̃sɨ], with the vowel being oral rather than nasal, which is incorrect.

(4) //vɔnsɨ//
– Vowel Nasalization
vɔ̃w̃sɨ Nasal Gliding
*[vɔ̃w̃sɨ]

Vowel Nasalization cannot have an effect in (4) because the vowel is not followed by a nasal glide at the stage of the derivation at which Vowel Nasalization has been assumed to apply. Because only the result in (3) is correct, we have evidence for the fact that Nasal Gliding and Vowel Nasalization need to be ordered. The question is whether ordering can follow from some general principle or whether it must be stipulated for individual rules.

Notice that the ordering of Nasal Gliding before Vowel Nasalization can be assumed to be natural since otherwise Vowel Nasalization could never apply in any derivation because nasal glides are not

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Notice that the ordering of Nasal Gliding before Vowel Nasalization can be assumed to be natural since otherwise Vowel Nasalization could never apply in any derivation because nasal glides are not

members of the underlying inventory of Polish, i.e., they all come from the application of Nasal Gliding. Consequently, the ordering of Vowel Nasalization before Nasal Gliding would be tantamount to saying that Vowel Nasalization does not exist as a rule of Polish. But Vowel Nasalization does exist in Polish, so the only possible ordering is the one that will permit Vowel Nasalization to apply, i.e., after Nasal Gliding. To put it differently, these rules order themselves automatically, a situation that is termed **intrinsic ordering**.

Not all the rules of the grammar order themselves intrinsically. Some rules require special stipulations that do not follow from any general principle (but see, for example, Kiparsky, 1971). Such stipulations are called **extrinsic ordering**. Extrinsic orders are of four basic types: feeding order, counterfeeding order, bleeding order, and counterbleeding order (Kiparsky, 1968, 1971). Each of these types is discussed separately below.

In Polish, the dental nasal //n// assimilates to the place of articulation of the following stop consonant, as shown in (5).

(5) sęp //sɛnp// → [sɛmp] 'vulture'
pręt //prɛnt// → [prɛnt] 'rod'
bąk //bɔnk// → [bɔŋk] 'gadfly'

The relevant rule is Nasal Assimilation.

(6) Nasal Assimilation: *n* assumes the place of articulation of the following stop consonant.

Furthermore, Polish has a pattern of alternations between [ɛ] and zero, as in *bez* 'lilac' NOM SG—*bz-y* NOM PL and *oset* 'thistle' NOM SG—*ost-y* NOM PL. The *e* that deletes is called a yer. An analysis of the behavior of yers is a matter of much controversy in the literature and will not be presented here (see, for example, Gussmann, 1980; Rubach, 1984, 1986). In a simplified way, Yer Deletion can be stated as the following rule.

(7) Yer Deletion:
ɛ → Ø before a single consonant followed by an inflectional vowel ending.

Consequently, //ɛ// deletes in the plural forms *bz-y* and *ost-y* but not in the singular forms *bez* and *oset* cited earlier.

With this background, we look at the assimilation facts in (8). The examples are nouns in the LOC SG form.

(8) bank-u 'bank': //bank-u// → [baŋk-u]; Nasal Assimilation applies;
pąk-u 'bud': //pɔnk-u// → [pɔŋk-u]; Nasal Assimilation applies;
BUT gank-u 'porch': [gank-u]; Nasal Assimilation does not apply.

The question is why Nasal Assimilation fails to apply to *gank-u*. The reason becomes clear when we look at the NOM SG forms of the words in (8): *bank* [baŋk], *pąk* [pɔŋk] and *ganek* [ganɛk]. Only the last word has [ɛ] between the nasal and the stop in the NOM SG. This *e* must be a yer at the underlying level because it deletes when the ending *-u* is added in the LOC SG: *gank-u*. The underlying representation of *gank-u* is therefore //ganɛk-u//. The yer blocks Nasal Assimilation, so the order of the rules must be Nasal Assimilation before Yer Deletion, as shown by the derivation in (9), which represents the facts of the Warsaw dialect of Polish.

(9) Warsaw Polish:
//bank-u// //pɔnk-u// //ganɛk-u//

baŋk-u	pɔŋk-u	–	Nasal Assimilation
–	–	gank-u	Yer Deletion
[baŋku]	[pɔŋku]	[ganku]	

The order in (9) must be stipulated, so it is extrinsic rather than intrinsic.

Interestingly, the nasal assimilation facts are different in the Cracow dialect of Polish. In this dialect, we witness assimilation not only in *bank-u* [baŋk-u] and *pąk-u* [pɔŋk-u] but also in *gank-u* [gaŋk-u]. The analysis is that Cracow Polish reverses the order of the rules in (9).

(10) Cracow Polish:
//bank-u// //pɔnk-u// //ganɛk-u//

–	–	gank-u	Yer Deletion
baŋk-u	pɔŋk-u	gaŋk-u	Nasal Assimilation
[baŋku]	[pɔŋku]	[gaŋku]	

The interaction between Yer Deletion and Nasal Assimilation in Cracow Polish is such that Yer Deletion creates the environment for the application of Nasal Assimilation to *gank-u*: after the deletion of the yer ɛ, the nasal stands next to the stop, so Nasal Assimilation can apply. We say that Yer Deletion and Nasal Assimilation apply in a **feeding order** in Cracow Polish, i.e., Yer Deletion feeds Nasal Assimilation.

The analysis of Warsaw Polish in (9) is different. The ordering of Nasal Assimilation before Yer Deletion makes the former rule inapplicable to *gank-u* //ganɛk-u//, which decreases the number of inputs to Nasal Assimilation. We say that Yer Deletion counterfeeds Nasal Assimilation in Warsaw Polish: the rules apply in a **counterfeeding order**.

To summarize, rules X ordered before Y are in a feeding order if X changes inputs in such a way that Y becomes applicable, as in (10). The opposite order is counterfeeding. If Y is ordered before X and attempts to apply but cannot do so because X has not applied yet, then X counterfeeds Y, as in (9).

A bleeding relation between rules is illustrated by the interaction of Fricative Devoicing and Voice Assimilation. Obstruent clusters in Polish must agree in voicing, i.e., they are either voiceless or voiced. This surface-true generalization is an effect of either of the following rules: Voice Assimilation, which applies regressively, or Fricative Devoicing, which applies progressively.

Voice Assimilation is a general rule that affects all obstruents and causes either voicing or devoicing. The decision of whether we have voicing or devoicing rests with the obstruent on the right, i.e., the obstruent that follows. Thus, the rule applies regressively, as shown in (11).

(11) a. Devoicing:
wesz [vɛʃ] 'louse' NOM SG – wsz-y [fʃ-ɨ] NOM PL, hence //vɛʃ-ɨ// → [fʃ-ɨ]

b. Voicing:
liczeb-n-y [litʃɛb-n-ɨ] 'numerous' – liczb-a [lidʒb-a] 'number'; the underlying representation of *liczb-a* is //litʃɛb-a// containing //tʃ//and the yer //ɛ//, both of which occur on the surface in the adjective *liczeb-n-y*, where the *-n* is the adjectivizing morpheme and the *–y* is the NOM SG ending of the adjective declension. The noun *liczb-a* undergoes Voice Assimilation: //litʃɛb-a// → [lidʒb-a]. (Consonants before *i* are soft, that is, palatalized, but I suppress this allophonic detail here and below.)

Voice Assimilation is stated informally as follows.

(12) Voice Assimilation: An obstruent assumes the feature [−voice] or [+voice] from the obstruent that follows.

Clusters of a voiceless obstruent followed by a voiced fricative behave differently from the way predicted by Voice Assimilation: the voiced fricative devoices under the influence of the preceding voiceless obstruent, i.e., the direction of assimilation is progressive rather than regressive. This observation is illustrated by words such as *bitw-a* [bitf-a] 'battle,' whose underlying representation is //bitɛv-a//. Both the yer and the voiced fricative //v// are motivated by the alternations in the adjective *bitew-n-y* [bitɛv-n-ɨ] 'warlike.' (Here, unlike in *bitw-a*, Yer Deletion is inapplicable, as the yer is separated from the following vowel suffix by two consonants.) In the noun *bitw-a* //bitɛv-a//, the two obstruents come together after the yer has been deleted: //bitɛv-a// → /bitv-a/. The /tv/ is devoiced to [tf] by Fricative Devoicing, a progressive assimilation rule.

(13) Fricative Devoicing: Fricatives become voiceless after a voiceless obstruent.

Notice that the intermediate derivational stage /bitv-a/ could potentially be an input to either Voice Assimilation or to Fricative Devoicing. In the former case, we would obtain a voiced cluster, which is incorrect: /bitv-a/ → *[bidv-a]. The attested output [bitf-a] is derived by applying Fricative Devoicing: /bitv-a/ → [bitf-a]. This result is delivered by the ordering of Fricative Devoicing before Voice Assimilation. The derivations of *bitw-a* as well as of *wsz-y* 'lice' and *liczb-a* 'number' cited in (11) are as follows.

(14)	//vɛʃ-ɨ//	//litʃɛb-a//	//bitɛv-a//	
	vʃ-ɨ	litʃb-a	bitv-a	Yer Deletion
	–	–	bitf-a	Fricative Devoicing
	fʃ-ɨ	lidʒb-a	–	Voice Assimilation
	[fʃ-ɨ]	[lidʒb-a]	[bitfa]	

Fricative Devoicing applies only to /bitv-a/ because this is the only word that meets the rule's environment: a voiced fricative is after a voiceless obstruent. (In /litʃb-a/, the obstruent after /tʃ/ is voiced but it is a stop /b/ and not a fricative, so Fricative Devoicing cannot apply.)

The relation between Fricative Devoicing and Voice Assimilation reveals a new type of extrinsic ordering: a **bleeding order**, which is defined as an ordering relation under which the application of one rule destroys the environment for the application of another rule. (The ordering of Yer Deletion before Fricative Devoicing is feeding because the deletion of the yer provides a context for the application of Fricative Devoicing.) The application of Fricative Devoicing in (14) removes /bitv-a/ from the list of inputs to Voice Assimilation (more accurately: to its part that is responsible for voicing). After the /tv/ has been changed into [tf], the voicing, /tv/ → [dv], is no longer possible: Fricative Devoicing and Voice Assimilation are in a bleeding order, i.e., Fricative Devoicing bleeds Voice Assimilation. (Actually, if Voice Assimilation applied before Fricative Devoicing turning /tv/ into [dv], Fricative Devoicing also would have been bled, so in fact Fricative Devoicing and Voice Assimilation stand in a mutually bleeding relation.)

Finally, rules may stand in a **counterbleeding order**, which is the reverse of the bleeding order. Rules X and Y are in a counterbleeding order if rule X applying

before Y fails to destroy the context for the application of rule Y. That is, Y would have bled X if the order were Y before X. This rather complex relation is illustrated by the interaction between Yer Deletion and Velar Palatalization.

Velar consonants //k g x// change into postalveolars [tʃ dʒ ʃ] before front vowels, a process that is known as Velar Palatalization.

(15) Velar Palatalization k g x → tʃ dʒ ʃ before front vowels.

The operation of this rule is illustrated in (16), where we look at the alternations triggered by the diminutive suffix *–ek*.

(16) kro*k* 'step' – krocz-ek [krɔtʃ-ɛk] NOM SG – krocz-k-u [krɔtʃ-k-u] LOC SG
mózg 'brain' – móżdż-ek [muʒdʒ-ɛk] NOM SG – móżdż-k-u [muʃtʃ-k-u] LOC SG
gro*ch* (*ch* stands for [x]) 'pea' – grosz-ek [grɔʃ-ɛk] NOM SG – grosz-k-u [grɔʃ-k-u] LOC SG

A comparison of the diminutive forms in the NOM SG and LOC SG shows that the *e* of the suffix *–ek* is a yer because it deletes when a vowel ending is added to the stem, as in the LOC SG. The point of interest is that Velar Palatalization takes effect not only in the NOM SG, where the front vowel *e*, a trigger of the rule, is present overtly on the surface but also in the LOC SG, where //ɛ// has been deleted by Yer Deletion. Clearly, the ordering of Velar Palatalization and Yer Deletion must be such that Velar Palatalization applies at the stage when //ɛ// is still present, i.e., before Yer Deletion can have an effect. In (17), we look at the derivation of the LOC SG form *grosz-k-u* 'pea,' whose underlying representation is //grɔx-ɛk-u//, with //x// being motivated by its occurrence in the nondiminutive form *groch* [grɔx].

(17) //grɔx-ɛk-u//
grɔʃ-ɛk-u Velar Palatalization
grɔʃ-k-u Yer Deletion
[grɔʃku]

Velar Palatalization and Yer Deletion apply in a **counterbleeding order**, which is the opposite of the bleeding order. Notice that if Yer Deletion were ordered before Velar Palatalization, then Velar Palatalization would have been bled (i.e., blocked) in its application to *grosz-k-u*, as shown in (18).

(18) //grɔx-ɛk-u//
grɔx-k-u Yer Deletion
– Velar Palatalization
*[grɔxku]

To summarize, a bleeding order is one in which the application of one rule destroys the environment for the application of another rule. We saw this in (14), where Fricative Devoicing made the application of Voice Assimilation impossible. The opposite relation where the order could have been bleeding but actually is not is called counterbleeding. This was illustrated in (17): the ordering of Yer Deletion after Velar Palatalization made the latter rule applicable.

Derivations can be long and complex. Such is the case for the LOC SG form *drąż-k-u* [drɔ̃w̃ʃ-k-u] 'pole' (diminutive). The underlying representation here is //drɔng-ɛk-u// and it is motivated as follows.

As noted earlier, the diminutive suffix has a yer because it shows an *e* – zero alternation seen in (16). Actually, this alternation is found also in the example under discussion because the NOM SG of *drąż-k-u* is *drąż-ek* [drɔ̃w̃ʒ-ɛk]. A comparison of [drɔ̃w̃ʃ-k-u] LOC SG and [drɔ̃w̃ʒ-ɛk] NOM SG shows that the root-final consonant must be voiced at the underlying level: we see the voiced [ʒ] in [drɔ̃w̃ʒ-ɛk]. The voiceless [ʃ] in the LOC SG [drɔ̃w̃ʃ-k-u] must therefore be due to Voice Assimilation: the devoicing of /ʒ/ to [ʃ] before the voiceless obstruent [k].

However, *ʒ* is not the underlying segment in the root morpheme, because we see [g] in the non-diminutive LOC SG form *drąg-u* [drɔŋg-u]. That is, the [ʒ] of *drąż-ek* [drɔ̃w̃ʒ-ɛk] DIMIN NOM SG alternates with the [g] of *drąg-u* [drɔŋg-u] LOC SG. Polish has a rule that derives [ʒ] but this rule, known as Spirantization, applies to /dʒ/ and not to /g/.

(19) Spirantization: dʒ → ʒ after sonorants.

The rule is restricted to the context of sonorants, because it does not apply if the preceding consonant is an obstruent. Consequently, there is not spirantization of *dʒ* to *ʒ* in *mózg* 'brain' – *móżdż-ek* [muʒdʒ-ɛk]. (The [ʒ] in [muʒdʒ-ɛk] is of a different origin: it is an effect of assimilation of /z/ to [ʒ] before [dʒ].)

Returning to *drąż-k-u*, we note that the derivation of /ʒ/ from //g// is possible if //g// is turned into /dʒ/ because then Spirantization becomes applicable. What we need is to find a way of changing the underlying //g// into /dʒ/. The solution is simple: the yer of the diminutive suffix //ɛk// triggers Velar Palatalization, hence //g// → /dʒ/.

Finally, the glide [w̃] is derived from //n// by Nasal Gliding, rule (1) discussed earlier. The derivation is completed by applying Vowel Nasalization (2) that nasalizes vowels before nasal glides.

In sum, the derivation for the LOC SG form //drɔng-ɛk-u// → [drɔ̃w̃ʃku] is as follows. (Stress Assignment is ignored.)

(20) //drɔng-ɛk-u//
drɔndʒ-ɛk-u Velar Palatalization
drɔnʒ-ɛk-u Spirantization

drɔnʒ-k-u	Yer Deletion
drɔw̃ʒ-k-u	Nasal Gliding
drɔ̃w̃ʒ-k-u	Vowel Nasalization
drɔ̃w̃ʃ-k-u	Voice Assimilation
[drɔ̃w̃ʃku]	

This derivation presents an array of various ordering relations between rules.

i. Some rules are **nonaffecting**, i.e., they are not related, so their ordering is irrelevant. This is true for Spirantization and Yer Deletion as well as for Voice Assimilation and Nasal Gliding or Vowel Nasalization.
ii. The ordering of Vowel Nasalization after Nasal Gliding is **intrinsic**. That is, if the order were reversed, then Vowel Nasalization would never have a chance to apply in Polish because all nasal glides are derived by Nasal Gliding and none exist in the underlying representation of Polish morphemes. Similarly, if Polish has no underlying //dʒ// (this is not fully accurate but let us ignore it here), the ?show =x(100)?> ordering of Spirantization after Velar Palatalization is intrinsic because this is the only imaginable order that would give Spirantization a chance to apply and hence document its presence in the grammar of Polish.
iii. Velar Palatalization and Yer Deletion stand in a **counterbleeding** relation: if the latter applied first, Velar Palatalization would have been bled since its trigger, the front vowel, would have been deleted. Counterbleeding is also true for Voice Assimilation and Spirantization: if Voice Assimilation were to apply before Spirantization, then Spirantization would have been bled because the intermediate /dʒ/would have been turned into /ʧ/, and Spirantization works on /dʒ/ and not on /tʃ/.
iv. The relation between Yer Deletion and Voice Assimilation is **feeding** since the deletion of the /ɛ/ brings together a voiced obstruent (here /ʒ/) and a voiceless obstruent (here /k/), which makes Voice Assimilation applicable. Similarly, Spirantization feeds Nasal Gliding because the latter applies before fricatives, so it becomes applicable only after /dʒ/ has been turned into /ʒ/.

Rules and their application in derivation can be evaluated from the perspective of **transparency** and **opacity**, the concepts introduced by Kiparsky (1971, 1973). Judgments regarding transparency and opacity are formed on the basis surface phonetic facts. A rule is transparent if its application can be understood by inspecting surface representations alone, without recourse to intermediate derivational stages. Opacity is the reverse of transparency. If no rationale for the application of a certain rule can be found in the surface structure, then the rule is opaque. The fragment of Polish phonology presented in the preceding paragraphs bears witness to both transparent and opaque rules.

Vowel Nasalization stated in (2) is a classic example of a transparent rule. Recall that vowels are nasalized before nasal glides and that Vowel Nasalization is the only source of nasalized vowels. That is, nasalized vowels do not exist in the underlying representation and they do not come from any other rule. The situation is simple: if we see a nasalized vowel, then it is always followed by a nasal glide, and there are no exceptions to this generalization. Thus, we can always see in the surface representation the rationale for the occurrence of nasalized vowels. To put it differently, the trigger of the rule, a nasal glide, and the effect of the rule, a nasalized vowel, are always visible in the surface representation. Since Vowel Nasalization is ordered intrinsically after Nasal Gliding (1), the generalization is that intrinsic order leads to transparency. Transparency is also the property of the rules that stand in two other ordering relations: feeding and bleeding.

The feeding order between Nasal Assimilation and Yer Deletion in Cracow Polish makes Nasal Assimilation a fully transparent rule. This is documented by the fact that all surface occurrences of [ŋ] before stops are due to Nasal Assimilation. We see [ŋ] not only in *bank* [baŋk] 'bank' but also in *gank-u* [gaŋk-u] 'porch' LOC SG; recall the derivation in (10).

The bleeding order between Fricative Devoicing and Voice Assimilation makes Fricative Devoicing transparent. First, there are no surface representations that would contradict the operation of Fricative Devoicing because clusters of obstruents are always uniform in their value for [±voice]. Second, the trigger of devoicing, a voiceless obstruent preceding the fricative, is always present in the surface representation.

Whereas feeding and bleeding orders lead to transparency, counterfeeding and counterbleeding orders cause opacity. A rule is opaque if we find derivations in which the application of this rule cannot be explained by looking at surface representations. The counterfeeding relation between Nasal Assimilation and Yer Deletion in Warsaw Polish is an example in point. The occurrence of [nk] rather than the expected [ŋk] in *gank-u* [gank-u] 'porch' LOC SG is not understandable from the point of view of surface representations. There is no answer to the question of why Nasal Assimilation has not applied to *gank-u*, given that the task of the rule is to assimilate /n/ to the following stop and [n] is followed by [k] in this example. The reason for the failure of Nasal Assimilation to apply to *gank-u* is hidden at an intermediate derivational stage. Recall Nasal Assimilation applies in

Warsaw Polish at the stage at which the underlying yer of //ganɛk-u// has not been deleted yet by Yer Deletion. Consequently, the nasal and the stop are not adjacent when Nasal Assimilation applies: Yer Deletion counterfeeds Nasal Assimilation. Later the yer deletes, yielding the unassimilated cluster [nk]. The absence of assimilation makes Nasal Assimilation opaque.

The counterbleeding order between Velar Palatalization and Yer Deletion in (17) shows that Velar Palatalization is opaque. The reason is that the change of the underlying //x// into [ʃ] in *grosz-k-u* 'pea' DIMIN LOC SG, //grɔx-ɛk-u// → [grɔʃ-k-u], makes no sense from the point of view of the surface representation. Since the trigger of Velar Palatalization, the yer *e*, is not present on the surface, we find no answer to the question of why Velar Palatalization has applied here.

McCarthy (1999) clarifies the concepts of transparency and opacity by evaluating phonological generalizations in terms of whether they are **surface-true** and **surface-apparent**. A rule is surface-true it is not violated in any regular way in surface representations. For example, Vowel Nasalization is surface-true because there are no instances of oral vowels before nasal glides in Polish. That is, Vowel Nasalization applies to vowels before nasal glides in an entirely exceptionless manner. The rule is also surface-apparent because its trigger, a nasal glide, is always present in the surface representation. More generally, a rule is surface-apparent if the reason for its application can be discovered by inspecting surface representations. Transparent rules are both surface-true and surface-apparent. In contrast, opaque rules fail on these criteria.

Nasal Assimilation in Warsaw Polish is not surface-true because it regularly fails to apply to words such as *gank-u* 'porch' LOC SG. The reason for this failure – the occurrence of a yer – is not visible in the surface representation because the yer has been deleted. That is, judging from the point of view of surface representations, Nasal Assimilation has a regular class of exceptions. The generalization is that not-surface-true rules are opaque.

Velar Palatalization is not surface-apparent. The evidence comes from words such as *grosz-k-u* 'pea' DIMIN LOC SG. Notice that the situation here is different from that found in *gank-u*. The word *grosz-k-u* [grɔʃ-k-u] is not a surface exception to Velar Palatalization because it does not have a velar consonant before a front vowel. That is, its surface representation is not *[grɔx-ɛk-u]. Rather, the problem is that we see no reason in the surface representation for why Velar Palatalization has applied here changing the underlying //x// into the surface [ʃ]: there is no front vowel in [grɔʃ-k-u] that could have triggered Velar Palatalization. A rule is not-surface apparent if its trigger is not visible in the surface representation. Such a rule is opaque. To conclude, opacity is the property of rules that are either not-surface-true or not-surface-apparent.

Finally, let us look at the relation between the domain of rules and extrinsic ordering. The point is that some (but not all) extrinsic orders can be predicted from the domain in which rules apply. This idea is best expressed in the model of Lexical Phonology, which draws a distinction between lexical and postlexical rules (Kiparsky, 1982; Booij and Rubach, 1987).

Lexical rules apply in the domain not larger than words because words and not phrases are derived in the lexicon. Postlexical rules are not limited in this way. They apply after the syntactic component of the grammar has put words together to form phrases and sentences, so postlexical rules use phrases and sentences as their domains. To put it differently, postlexical rules apply not only inside words but also across word boundaries. The distinction between lexical and postlexical rules is illustrated by the operation of Fricative Devoicing (13) and Voice Assimilation (12).

Recall that Fricative Devoicing must apply before Voice Assimilation (see (14)). This fact coincides with the observation that all instances in which Fricative Devoicing applies are strings that are wholly contained within the word. Consequently, Fricative Devoicing is a lexical rule. In contrast, Voice Assimilation cannot be regarded as lexical because we see it operating in phrase phonology.

(21) brat 'brother' NOM SG – brat-[brat-a] GEN SG, hence //brat//
BUT brat Barbabry [brad barbarɨ] 'Barbara's brother': /t#b/ → [d#b]
kod 'code' NOM SG – kod-u [kɔd-u] GEN SG, hence //kɔd//
BUT kod pocztowy [kɔt pɔʧtɔvɨ] 'postal code': /d#p/ → [t#p]

We conclude that Voice Assimilation is a postlexical rule.

The ordering of Fricative Devoicing before Voice Assimilation is now predicted correctly by the model of Lexical Phonology, whose tenet is that the lexical component of phonology (and hence the rules that constitute it) precedes the postlexical component (and hence the rules that constitute it).

The analysis of Fricative Devoicing and Voice Assimilation in terms of the lexical-postlexical distinction is corroborated by phrases that contain a

word-final voiceless obstruent followed by a word-initial voiced fricative, for instance, *brat wasz* //brat vaʃ// → [brad vaʃ] 'your brother.' According to Lexical Phonology, the phrase *brat wasz* does not exist in the lexical component in which lexical phonological rules apply. Rather, what we have is two separate words: *brat* and *wasz*. These words are processed separately by lexical rules. The consequence of this analysis is that the final /t/ of *brat* and the initial /v/ of *wasz* do not form the cluster /tv/ in the lexical component. In contrast, the /tv/ of *bitw-a* 'battle' is visible to lexical rules because the cluster is contained wholly within one word (recall the derivation in (14)). Fricative Devoicing, a lexical rule, takes effect, yielding [tf]. In the postlexical component, inputs are the structures derived by the syntax, hence phrases and sentences. It is there that *brat wasz* occurs as a phrase for the first time. (Let us assume that *bitwa* does not enter into any larger syntactic structure, hence it is a phrase itself.) Voice Assimilation, a postlexical rule, applies and voices the final /t/ of *brat* to [d], the correct result.

(22) Lexical component:

//bitɛv-a//	//brat//	//vaʃ//	
bitv-a	–	–	Yer Deletion
bitf-a	–	–	Fricative Devoicing

Postlexical component:

/bitfa/	/brat	vaʃ/	
–	brad	vaʃ	Voice Asssimilation
[bitfa]	[brad	vaʃ]	

To summarize, the word-internal /tv/ in *bitwa* and the phrasal /t v/ in *brat wasz* follow contradictory strategies in achieving the goal of making the cluster uniform with regard to the feature [±voice]: we see devoicing word-internally, /tv/ → [tf], and voicing in phrasal phonology, /t v/ → [d v]. These contradictions are reconciled by Lexical Phonology because, for independent reasons, Fricative Devoicing is a lexical rule, whereas Voice Assimilation is a postlexical rule. Because by definition lexical rules must precede postlexical rules, the extrinsic ordering between Fricative Devoicing and Voice Assimilation does not have to be stipulated any longer.

The final question is whether the concepts of ordering and derivation exist in the most recent version of generative phonology called Optimality Theory (Prince and Smolensky, 1993; McCarthy and Prince, 1995). The answer is that they exist, but the notion of derivation is highly controversial. Ordering appears in Optimality Theory as ranking, but it is the ranking of universal constraints and not the ordering of language-specific rules. Standard Optimality Theory rejects derivation and claims that phonological processing is carried out in a fully parallel (simultaneous) fashion, but there are researchers who claim that the rejection of derivation is an error (see, for example, Kiparsky, 2000; Rubach, 2000a, 2000b, 2003). The view of these researchers is that Optimality Theory should build on Lexical Phonology and admit three derivational levels: the stem level, the word level, and the postlexical level. Phonological processing within a level is fully parallel, as in standard Optimality Theory. However, the output of the stem level is the input to the word level, and the output of the word level is the input to the postlexical level, so we have derivational steps.

See also: Generative Phonology; Lexical Phonology and Morphology; Polish: Phonology; Pragmatics: Optimality Theory.

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Rules and Principles

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The notions 'rule' and 'principle' lie at the heart of the generative approach to linguistics. A grammar in this tradition is not prescriptive but rather is a finite, mentally represented system of rules that specifies a native speaker's knowledge about the mapping between linguistic expressions and their meaning. The rules that make up this system fall in two types.

The first define the set of well-formed phonological, morphological, syntactic, or semantic structures for the language. It is often assumed that each of these subdomains has its own dedicated generative rule system, although there is no universal agreement on the matter.

The second type of rule maps between linguistic objects that are constructed by different generative rule systems. For example, if it is assumed that syntactic and phonological structures are generated by dedicated rule systems, then there must be mapping rules that determine which phonological structures may be associated with which syntactic structures.

Let us consider generative rule systems first. Proposing a linguistic rule is not a matter of stating an inductive generalization (that is, a generalization based on the observation of repeated 'patterns' in the data). The formulation of a rule invariably depends on previous hypotheses about the domain under investigation, namely concerning the inventory of primitive objects that rules can be defined over. To give an example from syntax, rules for sentence structure rely on the hypothesis that words are specified for syntactic category (a label taken from a small set such as {V,N,A,P}). Once that much has been assumed, it becomes possible to state a rule like (1), which says that a V (such as *reads*) and an N (such as *books*) form a verbal category called a VP (verb phrase).

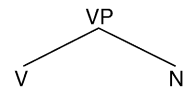

Figure 1 A simple verb phrase.

(1) VP → V N

Traditionally, a linguistic rule maps one object to another. A typical example is the rewrite rule described earlier, which maps the category VP to a string consisting of two categories, namely V and N. However, such a rule can also be interpreted as a well-formedness constraint. Thus, (1) can be read as a principle licensing the partial tree structure (**Figure 1**), in which a VP has a V and an N as its daughters. As a result, in modern linguistics the words *rule* and *principle* (or *constraint*) are often used synonymously.

The second type of rule identified earlier relates linguistic objects of different types. Such mapping rules allow for various kinds of mismatches between the structures they relate. To see this, consider an example like *John expects Mary to win*, in which the syntactic phrasing groups *Mary* together with *to win* (as in [2]), while the prosodic structure groups *Mary* together with *expects*, so that *Mary* precedes a prosodic boundary (as in [3]).

(2) [[John] [expects [[Mary] [to [win]]]]]

(3) [John]φ [expects Mary]φ [to win]φ

This mismatch falls into place if the mapping rules that relate syntactic and prosodic structures determine that right edges of prosodic phrases coincide with right edges of syntactic phrases.

See also: Fanagolo; Generative Phonology; Generative Semantics; Lexicon, Generative.

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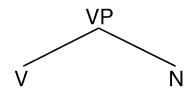

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See also: Fanagolo; Generative Phonology; Generative Semantics; Lexicon, Generative.

Rules and Rule-Following

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Why are the notions of rules and rule-following of significance to the philosophy of language and linguistics? Inspired by the discussions of rule-following in Wittgenstein's *Philosophical investigations* (sections 138–242) and *Remarks on the foundations of mathematics* (section VI), Saul Kripke and Crispin Wright independently developed arguments that challenged our intuitive conception of *meaning* as both *factual* and *objective* (see Wright [1980], Chapters 2 and 12, and Kripke [1982]). In this article, we will focus on the rule-following issue as presented by Kripke.

Rule-Following and Meaning

Suppose that Jones intends to follow the rule 'Add 2' in continuing the series: 2, 4, 6, 8, 10, ... Jones can continue the series in ways that *accord* or *fail to accord* with the requirements of the rule. For example, the continuation 12, 14, 16, . . . would accord with the rule (as standardly understood), whereas the continuation 12, 13, 14, . . . would fail to accord with the rule (as standardly understood). In other words, the former continuation would be *correct* by the lights of the rule, whereas the latter would be *incorrect* by the lights of the rule: the rule provides a *normative standard* against which particular continuations can be assessed as correct or incorrect. Intending to follow a rule is analogous in certain respects to meaning something by a linguistic expression. The meaning of a linguistic expression provides a normative standard against which the uses of that expression can be assessed as correct (or incorrect), as according with that meaning (or failing to accord with that meaning). Thus, for example, given the usual meanings of the numerals and signs involved, and given the arithmetical fact that the sum of 68 and 57 is 125, the answer '125' to the query '68 + 57 = ?' will be correct by the lights of those meanings, whereas the answer '5' will be incorrect by the lights of those meanings.

Suppose that Jones has laboriously written out the series 2, 4, 6, 8, . . . , 996, 998. Is there a fact of the matter as to what rule he's been following in writing out this sequence? Ordinarily, we'd be inclined to say that there is a fact of the matter, and, that, in all likelihood, he's been following the rule 'Add 2' (and not, say, the rule 'add 3,' or not following any rule at all but simply writing down numerals at random). According to Kripke's Wittgenstein (hereafter 'KW'), this is an illusion: there is no fact of the matter as to what rule Jones has been following, and indeed no fact of the matter as to whether Jones has been following any rule at all. In similar fashion, we can ask whether there is a fact of the matter as to what meaning Jones associates with the '+' sign. Assuming that Jones's uses of the '+' sign have been roughly similar to our own, we'd be inclined ordinarily to say that there is a fact of the matter, and, that in all likelihood, he understands '+' to mean the *addition* function (and not, say, the multiplication function or no function whatsoever). As in the case of rules, KW claims that this is an illusion: there is no fact of the matter as to what Jones means by '+,' and indeed no fact of the matter as to whether he means anything at all by '+.'

Constitutive and Epistemological Skepticism

Before turning to KW's argument, we need to note a distinction between two types of skepticism. An *epistemological skeptic* about a particular area claims that we are not entitled to the knowledge claims that we typically make within it. Thus, for example, an epistemological skeptic about the external world (such as the skeptic who is Descartes's protagonist in his *Meditations*) would argue that I am not entitled to claim that I know that I am currently awake and sitting at a computer writing a philosophy essay. The epistemological skeptic doesn't question whether there is a fact of the matter as to whether I'm currently awake: he's happy to concede that there is a fact of the matter (either I'm awake, etc., or I'm not), and questions only whether I'm entitled to say that I know which of the two relevant possibilities is actually the case. *KW's skepticism about rule-following and meaning is not only epistemological skepticism*. KW argues, not only that we don't know whether we mean addition by '+,' or intend to follow the rule 'Add 2,' but also that there may not be anything *to* know. That is, not merely are we ignorant about what '+' means; there is no fact of the matter as to what it means – there is nothing for meaning facts to consist in or to be constituted out of. KW is thus a *constitutive skeptic* about rule-following and meaning. But as we'll see, KW takes an epistemological route to his constitutive skepticism.

KW's Skeptical Argument

Suppose that, in the examples above, Jones has never previously gone beyond 996 in his apparent attempts

to continue the arithmetical series generated by the rule 'Add 2,' and has never performed arithmetical calculations with numbers greater than 57 (the fact that Jones is a finite creature ensures that we can always set up this sort of scenario simply by choosing numbers that are large enough). If there were a fact of the matter as to what rule Jones is trying to follow, or a fact of the matter as to what meaning he associates with the '+' sign, there would be a fact of the matter as to how he ought to continue the number series (if he is to accord with the relevant rule), and a fact of the matter as to how he ought to answer the query '68 + 57 = ?' (if his practice is to accord with the relevant meaning). KW argues that there is no fact of the matter as to how he ought to continue the number series, and no fact of the matter as to how he ought to answer the query '68 + 57 = ?.' Who is to say that Jones does not, in the case of the number series, intend to follow the rule 'Zadd 2,' in which the result of zadding 2 to a number is the same as the result of adding 2 to a number for numbers less than 1,000 and the same as the result of adding 4 to a number for numbers greater than or equal to 1,000? If Jones intended to follow this non-standard rule in continuing the series, he ought to continue the series 998, 1000, 1004, 1008, ... and not as we'd expect, namely 998, 1000, 1002, 1004, 1006 ... and so on. Likewise, who is to say that Jones does not, in the case of the arithmetical calculation, understand '+' to mean, not the addition function but, rather, the *quaddition* function, in which the result of *quadding* two numbers x and y is the same as adding them when both x and y are less than 57 but, rather, 5, when either x or y is greater than or equal to 57? If Jones meant the quaddition function by the '+' sign, he ought to answer '5' to the query '68 + 57 = ?,' and not, as we'd expect, '125.'

KW's argument proceeds by allowing us *unlimited and omniscient access* to two broad categories of fact, and invites us to find the fact that constitutes Jones's intending to follow the 'Add 2' rule as opposed to the 'Zadd 2' rule, or Jones's meaning addition as opposed to quaddition by '+': facts about Jones's previous behavior and behavioral dispositions and facts about Jones's mental history and mental states. The assumption is that if facts about rule-following and meaning are to be found anywhere, they will be found within these two kinds of fact. So, if unlimited and omniscient access to these two classes of fact fails to turn up a fact that constitutes Jones's intending to follow one rule rather than another, or meaning one thing rather than another, it will follow that there is simply no such fact to be found. This is why we said above that KW's argument for constitutive skepticism proceeds via an epistemological route: KW argues that even given unlimited and omniscient access to facts about Jones's behavior and behavioral dispositions and facts about Jones's mental life, we still couldn't claim to know, or justify, a particular hypothesis about how Jones ought to continue the arithmetical series or answer the arithmetical query.

Facts about Jones's previous behavior won't do the trick, as all of that behavior is consistent with Jones's intending to follow the 'Zadd 2' rule or meaning the quaddition function by the '+' sign: *ex hypothesi*, he had never previously dealt with cases in which the numbers were large enough for 'Add 2' and 'Zadd 2,' or meaning addition and quaddition, to demand different responses (Kripke, 1982: 7–15). Facts about how Jones is disposed to continue the series, or answer arithmetical queries, won't turn the trick either. Even if it was true that *if* Jones had reached 1000, he *would* have continued 1004, 1008, and so on, or true that *if* he'd been asked '68 + 57 = ?' he *would* have answered '125' and not '5,' neither of these facts could plausibly be said to constitute his intending to follow one rule rather than another, or mean one function rather than another. Facts about the rule he intended to follow, or the meaning he attached, are *normative* facts, facts about how he *ought* to continue the number series or answer the arithmetical query. But the dispositional facts canvassed tell us at most what he *would* do in certain situations, as opposed to telling us what he *ought* to do in those situations (Kripke, 1982: 22–38). KW also rules out the following as facts constitutive of rule-following and meaning: *general thoughts* or *instructions* (1982: 15–17); relative *simplicity* of hypotheses about rule-following and meaning (1982: 38–40); *qualitative, introspectible, irreducibly mental states* (such as mental images) (1982: 41–51); *sui generis and irreducible mental states* (1982: 51–53); relations to *objective, Fregean senses* (1982: 53–54). Thus, according to KW there are no facts about rule-following and meaning, and these notions vanish 'into thin air'(1982: 22).

KW's Skeptical Solution

KW describes this result as a 'sceptical paradox,' and attempts to avoid the 'insane and intolerable' (1982: 60) conclusion that 'all language is meaningless' (1982: 71) via a 'sceptical solution.' The main idea of the skeptical solution is that judgments about rule-following and ascriptions of meaning can be viewed as possessing a *non-fact-stating role*, so that the practices of ours involving the notions of rule-following and meaning avoid the worries associated with the skeptical paradox. If the function of judgments about meaning is not to describe facts, the discovery that

there are no facts about meaning no longer threatens our practice of making such judgments. It emerges as a consequence of the detail of the skeptical solution that the notions of rule-following and meaning only have application relative to *communities* of rule-followers or speakers, not absolutely. In particular, it follows that 'solitary' language is impossible. (This is KW's take on Wittgenstein's famous 'private language argument.')

Significance of the Issue

Unless it is blocked, the skeptical paradox threatens to undermine the idea that we can give a *cognitive-psychological* explanation of, for example, semantic creativity: the capacity speakers' have to understand novel utterances. One way of essaying such an explanation would be in terms of speakers' knowledge of the meanings of the familiar constituents of the novel utterance and their proceeding from this to knowledge of the utterance's meaning in a way that mirrors the compositional route to the meaning of the utterance from the meanings of its constituents and their mode of syntactic combination. Clearly, if there are no facts about meaning there will be no facts about the meanings of novel utterances or their constituents, so that the whole project of cognitive-psychological explanation of semantic creativity will be undermined. That would be a consequence of the skeptical paradox about meaning. But the skeptical paradox about rule-following in general would have even more destructive consequences: one way of attempting to explain the capacity speakers have to distinguish grammatical from ungrammatical strings would proceed in terms of their implicit grasp of grammatical rules governing the language in question. Clearly, if there are no facts of the matter as to whether these rules classify a given novel string as grammatical or not, this whole project, too, will be thrown in jeopardy. For a particularly clear exploration of these issues, see Wright (1989). See also Baker and Hacker (1984).

Responses to the Skeptical Paradox and Skeptical Solution

For defenses of dispositionalist, or otherwise naturalistic, solutions to KW's skeptical paradox, see Forbes (1984), Fodor (1990), Millikan (1990), and Horwich (1998). For further discussion of dispositionalism, see Boghossian (1989: Section V), McManus (2000), and Miller (2003). For non-reductionist responses (according to which facts about meaning are not reducible to facts about non-semantically and non-intentionally characterized behavior or states), see McDowell (1984), McGinn (1984), Wright (1989), Boghossian (1989: Section VI), and Pettit (1990). Wright takes the rule-following arguments to threaten, not the factuality of meaning but, rather, the *objectivity* of meaning: see the Introduction to Wright (1993). For discussion of the skeptical solution and the argument against solitary language, see Blackburn (1984), Wright (1984), and Boghossian (1989: Sections II–IV). KW's skeptical solution was characterized above as a version of non-factualism about ascriptions of meaning, but this interpretation has been challenged by a number of philosophers: see, e.g., Wilson (1994) and Kusch (in press). For a searching examination of the normativity of meaning, see Hattiangadi (in press). For a reaction to KW from the perspective of a linguist, see Chomsky (1986). For an introductory survey and overview, see Miller (1998: Chaps. 5 and 6).

See also: Indeterminacy, Semantic; Normativity; Private Language Argument; Radical Interpretation, Translation and Interpretationalism; Use Theories of Meaning.

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Runes

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Runes are characters of the runic alphabet, a writing system employed by all Germanic peoples. Different runic scripts are used for different languages. Sweden has the largest number of runic inscriptions (over 3000), followed by Norway and Denmark. Iceland has surprisingly few, given the frequency of references to runes in its literature. Significant numbers of runic inscriptions also survive from Greenland, Germany/Austria, the Isle of Man, Orkney, and England.

The earliest runic inscriptions date from the late 2nd century A.D. Runes continued in use in Scandinavia until well into the medieval period, elsewhere not long after the 11th century. The origins of the runic alphabet, or *futhark* (named after the value of its first six letters, with *th* represented by ᚦ) are unclear. Three main theories still attract support: that the *futhark* was developed ultimately from the Greek, the Northern Italic, or the Roman alphabets.

Runes provide us with much of our earliest evidence concerning the languages of the Germanic peoples, and valuable information about their social history and societal structure. Runes and runic inscriptions are preserved on materials such as stone, wood, metal, and bone. They also appear in manuscripts. Runes were originally designed for inscriptional use, primarily for cutting on wood; hence, the shape of early runes, which avoid curved and horizontal lines.

Transliteration and Terminology

Bold letters are generally used for the transliteration of Continental and Scandinavian inscriptions. Practice varies with Anglo-Saxon inscriptions, but the system devised by Dickins (1932) and adapted by Page (1984; reprinted 1995 with postscript), using spaced letters within inverted commas, has much to commend it.

Runic inscriptions may occasionally be written right-to-left ('retrograde') or 'boustrephedon' (with lines written in alternating directions). Normally there is no word separation, and geminates are simplified.

Occasionally rune cutters ligatured two runes together, perhaps on account of space considerations. The result is a 'bind rune' and may be signaled in transliteration by linking the letters with a superscript curve.

From an early period the *futhark* was divided into three groups (known as *ættir*) of eight letters each; this led later to the invention of elaborate codes in which a rune is obliquely represented using numbers relating to the group within which it appears and its position there. These numbers may be indicated in a variety of ways, often by a series of offshoots from a central stem or even (more inventively) by fins on one or other side of a fish. Cryptic rune types are most frequently found in manuscripts, but are also used in inscriptions, particularly in Scandinavia. Scandinavian runic inscriptions are cited using the number accorded them by the institute responsible for their registration in each country.

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Runic Alphabets

Futharks survive from the 5th century, although those from this early period are very rarely complete. They show some diversity of form, but comparison permits reconstruction of the likely shape of the common (older) Germanic *futhark* (Figure 1). It contained 24 letters and was employed in Scandinavia until c. 700 A.D. The order of letters was fixed.

Each rune appears to have had a name as well as a sound value, which generally began with the sound the rune represented. The names are only given in later manuscript sources, in some cases after the alphabet had been reduced and remodeled (see section on Scandinavian alphabets). Some names and meanings are common across all manuscript accounts. So, for example, the name of the L rune ᛚ is recorded as 'lagu' in Old English and 'lǫgr' in the Norwegian Rune Poem. Its reconstructed primitive Germanic form is therefore *laguz 'water.' However, ᚦ is 'thorn' in Old English, but seems to be a word meaning 'giant,' 'monster,' or 'demon' elsewhere. The meaning of some runes is unclear.

The Scandinavian Runic Alphabets

From around the 7th century A.D., the common Germanic *futhark* was extensively remodeled, perhaps first in Denmark. It was reduced from 24 to 16 letters. This alphabet, generally known as the 'younger *futhark*' (properly *futhąrk*), comprises two basic types: the Danish (or common) runes (Figure 2) and the Swedo-Norwegian (or short-twig) runes (Figure 3). Some inscriptions use an admixture of forms from the two varieties (a practice that led to the development of a distinctive futhark in Norway), and there are also variant forms of certain letters within each type. The reasons for the change must in part have been phonetically motivated following a series of sound changes within Old Norse. The resulting system, with no runes for *p, d, g, e,* or *o* but two for closely similar pronunciations of /a/ and /r/, does not appear an obvious improvement. Occasionally the initial sound of the rune itself was affected prompting a change: thus, the *j* rune, primitive Germanic **jēra*, became Old Norse *ār* around the 6th century and therefore came to denote [a]. The *a* rune, ᚬ, represented instead nasalized *a* [ã] following the development of primitive Germanic **ansuz* 'god' to Old Norse *ǫ́ss* (with loss of *n*, nasalization, and compensatory vowel lengthening), but retained its place in the *futhark*, transliterated as **ą**. The development of primitive Germanic *z* (ᛉ) into a strongly palatalized *r* led to a second rune representing *r*, transliterated **R**.

Around 1000 A.D., further modifications to the *futhark* began, with some attempt to address these phonetic inadequacies by a system of dots or points and with a new, Roman alphabetic order to the runes.

The Old English Runic Alphabet

The Old English runic alphabet is known as the *futhorc* (Figure 4). It contains 31 runes. Of these, two are connected with sound changes common to Old English and Frisian. In the case of **ansuz,* rounding took place in Old English and Frisian following the nasalization referred to above, resulting in *ō* (thus **ansuz* → OE *ōs*). In other environments in those languages, West Germanic *a* was fronted to *e* (*æ* in West Saxon). As a result of later sound changes and the development in Old English of West Germanic *ai*, a rune for *a* was still required. The old ᚬ rune was subsequently adopted for *æ* (with a new name *æsc*, 'ash-tree'), and two new runes, found only in Frisian and Old English, introduced: ᚪ for *a* (*ac* 'oak') and ᚩ for *o* (*ōs*). Whether this means that a modified alphabet common to these two peoples was developed on the European continent (as traditionally believed) or whether these similarities resulted instead from

ᚠ	ᚢ	ᚦ	ᚨ	ᚱ	ᚲ	ᚷ	ᚹ	ᚻ	ᚾ	ᛁ	ᛃ	ᛇ	ᛈ	ᛉ	ᛊ	ᛏ	ᛒ	ᛖ	ᛗ	ᛚ	ᛜ	ᛟ	ᛞ
f	u	th	a	r	k	g	w	h	n	i	j	ï	p	z	s	t	b	e	m	l	ŋ	o	d

Figure 1 The common Germanic *futhark.*

ᚠ	ᚢ	ᚦ	ᚬ	ᚱ	ᚴ	ᚼ	ᚾ	ᛁ	ᛅ	ᛋ	ᛏ	ᛒ	ᛘ	ᛚ	ᛦ
f	u	th	ą	r	k	h	n	i	a	s	t	b	m	l	R

Figure 2 The younger *futhąrk:* The Danish (common) runes.

ᚠ	ᚢ	ᚦ	ᚬ	ᚱ	ᚴ	ᚼ	ᚿ	ᛁ	ᛅ	ᛌ	ᛏ	ᛒ	ᛘ	ᛚ	ᛧ
f	u	th	ą	r	k	h	n	i	a	s	t	b	m	l	R

Figure 3 The younger *futhąrk:* The Swedo-Norwegian (short-twig) runes.

f	u	th	o	r	c	g	w	h	n	i	j	ï	p	x	s	t	b	e	m	l	ŋ	œ	d	a	æ	y	ea	ḡ	k	k̄

Figure 4 The Anglo-Saxon *futhorc.*

trading contacts between England and Frisia has recently been debated following new theories concerning the relationship between the two languages. Other additions to the Old English runic alphabet (some found only rarely) are the consequence of later sound changes or attempts to represent allophonic variation.

Runic Inscriptions

Surviving runic inscriptions are found on a variety of objects, from large, decorated memorial stones recording the achievements and passing of men and women, to the name of an owner or maker roughly cut on a comb, legends on coins, and graffiti. Early inscriptions employing the common Germanic *futhark* are generally found on portable objects.

Stone Monuments

One of the best known of all runestones is that at Jelling, Denmark, which was commissioned by King Haraldr Gormsson ('Bluetooth'). This large 10th-century stone commemorates the king's parents and lists his own achievements. The Karlevi stone on the Swedish island of Öland celebrates achievements in skaldic verse, requiring knowledge of both runes and the kennings and mythological allusions characteristic of that poetic style to understand its message. Runes would probably have been colored to help them stand out from their background.

In England, the most famous runestone is undoubtedly the Ruthwell Cross (8th century, Northumbrian). It contains extracts, inscribed in runes, from a version of a poem that survives in 11th-century manuscript form as *The Dream of the Rood*. The runes themselves, filling the borders of the two narrow sides of the cross, form part of a complex design involving both runic and roman script, decoration, and carved scenes.

Other Runic Objects

Some runic objects are undoubtedly high status. The 5th-century Gallehus gold horn (one of a pair; now destroyed) recorded the name of its maker in runes around its top. The 8th-century whalebone Franks/Auzon casket from England is composed of intricately carved panels featuring a series of scenes with accompanying runic texts often difficult to interpret.

One finding, however, gives an indication of the quotidian nature of most runic inscriptions. Excavations of the Bryggen district of Bergen, Norway, following a fire in 1955 led to the discovery of over 500 runic inscriptions dating from about 1150 to about 1350, mostly on wood. They include ownership tags, accounting records, poetry, business letters, and personal messages, the most celebrated of which is one that resonates through the ages, apparently from a woman to her mate: 'Gyða says you are to go home.'

Runes and Magic

The association of runes with magic is long-lived, although the evidence for rune-magic is supported far more by literature than by the inscriptions themselves. An unfortunate tendency to assign as 'magical' any inscription that is (or appears) meaningless persists. However, the etymology of Old English *rūn* and its cognates associates the noun with secrecy and mystery, although not necessarily with magic. We learn from the Eddic poem *Hávamál* that the god Óðinn was prepared to sacrifice himself by hanging from a tree for nine days and nights to acquire runic knowledge. A tradition of runic magic is alluded to in many sagas, which show runes being used at times benignly for healing purposes (for example, by the eponymous hero of *Egils saga* in unusually benevolent mood) or with maledictory intent (as in the runes carved by the witch Þurríðr, which lead to the outlaw Grettir's death in *Grettis saga*). *Futharks* inscribed on personal objects such as amulets or weapons may also have had magical significance, particularly as they sometimes appear in combination with words strongly associated with magic, such as **alu** ('luck'), and **laukaR** (literally 'leek,' and perhaps 'prosperity' or 'fertility').

Runes and their Interpretation

Runes present many difficulties of interpretation. It is clear that we must have lost the majority of inscriptions. Those that survive are unlikely to be representative, given the readiness with which wood rots and stone survives.

It can be difficult to distinguish between runes and accidental marks or scratches. Inscriptions on stone, once exposed to the elements, soften and become indistinct; those on other mediums similarly can fracture or become abraded. Our ignorance of the

circumstances (social, individual) leading to the production of an inscription can lead to a multiplicity of interpretations, each of which is necessarily speculative.

Nonspecialists should be encouraged to look at the runes themselves, rather than their transliteration; much can be learned from layout, and certain peculiarities may result from (for example) considerations of space or aesthetics that are not apparent from a printed text. Collaboration between scholars working in various disciplines is vital; numismatists, philologists, art historians, and archaeologists have much to contribute to runic studies, and the best work has been produced by those prepared to consult or collaborate with experts outside their own research area.

See also: Germanic Languages.

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Russell, Bertrand (1872–1970)

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Bertrand Russell was born May 18, 1872, in Ravenscroft, Wales, and died February 2, 1970, in Penrhyndeudraeth, Wales. He received his bachelor's degree in mathematics from Trinity College at Cambridge in 1893. He was elected Fellow of the Royal Society in 1908, but in 1916 he was fined £100 and dismissed from Trinity for protesting World War I. He remained a dedicated pacifist throughout his life, though he would deny (Russell, 1951: 35) that this term was an appropriate descriptor. Near the war's end, he was jailed for 5 months for refusing to join the military but was released in September, about 2 months before Armistice Day, November 11, 1918. Russell described his state of mind after the armistice: "Late into the night, I stayed alone in the streets, watching the temper of the crowd .... I felt strangely solitary amid the rejoicings, like a ghost dropped by accident from some other planet .... Always the skeptical intellect, when I have most wished it silent, has whispered doubts to me, has cut me off from the facile enthusiasms of others, and has transported me into a desolate solitude" (1951: 35). Throughout his life Russell (from 1931, the third Earl Russell) remained an elitist, a pacifist, an atheist, and a cynic of wry wit. He received the Nobel Prize for Literature in 1950 and, along with Einstein, advocated unilateral disarmament. He was dismissed twice more after the Trinity firing in 1916, once from City College of New York in 1940 and then from the Barnes Foundation in Pennsylvania in 1943. At age 89, in 1961, he was imprisoned for antinuclear protests for a week, and subsequently he became a vigorous opponent of America's involvement in Vietnam.

Russell's most important contributions to the study of language, and indirectly to linguistics, were grounded in logic and mathematics. In 1901 he discovered what appeared to be a genuine antinomy, that is, an inevitable mathematical paradox. It would become known as Russell's paradox and assured him a place in the history of ideas. It also helped to crystallize his lifelong skepticism. Although he was convinced by his senses that the material world is real, he argued that his faith in the existence of this same world was logically without sufficient justification. In particular, he found fault with the chain of representations and abstractions linking any object of

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See also: Germanic Languages.

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perception with an abstract conception, or a symbol, of that object.

The widening waves of skepticism owed to Russell's antinomy were to be felt in every field dealing with language, meaning, and truth. The paradox arose from the consideration that some classes seem to contain themselves as members, while others do not. For instance, the class of dogs is not a dog, but the class of classes is certainly a class. A linguistic parallel can be seen in the fact that the word *dog* is not a dog, but the word *word* certainly is a word. By defining a set of all those sets that do not contain themselves as members, Russell came to a mathematical result that turned out upon inspection to be self-contradictory: the defined set could contain itself only if it did not contain itself, but if it contained itself, it could not contain itself. The problem nearly drove a stake in the heart of mathematics. It challenged the hope that reasoning itself can be consistent. It rocked the foundations of epistemology and threatened to topple theories of meaning, reasoning, and language acquisition.

It turned out that Russell's paradox had a linguistic interest, because it was an oblique and austere summary of the language acquisition riddle. How is it possible for an infant to understand words that the infant has not yet learned? Must the infant, like the Baron von Münchhausen, raise itself by its own bootstraps? Is there no logically consistent (non-self-contradictory) escape from the paradoxical fact that language acquisition is evidently possible for naïve infants? How do they do it?

One proposed solution to Russell's paradox was his own, the theory of types. Though criticized as *ad hoc*, it noted that construing a sign as referring to some object or system of objects is a step in a process. If so, a sign under construction can hardly refer to the incomplete system of objects of which it is to be part. For instance, an ordinal number cannot be assigned to the whole system of ordinal numbers, because there is no last or greatest ordinal. Leibniz (1953 [1710]) anticipated this argument in part when he observed that there cannot be a greatest ordinal or a largest figure. Leibniz's extension had to do with the absurdity of applying finite concepts to Almighty God. To pretend to designate any ordinal number as one suited to refer to all ordinals would require reference to the whole set by a sign that is a component of the unfinished construction. The problem resembles the difficulty of meeting yourself on the street before you were born. While writers of fiction can conjure such fantastic self-contradictions, Russell's mathematical objective was to try to find a consistent and complete system of thought that would avoid any such contradictions. The remaining question is whether any such system is possible. Russell noted that the set of all possible ordinals can be referred to from a position above that set, i.e., from a higher level of abstraction. His solution was a hierarchy of distinct types, and it resonated with many logicians, including his student Ludwig Wittgenstein (1918/1922) and, later, P. F. Strawson (1959), Willard van Orman Quine (1960), and other logicians. Though never fully accepted, Russell's solution harmonized with the constructivist approaches to psychological and social theories of cognition as proposed by John Dewey (1938), Jean Piaget (1947, 1981), and Lev Vygotsky (1934/1962).

Russell's theory of types suggested a system of signs built up through layers of abstraction. Chomsky's kernel sentences (1957), used as building blocks for more complex structures, were layered in a sense, and the stratificational models proposed by Lamb (1999) and others were even more so. They were distant theoretical kinfolk, if not direct descendants, of Russell's theory of types. Suppose that an infant begins with basic signs for bodily things and persons and from these basic signs builds layer upon layer to attain higher and more abstract representations. If the higher systems can be shown to have been built up from the more basic signs through a series of layers of increasing abstractness, the language acquisition problem becomes solvable (Oller, 2005).

Related to his contributions to logic and mathematics were Russell's more speculative philosophical writings. In contrast to Reichenbach (1938), who argued that the discovery of meaning depends on the prior discovery of at least some empirical truths, Russell (1940) contended that empirical truths must be based on prior meanings. It was odd that Russell ended up being a materialistic realist in view of the fact that he continued throughout his life to hold that there was by all accounts no logically adequate basis for his faith in the existence of the real world. Russell's problem along that line was first laid out in 1914, when he argued that the existence of the common world cannot be certainly known or inferred from perceptual evidences. This idea was first demolished by John Dewey in 1916 in a book that answered Russell's. Yet Russell clung to the untenable argument and repeated it in his book *Human knowledge* (1948). He supposed that the percept of any object or event is so far removed from its object, and so unlike it in character, as to make the object or event itself problematical.

Dewey followed C. S. Peirce's approach in taking Russell's argument apart piece by piece. Dewey showed that Russell's skepticism was pretentious. In particular, there is no way, Dewey pointed out, to construe a percept or a demonstrative of any kind in a way that would allow the construction of Russell's

problem without presupposing the whole of the material world. In fact, C. S. Peirce (1908) had independently refuted Russell in his argument against the skepticism of David Hume. Peirce showed that if Hume had been merely consistent in his attempt to outlaw 'metaphysical' constructs, Hume would have had to outlaw all reasoning as intrinsically unreasonable. Einstein (1944) independently reached the same conclusion. According to Einstein, Hume's critique "if only carried through consistently, absolutely excludes thinking of any kind" (1944: 289). Einstein also rejected Russell's skepticism about the existence of real objects. Einstein wrote: "I see no danger in taking the thing (the object in the sense of physics) as an independent concept into the system together with the proper spatio-temporal structure" (1944: 291). Einstein agreed with the American pragmatists in their conclusion that "all knowledge about things is exclusively a working-over of the raw-material furnished by the senses" (1944: 283).

Nonetheless, Dewey was solidly among Russell's admiring critics. When they met at Harvard in 1914, Russell said, "To my surprise I liked him very much" (Clark, 1976: 232). In 1916, however, after Dewey demolished Russell's supposedly logical skepticism about the material world, Russell's opinion of Dewey plummeted to something resembling contempt. In 1921 Russell wrote: "In 1914 I liked Dewey better than any other academic American; now I can't stand him" (Clark, 1976: 387). Dewey had become "a man of a large slow-moving mind ... a good man but not a very clever one" (Clark, 1976: 232). When Russell lay nearly dying in Peking, however, it was Dewey, the very man whose "righteousness" Russell detested, who came to his aid (Clark, 1976: 387) and may well have saved his life.

See also: Einstein, Albert (1879–1955); Leibniz, Gottfried Wilhelm (1646–1716); Peirce, Charles Sanders (1839–1914); Piaget, Jean (1896–1980); Quine, Willard van Orman (1908–2000); Reichenbach, Hans (1891–1953); Strawson, Peter Frederick (b. 1919).

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Russenorsk

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The Arctic pidgin Russenorsk (RN), which developed from Norwegian and Russian during the second half of the 18th century, was used in barter trade in northern Norway for around 150 years. RN's main period of use was the 19th century when trading reached large proportions. The sociolinguistic situation in northern Norway during the 19th century was multifaceted and complex, involving many different languages.

RN, now extinct, exhibits several features that make it theoretically interesting. In spite of being formed as a dual-source pidgin – from two Indo-European languages – it shows most of the features common to all pidgin languages. To a stabilized grammatical and lexical core, a variety of lexical items could be added when the situation called for it. It also is noteworthy that RN, unlike most pidgins, was created by socially equal groups of speakers.

Until around 1850, RN enjoyed a high social status, as both fishermen and merchants had to use the pidgin when dealing with the Russians. After 1850, the use of RN was restricted mostly to common fishermen, because the merchants – who constituted the local upper classes – began to spend longer periods of time with colleagues in northern Russia and subsequently developed their own grammatically simplified variety of Russian. As a consequence, RN's social status was devalued.

Today, we have to rely on written material in our study of RN. However, the available texts allow for studies of both lexicon and grammar. They consist of isolated sentences, word lists, and conversations in dialogue form. Altogether, they include some 400 different words, with a core of 150–200 lexemes. Most of them are related to the barter trade. This trade constituted the socioeconomic basis for RN, and when it gradually gave way to cash trade early in the 20th century, the language lost ground and disappeared.

The characteristic features of RN can be summarized as follows:

a. The phonology reflects Norwegian and Russian – however, sounds and consonant clusters not found in both languages are avoided or simplified.
b. 1st and 2nd personal/possessive pronouns are *moja* and *tvoja*.
c. *po* 'on' is the only preposition.
d. *-om* is the general verbal marker (e.g., *kopom* 'buy'), although not always used. Verbs exhibit no markers for tense or person. A special *po*+V construction represents a possible TMA (Tense, Mood, Aspect) device.
e. *-a* tends to mark nouns (e.g., *fiska* 'fish'), which are not inflected and have no plurals.
f. There is no copula.
g. The vocabulary derives mostly from Norwegian and Russian, but contains a number of lexical items from other European languages (e.g., *slipom* 'sleep', from English).
h. RN has SVO syntax. Sentences with adverbial(s) are, however, verb final (e.g., *moja kopom fiska* 'I buy fish'; *moja po tvoja fiska kopom* 'I buy fish from you'). Most sentences are combined paratactically, but embedding is attested. The syntactic possibilities are quite restricted. Most syntactic variation is found in interrogative sentences, RN was used mainly to make inquiries about prices and barter for merchandise.

See also: Jargon; Language Change and Language Contact; Morphology in Pidgins and Creoles; Pidgins and Creoles: Overview; Variation in Pidgins and Creoles.

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Russian

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The Written Language

Diglossia

The adoption of Eastern Christianity in the 10th century brought to the East Slavs the religious language of the Slavs, Old Church Slavonic (OCS), written in Cyrillic.

Syntax, phraseology, and much of the word formation of OCS owed much to Byzantine Greek. In a russified form, OCS served for centuries as the language of 'culture' of the Russians. The earliest extant text is an aprakos Gospel compiled in 1056–1057 by Deacon Grigorij for Prince Ostromir ('Ostromir Gospel'). Secular works – writs, treaties, codes of law (e.g., *Russkaja Pravda* 'Russian Law', mid-11th century, earliest extant copy 1282), etc. – were written in vernacular Russian.

18th Century

Church Slavonic (CS) and Russian now merged to provide the foundation for the modern literary language. Though the everyday language that V. K. Trediakovskij (1703–1769) advocated as a literary language cannot be found in his own writings, he amply demonstrated the word-forming capabilities of CS elements and processes. M. V. Lomonosov (1711–1765) wrote the first complete grammar of Russian as Russian (1757), distinguishing 'high style' forms (i.e., of CS origin) from the rest and insisting elsewhere that CS words were an ineradicable part of Russian.

Writers of the late 18th and early 19th centuries, e.g., N. M. Karamzin (1766–1826) and others, created a 'new style' (*novyj slog*), in which clarity and straight-forwardness were fundamental criteria, eradicating the ponderous, convoluted earlier 18th century prose style. French provided a model for sentence structure and element order. Karamzin himself produced many new words – straight loans, calques (many based on French) and new creations using the resources of Russian.

Thus, modern literary Russian may be said to be at base a blend of a Graecized Church Slavonic, vernacular Russian, and French syntax and order.

Church Slavonic Features

Almost any printed page of modern Russian reveals numerous elements of CS origin. Such are the nominative singular masculine ending of the adjective *-yj/-ij*, the present active participle in *-ushchij*, etc., (and in general the use of participles), suffixes such as *-ie*, *-stvo/-estvo*, *-tel'*, and compound suffixes such as *-enie/-anie/-janie*.

Some morphophonemic alternations show CS origin. For example, CS are *d* ~ *zhd*, *t* ~ *shch* against Russian *d* ~ *zh*, *t* ~ *ch*. Compare *pobedit'* (PRFV) ~ *pobezhdat'* (IMPFV) 'to conquer' with *brodit'* 'to ferment' ~ *brozhenie* 'fermentation,' and *obet* 'promise' ~ *obeshchat'* 'to promise' with *otvetit'* (PRFV) ~ *otvechat'* (IMPFV) 'to answer'. In the striking alternation of pleophonic (*polnoglasnyj*) forms, of Russian origin, and apleophonic (*nepolnoglasnyj*) forms, of CS origin, a vowel *o* or *e* flanks both sides of *l* or *r* in pleophonic forms, whereas a single vowel *a* or *e* follows *l* or *r* in apleophonic forms. Thus, *moloko* 'milk' – *mlekopitajushchij* 'mammalian', *Mlechnyj put'* 'Milky Way'; *korotkij* 'short', *ukorotit'* 'to shorten' – *kratkij* 'brief', *prekratit'* 'to curtail'; *golos* 'voice', *golosovye svjazki* 'vocal cords' – *glasnyj* 'vowel', *soglasnyj* 'consonant'; *bereg* 'bank' – *bregoukre- plenie* 'reinforcement of banks', *bezbrezhnyj* 'boundless'. Pleophonic forms are 'concrete,' mundane; apleophonic forms are 'abstract,' 'learned,' 'technical.'

Phonetics

Old Russian had 12 vowel phonemes and some two dozen consonant phonemes, with open syllables and few clusters. The lapse, from the 12th century, of two ultrashort vowels in certain positions initiated the development toward a language with five vowel phonemes, many more consonant phonemes, many clusters and closed syllables, and a system in which palatalization is largely independent of the following vowel, i.e., is largely phonemic.

The vowels /i, e, a, o, u/ have several allophones each, depending on location of stress, consonantal environment, or the two combined. For example, /a/ – *dast* [dast] 'he will give,' *dal* [dɑ + l] 'gave' MASC, *pjat'* [p̪æt̪] 'five,' *dala* [dɒ'la] 'gave' FEM, *ʉydat'* ['vɨdət̪] 'to give out.'

The accent is not fixed and is mobile, shifting in regular patterns in both declension and conjugation, e.g., *storoná* 'side', ACC *stóronu*, GEN *storoný*, NOM PL *stórony*, GEN PL *storón*, DAT PL *storonám*, etc.

Except as described below, /o/ is replaced in unstressed syllables by /a/, in a system known as *akan'e* 'a-saying' (operating also in southern dialects and Belorussian but not in northern dialects or Ukrainian). Thus 'town' appears as *gorod* /'gorat/ NOM SING, *goroda* / gara'da/ NOM PL, *mezhdugorodnyj* /m̩ʒduga'rodnij/ 'interurban'. The last example also

illustrates *ikan'e* 'i-saying', in which /e/ is replaced in unstressed positions by /i/ (cf. *mezhdu* /'mʲeʒdu/ 'among, between'). *Ikan'e* also affects, in pretonic positions, /a/ after palatalized consonants and /j/, and /o/ after palatalized consonants, /j/ and the palatals /ʃ/ and /ʒ/. Thus, *pjat'* /pʲat/ 'five' ~ *pjati* /pʲi'tʲi/ GEN, *let* /lʲot/ 'flight' ~ *letat'* /lʲi'tat/ 'to fly', *zheny* /'ʒoni/ 'wives' ~ *zhena* /ʒi'na/ 'wife'. The orthography ignores both *akan'e* and *ikan'e*.

There are 13 pairs of distinctively nonpalatalized/palatalized consonants: /p–pʲ/, /b–bʲ/, /m–mʲ/, /f–fʲ/, /v–vʲ/, /t–tʲ/, /d–dʲ/, /s–sʲ/, /z–zʲ/, /n–nʲ/, /l–lʲ/, /r–rʲ/, /k–kʲ/. Consonants /g/ and /x/ have palatalized allophones; /tʃ/ and /ʃʲ/ (realized as [ɕʲ]) are nondistinctively palatalized. In addition, there are /ts/, /ʃ/, /ʒ/, and /j/.

Voiced consonants except sonants are devoiced word-finally and before voiceless consonants. Conversely, voiceless consonants are voiced before voiced consonants except sonants, /v/ and /vʲ/. Nonpalatalized consonants are frequently replaced by corresponding palatalized consonants before palatalized consonants, especially homorganic ones. Apart from a very few items and the devoicing of /z/ in prefixes, (e.g., *raz-* ~ *ras-*, *iz-* ~ *is-*), the orthography entirely ignores the various consonant assimilations and final devoicing. Thus, *otdat'* /ad'datʲ/ 'to give back', *sdelat'* /'zʲdʲelatʲ/ 'to do', *gorod* /'gorat/.

Grammar

Nouns

The Old Russian system of eight declensions, three numbers, and seven cases has been simplified into a system of three principal declensions and a vestigial consonant-stem declension, two numbers, and six cases, the dual number and the vocative case having been discarded.

The 'feminine' declension in *-a/-ja* declines in the singular thus: NOM *komnata* 'room', GEN *komnaty*, DAT *komnate*, ACC *komnatu*, INSTR *komnatoj*, PREP (*v*) *komnate*. A few masculine nouns are found in this declension. A typical noun of the 'masculine' declension is *stol* 'table', *stola, stolu, stol, stolom*, (*na*) *stole*. Neuters decline as masculines except for nominative and accusative, e.g., *okno* 'window', PL *okna* (cf. *stoly*) and, usually, GEN PL – cf. *stolov* – *okon*. One masculine noun is still found in the declension that is now otherwise feminine, illustrated by *chast'* 'part', *chasti*, *chasti*, *chast'*, *chast'ju*, (*o*) *chasti*.

Nouns of the masculine declension denoting animate beings use the genitive as an accusative, thus *muzh* 'husband,' GEN and ACC *muzha*. The genitive-accusative also applies to all nouns denoting animate beings in the plural, of whatever gender: *zhena* – GEN ACC PL *zhen* (/ʒon/).

Remnants of old declensions include an additional genitive in *-u* of some masculine nouns (usually partitive in function): *kilo sakharu* 'a kilo of sugar', cf. *vkus sakhara* 'taste of sugar'; and an extra PREP case in *-ú* of some masculine nouns, having purely locative function: *v lesu* 'in the wood' (cf. *o lese* 'about the wood').

A vestige of the dual probably explains the NOM PL MASC in *-á* instead of *-y*, e.g., *goroda*, cf. *stoly*. The graphic identity of the old NOM dual MASC in *-a* with the GEN SING in *-a* of the same declension has led to the use of the GEN SING of a noun of any gender with the numerals *dva* 'two', *tri* 'three', *chetyre* 'four', and higher numerals ending in these elements. Numeral syntax is further complicated by the use of NOM SING with all numerals ending in *odin* 'one' and GEN PL with all other numerals: *dva stola* 'two tables', *tridtsat' tri stola* '33 tables', *sorok chetyre stola* '44 tables', *sto odin stol* '101 tables', *pjat' stolov* 'five tables'.

The genitive not only is obligatory in negative partitive expressions – *Net otveta* (GEN SING) 'There is no reply', *Deneg* (GEN PL) *ne khvataet* 'There isn't enough money' – but also is more frequent than the accusative with negated transitive verbs – *Shkoly* (GEN SING) *ona ne brosit/Shkolu* (ACC SING) *ona ne brosit* 'She will not give up school'.

Syntactically interesting too is the predicative instrumental, standard with certain copula-like verbs and the future of *byt'* 'to be': *Ona okazalas' /stala/ budet sirotoj* 'She turned out to be /became/ will be an orphan'. With the past tense of *byt'* both the instrumental and the nominative are found: *V to vremja ja byl student*(*om*) 'At that time I was a student', the nominative being more colloquial. *Byt'* has no present tense: *Ona sirota* 'She (is) an orphan'.

There is no article, definite or indefinite. The 'long' form of the adjective, with a declension different from that of nouns, originally expressed 'definiteness' but is now simply the basic form of the adjective and the only attributive form. The 'short' form no longer declines and is restricted to predicative function, where it simply assigns a property to a subject – *Solntse velika, a Zemlja mala* 'The Sun is big but the Earth is small'. The long form is also used predicatively, assigning the subject to a class of like entities. Compare *Vera ochen' umna* (short form) 'Vera is very clever' to *Vera ochen' umnaja* (long form) 'Vera is (a) very clever (person)'. This distinction, while still active, is being eroded, especially in colloquial Russian, in favor of the long form.

Verbs

The aspect system of imperfective versus perfective, already active in Old Russian, has led to the reduction of the multiple tenses of Old Russian to just three: past, IMPFV or PRFV, present, IMPFV only, and future, IMPFV or PRFV. The past, originally a periphrastic participial form, is now reduced to what was the participle and so changes according to gender and number, while present and future have 'true' conjugations of three persons and two numbers, the future imperfective being periphrastic. Thus, 'to infringe' – IMPFV *narushat'*, PRFV *narushit'*: past MASC *narushal/narushil*, FEM *narushala/narushila*, NEUT *narushalo/narushilo*, PL *narushali/narushili*, present *narushaju*, *narushaesh'*, *narushaet*, *narushaem*, *narushaete*, *narushajut*: FUT IMPFV *budu/budesh'/budet/ budem/budete/budut narushat'*, FUT PRFV *narushu, narushish'*, *narushit, narushim, narushite, narushat*. The two aspects are differentiated formally by prefixation, suffixal changes, or a combination of the two and occasionally by suppletion. A complication is the existence of many verbs that are not members of minimal pairs, distinguished only by aspect. These form the groups known as *sposoby dejstvija*, Aktionsarten, 'modes of action'. While associated with a base verb, each Aktionsart, appearing in one aspect only, adds a nuanee to the base verb, without forming a plain aspectual counterpart. For instance, *stuchat'* 'to knock' is IMPFV and has no plain PRFV counterpart; *postuchat'* PRFV is diminutive or attenuative – 'to knock a little / for a short time' and may have to serve in lieu of a plain PRFV; *stuknut'* PRFV is semelfactive – 'to give a single knock'; *zastuchat'* PRFV is inceptive – 'to start to knock'; *prostuchat'* PRFV is perdurative – 'to knock for a certain period of time'; *postukivat'* IMPFV is intermittent (-diminutive) – 'to knock (a little) from time to time'.

The dozen or so pairs of 'verbs of motion,' while participating in the aspect system, also distinguish between determinate (motion in a single direction) and indeterminate (motion not restricted so): *On letel v Moskvu* 'He was flying to Moscow' – *On letal v Moskvu* 'He flew to Moscow (and back, or several times)'.

There are five participles: PRES ACT *narushajushchij* 'infringing', PRES PASS *narushaemyj* 'being infringed', PAST ACT IMPFV *narushavshij* 'were infringing', PRFV *narushivshij* 'having infringed', and PAST PASS PRFV *narushennyj* 'infringed'. They decline as adjectives and the two passive ones have short forms, the PRFV PASS short form being an indispensible component of the passive voice: *Zakon byl narushen*. 'The law was infringed'. The two indeclinable adverbial participles, often called gerunds, are, for example, IMPFV *narushaja* 'infringing' and PRFV *narushiv* (*shí*) 'having infringed'. Subordination by means of participles and gerunds, instead of relative and adverbial clauses, is common.

Lexis

While the bulk of the lexis is Slavonic, Russian has not been averse to borrowing at all periods. From Western European languages Dutch has provided nautical terminology: *botsman* 'bosun', *kil'vater* 'wake'; German – military and other terminology: *lager'* 'camp', *landshaft* 'landscape', *buterbrod* 'sandwich'; French – military, mundane and cultural vocabulary: *batal'on* 'batallion', *pal'to* 'overcoat', *rezhisser* 'producer'; English – nautical terms: *michman* 'midshipman', mundane: *bifshteks* 'steak', industrial: *rel'sy* 'railway lines', sociopolitical: *bojkot* 'boycott', *khuligan* 'hooligan', and in the 20th century, sport: *futbol* 'football', *vindsorfing* 'windsurfing', and technical: *bul'dozer* 'bulldozer', *komp'juter* 'computer'.

Naturally, Russian has gone on exploiting its historically established word-forming processes, but it has also exploited less traditional ones. In this respect, notable are appositional compounds such as *raketa-nositel'* 'carrier rocket,' *dom-muzej* 'home (which is also a) museum', and above all acronyms and various other accreted abbreviations – *vuz* (*vysshee uchebnoe zavedenie*) 'higher educational institution', *GUM* (*Gosudarstvennyj Universal'nyj Magazin*) 'State Department Store', *ROSTA* (*Rossijskoe Telegrafnoe Agentstvo*) 'Russian Telegraph Agency', *kolkhoz* (*kollektivnoe khozjajstvo*) 'collective farm', *univermag* (*universal'nyj magazin*) 'department store', *zarplata* (*zarabotnaja plata*) 'wages', *fizkul'tura* (*fizicheskaja kul'tura*) 'physical training'.

Influence of Russian

In varying degrees, Russian has provided loanwords, especially relating to 20th century life, of technological and cultural significance for many non-Slavonic languages of the former Soviet Union. An extreme case of such borrowing from Russian is provided by Chukchi. In Altaic, North Caucasian, and easterly Uralic languages, subordinating constructions on the Russian model have become common. The languages of many small speech-communities (Ingrian, Veps, Vot, Mordvinian, Siberian languages, etc.) have retreated or are retreating in the face of Russian.

See also: Armenia: Language Situation; Azerbaijan: Language Situation; Belarus: Language Situation; Estonia: Language Situation; Georgia: Language Situation;

Kazakhstan: Language Situation; Latvia: Language Situation; Lithuania: Language Situation; Moldova: Language Situation; Old Church Slavonic; Russian Federation: Language Situation; Russian Lexicography; Slavic Languages; Tajikistan: Language Situation; Ukraine: Language Situation; Uzbekistan: Language Situation.

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Russian Federation: Language Situation

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The Russian Federation, reconstituted as a state since the collapse of the USSR in 1991, is the homeland of a plethora of languages, but among these Russian itself, the language of the administrative center, occupies an unassailable, dominant position. This was true even when the Union of Soviet Socialist Republics was run from Moscow to administer the 15 individual republics. From its position at the center, the Russian language has bestowed on the minor languages within the Federation's borders a centrally organized education system, literacy, in most case the Cyrillic alphabet itself, and printing facilities – all the accoutrements for the successful propagation of language.

An inherent factor in the Russian language, which favored its propagation, was the relatively small dialect variation within the language. Considering the vast area it covers, Russian has always been – at least since the start of printing in the language – a remarkably homogeneous tongue, so that speakers from Vladivostok in the east and St. Petersburg in the west can readily understand one another. Such dialect variation as exists within Russian can be broadly divided into 'northern' and 'southern' variants. The northern variant grew out of the cultural center of Novgorod, the southern across an area incorporating Tula, Ryazan', and Voronezh.

The Russian language is the most widely spoken representative of the East Slavonic subbranch of the Slavonic branch of the Indo–European language family. The other two members of this branch are Ukrainian and Belarusian (Belarusan). By the 9th century A.D., we can assume that Russian was a distinctive language within this subbranch, but the written language of Kievan Rus was, up to the 14th century, Old Church Slavonic (Slavonic, Old Church), which stemmed from South Slavonic languages. The Cyrillic alphabet as used in that language, though it did not correspond well with the divergent sound system of East Slavonic, remained in use as the standard orthography from the beginnings of recorded writing in Russian, which coincided with the country's conversion to Christianity around the year 988, right up to the time of Peter the Great (1672–1725).

The first writings of the medieval period were translations from Greek liturgy and scripture into Old Church Slavonic. The centers of learning were mainly Kiev and Novgorod at first, but the creation of literature spread to such centers as Pskov and Ryazan' and, after the introduction of printing, primarily to Moscow. The first homegrown printed book known in Russia is a book of religious epistles dated 1564.

Russian has not, however, had an entirely phonetic spelling system, despite a process of orthographic simplification; for instance, the phenomenon of *akanye* or reduction of [o] to a schwa or [a] in unstressed syllables is a feature whose general spread within Russian predates the simplification of the Cyrillic alphabet as adapted to Russian use. This process began with the 'civic alphabet' introduced under Tsar Peter I in 1710.

Codification of the modern Russian language may be said to have really begun with the Russian Grammar by the great scholar Lomonosov, published in 1755. Within two generations of this, the great flowering of classical Russian literature had begun, Pushkin being the earliest acknowledged master. The alphabet was further simplified away from the conservative Old Church Slavonic script by the abolition of some redundant letters in 1917–1918 (**Figure 1**), in the first year after the October Revolution – though not as a result of it, but rather as the outcome of reforms proposed by an imperial orthographic commission.

The Cyrillic alphabet does adequately and systematically reflect the extensive phenomenon of

Kazakhstan: Language Situation; Latvia: Language Situation; Lithuania: Language Situation; Moldova: Language Situation; Old Church Slavonic; Russian Federation: Language Situation; Russian Lexicography; Slavic Languages; Tajikistan: Language Situation; Ukraine: Language Situation; Uzbekistan: Language Situation.

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А Б В Г Д Е Ж З И Й К Л М Н О П Р С Т У Ф Х Ц Ч Ш Щ Ъ Ы Ь Э Ю Я
а б в г д е ж з и й к л м н о п р с т у ф х ц ч ш щ ъ ы ь э ю я
a b v g d ye zh z i I k l m n o p r s t u f kh ts ch sh shch * y ** e yu ya
* nonpalatalization of preceding consonant
** palatalization of preceding consonant

Figure 1 The Cyrillic alphabet as used in modern Russian (abolished redundant letters in brackets) with their phonetic values.

palatalization in the language, with separate sets of 'palatalized' and 'unpalatalized' vowels, and predictable rules for palatalizing after particular consonants, but it hardly reflects the stress pattern at all. Stress in Russian is unpredictable, with emphasis occurring on any syllable (even varying among different inflections of the same word) and implying the 'reduction' of unstressed vowels in neighboring syllables.

Features of the Language

As mentioned, dialect variation within Russian is not great, and grammatical and pronunciation differences from the standard language tend to be minor. Differences are mainly lexical and are chiefly associated with cultural, mainly agricultural and domestic, terminology (for example, northern *boronovat'*, southern *skorodit'* 'harrow' (v.), northern *kuznets*, southern *koval'* 'smith'). The grammatical structure of Russian varies little from the standard across the country.

Russian is typical of the Slavonic languages in having three genders (masculine, feminine, and neuter) and an extensive noun case system by Indo–European standards. Six cases are in active use: nominative, accusative, genitive, dative, instrumental, and prepositional. Also characteristic is the 'partitive genitive' formation used for negating the verb 'to be' (in a location or in possession). The pronoun system is fully declinable in the six cases as well.

Another typical Slavonic feature is the aspectual system of verbs. While there are only two simple synthetic tenses (present and past, or more accurately, nonpast and past), there are also two aspects: perfective and imperfective. Perfective forms of the verb are used to indicate completed or finite single actions, whereas the imperfective forms tend to indicate continuing or repeated action (*prinimat'* (impf.) 'to receive' (= be receiving), *prinyat'* (pf.) 'to receive' (= have received). Perfective forms are mostly created by adding prefixes to the verb stem, but with some verbs, an imperfective form is created by adding a suffix to a basic (perfective) stem, or by altering the final vowel of the stem.

Characteristic of Russian and East Slavonic is the use of participles to replace relative pronouns in relative clauses (*vvidu nravov, tsarivshikh* . . . 'in view of the customs [that were] prevailing . . .').

As with many other Indo–European languages, the prepositions take a range of specific cases, for example, *zhena* 'wife' (nom.), *o zhene* (locative/prepositional) 'about the wife.'

Russian word order within the clause is very free and is adaptable for different nuances of emphasis. Subject–Verb–Object is common, but any variation on these is possible, owing to the relations within the clause or phrase being shown by the case-agreement system.

Language Policy in Russia

The pre-Revolutionary Russian Empire actively suppressed the use of minority languages (with the exception of Finland, Russian Poland, and the Baltic provinces (where German (German, Standard) was the medium of educated and official intercourse). Even nations with sizeable populations were forbidden the official use of their native tongues – Ukrainian was banned in Ukraine from 1876 to 1905, for fear of secessionism. Among the smaller non-Christian peoples of the Empire, Russian was also a medium of missionary expansion, though to some extent Bible translation and literacy were permitted among non-Orthodox nations.

After 1917, and the creation of the Union of Soviet Socialist Republics, the central policy changed markedly. Equality of languages within the new union, with no position of primacy accorded to Russian, was the lofty stated aim of Lenin's early administration, but the practical problems of providing teaching and literature and real official support for the languages of the smaller minorities led to certain inevitable compromises with this ideal. For a start, centralization of the new state in the Russian capital, the administrative center of a command economy, meant that, in effect, Russian became the lingua franca of the Soviet Union.

Nevertheless, the early years of the Soviet state saw energetic campaigning for Union-wide literacy and all that this implied. It was a stimulus for linguistic research, especially among the languages of the far North, in order to create viable orthographies.

The Russian orthography was itself simplified after 1918, with the removal of letters which no longer served a phonetic function. For languages – Turkish, Caucasian, and Indo–Aryan – of the Islamic peoples of the USSR, at first a modified Arabic script was devised, but this was abandoned within a few years in favor of a Latin-based model, as a compromise between Cyrillic and Arabic. Such scripts were devised even for very small languages of the union, such as the tiny Finno–Ugrian Veps community. Devising orthographies often meant an arbitrary choice of a particular dialect as the standard, especially among sparse, widely scattered speech communities.

This policy of standardizing languages within the Soviet Union was a selective one. Some smaller languages remained unwritten – some languages of the Caucasus and Pamirs, for instance. Such situations were usually accompanied by widespread bilingualism or multilingualism on the part of the speakers, and an assimilationist policy by the authorities.

'Assimilation' in Soviet times was to some extent a relative term, and in the later years was less aggressively pursued than in the Stalin era and the decade thereafter. Ethnic assimilation, or dilution, was effected as part of the mass migration policies (the deportations under Stalin of large portions of, or virtually entire, ethnic groups; immigration of Russian laborers and their families into republics undergoing heavy industrialization). While on the one hand, the proportion of native speakers of a minority language might be heavily diluted, an education policy was widely pursued that, at least nominally, offered a choice between a Russian- and a native-language education. Literacy, in both Russian and non-Russian languages, made huge strides forward under the Soviets compared with Tsarist times. Whereas 28.4% of the Russian Empire's population of school age and beyond was literate in 1897, by 1970 the figure was 99.7%, according to census figures.

Within the borders of the present-day Russian Federation there is a wide proliferation of languages belonging to several different linguistic families: Indo–European, Altaic, Uralic and Caucasian – at least 70 distinct languages in all. The present Russian Federation has inherited the legacy of the Soviet Union as regards the language policy of its constituent republics. The Russian language has left a heavy imprint on the lexical content, syntax, and grammar of these languages, regardless of how divergent they are from Slavic structure. Furthermore, although Soviet policy had set so many of the minority languages on the path to literacy, the infrastructure to implement it was not uniformly applied throughout the USSR, and now such infrastructure as there is has been left to its own devices or to the legislatures of the constituent republics. Objective factors such as remoteness from Moscow and sparseness of population (such as Yakutia) and proportions of Russians to natives (for example, Chuvashia, nearly entirely Chuvash, or Karelia, predominantly Russian), have an important part to play. Then there is the problem of dialect diversity in nonstandardized languages. For example, although the 318 000 speakers of Buryat (Buriat, China) make up 90% of the population of the titular Buryat republic, the language is spoken in a range of variants beyond its borders, in Mongolia and China, which differ from the 'literary' language of the Irkutsk area. The spoken language is the Khori dialect, but even in Ulan-Ude, the capital, Russian has a cohesive role to play as a common second language. And Buryat is by no means the most diverse language in Russia in terms of dialects.

Outside the borders of the present-day Russian Federation, Russian speakers can primarily be counted among the descendants of Russian populations who migrated to neighboring republics within the USSR in Soviet times or were already settled there. According to *Ethnologue* (2000), the current numbers of Russian speakers in former republics of the USSR, now the Confederation of Independent States (CIS), plus the Baltic republics are as follows (rounded off to the nearest thousand):

Armenia: 70 000 out of 3 536 000
Azerbaijan: 475 000 out of 7 669 000
Belarus: 1 134 000 out of 10 315 000
Estonia: 468 000 out of 1 476 000
Georgia: 372 000 out of 5 059 000
Kazakhstan: 6 227 000 out of 16 219 000
Kyrgyzstan: 1 409 000 out of 4 643 000
Latvia: 862 000 out of 2 424 000
Lithuania: 344 000 out of 3 694 000
Moldova: 562 000 out of 4 378 000
Tajikistan: 237 000 out of 6 015 000
Turkmenistan: 349 000 out of 4 309 000
Ukraine: 11 335 000 out of 50 861 000
Uzbekistan: 1 661 000 out of 23 574 000

Thus it can be seen that the numbers of Russians outside the immediate borders of Russia are sizeable. In absolute terms, the greatest number is found in Ukraine, followed by Kazakhstan; in terms of proportions, Russians are found in greatest numbers in Latvia and Estonia. Their influence on the economic and social life of those countries is strong enough for the present Russian government to use them as a powerful bargaining lever in intergovernmental relations, in defense of their ethnic institutions, their economic power base, and notably the maintenance of the Russian language in education and public life, acutely at loggerheads with the nation-building

efforts of newly independent states. Russian influence is less marked in the Central Asian republics, with the notable exception of Kazakhstan, a nation which was heavily industrialized and exploited during the Soviet period.

Russian diaspora are found, generally in much smaller numbers, further abroad. Jewish emigration to Israel from Russia in the later decades of the Soviet period and subsequently has resulted in a very sizeable Russian-speaking population of 750 000 (*Ethnologue*, 2000). It was for religious reasons, too, that some of the smaller and older-established Russian-speaking populations emigrated to the New World – such as the Doukhobors, a conservative Orthodox sect which left for the United States and Canada over a century ago. But these Russian populations in North America are dwarfed in size by the considerable waves of more recent emigrants.

See also: Language Education Policy in Soviet Successor States.; Russian

Language Maps (Appendix 1): Maps 117–122, 142, 143.

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Russian Formalism

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Formalism emerged from discussions between two small groups of young Russian scholars: the Moscow Linguistic Circle, which was founded in 1915 by Roman Jakobson, Grigorii Vinokur, and Petr Bogatyrev, and the OPOIAZ (Society for the Study of Poetic Language), which was established 1 year later in Petrograd (St. Petersburg) by literary scholars, including Victor Shklovskii, Iuri Tynianov, Boris Eikhenbaum, Boris Tomashevskii, Lev Iakubinskii, Osip Brik, and Victor Vinogradov. The term 'Formalist' was coined by opponents to the movement. Formalists themselves, especially Eikhenbaum ('The theory of the "Formal" method,' 1927), expressed strong opposition at the time about what they perceived to be a reductive appreciation of their work. On the contrary, they subscribed to a dynamic approach to literature, emphasizing a commitment to a science of literature rather than a concern for methodology alone. Between 1916 and 1923, the activities of the two groups led to the publication of six volumes of *Studies on the theory of poetic language* (*Sborniki po teorii poeticheskogo iazyka*).

Literary Criticism in Russia at the Time of the Formalists

Russian Formalism was a reaction against academic research, which used antiquated aesthetic, psychological, and historical axioms and had lost sight, in the words of Eikhenbaum ('Theory'), of its own subject and was unable to renew itself through a real understanding of theoretical problems. The Formalists were also united against the type of impressionistic criticism produced by journalists insofar as journalism had appropriated, during the last decades of the 19th century, the field of literary criticism ignored by unproductive scholars only concerned with sociopolitical issues. The Formalists insisted on the specific character of the literary text and on the need to examine it solely on literary grounds, without having to take into account the external conditions, biographical, psychological, or historical, that prevailed at the time of creation. On the other hand, most literary journalists were followers of the Symbolist movement and resorted to a kind of aesthetic subjectivism that the Formalists found unsuitable and ineffective in comparison with the diversity of the historical facts and the complexity of the stylistic devices displayed in a literary work. In addition, the Formalists were critical of the philosophical and religious language used by the Symbolists and opposed the theory, supported by the latter, of harmonizing form and content.

Although they remained indebted to literary and linguistic theoreticians such as Aleksandr Veselovskii (1838–1906) and Aleksandr Potebnia (1835–1881), the Formalists dismissed the ethnographic character of the genetic approach developed by the former, and the well-known view of the latter that "art is thinking in images." Genetic interpretations may throw light on the origin of a literary phenomenon, but they fail to account for the specific use of techniques and devices

efforts of newly independent states. Russian influence is less marked in the Central Asian republics, with the notable exception of Kazakhstan, a nation which was heavily industrialized and exploited during the Soviet period.

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Formalism emerged from discussions between two small groups of young Russian scholars: the Moscow Linguistic Circle, which was founded in 1915 by Roman Jakobson, Grigorii Vinokur, and Petr Bogatyrev, and the OPOIAZ (Society for the Study of Poetic Language), which was established 1 year later in Petrograd (St. Petersburg) by literary scholars, including Victor Shklovskii, Iuri Tynianov, Boris Eikhenbaum, Boris Tomashevskii, Lev Iakubinskii, Osip Brik, and Victor Vinogradov. The term 'Formalist' was coined by opponents to the movement. Formalists themselves, especially Eikhenbaum ('The theory of the "Formal" method,' 1927), expressed strong opposition at the time about what they perceived to be a reductive appreciation of their work. On the contrary, they subscribed to a dynamic approach to literature, emphasizing a commitment to a science of literature rather than a concern for methodology alone. Between 1916 and 1923, the activities of the two groups led to the publication of six volumes of *Studies on the theory of poetic language* (*Sborniki po teorii poeticheskogo iazyka*).

Literary Criticism in Russia at the Time of the Formalists

Russian Formalism was a reaction against academic research, which used antiquated aesthetic, psychological, and historical axioms and had lost sight, in the words of Eikhenbaum ('Theory'), of its own subject and was unable to renew itself through a real understanding of theoretical problems. The Formalists were also united against the type of impressionistic criticism produced by journalists insofar as journalism had appropriated, during the last decades of the 19th century, the field of literary criticism ignored by unproductive scholars only concerned with sociopolitical issues. The Formalists insisted on the specific character of the literary text and on the need to examine it solely on literary grounds, without having to take into account the external conditions, biographical, psychological, or historical, that prevailed at the time of creation. On the other hand, most literary journalists were followers of the Symbolist movement and resorted to a kind of aesthetic subjectivism that the Formalists found unsuitable and ineffective in comparison with the diversity of the historical facts and the complexity of the stylistic devices displayed in a literary work. In addition, the Formalists were critical of the philosophical and religious language used by the Symbolists and opposed the theory, supported by the latter, of harmonizing form and content.

Although they remained indebted to literary and linguistic theoreticians such as Aleksandr Veselovskii (1838–1906) and Aleksandr Potebnia (1835–1881), the Formalists dismissed the ethnographic character of the genetic approach developed by the former, and the well-known view of the latter that "art is thinking in images." Genetic interpretations may throw light on the origin of a literary phenomenon, but they fail to account for the specific use of techniques and devices

that organize, for instance, the basic raw material of a narrative (its contingent events) into a formal and artistic construct, insofar as a work of literature is not a mere accumulation of devices but an organized whole. Shklovskii rejected Potebnia's contention that "without imagery there is no art," arguing that images change little, that the same image can be found "from century to century, from nation to nation, from poet to poet" ('Art as device', 1917), and that images alone are less important than the techniques used by writers to produce them. Shklovskii also pointed out that images are common in both everyday and poetic language, and stressed Potebnia's unawareness of two aspects of imagery: "imagery as a practical means of thinking . . . and imagery as poetic, as a means of reinforcing an impression."

In its early stage, Russian Formalism was closely linked to the Futurist avant-garde movement (Vladimir Mayakovsky, Victor Khlebnikov, Aleksei Kruchenykh, and David Burlyuk, among others). Experimenting with language and especially the texture of sound, the Futurists attempted to create a new form of poetry directed against the Symbolist commitment to subjectivism. The notion of how form in itself can be expressive or meaningful, even in the absence of verbal meaning, was particularly appealing to the Formalists (Shklovskii's 'On poetry and trans-sense language,' 1916, and Jakobson's Khlebnikov's 'Poetic language,' 1919). The Formalists did not endorse the traditional dichotomy between content and form in the literary work, because they viewed content as expressed only through a certain formal arrangement, which becomes identified with it. Instead, they emphasized the difference between **material** and **device** – that is, between the protogenetic stage of the literary process and its constructive or creative stage. The organizational principles of that process transform the raw material into an aesthetic work through such devices as sound texture, rhythm, syntax, and plot features.

Literariness

Literariness (*literaturnost'*), a key concept for the Formalists, laid the ground for a science of literature. "The object of study in literary science is not literature but 'literariness,' that is, what makes a given work a literary work. [. . .] The historians of literature have helped themselves to everything – environment, psychology, politics, philosophy. Instead of a science of literature, they have worked up a concoction of homemade disciplines. They seem to have forgotten that those subjects pertain to their own fields of study" (R. Jakobson, *Modern Russian poetry*, 1921). Eikhenbaum stressed the importance of acknowledging the specific features of the literary object and its uniqueness in comparison with all other cultural or artistic products. According to Shklovskii, literariness was an effect resulting from the process of **defamiliarization** (*ostranenie*). Claiming that art is a way of perceiving the artfulness in an object, Shklovskii inferred that the object alone is not important, that the aim of art is to make objects **unfamiliar** by increasing the difficulty and duration of perceptual effect and thereby hindering the reader's ability to relate to objects, situations, and texts in a familiar and automatic manner. Tolstoy, for instance, created an effect of defamiliarization by not naming the familiar object: in *Shame*, he did not use the word 'flogging' but instead provided a full description of the act as if it were an extraordinary and unprecedented event. In his study of Lawrence Sterne's *Tristram Shandy*, Shklovskii associated with defamiliarization the 'laying bare' of the literary techniques – the narrator's commentaries on the structure of the novel.

Poetic and Everyday Language

In attempting to define literariness, the Formalists established a clear distinction between poetic and practical language (or everyday usage) and attached to the former the essential property of art. Concentrating on the analysis of the 'phonic texture' of poems, they followed the Futurists in arguing in favor of the primacy of sound over meaning in poetry. In addition, rhythm became, for Tomashevskii (Eikhenbaum, 'Theory'), the foundation for a theory of verse that would regulate the other formal components of poetic discourse, be it classical metrics or any rhythmic pattern. Whereas everyday language aims at efficient communication, poetic language emphasizes artistic self-consciousness, refers to its own composition rather than to objects or signifieds. In the words of Jakobson, it exerts an organized coercion on the mind of the reader, whose attention is drawn to the constructed formation of the poem. However, during the middle phase of Russian Formalism (1919–1924), the realization that poetry could not be reduced to its phonic features led the Formalists to reevaluate their views on verse and to reintroduce in their analysis considerations related to syntax and semantics (Eikhenbaum, *Melody of Russian lyric verse*, 1922; Tynianov, *The problem of verse language*, 1924; Brik, 'Rhythm and syntax,' 1927).

Story and Plot

The Formalists distinguished between two levels of narrative: story (*fabula*) and plot (*siuzhet*). Story defines a series of events connected through

chronological and causal links, whereas plot consists of the narrator's rearrangement of them without necessarily observing such determining factors. Plot includes other elements as well, such as comments and digressions. In fact, the plot, or *siuzhet* construction, is the defamiliarizing narrative counterpart of the story (*fabula*). According to Shklovskii, typical categories of plot composition are the 'staircase' (repetition and parallelism are used in relating events), the 'hooklike' structure (where contrast and opposition prevail, leading to a false ending), and double plotting (a combination of heterogeneous components). Plot construction is generally realistically motivated, or unmotivated, 'laid bare,' as in Sterne's *Tristram Shandy*, impeding the reader's expectations by means of continuous interruptions of the action, delays, authorial digressions, and various types of chronological shifting (Shklovskii, 'Sterne's Tristram Shandy,' 1921). Gérard Genette's more recent narratological distinction between *diégèse* and *récit* is clearly based on the *fabula/siuzhet* dichotomy.

Literary Evolution

In the late period of Russian Formalism (1924–1930), there emerged the realization that literature and language should be examined not simply on synchronic grounds as poetic devices but within their diachronic developments as well. It became clear to Tynianov ('On literary evolution,' 1927) that the very existence of a literary fact owes much to the interaction of both literary and nonliterary systems, and how important it is to stress the link between literature and social conventions (*byt*). In a 1928 article, 'Problems in the study of literature and language,' written jointly with Jakobson, Tynianov returned to the question of literary evolution by arguing that literature is part of a complex network of interrelated systems, each of which is regulated by its own internal laws and correlated to other systems through a finite series of structural laws. Therefore, the study of literature as a dynamic process entails two consecutive moves: the need to establish the specific laws that govern the literary text conceived as an immanent structure, followed by the analysis of possible correlations between literature and other systems of meaning. However, Tynianov and Jakobson's views were generally seen as isolated attempts to connect literature and culture, whereas Russian Formalism by and large remained committed to the notion of literariness and to literature as holding a unique place among cultural and artistic objects.

The Critique, Suppression, and Influence of Russian Formalism

In 1928 Formalism faced a serious critique in the form of an article, 'The formal method in literary scholarship,' that was signed by Pavel Medvedev but is now attributed to Mikhail Bakhtin. Formalists were attacked for providing neither a sociological nor a philosophical justification for their theories and for not addressing social and ideological issues. This criticism was echoed by the Soviet regime, namely by Leon Trotsky in his book *Literature and revolution* (1923) and by Anatolii Lunacharskii in an essay titled 'Formalism in the theory of art' (1924). As the attacks intensified, Shklovskii was forced to yield to political pressure and in 1930 produced a self-critical statement, 'A monument to a scientific error,' that harshly criticized the assumptions of Formalist theory. However, the Formalist movement had lost its momentum by that time: the Moscow Linguistic Circle had been dissolved in 1920 after the departure of Roman Jakobson and Petr Bogatyrev for Prague, and OPOIAZ had broken up in 1923.

Russian Formalism continued to exert influence abroad, through the Prague Linguistic Circle (Roman Jakobson, Petr Bogatyrev, Vilém Mathesius, Jan Mukařovsky), the Polish 'integral' school in the 1930s (Manfred Kridl), and the French Structuralist school in the 1960s (Greimas, Genette, Barthes, Todorov, Brémond), which became acquainted with Formalist principles through the publication of Tzvetan Todorov's anthology *Théorie de la littérature: textes des formalistes russes* (1965), with a preface by Roman Jakobson. The French Structuralists shared with the Russian Formalists the view that the study of literature had to be conducted in accordance with linguistic principles and methodology and that the literary text was an autonomous system to be apprehended only through an immanent process of reading.

In the early 1960s, some of the earlier Formalist studies were republished in the Soviet Union, and the appearance of the Moscow-Tartu School of Semiotics (Viacheslav Ivanov, Iurii Lotman, Boris Uspenskii), with its emphasis upon language and meaning generated as sign systems, may be seen as a new and revitalized brand of both Formalism and Structuralism.

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Russian River Pomo *See:* Pomoan Languages.

Russian Lexicography

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Origins of Russian Lexicography

Lexicography in Russia, as in many other European countries, originated in the Middle Ages (Kovtun, 1963).

Glossaries in the 13th century were mainly collections of difficult words, very often including proper names from the Bible and ancient Russian manuscripts. Strictly speaking, they were lists of difficult words called азбуковник 'alphabetic lists'. In the 16th–17th centuries they were frequently revised and laid the basis for more profound lexicographic projects (Kovtun, 1977). In the 18th century, A. Schichkov and A. Vostokov made significant attempts to undertake dictionary making as a serious scientific process (Bogatova, 2000).

Major Dictionaries of the 18th, 19th, and 20th Centuries

The Pre-Revolutionary Period

The end of the 18th century was marked by growing interest in vernacular languages, and Russian philological studies focused on creating a serious dictionary of Russian as a literary language. When in 1783 the Russian Academy was established, the first large dictionary of the contemporary language, in six volumes, was compiled (RAD), which appeared in 1789 (Словарь Русской Академии (*Dictionary of the Russian Academy*), 1789–1794).

It was aimed at revealing the system of the language, but the Russian written language had two forms: Russian itself and Old Church Slavonic. Therefore an entry in RAD had certain essential peculiarities: Its lexicosemantic abstraction covered the semantic units of both Russian and Old Church Slavonic. The Slavonic vocabulary in RAD exceeds the number of Slavonic words (and meanings) that circulated in the high and middle levels of the Russian written language. At the end of the 18th century, Russian and Slavonic were still united in the linguistic consciousness of their speakers. The notion of 'exemplary language' and correct literary word use was traditionally associated with the books of the Old Church Slavonic written language.

RAD was revised in 1806–1822, based on *a new alphabetical order*. Although revised, it did not reflect changes in the living language. This scholastic feature was typical of all early academic dictionaries, although they played an important role in society.

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In 1847, a new academic dictionary project in four volumes was launched, entitled Словарь Церковно-Славянского и Русского Языка (*A dictionary of the Church Slavonic and Russian languages*). This dictionary showed selected philological parameters of the vocabulary, including syntactic and phonetic features associated with each word. Positive features of this dictionary included differentiated word-forming and orthographic variants of lexemes, along with distinction of homonyms by means of language signs. Moreover, the definitions were based on the principles of linguistic analysis.

The second academic dictionary entitled Словарь Церковно-Славянского и Русского Языка (*A dictionary of Church Slavonic and Russian languages*) was planned and developed as 'a treasury of the language' according to contemporary scientific standards. It contained, along with words from early manuscripts, words extracted from the latest literary works. The number of foreign words as well as new terms from science and the arts were considerably increased compared to its predecessors. However, this work did not become a thesaurus as planned, because its compilers were more concerned with applying prescriptive principles of word and definition selection. Thus, only neologisms that were in general use in the literary language were introduced into the dictionary, and all the rest were left out.

Simultaneously, the Second Department of the Academy began to work on a dictionary of Russian popular dialects. *Outline of a regional dictionary of the great Russian language* appeared in 1852. Six years later, a supplement edited by A. Vostokov was published. Both editions were based on the *principle of differentiation*, and they laid the basis for dictionaries of Russian dialects that appeared in the 20th century.

The system of Russian dictionaries compiled in the Academy was oriented mainly towards the history of the language. The Second Department of the Academy had a great linguistic goal—to demarcate Old Church Slavonic and Russian, showing the points of maximum agreement, and to indicate the results of their long interaction. In 1858–1861, Словарь Церковно-Славянского Языка (*A dictionary of the Church Slavonic language*) was published in two volumes. It provided the necessary linguistic tools to discern between the two language systems.

The third Словарь Академии (*Academy dictionary*), edited by Y. Grot, appeared in 1895; for the first time, a dictionary undertook a description of modern Russian language. The fundamental links between word meaning and word use are described. After Grot's death, the dictionary was supervised and edited by A. Shakhmatov.

The 'Shakhmatov era' of Russian academic lexicography is frequently considered to be its peak. According to Shakhmatov's theory, the basis for the description of the national language must be a living language with a mixture of written and spoken languages.

The dictionary became a treasury of living Russian words and even now is considered to be a major milestone in Russian lexicography. It evidenced the connection between different parts of the Russian national language as well as the influence of dialects on the literary language. Shakhmatov's dictionary is recognized among Russian scholars as a dictionary of the national language in its complexity and unity. It contains a large number of slang and informal words. There is also a correspondence, where possible, between the regional (dialectal) and literary meanings of the words.

V. Dal was the first to use the term Толковый Словарь 'explanatory dictionary' in his Толковый Словарь Живого Великого Русского Языка (*Explanatory dictionary of the living great Russian language*), which was published in 1863 (Dal, 1863–1866). It was a pioneering dictionary that explained all the meanings of the words, its main purpose being to overcome the gap between written and spoken Russian. Accordingly, A. Shakhmatov gave a highly positive evaluation of this profound reference work.

As he was opposed to foreign borrowings in the Russian language, Dal registered various dialectal words alongside literary words in the dictionary, trying to show productive models of word formation based on народный 'folk language'. The dictionary contains 200 000 entry words, among them more than 80 000 that had never been included in dictionaries of the Russian language. In his effort to describe the living Russian language, he combined the alphabetic and thesaurus word orders, registering synonyms in the entries. This dictionary opened a new era in Russian academic lexicography.

Thus, in Russian lexicography of the 19th and early 20th centuries, there are three interconnected themes: dictionaries of the modern literary language, historical dictionaries, and dictionaries of regional dialects. Each of these themes had numerous branches that varied in purpose and range.

The Soviet Period

The Soviet period of Russian lexicography, which made use of the rich legacy of pre-revolutionary academic dictionaries, began with Словарь Русского Языка (*Dictionary of the Russian language*), compiled by a group of distinguished scholars and edited by D. Ushakov (Ushakov, 1935–1940). It was norm-based and registered many new words developed after the revolution, for example,

активист	activist	(a person active in social reform)
комсомолец	a member of the Komsomol	(Young Communist League)
многотиражка	published in large editions, e.g. factory newspaper	
рационализатор	rationalizer	
хлебозавод	large-scale bread-baking factory	
шефство	patronage	

and so on. Each word had a normative grammar and pronunciation label along with information on etymology, style, etc. Many collocations were included, which was a new feature of the dictionary. The selection of words was naturally based on Communist ideology and is the most vivid product of the ideologically colored reference works of the Soviet era.

Several other dictionaries of this kind appeared subsequently, the most popular being S. Ozhegov's dictionary, which went through more than 20 editions from 1949 on. But the most significant project undertaken by scholars in the 20th century was an enormous academic dictionary of the Russian language in 17 volumes that was published from 1948 to 1965, Словарь Современного Русского Языка (*Dictionary of the modern Russian language*). It contained many citations from classical Russian literature, fiction, and periodicals illustrating each word, with the etymology of the word being the central feature of each entry. The majority of definitions were ideologically oriented and influenced by Ushakov's dictionary.

The Perestroika Period

The latter part of the 20th century, beginning with perestroika, was marked by growing interest in borrowings from contemporary foreign languages, especially English, as well as in colloquial words and jargon, which was not previously recorded in dictionaries of the national language. At the same time, ideologically colored words characteristic of Communist times, such as:

агитпункт	propaganda/agitation centre
идейно-воспитательный	ideological and educational
партийно-хозяйственный	party-economic related, e.g. a meeting of party members and directors of factories to discuss local economy and development
партвзыскание	party penalty/fine
соцлагерь	a union of socialist nations, e.g. Bulgaria, Hungary, Poland and USSR
народный избранник	a person chosen by the people

began to disappear from the modern Russian language.

The process of borrowing into the Russian language is explained first and foremost by the prestige of the foreign language. For example,

презентация	presentation
представление	show (theatre/circus)
эксклюзивный	exclusive
консалтинг	consulting

New concepts also demanded new words:

автобан	motor way
блейзер	blazer/jacket
грант	grant
дайджест	digest
скоч	scotch (whisky reference)

The first dictionary of the Russian language at the end of the 20th century that had no predecessors was a new type of a national language dictionary (Sklyarevskaya, 1998). It included new concepts of the modern reality:

перестройка	perestroika
контрперестройка	against perestroika
пост перестроечный	post perestroika period
рынок	market
рыночник	a person in favour of market economy
дорыночный	before market economy
антирыночник	a person against principles of market economy

borrowings:

консенсус	consensus
приватизация	privatization
презентация	presentation
брифинг	breifing
менеджер	manager
маркетинг	marketing
рейтинг	rating
триллер	thriller
имидж	image
эксклюзивный	exclusive

slang/colloquial:

балдёж	wild, happy time
беспредел	chaos
лимон	million (money reference)
лажа	lies
вешать лапшу на уши	to lie
на халяву	to get something for nothing, for free
затрахать	to be sick and tired, bored (swear word)

jargon (mainly youthful):

общага общежитие	halls of residence (student reference)
стипуха стипендия	grant/scholarship usually paid monthly in Russian universities
шпора шпаргалка	notes used in an exam/test to cheat
удочка удовлетворительно	a satisfactory work (exam; c)
потрясно, классно, обалденно	great, fantastic, amazing (adv.)
убойный, клёвый	great, the best (adj.)
ржать	to laugh a lot, laugh out loud
кайф	happy, pleasant life/ experience
балдеть	to like something very much
прокол	failure in something
ишачить, пахать	work very hard without thinking or complaining/ to do donkey's work
заказать	to kill, do harm to

vocabulary of the criminal world:

шмон	search
баланда	2 meanings: Soup in prison, place full of people
вышка	capital punishment
стукач	'grass'
блатной	jailbird, old lag
мокрушник	murderer/killer
перо	knife

Terminology, especially from business and economics, is also recorded:

рублевое покрытие	money cover – to pay with roubles (Russian money)
ваучер	voucher
монетаризм	method of controlling economic process (e.g. inflation) by putting money into it
лизинг	lease (on a building, office)
экономическое информационное/ правовое пространство	co-operation of countries on the basis of agreement in areas of economy, information and law

political terms:

консенсус	consensus
стагнация общественной жизни	deterionation of life in a society

computer terms:

банк данных	database
интерфейс	interface
байт	byte
принтер	printer

sport:

фристайл	freestyle
бобслей	bobsleigh
ски-стрим	extreme sking
кикбоксинг	kick boxing
файтер	fighter

This dictionary became very popular, not only among Russian users but also among foreigners studying Russian. It was revised and republished in 2001. It certainly inspired modern Russian lexicographers to apply new productive approaches to the description of the modern Russian language in use.

The Proposed New Academy Dictionary

Discussion concerning the issue of the proposed Словарь Новой Академии (*A New Academy Dictionary*) (NAD) in 20 volumes has gained momentum since the early 1980s. NAD will have essential differences from all previous dictionaries of the Russian language. The main issues are: its treatment of the lexicographic object (the lexical system corresponds to the linguistic perceptions of contemporary native speakers); its orientation to current word usage; its comprehensive coverage (about 200 000 lexical units); and its lexicographical methods (including a computational lexicographer's workbench). NAD aims to describe the living, functioning language by using a wide range of lexical material resorting to a synchronous linguistic cut. Unlike previous academic dictionaries, this one rejects the traditional perception of the Russian language and will try to describe the living language without a historical perspective.

The notion of 'contemporaneity' has been changed to 'synchronism,' as the theoretical foundation for the dictionary. Synchronism is understood as one of the elements of the dynamic equilibrium of the language system. It is supported by the norms of the time period during which the dictionary is compiled. A synchronous type of dictionary contains only certain elements of the language system: neutral modern language elements that join the stable core of the lexical system, elements that have certain stylistic functions, certain obsolete words, and elements that are part of phraseology units.

The objectives of the dictionary caused a reconsideration of its empirical basis. According to the conception of NAD, its sources will consist of texts that reflect the language of contemporary native speakers. A multitude of derivatives along with new words make up the first source for the word list. Until now, these words have been excluded

from explanatory dictionaries. The second source for the word list is low-level colloquial vocabulary, which has been treated extremely cautiously in the past and seldom can be found in dictionaries. Borrowings are the third source for the word list. Word formation will serve as one of the most productive sources of new vocabulary. Another source of vocabulary is terminology. The scope and weight of technical terminology in the Russian language has not only increased but has become a menace. The last source of vocabulary for the New Academy Dictionary consists of word equivalents or *word combinations equal to a word, both formally and functionally.* Archaisms that are judged to be semantically and stylistically suitable for present-day usage will also be found in the macrostructure of the dictionary.

Enlargement of the word list in comparison with previous dictionaries will improve its main theoretical purpose—the elaboration of a segmentable, multiaspect, and differentiated system of functional and stylistic labels. Considerable enlargement of the word list, due to the inclusion of a number of new lexical elements, is not contrary to normative dictionary principles. The vocabulary will be differentiated according to its functional and stylistic features. Every lexical unit will be characterized and evaluated according to the norm. Moreover, characteristics of usage limits will be included in the dictionary.

NAD authors are making an attempt to structure all stylistic labels according to certain new parameters. These are: social and functional; chronological; territorial and social; normative; genre and stylistic; and connotative (expressive, emotive, evaluative). This stylistic label system was based on the one developed by V. Vinogradov for Толковый Словарь (*The Explanatory dictionary*) as edited by D. Ushakov.

The Relationship between Lexicography and Linguistic Theory

The theoretical basis of lexicography was explored much later than the first Russian dictionaries, in the middle of the 20th century by L. Scherba (Scherba, 1974). He developed three fundamental categories: typology of dictionaries, principles of semantic analysis for making a dictionary entry, and discovery of 'deeply' embedded semantic elements. His six oppositions describing the main types of dictionaries—academic/informative; encyclopedic/general; concordance/defining; ordinary/ideological; defining/translating; nonhistorical/historical—became the topic of numerous subsequent discussions.

As well as establishing the notion of language norms, Scherba defined stylistic criteria and promoted other ideas, such as comprehension of the lexical system as the vocabulary of a certain human community at a certain moment, and establishing two types of lexical relations (word-to-word relations and meaning-to-meaning relations within a single word). According to Scherba, the role of and knowledge within a dictionary is based on a complex of lexicological and lexicographic studies, on the one hand summarizing theoretical studies and on the other hand being a source and basis for further theoretical research.

The contribution of another well-known Russian linguist, V. Vinogradov, to the theory and practice of Russian lexicography includes many fundamental scientific studies and hundreds of articles (Bogatova, 1999: 253–278). His research was mainly based on critical analyses of Russian dictionaries. Thus, first and foremost, he discovered and formulated problems in the theory of lexicography and theoretical lexicology, his main contributions being a theory of meaning and working out of a phraseology theory. Vinogradov's fundamental statement about types of phraseological units became the starting point for the rapid and successful development of phraseology as an independent linguistic discipline with its own terminological system and object of study, with special reference to dictionary making.

Vinogradov created an integral semantic conception that determined the future of Russian semasiology (Vinogradov, 1977). The most important aspect of Vinogradov's semantic conception was determining the structure of lexical meaning. He interpreted the structure of lexical meaning as a complex interaction of semantics and grammar. Following Vinogradov, generations of Russian linguists understand lexical meaning as 'material matter formed according to the laws of grammar of the given language, an element in the general semantic system of the given vocabulary.' This overall definition of a word's lexical meaning was derived directly from lexicographical practice. It manifests itself in the continuous merging of one meaning of a word into another, in disputes about how many meanings a word has and in constant debates about the accuracy of definitions.

Vinogradov argued that lexical meanings related to reality and lexical meanings related to the lexical system are different. This observation led him to one of the most important conclusions for lexicology and semasiology: meanings are not homogeneous. There are qualitative differences in structures of various kinds of lexical meanings.

Vinogradov also developed a typology of lexical meanings. This typology outlines three main types of lexical meaning: free, phraseologically bound, and functionally and syntactically fixed. Structurally conditioned meanings represent an additional type. The typology offered by Vinogradov is still relevant today: it predicted the development of various

trends in semasiology: the theory of synonymy, homonymy, linguistic metaphor, and the theory of *nominalization*. It also contributed to the development of phraseology and lexicography.

The third semantic conception offered by Vinogradov was the issue of the semantic limits of a word. He saw this as a problem of homonymy in general and lexicography in particular. The issue concerning the modern Russian language had been under discussion for many years. Vinogradov introduced a number of proposals for determining the limits and norms of the modern Russian language. At first this question arose in connection with the need to determine the scope of an explanatory dictionary and as a matter of combining normative, stylistic, and historic principles in one reference book. Drawing on the ideas of Scherba, Vinogradov considered the understanding of structure, volume, contents, limits, and norms of the modern Russian language to be correlated within narrow chronological limits.

Further attempts to reflect the common literary language, codified and represented mainly by fiction, were undertaken in explanatory dictionaries of the modern Russian language. In the 1950s and 1960s, Russian lexicographers turned directly to the analysis of a dictionary's objectives (Sorokaletov, 1998). These objectives are: objectives of explanatory lexicography; structure and principles of making a dictionary entry; issues of homonymy and word identity; role of terminology in the national language; *substantiation of information capacity* as determined by the type of dictionary; criteria of synonymy; and stylistic diversity of the language. Multi-aspect and multilevel theories of typologies of lexical meanings are currently being developed on the basis of Vinogradov's ideas.

The search for systematic and unified principles of lexicography led to the formation of an integral systematic conception of vocabulary and stimulated semantic research. The systematic description of the vocabulary in the dictionary introduced by J. Apresjan (Apresjan, 2000) presupposes the following factors: discovery and description of external connections and relations of a word with other words; description of semantic structure of a word; and analysis of the seme structure of each lexical and semantic variant necessary for writing a definition. The conception of lexical and semantic systems has been accepted in modern Russian linguistics as an organization of the word stock with all its elements naturally tied together, interacting and correlating with each other in paradigmatic, syntagmatic, and derivative relations. Moreover the system possesses a dynamic character, and the system itself is interpreted as a model of a linguistic picture of the world.

The degree of vocabulary ordering within the system (and in the mind of a native speaker) is viewed by Russian linguists in two different ways. According to the idea of J. Karaulov, the system is completely ordered, and all of its elements are bound together into one solid unity (Karaulov, 1981). None of the elements can be separated. P. Denisov, on the other hand, argued that the system is relatively ordered. Some zones can have more or less unity, while others can be isolated. Variants on this issue are described as different levels of analysis (Denisov, 1974).

External and internal aspects of the lexical and grammatical system presuppose two kinds of vocabulary description in a dictionary. Research into the external aspect is aimed at revealing the synonymic, hyponymic, and other relations between words, as well as studying different kinds of lexical groups and formations. Traditional interpretations of the internal aspect are connected with studying lexical and grammatical variant correlations within one lexeme (polysemy) (Scherba, 1974; Karaulov, 1981). There are no contradictions between the external and internal aspects of the system; they simply show different stages of analysis. The method of componential analysis offers an insight into every lexical and semantic item. Thus, indivisible semantic unities become segmentable. These discoveries reveal three aspects of the lexical and semantic system: external, internal, and deeply embedded. This corresponds to the three levels of semantic analysis.

Semasiology was developed in the 1980s and covers various aspects of a word's semantic structure: from the simple correlation of a word and a concept, to the theory of reference, to a description of a hierarchically organized structure of lexical meaning. Critical analysis of dictionaries revealed the imperfection of the information presented in them. A new level of structural comprehension as well as lexical meaning led to the formation of a new trend in semasiology – the study of expression. Combining the expressive components of a word with its semantics became the object of this trend.

The idea of deriving lexical meaning from a group of words and text analysis became linguistically fruitful, going beyond mere lexicographic tasks and contributing to important theoretical conclusions. The analysis leads to the conclusion that the main unit of a dictionary – the dictionary entry – is a cluster of linguistic knowledge concentrating all information about a word. This conclusion makes it possible to use the structure and contents of a dictionary entry as a basis for further scientific research.

New integral conceptions developed on the basis of dictionary compilation and analysis of reference books include the conception of lexical compatibility,

language norms, the theory of synonymy, and the theory of reference. Linguistic pragmatics thus was generated as a lexicological discipline. It studies pragmatic information, not on the level of an utterance but on the level of a word. Stylistics was developed, along with semasiology. Stylistic research either was aimed at lexicographic needs or provided materials and ideas on dictionary issues for theoretical stylistics.

I. Mel'čuk carried out a series of linguistic studies of Russian in four domains of linguistic research: semantics and lexicography; syntax; phraseology; and morphology. These topics are grouped into seven thematic divisions, with special reference to basic problems of semantics and lexicography and the project of a new type of monolingual theory-oriented, semantically based collocational lexicon: the explanatory combinatorial dictionary (ECD) (Mel'čuk *et al.*, 1984).

ECD is intended to be one of the central components of the natural-language meaning ↔ text model (*see* **Mel'uk, Igor Aleksandrovic (b.1932)**).

$$\text{meaning} \leftrightarrow \text{text} \begin{cases} \text{model} \\ \text{theory} \end{cases}$$

It contains full-fledged illustrations of two complete lexical entries; a thorough description within a lexicographic approach of all the senses of two Russian temporal adverbs and emotion verbs; a countability/noncountability feature related to the division of senses in polysemous nouns; the border zone between syntax, semantics and lexicography, and more.

Thus, the new model of ECD is an essential component of linguistic description within the meaning ↔ text theory, which describes a natural language as a kind of logical device, called the 'meaning ↔ text model of natural language.' The lexical entries of an ECD are designed to both test and demonstrate the apparatus devised for the description of any type of lexical unit within the framework of the meaning ↔ text approach. This instrument for lexical description claims to do justice to words both as paradigmatic units in the network of relations in the lexicon and as syntagmatic units systematically related to other similar units in a discourse.

The ECD follows certain promising trends present in contemporary lexicography. Three of them stand out: developing active types of dictionaries; emphasizing the universal character of monolingual dictionaries; and matching linguistic to encyclopedic information.

For a long time, the most common type of monolingual Russian dictionary was the comprehensive one, to which the user would refer in order to find out about an unfamiliar word or phrase found in a text. Such dictionaries were oriented towards making texts comprehensible, i.e., providing for the transition from a text to the meaning expressed by it. Using the traditional contrast between passive grammar (text understanding, or analysis) and active grammar (text production, or synthesis) introduced by L. Scherba more than 50 years ago, one could call these dictionaries 'passive.'

Several attempts to create dictionaries that satisfied the needs of foreign-language teaching were made in the 1930s. A new type of reference book was developed, aimed at users' practical needs and contributing to their production of texts in a foreign language. Clearly, the meaning ↔ text model and its indispensable component, the ECD, also aim at achieving this objective. In this sense, the ECD is an 'active dictionary.' It differs, however, from other active dictionaries in that the linguistic means needed for the expression of a given idea are selected for inclusion in the ECD according to explicitly formulated uniform principles, which are given a formalized description in special artificial languages (such as the lexical functions employed for the description of restricted lexical co-occurrence).

At the same time, the fact that expressions of a natural language in the ECD are explicitly associated with corresponding expressions of a 'deeper' formal language opens up the possibility of using the ECD not only in an active but also in a passive role, i.e., not only for the production but also for the understanding of texts. Thus, the ECD is potentially a reversible dictionary of a universal character, based on an integrated linguistic theory, and combining an explanatory dictionary with phraseological, derivational, and conceptual dictionaries, along with dictionaries of synonyms and antonyms and of syntactic patterns.

Until recently, traditional lexicography differentiated between two types of dictionaries: (1) linguistic dictionaries, which describe meanings of words from the viewpoint of an unsophisticated native speaker, and (2) encyclopedic dictionaries, which describe the corresponding objects, processes, facts, and so forth. However, the development of linguistics, semiotics, and other related sciences has led to the idea that the correct use of words is determined to a significant degree by the way a language breaks down in reality into distinct fragments and by what typical linguistic representations are used to express these fragments.

Consequently 'explanatory' dictionaries (Тол ковый Словарь) began to provide minimal encyclopedic information for words with a strong cultural and factual-knowledge background. Following this trend, the ECD includes elements of encyclopedic information in linguistic dictionary entries. However, unlike other dictionaries, it strictly distinguishes

between these two types of information, presenting them in different sections of the dictionary entry. In maintaining this basic division between linguistic information and encyclopedic material, the ECD is more consistent with traditional lexicography. At the same time, the ECD possesses two important features that distinguish it from most existing dictionaries: its theoretical orientation and its formal character.

The ECD is completely theory-oriented. As stated above, it is conceived and implemented within the meaning ↔ text theory, and the lexicographic method used is intimately tied to this general linguistic framework. The ECD does not aim to satisfy the specific needs of a well-defined class of prospective users; nor does it take into account their probable level of understanding of the corresponding language. It is designed primarily for scientific purposes and tries to bridge the chasm between lexicography and theoretical linguistics by laying the basis for a fruitful interaction between both fields—an interaction that heretofore has been minimal.

In accordance with its main goal, the ECD is explicit and systematic, which means that it never relies on informal methods of communicating information about words or on the native speaker's intuitive knowledge of his language. The ECD also employs circular definitions and requires similar descriptions for semantically similar items. Thus, for example, all names of institutions or all names of movements must be described in exactly the same manner; all differences in the wording of the definitions or in the presentation of lexical collocations of semantically related words must be justified by actual linguistic differences.

The ECD is a monolingual dictionary with the following important features: it is an active, general-purpose dictionary with a substantial element of encyclopedic information; it is based on a modern linguistic theory, strongly emphasizing systematic, explicit, and formalized presentation of all information in the microstructure. The basic unit of an Explanatory Combinatorial Dictionary is a dictionary entry corresponding to a single lexeme or a single phraseme, i.e., one word or one set phrase taken in one particular sense. A family of dictionary entries for lexemes that are sufficiently close in meaning and share the same signifier (i.e., have an identical stem) is subsumed under each main entry.

The structure of a dictionary entry consists of such main sections as morphological information (gender of nouns, aspect of verbs); stylistic specification or usage label (specialized, official, colloquial, poetic); definition (elementary and complex word senses of the language in question); illustrations; lexical functions (synonym, antonym, diminutive, conversive, etc.); examples; encyclopedic information; idioms. The ECD is likely to become a central component of automatic text synthesis and analysis systems because it presents all essential information about the vocabulary of the language in question in an explicit and systematic way.

The ECD represents a contribution to language theory, at least insofar as it provides for the development and refinement of a semantic metalanguage, the systematic account of phraseology, and the development of a multifaceted approach to the word taken as the sum of all its semantic and syntactic characteristics. Various advantages are provided by the ECD in the area of language instruction, as well as in any activity connected with the development of language skills. Textbooks, pedagogically oriented dictionaries, reference works, and so on can be successfully developed along the lines of the ECD.

The Present Day: New Dictionary Types

Dictionaries for General Purposes

A new group of lexicographers from St. Petersburg integrated the experience of modern linguistic theory into lexicographic practice, borrowed the rich practical experience of British publishers such as Harper Collins, and created a new series of reference works of different sizes (Concise, Pocket and Gem). Their main product, Словарь Русского Языка (*Dictionary of the Russian language*), edited by D. Dmitriev, is an example of a dictionary of the new generation (Dmitriev, 2003). It represents a new type of dictionary intended to answer the question, 'How can one speak Russian effectively?'

Its compilers borrowed the policies of The Collins Cobuild dictionaries and apply their typical features: the dictionaries are corpus-based; full sentences are used to define words; headwords and the alphabet are marked with colors; words are exemplified in real contexts and collocations.

The dictionary is object-oriented. Every meaning is based on ideas about objects of reality, which possess different properties (they may be participants in communication, may act in different situations, etc.). Objects may be physical or abstract. Thus all objects are divided into classes, for example, living organisms, transportation vehicles, and so on. Every object is connected in our mind with a certain class, and in the language they have certain lexical meanings.

Thus the key to word usage in this dictionary is understanding that groupings of typical word usage that refer to different classes of objects have different collocational models, differ in form, and acquire definition in context. All of these features help the user to

understand the living Russian language and make this an active type of dictionary.

Special Purposes Dictionaries

Parallel to Russian academic lexicography, various groups of special dictionaries were developed. On the one hand, these adopted practices from academic dictionaries, but on the other hand they had their own peculiar features of macro- and microstructure. These include dictionaries of slang, difficult words, new words, and archaisms; phraseological, dialectal, etymological dictionaries, and so on. Among these, author and LSP dictionaries have the greatest share and are worth describing.

Single-Author Dictionaries Author dictionaries have a long tradition in Russian lexicography, going back to 1883, when the first glossary devoted to the words used by a single Russian writer, Derzhavin, compiled by academician J. Grot, was published. This was an alphabetically arranged word list with over 1750 headwords, accompanied by one or two illustrations, without part of speech labels or definitions, and including an index of proper names. Among these were proper names of mythological origin (*Dazhbog*, *Lada*, *Lel*), folklore characters, and ancient names (*Afet'* 'Europe', *Bel't* 'the Baltic sea').

The appendix of proper names gives exhaustive information about various historical, biographical, geographical, political, and biblical names in Derzhavin's works. Each entry has been supplemented by Grot's comments and references to Derzhavin's fiction, letters, or documents. Thus, the lexicographer introduced two types of author dictionaries: a concordance to Derzhavin's poems and a complete alphabetical index of the proper names used (see Karaulov, 2003: 17).

This dictionary was followed by modest attempts to describe the vocabularies of other famous Russian men of letters. A dictionary of the works and translations of D. Fon-Vizin appeared in 1904, compiled by K. Petrov. This was the first attempt to create a general-purpose lexicon for all genres of a writer's literary works. In spite of the fact that this new dictionary had a number of faults (the most significant one being an absence of definitions in many entries), its development is considered to be a major development in the lexicographic description of an author's vocabulary.

The language and style of A. S. Griboyedov's comedy 'Woe from Wit' by V. Kunitzky was published in Kiev in 1894, followed by *Materials for a dictionary of Pushkin's Prose* by V. Vodarsky. This was devoted to fiction and historical and critical prose only, and although it does not contain systematic definitions, the senses are differentiated as in regular concordances (Karaulov, 2003: 37).

The second period of Russian author lexicography is notable for *A Schedrin dictionary* by M. Olminsky. This was compiled in the late 19th century but only published in 1937. The majority of entries are proper names (the names of characters, with references to the works in which they appear), ideologically important words and word combinations, typical images, and cliches, which reveal Schedrin's artistic conception. The entries contain quotations showing the ideological importance of the characters or sarcastic or ironic implications. Despite the fact that both of the above-mentioned editions are not linguistic in the traditional sense of the term, their place in the general typology of single-author dictionaries is quite significant.

The major event of the second period of Russian single-author lexicography was the academic dictionary of A. Pushkin's complete works (*Pushkin dictionary*, 1956–1961). Pushkin, of course, significantly contributed to the formation of Russian literary language. This project had originated earlier in the century, but the first volume of the dictionary was published only in 1956, the volume's main purpose being a description of the Russian vocabulary in Pushkin's time. It contains detailed entries with grammar labels, full definitions of meanings, and illustrations of words as used by Pushkin. Being a historical dictionary, it was greatly influenced by Russian academic lexicography and does not show particular stylistic features of the writer's language. Instead, it uses Pushkin's works to explain and illustrate the Russian language in the early 19th century.

Another project describing the language of a single author was launched at Leningrad University in the 1950s (Словарь Автобиографической Трилогии М. Горького (*A dictionary of autobiographical trilogy of M. Gorky*), 1974–1990). B. Larin, the originator of the theory of single author lexicography, conceived the idea of a complete explanatory dictionary of M. Gorky's autobiographical trilogy. This was a new type of stylistic author dictionary, and its purpose was to show the individual peculiarities of a writer's language. The compilers worked out a range of stylistic labels that were later borrowed by compilers of other single-author dictionaries, such as one dealing with Gorky's dramatic language (Словарь Драматургии М. Горького (*A dictionary of the dramaturgy of M. Gorky's plays*), 1994).

Both dictionaries opened up a new era in Russian single-author lexicography, (see Karaulov, 2001), notable for explanatory lexicons (or Толковый Словарь), and a significant group of indices based on

frequencies of words in the works of M. Tsvetaeva, I. Brodsky, and other Russian poets.

The beginning of the millennium was marked by a two-volume work called Словарь Русской Поэзии 20 Века (*Dictionary of Russian poetry of the 20th century*) (2001–2003), which contains entries from all the major Russian poets of the 20th century, with a complete description of the usage in their texts, accompanied by stylistic and expressive labels and illustrations. This is a completely new type of historical-stylistic dictionary, which combines concordance with lexicon and aims to describe the language of the poets' period as well as their individual peculiarities.

Dictionaries of Language for Special Purpose (LSP)
LSP dictionaries were originally classified in Russian lexicography as терминологический 'terminological' or науино-технический 'scientific-technical terms'. They appeared in the early 1930s with the effective development of Russian science and technology, which demanded mono- and bilingual dictionaries describing different subject areas, such as metallurgy, energy, chemistry, physics, etc. (Marchuk, 1992). Since then, a Russian terminological school has been established and hundreds of linguistic and encyclopedic LSP reference works of different types and sizes have been published.

The most successful attempt to describe the historical and typological picture of Russian LSP dictionaries was made by Alexander Gerd (Gerd, 1985). According to his main idea, all LSP dictionaries must be based on a logico-notional scheme of a particular subject field, accompanied by specialist expertise. His idea found its development in numerous theoretical works and dictionary projects.

Nowadays, LSP in Russia has at its disposal monolingual, bilingual, and multilingual dictionaries of many different types (Leitchik, 1999). Modern LSP lexicography in Russia is greatly affected by computers, so many dictionaries have recently appeared on the Internet.

Culture-Oriented Dictionaries

The culture of speech has recently become a promising field of lexicographic research in Russia. The culture of speech embraces both language and rhetorical proficiency and is understood by most Russian scholars as the ability to chose the linguistic means that are proper and sufficient for achieving a communicative purpose. The culture of speech thus presupposes language acquisition (studying its grammatical, lexical, and phonological features) and learning the ethics of verbal interaction and the regulation of effective speech behavior, i.e., the conditions, principles, rules, and means of the appropriate and expressive arrangement of written and oral texts.

Creative use of the various linguistic means available is based on profound knowledge of language, which is, in its turn, the main goal of modern education. It is obvious, considering its educative goal, that the research by Russian scholars in the field of the culture of speech would inevitably result in an encyclopedic volume aimed at explaining the culture of the modern Russian language in all its many aspects.

The encyclopedic dictionary Культура Русской Речи (*The culture of Russian speech*), published in 2003, became the first reference book to define the subject field, as previously no attempts had been made to give a clear and precise description (Ivanov, 2003). The work started in 1989, when the main decisions about the dictionary were made. They can be summed up as follows:

- to avoid an excessive word list, it was decided not to focus on the historical perspective but instead to give a broad coverage of modern terminology with some etymological data;
- the editors did not include the terms of grammar, stylistics, poetry studies, or semiotics because of the variety of available specialized dictionaries in those subject fields;
- some subject field terms that have little connection with philology were included as headwords, such as лингвистическая экспертиза 'linguistic expertise'; нейролингвистическое программирование 'neurolinguistic programming'; реклама 'advertising';
- some entries on the theory of communication were deliberately targeted at specialists aware of the subject's peculiarities, not at nonprofessional users, such as адресант 'addresser', адресат 'addressee', каналы речевого воздействия 'channels of speech influence';
- while defining words that have explanations supplementing each other, the editors sometimes place two definitions by different scholars together, even if they seem to be incompatible, for example, лингвистическая экология 'linguistic ecology', стилистика 'stylistics';
- up-to-date 21st century mass-media texts were chosen as the main source of illustrative examples, although some examples come from the 1990s.

The structure of the dictionary is arranged in five parts:

1. general terms of the culture of speech, rhetoric studies, stylistics, and adjacent subject fields;
2. functional styles, genres, stylistic resources of the language;

3. rhetoric methods and stylistic devices;
4. mistakes and faults of speech;
5. reference works.

The dictionary is easy to use, as it has an alphabetical arrangement. The headwords are given mostly in the singular. In cases where the headword is a combination of a noun and an adjective, the variant starts from the adjective if the word combination is a unified term. When a group of terms is united by a general term, the entry starts from the latter; the same holds true in the case of synonyms: the entry starts from the most frequent. In the back matter, there is a list of the entries, which makes searching easier.

It is worth mentioning that the dictionary allows one to solve various tasks. In case the purpose is researching correct and effective speech production or using stylistic devices, the editors advise that users should first study the contents of the second and the third parts, then consult the entries. If the purpose is editing texts or correcting mistakes, the contents of the fourth and the fifth parts will be of greater help. The dictionary can also serve a perfect tool for college and university students reading for examinations in the culture of speech, stylistics, and rhetoric studies.

See also: Learners' Dictionaries; Lexicography: Overview; Mel'uk, Igor Aleksandrovic (b.1932); Russian Federation: Language Situation; Russian.

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Rwanda: Language Situation

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Rwanda is a country in eastern Africa bordered by the Democratic Republic of Congo, Burundi, Uganda, and Tanzania. It has about 8 million inhabitants.

Four main languages are spoken in Rwanda, each with their own status. Kinyarwanda is a national and official language and plays an important role in coordinating the political and social interactions among Rwandan returnees from various English- or French-speaking countries of refuge. French and English are used as official languages and for communication in academic matters. Some Rwandan families, especially well educated ones, even use English or French in their household communication. Kiswahili, though widely spoken, has not yet attained an official position; it is considered the commercial language used among indigenous and Afro-Asian traders. However, Kiswahili is taught as a subject in some secondary schools and used by Muslims as a language of communication in religious matters.

Kinyarwanda is spoken in the Republic of Rwanda as well as in neighboring countries such as the Democratic Republic of Congo, Burundi, Uganda, and Tanzania. Gasarabwe (1992) estimates that Kinyarwanda is spoken and understood by more than 20 million people. This number includes 8 320 000 Rwandans in Rwanda (according to the 2002 national census) and more than 5 million speakers in the neighboring countries and in the diaspora. In addition, Kinyarwanda is mutually intelligible with Kirundi, the language of about 7 million Burundians.

Kinyarwanda is a language of the Benue-Congo branch of the Niger-Congo family and belongs to the Bantu group, spoken in the central, eastern, and southern parts of Africa. Kinyarwanda has been classified by Guthrie (1948) as D 61, belonging to group D 60. However, following work by Meeussen (1967) and Schoenbrunn (1994), Kinyarwanda has been classified as belonging to the interlacustrine zone J, and, within this zone, as J 61, together with Giha and Kirundi. There are a number of slightly distinct alternative names for Kinyarwanda, all revolving around round the stem *-rwanda-,* e.g., Runyarwanda, Ikinyarwanda, Rwanda, Orunyarwanda, Urunyarwanda, etc. The name of their language for Rwandans themselves is Ikinyarwanda. According to available research (e.g, Nkusi, 1986: 289), Kinyarwanda has about a dozen dialects. These include Ikireera, Ikigoyi, Igisoozo, Ikinyanduga (standard Kinyarwanda), Igikiga (ubulimi), Igishobyo, Oluciga, Igihavu, Ururashi, Amashi, and Ikiyaaka.

The writing system of Kinyarwanda employs Latin characters, since the first writers of this language were missionaries who wrote the prayer book *Le livre de priere / Igitabo cy'abakristu bo mu Rwanda* in 1907, a manuscript produced in Maison Carée France.

Some sounds of Kinyarwanda are not found in IPA, so some linguists (e.g., Gerla, 1980; Kimenyi, 1983; Jouannet, 1984) have devised new phonetic symbols to represent these sounds, e.g., for the clusters *shy, jy, mf, pf, ts, mpky.* Kinyarwanda, as most other Bantu languages, is a tone language. Two tones are distinguished by the diacritics high (/) and low (\) to characterize the rising and falling tones respectively, e.g. *umuhùngu,* 'boy' and *abâna,* 'children.'

As any other language, Kinyarwanda can be used not only in communication but also in specialized domains, including drama, poetry, and other technical domains for which specialized Kinyarwanda is needed. Unfortunately, Kinyarwanda has not yet been used as a medium of instruction in schools except in the lower primary cycle. It is only taught as a subject from upper primary school cycle through secondary school and to university levels, as secondary schools and universities in Rwanda use education materials written in English or French. For this reason the policy of bilingualism was adopted in 1996, making both English and French used as mediums of instruction. It is still debatable (Nkusi, 1980) whether Kinyarwanda will become an instrument of modern or technical communication. If asked their points of views, many Rwandans would argue that this would not be a simple matter, since most of the modern communication and technology is imported from abroad. However, Kinyarwanda adopts to this modernity and assimilates it by finding equivalent terms. Only the technology invented by Rwandans is directly named in Kinyarwanda.

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Though not an international language, Kinyarwanda is widely spoken in the world. Apart from being spoken in the central and eastern parts of Africa, it is also broadcast over BBC, VOA, and Deutsche Welle. These emissions are intended to solve political and economic problems in Africa's Great Lakes region and in particular for Rwanda, which experienced terrible genocide in 1994.

An Example of an English Text Translated into Kinyarwanda

Original

The second edition of the *Encyclopedia of Language and Linguistics* (*ELL2*) builds on the foundation laid by the first edition (*ELL1*), which for a decade has been the most authoritative, up-to-date, comprehensive, and international reference source in its field.

Kinyarwanda Translation

Isohoka rya kabiri ry' inkoranya bumenyi
it-come out of-two of-put together-knowledge
y' indimi
of tongues
'edition second encyclopedia of language

n' iyiga ndimi icapwa rya kabiri
and learn tongues print of-two
and linguistics edition second

rishingiye ku ryaribanjirije k' uburyo
it-hinges on which came first in the manner that
kuva
from
builds on its predecessor to an extent that for

mu myaka icumi kugez'ubu ariyo
in years ten to reach-now was the one
a decade up-to–now was the most

yashingirwagaho kuberako ikubiyemo
that was hinged on because it-contains
acceptable reference since it encompasses

isooko y'inyandiko mpuza mahanga
source of writings bring-together territories
zigezweho
up-to date
up-to-date international reference sources

mu rwego rw'indimi
in the habitat of-tongues
in the field of languages'

Kinyarwanda Phonetic Transcription

[[isohwk^{h}a rgyaâ k^{h}âbirî rgyînkworaŋaßumeŋi yîîndîmi nîyîgâ ndîmi itʃapk^{h}a rgyaâ k^{h}âßirî riʃiiŋgyiye kwurgyaârißaanžiriže kwußurgyô kuva mû mŋâak^{h}îtʃûmí kugyezußârîyô yaʃiîŋgyirgwagâhô kwûßêrâkwikwûßiyêmŋîîsôokwo yîŋandikwô mpûuzâmâhaâŋga zigyêzgwêhô mû rgwêegwo rgwîîndîmi]]

See also: Kinyarwanda; Language Education Policies in Africa.

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Ryukyuan

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Also known as Luchuan and Okinawan, the Ryukyuan (Okinawan, Central) language comprises a group of diverse dialects of the former Ryukyu Kingdom, 1429–1879, which has lost much of its political and economic independence since 1609, when it fell to the hands of the Shimazu clan of Kagoshima, Kyushu. Following the Japanese annexation in 1879, the Ryukyu Islands became a prefecture of Japan – *Okinawa ken* 'Okinawa Pref.' – the status it regained in 1972, when the islands were returned to Japan from the American occupation. The Japanese government policy of fostering the use of standard Japanese since the time of the Meiji restoration (1868) has helped marginalize local dialects throughout Japan, and it has also had a pronounced effect in Okinawa. Based on the most recent census (2002), it can be estimated that of the current population of 1.3 million Okinawans, less than 300 000 people over the age 50 speak some variety of the Ryukyuan language with varying degrees of proficiency. Since children no longer learn to speak Ryukyuan, the language is bound to become extinct within the next 50 years unless active revitalization efforts are mounted.

Hypothesizing the sister-language relationship, Chamberlain (1895) remarked that the relationship between Ryukyuan and Japanese is something like that between Spanish and Italian or that between French and Italian. But unlike these Romance languages, the Ryukyuan dialects are often mutually completely unintelligible among their speakers, let alone to the speakers of any mainland dialect. Japanese dialectologists, on the other hand, have generally regarded Ryukyuan as a branch of Japanese dialects comprising three large groups: the Amami-Okinawa group (Amami dialect, Okinawan dialect), the Miyako-Yaeyama group (Miyako dialect, Yaeyama dialect), and the southernmost Yonaguni dialect group. The dialect of Shuri, the former capital of the Ryukyuan Kingdom, of the main Okinawa Island is generally regarded as the standard Ryukyuan, and it has served as a lingua franca of the Ryukyus.

It is generally estimated that the Ryukyuan stock split from the mainstream Japanese language at the latest around the 6th century A.D. (Hattori, 1976). Ryukyuan dialects show systematic sound correspondences with the modern Tokyo dialect, and they preserve a number of distinct features of Old Japanese. As shown in Tokyo–Shuri correspondences such as *ame:ami* 'rain', *hone:funi* 'bone', and *kokoro:kukuru* 'heart', the mid vowels have been raised in Ryukyuan dialects with the result of the standard five vowels *i, e, u, o, a* being reduced to the three vowels *i, a, u*. Innovative phonological developments include palatalization of /k/ before the /i/ corresponding to the Tokyo /i/ (Shuri *tʃiri* : Tokyo *kiri* 'fog'), centralization of the original /i/ in certain dialects (e.g., Miyako, Yaeyama), and the development of long mid vowels /o:/ and /e:/ from *au*, *ao*, and *ou*, as well as *e:* from *ai* and *ae*, respectively.

The features of Old Japanese preserved in Ryukyuan dialects cover all aspects of grammar. The Old Japanese consonant /p/ is preserved in such words as *piru* 'day time', *pi:* 'fire', and *pa:* 'leaf', corresponding to the Tokyo forms *hiru, hi,* and *ha*, respectively. The Ryukyuan lexicon contains older forms such as *tudzi* 'wife', *wan* 'I', and *warabi* 'child'. The notable syntactic features of Old Japanese preserved include the distinction between the conclusive form and the attributive form of verbs and adjectives; e.g., *katʃun* 'write-Conclusive' and *katʃuru* 'write-Attributive' correspond to the Tokyo form *kaku* used in both conclusive and attributive functions. Also seen is the preservation of the nominative function of the particle *nu* (Old Japanese/Modern Japanese *no*) in the main clause. In the total picture of the Japanese dialects, the Ryukyuan dialects form the most peripheral groups that preserve historically residual forms in line with the classical theory dialectology.

See also: Japan: Language Situation; Japanese.

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S

Saadya Gaon (882–942)

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Saadya was born in Pithom (Abu Suweir) in the Fayyum district of Egypt, in 882. The name Saadya is an artificial Hebrew equivalent of his Arabic name Sa'id. He left Egypt in 905 and lived in Palestine but moved further and finally settled in Babylonia. There he was associated with the rabbinic Academy of Sura and became its head, hence the title Gaon, from 928 to 930 and again from 936 until his death in 942.

Between the two terms of his gaonate, he lived in Baghdad and wrote his famous *Kitāb al-Amanāt wa-al-I'tiqādat* ('The book of beliefs and opinions') in 933, which was later translated into Hebrew by the Ibn Tibbon family. In this book, Saadya attempted to reconcile Judaism with the philosophical thinking of Aristotle and Plato, his goal being to bring assimilated Jews back to Torah and its practical application. Saadya accepted the notion that reason was a legitimate standard for truth and set out to demonstrate that the Torah was compatible with reason. What was more, Saadya contended, the Torah was the finest source of truth available, and the study of Torah further developed one's rational judgment. Saadya translated into Arabic almost every book in the Hebrew bible, adding an Arabic commentary, although there was no citation from the books of Chronicles. The translation of the Pentateuch was contained in the Polyglot bibles of Constantinople (1546), Paris (1645), and London (1657), and in an edition for the Jews of Yemen.

In 913, he completed his first great work, the Hebrew dictionary to which he gave the title of *Sefer ha-Agron*. It had two parts, each arranged according to the alphabetic order of initials and of final letters respectively. Its purpose was to help writers find rhyming words. In a later edition, Saadya added the Arabic translation of each word, and also included passages concerning various memorable subjects about poets and their diction, naming the work in its new form *Kitāb al-Shi'r*. Then in his *Kutub al-Lughah*, he sought to explain the *i'rab*, or derivational and inflectional morphology. His *Tafsīr al-Sabʿīna Lafẓah* was a list of 90 Hebrew words, and some Aramaic, which occur only once or very rarely in the bible and explained from the vocabulary of the Mishnaic Hebrew.

Saadya laid the foundation of Hebrew grammar by establishing categories and rules. His dictionary, primitive and merely practical as it was, became the foundation of Hebrew lexicography. The categories of rhetoric, as they were found among the Arabs, were first applied by Saadya to biblical stylistic analysis. He was likewise one of the founders of comparative philology, through his explanation of the Hebrew vocabulary by their Arabic cognates.

See also: Hebrew Lexicography.

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Saami

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Saami is a subfamily of closely related languages within the Uralic phylum. At present, the Saami languages are spoken in an area arching from Dalecarlia in central Sweden to the tip of the Kola peninsula in northwestern Russia. The number of native speakers is ca. 30 000; ca. 85% of these speak North Saami (Saami, Northern) in Finland, Norway, and Sweden. The rest are unevenly distributed between Lule Saami (Saami, Lule) (south of North Saami in Norway and Sweden, estimated 2000 speakers), Kildin Saami (Saami, Kildin) (inland and northern coast of the Kola peninsula, 900 speakers), South Saami (Saami, Southern) (in the southernmost Saami areas in Norway and Sweden, 500 speakers), Skolt Saami (Saami, Skolt) (in Finland and some speakers in Russia, 400 speakers), Inari Saami (Saami, Inari) (in Finland, 300 speakers). The rest, Ume Saami (Saami, Ume) and Pite Saami (Saami, Pite) in Sweden between South Saami and Lule Saami areas, and Ter Saami (Saami, Ter) in eastern Kola peninsula are maintained by a score of old speakers each; Akkala Saami (Saami, Akkala) in southwestern Kola peninsula is probably extinct; the documentation of the minor languages is unsatisfactory (Ter, Pite, Ume) or highly unsatisfactory (Akkala).

There have been Saami idioms down to southern Finland and southern Karelia in Russia; of these idioms, the northernmost ones went into oblivion in the 19th century. There is evidence (language documents, etc.) of Saami presence south of the South Saami area in Sweden and Norway. Loanwords from Finnic, Proto-Indo-European, Aryan, Germanic, Baltic, and Slavic witness contacts with other linguistic groups. There is an ostensible non-Uralic substrate, especially in place names.

First Saami books date to 1619. The author belonged to a trader family and the language represents a pidgin with Saami, Finnish, and Swedish words and hardly any inflection. The first books representing Saami vernaculars (Lule Saami, Ume Saami) were published in the same century. At present, six Saami languages (South, Lule, North, Inari, Skolt, and Kildin) have a literary norm.

The Saami languages are structurally close to the rest of the Uralic languages. The finite verb agrees with the subject and is conjugated in three numbers (singular, dual, and plural), three persons (first, second, and third), and two tenses (the present/future and the preterit) in most languages; the auxiliary *leat* 'to be' together with nonfinite forms of the main verb is used to form aspectual compound forms (progressive vs. terminative aspect in both tenses, e.g., *lean boahtime* 'I am coming' vs. *lean boahtán* 'I have come'). The number of morphological moods varies from two (indicative, imperative) to five (indicative, conditional, potential, imperative, adhortative).

Negation is expressed by a negative verb; in the idioms southwest of North Saami, it has two tenses. In North Saami and east of the language area, tense is encoded in the nonfinite main verb (e.g., North Saami *in mana* 'I do not go' vs. *in mannan* 'I did not go'). The rest of the auxiliaries (mostly for epistemic and deontic modalities) show a more complete conjugation. In addition to compound tenses the nonfinite verb forms are also used for sentence-embedding, e.g., *Máret logai Máhte* [AccSg] *boahtán* [Perfect Participial] 'Mary said that Matthew has come.' Derivation is extensive within and across word classes; in verbs, there are several morphological passives and causatives in addition to a wide selection of aspectual derivatives (frequentative, subitive, etc.).

The Saami languages are nominative-accusative languages; in North Saami, some verbs denoting natural processes may take their single participant argument either in the nominative or in the accusative (e.g., *biegga* [NomSg] *garai* 'the wind became harder' ~ *garai biekka* [AccSg] id.). The basic word order in most Saami idioms is SVO but the older SOV is still dominant in South Saami, and the object neutrally precedes its nonfinite head (S Aux O V). Word order is free for the dependents of the verb and determined by pragmatic factors; the attribute precedes its head; postpositions dominate over prepositions.

In addition to the grammatical cases nominative (= no case) and accusative, nominals have the local cases illative, inessive, and elative (illative and locative in North Saami and the languages east of its area), the predicative cases comitative, essive, and abessive; as a rare case of 'degrammaticalization,' the abessive ending has evolved into a postposition in North Saami (e.g., **guolihaga > guoli haga* 'without fish'). The local cases are also used in nonlocal arguments (e.g., *Máhtte ballá gumppes* [LocSg] 'Matthew is afraid of the wolf'); the comitative also expresses the instrument argument. In addition to determinative (e.g., *Máhte* [GenSg] *govva* 'Matthew's picture') and complementing uses (e.g., *seainni* [GenSg] *čađa* 'through the wall'), the genitive expresses the owner argument when the theme is definite, e.g., *beana* [NomSg] *lea áhči* [GenSg] 'the dog is father's'; if the theme is nondefinite, the

locative (< inessive) is the case of the owner argument, e.g., *áhčis* [LocSg] *lea beana* [NomSg] 'father has a dog'; in South Saami, genitive is used in both cases *aehtjien* [GenSg] *bïenje* [NomSg] 'father has a dog,' *bïenje aehtjien* 'the dog is father's.'

Saami phonology is an extreme sport: a bisyllabic stem may have over 20 different phonological forms depending on grade alternation, compensatory lengthening, vowel balance and metaphony, etc., caused by different suffixes. The number of consonant phonemes is 19–40 depending on idiom, and the basic vowel phonemes (5–10 depending on idiom) are combined to form vowel sequences (5–10 geminate vowels and 4–10 diphthongs with the first component higher than the second, e.g., /ie/ and /oa/). Word stress is trochaic, e.g., /kú.laa.hàl.laa.pèeh.teh/ 'you understand each other,' but morphology may cause deviations from the rule, e.g., /múj.j.hta.liš.kòah.tiih/ 'to begin telling' (/-š.kòah.tii-/ is a derivational ending). Ume, Pite, Lule, North, Inari, and Ter Saami have three degrees of quantity in consonants, e.g., North Saami /čáal.l.liih/ 'writers' (with an extra syllabic pulse) vs. /čáal.liih/ 'to write' vs. /čáa.liih/ 'make him/her write!' Also vowels in stressed syllables show three contrasting lengths (roughly [a] – [a·] – [a:]) but these derive from the phonological oppositions (a) single vowel vs. vowel sequence and (b) initial vs. final stress in a vowel sequence, e.g., /sáh.te/ 'haphazard' – /(ij) maáh.te/ 'does (not) know how to' – /máah.te/ 'Matthew's (GenSg)' (phonetically [sahte] – [ma·hte] – [ma:hte]); initial vs. final stress is also found in diphthongs, e.g., /sóa.đan/ 'I fight' vs. /poá.đan/ 'I come.' These contrasts originate in the grammaticalization of allegro forms in which vowel sequences in stressed syllables receive final stress, and vowel sequences in the following syllables are reduced to single vowels (*/póa.đaan/>/poá.đan/ 'I come'). Syllable border placement is distinctive in at least North Saami, e.g., eastern North Saami /pól.htuuh/ 'to rummage' vs. /pólh.tuuh/ 'you rummage.'

See also: Finland: Language Situation; Norway: Language Situation; Sweden: Language Situation; Uralic Languages.

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Sacks, Harvey (1935–1975)

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Most consequential for the development of his highly original accomplishments in sociology and linguistics was his contact with Harold Garfinkel (and his ideas on ethnomethodology) and Erving Goffman. The influence of Goffman's work in interaction analysis, i.e., the description of how participants behave in normal, everyday interactive encounters, is particularly evident in Sacks's early studies (on suicide help conversations), in which he began to move away from the established quantitative techniques and preanalytic methodology of mainstream American sociology. Instead, he adopted central concepts of ethnomethodology, which is chiefly concerned with the means and methods employed by interactants to create and act within their own social reality. Accordingly, he strongly argued against the widely shared belief that social norms, roles, and rules are statically and objectively given, prior to and independent of the interactants' verbal (and accompanying non-verbal) behavior, in which they are merely reflected. Being convinced that, on the contrary, social order is continuously achieved in social encounters by the participants' skillful use of language, he introduced 'conversation analysis' as an alternative (and by

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now major) approach. His aim was to prove that social norms are most adequately described not from a global but from a local point of view. The analyst's task is to meticulously describe the minute details of as many instances of ordinary everyday conversational events (telephone conversations, newspaper stories, jokes) as possible in order to discover systematically recurrent patterns of methods and means that interactants use collaboratively and routinely to negotiate, i.e., establish, maintain, and vary, social order. Conversation analysis is thus an inductive and strictly empirical data- though not theory-driven approach. Preexisting theories with their descriptive categories and rules, which have been independently developed for unspecified sets of data, are rejected as being neither necessary nor applicable to the analysis of naturally occurring (recorded and transcribed) discourse. Instead, analysts develop the necessary descriptive categories while analyzing the data; categories arise in and out of the analytical process and are based on observation, not intuition.

Conceptual landmarks of Sacks's studies of the mechanisms of talk-in-interaction include turn-taking organization (how and where speaking turns occur, how speakers select others or are selected themselves as next speakers, how turns are structured, etc.), topic organization, opening and closing procedures, mechanisms of self-correction and repair, preferred ways of referring to other people and telling stories in conversation, and the sequential organization of conversation with 'adjacency pair' as its key concept. These are pairs of speech acts whose first part sets up a slot with a 'conditional relevance' for an expected, i.e., preferred, second part, thus constraining the interlocutor's choice; examples are question–answer, statement–agreement or – contradiction, invitation–acceptance or – decline, reproach–justification, and also greeting–greeting. It follows that each contribution to an ongoing conversation is both responsive and initiative. By simultaneously taking up the preceding and setting up expectations for the following turn, each interactant reveals his or her understanding of what is going on, what activities are currently performed, and what interactional frames are shared. In this way, participants continually display their awareness of how their use of language contributes to the constitution of the social event they are engaged in. In his later work (from 1968 onward), Sacks broadened his perspective and preferred a more global to the earlier local, occasionally *ad hoc*, and detailed approach to conversational interaction; his work took "a turn toward systematicity and toward the relevance of substantial amounts of data" (Schegloff, 1992b: xi).

Summing up Sacks's legacy, Schegloff lists four aspects: methodology ("of how to study human sociality"), topic (the "recognition . . . that talk can be examined in its own right, and not merely as a screen on which are projected other processes"), discipline, and inspiration (Schegloff,1992a: xii ff.). However, even though the richness, originality, and intellectual vigor of his work together with his "ability to turn the apparently trivial into the gripping and insightful" (Silverman, 1998: x) are apparent from the available oeuvre, the significance of his beliefs is not generally recognized (Silverman, 1998). Not surprisingly, the methods of conversation analysis (being rigorously empirical, inductive, and interactant centered) have also been criticized as being too positivistic, operating in an interest-, ideology-, and culture-free vacuum.

See also: Conversation Analysis; Ethnomethodology; Goffman, Erving (1922–1982).

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Sacred Texts: Hermeneutics

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Introduction

The task of hermeneutics involves interpretation, and as a discipline, it concerns the theories and process of understanding. How does anyone come to understand specific human communication, and what is involved when they do? What do readers mean when they say that something has meaning? While such philosophical questions arise with all kinds of inquiries, what is entailed in the understanding of sacred texts, and more specifically, the Bible? In what sense does the Bible have meaning for readers?

On one hand, understanding the Bible is analogous to what occurs in reading any other document – even though this one is ancient. Employing various historical and critical procedures, scholars translate its words into those others can understand. On the other hand, the Bible is a sacred text to Jews (the Hebrew/Aramaic portion) (*see* **Jewish Languages**) and Christians (the Old and New Testaments). For some of these readers, the designation 'sacred text' may indicate simply that the Bible is a foundational document that has priority among all sources of knowledge or inspiration. For others, however, sacred text conveys a more literal belief that the Bible was inspired by God and exists as divine revelation. There are variations of these two positions. Thus the Bible is subject to very different kinds of readings, depending on the readers' views of its nature. How then do readers make sense of the Bible? Since crucial delimitations must restrict the range of this essay, I will focus my attention on Christian readers, and especially Christians in the postreformation period.

Historical Overview

Though the term 'hermeneutics' first appears only in the mid-17th century, the quest to explain how to understand the Bible began with the earliest Christians. Building on their Hebrew heritage, the New Testament (NT) writers themselves started the process of reading and interpreting their sacred text, what Christians came to call the Old Testament (OT), for its significance in light of their experience of Jesus. Luke says of Jesus: "Then beginning with Moses and all the prophets, he **interpreted** to them the things about himself in all the scriptures" (Luke 24:27; NRSV; emphasis added). Jewish rabbinic interpreters employed such tactics as: *midrash* 'interpretation' to find meanings in texts beyond the surface meaning; *pesher*, used at Qumran to unpack the mysteries in the sacred texts that explained their own experiences; allegory, to extract deeper and often multiple senses of the literal sense of texts; and typology, the belief that the Bible reflected patterns of God's working in history. Arguably the authors of the NT employed some or all of these same tactics when they interpreted the OT.

Not surprisingly, then, the next generations of Christians continued these same tactics, especially after they adopted a canon consisting of both the Hebrew Scriptures and what came to be the NT. Though the process was far from tidy, by the council of Carthage (397 A.D.) the fixed collection of 66 books emerged as the Christian Bible (though see below on the extent of the canon). Acknowledged as God's complete revelation, these books continued to be mined for their values for the church. A central concern was to explain and defend orthodoxy as it was developing – especially in opposition to the threats from various sects and heresies, such as Gnosticism.

During the centuries of the early church and into the Middle Ages, scholars interpreted the Bible in a wide variety of ways. Some sought the historical (or literal) sense of a text; Origen detected three senses, and John Cassian found four levels of meaning in a text: the literal, allegorical (doctrinal), moral (tropological), and anagogical (eschatological). The latter two reasoned that the meaning of Spirit-inspired texts could not be limited to what they had meant to the original writers or readers. In addition, for some medieval theologians, when the

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literal sense of a text did not suffice to defend orthodoxy, they found a level of meaning below the surface. The 'spiritual reading' (*lectio divina*) of texts also developed in this period. Here the goal was not to understand the historical meaning of a text; *lectio* served purposes of devotional edification and meditation.

The Protestant Reformation, coupled with the Renaissance, began the shift toward the 'modern' reading of Scripture. Martin Luther (*see* **Luther, Martin (1483–1546)**) differed from Rome on the fundamental locus of authority. Instead of relying on Scripture plus tradition (often resorting to these arcane methods of interpreting Scripture as the Roman church did), Luther insisted on appealing to Scripture alone (*sola scriptura*) as the channel of God's word and will for the church. He translated the Hebrew and Greek testaments into German – again to liberate God's word from the strictures of the Latin Vulgate. This act energized a renewed emphasis on finding the meaning of the Biblical texts themselves, and not the church's interpretation. On another front, the Renaissance spurred a new interest in classical learning, and called for a return to the original Hebrew and Greek manuscripts of the Bible. The Roman church rejected this challenge to its authority, reaffirming its control over biblical interpretation.

After Luther, William Tyndale (*see* **Tyndale, William (1494–1536)**) and King James of England brought the Bible into English – the Authorized Version appeared in 1611 – and it later was translated into numerous other languages. Many more Christians possessed and read the Bible for themselves – free to do with it whatever they willed. Devotional uses of the Bible paralleled many of earlier pre-Enlightenment uses. Yet the 'rational' reading of the Bible became the central legacy of the postreformation period. In the 19th century and beyond, Rationalism led to the proliferation of critical methods for studying the Bible. Interpretation was freed from all the constraints of dogma and orthodoxy. Studied from a naturalistic worldview that excluded supernatural phenomena by definition, the world of the Bible emerged as a natural one devoid of miracles. The Bible itself was viewed as merely a collection of religious writings on a par with the sacred texts of other religions. Emerging scientific methods gave scholars access to facts and evidence of material culture independent of the statements in the Bible. Some used these methods to call into question the historical reliability of the Bible. For many the Bible became merely a good source for moral or ethical values, not for theological or historical truths. Certainly not all scholars agreed with these dominant trends. In Germany, the British Isles, and North America, prominent scholars resisted some of these trends, insisted on the reliability of the biblical documents, and sought to refute some of the critical conclusions of the strict rationalists.

In the last century, further developments have altered the agendas of Bible interpreters. The focus began to shift from the biblical text as the object of study to the reader as the one who 'produces' meaning. Skeptical about the possibility of objective knowledge, some scholars discounted the ability of readers to find fixed meaning in ancient texts. Because readers are subjective beings, only in their application of texts to concrete situations do they come to understand what those texts mean for them. More recently, embracing postmodernist values (*see* **Postmodernism**), others insisted that readers jettison all attempts to discover objective meanings residing in the texts or the authors of those texts. They championed the meaning produced by the reader – thus the popularity of reader-response criticism. Escaping what they viewed as the restricted and arid confines of historical criticism, many scholars employed other kinds of scrutiny of the biblical texts: literary and rhetorical criticism, psychological exegesis, deconstruction (*see* **Poststructuralism and Deconstruction**), various advocacy criticisms (e.g., feminist, liberationist, Marxist, 'Queer,' or other types of criticism), and social-scientific analyses, among others (*see* **Literary Theory and Stylistics**). At the same time, many conservative readers embraced the new tactics for understanding the ways texts work (such as literary and rhetorical criticism) (*see* **Rhetorical Structure Theory**) without abandoning the essential historicist goal of seeking the text's and author's intentions.

The 'interpretive community' then assumes critical importance for biblical interpretation because each community determines its rules of engagement. One is the community of biblical scholars. Yet each group of scholars within that larger community – whether conservative or liberal – sets its research agenda and governs acceptable findings. A community of believers provides other interpretive constraints – whether the community understands the Bible as a repository of divine revelation (believing the Bible teaches authoritatively) or holds to a more nuanced stance (differing for each community). Finally, to limit the list to three, there is the global or societal community, for the Bible has passed into the larger culture in many parts of the world.

This essay will now outline how a believing community seeks to understand the Bible – those faithful people who read the Bible as a sacred text for them. The 'believing community' occupies the best position to understand the Bible on its own terms – the way, in fact, that most human communication is designed and intended to be understood. I argue that this approach comports most adequately with the putative

purpose of the Bible, the stance of its authors, and the historical view of the church. I reject the epistemological claim that no interpretation can ever be the correct one. Most Christians read the Bible with a view to understanding its meaning for themselves; they come to it positively and openly desire to learn and grow through their engagement with its message. Usually Christians who expend the energy to read and understand the Bible do so because they possess a cluster of qualifications for this enterprise: a reasoned faith that believes the Bible contains value for them; a stance of obedience or a willingness to learn from the Bible; a belief in the illumination of the Holy Spirit – that the Spirit will enable them to embrace or implement the Bible's wisdom; participation in a believing community in some meaningful way; and the willingness to employ appropriate methods for understanding. Stating this list is not to deny, however, that many read and understand the Bible who do not possess some, or perhaps any, of these qualifications. Using appropriate methods, others may understand what the Bible's authors sought to communicate. I simply argue here that believers are in the best position to understand its message from the inside.

The Extent of the Canon

What is the Bible, or in other terms, what constitutes the Christians' sacred text to be interpreted? In simplest terms, Protestant Christians have never agreed with Roman Catholics and Orthodox Christians on the extent of the canon of the OT. On the other hand, all wings of Christendom since the 4th century agree on the contents of the NT. Taking the position of the Jews of the 1st century A.D., Protestants limit the OT to 39 books and exclude the apocryphal or deutero-canonical books that the Catholics and Eastern Orthodox churches embrace. Though these secondary books contain valuable historical information about the Jews in the intertestamental period and though they were influential in the first 1500 years of the church's existence, their influence has waned. For more on the issues of the canon, see the article on the Bible (*see* **Bible**).

Definition of Hermeneutics

In the Gospel of Luke, the author notes that Jesus explained to the two disciples on the road to Emmaus what the Scripture said about him (Luke 24:27). Based on this explanatory function, and transliterating this Greek word *hermeneuō*, hermeneutics as a discipline concerns the principles and theory behind the process of understanding or interpreting human communication, and the cluster of tactics employed to implement that theory. Because the biblical documents derive from worlds very different from that of modern readers – spanning great distances of time, culture, and language – we require an appropriate and defensible procedure to help us understand them.

What should be the agenda for those who wish to interpret the Bible? What ought they seek? Some may despair of any valid interpretation, be content merely to read in their own meanings, be willing to allow all readings to be valid understandings of a text (see our discussion above), or seek the intended meaning of the author and the resulting written text. And there are other options. Three questions immediately surface before interpreters can settle on an agenda. First, since all interpreters bring their presuppositions and preunderstandings to a text, what role do these have in the interpretive process? Second, who gets to decide upon the goal? Third, is the historical meaning of the text the only meaning contained within it? I must develop each of these points briefly.

First, all readers bring who they are to the task of interpretation; indeed without some prior understanding, new understanding is all but impossible. So readers bring their presuppositions about the nature of the Bible and what their study of the Bible entails. They possess varied kinds of information, attitudes, ideologies, and competence in using the methods for explaining texts. But these neither guarantee nor preclude an accurate understanding of a biblical text. In principle at least, readers can overcome all deficiencies in knowledge, ideology, and methodology if they are willing and able to learn and employ what is required to understand an ancient text. The process of understanding allows growth and progress; interpreters do not merely enter a vicious hermeneutical circle in which they come out where they began. Instead, at least in principle, they can enter a hermeneutical spiral that allows them to grow and learn in understanding. Even unlettered Christians can comprehend much of the basic message of the Bible, though their deficiencies may prevent full understanding of many things. Yet those deficiencies, in principle again, can be addressed.

Second, the decision about the goal comes down to how communication functions. While different answers are possible, I contend that the goal of interpretation is to discern what the biblical authors or editors intended to convey in their messages – at least to the extent that such intentions can be recovered in their texts. As noted above, most readers adopt this stance when they seek to understand the Bible – or any communication. While many theorists speak of readers creating or inventing meaning in their

encounter with a text, I believe the most adequate way to understand what a text means is to seek to discover what the author intended to say. That is, I assert we readers ought to treat the biblical text with dignity and respect, as we treat people and their words when we engage in the communication process: we seek to understand what people mean when they speak. Biblical interpretation then succeeds when readers come as close as possible to deciphering the historical meaning of a text (what the author or editor and recipients of the original text would have understood it to mean) and then apply in a valid way the significance of that meaning to Christians today.

For example, consider words attributed to Jesus: "They do all their deeds to be seen by others; for they make their phylacteries broad and their fringes long" (Matt. 23:5; NRSV). Neither the most pious and prayerful meditation nor the most intuitive reader-response reading will achieve an understanding of the meaning and potential significance of Jesus' reference here. Seeking its meaning for Jesus, Matthew, and the original readers must be the goal for those who wish to understand the meaning of the text. This aim also reflects biblical interpretation at its best throughout the history of the church. Most Christians believe this kind of interpretation is what they are doing, even when, wittingly or unwittingly, they are doing some version of reader-response reading – whether from the deconstructionist left or the fundamentalist right.

The third issue on the agenda for determining the goal of biblical interpretation is the question of whether there is only a single meaning resident in a biblical text. It is crucial to distinguish between meaning and significance. By meaning I refer to what the author intended to convey in the words employed in a text. Significance refers to the variety of ways that meaning finds relevance at the time of the writing, in different contexts, and over subsequent centuries. Christians have often used the term 'application' to refer to this second category. So, in insisting that a text has but one meaning, I do not deny that it may have many applications through history. Another way to ask this question is whether, when authors write, they intend their words to communicate a single sense or multiple senses. But perhaps I must extend the question: when the biblical authors wrote, did they write texts capable of a single or multiple meanings? As to the first point, though readers can construe meaning differently – after all, words once written are out there for any to do as they wish – normal communication assumes that authors intend a single sense. That meaning may be intentionally (or unintentionally) ambiguous or may be conveyed through an intentionally nonliteral device or genre (e.g., metaphor or parable), but that ambiguity or figure of speech still describes what the author set out to accomplish.

Any communicative act has content (the message), energy (illocutionary force), and purpose (perlocutionary effect) (*See* **Mood, Clause Types, and Illocutionary Force**). The author selects the best genre to encode the message it order to accomplish these purposes. To understand the meaning in a text, therefore, requires that interpreters give full attention to these dimensions. They are not free to exclude the author when they seek the text's meaning – that is, if they conceive the biblical text as intended by its author to communicate some deliberate message. This inclusion is all the more crucial for those who believe the Bible to be inspired Scripture – in which case God also speaks through it. How can they listen to God speaking through the Bible if they exclude the author's intention as the goal?

Some argue that in biblical texts, the Holy Spirit encoded meanings apart from the human author's intention – a meaning called the *Sensus Plenior*, a fuller sense. As mentioned above, in the past, interpreters sometimes found three or even four levels of meaning in texts. But was that valid? There is no rational or nonrational way to test such a presumption. How would any reader of the Bible discern meanings beyond what normal means of analysis can uncover? The magisterium of the church may well endorse certain interpretations even though they depart from the normal sense of texts. Or an individual faith community could well authorize a meaning that others beyond it would dispute. But apart from such authoritative pronouncements, Christians have no objective way to discover whether any text they read has some deeper meaning(s) below the surface. So while theoretically other levels of meaning may exist (even purportedly put there by the Holy Spirit), readers have no means of detecting it – or, if there come to be rival claims to an alleged deeper meaning – of adjudicating between alternative interpretations.

The task is not always easy, for we are far-removed from the time, culture, and location of the original writers and readers. The distances may be great, but they are not insurmountable. Due to advances in historical, linguistic, archaeological, cultural, and many other kinds of studies, modern readers are now in a position to know much about the ancient world. And with this increasing fund of knowledge and critical expertise, current readers are in a excellent position to understand the world in which the biblical texts emerged. Errors can be committed; presuppositions may derail adequate assessments;

preunderstandings may blind some from seeing clearly what is there – all these and other pitfalls remain as significant challenges to an adequate understanding of the Bible. But in the pursuit of the Bible's meaning, our options are not limited to a free-for-all, anything-goes on one side, or a pessimistic nothing-can-be-known-for-sure on the other. Hard work is involved, but I contend that the essential goal is to understand the meanings of the authors to the extent interpreters can recover them from their texts.

Essential Tasks for Understanding

The pursuit of a text's historical meaning involves five basic steps. The likeliest candidate for the correct meaning of a text is most consistent with these: the literary context in which the text occurs, the features of the culture at the time in which the text emerged, the correct meanings of the words at the time they were used, the proper understanding of how the language was employed grammatically to construct the meaning, and the genre of the text itself. I give attention to each of these points in turn.

Literary Context

Any biblical text – whether a verse, a paragraph, or a larger section – exists within a literary context that flows from one section and into the next. Interpreting a text apart from its context runs the risk of misunderstanding its meaning. One cannot understand the intended meaning of the sentence, "That was the largest trunk I ever saw," apart from the sentences that precede or follow it. The context provides an understanding of the theme or topic of the discussion, gives readers the probable meanings of the words, and enables one to follow the structure or flow of the argument or narrative. Thus, the correct meaning of a passage is the meaning that best fits the literary context in which it occurs.

Literary context also involves moving beyond the immediate context of a text to its place within a larger section of the book, to the context of the entire biblical book in which it occurs, to other books written by the author, if such other books exist in the canon, and to other books written in that same genre, again, if such exist. Canon criticism reminds us that ultimately the canon itself occupies the largest literary context that may shed light on a text. Obviously, the farther out one moves, the less insight one will get into the precise meaning of the text under study.

Historical–Cultural Background

Since the biblical texts were written so long ago, comprehending their historical meanings requires research into their worlds. To put a biblical book into its context, interpreters must try to understand such data as the identity of the author and his or her circumstances, the recipients' situation, the time of the writing, and the circumstances that elicited the writing. Such knowledge is not always available, but can greatly aid interpreters. Beyond the overall context of a book interpreters must investigate the specific details within the book itself and the particular text under scrutiny. In a text under study, we will need to research features as they surface: the worldview, values, and mindset of the participants; societal structures of the time (marriage, family patterns, roles of men and women); physical and geographical features (e.g., climate, means of transportation, elevations); economic structures (wealth, poverty, slavery); political climate (structures, loyalties); behavioral patterns (dress, customs); and religious practices (power centers, rituals, affiliations).

Word Meanings

Words are the basic building blocks of any written communication, and interpreters must ascertain their meanings in a given text (*see* **Lexical Semantics: Overview**). From among the possible meanings of the word at the time, the goal of a word study is to discover the most likely sense in the context in which the author used it. The study of words is fraught with pitfalls, because their meanings change over time, and because most words cover a range of meaning – that is, have multiple senses. Earlier or later meanings of words may be anachronistic or impossible. In the sentence above regarding a large trunk, 'trunk' might refer to a part of a tree or an elephant, a compartment in an automobile (in American English!), a large version of a suitcase, or a transportation system. Here, the literary or historical context in which the sentence occurred will help settle the issue. For texts in the ancient worlds – whether in the OT Hebrew and Aramaic, or the NT Greek – we must access the best lexicons and other historical research to enable us to settle on the most likely sense for the biblical words in the specific contexts under study.

Grammatical-Structural Relationships

Since written languages communicate by combining words into larger units – sentences, paragraphs, sections, discourses, books – a correct understanding of the meaning of a text will fully account for these grammatical and structural features of a language (*see* **Narrative: Linguistic and Structural Theories**). The interpreters in the best position to recognize these features have learned the biblical languages. They seek to explain how things work from within the requirements

of that language – whether Hebrew, Aramaic, or Greek. Many critical commentaries make available the best insights of grammatical analysis to readers. The comparison of several translations also helps readers grasp the essential structures of a passage. Readers should identify the natural divisions in a section, grasp the organization of the argument, the impact of the key verbs, and any other features of the grammar and structure that shed light on the meaning of a passage.

Genre

Though encountered as one book, the Bible includes many books of distinct literary genres written over a period of more than a thousand years. Competent readers of the Bible will seek to become attentive to the ways its messages are conveyed through these various genres. Readers of the OT find narratives of various kinds, legal materials, poetry, prophecy, apocalyptic, and wisdom literature – along with various subcategories such as proverbs, riddles, parables, songs, and lists. In the NT, readers encounter gospels (theological biographies of Jesus), epistles (letters), narrative (Acts, sometimes termed 'theological history'), and apocalyptic (Revelations). Of course, within some of these categories are parables, miracle stories, hymns, vice and virtue lists, and household codes. Each genre or subtype has its own rules of interpretation, and readers must treat each with the integrity and methodology that its form requires. For example, "The mountains and the hills before you shall burst into song, and all the trees of the field shall clap their hands" (Isa. 55:12; NRSV) makes great sense in a poetic utterance, but is unintelligible in a historical narrative. Readers must interpret each genre according to the norms for understanding that kind of writing.

Reading literature responsibly assumes that interpreters understand figures of speech or other literary devices for what they are, and not in some unnatural or literal sense. Again, the intention of the author and the text reigns supreme. Readers should not subvert the meanings of texts or read into them meanings inconsistent with the genre in which they occur.

From Interpretation to Application

Most Bible readers are not content merely to understand what an ancient text means. What a text meant is one thing; its significance in the life of an individual or the church is another. While the meaning of a text is constant and constrained by its sense and the intention of its author (we have argued), it may have further significance (or implications) as Christians apply that meaning to their circumstances. This principle is demonstrated in many biblical texts. For example, Moses assured Israel of God's blessing if the people obeyed God's laws (Deut. 30:11–20). Jesus urged his listeners not merely to hear his words, but to put them into practice (Matt. 7:13–27). Paul goes so far as to say, "For whatever was written in former days was written for our instruction, so that by steadfastness and by the encouragement of the scriptures we might have hope" (Rom. 15:4). Again, "These things happened to them to serve as an example, and they were written down to instruct us, on whom the ends of the ages have come" (1 Cor. 10:11). Many other texts affirm this same dynamic: readers discover the point of Scripture in its application to their lives (*see* **Preaching**).

Application is not so straightforward a task, however. How might a Christian apply the OT injunction not to boil a baby goat in its mother's milk (Exod. 23:19)? Or respond to the prohibition against tattoos (Leviticus 19:28)? Or to the claim that long hair on a man is degrading (1 Cor. 11:14)? Chaos often reigns when individuals or preachers draw out implications of texts. Some rightly ask, why argue for some fixed (original) meaning of texts, when in actual practice Christians apply them in a dizzying variety of ways or no way at all. Further, even if Paul argued against homosexual practice (Rom. 1:24–28), are Christians bound to apply his rule in the same explicit way he did?

As not all interpretations of the meaning of a text are accurate, so not all applications (of even the correct interpretation) are legitimate. But four steps put a modern reader in an excellent position to draw out a legitimate application of a biblical text. Though these scarcely scratch the surface, they are essential: (1) Discover if in its original context the author makes a specific application of the text under study. (2) After assessing the specificity of the original application, determine whether adopting the same application today would convey the same meaning to modern Christians as did the original meaning to the first hearers. If so, then seek the culturally relevant way of implementing that application. (3) If the specific original application cannot be transferred to a modern context and still bear the original significance it had for the original readers, then seek to extract any broader principles that the text conveyed. (4) If possible, apply these principles in a manner that would embody or convey the broader principle.

Uses of the Bible

People interpret, implement, and employ the Bible in a wide variety of ways. If interpreters do not confine hermeneutics to the epistemological realm – how one comes to understand or know – but extend it, as

I have, to the process of explaining the biblical texts, then the result is a wide variety of uses. Though the list of uses could grow quite large, I will limit this discussion to the most obvious and widely practiced. Some people are interested in learning more about the worlds and thoughts of the peoples in Bible times. Their objectives may be informational. Some read and study the Bible as literature, whether for personal enjoyment or with some intellectual objectives. For believers in faith communities, the Bible informs their worship – whether personal or corporate – and the church's liturgy since the church's inception. Interpretations of the Bible have served the church in formulating its theology – growing out of the conviction that the Bible constitutes God's revelation to his people. Since Matthew records Jesus' words that his followers are to send disciples to all the nations and teach all Jesus commanded (Matt. 28:19–20), Christians have claimed to based their teaching and preaching on the content of the Bible. Its teachings underlie Christian faith and practice. In the hands of God's people the Bible serves as a resource for counsel and encouragement as well as correction and reproof. It has a truly formative and foundational role for Christians.

See also: Bible; Jewish Languages; Lexical Semantics: Overview; Literary Theory and Stylistics; Luther, Martin (1483–1546); Mood, Clause Types, and Illocutionary Force; Narrative: Linguistic and Structural Theories; Postmodernism; Poststructuralism and Deconstruction; Preaching; Rhetorical Structure Theory; Tyndale, William (1494–1536).

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Said Ali, Manuel Ida (1861–1953)

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Manuel Ida Said Ali is one of the Brazilian linguists whose work marked the first half of the 20th century in Brazil (Bechara, 1954, 1970; Silva Neto, 1955). The descriptive rigor of his work made him an obligatory reference for all linguists in the country. He had originally begun working in the Laemmert & Co. bookstore in Rio de Janeiro, where he came into contact with the Brazilian historian Capistrano de Abreu, who would greatly influence his intellectual life. He was a professor of German (German, Standard) at the *Colégio Pedro II*, the first public institution of basic and intermediary learning in Brazil. This school, founded in 1837, had a pivotal role in the

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studies of the Portuguese language in Brazil during the entire 19th century and a good part of the next. Ali's work, from the beginning, would show an important difference in relation to his contemporaries, due to its descriptive rigor (Câmara, 1961).

It is along this line that he is remembered in Brazilian linguistic history as one who, at the end of the 19th century and beginning of the 20th century, was making detailed descriptions that became classics, regarding the placing of atonic pronouns (a question that motivated many discussions of normative character in Brazil); the use of the personal infinitive (a characteristic particular to the Portuguese language); intonation in Portuguese in Brazil; and the study of what is in general considered the conditional mode and what he characterized as a future form of the preterit (Ali, 1908/1966).

There are also stylistic studies of authors in the Portuguese language, through which he introduces into Brazilian linguistic thought the question of the subject of the language who marks his expressiveness in that which he says (Ali, 1930). This work, *Meios de expressão e Alterações semânticas* ('Means of expression and semantic alterations'), was one of the few specific works on semantics produced in Brazil during the first half of the 20th century.

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Sainliens, Claude de (d. 1597)

D A Kibbee

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Claude de Sainliens was the most popular and most prolific of the French instructors in England in the second half of the 16th century, writing a number of instructional texts for French and Italian, along with at least two major French–English dictionaries.

A native of Moulins, France, de Sainliens fled the Wars of Religion early in the 1560s. He may be the M. Claudius who helped John Baret prepare the French part of his trilingual dictionary (*Alvearie*, 1573/74), and some attribute to him the *Dictionarie French and English* (1570).

His general French textbooks were the *French Schoolemaister* (1573) and the *Frenche Littelton* (1576). They represent slightly different philosophies of language instruction, the former presenting grammar and pronunciation rules first, the latter

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Sainliens, Claude de (d. 1597)

D A Kibbee

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Claude de Sainliens was the most popular and most prolific of the French instructors in England in the second half of the 16th century, writing a number of instructional texts for French and Italian, along with at least two major French–English dictionaries.

A native of Moulins, France, de Sainliens fled the Wars of Religion early in the 1560s. He may be the M. Claudius who helped John Baret prepare the French part of his trilingual dictionary (*Alvearie*, 1573/74), and some attribute to him the *Dictionarie French and English* (1570).

His general French textbooks were the *French Schoolemaister* (1573) and the *Frenche Littelton* (1576). They represent slightly different philosophies of language instruction, the former presenting grammar and pronunciation rules first, the latter

relegating those to reference status at the end. In 1580 de Sainliens published three texts meant to supplement the *Littelton: De pronuntiatione linguae gallicae* (in which he attacked efforts for orthographic reform), *A Treatise for the declining of verbs*, and a bilingual dictionary, *A Treasurie of the French tong*. In 1593 he considerably expanded the dictionary, retitling it *A Dictionarie French and English*. This dictionary was an important source for Cotgrave's dictionary of 1611. Both schoolbooks remained popular well into the 17th century, with many posthumous editions.

See also: Dictionaries.

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Sajnovics, János (1735–1785)

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Sajnovics, astronomer and linguist, was born on May 12, 1735, in Tordas, Hungary, the younger son of a well-to-do noble family. He entered the Jesuit Order in 1748, studied philosophy and mathematics at the Universities of Nagyszombat (Czech: Trnava; German: Tyrnau) and Vienna, and astronomy at the Vienna Imperial Observatory (1766). As a member of a team of Austro–Hungarian astronomers, he traveled, in 1769, to the Arctic island of Vardø, there to record the passage of Venus and to measure the earth–sun distance. Sajnovics, having observed a number of similarities between the words used by the indigenous Lapps and Hungarian words, went to study written sources in Copenhagen, which confirmed his theory that the two languages are related. He reported this to the Danish Royal Society, which published his account (Sajnovics, 1770). Unfavorable reaction to his theory in his native country turned Sajnovics away from further language studies, but he continued distinguished research and teaching in astronomy until his death in Buda (now Budapest) on May 4, 1785. He was a member of the Royal Societies of Denmark and Norway.

His model was fully developed and extended to the entire Finno–Ugric family by Sámuel Gyarmathi (*see* **Gyarmathi, Samuel (1751–1830)**).

See also: Gyarmathi, Samuel (1751–1830).

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Salar *See:* Turkic Languages.

Salina *See:* Hokan Languages.

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Salina *See:* Hokan Languages.

Salishan Languages

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The 23 languages of the Salishan family are spoken in the U.S. Northwest and neighboring British Columbia, along the Pacific coast in Washington, Oregon, and British Columbia, and inland to interior British Columbia, the Idaho panhandle, and northwestern Montana. The languages fall into five distinct branches, according to the most commonly accepted subgrouping schema (Czaykowska-Higgins and Kinkade, 1998a; 3): **Bella Coola,** the northernmost language and a one-language branch; **Central** (or **Coast**) **Salish,** comprising Comox–Sliammon (Comox), Pentlatch, Sechelt, Squamish, Halkomelem, Northern Straits, Klallam (Clallam), Nooksack, Lushootseed, and Twana; the **Tsamosan** languages, Quinault, Lower Chehalis, Upper Chehalis, and Cowlitz, located primarily south of the Central Salish languages; **Tillamook,** a one-language branch, spoken in Oregon; and **Interior Salish,** which is divided into two branches: the three Northern Interior languages – Shuswap, Lillooet, and Thompson River Salish – are spoken in interior British Columbia, and the four Southern Interior languages, Colville–Okanagan, Columbian, Coeur d'Alene, and Montana Salish-(a.k.a. Flathead-) Kalispel–Spokane (Kalispel = Pend d'Oreille), are spoken primarily in the interior U.S. Northwest (although Colville–Okanagan is also spoken across the border in Canada). In several instances, as with Montana Salish-Kalispel–Spokane, different tribes speak closely related dialects of a single (nameless) language.

Various proposals have linked the Salishan family genetically to other Northwest languages, but none of these is widely accepted. The isolate Kutenai, which has long been in close contact with some of the Southern Interior languages, is one candidate for a distant relative. Other proposed congeners are the Wakashan and Chemakuan families, also located in the Pacific Northwest; together, Salishan, Wakashan, and Chemakuan comprise the core of the famous Pacific Northwest linguistic area. A number of striking typological features are found in all three of these families (and some of them also in Kutenai); most of the features mentioned below for Salishan also occur in the other two core Pacific Northwest families.

All Salishan languages have rich consonantal inventories that include ejectives, lateral obstruents, velar vs. uvular obstruents, labialized dorsal consonants, and (in some of the languages) glottalized resonants and pharyngeal consonants. Table 1 shows a widely (though not universally) accepted set of Proto–Salishan consonant phonemes (modified from Kroeber, 1999: 7, partly on the basis of comments in Czaykowska-Higgins and Kinkade, 1998a: 51–52). Vowel inventories, in sharp contrast, are relatively simple: Proto–Salishan is generally believed to have had just four vowel phonemes, /i ə a u/.

Table 1 Proto-Salishan Consonant Phonemes

p	t		c	k	k^w	q	q^w			ʔ
p'	t'	ƛ'	c'	k'	$k^{w\prime}$	q'	$q^{w\prime}$			
		ɬ	s	x	x^w	χ	$χ^w$			(h)
m	n									
	(r)	l	y	(ɣ)	w			ʕ	$ʕ^w$	
	(r')	l'	y'	(ɣ')	w'			ʕ'	$ʕ^{w\prime}$	

Salishan phonology displays other striking features as well, notably the presence (in almost all the languages) of very elaborate consonant clusters, as in Montana Salish *Ta qesm'l'm'él'čstmstx^w!* 'Don't play with that!' Another widely shared phonological phenomenon is a sound change, in most of the languages and apparently independently in at least two subgroups, from the velar consonants *k k' x* to alveopalatals *č č' š* (and then sometimes to other consonants later).

Morphologically, Salishan is heavily agglutinative, or polysynthetic. All the languages have many suffixes, including both grammatical suffixes – for example, transitivizers, subject markers, and object makers – and lexical suffixes by the dozens, primarily indicating concrete objects (e.g., 'hand,' 'face/fire,' 'nose/road/cost,' 'round object,' 'root/berry'). Prefixes are not so numerous, though most of the languages have locative prefixes and several others as well. An affix-loaded Montana Salish word, for instance, is *q^{w}o č-taχ^{w}l-m-nt-cút-m-nt-m* 'they came up to me' (lit. 'me to-START-derived.transitive-transitive-reflexive-derived.transitive-transitive-indefinite.agent'). This word contains one locative prefix and six suffixes, with one suffix set, *-m* 'derived transitive' plus *-nt* 'transitive,' repeated after the reflexive suffix etransitivizes the stem.

Reduplication is a prominent morphological process in Salishan, used for such purposes as distributive plural (e.g., Montana Salish *qe č'uč'úw* 'all of us are gone, we left one at a time' vs. *qe č'úw* 'all of us are gone, we left in a group') and diminutive. Salishan languages have pronominal clitics that mark certain subjects (e.g., in intransitive predicates), suffixes that mark other subjects (e.g., in transitive predicates), suffixes that mark patients, and pronominal possessive affixes (see Czaykowska-Higgins and Kinkade, 1998a: 31).

Word classes include at least full words and particles. Because every full word can serve as the predicate of a sentence, some scholars have argued for the absence of a lexical distinction between verbs and nouns (see Kuipers, 1968; Kinkade, 1983; Jelinek, 1998; for the other side of this controversy, see Van Eijk and Hess, 1986; Kroeber, 1999: 33–36). There is general agreement that, if the distinction exists, its morphological and syntactic ramifications are weaker than in most or possibly all language families outside the Pacific Northwest. Salishan languages have suppletive lexical pairs of roots with singular and plural reference, e.g., Montana Salish *čn ʔúłx*^{w} 'I went in' vs. *qeʔ npílš* 'we went in.'

Nearly all Salishan languages are predominantly predicate-initial, mostly VSO but in some languages VOS; word order is rather free. In all the languages transitivity is a major morphosyntactic category, with transitivizing and detransitivizing suffixes, applicatives, causatives, and other complexities; they are head-marking. Jelinek (e.g., 1984) and Jelinek and Demers (e.g., 1994) have proposed that these are pronominal argument languages, with full noun phrases having the status of adjuncts rather than arguments. This claim has been debated vigorously, on both sides of the issue, by Salishanists and other theoreticians.

Research on Salishan languages began early, with wordlists collected by travelers as early as 1810 and the first grammar and dictionary published later in the 19th century – a grammar and a thousand-page two-volume dictionary of Montana Salish (Mengarini, 1961; Mengarini *et al.*, 1877–1879). Modern Salishan linguistics has been flourishing for over half a century, and three especially important surveys have appeared: Thompson, 1979; Czaykowska-Higgins and Kinkade, 1998a and Kroeber, 1999 (in particular Chap. 1). An annual conference, Salish and Neighboring Languages, is held each August, and the conference preprints are a major source for information on the languages. A sizable number of descriptive grammars and dictionaries of various Salishan languages are now available, together with a great many more articles on specific theoretical and descriptive issues, a large monograph on comparative syntax (Kroeber, 1999), and an etymological dictionary (Kuipers, 2002).

All the Salishan languages are gravely endangered. Czaykowska-Higgins and Kinkade (1998a: 64–67) report speaker figures that range from about 500 (for 4 languages) to fewer than 10 (for 9 languages) and 0 (for several now-vanished languages). Language-revitalization efforts are under way, however, for many of the Salishan languages.

See also: Canada: Language Situation; United States of America: Language Situation.

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Samar-Leyte

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Waray-Waray (Samar-Leyte) is an Austronesian language of the Central Bisayan subgroup of Central Philippine languages. With approximately 3 million speakers, Waray-Waray ranks sixth in terms of number of speakers in the Philippines, fifth in the Central Philippine subgroup, and third in the Visayan Islands. Waray-Waray is spoken in an area that roughly corresponds to the borders of the Eastern Visayas (Region VIII), except for the western coast of Leyte and Biliran and a number of small islands off the northwestern coast of Samar, most of which are Cebuano-speaking, except for Capul Island, which is home to Sama Abaknon, a language of the Sama-Abaknon subgroup.

As a Central Bisayan language, Waray-Waray is most closely related to Ilonggo (Hiligaynon), Capiznon, Masbatenyo, Romblomanon, Central and Southern Sorsoganon, Porohanon, and Bantayanon. Outside of the Central Bisayan subgroup, these languages are related to Cebuano, Asi (Bantoanon), the Western Bisayan languages (including Aklanon, Kinaray-a, and Unhan [Inonhan]), and the Southern Bisayan languages (including Tausug, Surigaonon, and Butuanon). Within the Central Philippine subgroup, the Bisayan languages are coordinate with Tagalog and the Bikol (Bicolano, Central) languages.

The 'standard' dialect of Waray-Waray is that of Tacloban City. The Waray-Waray-speaking areas exhibit substantial dialect variation, and in many places no two towns speak the same dialect. Approximately two dozen dialects and subdialects are found in the region. The greatest major dividing line is between Northern Samarenyo and the rest of the Waray-Waray area. The dialect of Allen, Samar, is predominantly Southern Sorsoganon mixed with Northern Samarenyo, and neighboring towns also have a considerable amount of borrowing from Southern Sorsoganon. There is also a modest amount of evidence for a split between Samar Waray-Waray and Leyte Waray-Waray, although much of this split consists of borrowings from Cebuano into Leyte Waray. The dialect of Abuyog, Leyte, is particularly heavily influenced by Cebuano, as is the dialect of Culaba, Biliran. It is also interesting that the dialects of the oldest settlements in Baybay, Leyte, (C. Rubino, personal communication), and the Camotes Islands (Wolff, 1967) show a Warayan substratum, indicating that Waray-Waray was much more widespread in previous centuries before the expansion of the Cebuanos in the mid-1800s (Larkin, 1982). In total, there are approximately 25 dialects and subdialects of Waray-Waray, defined mostly by lexical and morphological variation, as very little phonological and grammatical differences exist.

The earliest written works on the Waray-Waray language are Domingo Ezguerra's 1663 grammar *Arte de la Lengua Bisaya de la Provincia de Leite* and a dictionary by Mateo Sanchez (1562–1618) published a century after his death as the *Vocabulario de la Lengua Bisaya* (1711).

Recent works include two dictionaries (Abuyen, 1994; Tramp, 1995), a series of pedagogical texts (Wolff and Wolff, 1967), and two compilations of literature (Luangco, 1982b; Sugbo, 1995). Zorc (1977) contains data from three Waray-Waray dialects in comparison to other Bisayan languages. Waray-Waray is the language of the church throughout the Eastern Visayas region, and by far the most readily available literature in Waray-Waray is religious in nature, including two modern Bible translations and numerous prayer pamphlets.

Waray-Waray has the basic Central Philippine-type phonology, with 16 consonants / p b m w t d n s l r y k g sng_2 $uʔ_S$ h / and three vowels / a i u /, and both stress and length are contrastive. Most of the dialects of northeastern and eastern Samar have a fourth vowel as a reflex of PAn *e, a high, central, tense unrounded vowel ɨ. The Waray-Waray orthography is mostly regular except that it does not represent stress, length, or the glottal stop.

Waray-Waray is most readily distinguishable from other Central Philippine languages by the *s > /h/ sound change that has affected a small number of common grammatical morphemes in all areas of Samar south of the Sta. Margarita-Matuginao-Las Navas-Gamay line and all of Leyte Waray except the towns of Javier and Abuyog. However, the *s > /h/ change and the loss or retention of PAN *e are areal features, and therefore do not define genetic subgroups within Waray-Waray.

Waray-Waray is agglutinative, with a complex system of verbal morphology expressing a wide variety of semantic and syntactic contrasts. Although sometimes analyzed as ergative, these languages are probably of a separate type called Symmetrical Voice Languages, in which multiple voice distinctions exist, yet none can be considered more 'basic' than the other (Himmelmann, to appear). Like most other Philippine languages, there are four main verbal 'focuses' (actor, object, location, and beneficiary; see Table 1) and three 'case' distinctions (nominative,

Table 1 Waray-Waray focus-mood-aspect morphology

		Actor focus	*Object focus (1)*	*Object focus (2)/beneficiary focus*	*Location focus*
-um-verbs	**Infinitive**	-um-	-on	i-	-an
	Past/perfective	-inm- -īn-	-in-	i-. . .-in-	-in-. . .-an
	Present/progressive	nā-	-in-R-	i. . .-in-R-. . .	-in-R-. . .-an
	Future	mā-	R-. . .-on	i-R-	R-. . .-an
	Imperative/subjunctive	ø-	-a	-an	-i
	Future subjunctive	R-	R-. . .-a	R-. . .-an	R-. . .-i
mag-verbs	**Infinitive**	mag-	pag-..-on	ig-	pag-. . .-an
	Past/perfective	nag-	gin-	igin-	gin-. . .-an
	Present/progressive	nag-R-	gin-R-	igin-R–	gin-R-. . .-an
	Future	mag-R-	pag-R-. . .-on	ig-R-	pag-R-. . .-an
	Imperative/subjunctive	pag-	pag-. . .-i	pag-. . .-an	pag-. . .-i
	Future subjunctive	pag-R-	pag-R-. . .-i	pag-R-. . .-an	pag-R-. . .-i

Table 2 Waray-Waray pronouns

		Nominative	*Genitive*	*Oblique*
Singular	**1st**	akó, ak	ko	(ha/sa) ákon
	2nd	ikáw, ka	mo, nímo, nim	(ha/sa) ímo/im
	3rd	hiyá/siyá	niyá	(ha/sa) íya
Plural	**1st exclusive**	kamí	námon	(ha/sa) ámon
	1st inclusive	kitá	náton	(ha/sa) áton
	2nd	kamó	níyo	(ha/sa) íyo
	3rd	hirá/sirá	níra	(ha/sa) íra

Table 3 Waray-Waray case markers

		Standard Waray	*Abuyog*	*Calbayog; Northern Samar-A*	*Northern Samar-B*
Nom	-ref	in	in	in	i(n)
	+ref, +past	an	an	an	a(n)
	+ref, -past	it	it		
Gen	-ref	hin	sin	sin	si(n)
	+ref, +past	han	san	san	sa(n)
	+ref, -past	hit	sit		
Obl		sa	sa	sa	sa

genitive, and oblique) in noun phrases, name phrases, and pronouns (marked by an introductory morpheme) (see Table 2). Nouns, adjectives, and verbs distinguish between singular, plural, and in some cases, dual, and verbs may also be marked for reciprocal action. A number of other meanings can be marked by verbal affixes, including accidental, abilitative, distributive, causative, social, and diminutive. Tense-aspect-mood distinctions include infinitive, past/perfective, present/progressive, future, imperative/subjunctive, and future subjunctive. Both reduplication and repetition are productive mechanisms that can denote diminutive, repetitive, and intensive meanings, among others.

Table 4 Waray-Waray demonstratives

	Nominative	*Genitive*	*Oblique*
Near speaker; far from addressee	adí	hadi/sadi	didi, ngadi
Near speaker and addressee	iní	hini/sini	dinhi, nganhi
Far from speaker; near addressee	iton	hiton/siton	dida, ngada
Far from speaker and addressee	adto	hadto/sadto	didto, ngadto

Waray-Waray has much the same grammatical structure as Tagalog, except for (a) the existence of distinct imperative forms, (b) a preference for inflecting verbs for plural actors, (c) a more elaborate system of case markers that distinguish between referential and non-referential and past and non-past in both the nominative and genitive cases (see Table 3), and (d) a four-way distinction in demonstratives, including a contrast between referents that are near only the speaker vs. those that are near both the speaker and the addressee (see Table 4).

A noteworthy feature of the lexicon of dialects of Waray-Waray spoken in parts of eastern and northeastern Samar is the existence of a register of vocabulary reserved for usage by speakers when they are angry.

See also: Austronesian Languages: Overview; Bikol; Cebuano; Hiligaynon; Malayo-Polynesian Languages; Philippines: Language Situation; Tagalog.

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Samoa, American: Language Situation

Editorial Team

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A group of five volcanic islands and two coral atolls in the South Pacific Ocean, 14 degrees below the equator, about halfway between Hawaii and New Zealand, American Samoa is the southernmost territory of the United States. Linguistic and cultural evidence suggests that the first Samoa inhabitants migrated from the West, possibly by way of Indonesia, Vanuatu, Fiji and Tonga, to the eastern tip of Tutuila near the present village of Tula around 600 B.C. It is believed that there was at least an 800-year history of contact with Fiji and Tonga before the Samoan islands were officially 'discovered' by Dutch explorer Jacob Roggeveen in 1722. International rivalries in the latter half of the 19th century were settled by an 1899 treaty in which Germany and the United States divided the Samoan archipelago. The United States formally occupied its assigned portion – a smaller group of eastern islands with the harbor of Pago Pago – the following year. The western islands are now the independent state of Samoa. Although technically considered unorganized in that the U.S. Congress has not passed an Organic Act for the territory, American Samoa is self-governing under a constitution that became effective in 1967. The official languages are Samoan and English, with the majority of the population bilingual. The Samoan language is closely related to Hawaiian and other Polynesian languages. There are only minor regional dialect differences, but great phonological and lexical differences, between formal and colloquial speech.

See also: Samoa: Language Situation.

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Samoa: Language Situation

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The Independent State of Samoa, situated in the South Pacific Ocean, comprises two main islands and a number of smaller islands and uninhabited islets. Settled as early as 1500 B.C., Samoa was reached by European explorers in the 18th century. International rivalries in the latter half of the 19th century were settled by an 1899 treaty in which Germany and the United States divided the Samoan archipelago. Shortly after the outbreak of World War I in August 1914, New Zealand sent an expeditionary force to seize and occupy German Samoa. This was to stop German Samoa from being used as a naval refueling base in the Pacific. The German forces on the islands did not surrender; nor did they put up a fight. German Samoa was renamed Western Samoa and New Zealand continued the occupation of Western Samoa throughout World War I. In 1919, under the Treaty of Versailles, Germany dropped its claims to the islands and they were granted to New Zealand as a League of Nations mandate. New Zealand administered Western Samoa under the auspices of the League of Nations, and then as a United Nations trusteeship, until the country received its independence in 1962 as Western Samoa. The country was a constitutional monarchy under a native chief, making it the first Polynesian nation to reestablish independence in the 20th century. The country officially changed its name to Samoa in 1997. The official languages are English and Samoan. The Samoan language plays a significant part in the islands' culture; elaborate ceremonies and protocols revolve around it. Samoan presents no significant dialect variations but has important register-based distinctions in the phonology. The talking chiefs' dialect is very different and most Samoans have difficulty understanding it. The language used by the chiefs, who are versed in eloquent speech-making that recalls the village history, genealogy, and proverbs, is very poetical and figurative. Symbolic phrases are used lavishly in speeches during ceremonies and political debates. The everyday language is used by all, including the chiefs during personal conversations and at home.

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Samtoy *See:* Ilocano.

San Marino: Language Situation

Editorial Team

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A small and completely landlocked enclave in central Italy with a total territory of 61.2 km^2, San Marino claims to be the world's oldest republic, founded by a Christian stonemason named Marinus in 301 C.E. The national language of the Most Serene Republic of San Marino is Italian. The schooling is conducted in Italian and the literacy rate is of circa 98% both for men and women. Aside from Italian, 83% of the 28 503-strong population (July 2004) also speak the Sammarinese dialect of Emiliano-Romagnolo, a language structurally separate from Italian that is related to Lombard, traditionally spoken in Northwest Italy. Sammarinese-speaking adults use Italian as a second language, and there is a 100% literacy rate in the latter. San Marino also has a population of 1455 deaf people. San Marino has one television and three radio stations, which broadcast mainly in Italian, and residents regularly receive broadcasts also from Italy.

See also: Italian.

Samoa: Language Situation

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See also: Italian.

Sanchis Guarner, Manuel (1911–1981)

J Carrera-Sabaté, Universitat de Barcelona, Barcelona, Spain

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Manuel Sanchis Guarner was born in Valencia in 1911. At the age of five, following the death of his father, he was placed under the tutelage of his uncle, the Valencian archaeologist, Josep Sanchis Guarner, from whom he inherited his passion for the study of his own country. Manuel Sanchis Guarner obtained his university degree in Arts and Law at the University of Valencia, became one of the directors of Valencianist Cultural Action, and consolidated his life's project: to dedicate his efforts to his own country.

In 1932, he obtained a grant to work in the Centre for Historical Studies (CEH) in Madrid. In the philology section of the CEH, Sanchis Guarner learned phonetic methodology and dialectology from Menéndez Pidal, Américo Castro, Rafael Lapesa, and Tomás Navarro Tomás, and he acquired the necessary background to lay down the foundation for Valencian philology. In 1933, he agreed to write *La llengua dels valencians*, which became a point of reference in Valencian philology and Valencian identity, as can be seen by its many editions. In 1934, Navarro Tomás asked Sanchis Guarner to join a survey group for an ambitious project which he was directing: The *Linguistic Atlas of the Iberian Peninsula* (ALPI). With this project, Sanchis Guarner made several research journeys to Spanish-, Basque-, and Catalan-speaking lands, the latter with Francesc de Borja Moll.

The atlas project has never been finished because it was interrupted by the Spanish Civil War. Sanchis Guarner was incorporated into the Republican army, and during the war he spent most of his time in Extremadura and Madrid. After the defeat of the Republican army, Sanchis Guarner was held in a concentration camp (Salamanca) and later imprisoned in Madrid. After being a prisoner for nearly four years, he was released provisionally, and in 1943 he settled in Majorca, where he became a language teacher in a high school and took up scientific research again with the support of Francesc de Borja Moll.

During this 16-year Majorcan period, he collaborated with Francesc de Borja Moll in the writing of the *Diccionari Català-Valencià-Balear,* initiated by Antoni M. Alcover. Until that moment, Sanchis Guarner had specialized in phonetics and dialectology, but in working on the dictionary, he learned lexicographic techniques, etymology, semantics, language history, popular culture, and the study of proverbs and proper nouns. He produced different studies in Catalan philology, such as *Introducción a la historia lingüística de Valencia* (1949), *Gramàtica valenciana* (1950), *Els parlars romànics de València i Mallorca anteriors a la Reconquista* (1955), and others, centered on the recovery of local linguistic or literary topics: *Els poetes romàntics de Mallorca* (1950), *Calendari de refranys* (1951), and *Els poetes insulars de postguerra* (1951).

In 1947, Sanchis Guarner and Francesc de Borja Moll resumed interviewing for the ALPI. Sanchis, as one of the main transcribers for the project, traveled to New York in 1951 to retrieve the atlas materials that had been safeguarded by Navarro Tomás since the Spanish Civil War. The publications by Sanchis Guarner relating to the atlas were *La cartografía lingüística en la actualidad* (1953) and the *Atlas de la Península Ibérica* (1953). Furthermore, Sanchis Guarner, as the executive director of the ALPI, presented the publication of the first volume of the atlas at the Congress of Romance Philology in Strasbourg in 1962.

In 1954, Sanchis Guarner began teaching different courses in Valencian language and culture twice a year at the College of Arts at the University of Valencia. In 1959 he definitively returned to his native city, where he worked as a French teacher in a school. Later on, he was placed in charge of the Romance Philology and General Linguistics courses at the university. Afterwards, he became head of the Valencian Linguistics Department, in 1979, and he taught at the university until he retired, in 1981, the same year he passed away. From this period, publications he wrote that were significant include: *Els valencians i la llengua autòctona durant els segles XVI, XVII i XVIII* (1963), *Els pobles valencians parlen els uns dels altres*, 4 vols. (1963–1983), and *Aproximació a la història de la llengua catalana* (1980). He also collaborated on the *Història del País Valencià* (1960–1990).

Sanchis Guarner, as author of numerous papers, prologues, and books reviews, contributed to Catalan philology in several subjects, mainly: dialectology, grammar, history of the language, literature, and culture. Furthermore, throughout his academic life, he participated in different Romance philology congresses and joined the Miguel de Cervantes Institute of Spanish Philology of the CSIC – Consejo Superior de Investigaciones Científicas, the Centre de Cultura Valenciana, the Institut Alfons el Magnànim de Valencia, and the Escola Lul·lística de Mallorca. He

was also a member of the Institut d'Estudis Catalans, the Real Academia de la Historia, the Reial Acadèmia de Bones Lletres, The Hispanic Society of America, and Academia de Bellas Artes de San Fernando. In 1974 he was given the Honour Award of Catalan Letters and in 1981 he received the Award of the Unity of the Language for *Aproximació a la història de la llengua catalana*.

Unfortunately, Sanchis Guarner suffered the effects of numerous stratagems against him by several anti-nationalist sectors in Valencian society. He was even the victim of a frustrated bomb attack. Many people did not forgive the fact that his scientific work made the unity of Catalan clearly evident.

See also: Alcover, Antoni Maria (1862–1932).

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Sanctius, Franciscus (1523–1600)

M Piot, University of Grenoble, Grenoble, France

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Franciscus Sanctius or Francisco Sánchez de las Brozas, known in Spain as 'El Brocense,' was born c. 1522 in Las Brozas in the Spanish province of Cáceres into an aristocratic or 'hijosdalgo' family that had little economic means. At the age of 11, following his uncles on his mother's side named Sánchez (whose name he at that time assumed), he was trained into the Royal Portuguese household in Evora and then in Lisboa, where he began to study Latin and Classics. Coming back to Spain, he studied at the University of Salamanca and received his Bachelor of Arts in 1551. He was a lecturer in Rhetoric there also and later obtained a Cátedra de prima de Gramática (1564), and then a Chair of Rhetoric (1573) and the Chairs of Greek and Latin (1576). Sanctius married twice thereafter and had 12 sons. Bothered at the end of his life (1585–1595) by the Inquisition Court because of his rebellious and critical stance against indoctrination and conformism, he died in Valladolid in 1600.

He wrote treatises on Rhetoric: *De arte dicendi liber unus* (1556) and *Aphthonii Sophistae Progymnasmata Rhetorica* (1556); on Latin: *Grammatices Latinae Institutiones* (1562) and *Arte para en breve saber latin* (1576); and on Greek: *Grammatica Graeca* (1581). He also composed several works on Dialectic: *Organon Dialecticumm et Rhetoricum* (1579) and *De nonnullis Prphyrii aliorumque in Dialectica erroribus Scholae Dialecticae* (1588); and on philosophy, astronomy, literature, and translation. His work also includes philological comments on ancient writers such as Virgil, Ovidius, Pomponius Mela, Perse and Epicteta and moderns such as Politianus, Garcilaso de la Vega, and Juan de Mena.

In his major work, *Minerva: seu de causis linguae Latinae* (1587), a grammar of Latin whose subtitle he took from his predecessor Julius Scaliger, recognizing the same overall purposes and point of view on grammatical studies, he also referred to Nebrija's humanist work. He shared the same methodological concern about linguistic analysis as Petrus Ramus, and he conversely pointed out a lack of rationality and methodology in the Italian philological tradition exemplified by Valla. He also criticized Erasmus for using a nonclassical Latin.

Following his philosophical stands on Plato's and Aristotle's arbitrariness of motivation of the linguistic units, Sanctius explicitly took his place in the grammatical tradition of Quintilian's and Priscian's syntactic approach, attempting to recover the logical structure of sentences.

The purpose of the *Minerva* was to unearth the origins and logical structures (*causae*) as much as the internal rules (*vera principia*) of this language in order to simplify the multiplicity of uses and methods of language acquisition. Constructing this rule-based grammar, Sanctius, both theoretician and great philologist (he mastered the entire classical Latin corpora and leading grammaticians' works in order to exemplify his views and hypotheses), aimed at a theoretical

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and general analysis of language – using ellipsis as its main tool. His grammar implemented the rebuilding of syntactic elementary structures, most of them regular (*ratio*), although with redundancy and subjected in real language (*usus*) to various deletions. He accurately drew up the 'constraints' list on deletion and operations, such as addition, permutation, or substitution that allows passage from the logical level to the level of speech. Every part of speech that is morphologically well-defined has its own syntactic behavior and invariably remains in its primitive class. The keyword is 'unicity,' notwithstanding surface variations. At some level of the analysis (*oratio perfecta*), all the utterances of the clause's basic structure are composed of a subject (*suppositum*) and an object (*appositum*).

In comparison with his predecessors, he reduced the number of parts of speech and the number of verbal voices to active/passive contrast. Instead of expanding it, Sanctius preferred to clear terminology. He made some references to Greek about rhetorico-grammatical terminology, syntactic uses, etymologies, and some short allusions to Arabic.

The *Minerva* has always provided a wealth of problematics on coordination and subordination, case theory, verbal phrase structure, agreement syntax, polysemy, etc.

The works of Gasparus Scioppius and Jacobus Perizionius contributed to the *Minerva*'s popularity in Italy, the Netherlands, Portugal, Germany, and France during the 17th and 18th centuries. Writing his *Nouvelle Méthode Latine*, Claude Lancelot discovered Sanctius' Latin syntax and principles. Thus, Sanctius's ideas came into the *Grammaire Générale et Raisonnée* of Port-Royal through Lancelot. Later, Sanctius had a lot of direct and major influence on the thinking and work of grammarians in the 18th century. Nicolas Beauzée continued the Port-Royal and especially the Sanctius tradition and principles in his *Grammaire Générale* and the *Encyclopédie*'s grammatical entries he wrote. His overall views reflected Sanctius's theoretical framework, with his keyword: the ellipsis method. The simplicity of its rules and the fact that logical structures assisted in the interpretation of difficult uses of languages had the same didactic implications for Sanctius as for Beauzée. Du Marsais and James Harris's *Hermes* also followed, in part, the Sanctius tradition. After a certain lack of interest in general grammar in the 19th and 20th centuries, the advent of Zellig S. Harris's and then Chomskyan transformational models renewed curiosity in Sanctius's work and the subsequent French general grammars. The *Minerva* is today considered by a number of scholars as prefiguring aspects of Transformational Grammar, and Sanctius and his successors are considered as forerunners of that linguistic school.

See also: Beauzee, Nicolas (1717–1789); Chomsky, Noam (b. 1928); Generative Grammar; Harris, James (1709–1780); Harris, Zellig S. (1909–1992); Lancelot, Claude (1615–1695); Nebrija, Antonio de (1444?–1522); Port-Royal Tradition of Grammar; Priscianus Caesariensis (d. ca. 530); Quintilian (ca. 30–98 A.D.); Ramus, Petrus (1515–1572); Scaliger, Julius Caesar (1484–1558).

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Sandhi

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Sandhi is the term used by the ancient Indian grammarians, most notably Pāṇini, to refer to phonological processes occasioned by the putting together (Skt. *saṃ +dhi*) of morphemes to form words, and words to form phrases. Because the sacred Vedic texts were to be transmitted orally, it was important that the hymns be pronounced without change through time; considerable effort was therefore spent in describing the influence of adjacent segments on one another. The grammarians spoke of internal sandhi, the phonology that occurs within words, and of external sandhi, the phonology that occurs between words in connected speech.

and general analysis of language – using ellipsis as its main tool. His grammar implemented the rebuilding of syntactic elementary structures, most of them regular (*ratio*), although with redundancy and subjected in real language (*usus*) to various deletions. He accurately drew up the 'constraints' list on deletion and operations, such as addition, permutation, or substitution that allows passage from the logical level to the level of speech. Every part of speech that is morphologically well-defined has its own syntactic behavior and invariably remains in its primitive class. The keyword is 'unicity,' notwithstanding surface variations. At some level of the analysis (*oratio perfecta*), all the utterances of the clause's basic structure are composed of a subject (*suppositum*) and an object (*appositum*).

In comparison with his predecessors, he reduced the number of parts of speech and the number of verbal voices to active/passive contrast. Instead of expanding it, Sanctius preferred to clear terminology. He made some references to Greek about rhetorico-grammatical terminology, syntactic uses, etymologies, and some short allusions to Arabic.

The *Minerva* has always provided a wealth of problematics on coordination and subordination, case theory, verbal phrase structure, agreement syntax, polysemy, etc.

The works of Gasparus Scioppius and Jacobus Perizionius contributed to the *Minerva*'s popularity in Italy, the Netherlands, Portugal, Germany, and France during the 17th and 18th centuries. Writing his *Nouvelle Méthode Latine*, Claude Lancelot discovered Sanctius' Latin syntax and principles. Thus, Sanctius's ideas came into the *Grammaire Générale et Raisonnée* of Port-Royal through Lancelot. Later, Sanctius had a lot of direct and major influence on the thinking and work of grammarians in the 18th century. Nicolas Beauzée continued the Port-Royal and especially the Sanctius tradition and principles in his *Grammaire Générale* and the *Encyclopédie*'s grammatical entries he wrote. His overall views reflected Sanctius's theoretical framework, with his keyword: the ellipsis method. The simplicity of its rules and the fact that logical structures assisted in the interpretation of difficult uses of languages had the same didactic implications for Sanctius as for Beauzée. Du Marsais and James Harris's *Hermes* also followed, in part, the Sanctius tradition. After a certain lack of interest in general grammar in the 19th and 20th centuries, the advent of Zellig S. Harris's and then Chomskyan transformational models renewed curiosity in Sanctius's work and the subsequent French general grammars. The *Minerva* is today considered by a number of scholars as prefiguring aspects of Transformational Grammar, and Sanctius and his successors are considered as forerunners of that linguistic school.

See also: Beauzee, Nicolas (1717–1789); Chomsky, Noam (b. 1928); Generative Grammar; Harris, James (1709–1780); Harris, Zellig S. (1909–1992); Lancelot, Claude (1615–1695); Nebrija, Antonio de (1444?–1522); Port-Royal Tradition of Grammar; Priscianus Caesariensis (d. ca. 530); Quintilian (ca. 30–98 A.D.); Ramus, Petrus (1515–1572); Scaliger, Julius Caesar (1484–1558).

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The earliest use of the word in English seems to have been in 1806, when the missionary William Carey, in his published work on Indian grammar, referred to "the permutation of letters occasioned by the junction of syllables" in Sanskrit; Joseph Wright's translation of Brugmann (1888) extended the use of the term to Latin. Gabelentz (1891) was perhaps the first in Western Europe to use sandhi as a term in general linguistics. The American structuralists Edward Sapir (1925) and Leonard Bloomfield (1933) began to use the word as a synonym for 'juncture,' and they are most likely responsible for bringing the term into modern usage.

In the mid–20th century, linguists writing in English about Chinese phonology began regularly to use the term *tone sandhi* to refer to the alterations of tones conditioned by other tones (Shen, 1964; Kratochvil, 1968). It was gradually discovered that identical strings of tones might affect one another differently, depending on the rhythmic and grammatical organization of the words on which the tones fell. Determining the domain in which tone sandhi operates has become a major area of research (Chen, 2000). The sandhi domains differ among Chinese languages, some applying within metrical feet, others operating on larger domains of the prosodic hierarchy, such as phonological words, phonological phrases, and intonational phrases. Since these domains are constructed in part on the basis of syntax, it is frequently necessary to know something about the syntactic structure of a sentence in order to know how the tones will emerge.

In the last quarter of the 20th century, sandhi came to refer almost exclusively to external sandhi, and therefore to be more or less synonymous with phonological processes, both segmental and tonal, operating between words. Well-studied examples include *raddoppiamento sintattico* (gemination of a word-initial consonant) in Italian (Napoli and Nespor, 1979), *liaison* in French (syllabification of a word-final consonant as the onset of the next, vowel-initial word (Selkirk, 1972), and tone sandhi processes in many Bantu languages. Selkirk (1980, 1984), Nespor and Vogel (1986), Kiparsky (1982), and Kaisse (1985) were influential in bringing the study of such processes into the mainstream of generative studies. Selkirk and Nespor and Vogel pioneered work on the prosodic hierarchy as the mediating structure between syntax and phonology, whereas Kaisse took the position that rules of external sandhi could refer directly to an impoverished syntactic structure. Kiparsky divided phonological rules into lexical (word-internal) and postlexical (word-external) processes, each type having a defining set of characteristics. Efforts by Andersen (1986) and Inkelas and Zec (1990), for example, have brought together contributions on the external sandhi of particular languages and their theoretical implications.

See also: Chinese (Mandarin): Phonology; Lexical Phonology and Morphology; Panini; Phonological Words; Sanskrit; Tone: Phonology.

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Sango

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Sango was declared the 'national language' in the constitution of the Central African Republic (1964), French alone having the status of 'official language.' Sango also was given this status in 1991, allowing it to be used in governmental communications. In practice, however, it is not yet a legal language and is not used in public education, French being the official medium. Missionaries introduced written Sango in the 1920s, Catholics and Protestants using different orthographies; an official one was established by presidential decree in 1984. Literacy in Sango has been used nonreligiously, primarily in personal correspondence and by radio 'journalists' preparing notes in *ad hoc* orthographies based on religious Sango. There were about 46 hours of broadcasts in Sango in 1994, but most of them were broadcasts of dance music in the Kinshasa style, the rest news and practical information.

Sango is a pidgin in origin, emerging very quickly after representatives of King Leopold II in 1887 arrived to claim land and trade for elephant tusks in the Ubangi river basin, followed in 1889 by the French. Unlike other pidgins, Sango appears to have arisen, not from the attempts of whites to communicate in an indigenous language, but from the attempts of the linguistically diverse African soldiers and workers who were brought to the region for its colonization. The Belgians used many men from the east coast, the French from the west coast, and both many more from the Bantu population along the Congo river. Its existence as a *lingua franca* was noted by Belgians in 1895. It is based on the Ngbandi subfamily of languages (not just the variety called Sango) that make up the larger Ubangian family, to which most of the Central African languages belong. Although its phonology is the same as that of the source language and although most of its lexicon is Ngbandi, it is typically a pidgin in having a very limited vocabulary (from 500 to 1000 words in daily use) and virtually no inflection in its grammar; tone plays a very limited grammatical role and only in the speech of those influenced by Ngbandi speakers, such as the Sangos and Yakomas.

Despite Sango's linguistic limitations, it is a symbol of Central African identity and is by far the preferred language of daily discourse in its capital of one-half million persons, Bangui. However, several Central Africans are active in legitimizing Sango with claims about its adequacy for indigenous culture and with efforts to increase its lexicon with Sango-based neologisms and words from regional languages. Nonetheless, French words occur in all varieties of Sango. The influence of French has increased since independence in vocabulary, grammar, and syntax, even among those with little education.

Although Sango was remarkably uniform as a *lingua franca*, it has become extremely variable as the vernacular of Bangui in all of its structures but exceptionally in its phonology. Contraction creates most of the word variants, as *twa* from *tongana* 'when, if,' resulting in many syllable and word forms that are strikingly different from those of indigenous languages: e.g., *tl* from *tî* 'of' with *l* carrying high tone with words beginning with *l*. Central African activists, however, are striving for a 'standard' (that is, normative or prescriptive) form of the language.

Practically all of the estimated 2 500 000 inhabitants of the Central African Republic speak Sango (according to the census of 1988, varying from 10 to 100%), and in 1994, it was the only language known by about 40–50% of Bangui's preschool non-Muslim children.

See also: Pidgins and Creoles: Overview.

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Sanskrit

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The Sanskrit language – one of the oldest of the Indo–European group to possess a substantial literature – has particular interest for linguists because of the circumstances of its becoming known to Western scholars and the stimulus thus given to historical linguistics. It has also been of enormous and continuing importance as the classical language of Indian culture and the sacred language of Hinduism.

Origin and History

Sanskrit, in its older form of Vedic Sanskrit (or simply Vedic), was brought into the northwest of India by the Āryans some time in the second half of the second millennium BC and was at that period relatively little differentiated from its nearest relation within the Indo–European group, Avestan in the Iranian family of languages (these two being the oldest recorded within the Indo–Iranian branch of Indo–European). From there, it spread to the rest of North India as the Āryans enlarged the area that they occupied, developing into the classical form of the language, which subsequently became fixed as the learned language of culture and religion throughout the subcontinent, while the spoken language developed into the various

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Prākrits. There is ample evidence of rapid evolution during the Vedic period, with the language of the latest phase, attested for example in the Upanisads, showing considerable grammatical simplification from that of the earliest hymns. The later Vedic is, in broad terms, the form of the language that Pāṇini described with such exactness in his grammar around the fourth century BC, thereby creating – no doubt unintentionally – an absolute standard for the language thereafter; his work is clearly the culmination of a long grammatical tradition, based on concern to preserve the Vedas unaltered (hence the stress on phonetics), and is itself intended for memorization and oral transmission, as its brevity indicates.

This standardization was not as universal as has sometimes been represented (nor was the preceding Vedic a unified language, for it exhibits features only explicable as coming from slightly differing dialects, and classical Sanskrit is based on a more eastern dialect than the one attested in the *Ṛgveda*), and it has come to be recognized that, for example, the two Sanskrit epics exhibit systematic divergences from the language described by Pāṇini and represent a distinct epic dialect. However, with the growth of classical Sanskrit literature (mainly within the period from the fourth to the tenth centuries AD, when Sanskrit was clearly no longer a natural language), Pāṇini's description was regarded as prescriptive and followed to the letter, although the spirit was less closely observed (as shown by the tendency to longer and longer compounds and to nominal constructions and the like).

The earliest record of the language is contained in the hymns of the *Ṛgveda*, which belong to around 1200–1000 BC, but they were not committed to writing until a much later period because of their sacred character, for the Indian tradition has always placed greater emphasis on oral tradition than on written texts. In fact, the earliest dated record in Sanskrit is an inscription of 150 AD, significantly later than the use of Prākrit by the Buddhist ruler Aśoka for his inscriptions in the third century BC. Early inscriptions used one of two scripts: the Kharoṣṭhī, deriving from the Aramaic script used in Achaemenid Iran, and the Brāhmī, less certainly deriving from a North Semitic script. The latter evolved into the Nāgarī family of scripts, to which the Devanāgarī script now usually used for Sanskrit belongs, although before the twentieth-century manuscripts were normally written in the local script.

Characteristics

Any analysis of Sanskrit syntax must take account of the shift from the natural language of the Vedic and epic forms of Sanskrit to the learned language of the classical literature, which selectively exploits certain features of Pāṇini's description. Whereas the older forms of the language show frequent use of nominal compounds of two or three members and Pāṇini's grammar describes their formation in great detail (but in terms of their analysis into types: *dvandva*, *bahuvrīhi*, *tatpuruṣa*), classical literature is marked by a predilection for longer compounds, consisting in some styles of writing of 20 or more members. Another common feature, inherited from the Indo–European background but found much more extensively in the classical language, is the use of nominal sentences involving the juxtaposition of the subject and a nonverbal predicate. The frequent use of the past participle passive as a verbal equivalent leads to a preference for passive constructions, in a way typical of the Prākrits. Use of the absolutive becomes in the classical language a common means to form complex sentences by indicating actions occurring before that of the main verb; again the effect is a reduction in finite verbal forms. The usual sentence order is subject, object, verb; however, this is so commonly modified for emphasis (with initial and final positions in the sentence or verse-line carrying most emphasis) that Sanskrit word order is often regarded as being free. In vocabulary, the freeing from the affective connotations of a natural language brought a striking enlargement of the range of synonyms, skillfully exploited in much of the classical literature to produce rich sound effects.

In its morphology, Sanskrit is broadly comparable to Greek or Latin, though somewhat more complex. In both the nominal and verbal systems the dual is obligatory for all twos, not just pairs. The nominal system employs eight cases (seven according to the Indian reckoning, which regards the vocative as a form of the stem), three numbers, and three genders (masculine, feminine, neuter). Unlike other Indo–European languages, Sanskrit lacks a developed series of prepositions, and the relatively few adverbial formations used to define case relationships more exactly tend to be placed after the noun. The use of *vṛddhi* (IE strengthened grade) to form derivatives from nominal stems is a notable feature. The verb has two voices, active and middle, their functions well distinguished by the Sanskrit terms for them: *parasmaipada* 'word for another' and *ātmanepada* 'word for oneself'; it also has five moods (injunctive, imperative, subjunctive, optative, and precative) in the Vedic, somewhat simplified in the classical language. Prepositional affixes to the verb may in Vedic be separated from the verb but in the classical language must be prefixed to it (there is a comparable development between Homeric and classical Greek).

There is both an ordinary sigmatic future and a periphrastic future (formed through a specialized use of the agent noun), several aorist formations (principally a sigmatic aorist and a root aorist), and a perfect normally formed with a reduplicated stem; these are comparable to the equivalent tenses in Greek or Latin. The augment is prefixed to several past tenses: imperfect, aorist, pluperfect, and conditional. Verbal roots are divided by the Sanskrit grammarians into 10 classes: six athematic and four thematic. A distinctive feature of the verbal system is the employment of secondary conjugations with specific meanings: causative, intensive, and desiderative. Historically, the passive is also such a secondary conjugation, formed by adding the middle endings to a modified root. The Vedic language is marked by rather greater grammatical complexity with, most notably, a whole range of case forms from nouns functioning as infinitives, which are reduced to a single infinitive in the classical language. It also possessed a pitch accent that had died out by the time of the classical language.

Phonetically Sanskrit is marked by a number of innovations by comparison with other Indo–European languages of comparable age. It is also notable for the concern with phonetics of its own grammarians (exemplified by the fact that the alphabet is arranged according to the organ of articulation, with vowels preceding consonants) and the precision of their descriptions. On the one hand, Sanskrit has collapsed the three Indo–European vowels *a, e*, and *o* into *a*, and on the other it has introduced a complete new class of consonants, that of the retroflex consonants, mainly under the influence of one of the other language groups already present in India, either Dravidian or Munda, although in some instances the retroflex consonants probably arose through internal phonetic developments in relation to *ṣ* and *r*. The most widely known feature is that of *saṃdhi* 'junction,' the process of phonetic assimilation of contiguous sounds at the junctures between both words and their component parts (external and internal *saṃdhi*).

Sample Sentence

teṣāṃ	*khalv*	*eṣāṃ*	*bhūṭānāṃ*	*trīṇy*
/teṣa:ŋ	khəlv	eṣa:ŋ	bhu:ta:na:ŋ	tri:ɳy
eva	*bījāni*	*bhavanty*	*aṇḍajaṃ*	
evə	bi:ja:ni	bhəvənty	əɳɖəjəŋ	
jīvajam	*udbhijjam*	*iti*‖		
ji:vəjəm	udbhijəŋ	iti/		

'Living beings here have just three origins [literally 'Assuredly of these living beings are/come into being indeed three seeds']: being born from an egg or live-born or produced from a sprout.'

This simple sentence (from *Chāndogya Upaniṣad* 6.3.1) exemplifies several of the features that are taken to extremes in the classical language. There is the avoidance of a transitive construction (although here the verb, *bhavanti*, is expressed, whereas later such a copula is normally suppressed), the employment of compounds, and the liking for etymological figures (the latter two combined in the three compounds ending in the adjectival form *-ja*, coming from √*jan* 'to be born,' while the use of cognates is exemplified by *bhavanti* third pl present indicative and *bhūta* past participle passive from √*bhū* 'to become'). The use of *iti* may also be noted – here to function as the equivalent of the colon in the translation, more usually to perform the function of quotation marks, to mark off a passage in direct speech from the sentence in which it is embedded (an idiom probably calqued on the Dravidian); Sanskrit has no method of indicating indirect speech.

Role and Influence in Indian Culture

As is implicit in some of the statements above, it is clear that throughout the main period of its use as a literary language Sanskrit was not the first language of its users, who in North India would have been native speakers of one of the Prākrits deriving from Sanskrit (used here in its widest sense of the group of OIA dialects) or even of the next stage of MIA, the Apabhraṃśas, and in South India were speakers of one of the Dravidian languages (which have been influenced to varying degrees in their vocabulary by Sanskrit). The prestige attaching to its use for the Vedas, the authoritative scriptures for Hindus, resulted in its being regarded as the only language fit for use in the major rituals of brahmanical Hinduism, a role that to a limited extent it retains to this day. This was undoubtedly the reason why the Purāṇas and the many popular texts related to them were composed (from the fourth century to as late as the nineteenth century) in a form of Sanskrit that is greatly indebted to the epics for its linguistic and metrical expression, while similarly Mahāyāna Buddhism employed the so-called Buddhist Hybrid Sanskrit (essentially a Sanskritization of MIA). Sanskrit has therefore been a dominant influence on the development of the languages in both the MIA and NIA phases, supplying much of the religious vocabulary in the form of direct loans, over and above the large proportion of the vocabulary descended from Sanskrit.

Sanskrit and the West

First acquaintance with Sanskrit by Western scholars came even before the period of British rule. Sir William

Jones's famous discourse in 1786 to the Asiatick Society in Calcutta on the affinity of Sanskrit with Greek, Latin, and the other languages now known as Indo–European was not the first notice of such connection, which had been proposed two centuries earlier by Thomas Stevens (in 1583) and Fillipo Sassetti (in 1585). However, Jones's eminence ensured it a much wider audience than before, and this was in a significant sense the start of the discipline of comparative philology, whereas the appreciation before long of the achievements of the early Indian grammarians was an important stimulant to the development of modern linguistics, which has paid them the compliment of borrowing a number of their terms, such as *saṃdhi*.

See also: Sanskrit: Discovery by Europeans.

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Sanskrit: Discovery by Europeans

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Pioneers: Missionaries and Travelers in India (1583–1768)

The first known observation of a similarity between Indian and Western languages occurred in a letter of 1583 (published 1957) by Jesuit missionary Thomas Stephens/Stevens, which does not mention Sanskrit, but Indian vernaculars and Greek and Latin. A letter of 1586 (published 1855) by litterateur-merchant Filippo Sassetti noted Sanskrit's status as India's learned language, its antiquity and complexity, and lexical similarities with Italian, notably in numerals 6–9 and words for 'god' and 'snake.' In 1660–1662, Jesuit Heinrich Roth wrote, in Latin, the first European grammar of Sanskrit (published 1988); though organized on a Western plan, it follows Indian terminology and analysis.

In a letter of 1725 (published 1729), Protestant missionary Benjamin Schul(t)ze listed Sanskrit numerals with equivalents in Latin for all, and in other European languages for some. He offered in the *Orientalisch- und Occidentalischer Sprachmeister* (1748) a Sanskrit translation of the Lord's Prayer, reproduced in Adelung's *Mithridates* (1806). Most influential was a survey of Sanskrit literature (1740; published 1743) by Jesuit Jean-François Pons, which described Sanskrit as "admirable for its harmony, copiousness, and energy" and reported on the analysis by which native grammarians reduced "the richest language in the world" to a small number of primitive elements to which derivational suffixes and inflectional endings are added, according to rules the application of which generates "several thousand correct Sanskrit words." It informed the works of de Brosses, Dow, Sinner, Voltaire, Monboddo, Halhed, Beauzée, and Hervas, and was plagiarized by John Cleland (1778). In 1732–1733, Pons sent to the French Royal Library 168 Sanskrit manuscripts, which included the first five chapters of a grammar in Latin with Sanskrit words in Bengali script. A sixth chapter on syntax, in French with Sanskrit words partly in Telugu, partly in Roman script, was forwarded in 1772 by Gaston-Laurent Coeurdoux. Pons's grammar, which Anquetil-Duperron came close to publishing in 1804, was the first primer for students of Sanskrit in Europe. Coeurdoux was the author of a memoir that included, besides a basic vocabulary, lists of Sanskrit words that have equivalents in Latin, Greek, or both, notably numerals, pronouns, and a partial paradigm of *as-* 'to be.' Solicited in 1767 by the Académie des Inscriptions et Belles-Lettres, it was read only in 1786 and published in 1808, the same year as Friedrich Schlegel's *Ueber die Sprache and Weisheit der Indier*, which rendered it obsolete.

These pioneers' sometimes faulty data – muddled by erratic transliterations that reflected different local pronunciations and the recorders' various native tongues, and subject to misreading – were interpreted according to, or used to bolster divergent linguistic theories. Gottfried Siegfried Bayer (1738) explained similarities by contact and borrowing, yet a memoir of the Tranquebar missionary Christian Theodor Walther (1733), which Bayer appended, attributed them to the common Scythian origin propounded by Boxhorn, Saumaise, Jager, Leibniz, and others.

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La Flotte (1768) also posited a 'North Asian' origin, while Sinner (1771) thought of borrowing from Greek and Latin. The emphasis on numerals and other basic vocabulary, i.e., vocabulary unlikely to have been borrowed, which De Laet, Grotius, Leibniz, and others pioneered, did not necessarily lead to the conclusion of a common origin. Schul(t)ze credited similarities between Latin and Sanskrit to borrowing from Portuguese, while Coeurdoux favored the biblical myth of Babel, making of Sanskrit one of the primitive languages that preserved elements that antedated separation. Evidence from Sanskrit fed individual theories from the 'language mechanics' of de Brosses (1765), fascinated by Pons's report of Sanskrit's derivation from a handful of primitive elements, to the Celtomania of Le Brigant (1767).

Breakthrough: Colonials in Bengal (1768–1788)

Sanskrit's reputation for being "amazingly copious" and for showing a "regularity of etymology and grammatical order" induced Alexander Dow (1768) to suspect that Brahmans invented it "upon rational principles" to be "a mysterious repository for their religion and philosophy." This assumption led Christoph Meiners (1780) to explain similarities by assuming that the Brahmans patterned Sanskrit after Greek, a notion Dugald Stewart and Charles William Wall still held in the 19th century.

Governor Warren Hastings' orientalist policies and patronage of both pandits and orientalists caused a breakthrough. In the introduction to the translation of the *Code of Gentoo Laws* (1776) that Hastings commissioned, Nathaniel Brassey Halhed gave an account of Sanskrit that interested Beauzée and Monboddo among others. In his grammar of Bengali (1778), Halhed digressed on features of Sanskrit, spelling out the importance of similarities not only in basic vocabulary, but for the first time also in morphology, such as the conjugation in *-mi* in Sanskrit and Greek. In an unpublished letter of 1779, he articulated a method, built on Monboddo's view that Latin was a dialect more ancient than Greek: Sanskrit, closer to Latin than to Greek, had to be even more ancient, yet what of "the existence of the dual number and the middle voice in this tongue and in the Greek, which are totally absent from the Latin"? Holding, after Monboddo, that "it is one of the last gradations of art to simplify a complex machine," he mentioned "in favour of the pretensions to priority of original in the Shanscrit language, that it contains every part of speech, and every distinction which is to be found in Greek or in Latin, and that in some particulars it is more copious than either."

Sanskrit's 'copiousness' was emphasized again in Sir William Jones's statement of 1786 (published 1788), which, taken out of context, was elevated later to the rank of a charter of comparative Indo-European linguistics:

> The Sanskrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity, both in the roots of verbs and in the forms of grammar, than could possibly have been produced by accident; so strong indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists: there is a similar reason, though not quite so forcible, for supposing that both the Gothic and the Celtic, though blended with a very different idiom, had the same origin with the Sanskrit; and that the old Persian might be added to the same family.

For Jones, in keeping with the monogeneticism of his times, this emphasis was part of a search for a cradle of civilization, which encompassed also Egyptians, Ethiopians, Chinese, Japanese, even Peruvians. Yet it informed Michael Hissmann's summary of the evidence from Pons, Dow, and Halhed, interpreted to favor borrowing into Sanskrit (1780), and sidelined Beauzée's attempt to make of Sanskrit a model for an international scholarly language (1786). By founding the Asiatic Society in Calcutta (1784) and its organ, the *Asiatick Researches* (1788–), Jones provided a forum for further advances and a channel to broadcast them to Europe.

Taking Stock in Europe (1788–1802)

Returned missionary Paulinus a Sancto Bartholomaeo undertook to catalog oriental collections in Rome and to publish encyclopedic, if polemical, works that included the first two grammars of Sanskrit to be printed (1790, 1804), based on now lost manuscripts by Hanxleden; an edition of the first section of Amarasiṃha's dictionary (1798); and dissertations on the relationship of Zend, Sanskrit, and German, and of Latin, Zend, and Sanskrit (1798, 1802). He continued to emphasize basic vocabulary presented in tabular form for comparison, but discarded explanations by contact and borrowing. He rejected a Scythian origin in favor of an oriental cradle and judged Sanskrit to be closer to Latin than to Greek, while acknowledging that morphological similarities, such as the augment and the reduplicated perfect, point otherwise. Franz Carl Alter (1799) published the Sanskrit words in the St. Petersburg vocabularies corrected by Paulinus, and Paulinus's and his own comparisons of these with other oriental

languages. Hervas (1801) and Adelung (1806) drew heavily on Paulinus's work.

A New Beginning: Sanskrit in Paris (1802–1808)

In 1802, the oriental collections in the French National Library attracted the Scot Alexander Hamilton, a returned member of Jones's Asiatic Society, who cataloged anew the Sanskrit manuscripts with their keeper, Louis-Matthieu Langlès (1807), and introduced interested scholars to Sanskrit. Of the first consequence was his tutoring of Friedrich Schlegel, which provided a foundation for Schlegel's *Ueber die Sprache und Weisheit der Indier* (1808). In this complex and sometimes paradoxical book, Schlegel retreated from the first enthusiasm that had him exclaim that Sanskrit is "the actual source of all languages, of all thoughts and poetry of the human spirit; everything, everything without exception stems from India." Yet he still viewed Sanskrit as the most perfect, spiritual, quasi-divine language, the oldest, and possibly the parent of 'organic,' inflectional languages, which he considered superior to the 'mechanical,' agglutinative languages. Deeming lexical similarities inherently inconclusive, he focused on morphological similarities as the determining criterion for establishing genealogy.

Mainstream (1808–)

Schlegel's example showed that Sanskrit could be learned in Europe. It inspired Antoine-Léonard de Chézy, who, self-taught with the grammars of Paulinus and Pons and other manuscripts, became in 1814 the first incumbent of a chair of Sanskrit, at the Collège de France. August Wilhelm Schlegel followed in the footsteps of his younger brother, learning Sanskrit in Paris before initiating its teaching in Germany, in Bonn (1818). Franz Bopp, Othmar Frank, and others went on from Paris to London to consult manuscripts in the East India Company Library, which housed the great collections of Colin Mackenzie and of Henry Thomas Colebrooke, the first author of a Sanskrit grammar in English (1805), which remained incomplete, and the first Sanskrit scholar, some of whose works are still read for other than historical interest. Hamilton taught Sanskrit at the college opened in 1806 to train the civil servants of the East India Company, but no British university offered Sanskrit until 1832, when the Boden chair was created at Oxford in belated fulfillment of a bequest by a military officer of the East India Company. The qualifications of this chair's first incumbent, Horace Hayman Wilson, who learned Sanskrit from pandits in India, were challenged by A. W. Schlegel, who learned Sanskrit in Europe, in a public dispute that epitomized the appropriation of Sanskrit by Europeans, particularly on the Continent.

Sanskrit took pride of place in the development of comparative Indo-European grammar. Unlike Friedrich Schlegel, Bopp never referred to Sanskrit as the parent language, but he made it the centerpiece of his comparative studies of conjugational and other grammatical systems. Sanskritocentrism remained the norm for generations of comparatists. So significant was the discovery of Sanskrit in the development of comparative Indo-European linguistics that it has been felt necessary to voice reminders that it was not a prerequisite – as the works of Rask, Grimm, and others demonstrate. Accounting in part for the magnitude of this impact are the quality, quantity, antiquity, and longevity of Sanskrit literature, yet more important was the fact that Sanskrit was first taught to Europeans – directly or mediately – according to the tradition of rigorous analysis by Pāṇini and other Indian grammarians and phoneticians. The identification of the root as the smallest common denominator of derived forms, vocalic alternation, derivational and inflectional suffixes, substitution rules, zeroing, etc., and the description of articulatory processes were the procedures according to which Europeans learned Sanskrit from pandits. While this method of learning created an illusion that Sanskrit is more regular and transparent than other languages, the fact that the same procedures could serve to analyze cognate languages provided a framework for comparison.

See also: Adelung, Johann Christoph (1732–1806); Beauzee, Nicolas (1717–1789); Bopp, Franz (1791–1867); Boxhorn, Marcus Zuerius (1602/12-1653); Brosses, Charles de (1709–1777); Coeurdoux, Gaston-Laurent (1691–1779); Grimm, Jacob Ludwig Carl (1785–1863); Hervás y Panduro, Lorenzo (1735–1809); Historiography of Linguistics; India: Language Situation; Indo–European Languages; Jones, William, Sir (1746–1794); Leibniz, Gottfried Wilhelm (1646–1716); Panini; Rask, Rasmus Kristian (1787–1832); Schlegel, August Wilhelm von (1767–1845); Schlegel, Friedrich von (1772–1829); Ziegenbalg, Bartholomaus (1682–1719).

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Santali

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Santali (*hɔ̣r rɔ̣r*), a member of the North Munda (Kherwarian) subgroup of the Munda family within the Austroasiatic linguistic phylum, is spoken by between 5 million and 7 million people across several states in eastern and central India. The most compact area of Santal settlement is in the Sadar subdivision of Bunkura, the Jhargram subdivision of Midnapur, and Purulia in West Bengal; south of Bhagalpur and Monghyr, in the Santal Parganas, Hazaribagh and Dhalbhum in Bihar, and the newly formed tribal-dominant state of Jharkhand; and Baleshwar, Mayurbhanj, and Keonjhar in Orissa. In Bangladesh, the Santals are found mainly in Rajsahi, Rangpur, and the Chittagong Hill tracts (Ghosh, 1994: 3).

Santali is characterized by a split into at least a northern and southern dialect sphere, with slightly different sets of phonemes (Southern Santali has six phonemic vowels, in contrast with eight or nine in Northern Santali), different lexical items, and to a certain degree, variable morphology as well (e.g., the-*ič*':-*rɛ*n singular:plural opposition in animate genitive case markers).

There is a degree of laryngeal tension (phonation type) associated with certain Santali vowels. This gives Santali and the closely related Mundari their characteristic sound and differentiates these two languages from other languages of the region. Instrumental studies are needed to determine the exact phonetic characteristics of this. In addition, a wide range of vowel combinations may be found in Santali; this tendency finds an extreme expression in words such as *kɔeaeae* 'he will ask for him'.

The following statements can be made regarding the consonantism of Santali: retroflexion, while attested, is less developed in Santali (and Munda) generally than in Indo-Aryan or Dravidian languages. Further, in coda position, there is a characteristic use of so-called checked consonants, ranging in articulation from preglottalized to unreleased. Examples of checked consonants in final position in Santali include *sɛč* 'towards', *rit'* 'grind', *selep'* 'antelope', and *dak'* 'water' (Bodding, 1923: 79); before vowels (generally speaking), these consonants alternate with voiced stops, as in *dal-aka-'t-ko-a-e* 'he has beat them' vs. *dal-aka-d-e-a-e* 'he has beaten him'. Santali also makes use of prenasalized stops in a number of words as well: *kʰokṇḍo* 'ill conditioned', *məñjʰlə* 'fourth of six brothers', *mɔ̃ñj* 'beautiful', *oṭʰŋgao*'to steady on', *gaṇḍke* 'log', *oṇḍga* 'ogre', *bʰosṇḍo*'slovenly', *beṃbak'* 'incorrectly', and *telŋga* 'stick'; also *kʰəṃduŋ* ~ *kʰəṃduŋ* 'deep', *kɔṃ̃jɛ* (~*kɔñjɛ*) 'crooked', and *dʰaṛŋga* (~*dhəŋgra/i*) 'strapping' (Bodding, 1923: 36ff.).

Santali has a complicated demonstrative system (Zide, 1972). Its basic three-way system is a straightforward proximal, distal, remote system in animate (-*i*/*kin*/*ko*) and inanimate forms (-*a*/-*akin*/-*ako*), as shown in the following examples (ANIM, animate; INAN, inanimate; SG, singular; DL, dual; PL, plural):

(1a) Proximal:

	SG	DL	PL
ANIM:	nui	nukin	noko/nuku
INAN:	noa	noakin	noako
	'this'	'these 2'	'these'

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Santali

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Santali (*hɔ̣r rɔ̣r*), a member of the North Munda (Kherwarian) subgroup of the Munda family within the Austroasiatic linguistic phylum, is spoken by between 5 million and 7 million people across several states in eastern and central India. The most compact area of Santal settlement is in the Sadar subdivision of Bunkura, the Jhargram subdivision of Midnapur, and Purulia in West Bengal; south of Bhagalpur and Monghyr, in the Santal Parganas, Hazaribagh and Dhalbhum in Bihar, and the newly formed tribal-dominant state of Jharkhand; and Baleshwar, Mayurbhanj, and Keonjhar in Orissa. In Bangladesh, the Santals are found mainly in Rajsahi, Rangpur, and the Chittagong Hill tracts (Ghosh, 1994: 3).

Santali is characterized by a split into at least a northern and southern dialect sphere, with slightly different sets of phonemes (Southern Santali has six phonemic vowels, in contrast with eight or nine in Northern Santali), different lexical items, and to a certain degree, variable morphology as well (e.g., the-*ič*':-*rɛ*n singular:plural opposition in animate genitive case markers).

There is a degree of laryngeal tension (phonation type) associated with certain Santali vowels. This gives Santali and the closely related Mundari their characteristic sound and differentiates these two languages from other languages of the region. Instrumental studies are needed to determine the exact phonetic characteristics of this. In addition, a wide range of vowel combinations may be found in Santali; this tendency finds an extreme expression in words such as *kɔeaeae* 'he will ask for him'.

The following statements can be made regarding the consonantism of Santali: retroflexion, while attested, is less developed in Santali (and Munda) generally than in Indo-Aryan or Dravidian languages. Further, in coda position, there is a characteristic use of so-called checked consonants, ranging in articulation from preglottalized to unreleased. Examples of checked consonants in final position in Santali include *sɛč* 'towards', *rit'* 'grind', *selep'* 'antelope', and *dak'* 'water' (Bodding, 1923: 79); before vowels (generally speaking), these consonants alternate with voiced stops, as in *dal-aka-'t-ko-a-e* 'he has beat them' vs. *dal-aka-d-e-a-e* 'he has beaten him'. Santali also makes use of prenasalized stops in a number of words as well: *kʰokṇḍo* 'ill conditioned', *məñjʰlə* 'fourth of six brothers', *mɔ̃ñj* 'beautiful', *oṭʰŋgao*'to steady on', *gaṇḍke* 'log', *oṇḍga* 'ogre', *bʰosṇḍo*'slovenly', *beṃbak'* 'incorrectly', and *telŋga* 'stick'; also *kʰəṃduŋ* ~ *kʰəṃduŋ* 'deep', *kɔṃ̃jɛ* (~*kɔñjɛ*) 'crooked', and *dʰaṛŋga* (~*dhəŋgra/i*) 'strapping' (Bodding, 1923: 36ff.).

Santali has a complicated demonstrative system (Zide, 1972). Its basic three-way system is a straightforward proximal, distal, remote system in animate (-*i*/*kin*/*ko*) and inanimate forms (-*a*/-*akin*/-*ako*), as shown in the following examples (ANIM, animate; INAN, inanimate; SG, singular; DL, dual; PL, plural):

(1a) Proximal:

	SG	DL	PL
ANIM:	nui	nukin	noko/nuku
INAN:	noa	noakin	noako
	'this'	'these 2'	'these'

(1b) Distal:

	SG	DL	PL
ANIM:	uni	unkin	onko/unku
INAN:	ona	onakin	onako
	'that'	'those 2'	'those'

(1c) Remote:

	SG	DL	PL
ANIM:	hani	hankin	hanko
INAN:	hana	hanakin	hanako
	'that yonder'	'those (2) yonder'	

Alongside these are intensive forms (Example (2); marked by infixation of *-k'-*), 'just' forms (Examples (3a) and (3b); marked by a shift of (*o*/*u*>)-*i*-), as well as forms adding connotations of 'things seen' and 'things heard' (Examples (4a)–(4c)):

(2) Intensives:
nuk'ui 'this very one'
nik'i 'just this very one'
nɔk'ɔy 'this very thing'

(3a) 'Just' proximal:

	SG	DL	PL
ANIM:	nii	nikin	neko/niku
INAN:	nia	niakin	niako
	'just this'	'just these 2'	'just these'

(3b) 'Just' distal:

	SG	DL	PL
ANIM:	ini	inkin	enko/inku
INAN:	ina	inakin	inako
	'just that'	'just those (2)'	

(4a) 'Seen' distal:

SG	DL	PL
ɔnɛ	ɔnɛkin	ɔnɛko
'that seen'	'those (2) seen'	

(4b) 'Seen' remote:

SG	DL	PL
hanɛ	hanɛkin	hanɛko
'that yonder seen'	'those (2) yonder seen'	

(4c) 'Heard' distal:

SG	DL	PL
ɔtɛ	ɔtɛkin	ɔtɛko
'that heard'	'those (2) heard'	

Verbs as a lexical category in Santali, and indeed in Munda languages generally speaking, are not easily or rigorously defined in opposition to nouns (Bhat, 1997; Bhattacharya, 1975; Cust, 1878; Pinnow, 1966). As seen in the following examples (Ghosh, 1994: 21), one and the same root may be used as a noun, as a modifier (adjective/participle), and as a predicate/verb. Even a noun root such as 'house' may be used verbally with verbal inflection (ASP, aspect; TR, transitive; FIN, finite):

(5a) kombro kombro mɛrɔm
thief stolen goat
'thief' 'a stolen goat'

(5b) mɛrɔm-ko kombro-ke-d-e-a
goat-PL steal-ASP-TR-3-FIN
'They stole the goat'.

(5c) oṛak-ke-d-a-e
house-ASP-TR-FIN-3
'He made a house'.

The default position for subject agreement clitics is in immediately preverbal position in Santali. Note in the following examples (Bodding, 1929a: 58, 60, 208) that this is true even if the element appearing in this position is an overt subject (or object) pronoun (1, first person; INTR, intransitive; 2, second person; LOC, locative; ALL, allative):

(6a) Kumbṛəbad-te-ko əgu-ke-'t-le-a
K-LOC/ALL-PL bring-ASP-TR–1PL-FIN
'They brought us to Kumbrabad'.

(6b) hẽ iñ-iñ cala'k-a
yes I–1 go.INTR-FIN
'Yes I will go'.

(6c) iñ am-iñ ñɛl-mɛ-a
I you-1 see-2-FIN
'I will see you'.

A wide range of arguments or referents may be encoded within the Santali verbal complex. This includes subjects, direct objects, indirect objects, benefactives, and possessors of subjects or objects. Note that Santali is doubly unusual in its system of possessor indexing: it takes a special series of possessive inflection, and this pattern of referent indexing does not reflect a process of 'raising' (to argument/term status of this logical modifier/operator), as a verb in Santali may encode both its logical argument and a possessor of that argument simultaneously, as in Example 7d). Examples (7a)–(7d) are from Bodding (1929a: 212, 1923: 22, 21–22, 209), respectively, and Example (7e) is from Ghosh (1994: 65) (NEG, negation; ANT, anterior; BEN, benefactive; POSS, possessor):

(7a) ba-ko sap'-le-d-e-a
NEG-PL catch-ANT-TR-3-FIN
'They did not catch him'.

(7b) im-əñ-me
give-1-2
'give me'

(7c) dul-a-ñ-me
pour.out-BEN-1-2
'Pour out for me'.

(7d) sukri-ko gɔ'c-ke-d-e-tiñ-a
pig-PL die-ASP-TR-3-1.POSS-FIN
'They killed my pig'.

(7e) hɔpɔn-e hɛč'-en-tiñ-a
son-3 come-PAST.INTR-1.POSS-FIN
'My son came'.

The Santali language has been written in at least five alphabets, depending on the locale of production

and the purpose of the written material. There have been Santali publications in Devanagari (Hindi), Oriya, Bengali, and Roman and in the *ɔl čɛmɛt'* ~ *ɔl čiki* script of indigenous origin (Zide, 2000: 8). An ever-growing body of literature has appeared in Santali, and the language is used on a limited basis in other media (e.g., shortwave radio broadcasts).

See also: Austroasiatic Languages; India: Language Situation; Munda Languages.

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São Tomé and Príncipe: Language Situation

Editorial Team

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Africa's smallest country consists of two islands in the Gulf of Guinea, facing Gabon. The bigger island of the two, São Tomé, is the center of commercial and administrative activity, and it is where the capital, also called São Tomé, is found. The smaller island of Príncipe gained limited autonomy in 1995. The population of São Tomé and Príncipe is about 181 000 (2004 estimate).

São Tomé and Príncipe was under Portuguese control from the 15th century up to independence in 1975. The Portuguese colonizers used the islands as a port in the slave trade, as well as for large-scale, slave-based plantations growing sugar cane and later cocoa. A large number of the population of São Tomé

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and Príncipe thus has historic roots in the former Portuguese colonies of Angola, Mozambique, and Cape Verde Islands.

Through the mix of speakers of different African languages, different creole languages developed, with Bantu and Kwa substrate and largely Portuguese-based lexicons. The two main creoles on São Tomé are Sãotomese and Angolar. Sãotomense has the larger number of speakers and is spoken throughout the greater part of the island. Angolar is spoken in smaller pockets in the south, west, and east of the island and shows greater lexical influence from Angolan Bantu languages (notably Kimbundu (Mbundu, Loanda)) than does Sãotomese. Sãotomese is the national language of São Tomé. The main creole language of Príncipe is Principense. Despite being the national language of the island, Principense has only a few speakers, so the status as national language has a mostly symbolic function. The creole languages of São Tomé and Príncipe are historically and structurally similar to Fa D'Ambu, the creole language of Annobón Island of Equatorial Guinea.

In addition to Sãotomese, Angolar, and Principense, Portuguese is used widely, especially outside of informal contexts.

See also: Angola: Language situation; Equatorial Guinea: Language Situation; Pidgins and Creoles: Overview.

Language Maps (Appendix 1): Map 14.

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Sapir, Edward (1884–1939)

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Edward Sapir was born in Lauenberg, Pomerania. His family immigrated to the United States in 1889. He received his higher education at Columbia University, earning his B.A. in 1904, an M.A. in Germanic languages the next year, and completing his Ph.D. in anthropology in 1909, along with some advanced studies in historical and comparative linguistics.

He was first exposed to Native American languages as a graduate student under the direction of Franz Boas. The new approach to anthropology developed (and largely administered) by Boas integrated the study of cultures and their languages, as both were manifested in the content and form of traditional texts. Few would dispute that Sapir was unequalled among American anthropologists of his generation. Between 1907 and 1910 he held research fellowships at the University of California and the University of Pennsylvania. From 1910 to 1925, he was in charge of the new Division of Anthropology of the Geological Survey of Canada, based in Ottawa, enabling him to sponsor field studies by himself and others.

Sapir's intense, far-reaching field work began in 1905, with an Wasco-Wishram Chinookan, and over the next five years alone he covered six other languages, including his landmark description of Takelma (completed in 1911, and published in 1922) making him the paragon of Boasian, linguistically driven anthropology. Sapir's extraordinary energy and phonetic skills were the foundation for his capacity for quickly, accurately, and insightfully compiling and analyzing vast amounts of textual and grammatical data from a wide range of American languages. Unlike his contemporary Leonard Bloomfield, whose informant sessions were carefully nondirective, Sapir drew in and mobilized his informants, training them to write accurately in their own languages and to compile and translate traditional texts, which he then worked through with them. Early in their careers, the descriptive writings—the linguistics—of Sapir and Bloomfield seemed more alike in method than their later works. These apparent differences owe something to their very different personalities and their divergent rhetorical styles. It seems likely also that Sapir's wider anthropological responsibilities played a role. That each understood and respected the other's work can be seen in Sapir (1931) and Bloomfield (1922).

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Time perspective (1916; reprinted in Mandelbaum, 1949) he recast the older Powell classification of language relationships produced by the Bureau of American Ethnology, which recognized 55 separate stocks. Sapir reduced these to six, in a bold reclassification that is still an active topic of discussion.

In 1925 Sapir accepted an appointment to the University of Chicago. The position opened up new interdisciplinary connections for him: there were linkages with distinguished colleagues in sociology, psychology, and political science. Sapir moved again, to Yale, in 1931. During this period, he worked extensively in culture and personality studies, a field he was instrumental in launching. One of his students at Yale was Benjamin Lee Whorf, whose name is linked with his in connection with a characteristically intuitive hypothesis concerning the mutual influence of habitual forms and patterns in language and culture.

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See also: Bloomfield, Leonard (1887–1949); Boas, Franz (1858–1942); Harris, Zellig S. (1909–1992); Linguistics as a Science; Structuralism; Whorf, Benjamin Lee (1897–1941).

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Saudi Arabia: Language Situation

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The official language is Classical Arabic (Standard Arabic), which is the form used in writing and for official spoken purposes. This preserves the spoken form of the 7th century AD as exemplified by the Quran and pre-Islamic poetry. A diglossic situation exists with colloquial Arabic as the spoken medium in less formal situations.

There is considerable dialect diversity, the main dialect groupings originating in old population centers based on the availability of water for agriculture. These are the following:

1. the Southwestern dialects, including those of Najrān and 'Aṣīr on the borders of Yemen and the émigré 'Ijmān and Āl Murrah bedouin of the east;
2. the urban Ḥijāzi dialects, which are the result of a mixture of Arabian features and those of immigrants from other Arab countries;
3. the Najdi group, including Central and Northern Najd (Jabal Shammar) and the surrounding bedouin dialects, dividing into central and northern Najdi types, which have spread also into Syria and Iraq;
4. the Eastern dialects of the oases of al-Ḥasa.

Possibly because of their isolated location, some dialects of Saudi Arabia have retained many archaic

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features. This gives those of Najd and the bedouins in particular a resemblance to the older historical form of Classical Arabic (Standard Arabic), often remarked upon by earlier travelers and Arabs from outside the region. These features include:

- the retention of the indefinite marker *-in* in nouns, adjectives and participles, as in *wlidin zēn* 'a good boy';
- the retention of the internal passive in verbs in such forms as *gīl* 'it was said,' *yšāf* 'he is seen';
- the presence of certain particles such as *gid* or *ǧid* marking the perfective, *ṯim* or *ṯam* 'there,' and *ilā* or *wilā* 'behold';
- the negative structure *mā bi-* as in *māna b-rāyiḥ* 'I am not going';
- particularly in the southwest, certain lexical forms such as *rēt* 'I saw,' *tēt* 'I came,' and *ḏahabt* 'I went to';
- *lēs-last* 'be not,' cognate with Classical *laysa*, occurring in the dialect of Abha, and a marker *-ū* on nouns in the dialect of Tihāmah cognate with the Classical nominative *-u* ending, though not here acting as a case marker.

Although dialect diversity is wide, the effect of urbanization is producing two standard forms based on the Ḥijāzi and Najdi forms. Amongst the younger elite the influence of the dialects of Greater Syria is also apparent, resulting from education abroad and mixing with other Arab populations. However, the fact that the Najdi ruling class is linked by descent to bedouin populations and that both bedouin and settled Najdi populations have a strong oral literary tradition, often referred to as Nabaṭi poetry, means that the archaic Najdi and particularly bedouin dialects retain considerable prestige.

The dialects of the east particularly have absorbed much English vocabulary through the oil industry.

See also: Arabic; Kuwait: Language Situation; Variation and Language: Overview.

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Saussure, Ferdinand (-Mongin) de (1857–1913)

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Saussure (**Figure 1**) was born on November 26, 1857, in Geneva, and died on February 22, 1913, at Château Vufflens near Geneva. He is best known for the posthumous compilation of his lecture notes on general linguistics, the *Cours de linguistique générale*, edited by his former students and first published in 1916 (since translated into more than a dozen languages, including – in order of their first appearance since 1928 – Japanese, German, Russian, Spanish, English, Polish, Italian, Hungarian). However, during his lifetime, Saussure was most widely known for his masterly *Mémoire* of 1879, devoted to an audacious reconstruction of the Proto-Indo–European vowel system. It is generally agreed that his *Cours* ushered in a revolution in linguistic thinking during the 1920s and 1930s, that is still felt today in many quarters, even beyond linguistics proper.

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Figure 1 Photo of Ferdinand Saussure.

He is universally regarded as 'the father of structuralism.' (For a full bibliography of Saussures writings, see Koerner, 1972a.)

Although from a distinguished Geneva family that – beginning with Horace Bénédict de Saussure, whose portrait adorns the Swiss 20 franc note – can boast of several generations of natural scientists, Ferdinand de Saussure was early drawn to language study, producing an '*Essai pour réduire les mots du grec, du latin et de l'allemand à un petit nombre de racines*' at the age of 14 or 15 (published in *Cahiers Ferdinand de Saussure* [Engler, 1978]). Following his parents' wishes, he attended classes in chemistry, physics, and mathematics at the University of Geneva during 1875–1876, before being allowed to join his slightly older classmates who had left for Leipzig the year before. So in the fall of 1876, Saussure arrived at the university where a number of important works in the field of Indo–European phonology and morphology, including Karl Verner's (*see* **Verner's Law**) epoch-making paper on a series of exceptions to 'Grimm's Law,' had just been published. Saussure took courses with Georg Curtius (*see* **Leskien, August (1840–1916)**), the mentor of the '*Junggrammatiker*,' and a number of the younger professors, such as August Leskien (*see* **Curtius, Georg (1820–1885)**), Ernst Windisch, Heinrich Hübschmann, Hermann Osthoff, and others in the fields of Indic studies, Slavic, Baltic, Celtic, and Germanic. During 1878–1879, Saussure spent two semesters at the University of Berlin, enrolling in courses with Heinrich Zimmer and Hermann Oldenberg. After barely six semesters of formal study, when just 21, he published the major work of his lifetime (Saussure, 1879). In this 300-page work he assumed the existence, on purely theoretical grounds, of an early Proto-Indo–European sound of unknown phonetic value (designated *A) that would develop into various phonemes of the Indo–European vocalic system depending on its combination with various 'sonantal coefficients.' Saussure was thus able to explain a number of puzzling questions of Indo–European ablaut. But the real proof of Saussure's hypotheses came many years later, after his death, following the decipherment of Hittite and its identification as an Indo–European language, and after the Polish scholar Kuryłowicz (*see* **Kuryłowicz, Jerzy (1895–1978)**) in 1927 had pointed to Hittite cognates that contained the sound corresponding to Saussure's *A. These were identified as laryngeals, sounds previously not found in any of the other Indo–European languages.

Having returned to Leipzig, Saussure defended his dissertation on the use of the genitive absolute in Sanskrit in February 1880, leaving for Geneva soon thereafter. Before he arrived in Paris in September of that year, he appears to have conducted fieldwork on Lithuanian, like Schleicher and others before him. In Paris, Saussure found a number of receptive students, among them Antoine Meillet, Maurice Grammont, and Paul Passy, but also congenial colleagues such as Gaston Paris, Louis Havet, who had previously written the most detailed review of his *Mémoire*, and Arsène Darmesteter. Michel Bréal (*see* **Bréal, Michel Jules Alfred (1832–1915)**), the doyen of French linguistics, secured him a position as Maître de Conférences at the École des Hautes Études in 1881, a post he held until his departure for Geneva 10 years later.

During his lifetime, Saussure was best known for his *Mémoire* and the paper on Lithuanian accentuation (1896). Since the 1920s, however, his influence and fame have been almost exclusively connected with the book he never wrote, the *Cours de linguistique générale*. This volume was largely based on notes carefully taken down by a number of his students during a series of lectures on the subject that he had given from 1907 to 1911 at the University of Geneva (to which he had returned as a professor of Sanskrit and Comparative Grammar in 1891). One of them was Albert Riedlinger, whose name appears on the title page of the *Cours*, which was put together by Saussure's successors, Charles Bally and Albert Sechehaye (*see* **Geneva School of Linguistics after Saussure**), neither of whom had attended these lectures themselves (though it is frequently, but erroneously, stated in the literature that they had). The *Cours* was in fact never published in Geneva and was not published in 1915, but in Lausanne and Paris in 1916, that is, exactly 100 years after Franz Bopp's (*see* **Bopp, Franz (1791–1867)**) *Conjugationssystem*, which is usually regarded as the

beginning of comparative–historical Indo–European linguistics.

The ideas advanced in the *Cours* produced a veritable revolution in linguistic science; historical–comparative grammar that had dominated linguistic research since the early 19th century was soon relegated to a mere province of the field. At least in the manner the *Cours* had been presented by the editors, Saussure's general theory of language was seen as assigning pride of place to the nonhistorical, descriptive, and 'structural' approach (Saussure himself did not use the last-mentioned term in a technical sense). This development led to a tremendous body of work concerned with the analysis of the linguistic system of language and its function, and a neglect of questions of language change and linguistic evolution in general – a situation that remains characteristic of the linguistic scene until the 1990s, in particular the framework associated with the name of Noam Chomsky. From the 1920s onwards, a variety of important schools of linguistic thought developed in Europe that can be traced back to proposals made in the *Cours*. These are usually identified with the respective centers from which they emanated, such as Geneva, Prague, Copenhagen, and Paris. In North America too, through the work of Leonard Bloomfield (*see* **Bloomfield, Leonard (1887–1949)**), Saussure's ideas became stock-in-trade among linguists, descriptivists, structuralists, and generativists.

At the core of Saussure's linguistic theory is the assumption that language is a system of interrelated terms which he called 'langue' (in contradistinction to 'parole,' the individual speech act or speaking in general). This 'langue' is the underlying code that ensures that people can speak and understand each other; it has a social underpinning and is an operative system embedded in the brain of everyone who has learned a given language. The analysis of this system, Saussure maintains, is the true object of linguistics. The system is a network of relationships that he characterized as being of two kinds: syntagmatic (i.e., items are arranged in a consecutive, linear order) and associative, later termed 'paradigmatic' (i.e., the organization of units in a deeper fashion dealing with grammatical and semantic relations). Saussure's emphasis on language as 'a system of (arbitrary) signs' and his proposal that linguistics is the central part of an overall science of sign relations or 'sémiologie' have led to the development of a field of inquiry more frequently called 'semiotics' (following C. S. Peirce's terminology), which deals with sign systems in literature and other forms of art, including music and architecture.

Many of the ingredients of Saussure's general theory of language have often been taken out of their original context and incorporated into theories outside of linguistics, at times quite arbitrarily, especially in works by French writers engaged in 'structuralist' anthropology (e.g., Claude Lévi-Strauss, *see* **Levi-Strauss, Claude (b. 1908)**) and philosophy (e.g., Louis Althusser), literary theory (e.g., Jacques Derrida), psychoanalysis (e.g., Jacques Lacan, *see* **Lacan, Jacques (1901–1981)**), and semiotics (e.g., Roland Barthes, *see* **Barthes, Roland (1915–1980)**), and their various associates and followers. The trichotomies (usually reduced to dichotomies) which have become current in 20th-century thought, far beyond their original application, are: *langage-langue-parole* (i.e., language in all its manifestations or 'speech'; language as the underlying system; and 'speaking'), *signe–signifié–signifiant* (sign, signified, and signifier), synchrony versus diachrony ('panchrony' would be a combination of these two perspectives), and syntagmatic versus paradigmatic relations.

See also: Barthes, Roland (1915–1980); Bloomfield, Leonard (1887–1949); Bopp, Franz (1791–1867); Bréal, Michel Jules Alfred (1832–1915); Chomsky, Noam (b. 1928); Curtius, Georg (1820–1885); Geneva School of Linguistics after Saussure; Kuryłowicz, Jerzy (1895–1978); Lacan, Jacques (1901–1981); Leskien, August (1840–1916); Levi-Strauss, Claude (b. 1908); Lithuanian; Sanskrit; Saussure: Theory of the Sign; Schleicher, August (1821–1868); Verner's Law.

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Saussure: Theory of the Sign

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The sign theory of Ferdinand de Saussure (1857–1913) is principally to be found in his *Cours de linguistique générale* (*Course in General Linguistics* 1916; translated into English in 1959 and 1983). Saussure's previous work in philology and his focus on the development of Indo-European languages necessarily contains ruminations on the vicissitudes of the linguistic sign but it was his delivery of the course in general linguistics, at short notice to replace a sick colleague, at the University of Geneva from 1907 to 1911, which established his thought in this area. His posthumously published treatise of 1916 was based not on his own writings but on the notes of students present at the course. Specifically, the course was 'reconstructed' for publication by Charles Bally and Albert Sechehaye who stated in their introduction that they were aware of their responsibility to the author who "perhaps might not have authorized the publication of this text" (Saussure, 1983: xx).

The preliminary fact that needs to be taken into account, then, in relation to Saussurean sign theory is that, from the outset, it was never definitive. Readers of the *Cours* cannot be confident that Saussure's exact words are reproduced in full. Furthermore, they cannot be sure that the editorial choices of Bally and Sechehaye were not limited by what was available to them. For example, a notebook of notes in Saussure's hand, unknown to the editors, was discovered in 1996 and may force a re-reading of previous understandings of Saussurean sign theory. More important still, perhaps, is that Saussure's work has been refracted through the work of many illustrious successors beyond the realms of academic linguistics. While Saussure's *Cours* is just one, somewhat fragmented, publication that is still insufficiently read by those dabbling in sign study, the publications and teachings of his successors (or those who have invoked his name) have reached far wider audiences. The latter have had the benefit of an age of media saturation as well as a growing preoccupation with the aspects of communication that lie beyond the objects of linguistics. It is difficult to talk about Saussure's sign theory, then, without mentioning that there is also the Saussurean sign theory of Karcevskij, Vološinov, Jakobson, Benveniste, Hjelmslev, Lévi-Strauss, Lacan, Barthes, Mounin, Chomsky, Derrida, and Baudrillard, to name but a few. (Incisive discussions of a number of these are to be found in Harris, 2003).

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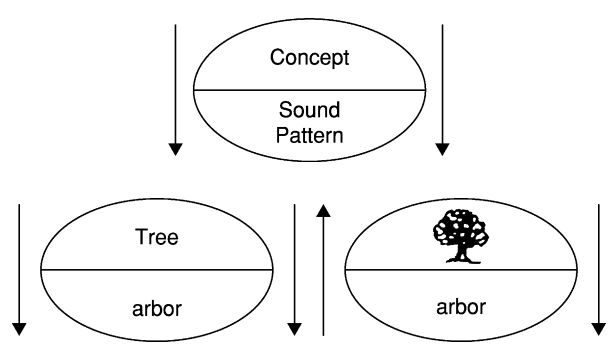

Figure 1 The linguistic sign as a ''two-sided psychological entity'' (cf. Saussure, 1983: 67).

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Saussure: Theory of the Sign

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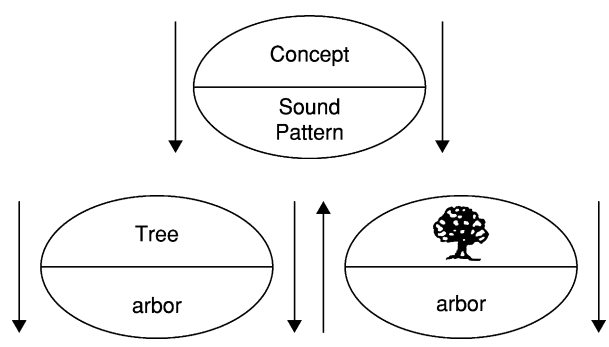

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way that it is designated, but a psychological entity that amounts to signhood.

Proceeding to refer to the sound pattern as the *signifiant* and the concept as the *signifié*, Saussure makes clear that the former is in the mind and represents sensory impressions of sound outside the mind, while the latter consists of an abstract formulation of phenomena in the world such as 'house,' 'white,' 'see' and so forth (Saussure 1983: 65, 101ff). Saussure insisted that there was a *signifié* bound to each *signifiant* but that the reasons for their binding was not natural or pre-ordained. This fact is the first of the two fundamental characteristics of the sign: that the relation in the sign is arbitrary. He writes,

> There is no internal connexion, for example, between the idea 'sister' and the French sequence of sounds *s-ö-r* which acts as its *signifiant*. The same idea might as well be represented by any other sequence of sounds. This is demonstrated by differences between languages, and even by the existence of different languages. The signification 'ox' has as its signal *b-ö-f* on one side of the border [between French- and German-speaking regions] but *o-k-s* (Ochs) on the other side. (Saussure, 1983: 67–68; the terms *signifiant* and *signifié* are left in the original with the permission of the translator.)

To use another example, the connection between a *signifiant* 'duck' and the concept of 'duckness' was seen to be specific to the development of particular national languages. Nevertheless, Saussure did consider possible deviations from this principle, such as onomatopoeic words or signs such as those used in mime. These, somehow, seem to have a bearing which, to an extent, does suggest a preordained relationship of *signifiant* and *signifié*. But they are only deviations from the main rule. Tellingly, then, Saussure insisted that "when semiology is established . . . the main object of study in semiology will none the less be the class of systems based upon the arbitrary nature of the sign" (Saussure, 1983: 68).

The second principle upon which Saussure insisted was the linear character of the *signifiant*. This has not been the focus of semiology in the same way as the first principle has, but is nevertheless important. Saussure says that the linguistic *signifiant*, "being auditory in nature, has a temporal aspect" (Saussure, 1983: 69). What the principle of temporality entails is that the auditory sign can only exist in a linear fashion. Unlike graphic signs, it is always part of a chain unfolding. Pictures can present elements simultaneously; sounds have to wait for the connections to mount up one after another. Saussurean theories of the sign that attempted to look at nonverbal semiosis tended to elide this observation of Saussure.

Saussure insisted on four crucial factors inherent in the function of the sign:

- The arbitrary nature of the linguistic sign
- The great number of signs necessary to constitute a language
- The complex character of the system
- Collective inertia resists all linguistic innovations (Saussure, 1983: 73–74).

All of these bear upon whether the character of signs can be changed individually, a question Saussure answers in the negative. Arbitrariness seems to suggest that the sign allows free choice; however, Saussure emphasizes that words are fixed by our ancestors and that the effort required to change them is considerable and necessarily collective. This issue of freedom and its restrictions also bears upon some crucial distinctions in Saussure's *Cours* that frame his theory of the sign. For Saussure, there is an emphatic difference between *langue* and *langage*. Rendering both terms accurately in English is difficult, but *langage* refers to a linguistic faculty of humans that *requires* a *langue* among its community of speakers. *Langage*, then, comprises two things. The first is the aformentioned *langue* – the differences between all signs (with their arbitrary relations), a set so multifarious and interconnected that it amounts to a system. This collective phenomenon, potentially available to, and stemming from, all "takes the form of a totality of imprints in everybody's brain, rather like a dictionary of which each individual has a copy" (Saussure, 1983: 19). The second is *parole* – the sum total of what people say, and it comprises (a) individual combinations of words, depending on the will of the speakers, and (b) acts of phonation, which are also voluntary and necessary for the execution of the speakers' combination of words" (Saussure, 1983: 19).

Saussure emphasizes that "there is nothing collective about speech" (Saussure, 1983: 19); *langue*, however, is precisely a matter of the collectivity, the system of differences shared by all speakers. *Langue*, in fact, is the system upon which the signs in individual speech acts is predicated. Harris writes:

> The priority of *langue* as far as (Saussurean) linguistics is concerned can be boiled down to the proposition that if any episode of human speech is to be the subject of serious scientific inquiry it must be related in the first instance to a system which must be presupposed as underlying it (Harris, 2001: 121).

This is not the only way in which 'choice' over signs is subordinate to the system for Saussure.

Saussure indicates that speakers can combine linguistic signs into an infinite number 'syntagmatic'

sequences, a fact that points to a certain amount of freedom. Such sequences – syntagmas, as Saussure calls them (Saussure, 1983: 121) – are bound by relations of combination. These relations exist to facilitate the combinations **within** words and also **between groups of words**. (Within words, certain suffixes or prefixes might be subject to combinations, e.g., the suffixes *-ly* or *-less* with *name*; between words, certain combinations might be almost unavoidable, e.g., *dint* is very seldom seen without *by* preceding it and *of*' succeeding it). Yet both are also subject to associative relations (Saussure, 1983: 123–124), or associations in the mind. Thus *-less* is not just a syntagmatic relation with *name*: it is also in an associative relation with all other uses of *-less* such as *blameless*, *feckless*, *careless*. Or, an associative relation may be in operation at the level of connectedness of concepts: *teaching*, *instruction*, *apprenticeship*, etc. (Saussure, 1983: 124). This has important consequences for the role of the sign in *langue* and *parole*. Saussure introduces the sentence, phrase, or clause as an example of a syntagma, but seems to hold back from suggesting they are always the subject of individual innovations. For Saussure, it seems that some combinations are a product of both *langue* and *parole*. Post-structuralists tend to suggest that 'discourse' (meaning many things, but frequently referring to the phrase, sentence, or larger syntagma) is an arena of choice or determination beyond the realms of *langue*. This is a matter that is implicitly taken up by a number of 'Saussurean' theories of the sign. What is apparent, though, in respect of the *Cours*, is that the status of *langue* as the fundamental system of signs is drawn into question by the possibility that it may be implicated with choice in syntagma production.

The role of the 'value' of the sign is clearer. Although combination is integral to Saussure's sign theory, he insists that individual signs do not have 'meaning' or intrinsic identity. Rather, *langue* is a system of values: "A language is a system in which all the elements fit together, and in which the value of any one element depends on the simultaneous coexistence of all the others" (Sausssure, 1983: 113). This is schematized in Figure 2.

Clearly, values arise from the relationships between whole signs. Yet these relationships are based on two key points:

Values always involve:

- something dissimilar that can be exchanged for the item whose value is under consideration, and
- similar things that can be compared with the items whose value is under consideration.

These two features are necessary for the existence of any value. To determine the value of a five-franc coin, for instance, what must be known is (1) that the coin can be exchanged for a certain quantity of something different, e.g., bread, and (2) that its value can be compared with another value in the same system, e.g., that of a one-franc coin, or of a coin belonging to another system (e.g., a dollar). Similarly, a word can be substituted for something dissimilar: an idea. At the same time it can be compared to something of like nature: another word (Saussure, 1983: 113–114).

Saussure is therefore keen to emphasize the system of values rather than the intrinsic meaning of signs. Thus, famously, he notes the value of the French word *mouton*, which carries both the animal to which it refers (the sheep) and the meat that comes from it (mutton); whereas the English word *sheep* has a different value because it needs to be supplemented by an additional word, *mutton*, to refer to the animal's meat.

Saussure's conclusion on value is that "In *langue* there are only differences, and *no positive terms*" (Saussure, 1983: 118). Putting this more broadly, he argues that "In a sign, what matters more than any idea or sound associated with it is what other signs surround it" (Saussure, 1983: 118). Effectively, if one were looking for it, this is the crux of Saussure's sign theory and what imputes to it a particular character. One could argue that it is certainly the feature that seems to have drawn other 'Saussurean' sign theories to the *Cours* like a moth to a flame. Indeed, Saussure's sign theory cannot really be considered without taking into account the many extensions, bowdlerizations, revisions, and plain distortions that it has suffered. Saussure's *Cours* was rapidly taken up in many different ways, a fact that was not without its problems. Roy Harris writes:

> Within five years of its publication Saussure's *Cours* had become widely read in linguistic circles (De Mauro, 1972: 366). Translations into various languages followed. An initially critical reception gradually yielded

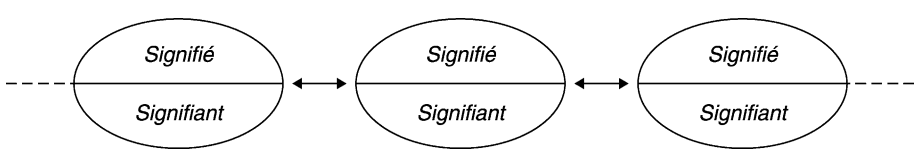

Figure 2 A system in which all the elements fit together (cf. Saussure, 1983: 113).

> to acceptance. By 1957 (centenary year of the eponymous Saussure's birth) it was possible for a professional academic linguist to write: 'We are all Saussureans now' (Spence, 1957). But whether they all were – and, if so, to what extent – are tricky questions (Harris, 2001: 118).

An early enthusiast for the *Cours* was the Russian, Sergej Karcevskij (1894–1955) who had attended Saussure's courses in Geneva and spread the word of their import back to Moscow in 1917. Saussurean sign theory was thus conveyed to the Moscow Linguistic Circle, featuring the young Roman Jakobson (1896–1982) and to OPOYAZ, a society that featured the Russian Formalists. One of the first major extensions of Saussure's theory of the sign, however, emanated from elsewhere in Russia. In fact, it was part of a penetrating critique by the Soviet theorist Valentin Vološinov. Vološinov (1895–1936), who had written a number of articles since 1922, published two books in the Soviet Union: in 1926, *Freudianism: a critical sketch* (1987) and, in 1929, *Marxism and the philosophy of language* (1973). Both remained virtually unknown for three decades except for the enthusiasm about the latter that was generated by Roman Jakobson in his communications to the Prague Linguistic Circle in the 1930s (Titunik, 1987: xv). At about the time that Vološinov was rediscovered in the Soviet Union, coinciding with the renaissance of Soviet semiotics (see Lucid, 1988) and leading to the translation into English of *Marxism and the philosophy of language* (1973), a number of sources began to argue that the author of Vološinov's works was none other than Mikhail Bakhtin (1895–1975) (see Todorov, 1984: 6–13).

Vološinov proceeds from an understanding of the linguistic sign as totally shot through with the social world from the outset. In fact, he devotes a considerable amount of time to criticizing "individualistic subjectivism" in the philosophy of language for simply studying words/utterances without the social dimension. His other target is the Geneva school (Saussure and his students, Bally and Sèchehaye) as representative of "abstract objectivism." Saussure's *Cours* is 'abstract' because it does not take as its main focus concrete utterances, opting, instead, for 'form' (*langue*, the non-concrete system of differences) as the basis of language study. It is 'objectivist' because it promotes the idea that this form rules concrete utterances and is the common denominator of all meaning among all people. In general, the *Cours* is argued to err in suggesting that the social world is constituted in the shared system *langue*. For Vološinov, actual utterances (*parole*) must be understood in terms of the role played by a speaker and listener: "A word is a bridge thrown between myself and another . . . A word is a territory shared by both addresser and addressee, between the speaker and his [or her] interlocutor" (Vološinov, 1973:). All signs are built to be received, even if the identity of the receiver is unclear or he or she is not present; what is important is that speaker and listener are bound in a social relationship that derives from both the utterance of signs and the wider set of social relationships in which the verbal interaction takes place. What is influential in Vološinov's *Marxism and the philosophy of language*, found also in Bakhtin, but arguably derived from dialogue with Saussure's *Cours*, is a 'dialogic' theory of the word.

Whereas Saussure sees instances of *parole* as being generated by a set of differences (in *langue*), Vološinov sees them as products of social situations. For Saussure, then, the production of utterances is ruled by purely formal laws while for Vološinov it is ruled by the multifarious nature of 'ideology.' 'Ideology' is to be understood here, as Vološinov makes clear at the beginning of *Marxism and the philosophy of language*, as both a part of reality and a reflection and refraction of a wider reality by means of signs (Vološinov, 1973: 9). Ideology is not to be understood as consciousness but as a sign system like that which makes up utterances; moreover, it fills the territory that is engendered by a verbal interaction. This, Vološinov argues, is because speakers and listeners are not concerned with the form of language, nor do they utter or hear 'words' as such; rather, they say and hear "what is true or false, good or bad, important or unimportant, pleasant or unpleasant, and so on" (Vološinov, 1973: 70). It is for this reason that any analysis of language must take into account the "*common spatial purview* of the interlocutors," "the interlocutors' *common knowledge and understanding of the situation*" and "their *common evaluation* of that situation" (see Vološinov, 1987).

In *Marxism and the philosophy of language*, Vološinov had also introduced 'theme,' 'meaning," and accent,' concepts that indicate the material fashion in which meaning is different each time an utterance occurs because the situation is different on every occasion. The term 'meaning' is quite a problematic one for both Volosinov **and** Saussure: the latter insists on 'value' rather than 'meaning' as the distinguishing attribute possessed by a sign in a system of differences; likewise, Vološinov denies the possibility that a sign can have 'meaning' on its own. But whereas Saussure locates 'value' in the interaction of signs, Volosinov finds that 'meaning' is only part of a 'theme' that resides in the whole interaction between speakers. Moreover, 'meaning' is subject to the specific socially oriented intonation of utterances that Vološinov names 'accent.' When two people are in

a room and the single word 'Well' passes between them, what does it mean? Saussure had maintained that the linguistic sign was an entity that was collective by virtue of its existence in *langue*. Yet, the collectivity that enthuses the *Cours* was not enough for Vološinov, simply because it was 'abstract' rather than concrete.

Marxism and the philosophy of language contained a major critique of Saussurean sign theory but, nevertheless, can be argued to be an extension of it. In his positing of 'theme' and 'meaning,' the latter might be said to be a concurring with the general principle of Saussure's notion of *langue*. Similarly, Vološinov does not deny that there are instances of *parole* that are generated from existing potentials. However, there would always be one factor distinguishing Vološinov's position from that of Saussure: for a sociolinguistic theory such as Vološinov's, performative rules or a system of differences are insufficient for analyzing the fortunes of the linguistic sign (Vološinov, 1987: 99).

Although Vološinov's critique of Saussure is often taken to be one of the first extensions of the latter's sign theory that has impinged upon contemporary semiotics, the closely argued essays on linguistics of Emile Benveniste (1902–1976) were taking Saussure's theory of the sign as their impetus. Benveniste was an Egyptian-born French linguist and defining figure in the thought of postwar France and beyond. Clearly, he is the father of post-structuralism, his work from the late 1930s onward paving the way for the critiques of structuralism offered by the likes of Derrida, Lacan, Kristeva, the later Barthes, Baudrillard, and assorted Anglo-American theorists in studies of film, literature, and philosophy (see Easthope, 1988). The essays in *Problèmes de linguistique générale* (1966, translated into English in 1971) ranged from a penetrating critique of Saussure's principle of arbitrariness in the sign, 'The nature of the linguistic sign,' through a series of extensions of Saussurean sign theory. These include consideration of the general role of prepositions, 'The sublogical system of prepositions in Latin,' to his essay on the third person as a non-person, 'The nature of pronouns.'

Benveniste argued in 'The nature of the linguistic sign' that the relations between the sound pattern of a sign and the mental concept attached to it were far from being arbitrary in experience. Where Saussure had insisted that the connection between a signifier and a signified was not a 'natural' one, rather it was based on convention or habit, Benveniste argued first that the arbitrary relation is one that exists between the whole sign and the object in the real world that it refers to. Relations between the *signifiant* and *signifié*, however, are not arbitrary at all for language users; in fact, the sound pattern and the concept almost seem to be as one in the human mind. In fact, the creation of a concept in the human mind that is bound with a sound pattern is rehearsed so often at an early age that it becomes an almost instantaneous process. The individual sign user cannot change the relation in English between the *signifiant* of *duck* and its *signifié*. Consequently, Benveniste's essay concludes, the connection between a sign's sound pattern and the concept with which it is bound seems almost natural and should, more accurately, be stated as a necessary rather than an arbitrary relation.

'The nature of the linguistic sign' is characteristic of Benveniste's take on linguistics: his extensions of Saussure are invariably conducted in an effort to apprehend the user's feelings in language. Benveniste's concern with the way in which signs work for the human subject points the way to further influential explorations of (post) Saussurean sign theory. In his essays on 'Subjectivity in language' and 'The nature of pronouns' collected in *Problèmes de linguistique générale*, Benveniste sought to demonstrate how signs under certain linguistic categories not only allow human subjects to refer to themselves but actually create the parameters of human self-consciousness. He writes,

> 'Ego' is he who *says* 'ego'. That is where we see the foundation of 'subjectivity' which is determined by the linguistic status of 'person'.
>
> Consciousness of self is only possible if it is experienced by contrast. I use *I* only when I am speaking to someone who will be a *you* in my address (Benveniste, 1971: 225).

Because *I* is a linguistic sign – and therefore usable by the whole linguistic community – it cannot begin to represent the fullness of one human being's self-consciousness. It is only a word. However, as relations in the linguistic sign are necessary, it invariably feels natural to humans that the word does have this power to represent.

In this light, it is easy to see how Benveniste so influenced post-structuralism. "It is in and through language that man constitutes himself as *subject*," he writes, "because language alone establishes the concept of 'ego' in reality, in *its* reality which is that of being" (Benveniste, 1971: 224). For Benveniste, the separation of *I* and *you* in dialogue was crucial to the category of *person* because it is the means by which the individual sets himself or herself up as a subject in discourse. The personal pronouns are just one, albeit most important, means by which each speaker appropriates a language; deixis is another means, demanding that meaning can only be realized with reference

to the instance of discourse in which the deictic category appears. As such, language creates the designation of person; but it also contributes to the human understanding of such supposedly autonomous phenomena as time and space.

Benveniste recognizes in Saussure's theory of the sign a fundamental split that he extends to the realm of subjectivity. If the relations in the linguistic sign are 'arbitrary' when placed under analysis, but 'necessary' (felt to be natural and automatic) when used, it is possible that this indicates the subject of signs is pulled two ways. Benveniste identifies two sides of any use of language: he calls these *énoncé* and *énonciation*. The *énoncé* is simple enough: it is the statement or content of the particular instance of language, what is being said. The *énonciation*, on the other hand, is the act of utterance and presupposes a speaker and a listener. The two can be recognized when separated in this abstract way but, in practice, they are always entangled. The subject of this dynamic in linguistic signs is in a dilemma. There will be the rendering of himself or herself as a subject represented in the use of pronouns such as *I* (*énoncé*); but there will also be that other 'I' who does the rendering (*énonciation*). The dilemma, here, is made clear in such paradoxical constructions as *I am lying*, in which the subject speaking **must** be separate from the subject represented in the instance of discourse.

If Benveniste's furthering of Saussurean sign theory took place in relation to a theory of the subject, Louis Hjelmslev's contemporaneous co-opting of Saussure was more oriented to the extension of the system. A Danish linguist and member of the Copenhagen School of linguistics, Hjelmslev founded the post-Saussurean linguistics called glossematics. Effectively, glossematics extended Saussure's investigations into *la langue*, particularly the latter's insistence that this is a form and not a substance. Harris writes,

> Glossematicians took the Saussurean dictum that *langue* is "form not substance" (Saussure, 1916: 163) to its logical conclusion, and argued that the languages now in existence and available to observation are merely historical realizations of certain systems that could equally well exist in other manifestations (not necessarily spoken and not necessarily written either). Thus "the task of the linguistic theoretician is not merely that of describing the actually present expression system, but of calculating what expression systems in general are possible as expression for a given content system, and vice versa" (Hjelmslev, 1970: 105) (Harris, 2001:128).

Whereas Hjelmslev had previously focused on distinctive features as elements of form in his early work, glossematics sought to identify systematic 'functioning' of signs. He embarked on an identification of signs in *langue* as, precisely, 'functions' in relation to 'functives.' A function exists, for example, between a class and its components, a chain and its parts or a paradigm and its members (or between members or parts or components). A functive, on the other hand, is the 'terminal' – at either end – of a function.

Hjelmslev proceeds from the preliminary notions that language is a system of signs and that the sign – by virtue of its being for someone – must be construed as a function. However, he insists that the sign conceived in this way must be clarified as a 'sign-expression.' As such, then, there are two planes to be considered in the analysis of language as a sign system. The first is the 'expression plane,' which has both a form and a substance. The second is the 'content plane,' which has the same. Both are made up of a restricted number of non-sign entities, *figurae* (such as phonemes), which can combine to produce an unlimited number of signs. The fact that there are two planes of the sign means that, for Hjelmslev, the notion of the sign as simply for someone is limited. This view tends to see the sign as a matter of an indication by an 'expression' of some external 'content,' whereas the Saussurean view, according to Hjelmslev, sees the sign as generated by the connection between an expression and content. If the sign relation is seen as a function, however, the functives of expression and content can never be separable and this has consequences for the conception of the sign. Chiefly, Hjelmslev's work contends that the sign does not just indicate; rather it is made up of 'content substance' ordered into 'content form,' is juxtaposed for sign users with other examples of content form (e.g., *ring* might indicate both jewellery for the finger and something that emanates from the telephone), and is constituted also on the plane of expression as an 'expression form' (containing specifically organized *figurae*), which is itself ordered to an 'expression substance' (other pronunciations, other enunciations by other people, etc.).

Hjelmslev's glossematics thus instituted a procedure that treated all text elements as relations of function within expression and content. Yet, because the relation of function was seen by him as all important, and because both were made of ('meaningless') *figurae*, those elements that make up 'expression' and those that make up 'content' are to be considered interchangeable. It was the combination of Hjelmslev's resolute systematization and his facilitation of the mutability of planes according to function that made his glossematics so amenable to other structuralist linguists and thinkers.

The early work of Roland Barthes (1915–1980) marks him, perhaps, as heir to Hjelmslev as much as to Saussure. This is clear in some of Barthes formulations such as 'denotation,' 'connotation,'

and 'metalanguage.' However, ultimately, Barthes saw himself as furthering Saussure's sign theory and, certainly, initiating Saussure's vaunted project of a semiology, a science that studies the life of signs within society. Commentators tend to agree that Barthes's work developed significantly enough during his career for there to be a manifest difference between the early and later Barthes. Usually, it is assumed that the earlier Barthes is a semiologist concerned with Saussure's sign theory, while the later breaks with this. However, it is not too difficult to see extensions and continuities of Saussure from *Mythologies* (1957) to *S/Z* (1970). Barthes book of 1964, *Elements of semiology* (translated into English, 1967a), is particularly noteworthy because it purports to be both a treatise and a primer of Saussurean theory of the sign. Indeed, *Elements of semiology* has been, in many instances, almost taken as the word of Saussure rather than Barthes.

For Barthes in *Elements of semiology*, it is the repetition of signs in successive discourses that entails that each sign become an element of the language (*la langue*, "language without speech" [Barthes, 1967a: 14–15]). However, according to Saussure, *langue* is a heuristic means for thinking about the language system; language without speech would actually be impossible. Barthes was keen to explicate an understanding of language not as a collection of discrete signs but as an organizing principle of discursive fields. Such discursive fields would not be constituted by verbal signs (and their connections) alone. Barthes therefore draws attention to the fashion system, where signs work in a somewhat different way. For Barthes, the garment cannot be an instance of speech; rather, it is always "a systematized set of signs and rules: it is a language in a pure state" (Barthes, 1967a: 26). This is because "fashion clothes (as written about) are the language at the level of vestimentary communication and speech at the level of verbal communication" (Barthes, 1967a: 26). The feature of the sign that seems to be most crucial for Barthes and that encourages him to make the counterpoint to Saussure is the idea of the sign as part of an 'ideological' organizing principle. Whereas individual or collective uses of speech (or individual or collective usages of food, the analogous example he uses; Barthes, 1967a: 28) might become part of language (or alimentary language) as a result of repetition or evolution, what makes up the constituents of 'language' in the case of fashion is the highly directed work of a 'deciding group.'

Elements of semiology makes it apparent that central to his theory of the sign is the way that it can be not simply an ideological vehicle but, in fact, ideological through and through. This is apparent in his comments on the nature of the *signifiant* and the *signifié* (usually translated into English, potentially confusingly, as 'signifier' and 'signified'). Nevertheless, Barthes's formulations in this area are the subject of some questions regarding their consistency and their Saussurean credentials. One reason for this is suggested by Roy Harris: that Barthes came to Saussure relatively late and that his understanding of the Saussurean sign was already refracted through the lens of his reading of Lévi-Strauss, Lacan, Jakobson, Martinet, Benveniste and, as noted above, Hjelmslev (Harris, 2003: 136). In respect of the latter, Barthes introduces accurate definitions of the *signifiant* and *signifié*, for example, but immediately reframes their operation in terms of form, substance, plane of expression, and plane of content (cf. Hjelmslev, 1970).

Barthes is initially very clear about the *signifiant* and *signifié*: they are an acoustic image and a mental concept, respectively. He underlines the latter, in fact, by writing "the signified [*signifié*] is not a thing but a mental representation of the thing" (Barthes, 1967a: 42). However, Harris points out that while Barthes's formulations about the internal relations in the sign are unexceptional, his definition of what the sign (*signe*) is, concentrating on the relation between *signifiant* and *signifié*, misses its mark. For Harris, Barthes

> fails to see that for Saussure the *signe* is indeed not only a linguistic unit but *the* linguistic unit, and not a mere 'rapport' between its constituent parts. *A fortiori*, the fundamental Saussurean tenet that in *la langue* semiological relations take priority over – and determine – units sinks without trace in Barthes' exposition ... Barthes had not only missed the most original theoretical feature of Saussure's account of linguistic structure, but reinstated precisely the concept that Saussure was at pains to reject, i.e., the sign as a mere correlation between antecedently given items (formal and semantic) (Harris, 2003: 141).

Yet Barthes' placing of the sign before the semiological relations of *la langue* has a further twist that has been undoubtedly influential and has served to distort the picture for those who take the account in *Elements of semiology* to be the definitive exposition of Saussure. In drawing attention to the "nature of the signifier [*signifiant*]," Barthes writes that

> it is purely a *relatum*, whose definition cannot be separated from that of the signified [*signifié*]. The only difference is that the signifier is a mediator: some matter is necessary to it. But on the one hand it is not sufficient to it, and on the other, in semiology, the signifier can, too, be relayed by a certain matter: that of the word. This materiality of the signifier makes it once more necessary to distinguish clearly 'matter' from 'substance': a substance can be immaterial (in the case of the substance of

> the content); therefore, all one can say is that the substance of the signifier is always material (sounds, objects, images) (Barthes, 1967a: 47).

It is fairly clear why Barthes makes this un-Saussurean assertion about the *signifiant* and, indeed, he is not shy about it:

> In semiology, where we shall have to deal with mixed systems in which different kinds of matter are involved (sound and image, object and writing, etc.), it may be appropriate to collect together all the signs, *inasmuch as they are borne by one and the same matter*, under the concept of the *typical sign*: the verbal sign, the graphic sign, the iconic sign, the gestural sign are all typical signs (1967a: 47).

For Barthes, the business of establishing a semiology in which verbal and nonverbal signs can be considered equally leads him to override Saussure's fundamental principle in which the relations within the linguistic sign are purely mental. This is probably the most characteristic feature of Barthes's theory of the sign, although, unfortunately, the fact that *Elements of semiology* has often been treated as a faithful explication of Saussure rather than as a manifesto, has prompted the erroneous belief that Saussure's *signifiant* is the same as Barthes' (see, for example, Bignell, 1997; Cobley, 1996).

Another feature of Barthes' revision of Saussure concerns the vaunted 'arbitrariness' of relations in the sign and, here, Barthes takes his cue from Benveniste and then Martinet. In respect of the word *ox*, Barthes suggests, after Benveniste, that the relation of *signifiant* and *signifié* "is by no means arbitrary (for no French person is free to modify it), indeed, it is, on the contrary, necessary" (Barthes, 1967a: 50). Ultimately, however, Barthes suggests that the relation is one that is determined by different degrees of 'motivation.' An unmotivated system, he argues, is one where signs are not founded by convention but by unilateral decision; so, for him, signs in *la langue* are not unmotivated but signs in the world of fashion (where there is an elite organizing body) are. Signs are motivated, on the other hand, when the relation between *signifiant* and *signifié* is analogical (Barthes, 1967a: 51). This is evidence of Barthes' attempt to smooth the transition from Saussure's linguistic sign to a general semiology containing, for example, pictorial signs whose *signifiant*/*signifié* relation is, frequently and unavoidably, one of motivation.

It is evidently important for Barthes that there be an analytic unity in his theory of both verbal and nonverbal signs, chiefly because the ravages of ideology, when exposed, would be less convincing if they were distributed unevenly across different kinds of signifying system. Indeed, Barthes' justly famous essays on photography (1977a, 1977b) are important in this respect since they indicate that the denotative sign enacts a motivated relationship often as if it were in the service of 'validating' the injustice of the connotative sign, establishing its literalness and helping to ground ideology. Barthes's close analytic readings, many of them informed by an implicit use of Saussure's notion of syntagmatic–paradigmatic interaction, have informed the practice of students of media, culture, and communications to the present day, although the later work of Barthes is often assumed to transcend Saussurean sign theory as though his earlier work did not. In a later book, *S/Z* (Barthes, 1970), Barthes does consider signs from a slightly different angle. However, one could argue that this work still struggles with the vicissitudes of the Saussurean sign.

In the opening pages of *S/Z*, Barthes formulate two kinds of texts, the 'readerly' and the 'writerly,' where the reader is respectively an idle consumer of the signs in the text or a diligent producer of it, almost rewriting what is presented (Barthes, 1974: 3–4). Barthes goes so far as to actively advocate the latter position but, curiously, the intense analysis that follows these comments and makes up the majority of the book produces an implicitly conflicting conclusion. *S/Z* dissects a Balzac short story, 'Sarrasine,' dividing it up into very brief segments and by elaborating five codes through whose matrix the text passes. The result is to expose an abundance of meanings, making a text that might have been billed as a 'simple realist narrative' into one that now threatens to be eminently 'writerly.' It is not clear whether Barthes set out to demonstrate that 'realist' texts – exemplified by 'Sarrasine' – somehow carried signs that purported to possess a 'stable,' one-to-one *signifiant*/*signifié* relationship. Yet, if this was Barthes's intention, then it is clear that the final delivery of *S/Z* stymied it. The Saussurean version of the sign was by no means complicit with 'readerly' texts; indeed, the analysis might suggest that post-Structuralist versions of the sign were not guaranteed to produce 'writerly' texts.

If one feature of Barthes's analyses has been an extension of Saussurean sign theory to make it almost synonymous with the analysis of everyday phenomena (as opposed to an element in the understanding of linguistic systems), then his work is of a piece with that of the enormously influential structuralist anthropologist, Claude Lévi-Strauss (b. 1908). To be sure, Lévi-Strauss was heavily influenced by a number of thinkers (Marx, Kant, Durkheim, Mauss, Jakobson) but most prominent among these, perhaps, was Saussure. Lévi-Strauss's work until the mid-20th century focused on kinship systems and marriage rules, while later he concentrated on belief systems

embodied in myths and religion. Inspired by phonology, Lévi-Strauss had developed a methodology to investigate marriage alliances and myth. Yet, more specifically, crucial to Lévi-Strauss's conception of anthropology was Saussure's insistence on how the differentiality between linguistic signs gives rise to value (*valeur*).

Rather than carrying intrinsic 'meaning,' Saussure argued that linguistic terms were imbued with an identity that relied totally on their difference to other terms. For Lévi-Strauss, in turn, differentiality characterized a range of anthropological phenomena, particularly in the practices of exchange to be found in kinship rules, but also elsewhere. This included such binary formulations as the 'raw' and the 'cooked,' one of a number of anthropological oppositions discussed at length by Lévi-Strauss in a Saussurean spirit heavily refracted through the work of Jakobson and Troubetzkoy. Taking the oppositions instanced by phonemes as the smallest possible units participating in the differentiality of language, Lévi-Strauss proceeded to formulate both a study of myth and of 'savage' thought in general. The analogy of phonemes combining and opposing to produce linguistic signs that might be employed in systems of exchange informed, for example, his analysis of kinship.

In his theory of myth, Lévi-Strauss considered mythic narratives to rely on 'mythemes' – a term that directly echoes 'phonemes,' of course. The conclusions that Lévi-Strauss reached about Saussure – that "language can be analyzed into things which are at the same time similar yet different" (Lévi-Strauss, 1977: 209) – encouraged him to concentrate on the 'form' by which phonemes were combined rather than the strictly semantic orientations of a myth's content. Lévi-Strauss thus devised a method that enabled him to break down all myths to allow the identification of a basic substrate. The most famous example of this is his 1955 interpretation of the Oedipus myth in which he treats it "as an orchestra score would be if it were unwittingly considered as a unilinear series" (Lévi-Strauss, 1977: 213).

Say, for instance, we were confronted with a sequence of the type: 1, 2, 4, 7, 8, 1, 3, 4, 6, 8, 1, 4, 5, 7, 8, 1, 2, 5, 7, 3, 4, 5, 6, 8 . . . the assignment being put to all the 1s together, all the 2s, the 3s, the result is a chart:

1	2		4			7	8
	2	3	4		6		8
1			4	5		7	8
1	2			5		7	
		3	4	5	6		8

(Lévi-Strauss, 1977: 213)

He then goes on to break down the features of the Oedipus myth – for example, 'Oedipus marries his mother, Jocasta' and 'Antigone buries her brother, Polynices, despite prohibition' (Lévi-Strauss, 1977: 214) – which he reorders in a similar way. Effectively, Lévi-Strauss comes up with four columns of relations in the myth: (a) overrating of blood relations; (b) underrating of blood relations; (c) slaying of monsters; (d) (names for difficulty of balance/standing). These mythemes suggest that the orchestrated myth has at its core a common human concern: anxiety over our origins. Put another way, the myth plays out the drama of humankind's quest to determine whether it has been forged in blood/earth or by human reproduction.

In the face of post-structuralism's revisions of his theoretical position and, in particular, the critique leveled by Jacques Derrida, Lévi-Strauss remained an unrepentant reductionist, revealing in his work the *langue* behind copious examples of *parole*. Lévi-Strauss was not alone in proposing such broad formulae at this time. In a series of articles in the late 1950s and early 1960s, which culminated in the 1966 book, *Sémantique structurale*, A. J. Greimas (1917–1992) worked out a semiotic project influenced by Hjelmslev and Saussure. Considering myth and narrative, Greimas, in a fashion that, from a distance at least, seems akin to that of Lévi-Strauss, gave priority to structural relations between narrative entities rather than to their intrinsic qualities. Lévi-Strauss, along with Vladimir Propp (1895–1970) and Greimas, effectively gave birth to the discipline known as 'narratology.' Narratology is a specific way of understanding narrative that was developed out of Russian Formalism but relied to a large extent on the theory of the sign put forth by Saussure. Sometimes 'narratology' is the name given to any form of analysis of narrative, but this is misleading. The term, instead, refers to a particular period in the history of narrative analysis that has had important consequences for other areas of study but that has also, itself, been transformed by other disciplines and perspectives. What characterizes narratology most readily is a systematic, thorough, and disinterested approach to the mechanics of narrative – an approach that provides a stark contrast to those that observe or seek out 'value' in some narratives (and not others) or that provide hierarchies of narratives based on spurious categories such as the 'genius' of an author or artiste.

Roland Barthes's essay 'Introduction to the structural analysis of narratives' (Barthes, 1977, [1966]) and Tzvetan Todorov's *Grammaire du Décaméron* (1969), the latter of which actually coined the term '*narratologie*,' represented the birth of narratology

proper. In the late 1960s and early 1970s, these paved the way for works by names frequently associated with the narratological enterprise: Mieke Bal, Seymour Chatman, Dorrit Cohn, Gérard Genette, and Gerald Prince. The fundamental distinctions in narratology between, for example, 'plot,' 'story,' and 'narrative,' were, in different ways, developed by the immediate precursors of the main narratological enterprise who came after Russian Formalism. Both Propp and Lévi-Strauss undertake analyses of narrative that focus on 'story' or, in the latter's case, in an extension of the linguistic terminology from Saussure, 'semantic structure.' In *Morphology of the folktale* (originally published in Russian in 1928, then auspiciously translated into English in 1958, appearing in book form 10 years later), Propp analyzed 100 Russian folk stories. Rather than attending to the surface differences of the narratives, he examined their underlying commonalities, particularly the basic function of actions in each story. Propp identified 31 functions characterizing the tales: for example, 'One of the members of a family absents himself from home'; 'An interdiction is addressed to the hero'; 'The interdiction is violated'; through to 'The villain is punished' and 'The hero marries and ascends the throne.' Each of these functions is, of course, carried out by one or more of the *dramatis personae*. Propp therefore proceeded to isolate the seven basic roles of characters in his sample, listing the particular sphere of action to which each belonged: the hero, the villain, the princess (sought-for) and her father, the dispatcher, the donor, the helper, and the false hero.

As differential signs in narrative, which Propp named 'functions,' it was easy to see the connection between such elements and Saussurean sign theory as adjusted by Hjelmslev. It is in this frame that the categories introduced by Greimas were so influential. Most importantly, Greimas emphasizes the functional nature of Propp's *dramatis personae* by referring, instead, to 'actants.' 'Actants' or 'actantial roles' are defined in the following ways: in relation to each other, in relation to their place in the narrative's 'spheres of action' or 'functions,' and in relation to their place in the logic of a narrative. In Greimas's revision of the *dramatis personae* in *Structural semantics* (1983, [1966]), the actants comprise 'subject vs. object,' 'sender vs. receiver' and 'helper vs. opponent,' a set of categories that replaces Propp's analysis based on character roles (heroes vs. sought-for person, father/dispatcher vs. hero, helper/provider vs. villain/false hero). Narrative meaning in this formulation is played out through the various functions: thus, the 'subject' searches for the 'object'; the 'sender' is on a quest, initiated by a 'subject' for an 'object'; and so on. In addition, Greimas explores the way in which the structure of narrative can be defined by the interaction of 'positive' and 'negative' functions such as the opposition between a relationship designated *A* and containing 'command/behest' (*a*) and 'acceptance' (*non a*), and a relationship designated *A* • consisting of 'violation' (*non a* •) and 'interdiction' (a •). Ultimately, the systematic scrutiny of these relations led Greimas to posit a 'semiotic square' of such coordinates as a tool for the analysis of narrative meaning.

The work of Greimas, as well that of many others, such as Barthes, had traveled a long way since adopting broadly Saussurean principles. Indeed, the extensions of Saussurean sign theory were often actually extrapolations from Saussure as explicated in the work of other linguists or cultural theorists. Another case in point is the sign theory of Jacques Lacan (1901–1981), which is heavily reliant on the work of Jakobson, Lévi-Strauss, and, especially, Benveniste. For Lacan as a psychoanalyst, the chief point about the linguistic sign was that it somehow misses something; it is unable to express the purely personal. This is because relations in the sign are arbitrary, allowing the same sign to be used by everybody else. In 1957, Lacan delivered a lecture at the Sorbonne entitled 'L'instance de la lettre dans l'inconscient ou la raison depuis Freud,' which incorporates a significant extension of Saussure's sign theory, while also pursuing a series of related questions evident in Lacan's work since the completion of his Ph.D. dissertation in 1932 (see Benvenuto and Kennedy, 1986: 107; Payne, 1993: 74).

Taking the fundamental constituent of the *Course in general linguistics*, Saussure's map of the sign with *signifié* on top of *signifiant* enclosed by an ellipse, Lacan inverts it and opens it up. He presents a picture of two identical doors distinguished only by the writing that appears above them (**Figure 3**).

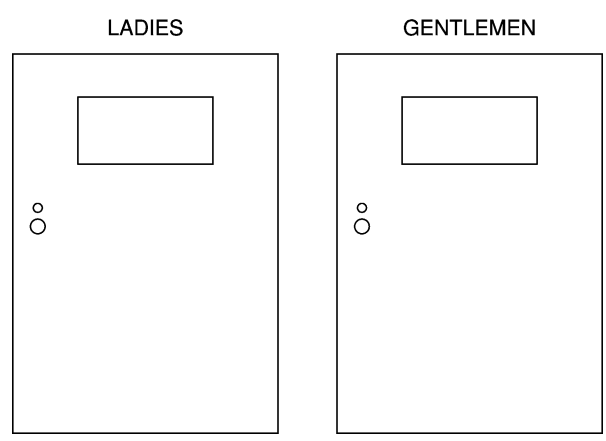

Figure 3 Lacan's twin doors. From Lacan, 1977.

Clearly, this is a version of Saussure's map (or algorithm) of the sign (**Figure 4**).

What is important here is that the priorities of Saussure are reversed by Lacan. The *signifié* (or mental concept) of what lies behind each door is determined entirely by the *signifiant* (what should be the 'sound pattern,' here, is translated without comment by Lacan into a written notation: 'Ladies,' 'Gentlemen') that lies above the door. A whole cultural law – as Lacan puts it, the subjection of public life to the law of urinary segregation – is engendered by the existence and location of the two *signifiants* as well as their difference from one another. Lacan seeks to demonstrate that the mental concept is created by the way in which language operates. So, in addition to inverting the priorities in the algorithm, Lacan also banishes the ellipse and reinforces the bar that separates *signifiant* and *signifié* to emphasize that there is an incessant possibility of the *signifié* sliding under the *signifiant*. The *signifiant* is therefore responsible for the birth of subjectivity; however, it does not give birth to the human as a whole. There remains in the human a complex domain of desires – the unconscious – ruled by an order that is totally different from that of the social institution, language.

The implications of Lacan's inversion of the Saussurean algorithm for the study of subjectivity are fairly clear. As such, his work was taken up in all manner of areas in the humanities. It was especially influential in film theory circles, particularly in the 1970s in Britain. Problematically, however, it was frequently seen as correcting the fundamentals of Saussure's sign theory (or, as was frequently the case, misrepresenting his theory of the sign in order to carry out some fixing that was never needed in the first place) or, worse, seen as standing for the truth of the Saussurean sign. This is a pattern that can be seen in other Saussurean sign theory, especially in the Gallic tradition – for example, Derrida (1976: 27–73) and Baudrillard (1983) – but also as Saussurean sign theory was used as a central figure in other disciplines (see, for example, Coward and Ellis, 1977; Culler, 1975; Hall *et al.*, 1980; Dyer, 1982; Fiske, 1990; Bignell, 1997; Hall, 1997; Cobley, 1996). Yet there is one area of Saussurean sign theory which has been of utmost importance to its dissemination and must be briefly mentioned here.

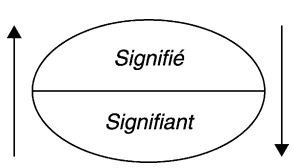

Figure 4 Saussure's sign. From Saussure, 1983: 113.

In his indispensable volume on *Saussure and his interpreters* (2003), Roy Harris discusses the Students' Saussure, the Editors' Saussure, Bloomfield's Saussure, Hjelmslev's Saussure, Jakobson's Saussure, Lévi-Strauss's Saussure, Barthes's Saussure, Chomsky's Saussure, Derrida's Saussure, and History's Saussure. Implicitly discussed, but it could also have merited a chapter of its own, would be the translators' Saussure. The English translation of the *Cours* is interesting in itself and, indeed, as Harris himself produced the second translation of the *Cours* in 1983, modesty may have prevented him from discussing the issue in his volume. However, it should be noted that the first English translation of 1959 has damaged the understanding of the *Cours* and caused it to be falsely applied in various areas. One example from Wade Baskin's translation of 1959 will suffice to illustrate the problem. It is the rendering of *signifiant*, *signifié*, and *signe* as 'signifier', 'signified,' and 'sign.' The first of these items produced the major misunderstanding. In short, it gave the impression to English natives that the *signifiant* was anything that did the work of signifying or, to put it another way, a sign. This was precisely the formulation that Saussure wanted to avoid and Saussure is explicit about this on a number of occasions in the *Cours*. The term for the *signifié*, at the same time, seemed to imply anything that was the object of signification – that is to say, any **thing** that was being **signified**, whether that be a thing in the head or a thing in the world (with the implication that it was generally the latter). At a stroke, Saussure's psychological conception of the sign was lost and versions of semiology were given free rein to look at the whole panoply of cultural artifacts as if they embodied a *signifié/signifiant* relationship. In his 1983 translation, Harris did his best to regain some of the ground that had been lost by rendering *signifiant* and *signifié* as 'signal' and 'signification' in an attempt to give a more accurate flavor of Saussure's sign theory and to head off erroneous extrapolations. However, the damage was already done and Harris' terms have not been widely taken up as yet. (Thus the present article retains the original French terms).

What is beyond doubt is that Saussure's theory of the sign has been extraordinarily influential and has generated some productive work while also spawning some monsters. The posthumous provenance of the *Cours* has, perhaps, entailed that the 'real Saussurean sign theory' will never be known. However, two points should be added. The theory of the sign in Saussure's *Cours* is still unfolding as new discoveries about the original Geneva course in general linguistics are made (see Harris, 2003: 214–252). And, while it may not be the word of

Saussure himself, Saussure's *Cours* is still insufficiently read.

See also: Phoneme; Barthes, Roland: Theory of the Sign; Benveniste, Emile (1902–1976); Jakobson, Roman (1896–1982); Levi-Strauss, Claude (b. 1908); Myth; Mythologies in Pop Culture; Phonology: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Semiology versus Semiotics; Structuralism.

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Saussurean Tradition in 20th-Century Linguistics

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Ferdinand de Saussure is considered one of the founding fathers of the modern science of linguistics (*see* **Linguistics as a Science**) and the main source of European structuralism (*see* **Structuralism**). He has come to stand as something of a figurehead, often cited in writings on the history of linguistics as the starting point, or key turning point, for the discipline as we know it today. For several years his name served as a shorthand reference for all that is good – or bad – in the structuralist approach. The fact that he did not himself publish the main volume that gave access to his thought, along with the widespread uses and abuses that were made of his theory (mainly in disciplines outside linguistics), attributed to him a mythical status that has sometimes obscured the true nature of his contribution to linguistics. However, with hindsight many of the debates surrounding the interpretation of his *Course in general linguistics* (the *Cours de linguistique générale* [*CLG*] was first published in French in 1916) can be seen as determined by changing intellectual fashions. With the current publication of new manuscript materials, a more balanced assessment of his contribution to linguistics may be reached.

Saussure is arguably the late-19th-century linguist who was most conscious of the stakes involved in the creation of a new discipline or paradigm. The papers collected in his *Writings in general linguistics* (originally published as *Ecrits de linguistique générale* [*ELG*] in 2002) demonstrate a strong awareness of epistemological issues and include a wealth of examples of his attempts to forge a terminology that would be capable of expressing the key concepts of the new approach. He constantly articulated his desire to develop a rigorous conceptual and methodological basis for descriptive linguistics and to define the boundaries of linguistics and its relation to neighboring disciplines, predicting its close affinities with, but separateness from, sociology and – especially – psychology. He is responsible for the term '*sémiologie*' to describe the future science of signs (*see* **Semiotics: History**), of which language would be just a part (albeit the major part), and he showed great vision in his clear but sometimes implicit references to language typology and embryonic generative rules. While the heated debates around certain Saussurean terms and concepts in themselves constituted an indirect tribute to his ideas, for many years there were only a few exceptional acknowledgments by linguists of his epistemological and terminological contribution to linguistics, with explicit recognition being for a time left largely to nonlinguists. Yet his concepts and terms are ones that linguistics cannot do without, and that have permeated most strands of 20th-century linguistics (*see* **20th Century Linguistics: Overview of Trends**) in one way or another. Indeed, our first measure of Saussure's importance is the pervasive and central role that the concepts and terms developed by him continue to play in both linguistics and in a range of disciplines. The terms of the *CLG*, such as 'synchronic,' 'paradigmatic,' '*langue*,' '*parole*,' '*signifiant*,' and '*signifié*' are now part of the metalanguage of the discipline, and the difficulty of translating the last four terms adequately and their acceptance as loanwords in a number of languages testifies to Saussure's achievement in rigorously honing key concepts that interlock to make a complete and coherent theory of the way in which communication is made possible.

The *CLG* is a posthumous compilation from some of the notes taken by students at Saussure's lecture series given at the University of Geneva from 1907 to 1911 and edited by Bally and Sechehaye. It has run into numerous editions, with the page numbering remaining the same from the second edition on, included in the excellent scholarly edition annotated by De Mauro. The main reading of the *CLG* in the second half of the 20th century was a structuralist one, which at first stimulated much comment and further scholarship both in linguistics and in other disciplines. In linguistics it influenced scholars from Hjelmslev in Denmark to Coseriu in Germany, and it contributed to the theoretical underpinning of descriptions of contemporary French and structuralist semantics. However, as the fashion for structuralism waned, Saussure came to be seen – misleadingly, it now seems – as offering a reductionist view of language as a code, and, particularly by Marxist critics, as denying the historical dimension of language. Saussure's insistence on the language system was held to exclude considerations of both language variation and of the speaker, which allowed some to lay at his door the tardy development of sociolinguistics in parts of Europe. New material emerged, especially pertaining to Saussure's study of anagrams in classical poetry. In addition, the comparative edition of lecture notes drawn up by Engler threw light on some of the choices made by the editors of the *Cours*, all of which led to a revised interpretation of his work. It began to be understood that for a philosopher such as Merleau-Ponty, who emphasized the potential of a theory that showed

meaning to emerge from the space between units, Saussure was anything but reductive. Similarly, Saussurean theory was not necessarily incompatible with pragmatics or theories of *énonciation*. Furthermore, with the publication of notes written for a philosophical book on language ('On the dual essence of language,' in *ELG*) and the preparatory notes for his Geneva lecture series, it has now become to some degree possible to trace the evolution of Saussure's thought in a way that does not lead us to reject the *CLG* but to arrive at a more flexible interpretation of it.

It should not be forgotten that Saussure's early reputation was made by his brilliant work in the field of historical and comparative grammar (*see* **Historical and Comparative Linguistics in the 19th Century**) (for the continued importance of his work on the Indo-European vowel system, see Morpurgo Davies, 2004). Nevertheless, he is famous for helping to establish the synchronic study of language, and in the *CLG,* the first methodological distinction in Saussure's tightly knit theory is the necessary separation of synchronic (descriptive) from diachronic (historical) linguistics (*see* **Synchronic and Diachronic Variation**). Saussure was not alone: at about the time of his Geneva lectures, for example, American linguists such as Bloomfield and Sapir were committed to a descriptivist approach. However, it is difficult to appreciate how deeply entrenched the historical approach was in Europe as a result of the hegemony of 19th-century German scholarship, so that linguists who wished to promote the study of the contemporary language, such as Saussure's Paris colleague Bréal, nonetheless continued to confuse the synchronic and diachronic approaches. It was Saussure who understood that our whole understanding of language as a system depended on the rigorous observation of this distinction, as therefore did the very foundations of the discipline of linguistics. The categorical and sometimes schematic expression of this observation in the *CLG* led some linguists, such as Roman Jakobson and those in the Russian tradition, to accuse Saussure of a 'static' conception that ignored the constant flux of language (see Hutchings, 2004). If it was not clear to the reader of the *CLG* that this was not Saussure's intention, it certainly became clear in the *ELG,* where Saussure said that "language is, at every moment of its existence, a historical product"(translation of *ELG*: 209*)*.

The next well known methodological distinction is the tripartite one between *langage/langue/parole*, which is often reduced to a *langue-parole* dichotomy. The reader of *ELG* is party to the linguist's working his way toward a definition of these concepts; by the third 'cours' on which the *CGL* is largely based, the concepts were more or less established, although the terminology fluctuated occasionally. '*Langage*' is the overarching term for the human phenomenon of language; '*langue*' refers to both the underlying linguistic structure and to the speaker's mental representation of it; and '*parole*' refers to language in use. It was Saussure's contention that priority had to be given to a '*linguistique de la langue,*' but that a '*linguistique de la parole*' would follow. The fact that he did not live long enough to complete the latter has, of course, led to the criticism that he neglected real language use, discourse, and the subjectivity of language.

In a rare example of Saussure's remaining hidebound by the legacy of 19th-century linguistics, he regarded syntagmatic relations that went beyond the word or fixed phrase as 'belonging' to *parole*. He gave what is probably the most coherent account of the essentially differential and relational nature of basic linguistic units and the way in which the functioning of these makes linguistics a science of values. However, whereas the latter can be of relevance at all levels of linguistic analysis, he illustrated it mainly with examples from phonology and morphology. While he could envisage structuralist semantics and semiology (although he himself used the word 'system,' not structure, with reference to language), he accorded almost no attention to syntax in the *CLG* and very little more in the *ELG*. This glaring *lacune* apart, he nevertheless stated his conviction that communication and discourse constituted the essential context of linguistic analysis ('Language is created only with a view to discourse'/'La langue n'est créée qu'en vue du discours,' *ELG*: 277). Each linguistic unit – each phoneme and each word – is a sign, characterized by Saussure as being linear and arbitrary. In the mid-20th century in some circles, the arbitrary nature of the sign made nearly as much ink flow as the debate about *langue/parole*, largely because the distinction between 'arbitrary' and 'unmotivated' was poorly understood; for Saussure, linguistic units could be more or less motivated within the system (e.g., derivatives from one part of speech to another), but the whole system was inherently arbitrary. More crucially, the linguistic sign for Saussure linked the mental representation ('*signifiant*') of the utterance with the mental representation of the referent ('*signifié*'). This proposal that only the signifier and the signified should be considered as part of linguistics proper is one of the most lucidly expressed and innovatory of Saussure's ideas, but, despite the widespread use of these terms, there is still a tendency to confuse 'signified' and 'referent.'

The initial reception of Saussure's work in the English-speaking world was relatively muted.

Contemporaneous with Saussure's attempt to define the functioning of meaningful units of sound was the work of British phoneticians Sweet, Ellis, and A. G. Bell, to whom Saussure refers in the *ELG*. Although the British school saw phonetics as the starting point for the new descriptive linguistics, for Saussure '*phonologie*' (which in the fluctuating usage of the time was his term for what we now call 'phonetics') was not part of the core study of the language system. Ogden and Richards, among the first to comment on the *CLG*, took issue with Saussure's dyadic account of the sign, which, in contradistinction to their own triadic model, excluded the referent. The warmest early praise for the *CLG* in Britain probably came from Gardiner (*The theory of speech and language,* 1932), who himself had proceeded to write the 'linguistics of *parole*' that had been left undone by Saussure. The perceived lack of emphasis on language in use and on language variation seemed to make Saussure something of an irrelevance to British linguists for whom both were major concerns. Although Firth famously claimed that "we are all Saussureans now," it could be argued that his own work and that of the so-called London School shows little Saussurean influence. Once American structuralist, and then generative, linguistics became dominant in Britain in the mid-20th century, there were only a few who remained open to European influences (such as J. Lyons, S. Ullman, or Romance linguists, such as N. Spence, who contributed in particular to the debate about *langue* and *parole*). It was clear that the influence of the *Cours* was most likely to be acknowledged by linguists who challenged the mainstream, and indeed interest in Saussure was reawakened by Roy Harris's translation (1983) and by his sympathetic but not uncritical reading of the *Cours* (*Reading Saussure*) published in 1987. With increased research being conducted in the history of linguistics, Harris was one of a number of scholars from the United Kingdom, the United States, and Canada, such as E. F. K. Koerner, W. T. Gordon, J. Joseph, and G. Wolff, who raised historiographical and epistemological questions about the place of Saussure in 20th-century linguistics. On the wider front, with the reappraisal that was underway, it now seemed feasible to reconcile Saussurean linguistics with critical linguistics and critical theory, as for example in *Re-reading Saussure: the dynamics of signs in social life* (1997) by P. Thibault, editor of a multivolume edition of Saussure criticism (Routledge, forthcoming 2006).

It was in the United States that the major debates of 20th-century linguistics were to take place. Saussure himself wrote appreciatively of the American W. D. Whitney, particularly of his conception of language as a social institution, while at the same time criticizing him for not really envisaging language as system. Bloomfield in turn acknowledged a debt to Whitney in the preface to his first book, *An introduction to the study of language* (1914). Perhaps unsurprisingly, the only review that appeared in the U.S.A. of the *CLG* (second edition) was by Bloomfield in 1924. Bloomfield's review contained mitigated praise; he credited Saussure, along with others, with having elaborated the notion of the phoneme (*see* **Phoneme**), and acknowledged that Saussure lucidly set out "the theoretical basis for a science of human speech." Bloomfield claimed that the primacy of descriptive linguistics was already established, as was the social nature of language (though many would dispute that he himself took full account of this). He referred to the *langue/parole* distinction and to the concept of language as a system, but apparently without fully appreciating their centrality to Saussure's theory of synchronic linguistics. While Saussure will be accused by some future critics of structuralism of paying insufficient attention to meaning, for Bloomfieldian behaviorists his approach was too "mentalistic." Post-Bloomfieldians thus refer rarely to his work, with some exceptions, such as Twadell's recognition of his conception of the phoneme as relational and abstract.

Bloomfield would later say (in a letter written in 1945) that Saussure was present in every page he had written, but this was after an interest in European linguistics had taken a hold in the United States as a result of the arrival of intellectuals who fled Europe during World War II. To trace this strand of Saussurean influence on 20th-century linguistics, we have to return to Europe, where a young linguist named Karcevski went back to Russia after a year's stay in Geneva and took part in the Moscow Linguistic Circle, along with Jakobson and Trubetzkoy. As is well known, these two linguists moved westward and participated in the elaboration of the theses of the Prague Circle in the 1920s. Once in the United States during World War II, Jakobson became the single greatest disseminator of Saussure's ideas, both promoting and criticising them in lectures, such as a series entitled 'La théorie saussurienne en rétrospection' and 'Six leçons sur le son et le sens' (both at the émigré 'Ecole des Hautes Etudes Libres' in 1942), and in his publications. He approved of, and attributed to, Saussure and to Baudouin de Courtenay, the definition of the phoneme, but went on to develop his own theory of 'distinctive features.' He also drew on the Saussurean notions of syntagmatic and paradigmatic relations in his own studies of aphasia, and of metaphor. Where he departed from Saussure was on the arbitrary and linear nature of the sign, and on

the division between diachronic and what he saw as 'static' synchronic linguistics.

Perhaps as important as Jakobson's own work in the spread of Saussurean ideas was the work that he did in collaboration. He worked with Halle on distinctive features (cf. *Fundamentals of language*, 1956), and his study of Baudelaire's sonnet *Les Chats,* undertaken jointly with anthropologist Lévi-Strauss, marked the first structuralist analysis of literary language. Jakobson was one of the founders of the Linguistic Circle of New York, in whose journal *Word* one of the most significant outlines of Saussurean linguistics of that time was published (Wells, 1947), an article that became widely known through its inclusion in Joos (1957). Also active in New York was Martinet, a former pupil in Paris of Saussure's successors, and it was perhaps due to the influence of Martinet and Jakobson that an American translation of the *CLG* by Wade Baskin was published in 1959.

From the 1960s, the European 'rationalist' tradition was more compatible with the prevailing paradigm than it had been with the Bloomfieldian approach. The *CLG* was commented upon, for example, in *Cartesian linguistics* (1966), by Chomsky in his revisiting of the rationalist tradition. There was some common ground between *langue/parole* and Chomsky's competence/performance distinction and the idea that the main focus of linguistics should be *langue* or competence, although Saussure's notion of *langue* as a 'treasure' located in the mind of every speaker did not attribute to it the generative potential that characterized Chomsky's idea of 'competence.' While not claiming him as a major influence, Chomsky continued to refer to Saussure until recent publications (e.g., *New horizons in the study of language and mind,* 2000). Historians of linguistics in the United States, too, have mulled over Saussure's influence. These include Aarsleff (1982), who threw light on Saussure by considering him alongside certain other French thinkers such as the linguist Bréal; Falk (2004), who analyzed responses to Saussure in a broad range of American linguists' publications. Finally, where linguistics and semiotics come together, as in the work of Sebeok, it was not only Peirce who provided the impetus, but also Saussure's *Cours*.

Within France, Saussure's influence on colleagues and students was marked; among the latter, Passy and Grammont were responsible for the drawing up of the International Phonetic Alphabet. At the Ecole Pratique des Hautes Etudes, Saussure was succeeded by Meillet (*see* **Meillit, Antoine (Paul Jules) (1866–1936)**), whose contribution was primarily as a historical linguist; despite a superficial similarity in his contention that language was a social phenomenon, he referred here largely to factors operating on language from outside, as opposed to Saussure's idea of language as inherently social in nature. Nevertheless, Meillet considered himself to be a follower of Saussure, particularly in his conception of the focus of linguistic study: he was responsible for the famous final sentence of the *Cours* ("la linguistique a pour unique et veritable objet la langue envisagée en elle-même et pour elle-même"/'the only true object of study in linguistics is language considered in itself and for its own sake').

Guillaume (*see* **Guillaume, Gustave (1883–1960)**), Meillet's pupil and successor at the Ecole Pratique des Hautes Etudes, also considered himself a Saussurean, and he could in some respects be seen as taking over where Saussure left off. His view of language was of something dynamic and speaker-centered. He broadened *langue/parole* into '*langue-puissance*' (thus stressing the generative potential of language) and '*parole-effet*.' The aim of his '*psychoméchanique*' was to explain the passage from one to the other, i.e., the production of discourse. Guillaume has followers not only in France, but also in Belgium, and particularly Canada: his papers are held and edited at the 'Fonds Guillaume' at Laval University, and his work has been translated into English by Canadian linguists. It has been commented that his interest in the speaking subject made him the forerunner of Benveniste, who succeeded Meillet in his other post (a chair in comparative grammar at the Collège de France). Originally an Indo-Europeanist, Benveniste engaged with Saussure's ideas throughout his career, elucidating the notion of the arbitrary sign and promoting the concept of a system made up of a series of differences. In his own way, he too saw language as a dynamic and intersubjective phenomenon, and developed the theory of '*énonciation*,' an approach covering both pragmatics and speech act theory, which is perhaps the most buoyant and characteristic trend in contemporary French linguistics. If Benveniste has done more than Guillaume to disseminate aspects of what might be called French post-Saussurean linguistics, it is because his writing was more accessible, his distinction between *histoire* and *discours* had an important impact in literary analysis, and he was prominent in the development of semiotics in Europe, becoming the first president of the International Association for Semiotic Studies set up in 1969.

The links between French post-Saussureans and other European structuralists continued productively. Meillet's pupil, Martinet, mentioned above in connection with the review *Word,* had spent time in both Prague and Copenhagen before going to the United States and had introduced into France the work of Danish linguist Hjelmslev, whose 'glossematics' aimed to discover the underlying system of

elements that could recur in diverse combinations to produce language. The structuralist semantics of French linguist Greimas built heavily on both Saussure and Hjelmslev. Moreover, Hjelmslev's subdivision of Saussure's twofold distinction between form and content into a fourfold distinction provided the theoretical underpinning for Roland Barthes's categories of 'denotation' and 'connotation' (in, for example, *Mythologies*). While Barthes was more literary critic and semiologist than linguist, an overview of Saussurean trends in France would not be complete without a reference to this proponent of structuralism. Although replete with productive misreadings of the *Cours* and with a sometimes approximate understanding of linguistics, his work served as the intermediary through which Saussurean linguistics came to be regarded in the 1960s as the *science-pilote* for all the humanities.

Within Saussure's native Switzerland, his legacy has continued to be rich and varied (*see* **Geneva School of Linguistics after Saussure**). Most immediately, his own students Sechehaye and Bally engaged in research both marked by the *Cours* and different from it. The former adopted a psychological approach, and the latter promoted the place of the study of linguistic stylistics within *langue*. Saussure discussed the work of both in the *ELG*. Arguably, the most important contribution to Saussurean linguistics made by Swiss linguists has been in manuscript research, textual exegesis, and the general custodianship of the linguist's legacy. Since Saussure's death, conferences and volumes such as Amacker's *Linguistique saussurienne* (1975) kept alive his memory, as did the regular appearance of the *Cahiers Ferdinand de Saussure,* as well as a recently created Institut Ferdinand de Saussure. In 1957 Godel published the manuscript sources for the *CLG*, and then in 1968 and 1974, Engler's seminal comparison of all the available source notes appeared in two volumes. The most recently discovered manuscripts were edited by Engler and Bouquet (2002), and another volume is promised. This most recent volume both reinforces many of the ideas of the *Cours* and provides an insight into their gestation. It also shows a different Saussure: one convinced of the importance of situating linguistic analysis within a new philosophy of language, and one much more given to doubt and nuance than the style of the *Cours* would lead us to suspect.

Two final points: while the influence of Saussure in European linguistics is perhaps the easiest to chart, his legacy is worldwide, as is demonstrated by the interest shown in Saussurean linguistics in Japan (see, for example, the special issue of *Gengo 7(3)* [1978] and Tajima and Koerner, 1978). Secondly, although his ideas are of most pertinence to linguists and semioticians, they continue to be debated by researchers in a variety of disciplines, as they were in the mid-20th century. This is reflected in numerous ways, such as the recent publication of an article on Saussure in the review *Pour la science* (Bouquet, 2005) and the conferences of the 'Institut Ferdinand de Saussure,' founded in 1999, which have drawn together interested scholars in areas ranging from the cognitive and biological sciences to cultural studies.

See also: Geneva School of Linguistics after Saussure; Guillaume, Gustave (1883–1960); Historical and Comparative Linguistics in the 19th Century; Linguistics as a Science; Meillit, Antoine (Paul Jules) (1866–1936); Phoneme; Semiotics: History; Structuralism; Synchronic and Diachronic Variation; 20th Century Linguistics: Overview of Trends.

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Archibald Henry Sayce, comparative philologist, Orientalist, Assyriologist, and religious scholar, was educated at Oxford, where he was later professor of both Assyriology and comparative philology. He dedicated much of his research and linguistic abilities to determining the chronology and historical accuracy of information related in the Bible (cf., e.g., White, 1993: 2, 20). This was wholly in keeping with the dimensions of the discipline as laid out and practiced during the latter half of the 19th century, when comparative philology, still more the study of languages than the study of language *per se*, conventionally intersected the study of mythology, archaeology, religion, and history. In particular, Sayce is recognized for his contributions to the decipherment of Hittite hieroglyphic script and the Armenian of the Van inscriptions. His *Assyrian grammar* (1872) was the first English-language grammar of Assyrian (Assyrian Neo-Aramaic). As an important contributor to the science of language, Sayce is best remembered for his *Principles of comparative philology* (1874) and *Introduction to the science of language* (1880), both of which enjoyed multiple editions. The topics covered in his *Principles*—the relation of comparative philology to other disciplines (including comparative mythology and religion), the three stages theory of linguistic development, and the doctrine of roots, for example—mirror the 19th-century approach to the study of language, as found, for instance, in the works of Max Müller, to whom Sayce dedicated *Principles*, and William Dwight Whitney. Sayce's treatment of the evolution and practical applications of grammar in his article 'Grammar' (1910) is surprisingly modern: his analysis of the evolution of adverbs, prepositions, conjunctions and infinitives, for example, can be seen as foreshadowing the later study of grammaticalization.

See also: Armenia: Language Situation; Bible; Christianity in Central Asia and the Near East; Grammaticalization; Historical and Comparative Linguistics in the 19th Century; Hittite; Müller, Friedrich Max (1823–1900); Semitic Languages; Whitney, William Dwight (1827–1894).

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Sayce, Archibald Henry, Reverend (1845–1933)

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Scaffolding in Classroom Discourse

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The concept of scaffolding is grounded in the classroom discourse tradition and draws on two scholarly perspectives, developed in the realms of psychology and sociolinguistics, namely, the sociocultural theory of language and learning, as put forward by the Russian psychologist Lev S. Vygotskij, and the sociolinguistic approach to human interaction according to John Gumperz and others. These two strands of theory share a view of language as the foundation of learning and place emphasis on human actions as jointly constructed efforts.

Scaffolding is a metaphorical concept that refers to the visible or audible assistance that a more expert member of a culture can give to an apprentice.

Scaffold work is most often analyzed as an instructional strategy in the school domain, but it occurs in any social setting where socialization processes take place.

The term 'scaffolding' was introduced by the American psychologist Jerome Bruner (1983) whose main interest was in the institutional forms by which culture is passed on. A basic concept underlying his work is Vygotskij's zone of proximal development (ZPD). This zone lies in between what learners can do without assistance and the maximum they can do with the help of a more experienced partner (*see* **Vygotskii, Lev Semenovich (1896–1934)**).

According to Vygotskij's sociohistorical theory, external speech affects internal thoughts: the intrapsychological apprehension of knowledge is made possible by the interpsychological action.

Another concept underlying the rationale of scaffolds is contextualization cues as advanced in Interactional Sociolinguistics, i.e., "any feature of linguistic form that contributes to signalling to the participants whether communication is proceeding smoothly and how intentionality is being communicated and interpreted" (Figueroa, 1994: 113). Contextualization cues are conveyed through multiple linguistic and paralinguistic channels, such as prosodic features (pitch and tone, loudness, rhythm) and kinesics (facial decoration, eye gaze, smiles, frowns, and any other resources of the body idiom), which are important tools in the management of scaffold-like actions (*see* **Gestures: Pragmatic Aspects**). Hence the advantage of using a microethnographic methodology to segment any scaffolding episode into smaller interaction units.

In the tradition of classroom discourse, scaffolding is associated with teacher initiating and evaluating the students' responses within the IRE (initiation-response-evaluation) framework of classroom interaction. This can take the form of prefaces to questions, overlapping, backchanneling, comments, rephrasing, and expansion of pupils' answers that will provide them with an opportunity for reconceptualization (Cazden, 1988) (*see* **Classroom Talk**).

A basic feature of scaffolds is the establishment of a positive atmosphere between the participants whereby teachers support (scaffold) the students' enactment of a competent behavior. This can be done through ordinary actions that ratify the learner as a legitimate participant, such as listening to them, as

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the late Brazilian educator Paulo Freire has pointed out (Freire, 1997). The scaffolding assistance in the classroom can come from the teacher as well as from peers.

Scaffolding strategies are culture-specific and can vary largely across social networks, ethnic and cultural groups, and national communities.

See also: Gestures: Pragmatic Aspects; Vygotskii, Lev Semenovich (1896–1934).

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Scaliger, Joseph Justus (1540–1609)

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A scion of the princely Veronese family della Scala and son of the prominent grammarian and humanist Julius Caesar Scaliger, J. J. Scaliger won renown as the greatest philologist and historian of his time.

Born in Agen, southern France, he was educated principally by his father, from whom he acquired a thorough knowledge of Latin. At the age of 19 he moved to Paris to study Greek, Hebrew, and Arabic. He later also mastered other Semitic and many modern European languages.

Brought up a Roman Catholic, he converted to Protestantism in his thirties.

Scaliger traveled extensively, partly on scientific missions and partly owing to the dramatic events of incessant religious wars. Luckily, on St Bartholomew's eve he happened to be in Lausanne, and he remained in Switzerland for two years teaching philosophy at the University of Geneva. His last 16 years were spent in The Netherlands as a professor at the University of Leiden. He was freed from lecturing and could devote all his time to his wide-ranging studies, his vast correspondence, and his instruction of students.

Scaliger began his scientific activities at the age of 25. In his critical editions of Latin and Greek authors, he substantially improved the philological methods of his Italian and French predecessors, basing his work on the collation of as many sources – manuscript and epigraphic – as possible and making amendments only if they were rigorously founded. Another important pursuit was a comparative investigation of ancient systems of dating. His summarizing work in this field, *De emendatione temporum*, became the foundation of scientific chronology. Scaliger's last substantial work, *Thesaurus temporum* (a critical edition of Eusebius's *Chronicle*), was another great achievement of his in historical chronology as well as in the technique of reconstruction of lost texts and in literary criticism.

In his best known linguistic work, *Diatriba de europaeorum linguis*, Scaliger, on the basis of obvious lexical and grammatical affinities, classified all main European languages. He discerned 11 families consisting of a mother-tongue (*matrix*) and off-shoots (*propagines*): four families were major (Latin, Greek, German, and Slavonic) and seven were minor (Albanian, Tartar, Hungarian, Finnish, Irish, Welsh, Basque). In a departure from earlier philology, Scaliger abandoned the monogenetic approach to languages, with Hebrew as the favored primeval tongue, and rejected the idea of genetic provenance of Latin from Greek. On the other hand, he abstained from the investigation of affinities between the mother-tongues, i.e., linguistic families, and denied any connections between them (*matricum vera inter se nulla cognatio est*).

See also: Classification of Languages; Language Families and Linguistic Diversity; Scaliger, Julius Caesar (1484–1558).

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Scaliger, Julius Caesar (1484–1558)

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© 2006 Elsevier Ltd. All rights reserved.

J. C. Scaliger was born in Riva, Italy, and died in Agen, France. He read medicine at Padua and practiced it in Agen. Scaliger is best known for *De causis linguae latinae* (1540). He criticized the earlier grammarians and turned to the Aristotelian doctrine of four causes (material, formal, efficient, and final) and the Aristotelian categories. He construed his theory and philosophy of language on the basis of the Aristotelian physical model of natural laws applicable to natural phenomena, arguing that grammar was science, not art. Furthermore, he argued that grammar had to explain the use of language, and that its goal was to speak correctly – *recte loqui*. In Scaliger, 'concept' (thought) and 'object' equaled 'word,' with concept being a *speculum intellectus* of reality. Scaliger returned to the Modistae grammars' way of thinking, in many instances, but without acknowledging it. His thought was centered upon a single language, Latin. By adopting a scientific approach, he rejected the interpretative scholarship of the humanists who were gaining control over his object of study, and he made language and logic the mainstay of debate until the 19th century. His contemporaries were astounded by the severe criticism he addressed to them and resisted his thinking. He conceptualized grammar on the basis of spoken usage of language, describing written grammars as a secondary accident – an innovation for the time. His was a grammar of words, mainly. He started with the smallest parts, letters – *partes indivisibiles* – as the building blocks in the construction of larger units, the parts of speech. He was one of the first to include phonetics into the study of language. He introduced the concept of degeneration or corruption in language use from his classical standpoint. *De causis linguae latinae* contains the following parts: letters and sounds, syllables, words, nouns, verbs, pronouns, participles, prepositions, adverbs, interjections, conjunctions, syntax, and general methodological issues. Syntax is a minor part, regarded as a part of '*usus*', speech, hence ancillary. His idea of the arbitrariness of the sign was Aristotelian in nature. To Scaliger, concepts were the same in all languages, and it was convention only that established the meanings of words. Scaliger examined the classification of pronouns, verb tenses, and etymology (as general derivation). He borrowed the grammatical terminology (or metalanguage) from the *Modistae*. He preferred the term '*essentia*' *(essence)* to 'substance'. Scaliger referred to the following sources: Aristotle, Galen and Averröes, and ancient grammarians, including Priscian, Varro, Victorinus, Nigidius, Aullus Gellius, Diomedes, Quintilian, and Linacre. He was a fierce critic of many scholars. For instance, he wrote against Erasmus in 1531. He had a controversial approach in his *Poetices libri* . . . in which he placed Virgil above Homer. His thoughts were not disregarded by scholars and were often approached critically, e.g., by B. Buonmattei, M. Luther, Justus G Schottel, C. F. de Vaugelas, and G. Vico and others. His son, Joseph Juste Scaliger, was a humanist and a distinguished linguist. J. C. Scaliger wrote a rather fanciful autobiographical account of his own life. He is remembered for both the sharpness in his critical appraisals and his superb intellectual capabilities.

See also: Etymology; Evolution of Phonetics and Phonology; Latin; Luther, Martin (1483–1546); Priscianus Caesariensis (d. ca. 530); Quintilian (ca. 30–98 A.D.); Scaliger, Joseph Justus (1540–1609); Schottelius, Justus Georg (1612–1676); Varro, Marcus Terentius (116–27 B.C.).

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Scandinavia: History of Linguistics

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This article focuses on the history of work on the Germanic languages of Scandinavia up to the turn of the 20th century. There was very little work of any significance produced prior to the 17th century. Two notable exceptions are the anonymous *First grammatical treatise* from mid-12th century Iceland and the 1586 *De Literis Libri Duo* by Jacob Madsen of Århus (1538–1586). The former, a highly subtle analysis of Icelandic phonology, stands at the beginning of a long and productive tradition of concern with orthographic reform in Scandinavia. The latter, an attempt to describe articulatory phonetics from a universal perspective, also exemplifies what would become a characteristically Scandinavian interest.

Much grammatical work of the 17th century was fueled by a patriotic desire to promote the national languages by demonstrating their richness. This is true, for example, of the 1651 *Grammaticæ Islandicæ Rudimenta* by Runólfur Jónsson (c. 1620–1654) and even more so of the work of the Danish 'Royal Philologist,' Peder Pedersen Syv (1631–1702). One of the results of this nationalist streak in grammar writing was the attempt to create a native set of grammatical terms to replace the Latinate terms, something we find in both Swedish and Danish grammars, and a task still occupying Scandinavian linguists two centuries later, most notably Rasmus Rask (1787–1832). While the 19th century may be regarded in the history of linguistics as *the* century of historical language work, 17th-century Scandinavian grammars exhibit a strong historical interest, as in the 1650 *Epitome descriptionis sueciæ, fenningiæ et subjectarum provinciarum* by Michaèl Wexionius Gyldenstolpe (1609–1670). Other Swedish scholars were occupied with work on Gothic (e.g., Georg Stiernhielm (1598–1672)) and the early history of the Scandinavian languages (e.g., Olof Verelius (1618–1682)).

The earliest grammars of Danish were reprinted in a six-volume set in the early 20th century (Bertelsen, 1915–1929). These are very mixed in terms of topics covered and of quality. *Introductio ad Lingvam Danicam* from around 1660 by Laurids Olufsen Kock (1634–1691), for example, is little more than a Latin grammar with Danish forms in the paradigms. The 1668 *Grammatica Danica* of Erik Eriksen Pontoppidan (1616–1678) is by contrast a substantial study of 426 pages, 100 of which cover syntax, and it was the first Danish grammar to accord syntax its proper place.

Two significant treatments of Icelandic appeared in the 18th century: *íslensk málfræði* by Jón Ólafsson of Grunnavík (1705–1779), from around 1737, and Jón Magnussón's (1662–1738) *Grammatica Islandica*. Although written in Latin, the latter work is the first description of Icelandic morphology on its own terms and is thus indicative of the greater sophistication of linguistic analysis in the 18th century.

The two questions dominating Swedish linguistic debate in the 18th century were standardization and lexical enrichment. The Swedish Academy of Science (Vetenskapsakademien) was founded in 1739, and it played an active role in the debate about the practical national linguistic questions that predominated at the time. In particular, it sanctioned the work of Abraham Magnusson Sahlstedt (1716–1776), whose prescriptive, usage-based *Swensk Grammatika* of 1769 was an admirably detached account of the structure of Swedish in an overheated climate. Unlike many of his contemporaries, he carefully distinguishes between the domains of the grammar and the lexicon. A theoretically more sophisticated grammar, praised by Noreen (1903), was the 1777 *Svenska Språket i Tal och Skrift* by Anders af Botin (1724–1790). The question of establishing a standard orthography dominated in Denmark too, although the

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Scandinavia: History of Linguistics

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summative work of Jens Pedersen Høysgaard (1698–1773) eclipsed the practical writings of linguists such as Peder Schulz (1691–1773). Høysgaard's 1747 *Accentuered og Raisonnered Grammatica* and its companion volume of 1752, the *Fuldstændig Dansk Syntax*, are patriotic and steeped in the principles of General Grammar, which proved popular in Scandinavia until well into the 19th century. These two volumes endure among the monuments of Danish linguistics. The General Grammar approach was found particularly fruitful in teaching grammars, notably the anonymous 1761 *Dansk Donat*, the work of Niels Lang Nissen (1771–1845).

Icelandic began to arouse greater interest in the 19th century, both within and outside Scandinavia—a result of both the Romantic view of non-standardized vernaculars and its historical and comparative approach to language study. The groundbreaking work here was *Vejledning til det islandske eller gamle Nordiske Sprog*, by Rasmus Rask (Rask, 1811), who was the first to "impose order on the description of the Icelandic sound system and morphology" (Kvaran, 1996: 126). The last part of this grammar deals with what Rask calls "the Faroese dialect," the first published description of the grammar of Faroese. Publication in 1861 of the brief *íslenzk málmyndalýsing* by Halldór Kristján Friðriksson (1819–1902) made it possible for the first time to teach Icelandic schoolchildren about the structure of their own language in that language.

In 19th–century Sweden, two grammars dominated the education system: the 1824 *Svensk Språklära* by Anders Fryxell (1795–1881) and the 1832 grammar of the same name by Carl Jonas Love Almqvist (1793–1866). Fryxell consciously maintained the six-case system of nouns inherited from Latin, which strikes us as a peculiarly naïve and outdated *modus operandi*. However, he had a practical pedagogical motivation, namely, that the system of Latin grammar was the most widely known, and so, again clearly in deference to the General Grammar system of language teaching, it made sense to him to persevere with that system in describing Swedish. Almqvist's grammar was much more up-to-date in style and content, and included historical and comparative observations along with even (in the 3rd edition of 1840) a chapter entitled, "On the tongues of the Swedish countryside or the provincial dialects." A potentially influential grammar was the anonymous *Svensk Språklära* of 1836, which was championed by the Swedish Academy. However, its slavish commitment to describing Swedish as if it were Latin soon meant opprobrium was heaped upon it.

In Denmark as in Sweden, the influential treatments of the language during the 19th century were those written for use in the schools rather than descriptive accounts in the service of standardization and enrichment. Søren Niclas Johan Bloch (1772–1862) taught Rask at Odense Cathedral School and wrote a Danish teaching grammar in 1808, which underwent a thorough revision that produced the *Fuldstændig dansk Sproglære* of 1817. This is an extensive phonology and morphology that represents the culmination of 18th-century Danish scholarship, and it is explicitly indebted to Høysgaard and other 18th-century scholars. The next major departure was the work of Hans Henrik Lefolii (1819–1908), whose principles of grammar study brought Danish teaching in line with the general direction of linguistic thinking in northern Europe. Lefolii focused on sentence structure rather than the parts of speech in isolation. He also took the view that a grammarian should take into account the spoken language and its varieties as well as the history and evolution of forms being used. By the end of the 19th century, a more modern and extensive grammar was called for, and a prize competition set up by the Ministry of Education was won in 1890 by Kristian Mathias Mikkelsen (1845–1924), who wrote four different versions that represented an ambitious and comprehensive attempt to provide for the study and teaching of Danish.

The final section of Rask (1811) on Faroese was not a description of Faroese as such, but rather ranked Faroese as one of the "Nordic subdialects" (p. xlvi). Serious work on Faroese was taken up in the 19th century by Venceslaus Ulricus Hammershaimb (1819–1909), a priest and patriotic Faroe-islander. He published a grammar of the language in 1854 that appeared in a revised, standardizing form in 1891. The anthology of which this grammar formed a part also included a series of phonetic transcriptions made by Jakob Jakobsen (1864–1918), who was also responsible for the Faroese-Danish dictionary in the volume. Hammershaimb and Jakobsen did not agree on the means of standardizing the language, but Hammershaimb's etymologizing approach was sanctioned in 1895 by a new language council, and his system has remained the standard for Faroese up to the present time, with only minor modifications.

When Norway gained independence from Denmark in 1814, the standard written language of the new nation was still Danish and would remain so until the second half of the century. However, a number of reform proposals were advanced during this period, and two of them were pursued in a serious and committed fashion. The first centered on the work of Ivar Aasen (1813–1896), who travelled around Norway, with public funding, to survey the lexical and grammatical forms evidenced by the dialects. His work resulted in a descriptive grammar in 1848 and a

more overtly standardizing grammar in 1864 that had the programmatic title, *Norsk Grammatik*. Aasen also produced a dictionary and samples of this new written variety (initially, *Landsmaal* and later renamed *Nynorsk*). The second proposal to be followed through was that associated with the Norwegianization work of Knud Knudsen (1812–1895), which involved the wholesale importation into Danish of more Norwegian-looking lexical and grammatical forms and which led to the variety initially called *Riksmaal* and later renamed *Bokmål*. The leading Norwegian linguist of the day, Johan Storm (1836–1920), found fault with both reform proposals – Aasen's for being unnatural and Knudsen's for being distasteful. Both received official backing, however, and despite a century of language planning to bring them together, both have now been left alone by Norwegian language policy makers and exist side by side.

Although inevitably limited and superficial, this article does serve to bring out some of the defining characteristics of Scandinavian concern for the Scandinavian languages. This is a history of reform of one sort or another, with the 19th-century Norwegian case simply being one rather extreme example in a linguistic area willing to engage with its languages.

See also: Danish; Faroe Islands: Language Situation; First Grammatical Treatise; Iceland: Language Situation; Madsen Aarhus, Jacob (1538–1586); Norwegian; Rask, Rasmus Kristian (1787–1832); Swedish.

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Scandinavian Lexicography

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Danish

The standard dictionary of ancient Danish is Otto Kalkar's *Ordbog til det ældre danske sprog* (*Dictionary of the ancient Danish language*). It was published between 1881 and 1918 in five volumes, including a supplement. Originally, it was planned that the dictionary would include only those words from the period 1300–1700 that were unintelligible to Kalkar's contemporaries, but the entries eventually included all documented words from these four centuries. Preparations for a new historical dictionary, *Gammeldansk ordbog* (*Dictionary of Old Danish*), began around 1950 and the editing process commenced at the end of the 1990s. This dictionary is based on documents covering the period 1100–1515 and will thus cover a whole surviving corpus of the medieval Danish language. In 2004, entries for the letter G were being edited. In Copenhagen, at the Arnamagnæan Institute, editing is underway for an 11-volume *Ordbog over det norrøne prosasprog* (*Dictionary of Old Norse prose*); this work will cover the vocabulary of medieval Icelandic-Norwegian prose literature and is intended to replace Johan Fritzner's 19th-century *Ordbog over det gamle norske sprog* (*Dictionary of the Old Norwegian language*) (see later, Norwegian). Definitions in the new work are given in both Danish and English. So far, two volumes (entries up to Da) have been published, and a dictionary word list is available on the Internet.

The major source of the Danish vocabulary is the 28-volume *Ordbog over det danske sprog* (*ODS*; *Dictionary of the Danish language*), published from 1918 to 1956 and subsequently reprinted three times in smaller format. Since 1956, work on the *ODS* has continued, with the aim of adding further information about the Danish language during the period from 1700 to 1955. This has resulted in five additional volumes, *Supplement til Ordbog over det danske sprog*. A successor to the historical *ODS* is *Den Danske Ordbog* (*The Danish Dictionary*), a six-volume dictionary of contemporary Danish.

Retskrivningsordbogen (*Dictionary of orthography*), edited by the Danish Language Board, gives official spellings and inflections. In addition to providing an alphabetical list of entries, it describes the official Danish orthographic rules. This dictionary is also available online. *Den Danske Netordbog* (*The Danish Internet Dictionary*), developed and maintained by the Centre for Lexicography at the Aarhus Business College, is available online to the general public. Dictionary entries consist of the entry form of the lemma and grammatical information; they may also contain explanations of meaning and usage, synonyms, antonyms, examples, collocations, idioms, locutions, derivations, and compounds.

The largest modern Danish etymological dictionary is *Politikens etymologisk ordbog* (*Politiken's etymological dictionary*, published in 2000). It gives the origins of ~20 000 words central to the Danish vocabulary as well as personal names and placenames. An earlier work (*Dansk etymologisk ordbog. Ordenes historie* (*Danish etymological dictionary. The history of words*)) was first published in 1966, and the fourth and last edition in 1989 contained about 12 000 entry words.

Dansk sprogbrug: en stil- og konstruktionsordbog (*Danish usage: a dictionary of style and constructions*) was published in a new and revised edition in 1995. It has 13 000 entry words and covers around 64 000 constructions, set phrases, and locutions. Stylistic information is occasionally provided. There are two main Danish pronouncing dictionaries, *Den store Danske udtaleordbog* (*The unabridged Danish pronouncing dictionary*, 1991) and *Dansk udtale* (*Danish pronunciation*, 1990).

Denmark got its first important dialect dictionary, *Bornholmsk ordbog* (*Bornholmian dictionary*), in 1908. Dictionaries covering two other major dialects, spoken in the islands (mainly Sealand, Lolland-Falster, and Funen) and Jutland, are now being edited. *Ømålsordbogen* (*Dialect dictionary of the Islands*) is planned in 15 volumes, with the first several volumes being published in 2004. The dialect dictionary for Jutland, *Jysk ordbog*, is published electronically on the Internet as the editing proceeds; the entries A–He were accessible by 2004.

Norwegian

Johan Fritzner's *Ordbog over det gamle norske sprog* (*Dictionary of the Old Norwegian language*), published in three volumes from 1886 to 1896, is still a major reference work in Old Norse philology; a fourth supplement volume was published in 1972. Another classic work, the one-volume *Norrøn ordbok* (*Old Norse dictionary*), with ~40 000 words, has come to be the standard dictionary of Old Norse in Scandinavia; this volume has been published in several revised and enlarged editions since the original publication, *Gamalnorsk ordbok* (*Old Norse dictionary*), first appeared in 1909.

The first major work of Norwegian lexicography was Ivar Aasen's pioneering *Ordbog over det norske folkesprog* (*Dictionary of Norwegian dialects*); first published in 1850, an enlarged and revised edition, with the more general title *Norsk ordbok* (*Norwegian dictionary*), was published in 1873. In both editions, Danish is the metalanguage. This dictionary, with its precise definitions and word localizations, formed the basis of the vocabulary of Landsmål (called Nynorsk since 1929), one of the two official languages of Norway. A supplement of 40 000 dialect words was published by Hans Ross in 1895.

The first major dictionary of Norwegian in the 20th century, *Norsk riksmålsordbok*, was published in four volumes from 1937 to 1957, with two supplemental volumes appearing in 1995. This work is a dictionary of the literary language or Riksmål (called Bokmål after 1929), which is the other official language of Norway. In 1930, the first steps were taken toward producing the most comprehensive Norwegian national dictionary ever. This project, *Norsk ordbok* (*Norwegian dictionary*), with the informative subtitle *Ordbok over det norske folkemålet og det nynorske skriftmålet* (*Dictionary of Norwegian dialects and the Nynorsk literary language*), is planned to be completed in 12 volumes in 2014 and to include ~300 000 words. As of 2005, five volumes have been published. The editorial decision to include both dialect and literary words is a unique feature. Much of the source material is available on the Internet, including the metadictionary, the complete card index, and the Nynorsk text corpus.

There are no standard dictionaries of Bokmål and Nynorsk that give official spellings and inflections, but numerous editions are examined and approved by the Norwegian Language Board. The most widely used general dictionary for Nynorsk is *Nynorskordboka* (third edition in 2001; 90 000 words). There is also a parallel edition, *Bokmålsordboka* (third edition in 2005; 65 000 words), for the users of Bokmål. Both dictionaries are available on the Internet. A controversy over Norwegian linguistics has promoted the publication of some Riksmål dictionaries with conservative spelling and inflectional variants not officially accepted; one of these works, *Norsk ordbok med 1000 illustrasjoner* (*Norwegian dictionary with 1000 illustrations*), has ~60 000 entries.

Standard etymological dictionaries published by Falk and Torp between 1903 and 1919 remained unrivalled until Bjorvand and Lindeman published *Våre arveord* in 2000; this work is a comprehensive collection of articles on the etymology of native words. The general acceptance of linguistic variation in Norway has resulted in few pronunciation dictionaries. One such dictionary for Bokmål, *Norsk uttaleordbok* (*Norwegian pronunciation dictionary*), was published in 1969.

Swedish

The vocabulary of medieval Swedish can be found in Knut Fredrik Söderwall's *Ordbok öfver Svenska Medeltids-språket* (*Dictionary of the medieval Swedish language*). This two-volume dictionary was first published in 1884–1918. Supplementary volume, *Supplement till Ordbok öfver svenska medeltidsspråket 1–2*, was published in 1925 and used in 1973. An electronic version of the two original volumes is available on the Internet.

The central project in Swedish lexicography is *Svenska Akademiens ordbok* (*The dictionary of the Swedish Academy*). Since the first volume appeared in 1898, 31 volumes have been published, covering approximately 436 000 entries, up to the entry *talkumera*. Articles contain information on pronunciation, definitions, and etymology. The dictionary is available on the Internet. *Svenska Akademiens ordlista* (*The wordlist of the Swedish Academy*) provides the unofficial norm for spelling and inflection in Swedish. The entries also give information on pronunciation, the structure of compound words, and the definitions of less common words. The 11th edition was published in 1998, with around 120 000 entries. This edition and two earlier ones are available on the Internet.

Svenska språknämndens uttalsordbok (*Pronouncing dictionary of the Swedish Language Board*), published in 2003, presents recommended standard pronunciations of 67 000 words in the central vocabulary of contemporary Swedish, as well as loanwords and technical words. In addition to transcriptions of the entry words based on International Phonetic Association standards, the articles give information on use and style. Another useful work, *Ordbok över konstruktioner och fraser* (*Dictionary of constructions and phrases*), also published in 2003, is edited by staff members at the Swedish Language Board. It covers grammatical constructions, more or less set phrases, and expressions and locutions in present-day Swedish. The dictionary contains approximately 85 000 constructions and more than 70 000 illustrating examples based on authentic texts.

There are two main Swedish etymological dictionaries, both first published in the 1930s. The most comprehensive work is Elof Hellquist's two-volume *Svensk etymologisk ordbok* (*Swedish etymological dictionary*); originally published in 1922, third edition in 1948. The first edition of Elias Wessén's *Våra ord: kortfattad etymologisk ordbok* (*Our words: Concise etymological dictionary*) was published in

1932; the second edition came out in 1973. Both dictionaries have been reprinted several times.

The most ambitious project among Swedish dialect dictionaries, *Ordbok över Sveriges dialekter* (*Dictionary of Sweden's dialects*), began in 1991. By 2004, the published material covered the entries A–back. The articles contain a pronunciation guide, definitions, and usage of the entry words, as well as occasional etymologies and literary references.

Swedish is the first language of approximately 6% of the population in Finland and has official status. There are some differences between Swedish in Finland and Swedish in Sweden, mainly in pronunciation, but also in vocabulary and grammar. *Finlandssvensk ordbok* (*Finno-Swedish dictionary;* third edition published in 2002) treats special Finno-Swedish words and phrases. *Ordbok över Finlands svenska folkmål* (*Dictionary of Finland's Swedish dialects*) is planned to be published in seven volumes. By 2004, three volumes had been published, covering the vocabulary up to 'kyss.'

Icelandic and Faroese

A comprehensive Old Icelandic-English dictionary was initiated by Richard Cleasby and was completed by Guðbrandur Vigfússon in 1874. A second edition with a supplement was published in 1957. The most widely used Icelandic dictionary today is *Íslensk orðabók* (*Icelandic dictionary*); reissued in 2000, this work has been revised and enlarged to contain 90 000 entries since the first edition appeared in 1963. The most recent and comprehensive Icelandic etymological dictionary is Ásgeir Blöndal Magnússon's *Íslensk orðsifjabók*, published in 1989, with 25 000 entries. The only comprehensive Faroese monolingual dictionary is *Føroysk orðabók* (published in 1998), with 65 600 entries.

See also: Danish; Denmark: Language Situation; Faroe Islands: Language Situation; Finnish Lexicography; Iceland: Language Situation; Norse and Icelandic; Norway: Language Situation; Norwegian; Sweden: Language Situation; Swedish.

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http://gagnasafn.is/g.aspx?dbid=2 – Íslensk orðabók.

Schank, Roger C. (b. 1946)

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Roger Schank is an innovative leader in artificial intelligence and narrative cognitive science.

He was born in New York City, son of Maxwell and Margaret (Rosenberg) Schank. His mother has remarked that she recognized his intelligence early because he taught himself to understand the calendar before he had learned to read. He received his B.S. (1966) degree from Carnegie Institute of Technology (now Carnegie Mellon University), and his M.A. (1967) and Ph.D. (1969) in linguistics from the University of Texas at Austin. He taught at Stanford University and Yale University, before joining the Northwestern University faculty, where he founded and directed its Institute for the Learning Sciences. He has headed several software development companies.

He has ranged prolifically over the field of artificial intelligence research and the application of cognitive models to education and business settings. Beginning

1932; the second edition came out in 1973. Both dictionaries have been reprinted several times.

The most ambitious project among Swedish dialect dictionaries, *Ordbok över Sveriges dialekter* (*Dictionary of Sweden's dialects*), began in 1991. By 2004, the published material covered the entries A–back. The articles contain a pronunciation guide, definitions, and usage of the entry words, as well as occasional etymologies and literary references.

Swedish is the first language of approximately 6% of the population in Finland and has official status. There are some differences between Swedish in Finland and Swedish in Sweden, mainly in pronunciation, but also in vocabulary and grammar. *Finlandssvensk ordbok* (*Finno-Swedish dictionary;* third edition published in 2002) treats special Finno-Swedish words and phrases. *Ordbok över Finlands svenska folkmål* (*Dictionary of Finland's Swedish dialects*) is planned to be published in seven volumes. By 2004, three volumes had been published, covering the vocabulary up to 'kyss.'

Icelandic and Faroese

A comprehensive Old Icelandic-English dictionary was initiated by Richard Cleasby and was completed by Guðbrandur Vigfússon in 1874. A second edition with a supplement was published in 1957. The most widely used Icelandic dictionary today is *Íslensk orðabók* (*Icelandic dictionary*); reissued in 2000, this work has been revised and enlarged to contain 90 000 entries since the first edition appeared in 1963. The most recent and comprehensive Icelandic etymological dictionary is Ásgeir Blöndal Magnússon's *Íslensk orðsifjabók*, published in 1989, with 25 000 entries. The only comprehensive Faroese monolingual dictionary is *Føroysk orðabók* (published in 1998), with 65 600 entries.

See also: Danish; Denmark: Language Situation; Faroe Islands: Language Situation; Finnish Lexicography; Iceland: Language Situation; Norse and Icelandic; Norway: Language Situation; Norwegian; Sweden: Language Situation; Swedish.

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with his collaboration with Robert Abelson on the application of the notion of 'script' (an ordered procedure for dealing with a type of situation) to cognitive functioning, he has productively explored a wide range of techniques for organizing induction and application of knowledge, including many suggestive, divergent strategies in training and education. He has emphasized a model of memory as episodic, organized around personal experience (rather than semantic categories). His model of learning emphasizes doing, risk-taking, and profiting from failure. He has contributed to narrative approaches, by emphasizing the role of stories in knowledge, through the formation and application of story indices and skeletons, both on individual and cultural (including linguistic) levels. He has described himself as a 'missionary,' who has learned "that you can change the world by getting people to be more open-minded." His daughter was skipped to the second grade because, when presented with a circle and asked to make a picture, she drew a moose (rather than the more usual human face).

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Schema Theory: Stylistic Applications

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From Scripts to Schemas

There have been several approaches in the recent history of linguistics to account in a principled way for the fact that meaningfulness is a product of both text and context. That is, meaning cannot be explored by an examination only of text and textual structures, but inevitably has to involve a discussion of the perceptions, selections, omissions, and enrichment provided by an observing consciousness. When linguistics as a discipline expanded exponentially in the middle of the 20th century, making claims for its scientific rigor as a rule-governed paradigm, structuralist and formalist linguists were understandably reticent to stray too far into psychology.

This is not to say that linguists have ignored the problem. Many semantic models – even thoroughly formalized ones – have included an element of the receiver's 'encyclopedic knowledge' as a means of explaining phenomena such as inferencing, perceived presupposition, implicature, and apparent leaps of intuition. The fact that text underdetermines the meanings that receivers experience is the simplest demonstration that this extraneous knowledge is being drawn upon to flesh out the bare bones of linguistic denotation. Bluntly, linguistic semantics alone cannot account properly for the richness of meaning.

The problem for linguistics in its rule-governed paradigm was establishing the principles that could explain which specific part of a receiver's potentially huge store of knowledge is drawn down on any particular occasion. The problem is even more acute for stylisticians interested in the operation of discourse in its social situation, and often concerned with how meaning is negotiated and developed beyond the text itself. It has long been recognized that language exhibits 'conceptual dependency': text underdetermines the meaning that it is intended to convey and that is actually derived from the utterance. Speakers and hearers rely on their shared assumptions, environment, and wider knowledge to convey a richness of communication without enumerating in excruciating detail every facet of the message. People tend only to be aware of this process in vague and intuitive terms.

One of the first theoretical developments to achieve some success was 'schema theory.' The idea that humans use a schematized representation of detailed experiences as a tool for negotiating similar experiences had a tradition going back to Kant, and the notion was operationalized in a series of experiments by Bartlett (1932) conducted in the early part of the century. However, modern schema theory arose out of experiments at the end of the 1960s, aiming towards creating artificial intelligence, and so arrived with appropriate scientific credentials to be accepted within linguistics. Machine intelligence researchers quickly realized that for computer-based minds to possess language, they needed to have a sense of a contextualizing world that would offer experiential connections between referents and processes. The artificial language user would need a limited set

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of knowledge, and a principled, programmable means of drawing down the appropriate elements of that set.

Early suggestions involved an extension of work in visual perception by, for example, Minsky (1975, 1986). The scene that a mind sees is far richer than the signals that the eyes see. Objects are foregrounded and backgrounded, common objects are treated conceptually as unitary features, the mind can understand that objects that disappear behind other objects maintain their conceptual integrity and will emerge when the occluding object has passed on. Relationships that are not actually seen are inferred and filled into the 'frame' of visual perception (Fillmore, 1985). The analogue of the frame in language is providing the artificial mind with a 'script': a predictable sequence of events with linguistic input.

The classic example is the 'restaurant script,' which maintains the rules of restaurant interaction. The restaurant script includes an inventory of commonly encountered objects, such as tables, cutlery, glassware, chairs, menus, wine lists, and their appropriate uses. It also includes objects such as the waiter, the chef, other diners, and sets of utterances they are likely to make. The restaurant script maintains the appropriate terms to be used, allows me to predict what the other person will say, and narrows down the possibilities for my replies. In short, the script represents a set of procedures that will allow me to get what I want.

Scripts are organized towards plans and goals, therefore. In fact, in the work of Schank and Abelson (1977), where the restaurant script first appeared, scripts are described as developing out of 'plans.' These are generalized conceptual procedures such as 'socializing,' 'engaging in a transaction,' or 'moving to a new location.' When a certain subtype of plan is repeated and becomes routine in experience, it becomes relatively fixed as a script. Plans and scripts arise in turn out of higher level 'goals,' which are very general aims and objectives carried by individuals, such as satisfaction goals, achievement goals, preservation goals, and so on. Plans and goals are the conceptual tools we use to negotiate new situations, and we adapt our existing scripts when we encounter situations that are similar but subtly different from recognized existing scripts.

In Schank's later work (1982a, 1982b, 1984, 1986), scripts, plans, goals, and their contents are regarded not as entirely fixed structures but are conceptualized as emerging from a process of assembly in the course of discourse processing. Their configuration is dynamic, responding to the environment at hand. Similarly, the detail of the script depends on the stylistic input as well as the particular experiential base of the receiver: in the restaurant script, for example, the recognition of a rude waiter or poor service will be identified largely by the politeness discourse used. In this way, the theory also encompasses pragmatic matters. As the notion of scripts became more dynamic and less fixed, and the notion was used by other researchers in stylistics and sociology, they came to be retermed 'schemas.' Schemas are what allow people to manage all situations that are familiar, not so familiar but similar to past experience, and unfamiliar but vaguely recognizable; they also offer a template for managing apparently alien and unexpected situations that can then be adapted and perceived in terms of existing knowledge. The rest of this article will use the terms 'scripts' and 'schemas' interchangeably to refer to the same phenomenon, though some linguists prefer to keep the sense that scripts are fixed and schemas are dynamic notions.

Operationalizing Schemas

So far, the notion of schemas is relatively uncontentious, since there is a mass of empirical as well as anecdotal and intuitive evidence that some sort of schematized understanding is a fundamental characteristic of human discourse processing. However, disagreement occurs as soon as the notion is 'operationalized': that is, rendered into a more detailed procedure that can actually be applied in analysis. This section will present the detail of schema theory's analytical framework, before going on to consider some complicating factors in the next section.

Clearly, individuals are not born with a ready-made set of schemas for their culture. These have to be learned either by experience or vicariously through teaching, mythology, or projected situations such as literary fiction, jokes, proverbs, and social rules. Later in life, schemas are built either by extending the detail in an existing schema, or by adapting several existing schemas to create a newly configured schema. In both cases, there is a question over where the first schema comes from, and it may be that human brains are 'hardwired' with the ability to schematize at the most abstract level, and life experience fills in those generalized frameworks with detailed and usable schematic knowledge (de Beaugrande, 1987; Spiro, 1982). The question of individual mental origins, however, remains debatable.

The fact that schemas accumulate complexity through life means that they become multifaceted. Restaurants can be encountered in a range of types: smart metropolitan cafe-bars; countryside pubs that serve food; corporate burger chains and fast-food trailers; Italian, Mexican, Thai, Chinese and French

restaurants – all with their different sets of elements and procedures for behaving appropriately. Rather than creating a new schema to deal with each of these subtypes, schema theory maintains that the basic schema has different 'tracks' through the schema. In other words, there are certain elements that are common to the restaurant schema (such as being served food prepared by someone else, sitting down, paying a bill or check) but different manifestations of these elements.

This existence of basic components does not mean, however, that schemas can be articulated in terms of a set of primitive elements that are core members of the schema. Even those previous few examples can be disrupted: there are restaurants in which you select and grill food yourself, there are restaurants in which you stand or kneel to eat, and there are restaurants operated by charitable organizations in which the diners do not pay, for example. This looseness of schema theory is partly handled by the notion of 'tracks' through basic schemas, but the difficulty of being able to formalize schematic elements could be seen as a problem.

Schemas like the restaurant example, that are defined by the location in which they take place, are 'situational' schemas. Drawing the appropriate schema into mental play in these cases is often a matter of being in the situation: it is self-evident that the restaurant schema is likely to be running if you walk into a restaurant. Other schemas depend on enacting social or individual roles: these are 'personal' schemas. We instantiate a personal schema in order to enact the role of being a passenger at an airline ticket desk, or to manage the appropriate conversation to have as a student, or to greet a potential business associate, for example. While personal schemas are of course also socially and culturally determined, there is a relatively greater degree of willful choice in performing a personal schema than in engaging in a situational schema.

Thirdly, 'instrumental' schemas maintain our knowledge of how to do things: switching on a room light, driving a car, being able to read, and so on. These schemas are intuitively regarded as skills that have been learned through life. Although situational and personal skills are also learned, most people have a sense that instrumental schemas represent useful knowledge. Situational schemas tend to be a matter of civilization and culture, and personal schemas tend to be a matter of personality and social adeptness.

Knowing exactly which schema to draw on in a particular circumstance is determined by recognizing certain 'headers' that are likely to instantiate the schema. The most obvious of these are 'internal conceptualization headers': references to elements, actions, or roles from inside the script and that are strongly associated with that schema are likely to activate the schema in general. If you are told a story that begins with someone ordering food from a waiter, the restaurant schema is highly likely to be drawn down immediately. The storyteller can then be fairly confident that the situation of the restaurant will be sufficiently rich in your head to be able to refer to elements in the restaurant without having to introduce them laboriously. Definite reference can be made ('the waiter arrived,' 'the food was cold,' 'the tip was generous') without you becoming confused ('oh, was there a waiter?,' 'what food?,' 'you didn't say you left a tip') and without the storyteller having to set out all of the objects in the situation ('there was a waiter,' 'some food was brought,' 'we left a tip'). Internal conceptualization headers are often the essential elements if the circumstance is being conveyed vicariously.

Clearly, in firsthand experience, you are much more likely to instantiate a particular schema during some preparatory period: it is rare that we come to consciousness already embedded in a situation, as we do in projected experiences like literary fiction. 'Precondition headers' are references that act as a precondition for the application of a script. Hearing someone say, 'I'm hungry,' and someone else adding 'I've just been paid,' the restaurant schema is likely to be drawn down. Alternatively, 'instrumental headers' such as, 'He booked a table over the telephone,' serve to highlight actions that are a means towards the realization of a restaurant script. Lastly, 'locale' headers that refer to the usual setting in which the schema applies are likely to instantiate the particular script.

These four types of headers are often combined, and in fact, it seems to be the case that at least two headers are required to get a schema up and running. Single headers ('I'm hungry') are not usually enough to instantiate the restaurant schema on their own ('I'm hungry, but I need to get on with this job'). If a schema is briefly brought to mind in this way, but then not developed further, this phenomenon is known as a 'fleeting script.' Similarly, there seems to be a factor of centrality or strength required in the header to activate a schema: prototypical elements of the restaurant script (waiters, menus, bills) are likely to be stronger headers than elements that are less prototypical or not exclusive to the restaurant script and are shared with other schemas (tables, plates, candles).

So far, the notion of the schema has been rather general. However, schema theory offers a sense of the schema as a rich conceptual environment. The framework includes a set of categories to operationalize the

detailed elements and processes involved in running a schema. There are various kinds of 'slots' that are associated with any particular script and are assumed to be in operation when the schema is running. These are 'props,' 'participants,' 'entry conditions,' 'results,' and the 'sequence of events.' The props of the restaurant schema consist of all the objects and paraphernalia that usually exist in a restaurant. The activation of the schema means that all these props are available for reference without preamble or laborious introduction, and in fact, our expectation of certain prototypial props is often so strong that a restaurant that lacks any of them is remarkable and requires explanation. A restaurant without tables, without a menu, or even without food would cause confusion unless there were some explicit reason given.

Similarly, schemas carry their cast list of characters in the form of expected 'participants.' There is no need to say, 'there was a waiter,' in the restaurant schema, since this core participant is already available for reference once the schema is running. In fact, 'self-service' restaurants are more likely to require that modifying explanation. So strong is the inventory of props and participants in a schema that the word 'but' in the following sentence seems entirely natural:

> We went into the restaurant but it was empty.

while the following sentence seems odd:

> We went into the restaurant but there were waiters and tables there.

Aside from the preparatory headers that instantiate a schema, the schema itself will often have a narrativized sequence that is normal and expected. The restaurant schema typically has 'entry conditions' involving walking into the restaurant, sitting down, and ordering food. Completing the restaurant schema has 'results' that are usually satisfaction, or food poisoning, or going home. And there is an expected 'sequence of events' within the narrative of the schema. Even nonsituational schemas (personal and instrumental scripts) possess typical props and participants, and are often conceptualized in narrative terms with opening, sequential, and resulting features.

Stylistic and Fictional Applications

It should be clear from the account above that schema theory can be used to provide a means of understanding everyday, commonly encountered experiences, where it offers an explanation for facts from human cognitive adaptability to the use of definite reference in specific circumstances. However, much daily interaction exhibits displaced discourse, in the sense that talk and writing can be about circumstances not here and now but past, imagined, hypothesized, occurring elsewhere, and drawing on the experience of other people. Fiction, in particular, offers a special case that challenges the capacity of schema theory, and literary stylisticians have tried to adapt schema theory into a schema poetics in order to address the cognitive problems of fictionality.

One problem for a schema poetics is that schema theory is based on commonality, whereas high quality literature tends to be based on uniqueness. That is, the ability to 'defamiliarize' the world and show it refreshed is sometimes regarded as the hallmark of good literature. Cook (1989, 1992, 1994) has developed a means within schema theory of accounting for this apparent discrepancy. He argues that most everyday discourse draws relatively straightforwardly on existing script knowledge, and is thus confirmatory and 'schema preserving.' In fact, common schemas are even reinforced in the process of being seen to work. He points to much advertising discourse that relies on stereotypical understanding as being schema reinforcing, however stylistically creative and apparently 'literary' it might seem.

By contrast, novel, startling, striking, or very moving literary works, it is argued, can potentially disrupt the reader's settled schematic worldview. Such experience offers a challenge to existing knowledge structures. One way in which these disruptions can be resolved is by 'schema accretion' (Rumelhart, 1975, 1980, 1984) – by the enlargement and complexification of the schema in question. In other words, existing schemas become richer either with a greater number of props and participants or by evolving more tracks through different narrative possibilities. This enriching is the experience of enhanced understanding arising from an encounter with a challenging discourse (such as, but not restricted to, literature). Alternatively, the reader of literature might experience a radical defamiliarization of their worldview, and is termed 'schema refreshment' (Cook, 1994) or 'tuning' (Rumelhart and Norman, 1978).

These uses of schema theory to discuss literariness distinguish between three types of schema occurrence: 'world schemas,' 'text schemas,' and 'language schemas' (Semino, 1997). World schemas are concerned with conceptual content, like the restaurant script discussed above. Text schemas represent the ways in which we expect to encounter these content-scripts in terms of their sequencing and structural organization. Our language schemas provide us with expectations of the appropriate linguistic and pragmatic features in which the world is articulated. The last two of these schema types – text and language schemas – constitute expectations about the discourse

patterning of experience. Crucially, they fill in the missing link of classical schema theory: the stylistic texture. Returning again to the restaurant schema, there are dozens of ways in which the restaurant manager might greet me at the door, but the world schema alone will not provide me with an expectation of what form of words might be used. However, the language schema I have associated with certain restaurant types will narrow down the possibilities, so that I will have my interactive toolkit of possible and appropriate utterances ready to go.

Disruptions in our expectations of sequence and style together constitute 'discourse deviation' (Cook, 1994), which will result either in confusion or, if resolved, will offer possibilities for schema refreshment. Schema theory thus offers the stylistician a neat way of connecting conceptual content with linguistic texture.

There are, of course, many questions that remain for schema poetics to answer. In focusing on the psychological processing of one of the participants, schema theory downplays the social and interactional aspects of discourse (see Edwards, 1997 for such criticism). For my schema to be efficient, my interlocutor must be running the same, or at least a very similar schema. Presumably this assumption must mean that they share my formative experiences. What happens if our respective experiences have been radically different? You might expect a waiter to have a much richer restaurant script than I do, yet I usually have little problem communicating in restaurants. Furthermore, my schema does not tell me exactly what the other person is going to say, though the extension of the theory into text and language schemas deals with this vagueness to some extent. Schema theory has a flavor of consensual social relations about it; what happens when interlocutors are being deliberately obstructive, obscure, or antagonistic?

Another question concerns the prospects for formalizing schema theory. Many schema poetic applications (Tsur, 1992: 207–243; Culpeper, 2001; and Cockcroft, 2003) suggest domains as schemas that are convincing in context but seem rather improvised or makeshift. In Culpeper's ingenious work on schema theory and characterization in Shakespeare, for example, he describes the effects of running a 'shrew schema' in a reading of the play *The taming of the shrew*. However, I'm not sure that I either have a shrew schema at all, or whether the poor shrew knowledge that I have might not be a track through a more general and imprecise rodent schema. Do I have a general 'play schema,' with a Shakespearean track, or in fact, do I have a 'Shakespeare schema,' or even a schema for individual plays? The last proposition seems unlikely, and in fact would rob schema theory of its claim to generalizability, but schema theory could do with a principled way of establishing which schemas are basic and which are superordinate and subordinate.

It might be argued (Stockwell, 2003) that the problems that remain in schema theory make it difficult to use as a sociolinguistic framework in which social and cultural factors, power asymmetries, and a principled set of fixed templates are needed to account for face-to-face interaction. However, many of the recent advances and innovations in schema theory have been developed by stylisticians in relation to the literary context, as a sort of schema poetics. In this context, the element of displacement between the discourse participants (most literary authors are dead and remote from their readers) leaves much of the foundations of schema theory intact. Schema poetics remains a convincing way of accounting for the fact that different readers produce different interpretations of the same text, while shared experience generates broadly shared readings.

See also: Cognitive Linguistics; Cognitive Science: Overview; Consciousness, Thought and Language; Context and Common Ground; Frame Analysis; Kant, Immanuel (1724–1804); Language of Thought; Narrative: Cognitive Approaches; Stylistics, Cognitive; Text World Theory.

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Scherer, Wilhelm (1841–1886)

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Although his life was relatively short, Wilhelm Scherer made substantial contributions to both Germanic linguistics and German literary studies. Scherer was born on April 26, 1841, in Schönborn, Austria. In 1858 he enrolled at the University of Vienna to study Germanic philology; in 1860, after clashing with one of his teachers, he left Vienna for Berlin, where he established a close relationship with Jacob Grimm and studied with a number of prominent scholars of the time. He made his first impression on the scholarly world when he collaborated with his Berlin teacher Karl Müllenhoff on an edition of early German prose and poetical texts (Müllenhoff and Scherer, 1864). Scherer was responsible for editing the prose texts and some of the poems; his work on this project was excellent, especially considering his youth and inexperience. His portion of this work earned him a doctorate (1862) and a *Habilitation* (1864), both from Vienna. In 1864 he also began his teaching career in Vienna, becoming *ordentlicher Professor* there in 1868. In 1872 he left Vienna for Strassburg, joining the faculty of the newly established German university there. (Schmidt, 1887 suggests that this change was at least partially motivated by Scherer's intense feeling of German nationalism.) Scherer taught in Strassburg for five years before accepting a position at the Humboldt University in Berlin, where he remained until his death in August of 1886.

Scherer's contributions to *Germanistik* are manifold. He contributed significantly to biographical studies, preparing biographies of his friend Jacob Grimm and his teacher Karl Müllenhoff, as well as various shorter biographical sketches. (A planned biography of Goethe was unfortunately never completed.) Scherer also published substantially on German literature; his contributions to this field include his early work with Müllenhoff cited previously, as well as books on medieval German poetry and the history of German literature (Scherer, 1875, 1880–1883). His main contribution to Germanic linguistics is his *Geschichte der deutschen Sprache* (Scherer, 1868). While this book was not universally applauded when originally published, it remains a landmark in Germanic linguistics. Scherer also prepared new editions of Jacob Grimm's *Deutsche Grammatik*, accompanied by detailed prefaces (e.g., Grimm, 1869), and published a number of shorter essays and reviews on linguistic topics. The newest edition of Scherer's most famous book (Scherer, 1995) should help to maintain awareness of Scherer's work.

See also: Grimm, Jacob Ludwig Carl (1785–1863).

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Schizophrenia and Language

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Overview of Language Deficits

Schizophrenia is a psychiatric disorder that affects approximately 1% of the population worldwide. Symptoms typically involve an array of perceptual, emotional, and cognitive impairments, including language. The term 'disorganized speech' has been used to describe a broad range of abnormal verbal communication behaviors observed in patients with schizophrenia. Many clinical researchers view such language deficits as a reflection of thought disturbance and, consequently, as a formal thought disorder (FTD). The expression of speech is not impaired, as in aphasia. Rather, a patient's speech is thought to represent an underlying disorganized thought process in which loose associations are woven into the conversation (see Critchley, 1964). The issue of whether language impairment in schizophrenia reflects an underlying disruption in thought processes or is a true disorder of speech is open to debate (see Chaika, 1982). It is nevertheless uncontroversial that linguistic disturbances in schizophrenic speech follow a general pattern of anomalies that are related to the presence of FTD. Therefore, this article discusses linguistic processing deficits in schizophrenia within the context of thought disorder.

Formal thought disorder is divided into positive and negative types. Positive FTD is associated with speech that is fluent and detailed; however, communication of ideas is poor. In contrast, negative FTD reflects an impoverished thought process in which speech is nonfluent or barren of content. The primary symptoms of FTD have been defined by Andreasen (1979) and are outlined in **Table 1**. This classification system has become a standard tool for characterizing language deficits in many psychiatric disorders.

Clinical Observations

Clinicians identify language deficits in schizophrenia through verbal communication with the patient. When FTD is present, the listener may find the dialogue hard to follow. Sometimes the direction of a patient's conversation dissolves as ideas become obliquely related. For example, a patient may start speaking on a particular topic but quickly digress to an irrelevant topic. Alternatively, a patient may answer a question at length in a seemingly normal manner, yet the response itself provides little substantive information. An interesting feature of disorganized speech, however, is that the syntactic and grammatical components of language remain intact, with the exception of relatively rare instances in which patients exhibit extreme incoherence. More commonly, it is the connection between sentences, rather than within sentences, that loses cohesiveness (**Figure 1**).

Behavioral Studies

Direct tests of language production allow researchers to delineate specific components of language that are disrupted. Thought-disordered speech, therefore, may be examined at the level of discourse, semantics, syntax, or phonology. The following sections discuss linguistic impairments at each of these levels in turn.

Discourse

When a patient with thought disorder speaks continuously and without interruption, he or she fails to maintain a sense of semantic cohesiveness throughout the conversation. Researchers have examined this phenomenon by quantifying errors and anomalies during uninterrupted speech. In some of the earliest systematic studies of discourse in schizophrenia, Rochester and Martin (1979) found that patients made an unusual number of reference errors; i.e.,

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Table 1 Primary symptoms of positive and negative formal thought disorder (FTD)

Speech impairment	*Definition*
Positive type	
Derailment	Responses that initially pertain to the topic at hand but gradually slide off track onto another topic that is unrelated
Tangentiality	Responses that are irrelevant and unrelated to the question
Circumstantiality	Long-winded speech that includes extraneous detail, although a logical conclusion is reached eventually
Distractible speech	Repeated and abrupt change of topic during speech in response to a nearby stimulus
Illogicality	Reasoning that is not based on logic or a clear rationale
Stilted speech	Excessively formal speech that may seem pretentious, outdated, or exceedingly proper
Pressure of speech	Rapid and spontaneous speech that may be difficult to interrupt, emphatic, and occur in the absence of prompting by social stimuli
Incoherence	Incomprehensible speech; sentences and word phrases may be lacking syntax, grammar, or semantic connectedness
Clanging	Word choice that is influenced by word sounds rather than semantic relations
Neologisms	Formation of novel words
Word approximations	Unconventional use of words; their new meaning may be understood within the context of conversation but seem peculiar
Negative type	
Poverty of speech	Restricted **amount** of speech; answers to questions contain the least number of words necessary to convey a message; responses are brief, concrete, and often monosyllabic
Poverty of content of speech	Restricted amount of information in speech; answers to questions may be adequate in length, but little substantive information is conveyed
Loss of goal	Failure to reach a conclusion; this behavior may coincide with derailment
Perseveration	Persistent return to words, phrases, or ideas throughout conversation
Echolalia	Repetition of words or phrases recently spoken by another; usually the repetitions reflect the concluding words of another's sentence or question (i.e., an 'echo')
Blocking	Interruption in speech that results from a loss of one's train of thought

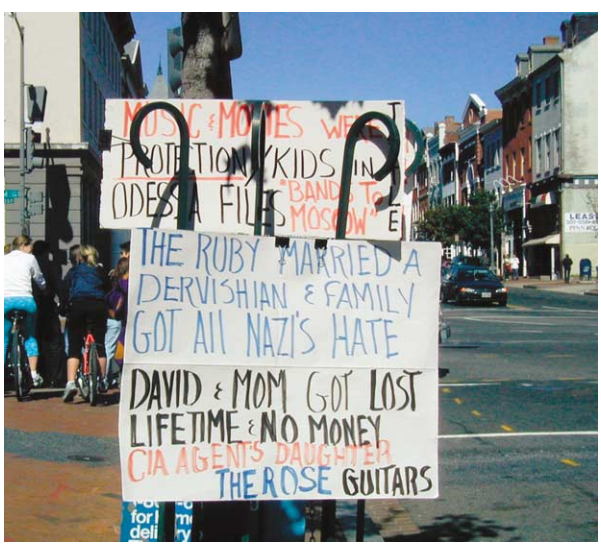

Figure 1 An example of extreme disorganized thought in which clipped ideas are merged to form seemingly random phrases. Photograph by Cherie Marvel.

they often failed to connect ideas to previously presented information. They also noted that schizophrenia patients produced longer pauses between sentence clauses and that these lengthy pauses were likely to be followed by a shift in topic.

It has been proposed that speech perception, in addition to speech production, is sometimes impaired in schizophrenia. According to patient accounts gathered by Lawson *et al.*, the problem stems not from an inability to perceive individual words, but from difficulties in tying several words together into a meaningful relationship. For example, one patient explained:

> I can concentrate quite well in what people are saying if they talk simply. It's when they go on into long sentences that I lose the meanings. It just becomes a lot of words that I would need to string together to make sense. (1964: 375)

Semantics

Studies have suggested that difficulties in speech processing in schizophrenia are related to an inability to understand how words are used in context. For example, when tested on pragmatic violations of noun–verb relationships (e.g., *buried* the guitar), thought-disordered patients had difficulty recognizing the implausible noun–verb context (see Kuperberg *et al.*, 2000). Semantic processing deficits have also been demonstrated during tests of confrontation naming (see Barr *et al.*, 1989). When asked to name an object portrayed in a picture, patients with FTD responded with words that were semantically related to the object but nevertheless were incorrect (e.g., saying *microscope* in response to a drawing of a telescope).

Certain tests of semantic knowledge (e.g., priming) are based on a model of spreading semantic associative networks in the brain that become activated during the course of lexical processing. That is, when brain areas become responsive to features of a word, additional brain areas associated with that word are primed for activation. According to Spitzer (1997), FTD patients have an accelerated rate of spreading semantic activation, and this activation extends to nearby indirect association 'nodes' in the brain. This hyperactivation of word associates may lead to loose associations, to thought intrusions, and, ultimately, to obliquely related utterances in speech.

Syntax

There is moderate agreement in the literature that syntax is preserved in schizophrenia. Some instances of syntax errors, however, have been noted during free discourse in schizophrenia patients with severe FTD. 'Word salad' is a term used to describe a pattern of speech that lacks grammar and syntax to the point of incoherence. In a less severe condition, patients may simply omit conjunctions or articles ('and' or 'the') from sentences.

Phonology

Language processing ultimately relies on a fundamental ability to detect the most basic aspects of speech sounds, or phonemes. The detection of phonemes allows a listener to integrate sounds into meaningful words. Kasai *et al.* (2002) used electrophysiological recordings of brain waves in order to record how the brain responds when hearing a sequence of phonemes. Compared to the behavioral responses from controls, patients showed a reduction in the magnitude of electrophysiological responses to changes in phoneme sequences, suggesting that language processing deficits in schizophrenia may begin with a fundamental inability to analyze individual speech sounds. Moreover, patients have consistently shown deficits on cognitive tests that rely on word sounds, such as verbal letter fluency (see Goldberg *et al.*, 1993).

Phonological processing deficits also can be observed in perseveration of phonemes, a term known clinically as 'clanging.' As described by Andreasen (1979), clanging represents a pattern of speech in which the choice of words is governed by sounds rather than semantics. For example, during a test of object naming, a patient who saw a picture of an octopus subsequently responded to a picture of a cactus with *octatoos* and then *captus* (see Barr *et al.*, 1989). Sometimes clanging occurs in the form of rhyming words. Alternatively, there may be a play on homonyms that results in a new direction of conversation: "I'm not making sense [cents] anymore. I have to make dollars" (Andreasen, 1979: 1320).

Neuropathology of Language Deficits

Structural Brain Imaging

A recent review of magnetic resonance imaging findings in schizophrenia found consistent reports of reduced volume in the left superior temporal gyrus (STG), a region important for language and communication (see Shenton *et al.*, 2001). Moreover, smaller left STG volume for patients was inversely correlated with severity of thought disorder. In a majority of the healthy population, the volume of a specific area of the brain that surrounds the posterior STG, known as the planum temporale (PT), is greater on the left than the right side of the brain. This hemispheric asymmetry is **reversed** in schizophrenia, such that patients tend to have larger PT volume on the right side of the brain instead of the left (see Shenton *et al.*, 1992, 2001).

Functional Brain Imaging

Functional brain imaging has produced results that are consistent with the morphometric findings described above. Increased blood flow during language processing is normally higher in the left STG than in the right STG. For patients, however, brain activations show the opposite pattern: greater blood flow is found in the right STG (see Kircher *et al.*, 2002). In addition, the patients' increased activation in the right STG has been correlated with the severity of positive thought disorder.

Less consistent findings have been reported regarding the frontal lobe. Healthy subjects generally show increased activation in the left frontal lobe during tests of word generation. Yet some studies in schizophrenia have reported reduced frontal lobe activation during verbal fluency (see Yurgelun-Todd *et al.*, 1996), whereas other studies have reported no patient activation deficits in this brain region (see Frith *et al.*, 1995).

Cerebellar structural and functional abnormalities in schizophrenia have led to the hypothesis that the cerebellum represents one node within a disrupted fronto-cerebellar system that underlies a variety of cognitive deficits, including language (see Marvel *et al.*, 2004). Neuroimaging studies have reported that increased volume (see Levitt *et al.*, 1999) and blood flow (see Kircher *et al.*, 2001) of the cerebellar vermis, as with the right STG, correlate to a greater severity in symptoms of positive thought disorder.

Summary

Patients with schizophrenia show a variety of linguistic processing deficits that become evident during verbal and written language production. Researchers and clinicians have examined impairments behaviorally at the level of discourse, semantics, syntax, and phonology. A dysfunction at the very early stage of phonological processing may contribute to disruption at higher-order levels of language. Recent advances in neuroimaging have provided new insight into the neural underpinnings of impaired linguistic processing in schizophrenia. Most notably, patients demonstrate a reversal of lateralized asymmetry in which the STG on the right side of the brain tends to be larger and more active than that on the left, a phenomenon that is opposite from what has been found in the healthy population. A disruption in functional circuits that include the frontal lobe and cerebellum also has been implicated.

See also: Anatomical Asymmetries versus Variability of Language Areas of the Brain; fMRI Studies of Language; Imaging Brain Lateralization: Words, Sentences, and Influencing Factors in Healthy, Pathological, and Special Populations; Psychosis and Language.

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include Armenian among those belonging to the Indo–European language family, but in view of the material he had at his disposal, he made a great number of important observations that were borne out by subsequent generations of historical linguists. Schlegel undoubtedly deserves a place among the 'founding fathers' of comparative Indo–European grammar, and not only as an interesting 'philological instigator' (see Klin, 1967).

See also: Ascoli, Graziadio Isaia (1829–1907); Bopp, Franz (1791–1867); German; Greenberg, Joseph H. (1915–2001); Grimm, Jacob Ludwig Carl (1785–1863); Herder, Johann Gottfried (1744–1803); Humboldt, Wilhelm von (1767–1835); India: Language Situation; Jones, William, Sir (1746–1794); Persian, Modern; Persian, Old; Sanskrit; Sapir, Edward (1884–1939); Schlegel, August Wilhelm von (1767–1845); Schuchardt, Hugo (1842–1927); Steinthal, Heymann (1823–1899).

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Schlegel, August Wilhelm von (1767–1845)

K Grotsch

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Schlegel, August Wilhelm [from 1815:] von, writer, literary critic, translator, philologist, and student of the Sanskrit language and its literature, elder brother of Friedrich Schlegel (*see* **Schlegel, Friedrich von (1772–1829)**, was born in Hanover (Germany) on September 5, 1767. He studied theology and philosophy at the University of Göttingen, where he was mainly influenced by the philologist C. G. Heyne and the poet G. A. Bürger. Between 1791 and 1795 he was a tutor in Amsterdam. From 1798 he was associate professor at the University of Jena. He moved to Berlin, where he delivered courses of private lectures on literary history (1801–1804). From 1804 till her death in 1817 he was secretary, traveling companion, and literary adviser to Madame de Staël (Anne Louise Germaine de Staël-Holstein, 1766–1817). In 1818 he was appointed professor of the history of art and literature at the University of Bonn, where he established Indic studies, thus becoming the founder of Indic philology in Germany. He died in Bonn on May 12, 1845.

Schlegel was a prominent member of the Romantic movement in Germany and succeeded in transforming the genuine romantic interest in foreign cultures, languages, and literatures, into a systematic scientific approach. He produced excellent translations of Italian and Spanish authors and of the dramas of Shakespeare (in a project later continued by L. Tieck and Tieck's daughter Dorothea). His most influential contributions to the study of language lay in the fields of language typology and reflections on method. As early as 1798 he pointed out the difference between analytical and synthetic languages (Schlegel, 1798: 60 ff.; cf. Schlegel, 1818: 16). By coining the term

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See also: Schlegel, Friedrich von (1772–1829).

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Schleicher, August (1821–1868)

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Schleicher (see **Figure 1**), an Indo–Europeanist and Slavist, was born on February 19, 1821 in Meiningen, Germany, and died on December 6, 1868 in Jena. He

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enrolled in the fall of 1840 at the University of Leipzig to study theology, but moved in the spring of 1841 to Tübingen to study theology, philosophy, and Semitic languages with Heinrich Ewald. He abandoned theology two years later to enroll at the University of Bonn, where he studied, among other things, classics with Friedrich Ritschl, oriental languages with Christian Lassen, and German dialects with Friedrich Diez (*see* **Diez, Friedrich (1794–1876)**). He completed his studies with a dissertation on Latin syntax, an examination for high school teaching, and a *venia legendi* for 'Indic language and literature and comparative grammar,' all between January and March 1846. From summer 1846 to early 1848 he taught at Bonn as a *Privatdozent*, adding Slavic to his research interests. He involved himself in the revolutionary movements of 1848–1849, acting as a journalist in various European capitals, especially in Prague, where he learned Czech from a young native, Alois Vaniček, who later became one of his students. He returned to Bonn late in 1849, where his continued work on Slavic languages led, in March 1850, to the offer of an extraordinary professorship, first for classical philology, subsequently for comparative linguistics and Sanskrit, at the University of Prague, where, in 1853 he became a full professor, with German linguistics added to his subjects. There Georg Curtius (*see*

Schlegel, Friedrich von (1772–1829)

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Schlegel was born in Hanover on March 10, 1772, and died in Dresden on January 12, 1829. In the annals of linguistic science he is usually accorded only a minor role. His strong involvement in the Romantic movement and his literary production may explain why he is usually seen as a poet and literary critic, and hardly ever as a linguist. It is true that his interest in Oriental studies had originally been aroused by translations from Sanskrit and Persian literature. The book he wrote during 1805 and 1807 and for which he became famous, *Ueber die Sprache und Weisheit der Indier*, contains chapters of approximately equal length on the philosophy and theology (Schlegel, 1808: 89–153) and on the '*historische Ideen*' concerning India (ibid. 157–230), with translations of Indian poetry into German (ibid. 231–324). Yet there is no doubt that the first part on language ('*Von der Sprache*,' 1–86) attracted the most enduring interest among his contemporaries. The fact that the King of Bavaria granted two of his subjects, Othmar Frank and Franz Bopp (*see* **Bopp, Franz (1791–1867)**), scholarships to pursue the study of Persian and Sanskrit in Paris a few years later may serve as an indication of the importance that was soon attached to Oriental studies, and this largely as a result of Schlegel's book. His importance in the history of linguistic science rests on this one work; it appears, however, that once the year 1816, the date of Bopp's *Conjugationssystem*, had been chosen by historians as marking the beginning of linguistics, Schlegel's book was only mentioned as precursory. It was no longer read, although the so-called founding fathers of comparative–historical philology, Bopp (*see* **Bopp, Franz (1791–1867)**), Rask (see *Rask*, *Rasmus Kristian*), and Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**), acknowledged their indebtedness to his work. Schlegel is traditionally credited with the first use of the term '*vergleichende Grammatik*.' However, others, like J. S. Vater, had used it in 1801, and the elder Schlegel, August Wilhelm (*see* **Schlegel, August Wilhelm von (1767–1845)**), used it in 1803 before his brother. But it is clear from Friedrich Schlegel's book (p. 28) that he had been inspired by the example of Blumenbach and Cuvier's Comparative Anatomy. By today's standards, Schlegel had a checkered career; following the study of law in Göttingen and Leipzig, he soon turned to literature as his main occupation, circulating among the Romantics as well as the people at the Court of Weimar, notably Goethe, Schiller, and Herder (*see* **Herder, Johann Gottfried (1744–1803)**), who was largely responsible for creating the general climate of the time that expected new and profound ideas to come from the East ('*ex Oriente lux*'). Schlegel's exposure to the writings of Sir William Jones (*see* **Jones, William, Sir (1746–1794)**) led him to travel to Paris, where Persian, Arabic, and other Oriental languages were taught. He was introduced to Persian by Antoine Léonard de Chézy soon after his arrival in 1802, and familiarized himself with the ancient language of India through Alexander Hamilton, from whom he took private lessons during 1803 and 1804. He copied Sanskrit manuscripts and translated literary texts; for a living, he gave lectures on German literature and philosophy.

Ueber die Sprache und Weisheit der Indier was important for the development of comparative–historical as well as typological linguistics in the 19th century. Schlegel's suggestion to compare grammatical features in order to establish genetic relationships, though not entirely new, was influential. For instance, his suggestion to investigate the conjugation system of Sanskrit in comparison with all the languages thought to be related to it led Bopp to his first work; his evolutionary view of language paved the way for Grimm's emphasis on the historical treatment of language, and his classification of languages according to morphological structure initiated an entire research program. This went from Wilhelm von Humboldt (*see* **Humboldt, Wilhelm von (1767–1835)**) to Steinthal (*see* **Steinthal, Heymann (1823–1899)**) to Sapir (see *Sapir*, *Edward*), to Greenberg (*see* **Greenberg, Joseph H. (1915–2001)**), and beyond, especially after his brother August had introduced the synthetic/analytic distinction in his 1818 essay on the history of the Romance languages. Timpanaro (1972: 77) pointed out that when Schlegel discussed at length questions of change and language mixture, he anticipated substratum theory, usually associated with Ascoli (*see* **Ascoli, Graziadio Isaia (1829–1907)**), Schuchardt (*see* **Schuchardt, Hugo (1842–1927)**), and others at the end of the 19th century. Schlegel maintained that language contact and the resulting borrowings made it difficult at times to identify all 'Sanskritic' languages, making it necessary to consider what we may call the external history of a given language, in addition to submitting it to close morphological analysis. In discussing linguistic contamination and the question of language descent, Schlegel drew particular attention to Armenian, in which he found many similarities with Latin, Greek, Persian, and German roots, and to agreements in grammatical structure. He was not quite ready to

include Armenian among those belonging to the Indo–European language family, but in view of the material he had at his disposal, he made a great number of important observations that were borne out by subsequent generations of historical linguists. Schlegel undoubtedly deserves a place among the 'founding fathers' of comparative Indo–European grammar, and not only as an interesting 'philological instigator' (see Klin, 1967).

See also: Ascoli, Graziadio Isaia (1829–1907); Bopp, Franz (1791–1867); German; Greenberg, Joseph H. (1915–2001); Grimm, Jacob Ludwig Carl (1785–1863); Herder, Johann Gottfried (1744–1803); Humboldt, Wilhelm von (1767–1835); India: Language Situation; Jones, William, Sir (1746–1794); Persian, Modern; Persian, Old; Sanskrit; Sapir, Edward (1884–1939); Schlegel, August Wilhelm von (1767–1845); Schuchardt, Hugo (1842–1927); Steinthal, Heymann (1823–1899).

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Schlegel, August Wilhelm von (1767–1845)

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Schlegel, August Wilhelm [from 1815:] von, writer, literary critic, translator, philologist, and student of the Sanskrit language and its literature, elder brother of Friedrich Schlegel (*see* **Schlegel, Friedrich von (1772–1829)**, was born in Hanover (Germany) on September 5, 1767. He studied theology and philosophy at the University of Göttingen, where he was mainly influenced by the philologist C. G. Heyne and the poet G. A. Bürger. Between 1791 and 1795 he was a tutor in Amsterdam. From 1798 he was associate professor at the University of Jena. He moved to Berlin, where he delivered courses of private lectures on literary history (1801–1804). From 1804 till her death in 1817 he was secretary, traveling companion, and literary adviser to Madame de Staël (Anne Louise Germaine de Staël-Holstein, 1766–1817). In 1818 he was appointed professor of the history of art and literature at the University of Bonn, where he established Indic studies, thus becoming the founder of Indic philology in Germany. He died in Bonn on May 12, 1845.

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Curtius, Georg (1820–1885)) was his colleague. In 1857, after difficult years (Schleicher, a foreigner, a Protestant, and a man of integrity and honesty engaged in matters concerning political freedom and justice, was subjected to various indignities at the hand of the Austrian authorities and misguided Czech nationalists), he was glad to accept a lesser position at the University in Jena, where he remained as an *ordentlicher Honorarprofessor* for comparative linguistics and German philology, despite offers from Warsaw and the Academy of St Petersburg (both in 1862) and Dorpat (in 1863), until his premature death at the age of 47 years.

Contrary to widespread belief, Schleicher's views on language and linguistics were fixed early in his career. Shortly after the publication of his first book, *Zur vergleichenden Sprachengeschichte* (1848), Schleicher worked out a naturalistic conception of language and a research program inspired by Hegelian philosophy and the exact analytical methods of the natural sciences, in particular, botany and geology. His second book (Schleicher, 1850) documents this turn to a natural science conception of linguistics very well. In his *Die Deutsche Sprache* (1860) and several other subsequent publications, he repeated almost verbatim what he had first pronounced in the 1850 book. Significantly, he published his first *Stammbäume* (genealogical trees) in 1853, six years before the publication of Darwin's *Origin of Species*, and in 1859 he introduced the term '*Morphologie*' into linguistic nomenclature.

Schleicher was the most distinguished Indo–Europeanist of his generation and an accomplished synthesizer of the accumulated linguistic knowledge of his time, as may be gathered from the various editions of his *Compendium* (1861–1862). Although he was not the first to use the asterisk, it was he who developed the method of reconstruction in comparative linguistics on which subsequent generations built. His famous story written in Indo–European was not 'a joke' (as Delbrück held in 1880; *see also* **Delbrück, Berthold (1842–1922)**) but a demonstration of the comparative method. In the fields of Baltic and Slavic as well as dialectology and the study of child language (1861) he was innovative; his synthesis of Indo–European phonology and morphology in the *Compendium* served as a model for subsequent research, especially Brugmann and Delbrück's *Grundriss* (1886–1916). Schleicher is nowadays best known for his Darwinian essays (e.g., 1863), although these are in fact his weakest works. His most distinguished students were Jan Baudouin de Courtenay, August Leskien (*see* **Leskien, August (1840–1916)**), Johannes Schmidt (*see* **Schmidt, Johannes (1843–1901)**), and Hugo Schuchardt (**Schuchardt, Hugo (1842–1927)**).

See also: Curtius, Georg (1820–1885); Delbrück, Berthold (1842–1922); Diez, Friedrich (1794–1876); Leskien, August (1840–1916); Schmidt, Johannes (1843–1901); Schuchardt, Hugo (1842–1927).

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Brigitte Schlieben-Lange, who died on September 14, 2000, after a short period of serious illness, was one of the first women to obtain a chair of Romance Philology in the German-speaking academic world (1974, at Frankfurt University). She studied Romance and Germanic philology, general linguistics, and philosophy in Munich, Aix-en-Provence, Marseille, and Tübingen. She felt especially attracted by Eugenio Coseriu's general linguistics, with its focus on Romance materials. In 1970 she received her Ph.D. in Tübingen, under the supervision of Coseriu. Early on in her career she focused on the languages that mark the transition between Gallo–Romance and Ibero-Romance, viz. Occitan and Catalan (1971a, 1971b); in her subsequent academic teaching and research (from 1974 to 1991 in Frankfurt, from 1991 on in Tübingen) she most often worked on the national languages French, Spanish, and Italian, while in the late 1990s she devoted her efforts to the study of Brazilian Portuguese.

Schlieben-Lange's interests were hardly in descriptive grammar and lexicology; her focus was – through a fruitful integration of linguistic theory, the study of literature and culture, and text-oriented language history – on sociolinguistic aspects. She was especially interested in language standardization, codification, and revitalization, in problems of intrasocietal and intercultural communication, in the relationship between oral and written culture, and in the history of 'traditions of speaking,' a concept which she developed (1983) and which shows much more affinity to continental discourse analysis (from a sociological point of view) than to Anglo–American ethnography of speaking. She wrote textbooks on sociolinguistics and pragmatics (1973, 1975), which have become standard references in the German-speaking world. The overall frame for her sociolinguistic and pragmatic studies was language history, viewed as the complex reconstructed history of language planning and development, descriptive linguistic work, linguistic theorizing, and traditions of speaking and writing.

Brigitte Schlieben-Lange was well at home in the study of the early periods of Romance languages and language study, but her favorite period was the turn from the 18th to the 19th century. She was a specialist of the lexicographical production during the French revolutionary period (1981, 2000) and of the diffusion of the linguistic and philosophical ideas of the French *idéologues* (a topic on which she directed a wide-spanning research project, 1989–1994). She not only contributed important insights to Romance sociolinguistics and language history and to the study of orality and 'scriptural culture and codification' (*Schriftlichkeit*; *Verschriftung*), but she also played an important role in the academic emancipation of female linguists, was co-editor of two journals (*Zeitschrift für Literaturwissenschaft und Linguistik*; *Zeitschrift für Katalanistik*), and was editor of important collective volumes on writing processes (1987, 1997), textual culture (1995), and (linguistic) alterity (1998).

See also: Coseriu, Eugenio (1921–2002); Orality; Romance Languages.

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Schmeller, Johann Andreas (1785–1852)

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Johann Andreas Schmeller was born in Tirschenreuth, north Bavaria, close to the Czech border, but grew up in a small village north of Munich. At his grammar school in Munich, he became familiar with the ideas of the Enlightenment (Leibniz) and of the Swiss educational reformer Pestalozzi. Since he could not afford university studies and Schmeller failed to find a publisher for his first booklet of 1803 (Schmeller, 1803), he walked to Switzerland hoping that Pestalozzi could help him and would appoint him as a teacher. This failed, and he joined the Swiss military in Spanish services. Performing Pestalozzi's principles, he taught languages at military schools in Tarragona and Madrid, and, finally, at a private teaching institute in Basle (1806–1813). In 1814, he joined a Bavarian military brigade at the rank of a first lieutenant. In 1816, the Bavarian Academy of Science asked him to make a Bavarian dialect dictionary. He had already seen parts of Franz Joseph Stalder's Swiss dialect dictionary by 1806 (Stalder, 1806–1812), from which he drew inspiration. He also had consulted a copy of Stalder's dictionary, Leonz Füglistaller, in St. Gallen (cf. Brunner, 1997: 13).

As a consequence of his Bavarian dialect grammar (1821), he was appointed member of the Academy in 1823; in 1827, he was honored with a doctoral degree, and in 1828, he received the title of an extraordinary professor for Old German Literature and Language at Munich university. As curator of the Royal Court and State Library (1829), he finally was free of all financial worries; he quit military and private teaching. His new activity was to systematize about 25 000 handwritten documents confiscated when 150 monasteries were secularized in 1803, but he also continued publishing. His career culminated when he was appointment full professor in 1846. Schmeller died of cholera in 1852.

As an introduction to the Bavarian dialect dictionary, Schmeller had planned a chapter on phonetics. But this was extended to a complete grammar, published in 1821. In accordance with the ideas set out in writing in 1803 (Schmeller, 1803), Schmeller invented his own phonetic alphabet. To a certain extent influenced by Jacob Grimm's *Deutsche Grammatik* [German grammar] (1st ed. 1819), Schmeller changed his early conception dating from 1818 (Naumann, 1988: 84). His method of description was both synchronic-comparative (*dialect–dialect*/'*Standard*'), and somewhat historical-comparative. Both grammar and dictionary comprised non-Bavarian dialects within the Bavarian kingdom.

Schmeller used three types of information: (a) written documents, (b) spoken language won through a network of informants of whom each was responsible for a certain area—a method that was worthy of imitation, and (c) his own explorations. (For the influence of Leibniz, see Wolf, 1988: 37; for the arrangement of the dictionary, *see* **Dialects: Early European Studies**).

Schmeller was very versatile: 70 printed and 22 unprinted publications were listed by Brunner (1997). The most important ones were the *Bavarian dialect grammar* (1821), the *Bavarian dialect dictionary* (4 vols. 1827–1837), the grammar and, posthumous 1855, the dictionary of the 'Cimbri' (Schmeller, 1984) (i.e., of Bavarian dialects near Vicenza/Verona, Italy). This way, Schmeller was the founder of German dialectology and of onomastics, mostly integrated in the Bavarian dialect dictionary (see Bauer, 1985). Next to the Grimm brothers and Karl Lachmann, Schmeller was a famous editor of medieval texts, e.g., of *Heliand* 1830, *Muspilli* 1832, *Tatian* 1841, *Carmina Burana* 1847. Finally, he was one of the founders of Albanology and of Czech linguistics. To place Schmeller in the history of ideas, see Harnisch (2002).

See also: Dialects: Early European Studies; Grimm, Jacob Ludwig Carl (1785–1863); Leibniz, Gottfried Wilhelm (1646–1716).

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Schmidt, Johannes (1843–1901)

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Johannes Schmidt was one of the most prominent Indo-Europeanists of his era. Born on July 29, 1843 in Prenzlau (Prussia, northeastern Germany), he was orphaned at the age of eight and subsequently moved to the home of his uncle, the classical philologist and grammar school teacher K. E. A. Schmidt, in Stettin (now Szczecin, Poland). From 1860 he studied classical philology in Bonn under Friedrich Ritschl and from 1862 Indo-European languages in Jena under August Schleicher. In 1865 he obtained his doctoral degree in Jena, and in 1868 his *Habilitation* in Bonn, where he received a full professorship in 1873. The same year he was appointed to Graz (Austria), and in 1876 he received the prestigious Chair of Comparative Linguistics in Berlin, which until 1867 had been held by Franz Bopp. Schmidt stayed in Berlin until his death on July 4, 1901, after a lingering illness of several years. Paul Kretschmer, Wilhelm Meyer-Lübke, and Holger Pedersen are the most famous among his many pupils.

Schmidt was averse to all schematization, being instead a meticulous, data-oriented comparativist. His work (which displays a distinct interest in Slavic, Germanic, and most of all Greek) consisted exclusively of studies into comparative Indo-European phonology and morphology. Major achievements to which Schmidt contributed include the Law of the Palatals in Indo-Aryan and proof that the original Indo-European vocalism distinguished three non-high vowels (*a*, *e*, *o*), as essentially mirrored by the European languages (and not by Sanskrit, which had only *a*). His reluctance to draw correlations and to engage in theoretical issues renders most of his work outdated, however.

A notable exception is *Die verwantschaftsverhältnisse der indogermanischen sprachen* (1872). Here Schmidt argued against Schleicher's genealogical tree and the concept of intermediary parent languages (e.g., Greco-Italic or European), which had been generally accepted until then. He held that the Indo-European language families must have formed a kind of geographical continuum of 'waves' from Asia to Europe in which each family was more closely related to its neighbors on either side, much like dialect areas. The interpretation of the wave as an image for a linguistic innovation radiating from a focal point (the so-called 'wave theory' in dialectology) is, however, of later date, and its attribution to Schmidt, though common, is erroneous.

From 1880 until his death, Schmidt was editor of the renowned *Zeitschrift für vergleichende Sprachforschung* ("Kuhn's Zeitschrift"), in which most of his major articles appeared. The Neogrammarians acknowledged Schmidt's erudition and would have liked him to take their side, but their self-proclaimed vanguardism clashed with Schmidt's own self-consciousness and conservative temper. The latter is revealed by several polemical exchanges between them, e.g., concerning the Neogrammarian principle of exceptionless sound laws, which Schmidt credited to Schleicher.

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See also: Bopp, Franz (1791–1867); Meyer-Lübke, Wilhelm (1861–1936); Neogrammarians; Pedersen, Holger (1867–1953); Schleicher, August (1821–1868); Sound Laws.

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Ruth Schmidt-Wiegand was born on January 1, 1926 in Berlin. Her scientific career began with university studies in German, history, philosophy, and theology in 1946. In 1951 she attained the doctoral grade from the University of Greifswald with a thesis on the origin of the 'Lex Salica.' The language of law would become Schmidt-Wiegand's main research topic in the combination of linguistics and the study of law: she established a link between law texts and the description of laws in literature throughout the development of the German language. After a research period at Bonn, Schmidt-Wiegand's postdoctoral thesis (Münster, 1970) focused on the historical development of legal word geography. The law texts from the German Middle Ages became Schmidt-Wiegand's main interest. In parallel, she documented main steps in the establishment of the German early written language. In 1971 she became professor of German linguistics in Münster and worked in a special research group on the Middle Ages from 1972.

Schmidt-Wiegand started to work in a second special research group on pragmatical writing in the Middle Ages in 1982. She became project manager of the subgroup on 'law books as media expressing pragmatical writing.' In this period, she was responsible for the edition of picture manuscripts of the law text *Sachsenspiegel*, which marks the beginning of written medieval German law texts. The edition made the Wolfenbüttel (1993) and the Oldenburg (1995) manuscripts available to a greater public for the first time. In her scientific contributions to the commentary supplements, and in other contributions dealing with these picture manuscripts, Schmidt-Wiegand broke the boundaries of linguistics in another way, by integrating the manuscripts' pictures into the linguistic perspective.

In her main research topic, the study of historical law language, Schmidt-Wiegand was one of the editors of the *Handbook of the history of the German law* and is part of the editing team of three German periodicals and a book series. She edited about 15 books on the history of law and legal language, mostly interdisciplinary, and wrote 6 monographs. She contributed to the research on the 19th-century German grammarians Grimm, among other things, by a new edition of Jacob Grimm's old law text collection *Weisthümer*. In addition, Schmidt-Wiegand's scientific work consists of more than 110 papers, numerous dictionary and lexicon articles, and book reviews on language history, and on the language and science of law. All of these up to the year of 1996 can be found in publication lists in the Festschrifts Schmidt-Wiegand (1991) and Höfinghoff *et al.* (1996), which appeared after a first Festschrift from 1986. Schmidt-Wiegand was honored with several awards and attained an honorary doctorate from the University of Marburg in 1985.

See also: German; Language of Legal Texts; Law and Language: Overview; Legal Language: History; Legal Pragmatics.

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Schottelius, Justus Georg (1612–1676)

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Justus Georg Schottelius (Figure 1) was born in 1612 in Einbeck, in southern Lower Saxony, Germany, and died in 1676 in Wolfenbüttel. Although he originally planned to train for a craftsman's career, he managed to obtain the qualifications for university studies, which he began in Leyden (1633–1636), subsequently moving to Wittenberg. With a *disputatio* in Helmstedt, he earned a Dr. jur. degree in 1643.

His membership a year earlier in the *Fruchtbringende Gesellschaft* (fruitful society), founded in 1617 with the aim of cultivating the German language, strengthened his belief in the crucial need to become actively involved in protecting the German language from overbearing foreign influences. His initial publication, *Lamentatio Germaniae expirantis* (1640), is an inspiring 'battle cry' as well as an outline of the agenda for a determined action plan on which he focused for the rest of his life.

Schottelius's (1663) first programmatic item was to write a comprehensive grammar of the German language. It turned out to be the first complete descriptive grammar of German. An early reviewer (Jagemann, 1893: 410) admiringly called him the "Jacob Grimm of the 17th century," which is hardly an exaggeration, even if this accolade is restricted to considering the few predecessors Schottelius could rely on, compared to the numerous predecessors whose work was available to Grimm.

Figure 1 Schottelius, Justus Georg (1612–1676).

Schottelius acquired all there was to know about the scientific study of language in his time. No languages other than the 'holy three,' Latin, Greek, and Hebrew, were deemed objects worthy of scientific investigation. While his few predecessors were still largely dependent upon the Latin model in their grammatical writings, Schottelius succeeded in breaking new ground in several respects.

Claiming that German was older than both Latin and Greek, and that in importance and age it was second only to Hebrew, Schottelius made the case that placing a much greater emphasis on the 'the people's language' was long overdue. He appealed to the patriotism of his German compatriots and pointed to France and Italy as countries much more successful than Germany in achieving a status of notability for their respective languages. For him, language went far beyond being a mere instrument of communication: "What we do and what we do not do is preserved with us, kept, and handed on through the German language. Through it we approach God and enter heaven; we might even say that through it we keep body and soul together" (1641: Introduction). He was fully aware that the existing German languages were only dialects, and since in his opinion all dialects are flawed and hence cannot serve as substitute for a German *HauptSprache,* or common standard language, he set out to define what that thus-far elusive national language should be like, hoping in this way to facilitate its birth and continued growth: "*Die Hochteutsche Sprache … ist nicht ein Dialectus eigentlich/sondern lingua ipsa Germanica, sicut viri docti, sapientes & periti eam tandem receperunt & usurpant*" (The High German Language … is not actually a dialect but the German language itself such as wise and experienced scholars at long last have retained it and are using it) (1663: 174).

Schottelius's *Ausführliche Arbeit* (1663), at 1529 pages, is his meritorious *opus magnum*. Paul Hankamer (1927: 124) conferred on it the title *Summa philologica*, and Wolfgang Hecht, in the 1967 reprint of that work, raised its stature even further: "The 'Ausführliche Arbeit' is not only Schottelius' summa philologica, but beyond this also that of the entire era. Nowhere else have the grammatical concepts and

the theoretical-linguistic thoughts of the epoch between Ickelsamer and Leibniz been treated more comprehensively than here" (Epilog, p. 7).

In 10 *Lobreden* (hymns of praise, eulogies), Schottelius praised the "*Uhraltertuhm/Reinlichkeit/Eigenschaft/Vermögen/Unvergleichlichkeit/Grundrichtigkeit*" (antiquity, purity, quality, capability, incomparability, fundamental correctness) of the German language and went on to present its grammar and the rules of word formation and derivation. In a major portion of this work (pp. 1269–1450) he dealt with the "*Stammwörter der Teutschen Sprache*" (roots or stem words of the German language), the (mostly monosyllabic) building blocks of the language, from which all other words are derived. He ascribed to them "superior qualities" such as being of native origin, sounding well, and being able to be sufficiently expanded. He also established their "*Grundrichtigkeit*" by tracing them back to what he believed was their ideal original state. With this inclusion of the historical dimension, he moved closer to a true understanding of the developmental aspect of language history.

Schottelius's list contains approximately 5000 stem word entries. According to his plan they were to form the nucleus of a comprehensive dictionary of the German language, a project keenly supported by Leibniz, which did, however, not proceed beyond the planning stage.

In the context of Schottelius's attempt to replace foreign words with native equivalents, it is worth mentioning that to this day we use grammatical terms that he created, for instance, *Sprachlehre* (grammar), *Wörterbuch* (dictionary), *Zeitwort* (verb), *Fragezeichen* (question mark), and *Zahlwort* (numeral).

Last but not least, it is important to note Schottelius's emphasis on the artistic dimension of language, requiring the grammarian to discover and make explicit the beauty of language. In addition to stressing this aspect in his *Lobreden*, he incorporated in his *Ausführliche Arbeit* all major portions of his *Teutsche Vers- oder Reimkunst* of 1645, thus illustrating as essential the interrelatedness of the poet's and the grammarian's accomplishments.

See also: Grimm, Jacob Ludwig Carl (1785–1863); Leibniz, Gottfried Wilhelm (1646–1716).

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Schuchardt, Hugo (1842–1927)

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Hugo Schuchardt was born in Gotha (Thuringia, Central Germany) as the son of a German lawyer and a French-speaking mother from Switzerland. He studied in Jena under August Schleicher, the mentor of the Neo-Grammarians, also in Bonn under Friedrich Dietz, the founder of Romance linguistics in Germany, and Friedrich Wilhelm Ritschl, Professor of Classical Philology (Latin), who was also a teacher of Schleicher's and even of Nietzsche's. Schuchardt's doctoral thesis submitted to Bonn university in 1862 became the basis of the famous book on the vocalism of Vulgar Latin (3 vols 1866–1868), building a bridge between Classical and Romance Philology.

In 1870, Schuchardt qualified as a university lecturer (*Dozent*) in Leipzig by submitting a postdoctoral thesis on a sound change of a Romance dialect in Switzerland. In 1873, he became a full professor of Romance Philology in Halle, Central Germany, and thereafter in Graz, Austria (1876–1900).

Schuchardt's fields of activity were immense and diverse, at first without a unified theory, but with individually developed methods. Spitzer (1928) gives a list of 770 publications. His teachers' influence on his first publications was unmistakable, as can be seen by the use of a stemma to describe the "inner history of the Roman vernacular" (Schuchardt, 1866–1868 vol. I: 82), a method used by Ritschl to depict "the descent of manuscripts from a common source," and by Schleicher to establish a family tree of the Indo-Germanic languages. Later, however, Schuchardt turned against Schleicher and the rigid sound laws of the Neo-Grammarians. In his conference on the classification of Romance dialects (1870, printed in 1890; see Spitzer, 1928: 166–188), he argued against Schleicher's transfer of Darwin's genealogical classification to linguistics: the geographical variation of dialects is continuous and rarely abrupt so that a clear-cut dialect classification is rather impossible. An exception is the contrast between city and rural language (see Schuchardt, 1885; Lichem and Simon, 1980). Although frequently ignored, this notion has been accepted from today's point of view.

From 1871 on (Spitzer, 1928), Schuchardt was occupied with etymologies and the cultural background of the words discussed and with descriptions of Portuguese-, French-, Spanish-, English- and Dutch-based creole languages, becoming the founder of creolistics. His research activities shed light on language mixture in Europe, Africa, and Asia (Schuchardt, 1884, 1886, 1906, 1918) involving, for example, Rhaeto-Romance, (Daco-)Romanian, Albanian, French, Slavo-Italian, Slavo-German, Spanish, Portuguese, English, Welsh, Basque, Magyar, Georgian; Berber, Bengali and Melanesian languages. This brought him to a general hypothesis of language change by mixture: "There is no completely unmixed language" ([1883] see Spitzer, 1928: 153). Schuchardt laid the foundations of the modern discipline of Languages in Contact (Weinreich, 1953).

No less famous were his studies on Basque (from 1887; Schuchardt, 1906, 1925a). Further discussed was the origin of languages and the question of an artificial world language, for example, Volapük (Schuchardt, 1894). In Schuchardt (1925b), the discussion of research methods is combined with autobiographical information.

Schuchardt considered his chair as a job, his research as a duty to study the phenomenon of language. His publications may give the impression of a great divergence, if not of oddness, but all in all, they build a mosaic of Schuchardt's linguistic theory after which there is only one linguistics: general linguistics and its application to special language systems. The development of language depends on the speakers, and it has ethnic, social, and psychic ties. The mixture of different cultures leads to the mixture of language systems, as shown in Schuchardt's studies on creole languages and pidgins, and on the lingua franca, a term used by Schuchardt beginning in 1909.

Language development cannot be grasped by the description of sound laws because it is brought about by the change of concepts, thoughts and meaning, thus regulating a change in expression. Concepts are based on the things of the real world, which therefore have to be included in the objectives of linguistic research. Pictures or even an atlas of pictures improve their description, a demand of Schuchardt's with respect to Comenius who, in 1658 already, used pictures for linguistic and educational purposes (Spitzer, 1928, no. 385, 421). Words make the cultural background of things accessible to the researcher. Therefore word history comes before language history and its correlate: the history of culture. It is this *Sachwortkunde* ('science of things and words') on which a new field of linguistic research is grounded and by which Schuchardt finds himself in full agreement with the famous French dialectologist Jules Gilliéron and his methods of etymology. Schuchardt's perspective is contrary to that of Rudolf Meringer (also a professor in Graz) who founded the journal *Wörter und Sachen* ('Words and Things') in 1909. In his article 'Sachen und Wörter' (Spitzer, 1928: 122–135), Schuchardt

stated that things as stable forms of existence are primary and words are secondary. These ideas were realized, later on, in the *AIS* (Linguistic and ethnographic Atlas of Italy and south Switzerland, K Jaberg & J Jud (eds.), vols I–VIII. 1928–1940), and also in the new French regional dialect atlases, so that Schuchardt's idea to collect all expressions referring to given concepts as existing in related dialects was partly realized. Concepts depend indeed on cultures and societies, but, with this restriction, they are quite universal while expressions (words) depend on particular language systems (dialects). "All our languages as dialects of the one, the only one, the human language, that is Schuchardt's vision" (Wandruszka in Lichen and Simon (1980): 312, translated from German).

See also: Gilliéron, Jules (1854–1926); Jaberg, Karl (1877–1959); Schleicher, August (1821–1868); Spitzer, Leo (1887–1960); Weinreich, Uriel (1926–1967).

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Schütz, Alfred (1899–1959)

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Alfred Schütz was born in Vienna, Austria, on April 13, 1899. In 1918, he entered the University of Vienna, earning a doctorate in law, and continuing his postgraduate studies in the social sciences until 1923. There Schütz encountered the sociology of Max Weber, whose focus on the meanings ascribed to social action made a lasting impression on him. Yet, Weber's abstract treatment of the individual's reality left Schütz dissatisfied. Later Schütz found renewed inspiration in the phenomenological writings of Edmund Husserl and Bergson, who had developed a sophisticated methodology for studying human consciousness, one that Schütz hoped to graft onto a new sociology.

In 1932, Schütz published his major statement in a work entitled *The phenomenology of social relations*, for which he received praise from Husserl himself. Fleeing the German invasion of his native Austria, Schütz immigrated to the United States in 1939, where he joined the Graduate Faculty of the New School for Social Research in New York City in 1943, first as a lecturer, then as professor of sociology, starting in 1952. In 1956, he was also appointed professor of philosophy. Schütz died in New York on May 20, 1959.

Schütz is best known for his pioneering writings on phenomenological sociology, a discipline that explores relationships between human social action

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Schütz is best known for his pioneering writings on phenomenological sociology, a discipline that explores relationships between human social action

and associated states of individual consciousness. For Schütz, language, as system of conventional signs, plays a central role in transmitting the many modes of thought expressed within a society, exerting a profound, though ultimately contestable, influence on personal worldview. Schütz starts with the assumption that speakers differ in their experiences, arguing that the meanings provided in language 'stabilize' individual perception in social encounters, though without leveling out personal differences. Because speakers use language to creative ends, worldview is not static, but socially constructed; though Schütz maintains that languages preserve historically significant systems of thought, which are slow to change. At the same time, knowledge of language is not uniform, for Schütz, but reflects the scope of speakers' social experiences.

For Schütz, language exists at the border zone between the private worlds of individuals, facilitating a temporary exchange between otherwise separate streams of consciousness. Schütz argues that communication rests on the principle of 'appresentation,' or the capacity of signs trigger absent orders of reality in consciousness. Below the threshold of language, even objects are capable of conjuring imagery, a process that Schütz calls an "indication" if the association is a natural one (e.g., smoke for fire) or a 'mark' if deliberate (e.g., a ribbon around the finger as a reminder). So far, these meanings are private. Yet with signs, such as those found in language, the meaning is 'intersubjective,' because an object of perception, such as a sound pattern, triggers similar, though not identical, associations for all parties. Though established on an intersubjective basis, Schütz argues that a meaning eventually becomes 'detached' from its original context, where this meaning is generalized until applied in another encounter, where the sign can take on subtle new shades of meaning.

Schütz continued to revise his phenomenological approach to sociology over his career, writing a series of articles that were later drawn together in his *Collected papers I-III* and presented in his posthumous *The structures of the life world [I–II]*. For many years Schütz served on the editorial board of the journal *Philosophy and Phenomenological Research*.

See also: Husserl, Edmund (1859–1938); Weber, Max (1864–1920).

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Scope and Binding: Semantic Aspects

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The scope of an expression E is the domain within which E's interpretation can impact that of other expressions. In the simplest cases this domain coincides with E's sister constituent (E's syntactic scope). The reading where E_1 scopes over some E_2 is notated as $E_1 > E_2$. E_1's impact on E_2 may be of different kinds. Some examples follow. In (1) teachers may vary with boys; similarly in (2) if scope is used to effect pronoun binding. In (3) negation eliminates existential import. In (4) the Grail need not exist in the actual world. In (5) the polarity item is licensed.

(1) Every boy saw a teacher.
'every boy > a teacher'

(2) Every boy saw the teacher who flunked him.
'every boy > him'

(3) Nobody drew a circle.
'nobody > a circle'

(4) Parsifal seeks the Grail.
'seek > the Grail'

(5) You have not responded yet.
'not > yet'

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See also: Husserl, Edmund (1859–1938); Weber, Max (1864–1920).

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Scope and Binding: Semantic Aspects

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The scope of an expression E is the domain within which E's interpretation can impact that of other expressions. In the simplest cases this domain coincides with E's sister constituent (E's syntactic scope). The reading where E_1 scopes over some E_2 is notated as $E_1 > E_2$. E_1's impact on E_2 may be of different kinds. Some examples follow. In (1) teachers may vary with boys; similarly in (2) if scope is used to effect pronoun binding. In (3) negation eliminates existential import. In (4) the Grail need not exist in the actual world. In (5) the polarity item is licensed.

(1) Every boy saw a teacher.
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'nobody > a circle'

(4) Parsifal seeks the Grail.
'seek > the Grail'

(5) You have not responded yet.
'not > yet'

(6) summarizes Montague's (1974) classical technique for obtaining a reading where *everyone* takes wide scope, binding *his* and inducing referential variation in *a picture*. *Every boy* is interpreted as a generalized quantifier (6b), and a property is formed from the interpretation of its scope (6c). Pictures may vary because they are chosen relative to individuals playing the subject role. Pronoun binding occurs due to the identification of two arguments.

(6a) *Every boy showed his father a picture* [Reading 1] is true if and only if the property (6c) is an element of the set (6b).
(6b) *every boy*: the set of properties every boy has
(6c) *_showed his father a picture*: the property of being an individual such that there exists some picture or other such that this individual showed that picture to this individual's father

(7) restates the right-hand side of (6a) using a logical notation similar to Montague's. Going beyond first-order logic, lambda is the abstraction operator and P a second-order variable over properties.

(7) $\lambda P \forall x[\text{boy'}(x) \rightarrow P(x)](\lambda y \exists z[\text{picture'}(z) \wedge \text{showed'}(y, \text{father-of'}(y), z)])$

Although the operator–variable notation is widely used, it is semantically not essential. For variable-free semantics, see Szabolcsi (1989), Hendriks (1993), Jacobson (1999), and Kruijff and Oehrle (2003).

The intended scope of an expression is often not its sister in the most straightforward constituent structure of the sentence. For example:

(8a) *Every boy showed his father a picture* [Reading 2] is true if and only if the property in (8c) is an element of the set (8b).
(8b) *a picture*: the set of properties some picture or other has
(8c) *every boy showed his father _*: the property of being an individual such that every boy showed this individual to that boy's father

Discrepancies are often resolvable by using a storage mechanism (Cooper, 1983), by positing a more abstract syntactic structure called Logical Form (May, 1985), or by making surface structure more articulated (Kayne, 1998). In other cases substantial semantic considerations or even new interpretive techniques must be invoked.

One semantically significant case is scope independence, exemplified by branching and cumulative readings (Schein, 1993; Hintikka and Sandu, 1997; Landman, 2000):

(9) Some relative of every townsman and some relative of every villager hate each other.

(10) Less than five detectives solved more than six crimes between them.

The main topic of this article is scope dependency. Many of the semantic innovations are necessitated by the observation that different operators have different scoping and binding abilities (Szabolcsi, 1997a). Nominal and adverbial quantifiers are the best studied. At least three classes emerge: (unmodified) indefinites like *some girl, two girls*, distributive universals like *every girl*, and counting quantifiers like *more/less than three girls*. Existential scope and distributive scope are distinguished, and E-type anaphora and covariance with situations are added to traditional bound variable and coreferential readings.

Thus, contrary to the traditional view, scope and binding are not uniform and are not unanalyzable primitives, and the two do not always go hand in hand.

Differential behavior regarding binding was observed first. (All referential dependencies involving pronouns will be indicated by underlining.) Indefinites, but not universals or counting quantifiers, support cross-sentential anaphora. Texts describing scenarios constitute an exception:

(11) A girl is laughing. She is happy.

(12) Every girl is laughing. # She is happy.

(13) More than one girl is laughing. # She is happy.

(14) Every graduate steps forward. The dean shakes hands with him or her.

Indefinites also support sentence-internal anaphora outside their syntactic scope. On the relevant reading both *a donkey* and *it* are within the scope of *every*.

(15) Every farmer who owns a donkey beats it.

These two binding peculiarities inspired varieties of dynamic semantics (Hintikka and Sandu, 1997; Heim, 1982; Kamp and Reyle, 1993; Groenendijk and Stokhof,1991), in which indefinites are associated with referents that outlive the indefinite's syntactic scope. Alternatively, "donkey pronouns" are interpreted as definite descriptions (Evans, 1980; Neale, 1990), and donkey anaphora may be reinterpreted using situation semantics (Heim, 1990; Elbourne, 2001):

(15′) 'every farmer who owns a donkey beats the donkey(s) he owns'
(15″) 'every minimal situation containing a farmer and a donkey he owns extends to one where the farmer beats the donkey'

Büring (2004) extends "situation binding" to other cases where a quantifier binds a pronoun it does not c-command:

(16) Every boy's mother likes him.

(17) Some person from every city likes it.

Indefinites are also special in that their scope within the sentence may escape the containing clause or even island:

(18) Every boy made up a story in which two girls had a bad dream.
'there are two girls such that every boy made up a story in which they had a bad dream'

But such extra-wide scope of indefinites only pertains to their ability to remain referentially independent of higher operators. Like universals and counters, plural indefinites cannot induce referential dependency in higher material. Boys cannot vary with girls in either (19) or (20). Only bad dreams can.

(19) Some boy or other made up a story in which every girl/less than three girls had a bad dream.
* 'for every girl/less than three girls there is a possibly different boy who . . .'

(20) Some boy or other made up a story in which two girls had a bad dream.
* 'for each of two girls there is a possibly different boy who . . .'

This duality cannot be expressed in traditional terms. It necessitates a distinction between existential scope, potentially unbounded, and distributive scope, typically limited to the smallest tensed clause (Beghelli *et al.*, 1997; Reinhart, 1997). Wide existential scope is attributed to referentiality (Fodor and Sag, 1982) or to the existential closure of a choice function variable (Egli and von Heusinger, 1995; Reinhart, 1997). A choice function looks at sets and chooses one element or subset of each. According to Reinhart, the determiner in indefinites is interpreted as a choice function variable, whereas the numeral is a cardinality marker. 0_{choice} *two girls* picks out a set of two girls. Distributivity, if present, is due to the interpretation of the clausemate predicate, e.g., *[each] had a bad dream*.

Extra-wide scoping indefinites may nevertheless be referentially dependent:

(21) Every professor praised every student who reviewed a certain book (that he wrote).
'every professor > a certain book > every student'

Such dependencies have been attributed to intermediate existential closure or to an overt or understood bound pronoun in a maximal-scope indefinite (Skolemized choice functions) (Kratzer, 1998).

Clause-internally, all quantifiers can take existential and distributive scope over material they c-command. Whether inverse scope is possible at all is subject to cross-linguistic variation, and which quantifiers take inverse scope over which others depends on their syntactic hierarchy; therefore these matters are to some extent syntactic. But the classes of quantifiers that behave differently are semantically characterizable (Beghelli and Stowell, 1997; Szabolcsi, 1997b).

Both unmodified indefinites and definites pick out sets undergoing existential closure. As expected from the foregoing discussion, in (22) it is easy to keep the poems fixed (wide existential scope). But triplets of girls only marginally vary with poems, probably because predicates only marginally support inverse distributivity.

(22) Three girls know two poems/these poems/all the poems.

Universals like *every/each girl* readily take inverse distributive scope:

(23) Three girls know each/every poem.

Counting quantifiers may be intersective (*at least n . . .*, *more/less than n . . .*) or proportional (*few . . .*). They do not take inverse scope over universals (24) but they can make higher counters dependent (25):

(24) Every girl knows more/less than three/few poems.

(25) At least one girl knows more than three poems.

It is usually assumed that both universals and counters operate in the manner of generalized quantifiers, see (6b), and the distributivity of universals comes from lexical semantics. Hungarian presents evidence to the contrary. In that language, different types of quantifiers occupy different surface syntactic positions. Interestingly, the comparative quantifier *több, mint n . . .* 'more than n . . .' may occur either in the position of universals or in the position of counters. In the former case its interpretation is necessarily distributive; in the latter case it may be collective. This suggests that the former position has a distributive operator associated with it. *Every girl* is distributive because it only occurs in that position; its own contribution to interpretation is just the set of girls. This set plays a similar role as the one contributed by *two girls*. Counters may be the only quantifiers that truly operate in the manner of (6b). (Bare plurals on the existential reading are not regarded as quantifiers but as kind-denoters or as incorporated predicates.)

See also: Boole and Algebraic Semantics; Discourse Representation Theory; Dynamic Semantics; Formal Semantics; Game-Theoretical Semantics; Monotonicity and Generalized Quantifiers; Montague Semantics; Negation: Semantic Aspects; Operators in Semantics and Typed Logics; Plurality; Polarity Items; Quantifiers: Semantics; Semantics in Categorial Grammar; Specificity.

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Scots

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Scots is in a sociolinguistic continuum with Scottish Standard English (SSE), and is often intermingled with it in practice. Speakers who maintain a rich and focused variety of Scots are found mainly in rural areas and small towns outside the central industrial belt. In the North-East and the Northern Isles, it is not uncommon for professional people to code switch sharply between Scots and English. There are concerns, however, that this ability may not be continuing among younger people. In the most densely populated areas of Scotland, Scots is spoken mainly lower down the social scale.

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A question on Scots (parallel to that on Gaelic) was considered for inclusion in the 2001 Census, but it was concluded that a valid and reliable question could not be framed. The question-testing exercises suggested that almost a third of the Scottish population might call themselves speakers of (a dialect of)

Scots, but, in the absence of a popularly accepted terminology, the responses were affected by the form of the question. Urban dialects, which are thinnest in traditional vocabulary, are least likely to be identified with the historical language or to be dignified with the name 'Scots,' and are most likely to be perceived as slang. There is some teaching and research on Scots at university level in Scotland and Northern Ireland, and at the Royal Scottish Academy of Music and Drama in Glasgow. In Northern Ireland, the Ulster Scots Agency supports cultural and linguistic projects, but attempts to promote a hastily modernized version have been met unsympathetically by speakers and nonspeakers alike. In Scotland, a modernized form of Scots ('Lallans') is promoted by the Scots Language Society.

Scots, like Standard English, is descended from the Anglian dialect of Old English. It is not clear to what extent this variety, established south of the Forth in the 7th century, was the ancestor of Scots, and to what extent it was swamped by a later influx of speakers, mainly from Yorkshire. These were followers of Anglo-Norman mercenaries and monastics, invited in by the Scottish crown in large numbers in the 12th century. Anglian spread throughout the Lowlands with the establishment of urban settlements (burghs) and of Norman administration in church and civil life. As a result, Lowland Scots is rich in loans from Old Norse, mostly shared with Northern English dialects. In Caithness, Orkney, and Shetland, where there was extensive Norse settlement, Scots replaced an extinct Scandinavian language, Norn (spoken in Shetland as late as the 19th century). Some loans survive, e.g., *bonxie* 'the great skua' and *moorit* 'brown (of sheep)'. Apart from place-names, Scots texts begin in the 14th century with glosses and phrases in Latin and French documents, and a few legal papers in a Scots are still very similar to Northern English. The long narrative poem, 'The Bruce,' by John Barbour, was written around 1375, but surviving manuscripts are from the early 15th century.

By the 15th century, the orthography of Scots was distinctive. The spellings <ee, oo, ea> were avoided. For /x/, <ch> was used, as in *nicht* 'night'. Words such as 'little' ended in <ill>, thus *litill*. As in Northern English, <quh> was used rather than <wh>, and <sch> rather than <sh>, and there was interchangeability among <u, v, w>, but Scots was unusual in using <w> initially, as in *wp* 'up'. Distinctively, Scots used <lȝ> for French- and Gaelic-derived /ʎ/, as in *tulȝie* 'a struggle', and <nȝ> for similarly derived /ɲ/, as in *cunȝe* 'a coin'. As the retention of these consonants in Early Scots illustrates, the influence of French was independent of its influence on English, and the same was true of Latin, so that loans from these languages further differentiated Scots, as did loans from Middle Dutch (through immigration to the burghs, and fishing and trade contacts), and, of course, loans from Gaelic. The long-term Gaelic influence on vocabulary is, however, unexpectedly small. It would appear that the transition from Gaelic to Scots was effected with some completeness. Gaelic has had phonological influences, e.g., North-Eastern /f/ for /hw/ (earlier /xw/), as in *fa* 'who', and grammatical influences, e.g., emphatic use of reflexives, as in 'It's yoursel!'

In the mid-15th century, Early Scots gave way to Middle Scots (both being stages of Older Scots). Middle Scots saw the spread (from Northern England) of 'i-digraph' spellings for stressed monophthongs—thus <ai>, as in <haim> for <hame> 'home'; <ei>, as in <leid> for <lede> 'lead' (noun or verb); <oi>, as in <rois> for <rose> (the flower); and <ui>, as in <muin> for <mune> 'moon'. As generally north of the Humber, words such as *hame* 'home' have retained a front development of Old English ā, raised by the 'Great Vowel Shift,' and words such as *mune* 'moon' have a fronted development of Old English ō.

Scots and its dialects are characterized by numerous conditioned sound changes. To mention just one dating from this time, there was a vocalization of /l/ following the short vowels /a, o/ and, less regularly, /u/. Examples include *ba* 'ball', pronounced /bɔ/ (Modern Central dialect) or /bɑ/ (Northern dialect); *gowd* /gʌud/ 'gold'; and *fu* /fu/ or *full* /fʌl/ 'full'. A standard based on Edinburgh was emerging when Scots was replaced in formal use by Standard English in the late 16th century, largely as a result of the printing press and of the Reformation of 1560, which introduced the Bible in English translation. Standard English became the speech of the ruling class following the Union of the Crowns in 1603, and of the professions following the Union of the Parliaments in 1707. Insistence that schoolteachers use English began with national inspection in 1845.

Literature and historical documents of all kinds exist from the Older Scots period, including the work of 'makars' such as William Dunbar, Robert Henryson, and Gavin Douglas. Well-known writers from the modern period include Robert Burns, John Galt, Walter Scott, and Robert Louis Stevenson. Folk tales and songs (including the 'muckle sangs,' or Child ballads) have been extensively collected. The 20th-century folk revival has been very important for the continuation of elevated styles of Scots.

Language revival has been a spur to literature, including the poetry of Hugh MacDiarmid (Christopher Grieve), the songs of Hamish Henderson, and drama (original and in translation). Notable work continues

also in local vernaculars – for instance, in the poetry of Sheena Blackhall in North-East Scots ('the Doric'). The urban dialects, being thinner, are more widely accessible, as witness the work of Liz Lochhead, Tom Leonard (both Glasgow), and Irvine Welsh (Edinburgh). Scots, when it is occasionally used in television and radio scripts, is generally thin, for the same reason.

Modern Scots (from 1700 on) has preserved little from Older Scots in orthography, apart from <ch> and <ui> spellings. The 18th-century introduction of <oo> for /ø/, as in /tøm, tɪm/ 'empty', though now replaced by <uCe, ui>, still causes some confusion in spelling and pronunciation in historical contexts. Apostrophes for 'missing' letters, such as for /d/ after /n/, as in *en'* 'end', or /d/ after /l/, as in *aul'* 'old', and for final <th>, as in *wi'* 'with', were also a feature of Modern Scots, but have largely been dropped as the result of spelling reform. The following example is of Modern Central Scots:

> The laddies gets hame fae the schule afore the wee lass an they wint their tea the meenit they're in the hoose. Bit it'll no dae thaim a scart o herm tae thole their hunger a while langer.
> ðɪ 'ladez gɪts 'hem fe ðɪ 'skɪl ʌ'for ðɪ 'wi 'las n̩ ðe 'wɪnt ðɪr 'ti ðɪ 'minɪt ðɪr ɪn ðɪ 'hus. bɪt ɪtl̩ 'no 'de ðʌm ʌ 'skart ɪ 'hɛrm te 'θol ðɪr 'hʌŋɪr ʌ 'hwəil 'laŋɪr.

Scots has minor differences in grammar from English dialects; for instance, there is a double system of concord in the present tense of verbs: if the subject is a personal pronoun adjacent to the verb, the verb is inflected only in the third-person singular (and second-person singular, where it is preserved), otherwise in all persons and numbers. The dialects of Orkney and Shetland preserve the second-person singular, as in *du* 'thou'. A new second-person plural form, *youse*, has spread from Ulster to Glasgow. In the demonstrative system, *yon* (or *thon*) expresses a greater distance than does 'that' or *thae* 'those'.

The vowel length of stressed monophthongs (other than /ɪ, ʌ/, which are always short) is determined by the Scottish Vowel-Length Rule, with long vowels before the voiced fricatives /v, ð, z, ʒ/ and /r/, and morpheme finally, thus *agreed* long but *greed* short (likewise in SSE for a narrower range of vowels). Old English ū remains /u/, as in *aboot* 'about' and *hoose* 'house'. Old English ō fronted to /ø/ remains in conservative dialects (mainly Orkney and Shetland), as in 'do' (from Old French), 'use' and *schule* 'school'. In North-East Scots, this unrounded already in Middle Scots to /i/, thus *dee*, *meen*, and *eese*. In Modern Central Scots, the vowel unrounds in the long environments of the Scottish Vowel-Length Rule to /e/, thus *yaise* (verb), and to /ɪ/ elsewhere, thus *yis* (noun). In some dialects, this /ɪ/ from earlier /ø/ remains separate from the reflex of Old English /i/, as in 'bring', which is lower and more central, as [ë]. This may be the source of the similar realization of /ɪ/ in New Zealand English.

Old English ī has split in Modern Scots into /aɪ/ in the long environments of the Scottish Vowel-Length Rule, as in 'five' and 'why', and into /əi/ otherwise, as in 'while'. (The similar allophony in Canadian English may owe something to Scots or to SSE.) This /əi/ merges with the reflex of *ai* word finally, as in *cley* 'clay', and in Anglo-Norman *ui*, as in *bile* 'boil'. The unrounding of ŭ to /ʌ/ is complete: there is no /ʊ/. Thus 'push' and 'pull' have /ʌ/. As a consequence of the Scottish Vowel-Length Rule, the short vowel /o/, as in 'lot', *tod* 'fox' has merged in Central Scots with the long vowel /o/, as in *thole* 'endure' (from Old English ŏ by Open Syllable Lengthening).

The vowel phonology of SSE is largely based on the vowel system of Central Scots, but with the lexical incidence of Standard English. In the circumstances of the 18th century, with limited access to native speakers of English, a number of interdialectal features became fixed in SSE. Since there was no /ʊ/, these words were assigned to /u/, thus 'pool' and 'pull' are homophones in SSE. (In Central Scots, they are /pɪl/ and /pu/ or /pʌl/.) Similarly, since there was no /ɒ/, words such as 'cot' were assigned to Central Scots /ɔ/, as in *lauch* 'laugh' and *saut* 'salt'. Thus 'cot' and 'caught' are homophones in SSE. (In Central Scots, they are /kot/ and /kɔxt/; in Northern Scots, they are /kɔt/ and /kɑxt/.) The similar absence of distinction between the vowels of 'cot' and 'caught' in some North American varieties may owe something to SSE. The lower and more central realization of /ɪ/ in Scots has left a residue of words in SSE with a phoneme /ë/, thus /nëvər/ 'never', contrasting with /rɪvər/ 'river' and /sɛvər/ 'sever'.

Scots has a large shared vocabulary with English (for example, 'the,' 'cat,' and 'tell') and also much distinctive vocabulary, as in the Old English survivals *neep* 'turnip' and *een* 'eyes', the coinages *gully* 'knife' and *tapsalteerie* 'head-over-heels', Old Norse *nowt* 'cattle' and *skellie* 'squint', Middle Dutch *craig* 'the neck' and *redd* 'clear up', Anglo-Norman *leal* 'loyal' and *hurcheon* 'hedgehog', Latin *stravaig* 'roam', Central French *Hogmanay* 'New Year's Eve', and Gaelic *corrie-(fistit)* 'left-(handed)' and *sonse* 'prosperity'.

See also: Language Education for Language Revival; Minority Languages: Education; Scots Gaelic; Scots Lexicography; United Kingdom: Language Situation.

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http://www.pkc.gov.uk – Website for Perthshire and for Perth/Kinross Council, where the Scots Language Resource Centre can be accessed.

Scots Gaelic

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Origins and Early History

The Scottish people originated with Gaelic-speaking incomers from northeastern Ulster who settled in the northwestern coastlands and islands of Caledonia in the later 5th century and subsequently relocated their kingdom of Dal Riata from Ulster to Argyll, 'the coastland of the Gael' (Bannerman, 1974). This community subsequently grew by absorption of the Picts in the east and the conquest of the Britons and Angles in the south into what came to be called Scotland by the 11th century. Viking settlements in the Northern Highlands and Northern Isles from the end of the 8th century established the Norn language, which survived in Caithness, Orkney, and Shetland until the 18th century.

Under the kingship of Malcolm III, 'Ceannmòr' (1054–1096) Gaelic began to lose its pre-eminence at court and among the aristocracy to Norman French and in the Lowland area to the Anglian speech of the burghs, which were established first in eastern Scotland by David I (1124–1153). This speech was known first as Inglis and later as Scots, and it rapidly became the predominant language of the Scottish Lowlands. However, Gaelic was maintained until the later Middle Ages in Galloway and Carrick in the southwestern Lowlands, reputedly finally ceasing in Ayrshire in the 18th century.

Linguistic Characteristics of Scottish Gaelic and its Dialects

Scottish Gaelic (Scots Gaelic) is a Celtic language, a member of the Goidelic or 'Q-Celtic' branch, closely related to Irish and Manx. It is basically a VSO language: sentences typically begin with the verb, followed by the subject and the object. Adjectives generally follow the noun. As with other Celtic languages, personal pronouns combine with prepositions and decline for person. Verbs do not generally decline for person, and there are only 10 irregular verbs.

There are two forms of the verb 'to be'. *Bi* is the basic form for straightforward statements. It conjugates fully for tense and combines with the present participle of other verbs to form continuous tenses. The emphatic form of the verb 'to be' *is* exists only in the present-future and past tenses. These two verbs, together with prepositions and prepositional pronouns, enable a vast array of idioms to be formed, which enable actions in the 'real world' to be grammatically distinguished from abstract, mental, psychic, and emotional states.

There are many English loanwords, such as *ad* (hat), *barant(as)* (warrant), *breacaist* (breakfast), *brot* (broth, soup), *comhfhurtail* (comfortable), *geata* (gate), *mionaid* (minute of time), *paidhir* (pair), *rathad* (road), *stràid* (street), and *targaid* (target). Direct borrowings from Latin include *aingeal* (angel), *airgiod* (silver, money), *crois* (cross), *eaglais* (church), *Ifrinn* (Hell), *feasgair* (evening), *gineal* (offspring), *manach* (monk). Substantial contact with

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Origins and Early History

The Scottish people originated with Gaelic-speaking incomers from northeastern Ulster who settled in the northwestern coastlands and islands of Caledonia in the later 5th century and subsequently relocated their kingdom of Dal Riata from Ulster to Argyll, 'the coastland of the Gael' (Bannerman, 1974). This community subsequently grew by absorption of the Picts in the east and the conquest of the Britons and Angles in the south into what came to be called Scotland by the 11th century. Viking settlements in the Northern Highlands and Northern Isles from the end of the 8th century established the Norn language, which survived in Caithness, Orkney, and Shetland until the 18th century.

Under the kingship of Malcolm III, 'Ceannmòr' (1054–1096) Gaelic began to lose its pre-eminence at court and among the aristocracy to Norman French and in the Lowland area to the Anglian speech of the burghs, which were established first in eastern Scotland by David I (1124–1153). This speech was known first as Inglis and later as Scots, and it rapidly became the predominant language of the Scottish Lowlands. However, Gaelic was maintained until the later Middle Ages in Galloway and Carrick in the southwestern Lowlands, reputedly finally ceasing in Ayrshire in the 18th century.

Linguistic Characteristics of Scottish Gaelic and its Dialects

Scottish Gaelic (Scots Gaelic) is a Celtic language, a member of the Goidelic or 'Q-Celtic' branch, closely related to Irish and Manx. It is basically a VSO language: sentences typically begin with the verb, followed by the subject and the object. Adjectives generally follow the noun. As with other Celtic languages, personal pronouns combine with prepositions and decline for person. Verbs do not generally decline for person, and there are only 10 irregular verbs.

There are two forms of the verb 'to be'. *Bi* is the basic form for straightforward statements. It conjugates fully for tense and combines with the present participle of other verbs to form continuous tenses. The emphatic form of the verb 'to be' *is* exists only in the present-future and past tenses. These two verbs, together with prepositions and prepositional pronouns, enable a vast array of idioms to be formed, which enable actions in the 'real world' to be grammatically distinguished from abstract, mental, psychic, and emotional states.

There are many English loanwords, such as *ad* (hat), *barant(as)* (warrant), *breacaist* (breakfast), *brot* (broth, soup), *comhfhurtail* (comfortable), *geata* (gate), *mionaid* (minute of time), *paidhir* (pair), *rathad* (road), *stràid* (street), and *targaid* (target). Direct borrowings from Latin include *aingeal* (angel), *airgiod* (silver, money), *crois* (cross), *eaglais* (church), *Ifrinn* (Hell), *feasgair* (evening), *gineal* (offspring), *manach* (monk). Substantial contact with

Norse produced *faodhail* (ford, crossing, from Norse *vadhil*), *gocaman* (lookout, from Norse *gokman, gauksman*), *sgalag* (lackey, from Norse *skalkr*), *sgioba* (crew, from Norse *skip*), and *uinneag* (window, from Norse *windauga)* (MacBain, 1982: 163, 200, 310, 315, 386).

Pre-aspiration in present-day Scottish Gaelic dialects occurs before the final vowels in such words as *mac* (son, pronounced as if *mahk*), *sop* (wisp, pronounced as if *sohp*), and *sloc* (pit, pronounced as if *slohk*). This is very typical of southwest Norwegian dialects and northwestern Scottish Gaelic dialects (Marstrander, in Geipel, 1971). Historically, Scottish Gaelic dialects in the northwest with its islands were very different from dialects in the east-central and eastern Highland areas. The latter are today well nigh extinct—and all mainland dialects are moribund. Eastern dialects did not diphthongize the long 'e' in words like *meud* (measure, pronounced *meeutt*) or *beul* (mouth, pronounced *beeal*) or intrude 's' between final 'r' and 't' in words like *tart* (thrirst, pronounced *tarst*), *neart* (strength, pronounced *nyarst*), etc. Similarly, the northwestern dialects intrude 't' between initial 's' and 't' as in *sruth* (stream, current, pronounced *strooh*) and *srath* (strath, wide valley, pronounced *strah)*.

As with Irish, Scottish Gaelic observes the spelling convention of *caol ri caol is leathan ri leathan* (narrow to narrow and broad to broad). Where a narrow vowel 'i' or 'e' occurs before a consonant, it must be followed by a narrow vowel. Where a broad vowel 'a,' 'o,' or 'u' occurs before a vowel, it must again be followed by a broad vowel. Pronunciation of consonants is determined by the surrounding vowels; that is, the consonants thus flanked by narrow or broad vowels are regarded as correspondingly 'narrow' or 'broad' and pronounced accordingly. For example, *feasgar* (evening, afternoon) is pronounced as *fessgar*, where the first *a* is silent but helps render the consonants as 'broad.' Another example is *seillean* (bee), where the first *o* renders the initial *s* as narrow and pronounced as *sh*, and the *i* and second *e* renders the *ll* narrow and pronounced with the tongue to the front of the palate.

Gaelic uses only these letters: *a b c d e f g i l m n o p r s t u*. The letter *h* is not regarded as a regular letter. No words begin with it, except Norse-derived place names, such as *na Hearadh,* (Harris); it never stands alone in spelling, except in combination with another consonant to signify distinctive phonemes or before words beginning with vowels (e.g., *bun na h-aibhne*, the foot of the river) or to indicate aspiration or lenition in grammatical change for gender, tense, case, or word combination.

History: Medieval to Modern

By the later Middle Ages, Gaelic had retreated to the Highlands and Hebrides, which maintained some degree of independence within the Scottish state. Attempts were made by legislation in the later medieval and early modern period to establish English at first among the aristocracy and increasingly among all ranks by education acts and parish schools. The Scots Parliament passed some ten such acts between 1494–1496 and 1698. The Statutes of Iona in 1609–1610 and 1616 outlawed the Gaelic learned orders and sought to extirpate the 'Irish' language so that the "vulgar English tongue" might be universally planted (MacKinnon, 1991). The suppression of the Lordship of the Isles (1411), the Reformation (1560), the final failure of the Jacobite cause (1746), and the end of the clan system were all in turn inimical to Gaelic.

Further setbacks for the language were brought about by the loss of life in the Napoleonic Wars, the ensuing Highland Clearances, the potato famine in the 1840s, and economic marginalization and underdevelopment that engendered large-scale migration to the Lowlands and overseas. Some mitigation resulted from legislation following the 'Crofters' Wars' in 1886, and at the end of the 19th century Gaelic was still the predominant language throughout the mainland Highlands and Hebrides.

In World War I, losses of life at sea and in the armed forces took a considerable toll on the Gaelic population, and the interwar period witnessed renewed emigration, especially from the Hebrides. The numbers of Gaelic speakers declined precipitately from 254 415 in 1891 to 58 969 in 2001. Because of internal migration from the Highlands and Islands to the Lowlands, 45% of all Gaelic speakers today reside in Lowland, in urban Scotland.

Gaelic in Present-Day Society: Cultural and Administrative Infrastructure

Although only 93 282 (1.84%) of Scotland's 5 062 011 population had any sort of oral, literate, or comprehension abilities in Gaelic in 2001 (GROS, 2001 Census), speakers and supporters have made increased demands for the use of Scottish Gaelic in education, broadcasting, and the arts, and have advocated for official recognition of the language. There was some presence of Gaelic from the earliest years of radio and on television since the mid-20th century. However, radio output of Scottish Gaelic greatly increased with BBC Radio nan Gàidheal from the mid-1980s, and a more realistic television budget from the early 1990s led to its increased use on

television. Now there are demands for 24-hour daily radio provision and a dedicated digital television channel in Scots Gaelic.

Gaelic has been taught as a specific subject in some Highland and Island schools since the early 20th century, and bilingual education started in the early primary stages in Gaelic areas in the late 1950s. Although a more all-through model was introduced in the Western Isles from 1975, it has not yet really produced a satisfactorily bilingual secondary stage. Gaelic medium primary education began in 1985 after a successful Gaelic preschool initiative (*Comhairle na Sgoiltean Àraich*/CNSA from 1982) in two schools at Inverness and Glasgow. By 2004, the number of schools had grown to 60, with some 1972 pupils. In the secondary stage, 36 schools were teaching 974 fluent speakers, and 14 schools had Gaelic medium streams with 284 pupils. A Gaelic higher education college, *Sabhal Mor Ostaig*, was established in 1972, offering diploma courses taught through Gaelic since 1983, and a range of Gaelic medium degree courses have been offered within the developing University of the Highlands and Islands since 1998. Although these provisions have produced some small growth in the numbers of young people with Gaelic abilities, these efforts have been clearly insufficient in stabilizing Gaelic numbers overall or in reversing language shift.

Over the past 30 years, the Gaelic cultural scene has been enriched by the growth of theater and television production companies. They have been greatly assisted by funding from the Scottish Arts Council, the Gaelic arts agency *Proiseact nan Ealan* (from 1987), the Gaelic Television (now, Broadcasting) Fund, and Gaelic Media Services and its predecessors from 1992. These have drawn upon a wealth of traditional culture, including folk songs and vernacular verse. These genres have grown in Gaeldom out of the suppression of the bardic schools in the early 17th century and are still viable today. The more formal verse of the bardic period and later is well represented in current publications, as are more recent genres, such as plays and the novel. These have been assisted since 1968 by the Gaelic Books Council. The Gaelic cultural organization, *An Comunn Gàidhealach* (The Highland Association), was founded in 1891 and has run a national cultural festival, the Royal National Mod, from 1892. More recently, a local Gaelic folk festival *Fèis Bharraigh* (1980/81) has developed into a national organization, *Fèisean nan Gàidheal,* which organizes local and national Gaelic cultural festivals.

The end of the 20th century witnessed much enhancement of cultural infrastructure for Gaelic, with organizations for Gaelic learners (CLI from 1982), pre-school education (CNSA from 1982), Gaelic parents (*Comunn nam Parant*, from 1983), and language development (*Comunn na Gàidhlig* [CNAG] from 1984). These bodies have called for further resources for the language, have commissioned studies and reports, and have advocated for its official recognition and status. The 1997 Labor Government appointed a Minister for Gaelic and set up the Milne Gaelic Broadcasting Taskforce from 1997–2000. The Scottish Executive set up two more commissions: the Macpherson Taskforce on Public Funding of Gaelic (1999–2000), and the Ministerial Advisory Group on Gaelic (MAGOG; 2000–2002). These have resulted in improved provisions for Gaelic education, calls to improve Gaelic media provision, the establishment of a Gaelic Language Board, *Bord na Gaidhlig,* and the introduction of a Gaelic Language Bill in 2003. With these developments, there has been an emphasis on research, and the application of such ideas as language planning, secure status, and reversing language shift (MacKinnon, 2004). New ideas and policy objectives have emerged in the new millennium. The future of Gaelic as a continuing language of home and community very much depends upon their outcome.

See also: Celtic; United Kingdom: Language Situation.

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Scots Lexicography

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The long tradition of Scots lexicography is discussed by Murison (1987) and Aitken (1989), themselves senior editors of *The Scottish National Dictionary* (SND) and *A Dictionary of the Older Scottish Tongue* (DOST), respectively. Aitken identifies three historical strands: glossaries to Older Scots texts, notably Ruddiman's (1710) glossary to Gavin Douglas's *Æneid*; glossaries to contemporary works, notably Robert Burns's own enlarged glossary to the 1787 edition of his *Poems*; and lists of scotticisms (as a guide to avoiding them), of which Beattie's (1787) is the first to be arranged alphabetically. The first full-scale etymological dictionary of Scots was Jamieson's (1808, 1825, with subsequent supplements and editions).

There are now two authoritative multivolume historical dictionaries, each the culmination of generations of scholarship. Conceived as extensions to *The Oxford English Dictionary* (OED), DOST, begun by Sir William Craigie (of the OED), covers the period up to 1700; and SND, begun by William Grant, covers the period from 1700 onwards. These have now also been published on-line as the *Dictionary of the Scots Language*.

The Concise Scots Dictionary (CSD) is a digest of SND and DOST. Its pronunciation entries are more systematically phonemic than those of SND. The *Scots thesaurus*, based on CSD, covers about half of its vocabulary. Other dictionaries in the Scottish Language dictionaries range include *The Concise English-Scots Dictionaries*.

Collins Gem Scots Dictionary is an independent work, treating current vocabulary.

All dictionaries of modern Scots, up to and including SND and CSD, omit material shared with Standard English, which can give the impression that Scots consists only of what is uniquely Scots. But Scotsmen and women were also active in the fields that yielded increases in Modern English vocabulary. It was to make just this point that Murison added an appendix to SND containing "A list of scientific terms with Scottish connections."

DOST includes vocabulary shared with Standard English, but both DOST and SND omit etymologies for items found also in Standard English in some form or sense.

Some other works should be borne in mind as sources of information about Scots vocabulary. The *Middle English Dictionary* can be useful for comparison, particularly in the poorly documented period of Scots before c. 1375. Although SND and DOST supercede, for Scots, both OED and *The English Dialect Dictionary* (of which Warrack (1911) was a spin-off), these can still supply independent selections of quotations.

The lexical volumes of *The Linguistic Atlas of Scotland* (Vols. I and II) were not incorporated into SND, and have some additional items.

Ulster is not well covered in SND, so Fenton (2000) and *A Concise Ulster Dictionary* both add to the record. The SND omits the slang component of the language almost entirely, apart from a few items labeled 'Glasgow slang.' *A Dictionary of Slang and Unconventional English* and the *Dictionary of the Underworld* are useful supplements, as is Munro's (1996) Glasgow compilation. Otherwise, the main value of dialect dictionaries published subsequent to SND is to sift out the material that is still current. Lamb (1988) and Fenton (2000) are particularly well focused in this respect.

See also: English Lexicography; Middle English Dictionaries.

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Scripts, Undeciphered

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> Every written document not only embodies the message 'I am meant to be read' but also instructions, however indirect, as to how this can be done. In other words, the systematic makeup of writing contains a key to its own decipherment (Coulmas, 2003).

The act of decipherment is one of reconstructing the reading instructions of a writing system from what remains of it hundreds, more often thousands, of years after it has no longer been in use. In the case of ancient scripts, what remains are normally fragments of the entire written record of the system, often with little other information to help. For this reason several ancient scripts remain undeciphered.

Linear A

Linear A script has about 1500 texts with 7500 characters. The texts are found in archaeological deposits in Crete, Greece, and Western Anatolia; they date to 1750 to 1450 B.C. Examples of the script are found on seals, tablets, and pottery. The first step toward the decipherment of Linear A occurred in 1950 with the decipherment by E. L. Bennett Jr. of the number system (including fractions). From the sign list it would seem to be a logosyllabic script.

There is a strong graphic resemblance between 60% of the Linear B phonetic (syllabic) signs and signs in the Linear A script (Robinson, 2002: 191). There is also some resemblance between a small number of Linear B logographs and some Linear A signs. This fact, and the fact that these two scripts are found in the same area and even in the same deposits, would lead us to believe that decipherment of Linear B would lead to the decipherment of Linear A – but it does not. The Linear A decipherment is a similar case to the Meroitic decipherment, where the words can be read but the root language is unknown. Meroitic sign values are known from their Egyptian hieroglyphic equivalents, but the words are not from a recognizable language. For Linear A, however, the values of the signs are not as certain. Several root languages have been suggested: Semitic family (nearly universally rejected), some form of Greek (disputed and unlikely), and Lycian (Robinson, 2002: 198–199). The case for Lycian is unproven, but it seems the most likely candidate given the data at hand. Linear A remains undeciphered, but active archaeological research in the area raises the possibility of further finds and keeps hope alive.

Proto-Elamite

The Proto-Elamite script was used on the Iranian Plateau and at Susa from 3050 to 2900 B.C. There are 1500 known texts bearing about 100 000 characters. The sign list contains 600–900 or so graphemes, indicating a logosyllabic script. As for Linear A the number system is well understood, and some logographs have known semantic values derived from comparisons with Proto-Cuneiform, but the overlap is only about 1%. There is no cultural continuity between the Proto-Elamite and later Elamite writing (Linear and Cuneiform), and so these systems cannot be used in attempted decipherments (Potts, 1999). As the root language is still unknown and the vast majority of nonnumerical signs cannot be read, Proto-Elamite remains undeciphered. "The prospects of discovering script characters that could lead to a decipherment of Proto-Elamite are not great, but there are some areas of promise" (Englund, 2001: 29). Englund believes that the statistical analysis of the text might lead to the identification of the root language and eventually to a decipherment. This work is still in progress, but early results seem promising.

The Indus Script

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The Indus Script

The Indus script is found inscribed on objects over a vast region of South Asia, but the Indus heartland is in

modern-day Pakistan and northwest India. Since its discovery, the Indus script has presented a challenge to epigraphers. The sign distributions are highly patterned, and that there is structure in the texts is obvious to all those who have worked with them. At least 2500 Indus texts have been available for study since 1940 (Marshall, 1931; Mackay, 1938; and Vats, 1940). These circumstances have led to a series of attempted decipherments using a variety of different methodologies. The results have been as varied as the number of would-be decipherments (Possehl, 1996: 76–161, lists the 60 most important). Several facts have emerged from these decipherments. The first is that no two decipherments agree on sign values, even when they are assuming the same root language. The second fact is that there is no agreement on the details of the Indus sign list. Sign lists vary in length from 62 (Rao, 1973) to 615 (Wells, 2000). Third, beyond a general agreement that the texts are mostly read from right to left, there is little agreement as to the mechanics of the script. In fact, with some notable exceptions (Knorozov, 1968; Lal, 1975; Parpola, 1994; Bonta, 1995; and Wells, 2000), little attention has been paid to sign distributions and macro structures (syntax) in the texts. Decipherments have suffered from a lack of typological, temporal, and geographic control (Kelley and Wells, 1995). That is, they generally lump all texts into a single analytical group without regard for the type of artifact the text was inscribed on, the site of origin, or the age of the artifact. This methodology has yielded contradictory and confusing results. This is especially true of decipherments that rely on very general sign lists, which have the effect of systematically removing detail of sign relationships from the texts (Knorozov, 1968; Mahadevan, 1970; and Parpola, 1994) and in some cases creating relationships that do not exist between signs (Parpola, 1994).

The Indus script has about 600–700 signs, indicating a logosyllabic system. While there are 5644 seals and other artifacts associated with the Indus civilization, only 3821 of these have at least one recognizable Indus sign (totaling 18 680 characters). The Indus script has resisted decipherment for over 75 years, and there are several good reasons for this:

1. No bilingual
2. Unknown language
3. No long texts
4. Unknown type of script
5. Poor chronological control
6. No adequate corpus
7. No comprehensive sign list.

As things stand, nothing can be said about the language(s) of the Indus people that is not tentative or speculative. To further complicate this issue, the possibility exists that within the boundaries of the Indus Civilization more than one language was spoken and written in antiquity.

So is the Indus script undecipherable? The only hope for a decipherment lies in the identification of the root language of the Indus script through the structural analysis of the texts. This research is currently under way at Harvard University, and the forthcoming results may answer this question.

Rongorongo (Rapanui) Writing

Father Joseph-Eugene Eyraud was the first foreign resident of Rapanui (Easter Island). Father Eyraud wrote in 1864, "One finds in all the houses wooden tablets or staff covered with sorts of hieroglyphic characters" (Fischer, 1997: 11). The many wooden objects inscribed with Rongorongo were apparently used as firewood in the year 1865. The conversion of the Rapanui to Christianity and the scarcity of wood combined to motivate this sudden and nearly complete destruction of the written records of their history and religion.

The age of Rongorongo is not easily determined. Estimates range from before 500 A.D. to after European contact. The early estimate is based on a Rapanui story that the first settler (Hotu Matu) arrived with 67 tablets. In truth, the origin of the script cannot be convincingly argued. The development of a complex script for which only rare examples are known, and for which most of the details of its history and meaning are lost, cannot be easily resolved. This issue bears directly on the decipherment of the script. The subject matter of the texts and the identification of what the signs represent are of immeasurable assistance in the decipherment of the texts.

As to the Rapanui people: In 1770 there were an estimated 4000 people living on Easter Island. In 1862 and 1863, somewhere between 1000 and 2000 Rapanui were carried off as slaves to Peru; few returned. Father Zumbohm tells us that in 1866 so many Rapanui died from disease that it was no longer possible to bury them. Included among the dead was Vike, the last Rongorongo expert (Fischer, 1997: 9). By 1868 only about 900 Rapanui were left on Easter Island (Fischer, 1997: 20), and none were literate in the indigenous writing system.

The Rongorongo script is found inscribed on 26 artifacts from Easter Island. These inscriptions contain 14 083 signs arranged in 314 lines. There are about 120 basic signs in Rongorongo that can stand alone, or be combined to form more complex signs. These combinations can take the form of a simple ligature, a compound ligature, or what Barthel called fusions. For anthropomorphic signs, the combination

of heads, arms, legs, and other elements allows the creation (spelling) of sign clusters (words). The script is read left to right. This reading order is based on statements by three different informants made in 1873, 1886, and 1914 (Fischer, 1997: 349). Texts are read beginning at the bottom left of the tablet and the tablet is rotated 180 degrees after each line is read. In other words every second line is inverted. The tablets are read ascending on the obverse and descending on the reverse. Every Rongorongo artifact with more than one line of text uses the inverse boustrophedon method.

Fischer (1997) gives account of 50 individual attempts to decipher Rongorongo, some more serious than others. The most famous and creditable attempt at decipherment was made by Barthel (1958). Barthel gives the first comprehensive sign list and the first full set of credible drawings. His decipherment was based on a methodology that relied in part on the analysis of parallel passages. Barthel also performs counts of frequencies for all signs and grouping of signs, which is useful in the analysis of ligatures and the identification of words respectively. One result of Barthel research was the identification of the 120 basic signs of Rongorongo. There is a possibility that this script is syllabic, as Rapanui has complex vowels and glottal stops, it would require about 120–130 syllables to express the language. While Barthel (1958) did not decipher Rongorongo, he did nevertheless make a huge contribution to the field. His drawings, sign list, statistical analysis, and identification of the count of moons section of the Mamari tablet add immeasurably to our understanding of Rongorongo.

Minor Scripts

Minor scripts are those scripts present in few texts (sometimes only one), where the language is unknown, the exact sign inventory is unknown, and consequently the prospects for decipherment are not good. The Phaistos disk and Byblos pseudohieroglyphic are both examples of this class of writing. Daniels (1996: 29–30) provides a description of Byblos pseudo-hieroglyphic: The ancient city of Byblos has yielded a handful of enigmatic texts in an unknown script of which the most extensive are two on bronze tablets. The 1038 characters found on them can be classified into 114 signs. There have been four significant attempts at decipherment – none successful.

The Phaistos disk is a unique item not just because it is the only example of this system, but also because the text was apparently made with stamps of the individual signs. It dates to 1850–1600 B.C. and contains 242 characters using 45 different signs. Little can be said about this script except that it exists, and more examples are needed before there can be any hope of a decipherment.

See also: Decipherment.

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Sebeok, Thomas Albert (1920–2001)

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Over his illustrious career as semiotician and linguist, Thomas A. Sebeok contributed significantly to the shaping of ideas and practices within the two interrelated fields. He brought not only outstanding scholarship to both, but also an enthusiasm and joy that made them interesting in and of themselves. By his own admission, Thomas Sebeok was not the prototypical scholar, one who takes on a narrow topic and studies it to its most profound depths. Rather, he liked to characterize himself as an 'academic bee,' who darted around from flower to flower, sipping nectar, gathering pollen from flowers, serendipitously fertilizing whatever he touched. His intellectual curiosity, amazing working capacity, and ease of writing would yield more than 450 books and articles.

Sebeok was born in Budapest in 1920. After a brief stay in England, he immigrated to the United States. He earned a Ph.D. in oriental languages and civilizations at Princeton, after studying at the University of Chicago under Charles Morris (1901–1979) and Leonard Bloomfield (1887–1949). He also commuted to Columbia to pursue his studies of linguistics under the tutelage of Roman Jakobson (1896–1982), who later became his dissertation director and whose broader views on the place of language within the humanities and social sciences would shape Sebeok's intellectual development.

In 1943 Sebeok went to Bloomington to teach in the Army Specialized Training Program in foreign languages during World War II. As enrollment swelled into the thousands and the number of less-taught tongues rose to 15, he took over the helm of the program. At war's end, he was assigned to teach courses in English composition and world literature in the department of English, broadening his domain of expertise by conducting fieldwork on the Wisconsin Winnebago and the Bolivian Aymar. He subsequently created and chaired the Program in Uralic and Altaic Linguistics, laying the groundwork for what was to become a leading center for research and graduate training on the peoples of Central Asia as well as on the Mongolian and Tibetan languages.

Sebeok's trailblazing in the various language sciences and arts established him as a leading scholar at Bloomington throughout the 1950s and 1960s, where he founded the famous Research Center for Language and Semiotic Studies and edited the journal *Semiotica* from its inception in 1969 until his death in 2001. Sebeok's intention was to give semiotics an autonomous disciplinary niche in the academic landscape rather than being perceived merely as a set of idiosyncratic techniques and loose concepts. For his pivotal efforts he was honored with the presidency of the Linguistic Society of America and of the International Association of Semiotic Studies.

Among Sebeok's most important books, the following stand out: *The sign and its masters* (1979), *The play of musement* (1981), *Contributions to the doctrine of signs* (1985), *A sign is just a sign* (1991a), *Semiotics in the United States* (1991b), and *Signs: an introduction to semiotics* (1994), *The forms of meaning* (with Danesi, 2000), and *Global semiotics* (2001). An overall assessment of his life and work can be found in the excellent booklet by Petrilli and Ponzio (2001). A retrospective of his ideas and his contributions to semiotics can be found in the anthology edited by Danesi (2001). Sebeok's place in the history of semiotics has been taken up by John Deely (2001) in his monumental historiography of semiotics.

Sebeok's main claim to fame was his work on animal communication and on the biological basis of the sign. He argued that the central goal of semiotics can be condensed, essentially, to figuring out how signs model reality in species-specific ways. Model making typifies all aspects of human intellectual and social life, Sebeok argued, constituting a truly astonishing evolutionary attainment, without which it would be virtually impossible for humans to carry out their daily life routines. All this suggested to him the presence of a 'modeling instinct' that is to human mental and social life what the physical instincts are

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to human biological life. In effect, the main tenet of Sebeokian semiotics is that the signs made by humans to understand the world result from this instinct.

The modeling process can be simulative, whereby the form is designed to resemble its referent in some way. It can also be relational, indicating the spatial or temporal relations of referents to each other. And it can be based on cultural conventions. The form made with the index and middle finger in the shape of a 'V' to stand for 'peace' is the outcome of specific cultural events (which need not concern us here). Human modeling is unique among species because, Sebeok maintained, it was governed by four basic principles:

1. knowledge is indistinguishable from the signs used to model it (the modeling principle);
2. modeling unfolds in various ways, from simulation to culture-specific symbolic practices (the variability principle);
3. models and their referential domains are interconnected to each other in cultural contexts (the interconnectedness principle);
4. all models display the same pattern of structural properties (the structuralist principle).

The modeling principle implies that in order for something to be known and remembered, it must be assigned some signifying form. The variability principle implies that modeling varies according to the referent and to the function of a representation. The interconnectedness principle asserts that a specific form is interconnected to other forms (words to gestures, diagrams to metaphors, etc.). The structuralist principle claims that certain elemental structural properties characterize all models (paradigmaticity, syntagmaticity, etc.).

Throughout his life, Sebeok saw himself not only as an academic bee but also as an 'academic sign' that spawned further, more developed academic signs, through publication and teaching. His goal was to make semiotics a global enterprise. And in this he was largely successful. Sebeok passed away peacefully at his home in Bloomington on December 20, 2001.

See also: Altaic Languages; Bloomfield, Leonard (1887–1949); Jakobson, Roman (1896–1982); Morris, Charles (1901–1979); Uralic Languages.

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Sebeok, Thomas Albert: Modeling Systems Theory

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Introduction

Thomas A. Sebeok (1920–2001), in company with Marcel Danesi, proposed at the very end of his long life a significant extension of the till-then standard version of semiotics owed to Charles S. Peirce (1839–1914). This new recension (Sebeok and Danesi, 2000), a theory of the systems that underlie the linking of signifiers with what they signify – or in the more clipped term of Sebeok and Danesi, 'modeling systems theory' – had two principal aims: (1) to emphasize the mental *acts* by which signifiers, or 'signs,' are tied to what they signify, and (2) to cross-cut the primary Peircean division of signs, which categorized them in terms of just the *logical* nature of what unites them with what they signify – 'index' (*actuated* by what it refers to), 'icon' (*resembles* what it refers to), and pure 'symbol' (neither actuated nor similar, hence *arbitrary*) – by newly categorizing those ties by their *complexity*. These two aims are conjoined, since in articulating and understanding signs, we may well be at least as responsive to the complexity of our associations as to their logical nature. By invoking an appeal to the mental and physical nature of those who make and receive signs (most importantly, us), Sebeok and Danesi in this way began to build a much-needed foundation for the science of 'cognitive semiotics.'

Peirce's mighty though tenebrous works (edited and published posthumously, from 1931 to 1958) had defined the modern practice of semiotics as being chiefly concerned with the logic of how signs have meaning, i.e., with how they are logically associated with their referents. A sign (e.g., a weather vane) that is perceived as being somehow actuated by its imputed referent (the local wind's direction), Peirce defined as being thereby indexical; a sign (e.g., a road sign indicating 'curve ahead'), perceived as somehow resembling its imputed referent (the upcoming curve), was for him iconic; and the default case, anything else (e.g., the word 'horse'), with a relation to its referent that is perceived only as being wholly arbitrary (the word 'horse' is neither actuated by nor in any known way physically like a horse), was thereby for him symbolic. A sign is a sign only to him or her who perceives it as such and ties it to some referent; Peirce, though, was rather incurious about the actual perceptions, as psychological processes. Though his sign-referent relations were indeed mediated or extended by a third entity called the 'interpretant,' his interpretants were just further signs, and were no less abstract. His interpretants were not creatures with earthly minds and finite brains; they could just have well been Martians or angels. So his signs were not affected by the real predispositions of minds and brains or by their ability (or inability) to juggle complex significations – as, of metaphors, for example (*that man is a pig*) – or by the mere fact that brains are physical and reside in bodies that inhabit and respond to a physical world rife with other physical things clamoring for, and often intended for, speedy interpretation. Nor, given his time and place, did Peirce accord the physiological execution or recognition of signs, as, for instance, by our neural speech mechanisms and by our vocal and auditory tracts, much serious attention, even though we are so natured and nurtured as to be capable of rapidly making and distinguishing some sounds and sequences but never others. Peirce was above all a logician, and one rather removed from the mundane claims of the corporeal, especially during the latter and reclusive half of his life that yielded most of his voluminous semiotic writings.

Sebeok and Danesi's new categorization of signs and referents, in terms of their individual and joint complexities, imposed on signs, then, a fresh rank-ordering, from simplest to most complex, ranging upward from simple signs tied to simple referents, through simple signs tied to complex referents, and then complex signs tied to simple referents, to, finally, complex signs tied to complex referents. (Somewhat different notions of 'complexity' are involved in their hierarchy.) An example at the first, or lowest, level of complexity (simplex signs/simplex referents) is the word 'cat' as tied to "a single referent or referential domain" (Sebeok and Danesi, 2000: 20) such as a particular cat or the set of all cats. Sebeok and Danesi called such a sign 'singularized.' At the next higher level (simplex/complex), we find the metaphorical, or in their term 'connective,' sign, as found in the sentence *That Louis Armstrong, he's a real cool cat*, in which 'cat' is still a simple sign (a word) but its referent is complex, being both feline and human. (To signs of this second level, and to those of the third and fourth, Sebeok and Danesi applied the term 'form,' but here, except where otherwise noted, the traditional term 'sign' will be preserved for the reader's convenience.) At the next higher level (complex/simplex), the sign is complex while its referent is simple: this Sebeok and Danesi called a 'composite' sign – for instance, the complex sign 'popular household pet that is useful for killing mice and rats' and

the (relatively) simple referent '{the set of (all) cats}.' At the fourth and highest level (complex/complex), a 'cohesive' sign provides a definition in which, for example, the same 'popular household pet' is placed in a Linnaean codification of related felines such as '{cat, tiger, lion, cheetah . . .}' (2000: 3).

Details

In their initial exposition, Sebeok and Danesi focused on symbols to the exclusion of the other two sorts of Peircean signs, indexes and icons, but clearly icons can also participate in these complexity relations. For instance a model of the dirigible Hindenburg, as standing for (and resembling) the real thing, would be a 'singularized' (simplex/simplex) sign in their scheme, and a picture of the Hindenburg erectile and spewing flames, interpreted both literally as referring to the Hindenburg and metaphorically as referring to a certain physiological event, would be a 'connective' or metaphorical (simplex/complex) sign. A Hindenburg model denoted by being placed in a Linnaean set of models of other equally doomed rigid dirigibles ({the R101, the Shenandoah, the Akron. . .}) would be a 'cohesive' or complex/complex sign, at the fourth and highest level of complexity. (That such sets are indeed subjectively defining can be seen in the fact that the set of models just named would most likely define the Hindenburg model as representing a '(rigid) dirigible'; however, placed in a different and superordinate set, including replicas of {the Titanic, the Queen Mary 2, and the Normandie}, the Hindenburg model would more likely lend itself to being defined as representing 'a large passenger ship.') Even an index such as a weather vane might be a connective or metaphorical sign if interpreted as signifying both the local wind and, say, a politician who changes direction with every passing breeze. Thus, as is seen, the new Sebeok–Danesi complexity categories cross-cut all three kinds of signs of the familiar Peircean typology. The weather vane that is tied both to a literal referent (the local wind) and a metaphorical one (a malleable politician) is, of course, at the same time both an index and a symbol, albeit a symbol for changeability (in politicians) that is based on the changeability of the index (the weather vane) with which the symbol is paired in the connective sign the two referents share. This issue returned in Sebeok and Danesi's notion of 'extension,' whereby a sign of one category becomes a sign of another (see later).

In these new complexity categories, which are therefore thoroughly cross-classifying, Sebeok and Danesi notably expanded the ways in which signs are defined, and in a way that bids fair to provide a means of heightening their potential for achieving psychological reality, if people prove responsive to their signs' complexities, as they demonstrably do to their logical or Peircean nature, as reported by psychological experiments (e.g., Paivio and Walsh, 1993; Katz *et al.*, 1994).

Plumbing more deeply into the issues they thus raised, Sebeok and Danesi proposed that signs of whichever of their four categories, joined to what they signify, can be arrived at through any (or any combination) of the three logical means fingered long ago by Peirce: by induction, deduction, or abduction – that is, by inference from example, or by deduction from logical syllogism, or by informed guesswork. Sebeok and Danesi also noted that their signs can be reclassified by still another criterion, namely, by whether the signs constitute *denotata*, *connotata*, or *annotata*: these are, respectively, the simplex sign, such as the word 'house' meaning 'dwelling'; the extended sign, such as the word 'house' meaning 'legislative assembly'; and the wholly subjective sign, the word 'house' meaning, perhaps, for an individual, the abode where he or she first set up housekeeping, (for instance, with his or her earliest consort).

Both of the categorizations just mentioned again cross-cut all four of their sign types defined by relative complexity.

Icon, Index, Symbol, and Primary, Secondary, Tertiary

A third and equally profound categorization also cross-cuts Sebeok and Danesi's basic four-way classification of signs in terms of their complexity: namely, Peirce's familiar categorization in terms of logic, which, as noted earlier, sorts signs by whether they are physically associated with the referents (indexes), or resemble their signifieds (icons), or are tied to them arbitrarily (symbols). These Peircean categories can be regarded as progressing (in the order listed) from lesser to greater complexity (though see later, for further discussion), and it is therefore not surprising that Sebeok and Danesi reintroduced Peirce's three-way categorization from a fresh angle, as part of a treatment of the ways in which signs of one Peircean type can 'extend' so as to belong to another. Such extensions come about as one product of the very means by which our signs achieve representation, the process by which we go about "transforming sensory knowing into conceptual knowing" (Sebeok and Danesi, 2000: 6) or, in plain words, our way of transforming what we sense into signs to which meaning is attached (2000: 9–10).

A 'primary' such process, in this classification, is one that produces a sign (an index), by virtue of just a primitive sensory or perceptual apprehension of

something, as when a child forms a generalized mental image from perceiving the family dog. The same child might then proceed to a more complex sign, probably an icon, via a secondary transformative process, thus achieving some idiosyncratic word for the dog in question, maybe the onomatopoeic word 'woof.' That child might then advance, via a tertiary transformation, to a more abstract hence more complex sign, a symbol, such as the local word for a domestic canine, the English 'dog(gie)' or the Portuguese 'cão.' Or, equivalently, the child may come up with the familial name 'Fido,' or whatever (Sebeok and Danesi, 2000: 10). These operations are quite explicitly put forward as mental activities, and they again connect the Sebeok–Danesi theory with cognitive matters. As such, they are, of course, testable.

We return now to primary, secondary, and tertiary transformations (in particular, to their extensions), and to an alteration in their characterizations, after pausing to sketch some of the clarifying principles that, with Sebeok and Danesi, governed their theory as a whole.

Principles

Generalizing, Sebeok and Danesi (2000: 11) advanced as a fundamental thesis the notion that all semiosis, the activity of tying signifiers to what they signify, rests on six principles:

1. The modeling principle, which holds simply that all semiotic representation is the end result of (re)modeling, that is, of the process of transforming concepts and/or percepts into signs.
2. The representational principle, which holds that knowledge (as such) is indistinguishable from how it is represented.
3. The dimensionality principle, which holds that the modeling of signs unfolds on three levels or dimensions, namely, the iconic, the indexical, and the symbolic (in Peirce's senses), of which the first two are said to be "prior developmentally and cognitively."
4. The extensionality principle, which holds that more abstract models derive from (and/or incorporate) more concrete or sense-based ones, as, for instance, when the set {cat, cheetah, tiger . . .} incorporates the simplex 'cat.'
5. The interconnectedness principle, which holds that every specific sign is interconnected with other signs – words, for instance, being interconnected with gestures, and diagrams being interconnected with metaphors.
6. The structuralist principle, which holds that all signs are characterized by the same elemental structural properties.

The elemental structural properties of the structuralist principle are also, but coincidentally, six in number. They are (1) the property whereby signs are at least minimally differentiable from each other (the paradigmatic property); (2) the property whereby a given semiotic system permits some sequences (*I drive a Mercury*) while forbidding others (**Mercury I drive a*) (this they call the 'syntagmatic' property); (3) the equivalence property, which under some circumstances permits the interchange of synonymous signs, as when the Roman numeral DCLXVI can be interchanged with the Arabic number 666 (whereby hangs a tale; see Watt (1989)); the properties of (4) synchronicity and (5) diachronicity, whereby signs have a particular shape at a certain point in time and can, over time, change that shape; and finally and most fundamentally (6), the property of significance, whereby signs can have meaning: that is, the property whereby a relation can obtain "between [a] physical signifier and [a] referent . . . to which it calls attention, namely, [its] signified" (Sebeok and Danesi, 2000: 12–13).

It is to be noted that these six structural properties are stated to be possessed by **all** signs, of whatsoever sort; naturally, the signs of more complex semiotic systems (language, for example) can possess still other properties. For example, the sign *I drive a Mercury* is more than a mere sequence of words, it is also a syntactic structure consisting of a noun phrase and a verb phrase (respectively, 'I' and 'drive a Mercury'), in which the first and second components are fitly characterized as 'subject' and 'predicate' and can be intuitively recognized as such by speakers. That superficial (subject + predicate) structure is, of course, capable of being analyzed into layers of progressively deeper armature (for instance, the predicate *drive a Mercury* resolves into the verb 'drive,' in the present continuative tense, and its object 'a Mercury'; and *a Mercury* resolves into the determiner 'a' plus the noun 'Mercury' that it modifies). Even the simple letters of the alphabet have an internal structure, 'B D E F' and so on, being analyzable as consisting of a *vexillum* or *hasta* – '|' – plus an augmentation to the right (Watt, 1992). The fact that, save in the case of 'J,' the augmentation is always to the right has a significance of its own (basically, that we write and read from left to right and so establish the basis of a letter ('|') before proceeding to the loops or whatever that differentiate one vexillary letter from another). So signs of various sorts can have underlying structures both superficial and profound that can have significance in their own right, and there are therefore 'properties,' arguably less universal than the six of Sebeok and Danesi's list, that are yet to be added to the list.

A Minor Triad: Symptom, Signal, and Name

All signs, starting with their singularized, or simplest, sign, Sebeok and Danesi subcategorized as iconic, indexical, and symbolic (the traditional Peircean division), plus the symptomatic, the signalic, and the nominal (Sebeok and Danesi, 2000: 20). The last three categories of sign characteristics are, of course, ordinarily considered to be but special cases of the classical three Peircean categories (or dimensions; see earlier), but, still, they are after all rather distinctive. Thus a 'symptom' is a special class of the index, since it is taken as a sign by virtue of its being physically caused by an interior state, most often an indisposition; and a 'name' is any arbitrary sign that both points to and identifies something ('Albert Einstein,' 'Fido,' 'newt') and is therefore, in Peircean terms, both an index and a symbol. Sebeok and Danesi defined a signal as any sign that "triggers a reaction on the part of the receiver" (2000: 22–23), which definition seems to fit all three Peircean kinds of signs, whether index, icon, or symbol, since all signs can perform this function – indeed, they **must** perform it to act as signs. Still, it is useful to distinguish at least the 'symptom' and the 'name.'

Conversions and Metasymbols

Sebeok and Danesi's firmest point of departure from abstract semiotic studies was, as remarked earlier, their postulation of the mental representations that are the ties between signs and what they signify. In fact, their discussion of this issue formed the very heart of their treatment, which is clear from their describing the act of forming such a representation as "converting information from one form into another" (Sebeok and Danesi, 2000: 33). Their introductory illustration of this process came from the life of bees, which, in their dances, with "amazing accuracy" (2000: 30), convert the details of flight to and hiveward from a food source into a communiqué of the direction of the source from the hive, its distance, and its quality. Sebeok and Danesi compared this feat to our making of nautical charts, which convert location on this globe into Cartesian coordinates in terms of longitude and latitude and into an (iconic) indication of shorelines, shoals, and like hazards (2000: 32). They also compared it to the process by which we convert Arabic numbers into Roman numeral systems – e.g., again, 666 into DCLXVI – and to the similar process by which we convert ordinary spelling into the dots and dashes of Morse code (2000: 36), as when the distress signal 'SOS' was transmitted ('. . . – . . .') from the sinking RMS Titanic. They then proceeded to the modeling of more complex connective signs (2000: 37–39), in particular those signs we are used to calling 'metaphorical.' Here, their main instance is the metaphor by which we deal with the inchoate act of understanding by transforming it into the accessible act of 'seeing,' as illustrated by the exclamation *I don't see* (= understand) *what you mean*. A further 'connective' remove from immediate accessibility is provided by an example such as *As far as I can* ***see,*** *that theory is a little blurry*, wherein, again, there is nothing concrete to be 'seen' at all. Leaps such as these Sebeok and Danesi identified as involving 'metaforms' (and by extension 'metametaforms' and so on), whereby 'understanding' has been converted into 'seeing' and more particularly into 'focusing.' What this view discloses is in fact a chaining process, infinite in principle, in which 'understanding' is conveyed by 'seeing' and 'seeing' (through a lens) is narrowed to 'focusing.' This constitutes a most intriguing approach to the treatment of metaphor and particularly to the fact that metaphors burgeon in unexpected manners and to unexpected removes, provoking the mind to follow them in a most gratifying way. This, surely, is one of the benefits (not the only one) of poetry, and one as well clarified here as in many other places during the many centuries of its treatment by literary critics. And, as Danesi (1993: 73 *et passim*), among many others, noted, this kind of metaphorical extension is also a fruitful source of linguistic innovation.

Sebeok and Danesi (2000: 40, 150–151) carried their treatment of connective semiosis a step further in their discussion of the metasymbol, such as the rose as a symbol for human love, a connection that depends on the rose's color and scent and generally pleasurable qualities, which qualities (quite apart from color and scent, unless, say, an inamorata is red and aromatic) are also those imputed to a loved one. Sebeok and Danesi concluded their section on connective semioses by opening their framework to the metonym, wherein one thing is used to refer to another, often in a *pars pro toto* way, as when we say *She's been reading Tolstoy*, whereby 'Tolstoy' stands *pars pro toto* for Count Leo's works, such as *War and peace*.

Varieties of Semiosis: Primary, Secondary, and Tertiary

Sebeok and Danesi presented a method, which they termed 'systems analysis,' for studying all varieties of semiosis, as practiced by creatures of whatever degrees of sophistication (but especially humans). To avoid confusion from the outset, it is to be noted that

in presenting this methodology they mostly assigned iconlike or imitative sign-making to their primary variety of semiosis, and indexlike or causative sign-making to their secondary variety, thus reversing the rank-ordering they followed in their earlier presentation of transformations. This apparent change of heart is presumably to be attributed to the fact that settling the issue of which is more primitive or more primary, the index or the icon, is very much an open question. Certainly from one vantage the index may seem more primitive; from another, the icon may seem more primitive, depending on whether the word 'moo' is regarded as more primitive than a wind-actuated weather vane.

At any rate, Sebeok and Danesi characterized the primary modeling system as that which "allows organisms [of whatever sort] to simulate something" (2000: 45) – that is, produce an iconic sign – in order to communicate with other organisms (mainly those of like sort). They identified two sorts of simulation, namely, the spontaneous and the imitative, which they termed the 'osmotic' and the 'mimetic,' respectively. When people reveal what they are feeling by spontaneous facial expressions the disclosure is osmotic; when they describe some sound as a 'crash' or a 'moo,' their crudely imitative emission is mimetic. ('Crudely imitative,' because colliding cars do not say *crash* and cows could not say *moo* if their lives depended on it.) Sebeok and Danesi followed their initiating discussion of the onomatopoeic imitation of heard sounds with an illuminating general treatment of the iconicity of words that audibly resemble, in some salient way, what they signify. Of course, some of these 'resemblances' are adventitious since, as Maurice Bloomfield (1895) pointed out long ago, when a number of words have formed a paradigm by sharing both a meaning and a sound (however this came about), speakers may associate this (arbitrary) shared meaning with the shared sound, and thus, in time, swell the paradigm by swerving like-sounding words into having like meanings, or even by inventing new ones of the same nature. An example is provided by the many English words in initial 'fl-' that betoken a flowing of some sort ('flow,' 'flux,' 'flood,' 'flue'), and which seem to have gravitated toward each other in such a way as to suggest that 'fl-' betokens a flowing in its own right, despite the prevalence in English of the many other non-'flowing' words, equally salient but not saliently part of a paradigm, such as 'flea,' 'floozy,' and 'flim-flam,' plus the occurrence of words also beginning with 'fl-' that betoken meanings of a different paradigm, meaning some sort of transient visual phenomenon ('flame,' 'flicker,' 'flitter,' and the like). Another example is the paradigm of words beginning with 'sn-' ('snout,' 'sniffle,' 'snort'). A seeming example of innovation into the latter paradigm is the pleasing creation of 'snorfle' (from the Coen brothers' 1994 movie, *The Hudsucker proxy*) – presumably a portmanteau of 'snort' and 'snuffle' – meaning something like 'to lap up noisily.'

Having applied their treatment of primary (or primitive) modeling systems to singularized modeling (simplex sign, simplex meaning), Sebeok and Danesi proceeded (2000: 58) to a discussion of primary composite modeling, wherein complex signs are combined to denote simplex meanings, as when sentences seem (to some) to order the order of mention of their constituents so as to convey a corresponding order of intended saliency, as perhaps in *Water, said W. C. Fields, was unfit for human consumption*, or, often, so as to reflect an order of initiative, with the actor therefore first and the acted-upon second (*Jack kicked Jill*). Sebeok and Danesi then passed on to primary cohesive modeling (complex sign, complex meaning), found especially in the nonverbal codes, such as those of courtship, that are found across species, ranging from cockroaches to humans. (Granted, though, when Grace Kelly swivels to kiss Cary Grant in the Hitchcock movie *To catch a thief* (1955), she looks supremely unroachlike.) Last, Sebeok and Danesi considered primary connective modeling (simplex sign, complex meaning), the metaphorical signs of which designate, as Sebeok and Danesi justly remarked, not denotata (direct meanings in the usual sense), but connotata (indirect meanings merely implied). In *the professor is a snake*, as they noted (2000: 71–72), clearly the speaker is not asserting that the professor is truly ophidian (has scales and fangs, crawls on his belly), but rather that he displays some of the other undesirable characteristics popularly ascribed to serpents (stealth, unwholesome appearance, an overwillingness to envenom). Finally, Sebeok and Danesi proceeded to specify some of the image schemata, or 'binary iconic features' – here, of course, they follow Lakoff and his collaborators (e.g., Lakoff and Johnson, 1980; Lakoff, 1987, 1993) – that underlie metaforms, such as those just mentioned, and which provide their "psychological source[s]" (2000: 76). For example the 'thinking = seeing' metaform taken up earlier, wherein 'see' is used to mean 'think,' Sebeok and Danesi noted must be based on the notion that 'thinking' is an 'internal seeing' of a sort. As they also noted, these more concrete embodiments of abstract actions such as 'thinking' are so much more vividly felt than their corresponding abstractions are that they probably offer a firmer basis for many feats of memory. The kind of sensory information that motivates such metaforms thus makes possible a lively mediation between the *Umwelt* (the perceived outer world)

and the *Innenwelt* (the inner world), to use von Uexküll's (1926) terms.

These points concluded Sebeok and Danesi's treatment of primary, or primitive, modeling systems, those that spring from a sensory or perceptual apprehension of a thing. They then discussed the secondary and tertiary modeling of systems, the first entailing an elementary reference to a thing in an indexical manner, the second entailing a more advanced reference to a thing, i.e., in a symbolic manner. (A tertiary, or symbolic, reference is more advanced in the obvious sense that it is derived from the cultural environment, hence is chiefly the special province of humans (2000: 82ff).) As part of this discussion, Sebeok and Danesi took up the topic of what they called 'extension' (2000: 296ff), a process whereby a sign of the primary or iconic level of simple apprehension, for example, can be raised to a higher level. Thus, the word 'crash,' which as a crude imitation of a sound is by definition basically primary, becomes altogether raised to the tertiary or symbolic level when it is extended, losing any direct reference to sound as such, so as to occur in a sentence such as *His business has crashed*. (As was noted earlier, all imitative words such as 'crash' are already partly arbitrary, hence partly symbolic; Sebeok and Danesi's point is best elucidated by considering that, when extended upward, the imitative quality of all or almost all of such words can be bled out of them. The point is a delicate one, but it may be clarified by considering some words that are highly imitative, such as 'ding-dong' and 'bang,' next to some words that are much less so, if at all, such as 'bell' and 'blast.')

Signs originating at the tertiary level, though they are already arbitrary hence symbolic, can be extended **within** the tertiary level to become symbolic in some other sense. Thus the tertiary word 'blue,' which begins by referring simply to a color, can become symbolic in some extended sense – without, of course, becoming any more arbitrary – when transferred to the phrase 'blue movie,' in which 'blue' means 'pornographic.' (The association between 'blue,' referring to the color, and 'blue,' meaning 'pornographic,' apparently originated long ago, when jailed prostitutes were dressed in blue (cheaply dyed) uniforms, which they then wore when released back onto the streets to ply their trade anew (Roppolo, 1953).)

Though Sebeok and Danesi considered only 'upward' and 'sideward' extensions (e.g., primary to tertiary and tertiary to tertiary), their analysis can easily be amplified to include 'downward' extensions as well. Thus the word 'crash,' to take an example used earlier, after it has been divested of its imitative quality by being lodged in a sentence such as *His business crashed*, can be 'reprimarized,' so to speak, regaining a little of its lost imitative character, by adding *and he had to hire a lawyer to pick up the pieces*. In any case, Sebeok and Danesi's discussion of extensionclarified a most intriguing problem, that of describing how signs originating in one Peircean paradigm can shift sideward within it or shift upward or downward into another.

Conclusion

In their summative final chapter, Sebeok and Danesi (2000: 158–189) looked back over their various schemata and, given the limitations of present knowledge about signs and signification, they invested them with fresh psychological import and made them available to empirical typological techniques. In so doing, they have redirected the emphasis of semiotic inquiry from the investigation of the logical nature of the sign–signified relationship to the study of semiosis, the **activity** through which sign becomes tied to signified. This redirection is nowhere better exemplified than in their definitions (2000: 161 ff) of semiosis as the "neurobiological capacity to produce [signs]" and of modeling as "the channeling of the semiotic activity towards . . . the representation of some referent" (i.e., the representation of something to be signified by a sign that signifies it). So modeling, as they put the matter succinctly, "reveals how the brain carries out its work of transforming sensory forms of knowing into internal forms of thinking and external forms of representation," so that "a specific external model is thus considered to be a 'cognitive trace' to the form [that] a concept assumes in the mind." Given their classificatory schemata, their exposition, and their rich set of examples, Sebeok and Danesi have provided a principled means of categorizing signs and the activities that use and extend them so as to achieve an apperception of the world we sense by means of recasting that world as the signs by which we understand it.

See also: Peirce, Charles Sanders (1839–1914); Sebeok, Thomas Albert (1920–2001); Sign Theories.

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Second and Foreign Language Learning and Teaching

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Not that long after the execution of his brother, Vladimir Lenin was himself banished to Siberia because of his political activities. In Imperial Russia, Lenin knew that the sequence of punishments for political offenses was first imprisonment, then banishment to Siberia, then banishment abroad, and then, execution. He was on step 2 of this sequence. He also knew that after his period in Siberia he would not cease his political activities and that the next stage would very likely be banishment outside Russia. Anticipating this possibility, he had evidently decided that his countries of choice for banishment would include Britain, and therefore it would be sensible to prepare himself, in Siberia, by learning English. Accordingly, he devised his own method. First, he tabulated and learned all the nouns. Then he went on to the verbs, the adjectives, the syntactic rules, and so on. He concluded that this systematic approach would enable him, on arrival in London, to converse with the locals. As it happened, he was amazed to discover that not only could he not converse well, he could not converse at all, and still less understand what people said! This chapter will explore factors that are relevant to the learning of a language, as well as the teaching that can promote such learning. It will review research into the nature of learning and acquisition and then go on to consider current views on the nature of language instruction. These reviews may shed light on the alternative courses of action that Lenin might have adopted.

Learning and Learners

We will consider language learning first, since it has a more fundamental role. A number of preliminaries are unavoidable here. First, there is the issue of a critical period for language, that is, a period during which acquisition is different from other learning processes. It will be assumed that there is such a critical period. Robert DeKeyser has demonstrated clear age-on-arrival effects for ultimate level of proficiency for Hungarian immigrants to the United States, that is, the younger the arrival, the higher the eventual performance. This research is far-reaching in its consequences. It implies that subsequent (second) language learning is mediated by general cognitive processes, an interpretation that has important consequences for instruction especially.

The second underlying issue concerns the concept of a focus-on-form. Michael Long has argued consistently that when learners engage in interaction, it is natural to prioritize meaning, with the result that form does not obviously come into focus. As a result, for effective learning to occur, it is necessary to *contrive* a focus-on-form, but in such a way that meaning is not compromised or distorted. A focus-on-form approach is consistent with current conceptualizations within cognitive psychology regarding the functioning of limited capacity attentional and memory systems. We cannot attend to everything, and so attention has to be directed selectively, and memory resources, especially working memory, have to be used efficiently.

The third underlying issue is over whether what is learned (the representation issue) is implicit or explicit, and indeed whether the learning process is

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The third underlying issue is over whether what is learned (the representation issue) is implicit or explicit, and indeed whether the learning process is

itself implicit or explicit (the transition issue). Allied to this is the question as to whether something that was initially explicit, e.g., a language rule or a structural pattern, can become implicit, or vice versa. The implicit-explicit distinction has largely replaced the earlier contrast between learning (explicit) and acquisition (implicit), and this realignment has been associated with a greater influence from contemporary psychology, and a strong interest in operationalizing the difference between implicit and explicit learning. Where people stand on this issue also has an important impact on different views of instruction.

Finally, by way of preliminaries, there is the question of the stages through which learners pass. It is useful to think of:

- Input processing strategies and segmentation
- Noticing
- Pattern identification, restructuring and manipulation
- Development of control
- Integration and lexicalization

Learners, of course, may be at different stages in this sequence for different parts of their developing language systems.

Each of these stages raises issues regarding the nature of second language learning. Bill VanPatten has argued that learners can benefit from being taught how to process input more effectively in order to focus on form. At the next stage, Dick Schmidt has developed the concept of noticing, arguing that before some aspect of language structure can be learned, it first has to be noticed, preferably with awareness. For Schmidt, the gateway to subsequent development is attentional focus, since it can permit deeper processing. In taking this position, Schmidt is arguing against Krashen's ideas on naturalistic learning and the acquisition-learning distinction. Clearly, though, whether noticing triggers explicit or implicit processes, the next stage in development is that the element that is noticed should become the basis for the learner identifying some sort of structural regularity in the language. This might be a new pattern, or the complexification of an existing pattern, and is the phase that accounts for development in the interlanguage system.

To perceive a structural regularity in the target language, however, does not mean that it can be used. Interlanguage development may sometimes be sudden and complete, but most accounts of second language learning assume that first insight has to be followed by a process of gradually increasing control over a new form. During this process, it is assumed that slow, effortful, and attention-demanding performance, which may also be error-prone, is progressively replaced by less conscious, easier, automatic, and fast performance. In this, the skilled control that is achieved over language performance resembles learning that occurs in other domains. Researchers have been interested in exploring the conditions that can enhance this development optimally, as well as describing the course and speed of such learning. A number of researchers, such as Nick Ellis, use general laws, for example, the power law of practice, to describe such learning.

In previous years, it was generally thought that the development of a high degree of automatization and control would have been the end-point of the learning process. In the last twenty years or so, linked perhaps with the development of corpus linguistics, there has been a greater realization of the importance of formulaic sequences and idiomatic language. That is, rather than prefabricated language being a minor part of the psycholinguistic abilities of the speaker, they are now seen as pervasive and vital for real-time communication. It is assumed that highly competent language users rely on formulaic language to ease the processing or computational burden during ongoing language production, and to sound native-like.

Having explored these preliminaries at a more explanatory level, there are a number of theoretical accounts relevant to the nature of second language development. Obviously the first to consider here is Universal Grammar (UG). Researchers influenced by this approach take a range of different positions, for example, full transfer/full access, vs. for example, residual access through previous parameter settings. Basically, all approaches assume the importance for second language learning of the continued existence of a Universal Grammar but differ over the impact that L1 learning has on this development. Lydia White proposed that it would be more appropriate to consider the role of UG in second language development as constraining the problem space, and requiring that L2 grammars be consistent with it, rather than expecting the L2 grammar to follow a deterministic path. In any case, in terms of relevance for instruction, there is the issue that UG researchers, necessarily, investigate features of language that are thought to be revealing about the operation of UG. In the main, these features, for example, the 'empty category principle,' the 'overt pronoun constraint,' do not follow the priorities of others, for example, language teachers. Second language research may therefore be more revealing for Universal Grammar than Universal Grammar is for language teaching.

An interesting contrast to UG that has emerged in recent years is William O'Grady's 'general nativism.' In this, there is acceptance, as with UG (which O'Grady terms 'grammatical nativism'), that human

beings are 'wired' to perform learning tasks in a certain way, but O'Grady proposes that this nativist capacity is general in nature, rather than a module specialized for language. He suggests that the more general propensities (a) to operate on pairs of elements, and (b) to combine functors with their arguments at the first opportunity, are sufficient to account for the nature of language development and the structures that emerge. It is too early to evaluate this approach as yet, but it is interesting that there are slight affinities between it and that of another theorist, Manfred Pienemann and 'processability theory.' Drawing upon lexical functional grammar and Levelt's processing model, Pienemann takes as fundamental a performance-based incremental approach to language generation. He offers a different set of processing procedures and routines to O'Grady, for example, lemma access, the category procedure, etc., but he, too, then makes predictions about sequences in second language development. So in either case, the nature of the grammar that results, is seen as the consequence of processing procedures.

In contrast, there have also been proposals in recent years to account for second language development through connectionist architectures. These are networks of associations, involving several layers to connect inputs and outputs, i.e., containing hidden layers that serve as general-purpose learning devices. They are implemented through computer software, and this software can 'learn' and be tested. For example, it could take the input of a simple verb form in English and the output would be a past tense form. Such networks can be trained to produce highly accurate past tense outputs, for example, including characteristic mistakes that second language learners make. There is nothing specifically linguistic about the networks, so they are used to support the claim that specialist modules are not required for languages to be learned. The best known example of a connectionist network applied to second language learning is the competition model. This uses cues such as animacy and word order to predict how well learners with different L1/L2 combinations will learn how to assign subject and object roles in sentences.

The approaches to learning covered so far have focused on individual mental structures and processes. But other approaches have been more concerned to situate learning within a social context, and to explore the potential that interaction provides to give learners useful data. One example of this is Long's interaction hypothesis. Assuming the inadequacy of input alone (i.e., positive evidence), Long focuses on the provision of negative evidence, i.e., evidence that a mistake has been made. He proposes that such evidence can be obtained within natural interaction. In particular, he proposes that particular sorts of interactive encounter, i.e., those in which there is negotiation of meaning, leading to feedback moves such as confirmation checks, comprehension checks, clarification requests, and especially interlocutor recastings of the L1 speaker's utterance, provide timely and personalized negative evidence without compromising the (vital) naturalness of communication. This approach is located within Long's proposals for the importance of a focus-on-form, since form is brought into focus incidentally through these conversational devices, enabling learners to attend to it and perhaps, at a later stage, incorporate the effects of such feedback into their interlanguage. There have been questions as to whether there is immediate uptake of recasts that are offered, but Cathy Doughty argued that immediate uptake may not be the most effective way to detect the influence of recasts on subsequent development.

Also concerned with interaction, but from a radically different perspective is sociocultural theory (SCT). Drawing on Vygotskyan theory, the emphasis here is on the collaborative, unpredictable meanings that will develop through conversation, with each partner making contributions that can be taken up and extended by their interlocutor. Jim Lantolf argued that this is a fertile ground for second language development, and sociocultural theorists claim that tasks that generate lower negotiation for meaning indices (e.g., a discussion task) may provide other more useful scaffolding for language development, since they push learners to build meanings collaboratively, and to engage in more extended turns. Indeed, developing the notion of interaction, Merrill Swain has proposed that output is vital for second language learning since it pushes learners to do things like notice gaps in their interlanguage; to explore and test out hypotheses; and to attain a metalinguistic level of processing.

We turn now to consideration of learner characteristics and differences. The remainder of this section on learning will cover language learning aptitude, motivation, language learning strategies, and personality. Earlier conceptions of foreign language aptitude, strongly associated with J. B. Carroll, proposed that there is a specific talent for language learning, consisting of four components; phonemic coding ability (the capacity to analyze sound so that it can be better retained); grammatical sensitivity (the ability to identify the functions that words fulfill in sentences); inductive language learning ability (the ability to take a sample of a language and extrapolate to further language); and associative memory (the capacity to make links between items in memory). This view of aptitude, underpinning older aptitude

test batteries (for example, the Modern Languages Aptitude Test), was reasonably successful, since these batteries led to correlations of around 0.40 between aptitude and achievement test scores. It has not, however, had great recent influence, partly because it has been argued that this conception of aptitude is irredeemably linked to instruction, indeed particular forms of instruction, such as audiolingualism, rather than to informal and acquisition-rich contexts.

More recently, however, a reassessment of aptitude has taken place. A new aptitude battery has been developed, CANAL-F. The battery incorporates cumulative, thematized learning within the sequence of subtests. Aptitude has also been reconceptualized and linked with second language acquisition processes, following the stages outlined above (noticing, pattern identification, etc.), and this sequence can also be related to the constructs that are said to underlie CANAL-F, such as selective encoding (noticing) and selective transfer (inductive language learning ability and pattern restructuring). Complementing this, there have been studies that have linked aptitude information to acquisitional contexts. These studies have shown that aptitude generates correlations with informal and implicit learning conditions as well as explicit ones. Indeed, reviews of the available evidence demonstrate that predictive relationships emerge in both informal and formal settings.

Motivation has seen an even greater diversification of research. This area has been dominated by the work of Robert Gardner, whose analysis of motivation in terms of integrative and instrumental orientations has been fundamental. He has continued to publish and to extend his model of second language learning. However, some earlier reviews of his work that called for a widening of the research agenda have led to different perspectives. There have been proposals for slightly different conceptualizations of motivational orientation, but essentially still within the Gardner framework (for example, proposals for knowledge, travel and friendship orientations, and suggestions that a world 'modernity' orientation is relevant).

There has also been a widening of the theoretical framework for motivation, with greater connections with mainstream psychology. For example, one perspective emphasizes linguistic self-confidence, which links with willingness to communicate research (WTC). This explores the reasons that underlie a learner's readiness to actually engage in communication. There have also been some studies on motivational attributions, and these indicate the richness of attributional thinking on the part of language learners and the impact such thinking can have on the maintenance of motivational strength. Such studies also indicate how qualitative methodologies can be applied to the motivational arena.

Perhaps the greatest change in motivation research concerns the temporal dimension. Many have argued that motivation needed to be related more clearly to the classroom, and conceptualized dynamically, rather than in terms of static, unchangeable orientations. Zoltan Dornyei, for example, uses action control theory as a way of achieving this. He argues that one needs to explore influences before a task is done (for example, motivational orientations), different influences on motivational levels while a task is done (stimulating activities), and also the post-actional stage, where learners reflect after learning on the degree of success they have achieved, and its likely explanations, such as a personal lack of effort. Such posttask refection may lead learners to make attributions that will influence future motivational levels. Interestingly, Gardner's latest research also explores the issue of the malleability of motivation, and how some aspects of the Gardner model, such as integrative orientations, do not seem malleable, while other areas, such as attitudes towards the teacher, are.

Learning strategies research has continued to be researched intensively. Some early problems with this area continue to cause difficulty. One of these is the categorization of learning strategies, and area about which Ellis suggested: "definitions of learning strategies have tended to be *ad hoc* and atheoretical." In response to this, Zoltan Dornyei and Peter Skehan suggested that one should operate with four main classes of strategy:

- Cognitive strategies
- Metacognitive strategies
- Social strategies
- Affective strategies.

They also draw attention to the way that within mainstream psychology, there has been a movement away from learning strategies and toward the term 'self-regulated learning,' which more generally captures the learners' conscious and proactive contribution to enhancing their own learning process. Interestingly, though, there has been recent evidence based on a confirmatory factor analysis in an attempt to distinguish between the various models that classify learning strategies, and this suggests that Rebecca Oxford's six-factor model (the above four, plus a separation of cognitive into cognitive and memory, and the addition of compensatory) best satisfied the data.

Perhaps the one other learner difference area where there has been interesting progress has been that of personality. Some researchers have tended to dismiss personality as the source of empirically-verifiable

correlations with language learning achievement. However, if one focuses on extroversion, it appears that applied linguists tend to have done two things (a) they have not been conversant with current theories of personality, or of associated standardized forms of personality assessment, and (b) they have tended to focus on possible relationships between personality variables and learning. When personality assessment is carried out using contemporary and validated personality inventories, results are clearly more stable. In addition, consistent correlations emerge between such extroversion–introversion measurements and foreign language performance – not with learning but with, for example, tests of speaking.

Teaching

Some twenty-five years ago, when second language acquisition research first began to have an impact, the value of instruction itself came under question, since direct evidence of its beneficial effects was slender, and it was proposed that exposure to language (and incidental learning) was sufficient for interlanguage development to occur. An important review article by Michael Long, "Does second language instruction make a difference?" responded to these issues and evaluated the available research on instructional effectiveness. Long's work was a meta-analysis – he evaluated, reanalyzed, and synthesized a wide range of studies and argued that the balance of evidence suggests that instruction does make a difference, and is associated with faster learning, and higher ultimate attainment. More recently, a major updated and extended meta-analysis has been published that demonstrates instruction does have an appreciable effect on performance; that explicit instruction produced larger gains than an implicit approach, which was, in turn, significantly greater than for control group conditions; and that instruction is durable in its effects.

What John Norris and Lourdes Ortega, in this updated meta-analysis, did not set out to do is provide a detailed justification of how instruction works, or, what specific aspects of instruction generate the differences that are found. Consequently, it is not easy to point to evidence of optimal learning environments – we simply know that having instruction compared to not having instruction is a good thing. How this lack of a fine-grained understanding of the effects of specific instructional types will be resolved is not clear. One approach is to continue to use research designs that do explore methodological comparisons that would be recognizable by teachers. Alternatively, the question may need to be posed differently. As Cathy Doughty recommends: "Rather than at the level of 'method,' the operationalization of instructional treatments is now considered best analyzed psycholinguistically in terms of input-processing enhancements that facilitate L2 learners' extracting forms and mapping them to meaning and function." She discusses a range of techniques that might achieve this, examining them in terms of degree of obtrusiveness, and also relating them to the functioning of limited capacity attentional functioning.

The preceding discussion means that explorations of language teaching options cannot be conducted simply in relation to evidence. But of course teachers need to act, and any broader research findings and theories about learning are going to be only one of the influences on such actions. We will next consider the major issues that motivate debates about teaching. Most fundamental of all, perhaps, are the topics of syllabus and methodology. The former concerns what is taught, and is traditionally approached in terms of the units of teaching, as well as their sequencing. The latter is concerned with how whatever is taught is taught. As we shall see, there have been changes with respect to each of these, although it is a moot point as to whether these changes are more characteristic of the 'chattering classes' of language teaching professionals rather than what happens in most actual classrooms.

Until relatively recently – the early 1970s – there seemed relatively little controversy in syllabus or methodology. The units of syllabus were seen to be language forms, and their sequencing was subject to reasonable consensus. True, the criteria that were used to establish syllabus ordering were not entirely convincing (for example, buildability, frequency), but there was considerable agreement about a high proportion of the ordering that was characteristic for the teaching of English, at least. This consensus was challenged during the 1970s and 1980s, and alternative proposals were put forward, with alternative units, such as functions and notions and lexical elements, and alternative classroom activities such as tasks and procedural syllabuses. Most radical of all, perhaps, was Candlin's proposals for retrospective syllabuses, where the syllabus that is taught is the result of negotiation between the teacher and learners, building on the distinction between the plan for teaching and the classroom reality of what actually happens, which are not going to be the same thing, Chris Candlin has suggested that one can only really say what a syllabus has been *after* a course has taken place. There were also vigorous attempts to develop specific purpose syllabuses based upon the analysis of learner needs.

Interesting issues have also been raised about the feasibility and limitations of planning courses, and

whether it is even worthwhile to use course books. There seemed to be strong moves to use meaning-units as the basis for teaching, and to bring the learner more centrally into decision making. But what is interesting is how this debate has lost vitality. Now there is much less debate on these issues, and, paradoxically, the solution has been something of a consensus to use forms of what are called 'multi-syllabuses,' where the early pages of a course book or syllabus document will contain a table indicating how structural units, functional units, context, themes and tasks are meant to exist in harmony, so that the syllabus can claim to comprise all the potential syllabuses in one. Even so, it would appear that some of the strands in a multisyllabus are more equal than others, and it is no surprise that the most dominant of these is the structural core.

There have also been discussions regarding what should be done within classrooms, and what methodologies are better. Significant reviews are available of the major contrasting methodologies, such as grammar translation, audiolingualism, functional-notional, and communicative approaches. Grammar-translation emphasizes written language and the use of rules (and exceptions) to construct sentences in a deductive manner. Grammar is preeminent and item-based vocabulary learning is extensive. Audiolingualism, in contrast, emphasizes the spoken language and teaches this inductively through stimulus-response-influenced pattern practice. Functional–notional and communicative approaches share a much greater emphasis on meaning and the use of (more) authentic materials. Functional–notional approaches use itemized meaning-units as a syllabus basis and are usually concerned with language use and contextualized teaching. Even so, there is the possibility that functional–notional approaches, although using meaning units, can be associated with fairly traditional practice-oriented methodologies.

Functional–notional approaches were really the foundation for the development of a communicative approach to language teaching, which is now regarded as the orthodoxy in many parts of the world. Communicative approaches come in two strengths: weak and strong. The weak form is compatible with multisyllabuses and gives communicative activities an important role, since it is assumed that learners will need to work on the development of communicative competence, and that they will not be able to do this without engaging in realistic communication of individual meanings. This goes well beyond the production phase of the three Ps, and requires authenticity of language use and genuine interaction. However, the weak form can be associated with optimism that teaching materials can blend structure, function, and communicative activity to promote balanced and integrated progress. The strong form of communicative teaching, now associated with task-based approaches, regards task itself as the primary unit and then sees language as following the demands of the task, so that the role of the teacher is to respond to whatever language the task generates as important. Jane Willis described a methodology for approaching instruction in this way, in which a language focus is the last phase in teaching, after some new language has been made salient by the need to do a task.

Of course, these are not the only methodologies that have been used, and there are other 'fringe' approaches. There are also, for example, total physical response, the silent way, suggestopedia, and community language learning, although it is interesting to note that while each of these has its devotees, it can be argued that they are becoming even less central (cf. the change in the amount of coverage in the first and third editions of Harmer's *The practice of communicative language teaching*).

The debates over methodology have been intense. In an attempt to make progress in these debates, in which distinctions between syllabus and methodology were not always clear, it has been proposed that it is fruitful to look at these issues in terms of approach (underlying theory), design (syllabus considerations), and procedure (methodology) and what goes on in the classroom, in order to characterize a broader concept of 'method.' In an ideal world, an approach to language teaching should balance all these things, but in practice, one of the three might dominate, somewhat at the expense of the others. Hence, with audiolingualism, the focus is on procedure, as well perhaps as approach, but there is much less to motivate design. In contrast, one could argue that functional-notional approaches emphasized design, but with less emphasis on approach and procedure.

It is interesting now to reflect on these debates and the intensity they used to provoke. Two issues stand out. First, prevailing practice would generally be seen as a communicative approach to language teaching, or at least this is what would be said, even if what happens in any particular classroom might not indeed be communicative language teaching. The approach has become the general orthodoxy. Second, and probably more important, we have seen the emergence of the course book series. We are now in a position where the production of course book materials is big business and associated with the commitment of very considerable resources. These resources are directed at the preparation of the course book proper, the extensive piloting of material, the development

of a wide range of supplementary and ancillary materials (including websites), even the development of associated tests. One consequence of these developments is that the role of the teacher is changed. There is less reason for teachers to devise their own materials and it is much more possible simply to 'teach the book' as the course book's ubiquitous multisyllabus is followed.

An interesting way of exploring changes in language teaching is a comparison between two editions of the same book, Jeremy Harmer's *The practice of English language teaching*. In addition to a great deal of common ground, there are some interesting changes. First, there is something of a retreat from grander ideas on syllabus and methodology, to a greater concern for techniques at a more micro level, and issues connected with classroom management. Interestingly, there is more emphasis on how to handle mistakes and how to provide feedback. Second, there is greater coverage of language itself, and of how it may now be studied through corpus analysis so that more realistic language is used. Third, there is a greater concern with course books. Coverage is provided about course book selection and how to work with a course book, changes that reflect the point made earlier regarding the greater domination of course book series presently. Finally, there is very significantly increased coverage of the role of technology in language learning, with complete chapters devoted to teaching using video, and educational technology. This last development is undoubtedly going to grow enormously in importance. There are now increasing numbers of books about the use of computers and the internet in language teaching, and leading journals such as *English Language Teaching Journal* contain regular sections detailing useful Web resources.

Language teaching, happily, still has some active areas of disagreement and debate. There are interesting proposals regarding process syllabuses, where the role of the learner in negotiating what will happen in the classroom is recognized and fostered, even to the extent of allowing learners to influence the nature of assessment. This work nicely complements applications of sociocultural theory to second language acquisition, which also regards the joint construction of meanings as fundamental (although in this case more because it facilitates acquisition itself). Process syllabus proponents are perhaps more interested in the rights of learners to influence their instruction as well as the broader societal benefits that follow from learners who learn how take personal responsibility in this way.

A second area for lively exchange concerns the role of tasks in language teaching methodology. Two sub-questions are relevant from this debate. First, there is the issue of how predictable tasks are in terms of the effects of task types and task implementation, for example, pretask planning, on the language that is produced. One response is to doubt any predictability because learners will negotiate their own interpretations in ways that reflect their own interests and desires, whereas another is to research these factors in the hope of providing evidence to assist teacher decision-making. Second, there is the issue that tasks have been attacked because it is proposed that what should really be the focus for teaching is grammar. In this view, tasks might be permissible as a form of language use after more conventional grammar teaching has taken place. It has been suggested that they should not used as the unit of language teaching, or even regarded as a means to enable interlanguage to change and develop. In contrast, others argue that tasks provide a way for acquisition processes to be brought into the classroom and become the basis for learner-driven development.

A final area of debate within methodology concerns the issue of appropriateness. There have been general debates about the connections between language teaching – especially English language teaching – and imperialism. The argument is that the teaching of English is not a neutral activity, but contributes to the perpetuation of existing international power structures, and implicitly the downgrading of local cultures and power. At a much more specific level, Adrian Holliday has argued that there has been insufficient attention paid to local needs and to the different conditions that operate in many language teaching contexts, and that another form of imperialism is the way methodologies devised in one set of circumstances are assumed to be relevant for wholly different context. At the broadest level, he contrasts two contexts and the imbalance between them. The first concerns approaches to language teaching developed for favorable circumstances (for example, Britain, Australasia, and North America, which he refers to, using the relevant initials, as BANA), a context in which individuals often pay fees for their instruction, are studying voluntarily, and in relatively small groups with good resources. In contrast, the second context, referred to as TESEP (*Te*rtiary, *Se*condary, *P*rimary) relates to state school education in the rest of the world, where there are usually large classes, with less favorable resourcing, different home-school relations, and learners who have no choice but to be in a classroom. They are also likely to be heading for a testing system that is less communicative in nature. Methodological options appropriate in the former context do not generalize easily to the latter, so

more attention needs to be paid to local cultures, realism about local resourcing, and local educational traditions.

Conclusion

As the first section of this chapter indicated, the field of second language acquisition research has made a range of interesting contributions to our understanding of how languages are learned. There are alternative accounts available and regular research output. It can even be argued that the two subfields of acquisition/learning processes and learner differences are coming together for the first time, to the mutual benefit of each. We have also seen that language teaching is an area with considerable vitality. Teaching is still strongly influenced by language description, but the consensus communicative approach has meant that a range of activities focusing on meaning are also central, and that the quality of materials available (if not always their accessibility) has improved dramatically.

As a final point, it is worth making the observation that although the two areas of learning and teaching might reasonably be expected to have strong relationships with one another, in practice, they do not. Learning/acquisition tends to have a research emphasis, and while it does have relevance for teaching, this requires some extrapolation. Teaching, in contrast, while not without interesting research work, nonetheless emphasizes other criteria in establishing and justifying its procedures. It would be desirable to see this separation reduce in the future, for the benefit of both.

See also: Communicative Language Teaching; Foreign Language Teaching Policy; Identity: Second Language; Interlanguage; Language Education: Grammar; Language Teaching Traditions: Second Language; Motivation and Attitude in Second Language Learning; Second Language Acquisition: Phonology, Morphology, Syntax; Teaching Technologies: Second Language.

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Second Language Acquisition: Phonology

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Introduction

This article provides an overview of work on second language (L2) phonology that has been undertaken within a generative framework. The discussion first addresses the acquisition of segments, then the acquisition of syllable structure and of higher level prosodic phenomena. A somewhat selective view of the field is presented, but an extensive bibliography points to additional analyses for those who want to read further. In much of the discussion here, the focus is on the situation that arises when a second language learner is attempting to acquire a structure that is absent from the first language. For an overview of broader issues in second language phonology, see Archibald (1998) or Major (2001).

What Is Acquired?

The first thing to consider in looking at the acquisition of phonology in a second language is the question of what exactly is being acquired. Second language learners must acquire features, segments, moras, syllables, and feet. A theory of phonological knowledge must be adopted; the model in **Figure 1** indicates some of the areas that will be examined in the following sections. Let us begin by looking at the acquisition of L2 features.

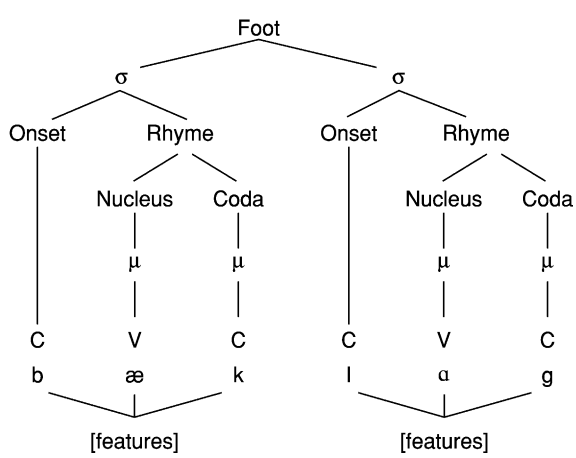

Figure 1 Phonological structure.

Phonological Features

Brown (2000) argued that if featural representations are lacking from the first language (L1), they will be unacquirable in the L2. She looked at the acquisition of English /l/ and /r/ by speakers of Japanese and Mandarin Chinese (neither language contrasts /l/ and /r/ phonemically). The Japanese situation is diagrammed in **Figure 2**, where SV represents 'sonorant voice.' In Japanese, [l] and [ɾ] are allophones of a single phoneme. This phoneme may appear only in a simple onset in Japanese. Mandarin Chinese also lacks the contrast (and hence the structure is the same as shown in **Figure 2**). If the segment is taken to be the level of explanation, then we might predict that both Mandarin and Japanese speakers should be unable acoustically to discriminate /l/ from /r/ (given their L1 feature geometries). In general, however, Japanese speakers are unable to discriminate /l/ from /r/, both acoustically and phonologically (in lexical choice tasks), whereas Chinese speakers discriminate the contrast in both tasks. The graph in **Figure 3** shows the overall performance of participants in an auditory discrimination task designed to assess this

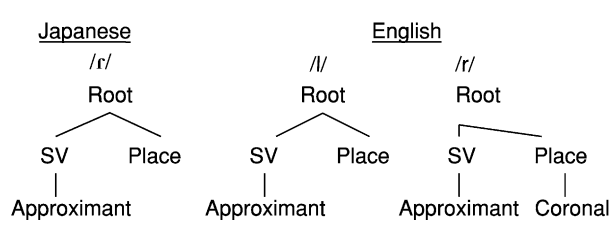

Figure 2 Feature geometry of liquids (SV, sonorant voice).

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Second Language Acquisition of Phonology, Morphology, and Syntax

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Introduction

Four questions have dominated recent research in second language (L2) acquisition: (i) What role does a speaker's first language (L1) play? (ii) Does L2 acquisition display developmental patterns that are similar across learners? (iii) Is an innately determined human language faculty involved? (iv) Why is knowledge of an L2 sometimes underdetermined by the input? This article reviews some of the empirical findings bearing on these questions in the domains of L2 phonology, morphology and syntax, and considers how answers might contribute to the construction of a theory of L2 acquisition.

L2 Acquisition of Phonology

Casual observation tells us that most speakers of an L2, where acquisition has occurred beyond childhood, have foreign accents. Is this the consequence of the pervasive influence of a speaker's L1? With some properties of L2 phonology there is early, but temporary, L1 influence, with others L1 influence is persistent, and with yet other properties the influence comes from universal principles of phonological organization.

Broselow (1983, 1988) offers a clear case of L1 influence. Native speakers of Egyptian and Iraqi Arabic, in their production of syllable-initial English consonant clusters, may insert an epenthetic vowel; i.e., a vowel that creates an extra syllable. Interestingly, Egyptian Arabic speakers insert it in a different position from Iraqi Arabic speakers (Table 1) as a result of their L1 Arabic syllable structure.

Table 1 Insertion of an epenthetic vowel by speakers of Arabic (based on Broselow, 1983, 1988)

English target form	*Egyptian*	*Iraqi*
floor	filoor	lfloor
plastic	bilastic	lblastic
children	chilidren	childiren
translate	tiransilate	itranislate

The maximal allowable syllable in Arabic is C(onsonant)V(owel)C(onsonant) (with some exceptions, irrelevant to the point here). When morphosyntactic operations in Arabic are in danger of producing consonant clusters, an epenthetic vowel is inserted. Compare (1) and (2) cited by Broselow.

(1) Egyptian katab + l + u → katablu
wrote-he to-him
Iraqi kitab + l + a → kitabla
wrote-he to-him
'He wrote to him'

(2) Egyptian katab + t + l + u → *katabtlu → katabtilu
wrote I to-him
Iraqi kitab + t + l + a → *kitabtla → kitabitla
wrote I to-him
'I wrote to him'

In (1), morphosyntactic operations combining the verb and affixes generate strings that do not violate Arabic syllable structure: *ka-tab-lu, ki-tab-la*. However, in (2), strings are generated with a non-syllabified consonant /t/: *ka-tab-t-lu, ki-tab-t-la*. Because adjunction either to the preceding or following syllable would violate Arabic syllable structure, an epenthetic vowel is inserted. But it gives rise to different syllabification in the two varieties. The Arabic speakers appear to transfer this L1 constraint into their L2 phonological representations for English.

L1 influence can also be found in the representation of segments. An interesting case of this is known as differential substitution (Weinberger, 1996: 269), where an L2 segment does not exist in the learner's L1 and the learner substitutes an L1 segment for it. But the substituting segment varies depending on the L1 in question. None of Russian, French, or Japanese have the English phonemes /θ/ or /ð/ found in the words *think* and *this*. Russian speakers substitute /t/ and /d/ for these segments, producing *tink/dis*. Speakers of French and Japanese, however, substitute /s/ and /z/, producing *sink/zis*. All of /t-d-s-z/ contrast phonemically in Russian, French, and Japanese. This is not, then, a case of simple surface substitution of one segment for another, nor random substitution of /θ-ð/ by segments in the same articulatory area. What could give rise to the observed behavior?

Weinberger suggests it is a combination of a universal property of phonological representation in human language, together with language-specific differences in implementation of this universal. The universal is the underspecification of features in the underlying representations of phonemes. Features that are entirely predictable are absent from the underlying representation of a phoneme and are filled in during the course of deriving a sentence by redundancy rules, e.g., in the five-vowel system /i, e, a, o, u/, if /i/ and /u/ are high vowels and their underlying representation is specified as [+high], the others need not be specified [−high] since this is entirely predictable. Language-specific differences arise where the inventory of phonemes in each language differs in which features are specified in underlying representations and which features are not.

Weinberger claims that the underlying representations of /s-z/ and /t-d/ in Japanese are all specified as [−sonorant] (distinguishing them from vowels, glides, liquids, and nasals), and for [+/−voice], but differ in that /t-d/ are specified [−continuant], while /s-z/ are not; the value [+continuant] is supplied for /s-z/ by a redundancy rule during the course of the derivation. In Russian, his claim is that the underlying representations for /s-z/ are specified [+continuant] while /t-d/ are not.

When speakers of Japanese and Russian encounter /θ-ð/ in an L2, they cannot initially represent this contrast (because it does not exist in their L1 phonology). Instead, they assimilate these segments to the closest minimally specified phonemes with matching features in their underlying representations in the L1: ones specified only as [−sonorant] and [+/−voice]. In Japanese the matching phonemes with the fewest features are /s-z/, but in Russian they are /t-d/. Thus differential substitution results from the interaction between a proposed universal of phonological representation (feature underspecification), a universal of L2 development (assimilation of a new segment to a minimally specified segment that matches in features in the L1), an L1-specific difference in the implementation of feature underspecification, and a phonemic contrast in the L2 that is new to the learners in question.

Is L1 influence temporary or persistent? The substitution of /s/ for /θ/ discussed by Weinberger is known to be a persistent feature of Japanese speakers. In Japanese, Mandarin Chinese, and Korean certain phonemic contrasts are not present: /s-θ/, /l-r/, /f-v/ and /p-f/. Brown (2000) investigated how speakers of these L1s treat the contrasts in L2 English. All three languages have the phonemes /s-p/, yet they lack /θ-f-v/. Furthermore, on Brown's analysis,

Mandarin Chinese and Korean have the phoneme /l/ but lack /r/, whereas Japanese has a flapped phoneme /ɾ/, which is traditionally equated with English /r/ but lacks the phoneme /l/ (although one of the allophonic realizations of /ɾ/ is an [l]-like sound).

In an auditory discrimination task participants heard two pairs of invented one-syllable words. In one pair the same phoneme occurred in syllable-initial position, while in the other there was a contrast, for example:

ra-la	ra-ra
fa-fa	va-fa

Informants were required to indicate, for each stimulus, which of the pairs was different. The participants were university students in Japan with 8 to 10 years of instruction in English, probably of high intermediate to advanced proficiency (n = 15 with L1 Japanese, 15 with L1 Mandarin Chinese, 11 with L1 Korean). Ten native speakers of English acted as controls. Results revealed that all groups, nonnative and native, correctly distinguished /p-f/ and /f-v/ on over 90% of items. However, the three nonnative groups' performance dropped below 80% accuracy with /s-θ/, whereas the natives performed at over 90% correct. This is a statistically significant difference. In the /l-r/ contrast, the Japanese and Korean speakers' (below 70%) were significantly less accurate than those of the Chinese and the native speakers (around 90%). There was no difference between the Chinese and the natives in this case.

These are surprising results. None of the tested contrasts exist in the informants' L1s. The /p-f/ and /f-v/ contrasts pose no difficulties for acquisition for any of the learners: /f/ and /v/ are acquirable, it seems, yet all learners had ongoing problems distinguishing /s-θ/, and only the Mandarin Chinese speakers acquired the /l-r/ contrast.

What could explain this selective influence of the L1 on the acquisition of new phonemes in an L2? Brown argues that the human language faculty in its initial state at birth provides a set of distinctive phonological features like [voice], [aspiration], [continuant], [coronal] etc. which would allow the child potentially to represent any phonemic contrast found in human language. When the child is exposed to a particular language or languages, only a subset of this universal inventory is required to establish a phonological representation. Unused features cease to be available to the learner at some point in development. When a learner comes to acquire an L2 later, only the range of features selected in L1 acquisition can be used for representing the phonology of the L2. New phonemes are acquirable providing that their feature composition involves features present in the L1, even if the phonemes are not present in the L2. To illustrate, Brown claims that the phonemic inventory of Mandarin Chinese includes the feature [coronal], which is required to distinguish alveolar /s/ from retroflex /ʂ/. This feature is also crucial for distinguishing /l/ and /r/ in English (on Brown's analysis). So when Mandarin Chinese speakers encounter English, they are able to set up a contrast between /l/ and /r/ involving the feature [coronal], even though /r/ is not a phoneme in Mandarin. By contrast, Japanese and Korean do not have the feature [coronal]. The /l-r/ contrast therefore remains persistently problematic for them. As for the /f-v/ contrast, it involves the features [continuant], [labial], [voice]. Although neither of these phonemes is present in Japanese, Chinese or Korean, the relevant features are present. Hence, /f-v/ poses no difficulty in L2 acquisition. Finally, none of Japanese, Chinese and Korean has the feature [distributed] that, according to Brown, distinguishes /θ/ from /f/ and /s/ in English. Hence, none of the groups is able to establish a phonological representation for /θ/.

A follow-up study by Brown comparing two Japanese native groups with L2 English (low proficiency vs. high proficiency) suggests that contrasts that are different between the L1 and the L2 are initially not represented, with L2 speakers assimilating new phonemes to existing L1 phonemic categories. If, however, features required to make an L2 contrast are present in the L1, restructuring occurs with continued exposure to L2 input.

In summary, L2 syllabic structure is initially determined by syllabic structure in the L1. Segments that are not phonemes in the L1 are initially assigned to phonemes with minimally matching sets of features. With continued experience of the L2 speakers restructure their phonological system and new phonemes are acquirable, but only if the L1 system has encoded the distinctive features required for establishing such new phonemes.

L2 Acquisition of Inflectional Morphology

Inflectional morphemes are the surface manifestation of features that are represented underlyingly in functional categories such as Inflection, Determiner, and Complementizer (Table 2).

Empirical studies have found quite similar developmental patterns in the L2 acquisition of inflectional morphology, with apparently little L1 influence. Dulay and Burt (1973, 1974) and Bailey, Madden, and Krashen (1974), using oral data, found that child and adult native speakers of Spanish, Cantonese, and other languages supplied some morphemes more frequently than others. Dulay and Burt (1974)

Table 2 Some English inflectional morphemes and the Realization of their underlying features

Inflectional morpheme	*Realization of underlying features*
Copula and auxiliary *be*	Tense, subject-verb agreement
-ing	Progressive aspect
Regular past (walk-*ed*), irregular past (*ran*)	Tense
Plural (dog-*s*)	Number]

compared Spanish and Cantonese child learners (Figure 1). Although the Spanish speakers supplied more morphemes in absolute terms than the Cantonese speakers, the relative ratio of suppliance between different morphemes was highly similar. This pattern of suppliance in oral production has been repeated in many other studies of L2 learners of English.

How can such non-L1-influenced patterns of behavior be explained? Dulay and Burt and Bailey, Madden, and Krashen assumed that frequency of suppliance reflected order of acquisition. That is, that progressive *-ing* is acquired earlier in L2 English than past tense, and copula *be* before the marking of subject-verb agreement by third-person singular *-s*. However, a recent interpretation postulates a separation between the development of syntactic knowledge and the development of inflectional morphology. Syntactic knowledge is more developed than the use of inflectional morphology would suggest. For example, Ionin and Wexler (2002) found that a group of Russian-speaking child learners of L2 English supplied past tense forms in obligatory past tense contexts 42% of the time, yet there were no errors of misuse of the past tense forms; and whereas third-person *-s* was only supplied in 22% of required cases, it was misused in just 5% of cases. Speakers appear to know the range of meanings of inflectional morphemes even if they fail to produce them in every context in which they are required. If this view is correct, then the syntactic properties underlying the distribution of inflectional morphemes in Dulay and Burt's (1974) study have been acquired. The reason why some forms are supplied more frequently than others must then be the result of something other than lack of acquisition of the underlying syntactic property.

The two views just described correspond to two different lines of theoretical enquiry in modern L2 research. One is known as Minimal Trees (MT) (Vainikka and Young-Scholten, 1994, 1996). This proposes that L2 learners' initial interlanguage grammars (ILGs) (i.e., their mental L2 grammars) consist only of projections (phrases) built from lexical heads

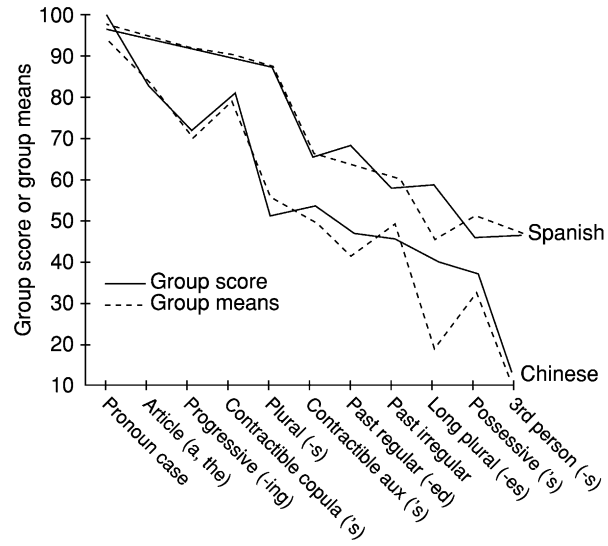

Figure 1 Acquisition of eleven morphemes by Spanish-speaking and Cantonese-speaking children in L2 English (Dulay and Burt, 1974: 49). Note: Group score is based on adding together the total score for each individual and dividing by the number of informants in each group; group mean is based on calculating the mean score for each individual, adding the means together for each group, and dividing by the number of informants in the group.

such as Noun, Verb, and Adjective. Learners identify forms in the input belonging to these categories, and generate linguistic expressions from them. Functional projections such as Inflection, Determiner, and Complementizer are acquired later on the basis of evidence in the L2 input. Importantly, functional categories develop incrementally with those emerging first that immediately dominate the lexical heads, e.g., Inflection, which dominates the verb phrase, emerges before Complementizer, which dominates Inflection. Furthermore, when functional categories first emerge they are minimally specified, e.g., Inflection might be specified for tense before it is specified for subject-verb agreement. Because MT predicts the sequential emergence of categories, different frequencies in suppliance of morphemes realizing functional categories (like those observed by Dulay and Burt and Bailey, Madden, and Krashen) reflect the acquisition of the corresponding underlying syntactic properties. Typically, 60% (or above) suppliance of a form implies acquisition of its syntactic properties (Vainikka and Young-Scholten, 1998).

The second line of theoretical enquiry assumes that both lexical and functional categories are present in early ILGs, either because the language faculty provides them directly as part of its architecture, or because they are transferred from the L1. If learners supply the morphological reflexes of a functional category, whatever their frequency, then the

functional category and its relevant syntactic features have been acquired. But why do learners sometimes fail to supply the morphological reflexes of functional categories? According to the Missing Surface Inflection Hypothesis (MSIH) (Haznedar and Schwartz, 1997; Prévost and White, 2000), L2 learners may select less specified 'exponents' for the output of morphosyntactic operations than would be required in the grammar of a native speaker. To illustrate, *walked* and *walks* are the forms of WALK required when the Inflection category is specified as [finite], and either [past] for *walked* or [nonpast, third-person, singular] for *walks*; *walk* is the exponent inserted elsewhere in finite clauses – it is an underspecified default form. L2 speakers sometimes map the default form *walk* onto [past] or [nonpast, third-person, singular] because L2 speakers are perhaps slower than natives at matching exponents to underlying syntactic representations, especially when speakers are under 'communication pressure' (Prévost and White, 2000) and when nondefault exponents have more complex final consonant clusters (*walked*: /kt/, *walks*: /ks/) than default exponents (*walk*). Nondefault forms may just be too costly in processing terms to select if a speaker's L1 disallows syllable-final consonant clusters (Lardiere, 2000). By contrast, Ionin and Wexler (2002) propose, following Guasti and Rizzi (2002), that if a syntactic operation involves overt movement, this should have a surface morphological reflex. Because copula and auxiliary *be* in English are usually assumed to be verbs that raise to Inflection, they must be morphologically marked on the surface. By contrast, main verbs like *walk* do not raise overtly to Inflection. Instead, tense and subject-verb agreement are associated with main verbs via a covert agreement operation. In such cases, there is no universal requirement to mark covert operations on the surface. Languages differ in whether they do or do not, and language learners have to acquire this on the basis of exposure: "... L2 learners know that morphological expression is obligatory for *be* forms ... but have not mastered the English-specific rules requiring agreement morphology on unraised lexical verbs in certain contexts" (Ionin and Wexler, 2002: 118). Until this rule has been acquired, L2 speakers may treat *-s* and *-ed* as optional. Like MSIH, this account assumes that underlying syntactic representations are more highly developed than oral suppliance of morphological forms.

L2 Acquisition of Derivational Morphology

Although evidence suggests little L1 influence on the development of inflectional morphology, this appears not to be true of derivational morphology. Derivational morphology is typically the surface manifestation of an operation that changes the grammatical class membership of a lexical item, e.g., *-er* signals the change of an item from a verb like *sing* to an agentive noun: *singer*.

Lardiere (1995) tested Spanish and Chinese native speakers' knowledge of derivational morphology in L2 English. English deverbal compound nouns like *dishwasher* are formed from verb-object constructions: *washes dishes*. They show O(bject)-V(erb) order (in contrast to the VO order of the verb construction), and the Object, if a regular plural, loses its *-s*. Spanish deverbal compounds continue to display VO word order and retain the plural *-s*, e.g. *un lavaplatos* (lit. a wash.3sg-dishes) 'a dishwasher.' In Chinese, there is no plural marking and deverbal compounds are either realized by relative clauses or by non-deverbal N-N compounds (Lardiere, 1995: 39, note 18). If properties of the L1 play a role in the development of knowledge of these compounds, we might expect to see a difference in the suppliance of *-s* (Spanish has plural marking, whereas Chinese does not), and in the rate of production of V-N (*washes-dishes*), with the Spanish speakers producing such cases more than the Chinese.

Learners of intermediate to high-intermediate proficiency (L1 Spanish, n = 15; L1 Chinese, n = 11) were presented with questions of the type: "What could you call a person who cleans shoes?," where the expected response is "a shoe cleaner." Results show that there was a significant difference in the production of targetlike English deverbal compounds by Spanish speakers (only 32%) vs. Chinese speakers (62%). Nontarget-like forms consisted of (i) word order errors like V-N, made almost exclusively by the Spanish speakers, and (ii) plural marking of the N, e.g., "a shoes-cleaner" (58% for the Spanish group vs. only 31% for the Chinese group). It appears that morphological properties of the L1 affect development. In particular, Spanish speakers expect deverbal nouns in English to have V-N order and the N to be marked for plural significantly more than the Chinese.

In a further study, Lardiere and Schwartz (1997) found that V-N word order errors decrease over time in Spanish-speaking learners of L2 English (42% for low intermediates, 23% for intermediates and 0.5% for advanced intermediates).

To summarize, L1 influences the representation of derivational morphology in early L2 development, but this influence disappears with proficiency.

L2 Acquisition of Syntax

One potentially impressive kind of evidence that interlanguage grammars develop within limits

defined by an innately determined faculty for language comes from cases where syntactic properties are underdetermined both by L2 input and by properties of a learner's L1. One such property is the Overt Pronoun Constraint, OPC (Montalbetti, 1986). It holds that in languages where an overt pronoun and a null pronoun can alternate freely, only the null pronoun can take a quantified expression as an antecedent, e.g., in Spanish null pronominal subjects (Ø) can alternate with overt pronominal subjects like *él* 'he.' Given a relevant preceding context, (3a), in (3b) both *él* 'he' and Ø in the embedded clause can refer to the referential expression *Juan* 'John' in the matrix clause, as indicated by the coindexing *i*. It also would be possible for both *él* and Ø to refer to an extrasentential antecedent like *Pedro* 'Peter.' In (3b′), the null pronoun Ø can refer to either the quantified expression *nadie* 'nobody,' or even to an extrasentential referent like *Pedro*. The overt pronoun *él* could also refer to an extrasentential antecedent but, crucially, the OPC prohibits the overt pronoun from referring to the quantifier *nadie* 'nobody.'

(3a) Pedro$_j$ y Juan$_i$ están participando en un concurso.
Peter and John are participating in a contest.

(3b) Juan$_i$ cree [que él$_{i/j}$ / Ø$_{i/j}$ ganará el premio]
John thinks [that he / Ø will-win the prize]

(3b′) Nadie$_i$ cree [que él$_{*i/j}$ / Ø$_{i/j}$ ganará el premio]
Nobody thinks [that he / Ø will-win the prize]

Pérez-Leroux and Glass (1997) tested OPC knowledge with English speakers learning L2 Spanish (n = 16) at a very advanced level of proficiency with a minimum of 7 years of experience in Spanish. Eighteen Spanish natives acted as a control group. In a contextualized translation task, natives categorically produced more null pronouns (75%) than overt pronouns (15%) with quantified antecedents. Learners behaved similarly (null pronouns 87% vs overt pronouns 0%), as predicted by the OPC (Table 3). With referential antecedents both groups produced significantly more overt subject pronouns (74% natives, 34% learners) than with quantified antecedents (15% natives, 0% learners), although learners overused null subjects with referential antecedents. Pérez-Leroux and Glass (1997: 159) conclude: "These results indicate a sensitivity to OPC effects in the grammar of highly fluent L2 speakers of Spanish."

Table 3 Proportion of acceptance (%) of antecedents for overt and null pronouns (based on Table 1 by Pérez-Leroux and Glass, 1997)

Antecedent	*Pronoun*	*L2-ers (n = 16)*	*Native Spanish (n = 18)*
Quantified	*él*	0%	15%
	Ø	88%	75%
Referential	*él*	34%	74%
	Ø	58%	24%

Note: The sum of the two conditions (*él* and Ø) in each antecedent context does not always amount to 100% since some of the participants' responses were categorized as 'other,' i.e., a pronominal subject was not produced.

Is the OPC operative at very advanced levels of proficiency only or rather at all levels of proficiency? Pérez-Leroux and Glass (1999) used the same method with three proficiency groups of English speaking learners of L2 Spanish (elementary, n = 39; intermediate, n = 21; advanced, n = 18) and a control group of Spanish natives (n = 20). The production of null subjects across groups (Figure 2) was significantly higher with quantified antecedents (as predicted by the OPC) than with referential antecedents. This suggests that "OPC is operative at all stages in the acquisition of Spanish" (Pérez-Leroux and Glass, 1999: 235).

Crucially, could knowledge of the OPC derive from the Spanish input alone? This seems unlikely. Learners will hear Spanish speakers using: (i) null pronouns with both quantified and referential antecedents; and (ii) *él* with referential antecedents, so nothing in the input prevents them from using *él* with quantified antecedents. Furthermore, if they transferred properties of English, they would allow overt pronouns to refer to a quantified antecedent, because English allows this possibility.

Recent research has uncovered other cases in which L2 knowledge is underdetermined by input, suggesting that innately determined principles of grammar construction are active in the development of L2 grammars, even when acquisition occurs in older learners (White, 2003: Chap. 2).

As for language-specific properties, some appear to be influenced by L1 and some do not. An interesting case of 'differential L1 influence' in syntax is

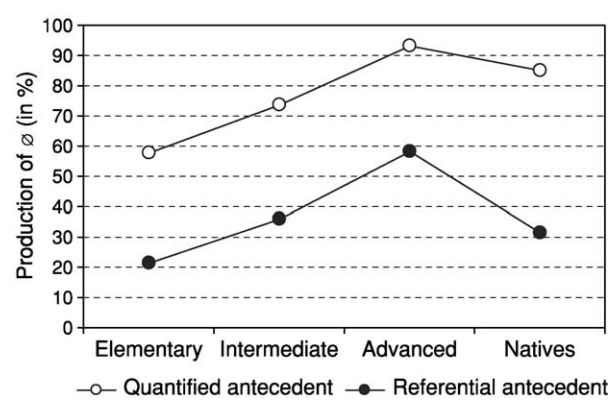

Figure 2 Percentage of production of null pronominal subjects with quantified and referential antecedents (based on Table 1 in Pérez-Leroux and Glass, 1999).

provided by the acquisition of expletive *it* in English, which is obligatory: *She says it/*ø seems hot today.* Spanish, Greek, Japanese, and Chinese have no expletive pronouns in equivalent cases. However, Japanese and Chinese speakers establish obligatory English expletives more quickly than Spanish and Greek speakers. Zobl (1990) found that Japanese speakers of English at a range of proficiency levels produced hardly any null expletives (ranging from 0% to 18%) in written compositions. A comparison by Zobl between his results and those of Phinney (1987), who tested Spanish speakers at comparable proficiency levels, revealed that Spanish speakers produced null expletives between 50% and 70%. Similar patterns have been widely observed for Spanish/Greek speakers vs. Japanese/Chinese speakers.

Why might this difference occur? It seems to be linked to the fact that null subjects are licensed differently in the two types of languages. Null subjects are licensed via rich person/number verbal morphology in Spanish/Greek (Rizzi, 1997), but via lack of verbal morphology in Japanese/Chinese (Huang, 1984). When speakers of Japanese/Chinese encounter impoverished English verbal morphology to mark person/number (only third-person singular *-s* vs. Ø), their innate language faculty tells them that English does not license null subjects (Yuan, 1997). It would appear that speakers of Spanish/Greek-type languages find it more difficult to determine that person and number morphology on verbs in English is impoverished.

Is L1 syntactic influence on the L2 temporary or persistent? Problems for speakers of Spanish/Greek with obligatory subjects in English appear to be temporary. But in cases in which L1 influence is more persistent, do L2 learners have full access to the resources of the language faculty? To illustrate, consider a case of considerable debate in recent L2 research. Lardiere (1998a, 1998b, 2000) reports a case study of an L1 Chinese speaker with long immersion in English. She found that this speaker in ordinary conversation was fully target-like in supplying pronouns of the right case, Nominative vs Accusative (e.g. *she* vs. *her*), but supplied past tense where it was required in only around one-third of contexts, and third-person singular *-s* on main verbs in less than 5% of cases. Chinese lacks all three of these properties: pronouns do not inflect for case, and verbs do not inflect for tense or subject-verb agreement. Has this speaker then failed to establish an underlying syntactic representation for the features of tense and subject-verb agreement? One answer could be 'yes, she has.' Tense and agreement features may be present in the inventory of syntactic features in the language faculty at birth, but, if they are not selected during L1 acquisition, they become inaccessible at some point during a person's maturation, as in Brown's (2000) finding of persistent failure of L2 speakers to acquire certain phonemes which are not present in the L1. However, Lardiere argues that her informant may just be having a problem mapping past tense and third-person singular present tense forms onto fully-specified syntactic representations, as discussed in the section on inflectional morphology.

It is clear from the evidence presented that L1 influence is considerable but not total in the development of L2 grammars. L2 knowledge is also driven by innate properties of the language faculty, especially when the L2 input underdetermines such knowledge. The picture of SLA that emerges is one of a complex interaction among innate knowledge, previous knowledge from the L1, and input from the L2.

See also: Compound; Distinctive Features; Formal Models and Language Acquisition; Functional Categories; Innate Knowledge; Interlanguage; Language Acquisition Research Methods; Language Development: Morphology; Language Development: Overview; Morpheme; Syntactic Development.

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Second Language Attrition

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Introduction

Language attrition is a process which many – linguists and nonlinguists alike – appear to find interesting. Many people feel that, at some point in their lives, they have lost or forgotten some of the competence that they once had in a language, be it a foreign language learned at school or through a sojourn in the country where it was spoken, or a first language which has fallen into disuse for some reason. It is certainly no coincidence that a seminal work on second language (L2) attrition opens with the statement "Language loss affects all of us" (Hansen, 1999). It would be hard to imagine a paper on language acquisition, markedness, or minimalism starting with such a sentence, although it might be equally true.

One reason for this, I would propose, lies in the simple fact that the process of 'un-learning' differs from the process of learning or acquisition (or, for that matter, any other process or aspect of the use of a language) in several ways, but possibly most profoundly on a psychological level: it is an individual (and often lonely) one. While learning a language will almost invariably take place through interaction, through the sharing of a linguistic system that others

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Second Language Acquisition: Phonology

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Introduction

This article provides an overview of work on second language (L2) phonology that has been undertaken within a generative framework. The discussion first addresses the acquisition of segments, then the acquisition of syllable structure and of higher level prosodic phenomena. A somewhat selective view of the field is presented, but an extensive bibliography points to additional analyses for those who want to read further. In much of the discussion here, the focus is on the situation that arises when a second language learner is attempting to acquire a structure that is absent from the first language. For an overview of broader issues in second language phonology, see Archibald (1998) or Major (2001).

What Is Acquired?

The first thing to consider in looking at the acquisition of phonology in a second language is the question of what exactly is being acquired. Second language learners must acquire features, segments, moras, syllables, and feet. A theory of phonological knowledge must be adopted; the model in Figure 1 indicates some of the areas that will be examined in the following sections. Let us begin by looking at the acquisition of L2 features.

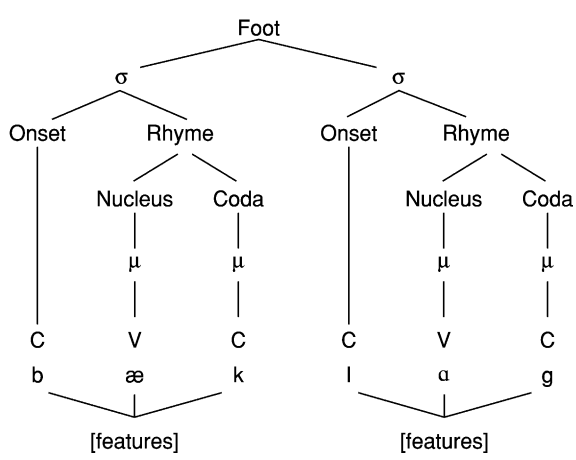

Figure 1 Phonological structure.

Phonological Features

Brown (2000) argued that if featural representations are lacking from the first language (L1), they will be unacquirable in the L2. She looked at the acquisition of English /l/ and /r/ by speakers of Japanese and Mandarin Chinese (neither language contrasts /l/ and /r/ phonemically). The Japanese situation is diagrammed in Figure 2, where SV represents 'sonorant voice.' In Japanese, [l] and [ɾ] are allophones of a single phoneme. This phoneme may appear only in a simple onset in Japanese. Mandarin Chinese also lacks the contrast (and hence the structure is the same as shown in Figure 2). If the segment is taken to be the level of explanation, then we might predict that both Mandarin and Japanese speakers should be unable acoustically to discriminate /l/ from /r/ (given their L1 feature geometries). In general, however, Japanese speakers are unable to discriminate /l/ from /r/, both acoustically and phonologically (in lexical choice tasks), whereas Chinese speakers discriminate the contrast in both tasks. The graph in Figure 3 shows the overall performance of participants in an auditory discrimination task designed to assess this

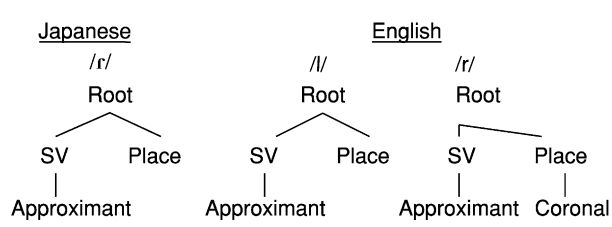

Figure 2 Feature geometry of liquids (SV, sonorant voice).

difference. The initial hypothesis, that speakers of both languages would be unable to perceive the /l–r/ distinction because one of the members of the contrast is an L1 phoneme, is not supported by the results (the Chinese speakers could). So, what aspect of the L1 could be accounting for this difference? Brown suggested that a speaker may be able to perceive a nonnative contrast if the feature that distinguishes the two segments is present in the L1 feature geometry (even if the feature is not utilized for the contrast in question). It is the feature [coronal] (Figure 2) that distinguishes /l/ from /r/. The Chinese language requires the coronal node for some sounds but the Japanese language does not. The two language inventories are shown in Figure 4.

Regardless, then, of the L1 liquid inventory, the Chinese speaker will have a representation for the feature [coronal] somewhere in the phonological inventory (i.e., to contrast alveolar from postalveolar segments shown in the box in Figure 4). The Japanese inventory, on the other hand, does not contrast any coronal phonemes and will therefore lack a coronal node. Thus, Brown concluded that L2 speakers cannot build representations for segments that require features not present in their L1. They can, however, combine the features of their L1 in new ways to yield new segments.

Atkey (2000) demonstrated that existing L1 features can be redeployed in new ways in an L2. She looked at the acquisition of palatal stops in Czech by English speakers (she looked at both production and perception but, due to space limitations, only her perception results are discussed here). Czech has two palatal stops, [c ɟ], as well as the alveolar stops [t d], as shown in Example (1):

(1) [tɛka] 'run' (3SG), [cɛka] 'wander'
[dɛkovat] 'to steal,' [ɟɛkovat] 'to thank'

Atkey argued that palatals are phonologically [coronal]. She proposed that the feature required to distinguish the alveolar from the palatal sounds is [posterior]. The Czech structures would be those shown in Figure 5. As a result of the English contrast of three coronal fricative places of articulation, /s, z/ versus /ʃ, ʒ/ versus /θ, ð/, Atkey argued that English has the [posterior] feature. She proposed the representations given in Figure 6. Therefore, English speakers should have the building blocks necessary for acquiring the structure of the Czech palatals. Atkey looked at six North American English-speaking adults who were learning Czech in the Czech Republic. Their exposure to the Czech language ranged from 3 months to 10 years. Learners were given a forced-choice picture selection task that depended on accurate discrimination of alveolar from palatal stops in all syllabic positions. Table 1 indicates the percentage of palatal stops perceived correctly by all learners. Clearly, L2 learners can perform this task at greater than chance levels. Native speaker controls scored 100%. The fact that the learners were much less accurate in final position is due to the reduced saliency of the information on place of

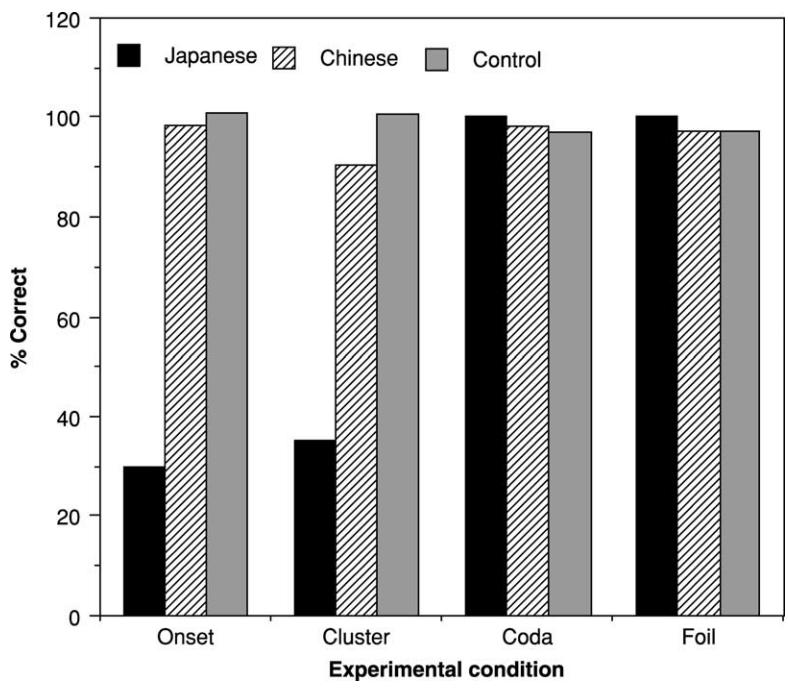

Figure 3 Overall performance on auditory discrimination task.

articulation recoverable at the end of a word. When a stop is released into a vowel, it is much easier for a listener to recover its place of articulation. Atkey's results, then, are consistent with Brown's.

Larson-Hall (2004) also found support for Brown's model when she looked at the perceptual abilities of Japanese speakers learning Russian. She assumed that the Japanese language lacks the underlying features [distributed] and [lateral], both of which are required in Russian. Therefore, it is predicted that the Japanese learners will have the most difficulty discriminating between the sounds [l]/[r] and [ʃ]/[ɕ]. This is exactly what Larson-Hall's study found.

However, the situation may not be as straightforward as the studies have suggested. Work by Curtin *et al.* (1998) documented a case study wherein English speakers learning Thai were able to acquire a feature that is not present in their L1. The property in question is aspiration, which is most likely represented by the feature [spread glottis]. English does not make use of the phonetic feature of aspiration contrastively in its lexical items. Ignoring some complexities, suffice it to say that English has aspirated stops at the beginning of stressed syllables (e.g., 'top' [tʰɑp]) but lacks aspiration after an [s] (e.g., 'stop' [stɑp]). Aspiration, then, in English is predicatable from the phonetic context and does not have to be memorized as part of the word. Thai, on the other hand, utilizes aspiration contrastively. For example, the word [pet] means 'duck' and the word [pʰet] means 'spicy.' English speakers learning Thai, then, would have to learn how to store the feature of aspiration as part of the lexical entry. Curtin *et al.* (1998) argued that English speakers did show the ability over time to lexicalize this phonological feature. That is to say, although their initial structures were transferred from the L1, they were able to trigger new knowledge.

LaCharité and Prévost (1999) proposed a refinement of Brown's model. In looking at French speakers acquiring English, they proposed a hierarchy of difficulty for new sounds. Whereas Brown argued that if a feature was lacking from the L1, then any contrast dependent on that feature could not be acquired, LaCharité and Prévost argued that a missing articulator node would be more difficult to acquire than a missing terminal node would be. French learners of English have to acquire the sounds [h] and [θ]; LaCharité and Prévost proposed the representations of Figure 7 for these sounds. The features in boldface are the ones that are absent from the French inventory. LaCharité and Prévost predicted that the acquisition of [h] would be more difficult than the acquisition of [θ] would be, because [h] requires

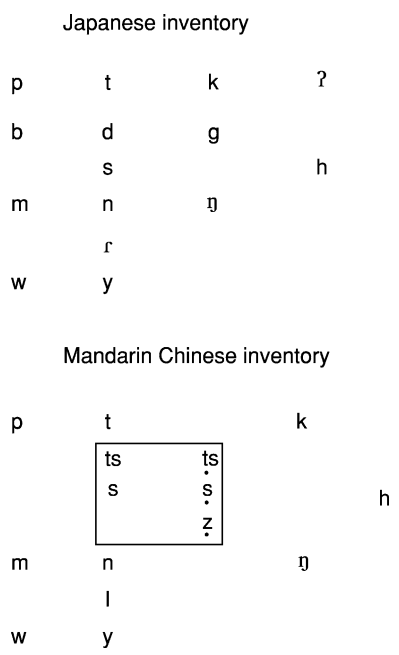

Figure 4 Chinese and Japanese phonological inventories.

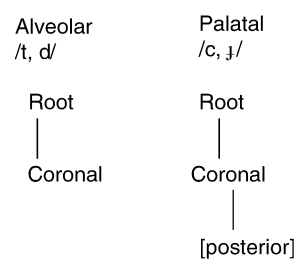

Figure 5 Czech alveolar and palatal stops.

Table 1 Perception of palatal stops by north American English speakers learning Czech[a]

Percentage of stops perceived by						
Position of stop	*Learner 1 (3 months)*	*Learner 2 (5 months)*	*Learner 3 (11 months)*	*Learner 4 (11 months)*	*Learner 5 (1 year)*	*Learner 6 (10 years)*
Initial	70	90	80	85	80	95
Medial	70	70	80	90	85	90
Final	20	30	50	70	70	80

[a]The length of time each learner had been exposed to the Czech language is shown in parentheses.

the learner to trigger a new articulator node. On a discrimination task, the learners were significantly less accurate identifying [h] than identifying [θ], but on a word identification task (involving lexical access), there was no significant difference between the performance on [h] vs. [θ]. Mah (2003) conducted an event-related potential (ERP) study that looked at English speakers acquiring French and Spanish 'r' sounds. Under her analysis, English lacks a pharyngeal node ([h] being laryngeal), whereas French [R] is analyzed as pharyngeal. Spanish [r], on the other hand, is coronal. The acquisition of both French and Spanish 'r' will require English speakers to activate a new terminal node that Mah defined as [vibrant]. In her analysis of the processing of these two 'r' sounds, Mah did not find any differences between the perception of a French 'r' as opposed to the Spanish 'r.' This is an argument against the LaCharité and Prévost position.

Syllables

Let us turn now to another example of hierarchical structure at a higher level: the syllable. A common model of syllable structure is shown in Figure 8. The languages of the world vary according to such things as whether syllabic nodes can branch. Some languages (e.g., Japanese) do not allow branching onsets or codas. A common phenomenon in second language learning involves modifying an L2 word so that it fits the L1 syllable structure. Consider the English target words and the nonnative speaker's version, given in Example (2), as spoken by someone whose L1 is Arabic (these examples come from Broselow (1988)):

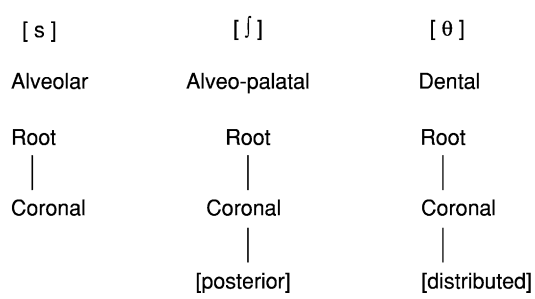

Figure 6 The [posterior] feature in English.

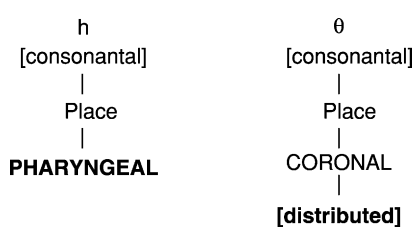

Figure 7 Articulator versus terminal nodes in English.

(2) plant 'pilanti'
Fred 'Fired'
translate 'tiransilet'

Arabic does not allow branching onsets or codas, so an English word such as *plant* cannot be mapped onto a single Arabic syllable. As this example helps show, we can explain why Arabic speakers pronounce English words in the way that they do by investigating the principles of syllabification in the L1. Especially at the beginning levels of proficiency, the structure of the L2 is influenced by the structure of the L1. This would suggest that learners are clearly transferring the L1 principles of syllabification.

Now let us look more closely at the acquisition of consonant clusters. Most of the consonant clusters in the worlds' languages obey what is known as the 'sonority sequencing generalization' (diagrammed in Figure 9), which captures the fact that the nucleus of a syllable is the most sonorous element, and sonority diminishes toward the edges. There are, however, sequences of consonants that violate this generalization, and they tend to involve the phoneme /s/. In English, some s-clusters violate sonority sequencing (e.g., 'st,' because the fricative [s] is more sonorous than the stop [t] is) and some do not (e.g., 'sn,' because the fricative [s] is less sonorous than the nasal [n] is). The analysis of the structure of s-clusters is a complex and problematic area of phonological theory, and the details are not further addressed here. In any case, many researchers argue that [s] is what is known as 'extrasyllabic.' In other words, it is not really part of the syllable, but somehow outside it. The interesting fact, bringing all this back to second language acquisition, is that L2 learners are aware of this.

Carlisle (1997) looked at how Spanish speakers deal with English onset clusters. He noted that three-consonant clusters are changed significantly more often than are two-consonant clusters. Carlisle (1991), in an earlier study on two-segment onsets, found that Spanish speakers modified onsets that violated the sonority sequencing generalization (e.g.,

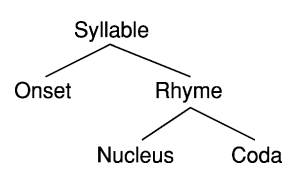

Figure 8 Syllable structure model.

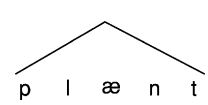

Figure 9 The sonority sequencing generalization.

st-) significantly more often than they did those that did not (e.g., sn-). Broselow (1992) showed that Arabic speakers treat s-clusters that violated the sonority sequencing generalization differently than they do those that do not, as shown in Example (3):

(3) *sweater* → [siwetar] and *study* → [istadi]
slide → [silayd] and *ski* → [iski]

Singh (1985) demonstrated the same pattern for Hindi speakers (Example (4)):

(4) *fruit* → [firut] and *school* → [iskul]
please → [piliz] and *spelling* → [ispɛliŋ]

Samarajiwa and Abeysekera (1964) showed the same pattern by native Sinhalese speakers pronouncing the Sanskrit words *tyage*, *sriyave*, and *stri* (Example (5)):

(5) tyage → [tiyage] 'gift'
sriyave → [siriyavə] 'grace'
stri → [istiri] 'woman'

These data suggest that L2 learners have full access to the principles of sonority sequencing, regardless of their L1 experience.

The work of Eckman and Iverson (1993, 1994) also clearly demonstrated that syllable structure can be changed in L2 learning. People can learn to pronounce new clusters that are not found in their L1. Abrahamsson (2003) provided one of the best overviews of the studies into the second language acquisition of syllable structure. He focused on the patterns of acquisition in coda position. Abrahamsson looked at the different types of repair strategies that are available to a learner whose L1 does not sanction coda consonants. Two strategies that are covered are epenthesis and deletion. Consider Example (6), which shows the target words, the deleted forms, and the epenthesized forms, respectively:

(6) when [wɛ] [wɛnə]
wet [wɛ] [wɛtə]
went [wɛ] [wɛntə]

As Example (6) illustrates, the deleted forms ([wɛ]) are much more difficult to recover for the listener than are the epenthesized forms. Abrahamsson hypothesized that the proportion of epenthesis to deletion repairs will increase as a learner's overall proficiency increases.

Abrahamsson also looked at speakers of Chinese (a language that allows at most one consonant in the coda) learning Swedish (which allows – or as Abrahamsson put it, has a "pain threshold of" – five consonants at the end of a word). Learners were recorded nine times, with 3 to 5 weeks between recordings. The first recording took place 10 to 24 days after the learners arrived in Sweden. The tenth recording took place 1 year after the ninth recording. For all three learners, the proportion of epenthesis to deletion increased over time (Figure 10). Furthermore, Abrahamsson showed that learners modified (epenthesis and deletion) inflected forms significantly more often than they did monomorphemic lexical forms. In addition, learners used epenthesis as a repair strategy more often on monomorphemic lexical items than they did on inflected items, as shown graphically in Figure 11. They also used inflection more often on open class lexical items than on closed class lexical items. Abrahamsson proposed a functional explanation for this: that there is a greater possibility for ambiguity in open class words than in closed class words and therefore recoverability will be

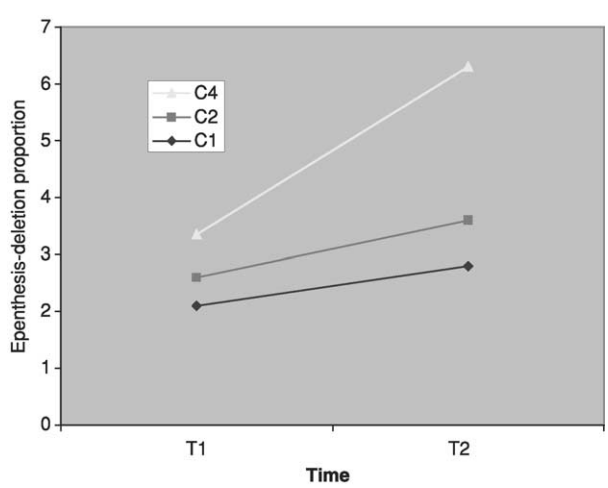

Figure 10 Proportion of epenthesis and deletion over time (modification strategies) for three Chinese-speaking learners (C1, C2, and C4) of the Swedish language.

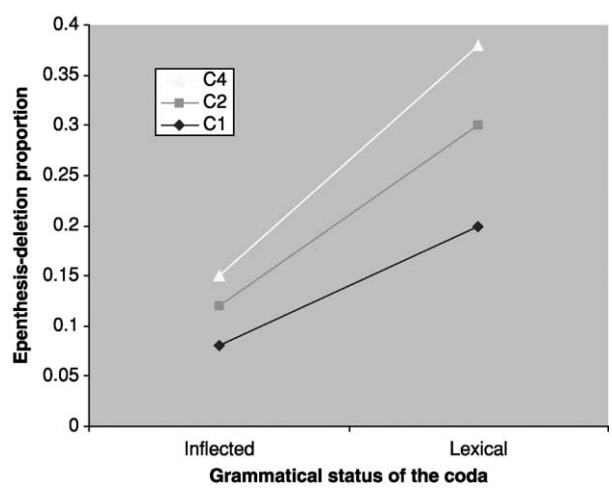

Figure 11 Error type in different grammatical categories, produced by three Chinese-speaking learners (C1, C2, and C4) of the Swedish language.

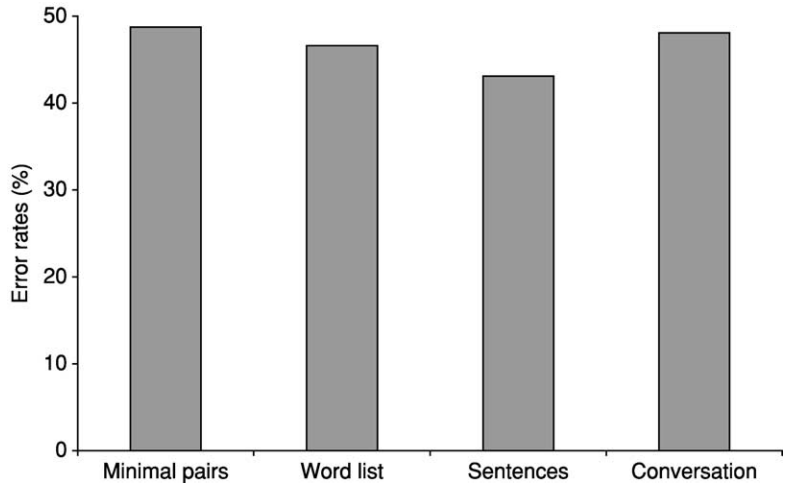

Figure 12 Overall error rates of Chinese speakers producing English monosyllables.

enhanced for the listener by epenthesizing the open class words. As there are fewer lexical competitors for closed class words, the subjects are freer to delete sounds from them, and the message will still be conveyed.

Lin (2001) presented another take on the syllable simplification strategies used by second language learners. Lin looked at the effects of different tasks, or different register as stimulated by a given task, on the accuracy of consonant cluster production. She argued that more formal registers do not lead to greater accuracy, as had been suggested in other studies (e.g., Tarone, 1983), but rather that the formality of the register correlates with the type of repair strategy used. She suggested that epenthesis is used relatively more often in more formal contexts (when focus is on the form of the utterance, rather than on the content). Conversely, deletion and substitution will be used relatively more often in less formal contexts. In the study, she looked at 20 Chinese speakers producing a variety of two-consonant onset clusters (e.g., [pj], [dr], [fl], [sn]) in English monosyllables. The speakers were taught the meanings of a variety of words (and pseudowords) and were given 15 minutes to learn them and practice pronouncing them. The four tasks were (1) reading minimal pairs with normal orthography and phonetic transcription, (2) reading randomized lists of target words in normal orthography, (3) reading two sentences out loud in a grammaticality judgment task, and (4) controlled conversation or structured interview. Task number one was assumed to be the most formal, moving down the scale to task four, which was assumed to be the most casual. There were no significant differences in overall error rates for the four tasks, as shown in Figure 12. However, as predicted, there was a significant decrease in the amount of epenthesis as the task formality decreased, as shown in Figure 13.

Moras

At another level of phonological structure, the moraic level, as shown by Broselow and Park in their work (1995) on mora conservation in L2 phonology, we see also that learners transfer their L1 phonological structures. Broselow and Park began by presenting the pronunciation data given in Examples (7a) and (7b), obtained from native speakers of Korean who were learning English:

(7a)	bit^{h}ɨ	'beat'
	čip^{h}ɨ	'cheap'
	p^{h}ik^{h}ɨ	'peak'
	rut^{h}ɨ	'route'
	k^{h}ot^{h}ɨ	'coat'
(7b)	bit	'bit'
	t^{h}ip	'tip'
	p^{h}ik	'pick'
	gut	'good'
	buk	'book'

Note that, the Korean speakers insert an epenthetic [ɨ] at the end of each word in Example 7(a), but not at the ends of the words in Example (7b). The first three words in the two examples end in the same consonants, so the epenthetic insertion cannot simply be triggered by the final consonant in the English word. Broselow and Park suggested that it is the quality of the vowel in the English root that determines whether epenthesis takes place. The epenthetic vowel is added to words that have long (bimoraic) vowels and not to words that have short (monomoraic) vowels. What would cause this difference in behavior? Broselow and Park (1995) assumed coda obstruents are nonmoraic in Korean. Syllabic nuclei must be

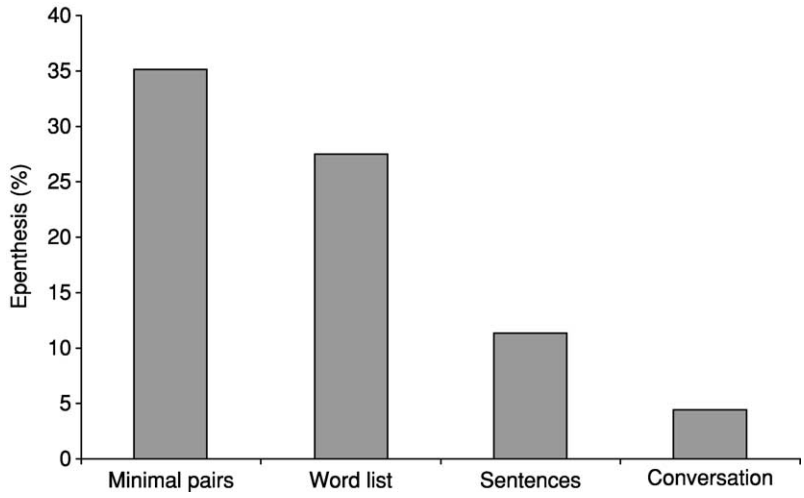

Figure 13 Epenthesis in different tasks.

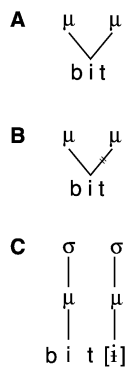

Figure 14 Mora. (A) Representation that includes a bimoraic vowel. (B) The second mora is delinked from the vowel, leading to epenthesis (C).

monomoraic in Korean (contrasted with English, in which they may be either mono- or bimoraic). In their view, the L2 learner begins by perceiving the L2 English input of a word such as 'beat,' and then setting up a representation that includes a bimoraic vowel, as shown in Figure 14A. Because this is an illicit structure in Korean, the second mora is then delinked from the vowel, as in Figure 14B; this triggers epenthesis, which fills the empty mora, and then onset formation occurs as in Figure 14C. Broselow and Park argued, then, that what the Korean learners are doing is attempting to preserve the mora count of the original English word (which has two moras attached to the vowel). Because this is an illicit structure in Korean, the learners set up a new syllable that allows the bimoraic structure to be preserved.

Stress

The question of L2 learners acquiring stress has been addressed in a number of projects. The broad conclusions suggest (1) that adult interlanguages do not violate metrical universals, and (2) that adults are capable of resetting their parameters to the L2 setting. The learners are quite good at putting English stress on the right syllable. Thus, their interlanguages are a combination of universal grammar principles, correct L2 parameter settings (from resetting), and incorrect L1 parameter settings (from transfer).

Table 2 illustrates how languages may differ in their parameter settings. When the parameter settings are different in the first and the second languages, we have the potential for transfer. Often, the L1 parameter settings transfer into the L2. Studies by Archibald (1993) showed that L2 learners were able to reset their existing parameters to new values. Van der Pas and Zonneveld (2005) argued against the parameter resetting analysis. However, it was less clear as to whether learners whose first languages did not have stress, but rather had tone, were able to trigger these metrical representations. Archibald (1997a) argued that Chinese and Japanese speakers learning English did not compute metrical representations, but rather stored stress placement for each lexical item. Ou and Ota (2004) argued that Chinese learners of English show sensitivity to syllable weight in a perception test of English words and hence that these learners are able to engage in a computational process to generate stress placement. This would be further evidence that second language learners are able to create new representations that are not found in their L1.

Rhythm

Whereas pedagogic treatments of L2 rhythm abound (primarily focusing on the differences between so-called stress-timed and syllable-timed languages), there have been relatively few empirical studies of

Table 2 Metrical parameter settings for different languages[a]

Parameter	*Spanish*	*Polish*	*Hungarian*	*English*
P1 (word tree)	Right	Right	Left	Right
P2 (foot type)	Binary	Binary	Binary	Binary
P3 (built from)	Right	Right	Left	Right
P4 (strong on)	Left	Left	Left	Left
P5 (quantity-sensitive)	Yes	No	Yes	Yes
P6 (sensitive to)	Rhyme	NA[b]	Nucleus	Rhyme
P8 (extrametrical)	Yes	No	No	Yes
P8A (extrametrical on)	Right	NA	NA	Right

[a]The parameters are considered part of universal grammar: values for each language determine how stress placement is assigned. L2 learners may transfer the settings of their L1 onto the grammar of the L2.
[b]Not applicable.

this phenomenon. Guilbault (2002) investigated the acquisition of French rhythm by English L2 learners. French has been argued to be a language wherein there is much more equal duration of syllables (syllable timed) than there is in English (stress timed). Guilbault argued that advanced L2 learners of French have modified the temporal properties of their speech to approximate its rhythmic patterns.

Intonation

There are very few studies on the acquisition of L2 intonation carried out within a generative framework. To understand why this would be the case, we need merely go back to the question posed at the beginning of this article: what is being acquired? In order to understand how syllable structure is acquired, we need to have a model of what syllable structure is. In order to understand how people arrive at knowledge of intonation in a second language, we need to have a model of what exactly native speakers of a language know when they can produce and perceive intonation patterns in their first language. And this is where we find relatively little agreement in the generative literature (for a discussion, see Ladd (1996)). One exception is the work of Jilka (2000). Working within the tone and break index (ToBI) system, Jilka demonstrated that a nonnative intonation pattern is a robust cue to nonnative-like phonology. Native speakers of English were recorded speaking German, and native speakers of German were recorded speaking English. All subjects were assessed as having high levels of proficiency and high levels of segmental accuracy. For all subjects, the nonnative utterances were 'corrected' by an automated program. Both raw and corrected versions of the sentences were played (nonsequentially) to native speaker judges. A significant number of the native-speaking judges judged the corrected versions to be more nativelike than the raw versions were.

Summary

When we probe the construct of second language accent, we can demonstrate the complexity of the phonological grammars of language learners. Linguistic theory and the field of second language acquisition combine to explain the nature of the mental representations that underlie second language speech.

See also: Distinctive Features; Interlanguage; Phonological Universals; Second Language Acquisition: Phonology, Morphology, Syntax.

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Second Language Acquisition of Phonology, Morphology, and Syntax

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Introduction

Four questions have dominated recent research in second language (L2) acquisition: (i) What role does a speaker's first language (L1) play? (ii) Does L2 acquisition display developmental patterns that are similar across learners? (iii) Is an innately determined human language faculty involved? (iv) Why is knowledge of an L2 sometimes underdetermined by the input? This article reviews some of the empirical findings bearing on these questions in the domains of L2 phonology, morphology and syntax, and considers how answers might contribute to the construction of a theory of L2 acquisition.

L2 Acquisition of Phonology

Casual observation tells us that most speakers of an L2, where acquisition has occurred beyond childhood, have foreign accents. Is this the consequence of the pervasive influence of a speaker's L1? With some properties of L2 phonology there is early, but temporary, L1 influence, with others L1 influence is persistent, and with yet other properties the influence comes from universal principles of phonological organization.

Broselow (1983, 1988) offers a clear case of L1 influence. Native speakers of Egyptian and Iraqi Arabic, in their production of syllable-initial English consonant clusters, may insert an epenthetic vowel; i.e., a vowel that creates an extra syllable. Interestingly, Egyptian Arabic speakers insert it in a different position from Iraqi Arabic speakers (**Table 1**) as a result of their L1 Arabic syllable structure.

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Second Language Attrition

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Introduction

Language attrition is a process which many – linguists and nonlinguists alike – appear to find interesting. Many people feel that, at some point in their lives, they have lost or forgotten some of the competence that they once had in a language, be it a foreign language learned at school or through a sojourn in the country where it was spoken, or a first language which has fallen into disuse for some reason. It is certainly no coincidence that a seminal work on second language (L2) attrition opens with the statement "Language loss affects all of us" (Hansen, 1999). It would be hard to imagine a paper on language acquisition, markedness, or minimalism starting with such a sentence, although it might be equally true.

One reason for this, I would propose, lies in the simple fact that the process of 'un-learning' differs from the process of learning or acquisition (or, for that matter, any other process or aspect of the use of a language) in several ways, but possibly most profoundly on a psychological level: it is an individual (and often lonely) one. While learning a language will almost invariably take place through interaction, through the sharing of a linguistic system that others

already possess, through entering some linguistic community – whether the artificial one of the foreign language classroom, or the real-life one in the country where it is spoken – and through communication, attrition is felt most keenly (although by no means does it have to be most drastic) where these factors are absent, where there is isolation from the language. It is my belief, born out of many interactions with people who feel that their competence in a language has 'attrited,' that this loneliness and isolation may, paradoxically, often lead the speaker to feel an authenticity and involvement about this process that is lacking in the more natural, common sense and communicative process of language acquisition.

While this aspect certainly adds to the compelling human interest of the topic, and is vital for the researcher to bear in mind when investigating attrition (a language that the speaker feels has attrited can be a very vulnerable spot in the first place, but if it is also an intimate territory that is easily violated, care and sensitivity are vital if one would avoid doing emotional damage), it may also be responsible for having biased research towards somewhat easy approaches and simplistic explanations over the past decades. It cannot be a coincidence that metaphors such as 'derelict houses,' 'riding a bicycle,' 'trying to find a lost possession,' to name but a few, abound in language attrition research. We know language to be an extraordinarily complex, multilayered neuropsychosociological system that very probably bears no resemblance whatsoever to a house, a bicycle, or a set of keys that we may have lost. However, there seems to be a profound need to think what we know – or think we know – to be true, authentic, and part of our own emotional experience, which we can also grasp and understand intellectually. It is often when this need is thwarted that we reach for metaphors that can explain what we cannot interpret within its own frame of reference.

The term 'language attrition' itself was clearly born out of such a metaphor: the OED defines attrition as "the action or process of gradually reducing the strength or effectiveness of someone or something through sustained attack or pressure." This indicates that the term was coined on the assumption that a linguistic system in disuse will be vying for memory space with the other linguistic system(s) occupying the same brain, that not being kept fresh and strong through constant use will somehow weaken it, and that it will therefore suffer in some way. Whatever deviant forms were observed in the attrition process were therefore implicitly assumed to be the result of another language encroaching on the linguistic system and changing its representation. It should be stressed that at the time that the term 'attrition' was first used, in the early 1980s, there was absolutely no evidence whatsoever for such a process (arguably, there still is none), and one should remember that the explanation engendered in the label was purely intuitive. The fact that the term has caught on, even though some still object to it very decisively (e.g., V. Cook, personal communication – such objections, however, are usually based more on the negative semantic potential the term carries than on the inaccuracy of the metaphor), further seems to indicate that this metaphorical explanation was intuitively convincing to many.

This underlying perspective changed as psycholinguistics and neurolinguistics began to take an increased interest in language attrition. It quickly became evident that many of the phenomena witnessed in attrition could not simply be explained on the basis of interference from another language. The forces governing attrition began to be ascribed more to a language internal process, due to lack of exposure or input in that language, not through the amount of exposure to or input from another. Even more recently, the role of output has also been stressed in this connection (de Bot, 2001: 70). And ever since it has become evident that there is more to the process of language attrition than a situation of hostile takeover by another language, researchers have been looking for theoretical models that might have the power to make sense of the puzzling phenomena witnessed in the process of attrition.

Theoretical Models

As mentioned above, one of the most important forces in both L1 and L2 attrition has always been assumed to lie in cross-linguistic influence (CLI). For L1 attrition, the investigation of this phenomenon is relatively straightforward, since one can assume that CLI was relatively minor or completely absent before the onset of attrition, that is, before the move to another environment takes place. For L2 attrition, on the other hand, it can be difficult to investigate the increase of CLI, since L1 probably always has some degree of influence on L2. It is therefore necessary either to isolate phenomena that are known to have been mastered at some time, or, ideally, to choose a longitudinal research design, where the development of certain selected features can be monitored over a longer time span (on the influence of time on attrition, see below).

One of the more intuitively persuasive models to be invoked in language attrition research was also one of the earliest ones: the regression hypothesis, first formulated by Ribot, extended to aphasia by Freud, and formulated more specifically in this context by Jakobson in

the 1940s, in particular with respect to phonology. This theory, also known as the LIFO (*last in, first out)* model, predicts that the process of loss of a language will be the reversal, or mirror image, of the process of acquisition. In other words, it assumes that we forget things in the inverse order in which we learned them, that the things we acquired earliest will be most persistent, while more recent knowledge will be more vulnerable.

As has often been pointed out, where pathological language loss is concerned the regression hypothesis does not provide a valid theoretical framework. However, the findings from L2 attrition research suggest that order of acquisition may be a valid predictor for the attrition process – order of acquisition, in this case, not referring to normal and unguided child language acquisition, but to the order in which the individual who is forgetting an L2 learned the features under investigation in the classroom (Berko-Gleason, 1982; Cohen, 1975; Hayashi, 1999; Jordens *et al.*, 1986, 1989) or in unguided exposure to an L2 environment (Cohen, 1989; Hansen, 1999; Kuhberg, 1992; Olshtain, 1989). As Hansen points out, in L2 attrition the question is no longer **if** the regression hypothesis applies, but "**when** and **under what conditions** its predictions hold true" (1999: 150, her emphasis).

A further interesting question to ask in this context is, of course, why. What is it in the acquisitional sequence that would have such a strong influence on language forgetting? Is it due to some intrinsic feature of linguistic knowledge and its organization in the brain (as was the original assumption)? Is it due to reinforcement, or lack thereof – features that have been acquired recently will not have been rehearsed as frequently as the early features (quality of learning vs. chronology of learning, cf. Obler, 1993: 189; Weltens, 1988: 7; Yoshitomi, 1994: 12)? Or does it have to do with the linguistic complexity of particular items and features; especially in classroom acquisition of an L2, one would assume that the simpler grammatical phenomena are taught earlier, while the more complex ones, which will be reserved for later and will be harder to master, will also be more difficult to maintain (Andersen, 1982: 113)? This factor has not yet been resolved.

Another linguistic theory that is often invoked in L2 attrition is markedness, most usually in the UG sense of the term (*see* **Linguistic Universals, Chomskyan**; Hansen, 1999; McCormack, 2001, 2004). This theoretical framework assumes that language-internal processes, such as those addressed in Chomsky's theory of government and binding (GB), can predict the sequence of language attrition. As Sharwood Smith and Van Buren (1991: 17) point out, it seems important to know whether an individual has lost or **is even able to lose** those kinds of underlying mental representations of an attriting language that may be identified as Chomskyan-style Universal Grammar (UG)-based competence. This is based on the assumption that second language learners only have access to a UG that is already parameterized. With respect to L2 attrition, the prediction would thus be that a marked value that the second language learner has acquired will, in the process of language loss, revert to its unmarked L1 setting. Such a process has indeed been identified by McCormack (2001, 2004), with the intriguing twist that the linguistic feature under investigation (the binding properties of the English reflexive) began to be influenced by another linguistic category (finiteness), which does not influence the feature in either of the attriter's languages, but does play a role in other natural languages.

These are the most important linguistic models for L2 research; other theoretical approaches have been applied to the development of certain linguistic features in L1 attrition; for an overview see Köpke and Schmid (2004).

Extralinguistic Factors

The process of language attrition is influenced not only by linguistic factors, but also by extralinguistic ones such as age at onset of attrition, achievement level at onset of attrition, time since onset of attrition, amount of exposure to the attriting language, attitudes and motivation, etc. For L1 attrition, a further important factor is education level. Where the study of L2 attrition is concerned, this factor usually has relatively minor influence, since often the same level of achievement in L2 presupposes a similar education level. Education will therefore not be included here: a discussion can be found in Köpke and Schmid (2004).

An important extralinguistic variable for the study of L2 attrition is attitude and motivation. Since this has been shown to be one of the most important determining factors for success in L2 acquisition (*see* **Motivation and Attitude in Second Language Learning**), it would be only natural to assume that it might also condition retention. However, attitude has proved to be a slippery diagnostic in attrition studies, probably partly because such studies typically cover a longer range of time than studies of acquisition, and attitudes are subject to frequent and often radical changes (Schmid, 2004a). So far, the only studies that were able to correlate attitudinal and attritional factors were those that measured attrition exclusively by self-evaluations (L1 attrition: Waas, 1996; L2 attrition: Gardner *et al.*, 1985, 1987). However, self-evaluations often are not a valid predictor of the

actual attritional process, especially in L2 attrition speakers, who tend to report massive losses that are not borne out by actual linguistic tests (Weltens, 1988).

Where age at the onset of attrition is concerned, findings so far suggest that there is an important turning point that probably can be situated somewhere between 8 and 10 years. Virtually all studies of both L1 and L2 attrition that investigate children around or below that age report a significant decrease in proficiency, while studies using older subjects often establish a surprising degree of stability in linguistic knowledge. Especially interesting in this context are the findings of Berman and Olshtain (1983) and Fujita (2002). Both of these studies suggest a freezing point or cutoff point around age 9, which proved the strongest determining factor for their investigation. Similar findings have been reported for L1 attrition (for an overview, see Köpke and Schmid, 2004). It is very interesting to note that this cutoff point in most cases coincides with the age at which children master literacy. The question of whether the stabilization of the linguistic system is conditioned purely by brain maturation processes that occur at that age or whether it may be caused or at least facilitated by literacy has recently been posed (Hansen, 2001; Köpke, 2004; Köpke and Schmid, 2004), but remains unresolved. (*see* **Phonological Awareness and Literacy**.)

Level of achievement, on the other hand, is a factor which plays a much greater role in the study of L2 attrition than it does for adult L1 attrition, where usually the process of normal acquisition of the feature(s) under investigation is assumed to have been completed prior to the onset of attrition. For L2 attrition, however, a critical threshold or critical mass (Nagasawa, 1996, 1999), after which L2 proficiency appears to stabilize, has often been suggested. Numerous further studies, while not going as far as proposing such a threshold, have found the level of initial proficiency (that is, proficiency at the time where instruction in or exposure to the L2 ceases) to be the best predictor of language loss or retention (e.g., Reetz-Kurashige, 1999). Interestingly, Hansen (1999) established the impact of length of exposure to L2, as opposed to initial level of proficiency. This factor has not been tested elsewhere, but it can be expected that length of exposure and proficiency will usually depend on each other. It has thus often been suggested that a higher proficiency in L2 is a good safeguard against attrition. In this context, an intriguing observation was made by Bahrick (1984) and Weltens (1988): their findings suggest that L2 learners will relatively quickly lose a fixed amount of knowledge, independent of their initial level of proficiency. However, while this means that both high and low proficiency speakers of L2 lose the same amount in **absolute** terms, **relatively** speaking each speaker has a lower proportion of knowledge at the onset of attrition.

A further finding from these latter two studies refers to the time period in which this loss takes place. As has also been suggested for L1 attrition, it seems that the greatest part of L2 attrition takes place within the first few years immediately following the end of instruction in or exposure to L2. The earliest major study of L2 attrition, Bahrick (1984), suggests that the lion's share of L2 attrition can be found within 3–6 years. After this, his findings suggest surprising longevity of linguistic knowledge. The part of this knowledge that will remain robust for approximately 25 years he labels permastore content, while another large part appears to be completely impervious to language attrition.

Linguistic Levels

Many attempts have been made to describe exactly which linguistic features are more vulnerable to loss, i.e., belong to the linguistic knowledge that will disappear in the early stages of language attrition, and which of them will belong to the more robust part of the linguistic repertoire. In both L1 and L2 attrition, it is generally agreed that the lexicon – or part of the lexicon – will suffer most easily and quickly. Whether such a reduction is a case of actual loss, or simply a matter of diminished accessibility, has often been debated, but the fact that many studies have found receptive skills to be unimpaired (e.g., Grendel, 1993; Weltens, 1988) suggests the latter.

How productive lexical skills, on the other hand, are affected by attrition seems to be influenced by frequency and similarity. It has often been pointed out that low-frequency lexical items tend to become inaccessible before high-frequency ones, and that cognate items are retained better. These findings are exactly what common sense would lead us to expect. While investigating the attrition of lexical skills may help us understand memory processes or the organization of the mental lexicon (*see* **Neurolinguistics from the Middle Ages to the Pre-modern Era**), there seems to be little we can learn from such studies in terms of the structure of linguistic knowledge. For this reason, more recently, language attrition has focused more on grammatical aspects.

The erosion of grammatical and phonological skills, too, has often been assumed to be influenced by similarity between the two languages. In these areas, frequency does not play an important role (most grammatical and phonological features occurring

very frequently in most types of discourse), and research has usually focused on complexity instead.

While there is a small body of work dealing with the impact of attrition on L2 phonetics (e.g., Dugas, 2000 on voice onset time and Nagasawa, 1996 on pauses), the attrition of L2 phonology remains very much under-researched. The only detailed investigation to have been conducted thus far focused only on receptive skills, where the impact of similarity between L1 and L2 was conclusively demonstrated (Weltens, 1988). Studies investigating, for example, the development of the production of phonemes not present in L1 are clearly called for. The large body of work on L2 acquisition of phonological features would be very useful in this context (*see* **Second Language Acquisition: Phonology, Morphology, Syntax; Second Language Acquisition: Phonology**).

Such studies could help elucidate the impact of similarity or dissimilarity between L1 and L2, which remains a contested matter. While in the earlier stages of language attrition research, the prevailing assumption was that items that are also present in an attriter's stronger language would be easier to preserve in the attriting language, this has more recently been called into doubt, especially where the grammatical system is concerned. It is tempting to assume that the presence of a feature in L1 will lead to its frequent rehearsal and thus prevent attrition of the same feature in L2. However, as two grammatical or phonological features, or even two cognate lexical items, are rarely if ever totally identical in two languages, this is a double-edged sword: it is also possible that the slightly different use, pronunciation, or meaning of the grammatical, phonological, or lexical feature under investigation will imprint itself on the comparable feature in L2, and thus lead to its misuse (this would be congruent with the early, intuitive meaning of the term 'attrition' mentioned above). At the same time, features of L2 that are not similar to anything that L1 has, such as English /θ/ or /ð/ for L1 speakers of Dutch or French, might be immune to such attritional forces (*see* **Second Language Acquisition: Phonology**).

To illustrate this last point, consider the case of past tense morphology. Both English and German have a synthetic past tense (formed by suffixation of the verbal stem) and a periphrastic one (formed with an auxiliary verb and the past participle of the main verb). However, while in English these two are clearly distinguished aspectually, in German no such distinction exists, and the distribution is mainly stylistically conditioned (*see* **Aspect and Aktionsart; Tense, Mood, Aspect: Overview**; see also Schmid, 2002: chap. 5.1). Consider the following example:

(1a) I did not go home.
(1b) I have not gone home.

In English, (1a) could only be part of a narrative, which at the point of telling is concluded: wherever the narrator had been going, he or she would be expected to have reached the destination at the moment of narration. Example (1b) suggests that he or she is still on her way, and will, at some point in the future, go home.

In German, however, one would expect the sentence grammatically corresponding to (1a) to occur in a written, formal or literary narrative, while (2b) would sound more natural in a spoken, colloquial one. There is no aspectual distinction between (2a) and (2b).

(2a) Ich ging nicht nach Hause.
(2b) Ich bin nicht nach Hause gegangen.

An investigation of this grammatical feature in language attrition would first have to come to a workable definition of similarity. Grammatically speaking, both languages possess the same feature; however, the meaning potential is different. So we might, for example, expect both L1 or L2 speakers whose German is attriting and whose English is dominant to reject (2a) in a context where the aspectual prerequisites that condition the use of the corresponding English structure are not met.

The methodological catch here is that it is a logical impossibility to establish the impact of (dis)similarity of a particular feature on the basis of only two languages. In order to investigate such a feature, it is necessary to include a cross-linguistic comparison with at least one other language. A possible candidate would be French, which has a three-way contrast that marks both aspectual and stylistic differences morphologically: the synthetic past tense in (3a) indicates a continuous aspect, the periphrastic one in (3b) suggests completion, while the synthetic tense in (3c) replaces the periphrastic tense in literary or formal contexts.

(3a) Je ne retournais pas à la maison.
(3b) Je ne suis pas retournée à la maison.
(3c) Je ne retournai pas à la maison.

It is this kind of contrast that would be interesting to investigate comparatively, in order to gain more information on the impact of similarity and contrast in language attrition, particularly where L2 is concerned.

Research Designs

It has recently been pointed out how important it is to recognize that the way in which data are elicited and the way in which certain linguistic features are

selected in particular studies of language attrition will determine and limit the conclusions to be drawn (Köpke and Schmid, 2004). In this respect, it is vital to recognize fundamental differences between L1 and L2 attrition. All aspects of language attrition research discussed so far have an impact on both L1 and L2 attrition, the differences are usually merely quantitative. It is where research designs are concerned that the division between the two fields becomes qualitative and not comparable.

This is understandable, since the skills acquired in both acquisition processes are probably very different, and so it takes different tasks and tests to measure their erosion as well as their acquisition (*see* **Assessment of Second Language Proficiency**; **Assessment of First Language Proficiency**).

However, L2 attrition can further be separated into two clear subfields, namely that of an L2 that was acquired through formal, classroom teaching (often, this means that it has hardly, if ever, been used in a naturalistic setting) and an L2 acquired informally through a sojourn in the country where the language was spoken. While earlier studies, such as Bahrick (1984), Weltens (1988), and Grendel (1993) focused on the former type, recently focus has shifted to the latter, particularly in the large body of studies focusing on Japanese returnees or former missionaries in Southeast Asia (e.g., the studies collected in Hansen, 1999).

An interesting case in point is the study by Murtagh (2003), who investigated the L2 attrition of Irish Gaelic. While this language had been a compulsory subject for all her informants at school, it is not quite clear how subjects' exposure to this language in childhood, e.g., from a grandparent, might influence the process of attrition. A similarly mixed situation is also investigated by Montrul in the case of heritage speakers of Spanish, and it seems clear that this distinction has the potential of confounding the issue unless it is given more prominence in L2 attrition research.

While L1 attrition studies often attempt, through informal conversations or semi-structured interviews, to elicit data that is as naturalistic as possible and thus matches the skills an L1 speaker can be assumed to possess, L2 attrition research has mainly relied on the methods developed for the assessment of L2 proficiency. In the case of a formally acquired L2, the logic behind this approach is compelling, since it allows the best comparison with the point of reference at the onset of attrition (ideally in a pre-test post-test design, if information about the informant's performance at this point is available, or through use of data obtained in a similar way from a control group). Often, such tests have even been standardized across large populations and can thus be considered to be particularly valid, and also have the further advantage that they are in a format that everyone exposed to L2 teaching is familiar and comfortable with.

However, when dealing with speakers who have acquired their L2 informally, these methods have their limitations. The first and most obvious one of these is that many such tests rely heavily on written material (with the great advantage that they can be administered to large groups of informants at a time). Speakers who have never had formal instruction in a language often have very limited literacy, especially in languages that use a different writing system than their own; and even in cases where they are literate, the gap between spoken and written skills is usually much greater than in the other type of L2 acquisition (where speakers often even prefer the written to the spoken code).

The second problem is that, while such standardized methods test skills that can be clearly assumed to have been learned after a certain time of systematic instruction, assessing the point of reference, i.e., the proficiency of an informant in a particular skill at the onset of attrition, is much more difficult for speakers who have never had any formal language teaching, since there is great individual variance in such cases. For such groups, thus, a longitudinal research design would be ideal. Nevertheless, considering Bahrick's (1984) findings about permastore content that remains stable for 25 years or more, one has to wonder just how practical such a design would be.

An investigation of testing techniques used in L2 attrition studies clearly reveals the shift in focus from the attrition of a formally to an informally learned L2: while virtually all studies that were conducted in the 1980s used measures such as cloze tests and other formal exams, many studies in the 1990s worked with free conversations or data elicited through picture-story retellings. (An annotated bibliography of studies of both L1 and L2 acquisition, detailing languages investigated, theoretical frameworks, and test methods can be found in Schmid, 2004b.)

Obviously, the manner of data elicitation can only ever be evaluated alongside a fair consideration of the goals pursued, since they permit very different conclusions. Naturalistic methods are ideal for global approaches, aimed at measuring all aspects of performance, or for preliminary research in order to identify sensitive areas. More formal tasks, on the other hand, allow for better control of linguistic and psycholinguistic factors and should thus be applied in the investigation of specific domains.

Most of all, it should be acknowledged that the attrition of a formally and informally acquired L2 probably makes up two separate and different

areas of study. This difference could be far more important and useful than the four-way classification of language attrition by attriting language and environment, which was first proposed by de Bot and Weltens (1985) but is usually ascribed to van Els (1986). This taxonomy is still invoked at the beginning of virtually every article on language attrition, although its practical impact has been negligible.

Conclusion

The study of language attrition, and in particular of L2 attrition, has come a long way, from the mostly descriptive approaches that dominated in the 1980s to the quantitative and theoretically informed studies of the past decade or so. More work is clearly needed in this expanding domain, since language attrition is a topic that is not only intuitively interesting. Like the study of a language being acquired, investigating a language that is in a process of decline can help us gain insights that a normal linguistic situation would not allow. But then again, what is normal? As the quote toward the beginning of this article states, "[l]anguage loss affects us all." If properly investigated, however, it can benefit us all as well.

See also: Aspect and Aktionsart; Assessment of First Language Proficiency; Assessment of Second Language Proficiency; Linguistic Universals, Chomskyan; Motivation and Attitude in Second Language Learning; Neurolinguistics from the Middle Ages to the Pre-modern Era; Phonological Awareness and Literacy; Phonological Awareness and Literacy; Second Language Acquisition: Phonology, Morphology, Syntax; Second Language Acquisition: Phonology; Tense, Mood, Aspect: Overview.

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Second Language Listening

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Introduction

It was not until well into the second half of the 20th century that second language listening was widely recognized as a skill that could and should be systematically developed and assessed by those teaching a second language. Whereas earlier scholars such as Henry Sweet and Harold Palmer had stressed the importance of teaching the spoken language, in their view such teaching was to be based on "the science of phonetics," which effectively meant that the aspect of the spoken language actually taught was its pronunciation. It seems that these scholars supposed that, if you could pronounce the target language reasonably well, it must follow that you would be able to understand it when you heard it spoken. So, in early work on listening comprehension based on the structuralist tradition, it was assumed that the main problems in second language listening would be a mirror image of problems with pronunciation. Students were systematically taught to identify differences between those sets of vowels or consonants in the target language that a contrastive analysis of the phonological systems of the L1 and L2 predicted would be difficult for the L1 speakers to distinguish in L2 speech. Students listened to triplets of words, such as *bit bit beat* or *try dry try*, and were required to identify which of the three words was different from the other two. They listened to sets of words with similar consonantal and vocalic structure but different stress patterns and identified those with different stress patterns. And they listened to phrases like *the pink one* uttered with either falling or rising intonation and identified the one with rising intonation as a question.

With the advent of mass tourism in the 1960s, the gulf became glaringly apparent between being able to identify a sequence of words spoken slowly and carefully in the foreign language and being able to identify words in the acoustic blur of normal conversational speech. As Wilga Rivers (1968: 135) remarked, emphasis in language teaching had hitherto been placed on students' production of the language, disregarding the fact that communication takes place between (at

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least) two people. She suggested that the primary difficulty for a traveler in a foreign country was not the problem of making himself understood but of being unable to "understand what is being said to him and around him".

On the rare occasions when students were invited to listen to a tape to understand the content of what was said, they typically listened to a text that consisted of a narrative or discursive text read aloud slowly and distinctly by a native speaker. After listening to the tape, they were asked questions on the content. The questions, often as many as 10 or more, concerned information spaced at roughly equal intervals through the text, following the format widely used in 'teaching' the comprehension of the written language. Consider what these second language learners were being required to do: "treat all spoken language as primarily intended for transference of facts ... listen with a sustained level of attention, over several minutes to spoken language ... interpret *all of it* ... commit that interpretation to memory ... answer random, unmotivated questions on any of it" (Brown and Yule, 1983: 60). Sophisticated adult native speakers often had difficulty in recalling some of the trivial detail that such 'comprehension questions' addressed. For most second language learners, the experience was negative and demotivating.

The challenge since the 1960s has been to help students identify words in the stream of speech and to equip them with strategies to enable them to interpret the content of utterances in the relevant context of utterance and to work out what speakers mean by what they say.

Bottom-up Interpretation

It seems clear that structuralists were correct in claiming that being able to identify words in the stream of speech is fundamental to understanding what a speaker is saying. In some genres of speech, notably in relaxed conversation, where the focus is on the establishment or maintenance of social relationships, it may not be necessary to identify all the words that are spoken but, to participate meaningfully in the conversation, it is essential to identify at least those expressions that indicate the topic of the utterance and what is said about that topic. In primarily transactional genres, on the other hand, where the transfer of information will have some effect in the world, it may be essential to identify even the detail of those unstressed grammatical words that you can often afford to leave only vaguely guessed at in social conversation. When you are listening in your first language, you tend to be quite relaxed about how much you can afford not to fully interpret. In a second language, particularly in the testing situation of a classroom, it is hard not to panic if you realize that a series of unidentified words is rushing past your ears.

It is sometimes suggested that, in order to identify words in the stream of speech, it is necessary to be able to identify all the consonantal and vocalic oppositions that occur in the accent of the target language that students are being exposed to. This is a counsel of perfection. We should remember that in any accent of English, some of the oppositions found in other accents will not occur. Thus, standard American English does not distinguish between the words *balm* and *bomb*; young speakers of southern British English ('RP') do not distinguish between the words *paw*, *pore*, and *poor*; Scottish English does not distinguish between the words *cot* and *caught*, *cam* and *calm*, or *pull* and *pool*; Yorkshire English does not distinguish between the words *put* and *putt*; and London Cockney English does not distinguish between the words *sin* and *sing*, *thin* and *fin*, or *that* and *vat*. Yet, on the whole, speakers of different accents of English understand one another's speech well enough, even though in their own accent they do not make exactly the same set of phonological distinctions that their interlocutor makes. Second language learners are likely to encounter speakers from a range of different English accents and need to learn to identify the basic distinctions that are maintained in stressed syllables in all English accents, rather than spending much time on rare sets of oppositions that do not occur in most accents and which, even there, may carry only a low functional load. Whereas courses in pronunciation will normally be based on only a single native accent, courses in second language listening need to be much less constrained and to be relevant to a variety of major English accents.

There is obviously a significant difference between encountering words in the written and spoken forms of the language. In the written form, spaces between words unambiguously demarcate individual words. A major difficulty in interpreting the spoken form of a second language lies in determining where word boundaries occur. It is not always appreciated that crucial information needed in the task of segmenting the acoustic blur of the stream of speech lies not only in discriminating between phonological oppositions but also in identifying the phonologically conditioned variables that characterize particular consonants when they occur initially or finally in a word or stressed syllable. For historical reasons, much has been made in teaching English as a second language of the 'aspiration' (delayed voice onset time) that follows the articulation of a voiceless stop when it is initial in a stressed syllable. On the other hand,

the glottalization that precedes the articulation of the same set of phonemes in the coda of a syllable in most accents is typically ignored. Yet each feature is equally informative in identifying relevant parts of word structure (Brown, 1990: Chap. 2). Similarly much has been made in British ELT of the distinction between palatalized ('light') and velarized ('dark') /l/, without noting the generalization that the structure of the syllable in the RP accent is always more palatalized in the onset and more velarized in the coda of the syllable, a fact that affects the articulation of all consonants in these positions. The effect is most easily heard in sonorants and continuants where syllable-initial (onset) consonants will be heard as more palatalized, and hence higher in pitch, than syllable-final (coda) consonants. There are, of course, accents whose syllables are differently structured: the English of Glasgow has velarized consonants initially as well as finally, and Welsh English has palatalized consonants finally as well as initially.

Much more generalizable across accents than these palatal/velar subtleties is information about those phonotactic constraints that are helpful in identifying syllable and word boundaries, information that is sadly underexploited in the teaching of second language listening. For example, if an ESL listener hears a sequence /ml/ in the stream of speech, it is relevant to know that, since this cannot form an onset cluster in a syllable of English, it cannot mark the beginning of a word. The /l/ must be syllable initial, which means that the /m/ must be final in the preceding syllable; the significance of this fact is that where there are syllable boundaries, there are potential word boundaries (Cutler and Norris, 1988). An essential requirement is to learn to identify and to pay attention to the stressed syllable of words, since this is the syllable that is most reliably clearly articulated. In the stream of speech, a great deal of the phonological information that is available when words are pronounced slowly and clearly in citation form is routinely lost, particularly in unstressed syllables. Unstressed syllables are frequently elided, particularly when they occur as one of an unstressed sequence (for instance, in words such as *library, governor, extraordinary*). Processes of elision and assimilation take place across syllable boundaries and radically alter the familiar features of the citation form. Such processes occur densely in normal, informal speech whose relevance for learners is much greater now than it was pre-1970 since this type of speech is used in a much wider range of situations than it used to be. It is not only found in informal conversational contexts but is regularly heard on radio and television (even in news broadcasts, once models of slow, carefully articulated speech) and is standardly used in academic lectures and in public speaking more generally. (Harris (1994) and Shockey (2003) gave detailed accounts of these processes.)

I have suggested that a crucial component of second language listening is identifying words correctly. More to the point may be identifying the larger, prefabricated structures of which so much spoken language is constructed. Wray (2002) reviewed an array of studies that demonstrated the crucial significance of such structures, particularly in the early stages of learning a second language. It seems likely that many expressions are, initially at least, learned as unanalyzed chunks. Other expressions may be incorrectly analyzed (as in the case of the L2 learner of French who analyzed the spoken version of *chocolat* as *chaud cola*). In many cases, it may be that such expressions are stored and used quite effectively until eventually confrontation between spoken and written forms (or the utterance and the world) leads to a reanalysis. The acquisition of lexis, and of formulaic expressions in particular, is still the subject of extensive research.

Having identified (some of) the expressions in an utterance, the listener needs to order them into chunks that can be understood as syntactically structured and co-interpretable semantically. Just as the written language uses punctuation and layout to indicate the organization of discourse, there are various signals in speech, for instance, intonation, slowing down, and pausing, that indicate the boundaries of chunks of speech that need to be co-interpreted. In most accents of English, the beginning of a new sentential structure is typically indicated by being placed relatively high in the speaker's pitch range, and the rest of the structure is included within the overall contour that follows. The end of the structure is usually marked by being uttered at a lower level in the pitch range than the onset and is often followed by a pause. Internal sentential boundaries may be marked by shorter pauses and sometimes by variation in pitch height or direction (cf., Ladd, 1996).

Where spoken language differs dramatically from written language is in the scale of interruptions, modifications, and use of interpersonal markers in its production and in its reliance on the present context of utterance to constrain possible interpretations by the listener. Most speakers have had the experience of interrupting themselves, pausing, reconsidering, planning again, beginning to express themselves in one way, and then immediately modifying what they have just said. Unlike writers, they cannot undertake such operations secretly, without the interlocutor knowing. Second language learners unused to listening to spontaneous speech that has not been previously at least partially planned are in danger of having

their attention distracted from the message by material that is introduced as part of the planning process. Often the changes speakers make are marked by interpersonal and modal expressions such as *well, erm … I mean, so … you see … , if you get my meaning …, as far as I'm concerned …, I think …, I'm sure …,* phrases that disturb the smooth flow of a sentential structure at both a syntactic and an intonational level. A feature of spontaneous conversational speech that second language learners need to become accustomed to is how such universal features of spoken language are managed in the second language.

As speech plays such an important role in interpersonal relationships, its production is often modified by paralinguistic features that express the attitude of the speaker toward the listener and/or toward what is being said. English speakers who are being particularly polite to the interlocutor often speak higher in their voice range, relatively softly, and with a 'breathy' voice, whereas those who are being aggressive typically speak lower in their pitch range, more loudly, and with a 'harsher' voice quality. Speakers who are being sympathetic or kind speak low in their voice range, slowly, and typically with a 'creaky' voice. Whereas it seems plausible that basic human emotions such as fear, anger, or timidity are expressed similarly in all languages, it seems probable that attitudes that are more culturally conditioned are more likely to be variable in their expression across languages. Second language learners, at quite an early stage in their exposure to tapes and videos of L2 speakers interacting, might profitably pay attention to paralinguistic features of speech in order to identify whether speakers are agreeing or disagreeing with each other, being polite or aggressive, or friendly or unfriendly, long before they can understand the linguistic details of what is being said (Brown (1990), summarized in Rost (2002)).

Interpretation and Inference

Clark and Clark (1977: 45) drew a helpful distinction between 'constructing an interpretation' and 'utilizing an interpretation,' drawing attention to the fact that, in everyday life, we use language to get things done. In doing a crossword puzzle, we might construct an interpretation without putting the interpretation to further use but most speech is functional, either to interact with someone socially or to transfer or extract information. This implies that there is more to the interpretation of an utterance than simply identifying words, syntactic structures, and thin semantic meanings; we must infer what the speaker who produced the utterance intended to achieve by it. The term 'interpretation' reflects this process better than the term 'comprehension.' To have comprehended an utterance suggests a total, correct product now present in the listener's mind. For a listener who is trying to understand a decontextualized utterance in a language test, a translation equivalent of the thin semantic meaning may yield a judgment of 'correct' but, as Goffman (1981: 28) remarked, "the mental set required to make sense of these little orphans is that of someone with linguistic interests" rather than someone who is using language purposefully. It might be supposed that a total, correct product could be achieved in understanding short, banal utterances such as *what is the time?* But even such a familiar utterance may have been produced by the speaker primarily to bring about an awareness of the passage of time on the part of the listener, an intention that the listener may remain unaware of even after having produced an apparently appropriate translation. 'Interpretation' gives a better impression of the riskiness of the listener's effort to understand what the speaker means by producing the utterance and it gives no impression of finality – once constructed, an interpretation is not fixed and immutable but may subsequently be modified. It is because, in most genres, there can be no single 'correct' interpretation of what is said that some scholars question the possibility of measuring or assessing the degree of a student's 'spoken language comprehension' (issues discussed in Shohamy (1996); Spolsky (1994)).

To arrive at an interpretation, the listener needs to make inferences at many levels. To begin with, the listener may need to infer the identity of words not clearly heard but which would make sense of the utterance. Then, the effect of the immediate verbal context on the sense (meaning) of words must be taken into account. For instance, the word *red* prototypically denotes a strong, saturated red hue and the word *face* prototypically denotes the configuration of eyes, nose, mouth, and chin that would be represented in a child's drawing. However, once these words occur in the phrase *red face, red* must be interpreted as denoting a pinky, blotchy color, whereas *face* will draw attention particularly to the cheeks and perhaps the forehead but certainly not the eyes or mouth. The listener must infer which of a wide range of senses is appropriate in a given verbal context. For a second language listener, particularly one who has learned the foreign words in terms of one-word translation equivalents, extending the interpretation of a word well away from its central translational sense requires considerable confidence since it is obviously an operation fraught with risk (Færch and Kasper, 1986).

The issues of syntax, of combining words in one syntactic structure rather than another, and of the choice of syntactic structure having any effect on interpretation have been curiously neglected in cognitive models of comprehension. Most accounts of discourse meaning simply ignore the nature of the syntactic structures selected by the speaker and produce representations of discourse meaning consisting of a set of abstract semantic 'propositions' from which all specifically syntactic information has been expunged. A few writers have insisted on the significance of syntactic structure in determining how the semantic content of an utterance is understood (e.g., Brown, (1994); Levinson (2000)). Halliday (1978) pointed out the disruptive effect on the listener's presuppositional coherence of using inappropriate syntactic structures (consider which is the most appropriate radio commentary on a ceremony: *The sun's shining. The day's perfect.* versus *It's the sun that's shining and the day that's perfect*). Davison (1980) noted the effect on interpretation of using passive rather than active constructions in some circumstances, and Sanford and Moxey (1995) have drawn attention to the inadequacies of any account of interpretation based solely on propositional representation. It is far from clear why a language should develop different ways of expressing the same propositional content if using a different syntactic structure has absolutely no effect on meaning. Rather little experimental work has been conducted on the effect on interpretation of varying syntactic form but at least we should note that a competent listener would need to draw inferences when an unexpected syntactic structure is employed: compare the effect of *He certainly spoke to her* with *She was certainly spoken to by him*.

The Context of Utterance

It is a truism that spoken language typically relies heavily on context for its interpretation. There is a widespread view that speakers and listeners 'share' the context of utterance. Yet a moment's thought reminds us that speaker and listener can usually see each other's face and facial expression but not their own, and each of them has private interests, perceptions, judgments, and prejudices and brings to any interaction different hopes and expectations for its outcome. As Johnson-Laird (1983: 187). remarked, "the notion of the context overlooks the fact that an utterance generally has two contexts: one for the speaker and one for the listener. The differences between them are not merely contingent but. . .a crucial datum for communication". I shall consider three aspects of context from the point of view of the listener: external context of situation, social context, and textual/discoursal context. Each of these aspects of context interacts and overlaps with the others, more or less obviously in different genres (Brown, 1998).

The External Context

Utterances are produced in a particular place and at a particular time. Much of what is said will be assumed to be relevant to the place and time of utterance. If someone comes into a room, shivers, and says *It's cold*, the listener will understand that the comment applies to the current place and time – if not to the temperature within the room, then to the local external temperature. If I, in a temperate country, say in winter *It's warm today,* I mean that it is relatively warm for this locality at this time of year, not that it is as warm as it might be in August or in Singapore. If the speaker says *She's coming on Monday,* the listener will assume that the relevant 'Monday' will be the next one after the day of utterance. If the conversation is about 'the president,' 'the doctor,' or 'the school,' the listener should assume that it is the participants' current, local president, doctor, or school, if no contrary information is given. Conversations will, by default and in the absence of contradictory information, be assumed to be relevant to 'local' conditions, where 'local' can be interpreted as widely as *here* can be interpreted in *here in my hand, here in this room, here on this street, here in this town, here in this country*, and so on.

A concept of 'appropriate behavior,' which may differ in different cultures, will set limits on what it is appropriate to say and how it is appropriate to say it in particular places and at particular times. There are appropriate greetings for different times of day, for meeting, and for parting. There are some places, places of worship, for instance, where some topics or manners of speaking would be judged inappropriate. If I have a trivial message for you about the postponement of some distant future event, it would be inappropriate for me to come to speak to you about it in your hotel room at midnight, invading your personal space and possibly awakening you from sleep. If, in defiance of convention, I were to insist on speaking to you in such circumstances, you might well infer that I meant more than I was overtly expressing. The subtleties of contraventions, deliberate or intentional, of conventions governing types of utterance appropriate to particular external contexts are peculiarly difficult for second language learners to interpret with any confidence without extensive experience of the culture where the second language is used.

The Social Context

For the listener, the most significant figure in the social context is the speaker, and the significant relationship is that between speaker and listener. Whether the speaker is speaking to a group of listeners or shaping the utterance for just one listener, the speaker must make judgments about how far they will share what Clark called "communal lexicons" (1998: 60–87). Communal lexicons, Clark suggested, are built on such social features as shared nationality, education, occupation, hobbies, language, religion, age cohort, and gender. The more social features that the speaker and listener share, the more the speaker can rely on the listener being able to understand specialist vocabulary. Where speaker and listener share an occupation, suppose both are ship's engineers, even where the listener is a second language learner, they are likely to be able to negotiate the senses of technical terms with some confidence that each understands what the other is speaking of as long as the listener feels relaxed and is able to think clearly. However, when the speaker is the dominant participant in an interview that is communicatively stressful for the second language learner, for instance, when the learner is a junior doctor being interviewed for a job by a senior member of the profession, the ability of the listener to negotiate a shared understanding of a term may be curtailed, which may result in a breakdown of communication. For nervous students in examination conditions who are exposed to tapes of speakers with whom they share few, if any, of Clark's social features, only the most self-confident of students are likely to arrive at an adequate interpretation in the lottery of a speaker, or speakers, talking on a quite unpredictable topic that may be distant from any of the student's own interests. It will always be the case that a second language learner will have least difficulty in understanding language that the speaker is sympathetically shaping for that particular individual, taking account of the learner's current state of control of the second language and anticipated knowledge of the topic.

When listening to speakers from their own speech community, listeners will often make stereotypical judgments about the speaker on the basis of the speaker's self-presentation in terms of dress, hair, posture, and what the listener knows about the speaker's occupation. Such stereotypical judgments may influence the listener's interpretation of what the speaker says. If asked in the street what the time is by a smartly turned-out passer-by as opposed to one who gives the general impression of having just stumbled out of bed, different listeners may respond with different degrees of helpfulness in each case. If the listener hears *This is yet another example of hard work by the left* said by a left-wing politician, the listener will infer that the expression is used positively and appreciatively, but if the very same remark is uttered by a right-wing politician, the listener will infer that it is used negatively and critically. Second language listeners may feel uneasy about importing stereotypical knowledge of the world from their own culture into interpreting what is said in another language.

They may also fail to notice when they have not properly understood what someone says, as young L1 listeners have been shown to do in their own language (Markman, 1981) or blame themselves for not having understood when native speakers express the content of their message inadequately. Robinson (1981), working with native speakers of English, showed young children who hear elliptical or ambiguous messages from adults may be 'listener blamers,' who attribute their difficulties in understanding such messages to their own inadequacy, rather than 'speaker blamers,' who are capable of recognizing that the speaker has produced a confused and confusing utterance. If second language learners hear a native speaker assert something that the listeners cannot make sense of, like 'listener blamer' children they may believe that they have not interpreted what the speaker said correctly, simply because they are reluctant to question the authority of a native speaker.

The Context of Discourse

The discourse context is created by whatever the conversational participants are currently paying attention to and by what has already been said on the topic. It is the structure of what has already been established in the discourse context that allows the listener to determine what anaphoric expressions refer to and what, within the discourse world, new expressions refer to (Gernsbacher, 1990; Smith, 2003). How much the listener must carry in memory from the previous discourse varies with the type of genre at issue. In genres such as instructions on how to complete a task, where each instruction is followed by a pause while the listener completes that step in the task, there is minimal burden on memory. Instruction tasks may be made easier by limiting the number of parts or participants and making them clearly distinct from one another. Narrative genres, where an understanding of what is happening now depends on your understanding of what has happened earlier, are likely to impose a greater burden on memory. Again, narratives can be simplified if events are narrated in the order of occurrence ('*ordo naturalis*'), if the

number of participants is limited, and each participant is physically clearly distinguished from the other participants (Brown, 1995). The more complex the task, the more difficult it is to arrive at a secure interpretation, culminating in the problems of following abstract arguments in academic lectures (Chaudron, 1995).

Listening as 'Input' to Second Language Learning

When we consider the complexity of the demands made on the learner listening to a second language, it seems truly remarkable that such input can form the basis for learning the second language. Nevertheless, it is clear that to a greater or lesser extent, in different contexts of acquisition, some learners do successfully learn to control a second language to an impressive extent, largely from absorbing aspects of spoken input while simultaneously putting that input to use in constructing an interpretation of what a particular speaker intends to convey on a particular occasion of use. How this is achieved is the subject of extensive speculation in the second language acquisition literature (for a useful critical overview of the literature and an initial stab at a theoretical approach that distinguishes between the procedures of processing language for meaning and the processes of language learning, see Carroll (1999)). The most promising research thus far on this topic is that concerned with the acquisition of lexis, given spoken input (see, e.g., Ellis and Beaton (1993); Vidal (2003)).

See also: Phonetics, Acoustic; Second Language Acquisition: Phonology, Morphology, Syntax; Speech Perception.

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Second Language Reading

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Introduction

Second language (L2) reading research is one of the older fields represented in the psychology literature (Bernhardt, 2003). In some sense, early L2 reading research might be characterized as something for curiosity seekers: a second language was used as a foil for a first. In other words, to examine one phenomenon (reading), scientists looked at a similar one from a different perspective (L2 reading) in order to verify universals in the process they were actually investigating. After this hothouse use of reading in second languages, the field of second language reading research lay dormant for many years. In reality, from World War I to the end of the Vietnam War, an interest in language (beyond grammar translation in the academic arena for literary use) was by and large focused on language for defense purposes or national interest (Moulton, 1963). An abrupt shift occurred in the mid–1970s, spurred by the massive global immigration brought about by war, economics, and technology. Language teaching became suddenly multipurposive, focused on preparing millions of nonnative speakers (of whatever language) to survive, work, and build lives in foreign cultures and countries in a manner in which previous generations could never have imagined. Efforts such as the European Unit Credit System (Trim, 1980), as well as the Oral Proficiency Movement in the United States (American Council on the Teaching of Foreign Languages, 1986) and the massive growth of professional organizations such as Teaching English to Speakers of Other Languages (TESOL) and the International Association of Applied Linguistics (AILA) are concrete reflections of the response to this global state of affairs. Most of the effort was expended on the development of oral skills with a survival-level reading and writing focus.

From the mid-1970s to 1995, reading in an L2 was by and large the domain of applied linguistics, and some significant work was conducted by applied linguists that led to both knowledge and theory development in the field. Volumes such as Alderson and Urquhart, 1984; Bernhardt, 1991; Carrell *et al.*, 1988; and Mackay *et al.*, 1979 populated the scene. The overwhelming portion of the work cited and collected in these volumes focused on adult readers, who more often than not came to the L2 reading process true to the concept of second. In other words, they had already acquired a native language and a native literacy.

The 1990s saw the awakening of education scholars to the concerns of second-generation immigrants. This second generation had frequently not been schooled in a home country (with, therefore, little or no native literacy) but rather needed to be schooled in a country where neither the language of schooling was spoken nor read in the home environment. This awakening brought about the widened expansion of interest in the field by literacy educators – i.e., scholars interested principally in mother-tongue literacy suddenly confronting the multilinguality that characterizes the overwhelming majority of classrooms as well as adult settings internationally. This expansion has brought welcome visibility to the area, as well as some communication difficulties across academic areas. Public and private efforts signifying an expanded interest in L2 literacy include *Teaching children to read,* the National Reading Panel Report (NICHD, 2000); the RAND Reading Study Group, *Reading for understanding,* RAND, 2002; National Literacy Panel for Language Minority Children and Youth Report, (forthcoming, 2005); as well as the *Handbook of reading research, volume II* (Barr *et al.*, 1991) and the *Handbook of reading research, volume 3* (Kamil, *et al.*, 2000). Scholars (Kern, 2000; Pennycook, 2001) also expanded their visions about L2 literacy, exploring the implications of a global technology that afforded immediate and essentially cost-free access to billions of written pages, as well as of the politics and social force of literacy.

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This expanded interest and extended perspectives and objectives brought forth a set of academic and theoretical complexities surrounding L2 reading.

These complexities can be characterized, first, by the search for a model of L2 reading that can accommodate a range of languages, developmental trajectories, and social/affective dimensions. Second, the expanded interest has brought forth a renewed perspective on the concept of transfer – what is transferred between languages when a literate or nonliterate first language (L1) reader attempts to understand in a second. Third, expanded views also pushed the field of L2 reading into a greater recognition of the import of the social context – whether that social context is the home background of a young reader, or that of an adult coping with abstract content material on the internet. These three areas form the organizational structure for the bulk of this article.

Current State of Theory

Three formally stated models of the L2 reading process have appeared in the literature. The first model, Coady (1979), was deliberately psycholinguistic in nature and isolates the variables of "conceptual abilities, background knowledge, and process strategies" (Coady, 1979: 6) with process strategies including word-level processes that are graphemic/morphemic in nature; lexical and syntactic knowledge; learning strategies; and affect. Coady plotted the processing strategies over time with higher-level processes such as the use of lexicon and context, becoming increasingly more important over time with word-level skills diminishing in importance. Within the statement of the model, no data were provided. Bernhardt (1991) influenced by Coady's positing of the process put the model to test, citing data from comprehension protocol studies of readers of French, German (German, Standard), and Spanish. Protocol data were by and large consistent with Coady's positing with the exception of the importance of syntax, which Coady posited as neutralizing throughout the L2 reading process, and which Bernhardt concluded became increasingly more significant in causing errors in comprehension before leveling off. A decade of research later, Bernhardt (2000) re-examined reading performances by examining studies that focused on readers comprehending equivalent texts in two languages. Such an examination – one that accounts for the impact of an L1 literacy on a second – provided a third installment of a model of L2 reading.

This third installment reviewed data across a number of languages and captured three specific areas in which there is consistency in research findings of readers of second languages: first, the impact of language (L2) knowledge on the L2 comprehension process; second, the contribution of literacy (L1) knowledge to understanding in a second language; and third, the acknowledgement that 50% of the L2 reading process remains uninterpreted. The first two elements call for a re-interpretation of the debate over the existence and criticality of a language and literacy threshold that characterized the research of the 1980s. The final element, 'the unknown 50%,' points toward the deficits in a theory based on a narrowly defined group of readers (principally adults) and an even narrower conceptualization of the context against which reading is learned and used. Failure to consider these critical variables exposes significant gaps in the understanding of L2 reading.

Revisiting L1/L2 Relationships: the Transfer of Literacy and Language Knowledge

In language learning, the most commonly cited definition of transfer came from Odlin (1989):

> Transfer is the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired (1989: 2).

The most obvious characteristic of this definition is its similarity to the psychological conception of transfer based on identical elements. Language transfer describes the phenomenon of influence between the existing L1 knowledge and the development of L2. Transfer can take both a positive, facilitating manifestation and a negative manifestation, which is marked by interference errors or overuse of certain forms. According to Ellis (1994), transfer was "historically speaking . . . the first factor to receive serious attention" (Ellis, 1994: 299). As transfer is a cross-linguistic phenomenon, the contrastive analysis hypothesis (CAH) assumed that structural differences between two languages represented difficulties and were a predictable error source, whereas structural similarities facilitated the development of the L2. The validity of this hypothesis has been both overestimated and underestimated in the past (Ellis, 1994: 306–312). Nevertheless, today it is not possible to "dismiss the evidence of transfer effects in bilinguals as irrelevant to L2 acquisition" (Ellis, 1994: 310).

Cummins formulated his well-known CALP/BICS distinction against the backdrop of transferability. He differentiates between linguistic skills and conceptual/academic skills. The language interdependence principle argues that transfers of universal, conceptual aspects of language proficiency occur automatically, after linguistic surface features of the L2 are acquired. The acquisition of the linguistic skills

necessary for the communication in the L2 initiates "[the] transfer of cognitive/academic or literacy-related skills across languages" (Cummins, 1984: 143). However, Cummins's threshold hypothesis put this strong claim into perspective. The threshold hypothesis argued that the transfer of cognitive skills from L1 to L2 only operates after the learner's performance of linguistic skills in the L2 has reached a certain threshold (Cummins, 1984: 106–107).

Cummins's conceptions have had a powerful effect on research in second language reading. They are, however, largely untestable, even though they seem to suggest very specific types of predictions. First, most of the data on which these formulations were based were from language acquisition studies, not literacy. They have been brought into the literacy area without adequate grounding in empirical research in reading and writing. Second, the two formulations make contrary predictions. Either L1 and L2 are interdependent or L2 operates only after some threshold. These are what are often referred to as under-specified theoretical perspectives. Neither formulation is sufficiently precise as to exclude the other. Finally, it is not clear how one defines a threshold. Until that is done, these two formulations are interesting heuristics, but not scientifically useful.

Recent thinking about transfer has shown that the situation is somewhat less clear when complex learning tasks are involved. The general findings are typically that individuals do not spontaneously transfer from one problem to the next. Bransford and Schwartz (1999) differentiated the conditions under which transfer has been studied. They described traditional studies of transfer as involving what they termed "sequestered problem solving" (1999: 61). In this assessment of transfer, individuals are given new problems to solve, but are denied resources to which they might have access in the initial learning. Bransford and Schwartz noted that the theory undergirding this conception is one that views transfer in terms of the direct applicability of prior learning in new contexts.

Bransford and Schwartz proposed an alternative to the traditional formulation by emphasizing what they term "preparation for future learning" (PFL) (Bransford and Schwartz, 1999: 61). In short, the notion here is that transfer is best viewed as the ability to learn in knowledge-rich environments. In an extensive review of the research, combined with new evidence, they show that some of the evidence of positive transfer was obscured by the conditions under which transfer was assessed. When learning was assessed under richer conditions, it became clear that learning was more efficient when learners had appropriate prior experiences. That is, learners could have experiences which did not necessarily relate directly to the task (in terms of identical elements) but which provided insights into what was needed in new situations. This has important implications for language transfer.

Transferring Knowledge About Language Elements

At first glance, the concept of transfer from L1 to L2 is simple: similar elements exist between and among all languages, and some languages are more similar to each other than they are to others. Basic features such as phonetic components and orthography form important loci of similarities and differences. Absent from much of the conceptual work on transfer in the L2 research literature is a perspective related to learning. The literate status of learners is key: learners are either literate or not in L1. When literate L1 learners enter an L2 literacy-learning environment, the important question is whether they have an easier time learning to read in L2. If they do, there is positive transfer. If they find it more difficult to learn to read than L1 learners, there is negative transfer. For learners who are not literate in L1, there are two questions. The first is whether or not such learners learn to read in ways that are the same or different from learners in an L1 context. An ancillary question is whether the transfer from L1 literacy to L2 literacy is sufficiently great to warrant teaching students L1 literacy *prior* to beginning L2 literacy instruction. One final issue that is not readily apparent is the tension between transfer of ability and transfer of knowledge; i.e., whether or not knowledge (content) is represented differently in different languages. It would seem that the reason for this tension is that content issues are not well represented even in the L1 reading literature. Another reason may be the implicit assumption that what the individual knows about the world is simply available, regardless of the language in which it is expressed.

Studies of metalinguistic awareness provide some insights into transferability by trying to separate the effects of literacy from those of bilingualism on specific measures of metalinguistic awareness. Carlisle *et al.* (1996) investigated the relationship among developing metalinguistic capabilities, English language proficiency, and literacy for Hispanic high school students who qualify for bilingual educational programs. High school students receiving services from the bilingual education program, all native speakers of Spanish, were given several tests such as an English and a bilingual grammar test and a definitions test. Overall, students had relatively low levels of English literacy achievement and metalinguistic capabilities

across the grade levels. The quality of their formal definitions was related to their reading and to their non-verbal problem solving, but not to their English oral language proficiency. There was a significant correlation between the formal definitional quality and the performance on the English reading test, and also between the formal definitional quality and the nonverbal cognitive development test, suggesting transfer across languages. Additional work with primary school children, indicates that performance on a definitions task is explained by word knowledge in the language of the task, and that degree of bilingualism is not significant when level of vocabulary knowledge is considered. Generally speaking, it appears that metalinguistic awareness transfers and may even be heightened by learning to read in a second language.

Further work examines the relationships between and among other reading variables. Gholamain and Geva (1999) examined the parallel development of reading in English and Persian. They suggest that there are common underlying cognitive and linguistic factors, such as working memory or rapid letter naming. They also found that acquisition of the principle of grapheme-phoneme correspondence rules in Persian did not require differential proficiency in Persian. This research is suggestive of the transfer of some phonological abilities, if not the exact graphophonemic rules. Additional research shows that phonological processing is transferred across Spanish-speaking first-grade children learning English (Cisero and Royer, 1995). English oral language proficiency predicted English and Spanish word reading, but Spanish proficiency did not predict English word reading. The general conclusion is that there is transfer of phonological processing skills across languages. It is also important to note that the set of languages studied in this arena is widely varied, including both Roman and non-Roman orthographies.

Transferring Language Elements: Grammar and Vocabulary

One of the earliest-researched variables in the reading and psychological literature about reading is morphosyntax. Ironically, this critical feature of text (how words in strings relate to each other) is, generally speaking, ignored in contemporary literacy research. This may well be because there is scant research found in the English language literature that addresses the impact of either morphology or word order on text comprehension. Indeed, the English language is, syntactically speaking, relatively inflexible. Word order is by and large SVO, and there is relatively little variance between spoken and written syntax. In a monolingual, English-speaking context, therefore, syntax may be an inconsequential variable. Readers and listeners are attuned to a predictable, strict word order.

Early studies using an eye-movement methodology, examined native; nonnative, highly fluent; and nonnative, nonfluent readers reading the same texts in German. Native Germans read in a relatively linear fashion; nonnative nonfluent readers put German into their own syntactic rules for word placement; and nonnative yet fluent readers were somewhere in the middle – not mentally rearranging German words, but certainly spending more time in areas of the text that both natives and the nonfluents were simply skimming (Bernhardt, 1991). Native readers of German also directly fixated endings of words, in contrast to readers of English who moved from content word to content word indeed seeing function words, but rarely spending more than 100 milliseconds on them.

In a parallel vein, qualitative data generated through recall were based on readers of various levels reading and recalling authentic texts in German, French, and Spanish. In these studies, readers would reveal a fairly discombobulated English syntax in their recalls, often failing to recognize which word an adverb was actually modifying, or who was doing what to whom. Support for the belief that syntax, or the way in which words relate to each other, is a key variable in predicting L2 reading comprehension is derived from the work of Odlin (1989) and Kern (2000). Evidence within L2 contexts predicts that the impact on the comprehension process of readers moving between predictable and unpredictable word order, for example, is significant. Languages such as German, Russian, or French exhibit degrees of flexibility in word order and, consequently, readers cannot merely rely on word meaning to comprehend, but must understand the signaling relationships between and among words (Kern, 2000). Odlin (1989) notes that L2 learners from flexible-word-order languages have higher numbers of production error rates when learning rigid-word-order languages. Odlin further hypothesized that learners from rigid word order languages have higher error rates in the receptive language skills, namely reading and listening. Few recent L2 studies examining the reading of either children or adults have examined morphosyntax extensively. While the finding that at least 30% of the L2 reading process can be predicted on the basis of language knowledge is consistent, few studies have examined the components of language knowledge. The exception is Brisbois (1995), who managed to decompose the 30% variance into 27% vocabulary and 3% grammatical knowledge.

Vocabulary knowledge is crucial to reading comprehension in L1 (NICHD, 2000). It has long been the case that L1 researchers believed that comprehension was composed of two skills: word knowledge, and reasoning. There is evidence that this applies equally to reading in L2 (Saville-Troike, 1984), although the research is neither as abundant nor as methodologically rigorous as it should be to reach unambiguous conclusions. Verhoeven (2000) found that for first- and second-grade children, vocabulary knowledge had a greater impact on L2 learners than on L1 learners. For speakers of Urdu, Mumtaz and Humphreys (2002) found that students with high levels of vocabulary knowledge and phonological awareness in Urdu were more likely to perform well on English reading tasks. It may be that vocabulary knowledge leverages the ability of readers to make use of the alphabetic principle by recognizing words more efficiently.

For example, for Spanish L1 students in first grade, reading and phonological processing appear to be related both within and across languages. Three factors seem to relate to proficiency: reading, oral language, and phonological processing. In addition, English vocabulary and reading also seem to be related, suggesting that vocabulary supports processing in beginning readers. This might also be interpreted as providing the same kind of leverage hypothesized above. Garcia (1991) found that unfamiliar English vocabulary was the major linguistic factor that adversely affected the reading test performance of fifth- and sixth-grade Spanish-speaking students. In the case of bilinguals, how conceptual and word knowledge (vocabulary) is represented in memory is still not well understood. Similarly, Nagy *et al.* (1997) explored the effects of Spanish-English bilinguals' L1 knowledge of syntax on their ability to guess the meanings of new words in English (L2). The importance of this study of seventh- and eighth-grade students is that it disentangled the contribution of language proficiency from knowledge of syntactic differences between L1 and L2. Evidence of transfer was found in that participants used their L1 syntactic knowledge to make guesses about the meaning of words in L2 contexts.

Some evidence suggests that vocabulary knowledge does not transfer very well for kindergarten students learning dissimilar languages such as Turkish and Dutch (Verhoeven, 1994). Yet, for older Spanish-speaking children (4–6) reading in English, Durgunoglu *et al.* (1993) found that knowledge of cognates, i.e., words with common ancestral roots with similar forms and meanings, can facilitate comprehension in the second language. Investigating the relationship between Spanish vocabulary knowledge, ability to recognize cognates, and English reading comprehension, indicated a significant transfer between knowledge of Spanish vocabulary and performance on the English comprehension task. More importantly, Spanish vocabulary knowledge and recognition of cognates interacted. Performance on the English multiple-choice items was highest in those cases where the student both knew the word in Spanish and recognized the English cognate.

The few studies on vocabulary transfer suggest that instruction should include the teaching of bilingual strategies for resolving unknown vocabulary, such as the use of translation, cognate searching, and word substitution (Nagy *et al.*, 1993; Garcia, 1998). Nagy *et al.* (1993) showed that the students underutilized their knowledge of cognates, indicating the potential for a cognate recognition strategy as a means for enhancing Spanish-speaking children's reading comprehension in English. For readers from noncognate languages, little research exists and yet is critical toward understanding the process of second language reading in its entirety.

An emphasis on cognate searching is not a trivial strategy for many L2 readers struggling with comprehension. Cognates in Spanish and English, most of which are taken from Latin and Greek, often "look alike" and sound alike (Nash, 1997). The entire set of these shared cognates is estimated to be between 10 000 to 15 000 words, which accounts for one-third to one-half of "the average educated person's active vocabulary ... with additional cognates in a person's passive vocabulary, that is, specialized, literary, and obsolete words" (Nash, 1997). If the transfer of the knowledge of these words is accomplished, an L1 learner has a head start to learning a second language. The caveat here is that there is a wide variation in the shared cognates between languages. Languages that do not share common linguistic roots will have few, if any, cognates. Consequently, the utility of cognate searching as a strategy is dependent on the relationship between L1 and L2.

Studies about how adult L2 learners learn new words or compensate for unknown words fall into three categories. The first category includes studies that investigate the role of traditional vocabulary lists and dictionaries. Davis (1989) found that vocabulary lists provided to learners prior to reading enhanced comprehension. No followup to how many of the words were actually acquired was conducted, although Hulstijn *et al.* (1996) provided some evidence in this regard. They found that Dutch learners of French who were most able to acquire incidental vocabulary through reading had access to marginal glosses. Generally speaking, most investigations find positive effects on vocabulary learning from the use of dictionaries, with some reported skepticism, however,

about the direct instruction of words with the use of dictionaries.

A second arena of investigation examines the polar opposite: the acquisition of words with no external support. Most of the studies in this area argue that the contexts surrounding words play critical roles in the acquisition of words meaning. They therefore cast doubt on the genuine utility of dictionaries that tend to provide a one-word meaning or translation. Some evidence exists that extensive reading fosters vocabulary acquisition, yet Laufer (2003) expressed skepticism that significant numbers of L2 words can be acquired through extensive reading. Other studies, e.g., Pulido (2003), noted that examining either dictionaries or extensive reading *per se* were not fruitful lines of inquiry without also considering the role of L2 proficiency, as well as the nature of the first language and culture in understanding the meanings of new L2 words.

A third area of investigation is comprised of studies that consider the contexts in which learners will use word-learning aids, and how they go about intentionally learning new words. The importance of repetition in new L2 word learning seems to be clear. Hulstijn (1993), whose subjects were 82 Dutch learners of English, examined the conditions under which learners employ word-learning strategies. Hulstijn found effects for both general literacy knowledge and for task. In others words, the greater the literacy level, the lower the chances of looking up words. Further, the comprehension task also determined the extent to which learners confronted individual words. When the task was a general summary, learners tended to look up fewer words than when they knew in advance that they would have to answer an explicit question.

Contextual Variables

The third complexity introduced into L2 reading research over the past years is the growing acknowledgement of the importance of contextual factors in literacy acquisition. These are factors that mediate and mold comprehension well beyond morphological, syntactic, or vocabulary knowledge in any language. For young children, the most important contextual factors for early reading is language and literacy activities in the home. For the acquisition of L2 literacy, there are differential effects of oral language and literacy activities. In an analysis of the literature, Goldenberg (2004) concluded that home literacy experiences in either L1 or L2 were, in general, positively associated with literacy attainment in either L1 or L2. By contrast, home oral language effects on literacy attainment were more differentiated. Home L1 oral language appears to be unrelated or negatively related to L2 literacy, although it has positive effects on L1 literacy. Home L2 oral language appears to have positive effects on L2 literacy acquisition. The results appear to be mixed when it comes to the effect of home L2 oral language on L1 literacy acquisition.

One possible explanation for this phenomenon is that oral language mediates early reading acquisition. Given the practice a child might have in either L1 or L2 is a trade-off. The more one language is used, the less the other will be. For literacy, the presence of any literate activity may serve as a model in either language. These results implicate the importance of the home environment variable in learning to read, either in L1 or L2. Other context variables, outside of SES, did not prove to be powerful. There is little evidence that language prestige and immigration circumstances influence literacy outcomes. Nor is there any evidence that discourse and interactional differences influence literacy outcomes.

Research on adult readers of second languages has examined an array of variables from gender and topic interest through instruction to the impact of particular text types (principally expository versus literary) on the impact of the acquisition of reading in second languages. Most of this research carries with it significant findings regarding one variable or another. The bulk of the work must be regarded with skepticism, however, because of the shallow context against which it has been conducted. Most studies isolate a variable without considering either the transfer of knowledge or linguistic forms that clearly interact in the process of second language reading. The converse of this research paradigm is that presented under the rubric of *critical*. Pennycook (2001) noted that "a great deal of work in critical literacy has shown how the significant issues for literacy are not so much how the brain deals with text but how literacy is related to its context" (2001: 77). Pennycook argued for an expanded vision of the elements entailed in a highly charged concept such as literacy. Indeed an expanded view de-emphasizes language elements and importantly emphasizes power relationships in the use of those language elements and points toward how adult L2 readers act on the content of what they are asked to read and understand.

Conclusion

The future of L2 reading research lies in theory development that integrates the knowledge provided by the areas noted above. A good theory attempts to capture a knowledge of the present and to point researchers and practitioners into important and targeted conceptualizations for the future. No such

theory currently exists. Present models either ignore young, developing readers learning and reading in two languages, or ignore developed L1 readers reading in L2. Any theory must try to account for the array of variables that characterizes L2 readers. In addition, present models oversimplify the transfer of both literacy knowledge and language knowledge to the L2 comprehension process. Transfer can be both negative and positive; it can interfere or facilitate; it can be deep or shallow. Models of the L2 reading process must be able to reflect the diversity and complexity of moving between and among languages of very different manifestations as well as different literacy levels. Finally, theory development must acknowledge the backdrop against which L2 readers learn to read in a second language and how they go about using the knowledge they acquire through reading. This is a tall order for theory development.

In order for more adequate theory development to occur, research designs will need to reflect the complexity of L2 reading. Stating the literacy levels of subjects in studies; their age and schooling levels; the linguistic nature of the two languages involved, including the level of cognate overlap; the linguistic knowledge that subjects have of the second language; as well as the sociocultural relationship between two languages will be critical in offering substantial and credible data. Examining the multivariate process of reading in an L2 through univariate lenses will not help the field progress. Variables within the L2 reading process are in contingent relationships with each other. The future lies in research designs that mirror these relationships.

See also: Applied Linguistics: Overview and History; Assessment of First Language Proficiency; Assessment of Second Language Proficiency; Bilingualism and Second Language Learning; Critical Applied Linguistics; French; German; Grammatical Relations and Arc-Pair Grammar; Language Education: Vocabulary; Morphology and Language Processing; Reading and Multiliteracy; Reading Processes in Adults; Reading Processes in Children; Spanish; Syntactic Development; Vocabulary: Second Language.

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Second Language Speaking

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Introduction

The productive skill of speaking in a second language has received attention only in relatively recent times. Bygate (2001) noted three reasons for this. First, many of the dominant approaches to language teaching (notably the grammar-translation approach) do not give any priority to the promotion of oral communication. Second, only since the mid-1970s has there been widespread availability of good recording media to facilitate the in-depth study of recorded natural speech and to allow for the use of spoken material in classrooms. Third, many of the approaches to language teaching, other than grammar translation, did use oral communication in the target language as a central medium for teaching (for example, the direct method, the audiolingual approach); however, ironically, speaking as a skill largely focused only on pronunciation. In the case of audiolingualism, the importance of speaking was highlighted in its input-before-output sequence: listening–speaking–reading–writing. This behaviorist

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view of language perceived speaking as a series of habits (in reality, structures) that could be broken down and learned by "no more than engineering the repeated oral production of structures in the target language" (Bygate, 2001: 15). Since the 1970s, other influences have changed the way we view second language speaking, most notably cognitive and sociolinguistic theories and the rise to prominence of spoken corpora.

Models and Descriptions of Second Language Speaking

Theoretical Models for Understanding Second Language Speaking

Concerted study of second language acquisition (SLA) has been under way since the late 1960s. A number of early SLA studies looked at the interactional aspects of speaking that were relevant to language learning. Simultaneously, and often independently, models of spoken language description, such as ethnography of speaking, conversation analysis (CA), interactional sociolinguistics (IS), discourse analysis (DA), and critical discourse analysis, have been evolving. Boxer (2004) noted that although some recent research in SLA has begun to glean insights from the various approaches to the analysis of spoken discourse, there is much more that could be studied to illuminate the theoretical and practical aspects of SLA. As she noted by studying how language users employ their language in a variety of contexts, with various types of interlocutors, and on a variety of topics, students, teachers, and scholars can create curricula, materials, and assessment instruments based on something more substantial than the intuition of mother tongue users. Boxer (2004: 8) identified three theoretical models that offer 'fairly compatible insights' into the processes involved in the development of spoken language ability in both first and second/additional languages. These are: (1) Language Identity, (2) Language Socialization, and (3) Sociocultural Theory.

The Language Identity model focuses on the impact of taking on an additional language in terms of an individual's identity (see Pavlenko and Lantolf, 2000). For those learning a language, the primary resource, as Boxer (2004: 9) noted, is "social and interactional, involving face-to-face spoken discourse." Pavlenko and Lantolf (2000) looked at the process that immigrants go through when they are faced with learning a new language. They either choose to appropriate or reject linguistic and cultural aspects of the new language and its culture that can potentially change one's sense of self. Within the same paradigm, but focusing on the cumulative effect of interaction, relational identities are said to build up over time, and successful interactions for language learners lead to further interaction and in turn promote more opportunities for language development (see Boxer and Cortes-Conde, 2000).

Language Socialization offers a framework for the study of second language speaking in which language is viewed as the symbolic means by which humans appropriate knowledge of norms and rules of verbal and nonverbal behavior in particular speech communities. Becoming a competent member of any speech community means taking on appropriate behaviors of the community. Most of the research in this area focuses on the first and second language development of children in particular speech communities and the role of parents and teachers who make explicit what ought to be said and done (see Boxer, 2004). SLA studies that draw on a Language Socialization model focus mostly on socialization practices in the classroom from the perspective of a community of practice rather than in a speech community. Socialization practices of such communities are reflected in the classroom discourse and interaction of second language classes in which talented teachers take on the role of socializing agent, much in the same way as adults take on this role with children in first language development.

The third and most influential model that Boxer (2004) identified as appropriate for the study of the processes involved in the development of second language speaking is Sociocultural Theory (SCT). This movement, springing mainly from the work of Lantolf and his associates, draws on the theories of Russian psychologist Lev Vygotsky (see Vygotsky, 1978, posthumously published). Vygotsky's philosophy supports the view that the acquisition of language (first and additional) is a sociocultural process linking the social/interactional with the cognitive. Boxer (2004) noted that contrary to Language Identity and Language Socialization models, SCT specifically connects the role of language as a mediating tool between social interaction and the development of higher-order mental processes. This theory proposes that mental functioning such as memory, attention, perception, planning, learning, and development come under the voluntary control of individuals as they internalize culturally constructed artifacts, which include all culturally organized forms of communication (Lantolf, 2000). Social relationships are transformed into psychological processes by individuals as a means of mediating their own mental activity.

Examination of Vygotsky's work (e.g., Lantolf, 2000) generated debate among applied linguists on

how such a perspective might feed into the teaching and learning of second language speaking. Two central notions of the Vygotskian paradigm are relevant here: the notion of scaffolding and that of the zone of proximal development (ZPD). Scaffolding is the cognitive support provided by an adult or other guiding person to a child or learner. Scaffolding occurs in dialogue, so that the child/learner can make sense of challenging tasks. The ZPD is the distance between where the child/learner is developmentally and what he or she can potentially achieve in interaction with adults or more capable peers (Vygotsky, 1978: 86). The concept of scaffolding refers to a situation where the interlocutor possessing the expertise guides the novice through a series of interactions in which the expert gradually cedes control as the novice takes on increasing responsibility and becomes more adept (Hall, 1997). This happens through the various configurations of social interaction, and as the process goes on, that which began as an intermental, socially mediated activity becomes an intramental, cognitive development process. In contrast to most traditional SLA perspectives, SCT views the learner not as a deficient version of the idealized monolingual expert, but as an active and creative participant in a "sociocognitively complex task" (Hall, 1997: 303). Instructors (or peers) and their pupils cocreate the arena for development; it is not preordained and has no locksteps or limits. Meaning is created through dialogue (including dialogue with the self, as may be evidenced in 'private speech') while the participants are engaged in activity. Ohta (2001) conducted a longitudinal case study of the private speech of seven adults learning Japanese in their foreign language classroom at the University of Washington in 1996 and 1997. She used the private speech of the learners to access what was actually going on in the mind of a learner while learning a second language. She defined private speech as "oral language uttered not for communicative interaction with another, but for dialogue with the self" (Ohta, 2001: 14), that is, an intermediary between social and inner speech. Ohta claimed that private speech has particular potential as a data source because it provides a window into the mind as it works on the cognitive, intimately social interactive problems presented by learning language, arguing that the paramount understanding is that private speech is not only a frequent feature of L2 classroom activity, but evidences SLA in process. She compared private speech to a moving picture of language acquisition in process.

In terms of the effectiveness of the Vygotskian approach in promoting second language speaking, Machado (2000) showed how peer-to-peer mutual help during the preparation stages of speaking tasks in the classroom (for example, negotiating interpretations of the tasks and the wording of meanings) can be directly reflected in the performance phases of the same tasks, suggesting that internalization of scaffolding has taken place. This supports the view that peer-to-peer scaffolding may be just as important as expert–novice scaffolding in the improvement of spoken performance. Ko *et al.* (2003) also took this line and sought to explicate what constitutes good, effective negotiation-of-meaning interactions in classroom tasks (see also Kasper, 2001). The contributions to such tasks made by the teacher may be enhanced by contributions from peers during the negotiation phase between separate performances of the same task, again suggesting the central role played by scaffolding in promoting and improving second language speaking. As a caveat to the general optimism toward Vygotskian approaches to second language speaking, Kinginger (2002) warned against the uncritical importing of concepts such as scaffolding and the ZPD in ways that do no more than justify unreformed current practices (e.g., the input–output hypotheses, all and any types of pair- and group-work tasks, teacher feedback moves), rather than genuinely reexamining the part played by social interaction in language development. In this respect, the work of Swain and associates (for example Swain and Lapkin, 2000) presented the ZPD as an open-ended arena for unplanned development and unpredictable events, and not as a fixed discourse based on input and output or the tightly circumscribed sequences of teacher–learner exchanges. Hughes (2002) also repeatedly stressed the need for proper social and cultural contextualization of second language speaking activities, and there certainly seems to be a growing awareness that second language speaking in pedagogical settings should not take place in a vacuum, sealed off from the social and cultural life of the learner.

Recent research has investigated the design and implementation of speaking tasks within cognitive frameworks, focusing principally on fluency, complexity, and accuracy of production (Bygate, 2001 provided an overview of the evolution of such research). Robinson (2001) has argued that stepping up the cognitive complexity of speaking tasks affects production, with a greater lexical repertoire on show in more complex versions and greater fluency evidenced in simpler versions of the task. Yuan and Ellis (2003) looked at the positive impact of pretask planning on learners' spoken production, especially with regard to fluency and complexity, even though it was not obvious that accuracy benefited. Yuan and Ellis also examined situations where learners were given unlimited time to formulate and monitor their

speech while performing; such planning seemed to positively influence accuracy and grammatical complexity. Research has also looked at repetition and recycling in speaking tasks and their contribution to the integration over time of fluency, complexity, and accuracy of spoken production (Bygate, 2001). Additionally, the role of the teacher in relation to task design and implementation and the teacher's ability to provide scaffolding to underpin the development of competence in speaking has become a focus.

Analytical Approaches for Understanding Second Language Speaking

Describing spoken language was a very difficult task before the widespread availability of audio recording equipment. Not surprisingly therefore, the past 40 years have seen a proliferation of studies and emergent methodologies in this area. Most relevant to the study of foreign language speaking have been conversation analysis (CA), Discourse Analysis (DA), and Interactional Sociolinguistics (IS). Though these analytical approaches differ, they all focus on empirical data and are concerned with turn-by-turn analysis of spoken interactions across many contexts of use. They have largely been used to describe first language interactions but many illuminating studies of foreign language speaking have also been carried out.

CA studies the social organization of conversation, or talk-in-interaction, by a detailed 'bottom-up' inspection of audio (and sometimes video) recordings and transcriptions. Core to its inductive analysis of the structure of conversations are the following areas: (1) the rules and systematicity governing turn-taking; (2) how speaker turns can be related to each other in sequence and might be said to go together as adjacency pairs (for example, complaint + denial A: *You left the light on*. B: *It wasn't me*.); (3) how turns are organized sequentially in context at any given point in an interaction and the systematicity of these sequences of utterances; (4) how seemingly minor changes in placement within utterances and across turns are organized and meaningful (for example, the difference between the placement of a vocative at the beginning, mid-point, or end-point of an utterance). The influence of CA as a tool for understanding and fostering speaking in second language learning contexts has grown in recent years. Ducharme and Bernard (2001) studied spoken interactions among learners of French, by means of microanalyses of videotaped conversations and post-task interviews aimed at incorporating the perspectives of the participants. CA was also used by Mori (2002), who analyzed a speaking task performed by nonnative-speaking learners (NNS) of Japanese, where learners interacted with Japanese native speakers (NS) who had been invited to the class. The intention was to encourage freer, natural conversation, but the NS–NNS interaction in Mori's case revealed the characteristics of an interview, with questions from the students and responses from the NS guests, an undesired outcome. More natural discursive exchanges happened when the learners made spontaneous contributions or when they paid more marked attention to the moment-by-moment progression of the talk. Key to the interpretation of such phenomena is an understanding of the participants' orientation toward the institutionalized nature of the task they had been set, and CA, it is argued, facilitates such understanding. The CA-based view is that aspects of activity design and implementation influence the outcomes of speaking tasks in ways that CA can elucidate and that CA can point to directions for the improvement of the design and implementation of speaking tasks. On the other hand, there has been criticism of the lack of a 'learning' dimension in CA studies of second language speaking, in that CA is a very locally oriented analysis that is not good at producing actual evidence of change and development in speaking ability over longer spans of time.

CA analysts also examine openings and closings in conversations and how speakers manage the topics they talk about or want to talk about. Topics generally shade smoothly into one another, without unnatural jumps, and in conversations between equals, the right to launch a topic belongs to any speaker, but the other participants must accept the topics and contribute to them before they can truly be said to be conversational topics. In short, topics are typically *negotiated* in everyday talk among equals. Again, questions relating to second language speaking pedagogy include the possibility of assembling a lexicon of topic-management expressions, such as *Oh, by the way*, *Going back to* . . ., and *As I was saying* (Dörnyei and Thurrell, 1994). Another related issue is the exercising of topical control (typically by the teacher) and the potential therein for losing opportunities for the introduction of topics of which learners have genuine knowledge. The question of motivation if topics are imposed on learners or whether it is preferable to allow learners to introduce and manage their own topics is also one of interest. Other issues include whether raising awareness of topic-boundary phenomena (such as metastatements or discourse markers) can help second language learners to listen more selectively to discourses such as university lectures and the way learners actually intervene in topical negotiation, including even in relatively 'traditional' language classrooms.

The DA approach has also been influential in research on second language speaking. In this approach, the smallest unit of interaction is seen as the exchange, which involves at least two turns: an initiation (I) and a response (R), for example, *How are you?* (I) *Fine*. (R). The most common pattern of spoken exchanges in the traditional teacher-fronted classroom is that of initiation (I), response (R), and follow-up (F), often called IRF exchanges. That is to say, the teacher initiates, the student responds, and the teacher then follows up, for example, *What color was the cat?* (I) *Black*. (R) *Very good*. (F). The original study in this area was carried out on L1 classroom data by Sinclair and Coulthard (1975) and it is often argued that the IRF pattern does not reflect the complex demands of everyday conversations outside of the classroom, especially since teachers most typically exercise the follow-up role, while learners languish in passive, respondent roles. However, Kasper (2001) took to task the commonly held view that IRF routines are a restrictive interactional format. Kasper argued that the negative reputation of the IRF exchange may not be entirely justified and that it is the kind of interactional status assigned by the teacher to individual learners that matters in how speaking occurs in the classroom. When learners are treated as primary interactants in speaking activities, teachers extend them more participation rights in the conversation. Kasper suggested that teachers can help learners to become actively involved in spoken interaction, even within the framework of the classic IRF patterning of teacher-fronted classroom talk.

McCarthy (2002), also starting from a DA base, suggests that R and F moves play a central role in the manifestation of 'listenership,' that is to say, verbal engagement in the discourse when one is not in the role of main speaker, a situation NNS typically find themselves in, especially at earlier stages of proficiency. Listenership is distinct from 'listening' in the conventional four-skills paradigm of listening–speaking–reading–writing, where listening is seen as receptive and is tested through comprehension tests. Listenership is instead a component of the speaking skill, since it demands appropriate verbal response as the main index of comprehension and engagement. The difficulty lies in the fact that many R moves and the vast majority of classroom F moves are produced by the teacher, resulting in impoverished opportunities for learners to engage in typical listener follow-ups as they occur in non-institutional, everyday conversations. Learners most typically experience the teacher's R and F moves only as peripheral participants (Ohta, 2001). Ohta advocated peer-to-peer interaction as offering more enriched opportunities for learners to engage in appropriate listener behavior. The happiest compromise seems to be exposure to the teacher's use of R and F moves accompanied by explicit guidance and instruction on the use of respondent moves to encourage learners to develop over time toward production of such moves in peer-to-peer speaking activities. In a framework that combines DA and CA elements, Walsh (2002) stressed the importance of distinguishing different modes of teacher talk and illustrated how different modes may hold back or optimize opportunities for second language learners to contribute via the distinct types of exchanges associated with each mode. Seedhouse (1996) also argued that traditional classroom discourse has been unfairly criticized by those advocating more 'communicative' pedagogies. He argued that the goal of creating 'natural' conversation in the second language classroom is basically unattainable and that it would be better to adopt an approach where classroom discourse is seen as an institutional variety of discourse, alongside other institutional varieties and alongside non-institutional varieties, in which the character of the interaction corresponds appropriately to institutional goals.

Interactional Sociolinguistics (IS) also provides an analytical framework for a number of studies of second language speaking. IS stems particularly from the work of Gumpertz (see Gumpertz, 1982). It is a microethnographic approach to the study of communication in the context of bilingualism and cross-cultural contexts. IS draws on CA and ethnographic approaches to look at audio- or videotaped interactions from the perspective of both the researcher and the participants. Research in this area is particularly focused on gaining insights into cross-cultural miscommunication and misperceptions when two cultures are involved in a spoken interaction. By scrutinizing the recorded interaction, participants can reflect on what they said, what they meant, and what they achieved. Boxer (2004) noted that IS offers rich contextualized analysis of talk-in-interaction that has important potential implications for of the study of second language speaking in SLA contexts. Halmari (2004), for example, conducted a 12-year study of the codeswitching patterns of two young Finnish Americans living in the United States. Her study illustrates 1) that codeswitching patterns may be seen as a reflection of developing discourse competences and 2) how the two languages are deftly altered in naturally occurring discourse among bilingual family members as a means of conveying a vast array of subtle pragmatic messages.

Speech Acts in Second Language Speaking

The study of speech acts is an area that is related to CA, DA, and IS, but studies in this field differ fundamentally in the data they use. Most studies into speech act realization in second language speaking have derived from elicited rather than spontaneously recorded data. This is because it can be difficult to gain access to data with rarely occurring or rarely recorded speech acts, or speech acts that do not readily occur in two languages that the researcher wishes to compare. One of the most common strategies is to use Discourse Completion Tasks (DCTs), which involve specially designed questionnaires that elicit responses. For example, they can provide a situation and leave a blank for the speech act to be supplied or provide a first turn followed by a blank. Multiple turns have also been employed to make DCTs more interactive. DCTs can alter contextual features, such as age, gender, and speaker status, to access varied responses from informants. Much discussion has taken place as to the adequacy of DCTs as a research instrument. They are criticized for making *a priori* decisions about sociolinguistic variables that are deemed to be important in a given situation (Boxer, 2004). Beebe and Waring (2004) designed a DCT-based study on rudeness that comprised six situations where someone was rude and the subject was asked to respond. The situations were selected from 750 naturally occurring examples of spontaneous rudeness. It involved 40 NNS participants from seven countries all enrolled in an Intensive English Language Program at a North American university. They were asked both what they would say and what they would feel like saying, so that the informants could respond (1) in a way that reflects social constraints and (2) in a way that reflects no social constraints that would hold them back. They found that the low-proficiency speakers tended to rely on sarcasm and intensifiers by repeatedly using a limited number of adverbs. The high-proficiency speakers, on the other hand, used a much wider range of adverbials to convey tone and managed to sound assertive without being hostile. Based on these and other findings, Beebe and Waring speculated that there is a cline of difficulty in acquiring pragmatic tone in second language speaking – intense and sarcastic tones are easier to acquire than more subtle tones of assertiveness or aggression.

Areas of Growing Influence and Debate in the Area of Second Language Speaking

Corpus Linguistics

The advent of the tape recorder changed not only how spoken language was taught but also how it was studied. Similarly, the availability of computers meant that large amounts of naturally occurring recorded spoken language could be transcribed and then stored on computer for analysis. Such principled collections of texts (spoken and written) are referred to as corpora. As a result, our knowledge of spoken language has changed significantly. Large corpora of spoken language are now collected and described. In the area of English as a Foreign Language, spoken corpora that have been or are being exploited for the teaching of speaking include the spoken components of the British National Corpus (100 million words in total, of which 10 million is spoken conversation) and of the Bank of English, the British/Irish CANCODE spoken corpus, the Michigan corpus of academic spoken English (MICASE), the Longman Spoken American Corpus, and the American National Corpus. Those studying the teaching of speaking note the growing influence of spoken corpora on the pedagogy of speaking and point out that new understanding has prompted new debates about the 'what' and the 'how' of the teaching of second language speaking.

In the context of English as a globally used language, new issues for second language pedagogical modeling arise with the collection and description of different varieties from around the world. In the case of English, the International Corpus of English (ICE) project makes available spoken data for the Englishes of Hong Kong, New Zealand, Singapore, Great Britain, Nigeria, and the Caribbean, with others under development, and Ireland can count on both ICE and the Limerick Corpus of Irish English (LCIE), all of which are either aimed at or have direct implications for the improvement of second language speaking. Though English dominates the present discussion, it is apparent that similar problems exist in the establishment of pedagogical models for the speaking of multi-national languages such as French and Spanish. North American universities often insist on the spoken model of metropolitan France rather than that of nearby French Canada and publishers routinely sanction language teaching materials for use in Latin America in terms of their faithfulness to European (Castillian) Spanish norms. Corpora are also currently influencing the teaching of spoken French, with similar debates about the modeling of spoken language for pedagogy as those under way with regard to English (Lawson, 2001).

Research into language corpora has frequently shown that there is a discrepancy between the language we use and the language we teach (see, for example, Holmes, 1988). A recent example is the finding by corpus analysts and other linguists that fixed 'chunks' of various kinds have a central role in everyday, fluent speech. Wray, investigating

formulaic sequences (which include idioms, collocations, and institutionalized sentence frames), stressed that such sequences circumvent the analytical processes associated with the interpretation of open syntactic frames in terms of both reception and production and she criticized attempts to encourage the analysis of formulaic sequences in second language pedagogy as "pursuing native-like linguistic usage by promoting entirely unnative-like processing behaviour" (Wray, 2000: 463). Wray's work attempted to move away from a static, behaviorist account of formulaic language, emphasizing its nature as dynamic, responding to the demands of language in use. The study of the role of fixed sequences in second language contexts has been investigated by Schmitt and his associates (Schmitt, 2004), and emerging insights into the importance of the acquisition of chunks in second language speaking continue to flow from corpus-based studies of both first and second language speaking.

NS versus NNS Models for Second Language Speaking

Another ongoing debate centers on the comparability of native versus nonnative speaking. Medgyes (1992) argued that a nonnative cannot aspire to acquire a native speaker's language competence and that native- and nonnative-speaking teachers reveal considerable differences in their teaching behavior and that most of the discrepancies are language-related. However, he noted that native and nonnative teachers have an equal chance to become successful teachers, but the routes used by the two groups are not the same. A number of publications debate the issue of NS versus learner corpora and NNS corpora (Seidlhofer, 2001; Prodromou, 2003). Prodromou, whose work is based on a mixed NS–NNS spoken English corpus, raised issues concerning the undermining effect of NS spoken corpora for NNS faced with language varieties and cultures that they can never appropriate completely for themselves. Reacting to similar concerns, Seidlhofer proposed a spoken corpus of English as a Lingua Franca (ELF) to profile ELF as robust and independent of English as a native language and to establish "something like an index of communicative redundancy" with pedagogical applications (Seidlhofer, 2001: 147). The shift away from the NS as the sole model for second language speaking is further underscored by the introduction into the debate of terms aimed at leveling the playing field between NS and NNS as potential models. Building on earlier work, such terms include 'expert users' and 'successful users of English,' with a focus on the modeling of successful language users (whether NS or NNS) in non-pedagogical contexts. Meanwhile, the Louvain International Database of Spoken English Interlanguage, set up in 1995, provides spoken data for the analysis of learner language.

Second language speaking is a complex affair and many aspects of research and observation of first and second language behavior have contributed to our understanding of the process. The future promises more data-based studies of second language speaking and more delicate descriptions of second language speaking on its own terms, rather than simply as an impoverished reflection of first language speaking.

See also: Communicative Competence; Communicative Language Teaching; Corpus Linguistics; Discourse Studies: Second Language; English: World Englishes; Identity: Second Language; Intercultural Pragmatics and Communication; Interlanguage; Language Teaching Traditions: Second Language; Lingua Francas as Second Languages; Nonnative Speaker Teachers; Second Language Listening; Socialization: Second Language; Speech Acts; Vocabulary: Second Language.

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Second Language Studies: Curriculum Development

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Introduction

One problem that arises in discussing curriculum development with language educators from many different countries is that different terminology is used in various places around the world. Hence, this article will begin by defining some key terms. Language class and course will refer to the regular meetings of a relatively small group of language students usually over a defined period of time with a particular teacher. A language program will be defined as a collection of such classes or courses in a single institution (e.g., a language school, university, school district, or state). Language curriculum will refer to the selection and structure of the content and learning processes of a language course or program. Also, language curriculum development will be defined as any systematic effort to create or improve the selection and structure of the content and learning processes to fit the needs of the people in a particular language course or program.

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that end, the following six main headings will be used: (a) underpinnings of curriculum, (b) contexts of curriculum, (c) organization of curriculum, (d) information gathering for curriculum, (e) key questions in curriculum, and (f) outcomes of curriculum.

Underpinnings of Curriculum

The underpinnings of curriculum development are the language teaching approaches in which students, teachers, and administrators believe as well as their overall philosophies of curriculum development.

Approaches

Most teachers begin teaching a course with certain preconceptions and assumptions about what and how their students need to learn. These will be referred to here as approaches (after Brown, 1995a). For years, language teachers have drawn on a variety of disciplines (including psychology, linguistics, education, and other fields) in formulating their approaches.

One early strain of thought that emerged over the years was called the grammar-translation approach. Based on humanistic traditions and prescriptive notions of grammar, teachers believed that languages were learned primarily in order to access the knowledge of the world (i.e., the great books). As a result, teachers felt that their students needed to learn prescriptive grammar deductively through reading, translation, and memorization of passages from important texts in whatever target language was involved. Note that this approach, like the others discussed below, continues to influence teachers today – at least in some places around the world.

The direct approach continued to be affected by the notions of prescriptive grammar. However, in reaction to the grammar-translation approach, the adherents of the direct approach felt that students needed to learn meanings directly (i.e., they needed to associate meanings directly with the appropriate objects, movements, and gestures) and therefore needed to learn inductively while using only the target language. In addition, oral skills (listening and speaking) typically took precedence over written skills (reading and writing).

Based on language teaching developments during World War II, the audiolingual approach drew on descriptive linguistics and behavioral psychology – especially the ideas of operant conditioning and behavioral modification. Students' learning needs revolved primarily around inductive learning of listening and speaking (before reading and writing) through habit formation based on stimulus–response exercises such as pattern, transformation, and substitution drills.

The cognitive code approach, which developed as a counterpoint to the audiolingual approach, was based on the belief that language learning is a set of dynamic cognitive processes, not just a set of habits that must be formed. Thus, students were believed to need active participation in their own cognitive processes by consciously learning the structures and using the language.

The communicative approach concentrated on developing the students' communicative competence including the use of different registers and styles needed in different situations. It was also felt that students needed to be able to formulate meanings that were important to them in their own lives. This approach advocated the use of both inductive and deductive learning based on the best available knowledge (drawn from the analysis of natural discourse) about grammar, semantics, pragmatics, etc., as this knowledge applied to the particular communicative needs of a particular group of learners for reading, writing, listening, or speaking. This approach is currently the most influential one around the world – at least from a theoretical perspective.

Naturally, the five major approaches listed above are not the final and definitive listing. Other prominent approaches defining what and how students need to learn may have been overlooked here, and new and exciting ways of defining students' language learning needs are likely to evolve in our dynamic field. Perhaps content-based instruction (Brinton *et al.*, 1989) will emerge as *the* important approach, or maybe some other as yet unpublished approach will emerge. The main point is that approaches describe a set of options in which all language curriculum developers must take an interest.

Philosophies

Brown (1995a) discusses four philosophies that can underlie curriculum development: the discrepancy, democratic, analytic, and diagnostic philosophies. The discrepancy philosophy takes the view that students' needs are the differences, or discrepancies, between what they can actually do and what the teachers think they should be able to do. For example, teachers may want their students to be at a high level of academic English ability so they can succeed in an American university, but observe that they are currently at a low level.

The democratic philosophy takes the view that students need to learn whatever the majority of the group thinks they should learn. Whether this group is defined as the students themselves, their teachers, program administrators, or the language school owners, the democratic philosophy leads to teaching the students whatever the majority of the group thinks appropriate.

The analytic philosophy takes the view that students will learn better whatever they need to learn next in the hierarchy of language development. Thus, this philosophy might lead to a curriculum based on what is known about language learning and the hierarchy of language development steps.

The diagnostic philosophy takes the view that students need to learn whatever would prove harmful by its lack. This philosophy might lead to curriculum that includes the important language skills necessary for students to survive on a day-to-day basis in the target language community.

Contexts of Curriculum

The contexts of curriculum have to do with the many possible levels at which it can occur, but also have to do with the purposes of the curriculum development process.

Levels

Curriculum development can take place at many levels, including at least international, national, state or province, county, school district, multiprogram, program, and classroom levels. The scale is obviously different for the various levels and the complexity of getting things accomplished can grow exponentially with increases in the numbers of people and the sizes of egos involved, depending also, of course, on the political realities of the situation (for more on this issue, see Brown, 1993).

Purposes

One of the factors in curriculum development that is often overlooked is the wide variety of purposes the process can serve. Naturally, curriculum development can help create sound pedagogy. However, it can also have residual effects that provide renewed purpose for the program, foster leadership, help maintain or gain control of resources, furnish necessary political structures, help give a voice to different constituencies, build consensus, resolve conflict, adapt to change, change practices, plan future policies and curriculum projects, ameliorate working conditions, foster professional growth, and provide knowledge for the whole field. Any or all of these purposes can provide motivation for curriculum development.

Organization of Curriculum

In organizing curriculum, different aspects may need sorting out. Most commonly, organizing course content and organizing people are the two areas that need most attention.

Organizing Course Content

Syllabuses are defined here as the different ways of selecting and organizing the overall order of course content whether that be viewed as course materials or the associated teaching. In other words, it is the process of deciding what should be included and what should come first, second, third, etc.

Structural syllabuses focus on grammatical forms. Many textbooks and classroom materials have been organized around grammatical structures. The rationale is that those structures that are important in the language should be selected and then sequenced from easy to difficult (or sometimes, from frequent to less frequent). The grammar-translation and direct approaches tend to be organized around structural syllabuses.

Situational syllabuses are based on the idea that language does not exist in a vacuum but rather is found in a particular context or situation. Textbooks based on a situational syllabus tend to be organized around a variety of different situations. One text designed for Asian refugees in the United States might have lesson titles such as An Evening at School, At the Employment Office, At the Bank, etc.

Topical syllabuses are similar to situational ones, but are organized around various topics or themes instead of around situations. Thus, materials designed for junior college ESL students in the United States might have lesson headings such as The Two Party System, Women's Liberation, Rising Crime, etc.

Functional syllabuses are typically organized around categories of semantic language uses, or things we do with language, called functions (after van Ek and Trim, 1991). For instance, an adult school English course in Utrecht, Holland might be designed to teach general-purpose social English and be organized around language functions such as Greeting, Seeking information, Inviting, etc.

Notional syllabuses are organized around conceptual categories called general notions (again, after van Ek and Trim, 1991). General notions include abstract concepts such as Shape, Position, Direction, Quantity, etc. This type of organization is related to the functional syllabuses in that notions sometimes serve as a general set of categories within which functions are also organized. Notional syllabuses are much less common than functional ones, but nonetheless have existed for some time.

Skills-based syllabuses are organized around language skills that the students will need in order to use the language. For instance, in a reading course, the skills might include Guessing Vocabulary from Context, Using Prefixes, Roots and Suffixes, Skimming, Scanning, etc.

Task-based syllabuses are organized around different types of tasks that students might need to accomplish with language in their real lives. Such tasks might include Giving and Following Directions, Filling out Forms, Writing a Check, etc.

Sometimes, syllabuses are mixed. For example, situational and topical syllabuses were mixed in my first college Spanish language textbook resulting in a mixture of situations (e.g., *en un restaurante español, en un hotel mexicano*) and topics (e.g., *fiestas, los deportes*). More often, syllabuses are layered. In the example above, the mixed situations and topics were together layered over a structural syllabus that flowed through all the chapters.

Organizing People

As pointed out in Brown (1993), Toffler (1991: 187–194) lists seven different strategies for organizing the people in any kind of institution. A pulsating organization is one that regularly expands and contracts in response to changes in the need for its products or services. Many educational institutions are pulsating in the sense that they contract in the summer and expand during the school year; their summer schools are often pulsating in the opposite direction.

A two-faced organization operates with two separate chains of authority that change depending on the circumstances. For instance, a language program might operate with an authoritarian structure during the curriculum planning process, but on a more egalitarian basis once teaching begins.

A checkerboard organization allows for two points of view to be represented throughout the organization such that the management is structured with interlocking roles in the hierarchy for the people representing the two alternative viewpoints. For example, binational language programs often adopt this sort of structure (e.g., the GELC (Guangzhou English Language Center) program described in Brown, 1995a).

A commissar organization promotes the flow of information through two main channels throughout the organization. For instance, the China program mentioned in the previous paragraph had some of this sort of organization as well, with one line of communication to the PRC Ministry of Education and another going to UCLA in California.

A buro-baronial organization is a bureaucracy that includes small feudal-like baronies with 'lords' who rule over people who function like serfs. This was of course the structure of feudal societies wherever they existed in the world, but ironically appears to also be the structure of most universities.

A skunkworks organization is one in which a team of people is assigned a loosely defined goal to reach or problem to solve, provided with the required resources, and left alone to work on their own outside any other existing organizational structures.

A self-start team is similar to the skunkworks organization, but is self-organized. A group of people comes together to deal with a common goal or problem. The group then finds its own resources and proceeds to work together, perhaps on a computer network, outside any other existing organizational structures.

All in all, Toffler's seven ways of organizing people in institutions seem to describe rather well the options that we need to consider in curriculum development.

Information Gathering for Curriculum

Information gathering for curriculum development involves different types of information, various foci of information, and a number of information-gathering tools.

Types of Information

Quantitative information versus qualitative information One continuum of information types might be labeled with quantitative information at one end and qualitative information at the other (for more on this, see Brown, 2004b). Quantitative information is typically countable and therefore usually gathered using instruments that produce numerical results in the forms of test or quiz scores, grades, student rankings, the numbers of students in each class, etc. Qualitative information is more likely to be based on observations that are not readily quantified such as student diaries, teacher journals, faculty meeting minutes, classroom observations, interviews, etc.

Objective needs versus subjective needs Another continuum of information types can be labeled with objective information at one end and subjective information at the other. Theoretically, objective information is not biased by the observer and is based on clear-cut, observable data gathered about the situation, the learners, their present proficiency, their language goals, etc. Subjective information is generally more difficult to defend because it may be biased by the observer or object of study. Such information may be about the students' or teachers' feelings, wants, desires, beliefs, and expectations (Brindley 1984: 31) and therefore may be particularly skewed by the points of view of the observers and the observed. This is not to say that such points of view are not important for curriculum developers to know about.

Curriculum development should probably be based on all types of quantitative and qualitative information as well as objective and subjective information.

Striking a balance is the trick, a trick that will depend in part on the focus of the information being sought.

Focuses of Information

Situation information versus language information Situation information will typically center on the political and other human aspects of curriculum, especially about the social, psychological, and physical contexts and constraints in which learning is taking place. Such information may be related to the personal, pedagogic, administrative, financial, logistic, cultural, or other factors that impact on a curriculum.

In contrast, language information is about the target linguistic behaviors, goals, and objectives of the program. Language information would logically include details about things like the students' reasons for learning the language, the present abilities of the students with regard to those reasons, the conditions under which the language will likely be used, etc.

Information about linguistic content versus learning processes Other focuses for information may involve the linguistic content that students must learn as opposed to the learning processes that they go through to learn that content. The linguistic content viewpoint focuses on curriculum information about the content that will be taught such as phonemes, morphemes, structures, utterances, functions, discourse markers, etc. The learning process viewpoint is more likely to focus on factors that will affect the students' learning such as motivation, self-esteem, attitudes, learning strategies, learning styles, etc. This distinction between linguistic content and learning processes is far from new. It corresponds roughly to Widdowson's (1981: 2) concepts of 'goal-oriented' versus 'process-oriented' views of language learning needs; Brindley's (1984: 31–32) 'language content' and 'learning content' duality; Nunan's (1985) 'content' and 'methodology' parameters; and White's (1988: 44–61) 'Type A What is to be learnt' and 'Type B How is it to be learnt' syllabuses. Regardless of the terminology used, responsible curriculum developers will need to gather and use information about both linguistic content and learning processes.

Information-Gathering Tools

Curriculum developers will also need to gather the information using the appropriate tools. As discussed in Brown (1995a: 45–59), these tools come in six basic forms. Existing information might involve examining a particular institution's records or the records of several institutions, reading the literature of the field related to the particular type of curriculum involved, making phone calls, writing letters, sending e-mail messages, etc. Tests of all kinds can be used to assess the abilities of the participants in a program, whether they be for criterion-referenced diagnostic, progress, or achievement purposes, or for norm-referenced aptitude, proficiency, or placement purposes. Observations tend to take the forms of case studies, diary studies, behavior observations, interactional analyses, inventories, etc. Interviews often involve individual face-to-face interviews, telephone interviews, or group interviews. Meetings are useful for getting advice from people on curriculum issues, for resolving conflicts between interest groups, or for getting feedback from participants. Questionnaires can be used to gather relatively large-scale biodata information, self-ratings, opinions, or judgments on various aspects of a curriculum. The trick with all these information-gathering tools is to select and use only those from the long list of possibilities that will provide a balance of information types and lead to addressing the various focuses necessary in curriculum development.

Key Questions in Curriculum

The key questions in curriculum are who, what, and how, all of which are important questions related to the mechanics of getting things done in curriculum development.

Who? – Stakeholders

Who should be involved in curriculum development? The best answer to that question is: any stakeholders (i.e., any people who have a reason to care whether it succeeds or fails) should be involved. Of course, the degree and manner of involvement will probably vary from group to group, and the roles that they will play may vary as well: some groups may serve as important sources of information, whereas others give advice, and still others would be most useful for reviewing the results of the curriculum development process and giving feedback. Some groups may serve two or more of these functions. The potential groups of stakeholders would naturally include the students, teachers, and administrators who are most intimately involved in the curriculum, but other groups may also be important, such as parents, future employers, future professors, higher authorities in the institution, politicians, and the public (for more on stakeholders, see Brown, 1993).

What? – Components

The components discussed here are taken from Brown (1995a) and are the main curriculum

components typically listed in the systems approach to curriculum development (for more on the systems approach, see Dick *et al.*, 2000). This list describes both a set of steps that can be taken to develop a curriculum and a set of components for the revision and maintenance of an already existing curriculum. The basic components are needs analyses, goals and objectives, testing, materials, teaching, and program evaluation.

Needs analysis Needs analysis in language curriculum is often seen as the process of identifying the language forms that students ultimately will need to use in the target language. However, since the needs of the teachers, administrators, employers, institutions, etc. also have some bearing on the language learning situation, many other types of quantitative and qualitative information of both objective and subjective types must be considered in order to understand both the situation and the language involved as well as information on the linguistic content and the learning processes. Needs analysis is defined here (after Brown, 1995a: 36) as "the systematic collection and analysis of all subjective and objective information necessary to define and validate defensible curriculum purposes that satisfy the language learning requirements of students within the context of the particular institutions that influence the learning and teaching situation." (For recent work on needs analysis, see Brown, 1995a; Iwai *et al.*, 1999; Witkin and Altschuld, 1995).

Goals and objectives One logical outcome of a needs analysis is the specification of goals and objectives. Goals are general statements about what needs to be done in order to satisfy the students' needs. In contrast, objectives are relatively precise statements of the content and/or skills that the students will have mastered by the end of each course. Objectives can take many forms and will probably differ in terms of their degree of specificity even within a particular program. Objectives are often drawn from or related to taxonomies of various types (for more on taxonomies and objectives, see Brindley, 1984; Brown, 1995a; van Ek and Trim, 1991).

Language testing Meeting the needs of the students and addressing the resulting goals and objectives may necessitate a fair amount of test development for a variety of different purposes. From a norm-referenced perspective (i.e., a standardized testing perspective), it may be necessary to decide who should be admitted to the program by using proficiency tests; for students already in the program, it may be necessary to place students in different levels of study using a placement test. From a criterion-referenced perspective (i.e., a classroom testing perspective), diagnostic testing may be needed at the beginning of a course to determine the students' relative strengths and weaknesses vis-à-vis the course objectives, and achievement testing will undoubtedly be necessary for purposes of grading or deciding who should pass or fail each course (for more on the distinction between norm-referenced and criterion-referenced testing, see Brown, 1995a, 2004a, or Brown and Hudson, 2002; for classroom testing ideas, see Brown, 1998).

Materials Having done needs analyses, and having developed goals and objectives, as well as the appropriate tests, curriculum developers are in the remarkable position of being able to deal logically with materials. Adopting, adapting, or creating materials is relatively easy in a curriculum that has well-developed needs analyses, objectives, and tests. In fact, deciding which strategy to use, that is, adopting, adapting, or creating materials, will itself be made easier. Can existing materials be adopted to fill the needs of the students? Or should existing materials be adapted so they meet the students' needs as expressed in the curriculum objectives? Or, if there are no existing materials that will work, should the materials be created from scratch? (For more on materials development, see Brown, 1995a; Byrd, 1995; McDonough and Shaw, 2003; Tomlinson, 1998, 2002.)

Teaching In any curriculum, teachers need support in the sense that they may need the following: orientation to the program when they arrive; observation and feedback; in-service training opportunities; incentives to engage in professional development; and so forth. Failure to provide these sorts of teacher support can lead to low morale, teacher burnout, and attrition. In contrast, a high level of teacher support will help them grow professionally, which, in turn, can lead to better morale and less teacher burnout. To some degree, teacher support may entail involving them intimately in the curriculum development and revision processes. All in all, teacher support should be designed to help teachers do what they do best—teach. (For more on teaching issues, see, e.g., Brown, 1995a; Pennington, 1995; Richards and Lockart, 1994).

Program evaluation Brown (1995a: 218) defined program evaluation as "the systematic collection and analysis of all relevant information necessary to promote the improvement of a curriculum and to assess its effectiveness within the context of the particular institutions involved." This definition is very

similar to the one provided above for needs analysis. Indeed, it is fair to say that program evaluation is a sort of ongoing needs analysis—one based on considerably more and better information. A needs analysis is usually conducted in the beginning stages of curriculum development, whereas program evaluation can take advantage of all the needs analysis information, but can also use all the information gathered in the processes of developing objectives; writing and using the tests; adopting, adapting, and creating materials; and supporting teachers. Such a continuing process of evaluation makes possible the assessment of the quality of all the components of a curriculum once it is in place, as well as the maintenance of that curriculum in an ongoing manner (for more on language program evaluation, see Alderson and Baretta, 1992; Brown, 1995a, 1995b, 2001; Brown and Rodgers, 2002; Lynch, 1995, 2003; Rea-Dickins and Germaine, 1992, 1998).

How? – Logistics

Even under the best of conditions, curriculum development will take a great deal of time and effort. Indeed, if curriculum development is viewed as an on-going process of development and maintenance, it will never be totally finished. Hence, curriculum developers should think in terms of setting up structures that will foster continued curriculum development. At some level or other, the logistics of curriculum development must involve at least the following seven steps:

1. Finding and marshalling resources;
2. Setting up structures to help teachers do their teaching;
3. Providing political structures and leadership that will help the teachers to work together and pool their abilities;
4. Dispensing the available resources equitably;
5. Buffering the teachers from external negative forces so that they can get on with curriculum development projects;
6. Representing the curriculum to the outside world;
7. Starting the whole process over again with Step 1.

In short, effective curriculum development must supply suitable logistical structures and safeguards so that those who are closest to the students will be able to investigate their needs, set goals and objectives, develop tests and materials, and teach, and then, continuously revise all of the elements through on-going program evaluation procedures. It is essential to provide logistical structures that will promote the purposes of the curriculum and, at the same time, provide enough freedom so that teachers can focus on their teaching.

Outcomes of Curriculum

Finally, in thinking about the outcomes of curriculum, we must consider the audiences involved, dissemination of the results, and the benefits to be derived.

Audiences

The issue of audiences involves deciding who should receive information about the results of any curriculum development efforts. They will typically be subgroups of the stakeholders, or groups of those people who need to be informed about the curriculum development, or need to be influenced, or impressed with all the hard work. Some groups may need a complete and detailed report of the results, whereas others may need only an 'executive summary' of one or two pages. The potential audiences would probably include at least the students, teachers, and administrators at the institution, but might also include higher authorities at the institution, politicians, the public, etc.

Dissemination

As mentioned just above, it may make sense to have reports of different lengths for different audiences. It can also make sense to deliver oral reports to some audiences, written reports to others, and combined oral/written reports to still others. For instance, a full hour-long oral presentation and a detailed handout might be appropriate at a full faculty meeting, whereas a short oral report might be better for the university president (accompanied by a written executive summary for later perusal), and then further written dissemination might be needed in the form of a full-length written curriculum document for the curriculum developers within the program. Other forms of dissemination might also be useful. A news release sent to local newspapers can be useful for informing the public of curriculum development efforts or a short article written for institutional or professional newsletters will let colleagues in other language programs know about the curriculum development project. Or, for even wider dissemination to the whole language-teaching field, presentations at professional conferences or articles in relevant journals and books might be useful.

Benefits

The results of any curriculum development project should be used in a variety of ways to benefit the course or program. Yes, it can be used to create sound pedagogy, but also to foster better leadership, gain control and maintain control of resources, create better political structures, afford different constituencies a stronger voice in the program, help build

UNDERPINNINGS OF CURRICULUM	
Approaches	***Philosophies***
Grammar-translation	Discrepancy
Direct approach	Democratic
Audiolingual	Analytic
Cognitive code	Diagnostic
Communicative	

CONTEXTS OF CURRICULUM	
Levels	***Purposes***
International	Create sound pedagogy, Provide purpose, Foster leadership, Control resources, Furnish political structures, Give a voice to different constituencies, Build consensus, Resolve conflict, Adapt to change, Change practices, Plan future policies and curriculum development, Ameliorate working conditions, Foster professional growth, Provide knowledge to the field
National	
State or provincial system	
Country or school district	
Multi-program	
Program level	
Classroom level	

ORGANIZATION OF CURRICULUM	
Course Content	***People***
Structural syllabus	Pulsating organization
Situational syllabus	Two-faced organization
Topical syllabus	Checkerboard organization
Functional syllabus	Commissar organization
Notional syllabus	Buro-baronial organization
Skills-based syllabus	Skunkworks organization
Task-based syllabus	Self-start team

INFORMATION GATHERING FOR CURRICULUM		
Types of Information	***Focus of Information***	***Information Gathering Tools***
Quantitative vs. qualitative	Situation vs. language	Existing information
Objective vs. subjective	Linguistic content vs. learning processes	Tests
	(Syllabus type A or type B)	Observations
		Interviews
		Meetings
		Questionnaires

WHO, WHAT, AND HOW OF DOING CURRICULUM		
Who? – Stake Holders	***What? – Components***	***How? – Logistics***
Students, Teachers, Administrators, Parents, Future employers, Future professors, Higher authorities, Politicians, Governmental agencies, The public, & any other stake holders...	Needs analysis	Marshall resources, Set up structures for teaching, Get teachers working together, Dispense resources equitably, Buffer teachers from external forces, Represent the organization to outside world, Start the whole process over again
	Goals and objectives	
	Testing	
	Materials	
	Teaching	
	Program evaluation	

OUTCOMES OF CURRICULUM		
Audiences	***Dissemination***	***Benefits***
Students	Faculty meetings	Sound pedagogy, Better leadership, Maintenance & control of resources, Better political structures, Stronger voice for different constituencies, Consensus on important issues, Resolution of conflict, Adaptaton to change, Better practices, Rational planning for future policies and curriculum, Amelioration of working conditions, Professional growth, More knowledge for the overall field
Teachers	Curriculum documents	
Administrators	Newsletters	
Higher authorities	Conferences	
Politicians	Journals	
The public	Books	

Figure 1 The many facets of language curriculum development.

consensus on important issues, resolve conflicts, help in adapting to change, create better practices, promote rational planning for future policies and curriculum, ameliorate working conditions, foster professional growth for teachers and administrators, and provide more knowledge for the field as a whole. Notice that these benefits have brought us full circle to the purposes of curriculum development listed much earlier in this article, which were exactly the same. Clearly, then, the very purposes of curriculum development offer benefits well beyond the development of sound pedagogy for the students.

Conclusion

In short, curriculum development involves at least the six major categories of curriculum activities listed in this article, which included a total of 15 curriculum facets and almost 100 individual subparts (see Figure 1). It is important to recognize that all of these categories of activities, facets, and subparts may interact with one another; that is, choices made with regard to one subpart will affect the choices that can be made with respect to other subparts. All of this can seem rather daunting if not framed clearly in terms of the tremendous benefits that can accrue from doing curriculum development.

See also: Assessment of First Language Proficiency; Communicative Language Teaching; Language Teaching Traditions: Second Language.

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Second Language Writing

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Introduction

Context

In light of increasing globalization and written electronic communication, worldwide interest in second language writing (L2W) has increased rapidly during the past 25 years. L2W instruction is available from kindergarten through graduate school and beyond.

However, while work on L2W and writing instruction is now being done throughout the world, across educational levels, and in a number of languages, the majority of work to this point has been done in North America (due to the existence of required composition courses) at the college level (where research is most viable) in English (due to its dominant position in the world). This bias will be reflected in what follows. Fortunately, scholarship on L2W and writing instruction is growing rapidly in Europe, Asia, Australia, and elsewhere; thus, it can be expected that in the next 25 years, L2W and writing scholarship will become truly international in scope.

Definitions

L2W will be defined here as writing done in a language other than one's mother tongue. The term 'second language' will encompass both second (writing in a context in which the target language is dominant) and foreign languages (writing in a context where the target language is not dominant); 'writing' will refer to composing written text (as opposed to orthography). In a more general sense, L2W will be seen as purposeful and contextualized communicative interaction that involves both the construction and the transmission of knowledge; its basic elements are the writer, the reader, text, and context, and the interaction of these elements in authentic settings.

History

L2W studies has grown primarily out of work done in applied linguistics and composition studies. A brief account of the recent history of composition studies and applied linguistics will be offered to provide context for the examination of the history of L2W.

Composition Studies

The roots of contemporary composition studies in North America, defined as the study and teaching of writing, can be traced back to the beginning of the 19th century. The model for first-year composition was a course that focused on reading and writing about the canonical literary works of the day. What students were taught about grammar, style, and organization, which were the staples of this course, was derived from these works.

Early in the 20th century, resistance to the belletristic focus and the imposition of the literary canon on writing courses began to mount. This resistance promoted student self-expression in writing, the social utility of writing courses, and the preparation of students to function in a democratic society.

With the advance of the 20th century, the division between literary scholarship and the teaching of writing in English departments grew wider. The increasing independence of the discipline of composition studies was reflected in its professionalization, examples of which are the founding of a professional organization and a scholarly journal. Other manifestations of the maturing of the field included advocacy for writing teachers and program administrators, the incorporation of knowledge from other disciplines, and the expansion of different avenues of inquiry (specifically, a move toward empirical research in composition).

The second half of the century brought even greater independence and change. The 1960s saw the return of classical rhetoric, the beginning of empirical study of composing processes, and an increased focus on the notion of a writer's authentic voice. The 1970s brought the notion of writing as a cognitive process and its application in both teaching and research, the recognition of student diversity in language and culture, the distinction between home and school language, and the encouragement of teachers outside of composition studies to give serious attention to teaching students how to write in their own disciplines.

In the 1980s, writing began to be seen as a sociocultural as well as a cognitive process and as an interdisciplinary field. Rhetoric became epistemic, involved in creating as well as transmitting knowledge, and the notion of discourse communities strongly took hold. The process of professionalization continued with the proliferation of graduate programs in composition studies, the establishment of a national center in the United States for the study of writing, the production of a comprehensive bibliography of composition scholarship, and an increase in outlets for publication overall. Tension between literature and composition faculty in U.S. departments of English also grew. Composition studies had become overtly political and had begun to inquire seriously into issues such as race, class, and gender.

The 1990s saw growing interest in postmodernism and cultural studies, social constructivist thought, and historical and archival studies of the field, all a function of an increasingly reflective attitude among composition professionals. Also foregrounded were longitudinal empirical research, a critique of composing process research and pedagogy, an increased focus on diversity with regard to language and cultural issues, and an explosion of interest in the use of computers and related technologies.

Applied Linguistics

It can be argued that applied linguistics has been around for hundreds of years. However, most commentators place the birth of contemporary applied linguistics, at least in North America, near the middle of the 20th century, particularly in 1941, with the founding of English language institutes and the establishment of applied linguistics journals. The motivation for all of this focus on language research was to a great extent the need for language training for military personnel in World War II. The theory that followed was a blend of American structuralist linguistics and behaviorist psychology; its manifestations, among other things were contrastive analysis, instruction based on the notion of operant conditioning, and discrete point language testing.

In the 1950s, applied linguistics' primary focus remained on L2 instruction, although there was some work on literacy and language arts. This decade also saw the appearance of graduate programs in and centers for applied linguistics. In addition to work on language teaching, the 1960s brought increased interest in language assessment, language policy, and the incipient research area of second language acquisition. The theoretical basis of applied linguistics began to move from structuralism to generative grammar, which would influence the field only indirectly via psycholinguistic inquiry that would later spawn the notion of interlanguage and studies in second language acquisition. This decade also saw the establishment of national and international professional applied linguistics organizations.

In the 1970s, while the foci of the 1960s continued, there was growth and interest in such areas as bi- and multilingualism, the rights of linguistic minorities, language policy and planning, and teacher training. In addition, new theoretical orientations that continue to the present day were put forward. These orientations included anthropological and sociological ideas that led ultimately to the influential notion of communicative competence. This work later manifested itself in the functional analysis of discourse, the development of courses in language for specific purposes, and the linguistic study of genre.

Applied linguistics in the 1980s began to go far beyond focusing on L2 learning and pulling work from only linguistics, psychology, and education. New foci included studying language use in academic and other professional settings, translation, lexicography, language and technology, and corpus linguistics; new disciplinary areas of influence were anthropology, sociology, political science, public administration, and English studies, particularly composition, rhetoric, and literary theory.

The 1990s and the first years of the new millennium brought even further expansion of work in applied linguistics, especially in terms of language learning and teaching (e.g., language awareness, attention and learning, task- and content-based learning, teacher/action research), in the critical appraisal of previous and current work (e.g., in language analysis, pedagogy, and rights), in ethical issues in language teaching and assessment, and in the viewing of applied linguistics as a discipline that mediates between research and practice.

Second Language Writing

Although developments in L2W have been greatly influenced by work in composition studies and applied linguistics, the unique contexts of L2W require distinct perspectives, models, and practices. In the recent history of L2W, a number of approaches or orientations (more or less specific to L2W) have vied for the attention of L2W professionals. These approaches or traditions will be addressed in order of their appearance on the L2W stage.

Controlled Composition

Controlled composition can be seen as an offshoot of the audiolingual approach to language teaching in that it shares two of its central tenets: the idea that language is speech (from structural linguistics) and that learning is habit formation (from behaviorist psychology). Thus, it is not difficult to understand why, within this tradition, writing is regarded essentially as reinforcement for oral habits and as a secondary concern.

In the controlled composition classroom, the primary focus is on formal accuracy. The teacher employs a controlled program of systematic habit formation in an attempt to avoid errors (presumed to be related to first language interference) and to reinforce appropriate second language behavior. Practice with previously learned discrete units of language is privileged over concerns about ideas, organization, and style; imitation and manipulation of carefully constructed and graded model passages are the central activities. Overall, in the controlled composition tradition, writing functions as a service activity, reinforcing

other language skills. The goal of writing instruction is habit formation. Students manipulate familiar language structures; the teacher is an editor privileging linguistic features over ideas. The text is seen as a collection of vocabulary or sentence patterns; there is negligible concern for audience or purpose.

Linguistic analysis dominated the research in this tradition and is still a major focus, though it has become more functional and less formal over the years. Early work in the linguistic analysis of second language writers' texts involved contrastive analysis (comparing the grammatical structures of two languages, for example, Spanish and English, in an attempt to ascertain structural differences, which were believed to pose the greatest problems for second language writers) and error analysis (locating, counting, and categorizing errors to discern patterns of error in written texts). Formal features examined include primarily lexical and syntactic phenomena; features such as number of words per t-unit and clause structures have been used to measure fluency, accuracy, and complexity in second language writers' texts.

Current Traditional Rhetoric

Increasing awareness of second language writers' need to produce extended written texts lead to the realization that there was more to writing than constructing grammatical sentences. The result of this realization was the ESL version of current traditional rhetoric (based on contemporary work in composition studies that focused on the written product, the analysis and classification of discourse, usage, and style), which emphasized the importance of organization above the sentence level. This approach owes much to the notion of contrastive rhetoric – the notion that writers' different cultural and linguistic backgrounds will be reflected in their rhetoric, with rhetoric typically (implicitly) seen as primarily a matter of textual structure. Thus, first language interference was believed to extend beyond the sentence to paragraphs and longer stretches of text.

The basic concern in this tradition was the logical construction and arrangement of discourse forms. Of primary interest, especially in the early years, was the paragraph, where the focus is on its elements (for example, topic sentences) as well as options for its development (for example, comparison and contrast). Another important concern was essay development, actually an extrapolation of paragraph principles to complete texts. This involved larger structural entities (for example, introductions) and organizational patterns or modes (for example, exposition).

Classroom procedures associated with this tradition have tended to focus students' attention primarily on form. At the most basic level, students are asked to choose among alternative sentences within the context of a provided paragraph or text. At a higher level, learners are instructed to read and analyze a model text and then apply the knowledge gleaned from this analysis to a parallel piece of original writing. At their most complex, exercises require students (already given a topic to write on) to list and group relevant facts, develop topic and supporting sentences on the basis of these facts, put together an outline, and compose a text of their own.

In short, this tradition sees writing as basically a matter of arranging sentences and paragraphs into particular patterns; learning to write requires developing skills in identifying, internalizing, and producing these patterns. The writer uses provided or self-generated data to fill out a pattern; thus, the reader is not confused by an unfamiliar pattern of expression. The text is made up of increasingly complex discourse structures (that is, sentences, paragraphs, sections, and so on), each embedded in the next largest form; and all of this takes place within an academic context, wherein the instructor's evaluation is assumed to reflect a community of educated native speakers.

By far, the largest single research focus in this tradition has been contrastive rhetoric. The focus of this work has been on characterizing how first language "cultural thought patterns" are reflected in second language writers' texts, how some cultures put the responsibility for successful written communication on the writer and others on the reader, and how differences between 'collectivist' and 'individualist' tendencies manifest themselves in L2W. The most commonly compared linguistic or cultural backgrounds have been Arabic, Chinese, English, Japanese, and Spanish. Contrastive rhetoric has been and is still a controversial issue, with some of its critics arguing that the notion can lead to stereotypes and others suggesting that the differences seen between groups are a matter of development rather than transfer. A number of other specific rhetorical features have been addressed in the literature. These include hedging, indirectness, reader orientation, introductions, metadiscourse, rhetorical preferences, and voice.

The Process Approach

Dissatisfaction with controlled composition and current traditional rhetoric, due to the belief that neither adequately engendered thought or its expression and to their perceived linearity and prescriptivism, paved the way for the process approach, another import from mainstream composition studies. This tradition sees the composing process as a recursive, exploratory, and generative process wherein ideas are discovered and meaning made. It is believed that guidance

through and intervention in the process was preferable to the imposition of organizational patterns or syntactic or lexical constraints and that, where there is a need or desire to communicate, content will determine form to convey meaning successfully.

In the classroom, the process tradition calls for providing and maintaining a positive, encouraging, and collaborative workshop environment and for providing ample time and minimal interference to allow students to work through their composing processes. The objective is to help students develop viable strategies for getting started, drafting, revising, and editing. From a process perspective, then, writing is a complex, recursive, and creative process that is very similar in its general outlines for first and second language writers; learning to write requires the development of an efficient and effective composing process. The writer is engaged in the discovery and expression of meaning; the reader is engaged in interpreting that intended meaning. The product (that is, the written text) is a secondary concern, whose form is a function of its content and purpose. In the process tradition, it is up to the writer to identify a task and an audience and to make the response to the former meet the needs of the latter.

The advent of the process approach prompted research on composing that focuses on the person (that is, the writer) and the process (that is, strategies) involved in writing. Many variables affecting second language writers have been identified and addressed in the literature. The second language writer has been looked at primarily in terms of the extent of transfer of first language proficiency or writing ability to L2W and the relationship between general second language proficiency and L2W ability. Also of interest are the possible connection between L2W ability and first language writing experience and expertise, writing apprehension, gender, learning style, language and instructional background, the second language writer's perceptions with regard to writing and writing instruction, and the amount of reading (in both first and second languages) a second language writer engages in. Research in this area has gone from seeing writer variables as simple and relatively discrete to very complex and greatly intertwined.

There is also a substantive body of scholarship on second language writers' composing processes. Predominant in this area are general composing process studies, that is, research that looks at L2W processes holistically. There are also studies that focus on particular subprocesses and elements of the composing process. The most common of these are studies of planning, drafting, revising, and editing. However, a number of other elements have also been examined. These include translating, backtracking, formulating, monitoring, the use of the first language when writing in the second, language switching, and the use of dictionaries and background texts when composing.

English for Academic Purposes

Perceiving theoretical and practical problems and omissions with regard to the process approach, critics suggested that the emphasis in ESL composition research and instruction be shifted from the writer to the reader, in particular academic and professional discourse communities. Most of the aforementioned criticism of the process approach came from proponents of an English for academic purposes orientation wanting to consider more seriously issues such as developing schemata for academic discourse, deriving insights from research on contrastive rhetoric, understanding what constitutes realistic preparation for academic work, learning about the nature of high-stakes academic writing tasks, giving students a better idea of how university writing is evaluated, and, generally, understanding the sociocultural context of academic writing.

Instruction in writing English for academic purposes focuses primarily on academic discourse genres and the range and nature of academic writing tasks. This instruction is meant to help students work successfully within the academic context. The instructional methodology suggested aims at recreating, as well as possible, the conditions under which actual university writing takes place and involves closely examining and analyzing academic discourse genres and writing task specifications; selecting and intensively studying materials appropriate for a given task; evaluating, screening, synthesizing, and organizing relevant information from these sources; and presenting these data in a form acceptable to the academy.

To sum up, in the English for academic purposes tradition, the emphasis is on the production of texts that will be acceptable at English-medium institutions of higher education; learning to write is part of becoming socialized into the academic community. The writer is pragmatic and interested primarily in meeting the standards necessary for academic success; the reader is a player in the academic community who has clear and specific expectations for academic discourse. The text is viewed as a more or less conventional response to a particular writing task that fits a recognizable genre; the context is the academic discourse community. Although the English for academic purposes tradition has grown and prospered, some have questioned its emphasis on writing in various disciplines (particularly in scientific and technical fields), pointing out the difficulty in learning and teaching the discourses of fields unfamiliar to L2W instructors.

Research in writing English for academic purposes has looked primarily at the issues of audience and, more recently, genre. The audience research has focused primarily on one particular readership: the academic discourse community, in particular, college and university professors and, to a lesser extent, editors of scholarly journals. This research has been performed primarily through surveys and addresses academics' beliefs, practices, expectations, reactions with regard to errors, literacy skills, and writing problems. The question of whether and how students should be initiated into the academic discourse community has also been debated.

In recent years, the study of genre in L2W has become very popular. In addition to general treatments of genre, many studies of particular written genres have appeared. Some address general types or modes of writing, such as narrative, descriptive, and argumentative writing as well as personal, academic, business, technical, and legal texts. A number of more specific text types addressed include summaries, essay examinations, laboratory reports, research papers, theses, dissertations, research articles, experimental research reports, and letters of reference.

Recent Trends

Recent years have seen the development of a number of new approaches, or perhaps it would be better to say extensions of prior orientations and traditions. These include a belletristic orientation focused on responding to literary texts and on reading and writing connections, an orientation based on work in critical theory and cultural studies, focusing explicitly on political and ideological matters, a genre orientation based on text analysis and work in corpus linguistics, and an orientation focused on general inquiry and rhetorical principles.

Current Status

For a long time (until the 1990s or so), L2W was primarily pedagogical in nature, borrowing, often uncritically, from composition studies and applied linguistics, working in their shadows, so to speak. However, in recent years, L2W has become a much more independent discipline in terms of mapping out its philosophical bases, theories, modes of inquiry, politics, and programmatic issues, as well as pedagogy.

Philosophy

Applied linguistics tends toward a positivist inquiry paradigm, with its realist ontology, objectivist epistemology, and empirical and manipulative methodology. It values certain truth and adopts a modernist orientation. Composition studies tend toward a relativistic paradigm, with its constructivist ontology, subjectivist epistemology, and hermeneutic methodology. It values consensus and adopts a postmodern orientation. The philosophical basis for inquiry in L2W studies reflects its lineage in the sense that it is a blend of the ideologies and inquiry paradigms of applied linguistics and composition studies. L2W studies favor a humble and pragmatic rationalism, with a modified realist ontology, an interactionist epistemology, and a multimodal methodology. It values contingent knowledge and adopts an orientation that incorporates elements of both modernism (e.g., progress, optimism, rationality) and postmodernism (e.g., relative and contingent knowledge, difference).

Theory

Applied linguistics theory grows primarily from linguistics; composition studies grow from rhetoric. Incipient L2W models and theories, in addition to drawing from these areas, look to psychological, sociological, educational, and other disciplines, and while there currently exists no well-developed theory of L2W, there seems to be a consensus that a such a theory would see L2W and first language writing as saliently different; address both the individual (cognitive) and social aspects of L2W; include consideration of second language writers' personal characteristics, composing processes, and written texts; be reasonably comprehensive and internally consistent; be informed by relevant work in relevant neighboring disciplines, and be sensitive to cultural, linguistic, and experiential differences of individuals and societies.

Politics

Current explicit commentary on political matters has its roots in work done in the early to mid-1990s. There were claims that L1 writing tended toward the ideological and L2 writing tended toward the pragmatic, and L2W professionals were warned against the uncritical acceptance of L1 writing ideology. In response to this, it was suggested that all forms of ESL instruction were political, that neutrality was a myth, and that a pragmatic position supports the status quo. It was also argued that L2 writing pedagogy is just as ideologically charged as L1 writing pedagogy, though not as openly articulated or discussed. In response came a denial of a necessary connection between pragmatism and an accommodationist ideology and a challenge to ideologist discourse. There was a call for adoption of critical theory and pedagogy, a critical pragmatism, and a subsequent critique of critical approaches to L2W.

A smaller cluster of work at the end of the 20th century and the beginning of the 21st century looked at ideology from a cultural perspective. It was claimed that L1 composition's principles and practices reflect an individualist ideology and that applying them with students whose culture may not share this ideology is problematic. In response, it was argued that, despite cross-cultural differences, such notions as voice, peer review, critical thinking, and textual ownership were not inherently individualistic. Other areas addressed included language bigotry in mainstream composition classes against speakers of nonprestige varieties of English; the role of power in the evaluation of L2 students' writing; L2W theory in terms of research methodology, discourse style, and gender sensitivity; the politics of textual production and consumption; how pedagogical approaches can help second language writers position themselves in vernacular and academic communities; strategies for advocating for ESL student support services; and the perceived efficacy of L2W instruction.

Research

Research in applied linguistics is typically empirical; research in composition studies is primarily hermeneutic. L2W studies employ both hermeneutic (narrative, historical, philosophical) and empirical (qualitative and quantitative) research methods to investigate both basic (the nature of the phenomenon of L2W) and applied (L2W instruction) problems.

In recent years, L2W research, has become better informed, theoretically and methodologically, has developed greater depth and breadth, has begun to use more mixed designs, and has gone from simple to more complex perspectives, toward a broad-based social understanding and toward greater inclusivity.

Specifically, its basic research foci have included writer characteristics (L2 writing ability, L2 proficiency, L2 writer background, and L1 influence on L2 writing), composing processes (planning, thinking, translation, rereading, revising, and editing), and written text (genre, organization, L2 text quality, text length, syntax, lexis, and errors). Its applied research foci have included content-based instruction, voice/identity, reading and writing, computers and technology, grammar and vocabulary, peer interaction, plagiarism, teacher response, literature, and film.

Programmatic Issues

Programmatic issues in L2W and writing instruction have been addressed mainly in three areas: assessment, instructional contexts, and instructional topics.

Assessment

Basic issues in assessment have included discussions of direct vs. indirect/objective writing tests; holistic, analytic, and primary trait rating; rater training; raters with or without experience with L2 writers; validity; reliability; and variables such as linguistic and rhetorical elements, subject matter knowledge, cultural expectations, nationality, reading comprehension, and amount of L1/L2 reading.

Instructional Contexts

Instructional contexts are discussed in terms of level (elementary, secondary, undergraduate, and graduate), aim (specific purposes vs. general categories), foci (composing processes, genre, grammar, and content), and type (basic/remedial, bilingual, immersion, submersion, sheltered L2, mainstream composition, cross-cultural, adjunct, writing across the curriculum, intensive L2 programs, and writing centers).

Instructional Topics

The main instructional topics that have been addressed include audience; cohesion; collaboration; computers and technology; conferences; content-based instruction; conventions; dictionary use; drafting; editing; error correction; freewriting; grading; grammar instruction; journals; literature; model/sample texts, peer review/response/evaluation/tutoring; plagiarism; planning/invention; portfolios; reading assignments; reading and writing; reformulation; research papers; sentence combining; sequenced writing assignments; teacher response; writing from sources; revising strategies; text analysis; topics/tasks/themes; translation; tutoring/writing centers; video/film; vocabulary; and workshops.

Future Directions

L2W seems to be moving toward a substantial treatment of three related issues: (inter)disciplinarity, professionalization, and inclusivity.

(Inter)disciplinarity

The field of L2W studies has come to view its parent disciplines neither as places to go for authoritative answers to its questions nor as role models to be emulated or imitated, but as areas with their own interests and agendas, strengths and weaknesses, and issues and problems that generate information and insights for L2 writing professionals to consider. While continuing to be sensitive to developments in other disciplines, the field of L2 writing has matured to the point of being able to resist the temptation to

try to import easy answers from other disciplines into the complex contexts of L2 writing. In addition, L2W studies have begun to draw on ideas from a number of other disciplines, e.g., psychology, sociology, and education.

Professionalization

The field of L2W studies has achieved a certain amount of independence and a distinct identity. It has a journal devoted exclusively to work in the area, professional conferences and symposia, book series, monographs, collections, and increased recognition in neighboring disciplines. However, it faces a number of challenges. One is continuity. It is the case that many specialists in the area do not work in Ph.D.-offering units, which prompts questions about where the next generation of L2W professionals will come from. Cutbacks in funding at research universities also make L2W studies vulnerable on this account.

To meet this challenge, it will be necessary for research universities with large numbers of second language writers in their graduate schools to recognize the need to hire full-time, tenure-track L2W specialists to run writing support programs and prepare teachers to staff these programs. It will also be necessary for Ph.D. programs in applied linguistics/second language studies and composition studies to see L2W as a viable research area and to accommodate students wishing to perform doctoral research in this area. That is, there will be a need for interdisciplinary cooperation and collaboration.

Inclusivity

As previously mentioned, currently, the majority of work done in L2W is carried out in North America with precollegiate and undergraduate college writers. For L2W studies to thrive, it will be necessary to encourage the expansion of L2W research, to look more and more closely at, for example, L2W in English outside of North America, in other second/foreign languages, in elementary and secondary schools, in bilingual education programs, with Deaf and hard-of-hearing students, in adult education programs, at the graduate level, and in the workplace.

Broadening the scope of L2W scholarship will require the efforts of scholars, publishers, and editors. Scholars will need to adopt a more global view, to promote a basic understanding of writing in general and L2W, to increase collaboration between specialists in North America and elsewhere, and to be willing to hold and attend conferences outside of North America.

Publishers and editors will need to create more outlets for publication outside of North America, to increase the accessibility of L2 writing scholarship, to distribute L2 writing research on-line, to be willing to publish research in languages other than English, and to start or continue to provide free or reduced-price copies (hard or electronic) of publications where prices are prohibitive.

Conclusion

The field of L2W studies is clearly becoming a mature discipline – it has begun to reflect on its history, reexamine its basic assumptions about L2W and writing instruction, synthesize research, and build models and theories. It is in transition from a tradition that sees L2W practitioners as consumers of imported instructional approaches and their accompanying research programs and ideologies to experienced and seasoned professionals with an understanding of the nature of L2W and a familiarity with relevant research from within and outside the field, who can reflect critically on knowledge of theory and on the results of inquiry from any relevant discipline so that they can develop their own models and theories, form their own research agendas, and, in their role as teachers, decide for themselves what makes sense for their students, for their objectives and teaching styles, and for their political, instructional, and classroom contexts.

See also: Applied Linguistics: Overview and History; Cohesion and Coherence: Linguistic Approaches; Discourse Studies: Second Language; Genre and Genre Analysis; Languages for Specific Purposes; Rhetorical Structure Theory; Second and Foreign Language Learning and Teaching; Second Language Studies: Curriculum Development; Style; Text and Text Analysis; Writing and Cognition.

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Selectional Restrictions

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Language combines the meaning encapsulated in listemes (items listed in a lexicon) into the complex meanings of phrases, sentences, and longer texts. Such combination is conditioned by the rules of syntax and at least four kinds of selectional restrictions. Category features (Noun, Verb . . .) determine different morphological and collocational possibilities, for example, of *fly*$_{\text{Verb}}$ and *fly*$_{\text{Noun}}$ in *his hand flew to his fly*. Strict subcategorization identifies other syntactic categories that collocate with the listeme. Syntactically transitive verbs, for instance, are defined by some notational variant of the strict subcategorization feature [+ ___NP] 'takes a first object'; *open* (as in *Fred opened the box*) has this feature, whereas the intransitive verb in *the door opened easily* has the feature [– ___NP]. Supposedly, syntactic inherent features, such as [+ human, + female . . .] for *woman* or [+ active . . .] for *go*, have a semantic basis. The selectional features of one listeme refer to the inherent features of collocated listemes, for example, for a verb [+ [+ animate]___[+ abstract]] 'has an animate subject NP and an abstract first object NP.' So, there are no grounds for the syntactic selectional features originally postulated to constrain a supposedly purely syntactic process of lexical insertion into syntactic phrase markers; and the procedure is semantically conditioned. It would otherwise be impossible to generate meaningful sentences like (1) and (2).

(1) "Grace me no grace, nor uncle me no uncle." (Shakespeare, *Richard II* II.iii.87)

(2) "But me no buts." ([='don't prevaricate'] Scott, *The Antiquary*, Chap. XI)

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Selectional Restrictions

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Language combines the meaning encapsulated in listemes (items listed in a lexicon) into the complex meanings of phrases, sentences, and longer texts. Such combination is conditioned by the rules of syntax and at least four kinds of selectional restrictions. Category features (Noun, Verb . . .) determine different morphological and collocational possibilities, for example, of *fly*$_{\text{Verb}}$ and *fly*$_{\text{Noun}}$ in *his hand flew to his fly*. Strict subcategorization identifies other syntactic categories that collocate with the listeme. Syntactically transitive verbs, for instance, are defined by some notational variant of the strict subcategorization feature [+ ___NP] 'takes a first object'; *open* (as in *Fred opened the box*) has this feature, whereas the intransitive verb in *the door opened easily* has the feature [– ___NP]. Supposedly, syntactic inherent features, such as [+ human, + female . . .] for *woman* or [+ active . . .] for *go*, have a semantic basis. The selectional features of one listeme refer to the inherent features of collocated listemes, for example, for a verb [+ [+ animate]___[+ abstract]] 'has an animate subject NP and an abstract first object NP.' So, there are no grounds for the syntactic selectional features originally postulated to constrain a supposedly purely syntactic process of lexical insertion into syntactic phrase markers; and the procedure is semantically conditioned. It would otherwise be impossible to generate meaningful sentences like (1) and (2).

(1) "Grace me no grace, nor uncle me no uncle." (Shakespeare, *Richard II* II.iii.87)

(2) "But me no buts." ([='don't prevaricate'] Scott, *The Antiquary*, Chap. XI)

What governs the cooccurrence of listemes is that the collocation has some possible denotation (be it substance, object, state, event, process, quality, metalinguistic statement, or whatever). Consider three examples marked anomalous in McCawley (1968a: 265).

(3) *That electron is green.

(4) *I ate three phonemes for breakfast.

(5) *My hair is bleeding.

Example (3) is judged anomalous because electrons are theoretical constructs that cannot absorb or reflect light and that therefore cannot be predicated as green. But suppose an explanatory model of an atom were constructed in which an electron is represented by a green flash; there would be no anomaly in stating *that electron is green* with respect to such a model. Consider (4): Phonemes are abstract entities, and we cannot eat abstract entities. Now imagine a situation in which a breakfast cereal is made in the shape of letters (*à la* alphabet soup); this cereal is fed to participants at a Linguistic Society conference and some wag eats a <p>, a <t>, and a <k> and utters *I ate three phonemes for breakfast*. Such a statement is no more anomalous than Austin (1975: 144) saying *France is hexagonal* – which no one has judged anomalous. Take (5): Hair has no blood vessels, so it cannot bleed; but that would not stop a child painting bleeding hair or a computer game creating bleeding hair somewhere in cyberspace – both cases establishing conditions under which the utterance of (5) would not be anomalous.

Empirical evaluations of sequences of listemes for coherence and sense depend on what they denote; evaluations must be matched in the grammar by well-formedness conditions, in part expressed by selection restrictions. To describe the full set of well-formedness conditions for the occurrence of every listeme in a language entails trying every conceivable combination of listemes in every conceivable context, and such a task is at best impracticable and at worst impossible. One alternative is to systematically describe semantic frames for every listeme along the lines of Pustejovsky's (1995) 'lexical semantic structures.'

See also: Frame Semantics; Syntax-Semantics Interface.

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Olga Nikolayevna Seliverstova was born October 17, 1934, in Moscow in a family of prerevolutionary Russian intelligentsia. In 1957 she graduated from Moscow University (Department of Germanic Languages and Literature) and subsequently began there her postgraduate study, obtaining in 1965 the Ph.D. degree (candidate's degree) with a thesis on the semantics of some Russian and English pronouns. In 1966 she was offered the post of a researcher at the Institute of Linguistics, Russian Academy of Sciences, where she worked in the Department of Germanic

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Languages until she died in 2001. In 1983 she obtained the Doctor of Science degree with her thesis on 'Existentiality and Possessivity in Language and Speech,' later gaining the title of Professor and the post of a leading researcher at the same institution.

In her Ph.D. thesis and first publications she elaborated on her innovative approach to meaning and the methods of its research and laid the foundation for her original theory of pronominal semantics. She considered the meaning of the linguistic sign to be a mental concept which in speech is realized as the information the sign carries about its *denotatum* (referent). This approach to meaning allows one to differentiate between meaning and denotatum, meaning and context, meaning and extra-linguistic knowledge, which is of primary importance for semantic research. According to her view, semantic investigation should be based on strict experimental methods, and its conclusions should be substantiated by their conformity to empirical language material. Her scope of interests and her activity as a linguist were varied and widespread. She is the author of four books and more than 50 articles on semantic theory and research which deal with the most topical problems of semantics. For many years O. N. Seliverstova was the leading consultant on a Russian-French project on the semantics of Russian syntactic words. She conducted seminars in experimental semantics at the Institute of Linguistics, The Russian Academy of Sciences, and gave lectures in Russia, France, and Italy.

Her life as a scholar, seemingly uneventful, was a life of dedication to science, her family, colleagues, friends, and students. Many of her students were attracted by her charming and warm personality, rare talent, enthusiasm, and never-exhausting ideas which she was always ready to share with them. O. N. Seliverstova was a rare type of scholar, exceptionally gifted, who possessed a striking individuality, a powerful analytical mind, and unerring linguistic intuition combined with subtlety and thoroughness of semantic analysis. She always took her own independent stand in science based on her remarkable linguistic vision and personal integrity. Her mature ideas and principles of semantic research were supported by her rich creative powers, strength of mind, and personality. Her works made her a leader in the field, leaving far behind the average level of present-day linguistic studies, paving the way for future semantic research and blazing new trails in linguistics.

Her major achievements pertain both to semantic theory and to research. Among her notable contributions are fundamental studies dealing with (a) the theory of linguistic meaning and types of its semantic structure, (b) progressive elaboration of experimental methods in semantic research, (c) componential analysis (its theory and application), (d) the semantics of pronouns, (e) the semantics of syntax (mainly Russian and English existential, locative, and possessive constructions), (f) the communicative sentence perspective, (g) the problem of factivity, (h) the invariant meaning of the Russian perfective aspect, (i) the innovative and original semantic descriptions of numerous wordgroups in Russian and English: among others, pronouns, polysemous words, predicate types, verbs of thinking and perception, spatial-distance prepositions and adverbs.

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Semantic Change, the Internet: and Text Messaging

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Electronic Communication: Efficiency and Expressivity

Since the 1980s, computer technology and mobile technology have given rise to various forms of text-based, electronic communication: e-mails, newsgroups, chatrooms, and, more recently, blogs (web logs that function as on-line diaries) and text messaging (Short Message Service, SMS). The language used in electronic communication has been described as a hybrid, showing both speech-like and writing-like features, as well as features that are unique to the digital medium and are, to some extent, the result of its technological restrictions. For instance, slow modems, limited bandwidth, costs, small screens, and typing speed are often cited as reasons for the preponderance of abbreviations in text-based electronic communication (cf. Baron, 2000; Shortis, 2000; Crystal, 2001).

The communicative need to use language efficiently within the constraints of the medium is complemented by the users' desire for conceptual and communicative expressivity (on efficiency and expressivity in semantic change cf. Geeraerts, 1997: 102–108). Crystal (2001: 67) has highlighted the "strong, creative spirit" that characterizes the language of Internet users: "The rate at which they have been coining terms and introducing playful variations into established ones has no parallel in contemporary language use." Linguistic creativity and playfulness can be described as conversational maxims of electronic communication and are most noticeable in recreational contexts (such as chatting and texting; Danet, 2001; Crystal, 2001: 168–170). Other conversational maxims (politeness, relevance, truth) can at times be suspended (or at least take second place; cf. Wallace, 1999: Chap. 3, on deception, masquerades, and lies on the Internet). Innovative in-group language use and a predilection for speech play was already a defining characteristic of those pioneer Internet users who engaged with the culturally still uncharted medium in the early 1980s. Raymond (2003) comments, e.g., on the popularity of form-vs.-content jokes among hackers (a person who enjoys exploring the workings and capabilities of programmable systems) and cites the tradition of 'hacker punning jargon' as an example. ('Hacker punning jargon' is the *ad hoc* use of intentionally transparent puns: FreeBSD → FreeLSD or IBM 360 → IBM Three-Sickly.)

Some Aspects of Semantic and Lexical Change in Netspeak and Texting

Users of electronic communication, despite their geographical dispersion, form a relatively cohesive, subcultural group and have been described as a 'virtual speech community' (Paolillo, 1999). Much linguistic work has concentrated on documenting the in-group national and international vocabularies that are used in electronic communication. The six standard categories of semantic change (cf. Traugott, 2000) can be identified in the specialist Internet lexicon (or jargon) that has its roots in hacker usage:

- Broadening/Generalization/Extension: *grep*, a UNIX command meaning 'Get REpeated Pattern,' is now used widely as a verb with the meaning 'to search.'
- Narrowing/Restriction: *banner* (top-centered graphic on a webpage), *to compress* (to reduce data size through the application of a mathematical algorithm).
- Amelioration: *nerd, geek* (which have acquired highly positive in-group connotations), *a hack* (a good and clever piece of work).
- Pejoration: *tourist* (an uninvited and usually non-participating guest on a discussion group), *random* (has a pejorative meaning of 'unproductive' 'undirected,' e.g., 'he is a random loser').
- Metaphor: *information superhighway, web-surfing, nipple mouse, gopher* (a software program designed 'to gopher' through information).
- Metonymy: *a suit* (someone involved in information technology who habitually wears suits and works in management, distinct from a real programmer or 'techie'; pejorative), *vanilla* ('ordinary' < vanilla ice cream, the default flavor in many countries, e.g., United States, United Kingdom).

Acronyms and abbreviations are a salient feature of what Crystal (2001) has called Netspeak, e.g., IRL 'in real life,' AFAIK 'as far as I know,' and BFN 'bye for now.' Media citations (from movies and computer games) have long been common in the in-group language of hackers and are moving into mainstream Netspeak: 'all your base are belong to us' is an expression used to declare victory or superiority (from a 1991 computer game; the citation spread through the Internet in 2001); 'and there was much rejoicing' can be used to acknowledge an accomplishment (from the movie *Monty Python and the Holy Grail*). Overlexicalization and the clustering of synonyms is another characteristic feature (e.g., *nick, handle, screen name,* and *pseudo* are all used to refer to the pseudonyms used by participants in chatrooms or newsgroups), as is the on-going creation of portmanteau neologisms

(*netiquette, newbie, progasm, screenagers*, etc.). There are also conventions for the encoding of prosody and paralinguistic meaning: emoticons (smiley icons such as :-)), the use of capitals (to indicate shouting), and repetition of letters (for emphasis) are used to disambiguate written messages.

With regard to derivational morphology: the *e* prefix and the *bot* suffix (from 'robot') have established themselves as productive morphemes (*e-loan, e-government, e-cards, e-books*, *annoybot, mailbot*, etc.). In inflecting languages, such as German, a new and productive lexical class has emerged in the context of chat communication: nonfinite verb-last stems. These are used by participants to describe actions that are performed in the context of the conversation. The action descriptions are inserted in asterisks: **away sei** (*away be*; the full German infinitive of 'to be' is *sein*), **schnell zu dir renn** (*quickly run to you*; the full German infinitive of 'to run' is *rennen*; cf. Schlobinski, 2001). Verbal stems (*schluck* 'swallow,' *gähn* 'yawn') have long been used in comics and also colloquially in German youth language. In English, on the other hand, action descriptions such as *nod* and *sigh* are structurally ambiguous and not necessarily identifiable as stems; moreover, inflected forms such as *shakes hand* are not unusual in English chat communication (Werry, 1996).

The lexical structure and character of nicknames ('nicks') is another aspect of the linguistics of Netspeak. In terms of semantic preferences, Bechar-Israeli (1996) identified six main semantic fields from which nicks are drawn: self-descriptors (<shydude>, <Dutchguy>, <irish>); technology (<Pentium>); real-world objects (<froggy>, <tulip>, <cheese>); play on words and sounds (<kukyMNSTR>, <whathell>); famous characters (<Elvis>, <Barbie>); and sex and provocation (<fuckjesus>, <sexpot>).

The language of text messaging/texting, which has become a popular form of interpersonal communication from the mid-1990s, is partially based on Netspeak, but shows a more radical use of abbreviations (e.g., 'it's prty low 4 sum 1 2 dump their b/f or g/f by sms' 'it is pretty low for someone to dump their boyfriend or girlfriend by sms'; special conventionalized abbreviations are also used in SMS, e.g., SWDYT 'so what do you think?'). The trend toward letter reduction (mostly achieved through a technique called 'consonant writing') and a generally telegraphic style have usually been interpreted as a response to the limited number of characters (max. 160) per message, and the small and awkward keyboard. They have since developed into a characteristic feature of the genre. It is not yet clear how technological innovations, such as predictive text software (which 'guesses' words after only a few key strokes), and market-related changes, such as the introduction of flat rates (rather than charging users per character), have affected (and will affect) the language of texting.

The Meanings of LOL: Semantic–Pragmatic Change in Electronic Communication

A well-known type of semantic–pragmatic change is subjectification, that is, the overall tendency for speakers/writers to construct new meanings on the basis of conversational implicatures reflecting speaker attitude or intention (cf. Traugott, 2000). In Internet Relay Chat (IRC), subjectification of meaning can be observed in the case of the popular abbreviation LOL/lol. The original propositional meaning of LOL is 'laughing out loud' and as such it can be used in response to, for example, a successful joke or an amusing story. This usage is indicated by metalinguistic comments such as 'I type it in after something funny is said . . . and I am laughing.' However, LOL, which has the structural advantage of shortness (i.e., it can be typed quickly), has been recruited and conventionalized by IRC users to express a range of discursive and interpersonal meanings (on laughter as a contextualization cue in spoken conversations; cf. Adelswärd and Öberg, 1998).

(1) LOL can be used as a discourse marker. This usage is illustrated in Example 1 (from a German chatroom, #Berlin), where <mib> closes his turn (a factual question addressed to another participant) with LOL, inviting a response from the addressee. The meaning of LOL in this example can be glossed as 'I have finished my turn, please answer my question.' (The spelling in Examples 1–4 is that of the original transcript and has not been corrected by the author of this paper.)

Example 1: #Berlin (8/7/2002)
<mib> kommst du eigendlich zum rl-treffen? ('will you come to the rl ('real-life')-meeting')
<mib> lol

(2) LOL can also be used as a supportive backchannel and as a means of establishing rapport between participants (emoticons can take on similar pragmatic and interactional meanings; cf. Crystal, 2001: 38). The following extracts come from two South African chatrooms (#Afrikaans; #India) and a German chatroom (#Berlin). In Example 2, <perfume_girl> uses LOL as an interpersonal modifier to soften her rejection of <Pyro>; her use of LOL fulfills pragmatic functions of hedging and face-saving. In Example 3, LOL is used in the context of

a virtual drinking game. It functions as an emphatic textual marker and creates emotional and interactional coherence (cf. Herring, 1999). In Example 4, <toxisches ei> ('toxic egg') uses LOL (as well as a positive emoticon) in response to the comment by <|Phylax|schule|>. The use of LOL is followed by supportive spoken-language discourse markers (*naja, hmm*).

Example 2: #Afrikaans (8/7/2002)
[1] <perfume_girl> sorry oom ('uncle')
[2] <perfume_girl> better luck next time
[3] <perfume_girl> lol
[3] <Pyro> ek is skat ry ('I am super rich')
[3] <perfume_girl> if u know what i mean
[4] <Pyro> help dit? ('does this help')
[5] <perfume_girl> lol
[6] <perfume_girl> nee ('no')
[7] <perfume_girl> sorry
[8] <Pyro> damnit

Example 3: #India (26/7/2002)
[1] <Renzo_ReXXXeL> what did he say?
[2] <PsYcHoMiKe> ehehe
[3] <MizHOttie> lets drink!
[4] <Miz_KeWL> LOL!
[5] * Miz_KeWL downs it!
[6] <MizHOttie> LOL!
[7] <MizHOttie> lol, wat he say

Example 4: #Berlin (19/8/2002)
[1] <|Phylax|schule|> beio uns ist der gk deutsch scwerer als der lk deutsch ('here (at our school) O-level German is more difficult than A-level German')
[2] <toxisches_ei> lol :D
[3] <toxisches_ei> naja
[4] <toxisches_ei> hmm

In the examples given above, LOL no longer has a clear propositional meaning. It appears to be 'desemanticized' or 'bleached' and is used as an interactional device that allows individuals to claim the floor, to express a range of interpersonal meanings (hedging, face-saving), and to provide supportive back-channeling and textual cohesion in the ongoing conversation.

(3) LOL can also occur as an adverb (expressing connotations of affection; cf. Example 4) and has developed a number of variants (*lolol, lolololo, lölchen* 'little lol' in German chats, *ol, olo*).

Example 5: #Berlin (17/7/2002)
<[c]hrono> mib du bist so lol :) ('mib you are so lol')

(4) Finally, the propositional meaning of LOL is increasingly and creatively deconstructed by Internet users, and a range of alternative meanings have been promoted in various on-line forums: 'lists of links,' 'lots of love,' 'lots of luck,' 'love on-line,' 'little old lady,' 'lovingly ornamented long-johns,' 'leagues of lemmings,' 'love of libraries,' etc.

Conclusion: Diversity of Usages

There is a constant tension between global and local practices in electronic media, and although the influence of, in particular, American English is paramount, local usages and variations persist (Danet and Herring, 2003). This refers not only to the large numbers of non-English-speaking Internet users who have developed their own jargons and usages, but also to those who do not participate fully in the subcultural linguistic practices of Netspeak. The degree to which individual users employ the innovative vocabulary of Netspeak and other highly marked in-group writing practices (e.g., consonant writing, emoticons, and abbreviations such as LOL) depends not only on the degree of their integration into the virtual speech community (Paolillo, 1999), but also on the genre (e.g., business e-mail vs. IRC) and the identity they wish to project within a particular communicative context (cf. also Crystal, 2001 on differences in language use across various 'Internet situations').

See also: Discourse Markers; Discourse Semantics; E-mail, Internet, Chatroom Talk: Pragmatics; Languages for Specific Purposes; Language in Computer-Mediated Communication; Neologisms; Semantics of Prosody; Slang: Sociology; Subcultures and Countercultures.

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Semantic Change: Bleaching, Strengthening, Narrowing, Extension

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Introduction

Like most terms in historical linguistics, 'semantic change' has been used to refer to both processes and results. Depending on the researcher's view of semantics, it has also been used to denote changes either in reference to the external world (object, cultural norms, etc.) or in a linguistic-internal sense, including ways in which pragmatic implicatures and inferences may become semanticized (coded) over time. Of all areas of linguistic change, semantic change is most subject to public comment and prescriptive attention. This is partly because semantics is codified in dictionaries, partly because of the ostensibly referential properties of some words, and most especially because meaning is subject to preemption by particular interest groups (cf. claims to the meaning of *Yankee* and, more recently to *gay* and *terror*) and even legislation (cf. the recent definitions of *harassment* as including 'hostile work environment').

Although in the past semantic change was often considered unsystematic, recent work has suggested that significant systematicities and unidirectionalities can be identified, especially crosslinguistically. These are usually considered from one of two complementary and mutually informing perspectives. The semasiological approach takes the form (hereafter *f*) as constant, ignoring phonological and other changes, and focuses on shifts in the senses associated with *f* (e.g., from *grasp* 'clutch' to 'understand'). The onomasiological approach takes abstract things or concepts as constant and focuses on recruitment to or loss of *f*s from the domain; for example, UNDERSTAND has come to be expressed by *grasp, understand*, and *comprehend* (itself ultimately derived from Latin *prehend*-'seize'). (Note: It is customary to represent abstract meanings in capitals, as in the previous example.)

Sometimes semantic change is treated as equivalent to lexical change. However, the latter concerns word formation, borrowing, and a number of morphological and phonological factors in addition to semantic change and will not be considered here.

Categories of Semantic Change

Early work on semantic change (e.g., Bréal, 1900/1966; Stern, 1931/1968; Ullmann, 1957) identified a recognized standard set of categories of change. The six listed next are the most important. (The following abbreviations are used: > means 'becomes' or, better, 'is assigned the new meaning' because the language itself does not change but, rather, speakers and hearers use languages in different ways over time;

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Chin. = (Mandarin) Chinese; Fr. = French; Gk. = Greek; Lat. = Latin; ME = Middle English (c. 1150–1500); OE = Old English (c. 600–1150); Span. = Spanish.)

1. Broadening (also referred to as generalization or extension): A relatively restricted meaning becomes less restricted, for example, Lat. *arripare* 'to arrive at the shore' > *arrive*; Late OE *docga* 'dog of a powerful breed' > generic *dog*.
2. Narrowing (also referred to as restriction or specialization): A relatively general meaning becomes more specific, for example, OE *deor* 'animal' > *deer*; OE *hund* 'generic dog' > 'hunting dog.'
3. Amelioration (also referred to as melioration): Meanings become more positive, for example, Lat. *nescius* 'ignorant' > *nice*; *Yankee* (from prior use as a derisive term).
4. Pejoration: Meanings become more negative, for example, OE *selig* 'blessed' > *silly*; ME *huswif* 'house-wife' > *hussy*; *knowing* 'having knowledge' > 'suggestive of secret knowledge' (cf. *a knowing look*); ME *cunning* 'knowledge, erudition' > 'deceitfulness,' ME *cur* 'dog' > a term of contempt (for dogs and humans).
5. Metaphor: One concept is transferred, projected or 'mapped' onto another that is in a different conceptual domain but has some resemblance to it, for example, Middle Fr. *grue* 'crane [bird]) > 'prostitute'; Lat. *musculus* 'little mouse' > 'muscle'; SPACE > TIME as in *before* 'in front' > 'earlier.'
6. Metonymy: One word is associated with another along the lines of already existing connections. Often-cited examples involve reference to perceived nonlinguistic contiguities, for example, the material that the object is made of for the object as in Gk. *papyrus* 'papyrus plant' (used as material for writing on) > *paper*; the form for the function as in OE *feoh* 'cattle' (used as payment) > *fee*; cause for effect as in *prove* 'test' > 'establish truth of'; and color for a plant associated with it as in 'the fruit of the orange tree' > *orange* 'color.' Metonymy is, however, also used with reference to language-internal associations, including ellipsis, for example, Fr. *rien* 'nothing' (from Lat. *res* 'thing,' typically used in the context of *ne* 'not'). Part for whole (synecdoche), as in *hands* 'laborers' and Span. *braceros* 'laborers' from *brazo* 'arm,' is sometimes treated as a subtype of metonymy and sometimes treated as separate from both metaphor and metonymy.

Because all six categories refer to both processes and results of change, it would be best to use forms derived with *-ation* for the last two, that is, 'metaphorization' and 'metonymization.' The six are discussed in this article in terms of how they have been construed from the perspectives of (1) semantic fields and Cognitive Linguistics, including Prototype Theory; (2) Neo-Gricean pragmatics, including Inviting Inferencing Theory; and (3) Grammaticalization Theory. For a history of early work on semantic change see Nerlich (1992), and for a brief partial account of more recent developments, see Traugott and Dasher (2002).

Although the pairs of changes that occur in the six types of semantic change may seem contradictory, they establish that later meanings of a form are linked to earlier ones; an arbitrary shift that breaks continuity of meaning is excluded. They also imply that change results from the use of language in context. Sometimes the context is cultural (value judgments about certain qualities, groups of people, etc., as with *hussy, silly,* and *nice*); sometimes it is linguistic (e.g., *rien*). Many words can be shown to have undergone several semantic changes over time. For example, originally Fr. *bureau* was borrowed into English to refer to a woolen cloth covering tables; by metonymization it came to be used for the furniture under the cloth, and by specialization it came to be used for desks; later it was generalized metonymically to offices with several desks and then to the function of those offices. Likewise, Fr. *toilet* was borrowed meaning 'a cloth for wrapping,' restricted to 'a cloth covering a dressing table,' metonymized to the table and to dressing at it (cf. *do one's toilet*), and finally used euphemistically for *lavatory*. Sometimes different changes occur in different syntactic functions. For example, OE *prættig* 'crafty, deceitful' came by metonymic association with artfully devised appearances to be ameliorated as 'handsome'; by narrowing it came to be associated largely with children and females; used as an adverb meaning 'in a fair way' it came by broadening (and ultimately bleaching) to mean *very* (cf. *that's pretty ugly*). Many metonymic pejorations can be seen to result from euphemism and taboo, in which case they are called 'dysphemisms.' Smells are often associated with objectionable experiences. This accounts for the pejoration of *stink* (originally OE *stincan* 'to smell (sweet)') and even of the word that replaced it, *smell*; this in turn is being replaced by *odor* and *scent* (the movie title *Scent of a Woman* would have had an entirely different connotation if *smell* or even *odor* had been used). Note that although the pejoration of *smell* is semasiological, its substitution by another word (*scent*) is onomasiological. A similar example is *undertaker* (originally 'someone who undertakes a job'), which by specialization, and hence pejoration, > 'funeral director'; in this meaning, *undertaker* has been replaced by *mortician* (borrowed terms are often considered

at least initially to be neutral, but they may then undergo semantic change).

All semantic change arises by polysemy; that is, new meanings coexist with earlier ones, typically in restricted contexts. Sometimes these new meanings split off and are no longer conceptualized as variants; for example, *mistress* used to mean 'woman in a position of authority, head of household,' but it came to be pejorated as 'woman in a sexual relation to a man.' The original meaning still survives but largely in restricted contexts (*mistress of the household, school mistress*). Most people nowadays probably think of the meaning in these phrase as distinct (homonymous).

Notations such as *stincan* 'smell (sweet)' > *stink* 'smell bad' not only suggest that the older meaning was replaced rather than being in a polysemous relation to the newer one but also that the change was instantaneous. In reality, the old and the new meaning typically coexist for a long time, at least in different communities and in different text types (e.g., conversation on the job, letters, drama, legal language, and poetry). For example, ME *estate* originally meant 'condition, status' and then, in legal contexts, 'interest in property including land'; only in the 18th century did it come to be used primarily for buildings (of the landed gentry). The original meaning persists but is largely restricted nowadays to religious and philosophical contexts, and the property meaning is largely restricted nowadays to legal ones (except in phrases such as *housing estate, real estate*).

From the Perspective of Semantic Fields, Cognitive Linguistics, and Prototype Theory

As attention turned during the 20th century from reference to sense and to relationships between abstract meanings, categories of change took back stage to the study of 'semantic fields': abstract meaning relationships that hold between sets of words and how they change over time (see Gordon, 2001, for early work). Some of these studies identified unidirectional changes. For example, Stern (1931/1968) noted that English words meaning RAPIDLY (e.g., OE *swifte* 'swiftly') came in the context of perfective verbs to mean IMMEDIATELY before 1300 but not later and suggested that semantic change was subject to 'laws' similar to those in phonology. Because 'laws' were, by hypothesis, exceptionless, but semantic change is not, this particular suggestion was problematic, but the observation of directionality proved to be highly fruitful because it drew attention to systematicities of change. Work was conducted in domains such as color (Kay, 1975); perception (Viberg, 1983); and synesthesia, the metaphorical extension of terms for the five senses into the domain of other sense and social behaviors, language, and so on (e.g., *soft sound* and *bitter comment*) (Viberg, 1983). This work suggested that terms for touch are extended cross-linguistically to hearing and sight and that terms for taste are extended to smell and sound, but not vice versa, so we would not expect *sweet touch*. In a study of metaphorization in the lexical field of English animal names, Lehrer (1985) showed that many came to be used pejoratively in the 15th and 16th centuries; for example, terms for primates, birds, and scavenger birds came to be used to signal brutishness, foolishness, and greed, respectively (e.g., *baboon, pigeon,* and *vulture*).

Metaphorical extension of meaning came to play a central role in Cognitive Linguistics, in which abstract meanings are interpreted as cognitive schemas, scenes, and frames. In a book that proved seminal for later work on semantic change, Sweetser (1990) suggested that one way to conceptualize the synchronic polysemic relationship between verbs of perception and cognitive states (cf. *I hear you* 'I understand you') or of root (obligation, or 'deontic') and epistemic (inferential) modality is in terms of metaphorical mapping of image schemata. Building on aspects of Talmy's (1988) theory of force dynamics, she hypothesized that the *may* of permission (*Kim may leave; I allow it*) expresses "an absent potential barrier in the sociophysical world," and epistemic *may* (*Kim may be there*) "is the force-dynamically parallel case in the world of reasoning" (Sweetser, 1990: 59). Root *must* (*you must go*) indicates a real-world force that compels the subject to act, whereas epistemic *must* (*you must be tired*) indicates that "an epistemic force applied by some body of premises" compels the speaker to "reach the conclusion embodied in the sentence" (Sweetser, 1990: 64). Seeking to account for the abstract patterns of thought underlying regular tendencies of change, she argued that meaning change in the modals is a unidirectional metaphorical mapping from content > reasoning meanings, not vice versa, because "viewing X as Y is not the same as, and does not imply, viewing Y as X" and metaphorical mapping is "inherently unidirectional" (Sweetser, 1990: 19).

A basic assumption of Cognitive Linguistics is that meanings are not discrete but overlapping. They are prototypical and some representations are more central ('stereotypical' or 'salient') than others. Furthermore, there are often "clusters of overlapping and interlocking meanings" (Geeraerts, 1997: 61). From the perspective of prototype theory, broadening and narrowing can be seen as the result of metaphorization and metonymization. The key issue is change in

the saliency of a meaning; for example, the salient meaning of the brand-named container known as *Thermos* came to be generalized to all vacuum containers designed to keep liquids hot or cold; the salient meaning of *liquor* 'generic liquid' came to be narrowed to 'alcoholic liquid'; and *meat* 'generic food' came to be 'food from animals.' Geeraerts (1997) provided a detailed account of historical prototype semantics, and Eckardt (2001a) formalized it in terms of Montague semantics.

From the Perspective of Neo-Gricean Pragmatics and Invited Inferencing Theory

Another strand of work has highlighted ways in which pragmatic polysemies can become coded as semantic polysemies (see e.g., Horn, 1984; Levinson, 2000; Enfield, 2003). Building on Levinson's (2000) revival of Grice's distinction among (1) utterance token implicatures that are by hypothesis universal and arise on the fly in the context of strategic interaction between speaker and hearers (and writers and readers), (2) utterance type implicatures that are conventionalized in particular communities and languages, and (3) coded meanings that are conventions of a language at a given time, Traugott and Dasher (2002) developed the Invited Inferencing Theory of Semantic Change. According to this model, utterance token implicatures may become salient and normative types in a community; at this point, meanings may be indeterminate or ambiguous. Change occurs when these utterance type implicatures are semanticized, that is, when the earlier meaning of an item would not make sense in a particular utterance (the earlier type implicature has been reanalyzed as a distinct meaning of *f*). The inference may, of course, not always be semanticized and may persist for centuries, even millennia (cf. *after*, the causal implicature of which has not been semanticized). Enfield (2003: 29) referred to ambiguous or indeterminate utterances at the intermediate stage as "bridging contexts"; here "an interpretation of *f* as merely implicating 'q' (on the basis of 'p') or as actually meaning 'q' (as distinct from 'p') become functionally equivalent."

The term 'invited inferencing' is used to highlight the fact that change occurs in strategic interaction: Speakers/writers invite hearers/readers to infer meanings beyond what is said. It is an associative process in the syntagmatic flow of speech and, therefore, has much in common with metonymy. Metonymy has, however, often been restricted to language-external associations (e.g., *paper, fee, orange,* and *bureau*). By contrast, invited inferencing is strictly language-internal, conceptual metonymy.

One recently much discussed type of semantic change is 'subjectification.' Langacker (1990) restricted subjectification to changes in the interpretation of the syntactic subject characteristic of raising constructions, for example, the shift from the restriction to animate subjects in motion in *be going to* or in the speech act verb *promise* constructions to the availability of inanimate or expletive subjects in future/epistemic constructions (*there is going to be an earthquake; it promises to be a fine day*). However, subjectification can be more broadly construed as a metonymically based association of what is said to the speaker's attitudes and speech act purposes by which speakers and writers recruit meanings to express and to regulate beliefs, attitudes, and so on (Traugott and Dasher, 2002; Traugott, 2003). At the most basic level, subjectification encompasses the evaluative, emotive changes known as amelioration and pejoration (cf. *silly* and *nice*) and euphemism (*scent*). But it also encompasses shifts from obligation to epistemic attitude, whether or not raising occurs, for example, *actually* 'in the act' > 'in reality,' as well as *promise* 'oblige/commit oneself to' > 'be likely to.' Subjectification also includes shifts from concrete descriptive meanings to focus particles and discourse connectives, for example, *only* 'single' (*an only child*) > 'focus particle' (*only Jane left*) > 'dismissive discourse connective' (*they are lovely*; *only, they have thorns*) (Brinton, 1998), as well as shifts from ultimately spatial terms to performative verbs (Lat. *pro-miss-* 'forward-sent' > *promise*).

The influence of Gricean pragmatics is particularly apparent in Horn (1984). Horn associated the Second Maxim of Quantity, Relation and Manner (Make your contribution necessary. Say no more than you must; he calls this the 'R-Principle') with semantic broadening (cf. *thermos*). Here, the specific term is understood to represent a salient exemplar of a wider class (Horn, 1984: 35). In Horn's view, the R-Principle may also give rise to narrowing, as in the case of a shift from set to subset (hyponym) denotation; that is, "a delimitation of a general term to a sense representing a salient exemplar of the category denoted by that term" (Horn, 1984: 35), as in *undertaker* and *liquor.* But narrowing may also involve what Horn called the Q-Principle, which combines Grice's First Maxim of Quantity and Relation (Make your contribution sufficient. Say as much as you can.). For example, a superordinate term in a taxonomy (e.g., *finger, gay*) may be narrowed to exclude its complement; when we say *I hurt my finger*, this is understood to exclude the thumb, and *they are gay* can be understood to exclude lesbians. In this view, the specialization of the general term is "triggered by the prior existence of the hyponym of that term" (Horn,

1984: 35), a situation called 'autohyponymy.' As Horn points out, autohyponymy is very idiosyncratic historically.

Although there is a great deal of mutual influence between Cognitive Linguistics and Neo-Gricean pragmatics in work on historical semantics, the emphasis is rather different in each theoretical tradition. The prime focus on metaphorization and metonymization in Cognitive Linguistics is on the cognitive structuring that they reveal. In Neo-Gricean pragmatics, it is on communicative strategizing as well as cognitive structuring. Furthermore, metaphorizing has played a stronger role in Cognitive Linguistics, whereas conceptual metonymization has played a stronger role in Neo-Gricean pragmatics.

From the Perspective of Work on Grammaticalization Theory

Much work on grammaticalization, "the change whereby lexical items and constructions come in certain linguistic contexts to serve grammatical functions, and once grammaticalized, continue to develop new grammatical functions" (Hopper and Traugott, 2003: 18), has focused on crosslinguistic typologies of semantic change as they interact with, and indeed in many cases trigger, morphosyntactic change (see Bybee *et al.*, 1994; Haspelmath, 1997; Heine and Kuteva, 2002). Standard examples include SPACE > TIME, for example, *before* 'in front' > 'earlier'; *be going to* 'be in motion toward' > 'future' OBLIGATION > EPISTEMIC, for example, *must* 'obligation' > 'conclusion'; GIVE > dative case adpositions, for example, Chin. *gei* 'give' > 'to.'

Grammaticalization has been construed as arising primarily from metaphorical conceptualization, specifically mapping of a more concrete concept onto a more abstract one (e.g., Heine *et al.*, 1991). However, arguing that what appears to be metaphorizing is in most cases an artifact of citing examples out of context and is, in fact, usually the result of implicatures that arise associatively (metonymically) in highly specific linguistic contexts. Bybee *et al.* (1994) and Traugott and Hopper (2003) showed that grammaticalization arises not so much out of metaphorical processes but primarily out of conceptual metonymy and invited inferencing. Texts typically reveal extensive evidence of bridging contexts at periods of transition. This suggests that, for example, *must* was not directly assigned an epistemic meaning by the mapping of obligation in the physical world onto obligation in the world of reason, as Sweetser's metaphorical model would suggest. Rather, the implication that the individual who is obliged to do something will do it became salient over time, especially in contexts in which the obligation was imposed by God or a king. Once the change has occurred, synchronically the relationships between obligation and conclusion may appear to be metaphorical, but the historical process is metonymic.

A word or lexical item can undergo grammaticalization only if it has a very general meaning and one relevant to grammatical structure; thus, *thing* is susceptible to interpretation as a pronoun, whereas *desktop* is not; likewise, *go* and *come* are interpretable as markers of temporality (especially tense) but *creep, jump,* and *drive* are not. Sometimes the contentful meaning of a word may become weaker over time, allowing it then to be subject to grammaticalization (e.g., Lat. *ambulare* 'to walk,' which was generalized to motion in general before its descendant Fr. *aller* 'to go' became available as a marker of future). Meanings are often said to be weakened, 'desemanticized,' or 'bleached' during grammaticalization. It is true that they lose concrete, referential, and content meaning and become highly abstract, but they normally do not become devoid of meaning, as 'bleaching' suggests (an exception is the *do* that is automatically required in a question as in *did you see that*?). On the contrary, in the course of grammaticalization, a former nonreferential implicature typically becomes enriched or strengthened (Sweetser, 1988). In many cases, these grammatical meanings are indexical, for example, personal and demonstrative pronouns (Span. *vuestra merced* 'your grace' > *usted* 'second-person singular polite'), scalar focus particles *(mere* 'pure, absolute' > 'nothing more than'; see König, 1991) and discourse markers (*in fact, y'know*; see Brinton, 1996). Sometimes bleaching is identified with grammaticalization. However, bleaching also occurs in the lexicon; a number of terms are used as address forms (e.g., *love* and *kiddo*), and recently the slang word for 'feces' has come to be used to mean 'stuff' (*I've got a lot of shit to do*) (note the pragmatically negative connotation, arising from association with the dysphemistic source). Eventually, such bleached forms might become grammaticalized as pronouns, but that would require them to be analogized with other pronouns, that is, made to share their distributional properties.

The term generalization (also broadening) is sometimes used synonymously with bleaching. It is, however, important to distinguish bleaching, although the latter may arise from generalization (cf. the development of degree *pretty*). Terms that broaden or generalize become hypernyms, higher, more abstract members of a semantic hierarchy. When *dog* came to be used in ME as the generic term it was generalized (it came to refer to a larger set of canines). This is not bleaching; however, use of *dog*

in, for example, *you dog*! (associated with an exclamatory intonation pattern) is – the content meaning 'canine' has been lost or at least demoted, and what is salient is the evaluative, insulting meaning of the construction.

Most examples of grammaticalization involve subjectification because speakers innovate grammatical meanings precisely to mark their perspective on what is said: what role the participants have in an event (case marking, raising), when the event occurred with respect to some other time (tense marking), what temporal perspective it had (completed, ongoing, etc.; aspect), how likely it was (modality), where the speaker got the information from (evidentiality), how the speaker perspectivizes the relationship between utterances (connectives, discourse markers), and what the focus of the speaker's contribution is (focus particles, topic markers). However, as previously indicated, subjectification is not limited to grammaticalization.

Constraints on Semantic Change

A number of constraints on semantic change have been proposed, of which three are mentioned here: semantic constraints on grammaticalization, avoidance of synonymy, and avoidance of homonymy.

1. Semantic constraints on grammaticalization. As we have seen, an item can undergo grammaticalization only if it has a very general meaning. Talmy (2000: 24–31) has, in addition, proposed that, synchronically, grammatical meanings tend to be related to topological, relativistic, and qualitative (and not Euclidean, absolute, or quantitative) meanings. Grammatical meanings do not express specific quantities (e.g., *inch* and *year*) or specific geometric relations (e.g., *square* and *corner*). Therefore, by hypothesis, Euclidean geometric terms are unlikely to be grammaticalized; that is, they are much less likely to be bleached of semantic content and enriched with grammatical meaning in the way that topological ones are, for example, *head* (cf. *in the years ahead* 'in future years') and *side* (cf. connective *besides*).
2. Avoidance of synonymy. Rather than using both *dog* and *hound* as the generic term for canines, speakers of ME shifted the semantic labor between the terms essentially by reversing their genericity. When a synonymous word is borrowed, a division of labor typically occurs; famous examples include native *cow*, used for the animal, and borrowed *beef*, used for the meat of the cow; likewise, native *sheep* and *pig*, versus French-derived *mutton* and *pork* (initially, at least, the borrowed word was associated with elite cuisine).
3. Avoidance of homonymy ('homonymiphobia'; see Geeraerts, 1997). There is a supposed constraint against development of homonyms with meanings that might be confused, especially those that are antonymous. Well-known examples are the development by sound change of both Lat. *cattus* 'cat' and *gallus* 'rooster' into southwestern Fr. *gat* and of both OE *lætan* 'permit' and *lettan* 'prevent' into ME *let*. The 'rooster' and 'prevent' meanings came to be expressed by other words: *gat* 'rooster' came to be referred to as *bigey*, a local variant of *vicaire* 'curate' (creating a new ambiguity), whereas *let* 'prevent' came to be referred to by native *forbid* and borrowed *prevent*. However, in fact, the coexistence of forms with apparently contradictory meanings is quite common, as evidenced by 'enantiosemy,' the presence of polysemies in which one sense is in some respect the opposite of the other. For example, *dust* can mean 'remove' or 'add,' but usually not in the same context (cf. *I dusted the table* 'removed dust from' and *I dusted the strawberries with sugar* 'added sugar to the top of'). The verb *sanction* can mean 'approve' or 'penalize' (e.g., for someone ignorant of current affairs, the headline *Bush sanctions Iran* could be understood in opposite ways). Eventually, enantiosemies do seem to be resolved, but this may take centuries. In English, adverbial expressions may be used (e.g., *rent to/rent out*); or there may be semantic split (often in different communities), for example, Lat. *populare* 'to devastate' appears later as Span. *poblar* 'to settle, colonize' and Eng. *populate*; also Indo-European **ghos-ti* 'stranger,' which gave rise to *guest, host,* and *hospital* but also to *hostile*. Antonymous homonyms and polysemies are puzzling to those who think in terms of discrete meanings out of context. They are not puzzling from the perspective of overlapping prototype meanings that arise and are maintained in different contexts.

Conclusion

Ultimately, the only ways of innovating meaning are metaphorization and metonymization. "The trick of being innovative and at the same time understandable is to use words in a novel way the meaning of which is self-evident. But there are only two main ways of going about that: using words for the near neighbours of the things you mean (metonymy) or using words for the look-alikes (resemblars) of what you mean (metaphor)" (Nerlich and Clarke, 1992: 137). From this perspective, it is not surprising to find that the dominant type of semantic change is subjectification: the metonymic use of words to express one's

evaluative viewpoint and to acknowledge (however unconsciously) the salience of speaker–hearer interaction, the most immediate neighbor to the communicative situation. Synchronically, metonymies can be regarded as indexical and syntagmatic, whereas metaphors can be regarded as paradigmatic. Diachronically, both types of innovation involve analogized inferences about similarities, whether to near neighbors in metonymy or to more distant resemblars in metaphorization. Semanticization of both types of innovation involves the reanalysis of the semantic content of *f* (for a proposal about how to formalize semantic reanalysis, see Eckardt, 2001b).

Meanings can also be borrowed, either with the foreign form, or calqued (translated into native forms with roughly equivalent meanings). Typically, meanings are borrowed without their original cultural associations. Therefore, the borrowed meaning may only approximate the original (e.g., *weltanschauung* and *sushi*). Like all borrowings, borrowed meanings are subject to change in the adopting language; for example, *feng shui* (originally Mandarin Chin. *feng* 'wind' + *shui* 'water,' used to refer to the practice of positioning objects such as graves, buildings, and furniture according to the principles of the opposing effects of ying and yang) has been generalized to 'cause to be in a peaceful state of mind' (cf. *fengshui your commute*). In sum, semantic change is subject to the same three mechanisms of change as morphosyntax: analogy/extension, reanalysis, and borrowing (Harris and Campbell, 1995).

See also: Antonymy and Incompatibility; Cognitive Linguistics; Context and Common Ground; Grammaticalization; Hyponymy and Hyperonymy; Inference: Abduction, Induction, Deduction; Lexical Fields; Metaphor and Conceptual Blending; Metonymy; Montague Semantics; Neo-Gricean Pragmatics; Onomasiology and Lexical Variation; Polysemy and Homonymy; Prototype Semantics; Synesthesia; Synonymy; Taboo, Euphemism, and Political Correctness.

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Semantic Maps

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A semantic map is a technique that aims to represent sound–meaning correspondences. It links up language-specific formal categories, henceforth 'markers,' to semantic categories, henceforth 'uses.' The essential idea is that multiple uses of a marker are related in a systematic and universal way. Consider the main strategies which English uses to refer to a nongeneric indefinite human being (1–9).

(1) **Somebody** called you while you were away: guess who?

(2) I heard **somebody**, but I couldn't tell you who.

(3) Please ask **somebody** else.

(4a) If you see **somebody**, tell me immediately.
(b) If you see **anybody**, tell me immediately.

(5a) Did **somebody** tell you about it?
(b) Did **anybody** tell you about it?

(6) He is better than **anybody** else in the group.

(7) I don't think that **anybody** knows the answer.

(8) **Anybody** can solve this problem.

(9a) I haven't seen **anybody**.
(b) I have seen **nobody**.

(1) to (9) list the nine uses that Haspelmath (1997) distinguished in a typological study of indefinite pronouns. As far as English is concerned, there are three main strategies: *somebody* (or *someone*) is used in (1–5), *anybody* in (4–9), and *nobody* in (9). Italian, too, has three main strategies, but they do not distribute along the lines of English. In the Italian translations, one will find *qualcuno* in (1–5, 7), *chiunque* in (6, 8), and *nessuno* in (5, 7, 9) (Haspelmath, 1997: 262–263). Haspelmath (1997) studied some 140 languages and found a great deal of variation, with respect to both the number of markers and their distribution. But there is also unity in this diversity. First, all the languages map their strategies on the same 'semantic space'. This semantic space is shown in (10). The map has nine points, each of which can be identified on semantic grounds. The labels are the ones proposed by Haspelmath (1997) and the numbers correspond to the example sentences (1–9). The lines show how the uses are related to each other. The second similarity concerns the fact that each marker covers a contiguous area. In (11) and (12) the uses of each of the markers are represented as an overlay. (11) shows the mapping needed for English, and (12) is the one for Italian.

The semantic map perspective is not entirely new. It relates to earlier work on semantic fields (e.g., Trier,

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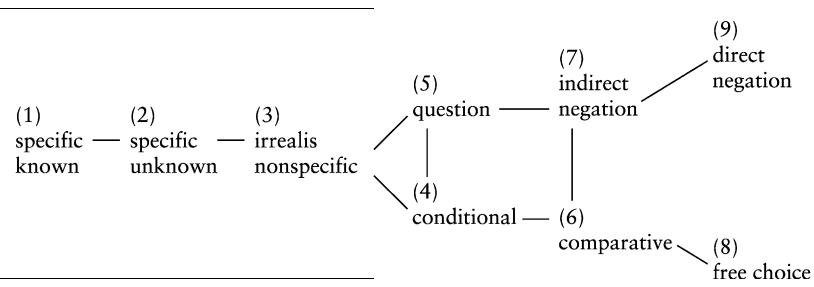

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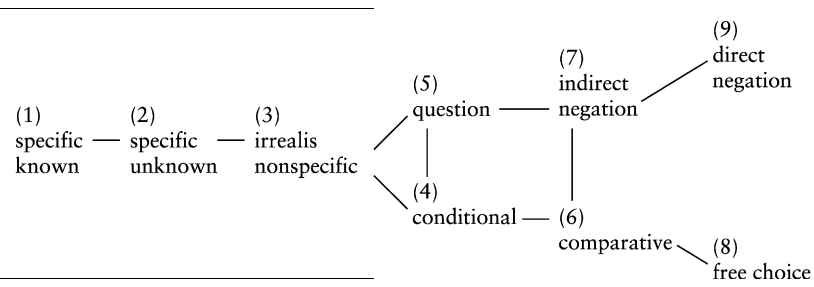

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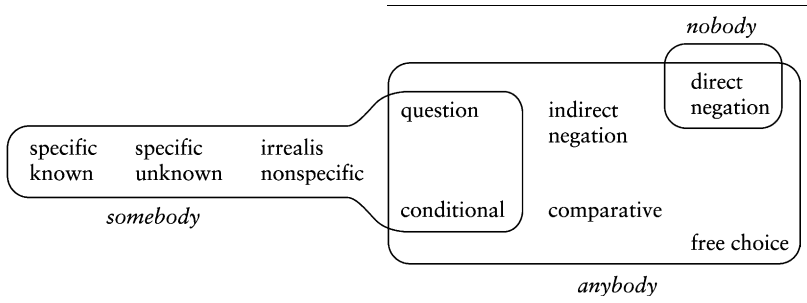

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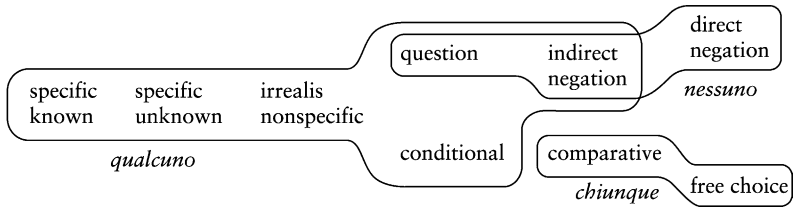

1931) or semantic networks (e.g., Aitchison, 1994) and there is even a resemblance with classical geometrical representations such as the 'Aristotelian square' (van der Auwera, 1996). Map making such as shown in (10) to (12) has proved successful for a wide variety of linguistic phenomena, particularly in the typology of grammatical semantics. These phenomena include the perfect (Anderson, 1982 – the first semantic map study), reflexives and middles (Kemmer, 1993), intransitive predication (Stassen, 1997), modality (van der Auwera and Plungian, 1998), mood (van der Auwera *et al.*, 2004), semantic roles (Luraghi, 2001; Haspelmath, 2003), and coordination (Haspelmath, 2004). In Croft (2001), semantic maps have even become a key component of a grammatical model. Semantic maps are also called 'implicational' (Haspelmath, 1997), 'cognitive' (Kortmann, 1997), 'mental' (Anderson, 1982), or 'conceptual' (Croft, 2001, 2003); Croft (2001, 2003) preferred to call them 'spaces,' reserving the term 'map' for any marker-specific region of the semantic space. The maps are hypothesized to be universal, and for some linguists they are not merely linguistic but pertain to "deeper levels of conceptualization" (Kemmer, 2003: 90). In the words of Croft (2001: 364), they show the "geography of the human mind, which can be read in the facts of the world's languages in a way that the most advanced brain scanning techniques cannot ever offer us."

The predictive power of the contiguity requirement is considerable. Once a semantic map is arrived at, usually through a combination of deductive semantic analysis and inductive generalizations on a sufficiently large sample of languages, one can predict that if a newly discovered marker has two uses that figure on the map, either these uses will be adjacent or the marker will also have the uses that connect them. Suppose we know about a marker that it is used for direct negation as well as for specific known reference. Then we can expect that it is also used for indirect negation, irrealis nonspecific, and specific unknown, as well as question and/or comparative and, if comparative but not question, then necessarily also for conditional reference. (Swedish *någon* is an illustration of this kind of marker: it has all the uses, except for the free choice use.)

We cannot, however, exclude noncontiguity. First, noncontiguous markers are acceptable in cases where they are the remnants of a contiguous area in an earlier stage of the language. Turkish *biri*, for instance, now covers all uses from specific known to direct negation, through the upper layer, as well as conditional. It should not be excluded that new markers develop and push *biri* out of all uses except specific known and direct negation, two uses which are not directly related. In the case of Tense-aspect-mood (TAM) maps, this kind of noncontiguity has already been documented. A modality example comes from Dutch. *Mogen* 'may' has a use paraphrasable by 'like' (13). One will be hard pressed to posit a direct semantic link between this use and the optative or concessive ones in (14) and (15). It is more plausible to discuss them in terms of homonymy and to see them as connected via uses which are no longer allowed in the modern language (see van der Auwera, 1999; see also Haspelmath, 1998 for an example involving tense).

(13) Ik mag soep.
I may soup
'I like soup.'

(14) Lang mag hij leven.
Long may he live.
'Long may he live.'

(15) Het mag dan al groot zijn,
It may then already big be
mooi is het niet.
beautiful is it not.
'It may be big, but it is not beautiful'.

Second, one should not exclude that two markers with different etymologies (possibly even borrowings from other languages) coalesce formally and that their uses end up on one and the same semantic map. The semantic connections could be expected to make these markers develop the in-between uses as well, and thus turn the homonymy into a polysemy. But, especially if the markers enter the map in only distantly related corners, the semantic pressure may be low. A possible example is the suffix *-m* in the Trans-New Guinea language Kilmeri. It is part of the (circumfixal) coding of the prohibitive – with a prefix that marks anaphoricity – and all by itself it is also a marker of weak probability (Gerstner-Link, 2004: 249). The prohibitive mood is – or is related to – deontic modality, and weak probability is epistemic modality. So the two uses are indeed related. But the relation remains weak and it is far from obvious how an assertion that the hearer will perhaps do something can amount to a prohibition to do this. So we may in fact be dealing with homonymy.

The discussion of the two cases of noncontiguity made it clear that although semantic maps are designed to map similarity of meaning and thus invite interpreting the various uses as exemplifying either vagueness or polysemy, there is room also for homonymy. The idea is simple: the weaker the semantic link between any uses, especially also when the uses are not (no longer or not yet) contiguous, then the uses are more likely to count as homonymous. Whether or not any individual speaker recognizes or exploits the semantic links posited by the linguists is yet another matter (see Sandra and Rice, 1995).

As the discussion of noncontiguity already shows, semantic maps have both a synchronic and a diachronic dimension. The contiguity requirement, while providing a synchronic constraint on possible patterns of polyfunctionality, simultaneously shows the possible paths of change. In this way, the semantic map approach has been linked with grammaticalization theory. In this theory, one studies the development of grammatical uses (and markers) out of one another and ultimately out of lexical meanings (and lexical items). The changes happen along what have been called 'paths' (Bybee and Dahl, 1989), 'chains' (Heine *et al.*, 1991), 'clines' (Hopper and Traugott, 1993), and 'channels' (Lehmann, 1995), and these are nothing else than the lines of the semantic maps that have been given a direction: the lines have become arrows. One must, however, allow that the relevant markers are no longer fully identical for grammaticalization involves a formal change as well as a semantic change.

It is of interest that arrows are not the only notational device that can be used to 'enrich' maps. Thus van der Auwera and Plungian (1998) made some proposals to represent the nature of the semantic change. They used ovals instead of points to represent individual uses, and suggested representing semantic specialization and generalization as inclusion of ovals, and metonymic/metaphoric links as mere contiguity.

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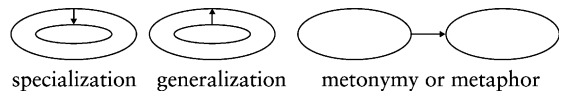

A final point is that semantic maps relate to the study of crosslinguistic gram types, as represented by Dahl (1985) and Bybee *et al.* (1994). Crosslinguistic gram types are idealized formal categories identified by a primary focal meaning and associated with a number of secondary foci. They are defined at a level "mediating between the universal concepts and the language-specific grams," which "singles out areas of the universal semantic space that are frequently grammaticalized across languages" (Bybee *et al.*, 1994: 48). From the semantic map perspective, the crosslinguistic gram types will involve those uses and combinations of uses that show up with a relatively high frequency. Given the example of the indefinite pronouns, a marker covering uses (2) and (3), and then, after the bifurcation, also the upper-layer uses (5), (7), and (9), would seem to be a candidate for a gram type status, given the data in Kahrel (1996: 37). A similar arrangement with (2) and (3), but with the lower-layer uses (4), (6), and (8) definitely is not: it is simply unattested (Haspelmath, 1997: 76–77). This illustration shows that semantic maps have their limitations: there is nothing in the semantic map itself that gives us any reason to expect the upper-layer arrangement to be more recurrent than the lower-layer one. But one can look at it in a different light: the semantic map represents the logical space of possible patterns of polyfunctionality, allowing for both the frequent and the infrequent and even the nonoccurring ones. As such, it provides the basis for further analysis.

See also: Concepts; Grammaticalization; Lexical Fields; Polysemy and Homonymy; Vagueness.

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Semantic Primitives

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> If nothing could be understood in itself nothing at all could ever be understood. Because what can only be understood via something else can be understood only

> to the extent to which that other thing can be understood, and so on; accordingly we can say that we have understood something only when we have broken it down into parts which can be understood in themselves (Leibniz, 1961: 430).

Other 17th-century philosophers also insisted that all complex ideas must be built from simple ones, and they drew from this the conclusion that not all words could be defined: an attempt to define all words would necessarily lead to an infinite regress. For example, Arnauld and Nicole (1996/[1662]: 64) wrote:

> I say it would be impossible to define every word. For in order to define a word it is necessary to use other words designating the idea that we want to connect to the word being defined. And if we then wished to define the words used to explain that word, we would need still others, and so on to infinity. Consequently, we necessarily have to stop at primitive terms which are undefined.

But if all explanations, and all definitions, must ultimately rely on a set of concepts that are self-explanatory, then it is crucial to identify those elementary, self-explanatory conceptual building blocks on which all human understanding depends. Leibniz thought that in principle this could be done by analyzing human languages, because languages are "the best mirror of the mind."

In the 20th century, the idea of searching for semantic (or conceptual) primitives through an analysis of meanings encoded in languages was taken up by a number of linguists. In particular, the Danish scholar Louis Hjelmslev (1969) initiated an approach that later came to be known as 'componential analysis.' For example, he proposed that the meaning of words like *ram*, *ewe*, *stallion*, *mare*, *man*, *woman*, *boy*, and *girl*, could be represented as a combination of elements like 'he,' and 'she,' 'sheep,' and 'horse,' 'human being,' and 'child.' Hjelmslev's ideas were later taken up and developed in new ways by linguists like Manfred Bierwisch (1967) and Jerrold Katz (1972).

But none of these scholars followed Leibniz's idea that the innate "alphabet of human thoughts" can be found through reductive paraphrases, that is, through definitions explaining complex meanings in terms of self-explanatory 'indefinibilia' (indefinables). This idea was first put on the agenda of modern linguistics by the Polish linguist Andrzej Bogusławski (1970), first in a lecture delivered at Warsaw University in 1964. Bogusławski maintained that the "golden dream" of the 17th-century thinkers, which could not be realized within the framework of philosophy and was therefore generally abandoned as utopian, could be realized if it was approached from a linguistic rather than from a purely philosophical point of view: the experience and achievements of modern linguistics (both empirical and theoretical) made it possible to approach the problem of conceptual primitives in a novel way and to put it on the agenda of an empirical science.

Leibniz's theory of an "alphabet of human thoughts" (1961: 435) could be dismissed as a utopia because he never proposed anything like a complete list of hypothetical primitives. As one modern commentator wrote, "in these circumstances it is understandable that Leibniz should consistently avoid the obvious question as to the number and type of fundamental concepts. The approach would be more convincing if one could at least gain some clue as to what the table of fundamental concepts might look like" (Martin, 1964: 25). Bogusławski argued that the best clues as to what the table of fundamental concepts might look like come from language, or, more precisely, from languages, and that for this reason linguistics had a chance of succeeding where philosophical speculation had failed. Unlike the proponents of 'componential analysis' based on 'features,' 'markers,' and other artificial devices, Bogusławski followed Leibniz in linking the idea of semantic primitives with the idea of 'reductive paraphrase,' formulated in, and intelligible through, ordinary language.

The 'reductive paraphrase' approach to the search for semantic primitives found a fuller programmatic expansion in the work of another Polish linguist, Anna Wierzbicka, whose book *Semantic primitives* (1972) proposed a first list of hypothetical semantic primes. That first list included only 14 elements: 'someone,' 'something,' 'I,' 'you,' 'world,' 'this,' 'want,' 'don't want,' 'feel,' 'think,' 'imagine,' 'say,' 'become,' 'be a part of.' After Wierzbicka's emigration to Australia (in 1972), the search for semantic primitives became increasingly linked with an empirical crosslinguistic search for lexical universals – words and wordlike elements that have exact semantic equivalents in all languages.

This major shift in the program from 'primes' to 'primes and universals' was associated with the theoretical and empirical input of the Australian linguist Cliff Goddard, and the evidence for or against hypothetical semantic primitives came to be increasingly drawn from Australian languages. (For example, 'world' and 'imagine' were removed from the original list in response to Goddard's observations on Australian languages.) The assumption behind the shift from 'primes' to 'primes and universals' was that if there are some innate simple concepts out of which all complex meanings and thoughts are built, these concepts must be the same for all people and therefore

Table 1 Table of universal human concepts – English version (cf. Goddard and Wierzbicka eds., 2002)

Substantives	I, YOU, SOMEONE (PERSON), SOMETHING (THING) PEOPLE, BODY
Determiners	THIS, THE SAME, OTHER
Quantifiers	ONE, TWO, SOME, MANY/MUCH, ALL
Attributes	GOOD, BAD, BIG, SMALL
Mental predicates	THINK, KNOW, WANT, FEEL, SEE, HEAR
Speech	SAY, WORDS, TRUE
Actions, events, movement	DO, HAPPEN, MOVE
Existence and possession	THERE IS, HAVE
Life and death	LIVE, DIE
Logical concepts	NOT, MAYBE, CAN, BECAUSE, IF
Time	WHEN (TIME), NOW, AFTER, BEFORE, A LONG TIME A SHORT TIME, FOR SOME TIME, MOMENT
Space	WHERE (PLACE), HERE, ABOVE, BELOW, FAR, NEAR, SIDE, INSIDE, TOUCHING (CONTACT)
Intensifier, augmentor	VERY, MORE
Taxonomy, partonomy	KIND OF, PART OF
Similarity	LIKE (HOW, AS)

*Exponents of primes may be words, bound morphemes, or phrasemes. They can be formally, i.e., morphologically, complex. They can have different morphosyntactic properties (including word class) in different languages. They can have combinatorial variants (allolexes). Each semantic prime has a well-specified set of grammatical (combinatorial) properties.

can be found in the shared lexical repertoire of all languages.

The results of these investigations were first published in *Semantic and lexical universals: theory and empirical findings* (Goddard and Wierzbicka, eds., 1994), then in Wierzbicka's *Semantics: primes and universals* (1996), and finally in *Meaning and universal grammar: theory and empirical findings* (Goddard and Wierzbicka, eds., 2002). The outcome of the search for semantic primitives lexically embedded in all languages has identified 60 odd such elements, listed in Table 1.

From the start, the set of semantic primitives postulated within the 'reductive paraphrase' approach was conceived of as a kind of minilanguage, carved out of natural language (any natural language): it was assumed that although each language varies greatly from all the others in its structure, as well as its lexicon, the lexical and grammatical core of each language is isomorphic to those of all the others. The medieval metaphor of a mental language, *lingua mentalis*, underlying all the 'vocal' languages of the world (*linguae vocales*), was seen as an apt way of talking, and thinking, about the shared core of all languages. At the same time, this shared core was seen as a 'natural semantic metalanguage' (NSM) for description and comparison of meanings.

Two other well-known approaches to semantic primitives are that of the American linguist Ray Jackendoff and that of the Moscow school of semantics. Jackendoff (1983) proposed as innate elementary concept categories like Thing, Event, State, Action, Place, Path, Property and Amount, as well as 'conceptual functions' like GO, STAY, TO, FROM and CAUSE. On the basis of such elements, he sought to develop an abstract semantic metalanguage, relying on artificial devices such as square brackets, pluses and minuses, and so on. In this approach, the focus is not on explanations (that ordinary people would understand) but on technical 'semantic representations.'

The Moscow school of semantics launched their program of semantic analysis based on semantic primitives in a number of pioneering articles by A. K. Zholkovsky (see in particular Zholkovsky 1964). From the start, the Moscow school has insisted on the need for a special 'semantic language' (metalanguage) as a tool for semantic analysis of natural languages. This metalanguage needed a minivocabulary, i.e., a set of semantic primitives, and a minisyntax, i.e., a set of rules for combining those primitives. In the 1960s and 1970s, it was assumed that the semantic primitives can be linked with artificial words, partly borrowed from mathematics or others sciences, and the syntax was a totally artificial construct, relying on devices like semantic graphs and dependency trees.

Over the years, however, the Moscow school has moved away from artificial terms and syntactic devices and has moved closer to the NSM position that the 'semantic language' needs to be a subset of natural language, intelligible via ordinary language. In contrast to several other semantic schools, the work of the Moscow school has resulted in an impressive body of semantic description and, especially, in a series of practically useful, very comprehensive lexicographic works (cf. in particular Apresjan, 1997, 2000a, 2000b, 2003).

Unlike in the NSM approach, in the work of the Moscow school lexicographic definitions and other

semantic descriptions rely largely on 'intermediate concepts' rather than directly on semantic primitives, and in fact no finite set of semantic primitives has yet been proposed. The highly restricted set of primes proposed by the NSM school and used by its practitioners as a tool of description is a major difference between these two schools. At the same time, the key idea of a 'semantic language' carved out of the natural languages and based on intelligible semantic primitives is shared. Furthermore, the increased recent reliance of the NSM school on the use of 'semantic molecules' (as well as semantic primitives) in semantic description is in some ways analogous to the reliance of the Moscow school on intermediate concepts. Overall there is a degree of convergence between the two schools that are the two staunchest defendants of the idea of semantic primitives and that have both sought to show the fruitfulness of this idea through descriptive work with socially useful applications (especially in lexicography but also in other areas).

See also: Lexical Conceptual Structure; Natural Semantic Metalanguage.

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Semantic Value

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A total theory of linguistic understanding is often taken to require three subtheories: a syntactic theory, a semantic theory, and a pragmatic theory. The semantic theory occupies an intermediary role – it takes as input structures generated by the syntax, assigns to those structures meanings, and then passes those meanings on to the pragmatics, which characterizes the conversational impact of those meanings. Semantic theories thus seek to explain phenomena such as truth conditions of and inferential relations among sentences/utterances, anaphoric relations among terms, and ambiguity and incoherence of expressions.

One way in which a semantic theory can provide the required explanations is by associating each expression provided by the syntax with a particular entity called its semantic value. These semantic values then serve both to ground the desired semantic explanations and to provide the pragmatic theory with input material on which to operate. While almost any approach to semantic theorizing can be reified into a theory of semantic value – a Davidsonian truth-theoretic account, for example, can associate atomic expressions with axioms and complex expressions with derivations; a translational theory can associate

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expressions with expressions in the target language of translation – setting semantic theory in the context of semantic value is most typical of an approach to semantics running through Frege, Carnap, and Montague. This discussion begins with the relatively simple theory of semantic values found in Frege, and progresses through various complications of that basic formula. First, the Fregean framework is extended to a full semantic type hierarchy. Second, the Fregean use of truth as the foundational semantic value is expanded to a notion of indexed truth as the foundational semantic value is expanded to a notion of indexed truth suitable for intensional and context-sensitive languages. Finally, dynamic semantic theories are considered, which diverge from traditional semantic theories by using qualities other than truth to construct semantic values.

Writing in 1891, Frege in 'Function and concept' considers the function $x^2 = 1$ formed by abstracting from an expression such as $(-1)^2 = 1$. Observing that the result of replacing x by various arguments is sometimes a true equation and sometimes a false equation, he says:

> I now say: 'the value of our function is a truth-value [*Wahrheitswert*],' and distinguish between the truth-values of what is true and what is false. I call the first, for short, the True; and the second, the False (Frege, 1997: 137).

Frege's shift from the adjectives 'true' and 'false' to the neologistic nominals 'the True' and 'the False' marks the beginning of semantic theorizing grounded in semantic values. '*Wahrheitswert*' then crosses into English as 'truth value' in Russell's commentary on Frege in 1903 in *The principles of mathematics*, and the contemporary 'semantic value' appears to derive from this usage.

Frege's semantic theory associates with each expression in the language a referent (*Bedeutung*). The various referents are then the semantic values of the expressions in the language. Two central theses governing Frege's conception of semantic value can be identified:

1. The two fundamental types of semantic values are truth values and objects (the referents of singular terms). Other semantic values are derived from the fundamental types through the construction of functions. Call this the categorical principle. Frege recognizes the derived categories of (a) first-level n-ary functions from objects and truth values to objects or truth values (paradigmatically, predicates and truth-functional connectives) and (b) second-order n-ary functions from first-order n-ary functions to objects or truth values (paradigmatically, quantifiers and definite descriptors).
2. Semantic values of complex expressions are derived from semantic values of their composite expressions, typically (although not necessarily) via functional application of one semantic value to another. Call this the compositional principle.

A standard semantic theory for quantified first-order logic can be formulated in Fregean terms by assigning to predicates the characteristic functions of their extensions, to connectives functions from truth values to truth values, and to quantifiers functions from predicate-assigned functions to truth values. The resulting theory will, as desired, account for truth conditions of and inferential connections between sentences. Thus, for example, semantic values can be assigned as follows:

- The predicate 'F,' interpreted as *is French*, is assigned the function f from objects to truth values such that $f(x)$ is the True if and only if x is French.
- The connective '$\vee$,' interpreted as *or*, is assigned the function g from pairs of truth value to truth values such that $g(x, y)$ is the True if and only if at least one of x and y is the True. The connective '$\neg$,' interpreted as *not*, is assigned the function h from truth values to truth values such that $h(x)$ is the True if and only if x is the False.
- The quantifier '$\exists$,' interpreted as *something*, is assigned the function j such that $j(x)$ is the True if and only if x is a function from objects to truth values, which does not map every object to the False.

From these semantic values, it can be determined that $\exists xFx$ is true if and only if something is French, and that $\exists x(Fx \vee \neg Fx)$ is a logical truth.

The basic Fregean framework of semantic values coupled with the categorical and compositional principles then generalizes in three significant directions in later semantic work. First, the space of semantic values is extended to a full type hierarchy based on truth values and objects. The roots of this extension can be seen in Tarski's (1933) paper 'The concept of truth in formalized languages,' but the full implementation of the thought in semantic theorizing about natural languages occurs with Montague's 'The proper treatment of quantification in ordinary English' and Lewis's 'Generalized semantics.' Introductory treatments can be found in Heim and Kratzer's *Semantics and generative grammar* and in the Dowty *et al.*'s (1980) *Introduction to Montague semantics*.

In Montagovian semantics, a categorical grammar is linked with a type hierarchy of semantic values. The categorical grammar takes a small collection of primitive syntactic categories. Ajdukiewicz's work introducing categorical grammars in 'Syntactic connexion' uses *N* (name) and *S* (sentence) as the primitive categories. Derived categories are then defined as follows:

- $<\alpha/\beta>$ = the category of expressions combining with a β-category expression to form an α-category expression.

Thus:

- Intransitive verbs can be of category $<S/N>$. 'Snores' can combine with an expression of category *N* ('Socrates') to form an expression of category *S* ('Socrates snores').
- Nouns can also be of category $<S/N>$. 'Linguist' can combine with an expression of category *N* ('Socrates') to form an expression of category *S* ('Socrates is a linguist'). Placement of nouns in $<S/N>$ is somewhat syntactically forced and is influenced by the treatment of nouns as predicates in first-order logic; other versions of categorical grammar contain a third primitive category *T* of nouns.
- Modal operators can be of category $<S/S>$. 'Necessarily' can combine with an expression of category *S* ('Aristotle is fond of dogs') to form an expression of category *S* ('Necessarily, Aristotle is fond of dogs').
- Quantified noun phrases can be of category $<S/<S/N>>$. 'Some linguist' can combine with an expression of category $<S/N>$ ('snores') to form an expression of category *S* ('Some linguist snores').
- Determiners can be of category $<<S/<S/N>>/<S/N>>$. 'Some' can combine with an expression of category $<S/N>$ ('linguist') to form an expression of category $<S/<S/N>>$, which in turn combines with an expression of category $<S/N>$ ('snores') to form an expression of category *S* ('Some linguist snores').

The type hierarchy of semantic values similarly takes a small collection of primitive semantic categories. Following the Fregean tradition (and setting aside issues of intensionality to be raised below), the primitive categories can be *t* (the set of truth values) and *e* (the set of objects). Derived categories are then defined as follows:

$<\tau, \pi>$ = the set of functions from category π to category τ.

If we then associate each syntactic category with a semantic category via a mapping $[\![\cdot]\!]$ such that:

1. $[\![N]\!] = e$
2. $[\![S]\!] = t$
3. $[\![<\alpha/\beta>]\!] = <[\![\alpha]\!]/[\![\beta]\!]>$

we can then obtain a semantic theory in which the semantic value of any complex expression results from the functional application of the semantic value of one of its immediate constituents to the semantic value of the other of its constituents. Both nouns and intransitive verbs, for example, are assigned functions from objects to truth values. Those functions can then be treated as characteristic functions determining predicate extensions.

This broadly Montagovian framework provides a fertile setting for much work in formal semantics. Barwise and Cooper's (1980) work on generalized quantifiers, for example, fits naturally into such an approach. The categorical grammar yields the categories of $<<S/<S/N>>/<S/N>>$ for determiners and of $<S/<S/N>>$ for quantified noun phrases. The type hierarchy of semantic values then assigns values of type $<<t/<t/e>>/<t/e>>$ to determiners and of type $<t/<t/e>>$ to quantified noun phrases. 'All philosophers' for example, is assigned a function from extensions (in the form of characteristic functions from objects to truth values) to truth values. The appropriate function is that which maps to the True sets that have the set of philosophers as a subset, and to the False other sets. The determiner 'all' then receives as semantic value a function from $<t/e>$ values (predicate extensions) to quantified noun phrase values $<t/<t/e>>$. The appropriate function for 'all' is that which maps each set *X* of objects to the function that maps a set *Y* to the True if and only if $X \subseteq Y$. The type hierarchy yields a natural space of all possible quantifiers, allowing the location of semantic universals governing quantifiers in natural language, of the sort Barwise and Cooper set out. Thus, monotone increasing quantifiers, such as 'some linguist' and 'every mathematician,' are assigned functions *f* such that, for any extensions *X* and *Y*, if *f(X)* is the True and $X \subseteq Y$, then *f*(*Y*) is also the True. Monotone increasing quantifiers thus support inferences of the form:

Some linguist owns a red car. Therefore, some linguist owns a car.

in which the predicate of the conclusion is more restrictive than that of the premise. Monotone decreasing quantifiers, on the other hand, are assigned functions *f* such that, for any extensions *X* and *Y*, if *f*(*X*) is the True and $Y \subseteq X$, then *f*(*Y*) is also the True. Monotone decreasing quantifiers such as 'no

archaeologist' and 'few physicists' support inferences of the form:

Few physicists own a red car. Therefore, few physicists own a car.

in which the predicate of the conclusion is less restrictive than that of the premise. Not all quantifiers are monotone in either direction, as examples like 'an even number of chemists' show – Barwise and Cooper thus hypothesize that all simple natural language quantifiers are conjunctions of monotone quantifiers.

Many complications of the simple type hierarchy of Montagovian semantics can now be investigated. Partee and Rooth's 'Generalized conjunction and type ambiguity,' for example, argues that expressions cannot be assigned a single stable semantic category. In the sentence:

John caught and ate a fish

the transitive verbs 'caught' and 'ate' need to be assigned the category $<<t/e>/e>$. If each transitive verb is assigned a function from entities (e) to intransitive verb extensions ($<t/e>$), then their conjunction will be assigned the function that maps any entity x to the intransitive verb that assigns the True to any entity that caught and ate x. This function can then combine with the entity assigned to 'John' to create an appropriate truth value for the whole sentence. However, this category assignment for transitive verbs fails in other examples such as:

John needed and bought a new coat.

The truth value of this sentence does not depend on a function that maps entities x to intransitive verbs assigning the True to entities that needed and bought x, since we do not here require that John needed and bought any one particular entity. Instead, we require that John needed and bought one type of entity. Thus, the transitive verbs 'needed' and 'caught' must be assigned the category $<<t/e>/<t/<t/e>>>$. By assigning to each transitive verb a function from nouns ($<t/e>$) to truth values, their conjunction will then be assigned the function that assigns the True to any object that needed and bought that type of object. Partee and Rooth (2002) thus suggest that the semantic value assigned to an expression can undergo type raising, which moves it from a simpler to a more complex type to fit constructions such as these.

The second generalization of the core Fregean framework is the move to truth at a specification point. The first instance of this is the intensionalization of Frege's extensional logic. The roots of intensionalization can already be seen in Frege's separation of sense and reference in 'On sense and reference,' but the full picture emerges in Carnap's *Meaning and necessity*. Carnap introduces state descriptions – negation-complete sets of atomic sentences equivalent to possible worlds – and defines truth in a state description. He then assigns to every expression both an extension and an intension. Its extension is its semantic value in the Fregean truth value/object-based type hierarchy, and its intension is its semantic value in a parallel hierarchy based on functions from state descriptions to truth values and functions from state descriptions to objects. Given a designation of an extensionally privileged state description (the actual world), the extensional type hierarchy can be subsumed into the intensional. The intensional type hierarchy is connected conceptually to the Fregean type hierarchy via an understanding of truth at a world in terms of truth simpliciter (what would be true, were the world a certain way). This conceptual connection allows the intensional semantics still to address questions of truth conditions and inferential connections.

The basic insight of the intensionalizing move is that a finer-grained semantics can be achieved by replacing truth values simpliciter in the type hierarchy with indexed truth values, in the form of functions from some set of indexes to truth values. The result is a semantic theory equipped for nontruth-functional operators such as modalities. A similar approach can thus accommodate tense by moving to truth at a time (or at a time/world pair). The same insight is employed in adapting the Fregean framework to context-sensitive expressions. Kaplan, in 'Demonstratives,' gives a semantic theory in which expressions are assigned intensions (both modal and temporal) with respect to a context, where a context provides information at least about utterance speaker, spatial and temporal location, and world. Kaplan's system thus uses a form of double-indexing; the background type hierarchy is grounded on functions from pairs of indices <<world, time>, context> to truth values and objects. Thus, the sentence:

I am a philosopher

can be assigned a truth value only relative first to a context that determines the referent of the indexical 'I' and second to a world–time pair that determines the properties of the contextually provided referent. Kamp's approach to tense in 'Formal properties of now' uses a similar system of double indexing, and Stalnaker (1978) in 'Assertion' gives a streamlined version of the double-indexing

approach, based on Segerberg's (1973) two-dimensional modal semantics, in which both indices are simply worlds.

Context-sensitive semantic theories thus extend the Fregean framework further in the direction begun by intensional semantics, by extending the indexing of truth at the foundation of the type hierarchy. The introduction of double-indexing gives rise to a novel issue in interpretation. The single-indexing of intensional semantics typically comes with a collection, in the analyzed language, of intentional operators that act on the indexing position; thus the expression 'necessarily' binds the world index in the semantic value of expressions it governs, causing them to be evaluated at every possible world. As a consequence, the new foundational semantic category of truth-at-an-index can be reductively understood via the simple truth of some claim containing an intensional operator. For example, a claim ϕ's being true at a world w can be reduced to the intensionally modified claim 'If it were the case that w^*, it would be the case that ϕ's being simply true' (where w^* is a canonical description of world w). However, in double-indexed semantic theories, the second indexed position is typically not subject to semantic interaction with intensional operators of the language. In a sentence such as:

I am always here.

the intensional operator 'always' controls the first index, governing the temporal evaluation of the verb. It does not, however, govern the second index, determining the contextual assignment of semantic values to 'I' and 'here.' Double-indexing thus means that truth at an index can no longer be understood in terms of what would be (or was, or will be) a true simpliciter. It requires instead a novel understanding of the elements of the type hierarchy. The result is the idea that semantic value characterized at a certain level ('utterance meaning') varies based on context of use, so that the same expression can have different semantic contents in different contexts of use.

The third and final generalization of the Fregean framework is the move to dynamic semantics. Dynamic semantics can be thought of as the other side of the coin of context sensitivity, investigating the way that expressions affect, as well as are affected by, context. Dynamic semantic theories have flourished over the last 25 years, taking such forms as discourse representation theory, file change semantics, dynamic predicate logic, and update semantics. When placed in a compositional form, one distinctive characteristic of dynamic semantic theories is a move away from indexed truth to a nontruth-based fundamental semantic value. Overviews of major topics in dynamic semantics can be found in Gamut's (1991) *Logic, language, and meaning* and in Kamp and Reyle's (1993) *From discourse to logic*.

Groenindijk and Stokhof's (1991) dynamic predicate logic, for example, makes dynamic the semantic analysis of sentences of first-order logic using sets of satisfying assignments to variables (where truth is equated with satisfaction by all assignments). In dynamic logic, a sentence is associated not with a static set of assignments, but with a function from input assignments to output assignments. An existential claim of the form '$\exists xFx$' pairs an incoming assignment g with an outgoing assignment h if and only if h satisfies Fx and there is some assignment $g \in G$ such that g and h differ at most in the x position. Quantifiers thus have unrestricted rightward scope; by passing on assignments whose x positions satisfy the existentially quantified matrix, future reference to and description of these objects is then possible. This unrestricted rightward scope allows dynamic predicate logic to model the behavior of crossclausal anaphora on indefinite noun phrases, as in:

A man walked in the park. He wore a hat.

The dynamic move to nontruth-based semantic values is more radical than the intensionalizing move to semantic values based on truth at an index. One consequence is that associated semantic concepts require redefinition. Equivalence, for example, can no longer be understood as sameness of truth value in all models, in the absence of truth-based semantic values. Dynamic predicate logic allows multiple notions of equivalence, the stronger of which is identity of behavior in input–output conditions:

$\phi \simeq \psi$ if ϕ pairs an input assignment g with an output assignment h if and only if ψ does as well.

$\exists xFx \wedge Gx$ is not equivalent to $Gx \wedge \exists xFx$ in this sense, since an assignment g whose x position does not satisfy Gx will produce no output when input to $Gx \wedge \exists Fx$, but can produce an output when input to $\exists xFx \wedge Gx$, since in the latter case the x value can be 'reset' to an object satisfying F and G, if there is such an object. Similarly, dynamic predicate introduces a new consequence relation:

$\phi \models \psi$ if and only if for any model $\mathcal{M}$ and any assignment g in $\mathcal{M}$, if the input of g to ϕ produces some output assignment h, then the input of h to ψ produces some further output assignment k.

The resulting consequence relation differs from classical consequence relations in many structural features. Idempotence fails; we do not have $Gx \wedge \exists Fx \models Gx \wedge \exists xFx$, since the output assignment, with its reset value in the x position, need not satisfy Gx. Transitivity similarly fails, since $\neg\neg\exists xFx \models \exists Fx$ and $\exists xFx \models Fx$, but $\neg\neg\exists xFx \not\models Fx$, since negation blocks dynamic effects.

See also: Character versus Content; Compositionality: Philosophical Aspects; Context Principle; Discourse Representation Theory; Dynamic Semantics; Extensionality and Intensionality; Frege, Gottlob (1848–1925); General Semantics; Meaning: Overview of Philosophical Theories; Montague, Richard (1931–1971); Quantifiers: Semantics; Semantic Primitives; Semantics in Categorial Grammar; Semantics–Pragmatics Boundary; Syntax-Semantics Interface

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Semantics in Categorial Grammar

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Introduction

Categorial Grammar (CG) has always held a strong attraction for semanticists, because of the close relationship that it exhibits between syntactic and semantic types, both of which it characterizes as either *functions* or *arguments*. For example, if the semantic type of entities is e and that of propositions is t, then the semantic type $(t \leftarrow e) \leftarrow e$ of the translation *loved′* of the English transitive verb 'loved' as a function from (object) entities of type e to functions from (subject) entities of type e to propositions of type t is reflected in one standard notation in the following syntactic type:

(1) $(S\backslash NP)/NP$

This is the 'result leftmost' notation used in Combinatory Categorial Grammar (CCG), in which the result α of a function category α/β or $\alpha\backslash\beta$ is always to the left of the argument β, and the rightward- or leftward-leaning lashes respectively indicate whether β is to be found to the right or to the left f α/β or $\alpha\backslash\beta$. (We suppress any mention of Categorial Slash Types, which further constrain the syntactic combinatory potential of function categories, and are discussed under **Combinatory Categorial Grammar**). There are several other notations for syntactic categories, including a widely used 'result on top' notation due to Lambek, according to which the preceding category would be written $(np\backslash s)/np$. However, when thinking about semantics it is helpful to be able to read the result/argument distinction via consistent inearization, independent of string order, as in semantic types themselves such as $(t\leftarrow e)\leftarrow e$, pronouncing the semantic type as 't-given-e, given e' (or 'e to e-to-t'), and the syntactic type in (1) as 'S given left NP, given right NP' (or 'right NP into left-NP-into-S').

It is then possible to write the combined syntactic type and translation of 'loved' as in (4), where *loved′* is a function of that type:

(2) $(S\backslash NP)/NP : loved'$

Again, there are other notations, notably the one in which the translation precedes the syntactic category to the left of the colon. However, because the syntactic combinatorics determines semantic composition, the present notation is helpfully consistent with English orthography. The standard forward and backward functional application rules of categorial grammar in (3) then allow us to write syntactic and semantic derivations in parallel, as in

(3) *The functional application rules*
(a) $X/Y : f \;\; Y : a \Rightarrow X : fa \; (>)$
(b) $Y : a \;\; X\backslash Y : f \Rightarrow X : fa \; (<)$

(4)
$$\dfrac{\dfrac{\dfrac{\text{Frankie}}{NP : frankie'} \quad \dfrac{\dfrac{\text{loved}}{(S\backslash NP)/NP : loved'} \quad \dfrac{\text{Johnnie}}{NP : johnnie'}}{S\backslash NP : loved'johnnie'}\,>}{S : loved'johnnie'frankie'}\,<}{}$$

Concatenation $\alpha\beta$ denotes application of α to β, and is 'left associative', so that the preceding translation is equivalent to $(loved'\ johnnie')\ frankie'$.

This approach is readily extended to intensional logic, according to which the type of *loved* might be given as $((t \leftarrow s) \leftarrow e) \leftarrow e$, and the type of the preceding translation is $t \leftarrow s$, a function from situations or possible worlds to truth, rather than simply t.

Because the application rules (3) are completely general and make no reference to any specifics of the logical forms that they combine, semantic translation in such grammars is completely type driven, in the sense of Klein and Sag, so that the derivation in (4) is completely transparent to the logical form. In fact, the one is a homomorphism of the other, so that we can if we like define a model-theoretic semantics directly on the syntactic categories and derivations of English, just as we define the semantics of first-order predicate calculus. Except for the fact that such logical forms eliminate the abundant ambiguity of natural languages, the logical form itself is redundant.

There is a sacred and a profane form of type-driven translation for natural language (the two are distinguished, though not in these terms, by Dowty). The sacred version says that because logical form is redundant in this sense, we should limit its role to that of providing a disambiguated syntactic form. We should define the model theory directly on the (disambiguated) words and syntactic derivations of English itself. Any deviation from strict homomorphism in the logical form is frowned on, although logical forms may be tolerated as a mere notational convenience and concession to the reader's mortal limitations.

The profane version of type-driven translation argues that, because we are lexicalizing the grammar anyway, we may as well allow arbitrary logical forms expressing such clause-bounded grammatical relations as binding and control to be associated with lexical items such as verbs. (Such relations, must under the sacred approach, be captured by syntactic WRAP rules and/or meaning postulates of a kind discussed later.)

Such profane type-driven grammars deliver logical forms that are no longer homomorphic to disambiguated derivations, so that the model theory must be defined over the former, rather than the latter. However, provided such logical forms and the operations that combine them are themselves purely type driven (and in particular do not change the logical forms that they combine with in any way) we can be sure that a sacred version of the grammar could be produced if necessary.

Montague Semantics

The most prominent advocate of the sacred viewpoint was Montague, who pioneered the model-theoretic view that "there is ... no important theoretical difference between natural languages and the artificial languages of logicians," and insisted that the use of logical forms be nonessential.

The details of Montague's own semantic proposal (and the important categorial alternatives by Lewis, and by Keenan and Faltz) are presented elsewhere and need not concern us here (*see* **Montague Semantics**). Although Montague's basic types are defined as categories in the sense of CG, the semantics is otherwise entirely unlexicalized and does not exploit categorial grammar in any significant way. That is to say that it is embedded in a large number of explicit (albeit claimed to be nonessential in the preceding sense – cf. 1973/1974: 256) translation rules and meaning postulates for combining and relating specific words and categories, rather than being associated with specific lexical items combined by general rules like (3). For example, rather than making the translation *seek′* of the intensional verb 'seek' differ from that of 'find,' *find′*, by making the lexical translation of the former but not the latter deliver an intensional reading, both verbs have the higher type required for 'seek.' There is then a meaning postulate for *find′* (but not for *seek′*) that equates the intensional reading with the nonintensional reading (1973/1974: 263,(4)). (That is, it says you find an intensional unicorn (say) if and only if you find an extensional one.)

It is worth pausing to consider this use of meaning postulates, because it raises some issues that will recur. Meaning postulates were introduced by Carnap (for somewhat unrelated reasons), to capture relationships among the nonlogical constants of languages, such as the following relating the property *bachelor′* and the properties *male′* and *unmarried′*:

(5) $\forall x[bachelor'x \Leftrightarrow (male'x \wedge \neg married'x)]$

Such meaning postulates are *axioms*, which is to say that there are no admissible models in which the individuals with the property on the left-hand side of the biconditional do not also have the property on the right, and vice versa, that the meaning of the one is entirely defined by that of the other. (Whether this is a true fact about the corresponding terms in English, and whether such meaning postulates capture linguistic facts or facts of world-knowledge, need not concern us here.) Montague's meaning postulate 1973/4: 264(9) relating *seek′* and *try-to′-find′* is of this apparently harmless kind.

However, a meaning postulate stating an equivalence between an entirely unavailable intensional meaning for *find′* and the standard extensional reading seems rather different. It does not seem like an axiom at all, but rather to be a consequence of the meaning of *finding*. More seriously, rather than relating nonlogical constants or lexical items of the language, it relates entire logical forms. In fact it seems to be an example of the dangerous expressive power of meaning postulates, and the way they can be abused to perform arbitrary side computations to fix up what would otherwise appear to be holes in the theory. Such meaning postulates seem profane in a new and more serious sense, amounting to operations on logical forms.

A number of complications ensue, not least for the category assigned to transitive verbs and the theory of Generalized Quantifiers, which latter is perhaps the most important contribution of Montague's work to natural language semantics. There has been a general tendency in subsequent work in semantics using categorial grammar to make the lexicon and purely categorial syntactic combinatorics do more of the work, even among those of a predominantly sacred persuasion, such as Cresswell, Dowty, Partee, Rooth, Moortgat, Morrill, Hepple, Jacobson, and Carpenter. We will discuss these and other more profane developments by focusing on three specific arenas; lexical semantics, or those relations associated with a specific head and bounded by its local domain; quantifier scope, which is not in general bounded; and pronominal binding, which is both bounded and unbounded.

Lexical Semantics

There are two main ways in which neo-Montagovian semantics has diverged from the original. The first is a general abandonment of the assumption that all categories (noun phrase, transitive verb, etc.) should have the highest type that is needed for any of their members, notably because of Partee and Rooth's 1983 demonstration that any such assumption concerning noun phrases interacts wrongly with the grammar of coordination. The second is the association of much more specific information with lexical items. There

are two ways to do the latter. One is to retain the Montagovian assumption that *find′*, *seek′*, *want′*, and the like are basic types, and to put the specific information into Carnap-Montagovian Meaning Postulates or lexical entailment rules. For example, Chierchia, Dowty, and Jacobson (1992b: 272) treat the control relation for 'equi-NP-deleting' verbs like 'want' in sentences like *John wants to leave* as a relation between individuals and properties, such that for any individual x who stands in the *want′* relation to a property p, px holds in the 'want world' of x – roughly, the possible world that x desires as a function of the world they do the wanting in. Thus we have something like the following, where *want′* is of type $((t \leftarrow s) \leftarrow e)\ (t \leftarrow e)$:

(6a) wants := $(S\backslash NP)/VP : want'$
(6b) $\mathrm{MP}_{want'} = \forall x \forall p \forall s[want' pxs \Leftrightarrow px(wantworld' xs)]$

Alternatively, one can achieve the same effect directly in a lexical entry like the following (in which the symbol *want″* denotes a predicate of a subtly different type $((t \leftarrow s) \leftarrow e) \leftarrow t$ from that of *want′* in (6), cf. Bach):

(7) wants := $((S\backslash NP)/VP : \lambda p \lambda x \lambda s{:}want''(px(wantworld' xs))xs$

This may look dangerously profane, because it includes a logical form, glossed earlier, that does significant work, such as making the subject x of the property p the same as the surface subject of *want′* and makes the language of logical form and English nonhomomorphic. (In particular, *want′* is not a constant of the logical language at all.) However, the profanity in question is venial, because we can always translate lexical entries like (7) into lexical entries like (6a) by making the interpretation $\lambda p \lambda x \lambda s{:}want''(px(wantworld' xs))xs$ of the former into the definition of the interpretation *want′* of the latter in the model theory (cf. Carpenter 1997: 438):

(8a) wants := $(S\backslash NP)/VP : want'$
(8b) $want' \stackrel{def}{=} \lambda p \lambda x \lambda s{:}want''\ (px(wantworld' xs))xs$

In one sense, this amounts to transferring the work of a meaning postulate to the process of interpretation. However, doing it that way seems more wholesome, because it cannot tempt us into the more serious profanity of defining relations over arbitrary logical forms. In which case, doing so directly in lexical logical forms like (7), as Dowty (1979: 199), Calder, Klein, Zeevat, and many computational linguists do, is more helpful, because it puts the same information into one definition, rather than two. We will use this notation from now on, regardless of the version used by the original authors.

Operations over terms that are strictly type driven are what Curry and Feys called 'combinators,' from which the eponymous variety of categorial grammar takes its name. Quite small collections of combinators were shown by Curry and Feys to yield variable-free calculi of the same expressive power as the simply typed λ-calculus. For this reason, some researchers, notably Shaumyan and Szabolcsi, have expressed their semantics directly in a variable-free combinatory calculus, rather than in λ calculus. (We will see examples in a later section on binding). As the two calculi are provably of exactly the same expressive power, and this use of combinators to define lexical semantics is logically independent of the use of syntactic combinatory rules, the difference is merely one of notational convenience, and we will not dwell on it here.

Quantifiers and Scope

Montague's 1973/1974 foundational analysis of quantification was based on a blatantly profane transformational rule schema relating logical forms including indexed pronouns such as $ran' he'_n$ to quantified sentences obtained by λ-abstracting over the pronoun and applying a Generalized Quantifier such as *every′*, as in *every′* $(\lambda x{:}ran' x)$, the translation of 'Everyone ran.' The ambiguity of sentences including multiple quantifiers such as (9) and (10) was accounted for by the possibility of deriving multiple logical forms from a logical form including correspondingly multiple pronouns via freely ordered multiple quantifyings-in.

(9) Everyone loves someone. ($\forall\exists/\exists\forall$)

(10) Someone loves everyone. ($\forall\exists/\exists\forall$)

In a series of publications from 1975 culminating in 1983, Cooper sought to eliminate this syntactic operation from an otherwise Montagovian semantics by treating meanings as pairs $\Lambda;Q$ in which a lambda term Λ (possibly including free variables) was paired with a (possibly empty) quantifier 'store,' Q. Montague-style syntactic rules caused expressions with the type of a generalized quantifier to introduce a (free, distinguished) variable directly into the logical form and to simultaneously introduce a pair consisting of the same variable and the relevant generalized quantifier to the store. At any point in the derivation, such a quantifier–variable pair may be removed from storage, and the quantifier applied to the entire derived expression to bind the variable in question. As in Montague's scheme, different orders of unstoring quantifiers gave rise to different readings for multiply quantified sentences like (9).

Certain general conditions applied to the unstoring process. For example, Cooper (1983: 78) pointed out that there does not seem to be a reading for (11b) in which different people (narrow scope someone) make the claims, in contrast to (11a):

(11a) Someone claimed that Frankie dated everyone. ($\forall\exists/\exists\forall$)
(11b) Someone claimed that everyone dated Frankie. ($^*\forall\exists/\exists\forall$)

Certain 'filters' (notably one that eliminates readings in which variables occur outside the scope of their quantifiers) are also necessary *post hoc* to eliminate overgeneralization. Thus, for examples like the following, one of the six possible orderings of the three quantifiers that would otherwise be permitted by the storage mechanism is eliminated by this filter, namely the one in which *two representatives* outscopes *four samples*, which in turn outscopes *three companies*.

(12) Two representatives of three companies saw four samples.

Cooper storage was later reformulated by Keller and by Shieber, Pereira and Dalrymple in a way that made the bound variable condition emergent. Pereira achieved a related result in a Lambek-style Categorial grammar using a quantifier-abstraction mechanism related to the extraction constructor of Moortgat and Hendriks's early work.

If we lexicalize the Montague account within a categorial grammar, the categories of 'everyone' and 'someone' come out as the following:

(13a) everyone := $S/(S\backslash NP) : \lambda p\colon \forall x[person'x \Rightarrow px]$
(13b) everyone := $(S\backslash NP)\backslash((S\backslash NP)/NP) : \lambda p\lambda y.\ \forall x[person'x \Rightarrow pxy]$
(13c) etc.

(14a) someone := $S = (S\backslash NP) : \lambda p\colon \exists x[person'x \wedge px]$
(14b) someone := $(S\backslash NP)\backslash((S\backslash NP)/NP) : \lambda p\lambda y.\ \exists x[person'x \wedge pxy]$
(14c) etc.

These categories are syntactically and semantically 'type-raised' – that is, they are functions over those functions that take types NP or *e* as arguments and apply those functions to themselves. There is a forward subject category and an object backward category for each. A finite number of further analogous categories will be required for generalized quantifiers as complements of object control verbs, ditransitive verbs, etc. – in fact, all function categories over NP that the grammar allows.

More generally, the determiners 'every' and 'some' translate into the following related generalized quantifier determiner categories:

(15a) every := $(T/(T\backslash NP))/N : \lambda n\lambda p\lambda \ldots .\forall x[nx \Rightarrow px \ldots]$
(15b) every := $(T\backslash(T/NP))/N : \lambda n\lambda p\lambda \ldots .\forall x[nx \Rightarrow px \ldots]$

(16a) some := $(T/(T\backslash NP))/N : \lambda n\lambda p\lambda \ldots .\exists x[nx \wedge px \ldots]$
(16b) some := $(T\backslash(T/NP))/N : \lambda n\lambda p\lambda \ldots .\exists x[nx \wedge px \ldots]$

Here, T schematizes over syntactic types corresponding to the ranges of all functions over NP that the grammar allows, where T may itself be a function type, $\lambda\ldots$ schematizes over λ bindings for the corresponding semantic arguments, if any, and $px\ldots$ schematizes over the application of p to x and those other arguments, if any. There is a forward and a backward syntactic instance for each generalized quantifier. (In English, the former corresponds to a subject and the latter to an object or other complement.)

In a pure (that is, context free) categorial grammar, these categories only allow one of the two readings available for each of (9) and (10). For example, we get the following 'narrow-scope someone' reading for the former, but no 'wide-scope someone' reading:

(17)
$$\dfrac{\dfrac{\text{Everyone}}{\begin{array}{c}S/(S\backslash NP)\\ :\lambda p.\forall y[person'y \Rightarrow py]\end{array}} \quad \dfrac{\begin{array}{c}\text{loves}\\ (S\backslash NP)/NP\\ :loves'\end{array} \quad \begin{array}{c}\text{someone}\\ (S\backslash NP)\backslash((S\backslash NP)/NP)\\ :\lambda p\lambda y.\exists x[person'x \wedge pxy]\end{array}}{S\backslash NP : \lambda y.\exists x[person'x \wedge loves'xy]}\,<}{S : \forall y[person'y \Rightarrow (\exists x[person'x \wedge loves'xy])]}\,>$$

Similarly, we only get the 'wide-scope someone' reading for (10).

We could get around this by modifying the categories along the lines laid down by Cooper, making them store a quantifier-variable pair, allowing a derivation in which the existential in (17) is unstored after the universal, giving it wide scope. However, it is somewhat unclear how to impose the necessary further conditions on unstoring within a lexicalized framework.

Another possibility might be to use Underspecified Scope Representations of the kind first proposed by Kempson and Cormack. However, it is unclear how either storage or underspecification can be made to comply with Geach's 1972 observation that sentences like the following have only two readings, rather than the four that would be expected on a quantifying-in account:

(18) Everyone loves, and everyone hates, someone.

Although there is a reading where everyone both loves and hates the same person that everyone else loves and hates, and a reading where everyone loves someone and hates someone else, there are no mixed readings such as the one where everyone loves

the same person as everyone else but hates someone possibly different from anyone else.

Whether we handle the (unbounded) 'right node raising' extraction of 'someone' by transformational Movement of the surface NP, or by GPSG/HPSG-style 'Slash-passing,' it is hard to see a principled way of excluding the mixed readings on a storage account. It seems as though storage, like quantifying-in, loosens the connection between scoping and syntactic derivational combinatorics too much. Because of this and other over- and undergeneralizations, later work on the semantics of quantifier scope in categorial frameworks has attempted to obtain scope alternations directly from type-driven syntactic combinatorics.

It is therefore interesting that the syntactic apparatus that CCG uses anyway to achieve the equivalent of extraction can be used to give *in situ* object quantifiers scope over the entire sentence. Thus, we can apparently obtain the wide scope reading of (17) as in (20), using the following Forward Composition rule, indexed >**B** in derivations:

(19) *The forward composition rule*
$X/Y : f \Rightarrow Y/Z : g \Rightarrow (\, X/Z : \lambda z.f\,(gz)\ (>\mathbf{B})$

(20)
$$\dfrac{\dfrac{\dfrac{\text{Everyone}}{\begin{array}{c}S/(S\backslash NP)\\ :\lambda p.\forall y[person'y \Rightarrow py]\end{array}} \quad \dfrac{\text{loves}}{\begin{array}{c}(S\backslash NP)/NP\\ :loves'\end{array}} \quad \dfrac{\text{someone}}{\begin{array}{c}S\backslash(S/NP)\\ :\lambda p.\exists x[person'x \wedge px]\end{array}}}{S/NP : \lambda x.\forall y[person'y \Rightarrow loves'xy]}\,{>}\mathbf{B}}{S : \exists x[person'x \wedge (\forall y[person'y \Rightarrow loves'xy])}\,{<}$$

At first glance this looks quite promising, although as an account of scope inversion it will require modification. The same apparatus of type-raising and composition underlies the standard CCG account of *wh*-extraction, on the assumption that wh-elements are functions over *S/NP* and an indirect question has category *Q* and type $t \leftarrow e$ (we ignore the semantics of 'wonder' and the related issue of functional vs. global interpretations of questions):

(21)
$$\dfrac{\dfrac{\begin{array}{c}\text{Frankie}\\ S/(S\backslash NP)\end{array} \quad \begin{array}{c}\text{wondered}\\ (S\backslash NP)/Q\end{array} \quad \dfrac{\begin{array}{c}\text{who}\\ Q/(S/NP)\\ \lambda p\lambda x.person'x \wedge px\end{array} \quad \dfrac{\begin{array}{c}\text{everyone}\\ S/(S\backslash NP)\\ :\lambda p.\forall y[person'y \Rightarrow py]\end{array} \quad \dfrac{\begin{array}{c}\text{loved}\\ (S\backslash NP)/NP\\ :loved'\end{array}}{}}{S/NP : \lambda x.\forall y[person'y \Rightarrow loved'xy]}\,{>}\mathbf{B}}{Q : \lambda x[person'x \wedge (\forall y[person'y \Rightarrow loved'xy])}\,{<}$$

It also allows such extraction to be unbounded, as in (22a), and predicts a number of constraints on extraction, including the Fixed Subject Constraint (22b) and the Across-the-Board Condition on extraction out of coordination (22c):

(22a) I wonder [who]$_{Q/(S/NP)}$ [Johnnie said that Frankie shot]$_{S/NP}$

(22b) I wonder [who]$_{Q/(S/NP)}$ *[Frankie said that shot Johnnie]

(22c) [Frankie loved,]$_{S/N}$P and [I heard that she shot,]$_{S/NP}$ [her man.]$_{S\backslash(S/NP)}$

We therefore predict Rodman's 1976 observation that similar constraints appear to apply to *wh*-extraction and quantifier scoping, as we saw in connection with examples (11) and the 'all wide scope' reading for a right node raised quantifier (as in (18)).

However, there is a difficulty. The grammar as stated does not yet yield the *other* across-the-board Geach reading for (18), the one where 'someone' has narrow scope in both conjuncts. This suggests that derivations like (20) are *not* the way – or at least, not the only way – that existentials gain wide scope.

Following preliminary work in a type-driven categorial framework by van Benthem and by Partee and Rooth, Hendriks (1993, and much earlier work), made a heroic proposal to make scope assignment entirely type driven, using a battery of type-changing rules over and above Montagovian type raising, notably including 'argument lifting' and 'argument lowering.' For example, in order to obtain the narrow scope object reading for sentences (9) and (18), Hendriks, would apparently need to subject the category of the transitive verb(s) to 'argument lifting' to make them functions over a type-raised object type. (The coordination rule must be correspondingly semantically generalized.)

Moortgat (in unpublished technical reports) and Carpenter attempted to lexicalize Hendriks's system using a 'scoping connective,' writing the standard syntactic type-lifted NP generalized quantifier category as $np{\Uparrow}s$, axiomatized within a version of the Lambek calculus, of which Carpenter shows Hendriks's rules to all be theorems. Pereira and Carpenter persuasively suggest that Keller's earlier idea of 'Nested Cooper Storage' is essentially a syntactic reification of the way the categorial grammar makes such properties as the bound variable constraint emerge from the combinatorics of the grammar itself.

However, such schemes are still very expressive. For example, of the remaining five readings for (12), four, according to which the companies either do or do not share the same two representatives, and in which the specific sets of three samples either do or do not vary

with the representatives, are immediately available. However, as Park pointed out, it is much less clear that a fifth reading exists, as claimed by Shieber, Pereira, and Dalrymple, according to which *three companies* outscopes *four samples*, which in turn outscopes *two representatives* – that is, where both representatives of any given company saw the same four samples, but not the same four as the two representatives of either of the other two companies.

There are a number of other constraints that remain hard to explain on any of these accounts. The most striking is the fact that most quantifiers fail to invert scope at all, in the sense of binding a syntactically commanding existential as the true universals *each* and *every* and their derivatives do in sentences like (10). For example, there seems to be no inverting reading for the following:

(23) Some linguist speaks at least three languages. ($\exists \geq 3/\# \geq 3\exists$)

The existentials also appear to differ from the universals in being immune to 'island effects' in their ability to yield wide scope readings, thus

(24a) Every witness claimed that Johnnie had dated some woman. ($\forall\exists/\exists\forall$)

(24b) Every witness claimed that some woman had dated Johnnie. ($\forall\exists/\exists\forall$)

Accordingly, Park, following Fodor and Sag, suggested that the apparent wide-scope readings of existentials in examples like (9) arose from a referential reading for the nonuniversal quantifiers, according to which they referred to a contextually available individual, which gave the appearance of having scope everywhere. When combined with CCG syntax, this immediately explained their inability to invert scope and their indifference to islands, as well as making the across-the-board narrow scope reading for (18) available and explaining the impossibility of mixed scope readings as proposed by Geach under his combinatory categorial approach. Steedman and Farkas proposed ways of obtaining both wide-scope discourse-referential and narrow-scope dependent readings from a single underspecified representation of a referential reading. The former account identifies these representations with a generalization of Skolem terms within a CCG framework and investigates several other ways in which syntax limits available scopings.

The assumption that all quantifiers other than the true universals are (possibly dependent) referential expressions rather than generalized quantifiers also explains their otherwise anomalous ability to apparently bind pronouns that they do not structurally command, as in the famous 'Donkey Sentences':

(25) Every farmer who owns a donkey feeds it.

The preferred reading of the sentence, according to which each farmer feeds the donkey(s) he or she owns, arises not from quantifier binding of *it* by a noncommanding existential generalized quantifier, but by discourse anaphora to a dependent donkey represented by a Skolem term in the variable bound by the universal, which *does* command the pronoun via the category defined at (15a). (This approach to the problem avoids a number of complications that accrue to the standard 'E-type pronoun' and Discourse Representation Theory (DRT) accounts.)

Anaphora

Reflexives

Bach and Partee influentially proposed that reflexive pronouns like 'herself' in sentences like *Frankie cooled herself* had the type of a type-raised NP. In present notation this can be captured in the following lexical entry (26) (we ignore the complication of object-bound reflexives for the moment):

(26) herself := $(S\backslash NP)\backslash((S\backslash NP)/NP) : \lambda v\lambda x{:}self'vx$

Thus, we have:

(27)
$$\dfrac{\dfrac{\text{Frankie}}{\begin{array}{c}S/(S\backslash NP)\\ :\lambda p.p\,frankie'\end{array}} \quad \dfrac{\dfrac{\text{cooled}}{\begin{array}{c}(S\backslash NP)/NP\\ :cool'\end{array}} \quad \dfrac{\text{herself}}{\begin{array}{c}(S\backslash NP)\backslash((S\backslash NP)/NP)\\ :\lambda v.self'v\end{array}}}{S\backslash NP : self'cool'}\,<}{S : self'cool'frankie'}\,>$$

This suggestion (which is also implicit in Geach's account) was taken up by Szabolcsi, Jacobson, Morrill, and Carpenter. In order to prevent the type-raised reflexive category from allowing unbounded reflexive binding analogous to the unbounded quantifer scope inversion in (11a) (contrary to Condition A of the Chomskyan Binding Theory) and in order to enforce nonlocal binding of pronouns (Condition B, discussed later), Bach and Partee added two extra Cooper stores to the grammar, one of which restricted anaphors like reflexives to local binding. Szabolcsi and Jacobson assumed that Condition A followed from other semantic considerations (although not, of course, from profane structural command relations defined over logical forms), but Morrill restricted his version of category (26) to lexical categories using slash modalities, whereas Steedman lexicalized anaphor binding on the verb, obtaining Condition A as a consequence of the intrinsic locality of lexicalization and Condition C (profanely stated).

All of these authors generalized their accounts to cover non-subject-bound local anaphors, and

'pied-piping' of elements like prepositions, as in the following:

(28a) I introduced Frankie and Johnnie to each other.
(28b) *I introduced each other to Frankie and Johnnie.

Pronouns

Bach and Partee treated pronouns like 'her' as type-raised NPs introducing a distinguished variable both into the logical form and into a third 'Superpronoun' Cooper store from which the variable could in due course be unstored to become bound by a (nonlocal) antecedent. This system was used to account for a very wide range of phenomena involving pronouns, including simple intrasentential anaphora, quantifier-bound variable anaphora, 'Donkey Anaphora' of the kind exhibited in (25), and 'Sloppy Anaphora' of the kind exhibited in the following 'Paycheck Sentence', in which 'it' can refer to a different paycheck, as well as the same one:

(29) The woman who put her paycheck in the bank was wiser than the woman who put it in a teapot.

However, adding even one store to a grammar (or the equivalent automaton) can bring about dramatic increases in expressive power, and subsequent accounts again attempted to eliminate storage in favor of more compositional mechanisms.

Szabolcsi treated the pronoun as having a category drawn from a family including the following:

(30a) him := $((S\backslash NP)\backslash(S\backslash NP))\backslash(S/NP) : \lambda f\, \lambda g \lambda x{:}f\,(gx)x$
(30b) he := $((S\backslash NP)\backslash(S\backslash NP))/(S\backslash NP) : \lambda f\, \lambda g \lambda x{:}f\,(gx)x$

This yielded derivations like (31) and (32).

Hepple and Jacobson developed a related account in which the pronoun itself was an identity function, as follows:

(33) him := $NP^{NP} : \lambda x.x$

The superscript ^{NP} is a syntactically inert functional type-constructor, to which none of the standard combinatory rules apply. A 'Geach Rule' G, corresponding to unary application of the composition combinator B, applies to pass ^{NP}-marking up the derivation to a point where a combinatory rule called Z with a semantics identical to that in Szabolcsi's pronominal schema (30) (although in other respects the theories differ) applies to permit the remainder of the derivation to proceed as in Szabolcsi's (31), thus:

In both Szabolcsi's and Jacobson's proposals, a 'family' of Z-rules or Z-related categories (and in the latter case G-rules) is needed to allow for cases like the following, in which multiple binding relations may not be across adjacent elements and may either nest or intercalate – see Jacobson 1999:(23),(29):

(35) Frankie$_i$ said Johnnie $_j$ thinks he$_j$/she$_i$ saw her$_i$/him$_j$.

In this respect, anaphoric relations stand in sharp contrast to standard syntactic multiple dependencies like the following, which generally have to do one or the other:

(36a) Which violin$_i$ is this sonata$_j$ easy to play$_j$ on$_i$?
(36b) *Which sonata$_i$ is this violin$_j$ easy to play$_i$ on$_j$?

Jacobson shows that GZ CCG supports the interpretation of 'Pronouns of Laziness' in 'Paycheck Sentences' like (29) among several other varieties of anaphora.

(31)

Every man	thought	Frankie saw	him
$S/(S\backslash NP)$: $\lambda p.\forall x[man'x \Rightarrow px]$	$(S\backslash NP)/S$: $thought'$	S/NP : $\lambda x.saw'x\,frankie'$	$((S\backslash NP)\backslash(S\backslash NP))\backslash(S/NP)$: $\lambda g\lambda f\lambda x.f(gx)x$

$$\frac{\dfrac{\text{Frankie saw him}}{(S\backslash NP)\backslash(S\backslash NP) : \lambda f\lambda x.f(saw'x\,frankie')x}\,<}{S\backslash NP : \lambda x.thought'(saw'x\,frankie')x}\,<$$

$$\frac{\text{Every man}\quad \text{thought}\quad S\backslash NP : \lambda x.thought'(saw'x\,frankie')x}{S : \forall x[man'x \Rightarrow thought'(saw'x\,frankie')x]}\,>$$

(32)

Every man	thought	he	saw Frankie
$S/(S\backslash NP)$: $\lambda p.\forall x[man'x \Rightarrow px]$	$(S\backslash NP)/S$: $thought'$	$((S\backslash NP)\backslash(S\backslash NP))/(S\backslash NP)$: $\lambda g\lambda f\lambda x.f(gx)x$	$S\backslash NP$: $\lambda y.saw'frankie'y$

$$\frac{\dfrac{\text{he saw Frankie}}{(S\backslash NP)\backslash(S\backslash NP) : \lambda f\lambda x.f(saw'frankie'x)x}\,>}{S\backslash NP : \lambda x.thought'(saw'frankie'x)x}\,<$$

$$\frac{\text{Every man}\quad \text{thought}\quad S\backslash NP : \lambda x.thought'(saw'frankie'x)x}{S : \forall x[man'x \Rightarrow thought'(saw'frankie'x)x]}\,>$$

(34)

Every man	thought	Frankie	saw	him
$S/(S\backslash NP)$	$(S\backslash NP)/S$	$S/(S\backslash NP)$	$(S\backslash NP)/NP$	NP^{NP}
$: \lambda p.\forall x[man'x \Rightarrow px]$	$thought'$	$\lambda p.p\ frankie'$	saw'	$: \lambda x.x$

$$\frac{\dfrac{\dfrac{\dfrac{\dfrac{}{(S\backslash NP)/(S^{NP})}\,{>}\mathbf{Z}}{: \lambda g\lambda x.thought'(gx)x}}{S\backslash NP : \lambda x.thought'(saw'x\ frankie')x}\,{>}}{S : \forall x[man'x \Rightarrow thought'(saw'x\ frankie')x]}\,{>}$$

$$\frac{\dfrac{\dfrac{}{((S\backslash NP)^{NP})/(NP^{NP})}\,{|}\mathbf{G}}{: \lambda q\lambda x.saw'(qx)}}{(S\backslash NP)^{NP} : saw'}\,{>}$$

$$\frac{\dfrac{}{(S^{NP})/((S\backslash NP)^{NP})}\,{|}\mathbf{G}}{: \lambda q\lambda x.qx\ frankie'}$$

$$\frac{}{S^{NP} : \lambda x.saw'x\ frankie'}\,{>}$$

A number of problems remain open for this attractive account of anaphora. One is that it is not yet clear whether the approach can be extended to donkey anaphora of the kind exhibited in (25) (Szabolcsi, 1989: 315; Jacobson, 1999: n. 1). On the assumption from the last section that existentials are referential rather than quantificational, which itself seems to be a forced move in any surface derivational semantics, it seems likely that an extension is possible, because the syntactic position of the donkey is one out of which universal quantifiers can invert scope, and the types seem otherwise compatible with composition via the GZ machinery, in combination with a 'wrapping' combinator – essentially as in Jacobson's analysis of paycheck sentences. The problem of Quantifier Scope in variable-free CCG is discussed by Barker.

A more serious open problem that both Szabolci and Jacobson draw attention to is that neither account of anaphora is compatible with the standard account of syntactic extraction in CCG (see Jacobson, 1999: n. 17). For example, on the earlier standard assumptions about the type of an indirect question, the following derivation in Szabolcsi's version blocks:

(37)

Every man	wondered	what	he	saw
$S/(S\backslash NP)$	$(S\backslash NP)/Q$	$Q/(S/NP)$	$((S\backslash NP)\backslash(S\backslash NP))/(S\backslash NP)$	$(S\backslash NP)/NP$
$: \lambda p.\forall x[man'x \Rightarrow px]$	$wondered'$	$: \lambda q.\lambda y[thing'y \wedge qy]$	$: \lambda g\lambda f\lambda x.f(gx)x$	saw'

$$\frac{\dfrac{((S\backslash NP)\backslash(S\backslash NP))/(S\backslash NP) \quad (S\backslash NP)/NP}{((S\backslash NP)\backslash(S\backslash NP))/NP}\,{>}\mathbf{B}}{: \lambda f\lambda x\lambda y.f(saw'yx)x}$$

The problem is that the type of the category of 'he saw', $((S\backslash NP)\backslash(S\backslash NP))/NP$, is not the same as that of 'Everyone saw,' S/NP in (21). The same is true for the corresponding type S^{NP}/NP in Jacobson's system. As Jacobson pointed out, the GZ mechanism offers no semantically coherent way for the category of 'what,' $Q/(S/NP)$, to shift into something that will combine with S^{NP}/NP.

Jacobson suggested that the CCG account of extraction could be dispensed with and replaced with an autonomous relative clause formation mechanism, such as the feature-passing mechanism of Generalized Phrase Structure Grammar (GPSG). However, to capture the full range of extraction phenomena covered in CCG, including multiple long-range dependencies, is known to be problematic in GPSG. The only constrained way of doing it that is known is equivalent to reimplementing the 'mildly context sensitive' CCG mechanism as a Linear Indexed Grammar via a form of storage. However, the GZ-plus-WRAP apparatus already amounts to an apparatus of at least this power, because CCG is known to be weakly equivalent to a Linear Indexed Grammar, and Geached ^{NP} arguments can stack. It is not immediately clear what combining two such mechanisms in a single grammar would do to its expressive power.

The fact that anaphora is notoriously free from the syntactic constraints that limit relativization, as example (35) shows, makes it seem possible to conclude that Pronoun Anaphora should not be treated in syntax at all. Differences of opinion on this question are not confined to Categorial Grammarians.

Computational Semantics for Categorial Grammars

Although we have used first-order predicate calculus as a semantic representation and the λ-calculus as the

'glue language' for assembling logical forms, as is standard, other representations are possible and may be important in computational applications of Categorial Grammar. Calder, Klein and Zeevat and Bos *et al*. use versions of DRT as a first-order representation language as a basis for inference. Baldridge proposed a 'flatter' Hybrid Logic Dependency Semantics (HLDS), which is better adapted to realization in Language Generation. The properties of such representations are important for computational efficiency, but we will not explore them here.

Conclusion

It appears that the Montagovian vision of a semantically transparent categorial theory of grammar for natural languages is close to realization, with profound implications for our view of both syntax and semantics. The remaining difficulties look soluble and represent the most important challenge for the approach.

See also: Combinatory Categorial Grammar; Compositionality: Semantic Aspects; Lexical Semantics: Overview; Monotonicity and Generalized Quantifiers; Montague Semantics.

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Semantics in Psychology

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Broadly speaking, semantics is the study of meaning – of words and of complete utterances. Formally, semantics is synonymous with logic applied to language, a narrow subset of issues about meaning. Psychological semantics is the application of psychological methods to the study of meaning. In their everyday lives, people use the meaning of words and utterances to convey messages and to understand the messages of others, so inevitably psychological semantics is concerned with, when, and how, meaning is used, as well as with what meaning is from the human perspective.

For convenience, we may divide the psychological study of meaning into several different types. The simplest of these is Lexical Semantics (LS), the study of word meaning. Beyond the word lies the study of utterance meaning. This includes both the meaning of sentences and what the speaker intends to convey, called speaker meaning. Beyond this is discourse semantics, the consideration of meaning beyond single utterances, as in dialog or text discourses.

Content versus Function Words

An important distinction should be made between content and function words. Content (or 'open-class') words include words that convey substance, such as nouns, verbs, and adjectives. Function (or 'closed-class') words include words whose function it is to relate on thing to another, such as prepositions, connectives, and quantifiers. Whereas the closed-class words in a language remain roughly constant, new open-class words may be introduced at any time. Open-class words refer to things (nouns); attributes of things (adjectives); and states, actions and events (verbs). Closed-class words do not refer to anything and effectively tell us how things relate to one another. For instance, in the sentence *John likes Mary because she is fun*, the word *because* tells us that it is being fun that is the reason for John's liking. This distinction means that psychological work is very different for the two classes of word, and we treat them separately in what follows.

Content Words: Features and Decomposition

Following leads in linguistics, much work in psychology has been motivated by the idea that the meanings of words may be represented in terms of (semantic) features. For instance, the word *boy* might be represented as a set of three features:

(1) boy(x) → male(x) & human(x) & not-adult(x)

This amounts to rewriting a word in terms of other words, much as we would find in a dictionary. From a psychological perspective, one idea has been that this information is stored in memory as the meaning of the word and may be made available when the word is read or heard. This simple account has been used to

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Semantics in Psychology

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Broadly speaking, semantics is the study of meaning – of words and of complete utterances. Formally, semantics is synonymous with logic applied to language, a narrow subset of issues about meaning. Psychological semantics is the application of psychological methods to the study of meaning. In their everyday lives, people use the meaning of words and utterances to convey messages and to understand the messages of others, so inevitably psychological semantics is concerned with, when, and how, meaning is used, as well as with what meaning is from the human perspective.

For convenience, we may divide the psychological study of meaning into several different types. The simplest of these is Lexical Semantics (LS), the study of word meaning. Beyond the word lies the study of utterance meaning. This includes both the meaning of sentences and what the speaker intends to convey, called speaker meaning. Beyond this is discourse semantics, the consideration of meaning beyond single utterances, as in dialog or text discourses.

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This amounts to rewriting a word in terms of other words, much as we would find in a dictionary. From a psychological perspective, one idea has been that this information is stored in memory as the meaning of the word and may be made available when the word is read or heard. This simple account has been used to

explain a number of empirical phenomena. For instance, it has been widely demonstrated that some members of conceptual classes are better examples of those classes than others. So, although *robin* and *penguin* are both certainly birds, people judge *robin* to be much more typical than *penguin*, and furthermore, if they are asked to make speeded yes/no judgments to questions such as (2), they answer, "yes," more quickly to *robin* than to *penguin*. (The slash denotes optional questions.)

(2) Is a robin/penguin a bird?

The explanation given for this was that, when people evaluate the question, they compare the features of bird (the general concept) with the exemplars, and the overlap in terms of general shape, wing size, ability to fly, and so on gives a greater overlap with *robin*, facilitating the response. This reasoning also explains why, in speeded tasks, people will erroneously affirm that *a whale is a fish*, even though they 'know' that it is not and can recognize their errors. Also, supposed feature overlap between two words has been used to explain the amount of 'priming' one word affords another. In a priming task, participants may be asked to decide whether strings of letters are words or not (lexical decision). The words are presented successively, in pairs, and a decision is made about each one as it is presented. If two words are related to one another (such as *nurse – doctor*), then the second word is judged more quickly than when it follows an unrelated word (as in *bread – doctor*). Feature theories have been used to explain how judgments of the degree to which two words are related in meaning (e.g., *cat* is more similar to *dog* than is *horse*) are made, and figure in many computer implementations of systems that use word meaning.

When the meaning of a word is rewritten as a set of features, as in (1), the question arises as to when the rewriting should stop. For instance, (1) requires that we further rewrite *not-adult* in order to specify **its** meaning. One solution is to seek a set of primitive terms that are not decomposable any further, but this is problematic because every verbal expression is itself is in principle capable of further definition. For linguistic purposes, this may not matter if the idea is to find a small set of words in every language that seem to be fundamental in defining others. But for psychology it is a problem because the idea is to say how people can actually know what a word means. One approach has been to suppose that primitives may be rooted in our nonverbal experiences. For instance, a basic biological activity is to ingest things (such as food and drink). It has been proposed that **ingest** is a primitive for many verbs that involve taking material from the environment into the body (*eat*, *drink*, *suck*, etc.) and that these verbs are just elaborated and specified versions of ingest (see, for instance Schank and Abelson, 1977, for a discussion of primitives including **ingest**; see also Miller and Johnson-Laird, 1976). Rooting meaning outside language itself is discussed in more detail later.

High-Dimensional Space Analysis

In recent years, a new approach to the representation of meaning in abstract terms has enjoyed considerable exploration; in this approach the meaning of a word is treated as a function of the context in which the words occur. One such theory is the Hyperspace Analog to Language (HAL; Burgess and Lund, 1997). The idea is that the meaning of a word can be expressed in terms of its cooccurrence with other words. To determine meaning under these schemes, many occurrences of a word, in context, are found in a corpus. Then a count is made of the number of occurrences of a number of words both preceding and following the word in question (the context words). This gives a distribution in which some context words are frequent and others less frequent. Then, by producing a matrix of the cooccurrence of every word with every other word, a given word's meaning may be characterized and compared to that of any other word; the similarity of two words is the similarity of the vectors characterizing the two words. So, the words that cooccur with *street* in a very large sample of sentences tend to be the same as those that cooccur with *road*. According to high-dimensional space analyses, these words are close in meaning. Expressing words in terms of these vectors does predict some empirical effects. For instance, it predicts the degree to which one word primes another in a lexical decision task: The more similar the words on their metric, the greater the priming. Another high-dimensional approach is latent semantic analysis (LSA; Landauer and Dumais, 1997). In this approach, a large number of contexts is selected (e.g., 30 000+ encyclopedia entries). A matrix is created with 30 000+ contexts as one dimension, each of the words that occurred in these articles is assigned to the other dimension. Then a matrix is constructed showing the frequencies of each word in each of the contexts. The meanings of the words can be compared in terms of values derived from these frequencies, and comparisons between the words can be made. Again, there are correlations between the vector values of words treated in this way and human performance data. For example, using a procedure to express whole sentences in terms of the vectors for the individual words of which they are comprised, it is

possible to predict how coherent successive sentences of a text are rated as being.

Grounded and Embodied Meaning

The problem with all of the approaches considered up to now is that the meanings of words are being expressed in terms of the meanings of other words or in terms of concatenations of other words. Such analyses of meaning run into the symbol-grounding problem (e.g., Harnad, 1990). Harnad discussed a person who lands at an airport in a foreign country, whose language he does not speak. Upon disembarking, he sees a sign he cannot decipher. So, he looks up the first part of the sign in the dictionary of the local language, only to find more indecipherable material. No matter how many of these abstract symbols he looks up and inter-relates, he can never get to meaning of the sign. This is the symbol-grounding problem. Without relating the writing to things in the world, the meaning cannot be determined.

But what does it mean to ground a meaning representation in events in the world? One approach is to link meaning to perception, and another is to link it to the way in which people interact with the world. Such approaches radically move away from simple featural approaches.

Procedural Semantics, Affordances, and Embodiment

An important extension of the feature idea, known as procedural semantics, proposes that the fit of a word to an object, action, or situation can be established by testing for the presence of the features that are supposed to define the word (Miller and Johnson-Laird, 1976). This is particularly useful for objects in the perceptual world, where meaning may be understood in terms of extensions. For instance, we might begin to define *table* as in (3):

(3) table: Is it a physical object?
Does it have a flat surface (of a certain area and shape)?
Does it have a support holding the flat surface off the ground (at the right height and the right angle)?

This example shows one of the problems in trying to produce a list of tests, however. A torchere (a tall candle holder of the eighteenth century), for example, would not normally be called a *table*: torcheres have supports that raise the platform too high for normal use and have a platform that is scarcely large enough to be a normal table. In defining the area and shape of the flat surface and the height and angle of the surface, it is necessary to call on the function of a table. Some surfaces afford certain uses, such as being suitable to write on, eat off, and sit at, and it is this affordance that functionally defines something as a table. This also means that something that is not normally called a *table* (e.g., the stump of a cut-down tree) may be called a *table* if we are looking for a picnic spot. So, sometimes, even describing a thing in terms of its physical attributes cannot easily be done without taking its function into account.

Many kinds of motion words cannot be described properly in terms of other words. For example, consider the walking verbs *shuffle* and *trudge*. Ultimately, the meanings of these must be given by their extensions, that is, by examples of making these movements. It has been shown that the information conveyed by the movements of the joints of a person, in side view, is adequate to enable people to correctly use the appropriate verb to describe the motion. Almost certainly, the meanings of these words consist of stored procedures for recognizing the movements when they occur, not words that may be used to capture some aspects of them.

Evidence from investigations of brain function suggests that the meanings of action words may be stored in the same parts of the brain as the procedures for carrying out the actions. For example, Pulvermüller and his colleagues (see Pulvermüller, 2003, for a review) had participants perform a lexical decision task in which they had to decide whether strings of letters were words. Verbs referring to actions normally performed with different parts of the body were used, for instance, leg-related words, such as *walk*, and face-related verbs, such as *talk*. While performing the task, event-related brain potentials (ERPs) were recorded using 60 electrodes at a wide range of sites on the scalp. They found that differences among ERPs for the words were found on the scalp above the cortical motor strip and adjacent frontal cortex, associated with the production of movements themselves. At the vertex of this strip, there is a cortical representation of leg actions. At this location, there was a strong ingoing current for leg-related verbs, such as *run*, *kick*, and *sprint*. Face-related verbs, such as *talk*, *gnaw*, and *whistle*, gave the strongest ingoing currents near the left Sylvian fissure, where the articulator actions (e.g., of the mouth and tongue) are represented. Similar results, comparing arm- and leg-related words have been obtained using functional magnetic resonance imagery (fMRI). Evidence such as this suggests that the representation of verbs of action may be in terms of representations of the motor activities that they depict; in other words, the verbs'

meanings are embodied in action (Pulvermuller, 1999).

The Indexical Hypothesis

These observations have motivated the Indexical Hypothesis as an idea of how meaning is established by humans (Glenberg and Robertson, 1999). The basic idea is that when we understand an utterance, such as *John stood on the chair to change a lightbulb*, we index the phrases to perceptual representations of the objects they denote. We then use the representation to derive affordances (for instance, a chair will afford being able to stand on it to reach something). Finally, the affordances of all the things mentioned are meshed together to form a final representation. Regardless of the details of this idea, the point is that not only are perceptual representations used, they are used to determine what is being depicted from what is possible based on what those entities afford.

Such an approach has the merit of suggesting a solution to some knotty problems of the novel uses of words. Novel uses provide a major challenge for theories of meaning based on abstractions (such as simple feature theories and high-dimensional analyses). One example is denominal verbs. These are nouns that are treated as verbs, such as *John* ***motored*** *to Scotland,* and novel uses are easily made, for instance, *this Christmas, Mary* ***parceled*** *her way to popularity with the kids*. Here, *parceled* can be used because a Christmas parcel affords popularity if it is given. But this is completely different from *Mary parceled the books and sent them to her sister in Alaska*. Experiments show that people easily understand such uses, rating them as sensible and easy to envision, even though they do not fit well with LS analyses (see Glenberg and Robertson, 2000, for a technical discussion).

Combining Words: Compositionality and Blending

The traditional view of how word meanings are combined is that the underlying semantics is compositional. The meaning of a sentence, for example, is the sum of the meanings of the words making up that sentence. This idea is quite compatible with the feature account of meaning, but it runs into difficulties when confronted with a number of commonplace phenomena. One of these is nominal compounds, as in *John died from a* ***knife wound***. Clearly the meaning of *knife wound* cannot be derived from the separate dictionary meanings of *knife* and *wound*. In processing terms, what is required to understand this construction is the invocation of situation-specific knowledge combining ideas about dying from a wound inflicted by a knife. The semantics thus depends on background knowledge of situations and cannot be derived from the 'meanings' of words in the sentence, any more than can the example of denominal verbs discussed previously (see Coulson, 2001, for a discussion of these issues and many others that challenge the compositional view). One simple psychological study (see Rips, 1995, for an overview) took concepts such as *smoky chimney* and *smoky apple* and asked people to list their properties and also to list the properties of the individual components (*apple, smoky*, etc.). For the compound, properties were listed that did not appear at all in the individual elements. This shows how a simple compositional account runs into difficulties. When we consider the fuller range of modifiers, the difficulties become even more obvious. For instance, it has been claimed that examples such as *cruelty-free make-up* rely on somewhat peripheral aspects of the words themselves rather than their core meanings and, in fact, depend on the presence (in the mind) of a strong alternative (in which make-up relies on animal testing that may be cruel). Although the trend in psychology is now away from compositional approaches, at a theoretical level it has its defendants (for problems see Franks, 1995; and especially Coulson, 2001).

Function Words

Closed-class, or function, words have to be treated somewhat differently from open-class items. They include a whole range of items, and here two are examined in some detail because they have received much attention from psychologists. Another class of function words are known as cue-phrases, and these serve to indicate how the propositions and utterances in a discourse are to be related to one another. They include connectives such as *when* and *while*, *hence* and *because*, and *so* and *since*. Because their primary function is to connect parts of discourse, the psychological treatment of these items is described elsewhere (*see* **Coherence: Psycholinguistic Approach**) and is not discussed any further here.

Spatial Prepositions

In psychology, because of the ubiquity of descriptions of things in relation to one another in space, among the most extensively studied function words are spatial prepositions. Spatial prepositions occur in all languages, but do not easily translate from one language to another, being among the most difficult terms to master in new language learning. They include *in, on, at, above, below, over,* and *under* – all

mundane, everyday words. Yet defining these words is surprisingly difficult. Consider *in*. The earliest attempts to define *in* were in terms of inclusion of an object within the boundaries of a one-, two-, or three-dimensional object. Thus, if an apple is within the boundaries of a jar, then it is true to say *the apple is in the jar* (three-dimensional enclosure). But there are difficulties with this simple idea. Suppose that there is a pile of fruit in a bowl, with a pear on the very top of the heap, such that it clearly protrudes over the top of the jar. It is still true to say *that the pear is in the bowl*, even though it is true that the pear is outside of the strict three-dimensional confines of the jar. Similarly, we say that *the lightbulb is in the socket*, even though most of the lightbulb is not physically within the three-dimensional confines of the socket. Similar problems occur with simple geometric accounts of all the other spatial prepositions (see Coventry and Garrod, 2004, for a thorough review, and Herskovits, 1986, for geometrically oriented account). One likely solution is that spatial prepositions do not simply express the spatial relations between things; they also express functional relations between things. For instance, it has been suggested that *in* expresses a relation of functional containment, which means that, if A functionally contains B, then B's location controls A's location by virtue of some degree of spatial enclosure. At the extreme, if something is in a box and you move the box, you move the thing, too, because it is functionally contained. So, moving a jar with a pear completely contained moves the pear too; but also moving a socket moves the whole lightbulb and moving a bowl of pears moves a pear that is largely protruding from the bowl. Experiments testing this sort of notion have been carried out using displays in which pears protrude from a bowl and either do or do not move when the bowl is moved. In the former case, *in* is taken as an appropriate description, whereas, in the latter, it is not. In general, with spatial prepositions functionality is most important when the relation depicts less obvious geometrical configurations.

Comparisons of *in, on,* and *at* have proven very enlightening, in that they differ in the amount of control they seem to entail. Thus, if *x is in y*, then x is controlled by y; if *x is on y*, then y supports x; and if *x is at y*, x and y are in close proximity but there is no control relationship (see Coventry and Garrod, 2004). Possible extensions of this approach might be applicable to different ways of describing containment more generally, such as (4), which could imply that wearing the suit is controlling John's behavior:

(4) John is in his suit.

or (5), which could imply that whatever John is doing is supporting wearing a suit:

(5) John has his suit on today.

Spatial prepositions pose a huge problem when it comes to determining which form of description is appropriate, despite their apparent simplicity, and psychological experimentation using people's judgments of when it is appropriate to use particular words offers a clear way forward.

Quantifiers and Expressions of Amount

A second widely occurring set of expressions is quantifying determiners (such as *all, none, most, few,* and *many*) and closely related expressions such as adverbs of frequency (such as *often, rarely, occasionally, regularly,* and *sometimes*), certainty (*certain, unsure,* and *not sure*), and probability (*likely, unlikely, not likely, probable,* and *improbable*). These words occur all the time in daily conversation, weather reports, descriptions of the side-effects of medicine, statements of risk, and so on and are of immense practical significance in addition to posing interesting theoretical problems.

Psychologists have long been interested in specifying the meanings of these terms, and the studies have given rise to a rash of papers with titles like 'How many is many?' Determining the answer to questions like this sounds easy but is virtually impossible. Many studies have been carried out to determine what numbers (percentages, say) might be a (numerical) translation of statements such as *many of the students failed their exam*. Rather than showing that percentages or numbers associated with quantity expressions were stable and consistent, the studies have established that the numbers depend on context. For instance, *many* and *some* mean a larger quantity if a lot is expected to be the case than if little is expected to be the case. So, if we say *many people enjoyed the party*, the mean value assigned might be 70%, whereas, if we say *many of the surgeons at the hospital are female*, the value will be much lower because people's expectations are lower. Expectations are influenced by what a person is used to, so for a person who visits the cinema three times a week *Jamie frequently goes to the cinema* will mean he goes, say, at least twice a week, whereas for a person who goes once a year *frequently* might mean only once a month. Apart from context, it has also been established that there is considerable variability in the assignments people give for judgments in the same context. Moxey and Sanford (1993, 2000), reviewing a wide range of studies, suggested that quantifiers simply do not denote specific

amounts. They suggested that quantity expressions typically convey only vague quantitative information and that they serve other functions, accounting for their variety.

One other function is perspective cueing. Compare (6) with (7).

(6) Few people enjoyed the meeting.

(7) A few people enjoyed the meeting.

Example (6) puts emphasis on the large set of people who did **not** enjoy the meeting, whereas (7) puts emphasis on the few people who did. This difference explains the different conditions under which speakers choose to use (6) and (7). The contrast of *few* and *a few* finds parallels in frequency expressions (*seldom* vs. *occasionally*) and expressions of riskiness (*little risk* vs. *slight risk*). In all these cases, the difference between the expressions is that the cases that parallel *few* are negative, whereas those paralleling *a few* are positive.

Semantics in Processing

Grappling with how humans understand the meanings of things naturally leads to questions of how processing works, a question at the heart of psychology. Two key issues are ambiguity resolution and the processing of metonymies.

Ambiguity and Metonomy

During understanding, the processor has to select appropriate senses of a word. For instance, the word *bank* is polysemous ('river bank' vs. 'savings bank'). Much effort has been spent on trying to determine when context leads to the selection of the appropriate sense of such words. Using priming techniques, it would appear that the appropriate sense is selected very early after the word has been encountered but that the inappropriate meaning is briefly retrieved and then inhibited shortly afterward, unless that sense is a very unlikely use. So, context influences meaning selection at a very early stage.

An interesting limitation occurs in the case of less radical sense differences, as with *newspaper*, in which the senses include the physical product and the organization. Although different, these senses are correlated, unlike the two meanings of *bank*. There is evidence to suggest that even in a context in which it is possible to decide which of the two or more senses of newspaper are intended, readers simply do not determine which one it is. The argument is that it does not matter for comprehension, so the details of the meaning are left underspecified.

Underspecification is an important concept, and it has been suggested that sometimes we may work out the meanings of language only as far as is necessary for the task at hand. Another example of this is found with the treatment of metonymy. For instance, the term *Vietnam* might be used to refer to the country itself (*John went to Vietnam*) or to the war that was fought there (*John protested against Vietnam*). Recent research has shown that people often do not discriminate between these possibilities when there is no need to; hence, there is mental underspecification of the word (see Sanford and Sturt, 2002, for an overview of these and other examples).

Semantic Illusions

Closely related to underspecification in comprehending meaning is a family of effects known as semantic illusions. These show how shallow our processing of word meaning can be. Three examples are:

(8) Suppose there was an aircrash right on the border of Iraq and Iran. Where should the survivors be buried?

(9) Can a man marry his widow's sister?

(10) No head injury is too trivial to ignore.

In example (8), people often miss the fact that we do not bury survivors. In (9), people often answer "yes," even though, if a man has a widow, he is dead and therefore unable to marry. Example (10) is particularly difficult, in that it reads as though the assertion were *no matter how trivial a head injury is, it should be treated*. In fact, it says nothing of the kind.

These examples show how, in practice, people do not make use of the full meanings of words when they read. Sometimes this is because people recognize what the message is supposed to be without working out in detail what the message actually says. In the case of (10), **treating** a head injury, no matter how trivial, is a standard idea, and this is how (10) is interpreted. This shows that getting a full sentence meaning does not necessarily precede interpreting the sentence against background knowledge. Such a finding is compatible with how the meanings of denominal nouns must be established, as discussed earlier. See Sanford and Sturt (2002) for a review.

See also: Causatives: Semantics; Coherence: Psycholinguistic Approach; Componential Analysis; Compositionality: Semantic Aspects; Discourse Semantics; Idioms; Latent Semantic Analysis; Lexical Fields; Lexical Semantics: Overview; Metonymy; Monotonicity and Generalized Quantifiers; Negation: Semantic Aspects; Psycholinguistic Research Methods; Quantifiers: Semantics; Semantic Primitives; Specificity.

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Semantics in Role and Reference Grammar

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Semantics plays a central role in Role and Reference Grammar (RRG). The aspects of semantics in RRG that are addressed herein are (1) the lexical representation of verbs and other predicating elements, (2) semantic roles, (3) the role of the lexicon in grammar, and (4) interclausal semantic relations. An overview of the theory as a whole is given in a companion article (*see* **Role and Reference Grammar**).

The Lexical Representation of Verbs

The heart of the RRG approach to lexical representation is a system of lexical decomposition based on Vendler's (1967) *Aktionsart* classification of verbs into states, activities, achievements, and accomplishments. In addition, there is a class of semelfactive verbs (Smith, 1997), and the telic uses of activity verbs are termed active accomplishments. Each of these classes has a causative counterpart, and examples of each class are given in **Table 1**. These classes can be characterized in terms of four features, [± static], [± dynamic], [± telic], and [± punctual], as shown in **Table 2**.

Table 1 Active and causative accomplishments of activity verbs

Class	*Active*	*Causative*
State	The boy is afraid of the snake.	The snake frightens/scares the boy.
Activity	The soldiers marched in the park.	The sergeant marched the soldiers in the park.
Achievement	The soap bubble popped.	The cat popped the soap bubble.
Semelfactive	The light flashed.	The policeman flashed the light.
Accomplishment	The water froze.	The cold froze the water.
Active accomplishment	The soldiers marched to the park.	The sergeant marched the soldiers to the park.

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Semantics in Role and Reference Grammar

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Semantics plays a central role in Role and Reference Grammar (RRG). The aspects of semantics in RRG that are addressed herein are (1) the lexical representation of verbs and other predicating elements, (2) semantic roles, (3) the role of the lexicon in grammar, and (4) interclausal semantic relations. An overview of the theory as a whole is given in a companion article (*see* **Role and Reference Grammar**).

The Lexical Representation of Verbs

The heart of the RRG approach to lexical representation is a system of lexical decomposition based on Vendler's (1967) *Aktionsart* classification of verbs into states, activities, achievements, and accomplishments. In addition, there is a class of semelfactive verbs (Smith, 1997), and the telic uses of activity verbs are termed active accomplishments. Each of these classes has a causative counterpart, and examples of each class are given in Table 1. These classes can be characterized in terms of four features, [± static], [± dynamic], [± telic], and [± punctual], as shown in Table 2.

Table 1 Active and causative accomplishments of activity verbs

Class	*Active*	*Causative*
State	The boy is afraid of the snake.	The snake frightens/scares the boy.
Activity	The soldiers marched in the park.	The sergeant marched the soldiers in the park.
Achievement	The soap bubble popped.	The cat popped the soap bubble.
Semelfactive	The light flashed.	The policeman flashed the light.
Accomplishment	The water froze.	The cold froze the water.
Active accomplishment	The soldiers marched to the park.	The sergeant marched the soldiers to the park.

The most fundamental contrast is between static and nonstatic verbs, which distinguishes verbs that code a 'happening' from those that code a 'non-happening.' The feature [± dynamic] refers to whether the state of affairs involves action or not. The feature [± telic] concerns whether a verb indicates a state of affairs with an inherent temporal boundary or not; this can be either the onset of an action or the end of a process or action leading to a result state. Finally, the feature [± punctual] differentiates events with internal duration from those without. Achievements and semelfactives are both punctual, but they differ with respect to telicity: achievements have a result state or action (hence they are telic), whereas semelfactives do not (hence they are atelic).

These distinctions underlie the syntactic and semantic tests for the six noncausative classes. The tests are given in Table 3 (see Van Valin, 2005, for detailed discussion of the tests and their complications). The causative versions of these classes all pass the causative paraphrase test.

The formal representation of the *Aktionsart* classes is based on, but not identical with, the decompositional system proposed originally in Dowty (1979). The representations for the classes are given in Table 4. INGR or BECOME plus state predicate signals a change of state (see examples of achievements and accomplishments in Table 5), whereas INGR or BECOME plus activity predicate signals an onset of an action, for example, Russian *zaplakat'* 'burst out crying' (INGR **do**′ (x, [**cry**′ (x)])) versus *zagovorit'* 'start talking' (BECOME **do**′ (x, [**talk**′ (x)])). Semelfactives may be based on either an activity predicate, for example,. *flash* (SEML **do**′ (x, [**flash**′ (x)])), or a state predicate, for example, *glimpse* (SEML **see**′ (x, y)). Some work has been done on decomposing state and activity predicates (see Van Valin and Wilkins, 1993; Mairal and Faber, 2002).

The decompositional representation of a predicate is referred to as its 'logical structure' (LS). Examples of English verbs (and also some nonverbal predicates) with their LSs are given in Table 5. The order of arguments is discussed in the next section. Despite having INGR in their LSs, the telic use of activity verbs is, following the literature, referred to as '(active) accomplishments.'

In many languages, verbs in these different classes may be overtly morphologically inflected to signal their class, and verbs in different classes may be morphologically related to one another. State predicates are the basis of change of state verbs, achievements, and accomplishments, and these in turn are the basis for causative change of state verbs, causative achievements, and accomplishments. There are languages that represent these relationships explicitly in their verbal morphology. These languages fall into a number of groups (Haspelmath, 1993), two of which are discussed here. In the first group, the base is a state predicate, either a verb or an adjective, and to this base a morpheme is added that indicates BECOME or INGR, deriving an accomplishment or achievement. Then, to this derived form is added a causative morpheme, deriving a causative accomplishment or achievement. In Northern Qiang, a Tibeto-Burman language (Van Valin and LaPolla, 1997), the relationship is straightforward:

Table 2 Features of classes

Class	*Features*
State	[+ static], [− dynamic], [− telic], [−punctual]
Activity	[− static], [+ dynamic], [− telic], [− punctual]
Achievement	[− static], [− dynamic], [+ telic], [+ punctual]
Semelfactive	[− static], [± dynamic], [− telic], [+ punctual]
Accomplishment	[− static], [− dynamic], [+ telic], [− punctual]
Active accomplishment	[− static], [+ dynamic], [+ telic], [− punctual]

Table 3 Tests for *Aktionsart* classes[a]

Criterion	*State*	*Achievement*	*Semelfactive*	*Accomplishment*	*Activity*	*Active accomplishment*
1. Occurs with progressive	No*	No*	No*	Yes	Yes	Yes
2. Occurs with adverbs like *vigorously, actively*, etc.	No	No	Some*	No	Yes	Yes
3. Occurs with adverbs like *quickly, slowly*, etc.	No	No*	No*	Yes	Yes	Yes
4. Occurs with *X for an hour, spend an hour Xing*	Yes*	No*	Yes*	Irr*	Yes	Irr*
5. Occurs with *X in an hour*	No	No*	No*	Yes	No	Yes
6. Can be used as stative modifier	Yes	Yes	No	Yes	No	Yes
7. Has causative paraphrase	No	No	No	No	No	No

[a] * Indicatives complications arise with this test; Irr, irrelevant.

ba	'big'	[state]
tə-ba	'become big'	[accomplishment]
tə-ba-ʐ	'cause to become big'	[causative accomplishment]

Consider the examples in Table 6, from Huallaga Quechua Huallaga Huánuco Quechua). In Table 6 examples (a)–(d), accomplishment verbs are formed from state predicates by the addition of the suffix *-ya:* 'become' and causative accomplishments are formed from them by the addition of the causative suffix *-chi*. As Table 6 examples (e)–(f) show, *-chi* can be added to underived accomplishment verbs as well.

The second group of languages exhibits a rather different pattern expressing the same relationships; it includes Yagua (Peru), Russian, and French (see Table 7). In these three languages, the base form of the verb is a transitive causative accomplishment, and the intransitive accomplishment and state forms are derived morphologically from it.

The derivational relationships illustrated in Tables 6 and 7 can be readily accounted for in terms of this system of lexical decomposition. The state → accomplishment → causative accomplishment pattern found in Qiang and Huallaga Quechua follows directly from the lexical representations; for example, in Table 6 examples (c), *hatun-* (**big**′ (x)) → *hatun-ya:-* (BECOME **big**′ (x)) → *hatun-ya:-chi-* (. . . CAUSE [BECOME **big**′ (x)]). The pattern in Yagua, French, and Russian also indicates a systematic relationship among these classes, but the function of the morphological markers is to cancel part of the LS rather than to add components to it; for example, in the Yagua examples in Table 7, *-muta-* (. . . CAUSE [BECOME **open**′ (x)]) → *-muta-y-* (BECOME **open**′ (x)), in which *-y-* cancels the '. . . CAUSE' part of the LS, → *-muta-y-maa* (**open**′ (x)), in which *-maa* cancels the 'BECOME' part of the LS. The examination of the verbal systems of a number of languages had led to the conclusion that this set of distinctions is one of the fundamental organizing principles of verbal systems in human language.

The semantic representation of a clause contains information about operators such as illocutionary force and tense in addition to the predicating element's LS. A simple example is given in (1).

(1a) Are the children playing?
(1b) $<_{IF}$ *INT* $<_{TNS}$ *PRES* $<_{ASP}$ *PROG* <[**do**′ (children, [**play**′ (children)])]>>>>

Table 4 Formal representations of *Aktionsart* classes

Class	*Formal representative*
State	**predicate**′ (x) or (x,y)
Activity	**do**′ (x, [**predicate**′ (x) or (x, y)])
Achievement	INGR(ESSIVE) **predicate**′ (x) or (x,y), or INGR **do**′ (x, [**predicate**′ (x) or (x, y)])
Semelfactive	SEML **predicate**′ (x) or (x,y), or SEML **do**′ (x, [**predicate**′ (x) or (x, y)])
Accomplishment	BECOME **predicate**′ (x) or (x,y), or BECOME **do**′ (x, [**predicate**′ (x) or (x, y)])
Active accomplishment	**do**′ (x, [**predicate**$_1$′ (x, (y))]) & INGR **predicate**$_2$′ (z, x) or (y)
Causative	α CAUSE β, where α, β are representations of any type

Table 5 Logical structures of predicates in English

Class	*Example*	*Logical structure*
States	Sam is a lawyer.	**be**′ (Sam, [**lawyer**′])
	The vase is shattered.	**shattered**′ (vase)
	Chris is at the office.	**be-at**′ (office, Chris)
	Kim saw the photo.	**see**′ (Kim, photo)
Activities	The door squeaks.	**do**′ (door, [**squeak**′ (door)])
	Lee drank beer.	**do**′ (Lee, [**drink**′ (Lee, beer)])
Achievements	The vase shattered.	INGR **shattered**′ (vase)
	The bubble popped.	INGR **popped**′ (bubble)
Semelfactives	Lee sneezed.	SEML **do**′ (Lee, [**sneeze**′ (Lee)])
	Chris glimpsed Pat.	SEML **see**′ (Chris, Pat)
Accomplishments	The water froze.	BECOME **frozen**′ (water)
	The sky reddened.	BECOME **red**′ (sky)
	Kim learned Swahili.	BECOME **know**′ (Kim, Swahili)
Active accomplishments	Lee drank a beer.	**do**′ (Lee, [**drank**′ (Lee, beer)]) & INGR **drunk**′ (beer)
	Paul ran to the store.	**do**′ (Paul, [**run**′ (Paul)]) & INGR **be-at**′ (store, Paul)
Causatives	The dog scared the boy.	[**do**′ (dog, Ø)] CAUSE [**feel**′ (boy, [**afraid**′])]
	Mary broke the pencil.	[**do**′ (Mary, Ø)] CAUSE [BECOME **broken**′ (pencil)]
	The cat popped the bubble.	[**do**′ (cat, Ø)] CAUSE [INGR **popped**′ (bubble)]
	Fred rolled the ball.	[**do**′ (Fred, Ø)] CAUSE [**do**′ (ball, [**roll**′ (ball)])]

Table 6 Verbs in Hullaga Quechua

State	*Accomplishment*	*Causative accomplishment*
a. qarwash- yellow 'be yellow'	qarwash-ta:- yellow-become 'become yellow'	qarwash-ta:-chi- yellow-become-cause 'make something yellow'
b. hanq̀a- above.on.slope 'above'	hanq̀a-ya:- above.on.slope-become 'become higher'	hanq̀a-ya:-chi- above.on.slope-become-cause 'make something higher'
c. hatun- big 'be big'	hatun-ya:- big-become 'become bigger'	hatun-ya:-chi- big-become-cause 'make something bigger'
d. umasapa- big.headed 'be big-headed'	umasapa-ya:- big.headed-become 'become big-headed'	umasapa-ya:-chi- big.headed-become-cause 'make someone big-headed'
e. —	wañu- die 'die'	wañu-chi- die-cause 'kill'
f. —	yacha- learn 'learn'	yacha-chi- learn-cause 'teach'

From Weber (1989).

Table 7 Verbs in Yagua, French, and Russian

Language	*Causative accomplishment*	*Accomplishment*	*State*
Yagua[a]	-muta- 'open'	-muta-y- 'open'	-muta-y-maa 'be open'
French	briser 'break'	se briser 'break'	brisé 'broken'
Russian	razbit' 'break'	razbit'sja 'break'	razbityj 'broken'

[a]Data from Payne and Payne (1989).

Semantic Roles

The RRG theory of semantic roles is rather different from that of other theories, in that it posits two types of semantic roles. The first are specific thematic relations, the traditional (since Fillmore, 1968; Gruber, 1965) notions of agent, theme, patient, experiencer, and so on. The second are generalized semantic roles called 'semantic macroroles'; they were introduced in Van Valin (1977) and have no exact analog in other theories, although Jackendoff's 'action tier' and Dowty's proto-roles bear some resemblance (see Van Valin, 1999, for a comparison of the different theories of generalized semantic roles). Following the ideas of Gruber (1965) and Jackendoff (1976), RRG defines thematic relations in terms of argument positions in LSs such as those in Tables 4 and 5. All thematic relations are defined in terms of argument positions in state and activity LSs; all other LS types are composed of them plus elements such as BECOME, INGR, and CAUSE.

The thematic relations posited in RRG are given in Table 8. Well-known relations such as recipient and goal are possessor or location arguments embedded under BECOME/INGR, whereas motion and transfer sources are location and possessor arguments embedded under BECOME/INGR NOT. Instruments are intermediate inanimate effectors in a causal chain. In verbs that lexicalize agency (e.g., *murder*), agent is represented by 'DO (x, . . .', following Dowty (1979). However, in most cases, agent is an implicature related to human effectors with certain types of activity predicates and is not represented in the LS of the verb (see Holisky, 1987; Van Valin and Wilkins, 1996). Because thematic relations have no independent status, they are really just mnemonics for the argument positions in LSs; for example, 'experiencer' stands for 'the first argument of a two-place state predicate of internal experience'.

Table 8 could give the impression that RRG posits a great many thematic relations, but in fact there are only five relevant distinctions. The five distinctions correspond to the five possible argument positions in LSs. This may be represented as in Figure 1. Agents are willful, controlling, instigating participants in states of affairs, whereas patients are strongly affected participants. Positing these as end points on the cline makes it possible to locate the other role types with regard to them. The DO of lexicalized agency always co-occurs with **do**′ (x, . . ., which defines effector and its subtypes, and therefore the first two columns are closely related to one another; both of them expressing participants that do something. At the other end of the continuum are patient, theme, and so forth. The single argument of state **predicate**′ (x)

includes those participants that are crushed, killed, smashed, shattered, broken, destroyed, and so on, whereas the second argument of **predicate′** (x, y) includes those participants that are placed, moved, thrown, given, possessed, transferred, seen, heard, loved, and so on. In terms of affectedness, the former type of participant is much more affected than the latter, hence the placement of the single argument of state **predicate′** (x) at the end of the hierarchy. Into the middle of the continuum falls the first argument of **predicate′** (x, y). If it is contrasted with the first argument of **do′**, it is clear that seeing, thinking, believing, possessing, and so on are less agentlike than are speaking, doing, moving, performing, and consuming, hence their placement to the right of effector. If, on the other hand, the contrast is with the second

Table 8 RRG definitions of thematic relations in terms of LS argument positions

	Class	*Thematic relations*	*Definition of x, y*
I. State verbs			
A. Single argument	1. State or condition	**broken′** (x)	x = patient
	2. Existence	**exist′** (x)	x = entity
B. Two arguments	1. Pure location	**be-LOC′ (x, y)**	x = location, y = theme
	2. Perception	**hear′** (x, y)	x = perceiver, y = stimulus
	3. Cognition	**know′** (x, y)	x = cognizer, y = content
	4. Desire	**want′** (x, y)	x = wanter, y = desire
	5. Propositional attitude	**consider′** (x, y)	x = judger, y = judgment
	6. Possession	**have′** (x, y)	x = possessor, y = possessed
	7. Internal experience	**feel′** (x, y)	x = experiencer, y = sensation
	8. Emotion	**love′** (x, y)	x = emoter, y = target
	9. Attributive	**be′** (x, [**pred′**])	x = attributant, y = attribute
	10. Identificational	**be′** (x, [**pred′**])	x = identified, y = identity
	11. Specificational	**be′** (x, y)	x = variable, y = value
	12. Equational	**equate′** (x, y)	x, y = referent
II. Activity verbs			
A. Single argument	1. Unspecified action	**do′** (x, Ø)	x = effector
	2. Motion	**do′** (x, [**walk′** (x)])	x = mover
	3. Static motion	**do′** (x, [**spin′** (x)])	x = st-mover
	4. Light emission	**do′** (x, [**shine′** (x)])	x = 1-emitter
	5. Sound emission	**do′** (x, [**gurgle′** (x)])	x = s-emitter
B. One or two arguments	1. Performance	**do′** (x, [**sing′** (x, (y))]	x = performer, y = performance
	2. Consumption	**do′** (x, [**eat′** (x, (y))])	x = consumer, y = consumed
	3. Creation	**do′** (x, [**write′** (x, (y))])	x = creator, y = creation
	4. Directed perception	**do′** (x, [**hear′** (x, (y))])	x = observer, y = stimulus
	5. Use	**do′** (x, [**use′** (x, y)])	x = user, y = implement

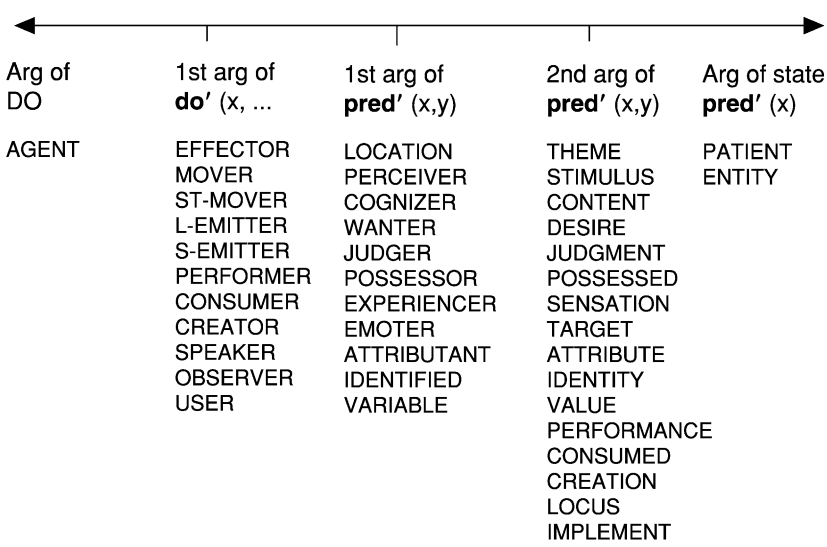

Figure 1 Thematic relations continuum in terms of LS argument positions.

argument of **predicate′** (x, y), then the reverse follows: seeing, thinking, liking, believing, and so on involve some kind of internal activity (mental, emotional or perceptual) on the part of the participant, whereas being seen, being thought about, being liked, and being believed do not require any action or effort of any kind on the part of the participant. Hence, the participant referred to by the first argument is more active and, hence, more agentlike than the participant referred to by the second argument and, accordingly, the first argument is closer to the agent end of the hierarchy than the second argument. Thus, the place of the different argument positions in the continuum in Figure 1 is indicative of the semantic contrasts among them.

The second type of semantic role plays a crucial role in the theory; macroroles act as the primary interface between the LS and syntactic representations. There are only two macroroles, actor and undergoer, corresponding to the two primary arguments in a prototypical transitive relation. They are called 'macroroles' because each subsumes a number of specific thematic relations. Consider the range of thematic relations that can function as subject and direct object in English, as shown in Table 9 (the subject NPs and their thematic relation are in italics; the direct object NPs and their thematic relations are in boldface). There is a range, sometimes overlapping, of thematic relations that can serve as subject and direct object; the subject can be an agent (effector), instrument (effector), perceiver, or recipient, whereas the direct object can be a patient, theme, stimulus, recipient, source, or perceiver. The passive versions of these sentences are given in (2).

(2a) **The duckling** was killed by *the farmer*
(2b) **The window** was broken by *the* rock
(2c) **The summons** was received by *the lawyer*
(2d) **The accident** was seen by *many tourists*
(2e) **Bill** was presented with the award by *Sally*

Table 9 Thematic relations of subjects and objects in English

Sentence	*Subject relation*	*Object relation*
The farmer killed **the duckling**.	*Effector/Agent*	**Patient**
The rock broke **the window**.	*Effector/ Instrument*	**Patient**
The lawyer received **the summons**.	*Recipient*	**Theme**
Many tourists saw **the accident**.	*Perceiver*	**Stimulus**
Sally presented **Bill** with the award.	*Effector/Agent*	**Recipient**
The mugger robbed **Sam** of $50.	*Effector/Agent*	**Source**
The clown showed **the child** a trick.	*Effector/Agent*	**Perceiver**

(2f) **Sam** was robbed of $50 by *the mugger*
(2g) **The child** was shown a trick by *the clown*

The very same grouping of thematic relations that functions as the direct object in Table 9 serves as the subject in (2), and similarly, the same grouping of thematic relations that functions as the subject in Table 9 appears as the object of *by* in the passive versions. The grammatical relations are different in Table 9 and (2), and yet the groupings of thematic relations are the same. This shows that these groupings do not constitute a grammatical relation but rather another, more general type of semantic role. The role of the subject of an active voice transitive verb and the object of *by* in a passive construction is actor, and the role of the direct object of an active voice transitive verb and the subject of a passive verb is undergoer. In terms of Table 9, the thematic relations in the second column function as the actor with each of those verbs, and the relations in the third column function as the undergoer with each of them. Actor and undergoer are thus generalizations across the thematic relations in each column. The single argument of an intransitive verb is either an actor, as with verbs such as *run*, or an undergoer, as with verbs such as *die*.

The relationship between the macroroles and the argument positions in LSs is captured in the actor-undergoer hierarchy in Figure 2. The positions in the actor-undergoer hierarchy are the same LS argument positions ranked as in Figure 1. Given the LS of a verb, the most agentlike argument will be actor and the most patientlike will be undergoer, in the default case. Macroroles are not equivalent to grammatical relations, as shown in the following German examples.

(3a) Der Junge [SUBJ, ACTOR] hat den Kuchen [OBJ, UNDERGOER] aufgegessen
'The boy [SUBJ, ACTOR] ate the cake [OBJ, UNDERGOER]'
(3b) Der Kuchen [SUBJ, UNDERGOER]wurde vom Jungen [ACTOR] aufgegessen
'The cake [SUBJ, UNDERGOER] was eaten by the boy [ACTOR]'
(3c) Der Hund [SUBJ, ACTOR] ist um das Haus herumgelaufen
'The dog [SUBJ, ACTOR] ran around the house'
(3d) Der Hund [SUBJ, UNDERGOER] ist gestorben
'The dog [SUBJ, UNDERGOER] died'

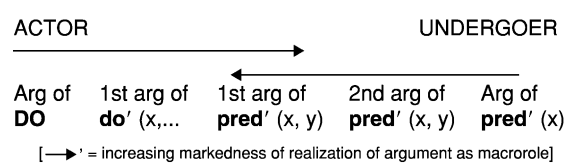

Figure 2 Actor-undergoer hierarchy.

The exact role of macroroles in the mapping (or linking) between semantic and syntactic representations is discussed elsewhere (*see* **Role and Reference Grammar**).

The Lexicon

The lexicon plays a very important role in RRG, and it should be considered a lexicalist theory. Lexical entries for verbs are built around LSs; the lexical representation of nouns is based on the theory of nominal qualia proposed in Pustejovsky (1995). RRG takes the position that lexical entries for verbs should contain only idiosyncratic information, with as much as possible derived from general lexical principles or rules. Information about transitivity is very important, and RRG defines transitivity in terms of the number of macroroles that a verb takes (Narasimhan, 1998): M(acrorole)-transitive = 2, M-intransitive = 1, M-atransitive = 0. In RRG, no syntactic subcategorization information is included in lexical entries; all the relevant information is derivable from the LS of the verb plus information about its transitivity. Thus, these principles have the effect of predicting the syntactic subcategorization of a verb from its semantic representation. (See Van Valin and LaPolla, 1997, for an application of this to the analysis of syntactic issues in a wide range of languages.) All theories must specify the transitivity of exceptional verbs, and this is done in RRG by specifying their M-transitivity in terms of [MRα], where α is 0, 1, or 2. Sample lexical entries for some English verbs are given in Table 10. The prepositions that mark oblique core arguments can, in many instances, be predicted from the LS of the verb and therefore need not be listed in the lexical entry (cf. Jolly, 1993; Van Valin and LaPolla, 1997).

RRG distinguishes lexical from syntactic phenomena in terms of the linking scheme (*see* **Role and Reference Grammar**). Basically, any process that affects LSs or the arguments therein or the mapping between LSs and macroroles is considered to be lexical. Examples include causativization, regardless of whether it is morphologically unmarked (as in English) or marked (as in Japanese and Lakhota (Lakota)); noun incorporation; the 'dative alternation' (which is analyzed as variable linking to undergoer; cf. Van Valin, 1993a, 2005); and some types of passivization and antipassivization. Syntactic phenomena involve the mapping between macroroles and the syntactic representation, for example, some types of passivization and antipassivization; Wh-question formation in languages such as English and Icelandic; and 'raising' constructions (cf. Van Valin, 2005).

Table 10 Sample lexical entries for English verbs

Verb	*Lexical entry*
kill	[**do**′ (x, Ø)] CAUSE [BECOME **dead**′ (y)]
own	**have**′ (x, y)
belong (to)	**have**′ (x, y) [MR1]
put	[**do**′ (w, Ø)] CAUSE [BECOME **be-LOC**′ (x, y)]
seem	**seem**′ (x, y) [MR0]
see	**see**′ (x, y)
watch	**do**′ (x, [**see**′ (x, y)])
show	[**do**′ (w, Ø)] CAUSE [BECOME **see**′ (x, y)]
run	**do**′ (x, [**run**′ (x)])
melt	BECOME **melted**′ (x)

The Semantics of Clause Linkage

Syntactic clause-linkage relations (*see* **Role and Reference Grammar**) are used to express certain semantic relations between the units in the linkage (e.g., causation, purpose, and temporal sequence). The interclausal semantic relations are given next.

1. Causative [1]: The bringing about of one state of affairs directly by another state of affairs, usually an event or action, for example, *Max painted the door green, Larry pushed the window open*.
2. Phase: A separate verb describes a facet of the temporal envelope of a state of affairs, specifically its onset, its termination, or its continuation, for example, *Chris started crying, Fred kept singing, Hari finished writing the chapter.*
3. Modifying subevents
   - Manner: The manner in which a motion event is carried out, for example, *Bill entered the room skipping*.
   - Motion: Motion accompanying another action, for example, Mparntwe Arrente (Wilkins, 1991):

     angk-tyantye-
     speak-go.upward
     'speak while going up'.

   - Position: Stance while doing an action, for example, *Dana sat reading a newspaper.*
   - Means: The means by which an action is carried out, for example, *Sam opened the box by slicing it with a knife*.
4. Psych-action: A mental disposition regarding a possible action on the part of a participant in the state of affairs, for example, *Max decided to leave, Sally forgot to open the window, Tanisha wants to go to the movies*.
5. Purposive: One action is done with the intent of realizing another state of affairs, for example,

Juan went to the store to buy milk, Susan brought the book to read.

6. Jussive: The expression of a command, request, or demand, for example, *Pat asked the student to leave, the king ordered the troops to attack the city.*
7. Causative [2]: The bringing about of one state of affairs through a distinct action or event, for example, *Fred forced Max to paint the table.*
8. Direct perception: An unmediated apprehension of some act, event, or situation through the senses, for example, *Rex saw the child open the door, Yolanda heard the guests arrive.*
9. Indirect perception: The deduction of some act, event, or situation from evidence of it, for example, (looking at an empty desk) *I see that John has gone home early.*
10. Propositional attitude: The expression of a participant's attitude, judgment, or opinion regarding a state of affairs, for example, *Carl believes that UFOs are a menace to the Earth, Paul considers Carl to be a fool, most fans want very much for their team to win.*
11. Cognition: An expression of knowledge or mental activity, for example, *Aaron knows that the Earth is round, George is thinking about Madeleine's refusal to go out with him.*
12. Indirect discourse: An expression of reported speech, for example, *Frank said that his friends were corrupt.*
13. Direct discourse: The direct quotation of a speech event, for example, *Frank said, "My friends are corrupt."*
14. Circumstances: The spatial or temporal parameters of an event, for example, *Sam talked to Sally at the library after work.*
15. Reason: The motivation or cause for an action or event, for example, *The baby cried because she was hungry.*
16. Conditional: An expression of what consequence would hold, given the conditions in a particular state of affairs, for example, *if it rains, we won't be able to have a picnic*; *were Fred to leave now, he would look like a fool.*
17. Concessive: The content of the main clause holds unexpectedly, given the content of the subordinate clause, for example, *Bill made it to work, even though it was snowing heavily.*
18. Temporal
    - Simultaneous states of affairs: One state of affairs is temporally coterminous with another, for example, *Max danced, and at the same time Susan played the piano.*
    - Sequential states of affairs: One state of affairs follows another temporally, with or without any temporal overlap, for example, *Juan had finished talking, and then Carlos entered the room.*
19. Temporally unordered states of affairs: The temporal relation between states of affairs is unexpressed, for example, *Tyrone talked to Tanisha, and Yolanda chatted with Kareem.*

These relations may be given a formal characterization in terms of the RRG decompositional system, following a suggestion of Ohori (2001). This is presented in Table 11. In this table, Causative [1] has the same LS as a lexical causative verb, as in the causative examples in Table 5, whereas Causative [2] involves a matrix LS, the LS of an overt causative verb and an embedded LS, as in *Kim forced Chris to wash the dishes*. See Jolly, 1993, for an explication of the purposive LS. '(x, [LS . . . x . . .])' means that the participant denoted by *x* is involved in both states of affairs signaled by the matrix and embedded LSs. The *x*

Table 11 Formal characterization in terms of RRG[a]

a. Causative [1]	. . . CAUSE . . .
b. Phase	BECOME/INGR, KEEP, TERMINATE
c. Modifying subevents	
1. Manner	**do**′ (x, [**MOTION**′ (x)] . . . ∧ [**MANNER.OF.MOTION**′ (x)])
2. Motion	**do**′ (x, [**MOTION**′ (x)] . . . ∧ [**pred$_2$**′ (x, (z))])
3. Position	**do**′ (x, [**STANCE**′ (x)] ∧ [**pred$_2$**′ (x, (z))])
4. Means	**do**′ (x, [. . .] ∧ [**pred$_2$**′ (x, z)])
d. Psych-action	**MENTAL.DISPOSITION**′ (x, [LS . . . x . . .])
e. Purposive	**want**′ (x, LS$_2$) ∧ DO (x,[[LS$_1$] ◇ CAUSE [LS$_2$]])
f. Jussive	[**do**′ (x, [**say**′ (x, y)])] CAUSE [**MENTAL.DISP**′ (y, [LS . . . y . . .])]
g. Causative [2]	[**do**′ (x, Ø)] CAUSE [**undergo**′ (y, [LS . . . y . . .])]
h. Direct perception	**PERCEIVE**′ (x, [LS . . . y . . .])
i. Indirect perception	**PERCEIVE**′ (x, [LS])
j. Propositional attitude	**BELIEVE**′ ((x,) [LS])
k. Cognition	**KNOW**′ (x, [LS])
l. Indirect discourse	**do**′ (x, [**say**′ (x, [LS ∧ TNS . . . ∧])])
m. Direct discourse	**do**′ (x, [**say**′ (x, [LS ∧ IF . . . ∧])])
n. Circumstances	**be-LOC/TEMP**′ ([LS$_1$], [LS$_2$])
o. Reason	[LS$_1$] **BECAUSE**′ [LS$_2$]
p. Conditional	[LS$_1$] ∧ [LS$_2$]
q. Concessive	[LS$_1$] **IN.SPITE.OF**′ [LS$_2$]
r. Temporal	[LS$_1$] ∧ [LS$_2$] [LS$_1$] & [LS$_2$]
s. Situation-situation	[LS$_1$] + [LS$_2$]

[a] ∧ means 'and simultaneously'; & means 'and then'; + indicates temporally neutral coordination; ◇ means possibly.

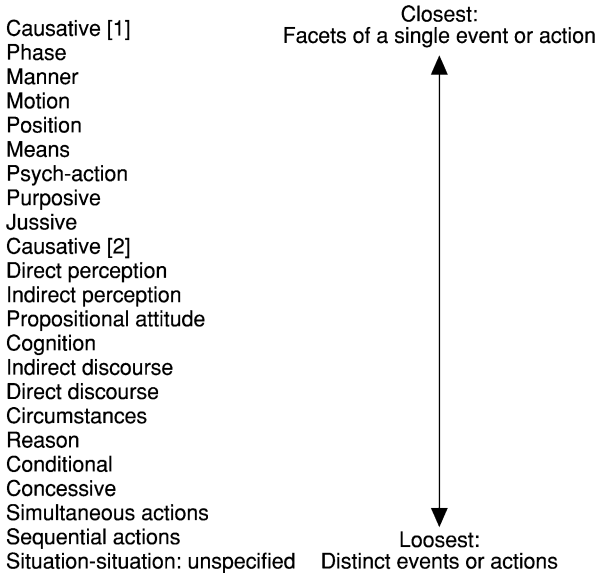

Figure 3 Interclausal semantic relations hierarchy.

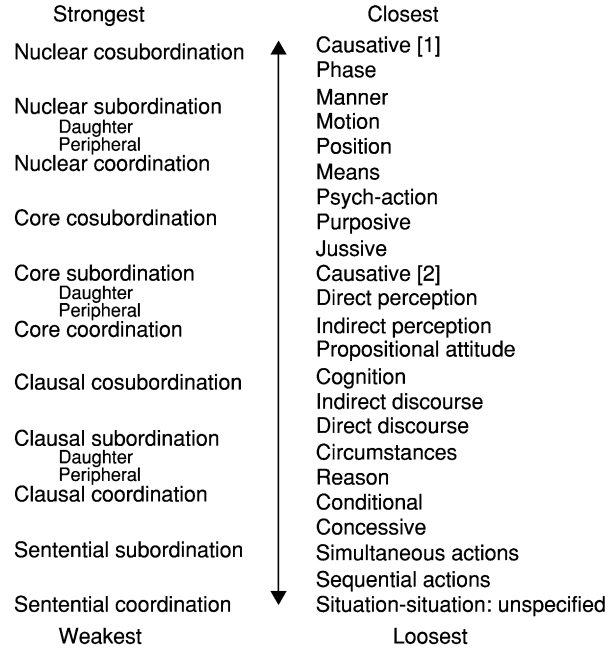

Figure 4 Interclausal relations hierarchy.

argument in Table 11 example (j) is optional because some propositional attitude predicates are one-place and take only a propositional argument (e.g., *be true, be false, be certain*). The contrast between direct and indirect discourse is signaled by the existence of an illocutionary force operator in the embedded LS in direct discourse and by the lack of one in the embedded LS in indirect discourse.

The semantic relations form a continuum expressing the degree of semantic cohesion between the propositional units linked in the complex structure, that is, the degree to which they express facets of a single action or event or discrete actions or events. This may be represented as in Figure 3.

The syntactic linkage relations may be ranked hierarchically in terms of the strength of the syntactic bond between the units, that is, in terms of how integrated the units are into a single unit or are coded as distinct units. The interaction of the two hierarchies is expressed in the interclausal relations hierarchy in Figure 4. The relationship between the syntactic and semantic relations in clause linkage is very complex – it is not one to one – but there are some striking regularities cross-linguistically. The primary principle governing the interaction of the two hierarchies is: the closer the semantic relation between two propositions, the stronger the syntactic link joining them is (Silverstein, 1976; Givón, 1980). In other words, the semantic relations at the top end of the hierarchy should be realized by the linkage categories at the top as well, and the relations at the bottom of the hierarchy should be realized by the linkage categories at the bottom of the syntactic side. Moreover, although there is often more than one syntactic realization of a particular semantic relation, the tightest syntactic linkage realizing it should be tighter than the tightest syntactic linkage realizing looser semantic relations.

See also: Aspect and Aktionsart; Role and Reference Grammar; Thematic Structure.

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Semantics of Interrogatives

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Many problems in semantics are typically expressed as problems about how to define a function from the form of a sentence to the conditions in which the sentence can be uttered truly (or, alternatively, to a proposition that can be expressed by an utterance of the sentence). The main problem posed by interrogatives for the truth-conditional approach to semantics is rather different. They do not give rise to a problem of how to map a function from the form of a sentence to its truth conditions. Rather, they give us reason to suspect that there is no such function. For interrogatives, unlike indicatives, do not seem to have truth conditions, and nor do they seem to express propositions that themselves have truth conditions. The main problem interrogatives pose is metasemantic: to say what a semantics for interrogatives must do.

In the 'Metasemantics' section of this article, I survey three attempts to deal with this question. In the 'Semantics' section, I present some basic-level semantic questions that would need to be addressed even if the metasemantic question were settled – though in all probability they will in fact **help** us to settle the metasemantic question.

Metasemantics

Above, I introduced one constraint on choosing a semantic framework for interrogatives: interrogative sentences are not true or false, so we should not assign to them some semantic object that is true or false, at least not without further explanation. Another is the Davidsonian constraint of 'semantic innocence': the fixed meaning of a word should not vary with the environment in which it occurs. This constraint generates a tension with any approach to the metasemantic problem that ignores the truth-conditional approach that works so nicely for indicative sentences. For this reason, the three dominant frameworks that I will focus on all treat the semantics of interrogatives in broadly truth-conditional terms. That is, in all of the frameworks to be discussed here, the meaning of an interrogative is in some way tied to a propositional object of some sort. In the rest of this section, I will look at the following three approaches to

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the metasemantic problem: the force/radical approach, the epistemic-imperative approach, and the question-as-answer approach.

According to the force/radical approach, sentences can be factored into two components: a force indicator and a propositional radical. Roughly, the propositional radical supplies the truth-conditional content to the sentence, and the force indicator suggests the attitude taken toward that content. So, on this approach, advanced by McGinn (1977), Davidson (1984), and Stainton (1999), sentences (1) and (2) have the same radical and different moods:

(1) The monkey is hungry.

(2) Is the monkey hungry?

The mood of the sentence indicates the force of a typical utterance of the sentence. Sentences in the indicative mood are typically used for asserting the proposition expressed by the radical. Sentences in the interrogative mood are typically used to ask whether the proposition expressed by the radical is true.

This picture works well for yes/no questions, such as (2). What about wh-questions, such as (3)?

(3) What does the monkey want?

The radical of (3) could be thought of as a propositional function of the form in (4):

(4) λx: the monkey wants x

Some story would then be needed to explain why attaching an interrogative mood to (4) would yield the desired interpretation. In addition, it seems like the only mood one could attach to (4) is the interrogative mood. This seems out of character with the general approach, which emphasizes the possibility of attaching different moods to the same radical, thus requiring some explanation if the approach is to be defended.

The epistemic-imperative approach treats the meaning of an interrogative as an imperative concerning one's epistemic state. Sentence (2) would be analyzed as meaning what (5) means, and (3) would be analyzed as meaning what (6) means.

(5) Let it be the case that (or: Bring it about that) I know whether the monkey is hungry.

(6) Let it be the case that (or: Bring it about that) I know what the monkey wants.

On this approach, advocated by Åqvist (1965) and Hintikka (1983), the direct interrogative exemplified by (2) and (3) is analyzed in terms of the indirect interrogative contained in (5) and (6). In order for this approach to provide a semantic framework for interrogatives, an account of the semantics of indirect interrogatives is needed.

Hintikka gave an analysis of 'know whether' in terms of 'know that.' Sentence (5) on this analysis would be equivalent to (7):

(7) Bring it about that either I know that the monkey is hungry, or I know that the monkey is not hungry.

However, this analysis of indirect interrogatives faces difficulties when embedded under verbs such as 'wonder':

(8) I wonder whether the monkey is hungry.

Sentence (8) does not seem susceptible to a similar sort of paraphrase, causing trouble for any view that attempts to analyze away the indirect interrogative.

Finally, the question-as-answer approach treats the interrogative, either direct or indirect, as denoting a question, where this is understood to be a special sort of semantic object. Since a question determines a set of answers, the set of answers is used as a surrogate object for the question (much in the way that a set of possible worlds is used as a surrogate object for propositions). The intuitive idea motivating this approach, originating in Hamblin (1958), is that to know the meaning of a question is to know what counts as an answer to it. Different versions of the approach differ in which set of answers is used.

On the most standard version of this approach, advanced by Hamblin (1958) and Groenendijk and Stokhof (1994), the meaning of an interrogative should be thought of as the set of possible answers to a question, where this set of possible answers forms a partition of logical space. Every possible answer on this view is a complete answer to the question, and the set of answers jointly exhausts the possibilities of complete answers.

Karttunen (1977) provided two reasons for treating the meaning of an interrogative as the set of its true, rather than possible, answers. First, consider sentence (9):

(9) Who is elected depends on who is running.

According to Karttunen, this sentence says that the true answer to the subject position question depends on the true answer to the object position question. So treating the meanings of interrogatives as sets of true answers provides a more straightforward account of verbs such as 'depend on.' Second, consider sentences (10) and (11):

(10) John told Mary that Bill and Susan passed the test.

(11) John told Mary who passed the test.

Sentence (11) entails that John told Mary the truth, whereas this is not the case with sentence (10). By treating the indirect interrogative in (11) as denoting a set of true answers, this entailment is straightforwardly explained.

Karttunen's account has some counterintuitive consequences, however. For example, somebody who asks question (2) in a situation where the monkey is hungry intuitively asks the same question as somebody who asks question (2) in a situation where the monkey is not hungry. But on Karttunen's account, the meaning of the questions asked in the two situations is different, since the true answers to the questions asked are different.

A more general worry with the question-as-answer approach, articulated by Stainton (1999), is that it makes the domain of the interrogative – the set of objects that figure in the possible answers to it – a part of its meaning. It seems intuitive that one can understand a question without knowing anything about the objects that figure in the possible answers to it. For example, if an alien from outer space lands on Earth, we might ask the question 'What does the alien want?' Surely, among the possible answers to this question are objects that we've never seen or imagined before. But that doesn't stop us from understanding the meaning of the question, as it seems it should on the question-as-answer approach.

Although the approaches to the metasemantic problem presented here are dominant in the literature, they are by no means exhaustive. Ultimately, the success of a given framework will depend on the extent to which it is successful in accounting for various semantic phenomena.

Semantics

One of the ongoing semantic debates in the semantics of interrogatives concerns the ambiguity that results from a wh-question containing a universal quantifier, as in (12):

(12) Who does everyone like?

According to one reading of (12), the question is asking which people are such that every person likes them. An appropriate answer might be, for example, 'Bill and Mary.' On the other reading of (12), the question is asking which person each person likes. An appropriate answer to this question would be a list of pairs of people of the form 'Bill likes Mary, Mary likes Sue, Sue likes Bill.' The debate specifically concerns this second reading of the question, called the pair/list reading. The question is how to account for that reading semantically.

There have been two main sides to the debate. According to one standard view, the role of the quantifier that occurs in the interrogative is to restrict the domain of the question. So (12) could be paraphrased roughly as (13):

(13) For every person, who does that person like?

Exactly how this paraphrased reading is derived from (12) will depend in large part on the metasemantic approach that one favors. For example, Groenendijk and Stokhof (1984) modified Karttunen's metasemantic approach in implementing their view.

According to an alternative view, pair/list readings are an instance of a more general kind of reading. Consider the following question/answer pair in (14):

(14a) Who does every man love?
(14b) His mother.

The answer in (14) gives rise to a functional reading of the question. The answer to the question is not an individual, but a function – that is, a rule which takes one from an object to another object. Pair/list readings are, according to this alternative, functional readings, where the function is specified extensionally, in terms of the ordered pairs in the extension of the function. This view was presented in Engdahl (1985) and developed by Chierchia (1993). Accounting for functional readings is an interesting semantic issue in its own right. For alternative accounts of pair/list readings, see Beghelli (1997), Szabolcsi (1997a), and Pafel (1999).

Another semantic issue concerns the nature of the presuppositions that different sorts of questions give rise to. For example, the question 'What is it like owning a monkey?' presupposes that the addressee owns a monkey. The question 'Who came to the party?' presupposes that someone came to the party. The question 'Which monkey ate the banana?' presupposes that a unique monkey ate the banana. Whether these presuppositions are semantic in nature and, if so, where they arise from has been a contested issue. See Belnap and Steel (1976), Karttunen (1977), Higginbotham and May (1981), and Hintikka (1983).

A final semantic issue that is of both linguistic and philosophical interest concerns the context sensitivity involved in whether something counts as an answer to a question. This issue is particularly pressing for the question-as-answer approach, since most versions of that approach assume that each question has some unique complete answer. Ginzburg (1995) developed a novel account of the semantics of interrogatives aimed at accommodating various sorts of context sensitivity. In general, questions calling for the identification of something seem to be interest relative. For

example, the sentence 'Where am I?' might be used to ask for the country in which one is located, the street on which one is located, the room in which one is located, etc. In some situations, one counts as knowing who killed Lady Chittlesworth when one knows simply that the murderer is the person that was wearing the yellow shirt. In other situations, this would not count as an acceptable answer. See Boër and Lycan (1985) for an account of knowing who someone is.

This brief survey of issues is far from exhaustive. For a very useful overview of both metasemantic approaches to interrogatives and semantic issues concerning interrogatives, see Groenendijk and Stokhof (1994).

See also: Mood, Clause Types, and Illocutionary Force; Truth Conditional Semantics and Meaning.

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Semantics of Prosody

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From the speaker's perspective, 'intonation' is the systematic variation in rate of vocal fold vibration that cannot be attributed to lexical properties of words (lexical tone) or to effects that are a result of consonants or vowels ('microprosody'). In more recent discussions of intonational meaning, a distinction is generally drawn between 'linguistic meaning,' which is associated with the structural elements making up the intonation contour, and 'paralinguistic meaning,' which derives from the way an intonation contour is pronounced (e.g., Ladd, 1996). The first section of this article discusses linguistic meaning and identifies three aspects of the structure that contribute to that meaning, phrasing, pitch accent distribution, and pitch accent type. The following section discusses paralinguistic meanings and links these to physiological conditions in the speech production process which have an effect on the rate of vocal fold vibration.

Linguistic Meaning

There are three aspects of the prosodic structure that can convey meaning: prosodic phrasing, pitch accent location, and type of pitch accent or melody. 'Prosodic phrasing' is the division of utterances into word groups, whereby smaller word groups can be distinguished within larger word groups ('prosodic hierarchy'). The difference between {*To govern, people use language*} and {*To govern people, use language*} illustrates a difference in 'intonational phrasing,' while that between {*They'll award*} {*Áberdéen*} {*Architecture*} (i.e., during a centralized redistribution of academic disciplines over universities) and {*They'll award*} {*Áberdeen árchitecture*} (i.e., give a prize to) illustrates a difference

example, the sentence 'Where am I?' might be used to ask for the country in which one is located, the street on which one is located, the room in which one is located, etc. In some situations, one counts as knowing who killed Lady Chittlesworth when one knows simply that the murderer is the person that was wearing the yellow shirt. In other situations, this would not count as an acceptable answer. See Boër and Lycan (1985) for an account of knowing who someone is.

This brief survey of issues is far from exhaustive. For a very useful overview of both metasemantic approaches to interrogatives and semantic issues concerning interrogatives, see Groenendijk and Stokhof (1994).

See also: Mood, Clause Types, and Illocutionary Force; Truth Conditional Semantics and Meaning.

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in 'phonological phrasing.' Two comments are in order here. First, a direct reflection of syntactic structure in prosodic structure may be upset by the length of constituents. For instance, if there is only a single word after *award* in the first of the last two examples, it would form a single phonological phrase with the verb, as in {*They'll award Aberdéen*}. Second, many languages require that the 'focus constituent' – the part of the sentence which the speaker intends to contribute as the new information – should begin or end at a prosodic phrase boundary. Thus, for example, Bengali ends the focus constituent with a phonological phrase boundary, regardless of the syntactic phrase structure, and while {*Shamolir bari*} 'Shamoli's house' could be an answer to 'What's that?', {*Shamolir*} {*bari*} implies a question: 'Whose house?' In a similar way, many languages, English among them, use pitch accents to convey information structure. Information structure concerns the status of the propositional information contained in the focus constituent relative to what the speaker assumes the hearer already knows. This need not be confined to marking 'newness,' as in the Bengali example, but also includes the status of the proposition as a description of a real event, as shown by *THIEVES will be PROSecuted* versus *THIEVES will be prosecuted*. In the second sentence, the absence of a pitch accent on the verb does not signify it is meant to be 'old' information, but causes the proposition to describe an upcoming event (cf. Gussenhoven, 2005).

Approaches to linguistic meaning of speech melody, the third structural aspect of prosody, can be distinguished on the basis of the size of the meaning-bearing (melodic) morpheme, which in principle ranges from a single tone (high or low) to the whole contour. The most fine-grained morphemic structure was proposed by Pierrehumbert and Hirschberg (1990), for whom each pitch accent and each boundary tone is a morpheme, and the most coarse-grained one by Liberman and Sag (1974) and Sag and Liberman (1975), who saw utterance-wide contours as morphemes. Intermediate positions were proposed in the mid-1970s by Brazil (1985), followed by Gussenhoven (1984), both of whom attached meanings to nuclear tones, i.e., combinations of pitch accents and boundary tones.

Consensus would appear to have been reached on the issue of whether the meaning of an intonation contour can be described independently of the meaning of the sentence it is used with, with Ladd's (1978: 139) 'lexical' approach to intonational meaning. Intonational meaning has alternatively been viewed as something that can only be characterized in combination with sentence type, which Cruttenden (1996: 91) refers to as 'local' meaning, where the suggestion is that a common element may be difficult or impossible to isolate from the meanings of a given tune in declaratives, questions, commands, etc. There is widespread agreement that intonational morphemes in fact have 'lexical' meaning and that this concerns discourse structure or information structure, rather than speech acts (e.g., Sag and Liberman, 1975) or speaker attitudes (e.g., O'Connor and Arnold, 1973). That is, intonational morphemes typically do not mean 'promise' or 'skepticism,' but rather define the way the speaker intends the proposition to be fitted into what he believes the hearer already knows at that point in their conversation (Brazil, 1985; Gussenhoven, 1984), or, as Pierrehumbert as Hirschberg (1990: 285) put it, "speakers use tunes to specify a particular relationship between the 'propositional content' [...] and the mutual beliefs of participants in the current discourse." For instance, the falling-rising tune of English has been characterized as somehow reactivating information by several authors (e.g., Brazil, 1985; Steedman, 1991), while the falling tune conveys that the information is new. In this view, the melodic meanings and the meanings conveyed by pitch accent distributions come from the same class. Since morphemes are acquired, they may and often do differ from language to language. For example, a pattern such as the English declarative fall signifies a question in Chickasaw (Gordon, 2003), and the number of languages in which rising pitch is regularly used for statements must be fairly large (Bolinger, 1978).

Paralinguistic Meaning

Just as segment duration and voice quality can be varied for expressive purposes (e.g., *How sa-ad!* or *I want it!* said with breathy voice) without changing the identity of the linguistic expression, so can pitch be varied, independent of the identity of the intonation contour. 'Pitch span,' the distance between the highest and the lowest pitch, and 'pitch register,' the average pitch of the contour, can be varied to express such meanings as insistent, sad, confident, etc. Relating pitch to the size of the larynx, and hence to the size of the creature that possesses it, Ohala (1983, 1996) extended the explanation for the widespread similarities among avian and mammalian vocalizations in face-to-face competitive encounters to human speech. Vocalizations by dominant individuals are low-pitched, suggesting a large creature, while those by subordinate individuals are high-pitched, suggesting a small creature. In speech, high and rising pitch is used to signal yes-no questions, while low and falling pitch signals statements. For Ohala, high pitch expresses that the speaker is

dependent on the other's good will for the information requested – but making statements implies certainty, hence dominance. Metaphorical extensions are politeness, submission, lack of confidence vs. assertiveness, authority, aggression, confidence, and threat.

Paralinguistic meanings may be seen as more or less metaphorical interpretations of three physiological conditions that influence the rate of vocal fold vibration, the main determinant of voice pitch. One of these is Ohala's 'frequency code' (Gussenhoven, 2004: ch 5). A second condition affecting rate of vocal cord vibration is degree of effort. The 'effort code' relates wide excursions, and generally precision in the articulation, to the expenditure of energy, and hence with importance, emphasis, and obligingness. Third, the physiological condition underlying the 'production code' is the exhalation phase of the breathing process used for speech production, and the way it leads to a fall-off in subglottal air pressure toward the end of the utterance, associating high pitch with utterance beginnings and low pitch with utterance endings. High beginnings thus signal new topics and low beginnings continuation of topics, while high endings signal continuation and low endings finality and end of turn. The effects of these conditions have to a large extent been brought under speaker control. Even derived effects, such as the later realization of higher peaks relative to lower peaks, may be exploited such that later peaks are used to signal the meanings of higher peaks. For instance, in many languages, early peaks signal statements and later peaks signal questions (e.g., D'Imperio and House, 1997).

In view of their biological basis, it is not surprising that paralinguistic form-meaning relationships are exploited across groups of speakers with different language backgrounds in strikingly similar ways. Nevertheless, crosslinguistic perception research suggests that the structure of the native language, along with phonetic factors such as the average pitch span, influence the listener's sensitivity (Chen, 2005). For instance, speakers of languages with narrower pitch spans may perceive greater meaning differences across a given pitch span than speakers of language with wider average pitch spans.

Whereas linguistic meaning is discrete – in the sense that if a language has two intonational morphemes (high-low and low-high, for instance), any well-formed utterance has either one or the other – paralinguistic meaning is gradient. A paralinguistic meaning is more or less present, depending on the value of the relevant pitch variable: the wider the span, the more effort is suggested, and the higher the register, the more submissiveness will be expressed.

See also: Animal Communication: Overview; Evolution of Phonetics and Phonology; Expressive Power of Language; Focus; Information Structure in Spoken Discourse; Intonation; Phonetics: Overview; Phonological Phrase; Prosodic Cues of Discourse Units; Register Variation: Core Grammar and Periphery; Sound Symbolism; Syntax-Phonology Interface.

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Semantics of Spatial Expressions

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Introduction

Spatial semantics has been an extremely active area of research in the past few decades, particularly within the field of cognitive linguistics (Langacker, 1987; Lakoff, 1987), in which spatial meaning is envisioned as standing at the very core of language and cognition. In a broader context, however, spatial semantics research is riddled with many controversies. It has long been known that there are strong parallels between space and other semantic domains, reflected in the fact that the same linguistic expressions often take spatial, temporal, and other more abstracts meanings, as in *from here to there*, *from now to tomorrow*, or *from me to you* (Clark, 1973). One explanation of this parallelism is conceptual metaphor, understood as a systematic asymmetric mapping between two experiential domains (Lakoff, 1987; Johnson, 1987). Since space appears to be the more concrete domain, the cognitive hypothesis is that "abstract domains are consistently conceptualized in terms of spatial image schemata" (Kreitzer, 1997: 317). However, other possible explanations of this analogy are historical processes involving grammaticalization (Heine *et al.*, 1991) and fundamental properties of mental representation (Jackendoff, 1990).

The Scope of Spatial Semantics

A common way of defining spatial semantics is by assuming a particular expression class – e.g., closed-class forms (Talmy, 1983) or spatial grams (Svorou, 1994). As Svorou (1994: 31) stated, "To talk about space and spatial relations . . ., languages make use of a relatively small number of elements. . . . I will refer to all these grammatical forms of language which express primarily spatial relations as *spatial grams*." However, this approach lacks the means to distinguish spatial from non-spatial senses and it aprioristically limits the domain of analysis to an expression class that is by no means universal (Brown, 1994).

An alternative is to define spatial language as expressions of spatial relations (Talmy, 1983; Regier, 1996). This semantic category assumes the semantic primitives 'trajector' and 'landmark,' whereby the location or motion of the first is characterized in terms of its relationship to the second (see later). Again, this approach is not general enough because different languages employ different strategies of locating objects in space, and not all are equally relational (Kreitzer, 1997). In English, we can readily characterize the meaning of the utterance in Example (1a) in terms of a trajector–landmark relation, and this can also be extended to Example (1b), assuming an elliptic/implicit landmark. To offer a similar analysis for Examples (2a) and (2b), however, we need to postulate landmarks of a different sort, e.g., 'the sky' and 'the speaker':

(1a) The plane flew over the house.
(1b) The plane flew over.

(2a) The plane flew upwards.
(2b) The plane flew this way.

Such an analysis, however, misses an important distinction: Examples (2a) and (2b) not only lack the explicit landmark as in Example (1b), but do not require one, since the trajector's position is determined not through objectlike reference points, but through coordinate systems (see later, Frame of Reference). A possibility would be to exclude sentences such as those in Examples (2a) and (2b) from the subject matter of spatial semantics proper, but this would be both arbitrary and ethnocentric, considering the basically relational meaning of Indo-European adpositions.

A third way of defining spatial semantics is through communicative function, i.e., the meanings of utterances that help the addressee determine the location or translocation of a given referent in discourse (Zlatev, 1997; Levinson, 2003). This definition intuitively excludes (metaphorical) extensions such as the utterance in Example (3), but includes the problematic (Examples (2a) and (2b)):

(3) He is over his divorce.

(4) He seems to be washing the dishes. [Where is he?]

Those who wish to assign spatial semantics to literally non-spatial uses would object to this (Lakoff, 1987), but it does provide a principled basis for constraining the domain of study. However, utterances such as in Example (4) can serve a locative communicative function indirectly, but we would hesitate before regarding them as 'spatial.' Thus, we must add the requirement that the locative function needs to be expressed conventionally: spatial expressions are conventional specifications of the location or the change of location (i.e., translocation) of an object.

Basic Spatial Semantic Concepts

A multitude of spatial categories have been proposed as 'universals' or 'primitives' in the literature, and

describing them all would be prohibitive. However, seven spatial concepts, trajector, landmark, frame of reference, path, region, direction, and motion, are present in nearly all descriptive systems. Authors may use different terms and make different distinctions, but the bare fact that there seems to be almost full agreement on the essentiality of these concepts is significant.

Trajector

The trajector is the entity for which (trans)location is of relevance (Lakoff, 1987; Regier, 1996). The trajector may be either static (Example (5a)) or dynamic (Example (5b)), a person or an object (Example (5c)); it can also be a whole event, as in Example (5d):

(5a) *He* is in the house.
(5b) *He* went into the house.
(5c) *The ball* is on the ground.
(5d) *He is playing* inside the house.

Other terms used for the same concept are the gestalt-psychological notion of 'figure' (Talmy, 1983; Levinson, 2003) and the more general term, 'referent' (Miller and Johnson-Laird, 1976).

Landmark

The landmark is the reference entity in relation to which the (trans)location of the trajector is specified. Views differ, however, on whether a landmark is always involved in a spatial predication as discussed in connection with the preceding problematic Examples (2b) and (2c). Similar lack of clarity exists about the use of other parallel terms, i.e., 'ground' (Talmy, 1983; Levinson, 2003) and 'relatum' (Miller and Johnson-Laird, 1976). For example, is there a landmark/ground/relatum in the simple everyday utterance in Example (6), and, if so, what is it?

(6) Come here!

For Langacker (who initiated the systematic use of the terms), trajector and landmark refer to extremely general notions that are not confined to (and are not projections from) the spatial domain: "The trajector/landmark asymmetry is fundamental to relational predicates and underlies the universal subject/object distinction" (Langacker, 1987: 231). So it is not surprising that in his analyses, any kind of 'point of reference' can serve as a landmark, but that would abolish the distinction between Examples (1) and (2), as pointed out.

Frame of Reference

A spatial concept that has received considerable attention lately is that of a linguistic frame of reference (FoR). However, although almost all authors acknowledge its importance, practically no two define it in the same way. In the most general sense, a FoR defines one or more reference points, and possibly also acoordinate system of axes and angles. Depending on the types of the reference points and coordinates, different types of FoRs can be defined. A strong claim is that "there are exactly three frames grammaticalized or lexicalized in language" (Levinson, 1996: 138):

- Intrinsic: the main reference point coincides with the landmark, and axes and angles are projected on the basis of its geometry.
- Relative: a real or imaginary viewpoint serves as a reference point, and coordinates are projected on the basis of this viewpoint.
- Absolute: the system is anchored in fixed geocardinal positions.

Spatial expressions defined on the basis of these FoRs have different logical properties: intrinsic and absolute expressions are binary, whereas the relative is ternary, as shown in Figure 1. The relative and the absolute FoRs support transitive and converse inferences, but the intrinsic FoR does not. A limitation of Levinson's trichotomy, however, is that it is systematically applied only to the static projective relations on the horizontal plane. So when it is claimed that there are languages that do not use the absolute FoR, this does not deny that the absolute FoR is used for terms that refer to the vertical dimension. Zlatev (1997) attempted a generalization of the trichotomy using the terms 'allocentric,' 'deictic,' and 'geocentric,' respectively. Still, this analysis is problematic because it confounds the type of FoR with landmark type;

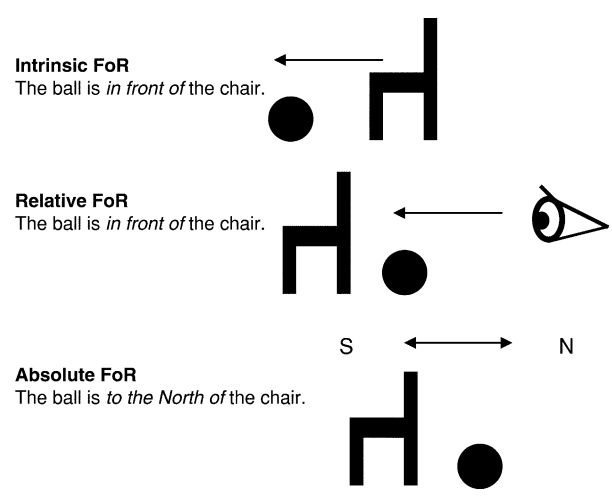

Figure 1 The three different linguistic frames of reference (FoR) proposed by Levinson (1996, 2003): intrinsic (binary, non-transitive), relative (ternary, transitive), and absolute (binary, transitive, and converse).

Levinson (1996: 135) correctly insisted that "linguistic frames of reference cannot be defined with respect to the origin of the co-ordinate system." For example, Examples (7a) and (7b) employ a relative FoR despite different kinds of origins, whereas Examples (8a) and (8b) use different FoRs, even though in both cases the origin (O) of the frame is the speaker:

(7a) He is standing in front of the tree.
(FoR: Relative; O: Speaker)
(7b) He is standing in front of the tree from John's point of view.
(FoR: Relative; O: John)

(8a) Stand behind the tree.
(FoR: Relative; O: Speaker)
(8b) Stand behind me.
(FoR: Intrinsic; O: Speaker)

A generalization seems nevertheless to be possible: a viewpoint-centered FoR as in Examples (7a), (7b), and (8a) need not have the speaker (or the addressee) as origin, and thus may not be, properly speaking, 'deictic.' Nevertheless, utterances such as in Examples (2b) and (6) can be subsumed under this notion, with the clarification that they (1) do not involve any angles and coordinates but only a reference point and (2) are binary rather than ternary. The binary senses are conceptually simpler and unsurprisingly are acquired earlier. What is common to both (binary and ternary) types is that the location or motion of the trajector is not defined in relation to a landmark, as, e.g., in Example (8b), but rather in relation to a viewpoint.

The object-centered FoR, on the other hand, always involves a landmark, and can be either projective (i.e., 'intrinsic'), as in Example (8b), or non-projective (topological), as in Example (5). Finally, the geocentric FoR can involve either the horizontal or the vertical plane, and, as with the other two, can be generalized to both static and dynamic descriptions (Examples (2a) and (9a)):

(9a) Go West! FoR: GEOCENTRIC
(9b) Go toward the setting sun! FoR: OBJECT-CENTERED

As the viewpoint-centered FoR, the geocentric one does not rely on a landmark in order to locate the trajector, but does so through the fixed geocardinal positions, which distinguishes Example (9a) from Example (9b).

This analysis captures the generalization that there are exactly three linguistic frames of reference and that some linguistic forms 'specialize' for frame, whereas others may be ambiguous, and still others may 'conflate' two frames. But this analysis differs in predicting that all languages use all three frames, although for different expressions, and to different degrees in discourse. The same utterance can express all three FoRs as in Example (10), displaying the flexibility of language and the power of semantic compositionality:

(10) He	came	up	to	the second floor.
	FoR:	FoR:	FoR:	
	VIEWPOINT-C	GEOCENTRIC	OBJECT-C	

Region

Even with an object-centered FoR and a (true) landmark, languages do not relate the trajector and landmark directly, but through a region that can be defined as a configuration of space in relation to that landmark (Svorou, 1994; Zlatev, 1997). Talmy (2000) invented the term 'conformation' for essentially the same notion. Jackendoff (1990) captured this distinction with the notions of thing and place, two of his semantic primitives, stating that, e.g., spatial prepositions such as *in* express place-functions: [IN ([THING])]→ [PLACE]. Figure 2 shows the regions lexicalized by a number of Japanese locative nouns, which apart from region also specify one or more frames of reference.

Jackendoff (1990) held that the set of such regions or place-functions is universal, but this is doubtful. Rather, all languages appear to make use of the concept, but they can differ both with respect to the extension of the regions that they express and whether they use primarily functional or perceptual properties of the landmark in order to define the relevant region. If such variation is granted, then arguments against the universal applicability of the

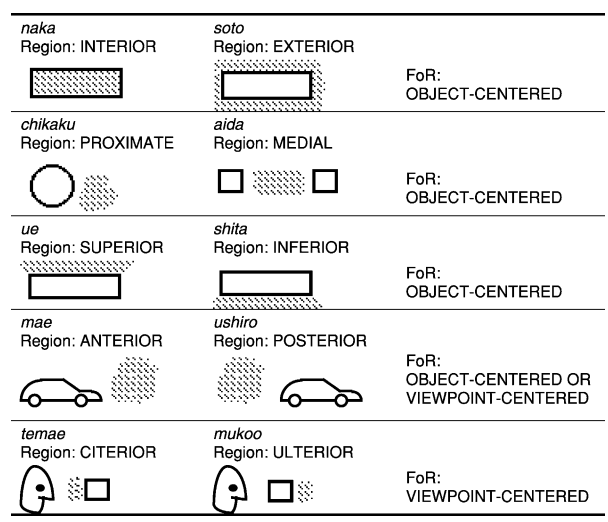

Figure 2 Japanese locative nouns expressing the spatial semantic category *region*. FoR, Field of reference. Reprinted from Zlatev (1997), with permission.

concept (Bowerman, 1996) can instead be interpreted as a characterization of its possible variation.

Path

The concept of path is used in spatial semantics in two very different ways. The first and more common may be called 'imagistic' and refers to the trajectory of actual or imagined motion of the trajector with respect to the landmark (Talmy, 1983; Lakoff, 1987). This trajectory may be schematic, but it has both extension and shape. The alternative is based on the cross-linguistic generalization that languages systematically distinguish between (at least) three components of a motion event – its beginning, its middle, and its end – and may be called the 'minimal path' characterization (Jackendoff, 1990; Zlatev, 1997). On this view, trajectories, are derived compositionally, by combining the minimal path information (e.g., END) with the region/place information (e.g., INTERIOR) to derive the meaning of a preposition such as *into*. English and other Indo-European languages contain many words, mostly prepositions, that conflate the concepts of region and path, but from a broader perspective, many if not most languages separate the two categories (Heine *et al*., 1991). Talmy (2000) arrived at the same conclusion, and currently distinguishes between the 'conformation,' corresponding to region as mentioned previously, and the vector, which "comprises the basic types of arrival, traversal and departure that a Figural schema can execute with respect to the Ground schema" (Talmy, 2000: II, 53).

Even for English, separating region and path allows for generalizations, such that the sentences in Examples (11a)–(11d) have the same value for region, but different ones for path. Including ZERO (no extension) as a possible value of path is consistent with the structure of locative case systems in, e.g., Slavonic and Finno-Ugric languages:

(11a)	Bill went out from the house.	Region: INTERIOR; Path: BEGINNING
(11b)	Bill went through the house.	Region: INTERIOR; Path: MIDDLE
(11c)	Bill went into the house.	Region: INTERIOR; Path: END
(11d)	Bill is in the house.	Region: INTERIOR; Path: ZERO

Direction

If path is defined minimally, then it always requires the category region in order to express the (trans) location, and region always requires a landmark. But since all reference points are not of the same kind, they should not be lumped under the cover term 'landmark.' If so, how is translocation specified in the geocentric and viewpoint-centered FoRs, in which there are (arguably) no landmarks? This requires the concept of direction, defined as a vector along one of the axes provided by a frame of reference (Example (12)):

(12a)	The plane is flying that way.	FoR: VIEWPOINT-C
(12b)	The plane is flying north.	FoR: GEOCENTRIC
(12c)	The plane is flying toward the North Pole.	FoR: OBJECT-C

When 'satellite-framed' languages (Talmy, 2000) that typically do not conflate path information into their motion verbs nevertheless seem to do so (e.g., *sink*, *fall*, *rise*), it can be shown that it is not path, but rather direction, that is being conflated (Zlatev, 2003).

Motion

Similar to the two ways of characterizing path, there is an imagistic and a minimal way of characterizing the concept of motion. The first would treat as motion not only expressions such as those in Examples (12a)–(12c), but also cases of so-called fictive motion (Talmy, 2000), as in Examples (13a)–(13f):

(13a)	The scenery rushed past us.	('Frame-relative motion')
(13b)	I looked toward the valley.	('Sensory path')
(13c)	The road goes through the woods.	('Coverage path')
(13d)	The church faces toward the square.	('Emanation path')
(13e)	The beam leans away from the wall.	('Advent path')
(13f)	His office is through the corridor.	('Access path')

The term following each example is from Talmy (2000), who presented an elaborate classification of types of fictive motion, claiming that motion exists at different levels of 'palpability' and that "every speaker experiences a sense of motion for *some* fictive motion constructions" (2000: I, 114). However, the classification is based very much on the author's private introspection, rather than on shared linguistic intuitions, and appears as a somewhat *ad hoc*. The alternative is to treat motion as a binary category: either the described scene involves perceived motion, and in that case we have translocation, or it does not, and the expression is one of location. This would make only Example (13a) translocative. At the same time, if motion is treated separately from the categories of path and direction, it is still possible to account for the 'fictive motion' aspect of, e.g.,

Examples (13a)–(13f), by specifying other than ZERO values: Path/Direction: END for Examples (13b) and (13d), Path: BEGINNING for Example (13e), and Path: MIDDLE for Examples (13c) and (13f).

Theoretical Controversies

Semantic or Conceptual

Three quite different standpoints have been adopted concerning the relation between spatial semantic meanings and language-independent conceptualization. The predominant view is that concepts such as path and (various values for) region constitute language-independent conceptual primitives (Talmy, 1983; Mandler, 1996). From this perspective, the function of language is simply to express (symbolize, lexicalize) conceptual representations such as image schemas (Johnson, 1987), which are largely of spatial nature and exist prior to and independently of language (Lakoff, 1987). Although Jackendoff's conceptual primitives differed in being 'digital' as opposed to 'analogue,' his semantic ontology was similar: "Conceptual structure . . . is an encoding of linguistic meaning that is independent of the particular language whose meaning it encodes" (Jackendoff, 1996: 5). In this theory, universal conceptual representations (CRs), defined by primitives such as PATH and PLACE, stand between an image-schematic spatial representation (SR) and linguistic forms (LFs).

Given the assumptions of either type of conceptual universalism, the only route for accounting for language-specific semantic differences is through choice of the underlying primitives and lexicalization patterns. However, there is more cross-linguistic variation than this approach predicts. For example, Korean lexicalizes the notions of TIGHT FIT and LOOSE FIT in a way that cuts across English INTERIOR and SUPPORT, and furthermore, these differences are acquired early by children (Bowerman, 1996). Even more problematic for a universal conceptual representation of spatial meaning are corroborations of linguistic relativity/mediation with respect to space, such as those shown with respect to frame of reference (Levinson, 2003).

The classic alternative is to view meaning as immanent in the usage patterns of the language. With respect to spatial meaning, this view has been defended by Bowerman (1996) on the grounds of extensive and developmentally early cross-linguistic variation. By distinguishing semantic and conceptual structure, however, Bowerman remained noncommitted on the question whether and to what degree these differences translate into conceptual differences. Indeed, still very much an open issue is to what extent linguistic differences of spatial meaning affect general cognition, and there are persistent findings that it is not a matter of complete determination (Gennari *et al.*, 2002).

The third possibility represents a synthesis of the preceding two, in stating that spatial semantic categories are based on prelinguistic experience, hence broad cross-linguistic similarities are expected, but language-specifically conventionalized, and hence there should also be differences. Regier's (1996) connectionist model can be seen as an explication of the idea of how a constrained, though flexible initial state can result in different spatial semantic systems, depending on the semantic structure of the language being acquired. From this perspective, semantic, perceptual, and conceptual structures are related but remain separate (Levinson, 1996). Categories of perception motivate categories of language, but do not determine them. Conversely, semantic structures may not affect, e.g., visual perception to any significant degree, but conceptual structures that are largely culturally mediated, such as spatial orientation, may be, more or less strongly, influenced by linguistic categories. The interactionist position appears to have the most support, but it should be mentioned that it is the least constrained of the three, and requires considerable methodological sophistication in order to be elaborated.

Localization or Distribution

As pointed out, the common answer is that spatial meaning is expressed by the members of one (or more) closed classes – e.g., Talmy (1983), Svorou (1994), and Regier (1996) acknowledged that sometimes open classes such as nouns and verbs participate in the expression, but insisted that the grammatical elements have priority. This, however, is objected to by Brown (1994), Sinha and Kuteva (1995), Ameka (1995), and Zlatev (1997, 2003), among others, on the basis of many examples from typologically different languages (e.g., Tzeltal, Ewe, Japanese, and Thai). As Sinha and Kuteva (1995: 168) argued, "an adequate analysis requires the abandonment of the localist approach, and the analysis of how spatial relational meaning is syntagmatically distributed over simultaneous selections from closed and open form classes."

Zlatev (1997, 2003) assumed representations such as that in Figure 3 which allows for a many-to-many mapping between semantic concepts and forms classes without privileging the closed classes. Conflation patterns (Talmy, 2000), distribution patterns (Sinha and Kuteva, 1995), and patterns of compositionality (Ameka, 1995) appear as special cases of such a mapping.

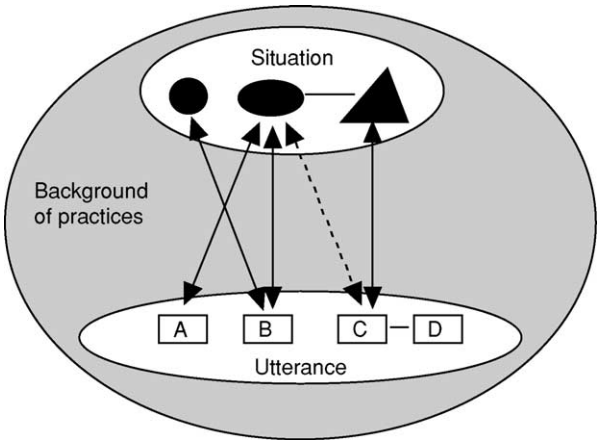

Figure 3 A representation of a form-meaning mapping involving conflation and distribution patterns, as well as pragmatic inferencing (the dashed line). Reprinted from Zlatev (1997), with permission.

Semantic or Pragmatic

In contradistinction to traditional analyses that attempt to separate conventional semantic meaning from contextual interpretation, cognitive linguists usually insist that (spatial) meaning is encyclopedic and that there is no non-arbitrary boundary between semantics and pragmatics (Langacker, 1987). This view would imply a 'full specification' account of the meaning of the prepositions in Examples (14) and (15), and would state that the expressions in Examples (14a) and (14b) involve different senses expressing different profiled regions:

(14a)	John flew *over* the bridge.	Region: SUPERIOR
(14b)	John walked *over* the bridge.	Region: SURFACE
(15a)	The room is *at the back of* the school.	Region: INTERIOR
(15b)	The tree is *at the back of* the school.	Region: EXTERIOR

An alternative analysis is to state that the prepositions do not express the relevant distinctions involving the category region semantically, but that the appropriate interpretation is derived through the gestalt-like properties of the expressed situation (see the dashed line in Figure 3) and the background of practices (Zlatev, 1997; Tyler and Evans, 2001), i.e., through pragmatic inferencing. Zlatev (2003) argued that a separation between semantics and pragmatics along these lines can provide the important cross-linguistic (typological) generalizations, and is therefore to be preferred.

The Nature of Spatial Polysemy

The ubiquitous polysemy of lexical meaning is commonly represented by analyses presenting networks of nodes standing for different senses connected via asymmetrical links. One of the most well-known applications for this kind of analysis has been precisely the semantics of spatial expressions, wherein non-spatial senses are (nearly) always treated as extensions from the spatial ones. Are such networks a characterization of psychologically real structures and/or processes and thus relate to the individual psychological level of language, or are they descriptive generalizations over the potential usages of the expressions in question? Sandra and Rice (1995) raised this question and critiqued the representational and methodological vagueness of network analyses, pointing out "the problem of determining whether the fine distinctions are part of the mental representation (as predicted by the prepositional network approach) or the result of an interaction between monosemous mental representations and a process of contextual supplementation" (1995: 125).

In a number of psycholinguistic studies summarized by Cuyckens *et al.* (1997), the evidence by and large does not support a direct mental representation of polysemous networks with spatial prototypes and metaphorical extensions. In brief, first-language acquisition studies do not show spatially 'transparent' uses to be regularly acquired before the more abstract and idiomatic ones. In sentence sorting and similarity judgment tasks, speakers do not regard polysemous spatial and non-spatial senses to be more closely related than homonymous (i.e., non-related) controls. Finally, and most crucially, primed lexical decision tasks show that spatial senses of the prepositions *at*, *on*, and *in* do not facilitate, but rather inhibit, the recognition of examples with temporal senses, attesting separate storage in memory. Although each one of these results can be multiply interpreted, taken together, they question both the existence of polysemy networks and the primacy of space on the psychological level. At the same time, this does not invalidate analyses of polysemy as explications of linguistic knowledge on the collective, conventional level (Itkonen, 1978). However, such analyses have to be made accountable to criteria of "descriptive economy, naturalness, generality and explanatory power" (Cuyckens *et al.*, 1997: 51) and above all – on intersubjective agreement – criteria that are often shunned within cognitivist approaches. A classic in the literature concerns the polysemy of *over* (Brugman, 1988), and it can illustrate how a spatial semantic analysis requires such criteria. Lakoff (1987) reformulated Brugman's analysis into an elaborate radial category

representation of 24 interrelated senses. His analysis has been criticized for lacking simplicity and rigor, since it attributed to usages such as those in Examples (15a) and (15b) the status of separate senses (Kreizer, 1997). Tyler and Evans (2001) argued for a systematic methodology of 'principled polysemy' and proposed a network of 13 distinct senses, derived diachronically through pragmatic inferencing and reanalysis from a single 'protoscene' in which the trajector is above but within the sphere of influence (and potential contact) with the landmark. Interestingly, the sense that Brugman (1988) and Lakoff (1987) assumed to be central, the 'over–across' sense of Example (16), does not even figure as a separate sense in the analysis of Tyler and Evans: it is rather explained as a contextual interpretation arising from the atemporal (i.e., static) meaning of the preposition, the dynamic meaning of the motion verb, and the knowledge of properties of walls and bridges:

(16a) The cat jumped over the wall.
(16b) He drove over the bridge.

Whether this analysis will be generally accepted is doubtful, but the major metatheoretical point of Tyler and Evans (2001: 733) on the need for a "methodology . . . that provides a rigorous and relatively consistent way of making judgments about whether a sense is distinct, and . . . can be used in an intersubjective way" should be uncontroversial.

Summary

Spatial semantics research is concerned with the definition of spatial semantics, the description of spatial semantic concepts, and the important theoretical controversies that any theory of spatial semantics would need to address. More theoretical work is needed in order to relate the conceptual and descriptive systems of different spatial semanticists, and to show where disagreements are only terminological and where they are substantial. In the latter case, a theoretical synthesis could be sought in an attempt to find a resolution of the persistent theoretical controversies.

The typological database of spatial analyses is being constantly extended with new languages, allowing better cross-linguistic generalizations. Furthermore, diachronic evidence, although not discussed here, is being taken into account to a greater degree, and it is possible that this will provide a more satisfactory explanation of patterns of polysemy and the 'primacy of space' than has been provided by synchronic psychological processes. Psycholinguistic studies have provided more questions than answers: Is there a principled way to distinguish polysemy from homonymy on the one hand, and from generality on the other? In which way does language mediate spatial thinking? The existing experimental paradigms need to be cross-checked for converging evidence, and new types of experiments are likely to be considered. Valuable new evidence for uncovering parallels between the linguistic and conceptual structure of space is likely to be found in gesture studies (Kita and Özyürek, 2003).

Finally, the existence of different ontological levels of linguistic meaning (i.e., the physical, the phenomenological, and the social), each with its appropriate methodology (Itkonen, 1978), is beginning to be more widely acknowledged, along with acknowledgment of a rehabilitation of the social-normative level of (spatial) meaning that is accessible through 'intersubjectively valid intuitions'. This is essential for any kind of consensus to be able to emerge within a field that has tended to oscillate between excessive private introspection and overemphasis on objective empirical data.

See also: Adpositions; Cognitive Semantics; Gesture and Communication; Language as an Object of Study; Semantic Primitives; Semantics–Pragmatics Boundary; Thought and Language: Philosophical Aspects; Verbs.

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Semantics: Field Work Methods

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The linguistic literature contains a wealth of information about semantics, on the one hand, and fieldwork methodology, on the other, yet it devotes comparatively little attention to the combination of semantics and fieldwork. Although the semantics literature acknowledges potential difficulties when researchers collect and semantically analyze data in less-described languages, its focus is clearly on the well-studied European languages (and often on English alone). Conversely, although the fieldwork literature considers many different aspects of data collection and language description, the investigation of semantic phenomena is rarely discussed (with the notable exception of specific semantic fields, e.g., kinship terminology, as found in the literature on linguistic anthropology). As a result, many fieldwork-based studies contain little semantic information, and our knowledge of non-European semantics remains limited.

This lack of convergence is not accidental: Semantic analysis relies to a great extent on native-speaker intuitions about the acceptability and equivalence of expressions, but field linguists are generally not native speakers of the languages they analyze. That is, they cannot resort to their own intuitions in order to determine the meaning of an expression, to distinguish between ambiguity and vagueness, to establish sense relations, or to set apart semantic entailments from pragmatic implicatures. Instead, they have to infer the meaning of an expression from observing its use in context or from eliciting grammaticality and acceptability judgments. In the first case, they need access to a text corpus, which has to be as large and diversified as possible (because many expressions occur only infrequently or are restricted to specific genres). In the second case, they need access to a thorough grammatical description (to be able to construct appropriate contexts and test sentences). However, neither corpora nor grammatical descriptions are usually available for the less-described languages. In most cases, such materials have to be created in a painstaking and time-consuming way by the field linguists

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themselves before they can embark on a semantic investigation.

Field linguists thus face two major challenges: the lack of suitable data and the problems of conducting an intensional semantic analysis on the basis of observed and elicited extensional data. In recent years, a number of studies have appeared that (explicitly or implicitly) address these methodological issues. These impulses come especially from the fields of semantic typology (aiming at a semantic comparison of languages and, therefore, needing comparable semantic data), documentary linguistics and linguistic anthropology (aiming at an adequate description and documentation of all areas of language, including semantics), cognitive linguistics (aiming at investigating possible cognitive correlates of linguistic phenomena), and language acquisition (aiming at understanding the learner's developing knowledge of the semantic structure of the target language).

Depending on the research question and the requirements of a particular field site, these studies exemplify quite a variety of fieldwork techniques: They ask speakers to describe objects, pictures, or video clips; to retell picture book or video stories; to play games; to respond to reenacted scenes from questionnaires or to (nonlinguistic) triads and categorization tasks; or – as in the probably best-known studies – they use color charts to discuss color terminology. Despite this attested variety, all studies propose to address the methodological issues in similar ways: They create controlled contexts that can generate a large number of desired target expressions, and, in particular, they use (visual) stimuli to create these contexts. By way of an example, two such stimuli are illustrated here: picture elicitation and matching games (see the bibliography at the end of this article for other examples).

In picture elicitation, speakers are presented with pictures and are then asked a question that would conceivably generate the target expression. **Figure 1** is an example of such a stimuli picture (designed to elicit locative expressions) and example (1) illustrates the prompt by the field linguist and the subsequent discussion between a linguist and speaker (conducted in the West Chadic language Goemai).

(1) Linguist: *Kwalba hok d'e nnang* ?
'Where is the bottle?'
Speaker: *T'ong k'a tebul.*
'It sits on the table.'
Linguist: *Ko d'yem k'a tebul a* ?
'Or does it stand on the table?'
Speaker: *A'a, d'yem ba, goe sh'e ba.*
'No, it doesn't stand, (because) it doesn't have a leg.'

Figure 1 Picture elicitation: Stimuli picture discussed in example (1).

In matching games, two speakers interact with on another, one speaker assuming the role of 'director' and the other the role of 'matcher.' In many studies, the two players are screened off from one another and are given a set of identical pictures. The director is asked to pick one of the pictures and to describe it to the matcher, who then picks the corresponding picture from his or her set. Because the two players cannot see one another, they have to rely on verbal descriptions for this purpose. After having identified a picture, both players put their chosen picture aside on a pile, and the director picks another one from the set. In the end, the screen is removed, and the players compare their piles to check if they match. **Figure 2A and B** present two of the stimuli pictures (out of a set of 16 pictures), and example (2) illustrates such a matching game and the resulting discussion between the two players (who, again, speak the West Chadic language Goemai).

(2) Director: *Ndoe kwalba na nd'e. D'yem k'a tebul.*
'See a bottle here. It stands on the table.'
The Director describes the upright bottle (**Figure 2A**), but matcher picks the upside-down one (**Figure 2B**). At the end of the game, they compare their piles (pointing at the different pictures).
Director: *A'a, d'yem k'a tebul muk mu?*
'No (= not **Figure 2B**), it (= **Figure 2A**) stands on its table, right?'
Matcher: *Ai, t'ong, moe yi: t'ong k'a tebul, ai. Nd'yem ba ai.*
'Hey, it (= **Figure 2A**) sits, we say: it sits on the table, hey. Not standing, hey.'

In this way, stimuli-based setups generate a large amount of data about the use of target expressions in reference to real world contexts; that is, they generate

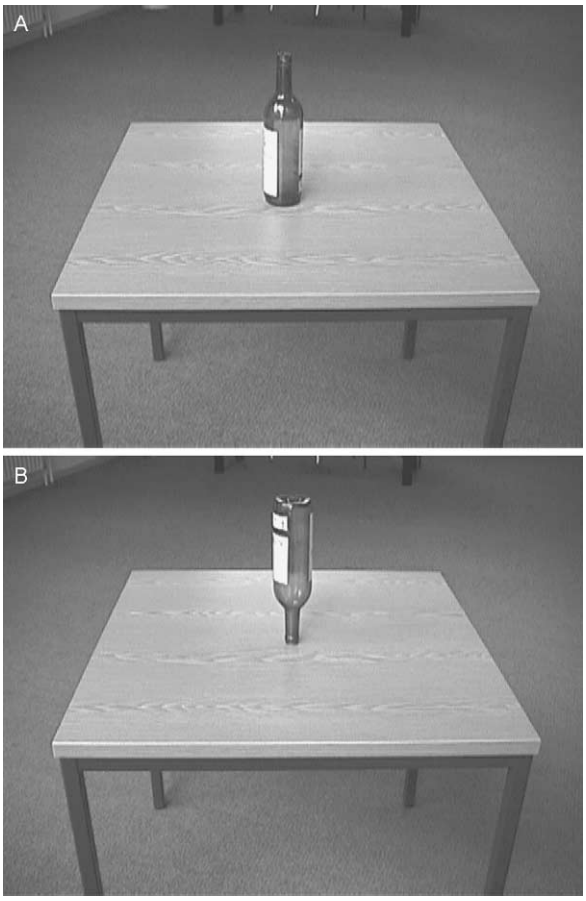

Figure 2 Matching games: Stimuli pictures discussed in example (2).

extensional data. At the same time, they also generate relevant information that makes the collected data accessible to an intensional analysis. Such an analysis is facilitated by the following characteristics of stimuli-based methods:

- The researcher exercises some control over the setup, allowing him or her to either probe for parameters that potentially determine the use of an expression or to systematically test hypotheses.
- The context and tested parameters are held constant; that is, the same task can be run with different speakers for purposes of comparison. Such data lend themselves to a quantification of preferred expressions or of dialectal and crosslinguistic variation.
- The setups provide speakers with a clear reference context for their answers, thereby reducing the risks of generating translation equivalents and misunderstandings. It is known that speakers tend to judge the acceptability of an expression against a specific context. If the researcher can provide such a context, the speakers can use it – otherwise, they have to create it themselves outside the control of the researcher, introducing potential misunderstandings. Furthermore, knowledge about the reference context makes it possible for the researcher to take it into account in the process of analysis, that is, to relate expressions to real-world contexts, to recognize contextual factors that trigger particular usage patterns, or to discover stimuli effects.
- Many setups generate negative evidence (e.g., speakers and players explicitly judge certain expressions as inappropriate) as well as information about the equivalence of expressions (e.g., expressions by fellow players cause misunderstandings, and players negotiate and discuss alternative possibilities and contexts). And because many setups are not overtly concerned with the speech of the speakers (but, e.g., with finding the matching picture), they reduce the risk of prescriptive language use.

Such information is needed for any kind of semantic analysis, independent of the theoretical framework adopted and independent of whether the analyst is a native speaker of the language analyzed. In fact, there are more and more studies in which native-speaker linguists do not rely on their intuitions alone but exploit the advantages offered by employing stimuli-based methods.

However, it is also acknowledged that such methods have potential drawbacks: a cultural bias (because such setups are not always appropriate in all cultures and all circumstances) and a creation of stimuli effects and 'nonnaturalistic' language use (because speakers are asked to make fine-grained distinctions that they would not necessarily make in everyday life). Although such problems cannot be avoided, the literature agrees that they can be counterbalanced by diversifying the database. That is, two opposing criteria need to be balanced: the amount of control researchers can exercise over the context and the degree to which speakers can talk naturally. Because no set of data can satisfy both criteria equally well, it is advocated that different stimuli-based techniques be combined with one another and augmented with data from natural settings, from staged communicative events (i.e., linguistic events that are prompted by the researchers but in which speakers structure their texts freely; e.g., a speaker is asked to talk about the manufacture of baskets), and from elicitation sessions in which researchers elicit expressions, grammatical information, and so on. Taken together, these methods generate a broad spectrum of relevant data that can serve as the basis for a detailed semantic analysis.

See also: Anthropological Linguistics: Overview; Color Terms; Extensionality and Intensionality; Lexical

Semantics: Overview; Phonetics: Field Methods; Spatiality and Language.

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Semantics–Pragmatics Boundary

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The Philosophical Debate

Texts in the philosophy of language frequently cite the tripartite distinction between syntax, semantics, and pragmatics made by Morris (1938). According to Morris, syntax is concerned with the structural properties of signs (i.e., with word-word relations), semantics with the relations between signs and the things they signify (i.e., with word-world relations), and pragmatics with the uses of signs by speakers and hearers to perform communicative acts (i.e., with word-user relations).

Philosophers generally follow Frege in rejecting any form of mentalist semantics. They think of languages as "abstract semantic systems whereby symbols are associated with aspects of the world" (Lewis, 1972: 170). There is a potential infinity of both syntactically well-formed (grammatical) and semantically well-formed (meaningful) sentences in any language, and it is the job of semantics to identify rules that generate this potential infinity. On the other hand, since we are interested in the semantics of

Semantics: Overview; Phonetics: Field Methods; Spatiality and Language.

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Philosophers generally follow Frege in rejecting any form of mentalist semantics. They think of languages as "abstract semantic systems whereby symbols are associated with aspects of the world" (Lewis, 1972: 170). There is a potential infinity of both syntactically well-formed (grammatical) and semantically well-formed (meaningful) sentences in any language, and it is the job of semantics to identify rules that generate this potential infinity. On the other hand, since we are interested in the semantics of

natural languages, these rules must be ones that are learnable by humans with finite minds. Semanticists are interested in what a competent speaker knows when she knows a language (i.e., her syntactic and semantic competence). Hence they assume that what a speaker knows is a **finite** set of rules that can compositionally generate the potential infinity of syntactically well-formed sentences and that can deliver a **semantic interpretation** for every meaningful sentence of the language.

Philosophers generally assume that there is a sharp division between syntax/semantics and pragmatics. While semantics studies the rules that a competent speaker knows when she knows the meanings of sentences, pragmatics studies how sentences are used in conversational contexts to communicate a speaker's messages. Pragmatics is thus concerned with linguistic **performance** rather than competence. It is **by** using sentences with certain syntactic and semantic properties that speakers succeed in communicating certain things. So, the central question of pragmatics is how we succeed in our communicative tasks.

Many philosophers are convinced that Grice (1975, 1989) made an important start in answering this question by articulating his Cooperative Principle and maxims of conversation. Grice sees conversations as rational cooperative activities where hearers use their linguistic knowledge, together with mutually available nonlinguistic contextual knowledge, to infer what the speaker means to communicate. The principles that guide conversations are analogous to the principles that guide any sort of rational cooperative activity, such as the joint activity of building a house or sailing a ship. Pragmatic principles on this view are not tied essentially to any language mechanism and are certainly not language-specific rules, unlike the syntactic and semantic rules that define a language.

An alternative view, argued for by Prince (1988, 1997), assumes that there are rules of use associating certain linguistic forms with certain functions. Moreover, these rules are language-specific, in the sense that the same pragmatic function could be served in different languages by different forms; so any competent speaker of the language must learn these rules. Knowledge of these rules constitutes the speaker's pragmatic competence. Hence it is incorrect to put the study of pragmatics on the performance side of the competence/performance divide. Related to Prince's ideas are those of Kasher (1991), who argues for a modular conception of pragmatics. Just as linguists have postulated a grammar module, so Kasher argues there is a module governing pragmatic processes, with its own proprietary rules and representations. Since it is Grice's conception of pragmatics that has set the agenda for debate in the philosophy of language, these alternative views will be set aside here.

Gricean pragmatics introduces the idea that it is **by** saying certain things in certain contexts that speakers are able indirectly to communicate (to implicate) certain further things. In working out what a speaker has implicated, a hearer will use his knowledge of the conversational maxims, together with contextually available knowledge, to infer what the speaker communicated. For example, after a terrible ordeal in which a man is rescued from a remote mountainside after a plane crash, a TV reporter interviews him. The reporter asks: 'Were you ever afraid?' and the man replies: 'I felt a twinge or two.' By his understatement he has implicated that things were pretty bad. The understatement is a violation of Grice's first Maxim of Quantity, which enjoins speakers to say as much as is required by the purposes of the talk exchange. The hearer, having recognized the violation, but assuming that the speaker is still bound by the Cooperative Principle, will search the context for further information that the speaker might have intended to convey. It is his background knowledge – of human psychology, of the probable consequences of plane wrecks, and of the low probability of survivors being found in remote, sparsely populated places – that allows the reporter to infer the speaker's intended meaning.

The currently dominant view in philosophy of language is that a theory of meaning for a language specifies the truth-conditions for each of the sentences of a language. It does this by specifying a finite set of rules that compositionally generates these truth-conditions. This truth-conditional approach to semantics has been grafted onto a Gricean view of pragmatics. It is generally accepted that saying and implicating are neatly separated. Saying is tied to sentence meaning and the expression of truth-conditional content. What a speaker says when she utters a sentence (i.e., the locutionary content of her utterance) corresponds to the truth-conditional content of the sentence. (Note that the notion of **saying** is not to be conflated with the notion of **stating**. The former is a locutionary act, namely the act of expressing some content. The latter is an illocutionary act. It is the expressing of some content with a particular illocutionary force.) Implicating is tied to (indirectly or implicitly) communicated content that can be inferred once the hearer has figured out what the speaker has (directly or explicitly) said. Since truth-conditional content is the province of semantics and implicature is the province of pragmatics, the saying/implicating divide goes along with a neat divide between semantics and pragmatics. Consequently, many believe that truth-conditions can be specified in a way that is essentially free from pragmatic considerations.

But there are problems with this Gricean view. One of the first indications of trouble for this view came from some observations by Cohen (1971). Others, such as Carston (1988, 2002), Levinson (1995, 2000) and Recanati (1989, 2004) have used examples similar to Cohen's to challenge the Gricean picture. Consider examples such as the following:

(1) Mary fell pregnant and she got married.
(2) Mary got married and she fell pregnant.

Grice would say that (1) and (2) have the same truth-conditional content, but that they implicate different things. (1) implicates (in a generalized way) that the pregnancy occurred before the marriage, whereas (2) implicates the opposite. (1) also implicates that the reason for Mary's marriage was her pregnancy. However consider examples such as the following:

(3) If Mary fell pregnant and she got married, her grandma will be shocked.
(4) If Mary got married and she fell pregnant, her grandma will be shocked.

According to Grice, the antecedents of the two conditionals have the same truth-conditional content. Therefore, (3) and (4) should themselves have the same truth-conditional content, yet intuitively they do not. (3) could be true while (4) is false. It looks as though the implicated content of (1) and (2) has become incorporated into the truth-conditional content of (3) and (4). In other words, (3) and (4) in effect express the following:

(3′) If Mary fell pregnant *and then for that reason* she got married, her grandma will be shocked.
(4′) If Mary got married *and then* she fell pregnant, her grandma will be shocked.

Clearly, (3′) and (4′) differ in content, so it is not a problem if one is true and the other is false.

These appear to be cases of pragmatic intrusion into truth-conditional content. Such pragmatic intrusion creates a problem for Grice that Levinson (2000) calls 'Grice's Circle.' The trouble is that to figure out what is conversationally implicated, the hearer must first determine what is said (since it is **by** saying such-and-such that a speaker succeeds in implicating something else). However, in figuring out what was said by (3) or (4), it looks as though one must first determine their implicated contents.

Levinson (1995, 2000) argues that pragmatic intrusion is not problematic, since it is limited to the intrusion of **generalized** conversational implicatures (GCIs), and these, he argues, are **default meanings** that will be automatically triggered by the use of certain kinds of expressions. The derivation of GCIs is governed by various heuristic principles. For example, the I-Principle can be summarized in the slogan 'What is simply described is stereotypically and specifically exemplified.' It applies only to 'unmarked, minimal expressions' (Levinson, 1995: 97). It enjoins speakers to minimize what they say when their hearers are able to use contextually accessible information to enrich the informational content of their utterances. Conversely, it enjoins hearers to amplify or enrich the informational content of the speaker's utterance up to the point that they judge is the speaker's intended meaning. Since 'and' is the sort of minimal, unmarked expression that calls for a stereotypical interpretation, conjunctions such as (1) and (2) will be given an interpretation according to which the events described by the two conjuncts are temporally ordered. The net effect is that (3) and (4) will be understood to express (3′) and (4′) respectively.

Not everyone would agree that in (3) and (4) we have pragmatic intrusion into truth-conditional content. Cohen (1971) appeals to examples of embedded conjunctions that seem to affect the truth-conditions of the larger sentences in which they are embedded to argue for a **semantic ambiguity** account of 'and.' If the suggestion of temporal ordering associated with (1) affects the truth-conditions of (3), Cohen concludes that this feature must be part of the semantically encoded meaning of 'and.' Since relations other than temporal ordering can be suggested by a conjunction, this view is committed to a multiple ambiguity account of 'and.' In addition to conjunctions such as (1) and (2), consider examples such as:

(5) It is summer in Europe and winter in Australia.
(6) The fan turned on and {as a result} a cool breeze blew through the room.
(7) Peter took a shower and {while in the shower} he practiced his singing.

In some cases, as in example (5), 'and' expresses simple truth-functional 'and,' and the conjuncts can be reversed without changing the meaning. In others, such as (6), it expresses a causal relation 'and as a result,' or, as in (7), a temporal containment relation 'and while.' In these last two cases, the relations are asymmetric, and reversing the conjuncts changes the meaning. For instance, reversing (6) suggests a different causal scenario, where the breeze somehow turns on the fan. Examples could be multiplied, and for each case where a different relation is suggested, Cohen would have to posit yet another meaning for 'and.'

Carston (1988) and Recanati (1989) argue against positing a semantic ambiguity for 'and,' maintaining instead that the contents represented between

brackets in the above examples are **pragmatically determined aspects of what is said**. (See entry on **Pragmatic Determinants of What Is Said**.) Rather than being semantically ambiguous, 'and' is **semantically underspecified**. It will be pragmatically enriched in different ways, depending on the assumptions that are operative in the conversational context.

Carston and Recanati agree with Levinson that there is pragmatic intrusion. However, they point to embedded contexts, like the conditionals (3) and (4), to argue that the pragmatic content associated with (1) and (2) belongs to what is said, rather than being conversationally implicated. (Carston (2002) prefers to use Sperber and Wilson's (1986) technical term 'explicature' instead of the term 'what is said,' since the latter has a commonsense usage that interferes with attempts at terminological regimentation.) If the pragmatic content of a simple sentence has an effect on the truth-conditional content of the compound sentences in which it is embedded, then that pragmatic content is part of what is said by the simple sentence, not something that is merely implicated. Recanati calls this the Scope Test.

Other tests have been proposed for determining whether some pragmatically determined content is part of what is said. Recanati (1989) proposes his Availability Principle, according to which any content that intuitively seems to affect truth-conditions should be regarded as a part of what is said. Carston (1988) proposes her Functional Independence Principle, which requires both explicatures and implicatures to occupy independent roles in inferential interactions with other assumptions. Take example (8) discussed below. The simple encoded content that Mary engaged in an act of swallowing is not functionally independent of the enriched content that Mary swallowed a bug. The latter entails the former, and it is from the latter that further contextual effects can be derived. This suggests that it is the enriched content that corresponds to what is said, not the more minimal encoded content, which has no autonomous role to play.

Explicatures are pragmatic developments of semantically encoded content and can be either **enrichments** or **loosenings** of encoded content. Carston argues that the processes involved in the recovery of explicatures are inferential processes and, hence, no different from the sorts of inferential processes involved in the derivation of conversational implicatures. What distinguish explicatures from implicatures are not the sorts of processes involved in their derivation but the starting points of these inferential processes. Derivations of explicatures begin with the semantically underspecified representations of logical form (LF) that are the output of processes of grammatical decoding. Implicatures, on the other hand, as Grice insisted, are contextual implications that follow from contexts including assumptions about what was said (i.e., including explicatures). This is **not** a commitment to the claim that explicatures are processed before implicatures. In fact, Carston thinks that the processing of explicatures and implicatures happens in parallel, and that the overall interpretation of a speaker's utterance is something arrived at via a process of mutual adjustment.

Recanati, on the other hand, distinguishes local from global pragmatic processes. The sorts of processes involved in the derivation of pragmatic determinants of what is said are of the local sort and are noninferential. For instance, such local processes might involve spreading activation within an associative conceptual network, or the accessing of stereotypical information from conceptual frames or scripts. Such processing happens at a subconscious level, and only the output of such processes is consciously available. In contrast, global pragmatic processes are inferential processes of the sort that Grice claimed are involved in the derivation of conversational implicatures. Such inferential processing is in principle consciously available, in the sense that language users can become aware not just of the conclusions of such reasoning but also of the inputs to such reasoning, as well as to the (putative) fact that premises and conclusions are inferentially connected.

Bach (1994) provides yet another perspective on these matters. Bach wishes to maintain a more minimalist conception of semantics and of what is said. Yet he acknowledges that there are pragmatically determined contents that are not Gricean implicatures. He introduces a third category of contents, intermediate between what is said and what is implicated, that he labels 'implicitures.' He regards these as contents that are implicit in what is said and that require pragmatic processes of either **completion** or **expansion** to be made explicit. Consider the following, where the content in brackets is supplied from contextually available information:

(8) Mary swallowed {the bug that flew into her mouth}.

(9) Mary invited everyone {in her department} to her wedding.

The sentence 'Mary swallowed' is syntactically and semantically complete. (Compare it to 'Mary ate,' which is syntactically but not semantically complete, since 'eat' is a two-place relation. Or to 'Mary devoured,' which is neither syntactically nor semantically complete, since 'to devour' subcategorizes for an obligatory second NP, and 'devour' has two semantic arguments). Bach regards (8) as an example of

conceptual incompleteness, and hence a pragmatic process of completion must operate, resulting in the derivation of the impliciture that Mary swallowed the bug that flew into her mouth.

On the other hand, 'Mary invited everyone to her wedding' expresses a complete proposition. Bach calls this a **minimal proposition**, since the domain of the quantifier is not restricted in any way (beyond the restriction to persons that is encoded by 'one' in 'everyone'). However, this minimal proposition is not the one that the speaker intends to communicate. A pragmatic process of expansion is required, yielding the impliciture that Mary invited everyone in her department to her wedding. Bach calls examples such as (9) cases of **sentence nonliterality**. No expression in the sentence is used nonliterally, yet the minimal proposition expressed by the sentence is not what the speaker intends to convey.

Bach denies that there are pragmatically determined aspects of what is said. What is said for Bach is a more minimal notion, which is tied to explicitly encoded semantic content. Bach in effect accepts what Carston (1988) calls the Linguistic Direction Principle. The only contextually determined content that belongs to what is said by the utterance of a sentence is content that corresponds to some element that is syntactically realized in that sentence. Thus the contextual values of the indexicals in 'She is swallowing now' will be part of what is said by an utterance of this sentence, but the implicit content that specifies what was swallowed (if anything) will not be a part of what is said, since that content corresponds to no element in the sentence. Bach's minimalism requires him to admit that on some occasions what a speaker says does not correspond to a complete proposition. Such is the case in example (8) above. In such cases Bach argues that what is said corresponds to a 'propositional radical,' a gappy object whose missing conceptual elements must be supplied by the context.

Each of the authors discussed above posits a different view of the boundary between semantics and pragmatics. According to Grice, sentence meaning, truth-conditional content, and what is said are all aligned and fall on the side of semantics, whereas implicatures fall on the side of pragmatics. Cohen basically preserves Grice's dichotomy. Cases that may seem to be pragmatic intrusions into truth-conditional content are instead incorporated into semantics. If there is a challenge to Grice it is simply that some phenomena that Grice would label as conversational implicatures are reanalyzed by Cohen as part of semantically encoded content, so that the domain of pragmatics shrinks.

Subsequent views can all in one way or another be seen to challenge Grice's neat dichotomy. Bach remains the most faithful to Grice, since on the whole he preserves the alignment of sentence meaning, truth-conditional content, and what is said on the side of semantics. Truth-conditional content may sometimes come apart from what is said, in those cases in which what is said is conceptually incomplete and hence does not correspond to a complete, truth-evaluable proposition. But when we have truth-conditional content, it is something that is delivered purely by semantics. However, Bach argues that Grice's view of what lies on the side of pragmatics is inadequate. The phenomena of semantic underspecification and sentence nonliterality require us to recognize a category of pragmatic content intermediate between what is said and what is implicated – the category of implicitures.

Levinson's (1995, 2000) views are also quite close to Grice's. He accepts that sentence meaning and what is said line up, and that these are semantic phenomena. However, he allows that there can be pragmatic intrusion into truth-conditional content, so this notion is not a purely semantic notion. On the other hand, Levinson's conception of pragmatics is conservative. He does not challenge the adequacy of the Gricean conception of pragmatics as the domain of conversational implicatures. He does, however, develop Grice's notion of a generalized conversational implicature (GCI) to a substantial degree. GCIs are said to be default meanings, which belong to a third level of meaning that Levinson calls utterance-level meaning, different from either sentence meaning or speaker meaning. It is only GCIs that are involved in pragmatic intrusion.

Carston's and Recanati's challenges to Grice are more radical. For them, the only purely semantic notion is sentence or expression meaning. What is said (which is equated with truth-conditional content) falls on the side of pragmatics, since there is pragmatic intrusion into truth-conditional content. (Remember, Carston prefers the term 'explicature.') Carston (2002) suggests that we make a distinction between lexical and truth-conditional semantics. Lexical semantics studies those aspects of meaning that have some sort of syntactic reflex in the language and hence that are a part of the mental lexicon. The lexicon is a store of words in long-term memory. An entry in the mental lexicon is in effect a rule correlating the phonological, syntactic, and semantic information associated with a word. Lexical semantics on this conception is a mentalist enterprise. We can continue to talk of truth-conditional semantics, so long as we realize that the project is very different from the traditional one. Truth-conditions are not assigned directly to the sentences of a language, since sentences by themselves do not have truth-conditions. It is

only sentences as used by speakers in particular conversational contexts that have truth-conditions. For a defense of a similar claim, see Stainton (2000).

Moreover, both Carston and Recanati reject Gricean pragmatics as inadequate, since for them pragmatics is not confined to the study of conversational implicatures. Recanati's rejection of Gricean pragmatics may be the most thoroughgoing, since for him, the pragmatic processes involved in the recovery of what is said are not even of the same type as the global pragmatic processes involved in the recovery of implicatures. They are noninferential processes.

Many other voices have been added to this debate. For example, Stainton (1995) argues for the view that semantic underspecification and pragmatic intrusion is rife. He points to the fact that many utterances are of sentence fragments, rather than of complete sentences. Consider:

(10) Top shelf.

Suppose Mary is making herself a sandwich and is rooting around in the kitchen cupboard looking for jam to spread on her toast, and that this is mutually manifest to Mary and her husband Peter. Peter could utter sentence fragment (10), meaning to convey the proposition that the jam that Mary is looking for is on the top shelf of the cupboard she is searching in. Stainton argues that cases such as these are not to be treated as cases of ellipsis. The missing content in (10) need not correspond to any well-defined syntactic element, as happens in standard cases of syntactic ellipsis, such as the VP-ellipsis in 'Mary donated blood and so did Peter.' (Ellipsis is a very vexed subject. Whether it is something that can be handled in the syntax is not at all clear. See Jackendoff, 1997: 75–78, for a discussion of some problematic cases.) We should accept that language understanding is able to proceed on the basis of fragmentary clues from semantically decoded content. A large burden is placed on the inferential capacities of hearers, who must elaborate these clues on the basis of contextually available information.

Stanley (2002) argues for a diametrically opposed view. According to Stanley, there is much more syntactic and semantic structure than meets the eye, and many of the alleged cases of semantic underdetermination calling for pragmatic enrichment can be reanalyzed as cases where some hidden element in the underlying sentential structure is directing the process of content retrieval. In other words, we preserve the idea of the linguistic direction of content, although the elements doing the directing are often hidden elements (ones that are not phonetically realized, although they are a part of underlying logical form).

Stanley's views have been especially influential in accounting for cases of quantifier domain restriction, such as (9) above or (11) below:

(11) Every child has been vaccinated against polio.

(12) In every country, every child has been vaccinated against polio.

It is possible to use (11) in an appropriate context to convey the proposition that every child **in the United States** has been vaccinated against polio. Stanley's view is that there must be a hidden free variable in (11) whose value is specified in that context as the United States. This variable is present in the underlying logical form of (11) but is not phonetically realized. (Strictly speaking, what is implicit is a free **function** variable, and what must be specified in context is both the function and the values of the arguments of this function. In (11) the function is something like 'resident-in(x).') The evidence that there is a hidden free variable in (11) is that this variable can sometimes be bound by a quantifier. For example, when (11) is embedded in a sentence with a quantifier that has wide scope over the embedded quantifier, as is the case in (12), what is said is that in every country *x*, every child *in x* has been vaccinated. For more detailed arguments, both pro and con, see Stanley and Szabó (2000), Bach (2000) and Neale (2000). This hidden indexical view has consequences for the quantificational analysis of definite descriptions and has led to some controversy as to the correct analysis of so-called incomplete descriptions. See the chapters in Part I of Reimer & Bezuidenhout (2004).

The Mentalist Picture of the Semantics-Pragmatics Boundary

It was noted above that many philosophers follow Frege in rejecting mentalist semantics. Many linguists on the other hand embrace mentalism, and in fact regard it as the only sensible perspective from which to study language. See Chomsky (2000), Jackendoff (1997, 2002). From the point of view of mentalism, the dispute about the semantics-pragmatics boundary is not one about how to delineate the notions of explicature, impliciture, implicature, etc. Rather, it is concerned with the question as to how semantic and pragmatic knowledge are represented and organized in the human mind/brain and how this information is combined in the course of on-line production and comprehension of language. Several of the authors discussed above straddle the divide between philosophy and linguistics. Carston, for instance, works in the mentalist tradition. She is concerned to offer a mentalist theory of language **performance**. (So the

suggestion made at the outset that semantics is concerned with competence and pragmatics with performance is one that Carston would reject.) On the other hand, although she is interested in articulating a cognitive theory of performance, she has also been an active contributor to the philosophical debate about how to delineate what is said from what is conversationally implied.

Within the mentalist framework, the dominant picture of the semantics-pragmatics interface has been that it is the interface between the language system proper and what Chomsky (1995) calls the conceptual-intentional system. From the comprehension perspective, this interface is where the output from the hearer's language system, namely a representation of the logical form (LF) of the speaker's utterance, is interpreted by processing it in the context of currently active pragmatic information, including information about the speaker's likely communicative intentions. From the production perspective, this interface is where the process of giving expression to a speaker's communicative intentions is initiated. Appropriate lexical-conceptual entries in the speaker's mental lexicon are accessed, thus initiating a process that will ultimately result in the output of an appropriate phonetic form (PF) at the interface between the language system and the articulatory system.

Jackendoff (1997, 2002) challenges this Chomskyan view while remaining within the mentalist camp. He argues that the language system has a tripartite parallel architecture. There are three independent generative systems or modules, the phonological system, the syntactic system, and the conceptual system. Each contains its own compositional rules and proprietary set of representations, of, respectively, phonological structure (PS), syntactic structure (SS), and conceptual structure (CS). However, it is necessary for these systems to communicate with one another, and they do this via various interface modules, whose job it is to map representations from one system into the representations of another. There is a PS-SS interface, an SS-CS interface (which Jackendoff calls the syntax-semantics interface), and a PS-CS interface. The lexicon is also an interface module, and the interfaces already mentioned are in effect parts of this larger interface system. The lexicon is a long-term memory store whose entries are triples of the three sorts of structures mentioned, namely of PS, SS, and CS. The lexical entry for expression α, $<PS_\alpha,SS_\alpha,CS_\alpha>$, is in essence a correspondence rule mapping representations from the three systems into each other. (Lexical entries may be for words, for phrases, such as idioms, or for expressions below the word level, such as agreement markers.)

What Jackendoff calls the syntax-semantics interface (namely the SS-CS interface) is of relevance to the current discussion, since he justifies his claim that CS is the level of semantics, and that it is a level separate from syntax, by appeal to phenomena of the sort that Carston, Recanati, and others appeal to in arguing for pragmatic intrusion into what is said (i.e., into the proposition expressed by an utterance). Jackendoff (1997) argues for what he calls enriched semantic composition. At the level of CS, the compositional principles that form propositions (or thoughts) are sensitive to information that comes from the pragmatic context. But not all this conceptual structure is reflected in the corresponding syntactic structures. Consider the following:

(13) Peter kept crossing the street.
(14) Mary finished the book.
(15) The ham sandwich wants his check.

(13) illustrates the process of aspectual coercion, (14) of co-composition, and (15) of pragmatic transfer. See Pustejovsky (1995) for an account of the first two processes and Nunberg (1979) for an account of the third.

A single act of crossing the street is not a repetitive and (potentially) open-ended action like clapping one's hands or bouncing or spinning a ball. But 'kept' requires such repetitiveness and/or open-endedness. Thus, in the case of (13), 'kept' coerces an interpretation of 'crossing the street' according to which there is either a repeated or an extended action. That is, either we understand Peter to have crossed the street multiple times, perhaps in his effort to lose the detective tailing him. Alternatively, we zoom in on Peter's action of crossing the street and see it as one whose end point is still in Peter's future. Perhaps the street is a very broad one, with a median strip, where Peter pauses briefly before continuing with his crossing.

In the case of (14), finishing is something that can be predicated of an event, but 'the book' refers to an object, not an event. Pustejovsky (1995) argues that the lexical-conceptual entry for 'book' contains information about the typical features of books, namely that they have authors, are read by readers, etc. This conceptual information, presumably along with other contextual information, can be used to arrive at an enriched interpretation of (14) according to which Mary finished reading (or writing, or binding, or illustrating, etc.) the book. In the case of (15), contextual knowledge about restaurants and what goes on in them is used to arrive at an interpretation according to which the ham sandwich orderer wants his check.

In all these cases Jackendoff argues that there is more conceptual (semantic) structure than is

represented syntactically. Some will be inclined to argue that there must be covert syntactic structure to match the semantic structure – structure that is there but is not phonetically realized. But Jackendoff argues that this is a mistake. Those who argue for covert structure are in the grip of an assumption that he calls syntactocentricism, namely the view that the only source of compositional structure is syntax. This is an assumption he attributes to Chomsky, since it is built into all the theories of the organization of the language system that Chomsky has proposed, from the Standard Theory of the 1960s, through the extended and revised versions of the Standard Theory in the 1970s, to the Government and Binding (GB) approach of the early 1980s and the minimalist approach of the 1990s. But Jackendoff's account of the tripartite parallel architecture of the language system rejects this assumption.

Moreover, Jackendoff goes further and argues that it is a mistake to talk of **any** semantic structure being directly encoded in the syntax, as Chomsky seems to suggest when he introduces the level of logical form (LF) and talks of it as the level in syntax that directly represents meaning (Chomsky, 1986: 68). It is unnecessary and perhaps even incoherent to talk in this way. First, it is unnecessary, since the correspondence rules belonging to the syntax-semantics interface (the SS-CS interface) will do the work of correlating syntactic and semantic structures. Note also that the correspondence doesn't have to be perfect. There may be only a partial homology between these two systems. If the communicative system as a whole works in such a way that semantic structure is recoverable from readily available contextual knowledge, then the fact that some of this structure is invisible to the syntactic system is no bad thing.

Second, talk of semantic structure being encoded in syntax may be incoherent if that is allowed to mean that semantic distinctions are directly represented in the syntactic system. The syntactic system is a module whose internal operations are defined over representations in its own proprietary code. So the syntactic system knows about nouns and verbs, case markings, active and passive constructions, WH-movement, etc., not about objects and events, predicate-argument structure, the telic/atelic distinction, thematic roles, etc. Thus it could not represent the sort of pragmatic knowledge needed to interpret examples such as (13)–(15).

As already mentioned, Carston accepts Chomsky's picture, including the assumption of syntactocentricism. She holds that the output from the language system is a representation of LF, which includes those semantic features that are directly syntactically encoded. Earlier we saw her acceptance of the idea that lexical semantics is the study of such encoded aspects of meaning. So, for her, the SS-CS interface would be better called the semantics-pragmatics interface, not the syntax-semantics interface. This makes it seem that her views are very far from those of Jackendoff. Yet Carston's notion of pragmatic enrichment and Jackendoff's notion of enriched composition are very similar.

Jackendoff (2002: 273) does briefly allude to what he might call the semantics-pragmatics interface. It turns out to be an interface level between two sublevels **within** the conceptual system. It is the level that integrates thoughts that are conveyed by means of language with one's previous knowledge, including knowledge of the communicative context and the speaker's intentions. Such integration may lead one to inferentially derive further thoughts (i.e., Gricean implicatures). In other words, Jackendoff's conception is basically the Gricean conception that is rejected by Carston, since it confines pragmatics to the derivation of implicatures, whereas Carston thinks pragmatic processes are also involved in the enrichment of lexical concepts (encoded meanings) to arrive at ad hoc concepts (contextualized meanings). Of course, Jackendoff can use terminology in the way he pleases. However, to make it clearer that his views are in fact very close to those of Carston, it might be more appropriate to relabel Jackendoff's SS-CS interface the syntax-**pragmatics** interface.

This does of course still leave some disagreements unsettled. In particular, it leaves unsettled the issue of syntactocentricism and the debate as to whether there is a specifically linguistic part of semantics, separate from nonlinguistic knowledge, thought, and contextualized meaning. (See Jackendoff, 2002: 281–293, for reasons to deny that there is any such level of semantics.)

See also: Character versus Content; Context Principle; Intention and Semantics; Metaphor: Philosophical Theories; Pragmatic Determinants of What Is Said; Sense and Reference: Philosophical Aspects; Speech Acts; Truth Conditional Semantics and Meaning.

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Seminole *See:* Muskogean Languages.

Semiology and the Focus on Language

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Introduction

The science of 'semiotics' – the name adopted by the International Association of Semiotic Studies in 1969 – has been listed under various names (Deely, 2004) by dictionaries and encyclopedias. But it is the term 'semiology' that has always been its primary competitor over the last century. It was Ferdinand de Saussure (1857–1913) who coined the term in the *Cours de linguistique générale* (1916/1969: 68), designating it as the study of "the whole group of systems grounded on the arbitrariness of the sign," which includes "symbolic rites, polite formulas, military signals" (1969: 16). Although 'semiotics' is now the preferred designator of the discipline, 'semiology' has had, and continues to have, a role within it (Clarke, 1987), boasting such users of its paradigm as Valentin Volosinov (1895–1936), Louis Hjelmslev (1899–1965) Roland Barthes (1915–1980), Claude

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Lévi-Strauss (1908–), Algirdas Julien Greimas (1917–1992) and Claude Brémond (1929–). The wider orientation towards 'semiotics' and the ideas espoused by Charles S. Peirce (1839–1914) can be traced to the influence of Charles Morris (1901–1979) in the 1940s (Morris, 1938, 1946).

Focus on Language

Saussure indicated in the *Cours* that:

> It is possible to conceive of a science which studies the role of signs as part of social life. It would form part of social psychology, and hence of general psychology. We shall call it *semiology* (from the Greek *semeion*, 'sign'). It would investigate the nature of signs and the laws governing them. Since it does not yet exist, one cannot say for certain that it will exist. But it has a right to exist, a place ready for it in advance. Linguistics is only one branch of this general science. The laws which semiology will discover will be laws applicable in linguistics, and linguistics will thus be assigned to a clearly defined place in the field of human knowledge' (1969: 15–16).

He then went on to classify it as a branch of social psychology and to claim that it would study all signifying phenomena as if they were linguistic ones because, as he puts it: "Signs that are wholly arbitrary realize better than the others the ideal of the semiological process; that is why language, the most complex and universal of all systems of expression, is also the most characteristic" (1969: 68). Further on, he suggested that this is so because: "Without language, thought is a vague uncharted nebula. There are no pre-existing ideas, and nothing is distinct before the appearance of language" (1969: 112).

In the semiological frame, language signs are crucial because they make up the elemental code of the circuit between individuals who are 'unlocking' the contents of each others' brains during communication. Decipherment of the code occurs unconsciously by virtue of the differences that signs bear with respect to each other. This difference gives rise to the possibility of a speech community. That, in essence, constitutes the mode of inquiry espoused by semiology.

See also: Barthes, Roland (1915–1980); Levi-Strauss, Claude (b. 1908); Morris, Charles (1901–1979); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Semiology versus Semiotics; Semiotics: History; Sign Theories; Structure and Structuralism: Semiotic Approaches.

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Semiology vs. Semiotics

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Two terms, 'semiotics' and 'semiology,' and their variants have as their etymological source the Greek word *semeion* 'sign.' The words have different histories, and their entrance into the English lexicon sheds some light on the origin and development of the interdiscipline of semiotics itself. It is for this reason that they are interesting. This article examines these two words briefly in terms of their etymology, orthography, and meaning.

Sebeok (1976: 48) traced the etymology of 'semiotics' to its Greek form *semeiotiké* (<*sema* 'sign' and *semeiotikos* 'observant of signs'), which has a medical reference in its usage for 'symptomatology.' Deely (2003: 1), however, noted that 'semiotics' does not appear as a distinct lexical item with its contemporary meaning in either Greek or Latin. John Locke (1632–1704) employed an untransliterated Greek word (*semeiotiké*) in his *Essay concerning humane understanding* (1689), from which Charles Sanders Peirce (1839–1914) took the word two centuries later.

The orthography of 'semiotics' also merits commentary. Several variants of the now commonly accepted English lexical item 'semiotics' have appeared historically. Sebeok (1976: 48–49) stated that Charles Sanders Peirce, most closely associated with North American semiotics, used several variants in his works: 'semeiotic,' 'semeotic,' and 'semiotic' (his most common usage) but never 'semiotics.' Dictionary entries from the 19th century (1895) have various spellings ('semiotic,' 'semeiotic,' and their plural forms). Sebeok (1976: 50) noted that 'semiotic' in English was launched by Charles Morris (1903–1979) in *Signs, language and behavior* (1946). The use of the expression with final *-s* is certainly by analogy with the closely related *semantics* and *linguistics*. Sebeok noted that the diffusion of 'semiotics' as the currently accepted form began in the mid-1960s.

'Semiotics' has two basic references, as does 'semiology.' First, its earliest Greek allusion refers to a medical meaning, namely, the interpretation of the signs of disease, or symptomatology. Second, its modern signification means the doctrine of signs.

The first appearance of the French word *sémiologie* occurs in the *Dictionnaire de Trévoux* (1752) with its medical meaning. Next, the *Imperial dictionary* of England (1883) contains an entry for 'semeiology,' with the definition 'doctrine of signs,' which predates Ferdinand de Saussure's (1857–1914) use of the French expression *sémiologie* in its current meaning, first in his personal correspondence (1894, 1910), and ultimately in *Cours de linguistique générale* (1916). 'Semiology' is most closely associated with Saussure, who used the expression in its widespread contemporary meaning of '*[a] science that studies the life of signs within society*' (Saussure, 1959: 16, emphasis in original).

The term 'semiotics' has an American English origin, while 'semiology' has a French one. The latter came to the United States under the influence of Saussure's linguistic analytical procedures, while the former traveled to Europe and has become the preferred form today.

See also: Historiography of Linguistics; History of Linguistics: Discipline of Linguistics; Semiotics: History.

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Semiosis

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Semiosis is the process of interpreting something as signifying something else, for example, the process of interpreting a south-pointing weathervane as signifying that the local wind is a southerly or of interpreting the word 'unicorn' as signifying ('meaning') an equine creature having a single helical horn and being susceptible to the importunities of virgins. So any act of semiosis is the real-time process of associating a signifier with what it signifies, or a 'representamen' with its 'referent,' in Charles S. Peirce's terminology (1931–1966: § 2.228). Every such act, whether or not exteriorized for transmission (as in Charles Morris

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Semiosis is the process of interpreting something as signifying something else, for example, the process of interpreting a south-pointing weathervane as signifying that the local wind is a southerly or of interpreting the word 'unicorn' as signifying ('meaning') an equine creature having a single helical horn and being susceptible to the importunities of virgins. So any act of semiosis is the real-time process of associating a signifier with what it signifies, or a 'representamen' with its 'referent,' in Charles S. Peirce's terminology (1931–1966: § 2.228). Every such act, whether or not exteriorized for transmission (as in Charles Morris

[1938: 109–112, 30; 1964: 172, 366]), is first of all interior to the creature performing it; in mammals it is mental, or neural, in humans involving most of the brain's 'modules' active in language use plus other semiotic 'modules,' such as those that store and compare sensory inputs like those of vision and hearing, and the reasoning faculty itself.

A semiosis may be evoked by an external stimulus (a real weathervane, perceived as a sign) or solely by an internal thought process (thinking of a unicorn), but the critical factor is that something is taken as a sign and interpreted as signifying something else.

Every act of semiosis resembles a logical deduction, but many such deductions are in the strict sense invalid. What is lacking, resuming our first example, is the 'universal' premise: Every southward-pointing weathervane indicates a local southerly. So the typical semiosis is akin to what Aristotle (e.g., in his *Prior analytics*, 1989 [c. 350 B.C.]: 226–227) identified as an 'enthymeme,' a syllogism missing its universal. To be valid, the universal must be supplied – howbeit tacitly – in what Peirce called a further 'interpretant' (1931–1966, e.g., § 5.284). Even so, most such interpolated universals will come additionally burdened with logically necessary qualifications, some admittedly farfetched: Every southward-pointing weathervane indicates a local southerly unless it is rusted stiff; unless it is being actuated by mischievous rustics; unless it was so poorly designed or built as to indicate a northerly when pointing southward, and so on. Indeed, to achieve validity, many semioses will entail 'interpretants' that are in principle unbounded (... unless this weathervane was perversely magnetized so that its tail turns always toward the Magnetic Pole; unless my eyes deceive me...). Since human time and patience are finite, many of our semioses' signs are tied to their referents mostly by informed guesswork, or in Peirce's phrasing (1931–66, § 2.303), by 'abductions,' *ad infinitum* (and see Watt, 1993: 435–436, note). This holds true for guessing from context the meaning of a language's ambiguous words (*Henry owns a bank*: financial institution or river margin?) and of words whose meaning is known but vaguely (*turgid*, for example) and, not least, for many natural phenomena (e.g., a severe earthquake) when forcibly interpreted by the credulous (e.g., a political disaster is in the offing [Gibbon, n.d., vol. 1: 899–900]).

Since everyday life consists in large part of performing semioses – we think, however darkly, in signs – understanding them as well as we can, at whatever depths we can plumb, is critical to trying to understand everyday life.

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Semiosphere versus Biosphere

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Semiosphere

The concept of semiosphere was first put forward by Yuri Lotman in the context of cultural semiotics. He introduced the term in the article 'On Semiosphere' (Lotman, 1984) and elaborated it further in *Universe of the mind* (Lotman, 1990) and *Culture and explosion* (Lotman, 1992). The fundamental insight that underlies Lotman's concept is the notion that the smallest functioning mechanism is not a single sign or single text or single semiotic system, but an entire semiotic space of which the internal organization is created and maintained by multiple sign processes, which occur at different levels of a multifaceted and multileveled system of communication.

Semiosphere is a semiotic space that is necessary for the existence and functioning of languages and other sign systems. All semiotic systems are 'immersed' in a semiotic space and "can only function by interaction with that space" (Lotman, 1990: 125). A sign cannot make sense except in the context of other signs. In other words, semiosphere is a sphere of semiosis and **an experience thereof**; and, as such, it is a prerequisite for any single act of communication to

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be interpreted as one. Lotman's insistence on the prior existence of semiotic space in relation to single texts as well as to the interrelationship of texts within semiosphere has an analogue in C. S. Peirce's principle *omne symbolum e symbolo*. In biology, an analogical relationship has been formulated as Redi's law: *omne vivum e vivo*. Another version of it is Jakob von Uexküll's (1920: 6) 'every design is from design.'

Some fundamental assumptions about the structural properties of the semiotic space of culture have been formulated already in the *Theses on the semiotic study of cultures*:

> In the study of culture the initial premise is that all human activity concerned with the processing, exchange, and storage of information possesses a certain unity. Individual sign systems, though they presuppose immanently organized structures, function only in unity, supported by one another. None of the sign systems possesses a mechanism which would enable it to function culturally in isolation (Ivanov *et al.,* 1998 [1973]: 33).

These statements, along with the insistence on the fundamental duality between verbal (discrete) and pictorial (iconic) modeling systems (i.e., 'code duality'), form the basis of Lotman's writings throughout his scholarly career. Yet, the concept of semiosphere marks a shift from strictly structuralist concerns to, addressing more explicitly, the dynamics and organicism (cf. Mandelker, 1994) of cultural systems.

The concept of semiosphere draws on an analogy to Vladimir I. Vernadsky's concept of biosphere. In his letter to Boris Uspensky, written in 1982, Lotman first outlines his position:

> While reading Vernadsky, I was stunned by one of his statements. You know ... my opinion that a text can exist (i.e., is socially acknowledged as a text) if another text precedes it, and that any advanced culture must have been preceded by an advanced culture. And now I have discovered Vernadsky's thought, deeply founded on experience of exploring cosmic geology, that life can originate only from the living, i.e., only if it is preceded by it [...] Only the antecedence of semiotic sphere makes message out of message. Only the existence of intellect explains the existence of intellect (Lotman, 1997: 630).

Lotman interprets Vernadsky's concept of biosphere as the totality and the organic whole of living organisms and life processes. Accordingly, he proposes that semiosphere is to be understood as the totality of texts, languages, and sign processes that are interconnectedly bound to each other. Mihhail Lotman has pointed out that this assumption has a necessary methodological implication: "In the field of culture simple models do not precede the complicated ones, but, vice versa, simple models are the result of investigator's abstraction or the result of reduction or degeneration of complicated systems" (Lotman, 2001: 98). The concept of semiosphere as put forward by Lotman forms the core of the holistic theory of culture that departs from the assumption that "the unit of semiosis, the smallest functioning mechanism is not a separate language, but the whole semiotic space of culture in question" (Lotman, 1990: 125). **The elementary unit of semiosis is semiosphere.**

Functionally, semiosphere can be characterised as a 'thinking' system that is able to: (1) transmit available information; (2) create new information that is not simply deducible according to a set of algorithms from already existing information, but which is to some degree unpredictable; and (3) preserve and reproduce information, that is, any semiotic system has its own memory. Semiosis in this system can be understood mainly in terms of translation and dialogue. "Translation is a primary mechanism of consciousness. To express something in another language is a way of understanding it" (Lotman, 1990: 127). The need for dialogue, the dialogic situation precedes both the real dialogue and the existence of a language in which to conduct it: dialogic situation creates the common language that underlies the translation of messages (143).

One of the most important categories in the semiosphere is that of **boundary**. The system is able to engage in dialogic processes only if its structural identity is established. The beginning point for semiotic individuation is the binary distinction of 'inside' versus 'outside': the boundary of the semiosphere can be defined as the outer limit of a first-person form. Therefore, semiosphere is a 'bounded' system in the sense that it is distinguished from and cannot have contact with nonsemiotic or alien semiotic systems. On the other hand, semiotic boundary is to be conceived as an abstraction, a series of bilingual filters or membranes that enable the translation of messages from one semiotic system to another. In this way, boundary that is defined as an at least double-coded system of translation filters both determines the identity of the system and allows the translation of messages between the different semiotic systems.

The category of 'boundary' leads to two further characteristics of semiosphere: **binarism** and **asymmetry**. The translation mechanism responsible for the generation of new meaning in semiosphere presupposes at least two semiotically different participants that are mutually untranslatable. The entire space of the semiosphere is transected by boundaries and "since in the majority of cases the different languages of the semiosphere are semiotically asymmetrical, i.e., they do not have mutual semantic correspondences, then the whole semiosphere can be regarded as a

generator of information" (Lotman, 1990: 127). Asymmetry is also manifest in the relationship between 'center' and 'periphery,' between the defining core that tends toward the 'homogeneity' in the semiosphere through the mechanisms of 'autocommunication,' and the accelerated semiotic processes (fluctuations) that reveal the internal heterogeneity of the semiosphere.

It follows from the above statements that, firstly, the unity of semiosphere is always a more-or-less phenomenon and can be conceived only insofar as we consider the 'self-description' of the given system: the semiosphere is marked by heterogeneity. It is filled up with multiple semiotic systems "that relate to each other along the spectrum which runs from complete mutual translatability to just as complete mutual untranslatability" (Lotman, 1990: 125). Secondly, at all stages of contact, semiosphere comes into connexion with other semiotic systems that formerly lay beyond the boundaries of the semiosphere. Thirdly, the dynamics of the subsystems within the semiosphere are marked by heterogeneity as well. As a conclusion, semiosphere can be described as a 'semiotic continuum,' a heterogeneous yet bounded space that is in constant interaction with other similar structures. The points of contact between different systems (which, in turn, are part of a heterogeneous space of a higher order) enable the emergence of new meaning, that is, the deviation from the already established codes, models, or habits of the given system.

The concept of semiosphere also reflects the influence of the theory of self-organizing systems proposed by Ilya Prigogine and Isabelle Stengers (1984). For Lotman, Prigogine's ideas have two important implications. First, the stochastic and lawful (chance and necessity) are revealed as two sides of the same coin. Secondly, this leads to the separation in time and causality. This enabled Lotman to formulate a non-progressive view on dynamics of culture where the rapid (stochastic, explosive) processes in culture alternate with the periods of normal development. Semiosphere thus appears as a self-organizing system that undergoes constant renewal due to the emergence of new meanings created in the process of internal and external translation. Indeed, the basic mechanism for the creation of new meanings in culture appears to be the existence of a certain amount of misunderstanding or miscommunication that is built into the very structure of its semiotic space while the structural stability of any semiotic system is maintained by the self-descriptions created by the system in the process of autocommunication. The communication between different semiotic systems tends towards the increase in heterogeneity while autocommunication tends towards the increase in homogeneity.

Biosphere

Biosphere is a global network of life, a self-regulating system that embraces both the living organisms (biota) and their abiotic environment to the extent it is involved in the processes of life, including the troposphere, the ocean, and the upper envelopes of the earth crust. Living matter, dispersed in the form of living organisms and sharply separated from its inert environment, is the most important source of self-regulation and stability in the biosphere.

The foundational treatises on biosphere (and a conception related to it, noosphere) are attributed to Pierre Teilhard de Chardin and Vladimir I. Vernadsky. However, the modern usage of the term 'biosphere' began with Eduard Suess, a palaeontologist and geologist at the University of Vienna, who adopted the term in 1875. His brief account is, however, ambivalent and can be interpreted as referring either to (1) the sum total of living organisms, or (2) a geosphere created and organized by the life processes. The former view was taken up by Teilhard de Chardin while Vernadsky combines the two meanings to account for the biosphere as a geological envelope and a self-organizing system.

For Vernadsky, the biosphere is defined by the "cyclical processes of atom exchange between living matter and inert matter in the biosphere" (Vernadski, 1977: 111), i.e., the biogenic migration of atoms. The processes of atom migration are also a fundamental source of change in the biosphere. According to the principles of biogeochemistry formulated by Vernadsky, the evolution in the biosphere is an irreversible process that proceeds "in the direction of increasing the level of self-regulation and stability" (Levit, 2001: 61). One of the basic methods to achieve this is "to increase the intensity and the complexity of biogenic migration of atoms" (65), i.e., the basic determinant in the evolution of the biosphere is the growth of the atom exchange caused by the life processes:

> The biosphere appears in biogeochemistry as a peculiar envelope of the Earth clearly distinct from the other envelopes of our planet. The biosphere consists of some concentric contiguous formations surrounding the whole Earth and called geospheres. The biosphere has possessed this perfectly definite structure for billions of years. This structure is tied up with the active participation of life, is conditioned by life to a significant degree and is primarily characterised by dynamically mobile, stable, geologically durable equilibria which, in distinction from mechanical structures are quantitatively fluctuating within certain limits in relation to both space and time (Vernadsky, 1977: 120).

One of Vernadsky's most fundamental assumptions is that living and inert natural bodies are connected only by a biogenic flow of atoms: living matter in biosphere is embedded in its inert environment, yet it is clearly distinct from it from both structural and energetic points of view in that it constitutes an independent space-time that functions according to its own laws. There are almost no transitional forms between living and inert matter. Vernadsky draws here on the observations made by Louis Pasteur and Pierre Curie about the molecular dissymmetry discerning living organisms from inert matter: for dissymmetry to occur, it presupposes a space in which its organization is also dissymmetrical. In other words, dissymmetrical effects can be brought about only by a dissymmetrical cause. This assumption leads to one of the most important statements in Vernadsky's theory: the impossibility of abiogenesis in biosphere, or that life presupposes life but also that life appears from the very beginning in the form of the biosphere. According to Vernadsky, then, biosphere is what we might call an emergent phenomenon.

The Gaia Hypothesis

In 1968, James Lovelock proposed the so-called Gaia hypothesis, which states that the physical conditions of the Earth's surface, oceans, and atmosphere have been made fit for life and, as well, have been maintained in this state by the living organisms themselves. According to a definition proposed by Lovelock, Gaia is

> a complex entity involving the Earth's biosphere, atmosphere, oceans, and soil; the totality constituting a feedback or cybernetic system which seeks an optimal physical and chemical environment for life on this planet. The maintenance of relatively constant conditions by active control may be conveniently described by the term 'homoeostasis' (Lovelock, 1979: 10).

In this respect, Vernadsky's concept of biosphere as a self-regulating system anticipates many crucial claims put forward in Lovelock's Gaia hypothesis.

Noosphere

According to Vernadsky, by the beginning of the 20th century, biosphere had evolved through a transitional period from biosphere to noosphere. In this stage, the central stabilizing force would not be living matter but human thought, or, more precisely, scientific thought. In this respect, the latter is a function of the biosphere and thus a geological phenomenon. Therefore, in noosphere, the functions of the biogenic energy created by living matter would be taken over by "the energy of human culture" – a term coined by Vernadsky to denote the transformative force created by the activity of human mind.

The rise of civilization is a geological necessity; its continuous development is related to the dissymmetry of time in living matter whose function is scientific thought. According to Vernadsky,

> a civilization of 'cultural humanity' (being a form of a new geological force created in the biosphere) *cannot disappear or cease to exist*, for it is a great natural phenomenon corresponding historically, or more correctly, geologically, to the established organization of the biosphere. Forming the noosphere, the civilization becomes connected through all its terrestrial roots to its terrestrial envelope (*biosphere*), which has never happened in the previous history of mankind to a comparable degree (Vernadsky, 1977: 33; English quotation in Levit, 2001: 77).

Noosphere, therefore, is not a layer **in** the biosphere but it **is** the biosphere, where the central role belongs to the "energy of human culture," to "scientific thought" (Vernadsky, 1977: 95).

Teilhard de Chardin considered biosphere as an aggregate of terrestrial living organisms. Accordingly, Teilhard's noosphere is a "thinking layer" (Teilhard de Chardin, 1967: 202), one more envelope around and over the biosphere, its appearance marking not the next stage in the evolution of the biosphere but the rise of the split between the intelligence and its material matrix leading to the death of the Earth. Therefore, noosphere is only a transitional stage in the further development of supreme consciousness, "the end of all life on our globe, the death of the planet, the ultimate phase of the phenomenon of man" where "mankind, *taken as a whole*, will be obliged [...] to reflect upon itself at a single point" (Teilhard de Chardin, 1967: 300, 315). Little by little, the human minds extend

> the radius of their influence upon this earth which, by the same token, shrank steadily [...] Through the discovery yesterday of the railway, the motor car and the aeroplane, the physical influence of each man, formerly restricted to a few miles, now extends to hundreds of leagues or more. Better still: thanks to the prodigious biological event represented by the discovery of electromagnetic waves, each individual finds himself henceforth (actively and passively) simultaneously present, over land and sea, in every corner of the earth (Teilhard de Chardin, 1967: 240).

This paragraph from Teilhard de Chardin was later recalled by Marshall McLuhan in a passage discussing the "new electronic interdependence" that "recreates the world in the image of a global village": "This externalization of our senses creates what de Chardin calls the 'noosphere' or a technological brain of the world" (McLuhan, 1962: 31–32).

One must make a clear distinction between semiosphere and noosphere: "The existence of noosphere

is material and spatial, it encompasses a part of our planet, whereas the space of semiosphere is of an abstract kind" (Lotman, 1984: 6). However, as noted by Vjačeslav V. Ivanov, the noosphere is unthinkable without the semiosphere (Ivanov, 1998: 792).

Biosphere as Semiosphere

In the semiotic context, Thomas A. Sebeok has defined biosphere as "that parcel of the planet earth which comprises life-signs [...] The biosphere is where we live and what we are; but, although it is the only domicile we possess thus far, we are neither its sole inhabitants or constitute anything approaching a plurality in – let alone tenured – occupancy" (Sebeok, 1997: 113).

In 1993, Danish biosemiotician Jesper Hoffmeyer adopted the term 'semiosphere' (independently of Lotman) to designate the totality of semiotic processes occurring on planet Earth. According to Hoffmeyer, semiotic quality of life manifests itself in the tendency to acquire habits, that is, in the tendency to evolve into new regularities.

> Living systems exhibit extreme semiogenic behaviour through the process I have termed 'semetic interaction.' Semetic interactions refer to interactions in which regularities (habits) developed by one species (or individual) successively become used (interpreted) as signs by the individuals of the same or another species, thereby eliciting new habits in this species eventually to become – sooner or later – signs for other individuals, and so on in a branching and unending web integrating the ecosystems of the planet into a global semiosphere (Hoffmeyer, 1998: 287).

Accordingly,

> the semiosphere is a sphere just like the atmosphere, the hydrosphere, and the biosphere. It penetrates to every corner of these other spheres, incorporating all forms of communication: sounds, smells, movements, colors, shapes, electrical fields, thermal radiation, waves of all kinds, chemical signals, touching, and so on. In short, signs of life (Hoffmeyer, 1996: vii).

Hoffmeyer departs from the semiotic theory of Peirce by considering semiosis central to the understanding of life processes: "signs, not molecules are the basic units in the study of life" (Hoffmeyer, 1997b: 940). In this perspective, semiosphere (the sphere of semiosis) coincides with biosphere (the sphere of life). However, Hoffmeyer goes even further by arguing that from the semiotic point of view, "biosphere appears as a reductionist category which will have to be understood in the light of the yet more comprehensive category of the semiosphere" (Hoffmeyer, 1997a: 934). "We tend to overlook the fact that all plants and animals – all organisms, come to that – live, first and foremost, in a world of *signification*. Everything an organism senses signifies something to it ..." (Hoffmeyer, 1996: vii).

Similar conceptions of semiobiosphere and biosemiosphere have been described in semiotic literature by, respectively, Augusto Ponzio and Susan Petrilli, and Floyd Merrell. Both accounts depart from the original concept by Lotman and introduce it into the Peircean theoretical framework. Ponzio and Petrilli identify the semiosphere with biosphere and provide an integrated view of semiobiosphere that "obviously includes the *semiosphere* as constructed by human beings, by human culture, signs, symbols and artifacts, etc." (Ponzio and Petrilli, 2001: 264–265, original emphasis). However, they also underline that "the semiosphere is part of a *far broader* semiosphere, the semiobiosphere – a sign network human beings have never left, and to the extent that they are *living beings*, never will" (265, original emphasis). Merrell (2001) follows similar assumptions.

See also: Biosemiotics; Semiosis; Text and Text Analysis.

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Semiotic Anthropology

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Fields of Signs

The domain of semiotic anthropology is here considered to be results of empirical research carried out by anthropologists (in all subfields) that makes use of concepts and methods associated with the tradition of scholarship labeled 'semiotics' or 'semiology.' Semiotic anthropology is not a formal subdiscipline of anthropology; it is not a school of anthropological thought; and it is not confined to researchers affiliated with particular academic institutions or national traditions. To some degree semiotic anthropology emerged as a correction and refinement of symbolic or interpretive anthropology or structural anthropology (Mertz, 1985). In addition to the study of linguistic and written codes, anthropologists have employed semiotic notions in the analysis of cultural signs such as pictorial representation and images, dress and bodily adornment, gesture and dance, spatial organization and the built environment, ritualized behaviors (taboo, divination, performance), exchange valuables, and food and cuisine. Although anthropology has played a relatively minor role in the development of the larger discipline of semiotics, which is dominated by literary studies, it was an anthropologist, Margaret Mead (1901–1978), who coined the modern label at an interdisciplinary conference at Indiana University in 1962. In her summary comments, Mead discussed the possibility of a new term

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Like all aspects of contemporary research in semiotics, semiotic anthropology is heir to two dominant intellectual strands stemming from work of the American scientist and mathematician Charles S. Peirce (1839–1914) and the Swiss linguist Ferdinand de Saussure (1857–1913). Peirce and Saussure did not know of each other; much of their writing on semiotics or semiology is fragmentary and took decades to become widely available; and neither discussed strictly anthropological topics with any specificity.

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Semiotic Anthropology

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represent their objects and that determine further interpretant signs, which in turn represent the relationship between the processually prior signs and their objects. Refusing to take natural language as the model semiotic system but recognizing the special character of conventional linguistic forms (which he called, following Aristotle, symbols), Peirce subdivided the opposed traditional category of natural signs (Greek *semeion*) into icons, which resemble their objects in some formal way, and indexes, which are spatially or temporally contiguous with their objects.

> A sign endeavors to represent, in part at least, an Object, which is therefore in a sense the cause, or determinant, of the sign even if the sign represents its object falsely. But to say that it represents its Object implies that it affects a mind, and so affects it as, in some respect, to determine in that mind something that is mediately due to the Object. That determination of which the immediate cause, or determinant, is the Sign, and of which the mediate cause is the Object may be termed the Interpretant (Peirce, 1934–1935: 237; CP 6:347).

Of the three Peircean grounds relating signs and objects, only symbolic conventionality requires the interpretant to supply the linkage between sign and object, although nothing actually functions as a sign unless it is interpreted to be a sign of some sort. Peircean symbols are, thus, irreducibly triadic; but symbols can communicate information about their objects only by embodying icons and can successfully point to the external world only by embodying indexes, which anchor the contextual flow of signs (or semiosis) so that potential interpreters can bring their collateral knowledge to bear on the objects being represented. A scientist of international stature and a strong exponent of the pragmatic theory of truth, Peirce was not at all sensitive to the imperfections and limitations of cultural sign systems, even preferring to employ his own artificial system of existential graphs as a calculus for reasoning. In thinking about both the linguistic and graphic diagrammatization of inferential thought, Peirce insisted that the particular form of symbolization is irrelevant to the constitution of meaning, and that a language is usable to the degree that its system of formal representation transparently mirrors the process of valid logical inference (Parmentier, 1994: 42–43). Of considerable impact in contemporary semiotic anthropology are passages in which Peirce suggests that, since all thought is in signs, a thinking person is not very different from a sign, and, furthermore, that the interior process of thought does not differ in principle from dialogical communication between people.

> There is no element whatever of man's consciousness that has not something corresponding to it in the word; and the reason is obvious. It is that the word or sign that man uses is the man himself. For, as the fact that every thought is a sign, taken in conjunction with the fact that life is a train of thought, provides that man is a sign; so, that every thought in an external sign, proves that man is an external sign . . . Thus my language is the sum total of myself; for the man is the thought (Peirce, 1934–1935: 189; CP 5.314).

Saussure continued the classical and medieval tradition of viewing the linguistic sign (*signe*) as a dual entity, conjoining a perceptible expression or 'signifier' (*signifiant*) with an intelligible concept or 'signified' (*signifié*). The signifying relationships that bind the two levels of the sign fall along a continuum from radical arbitrariness, where there are no external constraints on the linkage between expression and conception, to relative motivation, where the relational, systemic complexity or the value of the linguistic forms – considered in terms of linear sequence (the syntagmatic axis) and in terms of associative sets (the paradigmatic axis) – imposes a limitation on arbitrariness. In order to uncover the dynamic relationship between continuity and change in linguistic signs, Saussure adopted the methodological principle of separating actual events of speaking (*parole*) from the social conventions that stipulate the meaning of signs for members of a community (*langue*). Although his primary focus was on language as a semiological system, Saussure mentioned in passing a number of other cultural systems, such as maritime signals, religious icons, and gestural codes, where the component units that do not display the radical arbitrariness of linguistic signs are better called symbols. By replacing the view of language as nomenclature with the proto-structuralist notion that oppositional relations among signs constitute the system of *langue*, Saussure recognized that languages, and by extension other semiological systems, do not slice up conceptual space in the same ways.

A detailed comparison of Peirce and Saussure cannot be attempted here, but three points need to be made briefly. First, anthropological research following either Peirce or Saussure needs to be aware of the terminological confusion stemming from the fact that the Peircean symbol correlates with the Saussurean *signe*, and the Saussurean *symbole* is defined by the presence of iconic and indexical linkages. Second, there is a fundamental divergence between Peirce's keen attention to the token-level instantiation of general signs and to the contextual rootedness of semiosis and Saussure's omission of the referent from his basic notion of the sign and of events of speaking from his model of the linguistic system. And third, research

in semiotic anthropology has begun to demonstrate clearly that Peircean and Saussurean approaches are in fact complementary, in the sense that the strengths of one theorist are matched by a correlative weaknesses in the other (Parmentier, 1994: xiii–xv).

Foundations of Semiotic Anthropology

The Russian-born linguist Roman Jakobson (1896–1982) is certainly the pivotal figure in the development of semiotic anthropology. During summer holidays as a young student, Jakobson collected folklore (especially proverbs and epic tales) and recorded dialect data; with student friends (including the slightly older folklorist Petr Bogatyrev [1893–1971]) he went on fieldwork expeditions in 1915 and 1916 in the Vereja Region near Moscow. Jakobson's close association with Bogatryrev continued during their years together as members of the Prague Linguistic Circle; and in 1929 they published a short paper on creativity in folklore and literary language. Citing the Saussurean distinction between particular speech events (*parole*) and the set of conventions accepted by a community (*langue*), the authors noted that "like langue, the work of folklore is extra-personal and has only a potential existence. It is only a complex of certain norms and impulses, a canvas of living tradition, which the performers animate with the embellishments of individual creativity, just as the creators of parole do in relationship to langue" (Bogatyrev and Jakobson, 1982: 38). But they then go on to point out an important distinction between oral and written traditions: a 'work' appears as langue to the performers of folklore, that is, as extra-personal, whereas the author of a literary 'work' regards it as parole. They warn, however, against the naïve view that folklore can only be produced by a homogeneous society with a singular collective personality and that literary culture is totally isolated from the influence of legends, superstitions, and myth-making.

Bogatyrev continued his fieldwork among the Carpathian Ukranians (1923–1926) and his engagement as a scholar and performer of contemporary theater. In a series of papers written in the 1930s, he sought to synthesize Karl Bühler's functional approach to language and V. N. Vološinov's semiotic approach to language and material culture in arguing that tangible things become signs when they acquire meaning beyond the bounds of their existence as a practical thing, just as speech confers meaning on the phonemes of a language: "Some objects can be used equally as material things and signs; for instance costume with its several functions is a material thing and a sign at the same time ... Cases where costume is only a sign are quite rare. Even the Chinese actor's paper costume, which functions predominantly to signify that the actor is playing the role of a Chinese, is, after all, not only a sign but also something that covers the actors's body" (Bogatyrev, 1976: 14). Bogatyrev noted this same multifunctionality in the language of the stage: "In some cases, the dominant function of the speech of a dramatic character may lie not in the content of the speech as such but in those verbal signs that characterize the nationality, the class, and so forth, of the speaker ... A speech that is full of mistakes may designate not only a foreigner but usually also a comic character" (Bogatyrev, 1976: 36–37). From the point of view of the audience, then, the actor is a "system of signs" (Bogatyrev, 1976: 48). Bogatyrev was one of the first to apply semiotic and structural methods to cultural data beyond language, and his monograph on folk costume, which introduced the notion of the "function of the structure of functions," anticipated both French and British versions of structuralism in anthropology (Bogatyrev, 1971: 96).

At the International Congress of Slavic Philologists meeting in Prague in 1929, a steering committee from the Prague Linguistic Circle presented a unified text expressing their views on the nature of language and verbal art. A key point in these 'Theses' is the definition of the 'aesthetic function' (adding to the three functions identified by Bühler) as the focus on the level of signs or expression (also called the message in later formulations): "From the thesis that poetic speech is directed at expression itself it follows that all the levels of a system of language that play only an ancillary role in communicative speech acquire a greater or lesser autonomous value in poetic speech. The linguistic devices grouped in these levels and the interrelation among the levels, often automatized in communicative speech, tend to become deautomatized in poetic speech" (Jakobson *et al.*, 1982: 15). A second influential idea involves the systemic nature of cultural phenomena:

> There can be no doubt that poetry is a self-contained entity set apart by its own signs and determined as an entity by its own dominant feature: poeticity. But it is also a part of higher entities, a component part of culture and the overall system of social values. Each of these autonomous yet integral parts is regulated by immanent laws of self-propulsion, while at the same time depending upon the other parts of the system to which it belongs; if one component changes, its relationship to the other component changes, thereby changing the components themselves. With the invention of photography, the goals and structures of painting changed; with the invention of the motion picture, the goals and structure of the theater changed (Jakobson, 1976: 180).

This broader ideological context can be a matter of a culture's semiotic ideology, as Jakobson notes in an analysis of the Hussite's rationalistic attack on the mystical symbolism of the medieval Gothic period: in challenging the symbolic nature of religious icons and liturgical rites, the Hussites rejected the "dialectical unity of form and content, of image and thing, of sign and object signified – the dialectical unity that forms the basis of medieval art and philosophy" (Jakobson, 1976: 181). And a third idea is that Saussure's strict separation of synchrony and diachrony needs to be overcome by the recognition that language changes reflect the "needs of the system" and that phenomena such as stylistic archaism and unproductive forms are evidence of diachrony within synchrony.

Jakobson's extensive research on parallelism in both verse and prose has proven highly influential for comparative studies in linguistics and semiotics (see Fox, 1977). Reflecting on his days as a student hearing a famous female storyteller recite epic verse and on his subsequent analyses of parallelism in syntactic constructions, grammatical forms, lexical identities, and prosodic schemes, Jakobson confessed, "Apparently there has been no other subject during my entire scholarly life that has captured me as persistently as have questions of parallelism" (Jakobson and Pomorska, 1983: 100). These contributions exemplify his effort to take Saussurean concepts (here, the axes of selection and combination) and project them into veritable anthropological analyses of events of speaking and complex aesthetic constructions.

Anthropololgy Meets Semiotics

An early conjuncture of British anthropology and semiotics occurred in *The meaning of meaning* by C. K. Ogden and I. A. Richards, first published in 1923. The book includes an appendix containing extended excerpts from several of Peirce's published papers (1868–1906) and from his unpublished correspondence with Lady Victoria Welby (1904–1909) and a supplementary essay by Bronislaw Malinowski titled 'The problem of meaning in primitive languages.' This book, which went through five editions, is the first place that Peirce's ideas about semeiotic received wide attention. Although it does not appear that Malinowski was aware of the Peirce texts when composing his essay (and he does not employ Peircean terminology), there are several points of convergence between Malinowski's view of the "essentially pragmatic character" (1938: 316) of language and Peircean semiotics, including the focus on the contextual grounding of linguistic signs, the multiple functions of acts of speaking, and the refusal to reify meaning as the inherent property of lexemes.

A much more direct and productive conjuncture of anthropology and semiotics occurred in 1942–1943 when Claude Lévi-Strauss and Roman Jakobson attended each others' lectures at the Free School of Advanced Studies in New York City. Levi-Strauss's lectures dealt with comparative study of kinship systems, and Jakobson presented six lectures on sound and meaning and another series of lectures on Saussure. From his later reflections on these contacts, it is clear that it was the structural approach of Jakobson's phonological theory more than the general semiotic orientation that inspired Lévi-Strauss to found structural anthropology.

> It cannot be doubted that these lectures also make an important contribution to the human sciences by emphasizing the role played in the production of language (but also that of all symbol systems) by the unconscious activity of the mind. For it is only on condition that we recognize that language, like any other social institution, presupposes mental functions that operate at the unconscious level, that we can hope to reach, beyond the continuity of the phenomena, the discontinuity by those "principles by which language is organized" (Lévi-Strauss, 1978: xviii–xix).

From the premise that the invention of language is the defining development in the transition between the state of nature and the state of culture, Lévi-Strauss draws the inference that cultural analysis should follow the guidelines of linguistic analysis: "Because language is the most perfect of all those cultural manifestations which, in one respect or another, constitute systems, and if we want to understand art, religion or law, and perhaps even cooking or the rules of politesse, we must imagine them as being codes formed by articulated signs, following the pattern of linguistic communication" (Lévi-Strauss, 1969: 150–151).

While Lévi-Strauss clearly grounds structuralism in language, he generalized this approach to encompass other codes of communication, some relying on articulate language as their primary code and others operating independently of the linguistic code. But each of these languages must meet the qualification of being a system of signs "transformable, in other words **translatable**, into the language of another system with the help of substitutions" (Lévi-Strauss, 1976: 19).

By synthesizing methods of structural linguistics from Saussure and Jakobson with the insights from information theory as formulated by Claude Shannon, Lévi-Strauss attempts to formulate the similarities and differences of systems of signs such as affinal exchange, economic transactions, religious rites, and

mythological narratives, by employing semiotic concepts to differentiate these homologous communication systems. He puts speech and kinship alliance at opposite ends of a continuum, according to which the former exchanges words that are purely signifying signs (that is, mechanisms for the schematization of thought, without affective, possessive, or magical associations) and the latter exchanges marriageable women that continue to be both signs and values.

Two critical invariants are found in all these semiological systems: at the token level, all involve social activity mediated by the reciprocal exchange of messages, whether words, women, goods, or offerings; at the type level, the meaning of these messages is constituted not by motivated or analogous ties with isolated external referents but by the positional value of signs as part of systemic codes. The combination of these two fundamental invariants guarantees that cultural analysis will continue to be grounded in worldly realities functioning primarily as signifiers rather than as signifieds.

> One cannot study gods while ignoring their images; rites without analyzing the objects and substances manufactured and manipulated by the officiant; or social rules independently of the things that correspond to them. Social anthropology does not confine itself to a part of the domain of ethnology; it does not separate material culture and spiritual culture. Men communicate by means of symbols and signs. For anthropology, which is a conversation of man with man, all things are symbol and sign which act as intermediaries between two subjects (Lévi-Strauss, 1976: 11).

For Lévi-Strauss to prove his point that semiological value flows from the system and not from reference, he needs to analyze some cultural phenomenon in which the elementary units are not semantically motivated but rather are purely positional, that is, where the units resemble phonemes rather than lexemes. Myths serve this purpose well, since not only do mythic elements or 'mythemes' acquire significance due to their position in paradigmatic sets that are not part of the narrative sequence, but myths as a whole are subject to constant transformation across spatial and temporal boundaries.

It is precisely this relationship between event and system that provides Lévi-Strauss with a primary mode of typologizing the cognitive worlds of various societies, which he divides into the "savage mind," a cognitive style that works to deny the impact of historical contingency on systems of cultural classification, the "scientific mind," thinking that internalizes the historical process as the principle of development. This typological opposition is then expressed in terms of semiotic phenomena: the distinction between the dimensions of the sign as correlating a percept (that is, a sensory perception) and a concept (that is, a signified meaning) provides a metalanguage for comparison. Lévi-Strauss contrasts the engineer and the myth-teller as oriented respectively toward the intelligible signified and the perceptible signifier; the former tries to employ signs that are maximally transparent to known reality, while the latter forever generates new narratives out of the detritus of previous myths. He is careful to point out, however, that the distinction between mythological and scientific mentalities does not imply different degrees of rationality in contrasting types of societies, only different kinds of rationality. To further avoid the taint of evolutionary positivism, he notes that examples of each mentality are easy to find in the other kind of society: just as the famous *bricoleur* or 'handyman' who works by means of materials ready-to-hand manifests the savage mind within industrialized society, so the *churinga*, a sacred object that is the material embodiment of ancestral action in the past, indexes diachrony or pure historicity for Australian aborigines.

Peirce in Semiotic Anthropology

Just as Jakobson's revolutionary phonological theory and constructive critique of Saussure were providing Lévi-Strauss with a model for his semiological view of anthropology, Jakobson himself was making his first acquaintance with the writing of Peirce in the early 1950s. A 10-volume edition of Peirce's writings started to appear in print in 1931 under the editorship of Charles Hartshorne and Paul Weiss, both philosophy instructors at Harvard University, where Jakobson began teaching in 1949. Asked to summarize the results of the joint Conference of Anthropologists and Linguists held at Indiana University (Bloomington) in 1952, Jakobson prefaced his comments on specific papers with a general remark mentioning both Saussure and Peirce:

> In the impending task of analyzing and comparing the various semiotic systems, we must remember not only the slogan of F. de Saussure that linguistics is part of the science of signs, but, first and foremost, the life-work of his no less eminent contemporary, Charles Sanders Peirce. Peirce not only stated the need for a semiotic but drafted, moreover, its basic lines. His fundamental ideas and devices in the theory of symbols, and particularly of linguistic symbols, when carefully studied, will be of substantial support for the investigation of language in its relation to other systems of signs (Jakobson, 1971: 555–556).

The key to Jakobson's repeated efforts to combine the Saussurean definition of the sign as the correlative union of the perceptible signifier and the intelligible

signified with Peirce's triadic model of the sign is his idea that meaning is essentially a translation of the sign into another sign. In his many comments on Peirce, Jakobson focused his attention of the triadic division of icon, index, and symbol, which for Peirce involves the complex relationship between sign vehicle and the object referred to, as a way to further distance himself from the Sausssurean notion of the arbitrariness of semiosis in language which, in contrast, deals with unmotivated relationship between sign and meaning, that is, with what Peirce calls the symbol (Jakobson, 1980). Jakobson argued (incorrectly, it turns out) that the Peircean iconic sign is motivated by the similarity of the signifier and the signified, while the Peircean indexical sign is motivated by the contiguity of the signifier and the signified. (Saussure's signified is more accurately equated with Peirce's "immediate interpretant.")

An important next step in synthesizing Jakobson and Peirce was taken in 1976 by Michael Silverstein in a landmark paper that explicitly harnesses the Peircean trichotomy of icon, index, and symbol in order to contrast the decontextualized, referential value of linguistic signs (the subject of Saussurean analysis) with the contextualized, indexical, or pragmatic mode of meaningfulness that operates sometimes independently (e.g., deference forms) and sometimes conjointly with referential functionality (e.g., personal pronouns or other deictic forms or shifters) and is the real key to the linkage between acts of speech and the system of social life. Silverstein sees indexical meaningfulness rather than abstract semantic meaning as the true locus for the modeling power of language in anthropological theory:

> If language is unique in having a true symbolic mode, then obviously other cultural media must be more akin to the combined iconic and indexical modes of meaningfulness. In general, then, we can conclude that "cultural meaning" of behavior is so limited, except for speech, and see a cultural description as a massive, multiply pragmatic description of how the social categories of groups of people are constituted in a criss-crossing, frequently contradictory, ambiguous, and confusing set of pragmatic meanings of many kinds of behavior . . . Culture is, with the exception of a small part of language, but a congeries of iconic-indexical systems of meaningfulness of behavior (Silverstein, 1976: 54).

Having thus distinguished pragmatic or indexical categories and decontextualized or semantic categories, Silverstein proceeds to repeat this distinction at the meta level by separating metasemantics, that is, talk about the semantic code (e.g., glossing), from metapragmatics, talk about the pragmatics of speech. There is a fundamental asymmetry between these two levels: whereas metasemantic discourse is semantic, metapragmatic discourse is never pragmatic in the same sense that the object of that discourse is pragmatic. That is, metapragmatic characterizations never match the function being characterized: while language as a pure referential medium serves as its own metalanguage in metasemantic referential speech events, there can be no metapragmatic speech events in which use of speech in a given functional mode explicates the pragmatic structure of that very functional mode.

Language is the primary vehicle for people to understand the meaningfulness of their social action: it is the dominant expressive means of communication, facilitates the recording of cultural traditions across generations, and performs the metasemiotic function of interpreting other sign systems. But language can also block understanding because speakers regularly misread pragmatic sign relations as semantic ones; and in the course of everyday life they have little awareness of the mediational role language plays in shaping their experience of the world, or they are regularly led to project a cultural ontology out of what Benjamin Lee Whorf called cryptotypic regularities and fashions of speaking. Speakers are also subject to the active regimentation of interpretations by institutionally powerful forces, from schools and the press, to dictionaries and advertising commercials. Silverstein formulates the issue of awareness and lack of awareness in terms of the structural properties of language: "It is very easy to obtain accurate pragmatic information in the form of metapragmatic referential speech for segmental, referential, relatively presupposing indexes. It is extremely difficult, if not impossible, to make a native speaker aware of nonsegmental, nonreferential, relatively creative formal features, which have no metapragmatic reality for him" (Silverstein, 1976: 49). Silverstein's earliest prescription for a Jakobson-inspired *anthropologie sémiotique* in a short paper published in French in 1975 was followed a few years later by his University of Chicago colleague Milton Singer's Distinguished Lecture at American Anthropological Association meetings in 1978, which argued for a Peircean-grounded semiotic anthropology as opposed to a Saussure-inspired semiological approach:

> Without wishing to deny the fruitful ingenuity of a semiological analysis of culture . . . I would urge the application of Peircean semiotic to the problems of culture theory and suggest that we call such explorations "semiotic anthropology." In one important respect, at least, a semiotic theory of signs as a distinct advantage over a semiological theory: it can deal with some of the difficult problems generated by acceptance of the complementarity of cultural and social systems. Because semiology

> limits itself to a theory of signification and linguistic codes, it cannot deal with the problem of how different cultural "languages" are related to empirical objects and egos, to individual actors and groups. The existence of such extralinguistic relations is, of course, recognized by semiologists, but the study of them is relegated to other disciplines – psychology, sociology, economics, geography, and history. They do not enter directly and essentially into semiological analysis. In semiotic anthropology, on the contrary, it is possible to deal with such extralinguistic relations within the framework of semiotic theory, because a semiotic anthropology is a pragmatic anthropology. It contains a theory of how systems of signs are related to their meanings, as well as to the objects designated and to the experience and behavior of the sign users (Singer, 1984: 50).

Following Peirce's key insight that conventional symbols embody iconic and indexical modes of meaningfulness, Singer made a comparative study of emblems of identity such as flags, banners, insignia, and heraldic devices. His ethnographic analysis of emblems in Newburyport, Massachusetts, in the 1970s (a restudy of Lloyd Warner's classic accounts from the 1930s) moved significantly beyond the theoretical positions of both Durkheim and Lévi-Strauss by adopting a semiotic perspective.

> A semiotic analysis of emblems as constructed signs will thus require an understanding of the characters they signify, of the objects they denote, and of the system of conventional signs ("symbols") they use to make statements about the relations of emblems, objects, and characters. Such understandings will be realized in the dialogues between the designers of the emblems (the "utterers") and the viewers (the "interpreters") in the context of ongoing social interactions (Singer, 1984: 108).

Singer uncovered a transformation in the social referents of the indexicality of emblems, from ethnic origin (*Yankee* versus *Ethnic*) to residential duration (*local* versus *outsider*), accomplished by subtle reinterpretation of the latent identities signaled by formally continuous emblems. He witnessed a ceremony rededicating a bronze model (replacing an earlier stolen one) of the 17th century ship *Mary and John* that brought early settlers to the area; this "replica of a replica" was reinterpreted in the 1970s as a symbol of collective identity beyond the lineal descendants of the earliest settlers. Singer also observed the "double or triple symbolism" in multi-ethnic family households, where emblems of identity from different countries of origin are juxtaposed on walls and mantelpieces.

Eric Schwimmer's parallel study of "icons of identity" (1986) among the Orokaiva of Papua New Guinea is a second example of the application of Peircean insights to an ethnographic topic previously treated by Saussurean-structuralist techniques. Whereas Lévi-Strauss' attempt to replace a one-to-one metonymic relationship between social groups and totemic emblems by postulating a formal correlation between groups and totems as two systems of differences, Schwimmer showed that particular plant emblems (*hae*) signal a person's membership in a nuclear social group because an ancestor became spatially attached to that tree (ate it, was born near it, used to sit on it, etc.) and, according to mythological narratives, eventually was transformed into it. So when his descendants use a leaf of that same tree as a trail marker while walking in neighboring territory, they are in fact using a highly informational indexical sign that functions as a nonsemantic icon of group identity. As Schwimmer noted, "It is this shifting back between iconic and indexical that arouses our interest" (Schwimmer, 1986: 373).

A third example of the application of Peircean concepts in ethnographic description is Daniel's path-breaking study of the Tamil culture of India, in which he finds semiotic relations at two levels. The first more encompassing level characterizes the triadic relationship of the ethnographer's understanding (the Sign) representing the informants' culture being studied (the Object), and this necessarily imperfect or aniconic relationship in turn is represented by the resulting ethnographic writing (the Interpretant). (Perhaps a more logical depiction would have the ethnographic writing as the representing Sign, the total fieldwork situation as the Object, and the increased scientific understanding of the culture gained by the community of anthropologists as the Interpretant.) The second level characterizes the multimodal semiotic meanings manifested at various moments in the flux of mundane and ritualized social life.

> Most, if not all signs are mixed. Signs, including symbols (especially symbols), are polysemic . . . Some symbols, especially ritual and religious ones, tend to display their polysemic attributes with far greater élan than do others. The aspect of the sign that I have tried to bring forth is not its polysemy or its multivocality but its polychromy or multimodality. Iconic as well as indexical aspects may be concealed within the same sign. A sign runs in a bundle of cables, so to speak, not in a single strand . . . A satisfactory cultural account must evidence a sensitivity to the multimodality of the signs in that culture, a sensitivity to the significant color that comes to be dominant to those who traffic in these signs in their daily lives, and a sensitivity to the partially or fully concealed modalities that refract the significance emitted by the dominant modal facet (Daniel, 1984: 39–40).

Through close analyses of several interlocking sets of data (including household organization, the

relationship between bodily substance and human action, and pilgrimage rituals) Daniel argues that iconism coding shared substance is the regnant or dominant semiotic style of the culture, in contrast to the pervasive style of symbolization in Western positivist culture (of which Daniel, surprisingly, sees Peirce's semiotic and pragmatist philosophy as representative). It is not accidental, given this postulation of the primacy of iconism in Tamil culture, that the consciousness of pilgrims is described (again using Peircean terminology) as a processual movement from triadic Thirdness to dyadic Secondness to nonanalytical Firstness, this last stage leaving the pilgrim "where there is nothing left to know either through analysis or synthesis. This is *pūrna*, perfect knowledge" (Daniel, 1984: 286).

Indexicality, Mediation, and Ideology

As these and other ethnographic works demonstrate, one of the great merits of a Peircean as opposed to a Saussurean approach to the semiotics of social life is that the category of meaningfulness labeled indexicality, that aspect of sign meaning linked to its context of occurrence, is fully recognized as a mode of signification analytically independent from semantic or symbolic meaning, which depends on decontextualized regularities stipulated by convention. Given that social life is largely concerned with human interaction and the objectification of meaning in material objects, any attempt to analyze the indexical dimensions of culture as if they were purely symbolic, as in the language of flowers or symbols of empire, would be misguided. Indexicality works in two directions, what Silverstein (1976) labels 'presupposing,' signs whose contextual anchor must be known prior to the instance of the sign, and 'creative' or entailing signs whose very occurrence generates the contextual surround in reality or at least in cognitive salience.

Communicative events usually display some sort of construal by participants of the ongoing linguistic and non-linguistic signs – either explicitly in metapragmatic/metasemiotic forms that describe, explain, or even rationalize the signs-in-context, or implicitly in the co-textual organization of the "patterns of emergent entextualization" (Silverstein, 2003: 196). Parallelisms or other kinds of diagrammatic forms that manifest an asymmetrical indexical pattern or moment seem to be widespread semiotic constructs that realize social power in culture (Parmentier, 1997: 37–42). Urban's semiotic analysis of origin myth telling among the Shokleng of Brazil shows this clearly. Origin myths are narrated by knowledgeable men in a highly marked speaking style at death ceremonies, namely, the learning style involving two speakers, one of whom rapidly echoes the individual syllables of the myth uttered by the other. Urban (1985, 1986) argues that, in addition to many dimensions of micro- and macro-parallelism in the myth text, the performance itself is a diagrammatic iconic sign of the production of cultural continuity, a function accomplished by the event itself.

The retrospective interpretation of indexicals in real time can distort their potential for multiple indexical mappings; and asking people after the fact frequently produces interpretations favoring presupposing over creative meanings, the product over the process of production. For example, since product is easier to see than process in the archaeological record, there is a tendency to read material remains in a presupposing rather than creative manner, so that, for example, differential grave goods are said to index degrees of social inequality, thus overlooking the possibility that material elaboration is designed to create an augmented afterlife status. In later reflection, actors tend to re-read indexical multifunctionality, either focusing on the most obvious indexical modality or by translating complex indexicals into decontextualized semantic regularities. Furthermore, multiple indexical meanings frequently piggyback on a single chain of signifiers, whose occurrence can signal spatial, temporal, and social indexicality all at once. And indexical meaning can intersect in complex ways with symbolic meaning, as in the case of duplex signs or shifters, where referential value can only be discovered after indexical calculation.

In order to clear up some confusion in applying analytical labels to processes that operate in distinct yet interlocking levels of semiosis, Elizabeth Mertz and Richard Parmentier (1985) proposed the term "semiotic mediation," based on Peirce's approving citation of the word 'mediation' as a summary description for all semiotic processes at the level of generality or Thirdness (Parmentier, 1985). They identified three levels of semiotic mediation: token mediation, code mediation, and ideological mediation. Token mediation involves the play of sign instances in the give and take of social life, viewed as a flow of signs in context. The circulation of material sign tokens involves various dynamics between the sign values and the social relations they mediate on a continuum ranging from the transactionally generated values of amulets to hoarded noncirculating inalienable possessions. Code mediation deals with the skewing, bias, or refraction that operates between perception and reality, much like a pair of colored glasses modifies sight. Without an alternative or comparative perspective, this mediational effect can easily go unnoticed: members of a society regularly overlook the historical contingency and formal

arbitrariness of their familiar codes, preferring to consider them products of transcendent wisdom or natural order. Cultural codes, like linguistic ones, rarely determine the limits of what can be signaled; rather, they work to facilitate certain expressible meanings, and to prestructure equivalence relations by regular paradigmatic structures and syntagmatic parallelisms.

Ideological mediation has been the subject of much recent research into linguistic and semiotic ideologies, that is, relatively presupposed, systematic sets of assumptions about semiosis in general. Folk ideas about the distinction between natural and conventional signs, notions about the universe as a book, and homologies drawn between linguistic and economic processes are a few examples of widely discussed semiotic ideologies. Analysis of these ideologies is difficult, since it is easy to erroneously substitute a passing articulated expression of an ideology (by a chief, king, or priest, for example) or a spontaneous rationalization prompted by our own metasemiotic inquiry for a truly pervasive, though largely unspoken, semiotic ideology. Semiotic ideologies are also hard to locate given the frequent lack of specific markers for metasemiotic signs in culture. In contrast to the sign processes in social life, artificial semiotic systems (e.g., computer programs) necessarily make a clear distinction between signs operating at a particular discursive level and signs operating at a metadiscursive level with respect to it; the use of markers such as quotations or brackets serves to separate direct signification from comments on the signifying process. In human sign systems, on the other hand, these levels are often formally continuous, with little warning that a shift from use to mention has occurred. Linguistic terms that directly label various dimensions of semiotic functioning, ethnosemiotic labels, can be important clues to the operation of semiotic ideologies, although the ethnographer needs to be careful in not automatically assuming that an elite or specialist vocabulary and awareness reflects the general population.

Under the general rubric of the "semiotics of dominance" Gal (1998) discusses various semiotic processes and devices through which any cultural idea gains the discursive authority to become dominant. A good illustration would be the process Gal calls iconization (relabeled more recently by Irvine [2004: 108] as rhematization) in which the situation in which linguistic features that indexically signal social differentiation is transformed into a situation in which some (iconic) quality of the linguistic feature is represented as parallel to some feature (behavioral, affective, moral) in the social group. Since these devices are accomplished largely through the use of language and since an important subset of cultural ideas includes ideas about language, it follows that these semiotic processes can themselves be the object of debate and contestation. For example, in the late 19th century, Japanese intellectuals and educators identified certain linguistic forms (missing honorifics, phonological contractions of verb endings) in the speech of elite schoolgirls as lazy and vulgar. Their metapragmatic commentaries provided a rationalizing narrative of the origin of these forms in the schoolgirls' connection with impure *geisha* or corrupt Westerners. The commentaries, thus, collapse the temporal and causal relationship of indexicality between the index (the forms) and the indexed (the schoolgirls) into the relationship of iconicity, in which both forms and speakers are simultaneously lazy and vulgar (Inoue, 2004). Herzfeld, similarly, shows how powerful iconicity, or the "illusions of iconic purity," can be as a rhetorical device in the promulgation of nationalist ideologies (1986).

Semiotics of Culture and the Cultural Text

Since the 1970s the so-called Moscow-Tartu School of semiotics has attempted to chart a synthetic theory, combining Saussurean, Peircean, and information-theoretic models, for understanding cultural signs systems, both historically and comparatively. In 1973 a group of scholars associated with this school issued a joint statement outlining a "semiotic-typological" concept of culture that examines both the hierarchically linked semiotic subsystems within a culture and the dynamic opposition of culture and an external, nonsemiotic space of nonculture. The basic unit of analysis is the culture text, which is a functionally integral sequence of signs that carries a coherent meaning.

> From the semiotic point of view culture may be regarded as a hierarchy of particular semiotic systems, as the sum of the texts and the set of functions correlated with them, or as a certain mechanism which generates these texts. If we regard the collective as a more complexly organized individual, culture may be understood by analogy with the individual mechanism of memory as a certain collective mechanism for the storage and processing of information. The semiotic structure of culture and the semiotic structure of memory are functionally uniform phenomena situated on different levels. This proposition does not contradict the dynamism of culture: being in principle the fixation of past experience, it may also appear as a program and as instructions for the creation of new texts (Lotman *et al.*, 1973).

Yuri M. Lotman (1922–1993; 73), the dominant member of the group, argued that the data for cross-cultural comparison are already at the metacultural

level, since each culture displays specific metasemiotic constructs, such as instructional texts stipulating the norms of literary production or the artistic modeling of the universe. Systematic comparison is possible only because of the universal characteristic of cultural texts to be organized in spatial or topological schemes, such as center/periphery oppositions and boundary mechanisms.

The central myth-making mechanism of culture is organized as topological space.

> With projection onto the axis of linear time and from the province of ritual play-action into the sphere of the verbal text, it undergoes important changes: in assuming linearity and discreteness, it acquires the characteristics of a verbal text constructed on the principle of a sentence. In this sense it becomes comparable with the entirely verbal texts arising on the periphery of culture. Yet it is precisely this comparison which makes it possible to discover some very profound differences: the central sphere of culture is constructed on the principle of an integrated structural whole, a sentence; the peripheral sphere is organized as a cumulative chain simply by the accretion of structurally independent entities (Lotman, 1979: 173).

And because every culture, whatever the particular shape of its textual models, understands itself over against nonculture, it is universally the case that culture appears as a hierarchical organization of semiotic codes, including natural languages as well as "secondary modeling systems," that is, complex semiotic languages built upon linguistic materials (Lotman *et al.*, 1973: 76).

From this premise Lotman articulates the general goal of a typological approach to culture. Since the development of metalanguages within different domains or institutions of a culture will not all occur simultaneously, Lotman posits that, from a synchronic point of view, a culture needs to be seen as a cross-section of typologically distinct cultural epochs.

Lotman envisions a type of semiotic consciousness he calls mythological, in which signs (especially proper names) become so indexically linked with referents that the relationship appears asemiotic and thus there can be no hierarchical layering of language and metalanguage. Mythological texts appear to have symbols and metaphors only when translated into nonmythological categories. In the mythic world objects are seen as singular and integral wholes, signs are not ascribed but recognized (being synonymous with proper nouns), word and denotation are identified, and text is isomorphic with the described world, understanding is based on recognition, identification and transformation, and the entire system is monolinguistic.

Lotman's typological approach does not require the unilineal succession of mythological to nonmythological to logicoscientific cultures, but rather speaks of the "prevalence of certain cultural models or of an entire culture's subjective orientation toward them" (Lotman and Uspenskij, 1978: 226). Given the criterion of prevalence, a certain culture can display multiple types of semiotic complexity as a result, for example, of the penetration of mythological features into nonmythological periods (e.g., surrealism or symbolist poetry in 20th century Europe), the differential dynamism of center and periphery in incorporating new semiotic materials, the dialectical tension between motivated symbols and conventional signs corresponding to the opposition between a high sacred level and a low profane level, and the binarism of symbolic activity of state elites and the putatively asemiotic, practical behavior of peasants. In his book *Universe of the mind: a semiotic theory of culture* (1990), Lotman constructs the concept of the semiosphere, by analogy with the biosphere (as coined by the biologist Vernadsky), to refer to the semiotic space that supports all the heterogeneous languages in a culture. "Across any synchronic section of the semiosphere different languages at different stages of development are in conflict, and some texts are immersed in languages not their own, while the codes to decipher them with may be entirely absent" (Lotman, 1990: 126). At the metaphorical center of the semiosphere, Lotman places the most structurally developed languages (including the natural languages of the culture); the peripheral boundary is the locus of innovation and metasemiotic reflection.

The research into the semiotics of culture by Irene Portis-Winner represents the fullest synthesis in contemporary semiotic anthropology of the Moscow-Tartu School, the Prague School, and Peirce.

> Semiotics of culture may . . . be viewed as more encompassing than a general semiotics glottocentrically conceived, since, while it attends to aspects of all sign systems in culture as they interrelate and does not overlook the more abstract level of underlying invariants and codes, it concentrates upon the infinitely variable and endlessly transformable concrete text in culture in relation to its highly variable context, human and nonhuman. The effect of these factors has been to free semiotics of culture from certain limitations historically dominating the broad field of semiotics, namely the emphasis on langue or code to the detriment of parole, and the dominance of the linguistic model in the analysis of all sign systems whether verbal or not (Portis-Winner, 1986: 183).

Based on extensive ethnographic fieldwork both in Slovenia and among Slovenes in the Cleveland, Ohio, area (1973–1995), Portis-Winner finds that a subset

of cultural texts (as defined by Lotman) dealing with ethnic groups, relations, and boundaries display two correlated levels of dualism. First, these ethnic cultural texts are dualistic in that the unique characteristics of a particular ethnic group are highlighted in opposition to the characteristics of other groups; second, ethnic cultural texts are dualistic in the two ways in that they represent ethnicity, implicit montage and explicit montage, concepts drawn from Lotman's work on the semiotics of cinema. Portis-Winner generalizes the distinction between implicit montage, which involves the reorganization and transformation of images from the same semantic field, and explicit montage, which involves the juxtaposition of elements from different semantic domains and, by extension, the crossing of narrative boundaries. She then shows how one item, the *kosolec* (a large wooden hay rack in farmers' fields in Slovenia), can be an ethnic cultural text in both implicit and explicit senses:

> In the new ethnic culture the kosolec takes on various forms, such as a toy, a small carved trinket, or a landmark in the Cleveland farmlands. Here the compared elements, the different manifestations of the kosolec, form implicit montages, taking their origin from one semantic domain but inducing abstract, associative meanings as a set. Recollections of village activities, threshing, hay rides, and landmarks, are all brought together by the modality of the changing shapes of the kosolec. On the other hand, when the kosolec is covered with hay and juxtaposed to a truck on which it rides in a Fourth of July parade down Main Street in Cleveland, carrying a sign inscribed in large letters with the words "heartland of Slovenia," the kosolec suggests an explicit montage, namely the juxtaposition of elements from very different domains (Portis-Winner, 2002: 58).

Ethnic cultural texts (of either type) produced in a diasporic community can depict the origin village as timeless or mythological, enabling individuals who return for visits to overlook social changes; and in certain festive contexts ethnic cultural texts can represent ethnic realities as liminal or even carnivalesque. The influence of Peirce appears in Portis-Winner's use of semiotic portraits of three generations of related informants from both Slovenia and Cleveland to construct an extended human sign, a concept that expands on Peirce's discussion of the parallelism between a 'man' and a 'word' and treats the individuals in these portraits as boundary-crossers, equivalent to the culture heroes in Lotman's narrative analyses.

Semiotics and Material Culture

If one of the advantages of a Peircean approach in semiotic anthropology is that its model of meaningfulness encompasses but is not based on language, then there will be obvious benefits for the ethnographic and archaeological study of material objects considered, as Vološinov suggested, as simultaneously things and signs. Certainly Peirce's concepts of indexicality (grounded in spatiotemporal contiguity) and iconicity (grounded in formal resemblance) would be essential to this project (Keane, 2003: 415–417). And his distinction between individually occurring signs (sinsigns) and instances of general regularities (tokens of types) immediately raises important methodological questions. Given the obvious role that material objects play in mediating individual and group relations, as trade goods and exchange valuables, for example, and as repositories of sedimented cultural values and historical experiences, Peirce's model of the sign is directly applicable to many ethnographic cases. Peirce's inclusion of the Intepretant as a fundamental constituent of the sign relation, however, presents difficulties for archaeologist working without living informants, textual evidence, or possible ethnographic analogies. The relative permanence of material objects results in multiple layers of Interpretants: users of objects who are contemporaneous with their production regard them differently than people reacting to them centuries later, and scholars treating objects as evidence of stylistic growth or of evolutionary development construct radically different Interpretants than either of these two (Parmentier, 1997: 51).

On the other hand, a Saussurean effort to talk about the material world as directly meaningful has occasionally assumed a full or partial analogy between language and objects; the material record is analyzed in terms of grammar, speech acts, constitutive rules, denotation/connotation, and textuality. Several criticisms of this language analogy need to be made, including the absence of evidence that objects have the degree of relative arbitrariness found in linguistic symbols, that the meaningfulness of objects displays the double articulation found in all languages, and that the systematicity of patterning in the material record is driven by decontextualized referentiality. But the Saussurean concept of value as the positional meaning of a sign can play a positive analytical role, especially in situations where multiple objects display variation in quality aligning with differentiated spatial arrangement (Herzfeld, 1992) or with a calculus of relative exchange value (Keane, 1997: 72–75; Munn, 1983: 302).

Semiotics and Diachrony

Peirce and Saussure have had only a modest impact on diachronic or historical work in semiotic

anthropology. Marshall Sahlins, in charting new territory for a structural history based on the repudiation of the ahistorical disposition of classic structuralist theory (such as the notion of stereotypic reproduction), sees two critical dilemmas in the Saussurean project of general semiology (1995: 246): first, that the systematicity of signs requires that individual signs have no externally generated values (since their value is entirely positional) and, second, that the collective or social dimension of sign systems necessitates a strict separation of the system of signs from the implementation of sign tokens in discourse and interaction. Rather than throw away a valuable Saussurean insight, that "cultural categories by which experience is constituted do not follow directly from the world, but from their differential relations within a symbolic scheme" (Sahlins, 1985: 147), Sahlins attempts its recuperation by demonstrating the role of events in revaluing signs, especially through the indexical relations between signs and their real-world objects in which "signs are set in various and contingent relationships according to people's instrumental purposes – purposes of course that are socially constituted even as they may be individually variable" (Sahlins, 1981: 5). Social praxis puts symbolic systems in jeopardy, since the instantiation of cultural categories in social action implies the functional revaluation of signs: "No longer a disembodied or virtual semiotic system, meaning is now in contact with the original human powers of its creation ... In action signs are subsumed in various logical operations, such as metaphor and analogy, intensional and extensional redefinitions, specializations of meaning or generalization, displacements or substitutions, not to neglect creative 'misunderstandings'" (Sahlins, 1975: 151). In his extensive comparative research on Polynesian cultures, and especially in his reconstruction of the cultural impact of Captain James Cook's death in the Hawaiian Islands in 1779, Sahlins documents the performative quality of Hawaiian history.

> The Hawaiian order is more active historically, in a double way. Responding to the shifting conditions of its existence – as of, say, production, population, or power – the cultural order reproduces itself in and as change. Its stability is a volatile history of the changing fortunes of persons and groups. But then, it is more likely to change as it so reproduces itself (Sahlins, 1995: 250).

In a series of ethnographic studies dealing with Palau or Belau (Micronesia), Richard Parmentier develops two semiotic angles implicit in Sahlins' theory of structural history. First, he finds deployed in origin myths and historical narratives a set of spatial models found in various contexts in the culture. These models are diagrammatic icons in Peirce's terminology, that is, complex signs that represent the relations among parts of some object by analogous relations among components of the sign vehicle. In Palau these ethnosemiotic schemata include the model of the 'path' (*rael*), persons or objects moving or lined up in a linear order from a starting point to an ending point; 'cornerposts' (*saus*), four coordinated elements supporting a quadripartite structure; 'sides' (*bitang*), an oppositional pair of elements in which both halves are identical yet inverse; and 'larger/smaller' (*klou/kekere*), a continuum of elements in a series ranked according to the degree or strength of a single dimension such as social rank, wealth, physical maturity, or sacredness.

In contrast to a simple structuralist account, Parmentier argues that the narrative use of these four models in the present-day storytelling represents the history of the society as the logical unfolding of three of these models, that is, as the development of political organization from paths to cornerposts to sides. This sequence does not represent the actual development of Palauan society, as might be uncovered in archaeological research, but rather expresses a cultural logic grounded in the meanings of the semiotic models themselves: 'paths' imply the fundamental act of creating cultural meaning as the categorization of instances as tokens of general types, 'cornerposts' express the hierarchically graded and functionally differentiated order found in mature or stable cultural institutions; and 'sides' codes oppositional, complementary, factional, or competitive units that presuppose a dyadic structure as a balanced whole. Whereas Sahlins concentrates on the revaluation or realignment of cultural values (male/female, chief/commoner, warfare/agriculture, foreign/indigenous) as a result of the engagement of these values in social action (especially in situations of culture contact), Parmentier focuses on the recategorization of cultural values in the rhetorical deployment of semiotic models that have a relatively constant meaning.

Second, Parmentier documents a particular category of historicizing signs in Palauan culture called *olangch*, meaning 'commemorative or historical marker.' These markers, including for example personal names and titles, gravestones and anthropomorphic stones, exchange valuables and money, ritual prerogatives and social routines, function as cultural shifters by articulating the organizational diagrams in contexts of social action and experience. *Olangch* are permanent signs that are present evidence of a significant past, but having been created in certain contexts in the past they continue to undergo strategic manipulation in the present. Parmentier divides the functioning of these indexical symbols into "signs of history" and "signs in history": signs of history

represent the past as history in the sense of providing an explicit classification in terms of the four differentially valued diagrammatic schemata; signs in history are signs of history that, additionally, become objects of social interest and action because of their value as reified embodiments of historicity: "olangch look in these two directions, toward the typifying role of schemata and toward the sedimenting role of practice" (Parmentier, 1987: 308).

See also: Anthropological Linguistics: Overview; Anthroposemiotics; Indexicality: Theory; Jakobson, Roman (1896–1982); Peirce, Charles Sanders (1839–1914); Pragmatic Indexing; Saussure, Ferdinand (-Mongin) de (1857–1913).

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Semiotics of Architecture

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Two definitions of architecture are conceivable: the one from the architect, for whom the architecture is the conception of a measured structure inscribed in a *monument*, a conception appealing to models and rules of composition, to a knowledge transmitted by masters; and the other from receivers of the architectural project, clients and users, for whom an architecture is a building in its material reality, an *instrument* (Prieto, 1975) with functions, endowed with usefulness, which corresponds to needs of spaces and conforms to usages determined by a social system.

These two definitions bear therefore on two different objects, a knowledge applied in a project for the first, an instrument responding to needs for the second. They are complete only if the first includes the second, if the conception of the architect takes for a goal the needs of the users of the building in project, and reciprocally if the second seizes the first, if needs of users are open to possibilities provided by instruments projected by the architect (Pellegrino, 2003). This creates problems of conception as much as of reception, that is to say semiotic problems of communication.

Summing up modern architects' attempts to define functions (Le Corbusier, 1930), Umberto Eco proposes to differentiate them in *first*, denoted functions, which articulate the building to a usage, and *second*, connoted functions which articulate it to distinctive values of cultural systems; the emergence of events crossing these systems continually displaces objects of usage between first functions and second functions (Eco, 1968).

The physical instrument conformation remaining stable, the cultural process confers upon it a new signified in a consumption of forms and an obsolescence of values. Signifier forms are recuperated and endowed with other signifieds. With regard to the architecture, the physical stability refers to stability of places that buildings occupy and of spaces that they offer for usage.

This stability testifies to a state of the distribution of the signifiers and, at the zero degree of the marking of the space, fixes the empty place of the signified (Barthes, 1967). The signifiers are understood as such

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more by their correlative positions than by their contents; they carry in an intrinsic manner a value by offering a place for a possible signified.

But the signifier and the signified do not correspond according to a permanent norm, as is the case in the constitution of a lexicon; there is an open gap between signifier forms and the forms of what is signified, a gap that precisely is where the work of the architect enters. This gap renders codes, according to what are defined as the second and first functions, **variable** and **opened**. Changing, the coded signifieds do not refer in a one-to-one manner to stable signifiers.

One may wonder how this stability of the conformation of the signifiers remains, while that of the signifieds changes, as the first and second functions displace; how, for example, an archeologist architect can determine the form of a crumbled building from incomplete fragments while not knowing the precise location and the usage of origin.

In this case it is necessary to admit that architectural codes are constitutive without being directly linked to functions (firsts and seconds) admitted by the usage; that there is a cultural autonomy of the architecture, that the architectural conception is self-referential. The work is generated by detaching itself from instrumental codes admitted by the usage; the architecture escapes from determination by functions.

The self-reference of the work, however, draws in relations of homology, in a similar structural diagram governing plans of the expression and plans of the content of the architecture, as in an idiolectal code (Eco, 1968). But this homology is arbitrary; it is the fruit of an intention, the object of the project of the architect, and the partitions of the content proposed by the architectural plan are not necessarily recognized and resumed by the usage of the building.

Even if, as instrument, in its internal functioning, it maintain causal **necessary** relations between its parts (Alberti, 1485), the architectural building renders possible, but not obligatory, operations feasible in its usage; projected by the architect, the shelter communicates its function of protected internal space as a possible but not necessary function. The architect therefore asserts its autonomy in the face of the virtuality of usages of its works. He defines the autonomy of its work not by a servile following of the habits and desires of users of its products, but in reference to other works that it accepts as models; models that give it measured rules of spaces that it projects, forms and forces to postpone in the drawing of its projects. To assert the autonomy of its conception, the architect interprets the expectations of addressees of its work, and classifies it according to types (Levy, 2003), but gives them a reply that is based on the logic of the models of a learned architecture.

From the most ancient treatise that has reached us, the *Ten books of architecture* of Vitruvius, we learn that this science is acquired by practice and by theory (Vitruvius, circa 80 B.C.). The practice comprises the execution of designs whereby the matter of architectural works is given suitable form. The theory explains and demonstrates the fitness of the proportions of the things proposes to make, the relevance of the measurements given to the various parts of the edifice planned. Architecture cannot do without either its theory or its practice.

And theory in architecture, according to Vitruvius, is a semiotic theory, inasmuch as in architecture, as in any other science, two things are noticed: that which is signified and that which signifies. Still more precisely, it is a theory based both:

> on a **metasemiotic** system, in which the thing signified, the thing stated and spoken about, is the object of the architectural design, the building, a tool possessing a certain utility for those who use it;
>
> and on a **connotative** representation, in which the thing that signifies in the design of the object of architectural project is the demonstration given of it by reasoning, supported by science.

For Vitruvius, what signifies in architecture is not the building *per se* but the secondary connotative signification that architecture gives of the connection that the edifice may have with things other than itself: certain items of knowledge, a branch of learning. In architecture, the **demonstration** of the usefulness of the instrument is given by a measured design that connotes a reasoning (Table 1).

We also learn that architecture *is a science that should be accompanied by a great variety of studies and knowledge, by means of which it judges all works of the other arts that belong to it*: to the point where *most cannot comprehend that the understanding and memory of one man should be capable of so much knowledge*. All sciences, however, have *a communication and link between them*; *universal science is composed of all these sciences*, so that it is enough for the

Table 1

Signifier 1 reasoning	Signified 1 reasoning	
Signifier 2 design of the reasoning		Signified 2 **connotation** of the reasoning
Signifier 2 design of the building		Signified 2 **metasemiosis** of the building
	Signifier 1 building	Signified 1 building

architect to know the *consistencies . . . between certain things that are common to all the sciences, one of which helps in learning another more easily.*

The connotative connection between what architectural reasoning signifies and what is signified in the design of the edifice that it builds is thus marked in the building as a *right measurement* of objects *in relation to their use*; architecture is then *constituted* by operations of measurement, as disposition and distribution, as well as the ordering, rhythm, and proportion of the parts of the edifice. And the theory of architecture is a theory of measurement (Boudon, 1975) signified in the edifices it produces.

As an instrument endowed with a usefulness, the building is the semiotic object of a demonstrative metadiscourse explaining intentions that preside over partitions of which it is the object and to the articulation of the variable forms of its content and its expression. This metadiscourse is contained in the forms of the project; it disarticulates and rearticulates its models of reference, to seize its deep semantic and to neutralize its context, as it decomposes and recomposes its in a graphic reasoning (Figure 1) by putting them at stake to test its syntactic rules and transform the context in a measured co-text (Jeanneret, 2005).

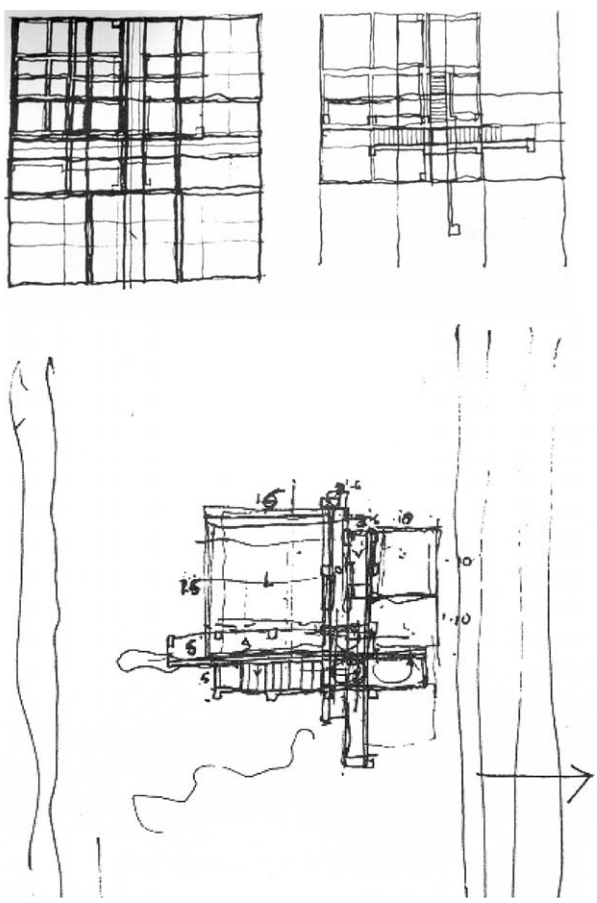

Figure 1 Sketches of the House VI, P. Eisenman, Cornwall, 1972–1973. (Source: P. Eisenman, 1987, *Houses of cards*, Oxford University Press, New York, with permission.)

By defining itself arbitrarily in an articulation of components of the graphic sign that its drawing handles between metalanguage and connotation, the plan of the architectural expression creates a connotative articulation between expression and content; thus, by the ambiguity and the contradiction (Venturi, 1966) between its levels of shape, architecture escapes habit, escapes from the reproduction of usage norms and the imitation of a stylistic manner.

As monument, the building is the semiotic object of connotation. The shape taken by the signifier enters into measured relation with that taken by the signified (Pellegrino, 2004). It represents the communication of a primary conception with which a secondary, sometimes contradictory one is brought into relation, and interprets its functioning as a measuring of an articulation (Table 2).

It is then the articulation of the design by the measuring, presenting itself as a monument, a mechanism of communication that gives meaning to the form of the expression as well as to the form of the content. The intention of the architect is thus measured in a design that contains and expresses it.

Exploiting this articulation, in opposition to the concept of form of the modernist architects, for whom **form follows function** (Sullivan, 1903), contemporary architects develop an articulation of **complex form**, that is to say of form conceived at several levels of design (Muntañola, 1996).

To seize these levels of complexity, A. Colquhoun draws attention to the concept of *figure* (Colquhoun, 1981), which stems from the classical tradition of rhetoric (Fontanier, 1830). The figure is built upon a procedure of secondariness and is designed to persuade the receivers of the values to be adopted.

But form is conceived as an approximation as faithful as possible to the referred content, which **remains unutterable**, i.e., to the signified of the second level of conception (Table 3). At the first level, the form is conceived in an articulation inserted into a system of potentialities; it may be symbolized and enter into

Table 2

Sr1	Mr1	Sd1	
Sr2	Mr2		Sd2

Table 3

(I)	Sr1	Mr1	Sd1	
(II)	Sr2	Mr2		x

(I) level of reasoning
(II) level of interpretation

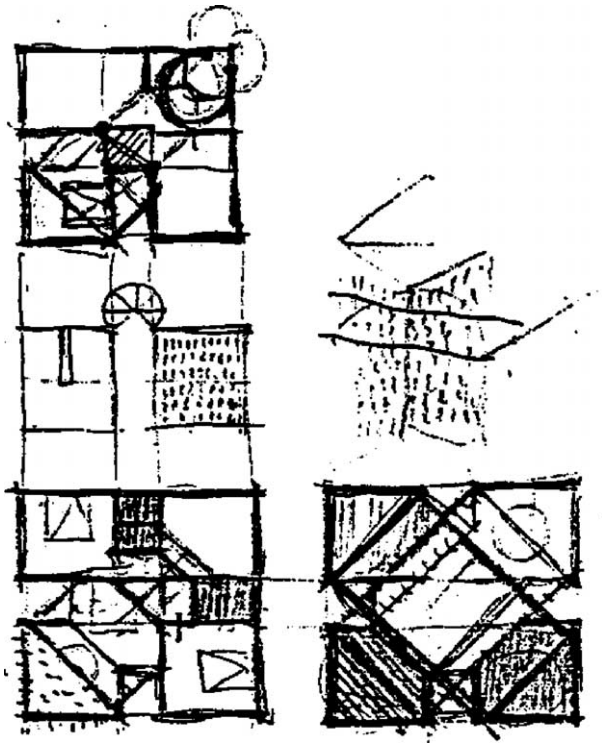

Figure 2 Sketches of the Bregenzona House, M. Botta, 1983. (Source: E. Pizzi, 1991, *Mario Botta*, Gili, Barcelone, with permission).

substitutive paradigms, for example that of orders of columnage.

The connotation diagram is then as in Table 3, where the form of the first level of conception is inserted in a constituted culture, a learned one in this case; whereas at the second level, it tends to inform an unknown, x, which is the interpretation of its use. Thus contemporary architects propose to reinsert the figure in the conception of their project, but at the same time creating shocks and fragmenting it (Figure 2).

No longer seeking to produce functional form, they also tend not to *integrate fragments in a coherent system of the figure* (Colquhoun, 1981) but, by playing on connections, to juxtapose figurative elements in an unexpected manner producing the meaning of the measure (Table 4).

We may ask, then, whether what links the fragmentary references one to another is the fact that they interpret certain attributes of the second-level signifier. Rhetoric helps us to find the answer (Perelman, 1989); it is a logic of the figure in which attributes maintain measured relations with what they connote: synecdochic relation, correspondence of the part with the whole; relation of metonymy, connection of the container to the content; contrastive relation, of a part antithetical to the whole that posits it; relation of semantic metaphor, resemblance that posits a gap

Table 4

	Srn	Mrn	Sdn		
	Sr2	Mr2	Sd2		
	Sr1	Mr1	Sd1	(I)	
	Sr+	Mr+	Sd+		
(II)	Sr		Mr		x

(I) levels of fragmentary references
(II) level of indetermination of the signified

in order to propose its reduction (Ricoeur, 1975); relation of catachresis, to extend the meaning of a part to a whole that no longer has any meaning; relation of integrative analogy, in which the parts maintain with one another relations similar to the relations that the totality they constitute maintains with another totality (Quatremère de Quincy, 1823). In these figures, the connotative drift opens a gap, a reduction of the primary signifier to a few of its attributes, to reveal a secondary signified that restores meaning to the complexity of a whole. And this rhetoric of the project does not remain with the surface of forms, but acts at the depth of their genesis to introduce there, by displacement, subtraction, and addition, spatial measured components of a monument previously ignored.

See also: Denotation versus Connotation; Figurative Language: Semiotics; Iconicity; Paradigm versus Syntagm; Rhetoric: Semiotic Approaches; Visual Semiotics.

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Semiotics: History

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Semiotics is the body of knowledge that arises from thematic or systematized study of the action of signs, called 'semiosis,' wherever that action occurs in the universe. If, as has been suggested in the Kassel symposium opening the 21st century discussion of semiosis as the subject matter of semiotic inquiry (Nöth, 2001; see also Deely, 1996), the action of signs is coextensive with the physical universe itself, then the history of *semiosis* itself would be nothing less nor other than the history of what has heretofore been called 'evolution.' Be that as it may, the history of *semiotics* is quite another matter, for here we are studying directly not the *action* of signs in the world of nature or culture, but only the *awareness* of that action insofar as it enters into that systematic body of knowledge called 'semiotics.'

The thinkers of the Latin Age, inspired by Aristotle, liked to distinguish between remote and proximate potentialities. Thus, awareness or knowledge of the action of signs was no more than a remote possibility in the long ages of cosmic semiosis (or evolution) that preceded the establishment of those forms that we call 'conscious life,' the animals. Even among the animals, however, prior to the human animal, called by Aristotle ζῳον λογον ἐχῶν and by the Latins *animal rationale*, semiotics remained a remote possibility, not a proximate one. For the precursors of human beings in the biological community, the ζῳα λογον ουκἐχῶν or 'nonlinguistic animals' of Aristotle, the *animalia bruta* of the Latins, make use of signs but without knowing that there are signs. Zoösemiosis, the action of signs in and among animals, gives rise to zoösemiotics only within anthroposemiosis, the human use of signs, not within zoösemiosis as such.

So the actual or proximate possibility of semiotics as a distinctive branch or field of knowledge comes to be only with the emergence on earth of animals capable not just of using signs but also of knowing that there are signs. These animals, originally called, as we have noted, ζῳα λογον ἐχῶν in philosophy, later *animalia rationalia* or 'rational animals,' were also the bearers of the proximate possibility of developing semiotics as a distinctive kind of knowledge. From this point of view, on Aristotle's own terms that a thing is best known from what it finally becomes, the ζῳον λογον ἐχῶν is best described not in terms of its subjective constitution of possibility as a 'rational animal,' or even as a 'thinking thing' (*res cogitans*, as modernity would conceive it), but in terms of what is most distinctive about the exercise of awareness in such an animal as expressing not only its animality but also its ties to the larger world of nature, inorganic as well as organic. So the richest definition of the human being as ζῳον λογον ἐχῶν is the *semiotic animal* (Deely, 2002, 2003). And the history of semiotics is the history of the development of the awareness among human beings *that there are signs* distinct alike from objects and things to the realization that signs in their proper being are invisible to sense and presupposed in their action both to the constitution of objects and the exploration of things.

In fact, the three main definitions philosophy has given of the human being – ζῳον λογον ἐχῶν in the Greek period, *animal rationale* in the Latin Age, and 'semiotic animal' today – correspond to the three main stages in the development of semiotic consciousness, as follows. The *presemiotic stage* begins with the appearance of human beings as the original animals capable of knowing that there are signs, preliminary to realizing that capacity in various theoretical fashions. The *protosemiotic stage* begins with the first proposal of sign as a general mode of being transcending nature and culture, inner and outer of consciousness, in the age of Augustine. And finally, the stage of *semiotics proper* begins as a proximate possibility with the establishment theoretically in the work first of Poinsot and next of Peirce of how it is that the being proper to signs transcends, or, in a certain way, 'maintains an indifference to,' the

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In fact, the three main definitions philosophy has given of the human being – ζῳον λογον ἐχῶν in the Greek period, *animal rationale* in the Latin Age, and 'semiotic animal' today – correspond to the three main stages in the development of semiotic consciousness, as follows. The *presemiotic stage* begins with the appearance of human beings as the original animals capable of knowing that there are signs, preliminary to realizing that capacity in various theoretical fashions. The *protosemiotic stage* begins with the first proposal of sign as a general mode of being transcending nature and culture, inner and outer of consciousness, in the age of Augustine. And finally, the stage of *semiotics proper* begins as a proximate possibility with the establishment theoretically in the work first of Poinsot and next of Peirce of how it is that the being proper to signs transcends, or, in a certain way, 'maintains an indifference to,' the

modern division of philosophers into 'realists' and 'idealists.'

According to this way of considering the matter, the modern period itself, wherein the ζῳον λογον ἐχῶν is conceived solipsistically as a *res cogitans*, appears as a 'cryptosemiotic interlude' between the original vindication of semiotic consciousness in the 17th century work of John Poinsot and resumption of the development of that consciousness in the late 19th–early 20th century work of Charles Sanders Peirce. Peirce stands historically as last of the moderns who is also first of the postmoderns in the matter of semiotics proper, just as his predecessor, John Poinsot, can rightly be termed the last of the medievals who is first of the postmoderns in this same matter of semiotics proper. Poinsot and Peirce, across the centuries separating the Latin Age from postmodern times in intellectual culture, stand shoulder-to-shoulder – indeed, joined at the hip – as the initiators of the postmodern philosophical epoch, inasmuch as both alike are the first among the giants of thought thematically to recognize and systematically to establish the parameters of the Way of Signs, the path leading "everywhere in nature, including those domains where humans have never set foot" (Emmeche, 1994: 126). It is to the understanding of this path that semiotics gives us the means integrally to aspire. We are at the nexus and *initium* of postmodernity.

Now the notion of 'cryptosemiotics' and 'cryptosemioticians' should be an incidental or marginal category, but it is not. Cryptosemiotics is a category made necessary in the main by an historical accident. After – and (as I think) largely as a result of – the disastrous condemnation of the view of Galileo and Copernicus concerning the relative motion of sun and earth as a heresy contrary to the Word of God, philosophy in the 17th century deviated from the Way of Signs, reached at the end of the arduous protosemiotic development, unto the Way of Ideas. The Way of Ideas effectively concealed the requirements of semiosis respecting the interconnections between objects and things in favor of a path that could only lead the human mind ever deeper into the labyrinth of its own constructions in isolation from any recognizable contact with the independent realm of nature. An independent realm of nature is what the medievals called *ens reale*, and what philosophy in ancient Greece had begun by awakening the ζῳον λογον ἐχῶν to under the guise of ον or 'being' as that which can only be 'said in many ways' (το ὀν λ∈γ∈ ται πολλαχως), including first of all 'independently of the finite mind.' The modern period of 'epistemology in philosophy,' in short, missed the point of the dependence of human knowledge throughout on the action of signs, semiosis. This is the action that alone makes a world of objects, or 'Umwelt,' possible in the first place for any animals. The horror inspired by the fate of Galileo inspired thinkers of the modern formative years to take all too seriously the warning of Descartes (1628: 13) that "there is a considerable danger that if we study these works" of the Latin scholastics "too closely traces of their errors will infect us and cling to us against our will and despite our precautions." Thus, was the vantage proper to semiotics hardwon between Augustine and Poinsot lost to the modern centuries.

So, just as after Augustine 397 A.D. there could hardly be any more simple 'presemioticians,' so after the publication of Poinsot's *Tractatus de Signis* in 1632 there will only be possible, in this matter of the history of semiotics, *cryptosemioticians*, on the one hand, or, on the other hand, semioticians proper. Cryptosemioticians are thinkers who should have been semioticians and would have been but for ignorance – ignorance *either* of the medieval Latin development (the case of modern philosophy); *or* of the central thrust of the postmodern Peircean development; *or*, more commonly on the contemporary scene (Sebeok, 1971, 1977; Deely, 1986b, 2001: ch. 16, 2003b, 2004; Deely *et al.*, 1986: viii–xvii), *of both*, as in the case of Ferdinand de Saussure (1916) and the 'limiting development of semiology.' By contrast, *semioticians properly so-called* (or 'semiotists,' as Rauch, 1983: 3 would have it, for 'anyone who explicitly does semiotics') will be those who undertake the study of signs not unwittingly or indirectly but explicitly in the recognition of treating a distinctive mode of being with a consequently distinctive sort of action operative no less in nature than in culture and in the interweaving of the two we call 'experience.' Of course, a true semiotist might emerge ignorant of his forebears, as the lad in the 1800s who discovered on his own the calculus of Leibniz and Newton. But the late modern network of global communications renders this prospect increasingly unlikely, even as the cryptosemioticians are a dying breed in the wake of the 20th century rediscovery and seminal development anew of semiotic consciousness.

There we have, then, the main divisions for our consideration of the history of semiotics: presemiotics, protosemiotics, and semiotics proper (the postmodern development), wherein begins to be developed in earnest the consequences of Roger Bacon's suggestion and Poinsot's establishment of the being of sign as consisting in triadic relation.

Presemiotics

Let us try to imagine the situation of truly primitive human beings. I mean the really early human beings

prior even to the evidence for the civilizations of Sumeria, Egypt, Babylonia, Assyria, Persia, India, and China. That evidence carries us backward only 7000 years or so from our 2005 A.D. No one knows how long has the animal called by Aristotle *ζῳον λογον ἐχων* prowled this earth, though the best guesses approximate or exceed one million years (sometimes by a factor of fifty!). No matter how we approach this animal, it differs from the other animals (originally, presumably, even from both members of the first pair to engender or parent it) in the way that a pregnant woman differs from a woman who is not pregnant – that is to say, by a factor that admits no middle ground, even though, *once given*, it admits of degrees of development. As an animal, this creature perforce possessed the capacity for sensation, for so interacting with its environment as to *become aware* of certain aspects or features of that environment. As a so-called 'higher animal,' an animal not only able to become partially aware of its surroundings but further to fashion that awareness into a world of objects perceived as to be sought (+), avoided (−), or safely ignored (∅), our *ζῳον λογον ἐχων* possessed interior senses as well as the so-called external ones (cf. Deely, 1971). Hence, it could model the world for the purposes of its own interests and survival – could fashion, as we say in semiotics today, an 'objective world,' or Umwelt (Kull, 2001), in contrast to the mere physical environment in its being indifferent to the interests of the animal foraging within it.

But this animal Umwelt as such knows no difference between objects and things. True, in sensation the two are aspectually identified, and this aspectual identification is incorporated within the perception of animals to constitute their irreducibly 'realistic' orientation. But the 'realism' of *ζῳα λογον ουκ ἐχῶν* is not and cannot be the same as the 'realism' philosophy seeks to vindicate among humans. For the realism of animals extends no further than the objective world *in its very objectivity*, that is to say, in its relations as such to the animal cognizing and cathecting.

Enter the *ζῳον λογον ἐχων*

The animal world of the *ζῳον λογον ἐχων*, by contrast with the Umwelt of all its predecessors among the animals *λογον ουκ ἐχων*, includes a further dimension. For whereas all the objects of animal perception without exception relate to the animal as +, −, or ∅, the *λογον* of the *ζῳον λογον ἐχων* adds to this perception a further relation of the Umwelt as a whole *to itself*. This relation is not, as a relation, 'real' outside of and apart from the awareness of the *ζῳον λογον ἐχων* perceiving. But this relation is nonetheless sufficient to sever the exclusive 'self-interest' set of relations of the objective world to the biological nature of the animal perceiving that world. The *λογον*, so to speak, exactly as Sebeok (1984, 1986, 1987, 1987a) was the first in semiotics to point out, drives a wedge between the self-interest of the animal in the objects of its awareness as +, −, or ∅, and the possible *further* awareness of those same objects as somehow existing in their own right *whatever the interested awareness of the animal perception*. This added awareness is what Aristotle called simply a grasp of *ον*, and Thomas Aquinas (followed in this detail by Duns Scotus) more fully termed *ens primum cognitum*, the species-specifically distinctive element of human awareness present in all the awareness of *ζῳον λογον ἐχων* as such, perceptual and sensory as well as intellectual, but owing originally to the *λογον*, the 'intellectual' element (and hence absent entirely in the *ζῳα* lacking *λογον*). We could say, using a metaphor to express a truth considerably more than metaphorical, that the awareness of the *ζῳον λογον ἐχων* is pregnant with an understanding of being (which will prove to require expression 'in many ways' – *πλεοναχως λεγεσθαι*) that is completely impossible for the *ζῳα λογον ουκ ἐχων*.

Now, for the first time, there stalks the earth a *ζῳον* that sees first of all not merely a world of objects to be dealt with but a world of things existing. Signs as such have barely entered the picture, but they are already everywhere, as we shall come to see.

Signs in the World of the *ζῳον λογον ουκ ἐχων*

Remember our perspective: we are trying to rethink or imagine the situation of the *ζῳον λογον ἐχων* newly born on earth, making its way toward a fuller and fuller understanding of its species-specifically distinctive awareness of the objective world as a realm of being over and above, above and beyond, the zoösemiotic character of that world as an Umwelt of safe (+), dangerous (−), and neutral (∅) places to roam. It is easy enough to see that such a world is a world permeated with signs, and fallible signs at that. For if one animal never mistook the objects 'safe to ignore,' they would never fall prey to the other animals seeking and needing them for food. The world is a dangerous place, and the animal who cannot rightly 'read the signs' distinguishing the safe from the dangerous is not long for this world. But what are these signs which it reads? For the animal *λογον ουκ ἐχων*, the 'brute animal' (as the medieval Latins put it), signs are nothing more than a particular class or aspect of objects not even recognized as such, but simply as sense-perceived objects presenting what is to be sought or avoided in the vicinity, period. Full stop.

So it is no wonder, and indeed to be expected, that the *ζῳον λογον ἐχων*, making its way among the plants and streams, hills, mountains, and plains (to

mention nothing of the dangers presented by other ζῳα λογον ουκ ἐχων), thought in terms of those sensible elements of the surroundings wherein objectivity and 'thinghood' present themselves indistinguishably in functioning to alert the animal to what is other than itself. These 'alerting aspects' of the experienced world are what the Greeks termed σημεία and modern translators since the Renaissance naively translate simply as 'signs.' They are features of nature which warn us of what to expect (clouds portending rain, omens portending fate and the will of the gods) or what is happening or has happened (smoke warning of burning, milk in the woman's breasts proclaiming her a mother) in the realm of being (see Manetti, 1993–2002).

Yet that is how sign makes its first appearance among the animals as a distinctive element in their awareness of the world. What so appears is not a sign as such, but rather a sensible object *functioning* in a certain distinctive way, namely, so as to make present in awareness (or to point awareness to) something beyond, something other than, the object immediately apprehended. So there are mainly objects that are further signs, all belonging to that great realm of *Φυσις* or 'nature,' the realm of being that, in order to be understood, must come to be λ∈γ∈ται πολλα χως, 'said in many ways.' But for the ζῳα λογον ουκ ἐχων, that is to say, for all the *animalia bruta*, remember, there is no being, only objects, objects distinguished neither from the signs in terms of which they function in structuring perception, nor from the things necessarily involved and incorporated within perception, but unrecognizable as such, as Sebeok (1976: 195) has well described:

> Organisms thus perceive not the *Ding an sich*, i.e., 'things as they are,' but signs, and from these signs, each according to its preexisting *Bauplan*, or blueprint, build up mental models of the world that are equivalent to Peirce's interpretant, the function of which, according to him, is performed by another sign or set of signs that occur together with the given sign, or might occur instead of it. What an animal communicates, in other words, is an edited selection from what, to it, is space/time.

All the ζῳα λογον ουκ ἐχων make use of signs, yet without knowing that there are signs (or, for that matter, that there are 'things' with a being independent of being perceived).

Signs in the World of the ζῳον λογον ἐχων

With the coming of the 'rational animals,' the ζωα λογον ἐχων, signs first appear within the world of objects (as also do 'things'), but not yet (neither signs nor objects nor things) for what they are in their proper being, but only as a certain type or modification of objects. They first appear, as it were, as a certain class of 'things,' 'realities,' namely, those 'realities' that involve such a relation to other objects that to perceive one is to become aware of the other – those objects that are, precisely, σημ∈ια.

We perforce pass over here the 'signs of divination' which, for the Greeks, belonged as much to nature as did the milk in a new mother's breasts (but cf. Manetti, 1993). With that caveat, we can say, with Sebeok (1981: 181), that Greek medicine pertains to the origin of semiotics, as indeed the etymology of the name indicates, so long as we understand that 'semiotics' names a prospective discipline, a 'doctrine' – as Sebeok urged in preference to the expression 'new science' (Sebeok, 1976, 1979: vi; Deely, 1978, 1982: 127–130, 1986) – the proper possibility of which originates in a mode of being (relation as everywhere suprasubjective) that is equiprimordial with the possibility of that general semiosis in nature of which anthroposemiosis is but one of the final, latest specifications, and the one whereby semiosis becomes conscious of itself in the 'metasemiosis' which is what semiotics consists in.

We can say that the ζῳον λογον ἐχων, the first animal able to become aware that there are signs, originally does so only in terms of its sensory awareness of the world of nature and in a confused way, which equates the being proper to signs with a certain functioning exhibited by objects experienced, as it were, as if causally related to specific other objects. These objects are the σημ∈ια, the closest the Greeks of ancient philosophy get to the notion that will actually give rise to semiotics as a general doctrine of signs (in contrast to a branch of natural philosophy or medicine). The Greeks see culture itself as a world of symbols and names, σύμβολα and ονοματα, into which σημ∈ία intrude, and intrude informatively, but do so from another realm entirely.

In terms of what we have come to call semiotics, the Greek theoreticians – from the early Ionian physicists (6th–4th century B.C.) through Socrates (c. 469–399 B.C.), Plato (c. 427–347), Aristotle (384–322 B.C.), and on through the Stoics (4th century B.C.–2nd century A.D.), Epicureans (4th century B.C.–4th century A.D.), and Neoplatonists (3rd–6th century A.D.) ending the ancient Greek age of philosophy in the time of Augustine (354–430 A.D.), and even including Hippocrates (c. 460–377 B.C.) and Galen (A.D. 129–c. 199/225) – are strictly forerunners, *presemioticians* respecting the general doctrine of signs yet to emerge.

Transition to Protosemiotics

Inasmuch as semiotics is the knowledge that arises from the study of the action of signs, or semiosis, an action in

its turn consequent upon the being proper to signs (according to the medieval adage, *agere sequitur esse*, a thing acts according to the way it has being), it is fair to say that, prior to the first explicit awareness of sign as a reality that transcends and is not confined to the realm of nature, semiotics was no more than a remote possibility, a 'science' that, as Saussure (1916: 11) said, "has a right to existence, a place staked out in advance," but no actual existence in the world of intellectual culture. Nor, perhaps, would it fully exist yet, had it not been for the work of Saussure's slightly older contemporary, Charles Sanders Peirce, followed by that master, almost inventor (see Deely, 1989, 2000; Danesi, 2001; Petrilli, 2001; Petrilli and Ponzio, 2001, 2002), of today's quintessentially postmodern 'global semiotics network,' Thomas Albert Sebeok (1920–2001).

Let us sum up the picture so far.

For there to be semiotics there has to be an actual awareness of sign as a general mode of being. The *possibility* of that awareness became part of the earthly biosphere with the emergence of the *ζῳον λογον ἐχων*, but it remained a remote possibility, largely lost in the struggle for survival over a million to fifty million or so years. No doubt ('factually') the awareness that there are signs came earlier; but the first clear records we have of such an *actual* consciousness is still not of signs as any general mode, but rather of signs as a specific and restricted variety of 'natural' phenomenon, the *σημ∈ιον*, particularly as it becomes thematized in the work of Hippocrates (c. 460–377 B.C.) and disseminated among the physicians of the ancient world.

The first record in fact that we have of a thinker proposing a notion of 'sign in general' is Augustine of Hippo (354–430 A.D.), for the purpose of framing his discussion *De doctrina christiana* (397 A.D.). In a sense, then, not before Augustine does semiotics proper begin to emerge as a fully proximate possibility, a nascent reality. For semiotics, as we have said, is the knowledge developed by the study of the action of signs in any realm, and (astonishingly enough: see Eco *et al.*, 1986: 85; cf. Markus, 1972) prior to Augustine we have no reason to believe that anyone thought of an action of signs that extended beyond the natural world to include the whole realm of culture and human language.

This strains credulity, but the present state of the evidence now available (perhaps like the evidence in the time of Aristotle, Ptolemy, and Aquinas that left little or no room for doubt that the earth stood still at the center of the solar, lunar, and stellar revolutions) compels us to consider that Augustine was the first to conceive of sign as transcending the divide between nature and culture, *φυσις* and *ονοματα* – the first to conceive of linguistic communication, and hence the whole realm of cultural *σύμβολα*, which can only be accessed through language, as consisting of signs. On this work and view of Augustine is based the development of the notion of 'sacraments as signs,' or 'sacramental theology,' so central to medieval Christendom (as indeed to Christian churches down to this day). Augustine's definition of sign (as any material structure – natural *or* cultural – that, on being perceived, brings into the perception some other object besides) Peter Lombard will introduce as the opening to the discussion of sacraments in his *Libri Quattuor Sententiarum* (c. 1150), the book that will form the basis for theological study in the universities over the last four hundred years or so of their existence in the Latin Age.

Protosemiotics

Augustine thus marks a divide between the *presemiotic* thinkers of ancient Greek philosophy and the Latin Age, respecting which he stands at the beginning. From this point of view, the point of view of the first or initial proposal of *signum* (or 'sign in general') transcending the opposition of nature to culture, Augustine is not yet fully a semiotician, for he posits rather than warrants; but neither is he any longer a presemiotician. He is, in the expression of Sebeok, a *protosemiotician*, one – the first, in fact – of the pioneers or founding figures of semiotics as such, those thinkers who originally undertook consciously the struggle to establish the essential nature and fundamental varieties of possible semiosis, not as contained within, but as transcending, the world of *φυσις* and *σημ∈ία*.

To get from Augustine to Poinsot and Peirce, then, we have to examine the Latin line of the 'protosemioticians.'

After Augustine will come Boethius (c. 480–524/5 A.D.) among the Latins. He is important to the Latin development of semiotic consciousness, but not directly. I would not even count him formally, but only materially, among the protosemioticians. To the discussion of sign he will no more than presuppose Augustine's point of view and directly contribute nothing. But by his translations of and commentaries upon Aristotle's discussion of *Categories*, particularly the category of relation as an irreducible mode of mind-independent being (*ens reale*), Boethius will lay the groundwork and establish the terminological framework that the Latins will employ in resuming Aristotle's discussion. That discussion resumed, in turn, will lead to the final resolution of the possibility of Augustine's proposal of the notion of 'sign' as a general mode of being. Intermediate to this final resolution will be the 13th-century work of Albertus

Magnus (c. 1201–1280) and Thomas Aquinas (1224/25–1274) establishing the full range of the Aristotelian *corpus* as essential to the curriculum of the newly nascent universities (and against those religious authorities who sought to restrict study to an orthodox canon of writings and to restrict reason to a confessional perspective). The final resolution itself will not be achieved until the early 17th century, when John Poinsot (1589–1644), in his *Treatise on signs* (1632), will be the first to establish both the nature of sign as such in triadic relation (invisible to sense), and consequently the unity of semiotic inquiry in a common subject matter transcending all the possible divisions of sign in particular.

After Poinsot, practically speaking, there will no longer be protosemioticians. Just as after Augustine there could hardly be (at least in the Latin Umwelt) any more simple 'presemioticians,' so after the publication of Poinsot's *Tractatus de Signis* there will only be possible either semioticians proper or instead cryptosemioticians, for immediately after Poinsot's culminating treatise of the Latin development philosophy will begin a new development – modern philosophy – that will move ever more determinately in the direction of an 'epistemology' both ignorant of the doctrine of signs and severed (Schrader, 1967: 188; by the postulate that mental representations as formed by the mind establish the objects of knowledge proportionate only to the biological subjectivity of the knower) from the natural roots of signification as a system of relations interweaving nature and culture. We will examine this interlude in due course. But here we have first to trace the lineage of the protosemioticians.

Poinsot will depend in his work on a long line of Latin thinkers after Augustine: Aquinas (1224/5–1274), first of all; then, in varying manners and degrees, Roger Bacon (c. 1214–1292); Duns Scotus (c. 1266–1308); William of Ockham (c. 1285–1349); Pierre d'Ailly (1350–1420); Thomas de vio Cajetan (1469–1534); Domingo de Soto (1494–1560); Pedro da Fonseca (1528–1599); most proximately the Conimbricenses (1592–1607; they were among Poinsot's undergraduate teachers); perhaps Francisco Araújo (1580–1644); but above all his own genius. For in the end, Poinsot, in a way that no writer before him fully anticipated, hit upon the solution to the problem of how sign can transcend the particular modes of being and weave a web – the semiotic web, as Sebeok (1975) would centuries later say – wherein the whole biological community is caught up in communication by signs even with the inorganic realm of physical nature.

The links from Augustine to Poinsot are direct, but the link from Poinsot to Peirce is indirect, mediated by the Conimbricenses as the source common to both for the doctrine of signs as irreducibly triadic (see Doyle, 1984; Deely, 1994; Beuchot and Deely, 1995). That this irreducibly triadic being proper to signs – that is, constituting every sign as such in its being as sign, and explaining the unique feature of the action of signs whereby semiosis can transpire between what exists and what exists no longer, never did or will exist, or exists not yet but eventually – consists, however, in a *relationship as such*, that is to say, in a mode of being irreducibly suprasubjective as well as triadic, rather than in any particular mode of subjective (or objective) being, such as most theorists prior to Poinsot had assumed (seeing the relation of sign to signified as 'something additional' to or a 'property of' the particular object or thing that was *taken to be* the sign), seems to be the final key element that Poinsot and Peirce hit upon independently. That their sharing in the text *De Signo* of the Conimbricenses a common teacher is a merely coincidental, or even incidental, fact is unlikely in the highest degree. The Conimbricenses provide the common link between the postmodern semioticians after Peirce and the protosemioticians up to Poinsot.

Poinsot marks the terminus of the protosemiotic lineage. It is not that there are no minor Latin figures of his time and after him; of course there are, such as Clemens Timpler (c. 1563–1624), Bartholomaeus Keckermann (c. 1571–1609), Christoph Scheibler (1589–1653), Miguel Comas del Brugar (fl. 1661), the team of Bartholomeus Mastrius (1602–1673) and Bonaventura Belluto (1599–1676), and others. Yet, so far as the development of semiotic consciousness is concerned (see Deely, 1994a), Poinsot's work marks the break between medieval and modern philosophy, on the one side, and stands on the other side as harbinger of the postmodern development wherein semiotics will decisively break with the Kantian doctrine of *Dingen-an-sich* as unknowable (and, by extension, with the Kantian doctrine of empty *Noumena* where human understanding of being turns upon consequences that exceed the capacity of the senses to put to direct experimental test).

Poinsot should stand as the first semiotician. But, as regards what should have been a modern transition from protosemiotics to semiotics proper, his work on signs falls stillborn from the press. There will, instead, perhaps partially as a consequence, be no modern semiotics, strictly speaking; and Poinsot's work effectively will not surface outside its Latin tomb for some three centuries, when it will be resurrected first as an influence in the cryptosemiotics of Jacques Maritain (1938, 1943, 1957; Deely, 1986a), and then in a critical edition as a classic of semiotics in its own right (Poinsot, 1632/1985; see Sebeok, 1986a).

Two Watershed Events

Ideally, we should here go through, one by one, the doctrines of the several protosemioticians between Augustine and Poinsot, such as Peter Abaelard (c. 1079–1142), Petrus Hispanus (c. 1210–1277), Roger Bacon (c. 1214–1292), John Duns Scotus (c. 1266–1308), William of Ockham (c. 1285–1349), Pierre d'Ailly (1350–1420), Dominic Soto (1494–1560), Pedro da Fonseca (1528–1599), the Conimbricenses (i. 1592–1607), Francisco Araùjo (1580–1644). I have outlined details of this path elsewhere (Deely, 1998, 2001: chs. 6–10). Here I will consider simply the watershed events of this Latin development of semiotic consciousness. With the consideration of Augustine, there are mainly two such events. There is a third, of course, but when that one arrived the *de jure* standpoint proper to semiotics became fully achieved in principle, for the third watershed was the arrival (first in the work of Poinsot, then in the work of Peirce) at explicit, thematic consciousness of the uniqueness of the being at the heart of signs which enables them (to use the medieval terms) to transcend and to coordinate in human science the otherwise disparate orders of *ens reale* (mind-independent being) and *ens rationis* (mind-dependent being) and to explain their synthesis in (to use the modern term) the 'social construction of reality' (Berger and Luckmann, 1966).

Augustine's genius was to see that the sign transcends the divide between nature and culture. That is the first watershed. Augustine marked the terms of this divide with respective labels *signa naturalia* ('natural signs') and *signa data* (including 'conventional signs'). It was a little oversimplified (Poinsot would show that conventional signs are a matter of custom as well as stipulation, and so, along with other later Latins, would divide the social signs within human culture into *signa ex consuetudine*, which give a continuity to nature and culture in patterns of behavior assumed and presumed natural, and *signa ad placita* strictly so called, that is to say, conventional signs where the element of stipulation remains fully in the foreground, however layered-over habit would try to make it). But Augustine's reduction of σημ∈ία to a subclass of signs (*signa naturalia*, in Augustine's terms) subordinate to *signum* in general and coordinate with conventional signs (within *signa data*) as a species served the introduction of the consideration of sign as a mode of being transcending particularity.

The second watershed remains partly concealed to our eyes, so far as to whom originally to attribute it. It is anticipated in d'Ailly; in Soto, who clearly got it from his studies among the nominalist professors of Paris at the 15th–16th century transition, the terminology appears full-blown. In any event, whoever marked the terms of the divide of this second watershed with the respective labels *signa formalia* and *signa instrumentalia* did no small service to the Latin development of semiotic consciousness, for what he or she opened the way to was nothing less than the realization that the psychological states of animals (whether λογον ἐχων or λογον ουκ ἐχων) are alike in serving first of all *ex natura suarum* ('according to their very nature') the function of presenting what is other than themselves in this or that light ('under this or that interpretation,' as we might say). Psychological states, now newly designated 'formal signs' in contrast to objects of perception labeled 'instrumental signs,' the Latins more generally called simply *passiones animae*, 'passions of the soul.' They are not directly detectable by sensation ('external sense'), but they are determinative of perception and, in intellection (for the ζῳα λογον ἐχων), of understanding as well.

To make of the *passiones animae* 'signs' on a par with σημ∈ία and *verba* (ονοματα) is no small thing. To speak of σημεία and ονοματα as signs was a watershed, because it made the 'theory of signs' transcend the division between nature and culture. To speak now of the *passiones animae* as well as the *verba exteriora*, the spoken words of human language, as 'signs' now makes that nascent 'theory' of sign, unheard of among the Greeks, transcend further the division between inner and outer. What is 'in the mind' and what is 'outside the mind' are now alike united in the being proper to sign!

It was no mean proposal, some two centuries or so after Aquinas laid the foundation which Poinsot would demonstrate for a unified doctrine of signs.

The Role of Thomas Aquinas

Aquinas plays a crucial role in the establishment of semiotics as the foundation of the possibility of sciences as species-specifically human modes of understanding, but not the decisive role. It could have been otherwise, for no one in the Latin Age treated more profoundly of the passions of the soul, or treated more extensively of the teleonomy of those passions toward the being that surrounds the ζῳον λογον ἐχων as its environment. But in fact Aquinas never focused on the point, never thematized the question of what is the being proper to signs that enables signs to exhibit an action that transcends nature and culture, inner and outer. What he does do, however, is to bring explicitly to the foreground the incompatibility between the definition of sign in general that Augustine proposed and the being proper to signs that enables it to function as it does in mediating the

difference between objects and things (objectivity, on the one hand, and mere physical existence on the other). In bringing fully into the Latin consciousness this inner tension between Augustine's proposal of sign as a general mode of being and his attempt to define that mode, Aquinas creates the texts (see Deely, 1994b: 58 n.9) that provide the proximate materials for Poinsot's synthesis establishing the foundations in relative being for the doctrine of signs as a subject matter in its own right – in short, for semiotics in the full and postmodern sense. But Aquinas does not himself thematize or even directly focus upon, let alone resolve, this incompatibility, this "burning and inevitable problem" (Beuchot, 1986: 26) bequeathed from Augustine, concerning the being proper to sign.

'Die Spur des Zeichens'

The one who sets the complex discussion of Aquinas's day on what will prove 'die Spur des Zeichens' (Meier-Oeser, 1997), however, seems to have been Roger Bacon (c. 1214–1292), a rather bitter figure whose attitude is well summed up in his self-description ([1292] 1988: 12): "the only seer in the land of the blind." For a seer – let alone "the only seer" – Bacon in the end turned out to be pretty blind, at least in the matter of semiotics (Deely, 2001: 367–368), as also in the importance of separating the confessional use of reason (*sacra doctrina*, or theology in Aquinas's sense) from the philosophical use of reason or, as we might also say (in view of the scientific developments Bacon presaged but Galileo especially introduced), 'reason *tout court*.'

The Conimbricenses it was (see Doyle, 1984, 2001), after Aquinas, who finally provoked Poinsot to the daring perspective he outlined in his *Treatise on Signs*. After Poinsot's achievement, as I have pointed out, there could no longer be 'protosemioticians,' but only either 'cryptosemioticians' made such by ignorance (far from culpable, we may generally say on the early moderns' behalf, given the debacle of the trial of Galileo in 1633; and, be it added, followed by Descartes's *Meditations on First Philosophy* in 1645) or 'semioticians' – 'semiotists' full-blown. As Peirce was 'the last of the moderns and first of the postmoderns,' so Poinsot was the 'last of the protosemioticians.' But I would have to say that, unlike Peirce, he was not quite 'the first of the semiotists.' Like Moses in Old Testament times, he was destined to 'see but not enter' the Promised Land. Eyes fixed firmly on the past, the inevitable future was just not his center of interest. In essaying his *Tractatus de Signis*, as in the whole of his philosophical and theological writings, I think, Poinsot did exactly what Simonin (1930: 145–146) described him as doing: he attempted a 'synthesis of irreconcilables.' For while he sketched for future thought the requirements for the development of tradition, he yet made of the established tradition, as it were, a Procrustean bed on or against the horizon of which to present the requirements of future developments, as though those developments were to be recognized, indeed, in their consequential inevitablity, yet without being allowed to introduce changes in the patterns and methods of the thought that preceded them and made their difference originally visible.

The Third Watershed

Even so, it was Poinsot who showed that distinctively human and scientific knowledge is possible because the human mind is able in principle (certainly not always in fact, to be sure) to discriminate between true and false in its apprehensions, and is able to do this by discriminating between signs and objects, on the one hand, and objects that are and are not also things, on the other hand. Presupposed to the whole enterprise of separating the true from the false, the fictive from the real, the cultural from the natural, he showed, is in every case *the action of signs* or 'semiosis' (in Peirce's later term), rooted in the indifference of relation as such (in which the being of all signs suprasubjectively consists) to whether its provenance is mind-dependent or mind-independent, as determined by circumstances surrounding the sign (which it is the task of the cognitive organism to determine, after all!). The prior possibility of finite truth at all, Poinsot showed, lay in the being unique to relation; and the possibility of truth as correspondence lay in the fact that circumstances external to any relation determine whether that relation belongs to the order of mind-independent being (*ens reale*) or mind-dependent being (*ens rationis*). Both these orders are alike determinations of that *ens primum cognitum* which distinguishes the animals *λογον ἐχων* from the animals *λογον ουκ ἐχων* in the first place.

It is because signs are not sign-vehicles (Deely, 2001a), and sign-vehicles are the particulars they are (namely, sign-vehicles as opposed merely to objects) only because of the particular place they occupy (or 'role they play') within the triadic structure of the relation that constitutes a sign strictly and properly, that signs at once "perfuse the universe" (Peirce, 1906: CP 5.448n; Deely, 1997) of all animals alike, *ζῳα λογον ουκ ἐχων* (*animalia bruta*) and *ζῳα λογον ἐχων* (*animalia rationalia*), and constantly trade places with objects and interpretants in the dynamic context of everchanging experience (the "spiral of semiosis," as I have put it: Deely, 2001b: 28, 2003a: 164). More particularly, because signs as such, strictly and properly speaking, *consist in* and do not merely *involve* triadic relations, and because relations as

such (as distinct from the objects and/or things *involved* in the relations) are indetectable by sense in any direct manner, the human animal (the ζῳον λογον ἐχων) is the only animal that not only necessarily makes use of signs but contingently is able to become aware that there are signs and, beyond that confused awareness, to become further aware of what signs are in their proper being, namely, triadic relations as such knowable but not directly perceptible.

This was the third and final watershed in the development of semiotic consciousness. To see that the sign consists in a triadic relation is to see *why* it transcends nature and culture, inner and outer: because it is suprasubjective respecting the whole order of subjective being, psychic no less than physical, even though, like every relation, triadic or dyadic, it cannot exist apart from those subjectivities and objectivities it fashions into a historical world, through zoösemiosis or also anthroposemiosis, as the case may be.

The Cryptosemiotic Interlude

The point of view introduced into and distinctive of modern philosophy is often characterized as 'the epistemological turn' (much later, and more narrowly still, 'the linguistic turn'), an expression that means, concretely, the point of view introduced into philosophy by Descartes and furthered, with differing emphases, by Locke and Hume after him, but synthesized by the work of Immanuel Kant (1724–1804) transcending and reducing to order the early modern opposition between Rationalism (after Descartes, 1596–1650) and Empiricism (after Locke, 1632–1704).

From the point of view of semiotics, however, especially if we go back to its origins in the general notion of sign, the modern standpoint, whether epistemologically or (a fortiori) linguistically conceived, is itself highly problematic. For I deem it is clear by this point that, to reach all the way from Augustine to Poinsot, to say nothing of Peirce after Poinsot, we have had to adopt and fashion a perspective on being and the being of signs that is considerably broader than any such modern perspective, early or late (pre-Kantian or post-Kantian), can supply. Fortunately, semiotics, in sharp contrast to semiology in its original 20th century development (Sebeok, 1977), being of the essence of postmodernity (Deely, 2004a), depends little if at all on late modern perspectives for its self-understanding (cf. Bouissac, 1981; Deely, 1982: 3). Further, semiotics, when speaking from the vantage proper to itself, derived from the being distinctive of sign as transcending from the first (Poinsot, 1632: Book I, Question 1, 117/18–118/18) the modern realism/idealism opposition, has a very precise, though generic, understanding of 'science' as a species-specifically human possibility that antecedes even philosophy itself, let alone the later sciences to which anthroposemiosis gives rise. For all the sciences, humanistic or natural, and the doctrinal philosophical ones no less than the experimental and mathematicized modern sciences, have in common their origin in the ability of human understanding to consider objects of experience in terms of a question as to whether any given object or range of objects simply reduces to our experience of it, or exhibits as well a being which obtains independently of (and whether prior or posterior to) the experience in which the objects in question are given as objects.

One-sided and crippled as philosophy becomes in taking the modern mainstream 'epistemological turn,' however, it is not without its contributions to semiotics proper, even though these contributions are perforce 'underground,' as it were, and in spite of the solipsistic constraints that accompany the 'epistemological turn.' History has its many ironies, and not least among them is the fact that the quintessentially modern Kantian perspective has inspired the single most important foundational work for biosemiotics, and especially for zoösemiotics (Sebeok, 1976, 1979), namely, the *Umwelttheorie* of the cryptosemiotician Jakob von Uexküll (Kull, 2001; Deely, 2004). On the other hand, the Kantian perspective extended to anthroposemiosis introduces a crippling erasure (cf. Pieper, 1952: 84–85; Deely, 2004), namely, the denial to human understanding of the ability to investigate the things themselves in themselves as they provide an environment that is common to all the species of life on earth.

This last remark is not made lightly, for it is not yet generally understood how completely the Kantian perspective is opposed to the original foundations of semiotic inquiry as proposed by Augustine. It is not too much to say that the difference between anthroposemiosis and zoösemiosis turns upon bringing out from under the erasure in which Kant placed it the medieval notion of *ens reale*, developed from the original philosophizing of ancient Greece aimed at ον. *Ens reale* is the notion of being as existing independently of human awareness and knowable in the independent requirements and exercise of that existence, something that natural science today presupposes, especially in the increasingly important applications of science to environmental matters (and something that modern science presupposed from the beginning of the establishment of its difference in matters 'epistemological' from what modern philosophy tried to require in cutting off the whole realm of *ens reale* from the sphere of the knowable: see Deely, 1984, 2001: ch. 13, esp. 553–572).

In tracing the history of semiotics from Poinsot to Peirce, therefore, we cannot draw a straight line, as it

were, nor can we adopt, let alone immerse ourselves in, the standpoint of the 'epistemological turn' which modern philosophy so intimately involves, but which in its very adoption required an abandonment of the Way of Signs in favor of what ultimately proved, on its own terms, a cul-de-sac: the Way of Ideas, reducing and subordinating signification to representation.

In the historical evolution of human intellectual culture, while human animals by virtue of their intellectual nature spontaneously recognize the reality of things existing prior to and independently of themselves in a surrounding environment, in the very doing so they overlook the profound difference between things as objects and those same things as things. Human animals tend to treat as nothing the more general difference between objects as such and things as such, as though to speak of 'objects' and to speak of 'things' – as in English to this day – were a matter of indifference and virtual equivalence. This is a theoretical oversight of the first magnitude, to be sure, and it is to his merit that Immanuel Kant set himself to remedy the situation. But, as it turned out, Kant's version of a cure works only when adapted for our understanding of zoösemiosis (a large part, but not the whole, within anthroposemiosis). Applied to anthroposemiosis as a whole, the cure proved worse than the disease, because the Kantian view of the relation of reason to sense eliminates the very factor of being that anthroposemiosis introduces into the otherwise purely animal Umwelt!

What Kant failed to see, and the moderns before and after him as well, was the hard-won insight of the original semiotic consciousness that objectivity presupposes semiosis (see "A new definition of *signum*" in Deely, 2001: 434–435), and this semiosis is already prior and indifferent to the difference between objects as such and things, precisely because it is presupposed to the recognition of either and both of them. Kant saw the need to remedy a blindness species-specific to the ζῳον λογον ἐχῶν, but he prescribed the wrong remedy. Small wonder, then, that in his account of 'epistemology' signs hardly entered the picture, even while invisibly playing their indispensable role nonetheless in mediating between things and objects, on the one hand, and among objects, on the other. Small wonder too that, on Kant's account, what semiotics would establish as the being proper to signs, namely, relation in its indifference to the opposed orders of *ens reale* and *ens rationis*, was ruled out of account *a priori*.

Semiotics Proper

Semiotics thus, as it developed from Augustine to Peirce (and especially as it was definitively illustrated in the work of John Poinsot, intermediary between the age of the protosemioticians after Augustine and the semioticians after Peirce), established nothing less than the foundation for understanding the distinctiveness of anthroposemiosis, the action of signs among human animals, ζῳα λογον ἐχῶν, the very possibility of 'scientific understanding' in whatever area. The *Treatise on signs* of Poinsot exhibited that semiotics was, of its very nature as defining the interface between nature and culture, already more than modern philosophy with its 'epistemological turn' could accommodate. Semiotics was from the start the quintessence of postmodernity, given what modernity became (or turned out to be) in the works of 'rationalism' and 'empiricism' synthesized by Kant. And this is what Peirce too arrived at in his own development of a semiotic consciousness, drawing from the source he shared in common with Poinsot – the Conimbricenses, and, more generally, other Latin protosemioticians which Peirce distinguished himself among the moderns by studying.

What the postmodern semiotic development – the actual development of semiotics proper, as distinguished from simply achieving the standpoint from which such a development becomes possible – finally made clear was the fact, not yet self-evident in the days of the protosemioticians, and even less so in the time of presemiotics, that, as Thomas Sebeok (2001: ix) put the matter in his final book: "each and every man, woman, and child superintends over a partially shared pool of signs in which that same monadic being is immersed and must navigate for survival throughout its singular life." Therein lies the semiosic foundation for anthroposemiosis itself, of which all the sciences, past, present, and to come, are, with all their semiotic dimensions, but offshoots. That is the point at which the history of semiotics stands as the 21st century opens upon the postmodern dawn of a global intellectual culture.

See also: Anthroposemiotics; Augustine, Saint: Theory of the Sign; Cognitive Science: Overview; Hippocrates: Theory of the Sign; History of Linguistics: Discipline of Linguistics; Metasemiosis and Metapragmatics; Psycholinguistics: Overview; Saussurean Tradition in 20th-Century Linguistics; Semiosis; Semiosphere versus Biosphere; Terminology and Terminological Databases; Thought and Language: Philosophical Aspects; 20th Century Linguistics: Overview of Trends.

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Semitic Languages

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Introduction

The Semitic languages are part of the Afroasiatic family. In the ancient world, Semitic languages were spoken from the western Mediterranean in the west to Iraq in the east, and from Ethiopia north to Anatolia. Many Semitic languages are still spoken today. Arabic is by far the most common; some dialect of Arabic is spoken by some 200 million speakers, from Morocco to Tajikistan, and it is also used, in its Classical and Modern Standard forms, for religious and other formal purposes. Modern Standard Arabic is the official or national language of countries throughout the Middle East and northern and northeastern Africa, and Classical Arabic has been and still is used for religious purposes all over the world, following the spread of Islam. Modern Ethiopic languages like Amharic, Tigrinya, and Tigre are spoken by 25 million people in Ethiopia and Eritrea. Modern Hebrew is the language of 5 million inhabitants of Israel. In Yemen and Oman, Modern South Arabian languages like Mehri, Jibbali, and Soqotri have around 60 000 speakers. And Aramaic dialects continue as the languages of a few hundred thousand speakers who have left the Middle East in recent years and spread far and wide.

Our earliest attestations of a Semitic language occur in Sumerian texts of the first half of the 3rd millennium. Sumerian is not a Semitic language, but within these early texts we can recognize Akkadian names and Akkadian loanwords into Sumerian. By around 2500 B.C., entire texts written in Akkadian start to appear.

Proto-Semitic is a scholarly reconstruction that suggests a common source to which all the known languages of the Semitic language family can be traced. Although the Semitic languages are thought to descend from some common ancestor, Proto-Semitic is not that ancestor; the term is not meant to represent a language that was ever spoken. It is instead the most economical reconstruction from which the known languages could have developed, through well-established phonological, morphological, and syntactical rules. We postulate a tense-mood-aspect verbal system with a perfective conjugation (**yaqtul*) and an imperfective conjugation (**yaqattal*). There was also a verbal adjective (**qatil* + enclitic pronouns). Another characteristic of the Semitic verbal system is a set of derived verbal stems, derived from the basic stem (the G, for *Grundstamm*), including one that doubles the middle root consonant (the D stem), a causative stem with some sort of causative affix (the C stem), a passive stem with infixed or prefixed *-n-* (the N stem), a medio-passive stem with infixed or prefixed *-t-* (the various t-stems), and

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possibly others. Nominals in Semitic have case endings (nominative, genitive, accusative in the singular; nominative and oblique in the plural), two genders, and three numbers (singular, dual, plural), plus both bound and unbound states of a noun.

These languages typically form words around triconsonantal 'roots.' Although there are words that cannot be related to a verbal root at all, and others that appear to have developed from fewer than three consonants, the vast majority of lexical items are formed by patterns of vowels and affixes interdigitated into and around the three consonants that carry the meaning of a given root. Thirty consonant phonemes are reconstructed for Proto-Semitic: bilabials p, b, m, and w; interdentals θ, θ', and ð; dental/alveolars t, t', d, ^{t}s, ^{t}s', ^{d}z, s, ɬ, ɬ', l, r, and n; palatal y; velars k, k', g, x, x̣, and ɣ; pharyngeal ħ and '; and glottal ' and h. We reconstruct three short and three long vowels: a, i, u, ā, ī, ū.

Verbal sentences in Semitic are typically V-S-O, and adjectives follow the nouns they modify. There is a genitive chain, called a construct chain, that consists of two or more nouns, the first of which can be in any case, but the remaining members are genitive. For the most part, this chain describes the 'of' relation: for instance, 'the king of the land' would be 'king' + case ending followed by 'the land' + genitive case ending. Adjectives and the nouns they modify must agree in gender and number, except that the numerals from three to ten have the odd feature that the feminine-looking numeral modifies the masculine noun, and the masculine-looking numeral modifies the feminine noun. Some of these features can be followed through the innovations that define the various branches of Semitic.

East and West Semitic

The Semitic languages are a fairly close-knit family. Semitic divides into two major groupings, East Semitic and West Semitic.

East Semitic

East Semitic is made up of Akkadian and Eblaite.

Akkadian Akkadian is the language of ancient Mesopotamia (ancient Iraq), and so far hundreds of thousands of Akkadian texts have come to light. It is written in left-to-right cuneiform, inscribed with a stylus on clay tablets. Akkadian cuneiform uses logograms and syllabic signs, with vC, Cv, and CvC syllables. Akkadian can be broken down into several dialects. In the 3rd millennium, we use the term Old Akkadian for a number of dialects used to write royal inscriptions, letters, ritual texts, administrative texts, and literary texts. Beginning in the early 2nd millennium, the umbrella term Akkadian is replaced by Assyrian and Babylonian. Old Assyrian is the language of some 15 000 early 2nd-millennium documents, mostly written by or for merchants residing in Anatolia. The name Old Babylonian covers the many thousands of texts from the first half of the 2nd millennium, especially from the First Dynasty of Babylon, of which Hammurabi is the most famous king. These texts are letters, omen texts, literary texts, administrative texts, and laws, including the famous law code of Hammurabi.

Both Middle Assyrian and Middle Babylonian, from the second half of the 2nd millennium, are less fully documented, but with the same array of genres. For much of the 2nd millennium, Akkadian was a lingua franca for the entire Near East, and Peripheral Akkadian texts are found from Egypt (especially the el-Amarna archive of letters from Palestinian governors) to Syria (especially the administrative texts from ancient Ugarit, modern Ras Shamra) to Anatolia (the archive from ancient Hattusa, modern Boghazköy).

Neo-Babylonian texts survive from the first half of the 1st millennium, largely letters and administrative texts, and Late Babylonian continues in use until the 1st century A.D. Neo-Assyrian, the language of the Neo-Assyrian Empire, stretches from the early 1st millennium until the fall of the empire in the late 7th century B.C. These documents are far more numerous than the Babylonian texts of the 1st millennium. Finally, Standard Babylonian refers to the archaizing written language in use in the first half of the 1st millennium, in which both Babylonians and Assyrians recorded religious and literary texts, royal inscriptions, and other formal texts.

Eblaite A cache of texts was uncovered beginning in the 1970s at Tell Mardikh in Syria, the ancient city of Ebla. These texts, which date to the 24th or 23rd century B.C., are largely in Sumerian, but bilingual lexical lists and some other texts display another language that is not Sumerian and not Akkadian, but seems to be closely related to Akkadian. It is this language that is dubbed Eblaite.

West Semitic

The West Semitic languages are separated from the East Semitic by an innovation that can be seen in all West Semitic languages: the development of an original verbal adjective **qatil* + case ending into an active, perfective suffix conjugation, **qatala*. This new perfective conjugation replaces the Common Semitic

perfective/volitive form **yaqtul*, which continued in use in West Semitic, especially as a volitive, but as a past tense form only in restricted environments. West Semitic itself can be divided into the Ethiopian languages, the Modern South Arabian languages, and the Central Semitic languages.

Ethiopian Classical Ethiopic (Geʿez) is attested beginning in the 4th century A.D. as the language of ancient Aksum and probably went out of use as a spoken language in the 10th century, with the demise of the Aksumite Empire. It continued, however, as the language of the Ethiopian church and as a general literary language until recently. Closely related to Geʿez are the Northern Ethiopian languages Tigrinya and Tigre, spoken in Eritrea. Amharic, the official language of Ethiopia, is the best known of the Southern Ethiopian languages. It is generally thought that the Ethiopian languages came to east Africa from the southwest Arabian peninsula, probably no earlier than the 1st millennium B.C. The earliest Geʿez was written in the alphabet used for Old South Arabian inscriptions; this alphabet later developed into a distinctive Ethiopic syllabary with the addition of vowel marks.

Ethiopian languages use the innovated **qatala* perfective form, but are differentiated from the Central Semitic by their retention of the old Common Semitic imperfective form **yaqattal*, with doubled middle radical, which they share with East Semitic.

Modern South Arabian The Modern South Arabian languages (particularly Mehri, but also Jibbali, Hobyót, Harsusi, Soqotri, and several smaller groups), are spoken by around 60 000 people (and dwindling) in Yemen and Oman. They have only recently been written down and so have no literary history; there is also no script associated with them, since we know them from transcriptions into the Latin or Arabic alphabet. Like the Ethiopian languages, Modern South Arabian languages have both the innovated **qatala* perfective and the retained **yaqattal* imperfective. These languages are not the descendants of the Epigraphic or Old South Arabian inscriptions (see below).

Central Semitic The Central Semitic languages break off from the rest of West Semitic with the innovation of a new imperfective form **yaqtulu*, probably a development from an old subjunctive form such as we see in Akkadian **yaqtul-u* used in subordinate clauses. The Central Semitic languages also exhibit the innovated **qatala* perfective that defines all West Semitic languages. Volitive **yaqtul* remains but can be confused with imperfective **yaqtulu* in languages without final short vowels; preterite **yaqtul* is also used in certain restricted environments such as the *waw*-consecutive preterite *wayyiqtol* forms in Classical Hebrew. The Central Semitic branch is divided into Old South Arabian, North Arabian, and Syro-Palestinian or Northwest Semitic.

Old South Arabian The Old South Arabian (or Ancient South Arabian) inscriptions (or Sayhadic) date from the 8th century B.C. to the 6th century A.D. This umbrella term includes several dialects, the best attested of which is Sabaean (or Sabaic); inscriptions are also found in Hadramitic, Minaean, and Qatabanian dialects, but in much smaller numbers. There are at present more than 10 000 stone inscriptions in Sabaean, and a recent find of many inscriptions on short wooden sticks in a cursive script, probably from the 2nd or 3rd century A.D., has greatly increased our knowledge of the grammar of this language.

Recent work has shown that the language of the Old South Arabian inscriptions should be classified along with Central Semitic rather than the traditional South Semitic classification. I-*w* verbs in these inscriptions never have *w* in the prefix conjugation, and since the **yaqattal* form would show the *w*, the prefix conjugation must be not **yaqattal*, but rather the Central Semitic **yaqtul*.

The earliest Sabaean inscriptions are mainly written boustrophedon; otherwise, writing is from right to left. The majority of the stone inscriptions fall into the following categories: graffiti, mostly personal names; dedicatory inscriptions; building inscriptions; reports of military campaigns; legal documents; funerary inscriptions. The inscriptions on wood at least partly concern legal and economic matters, sometimes written in the form of a letter.

The South Semitic alphabet, which broke off from the early Canaanite linear alphabet around the 13th century B.C., represented only consonants. The Old South Arabian inscriptions maintain this system of writing, with rare indications of vowels.

North Arabian The North Arabian languages of the Central Semitic branch are divided into two groups: Arabic, including Old Arabic, Classical, and modern dialects; and Old North Arabian (or Ancient North Arabian).

Old North Arabian includes inscriptions in pre-Islamic dialects, dating from the 8th century B.C. to the 4th century A.D.: Oasis North Arabian (Taymanite, Dedanite, Dumaitic, and Dispersed Oasis North Arabian); Safaitic; Thamudic; and Hismaic; plus what is generally called Hasaitic – a dialect seen in a few dozen mostly funerary inscriptions from

northeastern Arabia, near the Persian Gulf, probably dating from the second half of the 1st millennium B.C. Old North Arabian inscriptions are largely graffiti, and so the handwriting is mostly informal, not highly trained; therefore, the dating and even ancestor of some of the individual scripts are not clear. For the most part, however, Old North Arabian inscriptions are written in a script closely related to that of the Old South Arabian inscriptions. The number of graffiti and their dispersal patterns are astounding in their implications for literacy, both in the towns and among the nomads, since thousands of the graffiti so far published were written on rocks in the desert areas that stretch from Syria to northern Arabia. The writing of the Oasis texts was usually right to left, and sometimes boustrophedon, while the nomads' writing on rocks goes in every possible direction, including a spiral, across the surface of the rocks on which they were written.

The Oasis dialects are those used in the oases associated with the routes of the spice and aromatics trade (especially frankincense). Approximately 400 short inscriptions found in and around the oasis of Tayma have been published so far, in a dialect and script that are somewhat different from the rest of Old North Arabian. They probably date to the 6th or 5th century B.C. Two inscriptions have recently been published that mention "Nabonidus, king of Babylon"; Nabonidus in fact spent ten years of his reign in Tayma in the mid-6th century B.C. Dedanite is the dialect of hundreds of graffiti found in the vicinity of the oasis of Dedan. It is the only one of these dialects used for monumental inscriptions as well, and so far hundreds of mostly dedicatory monumental inscriptions have been found. Dedanite inscriptions probably date to the second half of the 1st millennium B.C. The Dumaitic dialect is represented by only three texts so far, found in or near Sakaka in northern Arabia. There is very little evidence for dating, but they may also be from the second half of the 1st millennium B.C. The Dispersed Oasis North Arabian are those texts that are clearly related to the Oasis North Arabian but are found outside Arabia, carried north by traders and found mostly in what was Mesopotamia.

Of the Safaitic, Thamudic, and Hismaic inscriptions, the Safaitic are the most numerous, with some 15 000 graffiti from the 1st century B.C. to the 4th century A.D.; written by nomads, they are found as far north as Damascus and east to the Euphrates, as well as south to northern Arabia. Hismaic inscriptions are written in the language of the Hisma desert nomads, and they stretch from northwestern Arabia to central and northern Jordan. Approximately 1000 Thamudic graffiti date from the 6th century B.C. to the 3rd century A.D. Thamudic includes all the non-Oasis Old North Arabian inscriptions that are not otherwise classified.

The prominent difference between Old North Arabian and Arabic is the definite article in each: *'al-* in Arabic, but *h-* in Old North Arabian.

Classical Arabic has made its way around the world as the literary language of Islam, but a dialect or dialects similar to Classical Arabic were known already in 4th-century A.D. inscriptions (hence the name Old Arabic). Classical Arabic has elements of spoken pre-Islamic Arabic, but was shaped by the Qur'an (7th century A.D.), which reflects also the spoken dialect of the Hejaz region of central and west Arabia, in particular, the dialect of Mecca which was Muhammad's dialect. Arabic script was adapted from the script of the Nabateans. It is written from right to left and was originally consonantal, with indication of long vowels, and has developed diacritical marks to indicate short vowels and other features. The 8th- and 9th-century Arab grammarians standardized the language, and it has changed very little since that time.

Modern Standard Arabic, which is the Arabic of newspapers, radio, television, and international communication, is still Classical Arabic at its base, with vocabulary updated as necessary. A development from Classical Arabic is Middle Arabic, which is meant to be literary Arabic, but deviates from it in ways that betray the authors' dialects; examples of Middle Arabic are Judeo-Arabic, Medieval Christian Arabic, and Spanish Arabic. Finally, there are the modern vernacular dialects of Arabic that have evolved over the centuries over the large territory in which Arabic is spoken. Many, in fact, are no longer mutually comprehensible, especially at the outer ends of that territory, so that someone speaking in the vernacular dialect of Morocco and someone speaking in the vernacular dialect of Iraq would have to move closer and closer to the classical language until they came to a point where each could comfortably understand the other. Arabic is one of the most commonly spoken languages in the world, with approximately 200 million speakers.

Northwest Semitic The Northwest Semitic (or Syro-Palestinian) languages can be divided into at least four subcategories: Ugaritic, Canaanite, Aramaic, and other. These languages all share the innovations of West and Central Semitic, plus two more: the change of initial **w* to **y* in virtually all environments except for the word 'and,' which remains proclitic **wa-*; and the plural pattern that adds *-a-* insertion to the regular external plural, for nouns of the type $C_1vC_2C_3$. Thus, **sipr-* 'book'; plural **siparūma/siparīma* (Hebrew *sḗper, səpārîm*).

Ugaritic is the language attested from the late 14th century to around 1200 B.C. at the ancient city of Ugarit (modern Ras Shamra) on the Syrian coast above Latakia, and at an outlying town called Ras Ibn Hani. It is known from the approximately 1500 texts written left to right in alphabetic cuneiform on clay tablets. The writing system postdates the linear alphabet known from the same general region and seems to be a clever combination of the technology of cuneiform writing on clay (like the lingua franca at the time, Akkadian) and the idea of an alphabet and the ease of writing it affords. Ugaritic is written without vowels, but there are some multilingual texts with columns that represent the Ugaritic pronunciation written out in syllabic cuneiform, so that the vocalization of some words and some basic rules are known. Further, there are three signs for *'aleph,* representing, among other things, the consonant *'aleph* plus vowels a, i, and u, so words with *'aleph* as a root letter often have some indication of the vocalization of that word and by extension other words of the same type (perfective verb, for instance). The corpus consists of poetic mythological texts, ritual texts, administrative texts, letters, and school texts.

Ugaritic is sometimes thought to be a Canaanite language rather than a branch on its own, but there is at least one of the defining innovations of Canaanite that Ugaritic does not participate in (see below on 'intensive' and causative stems); perhaps there were more, but they cannot be seen in the Ugaritic consonantal alphabet, even with the aids mentioned above. Canaanite describes a grouping of closely related languages: early Canaanite seen in scattered inscriptions and in the underlying dialects of the Amarna letter scribes (see below); Phoenician; Moabite; Hebrew; Ammonite; and Edomite. These languages share a change of the 'intensive' and causative conjugation perfective verb forms from **qattila* and **haqtila* to **qittila* and **hiqtila*, and the so-called Canaanite shift of *ā* to *ō*, among others. While these languages are written consonantally, later vocalizations (of Biblical Hebrew, for instance) and the spelling out of words in contemporaneous Akkadian, Greek, and Roman documents allow us to reconstruct many of these changes where they are not obvious.

Ancient Canaan covered roughly modern southern Lebanon, Israel, and the northwestern part of Jordan. The earliest indications of Canaanite languages come from the few scattered alphabetic inscriptions beginning in the 18th century B.C., and from the 'Amarna letters,' Akkadian cuneiform clay tablets written by rulers of ancient Canaan (among others) to the pharaoh in Akhetaten, modern el-Amarna, in Egypt. Sometimes the Canaanite-speaking scribe glosses a word in his own language, using Akkadian syllabic writing just as he did for the lingua franca Akkadian in which the texts are mostly written; and this Akkadian itself is a mixed language with Akkadian vocabulary but the morphology and syntax of the local dialects of the scribes. There is enough evidence in the Amarna letters to identify the dialects of the Canaanite scribes as an early form of what later became Phoenician, Hebrew, and so on.

Phoenician is the name we give to the Canaanite language spoken in the cities of the northern coast of the Levant; modern scholars refer to the language as Phoenician after about 1200 B.C. This date marked a turning point in the region's fortunes, because it was approximately then that the so-called Sea Peoples, refugees from Mycenaean Greece, attacked Egypt, establishing a number of cities on the southern coast of the Levant and freeing the rest of Canaan from Egyptian control. (The most famous of the Sea Peoples are the Philistines.) Phoenician spread throughout the Mediterranean through the trading empire of the Phoenicians, and later the commercial empire of North African Carthage, originally an outpost of Levantine Tyre. Phoenician is a long-lived language: the first inscriptions long enough to analyze come from 10th-century Byblos, and in its Carthaginian extension (called Punic), the language is attested until the 4th century A.D., in Latino-Punic inscriptions. Phoenician and Punic texts are dedicatory, royal, funerary, votive, and commercial, plus a number of seals and coins.

Hebrew is the best-known Canaanite language because it was used to write most of the Hebrew Bible; because of its continued use as a literary language throughout Late Antiquity, the Middle Ages, and beyond; and because of its modern incarnation as the language of the modern state of Israel. Biblical or Classical Hebrew was the language of the ancient kingdoms of Israel and Judah in at least two dialects, Northern (or Israelian) and Judahite, from around 1200 B.C. to 600 B.C., when Judah was defeated by the Neo-Babylonian Empire. It is known from texts in the Hebrew Bible and from epigraphic remains and was written in the Hebrew script (developed from the linear Canaanite alphabet) right to left on various media, including stone, potsherds, and metals; no doubt the majority of ancient Hebrew texts were written on papyrus and are now lost to us. The few epigraphs that remain from this period are commercial, dedicatory, funerary, and administrative, plus a few seals and bullae (only a few that are surely authentic; forgeries abound).

It remained the spoken language of the area of those former kingdoms on some level, but exactly how central it was to most people is not clear, since Aramaic (see below) had taken over as the lingua

franca in the Near East as early as the 8th-century Neo-Assyrian Empire. Once Israel and Judah became provinces in the Assyrian, Babylonian, and Persian empires, most epigraphic evidence appeared in Aramaic, and the books of the Hebrew Bible that are written in that era, such as Daniel, Esther, and Chronicles, are written in Late Biblical (or Classical) Hebrew, a dialect or dialects that are either simply different from or developed from the Standard Biblical Hebrew of the earlier literature of the Bible. The extent of the differences is muted by the many editorial hands that have leveled the dialects in which the Hebrew Bible was written.

Middle Hebrew was the language of the several nationalistic revolts (under the Maccabees in the 2nd century B.C.; against the Romans, ending in 70 A.D.; and the Bar Kokhba insurrection ca. 135 A.D.) and it continued to be used in written texts from the 2nd century B.C. to the 5th century A.D., including the Hebrew texts from Qumran, Samaritan Hebrew, and the Mishnah. Medieval Hebrew continued the tradition of Middle and Classical Hebrew, both as a sacred and literary language, and as the language in which Jews from different countries could communicate. Modern Hebrew was revived as a spoken language in the 19th century and is still spoken today in the state of Israel.

Besides a few seals, Moabite is known from one reasonably long inscription, written on behalf of King Mesha to commemorate his military triumphs. It dates from the second half of the 9th century and is very much like Hebrew and Phoenician. The area of ancient Moab was in the southern part of modern Jordan. Ammonite and Edomite are known from only a very few inscriptions and seals, but as far as they can be analyzed, they, too, are very similar to the better-attested Hebrew and Phoenician. Ancient Ammonite was spoken in the central highlands of what is now Jordan, and Edomite was the language of the far south of Jordan.

Aramaic is distinguished from the rest of Northwest Semitic by its use of *-na* as the first-person plural suffix in all environments; by the change from vocalic *n* to *r* in the words for 'son,' 'daughter,' and 'two'; by its loss of the N-stem; and by the development of a new causative-reflexive stem **hittaqtal*, which replaces general Central Semitic **(v)staqtala*. Aramaic is divided into Old Aramaic, Official or Imperial Aramaic, Middle Aramaic, Late Aramaic, and Modern Aramaic.

Old Aramaic describes inscriptions from a number of closely-related dialects that date from the mid-9th century to the 6th century B.C. They are royal inscriptions, for the most part, but there is also a long treaty text, funerary inscriptions, religious texts, and a few seals, as well as other scattered pieces. Most are carved into stone in a 22-letter alphabet borrowed from the Phoenicians, written right to left, that is mostly consonantal, but even early on with indications of some long vowels.

Official or Imperial Aramaic was the lingua franca of the Persian Empire (from the 6th to the 4th century B.C.), and as such it spread west to Egypt and east as far as Pakistan. It survives in large numbers of papyri, especially from Egypt, where they have been protected by the dryness for millennia. The Aramaic of the biblical book of Ezra is Imperial Aramaic.

Known from the 3rd century B.C. to the 2nd century A.D., Middle Aramaic describes a large number of inscriptions written in a variety of dialects, such as Nabatean, Palmyrene, Hatran, and Old Syriac. Standard Literary Aramaic developed in Palestine and is the Aramaic of the biblical book of Daniel, of Targums Onqelos and Jonathan, of the Dead Sea Scrolls, the Bar Kochba letters, and quotations in the Mishnah and New Testament.

Late Aramaic begins in the 3rd century A.D. and includes Late Western Aramaic, Late Eastern Aramaic, and Literary Syriac. Late Western Aramaic is the language of the Palestinian Talmud, the Midrashim, and the Targums. It also includes Christian Palestinian Aramaic and Samaritan Aramaic. Late Eastern Aramaic is the language of the Babylonian Talmud. It also includes Mandaic and the language of a large number of incantation bowls from the 4th to the 7th century A.D. There is, finally, a huge Christian literature written in Literary Syriac from the 4th to the 13th century A.D. After the rise of Islam in the 7th century, Syriac was used less and less as a spoken language, but continued as the literary language of the Syrian Orthodox Church.

Modern Aramaic, or Neo-Aramaic, is still spoken by a few hundred thousand people from communities formerly situated in Iran, Iraq, and Syria for the most part; in recent decades, most of the speakers have left the Middle East and emigrated with their languages to the United States, Sweden, Germany, the Netherlands, and Australia, among others. Neo-Aramaic speakers are Christian, Muslim, Jewish, and Mandaean. The four main branches of Neo-Aramaic are Western (spoken in three villages near Damascus); Central (Turoyo and Mlahso, spoken in southeastern Turkey); Eastern (or Neo-Syriac, no relation to classical Syriac; spoken originally in Kurdistan); and Neo-Mandaic (spoken originally in western Iran).

There are some Northwest Semitic inscriptions that are difficult to identify as Ugaritic, Canaanite, or Aramaic. The dialect of the 8th-century B.C. prophetic inscription found at Tell Deir Alla in Jordan has been a matter of much controversy because it seems to

combine features of Aramaic dialects and of Canaanite dialects. The same is true to a lesser degree of the dialect of two 8th-century royal inscriptions from Zincirli in Turkey. It has been suggested that these inscriptions represent other forms of Northwest Semitic that did not hive off of the main branch at quite the same time as the three major languages.

See also: Afroasiatic Languages; Akkadian; Arabic; Arabic Linguistic Tradition; Babylonian Grammatical Texts; Ben Yehuda, Eliezer (1858–1922); Eblaite; Egypt: Language Situation; Gesenius, Wilhelm (1785–1842); Hebrew, Biblical and Jewish; Hebrew, Israeli; Hebrew Linguistic Tradition; Ibn Ezra, Abraham (ca. 1089–1164); Ibn Janah (ca. 990–1050); Ibn Jinni (d. 1200); Ibn Mada'al Qurtubi (1120–1196); Iraq: Language Situation; Kuryowicz, Jerzy (1895–1978); Lowth, Robert (1710–1787); Morocco: Language Situation; Nöldeke, Theodor (1836–1930); Polotsky, Hans (Hayyim) Jacob (1905–1991); Qimhi, David (1160–?1235); Reuchlin, Johann (1455–1522); Saadya Gaon (882–942); Sayce, Archibald Henry, Reverend (1845–1933); Sumerian; Ullendorff, Edward (b. 1920); Writing Materials; Yemen: Language Situation.

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See also: Bengali; Chatterji, Suniti Kumar (1890–1977); Indo–Aryan Languages.

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Senegal: Language Situation

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Introduction

Senegal is a country of approximately ten million people, located on the west coast of Africa in the arid Sahelian zone that lies south of the Sahara desert. Senegal shares a northern border with Mauritania, an eastern border with Mali, and a southern border with Guinea Bissau and Guinea Conakry. In addition, the small country of Gambia separates much of the northern part of Senegal from the south. The majority of languages spoken in Senegal are members of either the Atlantic or Mande families of Niger-Congo. Twenty or so indigenous languages are spoken in Senegal, quite a small number compared to the linguistic diversity of many other African countries. Six of these languages are legally classified as 'national languages.' These include Wolof, Pulaar (known elsewhere as Fula, Fulani, Fulfulde), Seereer, Joola, Soninke and Mandinka. The latter two are Mande languages while the former belong to the Atlantic family. In addition to the indigenous languages spoken in Senegal there are sizeable populations who speak Cape Verdean and other Portuguese superstrate creoles, and various dialects of Arabic. The largest populations of Arabic speakers are primarily of Mauritanian origin or of Syrian or Lebanese origin.

The Official Language versus the National Language

Superimposed on the mosaic of languages spoken in Senegal is French, the official language, the language of instruction in schools, and the language of the former colonial regime. While there are two important

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The Official Language versus the National Language

Superimposed on the mosaic of languages spoken in Senegal is French, the official language, the language of instruction in schools, and the language of the former colonial regime. While there are two important

factors that might seem to predispose Senegal towards widespread use of French, namely the nation's history as capital of the vast colonial territory of French West Africa and the intellectual legacy of former president, poet and member of the French Academy, Léopold Sédar Senghor, who promoted the use of French, its use in public and private life is considerably restricted. Instead, Wolof has become the nation's lingua franca, thanks in part to its having emerged as an urban language during the colonial period.

The spread of Wolof, which began during the colonial period, picked up momentum with the sustained migration of rural populations into the cities before and after independence in 1960. The social and economic influence of the Mouride Sufi order, whose origins are in the Wolof speaking heartland, have also encouraged the growing use of Wolof. Estimates indicate that while approximately 40% of Senegalese are ethnically Wolof, around 90% of the population use Wolof as a first or second language. Although it enjoys only co-equal status as an official 'national language' with the five other indigenous languages, Wolof is commonly, albeit informally, known as the national language of Senegal.

Urban Wolof

Wolof spoken in urban areas of Senegal has long been in contact with the official language, French. One of the consequences of this language contact is the emergence of an urban variety of Wolof, distinguished from its rural counterparts by large-scale borrowing of lexical items from French and a tendency to reduce the noun class system to a default class. Urban Wolof carries a certain prestige since it is associated with urban life and sophistication, but it is also looked down upon as a hybrid language whose speakers are unable to speak 'deep Wolof,' a Wolof free of loans.

Reactions to Wolofization

Wolof has varied sociolinguistic relationships with the five officially recognized languages, all of which are in some way influenced by the dominant position of Wolof on the national scene. Speakers of some of these languages share cultural as well as linguistic traits with speech communities outside Senegal. Pulaar is one of the western dialects of Fula, a language that has a vast geographic dispersion across west Africa, from Senegal, Guinea and Mauritania in the west to Cameroon and Chad in the east. Pulaar speakers consider their language to be a crucial aspect of their identity that links them to other Fula-speaking communities throughout West Africa. Likewise, Mandinka and Soninke are part of the Mande linguistic and cultural area that includes large parts of Mali, Guinea, Burkina Faso, Côte d'Ivoire and countries further afield. The transnational dispersion of these languages naturally plays an important role in how speakers view the spread of Wolof as a lingua franca. Seereer, on the other hand, is spoken almost exclusively in Senegal and Gambia, but Seereer ethnicity correlates with at least five different languages, thus language is less important as a marker of identity among this group who are generally also quite fluent in Wolof. Joola is spoken in Casamance, a region of the country that is culturally distinct from the area north of Gambia and which shares characteristics with the forest cultures of Guinea and Guinea Bissau. In addition, Casamance has been the seat of periodic secessionist uprisings that have fueled local sentiment against a heavily Islamized and Wolofized central government. Joola speakers are consequently not favorably presdisposed to the adoption of Wolof as a lingua franca, although Wolof has replaced Portuguese Creole as the main language of Ziguinchor, the main city of Casamance, within living memory.

Language and Religion

Religion – both majority Sufi Islam and minority Catholicism – plays an important role in Senegalese identity. The indigenous Senegalese Sufi order, that of the Mourides, has played an important role among its disciples in encouraging the use of Wolof as a religious language, whereas the other Sufi orders still grant such status to Arabic. Catholic populations, who are found primarily among the Joola and the Seereer, are more favorably disposed to the use of French.

Writing in Senegal

There are standardized writing systems for Senegal's national languages in the Roman script, but they are not widely used. Generally, those who write in the Roman alphabet write in French, while those who have not been educated in the French school system often keep records and write letters in their own language in the Arabic script. Since Koranic education is almost universal for Senegalese Muslims, rates of literacy in the Arabic script are no doubt quite high, although most measures of literacy only take writing in the Roman alphabet into account. Some contemporary writers such as Seex Aliyu Ndaw, Saxiir Caam, and Bubakar Bóris Jóob write in Wolof in the Roman script.

See also: Arabic; Fulfulde; Mande Languages; Multilingualism: Pragmatic Aspects; Niger-Congo Languages; Wolof.

Language Maps (Appendix 1): Map 37.

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Sense and Reference: Philosophical Aspects

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The Origins and Central Core of the Sense/Reference Distinction

In his earliest works (e.g., Frege [1879]), Frege espoused a referentialist approach to language, according to which the meaning of an expression is whatever it is to which the expression refers. The referentialist picture is simple and compelling: singular terms such as 'Nancy' mean objects, general terms such as 'doctor' mean sets or properties, and the meaning of a sentence such as 'Nancy is a doctor' is the fact or state of affairs that the sentence is about.

Informative identity statements – i.e., true but nontrivial statements of the form 'a = b' – shattered this picture for Frege. His classic example is

(1) Hesperus is Phosphorus.

According to the lore, the Evening Star (the brightest heavenly body visible in the evening at certain times of the year) was baptized 'Hesperus,' whereas the Morning Star (the brightest body in the dawn sky at certain times) was baptized 'Phosphorus.' With the growth of astronomical knowledge, it turns out that Hesperus *is* Phosphorus, and what is more it is not a star at all but the planet Venus. The problem is to account for the difference between the meanings of (1) and

(2) Hesperus is Hesperus.

As (1) and (2) are constructed from co-referential parts, the referentialist approach seems to be committed to the view that they say exactly the same thing. However, according to Frege, there are substantive differences here: "'a = a' and 'a = b' are obviously statements of differing cognitive value; 'a = a' holds *a priori* ... while statements of the form 'a = b' often contain very valuable extensions of our knowledge and cannot always be established *a priori*" (1892: 175). Because referentialism cannot account for this evident fact about meaning, it is untenable, and a new view is wanted.

Frege's problem, then, is this: insofar as the function of a term is just to single out its referent, there is no way to distinguish the meanings of co-referential terms, and so no way to distinguish the propositions expressed by sentences that differ only in the interchange of co-referential terms. Frege's solution is that the semantic contribution of a term encompasses more than just its referent. 'Sense' is the name for the dimension along which the semantic contributions of co-referential terms can differ. Every term is associated with a sense, and the sense specifies the condition for being the term's referent. Co-referential expressions can have distinct senses, and expressions

See also: Arabic; Fulfulde; Mande Languages; Multilingualism: Pragmatic Aspects; Niger-Congo Languages; Wolof.

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need not have an actual concrete referent to have a sense.

The distinction between sense and reference is clearly illustrated in the case of a definite description, such as 'the tallest woman in Mongolia' or 'the architect who designed this building.' The sense is the identifying condition expressed by the term. It is that which must be grasped in order to understand the expression, and it is accessible to any competent speaker, regardless of whether they have been to Mongolia or seen this building. The referent is the individual that satisfies the condition that the sense specifies. Frege (1892) characterizes the sense as the mode of presentation of the referent. There are multiple ways of describing and conveying information about one and the same referent; and to each of these ways corresponds a distinct sense.

Frege's distinction generalizes well beyond cases like (1) and (2) – it is not limited to identity statements, or to singular terms. For example, (3) and (4) might differ in meaning, and (5) and (6) in truth-value, despite differing only in the interchange of co-referential terms:

(3) Hesperus is visible in the evening.

(4) Phosphorus is visible in the evening.

(5) The ancient Babylonians believed that Hesperus is visible in the evening.

(6) The ancient Babylonians believed that Phosphorus is visible in the evening.

Some related points are illustrated by sentences such as:

(7) Pegasus does not exist.

Such negative existential statements with non-denoting names in the subject-position pose problems for referentialism, as (7) is clearly meaningful despite the fact that its subject-expression does not refer to any actual thing. Furthermore, the same points apply to general terms. For example, to be a renate, one must have kidneys, whereas to be a cordate, one must have a heart. All and only renates are cordates, so the terms are co-referential; nonetheless, they clearly differ in meaning, and so are subject to the phenomena illustrated by (1)–(6). There are also non-denoting general terms – the term 'phlogiston', for instance, was introduced to name a substance given off in the process of fire. With the growth of knowledge, it turns out that there is no such thing, and so (8) poses problems for referentialism similar to those posed by (7):

(8) Phlogiston does not exist.

Frege concludes that, in general, the semantic contribution of an expression is not simply its referent. Instead, every significant linguistic expression has associated with it a sense that determines its referent. So, Frege's distinction amounts to a fully general approach to language that posits an intermediate layer of sense between words and referents.

More on Frege's Distinction

Frege's approach to the word-referent relation is a classic instance of what is called 'mediated' or 'indirect' reference – reference is *indirect* because there is a sense *mediating* the link between a term and its referent. The characteristic virtue of the indirect reference approach is that it affords a clear semantic distinction between co-referential expressions.

The distinction between sense and reference is a distinction between what we say and what we say it about. The sense of an expression is its contribution to the content of the thought or proposition expressed by uses of sentences in which it figures; the referent of an expression is its contribution to the truth-value of this thought or proposition. To illustrate, when enjoying a work of fiction, we are only engaged at the level of sense – "The thought [expressed by a sentence in the *Odyssey*] remains the same whether 'Odysseus' has a reference or not" (1892: 180). However, if we are interested in whether a thought is true, then we become engaged at the level of reference. "The question of truth would cause us to abandon aesthetic delight for an attitude of scientific investigation. . . . It is the striving for truth that drives us always to advance from the sense to the reference" (1892: 180). At the limiting case of a complete sentence, Frege takes its sense to be a thought or proposition, and its referent to be a truth-value (see Frege [1891, 1892] for further explanation).

Frege's individuates senses in terms of cognitive significance. Two statements differ in cognitive significance if it is possible for a competent speaker to take contrastive attitudes toward them (i.e., to believe that one is true while disbelieving, or withholding judgment concerning, the second). According to Frege, pairs such as (1)–(2) and (3)–(4) differ in cognitive significance. If two statements that differ only in the interchange of co-referential terms differ in cognitive significance, this proves that the terms differ in sense.

Consider again (3)–(6). Even though (3) and (4) differ in cognitive significance, they are nonetheless truth-conditionally equivalent, because they are built from co-referential parts. How then can (5) and (6) differ in truth-value, if truth-conditions are solely a matter of referents, not senses? Here Frege (1892) argues that in certain contexts (such as inside the scope of 'A believes that . . .') the referent of an expression is its customary sense. (5) and (6) assert

relations between agents and thoughts, not between agents and truth-values. They attribute distinct thoughts to the Babylonians, and thus can differ in truth-value.

Sense is that which links belief, meaning, and rational action. One might, for instance, believe that Hesperus is populated by an advanced and benevolent race and desire above all else to visit them, but still turn down a free trip to Phosphorus – and not be in the least bit irrational – as long as one does not believe that Hesperus is Phosphorus. Thus, senses are integral to the task of explaining and predicting rational action. Relatedly, merely identifying the referents of the expressions uttered is not sufficient for understanding what a speaker has said, on a Fregean view. (For instance, if one says 'Hesperus is Phosphorus,' to report or translate this utterance as saying that Hesperus is Hesperus is clearly unsatisfactory, even though it preserves truth-conditions.) To understand what has been expressed, one also needs to bear in mind the speaker's perspective on those referents.

Subsequent History, and Criticisms

Frege's distinction between sense and reference has had enormous impact on the subsequent development of the philosophy of language. Starting with Russell (1905), and continuing through seminal work by Davidson (1967), Kripke (1972), Putnam (1975), and Kaplan (1977), theorists begin their constructive projects by situating their theories in relation to Frege's. Furthermore, the influence of Frege's distinction is far from exclusively negative. There is a rich tradition, running through such influential theorists as Carnap (1947), Church (1951), and Montague (1974), which follows Frege's indirect reference approach in assigning two such semantic entities to every significant linguistic expression. Down this path, Frege's distinction had a direct influence on the development of more or less every single branch of intensional logic and semantics.

More generally, Frege's distinction is now pervasive throughout philosophy, a part of the canon. Whether the topic be ontology, minds, or morals, in any case in which it is important to bear in mind subtle distinctions between conceptual conditions and that which satisfies those conditions, one is likely to encounter the sense/reference distinction. (This is clearly illustrated in recent philosophy of mind, in which finessing the distinction between the sense and the reference of psychological [qualitative, phenomenal] terms is – interestingly, and tellingly – a core part of the arguments of both dualists [cf. Chalmers (1996)] and the physicalists who oppose them [cf. Papineau (2002)].)

There are, however, many critical questions raised by Frege's distinction between sense and reference. For one thing, positing senses gives rise to difficult metaphysical questions, such as: 'What, exactly, are senses?' Frege (1892, 1918) gives arguments about what senses are not – because co-referential expressions can differ in sense, senses are not of the physical realm; since distinct mental states can have exactly the same sense, senses are not private mental entities. However, as for what senses are, exactly, Frege (1918) just offers a vague metaphor: senses exist in some third realm, distinct from the physical and mental realms. Understandably, many find this 'third realm' talk to be beyond belief. At best, it is in need of significant clarification.

Some of the most influential objections to Frege's distinction were raised in the 1970s – led by Donnellan (1970), Kripke (1972), Putnam (1975), and Kaplan (1977). One way to put their basic thrust is this: two central constraints on senses are that they be answerable to concerns of cognitive significance and that they be objective; however, there is something subjective, or speaker-relative, about cognitive significance. (For example, two competent speakers could disagree as to whether it is significant or trivial to be told that Homer is the author of the *Odyssey*; and it is not evident that there are any objective grounds that would conclusively resolve such a dispute.) Thus, these two constraints pull in opposite directions, and it is not clear that any one thing can satisfy them both. More generally, the aforementioned articles give reasons to be skeptical as to whether expressions have one determinate objective sense, and, even if so, reasons to be skeptical as to whether this sense determines reference.

Led by Dummett (1981), Evans (1982), and McDowell (1986), neo-Fregeans have sought to defend refined interpretations of Frege's doctrines from some of these objections. (One of the core ideas is that many criticisms of Frege's views can be met if senses are conceived as object-dependent – and so 'rigid,' in Kripke's [1972] terminology.) In the other direction, original criticisms of Frege's approach continue to surface. (For an important example, see Schiffer's [1992] argument that nothing can satisfy the demands that Frege places on the notion of 'sense'.) In any case, it is evident that Frege's problem does pose a challenge to many views of meaning and reference, and that there is some aspect of meaning, distinct from reference, that is essential to understanding rational thought and intentional action. Exactly what Frege's problem shows, or exactly how to characterize the latter aspect of meaning, though, are complex matters that remain controversial.

See also: Direct Reference; Empty Names; Proper Names: Philosophical Aspects.

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Sentence Fragmentation: Stylistic Aspects

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The Study of Sentence Fragmentation in Written Texts

The term 'sentence fragmentation' refers here to the use of linguistic expressions that are not grammatically full sentences but that are nevertheless punctuated like sentences. This article focuses on how fragmentation is used for stylistic purposes in written texts. The examples are drawn primarily from literary texts, but fragmentation is nevertheless also used in many other types of written texts, including newspaper articles, advertisements, and popular science writing.

Sentence fragmentation attracted interest in the early days of modern stylistics as part of the study of sentence length. Crystal and Davy (1969) examined fragments in spoken discourse and a range of written texts, using the term 'minor sentence.' Crystal and Davy made a distinction between 'minor sentences' and 'ellipses' of major sentences, arguing that "there is no intuitively clear relationship between a minor sentence and a corresponding major version, and in many cases it is impossible to say what in fact was the form of the major sentence from which the minor sentence was supposed to have been derived" (1969: 51). Leech and Short (1981: 217) continued the stylistic analysis of fragmentation in their study of prose fiction, arguing that the punctuation of fragments provides additional emphasis and can suggest "the rhythm and intonation one would use in reading the texts aloud." According to their discussion, fragments are graphological sentences but not syntactic sentences. In both these classic stylistic studies, the term 'sentence' was retained, whereas we prefer to give priority to the syntactic definition of the sentence and hence see these items as fragments of sentences, not as a type of sentence.

Since these early studies, stylisticians have continued to observe sentence fragmentation in the process of performing their analyses of specific texts. The study of fragments is hence an accepted part of any stylistician's 'tool kit' of techniques of analysis and so is of general interest within stylistics. However, as a topic of study in its own right, fragmentation has been of most interest to those stylisticians

See also: Direct Reference; Empty Names; Proper Names: Philosophical Aspects.

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who focus specifically on the form of literary texts (a to d) and those who work on types of text that make heavy use of fragments (e, for example).

a. Stylometry: Within the area of 'literary and linguistic computing,' there is an interest in the use of the computer to 'measure' style, termed 'stylometry.' The average length of sentences is studied, and there is particular interest in the range from those that are 'monumental' in length to extremely short sentences, including sentence fragments (Barr, 2001). This type of analysis is used particularly in cases of disputed authorship but can also be used to assess stylistic differences between authors.
b. Iconicity studies: In this area, the interest is in the nature of the linguistic sign. Iconicity specialists suggest that form might 'mime meaning,' rather than the sign's being arbitrary (e.g., Nänny and Fischer, 1999). The study of iconicity includes the study of sentence length (e.g., Müller, 1999). Fragmentation is of relevance here because the heavy punctuation can be used to create 'mimicking' effects such as indicating speed or slowness of movement (see the section 'Summary of Major Stylistic Functions of Fragmentation in Literary Texts').
c. Bibliography: In this area, the interest is in the physical presentation of a text, i.e., its editing and printing. Punctuation is studied for its role in the layout of the text (e.g., Bray *et al.* [eds.], 2000) and because it is an aspect of the text that often gets changed in the editing process, sometimes affecting the author's intended meaning (see, for example, Sotirova, 2002, for a study of editorial punctuation changes in D. H. Lawrence's work).
d. Poetry and verse drama: Sentence fragmentation is important in poetry and verse drama, since it affects the line length and rhythm of the verse (e.g., Leech, 1969: 47–48; Nänny, 2001).
e. Representation of speech and thought in narrative texts: Sentence fragmentation is recognized as being a key method of representing speech and thought in the novel (Leech and Short, 1981; Fludernik, 1993). In direct speech, the fragmentation could perhaps be argued to suggest the natural rhythms of real speech, although stylisticians are extremely cautious about making any claims of this type, since represented speech is quite different from a transcription. The interest in fragmentation in thought owes much to studies of 'stream of consciousness' writers, such as James Joyce, but fragmentation can nevertheless be found in a much broader range of writers, as illustrated in the section 'Types of Fragmentation.'

Beyond stylistics, fragmentation is also a concern of writers of style manuals (e.g., punctuation guides and books intended to train the novice writer about 'good' style). Traditionally, writing style manuals have warned novice writers against producing fragments, but there is nevertheless a tendency nowadays to acknowledge that there are special stylistic uses of this type of writing in literary texts (e.g., Allen, 2002: 57; King, 2004: 13–14).

Fragmentation is sometimes referred to in grammar textbooks, but the handling of this topic is often rather brief, peripheral to the main grammatical discussion of these books, and certainly does not reflect the diversity of use of fragments in written texts. Quirk *et al.* (1985: 1446) discuss the topic in a section on prosody and punctuation in their chapter 'From sentence to text.' They contrast 'I saw Miriam and Walter.' with 'I saw Miriam. And Walter.', arguing that the first suggests a couple who regularly appear together, whereas the second might suggest either that Walter is being mentioned as an afterthought or that the sight of him is being given special or dramatic significance. Quirk *et al.* claim that these two very different interpretations are context dependent and have different prosodies attached to them in reading (including silent reading). They regard the punctuation of the fragments as 'unconventional' and suggest that novelists and poets are more likely than ordinary writers to use such punctuation, yielding prosodic interpretations of their works. Huddleston and Pullum (2002: 944–945) use the term 'minor clause types' to cover exclamations and fixed phrases (e.g., 'On with the show!' and 'Like father, like son.'). In their section on punctuation, Huddleston and Pullum (2002: 1735) recognize one specific type of fragmentation that occurs in connected prose, the splitting of a single sentence into two separate components (e.g., 'He had broken the vase. Deliberately.'). This type of structure is covered in 'Types of Fragmentation' (see discussion of Type 5 fragments). Huddleston and Pullum's explanation is in terms of information packaging, suggesting that the punctuation gives extra importance to the latter element in the same way as prosody could set it apart in speech. They also argue that brevity might be a consideration and might explain the use of fragments in journalism. These discussions of fragmentation in writing have shown an awareness of parallels with spoken discourse. Fragmentation has attracted greater interest among those grammarians and discourse analysts working on the differences between speech and writing (e.g., Miller and Weinert, 1998; Biber, 1988; Biber *et al.*, 1999), sometimes causing them to question whether the sentence as a unit has significance in spoken discourse (e.g., Miller and Weinert, 1998; Sornicola, 1981).

In psychology, the study of sentence fragmentation has relevance to research on sentence complexity. There is a growing body of empirical research on

'depth of processing' that shows that readers are less attentive to errors or changes in a text when information is embedded in complex structures, such as subordinate clauses, rather than in main clauses (see Sanford and Sturt, 2002; Sturt *et al.*, 2004). On this basis, fragments might be predicted to increase attention due to their brevity and simplicity and also to their ability to extract information that might otherwise have appeared within an earlier full sentence. We have investigated the functionality of short fragments as part of the Glasgow LINCS Project (Literature, Narrative and Cognitive Science: Interdisciplinary Perspectives on the Nature of Reading). In one experiment (Emmott *et al.*, 2004), readers saw a variety of passages, including critical phrases presented in three possible settings: (a) as sentence fragments in their own paragraphs, (b) as sentence fragments not in their own paragraphs, or (c) as part of a preceding sentence. The passages were presented not once but twice, in close contiguity, and sometimes a word was changed in the critical phrase to one that was different but of similar meaning. The task was to indicate any changes that might have occurred. It was found that more changes were detected when the critical phrases were not part of another sentence but stood alone. However, it did not matter whether the fragments were in their own paragraphs or not. These results show that short fragments serve to grab attention and lead to more substantial processing than do (identical) phrases in longer sentences, thus confirming one of the primary assumptions made in the stylistic analysis in the next section.

Types of Fragmentation

In the stylistic work described earlier, there has been interest in fragmentation, but little systematic exploration of the different types of fragmentation. In this section we provide examples of 16 types of fragmentation found in our database of examples collected and categorized for the Glasgow LINCS Project. The list is not intended to be fully comprehensive at this stage but nevertheless shows the wide range of different uses of fragmentation. The source texts are mainly narrative fiction but also include two autobiographies (examples [2b] and [16a]) and two popular science texts (examples [9b] and [16b]). The fragments under discussion (and occasional short elliptical expressions) are indicated with bold underlining, and other items that are particularly relevant to the stylistic analysis are marked in bold. For all of the examples discussed here, the stylistic interpretations are subjective literary–linguistic judgments and would need to be tested empirically to show whether the fragments are interpreted by readers in the ways suggested (only the effect on attention has been tested so far, using Type 4 fragments).

Type 1: Echoic Fragments (I): Direct Repetition

Fragments can directly repeat an element of the previous sentence or an earlier sentence. This can be used to represent a character's reviewing his or her own thoughts or reacting to the speech of another character.

(1a) On the kitchen door, up behind Mattie, was **a quilted Christmas tree** that had been bought at **a church Christmas fair** years ago [. . .] **Christmas.** A subject Kathryn didn't want to think about hovered at the edges of her brain, like a dull headache. (Shreve, *The Pilot*'s *Wife,* p. 87; our ellipsis)

(1b) 'Oh,' she said quickly, 'I think **my Evan** would mind. He would not like to sleep without me.' **My Evan.** (Shreve, *The Weight of Water,* p. 228)

The fragmentation in (1a) allows the focalizer to reflect on an aspect of the situation and then use it as a topic for further discussion (the fragment is Type 1 in terms of echoing previous information and Type 12, discussed later, in terms of specifying a new topic). This provides an effective representation of the 'double take' of the recently bereaved focalizer as she views the decorations around her and reacts to their inappropriateness in her new situation. The fragmentation allows the word 'Christmas' to switch from a modifier to a headword, facilitating this change of direction.

Example (1b) shows the focalizer reacting to the direct speech of another character. The words 'my Evan,' spoken here by Evan's new wife, are subsequently echoed in the following line in the mind of his sister, the focalizing character, reflecting her difficulty in coming to terms with his recent marriage due to her own previous close relationship with him. Examples (1a) and (1b) require 'text world' knowledge (Werth, 1999; see also Emmott, 1997) of the relevant situations in the stories in order to clarify the significance of the fragments.

Type 2: Echoic Fragments (II): Repetition with Expansion

A particularly common pattern is for the fragment to repeat a specific element of the previous text (usually the previous sentence) with an extra word or words added.

(2a) The car is in a **driveway. A familiar driveway.** (Shreve, *The Pilot*'s *Wife*, p. 45)

(2b) I had cancer. **Stage III ovarian cancer.** (Tilberis, *No Time to Die*, p. 15)

(2c) That would have been **unbearable. Literally unbearable.** (Shreve, *The Pilot*'s *Wife*, p. 127)

(2d) For **seven months** she had been ripening, like a mango on a tree. **Only seven months.** (Ali, *Brick Lane*, p. 11)

The additional wording in the fragments may have a wide range of functions, some of which are illustrated here. In (2a) and (2b), the extra words provide additional information. In (2c), the fragment has an intensifying function, reinforcing the validity of the assertion. Sometimes the added element focuses on a specific detail of the previous sentence to make the significance of that information clear. So in (2d), which relates to a woman's suddenly giving birth, the fragment highlights the unusually short duration of the pregnancy.

Type 3: Additional Information without Repetition

The repetition in (2a) and (2b) is a common way to present extra information in a fragment, but additional information can also be presented without the repetition as in (3):

(3) He holds a watch in front of her face. It swings to and fro on a chain. **Gold or brass, perhaps, beautifully polished.** (Galloway, *Clara,* p. 19)

Type 4: Greater Specificity: Identification of an Under-specified Referent or Clarification of Function

(4a) **Something** was digging sharp into the soft flesh at the small of my back. I shifted a little. **A hairpin**. (Welsh, *The Cutting Room,* p. 115)

(4b) At a little wash-hand stand at the foot of the bed there was **another figure. Walter**. (Waters, *Tipping the Velvet,* p. 167)

(4c) But no, he's reaching into his pocket and now he's releasing **two coins** onto the table. **The tip**. (Shields, *Unless,* p. 34)

In (4a), there is a cataphoric relation, with the referent initially being under-specified by an indefinite pronoun and then the identification being provided in the fragment. This reflects the gradual process of discovery of a focalizing character as she identifies the source of a tactile sensation. Example (4b) is similar, but with initial under-specification by means of a general noun phrase rather than a pronoun. The initial under-specification builds up suspense about a character who appears unexpectedly in a situation, leading us to wonder initially who the person is. Example (4c) is rather different, since the coins are clearly identified, but the fragment provides an indication of their function in this context.

Type 5: Fractured-Off Components

In certain cases, the fragment could have been part of the previous sentence, but the overall structure has been fractured into a grammatically complete sentence and one or more fragments (e.g., [5a] and [5b]). The 'fractured-off' component can also follow an 'and-clause' (e.g., [5c]) or follow another nonclausal fragment (e.g., [17], discussed later).

(5a) The whole combination would melt his bones into jelly. **Inch by inch**. (Dick, *Ubik,* p. 146)

(5b) In all her eighteen years, she could scarcely remember a moment that she had spent alone. **Until she married**. (Ali, *Brick Lane,* p. 24)

(5c) And she died. **At forty three**. (Lively, *The Photograph,* p. 45)

Often these 'fractured-off' fragments are manner and time adverbials, as shown in (5a) to (5c), but other grammatical structures are possible, such as the relative clause in (17).

The interpretation of the fragmentation depends on the specific example. In (5a), the fragmentation intensifies the manner of the horrific event. The fractured-off time adverbial in (5b) is deeply ironic, since we would expect marriage to bring companionship, not loneliness – this nevertheless reflects a key aspect of this character's life and a key theme of the book. Example (5c), like (5b), separates off a time adverbial in order to highlight the surprisingly early age of death.

Type 6: Isolated Connectives

In some cases, connectives are isolated entirely from the surrounding text, generally providing either a strong contrast or addition.

(6a) By *play*, she meant *work*, which was what *play* meant, had always meant. **But**. (Galloway, *Clara,* p. 176; Galloway's italics)

(6b) I think it is time I retired into respectability. ***And***. If you cannot see that Ricky has four or five times your significance, then you are deluding yourself. (Peter Straub, *Ghost Story,* p. 335; Straub's italics. Cited by Quirk *et al.*, 1985: 1446)

Quirk *et al.* discuss (6b), arguing that the fragment's occurrence in direct speech reflects the prosody of real speech. (Straub's italicization, ignored in Quirk *et al.*'s citation of the example and their discussion of it, is also significant in this respect.)

Connectives can also occur with topic indicators (Type 12), as shown in (6c).

(6c) Most memory is friable as dust and no one can be expected to remember everything. **Dresden,**

however. She may admit recalling a visit to Dresden [. . .] (Galloway, *Clara,* p. 66)

Type 7: Incomplete Narration

This type of fragmentation suspends the narrative and can leave important information unexpressed, as in (7). This type of example is uncommon in the texts we have examined, but it is of particular stylistic interest.

(7) Most of all, Nick finds himself plunged suddenly into endless replays of Glyn's voice. Not only now, but back then. **That day**. **When Kath**. (Lively, *The Photograph*, p. 204)

The reader of the novel can infer from their 'text world knowledge' that the final fragment refers to 'When Kath died.' The incomplete expression gives the impression of Nick's inability to reflect on Kath's death, imitating his 'mind-style' (Fowler, 1986/1996). The following chapter (starting on the page after this example) uses one of these fragments, 'That day,' as its heading and then looks in more detail at the circumstances of the death, revealing that the final fragment in the above example might more accurately read 'When Kath committed suicide.' Hence, the fragments have plot significance as well as reflecting the character's style of thinking.

Type 8: Similarity: Paraphrase, Semantic/Pragmatic Connection

In some cases, the fragment is a paraphrase or rough paraphrase of an element in a previous sentence or a previous fragment, as in (8a) and (8b).

(8a) On her way home that evening, she felt **troubled**, she says. **Unsettled**. (Heller, *Notes on a Scandal*, p. 49)

(8b) It couldn't be suicide, Kathryn thought. Suicide was absolutely impossible. It was **unimaginable. Unthinkable**. **Out of the question**. (Shreve, *The Pilot's Wife,* p. 79)

Sometimes the fragment can go beyond paraphrase and provide a semantically or pragmatically-related reformulation:

(8c) [. . .] I meant to write **a jokey novel. A light novel. A novel for summertime, a book to read while seated in an Ikea wicker chair with the sun falling on the pages as faintly and evenly as human breath.** (Shields, *Unless*, p. 14)

In (8c), the different ways of describing the novel do not mean exactly the same thing, but they nevertheless specify roughly the same type of novel in this context. In some cases, the relation may be specific to the ideology and/or special mind-style of the focalizer and so may not be generally accepted as related (as illustrated in [17]).

Type 9: General–Particular and Hypothetical–Real Relations

A common pattern in texts is the general–particular relation (Hoey, 1983; see also Mann and Thompson, 1988). Example (9a) illustrates this, with the fragment giving a specific example of an item in the category of gifts mentioned in the previous sentence. Example (9b) shows how this type of relation is characteristically used in expository writing, here providing a negative contrast between the actions of the general category of scientists and the actions of this particular scientist. Example (9c) represents Archie as a particular instance of the general category 'a man as average as this,' but the contrast is between Clara's hypothetical notion of how Archie should behave and the real Archie's behavior, hence a hypothetical–real relation (Hoey, 1983; Winter, 1986).

(9a) Now, how do the young prepare to meet the old? [. . .] with the feeling that they must arrive with something the other will like, something suitable. **Like Garibaldi biscuits**. (Smith, *White Teeth,* p. 162)

(9b) Some lab scientists killed the frogs after cutting them open to remove their eggs. **Not Zasloff**. (Shnayerson and Plotkin, *The Killers Within: The Deadly Rise of Drug-Resistant Bacteria,* p. 217)

(9c) And if you are saddled with a man as average as this, Clara felt, he should at least be utterly devoted to *you* – to your beauty, to your youth – that's the *least* he could do to make up for things. **But not Archie**. (Smith, *White Teeth,* p. 48; Smith's italics)

Type 10: Evaluations, Conclusions, and Comments

Fragments often provide an evaluation, a conclusion, or a comment representing the reaction of a focalizing character to a particular situation. Examples (10a) and (10b) show the narrative of the first sentence in each case leading into the thoughts of the character, thereby providing an evaluation and inference respectively (see also [21] and [22] for evaluations and a summary respectively). Example (10c) is more generally descriptive, and the fragmentation highlights the rather paradoxical conclusion.

(10a) He looks up from the spread photograph and stares out of the window struck by this. **Odd**. (Lively, *The Photograph,* p. 20)

(10b) He listened to the ringing tone for a minute or so then hung up. **Gone out, presumably**. (Lively, *The Photograph,* p. 208)

(10c) It was like curing a case of tapeworm by starvation. **Entirely possible, and unavoidably lethal**. (Ali, *Brick Lane,* p. 131)

Type 11: Repairing and Reworking – Negation, Correction, Qualification, and Uncertainty

Fragments can be used to repair or otherwise rework a previous statement, as in (11a) to (11e).

(11a) **A body** spinning in the air. **No**. **Not even a body**. (Shreve, *The Pilot*'s *Wife*, p. 18)

(11b) They lived in cheerful **squalor. Or not squalor: disorder**. (Atwood, 'Weight' in *Wilderness Tips*, p. 182)

(11c) If it was counsellors, the waitresses would giggle more, preen more, arch their backs. **Or some of them would**. (Atwood, 'True Trash' in *Wilderness Tips*, p. 11)

(11d) It is a decisive journey. **For me, at least**. (Walker, *Blackbox*, p. 1)

(11e) Mother was a woman with **brown** hair. **Reddish perhaps**. **Light ash**. (Galloway, *Clara*, p. 124)

The fragment in (11a) negates the existence of the entity in the previous sentence, showing the focalizing character's revised perception of a situation. Example (11b) shows a shift in wording that offers a different perspective on the previous statement. The fragments in (11c) and (11d) do not negate their previous sentences but qualify their assertions. In (11e), the fragments provide alternative possibilities due to the uncertainty of the focalizing character.

Type 12: Topic Management and Orientation

Fragments can introduce a new topic or subtopic for discussion, as in (12a) and (12b) (see also [1a] and [6c]). Fragments can also consist of orientation signals that provide time and/or place information as a new section of a narrative starts, as in (12c). These orientation signals sometimes serve as topic indicators in addition to specifying the spatiotemporal coordinates. In (12c), there is some subsequent discussion of the garden opening festival, before the events on that occasion are described.

(12a) She tried to single out a thought, any thought, and take charge of it. **The children**. How could she present the girls with a new father like that? (Ali, *Brick Lane*, p. 404)

(12b) I was thinking quickly. **Drugs**. Some awful mix-up with drugs. **Or a cult**. I tried to picture cult members I'd seen hanging around the university, grey robes, sandals. (Shields, *Unless*, p. 132)

(12c) **Saturday**. **Garden opening day**. And it is all that was promised by the weather forecasters: Wedgwood-blue summer sky with trails of rippling cirrus, warm sunshine, the lightest of breezes. (Lively, *The Photograph*, p. 158)

Type 13: Discovered/Noticed Objects, Impressions, and Memories

Fragments can often reflect the observations of a focalizing character, sometimes individual items, but often in list form. These observations may be of items discovered or noticed by a character, as in (13a). Observations may also be impressions that have been made on the focalizer over a space of time. In (13b), the sounds are not necessarily observed on a single occasion. In (13c), the impressions are a bereaved son's memories of his father (extracted from a longer list of fragments in the original text). These impressions include Type 1/2 echoic items ('His face.'; 'And again, his face.'). Some of the expressions in (13b) and (13c) might more accurately be described as elliptical sentences rather than sentence fragments (see 'Future Linguistic and Stylistic Research').

(13a) She felt around in the pockets of her parka. **A used Kleenex**. **Coins**. **An outdated credit card**. **A couple of dollar bills**. **A tube of Lifesavers**. (Shreve, *The Pilot*'s *Wife*, p. 128)

(13b) If she put her ear to the wall she could hear sounds. **The television on**. **Coughing**. **Sometimes the lavatory flushing**. **Someone upstairs scraping a chair**. **A shouting match below.** (Ali, *Brick Lane,* p. 24)

(13c) **Watching him play tennis**.
The way his knees sometimes buckled when he walked.
His face.
His resemblance to Abraham Lincoln, and how people always remarked on it.
His fearlessness with dogs.
His face. And again, his face. (Auster, 'Portrait of an invisible man,' p. 29)

Type 14: Narrated Action Sequences

Fragments can represent action sequences, as in (14a), where the sequence might be viewed as iconically reflecting the speed of movement and/or the fact that the character is probably out of breath so communication in full sentences is impaired. The manner of performing actions can also be represented in fragments (see [24]). In (14b), the recurrence of an action is iconically represented by fragments that count the actions.

(14a) Nazneen ran. Down Bethnal Green Road. **Turned at Vallance Road. Jogged down New Road. Stitch**

in her side on Cannon Street. (Ali, *Brick Lane*, pp. 466–467)

(14b) While Archie and Samad assessed this situation as best they could, Colonel-General Jodl sat in a small red schoolhouse in Reims and shook his fountain pen. **Once**. **Twice**. (Smith, *White Teeth,* p. 92)

There is some overlap between Types 13 and 14. Impressions and memories (Type 13) can include impressions and memories of actions, as in (13b) and (13c). Also, movement can underlie sequences of impressions, as in (23), where we see the observations of a focalizing character as she speeds across town in an ambulance.

Type 15: Brevity of Direct Speech

Direct speech in fiction mimics real speech by presenting brief phrases that rely on contextual information for their interpretation. In some cases, the meaning might be inferred from an earlier utterance or from the physical context of the characters, and so might be regarded as elliptical rather than fragmentary (Huddleston and Pullum, 2002: 1541–1542; Biber *et al.*, 1999: 1099). In (15), the context is set up by the earlier episode in which Samad decides what to bring as a gift. In addition to representing the brevity of speech, the identification of the coconut provides a Type 4 clarification of a previously underspecified object, the surprise effect being accentuated by the intervening ellipsis between episodes.

(15) Alibi done, three minutes were left for Samad to consider what an old man brings a young girl [. . .]; something suitable . . .
'A coconut?'
Poppy Burt-Jones took the hairy object into her hands and looked up at Samad with a perplexed smile. (Smith, *White Teeth,* p. 166; our ellipsis followed by Smith's ellipsis)

Type 16: Interactive Components: Metalinguistic Items and Dialogic Responses

Fragments can be used for metalinguistic items employed on occasions where the narrator suddenly comments on his/her own narrative style, as in (16a). Fragments are also common in the heavily rhetorical use of answers provided in response to an author or narrator's own questions. Example (16b) provides an example from a popular expository text, and (16c) is from a literary text.

(16a) **Enough rambling**. (Bauby, *The Diving-Bell and the Butterfly*, p. 13)

(16b) It sounds like it should be a winner, right?
Wrong. (Gladwell, *The Tipping Point*, p. 114)

(16c) His solution? **To refuse sleep**. (Galloway, *Clara*, p. 107)

Summary of Major Stylistic Functions of Fragmentation in Literary Texts

Speech and Thought Representation

Fragmentation has been recognized as being particularly important in the representation of speech and thought in literary texts (e.g., Leech and Short, 1981; Fludernik, 1993). It is very common in direct speech and has the role of making the speech appear realistic (although, as discussed earlier in this article, there is a considerable difference between fictional direct speech, designed to be easily readable, and a transcript of real speech) and may also be used to indicate rhetorical emphasis by the speaker. In narrative texts containing a lot of direct speech and in drama texts (where direct speech is the main medium of communication), fragmentation might perform a much broader range of functions (this would need further investigation; see the section 'Future Linguistic and Stylistic Research'). As far as thought presentation is concerned, fragmentation can signal switches from main narrative to represented thought and hence indicate crucial changes of perspective. Some of the types of fragmentation listed in the previous section are particularly well suited to represent thought in fiction. Echoic fragments (Types 1 and 2) enable a character to think over his or her own thoughts again or to react to the speech or thoughts of another. They can also reflect the pervasiveness of a particular memory (13c). Fragments that provide greater specificity (Type 4) enable a character to gradually realize details of his or her surroundings, which is very different from the more factual presentation style of an omniscient narrator. Paraphrase and semantic/pragmatic connections (Type 8) can give the sense of a character's pondering over a topic, as in (8b). Evaluations, conclusions, and comments (Type 10) show the character's perspective on the events that are occurring. Repairs and reworkings (Type 11) enable a character to revise or modify his or her view as the text progresses, or they can reflect uncertainty. Topic management fragments and orientation fragments (Type 12) guide the character's thoughts and make the direction of the thoughts clearer to the reader. Observations, impressions, and memories (Type 13) are the basic material of stream of consciousness fiction.

Fragmented thought can help convey a particular mind-style. This has already been discussed in relation to example (7), where incomplete narration (Type 7) reflects a bereaved character's inability to

think through the details of the day of death. Sometimes connections made can be idiosyncratic to the focalizer. Hence, in (9a), the children selecting the gift are wrong in their assumption that the old person in question will like Garibaldi biscuits, since we later discover that he has no teeth to eat them with. Example (17) reflects the distinctive ideology of a particular focalizing character, the father of the 'inattentive daughter.'

(17) Only an inattentive daughter could fail to see. **A disrespectful daughter. Who fully deserved the lashing, verbal or otherwise, that followed such dereliction of duty**. (Ali, *Brick Lane*, p. 205)

The fragment 'A disrespectful daughter.' may be connected (Type 8) in the mind of the focalizer, but there is nevertheless a leap between this and the notion of 'inattention.' The 'fractured-off' (Type 5) relative clause that follows it highlights a rather dubious logic that may be held by the character but will not necessarily be held by the reader.

Fragments may also be used as part of the stylistic technique of 'defamiliarization' (Shklovsky, 1965 [1917]), the way in which the familiar is 'made strange.' In (18), the defamiliarization reflects the focalizer's unusual perception when she is having a tooth extracted at the dentist.

(18) The bones in his hand were bruising her lip. And that sound of the gum tugging back from what he was doing, **the jaw** creaking. **Her jaw**. (Galloway, *Blood*, p. 1)

Here, the focalizing character hears the sound of the creaking jaw but acknowledges only in the final fragment that the sound is coming from her own body.

Rhetorical Functions

The examples in the section 'Types of Fragmentation' illustrate a broad range of rhetorical functions. Type 2 allows extra emphasis by repeating and modifying a phrase, and Type 5 enables a part of a sentence to be highlighted by segmenting it from the previous sentence. The Type 6 isolated connectives enable strong contrasts and additions to be made. Relations such as similarity (Type 8), general–particular (Type 9), and hypothetical–real (Type 9) are a crucial part of the basic rhetorical structure of a text (Hoey, 1983; Winter, 1986; Mann and Thompson, 1988), together with text components such as evaluations (Hunston and Thompson [eds.], 2000). Topic management and/or orientation enables a text to be organized at a higher topic or episode level. The interactive components provide heavily rhetorical elements such as answers to rhetorical questions.

In certain cases, a fragment can signal a major change in the rhetorical direction of a passage, as in (19).

(19) The Scheme for Full Employment was the envy of the world [. . .] Planned to the finest detail by people of vision, The Scheme was watertight, and could not possibly go wrong.
Except in this country.
In this country we managed to destroy it. (Mills, *The Scheme for Full Employment*, unnumbered preface)

Here the fractured-off item (Type 5) provides a sudden switch of direction, which then functions as a topic indicator (Type 12) to introduce the discussion about why the situation is different 'in this country.'

Global Functions: Theme and Plot

Although fragmentation often has a local rhetorical function, the fragments may also have global significance in a text. Example (19) facilitates the local flow of the argument but also highlights the key theme of the book, the failure of The Scheme in this particular country due to the greed of the participants.

In (20), the word 'unless' has thematic significance, since the story deals with the notion of coincidence. The fragment comes shortly after an explicit discussion of the meaning of the word 'unless' (Shields, 2003: 313) and also echoes the title of the book.

(20) By chance it was Friday, the day Tom drives by the corner of Bathurst and Bloor for a glimpse of her. She was not there. For the first time since April she was not there.
Unless, unless. He rang the bell at the hostel [. . .] (Shields, *Unless,* p. 314)

A similar fragment, with the single word 'Unless,' is repeated at the start of the following paragraph (2003: 314), and the fragment 'Unless we ask questions.' occurs in its own mini-paragraph two pages later (2003: 316). This type of heavy use of a fragment with explicit signaling of its importance can enable a fragment to play a global role in a novel.

Other examples of thematically important fragments are found in (1b) and (7), as already discussed. Example (4b) shows how under-specification can be used to stimulate suspense at a crucial point before a major plot revelation. See also Emmott *et al*. (2003) for examples of instances where fragmentation can be used to highlight key clues in detective fiction.

Rhythm and Iconicity

Fragments play a major role in providing rhythmic pacing in texts. In (21), a description of the labor pains as a woman gives birth, the Type 10 evaluative

fragments (including Type 2 echoing) provide a rhythmic alternation to the average length and longer sentences, which Barr (2001: 385) described as "toggling." The effect is also achieved by the silent stresses that are likely to occur before the fragments during reading.

(21) When the wave of pain had receded, and she lay spent, she was grimly flogging her mind to *imagine* the quality of the pain that had just gone. **Impossible**. [Then, when in pain, she tries to imagine no pain, but again fails.] With all her determination, she could not. There were two Marthas, and there was nothing to bridge them. **Failure**. **Complete failure**. (Lessing, *A Proper Marriage*, p. 164; Lessing's italics, our paraphrase in square brackets)

In (22), the lengthy first sentence is followed by a concluding fragment (Type 10) that rounds off this paragraph and gains its effect from the contrasting length and the silent stresses before the first 'Deadness' and before 'within.'

(22) The great, sun-dried dead church, the dead portales, the hopeless covered market-place, where, the first time she went, she saw a dead dog lying between the meat stalls and the vegetable array, stretched out as if for ever, nobody troubling to throw it away. **Deadness within deadness**. (Lawrence, "The woman who rode away," p. 39)

More specifically, fragmentation can often have iconic effects, where the rhythm may 'mime' specific types of action. Examples (14a) and (14b) 'mime' the speed and recurrence of actions respectively. Also, many of the examples shown earlier might be argued to be iconic insofar as they reflect the rhythms of speech and thought (or at least a conventional notion of the patterns of speech and thought in literary writing).

One problem for iconicity researchers is that the same type of writing style can have quite different meanings in context, even in the same literary work. In (23), the fragments mimic the speed of the focalizer hurtling through the city in an ambulance and also iconically reflect the 'shattering' of the city (actually the focalizer's perception of everything around her shattering in this moment of crisis). The representation of shattering is, however, specific to this context. Moreover, although fragments can often represent speed (as in [14a]), they can also represent slow movements, as in (24).

(23) The city shattered. Everything was in pieces. She knew it straight away, glimpsed it from the painful-white insides of the ambulance. **Frantic neon signs. Headlights chasing the dark. An office block, cracked with light. These shards of the broken city**. (Ali, *Brick Lane,* p. 117)

(24) She did not know what the words meant but the rhythm of them soothed her. Her breath came from down in her stomach. **In and out**. **Smooth**. **Silent**. Nazneen fell asleep on the sofa. (Ali, *Brick Lane*, p. 21)

Possibly, then, the interpretation owes more to the way the reader reads a series of fragments, as triggered by the scene being described.

Future Linguistic and Stylistic Research

There are several areas where further linguistic and stylistic study is needed of fragmentation:

Fragmentation in Different Types of Text

The examples in this article are drawn mainly from literary narratives. More work is needed to show the rhetorical functions of fragmentation in other types of texts, such as expository texts, newspapers, and advertisements. The extent to which the acceptability of fragments in writing differs crosslinguistically and diachronically also merits further investigation (for crosslinguistic and historical examples from written text, see Miller and Weinert, 1998: 41–45). It would also be interesting to study how fragmentation in written text differs from that in speech, since the former is not prompted by spontaneity (except, perhaps, the simulation of spontaneity in speech and thought representation).

Even in relation to literary texts, the study needs to be extended to cover different types of texts (e.g., drama and poetry). The list of fragment types shown earlier is not fully comprehensive; it could be developed further to describe the full range of examples that occur in narrative fiction. Special types of experimental writing may contain more dense fragmentation and may require a much broader range of categories.

Ellipsis and Fragmentation

Crystal and Davy's (1969) discussion of 'minor sentences' as being nonelliptical is useful for describing the fragments discussed in this article. In many cases, it would be difficult to construct a specific sentence around the fragment, and such reconstruction would destroy the rhythmic and rhetorical effects. Further research would be beneficial to show the dividing line or gradient between ellipsis and fragmentation.

Good and Bad Writing

As discussed earlier, novice writers have traditionally been warned against writing in incomplete sentences. Nevertheless, fragmentation is a very effective aspect of the style of some of our major literary writers.

More detailed study of fragmentation would be necessary to draw a distinction between the properties of ineffective and effective use of fragmentation, in order to make this type of stylistic analysis useful for pedagogical purposes.

Acknowledgments

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See also: Clause Relations; Connectives in Text; Ellipsis; Evaluation in Text; Iconicity: Literary Texts; Interjections; Literature and the Language of Literature; Mind Style; Sentence Processing; Speech and Thought: Representation of; Stylistics; Text World Theory; Thematics.

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Sentence Processing

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An essential part of understanding a sentence is to construct the appropriate syntactic structure. Research investigating how language users do this is usually referred to as sentence processing research. Most sentence processing research has focused on syntactic ambiguities. Although language users are often unaware of syntactic ambiguities, they are in fact very common, so an important goal of this research is to develop theories that explain how language users process them. Furthermore, syntactic ambiguities present a precious opportunity to gain insight into the architecture and mechanisms of the sentence processor. People often experience difficulty in adopting the intended analysis of syntactically ambiguous sentences and by examining when processing difficulty occurs, psycholinguists can study the workings of the sentence processor.

Sentence Processing Theories: Two-Stage Versus Constraint-Based Theories

The literature on syntactic ambiguity resolution is dominated by two largely incompatible classes of theories, two-stage and constraint-based theories. Two-stage theories claim that the processor initially draws upon a restricted range of information to construct a single analysis of an ambiguous structure. According to the most influential two-stage account, the garden-path theory, the syntactic processor is modular (e.g., Frazier, 1979, 1987; Rayner *et al.*, 1983). It claims that the processor initially adopts the analysis that is simplest in terms of syntactic tree structure (e.g., the fewest nodes), whereas other potentially useful information for resolving syntactic ambiguities is delayed until the second stage of processing. Other two-stage theories assume that the processor uses thematic role information during its initial stage (e.g., Pritchett, 1992). However, all two-stage theories claim that reanalysis occurs when the initial analysis is inconsistent with information that is used during the second stage of processing. Discovery of the misanalysis and subsequent reanalysis result in processing difficulty.

In contrast, constraint-based theories claim that all sources of information, including nonsyntactic constraints, immediately affect syntactic ambiguity resolution (e.g., MacDonald *et al.*, 1994; Trueswell *et al.*, 1993, 1994). They claim that the processor activates multiple analyses of a syntactic ambiguity in parallel. All sources of information have an immediate effect on their activation and the activation of an analysis is determined by the number and strength

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of the constraints supporting it. When the activation of one analysis is much higher than that of the alternative analyses, processing the ambiguity is easy. But when two analyses are approximately equally activated, they compete, and processing difficulty occurs.

The Use of Nonsyntactic Information

A large body of research has tested the two opposing classes of theories by investigating whether the use of nonsyntactic information is delayed relative to syntactic information. Ferreira and Clifton (1986) investigated sentences such as (1–4) in a reading experiment.

(1) The defendant examined by the lawyer turned out to be unreliable.
(2) The defendant that was examined by the lawyer turned out to be unreliable.
(3) The evidence examined by the lawyer turned out to be unreliable.
(4) The evidence that was examined by the lawyer turned out to be unreliable.

Sentence (1) contains a reduced relative clause (*examined by the lawyer*) that results in a temporary ambiguity, because the initial words also permit a main clause analysis (as in *the defendant examined the lawyer*). According to the garden-path theory, the processor initially adopts the main clause analysis, because it is structurally simplest. This correctly accounts for Ferreira and Clifton's (1986) finding that the disambiguating phrase (*by the lawyer*) in (1) is harder to read than in an unambiguous sentence like (2).

More interestingly, Ferreira and Clifton (1986) observed that readers experienced difficulty with reduced relatives even in (3), where the main clause analysis is ruled out by plausibility (evidence does not normally examine anything). This suggests that the processor bases its initial analysis on syntactic information and that the use of plausibility information is delayed, as claimed by the garden-path theory. However, Trueswell *et al.* (1994) argued that the plausibility manipulation in Ferreira and Clifton's study was too weak. With stronger materials, they showed that no difficulty occurred in (3) relative to (4). They argued that this supports constraint-based theories.

Other studies have investigated the use of contextual information. Constraint-based theories incorporate ideas from referential theory (Altmann and Steedman, 1988; Crain and Steedman, 1985), which claims that the processor favors the analysis with the fewest unsupported discourse presuppositions. In (5), the temporarily ambiguous PP *with the new lock* modifies the NP *the safe*.

(5) The burglar blew open the safe with the new lock.

This interpretation presupposes that there is more than one safe in the discourse, but only one has a new lock. However, in the absence of a context mentioning more than one safe, this presupposition is unsupported. Hence, (5) should be harder to process than the verb modifier interpretation in (6), which does not contain this presupposition.

(6) The burglar blew open the safe with the dynamite.

However, in a context mentioning more than one safe, as in (7), the NP modifier interpretation should be preferred.

(7) The burglar saw a safe with a new lock and a safe with an old lock.
He blew open the safe with the new lock.

The presupposition associated with the NP modifier is now supported, because the PP singles out one of the safes. In contrast, the verb modifier interpretation is infelicitous because it presupposes that the discourse contains only a single safe.

Several reading studies have shown that referential context affects syntactic ambiguity resolution (e.g., Altmann and Steedman, 1988); however, the effects are less strong than claimed by referential theory: in syntactic ambiguities with a strong bias for one analysis (in the absence of a context), discourse context does not appear to override structural preferences (e.g., Britt, 1994). This fits well with constraint-based theories. They claim that discourse information has a strong effect when other constraints do not strongly favor a single analysis. But when other constraints strongly favor one analysis, these constraints may override context effects.

Another important nonsyntactic constraint is the frequency with which structures occur in a language. Trueswell *et al.* (1993) investigated temporarily ambiguous sentences such as (8, 9).

(8) The student forgot the solution was in the book.
(9) The student hoped the solution was in the book.

Verbs such as *forget* occur more frequently with a direct object (as in *The student forgot the solution*) than with a sentence complement (as in [8]), whereas verbs such as *hope* show the opposite pattern. Trueswell *et al.* showed that the disambiguating region in (8) (*was in the*) took longer to read than in unambiguous sentences containing *that* following the critical verb. However, no difference was observed between (9) and

its unambiguous control, suggesting that frequency information had an immediate effect on syntactic ambiguity resolution. They concluded that this supports constraint-based theories.

Ongoing Controversies

The garden-path model may be able to account for early effects of nonsyntactic information by stipulating that such information is used so rapidly that its delay is undetectable (Ferreira and Clifton, 1989), but this makes its predictions rather unclear. As a result, constraint-based theories have become the dominant approach in the sentence processing literature. However, not all studies support the constraint-based view. Binder *et al.* (2001) investigated whether nonsyntactic information (plausibility and context) could make the main clause analysis in reduced relative/main clause ambiguities the preferred analysis, as predicted by constraint-based theories, but it did not. Clifton *et al.* (2003) investigated the use of plausibility information in reduced relative structures, but used a larger set of materials than Trueswell *et al.* (1994). They observed that plausibility information facilitated the reduced relative analysis, but it did not completely eliminate difficulty. Finally, some studies show that verb frequency information does not always eliminate processing difficulty (e.g., Pickering *et al.*, 2000).

Constraint-based theorists argue that such results do not provide evidence against constraint-based theories. Syntactic preferences may be particularly strong and therefore nonsyntactic information cannot always override them. Unfortunately, such claims make it difficult to derive exact and testable predictions as to how linguistic factors interact. In order to make constraint-based models more explicit and testable, researchers have started to build computational models (e.g., McRae *et al.*, 1998; Tabor and Tanenhaus, 1999). Furthermore, constraint-based theorists have argued that people's completions of sentence fragments provide a good estimate of usage frequencies, and therefore they can be used to predict parsing preferences (e.g., McRae *et al.*, 1998; Garnsey *et al.*, 1997). However, it is unclear whether parsing preferences are the result of usage frequencies or whether the same underlying factors influence both parsing preferences and usage frequencies. Hence, a promising alternative approach is to explain both parsing and production preferences as the result of semantic factors (e.g., McKoon and Ratcliff, 2003).

New Directions

Recent studies have started to address new issues. An important line of research explores the interactions between visual context and sentence processing by measuring people's eye movements to visual scenes while they listen to sentences. Tanenhaus *et al.* (1995) and Spivey *et al.* (2002) asked people to follow auditory instructions such as (10, 11).

(10) Put the apple on the towel in the box.
(11) Put the apple that's on the towel in the box.

They were presented with either a one-referent scene containing a single apple on a towel, or a two-referent scene containing two apples, one of which was on a towel. Both scenes also contained an empty towel without an apple, and a box. When people heard (10) while looking at the one-referent scene, they looked more often at the empty towel than when hearing (11). This indicates that they initially misinterpreted *on the towel* in the temporarily ambiguous sentence (10) as modifying the verb *put* and took it as the destination for the apple. However, for the two-referent scene, no such difference was observed, suggesting that the visual context immediately affected syntactic ambiguity resolution. Recent research has also used this visual-world method to investigate how children process syntactic ambiguities. Trueswell *et al.* (1999) showed that, in contrast to adults, children do not use the visual context. However, both adults and children appear to use verb frequency information (Snedeker and Trueswell, 2004).

Using a similar method, Altmann and Kamide, (1999; Kamide *et al.*, 2003) showed that listeners looked at edible objects when hearing sentences such as (12), even before they heard *cake*.

(12) The boy will eat the cake.

Kamide *et al.* (2003) argued that the processor anticipates properties of upcoming phrases, using both semantic and syntactic information up to that point. What properties it anticipates is less clear, in particular whether it anticipates syntactic structures. Furthermore, it is likely that the anticipations are at least partly triggered by the visual context. During normal language comprehension, such a context is usually absent, and people may therefore not make the same type of anticipations. Nevertheless, what these studies show is that in a visual context, sentence processing proceeds very rapidly and is highly incremental.

Other recent research has continued to use reading methods, but has addressed new questions. Van Gompel *et al.* (2005) investigated whether processing difficulty is the result of competition between analyses. Most constraint-based theories claim that competition should occur in globally ambiguous sentences with no strong bias for either analysis, because constraints support two analyses to an equal

extent. Hence, such sentences should be harder to process than disambiguated sentences, where only a single analysis is supported. However, Van Gompel *et al*. observed exactly the opposite pattern of results, suggesting that competition is not the mechanism causing processing difficulty. They argued that processing difficulty is due to reanalysis: globally ambiguous sentences are easy to process, because the initial analysis remains possible throughout the sentence, regardless of which analysis is adopted. In contrast, when a sentence is disambiguated, the initial analysis may be incorrect, and the processor has to reanalyze.

Christianson *et al*. (2001) showed that readers often fail to adopt the intended analysis in temporarily ambiguous sentences. In line with this, Ferreira (2003) argued that readers often construct shallow representations of the sentence, even for completely unambiguous sentences such as passives. Finally, researchers have started to show a renewed interest in how working memory constraints affect the processing of both ambiguous and unambiguous sentences (e.g., Caplan and Waters, 1999; Gibson, 1998; Gordon *et al*., 2004). Future research will probably continue to explore these and other new issues.

See also: Cognitive Science: Overview; Discourse Processing; Human Language Processing: Connectionist Models; Modularity of Mind and Language; Psycholinguistic Research Methods; Psycholinguistics: Overview; Rational Analysis and Language Processing; Reading Processes in Adults.

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Serbia and Montenegro: Language Situation

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'Serbia and Montenegro' became the official name of the country as of February 4, 2003, as a result of the process of restructuring the country formerly known as 'The Federal Republic of Yugoslavia.' Serbia and Montenegro is the largest descendant of the former Socialistic Federative Republic of Yugoslavia and consists of two republics: Serbia and Montenegro. Within Serbia, there are two autonomous provinces, Vojvodina and Kosovo. Kosovo has been under the protectorate of the United Nations since 1999.

Language politics and manipulations of the history, official status and names of different languages played an important role in the numerous ethnical conflicts that took place from 1990 to 1999 and it is still a very sensitive issue in the whole area of the Balkans.

The official language of the Republic of Serbia is Serbian (with over 6 620 000 speakers in the territory of Serbia without Kosovo, or 88% of the population); an equal legal status is afforded to both the Cyrillic and the Roman alphabet, although the former is favored for Serbian state administration. Minority languages, which are also in official use in the regions where they are spoken, are Hungarian (according to the 2002 census data of the Statistical Institute of the Republic of Serbia, estimated at 286 500 speakers), Bosnian (134 500 speakers), Romany (82 000 speakers), Albanian (63 500 speakers), Slovakian (57 500 speakers), Valachian (55 000 speakers), Romanian (34 500 speakers), Croatian (27 500 speakers), Bulgarian (16 500 speakers), and Macedonian (14 500 speakers). Minority languages are used at all levels of education: in primary schools, high schools, and at colleges and universities.

One linguistic consequence of the political and ethnic processes of the 1990s is that the language that used to be officially called 'Serbo-Croat' has received several new ethnically and politically based names. Thus, the names 'Serbian,' 'Croatian,' and 'Bosnian' are politically determined and refer to the same language with possible slight variations. The language has two major dialects, Ekavian and Ijekavian. Although, in general, Ekavian is spoken more in Serbia (and parts of Croatia), and Ijekavian is spoken more in Montenegro (and also in Bosnia, Herzegovina, and parts of Croatia), these dialects do not coincide with the ethnically motivated names.

The language situation in Kosovo is less clear at present, because about 300 000 refugees from this province, mostly Serbs, are still in the process of returning to their homes. This fact makes the numbers of speakers reported unreliable. Today, according to the Statistical Office of Kosovo, about 1 672 000, or 88% of the inhabitants of Kosovo, speak Albanian, and about 133 000, or 7%, are speakers of Serbian. The rest of the population (5%) speaks mostly Romany, Bosnian, and Turkish.

The official language of the Republic of Montenegro is Serbian, but there are recent tendencies to introduce the name 'Montenegrin,' either parallel to or instead of the name 'Serbian.' Just as with Serbian, Croatian, and Bosnian, this term refers to the same language that used to be called Serbo-Croat, and is rather a matter of political decisions and convictions. The Cyrillic and the Roman alphabet are officially in use. The 2003 census data from the Statistical

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See also: Serbian–Croatian–Bosnian Linguistic Complex.

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Serbian *See:* Serbian–Croatian–Bosnian Linguistic Complex.

Serbian Lexicography

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Sociopolitical circumstances in the region have shaped three distinct phases of Serbian lexicography (Early Serbian, Serbo-Croatian, and Modern Serbian).

Although some earlier glosses have been found, it is Serbian migrations to southern Hungary that gave rise to a series of early Serbian bilingual dictionaries, including Latin, German, Greek, and Turkish editions, stretching from the late 18th to the mid-19th century. These dictionaries were intended primarily to meet the daily needs of those learning foreign languages in this cultural environment. One of the most popular dictionaries from this series was the anonymous *Rečnik malij*, a German-Serbian subject matter dictionary with 37 lexical fields. This branch is somewhat of a side track primarily because its linguistic substance is a mixture of the Serbian and Russian redactions of Old Church Slavonic, quite distant from the *Što-dialect*, which served as the basis for the standard Serbian which emerged in the 19th century.

The Serbo-Croatian phase was initiated by the 1818 *Srpski rječnik* by Vuk Stefanović Karadžić, which was enlarged and corrected in 1852. These two editions promoted the *Što-dialect* common to Serbs and Croats, which after decades of polemics was finally accepted in the second half of the 19th century. In terms of its microstructure, this trilingual Serbian-Latin-German dictionary for the most part follows the tradition established by the earlier Croatian lexicography while having almost no connection with the Serbian tradition of that period.

The linguistic views of Vuk Karadžić and his followers molded the lexicographic treatment of the monumental Croatian 23-volume *Dictionary of the Croatian or Serbian Language*, compiled from 1880 to 1976. It is based on materials from the mid-19th

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century and earlier. The subsequent *Dictionary of Serbo-Croatian standard and colloquial language*, published by the Serbian Academy of Arts and Sciences beginning in 1959, is now in 15 volumes with over 20 yet to be published. It is meant to be a continuation of the aforementioned Croatian dictionary project with corpora from the mid-19th century and, when finished, will have approximately 400 000 entries. Another sizable dictionary of the Serbo-Croatian phase is the six-volume standard language dictionary published between 1967 and 1976, initially jointly by Matica Srpska and Matica Hrvatska (the first two volumes) and by Matica Srpska alone thereafter. This dictionary was an object of heated political debate between Serbian and Croatian linguists.

The Serbo-Croatian phase has brought forth numerous other dictionaries which vary considerably in quality and importance. During this phase Serbian lexicography abandoned the Romanticist discursiveness of lexicographic entry (e.g., the presence of folktales within dictionary entries) and moved toward a structured and concise lexicographic treatment. The vast breadth of quality is particularly observable with bilingual dictionaries. The Serbo-Croatian phase ended with the disintegration of the former Yugoslavia in the early 1990s.

The principal projects of the Modern Serbian phase are still in progress, comprising an etymological dictionary, a dictionary of foreign words, a dictionary of synonyms, and continued work on the aforementioned dictionary by the Serbian Academy of Arts and Sciences. The most conspicuous gap in Serbian lexicography remains the absence of a modern one-volume monolingual dictionary.

See also: Croatian Lexicography; Serbian–Croatian–Bosnian Linguistic Complex.

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Serbian-Croatian-Bosnian Linguistic Complex

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Bosnian

The official name of the language spoken in Bosnia Herzegovina is Bosnian. The status of the language in reality, however, is more complex, as may be seen in the language law adopted in 1993: "In the Republic of Bosnia and Herzegovina, the Ijekavian standard literary language of the three constitutive nations is officially used, designated by one of the terms: Bosnian, Serbian, Croatian. Both alphabets, Latin and Cyrillic, are equal." The law reflects the fact that the territory is inhabited by three national groups: Bosniaks (South Slav Muslims, the majority population of the Bosnian/Croatian Federation), Croats (Catholics, the majority population of the territory of Herzegovina, the southwestern area of the Bosnian/Croatian Federation); and Serbs (Orthodox, the majority population of the other Bosnian entity, known as *Republika srpska*). In practice, it is normally only Bosniaks (and those committed to the survival of Bosnia Herzegovina as a unified country), who refer to their language as 'Bosnian.' And it is logical enough that Croats should speak Croatian and Serbs Serbian now that there is no longer an all-inclusive Serbo-Croatian umbrella. The debate as to whether or not a distinct Bosnian language exists continues. At the time of writing, the standard language used by the official authorities in Sarajevo and other parts of the Federation may be described as distinct from the standard languages in Serbia and Croatia, but the process of standardization, through dictionaries, grammars, and scholarly studies, has yet to be completed. For the time being, it cannot be said that Bosnian has quite the same status as Croatian in terms of its recognition as a specific standard.

Croatian

Croatian is the official name of the language spoken in the territory of Croatia. To a considerable extent, the political tensions that ultimately led to the collapse of Yugoslavia were first reflected in issues related to language. Long before it was possible for ideas of political separation to be contemplated, in 1967, Croatian linguists published a Declaration on the Name and Position of the Croatian Literary Language, calling for official recognition of Croatian as a separate language. From the outset, however, it was clear that the Declaration had more to do with cultural and sociopolitical aspirations than linguistics. From 1971, nationalist policies in Croatian became steadily more entrenched, leading eventually to the secession of Croatia (and Slovenia) from the common state of Yugoslavia in 1992. As language and statehood have been inextricably linked since the rise of nation states in Europe, it was understandable that nationalist politics should place particular emphasis on separating the Croatian element of the Serbo-Croatian language as far as possible from its Serbian counterpart. To this end, archaic words were reintroduced, neologisms forged and various 'differential' dictionaries published in an effort to raise the consciousness of individual Croats to the special nature of their language and to purify the Croatian language of Serbianisms. Apart from lexical items and favoring two characteristic syntactic differences (the infinitive in Croatian for dependent verbs, as opposed to *da* + present tense in Serbian; verb + interrogative particle *li* for questions as opposed to *da li* + verb in Serbian), particular emphasis has been placed on differences in word formation. At the height of the nationalist era, in the extreme circumstances of war and later, as Croatia consolidated its position as an independent state, linguists were particularly active. Some of the results of this frenzy were inevitably artificial and at times entertaining. This phase of heightened self-consciousness has now passed, with the recognition that Croatian has been widely accepted as a separate standard at an official level. Speakers may now be left to express themselves naturally and the language to develop in a more organic manner.

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The official name of the language spoken in Bosnia Herzegovina is Bosnian. The status of the language in reality, however, is more complex, as may be seen in the language law adopted in 1993: "In the Republic of Bosnia and Herzegovina, the Ijekavian standard literary language of the three constitutive nations is officially used, designated by one of the terms: Bosnian, Serbian, Croatian. Both alphabets, Latin and Cyrillic, are equal." The law reflects the fact that the territory is inhabited by three national groups: Bosniaks (South Slav Muslims, the majority population of the Bosnian/Croatian Federation), Croats (Catholics, the majority population of the territory of Herzegovina, the southwestern area of the Bosnian/Croatian Federation); and Serbs (Orthodox, the majority population of the other Bosnian entity, known as *Republika srpska*). In practice, it is normally only Bosniaks (and those committed to the survival of Bosnia Herzegovina as a unified country), who refer to their language as 'Bosnian.' And it is logical enough that Croats should speak Croatian and Serbs Serbian now that there is no longer an all-inclusive Serbo-Croatian umbrella. The debate as to whether or not a distinct Bosnian language exists continues. At the time of writing, the standard language used by the official authorities in Sarajevo and other parts of the Federation may be described as distinct from the standard languages in Serbia and Croatia, but the process of standardization, through dictionaries, grammars, and scholarly studies, has yet to be completed. For the time being, it cannot be said that Bosnian has quite the same status as Croatian in terms of its recognition as a specific standard.

Croatian

Croatian is the official name of the language spoken in the territory of Croatia. To a considerable extent, the political tensions that ultimately led to the collapse of Yugoslavia were first reflected in issues related to language. Long before it was possible for ideas of political separation to be contemplated, in 1967, Croatian linguists published a Declaration on the Name and Position of the Croatian Literary Language, calling for official recognition of Croatian as a separate language. From the outset, however, it was clear that the Declaration had more to do with cultural and sociopolitical aspirations than linguistics. From 1971, nationalist policies in Croatian became steadily more entrenched, leading eventually to the secession of Croatia (and Slovenia) from the common state of Yugoslavia in 1992. As language and statehood have been inextricably linked since the rise of nation states in Europe, it was understandable that nationalist politics should place particular emphasis on separating the Croatian element of the Serbo-Croatian language as far as possible from its Serbian counterpart. To this end, archaic words were reintroduced, neologisms forged and various 'differential' dictionaries published in an effort to raise the consciousness of individual Croats to the special nature of their language and to purify the Croatian language of Serbianisms. Apart from lexical items and favoring two characteristic syntactic differences (the infinitive in Croatian for dependent verbs, as opposed to *da* + present tense in Serbian; verb + interrogative particle *li* for questions as opposed to *da li* + verb in Serbian), particular emphasis has been placed on differences in word formation. At the height of the nationalist era, in the extreme circumstances of war and later, as Croatia consolidated its position as an independent state, linguists were particularly active. Some of the results of this frenzy were inevitably artificial and at times entertaining. This phase of heightened self-consciousness has now passed, with the recognition that Croatian has been widely accepted as a separate standard at an official level. Speakers may now be left to express themselves naturally and the language to develop in a more organic manner.

Serbian

Serbian is the official name of the language spoken in the territory of Serbia and Montenegro. Unlike the

other components of the Serbian-Croatian-Bosnian linguistic complex, Serbian, as the standard language of the Serbs and Montenegrins, has not changed essentially from its earlier incarnation as Serbo-Croat. It was the Croats who opted to remove their language from the dual name, and set about making their standard as distinct as possible from standard Serbian (see 'Croatian'), while the Serbs had only to stand still. The process of the disintegration of standard Serbo-Croatian may thus be described as 'assymetrical and asynchronic' (Ljubomir Popovic, 'From Serbian to Serbo-Croatian to Serbian,' in Bugarski and Hawkesworth, 2004). In response, a Serbian Language Standardization Committee was set up to describe the current situation and Serbian has now been officially recognized as a separate language within Slavonic studies.

Serbian-Croatian-Bosnian Linguistic Complex

The language formerly known as Serbo-Croat belongs, with Bulgarian, Slovene, and Macedonian, to the South Slav branch of the Slavonic language family. The first written records are 11th-century inscriptions in stone in both the Glagolitic and related Cyrillic scripts. The cultural division between the two variants reflects their history: the western Latin-script culture of Croatia, in the orbit of the Catholic Church and later the Hapsburg Monarchy; and the eastern, Cyrillic, Byzantine, Orthodox culture of Serbia.

The dia-system linguistic complex is the most heterogeneous Slavonic dia-system, with an exceptionally large variety of dialects, some with six or seven cases, some with four, and a great variety of verbal tenses. At the same time, these dialects have a striking degree of connectedness, containing characteristic features, which distinguish the complex from all other Slavonic languages. One of these is its archaic prosodic system, in which stress position, vocalic quantity (length/shortness) and tone (rising/falling) are marked. The traditional accents are long falling: *noć*; short falling: *kuća*; long rising: *réka*; short rising: *ostati*. There are not many minimal pairs. Examples would be *grad* 'hail' and *grad* 'town'; *pas* 'dog' and *pas* 'belt, waist; pass'; and the sentence *Sam sam* 'I [masc.] am alone'.

In terms of morphology, the structure has remained complex, although one feature of Old Slavonic – the dual – has disappeared from the declensions and conjugations of all dialects in the complex. Case and verbal endings and accent shifts are the main morphological categories.

Word order is free, with the exception of strict rules governing the position of enclitics. These are verbal and pronominal short forms and the interrogative and reflexive particles.

Orthography has experienced the systematization of the Serbo-Croatian vernacular, which was carried out in the mid-19th century on phonetic principles, with one letter corresponding to one sound, making its orthography one of the most consistent in Europe. There is exact correspondence between the two scripts so that transliteration from one to the other is straightforward. There are three symbols unique to the language: **ć, ħ; đ ђ; dž џ.** For example:

Ijekavian variant (characterized by the rendering of Old Slavonic *jat* as *je* or *ije*, and spoken in Croatia, Bosnia, and Montenegro):
Od dviju sjevernih skupina, tj. istoćne i zapadne, juæna se razlikuje nizom osobina.
Ekavian variant (characterized by the rendering of Old Slavonic *jat* as *e*, and spoken in most of Serbia, which can equally well be written in the Latin script):
Од двеју северних скупина, тј. источне и западне, јужна се разликује низом особина.
'The Southern (Slavonic) group is distinguished from the two Northern groups, i.e., the Eastern and Western, by a series of features.'

Extensive bibliographies, as well as detailed studies, on the language situation of former Yugoslavia may be found in Bugarski *et al.*, 1992; the current situation is covered in the sequel: *Language in the former Yugoslav lands,* Slavica, 2004.

Serbo-Croat

The linguistic unity of the majority of the Southern Slav population of the Hapsburg and Ottoman lands that were to become Yugoslavia after the collapse of these empires in the First World War was first acknowledged in the joint Literary Agreement of 1850. The name 'Serbo-Croat' was officially adopted with the formation of the Kingdom of the Serbs, Croats, and Slovenes (known as Yugoslavia from 1928). It was never a straightforward phenomenon, however, as can be seen in the description adopted by many scholars: a polycentric standard language. The language could be officially termed 'Serbo-Croat,' 'Croato-Serbian,' 'Serbian and Croatian,' 'Croatian and Serbian,' 'Serbian or Croatian,' 'Croatian or Serbian.' In practice, from the end of the 1960s, most people in Croatia and Serbia referred to their language as 'Croatian' or 'Serbian,' respectively, simply for convenience, without this label implying any separatist tendencies. This situation lasted until the collapse of Yugoslavia in the wars of 1991–1995. Since the establishment of the independent states of Bosnia Herzegovina, Croatia, and Serbia and

Montenegro (still officially known as Yugoslavia until 2003), the term 'Serbo-Croat' no longer has any official validity in sociopolitical terms. The language spoken in these countries is now officially known as Bosnian, Croatian, and Serbian, respectively. In linguistic terms, the standard language remains essentially the same, but the sociopolitical reality is that it no longer has a single name. When native speakers wish to refer to the language in its broader sense, beyond the borders of their own homeland, they tend to say 'naπ jezik' or 'naπki (our language). For the purposes of the War Crimes Tribunal in The Hague, it is known as BCS. University departments in Europe where it is taught refer to it variously as Bosnian/Croatian/Serbian (Austria, Norway); Serbo-Croatian (Denmark); Serbo-Croat (France); South Slavic (Finland); Serbian/Croatian/Bosnian (Sweden); Serbian and Croatian (UK). In the absence of an entirely satisfactory solution, in this volume the term 'Serbian-Croatian-Bosnian linguistic complex' has been adopted as a clumsy but accurate description.

See also: Bosnia and Herzegovina: Language Situation; Croatia: Language Situation; Croatian Lexicography; Serbia and Montenegro: Language Situation; Serbian Lexicography.

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Serbo-Croat *See:* Serbian–Croatian–Bosnian Linguistic Complex.

Serial Verb Constructions

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Introduction

A serial verb construction (SVC) can be formally described as a clause consisting of two or more predicates showing a number of properties that suggest treating them as one structural unit. Such a construction denotes a single, complex event; typically, the secondary predicate expresses an extension or an aspect of the basic predicate. There is, however, significant variability within structural realizations of SVCs, a fact that leads to difficulties in characterizing SVCs as a unitary phenomenon.

Grammar and Semantics

Formal Features

A working definition of SVCs can go as follows: "A serial verb construction contains two or more verb roots that are neither compounded (...) nor members of separate clauses. Serial verbs occur in all types of languages, but may be more common in languages that have little or no verbal morphology (...)" (Payne, 1997: 307). Although it is true that languages of the isolating type frequently employ serialization, a number of more recent studies have clearly shown that SVCs also occur in languages with rich morphological indexation. Serialization has in fact been abundantly reported on for languages of different structural types, from morphologically isolating, verb-medial languages (e.g., Sinitic languages and creoles) to morphologically complex, verb-final languages (e.g., Papuan). SVCs are a feature of West African languages (Bamgbose, 1974; Givón, 1975; Lord, 1989, 1993); creoles (Sebba, 1987; Muysken and Veenstra, 1995; Veenstra, 1996); Sinitic languages (Li and Thompson, 1981; Matthews and Yip, 1994); Southeast Asian languages such as Hmong-Mien, Tai-Kadai, and Mon-Khmer (Matisoff, 1969; Bisang, 1996); and Oceanic languages (Crowley, 2002). It is interesting to note that in at least three geographical areas SVCs

Montenegro (still officially known as Yugoslavia until 2003), the term 'Serbo-Croat' no longer has any official validity in sociopolitical terms. The language spoken in these countries is now officially known as Bosnian, Croatian, and Serbian, respectively. In linguistic terms, the standard language remains essentially the same, but the sociopolitical reality is that it no longer has a single name. When native speakers wish to refer to the language in its broader sense, beyond the borders of their own homeland, they tend to say 'naπ jezik' or 'naπki (our language). For the purposes of the War Crimes Tribunal in The Hague, it is known as BCS. University departments in Europe where it is taught refer to it variously as Bosnian/Croatian/Serbian (Austria, Norway); Serbo-Croatian (Denmark); Serbo-Croat (France); South Slavic (Finland); Serbian/Croatian/Bosnian (Sweden); Serbian and Croatian (UK). In the absence of an entirely satisfactory solution, in this volume the term 'Serbian-Croatian-Bosnian linguistic complex' has been adopted as a clumsy but accurate description.

See also: Bosnia and Herzegovina: Language Situation; Croatia: Language Situation; Croatian Lexicography; Serbia and Montenegro: Language Situation; Serbian Lexicography.

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appear to be a strong areal feature: Southeast Asia, West Africa, and the Pacific/Papua New Guinea (Durie, 1995). There is also substantial evidence of SVCs in Central and South American languages (cf. Aikhenvald, 2003), some languages of Australia, and Korean.

Typical features of serialization include the following (cf. Givón, 1990; Durie, 1997; Payne, 1997):

1. The construction is interpreted as a single clause describing a complex event.
2. There is only one subject marked for the main predicate (but it may be marked on each verb separately).
3. There is no overt coordination/subordination within the construction.
4. One or more arguments of the clause are shared.
5. The construction is a single clause in which tense, modality, and aspect (TMA) and polarity markers are shared.
6. The construction is perceived as one intonational unit.
7. The construction may be lexicalized or grammaticalized.

It is important to note that these features represent a cluster of prototypical features in serializing languages; when we look at actual examples of SVCs, it is clear that not all conditions are met in all languages. The examples that follow are from languages of different morphological types in which SVCs are found. (The tones for Sinitic languages are shown in tone numbers for that language).

Example (1) is from American English (Payne, 1997: 307), a mildly agglutinative SVO language.

(1) run go get me a newspaper

Examples (2), Sranan (Sebba, 1987: 53); (3), Cantonese (Yue Chinese); and (4), Twi (Akan) (Lord, 1993: 143), are from isolating SVO languages.

(2) wan man go luku wan dansi
a man go look a dance
'a man went to watch a dance'

(3) ngo^{5} maai^{5} syu^{1} bei^{2} koei^{5}
1.SING buy book give 3.SING
'I buy her a book'

(4) me-wɔ sika me-seŋ no
I-have money I-SUR him
'I have more money than he has'

Examples (5), Akan (Schachter, 1974: 258), and (6), Papiamentu (Muysken and Veenstra, 1995: 289), are from inflectional SVO languages.

(5) mede aburow migu msum
take.1.SING corn flow.1.SING water.in
'I pour corn into the water'

(6) e-l a bula bai
3-SING ASP fly go
'he flew away'

Examples (7), Miskitu: Misumalpan (Mískito) (Hale, 1991: 10); (8), Tibetan (Delancey, 1990); and (9), Jabêm (Yabem) (Bisang, 1986: 146–147; my translation), are from inflectional SOV languages.

(7) witin sula yab-an plap-an
he deer cause-OBV.3 run-PAST.3
'he caused the deer to run'

(8) q^{h}ó p^{h}oo čĩ pɑ́ɑ̀
he.ABS escape went PERF.DISJUNCT
'he escaped away'

(9) ka-toc amê kê-kô màsac
3.SING-place yam 3.SING-stand floor
'I put the yams on the floor'

Example (10) is from Barai (Foley and Olson, 1985: 44), an isolating SOV language.

(10) fu burede ije sime abe ufu
he bread DEF knife take cut
'he cut the bread with the knife'

As is evident from these examples, departures from what is generally believed of serialization are found. For example, more than one verb in the construction can be inflected for person and number, in contrast to the specification in feature 5, as in examples (3) and (5). Also, there can be different subjects for an SVC, as in example (7), thereby contradicting feature 2; and, example (1) is dubious in the light of the same-event feature 1.

Functional Features

Although showing quite a diverse array of superficial structures, from a functional point of view, SVCs tend to show even more consistency. A functional typology of SVCs should include at least the following types:

1. Directional, expressing movement toward, movement away from, or presence at a given location, as in (1), (2), (6), (8).
2. Argument marking, such as transitive marking; comitative or instrumental, as in (10); benefactive, as in (3); causative, as in (7); or complementizer (cf. Lord, 1993).
3. TMA marking.
4. Comparative degree (surpass), and in (4).

The internal sequencing of SVCs yields yet another typology. Durie (1997) suggested that within one and the same language we may be able to distinguish different types of serialization based on two different parameters: the inflectional parameter and the symmetry parameter. The former is particularly useful for

capturing the difference between verb compounding and serialization, two strategies that tend to be in complementary distribution in languages. Durie proposed distinguishing four types of serialization as a result of the interaction of the following features: contiguous/noncontiguous and incorporating/nonincorporating. The latter relates to the nature of constituents within the SVC and yields three types of SVCs:

1. Symmetrical, in which the constituents are grammatical equals and appear in iconic order (i.e., according to the order of events).
2. Asymmetrical, in which the noncore verb functions as a semantic variation of the core verb and no iconic order can be found.
3. Ambient, a hybrid of (1) and (2).

Note that the relation between the serializing predicates may be relevant from a formal perspective because verb forms that specialize as adverbial subordination can be treated as converbs in the typological literature (cf. Haspelmath, 1995). In such cases, usually we refer to verbs that cannot occur as main verbs on their own. This is not always the case of the verbs in the previous examples because they often retain full or partial functional value (cf. Ansaldo, 1999). Bisang (1995) suggested treating these cases as serial units, that is, as verb serialization in a narrow sense, with the influence of grammaticalization and lexicalization, as opposed to verb serialization in a broader sense. Serial units would also include structures such as 'resultatives,' as in Mandarin (Mandarin Chinese):

(11) ta^{1} chi^{1} bao^{3} le
3.SING eat full ASP
'she/he ate his/her fill'

In these structures, typical of Sinitic languages and common to mainland Southeast Asia, the noncore verb expresses the **result** of an event (see example (3)).

Diachronic Aspects

A particularly interesting aspect of serialization is its link to grammaticalization, that is, to the process whereby lexical items fossilize within a construction and assume grammatical function. Within the verbal domain, an SVC provides an ideal ground for the noncore verbs to fossilize into a given function and eventually deverbalize, although they do not necessarily undergo a full semantic loss (cf. Matisoff, 1969; Bisang, 1991, 1996; Ansaldo, 1999). The items that grammaticalize are typically found within a heterogeneous pool of semantic concepts and lead to the emergence of a number of constructions, illustrated next with examples mostly from Sinitic and creole varieties (cf. Bruyn, 1996, on creolization and grammaticalization).

Aspect

- Completive. The grammaticalization of 'to finish' as the completive marker in Saramaccan (Bakker *et al.*, 1995: 257).

  (12) a nján di físi káá
  he eat the fish already
  'he already ate the fish'

  Here *káá* is etymologically derived from a verb (borrowed from Portuguese) meaning 'to finish'; from what used to be a SVC, it has grammaticalized into a completive construction.
- Nonpunctual (durative). The grammaticalization of 'to stand' as the durative or habitual marker in Fa d'Ambu (Bakker *et al.,* 1995: 251).

  (13) ineni xa tabaya
  they HAB work
  'I work/am working'

  Here *xa* is derived from a verb originally expressing location.
- Experiential, The grammaticalization of 'to pass/cross' to the experiential marker in Mandarin.

  (14) wo^{3} qu^{4} guo
  1.SING go EXP
  'I've been there (at least once)'

  In Sinitic languages, the marker guo/gwo can also function as a lexical item meaning 'to pass.' Furthermore, it also grammaticalizes into a surpass marker (cf. Ansaldo, 1999) in Cantonese and other Southern Sinitic varieties.

  (15) ngo^{5} faai^{3} gwo^{3} lei^{5}
  1.SING fast SUR 2.SING
  'I am faster than you'

Case

- Patient. The grammaticalization of 'to take/grab' to the patient marker in Mandarin.

  (16) ba^{3} nei^{4} ben^{3} shu^{1} gei$^{3>2}$ wo^{3}
  OBJ DET.NUM CL book give 1.SING
  'give me that book'

  Ba^{3}, originally 'to grasp,' has grammaticalized to a patient marker.
- Beneficiary. The grammaticalization of 'to give' as the beneficiary marker in Fa d'Ambu (Post, 1995: 201).

  (17) Malía ma dyana ba da pe-déli
  Maria take banana go give father
  'Maria brought a banana to her father'

- Instrumental or Comitative. The grammaticalization of 'to use' (but also 'to take') to the instrument (sometimes associative) marker in Papiamentu (Sebba, 1987: 171):

(18) e-l a tuma e kuchu korta e krani
3SG-PAST take the knife cut the meat
'he cut the meat with the knife'

- Locative. The grammaticalization of 'to be at' as the location marker in Mandarin.

(19) ta^1 zai^4 jia^1 kan^4 shu^1
3.SG at home look book
's/he reads at home'

Directional Markers

The grammaticalization of 'to come' in Mandarin.

(20) zuo^4 xia^4 lai^2 ba
sit down come PRT
'sit down!'

Grammaticalization

These grammaticalization paths are attested crosslinguistically in a vast number of languages. The semantic pool of concepts from which the lexical items are chosen is rather limited, and the crosslinguistic similarity can be so striking and cut through such different genetic groups that it suggests areal convergence, for example, in the case of Southeast Asia (cf. Matisoff, 1969; Bisang, 1996; Ansaldo, 1999), and/or universal grammaticalization tendencies.

Typological Challenges

It will be obvious from the examples that defining SVCs is a rather complex enterprise. A basic problem is establishing what exactly is being compared; as Sebba (1987: 1) pointed out, in many languages it is difficult to provide a satisfying definition of verb in the first place. Moreover, not all types of verbs in a series should be treated as SVCs; a distinction should be made between serialization and patterns of subordination, coordination, and so on. An additional problem is the plethora of terms that have been created in language-specific contexts to capture aspects of serialization, such as resultative verbs, directional verbs, locative copulas, verboids, and coverbs. Finally, certain criteria for deciding on the serial status of a construction should be treated carefully, for example, the 'tonal unit' criterion, which suggests that a SVC is realized as a single intonational unit (Lehmann, 1988); as noted in Crowley (2002), the risk of faulty subjective judgments should be weighed carefully in instances of this kind.

A conservative and cautious set of diagnostics for recognizing a 'true' SVC is put forward in Sebba (1987: 39); it requires, in short, that (1) both verbs be lexical (i.e., capable of independent function), (2) both verbs be assigned the same TMA categories, and (3) there be no clause boundary or conjunction between the verbs. Even this narrow set of properties encounters difficulties when tested on any specific language, and it may be the case that satisfying a definition of SVCs can be achieved only at the language-specific level. As suggested in Durie (1997), a phenomenon such as serialization is likely to evade syntactic theorizing and may be better understood as being based on culture-specific constructions of eventhood and fusion in complex argument structure (cf. Alsina *et al.*, 1997).

See also: Areal Linguistics; Case; Compound; Converbs; Coordination; Grammaticalization; Inflection and Derivation; Semantics of Spatial Expressions; Subordination.

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Setälä, E. N. (1864–1935)

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In 1896, Setälä proposed three great dictionary projects covering (a) Finnish dialects, (b) modern literary Finnish, and (c) old literary Finnish. These projects were in many respects problematic, not the least due to Setälä's mixing private and public means in the running of the projects. Furthermore, in a small country like Finland, three such big linguistic projects bound a considerable part of both human and personnel resources and left little to other linguistic activities.

In the last part of his life (i.e., after 1917), Setälä was very active in politics. He wrote the Finnish Declaration of Independence (1917) and was Minister of Education, Minister of Foreign Affairs, and Finnish ambassador to Copenhagen and Budapest.

See also: Finnish Lexicography; Neogrammarians; Uralic Languages.

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Sexist Language

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Sexist Language

Sexist language can be defined as one type of discriminatory language (use); it refers to linguistic expressions that exclude, trivialize, or insult (mainly) women. Linguistic manifestations of such practices are female invisibility (*mankind*), asymmetrical gender-marking (*lady philosopher*), and stereotyping (*doctors and their wives*). For a documentation of sexist language practices in 30 languages of diverse origin, structure, and typological affiliation, see Hellinger and Bußmann (2001–2003). A major issue in ongoing debates about sexist language is whether it is a manifestation of conservative usage indicating how women (and men) are portrayed in a particular culture, or whether it is harmful in itself, contributing toward the maintenance of gender stereotypes. While the first view takes language as a symptom, the latter sees language as one cause of social inequality (Miller and Swift, 1995; Cameron, 1992: 102). Alternatives for discriminatory wording have been proposed by feminist linguistic activists as well as language planning agencies (Pauwels, 1998; 2003). Such initiatives for deliberate change have been interpreted as a challenge to the political and social status quo (Romaine, 1999: 293; Cameron, 1995).

Categories of Gender

In a theoretical framework capable of analyzing gender in a language, at least four categories of gender must be differentiated: grammatical, lexical, referential, and social.

Grammatical Gender

Grammatical gender is an inherent morphosyntactic property of the noun which controls agreement between the noun's gender class and some so-called satellite element which may be an article, adjective, pronoun, or verbal form. Satellite elements must be gender-variable, i.e., they must allow for a choice between at least two values, e.g., feminine and masculine (as in French and Italian), or feminine, masculine, and neuter (as in Russian and German). With few exceptions, each noun typically belongs to one gender class only, which is defined by an interaction

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of formal and semantic assignment rules (Corbett, 1991).

Languages with grammatical gender have developed language-specific rules of agreement. Thus, in the highly inflected Slavic languages, overt gender-marking is much more visible than in most Germanic languages, simply because more satellite elements have gender-variable forms. In the following example from Russian, agreement is established between the feminine noun *studentka* 'female student' and various verbal, pronominal, and adjectival forms (Doleschal and Schmid, 2001):

(1) *Prišl-a* *moj-a* *byvš-aja* *studentka,*
came-FEM my-FEM former-FEM student.FEM
kotor-aja *očen'* *umn-aja.* *On-a*
who-FEM very intelligent-FEM she-FEM
mogl-a *by* *pomoč'.*
might-FEM COND help
'A former student of mine, who is very intelligent, has come. She might help.'

Of course, this kind of formal agreement does not exist in grammatically genderless languages such as Turkish, Chinese, or English.

Lexical Gender

Lexical gender constitutes part of the semantics of animate/personal nouns. For example, in English, personal nouns such as *daughter* and *son* are lexically specified as [female] and [male], respectively. Such nouns may be classified as 'gender-specific,' in contrast to nouns such as *citizen* or *patient*, which are considered to be 'gender-neutral' or 'gender-indefinite.' Of course, languages have lexical gender nouns irrespective of whether they also possess grammatical gender. Lexical gender is an important parameter in the structure of kinship terminologies, address terms, and a number of basic, i.e., frequently used personal nouns such as *woman*, *man*, *girl*, and *boy*. The examples in (2) are from Spanish and Danish which have two grammatical gender classes each, i.e., feminine and masculine in Spanish, and common and neuter in Danish:

(2)	Female-specific	Male-specific	Gender-indefinite
Spanish	*hija* (f)* 'daughter'	*hijo* (m) 'son'	*individuo* (m) 'individual'
	hermana (f) 'sister'	*hermano* (m) 'brother'	*persona* (f) 'person'
	profesora (f) 'female professor'	*profesor* (m) 'male professor'	'professor'
Danish	*datter* (c) 'daughter'	*søn* (c) 'son'	*barn* (n) 'child'
	søster (c) 'sister'	*bror* (c) 'brother'	*menneske* (n) 'person'
	lærerinde (c) 'female teacher'	*lærer* (c) 'male teacher'	*lærer* (c) 'teacher'

* (f) = feminine, (m) = masculine, (n) = neuter, (c) = common gender.

Lexical gender may or may not be marked on the noun itself. In English, most human nouns are not formally marked for lexical gender, with exceptions such as *widow<u>er</u>* or *princ<u>ess</u>*, which show overt lexical gender-marking by suffixation. By contrast, lexical gender is marked extensively in German, because most personal feminines are derived from corresponding masculines by means of the fully productive suffix *-in*, as in *Bischöf<u>in</u>* 'female bishop,' *Soldat<u>in</u>* 'female soldier' or *Punker<u>in</u>* 'female punk.' Obviously, in languages such as German, Russian, or French, the relation between grammatical gender and lexical gender is anything but arbitrary.

In (grammatically) genderless languages, lexical gender determines the choice of gender-variable pronominal forms, e.g., anaphoric *she* or *he* in English. In the case of gender-neutral nouns, pronominal choice may be determined by the referent's gender, but also by tradition, prescription, or speaker attitude.

Referential Gender

Referential gender relates linguistic expressions to the non-linguistic world and identifies a referent as female, male, or gender-indefinite. For example, a personal noun such as Germ. *Tennisstar* is grammatically masculine, lexically gender-neutral, and may be used to refer to males or females. In (3b), referential gender (female) overrides grammatical gender:

(3) a. *der* *Tennisstar* ... *er*
DET.MASC Tennisstar.MASC PRO.MASC
→ grammatical agreement
b. *der* *Tennisstar* ... *sie*
DET.MASC Tennisstar.MASC PRO.FEM
→ referential agreement

Like *Person* (f) 'person' and *Individuum* (n) 'individual,' the German noun *Star* (m) 'star' belongs to the group of nouns (sometimes called *epicenes*), which are in principle gender-neutral. However, compounds such as *Fußballstar* 'footballstar' and *Pornostar* 'pornstar' are likely to elicit a male or female imagery, respectively. This suggests that the context will affect the noun's connotative semantic specification in various ways, and that many personal nouns have an underlying or covert gender bias.

Social Gender

Personal nouns have social or covert gender if the choice of associated words can neither be explained by grammatical nor by lexical or referential gender. Social/covert gender has to do with stereotypical assumptions about what are appropriate social roles for women and men, including expectations about who will be a typical member of the class of, say, *surgeon* or *schoolteacher*. The term *social*

gender emphasizes the social causes of a noun's gender bias, while *covert gender* refers to its structural invisibility.

An illustration of social gender in English is the fact that many high-status occupational terms such as *surgeon* or *scientist* will frequently be pronominalized by *he* in contexts where referential gender is either not known or irrelevant. By contrast, low-status occupational titles such as *schoolteacher* or *nurse* will often be followed by anaphoric *she* in neutral contexts. In cases of conflict between such practices and actual reference, explicit – and often asymmetrical – gender marking is an optional solution, as in English *woman scientist* or *male nurse*.

Asymmetrical Gender Marking

In principle, and irrespective of whether the language has grammatical gender, lexical or referential gender can be expressed symmetrically in any language, e.g., feminine/female terms can be derived from existing male/masculine terms (4a), and lexical gender nouns can be used in compounding (4b) to create morphologically symmetrical pairs:

(4)			
a.	*Derivation*		
	Masculine/ male	Feminine/ female	
Arabic	*katib*	*katib<u>a</u>*	'secretary'
Norwegian	*forfatter*	*forfatter<u>inne</u>*	'author'
Romanian	*pictor*	*pictori<u>ță</u>*	'painter'
b.	*Compounding*		
	Masculine/ male	Feminine/ female	
English	*congress<u>man</u>*	*congress<u>woman</u>*	
German	*Geschäfts<u>mann</u>*	*Geschäfts<u>frau</u>*	'business man/woman'
Norwegian	*politi<u>mann</u>* police.man	*politik<u>vinne</u>* police.woman	'police officer'

However, female linguistic visibility is often a marked and loaded concept (Baron, 1986), and there is considerable variation concerning the status and productivity of feminine/female word formation processes across languages. Thus, in contrast to German, few derived feminines exist in Welsh (which also has grammatical gender, but no productive feminine/female word formation patterns), and most occupational terms in Welsh are grammatically masculine and have no feminine counterparts (Awbery *et al.*, 2002).

Frequently, the creation of female-specific nouns will produce semantically asymmetrical pairs in which the female represents the lesser category, illustrating what Schulz (1975) has called *semantic derogation*. Notorious examples are English *governor/governess*, *major/majorette*, etc. (Kramarae and Treichler, 1985). Of course, such pairs also occur in languages with grammatical gender:

(5)			
	French	*couturier* (m) 'fashion designer'	*couturière* (f) 'seamstress, female tailor'
	Polish	*sekretarz* (m) '(party) secretary'	*sekretarka* (f) 'secretary (in an office)'
	Swedish	*tjänsteman* (c) service.man 'public servant'	*tjänstekvinna* (c) service.woman 'female servant'

Generally, feminine/female terms are not consistently used; they may be stylistically marked and in many languages carry negative connotations, which makes them unacceptable not only in neutral, but also in female-specific, contexts. Thus, in Russian or Polish, where masculinity is highly valued, feminine/female counterparts of terms denoting prestigious occupations are avoided. By contrast, masculine/male terms are either neutral or carry positive connotations. The implicit ambiguity of masculine/male terms (i.e., their interpretation as either generic or male-specific) explains the fact that combining a gender-neutral noun with a female-specific element is traditional practice, while combination with a male-specific element is the rare exception.

(6)		Gender-neutral term	Gender-specific term
	Icelandic	*skáld* (n) 'poet'	*skáldkona* (f) poet.woman 'female poet' **skáldmaður* (m) poet.man 'male poet'
	Japanese	*kisha* 'reporter'	*joseikisha* woman.reporter 'female reporter'
	Indonesian	*dokter* 'doctor'	*dokter perempuan* doctor woman 'female doctor'
	French	*écrivain* (m) 'writer'	*femme écrivain* (f) 'female writer'

Asymmetrical gender-marking may fulfill various communicative functions: it may emphasize visibility of the 'unexpected' referential gender, define the marked gender as the deviation from the norm, or serve contrastive purposes.

The use of gendered pronouns to refer to inanimate objects may also be discussed in terms of asymmetrical gender-marking, e.g., in English, a boat, motorcycle, airplane, or even a big wave in surfing may be referred to as 'she.' This practice establishes a possessive, i.e., asymmetrical relation between the (stereotypically male) possessor and the 'possessed' object. In the past, hurricanes had female names, were referred to by female pronouns, and associated with stereotypically (negative) female imagery. Today, hurricanes with female names still have female anaphoric pronouns, while hurricanes with male names tend to be followed

by neuter pronouns. This practice reflects on the "larger metaphor in which nature is a woman" (Romaine, 1999: 74). Nature as well as women can be dangerous (or 'uncivilized') and need to be controlled by men. Metaphorical relations have also been established between women and topography.

Again, in English, towns, cities, and countries may be referred to by 'she,' while in a gender language such as German, this relation may be grammaticalized in that the respective nouns belong to the feminine gender class: e.g., *(die) Natur* 'nature', *(die) Wildnis* 'wilderness', *(die) Stadt* 'town' (see also Corbett, 1991: 94). Such practices may be symbolic of the concept of woman as 'the other' which takes an extreme form in discourses of colonialism and war, when physical conquest of a territory may be linked with sexual conquest or rape (Romaine, 1999: 77).

Androcentric 'Generics'

Traditional prescription requires the use of so-called generic masculines (in the case of languages with grammatical gender) or male generics (in the case of grammatically genderless languages) to refer to both men and women. For example, masculine nouns such as Russ. *vrač* (m) 'physician', Fr. *ministre* (m) 'minister', or Arab. *muħami* (m) 'lawyer' may be used to refer to males, groups of people whose gender is unknown or unimportant in the context, or even female referents, illustrating the generic function of masculine nouns.

In languages without grammatical gender, the use of male-biased nouns (*chairman, mankind*) and pronouns (generic *he*) illustrates androcentric practices in cases of gender-indefinite reference. Thus, in English, where gender-variable third person singular pronouns remain of an original grammatical gender system, generic *he* is the prescriptive choice in gender-indefinite contexts such as *an American drinks his coffee black*. While this practice adds to the invisibility of female pronouns, it does not necessarily account for the dramatic imbalance between pronominal references to women and men in texts, where men may be referred to considerably more often than women, e.g., a word count of *he/she* in the Brown corpus of American English yielded a total of 9,543 occurrences of (male-specific) *he* compared with 2,859 of *she* (Romaine, 2001: 161).

Pronominalization is a powerful strategy of communicating gender (Romaine, 2001; Holmes, 2001). Anaphoric gender-variable pronouns may indicate lexical gender, they may function as a means to either specify or abstract from (intended) referential gender, and they may emphasize traditional or reformed practices, as when a speaker makes the choice between a false generic and a gender-inclusive alternative (e.g., Engl. generic *he* vs. singular *they*; Danish *han* 'he' vs. *han/hun* 'he/she', see Gomard and Kunøe, 2003).

In languages that lack even gender-variable pronouns, male generics may be found in the nouns themselves. In Finnish, for example, occupational terms ending in *-mies* 'man' are used to refer to both men and women (e.g., *lakimies* lit. law-man; 'lawyer') and are officially claimed to be gender-neutral.

In languages with grammatical gender, androcentric generics typically occur in coordination, e.g., when a noun phrase conjoins a masculine and a feminine noun, the choice of a related satellite form, e.g., a predicative adjective, may create a conflict between the two competing genders. Examples from Romanian (8a) (Maurice, 2001) and Arabic (8b) (Hachimi, 2001) show that agreement occurs with one conjunct only, namely the masculine:

(8) a. *un* *vizitator* *şi* *o* *turistă*
a visitor.MASC and a tourist.FEM
mult *interesați*
very interested.MASC.PL
'a very interested (male) visitor and a very interested (female) tourist'

b. *Lab* *u* *bnat-u*
father.MASC.SG and daughter.FEM.PL-his
ʕyyan-in.
tired.MASC-PL
'The father and his daughters are tired.'

According to one interpretation the choice of masculine agreement forms in such cases is "evidently of the syntactic type" (Corbett, 1991: 279), claiming that what determines agreement is independent of the meaning of the nouns involved. In an alternative view, the example illustrates the prescriptive practice that if at least one conjunct is headed by a masculine noun, masculine agreement forms are used.

There are occasional exceptions to this prescription. For example, in some gender languages, the neuter gender may be employed to resolve the gender conflict in coordination, as in this example from Icelandic (Grönberg, 2002), where a grammatically neuter form is chosen:

(9) *Óli* *og* *Elsa* *eru* *ung.*
Óli.MASC and Elsa.FEM are young.NEUT.PL
'Óli and Elsa are young.'

Underlying syntactic conventions as in (8) may be a gender hierarchy that defines the masculine as the "most worthy gender" (Baron, 1986: 97). As a result, masculine/male (pro)nouns are highly visible in gender languages and carry considerably more weight and emphasis than feminine/female expressions.

The Psycholinguistic Effects of Androcentric Generics

There is extensive empirical evidence documenting the psycholinguistic effects of androcentric generics; e.g., for English (MacKay and Fulkerson, 1979; Gastil, 1990; Switzer, 1990; Hamilton *et al.,* 1992; Prentice, 1994; Madson and Hessling, 2001) and German (Irmen and Köhncke, 1996; Braun *et al.,* 1998; Rothermund, 1998; Stahlberg and Sczesny, 2001; Rothmund and Scheele, 2004), while there are few experimental studies on other languages, e.g., Braun (2000) on Turkish, and Engelberg (2002) on Finnish.

In experimental studies on English, the focus is necessarily on pronouns (generic *he* and alternatives), while studies on German investigate masculine nouns and alternative formulations. Dependent variables include verbal as well as nonverbal responses: give referent a name, create a story around referent, complete sentences, decide whether an expression can refer to females/males, draw figures, estimate percentage of females in a given group of referents, give judgment on a defendant's criminal offence.

For English, the overwhelming evidence is that generic *he* invokes significantly more male than female imagery, i.e., the concept female is not generally available in the processing of androcentric expressions. The use of generic *he* may in fact have dramatic practical consequences: Hamilton *et al.* (1992) found that the use of generic *he* in instructions to a jury led jury members to interpret a defendant's criminal offense significantly more often as manslaughter or murder, while the same text using gender-inclusive wording resulted in a higher percentage of interpretation as self-defense.

The German studies tested generic masculine nouns as compared to reformed alternatives, esp. nominal splitting (e.g., *Bürger und Bürgerinnen*; *Bürger/innen* 'citizens'), neutral expressions (e.g., *die wissenschaftlich Tätigen* 'scientists), and the so-called *internal I* (as in *BürgerInnen* 'citizens,' an abbreviated form of *Bürger und Bürgerinnen*). The use of masculine generics was found to produce overwhelmingly more male-specific imagery. By contrast, long splitting appears to achieve a roughly symmetrical mental representation of female and male referents. Interestingly, the variant 'internal I' tended to evoke an overly female mental imagery. It seems that this variant has the effect of a politically correct symbol signaling a pro-feminist attitude (Stahlberg and Sczesny, 2001: 138). Finally, the practice of adding a footnote to a text explaining that the masculine generics used in the text are intended to include women turned out to be totally unsuitable as a reform measure. Informants rather felt relieved of the burden to speculate about potential female participation in a text (Rothmund and Scheele, 2004: 8). In languages with grammatical gender, the only way of significantly increasing the availability of the concept female in a text seems to be the use of multiple female-specific expressions.

Language Politics: Guidelines for Non-sexist Language

From the 1970s, feminist linguistic activists in the United States and Western Europe began to document sexist language practices and develop proposals for non-sexist alternatives (Frank and Treichler, 1989; Pauwels, 2003). Often, such recommendations took the form of guidelines that were adopted by publishing houses, professional organizations, academic institutions, the print media, etc. (for English see: NCTE, 1985; UNESCO, 1989; APA, 1994; APhilA, 2003; for German: Hellinger and Bierbach, 1993; Kargl *et al.,* 1997; Häberlin *et al.,* 1998). Frequently, explicit reference was made to the respective national legislation on Sex Discrimination, Equal Opportunity, and Human Rights Acts, maintaining that the equal treatment of women and men must also be realized on the level of communication.

Reform measures in international organizations tend to be moderate. While in 1989 UNESCO produced the *Guidelines on non-sexist language* (UNESCO, 1989), in 1994, the UNESCO Executive Board once again discussed the question of the elimination of sexist language from all UNESCO Basic Texts (which must all be produced in UNESCO's six working languages, i.e., English, French, Spanish, Russian, Arabic, and Chinese). The General Conference adopted a resolution stating its conviction that gender-neutral wording "may alter attitudes and expectations that now constitute a barrier to achieving equality of opportunity for women and men" (UNESCO, 1994: 1). However, the practical consequences of the reform measures were minimal, because non-discriminatory replacements for male/masculine generics in UNESCO's six working languages were largely modeled on English. Thus, only a small number of androcentric personal nouns were replaced by gender-inclusive alternatives, e.g., Engl. *(chair)man, mankind* → *(chair)person, humanity*; Fr. *homme* → *la personne humaine, l'individu*; Span. *hombres* → *los seres humanos, las personas*. Neutralization is the favored reform strategy, in spite of the fundamental structural differences between UNESCO languages concerning grammatical gender, the productivity of feminine/female word formation processes, and the number of gender-variable pronouns. It is claimed that the continued linguistic invisibility of women is no problem in the

languages with grammatical gender (French, Spanish, Russian, and Arabic) because "the generic use of the masculine form for post titles for both sexes is considered acceptable" (UNESCO, 1994: 4). In fact, a decision was made to the effect that all UNESCO documents must simply carry a footnote explaining that any person-denoting term is to be interpreted as referring equally to women and men. This ignores the empirical evidence that has proved the generic potential of personal masculines to be a myth.

In Europe, in 1990, the Committee of Ministers of the Council of Europe adopted the UNESCO recommendations on the use of non-sexist language, and in 2003, the European Parliament recalled that "the sexism reflected in language is an obstacle to equality between men and women" (EU, 2003: 8). The use of non-discriminatory language in all EU documents was mandatory, "since equality is one of the democratic values of the European Union" (EU, 2003: 30). So far, this rhetoric has had minimal practical consequences.

As an instrument of language planning, guidelines for non-sexist usage symbolize the dissonance between traditional prescription and reformed usage. Gender-inclusive formulations question the *status quo* which supports the use of masculine/male generics to refer to both sexes. Public responses frequently reveal openly hostile reactions maintaining that reformed usage violates grammar, is cumbersome and unaesthetic, and interferes with freedom of speech (Cameron, 1995: 132; Blaubergs, 1980; Hellinger, 2000). By contrast, proponents of reformed usage adhere to various degrees of linguistic relativity, suggesting that a change in behavior, i.e., using more instances of non-sexist language, will enlarge the mental space of female imagery and weaken the male-as-norm ideology, thus contributing to social change. The ongoing debate on (non)sexist language must be interpreted as part of the ongoing political discourse over the equal participation of women in all public domains.

The choice of non-sexist alternatives presents relatively minor problems in languages such as English, Turkish, Finnish, Chinese, or Japanese, which possess few gender-variable forms, and will therefore tend toward neutralization, while more female visibility is expected in gender languages such as French or Russian. However, the structural properties of a language are no sufficient basis for making the choice between feminization, neutralization, or a mixed strategy. Perhaps of equal importance in feminist language planning will be non-linguistic parameters pertaining to the specific historical, sociocultural, and ideological context of the language. Issues such as the following must be addressed:

- Does the country have a tradition of language planning? For example, in Greece, language planners are preoccupied with the implementation of the new, no longer diglossic situation and the standardization of the demotic variety of Greek, rather than with the unequal linguistic treatment of women and men (Pavlidou, 2003: 189).
- Does the country have influential key agents (individuals and organizations) who are accepted as innovators or supporters of change?
- Is there a tradition of purist attitudes which would encourage rejection of any change?
- Does the country have a major feminist movement, and if so, has the feminist critique of language been recognized as an arena of political discourse?

Another factor that may have an impact on feminist language planning is the dominance of English. Recommendations to avoid female visibility in Italian have been linked to an adoption of Anglo-American models (Marcato and Thüne, 2002: 210). Female visibility is also rejected for Welsh, where the creation of new personal feminines has been interpreted by the Welsh minority as linguistic imperialism from the dominant English language (Awbery *et al.,* 2002: 328). Similarly, it is not unlikely that the impact of German in Eastern Europe will be an issue in the emerging feminist critique of language in the Czech Republic, Poland, and Russia (Koniuszaniec and Błaszkowska, 2003: 279).

Changes in language practices do not necessarily reflect the intentions of feminist activists or official guidelines. In German, the disappearance of *Fräulein* 'Miss' as a term of address for female adults has in fact created a symmetrical pair of address terms (*Herr/Frau*), but in English, the creation of *Ms* as a title that would transport no information on the referent's marital status, has not replaced *Miss*. And although a significant increase in the usage of *Ms* among Australian women has been reported between 1987 and 1996, users do not necessarily share the term's understanding. In addition to the promoted meaning, *Ms* transports a number of unintended meanings, from 'separated/divorced,' 'living in a *de facto* relationship,' to 'feminist,' or 'lesbian' (Pauwels, 2001: 142).

Generally, however, at least for English and a few Western languages, a decrease of male/masculine generics in favor of non-sexist alternatives can be observed (Cooper, 1984; Ehrlich and King, 1994; Pauwels, 1998). A study on public discourse among American economics leaders found a sharp decline in sexist usage since the 1970s (Rubin *et al.,* 1994). Also, many young people produce more gender-neutral or inclusive language, but this may not

necessarily be connected with a pro-feminist attitude. However, non-sexist language reform will only be successful if changed practices are a reflection of the user's awareness of the discriminatory nature of traditional prescription, and of a personal commitment to change (Pauwels, 2003). Linguistic choices remain symbolic of different beliefs and ideological positions.

See also: Critical Applied Linguistics; Cultural Evolution of Language; Deixis and Anaphora: Pragmatic Approaches; Expression Meaning versus Utterance/Speaker Meaning; Gender and Political Discourse; Gender, Sexuality and Language; Heterosexism and/in Language; Language Ideology; Normativity; Norms and Correctness; Politics and Language: Overview; Register: Dictionaries.

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Sextus Empiricus (fl. 200 A.D.)

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Given the scarcity of (direct and indirect) sources on Sextus Empiricus's life and work, it is possible only to situate him roughly in the second half of the second and the first quarter of the third century A.D. Sextus may have been of North African origin; he seems to have known well Athens, Cos, and also Rome, where he taught for some time.

A physician and adherent of the Greek empirical school, Sextus Empiricus is especially known for his philosophical work (transmitted in manuscripts of the Middle Ages). A follower of Pyrrho (360–270 B.C.), Sextus became one of the most eloquent and radical defenders of philosophical scepticism. His views are expounded in three books entitled 'Outlines of Pyrrhonism' (*Purrhoneiai hypotuposeis*), which constitute an introduction to scepticism and offer a critical analysis of the foundations of logic, ethics, and natural philosophy, and in his 'Against the Professors' (*Pros mathematikous*), a collection of 11 treatises (not written in the order as they were definitively organized by Sextus: VII-XI were written before I-VI), in which he raises doubts about the principles, the specific place and importance, the usefulness, and the teaching (and teachers), of the following disciplines: grammar, rhetoric, logic, physics, ethics, geometry, arithmetic, astronomy, and music.

The highly entertaining first treatise against the grammarians (*Pros grammatikous*), while recognizing the important (social and cognitive) role of language, is a vehement attack on Stoic philosophy of language (which is also critically dealt with in the treatise against the logicians) and on Alexandrian grammar. Sextus adopts a common-sense and anti-mentalist view of language, a pragmatic view of linguistic correctness (successful communication being the yardstick of correctness), and an anomalist (antianalogist) view of the nature of language (use and description of language should follow natural acquisition and custom, and not an *a priori* conception of language regularity); Sextus excels in ridiculing the grammarians' theoretical pretensions and blaming them for their ignorance about words used in poetry and their meanings. Pyrrhonian scepticism is combined here with elements of Epicurean philosophy (stressing the primacy of naturalness). Sextus Empiricus's criticism of 'technical' grammaticography follows the structure of the ancient grammatical manuals (*technai*

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See also: Dionysius Thrax and Hellenistic Language Scholarship.

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Seychelles: Language Situation

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The Republic of Seychelles comprises about 100 islands off the East African coast in the Indian Ocean. Originally settled by French settlers and slaves, the islands were under British rule from 1794 until independence in 1976. French and English are the colonial languages of the islands, and are widely used, but the main language is Seychellois Creole (Seselwa Creole French), which is spoken by more than 95% of the population. While Seychellois Creole had little prestige under colonial rule, it became the first official language (with English second and French third official language) after independence, and has increasingly been developed through standardization and the development of an orthography and teaching materials. Seychellois Creole is used in primary education as a medium of instruction. All three official languages are found in the media and all are official languages of parliament.

See also: Pidgins and Creoles: Overview.

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Petr Sgall, born in 1926 in Cheske Budejovice (Southern Bohemia), graduated from Charles University in Prague with a degree in General and Indo–European Linguistics. Appointed Teaching Assistant in 1958, he began studies toward a Ph.D. in mathematical linguistics, which he obtained in 1966. From then on, he devoted himself to the development of formal and computational linguistics, in relation to the development of automated translation. At the end of the 1950s, he set up a team at Charles University, located first at the Faculty of Literature, then at the Faculty of Mathematics and Physics. In 1967, he was appointed Research Director in Theoretical Linguistics and Natural Languages Automated Treatment within the Faculty of Mathematics and Physics. In 1990, he became Professor of General Linguistics within the Faculty of Literature and Human Sciences. Petr Sgall has also been Director of the Laboratory of Algebra Linguistics from 1968 on, and, since 1990, Director of the Institute of Theoretical and Automated Linguistics.

Petr Sgall became famous as a theoretical linguist, specializing in natural languages automated treatment, from the viewpoint of linguistics as well as that of logic or mathematics. His work covers the fields of morphology, but also syntax and the relations

grammatikai), viz.: definition of grammar, its division into parts, and discussion of the separate parts. His main target was probably the now lost treatise 'On Grammar' by Asclepiades of Myrlea (who had taught in Rome in the first century A.D.), which Sextus seems to have known through an Epicurean demolition of its doctrine.

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The Republic of Seychelles comprises about 100 islands off the East African coast in the Indian Ocean. Originally settled by French settlers and slaves, the islands were under British rule from 1794 until independence in 1976. French and English are the colonial languages of the islands, and are widely used, but the main language is Seychellois Creole (Seselwa Creole French), which is spoken by more than 95% of the population. While Seychellois Creole had little prestige under colonial rule, it became the first official language (with English second and French third official language) after independence, and has increasingly been developed through standardization and the development of an orthography and teaching materials. Seychellois Creole is used in primary education as a medium of instruction. All three official languages are found in the media and all are official languages of parliament.

See also: Pidgins and Creoles: Overview.

Sgall Petr (b. 1926)

S Archaimbault, University of Paris, Paris, France

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Petr Sgall, born in 1926 in Cheske Budejovice (Southern Bohemia), graduated from Charles University in Prague with a degree in General and Indo–European Linguistics. Appointed Teaching Assistant in 1958, he began studies toward a Ph.D. in mathematical linguistics, which he obtained in 1966. From then on, he devoted himself to the development of formal and computational linguistics, in relation to the development of automated translation. At the end of the 1950s, he set up a team at Charles University, located first at the Faculty of Literature, then at the Faculty of Mathematics and Physics. In 1967, he was appointed Research Director in Theoretical Linguistics and Natural Languages Automated Treatment within the Faculty of Mathematics and Physics. In 1990, he became Professor of General Linguistics within the Faculty of Literature and Human Sciences. Petr Sgall has also been Director of the Laboratory of Algebra Linguistics from 1968 on, and, since 1990, Director of the Institute of Theoretical and Automated Linguistics.

Petr Sgall became famous as a theoretical linguist, specializing in natural languages automated treatment, from the viewpoint of linguistics as well as that of logic or mathematics. His work covers the fields of morphology, but also syntax and the relations

grammatikai), viz.: definition of grammar, its division into parts, and discussion of the separate parts. His main target was probably the now lost treatise 'On Grammar' by Asclepiades of Myrlea (who had taught in Rome in the first century A.D.), which Sextus seems to have known through an Epicurean demolition of its doctrine.

See also: Dionysius Thrax and Hellenistic Language Scholarship.

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Seychelles: Language Situation

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between semantics and pragmatics. His ultimate achievement is his definition and development of the 'Generative Functional Description' (GFD), strongly anchored within the Prague tradition, of which Petr Sgall is a specialist and a prominent contemporary representative. However, his research interests are much wider, since they encompass language typology, sociolinguistics, and, above all, Bohemistics, with a special interest in common contemporary Czech.

From 1961 on, when the first automated translation experiment was carried out in Prague, Petr Sgall worked on the definition of the consistent theoretical framework of GFD, seeking contiguities with research projects in that field all over the world (developments of the Chomskyan model, unification formalisms, LFG, meaning-text model, etc.).

The GFD contributed to linguistic knowledge

1. by describing the verb as the sentence nucleus, and also describing its relation to agents and adverbials, and then to its internal and external participants, whether they can combine freely with any verb or obey constraints relating to the verbal frame of certain lexical units;
2. by the research on the present division, which is treated in many articles. The conclusions are that word order is not free whatsoever, even in Slavonic languages, and that the definition of the separation topic, or focus, in relation to the scope of negation, helps rule out the homonymic ambiguity on the surface level;
3. by finally establishing stable criteria for sentence synonymy.

In the field of applications, the work of the team coordinated by Petr Sgall focused on the systems of automated information search, in free texts (MOZAIKA) or in textual databases (ASIMUT), also on the automated understanding of texts (TIBAQ: Text and Inference-Based Answering of Questions), and, of course, on automated translation, with the APA system of English/Czech translation and the Czech-to-Russian RUSLAN system. The team also took part in the MATRACE project, started by IBM.

Although he officially retired on October 1, 1992, Petr Sgall, as Emeritus Professor, is still very active within the Theoretical and Mathematical Institute and the Institute of Formal and Applied Linguistics, now run by Eva Hajiová with whom he co-edits the series *Studies in Functional and Structural Linguistics* published by John Benjamins in Amsterdam.

See also: Chomsky, Noam (b. 1928); Computational Linguistics: History; Czech.

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Shanghainese *See:* Chinese.

Shared Knowledge

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What is it to know a proposition? A person A knows that proposition p if and only if (iff):

A believes that p;
A is justified in believing that p;
p is true.

So there are three clauses that must be satisfied for a state of knowledge to be correctly ascribed to A. To explicate each of the three clauses would be a Herculean task, for the first clause would require a theory of propositional attitudes, the second clause would require a theory on what counts as appropriate justification for a belief, and the third clause requires a theory of truth. We accept, without making a real effort to justify it, the idea that for A to believe a proposition p is to be in a mental state that is likely to influence A's conduct; we also accept that a person has appropriate justification for a belief if he or she has canonical evidence guiding him or her toward ascertaining the truth; we accept that a proposition

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p is true if the world conforms to some mental state p or some fact p or if p is a proposition accepted by convention or stipulation within a certain society.

Having defined knowledge in this way, we are able to refute the skeptics and in particular to counter the skeptics' attacks on shared knowledge. From the fact that knowledge can be revised, we should not deduce that there is no knowledge or no shared knowledge.

What is shared knowledge? An intuitive definition could be one like the following: two persons, A and B, share knowledge of a proposition p iff they both know that p and if they both know that the other knows that p and that B knows that A knows that B knows that p and A knows that B knows that A knows that p. In other words, shared knowledge is not just knowledge on A's part that the other person, B, knows a proposition p that A also knows, but also knowledge that the other person knows that A knows that p. The definition does not necessarily generate infinite recursion; a regress of the second or third order may suffice for the purpose of practical understanding. In any case, even infinite recursion can be finitely represented, albeit not at the conscious level (a simple mathematical example is the case of recursion in 3.3 periodical).

How can shared knowledge be obtained? Shared knowledge can be constructed through shared perceptual stimuli or through publicly vocalized utterances. Suppose you and I stand in front of the Statue of Liberty in New York City: both of us see the imposing statue, and there is little doubt that it does not escape our attention; we are confronted with something that we cannot but see. Shared knowledge can also be constructed linguistically, by referring to an authority, or in general, to human linguistic productions.

Of course, shared knowledge is a testable assumption; one assumes it to be present unless there are overwhelming reasons for doubting that things are as they are assumed to be. It is possible, albeit unlikely, that you are momentarily blinded, that I do not realize that fact, and that I erroneously assume that you know that the Statue of Liberty is there in front of you; however, this assumption can easily be tested by analyzing your reply (or absence of reply) to my casual remark, as when I say "That statue is impressive"; in the absence of an appropriate reply, I realize that the presumption of shared knowledge was not justified. But this is not the way we standardly proceed. We just assume that salient visual (and other) stimuli are part of our shared knowledge, and we do not put this assumption to the test.

See also: Propositional Attitudes; Propositions.

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Shastan *See:* Hokan Languages.

Shaw, George Bernard (1856–1950)

M Net, Bucharest, Romania

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George Bernard Shaw is chiefly known as a world-famous playwright who won the Nobel prize for literature in 1925. He was also a critic of music, art, and drama, as well as a defender of Fabian socialism. His plays, articles, prefaces, and public pronouncements programmatically challenge the accepted ideas of what he used to call "middle class respectability" (*Pygmalion*, Act I).

Shaw is included in the present encyclopedia owing to his interest in language use in various contexts, social strata, and milieus, and especially for his concern with elocution, phonetics, and spelling. Shaw

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even made explicit provisions in his will for funding the development of a new, phonetically based English alphabet.

Shaw was born in Dublin on July 26, 1856, into a family of Irish Protestants. After graduating from a business college, he worked for a brief span in his native city. In 1876, he settled in London. By the end of his life, Shaw lived mostly at Ayot, St Lawrence, Hertfortshire.

During his first nine years in London, Shaw earned no money. While attending some lectures at University College, London, he met F. J. Farnivall from the New Shakespeare and Philological Societies, who commissioned him to write the index and glossary of the Hunterian Club edition of Thomas Lodge's works.

At the beginning of his literary career, Shaw wrote five novels but did not manage to sell any. His first play, *Widowers' House* (performed in 1892) passed almost unnoticed. Nevertheless, during his lifetime, Shaw wrote more than 50 other plays, most of them successful. He got into the habit of publishing them preceded by his own prefaces.

Shaw's interest in phonetics was first aroused by a nephew of Alexander Melville Bell, the inventor of 'visible speech.' In 1979, Shaw also got to know Henry Sweet, with whom he corresponded on topics related to phonetics. Shaw was to be inspired by both Sweet and Daniel Jones when he created the famous character of Henry Higgins.

In his *Three Plays for Puritans* (1901), Shaw made a few innovating (therefore rather shocking) remarks on the Cockney dialect. Then Shaw also launched a newspaper campaign for what he considered a more rational orthography.

Similarly, in Act II of *Major Barbara* (1901), he introduced a passage of dialect transliterated in the international phonetic alphabet; then he translated it back into standard English (for the use of the uninitiated readers) and eventually resumed his habit of giving a phonetic approximation of the characters' pronunciation by using the symbols of the conventional alphabet. This kind of respelling has been always challenging (to say the least) to both actors and readers.

Pygmalion (Shaw's best-known play) was characterized by the author himself as "a play about phonetics" (*apud* Ducat, 1859: 59). It was first published in German in 1913. Later in that same year, its original version is generally considered one of the greatest hits yet registered on the English stage (though nowadays it is better known to audiences all over the world via F. Löwe's musical *My Fair Lady* and via the even more renowned musical film of the same title, featuring Audrey Hepburn and Rex Harrison). Shaw's play raises interesting questions concerning the complex relationship between the use of language, on the one hand, and education, manners, fashion, social strata, and cultural values, on the other hand. The relation between gender and language (quite fashionable at the time) is also considered.

Pygmalion is also connected to one of Shaw's best-known dictums on speech. In 1942, he added the following sentence to his preface to this play: "it is impossible for an Englishman to open his mouth without making some other Englishman despise him." Presumably, this bitter pronouncement originated from the eight years Shaw spent as chairman of the Advisory Committee on Spoken English to the British Broadcasting Company. The acknowledged aim of the Committee was to advise announcers on the pronunciation required by the BBC; nevertheless, it contributed a great deal to establishing a standard 'BBC English' (received pronunciation), which became the accepted norm with most speakers of English.

It had been Shaw's lifetime desire to establish a new English alphabet. In 1944, he advertised his wish to set up a trust that would empower the executors of his will "to finance any promising scheme for providing a new phonetic alphabet capable of expressing the fourty-two sounds listed by the late Henry Sweet" (*apud* Pearson, 1981: 434). In case the project failed, the money was meant to be spent on other enterprises of public interest. Shaw's campaign was unsuccessful, and the Simplified Spelling Society (the only authority entitled to put it into practice) openly opposed the project.

After Shaw's death, two of his official legatees (the Royal Academy of Dramatic Art and the British Museum) contested the will by which Shaw had left most of his huge fortune for research on this new alphabet. Due to lack of funds, the only concrete result of Shaw's project concerning the simplification of English spelling is an edition of his play *Androcles and the Lion* transliterated in a hybrid alphabet based on Kingsley Read's system of 48 graphemes.

Shaw's ideas about pronunciation and spelling seem to have no future.

See also: Jones, Daniel (1881–1967); Phonetic Classification; Phonetics: Overview; Phonology: Overview; Spelling Reform; Spelling Reform Proposals: English; Sweet, Henry (1845–1912).

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Shcherba, Lev Vladimirovich (1880–1944)

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Graduating in 1903 from St Petersburg University, Lev Vladimirovich Shcherba was a pupil of J. Baudouin de Courtenay. He spent 1906–1909 in western Europe, in Germany, France, and Italy. In Leipzig, he attended the lectures of E. Sievers; and in Paris, he worked in the phonetic laboratory of J. P. Rousselot. He studied Italian dialects in Northern Italy, and Sorbian, the language of a Slavic minority, in Germany. In 1909, he resumed his activity at St Petersburg University, where he was appointed the head of the laboratory of instrumental phonetics, which for a long time was the main center of phonetic studies in Russia. He published his first substantial work in phonetics, considering Russian vowels (Shcherba, 1912), and a description of the Sorbian subdialect that he studied in Germany (Shcherba, 1915). In 1916, he became a professor at St Petersburg/Petrograd (later Leningrad) University and remained in this position till 1941. In 1923, he was elected a corresponding member of the Academy of Sciences, and he became a full member of the Academy in 1943. In 1941, after Leningrad was besieged during World War II, he was transferred to Moscow, where he spent his last years.

Developing the ideas of J. Baudouin de Courtenay on 'psychophonetics,' Shcherba took a substantial step in phonology, pointing to the distinctive function as a main function of the phoneme. However, phoneme was for him not an abstract construct, but an acoustic reality. His phonological theory was in synch touch with his phonetic work (he had written, beside his publications on Russian phonetics, a fundamental work on French phonetics, cf. Shcherba, 1937). Shcherba's ideas made an impact on other Russian scholars, including R. Jakobson and N. S. Trubetzkoy, who continued their activity after emigrating from Russia. He founded the Leningrad/Petersburg phonological school, being till now (parallel to the Moscow version of phonology), one of two main Russian phonological schools.

In the field of general linguistics, Shcherba reviewd Saussure's distinction between *langage*, *langue*, and *parole*, proposing his own triple division of the object of linguistics: linguistic activity, linguistic system, and linguistic material. The investigation of a living language should be, according to Shcherba, a sort of experimental research. He combined theoretical work with practical tasks; he was a practical lexicographer (cf. his Russian–French dictionary: Shcherba and Matusevich, 1936) and at the same time wrote *A tentative general theory of lexicography* (1940); he also wrote on his applied work on orthography, transcription, etc., with *Theory of Russian writing system* (posthumous, cf. Shcherba, 1957: 144–179).

See also: Jakobson, Roman (1896–1982); Rousselot, Pierre Jean, Abbé (1846–1924); Saussure, Ferdinand (-Mongin) de (1857–1913); Sievers, Eduard (1850–1932); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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See also: Jakobson, Roman (1896–1982); Rousselot, Pierre Jean, Abbé (1846–1924); Saussure, Ferdinand (-Mongin) de (1857–1913); Sievers, Eduard (1850–1932); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Sheridan, Thomas (1719–1788)

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Thomas Sheridan (1719–1788), actor, stage manager, and elocutionist, was a prominent writer on education and elocution in the second half of the 18th century. Born in Capel Street, Dublin, he was the third son of the eminent schoolmaster Thomas Sheridan (1687–1738) and the godson of Jonathan Swift. Swift's strictures on the importance of the spoken language strongly influenced the young Sheridan's choice of career; an exchange between the two while Sheridan was studying at Trinity College, Dublin, revealed Swift's belief that education was 'nothing' unless it also included instruction in how to speak. This conversation "particularly sunk deep into my Mind," Sheridan noted in his *Life of the Rev. Dr. Jonathan Swift* (1784). While he was also a successful actor and theater manager, both in Dublin and in London (see Sheldon, 1967), much of Sheridan's later work involved the attempt to integrate elocution and education, beginning with his *British education: or, the source of the disorders of Great Britain* (1756), and continuing in a range of subsequent publications including his *Lectures on the art of reading* (1761), his *Course of lectures on elocution* (1762), and his *Elements of English* (1786), a work in which he attempted to translate his educational theories into a format that could be applied in the very first stages of instruction. Language was, Sheridan stressed, "my chief object in life, and the centre to which all my views tended"; his chosen role was as a reformer of both language and language attitudes. To this end, he gave numerous well-attended lecture tours throughout the nation, as well as being a sought-after private tutor in the arts of elocution. James Boswell was taught by him in his own attempt to shed his Scottish accent, as was Lord Alexander Wedderburn and Lord Loughborough (later the Lord Chancellor). Sheridan was given honorary degrees by both Cambridge and Oxford, as well as the freedom of the city of Edinburgh. As the title page of Sheridan's *General dictionary of the English language* (1780) indicates, the attempt to fix pronunciation was one of his major aims—the dictionary was, he stated, intended "to establish a Plain and Permanent Standard of Pronunciation." Like a number of other writers in the late 18th century, Sheridan was perplexed by the geographical and social variabilities of English pronunciation and desired instead to secure a uniformity of speech throughout the nation. While Samuel Johnson derided his attempt to integrate the teaching of a standard of pronunciation in the dictionary (his own *Dictionary* of 1755 had merely marked the main position of stress), Sheridan's influence was significant and can be detected in many of the educational writings and textbooks produced over the 19th century.

See also: English Lexicography; Johnson, Samuel (1709–1784); Walker, John (1732–1807).

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Izuru Shinmura, the most senior founder of the Linguistic Society of Japan and the earliest and most prominent lexicographer of Japanese, was born on October 4, 1876, in Yamaguchi, Japan. At the age of 8 he began to study Sinology which had a lasting influence on his entire scholarly life. He studied linguistics at the Department of Philology of the Imperial University of Tokyo (1896–1899) under Kazutoshi Ueda. In 1907, as a Japanese government grantee, he was sent to Europe for two years to study linguistics; he returned to the Imperial University of Kyoto as Professor of Linguistics (1909–1936) and Professor Emeritus thereafter. He was awarded a Doctor of Literature by recommendation in 1910, a year before he became director of the University Library (1911). He was the first president of several academic societies, most notably the Linguistic Society of Japan (founded 1938), the Dialect Society of Japan (founded 1941), and the East Asian Academic Society (founded 1942). Among the numerous honors conferred upon him are Member of the Imperial Academy (1928), First Order of the Sacred Treasure (1936), Cultural Medal (1956), commendation of distinguished Culture Service (1956), and Honorary Citizen of Kyoto (1956). Shinmura died in 1967 at the age of 91.

Shinmura recalled November 10, 1894 as a decisive day in his professional life. He was inspired by the lecture given that day by Kazutoshi Ueda entitled 'Hakuseki Arai as a linguist.' Arai (1657–1725) was a Confucian scholar, a politician, and, most importantly, the author of *Toga* (1719), the pioneering masterpiece of an etymological dictionary of Japanese. This lecture, given from the Western linguistic point of view, led Shinmura to historical linguistics and to study French, Greek, Latin, and languages of Asia, including those of India and China and Ainu.

Throughout his work, which resulted in a series of dictionaries of Japanese, Shinmura's abiding interest and method were descriptive rather than prescriptive, and historical, comparative, and etymological; he laid the foundation for Japanese linguistics, adopting the German linguistic methodology of the time. *Kojien* ('A wide garden of words') is his monumental masterpiece, a widely sold encyclopedic dictionary of the Japanese language, which has evolved, since its first edition (1955), into the 5th edition (1998); this latest edition is about 3000 pages, containing approximately 230 000 lemmata and 2800 figures and illustrations. Shinmura's other research includes works on the history of Christian culture in Japan, the history of Eastern languages, and the etymology of East Asian languages and has also resulted in a number of masterpieces. His scholarship contributed significantly to the development of Japanese linguistics and cultural life.

The Shinmura Izuru Memorial Foundation was founded in Kyoto in 1981. The Shinmura Izuru Prize has been awarded annually since 1982 to outstanding research achievements on the Japanese language.

See also: Japan: History of Linguistics; Japan: Language Situation; Japanese Lexicography; Ueda, Kazutoshi (1867–1937).

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Shintō

I Reader

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Shintō, the indigenous religion of Japan centered on the relationship between the Japanese people and the native deities, *kami*, is closely associated, both at national and local community levels, with issues of Japanese identity and with social and cultural belonging. With no fixed doctrines, its focus is primarily expressed in ritual actions that are concerned with the celebration and promulgation of life, and with issues of spiritual purity and ritual performances that uphold and maintain the relationship between the human world and the world of the *kami*. Although its influence on the Japanese language has never been as pronounced as that of the imported religion Buddhism (see *Buddhism, Japanese*), it has nonetheless played a role in the development of philological studies in Japan as well as producing important texts and specialist vocabulary.

Shintō: Meaning and Derivation

The word '*Shintō*' itself comes from two Sino–Japanese ideograms in their *on* (Japanese approximations of the original Chinese) readings. The first, *shin* (Chinese *shen*), also has the Japanese reading *kami*, the word used to refer to Shintō deities or powers, and the second *tō* (Chinese *tao* or *dao*), whose *kun* or Japanese reading is *michi*, means 'way' or 'path.' Together they signify the *kami no michi*, or *Shintō*, the 'way of the *kami*,' a word developed to identify the rather amorphous and undifferentiated native Japanese religious tradition centered on its native *kami* from the new religious entities and traditions, notably Buddhism, that were introduced to Japan from the Asian mainland from the sixth century AD onwards. Shintō as a named and identifiable entity thus evolved as a result of this cultural interaction with the outside. Although thereby identified as separate from the continental traditions and as specific to the Japanese experience, Shintō has generally existed in tandem with Buddhism in a mutually interpenetrating process. This interpenetration has not, however, prevented each from retaining its separate identity and form, including specialized linguistic forms.

Textual Traditions, Forms of Prayer, and Linguistic Specialities

The introduction of Buddhism and the Chinese writing system provided the means by which a Shintō textual tradition and prayer forms specific to Shintō could be established and recorded. Because the myths and legends associated with Shintō were written at the instigation of the Imperial Court, they tended to legitimate the rule of the Imperial household as well as posit a special relationship of descent between the Japanese and their *kami*. The major text, the *Kojiki* or 'Record of Ancient Affairs,' and the *Nihon Shoki* or *Nihongi* ('Chronicles of Japan'), were written in the early eighth century in a Classical Japanese style strongly influenced by Chinese (indeed the *Nihongi* also contains sections from Chinese and Korean classical works) and describe the creation of Japan by the *kami*, the prominence of Amamterasu the Sun Goddess, and the descent of the Imperial lineage from her.

The adopted writing system provided the vehicle through which to record the *norito*, the sacred incantations and prayers used in Shintō rituals. According to the *Kojiki*, the first *norito* date from the mythical period of Japanese history described in the *Kojiki*, although in reality the earliest recorded extant examples only date to the early tenth century. *Norito* developed their own specialized style and linguistic structure, making use of the textual form of ideograms but adopting it into a style specific to Shintō ritual and terminology. In particular they used Chinese ideograms not simply in terms of meaning but also as phonetic devices: various grammatical nuances, such as verb endings and particles were denoted by ideograms inserted in the text in reduced size, to indicate that they were to be read for their sound rather than meaning. While the use of ideograms indicates the extent to which the indigenous religion was dependent on the linguistic forms provided by the adopted writing system to express itself, the specialized structure of *norito* equally reflects a dynamic within Shintō to create its own linguistic forms that could continue to differentiate it from Buddhism.

Shintō has also developed its own ritual vocabulary that serves to distinguish it both from Buddhism and from everyday affairs. Much of this revolves around taboos, either of words associated with death (a taboo subject in Shintō) or of words associated with Buddhism. In ritual terms, also, specialized Shintō terms are used for everyday words so as to

differentiate them from ordinary life and transpose them to the purified realms of the *kami*. Many foodstuffs, for example, which are important offerings in Shintō rites, have Shintō as well as ordinary names: rice wine, for example, is normally known as *sake* but in Shintō contexts is called *miki*.

Linguistic Studies and the Purity of Language

Its close associations with Japanese identity have often placed Shintō in the forefront of moves to assert the indigenous culture over and against any external influences. Shintō itself was largely an amorphous tradition until attempts were made by various scholars and nationalists from the eighteenth century onwards to codify it as part of a wider design to distinguish Japanese from Chinese and continental influences in Japanese culture, and to attempt to assert the superiority of the former over the latter. Prominent in this was Motoori Norinaga (1730–1801) whose studies of early Japanese texts and pre-Buddhist Japanese as part of his endeavors to assert the culturally unique content of Shintō were – despite their chauvinistic themes – a major starting point for modern philological understandings of the Japanese language.

In the following centuries until 1945, Shintō was a focal rallying point for successive governments in their attempts to assert the purity of Japanese cultural identity over and against the outside world, and this led to further codifications of Shintō and the formation of state Shintō (*kokka Shintō*). While the attempts made by the government, especially in the 1930s and 1940s, to 'purify' Japanese by excising foreign loanwords have no direct and overt connection to Shintō in religious terms, the close association between the Shintō of that period and the state, and Shintō's association with and legitimation of concepts of Japanese national identity, did mean that Shintō had some influence in this issue.

Since 1945 and the legal separation of religion and state, Shintō has reverted more clearly to its basic connections with local communities and with rites, festivals, and celebrations. Nonetheless, its continuing and underlying associations with issues of purity and identity mean that its potential as a rallying point and medium for the expression of nationalistic reactions to the increasing numbers of loan-words in Japanese, and hence its subliminal influence and image as a defender of the purity of the Japanese language, cannot entirely be dismissed. This is perhaps somewhat ironic considering that its linguistic influences were never as far-reaching as those of Buddhism and that its very emergence as a named entity was very much dependent on the tools provided by Japan's cultural borrowings from Chinese culture.

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Shklovsky, Viktor Borisovich (1893–1984)

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Viktor Borisovich Shklovskij (Shklovsky) was born in 1893. Both a writer and a critic, he came to be known in 1913 thanks to his conference on the 'Role of Futurism in Language History.' In the article 'The resurrection of words' (1914), he advocated the need for a poetical reflection based on the general laws of language evolution. With this article, Shklovskij started a polemical debate in absentia with A. Potebnja, who drew his dynamic conception of language from Humboldt. The word, along with its content (a logical, lexical meaning), also has an internal form (a concrete image) that motivates its sound. For Potebnja, the image stands for the creative energy of language, but it progressively erodes as the internal form fades away. The erosion process underlies the passage from poetry to prose. Shklovskij started from this observation to posit the need for a renewal of language and to ground the futurists' attempts. In passing, he also criticized Potebnja for not paying attention to the external form. Moreover, he stated the necessity of positing the existence of a 'prosaic language' and a 'poetic language,' which obey different laws. Later on, he elaborated on such criticisms, and more precisely on the conceptual ambiguity linked to images, in his 1917 article 'Art as a process.'

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The dialogue between the poetic vanguard and the general linguistic reflection was triggered by Jan Baudoin de Courtenay, who was interested in the 'transmental language' (*zaum*) of the futurists and who accepted having public discussions with Shklovskij about futurism. Baudoin made him meet several of his young disciples, such as Lev Jakubinskij and Lev Polivanov.

Shklovskij was one of the bold young men who, in 1916, launched the review *Pétrograd*, published and funded by Osip Brik, and who created the Society for the Study of the Poetical Language at the beginning of 1917 in Pétrograd. The Society thus integrated the Moscow Linguistic Circle created by Roman Jakobson. Personalities such as J. Tynjanov, B. Ejkhenbaum, and so forth soon joined this new circle, which was to be known under the acronym OPOIAZ (**O**bshchestvo izuchenija **PO**eticheskago **JAZ**yka) and remain associated with the Russian formalist school.

Viktor Shklovskij played a major role in the identification among writers – notably L. Tolstoï – of a process of 'defamiliarization,' 'distanciation,' or 'estrangement,' *ostranenie*. It means that for a thing to acquire an artistic value it must be cut off from its usual associations. Shklovskij studied the unfolding of this process in *War and peace*: He tried to show that Tolstoï does not name things by their habitual names but pretends that he sees them for the first time. He regarded that as a rehabilitation of sensation at the expense of knowledge.

He also aimed at defining the laws of the construction of the narrative subject. His examples are drawn from a very large and very varied corpus of Russian or foreign prose, poetry, folklore, theatre, which all rely on a general law, governed by 'gradation' and 'delay.'

During his exile in Berlin in 1922 to 1923, he published 'The horse ride,' a miscellany of articles previously published in Russia and headed by a text that may be the key to his entire work. The horse or horse rider rides sideways, because it is a convention of art, but also because he is not free – there is no direct way for him.

Even if Viktor Shklovskij is mainly known for his activity in the 1920s, he remained a versatile and prolific writer and critic, whose passion was literature as well as cinema, for which he wrote many a scenario. He was an eccentric and indefinable man, and he also appeared once in a while as a literary character, in works such as *The white guard* by M. Bulgakov (1924) and *Skandalist* by V. Kaverin (1928).

Several writers, such as Boris Ejkhenbaum and Mikhail Zoshchenko, have praised his writing, thanking him for shortening the sentences and 'airing' his articles. As for readers, they remember the vivid impression of a friendly dialogue, or even asides, with the author: addresses, direct or subliminal messages, private jokes, apologies for the complexity of the composition of a book, and so forth. As an example, we will quote the last sentences of his miscellany of selected works published in 1983, one year before he died:

> Hail to you, reader. Read this book at home, read it in your garden, if your head is not spinning when you look at the trees in the sun spots.

See also: Humboldt, Wilhelm von (1767–1835); Jakobson, Roman (1896–1982); Potebnja, Alexander (1835–1891).

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Shona

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Shona is a member of the Bantu language family, S10 in the Guthrie classification, having roughly 7 000 000 speakers in Botswana, Malawi, Mozambique, and Zambia, with the majority of speakers in Zimbabwe. Shona is the dominant African language of Zimbabwe; as one of the major languages of southern Africa, the speaker population is comparable to that of Zulu and Xhosa. Shona is also a literary language, with a considerable literature having developed since the 1950s. The main dialects of Shona are Karanga, Korekore, Manyika, and Zezuru; Zezuru forms the basis of the

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Shklovskij was one of the bold young men who, in 1916, launched the review *Pétrograd*, published and funded by Osip Brik, and who created the Society for the Study of the Poetical Language at the beginning of 1917 in Pétrograd. The Society thus integrated the Moscow Linguistic Circle created by Roman Jakobson. Personalities such as J. Tynjanov, B. Ejkhenbaum, and so forth soon joined this new circle, which was to be known under the acronym OPOIAZ (**O**bshchestvo izuchenija **PO**eticheskago **JAZ**yka) and remain associated with the Russian formalist school.

Viktor Shklovskij played a major role in the identification among writers – notably L. Tolstoï – of a process of 'defamiliarization,' 'distanciation,' or 'estrangement,' *ostranenie*. It means that for a thing to acquire an artistic value it must be cut off from its usual associations. Shklovskij studied the unfolding of this process in *War and peace*: He tried to show that Tolstoï does not name things by their habitual names but pretends that he sees them for the first time. He regarded that as a rehabilitation of sensation at the expense of knowledge.

He also aimed at defining the laws of the construction of the narrative subject. His examples are drawn from a very large and very varied corpus of Russian or foreign prose, poetry, folklore, theatre, which all rely on a general law, governed by 'gradation' and 'delay.'

During his exile in Berlin in 1922 to 1923, he published 'The horse ride,' a miscellany of articles previously published in Russia and headed by a text that may be the key to his entire work. The horse or horse rider rides sideways, because it is a convention of art, but also because he is not free – there is no direct way for him.

Even if Viktor Shklovskij is mainly known for his activity in the 1920s, he remained a versatile and prolific writer and critic, whose passion was literature as well as cinema, for which he wrote many a scenario. He was an eccentric and indefinable man, and he also appeared once in a while as a literary character, in works such as *The white guard* by M. Bulgakov (1924) and *Skandalist* by V. Kaverin (1928).

Several writers, such as Boris Ejkhenbaum and Mikhail Zoshchenko, have praised his writing, thanking him for shortening the sentences and 'airing' his articles. As for readers, they remember the vivid impression of a friendly dialogue, or even asides, with the author: addresses, direct or subliminal messages, private jokes, apologies for the complexity of the composition of a book, and so forth. As an example, we will quote the last sentences of his miscellany of selected works published in 1983, one year before he died:

> Hail to you, reader. Read this book at home, read it in your garden, if your head is not spinning when you look at the trees in the sun spots.

See also: Humboldt, Wilhelm von (1767–1835); Jakobson, Roman (1896–1982); Potebnja, Alexander (1835–1891).

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Shona

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Shona is a member of the Bantu language family, S10 in the Guthrie classification, having roughly 7 000 000 speakers in Botswana, Malawi, Mozambique, and Zambia, with the majority of speakers in Zimbabwe. Shona is the dominant African language of Zimbabwe; as one of the major languages of southern Africa, the speaker population is comparable to that of Zulu and Xhosa. Shona is also a literary language, with a considerable literature having developed since the 1950s. The main dialects of Shona are Karanga, Korekore, Manyika, and Zezuru; Zezuru forms the basis of the

standard language. Ndau and Kalanga are closely related and might be considered to be highly divergent dialects or closely related but separate languages: in this article, they will not be treated as Shona dialects. The main linguistic reference works for Shona are the reference grammars of Fortune (1955, 1980) an extensive dictionary indicating tone and dialectal properties (Hannan, 1984), and *Duramazwi Guru reChiShona*, which is a major Shona monolingual dictionary.

With 5 vowels and minimally 32 uncontroversial consonants, Shona has somewhat more than the usual complement of consonants for Bantu languages. The consonantal system includes a contrast between the labiodental fricative [v], spelled *vh*, and a bilabial semi-approximant [β], spelled *v*, as well as a labiodental flap [v̌] found in some ideophones and reported in a few nouns, as well as a contrast [b, d] vs. [ɓ, ɗ]. The most well-known phonetic oddity of Shona is a set of 'whistling fricatives,' a set of retracted alveolar fricatives and affricates articulated between [s] and [š] (with which they contrast), produced with a degree of lip protrusion but not full rounding: these sounds, for which the International Phonetic Alphabet (IPA) lacks symbols, are spelled *sv*, *zv*, *tsv*, *dzv*. In some dialects, especially Manyika, the labial constriction is so extreme that a stop closure is formed. In addition, the language has a series of prenasalized consonants of nasal plus consonant sequences [mb], etc., and morphophonemic consonant plus *w* sequences pronounced with various degrees of velarization according to dialect, so that /tw/ may be phonetically [txw] or [tkw] with unrounding after labials, and /pw/ may be [px] or [pk].

Shona is a tone language, but extensive tonal data is available only for the Karanga and Zezuru dialects (see Fivaz (1970) and Fortune (1980) for tone-marked paradigms of Zezuru, Myers (1987) for analysis, and Odden (1981) for Karanga). Differences in the tonal morphophonemics of different Shona dialects are significant, and are comparable to tonal differences across Makonde dialects or the so-called Luhya languages. One characteristic of Shona tonology is a panoply of dissimilative H-tone lowering and rightward spreading processes, which are subject to a variety of morphosyntactic conditions. Tone-melodic inflectional patterns also play a role in marking tense aspect and clause type, providing the sole distinction between forms such as (Karanga) *akarima* 'then he plowed', *ákáríma* 'he plowed (yesterday)', and *ákárimá* 'he having plowed'.

Shona exhibits typical structural properties of Bantu languages. It has a rich system of 19 noun classes marked on nouns by prefixes that encode singular/plural distinctions as well as semantic properties (such as diminutives and augmentatives), with all of the proto-Bantu noun classes represented, except **gʊ-* – class 19 **pi-* is represented in the Karanga dialect by the diminutive *svi-*. Noun stems can thus appear in a number of classes, the choice of class marking semantic differences, e.g., *mu-kómaná* 'boy', *gómaná* 'huge boy', *chi-kómaná* 'short boy', *ka-kómaná* 'tiny sickly boy', *ru-kómaná* 'thin boy', and *svi-kómaná* 'little boy'. The Bantu class 5 prefix **li-* is itself phonologically null in Shona, and voicing of a stem-initial stop replaces an overt prefix in [ɓáŋgá] 'knife' ~ [ma-páŋgá] 'knives', [ɗéndé] 'gourd' ~ [ma-téndé] 'gourds', [guɗo] 'baboon' ~ [ma-kuɗo] 'baboons', [ǰékó] 'sickle' ~ [ma-čékó] 'sickles': observe that the voiced correspondents of *p*, *t* are the implosives [ɓ, ɗ], not [b, d].

Verb morphology is particularly rich. Stems are composed of a root plus a number of fully and partially productive derivational suffixes marking causative (*-is-*), applicative (*-ir-*), reciprocal (*-an-*), passive (*-w-*), intensive (*-is-*, *-isis-*), reversive (*-Vnur-*), and stative (*-ik-*), as well as reduplication for frequent actions. Pronominal markers include encoding of objects, subjects, and relative clause heads for each of the noun classes. Tense-aspect marking indicates past, present, future, persistive, potential, subjunctive, imperative, hortative, and numerous other distinctions, as well as corresponding negative and subordinate clause forms. The word-formation potential of Shona reaches astronomical levels due to a series of *Aktionsart* prefixes such as *-do-* 'willingly', *-ndo-* 'go', *-zo-* 'hypothetical, remote', *-garo-* 'always', *-nyatso-* 'do well', and *-raro-* 'at night'; thus *ndichá-dó-rima* 'I will gladly plow', *ndichá-zó-rima* 'I will plow in the remote future', and *ndichá-nyatsó-rima* 'I will plow well'. These prefixes can be combined and permuted, so that *ndichá-zó-ndó-ráro-rima* 'I will perhaps go plow at night' can also be rendered as *ndichá-ndó-zó-ráro-rima*.

Shona syntax is typical for a Bantu language. Noun phrases are fairly strictly head initial, with noun class agreement governed by the head noun (*vána va-kúrú va-virí vá-no* [children big two these] 'these two big children'), though some determiners may be put before the head noun (*iri bángá* [this knife]). Derivational verbal extensions such as the causative and applicative allow a clause to have multiple bare objects, e.g., *ákáríma munda* 'he plowed the field', *ákárímisa Fárái munda* 'he made Farai plow the field', and *ákárímira munhu munda* 'he plowed the field for the person'. Locative noun phrases can ostensibly function as subjects via inversion (*mu-mbá mw-ákárára vaná* [in-house loc-slept children] the children slept in the house') or passivization (*mu-mbá mw-ákafámb-w-á naFárai* [in-house

loc-walk-passive by-Farai] 'in the house was walked by Farai').

See also: Bantu Languages; Botswana: Language Situation; Malawi: Language Situation; Mozambique: Language Situation; Southern Bantu Languages; Zambia: Language Situation; Zimbabwe: Language Situation.

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Shoshoneon Languages *See:* Uto-Aztecan Languages.

Shuswap *See:* Salishan Languages.

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Shuy earned a B.A. in English from Wheaton College and went on to study at Kent State University. He received his Ph.D. in English and Linguistics from Case Western Reserve University in 1962.

Shuy has conducted research in the area of sociolinguistics. His early interests were in social dialects and the relation of linguistic diversity to language learning. He is a social advocate and has worked to apply linguistics to social concerns. Shuy was the President of the American Association for Applied Linguistics (AAAL) from 1978 to 1980. He was honored in 1999 by AAAL with a Distinguished Scholarship and Service Award. A festschrift called *Language in action: New studies of language in society* was written in his honor in 2000.

He has been at the forefront of the emerging field of forensic linguistics, the application of linguistics to criminal law. Shuy has consulted on over 500 court cases and has testified as an expert witness in over 50 criminal and civil trials, including the high profile case involving auto executive John DeLorean. He testified before the U.S. Senate and the U.S. House of Representatives in the impeachment trials of Senator Harrison A. Williams and others involved in the FBI Abscam operation. Shuy also served as a consultant on the Unibomber case and received an award from the FBI for his service. He has written several influential books in the area of forensic linguistics, including *Language crimes* (1993) and *The language of confession, interrogation, and deception* (1998). He has also written about language use in corporate advertising in the book *Linguistic battles in trademark disputes* (2002). He is currently the President of Roger W. Shuy, Inc. and continues to do linguistic research and consulting from his office in Montana.

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Takesi Sibata was born in Nagoya, Japan on July 14, 1918. He graduated from the University of Tokyo with an M.A. in 1942 and received his D.Litt. in 1969 from the same university. He was a professor at Tokyo University of Foreign Studies from 1964 to 1968 and then became professor at his alma mater in 1968, where he was chairman of the Department of Linguistics from 1969 to 1978 and remained there until his retirement in 1979. He received the title of Professor Emeritus of the University of Tokyo in 1987.

His major fields include Turkish, linguistic geography, sociolinguistics, onomastics, and Japanese lexicology. He worked for the National Institute for Japanese Language Research from 1949 to 1964. His major work there was the preparation of the massive *Nihon Gengo Chizu* (*Japanese Linguistic Atlas*), which was published in six volumes from 1966 to 1975. Parallel with this work, he carried out other intensive fieldwork on linguistic geography in Itoigwa area, Niigata Prefecture, with several collaborators. The unique feature of the survey was a microscopic survey of every inhabitant in the area. Through the analysis of the survey, he developed an original method of linguistic geography, the outline of which can be seen in Sibata (1969). The publication of the whole work was completed in the form of Sibata (1988–1995).

In the field of sociolinguistics, he put forward a new point of view from which to survey people's verbal behavior in every aspect of everyday life: when and how people speak, listen, write, read, and keep silent. This whole complex of activities is called in Japanese *gengo seikatsu*, which literally means 'verbal life'.

Sibata has also contributed greatly to the development of Japanese lexicology and lexicography. He produced three volumes on the semantic analysis of basic Japanese words with other colleagues. He is a co-editor of several Japanese dictionaries, and was especially responsible for the description of word accents and the meaning of loanwords. Since 1966, he has been a member of the Committee for Japanese for Broadcasting at Nihon Hoso Kyokai (Japanese Broadcasting Corporation) and a member of the government committee for Japanese language policy. He also served as a member of the Japan Academic Association from 1988 to 1994.

See also: Dialect Atlases; Japanese; Japanese Lexicography.

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Sibawayhi (8th Century A.D.)

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Sībawayh is ʔabu Bišr ʔibn ʕuΘmān ʔibn Qanbar Sībawayh. He is an 8th century linguist (140?–180 H/757–796 A.D.), who wrote the first grammar of Arabic. He is known simply as Sībawayh. He was born in Baydˤāʔ, in the province of Shiraz, in southwestern Persia. From Persia, his family migrated to Basrah, and Sībawayh studied first under Qurʔanic teachers, but due to some linguistic embarrassment, he ended up with ʕabdu ʕal-Raħmān ʔal-Khalīl ʔibn ʔaħmad ʔal-Farāhīdī (100–175 H/719–791 A.D.). In this new environment, he excelled in linguistic matters and would become the person both to set down the principles of Arabic grammar and to compose the first grammar of Arabic in a manner that has not been surpassed. His was the first full treatment of Arabic; it is both comprehensive and thorough. Sībawayh is to Arabic grammar what Panini (c. 400 B.C.) is to Sanskrit grammar – they are both of equal prestige in their respective cultures.

Sībawayh wrote only one book, called *ʔal-kitāb* 'The book'; it included, in the order of appearance, the general norms of grammatical analysis, syntax, and morphology, and it concluded with the phonetics of Arabic. Within its ~950 pages of text, the grammar is composed of 571 chapters. The subject matter of analysis is the Arabic used in the Qurʔān, the Arabic used by the pre-Islamic and Islamic poets, but rarely contemporaries, and the Arabic of speakers whose Arabic was considered acceptable, which often meant representative of the known tribes across the peninsula from Hijaz in the West to Tamiym and Basrah in the East. All were held in equal respect, and no datum was considered more correct than the other because it occurred in the Qurʔān, was spoken by a famous poet, or came from a prestigious tribe. Each piece of data was acceptable in form and content because it was in use by the Arabs, and it was patterned according to their usage.

'The book,' with all its rich linguistic analyses, is a treasure of linguistic lore. It summarizes the state of linguistic studies of Arabic at the time of Sībawayh. It culls from the sayings of the ancient grammarians what was known at the time, it quotes abundantly from his teachers and their teachers on the testimony of respected authorities, and even though it is a synchronic statement about the structure of the Arabic spoken at the time of Sībawayh, the account it provides of the previous generation(s) of linguists gives the book a historical dimension and depth. One can gauge the weight of one person versus another by the number of citations or references the author gives him or her. For example, Al-Khalīl is mentioned 608 times, Yuwnus 217 times, ʔibn ʔabi ʔisħāq 7 times, and ʔibn Marwān once. This goes also for the poets and tribes listed in the book. This in no way implies that Sībawayh was a mere chronicler of opinions; rather, he was an original linguistic thinker who systematized and formalized the complex Arabic grammar in an unprecedented manner. Compare his phonetics (cf. Table 1) with those of Al-Khalīl, his teacher.

The book begins by dividing the Arabic *kalimu* 'words' into three classes: *ʔism* 'name/noun', *fiʕl* 'action/verb', and *ħarf* 'particle'. The particles are invariable, but the *ʔism* 'name/noun' and *fiʕl* 'action/verb' have variable endings. To explain the variations in the forms of Arabic, called *ʔi ʕrāb* 'desinence',

Table 1 Sībawayh's phonetic table

Lower perimeters	*Muxrag 'exit'*	*Upper perimeters*
1. Throat: farthest section	ʔ, h, A ʔ/ء, ه, ا	1. Throat: farthest section
2. Throat: mid section	ʕ, ħ, ع, ح	2. Throat: mid section
3. Throat: closest to oral cavity	ɣ, x / غ, خ	3. Throat: closest to oral cavity
4. Tongue: farthest section	G / ق	4. Palate: farthest section
5. Tongue: lower than [G]	k/ك	5. Palate: pre-farthest section
6. Tongue: mid section	g,š,y/ج,ش,ي	6. Palate: mid section
7. Tongue: beginning of edge	dˤ /ض	7. Palate: molar section
8. Tongue: closest edge to tip	l/ل	8. Palate: above pre-molars, canines and incisors
9. Tongue: tip	n/ن	9. Palate: above the incisors
10. Tongue: slightly inner surface of the tongue	r/ ر	10. Palate: above the incisors
11. Tongue: tip	z,s,sˤ/ زسص	11. Palate: slightly above the incisors
12. Tongue: tip	tˤ ,d,t/ط, د, ت	12. Palate: base of incisors
13. Tongue: tip	ðˤ ,ð,θ / ظ, ذ, ث	13. Teeth: tip of incisors
14. Lip: inner surface of the lower lip	f/ف	14. Teeth: tip of the upper teeth
15. Lip: lower	b,m,w/ ب, م, و	15. Lip: upper
16. Nostrils: nasal cavity	light [n]/ ن	16. Nostrils: nasal cavity

Sībawayh proposed the concept of *ʕāmil / ʕawāmil* 'operator/s', that is, variation was motivated, not random. For example, *Hāða zaydun* 'this is Zayd'; *Raʔaytu zaydan* 'I saw Zayd'; *Marartu bi-zaydin* 'I passed by Zayd'. The variation [-un, -an, -in] in Zayd indicates its desinence due to syntactic factors/operations. It is estimated that more than 9000 sentences, 1000 lines of poetry, and 400 verses from the Qurʔān, and countless morphological structures are discussed and analyzed in the book. Sībawayh and Al-Khalīl are responsible for the multitude of technical terms and the intellectual structure of the discipline of Arabic linguistics.

See also: Al-Khalil (8th Century A.D.); Arabic; Panini; Phonetic Classification.

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Sidaama *See:* Highland East Cushitic Languages.

Sierra Leone: Language Situation

C N Fyle

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Sierra Leone has a population of some 4 million people over a land area of 71 740 square kilometers, giving a density of some 55 persons per square kilometer on the average. There are 18 languages, distributed as shown in **Table 1**. (The percentages in **Table 1** are derived from the 1963 census figures. It is unlikely the picture has changed significantly.)

Eight of the languages: Susu, Yalunka, Mandingo (Maninka, Kankan), Kono, Vai, Loko, Mende, and Kuranko, belong to the Mande language group, which stretches from Senegal to Sudan. Seven others are Niger–Congo languages within the African fragmentation belt, namely: Temne (Themne), Kisi, Krim, and Gola belonging to the Mel group, as well as Fula (Pulaar), Kru (Klao), and Limba. Sherbro and Galinas also may belong here but their affinities are unknown. Krio is an English-related creole language that has strong affinities with Aku, Fernandino (Bubu), and Weskos in the Gambia, Equatorial Guinea, and Cameroon respectively.

Krio is the lingua franca of Sierra Leone but this language has only recently received recognition as a language in its own right. Two other nonindigenous languages exist. Arabic is a language of religion but also of some business at grassroots level (*see* **Arabic**). English is the official and international language of government, business and administration, broadcasting and journalism, and education.

The population density figure, as well as a century-old tradition of social mobility, indicate that there is a fair amount of language contact, resulting in widespread bilingualism/multilingualism. The order is that

Table I Percentage of speakers by language

Language	*% of population using language*	*Language*	*% of population using language*
Mende	29.9	Mandingo	2.3
Temne	24.4	Kisi	2.2
Limba	8.1	Krio	1.9
Kono	4.6	Yalunka	0.7
Kuranko	3.6	Krim	0.4
Sherbro	3.3	Vai	0.2
Susu	3.0	Gola	0.2
Fula	3.0	Kru	0.2
Loko	2.9	Galinas	0.1

Sībawayh proposed the concept of *ʕāmil / ʕawāmil* 'operator/s', that is, variation was motivated, not random. For example, *Hāða zaydun* 'this is Zayd'; *Raʔaytu zaydan* 'I saw Zayd'; *Marartu bi-zaydin* 'I passed by Zayd'. The variation [-un, -an, -in] in Zayd indicates its desinence due to syntactic factors/operations. It is estimated that more than 9000 sentences, 1000 lines of poetry, and 400 verses from the Qurʔān, and countless morphological structures are discussed and analyzed in the book. Sībawayh and Al-Khalīl are responsible for the multitude of technical terms and the intellectual structure of the discipline of Arabic linguistics.

See also: Al-Khalil (8th Century A.D.); Arabic; Panini; Phonetic Classification.

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of English (for the educated), Krio, Mende or Temne (the largest languages), then the mother tongue if different. Incidentally, this pattern also represents the hierarchy of language status.

Even so, and perhaps because of a much older tradition of group consciousness, dialectal differences tend to be marked especially for the larger languages. Thus Mende has at least six distinct dialects (Ko, Sewama, Komboya, Kpa, Sherbro, and Wanjama Mende), Temne has three (Konkay, Yoni, and Gbembeli Temne), and Limba has four (Safroko, Wara-wara, Tonko, and Biriwa Limba). The comparatively large number of the languages themselves, as well as the tendency towards dialectal preservation, have been factors in hindering language development in Sierra Leone. Another factor has been the status of English as an elitist language.

Linguistic studies began early in the 20th century with Koelle's *Polyglotta Africana* (*see* **Koelle, Sigismund Wilhelm (1823–1902)**) but slowed drastically, so that over the years language development work has depended upon the isolated and unsystematic efforts of only some foreign scholars – the small linguistics department of the university is of very recent creation. Consequently most of the languages have not been properly described. Thus, for example, attempts since the mid to late 1970s to use Mende, Temne, Krio, and Limba as instructional media in primary education, through the government's Sierra Leone Indigenous Languages Project, have so far not succeeded, very largely because of a lack of the necessary linguistic backup materials – for example, a dictionary and a grammar of Limba – are not even available. However, recommended orthographies are available for nine of the languages, and these are used in literacy materials production and programs.

Illiteracy remains widespread, despite efforts since the early 1960s to eradicate it. The rates are 69.3% men, 88.7% women, and overall 79.3%. Little printed literature is available in the languages; and the Bunumbu Press, the sole rural press that used to publish literacy and postliteracy materials as well as a rural newspaper in eight languages, has been dormant, though there are plans for its revival during the 1990s. The government is begining to place much emphasis on universal literacy and the use of national languages in education.

The teaching of French (and French only), as a second language in addition to English, continues to be encouraged at the national university and in all secondary schools.

See also: Arabic; Koelle, Sigismund Wilhelm (1823–1902); Language Education Policies in Africa; Niger-Congo Languages.

Language Maps (Appendix 1): Map 38.

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Sievers, Eduard (1850–1932)

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Together with Hermann Paul and Wilhelm Braune, Eduard Sievers was one of the Germanists who, in connection with some Indo-Europeanists, can be seen as the central group of the so-called Neogrammarians. In comparison with Paul and Braune he certainly was the most outstanding character. Even though he was much more interested in the natural sciences, out of economic reasons he decided to study philologies and managed to get his final degree when he was only 19 years old. One year later he was already a professor in Jena. Due to his reputation and probably also due to the fact that he could speak English fluently (which was quite unusual at that time) he was offered a chair at Harvard University, in Cambridge, Massachusetts, in 1881. Sievers declined the offer due to personal reasons and taught in Tübingen and Halle for several years instead, until finally he was offered a chair at the University of Leipzig and so returned to the place where he started his career. There he died in 1932.

Looking at his numerous publications there is no doubt that his book *Grundzüge der Lautphysiologie* (1876) was of great influence on the development of

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Looking at his numerous publications there is no doubt that his book *Grundzüge der Lautphysiologie* (1876) was of great influence on the development of

the phonetical studies at that time. When the second edition – revised under the influence of the works of Henry Sweet and Johan Storm – was published only 5 years later, the title was changed accordingly: *Grundzüge der Phonetik*.

The importance of Sievers for this scientific branch was only recently emphasized once more by Christine Römer (2001). But whereas Peter Ganz (1978) and L.R. Sinder (1982) were convinced that Sievers already had an idea of the concept of phonemes, even though he did not introduce a special term for it, Römer believed Sievers to be a precursor of sociolinguistics rather than of phonology: "Sievers was interested in anthropological-social aspects, which from the point of view of de Saussure did not belong to the center of linguistics ..." (Römer, 2001: 123). This may be true for his later development, but at least in the first half of his scientific life his point of view was rather close to that which de Saussure pronounced later on. So in his first edition of the *Grundzüge* Sievers postulated that for the linguist "not the single sound is of value, but the soundsystems of the single language units, their relationship and their gradual shift" (Sievers, 1876: 2). Of course—differing from de Saussure—the historical aspect still functions as a kind of frame for the analysis of sound systems; nevertheless, this passage shows that Sievers was not interested in the analysis of isolated elements (see also Schneider, 2001: 180) and therefore was far from being the purely positivistic linguist, to which the Neogrammarians often were (and sometimes still are) presented.

This can be confirmed further by the fact that Sievers was well aware of the importance of the context. He therefore proposed to start with the sentence, when analyzing the sound system of a language, "because the sentence alone is the object which occurs in spoken language and can be observed directly" (Sievers, 1893: 7). Considering his rather modern definition of sentences (Sievers, 1893: 211) one can say that some of his views were rather progressive for its time.

Besides his *Grundzüge* it was namely his *Angelsächsiche Grammatik* (1882) that was widely appreciated and soon translated into English (1885) (the *Abriss*, i.e., the short version, was in print until 1963!). The grammar was quite an improvement in comparison to other publications on Old English because Sievers's comments were not based on poetic texts alone but also on prose fiction. It should also be mentioned that early in his career Sievers presented himself not only as a linguist but also as a philologist in the traditional sense of the word, e.g., he produced critical editions of the *Tatian* (1872), the *Murbacher Hymnen* (1874), and the *Heliand* (1878).

Later on his scientific focus changed completely. The turning point probably was his work on the *Altgermanische Metrik* (1893). Here for the first time he used a kind of experimental-aesthetic method, based on the conviction that the hearer is able to reconstruct the original rhythmical structure of a text as intended by the author. Sievers was convinced that this method, which he explained in more detail in 1912 in his *Rhythmisch-melodische Studien*, was an appropriate instrument for critical text editions. Most scientists would not accept Sievers's so-called *Schallanalyse* ('analysis of sound'); however, they were not able to dissuade him from his conviction. He concentrated on the further development of the method during the last decades of his life. But since he did not manage to supply his experiments with a sufficient theoretical fundament, the *Schallanalyse* fell into oblivion after his death (for details, see Frings, 1933; Ungeheuer, 1964).

Most probably Sievers will mainly be remembered as the author of the *Angelsächsische Grammatik* and especially of the *Grundzüge*, which, with respect to its influence, Kurt R. Jankowsky compared with Hermann Paul's *Prinzipien der Sprachgeschichte*. They "proved to be most powerful and influential guidelines for the reorientation of linguistic research in that both monographs offered an abundance of detailed methodological reflection unavailable through any other existing publication" (Jankowsky, 2001: 1357).

See also: Braune, Wilhelm (1850–1926); English, Old English; Evolution of Phonetics and Phonology; Frings, Theodor (1886–1968); German; Phoneme; Paul, Hermann (1846–1921); Phonetics: Overview; Saussure, Ferdinand (-Mongin) de (1857–1913); Sweet, Henry (1845–1912).

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Siger de Courtrai (d. 1341)

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Siger of Courtrai (latinized as Sigerus de Cortraco/Curtrarco, and named Zeger van Kortrijk in Flemish) was born c. 1283 in Gullegem (then Ghueldeghem) near Kortrijk/Courtrai, Flanders, Belgium. Since c. 1309 he had taught as *Magister artium regens* in Paris, where in 1310 he became a *socius*, and in 1315 the *procurator* of the Sorbonne, at a time when his colleague Radulphus Brito was its provisor. In 1308, he is mentioned as dean of the chapter of Notre-Dame de Courtrai and remained in that position until 1327. He died in Paris on May 30, 1341.

Siger composed his logicolinguistic works after 1300, probably between 1310 and 1320. His widely known *Summa modorum significandi* (edited in Wallerand, 1913: 93–125, reedited in Pinborg, 1977: 1–40), though incomplete, made him an important figure in the endeavors of the medieval Modistic linguists, while expanding on Priscian's *Institutiones grammaticae*, to construct a speculative grammar on the basic notions of *modus essendi, modus intelligendi*, and *modus significandi*. As a philosopher, this later-generation Modist drew on Thomas Aquinas and Albert the Great, whereas he was reluctant with Radulphus Brito's new ideas. Previous to the *Summa*, Siger wrote *Sophismata* (4 of them edited in Wallerand, 1913: 129–165; 7 in Pinborg, 1977: 41–95; cf. Kann, 1999), and even earlier he had commented on Aristotle's *Categories*, on *On interpretation* (edited in Verhaak, 1964), on the *Prior analytics* (edited in Wallerand, 1913: 1–75), on Porphyry's *Isagoge* and on *De sex principiis*. He also left us fragments of *Fallaciae* (edited in Wallerand, 1913: 79–90), where he also mentions his *Ars obligatoria*, as yet unidentified. A tract on *Impossibilia* is also attributed to him.

See also: Linguistic Theory in the Later Middle Ages.

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Sign Language: Acquisition

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Sign languages are expressed with the hands, arms, and face and are understood through the eyes. Sign languages have evolved within communities of individuals who are deaf, and the children of these communities acquire sign as a first language. Like all languages, sign languages have linguistic rules for how words, sentences, and discourse are structured. Thus, all sign languages have a lexicon, grammatical and derivational morphology, phonology, syntax, and semantics. We focus here on sign language acquisition begun in infancy, as is typical for spoken language acquisition.

Sign language acquisition has been studied in several languages, including American Sign Language (ASL), Australian Sign Language (Auslan), British Sign Language (BSL), Danish Sign Language (DSL), French Sign Language (LSF), Italian Sign Language (LIS), Japanese Sign Language (JSL), Sign Language of The Netherlands (SLN), and Quebec Sign Language (LSQ). Research suggests that the developmental path from first words and combinations to sentence structure and discourse is similar across sign languages, although it is important to remember that the linguistic details vary from sign language to sign language (see **Table 1**). Sign language research reveals that the child's discovery of the units and rules of grammar is an abstract process that transcends sensory-motor modality.

Infant-directed sign language attracts and holds babies' attention more than adult-directed sign does, even when babies have never seen sign before. Infant-directed sign is slower, with larger movement trajectories, and tends to have more repetitions, compared to adult-directed sign (Masataka, 1996). Some elements of infant-directed sign are ungrammatical for adult signers but are modified in infant-directed sign to accommodate the visual needs of babies. For example, adults will displace signs away from their bodies to sign within the baby's visual field until the infant is about 20 months old, the time at which infants look automatically at the visual linguistic input source. Children must learn where to look to 'see' language, a task unique to sign language acquisition (Harris and Mohay, 1997; Holzrichter and Meier, 2000). Another modification in infant-directed sign involves facial expression. In adult sign language, facial expression has two functions, the affective function, which is universal to humans, and the linguistic function, which is unique to sign languages. In infant-directed sign, adults use only affective facial expression. When children have acquired signs for some facial linguistic markers, around 24 months of age, adults can begin to add more linguistic facial expressions to their infant-directed sign (Reilly *et al.*, 1991; Reilly, 1996).

Infants who experience sign language babble with their hands. Manual babble occurs around the same age as vocal babble, from 6 to 12 months. Manual babble consists of a reduced set of phonological parameters found in the sign language input and follows the syllabic organization of sign languages, especially with respect to rhythmic timing. The handshapes most commonly observed in manual babbling are: [5] (relaxed hand), [A] (fist), [0] (including baby O), and [G] (index point). These handshapes are used with more repetitious movements than they are in the adult model, and movements such as opening and closing the handshape, raising and lowering the hands or arms, and movement toward the body are common. The location (or place) parameter of manual babbling seems to be idiosyncratic; for example, some infants babble in neutral space in front of the body, while others babble mostly on the head or face (Petitto and Marentette, 1991).

The transition from manual babbling to first words occurs around 10 months of age (with large individual variation). Manual babble and communicative pointing decline just before the appearance of the first sign (Petitto, 1987). First signs have been reported from as early as 8 months to as late as 16 months. The first 10 signs are produced around 12 months of age, and the first 50 signs emerge at 24 months and older (Anderson and Reilly, 2002). Children inevitably make signing errors; the phonological parameters used most frequently in manual babble tend to be the most common substitution errors in early sign (see **Figure 1**). The sign parameters

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Table 1 Summary of acquisition of grammatical structures in sign language

Structures	*Age*[a]		*Sign languages*[b]
	Of first appearance	*First mastered*	
Babbling	0;7–0;10	—	ASL, JSL, LSQ
First words	—	0;8–0;12	ASL, JSL, LIS, LSQ
Word combinations			
Two words	1;2–1;6	—	ASL, JSL
Basic word order	2;4–2;6	—	ASL, SLN
Pronouns			
First person	1;8	2;2	ASL
Second person	1;10–2;0	2;2	ASL
Third person	2;0	3;6	ASL
Possessives	2;0	2;4–2;9	ASL
Negation			
Negative signs	1;6	—	ASL
Negative-incorporated verbs	1;6	—	ASL
Negative sign with headshake	1;8	4;0	ASL
Negative-incorporated verb with headshake	2;0	4;0	ASL
Negative predicate with headshake	1;8–2;2	4;0	ASL
Questions			
Yes/no facial grammar	1;0	—	ASL
Question signs	1;6–2;4	—	ASL
Non-manual markers over question signs	3;6	6;0	ASL
Facial adverbials	1;10–2;0	5;0	ASL
Topics	2;9	3;0	ASL
Conditionals			
Conditional signs	3;0	4;0	ASL
Non-manual markers over signs	5;0	7;0–8;0	ASL
Verb agreement			
Agreement verbs without inflection	2;6	—	ASL
Agreement verbs with inflection	3;0	6;0	ASL
AB verbs	6;0	11;0–12;0	ASL, BSL
Perspective shift			
Shift roles with eye gaze	3;0	—	ASL, BSL
Direct quote	3;6	6;0–8;0	ASL, BSL
Non-manual markers	3;6	13;0	ASL, BSL
Classifiers			
Figure (handshapes)	3;0	8;0–9;0	ASL, BSL, SLN
Use of space	3;0	9;0–10;0	ASL, BSL, SLN
Ground	4;0	11;0–12;0	ASL, BSL, SLN

[a]Given in years;months.
[b]ASL, American Sign Language; JSL, Japanese Sign Language; LSQ, Quebec Sign Language; LIS, Italian Sign Language; SLN, Sign Language of The Netherlands; BSL, British Sign Language.

most frequently misarticulated are handshape, followed by movement, with location being the most accurate (Marentette and Mayberry, 2002). Development of motor control is evident in early signs, with movements made by proximal joints, such as the shoulders and elbows, being substituted for movements made by distal joints, such as wrists and fingers (Meier *et al.*, 1998).

Less than a third of children's first signs are composed of vocabulary with iconic qualities. Instead, children's first signs are semantically similar to those of children learning spoken languages. Words closely related to the child's experience appear first, such as words for people, animals, and food. The acquisition of more abstract words is related to the size of the lexicon. Question words, cognitive verbs, and negation all appear after 100 words have been learned, around 18 to 24 months of age (Anderson and Reilly, 2002). Pointing is present in infants' communicative repertoires starting at 10 months of age, but does not lead smoothly into the use of sign pronouns, which are produced using the same form. Until 20 months of age, children use nominals instead of pronouns/possessives to refer to people, and begin using pronouns with errors just before 2 years. The first-person pronoun is acquired first, followed by second person; pointing to a third person who is present precedes the use of abstract locations in space to refer to people

Figure 1 A child's sign error: the child signs 'APPLE' by using the handshape [I] instead of [Ih] and the movement [contact] instead of [twist], in comparison to the mother's correct target sign. Illustration by Michael Shang. Reprinted with permission from Marentette P F & Mayberry R I (2000). 'Principles for an emerging phonological system: a case study of early ASL acquisition.' In Chamberlain C, Morford J & Mayberry R (eds.) *Language acquisition by eye*. Mahway, NJ: Lawrence Erlbaum Assoc. 71–90.

and objects not present, which is acquired after 3½ years (Hoffmeister, 1987; Petitto, 1987).

In the transition from single words to the two-word stage, children begin by combining a gesture, usually a point, with a single word (as is the case for babies acquiring spoken language). This development, around 12 months of age, is called the semantic one-sign stage because the gesture and sign both refer to the same meaning. The semantic two-sign stage follows, at around 16 months, with the point and the sign referring to two distinct meanings. For example, the child may point at an object and sign a verb such as 'EAT', or make a request, such as 'MORE' (Capirci *et al*., 2002; Torigoe and Takei, 2001). Children combine lexical signs once they have a vocabulary of 100 signs, from 18 to 24 months of age. These combinations generally consist of uninflected nouns and verbs such as 'MOMMY EAT' or 'WANT DRINK' or may include quantifiers such as 'MORE CRACKER' (Anderson and Reilly, 2002). After the two-word stage, children begin to acquire the more complex elements of sign languages, such as morphology, that depend on non-manual markers and the linguistic use of space with signs. In general, non-manual markers, or linguistic facial expressions, are neither comprehended nor produced by children until they have acquired the corresponding manual signs. Children begin to use non-manual markers around the age of 2 years, but cannot produce them comparable to the adult model until after 12 years of age. Although children communicate negation using a non-linguistic headshake by 12 months, their first negative signs at 18 months are produced without the obligatory linguistic headshake. They integrate the headshake (with errors in timing and scope) a few months later and use both sign and non-manual negation correctly between 26 and 28 months of age. Similar to the acquisition of negation, facial adverbials, such as 'puff' (puffing the cheeks out, meaning 'very big/fat'), are not acquired until children can express these meanings in signs. Dozens of facial adverbials are acquired much like lexical items are acquired, from the age of 22 months to 4 years and older (Anderson and Reilly, 1997, 1998).

The acquisition of yes/no questions occurs early because there are no signs to be mastered first. Babies use the necessary non-manual marker, generally raised eyebrows, over a single sign as early as 12 to 16 months of age. Questions requesting information require the acquisition of both signs and non-manual markers (such as lowered eyebrows and eye squint). Question signs appear first at 18 months and gradually increase in variety and use until 3 years of age, but non-manual markers are not added consistently or appropriately until 3½ years of age (Anderson and Reilly, 2002). The adult model has a variety of acceptable word orders in questions, and children start using these orders, also adding a redundant question word in sentence-final position, after the age of 4½ years (Lillo-Martin, 2000). Although topicalization uses non-manual markers that are similar to those used in yes/no questions, non-manual markers are not used for topics until the age of 3 years. However, there is some evidence that children can express topicalization using a prosodic break by the age of 2 years (Pichler, 2002).

The development of conditional sentences further demonstrates the dichotomy between the acquisition of the signed and non-manual markers of many syntactic structures. Non-manual conditional markers

are obligatory but conditional signs are not in ASL. From ages 3 to 4 years, children can comprehend the conditional structure in signs, but not in non-manual markers, and they can express some conditionals in signs without the obligatory non-manual markers. By the age of 5 years, children can comprehend non-manual markers but are inconsistent in their production of these structures. The timing and scope of non-manual markers with signing are not fully mastered until the age of 8 years (Reilly *et al.*, 1990).

In many sign languages, verb agreement is marked with the linguistic use of space. Acquiring spatial morphology is a gradual process in which children actively attempt to identify morphological components; this is apparent in the errors they make, which are productive as opposed to being iconic. In general, around the age of 3 years, children can comprehend the use of locations in space for verb agreement before they can produce it. At the same time, they are able to inflect verbs using people, places, and objects that are present. The period from age 4 to 5 years is the time in which they comprehend verb agreement but produce it with errors, such as overgeneralizations to verbs that cannot take agreement. Correct production of basic verb agreement is acquired by the age of 6 years (Meier, 1987, 2002). Shifting directional verb agreement, involving what are known as AB verbs, is a kind of verb agreement that takes children longer to grasp. In this case, three thematic roles are mapped onto two-argument verbs. In English, this could be expressed as *John hit Peter on the head*. In many sign languages, this is expressed using two parts, A and B. In A, the verb agrees with person X and person Y. In B, the verb agrees with person Y and the part of the body being affected (in this case the head). Children can comprehend AB verbs (ages 3 to 5 years) long before they can produce them. Usually, children will attempt to produce these verbs using only the B part, omitting the subject information. Between the ages of 6 and 8 years, they will sometimes produce only one part, and usually omit the obligatory perspective shift. Production of AB verbs is mostly correct by 9 years of age, although it takes a few more years for the non-manual markers to become fully adultlike (Morgan *et al.*, 2002).

The acquisition of sign language structures referred to as classifier constructions is protracted, because full mastery requires the adept combination of several linguistic skills. Children must be able to use an array of signs alongside classifier handshapes, must coordinate both hands so that they can work together to track figure and ground, and must know when to introduce a referent with an identifying sign versus a classifier. Before they start using classifiers, children first use the bare form of the verb to describe an action. Also, children focus entirely on the action involved, do not focus on the figure, and generally omit the ground. By 5 or 6 years of age, children can select appropriate semantic classifier handshapes without specifying all of the relevant dimensions, and they start to distinguish the beginning and end of the action. Children are able to show facial affect with classifier constructions and change the orientation of the non-dominant hand to represent the ground by the age of 8 years. By age 9½ years, their classifier constructions are mostly correct. Nonetheless, children do not properly specify the ground in classifier constructions until 11 or 12 years of age. In mastering classifier constructions, children tend to focus first on the action and then begin to add information about the figure; finally, they are able to specify the ground (Engberg-Pedersen, 2003; Slobin *et al.*, 2003).

Reported action in many sign languages requires the mastery of perspective shift, which is important to narration. Children need to understand the concept of shifting viewpoint and must be able to produce several different non-manual markers. From ages 3 to 4 years, the only evidence that children are changing perspective is in their eye gaze shift; some children may use a character facial expression incorrectly. Around 5 years of age, children transition to expressing perspective shift linguistically by first labeling a character and then signing 'SAY' to introduce a direct quote. Most children of this age also correctly take on the facial expression of the character, although they tend to stay fixed in one perspective (whereas adults are capable of changing perspectives rapidly and often). By ages 6 and 7 years, children have mastered the signed and most of the non-manual markers for a direct quote, but they continue to have difficulty with reported action; i.e., whereby the narrator reports a character's actions and takes on the facial expression of that character while remaining in the role of narrator. At this point, children tend to tell narrations solely from a narrator's viewpoint using primarily linguistic, as opposed to paralinguistic, means. They gradually integrate paralinguistic devices with perspective shift after 8 years of age. Finally, as in most structures that use complex non-manual markers, the non-manual markers for character perspective and reported action do not become adultlike in narration and discourse until age 12 years and older (Morgan *et al.*, 2001; Reilly, 2001).

Cross-linguistic research shows that linguistic structure remains abstract when it is understood through the eyes and expressed with the hands, arms, and face. Children who are acquiring sign languages face the same challenges that children acquiring spoken languages face. They must discover the

underlying units and rules of the words, sentences, and discourse patterns of the language around them. Like children acquiring spoken languages, children acquiring sign languages are highly analytic and acquire grammatical structure one piece at a time through communicative interactions with the people who care for them.

See also: Cross-Linguistic Comparative Approaches to Language Acquisition; Language Development in Deaf Children with Hearing Parents; Language Development: Morphology; Language Development: Overview; Modality Issues in Signed and Spoken Language; Nonmanual Structures in Sign Language; Sign Language: Discourse and Pragmatics; Sign Language: Morphology; Sign Language: Overview; Sign Language: Phonology; Sign Language: Syntax; Sign Language: Transcription, Notation, and Writing; Sign Languages of the World; Syntactic Development.

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Sign Language: Communities and Cultures

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In Western industrialized societies, sign language-using Deaf people form a small percentage of the population (around 1 in 1000). Their numbers are augmented by the non-Deaf children who have sign language-using parents, and in recent times by growing numbers of non-Deaf people who have taken formal classes to learn the sign languages of those nations. In the UK, the latter number over 100 000 (Woll, 2001), but figures for other countries are not known, although it is estimated that in the United States these numbers exceed 1 million. However, the center of those sign language communities revolves around those (mostly Deaf people) who participate in the daily lives of those communities and have a stake in the ongoing future and their quality of life. They are characterized by intermarriage, and it is estimated that 90% of Deaf people who marry choose Deaf partners.

A History of the Western Concept of Deaf Community

It is probable that Deaf people who communicate by gesture or sign have existed as part of humanity from its inception; in the West, the first written evidence of their existence can be found at the dawn of Western literacy itself, with the rise of the Mediterranean societies in the 5th century B.C. From that time onward, Greek philosophers such as Herodotus, Socrates, Aristotle, and Plato, and their equivalents in Jewish and Roman society, found the existence of signing Deaf people illuminating when considering wider issues concerning human thought and behavior, and philosophized about the nature of Deaf people's existence and their place in society, eventually establishing laws relating to them.

In these discourses, many of which suggest the existence of Deaf communities even then, two contrasting positions can be identified between those who present a positive or negative view of Deaf peoples and their potential.

Deaf 'Emergence' in the Middle Ages

Little is known of Deaf communities until the 15th century, when, for a number of complex reasons, including the impact of the Renaissance with its revival of Greek philosophy, there was a considerable increase in both discourses. One strand concerns the education of Deaf people, while others indicate an emerging recorded respect for Deaf people by lay society; achievements by Deaf individuals and groups in artistic and business domains (Miles, 1988; Mirzoeff, 1995); the existence of Deaf networks (Bulwer, 1648); and communities that incorporated sign language into their everyday lives (Groce, 1985). A further theme considers the importance and status of visual gesture in some societies during these periods (Mirzoeff, 1995); these may have underpinned a more positive view of Deaf people.

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Sign Language: Communities and Cultures

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In Western industrialized societies, sign language-using Deaf people form a small percentage of the population (around 1 in 1000). Their numbers are augmented by the non-Deaf children who have sign language-using parents, and in recent times by growing numbers of non-Deaf people who have taken formal classes to learn the sign languages of those nations. In the UK, the latter number over 100 000 (Woll, 2001), but figures for other countries are not known, although it is estimated that in the United States these numbers exceed 1 million. However, the center of those sign language communities revolves around those (mostly Deaf people) who participate in the daily lives of those communities and have a stake in the ongoing future and their quality of life. They are characterized by intermarriage, and it is estimated that 90% of Deaf people who marry choose Deaf partners.

A History of the Western Concept of Deaf Community

It is probable that Deaf people who communicate by gesture or sign have existed as part of humanity from its inception; in the West, the first written evidence of their existence can be found at the dawn of Western literacy itself, with the rise of the Mediterranean societies in the 5th century B.C. From that time onward, Greek philosophers such as Herodotus, Socrates, Aristotle, and Plato, and their equivalents in Jewish and Roman society, found the existence of signing Deaf people illuminating when considering wider issues concerning human thought and behavior, and philosophized about the nature of Deaf people's existence and their place in society, eventually establishing laws relating to them.

In these discourses, many of which suggest the existence of Deaf communities even then, two contrasting positions can be identified between those who present a positive or negative view of Deaf peoples and their potential.

Deaf 'Emergence' in the Middle Ages

Little is known of Deaf communities until the 15th century, when, for a number of complex reasons, including the impact of the Renaissance with its revival of Greek philosophy, there was a considerable increase in both discourses. One strand concerns the education of Deaf people, while others indicate an emerging recorded respect for Deaf people by lay society; achievements by Deaf individuals and groups in artistic and business domains (Miles, 1988; Mirzoeff, 1995); the existence of Deaf networks (Bulwer, 1648); and communities that incorporated sign language into their everyday lives (Groce, 1985). A further theme considers the importance and status of visual gesture in some societies during these periods (Mirzoeff, 1995); these may have underpinned a more positive view of Deaf people.

The Development of Sign Language Education

As Deaf educational establishments began to bring together large numbers of Deaf children and adults, sign languages began to flourish (cf. de L'Epée, 1984). Although it can be argued that Deaf people can maintain satisfactory lifestyles while existing outside education systems (cf. Desloges in Lane and Philip, 1984), there is no doubt that the concentration of Deaf children and adults within a residential school system is the single most important factor in maintaining a sizable and healthy Deaf community. Deaf education therefore was, and continues to be, the battleground on which the community's future existence and quality of life is contested.

By the early 19th century, the numbers of Deaf graduates from these schools created a demand for Deaf meeting places; large numbers of clubs and religious societies were consequently established across Europe and the United States, many again founded by Deaf people themselves (Lysons, 1963), and thus the first modern Deaf communities were created. For the first time, Deaf school graduates attained professional positions, and Deaf magazines and newspapers were developed to facilitate regional and national communication. These developments were enhanced by the establishment in the United States in 1867 of Gallaudet College, the world's first (and only) Deaf university.

Documents from the era show high levels of Deaf self-confidence (Mottez, 1993), including beliefs about the importance of possessing (God-given) languages with the potential to be globally understood. This embodiment of world citizenship was seen as setting an example for spoken language users, to whom they wished to extend this globalizing opportunity.

The national Deaf communities were perceived as a single global community with national branches in each country of the world. Although this represents an elevated epistemology within Deaf discourses, the persistence of such thought right through to the present day indicates that Deaf communities cannot be truly understood if this dimension is not grasped. In the process of developing such discourses, attempts were also made toward formalizing the concept of individual enfranchised or independent 'Deaf-Mute Nations', for example in France (Mottez, 1993) and the United States (Van Cleve and Crouch, 1989).

Although limited educational opportunities meant that only a percentage of Deaf children in each country were able to come together in the schools and clubs, sufficient numbers began to travel internationally and establish formal links with other national Deaf communities. This led to the founding of international congresses, initially focused on the agendas of Deaf professionals, but which by the early 20th century multiplied to encompass sports and other specialized associations.

Sign Languages and Linguistic Colonization

However essential to sign language community development, the expansion of Deaf schools and clubs also created something of a Trojan horse. Deaf education itself was often presented as presupposing non-Deaf masters of Deaf subjects (e.g., Sicard, 1984), and an ideology of the miracle of Deaf education, that is, the rescuing of Deaf people from subhuman status, was disseminated to lay people. Deaf leaders, seeking money to establish more schools, had little choice but to go along with this; a similar pattern occurred in the development of Deaf clubs. This pattern of control having been established, Deaf communities were vulnerable when the methodologies of the education system changed.

As the 19th century continued, the growth of industrialization saw the development of self-justifying tropes of *science* and *progress*, which began to construct Deaf people within the regressive trope of *Nature*, that is, as something that could be changed for the better. Developments in these domains were reinforced by the concerns of healthy parents of Deaf children who controlled the funding of the charitable and private school. Many wished their children to remain within their own social groups, and not to join communities of the Deaf multitudes.

All these themes coalesced in the doctrine of Oralism, which sought to remove sign languages and Deaf teachers from the schools, to replace them by advocating the sole use of spoken communication, and thus to forbid Deaf children from signing with each other. These culminated in the famous Milan Conference of 1880. The power embodied in the ruling bodies and their control of the media resulted in rapid dissemination of this message; a useful example is the proclamation by the *London Times* that "Deafness is abolished," only days after the conference. Emerging at a time when the centralization processes of the nation-state were advancing rapidly, the Oralist philosophy was able to swiftly attain hegemonic status.

However, in the first phase of Oralism, when Deaf communities were still strong and their leaders still qualified and experienced professionals, the communities and their allies were able to respond by founding national organizations to combat Oralism; the National Association of the Deaf (NAD) was established in the United States in 1880, and the British

Deaf and Dumb Association (BDDA) in the United Kingdom in 1890, both of which still exist today. International congresses were held, culminating in Paris in 1900, where Deaf teachers and headmasters attempted to join the conference intended to ratify Milan. This battle was lost, and although the communities never gave up demanding change, their prime focus turned inward, toward preserving their language and their community and developing their own social structures. Thus Oralism was to remain essentially unchallenged for the next 70 years.

Once Deaf teachers were removed, Oralism was able to enshrine itself as a system of linguistic colonization (Lane, 1993; Ladd, 2003). National governments sought to remove sign languages from the lives of Deaf children with the intent that they be assimilated into majority societies, using only those languages. In effect, this implied the removal of sign language communities from existence.

An outgrowth of these discourses, a Social Darwinist eugenics discourse also resulted in attempts to close Deaf clubs, to prevent Deaf marriages, and laws to sterilize or castrate Deaf people were placed on the statute book of 30 U.S. states (Mirzoeff, 1995) by the 1920s, in Sweden in the 1930s, reaching its apogee across Nazi-occupied territories. These policies too were designed in the hope of removing those languages and communities from existence altogether (cf. Bell, 1984).

During the dominance of this discourse, Deaf people's positive image with the lay public was diminished; earlier perceptions of an organic community with philosophical significance were supplanted by the medical-model perception of a collection of isolated and handicapped individuals who constituted a medical and social problem. Oralist discourses suggested that lay attitudes toward Deaf people were irrevocably negative, so that they were justified in taking upon themselves the mantle of caring for such social outcasts. Moreover, given these supposedly negative attitudes, there was no possibility that lay people would be willing to learn sign language; thus communication with them was conceived of as based solely on the spoken word.

Deaf Communities' Resurgence

In the mid 1970s, growing awareness of the failure of Oralism, combined with the decolonization processes engendered by the liberal 1960s, enabled the beginnings of a Deaf resurgence. A number of factors contributed to this process: the development of welfare states, which weakened the hold of the charitable sector over Deaf community life; Deaf activist movements, such as the National Union of the Deaf in the UK, and the revolt to achieve a Deaf President at Gallaudet University in the United States; the Total Communication (and later bilingual/bicultural) movement, which sought to restore sign languages to Deaf education; Deaf visibility in the media, especially in the creation of Deaf TV programming itself; linguistic recognition of sign languages, public prominence of sign language interpreters; and the rediscovery of Deaf history, culture, and arts. These have culminated in the very recent development of Deaf Studies as an academic discipline.

Although it is too early to speak of a Renaissance as opposed to a resurgence, the larger numbers of Deaf children educated in sign languages who have now reached maturity have taken advantage of the developments above to create new dimensions of Deaf cultural and artistic activities, perhaps most notably observed at the two international Deaf Way congresses of 1989 and 2002, the latter drawing 15 000 participants from across the world.

Once Oralism's grip was weakened, sign languages rapidly emerged from their century-long comparative invisibility, so that large numbers of non-Deaf persons have learned the languages, effectively extending the concept of sign language communities by becoming fringe members of Deaf communities themselves.

Among the numerous ramifications of these developments has been the recent moves toward official governmental recognition of sign languages, and consequently their communities and cultures. Several countries, including the United Kingdom and most Scandinavian countries, have pronounced such recognition, although the implications of recognition have not yet been translated into consistent decolonizing praxis. Recognition by the European Union, although not legally binding on member states, has proved the most significant in as much as it has brought sign language communities into direct contact with European minority language organizations.

Despite these positive developments, both Oralism and more liberal beliefs in linguistic assimilation have continued and can even be said to have intensified with the enforced mainstreaming of Deaf children (as many as 95% in the case of the United Kingdom) and the closure of hundreds of Deaf schools.

Cross-Categorization of Deaf Communities

In this ensuing battle, the unique status of Deaf communities is itself a problem. To define them simply as disabled is to overlook the linguistic foundation of their collective life. To define them as a linguistic group is to overlook the very real sensory characteristics of their existence, both positive (a unique

visual-gestural-tactile perception of life around which sign languages have been constructed), and negative (communication barriers are not simply linguistic, but auditory, too).

Conventional definitions of cultures also appear to thwart easy recognition of Deaf culture. The characteristic of ethnicity is rendered problematic because only 5–6% of Deaf children at most are born to two Deaf parents (Kyle and Woll, 1985), posing questions in relation to conventional ideas of cultural transmission. Traditional theories also emphasize that cultural development is involuntary; since individuals are socialized into their community from birth, questions are raised concerning the cultural validity of choosing to be Deaf.

Additionally, Deaf communities do not have their own land, nor live (or even choose to live), as geographically intimate communities. There are also very few material productions that are Deaf, compared to those of many other cultures. Finally, doubt has been expressed as to whether Deaf cultures have ontological systems, which most other cultures possess. Although these arguments can be refuted (cf Ladd, 2003), they can only gain prominence if the world in general develops a more profound understanding of the concept of culture itself.

Deaf Cultures

The term 'culture' in relation to descriptions of Deaf collective life occurs first in Stokoe *et al.* (1965) where an appendix describes the social and cultural characteristics of Deaf people. By 1975, Padden and Markowitz (1975) were defining community as "a group of persons who share a common culture," and applying this to Deaf communities.

Baker and Cokely (1980) establish a contrast between definitions of Deaf people from clinical-pathological and cultural perspectives. However, they do not use the latter term again, listing instead four factors – linguistic, political, audiological, and social – with the last doing duty for what might now be thought of as cultural. Their approach is perhaps the most influential of perspectives; Kyle and Woll summarize that "[this seems] to be the most consistent of the theoretical views of the community" (Kyle and Woll, 1985: 8).

It is not until Padden (1980) that a specific definition is attempted for the culture of American Deaf people. Having taken culture to mean "A set of learned behaviours of a group of people who have their own language, values, rules for behaviour, and traditions" (Padden, 1980: 92), she then states: "Members of the Deaf culture behave as Deaf people do, use the language of Deaf people, and share the beliefs of Deaf people towards themselves and other people who are not Deaf" (Padden, 1980: 93) and concludes that "the most striking characteristics of the culture of Deaf people is their cultural values – these values shape how Deaf people behave and what they believe in" (Padden, 1980: 95).

Like a number of other studies, Higgins' (1980) study, although sociological, describes numerous cultural features such as membership criteria and attitudes of different groups of Deaf people to each other.

During the 1980s, use of the term spread widely, although most described aspects of Deaf culture rather than attempting to measure or comprehend its totality. Bienvenu and Colonomos (1986) among others, begin to use the term as an all-encompassing framework and give taxonomic descriptions, some of which are rather unsystematically constructed.

There has been some controversy within the American Deaf community around the spread of the sign DEAF CULTURE, some arguing that the original Deaf terms such as DEAF-HIS and DEAF-WAY are good enough. Nevertheless, Bahan (1994: 245) discusses the term DEAF CULTURE, how it has begun to be accepted and has started to develop an extra level of meaning: "There are Deaf people who go out and say to others, 'YOU NOT DEAF CULTURE'." Asserting that there was never a time when any Deaf person would go up to another and say 'YOU NOT DEAF WORLD', he concludes that: "What the [first comment above] is making them do is to assess different things that they have internalized while growing up. It becomes an avenue for checking into the values and patterns that one has internalized in the hearing world. It is not that those hearing values are bad, but rather, it is a reminder that this is now our world you are in" (Bahan, 1994: 245). Bahan's conclusions lead one to ask whether past Deaf communities did not attempt to exclude or criticize other Deaf people, or whether it is simply the recent emergence of Deaf pride that has led to such distinctions. They also suggest that one can be in a Deaf community (Deaf World), but not have, or always manifest Deaf Culture.

Academic Perspectives on Deaf Culture

From the 1980s onward, writers have examined Deaf culture within frameworks they have devised or adopted, such as membership perspectives. Padden and Humphries (1988) proposed a refinement of Woodward's definition: "We use the lowercase *deaf* when referring to the audiological condition of not hearing, and the uppercase *Deaf* when referring to a particular group of deaf people who share a language . . . and a culture" (Padden and Humphries, 1988: 2).

The same authors also provided a symbolist perspective in the first book-length text on Deaf culture, developing an anthropological (Geertzian) perspective of what it means to operate from within one's Deaf identity, with themes such as learning to be Deaf, images of being, the meaning of sound, and historically created lives.

Carmel (1987) and Rutherford (1993), in their focus on Deaf identity issues, also work from anthropological perspectives to bring to the surface deeper examples as manifested in symbolic relationships, focusing particularly on Deaf folklore.

Other accounts operate from linguistic perspectives, seeing sign language as the one clearly unique cultural characteristic of the Deaf community. As Kannapell (1982) eloquently puts it, "ASL is the creation which grows out of the Deaf community. It is our language in every sense of the word. We create it, we keep it alive, and it keeps us and our traditions alive."

Johnson and Erting (1989) present an ethnicity perspective. This is concerned that the treatments reviewed above are taxonomic: "basically labelling theories which place people in groups on the basis of interpretations made by those who are doing the labelling" (Johnson and Erting, 1989: 44) as they go on to say: "Such labels can correspond to salient behaviours and values of a cultural group but they are unlikely to provide substantial insight into the processes that account for the emergence and maintenance of those values and behaviours as identifying features ... For this reason we align ourselves with anthropologists who study phenomena similar to the Deaf sociocultural experience under the title of ethnicity" (Johnson and Erting, 1989: 44).

Other anthropological perspectives draw on linguistic, membership, ethnicity, and structuralist perspectives, but are notable chiefly both for the amount of anthropological data given, and for an emphasis on examining diversity within the Deaf community.

All these perspectives being very recently developed, there have been few attempts to cross-reference each, apart from Turner (1994a, 1994b), and thus to begin to find a workable consensus. Likewise, since most have not produced a sustained subaltern-oriented ethnography, there is little hard data for others to reinterpret.

Thus most of these perspectives remain taxonomic, focusing on differences between Deaf and hearing cultures rather than exploring Deaf culture in and of itself. Consequently they fall victim to what Wright has summarized in another context as "the old idea of culture":

- bounded, small-scale entity
- defined characteristics (checklist)
- unchanging, in balanced equilibrium or self-reproducing
- underlying system of shared meanings: 'authentic culture'
- identical, homogenous individuals (Wright, 1998: 8).

Recent Developments

The work of Mindess (2000) was something of a breakthrough. Although not addressing these weaknesses she provides an in-depth analysis of Deaf cultural features based on cultural categories developed by the new discipline of inter-cultural communication. Ladd (2003) addresses these weaknesses by identifying cultural patterns across generations in the United Kingdom, and showing how these are affected by class distinctions within the community. By developing a model of Deaf cultures as minority cultures, he also illustrates how majority society and colonialist cultural values are absorbed into Deaf cultures themselves, often with negative effects.

Other Deaf Communities

Although the cultural patterns above are characteristic of Western Deaf communities, similar patterns can be found in so-called developed countries such as Japan, Australia, and New Zealand.

There are at least four other models of Deaf communities that can be identified. The first, rudimentary or ur-communities, describe those communities in the West prior to Deaf education; these are still found in many Third World countries today. They are characterized by very small localized gatherings of Deaf people, the majority being isolated within the general population, and by a gradual move toward larger communities in urban areas, especially the capital cities.

The second represents communities where some Deaf schools have been set up but where large numbers of Deaf children do not attend schools and/or there is a less developed local, regional, or national Deaf infrastructure. This description of such a developmental stage roughly parallels that reached in the mid-19th century in the West, and can be applied to many Latin American and Asian Deaf communities, as well as several African countries. Although Oralism was exported to these countries (as in almost every part of the world), the last decade has also brought the beginnings of a Deaf resurgence, with sign languages used in many Deaf schools, and through the work of the World Federation of the Deaf (WFD) and others, national organizations and official WFD regions have been formed. Indeed, in some of these countries, such as Columbia, Uganda,

and South Africa, the indigenous sign languages have been granted official recognition.

The third and fourth, characterized by Woll and Ladd (2003) as integrated communities and single communities, indicate that the socioeconomic status and educational achievements of Deaf people is largely equivalent to that of hearing people, that there is a higher rate of endogamous marriage, and that the hearing communities have awareness of the Deaf community, including a degree of knowledge of those sign languages. It cannot as yet be confirmed that Deaf communities in each of these examples engage in their own separate gatherings, but if they do, they can be characterized as Deaf subcommunities.

Erting *et al.* (1994) include several accounts of communities in Nepal, Pakistan, Burundi, and Ghana. There have also been a number of studies of more isolated signing communities, including Grand Cayman Island; Providence Island, off the coast of Colombia; several villages in Surinam; the Urubu of Amazonia; Martha's Vineyard (from the 17th to 19th centuries); the Enga of New Guinea; the Yucatan; Bali; and a Bedouin tribe.

Schmaling (2000) provides a thorough and grounded description of a well-established Deaf community of this type, the Deaf community of Northern Nigeria, which is briefly described below to give an idea of what such Deaf communities might be like.

Although there are no written historical records of Deaf Hausa people, oral tradition reports that Deaf people have always had meeting points in towns and villages where they met to share information and experiences. Members of the Deaf community share a common language, Hausa Sign Language. The Deaf community has its own leader, the Sarkin Bebaye (Chief of the Deaf) whose office is regarded as that of representative of the Deaf, paralleling the system of chiefs which is one of the basic organizational principles of Hausa society.

Deaf people are well integrated into hearing Hausa society. As a result, interaction and communication between Deaf and hearing people is high. Many hearing people are able to converse with the Deaf freely and effectively through signing, at least on a basic level. Hearing people do not feel ashamed of talking with the hands; they generally try to use their hands as much as possible when communicating with Deaf people and accept that signs or sign language are the medium of communication for Deaf people. Schmaling discusses a number of features that may account for the high level of integration of Deaf people in Hausa society, including a high incidence of Deaf (and deafened) people, and a life primarily conducted in a hearing extended family. Another, of interest given what follows below, is that Islam, the majority religion, promotes the belief that everything is from God, so society is generally accepting of deafness. In addition, as prayers are not spoken aloud, Deaf people can fully participate in religious activities.

Schmaling does report that there is a danger that this state of integration may weaken, as individualization progresses with a loss of traditional societal values. In the case of Desa Kolok in Bali, this process may be exacerbated by the establishment of a residential school away from the village. A similar development resulted in the Martha's Vineyard community slowly moving away from the island, joining with the Deaf community formed around the mainland residential school (Groce, 1985).

A rare example of a Deaf community that appears to have a higher status than many of the hearing people in that society was identified by Miles (2000). The (Islamic) Ottoman court from 1500 to 1700 and possibly later was ruled by a succession of sultans who appear to have granted sign language higher status than spoken language for use in their presence. This led to them actively recruiting Deaf people, as many as 200 at one time, to teach hearing people the language. The Deaf seemed to have formed an identifiable community within the Court, marrying among themselves and distinguishable also by their own livery. They also seemed to be granted special status with the sultans themselves, being chosen as close companions or for specific military tasks.

Western Deaf Subcommunities

Increasing social mobility and professional status, together with the growth in numbers of non-Deaf signers, has had the effect of creating small subcommunities of Deaf and hearing signers around towns or cities containing Deaf schools and universities. Bienvenu and Colonomos (1989) refer to these types of development as constituting a *third culture*.

In recent years, researchers have also begun to identify Deaf subcommunities oriented around ethnicity. These include, in the United Kingdom, Asian (Taylor and Meherali, 1991) and Afro-Caribbean Deaf peoples (James and Woll, 2002). Although these overlap to some degree with majority Deaf communities in social activities, the relationship between the two is problematic. In the United States and South Africa, where Deaf communities were segregated through apartheid policies, the traditional construction asserted a 'majority' (white) Deaf community and Black Deaf subcommunities. It is now understood that such an attitude is in itself born of racism, and concerted efforts are now being made to reunify the community.

Similar patterns can be identified around religion (Jewish and Roman Catholic Deaf communities) and sexual preference. In some cases, notably the latter two, there is evidence to suggest that distinctive sign dialects exist.

It also appears to be the case that in some countries where mainstreaming policies are especially advanced, Deaf youth are now beginning to form their own subcommunities and thus have limited contact with the traditional communities. Indeed, although many appear to move toward such communities in order to escape from isolation and begin the process of learning sign language upon arrival, there is evidence that due to the concept of critical mass, significant numbers are either learning the language superficially or barely at all.

These patterns also appear to be exacerbated by the spread of cochlear implantation among the young. Such developments, together with the rise of genetic engineering and the threat of removal of the Deaf genes, pose an immense challenge for the future of Western Deaf sign languages and thereby their communities. Their long-term future is once again placed in doubt, although it is clear that many of these will resist their potential eradication. Perhaps their most powerful tool remains with recognition of their linguistic status, and their support from other threatened minority languages, since this discourse stresses that it is a breach of the United Nations Charters to attempt to exterminate any of the world's languages and cultures.

See also: Orality; Sign Language: Communities and Cultures; Sign Language: Interpreting.

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Sign Language: Discourse and Pragmatics

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Culture and the Pragmatics of Discourse

In every culture, conversations have structures that reflect their values, for example, whether the information provided is truthful, or satisfies the questioner, or is polite. As an example, Weiser (1975) notes that an answer can be acceptable in discourse if the answer addresses the questioner's purpose for asking the question. She illustrates this with (1):

(1) Q: How old are you?
A: Don't worry, they'll let me in.

The questioner thinks something like: We are going to a bar; there is a minimum age of 21 to get in; I wonder if my date is old enough. The questioner asks for specific information. The date responds with reassurance that his underlying concern will not be a problem. The date's age remains a mystery. Such a conversation is considered polite in a culture that places high value on not invading a person's privacy by requesting personal information, such as age.

Conversational style and structure differ significantly between Deaf and hearing communities. Because signers can see, and be seen by, anyone who is present, it is especially difficult to maintain privacy. Furthermore, as Hall (1989) observes, the Deaf community functions as a surrogate family – everyone knows everyone. The politeness conventions that dominate Deaf community interactions help promote unity among the Deaf. Since maintaining privacy is problematic, conversations among Deaf people lean toward the opposite – being more direct, which may feel intrusive to people unfamiliar with this cultural priority. Attempts at evasive answers may lead to joking, teasing, and not-so-subtle prodding.

Minority Language Status and Signing Style in Discourse

As with spoken languages, there are sign register differences, such as formal/informal articulation, larger signing and signing space when 'shouting' across the room, and so on. Signing style is also heavily affected by its minority language status, especially when hearing people are present. If the hearing people are supposed to be conversational participants but do not know sign, signers may switch to voice and speak the dominant spoken language, or they may resort to writing with paper and pen. Others may continue to sign, but in an altered form that involves speaking while putting the signs into the word order of the dominant language (known as 'signed English,' 'signed Croatian,' etc.). Such simultaneous speaking and signing is a hybrid communication technique that distorts both speech and signing, and is not itself a natural language (Wilbur and Petersen, 1998). If the hearing people do know some signing, Deaf signers may continue in their own sign language, but with a slowed signing rate, and perhaps with altered choice of signs. There is a signing style (rate of signing, lexical choice, use of facial expressions) reserved for use among members of the Deaf community.

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Sign Language: Discourse and Pragmatics

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Culture and the Pragmatics of Discourse

In every culture, conversations have structures that reflect their values, for example, whether the information provided is truthful, or satisfies the questioner, or is polite. As an example, Weiser (1975) notes that an answer can be acceptable in discourse if the answer addresses the questioner's purpose for asking the question. She illustrates this with (1):

(1) Q: How old are you?
A: Don't worry, they'll let me in.

The questioner thinks something like: We are going to a bar; there is a minimum age of 21 to get in; I wonder if my date is old enough. The questioner asks for specific information. The date responds with reassurance that his underlying concern will not be a problem. The date's age remains a mystery. Such a conversation is considered polite in a culture that places high value on not invading a person's privacy by requesting personal information, such as age.

Conversational style and structure differ significantly between Deaf and hearing communities. Because signers can see, and be seen by, anyone who is present, it is especially difficult to maintain privacy. Furthermore, as Hall (1989) observes, the Deaf community functions as a surrogate family – everyone knows everyone. The politeness conventions that dominate Deaf community interactions help promote unity among the Deaf. Since maintaining privacy is problematic, conversations among Deaf people lean toward the opposite – being more direct, which may feel intrusive to people unfamiliar with this cultural priority. Attempts at evasive answers may lead to joking, teasing, and not-so-subtle prodding.

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Modality Effects on the Pragmatics of Discourse Structure

Conversations in sign language always take place face-to-face, even when facilitated by new technology such as web cameras that allow signers to be seen across great distances. Face-to-face interaction is likely to be infrequent among people who live at distances from each other, and may be limited in duration. This may be the reason for a prominent characteristic of signed conversations, namely, that they start informally, get right to the point, and conclude formally and slowly (Hall, 1989 for ASL). In contrast, American speakers of English begin formally and slowly, conclude informally and quickly, and tend not to be direct about getting to the main point.

Getting Attention

Conversations in SLs require the participants to be paying attention to each other. Ways to obtain attention include waving at or tapping someone, or enlisting a third person to help with this procedure. In larger groups, the lights may be flicked off once or twice to get everyone's attention.

Saying Good-bye

It takes a while to say good-bye to each person in a conversation or large gathering. Saying good-bye ends a face-to-face interaction, leaving communication to be resumed at some uncertain future time. Thus, saying good-bye includes some discussion of when that might be, such as other upcoming events.

Turn Taking

Hand Position Given that all interaction is face-to-face, an orderly system of turn taking is necessary to ensure that participants do not miss part of the communication. Baker (1977) observed regulators that mark turns within conversations, such as hand position. When a signer is listening and not intending to take a turn, the hands are down. When a signer is preparing to sign, perhaps to interrupt or waiting for a turn but wants the current signer to acknowledge that he is waiting, the hands assume half-rest position, generally at waist level. Hands higher than this are in quarter-rest position, a strong indication to the current signer to yield the floor. Of course, a signer can simply begin to sign and hope that the other signer will yield the floor. The floor is yielded by returning hands to full-rest or half-rest position as an indication of wanting the floor back.

Nonmanuals Eye contact plays a significant role in regulating conversational turns. A conversation cannot begin without eye contact between participants, after which the addressee must continue to watch the signer, but the signer is free to look away, for organizing thought or maintaining the floor. As in speech, the signer must check back with the addressee to be certain that the addressee is following the conversation. A signer can ignore an interruption by not establishing eye contact with the person attempting to interrupt (Baker, 1977).

Information Flow and Discourse Structure

Information Flow and Focus

The presentation of information in a discourse is structured according to the sender's belief regarding the receiver's knowledge and attentional state (whether something is in the receiver's mind at the time). Gundel (1999) separates three types of 'focus': psychological 'salience'; semantic 'new information'; and contrastive focus. Psychological focus is what the sender and addressee are attending to. Joint attention ensures that what is the current center of attention is salient to both partners, making it old or given: the 'topic' of conversation. Linguistically, nonfocused information tends to be referred to with pronouns (which refer back to something), definite articles ('the') in languages that have them, and pro-drop in languages that allow it (that is, not expressed at all in the sentence).

In contrast, the term 'focus' is used to refer to new information. By definition, all sentences have new information (Gundel's 'semantic focus'). This is the assertion of the utterance; that part which cannot be deleted. Other terms used for the new information include 'comment' in topic-comment constructions, and 'rheme' in theme-rheme constructions. The term 'focus' will be used here.

Focus Prominence Placement and Marking

Broad Focus Every language has a procedure for determining (a) where the stress prominence falls in a 'neutral' sentence, that is, one that is entirely in focus; and (b) how the prominence will be marked phonetically. When the whole sentence is in focus, stress may be placed on whatever word happens to occur in a particular position, such as final. Or it may be placed on the last lexical item, ignoring functional words. Other strategies include placing it on the last argument of the predicate, or if that argument is a phrasal constituent, on the lexical head of the phrase.

In spoken languages, the marking of linguistic stress itself may include increased duration of the prominent item, higher fundamental frequency (pitch), and increased amplitude. SLs do not have

access to pitch. Research on ASL shows that it uses increased peak velocity of signed movement for stress prominence, and uses increased duration of signs primarily for Phrase Final Lengthening (Wilbur, 1999). ASL also has many other cues to indicate stress, including nonmanuals of head and eyes, and body leans, discussed below.

Narrow Noncontrastive Focus When the whole sentence is not in focus, a variety of distinctions are made. The first is Gundel's 'semantic' focus or what Dik (1989) calls 'completive' focus. This is the part of the sentence that provides the relevant new information; if someone asks 'What flavor do you want?' and the answer is 'I want chocolate,' 'chocolate' is the focused part of the sentence and 'completes' the exchange. A second is focus particles, such as 'even,' 'only,' 'both,' and 'also,' which are traditionally distinguished as lexical focus markers; the items they focus on are called 'focus associates.' In ASL, the sign glossed as SAME functions as 'even,' and ONLY-ONE as 'only.' The focus associates may precede or follow the particle; if it precedes, a brow raise is required on the associate but not on the focus particle. A third is intensive focus, which uses reflexives, e.g., 'Only the defendant *herself* remained completely calm.' In ASL, the sign SELF is used for this.

Narrow Contrastive Focus A more emphatic type is 'contrastive' focus. Gundel argues that contrastive focus is used "because the speaker/writer doesn't think the addressee's attention is focused on a particular entity and for one reason or another would like it to be, because a new topic is being introduced or reintroduced (topic shift), or because one constituent (topic or semantic focus) is being contrasted, explicitly or implicitly, with something else" (Gundel, 1999: 296). By this definition, 'topics' can be 'focused' when they are new or reintroduced.

When contrastive focus selects a correct form from a closed and known set (Dik's 'selecting' focus), ASL uses a lean forward on the selected item. If the question is 'Do you want vanilla, chocolate or strawberry?' (a closed set) and the answer is 'I want strawberry,' it is 'strawberry' that is 'selected' or contrasted with the other items. When 'replacing' focus is involved ('chocolate' not 'strawberry'), a lean forward is used to mark the correct response 'chocolate' and lean backward is used to mark the rejected response 'strawberry.' When two items in the same sentence are contrasted with each other ('and/or/but'), 'parallel' focus is involved and ASL uses left/right leans as well as forward/backward leans.

Syntactic Mechanisms of Focus Marking

Contrastive focalization ('topicalization') is the movement of a constituent to sentence initial position for purposes of contrasting it with a previously mentioned item. Aarons (1994) gives example (2):

(2) $\underline{\quad\quad t}$
JOHN$_i$ NOT-LIKE JANE. MARY$_j$, HE$_i$ LOVES Ø$_j$
'John doesn't like Jane. It's Mary he loves.'

Another syntactic focus construction is the cleft ('It was a new sweater that Kio gave Mia for her birthday'). ASL uses the focus sign THAT in the cleft, with nonmanual marking (brow raise) on the focused nominal ('a new sweater'), which must precede THAT. When the sequence THAT NP does occur, its interpretation is purely demonstrative ('that man'), and no brow raise is used.

Languages also have syntactic constructions that put words or phrases in focus, such as the wh-cleft ('What Kio gave Mia for her birthday was a new sweater'). The wh-cleft (so-called 'rhetorical question') is particularly useful for focusing large constituents ('sterilize surgeon's tools'):

(3) $\underline{\quad\quad\quad\quad\quad\quad\quad\quad br}$
ELLEN WORK DO++ WHAT, CLEAN
STERILIZE SURGEON POSSESSIVE
TOOLS
'What Ellen does for a living is sterilize surgeon's tools.'

Language Typology for Focus

When only part of the sentence is in focus, some languages may move the prominence marking to the focused item ([+plastic], Vallduví, 1991, 1995). English is plastic in this sense, as seen in (4), where bold indicates prominence:

(4a) Juan saw Mariko **leave** the party early.
(4b) Juan saw **Mariko** leave the party early.

In contrast, nonplastic languages, such as Catalan, have reserved locations for focus, usually in sentence initial, preverbal, or final position. The word order may be changed in order to put different focused items in the reserved position. In ASL, the wh-cleft puts the focused material in final position and uses brow raise on the nonfocused part (5) (Wilbur, 1997, 1999).

(5) $\underline{\quad\quad\quad\quad\quad\quad\quad\quad br}$
(i) HELENA SEE KIM PUT BOOK WHERE, TABLE
'The place where Helena saw Kim put the book was the table.'
$\underline{\quad\quad\quad\quad\quad\quad\quad\quad br}$
(ii) HELENA SEE KIM PUT-ON-TABLE WHAT, BOOK
'What Helena saw Kim put on the table was the book.'

br
(iii) HELENA SEE BOOK PUT-ON-TABLE WHO, KIM
'The person who Helena saw put the book on the table was Kim.'

br
(iv) HELENA SEE KIM DO++, BOOK PUT-ON-TABLE
'What Helena saw Kim do was put the book on the table.'

Common Sign Language Structure for Emphasis

Finally, linguistic prominence for 'emphasis' can be separated from focus. While focused items may also be emphasized, not all emphasized items are focused. SLs frequently have a process of 'copying' or 'doubling' certain lexical categories, including modals, negation, wh-words, subject pronouns, quantifiers, and numerals. Such doubling of signs often leads nonsigners to erroneously conclude that sign languages are just repetitive gestures with no systematic structure. But typically, a doubled item will occur sentence initially or in its in situ position, and the double will occur sentence finally. Items such as these are not new information or in focus. The repetition of them by doubling serves to emphasize them as important (but not as new) (Petronio, 1993).

See also: Cooperative Principle; Discourse Markers; Multilingualism: Pragmatic Aspects; Shared Knowledge.

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Sign Language: History

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Sign languages for the most part are examples of languages that have only emerged during the past 300 years. Just as all languages need a community of users, sign languages need a Deaf community. Deaf communities can only exist where there is a large enough concentration of deaf people (Woll and Ladd, 2003). In Europe, this only happened with the development of large towns during the industrial revolution. Before that, signers were scattered across villages and small towns and any signing must have been widely varied. The development that triggered the creation of large Deaf communities and sign languages as we know them today came when schools were set up for deaf children, starting in the late 18th century in Europe. At these schools, children were able to use a single form of a language, developed from the signed languages that were being used by educators. In many countries, education for deaf children has only recently begun and in turn has provided an environment in which sign language can develop. Linguists (e.g., Kegl *et al.*, 1999) have described how the establishment of the first school for deaf children in Nicaragua in the 1980s led to the beginnings of a national sign language.

Counts of the world's languages almost always exclude sign languages. This may be because of the relative newness of sign languages. Many people still mistakenly believe that sign languages are simply forms of spoken languages. Other people do not consider sign languages to be languages at all but merely nonlinguistic systems of gesture and pantomime. All these factors may explain why sign languages have been ignored, along with many spoken languages of disempowered communities.

The Ethnologue database, however, does include sign languages. It lists 103 known sign languages. This figure almost certainly underestimates the number of sign languages in the world, but it is an initial figure with which to work.

History of the Modern Sign Languages

One of the great achievements of comparative linguistics during the past 200 years has been the construction of language 'family trees.' Using clues from similar words and grammars and available knowledge of a language's history, linguists have placed languages into families and described their relationships to each other. The relationships of sign languages can also be traced, but the relationships are different from those of spoken languages. Spoken languages are believed not to arise independently, spontaneously, and rapidly. In general, the spoken languages of today are all assumed to have histories of many thousands of years. Sign languages, on the other hand, clearly arise spontaneously and independently in many areas of the world.

Although we cannot divide sign languages into families in the same way that we can examine spoken languages, we can, nonetheless, find patterns and relationships between sign languages. Specifically, we can see how both world politics and situations specific to the Deaf community, especially education and other 'welfare' arrangements, affect sign languages.

Glottochronological techniques have been applied to sign language to explore historical relationships. The greater the percentage of similar words, the more likely that the two language variants are mutually intelligible and considered the same language. The strength of the glottochronological approach is that it is free from social attitude judgments. However, there are problems with this approach. Basic word lists may be inappropriate for modern sign languages in the developed world and often include words that we might expect to be similar in sign languages because of the use of visually motivated signs, such as DRINK.

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of similarity seen between languages because of visual motivation in signs also makes it necessary to shift the time scale devised for calculating differences between spoken languages.

Woodward (1978) applied a glottochronological analysis to American Sign Language (ASL) and French Sign Language (LSF), finding a similarity score of 60%. Given that historical records demonstrate that ASL as we know it was only formed after LSF was introduced to America in 1816, 60% is a very low figure (this figure would be consistent with two spoken languages that had diverged at least 1700 years ago). Woodward concluded that ASL must have mixed with other sign languages that were already used in America and must be some sort of creole.

Kyle and Woll (1985) examined British Sign Language (BSL), Sign Language of the Netherlands (SLN), Italian Sign Language (LIS), and Walloon (Francophone Belgian) Sign Language. They deliberately chose these because they were not believed to be related to each other. This appeared to be borne out by data from terms for family members, which are often similar in related languages. When Kyle and Woll examined signs for family members, they found no similarities. Yet more than 40% of the signs in the four languages were closely similar or identical. The researchers noted that this figure would be remarkable in unrelated spoken languages and suggested that this high degree of similarity was caused by the presence of visually motivated (iconic) signs in the languages that exhibited similarity independently of historical links. This feature of sign languages will continue to cause problems for the classification of sign languages, unless such examples can be factored out.

McKee and Kennedy (1998) compared ASL, Auslan, New Zealand Sign Language (NZSL), and BSL using a modified version of the Swadesh list of vocabulary items. They found that Auslan, NZSL, and BSL had a similarity of approximately 80% when using the Swadesh list. However, this fell to approximately 64% when they used a semirandom selection of signs. They found that Auslan and NZSL were more similar to each other than they were to BSL. They also found that many Auslan signs that were 'different' from BSL were actually similar to old BSL signs that are no longer commonly in use in Britain. This demonstrates the dangers of comparing a small list of signs and the importance of the need to recognize that some dialects of different sign languages may be more similar to each other than other dialects.

The sign languages of Germany, Austria, and Hungary are closely related, as part of the legacy of the Hapsburg Empire. Teachers of the deaf were trained in Germany and they influenced Deaf communities throughout that empire (McCagg, 1993). Britain's history of empire and commonwealth has meant that sign languages used thousands of miles apart may be very similar. Deaf children from all over the British Empire were educated in Britain and returned to their own countries, bringing their signs with them. Even more significantly, deaf adults joined other immigrants to the colonies, bringing BSL. Consequently, today Auslan, NZSL, and certain dialects of Indian and South African sign languages are intelligible to BSL users.

The first Irish deaf school was set up by a British man in Dublin at the start of the 19th century, and for several decades BSL was used by the pupils. Today, despite subsequent radical changes in the Irish deaf education system that resulted in Irish Sign Language (ISL) being more closely related to LSF, some ISL signs are similar to BSL. Much of this may be accounted for by later borrowing, but other signs are considered by ISL signers to be well-established signs that are not seen as loans (Matthews, 1996). As a result of the Japanese occupation of Taiwan, some dialects of sign language in Taiwan are very similar to Japanese Sign Language. Since Japanese withdrawal, however, and with the influx of large numbers of people from the Chinese mainland, another form of Taiwanese Sign Language has developed that is more similar to the sign language used in Shanghai (Ann, 1998).

World politics has also influenced Israeli Sign Language. In the early years of Jewish settlement in Palestine, most deaf people came from Germany, Hungary, and other Central European countries. These deaf people were relatively well educated and were fluent signers. They had considerable influence in the education system and in the production of the Israeli Sign Language dictionary. Israeli Sign Language today contains many signs similar to those in German Sign Language (Namir *et al.*, 1979).

Educational Systems

Another very strong influence on sign languages has come not from political domination but from educational systems being shared between nations. Frequently, educators from one country have had a religious or missionary agenda when bringing education and their own sign language to other countries.

The language that has had the most profound influence on other sign languages, especially in Europe and North America, has been LSF. The powerful influence of LSF over the world's sign languages should not be underestimated. Influence from LSF can be seen clearly in ISL (Burns, 1998), ASL (Lane, 1984), Russian Sign Language (Mathur *et al.*, 1998), and on some dialects of BSL (particularly where BSL

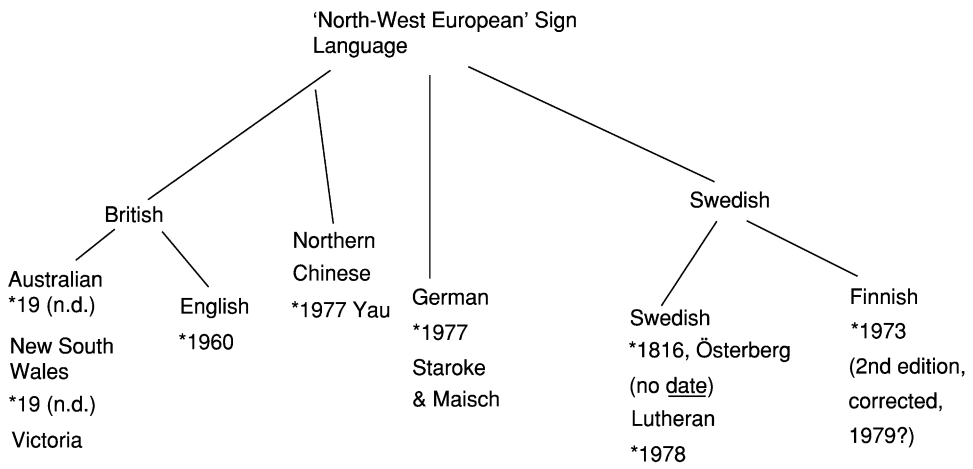

Figure 1 Proposed relationship of 'North-West European' sign languages. After Anderson (1979), cited in Sutton-Spence *et al.* (2001).

has been influenced by ISL). In each case, educators were influenced by the French deaf education system and brought LSF back to their own countries. Other sign languages have also had this sort of influential role. For example, Swedish Sign Language has influenced Portuguese Sign Language through its use of the manual alphabet, after a Swedish educator helped to found a deaf school in Portugal.

ISL, originally heavily influenced by LSF, has also had considerable impact on sign languages throughout the world. Irish nuns and Christian Brothers have taught in Catholic schools for deaf children in countries including India, South Africa, and Australia, and the influence of ISL is noticeable in the sign languages in these countries (Aarons and Akach, 1998).

ASL, also heavily influenced by LSF in the past, now has a major impact on sign languages throughout the world. Gallaudet University offers scholarships to foreign deaf students who take ASL back to their own countries. The United States has been especially generous in providing teacher training for teachers in many Third World countries. Andrew Foster, a deaf African American, led a movement for the establishment of schools in African countries where ASL was introduced as the language of tuition (Lane *et al.*, 1996). In Nigeria, ASL taught in schools is mixing with the indigenous sign languages (Schmaling, 2000). Even when ASL is not deliberately taught in schools in other countries, the presence of fluent signers of ASL can exert an influence. The U.S. presence in Nicaragua has led to influence of ASL on Nicaraguan Sign Language. Scandinavian sign languages have also influenced African and Asian sign languages as aid programs use foreign nationals to help set up schools in developing countries.

Anderson (1979) is one of the few linguists to have attempted to create family trees for sign languages (Figure 1).

In the absence of written or pictorial records, it is unlikely that we will be able to discover earlier data on any of the European sign languages. However, with the recent growth of comparative and cross-linguistic research on sign languages from Asia and Africa, and our increased understanding of the circumstances in which sign languages develop, it may be possible to expand our understanding of the history of sign languages.

See also: Language Change and Language Contact.

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http://www.sil.org/ethnologue.

Sign Language: History of Research

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The first modern linguistic analysis of a signed language was published in 1960: *Sign language structure: an outline of the visual communication systems of the American deaf*. The author was William C. Stokoe, Jr. (1919–2000), a professor of English at Gallaudet College, Washington DC, the only college for the deaf in existence at that time. To be sure, Stokoe was not the first scholar to take an interest in signed languages; during the 18th and 19th centuries, sign language and deafness were the subject of a number of learned reflections in France and England. Unlike the work of Stokoe (and those that followed him), the early works focused not on the linguistic aspects of signed languages, but rather on nonlinguistic issues such as the use of signs in teaching the deaf and the potential for sign to become a universal language. While this article primarily focuses on the history of modern linguistic research on the natural signed languages of the deaf, I shall begin with a brief discussion of some of the important works that predate the work of William Stokoe.

The Prehistory of Sign Language Linguistics

The history of modern sign language linguistics is, in many respects, closely tied to the institutional education of the deaf, which itself began in the late 1760s when Abbé Charles Michel de l'Épee (1712–1789) founded the first school for the deaf in Paris, France. De l'Épee's *L'institution des sourds et muets, par la voie des signes méthodiques* (1776) outlines his method for teaching the deaf through the use of methodical signs, manual gestures that represented specific aspects of French grammar. While this method relied, for the most part, on signs that were either adapted from natural signs or invented (and therefore served as a form of manual French), de l'Épee and his followers understood the value of manual communication as an educational tool and took a serious interest in the natural language (i.e., French Sign Language) used among the deaf (see Seigel, 1969). One of de l'Épee's followers, Auguste Bébian (1789–1839), was an avid supporter of the use of French Sign Language in the classroom. Bébian's most influential work, the one that relates most directly to modern linguistic analyses of signed languages, is his 1825 *Mimographie: essai d'écriture mimique, propre à régulariser le langage des sourds-muets*. In this work, Bébian introduces a sign notation system that is based on three cherological (phonological) aspects: the movement, the *instruments du geste* (the means of articulation), and the *points physionomiques* (applying mainly to aspects of facial expression) (cf., Fischer, 1995). Using this notation system, Bébian presents a dictionary of signs that is organized in such a way as to facilitate independent learning on the part of the students. In addition to serving as an

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educational tool, the *Mimographie* served as a way of standardizing and recording FSL signs, which Bébian hoped would lead to further development and serious study of the language itself (see Fischer, 1993). Although the primary focus of Bébian's work was not exclusively linguistic, his *Mimographie* is a significant contribution to the linguistic study of signed languages in that his notation system represented a phonological approach to the analysis of signs.

A contrasting approach to educating the deaf was adopted in Germany by Samuel Heinicke (1723–1790), considered by many to be the father of oral deaf education. Unlike de l'Épee and his colleagues in France, Heinicke's primary concern was the integration of deaf children into hearing society, a goal best accomplished, he believed, by prohibiting the use of manual signs and instead focusing on speech and speech reading. These two distinct educational philosophies (manualism and oralism) spread throughout Europe in the 18th and 19th centuries; the manual approach of de l'Épee took hold in areas of Spain, Portugal, Italy, Austria, parts of Scandinavia, French Switzerland, and Russia, while the oral approach of Heinicke was adopted by educators in many German-speaking countries and parts of Scandinavia. In the UK, early efforts at institutional education of the deaf favored a 'combined' approach that utilized speech and sign (see Kyle and Woll, 1985), but a strictly oral approach eventually took hold here as well.

In 1815, the American Thomas Hopkins Gallaudet (1787–1851) traveled to Europe and spent time at the Paris school observing and learning the manual educational techniques used there. Gallaudet returned to America and brought with him a deaf Frenchman, Laurent Clerc; together the two men established, in 1817, the first American school for the deaf in Hartford, Connecticut. Clerc's French Sign Language, as well as certain aspects of the methodical signing, was introduced into the school's curriculum, where it mingled with the gestural systems already in use by the deaf children and eventually evolved into what is now known as American Sign Language (ASL). ASL flourished in American schools for the deaf until the middle of the 1800s, at which time interest in the oral method of education grew.

An important event in the history of deaf education, and therefore also in the history of sign language research, was the Second International Congress on Education of the Deaf, held in Milan, Italy, in 1880. At this congress, a resolution was passed stating that oral methods of educating the deaf were superior to manual methods, and in subsequent years there were drastic changes in political and public policy concerning the deaf in Europe. The consensus now was to promote oralism, and signing in the schools was banned. Though the effects of the Milan Congress were felt most directly in European schools for the deaf, the oralist approach to the education of the deaf eventually took hold in America as well and there was a marked decline in the use of ASL. Within the United States, oralism enjoyed widespread acceptance through the 1960s and into the early 1970s.

This shift toward exclusively oral education of the deaf led, quite directly, to signed languages being considered devoid of value, a sentiment that persisted for most of the following century. Had the manual tradition of de l'Épee and his followers not been effectively stamped out by the Milan resolution, interest in signed languages would surely have persisted, and might even have led to earlier recognition of signed languages as full human languages, worthy of linguistic study. As it was, in the first half of the 20th century, the prevailing view of signed languages, both in the field of education and in the field of general linguistics, was that they were little more than crude systems of gestures. Leonard Bloomfield, for example, characterized signed languages as "merely developments of ordinary gestures" in which "all complicated or not immediately intelligible gestures are based on the conventions of ordinary speech" (Bloomfield, 1933: 39). The "deaf-and-dumb" language was, to Bloomfield, most accurately viewed as a "derivative" of language.

Early Sign Language Research in North America

The Pioneering Work of William C. Stokoe

In 1955, William Stokoe accepted a job in the English Department at Gallaudet College (now Gallaudet University). He had received his Ph.D. in English from Cornell University in Ithaca, NY, in 1946, and in the years directly prior to his arrival at Gallaudet, Stokoe had been working on various problems in Old and Middle English, and had come across George Trager and Henry Lee Smith's *An outline of English structure* (1951). The procedural methods for linguistic analysis advocated by Trager and Smith made a lasting impression on Stokoe. As he was learning the basics of sign communication at Gallaudet and, more importantly, watching his deaf students sign to each other, Stokoe noticed that the signs he was learning lent themselves to analysis along the lines of minimal pairs (see Stokoe, 1979). This initial observation led Stokoe to explore the possibility that signs were not simply iconic pictures drawn in the air with the hands, but rather were organized symbols composed

of discrete parts. Stokoe spent the summer of 1957 studying under Trager and Smith at the LSA-sponsored Linguistics Institute held in Buffalo, NY, and then returned to Gallaudet and began working on a structural linguistic analysis of American Sign Language. In April of 1960, *Sign language structure* appeared in the Occasional Papers of the journal *Studies in Linguistics*, published by the Department of Anthropology and Linguistics at the University of Buffalo, New York.

There are two main contributions of this first modern linguistic analysis of a signed language. First, Stokoe presented an analysis of the internal structure (i.e., the phonology) of individual signs; the three primary internal constituents that Stokoe identified are the tabula (position of the sign), the designator (hand configuration) and the signation (movement or change in configuration). Stokoe's analysis of the abstract sublexical structure of signs illustrated that the signs of signed languages were compositional in nature, and were quite unlike nonlinguistic gestures. The second major contribution of the 1960 monograph was the transcription system Stokoe proposed (subsequently referred to as Stokoe notation). Prior to the publication of the 1960 monograph, there existed no means of writing or transcribing the language used by members of the American deaf community; individual signs had been cataloged in dictionaries through the use of photographs or drawings, often accompanied by written English descriptions of the gestures. Stokoe notation provided a means of transcribing signs, and in so doing helped illuminate the internal structure of the language.

In the years directly following the publication of the monograph, Stokoe continued developing his analysis of ASL. With the help of two deaf colleagues, Carl Croneberg and Dorothy Casterline, Stokoe published the first dictionary of ASL in 1965, *A dictionary of American Sign Language on linguistic principles* (*DASL*) (Stokoe *et al.*, 1965). It is an impressive work, cataloging more than 2000 different lexical items and presenting them according to the linguistic principles of the language. Stokoe's two early works formed a solid base for what was to become a new field of research: Sign Language Linguistics.

For the most part, Stokoe's initial work on the structure of ASL was not well received within the general linguistics community (see McBurney, 2001). The message contained within the monograph – that signed languages are true languages – stood counter to the intellectual climate within the field of linguistics at that time. In the years prior to the publication of *Sign language structure*, language was equated with speech, and linguistics was defined as the study of the sound symbols underlying speech behavior. This view of linguistics, and of what constitutes a language, was not easily changed. Furthermore, Stokoe's analysis of ASL was nested within a structuralist framework, a framework that soon fell out of favor. The 1957 publication of Noam Chomsky's *Syntactic structures* marked the beginning of a new era of linguistic theory, where the focus shifted from structural analysis to an explication of the generative capacities of grammar. Because Chomsky's emphasis on grammar as a cognitive capacity was nowhere to be found in the work of Stokoe, it is not entirely surprising that Stokoe's monograph received little attention from linguists of the day.

Just as Stokoe's early work was not well received by linguists, the analysis of ASL along linguistic lines was not something that was readily accepted by deaf educators and related professionals. Though ASL had been used by students outside the classroom all along, oralism had been standard practice in most schools for many years, and Stokoe's seemingly obscure and technical analysis of signs did not change that overnight. In the years directly following the publication of Stokoe's monograph, educators still did not consider the sign language to be a real language worthy of study, and any efforts to utilize signing in the classroom would interfere, they claimed, in the education of deaf students. It was not until the late 1960s and early 1970s that this began to change; around this time many educators, frustrated by the failure of oral methods, began using a combined approach where sign and speech were used together. This period also saw a change in the overall perception of deaf people in America; a changing attitude toward disabled Americans and an increasing articulateness and visibility of deaf leaders brought about a new appreciation for and acceptance of the language of the deaf community. Throughout the 1970s and 1980s, the combined method (a version of which was termed total communication) came to be used in most schools, representing a marked change from strictly oral education. In more recent years, the bilingual approach to the education of the deaf, in which ASL is considered the first language of the deaf and English is learned as a second language, primarily through reading and writing, has gained popularity.

The Development of the Discipline

Even though Stokoe's early work was not acknowledged or accepted by either linguists or educators, Stokoe continued his research on the linguistics of ASL and inspired many others to do the same (see Armstrong *et al.*, eds. 2002). Before long, scholars recognized that ASL evidenced the duality of

patterning that is characteristic of natural languages, and that it therefore warranted the same types of scientific investigation as spoken languages.

In 1970, the Laboratory for Language and Cognitive Studies (LLCS) was established at the Salk Institute for Biological Studies in San Diego, under the directorship of Ursula Bellugi (the laboratory's name was eventually changed to the Laboratory for Cognitive Neuroscience). In the years following its founding, this laboratory hosted a number of researchers who have conducted an impressive amount of research on the grammar, acquisition, and processing of ASL, both at the LLCS and at other institutions across North America (among them are Robbin Battison, Penny Boyes Braem, Susan Fischer, Nancy Frishberg, Harlan Lane, Ella Mae Lentz, Don Newkirk, Elissa Newport, Patricia Siple, Ted Supalla, Scott Liddell, Richard Meier, Geoffrey Coulter, David Corina, and Karen Emmorey). Also in San Diego, graduate students of linguistics and psychology at the University of California researched various aspects of ASL structure; the most well known, perhaps, was Carol Padden, a deaf linguist whose 1983 Ph.D. dissertation (published in 1988) was and continues to be an influential study of the morphosyntax of ASL.

In 1971, the Linguistics Research Lab was established at Gallaudet College. Stokoe served as its director and continued to work, along with a number of other researchers, on the linguistic analysis of ASL. Although the LRL closed its doors in the late 1970s, many researchers who got their start there went on to do important work in the field (among them were Laura Petitto, Carol Padden, James Woodward, and Harry Markowicz). The following year, 1972, Stokoe began publishing the quarterly journal *Sign Language Studies*. Although publication was briefly suspended in the 1990s, for over 30 years *Sign Language Studies* (currently published by Gallaudet University Press and edited by David Armstrong) has served as a primary forum for the discussion of research related to signed languages. The same year also saw the publication of one of Stokoe's later influential works, *Semiotics and human signed languages* (Stokoe, 1972).

The first linguistics Ph.D. dissertation on ASL was written at Georgetown University in 1973 by James Woodward, one of the researchers who had worked with Stokoe in the Linguistics Research Laboratory at Gallaudet. Since that time, well over 200 theses and dissertations have been written on ASL, representing all the major subfields of linguistic analysis. Also in 1973, a section on sign language was established at the annual conference of the Linguistic Society of America. At the 1973–1974 LSA meeting, members of the LLCS presented papers on the phonological structure of ASL and, henceforth, research on ASL began to have an impact on the general linguistic community (Newport and Supalla, 2000).

In 1974, the first conference on sign language was held at Gallaudet, and in 1979 the Department of Linguistics was established at Gallaudet University. At present, there are several other linguistics departments around the United States that have a particular focus on ASL, including Boston University, University of Arizona, Rutgers University, University of Rochester, University of California at San Diego, University of Texas at Austin, University of New Mexico, and Purdue University.

While much of the initial work on ASL focused on the phonological structure of ASL, throughout the 1970s and 1980s an increasing number of American researchers published works that contributed to a broader understanding of the linguistic structure of ASL. Among the areas explored during this period were the following: complex word structure, particularly verbal constructs (Fischer, 1973; Padden, 1983); morphological processes (Supalla and Newport, 1978); verbs of motion and location (Supalla, 1983); and syntactic structure, including nonmanual markers (Liddell, 1980).

Aside from Stokoe's 1960 monograph, the single most influential work in the discipline of sign language linguistics, and, more specifically, in the acceptance of signed languages as real languages, worthy of linguistic study, was Edward Klima and Ursula Bellugi's *The signs of language (SOL)* (Klima and Bellugi, 1979). *SOL* had begun as a collection of working papers at the Salk Institute's LLCS, but was developed into a full-length book and published by Harvard University Press in 1979. Although this volume was, and still is, referred to as the Klima and Bellugi text, it was, in fact, a summary of research that had been conducted by a number of scholars throughout the 1970s, all of whom worked with Bellugi at Salk. In addition to discussing the internal structure of signs, *SOL* contained analyses of, among other things, the origin and development of ASL, historical changes in the language, the nature of iconicity, the grammatical processes at work, the coding and processing of signs, and wit and poetry in ASL. The text was particularly thorough in its treatment of the various aspects of ASL morphology.

In contrast to *Sign language structure*, Klima and Bellugi's *The signs of language* was widely read by linguists as well as individuals working in related disciplines. *SOL* was, and still is, viewed as an important work, one that demonstrates that human language does not have to be spoken, and that therefore the human capacity for language is more profound that the mere capacity for vocal–auditory communication.

While the changing theoretical landscape of Stokoe's time worked against him, it worked to the advantage of Klima and Bellugi; the paradigmatic shift in linguistic theory that followed from the work of Chomsky created a new space for and interest in the study of signed languages. If the universal principles that are proposed to exist in all languages are, in fact, universal, then they should be able to account for language in another modality.

While ASL is used in much of Canada, Langue des Signes Québécoise (LSQ) is used by French deaf people throughout the country. In the late 1970s, a group of deaf researchers, headed by Paul Bourcier and Julie Elaine Roy, began working on a dictionary of LSQ at the Institut Raymond-Dewar in Montréal. Also at this time, Rachel Mayberry conducted some preliminary research on the comprehension of LSQ. In 1982, Laura-Ann Petitto established the Cognitive Science Laboratory for Language, Sign Languages, and Cognition at McGill University, in Montréal, where she investigated the linguistic structure, acquisition, and neural representation of LSQ. Fernande Charron, one of Dr. Petitto's graduate students, was actively involved in the lab's research as well. In 1988, Colette Dubuisson of Université du Québec à Montréal received a research grant from the Social Sciences and Humanities Research Council of Canada (SSHRC) and began working on the linguistics of LSQ; collaborators in this group included Robert Fournier, Marie Nadeau, and Christopher Miller.

Early Sign Language Research in Europe

The earliest work on signed communication in Europe was Bernard Tervoort's 1953 dissertation (University of Amsterdam), *Structurele analyse van visueel taalgebruik binnen een groep dove kinderen* (Structural analysis of visual language use in a group of deaf children) (Tervoort, 1954). This work has not, for the most part, been considered a modern linguistic analysis of a signed language because the signing he studied was not a complete and natural sign language; the Dutch educational system forbade the use of signs in the classroom, so most of the signs the children used were developed among the children themselves and did not, therefore, represent Sign Language of the Netherlands (SLN), a true natural signed language. Nevertheless, Tervoort treated the behavior of the children as largely linguistic in nature, and his descriptions of the signing suggest a complex structural quality.

Research on the linguistics of natural signed languages emerged later in Europe than it did in the United States. Two factors contributed to this (see *Sign Languages in Europe: History and Research*). First, European schools for the deaf maintained a strictly oral focus longer than did schools in North America; signing was discouraged, and signed languages were not understood to be languages worthy of study. Second, the rise in social status and acceptance of sign language that deaf Americans enjoyed beginning in the late 1960s was not, for the most part, experienced by deaf Europeans until later.

European sign language research began in the 1970s and became established most quickly in Scandinavia. Research on the linguistics of Swedish Sign Language began in 1975 at the University of Stockholm, Department of Linguistics, under the direction of Brita Bergman (Bergman, 1982). Other linguists involved in early work on Swedish Sign Language included Inger Ahlgren, Sten Ulfsparre, Birgitta Ozolins, Lars-Åke Wikstroem, and Lars Wallin. In neighboring Scandinavian countries, research on the structure of other signed languages was to follow. In 1979 Marit Vogt-Svendsen began working on Norwegian Sign Language at the Norwegian Postgraduate College of Special Education, near Oslo, and in 1981 Odd-Inge Schröder began a research project at the University of Oslo. Research on the structure of Finnish Sign Language was initiated in 1982, at the Department of General Linguistics at the University of Helsinki, with some of the earliest research conducted by Terhi Rissane.

In Germany, scholars turned their attention to German Sign Language (Deutsche Gebärdensprache, DGS) in 1973 when Seigmund Prillwitz, Rolf Schulmeister, and Hubert Wudtke started a research project at the University of Hamburg (Prillwitz, 1985). In 1987, Dr. Prillwitz founded the Center for German Sign Language and Communication of the Deaf at the University of Hamburg (the center has since become the Institute for German Sign Language and Communication of the Deaf). Several other researchers contributed to the early linguistic investigations, including Regina Leven, Tomas Vollhaber, Thomas Hanke, Karin Wempe, and Renate Fischer. One of the most important projects undertaken by this research group was the development and release, in 1987, of the Hamburg Notation System (HamNoSys), a phonetic transcription system developed in the tradition of Stokoe's early notation. A second major contribution is the International Bibliography of Sign Language; a searchable online database covering thousands of publications related to sign language, the bibliography is an indispensable tool for sign linguists.

Research on the structure of Danish Sign Language began in 1974, with early projects being initiated by Britta Hansen at the Doeves Center for Total Communication (KC) in Copenhagen. Dr Hansen collaborated with Kjær Sørensen and Elisabeth

Engberg-Pedersen to publish the first comprehensive work on the grammar of DSL in 1981, and since that time there has been a considerable amount of research into various aspects of DSL. The early 1970s also marked the start of research on Israeli Sign Language, with linguistic investigations and dictionary development instigated by Izchak Schlesinger, and Lila Namir.

The first linguistics Ph.D. dissertation on a European sign language (British Sign Language, or BSL) was written by Margaret Deuchar (Stanford University, California, 1978). Following this, in the late 1970s and early 1980s, there was a marked expansion of research on the linguistics of BSL (see Lee, 2005). The Edinburgh British Sign Language Research Project (1979–1984) was headed by Mary Brennan and focused primarily on developing a notation system for BSL. In 1978, the Sign Language Learning and Use Project was established at the University of Bristol; this project eventually led to the formation of the Centre for Deaf Studies (CDS) at Bristol, cofounded in 1980 by James Kyle and Bencie Woll. Early research here focused on language acquisition and coding of BSL, but before long scholars at CDS were exploring all aspects of the structure of BSL (Kyle and Woll, 1985). The Deaf Studies Research Unit at the University of Durham was established in 1982, and researchers there worked to complete a dictionary of BSL, originally begun by Allan B. Hayhurst in 1971.

In the mid 1970s, Bernard Mottez and Harry Markowicz at the Centre National de la Recherche Scientifique (CNRS) in Paris began mobilizing the French deaf community and working toward the recognition and acceptance of French Sign Language (LSF). While the initial focus here was social, research on the structure of LSF began soon after. Two of the first researchers to focus specifically on linguistic aspects of LSF were Christian Cuxac (Cuxac, 1983) and Danièle Bouvet in the late 1970s. Another important early scholar was the late Paul Jouison, who, in the late 1970s, worked with a group of deaf individuals in Bordeaux to develop a notation system for LSF, and went on to publish a number of important works.

In Italy, Virginia Volterra and Elena Pizzuto were among the first to do research on Italian Sign Language (LIS) in the late 1970s and early 1980s. Working at the CNR Institute of Psychology in Rome, these women conducted a wide range of investigations into various linguistic, psycholinguistic, educational, and historical aspects of LIS (Volterra, 1987). Also in the late 1970s, Penny Boyes-Braem, who had worked alongside Ursula Bellugi at the LLCS, started a research center in Basel, Switzerland, and began investigating the structure of Swiss–German Sign Language.

Modern linguistic research on the Sign Language of the Netherlands (SLN) began in the early 1980s. Following the publication of his 1953 thesis, Bernard Tervoort continued to publish works on language development and sign communication in deaf children, but the focus of most of his investigations was not, strictly speaking, linguistic. In 1982, the first formal sign language research group was established at the Dutch Foundation for the Deaf and Hard of Hearing Child (NSDSK), with support from Bernard Tervoort at the University of Amsterdam. The initial focus here was research into the lexicon of SLN; Trude Schermer served as the project director for the development of the first SLN dictionary, and worked in collaboration with Marianne Stroombergen, Rita Harder, and Heleen Bos. Research on various grammatical aspects of SLN was also conducted at the NSDSK, and later on at the University of Amsterdam as well.

Throughout the 1980s and 1990s, sign language research continued to flourish across much of Europe, and the number of individual researchers and research groups has grown considerably. Here the focus has been on discussing the earliest work on individual European signed languages. While some European signed languages have received more scholarly attention than others, nearly all natural signed languages found in Europe have been subject to at least some degree of linguistic investigation.

Sign Language Research in Other Parts of the World

Research on the linguistics of natural signed languages outside North America and Europe is, for the most part, less well established, though certainly underway in a number of other countries around the globe. Dictionaries have been compiled for many of these signed languages, and additional research into the linguistic structure of some has been undertaken. Here, I mention only a few. In the mid 1970s, research on Indian Sign Language was undertaken by Madan Vasishta, in collaboration with Americans James Woodward and Kirk Wilson. More recent research by Ulrike Zeshan has revealed that the sign languages of India and Pakistan are, in fact, varieties of the same language, which she terms Indo-Pakistani Sign Language (IPSL). Chinese Sign Language was also the subject of scholarly interest in the mid 1970s, with initial research conducted by Shun-Chiu Yau. The late 1970s and early 1980s saw beginning research on a number of other signed languages, including Taiwanese Sign Language (Julia Li-mei Chen and Wayne Smith) and Brazilian Sign Language (Lucinda Ferreira-Brito). With the exception of Brazilian Sign Language, studies

of the sign languages of South America were not undertaken until the 1990s. Finally, research on the lexicon and structure of Australian Sign Language (Auslan) began in the mid 1980s, with Trevor Johnston's 1989 Ph.D. dissertation (University of Sydney) (Johnston, 1989) serving as the first full-length study of the linguistics of Auslan.

Establishment of Sign Language Linguistics

One indication of Sign Language Linguistics having become a mature field of scholarly endeavor is its professionalization. There have been no fewer than four different series of conferences or symposia dealing with sign language linguistics, nearly all of which were followed by the publication of conference proceedings. The earliest of these was the National Symposium on Sign Language Research and Training. Primarily a meeting of American researchers and educators, the NSSLRT held its first symposium in 1977 (Chicago, IL), and others followed in 1978 (Coronado, CA), 1980 (Boston, MA) and 1986 (Las Vegas, NV). In 1979, the first International Symposium on Sign Language Research was held in Stockholm, Sweden. The ISSLR held a total of five symposia, with additional meetings in 1981 (Bristol, England), 1983 (Rome, Italy), 1987 (Lappeenranta, Finland), and 1992 (Salamanca, Spain). In contrast to the ISSLR, which brought together researchers from North America and Europe, the European Congress on Sign Language Research (ECSL) focused on research being conducted on European sign languages. Four meetings were held by this congress: 1982 (Brussels, Belgium), 1985 (Amsterdam, The Netherlands), 1989 (Hamburg, Germany), and 1994 (Munich, Germany). Finally, the International Conference on Theoretical Issues in Sign Language Research (TISLR) first convened in 1986 (Rochester, NY), and was followed by (largely) biannual conferences in 1988 (Washington, DC), 1990 (Boston, MA), 1992 (San Diego, CA), 1996 (Montreal, Canada), 1998 (Washington, DC), 2000 (Amsterdam), and 2004 (Barcelona, Spain). While both European and North American researchers continue to hold smaller research meetings and seminars, TISLR has become the primary international conference for sign language researchers.

The International Sign Linguistics Association (ISLA) was founded in 1987 to encourage and facilitate sign language research throughout the international community. Three publications have come out of this organization: the newsletter *Signpost*, which first appeared in 1988, became a quarterly periodical in the early 1990s and was published by ISLA until 1995; *The International Journal of Sign Linguistics* (1990–1991); and *The International Review of Sign Linguistics* (1996, published by Lawrence Erlbaum Associates). In 1998 John Benjamins began publishing the peer-reviewed journal *Sign Language and Linguistics*, with Ronnie Wilbur serving as the general editor.

In 1989 Signum Press was created; an outgrowth of the Institute for German Sign Language and Communication of the Deaf at the University of Hamburg, Signum Press publishes a wide range of books and multimedia materials in the area of sign language linguistics, and also publishes *Das Zeichen*, a quarterly journal devoted to sign language research and deaf communication issues. Finally, the online discussion list, SLling-L, has been up and running since the early 1990s and is devoted to the discussion of the linguistic aspects of natural signed languages. With a subscription rate of nearly 400, this electronic forum has become a central means of facilitating scholarly exchange and, thus has played an important role in the growth of the discipline of sign language linguistics.

Overall Trends in the Field

During the early years of sign language linguistics, much of the research focused on discovering and describing the fundamental structural components of signed languages, most particularly at the level of phonology, but morphology and syntax as well. Such discoveries served as proof that, contrary to what had been previously assumed, signed languages were legitimate human languages, worthy of linguistic analysis. Early works tended to stress the arbitrariness of signs and highlight the absence of iconicity as an organizing principle underlying signed languages, and features that were markedly different from spoken languages were not often addressed. The early research revealed that signed languages are structured, acquired, and processed (at the psychological level) in ways that are quite similar to spoken languages. With advances in technology, researchers eventually discovered that largely identical mechanisms underlie the neurological processing of languages in the two modalities.

In later years, once the linguistic status of signed languages was secure, researchers eventually turned their attention to some of the more unusual aspects of signed languages, such as the complex use of space, the importance of nonmanual components, and the presence of both iconicity and gesture within signed languages. In recent years, there has been an increased interest in questions concerning sign language typology; cross-linguistic studies have revealed that signed languages are remarkably similar in certain respects (for example, in the use of space in verbal and aspectual morphology). This has led

researchers to examine more seriously the effects that language modality might have on the overall structure of language (see, for example, papers in Meier *et al*., 2002). Crosslinguistic research on an increasing number of natural signed languages has been facilitated by the development of multimedia tools for the collection, annotation, and dissemination of primary sign language data (most notably SignStream, a database tool developed at Boston University's American Sign Language Linguistic Research Project (ASLLRP), under the direction of Carol Neidle).

One additional research project deserves mention. Since the mid 1980s, linguist Judy Kegl and colleagues have been studying the newly formed deaf community in Nicaragua, and have essentially witnessed the birth of a new language: Nicaraguan Sign Language (NSL). In this living laboratory, researchers have been able to document the unfolding of language within a population of deaf children over time. Results of recent studies indicate that, between generations of signers, the language has evolved from home sign, through a stage of pidginization, and finally into NSL. The full-blown language arose rather abruptly when very young children began to restructure and regularize the variable and impoverished sign pidgin. This unusual project highlights the extent to which the study of signed languages has broadened and deepened our understanding of the nature and structure of human language.

See also: Language Education of the Deaf; Sign Language: History; Sign Languages of the World; Stokoe, William (1919–2000).

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Sign Language: Interpreting

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Locating Sign Language Interpreting

Since the groundbreaking work of William C. Stokoe (1960), it has become widely recognized that natural sign systems are amenable to linguistic description in parallel with spoken languages and are therefore identifiable as complete, independent languages (e.g., Sutton-Spence and Woll, 1999; Lucas, 2001; Liddell, 2003). Sign language (SL) interpreting therefore aligns analytically, professionally, and pedagogically with other forms of interpreting, fitting the prototype formulated by Franz Pöchhacker: "Interpreting is a form of Translation in which a first and final rendition in another language is produced on the basis of a one-time presentation of an utterance in a source language" (2004: 11). In the case of SL interpreting, one of the languages is typically spoken, and one signed. SL interpreting is exceptional in requiring the transfer of meaning between language *modalities* (visual-gestural and oral-aural) as well as languages.

SL interpreting differs in several key ways, however, from those forms dominant within the early years of interpreting studies (where analysis often centered upon international gatherings, war crimes trials, and the like). Firstly, its norms correspond much more closely to those of community interpreting (CI) than to those of conference interpreting (Mikkelson, 1999). In particular, since SLs have occupied the position of 'minority languages' (in socioeconomic and geopolitical terms), issues of relative power and status – of the interpreters and of their clients, expressed through their languages – have been prominent in the theoretical development of the field. Furthermore, like CI, the work of SL interpreters is most commonly bilateral; however, the biological inaccessibility of spoken utterances to Deaf people presages a profession staffed almost exclusively by people whose dominant language is spoken. This has resulted in a highly imbalanced workforce wherein issues of cultural allegiance therefore become intense (Mindess, 1999). Secondly, the nature of the language pairs present in SL interpretations makes simultaneous, rather than consecutive, interpreting by far the more typical form, largely because the linguistic interference effects are minimized when the languages are produced and received through entirely different channels. The tacit expectation is therefore likely to be that SL interpreters will work in the simultaneous mode, despite the fact that they will be transferring meaning between modalities as well as languages – twice the task, to be done in a fraction of the time! Finally, it is necessary to distinguish between SL interpreting and transliteration: the latter term – particularly associated with the United States (Winston, 1989) – refers to the transfer of meaning from a spoken language to a manually coded form of the same language (e.g., English to Signed English). The linguistic status of these forms remains in dispute (Lucas, 2001), but either they are essentially English – in which case, no interpretation, in the sense defined here earlier, is taking place – or they fall within the range of 'natural' SL variation – in which case no exceptional descriptive apparatus is required to account for SL interpreting using such forms.

Historical Background

Historically, SL interpreting of some description has doubtless existed wherever communication has been mediated between signing and nonsigning people. The hearing children of Deaf, signing parents, becoming fluent bilinguals through natural language transmission, were most likely to act as interpreters (Preston, 1994). This task began to receive formal

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recognition in the 1960s, with the first known attempt at institutionalization taking place in 1964 with the formation of the Registry of Interpreters for the Deaf in the United States (Frishberg, 1990). The need to carve out a distinct role for interpreters reflected anxiety about the conflation of interpreting with other relational positions, such as those of assistants or advocates, and with separable professions whose members had often undertaken to mediate communication – e.g., welfare officers, teachers, priests. The drive to formalize and tightly define the interpreter's role has been addressed in widespread debates over codes of ethics that recognize the interpreter's unique position of responsibility (Tate and Turner, 1997). In recent decades, SL interpreting has thus developed in many countries as an independent profession, regulated in order to institutionalize altruism, with increasingly structured and extensive education leading to professional status, and practitioner associations providing collective representation and strategic development (Stewart *et al.*, 1998).

Models and Paradigms

As SL interpreting emerged, the dominant paradigm inherited from the wider field inscribed a role representing the interpreter as a mere conduit through which messages could be transferred. Interpreters were understood and expected to have no more influence on meaning or on discourse dynamics than the handheld apparatus has on a cell phone conversation. In keeping with the paradigm, attempts to describe and explain the process of interpreting centered upon the desire to unpack the cognitive activity required, sometimes acknowledging the relevance of social context (Cokely, 1992).

In the late 1980s, however, an alternative perspective rose to prominence, inspired in particular by recognition that the 'conduit' model described a passive role for SL interpreters that was simply unrealistic. The natural lexical disparities between languages and the nonlinear, multilayered structure of naturally occurring dialogue required practitioners actively to reach decisions about how to convey meanings and maximize communicative equivalence (Roy, 2000a). In the United Kingdom, the switch to an 'interactional' model was signified by a small but momentous change in the SL interpreters' code of ethics: to the end of the statement "Interpreters shall interpret truly and faithfully and to the best of their ability between the parties without anything being added or omitted" were added the three significant little words "from the meaning." This paradigm shift also drew upon the steady growth in awareness of CI in general: as in the wider field (see Wadensjö, 1998), the normative image of the SL interpreter as an 'invisible' nonpresence within the prototypical interpreting triad has been superseded by accounts that explore the coparticipant status of the interpreter (Metzger, 1999; Harrington and Turner, 2001).

A key element in the development of understandings of the SL interpreter's role has been the attention paid to matters of power and control in discourse. Popular social misperceptions of Deaf people as intellectually incapable (for discussion, see Lane, 1992) have historically led to a paternalistic approach toward them. Since the profession began to grow independently, interpreters have been at pains to identify their impartiality. Nevertheless, a recurring train of thought (e.g., Baker-Shenk, 1991) has suggested that the interpreter's role as a communication broker also affords an opportunity to act as an 'ally,' engaging in the social repositioning of Deaf people by prioritizing Deaf participants' contributions and preferences. While such radical ideas do circulate, the strong but misguided normative expectation – that interpreters are communicatively neutral, do not change the course of dialogue, and make no self-generated contribution to interaction – remains largely in place, making the education of consumers a continuing priority (Marschark *et al.*, 2005).

Contexts and Developments

SL interpreting takes place across a full, growing range of social activity. Of particular significance to the deaf community is interpreting for deaf children during compulsory education (Seal, 2004): this is one community setting in which spoken language interpreting rarely occurs. The interpreter undertakes essentially the same process of transmitting meanings between pupils and teachers, although children are not expected to make firm teacher/interpreter role distinctions in this environment. Legal interpreting has also received greater attention in recent years (Turner and Kegl, 1995; Brennan and Brown, 2004), with researchers having uncovered particular translational dilemmas as regards the quality of evidence maintained in the transfer of meaning across modalities. While instances of interpreting in such settings are now relatively commonplace, there remain less-investigated areas, such as interpreting for Deafblind people (Peckford, 2000) and using 'international signing,' especially at multilingual conferences (e.g., Locker McKee and Napier, 2002).

Interpreter education increasingly follows the paths familiar in the broader field as SLs are steadily recognized by governments and formally taught up to higher educational levels. Innovative practices are required in order to deliver effective training

bilingually, integrating the contributions of Deaf and hearing educators (Roy, 2000b). In the early 21st century, new challenges face trainers, strategists, and policy makers (see Brien *et al.*, 2004). Among these is the growing presence of Deaf practitioners: their work often involves prepared texts or 'relay' interpreting (i.e., two practitioners conveying meaning via successive steps, each partially modifying the source message, between producer and receiver) and thus further problematizes familiar terms and definitions already questioned by analysts (e.g., Turner and Pollitt, 2002). Technological advances promise an expansion in remote interpreting, with digital video images obviating the need for face-to-face interaction. Early exploration of 'virtual signing,' using digitally created avatars, suggests the theoretical potential for the replacement, in the long term, of human mediation by technological resources: for the time being, human interpreters, often in unpredictable circumstances, perform this highly complex linguistic work.

See also: Bilingualism; Conversation Analysis; Language Education of the Deaf; Minorities and Language; Multilingualism: Pragmatic Aspects; Power and Pragmatics; Sign Language: Syntax.

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Relevant Websites

http://www.efsli.org.uk – European Forum of Sign Language Interpreters (EFSLI) (click on "links").

http://www.visicast.sys.uea.ac.uk – Virtual Human Signing at UEA (University of East Anglia).

http://www.rid.org – Registry of Interpreters for the Deaf.

Sign Language: Lexicography

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The modern concept of a dictionary as a table of words arranged alphabetically, including their pronunciation, spelling, and meaning, originated in the 17th century. The first dictionary, a table of alphabetically listed hard English words, was published in London in 1604.

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This brief history illustrates most of the questions and problems a lexicographer may come across in carrying out his or her work: What is the status of a dictionary, who is the potential user, what constitutes a lemma, who decides what should go into the dictionary and why, what are the limits of a lemma definition, what is the source of information, and who is a proper informant?

Although the first known 'dictionary' of signs was produced by John Bulwer in 1644, sign language lexicography did not really begin until 1965 when the first sign language dictionary based on linguistic principles was published (Stokoe *et al.,* 1965). This dictionary, DASL, has become the inspiration for sign language researchers.

In the next section, the most important aspects of sign language lexicography and the making of sign language dictionaries are discussed. There are two sets of issues: (1) those that relate to the process of making a dictionary and its organization: the type and function of the dictionary, data collection, informants, and the lexeme and its depiction, and (2) those that relate to the status of the language as a minority language: standardization, variants, and the dictionary as proof of a sign language being a full-fledged language.

Making a Dictionary and Its Organization

The history of most sign languages is one of oppression by hearing educationalists. Until the mid-1960s, most sign languages were not viewed as full-fledged languages, comparable to spoken languages. However, after that, once sign language research began to flourish in a country, usually the first major task was the compilation of a dictionary.

Type of Dictionary

The majority of published sign language dictionaries in book form are bilingual dictionaries: They usually offer translations of signs into the written language of the hearing community. Problems stem from the absence of orthographies for sign languages. Most sign language dictionaries produced in the 1970s and 1980s were unidirectional bilingual dictionaries (O'Rourke, 1978; Sternberg, 1981).The loose-leaved SLN (Netherlands Sign Language) children's dictionary (Schermer *et al.*, 1988) is an example of a simple bidirectional, bilingual dictionary: It can be organized according to hand shape or alphabetically. Examples of the most sophisticated bidirectional and bilingual dictionaries in book form are the Auslan dictionary (Johnston, 1989), the dictionary of British Sign Language (Brien, 1992), the dictionary of Italian Sign Language (Radutzky, 1992), and the Finnish Sign Language Dictionary (Malm, 1998). Examples of bidirectional, bilingual dictionaries on CD-ROM or on the Internet are Signs of Australia (Johnston, 1997),

Relevant Websites

http://www.efsli.org.uk – European Forum of Sign Language Interpreters (EFSLI) (click on "links").

http://www.visicast.sys.uea.ac.uk – Virtual Human Signing at UEA (University of East Anglia).

http://www.rid.org – Registry of Interpreters for the Deaf.

Sign Language: Lexicography

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several CD-ROMs on SLN (Schermer *et al.*, 1996–2002), and the digital sign language dictionary on VGT (Flemish Sign Language; Van Herreweeghe *et al.,* 2004). These dictionaries represent the lexicon of a signed language by an ordered sequence of head signs, which they subsequently explain in the second language. This requires a detailed analysis of the features of phonology of signs.

Monolingual dictionaries, offering citation forms and definitions in the sign language itself, are virtually impossible to make in book form. Today, with the availability of CD-ROM technology and digitized video stored in computerized databases, it is possible to make a monolingual dictionary. A prototype of such a dictionary was produced by Brien, Brennan, and Collins in 1996: the BSL/English Dictionary of Deaf Community and Culture on CD-ROM. In this dictionary, the meanings of signs are given directly in BSL, as is grammatical information on the type of sign. A great advantage of CD-ROM applications over traditional sign dictionaries is that they provide the users with demonstrations of how the sign is produced and offer the possibility of searching the linguistic parameters of a sign.

Web technology will make it feasible in the near future to produce true monolingual sign language dictionaries. To do full justice to the richness of the lexicon of sign languages, it is necessary to develop and produce monolingual dictionaries. Bilingual dictionaries should be based on monolingual dictionary information to avoid translation difficulties between the sign language and the spoken language of a community.

Function of a Dictionary

Spoken language dictionaries evolved from listing only difficult words to archiving the entire lexicon of a language: The number of words in a dictionary is seen as an indication of the complexity and thus the status of a language.

Sign language dictionaries are usually made for two purposes: to describe the language of the Deaf community and to make the language accessible for (hearing) language learners. The majority of deaf children have hearing parents, who need to learn a completely new language and require course materials and dictionaries to accomplish that task. More and more, we find examples of thematic dictionaries or dictionaries for specific groups and subjects: parents, children, teachers, and second language learners.

Data Collection and Informants

Spoken language lexicographers have access to large digital corpora of texts, which permit easy searching and concordance extraction. In contrast, sign language lexicographers have to rely on information from sign language users. The importance of data collection has long been neglected in sign language lexicography. In the early dictionaries, the source of the information in the dictionary was often not specified. In extreme cases, the entire dictionary was based on the information of one informant, the editor.

However, it is now common practice for sign lexicographers to define a set of criteria that informants have to meet. Most importantly, informants must be deaf native sign language users, preferably with deaf parents, and they have to be well-respected members of the Deaf community; in some cases, hearing children of deaf parents whose first language is a sign language are involved in data collection. Sign language dictionaries that are based on the information of hearing sign language users only (teachers, priests, linguists) are often not accepted by the Deaf community.

In contrast to spoken language dictionaries, which only include existing words, sign language dictionaries often contain not only existing signs but also newly developed signs. For almost a century, the use of sign languages has been banned in education in Western Europe and North America. As a consequence, there are deficiencies in the sign language corpora compared to the spoken languages of the hearing community. The expansion of bilingual (sign language/ spoken language) programs and the continuing growth of educational interpreting at secondary and tertiary levels have created an urgent need for a coordinated effort to identify signs for technical terms and for school subjects. It is very important for native deaf signers to be involved in the development of new signs. One productive approach is to work with a team of native deaf signers, (deaf) linguists, and people who have specific content knowledge. Excellent examples of a series of dictionaries aimed at a specific profession for which new signs had to be developed are the sign language dictionaries produced by the Arbeitsgruppe Fachgebärden in Hamburg; for example, the one for Psychology.

The Lexeme and Its Depiction

Several issues must be considered in the debate over what constitutes a lemma. One issue is the productive versus the frozen (established) lexicon. Some lexicographers feel the need to incorporate both elements, since the frozen lexicon is such a small portion of the possible lexicon of most sign languages. Other lexicographers claim that their primary interest should be to define the lexical signs of a language. They make a distinction between a lexeme and a sign: Not all signs are lexemes but all lexemes are signs.

The grammatical information for a given lexeme poses difficulties for most sign language lexicographers: In most cases, there is no reference grammar for a sign language of the sort that would provide this type of information.

A feature specific to sign language dictionaries is the depiction of the signs: drawings, photographs, or, on CD-ROM or the Internet, a digital movie. The problem with drawings and photographs is that the movement and the nonmanual features of a sign cannot be depicted accurately. Digital movies are preferable. However, movies pose their own set of issues: determining what is the exact form of the citation (what should be done with optional nonmanual components, such as mouthings in some sign languages) and who can be a model (the model in a movie is often known to the deaf community and may be subject to criticism). To produce the most accurate movies, much research has been undertaken on background color, light, clothes of the model, signing speed, and the like.

Role of a Sign Language Dictionary, Standardization, and Variation

Role of a Sign Language Dictionary

Dictionaries clearly are much more than a text that describes the meaning of words. The word 'dictionary' suggests authority, status, and scholarship: The size of the dictionary, the paper that is used, and its cover all contribute to the status of the language described in it. The first dictionaries of sign languages not only served the purpose of describing the lexicon of the language; for most Deaf communities, they were also historic publications of paramount social importance that could be used as powerful instruments in the advancement of quality bilingual education, as well as in the full exercise of the constitutional rights of deaf people. Many introductions to sign dictionaries mention that their purpose is to elevate the status of the sign language, which may not have been considered a real language.

Standardization and Variation

Like spoken languages, sign languages exhibit variation at all levels in phonology, morphology, and syntax. Furthermore, studies have shown that, as in spoken languages, variation in sign languages correlates with social factors, such as region, age, gender, ethnicity, and socioeconomic status.

Sign language dictionaries deal with variation in the language in different ways. The majority of sign lexicographers attempt to produce a standardizing dictionary of the sign language or at least nominate one variant as the preferred one. Even if it is not the intention of a sign language lexicographer, the general public often interprets the information in the dictionary as *pre* scribed, rather than *des* cribed language. The fact that sign languages lack a written form confronts lexicographers with a problem of determining which form of the sign is the correct one and should therefore be the citation form in the dictionary. Lexicographers have to determine, one way or the other, whether an item in the language is used by the majority of a given population and can thus be labeled standard or whether it is a dialect form. Although the more sophisticated dictionaries account for variation in one way or the other, few dictionaries have been based on extensive research into language variation. The new web technology and computerized database technology may solve this problem in the near future, helping sign language lexicography come of age.

See also: Sign Language: Interpreting.

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Sign Language: Morphology

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Morphology deals with the regular, minimal, meaning-bearing units in language – morphemes – which are words or parts of words. Morphemes can effect changes in meaning by signaling the creation of a new word or a change in word class (derivation), or by signaling grammatical information such as case, number, person, aspect, tense, etc., (inflection) (*see* **Morpheme**).

Individual signs in a signed language are the basic equivalent of words in a spoken language. Each signed language has a vocabulary of conventional lexical signs which are often monomorphemic. In the closely related Australian and British Sign Languages (Auslan and BSL, respectively), for example, none of the formational aspects of the sign SISTER has any separate meaning of its own (*see* **Sign Language: Phonology** and **Sign Languages of the World**). See **Figure 1**.

The type of morphological processes commonly found in signed languages seems to be influenced by the fact that most lexical signs are monosyllabic or, at most, bisyllabic (Johnson and Liddell, 1986; Liddell, 1984; Sandler, 1995; Wilbur, 1993). Signed languages appear to favor simultaneous sign internal modification, rather than the concatenation of morphemes. This may be related to the fact that the larger size of the articulators in signed languages (the hands, arms, face, and body) means that each sign gesture takes more time to execute than each spoken articulatory gesture (Bellugi and Fischer, 1972). If segments are added to a stem, producing a multisyllabic sign, processes of assimilation and deletion tend to restructure the resulting sign into a bisyllabic or monosyllabic one with simultaneously expressed morphemes.

This process is most clearly seen in the formation of new signs through compounding. In Auslan/BSL, for example, the sign CHECK derives from SEE and MAYBE. SEE has lost its outward movement with final hold and has incorporated the anticipated handshape of MAYBE, while MAYBE has lost its repeated twisting movement. The compound has a single syllable (Sutton-Spence and Woll, 1999). See **Figure 2.**

With the exception of prefixes in Israeli Sign Language (Aronoff *et al.*, 2000), the few affixes that have been identified in signed languages are all suffixes. Indeed, many appear to have grammaticized from one of the elements in erstwhile compounds. For example, a negative suffix –NEG can be attached to AGREE to derive the new sign DISAGREE, in Auslan/BSL. The affix appears to be a reduced form of an independent sign, which itself seems related to a gesture (meaning something like 'not know') shared with the hearing culture. A similar suffix (in both form and meaning) has been identified in a number of signed languages (Zeshan, forthcoming). See **Figure 3**.

Researchers have also identified a derivational process whereby stem signs for certain units that are enumerable (e.g., TOMORROW, WEEK) may incorporate

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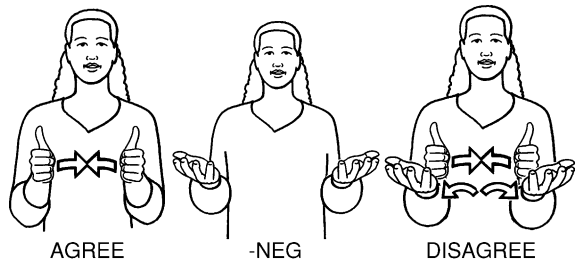

Figure 3 Derivation through negative affixation. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

Figure 5 Derivation through movement modification. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

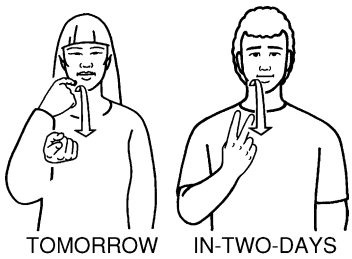

Figure 4 Number incorporation in Auslan/BSL. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

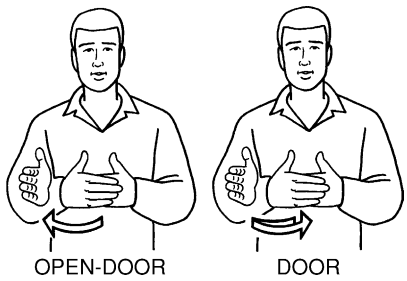

Figure 6 The derivation of a nominal from a verb. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

numeral handshapes to create specific signs for specific numbers of these units (e.g., IN TWO DAYS, TWO-WEEKS). See Figure 4.

Modification of the quality of the movement in a sign can also be used to derive new signs, such as BUSY from WORK (Auslan/BSL). A similar process derives NARROW-MINDED/PRUDISH from CHURCH in ASL, and this has been compared to templated morphology as found in Semitic languages (Fernald and Napoli, 2000). See Figure 5.

It is often difficult to clearly distinguish between stem modification or suprasegmental modification in signed languages. In many respects, modifying the movement parameter of a sign is akin to changing a vowel (a stem modification); however, in others, modifying for manner of movement is akin to tone (a suprasegmental modification). The derivation of nouns from verbs in some signed languages is a case in point.

Originally described in ASL (Supalla and Newport, 1978), this morphological process, in which nouns are derived from verbs by a sign-internal modification of movement, also has parallels in other signed languages. The continuous single movement found in the verb is modified to be restrained and tense, and often repeated, in the noun, as in the Auslan/BSL pair DOOR and OPEN-DOOR. See Figure 6.

However, typical exemplars in many signed languages overlap considerably in both form and meaning, and the productivity of the derivational process appears influenced by underlying iconicity. Though it is to be expected that derivational paradigms in any language will be restricted and morpheme productivity limited, for some signed languages at least the degree of grammaticization of these modifications is as yet uncertain.

Morphemes and morphological processes can also signal the inflection of existing signs, adding grammatical information (e.g., marking for number, person, aspect, etc.) while maintaining the essential lexical meaning of the stem. Inflections in signed and spoken languages can be found on nominals or predicates (verbs and adjectives).

Inflection by concatenative affixation appears to be extremely rare in signed languages. One example is a nominal genitive suffix in Auslan which is used to signal possessive relationships between two nouns. This sign is not used as a free morpheme of any kind, but only as a suffix, as in MOTHER+GEN SISTER+GEN HUSBAND to mean 'mother's sister's husband.'

Data from a growing number of signed languages have shown that all of them exploit space and movement patterns inherent in sign formation to convey information regularly encoded in the inflectional

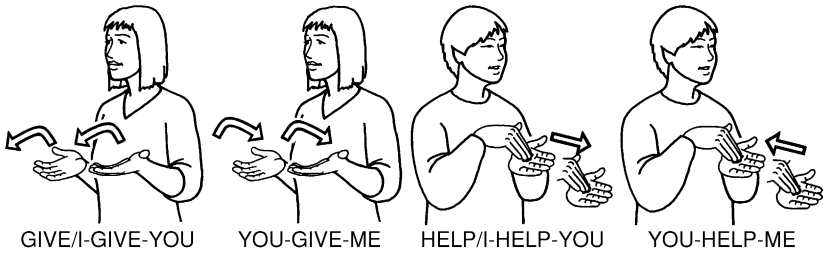

Figure 7 Inflection ('person agreement') through movement modification in the Auslan/BSL sign GIVE, and the Auslan sign HELP. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

systems of spoken languages. Indeed, the markings often appear to be in part phonologically conditioned. For example, space will be exploited when a sign is not anchored throughout its production at a particular location on the body, or if its movement parameter is not specified for repetition.

These processes are exemplified in both nominal and verbal inflections. In nominal signs, inflection for plurality can be marked by repetition (often in different locations if the sign is not anchored). Spatial modifications can also signal topographical information about referents (e.g., a noun may be placed in the signing space to mean 'thing-at-such-and-such-a-place').

A basic tripartite division of ASL verb signs as plain, spatial, and agreeing (Padden, 1988) has been found to apply to signed languages to which the framework has been applied (with or without various modifications and reinterpretations).

For example, no sign language lacks the ability to modify the direction of the movement parameter of agreeing verbs so that the beginning and end points of these signs move between regions in the signing space associated with the *subject* (or the *agent*) and the *object* (or the *patient*) of the action. (Alternative interpretations of this phenomenon include those that assign *source* and *goal* as the underlying significance of these locations (Johnston, 1991; Meier, 1982).) The sign glossed as GIVE in many signed languages can have the meanings 'I give you' when moved from the signer to the interlocutor, or 'you give me' when moved from the interlocutor toward the signer, and 'he/she gives him/her' when moved between two (real or imaginary) third entities in the signing space. In spatial verbs the same mechanism is exploited to mark spatial and locative information. (Plain verbs are unable to exploit location and direction of movement in this way because they have a fixed place of articulation.) See Figure 7. For Padden and many linguists, the modifications on agreeing verbs are analyzed as non-concatenative affixes inflecting for person, while for other linguists the modifications indicate locations, depicting actions within a mental space representation of an event (Liddell, 2003).

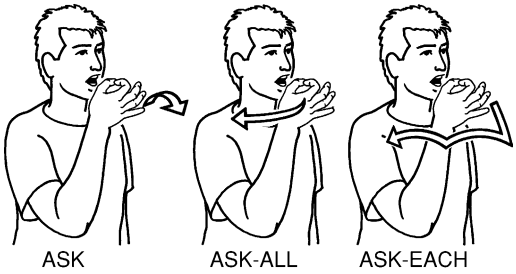

Figure 8 Inflection ('distribution') through movement modification in Auslan/BSL. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

A second related phenomenon in verb inflection refers to distribution and involves a 'plural sweep' in which the end point is moved in an arc through locations associated with referents or relocated and redirected at each in a series of repetitions, as in the modification of ASK to mean 'ask all' or 'ask each.' See Figure 8.

Similarly, modifications can be made to the movement parameter of verb signs to express a number of aspectual nuances. Researchers in many signed languages have identified similar patterns of movement modification, with similar meanings, as first described in ASL (Klima *et al.*, 1979). For example, similar patterns of cyclic and repeated movements also convey durational and continuative aspect (e.g., 'ask repeatedly'). Aspectual and distributional modifications can also combine to create a morphologically complex multilayered pattern of modifications (e.g., 'ask all repeatedly').

Verbal modifications based on suprasegmental modifications involve nonmanual features such as facial expression. A large number of facial expressions have been identified across many signed languages. Two found in Auslan/BSL – 'th' (as if producing an interdental fricative) and 'mm' (a bilabial protrusion) – are examples also found in some

other signed languages. The former implies lack of control or inattention, the latter implies relaxed normality and when co-articulated with DRIVE they mean 'drive carelessly' and 'drive relaxed and normally', respectively.

As with the derivation of nominals, the extent of the grammaticization of movement modifications inflecting for aspect and manner, and their obligatoriness, within many signed languages, is still yet to be determined, or, at minimum, appears to vary.

Though many signs are monomorphemic or bimorphemic, highly iconic lexical signs, of which there are significant numbers in any signed language, often have more than two identifiable morphemes – they are multimorphemic. Take the highly iconic sign DRINK/CUP (as if holding a cup to one's mouth) which is found in many signed languages with a similar form and meaning. It consists of at least three morphemes: The handshape signifies holding a cup, the movement signifies turning a cup toward the mouth, and the location signifies the mouth.

Importantly, there are a significant number of signs produced in many utterances in any signed language which are neither lexical nor grammatical signs. They display a moderate to high degree of conventionality in the form and meaning of handshapes, while movements and locations appear to be draw on particular representational exigencies of the moment. These signs are variously called classifier signs or polymorphemic signs.

Polymorphemic signs are used to convey a large amount of visual spatial information about participants in a situation (e.g., the size and shape and location of entities, how they may be handled, their position in space, and their path and manner of movement). In the following sign, the upright index finger represents a person, the palm the front of the body, the movement left to right the path, and the bobbing up and down movement a walking action. See Figure 9.

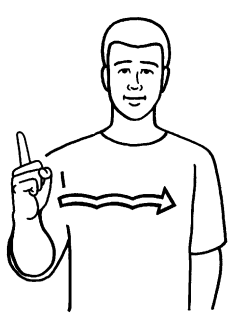

PERSON-WALK-BY-FROM-RIGHT-TO-LEFT

Figure 9 A complex polymorphemic sign found in many signed languages. Reproduced from Johnston T & Schembri A (eds.) (2003). *The survival guide to Auslan: a beginner's pocket dictionary of Australian Sign Language*. Sydney: North Rocks Press with permission.

No signed language appears to lack these types of signs, and a considerable literature has been generated in an attempt to analyze them systematically in linguistic terms (Emmorey, 2003; Engberg-Pedersen, 1993; McDonald, 1982; Schick, 1990; Supalla, 1986). They can create monosyllabic polymorphemic signs which are unattested in spoken languages and which resist analysis into roots and listable morphemes. They remain a problem area for linguists (Schembri, 2003).

Original research into signed languages aimed to establish them as real languages with language-like characteristics. Subsequent research has aimed to establish the validity of linguistic universals that had been made on the basis of the study of spoken languages only, or to determine the impact of modality on language structure (e.g., Meier *et al.*, 2002).

Another line of research seeks to acknowledge the degree to which signed languages are different from spoken languages. Depending on how the dynamics of spoken language are understood, these differences have been perceived as additional special characteristics peculiar to language in the visual-gestural modality, or as differences of degree only which have been occasioned by modality, e.g., some representational resources, such as space, are universally exploited in signed languages. For some linguists, the exploitation of a spatial and iconic morphology is seen as unique to signed languages but is nonetheless analyzed as part of a fully linguistic system of agreement (Aronoff *et al.*, 2000), for others it represents a fusion of elements of language and gesture (Liddell, 2003). For yet others, these face-to-face representational resources are recognized as available to *all* language users – even if they are underexploited in spoken languages and are ignored in most grammars. They saturate the lexico-grammar of signed languages because they are always available in languages that are embodied and, of necessity, always in view (Johnston, 1992).

It is as yet unclear if all of the phenomena of sign language morphology can be properly dealt with as 'linguistic,' narrowly defined. Insofar as it may contribute to the redefinition of what is 'language' or what is properly 'linguistic,' the short history of the study of signed languages belies its relative importance to linguistics.

See also: Classifiers and Noun Classes: Semantics; Compound; Inflection and Derivation; Morpheme; Morphology; Possession, External; Sign Language: Phonology; Sign Languages of the World.

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Sign Language: Overview

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In many ways, sign languages are like spoken languages: They are natural languages that arise spontaneously wherever there is a community of communicators; they effectively fulfill all the social and mental functions of spoken languages; and they are acquired without instruction by children, given normal exposure and interaction. These characteristics have led many linguists to expect sign languages to be similar to spoken languages in significant ways. However, sign languages are different too: As manual–visual languages, sign languages exploit a completely different physical medium from the vocal–auditory system of spoken languages. These two dramatically different physical modalities are also likely to have an effect on the structure of the languages through which they are transmitted.

It is of special interest, then, to compare natural languages in the two modalities. Where the two systems converge, universal linguistic properties are revealed. Where they diverge, the physical medium of transmission is implicated, and its contribution to the form of language in both modalities is illuminated. Neither can be seen quite so clearly if linguists restrict their study to spoken language alone (or to sign language alone). For this and other related reasons, it is often remarked that sign languages provide

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us with a natural laboratory for studying the basic characteristics of all human language.

Once the existence of natural language in a second modality is acknowledged, questions such as the following arise: How are such languages born? Are the central linguistic properties of sign languages parallel to those of spoken languages? Is sign language acquired by children in the same stages and time frame as spoken language? Are the same areas of the brain responsible for language in both modalities? What role does modality play in structuring language? In other words, within the architecture of human cognition, do we find the structure of one language 'faculty' or two? Although there is no conclusive answer to this deceptively simple question, an impressive body of research has greatly expanded our understanding of the issues underlying it.

How Do Sign Languages 'Happen'?

Evolution made language possible scores of millennia ago, and there is no human community without it. What sign language teaches us is that humans have a natural propensity for language in two different modalities: vocal–auditory and manual–visual. Since the human ability to use language is so old, and since speech is the predominant medium for its transmission, it seems that spoken languages are either also very old or descended from other languages with a long history. However, sign languages do not have the same histories as spoken languages because special conditions are required for them to arise and persevere, and for this reason they can offer unique insight into essential features of human language.

The first lesson sign language teaches us is that, given a community of humans, language inevitably emerges. Although we have no direct evidence of the emergence of any spoken language, we can get much closer to the origin of a sign language and, in rare instances, even watch it come into being.

Wherever deaf people have an opportunity to gather and interact regularly, a sign language is born. Typically, deaf people make up a very small percentage of the population (approximately 0.23% in the United States, according to the National Center for Health Statistics, 1994) so that in any given local social group, there may be no deaf people at all or very few of them. The most common setting in which a deaf community can form, then, is a school for deaf children. Such schools only began to be established approximately 200 years ago in Europe and North America. On the basis of this historical information and some reported earlier observations of groups of people using sign language, it is assumed that the oldest extant sign languages do not date back farther than approximately 300 years (Woll *et al.*, 2001). Currently, linguists have the rare opportunity to observe the emergence and development of a sign language from the beginning in a school established in Nicaragua only approximately 25 years ago – an opportunity that is yielding very interesting results.

Graduates of such schools sometimes choose to concentrate in certain urban areas, and wider communities arise and grow, creating their own social networks, institutions, and art forms, such as visual poetry (Padden and Humphries, 2005; Sandler and Lillo-Martin, 2005; Sutton-Spence and Woll, 1999). Deaf society is highly developed in some places, and the term 'Deaf' with a capital D has come to refer to members of a minority community with its own language and culture rather than to people with an auditory deficit.

It is not only the genesis of a sign language that is special; the way in which it is passed down from generation to generation is unusual as well. Typically, fewer than 10% of deaf children acquire sign language from deaf parents, and of those deaf parents, only a small percentage are native signers. The other 90+% of deaf children have hearing parents and may only be exposed to a full sign language model when they go to school. These social conditions taken together with certain structural properties of sign languages have prompted some linguists to compare them to spoken creoles (Fischer, 1978).

Another way in which a deaf social group and concomitant sign language can form is through the propagation of a genetic trait within a small village or town through consanguineous marriage, resulting in a proportionately high incidence of deafness and the spread of the sign language among both deaf and hearing people. Potentially, this kind of situation can allow us to observe the genesis and development of a language in a natural community setting. Although the existence of such communities has been reported occasionally (see Groce, 1985), no comprehensive linguistic description of a language arising in such a community has been provided.

These, then, are the ways in which sign languages happen. The existence of many sign languages throughout the world – the number 103 found in the Ethnologue database is probably an underestimate – confirms the claim that the emergence of a highly structured communication system among humans is inevitable. If the oral–aural channel is unavailable, language springs forth in the manual–visual modality.

Not only does such a system emerge in the absence of audition, but its kernels can be also observed even in the absence of both a community and a language model. Deaf children who live in hearing households in which only oral language is used, who have not yet

experienced speech training, and thus have no accessible language model, devise their own systematic means of communication called home sign, studied in exquisite detail by Goldin-Meadow and colleagues (Goldin-Meadow, 2003). The gesture talk of these children contains the unmistakable imprint of a real linguistic system, and as such it offers a unique display of the fundamental human genius for language.

At the same time, the form and content of home sign are rudimentary and do not approach the richness and complexity of a language used by a community, spoken or signed. This confronts us with another important piece of information: Language as we know it is a social phenomenon. Although each brain possesses the potential for language, it takes more than one brain to create a complex linguistic system.

The Linguistic Structure of Sign Language

Hearing people use gesture, pantomime, and facial expression to augment spoken language. Naturally, the ingredients of these forms of expression are available to sign languages too. The apparent familiarity of the raw material that contributes to the formation of sign languages has led many a naïve observer to the mistaken assumption that sign languages are actually simple gesture systems. However, instead of forming an idiosyncratic, ancillary system like the one that accompanies speech, these basic ingredients contribute to a primary linguistic system in the creation of a sign language, a system with many of the same properties found in spoken languages. In fact, linguistic research has demonstrated that there are universal organizing principles that transcend the physical modality, subsuming spoken and signed languages alike.

The Phonology of Sign Language

William Stokoe (1960) demonstrated that the signs of American Sign Language (ASL) are not gestures: They are not holistic icons. Instead, Stokoe showed that they are composed of a finite list of contrastive meaningless units like the phonemes of spoken languages. These units combine in constrained ways to create the words of the language. Although there are some differences among different sign languages in their phonological inventories and constraints, there are many common properties, and the generalizations presented here hold across sign languages, unless otherwise indicated.

Stokoe established three major phonological categories: hand shape, location, and movement. Each specification within each of the three major categories was treated as a phoneme in Stokoe's work. Later researchers accepted these categories but proposed that the specifications within each category function

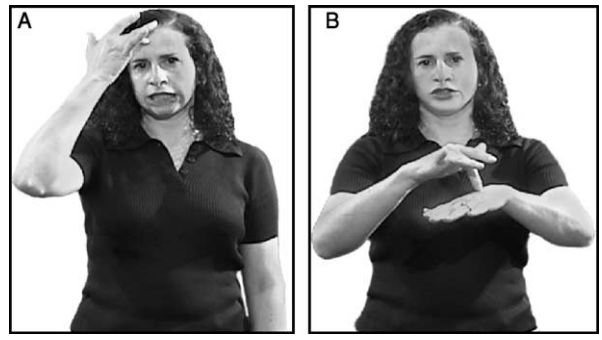

Figure 1 ASL minimal pair distinguished by a location feature. (A) SICK and (B) TOUCH.

not as phonemes but as phonological features. The ASL signs SICK and TOUCH, illustrated in Figure 1, have the same hand shape and the same straight movement. They are distinguished by location only: The location for SICK is the head, whereas the location for TOUCH is the nondominant hand. Minimal pairs such as this one, created by differences in one feature only, exist for the features of hand shape and movement as well. Although the origins of these and other (but certainly not all) signs may have been holistic gestures, they have evolved into words in which each formational element is contrastive but meaningless in itself.

Two other defining properties of phonological systems exist in sign languages as well: constraints on the combination of phonological elements and rules that systematically alter their form. One phonological constraint on the form of a (monomorphemic) sign concerns the set of two-handed signs. If both hands are involved, and if both hands also move in producing the sign (unlike TOUCH, in which only one hand moves), then the two hands must have the same hand shape and the same (or mirror) location and movement (Battison, 1978). An example is DROP, shown in Figure 2B: Both hands move, and they are identical in all other respects as well. The second defining property, changes in the underlying phonological form of a sign, is exemplified by hand shape assimilation in compounds. In one lexicalized version of the ASL compound, MIND + DROP = FAINT, the hand shape of the first member, MIND, undergoes total assimilation to the hand shape of the second member, DROP, as shown in Figure 2.

Stokoe believed that hand shapes, locations, and movements cooccur simultaneously in signs, an internal organization that differs from the sequentiality of consonants and vowels in spoken language. Liddell (1984) took exception to that view, showing that there is phonologically significant sequentiality in this structure. Sandler (1989) further refined that position, arguing that the locations (L) and movement (M)

Figure 2 Hand configuration assimilation in the ASL compound. (A) MIND + (B) DROP = (C) FAINT.

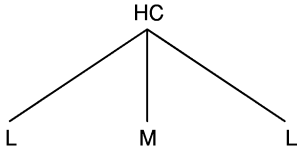

Figure 3 The canonical form of a sign. From Sandler (1989).

within a sign are sequentially ordered, whereas the hand configuration (HC) is autosegmentally associated to these elements – typically, one hand configuration (i.e., one hand shape with its orientation) to a sign, as shown in the representation in Figure 3. The first location of the sign TOUCH in Figure 1B, for example, is a short distance above the nondominant hand, the movement is a straight path, and the second location is in contact with the nondominant hand. The hand shape of the whole sign is .

Under assimilation, as in Figure 2, the HC of the second member of the compound spreads regressively to the first member in a way that is temporally autonomous with respect to the Ls and Ms, manifesting the autosegmental property of stability (Goldsmith, 1979). The sequential structure of signs is still a good deal more limited than that of words in most spoken languages, however, usually conforming to this canonical LML form even when the signs are morphologically complex (Sandler, 1993).

Morphology

All established sign languages studied to date, like the overwhelming majority of spoken languages, have complex morphology. First, as shown in Figure 2, compounding is very common. In addition, some sign languages have a limited number of sequential affixes. For example, Israeli Sign Language (ISL) has a derivational negative suffix, similar in meaning to English *-less*, that was grammaticalized from a free word glossed NOT-EXIST. This suffix has two allomorphs, depending on the phonological form of the base, illustrated in Figure 4. If the base is two-handed, so is the suffix, whereas one-handed bases trigger the one-handed allomorph of the suffix.

Sign languages typically have a good deal of complex morphology, but most of it is not sequential like the examples in Figures 3 and 4. Instead, signs gain morphological complexity by simultaneously incorporating morphological elements (Fischer and Gough, 1978). The prototypical example, first described in detail in ASL (Padden, 1988) but apparently found in all established sign languages, is verb agreement. This inflectional system is prototypical not only because of the simultaneity of structure involved but also because of its use of space as a grammatical organizing property.

The system relies on the establishment of referential loci – points on the body or in space that refer to referents in a discourse – that might be thought of as the scaffolding of the system. In Figure 5, loci for first person and third person are established.

In the class of verbs that undergoes agreement, the agreement markers correspond to referential loci established in the discourse. Through movement of the hand from one locus to the other, the subject is marked on the first location of the verb and the object on the second. Figure 6A shows agreement for the ASL agreeing verb, ASK, where the subject is first person and the object is third person. Figure 6B shows the opposite: third person subject and first person object. The requirement that verb agreement must refer independently to the first and last locations in a sign was one of the motivations for Liddell's (1984) claim that signs have sequential structure.

Although each verb in Figure 6 includes three morphemes, each still conforms to the canonical LML form shown in Figure 3. The agreement markers are encoded without sequential affixation. Sign language verb agreement is a linguistic system, crucially entailing such grammatical concepts as coreference, subject and object, and singular and plural. It is also characterized by sign language-specific properties, such as the restriction of agreement to a particular class of verbs (Padden, 1988), identified mainly on semantic grounds (Meir, 2002).

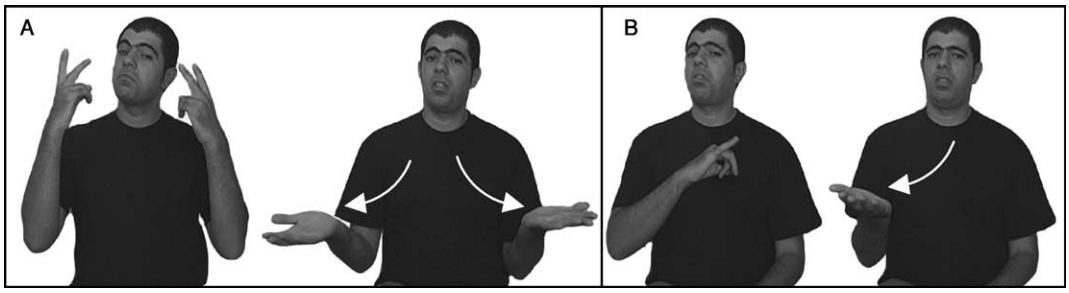

Figure 4 Allomorphs of an ISL suffix. (A) IMPORTANT-NOT-EXIST (without importance). (B) INTERESTING-NOT-EXIST (without interest).

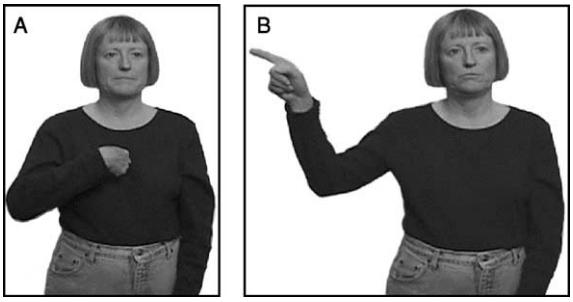

Figure 5 Referential loci. (A) First person. (B) Third person.

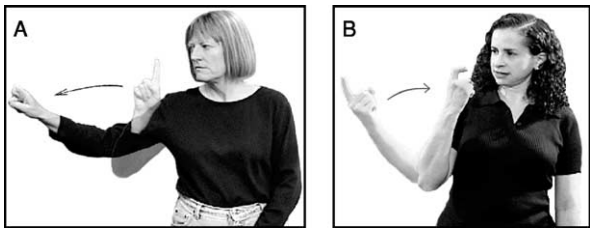

Figure 6 Verb agreement. (A) 'I ask him/her.' (B) 's/he asks me.'

Another productive inflectional morphological system found across sign languages is temporal and other aspectual marking, in which the duration of Ls and Ms, the shape of the movement path, or both may be altered, and the whole form may be reduplicated, to produce a range of aspects, such as durational, continuative, and iterative (Klima and Bellugi, 1979). This system has templatic characteristics, lending itself to an analysis that assumes CV-like LM templates and nonlinear associations of the kind McCarthy (1981) proposed for Semitic languages (Sandler, 1989, 1990).

Figure 4 demonstrated that some limited sequential affixation exists in sign languages. However, the most common form of sign language words by far, whether simple or complex, is LML (setting aside gemination of Ls and Ms in the aspectual system, which adds duration but not segmental content). In fact, even lexicalized compounds such as the one shown in Figure 2 often reduce to this LML form. If movement (M) corresponds to a syllable nucleus in sign language, as Perlmutter (1992), Brentari (1998), and others have argued, then it appears that monosyllabicity is ubiquitous in ASL (Coulter, 1982) and in other sign languages as well. In the midst of a morphological system with many familiar linguistic characteristics (e.g., compounding, derivational morphology, inflectional morphology, and allomorphy), we see in the specific preferred monosyllabic form of sign language words a clear modality effect (Sandler and Lillo-Martin, 2005).

No overview of sign language morphology would be complete without a description of the classifier subsystem. This subsystem is quintessentially 'sign language,' exploiting the expressive potential of two hands forming shapes and moving in space, and molding it into a linguistic system (Emmorey, 2003; Supalla, 1986). Sign languages use classifier constructions to combine physical properties of referents with the spatial relations among them and the shape and manner of movement they execute. In this subsystem, there is a set of hand shapes that classify referents in terms of their size and shape, semantic properties, or other characteristics in a classificatory system that is reminiscent of verbal classifiers found in a variety of spoken languages (Senft, 2002). These hand shapes are the classifiers that give the system its name. An example of a classifier construction is shown in Figure 7. It describes a situation in which a person is moving ahead, pulling a recalcitrant dog zigzagging behind. The hand shape embodies an upright human classifier and the hand shape a legged creature.

What is unusual about this subsystem is that each formational element – the hand shape, the location, and the movement – has meaning. That is, each has morphological status. This makes the morphemes of classifier constructions somewhat anomalous since sign language lexicons are otherwise built of morphemes and words in which each of these elements is meaningless and has purely phonological status. Furthermore, constraints on the cooccurrence of these elements in other lexical forms do not hold on

Figure 7 Classifier construction in ASL.

classifier constructions. In Figure 7, for example, the constraint on interaction of the two hands described in the section on phonology is violated. Zwitserlood (2003) suggested that each hand in such classifier constructions is articulating a separate verbal constituent, and that the two occur simultaneously – a natural kind of structure in sign language and found universally in them, but one that is inconceivable in spoken language. Once again, sign language presents a conventionalized system with linguistic properties, some familiar from spoken languages and some modality driven.

Syntax

As in other domains of linguistic investigation, the syntax of sign languages displays a large number of characteristics found universally in spoken languages. A key example is recursion – the potential to repeatedly apply the same rule to create sentences of ever increasing complexity – argued to be the quintessential linguistic property setting human language apart from all other animal communication systems (Hausser *et al.*, 2002). Specifically, through embedding or conjoining, recursion can result in sentences of potentially infinite length. These two different ways of creating complex sentences have been described and distinguished from one another in ASL. For example, a process that tags a pronoun that is coreferential with the subject of a clause onto the end of a sentence may copy the first subject in a string, only if the string contains an embedded clause, but not if the second clause is coordinate (Padden, 1988). In example (1), the subscripts stand for person indices marked through verb agreement, and INDEX is a pointing pronominal form, here a pronoun copy of the matrix subject, MOTHER. (These grammatical devices were illustrated in Figures 5 and 6.)

(1a) MOTHER SINCE $_{i}$PERSUADE$_{j}$ SISTER $_{j}$COME$_{i}$ $_{i}$INDEX
'My mother has been urging my sister to come and stay here, she (mother) has.'

(1b) * $_{i}$HIT$_{j}$ $_{j}$INDEX TATTLE MOTHER $_{i}$INDEX.
'I hit him and he told his mother, I did.'

The existence of strict constraints on the relations among nonadjacent elements and their interpretation is a defining characteristic of syntax. A different category of constraints of this general type concerns movement of constituents from their base-generated position, such as the island constraints first put forward by Ross (1967) and later subsumed by more general constraints. One of these is the WH island constraint, prohibiting the movement of an element out of a clause with an embedded WH question. The sentence, *Lynn wonders [what Jan thinks]* is okay, but the sentence **It's Jan that Lynn wonders [what __ thinks]* is ruled out. Lillo-Martin (1991) demonstrated that ASL obeys the WH island constraint with the sentences shown in example (2). Given the relative freedom of word order often observed in sign languages such as ASL, it is significant that this variability is nevertheless restricted by universal syntactic constraints.

(2a) PRO DON'T-KNOW ['WHAT' MOTHER LIKE].
'I don't know what Mom likes.'
_____t

(2b) MOTHER, PRO DON'T KNOW ['WHAT' ____ LIKE].
* 'As for Mom, I don't know what likes.'

The line over the word MOTHER in (2b) indicates a marker that is not formed with the hands, in this case a backward tilt of the head together with raised eyebrows, marking the constituent as a topic (t) in ASL. There are many such markers in sign languages, which draw from the universal pool of idiosyncratic facial expressions and body postures available to all human communicators. These expressions and postures become organized into a grammatical system in sign languages.

A Grammar of the Face

When language is not restricted to manipulations of the vocal tract and to auditory perception, it is free to recruit any parts of the body capable of rapid, variegated articulations that can be readily perceived and processed visually, and so it does. All established sign languages that have been investigated use nonmanual signals – facial expressions and head and body postures – grammatically. These expressions are fully conventionalized and their distribution is systematic.

Early research on ASL showed that certain facial articulations, typically of the mouth and lower face, function as adjectivals and as manner adverbials, the latter expressing such meanings as 'with relaxation and enjoyment' and 'carelessly' (Liddell, 1980).

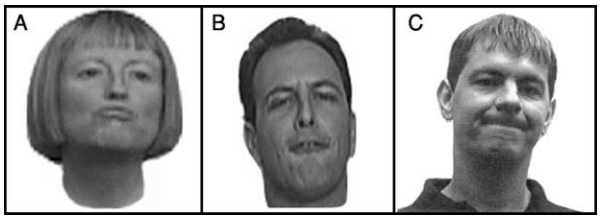

Figure 8 Lower face articulations. (A) ASL 'with relaxation and enjoyment.' (B) ISL 'carefully.' (C) BSL 'exact.'

Figure 9 Upper face articulations. (A) yes/no question, (B) WH question, and (C) 'shared information.'

Other sign languages have been reported to use lower face articulations in similar ways. The specific facial expressions and their associated meanings vary from sign language to sign language. Figure 8 gives examples of facial expressions of this type in ASL, ISL, and British Sign Language.

A different class of facial articulations, particularly of the upper face and head, predictably cooccur with specific constructions, such as yes/no questions, WH questions, and relative clauses in ASL and in many other sign languages. Examples from ISL shown in Figure 9A illustrate a yes/no question (raised brows, wide eyes, and head forward), Figure 9B a WH question (furrowed brows and head forward), and Figure 9C the facial expression systematically associated in that language with information designated as 'shared' for the purpose of the discourse (squinted eyes). Although some of these facial articulations may be common across sign languages (especially those accompanying yes/no and WH questions), these expressions are not iconic. Some researchers have proposed that they evolved from more general affective facial expressions associated with emotions. In sign languages, however, they are grammaticalized and formally distinguishable from the affective kind that signers, of course, also use (Reilly *et al.*, 1990).

Observing that nonmanual signals of the latter category often cooccur with specific syntactic constructions, Liddell (1980) attributed to them an expressly syntactic status in the grammar of ASL, a view that other researchers have adopted and expanded (Neidle *et al.*, 2000; Petronio and Lillo-Martin, 1997). A competing view proposes that they correspond to intonational tunes (Reilly *et al.*, 1990) and participate in a prosodic system (Nespor and Sandler, 1999). Wilbur (2000) presented evidence that nonmanuals convey many different kinds of information – prosodic, syntactic, and semantic. A detailed discussion can be found in Sandler and Lillo-Martin (2005).

Acquisition of Sign Language

Nowhere is the 'natural laboratory' metaphor more appropriate than in the field of sign language acquisition. This area of inquiry offers a novel and especially revealing vantage point from which to address weighty questions about the human capacity for language. Research has shown, for example, that children acquire sign language without instruction, just as hearing children acquire spoken language, and according to the same timetable (Newport and Meier, 1985). These findings lend more credence to the view, established by linguistic research on the adult system, that languages in the two modalities share a significant amount of cognitive territory; children come equipped for the task of acquiring language in either modality equally.

Studies have also shown that signing children attend to grammatical properties, decomposing and overgeneralizing them as they advance through the system, sometimes even at the expense of the iconic properties inherent in that system. For example, even the pointing gesture used for pronouns (see Figure 5) is analyzed as an arbitrary grammatical element by small children, who may go through a stage in which they make mistakes, pointing at 'you' to mean 'me' (Pettito, 1987). Meier (1991) discovered counter-iconic errors in verb agreement (see Figure 6), similarly indicating that children are performing a linguistic analysis, exploring spatial loci as grammatical elements and not as gestural analogues to actual behavior and events.

Due to the social conditions surrounding its acquisition, sign language lends novel insight into two key theories about language and its acquisition: the critical period hypothesis and the notion that the child makes an important contribution to the crystallization of a grammar. Some deaf children are raised in oral environments, gaining access to sign language later in life. Studies comparing the ASL performance of early and late learners found that the age of exposure is critical for acquisition of the full grammatical system (Newport, 1990) and its processing (Mayberry and Eichen, 1991), providing convincing support for Lenneberg's (1967) critical period hypothesis. An untainted perspective on the child's contribution can be gained where the input to the child is simpler and/or less systematic than a full language system, as with pidgins (Bickerton, 1981). Researchers

of the sign language that originated in the Nicaraguan school mentioned previously studied the communication system conventionalized from the home sign brought to the school by the first cohort of children. This system served as input to the second cohort of children younger than the age of 10 years who later arrived at the school. Comparing the language of the two cohorts, the researchers found that children make an important contribution: The second cohort of signers developed a significantly more structured and regular system than the one that served as their input (Kegl *et al.*, 1999; Senghas *et al.*, 2004).

Sign Language and the Brain

Broadly speaking, it is established that most spoken language functions involve extensive activity in specific areas of the left hemisphere of the brain, whereas much of visuospatial cognition involves areas of the right cerebral hemisphere. Therefore, the discovery that sign language, like spoken language, is primarily controlled by the left hemisphere despite its exploitation of the visuospatial domain is striking and significant (Emmorey, 2002; Poizner *et al.*, 1987). Various explanations for left hemisphere dominance for language are currently on the table, such as the more general ability of the left hemisphere to process rapidly changing temporal events (Fitch *et al.*, 1997). This explanation has been rejected for sign language by some researchers on the grounds that sign language production is slower than that of spoken language (Hickock *et al.*, 1996). Whatever explanation is ultimately accepted, Emmorey (2002) and others have argued that similarities in the kind of cognitive operations inherent in the organization and use of language in the two modalities should not be ignored in the search.

Although most language functions are controlled by the left hemisphere, some do show right hemisphere involvement or advantage. With respect to sign language, there is evidence that the right hemisphere may be more involved in producing and comprehending certain topographic/spatial aspects of sign language, particularly those involving classifier constructions (Emmorey *et al.*, 2002). Although this result sits well with the known right hemisphere advantage for spatial processing, it is made even more interesting when added to discoveries of right hemisphere dominance for certain other spoken and sign language functions that may be related to the classifier system, such as processing words with imageable, concrete referents (Day, 1979; Emmorey and Corina, 1993). Findings such as these are an indication of the way in which sign language research adds important pieces to the puzzle of language organization in the brain.

Language Modality, Language Age, and the Dinner Conversation Paradox

A large body of research, briefly summarized here, attributes to sign languages, essential linguistic properties that are found in spoken languages as well (Sandler and Lillo-Martin, 2005). Also, like different spoken languages, sign languages are not mutually intelligible. A signer of ISL observing a conversation between two signers of ASL will not understand it. Although cross sign language research is in its infancy, some specific linguistic differences from sign language to sign language have already been described.

At the same time, there is a rather large group of predictable similarities across sign languages and, as Newport and Supalla (2000: 109) stated, "A long dinner among Deaf users of different sign languages will, after a while, permit surprisingly complex interchanges." Here we find a difference between signed and spoken languages: One would hardly expect even the longest of dinners to result in complex interchanges among monolingual speakers of English and Mandarin Chinese. Although it is clear that more differences across sign languages will be uncovered with more investigation and more sophisticated research paradigms, it is equally certain that the dinner conversation paradox will persist. Two reasons have been suggested for crosssign language similarities: the effect of modality on language structure and the youth of sign languages.

Modality Effects

Modality is responsible for two interwoven aspects of sign language form, both of which may contribute to similarities across sign languages: (i) an iconic relation between form and meaning, and (ii) simultaneity of structure. Because the hands can represent physical properties of concrete objects and events iconically, this capability is abundantly exploited in sign languages, both in lexical items and in grammatical form. Although spoken languages exhibit some iconicity in onomatopoeia, ideophones, and the like, the vocal–auditory medium does not lend itself to direct correspondence between form and meaning so that the correspondence in spoken language is necessarily more arbitrary.

Iconicity in Sign Language Leafing through a sign language dictionary, one immediately notices the apparent iconicity of many signs. An example is the ISL sign for BOOK, shown in Figure 10, which has the appearance of a book opening. Although clearly

Figure 10 An iconic sign: (ISL) BOOK.

widespread, iconicity in sign language must be understood in the right perspective. Many signs are not iconic or not obviously motivated, among them the signs for abstract concepts that exist in all sign languages. Interestingly, even the iconicity of signs that are motivated is not nearly so apparent to nonsigners if the translations are not available (Klima and Bellugi, 1979). In addition, the presence of iconicity in sign language does not mean that their vocabularies are overwhelmingly similar to one another. In fact, although even unrelated sign languages have some overlap in vocabulary due to motivatedness, their vocabularies are much more different from one another than one might expect (Currie *et al.*, 2002). Nevertheless, the kind of symbolization and metaphoric extension involved in creating motivated signs may be universal (Taub, 2001). For example, a bird is represented in ISL with a sign that looks like wings and in ASL with a sign that looks like a beak, and experience with this kind of symbolization in either sign language may make such signs easier to interpret in the other.

Simultaneity in Sign Languages Another modality feature is simultaneity of structure, alluded to previously. Some researchers have argued that constraints on production, perception, and short-term memory conspire to create simultaneity of linguistic structure (Bellugi and Fischer, 1972; Emmorey, 2002). Interestingly, iconicity also makes a contribution to simultaneity of structure, especially when one looks beyond the lexicon to grammatical forms of a more complex nature.

The hands moving in space are capable of representing events that simultaneously involve a predicate and its arguments (e.g., giving something to someone or skimming across a bumpy surface in a car) with a form that is correspondingly simultaneous. The result is verb agreement (exemplified in Figure 6) and classifier constructions (exemplified in Figure 7). Therefore, these structures, with particular grammatical properties, are found in all established sign languages that have been studied, leading to the observation that sign languages belong to a single morphological type (Aronoff *et al.*, 2005). Although the grammatical details of this morphology differ from sign language to sign language, the principles on which they are based are the same, and this similarity makes another welcome contribution at the dinner table.

The Role of Language Age

Recent work pinpoints the role of language age in the structure of sign language, indicating how age may be partly responsible for the impression that crosssign language differences are less abundant than is the case across spoken languages. It does so by comparing the type of morphology ubiquitously present in sign languages with a language-specific type (Aronoff *et al.*, 2005). This study noted that the form taken by the verb agreement and classifier systems in all established sign languages is similar (although not identical) due to the modality pressures of iconicity and simultaneity sketched previously, but that sequential affixes of the kind exemplified in Figure 4 vary widely between the sign languages studied. Such affixes, arbitrary rather than iconic in form and limited in number, develop through grammaticalization processes, and these processes take time. Given time, more such arbitrary, sign language-specific processes are predicted to develop.

The physical channel of transmission affects language in both modalities. Where sign languages are more simultaneously structured, spoken languages are more linear. Where spoken languages are mostly arbitrary, sign languages have a good deal of iconicity. However, none of these qualities are exclusive to one modality; it is only a matter of degree.

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Sign Language: Phonology

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It is taken as given that phonology refers to a level of that grammar that combines a finite number of meaningless features into an infinite number of pronounceable utterances and that the communication modality in which this phonology is expressed can be either auditory/vocal (i.e., a spoken language) or visual/gestural (a sign language). An important, but distinct, subject of investigation is whether phonology refers to the auditory signals and gestures of the vocal apparatus in a spoken language or the visual signals and gestures of the hands and body in a signed language with the phonological grammar. With this in mind, two of the primary theoretical goals of studying the phonology of sign languages are to put into sharp contrast those aspects of phonology that are shared by all languages, both signed and spoken – and thereby be able more clearly to identify those properties that are universal – and to better understand how the particular properties of the phonetic systems of spoken or signed languages might influence the abstract units that comprise a phonological grammar. The first goal might be called the 'phonological universals' question, since it is concerned with the common properties shared by signed and spoken languages, and the second the 'modality' question, since it addresses the extent to which the visual/gestural nature of sign languages and the auditory/aural nature of spoken languages affect the grammars of those languages.

During the first phase of research on sign language phonology, the focus was primarily on the 'phonological universals' question. Some commonalities between signed and spoken languages that were brought to light during this period are the following (this is not an exhaustive list, see Corina and Sandler, 1993; Brentari, 1995). First, just as in spoken languages, there is an autonomous prosodic hierarchy that uses the syllable (Perlmutter, 1992), the prosodic word (Sandler, 1999), the phonological phrase (Nespor and Sandler, 1999), and the intonational phrase (Wilbur, 1994; Nespor and Sandler, 1999). Second, in the community of deaf children born to deaf parents, the *time course* of phonological acquisition has been shown to unfold in the same manner as *that* of hearing children who are natively acquiring a spoken language. For example, the syllable is the fundamental unit used in sign language babbling, just as it is in spoken languages (Pettito and Marentette, 1991). Moreover, as Jakobson (1968 [1941]) predicted for spoken languages, the appearance of less marked phonological properties is earlier and the appearance of more marked ones later in sign languages as well (Klima and Bellugi, 1979); Boyes Braem, 1990; Marentette and Mayberry, 2000). Third, there is dialectal variation in sign languages from one region to another within a sign language (Lucas, 2001), and sign languages change historically over time via principles of diachronic change (Frishberg, 1975). Finally, elements are borrowed from one sign language to another as well as from the surrounding majority spoken (and written) linguistic community (Battison, 2003 [1978]; Brentari, 2001). Within the past 10 years, work on sign language has turned more toward what was referred to in the first paragraph as the modality question. There are several

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It is taken as given that phonology refers to a level of that grammar that combines a finite number of meaningless features into an infinite number of pronounceable utterances and that the communication modality in which this phonology is expressed can be either auditory/vocal (i.e., a spoken language) or visual/gestural (a sign language). An important, but distinct, subject of investigation is whether phonology refers to the auditory signals and gestures of the vocal apparatus in a spoken language or the visual signals and gestures of the hands and body in a signed language with the phonological grammar. With this in mind, two of the primary theoretical goals of studying the phonology of sign languages are to put into sharp contrast those aspects of phonology that are shared by all languages, both signed and spoken – and thereby be able more clearly to identify those properties that are universal – and to better understand how the particular properties of the phonetic systems of spoken or signed languages might influence the abstract units that comprise a phonological grammar. The first goal might be called the 'phonological universals' question, since it is concerned with the common properties shared by signed and spoken languages, and the second the 'modality' question, since it addresses the extent to which the visual/gestural nature of sign languages and the auditory/aural nature of spoken languages affect the grammars of those languages.

During the first phase of research on sign language phonology, the focus was primarily on the 'phonological universals' question. Some commonalities between signed and spoken languages that were brought to light during this period are the following (this is not an exhaustive list, see Corina and Sandler, 1993; Brentari, 1995). First, just as in spoken languages, there is an autonomous prosodic hierarchy that uses the syllable (Perlmutter, 1992), the prosodic word (Sandler, 1999), the phonological phrase (Nespor and Sandler, 1999), and the intonational phrase (Wilbur, 1994; Nespor and Sandler, 1999). Second, in the community of deaf children born to deaf parents, the *time course* of phonological acquisition has been shown to unfold in the same manner as *that* of hearing children who are natively acquiring a spoken language. For example, the syllable is the fundamental unit used in sign language babbling, just as it is in spoken languages (Pettito and Marentette, 1991). Moreover, as Jakobson (1968 [1941]) predicted for spoken languages, the appearance of less marked phonological properties is earlier and the appearance of more marked ones later in sign languages as well (Klima and Bellugi, 1979); Boyes Braem, 1990; Marentette and Mayberry, 2000). Third, there is dialectal variation in sign languages from one region to another within a sign language (Lucas, 2001), and sign languages change historically over time via principles of diachronic change (Frishberg, 1975). Finally, elements are borrowed from one sign language to another as well as from the surrounding majority spoken (and written) linguistic community (Battison, 2003 [1978]; Brentari, 2001). Within the past 10 years, work on sign language has turned more toward what was referred to in the first paragraph as the modality question. There are several

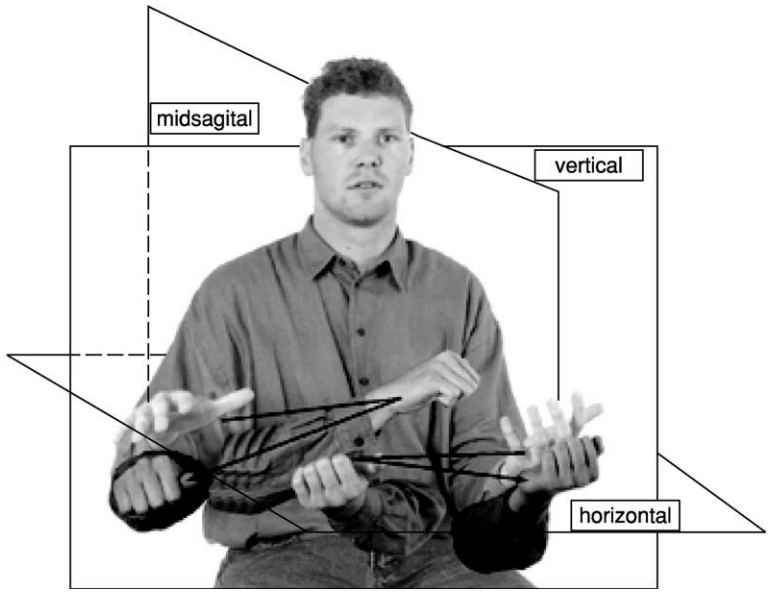

Figure 1 A two-movement (disyllabic) ASL sign that demonstates the 'A' handshape and the three-dimensional planes used as places of articulation. (Reproduced with permission from Mouton de Gruyter.)

Figure 2 The ASL sign CANDYwith [flexed] index finger and twisting movement at the cheek. (Reproduced with permission from Mouton de Gruyter.)

ways in which signed and spoken languages are fundamentally different in their phonological organization. Each of these comprises a separate section of this article, and a possible source for these differences is proposed. But before this comparison is made, there is an important comparison internal to the phonological structure of signs that has come to light in the past 15 years.

The Categorical Nature of Sign Parameters

The five commonly accepted parameters (or feature classes) of sign languages are the following:

- Handshape: properties of the fingers and joints of the hand in forming a particular handshape, e.g., a 'fist' handshape with *all* fingers *flexed* at the joints (see Figure 1, the ASL sign DESTROY)
- Movement: how and where the hand moves – e.g., a twisting movement of the hand (as seen in Figures 2 and 3 in the ASL signs CANDY and APPLE)
- Place of articulation with which the hands interact: a region on the body (such as the cheek, in Figures 2 and 3) or one of the three-dimensional planes seen in Figure 1
- Orientation of the hand: the interaction between a place of articulation and a particular part of the hand – e.g., fingertip to side of cheek (see Figure 2)
- Nonmanual behaviors: properties of the face and body (excluding the hands), such as open-to-closed mouth – e.g., the ASL sign ACCOMPLISH-EASILY (see Figure 4).

A finding that has emerged from a number of converging types of evidence about sign language phonology is that each of the parameters of a sign does have identical types of structures in the phonology.

Figure 3 The ASL sign APPLE with [extended] index finger and twisting movement at the cheek. (Reproduced with permission from Mouton de Gruyter.)

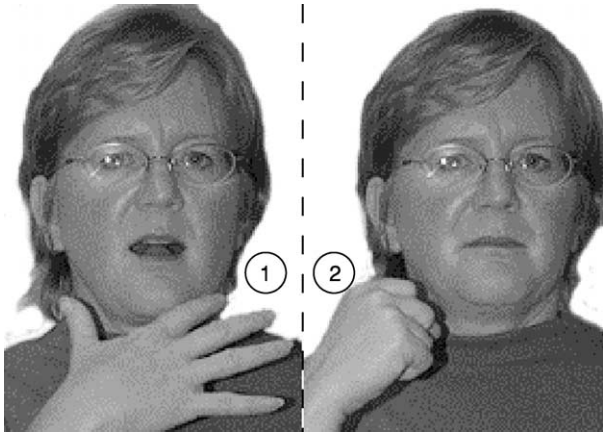

Figure 4 The ASL sign ACCOMPLISH-EASILY, demonstrating the required nonmanual behavior of the mouth closing during the articulation of the sign. (Reproduced with permission from Cambridge University Press.)

Handshape can be considered the most arbitrary and the most categorical of the sign language parameters. This means that it is comparatively easier to list a reasonably small number of handshapes based on their discrete component parts than it is to do this with movement or place of articulation. Compared with the other parameters, handshape is able to conform most closely to the formalism of binary oppositions and hierarchical representations (Sandler, 1989; Brentari, 1998). This perspective on handshape as more categorical than the other parameters is supported in the psycholinguistic literature as well. In Emmorey *et al.* (2003), handshape was found to exhibit categorical perception effects for signers (but not for nonsigners), while place of articulation failed to exhibit such effects. In studies of word segmentation judgments (Brentari, in press) and of judgments of 'similarity' between signed words (Corina and Hildebrandt, 2002), both signers and nonsigners used movement and handshape most heavily, and only signers made use of the handshape parameter in this task.

We now turn to the differences between signed and spoken languages in their phonological organization.

Dominance and Dependency within the Feature Geometry

With respect to the prominence of phonological units in a feature geometry, the position of the segment – understood here as C(onsonant), V(owel) or undifferentiated 'X' slots on the timing tier – is fundamentally different in signed and spoken languages. The difference can be stated as follows (van der Hulst, 2000; Brentari, 2002): In a spoken language hierarchy of units, segments are autonomous from features, dominate features, and can create minimal contrast (i.e., segments >> features). In a sign language hierarchy of phonological units, feature information predicts and dominates segmental units (i.e., features >> segments). This can be seen in the use (or lack of use) of segmental orders to create new words and in the unit upon which minimal pairs are based.

Regarding segment order, the degree of variability in order and content of segments in spoken words is greater than in signed words. 'Teen' and 'neat' are different, unrelated words in English that use the same phonological segments in different orders. In ASL, this type of contrast is severely limited (Channon, 2002a, 2002b). Except in the case of compounds, the order of handshapes in a sign is largely predictable; the only handshape that can precede or follow a (closed) handshape is its (open) variant, and the only place of articulation that can precede or follow a specified place is an allophonic place within that region. Most counterexamples to this generalization – i.e., pairs of signs, similar to 'neat'/'teen,' with contrasting order in ASL – are signs with opposite meanings, such as TAKE-UP (HS1 → HS2; Figure 5)

Figure 5 A one-handed form of the ASL sign TAKE-UP [a course]. (Reproduced with permission from MIT.)

Figure 6 A one-handed form of the ASL sign DROP [a course]. (Reproduced with permission from MIT.)

vs. DROP (HS1 → HS2; Figure 6); IMPROVE (POA1 → POA2) vs. GET-WORSE (POA2 → POA1). This shows that segment order might have a morphological rather than a phonological use.

Minimal Pairs

The unit upon which most minimal pairs are based also shows a lack of reliance on the segment. Minimal pairs in ASL involve the unit of the entire word, rather than the syllable or the segmental unit. In the schematic structural representations in Figure 7,

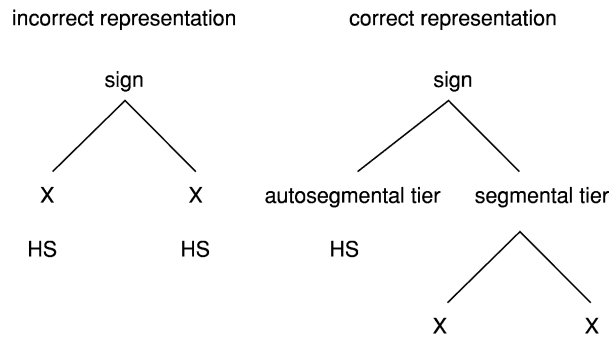

Figure 7 Representations using segmental (left) and autosegmental (right) models to represent a minimal pair. The segmental representation incorrectly indicates 2 instances of the same handshape, while the autosegmental correctly indicates only 1 instance (cf. Sandler, 1986; Brentari, 2002).

a schematic structural representation, you can see two different ways that CANDY and APPLE (Figures 2 and 3) might be represented, but there is consensus among sign language phonologists that the representation on the right is the correct representation, with the handshape an independent part of the representation that spreads across the entire word domain.

The Syllable in Signed and Spoken Languages

The syllable has been demonstrated to be a fundamental unit in word segmentation in spoken languages. There is evidence that when properties, such as vowel harmony, that are expressed at the word level are put into conflict with stress, the syllabic cue of stress is more heavily relied upon. Moreover, words in most spoken languages have binary metrical feet, where feet often are defined in terms of syllables. All of these factors indicate that there is at least a statistical preference for words to be longer than one syllable in spoken languages. This contrasts with the relatively low use of the syllable in sign languages. The majority of ASL monomorphemic signs are one syllable (93%, according to the dictionary Stokoe *et al.*, 1965). However, within the 7% of disyllabic lexical items, there are four types (Brentari, 1998): (i) those that repeat the movement in some form with no change in handshape (e.g., CHILDREN); (ii) those that repeat the movement in some form with an allophonic change in handshape on one movement only (e.g., DESTROY, Figure 1); (iii) those with two distinctive movements with an allophonic change in handshape (e.g., JUMP); and (iv) those that repeat the movement in some form with a contrastive change in handshape (e.g., BACKGROUND). The syllable does have one important role, however. As argued in Perlmutter (1992) and Brentari (1998), the

Table 1 Comparison of 3 key factors in visual and auditory processing

	Vision	*Audition*
a. Speed of signal transmission	186 000 mps	1089 ft/sec
b. Peripheral temporal resolution	25–30 ms	2 ms
c. Spatial arrangement information	peripheral	non-peripheral

syllable is the unit that best captures the coordination of the timing of handshape with movement in such forms. For example, a handshape change such as the one in DESTROY (Figure 1) is coextensive with an individual movement; it does not extend throughout an entire disyllabic sign.

Effect of Signal Processing

The differences between the phonology of signed and spoken languages seen in the earlier sections of this article, such as a deemphasis of the syllable and the segment, may be characterized as a tendency toward simultaneous rather than sequential structure within words. This may be due to the relative strengths inherent in the design of the visual and auditory systems. A few differences between vision and audition are given in Table 1.

Many aspects of *vertical* and *horizontal* processing take place in both vision and audition. 'Vertical processing' is a cover term for our ability to process various input types presented roughly at the same time (e.g., pattern recognition, paradigmatic processing); 'horizontal temporal processing' is our ability to process temporally discrete inputs into temporally discrete events (e.g., ordering and sequencing of objects in time, syntagmatic processing). Aside from the simple 'speed of transmission,' there is also a difference between audition and vision in the time required for a subject to detect temporally/sequentially discrete stimuli – a *horizontal* processing task, called 'threshold of flicker fusion' in vision and 'peripheral temporal resolution' in audition. Humans can perceive two auditory stimuli as discrete when they are separated by an interval of only 2 ms, while the visual system requires at least a 20 ms interstimulus interval to perceive two visual stimuli as discrete. The advantage here is with audition. In contrast, when comparing *vertical* processing tasks in audition and vision, 'spatial arrangement' vision has the advantage. Vision can take advantage of light waves reflected not only from the target object but also from other objects in the environment, thereby making use of 'echo' waves – i.e., those reflected by the target object onto other objects. These echo waves are available simultaneously with the waves reflected from the target object to the retina. The same echo phenomenon in audition is available to the listener much more slowly. Only after the sound waves produced by the target object have already struck the ear will echo waves from other objects in the environment do the same. The result of this effect is that a three-dimensional image is available more quickly in vision, due in part to the speed at which light travels. Moreover, the localization of visual stimuli is registered at the most peripheral stage of the visual system, at the retina and lens, while the spatial arrangement of auditory stimuli can be inferred only by temporal and intensity differences of the signal between the two ears.

Well-designed research that compares the impact of differences in peripheral systems and signal processing on the phonology of signed and spoken languages will bring us closer to understanding the phonological capacity that all humans share.

See also: Autosegmental Phonology; Feature Organization; Language, Visual Cognition and Motor Action; Modality Issues in Signed and Spoken Language; Phonemic Analysis; Phonological Words; Phonology in the Production of Words; Phonology: Overview; Syllable: Phonology.

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Sign Language: Psycholinguistics

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The field of psycholinguistics strives to understand the relationship between linguistic structure and cognitive processing. Linguistic, and especially psycholinguistic, research of signed languages is still in its infancy. It has only been approximately 30 years since American Sign Language (ASL) has been regarded as an autonomous and linguistically complex language (Klima and Bellugi, 1979). Additional descriptions and analyses of signed languages from around the world have emerged over the years, rapidly broadening the sign language linguistics landscape (Brentari, 2001). In his seminal works, William Stokoe described each sign according to the shape of the hand (hereafter *handshape*), the location in relation to the body, and the movement in space produced during its articulation (Stokoe *et al.,* 1976). These separate dimensions of sign formation came to be known as 'parameters.' Subsequent work by Battison (1978) argued for the inclusion of hand shape orientation as an additional parameter. Over the last few decades, researchers have elaborated on these initial descriptions of sign structure, proposing models that encompass phonological, morphological, syntactic, semantic, and pragmatic properties of signed languages. Descriptions cast within these formal linguistic models help elucidate those properties of sign languages that are common to all human languages, as well as to isolate those properties that reflect the unique structure of human languages that are articulated manually and perceived visually.

Single Sign Recognition

As in spoken language psycholinguistics, much of the literature on sign language psycholinguistics has sought to uncover the structure of the lexicon, and the processes governing the access of lexical items stored therein. Most contemporary models of spoken and

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Single Sign Recognition

As in spoken language psycholinguistics, much of the literature on sign language psycholinguistics has sought to uncover the structure of the lexicon, and the processes governing the access of lexical items stored therein. Most contemporary models of spoken and

written word recognition conceptualize lexical access as a matching processing between a perceptual signal that accrues over time, and potential lexical candidates stored in memory (e.g., Cohort model, Neighborhood Activation model, and TRACE). (For a review, see Jusczyk and Luce, 2002). Competitive activation among lexical candidates ultimately yields a single word percept. Questions that are especially relevant to sign language psycholinguistics, therefore, include how the *physical* properties of the sign language signal affect the way the lexicon is initially accessed en route to word recognition, and what organizational principles dictate how signs are stored within the lexicon.

In spoken languages, word recognition is achieved through the mapping of the acoustic speech signal received by the ear onto stored mental representations of word forms in the listener's mind. The mapping process unfolds in time as the acoustic signal of the word accrues, and is thought to be mediated by psychological representations that, in part, rectify variances in the signal due to coarticulatory factors (e.g., allophonic variation) and cross-speaker differences. The details of the initial phonetic mapping, the structure of the representations, and the structure of the mental lexicon have been elucidated by psycholinguistic research. Well-accepted findings include lexicality and word frequency effects, context effects including semantic and form-based priming, and neighborhood effects.

Lexicality effects refer to the finding that words are recognized faster than non-words. This basic finding suggests that the presence of a mental representation (i.e., a known word) provides a target for a search though the lexicon, whereas the lack of a representation engenders an exhaustive and unfilled search and thus incurs a processing disadvantage. *Word frequency effects* suggest that words that are highly frequent in the language (e.g., *baby*) are recognized faster than low-frequency words (e.g., *dragon*). Psycholinguists have proposed a thresholding account of these data, with highly frequent words having a lower resting threshold, thus requiring less information in order to be recognized. *Context effects* may occur in time, whereby a word that has been previously encountered may affect the subsequent processing of incoming words. For example, the recognition of the word *cat* is faster if subjects previously heard the word *pig* rather than an unrelated word such as *pail*. This robust effect is known as *semantic priming*. These data suggest that the lexicon is structured along a semantic dimension, such that semantic features may be shared between entries and thus may be coactivated, leading to speeded processing of related entries.

While only a few psycholinguistic studies of on-line processing in signed languages exist (see Emmorey, 2002 for a recent review of psycholinguistic studies of ASL), there is a growing body of literature confirming that factors affecting spoken word recognition also influence the recognition of signed language sign. For example, the importance of the lexical status of a sign form was demonstrated in a study in which participants were required to make a lexical decision about a target sign, after first being primed by a related sign or sign-form. Reaction times were significantly slower to formationally possible but non-exisiting ASL signs than to real ASL signs (Corina and Emmorey, 1993). Similarly, Dye and Shih (2005) reported data from native users of British Sign Language that showed lexicality effects (with slower responses to non-signs) in that language.

From Signal to Representation

Although signs and spoken words are formationally quite different, we have reason to believe that words in each modality unfold in time in a lawful fashion, and that accessing lexical representations may vary as a function of sublexical properties. For example, in a study by Emmorey and Corina (1990), signs were partitioned into 33 millisecond parts and presented to participants in a cumulative procedure. The location of the sign was identified first, followed quickly by the hand shape, and finally, the movement. Signs located in neutral space were recognized before those located upon the face, presumably because the target location of the sign was achieved earlier for neutral space signs. In addition, it was observed that signers could anticipate changes in signs that included a hand shape change prior to full articulation of the hand shape. These data are important as they demonstrate that in sign recognition, as is seen with spoken language, coarticulatory factors may assist word identification.

Finally, these studies confirmed that signs, though typically longer in duration than spoken words, were identified very quickly. In contrast to spoken English words in which approximately 83% of a word must be heard before identification occurs, sign identification occurred only after approximately 35% of the sign form had been seen. Two factors that may account for this finding include the relatively greater simultaneous packaging of phonological information within a sign and the fact that few signs share an initial phonological shape, leading to a reduced number of competing lexical items (i.e., reduced initial cohort size).

Form-Based Structure of the Lexicon

While the lexicon may be organized along a semantic dimension such that words sharing a meaning

relation prime one another, there is substantial support for the findings that structural properties of words influences processing. For example, the processing of the word *cat* can be affected by a previous encounter with a similar sounding word like *mat* more than an unrelated word like *lip*. This suggests a further dimension of lexical organization that honors a structural relationship between words (for example the phonological status of shared 'rime.')

Frequency effects and semantic context effects speed recognition. In contrast, structural relations (e.g., phonological composition of words and lexical neighborhoods) have been reported to typically produce inhibitory effects. Lexical decision studies have sought to establish processing effects based upon shared formational similarity (i.e., sign sharing one or more parameters), but have reported discrepant findings. For example, Corina and Emmory (1993) reported *inhibitory* effects for targets sharing an articulatory location with primes, no effects for shared hand shapes and a facilitatory effect for movement. More recently, Corina and Hildebrandt (2002) investigated movement and location priming activation at 500 and 100 milliseconds interstimulus interval (ISI) lags, and found no evidence of phonological priming for either movement or location at the 500 ISI lag, though inhibitory non-significant trends (movement $p < .064$, location $p < .088$) were observed both for location and movement at 100 ISI lag. Further, Dye and Shih (2005) found some evidence of facilitatory phonological priming in native signers for signs that shared a common location and/or location and movement. Importantly, these effects were not observed when primes were non-signs, suggesting these source of effects were not pre-lexical.

The inconsistent findings in structural priming studies of signed languages may reflect different sources of activation. The studies of Corina and Emmory (1993) and Dye and Shih (2005) that report facilitation document unusually long reaction times for sign target detection (>1100 msec), while the study that reported inhibition has reaction times in the 800 msec range. There is a growing consensus in the psycholinguistic literature that these longer reaction times may reflect post-lexically mediated or controlled processing strategies, while inhibition represent the effects of automatic priming. That is, these inhibitory effects reflect lexical rather than post-lexical access.

A related and well-known factor influencing lexical access across both written and spoken language modalities is the composition of the candidate set of lexical entries from which a single target form must emerge. In spoken languages these effects are conceptualized as owing to competition among formationally similar lexical entries – so-called *neighborhood effects*. The metric of lexical neighborhood similarity has been traditionally defined in terms of phonological properties in studies of spoken words and orthographic properties in studies of written words. For example, Luce and Pisoni (1998; see also Luce, 1986) derive neighborhood similarity by considering the number of words that could be obtained by a single phoneme substitution, addition, or deletion. Numerous studies have demonstrated that these similarity properties influence word recognition, as shown in the accuracy of perceptual identification, latencies in naming and lexical decision tasks, and priming effects, both in spoken and visual word recognition (for discussion see Jusczyk and Luce, 2002).

The frequency of individual lexical items may also interact with properties of similarity. Importantly, the effects of similarity and word frequency have been observed across many spoken languages. A general characteristic of these effects, based upon the spoken word recognition literature, is that lexical access tends to be inhibited as similarity increases, especially when lexical frequency is held constant. A series of studies conducted with Lengua Signos Espanol (LSE) have examined the interaction between sign similarity and frequency (Carreiras *et al.,* submitted). As sign frequency counts are unavailable for most signed languages, this measure was formalized as a familiar rating based upon how often a particular sign was used. Lexical similarity was evaluated using the Hamburg Sign Language Notation System (Prillwitz *et al.,* 2004) whereby the degree of similarity for the parameters of location and hand shape was calculated by counting how many signs were produced in a particular location or articulated with a specific hand shape. These studies reveal that for neighborhoods defined by location, low-frequency signs are recognized faster in non-dense neighborhoods. A different pattern was observed for neighborhoods defined by hand shape. Here, low-frequency signs were recognized faster in dense neighborhoods.

Several explanations for the processing differences for location and hand shape are offered. In many theoretical models of sign structure, hand shapes are represented as multi-featured compositional and hierarchically-ordered entities that serve as auto-segments within skeleton-based phonological treatments (Corina and Sandler, 1993). Featural representations of location tend to be far less compositional, often adopting a unitary or privative representation such as [shoulder] for a sign articulated on or near the shoulder (Brentari, 1998). These variations in richness of representation may differentially impact lexical activation. It is interesting to note that in spoken work there is some evidence for word onset

information producing inhibitory effects (e.g., Luce and Pisoni, 1998; Vitevitch and Luce, 1998). As noted above in the gating studies of sign recognition, location was the first parameter to be accurately and consistently identified during the unfolding of a sign, followed by hand shape. This is not to suggest that location serves as a syllabic onset in sign languages, but rather that there may be a special status of first recognized word/sign elements across languages.

Effects of Language Experience

A different approach to the study of the underlying structural properties of signs and the sign lexicon is through the study of *phonological awareness* in deaf signers. Phonological awareness reflects an understanding that words are not unsegmented wholes, but are made up of component parts. Some structural groupings in spoken languages have a special status that can often be observed in stylized language usage such as poetry, language games and song. For example, words that rhyme (e.g., *juice-moose*) are generally appreciated as more similar-sounding than words that share onsets (e.g., *juice-june*).

Signed languages exhibit similar privileged groupings. Controlled studies reveal that similarity judgments of signs sharing two sign parameters (i.e., hand shape and movement) produced much more consistent judgments that signs sharing only one parameter (Hildebrandt and Corina, 2002). Both deaf and sign-naive subjects judge signs that share movement and location as the most similar, indicating that this combination of parameters enables a robust perceptual grouping. This fact accords well with the observation that languages commonly capitalize on robust perceptual distinctions as a basis for linguistic distinctions. Interestingly, however, response patterns of the deaf native signers indicate that under some circumstances, tacit knowledge of ASL syllable structure may override purely perceptual factors. The findings that the combination of movement and location provides a robust perceptual grouping accords well with theories of syllable structure in ASL that have proposed that the combination of movement and location properties serve as the skeletal structure from which syllables are built, and that movement is the most sonorous element of the sign syllable (see, for example, Sandler, 1993).

The effects of language experience on the perception of signing are further illustrated in the studies investigating the phenomena of *categorical perception*. In the spoken language domain, this phenomenon refers to the finding that speech stimuli are perceived categorically rather than continuously despite a continuous variation in form (Liberman *et al.*, 1967). The principle of categorical perception helps explain how listeners may resolve the many-to-one mapping between continuous acoustic patterns and discrete phonological categories. Initially, the phenomenon of categorical perception was taken as evidence for a hard-wired, language-specific mechanism, but more recent work has placed the phenomenon within the framework of a general psychophysical mechanism that may be observed over a variety of non-language domains.

Studies of categorical perception for phonological parameters in ASL have been conducted for place of articulation, hand shape, and facial expressions in signers and non-signers. Recently, categorical perception was found for the parameter of hand shape, but not place of articulation (McCullough *et al.*, 2000), an effect that was limited to deaf signers. This indicates that linguistic knowledge can influence perceptual judgments. While it has been demonstrated that hearing non-signers exhibit categorical perception for emotional facial expressions (Calder *et al.,* 1996), the study of categorical perception for facial information is interesting in signed languages, as facial information in ASL not only conveys emotional information about the state of the speaker, but also serves a linguistic function. Several well defined facial configurations serve to signal adverbial modulations and specify syntactic forms. Recent studies have found categorical perception of both emotional and linguistic facial expression (McCollough and Emmory, 1999) and British Sign Langauge (Campbell *et al.,* 1999). However, these effects were observed in both deaf signers and hearing non-signers, suggesting that categorical perception for facial expression is not mediated by linguistic knowledge *per se*.

Sign Language Production

As with the study spoken languages, psychological processes underlying the production of sign language have been underrepresented in the literature. However, examples of 'slips of the hand' akin to 'slips of the tongue,' have been reported in signed languages, in which semantic- and form-based errors are attested, but dual (semantic + phonological) errors are rare. For example, in a recent report of production errors in German Sign Language (Deutsche Gebaerdensprache [DGS]), 38/40 sign-substitution errors are semantically based; only one is semantically and form-based (Hohenberger *et al.,* 2002). Sign language form-based errors are manifest primarily as anticipations and perseverations. Interestingly, there is marked disparity in the frequency with which the individual sublexical form parameters are subject to error, with hand configuration being far

more susceptible to error than place of articulation and movement (Hohenberger *et al.,* 2002). These data are consistent with previous slip literature (Klima and Bellugi, 1979; Newkirk *et al.,* 1980) in which the majority of form-based errors were in hand configuration.

In a sign language production experiment (Corina and Knapp, in press), the time-course of semantic and phonological form retrieval in a visual-manual language during production was examined using a sign-picture naming paradigm, in which signers were required to articulate sign names of an object while observing an overlay of a distractor sign. This Stroop-like task found that native signers of ASL exhibit longer naming latencies in the presence of semantically-related sign distractors than in the presence of unrelated distractors at early, but not late, stimulus onset asynchronies (SOAs). In contrast, phonologically-related stimuli produce naming facilitation both early and late in the naming process, but effects vary by degree and type of phonological relatedness. We observed different amounts of interference between distractors that shared one, two, and three parameters with the target, with greatest effects observed when the sign target to be articulated and the interfering stimulus shared both movement and location parameters. Interestingly, the combination of location and movement was an important factor in the lexical decision experiment of Dye and Shih (2005). As noted previously, location and movement components of signs are linguistic categories that may comprise the skeletal structure of a sign.

Morphology

Morphological theories are formal statement about how word forms are built. Traditional approaches provide accounts of how new words are adopted into the existing lexicon (i.e., coinage), the relationships between word forms that change grammatical category and thus extend meaning usage (i.e., derivational morphology), and how word forms adapt in the face of syntactic phenomena (inflectional morphology).

Psycholinguistic studies of sign language morphology have been largely driven by the fact that morphological processes do not easily fit into a traditional segment-based approach. In contrast to spoken languages, in which morphological forms are commonly created by prefixing or suffixing onto a stem, many of the morphological form changes observed in signed languages are non-concatenative. Under morphological inflection, the entire base form undergoes complex movement modulations.

Consider, for example, the morphological changes that affect a verb like *tell*. In the citation form of this sign, the extended index finger of the otherwise closed hand shape touches the chin with the palm facing the signer. It moves forward in a straight path via the extension of the elbow to approximately a 120-degree angle. In one aspectual inflection that signals intensity or forcefulness, we find the elbow extension reduced, and an increase in movement velocity. A temporal inflection, giving rise to a meaning that this action occurred again and again over time, adopts an elliptical path movement that passes by the chin in repeated cycles. Inflection for grammatical number agreement may take on a sequence of repeated straight movements directed towards between two or three laterally and evenly displaced points in space. Finally, grammatical verb agreement inflections modulate the beginning and end of the path movements which in turn signal the grammatical subject and object of the sentences, respectively.

Many psycholinguistic studies of spoken language morphology have examined whether morphologically complex forms are decomposed into constituent parts or treated in a more holistic fashion. Current indications are that the degree of decomposionality may vary with the formal devices used to modulate word meaning in a specific language. The question of how complex sign forms are parsed has been dealt with in only a handful of studies. Emmorey (Emmorey *et al.,* 1991; Emmorey, 1991) investigated the organization of the lexicon for morphologically complex forms using a repetition priming experiment. Here, a morphologically inflected sign was used as a prime, and a lexical decision was made about its uninflected form. These studies found that whereas sign primes inflected for aspect (e.g., habitual, continual) did produce facilitation in the recognition of the associated uninflected stem, signs inflected for grammatical agreement (e.g., dual, multiple, reciprocal) did not prime their citation forms. Emmorey (2002) has suggested that differing degrees of productivity may effect the lexical representation of morphologically complex forms in ASL. The interplay between the number of verb types that participate in a particular inflectional process may influence the association between related forms in the lexicon. For example, more verb forms can be marked with the habitual inflection than the reciprocal inflection.

Syntax

Syntax refers to a level of language form that specifies the interrelationship between words in a sentence. Formal studies of syntax reveal universal and language-specific patterns and constraints that reliably

contribute to interpretation of the sentence meaning, especially those specifying thematic roles. Psycholinguistic studies of syntactic processing strive to understand how these structured patterns are exploited during on-line comprehension of sentences, and how this information is combined with word meaning to give rise to a conceptualization of the intended message.

Early spoken language studies examined the psychological reality of clause boundaries and syntactic complexity (Garrett *et al.,* 1996). More recent studies have attempted to document the precedence of sentence interpretation as it unfolds in time, with some suggesting a leading role of syntactic over semantic properties. Other studies have examined how structural dependencies in a sentence are instantiated – for example, the integrative processes by which a noun and its associated pronoun are coupled in sentences such as 'John went to the store and he bought some bread.' The few studies of syntactic processing in signed languages have focused on the phenomenon of co-reference, exploiting the unusual means by which pronouns and their noun antecedents are associated. Specifically in signed languages like ASL, a signer may associate a noun with a specific location in articulatory space (typically on a horizontal plane in front of the signer) with a later indexic point to this space signaling a co-referential relationship. Thus in the sentence above, the proper noun John may be articulated in a right-sided location in neutral space, a subsequent point to that same location would signal the antecedent 'John.' In many theories of sign language grammar this pointing sign is considered a pronoun.

Spoken language studies have found that at the time one encounters a pronoun in a sentence one can find evidence that its noun antecedent has been reactivated. Using a probe recognition technique Emmorey and colleagues found evidence for antecedent re-activation during sign comprehension that was similar to that observed for spoken languages. A semantically-related probe sign that followed the pronoun was recognized faster than a semantically inconsistent sign. The authors also explored several sign language-specific aspects of co-reference. For example, the re-activation was noted even when the grammatical co-reference was signaled by verb agreement rather than by an overt pronoun, thus providing a psycholinguistic validation of the theoretically motivated analysis of null-pronoun phenomena in ASL (Emmorey and Lillo-Martin, 1995). In addition, Emmorey, Corina, and Bellugi (1995) examined whether the spatial location of the probe interacted with the entailed semantic relationships. They found that the consistency of the spatial location of the probe item did not influence response times. That is, while a semantically (and co-referentially) appropriate related probe sign was recognized faster than a semantically inconsistent sign, these recognition times were not modulated by absolute spatial location of the probe (which could appear in the same location as the pronoun [and antecedent] or a different location). Interestingly, this lack of spatial effect was observed only in sentences in which the spatial locations signaled grammatical relations. In contrast, when the spatialization of the nouns and pronouns made reference to actual topographic relationships (i.e., real world space, e.g., 'chair located to the left of a table'), the consistency between the probes and the spatially established referents did positively influence reaction times. This finding is consistent with a theoretically-motivated distinction between grammatical space and topographic use of space in sign. In sum, these studies have found that the same processing mechanisms are required to interpret coreference in signed and spoken languages, but for signed languages, the type of information represented by the spatial location can influence how coreference relations are processed (Emmorey, 2002).

In conclusion, while psycholinguistic studies of signed languages are just beginning, preliminary findings indicate a great deal of commonality between the factors underlying the recognition, access, and structure of items in the mental lexicon, as well as the parsing and interpretation of morphological and syntactic structure. However, some unique and subtle processing differences have been found between spoken and signed languages, thus confirming that the modality of language expression can affect the final form of mental structure of language.

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See also: Animal Communication: Overview; Cognitive Science: Overview; Morphology: Overview; Phonetics: Overview; Phonology: Overview; Psycholinguistics: Overview; Sign Language: Overview; Sign Language: Syntax.

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Sign Language: Semiotic Approaches

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'Sign languages,' or 'gestural languages,' mostly arise in place of voice languages when voice languages are unavailable to people because they are profoundly deaf, because they speak different languages that are mutually unintelligible, or because speaking is barred by custom. ('Gestures' in this context include facial expressions.) Examples are the gestural language of the American deaf – 'Ameslan' or 'ASL' (American Sign Language) – and the gestural languages of the American Plains Indians and of certain monks sworn to silence. A gestural language is a language just as English is; lesser gestural systems such as the signals used by traffic cops or landing signal officers on aircraft carriers do not offer a sufficiently rich repertoire of signs – or above all, a syntax – to enable their users to convey whatever they wish. A landing signal officer can convey 'OK to land' but not, as English can so easily, 'A two-mile-long aircraft carrier has just been commissioned that can land 747s.'

Because gestural languages mainly use hand gestures to produce their sentences and eye recognition to receive them, they differ significantly from voice languages produced by the vocal tract and received by the ear. For example, voice languages convey much by intonation and stress – thereby distinguishing between 'You've been to Paris' and 'You've been to *Paris*?' – while in a gestural medium, these are conveyed by gestures alone.

True gestural languages must be distinguished, not only from the communications available to traffic cops and the like, but also from another limited medium, the 'fingerspelling' that the deaf sometimes resort to. Fingerspelling, whether assigning areas on one hand to stand for a letter to be pointed at by the forefinger of the other (Dalgarno, 1680), or more directly indicating the letters with finger configurations (often mimicking letter shapes) (Stokoe, 1974), is only a way of conveying the spelling of some voice language (e.g., English). In contrast, Ameslan is quite independent of American English (and differs from its British counterpart). Their autonomy is another criterion by which gestural languages can be judged 'true languages.'

Gestural languages combine partial gestures that are functionally equivalent to phonemes (West, 1960: vol. I, 9–18) to form morphemes and words. These partial gestures are variously called 'cheremes' or 'kinemes' and are syntactically structured into sentences. Thus, the Ameslan morpheme 'girl' is gesturally conveyed, rather than by the four phonemes /g/, /^/, /r/, and /l/, by three concurrent 'cheremes' characterized as 'drawing down,' 'the ball of the thumb,' and 'along the cheek' (Nöth, 1990: 284). Despite their structural similarities, however, other gestural languages typically have less expressive power than those of the deaf.

Gestural languages have been studied in depth by linguists, other semioticists, amateur and professional anthropologists, psychologists, and neurologists, whether they are used by the deaf (e.g., Bellugi and Studdert-Kennedy, 1980, esp. 29–40, 115–140, 291–340), by people lacking other inter-tribal communicative means (Umiker-Sebeok and Sebeok, 1978), by people who must abjure speech when orating stories or rituals (West, 1960: vol. II, 9, 62, 68), or by people for whom speech is taboo, such as certain monks (Umiker-Sebeok and Sebeok, 1987) and newly widowed Aboriginal women (Kendon, 1980).

See also: Language Education of the Deaf; Sign Language: Acquisition; Sign Language: Interpreting; Sign Language: Overview; Sign Language: Phonology; Sign Languages of the World.

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Sign Language: Syntax

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Introduction

A major reason for interest in sign language syntax is the light it can shed on proposed universals of grammar. It is well established on the basis of spoken language research that there are consistent regularities across languages in the domain of syntax. There are also clusters of properties shared by subgroups of languages. With the advent of research on sign languages, it is possible to test the hypothesis that the principles are linguistic universals, and the systematic variability can be captured by parameters. If the same constraints apply to sign languages as to spoken languages, then it can be concluded that these are intrinsic to language. On the other hand, if signed and spoken languages display different properties, then the properties must be attributed to modality.

Discourse Orientation

A large number of studies have concentrated on determining the basic word order of a particular sign language, or, in fact, whether a basic order can even be determined. The question has been of interest because most researchers have concluded that the sign language they are investigating permits considerable variation in word order, in a way very similar to that found in the so-called Discourse Oriented languages, including Chinese and Russian (*see* **Sign Language: Discourse and Pragmatics**). In most cases a basic or underived order has been determined (e.g., SVO in American Sign Language (ASL), Brazilian Sign Language (LSB), etc. and SOV in German Sign Language (DGS), Japanese Sign Language (NS), etc., as illustrated in (1)). However, it seems that sign languages in general productively employ devices for presenting information in a different order determined by discourse factors, such as presenting old information (topic) before new information (comment) (as illustrated in (2)) (*see also* **Sign Language: Transcription, Notation, and Writing**).

(1) (a) JOHN EAT APPLE SVO order, used in ASL
(b) JOHN APPLE EAT SOV order, used in DGS
'John ate an apple'

(2) JOHN, I LIKE (t) object in topic position
'John, I like.' / 'I like John.'

In addition to evidence from the contexts in which various orders are used, researchers have noted the presence of specific non-manual markers used when the order is something other than the basic (*see also* **Nonmanual Structures in Sign Language**). Commonly (though not universally) this includes raised brows in the facial expression accompanying topics, which are also set off from the rest of the sentence by a prosodic break, including a hold and/or pause and a change of the facial expression.

Another characteristic some sign languages share with 'Discourse Oriented' languages is a special position for focused, or prominent, elements, which in ASL and LSB is the sentence-final position (as illustrated in (3)). Not as much attention has been paid to the possible existence of a particular position for focus across sign languages, although the final position is used for commonly focused elements such as negatives and WH-elements in many sign languages (*see also* **Sign Languages of the World**). Further research is needed to determine whether the existence of a focus position and/or the placement of such a focus position varies across sign languages.

(3) (a) focused elements in final position
(br) JOHN LIKE WHO, MARY
'Who John likes is Mary.'
(b) JOHN READ CAN
'John really CAN read.'

In addition to discourse motivation for word order changes, order may change in the presence of certain linguistic elements, such as verbal agreement (*see also* **Sign Language: Morphology**). When agreement is present, it provides evidence for identifying the verb's subject and object, and changes in word order are possible (see example (4)); put another way, verbal morphology licenses syntactic reordering rules. Whether to account for such reordering in the terms of scrambling or some other syntactic movement operation is not yet clear.

(4) SOV order used with agreement
GIRL IX-a BOY IX-b a-HELP-b
'The girl helped the boy.'

Another way in which sign languages are 'discourse oriented' is in the use of null arguments. Arguments of verbs marked for agreement may freely be non-overt. When verbs are not marked for agreement, arguments may also be dropped, as in languages like Chinese.

Syntactic Movement and Constraints

There has been considerable controversy over the direction of WH-movement in several sign languages,

since WH-elements can appear in sentence-initial position or sentence-final position (as illustrated in (5)).

(5) (a) WHAT ANN BUY (wh) — Sentence-initial WH-object
'What did Ann buy?'

(b) BUY CAR WHO (wh) — Sentence-final WH-subject
'Who bought a car?'

Some researchers have proposed that movement to the sentence-final position indicates that true WH-movement is rightward. An analysis that maintains that WH-movement is to the sentence-initial position, making the sentence-final WH-elements part of the more general process of focus, is able to account for a wider range of data.

An important source of data on universals of spoken language concerns constraints on syntactic movement. Whereas cyclic movement is potentially unbounded, movement is not permitted out of a syntactic 'island.' Relatively little work has been undertaken to examine the characteristics of long-distance movement in sign languages, but it has been claimed (for ASL, at least) that long-distance movement is permitted (see (6a), in which the topic 'exercise class' has moved from the embedded object of the verb 'take-up'). Movement is constrained, however, by principles such as the Coordinate Structure Constraint (see (6b), which is ungrammatical because the topic 'flower' has moved from the object of the second conjunct 'give').

(6) (a) EXERCISE CLASS, $_1$INDEX HOPE SISTER SUCCEED PERSUADE MOTHER TAKE-UP. (t)
'The exercise class, I hope my sister manages to persuade my mother to take (it).'

(b) *FLOWER, 2GIVE1 MONEY, jGIVE1. (t)
'Flowers, he gave me money but she gave me.'

Conclusion

An interesting point for future study will be to determine the extent to which sign languages themselves are parameterized. While variation is found in basic word order (at least SVO and SOV are attested), current analyses do not show variation with respect to discourse orientation. Even with this question unanswered, it is clear that the analysis of sign language syntax is quite consistent with the hypothesis that universal principles and limited cross-linguistic parametric variation apply across all languages including sign languages.

See also: Nonmanual Structures in Sign Language; Sign Language: Discourse and Pragmatics; Sign Language: Morphology; Sign Language: Transcription, Notation, and Writing; Sign Languages of the World.

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Sign Language: Transcription, Notation, and Writing

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The complex nature of the signal in sign languages places special demands on notation systems, orthographies, and the transcription process itself. Signing is composed of visible gestures of the hands, arms, head, and body, which use space in linguistically meaningful ways. No single system has achieved the status of a standard notation for signing comparable to the IPA for spoken languages, and everyday sign language writing is the exception rather than the norm.

The process of transcribing signed data, as well as the kind of notation adopted, depends primarily on the uses and applications of the data. Different kinds of conventions are used depending on whether transcribed data are used for phonological analyses, morphological, discourse, or syntactic analyses. For the latter three, sets of fairly widespread conventions have evolved (see Klima and Bellugi, 1979). Signs are represented by upper case word glosses (joined by hyphens if more than one word is required to represent a sign's meaning), additional information usually provided in lower case. If a distinction between the two hands is important in the sentential or discourse context, the two hands are usually noted on two separate lines; information about non-manuals and mouthing, is normally placed on a line above the sign glosses.

Various systems have been developed to note the phonological structure of signs. One of the first, and the most influential, is introduced in Stokoe (1960). This notation matches handshapes to the closest letter of the American manual alphabet and ASL numbers, and uses conventionalized iconic symbols for location, movement and spatial relation. Stokoe notation has been extended and adapted since: Mandel (1981) for American Sign Language, Kyle and Woll (1985) and Brien (1992) (British Sign Language), and Bergman (1993) (Swedish Sign Language), contain some of the most extensive descriptions of such modifications, which involve adding symbols for aspects of sign structure absent in Stokoe, in particular for handshapes not in ASL or symbols that better match the local manual alphabet values (e.g., Bergman or Radutzky, 1979). Another outgrowth of Stokoe notation (Liddell and Johnson, 1989) adds detailed, word-based descriptions of movement and location structure. HamNoSys (Prillwitz and Zienert, 1990) is fairly widely used, and while similar in principle to Stokoe notation, uses iconic representations of handshape instead of letter and number symbols. Other, less widely used systems are referenced in the bibliography.

Although sign languages are rarely written down for everyday communication, two significant attempts at developing writing systems have been proposed: *Mimographie* (Bébian, 1825) and Sign Writing (Sutton, 1981), which has gained a certain following.

Software alternatives to transcription on paper have begun to appear, each of which allows computerized transcriptions to be linked to stretches of digitized video. Significant software packages are SyncWriter (Papaspyrou and Zienert, 1990), SignStream (Neidle, 2001) and Elan (Eudico Linguistic Annotator) from the Max Planck Institute in Nijmegen,

See also: Sign Language: Discourse and Pragmatics; Sign Language: Phonology; Sign Language: Syntax.

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Relevant Website

http://www.SignWriting.org.

Sign Language: Variation

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Natural sign languages are autonomous linguistic systems, independent of the spoken languages with which they may coexist in a given community. As sign languages are full-fledged autonomous linguistic systems shared by communities of users, the sociolinguistics of sign languages can be described in ways which parallel the description of the sociolinguistics of spoken languages. That is, the sociolinguistics of sign languages concerns the interrelationship of sign language and social structure. As with spoken languages, sign languages are at once used to communicate information and to define the social situation, i.e., to make statements about individual identity, group loyalties, and one's relation to one's interlocutors. The sociolinguistics of sign languages includes the study of regional and social variation, bilingualism and language contact phenomena, language maintenance and choice, language attitudes, language policy and planning, and discourse analysis (Lucas, 1995, 2001). However, it is very important to understand that while each of these areas has relevance for deaf communities, the sociolinguistics of sign is a relatively young discipline and there exist few if any empirical studies in some of these areas.

Regional and Social Variation

Regional and social variation in sign languages has been described mainly at the phonological and lexical-levels, and to a lesser extent at the morphological and syntactic levels. Variation at the phonological level involves variation in the production of the component parts of signs, such as handshape, location, palm orientation, nonmanual signals, and segmental structure. For example, the American Sign Language (ASL) signs FUNNY, BLACK, and CUTE might be produced with the thumb extended or with the thumb closed; the ASL signs BORED and DEAF might be produced with the little finger extended or with the little finger closed; the ASL sign WEEK might be produced with the palm of the dominant hand facing upward or the palm facing downward; the ASL sign KNOW might be produced on the forehead or on the cheek. Lexical variation concerns different signs for the same concept. Regional differences have been described in British Sign Language (BSL), for example, between Reading and York for the signs LEARN, SUNDAY, and WHO (Deuchar, 1984: 131). Lexical variation in BSL has also been described by Kyle and Woll (1985). Lexical variation

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has also been looked at in New Zealand Sign Language, Italian Sign Language, Dutch Sign Language, Swiss–German Sign Language, Swiss–French Sign Language, Brazilian Sign Language, and Australian Sign Language or Auslan (Schembri and Johnston, 2004). Variation in terms of ethnicity has been looked at by Woodward (1976) and Aramburo (1989), i.e., differences between black and white signers in the USA. Gender variation has been looked at in ASL, in Chinese Sign Language, and in Irish Sign Language. However, social variation in terms of socioeconomic status (i.e., the classic Labovian type of sociolinguistic analysis) or in terms of social networks such as have been described for spoken languages has yet to be described systematically for sign languages. The variety of ASL used by deaf/blind people, known as Tactile ASL, has been investigated by Collins (2004) and similar varieties used by deaf/blind people in other countries have also been described (Mesch, 2000). Recent studies (Lucas *et al.*, 2001) have shown there to be consistent modality differences in variation, so that factors such as the grammatical function of the sign that shows variation play a more important role in explaining variation in sign languages than the immediately preceding or following environment, i.e., the sign before or after, as is commonly the case in spoken language variation.

Bilingualism and Language Contact Phenomena

There exist different kinds of bilingualism in deaf communities (Ann, 2001). For one, most deaf individuals have at least some exposure to the spoken language of the majority community in which they live. This exposure may be primarily exposure to the written form of the majority language, although in many countries a signed code to manually represent the spoken majority language has been devised, with signs invented to represent the bound morphemes of the spoken language. A discussion of bilingualism in deaf communities necessarily requires a re-examination of the term 'bilingual' as it has been used to describe spoken language communities. This is because many deaf people with a firm command of the written version of the majority spoken language choose not to use their voices because they are not able to hear themselves and hence monitor the volume or pitch of their speech. Bilingualism in deaf communities does not necessarily include **speaking** the languages in question, at least not in the way that the term 'speaking' is generally understood by linguists.

There are many occasions for language contact in deaf communities. Figure 1 presents a model of the linguistic outcomes of language contact. A fundamental distinction is made between a situation involving contact between two sign languages and a situation involving contact between a sign language and a spoken language, a distinction necessary because of the difference in modality between sign and spoken languages. Naturally, the situation is not entirely straightforward, as two sign languages may be in contact, both of which may incorporate outcomes of contact with their respective spoken languages, outcomes which may then play a role in the contact between the two sign languages.

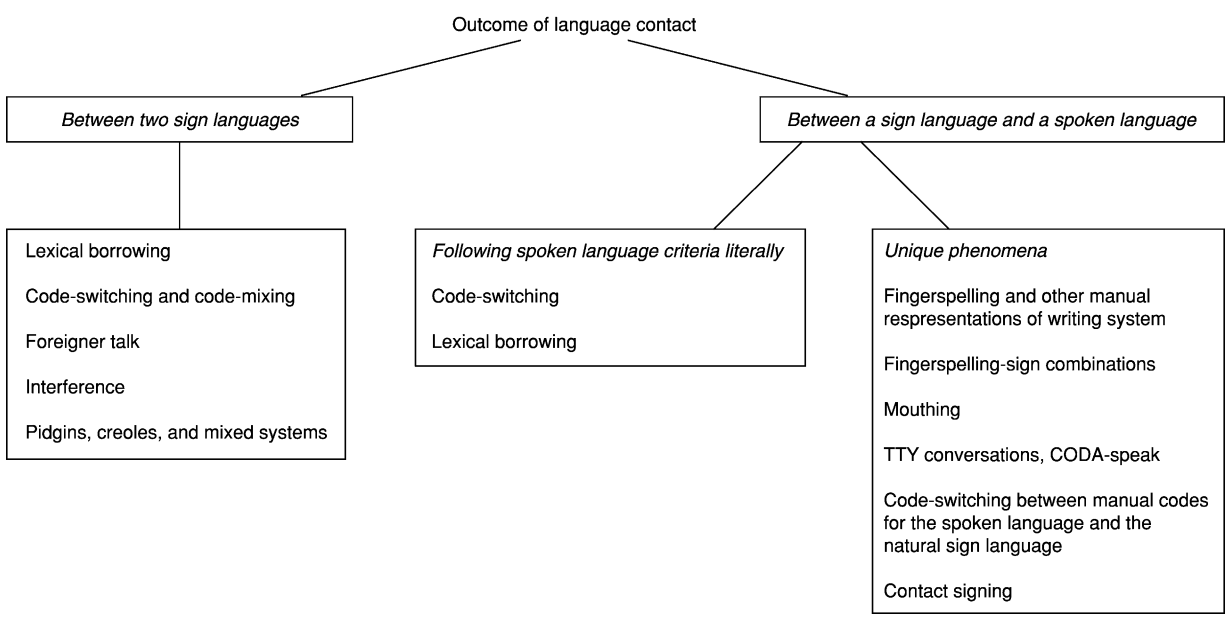

Figure 1 Outcomes of language contact.

As can be seen from Figure 1, the outcomes of contact between two sign languages parallel the outcomes that have been described for contact between spoken languages, namely lexical borrowing of various kinds, code switching and code mixing, foreigner talk, interference, pidgins and creoles, and mixed systems (Supalla and Webb, 1995). There is much anecdotal evidence for many of these outcomes and empirical studies of the outcomes of contact between two sign languages are beginning to appear (Quinto-Pozos, 2002; Yoel, 2001). Signers borrow the signs from one language into their own; bilinguals may code-switch and code-mix elements from two sign languages; a signer may alter his signing and simplify it when signing to a nonnative, and signers may show interference from one sign language when using another. Signers have been observed to have 'accents.' As concerns contact between a sign language and a spoken language, a distinction is made between outcomes which reflect literal adherence to the spoken language criteria defined for those outcomes. For example, code switching would mean ceasing signing and beginning to talk. This is distinct from unique phenomena that occur, such as contact signing, as observed in the American Deaf community: the simultaneous production of ASL lexical forms in English word order with mouthing of English words, with the possible inclusion of inflected ASL verbs and ASL nonmanual signals. Some analyses have characterized this as a pidgin but more recent analyses find the features of this kind of signing to be inconsistent with the features of pidgins (Lucas and Valli, 1992). Fingerspelling is also a unique phenomenon, because although the forms are part of the natural sign language – i.e., the hand shape, the location, the orientation, and the segmental structure – it is a representation of the writing system of the majority spoken language (Battison, 1978). Signers in contact with languages which use the Roman alphabet fingerspell, but signers in contact with Arabic, Russian, Japanese, and Chinese also represent the writing systems of their respective spoken languages (Ann, 1998). Other unique phenomena include the English sometimes produced by the children of deaf adults (CODA-speak, Bishop and Hickes, 2005), the English of typed telephone conversations that often incorporates features of ASL (Mather, 1991), and the alteration of French places names in Langue des Signes Québécoise (Quebec Sign Language) (Miller, 2001).

Language Maintenance and Choice

Typically, the use of natural sign languages has been restricted to a very limited set of functions and has been totally excluded from the educational process. Such a sociolinguistic situation has led to the characterization of language use in the deaf community as diglossic, the majority spoken language being the H variety and the natural sign language being the L variety (Stokoe, 1969). There is a lot of evidence that some signers clearly see their natural sign language as appropriate only for intimate, informal situations, and the signed version of the majority spoken language as appropriate for public, formal situations, be the interlocutors hearing or deaf. However, as many countries around the world begin to use natural sign languages in deaf education, these sign languages are acquiring functions that they have not had before, and the spoken or signed version of the majority spoken languages may lose the functions they once had or be restricted to the functions of reading and writing. Because of the clear need in deaf communities for both a natural sign language and for some form of the majority spoken language, the situation in most deaf communities can be characterized as one of maintained bilingualism. Unlike many minority languages in a majority language situation, it would not appear that natural sign languages are in any danger of disappearing.

Language Attitudes

Language attitude studies in deaf communities concern signers' attitudes toward their natural sign language and toward the majority spoken language, attitudes toward users of the sign and spoken language, attitudes of teachers of the deaf and professionals toward natural sign languages, attitudes toward the invention and introduction of new signs, and attitudes toward the outcomes of language contact (Kannapell, 1989; Burns, 2001). Language attitude studies often reveal conflicting attitudes toward the natural sign language and the majority spoken language in a given community, as a result of lack of recognition of the status of the sign language as a viable and autonomous linguistic system. That is, pride with respect to the sign language may cooccur with an attitude that its use reveals a lower educational level or even lower intelligence in the user, while use of a signed version of the majority spoken language may be viewed as evidence of good education and superior intelligence. Pride with respect to the natural sign language may coexist with the misconception that it is not a real language or is a deficient form of the spoken majority language.

Language Policy and Planning

Language planning has been defined as deliberate decision making in response to language problems.

Deaf communities have very often been perceived as the sites of language problems, particularly as concerns the education of deaf children, for the obvious reason that deaf children do not have easy access to the spoken majority language as a medium of instruction (Ramsey, 1989; Nover, 1995; Reagan, 2001). Approaches since the 1970s have involved the invention of manual codes to represent the majority spoken language and may involve the simultaneous production of the spoken language and the sign language, referred to as sign-supported speech (Johnson *et al*., 1989). However, many deaf communities around the world are beginning to use the natural sign language of the community as the medium of instruction. All of these approaches have implications for language planning, either in the invention of manual codes for educational use, or in the use of the natural sign language for functions it has not previously had. This may entail expanding the lexicon of the natural sign language, an expansion which leads to other language-planning issues, such as whether signs should be invented for new concepts or whether new concepts should be represented with fingerspelling. Issues of access and hence of language policy and planning are not limited to deaf education. For example, providing deaf adults with full access to the business of the majority language community – i.e., media, government, the law, medical care – entails decisions as to how linguistic access will be provided. For example, whether closed captioning is preferable for television news to a sign language interpreter; whether a sign language interpreter, if provided, should use the natural sign language or a signed version of the spoken majority language; what the interpreting policy should be in an international gathering of deaf people – the natural sign language of the location of the gathering or an international variety or both (Rathmann *et al*., 2000). These are all issues that are the subject of debate in many deaf communities around the world.

Discourse Analysis

As with spoken languages, the discourse of natural sign languages is structured and subject to sociolinguistic description (Metzger and Bahan, 2001). Signers use natural sign languages and choices between natural sign languages and other kinds of signing to make statements about who they are, what their group loyalties are, how they perceive their relationship to their interlocutors, and what kind of speech event they consider themselves to be involved in. Sign languages are used to establish or reinforce social relations and to control the behavior of others. Sign language discourse has internal structure and is governed by norms such as how many people sign at once, how much one person should sign, what can be signed about in public, how a conversation should be entered or left, how turns should be allocated, how repairs should be undertaken, and so forth. Topic and the world knowledge that individuals bring to the discourse may also structure it (Roy, 1989), and sign language discourse can be described in terms of register variation (Lawson, 1981; Deuchar, 1984; Zimmer, 1989). The concept of 'language as skilled work' is applicable to sign languages, as skill is demonstrated both in everyday use of language and in special forms such as storytelling and poetry (Winston, 1999).

See also: Language Education of the Deaf; Minority Languages: Education; Sign Language: Acquisition; Sign Language: Communities and Cultures; Sign Language: History of Research; Sign Language: Overview; Sign Language: Phonology; Sign Language: Semiotic Approaches; Speech Community; Variation and Language: Overview.

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Sign Languages of the World

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The Current State of Knowledge

After more than 30 years of systematic sign language research, most sign languages throughout the world still remain scarcely documented or even entirely unknown. We can only estimate how many sign languages exist in the world, and we are even less sure about how they may be grouped into language families. A few sign languages in industrialized countries are reasonably well documented, whereas little is known about sign languages in other areas of the world, such as sub-Saharan Africa, Southeast Asia, and the Arab world. Nevertheless, increasingly more information has been coming to light during the past decade, although we are still far away from systematic linguistic documentation in most cases.

Based on what we know to date, it is fairly clear that the sign languages of the world number in the hundreds rather than in the thousands and are thus much fewer in number than their spoken counterparts. For all we know, they are also much younger than spoken languages, although other forms of gestural communication are as old as humanity itself. The latest edition of the *Ethnologue* (Grimes, 2004) lists approximately 100 living sign languages. However, there are many omissions and errors in this list, so the actual number of sign languages in the world is likely to be at least three or four times greater.

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more than 2000 years ago should not have had groups of sign language users, but we do not have any reliable sources for these times. On the other hand, it is quite unlikely that communities of sign language users as we know them today would have existed even earlier. Only after urbanization had created reasonably large populations could critical numbers of deaf people theoretically have come together to use a sign language.

For many known sign languages, there is more or less detailed anecdotal evidence of historical links with other sign languages. These links may have to do with colonial history, migration of populations, or, in more recent times, the establishment of deaf education with the help of another country. The principal difficulty lies in determining whether a particular relationship between sign languages is genetic in nature (i.e., in how far we can speak of a sign language family) or whether we are dealing with a language contact situation. Attempts at addressing this issue have been largely unsuccessful, and no theoretically sound method of investigating historical relationships between sign languages is available.

In recent years, increasingly more sign languages are beginning to be documented. A first step is usually the compilation of basic vocabulary in word lists (pairing a word and a picture of a sign), which are often wrongly called 'dictionaries' (see Figure 1). During the past decade, these and other developments have resulted in a situation in which it is now possible to systematically compare linguistic structures across a much wider range of sign languages than in the past. The newly emerging field of sign language typology is concerned with the issue of how to systematize this new knowledge in a theory of variation across sign languages.

Sociocultural and Sociolinguistic Variables

Signed communication occurs in a variety of situations. This article is concerned exclusively with natural full-fledged sign languages that are the primary languages of their users. We are not concerned with artificially created sign systems such as 'Manually Coded English,' 'Signed Japanese,' and 'Dutch in Signs,' which have been invented for educational purposes with the aim of mirroring spoken language structures 'on the hands' (*see* **Sign Language: Communities and Cultures**). We are also not concerned with secondary sign languages that are used in communities where the usual mode of communication is through a spoken language but where signed communication plays a supplementary role for certain purposes, such as conditions of speech taboo. Rather, the sign languages we are interested in involve groups of deaf people for whom the sign language is the primary means of communication.

The first sign languages that were documented in detail from the 1970s onwards are used by communities of deaf people in urban settings. These are minority languages in which most of the users are deaf and there is constant language contact with the surrounding spoken/written language of the majority culture of hearing people. This situation is well described and occurs in urban areas in all regions of the world.

However, sign languages also exist in an entirely different sociocultural setting that is less well documented but highly significant for cross-linguistic comparison. These sign languages are used in village communities with a high incidence of hereditary deafness. Village-based sign languages arise because deaf individuals have been born into the village community over several generations, and therefore a sign language has evolved that is restricted to the particular village or group of villages. These sign languages are typically used by the whole village population no matter whether deaf or hearing, and in this sense, they are not minority languages, nor do they face any linguistic oppression. They have developed in isolation from other sign languages and are not used in any educational or official context. Deaf people are fully integrated into village life and may not be considered to be 'disabled' in any sense (Branson *et al.*, 1999). The existence of village-based sign languages has been reported from places as diverse as Bali, Ghana, Thailand, Mexico, an Arab Bedouin tribe in Israel, and a native Indian tribe in the Amazon, but their linguistic documentation is only just beginning. These languages have the potential to call into question many of the general assumptions that were made previously about the structure of sign languages.

Some village-based sign languages are already endangered and have not been documented in detail. As the larger, urban sign languages move in through formal education and the media, these small, locally restricted sign languages face similar pressures as their spoken language counterparts (*see* **Endangered Languages**). Similarly, sign languages in some developing countries have been under pressure from foreign sign languages, as in many African countries. In places where the deaf community is very large and the indigenous sign language has had time to develop on its own, it is relatively immune to foreign influences, as is the case in China and in the Indian subcontinent.

Despite similarities with respect to language endangerment, the life cycle of sign languages also differs from that of spoken languages in that new sign languages continuously emerge throughout the world, as most famously documented in Nicaragua (Kegl

NANASI
pineapple

Hutumika pia kwa Katani
it is alsoused for "sisal"

Alama sanifu
standard sign

169:571

NAZI
coconut

Alama sanifu
standard sign

LANGUAGE RULES AND TERMINOLOGY OPPOSITES قواعدالفاظوزبان متضادالفاظ

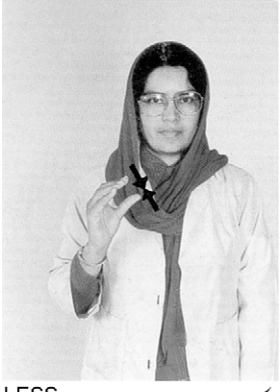

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MORE زیادہ

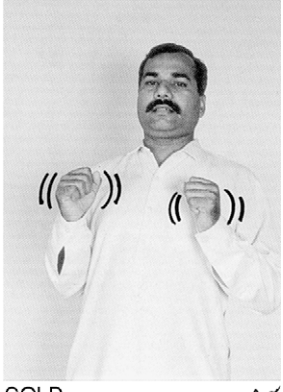

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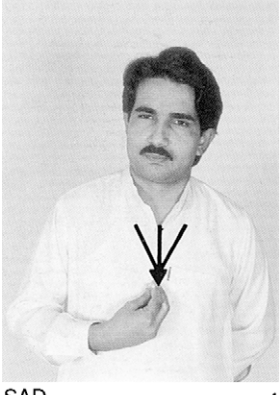

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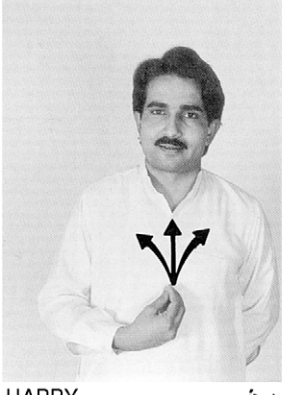

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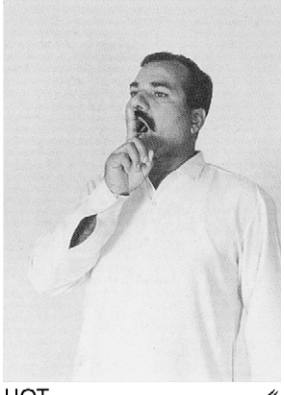

HOT گرم

Figure 1 Entries from sign language dictionaries (Tanzania, Pakistan).

et al., 1999). Throughout the world, urbanization and the spread of special education for the deaf create new deaf communities with newly emerging sign languages. The stage of a sign language's life cycle is an important consideration for comparing the structures of sign languages.

Relationships between Sign Languages

For a number of individual sign languages as well as groups of sign languages, the notion of sign language family has been proposed, based on known facts about their relationship with each other. For example, it is well-known that sign language was brought to New Zealand and Australia from the United Kingdom, and therefore these three sign languages make up the 'British Sign Language family.' For different historical reasons, the Japanese Sign Language family includes sign languages in Taiwan and Korea, both of which had been under Japanese occupation. In cases in which one and the same sign language-using community seems to have split and subsequently developed independently from each other, the traditional family tree model can be applied, and the shared history is visible and interpretable. Sign languages in Australia, New Zealand, and the United Kingdom are still mutually intelligible to a large extent and share most of their vocabulary, to the extent that it is doubtful whether they should not be classified as dialects of one and the same language. Sign languages in Korea, Japan, and Taiwan all share a peculiar grammatical mechanism of gender marking, with the thumb indicating male and the little finger female gender as formative elements in complex signs (see Figure 2). This feature is not found in any other known sign language and, together with other factors, makes a strong case for positing a shared history of this sign language family.

However, the situation is usually not so clear-cut. In most cases, it is impossible to determine whether similarities between two sign languages are the result of a genetic relationship or the result of language contact. Instead of the 'pure' kind of family tree relationship, a more common type of relationship between two sign languages involves various kinds of language contact situations, language mixing, and creolization. For example, American Sign Language is said to have arisen in a creolization process, where Old French Sign Language came in contact with indigenous sign varieties, resulting in a new language with input from both of these sources. This kind of relationship cannot be considered genetic in the usual sense of the term.

In many cases, there is more or less clear historical evidence of relationships between sign languages. This may be related to colonial history so that, for instance, sign language communities in the Indian subcontinent use a two-handed manual alphabet as in British Sign Language. However, actual historical documentation of how this came to be the case is lacking, there are very few meaningful similarities in the vocabulary and grammar of the two sign languages, and there is thus no evidence for including Indo-Pakistani Sign Language in the British Sign Language family. Another common factor in linking two sign languages often involves the establishment of educational facilities for the deaf. For instance, the sign language in Brazil is said to have its root in French Sign Language because a deaf Frenchman established the first school for the deaf in Brazil, and Swedish Sign Language was similarly brought to Finland. We find this kind of link between many African countries and one or more Western 'source' sign languages (Schmaling, 2001). American Sign Language (ASL) has had a major impact on deaf communities in other countries, such as Thailand, the Philippines, Uganda, Zambia, Ghana, Malaysia, and Singapore, and it is often unclear whether the sign languages used in these countries should be considered dialects of ASL, descendants of ASL in a family tree of

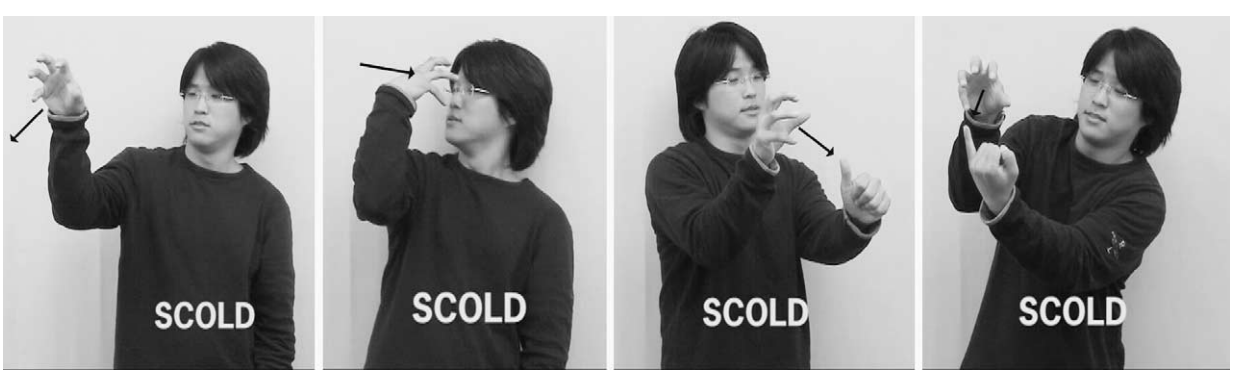

Figure 2 Gender marking in South Korean Sign Language: SCOLD(someone), SCOLD(me), SCOLD(a male person), SCOLD(a female person).

languages, ASL-based creoles, or independent sign languages with extensive lexical borrowing from ASL. To the extent that indigenous sign languages already existed in these countries and secondarily came under the influence of a foreign sign language, the relationships between them are not genetic in the usual sense but are instances of language contact.

This kind of problem is not unknown for spoken languages but is aggravated by a number of complicating factors in the case of sign languages. First, the familiar historical–comparative method that is used to determine language families and reconstruct older forms of source languages has never been applied to sign languages. No process of regular sound change has been identified, and the comparison of morphological paradigms is often compromised because the forms in question are iconically motivated. Vocabulary comparisons are highly unreliable, and there seems to be a considerable 'baseline level' of iconically determined lexical similarity even between unrelated sign languages (Guerra Currie *et al*., 2002). The first family trees that were proposed for sign languages were based on historical evidence and lexical similarities, and later attempts at using glottochronology on the basis of word list comparisons (Woodward, 1993, 2000) are similarly unreliable.

Another complicating factor in many cases is the uncertainty about whether or not there were indigenous sign varieties before the influence of a foreign sign language set in and, if so, what the linguistic status of this signed communication might have been. It is possible that in a particular region, limited home sign systems came in contact with a foreign full-fledged sign language, resulting in a new sign language in a process that has no counterpart among spoken languages. Finally, the lack of any historical records makes it difficult to directly test and evaluate any proposed historical relationship between sign languages. In the absence of any sound methodology for establishing sign language families, the issue of how one sign language is related to another one usually remains unresolved.

Grammatical Similarities and Differences across Sign Languages

Over time, sign language linguists have come to expect certain features in the structure of sign languages that have been shown to occur with great regularity in most or all sign languages known and described so far. Accordingly, there are attempts at accounting for these putative sign language universals on the basis of their visual–gestural modality. For instance, sign languages offer the possibility of using spatial grammatical mechanisms by virtue of being three-dimensional languages, and therefore they tend to use movement modifications to express aspectual distinctions or to use movement direction to code verb agreement (*see* **Sign Language: Interpreting**). Since the articulators in sign language are larger and slower than in a spoken language, sign languages tend to mark grammatical functions in a simultaneous rather than a sequential fashion; therefore, they use nonmanual behaviors such as facial expressions to mark sentence types (questions, negation, and subordination), and they use complex signs with numeral incorporation (e.g., a single complex sign meaning 'three months') (*see* **Sign Language: Morphology**). It has been claimed that sign languages are similar in the kinds of complex simultaneous morphology just mentioned but differ from each other in sequential morphology such as clitics and affixes, with sequential morphology being comparatively rare in sign languages (Aronoff *et al*., 2000).

Most of these generalizations about the similarities between sign languages are based on investigations of a limited number of languages, mainly in Europe and North America. The picture changes somewhat when examining a larger range of the world's sign languages. Although the previous observations are indeed true of many sign languages throughout the world, this is only part of the story. First, some sign languages do not show the 'expected' types of structures. Two unrelated village-based sign languages, in Bali and Israel, do not show an elaborate system of spatial verb agreement as is familiar from other sign languages. Another village-based sign language in Ghana does have spatial verb agreement but does not use the so-called 'classifier' hand shapes to refer to categories of moving persons, animals, and vehicles (*see* **Sign Language: Syntax**). Given that village-based sign languages have developed in isolation from any other sign language and exist under very different sociolinguistic conditions, it is not unexpected to find important differences in their structures in comparison with urban sign languages.

The range of possible structures in sign languages expands considerably when we consider non-Western, lesser-known sign languages. The gender marking system in the Japanese Sign Language family represents one such example. Sign language varieties in China also show many particularities that are not familiar from documented Western sign languages. Chinese Sign Language varieties include so-called 'character signs,' a particular type of borrowing in which the shapes and movements of the hands imitate the whole or part of words from the Chinese writing system (see **Figure 3**). Both northern and southern sign language varieties in China also make use of a productive mechanism of negation in which negative

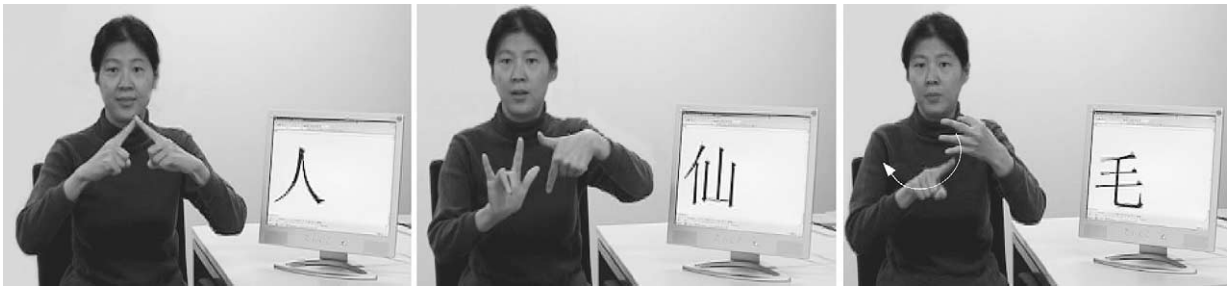

Figure 3 Character signs in Chinese Sign Language.

Figure 4 Chinese Sign Language signs with ''little finger'' negative morpheme: DEAF and TASTELESS.

signs are marked by an extended little finger and the positive counterparts have an extended thumb (see Figure 4). Finally, question words for quantifiable concepts include one or two open hands with finger wiggling as part of complex signs, forming a large paradigm of interrogatives. The study of a greater range of sign languages thus reveals a large number of previously undocumented grammatical structures, just as the study of 'exotic' spoken languages did in earlier stages of spoken language linguistics.

Other structural differences between sign languages are more subtle and only come to light after systematic investigation. Typologically oriented studies across sign languages exist for a limited number of grammatical domains (for pronouns, see McBurney, 2002; for questions and negation, see Zeshan, 2004a, 2004b). Such studies show that the degree of structural differences between sign languages may be considerable but is unevenly distributed across different parameters of investigation. For example, sign languages differ as radically as spoken languages with respect to the set of their possible question words. A sign language may have only a single question word, as in certain dialects of Indo-Pakistani Sign Language (see Figure 5), or more than a dozen, as in Hong Kong Sign Language. On the other hand, the facial expressions accompanying questions tend to be very similar across unrelated sign languages, with eye contact, forward head position, and eyebrow movement as prominent features. Understanding the reasons for these patterns is important for building a theory of typological variation across sign languages.

Another important result from comparative studies is that certain sign language forms may look very similar superficially but in fact have very different properties. For instance, in a broad range of 38 sign languages throughout the world (see Figure 6), it has been found that in each case, negation can be expressed by a side-to-side headshake (Zeshan, 2004a). However, the grammatical constraints governing the use of headshake negation in fact differ greatly across sign languages. Whereas in some sign languages, such as in the Scandinavian region, headshake negation is a primary negation strategy and may often be the only instance of negation in the clause (Bergman, 1995), other sign languages, such as in Japan and Turkey, obligatorily use a manual negative sign with or without headshake negation as a secondary accompaniment. Sign languages in the eastern Mediterranean region (Greece, Turkey, and neighboring Arab countries) additionally use a single backward head tilt for negation that has not been found in any other region of the world (Zeshan, 2002).

It can be assumed that the significance of many possible parameters of variation across sign languages has not been recognized. For example, mouth movements deriving from a silent representation of spoken words, so-called 'mouthing,' carry an important functional load in some sign languages (e.g., in Germany, The Netherlands, and Israel) but are functionally largely irrelevant in Indo-Pakistani Sign Language (Boyes Braem and Sutton-Spence, 2001). The presence or absence of contact with literacy may be another important factor, evidenced by the fact that not all sign languages use an indigenous manual alphabet for fingerspelling (*see* **Fingerspelling**).

Future Developments

The dynamics of developments throughout the world with respect to sign languages and their

Figure 5 Combinations with the Indo-Pakistani Sign Language question word (WH): PLACE+WH ''where'', TIME+WH ''when''.

Figure 6 Sign languages represented in the typological survey on questions and negation.

documentation carry considerable momentum. Some sign languages are endangered, whereas others are expanding in geographical spread and contexts of use, and some are only just being created by new communities of users. Forces such as intensive contact between sign language and spoken language, as well as between one sign language and another, and the move toward official recognition for sign languages and the deaf communities that use them rapidly change and reshape the makeup of many sign languages worldwide. It is a continuous challenge for sign language linguistics to keep up with these developments and put together an increasingly detailed picture of linguistic diversity among the world's sign languages.

See also: Endangered Languages; Fingerspelling; Sign Language: Communities and Cultures; Sign Language: Interpreting; Sign Language: Morphology; Sign Language: Syntax.

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Sign Theories

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Sign Theory and Semiotics/Sign Theory vs. Semiotics

Semiotics, if taken as a scientific, theoretical, and philosophical approach as a whole, is more often than not considered synonymous with the terms 'theory of signs' or 'sign theory.' In this view, treating 'sign theories' would be equal to treating semiotics as a very comprehensive intellectual endeavor and indeed age-old human 'project,' and would thus be in the present framework tautological with an entry on 'semiotics.' What will be discussed here are the theories about the fundamental unit of sign systems and processes: 'sign theories' in the closer sense, theories about the sign itself as the central topic of theoretical semiotics. Such theories may in some cases comprise not much more than explanations; in major cases, they comprise theoretical consequences such as sign typologies or conceptions about sign functions. 'Theory' may also tendentiously coincide with 'model,' 'conception' or 'definition.' In this view, one accepts that semiotics is an 'overarching metadiscipline' (Stam *et al.*, 1992: 1) comprising (besides sign theories) theories of sign systems and processes, text theories, discourse theories, theories of narration, theories of sign 'dimensions,' code theories, and even media theories, etc. Also included are the 'doctrine of signs,' what is not the same as 'theory' (as the late Thomas A. Sebeok, spiritus rector of the semiotic community, never got tired to hint at), and even entire theories of culture, as in the semiotics of

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Sign Theories

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Sign Theory and Semiotics/Sign Theory vs. Semiotics

Semiotics, if taken as a scientific, theoretical, and philosophical approach as a whole, is more often than not considered synonymous with the terms 'theory of signs' or 'sign theory.' In this view, treating 'sign theories' would be equal to treating semiotics as a very comprehensive intellectual endeavor and indeed age-old human 'project,' and would thus be in the present framework tautological with an entry on 'semiotics.' What will be discussed here are the theories about the fundamental unit of sign systems and processes: 'sign theories' in the closer sense, theories about the sign itself as the central topic of theoretical semiotics. Such theories may in some cases comprise not much more than explanations; in major cases, they comprise theoretical consequences such as sign typologies or conceptions about sign functions. 'Theory' may also tendentiously coincide with 'model,' 'conception' or 'definition.' In this view, one accepts that semiotics is an 'overarching metadiscipline' (Stam *et al.*, 1992: 1) comprising (besides sign theories) theories of sign systems and processes, text theories, discourse theories, theories of narration, theories of sign 'dimensions,' code theories, and even media theories, etc. Also included are the 'doctrine of signs,' what is not the same as 'theory' (as the late Thomas A. Sebeok, spiritus rector of the semiotic community, never got tired to hint at), and even entire theories of culture, as in the semiotics of

culture, or of society at large, as in sociosemiotics, on the one hand, and the application of theories, on the other – in the broadest, rather sociological sense, the entire semiotic community itself, including its infrastructures, because there is no semiotics without semioticians and all their intellectual as well as practical tools.

Pretheoretical Sign Conceptions

The term 'sign' appears theoryless already in everyday language, for instance, in combinations like 'traffic signs' or 'star signs' (which are signs in scientific understanding but in a more complex way). If people (for instance, in Vienna, Austria) used to say that the bunch of conifer branches over the entrance of a certain type of wine tavern is a sign that this tavern is a '*Heurigen*' (a locality where one can consume the wine from last year together with certain popular food), then they mean by sign only that particular element, the bunch, which in different semiotic terminologies is called e.g., 'sign vehicle,' 'signans,' 'representamen,' or 'means,' that is, the visible carrier of this special meaning, *Heurigen*. Why the bunch carries meaning at all and needs further components to function (in this case, to indicate the tavern) is a matter of mere habit but not of theoretical reflection.

In this example, one can make out, or presuppose, an intuitive understanding that the bush 'stands for' something else, the tavern and all what is connected with it (also a social institution, i.e., the specific type of Viennese localities called *Heurigen*, quite different from pubs, restaurants, McDonalds, etc., because one finds the bunch over each individual '*Heurigen*'): *aliquid stat pro aliquo*, but this popular understanding of the term 'sign' would not cover, for instance, written or spoken words, a painting, a photograph, or a film sequence.

As a matter of fact, other sciences than semiotics (and sometimes linguistics and philosophy) use the term 'sign' too, but mostly also in an everyday language understanding, or in some diffuse ways nursed by *ad hoc* descriptions. The minimal prerequisite for describing a 'sign' systematically is what Roman Jakobson called *renvoi* 'referring back to,' and this definition is therefore the germ of a genuine sign theory, or a rudimentary scientific consideration of the sign phenomenon. A semiotic view on the sign is always dynamic-relational; it highlights the fact that by the term 'sign,' semioticians try to describe the interaction and/or mutual interdependence of the components involved in a sign process, that is, in semiosis, which is the final-instance term, while 'sign' is already a kind of analytical abstraction, in whichever current of semiotic thought.

Sign Theories and Conceptions in History

Leaving aside some seemingly semiotic terms like 'signal,' a term used in information theory, sometimes (ambiguously) in biology, and in certain situations in everyday language (an alarm clock 'signalizes' the sleeper to wake up), which in some uses can be made compatible with a semiotic understanding and in some not, the focus should now first be on the history of attempts to identify the elements of the sign. There exist several comparative overviews of sign conceptions since antiquity, for instance in Eco (1977b) and Nöth (1990: 88, 90). The latter's interest is to show that the fundamental controversy being also characteristic of the two mainstreams in modern semiotics; the differentiation into dyadic and triadic sign conceptions, can be already found in the theorizing about signs since antiquity, in Scholastic thought, in the Baroque era, in the Age of Enlightenment, in German idealist philosophy, and at other stages of the history of mind.

This list contains Nöth's synopsis of dyadic models of the sign (1990: 88) (here very selectively in parentheses: the notions for the sign; the notions for the two correlates):

- Augustine (sign; sign (as thing)/something else)
- Hobbes (sign; antecedent experience/consequent experience)
- Degérando (sign; sensation/idea)
- Cassirer (symbol(ic) form; concrete sensible sign/content, meaning)
- Bloomfield (linguistic form; speech sound, signal/response in hearer)
- Buyssens (seme; semic act/meaning, signification)
- Jakobson (*signum*; *signans*/*signatum*).

In the synopsis of triadic models (1990: 90), one finds e.g., the following authors (again selectively: same order but three correlates):

- Plato (name; sound/idea, content/thing)
- Stoics ((sign); *sémainon*/*sémainómenon*/object or event)
- Bacon ((word); word/notion/thing)
- Husserl (sign; expression/meaning/thing)
- Ogden and Richards (–; symbol/thought or reference/referent).

In both cases, these exemplary lists (thus also in Nöth, 1990, not aiming at completeness) span centuries and include some founding fathers of modern semiotics, who will be dealt with below, and some major figures of modern theorizing too. Nöth commented:

> A clear-cut distinction between dyadic and triadic sign models is not always possible [...]. There is a zone of vagueness whenever a third correlate is mentioned but

> not systematically incorporated into the semiotic theory (1990: 87).

And later on:

> Triadic sign models comprise a non-homogeneous group of semiotic theories distinguishing three correlates of the sign, sign vehicle, sense, and referent [. . .]. In some cases, there is no distinction between dyadic and triadic models (1990: 89).

These two comments show that, although there are clearly two distinctive trends throughout history, it also very much depended on the research frameworks, perspectives, and interests of the authors, and also on their individual cognitive disposition and *weltanschauung*, which components they emphasized. One can nonetheless recognize an implicit tendency towards a possible reconciliation of these two standard views or generalized conceptions, despite the fact that even still in the 1960s, 1970s, and 1980s of the 20th century (that is, in the era in which semiotics became a broader movement and a transdiscipline), the question whether dyadic or triadic evoked many vivid controversies.

Meanwhile, this article will risk here to characterize the current phase of the semiotic movement as its 'enyclopedic phase,' that is, with comprehensive metavolumes like Sebeok (1986: 3 vols), Bouissac (2000), and especially Posner, Robering, and Sebeok (1997–2004: 4 vols), while also Nöth's first edition of *Handbuch der Semiotik* (1985), indeed at the beginning an introduction, has grown in its last version (2000) to a remarkable kind of encyclopedia. Each of these works has its advantages but also some blind spots, so that it can only be recommended to use them in their complementarity. Anyway, by this and/or parallel with this development, the mentioned controversies have become less characteristic, are more or less outdated, and were replaced by the rise of a comparative semiotics, on the one hand, and an 'intersemiotics' (Gérard Deledalle's term), on the other, which even tries to elaborate the common grounds or the common smallest denominator of the different currents in semiotics, despite their roots in different traditions within the history of mind. This search for common ground means no unification but a tendency towards mutual complementarity or completion. Before shifting the discussion still dominating sign theories and some vitally coexisting ones of major importance, it seems necessary to give a very short assessment of the megatrends in recent semiotics.

Mainstreams and Currents in Modern Semiotics

In the first version of Nöth's *Handbuch* (1985), one can find an attempt at classifying the existing currents of modern semiotics of that time, which is a correct, although incomplete, report identifying far more than a dozen currents (1985: 4–9). In view of the present aims, it suffices however to refer to this enumeration, although some further groups have taken shape since then. There are a number of distinct currents such as (comments in parentheses): (1) semiology and general semiotics; i.e., the linguistic-structuralist respectively the Peirce–Morris paradigm; (2) a functionalist semiotics (Martinet, Mounin, Prieto; structuralist, too); (3) Marxist semiotics (could as well function as part of a comprehensive sociosemiotics: marxist, marxistoid, and nonmarxist, e.g., Alfred Schütz); (4) phenomenological semiotics (indeed one of the 'philosophical' subcurrents); (5) diverse 'schools', e.g., Prague School (structuralist), Moscow-Tartu-School (structuralist), Paris School (structuralist), Stuttgart School (Bense's, clearly Peircean), 'sociosemiotic structuralism' (i.e., W. A. Koch, departing from structuralism, more recently rather bioevolutionary), and an action-theoretic approach (Trabant; tending toward sociosemiotics); and (6) poststructural(ist) semiotics, especially Derrida's grammatology and Kristeva's *sémanalyse* (the first an 'extremist' structuralist, the latter a multiinfluenced boarderline case). It includes no biosemiotics at large, or no zoosemiotics, for instance.

In contradistinction, one could draft a more fundamental and therefore diminished typology based on the general points of departure. In this perspective, the two mainstreams have to be the same, i.e., a philosophy-derived semiotics, with Peirce and Morris as the founding fathers, and a linguistically inspired semiotics (departing from Saussure; structuralisms in any sense). Then one can identify two clearly 'deviating' wings: biosemiotics (departing from Jakob von Uexküll), and sociosemiotics (founding father: M. M. Bakhtin in his Vološinovian appearance; most elaborate version: Rossi-Landis). These are four qualitatively different currents since their immanent logic is entirely different: Peirce's comes from thought (inference), the structuralisms from Saussure's *langue* as the most advanced sign system, biogenetic biosemiotics from bio-logic, and sociogenetic sociosemiotics from socio-logic (thus, not to be confused with e.g., Greimas' *sociosémiotique*, a kind of substitute for pragmatics).

The different currents can be condensed to four plus a zone of interaction, i.e., intersemiotics. The major divide in the second half of the 20th century concerned the linguistics-derived structuralisms (including even poststructuralism; in this view, only a radical variant of the former), on the one hand, and the more philosophically motivated, or nursed, approaches, on the other (i.e., motivated by

pragmatism/pragmaticism plus related orientations, such as behaviorism, phenomenology, etc.). The foci of this divide are the respectively underlying sign theories or conceptions, in first approximation: dyadic vs. triadic. The rise of biosemiotics as well as sociosemiotics, the first already in a distinct shape, the second in a way not yet clearly depicted by the mentioned encyclopedias, but obvious after careful inspection, suggests that the future discussions in semiotics, as far as it concerns its foundations, will rather concentrate on the differences (as well as possible coincidences) between biosemiotics and sociosemiotics (or anthroposemiotics). And it is again the sign theories on which these currents are based that will play an important role in this interaction.

The Major Structuralist Sign Theories in Modern Semiotics

In this perspective, the major sign theories shall now be presented that are at the core of these different general orientations of semiotics at the turn of the millennium. The founding fathers of the structuralist approaches are, first of all, Saussure, who drafted what he called semiology, and Louis Hjelmslev, who, in his glossematics, developed an indeed comprehensive semiology/semiotics, although he foremost concentrated on verbal signs. (It is important to note that Saussure had a vision and showed a way how to follow it, but it was Peirce who developed the first comprehensive semiotics in the modern sense as well as a genuinely differentiated theory of the sign in the closer understanding).

Saussure's sign theory (1916/1986) can be pinpointed by his excessively quoted sign model, a lying oval, divided horizontally by a broken line (the 'bar'); in the upper half stands *signifié*, in the lower *signifiant*; one arrow on the left points upwards, another on the right downwards. This configuration tries to depict the structure of the linguistic sign, first of all in spoken language. The idea behind it is, that there are (in our minds) two distinct planes of mere form, the planes of thought and sound, from which the speakers arbitrarily draw small parts and correlate them. The correlate of a piece of plane 1 and of a piece of plane 2 is the material to shape the sign. In this sense, Saussure

> offered a two-part model of the sign [...which] he defined [...] as being composed of a 'signifier' (*signifiant*) and a 'signified' (*signifié*). Contemporary commentators tend to describe the signifier as the form that the sign takes and the signified as the concept to which it refers (Chandler, 2002: 18).

Sometimes, instead of the word *signifiant* appears the words *image acoustique*; instead of *signifié*, *concept*. For him, the (image of the) sound pattern and the concept were psychic phenomena: forms but not substance. For Saussure,

> the sign is the whole that results from the association of the signifier with the signified [...] The relationship [...] is referred to as 'signification,' and this is interpreted in the Saussurean diagram by the arrows (Chandler, 2002: 19).

Therefore, the quintessence is that Saussure's sign theory is a mentalistic one, and the relationship of the *signifiant* to external sign carriers remains undefined since it is not in the center of interest. The same goes for the relationship between the *signifié* and what is externally represented by it. This view is an understandable one of the rise of positivism in the humanities at Saussure's time. While he tried to isolate the smallest unit of language, the linguistic sign, the early sociologists tried to define the true topic of their young discipline, the social, by reduction. It would be one of the major problems of the later structuralisms that the sign 'remained' entirely in the heads of the speakers. Although the majority of indebted researchers maintained Saussure's understanding of the sign, some implicitly (e.g., members of the Moscow-Tartu School) and some explicitly (Roman Jakobson) rematerialized the *signifiant* for practical reasons.

To close this short presentation of the Saussurean sign conception, one should, however, remark that Saussure also made original efforts with lasting effect to theorize the connection between the signs semiotically (or rather semiologically). Central notions, as to this, are value and difference. The value of a sign depends on its position in a (sign) system, and the sign system 'language,' like other sign systems, is one of functional differences and, consequently, oppositions. Since he departed from the study and analysis of the linguistic sign, he also stressed the arbitrariness of the sign, although he didn't deny the existence of motivated signs. Later on, when the structuralist semioticians extended their research more and more into fields of nonverbal and composite sign systems, the restrictions of the underlying sign theory became increasingly obvious, and some theorists adapted terms from Peirce's sign typology, such as index and icon, for motivated signs (see below).

Louis Hjelmslev (1943/1961) was the one to develop Saussure's vision of a comprehensive theoretical semiotics/semiology. In linguistics, he ranks as a great historical figure only, since his system wasn't very influential due to its alleged abstractness, but his reputation in the semiotic community is great. Although his theory also considers 'nonlinguistic languages,' his focus was (like Saussure's) on *langue* and/

as the general principle of semiotic structure. Thus, his structural linguistics, or 'glossematics,' appears in all major semiotic reference works as a genuinely semiotic approach towards the totality of all sign systems. Based on the Saussurean conception of the planes of sounds and ideas, he specified and stratified Saussure's sign model, in which he replaced the signified/signifier dyad by one describing directly the interdependence correlation of two forms: expression–form (EF) and content-form (CF). Both draw from their respective material: expression-form from expression–substance (ES), which is an already semioticized segment of the otherwise amorphous matter of expression–purport (EP). The same circumstances are mirrored on the side of content-form: content-form draws from content–substance (CS), which is an already semioticized segment of the otherwise amorphous matter of content–purport (CP). However, the sign in the strict sense is built only by the expression-form/content-form dyad, both nursed by their substantial environs. Thus, the six parts work together this way:

(1) EP – ES > <u>EF <> CF</u> < CS – CP

Only the underlined couple represents the sign, because: "Following on from another of Saussure's maxims, the sole object of glossematics is the pure, nonsubstantial form" (Trabant, 1987: 94).

This model is the core of Hjelmslev's sign theory and allowed him to build an extensive semiotics in which he could very systematically thematize phenomena like – to quote one of the best known of his accomplishments – connotation, which he understood in a broader sense as

> something far more general, namely everything that the sign says about the speaker [...] as something that the sign says about itself [...E]very sign participates as a matter of principle in several connotative semiotic structures (Trabant, 1987: 100–101).

Besides the cited abstractness claimed by linguists and also some semioticians, such as Eco, (1977a: 41) who found his 'jargon impenetrable' and criticized the lack of examples from other sign systems than language, another fact also hindered the proliferation of his ideas: the deviating use of the term 'semiotics.' "Hjelmslev introduced the term *semiotic* for language in this broad sense [...T]he distinction between language and semiotic, and with it the distinction between linguistics and semiotics, tends to dissolve itself' (Nöth, 1990: 65–66). Instead, what is understood now by semiotics appears in Hjelmslev's theory as 'metasemiotics.' There is no doubt, however, that he contributed decisively to sign theory in the closer sense as well as to semiotics in general, and his influence on certain important movements in semiotics, most of all on the 'Paris School' around Greimas, cannot be overrated.

The Major Pragmat(ic)ist Sign Theories in Modern Semiotics

Charles S. Peirce is the next founding father of sign theory to be reviewed, and with him, we enter the field of triadic conceptions in the modern understanding. (Common in Peircean scholarship, quotes and citations will be identified by volume and paragraph number, such as 2.228, from Peirce [1931–1958].) Charles W. Morris (cf. esp. 1938, 1970) was a co-founding father of this current in the first half of the 20th century. A further prominent witness from the second half of the century, Max Bense (Bense and Walther, 1973), developed on mainly Peircean foundations his so-called basis theory, a theory tending to formalize Peirce's thought by mathematical means. Although Peirce himself never used an equilateral triangle △ to diagrammatize his sign model, one could take the Bensean triangle as a tool for roughly modeling his conception as well as the ones developed by Peirce and Morris (despite some remarkable differences), all in one.

In this sense, in the left corner of the triangle one could place

- in Peirce's case: object
- in Morris' case: designatum/denotatum
- in Bense's case: object.

In the right corner:

- Peirce: interpretant
- Morris: interpretant
- Bense: interpretant.

In the upper corner:

- Peirce: sign or representamen
- Morris: sign vehicle
- Bense: sign or means (German: *Mittel*).

The triangle stands for triad and triadic conception, by which is meant, that all three parts must coexist since they condition each other, as there is no child without father and mother, no mother without father and child, etc. Translated into a definition, Peirce's understanding of the sign, which is rooted in his most general philosophical idea, his theory of categories (Firstness, Secondness, Thirdness), is as follows:

> A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign [...]. That sign which it creates

> I call the *interpretant* of the first sign. The sign stands for something, its *object* [...] not in all respects, but in reference to a sort of idea (2.228).

It has to be noted that Peirce, who dealt with the sign problem all his life and approached it at different times and from different angles, has left us several dozens of definitions and analytical descriptions of the sign. Marty (1990) has shown by mathematical means, however, that he always indicated the same with different words. Peirce's sign theory may thus be considered as a steadily scrutinized and validated construct that indeed meets the point. In the above formulation, representamen is his term for the conveyable material substrate, the object is what the sign represents, the interpretant the meaning of the sign and at the same time, another sign – the root of the idea of the possible endless concatenation of signs, of unlimited semiosis.

Peirce distinguished further between an immediate and a dynamical object on the one hand, and an immediate, a dynamical, and a final interpretant on the other. By this, he tries to describe a kind of corridor, or continuity, between inside and outside (the sign as well as the sign user). The final interpretant is a 'habit' by which the endless sign chain is made to come to a provisional end. Conceptually very important is Peirce's sign typology, because it is the only one directly derived from the sign model, and it became (in parts) influential within other semiotic approaches. Sign typologies are not exactly the topic of this presentation, because most are empirically conceived. However, his is a constitutive part of the sign theory, thus it must be mentioned here. From the representamen relation derives a trichotomy built of qualisign, sinsign (token), and legisign (type); from the interpretant relation, one of rhema, dicent, and argument (generalizing the old division of term, proposition, and argument in logic). The most influential trichotomy (also outside traditions indebted to Peirce) became the one concerning the object relation: icon, index, and symbol (the first two motivated, either by similarity or contiguity, the latter arbitrary); the icon renders moreover a subtrichotomy of image, diagram, and metaphor. From the nine terms of the main trichotomies, Peirce built his highly systematic and differential tool for sign classification, which comprises 10 sign classes (Bense's 'basis theory' follows him in all major respects, see below, as does the greatest part of the closer Peirce community within semiotics).

Morris' triadic sign model consists of the three components designatum/denotatum (D), sign vehicle (S), and interpretant (I; but he stressed also the importance of the interpreter and the context). One of his definitions (although he emphasized not to define but to clarify the conditions of the possibility of signs) said: "*S* is a sign of *D* for *I* to the degree that *I* takes account of *D* in virtue of the presence of *S*" (Morris, 1938: 4), while D might be a denotatum (a real object referred to) or a designatum (a class of items). This formula is used not only for human signs, but also for any kind of organisms. Morris intended a biologically and behavioristically based science, including the study of what could be called protosemiosis, or animal sign use. The interpretant is a reaction upon the sign in an organism.

Thus, influenced mainly by Peirce and by G. H. Mead's social behaviorism, Morris developed a sign theory uniting, in the final analysis, the philosophical traditions of rationalism (as to the syntactic dimension of semiosis), empiricism (as to the semantic dimension), and pragmatism (as to the pragmatic dimension). From these three dimensions follow the three subdisciplines of semiotics, i.e., syntactics (concerning the relations between the signs themselves), semantics (concerning the significative relations), and pragmatics (concerning the relations between sign and sign user), terms that are to be understood in a broader form than found in linguistics. His research interests also included the dimensions of sign use, and of value in general, which led him to develop a semiotically based discourse typology (while his sign-typological suggestions were later on replaced by those within the Peirce reception).

Max Bense was the one to introduce Peircean semiotics in Europe, especially Germany, by initiating an international scientific community called school of scientific semiotics, or Stuttgart school. The core of his own 'basis theory' (first of all indebted to Peirce, but drawing also from Morris) is a trirelational sign model formulated as a triangular diagram with the three relata O, M, and I. The sign relation is defined as sign S = R(O, M, I), wherein the three relata are object, means, and interpretant. To stress the integrative role of the interpretant, also the formulation S = R((O, M)I) exists. The term *Mittel* 'means' has two meanings in German. First, it means tool or instrument. Secondly, in a more indirect way, it connotes also the thing in between, the mediating instance between the object and the interpretant. In Peirce as well as in Bense, there is a certain ambiguity concerning the seeming identity between sign and representamen on the one hand, and sign and means on the other. This ambiguity can easily be solved by recalling the fact that what is described componentially is a process, semiosis. The sign unfolds only in its actualization: the everyday language's sign equals sign vehicle and differentiates itself in its processually developing relata, among them representamen/means. Bense became famous by his

endeavor to develop a kind of notation, or formalization, based on cardinal numbers, that allowed him to denote Peirce's sign typology very systematically. Bense and his group delivered many applications to concrete sign phenomena, and he also offered some original theoretical contributions, such as his theory of reality thematization.

Sign Theories in Biosemiotics and Sociosemiotics

Next, let's turn to biosemiotics. From some remarks about Morris, it has already become clear that sign theories are not restricted to human sign use but may also concern the means of animal communication. Peirce knew about this view, as is quite obvious in a theory characterized (positively or critically) as pansemioti(ci)sm. The rediscovery of Jakob von Uexküll from the side of the semiotic community led to installing him posthumously as one of the founding fathers of modern semiotics (von Uexküll, 1983). Jakob von Uexküll, whose work developed in the first half of the 20th century, was a zoologist, biologist, behavior researcher, and most of all an *Umwelt* theorist, because his environment theory is the best known of his accomplishments. What is less recognized outside semiotic circles is that within his *Umwelt* theory, he also developed a sign theory that is crucial for the whole approach as such. For him, all this was simply 'biology,' but the present focus is a semiotic one, since the

> *objective* of *Umwelt*-research is to develop a theory of nature's composition, or to reconstruct the score to the 'symphony of meanings' that nature composes out of the innumerable surrounding-worlds (*Umwelten*)

wrote his son Thure von Uexküll, 1983: 149, who 'translated' his father's metaphors into modern more system-conscious language. A symphony of meanings must indeed rest on those elements that carry and convey meanings, i.e., signs. The central model of *Umwelt* theory is the so-called functional circle showing the ecological niche of an organism, i.e., the interaction between an individual organism's exchange with its *Umwelt* (or segment of *Umwelt*). On the subject's side, the organism has perceptual and operational organs to either experience the *Umwelt* object(s) or to (re)influence them, while the object(s) seen as a connecting structure possess perceptual and operational cue carriers. In between subject and object unfold the perceptual and the operational worlds. Subject (meaning utilizer) and object (meaning carrier) are linked in a whole, a sign (system). Actually, the *Umwelt* is the representation of the environment in the organism. In the functional circle's perceptual and operational worlds, already appear what von Uexküll called *Merkzeichen* and *Wirkzeichen*, and he also identified some other types of signs, but one can see the whole relationship as a sign process (semiosis), whose components can be identified:

> In the simple formula of sign = meaning carrier + meaning and meaning = reference to the meaning utilizer, 'meaning' has the central function of bracketing heterogeneous elements into a whole (the sign) [. . .]. Thus, the formula, meaning = link between carrier and utilizer, takes on the nature of a dynamic process (von Uexküll, 1987: 169).

As mentioned in the beginning, the scientific understanding of 'sign' is dynamic-relational, thus von Uexküell's view fulfills this condition. This theory has the enormous consequence that semiotics, mainly stemming from linguistics and philosophy, extends its relevance from culture to nature-and-culture.

It was Thomas A. Sebeok's (for an overview, see Baer, 1987; Bernard, 1997) major aim to deepen as well as to propagate this understanding of semiosis as well as semiotics; his point of departure was biology, thus he was an admirer of von Uexküll (although, concerning the mainstream protagonists, Sebeok also belonged to the Peirce-Morris line). He contributed to this expanded semiotics by developing biosemiotics, especially zoosemiotics. He hinted at the fact that there are myriads of sign systems outside the human species waiting for research; he steadily recalled also the medicinical roots of semiotics since antiquity; and he added moreover, the division between endosemiotics and exosemiotics, the first covering semioses taking place in an organism, the second covering semioses involving organisms and their *Umwelt*s. In his considerations about anthroposemiotics and zoosemiotics, he stressed the fact that many human sign phenomena belong to bio- and zoosemiotics at the same time. Concerning sign theory, he contributed only some additional suggestions, such as a sign typology especially useful for biosemiotics (signals, symptoms/syndromes, icons, indices, symbols, names), but his influence to push the whole semiotic community into a more 'global semiotics' was indeed great.

Concerning the sociosemiotic current (consciously written in hyphenated form, to distinguish it from narrower understandings of sociosemiotics without a hyphen, such as in Nöth (2000: 537) where only a kind of miscellanea semiotics appears) there is, despite some nearly unknown forerunners, also a true founding father, Mikhail M. Bakhtin (esp. Vološinov, 1929) who was the first major critic of Saussure. While the latter privileged *langue* as a system, Bakhtin emphasized *parole*, i.e., actualized, living, interactive language as the field proper of semiotic study, and

thus arrived at his famous principle of dialogicity. As to the term 'sign,' he seemed to use it in a sense similar to Saussure's, but he emphasized the closeness of sign and ideology, contrary to Saussure. However, one can reconstruct Bakhtin's more complex understanding of (the components of linguistic) semiosis, as it shall be suggested here: in an archetypical way, we could postulate that semiotics is about means of communication M, reference and/or reality R, senders S and percipients P in a more personal sense. We project 'dialogue' as the central agent into this diamonds-shaped form ◇. On the side of M, there is sign as structure and ideology as superstructure; on the side of R, first the theme, and then (social) reality; all encircled by the context, while two two-sided arrows point to and from the direction of P and S, symbolizing enduring interactivity.

It is widely accepted that Bakhtin, with these ideas, has been one of the precursors of sociolinguistics, and that with his later works, he has made important early contributions to what was called semiotics of culture in the 1960s, but his outstanding place in the ancestry of sociosemiotics has still to be more clearly established. It suffices for now to state, that there is a series of major authors building this current, such as Vygotskij, Lukács (in his sign–theoretic chapters), Schaff, Klaus, Resnikov, Schütz, Halliday, some Symbolic Interactionists, Robert Lafont, and many others, all of whom have in common that they stress the role of the sociality of human sign use, the relation and interdependence of signs and sign users, and the role of Man as a sign producer and receiver (re-producer).

The most elaborate theory of that sort is Ferruccio Rossi-Landi's (for an overview, see Bernard and Withalm, 1986). In his early phase, i.e., in the mid-20th century, he was the first to introduce Morris' semiotics to Europe. His declared aim was to extend Morris behaviorism to social(ized) behavior. He then criticized Saussure and the structuralist models by developing his own counter–concept of common speech (*parlare commune*, cutting across the Saussurean dichotomies), which later on, he extended to common semiosis. In the background appeared his concept of sign work, based on work as such as an anthropological constant. Work is defined as an endeavor that needs *sine qua non* a worker W, instruments I, materials M, an aim A, and (working) operations O, to render a product P; in the most condensed version (i.e., some factors already presupposed), a transformation triad M/O/P can be formulated. For sign work, it is principally the same. This conception is the basis (or 'hidden structure') underlying his most famous theoretical construct, the so-called Homology of Material and Linguistic Production (to be extended also to sign systems in general).

Less known but equally important is his unique sign theory condensed in the following sign model: a *signans* is the identifier of a piece ('coagulation') of society, the *signatum*. Both are melted together (for a while) to a sign (*signum*) as social result. But how does it happen that this transformation triad gets in motion? Because it is indispensably connected with the sign work triad M/O/P (wherein M is *signans* plus *signatum*, O the operations of the sign worker, and P the product, i.e., *signum*). (A three-dimensional diagram would be necessary to illustrate the interaction of the two triads, one at the level of semiosis, the other of sign work). An important part of Rossi-Landi's sign theory is his Theory of Sign Residues, which deals with the elements that enter or leave the signs on the side of *signans* as well as *signatum*. In his later works, Rossi-Landi concentrated on the theoretical embedding of the sign systems and processes in social reproduction, delivering finally a threefold model of society driven by three great triadic movements: material production; intermediary production, first of all sign production; and ideological production. The central locus or agent keeping the entire system together is the one of sign exchange equals communication. It is interesting to see that the summarized movement of all triads mentioned (the triad of social reproduction in general – social practice; social reproduction in its instrumental/operational aspects; history) still mirrors the triad M/O/P, though on a grander scale. This mirroring hints at the astonishing consistency of Rossi-Landi's thought throughout the decades.

An Intersemiotic Contribution

The last two sections presented the main sign theories in the described four major currents of modern semiotics. At this point, we enter intersemiotics and present an example of sign–theoretic intersemiotics, which goes beyond mere comparative semiotics. Bernard and Withalm (1987) offered a three-dimensional sign model that is first of all indebted to Rossi-Landi (i.e., refers to one of his special variants called situational triads) but draws also from Resnikov, Schaff, and Bystřina, and on deliberations about the whole history of sign theories. Their model is based on sociosemiotics, but intends also reconciliation with the mainstream paradigms. It is shown here in a simplified form reached by reprojection into two dimensions (**Figure 1**).

It doesn't claim to be a sign model, but rather a sign components' situation model. It comprises and identifies a larger triad consisting of *Signatum* Sm, *Signans* Ss, and *Signum* S (all with capital S; terminology like Rossi-Landi's above) that represents

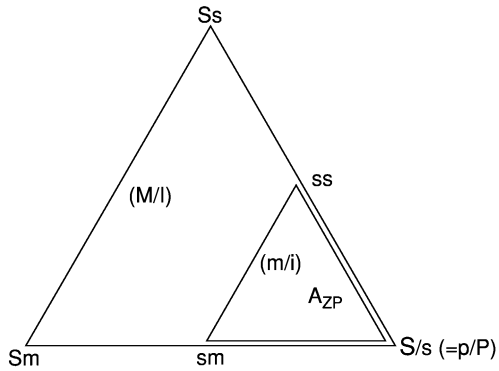

Figure 1 Sign components' situation model.

the communicable external sign triad (wherein Sm is a socialized fact with intersubjectively accepted meaning), and driven (partly) by external sign work (P; M/I; while O presupposed), and a smaller triad inscribed (which depicts, in a way, Bystřina's 'model of the sign' or Peirce's 'thought sign'): the internal *signatum* sm, *signans* ss, and *signum* s, once again driven by sign work, this time a purely internal one (p; m/i; while o presupposed); A_{ZP} is the sign worker (in German: *Arbeiter als Zeichenproduzent*). If one is willing to accept the unified Peirce/Morris/Bense triad from above in first approximation as a triadic sign model as such, characterizing this mainstream, then an identification with Sm/Ss/S (with the interpretant as a Morrisian reaction in an organism presupposed) becomes possible; if one is willing to accept a more dialectical (and also more materialist) view on Saussure's mentalistic sign model and reads it as signified and signifier melted together by some brainwork to a complete internal sign, then an identification with sm/ss/s becomes possible. (One could also recognize that some rematerializations of the signifier in the history of structuralist semiotics would lead to sm/Ss/s, that is, would show that something is missing.) A biosemiotic sign model is admittedly not yet included and would be also questionable; reconciliation is suggested by means of comparison: what is common to human and animal *Umwelt*s, and what distinguishes them?

Special Cases: Sign Function Theories

A presentation of sign theories like the one in this article would be incomplete without a glance on the modeling of sign functions. In semiotics and other related sciences, the term 'function' usually refers to finality or to internal structural relationships within the subject matter; this reference touches the present topic only marginally. The matter is different, however, when it concerns a sign conception itself, what is sometimes the case especially with the pragmatic functions, that is, when the sign model as such thematizes sign functions. The best known and dominant tradition, as to that, is the one in the wake of Bühler, who proposed the so-called organon model, in which the sign has with regard to the sender an expressive function, with regard to the receiver an appellative one, and with regard to what is referred to, i.e., objects or states of affairs, a representative one. Based on Bühler, Jakobson's sign function model (1960: 353–357; originally developed for literary research reasons, but then generalized) is meanwhile to be found in nearly all introductions, scripts, glossaries, and textbooks on semiotics. It comprises six functions: an emotive function (as to the sender), a conative one (as to the receiver), a referential one (as to the context), a poetic one (as to the message itself), a phatic one (as to maintaining contact), and a metafunction (as to the code). An adaptation of Jakobson's model, to change with the times and include the ever increasing importance of the media, is Itamar Even-Zohar's (1990: 31) variant of the same model, which replaces the sender- and receiver-related terms by producer- and consumer-related ones, further context by institution, message by repertoire, contact by market, and code by product. Mukařovský's (1942/1977) pragmatic functions concern the sign just indirectly, rather the sign user and his/her self-realization vs. the world; they are of two kinds: immediate and mediated functions, the first divided into theoretical and practical ones, while the mediated ones are called semiotic functions.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Biosemiotics; Dyadic Constructions; Eco, Umberto (b. 1932); Eco, Umberto: Theory of the Sign; Hjelmslev, Louis Trolle: Theory of the Sign; Jakobson, Roman (1896–1982); Jakobson, Roman: Theory of the Sign; Metasemiosis and Metapragmatics; Morris, Charles (1901–1979); Morris, Charles: Theory of the Sign; Peirce, Charles Sanders (1839–1914); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussure: Theory of the Sign; Structuralism.

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Sign-Based Morphology

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Sign-Based Morphology (SBM) is a theory of the phonology-morphology interface, proposed in Orgun (1996), that builds on unification-based syntactic theories such as G/HPSG (Gazdar *et al.*, 1985; Pollard and Sag, 1994) and Construction Grammar (Fillmore *et al.*, 1988), with which it shares the basic assumption that nodes in a constituent structure are signs – pairings of form (value of a PHON attribute) and meaning (value of a SYNSEM attribute). SBM aims to account for effects modeled in Lexical Phonology (Kiparsky, 1982; Mohanan, 1986) via interleaving, within a monotonic model of constituent structure building.

An SBM grammar consists of constructions, each of which is a description of an allowable configuration of a mother node and its daughter(s). Included in each construction is a specification of how the mother node's PHON and SYNSEM values relate to the daughter nodes' values. Each construction includes a function φ such that

$$\text{PHON}_{\text{mother}} = \varphi(\text{PHON}_{\text{daughter 1}}, \text{PHON}_{\text{daughter 2}}, \ldots)$$

Phonological strings (values of PHON) include segmental and metrical structure, but exclude other

Table 1 Minimal size condition

Unsuffixed form (not subject to minimality)	*Suffixed form (subject to disyllabicity)*
do:	*do:-m
'musical note C'	C-1.SING.POSS
	'my note C'
ye	*ye-n
'eat'	eat-PASS.
	'be eaten'
sol	sol-üm
'musical note G'	'G-1.SING.POSS'
	'my note G'
döv	döv-ül
'beat'	swallow-PASS.
	'be swallowed'

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'musical note G'	'G-1.SING.POSS'
	'my note G'
döv	döv-ül
'beat'	swallow-PASS.
	'be swallowed'

$$\begin{bmatrix} \text{PHON} & \text{[do:mu]} \\ \text{DAUGHTERS} & \left\{ \begin{bmatrix} \text{PHON} & \text{[do:m]} \\ \text{DAUGHTERS} & \{\text{[PHON [do:]], [PHON [m]]}\} \end{bmatrix}, \text{[PHON [u]]} \right\} \end{bmatrix}$$

Figure 1 Binary branching constituent structure (SYNSEM values suppressed for readability).

$$\begin{bmatrix} \text{PHON} & \text{[yenir]} \\ \text{DAUGHTERS} & \{\text{[PHON [ye]], [PHON [n]], [PHON [ir]]}\} \end{bmatrix}$$

Figure 2 Ternary branching constituent structure.

information such as morphological boundary symbols. Phonological sensitivity to morphological structure results from the chains of dependencies in the determination of the PHON attribute of a node through the application of the φ function of each intermediate node it dominates.

For example, consider a minimal size condition of two syllables that some Turkish speakers impose on suffixed forms (Itô and Hankamer; Inkelas and Orgun, 1998), as shown in Table 1. When further suffixation renders the forms disyllabic, we might expect them to be grammatical. This indeed works for *ye-n-ir* 'is eaten' but not for **do:-m-u* 'my (musical note) C, accusative'.

SBM handles this difference by assuming a binary branching structure for **do:-m-u* with each nonterminal node subject to the disyllabic minimal size condition, as shown in Figure 1. The intermediate node violates the minimal size condition; hence, the form is ungrammatical (forms are grammatical if and only if all their nodes are well-formed). By contrast, the form *ye-n-ir* is assumed to have a ternary branching structure, as shown in Figure 2. Because *ye-n* is not an intermediate form in this structure, there is no minimality violation. (Orgun, 1996, presents morphosyntactic data confirming the binary versus ternary branching contrast.)

Work in SBM has so far addressed cyclic versus noncyclic phonological effects, stratum ordering, morphologically conditioned phonology, paradigmatic versus structural accounts of phonology-morphology interaction, Bracket Erasure effects, and reduplication.

See also: Declarative Morphology; Head-Driven Phrase Structure Grammar; Lexical Semantics: Overview.

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Significs: Theory

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'Significs' is a term coined by Victoria Lady Welby (1837–1912, England) in 1896 for her theory of meaning and interpretation, which she developed in terms of the relation between sign, value, and behavior. Significs focuses on the sign's ultimate value and significance beyond semantic meaning and as such keeps account of the everyday expression, "What does it signify?" In contrast to such terms as 'semantics,' 'semasiology,' or 'semiotics,' 'significs' was free from technical associations. It follows that it was suitable to signal the axiological implications in the relation between sign and meaning, therefore the connection between sign and value in all its aspects – pragmatic, social, ethic, esthetic, etc. (see Vialati (1971) for Welby's correspondence with Giovanni Vailati [1863–1909] and Hardwick (1977) for her correspondence with Charles S. Peirce [1839–1914].)

Central to significs is Welby's triadic model for the analysis of meaning, the distinction between 'sense,' 'meaning,' and 'significance' (Welby, 1985[1893], 1985[1896], 1983[1903]: 5–6). As specified in her encyclopedia entry, "Significs": "Sense" refers to "the organic response to environment" and "essentially expressive element in all experience"; "Meaning" is purposive and refers to the specific sense which a word "is *intended to convey*"; "Significance," which includes sense and meaning and transcends them, refers to "the far-reaching consequence, implication, ultimate result or outcome of some event or experience" (Welby, 1977[1911]: 169). According to Peirce, Welby's meaning triad relates closely to his own triadic distinction between Immediate Interpretant, Dynamical Interpretant, and Final Interpretant (in Hardwick, 1977: 109–111).

A provisional definition of significs was formulated by Welby in *Significs and Language* (1911): "the study of the nature of significance in all its forms and relations" (Welby, 1985[1911]: vii), with a practical bearing "not only on language but on every possible form of human expression in action, invention, and creation" (ix). Furthermore, as specified in *What is meaning?*, significs as the "philosophy of Significance" involves the "philosophy of Interpretation, of Translation, and thereby of a mode of synthesis accepted and worked with by science and philosophy alike" (Welby, 1983[1903]: 161).

In addition to a theory of meaning, significs develops a 'significal method' that transcends pure descriptivism and strictly logico-epistemological boundaries in the direction of axiology and of the study of the conditions that make meaningful behavior possible. Significs is "a method of mental training" which concentrates intellectual activities on "meaning," the main value and condition for all forms of study and knowledge (Welby, 1983[1903]: 83). Again, significs is "a method of observation, a mode of experiment" which "includes the inductive and deductive methods in one process" (161).

The scope and reference of significs is universal, so that the term 'significs' designates a *transdisciplinary* approach and not a "supplanting system." Most significantly: "The principle involved forms a natural self-acting Critique of every system in turn, including the common-sense ideal" (Welby, 1983[1903]: 162), therefore significs is also *metadisciplinary.*

Significs is the expression of 'cooperating minds' in a community context. Welby worked on her ideas in dialogue with others, and particularly through an international network of epistolary relations with over 450 correspondents. In addition to Peirce and Vailati, these included Bertrand Russell, John M. Baldwin, Herbert Spencer, Thomas A. Huxley, Max Müller, Benjamin Jowett, Frederick Pollock, George F. Stout, H. G. Wells, Mary E. Boole, Henry and William James, Henri L. Bergson, Michel Bréal, André Lalande, J.-H. Poincaré, Ferdinand Tönnies, Rudolph Carnap, Otto Neurath, Harald Höffding, and Frederik van Eeden. Accordingly, Welby believed that significs could not be attached to any individual name.

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Important figures in Welby's time were influenced by significs, including Charles K. Ogden. He mentions her theory of meaning in his 1923 book with Ivor A. Richards, *The Meaning of Meaning*, and signals her correspondence with Peirce (which presents his important writings on "existential graphs"; see Hardwick, 1977).

Through mediation of the poet and psychologist Frederik van Eeden (1860–1932), Welby's Significs gave rise to the Significs Movement in the Netherlands in the first half of the twentieth century.

Welby's published and unpublished writings, including her mostly unpublished correspondence, are available in the Welby Collection, York University Archives and Special Collections, Toronto (Canada) and in the Lady Welby Library, University of London Library (England). For information on publications in Significs and the Significs Movement, see Petrilli (1990, 1998a, 1998b, 2005a); Schmitz (1985, 1988, 1990); and Schmitz and Heijerman (1991).

See also: Anthroposemiotics; Body Language; Indexicality: Philosophical Aspects; Indexicality: Theory; Structure and Structuralism: Semiotic Approaches; Semiotics: History; Social Semiotics.

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Silence

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What monochrome painting, in its richness and multitude of manifestations is to history of art, silence is (or should be) to linguistics. Functionally, the question what silence 'does' is best answered in the same way as is the question what speech, or any other semiotic system, can 'do' in communication. Taking Halliday's (1978) view of semiotic systems, for example, silence can be shown to fulfill three major functions: ideational, interpersonal and textual (*see* **Systemic Theory; Halliday, Michael A. K. (b. 1925)**).

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See also: Anthroposemiotics; Body Language; Indexicality: Philosophical Aspects; Indexicality: Theory; Structure and Structuralism: Semiotic Approaches; Semiotics: History; Social Semiotics.

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In its ideational function, i.e., describing or referring to the nonlinguistic reality, silence's primary function is to conceal information. But it can also allow ideational inferences to be made, as when a silent response follows a request for information. Consider the following (constructed) example:

A: Who ate all the cookies?
B: [silence]
A: I knew you did!

Not unlike other forms of nonverbal communication, what silence serves best is the interpersonal function, i.e., managing social actors' relations of power and solidarity. Thus, silence can either mark interpersonal intimacy or extreme distance in situations where 'small talk' is normally required between casual acquaintances (Jaworski, 2000); alternatively, it may signify an extreme power differential between interactants (Braithwaite, 1990) (*see* **Power and Pragmatics**). In its textual function of organizing coherence, or the framing of talk, pauses are often used to add emphasis to what is going to be said next (Duez, 1982), or they may occur before and during a stretch of talk marked as a performance (e.g., when reciting a poem) (Bauman, 1997) (*see* **Cohesion and Coherence: Linguistic Approaches**).

Silence has been studied more or less explicitly in most functionally oriented frameworks of linguistic analysis. Saville-Troike (1985) has offered a holistic view of silence from an ethnographic perspective, arguing that silence in the form of pauses and hesitations carries predominantly affective and connotative meaning, whereas silent communicative acts (such as responses to greetings, queries or requests) may carry propositional meanings on a par with other verbal communicative acts, such as questions, promises, denials, warnings, threats, insults, and so on (*see* **Speech Acts; Pragmatic Acts; Speech Acts, Literal and Nonliteral**). In Conversation Analysis, pauses have been identified as 'dispreferred seconds' (e.g., Davidson, 1984) such that, if an invitation is followed by a pause, other things being equal, it is most likely going to be interpreted as a 'refusal' (*see* **Conversation Analysis**). Numerous versions of Critical Discourse Analysis have focused on silence and silencing as forms of sociopolitical control and oppression (Gal, 1989; Theismeyer, 2003) (*see* **Critical Applied Linguistics**). Other approaches have included semiotics (Kurzon, 1998) and politeness theory (Sifianou, 1997) (*see* **Semiotics: History; Politeness**). Many studies have been concerned with crosscultural differences in the use and 'toleration' of silence, including differing attitudes to talk and nontalk, relative length of intra- and interturn pauses, and silence or volubility as sources of miscommunication (e.g., Philips, 1976; Scollon, 1985; Enninger, 1987; Jaworski & Sachdev, 2004) (*see* **Intercultural Pragmatics and Communication**).

Another productive way of studying silence is by examining specific domains of language use and genres of communication in which silence plays a prominent communicative or expressive role. These include ritual (including religious) communication (cf. Bauman, 1983), censorship (Jaworski, 1993; Jaworski and Galasiński, 2000), literature and performance art (Tannen, 1990; Jaworski, 1998) (*see* **Ritual and Religious Language; Narrativity and Voice; Literary Pragmatics**).

See also: Cohesion and Coherence: Linguistic Approaches; Conversation Analysis; Critical Applied Linguistics; Halliday, Michael A. K. (b. 1925); Intercultural Pragmatics and Communication; Literary Pragmatics; Narrativity and Voice; Politeness; Power and Pragmatics; Pragmatic Acts; Ritual and Religious Language; Semiotics: History; Speech Acts; Speech Acts, Literal and Nonliteral; Systemic Theory.

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Silence: Cultural Aspects

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Silence as a Signifier

Silence, perhaps because it is typically defined as the absence of acoustic signals, has long been neglected in linguistics. Nevertheless, it is an essential component of communication, and people who are members of the same speech community share as much in the uses and interpretations they give to silence as they do in regard to the linguistic forms that they use. Silence is a 'signifier' in Saussure's sense of a meaningful element that is linked to a referent by cultural convention. As with spoken language, the linkage between silence and meaning may be symbolic, indexical, or iconic. The symbolic link of silence to meaning is arbitrary, with segments of silence assigned referential meaning much as speech segments are (e.g., /hors/ in English for the four-legged creature that eats hay). For example, *a moment of silence* may mean 'respect,' or silence in response to a request may mean either 'yes' or 'no,' depending on which interpretation has been assigned to it in particular contexts by the speech community. The indexical link of silence to meaning essentially involves the association of ideas. This level of signification goes beyond the literal content of messages and requires understanding of the interpretive frames within which they occur, as when silence indexes social relationships. The iconic link between form and meaning is a more direct and 'natural' one, although it is also importantly related to cultural considerations. Silence has meaning at this level, for example, in its representation of 'death.' This meaning is invoked in such metaphors as *the silence of the tomb*, and in Hamlet's final utterance: *The rest is silence*.

In contrast to its relative neglect within linguistics, silence has been accorded widespread attention in philosophy, anthropology, and literary analysis. A search for *silence* and *silent* in the *MLA International Bibliography* website, for example, yields over 3000 entries, most related to the role of silence as a sociocultural signifier.

Cultural Meanings and Social Distribution

Ultimately all aspects of culture are potentially relevant to the domain of silence, but those that have the most direct bearing on this topic are social and institutional structure, values and attitudes held about language and speaking (or not speaking), and ways in which communicative knowledge and skills (including appropriate use of language and silence) are transmitted from one generation to the next and to new members of the group.

Aspects of social structure that are indexed by silence commonly involve interaction phenomena that reflect status and role. Speech may be proscribed, for example, from a commoner to a chief, or between a man and his mother-in-law. Where power is accorded voice, silence is often indicative of powerlessness.

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Silence as a Signifier

Silence, perhaps because it is typically defined as the absence of acoustic signals, has long been neglected in linguistics. Nevertheless, it is an essential component of communication, and people who are members of the same speech community share as much in the uses and interpretations they give to silence as they do in regard to the linguistic forms that they use. Silence is a 'signifier' in Saussure's sense of a meaningful element that is linked to a referent by cultural convention. As with spoken language, the linkage between silence and meaning may be symbolic, indexical, or iconic. The symbolic link of silence to meaning is arbitrary, with segments of silence assigned referential meaning much as speech segments are (e.g., /hors/ in English for the four-legged creature that eats hay). For example, *a moment of silence* may mean 'respect,' or silence in response to a request may mean either 'yes' or 'no,' depending on which interpretation has been assigned to it in particular contexts by the speech community. The indexical link of silence to meaning essentially involves the association of ideas. This level of signification goes beyond the literal content of messages and requires understanding of the interpretive frames within which they occur, as when silence indexes social relationships. The iconic link between form and meaning is a more direct and 'natural' one, although it is also importantly related to cultural considerations. Silence has meaning at this level, for example, in its representation of 'death.' This meaning is invoked in such metaphors as *the silence of the tomb*, and in Hamlet's final utterance: *The rest is silence*.

In contrast to its relative neglect within linguistics, silence has been accorded widespread attention in philosophy, anthropology, and literary analysis. A search for *silence* and *silent* in the *MLA International Bibliography* website, for example, yields over 3000 entries, most related to the role of silence as a sociocultural signifier.

Cultural Meanings and Social Distribution

Ultimately all aspects of culture are potentially relevant to the domain of silence, but those that have the most direct bearing on this topic are social and institutional structure, values and attitudes held about language and speaking (or not speaking), and ways in which communicative knowledge and skills (including appropriate use of language and silence) are transmitted from one generation to the next and to new members of the group.

Aspects of social structure that are indexed by silence commonly involve interaction phenomena that reflect status and role. Speech may be proscribed, for example, from a commoner to a chief, or between a man and his mother-in-law. Where power is accorded voice, silence is often indicative of powerlessness.

Thus women may be required to keep silent in the presence of men, or children in the presence of adults. The opposite is the case in settings where self-exposure is required, and where the listener sits in silent judgment: e.g., in religious confession, psychotherapy, bureaucratic interviews, and jury trials. The amount of talk versus silence that is prescribed is closely tied to social values and norms, and can only be interpreted in its cultural context.

Components of the interpretive frame that defines interactional silence include the physical and temporal setting, the type (or genre) of event, its general purpose and topic, the identity and relationship of participants, and the textual sequence (what has preceded and what is expected to follow). This interpretive frame is situated within the larger context of societal institutions, beliefs, and norms. Non-interactional silence may merely indicate absence of activity, but it too is imbued with conventional meaning when it is the frame for such contemplative and meditative events as that invoked in the Judeo-Christian call to worship: *The Lord is in His holy temple; let all the earth keep silence before Him*. Other sociocultural functions include marking boundaries of events and serving as a background against which speech and other activity is interpreted.

In some cases, the meaning of silence may be defined by a society's covenants and laws. In the United States, for instance, suspected legal offenders must be explicitly informed that they have the 'right to remain silent' to avoid self-incrimination, although in other legal contexts a person may commit perjury by silence. Instances of implicit silence (i.e., non-disclosure) in business transactions have been ruled to constitute active concealment and fraud. In some societies, silence in interpersonal interaction may be invoked as a powerful instrument of social control (e.g., 'shunning' among the Eskimo, the Igbo, or the Amish).

Acquisition of communicative competence requires learning the appropriate usage of silence in a community as well as of speech. Because cultural beliefs, values, and practices are integrally involved in the process, socializing young children or new group members to the meaning of silence may be considered part of the transmission of worldview.

Study of Silence

Silence is often not documented because it does not attract attention in the same way that audible or visible behavior does. Norms for appropriate use in specific situations can perhaps most easily be inferred from the reaction of participants to their violation, or when explicit instruction or 'correction' is given to children or newcomers. Cultural beliefs and values concerning silence may also be distilled in proverbs: e.g., *Silence is golden* (English); *Because of the mouth the fish dies* (Spanish); and *Man becomes wise through the ear* (Farsi). Additionally, cultural understandings regarding the contextual or interactional interpretation of silence may be made explicit in the choice of adjectives coupled with the term *silence* itself (e.g., *ominous silence*, *reverent silence*, *eerie silence*, *smug silence*, *reflective silence*, *pregnant silence*) or may be implied by terms used to describe people who exhibit relatively silent behavior (e.g., *taciturn*, *reserved*, *secretive*, *circumspect*). Metaphorical references that link silence to seemingly unrelated objects and events provide insights into how people conceptualize their world and the meanings they accord silence in relation to other experiential domains.

As with study of other aspects of culture, the study of silence as a sociocultural signifier may be approached from functionalist, constitutive, and critical perspectives. Each of these informs and highlights different facets of the topic, and all may be needed to achieve adequate understanding. The functionalist approach is emphasized in viewing silence as a component of communication that functions in relation to such cultural categories as belief systems and social organization; the constitutive approach is emphasized in viewing silence as a dynamic interactional phenomenon that is involved in establishing role-relationships and expressing social identity; the critical approach is emphasized in viewing silence in relation to sociopolitical domination and subordination.

Asymmetries of Access to Speaking Privilege

Differential speaking privileges and responsibilities are allocated to individuals or classes of people who are engaged in communicative events. Some of these are institutionally-determined, with lower-status (less powerful) members of a society or organization usually accorded less access to speaking opportunities than higher-status persons. Institutionally-determined asymmetries in participation also result from ritual constraints on speech versus silence, such as who has a responsibility to speak or remain silent in religious services, legal proceedings, funerals, classes in school, and public performances (e.g., concerts and movies). Other asymmetries are group-determined, with differential access to speaking roles delegated (e.g., in legislative bodies and committees), or assigned as the implicit or explicit outcome of group dynamics. Still others are individually-determined, often by personality factors (e.g., the relative aggressiveness of participants), tactical strategies (e.g., concealment or image manipulation), and attitudes (e.g., respect or

disapproval). For example, silent attentiveness during relatively long stretches while one person 'holds the floor' may convey listener interest and respect, although the same absence of conversational backchannel noise in some speech communities (e.g., African-American) would convey indifference or hostility.

Position and Duration of Silence in Discourse

Discourse is both silence and sound. The former includes the pauses and hesitations that occur within and between turns of talk – the rhythmic patterns of silence. The meanings they carry are generally affective in nature, and typically connotative rather than denotative. These meanings may nonetheless be symbolic and conventional, as is seen in the various patterns of use and norms of interpretation in different speech communities. Cultural differences are particularly notable in the duration of pauses between turns, or 'switching' pauses. For example, certain American Indian groups are accustomed to waiting several minutes in silence before responding to a question or taking a turn in conversation, while the native English speakers they may be talking to have very short time frames for responses or conversational turn-taking, and find long silences distressful. For members of these particular American Indian groups, a shorter duration may be interpreted as impoliteness, and as not giving adequate consideration to the topic under discussion. For native English speakers, a longer duration may be interpreted as unfriendliness or shyness, lack of knowledge, or not wanting to be involved. In the context of legal proceedings, native English speakers are likely to (mis)interpret long pauses by defendants and witnesses as signs of lack of cooperation and of evasiveness, perhaps even of guilt.

The duration of pauses within speaking turns varies by cultural group membership, but it is influenced more by situational factors than are switching turns. Pauses may reflect time that is needed for mental search processes, especially in cognitively demanding speaking tasks, and there are pauses that reflect encoding difficulties. Duration of pausing is strongly influenced by whether the speech is preplanned or spontaneous.

The genre of discourse also influences pausing position and duration, with poetry reading, prose reading, spontaneous narratives, and conversations all showing different patterns of placement and duration of silence in relation to sound, whatever the cultural context.

Silence occurs in terminal positions within discourse as well as in switching and medial slots. Utterances and even whole communicative events may be completed in silence when the topic is a particularly delicate one or the word that would be used is taboo, or when the situation is emotionally loaded and the speaker is 'at a loss' for words. The Japanese term *haragei* 'wordless communication' captures the essence of this latter usage.

On one side, silence functions to structure discourse. On another, silence often conveys a message precisely because it forms part of discourses that are additionally structured by sound.

Special Group Uses of Silence

Cultural aspects of silence are often most dramatically apparent in special group uses of silence. These are typically associated with activity domain (e.g., religion) and with dimensions of power.

Extreme manifestations mark some religious group membership, as the vow of silence required by certain monastic orders. Silence is needed in Quaker worship services in order to allow 'space' in which God can work; in some ritual contexts, any speech at all is considered profane. The ban on speech is often associated with setting, with entry into a place of worship calling for silence even when no service is in progress. The silence is often accompanied by special patterns of head, hand, and body position and movement.

Silence is a signifier of power when it indexes the capacity of some individuals, groups, and institutions in a society to control others. From a critical perspective, most notable are coercive acts that force certain participants to speak, limit expression, or maintain silence. These may be institutionally prescribed for the maintenance of system and order, such as teachers' authority in school classrooms to control speaking rights, or judges' authority in courtrooms, or may be self-imposed by common agreement, as when a group adopts *Roberts' Rules of Order*. However, when whole classes of members of a society (such as women or members of certain ethnic, social, or religious groups) are compelled to remain silent by being denied speaking rights, their silence becomes a sign of oppression, and may even, to the discerning observer, 'speak louder than words.'

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Silvestre de Sacy, Baron Antoine-Isaac (1758–1838)

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Silvestre de Sacy was born on September 21, 1758, in Paris and died there on February 21, 1838. Silvestre was the surname of his father, a Parisian notary, and 'de Sacy' was added by his son. As early as 1781, Silvestre de Sacy became a counsellor in the Cour des monnaies and was appointed commisioner-general in 1791. During this time, he studied most Semitic languages and was able to decipher the Pahlavi inscriptions. In 1792, he retired from this position and became a member of the Académie des Inscriptions. He became the perpetual secretary of this institution in 1833. The Ecole des Langues Orientales Vivantes, founded in 1795, employed Silvestre de Sacy as a teacher of Arabic, and beginning in 1806 he also taught Persian at the Collège de France. From 1808 to 1814, he was a member of the Legislative Corps and was made a baron in 1813. From 1815 to 1820, he served on the Commission for Public Instruction and was rector of the University of Paris, and in 1822 he became a member of both the Collège de France and the Ecole des Langues Orientales Vivantes. In the same year he was joint founder with Abel Rémusat of the Société asiatique. In 1832 he became a peer of France, librarian of the Eastern manuscripts at the Royal Library, and inspector of oriental typefaces at the royal printing press.

Silvestre de Sacy was soon recognized as a great orientalist. His *Grammaire arabe*, *Chrestomathie arabe*, and *Anthologie grammaticale* are still known as important textbooks. He contributed to the European knowledge of Eastern cultures by editing and translating early literature (*Calila et Dimna*, Hariri's *Maqamat* with an Arabic commentary, the *Alfiyya*) and a version of Abd al Latif's *Relation arabe sur l'Egypte*. He studied property law in Egypt and provided editions of the Arabic and Syrian New Testament texts for the British and Foreign Bible Society. His lifetime work, a study on the religion of the Druzes (*Exposé de la religion des Druzes*), was unfinished. In addition to oriental studies, and as a preparation to his *Grammaire arabe*, Silvestre de Sacy wrote a general grammar (*Principes de Grammaire Générale mis à la portée des enfants*) in 1799. Along with its educational value, this textbook provides a synthesis of the main general grammars of the past (i.e., the works of Port-Royal, Beauzée, and Court de Gebelin), adding references to Eastern and Semitic languages. A major feature of this grammar is its description of the subordinate clause introduced by the conjunction *que* (the so-called *proposition complémentaire*) as a proper type of subordinate clause. De Sacy's scholarly colleagues at the Collège de France and the Ecole des Langues orientales Vivantes (G. Flügel, H. G. L. Kosegarten, E. M. Quatremère, W. de Slane, and H. L. Fleischer) contributed to the dissemination and growth of Arabic studies and knowledge in the 19th century.

See also: Arabic Linguistic Tradition; Arabic; Beauzee, Nicolas (1717–1789); Language Teaching: History; Persian, Old.

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John McHardy Sinclair is a well-known linguist who has contributed substantially to several areas of scientific language study, including lexicography, discourse analysis, and computational linguistics. He is a leading figure in current corpus-based language research (Baker *et al.,* 1993).

He was born in 1933 in Great Britain, and graduated in English Language and Literature at Edinburgh University, where he was appointed to a lectureship in the Department of English and General Linguistics in 1958. In 1965, he was elected to the foundation chair of Modern English Language at the University of Birmingham, where he took a very active part in developing Modern English Language teaching. Since his retirement in 2000, he has been Emeritus Professor of English Language and Linguistics at the University of Birmingham and has continued his research at the Tuscan Word Center, which he founded in 1995 in Italy.

At Edinburgh University in 1961, John Sinclair planned with Michael A. K. Halliday to collect a corpus of spontaneous English speech in order to study sentence structure and lexical collocation, thus joining the pioneering trend of computerized corpora flourishing at that time, such as the British *Survey of English usage* (1960), the French *Trésor de la langue Française* (1960), and the American *Brown corpus* (1967). From their acquaintance with the London School, Sinclair and Halliday regarded lexicogrammar as a proper field, denying strict boundaries between grammar and lexis. Moreover, Sinclair borrowed from Firth the notion of collocation, which he implemented in computational studies of English lexis (Sinclair, 1966; Sinclair *et al.,* 1970, Jones and Sinclair, 1974) and corpus research (Sinclair, 1991). His concerns with the uses and usability of texts led him to work, in association with his colleagues of the University of Birmingham, Malcolm Coulthard and David Brazil, on discourse analysis and its application to English teaching (Sinclair and Coulthard, 1975, Sinclair and Brazil, 1982). In 1980, Sinclair initiated the Cobuild project in computational lexicography, based on a large corpus of English language texts, and devoted himself to the design of dictionaries and grammars from collocations (Sinclair, 1987). In addition to practical concerns, such as teaching, dictionaries, and grammars, corpus-based research led him to address more theoretical issues. He coined the word 'naturalness' to account for the fact that most examples chosen by linguists are not natural, although they are well formed. Well-formedness is absolute, while naturalness is probabilistic, that is, corpus-dependent. His hypothesis is that any instance of language depends on its surrounding context, so he attempted to promote naturalness as textual well-formedness (Sinclair, 1984, 1991).

See also: Collocations; Computational Lexicons and Dictionaries; Computers in Lexicography; Corpora; Corpus Linguistics; Coulthard, Malcolm (b. 1943); Firth and the London School; Firth, John Rupert (1890–1960); Halliday, Michael A. K. (b. 1925); Learners' Dictionaries; Lexicography: Overview; Text and Text Analysis.

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Sindhi

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Sindhi is an Indo-Aryan language with its roots in the lower Indus River valley. It takes its name from the Indus River, known in earlier times as the Sindhu. Today Sindhi is spoken in the province of Sindh, Pakistan, where it is recognized by the government as the official language of the province, home to an estimated 30–40 million people (projected from 1981 census data). Nearly half of the population of Sindh lives in rural areas, where Sindhi is the primary language. In the urban centers of Sindh, Sindhi competes for status and speakers with Urdu (the national language of Pakistan) and, increasingly, English. Sindhi is also spoken by about 2.5 million people in India, including major communities in Gujarat, Mumbai, and Pune, where immigrants from Sindh relocated after the 1947 partition of India and Pakistan. Beyond the Indian subcontinent, Sindhi is spoken by large diaspora communities in the United Kingdom and the United States, and around the world.

Language History

Sindh is the site of the ancient Harappan civilization of the lower Indus River valley. A case can be made that remnants of Harappan culture are evident in classical Sindhi folklore and religious rituals, which raises the question of a possible linguistic link between Sindhi and the Harappan language. Unfortunately, there is little evidence on which to determine the linguistic stock of the Harappan language, the ancient script is as yet undeciphered, but a prevailing theory suggests a Dravidian origin. This theory points to the presence of the Dravidian language Brahui, spoken in the northwestern Pakistani province of Baluchistan, as a remnant of a broader Dravidian region in the subcontinent in earlier times. This possible link to an ancient Dravidian language of the Harappans has led some scholars to claim a Dravidian origin for Sindhi. This minority view, however, clashes with a substantial body of linguistic evidence for an Indo-Aryan origin of Sindhi.

The earliest historical reference to Sindhi is in the *Nātyaśāstra*, a dramaturgical text that was written between 200 B.C. and 200 A.D. Evidence for Sindhi as a written language dates to a translation of the Islamic *Qur'an* in 883 A.D., followed a century later by a Persian translation of the ancient Indian religious epic *Mahābhārata* taken from a language thought to be Old Sindhi. Dating the emergence of Sindhi in the evolution of Indo-Aryan is a matter of some controversy. Various theories, ably summarized by Khubchandani (2000), trace Sindhi to the Vrācaḍa Apabhramśa or to an earlier pre-Vedic Prakrit language. Although Trumpp (1872), in his authoritative Sindhi grammar, describes Sindhi as a more 'pure Sanskritical' language compared to the other modern Indo-Aryan languages, Sindhi undeniably reveals the impact of its long history of contact with speakers of other languages.

Sindh has succumbed to foreign rule many times over a history of 2500 years and, much like English, has accumulated linguistic features and vocabulary from the languages of its foreign rulers. In pre-Muslim history, from the 6th century B.C. through the 1st century A.D., Sindh was invaded by a succession of Achamenian, Greek, Mouryan, Scythian, and Persian rulers, including Alexander the Great (329–324 B.C.). After a brief period of rule by local dynasties, the Arab invasion in 711 A.D. initiated the Muslim period and the heavy influence of Persian on Sindhi with numerous lexical borrowings. Following a period of rule by local dynasties from the 11th through the mid-19th century, Sindh joined the British Empire in 1843. The influence of English on Sindhi, especially through lexical borrowings, began at that time and continues in the present, and is second only to Persian (Western Farsi) in its impact on the language. The result of language contact in all these periods of foreign rule is a Sindhi lexicon with diverse etymological bases and multiple cognate forms, which is further complicated by an exceptional number of irregular verbal inflections, and by the expansion of the sound inventory to include several Perso-Arabic sounds not native to Indo-Aryan.

Related Languages and Dialects

Among the languages spoken in the region today, Sindhi is closely related to Sirāikī (Saraiki), spoken north of Sindh province, and to Kachchhī (Kachchi), spoken in the Kachchh region of Gujarat, along the border between Pakistan and India. Grierson's (1919) survey listed five regionally defined Sindhi dialects, with Vicholī ('Central') as the standard variety. Contemporary dialectal work has been carried out by Khubchandani (1962–1963) and Rohra (1971) on Kachchhī (also spelled Kachhi, Kachchhi). Bughio's (2001) sociolinguistic study of the urban and rural Vicholī varieties is the only work since Grierson to deal with Sindhi dialect variation within Pakistan, and opened the door for promising future investigation.

Linguistic Features

Sound System

Sindhi and the neighboring languages Sirāikī and Marwari are distinct among Indo-Aryan languages for their use of the glottal implosive stops /ɓ, ɗ, ʃ, ɠ/, which derive from Middle Indo-Aryan geminate voiced stops in medial position and single voiced stops in initial position. In other respects, the sound inventory of Sindhi is typical of Indo-Aryan, with a full series of voiceless, voiced, aspirated, and voiced aspirated stops and nasal stops at five places of articulation (see Table 1). Alongside the alveolar rhotic tap [r] there is a retroflex tap [ɽ]; but unlike [r], the retroflex tap is restricted to intervocalic position, where it can be considered the positional variant of the retroflex stop [ɖ]. Retroflex [ɖ] occurs intervocalically only in a few English loan words, where it corresponds to the English alveolar [d], as in *loɖiŋga* 'truck' and *reɖiyo* 'radio' (from English *loading*, *radio*). Sindhi has incorporated a number of consonants from Persian, including the well-established sounds /f, v, ʃ, z, χ/, along with /q, ɣ/, which are not typically used except by urban, educated speakers for whom they are arguably reinforced by their stable presence in Urdu.

Sindhi has the standard Indo-Aryan vowel inventory with ten vowels that can be grouped in five long–short pairs: /i, iː, e, eː, u, uː, o, oː, a, aː/. The short mid vowels are subject to dialectal variation or merger (discussed below). Long vowels can occur with contrastive nasalization; compare the final long nasal vowels in *saːmhoː̃* 'in front of' and *vitʃʰuː̃* 'scorpion', with the final long oral vowels in *sanhoː* 'thin' and *kaduː* 'gourd'. Phonetically nasal short vowels occur in the context of a following tautosyllabic nasal consonant, e.g., *ãmbu* 'mango', but can also occur in an open syllable preceding or following /h/, where they contrast with oral short vowels. Compare the short nasal vowels in *mũhũ* 'mouth', *jĩhĩ* 'who/relative pronoun' with the short oral vowels flanking /h/ in *mahalu* 'palace', *subahu* 'morning'.

Sindhi syllable structure allows for at most one consonant to appear in the onset and coda position (CVC). Consonant clusters (CC) occur word medially, as in CV<u>C.C</u>V *kursiː* 'chair'. With a few loanword exceptions, Sindhi words must end in a vowel. Short vowels in word-final position are extremely reduced, though grammatically important as markers of noun number, gender and case. Vowel-initial syllables may occur initially and medially, and in the latter case may give rise to word-internal vowel sequences (hiatus), as in *bʰaːʃaːiː* 'brother's wife'. Hiatus sequences never occur with identical vowels.

There are several features of Sindhi pronunciation that are subject to dialectal variation, distinguishing the speech of rural, uneducated, or older speakers who represent an older variety of Sindhi, from urban, educated (i.e., literate) or younger speakers, whose speech is more noticeably influenced by Urdu, Hindi, and English pronunciation patterns. Three dialectal features described by Bughio (2001) are as follows. The short vowels /e, o/ are typically merged with their long counterparts in the old variety, resulting in [e, o] while new variety speakers more frequently keep them distinct, producing long monophthongs [eː, oː] and short diphthongs [ɑɪ, ɑʊ] or lax vowels [ɛ, ɔ]. The diphthong realization is typical of Muslim new variety speakers, and the lax vowels are typical of Hindu new variety speakers. This distinction based on religious affiliation reflects in part the separation of Hindu and Muslim communities since the 1947 partition of India and Pakistan, and the maintenance of diphthongs in Arabic loan words (borrowed through Persian) in the speech of both Sindhi- and Urdu-speaking Muslims. Old and new varieties of Sindhi are also distinguished by the frequent deletion or total loss of the word-final short vowels in the new varieties. The third dialectal feature in Sindhi is the pronunciation of the retroflex stops

Table 1 The consonants of Sindhi

	Labial	*Dental*	*Alveolar*	*Post-alveolar*	*Palato-alveolar*	*Velar*	*Glottal*
Stop	p b pʰ bʰ	t d tʰ dʰ		ʈ ɖ ʈʰ ɖʰ		k g kʰ gʰ	
Implosive	ɓ		ɗ		ʃ	ɠ	
Affricate					tʃ dʒ tʃʰ dʒʰ		
Nasal	m		n	ɳ	ɲ	ŋ	
Fricative	f		s (z)		(ʃ)	(x ɣ)	h
Rhotic			r	(ɽ) ɽʰ			
Lateral		l					
Glide	ʋ				y		

Table 2 Nominal declensions for masculine and feminine nouns

		Nominative	*Oblique*	*Ablative*	*Vocative*
'boy'	Singular	tʃʰokiro:	tʃʰokire:	tʃʰokirã:	tʃʰokira:
	Plural	tʃʰokira:	tʃʰokirani	tʃʰokiraniã:	tʃʰokira:
'table'	Singular	meza	meza	mezã:	meza
	Plural	mezũ:	mezuni	mezuniã:	mezũ:

/ʈ, ɗ, ɗʰ/ as stop-rhotic clusters [ʈr, ɗr, ɗʰr] in the old varieties.

Morphology

Sindhi has a rich system of nominal and verbal morphology, with regular paradigms of declension and conjugation that exist alongside a remarkably high number of exceptional forms. Nouns, adjectives, and pronouns are marked for number, gender, and case. The gender class of the noun is in most cases marked by the final vowel, and number and case marking are expressed through a combination of stem alteration and final vowel suffix. Examples of nominal declension are shown with paradigms for the masculine noun 'boy' and feminine noun 'table' in Table 2.

Cases other than the ones shown in Table 2 are marked through the use of a postposition following the noun in the oblique singular form, for example *gʰara kʰe* 'to the house' (dative), *gʰara kʰã:* 'from the house' (ablative), *gʰara sã:* 'with the house' (comitative), *gʰara mẽ:* 'in the house' (locative), *gʰara jo:* 'of the house' (genitive). The genitive postposition is unique in that it is declined like an adjective, agreeing with the possessed noun in number, gender and case, as in (1):

(1) tʃʰokire ja:
boy.MASC.sing.OBL GEN.MASC.pl.NOM
kita:ba
book.MASC.pl.NOM
'the boy's books'
tʃʰokire ji:
boy.MASC.sing.OBL GEN.FEM.sing.NOM
ɓili:
cat.FEM.sing.NOM
'the boy's cat'

Sindhi verbs are marked for aspect, tense, mood, and concordance (gender and number) through a complex system of modification of the verb stem, which may in addition be followed by a modal and an auxiliary verb. These elements combine in various ways to produce 17 distinct finite verb forms, and six nonfinite verb forms that function as nominal, adjectival, and adverbial participles. Each finite and nonfinite verb form can undergo further modification of the verb stem to express voice (active/passive) and valence (transitive/causative) distinctions. Several finite forms of the verb *likʰaɳu* 'to write', all expressing masculine, singular concordance, are illustrated in Table 3.

Table 3 Example verb forms based on the root *likʰ*-'write'

Present unspecified	likʰe tʰo	'he writes'
Definite future	likʰando	'he will write'
Present habitual	likʰando a:he	'he writes (habitually)'
Present continuous	likʰi: rahiyo a:he	'he is writing'
Unspecified perfective	likʰiyo	'he wrote'
Subjunctive perfective	likʰiyo huje	'he may have written'
Imperative	likʰu likʰo	'Write!' (familiar) 'Write!' (polite)

Syntax

The pragmatically neutral word order in Sindhi is Subject-Object-Verb, but the order of these major constituents can be changed to put a phrase with Topic focus at the front of the sentence. Within phrases, the head element always occurs at the end, as in the noun phrase and verb phrase examples in (2):

(2) hi:a nandʰri: ʈopi:
this small hat
'this small hat'
ama: kʰe tʃiʈʰi: likʰi:
mother DAT letter wrote
'wrote a letter to mother'

The verb typically agrees with a nominative case-marked subject, as in

hu:a atʃe tʰi:
she-NOM come-3sing aux.FEM
'she comes'.

An 'experiencer' subject of a verb expressing physical state, psychological state, or kinship is marked with the dative postposition, as in

huna kʰe ɓukʰi laɠi:
he-OBL. DAT hunger-FEM strikes-FEM.sing.
'he is hungry'.

Sindhi has the split-ergative agreement pattern found in other Indo-Aryan languages, whereby in

the perfective aspect the subject of a transitive verb is marked for oblique case, and the verb agrees with a nominative (inanimate) object if present, and otherwise displays a default agreement (3sing.MASC).

Linguistic Works on Sindhi

Among published grammatical works on Sindhi, there are several grammars in the Sanskritic tradition, including Stack (1849), Trumpp (1872), and a section in Grierson's *Linguistic survey of India* (1919). Contemporary linguistic studies include instrumental phonetic studies (Nihalani, 1986, 1995), sociolinguistic and dialect studies (Rohra, 1971; Bhugio, 2001), and contemporary grammatical analysis (Khubchandani, 1961). Khubchandani (2000) presents a comprehensive bibliography of works on Sindhi from 1947–1967.

See also: Pakistan: Language Situation.

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Singapore: Language Situation

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The Republic of Singapore's resident population of 3 263 200 comprises 76.8% Chinese, 13.9% Malay, 7.9% Indian, and 1.4% 'Others'; these are, however, only official race groupings with much internal ethnic and linguistic variation. Four languages have official status: Mandarin Chinese, Malay, Tamil – to represent the three main official races, with Malay being the national language for historical reasons – and English. Numerous other languages are also widely used in the community in a polyglossic situation.

Chinese languages such as Hokkien (Chinese, Min Nan, Xiamen) (approximately 42% of Chinese population), Teochew (Chinese, Min Nan, Chaoshan) (22%), Cantonese (Chinese, Yue) (15%), Hainanese (Chinese, Min Nan, Hainan) (7%), Hakka (7%), and Foochow (Chinese, Min Dong, Fuzhou) (2%) are robust within the respective speech communities. Mandarin has, however, shown a marked increase in usage in Chinese households (35% in 2000 from 24% in 1990), at the expense of the other Chinese languages (24% from 40%), reflecting the government's annual campaign since 1979 promoting the use of Mandarin over the other Chinese languages (referred to as 'dialects' in Singapore). Still, these so-called Chinese dialects have been increasingly and significantly used in political rally speeches in recent years, in a bid to connect more with the majority heartland populace.

Over half the Indian population in Singapore is Tamil, and Tamil is the dominant home language in 43% of Indian households. Malayalam, Punjabi (Panjabi), Hindi, Bengali, Gujarati, and Sinhala are also spoken by the respective speech communities. Malay is by far the most significant dominant home language in Malay households at 92%, and languages of Indonesia such as Javanese are also spoken in the respective ethnic groups. In the Peranakan or Straits Chinese community comprising some 10 000 in Singapore, Baba Malay, a mixed Hokkien-Malay

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variety, is spoken in the middle-older generations. In the 17 000-strong Eurasian community, a third of Portuguese-Malaccan descent, a creolized variety of Portuguese, Papia Kristang (Malaccan Creole Portuguese), is found in a few of the older generation. Most Baba and Eurasian households have English as the first language nowadays.

English has been since 1987 the medium of instruction in all schools (excluding the handful of officially recognized Malay-medium Muslim *madrasahs*), in a bilingual system where children learn as their second language (referred to as mother tongue) the official language matching their official ethnic group. With such cultivation of English-knowing bilingualism, the primary working language in Singapore has been recognized since the 1970s to be English, supplanting ubiquitous Bazaar Malay and Hokkien, which were until then Singapore's *lingua franca*. Literacy in English has risen steadily over the decades to 71%. Concurrent with this is the increase in the use of English as the dominant home language in all ethnic groups. English is also clearly more dominant in the younger generation. Code-mixing between the various languages is a salient feature of intra- and interethnic communication.

In linguistically heterogeneous Singapore, English has unsurprisingly evolved to display features resulting from language contact, particularly from Malay and Hokkien. While a more Standard Singapore English is still the variety found in more official, formal situations, Colloquial Singapore English, commonly known as Singlish, is widely used across generations and social classes, as well as in the media; as a reaction to the increasing prevalence of Singlish, the Speak Good English Movement was launched in 2000.

See also: China: Language Situation; Code Switching and Mixing; India: Language Situation; Language Change and Language Contact; Language Planning and Policy: Models; Malay; Malaysia: Language Situation; Multilingualism: Pragmatic Aspects; Tamil.

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Singhalese *See:* Sinhala.

Sinhala

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General

Sinhala (Sinhalese, Singhalese) is the first language of the majority in Sri Lanka, spoken by approximately 75% of the island's population (approximately 20 million in 2004) and thus has about 15 million first language speakers. It was declared the only official language of the country in 1956, but the status of official language was extended to the main minority language, Tamil, in 1987, with English as a link language. Sinhala belongs to the Indo-Aryan family and is thus related to languages of Northern India such as Hindi-Urdu, Panjabi, Bengali, and Marathi, and ultimately through Indo-European to English and the major Western European languages. Within Indo-Aryan, its closest relative is Dhivehi (Maldivian) of the Maldive islands (also on Minicoy, where it is known as Mahl) with which it forms a southern sub-group. These two languages have been isolated from their sister North Indian languages for over two millennia and have developed special characteristics of their own, many of them shared, though the languages are mutually unintelligible. They have also been significantly influenced by the neighboring Dravidian languages, particularly Tamil-Malayalam. One common Sinhalese Buddhist tradition states that the language was brought to the island from northeast India, on the date of the final passing of the Buddha (544–543 B.C.E in that tradition) though there are competing accounts. In any event, there are Sinhala inscriptions from the third and second centuries B.C.E. already showing changes distinguishing it from its sisters in India, most notably the complete loss of the aspirated consonant series, so that a date around the middle of the first millennium or shortly thereafter is not unreasonable. The place of origin has been disputed by serious scholars, one problem being that the time of separation predates the major changes that differentiate the Indian Indo-Aryan dialects. Recent work on historical phonology, however, does give some evidence for a generally eastern origin, along with dialect admixture.

The extant literature in Sinhala dates from the 9th–10th centuries, but it is clear from Pali texts and later references that there was an earlier body of works that was lost due to internal turbulence. Fortunately, there is an epigraphical record from the 3rd–2nd centuries B.C.E. on, so that we have a continuous record of the language from that time, an asset unmatched in any other modern Indo-Aryan language. The literary legacy is rich. Not surprisingly, given the cultural history of the island, much of it is Buddhist in content, encompassing both prose and poetry, but there is a flourishing current literary scene in virtually all genres, including poetry, novels, short stories, criticism, and a lively theatre. Literacy is high, approximately 89%, and near 100% in some areas, which contributes to this productivity.

Sinhala vocabulary includes words from many languages, including English, Dutch, Portuguese, and others as well as Dravidian. Sanskrit loans abound, especially in the technical and religious/philosophical spheres, but perhaps unexpectedly, given the prevalence of Theravada Buddhism, Pali loans are scarce.

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Varieties

While there is some regional dialect variation, all spoken dialects are mutually intelligible, requiring only some small adjustment. The main varietal difference is diglossia, involving two main functional varieties, generally referred to as Spoken Sinhala and Literary Sinhala. The former is used for all face-to-face communication, and the latter for virtually all written and published materials, except in some informal communication and in dialogue in modern fiction and drama, with the embedding narrative material generally in Literary. One major difference that has been taken as the defining characteristic of the varieties is that Literary Sinhala has subject-verb agreement, as in (1), while all of the Spoken varieties lack it, as in (2). There are also accompanying differences in morphology, case forms, and use, and in fact the varieties differ on all levels of structure except phonology, since oral presentations of Literary use the spoken repertory. Literary productions are virtually always written beforehand. There are subvarieties within each of the major ones, and a Formal Spoken variety lacking agreement but showing some Literary features such as lexicon and some case features is seeing increasing use, partly because of the need for live production in the media, as in interviews and speeches. Some news broadcasts now use that variety, though earlier they were written in Literary and read out.

(1) Literary (in transliteration):
mama goyam kapami.
I *rice-plants* *cut*-PRESENT-1SG
'I reap paddy.'

api goyam kapamu.
We *rice-plants* *cut*-PRESENT-1PL
'We reap paddy.'

ma:ma: goyam kapayi.
uncle *rice-plants* *cut*-PRESENT-3SG
'(Maternal) uncle reaps paddy.'

(2) Spoken (in phonological representation):
mamə/api/ma:ma goyaŋ kapənəwa.
I/we/uncle *rice-plants* *cut*-PRESENT
'I/we/maternal uncle reap paddy.'

Phonology

Two notable characteristics of the Sinhala phonological inventory that are shared with Dhivehi but that are different from other Indo-Aryan languages are the lack of aspirated consonant series and a series of prenasalized stops that contrast with nasal-stop clusters. The vowel and consonant inventories are shown in Table 1.

Table 1 The Sinhala consonant and vowel inventory

Consonants		*Vowels*		
Voiceless stops	k c ṭ t p	i i:		u u:
Voiced stops	g j ḍ d b			
Prenasalized stops	^{n}g (^{n}j) ^{n}ḍ ^{n}d ^{m}b	e e:	ə	o o:
Nasals	ŋ ñ n m			
Resonants, spirants	y r l w š s h	æ æ:		a a:

Orthography

Sinhala has an orthographic system of its own, also used for writing Sanskrit and Pali in Sri Lanka. Like most other South Asian systems it is alphasyllabic; that is, consonants imply an inherent vowel <a>, with other following vowels or the lack of one indicated by sattelite diacritics. The independent vowel symbols are used for word initial or independent vowels. Thus ප is <pa> and පා, පි, පු, පෙ, and පො, indicate <pa>, <pi>, <pu>, <pe>, and <po>, with (plain) <p> written as ප්. The full inventory, given in Table 2, does include symbols for aspirate consonants and others for writing Sanskrit and Pali as well as loans from those languages.

Morphology

Sinhala nouns inflect for definiteness, number, and case. The basic gender categories are animate and inanimate. Table 3 gives a partial set for Spoken and Literary. Literary Sinhala also distinguishes masculine and feminine within animate.

Spoken Sinhala has six cases, including the vocative: nominative, dative, genitive, instrumental-ablative, and vocative. Literary Sinhala and some dialects of Spoken also have a distinct accusative, though they differ in form.

Demonstratives and pronouns exhibit a four-way distinction: 1st proximal, 2nd proximal, distal, and (discourse) anaphoric. Thus, roughly, *me*: 'this by me', *oyə* 'that by you', *arə* 'that over there', and *e*: 'that has been spoken of'.

As stated earlier, Spoken Sinhala verbs lack person-number-gender agreement, while Literary Sinhala has it for all three categories. Both varieties have a number of forms for tense, mode, voice, and aspect, though the inventories differ somewhat. There is also a three-way derivational system with sets including active, causative, and involitive verbs, though some sets are incomplete. Thus, *kaḍənəwa* 'break' (active, transitive), *kaḍəwənəwa* 'cause (someone) to break', and *kæḍenəwa* 'get broken' (intransitive/involitive). The syntactic/semantic reflexes associated with these forms are complex and involve transitivity, causativity, and involitivity and the case of subjects and other grammatical relations, as well as special characteristics of specific

Table 2 The Sinhala writing system

Vowels					
අ	ආ	ඇ	ඈ	ඉ	ඊ
a	a:	æ	æ:	i	i:
උ	ඌ	ඍ	ඎ	ඏ	ඐ
u	u:	ṛ	ṛ:	ḷ	ḷ:
එ	ඒ	ඓ	ඔ	ඕ	ඖ
e	e:	ai	o	o:	au
Consonants					
ක	ඛ	ග	ඝ	ඞ	ඟ
ka	k^ha	ga	g^ha	ŋa	^{n}ga
च	ඡ	ජ	ඣ	ඤ	ඦ
ca	c^ha	ja	j^ha	ña	^{n}ja
ට	ඨ	ඩ	ඪ	ණ	ඬ
ṭa	$ṭ^h$a	ḍa	$ḍ^h$a	ṇa	^{n}ḍa
ප	ඵ	බ	භ	ම	ඹ
pa	p^ha	ba	b^ha	ma	^{m}ba
	ය	ර	ල	ව	
	ya	ra	la	va	
ශ	ෂ	ස	හ	ළ	
śa	ṣa	sa	ha	ḷa	

Other

The 'class nasal' ° (Si. *binduva*) is listed following the vowels, but usually represents a velar nasal, transcribed <ŋ> or <ṃ>.
A symbol ෆ has been introduced for <f>, but often Roman <f> is combined with ප <pa>, as in ෆ්.

Table 3 Spoken (colloquial) and literary nouns

	Singular[a]		*Plural*
	Definite	*Indefinite*	
Animate (masculine)			
Nominative/Direct			
Coll	miniha 'the man'	minihek	minissu
Lit	minisa:	minisek	minissu
Accusative			
Coll	minihawə	minihekwə	minissunwə
Lit	minisa:	minisaku (-eku)	minisun
Dative			
Coll	minihaṭə	minihekuṭə	minissunṭə
Lit	minisa:ṭa	minisakuṭa	minisunṭa
Inanimate			
Direct[b]			
Coll and Lit	potə 'the book'	potak	pot
Dative			
Coll and Lit	potəṭə	potakəṭə	potwələṭə/ potvələṭə

[a]Spoken forms are given in phonological representation; literary forms in transliteration.
[b]Nouns of this type have no separate accusative in either variety, but only a direct case serving both functions.

verbs. Thus the causative of *kiyənəwa* 'say, tell' is the common verb for 'read', but it is uncommon, though possible, in its causative sense, and its conjunctive participle *kiyəla* is also the quotation marker/complementizer in Spoken Sinhala (see (6) below).

Syntax

The basic word order in Sinhala is subject-object-verb, though other orders are not only possible but common for pragmatic effects such as foregrounding and emphasis. It is a thorough-going left-branching (i.e., right-headed) language, and verb and noun modifiers, including relative clauses, precede their heads. (The correlative relative construction generally characteristic of Indo-Aryan languages was lost early in its history.) It has postpositions, and complementizers are clause final. These characteristics are illustrated in (3) through (6).

(3) siri gunəpa:ləṭə potak dunna.
*Siri Gunapala-*DAT *book-*INDEF *give-*PAST
'Siri gave Gunapala a book.'

(4) mama ada koləm̆bə i^{n}dəla ko:ciyeŋ a:wa.
*I today Colombo-*GEN *from train-*INSTR *come-*PAST
'I came from Colombo by train today.'

(5) siri gunəpa:laṭə dunnə potə.
*Siri Gunapala-*DAT *give-*PAST-REL *book*
'The book that Siri gave Gunapala.'

(6) siri i:ye a:wa kiyəla gunəpa:lə kiwwa.
Siri yesterday came COMP *Gunapala say-*PAST
'Gunapala said that Siri came yesterday.'

Sinhala has the conjunctive participle that is a feature of both Indo-Aryan and Dravidian languages,

and it is the major way in which sentence conjunction is effected.

(7) siri kæ:mə ka:la gedərə giya.
*Siri food eat-*CONJPART *home went*
'Siri ate and went home.'

Nonverbal sentences, which are common, may be of numerous types, of which three are illustrated in (8) through (10). Such sentences do not have a copula, but vowel-ending adjective predicators take an assertion marker, as in (10).

(8) Nominal-equational:
me: potə puskolə potak.
*this book ola-leaf book-*INDEF
'This book is an ola-leaf manuscript.'

(9) Adjectival-attributive:
me: potə ho^{n}dayi.
*this book good-*ASSMKR
'This book is good.'

me: potə alut.
this book new
'This book is new.'

(10) Nonverbal modal:
maṭə e: alut navakəta:potə o:nə.
*I-*DAT *that new novel-book want/need*
'I want that new novel.'

Sinhala has the dative subject sentences common in South Asia. A nonverbal example was provided in (10). Dative subject verbal sentences commonly involve involitive verbs, as in (11):

(11) maṭə aliyek penuna.
*I-*DAT *elephant-*INDEF *see-*PAST
'I saw the elephant (it was visible to me).'

An uncommon feature of Sinhala is that it also has subjects in case forms other than nominative/direct and dative, in fact, in all except the genitive, as in (12)–(14). (12) illustrates the involitive optative verb inflection, indicating possibility of occurrence.

(12) minihawə ga^{n}gəṭə wæte:wi.
*man-*ACC *river-*DAT *fall-*INVOLOPT
'The man might fall into the river.'
(There are no accusative subject transitive sentences.)

(13) ehe: po:lisiyeŋ innəwa.
*there police-*INSTR *be (Animate)*
'There are police there.'

(14) a:nḍuweŋ e:kəṭə a:da:rə
*government-*INSTR *that-*DAT *support-*PL
denəwa.
*give-*PRES
'The government gives support for that.'

Sinhala has an interesting cleft or focused sentence construction that requires a special form of the verb, as in (15). The focused element may be virtually any type of sentence constituent, and it may be postposed as in (15) but need not be. This structure is very common in discourse and is used in most types of question word questions, as in (16). The question marker *də* that appears in (16) is also the way in which ordinary yes/no questions are formed, as in (17):

(15) i:ye gunəpa:ləṭə salli
*yesterday Gunapala-*DAT *money*
dunne e: miniha.
*give-*PAST-FOC *that man*
'It was that man who gave Gunapala money yesterday.'

(16) i:ye gunəpa:lə e: minih aṭə
*yesterday Gunapala that man-*DAT
dunne mokak də?
*give-*PAST-EMPH *what* Q
'What did Gunapala give that man yesterday?'

(17) e: miniha i:ye gunəpa:ləṭə
*that man yesterday Gunapala-*DAT
salli dunna də?
*money give-*PAST Q
'Did that man give Gunapala money yesterday?'

The related Dhivehi has a similar focus construction. It is also found in several Dravidian languages, and it is very likely that it, like other characteristics such as the completely left-branching nature of Sinhala-Dhivehi, is a result of language contact.

See also: Dhivehi; Indo–Aryan Languages; Sri Lanka: Language Situation.

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Sinhalese *See:* Sinhala.

Sino-Tibetan Languages

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The Sino-Tibetan (ST) language family includes the Sinitic languages (what for political reasons are known as Chinese 'dialects') and the 200 to 300 Tibeto-Burman (TB) languages. Geographically it stretches from Northeast India, Burma, Bangladesh, and northern Thailand in the southeast, throughout the Tibetan plateau to the north, across most of China and up to the Korean border in the northeast, and down to Taiwan and Hainan Island in the southeast. The family has come to be the way it is because of multiple migrations, often into areas where other languages were spoken (LaPolla, 2001). Proto-Sino-Tibetan (PST) would have been spoken in the Yellow River valley at least 6000 years ago. Waves of migration followed: to the southeast, forming the Sinitic languages, and to the west and southwest, forming the TB languages (the speakers of what became the Bodish languages migrated west into Tibet and then south, all the way to the Bay of Bengal, while the speakers of what became the rest of the TB languages followed the river valleys down along the eastern edge of the Tibetan plateau and across into Burma, India, and Nepal). The large spread of Mandarin Chinese to the northwest, southwest and northeast, giving it its large population and geographic spread, happened only in the last few hundred years.

In the past, and to some extent in China still today (e.g., Ma, 2003), this family was also said to include the Tai-Kadai (Zhuang-Dong) and Hmong-Mien (Miao-Yao) languages of southern China and Southeast Asia, but the resemblances found among Sinitic, Tai-Kadai, and Hmong-Mien are now understood to be a result of contact influence (these peoples originally inhabited southern China). Sino-Tibetan has the second largest number of speakers of any language family in the world, due largely to the over one billion Sinitic speakers; except for Burmese (see Bradley, 1996), most Tibeto-Burman languages have relatively few speakers.

Subgroupings within ST are still controversial, due to differences in criteria for subgrouping, a paucity of reliable data, particularly on morphosyntactic

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Subgroupings within ST are still controversial, due to differences in criteria for subgrouping, a paucity of reliable data, particularly on morphosyntactic

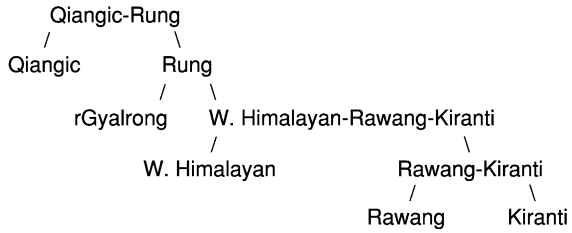

Figure 1 The subgrouping of Qiangic-Rung.

patterns, and the fact that the development and distribution of these languages has been greatly influenced by migration and language contact. Some of the influential proposals for subgrouping within TB are Grierson 1909, Shafer 1955, Benedict 1972, DeLancey 1987, Sun 1988, Dai, Liu & Fu 1989, Bradley 1997, Matisoff 2003, and Thurgood 2003 (see Hale 1982 for comparison of the older proposals). There is now general agreement on the existence of the following groupings (individual languages listed are only representative; see Matisoff 1996 for the many different names used for TB languages and groupings).

- Qiangic (Qiang, Pumi, Muya, Namuyi, Shixing);
- Lolo-Burmese, comprising the Burmish languages (Burmese, Lawngwaw [Maru], Ngo Chang [Achang], Zaiwa, Lachik [Lashi]) and the Loloish languages (further divided into Northern: Nosu [Yi, Yunnan or Sichuan], Nasu, Nisu; Central: Lahu, Lisu, Nusu, Jinuo; and Southern: Hani, Bisu, Phunoi, Mpi;
- Bodish (Tibetan, Dzongkha, Tamang (several varieties), Tshangla, Takpa);
- Kuki-Chin (Lushai, Asho Chin, Tiddim [Chin, Tedim], Anal, Hmar);
- Bodo-Koch (Bodo, Garo, Dimasa, Kachari, Koch, Rabha);
- Konyak (Tangsa [Naga, Tangsa], Chang [Naga, Chang], Konyak [Naga, Konyak], Nocte [Naga, Nocte], Wancho [Naga, Wancho]);
- Tani (Apatani, Mising [Miri], Adi); and
- Karenic (Pwo [Karen, Pwo], Karenni, Sgaw [Karen, S'gaw]).

There is much controversy over the affiliations of many of the languages of Northeast India and whether they all form a group together (see Burling, 1999; Matisoff, 1999), as well as the positions of the Bai language of Yunnan, China, Newari and the Kiranti languages of Nepal, Dulong-Rawang-Anong (Rawang) of Burma and China, the extinct Tangut language of northwest China, and the rGyalrong language of Sichuan, China, among many others. The latter two are most often said to be part of the Qiangic group, and the Kiranti languages are often seen as forming a higher grouping with the Bodish languages, but LaPolla (2003a), with reference to the morphological paradigms, argued that rGyalrong, the Kiranti languages (Bantawa, Athpare [Athapariya], Dumi, Khaling, Camling), Dulong-Rawang-Anong, the Kham languages, and the Western Himalayan languages (Kinnauri, Rongpo, Chaudangsi, Darmiya; also often grouped with Bodish) should be seen as forming a single higher-level grouping. This grouping was given the name 'Rung' because of the similarity (but not identity) of this proposal to an earlier one by Thurgood (1985). The Rung languages most likely split off from an even higher-level grouping with the Qiangic languages, then rGyalrong split off from the group as migrations moved south, then Western Himalayan split off from Kiranti and Rawang, and then these two groups split (**Figure 1**; see LaPolla, 2003a, for the evidence).

Within Sinitic, it is generally agreed there are at least six major dialect groups, initially distinguished on the basis of the reflexes of the historically voiced initial consonants (Li, 1936–1937): Mandarin (northern and southwestern China), Wu (Jiangsu and Zhejiang), Xiang (Hunan), Gan (Jiangxi), Yue (Guangdong and Guangxi), and Min (Guangdong, Fujian, Hainan Island, and Taiwan). The Hakka group of dialects (Guangdong, Fujian, Jiangxi, Sichuan, and Taiwan) is seen by some as part of the Gan group and by others as a separate group. Another three groups were proposed by Li (1987): the Jin group (Shanxi and Inner Mongolia), the Hui group (Anhui and Zhejiang), and the Pinghua group (Guangxi), but these groupings are not universally accepted. Norman (1988, 2003), based on a paradigmatic set of lexical and grammatical items, further grouped the dialect groups into the Northern (Mandarin) group, the Central group (some Xiang dialects, Wu, Gan), and the Southern group (Yue, Hakka, and some Xiang dialects). He left out the Min group because he felt that the Min dialects lay "outside the mainstream of Chinese linguistic development" (2003: 81). That is, they cannot be reconciled with the reconstructed Middle Chinese system (seventh century A.D.) to which the other dialect groups can be traced.

Mandarin has the largest geographic spread and population, and can be subdivided into as many as eight subgroups (see Li, 1987; cf. Ho, 2003), based largely on the reflexes of the stopped tone category. Of these, the Southwestern (Sichuan, Yunnan, Guizhou), Central Plains, and Jianghuai (Southeastern) groups are generally recognized.

One variety of Mandarin, *P≪ut – onghu\a,* the 'Common Language' of China today, was developed in the early 20th century (and dubbed *Gu|óy≪ŭ,* 'National Language,' at that time), taking the

phonology of the Beijing dialect but the lexicon and grammar from a more generalized Mandarin and from the vernacular literature of the time. Standardization and spread of the standard through aggressive educational programs continues today.

Min does not have a large spread and population, but because of the complex nature of its historical development (multiple migrations into the area, causing multiple strata, even within a single variety), it can be subdivided into as many as seven subgroups: Southern, Northern, Central, Eastern, Puxian, Shaojiang, and Qiongwen (Li, 1987). For an excellent book-length synchronic and historical overview of Sinitic, see Norman, 1988; for the best detailed analysis of a single dialect, see Chao (1968).

Proto-Sino-Tibetan was monosyllabic, but with a much more complicated syllable structure than most of the modern languages: *(PREF) (PREF) C_i (G) V (:) (C_f) (s) (Matisoff, 1991: 490; Ci = initial consonant, G = glide, : = vowel length, C_f = final consonant, s = suffixal *-*s;* parentheses mark items that do not appear in all syllables). The modern languages have moved much more toward bisyllabic or polysyllabic words, although they are often reduced again to sesquisyllabic (syllable and a half) or monosyllabic forms, and tone systems have developed in Sinitic and many of the TB languages (either through contact, through independent innovation, or a combination of the two). For example, in Sinitic the tones developed out of consonant suffixes (*-*s,* *-ʔ) and loss of initial voicing (Baxter, 1992: 8.2), and in Lhasa Tibetan the tones developed independently, out of loss of initial voicing and the influence of final consonants. Within this general commonality there is also diversity in phonemic inventories and syllable structures, with, for example, the Qiang language (LaPolla, 2003b) having 36 initial consonants, a complex system of consonant clusters in initial and final position, and no tones, while Lahu (Matisoff, 1973) has only 24 consonant initials, a simple (C)V syllable structure (no consonant clusters), and seven phonemic tones.

Proto-Sino-Tibetan morphology included derivational prefixes and suffixes and a voicing alternation of the initial consonant of some verbs that could affect the valency or form class of a word, but no relational morphology. Many of the modern languages have grammaticalized person-marking affixes on the verb and/or semantic role marking on nouns, but these cannot be reconstructed to the PST level (see LaPolla, 2003a, and references therein). The clause was verb focused, in that the verb was the key element, and noun phrases were optional. This is still the case in most languages. Most have not grammaticalized the kind of constraints on referent identification we associate with the concept of 'subject' and other grammatical relations. If noun phrases appeared in the clause, the verb would have been clause final. In Sinitic the clause is largely verb medial, as the verb has come to function as the divider between topical (preverbal) and nontopical (postverbal) elements (there has clearly been a progressive change away from verb-final order over time). This change has happened to a large extent in Bai and Karen as well. With morphology as with phonology we find diversity of types. Using our examples of Qiang and Lahu again, we find Qiang is agglutinative, whereas Lahu is isolating. Qiang has complex affixal systems of direction marking, person marking, and evidential marking on the verb and definite marking in noun phrases, whereas Lahu has none of these features. Both languages have developed complex sortal classifier systems – a common, but not universal, trait among ST languages. All ST languages have modifier-modified order in noun–noun structures (with genitive-head order being a subtype of this – there was no genitive marking in PST, but some languages have developed genitive marking), as well as relative-head order (Karen has a secondary head-relative order as well). Proto-Sino-Tibetan had negative-verb order, and this is still true of most ST languages.

Matisoff (2003) grouped the languages in the family into the 'Sinosphere' and the 'Indosphere' due to the linguistic and political influence of China and India, respectively, on the languages. In Indospheric languages, such as the TB languages of Northeast India and Nepal, for example, we often find the development of relative pronouns and corelative structures, and also of retroflex initial consonants. In the Sinosphere we often find the development of tone systems and more analytic structure. We also find contact influence from the Altaic languages in the north (Altaic speakers controlled large parts of northern China for long periods over the last thousand years) and the Austroasiatic, Tai-Kadai, and Hmong-Mien languages in the south. For example, there is a cline from north to south in terms of complexity of tone and also classifier systems (greater in the south, less in the north), and influence on prosody and word structure where the sesquisyllabic light-heavy structure of Austroasiatic languages is also found in many of the southern TB languages, such as Burmese and Jinghpaw (Jingpho), often leading to the reduction of the first syllable in a compound, in contrast to a trochaic stress pattern in northern TB and northern Sinitic, which often leads to the reduction of the second syllable in compounds.

See also: Bangladesh: Language Situation; Burma: Language Situation; China: Language Situation; Chinese; India: Language Situation; Nepal: Language Situation; Thailand: Language Situation; Vietnam: Language Situation.

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Siouan Languages

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At the time of earliest contact with Europeans, the Siouan-speaking peoples were found in an arc extending from the northern high plains of North America, east and southward along the prairie-plains border to the mouth of the Arkansas River, with small enclaves farther to the east and southeast. The Siouan languages generally bear the names of the Native American tribes that speak them.

Subgroups, Locations, and Speaker Statistics

The Siouan languages fall into four major subgroups named after the river valleys where they were spoken in protohistoric times; however, the classification is based on shared linguistic innovations, not geography. Missouri River Siouan includes Crow, still spoken in southeastern Montana by perhaps 3000 persons of all ages, and Hidatsa in North Dakota, with approximately 60 speakers, all adults. Mississippi Valley Siouan is split into three major groups, Dakotan, Chiwere-Winnebago, and Dhegiha. Dakotan is spoken by over 10 000 persons of all ages in several dialects, including Assiniboine, Stoney, Teton, Yankton-Yanktonai, and Santee-Sisseton, scattered across northern Nebraska, Minnesota, the Dakotas, Montana, Manitoba, Saskatchewan, and Alberta. The Chiwere dialects are Ioway, Otoe, and Missouria, spoken originally in Iowa, southeastern Nebraska, and northern Missouri. The Missourias took refuge among the Otoes in 1829, and all three tribes were moved to Oklahoma by the 1880s, where today there are perhaps a very few elderly speakers. Winnebago, called Hochunk by its speakers and originally spoken in Wisconsin, is still spoken by adults both there and in Nebraska. The Dhegiha dialects are Omaha-Ponca, Kansa, Osage, and Quapaw. Omaha-Ponca is still spoken by perhaps 50 adults of both tribes in their ancestral home, Nebraska (Omaha), and near Ponca City, Oklahoma (Ponca). Kansa, also called Kaw, originally of northeastern Kansas; Osage, originally of southwestern Missouri; and Quapaw, originally of eastern Arkansas, now in northeastern Oklahoma, no longer have fluent native speakers.

Ohio Valley Siouan is extinct but once comprised several languages, Biloxi in southwestern Alabama, Ofo in Mississippi, and Tutelo-Saponi, Moniton, and Occaneechee in Virginia. There were a few Tutelo speakers living with the Cayuga in Ontario as recently as the early 1980s. The Mandan language, with only one or two speakers in North Dakota, is considered a separate subgroup by the author and a close relation of Mississippi Valley Siouan by some others. The Dakotan, Chiwere, and Dhegiha languages share a certain amount of mutual intelligibility subgroup internally, but there is little or no intelligibility among these subgroups or among other Siouan languages.

External Relationships

The Siouan family is related to the extinct Catawban languages of the Carolina Piedmont. These included Catawba and Woccon and a number of unattested languages said by explorers to have been similar. There is fairly strong recent evidence that Siouan-Catawban is related to Yuchi, originally spoken in Tennessee. Sapir (1929) proposed even more distant links to the Iroquoian and Caddoan language families, but there is little agreement among specialists on any of these.

Grammatical and Phonological Features

Siouan languages are primarily head-marking, active-stative, subject-object-verb (SOV), i.e., dependent-head languages of moderate morphological complexity. Sapir characterized Dakota Sioux as complex pure relational, with derivational concepts signaled by agglutinating elements and pure-relational (here, pronominal) concepts somewhat fused. Sapir characterized Dakota's overall morphological technique as agglutinative fusional and the degree of synthesis as synthetic to mildly polysynthetic. Siouan languages are among those considered by many linguists to be pronominal argument languages, i.e., the pronominal prefixes on the verb are considered to be the arguments of that verb, not just agreement markers for external arguments. If they are considered agreement markers, then Siouan languages are double-agreement languages, with prefixes for subject and object, or, alternatively, actor, patient/experiencer, along with additional roles such as recipient, locative, and instrumental. Siouan lexical classes include nouns, verbs, pronouns, postpositions, particles, and probably adverbs, but not adjectives. The equivalents of English adjectives are all conjugatable verbs.

Siouan argument structure is of the active-stative type in which the subjects of stative verbs (and some active verbs with experiencer subjects) and objects of active transitive verbs are marked alike, whereas agentive subjects of active verbs (both transitive and intransitive) are marked differently. Siouan

languages possess many of the other syntactic orderings that dependent-head languages tend to have (postpositions, main verb–auxiliary verb, possessor-noun (inalienable), and subordinate clause–main clause). All mark person, number, aspect (not tense), mode, and pronominal case in their verb morphologies, and permit noun incorporation. Nominal incorporation is most active in the northern languages: Crow may incorporate entire relative clauses within the verb. Many of the languages have fairly complex phonological inventories, including aspiration, glottalization, and nasalization contrasts for three or four places of articulation among consonants, and length contrasts for five oral and three nasal vowels. Many, if not most, Siouan languages have pitch accent and tend to assign accent to the second mora of words. Phonologists are warned that the practical orthographies, such as those developed by Riggs for Dakota or La Flesche for Omaha, lack detail necessary for phonological analysis.

Future Scholarship

Siouan scholarship is presently flourishing, but much remains to be done. New dictionaries are being or have recently been elaborated for Crow, Hidatsa, Mandan, Dakota, Chiwere, Winnebago, Kansa, Osage, and Quapaw, along with grammars of Crow, Hidatsa, Chiwere, Omaha, Osage, Biloxi, and Ofo. A comparative Siouan dictionary is nearing completion.

See also: Crow; Omaha-Ponca; United States of America: Language Situation.

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Situation Semantics

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Situation theory starts with a fundamental observation: reality consists of situations. A situation is a rich object consisting of individuals enjoying various properties and standing in a variety of relations. It is, in a sense, a 'small' world. We always find ourselves in situations. Right now, you, the reader, are in a reading situation. You are, I hope, satisfied with your being in this situation (notice that this is an attitude you have toward this situation). Some months ago, I, the author of this article, was in a writing situation (distributed over time and place).

Situations describe parts of the real world. Information flow is made possible by a network of abstract links between high-order uniformities, that is situation types. One of the distinguishing characteristics of situation theory *vis-à-vis* the traditional account is that information content is invariably context-dependent (Akman and Surav, 1997).

Situation semantics is applied situation theory. We are engaged in situation semantics if we are using situation-theoretic ideas – mathematical theories of information content – to study meaning in natural language. In fact, the two areas are not clearly separable, as the still-popular acronym STASS (situation theory and situation semantics) neatly shows.

Unlike the older and widely known approaches to natural language meaning (e.g., Montague grammar), there is certain natural feel to situation semantics. This makes it enticing for a newcomer to the realm of semantics. Situation semantics does not impose

languages possess many of the other syntactic orderings that dependent-head languages tend to have (postpositions, main verb–auxiliary verb, possessor-noun (inalienable), and subordinate clause–main clause). All mark person, number, aspect (not tense), mode, and pronominal case in their verb morphologies, and permit noun incorporation. Nominal incorporation is most active in the northern languages: Crow may incorporate entire relative clauses within the verb. Many of the languages have fairly complex phonological inventories, including aspiration, glottalization, and nasalization contrasts for three or four places of articulation among consonants, and length contrasts for five oral and three nasal vowels. Many, if not most, Siouan languages have pitch accent and tend to assign accent to the second mora of words. Phonologists are warned that the practical orthographies, such as those developed by Riggs for Dakota or La Flesche for Omaha, lack detail necessary for phonological analysis.

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Unlike the older and widely known approaches to natural language meaning (e.g., Montague grammar), there is certain natural feel to situation semantics. This makes it enticing for a newcomer to the realm of semantics. Situation semantics does not impose

human-made assumptions in our conceptual scheme. It may be burdensome for someone to embrace, say, Montagovian intensions, but situations have a certain conceptual clarity and naturalness that make them believable. You may have heard that the classical model theory is a 'model' theory in the sense that it depicts how a logical theory should be like. Likewise, situation semantics is a fine exemplar of what a naturalized theory of semantics should be like.

Classical approaches to semantics underestimate the role played by context; they ignore factors such as intentions and circumstances of the individuals involved in the communicative process. (Or, rather, they place them in the pragmatics basket.) But, linguistic devices such as indexicals, demonstratives, and tenses rely heavily on context for interpretation and are fundamental to the way language carries information. Context-dependence is essential to situation semantics. (The insistence of situation semantics on contextual interpretation makes it compatible with speech act theory and discourse pragmatics.) A sentence can be used over and over again in different situations to say different things (called the efficiency of language). Its interpretation (i.e., the class of situations described by the sentence) is therefore subordinate to the situation in which the sentence is used. This context-providing situation (discourse situation) is the speech situation, including the speaker, the addressee, the time and place of the utterance, and the expression uttered. Because speakers are always in different situations, having different causal connections to the world and different information, the information conveyed by an utterance will be relative to its speaker and hearer (called the perspectival relativity of language).

Context supports not only facts about speakers, addressees, and so on, but also facts about the relations of discourse participants to other contextually relevant situations such as resource situations. Imagine two card games that are going on, one across town from the other. Suppose Alice is playing rummy with Bob and Carol is playing rummy with David. Elwood, watching the former card game, mistakes Alice for Carol, and mutters, *Carol has the ace of clubs*. According to the classical theory, if Carol indeed has the ace of clubs (A♣), his claim would be true since *Carol* and *the ace of clubs* are used to pick, among all the things in the world, the unique objects satisfying the properties of being someone named Carol and being an A♣, respectively. In contrast, situation semantics identifies these objects with respect to some limited situation – the resource situation exploited by Elwood. The claim would then be wrong even if Carol had the A♣ in the other card game.

In traditional semantics, statements that are true in the same models convey the same information. Situation semantics takes the view that logically equivalent sentences need not have the same subject matter because they need not describe situations involving the same objects and properties. The notion of partiality leads to a more fine-grained notion of information content and a stronger notion of logical consequence that does not lose track of the subject matter.

Ambiguity is another aspect of the efficiency of language. Natural language expressions may have more than one meaning. There are factors such as intonation, gesture, the place of an utterance, and so on that may play key roles in the interpretation of an utterance. Instead of downgrading ambiguity as an impurity of natural languages, situation semantics tries to build it into a full-fledged theory of linguistic meaning.

Intelligent agents generally make their way in the world by being able to pick up certain information from a situation, process it, and react accordingly. Being in a situation, such an agent has information about the situations he or she sees, hears about, believes in, and so on. Thus, upon hearing Bob's utterance *a wolf is running toward you*, Alice would have the information that her friend is the speaker and that he is addressing her with *you*. Moreover, by relying on the situation the utterance described, she would know that there is a wolf fast approaching her. She would then form a thought about this – an abstract object having the property of being a running wolf – and, on seeing the wolf around, her thought would start to correspond with facts. Normally, the realization of some type of situation causes an agent to acquire more information about that situation and to act accordingly. Alice would run away, having in her possession the acquired knowledge that wolves are hazardous. She activates this knowledge from the situation she finds herself in via a constraint – the link between wolves and their fame as life-threatening creatures. The role of constraints in information flow is best illustrated with an example. The statement *smoke means fire* expresses the lawlike relation that links situations in which there is smoke to situations in which there is a fire. If s is the type of smoky situations and f is the type of fire situations, then, by being attuned to the constraint $s \Rightarrow f$, an agent can pick up the information that there is a fire in a particular situation by observing that there is smoke.

Meaningful expressions are used to convey information not only about the external world but also about our minds (called the mental significance of language). Returning to an earlier example, consider the sentence *a wolf is running toward you* uttered by

Bob. It can give Alice information about two different situations. The first one is the situation that she is located in. The second one is Bob's mental (belief) situation. If Alice is certain that he is hallucinating, then she learns the second situation, not the first. Situation semantics differs from other approaches in that in attitude reports we do not describe our mind directly (by referring to states of mind, ideas, senses, thoughts, and whatnot) but indirectly (by referring to situations that are external).

According to situation semantics, the meanings of expressions reside in systematic relations between different types of situations. They can be identified with relations on discourse situations *d*, (speaker) connections *c*, the utterance situation *u* itself, and the described situation *e*. Some public facts about *u* – such as its speaker and time of utterance – are determined by the discourse situations. The ties of the mental states of the speaker and the hearer with the world constitute *c*.

A discourse situation *d* involves the expression uttered, its speaker, the spatiotemporal location of the utterance, and the addressee. Each of these defines a linguistic role (the role of the speaker, the role of the addressee, etc.). The utterance situation *u* constrains the world in a certain way, depending on how the roles for discourse situations, connections, and described situation are to be filled. For instance, an utterance *I am crying* defines a meaning relation:

d,c[[I am crying]]e

Given a discourse situation *d*, connections *c*, and a described situation *e*, this holds just in case there is a location *L* and a speaker *s* such that *s* is speaking at *L*, and, in *e*, *s* is crying at *L*.

In interpreting the utterance of an expression *f* in context, there is a flow of information, partly from the linguistic form encoded in *f* and partly from contextual factors provided by the utterance situation *u*. These are combined to form a set of constraints on the described situation *e*. This situation is not uniquely determined; there may be several situations that satisfy the constraints. The meaning of an utterance of *f* and hence its interpretation are influenced by other factors such as stress, modality, and intonation. However, the situation in which *f* is uttered and the situation *e* described by this utterance seem to play the most influential roles.

Guide to Literature

Ground-breaking work on STASS is due to the late Jon Barwise, well-known mathematical logician, and John Perry, prominent philosopher of language and mind. Barwise and Perry were the founders of Stanford University's Center for the Study of Language and Information (CSLI), which became almost synonymous with STASS research. In the beginning, the development of situation theory was hampered by a lack of appropriate tools. Later, the theory assembled its foundations based on innovations coming from set theory (Barwise and Etchemendy, 1987; Aczel, 1988). Barwise and Seligman (1997) further advanced the theory by introducing the concept of an information channel, which preserves information as it is transmitted through a system. Their work is in the spirit of Dretske's (1981) landmark work on information flow.

It is impossible to do justice to the profundity of STASS in a brief summary of this kind. The reader is referred to two seminal books, Barwise and Perry (1983) and Devlin (1991), for a thorough understanding. Although somewhat dated, the former is densely packed with excellent semantic common sense. The latter volume proposes a streamlined vocabulary and pays close attention to the foundations; it is the only modern introduction to STASS. (However, it does not render the Barwise and Perry volume obsolete; each book has its own merits.) Seligman and Moss (1997) is a beneficial survey that is mathematically demanding; it also has an excellent bibliography.

Various versions of situation theory have been applied to a number of linguistic issues (mainly) in English. The ideas emerging from research in situation semantics have also been coalesced with well-developed linguistic theories and have led to rigorous formalisms (Fenstad *et al.*, 1987). On the other hand, situation semantics has been compared to another influential approach to the theory of meaning, discourse representation theory (DRT).

Indexicals, demonstratives, referential uses of definite descriptions, deictic uses of pronouns, tense markers, and names all have technical treatments in situation semantics. Gawron and Peters (1990) focused on the semantics of pronominal anaphora and quantification. They argued that the ambiguities of sentences with pronouns can be resolved with an approach that represents anaphoric relations syntactically. They use a relational framework that considers anaphoric relations as relations between utterances in context. Cooper (1991, 1996) offered painstaking studies of linguistic problems to which situation semantics has been applied with some success. Tin and Akman (1994, 1996) showed how situation theory can be given a computational twist. They implemented a prefatory prototype (named BABY-SIT for obvious reasons) to program some practical problems, including anaphora resolution. Devlin and Rosenberg (1996) explored applications of situation

theory to the study of language use in everyday communication to improve human–computer interaction.

There used to be a specialized series of conferences devoted to recent developments in STASS. The first three volumes of proceedings were published as Cooper *et al.* (1990), Barwise *et al.* (1991), and Aczel *et al.* (1993). Nowadays, it is possible to find situation–theoretic papers dispersed in numerous conferences on logic, language, and information.

Finally, Devlin (2004) provides – despite the specific sounding title – a general appraisal of what STASS is all about; it may be consulted to get a better grasp of the historical developments that shaped STASS. Many of the Barwise papers reviewed by Devlin can be found in Barwise (1989), a fertile collection for technically oriented readers.

See also: Anaphora: Philosophical Aspects; Conditionals; Context and Common Ground; Context, Communicative; Demonstratives; Discourse Representation Theory; Expression Meaning versus Utterance/Speaker Meaning; Formal Semantics; Indexicality: Philosophical Aspects; Logic and Language: Philosophical Aspects; Logical Consequence; Meaning: Overview of Philosophical Theories; Metaphysics, Substitution Salva Veritate and the Slingshot Argument; Montague Semantics; Possible Worlds: Philosophical Theories; Pragmatic Determinants of What Is Said; Pragmatics and Semantics; Propositional Attitudes; Quantifiers: Semantics; Relevance Theory; Representation in Language and Mind; Semantics–Pragmatics Boundary; Sense and Reference: Philosophical Aspects; Speech Acts; Thought and Language: Philosophical Aspects.

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Skou Languages

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The languages of the Skou family are spoken along the north coast of New Guinea, from the Skou villages east of Humboldt Bay in Indonesia to Barupu west of Aitape in Papua New Guinea. There are 16 known languages in the family, split fairly evenly between three family-level units and one isolate, I'saka (Krisa). Most of the languages are found along the coast, but the orientation of most groups lies inland. Tone and in most cases either unusual consonants or a high number of vowels feature prominently. Tonal contrasts range from three to six on a monosyllabic word, but in all well-investigated cases the domain of tone is the morpheme, not the syllable. Unusual segments found in the family include the palatal lateral dental affricate of Puare (Puari) and the nonback rounded vowels [ʉ] and [ø] of Skou. Contrastive nasalization on either the syllable or the rime is common. Other phonologically marked features include the lack of contrastive nasal consonants in I'saka and the lack of an /s/ phoneme in Skou or many of the Piore River languages.

Morphosyntactically the languages show a lot of variation from one to another, and only some salient features are mentioned here. The basic order is SOV, with postverbal obliques. Case marking is not used, but verbs typically show prefixal agreement for subject, and object agreement, if present, is suffixal. In the western group there is no suffixal agreement, but we do find alternations in the vowel of the verb root that indicate earlier affixation:

ke-fu
3.SING.NF-see.FEM.OBJ
'he saw her'

(where NF stands for nonfeminine) from earlier ke = fʉ-u. Compare this with Sumo, which has regular suffixation for object:

b-a-chara-u
MOOD-3.SING.MASC-see-3SING.FEM
'he saw her'

Often a language will employ one or more applicatives; typically a goal (beneficiary or direction) or, secondarily, an accompanier has dedicated applicative morphology, whereas instruments are not marked with applicatives but simply appear in the clause.

Many Skou languages show the frequent use of multiple exponence to mark the subject. In Puare we can see double marking for subject on the verb, once by an infix (marked here with angled brackets) and once by a proclitic, as in the sentence:

aro n-s<h>i
firewood 1.DU-chop<1.SING/DU>
'we chopped firewood'

Similarly in Skou we can find verbs with proclitic, prefix, and vowel agreement. The verb /ø/ 'shave' is [təri] when inflected for third-person plural

te-t-lø
3.PL-3.PL-shave<(3).PL>
'they shaved'

Gender is a pervasive feature of the languages. All the languages distinguish at least two genders in the third-person singular pronominal paradigms, and in most cases gender is found elsewhere as well. In Skou, all the dual pronouns, but none of the plural, are differentiated for gender. Barupu (Warupu) and Ramo both distinguish gender in all but the dual pronouns, both free and bound forms. The Serra Hills languages typically mark gender only in the second- and third-person dual pronouns. In Skou itself, a number of nouns obligatorily mark gender. Thus, *ʉme* 'woman' cannot appear on its own and must take the feminine clitic *pe, pe-ʉme* 'woman', and *ãku* 'child' is heard as *pe-ãku* 'girl' or *ke-ãku* 'boy'.

See also: Indonesia: Language Situation; Papua New Guinea: Language Situation; Tone: Phonology.

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Slang Dictionaries, English

J Green, London, UK

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The standard dictionary, the dominant production of lexicography, deals with standard forms of language. There are, however, a wide variety of nonstandard forms – regionalisms, jargon, technical terminology – which, while excluded from the standard lexica, require specific dictionaries. Of these the most common have been those of slang, a widely popular and continually evolving 'counterlanguage,' which has been collected for nearly half a millennium.

English slang lexicography falls into three periods: the 'canting' or criminal slang dictionaries of the 16th to the 18th centuries, the 'vulgar tongue' works of the late 18th to the mid-19th centuries, and the 'modern' productions that have appeared since.

Canting

The collection of 'cant,' properly the jargon of the mendicant criminal beggars of Tudor and Stuart England, echoes the near-contemporary 'beggar-books' of Europe: designed to alert the law-abiding public to the existence of such beggars – 'the canting crew' – listing their occupational types and offering a small glossary of their language. The first such work was Robert Copland's *The hye way to the Spytell House* (c. 1535). In the form of a verse dialogue between the printer Copland and the porter of the Spytell House (a charity hospital), Copland noted and the porter described the various categories of beggars and thieves, as well as their tricks and frauds. There is no glossary as such, but some 36 terms are defined in the text. Two similar and expanded works followed. In 1561 John Awdeley, another printer, published *The fraternitie of vagabondes*. The brief (nine-page) work, offering 48 headwords, falls into three parts: the first deals with rural villains, the second with their urban cousins, and the third is Awdeley's list of "the xxv. Orders of Knaues, otherwyse called a Quartern of Knaues."

The most influential 16th-century work appeared around 1566: Thomas Harman's *Caveat for common coursetours*. Harman, a magistrate, produced a consciously didactic work, designed to introduce the reader to "the leud lousey language of these lewtering [loitering] luskes [idlers] and lasy lorrels [blackguards] where with they bye and sell the common people as they pas through the country. Whych language they terme Peddelars Frenche ..." There are 24 small essays, each dealing with a different rank of villain, plus a list of some 114 terms. These are very briefly defined, usually with a single synonym. The *Caveat* concludes with a list of contemporary beggars and a cant dialogue.

Harman's vocabulary would remain the core of several subsequent glossaries, with a succession of 'rogue pamphlets' appearing over the two centuries. Among these are *The bellman of London* and *Lanthorne and candlelight* (1608) by the playwright Thomas Dekker, and *Martin Mark-All, beadle of Bridewell* by Samuel Rowlands (or Rid), in 1610. Others include Richard Head's *The canting academy*, or *The Devil's cabinet opened* (1673) and John Shirley's *Triumph of wit* (1688).

While Harman can be seen as a sociological researcher, and Dekker *et al.* as informative reformers, the 'coney-catching' pamphlets of playwright Robert Greene are nakedly sensational. The first such pamphlet, *A notable discouery of coosnage* [cozenage, or trickery]*: now daily practised by sundry lewd persons called Connie-Catchers* [confidence tricksters] *and Cross-biters* [swindlers] ... appeared in 1591. Five sequels followed by 1592. Greene gleefully peddled his downmarket sensationalism, larded with new canting terms – the vocabularies of the various branches of confidence trickery – and supposedly firsthand anecdote, but carefully quarantined with pious horror. In one pamphlet, *The defence of connycatching* 'by Cuthbert Conny-catcher,' he even attacked himself.

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is the first ever stand-alone 'slang dictionary,' rather than an appended glossary. The title emphasizes canting but B.E.'s vocabulary, some 4000 words, adds general slang, colloquialisms, and a variety of noncriminal jargons to the core material. There are other innovations: for some entries, however few, he offered citations and etymologies, there are a number of crossreferences, and he adopted usage labels.

Like Harman, B.E. would be 'honored' by his plagiarists. These included Captain Alexander Smith, whose *Thieves' new canting dictionary*, in his history of highwaymen (1719), is unashamedly derivative. Similarly the *New canting dictionary* (1725) is no more than an adaptation. The glossary attached to the oft-reprinted *Life* of the self-styled gypsy king Bamfylde Moore Carew (1750 *et seq.*) is similarly sourced. And it is B.E. whose word list provided the basis of the 'Collection of canting words' included in Bailey's *Universal etymological English dictionary* (1737).

The Vulgar Tongue

The 18th century did not merely produce adaptations of B.E. Among other works, all offering glossaries, are *Hell upon Earth* (1703), *The memoirs of the right villainous John Hall* (1708), *The amorous gallant's tongue*, by 'G.L.' (1710 *et seq.*), *The regulator* (1718) by Claude Hitchens, Daniel Defoe's *Street robberies considered* (1728), James Dalton's *Genuine narrative of street robberies considered* (1728), the confessional *Discoveries of John Poulter* (1753), and George Parker's *View of society in high and low life* (1781) and *Life's painter of variegated characters* (1789).

In 1785 arrived the next way station in slang collection: *A classical dictionary of the vulgar tongue*, by the antiquary and former militia officer Captain Francis Grose. A second, substantially augmented edition appeared in 1788, followed by a third in 1796, the pirated *Lexicon Balatronicum* (effectively the fourth) in 1811, and the fifth, edited by the boxing journalist Pierce Egan, in 1823. In his 4000 headwords Grose incorporated his main predecessors, but expanded much further into general slang, his 'vulgar tongue.' Grose now set the pattern for the next century. One other dictionary appeared in 1823, that 'of the turf, the ring, the chase, the pit, of bon ton and the varieties of life' Its author was 'Jon Bee' (properly John Badcock), who had already challenged Egan's bestselling chronicle of *Life in London* (1821) with his own hugely derivative *Real life in London* (1821). Badcock's book is far more verbose than Egan's, but lexicographically it is more curiosity than a linguistic tool.

Four more noteworthy dictionaries appeared before 1900. The first, in 1857, was the brief *Vulgar tongue* by 'Ducange Anglicanus.' It comprises a pair of glossaries, the first collected by the author, the second from a report presented to the Government in 1839. In addition there is 'The leary man,' a flash song, and a tailor's handbill written in slang, with a translation into standard English on the reverse. It is the first to offer rhyming slang. In 1859 appeared the first of the six editions (variously expanded) of John Camden Hotten's *Modern slang, cant and vulgar words*, latterly *The slang dictionary*. Hotten was variously a bookseller/publisher, a pirate of such American 'stars' as Mark Twain, and a cultivator of his 'flower garden,' books of flagellant pornography. The dictionary has lists of rhyming slang and of back slang, both prefaced by a brief history and discussion. There is, for the first time, a 'bibliography of slang and cant,' listing some 120 titles, plus his own critical comments on each. Hotten stressed that this is above all a dictionary of "**modern** Slang – a list of colloquial words and phrases in **present** use – whether of ancient or modern formation." He omitted obsolete terms and opted, unlike Grose, to exclude 'filthy and obscene words' although he acknowledged their prevalence in street talk. He touched on jargon, without describing it as such, and thus dealt with the terminology of the *beau monde*, politics, the army and navy, the church, the law, literature, and the theater. He had a list of slang terms for money, one of oaths, and one for drunkenness and dealt with the language of shopkeepers and workmen.

Hotten was **the** slang dictionary until 1890. His pre-eminence was somewhat breached in 1889 by *The dictionary of slang, jargon and cant* by Albert Barrère and C. G. Leland. But this two-volume work had barely been published when it was displaced, by the seven volumes of John Farmer and W. E. Henley's *Slang and its analogues* (1890–1904). Farmer, who combined slang researches with writings on spiritualism, and Henley, then one of Britain's leading poets, took slang lexicography into a new dimension (subsequently renamed the *Oxford English dictionary*; see **English Lexicography**). The book adopted the same 'historical' method as the contemporaneous *New English dictionary*. All but a few headwords come with a number of citations, some 100 000 in all, set out as in a standard English dictionary, to illustrate usage and nuance. These quotes take in "the whole period of English literature from the earliest down to the present time" and are arranged as far as possible from 'first use' to current use. As well as citations there are wherever possible foreign synonyms for the slang. English synonymy is also paramount: those listed at *monosyllable* (i.e., *cunt*), for instance, run to 13 columns, while those at *greens* (sexual intercourse) run to seven. There are errors, typically in the citations,

where dates and even the quotes themselves may have fallen foul of the sheer size of the undertaking, but the overall achievement of Farmer and Henley far outweighs such slips.

Modernity

To list the collections of 20th- and 21st-century slang is impossible. The range, from massively researched multivolume 'historical' dictionaries, to fly-by-night glossaries posted on the Internet, defies cataloging. Nor is it possible to restrict 'English' slang to England. While the last slang lexicographer to dominate his field, Eric Partridge, could entitle his book, based originally on Farmer and Henley, whose rights were owned by his publisher, as the *Dictionary of slang and unconventional English* (*DSUE*) (1937–1984) and focus almost exclusively on the language of England, such exclusivity would now be foolhardy. In dictionaries as in the vocabulary, American slang has taken over, and must take equal prominence. Similarly Australian slang, pioneered by the mid-20th century work of Sidney J. Baker, has an important presence. The mass media, the Internet, and the role of English, or rather **Englishes**, as a world language mean that its slang is equally multiheaded and its dictionaries reflect that fact.

Partridge, as mentioned, dominated much of the 20th century. His is perhaps a flawed canon: his lexicographical method was less than wholly scrupulous, his inability to keep personal comment out of his definitions less than useful, his etymologizing sometimes tendentious, but his body of work can be said to have maintained the momentum of slang lexicography through the mid-20th century. He has that rare accolade: like Webster, his name became an eponym. The last edition of the *DSUE* appeared in 1984; an Americanized edition, from 1945 onwards, will appear in 2005 edited by Tom Dalzell. Partridge's immediate successor, Jonathon Green, published his single-volume *Cassell Dictionary of Slang* in 1998; a multivolume 'historical' expansion is due in 2007.

America

Slang is an urban phenomenon. Modern America seems quintessentially urban; 19th-century America was not. Thus the century saw only one major slang dictionary: the *Vocabulum* by the New York chief of police, G. W. Matsell (1859). Its only predecessor is a short glossary appended by Edward Judson to his *Mysteries and miseries of New York* (1848). Much of his vocabulary seems to have been taken wholesale from Egan's revision of Grose, although there are a number of genuine localisms. Nonetheless, there were no contenders: Matsell remains an American pioneer.

The 20th century hosted an explosion of US slang lexica. Many of these, such as Jackson and Hellyer's *Vocabulary of criminal slang* (1914), Godfrey Irwin's *American tramp and underworld slang* (1931), Hyman E Goldin's *Dictionary of American underworld lingo* (1950), or the wide-ranging specialist work of David Maurer, published in *American Speech* and elsewhere, point up the wide variety of US criminal slang. More general works include Maurice H. Weseen's *Dictionary of American slang* (1934), Lester V. Berrey and Melvin Van der Bark's *American thesaurus of slang* (1942, 1952), Harold Wentworth and Stuart Berg Flexner's *Dictionary of American slang* (1960, 1975), and, pre-eminently, Jonathan Lighter's multivolume work in progress, *The historical dictionary of American slang* (1994–). Specialist works abound, especially as regards such sources of slang as the campus, African-American speech, drugs and war. Among these are Connie Eble's series of *Campus slang* glossaries (1972–) and the works of Edith A Folb (*Runnin' down some lines*, 1980), Geneva Smitherman (*Black talk*, 1994), Richard A. Spears (*The slang and jargon of drugs and drink*, 1986), and Gregory C. Clark (*Words of the Vietnam War*, 1990).

Today's anglophone slang is international rather than parochially English. And its sources, including dictionaries, are increasingly so as the Internet gains influence and online reference searches replace the traditional printed works. The upcoming crop of multivolume lexica may signify the end of a half-millennium era. 'Slang dictionary' obtains 75 000 hits on Google: slang collection, one might suggest, has barely begun.

See also: American Lexicography; Australian Lexicography; English Lexicography; Jargon; Lexicography: Overview; Partridge, Eric Honeywood (1894–1979); Slang, Argot and Ingroup Codes; Taboo.

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See also: Communities of Practice; Identity and Language; Sociolinguistic Crossing; Subcultures and Countercultures.

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Slang, Argot and Ingroup Codes

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Slang, argot, and ingroup codes are sets of words and expressions that are motivated by the social and interpersonal functions of language. Their purpose is to bring about a social bond among their users through awareness of shared knowledge. Such vocabulary is usually an alternative to words and expressions in the standard variety of the language. For example, many topics that American college students talk about are time-honored on college campuses and can be referred to with general vocabulary. For social reasons, though, at the beginning of the 21st century American students used *bia* for 'a thoroughly unpleasant female,' *pimp* for 'a popular male,' and *money* for 'very good,' as in "Last night's concert was money."

By comparison with the general vocabulary, such socially salient words and expressions are often short-lived and fall into disuse quickly by being displaced by

new synonyms. In 2004, American teenagers showed themselves attuned to hip-hop culture by using the slang word *bangin'* to describe anything overwhelmingly positive, as in "Last night's concert was *bangin.*" Their parents in the 1970s would have said *awesome*, and their grandparents a generation earlier would have said *swell* to show that they were part of the group in-the-know in their youth. A comparison between the slang used by college students at the same American university at two points 30 years apart showed that 95% of the items submitted as good, current campus slang in 1974 were not submitted in 2004. Although the actual words were almost entirely different at the two points, the topics were highly congruent. The same meanings – positive and negative evaluations, alcohol and drugs and their use, dress and grooming, and so forth – accounted for about three-fourths of the items in each year (Eble, 2005: 3).

Slang, argot, and ingroup code are not technical terms with precise definitions. Slang, the most general and widely used of the three, refers to an ever-changing set of words and phrases that speakers use in casual conversation but usually avoid when writing or when interacting with strangers or on important occasions. The purpose of slang is to establish or reinforce social identity or cohesiveness, either within a group or with a trend or fashion in society at large. Robert Chapman distinguishes two types of slang based on its group delimiting function. Primary slang is "the pristine speech of subculture members" (Chapman, 1986: xii). Secondary slang is "a matter of stylistic choice rather than true identification" (Chapman, 1986: xii). Almost everyone who interacts informally with others uses secondary slang, be it as ordinary and enduring as current American *bomb* 'fail miserably,' *hit the hay* 'go to bed,' and *poop out* 'quit'; or as flashy as *bling bling* 'jewelry,' borrowed from hip-hop culture; or as cosmopolitan as *metrosexual* 'a fashion-conscious heterosexual male,' in vogue in 2003.

Social groups are fertile breeding grounds for primary slang – a self-conscious, irreverent, and often clever vocabulary to enhance solidarity among members and to set them apart from those outside the group. Often the slang vocabulary that such groups create refers to the activity or behavior that is the basis for their association. Surfers, for instance, have developed many ways to refer to ocean waves and to their equipment. They call 'the hollow part of a wave' a *tube* or a *barrel* and 'a surfboard for big waves' a *big gun*. Skateboarders call the small injuries of their sport *bongos* or *road rash*. Military aviators use *bingo* for 'the minimum amount of fuel for a safe return to base,' *music* for 'electronic jamming to deceive radar,' and *nylon letdown* for 'ejection followed by a parachute ride.' The primary slang of groups sometimes diffuses into the informal registers of the general population, for example *foul up* 'fail through confusion or ineptitude' and *zap* 'kill, put an end to' from military slang. During the last decades of the 20th century, the slang of African Americans gained widespread recognition and adoption in common parlance, contributing *bad* 'good,' *chill out* 'relax,' *homeboy/homegirl* 'friend,' and many more.

Secondary slang signals identification with a style or attitude rather than with a specific, easily delineated group. English *coffin nail* 'cigarette,' *freebie* 'article or service given for free,' *sack* 'discharge from employment,' and *loaded* 'drunk' are all labeled *slang* in one current American desk dictionary. Yet none of these terms marks a speaker as belonging to a group. The use of slang items like these conveys an attitude of nonchalance, flippancy, or irreverence. For a smoker to call a 'cigarette' a *coffin nail*, for example, suggests defiance of the known relationship between smoking tobacco and fatal disease. Describing an intoxicated person as *loaded, polluted*, *torn out of the frame, wasted*, and the like pictures the intemperate drinker as a victim rather than an agent of behavior potentially harmful to the individual or to society.

Argot is the distinctive vocabulary developed by a group. Argot differs from primary slang only because historically the terms *argot* and *cant* usually applied to groups that operate on the periphery of respectable society, such as con artists, thieves, or, more recently, drug dealers. Their argot is often held in secret and deliberately separates them and their activities from outsiders. At the extreme, the argot of a group that is completely alienated from society, such as prison inmates, can develop into an *antilanguage* (Halliday, 1976). Personal websites on the internet show that many players of alternative reality games understand the function of antilanguage in opposing the established order and create vocabulary for their imagined antisociety. Players of the role-playing game 'Shadowrun' (a registered trademark of Fantasy Productions) form a worldwide community via the internet. One site maintains a 'Shadowslang Glossary.' *The Shadows* is a 'quasi-criminal world,' and a *shadowrun* is 'any movement, action, or series of such made in carrying out plans which are illegal or quasi-legal.' An example of *Shadowslang* is *sidewalk outline* for 'a recently deceased person,' an allusion to the chalk outline of a body at a murder scene. 'Shadowrun' vocabulary is evolving and open-ended, and players submit new vocabulary to the list.

Ingroup code usually refers to deliberate and collaborative lexical inventions or systematic alterations of the standard language, sometimes involving only two or three people. For English, the widely known pig latin is an ingroup code, though the ingroup

includes virtually every school child. More typically, ingroup codes are shared by twins, siblings, or an intimate set of friends and seldom exert influence beyond the small circle of users. Like pig latin, ingroup codes may involve deviating systematically from the standard patterns of word and sentence structure.

By form, slang, argot, and ingroup code are not distinguishable from the general vocabulary of a language. Ordinary word-building processes apply. In English, slang arises from compounding (*freeload* 'take advantage of the generosity of others'); affixation (*megabucks* 'lots of money'; *spacey* 'unaware'); shortening (*abs* 'abdominal muscles'); blending (*vomatose* 'disgusting,' from *vomit* + *comatose)*; acronymy (*snafu* 'malfunction,' from *situation normal all fucked up*; *o.d.*, from *over dose*); and shifts in grammatical function (*creep* 'unpleasant person,' from verb to noun). The semantic processes favored are those that rely on shared knowledge: metaphor (*porcelain god* 'toilet'), metonymy (*ice* 'diamonds'), and allusion (*oreo* 'black person with white values,' from *Oreo*, trademark for a chocolate cookie with a cream filling).

The range of meaning evoked by slang, argot, and ingroup codes is narrow, tending to refer to types of people, personal relationships, and judgments of acceptance or rejection. Because these types of vocabulary arise in opposition to a general norm, their tone tends to be negative, and they elaborate on the taboos of the dominant culture. As a result, these kinds of words and expressions are often tasteless or offensive – expressing images of sex, violence, and bigotry. For instance, synonyms for sexual organs include *heat seeking missile* for 'penis,' *snapping turtle* for 'vagina,' and *knockers* for 'woman's breasts.' The hundreds of synonyms for 'sexual intercourse' include *bounce refrigerators, bumping uglies, laying pipe, knocking boots*, and *slamming;* and a 'sexual partner' is a *slampiece*. 'Caucasians' are *honkies*, 'Arabs' are *camel jockies*, and 'Asians' are *gooks*. 'Incompetent or unlikable people' are *assholes, dickheads*, and *pricks*.

Technological advances in communication have added new dimensions to vocabulary whose purpose is social rather than ideational. From the earliest observations centuries ago, slang and argot were characterized as primarily oral and linked to subcultures within a society. Slang is now transmitted in writing and across linguistic and cultural boundaries by websites, electronic chat rooms, and email. A kind of e-mail slang marks users in-the-know. Predictable emotions and reactions are often represented by an evolving set of shortenings and acronyms, for instance LOL 'laughing out loud' or OMG 'o, my God.' Iconic representations of emotions made at first with key strokes are now a standard feature of word processing graphics, for example ☺ 'smiley face.' Such emoticons are so widespread that they carry no nuance of irreverence or of in-group knowledge and are now more equivalent to informal oral usage than to slang.

The groups that create and maintain slang are now more amorphous and open, and many form deliberately around a common interest rather than on the basis of physical and social proximity. One such group is united by cult-like devotion to the television series *Buffy the Vampire Slayer*, which ran for seven seasons, 1997–2003. Its distinctive vocabulary was invented by the writers of the drama and promulgated and elaborated on by *Buffy* fans. Buffyisms are posted on websites, exchanged in e-mail messages, and printed in magazines and books. Linguist Michael Adams offers an insightful analysis of the recently possible linguistic phenomenon in *Slayer Slang* (Adams, 2003). An even less coherent group is constituted by the followers of hip-hop culture and rap music. The fashion value of the style invented by African American youth in urban ghettos has given international cachet to hip-hop slang such as *dawg, floss, holla back, pimp*, *playa, props*, and *word*. Thanks to new means of communication, youth around the world who have never met or spoken to an African American jockey for social status among their peers by using the slang popularized by hip-hop.

Another new dimension to slang and similar kinds of vocabulary is instantaneous diffusion. Live television carries news events and entertainment to distant locations 24 hours a day. Socially salient vocabulary that is created for a film or a television series, a comedy routine, or the lyrics of a song need not spread from one speaker to another by personal communication. An appealing turn-of-phrase can be uttered in a film or on a television program in California one night and be spoken the next day in Munich or Beijing.

There is no evidence that written, widespread, and instant diffusion of slang has diminished the long recognized effects of its use.

See also: Identity and Language; Partridge, Eric Honeywood (1894–1979); Slang: Sociology; Subcultures and Countercultures; Teenagers, Variation, and Young People's Culture.

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Relevant Website

http://www.intercom.net/user/logan1/glossary.htm – 'Shadowslang glossary' from the role-playing game 'Shadowrun.'

Slavic Languages

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The Slavic language group contains three subfamilies: (1) East Slavic, consisting of Russian, Belarusian (Belarusan), and Ukrainian; (2) West Slavic, consisting of Polish, Czech, Slovak, and Sorbian (the latter spoken in Germany and also known as Lusatian); and (3) South Slavic, consisting of Bulgarian, Macedonian, Slovene (Slovenian), and Bosnian/Croatian/Serbian (BCS; formerly known as Serbo-Croatian). The Slavs are believed to have expanded from an area corresponding to southwestern Belarus/northwestern Ukraine beginning in the 6th century C.E., an event that contributed to the linguistic differentiation of Late Common Slavic (LCS) into the modern Slavic languages. In the late 9th century a Byzantine mission to the present-day eastern Czech Republic yielded translations of liturgical texts into Old Church Slav(on)ic, a written language presumed to be very close to LCS. These documents have made it possible for us to reconstruct the history of the Slavic languages quite reliably. Orthography follows religion in dividing the Slavic languages into an Eastern/Orthodox Christian group that uses the Cyrillic alphabet (Russian, Belarusian, Ukrainian, Bulgarian, Macedonian, and part of BCS), and a Western/Catholic and Protestant group that uses the Latin alphabet with the addition of diacritics (Polish, Czech, Slovak, Sorbian, Slovene, and part of BCS).

Phonological History

Within the Indo-European language family, the closest relatives to the Slavic languages are the Baltic languages (Latvian and Lithuanian). Both Slavic and Baltic are 'satem' languages, a name based on the Avestan word for 'hundred,' which identifies the reflex of Proto-Indo-European (PIE) *k'* → *s* (and *g'* → *z*), as in the Late Common Slavic (LCS) *sъto* 'hundred'. Peculiar to Slavic (though with some analogues in Baltic and Indo-Iranian languages) is the 'ruki' rule sound change, which caused *s* (*š*) → *x* in positions following *r*, *u*, *k*/*g*, and *i*, as in Proto-Indo-European (PIE) *ousos* → LCS *uxo* 'ear'. 'Ruki' and 'satem' are ancient changes in the development of PIE into Early Proto-Slavic (EPSl). The subsequent era linking EPSl and LCS is marked by sound changes that affected all of Slavic, though their ultimate outcomes are not entirely uniform. Many EPSl-to-LCS sound changes reflect a phonotactic strategy aimed at creating 'ideal' syllables of rising sonority and level tonality, i.e., syllables with CV structure where both the C and V elements had the same (high or low) tonality (also known as 'syllabic synharmony'). The conflict between the most normal structure for a root morpheme, which was CVC, and the ideal syllable structure of CV resulted in the great number of morphophonemic alternations so characteristic of Slavic. The last element in a CVC sequence was in a precarious position: either it was assigned to the syllable containing the preceding CV, in which case sonority constraints made it subject to absorption or loss, or it

Slang, Sociology

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Introduction

It is with frustration and a nice sense of humor that William Labov advises that all articles on slang should be consigned to "an outer, extra-linguistic darkness" (Labov, 1972: 97), but linguists do not have that privilege. In defining slang, one needs to remember four vital aspects: firstly, slang is typical of the spoken, colloquial, informal aspects of human interaction, and its presence will markedly lower the dignity of formal or serious speech or writing since it is not generally accepted in standard educated speech. Secondly, typically such words are restricted in their social status and distribution, and they are more metaphorical and transitory than standard language, rapidly going in and out of fashion within the particular subculture that knows and uses them. For example, the word *groovy*, so popular in the 1960s, has long since lost its appeal and has been replaced by other, more trendy equivalents of *nice*, such as *blind*, *epic*, and *legend*. A third feature of slang is the fact that it is generally vague in meaning, and slang words are notoriously difficult to define. This is partly because slang is primarily verbal, and seldom finds its way into print, which means that the spellings for slang words tend to be idiosyncratic and problematic. A further reason why most slang terms are etymologically obscure is the fact that they are coined off-the-cuff, in oral discourse: speakers hear them and subsequently use them without being sure of their meanings, which resultantly distort, shift, and adjust over time. Also, many slang words refer to taboo aspects of life, where secrecy is important.

Not only is slang restricted in terms of its 'shelf-life,' so to speak, but it is also typically localized, both geographically and socially, and will only be recognized in certain areas or institutions, where people are in regular and close contact with each other, such as schools, prisons, army camps, and the like. Thus, anyone seeking to make generalizations about slang faces the inevitable problem that such linguistic usage is inherently colored by the social, cultural, geographical, and temporal context of users. There is no single set of English slang words, obviously, because of its localized and topical nature, and the fact that it flourishes in small and intimate subcultures. While broad trends and truisms are evident across languages, this entry draws examples from South African English teenagers elicited between 1990 and 2003.

The Social Functions of Slang

Membership of the Group

The main use of slang is to show that one belongs to a particular subculture and that one is on the same wave-length as they are. For this reason, slang thrives where group membership and solidarity are important. These words act as badges of membership, and are used in much the same way as fashions in clothing and hairstyles are used. By using the slang of the group with whom one associates oneself (or wishes to associate oneself), one is sporting a symbol of a sort.

Slang is typical of any tight-knit linguistic community where a relaxed atmosphere among peers or people of equal status provides a space where language is liberated from the conventions and pretensions of politeness and formality that govern the ideal standards for language use in society. Thus, slang may be found among factory workers, sailors, and miners, for example, and the more isolated a particular social group is from mass social intercommunication, the higher the likelihood that group has for using language that deviates from formal standard language use. For this reason, slang is often found among younger generations of people, especially adolescents. This is because adolescence is a time of life when belonging is of particular importance, and when age cohorts find themselves constantly in each others' company for educational, sporting, and entertainment purposes. For adolescents, slang forms part of a shared linguistic code, reinforcing group membership, indicative of shared knowledge and interests and the all-important sense of belonging (Hudson, 1983; Munro, 1989). As Crystal puts it, "the chief use of slang is to show that you're one of the gang" (Crystal, 1987: 53).

To further complicate matters, using slang does not necessarily imply that one knows the meaning of these words. Because slang is used on informal occasions among peers with a high degree of shared knowledge and common interests, it forms part of a contextualized restricted code, full of highly implicit connotations. New 'wannabe' members of a particular group or subculture would typically pick up the slang by careful observation. Asking about the meaning of such words would be like admitting failure as a prospective member of the group. In any event it is unlikely that anyone would be able to explain their slang terms' real and complete meaning

to an outsider, since the main reason for their very existence lies in their connotations (Sornig, 1981: 1). For this reason, many slang users have only a very vague idea of what their slang words mean. The very essence of such words rests in their vagueness and adaptability. As Hall (2002) points out, *cool* can be used to describe a teacher (popular), a shirt (fashionable), a test (easy) or a potential problem (inconsequential). It generally connotes the fashionable or the approved, and includes an easy-going, laid-back attitude. Similarly, the exact meanings of verbs like *suck* (with negative connotations), *rock* (with positive connotations!), and adjectives such as *hectic* (used to describe anything from a difficult lecture, or a terrible car crash to an enjoyable meal), are all equally elusive.

Creativity, Fun, and Fashion

One of the more positive functions of slang is its witty and humorous effect, often with a touch of creativity, driven by the constant desire to be innovative and create a rhetorical effect, such as incongruity, irreverence, or exaggeration. In this role, slang is used to oil the cogs of socialization, to reduce seriousness, poke fun and to be witty and clever, and many of these words are flippant, irreverent and lightheartedly indecorous. Slang constantly reveals considerable delight in the language as an expressive, almost poetic, medium, evidenced by the amount of rhyme, alliteration, metaphor, onomatopoeia, and other linguistic devices it draws on, for example, *blow some zeds* (sleep), *act like jeans and fade* (go away), *ruggerbugger* (macho young man).

The evanescence of slang gives it a trendy or fashionable feel that makes those who use it feel 'cool.' In the words of Hall (2002), who discusses the expressions *crashing* (staying over), and *hanging* (staying at home; doing nothing), "It'd be risky to dwell on the words ... they may have undergone some permutations since I heard them a few hours ago." This up-do-date-ness of slang means that is it often very localized and topical, and may have a regionalized flavor that distinguishes it from other forms of slang. It certainly has an appeal for the young, who aim to be fashionable and trendy in the way they use language just as much as the way they dress. Part of the reason for the short shelf-life of slang is that most words die a natural death, either through excessive use that dulls the lustre of even the most colorful words or descriptions, or through too limited circulation. Overuse is often the fault of the media, who raise to public awareness words that might otherwise have remained the property of the subculture that coined them. Underuse is attributable to the need to restrict slang to subcultures, causing them to drop out of use when group members leave, grow up, etc. Such words are then forgotten, except in the minds of a few, who, when they use them, reveal their age; nothing dates one more than old slang, with *groovy* from the 1960s and *oh you kid*, a very stylish thing to say in 1910. Nevertheless there are certain slang words that persistently bubble below the level of public awareness for centuries, as is the case with criminal cant and all our swearwords. Thus, despite the view that slang is ever-changing, many words are aged in the extreme: Bailey (1985: 40) mentions the following as examples (cited in Gorse, 1796): *blab, chum, cut* (drunk) *ding* (knock down) *mellow* (drunkish) punk. *Lift* (for shoplift) dates from 1526, *pig* (policeman) from 1700, *jug* (prison) from 1800, *bones* (for dice) comes from Chaucer, *booze* and *duds* (clothes) from Dekker and *beat it* (run away) from Shakespeare. Such slang, although it never dies, also has not made it as standard.

In a few cases, slang words join the ranks of standard language: the words *slang, spunk, jazz*, *bus, piano*, and *funky* are a few that have ultimately found their way into respectability. In this way the slang of yesterday becomes the literary language of the next generation. More recently, Hall (2002) reports that even educated, well-read people tell her that slang words are "not slang at all. They are the way we speak now." Often new slang, which appears fresh and original, may in fact involve the recycling of old terms which are new to a new generation of users, generally through exposure to old movies. Another explanation for the aura of creativity surrounding slang is its rarity in formal contexts. A counterview, expressed by several critics of slang, is that force of habit and peer pressure to conform actually restricts the linguistic choices available to the average teenager. For them, slang becomes a drab and boring uniform and only a few skilled speakers have a genuinely wide repertoire in this register.

Excluding Nonmembers and Labeling the "Other"

Slang is frequently derived from a context (such as a prison) in which there is a need to have a private language, often with the intention of being ambiguous and misunderstood in order to exclude outsiders from that particular group. Here, slang is not generated for lack of a lexicon, but from the need to create an identity specific to a particular social group. Often this slang can signal rebelliousness and disrespect for authority, and it flourishes in groups that conflict in some way with the dominant culture (such as prison inmates), by emphasizing the values, attitudes, and interests of the subculture, and thereby marking

social and linguistic identity. In schools, therefore, there are many slang words for those in authority over adolescents, such as prefects and teachers. Ironically, for this reason there are also many slang terms for adolescents who do not fit in with the subculture, such as *geek* or *nerd, lurker, rash* and *bog-fly.*

A less appealing aspect of slang is its pejorative and abusive side. It is frequently used to break norms, to shock and to show disrespect for authority. Typically flippant, irreverent, and lightheartedly indecorous, there are no holds barred, particularly in areas of social taboo. Mocking and unsentimental, slang can be devastatingly cruel and harshly critical of deformity or inadequacy of any kind. Its words aptly summarize group attitudes to outsiders and towards the unfortunate fat, ugly, or mentally disadvantaged people of this world, and are used to label the outsider as 'other.' This accounts for much of the negativity which surrounds its use more generally. In his questionnaire-based research, surveying 377 high-school adolescents, Thurlow (2001) received 100% percent responses to one question: "what words do people at school use for slagging someone off?" (Thurlow, 2001: 27) (*slagging* means to criticize harshly or speak disparagingly). Naturally, such derogatory and pejorative names that are ascribed to certain groups can be extremely hurtful to the recipients, marking them as deviating from some sort of externally imposed norm, and criticizing and excluding those who are socially ostracized for one reason or another. Such language usage is undoubtedly a contributing factor in "the reproduction of social inequalities and power relations" (Thurlow, 2001: 35), and can be harsh, abusive, critical, exclusionary, and coercive. Abusive naming practices reveal the social attitudes of the community of users, distinguishing the outgroup from insiders, and implicitly or explicitly declaring who one is and who one is not. It is this combination of exclusion and bonding that makes slang and swearwords especially attractive to teenagers.

The Sources of Slang

From a linguistic perspective, slang and expletives are typically the lexically full or content words of language: the nouns, verbs, and adjectives and adverbs; the grammatical skeleton (e.g., determiners) are seldom tampered with. But what is more interesting is the syntactic versatility (or vagueness) of slang and expletives, the words frequently acting on demand as adjectives, verbs or nouns: for example, the South African slang word *arb* (possibly derived from *arbitrary*, although the original meaning has shifted) has several different meanings (unexciting, ordinary, not worthy of much comment, boring) and can act as a noun (*I saw this arb walking towards me*) or an adjective (*this arb person suddenly came up*), a verb (*we were just arbing around*), or an expletive (*arb man!*).

While it is conceivable that slang terms could be coined to refer to trees, doors or teaspoons, it is interesting to note that such unexciting areas of life do **not** contain many slang terms. These semantic areas are typically immune from the influence of slang because they refer to commonplace, unexciting areas of life that have no emotive connotations whatsoever. Slang augments the lexicon in those areas in which existing words aren't enough to accommodate the needs of speakers (Bailey, 1985: 12), particularly areas of life that hold a fascination for the subculture that creates and uses these words. If this happens to be a group of motor-bike enthusiasts, one expects many words for motor-bikes, and in teenage groups, these words revolve around typical teenage interests, especially taboo areas.

Thus, one finds an abundance of slang terms in semantic areas relating to (often illicit) enjoyment, fun and pleasure: eating and drinking (often to excess), sleeping, money, cigarettes and drugs, and sexual activity (in the broadest senses). All of these are interesting, enjoyable, exciting and often forbidden to the young. There are also usually slang terms for words that are high-frequency words, such as *nice* and *unpleasant*. Another semantic area in which slang flourishes is the area of social taboo, relating to the embarrassing or sensitive aspects of life: genitalia, scatalogical terms, mental and physical deficiencies, racist terms, conflict, and death.

People who coin slang words draw from a variety of linguistic resources, all reflective of the lighthearted and creative underpinnings of these words. Common sources include alliterations (e.g., *boing-boing* = fat person; *numbnuts* = unlikeable male), metaphor (*swamp donkey / cow / gravel* = unattractive female), acronyms (e.g., *NBS* = nearest bottle store), and antonymy (*beaut* = unattractive woman; *bitching / blind* = nice). Borrowing and adapting from other languages is also a rich source of ideas, and in the Eastern Cape Province of South Africa slang words in Xhosa abound (e.g., *fotloza* = ugly girl), often reflecting a blend of the phonetic properties of each language. For example, the word *costile* (a costly mistake or failure) (pronounced /khosti:lɛ/), is actually derived from the English word *cost* and has the past tense verbal suffix from Xhosa *(-ile)* added, to indigenize the word so that it fits in with the sound and rhythmic structure of the "other" language, thus disguising itself as a non-English word. In the same way *wacooka* is based on the English word *cook*,

with a Xhosa prefix. Similarly, *nqooze,* pronounced to rhyme with *booze*, is a Xhosa-ization of this English slang word itself, and *mnca* (nice) and *nqube* (a party) are pronounced with an alveolar and palatal click, respectively. Borrowings from Afrikaans are just as frequent (*gaar* = drunk; *jol* = party; *klap 'n dos* = have a snooze; *blom* = enjoy oneself).

Euphemism is also evident in the lexicon of slang, reflecting a light-hearted flippancy about serious, disgusting or embarrassing topics such as death (*snuff it, kick the bucket*), pimples (*cheese burgers; warheads*), vomiting (*spray paint; throw chungies*) or being drunk (*running a temperature*). Hyperbole is also frequently evident in such words or phrases, many of which act as idiomatic expressions, not analyzable into component parts (e.g., *drop Garth from the team* = vomit; *pick up stompies* = butt into a conversation). Another common linguistic device is the use of metonymy, with a part referring to the whole (e.g., *fluff / meat* = attractive female). Often pure invention comes to the fore, and neologisms, including phonetic distortions (with accompanying spelling problems) are found in great numbers (e.g., *knarley / fantabulous* = nice, *babinski / schweet*, = attractive girl). Onomatopoeia is also frequently evident (e.g., *ralph* = vomit), as is the experimentation across languages evident in the playful use of the Xhosa click in English words: *overated* has become *nqovarated*, and *overboard* has become *nqovaboard*, each with an African accent and a resounding click at the start. The same sheer enjoyment of sounds is evident in phrases that combine synonymy with rhyme (e.g., *cruising for a bruising* = looking for trouble; *going like a Boeing* = moving fast). Reduplication of sounds is common as well (*goodie-goodie* = prefect; *mshi mshi* = clothes), as is the abbreviation or shortening . . . evident in some words (*woosie* = effeminate person; *civvies* = clothes).

Another ploy is to take a standard English word and shift its denotation (e.g., *channel* = vomit; *tanked / toasted* = drunk). This naturally adds to the delicious confusion wrought by the use of slang, in which the secret code is only shared by those in the know, as it were.

Attitudes toward Slang

Slang has, until recently, been neglected by serious linguists, and either romanticized by its supporters as witty, creative, and vivid, unrestricted by the chains of a standard, or viciously criticized and condemned by prescriptivists as dangerously vulgar nonstandard speech. Although many people approve of slang, and lightheartedly refer to it as "language on a picnic," "the poetry of everyday life" (Hayakawa, 1941: 195), and "a language that rolls up its sleeves, spits on its hands, and goes to work" (Sandburg in Anderson and Trudgill, 1990: 69), others view it less positively. Because it is not accepted as good, formal usage by the majority, those with higher status or responsibility, the 'gate-keepers' of language such as teachers and parents, resist it and disapprove of its use in formal or serious speech or writing, warning that it is a sign of mental laziness that prevents its users from acquiring a wide-ranging vocabulary in standard English. Another reason for its negative associations is that it often serves to mock, ridicule, or hurt others.

Slang also attracts disapproval because it is very closely associated with swearing and profanity (in which the name of a deity is used to express negative affect or disrespect), and distinguishing the two is not always a simple task. While swearing is regarded as "language in its most highly charged state" (Hughes, 1991: 4), generally connected with taboos of some kind, slang terms are not as powerful or as strongly forbidden. For most Western middle and upper classes, swearwords and slang form a continuum of nonstandard forms, with expletives comprising the more shocking or taboo range of words and slang coming closer to acceptability. Research over the years suggests that increasing numbers of former taboo words are regarded now as mild slang terms: Dumas and Lighter (1978: 9) found that most speakers could not clearly distinguish slang from expletives with any degree of reliability, and according to Tweedie (2003) only 16 of the 70 taboo words listed in the earlier edition of *Collins dictionary* remain taboo, and the rest (e.g., *bollocks*) have been downgraded to mere slang or informal expressions on the basis of frequency of use and of the majority view of perceptions of the shock value of these words. Increasingly, erstwhile shocking words such as *fuck* are used so liberally in the media and in some subcultures that their users scarcely notice them.

Who Uses It and Why?

There are two long-standing strong cultural stereotypes regarding slang users. The first is that slang is the primary domain of adolescents, all of whom inevitably use it. The second is that slang (especially words that are more taboo) is largely the domain of males, while females avoid it as unladylike, because of its strong connotations of masculinity and toughness (Jespersen, 1922; Flexner and Wentworth, 1975; Holmes, 1984).

The first of these claims must be made with care: linguistic behavior in adolescence is not simply a matter of conformity to clear and unambiguous role models. While it is tempting to overgeneralize that all

adolescents behave in the same way, there are many thousands of adolescents who do not use slang, and who assert their individualism in ways that uniquely reflect their intelligence and personalities.

The view that males typically use slang is often supported by claiming that male adolescent peer groups are commonly very much larger, more hierarchical, close-knit and competitive than female groups (Romaine, 1984), which are smaller, more intimate, and do not value verbal posturing as much. Also associated with male slang usage is its symbolic rebellion against adult norms, linked to growing social power. However, this stereotypical association between slang usage and males is increasingly subject to critical scrutiny, and linguists have begun to realize that the view may not be at all accurate. As early as 1943, Schlauch regretfully notes tendencies for females to encroach on this all-male precinct, and Hertzler (1965) makes the same point. It would appear that with shifts in power, norms and habits of slang (and expletive) usage are being challenged, and signs of change are revealed in more recent studies by Bailey *et al.* (1976), Staley (1978), Risch (1987), de Klerk (1997) and Sutton (1995), all of whom indicate a growing resistance by females to conformity to expectations regarding the use of both slang and swearwords. Evidence shows that they do use them and in so doing, reveal a need to do so.

The steady lessening of gender differences over the past half-century, particularly in the workplace, has been caused to some extent by feminist rhetoric, and the lack of conformity to the stereotype both within and across gender groups suggests that these words, instead of being regarded exclusively as signs of masculinity *per se*, are increasingly being regarded more as symbols of power more generally, equally available to both gender groups. Linguistic behavior is no longer a simple matter of conformity to clear and unambiguous role models, and linguistic differentiation is neither smooth nor consensual. If female trends in slang (and expletive) usage are shifting, either it could be seen as an attempt by them to mimic male behavior, and associate with the socially dominant group, or there may be an increasing number of women who aim to assert a new image of women that runs contrary to stereotyped images of being pure, sensitive, and caring (Sutton, 1995: 290). Also, ironically, while male adolescents may indeed know and use more slang than females, it might not be because they want to, but simply because they have very little choice: society expects them to.

Individuals must go through the process of working out for themselves whether slang suits their image. For young females, using slang breaks rules and thereby makes a clear statement; for young males not using it makes a different kind of statement. Linguistic choices are only meaningful within and determined by current social circumstances. Critical linguists (e.g., Fairclough, 1992: 26) link linguistic choices to wider social processes, relationships, and power: on the one hand, discourse is seen as reproducing and perpetuating existing social relations and structures, because people enter social interaction with social identities that are preformed and affect their linguistic practice. On the other hand, the potential for change comes when groups with different discourse norms or conventions find themselves interacting, and this is the case when males and females, or adolescents and adults come together and follow slightly different linguistic norms. Their discourse can be seen as representing a kind of delicate social power struggle that may often result in change, both in the mode of discourse and of wider social and cultural domains (Fairclough, 1992: 28–29).

The concept of a linguistic market, derived from Boltanski and Bourdieu (1975) is also useful to describe patterns in slang usage. In terms of this framework, different varieties and styles carry different value in the various linguistic markets operating at any one time in any community. These include the standard, global market, in which legitimate standard language holds the highest value and power, and submarkets, in which nonstandard slang holds more sway. Trudgill's notion of covert prestige (1972) goes some way in recognizing that local market values can conflict with global ones. While users of slang and other vernacular forms know that their varieties are stigmatized in the global hierarchy, it nevertheless pays useful dividends in the local marketplace, and is full of positive meaning in concrete local practice, a prime symbolic asset carrying markedly higher value during the adolescent years than in later years.

For this reason, later in life, when social class and education outweigh age, location (and masculinity) in indicating status, linguistic values shift again, and the types and styles of language that used to wield power are slowly and naturally replaced by other, more widely recognized standard forms (Holmes, 1992: 185), with use of standard forms peaking at age 30–55. Exceptions to this trend are those with less social power, restricted economically or socially, who are far more likely to keep using their local slang as covert status symbols, in order to fit into their local subcommunities. Ironically, those who are successful and who acquire social status along with the trappings of wealth are very likely ultimately to impose and uphold the very taboos against the use of slang that they flouted in their own youth.

See also: Communities of Practice; Identity and Language; Sociolinguistic Crossing; Subcultures and Countercultures.

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Slang, Argot and Ingroup Codes

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Slang, argot, and ingroup codes are sets of words and expressions that are motivated by the social and interpersonal functions of language. Their purpose is to bring about a social bond among their users through awareness of shared knowledge. Such vocabulary is usually an alternative to words and expressions in the standard variety of the language. For example, many topics that American college students talk about are time-honored on college campuses and can be referred to with general vocabulary. For social reasons, though, at the beginning of the 21st century American students used *bia* for 'a thoroughly unpleasant female,' *pimp* for 'a popular male,' and *money* for 'very good,' as in "Last night's concert was money."

By comparison with the general vocabulary, such socially salient words and expressions are often short-lived and fall into disuse quickly by being displaced by

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Relevant Website

http://www.intercom.net/user/logan1/glossary.htm – 'Shadowslang glossary' from the role-playing game 'Shadowrun.'

Slavic Languages

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The Slavic language group contains three subfamilies: (1) East Slavic, consisting of Russian, Belarusian (Belarusan), and Ukrainian; (2) West Slavic, consisting of Polish, Czech, Slovak, and Sorbian (the latter spoken in Germany and also known as Lusatian); and (3) South Slavic, consisting of Bulgarian, Macedonian, Slovene (Slovenian), and Bosnian/Croatian/Serbian (BCS; formerly known as Serbo-Croatian). The Slavs are believed to have expanded from an area corresponding to southwestern Belarus/northwestern Ukraine beginning in the 6th century C.E., an event that contributed to the linguistic differentiation of Late Common Slavic (LCS) into the modern Slavic languages. In the late 9th century a Byzantine mission to the present-day eastern Czech Republic yielded translations of liturgical texts into Old Church Slav(on)ic, a written language presumed to be very close to LCS. These documents have made it possible for us to reconstruct the history of the Slavic languages quite reliably. Orthography follows religion in dividing the Slavic languages into an Eastern/Orthodox Christian group that uses the Cyrillic alphabet (Russian, Belarusian, Ukrainian, Bulgarian, Macedonian, and part of BCS), and a Western/Catholic and Protestant group that uses the Latin alphabet with the addition of diacritics (Polish, Czech, Slovak, Sorbian, Slovene, and part of BCS).

Phonological History

Within the Indo-European language family, the closest relatives to the Slavic languages are the Baltic languages (Latvian and Lithuanian). Both Slavic and Baltic are 'satem' languages, a name based on the Avestan word for 'hundred,' which identifies the reflex of Proto-Indo-European (PIE) *k'* → *s* (and *g'* → *z*), as in the Late Common Slavic (LCS) *sъto* 'hundred'. Peculiar to Slavic (though with some analogues in Baltic and Indo-Iranian languages) is the 'ruki' rule sound change, which caused *s* (*š*) → *x* in positions following *r*, *u*, *k*/*g*, and *i*, as in Proto-Indo-European (PIE) *ousos* → LCS *uxo* 'ear'. 'Ruki' and 'satem' are ancient changes in the development of PIE into Early Proto-Slavic (EPSl). The subsequent era linking EPSl and LCS is marked by sound changes that affected all of Slavic, though their ultimate outcomes are not entirely uniform. Many EPSl-to-LCS sound changes reflect a phonotactic strategy aimed at creating 'ideal' syllables of rising sonority and level tonality, i.e., syllables with CV structure where both the C and V elements had the same (high or low) tonality (also known as 'syllabic synharmony'). The conflict between the most normal structure for a root morpheme, which was CVC, and the ideal syllable structure of CV resulted in the great number of morphophonemic alternations so characteristic of Slavic. The last element in a CVC sequence was in a precarious position: either it was assigned to the syllable containing the preceding CV, in which case sonority constraints made it subject to absorption or loss, or it

was assigned to the following syllable, where tonality constraints could subject it to mutation. We will look at each group of sound changes separately.

Rising Sonority

Rising sonority motivated syllable shape changes CVC → CV and V → CV, which resulted in both loss of final consonants, as in EPSl *su:nus* (cf. Gothic *sunus*) → *synъ* 'son', and prothesis, as in EPSl *esti* (cf. Latin *est*) → *jestь* 'is'. If a syllable peak contained a diphthong (a vowel followed by a sonorant: a glide, nasal, or liquid), its sonority rose but then dipped, and this lack of conformity to rising sonority also motivated changes in syllable structure, mainly monophthongization or metathesis.

Diphthongs ending in a glide monophthongized to yield new vowels:

- *ei* → *i*, as in *zeim-* → *zima* 'winter'
- *åi* → *ě* (known as 'jat'), as in *måix-* → *měxъ* 'fur'
- *eu* → *(j)u*, as in *teu-* → *tjudjь* 'alien'
- *åu* → *u*, as in *låu-* → *luna* 'moon'.

The subsequent development of 'jat' is quite diverse in Slavic.

Diphthongs ending in a nasal monophthongized to yield nasal vowels:

- *e/i* + *m/n* → *ę*, as in *swent-* → *svętъ* 'holy'
- *å/u* + *m/n* → *ǫ*, as in *åmb-* → *zǫbъ* 'tooth'

Polish is the only Slavic language that retains nasality for these vowels (though they have been reorganized: those that developed length became the back nasal *ą*, whereas those that remained short became the front nasal *ę*). The remaining Slavic languages denasalized these vowels, with various results. Thus *svętъ* 'holy' and *zǫbъ* 'tooth' yield, respectively: Russian *sviatoĭ* and *zub*, Polish *święty* and *ząb*, Czech *svatý* and *zub*, Slovene *svet* and *zob*, BCS *svet* and *zub*, Bulgarian *svet* and *z″b*.

Diphthongs ending in a liquid differed in the presence or absence of an initial consonant and in whether the vowel was a 'full' vowel or a reduced vowel ('jer'), and are referred to as ORT (for orC- and olC-), TORT (for CorC, CerC, ColC, and CelC), and TъRT (for CъrC, CъlC, CьrC, CьlC). Overall, these are referred to as the 'TORT' phenomena, and the results (particularly in terms of vowel quality) are quite varied across Slavic. The examples represent only a fraction of the relevant data:

- ORT reflexes show metathesis: *orstъ* 'growth' → Russian *rost*, Polish *-rost*, Czech *růst*, BCS *rast*, Bulgarian *rast*.
- TORT reflexes show an epenthetic vowel in Russian (pleophony, creating two syllables from one), and metathesis elsewhere: *gordъ* 'enclosure' → Russian *gorod*, Polish *gród*, Czech *hrad*, BCS *grad*, Bulgarian *grad*.
- TъRT reflexes are the most varied and hard to characterize by rule: *vъlkъ* 'wolf' → Russian *volk*, Polish *wilk*, Czech *vlk*, BCS *vuk*, Bulgarian *v″lk*.

Syllabic synharmony

Syllabic synharmony was violated when a low tonality consonant was followed by a high tonality vowel (or sonant), or when a high tonality consonant was followed by a low tonality consonant. The solution in both cases was to raise the tonality of the low tonality segment. Raising the tonality of consonants yielded the postalveolar fricatives and affricates conspicuous in the Slavic languages, resulting from the palatalizations of velars. In the first palatalization, *k* → *č*, *g* → *ž*, *x* → *š* before a front vowel or *j* uniformly throughout Slavic: *plåkjåm* → *plačǫ* 'I weep', *gen-* → *žena* 'woman', *du:xe:tei* → *dyšati* 'breathe'. The second (and third) palatalization of velars took place in two environments: after a high front vowel (or diphthong containing one) or before *åi*. This palatalization yielded *k* → *c*, *g* → *z* (*dz* in Polish), *x* → *s* (*š* in West Slavic): *åtikås* → *otьcь* 'father', *kåinå:* → *cěna* 'price', *kuningås* → *kъnęzь* 'prince' (cf. Polish *ksiądz* 'priest'), *någåi* → *nozě* 'leg.DAT/LOC.SG' (cf. Polish *nodze*), *vixås* → *vьsь* 'all' (cf. Czech *všechen*), *xåir-* → *sěr-* 'gray' (cf. Czech *šerý*). The velar palatalizations show a loss (except for Polish) of the stop quality of *g*, and this was part of a larger phenomenon which included the lenition of *g* in all positions to a velar or uvular fricative in East Slavic (except Russian), Czech, Slovak, and Upper Sorbian.

Dentals followed by *j* (and similar clusters) were subject to similar sound changes. Throughout Slavic *sj* → *š* and *zj* → *ž*: *peisjå:m* → *pišǫ* 'I write', *må:zjå:m* → *mažǫ* 'I smear'. Original *dj* (also *deu* and *gti*) and *tj* (also *teu* and *kti*), as in LCS *medja* 'boundary', *světja* 'candle', yielded a variety of reflexes: Russian *mezha/svecha*, Polish *miedza/świeca*, Czech *meze/svíce*, Slovene *meja/sveča*, BCS *međa/svijeća*, Bulgarian *mezhda/sveshch*. The various palatalizations occur both in roots and at morpheme boundaries, where they occasion various morphophonemic alternations of consonants in Slavic languages. The principle of raising the tonality of a consonant followed by a high tonality vowel has been further continued in some languages: Russian has developed phonemic palatalization, such that all nonpalatal consonants are opposed hard to soft, except the dental affricate *ts*; in Polish this goes one step further and dentals are palatalized to palatals (*t/d/s/z/n* → *ć/dź/ś/ź/ń*) before front vowels.

A low tonality vowel following a high tonality consonant (usually *j*) was also subject to the adjustment of syllabic synharmony, and this resulted in the fronting of back vowels: *mårjås* → *morje* 'sea', *sju: tei* → *šiti* 'sew'.

Vowel Distinctions

EPSl had four vowels, all of which could be long or short: *i*, *u*, *e*, *å*. These vowels were reinterpreted as eight LCS vowels, differentiating the long and short vowels qualitatively. Thus long *i:* → *i*, *u:* → *y*, *e:* → *ě*, *å:* → *a*; and short *i* → *ь*, *u* → *ъ*, *e* → *e*, *å* → *o*.

The LCS era (and the law of rising sonority) comes to an end with the loss of the two short high vowels, *ь* ('front jer') and *ъ* ('back jer') in weak positions, commonly known as 'the fall of the jers'. A jer was strong in a syllable preceding a syllable with a weak jer; all other jers were weak. Weak jers were lost, but strong jers attained the status of full vowels. The fall of the jers created new closed (CVC) syllables, new consonant clusters, and many vowel/zero morphophonemic alternations. In this example, the strong jer is underlined: LCS *sъ̲nь/sъna* 'dream.NOM/GEN.SG' yields Russian *son/sna*, Czech *sen/sna*, BCS *san/sna*.

Prosody

LCS had a system of phonemic pitch and subphonemic stress. Although length had been lost in the re-interpretation of vowels, it was subsequently re-established in parts of the Slavic territory. Russian, Belarusian, Ukrainian, and Bulgarian have phonemic stress. BCS and Slovene have phonemic pitch and length. Polish and Macedonian have fixed stress on the penultimate and antepenultimate syllables, respectively. Czech and Slovak have phonemic length and fixed stress on the initial syllable.

Morphological history

Declension

LCS was, and Slavic languages for the most part remain, highly synthetic, with distinct inflectional desinences as well as derivational suffixes and prefixes affixed to roots. EPSl declensions were based mostly on stems with theme vowels, with a few consonantal stems. By the LCS period, the declensions had moved toward association with genders, and the theme vowels were absorbed by sound changes into synthetic desinences that mark case, number, and gender. LCS had three numbers, singular, dual (with restricted case distinctions), and plural, but all the modern languages except Slovene and Sorbian have lost the dual. Slavic maintained much of the PIE case structure, though it merged the ablative with the genitive (restrictive), to yield nominative, genitive, dative, accusative, vocative, locative, and instrumental. The case distinctions (all but the vocative) were subsequently lost in Macedonian and Bulgarian, and the vocative was lost in Russian, Slovene, Slovak, Lower Sorbian, and Belarusian. In addition to the three genders (masculine, feminine, neuter), an animacy distinction developed within masculine during LCS, marked by the substitution of the genitive singular inflection for the accusative singular. Animacy is realized in the plural only by a few languages, in particular Russian and Polish (where it marks only male humans), plus Czech (where it is available only in the nominative plural and dative/locative singular). In LCS, Slavic adjectives were enlarged by the affixation of the corresponding pronominal forms, to create compound adjectives, which initially signaled definite, as opposed to the shorter 'indefinite' adjectives. BSC and Slovene continue this distribution of long vs. short adjectives. Polish, Czech, and Russian expanded the long compound adjectives, and have restricted the short adjectives to predicate position. Bulgarian and Macedonian maintained only the short adjectives, and developed a postposed article to mark definiteness. The LCS personal pronouns had both long (emphatic) and short (enclitic) forms, and the West Slavic and South Slavic languages continue this distinction.

Conjugation

The most important development for verbs is the evolution of Slavic aspect, which is peculiar because it obligatorily distinguishes perfective from imperfective in all verbal forms, and because the imperfective is more complex and unmarked (whereas it is the marked category in most other languages with this distinction). Aspect is expressed in simplex stems, and via an elaborate system of derivational prefixes and suffixes. The PIE supine, middle, subjunctive, and perfect disappeared in Slavic (but Bulgarian and Macedonian have a new perfect), and the LCS aorist and imperfect tenses have been lost in both East Slavic and West Slavic (except Sorbian). The only two tenses that the modern languages all share are a past (derived from a resultative participle) and a nonpast (usually interpreted as a future if perfective, but as a present if imperfective). Bulgarian and Macedonian lack an infinitive. The Slavic imperative has been innovated from the PIE optative, and the conditional is expressed paraphrastically using an auxiliary from *byti* 'be'. LCS had no distinct future tense, but used instead the perfective nonpast or an auxiliary verb with a participle or infinitive. LCS had a system of four participles expressing present vs. past and active vs. passive; these survive in their entirety only in

Russian. Like its nouns, EPSl verbs were inflected by combining a stem with a theme vowel and a desinence (with the exception of five 'athematic' verbs), and again sound changes obliterated the distinct role of the theme vowel by LCS. In the modern languages, verbs express aspect, tense, person, number, and, in certain forms, gender.

See also: Balto-Slavic Languages; Belorussian; Bulgaria: Language Situation; Bulgarian; Croatian Lexicography; Czech; Czech Republic: Language Situation; Indo–European Languages; Macedonia: Language Situation; Macedonian; Poland: Language Situation; Polish; Russian; Russian Federation: Language Situation; Serbian Lexicography; Slovak; Slovene; Sorbian; Ukrainian; Ukraine: Language Situation.

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Slobin, Dan Isaac (b. 1939)

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Dan I. Slobin, an outstanding American psycholinguist whose research has had enormous influence on the field of language acquisition studies, was born in Detroit, Michigan, on May 7, 1939. He graduated in psychology from the University of Michigan, Ann Arbor in 1960. He received his M.A. and Ph.D. degrees from Harvard in 1962 and 1964, respectively. In 1964 he joined the Department of Psychology at the University of California at Berkeley, where he was appointed to the position of Full Professor in 1972.

Slobin's research has focused on the specific phenomena of language acquisition as a window on the more general issue of the intricate relation of language to cognition and culture. Specifically, he is concerned with cognitive structures and mechanisms giving rise to the emergence of a linguistic system in mind, but also the effects of language on thinking. One of his influential proposals concerning the identification of universal developmental patterns was that the acquisition device contains a set of procedures and inference rules for analyzing linguistic data, subsequently called operating principles, rather than an actual body of linguistic knowledge in the form of grammatical rules. Slobin (1985) proposes close to 40 such principles, which he describes as "procedures for perceiving, storing and analyzing linguistic experience" (Slobin, 1985: 1158).

The deployment of a cross-linguistic research design, making use of both experimental and naturalistic methods in an attempt to identify universal developmental patterns, on the one hand, and his functionalist interest in uncovering cognitive and communicative bases of linguistic structures, on the other, naturally led Slobin to extend his research agenda in recent years, assuming a typological perspective, looking for the effects of particular types of languages on psycholinguistic processes – what he has come to call "thinking for speaking" – and even going beyond it (e.g., in studying sign languages in order to examine the extent to which universals of language and language behavior are determined by modality (vocal/auditory vs. manual/visual)). Thus, in a series of recent papers, Slobin applies Talmy's (1985) distinction between satellite- and verb-framed languages as representing different types of lexicalization pattern in the analysis of the conceptualization and verbalization of motion events in languages such as English and Russian (satellite framed) versus French, Spanish, Turkish, and Hebrew (verb framed). The preferred construction type in these languages

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See also: Cognitive Grammar; Cross-Linguistic Comparative Approaches to Language Acquisition; Developmental Relationship between Language and Cognition; Inference: Abduction, Induction, Deduction; Meaning: Development; Psycholinguistic Research Methods; Psycholinguistics: Overview; Rules and Principles; Sign Language: Acquisition; Syntactic Development.

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Slovak

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Slovak is a West Slavic language, most closely related to Czech. It is the native language of some 4.6 million residents of Slovakia, of somewhere between 300 000 and 500 000 residents of the Czech Republic, and of additional speakers in Hungary, Poland, Romania, Serbia, and North and South America.

Orthography

Like other Slavic languages that were historically in the cultural sphere of the Western Church, Slovak uses the Latin alphabet with diacritic marks. Long vowels are marked by an acute accent, *ô* represents the diphthong [uo], and *ä* traditionally represents the vowel [æ], which almost all speakers replace with [ɛ]. The letters *i* and *y* both represent [i], and *í* and *ý* both represent [iː]; the distinction is etymological. Digraphs are used to spell the voiceless velar fricative (*ch*) and the voiced dental and alveolar affricates (*dz* and *dž*, respectively). The voiceless alveolar affricate and the voiced and voiceless alveolar fricatives are represented, respectively, by *č*, *ž*, and *š*. Palatal stops and sonorants are not specially marked before the vowels *e*, *i*, and *í* or the diphthongs *ia*, *ie*, *iu*; elsewhere they are indicated by diacritics: *ť*, *ď*, *ľ*, *ň*. Certain words and categories of words constitute exceptions to this rule for spelling palatals; thus, there is a contrast between the adverb *stále* 'constantly,' pronounced [stáľe], which follows the rule, and the adjective form *stále* 'constant,' pronounced [stále], which does not.

Phonology

The Slovak phonemic inventory consists of fifteen vocalic segments (six short vowels, five long vowels, and four diphthongs) and 27 consonantal ones. Most speakers have only five distinct short vowels, the basic phonetic realizations of which are [i], [ɛ], [ɐ], [ɔ] and [u] (orthographic *i*, *e/ä*, *a*, *o*, *u*), but the different alternation patterns of orthographic *ä* and *e* (the former alternates with *ia*; the latter with *á* or *ia*) are grounds for treating them as representing distinct phonemes. The five long vowels correspond to the short vowels, but /ó/ occurs only in nonnative words, and the distribution of /é/ outside of nonnative words is limited. The four diphthongs are /uo/, /ie/, /ia/, and /iu/, but the last of these seems always to result from a process of contraction and may therefore not be a phoneme. The diphthongs behave like long vowels with respect to phonologically or morphologically conditioned processes of shortening and lengthening, but the relationships between the long vowels and diphthongs on the one hand and the short vowels on the other is mediated by various contextual constraints. The liquids /r/ and /l/ can be syllabic and in that role distinguish length.

A so-called 'rhythmic law' that operates in Central Slovak dialects and in the standard language mandates the shortening of a syllable that follows a long syllable (one containing a long vowel or a diphthong). Thus, in the masculine nominative singular of adjectives, we find *hladký* 'smooth,' but *krátky* 'short' and *riedky* 'rare.' The rhythmic law does not apply in certain grammatical and derivational contexts, e.g., the declension of adjectives derived from animal names (e.g., *vtáčí* 'bird's).

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The consonants that arose from the historical palatalization of velars or from the deiotation of clusters consisting of dental stop or fricative plus glide have lost their palatal character. The historical palatalization of dental consonants, on the other hand, has given rise to a series of palatal consonants: *ť*, *ď*, *ň*, *ľ*. As in most other Slavic languages, final voiced obstruents lose voicing before pause. In obstruent clusters both within phonological words and between words, there is regressive assimilation with respect to voicing. Before a word-initial vowel or sonorant, a word-final obstruent is voiced; such voicing may also occur at morpheme boundaries within words. The laryngeal fricative represented by *h* devoices to the velar fricative *ch*, but when the latter becomes voiced, there is free variation between a voiced velar fricative [ɣ] and *h*. The voiced labiodental fricative *v* behaves like an obstruent at the beginning of a phonological word, but does not cause voicing of a preceding voiceless obstruent within a word. It is realized as [w] in word-final position and is generally realized as [w] word-internally in the environment V_C.

The primary word stress is on the initial syllable and can thus fall on a monosyllabic preposition, especially if the following noun or pronoun is monosyllabic, e.g., *pOd ňou* 'under it,' but also potentially *dO prácy* 'to work.' Unstressed vowels are not reduced, and words longer than three syllables alternate unstressed and secondarily stressed syllables.

Morphology

Nouns distinguish six cases (nominative, accusative, genitive, dative, instrumental, locative); a few masculine nouns have vestigial vocative forms (e.g., *synku* 'son'). Three genders (masculine, feminine, neuter) are distinguished in the singular by agreement phenomena, and a masculine animate subgender can also be distinguished by its syncretism of accusative and genitive and by the ending *-ovi* for dative and locative singular. Certain classes of semantically inanimate masculine nouns also show the accusative-genitive syncretism (e.g., names of trees, mushrooms, diseases: *sťať duba* 'cut down an oak tree'; *nájsť hríba* 'find a boletus mushroom'; *mať vreda* 'have an ulcer').

In the plural there is a binary distinction of masculine-personal (nouns referring to male human beings) and nonmasculine-personal (all other nouns); they are distinguished by the nominative endings, by agreement phenomena, and by the accusative-genitive syncretism of the former vs. the accusative-nominative syncretism of the latter. Adjectives and third-person pronouns also distinguish three genders in the singular and two in the plural; the past-tense forms of verbs show a three-way distinction in the singular but have only a single form for the plural. Some nouns have only plural forms (e.g., *vidly* 'pitchfork[s]'); others are used primarily in the singular (e.g., mass and abstract nouns) but have potential plural forms that usually acquire specialized meanings (e.g., *pivo* 'beer' vs. *pivá* 'kinds or portions of beer'; *láska* 'love' vs. *lásky* 'objects of affection').

Noun declensions are largely gender-based: the masculine and neuter declensions have most endings in common in the singular, while the three feminine declensions in the singular (one for nouns ending in *-a* in the nominative singular and two for those ending in a consonant, i.e., with zero-ending) also share most endings. There is a class of masculine nouns ending in *-a* that refer to male human beings; they follow the masculine declension except for the genitive and accusative singular, which use the *u*-ending of the feminine *a*-declension. In the plural, feminine and neuter nouns have common oblique-case endings, which are different from those of masculine nouns. The traditional presentation of multiple declensional types is based on the fact that certain case endings are dependent on the nature of the final stem consonant – whether it is 'soft' (palatal or 'historically soft,' i.e., the result of historical palatalization or deiotation) or not. Cf. dative singular *žene* vs. *ulici*, which traditional grammars describe as belonging to different declensional types (*žena* 'wife' vs. *ulica* 'street').

Most inherited consonant mutations have been lost from noun declensions. The remaining mutations affect velars and dentals in the masculine personal nominative plural (e.g., *vojak/vojaci* 'soldier[s]'; *Američan/Američania* 'American[s],' with the alternation /n/ to /ň/; *pilot/piloti* 'pilot[s],' with /t/ to /ť/) and dentals in the locative singular of all three genders (e.g., *sused/susede* 'neighbor,' *žena/žene*, *mesto/meste* 'city'). Noun declensions do show quantitative alternations of vowels, for example, between forms with an ending and forms with a zero ending (e.g., NOM/ACC sg *chlieb* vs. GEN sg. *chleba* 'bread,' NOM sg. *ruka* vs. GEN pl. *rúk* 'hand; arm').

Slovak verbs belong to one of two aspectual categories, perfective or imperfective; there are also some biaspectual verbs (e.g., *absorbovať* 'absorb,' *pomstiť* 'avenge'). Perfective verbs express accomplishments or transitions; imperfective verbs express states or activities/processes. Imperfective verbs are typically unprefixed; adding a prefix perfectivizes the verb, sometimes also adding an additional semantic component (e.g., *písať* 'write = engage in the activity of writing'/*napísať* 'write = get something written' vs. *prepísať* 'rewrite,' *opísať* 'describe,' *popísať* 'write a lot'). There are also productive ways of imperfectivizing a perfective verb through a change in suffix and/or the stem (e.g., *prepisovať* 'engage in the activity of

rewriting,' *opisovat'* 'engage in the activity of describing'). Occasionally, corresponding verbs are based on different stems (e.g., imperfective *brat'* vs. perfective *vziat'* 'take'), and some verbs have no corresponding verb of the opposite aspect (e.g., imperfective *mat'* 'have' or perfective *vydržat'* 'bear, stand').

Imperfective verbs have synthetic forms for past and present tense and analytic forms for the future tense; perfective verbs form their past tense in the same way as imperfective verbs, but the forms that look like the present-tense forms of imperfective verbs normally express future tense (or, under certain circumstances, potentiality). An analytic pluperfect tense is formed mostly from perfective verbs. The perfective/imperfective distinction is also present in infinitives, imperatives, and conditional/subjunctive forms. The last of these is formed analytically and distinguishes present vs. past ('would X' vs. 'would have X'). Imperfective verbs form verbal adjectives and adverbs expressing simultaneity, while perfective verbs form verbal adjectives and adverbs that express temporal precedence or subordination to the action of the main verb. Both perfective and imperfective transitive verbs form passive participles, which can be used with *byt'* 'be' to form passive constructions.

Within the imperfective aspect, a further distinction is made between determinate and indeterminate verbs of motion. The former designate motion in a single direction on a single occasion, while the latter do not have those restrictions and can therefore designate repeated motion, the ability to move, etc. (e.g., determinate *ist'* vs. indeterminate *chodit'*). Many imperfective verbs also have derived iteratives that express repeated, often regular, actions (e.g., *hrávat'* 'play frequently' from *hrat'* 'play').

Most of the inherited consonant alternations have been eliminated from present-tense paradigms, except for the alternation between palatals and dentals (*idiem* 'I'm going,' *idieš* 'you're going' vs. *idú* 'they're going'; cf. *pečiem, pečieš, pečú* 'I'm baking, etc.,' and the corresponding Polish forms *piekę*, *pieczesz, pieką*). Other inherited consonant alternations are reflected in the relation between infinitive and present tense (*písat'* 'to write' vs. *píšem* 'I write'), past tense and present tense (*mohol* 'he could' vs. *môže* 'he can'), or perfective and derived imperfective (*podtvrdit'* 'confirm – pf.' vs. *potvrdzovat'* 'confirm – impf.'). Quantitative alternations of vowels appear in conjugation (e.g., *piect'* 'to bake' vs. *pečiem*) and in the derivation of imperfective from perfective verbs (e.g., *kúpit'* vs. *kupovat'* 'buy' or *skryt'* vs. *skrývat'* 'hide'), as well as in nonverbal derivation (e.g., *Nitran* 'man from Nitra' vs. *Nitrianka* 'woman from Nitra').

Syntax

Slovak word order is relatively free and is used, together with sentence intonation, to express the informational structure of the utterance. Thus, the rheme normally follows the theme in emotionally neutral speech. Pronominal and some verbal clitics follow the first stressed word in a sentence. Among them is the particle *sa*, which is historically the enclitic accusative form of the reflexive and reciprocal pronoun. The reciprocal function is still present (e.g., *poznáme sa* 'we know one another'), but true reflexive uses are rare (e.g., *bránit' sa* 'defend oneself'). Verbs with *sa* can express a variety of meanings, among other things, a kind of middle voice (e.g., *umývat' sa* 'wash/wash up/get washed') and also an intransitive verb with an unaccusative subject (e.g., *lekcia sa začína* 'class is beginning'). They can also be used in passive constructions with unexpressed agent (e.g., *reči sa hovoria a chlieb sa je* 'speeches are spoken, but bread is eaten'). As in some other Slavic languages, *sa* has acquired the function of a generic human subject, parallel to German *man* or French *on*, with third-person singular agreement (e.g., *hovorí sa* 'they/people say').

The enclitic dative form of the reflexive and reciprocal pronoun, *si*, occurs both in its literal meaning (e.g., *pomáhat' si* 'help one another' or 'help oneself') and like *sa*, as a component of *reflexiva tantum* (e.g., *všímat' si* 'notice'; cf. *bát' sa* 'be afraid'). Both *sa* and *si* also combine with prefixes to produce a variety of Aktionsart meanings (e.g., *nasediet' sa* 'have one's fill of sitting,' *pospat' si* 'have oneself a nap').

First- and second-person subject pronouns are normally used only for contrast or emphasis; third-person subject pronouns are typically dropped after their first use, unless a previous theme has been reintroduced. Nonfamiliar address uses second-person plural forms of pronouns and verbs.

Lexicon

In addition to preserving its Common Slavic patrimony, the Slovak lexicon has been open to borrowings and adaptations from neighboring languages. Among the earliest borrowings were elements of Christian terminology from Latin, often via German. Throughout the centuries, those two languages, as well as Czech, Hungarian, and Romanian have been important linguistic donors (Slovak has also contributed to Hungarian); in more recent times, Polish, Russian, French, and English have also served as source languages. In the last decades, the role of internationalisms and Anglicisms has been especially important.

Dialectology

The three major dialect areas are Western Slovak, which is transitional to Moravian Czech; Central Slovak, which served as the basis for the literary language; and Eastern Slovak, which is transitional to Polish. The most striking feature of Eastern Slovak is the lack of quantitative distinctions and a tendency to penultimate stress. Central and Western Slovak both distinguish long and short vowels, but the 'rhythmic law' that (with a variety of systematic exceptions) prevents two successive long syllables applies only in Central Slovak. Central and Western Slovak both have initial stress.

History

The incorporation of the Slovak lands into the Hungarian kingdom that was established at the end of the 10th century separated the Slovaks from the Czechs, who maintained their independence until being subdued by the Habsburgs in 1648. The written language of the Hungarian kingdom, and therefore also of Slovakia, was Latin, but thanks to continuing contacts with their Czech brethren, Slovaks began to use Czech as a written language as well. This was especially true after the establishment of Charles University in Prague in 1348, where Slovaks were among the students, and with the influence of the Hussite movement in the 15th century. From the beginning, the Czech written by Slovaks showed the influence of spoken Slovak.

As early as the 15th century there were efforts to write in Slovak, but the first comprehensive effort to create a Slovak literary standard was by a Catholic priest, Anton Bernolák, at the end of the 18th century, who based his norms on the Western Slovak dialects. Perhaps because Western Slovak is closest to Czech, Bernolák's project did not win general acceptance. Slovak Protestants continued to base their writing on the language of the Czech Kralická Bible.

In the middle of the 19th century, Ľudovít Štúr and his colleagues proposed a new literary standard based on the Central Slovak dialects, and this became the basis of the modern Slovak literary language. During the first Czechoslovak Republic (1918–1938), Slovak linguists had to cope with the official doctrine of a single Czechoslovak language, and after World War II the question of the relationship between the Slovak and Czech languages was still on the agenda. Since the creation of two independent states in 1989, there is evidence of decreasing mutual intelligibility, especially among the younger generation of Slovaks and Czechs, who are less exposed to mass media in the other language.

See also: Czech Republic: Language Situation; Hungary: Language Situation; Poland: Language Situation; Slavic Languages; Slovak Lexicography; Slovakia: Language Situation.

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Slovak Lexicography

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Early dictionaries from the Slovak region (part of the Kingdom of Hungary) were bilingual or multilingual dictionaries with Latin as the source language. The target languages were Hungarian, Early New High German, and more or less 'Slovakified' Czech (for Slovaks, this fulfilled the role of their own written standard from the 14th century) or dialectical variants of 'cultural' Slovak (from the 16th century). Latin schools often used copies of Klaret's *Glossarius* and Slovak prints of J. Amos Comenius' *Orbis Pictus*. The first dictionary of cultural Slovak was the *Trnavský slovník* (1648), which was a trilingual dictionary (Latin, Hungarian, and Slovak) arranged alphabetically. One of the important dictionaries that tried to achieve linguistic and orthographic standardization of Slovak was the *Kamaldulský slovník* (*Syllabus Dictionarij Latino-Slovenicus*, 1763), which was compiled by monks of the Camaldul order, who were translating the Bible into Slovak.

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After 1918 (when Slovakia became part of Czechoslovakia), a number of comparative dictionaries and terminological dictionaries (particularly in the fields of administration and law) were published showing the differences between Czech and Slovak and reflecting the changed sociocultural situation of Slovak in the new political structure. The *Slovenský frazeologický slovník* (1933) by P. Tvrdý was the first monolingual dictionary of Slovak (*frazeologický*, or 'phraseological,' means that entries were illustrated by example set phrases and collocations). In the 1940s, preparations to publish a modern monolingual dictionary drawing on a wealth of examples were carried out simultaneously at two different locations: the *Matica slovenská*, the well-established cultural institute and publishing house, and the newly founded (1942) Slovak Academy of Sciences and Arts. After World War II, the Academy took over the project and eventually published a five-volume dictionary of the Slovak language (1959–1968) under the supervision of Š. Peciar. This dictionary drew on texts from the period 1860 to 1960 and contained 120 000 entries. In the 1950s and 1960s, the Academy also coordinated the creation of a number of terminological dictionaries under the supervision of J. Horecký. Among all the bilingual dictionaries, the Slovak–Russian ones, based on the theories of translation equivalence and 'translational meaning,' stood out in terms of size and quality. In 1987 the *Krátky slovník slovenského jazyka* (Kačala *et al.*), which is now in its fourth edition, was published. Gradually, more and more dictionaries are being published specializing in various aspects of lexis: frequency (*Frekvencia slov v slovenčine* by Mistrík, 1968), inversion (*Retrográdny slovník* by Mistrík, 1976), synonyms (*Synonymický slovník slovenčiny* edited by Pisárčiková, 1995), foreign words (numerous dictionaries by M. Šalingová), and morphemes (*Morfematický slovník slovenčiny* by Sokolová *et al.*, 1999). The Academy's long-term projects are to produce the kind of dictionaries that form the lexicographical basis for every language. At the time of writing, it has published five volumes (of seven planned) of the *Historický slovník slovenského jazyka* (supervised by M. Majtán, 1991–2000) and the first volume (of three planned) of the *Slovník slovenských nárečí* (supervised by I. Ripka, 1994). The *Etymologický slovník* by Ľ. Králik is currently being printed (2005).

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Slovakia: Language Situation

Editorial Team

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Until 1992, Slovakia was a federated state within Czechoslovakia. It separated from the Czech Republic when that country split in 1993. The official language of the country is Slovak, a Western Slavic language, with a Roman script. Slovak differs only slightly from Czech and is by and large mututally intelligible with it.

The country has a population of about 5 379 500 (as of June, 2004). According to the 2001 census, the Slovaks make up 85.8% of this population. The largest minority group is Hungarians (9.7%). In addition to Hungarians, there are Romanies (1.7%), speaking mainly Carpathian Romani and some, Vlax Romani, and a small group of Czech speakers (0.8%). There are even smaller numbers of Ukrainian, Rusyn, Russian, German, Polish, and Croatian speakers.

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communities where the minority represents at least 20% of the population, have the right to be educated in their native language and to use their native tongue in all official contacts and transactions with local and state authorities. Hungarian, the most widely spoken minority language, is represented by a couple of daily and weekly newspapers and some hours of weekly radio and TV broadcasts in the Slovak media. The number of children attending Hungarian schools has increased considerably over the last 10 years, as more parents recognize the importance of native-language education.

The literacy rate is very high in Slovakia. In terms of second languages, 30% of the population speaks Russian, 20% speaks German, and 14% speaks English. Since the breakup of Czechoslovakia, Russian lost its prominant role in foreign language education. The most commonly taught languages in schools are German, English, French, and Spanish.

See also: Hungarian; Linguistic Rights; Minorities and Language; Slovak.

Slovene

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Introduction

Overview

Slovene (or Slovenian), the titular language of the Republic of Slovenia, is spoken by some 2.4 million people, including speakers in bordering areas in Italy, Austria, and Hungary as well as in diaspora communities in Argentina, Australia, Canada, and the USA.

Together with Bosnian, Croatian, and Serbian (Serbo-Croatian), Slovene makes up the Western subgroup of the South Slavic branch of the Slavic languages (Indo-European). Slovene transitions to the Čakavian and Kajkavian dialects of Croatian. It is less close to the Štokavian dialect, the basis for the Bosnian, Croatian, and Serbian standard languages. Ancient connections to the central dialect of Slovak (West Slavic) are evident.

Slovene is traditionally divided into seven dialects, each of which has further dialect differentiation: (I) littoral dialects, spoken partly in Italy; (II) Carinthian, spoken mostly in Austria; (III) Upper Carniolan; (IV) Lower Carniolan; (V) Styrian; (VI) Pannonian, spoken partly in Hungary; (VII) Rovte (Figure 1). There are 48 distinct local varieties.

Standard Slovene is constructed of features from various dialects and historical stages of Slovene and does not correspond exactly to any one dialect. Even in the capital, Ljubljana, everyday speech differs in fundamental ways from the standard; compare standard: *kaj mislite*? 'what do you think?' and colloquial: *kva misl̥te*?

Historical Development and Emergence of Literary Language

By the 6th or 7th century A.D., Proto-Slovene was spoken in an area bounded by the Tagliamento River, the Gulf of Trieste, Linz and the outskirts of Vienna, and the southern end of Lake Balaton. The Proto-Slovene speech territory gradually diminished in the medieval period as speakers shifted to Friulian, Italian, German (Standard German), and Hungarian, leaving a core area today consisting of the Republic of Slovenia plus border areas in Italy, Austria, and Hungary.

The earliest surviving documents are the Freising Folia, liturgical texts composed around 1000 A.D., which are among the oldest attestations of any Slavic language. There are a few surviving Slovene documents dating from then until the middle of the 16th century, mostly religious and legal texts. The first printed books in Slovene are Primus Truber's (1508–1586) *Catechismus* (1550) and Jurij Dalmatin's (1547–1598) translation of the Bible (1584), which mark the first attempt at a standard language. Truber modeled the language on the speech of Ljubljana and his native Lower Carniolan. The Counter–Reformation submerged Truber's legacy, while the Protestants developed a regional literary language in the northeast.

Until the 19th century, Slovene remained secondary to the state language, German (Standard German), and, regionally, Italian and Hungarian. Modern standard Slovene dates to Jernej Kopitar's 1809 grammar, the prestige of which was elevated by the poet France Prešeren (1800–1849) and the intellectual circle around Sigismund Zois (1747–1819). The orthographic system essentially as it is found today

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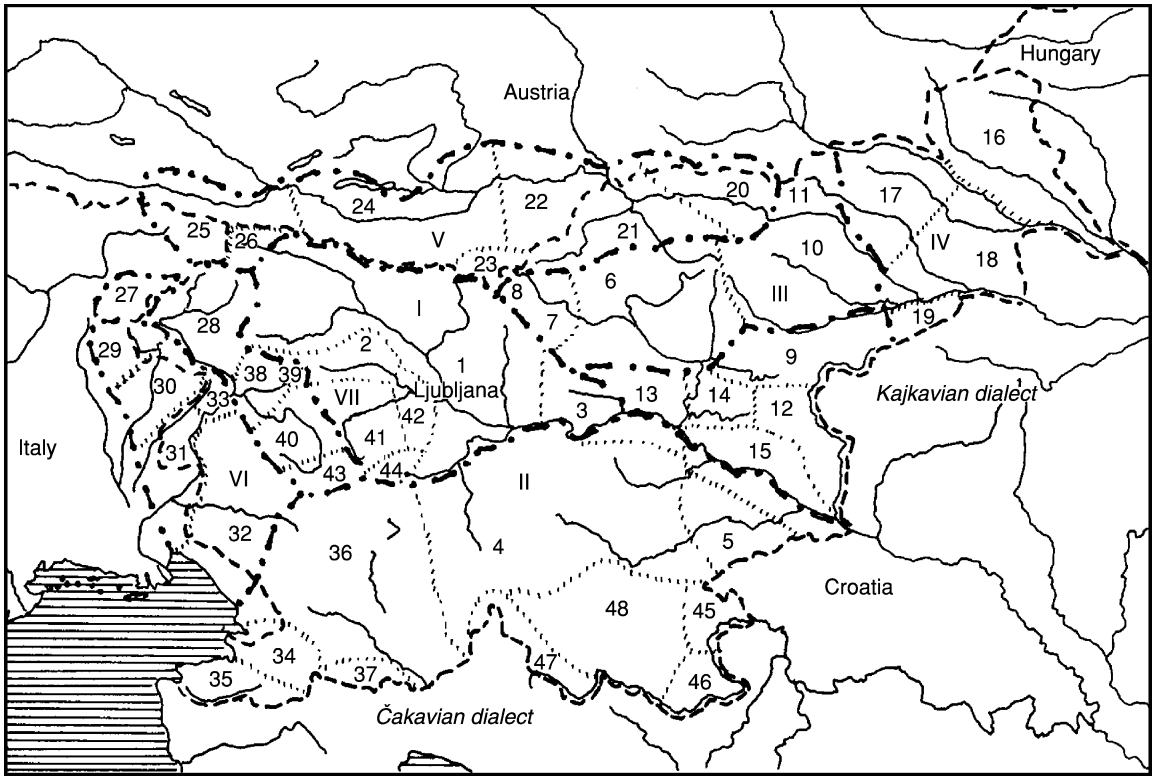

Figure 1 Map of Slovene dialects. Roman numerals indicating local speech varieties are referenced in Greenberg (2000).

was codified in Maks Pleteršnik's Slovene–German Dictionary (1894–95).

Political Issues and Language Maintenance

After the incorporation of the Slovene speech territory (minus border regions in Austria, Italy, and Hungary) into the Kingdom of Serbs, Croats and Slovenes in 1918 (renamed Yugoslavia in 1929), Slovene now became subordinate to Serbo-Croatian, the *de facto* lingua franca of the Yugoslav state. The legal status of Slovene was raised after World War II. Its rights as an official language were reaffirmed in the 1974 Yugoslav Constitution. In reality, the status of Slovene remained unfavorable with respect to Serbo-Croatian, an issue that contributed to Slovene dissatisfaction with Yugoslavia and was resolved with the 1991 Slovene secession from that state.

Slovenes continue to be concerned with language rights among their minorities in Italy, Austria, and Hungary, where they have attempted to encourage the respective governments to accord language rights and allow Slovene-language media and education.

Slovene became one of the official languages of the European Union with the 2004 accession.

Phonology

Writing System

Slovene is written in modified Roman letters, with diacritic marks for sounds not represented by the inherited alphabet (see Table 1). Several other letters are sanctioned in standard orthography to render direct citation of foreign words, viz., *Ç*, *ç*; *Ć*, *ć*; *Đ*, *đ*; *Q*, *q*; *Ś*, *ś*; *X*, *x*; *Y*, *y*; *Ź*, *ź*; *Ż*, *ż*.

Vowel System

See Table 2. *i*, *e*, *ɛ*, *a*, *ɔ*, *o*, *u* occur in long stressed syllables, while stressed *ə* is always short (*pes* [pə̀s] 'dog'). In unstressed syllables the distinctions between *e–ɛ* and *o–ɔ* are neutralized to *ɛ* and *ɔ* respectively: *človek* [tʃlə̀ːvɛk] 'person-NOM-sing', *človeka* [tʃlɔvɛ̗́ːka] 'person-GEN-sing'; *potok* [pə̀ːtɔk] 'stream-NOM-sing,' *potoka* [pɔtɔ̗́ːka] 'stream-GEN-sing.' The grapheme *r* between consonants represents a sequence of *ə* + *r*, e.g., *vrt* [vərt] 'garden,' *srce* [sərce] 'heart.'

Word Prosody

Standard Slovene pronunciation allows two accentual norms, one with pitch accent (characteristic of the Carniolan dialects), the other by stress and vowel

Table 1 The Slovene alphabet

Upper case	*Lower case*	*Pronunciation (IPA values where significantly different than English)*
A	a	[a]
B	b	
C	c	[ts]
Č	č	[tʃ]
D	d	
E	e	corresponds to tense and lax e-vowels or schwa (see vowel chart)
F	f	
G	g	
H	h	[x]
I	i	[i]
J	j	[y]
K	k	
L	l	see explanation under Consonants
M	m	
N	n	
O	o	corresponds to tense and lax o-vowels (see vowel chart)
P	p	
R	r	tapped or trilled r
S	s	
Š	š	[ʃ]
T	t	
U	u	[u]
V	v	[w] before a consonant or in word-final position
Z	z	
Ž	ž	[ʒ] as the s in pleasure

Table 2 Standard Slovene vowel phonemes

	Front	*Central*	*Back*
High	i		u
Tense (high-mid)	e	ə	o
Lax (low-mid)	ɛ		ɔ
Low		a	

Table 3 Standard Slovene consonant phonemes

		Labial	*Dental*	*Palatal*	*Velar*
Stops	voiceless	p	t		k
	voiced	b	d		g
Affricates	voiceless		c	č	
	voiced			ǯ	
Fricatives	voiceless	f		š	x
	voiced			ž	
Nasals		m	n		
Lateral			l		
Trill/tap			r		
Glides		v [w]		j	

length. In the pitch accent system, any long-stressed syllable – almost always only one per accented word – is characterized by either a low rising tone or a high falling tone. Accented words (i.e., not unstressed particles, prepositions, conjunctions, and some pronouns) that lack a long-stressed vowel are short stressed (phonetically high falling) on the final syllable, for example, *brati* [brá:ti] 'to read' (low rising), *brat* [brà:t] 'to go read' (high falling), *brat* [bràt] 'brother' (short), *poskòk* 'hop' (short).

Stress patterns are morphophonemic in that each morpheme carries an underlying prosodic marker and the concatenation of morphemes to form words determines realization of the placement and identity of the pitch and quantity. The realization of these concatenation rules is that paradigms are characterized either by fixed or by mobile stress patterns, e.g., fixed: *mesto* [mé:sto] 'town-NOM/ACC-sing'–*mesta* [mé:sta] 'town-GEN-sing'–*mestu* [mé:stu] 'town-DAT-sing'; mobile: *meso* [mesò:] 'meat-NOM/ACC-sing'–*mesa* [mesà:] 'meat-GEN-sing'–*mesu* [mé:su] 'meat-DAT-sing.'

Consonant System

See Table 3. *V* is pronounced as English *v* only when it precedes a vowel; otherwise, it is pronounced similarly to *w*: *cerkve* 'church-GEN-sing,' *cerkev* [-kəw] 'church-NOM-sing'; *vrag* [wrak] 'devil'; *navkreber* [-wk-] 'uphill.' *L* is usually pronounced as *w* in word-final position and before a consonant (except in some morphologically conditioned environments, where it is pronounced as [l]): *vedela* 'she knew,' *vedel* [-dew] 'he knew'; *poznavalec* [-ləc] 'connoisseur-NOM-sing,' *poznavalca* [-wca] 'connoisseur-GEN-sing.'

Morphology

Slovene is an inflecting language. Nouns, pronouns, adjectives agree in case, number, and gender. The cases are nominative, accusative, genitive, dative, locative, and instrumental, the last two occurring obligatorily with prepositions. In addition to plural and singular, Slovene has distinct forms for dual. The genders are feminine, masculine, and neuter.

In the standard language masculine adjectives in the nominative and accusative mark the definite article, e.g., *grd obraz* '(an) ugly face,' *grdi obraz* 'the ugly face.' In the colloquial language a definite article has developed from a demonstrative pronoun (in all genders and numbers): *grd* 'ugly' (generic or indefinite), *ta grd* 'the ugly (one).' An indefinite article, also characteristic of colloquial speech, has developed from the numeral 'one' (*eden*), e.g., *ena grda faca* 'an ugly face/guy.'

The present tense of the verb distinguishes person and number. Pronouns are normally dropped unless the subject is emphasized or reference is switched. Second person plural is used also as an honorific for a single addressee.

Table 4 Singular ADJ + noun

Case	*Feminine*	*Masculine*	*Neuter*
Nominative	lepa hiša 'beautiful house'	lep(i) hrib 'beautiful hill, mountain'	lepo mesto 'beautiful town'
Accusative	lepo hišo	lep(i) hrib	lepo mesto
Genitive	lepe hiše	lepega hriba	lepega mesta
Dative	lepi hiši	lepemu hribu	lepemu mestu
Locative	(pri) lepi hiši	(pri) lepem hribu	(pri) lepem mestu
Instrumental	(z) lepo hišo	(z) lepim hribom	(z) lepim mestom

Table 5 Plural ADJ + noun

Case	*Feminine*	*Masculine*	*Neuter*
Nominative	lepe hiše	lepi hribi	lepa mesta
Accusative	lepe hiše	lepe hribe	lepa mesta
Genitive	lepih hiš	lepih hribov	lepih mest
Dative	lepim hišam	lepim hribom	lepim mestom
Locative	(pri) lepih hišah	(pri) lepih hribih	(pri) lepih mestih
Instrumental	(z) lepimi hišami	(z) lepimi hribi	(z) lepimi mesti

Verbs distinguish imperfective and perfective aspect, in general, incomplete vs. completed action. Unprefixed verbs are usually imperfective (*pisati* 'to write') or bi-aspectual (*nesti* 'to carry'). Prefixation creates additional, primarily perfective meanings, such as *podpisati* 'to sign (e.g., a document),' *odnesti* 'to carry something away.' Imperfectives are derived from these prefixed forms by suffixation and sometimes also vowel gradation, e.g., *podpisovati* 'to sign repeatedly, to be in the process of signing,' *odnašati* 'to carry away repeatedly, to be in the process of carrying away.'

Noun and Adjective Inflection

See Tables 4–6.

Verb Inflection

The present tense declension marks person and number. Past and future tenses are constructed of an auxiliary (*sem* = past, *bom* = FUT), conjugated as in the present tense, plus a past participle marked for gender and number, e.g., *sem delal* 'I worked-MASC-sing,' *bom delala* 'I shall work-FEM-sing.' The conditional is formed with an invariant particle *bi*, e.g., *bi delali* 'we/you all/they would work' (see Table 7).

Table 6 Dua ADJ + noun

Case	*Feminine*	*Masculine*	*Neuter*
Nominative, Accusative	lepi hiši	lepa hriba	lepi mesti
Genitive	lepih hiš	lepih hribov	lepih mest
Locative	(pri) lepih hišah	(pri) lepih hribih	(pri) lepih mestih
Dative, Instrumental	lepima hišama	lepima hriboma	lepima mestoma

Table 7 Present-tense inflection

	Singular	*Plural*	*Dual*
1	vozi-m '(I) drive'	vozi-mo	vozi-va
2	vozi-š	vozi-te	vozi-ta
3	vozi	vozi-jo	vozi-ta

Syntax

Word Order

Neutral word order (1) is SVO, but the order may be rearranged depending on emphasis, with either the object moving to the beginning (2) or the subject to the end of the sentence (3).

(1) *Miran* *je*
Miran-NOM-sing 3-sing-AUX
kupil *kruh*
bought-MASC-sing bread.ACC
'Miran bought bread'

(2) *Kruh* *je* *kupil*
bread.ACC 3-sing-AUX bought-MASC-sing
'He bought **bread**'/'It was bread that he bought'

(3) *Kruh* *je* *kupil*
bread.ACC 3-sing-AUX bought-MASC-sing
Miran
Miran-NOM-sing
'**Miran** bought bread'/'It was Miran who bought bread'

In noun phrases the order is DEM + NUM + ADV + ADJ + noun, where all but the ADV agree in case, number and gender:

(4) *Tisti* *dve* *prav*
those-DEM-NOM-DU-FEM two-NOM-DU-FEM quite-ADV
brihtni *punčki*
bright-NOM-DU-FEM girls-NOM-DU-FEM
'these two quite bright girls ....'

Clitics

Clitic elements, in accord with Wackernagel's Law, follow directly after the first accented word or noun phrase in the main clause:

(5) *Trudili* *smo*
try-IMPERF-PP-MASC-PL AUX-1-PL
se *jo* *razumeti*
REFL-PART PRO-3-sing-ACC-FEM understand-INF
'we were trying to understand her'

Subordinate clauses are typically introduced by *da* 'that,' *ki / kateri* 'which,' *ker* 'because,' *ko(t)* 'as,' *če* 'if':

(6) *Prepričana* *sem,* *da* *je*
convinced-FEM-sing be-1-sing that be-3-sing
tvoj *računalnik* *zastarel*
your-MASC-sing-nom comp-MASC-sing-NOM superannuated-MASC-sing-NOM
'I'm convinced that your computer is obsolete'

(7) *Pazi,* *ker* *te*
watch out-IMP-2-sing because PRO-2-sing-ACC
bo *avto* *povozil*
FUT-AUX-3-SG car-ACC-SG run over-PP-MASC-SG
'watch out or the car will run you over'

Lexicon

Historical influences on Slovene have come from Friulian, German (Standard German) (especially the Bavarian and Tyrolean dialects), Hungarian and Croatian (Serbo-Croatian), as well as Venetian Italian (Venetian), Dalmatian and Istrian Romance. A number of languages, including Illyrian and continental Celtic, may have made up substrata to Proto-Slovene (or, more likely, to the Romance dialects that preceded it) and are recognizable as trace elements in the vocabulary, e.g., from Celtic *Karavanke* 'Karawanken Alps,' *Kranj(ska)* 'Carniola.' German (Standard German) and English are the source of most contemporary loans, though these are officially deprecated in favor of native formations, which are increasingly accepted in everyday speech, e.g., *zgoščenka* 'compact disk' from *zgostiti* 'to make compact,' replacing *cedejka*. The youngest generation uses English freely, e.g., *ful dober* 'really good' (from Eng. *full*).

See also: Bulgarian; Language Change and Language Contact; Macedonia: Language Situation; Macedonian; Serbian–Croatian–Bosnian Linguistic Complex; Slovakia: Language Situation; Slovak; Slovenia: Language Situation.

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Slovenia: Language Situation

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Slovenian, or Slovene, is the national language of the Republic of Slovenia. Slovenian territory was part of the Hapsburg Empire for centuries before 1918 and part of what was commonly called Yugoslavia between 1918 and 1991. In 1991 Slovenia became an independent republic with a parliamentary democracy. Slovenia is situated on the 'sunny' side of the Alps, bordered by Italy, Austria, Hungary, and Croatia, with a small coastline on the Adriatic Sea. Its area is approximately 20 000 km^2 (7800 mi^2), and its capital is Ljubljana.

The population of 1 964 000 is ethnically 88% Slovenian, and there are Slovenian minorities in Italy (84 000), Austria (40 000), Hungary (6000), and Croatia (approximately 20 000), as well as in diaspora (400 000–500 000). Of the autochthonous

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REFL-PART PRO-3-sing-ACC-FEM understand-INF
'we were trying to understand her'

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minorities in Slovenia, Hungarians (6250) and Italians (2260) enjoy substantial minority rights, whereas the Romany (6000) and Germans/Austrians (680) are not equally represented.

Standardization of Slovenian has proceeded gradually since the beginnings of continuous attestation of the language in the mid-16th century. The language has used the Latin alphabet with three additional letters – č, š, ž – since the mid-19th century. Milestones in the standardization consist of grammars (the first published in 1584) and dictionaries (the monolingual dictionary published 1970–1991, 93 000 headwords), including (repeatedly since 1899) orthographic-and-orthoepic dictionaries and two etymological dictionaries. The principal grammar of Contemporary Standard Slovenian is Toporišič (4th augmented edn., 2000), and Herrity has written a Slovene grammar in English 2000.

Until the end of the 18th century the (preserved) texts were mostly religious. Slovenian literature reached an early peak in the poetry of France Prešeren (1800–1849). In the 19th century and thereafter, Slovenian gradually expanded into all spheres of communication, especially after 1918; the emancipation in 1991 even brought about the use of Slovenian in the military and in diplomacy. Currently, there is a self-imposed nonuse of Slovenian in scholarly publications of the natural sciences, a circumstance that diminishes the prestige of the language in the eyes of its users. Slovenian was most influenced by German (German, Standard and dialects), Serbo–Croatian, and now English; in the latter half of the 19th century the German impact was counterbalanced by conscious Slavization.

Scholarly work on Slovenian has been conducted since the 19th century – first at the Austrian universities of Vienna and Graz, since 1919 at the University of Ljubljana, and since 1975, also at the University of Maribor. Initially, the investigations concentrated on the history and prehistory of the language (and dialectology); since the 1960s even descriptive studies have been in full bloom (including generative grammar) and, in addition, aspects of applied linguistics. Some prominent names in Slovenian language studies include Jernej Kopitar (1780–1844), Franz Miklosich (1813–1891), Stanislav Škrabec (1844–1918), Vatroslav Oblak (1864–1896), Fran Ramovš (1890–1952), and Jože Toporišič (b. 1926).

An important field of activity is Slovenian for foreigners; summer courses in Contemporary Standard Slovenian for foreigners are offered at the University of Ljubljana.

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Slovenian Lexicography

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After the standardization of the Slovenian language in the 19th century, the seminal *Slovenian-German dictionary*, containing 110,000 headwords (Pleteršnik, 1894–1895) as well as an orthographic manual combining rules with a monolingual dictionary (Levec, 1899), was compiled.

The Institute of Slovenian Language (ISL), the first Slovenian institution that could coordinate extensive lexicographic work, was created after World War II. The institute, hosted by the Scientific Research Center of the Slovenian Academy of Sciences and Arts, prepares a wide range of monolingual dictionaries. After its foundation, it started the preparation of the *Dictionary of standard Slovenian* SSKJ (Bajec *et al.*, 1970–1991), a five-volume dictionary containing more than 107,000 entries and subentries. The line of Slovenian orthographic manuals has been continued by different authors, but the recent sixth *Slovenian orthography* (Toporišič *et al.*, 2001) was compiled by ISL. Its dictionary part contains 130,000 headwords and subentries, including proper names. In addition to etymological, terminological, and historical dictionaries—many of which are already available—a synonym dictionary, a phraseological dictionary, and a valency dictionary as well as a linguistic atlas for Slovenian are expected to be published by ISL in the near future. The project of a new one-volume monolingual dictionary has been transformed into that of a dictionary of neologisms.

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Slovenian monolingual lexicography is vividly discussed in public, for example, in the journals *Slavistična revija, Jezik in slovstvo*, and *Jezikoslovni zapiski*.

The most comprehensive bilingual dictionaries are published by the publishing house DZS. The three largest ones cover the languages German, English, and Italian, with the following main authors, years of most recent edition, and numbers of headwords: Doris Debenjak (2001: German-Slovenian, 123,000; 2003: Slovenian-German, 100,000), Anton Grad (2004: English-Slovenian, 80,000; 2002: Slovenian-English, 45,000), and Sergij Šlenc (2001: Italian-Slovenian, 70,000). These bilingual dictionaries as well as the *Dictionary of standard Slovenian* are available on CD-ROMs produced by the software company Amebis. A corpus-based English–Slovenian dictionary of 120,000 headwords is to appear from DZS in two volumes (2004: A–K, 2006: L–Z).

The two largest Slovenian corpora, FIDA (owned by DZS, Amebis, the Philosophical Faculty of Ljubljana University, and the research institute Jožef Stefan) and Nova beseda (ISL) comprise more than 100 million words each. Web interfaces provide public access to a restricted version of the FIDA corpus and to the full version of Nova beseda. While FIDA contributes mainly to the compilation of bilingual dictionaries at DZS, Nova beseda supports the preparation of monolingual dictionaries at ISL.

See also: Academies: Dictionaries and Standards; Corpora; Corpus Linguistics; Corpus Lexicography; Slovene; Slovenia: Language Situation.

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Smith, Adam (1723–1790)

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Adam Smith was born in Kirkcaldy, Scotland, in 1723. He studied at the University of Glasgow from 1737 to 1740, concentrating on mathematics and natural philosophy (science), but he was also much influenced by Francis Hutcheson's lectures on moral philosophy. Smith then moved to Balliol College, Oxford, where for the next seven years, according to the biographical account written by Dugald Stewart, he devoted himself to the "study of human nature in all its branches, more particularly of the political history of mankind" (Stewart, 1793). As part of this study he undertook to master the major European languages and literatures, and it was in the area of rhetoric and belles-lettres that he initially undertook private lecturing when he left Oxford for Edinburgh in 1748.

In 1751 Smith was appointed to the Chair of Logic and Rhetoric at the University of Glasgow, and his lectures continued to be mainly about rhetoric and belles-lettres, prefaced with some considerations of psychology. A year later, the Chair of Moral Philosophy fell vacant and he was given it instead. His lectures from this chair over the next 13 years encompassed rhetoric, theology, and ethics, and also 'Justice, Police, Revenue, and Arms,' a conglomeration from which his political economics would eventually develop. In 1759, drawing mainly from his lectures on ethics, he published *The theory of moral sentiments*, the work that established his reputation universally.

Smith's one direct contribution to the linguistic thought of his time is his 'Considerations concerning the first formation of languages, and the different genius of original and compounded languages,' first published in 1761. It would form part of his lectures on rhetoric, but was appended to the *Theory of moral sentiments* starting with the book's third edition of 1767. The essay falls squarely within the line of historical inquiry launched by Condillac's *Essai sur l'origine des connoissances humaines* (1746), though it appears to be reacting more directly to Rousseau's *Discours sur l'origine et les fondemens de l'inégalité*

Slovenian monolingual lexicography is vividly discussed in public, for example, in the journals *Slavistična revija, Jezik in slovstvo*, and *Jezikoslovni zapiski*.

The most comprehensive bilingual dictionaries are published by the publishing house DZS. The three largest ones cover the languages German, English, and Italian, with the following main authors, years of most recent edition, and numbers of headwords: Doris Debenjak (2001: German-Slovenian, 123,000; 2003: Slovenian-German, 100,000), Anton Grad (2004: English-Slovenian, 80,000; 2002: Slovenian-English, 45,000), and Sergij Šlenc (2001: Italian-Slovenian, 70,000). These bilingual dictionaries as well as the *Dictionary of standard Slovenian* are available on CD-ROMs produced by the software company Amebis. A corpus-based English–Slovenian dictionary of 120,000 headwords is to appear from DZS in two volumes (2004: A–K, 2006: L–Z).

The two largest Slovenian corpora, FIDA (owned by DZS, Amebis, the Philosophical Faculty of Ljubljana University, and the research institute Jožef Stefan) and Nova beseda (ISL) comprise more than 100 million words each. Web interfaces provide public access to a restricted version of the FIDA corpus and to the full version of Nova beseda. While FIDA contributes mainly to the compilation of bilingual dictionaries at DZS, Nova beseda supports the preparation of monolingual dictionaries at ISL.

See also: Academies: Dictionaries and Standards; Corpora; Corpus Linguistics; Corpus Lexicography; Slovene; Slovenia: Language Situation.

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Smith, Adam (1723–1790)

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Adam Smith was born in Kirkcaldy, Scotland, in 1723. He studied at the University of Glasgow from 1737 to 1740, concentrating on mathematics and natural philosophy (science), but he was also much influenced by Francis Hutcheson's lectures on moral philosophy. Smith then moved to Balliol College, Oxford, where for the next seven years, according to the biographical account written by Dugald Stewart, he devoted himself to the "study of human nature in all its branches, more particularly of the political history of mankind" (Stewart, 1793). As part of this study he undertook to master the major European languages and literatures, and it was in the area of rhetoric and belles-lettres that he initially undertook private lecturing when he left Oxford for Edinburgh in 1748.

In 1751 Smith was appointed to the Chair of Logic and Rhetoric at the University of Glasgow, and his lectures continued to be mainly about rhetoric and belles-lettres, prefaced with some considerations of psychology. A year later, the Chair of Moral Philosophy fell vacant and he was given it instead. His lectures from this chair over the next 13 years encompassed rhetoric, theology, and ethics, and also 'Justice, Police, Revenue, and Arms,' a conglomeration from which his political economics would eventually develop. In 1759, drawing mainly from his lectures on ethics, he published *The theory of moral sentiments*, the work that established his reputation universally.

Smith's one direct contribution to the linguistic thought of his time is his 'Considerations concerning the first formation of languages, and the different genius of original and compounded languages,' first published in 1761. It would form part of his lectures on rhetoric, but was appended to the *Theory of moral sentiments* starting with the book's third edition of 1767. The essay falls squarely within the line of historical inquiry launched by Condillac's *Essai sur l'origine des connoissances humaines* (1746), though it appears to be reacting more directly to Rousseau's *Discours sur l'origine et les fondemens de l'inégalité*

parmi les hommes (1755), which it cites, and to Girard's *Vrais principes de la langue françoyse* (1747), which in a letter of 1763 Smith said "first set me a thinking upon these subjects."

According to Smith, language began with savages naming things, then extending a name from one thing to another that resembled it. The creation of adjectives to denote the qualities that produced this resemblance involved considerable abstraction and generalization, even more of which was required to produce prepositions, which indicate metaphysically complex relationships between nouns. A more natural procedure for indicating qualities and relationships is to make a slight change in the noun itself – what we now call inflectional morphology – and Smith asserts a basic distinction between 'original' languages, which rely mainly on inflection, and 'compounded' languages (in modern terminology, 'analytic'), which instead use separate words to express qualities and relationships. Verbs similarly began with the impersonal type (e.g., Latin *pluit* 'it is raining'), then when the need came to express the subject, the 'original' way was to mark it morphologically and the 'compounded' way was to express it separately.

Smith ties the move from original to compounded structures to the historical mixture of populations. Greek, he writes, "seems to be, in a great measure, a simple, uncompounded language, formed from the primitive jargon of those wandering savages, the ancient Hellenians and Pelasgians, from whom the Greek nation is said to have been descended" (§37). This historical simplicity is mirrored in the lexicon of the language: "All the words in the Greek language are derived from about three hundred primitives, a plain evidence that the Greeks formed their language almost entirely among themselves, and that when they had occasion for a new word, they were not accustomed, as we are, to borrow it from some foreign language, but to form it, either by composition, or derivation from some other word or words, in their own" (§37). However, the resultant need to form new words through the morphological processes of composition and derivation means that such simplicity as Greek possesses in its lexicon is balanced by compoundedness in its morphological structure. Latin, in contrast, "is a composition of the Greek and of the ancient Tuscan languages" (§38), a historical make-up that Smith sees as being directly reflected in the compounded structure of the Latin lexicon, while "Its declensions and conjugations accordingly are much less complex than those of the Greek" (§38). French and Italian represent a further stage of compoundedness from that of Latin, and English a still further one, being "compounded of the French and the ancient Saxon languages" (§40).

"In general," he writes, "it may be laid down for a maxim, that the more simple any language is in its composition, the more complex it must be in its declensions and conjugations; and, on the contrary, the more simple it is in its declensions and conjugations, the more complex it must be in its composition" (§36). Over time there are ever fewer original languages and ever more compounded ones, hence the trend away from the highly inflected classical languages toward the simpler morphology (but complex lexica and fixed syntax) of modern tongues. Smith likens this to the process by which a machine gets simplified over time from the complex form in which it is first invented, as its users gain greater awareness of how its parts function – but with the difference that, whereas this process leads to the perfecting of machines, it tends toward increasing imperfection in languages, where simplification of structure makes them more prolix, less agreeable to the ear, and less readily susceptible to the play of syntax for poetic and rhetorical purposes.

Early in 1764 Smith left his chair at Glasgow to accompany the Duke of Buccleuch as his tutor on a tour through continental Europe that would last until October 1766. From that time on Smith labored on his *Inquiry into the nature and causes of the wealth of nations*, which was published in 1776 and became the cornerstone of modern economic theory. In Book IV, Chapter 2, he famously writes of how an individual who "intends only his own gain" is "led by an invisible hand to promote" a social "end which was no part of his intention." In recent years this notion of the "invisible hand" has been invoked in historical linguistics to explain how language change can follow consistent, long-term paths that speakers are unaware of. Whether Smith, who died in 1790, would have endorsed the transfer of this metaphor from economy to language is unknowable but doubtful, since he did not see change in a language as representing any kind of progress for the interests of those who speak it, but enacting a very different kind of structural economy in which a shift from simplicity toward compoundedness follows necessarily from the movement of populations, and provokes an equal and opposite shift within another area of language structure.

See also: Condillac, Etienne Bonnot de (1714–1780); Evolutionary Theories of Language: Previous Theories; Origin and Evolution of Language; Origin of Language Debate; Rousseau, Jean-Jacques (1712–1778).

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Smith, Henry Lee (1913–1972)

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Henry Lee Smith, Jr., is best known for his contributions to the fields of phonology/morphology, literacy, and foreign language teaching. Specifically, Smith introduced the concept of the morphophone, a structural unit between phoneme and morpheme. Smith instructed teachers to create beginning reading materials that concentrated on the association between graphs, one or more letters used to represent a single morphophone, and the morphophone itself. Smith also designed materials for foreign language teaching, many of which are still in use, for the U.S. Army and the Foreign Service Institute (FSI) School of Language and Linguistics (later the School of Languages), which he cofounded.

Smith was born on July 11, 1913, in New Jersey. He received his Bachelor's Degree summa cum laude, Phi Beta Kappa, from Princeton University in 1935. He continued his studies at Princeton, from which he received his M.A. in 1937 and his Ph.D. in Oriental languages and literature in 1938. He was named a Charlotte Elizabeth Procter Fellow at Princeton in 1937–1938. From 1938 to 1940, he lectured at Barnard College, Columbia University, before accepting a two-year appointment as an English instructor at Brown University. From 1942 to 1946, Smith produced manuals, dictionaries, recordings, and phrase books for 22 foreign languages for the Intensive Language Program of the U.S. Armed Forces Institute. In 1946, Smith joined the Department of State and became Assistant Director of the FSI and cofounder of the FSI School of Language and Linguistics, Washington, D.C., in 1946. Appointed professor of languages in 1952, he served as dean of the school in 1955–1956. Smith then went on to cofound and serve as chairman of the Department of Anthropology and Linguistics at the then University of Buffalo (now SUNY-Buffalo) with George L. Trager in 1956. He served as chairman of the Department of Anthropology there from 1964 to 1965 and as director of the Program in Linguistics from 1967 to 1968, before resigning to continue as a full-time professor of Linguistics and English at that same university.

Smith's research in structuralist linguistics was a data-oriented system of analysis focused on using native informants. Smith proposed a series of conclusions about English sounds and structure, many of which can be found in *An outline of English structure*, which he co-authored with George Trager in 1951 (revised in 1957) and which is considered a foundational work in linguistic analysis. In this work, Trager and Smith present a tripartite, 36 vocalic system consisting of nine simple vowel phonemes /i, e, æ, ɨ, ə, a, u, ɔ, o/, which can each combine with each of the three semivowel phonemes /y, w, h/ to form 27 complex vowel nuclei. Although this system is not widely used, it once competed with the IPA system and is the system that William Labov uses, with slight modifications, in his variationist research.

Smith also spent a considerable amount of time thinking and writing about the concept of the morphophone, the basic unit of the morpheme, which Sustakoski, in a foreword to Smith (1968), predicted would be considered as important in the history of linguistics as the clarification of the phoneme. This concept was introduced in Trager and Smith (1951) and was further developed in such publications as 'The concept of the morphophone' (1967), *English morphophonics: implications for the teaching of literacy* (1968), and 'The morphophone and English dialects' (1972). The morphophone, as defined by Smith (1972), was a "'holding company' or 'super family' of different phonemes which are *noncontrasting in the same word*" but also are "a *unit* of the language *as a whole* which, *as a unit*, furnishes the basis for 'higher order' or 'higher level' *contrasts*." To put it in technical language, the morphophone is the *basic unit* of the morpheme, and morphophones are *expressed* by phonemes. Smith claimed that the level of the morphophone was the level at which speakers calibrated equivalence between different phonemes in what they hear as the same words. Contrasts in vowel

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phonemes that occurred in pristine environments, or, in English, monosyllabic words ending in /p/, /t/, /k/, were primary contrasts, requiring a separate morphophone unit for each contrast. Phonemes that make these contrasts were the principal variants of the morphophone unit, each of which constituted the pure variants of each morphophone unit. Secondary contrasts occurred when different phonemic expressions were analyzed as the principal covariants of the same unit, but did not occur in pristine environments. Tertiary contrasts occurred when phonemes making the contrasts never occurred in pristine environments, are assignable within the idiolect to two morphophone units, and are in free variation with those constituting the principal variants of each of the two units. Dialects differ in their diamorphophonic selections, or the selection of different morphophone units as units that are noncontrasting in the same words. Smith felt that one could objectively distinguish between dialects and languages based on whether calibration between different forms of morphonones was evident (dialects of same language) or not (two separate languages).

For Smith, the morphophone was a useful tool for language education. Smith claimed that the current writing system was based on the graphic representation of morphophone units rather than phonemes. Readers respond to graphic symbolizations with the phonemic expressions of the morphophones from their dialect or idiolect. In a 1954 lecture at Harvard University, 'Linguistic science and the teaching of English' (published in 1956), Smith stated that language educators should systematically teach the relationship between sound and letter. In addition, Smith co-authored *The linguistic readers* (1963–1967), materials for beginning learners, and *A linguistic approach to English* (1964 and 1965), designed for high school students, both of which incorporate the concept of morphophone.

In general, Smith felt that language educators needed to learn more about linguistics. He stressed that teachers needed to understand that students' variable pronunciations were not incorrect pronunciations. He also emphasized that teachers should never make a child feel inadequate because of his or her variable pronunciation.

Smith also hoped to teach the general public about linguistics. He prepared and appeared on such programs as 'Where Are You From?' on WOR New York from 1939 to 1941, in which he asked participants to pronounce words and would try to determine their dialects; a 13-film series titled 'Language and Linguistics' in 1959; 'Meet the Professor'; and 'Speaking of Ideas,' a weekly program airing on WGR Buffalo that he moderated from 1961 to 1964. He also appeared on the television quiz shows 'What's My Line?' and 'I've Got a Secret.'

For the last years of his life, Smith was working on what he called aspectualism, a descriptive analysis of English that relied on real world events. This system expanded a tripartite approach of phonology, morphology, and semology to a total of 27 levels, or aspects. His final results were never published since Smith died suddenly of a heart attack on December 13, 1972, after speaking to a civic group about English dialects. He was survived by his wife, Virginia von Wodtke Smith, who died in 1987, and four children, Heather Kleiner, Marshall, Randolph, and Letitia.

See also: Labov, William (b. 1927); Morphophonemics; Phoneme; Phonology: Overview; Trager, George L. (1906–1992).

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Social Aspects of Pragmatics

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Introduction

It might seem somewhat strange to talk of 'the social aspects of pragmatics' because the very choice of such a topic might lead a newcomer to the field to think that, strictly speaking, there is nothing social about pragmatics. That such an inference is perfectly in order may be verified by comparing the expression to an analogous one like 'the economic aspects of the AIDS pandemic' where clearly no one is suggesting that economics is of the very essence as far as AIDS is concerned. Does it at all make sense, one might ask, to conceive of pragmatics in any terms other than social? Alternatively, is it not pleonastic to speak of the social aspects of pragmatics, given that, no matter how you define the field of research called linguistic pragmatics, the social dimension of language will – or should, if it is to remain faithful to its object of study – turn out to be constitutive of it, rather than something added on to it subsequently, say, by way of an afterthought? As Koyama (1997: 1) put it, "[. . .] a pragmatic theory is evidently a linguistic and social theory at once."

Furthermore, if it is granted that pragmatics addresses issues relating to the use of language, as most scholars would agree it does, one might equally wonder how one can sensibly approach such issues except by first recognizing their social embeddedness. Finally, isn't language itself, as Dummett (1975: 135) aptly put it, "something *essentially social*, a practice in which many people engage" (italics added)? Or isn't it essentially "dialogic," as Bakhtin (1981) forcefully argued, thus, to quote Dentith (1995: 91), "radically socializ[ing]" the way the speaking subject is theorized? Mey (1985: 11) goes straight to the heart of the matter when he says:

> We cannot describe language and its use outside the context of that use, viz. the society in which language is used. To start out either with a definition of language (which one?), and then define society (what kind of?), or the other way around, will only lead to endeavors (as frantic as they are makeshift) to paste together what never should have been separated in the first place.

Neglect of Society in Language Studies

But the fact remains that many scholars have traditionally preferred to theorize language in complete disregard for its social setting. There has been a strong tendency among linguists to reify language and view it as a purely mental phenomenon and, as such, the attribute of a single individual existing, as it were, in an idyllically pre-social, Adamic or pre-Fall state. The following remark by Whitney (1827–1894) is typical of a research orientation that dominated most of the thinking on the nature of language in the 19th and 20th centuries.

> There can be asked respecting language no other question of a more elementary and at the same time of a more fundamentally important character than this: how is language obtained by us? How does each speaking individual become possessed of his speech? Its true answer involves and determines well-nigh the whole of linguistic philosophy (Whitney, 1875 [1979]: 7).

Notice that the whole emphasis is on the individual acquiring his/her linguistic skills – the initial mention of "us" gives way, with no justification or apology whatsoever, to "each speaking individual" now being considered severally rather than collectively. The fact that, for a language to be said to exist in any minimally meaningful sense of the word there must be at least two speakers who use that language to communicate to each other, is treated as being of secondary or marginal interest. Instead, all attention is directed at the single individual and his/her knowledge of the language in question. This is all the more intriguing because, as has been pointed out (cf. Andresen, 1990), Whitney belonged to a period in the history of the United States when scholarly research on language was intimately tied to a wider agenda of national self-affirmation, so that, far from being considered an autonomous entity, language was seen as a national symbol, hence approached from an eminently political perspective.

Linguistics and the Focus on the Individual Speaker

In focusing on the individual speaker, Whitney was anticipating what was to become a central tendency in linguistics as the discipline consolidated itself in the first half of the 20th century. When in the mid-1950s, Noam Chomsky revolutionized linguistics with his radically new approach, the centerpiece of his theorizing was, true to this long tradition of relegating the social to the margins, an idealized speaker-hearer, that is to say, the two clearly distinguishable ends of a minimal communicative event (Saussure's twin "talking heads") fused into one. Society or the social embeddedness of the speaker was, in Chomsky's view, a fact of no great consequence. Here is how he put it: "As for the fact that the rules of language are 'public rules,' this is, indeed, a contingent fact." (Chomsky, 1975: 71). Society is viewed as nothing but the

backdrop against which the individual is to be singled out and focused on. The 'social context' is then equated with 'extra-linguistic context' (Fetzer and Akman, 2002: 395), thus giving short shrift to the fundamental role played by society in constituting a language. Such principled neglect of society has been justified in the name of 'autonomism' by Frederick Newmeyer, who summed up the guiding spirit of the whole approach in the following words:

> (The advocates of autonomism) approach language as a natural scientist would study a physical phenomenon, that is, by focusing on those of its properties that exist apart from either the beliefs and values of the individual speakers of language or the nature of the society in which the language is spoken (Newmeyer, 1986: 5–6).

Dissident Voices

No doubt, there are important exceptions to the dominant tendency to construct a theory of language around the figure of a single individual. Thus, Hymes warned: "A perspective which treats language only as an attribute of man leaves language as an attribute of men unintelligible" (Hymes, 1973: 60). Writing in much the same vein, Halliday characterized linguistics as a "social semiotic" and insisted that "[a] speaking man does not talk; men talk" (Halliday, 1974: 17). Outside the disciplinary bounds of linguistics, Wittgenstein (1953) had already put forward what is famously known as the 'private language argument': an argument against the very possibility – not empirical, but conceptual – of a language so exclusively private that no one else has access to it. As Itkonen (1996) has forcefully argued, Wittgenstein's argument strikes at the heart of Chomsky's conception of language. So, too, from a completely different perspective, the Russian psychologist Lev Vygotsky (1896–1934) had insisted on the importance of social interaction in the development of cognition, arguing that

> All the higher functions [including voluntary attention, logical memory, and the formation of concepts] originate as actual relationships between individuals (Vygotsky, 1978: 57).

Speaking from a philosophical perspective, Hacker (1988: 171) preferred not to mince matters when he declared:

> The study of language is not a branch of psychology. Little but confusion has stemmed from the supposition that linguists are investigating the nature of the mind, or the mechanisms of understanding.

The Genealogy of the Lone Individual

Given the predominant tendency among linguists to start their inquiry into the nature of language around single speakers and their linguistic competence and only subsequently pan out in order to look at the society of which the individual is an integral part, it is useful to begin by asking why it is that the lone individual occupies such a central place in much of the thinking about language.

The Broader Canvas

It is not all that difficult to track down the origins of modern linguistics' excessive emphasis on the individual speakers and their linguistic competence, in combination with its relative neglect of society which is where, as we have seen, a language can truly be said to exist. As has been argued by a number of scholars (e.g., Hutton, 1996), modern linguistics is a discipline heavily premised on principles that date back to the 19th century. Taylor (1992: 25ff) points out that, some time during the 18th century, the idea of man as a socially inscribed being gave way to that of a uniquely constituted self, based on self-awareness and self-reflection. In Germany, Herder (1744–1803) contributed to the shaping of not only an individual identity, but also of a collective one, modeled on that individual identity (for instance, that of a people or *Volk*), by insisting that the Germans could only aspire to a national identity by being true to themselves and their past and not, say, by aping the French.

Ian Watt (1957, 1996) has painstakingly documented the growth of individualism in the 18th through 19th centuries, as reflected in the literary works of the period. The new sense of realism that swept across Europe during that period was accompanied by the equally new spirit of individualism, and the two together underpinned what one might call the cultural and sociopolitical ethos of the period. Daniel Defoe's *Robinson Crusoe* is a synthesis of that ethos. Modeled on the real life story of a man called Alexander Selkirk, the protagonist of what many literary critics consider the first English novel is the finest example of the glorification of the loner. The importance of Crusoe as a key to the understanding of changing perceptions of the lone individual can only be fully appreciated if we compare him to Faust, Don Juan, and Don Quixote, all originally conjured up between the 16th and the 18th centuries by their respective creators as prototypes of 'anti-individuals' – the first two are burned in hell-fire and the last is publicly mocked and ridiculed. Incidentally, it is also the very same figure of the loner who is glorified when historians of modern philosophy fondly register that René

Descartes, its founding father, experienced a moment of intense inspiration during a dream "in a stove-heated room" when he was serving at Ulm in 1619 (Blackburn, 1994: 100). Linguistics in general and much of early pragmatics is thus wedded to the idea of "the Cartesian autonomous agent" (Kopytko, 2001).

As Watt shows, by the 19th century, this inward-looking and narcissistic individualism had firmly taken hold of the European psyche. The spirit of colonial expansionism that swept across the continent glorified the figure of the loner who braved the elements and conquered distant lands – a Tarzan in the land of apes. The spirit of Enlightenment also took its cue from Descartes and elected the loner as the prototype of the reasoning man in intense meditation, away from the madding crowd, as portrayed in the familiar tale told about Socrates, the Father of Western Philosophy, lost in a philosophical trance while perched on his doorstep before being rudely awakened by a bucketful of cold water tossed at him by Xanthippe, his notoriously cantankerous wife. Radical, navel-gazing forms of individualism have been complicit in the history of European colonialism (cf. Said, 1978) on the one hand, and, on the other, tied up with the very emergence of modern society (Berman, 1971). It is interesting to note in this context that even Freudian psychoanalysis, which otherwise called into question some of the fundamental tenets of modernism, such as the centrality of the all-knowing rational agent, was built around the concept of the lone individual (*see* **Psychoanalysis and Language**). In writings such as *Totem and Taboo* and *Civilization and its Discontents*, Freud took a view of the progress of human civilization (as evolving, according to him, from savagery to monotheism and patriarchy) along essentially the same lines as he considered the child's development to adulthood; thus, Freud became the lightning rod for charges of ethnocentrism, and the accusation that the very idea of Oedipus is "colonialism pursued by other means" (Deleuze and Guattari, 1977: 170).

In thinking about and theorizing about language, the intellectual stance adumbrated in the foregoing paragraphs contributed to the consolidation of the idea that language itself is but the visible manifestation of the reasoning mind. It is not surprising therefore that, to the extent that the human linguistic faculty was seen as a property of man's reasoning mind, language itself was seen as primarily pertaining to the individual speaker-listener and only secondarily and derivatively to the society. Indeed, the centrality accorded to the lone individual underwrites the widespread practice among scholars working in the area of language acquisition of simply taking it for granted that phylogeny follows the same course as ontogeny. The underlying principle may be seen as authorizing the widespread use of biological metaphors such as 'growth', 'decline, 'death', etc., to depict specific moments in the history of an irreducibly social object such as language.

The More Immediate Context

The reason why many pragmaticists have tended to concentrate on the cognitive dimension, often to the total neglect of the social – Steven Davis' 1991 book *Pragmatics: a reader* (Davis, 1991) has an entire section devoted to Psychology and Pragmatics but none whatsoever entitled Sociology and Pragmatics) – has more to do with the way this 'branch of linguistics' developed historically, in spite of claims such as made by the editors of the first of issue of the *Journal of Pragmatics* to the effect that the "science of language use," as it is pursued by contemporary researchers, has "no direct ties with the historical use of the term" (Haberland and Mey, 1977: 1). Originally conceived as part of a general theory of signs, pragmatics is often seen as dealing with those aspects of meaning that cannot be adequately handled by semantics, thus representing, as Tyler (1978: 461) lamented, "a mere appendage of semantics"; alternatively, from the perspective of contemporary generative grammar, pragmatics should be dealt with by syntax, given that a central tendency within this paradigm today is to empty semantics of most or all of its contents, distributing the spoils between the other two components of the old triad (*see* **Syntax-Pragmatics Interface: Overview**). Katz and Fodor (1963) famously delimited the domain of semantics by stipulating that "Linguistic description minus grammar equals semantics," and Gazdar (1979), most likely taking his cue from them, went on to characterize pragmatics as "meaning minus semantics." In other words, pragmatics became the "wastebasket" (Bar-Hillel, 1971) of linguistics and the working motto of linguists became: "When in trouble call it pragmatics and jump!" (Haberland and Mey, 1977: 7) (*see* **Pragmatics: Overview**).

The tripartite division of the theory of signs into syntax, semantics, and pragmatics has led many unwitting scholars to conclude that syntax is the crux, or, if you will, the real hard core of linguistics, with a progressive 'softening up' of rigor and internal coherence as one moves from syntax through semantics to pragmatics. This attitude is spelled out in such remarks as

> Pragmatics, though less so than syntax and semantics, is characterized by a set of central research issues forming a coherent scientific program of linguistic inquiry (ter Meulen, 1978: 439).

The underlying preoccupation in such descriptions of the role of pragmatics seems to be to define the subfield relative to what by implication is treated as its 'meatier' sister subdisciplines. It is as though the scientific credentials of pragmatics could only be established by parading it alongside the other two members of the triad and conceding how miserably it pales in comparison.

On Defining a New Role for Pragmatics

A more liberating view of what pragmatics should concern itself with is taken by Cook when he says:

> Pragmatic philosophy is not, as it is often taken to be, a ready-made technique for analyzing occurring discourse . . .. The subjective, selective, and fundamentally unscientific nature of analysis of language in context should be acknowledged and not disguised by adopting the symbols and signs of more confident (if less exciting) approaches (Cook, 1990: 15).

In fact, a positive development in recent years has been a clearly discernible tendency among leading pragmatists to rethink the very contribution of pragmatics to an understanding of language. Thus McHoul (1997) makes a clarion call for a 'pragrammatology' on the strength of Jacques Derrida's candid admission that "[g]rammatology has always been a sort of pragmatics" (Derrida, 1988: 159), and urges fellow pragmatists to "'deconstruct' all hitherto-existing pragmatics." Verschueren pleads for a sea-change in the way we conceptualize pragmatics, starting with viewing it as "not a layer or component but a perspective" (Verschueren, 1987, 1999a) and argues that "[a] thorough 'ideological' critique of the pragmatic literature is urgently called for" (Verschueren, 1999b: 877).

Mey has been one of the leading scholars in the crusade to openly politicize research in pragmatics, thus initiating what one might refer to as the 'critical turn' in contemporary pragmatics. With hindsight, one may consider the following excerpt as marking a watershed:

> One of the main theses is that our use of language cements the dominant interests of our society, helping to oppress a large segment of the population (Mey, 1985: 16).

For Mey, work done in linguistic pragmatics should go beyond the merely descriptive or explanatory ambitions of mainstream linguistics and embrace transformative or emancipatory goals. The idea of pragmatics as a 'perspective of linguistics' is also forcefully defended by Mey (2001 [1993]).

Not just a perspective *of* linguistics, one may note, but a perspective *on* linguistics. Thus Haberland and Mey (2002: 1672) underscore the urgent need for ensuring that work done in pragmatics is socially relevant, drawing attention to the "society's need for language studies." The rhetorical question posed by the authors (Haberland and Mey, 2002: 1673) when they ask whether pragmatics should be defined "from the inside out" or "from the outside in," "by considering the conditions that make the object possible" may be read as a powerful indictment of the hallowed practice in mainstream linguistics of conceptualizing language by starting with the lone speaker, i.e., starting with what goes on in the mind of the individual speaker and finally paying lip service to the idea that that individual, as it happens, is socially embedded.

The Politics of Pragmatics

The New Orientation

The basic upshot of the discussion in the foregoing section is that research in pragmatics is inescapably caught up in the politics of language and, no less important, in the politics of linguistics. What the recent about-face in pragmatic research – implied in the transition from a component of to a perspective of/on linguistics – really amounts to is a desire on the part of leading researchers to carve out a disciplinary matrix where they no longer have to wait to work on unresolved problems in so-called 'hard core linguistics' (i.e., linguistics where the social question enters as at best an afterthought), but to rethink the very role of society in molding and sustaining language. It is, above all, a desire to free research on language from its time-honored tendency to concentrate on "the language user as an autonomous agent, a kind of linguistic Robinson Crusoe, always reinventing the linguistic wheel" (Mey, 2000: 7).

Interesting Consequences

It is important to point out that a willingness to look at language "from the outside in" rather than "from the inside out" has interesting and often dramatic consequences for the way we identify problems and propose solutions. To begin with, there is a need to recognize that many of the problems we have customarily identified in language are the result of our "inside out" way of conceiving of language. Examples are legion. Consider, for example, the treatment standardly given to the phenomenon linguists have identified as the 'context.' The practice of forcibly isolating naturally occurring utterances in order to study them as mere ordered sequences of words or sentences, or what has been referred to as "context-excluding fact fetishism" (Mey, 2003), is what made the whole concept of context so attractive to begin with and at the same time ever so elusive.

Recent work on context and the whole idea of 'recontextualizing' in order to solve such problems as ambiguity and vagueness (both of which only exist when sentences are focused on in isolation from their contexts) shows that a radically new approach is called for (Scharfstein, 1989; Akman and Bazzanella, 2003) (*see* **Context, Communicative**). Nerlich and Clarke (2001) illustrate one interesting possibility of looking at ambiguity, not as a structural given, but as something that language users purposively exploit to certain communicative ends. Contrary to what theorists of implicature and relevance imagine, these authors contend "that people who engage in conversation do not always strive for rationality and relevance, that they do not always intend words to have one meaning and 'disambiguate' polysemous words automatically in context" (Nerlich and Clarke, 1002: 1) (*see* **Conspicuity**).

The Lure of Cognitivism

Athough, as we have seen, there is today a clearly recognizable move today toward rethinking pragmatics by recognizing the inalienable social nature of language, one should by no means overlook what Haberland and Mey call "a revisionist or reductionist tendency" among certain practitioners, as manifested in the attempts "to revise and 'redo' especially Grice and, to a lesser degree Austin" (Haberland and Mey, 2002: 1674).

Perhaps the best-known attempt at 'revising' Grice is Sperber and Wilson's (1986) work on relevance, aptly described by Levinson (1989: 469) as "an ambitious bid for a paradigm-change in pragmatics" whereby "pragmatics is reduced to a single cognitive principle, a mental reflex, which governs much else besides language use." For Carston (2000: 87), relevance theory brings pragmatics in line with formal linguistics with the only difference that "it is an account of performance mechanisms" (*see* **Relevance Theory**).

There is no doubt either that Austin, too, has been hijacked to fit into the mold of mainstream linguistics. It has been argued (Rajagopalan, 2000) that Searle's intervention has been pivotal in 'domesticating' Austin and revising his thoughts in such a way that they could be incorporated into the formal structure provided by generative grammar in what is referred to as the 'abstract performative hypothesis.' By decontextualizing the individual speech act, i.e., by prying it from its context in order to consider it in isolation as a unit invested with a certain communicative (illocutionary) potential, Searle made it possible for the concept to be smoothly absorbed into the model of syntax being proposed by the advocates of 'generative semantics', inviting such pointed criticisms as:

> There is, to my mind, no escaping the observation that context, which is most proximately and consequentially temporal and sequential, is not like some penthouse to be added after the structure of action has been built out of constitutive intentional, logical, syntactic, semantic and pragmatic/speech-act-theoretic bricks (Schegloff, 1992: 125).

Societal Pragmatics as a Politically Self-conscious Way of Doing Pragmatics

Margaret Thatcher's famous words "There is no such thing as society. There are individual men and women, and there are families" (Thatcher, 1987) were not uttered before an audience of linguists. Yet, her words have important implications for the way we go about setting up priorities in our research in the field of pragmatics. Cognitivism and societalism are not simply two purely theoretical alternatives. Neither is the choice between them simply a matter of attaining adequacy at the descriptive or explanatory levels. The choice between the two is political.

Cognitivism and societalism in pragmatics have their counterparts in political philosophy in individualism and collectivism – which entail conflicting views on the nature of the human being, society, and the relationship between the two. Thatcher's summary dismissal of society has important political connotations. So, too, does the dominant attitude in many mainstream theories in linguistics of relegating the social underpinnings of language to a lesser status.

Thus Mey and Talbot (1988) criticize what they see as "the presumed lack of social consciousness that is inherent in relevance theory." "The important bit here," they note, "is the social anchoring of language use – not, as some would like to have it, the reduction of all society to language use, i.e., to competing discourses."

Conclusion

As one surveys the recent history of intense research in the field of linguistic pragmatics, one cannot but be struck by the perception that, despite great advances made in the direction of recognizing the social nature of language as the key to coming to grips with language in use, there has also been some rearguard maneuvering to suppress the social dimension by privileging the cognitive. The road ahead is thus one paved with political considerations.

See also: Communicative Competence; Communities of Practice; Conspicuity; Context, Communicative; Dialogue and Interaction; Expression Meaning versus Utterance/Speaker Meaning; Intercultural Pragmatics and Communication; Language Socialization; Pragmatic Determinants of What Is Said; Pragmatics: Overview; Psychoanalysis and Language; Relevance Theory; Scaffolding in Classroom Discourse; Shared Knowledge; Social Construction and Language; Speech Acts; Syntax-Pragmatics Interface: Overview; Vygotskii, Lev Semenovich (1896–1934).

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Social Class and Status

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The key concepts of social class and status are like most in the social sciences, subject to change in purpose and meaning. Both are rooted in the discipline of sociology, and are central concepts in attempts to describe and explain social inequality and division arising from industrialization, capitalism, and democracy spanning two centuries in industrial and postindustrial societies throughout the world. As to be expected, the major theories differ as to how they define social classes and status groups.

To complicate matters, the concepts of social class and status have been absorbed into linguistic and sociolinguistic theory from different and often conflicting sociological perspectives creating substantial debate. Indeed, some authors would argue that normative sociological concepts have been introduced into linguistic endeavor in an extremely uncritical fashion (Coupland, 2001: 1–26; Williams, 1992; Le Page, 1997).

Since the 1960s, there has been an added interest in the nature of cultural capital, educational credentials, accumulation of knowledge, symbolic systems, and their relationship to social class (Bell, 1974; Habermas, 1987). The investigation of symbolic systems such as language, has in this way contributed to attempts to describe and understand the nature of social class and status. The use of class and status in linguistics, and specifically sociolinguistics, broadens the attempt at understanding society from the socioeconomic base to the super structural and cultural spheres of society. The emergence of sociolinguistics as an area of enquiry coincides with this period.

Common Sense and Class

Social class has its etymological root in the Latin term *classis*, used by census takers to differentiate social strata based on wealth, in order to assess Roman citizens's obligations to military service (Mann, 1983). Within sociological thought, the concept of social class emerged from common sense concepts. For example, the term 'the working class' emerged in English in the early 1800s to describe anyone who worked for a living, as opposed to landlords, who did not have to work and who had a guaranteed income. It slowly shifted its meaning to people who did mainly physical and skilled labor. The common sense use of class, such as in 'lower class' and 'upper class,' are general and relative terms, not always well defined, and still used as such in sociological and sociolinguistic writing. The terminology of social class is, in other words, not exact and is in need of some explanation if we are to get beyond a common sense notion (Williams, 1983). It is necessary to trace the two 'classical' approaches to social class and status, and then to link them to approaches to research on language and society.

Two Approaches to Class as Social Formation

If defining social class presents problems, it is useful for linguists to know which conceptualization within sociology is being drawn on. 'Class as social formation' refers to the development of class in its dual manifestation. A 'class in itself' encapsulates the objective criterion of the structural emergence of class in relation to the means of production. Once a class develops consciousness and self-awareness as a social

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group, it becomes a 'class for itself,' as characterized by Marx – the subjective criterion of being a class – and engages with other classes in the furtherance of its own interests. This approach to class as social formation is found in the work of two key theorists in sociology, Karl Marx and Max Weber. These two strands of sociological thought have been elaborated in subsequent generations; their advocates are now described as neo-Marxist and neo-Weberian.

The Marxist Perspective

A Marxist view of social class is based on a subjective notion, with social classes determined by relationships and consciousness. The early Marxist categories of social class, defined the social groups' relationships to the ownership of the means of production. The key ones were: peasantry (small, largely subsistence farmers), lumpen proletariat (unemployed and criminal strata), proletariat (employed working class), petite bourgeoisie (the middle class) and bourgeoisie (the capitalist class). The relationships were defined by exploitation under capitalism, this entailed the process whereby the bourgeoisie benefited from the surplus created by the proletariat.

The social process surrounding the formation and relationships of these classes was for Marx one of intense conflict and struggle; it was central to determining the course of history. For him, the proletariat was the key to social change, and the class that would ultimately bring freedom from capitalist domination. Hence, his notion that the central social conflict under capitalism was between the proletariat and the bourgeoisie. He discussed other classes but did not portray their role as formative.

This was literally a world-dividing perspective on society. Some within the Marxist tradition were partially critical and wished to modify Marx's arguments. For example, while adopting many of Marx's explanations, members of the Frankfurt school in the 1920s, did not view the working class as a key liberating force. In contrast, they sought to explain its fragmentation on the one hand and on the other, its identity with authoritarian forms of thought in the 20th century (Held, 1980).

Marx had little to say about language and symbolic systems and their relationship to class. For him, these were questions about culture and the superstructure of society. A specifically Marxist perspective on language did not emerge until the 1930s, when the Russian author V. N. Volosinov wrote his treatise *Marxism and the philosophy of language* (Volosinov, 1986). This particular work only became generally known in the 1970s through its translation from Russian; written some forty years earlier. It was the first text to look at the relationship between class, semiotic social systems and language from a Marxist perspective. The empirical interest in the text is firstly a stylistic question on the nature of reported speech and then on questions of discourse.

The Weberian Perspective

Max Weber's perspective of class as a social formation differs in important respects. In a key paper, 'Class, status and party,' he added the concepts of status and political party, social groupings that cut across and create social cleavages in social classes. He gave examples of religious and ethnic associations forming status groups, with strong ties of identity and subjective perceptions of community. Weber redefined the concept of status, and gave it equal importance to class as a motivating feature of conflict and change in society. As a result, the combined power of class, status, and party were what determined historical and social change in an industrializing and bureaucratizing world; social class alone was not the sole determinant for Weber. In addition, he emphasized market and consumption, and saw property or lack of property, as a key to defining class. In the 1920s, Weber saw the future unfolding in what he described as the 'iron cage of capitalism,' the inexorable continuation of class, status group, and party conflicts; and that social mobility was one of the few factors that could temper the consequences of such conflict.

Weber argued that neither class nor status were dominant; instead, he asserted that the one that prevailed at any time depended on economic circumstances. While status group competition predominated during periods of relative stability, class conflict emerged when rapid or extensive economic and technological change took place. From this Weberian perspective, power did not always lie with the dominant social groupings. Social closure, a mechanism for excluding other groups and classes from decision-making positions, was for Weber a means by which status groups or classes organized their conflict.

Both Marxist and Weberian approaches viewed society in terms of conflicting human interests, and held that the nature of class composition, relationships, status, political party, and property constantly changed. (Weber redefined status and added political party and property, and emphasized that power does not always lie with dominant social groupings.) Weber in essence offered a critique of Marx's theory, in that he extended the concept of social class. For linguistics, the significance of social class as a form of stratification involving domination and subordination is that the linguistic and symbolic differences

between classes are often readily observed in speech and in communicative practices. The particular perspective that linguists and sociolinguists adopt towards social class will significantly shape how they research language in society.

Neo-Marxists and Neo-Weberians

Contemporary analysis of class has involved a rethink about which groupings are socially significant, and who belongs to which grouping. Neo-Marxist perspectives continue to stress social class as the most significant social cleavage. Neo-Marxists are divided into three groups of theorists: minimalists (Structuralist Marxists), maximalists, and intermediates:

1. The minimalists believe that only manual workers belong to the working class; all other members traditionally thought of as working class are more properly classified in the petite bourgeoisie. Structuralist Marxists such as Louis Althusser and Nicos Poulantzas, held this view (Althusser, 1984; Poulantzas, 1973).
2. The maximalists believe a broad band of the middle class is in fact better classified with the interests of the working class, since they are squeezed by the bourgeoisie to such an extent that their lot is similar to that of workers (a classic position can be found in Baran and Sweezy, 1966).
3. The intermediates believe that many in society fall within a contradictory class location, where their identities and allegiances are insecure and oscillate between classes. No firm social group identity can be forged under such circumstances (Olin Wright, 1985).

First introduced by Weber, the concept of closure, analyses group and class behavior in terms of the exclusion or inclusion of other social groups, and the resulting conflict, was examined by the neo-Weberian writer Frank Parkin, who categorized the workings of social closure as follows: (1) Social closure from below, a subordinate group keeps a dominant group out. (2) Dual social closure, an intermediate group keeps a dominant group and a subordinate group out. (3) Usurpationary social closure, a previously subordinate group comes to dominate and exclude a previously dominant group (Parkin, 1983).

This particular approach using social closure can also be used to link social consciousness and communicative action to class and status, which has particular relevance for the study of sociolinguistics in areas such as code switching (Myers Scotton, 1995).

Table 1 is a brief tabulation (based on Bradley, 1992: 15) of some key contemporary differences between neo-Marxist and neo-Weberian approaches.

Table 1 Comparing Neo-Marxists with the Neo-Weberians

Neo-Marxist	*Neo-Weberian*
1. Class divisions generated by relations of production	1. Class divisions generated by operation of market
2. Classes unified by exploitation	2. Classes fragmented by markets
3. Conflict between classes dominates social relationships	3. Conflict within classes as important as conflict between them
4. Middle class linked to one of major classes	4. Middle classes are autonomous groupings as significant as the propertied and working classes
5. Consciousness arises from relations of production	5. Consciousness has many different sources

(Based on Bradley, 1992: 15).

Giddens has commented that the various permutations of the meanings of social class bring neo-Weberian and neo-Marxist understandings of class very close together at times. For example, the understanding of social mobility is difficult to distinguish from 'contradictory class location,' where people appear to occupy an intermediary position and switch their allegiances and identities between classes (Giddens, 1993).

Class as Category

In stark contract to the idea of class as social formation, class as category presents a consensual, normative view of society. This idea of class has an affinity with Emile Durkheim's structuralist interpretation of the division of labor in any society, but specifically industrial society, and the structural analysis of all social institutions in relation to their social functions within society. Durkheim was interested in the basis of social order and the establishment of social norms, rather than conflict. By the 1950s, structuralism had a far-reaching impact on social thought, even influencing Marxism. Most importantly, it spawned the structural functionalism and normative sociology of Talcott Parsons in the United States (Parsons, 1964).

The approach of defining class as category, brings us somewhat closer to the original Latin meaning *classis*. By measuring income levels or classifying people into occupations, one can determine social class. This is a socioeconomic definition of class, with no reference to subjective notions of consciousness of class position and status. It is referred to as a 'scale and category' measurement of social hierarchy, which tends to permeate a bureaucratic understanding of social hierarchy. It is a form of measurement that has been used, for example, to determine actuarial

predictions of life expectancy and insurance risk, and to analyze potential markets. As a gradational measurement, it is well suited to quantitative empirical investigations of society.

The structural functionalist perspective of Talcott Parsons was the dominant postwar voice in American social theory. Parsons claimed the influence of Weber, whom he encountered as a student, and whose work he translated and published. Yet, he adopted a normative, consensual approach to social structure, and largely used the perspective of social class as an occupational role. This body of social theory emphasizes the possibility of social mobility, and has used the version of industrial democracy as developed in the United States, as its social exemplar of advanced social development. It has been influential as a framework in sociolinguistic studies, particularly in understanding of the relationship between language and social class, since variables such as income, occupation and educational level are all deployed in understanding the normative category of class. An example is William Labov's use of occupational hierarchy to assess class speech variation in his survey of New York City (Labov, 1966).

The Use of Class and Status in Sociolinguistic Research

Class, Codes and Control

Bernstein's seminal work, *Class, codes and control* was one of the first systematic attempts to investigate the cultural features of social class and its relationship to education. His concept of code, is in essence, a communication process deeply embedded in the nature of social stratification. It is not readily evident, and has therefore to be subjected to decodification and analysis in order to be rendered explicit. Drawing on the work of Marx, Weber, and Durkheim, Bernstein looked for reasons for the perpetuation of working class failure in the educational system; his research typified the turn to cultural and superstructural analysis of social inequality.

His research in 1960s Britain, consisted of a relatively homogeneous social context, with very small minority populations. As in many European societies at the time, the articulation of class interest and conflict was well reflected in the major competing political parties. Bernstein's belief was that the reproduction of working class failure in the face of postwar educational reforms could in fact be understood and rectified. He developed Durkheim's profiles of the working class and middle class family, and typified their communicative codes as 'mechanical' in the case of working class (an understood, implied process of communication with much left unspoken), and 'organic' in the case of the middle class (a more explicit negotiation of social meaning). In turn, he investigated the structure and process of communication within the schooling system, and the congruence or lack of congruence between the school and the family. He sought to establish patterns in communication and socialization that disposed the middle class to success in educational contexts.

Bernstein developed the notion of 'elaborated' and 'restricted' codes, the working class had a restricted code and the middle class an elaborated one. Code, in fact, referred to a great deal more than the surface features of morphology and syntax. Unfortunately for Bernstein, this was the feature that became synonymous with the so-called 'deficit hypothesis.'

In what was a voluminous work based on the contributions of many researchers, one Bernstein article dealt with grammatical and semantic structure and linked this, in a strong expression of the Whorfian hypothesis, to the concept of working class language being in itself cognitively deficient. It described the features of a restricted code at a syntactic and morphological level, which was thought to inhibit communication and conflict with the communicative systems in education, in contrast to the middle class elaborate and explicit code, which enhanced this process. This was in turn thought to create problems in the communicative adaptation to schooling for working class children.

This aspect of the research became enlarged and was misconstrued as the substance of Bernstein's work. In fact, as argued above, many of the features of Bernstein's analysis of the working class family drew on structuralism, and were concerned with processes of communication, which had nothing to do with surface features of language and even contradicted their importance (Atkinson, 1985). Yet, many subsequent research works repeatedly drew attention to the surface levels of working class speech, and claimed that specific means of expression were deficient and at odds with institutional forms of communication. It was also this feature of the research that made it extremely significant to linguistic and sociolinguistic discussion.

This small aspect of Bernstein's work was taken up in the educational reformism of the 1960s in the United States by a project called Operation Head Start (Bereiter and Engelmann, 1966). This project advocated the teaching of standard grammar as the solution to educational failure in the black ghettos. Drills were developed for the development of standard speech varieties; the result was to further alienate the communities from the schooling process.

The result was the celebrated but unfortunately one-dimensional critique of Bernstein developed by

William Labov in support of the logic of nonstandard English of African-Americans, the key target of educational reform at the time. The implied acceptance of the strong version of the Whorfian hypothesis in Bernstein's work was the basis for the critique. Labov demonstrated very adequately how surface features and sociolect had nothing to do with rational thought and established, in contrast, the difference hypothesis (Labov, 1966). This much-remembered debate, in many ways, was built on straw characterizations of each side of the argument.

Bernstein did not anticipate that his work would be used in the context of a minority status group along with a prejudiced perception of the group's speech patterns. He did not expect the degree of misconstrued interpretations of his work in the United Kingdom. Any validity on the sociological side of Bernstein's research was muted in the face of the barrage of criticism that was directed against what was perceived to be a restatement of class prejudice in his work.

There were in essence many more concerns in Bernstein's research, not least of which was the acquisition of literacy, the graphic shibboleth of all educational systems. The linguist Halliday defended Bernstein's work and qualified his understanding of it, on the basis that it was concerned with questions of literacy, and creative work in educational practice. As Bernstein himself pointed out, "We are told and socialized into what to reject, but rarely told how to create (Bernstein, 1977: 167)." Much was produced in the concern for language across the curriculum, and the methods of teaching reading and writing that emerged from this period of critical debate about language teaching and the development of literacy in the United Kingdom at the time (Hasan, 1996: 34; Halliday, 1978). The debate over restricted and elaborated codes and its tenor probably lost more ground for sociolinguistic enquiry than it gained.

Bernstein continued to look at notions of horizontal and vertical knowledge and issues that are of central concern to sociology in more recent times. Bernstein's death in 2000 led to a great deal of revisiting of his work (Moore and Muller, 2002: 627).

Variation Studies and Class as Category

A number of large-scale quantitative studies on language variation were conducted in the 1960s and 1970s, by researchers such as Trudgill in the United Kingdom and Labov in the United States (Trudgill, 1974; Labov, 1966). These studies were symptomatic of the nature of quantitative social enquiry at the time, but their important common feature was that they focused on socioeconomic and stylistic stratification of linguistic variables over large populations. This approach adopted a consensual view of language and social class; that is, class as category, as outlined above. For a period, these approaches sought to define linguistic and sociolinguistic research endeavor as having scientific validity.

Table 2 Labov's class categories

Category	*Description*
Upper class	First rate professional, manager, official, or proprietor of a large business
Upper middle class	Career man in professions, managerial, official, or large business positions
Lower middle class	Semiprofessional, petty businessmen, white collar, foreman, and craftsman
Working class operatives	Blue collar workers dependent on labour market
Lower class	Laborers with insecure job status

(In Eckert, 2000: 26).

Labov's work is interesting in that it applies a very clearly developed category approach to class. The categories he used in his survey of New York City in 1966 are shown in Table 2 (from Eckert, 2000: 26).

This research is very much part of the investigation of cultural phenomena and their relationship to class, which has been typical of the postindustrial research endeavor, particularly in advanced industrial societies. The consensual nature of this form of social investigation is criticized for failing to portray the dynamic nature of social change and innovation necessary for social explanation. What Labov produced with this research was a series of functionally explained categories, where occupation was seen as the very basis of class, and the agent of language change. For him, it proved the plasticity of the vernacular and the endurance of the standard variety.

His identification of the linguistic insecurity in the lower middle class, and the desire for hypercorrection on both a class basis and a gender basis, is interesting for its depiction of class semiotic and its interface with a status group such as gender. Little is made of the social groupings and networks in the construction of the standard and vernacular that Labov portrays on his linguistic scale: the interpretation of different styles and relation to social class is limited.

Labov's former student, Penelope Eckert, has completed an interesting reinterpretation, using a Bourdieu-like analysis of the networks that sustain standard and vernacular forms. She shows the significance of past and present variation studies for current social description and understanding of the nature of social class and status (Eckert, 2000: 16). Her work represents an ongoing debate with Labov, which makes the latter's work as pertinent today as Bernstein's.

Bourdieu's Cultural Capital, Linguistic and Symbolic Markets

Pierre Bourdieu is perhaps the strongest voice in sociological writings, other than Bernstein, to have rearticulated the question of culture and its meaning in the stratification of society. He has developed the concepts of 'cultural capital,' 'fields,' and 'habitus.' Cultural capital is the value placed on an aspect of culture; a field is an area of endeavor, such as education; and a habitus is 'embodied social structures that serve as principles organizing practice.' His work has permeated the field of sociolinguistics since his first essays on the linguistic market on the value of the symbolic system to the accumulation of cultural capital. His work has been highly influential.

Class codes, unlike Bernstein's elaborated and restricted, are simply described by Bourdieu and his associate Passeron in terms of 'bourgeois,' and 'common' parlance. A Latinate vocabulary and a striving for novel expressions mark bourgeois parlance. Common parlance is characterized by situational reliance, nonlearned vocabulary, and reliance upon shared figures of speech (Bourdieu and Passeron, 1977: 116). The bourgeois code is fostered in the educational system, and where the dominant language is also the official language. The privileged, through their command of a bourgeois code, are better able to cope with the demands of the education system. Those students who possess common parlance cannot develop an understanding of what might be expected of them in such a field. Bourdieu, unlike Bernstein, did not express any hope for educational reform through remediation, as he treated the schooling system as one that systematically served the interests of class-divided societies.

For Bourdieu, the concept of linguistic capital is but one dimension of the concept of cultural capital. Language use is valued in different domains. The state, Bourdieu argues, unifies the linguistic market. He asserts that the school-based standard language underpins the requirements of a literate class, in which text falsely corresponds with truth and social domination is represented falsely as mental development.

As influential as Bourdieu's work has been, it has also attracted criticism. Collins argues that the determinist nature of class in his work is not able to deal with both structure and agency/practice in understanding the subjective conditions of dominated groups (Collins, 1993: 121–123). It is this balance between structure and agency in understanding social class that Giddens has termed 'structuration' (Giddens, 1979). Eckert has also drawn on this more complex concept of social class and its social determinants in her work (Eckert, 2000: 44).

Sociolinguistics is concerned with sociological explanations of the semiotic system. According to Eckert, a social theory of language cannot view *langue* as a given, but must be about the process of being conventional. What the creolist Le Page claims is needed is to understand how languages are 'named, formalized, standardized and totemized by society' (Le Page, 1997: 32). The ideas of ideal speaker and listener, and the dichotomy of competence and performance, are abstractions that are meaningful only in the context of showing us the nature of domination and subordination in understanding language and society. In this regard, Bourdieu is not alone in going to the root of questioning the very concept of 'a language' in order to provide it with an adequate sociological explanation (Bourdieu, 1992: 43–65).

Social Network and Social Class

Milroy and Milroy argue that the concept of being 'local,' or district-based is strongest amongst working class communities. They build on the arguments of Thomas Hojrup, who found that working class communities are more fragmented than others, and developed a concept known as a 'life mode' analysis, to construct a model that examines cultural aspects of social existence. In their research in Belfast, Milroy and Milroy traced the existence of close-knit networks that served as the basis for vitality of the vernacular forms of working class language. Williams has criticized this perspective as being a rejection of sociological analysis, on the grounds that network theory is incompatible with social class. Le Page defends the Milroy network research, by claiming that their network theory is both compatible with social class analysis and a useful tool to explore working class solidarity and linguistic identity (Milroy and Milroy, 1997: 61; Le Page, 1997; Hojrup, 1983). This technique for exploring language change and understanding the manifestations of class and status has been followed in a number of studies (Le Page, 1997; Williams, 1992).

Sociolinguists have sometimes naively deployed the concepts of class and status on the supposition that 'language mirrors society.' The relationship is rather more complex. Class and status are not fixed notions in sociology and have been interpreted very differently, as has been seen. Sociology and social theory are now moving beyond the characterization of the societies we live in as 'postindustrial,' and now look to the notion of the transition in capitalism to 'the iron cage of the information age,' and the rise of the network society and the rapidly changing nature of local social class and status groups globally (Castells, 1996). The

implications for the understanding of language in society are enormous, the way forward is to maintain close but critical links between the ideas of social class, social status, and sociolinguistic theory.

See also: Communities of Practice; Language Politics; Society and Language: Overview.

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Social Construction and Language

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Nonanalytic Approaches

According to Georg Wilhelm Friedrich Hegel the topic of "language and social construction" encompasses everything there is. I note this all embracing approach to contrast it with how these topics are discussed today. This article will focus on one view concerning the relation between language and social construction, namely John Searle's approach, which at the same time will serve to introduce into the fundamental problems. It will be necessary, however, to show first how this specific way of situating and addressing the problem evolved.

Subsequent to Hegel one can distinguish roughly four lines of thought: (1) the social theorists, ranging from Karl Marx through Emile Durkheim to Max Weber and modern sociology, (2) hermeneutical philosophers, from Wilhelm Dilthey through Edmund Husserl and Maurice Merelau-Ponty to modern post-structuralism, (3) the analytic philosophers starting with Gottlob Frege, Bertrand Russell, and Ludwig Wittgenstein up to modern analytical philosophy. Specific problems of social constructions are (4) also discussed in various disciplines such as jurisprudence, economics, and political science, sometimes accompanied by philosophical inclinations. However, none of these traditions is totally exclusive of the others. Even though the topic 'language and social construction' features in all such discussions, this article will only consider the analytical tradition.

Analytic Approaches

Early Analytic Approaches and Social Construction

The second generation of Analytic philosophers were in the beginning firmly rooted in either logical positivism or ordinary language philosophy. Their original objectives were to reveal the logical structure of language or to solve philosophical puzzles by analyzing the ordinary usage of words. Both schools of thought shared an empiricist and scientific attitude. For this early reason, analytical philosophers showed little interest in social and political reality or history. A few philosophers within the analytic tradition did pay attention to institutions, however, most notably Peter Winch (1958) and David Lewis (1969). Winch argued on the basis of Wittgenstein's *Philosophical Investigations* that explaining human action requires an understanding of the forms of life established in the society wherein the action is carried out; hence objective, culture independent explanations like those found in the natural sciences are unavailable in the social sciences. David Lewis, on the other hand, gave a game theoretic account of conventions as a solution to recurrent coordination problems. While Winch tried to justify the traditional distinction between the approaches in the natural sciences and the social sciences, Lewis examined ways of reconstructing classical arguments of social philosophy using modern means. Recently John Searle has developed an ontology of social facts and, in particular, of social institutions based on his speech act theory and philosophy of mind (Searle, 1995). This development marks the beginning of a renewed interest in social facts within analytic philosophy.

John Searle's Approach

Social Construction John Searle's first major work was on speech acts, where he first pointed out the distinction between brute facts and institutional facts, and highlighted the particular role of constitutive rules in the creation of institutions (Searle, 1969: 50–53). He subsequently based the foundations of speech act theory on his philosophy of mind (Searle, 1983). Searle then returned to institutional facts to elaborate his point more systematically. He uses three concepts as building blocks for his theory: the assignment of functions, collective intentionality, and constitutive rules of the form "X counts as Y in context C" (Searle, 1995: 13). Taking the "scientific worldview" for granted, Searle starts with the puzzle of how it is possible that there are objective social facts, such as "George Washington was the first president of the U.S.," within a world composed entirely of minute physical particles. Searle's basic proposal is that we assign functions both to naturally occurring objects (e.g., using a stone as a paperweight) and to those created for the purpose of performing an assigned function (e.g., using a hammer) (Searle, 1995: 13–23). Searle argues that such functions are never discovered in nature, like the natural properties of weight, color, etc., and cannot be completely reduced to causal explanations. Instead they are always imposed on things by intentional actors. Functions thus are always observer relative. This distinction is crucial because it allows us to mark the difference between features of reality that are observer independent (e.g., gravity, force) and usually described by the natural sciences and those that are observer dependent and usually dealt with by the social sciences. The latter features are always partly constituted by an ontologically subjective set of attributes (intentions);

nevertheless they can in the case of institutions still be epistemically objective.

Searle also uses the imposition of functions to explain the meaning of words and signs. According to Searle, meaning arises whenever we assign functions to things as to symbolize, represent, or stand for something. Hence a red traffic light signals 'Stop!' because we have assigned this function to red lights in boxes at the roadside. Searle's theory of meaning is taken for granted. The relevant point here concerns only the relation between the natural world and the social world of animals and humans. While Searle attempts to adhere to the program of realism he nevertheless makes frequent use of terms like intentions, functions, etc. According to Searle they are compatible with the scientific worldview of realism since he claims intentionality, the prerequisite for the imposition of functions, is a "higher level feature of the brain."

Searle uses the same scheme of explanation to introduce the second building block of his theory, collective intentionality (Searle, 1995: 23–29). He sees collective intentionality or 'we-intentionality' as a "biologically primitive phenomenon" that cannot be reduced or eliminated in favor of something else. Searle, in particular, stipulates that it cannot be reduced to "individual intentions plus something else." Whenever people engage in cooperative social action, Searle argues, there has to be "collective intentionality at a higher level." This concept holds true for a violinist playing in an orchestra and even for certain hostile activities like litigants in a legal proceeding or two faculty members trading insults at a cocktail party. Searle holds that all these are social facts that involve the 'we intentions' of the parties.

Finally, constitutive rules of the form "X counts as Y in the context C" are employed to explain the difference between brute facts and institutional facts (Searle, 1995: 27–29). According to Searle, brute facts, such as that gold is a chemical element, exist independently of social institutions. Only the sentence "gold is an element" depends on the institutions of language and science. Institutional facts, on the other hand, such as the scoring rules of football, depend for their very existence on conventional agreements and on the acceptance of such conventions by the group taking part in the game; they are not pregiven. To explain institutional facts Searle further distinguishes between regulative and constitutive rules. Regulative rules govern preexisting activities, like driving on the right side of the road. The activity of driving (on either side of the road) existed before it was made obligatory to drive on the right. Constitutive rules, on the other hand, create the very possibility of an activity. Without the rules of football there would be no such game, and kicking a ball between two posts would not count as scoring. Searle concedes that the distinction between regulative rules and constitutive rules cannot always be strictly drawn as many constitutive rules rest on preexisting activities that might be governed by regulative rules. In any case, it is a distinction within the realm of social facts. All institutions are then built by using a system of constitutive rules of the form "X counts as Y in the context C" (Searle, 1995: 43–51). Thus, shooting a ball between posts (X) counts as scoring (Y) in a football game (C). The X term stands for some object or activity, to which (via collective intentionality) a certain status function has been assigned.

The most obvious example of social facts, explainable along the lines of Searle's analysis, is an institution such as money. Status functions are assigned on certain pieces of paper. Such statements require an involvement of collective intentionality; hence the paper functions as money only as long as we consider it to be money. It is moreover dependent on a specific context. The formula is useful for explaining standard cases, though it allows as well for the reflection of unusual cases. A standard case might be: 'Bills issued by the Bureau of Engraving and Printing (X) count as money (Y) in the United States (C).' The existence of a 'cigarette currency' in post-war Germany might be an unusual case: 'American cigarettes (X) counted as money (Y) in post-war Germany (C).' With these basic distinctions at hand it is possible to give a 'hierarchical taxonomy of (certain types of) facts' starting from brute facts and going up to institutional facts (Searle, 1995: 37–43).

The Role of Language Searle's approach makes obvious why social construction is a linguistic activity. Collective intentionality alone does not require language or any symbolic means as it may be presupposed that even a pack of wolves hunting together are engaged in a collective enterprise. Indeed, Searle assumes that animals have intentionality. The difference comes only with the imposition of the status functions.

In moving from the X to the Y term the matter of the X term does not change, it only acquires a new meaning. It is used to symbolize something that exists only by virtue of a collective agreement. This theory requires some elucidation. Symbols are often (but not always) used to refer to objects that exist independently of the symbols and even independently of language. The symbol 'cat' refers to cats; and cats exist independently of any symbol referring to them. The imposition of status functions on something, on the other hand, creates a new category of objects or actions that have not existed prior to symbolization

and collective agreement. The difference is made obvious by comparing social behavior of animals and humans. Certain animals might live in lifelong pair-bonding but they will nevertheless not be married, as they do not have the institution of marriage. That humans are married cannot be read off their behavior either but has to be declared in a certain situation. The declaration of marriage is an indispensable linguistic activity as only by virtue of the symbolic act are certain rights and duties granted. Institutions hence create reasons for action that depend on forms of symbolization. The initial act is usually thereafter represented by some symbolic means, Searle calls them status indicators, as e.g., wedding rings or a marriage certificate.

A further sign evincing their linguistic nature is that status functions are intensional and cannot be replaced *salva veritate* by coextensive expressions. Hence, even if it is true that 'marriage ruins the sex life,' it does not follow that 'exchanging rings counts as "ruining sex life" in the context of a church ceremony.'

It should be kept in mind that the formula is meant not only to explain the creation of institutions out of brute facts but as a general explanation. Therefore, institutional facts are permissible at the place of the X term so that social facts can be reiterated. Indeed, Searle notes that language itself is an institutional fact that can be analyzed using the formula.

However, this feature reveals a fundamental problem. One of Searle's main objectives is to show how institutional facts emerge out of natural facts through language. If, however, language is an institutional fact in itself, the formula merely highlights a structure within the realm of institutional facts but cannot ultimately explain the emergence of institutional facts. Searle addresses the problem merely by stating that language is a special kind of institutional fact, namely one that is "designed to be a self-identifying category of institutional fact" (Searle, 1995: 73).

Critical Assessment

Searle labels his approach "philosophy of society," analogous to classic fields like philosophy of language or philosophy of mind. Three kinds of criticisms in reaction to Searle's proposal have emerged. Those who agree in principle with Searle's line of thought dispute specifically the concepts of collective action and collective intentionality (Gilbert, 1989; Bratman, 1999; Tuomela, 2002). There are, on the other hand, two kinds of criticisms questioning Searle's approach in principle. Some philosophers hold that Searle misses the fundamental role ordinary language plays in conceiving reality at all, since Searle presupposes implicitly that the world as described by the natural sciences can be attained independently and prior to the everyday social world, hence independently of ordinary language. Social scientists, on the other hand, criticize Searle for failing to account for social facts properly, since social facts pertain to the explanation of actions, a feature Searle omits in his philosophy of society. The different kinds of criticism do not exactly correspond with the lines of thought mentioned in the beginning; however they show that the philosophical discussion is still divided over fundamental questions.

See also: Analytic Philosophy; Philosophy of Science and Linguistics; Speech Acts: Definition and Classification.

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Social Psychology and Language

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Introduction

Humans are symbol-using creatures. Aristotle claimed that humans are political animals (*anthropos politicon zoon*), but arguably a stronger claim is that humans alone are **linguistic** animals, the recent attempts to teach special symbols to chimpanzees and dolphins notwithstanding. The argument that humans are essentially and uniquely symbol users has been made forcefully by various scholars. In light of the special status of language, it is not surprising that linguistics, the science of language, emerged well over 2000 years ago and is still flourishing in the 21st century. However, humans are also psychological animals (although not uniquely so), hence the rise of psycholinguistics. Additionally, humans are social animals (again not uniquely), hence sociolinguistics. One of the most recent human science specialties to emerge acknowledges all of these facts: the social psychology of language (SPL).

Definition and Key Concepts

Language has both social and psychological antecedents and consequences. The social psychology of language investigates these causes and effects scientifically. Thus, the social psychology of language can be described as the scientific study of language in its social and psychological contexts. Three major concepts underlie this definition: society, mind, and language. 'Society' refers to the fact that humans form relationships with other humans and that they live in and identify with groups. Relationships exist between and among individuals within and between social groups. Both interpersonal relationships and larger social groupings are represented cognitively. People think about and evaluate these social entanglements, or in other words, people have attitudes toward them. Attitudes are important components of 'mind,' comprising beliefs and corresponding evaluations: "Politicians talk and don't act, and I dislike this." Attitudes are linked to stereotypes, which are often defined as beliefs about social groups: "Asians are intelligent." As the previous example shows, stereotypical beliefs often have an evaluative aspect. A very large body of research demonstrates that people also have attitudes toward and stereotypes about languages and dialects, and within these, toward molecular features of speech, such as hedges ("it's *sort of* good"), hesitations ("it was ... *uh* ... nice"), repetitions of words (lexical diversity or vocabulary richness), language intensity ('hate' versus 'dislike'), and many other forms.

Bradac (1999) has suggested that 'language' can be construed as three related but distinct objects of research and theorizing. Language$_1$ is examined by conversation analysts and discourse analysts. It is a flexible system that speakers use to achieve interpersonal goals and to perform tasks demanding communication for their accomplishment. Researchers viewing language in this way attend to fine details of lexical arrangement as these are used to communicate nuanced meanings in specific situations. Meanings are locally determined. Researchers may examine the different uses of 'you know' or the different meanings of 'hello' versus 'hi.' Various communicative routines and interaction rituals are also investigated. The grammaticality of utterances is interesting only to the extent that it affects idiosyncratic meanings in context. Importantly, researchers studying language$_1$ rarely invoke the notion of mind when explaining the workings of a segment of conversation.

On the other hand, individuals studying language$_2$ may well show recourse to mentalistic explanations, as in contemporary cognitive linguistics or Chomsky's (1968) classic *Language and mind*. Language$_2$ is a possibly innate, uniquely human, hierarchical, rule-governed communication system, typically studied by linguists. The idea of hierarchy suggests that language$_2$ is a structured entity with interrelated levels spanning phonology, morphology, and syntax. One of the historically important tasks of linguists is the construction of grammars of natural languages, and perhaps eventually (and chimerically), a Universal Grammar. In the latter respect, researchers investigating language$_2$ are very different from those studying language$_1$. However, they do share an interest in the creative properties of language (e.g., being able to say **anything**), which typically entails a philosophical rejection of determinism and logical positivism.

Language$_3$, on the other hand, is studied by researchers who are logical positivists, at least in practice. It is a heterogeneous set of verbal variables that are often controlled by psychological processes. Language$_3$ is a collection of verbal features that are often influenced or even determined by environmental, physical, or psychological variables that are not under the conscious control of speakers. The collection has no internal structure; instead, each collected item reflects a theory or concept of interest to a diverse

group of social psychologists and communication researchers. For example, utterances necessarily exhibit some level of lexical diversity (redundancy) that varies across speakers and occasions (Bradac *et al.*, 1979); diversity level is affected by anxiety and neurological pathology (aphasia). Utterances may also exhibit varying levels of language intensity; relatively intense language ('I despise cigarettes') signals a speaker's departure from attitudinal neutrality (Bowers, 1963). To give a final example, speakers vary in linguistic power; some persons use many hedges ('sort of good') and tag questions ('good, **wasn't it**?'), whereas others do not (Ng and Bradac, 1993).

Language$_3$ carries a special meaning for language and social psychology (LSP) researchers, who vary in the extent to which they are familiar with or even work with the meanings of language familiar to conversation analysts or linguists. It is certainly the case that LSP researchers who study the effects of dialect or accent on impression formation understand a part of the meaning of 'language' for linguists (Giles and Powesland, 1975), but these researchers exploit this part for unique purposes. On the other hand, language$_3$ is probably unfamiliar to many linguists and conversation analysts, and it may seem to be a strange conception if they happen to encounter it. The three meanings of 'language' suggest a fairly high degree of separation that could lend itself to exaggeration; the meanings actually have areas of overlap.

More pertinently, dissimilar metaphors have been dominant in competing movements in psychology. British and American introspective psychology of the late 19th and early 20th centuries inherited the Cartesian mind-body dualism: both mind and body are real, but they are independent entities, which allowed self-conscious investigations of the mind's contents. Introspectionism was replaced by John B. Watson's behaviorism (in America) which exploited a radically different metaphor: humans are machines that are energized by environmental forces; mind does not exist, but the body's observable behavior does. The ultimate expression of this kind of metaphor may well be Skinner's *Verbal Behavior* (1957), in which humans are viewed as talking machines, emitting 'tacts,' 'mands,' and other classes of utterance; language is a type of behavior, essentially the same as any other behavior, like scratching an itch. This view of language allowed and stimulated a large stream of studies on verbal conditioning (Brown, 1958: 182–186). For Chomsky and post-Chomskian social cognitivists in social psychology and communication, humans are essentially disembodied minds, making plans (Berger, 1997) and processing information (Fiske and Neuberg, 1990), a reversion to a version of the Cartesian metaphor (*cogito ergo sum*).

In LSP, a guiding metaphor was articulated by Giles: "Humans are not sociolinguistic automatons" (Giles, 1979). This view was offered in reaction to an implicit metaphor underlying the work of Labov, Hymes, and others who can be construed as having argued that phonological, lexical, and other linguistic features vary as a function of group membership and situational constraints; these memberships and external constraints **force** particular forms of language (Giles, 1979). This view certainly is not entirely incorrect, but it does not attend to the important role of individual psychological states, intentions, and motivations that can affect language performance. Individuals may converge to or diverge from the language of an interlocutor depending on their needs for social approval or group distinctiveness. Speakers can intend to parody a foreign accent in order to produce laughter in hearers. Although communication contexts may tend to coerce certain forms of language behavior in passive adherers to norms, language can be used **actively** by speakers to shape or even establish the context (Giles and Hewstone, 1982). Although hearers may tend to be affected predictably by messages exhibiting various language styles, individual response differences will occur as a result of different goal orientations, attentional sets, and personality variables (Cargile and Bradac, 2001).

Another fundamental assumption of LSP researchers, which need not be developed at length, is that signs and symbols, which are simultaneously social, mental, and linguistic phenomena, are the basic elements in the human universe. This is in contrast to, say, neo-behaviorist psychologists for whom 'habit' is the irreducible particle. Thus, Ng and Bradac (1993) discuss 'signs of power,' a term that refers to language features that provide information to hearers about a speaker's social status, intellectual competence, and authoritativeness. Other verbal signs provide information about a speaker's apparent sociability, trustworthiness, and attractiveness (Giles and Ryan, 1982). Verbal signs are diagnostic for hearers. Typically, they exist outside of a speaker's awareness and control, as in the case of a dialect or level of vocabulary redundancy. Signs have a one-to-one relationship to their referent: dialect$_w$ –> Welsh group membership. By contrast, symbols have multiple referents; they are ambiguous and flexible. Speakers use them consciously and strategically to accomplish any conceivable purpose: writing a poem, seducing a stranger, flattering a boss, constructing a theory, and a million other things. Signs are on the surface; symbols probe the depths.

Relationships with Allied Areas

One could use the term 'socio-psycholinguistics' to label LSP, but that would be awkward. However, the term suggests what are probably the two most closely allied areas of research, psycholinguistics and sociolinguistics. Psycholinguistics emerged in the early 1960s as a result of a new interest in the mental processes and structures underlying humans' use of language, to a large extent an effect of Chomsky's theorizing. An interest in 'mental processes and structures' could not have existed for traditional descriptive linguists working under the sway of behaviorism. From its inception, psycholinguistics has focused closely on issues of child language acquisition, initially child grammar (Brown, 1970), and more recently, the development of pragmatic competence (Pedlow, 2001). Other classic psycholinguistic topics include the measurement of connotative meaning, semantic memory, relationships between language and thought, psychological aspects of second language learning, and the organization of the 'mental lexicon' (Aitchison, 1994). Important psycholinguistic researchers at the field's inception included Brown (1970), McNeill (1966), Miller (1963), and Osgood (Osgood *et al.*, 1975). Although psycholinguistics is the offspring of both linguistics and psychology, over the years it has relied heavily on the quantitative, experimental methods of psychology rather than the descriptive, intuitive methods of linguistics. It is probably accurate to say that the typical psycholinguistic experiment pays scant attention to social phenomena, although not surprisingly, in some cases the border between psycholinguistics and LSP is fuzzy.

The roots of sociolinguistics go back to studies of dialects in the early 20th century, but the explicit study of relationships between social stratification and language performance emerged in the 1960s (at the same time as psycholinguistics). In this case, social issues in the larger society, such as racial and ethnic relations, provided an important impetus to sociolinguistic research, a pattern that differs from that of psycholinguistics, where the early research problems emerged almost entirely from **within** the community of interested scientists, more in line with the tendencies of Kuhn's 'normal science' (1970). Important sociolinguistic researchers at this time included Labov (1966), Trudgill (1974), and Shuy (1969). A good deal of the research attempted to describe phonological and syntactic differences between groups that were differentiated along the dimensions of race, social class, and geographical region, and this kind of research is still apparent (Ito and Preston, 1998). Recent sociolinguistic research has broadened its focus to include the study of social networks and language performance (Milroy, 1980), of social context and language registers (Caporael, 1981), and of lay beliefs about dialects and dialect boundaries (Preston, 1986). This research overlaps with LSP.

So, to exaggerate a bit, sociolinguistics attends to social aspects of language, while largely ignoring the mental underpinnings of linguistic phenomena; psycholinguistics examines these underpinnings while largely ignoring variables such as social group membership; and prototypical LSP research examines the social and psychological bases of language, as in the case of language-attitudes studies that focus on group membership, group language, and hearers' psychological reactions to this language.

Several styles of theorizing are apparent in LSP, although some are more typical than others. There are concatenated theories (Reynolds, 1971), which exhibit an open, web-like (as opposed to propositional) structure and are often densely verbal, communicated at length in book form. This type of theory may be highly suggestive and stimulate large thoughts, but it may also be difficult to test empirically. An example may be Babrow's problematic integration theory (1992). Probably more typical are causal theories that suggest testable hypotheses depicting a relationship between an antecedent variable and a consequence. Giles's communication accommodation theory is a prototypical example (Shepard *et al.*, 2001). Causal process theories depict a chain of causes that constitute the mechanism that explains a bounded process; they may be modeled as an input-mediator-output structure (Pavitt, 2000). Axiomatic theories are highly formalized explanatory instruments containing basic propositions (axioms) that are combined via some logical rule to form higher-order propositions (theorems). Causal process theories may assume an axiomatic form (Berger and Calabrese, 1975; Bradac *et al.*, 1980). Finally, mathematical theories, as the term indicates, contain interrelated propositions expressed in mathematical form. This constitutes an 'empty set' in LSP currently. Mathematical theories and concatenated theories are maximally distinct formally.

Predominant Theories of LSP

The Social Identity Approach

The social identity approach stands as a meta-theoretical perspective that frames a set of influential theories in LSP. Starting with ideas (Tajfel, 1974) that were formalized as social identity theory (Tajfel and Turner, 1979), the uniting assumption is an interactive meta-theory. Social psychological processes articulate with social perceivers' understanding of their

social environment to predict language use, attitudes, beliefs, and behavior. This perspective incorporates but is not limited to social identity theory, ethnolinguistic identity theory (Giles *et al.*, 1977; Giles and Johnson, 1981, 1987), communication accommodation theory (Giles, 1973; Shepard *et al.*, 2001), self-categorization theory (Turner *et al.*, 1987), and the social identity model of depersonalization effects (Reicher *et al.*, 1995). Among many other phenomena, these theories have been applied either directly or in combination to understanding second language learning, code-switching, semilingualism, diglossia, patterns of language attitudes and language shifts, gender and language use, power in language, leadership, and computer-mediated communication.

The impetus for the application and development of social identity ideas to language phenomena came in two forms. First, Giles (1973) interpreted Labov's (1966) data on shifts in post vocalic /r/ in New York City. Giles suggested that linguistic shifts between contexts – interpreted by Labov as reflective of situational formality – could also be interpreted with respect to the motivations of respondents in accommodating the perceived language style of their (experimenter) interlocutors. In other words, situational cues were mediated through respondents' motives to linguistically approach (accommodate) or distance (diverge) from their interlocutors. Empirical confirmation led to the development of speech accommodation – and later, communication accommodation theory (Shepard *et al.*, 2001). People accommodate linguistically and/or non-verbally in myriad ways: under-accommodation, over-accommodation (e.g., patronizing speech), mutual accommodation, and unilateral accommodation. It is assumed that accommodation towards an interlocutor is motivated by a desire to show liking, whereas divergence away from an interlocutor satisfies a motive for positive intergroup distinctiveness.

Critically, the power of communication accommodation theory was not fully realized until a second development of social identity theory was made: ethnolinguistic identity theory (Giles *et al.*, 1977; Giles and Johnson, 1981, 1987). Ethnolinguistic identity theory was designed to explain macro-social processes – broadly speaking, language survival and death. Ethnolinguistic identity theory accomplishes this by elaborating the logic of social identity theory. By understanding a social perceiver's identification level, the perceived stability and legitimacy of the status between relevant groups, the possibility of shifting between groups, and the subjective vitality of those groups, it is possible to delineate three (in practice, even more) intergroup orientations. These orientations – social mobility, social creativity, and social conflict – in turn predict the communicative shifts discussed in communication accommodation theory.

A mainstay of work in LSP has been language attitudes, an area where ethnolinguistic identity theory has been particularly powerful. Lambert *et al.* (1960) devised the matched guise technique (MGT) for measuring language attitudes. The impetus for developing the MGT was to investigate stereotypes of speakers uncontaminated by social desirability motivations in subjects. To do this, subjects are told that they will be asked to make personality inferences of different speakers from brief recordings, much as we quickly develop ideas about the personality of someone on the radio from listening to them briefly. Unknown to subjects, however, it is the same bilingual speaker speaking in a different guises – French-Canadian versus Anglo-Canadian in the original study. The advantage of the MGT is that it makes it possible to control for individual differences in speaking style (i.e., prosodic and paralinguistic features) while varying only the language or accent of the speaker. Any differences in beliefs about the 'personality' of the speaker are therefore attributable to group differences. Research shows that two dimensions of social evaluation are most common: status (e.g., intelligence, competence, wealth) and solidarity (e.g., integrity, benevolence, social attraction).

Work on language attitudes followed a descriptive empirical path unguided by theoretical concerns for some time. Different patterns of language attitudes for different groups – even different patterns for the same group over time – were found (see Giles and Coupland, 1991). However, Giles and his colleagues showed that much of the variation could be understood using ethnolinguistic identity theory. Lambert *et al.*'s original (1960) study demonstrated that French-Canadian and Anglo-Canadians alike downgraded the former on dimensions of status and solidarity. This suggested social mobility/group assimilation beliefs. This pattern occurs when the dominant group has overwhelming vitality; subordinate and dominant members identify with the dominant group. Both perceive that the boundaries between groups are permeable and that the vitality difference is legitimate and stable. Social mobility is then realized as identification with the dominant group. Other findings could be interpreted as evidence of social creativity. For example, Cheyne (1970) studied the language attitudes of Scots and English and found that while the former was rated higher on solidarity variables, the latter was rated higher on status variables. This pattern occurs when identification with the group is high, group boundary permeability is low, but both groups wish to avoid direct competition. In

such cases, positive identity for the ingroup is achieved by finding a dimension of comparison that enables positive distinctiveness. Finally, Lambert *et al.* (1965) studied the language attitudes of Arabs and Israelis and found mutual downgrading on status and solidarity dimensions – a pattern consistent with social competition social beliefs. This pattern occurs when group members believe that social competition will achieve dominant status for the ingroup.

The Linguistic Category Model

In their linguistic category model (LCM), Semin and Fiedler (1988) proposed a linguistic counterpart to attributional biases in person perception such as the fundamental attribution error (Ross, 1977) – the phenomena where people are more likely to make internal attributions for their successes (e.g., 'I'm a smart person') than for their failures (e.g., 'that test was difficult'), whereas the reverse is true when people make attributions for other people. Semin and Fiedler proposed that such biases are reflected in – and in turn affected by – word choice. According to the LCM, people and their actions can be described by four linguistic categories that vary along a dimension of concreteness-abstractness. Descriptive action verbs (e.g., *punch, kiss, run*) are the most concrete, referring directly to the behavior concerned. Such descriptions tell us little about the attributes of the person who engaged in the act – any number of attributions might be applied. Interpretive action verbs (e.g., *hurt, court, training*) are more abstract and tell us more about the meaning of the given behavior, but still such descriptions tell us little about the actors' reasons for engaging in the behavior. State verbs (e.g., *be angry, be aroused, love sport*) refer to the internal emotional and motivational states of the action and therefore constitute a person attribution, albeit one that can be highly unstable. Finally, the same person or actions can be described by adjectives (e.g., *aggressive, nymphomaniac, athletic*). Such descriptions are the most abstract and imply most about the dispositions of the actor.

The most sustained research employing the LCM has been on the linguistic intergroup bias (LIB) (Maass *et al.*, 1989). The LIB occurs in circumstances where people who identify strongly with a group are given the opportunity to describe the actions of members of the ingroup or a relevant outgroup. Given these background conditions, people describe positive ingroup and negative outgroup actions using more abstract language than they use when describing negative ingroup and positive outgroup actions. Much research has focused on testing explanations for the LIB. Maass *et al.* (1996) tested an identity threat explanation that implicated the motive for social identity enhancement. Maass *et al.*'s reasoning was that the LIB should only result when one's ingroup is threatened in some way by an outgroup member (e.g., being criticized), but not when relations between groups are construed as cooperative. Maass *et al.* found an accentuated LIB when under ingroup threat and an attenuated LIB under the no-threat condition. While the LIB is sensitive to self-enhancement motives, there is still residual variance to explain. Maass *et al.* (1995) tested a differential expectancy explanation. Perhaps it is the case that people simply describe behaviors that are in accordance with stereotypical expectations, regardless of valence? Maass *et al.* (1995) demonstrated that this is indeed the case – regardless of whether ingroup and outgroup stereotypes were negative or positive, people described behavior consistent with those stereotypes in more abstract language. While progress has been made in understanding the causes of the LIB, research continues to reveal new moderating variables. For example, Douglas and Sutton (2003) showed that the LIB can vary with strategic intent – findings that are not readily explainable using identity protection or expectancy explanations.

An additional implication of the LIB is that it may partly explain why stereotypes are notoriously difficult to change (Maass, 1999). Stereotypes are most negative during intergroup competition, and such stereotypes are linked with intergroup discrimination. It is also under these circumstances that the LIB is found. The LIB communicates stereotypes and by so doing may reinforce those stereotypes.

Uncertainty Reduction Theories

Uncertainty reduction theories have been very common in the field of communication. Berger and Calabrese (1975) began with a concern with the role of uncertainty reduction in initial (interpersonal) encounters, but this was expanded to ongoing interactions by Berger and Bradac (1982). The starting assumption was that coping with uncertainty is a central issue in the production and reception of any communication. People must deal with their uncertainties to be able to communicate effectively. Following the Yerkes-Dodson law, very high uncertainty is stifling and decreases communication (imagine trying to communicate a complex idea to a foreigner), moderate uncertainty is optimal for communication, and very low uncertainty is unlikely to carry the motivational force to lead one to communicate at all. Uncertainty can be about ourselves or about our communication partners; it can be cognitive (i.e., uncertainty about values, attitudes, beliefs, and feelings) or behavioral, explanatory or predictive. Uncertainty is reduced by engaging in communicative

strategies. Strategies can be passive (e.g., watching people talk to others), active (e.g., asking others about the individual of interest), or interactive (e.g., interrogation, self-disclosure). However, Berger (1987: 41) makes the point that "uncertainty is not reduced for its own sake." We become uncertain when we perceive a deviation from norms or expectations, because of expected future interaction, or for incentive value (we are motivated to reduce uncertainty about people who have reward power).

Uncertainty reduction theory accounts for the fact that much of our initial interactions are highly scripted. Our scripted interactions with shopkeepers, ticket agents, office receptionists, waiters, and so on obviate the need to deal with uncertainty. However, when we do not have a ready made script, we have to rely upon attributions. Berger and Bradac (1982) propose four models of uncertainty reduction. Each model begins with communication of some form. This, in turn, leads one to make a judgment about either the group membership of the communicator or the psychological trait/state of the speaker. This will then make it possible to determine the degree of similarity between self and communicator, which in turn will affect the level of uncertainty. If the level of uncertainty is tolerable, people will then engage in some strategy to reduce uncertainty. Research suggests that strategy selection is governed by beliefs about the efficiency and social appropriateness of the strategy (Kellerman and Berger, 1984).

Elaboration Likelihood

The Elaboration Likelihood Model of persuasion (ELM) (Petty and Cacioppo, 1986) has stimulated some recent language-attitudes research. A major idea here is that persons can focus on the arguments contained in persuasive messages when forming, maintaining, or changing attitudes (central processing), or they can rely upon extra-argument information, such as communicator credibility or attractiveness (peripheral processing). Under conditions of high distraction, for example, persons may find peripheral cues especially useful, whereas in situations where attitudinal decisions have crucial consequences, message arguments may be highly salient. One possibility is that language style may serve as a peripheral cue in some situations. Message recipients may not attend closely to arguments, but instead use their evaluative reactions to dialect, accent, and so on as a basis for decision making. Two studies demonstrated that linguistic power can affect message recipients' cognitive responses (findings consistent with ELM), but power of style did not affect persuasion **uniquely** under conditions of distraction (Holtgraves and Lasky, 1999) and low message relevance (Gibbons *et al.*, 1991); two-way interactions between power and distraction and between power and message relevance were not obtained, findings that do not support predictions of ELM with regard to power of style.

Information Processing Theory

Information Processing Theory has generated some interesting language-attitudes hypotheses. This is a general theory of attitude change constructed by McGuire (1968) and extended by Hamilton (1997). Persuasion is viewed as a process with six phases: exposure to a message, perception, orientation to the communicator and the position advocated, goal-directed processing, causal attribution to the communicator regarding the position taken and arguments made, and information integration (i.e., relating the message to the message recipient's established knowledge). The basic processes of message comprehension and message/source evaluation undergird these phases, and a general hypothesis is that comprehension affects evaluation. The communicator's language style becomes important during the exposure and perception phases, and it can affect causal attributions and, more generally, message/source evaluation. A specific causal hypothesis reflecting the theory is that linguistic specificity is directly related to perceived message clarity, both specificity and clarity facilitate judgments of the position advocated, and perceived message clarity is directly related to perceived personalization of the message. There is evidence supporting this hypothesis and indicating that these effects are mediated by channel immediacy (e.g., written versus face-to-face messages) (Hamilton, 1998). Linguistic specificity is a function of several factors, including breadth of the semantic category referenced, presence or absence of euphemisms and dysphemisms, and presence or absence of adverbial or adjectival modifiers (Hamilton, 1998: 112). Another hypothesis (Hamilton, 1997) describes the 'charisma sequence': some message feature, for example, language intensity, triggers judgments of source dynamism which, in turn, increases competence, then trustworthiness and thus liking for source.

Conclusion

As an area of study, language and social psychology occupies a niche between mainstream social psychology and linguistics. Developments in the field have provided powerful integrative theories, particularly in the form of ethnolinguistic identity theory, communication accommodation theory, and uncertainty reduction theories. However, more recent work has demonstrated the utility of more cognitive models of language processing. In the future, we expect that

further advances will be made in the social cognitive developments of the social identity approach in the form of the extension to social identity theory, self-categorization theory. Further developments will likely link communication accommodation and uncertainty reduction theories.

See also: Ethnolinguistic Vitality; Identity and Language; Language Attitudes; Society and Language: Overview; Speech Accommodation Theory and Audience Design.

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Social Semiotics

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Social semiotics is a part of semiotics understood as the general science of signs. This statement is important to understand the place of social semiotics in the global framework of semiotics. According to Ferdinand de Saussure, the general science of signs, '*sémiologie*,' coincided with the 'science qui étude la vie des signes au sein de la vie sociale.' But semiotics today has come a long way with respect to this conception. In *Semiotik/Semiotics: a handbook on the sign-theoretic foundations of nature and culture* (Posner *et al*., 1997–2004), semiotics is far broader than a science that focuses on signs in the sphere of sociocultural life. Semiotics is not only *anthroposemiotics* but also *endosemiotics* (semiotics of cybernetic systems inside the organic body on the ontogenetic and phylogenetic levels), *microsemiotics* (the study of metabolism in unicellular life forms), *mycosemiotics* (semiotics of fungi), *phytosemiotics* (semiotics of plant life), *zoosemiotics* (semiotics of interactions among animals), *machine semiotics* (semiotics of sign processing machinery), *environmental semiotics* (the study of the interaction between the various species and environment).

Social semiotics today must consider its place in the universe of signs. Nor is it sufficient to consider the connection between one individual and another in a given society and culture. Dominant approaches to semiotic inquiry now refuse the idea of the individual as a separate and self-sufficient entity, and not only on a social level. The body of an organism in the micro- and macrocosm, in nature and culture, is not an isolated biological entity, it does not belong to the individual, it is not a separate and self-sufficient sphere in itself. The body is an organism that lives in relation to other bodies and as such it is intercorporeal and interdependent. The individual's relations transcend the individual sphere as well as the social sphere, culture, that is, the general anthroposemiosic sphere. The global character of social relations in the present-day world involves sign situations that not only are international, intercultural, and interethnic; they also cut across abstract separations, such as the dichotomy natural vs. historico-social life, and evidence how human life shares the same destiny as all of life on the planet.

An approach to semiotics that is at once global and detotalizing presupposes dialogue and otherness. In other words, social semiotics presupposes the capacity for listening to the other, opening to the other, hospitality. 'Opening' is not only understood in the quantitative sense (i.e., with reference to the omnicomprehensive character of global semiotics), but also in the qualitative sense. Otherness obliges the totality to reorganize itself ever anew in a process related to 'infinity,' as Emmanuel Levinas teaches us, or to 'infinite semiosis,' as says Charles S. Peirce. The relation to infinity is far more than cognitive: beyond the established order, the symbolic order, convention and habit, it presupposes a relation of involvement and responsibility. This relation to infinity is a relation to what is most refractory to the totality, a relation to the otherness of others, the other person. Nor is the expression 'other person' understood in the sense of another Self like ourselves, another *alter ego*, an I belonging to the *same community*. Instead, reference is to the other in its extraneousness, strangeness, difference – the alien self. In spite of all efforts made by identity, of all guarantees offered by identity, Self cannot be indifferent in the face of difference thus described.

All semiotic interpretations by the student of signs – especially when operating on a social semiotic level – must keep account of the dialogic character of the relation with the other. Dialogism is a fundamental condition for a social semiotic approach with a global orientation. And rather than englobe the particular and the local, in the light of such an approach these are enhanced in their dynamic relation to the detotalized totality.

See also: Indexicality: Philosophical Aspects; Indexicality: Theory; Body Language; Anthroposemiotics; Structure and Structuralism: Semiotic Approaches; Significs: Theory; Linguistic Anthropology; Pragmatics: Overview; Semiotics: History; Semiotic Anthropology; Biosemiotics; Society and Language: Overview; Translation: History.

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Social-Cognitive Basis of Language Development

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Linguistic communication is a form of social interaction. It is a special form because it is mediated by linguistic symbols. Linguistic symbols are social conventions used by human beings to direct one another's attention to various aspects of their shared environment. Different societies have created different sets of linguistic symbols – at the moment there are approximately 6000 languages in the world – and indeed the linguistic symbols of each society evolve fairly rapidly over historical time as speakers modify existing ways of talking to meet changing communicative circumstances.

Children are exposed to the linguistic conventions of their speech community as they interact socially with mature language users. To acquire productive use of linguistic conventions children must have the social-cognitive skills to:

- participate with others in the joint attentional interactions that provide a common referential ground for symbolic communication (joint attention);
- understand the communicative intentions of others as embodied in linguistic symbols of various types (intention reading);
- take the perspective of others in tailoring the choice of linguistic expression to particular communicative contexts (perspective taking);
- collaborate with others in coconstructing a conversation with a shared topic and 'relevant' contributions of new information (communicative collaboration).

Other animal species do not possess any of these social-cognitive skills – at least not in their human form – and that is the main reason why they are unable to create or to learn a human language (Tomasello, 1999, 2003).

Joint Attention, Intention Reading, and Word Learning

The social-cognitive foundations for language acquisition begin to emerge in human ontogeny near the end of the first year of life in various of infants' nonlinguistic activities. Most importantly, at around 9 months of age infants begin to interact with other people triadically around a 'topic' of mutual interest ('the primordial sharing situation'). Thus, they begin to follow others' attention to external events and entities (Tomasello, 1995), to direct others' attention to external events and entities using nonlinguistic gestures for both imperative and declarative purposes (Bates, 1979), and to engage with others in relatively extended bouts of joint attentional activity (Bakeman and Adamson, 1984). Other animal species engage rarely, if at all, in triadic communicative interaction.

Children acquire their earliest linguistic conventions within the context of routine joint attentional activities such as having a meal together, taking a bath together, going for a ride together in the car, and so forth (Bruner, 1983). These routines serve as necessary scaffolding because linguistic symbols are associated with their communicative functions only conventionally – which presents a unique learning situation. That is, no matter how intelligent a child is, she cannot on her own figure out what some sound means, but rather she must experience a speaker using that sound for the purposes of communication and then determine why, toward what communicative end, he is using it. This determination requires the child to have some nonlinguistic access to the kinds of thing the adult may be communicating about. This is provided by the joint attentional activity, which basically defines 'what we are doing' and so determines a kind of domain of relevance. For example, if a child hears the new word *gavagai* from an adult out of the blue, so to speak, she will not learn it because she has no idea why, for what communicative purpose, the adult is using this word. But if she and the adult

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are giving her a bath together and the adult looks at the rising water level and says *gavagai* while turning the faucet off, there are only a limited number of plausible meanings for this expression – assuming it is relevant to the activity. It is thus not surprising that Carpenter *et al*. (1998) found that the size of children's early vocabularies is highly correlated with the amount of time they spend in joint attentional engagement with others.

For the child to be able to zero in on a single one of the plausible meanings of a new expression used within a joint attentional activity, she must be able to read the communicative intentions of other people more specifically; that is, she must be able to determine specifically what the adult intends for her to attend to. Initially, it is very helpful if adults do most of the work and follow into the child's already existing focus of attention when using a new expression (see Tomasello, 1988 for a review). But as development proceeds, children become ever more skillful at determining adult communicative intentions in novel contexts in which the two of them are focused on different things. Thus, if an adult uses a novel word when he, the adult, is attending to one object and the child is attending to a different object, the 18-month-old child will follow the adult's attention to the object on which he is focused in determining the intended referent (Baldwin, 1993). Further, if the adult is picking his way through a toy box full of objects in search of a 'modi,' 18-month-old children will be able to pick out his intended referent by the fact that he rejects some objects and finally accepts one – despite the fact that he looks equally at them all. And if the adult uses a novel verb to announce an intended action ("Now, let's dack Ernie") and then performs one act on purpose and another by accident on Ernie – with different orders of these two across children – 24-month-old children know that the intended referent of *dack* is the one done on purpose (see Tomasello, 2001 for a review of these and similar studies).

Children's acquisition of linguistic symbols thus depends most fundamentally on their ability to participate in the joint attentional activities that create a common communicative ground with their interlocutor and on their ability to read the intentions of others in particular communicative contexts.

Perspective Taking and Construction Learning

The broader social purposes for which people use language are such things as greeting others, informing others, asking questions, requesting favors, and so forth. In many cases the speakers of a language have conventionalized entire grammatical constructions for the most frequently occurring of these functions, for example, English wh-questions for requesting information and imperatives for requesting favors. In addition, speakers use different conventionalized grammatical constructions depending on who the listener is and what she knows and expects. For example, if we are conversing about my sister and I want to tell you something that happened to her, I might very well use an English passive construction such as *She was sued by her landlord*. Or perhaps I learn that you erroneously believe that my sister's therapist sued her, in which case I might correct you by using a cleft construction such as *It was her* ***landlord*** *that sued her.* If we have been talking about something else I might introduce the topic by using some kind of presentational construction like *You know my sister's landlord, he* . . . . In theories of language such as cognitive linguistics and construction grammar these kinds of constructions are, like words, linguistic symbols that pair a linguistic form and communicative function (i.e., the communicative intentions the symbol embodies). Children thus learn these constructions in a way that is not totally different from the way they learn words, that is, by observing people use them for particular communicative functions – which they determine by intention reading, including the subintentions of any subconstructions involved (e.g., noun phrases, locative phrases; see Langacker, 1987; Goldberg, 1995).

From a social-cognitive point of view, the most interesting thing about the acquisition of constructions is that children must learn when to use which one, and this often involves a subtle assessment of the knowledge and expectations of the listener. For instance, in their acquisition of noun phrases 2-year-old children learn to do such things as use pronouns to refer to an entity when they are jointly attending to that entity with their listener, but use a lexical noun with a determiner (or even a relative clause) when the two of them are not jointly attending (see Tomasello, 2003: Chap. 6 for a review). Similarly, to learn to use a cleft construction (e.g., *It was Jeffrey that took the cookies*) children must be able to tell that their listener is currently under the mistaken impression that someone else took the cookies and then choose a construction that makes contact both with the mistaken impression and its correction. Saying *The vase broke* enters the event from the perspective of the vase whereas saying *I broke the vase* enters it from the perspective of me and my activity (Budwig, 2000).

In all these cases, then, children must learn the perspective, in the broad sense of that term, that a construction embodies, and the communicative situations in which it is appropriately used. They do this

initially in a very local and item-based way. For example, they might initially be able to alternate between the object's and the actor's perspectives only with the verb *break*, with extension to other verbs coming only very gradually (Tomasello, 2000).

Communicative Collaboration in Conversation

As children are acquiring the various symbols and constructions of their language they are at the same time learning how to use these symbols and constructions to communicate more effectively in extended conversational interactions with other people. Conversational and discourse skills are concerned not so much with the mastery of the grammaticized and conventional aspects of a language, but more with the mastery of strategies for using those constructions effectively to manage the flow of information across turns in a developing conversational interaction. Skill at conversation involves such things as taking turns appropriately, managing the conversational topic effectively, and repairing a conversational interaction when it breaks down.

Becoming a skilled conversationalist requires children to read the intentions and take the perspective and role of their listener in many complex ways in novel contexts, and so many conversational skills do not fully develop until late in the preschool period. Thus, at 2 years of age only a minority of children's utterances are semantically contingent on the adult's previous utterance, and very few of their turns include reference to both the preceding topic and also some new information – the prototype of a mature conversational turn. When they do engage in a relatively extended conversation on a single topic, 2-year-olds typically take only one or two turns per conversation, with this value doubling by about 4 years of age (Pan and Snow, 1999).

Conversation is a form of collaboration in the sense that from a very early age there is a 'negotiation of meaning' between the two conversationalists (Golinkoff, 1983), and there are requests for clarification back and forth when one person does not understand something in the other's formulation. Almost from the beginning of the language acquisition process, young children both respond to requests for clarification and, less frequently, request clarification of others in their conversations (see Tomasello, 2003: Chap. 7 for a review). This again requires sophisticated skills of intention reading and perspective taking.

Collaborative activities, either nonlinguistic or linguistic, thus require participants to have a common goal and to work together in coordinated ways to achieve it. This coordination is not a foregone conclusion, and indeed animals that communicate with one another in fairly sophisticated nonsymbolic ways still do not engage in the back and forth of conversational interaction (and often engage very little in collaborative, turn-taking interactions of any kind).

Conclusion

Children thus employ their species-unique social-cognitive skills to acquire and use a natural language – skills of joint attention, intention reading, perspective taking, and communicative collaboration. But in the process of acquiring a language, children are led to consider various particular intentions and perspectives that they almost certainly would not have created on their own: the very same animal is referred to on different occasions as a dog, an animal, a pet, or a pest; the very same action is referred to as running, fleeing, chasing, or exercising. Acquiring a natural language in interaction with other persons thus leads young children to create some species-unique forms of cognitive representation, namely, perspectival cognitive representations (Tomasello, 1999).

A number of theorists have also proposed that conversation and discourse might play an important role in children coming to have a 'theory of mind,' that is, in coming to view other persons as mental agents who can have beliefs (including false beliefs) about the world (Harris, 1996). Thus, to engage in true conversation children must in some sense simulate the perspective of other people as they express themselves linguistically, and thus the back and forth of discourse involves the child in a constant shifting of perspectives from her own to that of others and back again – which helps her to construct both social norms and individual attitudes and beliefs (Tomasello and Rakoczy, 2003).

And so the relationship between children's social cognition and language is not one way. They must have certain social-cognitive skills to acquire a language, but then engaging in linguistic communication leads them to create new social-cognitive skills. Acquiring a language may thus be seen as another manifestation of the basic dialectic in which children are biologically prepared for culture, but then participation in culture – whose artifacts embody the skills, attitudes, and perspectives of other individuals – takes their cognitive skills to new places.

See also: Cognitive Linguistics; Cohesion and Coherence: Linguistic Approaches; Communicative Principle and Communication; Context, Communicative; Cooperative Principle; Cultural and Social Dimension of Spoken Discourse; Discourse Anaphora.

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Socialization

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In anthropology, sociology, as well as social psychology, studies of children are traditionally found under the heading of 'socialization.' In the widest sense, this term refers to an indefinite array of social events taking place in ordinary life surroundings as well as in institutional settings, representing events through which people become skilled in the ways of society. However, researchers within the social and behavioral sciences have settled for a much narrower conceptualization, typically treating socialization as the process through which adults secure the transition of the youngest generation from childhood into ordinary membership of society.

For the early sociologists such as Durkheim and Parsons (*see* **Durkheim, Emile (1858–1917)**), who conceived of society largely in moral terms, socialization is primarily a matter of the individual internalizing a set of norms and values crucially shared by members of society. For sociologists and psychologists alike, socialization is the process through which the individual acquires a sense of a social 'self.' Within traditional social anthropology (e.g., Mead, 1930), this process is taken to also include the development of particular skills in relation to the socioeconomic order of a culture. Thus, the notion of socialization has provided sociologists and anthropologists with a way of accounting for the maintenance and reproduction of social order, and furnished psychologists with an axiomatic for understanding the individual's social as well as moral development (Tholander and Cromdal, 2005).

Norms, Rules, and the Maintenance of Social Order

One of the central tasks of early sociology was to explain how societies are held together. Assuming that humans are born into society as virtually asocial beings, Durkheim (1979) came to the realization that the notion of mutual economic interdependence, with its resulting division of labor among members of society, is not enough to account for the maintenance and reproduction of social order. For society to be possible, there must be an underlying consensus

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Socialization

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among its members concerning the most central values and beliefs that inform and crucially constrain social behavior. This assumption raised questions about how society's central norms and values are transmitted across generations, how in becoming part of society, children come to internalize these most central features of social life. For Durkheim, this task is handled by society's institutions: the family, the church and most importantly the school, which is responsible for the moral education of the child. (*see* **Institutional Talk**).

Following up on these ideas, Parsons (1951) sought to elaborate how societal norms and values are translated into concrete rules of behavior, i.e., how they inform and essentially govern people's actions. Central in his work is the notion of 'value orientation patterns,' which allow individuals to infer the expected forms of behavior from the social roles participants occupy in a variety of settings. This allows people not only to recognize what is expected of them when acting within their roles but also to assess other people's role performance. This is a crucial aspect of the normative nature of social structures, as it enables society's actors to impose social control on each other. Moreover, it allows adult members of society to socialize the children. In this way, the processes of social control and socialization operate within the social system toward an ideal state of equilibrium.

A Developmental Orientation

A notable feature of these early works as well as their subsequent applications is that the concept of socialization is almost exclusively applied to the study of children. In his work on society as a social system, Parsons readily acknowledged that socialization is a life-long process, only to argue later on the same page that sociological inquiry should remain focused on childhood, or the period of 'primary socialization.' It is during this period in life, Parsons argued, that the 'major value-orientation patterns,' comprising normative patterns of behavior, are 'laid down' within the social actor (Parsons, 1951: 208). These orientations to shared values were seen as foundational to an individual's 'basic personality structure,' and as such they would not undergo substantial change later in life. Among the specific processes of socialization, Parsons identifies such mechanisms as *reward-punishment*, *instruction*, and a set of *mechanisms of value-acquisition*, of which the most important one is the child's *identification* with the adult.

Parsons's integration of various streams of concurrent psychological reasoning within his systemic theory of society suggests that socialization theory is not a strictly sociological enterprise. Indeed, it provides something of a paradigmatic perspective for social and behavioral studies of children. Hence, issues of socialization have been addressed by virtually all the major psychological theories of development, and there are few major works within social anthropology that do not attend to the problem of cultural transmission across generations, often referred to as 'enculturation.' Common to all the traditional – and much of the contemporary – socialization research is a view of childhood as a period of transition, during which children gradually become (or fail to become) full-fledged members of society. In this way, socialization research trades on massively commonsensical and normative notions of children and childhood. At the same time, it provides a scientific foundation for these cultural beliefs.

Socialization: Critical Perspectives

One of the earliest criticisms of socialization theory appeared in Wrong's (1961) essay on the 'oversocialized conception of man,' in which he argues that the notion of socialization is used as an automatic account for any queries of social order:– Why does society hold together? – Because people are socialized to follow common rules of behavior. The problem here, according to Wrong, is the implication that, having been socialized into society, people have little choice but to follow its rules. Apart from its social determinism, this view renders sociological inquiry trivial.

Similar problems were addressed in Garfinkel's early ethnomethodological investigations (1967), in which he points out that sociological theory construes the member of society as a 'judgmental dope,' who 'produces the stable features of the society by acting in compliance with preestablished and legitimate alternatives of action that the common culture provides' (Garfinkel, 1967: 68). Garfinkel then proposes that in billing the member of society as a judgmental dope, social science scholars employ a variety of (research) procedures, designed to preclude the practical concerns of members in actual social situations. The concept of socialization can then be seen as an analytical resource to this end, in that it allows researchers to gloss over (Mackay, 1975), rather than investigate, the lived features of cultural (re)production. Indeed, the invisibility of actual practices of socialization is already built into Parson's sociological theory, in which he proposes that 'many features of the actual process of socialization of the child are obscure' (Parsons, 1951: 214).

A related set of problems in socialization theory pertains to the specific status of the child as social

actor, including, as we have noted, a general research bias toward issues of development. As Speier (1971: 188) points out:

> sociologists (and this probably goes for anthropologists and psychologists) commonly treat childhood as a stage of life that builds preparatory mechanisms into the child's behavior so that he is gradually equipped with the competence to participate in the everyday activities of his cultural partners, and eventually as a bona fide adult member himself.

Speier refers to this view as the 'classical' formulation of socialization because, although employed by researchers for 'scientific' purposes, it is rooted in folk beliefs about children. These beliefs form a set of ideological conventions, according to which children are treated as incomplete social participants, as 'incipient beings' (Durkheim, 1979). On this view, children's social skills are thought of in terms of incompetence, or at best, pre-competence, and therefore, children need to be guided into social life by adults.

Jenks (1997) proposes that most social theories adopt this adult-oriented perspective on children and therefore 'spectacularly fail to constitute the child as an ontology in its own right' (Jenks, 1997: 10). We should note that the adult perspective not only casts children as less-than-competent participants in society's business but also ascribes the problem of participation in social life *to the child* (Speier, 1976). One important implication of this interpretive imposition is that children's actions will be understood in ways that conform to, ratify and elaborate the biased, adult-folklore-oriented view of what goes on between children and adults. This in turn inevitably precludes not only any adequate understanding of children's social worlds but also inhibits an understanding of the joint interactional work in which both parties to adult-child exchanges must necessarily engage. Ironically, it is precisely these situated practices of action and reasoning that form the very basis of socialization (see Edwards, 1995, and Waksler, 1991, for further discussions).

These concerns led Speier (1971) to respecify the very notion of socialization as above all a matter of developing skills for participation in social events. This opens up for empirical investigation of socialization from within social events, by attending to the organization of talk-in-interaction. In this vein, pioneering ethnomethodological works by Sacks (1992, Vol. 1, Lecture 2, Spring 1966: *et passim*), Speier (1976), and Mackay (1975) demonstrate how children manage to participate in talk under overwhelmingly restricted conversational rights with adults. (*see* **Ethnomethodology; Sacks, Harvey (1935–1975)**.) In later years, analysts of social interaction have focused on the organization of talk within a range of activities within the peer group such as negotiations of local alignments and friendship relations (Goodwin, 1990; Whalen, 1995), teasing (Tholander, 2002), and the management of conflict (Cromdal, 2004; Maynard, 1985). (*see* **Organizational Discourse; Institutional Talk.**)

The focus on socialization within the peer group arose out of an increasing sociological interest in children's play. As Sutton-Smith pointed out, "Peer interaction is not a preparation for life. It is life itself" (1982: 75). In this vein, interpretive sociologists and social psychologists argued that it is through the management of peer group concerns that children appropriate the values and beliefs of the adult world, and it is through these necessarily communicative practices that children produce their own unique peer culture (e.g., Corsaro and Eder, 1995; Harris, 1995).

The necessity of studying the communicative practices within the peer group is also highlighted by language-oriented ethnographers, who not only demonstrate how children are socialized through language but, crucially, demonstrate how the children are socialized to use language appropriately within distinct social groups (e.g., Ochs and Schieffelin, 1995). These studies, commonly known as 'language socialization,' provide a critical perspective on the relation among language, culture, and communicative practice, and its role in children's language acquisition.

In 1990, James and Prout outlined a social constructionist framework for the study of children and childhood. This interdisciplinary enterprise was designed to revitalize and redefine the status of childhood on the social studies research agenda, and was accordingly launched as a 'new paradigm for the study of childhood' (James and Prout, 1990: 5). Echoing the early ethnomethodological critique, researchers embracing this orientation strongly dispute the traditional view that studies of childhood are interesting only insofar as they tell us something about future adulthood, along with its allied notion of children as passive recipients of culture. Instead, within this approach – sometimes referred to as 'the new social studies of childhood' – researchers insist that children be recognized as social agents, capable of constructing their own social worlds. A further interest is in understanding the relations between children's social worlds and society's institutions, such as the family, school, or any other of the adult-dominated spheres of social life in which children routinely participate. Stressing the constructed nature of cultural conceptions of children and childhood, researchers clearly

recognize that this process of construction is part and parcel of everyday interactional practices. However, although James and Prout emphasize the need for empirical studies to equal the theoretical development of this enterprise, analyses of situated interactions through which children create their peer cultures within society have hitherto been scarce. Hence, the current challenge for studies of children and childhood lies in exploring the overwhelmingly language saturated practices through which children take part in society's business.

See also: Durkheim, Emile (1858–1917); Ethnomethodology; Institutional Talk; Organizational Discourse; Organizational Discourse; Sacks, Harvey (1935–1975).

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Socialization: Second Language

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Second Language Socialization

Socialization refers to the interactional processes through which a child or other novice develops the competence required for participation in the social life of a particular community or communities, including routine cultural practices, such as language and literacy activities, and local preferences for action, thought, and emotion. These processes occur in large part through language, the primary symbolic medium of cultural reproduction and transformation. Language socialization researchers invoke Whorfian views of linguistic relativity in articulating the view that "acquiring a language is part of a much larger process of becoming a person in society" (Ochs, 2002: 106). Accordingly, the language socialization paradigm is concerned with two interconnected phenomena: how children and other novices are socialized to use language and how these same individuals are socialized through the use of language. Language socialization research strives to relate individual processes to broader sociocultural contexts, seeking a maximally holistic perspective while simultaneously attending to the microlevel details of language use.

Background and Key Concepts

Originally articulated nearly two decades ago (Ochs and Schieffelin, 1984), this paradigm has retained an emphasis on the dialectic of language learning and socialization. Early language socialization research emerged as a branch of linguistic anthropology, opening new analytic pathways, through the combined use of ethnography and microlinguistic analysis, toward an understanding of first language and literacy development in childhood. Focusing on young children acquiring their L1 in diverse sociocultural settings (Ochs, 1988; Schieffelin and Ochs, 1986), and on relationships between culturally specific patterns of language socialization at home and in school (e.g., Heath, 1983), this research clearly documented the cultural specificity of language and literacy socialization practices and their developmental consequences during the transition from home-based to schooled activities. In subsequent years, language socialization research has expanded beyond its original emphasis on first language learning in childhood, incorporating studies of second and multiple language learning across the life span.

Inspiration for the genesis of the approach is often traced to seminal work on interactional and communicative competence by Gumperz (1982) and Hymes (1972), especially Hymes' formulation of the construct of communicative competence. To recall, Hymes opposed the view that only knowledge of formal structure was relevant to a theory of competence, arguing instead that competence consists of **variable** knowledge about patterns of language **use**. "Communicative competence involves knowing not only the linguistic code, but also what to say to whom, and how to say it appropriately in any given situation" (Saville-Troike, 2003: 18). Additional disciplinary sources of language socialization research are to be found primarily within scholarly domains privileging various integrated views of language and culture, including, as noted above, linguistic anthropology, but also sociocultural–historical psychology, discourse analysis, and, more recently, cultural and practice theory.

Second language socialization research draws its views on cognition as an integrity of language, mind, and society from sociocultural psychology as originally outlined by Vygotsky (1962, 1978) and Leontiev (1981), with its emphasis on the development of higher-order cognitive functions from the outside in, that is, through social interaction with adults or other experts where performance is assisted. Novices are seen to develop capacities through active and selective participation in social practices at various degrees of engagement (from legitimate peripheral to full participation) and, in so doing, to transform not only their own cognition, but also the qualities of the practices themselves (Lave and Wenger, 1991).

A perspective on language integrating linguistics and social practice is taken from discourse analysis, a field of linguistics that emphasizes the study of language in use, examining how the elements of language systems are used for communicative purposes within and across particular social and cultural contexts. "Language is seen as fully integrated into sociocultural behavior, as both the result and the creator of context and structure" (Watson-Gegeo and Nielsen, 2003: 163).

In recent years, language socialization research has been influenced by "...the poststructuralist realization that learning is a non-linear, relational human activity, co-constructed between humans and their environment, contingent upon their position in space and history, and a site of struggle for the control of power and cultural memory" (Kramsch, 2002: 5). Poststructuralist and critical theories attempt to unite research on language and power and thereby to

enhance the relevance of this research through agendas of social critique. These approaches highlight the role of language as symbolic capital and the subtle mechanisms by which power is circulated and reproduced in the discourse of socialization practices. Whereas language socialization was once portrayed as inevitable, desirable, and uniformly accessible, many researchers are now sensitive to the dynamic and negotiated nature of the process, including the possibility that novices may not have ready access to socialization, and the fact that they are endowed with agency (to accept, accommodate, resist, or reject socialization processes).

Foci and Methodologies

A constant in language socialization (LS) studies is their emphasis on developmental processes and their longitudinal design, requiring selection of research sites believed to be places of transformation, whether such change is observed in classrooms or chatrooms, in homes, schools, or workplaces. Research involving educational contexts has examined foreign and second language classrooms and participants of varying age, but has also examined the role of socialization practices in technology-enhanced learning environments, study-abroad programs, and adult language and literacy courses. The research on second language socialization is not limited to educational contexts, however, but also includes studies in homes, workplaces, and bilingual or multilingual communities.

Whereas the original methodology combining ethnography and microlinguistic analysis has remained at the core of the approach, language socialization research has also been enriched and refined in the intervening years through inclusion of a variety of definitional constructs, data elicitation practices, and analytic procedures. Thus, ethnographic approaches, in particular the ethnography of communication (EC), feature prominently in the literature on second language socialization. However, this literature is characterized by great variety in the choice of theoretical and analytic emphasis. Some studies take their primary inspiration from sociocultural psychology, examining the mediating role of language in the development of higher-order cognitive functions as individuals participate in 'activity systems'. Other studies focus less on the achievement of a 'thick description' of the surrounding sociocultural context (Geertz, 1973) and more on detailed analysis of particular discourse practices, often in second language classrooms. Still others, often inspired by poststructuralist theories of second language learning, investigate autobiographical representations of language socialization as they are presented in narrative and other texts.

Language socialization research varies considerably with respect to focal scale. Some studies involve minimal engagement with large numbers of participants, whereas others scrutinize the activity of one participant in multiple ways. Some studies examine the activities of participants in a range of contexts, whereas others confine their perspective to one (the classroom, the chatroom, the workplace). Time frames for longitudinal studies also vary considerably, with some studies emphasizing microgenesis of skills and capacities over relatively short developmental periods, such as one academic semester, and others attempting to trace ontological or developmental histories over periods of years or entire life spans.

Overview of Second Language Socialization Research

The overview of second language socialization research presented here is organized by primary methodological emphasis. Although division of studies into such categories is admittedly somewhat artificial, risking simplification, this descriptive account also provides a clear organizational framework for characterizing how differing epistemological goals and methodological resources are organized in illustrative individual studies. Therefore, the review begins with studies that are primarily ethnographic in orientation and then proceeds to examine the activity-theoretical approach, research examining socialization in second language classroom discourse, and investigations based on narrative study.

Ethnographic Approaches

As defined by Duff (2002), the EC is a "composite of approaches" (p. 292) for conducting qualitative or interpretive research on communication within or across cultures. EC combines etic and emic analyses of communication (i.e., outsider's and insider's views) as well as macro- and microanalyses of discourse in order to examine what a speaker needs to know in order to communicate effectively within a particular speech community and how he or she learns to do so (Saville-Troike, 2003). Ethnographic research normally requires prolonged engagement with the community under study and an effort at data triangulation, as well as careful observation of authentic communicative practices in their naturally occurring context.

Within ethnographic approaches, microlevel analyses of discourse are organized around the "communicative event" as the basic descriptive unit,

defined by "a unified set of components throughout, beginning with the same general purpose of communication, the same general topic, and involving the same participants, generally using the same language variety, maintaining the same tone or key and the same rules for interaction, in the same setting" (Saville-Troike, 2003: 23). Within contemporary second language socialization research, routine cultural practices are often mined in attempts to uncover the cultural or ideological underpinnings of everyday language and the processes by which accompanying values or worldviews are inculcated in children or other novices.

Thus, in many cases, data elicitation begins with a multimethod, holistic approach to thick description (Geertz, 1973) of socialization practices, followed by a choice of relevant communicative events based on this emic analysis. These events are then observed closely and repeatedly as they are audio- or video-recorded and transcribed. The choice of method for microanalysis of socialization practices varies greatly, with some researchers opting for close analysis of emergent routines through conversation analysis and others choosing various other forms of discourse or interaction analysis.

The work of Duff (1995, 2002) offers several examples of ethnographic research, examining the interface between macro- and microlevels of educational discourse in secondary schools. Duff (1995) investigated the consequences of post-Soviet educational reform in English language immersion classes in a progressive Hungarian school. Duff's study revealed how macrolevel changes are reflected in the qualities of classroom discourse as students in English-medium history classes are socialized to accept the replacement of traditional oral assessment through recitation (*felelés*) by student-led activities and open-ended discussion. More recently, Duff (2002) performed an ethnographic study in a mainstream Canadian high school with a large proportion of students who speak English as a second language. Concerned with the creation of cohesive and harmonious school communities that nonetheless accommodate diversity, the study analyzed the sequential organization of talk in a social studies course, including the organization of turn taking, alignment, and other features of participation. Results revealed that the teacher's emphasis on social justice and empathy for others was enacted in her attempts to allocate turns equitably and to have all students, local and nonlocal, draw cultural connections based on personal experience. However, some ESL students often declined to participate in discussions where they were positioned in various ways as outsiders. Thus, the teacher's efforts to foster a cohesive classroom community in which all members participated were often unsuccessful.

Another exemplary ethnographic study was performed by Willett (1995), focusing on the participation of ESL children in the daily routines of a mainstream first-grade classroom in the United States. Willett investigated the qualities of interactional routines embedded in communicative events as four children acquire English in first-grade classroom. The study reveals how the "micropolitics of social interaction" (p. 475) in this case positioned the three girls in the study as successful learners, able to collaboratively appropriate desirable social, linguistic, and academic competence. The one male participant, however, needed a public status in order to build solidarity with other boys. Having first acquired the public and often crude language used by these boys, he was isolated from his peers and was subsequently deemed an excessively needy and problematic student.

Additional ethnographic studies of note have been carried out in a wide array of contexts. Studies of schooling include Moore's (1999) report of major discontinuities between community and classroom language socialization practices in a Cameroon village, a gap that contributes to widespread rejection of French-based schooling due to the inaccessibility of the French language. Miller's (1999) ethnographic study of ESL students' socialization in a mainstream Australian high school showed how Chinese students' use of English is not legitimated in the same way that it is for European immigrants.

Ethnographic studies of socialization in multilingual workplaces include, for example, Goldstein's (1997) study documenting the complex interaction of community resources and identities combining to limit access to English for Portuguese immigrant factory workers. An ethnographic case study by Li (2000) focused on the pragmatics of higher-stakes social communication, illustrating how one woman, a Chinese immigrant to the United States, came to internalize second language norms and develop communicative competence in English through participation and exposure to social interactions and assistance from experts and more competent peers.

A number of studies have examined the study-abroad sojourn as a context for language socialization. DuFon's (2000) study of the acquisition of linguistic politeness by U.S. sojourners in Indonesia revealed conflicts between the participants' own gender- and religion-related identities and the parallel options available in Indonesian. Talburt and Stuart (1999) discussed the manner in which an African American woman studying in Spain was subjected to continuous and humiliating emphasis on race and

sexuality in her interactions with Spaniards. Kline (1998) reported that American women studying abroad in France sought refuge in literacy following repeated encounters with sexist and hostile attitudes in the French-speaking community.

Sociocultural Theory and Language Socialization

Researchers primarily inspired by sociocultural perspectives, including activity theory (Vygotsky, 1978; Leontiev, 1981), have also begun to contribute to the literature on second language socialization. As Kasper has noted (2001), sociocultural theory and language socialization perspectives differ in their epistemological goal: whereas sociocultural theory aims to explain the mediating role of language (and other symbolic or physical tools) in the development of higher forms of cognition, language socialization strives toward an integrated account of language and culture acquisition. Nonetheless, the compatibility of the two perspectives derives from certain basic theoretical and methodological premises.

Just as LS strives to link individual processes to their sociocultural context, activity theory aims to overcome the traditional Cartesian dualism in the social science between the individual and surrounding social environment (Lantolf, 2000). It does so through the concept of mediation, or the observation that all human activity is mediated by culturally created physical and symbolic artifacts, including language.

Whereas LS studies aim to comprehend the norms of 'speech communities', activity theory defines the scope of sociocultural context in relation to the organization of practice. In any activity system, there exists a division of labor according to which certain roles are assigned or negotiated among the participants, and from which emerge the tacit or explicit rules that individuals and the community as a whole follow when interacting with one another and with mediating artifacts. The community of practice, an affiliated term, is seen to emerge from this division of labor and is the prime context in which individuals can work out common sense through (continuous) mutual engagement, a joint enterprise, and a shared repertoire of communicative resources (Wenger, 1998).

A crucial aspect of activity theory is its tracing of human behavior to historical rather than biological sources. The study of development is conceived as observation of genetic processes occurring over time. Language socialization research focuses primarily on two historical domains: ontogenesis (life history of individuals) and microgenesis (history of particular psychological functions over short periods of time). Thus, in practice, methodology of activity-theoretical research shares with LS a concern with prolonged, ecologically valid observation of human action.

From the perspective of activity theory, the meaning of human behavior arises from a need directed toward an object. The projection from the object to the outcome of the behavior is the motive. Motives are not always pre-established, but are dynamic and malleable and may be formulated in the process of activity itself.

An example of an activity-theoretical approach to language socialization is to be found in a study by Lantolf and Genung (2002) documenting the history of one graduate student's failure to learn Mandarin Chinese as a participant in a summer intensive Chinese course. The participant, P.G., a colonel in the U.S. Army, is an experienced language learner and teacher specializing in applied linguistics who is required to complete a requirement of six credits in a non-Western language. The study focuses on the conflict between P.G.'s historically formed self-image as a good language learner and the rules for interaction imposed by the activity system of the classroom and institution, where an authoritarian methodology is enforced. The study traces the transformation over time in this learner's motives for participating in the course. Whereas initially, P.G. defined her goal as developing communicative competence in Chinese, when her efforts to do so were repeatedly thwarted, she reframed her efforts as related to success in the course so as to meet the requirement and fulfill her obligation to the Army in securing a graduate degree. Thus, the study documents the dynamism of learner motives and accompanying social and cognitive activity as they evolved through participation in the course.

Classroom Discourse

In research on the qualities of classroom discourse, the socialization perspective serves to illuminate the nature and function of interaction as a cultural medium for language learning, focusing on both socialization through language and socialization to use language. For example, in a study of beginning ESL classes in the United States, emphasizing socialization through language, Poole (1992) demonstrated that routine interactional sequences led by the teacher bear significant resemblance to American caregiver language behavior in general. In this context, the teacher/expert coconstructed learner responses, attributed collective task accomplishment to individuals, and avoided an overt display of hierarchical asymmetry, thus expressing cultural preferences for conjecture on the mental states of others, individual

achievement, and suppression of power differentials. In a longitudinal study of similar aim, He (2003) examined the heritage Chinese-language school as a locus for socialization into cultural norms, focusing on the speech roles assigned to students. His study demonstrated the variability of novices' responses to socialization practices, showing how the opportunity to acquire Chinese and associated cultural values may be accepted or contested, even by young children.

For adults, socialization through a second language may present particularly complex problems related to language use and identity. Siegal (1996) presented a case study focusing on the role of learner subjectivity in the acquisition of sociolinguistic competence by European women learning Japanese in Japan. The study examined the conflict concerning sociolinguistic appropriateness experienced by one learner in conversation with her professor, where unequal power and positionality exerted influence on the quality of the interaction. Although she did understand the pragmatics of appropriate demeanor for a woman in Japanese society, in attempting to craft a voice for herself as a professional woman in Japanese, the student manipulated honorifics, modality, and topic control in ways that sometimes resulted in inappropriate language use.

Other classroom discourse studies orient their analysis more closely toward socialization to use language. Ohta (1999) probed interactional sequences in a Japanese-as-a-foreign-language classroom, emphasizing how these sequences engage learners' participation. The study tracked the pragmatic development of a learner over the course of 1 year, demonstrating that active and peripheral participation in the routines of classroom language use shaped the learner's ability to use the follow-up turn of the Initiation–Response–Follow-up routine to perform assessments and other responses to interlocutors' utterances. Hall (1995) scrutinized the interactive environment of a first-year high school Spanish class intended to provide speaking opportunities. The teacher's primary method of developing and maintaining topical coherence took place through repetition and chaining of a small number of lexical items. This practice differs considerably from the ways in which topics are discursively established and managed outside the classroom and produces a limited repertoire of communicative practices for the students. Students in such classrooms are not socialized to use discursive forms and functions for engaging in complex, extended talk about a topic and, indeed, in the absence of overarching topic relevance, these students cannot orient to the talk in ways that permit coherent contributions.

With the arrival and widespread use of computer-mediated communications (CmC) technology in the language classroom, researchers have also begun to investigate the implications of CmC use for language socialization. For example, in a study focused on the development of pragmatic competence in the use of address forms (du vs. Sie), Belz and Kinginger (2003) examined the discourse of intercultural exchanges in German and English in the context of a telecollaborative language course. Internet-mediated contact with peers who are expert users of German offered participants in the United States many opportunities for assisted performance in socially acceptable use of the address form system in German.

Narrative Study and Second Language Socialization

The contemporary literature includes a number of narrative approaches to second language socialization, aiming to understand how multilinguals represent the process of language socialization and how this process impacts on the qualities of communicative repertoires. Research on the representation of language socialization examines learners' autobiographical accounts of language learning. Based on representations of language learning history, often written by exceptional learners and users of multiple languages, this research offers insights into the ontogenesis of multilingualism over time and in relation to personal identity and historical context.

Pavlenko (2001), for example, adopted a poststructuralist approach to narrative study in a series of studies linking L2 socialization to various aspects of identity. Poststructuralism is "understood broadly as an attempt to investigate and to theorize the role of language in construction and reproduction of social relations, and the role of social dynamics in the processes of additional language learning and use" (Pavlenko, 2002a: 282). Narrative study is a socioculturally and sociohistorically situated literary analysis in terms of genre conventions, metaphors, and tropes (e.g., the self-made man, language learning as appropriation of voice) (Pavlenko, 2002b). Pavlenko (2001) posited cross-cultural differences in societal conceptions of normative gender-related identities. Based on a corpus of 30 second-language learning stories, Pavlenko analyzed learners' encounters with ideologies of gender and their associated discursive practices. She explored the dilemma of border crossers who find themselves in situations where their previous subjectivities cannot be legitimately produced and understood and who must choose to resist or produce new social identities, beginning with perception and critical examination of these identity options, through the processes of choosing

assimilation or resistance and of undergoing gender socialization.

Narrative approaches may also be applied to the study of bilingual communicative repertoires, as exemplified in the work of Koven (1998) examining the performance of identity in narrative by Portuguese–French bilinguals. The study involved elicitation of the same oral narratives of personal experience in Portuguese and French, with analysis of communicative style and use of register in each. Development of communicative repertoires in each of the two languages was closely tied to the sociocultural context of socialization, such that, in effect, the participants appeared to be performing different "selves" in each of their two languages. Having grown up in Paris, with family ties and frequent visits to rural Portugal, when narrating in French the participants employed contemporary urban speech styles expressing progressive values and gender roles in which, for example, women's self-expression is relatively unconstrained. When narrating in Portuguese, however, the same participants employed speech styles characteristic of rural settings and presented a more conservative version of their identity.

Taken together, these narrative approaches represent a promising new direction in the study of language socialization as a complex, lifelong process with consequences for discursive performance of identity.

Conclusion

Within second language studies, language socialization is now represented in numerous domains, including bilingualism, multilingualism, and foreign language learning in homes, workplaces, and educational settings of various kinds. Edited volumes (Kramsch, 2002; Bayley and Schecter, 2003) and a summary article (Watson-Gegeo and Nielsen, 2003) have marked the general acceptance of language socialization perspectives. At the same time, this growth has not gone uncontested, largely because the disciplinary roots and epistemology of socialization research are seen as fundamentally incompatible with those of the field known as Second Language Acquisition (SLA). Kramsch (2002), for example, expressed this conflict in terms of basic conceptual metaphors, with SLA preferring the Learner as Computer, and language socialization, the Learner as Apprentice. Historically, she noted, there has been little communication between these fields despite the fact that in practice (e.g., the practice of language learning and teaching) the goals of each may be seen as complementary, as, for example, when the aim of second language instruction is expressed as communicative development that requires precise knowledge of grammar and lexis. It is to be hoped that the complementarity of these approaches will increase in salience as researchers continue to design investigations of language learning.

See also: Communicative Competence; Communicative Language Teaching; Communities of Practice; Identity in Sociocultural Anthropology and Language; Identity: Second Language; Language Socialization; Narrative: Sociolinguistic Research.

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Society and Language: Overview

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Language

'Linguistics' may be somewhat blandly defined as the study of language. Such a characterization leaves out the all-important formulation of how such study is to be conducted, and where exactly the boundaries of the term 'language' itself lie. Broadly speaking, different branches of linguistics are concerned with language structure, acquisition, and use. 'Sociolinguistics' is one of the branches that is concerned more with the use of language than the other two aspects. And unlike branches like pragmatics and discourse analysis, which are also concerned with 'use,' sociolinguistics lays particular emphasis upon the social embeddness of language. When we use the term 'language' as a general phenomenon, we refer to a system of arbitrary

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symbols used for human communication. Having 'human communication' as part of the definition of language makes it impossible to study language comprehensively without due regard to the social context of speech. Such an emphasis was not always explicit in linguistics.

Antecedents of Sociolinguistics

While sociolinguistics as a specially demarcated area of language study dates only to the early 1960s (e.g., Paulston and Tucker, 1997; Shuy, 1997: 23, who cite the summer of 1964 as a crucial time), attention to the social was implicit in many earlier studies. It is possible that just as most linguists accept that scholarly linguistics was first practiced in ancient India, culminating in Panini's *Astadhyayi* (ca. 500 B.C.E.), Panini may prove a pioneer of sociolinguistics too. The suggestion has been made that Panini's rules are, *inter alia*, "sophisticated attempts at capturing the stylistic preferences among variants which are characteristic of any living language" (Kiparsky, 1979: 1). In terms of a continuous lineage for modern sociolinguistics, however, four western traditions have been most influential: historical and comparative linguistics, anthropology, rural dialectology, and the study of mixed languages.

Historical and comparative linguists became interested in modern speech forms (or 'dialects') for the possible light they could shed on theories of language change that had previously been based on written materials. Two branches of what is now called 'sociolinguistics' had strong 19th-century antecedents: the study of rural dialects in Europe and contact between languages that resulted in new 'mixed languages.' The work of Hugo Schuchardt (1882), Dirk Hesseling (1897) and Addison Van Name (1869–1870) challenged many of the assumptions of their contemporaries.

Even Saussure, who is most frequently associated with modern structuralism, stressed in his work that language was a 'social fact,' i.e., it belonged to a realm larger than that of the individual. A society is not just the lowest common denominator of its individuals. For Saussure, the concrete data of language (what he called '*parole*') are produced by individual speakers, but "language is not complete in any speaker; it exists perfectly only within a collectivity" (1959: 14).

In the early 20th century, structuralists in the United States were partly motivated by the need to describe rapidly eroding American Indian languages before they became extinct. Becoming acquainted with the cultural patterns of societies that were novel to them led scholars like Franz Boas, Leonard Bloomfield, and Edward Sapir to establish what became the foundations of studies of language, culture, and cognition. Such an anthropological perspective on language was a forerunner to some branches of sociolinguistics, especially the ethnographical approach.

The term 'sociolinguistics' appears to have been first used in 1952 by Haver Currie, a poet and philosopher who noted the general absence of any consideration of the social in the linguistic research of his day. Significant works on sociolinguistics appearing after this date include Weinreich's influential *Languages in contact* (a structural and social account of bilingualism; 1953), Einar Haugen's two-volume study of the social history of the Norwegian language in America (1953), and Joos (1962) on the dimensions of style.

Emphases in Sociolinguistics

Chomsky's emphasis in the 1960s on an approach that abstracted language away from everyday contexts ironically led to the distillation of a core area of sociolinguistics, which was opposed to his conception of language. In a now infamous passage, Chomsky (1965: 3) argued that linguistic theory should be concerned primarily with an ideal speaker-listener in a completely homogeneous speech community, who knows its language perfectly and who is unaffected when applying his knowledge of the language in actual performance. While such an approach brought significant gains to the theory of syntax and phonology, many scholars felt that abstracting away from society could not lead to an encompassing theory of human language. This period marked a break between sociolinguists, who had an interest in language as communication within human societies, and the 'generativists,' who were interested in an idealized, nonsocial, psycholinguistic competence. Whereas the Chomskyan framework focused on what could be generated in language and by what means, the social approach tried to account for what can be said in a language, by whom, to whom, in whose presence, when and where, in what manner and under what social circumstances (Fishman, 1971; Hymes, 1971; Saville-Troike, 1982: 8). For the latter group, the process of acquiring a language is not just a cognitive process involving the activation of a predisposition in the human brain: it is a social process as well, that only unfolds in social interaction. The child's role in acquiring its first language is not a socially passive one, but one which is sensitive to certain 'environmental' conditions, including the social identity of the different people the child interacts with.

Dell Hymes (1971) was the principal objector to the dominance of Chomsky's characterization of what constituted the study of linguistic competence. He suggested that a child who might produce any

sentence whatever without due regard to the social and linguistic context would be "a social monster" (1974: 75) who was "likely to be institutionalized." Hymes coined the term 'communicative competence' to denote our ability to use language appropriately in different settings. His stress on language **use** was in strong contrast to Chomsky's focus on the abstract code. Hymes interest was not just in the production of sentences, but in characterizing the more social-bound aspects, such as the amount and volume of talk in different communities, acceptability of silence, rules for turn-taking, amount of simultaneous talk, etc. In this view, there are rules of use without which the rules of grammar are, at best, abstractions (at worst, Hymes said, "useless"). William Labov (1972: xiii), whose name features prominently in the discipline, expressed uneasiness about the term 'sociolinguistics,' since in his view there can be no linguistics that is not social. Still others are slightly suspicious of the term, since it privileges the linguistic over the social. One distinction that is sometimes made is that between 'sociolinguistics' (proper) and the 'sociology of language.' Some scholars believe that the former is part of the terrain mapped out in linguistics, focusing on language in society for the light that social contexts throw upon language. For these scholars, the latter ('sociology of language') is primarily a subpart of sociology, which examines language use for its ultimate illumination of the nature of societies. One writer (Fasold, 1984, 1990) has attempted to capture this formulation by writing two scholarly books: *The sociolinguistics of society* and *The sociolinguistics of language*. While there is some basis for such a partition, and something to be gained by it, in practice the boundaries between the two areas of study are so flexible as to merit one cover term (although, as in this entry, there is a slight difference in nuance between 'sociology of language' and the more common and general term 'sociolinguistics'). Sometimes the distinction between the two orientations is expressed by the terms 'macrosociolinguistics' and 'microsociolinguistics.' As in other subjects, notably economics, macrostudies involve an examination of interactions at a broader level (the focus is broad, as in the study of multilingualism or language attitudes in a community). Microstudies examine finer patterns on a local level (e.g., the details of conversational structure or accents in a particular community). Macrosociolinguistics tends to overlap with applied linguistics to some extent, especially regarding language policy, language use in the domain of education, and the interface between dialect and standard. The two fields are separated by the greater interest among applied linguists in the psychology of language learning, especially in second-language acquisition. There is also a more practical orientation among applied linguists in their educationally focused work on curriculum issues, materials development, language assessment, remediation, and so forth.

'A Language' as a Social Construct

Up to now we have been dealing with 'language' in the abstract, as a collective term. When we turn to 'languages' as individual entities, the possession of specific societies, we run into problems of definition. It may come as a surprise to the nonspecialist to learn that linguists are unable to offer a definition of what constitutes 'a language' (as against overlapping entities such as 'dialects'). For this reason the term 'variety' is employed as a neutral one, referring to any form of speech. The term 'variety' is particularly useful when the status of a speech form is unclear and one wishes to avoid prejudging the issue whether a given speech form is (in popular terms) a 'language' or a 'dialect.' In many instances the boundaries between languages are far from clear, especially where historical and geographical links are involved. Mutual intelligibility might seem a useful test of whether two varieties are distinct or not. In practice, however, it is almost always sociopolitical criteria that decide the status of a variety, rather than linguistic ones.

The case of Norwegian and Danish provides a clear illustration of the sociopolitical nature of the distinction between what counts as a language and what does not. For four centuries Norway was ruled by Denmark. Danish was considered the official language, with Norwegian speech having dialect status (i.e., it was considered a dialect of Danish). Upon Norway gaining its political independence in 1814, Norwegian was declared an 'official language,' distinct from Danish. The same has happened in what was formerly Yugoslavia, where Serbian and Croatian did not have independent status but were considered as 'eastern' and 'western' variants of the same language called Croato-Serbian (or Serbo-Croatian). With the bloody conflict that accompanied the break-up of the federation in the 1990s, differences between the two varieties were emphasized, and each of them have come to be considered independent 'languages.'

The opposite case is that of two varieties classified by linguists as distinct languages but considered the same by a community. Linguists consider creole forms of language to be separate systems from the languages they drew much of their vocabulary from (e.g., Jamaican Creole English is a different system from the standard English of southern England). Yet their coexistence of the two systems in the same society and the dominance of the more standard forms of English may not always lead to the recognition of the two as separate languages.

Language Is Not a 'Given'

The work of Le Page (1978) and Le Page and Tabouret-Keller (1985) has been influential in showing the potential diffuseness of the notion of 'a given language' and the way that the identities of groups of people are shaped by, and in turn shape, language use. For Le Page and Tabouret-Keller (1985: 14), linguistic behavior is "a series of **acts of identity** in which people reveal both their personal identity and their search for social roles." In this view, identity and language use are potentially fluid; and individuals have priority. Well-defined social groups may or may not exist beforehand. In the highly multilingual and heterogeneous communities they studied in the Caribbean, the researchers found it necessary to pay attention to the processes of emergence and disintegration of identities in relation to linguistic processes of focusing and diffusion. The terms 'focusing' and 'diffusion' are based on the imagery of the movie screen. Speech acts are acts of projection: the speaker projects his inner universe via a common language (with its nuances of grammar, vocabulary, and accent) or via a particular choice of language where choices exist (in multilingual settings). The speaker implicitly invites others to share his projection of the world, insofar as they recognize his language as an accurate symbolization of the world, and to share his attitudes toward it (Le Page and Tabouret-Keller, 1985: 181). The feedback he receives from those with whom he talks may reinforce his perceptions, or they may cause him to modify his projections, both in their form and content. To the extent that he is reinforced, his behavior in that context may become more regular, more focused; to the extent that he modifies his behavior to accommodate others, it may for a time become more variable, more diffuse. In time, however, the behavior of the group – that is, he and those with whom he is trying to identify – will become focused. The individual thus creates for himself patterns of linguistic behavior so as to resemble those of the group or groups which he wishes to be identified at different times. Le Page stressed four provisos to this hypothesis:

a. that one can identify the groups
b. that one has adequate access to the groups and the ability to analyze their behavioral patterns
c. that the motivation for joining the group must be sufficiently powerful and is either reinforced or lessened by feedback from the group
d. that one has the ability to modify one's behavior.

Le Page and Tabouret-Keller's model thus teases out the kind of variation evident in a society from its historical moments: is it a society in the making or in flux (diffuse) or is it, historically speaking, focused?

Sociolinguistics Is Not Prescriptive

Following studies like those of Le Page and Tabouret-Keller, sociolinguists now accept the idea that language is partly inherited and partly made and remade by its speakers. This perspective does not fit well with the traditional views one encounters among some writers, educationists, parents, and policy makers. The latter are more concerned with inculcating and transmitting a formal, written, and relatively homogeneous standard form of a language. There is nothing wrong with this ideal, provided that all citizens have access to the resources that are necessary for the mastery of the standard. Sociolinguists and linguists generally do, however, insist that inculcation of a standard norm among schoolchildren should not be accompanied by the denigration of the vernacular forms of language that pupils bring to the school. Children have in place a full language system, capable of considerable communicative nuance, before arriving at school. The vernacular has been demonstrated (see Labov, 1969) to be rule governed, even if it does not always meet the preconceived notions of correctness that two centuries of prescriptivism have inculcated among educators. Linguists (see Palmer, 1971; Crystal, 1971) have long shown the subjectivity and contradictions of the prescriptive rules insisted on by teachers ('don't split infinitives'; 'two negatives make a positive'). For English, these norms evolved over a period of time after considerable subjective pronouncements by 18th-century writers and grammarians (see Milroy and Milroy, 1985). They can easily be shown to have logical flaws. (In Latin, the infinitive occurs as a single word, which cannot be split; English, by contrast, expresses the infinitive in two words – *to* + verb – which occasionally permits an intervening adverbial element, as in *I want you to really try, for my sake*. The insistence that two negatives make a positive in English is nullified by prescriptivists' views of collocations of three negatives, as in *Nobody never said no such thing*. Prescriptivists would not accept this sentence as grammatical, even though the mathematics they appeal to makes it negative, rather than positive.) Prescriptive judgments ultimately serve upper- and middle-class interests, stamping their ideology as relating to 'taste,' 'discrimination,' and 'culture.' The sociologist Basil Bernstein (1974) argued that the orientation of children from working-class backgrounds toward language was 'restricted' compared to the relatively 'elaborated' norms of the middle classes. And since school success demanded the mastery of the latter, children from working-class backgrounds were less likely to succeed, given their limited access to those norms. Furthermore, their class position militated against

acquiring norms that are associated with forms of authority and/or lifestyles that they see no point in emulating. Bernstein's dichotomy between restricted and elaborated codes has been argued to be more an assumption than a linguistic reality (Labov, 1969; Edwards, 1979). However, his foregrounding of language and class issues in education is a lasting contribution to the sociology of language.

Society

A coherent theory of language in society can unfold only within a particular theory of society. Within sociology there are three dominant theories of human society, and there is little agreement between their adherents. The three theories (or sets of ideas about how society works) that have informed different approaches to sociolinguistics are 'functionalism,' 'Marxism,' and 'interactionism.'

Functionalism

Functionalism was the dominant theoretical perspective in western thought between the 1940s and mid-1960s. It pursued the view that a society may be understood as a system made up of functioning parts. To understand any part of society (e.g., the family or school), the part must be examined in relation to the society as a whole. Haralambos and Holborn (1991: 8) stressed the analogy with biology: just as a biologist might examine a part of the human body (e.g., the heart) in terms of its contribution to the maintenance of the human organism, the functionalist examines a part of society (e.g., the family) in terms of its contribution to the maintenance of the social system. The social system has certain basic needs (or functional prerequisites) that must be met if is to survive (e.g., food and shelter). The value of the function of any part of society lies in its contribution to the maintenance of the overall whole. There is a certain degree of integration between the parts (social institutions) that make up the society. Functionalists argue that the order and stability they see as essential for the maintenance of the social system are provided by 'value consensus,' i.e., agreement about values by members of society. In this view, two major occupations of the sociologist are the study of social subsystems and the value consensus that binds them together. Concepts stressed within (but not exclusive to) this brand of sociology that are particularly useful to sociolinguists include the following.

Culture Although the popular sense of this word stresses 'high' culture (e.g., musical, literary, and artistic achievements), in the technical sociological-anthropological sense, the culture of a society is "the way of life of its members; the collection of ideas and habits which they learn, share and transmit from generation to generation" (Linton, 1945). Culture in this sense is a "design for living" that defines appropriate or acceptable ways and forms of behavior within particular societies.

Socialization 'Socialization' refers to the process through which people learn the culture of their society. Primary socialization takes place in childhood, usually within the family. From a linguistic point of view, the peer group (e.g., the child's circle of playmates within and outside the home) soon overtakes the parents as the main reference group in transmitting linguistic behavior. Socialization continues into adulthood, and upon permanently entering a new society that differs considerably from one's own a person may undergo resocialization.

Norms and Values "A norm is a specific guide to action which defines acceptable and appropriate behavior in particular situations" (Haralambos and Holborn, 1991: 5), as evident in dress codes at school, at home, and at a party. In the course of socialization, 'norms' are inculcated by rewards (a sweet, a kind word) or punishments. Some norms become enacted in law to serve a larger society, e.g., a law forbidding nude bathing or the exposure of a woman's face in public in some societies. 'Values,' on the other hand, provide general guidelines regarding qualities that are deemed to be good, desirable, and of lasting worth. In many modern societies, the value placed on human life is a basic one that determines norms of behavior (e.g., standards of hygiene, settling of disputes, work safety regulations, etc.). Functionalist sociology proceeds from the premise that unless norms are shared, members of society would be unlikely to cooperate and work together. In this view, an ordered and stable society requires shared norms and common values.

Status and Role 'Status' refers to social positions that society assigns to its members (not just the high ones, as in popular parlance). Such a status may be ascribed, i.e., relatively fixed by birth (e.g., one's gender status, or aristocratic titles in some societies); or it may be achieved. The latter refers to statuses that result from some degree of personal endeavor, e.g., a career as a teacher or an athlete. In a caste-based society, one's occupation is ascribed, i.e., determined by birth; whereas in other societies it is achieved (i.e., by choosing one's training). According to Haralambos and Holborn (1991: 7) each status in society is accompanied by a number of norms that define how an individual occupying a particular status is expected to act. This group of norms is known as a 'role.'

Social roles regulate and organize behavior. In the course of a day, a person may play out several roles: that of teacher (at work), mother and wife (at home), client (with a bank), poet (at a leisure society), etc. These roles are defined by their interactive nature: the role of doctor usually assumes the existence (if not the presence of) a patient, that of mother the existence of the child, and so on. Each of these roles calls upon different forms of behavior, including linguistic behavior.

Marxism

Since the 1970s Marxist approaches in sociology have become increasingly influential. Differing sharply from the functionalist belief that all social groups benefit if their society functions smoothly, Marxism stresses fundamental differences of interest between social groups. These differences ensure that conflict is a common and persistent feature of society, not just a temporary disturbance of the social order (as functionalists believe). Karl Marx (1818–1883) stressed the economic basis of human organization, which could be divided into two levels: a base (or infrastructure) and a superstructure. The 'base' is determined by the forces of production (e.g., the raw materials and technology of a particular society) and the social relationships of production (e.g., social relationships that people enter into – such as manager and worker – to produce goods). The other aspect of society, the 'superstructure,' is made of the political, legal, and educational institutions, which are not independent of the base but shaped by it. Marx believed that all societies in historical times contain basic contradictions that preclude them from existing permanently. These contradictions, involving the increasing exploitation of one group by another (e.g., the exploitation of serfs by lords in feudal times), have to be resolved, since a social system containing such contradictions cannot survive unchanged.

The concepts that Marxists emphasize in their studies include social class; exploitation and oppression; contradiction, conflict, and change; and ideology and false consciousness. 'Class' denotes a social group whose members share a similar relationship to the means of production. Essentially, in capitalist societies, there is the ruling class, which owns the means of production (e.g., land, raw materials) and the working class, which must sell its labor power to earn a living. In feudal society the two main classes are distinguished relative to ownership of the land: the feudal nobility who owns it and the landless serfs who work it.

'Exploitation' in this theory is a technical term that stresses that the wealth produced by the labor power of workers is appropriated in the forms of profits by the ruling class. 'Ideology' within Marxist theory refers to the set of dominant ideas of an age: it emanates from the control of the ruling classes of the institutions of the superstructure. Such ideas serve ultimately to justify the power and privilege of the ruling class "and conceal from all members of society the basis of exploitation and oppression on which their dominance rests" (Haralambos and Holborn, 1991: 14). A clear example comes again from the feudal age in Europe, when the dominant concepts were honor and loyalty, which appeared to be the natural order and were celebrated in literature and implicit in superstructural institutions such as the law courts and education. Similarly, according to many theorists, in the capitalist age, exploitation is disguised by the ideology of equality and freedom, which appear to be not just sensible and true but natural and desirable. This, Marxists argue, conceals the reality that capitalism involves fundamentally unequal relationships: workers are not ultimately 'free' since they are forced to work to survive: all they can do is exchange one form of wage subordination for another.

Interactionism

A third school of thought within sociology, less influential than the previous two, proceeds from a bottom-up approach of examining small-scale encounters, rather than large-scale social systems. It seeks to understand action between individuals. Haralambos and Holborn (1991: 15) emphasized that interactionism begins from the assumption that action is meaningful to those involved, and that those meanings are accordingly not fixed, but created, developed, modified, and changed within the actual process of interaction. Not only is the meaning of a social encounter a negotiated entity, but the individual develops a 'self-concept' (or idea of oneself) according to the interaction processes he or she takes part in and according to the way he or she is evaluated therein. For the interactionist, social roles are not as clearly defined as within functional theory. Furthermore, interactionists argue that roles are often unclear, ambiguous, or vague. This may provide actors with considerable room for negotiation, improvisation, and creative action.

Much sociolinguistics has proceeded implicitly from a functionalist perspective of society, although it must be said that within the discipline the linguistic tends to overshadow the sociological. The latter is often considered useful, largely for informal background information and orientation. Marxist approaches are not typically emphasized in the West, and while the skepticism with which Marxist/communist political practice has come be to viewed

worldwide is understandable, from a scholarly point of view, many of the insights emanating from sociolinguistics do fit the Marxist critique of social systems quite well. Some sociolinguists have explored the linguistic ramifications of rule, control, and power. And class differences (which often criss-cross with gender or ethnicity) remain at the heart of studies of sociolinguistic variation. Interactionism, which may not seem as substantial a sociological approach as the other two, has nevertheless inspired some important work in sociolinguistics (*see* **Interactional Sociolinguistics**).

Language in Society, Society in Language

A concern for the 'human communication' aspect within the definition of language implies attention to the way language is played out in societies in its full range of functions. This function is not just 'denotational'; the latter term refers to the process of conveying meaning, referring to ideas, events, or entities that somehow exist outside language. Even while primarily concerned with this function, a speaker will inevitably give off signals concerning his or her social and personal background. Language is accordingly said to be 'indexical' of one's social class, status, region of origin, gender, age group, etc. The term 'index' here is drawn from semiotic theory (or the science of signs), in which it refers to a particular relation between a sign and the object it stands for (*see* **Semiotics: History**). In the sociolinguistic sense 'index' refers to certain features of speech (including accent) that indicate an individual's social group (or background); the use of these features is not exactly arbitrary, since it signals (or indexes) that the individual has access to the lifestyles that support that type of speech.

The relationship between region of origin, age, and – especially – social status and characteristic ways of using language are emphasized in 'variation theory,' as developed by William Labov (1966). Variationists use correlational techniques in revealing the relationship between linguistic variables (e.g., a vowel sound that has different variants that result in different accents) and social variables (age, gender, class, etc.). This is a vibrant and rigorous branch of sociolinguistics – to the extent that many characterize it as 'core sociolinguistics' or 'sociolinguistics proper.' Many sociolinguistics, however, argue that correlation does not capture the complex way in which language is intertwined with human existence. That is, they stress that talk is not just a reflection of social organization; rather, it is a practice that is one of social organization's central parts. This approach has informed much work on language and gender in linguistics. In earlier gender and language research (see Lakoff, 1975) the main aim was to demonstrate a broad linguistic split between the sexes. Subsequent researchers went beyond the descriptive framework to an action-research mode that popularized the argument that languages could be sexist – that is, they could discriminate against women by presenting things from a male perspective (see, e.g., Spender, 1990). Language thus not only reflects existing inequalities but also helps to sustain and reproduce them, unless challenged. Subsequent gender research has increasingly become more nuanced. Eckert (1989) stressed the interplay between gender and social class in setting up various overlapping identities. From anthropology and gay studies has come the notion that a simple two-way dichotomy is misleading; there are differing degrees of masculinity and femininity (Johnson and Meinhof, 1997; Kulick, 2000).

Similar arguments hold for sociolinguistic approaches to ethnicity. In some societies, ethnicity may be more salient than class stratification, and language may play a key role in reflecting and indeed in maintaining and 'reproducing' an ethnic identity. Ethnicity is notoriously difficult to define and may not be as objective a phenomenon as sometimes assumed. Edwards (1985: 8) quoted Weber (1968), who regarded ethnic groups as "those human groups that entertain a subjective belief in their common descent . . . it does not matter whether or not an objective blood relationship exists. Ethnic membership . . . differs from the kinship group precisely by being a **presumed** identity." Sociolinguists therefore argue against the notion of a 'primordial ethnicity' that one sometimes finds in the literature on language maintenance. After all, group identity can survive language shift and frequently does. On the other hand, it is difficult to imagine a sense of ethnicity that does not entail significant differences in language use (e.g., religious and cultural vocabulary and nuances of accent are well attested in ethnic dialects). Postmodern urban people of the 21st century frequently have multiple identities, playing out a number of roles in a single day, each of which may require different language choices.

The idea was once popular in linguistics and anthropology that language and thought are more closely entwined than is commonly believed. An extreme form of this belief is what has come to be known as the 'Sapir–Whorf hypothesis': It is not just that language reflects thought; but conversely, thought is influenced by the language one is 'born into.' Mind, according to this hypothesis, is in the grip of language, and so are social consciousness and organization. Edward Sapir, and – especially – Benjamin Lee Whorf were led by their studies of Amerindian

languages to argue that speakers of certain languages may be led to different types of observations and different evaluations of externally similar phenomena. According to Whorf (1956: 213), "we dissect nature along lines laid down by our native language." He said that using a language forced us into habitual grooves of thinking, almost like putting on a special pair of glasses that heighten some aspects of the physical and mental world while dimming others. One example provided by Whorf concerned the distinction between nouns and verbs in Hopi as opposed to English. The Hopi terms for 'lightning,' 'wave,' 'flame,' 'meteor,' 'puff of smoke,' and 'pulsation' are all verbs, since events of necessarily brief duration fall into this category. The terms for 'cloud' and 'storm,' on the other hand, are of just enough duration to qualify as nouns. Another of Whorf's striking examples concerns tense and time. Whereas English dissects events according to their time of occurrence (relative to the act of speaking), Hopi expresses other categories in the verb, notably the kind of validity that the speaker intends the statement to have: is it a report of an event, an expectation of an event, or a generalization or law about events?

The Sapir–Whorf hypothesis is a thought-provoking one, whose strong form suggests, among other things, that real translation between widely different languages is not possible. The hypothesis has proved impossible to test: how would one go about ascertaining that the perceptions of a Hopi speaker concerning the world are radically different from that of, say, a French speaker? Generative linguists today insist that there are limits (or parameters) along which languages vary. In appealing to the notion of deep structure (or its more recent mutations), this school of linguistics stresses an underlying capacity for language that is common to humans. What seem to be radical differences in the grammatical structure of languages are held to operate 'on the surface,' as mappings from an abstract and quasi-universal deep structure. Linguists feel safer in accepting a 'weak form' of the Sapir–Whorf hypothesis: that our language influences (rather than completely determines) our way of perceiving things. But language does not grip us so strongly as to prevent at least some individuals from seeing things from different perspectives, from forming new thoughts and ideas. Within sociolinguistics, studies in the way that languages influence each other (by borrowing and mixing) also cast doubt on the strong form of the hypothesis. As Gillian Sankoff (1986: xxi) put it: "my conviction [is] that in the long term language is more dependent on the social world than the other way around . . . Language does facilitate social intercourse, but if the social situation is sufficiently compelling, language will bend."

Types of Societies, Types of Language?

Societies may be characterized in terms of their complexity, as defined by their size, hierarchical organization, specialization of tasks, and interaction with other societies. It is important to note that there is no linguistic analogy to this. Languages cannot be arranged in a list from least complex to most complex. The structure of a language does not correlate with the complexity of the communities that typically use them. In terms of morphology, syntax, and semantics, a language of an isolated mountain-bound community in the Himalayas is no less complex than any of the six world languages of the United Nations. The poet-cum-linguist Sapir (1921: 219) put it as follows: "When it comes to linguistic form, Plato walks with the Macedonian swineherd, Confucius with the head-hunting savage of Assam." Sapir's student, Whorf (1956: 84), who was intimately acquainted with the structure of Hopi and other Amerindian languages, was just as emphatic, if less poetic:

> The relatively few languages of the cultures which have attained to modern civilization promise to overspread the globe and cause the extinction of the hundreds of diverse exotic linguistic species, but it is idle to pretend that they represent any superiority of type. On the contrary, it takes but little real scientific study of preliterate languages, especially those of America, to show how much more precise and finely elaborated is the system of relationships in many such tongues than is ours.

A reverse argument sometimes holds: people maintain that languages rich in inflections or in ways of combining basic grammatical units (morphemes) into words are perhaps too complex to function as languages of wider communication. Conversely, they suggest that the inflectional simplicity of English enables it to be effective as a language of international transactions. Several things are wrong with this argument. In the first place, notions of complexity should not be limited to the morphology of a language. Modern linguistics emphasizes the enormously complex organization of all languages. One language might appear to be morphologically richer on the surface, but a relatively simpler morphology (as with English) has to be made up in other components of the grammar – in the syntax and lexicon. If we are to look for reasons for the spread of one language over another, the wrong place to start would be the structure of the language, as Edwards (1995: 40) forcefully suggested:

> It is [...] clear, to the modern linguist at any rate, that these varieties [dominant languages] achieved widespread power and status because of the heightened fortunes of their users, and not because of any intrinsic linguistic qualities of the languages themselves. The most common elements here have to do with military, political and economic might, although there are also examples in which a more purely cultural status supports the lingua franca function. However, in this latter case, the cultural clout which lingers has generally grown from earlier associations with those more blatant features just mentioned. The muscle, in any case, which these languages have, derives from the fact that their original users control important commodities – wealth, dominance, learning – which others see as necessary for their own aspirations. The aphorism 'all roads lead to Rome' has linguistic meaning too.

It is sometimes said that if languages are all linguistically equal, they are not all sociolinguistically equal. In this vein, Joseph (1987: 25–39) pointed to the effects of print literacy and standardization in giving some forms of language and some languages an advantage over others, so that certain forms of language come to be seen as more important than others. But this should not be taken to mean that some languages are better placed in an absolute sense to serve a range of sociolinguistic functions (e.g., in formal speeches, writing, or television) than others. Every language has the potential to add to its characteristic vocabulary and ways of speaking if new roles become necessary. Some languages have a superior technical vocabulary to that of others in certain spheres. This is a difference in actuality rather than in potential.

Multilingualism: One Society, Many Languages

Many countries, especially in the West, attach special significance to one of their languages over others, adhering to an ethos of 'one state, one language.' Many of the states of Europe arose during a period of intense nationalism, with accompanying attempts to make national borders coterminous with language (and vice versa). The dominance of European powers in modern history has made this seem a desirable situation, if not an ideal one. The nonaligned sociolinguist instead points to the essentially multilingual nature of most human societies and to the fact that there are almost no countries in the world – even in western Europe – where everyone speaks, or identifies with, one language. In statistical terms, Grosjean (1982: vii) estimates that about half the world's population is bilingual. Romaine (1989: 8) points out further that there are about 30 times as many languages as there are countries. Even countries like France and England, which we are tempted to think of as monolingual, have, in fact, a vast array of languages within their borders. In France, for example, the following languages are still in use: French, Breton, Flemish (Vlaams), Occitan (Languedocien), Catalan (Catalan-Valencian-Balear), Basque (Navarro-Labourdin and Souletin varieties), Alsatian (a dialect of Allemanisch), and Corsican.

While multilingualism is not uncommon throughout the world, many schools have a policy that recognizes (and replicates) the hierarchy of relations within a territory and in the world as a whole. Only a small proportion of the 5000 or so languages of the world are used at the secondary level as media of instruction, and still fewer are used at the university level. Schools have often downplayed the value of the 'vernaculars' by minimizing their use in classrooms or recognizing them only as means of facilitating competence in the dominant language(s). Since the 1950s, and more especially since the 1970s, educationists have begun to recognize that multiculturalism is not a transient phenomenon. Sociolinguists are generally sympathetic to an approach that gives recognition to – and valorizes – as many of a society's languages as possible. This is in keeping with a holistic approach that is sensitive to the needs of children from different backgrounds ('bottom up') and not just the bureaucratic needs of the state ('top down').

Language Variation and Contact between Languages

These two branches of sociolinguistics ('language variation' and 'language contact') show above all others how much language and society influence each other. Some variation studies that are concerned with 'style, situation, and function' deal with the importance of contextual factors in determining different registers, styles, and genres. They also deal with the use of language in specific domains and functions, such as in advertising, religion, business, and e-mailing. The notion of a 'domain' is a particularly useful one. Fishman (1965) defined a domain as a sphere of activity arising from combination of specific times, settings, and role relationships, which results in a specific choice of language or style. The notion of 'register' is a linguistic counterpart of the sociological concept of domain. A register (Halliday *et al.*, 1964) refers to variation according to the context in which language is used. Relatively well-defined registers include the language of the law, the language of science, and the language of hip hop or jazz. Whereas register studies focus upon language use relatively independent of the users, social dialectology does the reverse. Dialects and social groups in the modern Labovian tradition are central to an understanding of

language variation and change. The emphasis in this tradition falls upon the finely nuanced differences within a language according to social groupings, based especially on class, gender, ethnicity, and region. The subfield of language contact stresses the reality that societies are rarely monolingual; languages exist amidst other languages. The idea of a pure and self-contained language is a poor, simplifying assumption, compared to the challenges of studying the ways in which speakers of different languages influence each other – how new languages (e.g., pidgins, creoles, 'New Englishes') may be borne out of struggle and how multilingualism is 'managed' by speakers at a microlevel and by societies at a macrolevel.

Social Interactions via Language

This section serves to introduce many of the 'Language in Society' entries covered in this encyclopedia (specifically excluding variation theory and language contact, which are covered elsewhere). The concept of communicative competence, as cited above, describes and accounts for the knowledge that people have that enables them to communicate appropriately in different social contexts. Speakers possess more than just grammatical knowledge. In a multilingual context, for example, interlocutors choose an appropriate code according to context. 'Context' includes the relative status of the interlocutors, the purpose of the communication, the respective rights and obligations associated with different language varieties, background knowledge, cultural rules of politeness, etc. This fine-tuning also applies to monolingual societies – this time relating to the choice of style to determine and reinforce the appropriate 'tenor' of the interaction. An example comes from the choice of an appropriate second-person pronoun in Hindi: *āp* for formal and respectful usage, *tum* for neutral usage, and *tū* for intimate or disrespectful usage. Such important determinants upon the use of language cannot be relegated to the study of 'performance' and hence be excluded from the domain of linguistics as a discipline (as it is within Chomskyan linguistics). Hymes popularized the field of the 'ethnography of speaking' within sociolinguistics, drawing upon anthropological traditions of studying speech in its social context and in terms of the value and meaning placed by individual speech communities upon specific speech events. Interactional sociolinguistics, associated with Hymes's occasional collaborator John Gumperz (e.g., 1982), is a subpart of the study of communicative competence that stresses the dialogic nature of speech. Like Bakhtin, the Russian linguist/critic who wrote in the 1920s to the 1940s, Gumperz insisted that linguistic signs are socially grounded, existing in context-bound encounters between individuals. Social and cultural forces, together with grammar and lexicon, constrain what can be said and how it can be said. An important part of this work concerned the identification of 'contextualization cues.' These are constellations of features of the verbal (e.g., vocabulary, prosody, syntactic choices) and nonverbal (e.g., gestures, facial expressions) configurations, which in the light of previous experience signal what kind of speech activity interlocutors consider themselves to be engaged in (e.g., banter, negotiating a loan, telling a story). The cues help establish social relations, set the frame for what will come next, fill in implicit information, and make inferences about the nature of the speech act. The allied field of 'ethnomethodology' (Garfinkel, 1967) in the social sciences, places such conversational and interactional speech analysis within a wider framework that encompasses all human action, which is seen as reflexively related to the occasions and settings within which it occurs. The focus falls on the perspective of participating members. For ethnomethodologists, the study of members' methods, including all types of practical reasoning and actions, is significant.

'Speech accommodation' is a particular perspective upon the communicative competence that fosters variation in speaker style. Giles and Powesland (1975) held that speakers attune their communicative style in relation to their interlocutor. The basic forms of accommodation are 'convergence' and 'divergence,' depending on the relative status of the speakers and the intended social relations. Bell's (1984) 'audience design' framework elaborated this scheme, taking into account not just the speaker, but the audience (authorized participants, overhearers, eavesdroppers, a displaced mass audience on radio, etc.)

The communicative competence of a speaker might involve proficiency in more than one language coexisting in a society. Whereas Chomskyan syntax focused on an ideal monolingual native speaker, scholars working in multilingual environments have called into question the idea of the native speaker. (As noted in the section above, "Language Is Not a 'Given,'" some scholars have also questioned the very assumption of a prior, well-defined heritable language.) Several commentators have pointed out that such definitions of a native speaker seem to be premised on the norms of monolingual societies, whereas in fact the world is largely multilingual (see Singh, 1998). In some multilingual societies, a child may be said to have several native languages, with the order of acquisition not being an indicator of ability. Multilingual speakers may switch languages according to situation in a way that monolingual speakers switch styles of the same language 'natively' (Scotton, 1985).

For many 'New English' speakers, monolingualism is the marked case, a special case outside of the multilingual prototype. Today's ideal speaker lives in a heterogeneous society (stratified along increasingly globalized lines) and has to negotiate interactions with different people representing all sorts of power and solidary positions on a regular basis. What is this ideal speaker a native speaker of, but a polyphony of codes/languages working cumulatively (and sometimes complementarily), rather than a single, first-learned code?

Studies of code-switching reinforce the notion that communicative competence goes beyond that of the monolingual's mastery of syntax. Accounts of the social and contextual motivations for code-switching have proven a necessary complement to purely structural approaches that seek to account for when in a sentence a speaker may (or may not) switch to another language (Myers-Scotton, 1993). Interaction between speakers, degrees of convergence and divergence, and intentions to alter the rights and obligations associated with one code rather than another have all been fruitfully employed to account for the facility that fluent bilinguals show in switching between languages. 'Crossing' is a particular kind of code-switching in which speakers use a variety that is not generally associated with their group (Rampton, 1995). It permits speakers from one group to overcome social boundaries and build links with members of what may be otherwise seen as an 'outgroup.' Crossing may have an accommodative and emblematic function, but it can also emphasize boundaries if the code used in the crossing reflects stereotypes about the outgroup's language use, rather than their actual practice. Crossing, which is done mainly by adolescents or postadolescents, is one way of calling into question set identities associated with older generations. The notion of identity is crucial in sociolinguistics, in which emphasis falls more on small, self-selected groups or larger groups tied to a regional identity, rather than on national identities.

A 'community of practice' is a collection of people who engage in a common activity on an ongoing basis. The value of the concept, introduced into sociolinguistics by Eckert and McConnell-Ginet (1992), lies in the identification of a social grouping not on the basis of shared abstract characteristics (class, ethnicity etc.) but on the basis of shared practice. The community of practice concept thus mediates between the vernacular (and its basis in early learned, localized forms of language) and official/bureaucratic/transactional language. A focus on the domains of usage and code choice pertaining to those domains necessitates an examination of language in its more bureaucratic modes. The field of language planning deals with the management of language resources of a state or other political entity. A formal language policy may be the outcome of language planning. Language policy may also refer to the norms of the speech community in its characteristic choices of language items or language varieties in relation to some conscious or unconscious ideology. Whereas one policy or another may have significant influence on the fate of a language, the field of language maintenance and shift shows that language legislation is seldom sufficient to halt the decline of a language. Factors associated with perceived economics and prestige amongst speakers and would-be speakers are equally important.

A fitting though sobering conclusion has to record sociolinguists' involvement in studies of language maintenance and shift in minority communities, and of language endangerment. It is predicted that the vast majority of the world's languages will face a struggle to survive in the present century (Krauss, 1992) as regionally and globally more powerful languages spread. The very cultural and linguistic diversity that sustained small and less powerful communities and that formed the core concerns of sociolinguistics and anthropology is under threat. Recording, cataloguing, archiving, and even teaching languages to communities who have few or no native speakers left have become vital concerns in linguistics.

Applications of Sociolinguistics

There are many practical outcomes of sociolinguistic research, especially in the field of language in education. Sociolinguists have contributed considerably to areas like the home language/school language interface, public debates about less-feted varieties like Ebonics (African American Vernacular English or Black English), an understanding of educational failure, enhancement of gender sensitivity in male-dominated classrooms, and so forth. Sociolinguists provide expert testimony in courtrooms based on their studies of discourse and accent patterns. They also contribute significantly to the growing attempts to save endangered languages and record their heritage, and they cooperate with educationists in government and nongovernment committees on language matters, especially those pertaining to minorities. Sociolinguists also contribute to cultural vitality by recording, describing, and popularizing rural speech and other varieties that are either denigrated or not always recognized as 'legitimate' language. This smooth and holistic interface between theory and application promises health and longevity to a young discipline.

See also: Communicative Competence; Communities of Practice; Discrimination and Language; Endangered Languages; Ethnolinguistic Vitality; Ethnomethodology; Identity and Language; Interactional Sociolinguistics; Language Attitudes; Language Maintenance and Shift; Language Planning and Policy: Models; Language Spread; Migration and Language Planning; Minorities and Language; Native Speaker; Reversing Language Shift; Slang: Sociology; Social Class and Status; Social Psychology and Language; Sociolinguistic Crossing; Subcultures and Countercultures.

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Sociolect/Social Class

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Those working in the field of variationist sociolinguistics generally look for some extralinguistic factor that may help to identify features of speech characteristic of groups of speakers. Although all speakers belong to multiple speech communities, four factors have proved the most durable: age, gender, ethnicity, and social class.

In principle, the easiest social factor to determine is age because at any given time an individual is a certain age, though some people may be reluctant to say what it is. Where precise information is not available, classification into broad categories can usually be estimated on the basis of appearance (Chambers, 1995). It is therefore not surprising that age regularly appears as an extralinguistic variable in sociolinguistic studies (e.g., Labov, 1963, 1966, 2002; Wolfram, 1969; Fasold, 1972; Trudgill, 1974; Macaulay, 1977; Feagin, 1979; Milroy, 1980; Haeri, 1996; McCafferty, 2001).

However, as Eckert (1997) has pointed out, using age as an extralinguistic variable is not a simple matter. The obvious problem is that age is a continuous variable so that for purposes of correlation with linguistic features, speakers must be classified in age groups. Thus, any use of age as an extralinguistic variable requires a decision about how such age groups are to be identified and justified. Even a simple classification into adults and children is complex, not only because the age at which one can be counted as an adult is itself problematic but also because neither category will be homogeneous.

In comparison to age, gender, seen as a division into male and female, rather than sexual orientation, is relatively simple. Most people are accustomed to declaring their sex/gender in response to many kinds of enquiry and thus this information is usually available to the investigator. Gender is also generally fairly easy to determine on external criteria, although there may be ambiguous cases. Again, it is not surprising that gender is one of the factors frequently examined in sociolinguistic investigations (e.g., Fischer, 1958; Labov, 1966, 2002; Wolfram, 1969; Fasold, 1972; Trudgill, 1974; Macaulay, 1977; Feagin, 1979; Milroy, 1980; Cheshire, 1982; Coupland, 1988; Haeri, 1996; Eckert, 2000; McCafferty, 2001).

Ethnicity is an even more problematic category than gender, not least because it can be determined with reference to a number of characteristics: race, nationality, religion. Any sociolinguistic investigation that includes ethnicity as an extralinguistic category will consequently need to specify clearly how membership in that category is to be established. However, in many situations the population is not ethnically diverse and thus such differences will not be salient in the community.

Social class is perhaps the category that has received the most regular attention from the earliest sociolinguistic studies (e.g., Fischer, 1958; Labov, 1966; Wolfram, 1969; Fasold, 1972; Trudgill, 1974; Macaulay, 1977; Feagin, 1979), and it has continued to be examined in later studies (e.g., Coupland, 1988;

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Macaulay, 1991, 2005; Haeri, 1996; Foulkes and Docherty, 1999; Labov, 2001; McCafferty, 2001), though it has recently received less consistent attention as a key variable than in earlier studies. However, social class is a much more problematic category than the other three.

Despite receiving considerable attention in recent years by a range of scholars (e.g., see the references in Crompton *et al.*, 2000), social class remains a controversial subject with many conflicting views. From Lloyd Warner's pioneering studies (Warner, 1949) to Gilbert (2003) in the United States and accounts such as Reid (1989), Argyle (1994), and Cannadine (1998) in Britain, no clear method of identifying social membership has emerged. As Gilbert observes: "there is as much art as science in the study of social stratification" (Gilbert, 2003: 16). For sociolinguists, there is the added problem that the categories identified by sociologists or political scientists may not be the most useful for investigating language variation. Categories that are developed for studying national voting patterns or marketing strategies may not be the most appropriate for examining stratified uses of language in a smaller speech community.

There are two basic questions that are crucial in employing social class as an extralinguistic variable: (1) How many divisions are there within the category of social class? (2) How is membership in any of these divisions to be identified? In response to the first question some investigators (e.g., Fischer, 1958; Trudgill and Foxcroft, 1978; Macaulay, 1991; most contributors to Foulkes and Docherty, 1999; McCafferty, 2001) have treated social class as a dichotomous variable similar to gender with two polarized categories, usually working-class vs. middle-class, or blue-collar workers vs. white-collar workers (Chambers, 1995: 37). Other investigators (e.g., Labov, 1966; Wolfram, 1969; Fasold, 1972; Trudgill, 1974) have treated social class as a continuous variable similar to age and divided the continuum into categories on the basis of certain criteria. Still other investigators (e.g., Macaulay and Trevelyan, 1973; Feagin, 1979; Winford, 1993) have used a judgment sample based on a notion of several discrete social class divisions within the community. Feagin chose a sample that contrasted upper class with working class but also included distinctions according to age (adults over 65 vs. teenagers) and a rural/urban dimension. Winford chose a sample of Trinidadian males on the basis of occupation: middle-class (white-collar workers), upper working class (skilled and semi-skilled workers), and lower working class (unskilled workers and low-paid laborers). The method employed by Macaulay and Trevelyan will be presented below.

The answer to the second question about determining membership in a particular class will differ depending upon the way the sample is chosen. In a judgment sample, the membership in a certain category is determined in advance according the criteria employed (e.g., occupation, residence). In a random sample, the speakers will also be grouped according to similar criteria, but the linguistic data are sometimes used to refine this classification, as will be illustrated below.

The answer to both questions will also be affected by the degree to which social class is a salient category in the community. Social stratification may be nearly as universal as language but, like language, social stratification takes different forms in different societies. The extent to which social class differences are a common feature of public discourse will affect the ways in which membership in a particular category can be identified. Cannadine (1998) and Milroy (2004) have pointed out that social class is a much more salient notion in Britain than in the United States.

Argyle (1994) points out that with regard to the situation in Britain: "Part of the evidence that there *is* a class system is that about 95 per cent of the population think there is, and can say which class they belong to themselves" (Argyle, 1994: 3). Given the desire to use social class as an extralinguistic variable, it is necessary to have some basis on which to choose the sample. Labov (1966) was able to make use of an earlier survey that had been designed by the New York School of Social Work for the Mobilization for Youth survey with a team of 40 interviewers. Probably no other sociolinguist has had such a large randomly chosen sample to work with in a single community.

Labov made use of a 10-point socioeconomic class index developed for the Mobilization for Youth survey by John Michael based on measures of occupation, education, and income. Labov points out that Michael gave "considerable attention to the problem of dividing the continuum of social class" (Labov, 1966: 216), and this was a problem for Labov, too. Labov did not only correlate use of the linguistic variables with speakers from each of the ten points on the scale. Instead, he usually grouped the speakers into three or four social class groups and illustrated the difference this can make (Labov, 1966: 220–248). The most interesting of these is the difference between Labov's figure for the class stratification of the variable (r) (1966: 22, Figure 1) and another figure (1966: 240, Figure 11) for the same variable. In the first, Labov has three groups: 0–2 (the lowest group), 3–5 (the middle group), and 6–9 (the highest group). The three groups show the same stylistic stratification.

In the other figure (which is the most frequently cited example of hypercorrection), there are six groups (0, 1, 2–3, 4–5, 6–8, and 9). The separation of 9 from 6–8 shows that the speakers in the latter group use more /r/ in reading aloud word lists and sets of minimal pairs than the speakers in the highest group. This difference was concealed by the grouping used in the first figure. The example illustrates one of the problems with 'dividing the continuum of social class.' There is clearly a linguistic justification for the grouping in the latter figure, but is there other evidence that the speakers in, for example, category 8 belong with those in categories 6 and 7 rather than with those in category 9? For the (dh) variable (i.e., the use of a stop or an affricate instead of a fricative in words such as *this* and *then*), Labov divides the continuum into three groups: 0–4, 5–6, 7–9. This produces a regular stylistic pattern in a third figure (Labov, 1966: 246, Figure 15). However, from the list of speakers who used either stops or affricates (Labov, 1966: 259, Table 5), there is an argument for dividing the speakers into only two groups 0–4 and 5–9. In the first group, 14 of the 46 speakers (30%) used stops or affricates, in contrast to the second group, in which only 2 of the 35 speakers (6%) used any stops or affricates, a highly significant difference. Later, Labov (1966: 274, Figure 2) shows that educational level accounts for this dichotomy: speakers with less than a 10th-grade education have a much higher frequency of stops and afficates. However, rather than employ the division into two social classes, Labov goes on to develop a four-point social class scale on the basis of education and employment (Labov, 1966: 278) that shows a more regular distribution of the speakers from the lowest social class to the highest in their use of (dh). However, in a reanalysis of Labov's data, Horvath (1985: 64–65) showed that gender was also a powerful determinant of (dh) and better helped to explain the deviant case of Nathan B. (Labov, 1966: 249–253). Chambers (1995: 55–57) points out that the use of fewer non-standard variants of (dh) is an important feature of upwardly mobile speakers, suggesting that this variable is salient for such speakers.

Labov thus presents various arguments for different social class groupings of the speakers, but his questionnaire does not include any question for the speakers about their own view of their class affiliation. Either he did not think it was appropriate, or perhaps he thought his respondents might have difficulty in answering it. However, their answers might have helped to choose between the various groupings rather than depending upon the linguistic analysis to justify the categories. Plausible criteria for identifying social class categories and membership are crucial when social class is employed as one of the extralinguistic variables.

Labov (2001) followed a similar strategy in his later Philadelphia Neighborhood Study. On the basis of education, occupation, and residence value, he developed a 16-point scale which he then divided into six social classes. Labov used regression analysis to tease out the different effects of occupation, education, and residence value on the use of the variables (2001: 183–186). He concluded that occupation was the most important factor (Labov, 2001: 185). The other factors are perhaps more relevant to notions of social prestige in general than to categories of social stratification. The differences in occupation, however, do not provide a clear answer to the question of how many social classes there are.

It is hard to be sure from Labov's charts (2001: 168–171), but there would appear to be a major difference between his first three groups (the working class groups) and the other three (the middle class and upper class groups). In terms of social class differences, a two-way division would probably have provided clear evidence of the difference between the two. Would this have been a more accurate picture of social class differences in speech than the one that Labov presents? In the absence of any corroborating evidence, it is impossible to tell, but the question is central to an understanding of the relationship between language variation and social class.

Trudgill (1974) also selected a quasi-random sample, from the local register of electors from four of Norwich's electoral wards. Trudgill then developed a social class index on the basis of six separate indicators: occupation, father's occupation, income, education, locality, and housing. One problem with this approach is that each of the indicators is taken to have an equal effect on social class, and that assumption may not be justified (Macaulay, 1976: 185). Like Labov, Trudgill then, on the basis of linguistic data, grouped the scores on the 30-point range into groups that he labeled Middle middle-class, Lower middle-class, Upper working-class, Middle working-class, and Lower working-class. Trudgill was able to show fine stratification in these five categories, but a skeptic looking at his results might wonder whether the separation of the working-class speakers into three categories is justified. Like Labov, Trudgill did not ask his speakers about social class or where they would put themselves.

Labov's and Trudgill's methods are worth examining closely because they are scrupulously honest and make it quite clear how they arrived at their categories. However, they also illustrate the difficulties that sociolinguists face in employing categories such as social class. It is not enough to choose a way of

dividing up the sample into discrete groups; there has to be some reason to believe that these groups correspond to actual social divisions. Those who have not employed multiple indices have usually taken occupation as the main criterion for membership of a particular social class (e.g., Macaulay, 1977; Coupland, 1988; McCafferty, 2001), but some investigators have used place of residence (e.g., Stuart-Smith, 1999). Such criteria, however, are no guarantee that the resulting categories correspond to actual social classes.

When I was planning my work in Glasgow (Macaulay and Trevelyan, 1973; Macaulay, 1977), the most recent work on Scottish society was Kellas (1968) in which it was suggested that there were three major social class divisions in Scotland, based on occupation. In adopting this classification, I modified it, splitting Kellas's middle category by separating manual workers from non-manual. This gave four social class groups: I, IIa, IIb, III. The Registrar-General's list of occupations provided a guide to membership in each of these categories. I used these categories to identify a judgment sample of speakers, balanced for gender and age (10-year-olds, 15-year-olds, and adults), and the use of five linguistic variables was correlated with these categories. On the basis of the results of the analysis, it became obvious that there were no significant differences between groups IIb and III. In other words, the difference between manual (IIb and III) and non-manual (IIa) workers proved important. Thus, like Labov and Trudgill, I modified my classification on the basis of the linguistic data.

As part of the interview, I had included questions for the adult speakers about the number of social class categories in the city and where they would place themselves. Their responses were consistent with the notion of a three-part division (Macaulay, 1976) that matched the results of the linguistic analysis. However, it also appeared that there was no clear label for those who fell between the polarized groups of working-class and middle-class. As one woman put it:

> Well I wouldn't call myself middle-class but on the other hand I would call myself middling. In other words, I'm not up there and I'm not down there. I just reckon I'm pretty average. [Macaulay, 1977: 63]

This speaker sees the middle-class as being 'up there' and the working-class as being 'down there,' but she does not have a simple label for people like herself who are 'pretty average.' This comment illustrates the danger of taking a label such as 'middle-class' literally. The Class I speakers also resisted the suggestion that they were 'upper class', although they admitted that they belonged to the upper stratum of Glasgow society.

Responses such as this one and others collected in the Glasgow survey (Macaulay, 1976) show that even when social class divisions are salient in the society, there may not be an adequate public language in which to label the differences. Nevertheless, the kind of subjective opinions elicited in the Glasgow survey can be useful in identifying how the speakers themselves perceive the critical social class divisions in a society. Perhaps investigators carrying out large-scale sociolinguistic surveys could incorporate some of the methods of perceptual dialectology (Preston, 2002).

There is, however, little evidence that many investigators are planning large-scale surveys of specific communities in which social class differences might be significant in accounting for language variation. A preoccupation with linguistic change has perhaps deflected attention from wider goals. This is unfortunate because social class differences are obviously important in predicting educational achievement, and language skills are fundamental to success in the school system. More attention by sociolinguists to aspects of language variation other than pronunciation might be helpful in educational planning.

Given the complexity of dealing with social class, some investigators have followed the example of the Milroys (Milroy and Milroy, 1978; Milroy, 1980) in using social networks as the basis for examining language variation. Social networks are "personal communities which provide a meaningful framework for solving the problems of daily life" (Milroy, 2001: 550). A network approach "provides a set of procedures for studying small groups where speakers are not discriminable in terms of any kind of social class index" (Milroy, 2001: 556).

A similar kind of approach is to examine a community of practice. "A community of practice is an aggregate of people who come together around mutual engagement in an endeavor" (Eckert and McConnell-Ginet, 1992). Eckert (2000) demonstrates the value of this approach in her study of high school students in Detroit. The difference between a social network and a community of practice is not simply one of size, though networks have the potentiality to be much larger than communities of practice. One important difference is that an individual 'may belong to or participate in a number of different communities of practice' (Meyerhoff, 2001: 531), while individuals will rarely belong to numerous social networks.

Social networks and communities of practice provide an alternative basis for approaching language variation, but they do not replace the larger notions of age, gender, ethnicity, and social class, because individuals will still have these characteristics.

However, all four categories interact in complex ways (Eckert, 2003; Macaulay, 2005) and thus generalizations about the effect of one factor may be misleading without taking the others into consideration. For this reason, claims about social class differences in language should always be carefully examined for possible sources of bias and the empirical basis for the claims. For example, it is not always made clear that Basil Bernstein's wide-ranging claims about social class differences in Britain (Bernstein, 1962) were based on small samples of speech from ten middle-class boys and fourteen working-class boys, aged between 15 and 18, recorded under inadequate conditions of control (Macaulay, 2005).

Despite the problems, social class has been shown to be related to variation in many aspects of language. It is not possible here to review all the work that has been done in many parts of the world, but some illustrative examples will suggest the range of investigation. The majority of studies have dealt with phonological variables. Differences in vowel quality have been found to correlate with social class differences in a number of studies (e.g., Labov, 1966, 2001; Trudgill, 1974; Macaulay, 1977, 1991; McCafferty, 2001), but interestingly more robust correlations have often been found for consonants (e.g., Labov, 1966; Wolfram, 1969; Trudgill, 1974; Macaulay, 1977; Coupland, 1988; Milroy *et al.,* 1994; McCafferty, 2001). This may be because consonantal variables are often stable sociolinguistic features, though the recent spread of glottal stops in Britain is an obvious exception. Social class differences in intonation have not been investigated systematically, but that may change with developments in instrumental techniques of measurement. Stuart-Smith (1999) has examined social class differences in voice quality in Glasgow. She found that working-class Glaswegian voice quality had more open jaw, raised and backed tongue body with possible retracted tongue root, and whispery voice. She observes that middle-class Glaswegian voice quality "is best described in terms of the *absence* of WC traits" (Stuart-Smith, 1999: 215).

In morphology, social class differences have been found in tense marking (e.g., Wolfram, 1969; Fasold, 1972; Feagin, 1969; Macaulay, 1991). Social class differences in forms of negation have also been found in widely different communities (e.g., Wolfram, 1969; Feagin, 1979; Macaulay, 1991). With regard to modality, Feagin (1979) showed that there were social class differences in the use of double modals (e.g., *she might could be a big help to you*) and the quasi-modal *liketa* (e.g., *she liketa had a heart attack!*) in Anniston, Alabama. Thibault (1991) identified social class differences in the use of *devoir* as a modal in Montreal. Winford (1993) found social class differences in the use of perfect *have* in Trinidadian English.

A small-scale study showed social class differences in the use relative pronouns in Ayr (Macaulay, 1991) with the middle-class speakers much more likely to use *wh*-relatives. In a longitudinal study of Montreal French, Blondeau (2001) found that simple non-clitic pronouns (e.g., *nous* vs. *nous autres*) were more common in the upper levels of the social scale in Montreal. In another Montreal study, Dubois (1992) described social class differences in the use of extension particles with the professional class more likely to use forms such as *et cetera* while the working-class speakers preferred forms such as *patati patata*. Macaulay (2001) showed that in Ayr and Glasgow, working-class speakers used significantly fewer derived adverbs and intensifiers such as *very* than the middle-class speakers.

In a study of discourse variation in a sample of Glasgow adolescents and adults, Macaulay (2005) found that three-quarters of the 32 discourse features examined showed no social class differences. In addition to the differences in adverbs and relative pronouns mentioned above, the working-class speakers used more modal auxiliaries and more dislocated syntax, such as clefting or right and left dislocation (e.g., *Mr. Patterson he was a gentleman*). The middle-class speakers used more passives and more evaluative adjectives, as well as the hedge *sort of*. The lack of more significant differences led to the conclusion:

> Despite important differences in education, income, and place of residence, the Glasgow speakers use language for the most part in very similar ways. (Macaulay, 2005: 157)

This point perhaps needs emphasizing in any account of language variation. While age, gender, ethnic, and social class differences in language are of interest and may often be socially important, these differences are small in comparison with what the speakers have in common with each other.

See also: Age: Apparent Time and Real Time; Communities of Practice; Gender; Society and Language: Overview.

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Sociolinguistic Crossing

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Research on code-switching (*see* **Code Switching**) tends to start from the assumption that the languages used in a bilingual encounter are, matters of bilingual competence aside, equally accessible and available to all participants, and that the participants belong to one bilingual community in which a common repertoire of linguistic resources is shared. Often, the languages of this repertoire are organized along such dimensions as we-code/they-code, minority/majority language or standard/nonstandard. This assumption is justified in many cases, while it amounts to a considerable idealization of the facts in others. In yet other cases, code-switching has remained outside the scope of bilingual studies for the very reason that in a most blatant way, one of the languages or varieties used in the bilingual encounter does not belong to the speaker, i.e., its use implies a transgression, an act of trespassing into the linguistic territory of another group of speakers who have privileged or sole access to it, by a speaker who is not an accepted member of that group. Such cases of code-switching will be called sociolinguistic crossing in the present article. Crossing then always implies three parties: a speaker who crosses, the owners of the language or variety into which the crossing is done, and a recipient in the bilingual encounter in which the crossing occurs. The recipient may of course be one of the owners, but the owners may also be absent or mere bystanders.

It is obvious that the interpretation of an act of code-switching as a transgression is open to negotiation and may not be shared by all participants involved. For instance, a speaker may not intend to cross into linguistic territory *extra muros* believing that he or she is part of the group who owns the variety switched into; he or she may on the contrary believe that he or she crosses into another variety while the others do not see themselves as distinct from the speaker's social group; and the recipient may side with the speaker or with the owner in his or her interpretation. But in all cases, sociolinguistic crossing raises questions of boundary-marking, of maintaining or contesting, building or tearing down social borders. It makes these matters relevant to the interaction, although group boundaries are not usually a topic of talk in the situation.

Greatly simplifying, crossing may, as an act of alterity, either be antagonistic, i.e., aimed at maintaining or reinforcing group boundaries, or it may, as an act of identity, be accommodating, i.e., aimed at camouflaging or making irrelevant group boundaries, or even establishing new social categories and ideological alliances. However, as we shall see, the interpretation of crossing is often a complex issue in which the situational context plays a decisive role.

In addition to the allocation of the role of the code-switching speaker, the recipient and the owner of the crossed-into language, and to their interpretation of the code-switching as antagonistic or accommodating, the linguistic form of the code-switch needs to be taken into account. It is important to distinguish between straight crossings in which the variety or language crossed into is more or less identical to the one used in the owning group, and crossings in which the code-switching speaker stylizes a typical speaker of the owning group. Sometimes, he or she will then use a mock form of that variety or language. Some examples may be useful to show the amount of variability in crossing, and the linguistic activities on which or for which it is employed.

First of all, sociolinguistic crossing may be involved in any quotation of another voice. The current speaker then animates another past or future, factual or fictitious, generic or individualized speaker, giving him or her a typified or even stereotypical representation through language choice, accent, prosody, or any kind of social-communicative style that is not associated with the teller's own social persona. Such cases of reported speech always involve double-voicing, i.e., an overlay of the reported voice and the reporter's, as has been shown by many studies in the tradition of Bakhtin (1973 [1981])/Voloshinov (1929 [1993]) (cf., e.g., Günthner, 1999, in press). For instance, Keim (2002) discusses an example in which a Turkish-German bilingual girl brought up and living in Germany animates her mother's voice in *Gastarbeiterdeutsch* (a simplified variety of German which her mother, a first generation work migrant, speaks). For the daughter, who is a fluent speaker of colloquial German, this transgression into a variety which does not belong to her but typifies another social group (that of first generation *Gastarbeiter*), is clearly antagonistic: she uses language in order to erect a social boundary between her mother and herself, which, in the context of the interaction at hand, serves to criticize the mother's point of view in an argument. This point of view is discredited by the very fact of being associated with the social group indexed by the variety switched into.

Reported speech, although often involving sociolinguistic crossing, is not where the term has originated from, however. Rather, it was introduced by Rampton (1995, 1998) in his study on the use of

London Jamaican Creole and other immigrant varieties in the UK (Punjabi and Indian English) by white English adolescents in London, which in turn built on previous sociological work by Hewitt (1986). Rampton observed crossing not in interactions between entitled and nonentitled users of the codes, but rather, in intragroup situations where the crossers were among themselves. (Hewitt, 1986 in fact reports sanctions by Creole speakers when whites used it, which explains this finding.) He found this bilingual practice to occur in what he calls liminal situations, i.e., "at the boundaries of interactional enclosures, in the vicinity of delicts and transgressions, in self-talk and response cries, in games, cross-sex interaction and in the context of performing art. Adolescents used language to cross ethnic boundaries in moments when the constraints of everyday social order were relaxed" (Rampton, 1995: 281). The interpretation of crossing is, according to Rampton, more complex than that of in-group code-switching: "Recipients have to run through a much more extensive set of possible inferences in order to make sense of an utterance, and [. . .] it is this often unfinished process that generates the symbolic resonance around an utterance" (Rampton, 1995: 278). Crossing is particularly rich in inferences; this is so, not in the least, because there are no established interpretational routines involved, and because crossing calls into question some very fundamental assumptions of everyday language-based categorization work.

Its exact meaning is difficult to pinpoint and requires a close look at its contextual embedding. Accommodating tendencies in which the crossers attempt to borrow some of the prestige that the creole doubtlessly has on a nonofficial language market in which street-wiseness, virility, and verbal virtuosity are highly appreciated (cf. Sebba and Tate, 2002) do not necessarily imply a wish to identify with the social-ethnic category of the West Indians in Great Britain. A similar ambiguity was observed by Cutler (1999) in a study on crossing into African-American English by white Anglo-American youngsters. On a wider scale, the use of American English by British English pop singers (as described by Trudgill, 1983) can also count as an instance of accommodating crossing. It seems that some prestigious symbolic resources tend to dissociate from the social group who originally owned them (perhaps against their will) and to become more widely available as an index to those moral values and ideologies that have come to be associated with the owning group. The worldwide borrowing of cultural resources from African-American culture (such as hip-hop music) are a case in point. However, crossing is also observed in sociolinguistic contexts in which the crossed-into variety has no prestige (not even a covert one). For instance, code-switching into Hindi is part of a funny style used among Fijians, with secondary functions of boundary marking against the Hindi minority (Siegel, 1995).

Although the use of stylized and highly exaggerated varieties seems to be a straightforward case of antagonistic crossing (cf. Hill, 1995), there can be a large amount of interpretational ambiguity in parody as well. In addition, everyday crossing of this kind is usually mediated by models made popular through the mass media such as TV shows, movies, or advertisements (cf. Sebba, in press, on the role of Ali G. in the UK). As an example, consider the use of a stylized variety of ethnolectal German. This variety, which is associated with Turkish and other 2nd generation immigrants in Germany (other than the *Gastarbeiterdeutsch* referred to above, which is the result of a fossilized process of spontaneous acquisition in first-generation immigrants), has become popular among German adolescents of a nonmigrant background through being used in the mass media. This secondary ethnolect in turn is copied and transformed by the monolingual German adolescents (thereby becoming a tertiary ethnolect), who themselves may have no direct contacts with the social group with which the primary ethnolect is associated (cf. Androutsopoulos, 2001; Auer, 2003a). As Deppermann (in press) shows, crossing into a stylized ethnolect of German can serve to stylize another social group (that of a particular type of immigrant youngster) as a relevant alterity, which provides an oppositional display of one's own social identity; more often, however, it indexes media competence and access to a code that is as fascinating as its primary owners are despised.

Questions of ownership of a variety may be an issue that makes the interpretation of a style shift as antagonistic crossing difficult as well, as Coupland (in press) shows in an analysis of style shifting in the Welsh Labour politician Aneurin Bevan. Although Bevin, in his political speeches, often uses standard or exaggerated RP pronunciation in order to caricature his political enemies – without quoting them – and 'Valleys' Welsh English features in order to align with his political supporters (the workers), there is by no means a one-to-one relationship between stylistic choices and political assessments. Bevin does not consistently treat standard English/exaggerated RP as a variety not owned by himself, but uses it as a voice of authority and honesty as well, which is owned by him as a member of the political elite just as the accent of his Welsh background is.

In a particularly obvious way, the dissociation of symbolic resources and their meanings from the social group which can be called their owners applies to crossing into school languages by the learners, particularly for ludic functions. For instance, the use of a song-line from a German pop song by Turkish-Danish bilingual adolescents (Jørgensen, 2005) or the use of German fragments by British pupils in London (Rampton, 1999) is part of a widespread usage of foreign languages for playful reasons in adolescents' social styles. It is only marginally related to social boundaries and their transgression; here, we reach the limits of sociolinguistic crossing in the sense of the definition given above.

Finally, it should be clear that the use of a particular code by certain speakers that comes as a surprise **to the analyst** does not *eo ipso* qualify as sociolinguistic crossing; for instance, the unexpected use of a minority language by speakers of the majority (such as Turkish by (ethnic) Germans – cf. Auer, 2003b; Dirim and Auer, 2004) is part of the emerging multilingual youth styles that are typical of some multiethnic metropolitan spaces in Europe. As a rule, though, these social-communicative styles do not address issues of ethnic boundary-making but rather index a social milieu in which certain languages are an integral part of everyday life.

See also: Code Switching; Identity and Language; Language Attitudes; Migration and Language.

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Sociolinguistics and Political Economy

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Since the beginnings of sociolinguistics, it has been well established that language and economic structures are interrelated. Other social sciences concerned with political economy have been largely dismissive of language, viewing it as an entirely symbolic rather than material phenomenon. By contrast, sociolinguists – including both those who describe and those who critique capitalist systems – have repeatedly and conclusively demonstrated that language is intimately tied to speakers' material economic position.

The earliest work examining this relationship concentrated on the linguistic dimensions of social class, particularly the social and economic reflexes of the standard and the vernacular forms of a language. The robust correlations that variationist sociolinguists found between socioeconomic status and language use were cited as powerful evidence of the social organization of linguistic variation. Variationist sociolinguistics was also instrumental in redirecting scholarship on speakers living in poverty from a framework centering on language deficiencies to one focused on linguistic difference.

Whereas the first studies of language and social class were largely framed within a structural-functionalist paradigm in which social classes orient to the same social norms, and in which class organization is consensual, scholars informed by Marxist theory have argued that a conflict-based model of class would improve the fit between sociolinguistic findings and the social theories used to account for them, insofar as language is used not only in parallel fashion across classes but also to carve out social differences between classes. The difficulties of objectively determining class led other researchers to focus on social networks, in which occupation figured heavily, as a way of arriving at locally meaningful social groupings for linguistic analysis.

Social class has been at the center of a longstanding debate in sociolinguistics: how to account for the widespread pattern in which women are frequently found to surpass men in the use of standard variables. One early explanation for this pattern was that women, lacking equal access to real-world power, use language as a symbolic resource to claim social prestige by projecting through their speech a class position above their actual material circumstances. A revised version of this argument posits that women more than men are socially evaluated not on their accomplishments but on their personhood, and that language is a crucial component of self-presentation. This account allows for the possibility (which has been empirically demonstrated in variationist-sociolinguistic research) that some female speakers might seek to project a working-class rather than middle-class persona and hence will outpace their male counterparts in the use of vernacular rather than standard variables.

This analysis of the semiotic power of language relies heavily on the work of Pierre Bourdieu, a central theorist in sociolinguistic discussions of political economy. For Bourdieu, language is a form of capital, a term that for him includes not only economic power but also social, cultural, and symbolic power. Bourdieu argues that when a linguistic market is constituted in a society, the distribution of linguistic capital – that is, the form of the language imbued with the most power within the market – is uneven across speakers. The economic analogy is not wholly metaphorical, for Bourdieu notes that power in the linguistic marketplace tends to extend to power in the economic marketplace as well. However, language can function as a primarily symbolic form of capital that enables speakers to accrue local prestige, such as popularity among high school students in the United States, although even in this situation speakers' choice of linguistic variables tends to correlate with their orientation to socioeconomically divergent pathways after high school: jobs versus college.

The relationship between language and work, which has long informed variationist socioinguistic research, has also been explored within other paradigms. Ethnographic sociolinguists have documented the ways in which opportunities in the labor market are tied to language, demonstrating not only that lack of access to linguistic capital prevents economic mobility, but also that even within a limited field of options speakers may make agentive and strategic linguistic choices to promote their own social goals, whether these involve economic advancement or participation within a local linguistic and economic market. Although scholarship on standardization, language shift and loss, and the international spread of English has shown that broad political-economic forces such as nationalism, colonialism, industrialization, and globalization have dramatic and often catastrophic consequences for language, such research also demonstrates that these forces cannot fully determine speakers' linguistic practices.

In contrast to much of the work on language and economic systems discussed above, which considers the linguistic consequences of broad economic structures and processes, research within discourse analysis

considers the details of language use within specific economic contexts. A body of literature in several subfields has examined a wealth of issues regarding language in the workplace. Interactional sociolinguists, concerned with how cultural differences in interactional style may lead to misunderstandings and conflicts between interlocutors in culturally diverse work settings, seek to document the pragmatics of talk among coworkers and between service providers and customers or clients. Scholars working in the traditions of interactional sociolinguistics, conversation analysis, critical discourse analysis, and other approaches have also given extensive attention to language use in institutional settings such as medical contexts, the legal system, the educational system, and the media, in which issues of power and economic access are centrally relevant. And as both multilingual linguistic competence and friendly, facilitative interactional practices have emerged as marketable skills within the postindustrial service economy, scholars have begun to document the ways in which the linguistic abilities of a diverse workforce come to be shaped to the needs of late capitalism.

Although socioeconomic structures and institutional contexts have been the aspects of economic systems most central to sociolinguistic research, another crucial element of economic processes, consumption, has begun to gain ground. The relationship between language and consumer culture has been of deep interest particularly within critical discourse analysis and other politically oriented sociolinguistic frameworks. Focusing on advertising discourse, popular media textual products such as mass-market fiction and television shows, and other commodified forms of discourse, this body of work offers a critical perspective on how members of the public are transformed into consumers. However, research is still greatly needed on how people both at the center and on the periphery of consumer culture use language to make sense of such texts and of other aspects of consumption in their daily lives.

Related to this issue is the phenomenon of commodified language – language that functions not only as labor but as a product for consumption. Such commodification is most vividly seen in the appropriation of symbolically laden languages and dialects in advertising, mass media, and popular culture to enhance corporate profits, but it is also evident in the promotion of talk as a valued object in its own right in all aspects of late capitalist society, as seen in the marketing of verbal intimacy from psychotherapy to phone sex to coffeehouse conversations.

Many other arenas of language and political economy are only recently being explored by sociolinguists, particularly within newly industrializing societies and those most dramatically reshaped by globalization. Indeed, it is not an overstatement to assert that every aspect of sociolinguistics touches on political-economic issues. As those working in the many branches of the field continue to pursue their diverse research agendas, scholarship will benefit greatly from deeper and more extensive attention to this powerful and pervasive aspect of sociolinguistic life.

See also: Conversation Analysis; Critical Discourse Analysis; Gender and Language; Institutional Talk; Interactional Sociolinguistics; Language in the Workplace: Different Approaches; Multilingualism: Pragmatic Aspects; Standardization; Variation and Language: Overview.

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Sociophonetics

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Sociophonetics, as is evident from its morphology, describes work at the intersection of sociolinguistics and phonetics.

The term has had its widest currency among phoneticians, referring especially to descriptive accounts of phonetic and phonological variation in particular dialects, speech styles, or speaker groups. The results of such investigations are often used to address issues in phonetic and/or phonological theory. One such issue is the relationship between phonetics and phonology (e.g., Ohala, 1990), although many sociophoneticians appear to make no distinction between them, using 'phonetics' and 'phonology' interchangeably. Sociophonetics is also used to refer to phonetically oriented research in variationist sociolinguistics. Such work again focuses on the interrelationships between phonetic/phonological form and social factors such as speaking style and the background of the speaker, but with a particular interest in explaining the origins and transmission of linguistic change.

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term therefore has a reasonable time depth, the field has expanded rapidly since the mid 1990s. Sociophonetics is now an eclectic field with an expanding agenda. It is furthermore emerging as a research area in its own right, instead of being viewed as a component of other, more established traditions. Today's sociophoneticians are concerned not only with aspects of speech production, but also with the effects of variation on speech perception; the implications of variation for theories of language change, the lexicon, phonology, and speech production and perception; how variation impacts the process of language acquisition; and the value of understanding variation for a range of applied areas.

This review illustrates these areas with reference to key works. It should be borne in mind, however, that the authors cited may not themselves have used the term 'sociophonetic' to describe their research.

Speech Production

The majority of sociophonetic work has been concerned with social, regional, and stylistic variation in speech production. Variationist sociolinguistics in particular has yielded a wealth of information to show that variation in speech production is systematically influenced by a range of factors. These include aspects of speakers' social background such as their age, gender, ethnicity, and socio-economic status (e.g., Labov, 1966, 1994–2001). Further influence may come from the groups and social networks with which speakers are affiliated (e.g., Milroy, 1987; Eckert, 2000).

Interest in regional variation predates modern linguistics. Systematic large-scale surveys of many languages have been carried out since Georg Wenker used a postal questionnaire to investigate the German dialect forms used by schoolchildren in 1876. Recent surveys have used innovative methods such as telephone interviewing to gain rapid access to large samples of informants (e.g., Labov's TELSUR project). More work has been carried out on English than any other language (but see e.g., Verstraeten and Van de Velde, 2001; Kissine *et al.*, 2003 on Dutch; Sankoff *et al.*, 2001 on Canadian French). Wells (1982) provided a comprehensive account of regional variation in English accents, while Foulkes and Docherty (1999) contained several detailed studies on varieties in the British Isles.

It has also been demonstrated that phonetic and phonological form may be influenced by many dimensions of the context of interaction. These include the style or register of speech, the topic of discussion, and the addressee. Style-shifting (sometimes called phonostylistics) was summarized by Schilling-Estes (2002). A common finding is that more formal registers tend to elicit more standard spoken forms. In a slightly different vein, Lindblom (1990) hypothesized that speakers adjust their speech along a 'hyper-hypo' continuum, in accordance with the perceived interactional needs of the interlocutor. More elaborated (hyper) articulations are used if the context demands listener-oriented speech, such as giving clear instructions. On the other hand, articulatory control in interactions such as narratives may be more speaker-oriented, permitting a greater degree of underarticulation (hypo-speech).

Variation in speech may contribute to expressing solidarity with, or distance from, an interlocutor. An example was provided by Trudgill (1986: 8), who monitored his own speech during fieldwork in Norwich, England. He found his use of glottal stops for /t/ correlated with that of his interviewees. Recent phonetic studies further reveal that interlocutors exert very fine control over phonetic parameters in order to structure discourse, for example to control turn-taking (e.g., Local, 2003). It has also been shown that adults modify their speech when addressing children, including the use of higher fundamental frequency (F0) and a wider F0 range. Sociolinguistic variables may appear with different distributions relative to patterns in inter-adult speech, and may be affected by the age and gender of the child (Foulkes *et al.*, 2005). Bilingual interaction displays a unique range of addressee effects, in that patterns of interference between languages depend upon the "language mode" being used (Grosjean, 1998). In some circumstances a bilingual is likely to use just one language, such as speaking to a monolingual. In a monolingual mode, any interference between the speaker's two languages is minimal. However, in conversation with other bilinguals code-switching often emerges. That is, speakers engage in a bilingual mode where both languages are used and structures from one language may well be transposed onto the other. The phonetics and phonology of bilingualism remain, however, under-researched relative to other linguistic features (but see e.g., Khattab, 2002). Another area which has only just begun to attract attention is how variation is learned in the course of language acquisition. The available evidence (summarized by Roberts, 2002) suggests that children acquire knowledge of sociolinguistic variation from the earliest stages.

Speech production research has been based mainly on auditory and acoustic (spectrographic) analysis of segmental properties. Sociolinguists in particular have relied on acoustic analysis to study vowels, especially formant analysis of stressed monophthongs (e.g., Labov, 1994–2001). Acoustic analysis has been extended to other aspects of vocalic quality such as

duration (e.g., Scobbie *et al.*, 1999) and formant transition rate (e.g., Thomas, 2000), and to consonantal variables (e.g., Docherty and Foulkes, 1999; Kissine *et al.*, 2003). Work on suprasegmental features is increasing as well. These include regional and social variability in intonation (e.g., Britain, 1992), voice quality/vocal setting (e.g., Henton and Bladon, 1988; Stuart-Smith, 1999), and rhythm (e.g., Low *et al.*, 2000). Further advances have been made as a consequence of technical developments in recording and analysis methods. Nolan and Kerswill (1990), for example, were innovative in employing electropalatography to analyze variation in connected speech processes. Other techniques such as ultrasound, laryngography, electromyography (EMG), and electromagnetic articulography (EMA) promise much for the future of sociophonetics, although not all are yet amenable to use on large speaker samples because of cost and/or invasiveness.

Speech Perception

Compared with work on production, less is known about the relationship between phonetic/phonological variation and speech perception. Thomas (2002a) provided a thorough review of perceptual work in sociophonetics, identifying five main types of work. First, a number of studies tested whether listeners can identify the social or regional background of speakers, based on exposure to the phonetic and phonological properties of their voices (e.g., van Bezooijen and Gooskens, 1999).

Second, a group of studies showed that phonological categorization may be influenced by the (assumed) social characteristics of the speaker. For example, Strand (1999) presented listeners with a continuum of synthetic stimuli ranging from a good [s] at one pole to a good [ʃ] at the other. The listeners' task was to label the stimuli as either /s/ or /ʃ/. As the stimuli were presented some listeners saw a female face while others saw a male face. The category boundary differed for the two listener groups, in line with typical differences in speech production: listeners who saw a female face placed the boundary at a higher frequency, since female voices typically produce fricatives with higher frequencies than male voices. Similar results were found by Elman *et al.* (1977). The third type of study assessed how native dialect impacts on perceptual categorization. Janson (1983), for instance, found that younger and older listeners in Stockholm had a different perceptual boundary to divide a continuum of synthesized Swedish vowels. The boundary was in line with differences in the production of the two groups.

Thomas's fourth group included investigations of whether listeners are able to perceive sound changes in progress, such as subtle splits in vowel quality (e.g., Di Paolo and Faber, 1990). The final group of experiments investigated how variation contributes to listeners' judgments about the personality of the speaker (e.g., Giles and Powesland, 1975).

Theoretical Implications

The wide variety of work that can be called sociophonetic has contributed in diverse ways to the development of linguistic theory. In sociolinguistics, the discovery of socially constrained variation has made a particular impact on understanding how linguistic change originates, and how it spreads through communities and grammars (e.g., Milroy, 1992; Labov, 1994–2001; Kerswill and Williams, 2000; Trudgill *et al.*, 2000). Labov's work on vowel formant analysis yielded influential models that aimed to explain and predict directions of long-term phonological change via universal principles, including chain shifting (for a critical review see Gordon, 2001). In particular it has been shown that certain individuals are more likely to adopt new variants than others because of their social position (e.g., the structure of their networks of interaction), physical and social mobility, and attitude. In the latter case, for example, an individual may be willing to adopt new pronunciations if such forms have a high "market value" in the workplace (Coupland, 1980).

Until recently, sociophonetic studies have made less of an impact on grammatical theory, which is unsurprising in view of the fact that modern linguistic theory has been preoccupied with the "ideal speaker-hearer in a homogeneous speech community." Variation has therefore not been a prime concern in the development of most phonological models. However, adjustments to the machinery of several phonological models have been made in response to the findings of sociophonetic work. These include Optimality Theory (e.g., Nagy and Reynolds, 1997), Government Phonology (Harris, 1994), and Lexical Phonology (McMahon, 1991). The recent emergence of exemplar theories of lexical representation, based primarily on psycholinguistic research, has also seen variation in both perception and production play a more central role (Pisoni, 1997; Pierrehumbert, 2002).

Applications of Sociophonetics

Sociophonetic work has an important contribution to a range of interests beyond linguistic theory.

Speech technology, for instance, must cater for social, regional, and contextual variation to generate natural-sounding synthesized speech and to ensure speech recognition systems can tolerate natural variation (Hoequist and Nolan, 1991). Descriptive accounts of systematic variation in speech are therefore of vital importance, as is testing of the perceptual evaluation of synthetic speech.

Speech and language therapists benefit from informed views of linguistic variation, enabling them to distinguish genuine pathology from natural, non-standard variation. Pedagogical issues are similarly informed by debate on phonological variation, most famously perhaps in the case of the 'Ebonics' debate in the United States (Wolfram and Schilling-Estes, 1998: 169ff.). Models of English for teaching as a foreign language are also constantly revised in line with changes in British and American standard varieties, as well as in response to the development of influential new standards, such as Australian in east Asia.

Information on variation is critical for casework in forensic phonetics, in which the commonest task is the comparison of a criminal recording (such as a threatening phone call) with a suspect's speech, to assess the likelihood that the suspect was indeed the speaker in the crime (Nolan, 1997). The strength of conclusion that can be reached is largely dependent on the state of descriptive reference material, including the likely geographical origins of particular features and the distribution of variable features across the relevant population.

Summary

Sociophonetics is very much a developing field with a wide remit. As it begins to take on its own shape and gain independence from its parent disciplines, it is apparent that its defining characteristic is a cross-fertilization of methods and theories which have their origins in distinct fields. As Thomas (2002b) pointed out, this enables sociophonetics to address the weaknesses in its components. It takes its material not only from standard dialects and careful speech, but also from spontaneous interaction. It combines highly controlled experimental designs with observation of speaking and listening in different everyday situations, often using large and heterogeneous samples of subjects. It employs detailed analysis using a variety of techniques. Its methods are informed by a variety of different theoretical models, and its results are in turn used to address a wide range of theoretical issues. This approach is allowing us to gain an ever more focused picture of what is probably the single most defining characteristic of human speech – its variability.

See also: Phonetics, Forensic; Accent; Bilingualism; Dialect Atlases; Intonation; Phonetics: Overview; Phonology: Overview; Rhythm; Sociophonetics; Speech Perception; Speech Production; Style; Variation and Language: Overview; Voice Quality.

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Relevant Website

http://www.ling.upenn.edu—Labov's TELSUR project.

Sodium Amytal Testing and Language

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Overview of the Intracarotid Amobarbital Procedure

The intracarotid amobarbital test (IAT) was first described by Juhn Wada and thus is often referred to as the 'Wada test.' Wada originally developed this technique to study the interhemispheric spread of epileptiform discharges in patients undergoing unilateral electroconvulsive therapy. Based on his observation that an expressive aphasia resulted when the language dominant hemisphere was injected with amobarbital, he reasoned that this technique might be useful in determining hemispheric language dominance in neurosurgical candidates (and thus minimize speech and language dysfunction in patients undergoing dominant hemisphere surgery).

Since the exact nature of the amobarbital procedure varies from center to center (and some centers perform injections of vessels other than, or in addition to, the internal carotid artery that can also inform about language), this article restricts itself to a general description of the practice of this procedure and its underlying assumptions. In general, the IAT involves invasive carotid arteriography. During the IAT procedure, a catheter is positioned within the internal carotid artery, and amobarbital then is injected to anesthetize the majority of one hemisphere of the brain. Such an injection leads to pharmacological inactivation of brain areas in the distribution of the ipsilateral anterior and middle cerebral arteries, and the anterior choroidal artery. That is, a great deal of the frontal and temporal cortices is deactivated. Following the infusion of amobarbital, the patient carries out multifarious memory and language tasks. Since it is assumed that disruptions of language and memory during IAT are a consequence of the temporary 'lesioning' of the injected hemisphere, and that IAT mimics the effects that surgery on the injected hemisphere might have, the IAT allows one to predict the effect that surgery would have on each hemisphere. Of course, what is at issue is whether the uninjected ('intact') hemisphere could adequately support language and memory were the other hemisphere to be operated on. Although some centers inject only the hemisphere to be operated on, most centers also carry out the procedure on the other hemisphere to establish the extent of lateralization of function.

The Wada Test's Contribution to Neurolinguistics

The IAT bears several advantages as a research tool relative to traditional lesion studies. Specifically, it is possible to obtain baseline data in the individual to be studied, meaning language and memory performance is known in the 'prelesion' state; to compare lesion effects on both hemispheres in the same individual; and gather group data where the 'lesion'-to-assessment interval is relatively homogenous, thus minimizing maturational confounds, and the lesion is fully reversible. The disadvantages of the IAT entail the brevity of the drug effect and the possibly limited generalizability of findings. When gathering clinically relevant information is of paramount importance, there is, within the time constraints of the IAT, little opportunity to manipulate the nature of stimuli. Furthermore, because the IAT is carried out in individuals with typically chronic cerebral dysfunction (epilepsy), it is unclear whether findings obtained apply also to normal populations or even to groups with other neurological conditions. Nonetheless, the IAT has enabled researchers to explore not only intra- and interhemispheric differences in language representation and their correlates, but also, by looking at individuals with brain injury, the functional resiliency and plasticity of brain structures.

One domain of inquiry richly informed by IAT studies is the relationship between handedness and hemispheric language dominance. In most people, the left hemisphere is language dominant, but occasionally the right hemisphere is dominant or both hemispheres may participate in language on more equal footing. Although right-handedness is highly correlated with left hemisphere speech dominance in the population at large, brain abnormalities may interfere with the normal neuroanatomical organization of cognitive functions and involve reorganization. Specifically, IAT studies have shown that early brain injury is often associated with a shift in language dominance, but a shift in language dominance does not necessarily entail a shift in handedness, or vice versa.

Several studies have identified factors associated with shifts in language and handedness. Left hemisphere injuries sufficient to cause hemiparesis have been found to be associated with both left-handedness and right or bilateral speech representation. Among patients without hemiparesis, sinistrality and right or bilateral language representation were associated with the existence of extratemporal pathology. Left-handers with left hemisphere speech dominance

have also been found to be less likely to have had hemiparesis or extratemporal injuries. Extratemporal lesions and multiple or bilateral seizure foci have been found to be related to atypical speech representation. In addition, among left mesial temporal lobe epilepsy patients, atypical language lateralization has been found to be associated with higher spiking frequency on EEG. Thus, the location and extent of injury may be factors related to language shifts.

One of the most important factors underlying atypical language representation is the age at which brain injury occurs. Since the resiliency of the brain is maximal during the early years of life, it makes sense that injury at a very early age might induce either the intact or the damaged hemisphere to reorganize (i.e., accommodate speech and language zones) so as to compensate for functional losses. Intrahemispheric language reorganization has been found to be more likely than interhemispheric reorganization after the age of 6 years. Interhemispheric language reorganization is more likely to occur at earlier ages, but unfortunately, not without possible cost to nonverbal functions. Specifically, patients may experience a 'crowding' of nonverbal function. Evaluation of verbal and nonverbal functions during IAT in epileptic patients with early onset of left hemisphere dysfunction has revealed that patients with atypical (right hemisphere) speech representation perform as well as patients with left hemisphere speech on most measures of language function. However, patients with atypical speech patterns perform more poorly than 'left hemisphere' patients on nonverbal tasks. Transfer of language may 'crowd out' functions normally under the mandate of the right hemisphere. Thus, a right–left maturation gradient, characterized by a slower development of the right than left hemisphere, might permit the still more plastic right hemisphere to assume language functions, but not without disturbing the typical organization of right hemisphere functions.

Amobarbital studies of patients with epilepsy have also challenged the notion that hemispheric language dominance falls into discrete categories. Rather, it is more likely that language representation falls on a continuum from strongly left hemisphere dominant to strongly right hemisphere dominant, just as handedness seems to fall on a continuum from strongly dextral to strongly sinistral. However, other data suggest that cases might not fall along all points of such a continuum. Specifically, there are four major patterns of hemispheric speech representation. Toward the left-dominant end of the spectrum, there are indeed several clusters representing degrees of left speech dominance. However, individuals with bilateral or right speech dominance tended to center at these respective points, without the gradation observed for left hemisphere representation.

A limited number of amobarbital studies have addressed two other important issues, namely, the intra- and interhemispheric organization of language in bilinguals and the organization of sign language. With respect to studies of bilinguals, studies have consistently shown that the interhemispheric organization of both languages is complementary; i.e., hemispheric dominance for the two languages is similar. However, the intrahemispheric organization of the native and second language is likely different. On the basis of the observation that the patient's second language recovered before the native language after left middle cerebral artery amobarbital injection, the second language might be organized within the central sylvian core, whereas the first language might be represented in more distant perisylvian areas. One might, however, find a diametrically opposing interpretation to be more plausible. Electrical stimulation studies show that object naming in the first and second languages is differentially represented within the language dominant hemisphere. According to these studies, the second language is represented in a larger area, more peripheral from the Sylvian fissure. Thus, one might conclude, assuming that the effects of amobarbital dissipate earlier in more distant areas, that the first language is more centrally represented.

Sign language studies in nondeaf individuals also indicate hemispheric organization of sign and spoken language to be similar, at least insofar as the same hemisphere is dominant for both forms of communication. The existence of subtle interhemispheric differences in the organization of signed and spoken language, however, is not settled by amobarbital studies. On the one hand, some studies have found that sign language is characterized by greater bilateral representation than spoken language. In contrast, several other studies have found the interhemispheric organization of signed and spoken language to be complementary and highly similar.

Because a substantial proportion of deaf individuals apparently have experienced some cortical reorganization, reports of IAT test results in a deaf individual are of particular significance. That is, such studies provide tentative data about whether findings from normal-hearing individuals concerning the organization of sign language apply to deaf individuals. Complete left-hemispheric dominance has been found in a right-handed individual for American Sign Language, signed English, and finger spelling. Thus, evidence of bilateral representation for sign language was not found.

Amobarbital studies have also indicated that crossed aphasia (the occurrence of aphasia in right-handed

individuals after insult to the right hemisphere) should not necessarily be taken to imply right-hemispheric language dominance in these right-handers. Researchers have determined via IAT that their patients with crossed aphasia actually had bilateral language representation.

Functional Magnetic Resonance Imaging and the Future of the Intracarotid Amobarbital Test

Even though IAT continues to be the standard presurgical means of assessing lateralization of language and memory, its invasiveness and attendant risks have caused many to search for a less invasive method. Researchers have begun using functional magnetic resonance imaging (fMRI) as a noninvasive alternative to the IAT. fMRI allows visualization of changes in the flow of fluids in brain areas that occur over time spans of seconds to minutes. In the brain, blood oxygen level is assumed to be related to neural activity, and consequently fMRI can be used to infer brain activity changes when images of the brain are obtained while persons are engaged in tasks and compared to images obtained during rest or a comparison task. A variety of language and memory activation paradigms have been described. In general, fMRI determines hemispheric dominance through the use of laterality indices that compare the ratio of activated pixels (small areas within an image) in one hemisphere to those in the other. Alternatively, hemispheric dominance for a function can be inferred from comparisons of the activation of specific, homologous regions in each hemisphere, which may yield results more consistent with those of the IAT than does the derivation of global lateralization indices. Despite the fact that fMRI shows promise as a noninvasive alternative to IAT, its reliability in predicting postoperative memory function has not been sufficiently investigated. It remains unclear whether removal of a region activated in an fMRI image necessarily leads to inability to perform the related task. Hence, additional studies are needed before fMRI can be trusted for surgical planning.

See also: Anatomical Asymmetries versus Variability of Language Areas of the Brain; fMRI Studies of Language; Imaging Brain Lateralization; Mapping Syntax Using Imaging: Problems and Prospects for the Study of Neurolinguistic Computation.

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Sogdian

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Sogdian, an Eastern Middle Iranian language, was spoken at least up to the 8th century in Sogdiana, the area of modern Uzbekistan that includes the cities of Samarkand and Bukhara. Many Sogdians were merchants, however, and traveled east as far as China, bringing with them the Sogdian language. The Manicheans and Christians, as they fled from persecutions from the 3rd century on, took the Sogdian language with them to the farthest reaches of Chinese Turkestan and beyond, into Mongolia, where the Sogdian alphabet was adopted by the local Turks and the Mongolians, who still use it. The Sogdian written remains consist of religious and nonreligious texts. Most of the religious texts are translations, the Buddhist texts from Chinese, the Manichean ones from Persian and Parthian, and the Christian ones from Syriac.

We have Sogdian texts in five different alphabets: Old Sogdian Aramaic, Sogdian-Uighur (Uyghur), Manichean, Nestorian Christian, and Northern Brahmi. The Sogdian Aramaic script is used in the *Ancient letters* (see below) and in graffiti on rocks along the Karakorum Highway in northern Pakistan. The Sogdian-Uighur script is the most common, being used for secular documents, as well as for Buddhist and Manichean texts. The Manichean and Nestorian scripts were used for Manichean and Christian texts, respectively. There are a small number of late Sogdian manuscripts from Turfan written in Northern Brahmi script.

In early times, the Sogdians must have been the neighbors of the Tocharians (*see* **Tocharian**), who borrowed numerous (proto-)Sogdian words. The modern Iranian language Yaghnobi is the descendant of a Sogdian dialect different from the known Sogdian.

The oldest Sogdian texts are the *Ancient letters*, written on paper and discovered by the British-Hungarian discoverer and archeologist Marc Aurel Stein in eastern Chinese Turkestan (now in The British Library). The letters can be dated to the early 4th century by references to current events.

From the 8th century, we have a collection of letters and administrative, economic, and legal documents written in the Sogdian script from the archives of King Dhewastich found at Mount Mug east of Samarkand.

The largest corpus of Sogdian texts are the Buddhist texts removed from a cave at Dunhuang in eastern Xinjiang by Aurel Stein and the French scholar and archeologist Paul Pelliot (now in The British Library and the Bibliothèque Nationale). Numerous Sogdian Manichean and Christian texts were discovered at Turfan in northeastern Xinjiang by German archeologists (now in the Brandenburgische Akademie der Wissenschaften in Berlin).

Sogdian phonology and morphology are both conservative and innovative. The most important innovation is the 'rhythmic law,' by which words with long vowels before the endings ('heavy' stems), lose final short vowels. Thus, OIran. SING NOM **wrk-ah* and ACC **wrk-am* 'wolf' are Sogd. *wərk-í* and *wərk-ú* ('light' stem), while OIran. **daiw-ah* and **daiw-am* and **daiw-am* 'demon' are both *δḗw*. Sogdian shares with Ossetic the plural suffix *-t-* (originally a collective noun, hence declined like a feminine singular), for instance, *δḗw-t* 'demons'; forms of *δβar-* 'door': SING NOM *δβar-í*, LOC *δβar-yá*, PLUR NOM-ACC *δβar-t-á*, GEN-DAT, LOC *δβar-t-yá* 'at the doors'. Sogdian uses demonstrative pronouns as definite articles (*xō mártī* 'the man', *xā strīš-t* 'the women' [< *strīč-*], *uya kánθ-ī* 'in the city' [LOC]).

The verb system is complex. There are three stems: present, past, and perfect (perfect participle = past stem + suffix-*ē*, FEM-*č-a*; e.g., PRES *pətsā́č-* 'fit', PAST *pətsaγt-*, PERF MASC *pətsaγt-ḗ*, FEM *pətsaγ-čá-* [*-γt-č-*> *-γ-č-*]). It has all the Old Iranian moods (indicative, imperative, subjunctive, optative, injunctive), as well as active and middle. It has, in modified form, the old imperfect, for instance, PRES *βar-ám*, IMPERF *βar-ú* 'I carry, carried', PRES *wḗn-am*, IMPERF *wḗn* 'I see, saw', PRES *θaβr-ám*, IMPERF *θā́βr-u* 'I give, gave'. Progressive tenses are formed with the suffix *-skun* (*-sk*) and the future with the suffix *-kām* (*-kan*, *-k*) from a noun meaning 'wish' (IMPERF PROG *βar-á-skun* 'he was carrying', FUT *βar-ám-kām* 'I shall carry'; Christian Sogd. PRES PROG *γərb-ám-sk* 'I am seizing', FUT *wā́b-t-kan* 'he shall say').

There is a large range of past tense forms built on the remade Old Iranian perfect system: transitive active tenses with past stem plus the verb *δār-* 'hold, have' (e.g., *uγt-u-δā́r-t* 'he has said'), but intransitive and passive tenses with past stem plus copula (e.g., *tγat-ḗš* 'you entered', *ā́žit-əsθa* 'you were born').

The perfect is made with the perfect participle in the same way (e.g., *βast-ḗ δārand* 'bind-PERF.MASC hold.PRES-3RD.PLUR' = 'they hold/keep bound,' *βast-č-á astí* 'bind-PERF.FEM COP.3RD SING' = 'she is (now) bound'). The passive is made with the perfect participle plus 'be, become' (e.g., *βast-ḗ-t uβ-and* 'bind-PERF.MASC.PL become.PRES-3RD.PLUR' = 'they are being bound', *ánxast-ē əkt-ēm* 'goad-PERF.MASC become.PAST-COP.1ST SING' = 'I was goaded').

Among special formations, note the 'potentialis,' formed with a past participle with the ending (light) *-a* and the verbs *kun-* 'to do' (active) and *β-* 'become' (passive), by which possibility and completion of action are expressed (e.g., *nē žaγd-á kun-am* 'NEG uphold.PART do.PRES-1ST.SING' = 'I cannot uphold', *nē āpāt βō-t* 'NEG reach.PART become.PRES-3RD.SING' = 'it cannot be reached', *čānō xwart xurt kun-and* 'when food eat.PART do.IMPERF-3RD.PL' = 'when they had eaten').

There are minor dialect differences between texts written in the Sogdian, Manichean, and Nestorian scripts (e.g., Sogd. *wan-*, *kwn-* 'to do', Man., Chr. *kun-*). Christian Sogdian also has phonetically more developed forms (see also on the progressive and future above), e.g., **kərtu-δār-am* 'I did, I have done' > Buddhist Sogdian *əktu-δār-am* > Christian Sogdian *k-θār-am*.

See also: Iran: Scripts, Old Persian, Aramaic, Avestan; Iranian Languages; Old Church Slavonic.

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Solomon Islands: Language Situation

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The Solomon Islands (SI) is a former British colony bordering Papua New Guinea (PNG) in the southwest Pacific. Despite a population of only about 400 000, the country has 63 vernacular languages, many with several dialects. Seven are Papuan; the rest belong to the Oceanic branch of Austronesian.

Most of the country's languages belong to two separate branches of Oceanic: Southeast-Solomonic (SES) and Northwest-Solomonic (NWS).

SES is the largest group, with 26 languages accounting for 65.5% of the vernacular-speaking population. It is a conservative and clearly defined subgroup within Central/Eastern Oceanic, more closely related to the languages of Fiji, Polynesia, and Micronesia than to NWS. SES has two main branches, one centered on Guadalcanal and Gela, the other on Malaita and Makira.

NWS is a more complex group extending across the PNG border into Bougainville, with close links to languages farther west in PNG. Accounting for 22.5% of the population, SI's 19 NWS languages comprise three branches centered on Choiseul, Santa Isabel, and New Georgia, plus Mono-Alu, from a Bougainville-based branch.

Four further languages comprise Utupua-Vanikoro, a sister subgroup to SES within Central/Eastern Oceanic. Spoken in the remote Reefs-Santa Cruz islands, they account for 0.5% of the population. Another six languages, spoken on remote islands by 3.5% of the population, are Polynesian Outliers, the result of prehistoric back-migration from Polynesia. Finally, the Micronesian Kiribati language (Gilbertese) is spoken in several communities resettled from Kiribati in the 1950s (0.5% of the population).

The remaining seven languages divide into two possibly unrelated Papuan groups: Central Solomons and Reefs-Santa Cruz, each representing 4% of vernacular speakers.

This complex picture is the result of a complex linguistic history. At least 35 000 years ago the region was inhabited by Papuan speakers. As the easternmost limit of intervisible islands, SI probably represented the farthest reach of pre-Austronesian human settlement in the Pacific.

The first Oceanic settlement, around 1400 B.C., was rapid, probably giving rise to SES and Utupua-Vanikoro. A second, slower wave followed as Western Oceanic speakers spread into western SI, overlaying the earlier Oceanic stratum and giving rise to NWS. Over time, Oceanic languages largely displaced earlier Papuan languages. Contact between Oceanic and Papuan speakers brought lexical innovation in SES, and long periods of Oceanic/Papuan bilingualism contributed to grammatical innovation in NWS. In the Reefs-Santa Cruz islands, long coexistence between Papuan and Utupua-Vanikoro languages resulted in

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Table 1 Speaker numbers for Solomon Islands vernacular languages in 1998 (Ethnologue)

More than 18 000	1
15 000–18 000	3
10 000–15 000	7
5000–10 000	15
1000–5000	25
500–1000	4
100–500	7
Fewer than 100	1

considerable mutual influence. More recently, Polynesian back-migration brought Outlier languages to small islands away from the main group.

Most SI languages have hundreds or thousands of speakers rather than tens of thousands (see Table 1). With 40% of the population, the Malaitan group contains the seven largest, with Kwara'ae (33 600) the only language with more than 18 000 speakers.

Multilingualism is the norm and code-switching common. Intermarriage between speakers of different languages is widespread, with communication often in Solomon Islands Pijin (SIP). Many smaller languages are seriously endangered, most losing ground to a few increasingly dominant vernacular languages. At least one Papuan language and three Oceanic languages have disappeared during the last century, and one is moribund.

The largest indigenous lingua franca is Roviana, with 16 000 second-language users. Over the past century, the role of vernacular lingua francas has steadily decreased in favor of SIP. Today, over 300 000 Solomon Islanders speak SIP as a supplementary language, and 15 000 speak it as their first language, securing its creole status. SIP is mutually intelligible with Tok Pisin (TP) (PNG) and Bislama (Vanuatu), the three forming Melanesian Pidgin. SIP is closer to English than are the other dialects, lacking the French element in Bislama and the German component and extensive vernacular source of TP.

Although SIP is almost universal in intergroup communication, it is typically viewed as 'broken' English by many speakers. Unlike TP and Bislama, SIP has no official status and is not used in education beyond the earliest years. However, it is the only language known throughout the country and is the language of urban life and of an emerging urban culture. English is the official language, used in government, courts, education, and most media, although SIP does appear in some media.

See also: Austronesian Languages: Overview; Bislama; Central Solomon Languages; Language Education Policies in the Pacific; Malayo-Polynesian Languages; Papuan Languages; Pidgins and Creoles: Overview; Tok Pisin.

Language Maps (Appendix 1): Map 173.

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Somali

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Somali is a Cushitic language of the Afro-Asiatic language family spoken by approximately 10 million speakers in and around Somalia. There are five major Somali dialects (Lamberti, 1986).

Phonology

The following consonant phonemes are distinguished as shown in **Table 1**

There are five vowels: a, e, i, o, u and vowel length, in standard orthography indicated by doubling the vowels, is distinctive.

The following shows the letters used in Standard Somali orthography

IPA	ʔ	ʕ	ħ	ʃ	ɖ	x
Somali Orthography	′	c	x	sh	dh	kh

Tone appears to be distinctive in Somali both on the lexical level and on the grammatical level. It is, however, still a matter of debate whether this tonal distinction is really a tonal distinction or pitch accent (Hyman, 1981 for discussion).

Table 1 Speaker numbers for Solomon Islands vernacular languages in 1998 (Ethnologue)

More than 18 000	1
15 000–18 000	3
10 000–15 000	7
5000–10 000	15
1000–5000	25
500–1000	4
100–500	7
Fewer than 100	1

considerable mutual influence. More recently, Polynesian back-migration brought Outlier languages to small islands away from the main group.

Most SI languages have hundreds or thousands of speakers rather than tens of thousands (see **Table 1**). With 40% of the population, the Malaitan group contains the seven largest, with Kwara'ae (33 600) the only language with more than 18 000 speakers.

Multilingualism is the norm and code-switching common. Intermarriage between speakers of different languages is widespread, with communication often in Solomon Islands Pijin (SIP). Many smaller languages are seriously endangered, most losing ground to a few increasingly dominant vernacular languages. At least one Papuan language and three Oceanic languages have disappeared during the last century, and one is moribund.

The largest indigenous lingua franca is Roviana, with 16 000 second-language users. Over the past century, the role of vernacular lingua francas has steadily decreased in favor of SIP. Today, over 300 000 Solomon Islanders speak SIP as a supplementary language, and 15 000 speak it as their first language, securing its creole status. SIP is mutually intelligible with Tok Pisin (TP) (PNG) and Bislama (Vanuatu), the three forming Melanesian Pidgin. SIP is closer to English than are the other dialects, lacking the French element in Bislama and the German component and extensive vernacular source of TP.

Although SIP is almost universal in intergroup communication, it is typically viewed as 'broken' English by many speakers. Unlike TP and Bislama, SIP has no official status and is not used in education beyond the earliest years. However, it is the only language known throughout the country and is the language of urban life and of an emerging urban culture. English is the official language, used in government, courts, education, and most media, although SIP does appear in some media.

See also: Austronesian Languages: Overview; Bislama; Central Solomon Languages; Language Education Policies in the Pacific; Malayo-Polynesian Languages; Papuan Languages; Pidgins and Creoles: Overview; Tok Pisin.

Language Maps (Appendix 1): Map 173.

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Somali

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Somali is a Cushitic language of the Afro-Asiatic language family spoken by approximately 10 million speakers in and around Somalia. There are five major Somali dialects (Lamberti, 1986).

Phonology

The following consonant phonemes are distinguished as shown in Table 1

There are five vowels: a, e, i, o, u and vowel length, in standard orthography indicated by doubling the vowels, is distinctive.

The following shows the letters used in Standard Somali orthography

IPA	ʔ	ʕ	ħ	ʃ	ɖ	x
Somali Orthography	′	c	x	sh	dh	kh

Tone appears to be distinctive in Somali both on the lexical level and on the grammatical level. It is, however, still a matter of debate whether this tonal distinction is really a tonal distinction or pitch accent (Hyman, 1981 for discussion).

Table 1 Consonant phonemes

b		t d		ɖ		k g	q	
m			n					
					J			
			l					
			r					
	f		s		ʃ	x	ħʕ	h
w					y	(W)		

In terms of syllable structure, no word-initial or -final consonant clusters are allowed.

Morphology

Verbs

Somali has a rather rich system of lexical affixes by which new stems can be derived. The main derivational affixes are listed below.

Causative			
in jabay	'is broken'	*jab-i-yey*	'to break'
Stative/passive			
am jeex	'to tear'	*jeex-an'*	'to be torn'
Autobenefactive			
an wádayaa	'to drive'	*wadá-na-yaa*	'to drive for oneself'

The following examples demonstrate the use of these derivational affixes with the verb *fur* 'to open':

Wuu fúrayaa	'He is opening it.
Wuu fúrmayaa	'It's getting opened, it is opening'
Wuu furánayaa	'He is openening it for himself'

Morphosyntactic categories of the verb are tense, aspect, and person. There is also an inflectional distinction between main and subordinate predications.

The basic tense distinction is past/non-past, whereby non-past usually has a habitual meaning. Future is expressed by periphrastic construction with the auxiliary *doon* 'want'. There is furthermore an aspectual distinction between progressive and non-progressive.

	Past	Non-Past	
Non-Progressive			
Keen-ay	'brought'	*Keen-aa*	'brings'
Progressive			
Keen-ay-ay	'was bringing'	*Keen-ay-aa*	'is bringing'

The progressive form is historically derived from an auxiliary construction with the verb *hay* 'to have'.

The verb agrees with the subject in gender and number. Inflection is mainly done by suffixes (weak verbs) but there is a small group of five verbs that still have at least partly prefix conjugation (strong verbs). The following sample shows the main verbal forms for the weak and the strong verbs. It should be noted that at least in the main paradigms the forms for 1st and 3rd person masculine and the forms for 2nd and 3rd person feminine are identical.

A sample paradigm for the simple past is given for *keen* 'bring' and *yimi* 'come'

	Weak verbs 'bring'	Strong verbs 'come'
1st/3sm	*keenay*	*imid*
2nd/3sf	*keentay*	*ti-mid*
1pl	*keennay*	*nimid*
2pl	*keenteen*	*timaaddeen*
3pl	*keeneen*	*yimaaddeen*

Predicate negation is expressed by preverbal particles and verbal inflection. An invariable form is used for all persons in the past. The present form inflects regularly.

Past:	*Má keenín*	'I/you/he etc. didn't bring'
	má iman	'I/you/he/etc. didn't come'
Present:	*má keenó*	'I don't bring'
	má imaaddó	'I don't come'
	Má keentó	'she doesn't bring'
	má timaaddó	'she doesn't come'

Nouns

Nominal morphosyntactic categories are case, number, and gender. There is a twofold gender distinction based on masculine and feminine. Gender is marked by tonal distinction and by agreement on determiners like possessives, demonstratives, articles, and the verb. The masculine marker is basically *k* the feminine marker *t*. For a discussion of the status of these, see Lecarme, 2002.

Nin-ka	'the man'	*naag-ta*	'the woman'
inan-kayga	'my son	*gacan-tayga*	'my arm'

The basic distinction with number is singular/plural. Plural is marked by several means depending on the length and the gender of the noun. The following examples demonstrate the diverse plural forms.

	Singular	Plural
Woman	*náag*	*naago*
Road	*darìiq*	*dariiqyo*
Shoulderblade	*gárab*	*garbo*
Man	*nín*	*niman*
Bull	*díbi*	*dibí*
Story	*shéeko*	*sheekóoyin*
Father	*áabbe*	*aabbayaal*

There are mainly two cases: subject case and absolutive. The absolutive is the base form and the subject case is marked by a tonal distinction and optionally by the segmental elements *-i* with indefinite and *ku/tu*

with definite nouns. This subject marking occurs at the end of the entire noun phrase:

Buug-ga	*cusub*	*ee*	*wiil-kan-i*
Book-DET	new	COORD	boy-DEM-SUBJ
wux-uu	*yaala*	*miis-ka*	*guud-kiisa*
wax-3sm	located	table-DET	top-poss3sm

'The new book of this boy is lying on the table'

Possession is marked on the noun by pronominal suffixes: *aabe-hiis-a* 'his father'. If the possessor is expressed by a noun then the two nouns are juxtaposed and the order is possessee possessor: *faras-ka nin-ka* (horse man) 'the horse of the man'. Alienability is not expressed in Somali, with the exception that kin relationships cannot be simply juxtaposed but use an inverted construction where the possessor is additionally expressed: *ínanka aabi-hiis* 'the father of the boy' (lit. the boy his father). This construction is optional with other possessive relations.

Numerals are nouns and within the noun phrase they precede the noun and actually function as the head of the complex construction.

Laba nín	*sáddex nín*	*áfar nín*
'two men'	'three men'	'four men'

Adjectives

Qualitative concepts are expressed by elements whose status is not entirely clear (For a discussion, see the contributions in Bechhaus-Gerst and Serzisko (eds.), 1988). In predicative usage these elements occur with the copula:

Buug-gan	*waa*	*wanaagsán*	*yahay.*
Book-DEM	DM	good	COP:3sm

'This book is good.'

In attributive usage, adjectives may agree with their head noun in number; agreement is indicated by reduplication of the first syllable:

Guri cusub	'a new house'
guriyo cuscusub	'new houses'

The comparative is expressed by means of verbal case particles:

Nín-kanu	*nín-káas*	*wuu*	*ká*	*wèyn*	*yahay*
Man-this	man-that	DM	than(ABL)	big	COP

That man is bigger than that man.

The superlative is formed with the preverbal particle cluster *ugú*:

Nínkanu	*wuu*	*ugú*	*dhèer*	*yahay*
Man-this	DM	most	tall	COP

'This man is the tallest'

Syntax

The structure of a simple sentence can roughly be described as consisting of a verb complex, which contains all the necessary information, and noun phrases, which stand in a kind of appositive relation to this verbal complex. The structure of the verbal complex is as follows:

waa	Impersonal	object pronoun	case marker
directional	verb stem		

waa is a declarative marker that stands in complementary distribution with the negative marker. The declarative marker in main clauses, which has also been described as a verbal focus marker (see below), is the left-most element in the verbal complex. The next position may be filled by an impersonal marker. Object pronouns for 1st and 2nd person follow. The 3rd person object is always zero. These pronouns combine with the following case markers. Four cases are distinguished: benefactive /u/, locative/instrumental /ku/, ablative /ka/ and comitative /la/. The following shows the combinations of object pronouns and case marker for the singular pronouns:

	Benefactive	Loc/Instr	Ablative	Comitative
1st sing.	*ii*	*igu*	*iga*	*ila*
2nd sing.	*kuu*	*kugu*	*kaa*	*kula*

Directional particles indicate whether the action is directed toward the speaker /soo/ or away from speaker /sii/, as in the following examples.

w-aan	*ku*	*ark-ay*	'I saw you'
DM-1sg	2sgOBJ	see-1sg	
w-aan	*ku-gu*	*ark-ay*	'I saw you in it'
DM-1sg	2sgOBJ-LOC	see-1sg	
w-uu	*ku soo*	*noqd-ay*	'He came back to it.'
DM-3sm	LOC back	came-3sg	

The negation particle also occurs within the verbal complex:

I-i-ma	*soo*	*iibinin*
1sgOBJ-DAT-NEG	DIR	bought-NEG

'He didn't buy them for me.'

Sentence Structure

The most striking feature of Somali is the use of focus particle. Noun focus is expressed by the particles *ayaa/baa*, which are alternants whose use is determined by regional and stylistic factors, following the noun in focus. The particle *waa*, which has been described as a declarative marker above, is by some authors called verbal focus marker. Nominal

and verbal focus markers stand in complementary distribution, i.e., there can only be one focus marker in a main clause. The form of the focus marker is as a rule dependent on whether the noun in focus is the subject of the sentence or not. If the subject is in focus the marker occurs in its simple form and the predicate occurs in the restricted form. This indicates that the source of the focus construction may be a relative clause. If a non-subject is focused the subject pronoun combines with the focus marker, which yields the following paradigm of forms:

	Singular	Plural
1st sing	*ay-aan*	*ay-aynu/ay-aanu*
2nd	*ay-aad*	*ay-aad*
3rd masc.	*ay-uu*	*ay-ay*
3rd fem	*ay-ay*	

There is, furthermore, a presentative marker *waxa*, which also attracts the subject pronoun. This construction is used to highlight a nominal participant in a kind of clefting construction. The highlighted noun phrase occurs after the verbal complex.

Shaah b-aan doonayaa. 'I want some tea'
waxaan doonayaa shaah. 'What I want is tea'

Word Order

The unmarked word order in a main clause is SOV, the order of the nominal participants is relatively free and interacts with the focus marking system.

Nin-kii libaax-ii ayuu dilay 'The man killed the lion.'
Man-DET lion-DET FOC-3sg kill-3sg
Libaax-ii ninkii ayaa dilay 'The lion was killed by the man'
Nin-kii ayaa libaax-ii dilay 'It was the man who killed the lion'

Since there is an obligatory syntactic and morphological marking of aspects of discourse structure, Somali can be considered to be an example of a discourse configurational language (Svolacchia *et al.*, 1995).

Questions

Yes-No questions are formed by replacing the declarative marker *waa* by the question particle *ma*:

Cali wuu yimid. 'Ali came'
Cali ma yimid? 'Did Ali come?'

If the sentence contains a nominal focus the question particle is placed before the focused noun phrase:

Cali baa keenay. 'ALI brought it.'
Ma Cali baa keenay. 'Did ALI bring it?'

WH-questions always involve nominal focus and the questioned noun phrase stands with the interrogative article *kee/tee*:

Ninkee ayaa yimi? 'Which man came?'
Xaggee buu tegay? 'Which place did he go? = Where'
Sidee baad u sameysey? 'In which manner did you do it? = How'
Intee baad joogaysaa? 'What amount did you stay? = How long'

Complex Sentences

Complex sentences can be coordinated or subordinated. Clauses may be coordinated by the particle *oo* as in:

Cali hílibkíi ayùu keenay oo wàanu cunay
'Ali brought the meat and we ate it.'

Or they may be conjoined by attaching an element *-na* to the first element of the second clause:

Cali w-uu I arkay w-ùu-na
C. FOC-3s 1sgOBJ see-3sg FOC-3sm-COORD
i-lá had lay
1sgOBJ-COM speak-3sm
'Ali saw me and he spoke to me'

In subordinated clauses, there is no classifier or focus particle and the verb occurs in its subordinated form.

There is a formal distinction between restrictive and nonrestrictive relative clauses. The former are simply juxtaposed to the noun they qualify while the latter are coordinated by *oo*:

Nínkíi Soomáaliya ká yimí
'The man who came from Somalia . . .'
Nínkíi oo Soomáaliya ká yimí
'The man, who came from Somalia, . . .'

Complement clauses are introduced by the particle *in*:

In-uu imanayo ay-aan ogahay
Comp-3sm come-SUB FOC-1sg know-1sg
'I know that he is coming'

Adverbial clauses expressing temporal, local, and causal circumstances are formed with relative clauses to a noun like *marka* 'time'.

Markii aan casheynayay
Time-DET 1sg dining-PROG-PAST-1s
saaxiibkay baa soo galay
friend-POSS1sg FOC DIR come:in
'When I was dining my friend came in.'

See also: Cushitic Languages; Somalia: Language Situation.

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Somalia: Language Situation

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Of the many countries of Africa, Somalia, including the Republic of Somaliland in the north (which is not officially recognized by the international community), is unusual in that there is essentially only one language spoken throughout the whole country, namely Somali (*see* **Somali**). Somali speakers also live in the countries of Djibouti, Ethiopia, and Kenya. Some minority languages are spoken in Somalia by small numbers of people, but these have never had any official status and speakers of these languages have been persecuted during the destructive civil conflicts that have plagued the country over the last decade and a half. All speakers of minority languages also have some knowledge of Somali, whether Standard Somali or the local dialect.

Oromo is spoken in two regions: the Gedo region in the southwest and the lower Jubba region in the south. Another Cushitic language, Boni (or Aweer), more closely related to Somali, is spoken by a small number of people in the far south as well as in neighboring Kenya, and is in danger of becoming extinct in the not-too-distant future. Three Bantu languages are also spoken in Somalia: Mushungulu, spoken along the banks of the Jubba near the town of Jamaame, Ki-Bajuni, spoken in Kismaayo and along the nearby coast, and Chi-Mwini, spoken in Baraawe (Brava) and along the neighboring coastland. To what extent these languages are still represented in these areas is not known given the displacement of persecuted populations in Somalia and the small numbers of speakers.

Somali itself is made up of a number of dialect groups. Af Maxaad Tidhi, often referred to in English as the northern dialect group, is the most widely spoken by the predominantly pastoralist nomadic people of the northern, western, and southwestern regions of the Somali-speaking territories. In the region of the Jubba and Shabeelle rivers, where the people are mostly sedentary agriculturalists, the dialect groups May and Digil are spoken. The Banaadir group of dialects is spoken eastwards of the Shabeelle river to the coast and the Ashraaf dialects are spoken in Mogadishu and in the region around the town of Marka.

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Standard Somali, based on the northern dialect group, is used as a lingua franca throughout the Somali-speaking territories and is the language of broadcast and written media. This dialect group became a lingua franca prior to the introduction of Somali as the national language of the country (see below) since it was spoken by the nomadic population who were more widespread throughout the territories and whose oral poetry also became more widely known. Its use in radio, particularly by the Somali Section of the BBC World Service, means that it is understood by all Somalis.

Once the dialect was used as a national language, a lot of work was put into the development of words for concepts that had not previously been part of Somali life. The extension of the meaning of indigenous words and making compound words was one way in which this was achieved as, for example, in the use of *dayax gacmeed* for 'satellite,' where the literal meaning is 'hand-made moon.' Borrowings were also made from Arabic, which was already a source of loanwords, particularly in the spheres of religion (the Somalis are Muslims) and in trade, given the proximity of the Arabic speaking world to the Horn of Africa. Although there were official committees set up by the government in the 1970s to develop this new Somali terminology, the process was one that had already been started by broadcasters, particularly the Somalis who worked for the BBC, who had coined a large number of words prior to the development of an official script.

It was only in 1972 that Somali gained an official script, using the Latin alphabet chosen by the military regime of the time. This version, which was invented by Shire Jaamac Axmed, was based on other previous uses of the Latin alphabet, particularly that proposed by B. W. Andrzejewski and Muuse Galaal. Prior to that time Somali had been little written. In precolonial times written communication had been through the medium of Arabic or, very occasionally, in the idiosyncratic use of the Arabic alphabet for Somali, of which very few examples are known. During the colonial era the European languages, specifically English and Italian, were used for writing, and some indigenous scripts were invented at this time to write Somali. Of these indigenous writing systems the Osmaniya became the most widely used, although still limited.

Following independence the issue of choosing a national script was protracted due to the debate over which writing system to choose: Arabic, primarily for religious reasons; an indigenous script because it would be a genuinely Somali option; or the Latin script for predominantly practical reasons relating to typing and printing. The choice of the Latin script of Shire Jaamac Axmed proved to be fortuitous since Somali is now written without diacritics and can therefore be used very easily on the Internet where there are a great number of websites in the language. Once the Latin alphabet had been introduced the Somali language was made the official language of the country and ambitious literacy campaigns were started, initially in urban areas and subsequently in the countryside. The language was then used in education up to university level and in all administrative contexts.

Despite these efforts at developing literacy, the war with Ethiopia in the late 1970s, the developing civil conflict with the dictatorial regime in the 1980s, and continued unrest in the 1990s, with a total lack of central government everywhere except Somaliland, have all contributed to one of the lowest literacy rates in the world at 17.1% adult literacy (*Somalia Human Development Report 2001,* published by the UN Development Programme, p. 46).

See also: Language Development: Overview; Language Planning and Policy: Models; Somali.

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Sommerfelt, Alf (1892–1965)

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Alf Sommerfelt was born in Trondheim, Norway. He studied Nordic and comparative Indo-European philology and Celtic languages in Oslo. In 1914, he went to Ireland. He spent one year there before going to France, where he stayed for seven years, mainly studying Celtic languages and general linguistics. From 1921 onward, he published several important contributions to Celtic dialectology and comparative Celtic philology.

In 1922, he returned to Oslo, and in 1926 he became lecturer and in 1931 professor of general linguistics, one of the first chairs in general linguistics in the world. Beginning in 1923, Sommerfelt was engaged in a large Norwegian lexicographic project (*Norsk riksmålsordbok*; Knudsen and Sommerfelt, 1937–1957). His interest in linguistics, which was inspired by de Saussure and Meillet, made him gradually turn away from Celtic studies toward general linguistics, where he was especially occupied with the social dimension of language. A milestone in his production is *La langue et la société* (1938), in which he not quite successfully tries to analyze a 'primitive' language in relation to the social and economic structure of the society where it is spoken. In the 1930s and the 1940s Sommerfelt published several important studies of the relationship between language and society that made him a pioneer of what later was labeled sociolinguistics (Sommerfelt, 1962).

In the 1930s Sommerfelt gathered the main Norwegian linguists (Bergsland, Borgstrøm, Morgenstierne, Stang, Vogt, etc.) once a month for seminars and dinner in his home. These meetings were of great importance for creating a good linguistic research milieu in Oslo, and due to Sommerfelt's international network the Norwegian linguists got first-hand knowledge of and contact with leading international linguists such as Louis Hjelmslev and Roman Jakobson.

During World War II, Sommerfelt worked at the Norwegian administration in London. After his return home he neglected to some extent his teaching and linguistic research. Instead he devoted most of his time to administrative duties at the University of Oslo and work related to UNESCO and Comité International Permanent des Linguistes where he for a long time was secretary general.

Sommerfelt was an undogmatic and theoretically diverse linguist. Through his seminars, he educated a whole generation of Norwegian linguists. In his own works, he combined structuralism with a sociolinguistic approach to language studies, being in that respect a pioneer.

See also: Bergsland, Knut (b. 1914); Borgstrøm, Carl Hjalmar (1909–1986); Hjelmslev, Louis Trolle (1899–1965); Jakobson, Roman (1896–1982); Meillit, Antoine (Paul Jules) (1866–1936); Morgenstierne, George (1892–1978); Saussure, Ferdinand (-Mongin) de (1857–1913); Stang, Christian S. (b. 1900); Vogt, Hans (1903–1986).

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Song Translation

P Low, University of Canterbury, Christchurch, New Zealand

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What characterizes song as a genre is the combination of words and music, a combination that is fully realized in vocal performance. Although the most typical songs have short texts and relatively simple melodies, the genre is very diverse: a song may be (for example) a long narrative ballad, a sacred hymn, a complex aria from opera, a satirical jazz-song, or a repetitive chant for dancing.

From the standpoint of translating, two notable features about this genre are (a) the variety of specific purposes for which a translation might be sought, and (b) the very tight constraints imposed by one of these purposes, namely when the translation must itself be singable.

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From the standpoint of translating, two notable features about this genre are (a) the variety of specific purposes for which a translation might be sought, and (b) the very tight constraints imposed by one of these purposes, namely when the translation must itself be singable.

Songs are often translated, partly because the ability of their tunes to cross linguistic frontiers prompts curiosity about their words. Thus translations exist for thousands of songs and hymns, and hundreds of extended entertainments based on song (operas and musicals). Yet few of the translators have said very much about their objectives and strategies, and little scholarly attention has been given to translating this genre.

Certain problems of song translation derive from the nature of the texts, for example, the use of metaphor, rhythm, rhyme, and raw emotional utterance. These features are encountered also in poetry translation (in fact, many song-texts began life as poems, being set to music later, whether or not that was the poet's intention). Other problems, however, relate to the essence of song as a performance genre. These problems are greatest when the translated text (TT) is itself meant to be sung, in which case numerous requirements must be met, as will be explained shortly. In many cases, however, notably in the classical music tradition, a song will be performed in a language unfamiliar to the audience, and so a TT is needed not for singing but for speaking, reading, or studying. Because these requirements are different, there are different types of song translating, according to the function that the translation is intended for.

Here are the five main functions that a song translation may have:

1. To be sung in the target language
2. To be spoken as an introduction to the original song
3. To be read in a recital program or a CD insert
4. To be studied by the singer preparing to perform the song in the source language
5. To be displayed as surtitles while the song or opera is being performed, or as subtitles on a videoed performance.

The present article will focus first on (1) before surveying the other possible functions. Comparison of these functions highlights the general truth that all translating is *ad hoc* and shows that a TT devised with one purpose in mind is unlikely to be ideal for another purpose.

Singable Translations

"It is impossible, of course, to translate any song verbatim: it simply won't fit the music in the other language," says Gene Lees, an expert on jazz song. He adds: "What one has to do is to understand the song's essential spirit and reconstruct it as closely as possible in the second language" (1998: 222).

The devising of singable texts is a particular challenge to a translator: one is subject to huge, multiple constraints imposed by the pre-existing music, which has its own rhythms, note-values, and stresses that one cannot simply ignore. Besides, the text often rhymes, and so rhyme is often desirable in this kind of song-translating (though not in others). Furthermore, when translating into English, one must seek to reduce the number of short vowel-sounds – unsuited to long notes – and the clustering of consonants, which can create tongue-twisters. Ideally, the TT must give the impression that the music has been fitted to it, even though it was actually composed to fit the original. Various translators have likened this task to solving a crossword puzzle – which suggests, among other things, the challenge of difficulty. A recent paper compares it rather to a pentathlon in which the translator is judged on five 'events': singability, sense, naturalness, rhythm, and rhyme (Low, 2003b).

Yet such translating is often attempted. One well-documented case is the songs of Georges Brassens, a popular French wordsmith whose rich, amusing, provocative texts might seem too daunting to tackle. They are not, as is shown in the collection *Traduire et interpréter Georges Brassens*, where various authors discuss making singable translations into English, German, Swedish, Czech, Dutch, Italian, etc. For example, a fine practical article by Andrew Kelly gives this advice to the translator: "(1) Respect the rhythms; (2) Find and respect the meaning; (3) Respect the style; (4) Respect the rhymes; (5) Respect the sound; (6) Respect your choice of intended listeners; and (7) Respect the original" (1992–1993: 92).

Because of the constraints imposed by the pre-existing music, song translators resort to numerous methods in order to overcome the difficulties they encounter. These include not only things like paraphrase, transposition, and modulation – which are fairly standard methods – but also devices like those mentioned by translators of Brassens: replacement metaphors, compensation in place, calque, omission, explicitation, cultural adaptation, superordinates, stylistic equivalence, the suppression of difficult verses, the use of added words to solve rhythmical problems, and the replacement of rhyme with assonance. The best song-translators use a toolbox plus a 'box of tricks'!

The results are seldom close to that semantic equivalence that receives high priority in most prose translation. But at best they can creatively deliver what some theorists call equivalent effect – or what Lees calls "the song's essential spirit." This phrase sums up the song-translator's objective. It is not well served by pedantic rules such as 'Never ever alter the rhythm' or 'Retain

the identical number of rhymes.' It is better served by taking the whole song as the 'unit to be translated' and by creative use of the methods just mentioned. Fortunately, the musical dimension of the source is being retained in performance, so that the TT will be transmitted in conjunction with the same non-verbal code that accompanied the source text (ST).

Singable translations are used much less in classical music than in popular music. Two reasons for this difference are the strong claim of the ST and the inadequacy of many available translations. One singer who has criticized translations like these ones is Arthur Graham, who stresses the point that: "The singer needs words that may be sung with sincerity" (Graham, 1989: 35). His emphasis on singability parallels a notion that is widely accepted in the translating of drama, that 'effectiveness on stage' is a practical necessity and must receive priority.

One kind of song-translating is itself a kind of drama-translating: the making of singable translations for operas or other works of musical theater. The bibliography mentions several articles that explore this complicated subject – Apter (1985), Gorlée (1997), Herman and Apter (1991), and Irwin (1996). Apter and Herman, writing as opera-translators, argue strongly that a very flexible translating strategy is essential for practical success on stage.

A Spoken Introduction

Sometimes a singer or presenter reads aloud a TT before the song is performed in the foreign language. This reading may be a full version of a short text, or a précis of a longer one. Some radio stations broadcasting classical songs use brief introductions giving the gist of the verbal content. Such a text has to communicate quickly and directly (re-reading is not possible). Good examples tend to be informal, brief, and clear.

A Program for Audience Members

Frequently the printed program for a concert gives translations of the foreign texts. The expectation is that audience members may consult this program before or during the performance. Sometimes recital programs print the ST also, in a parallel or 'facing-page' format, for the sake of those who have some familiarity with the source language.

Given the context, there is a good case here for a clear communicative translation, understandable at a glance. One translation expert advocates "sober, close, 'plain prose,' parallel, line by line translations" (Newmark, 1998: 21).

Similarly, recordings of classical vocal music almost always print translations, with or without the original words. This information enables the listener to read a TT while listening to the recording, or else to study it at another time, comparing it with the original. Some CD inserts print parallel texts in two languages or more. This context may be viewed as slightly different from the recital room, and as permitting a more literary TT (Low, 2003a).

A Performers' Crib

Editions of vocal music commonly print translations for the singer to use as a crib while rehearsing the song. These TTs may appear near the start of the volume, at the start of each song, or in the end papers. Often such translations are presented in parallel format; sometimes the layout is interlinear.

Such translations always present the text line by line, aiming thus to enlighten the singer about the meaning and function of every word. The objective is study, not easy reading – since the singer wants to know deeper meanings that will shape the artistic interpretation.

One of the best-selling collections of song translations focuses on this function. *Lieder line by line, and word for word* by Lois Phillips adopts a double strategy of providing both a pedantically close version (in interlinear format) and a clear prose version intended "to disentangle the often unintelligible series of words resulting from a literal word-for-word translation" (1979: vi). The former version is designed to help people to engage with the German words and word order; the latter to give a better sense of the whole poem.

Such translations made for study purposes may (and sometimes do) use informative footnotes to explain complexities and allusions in the source text. Providing such information is an appropriate role for the translator as cultural go-between.

Surtitles at a Performance

A surtitle is a caption displayed above the stage during a live performance, giving a written translation of the audible words – though not all of them – that are being sung at any given moment. Similar to the subtitles that are a standard means of translating films, surtitles are now common in the presentation of operas. Opera-goers have become accustomed to glancing up at the titles periodically, rather like drivers checking the rear-vision mirror – they have incorporated this habit into the set of conventions that go with the genre. In addition, surtitles are

sometimes used for song recitals and other musical performances.

Translating for the purpose of surtitles has many similarities to film subtitling. There are some differences, however, that are explored in two recent articles (Sario and Oksanen, 1996; Low, 2002). The main difference is that, if anything, one should make surtitles even less obtrusive than film subtitles, so that the words draw less attention away from the musical and visual aspects of the performance. Good surtitles will generally be simple, clear, and economical.

Particular constraints are imposed by the size of the screens displaying the surtitles. Legibility requires large lettering, with few characters per line. These constraints of size, though irksome, are not inimical to good surtitling. Once one grasps that the titles need not render every word, then one's objective becomes an attainable one: to provide visible 'sight-bites' that help the audience to understand. Unimportant adjectives are frequently cut; long words are avoided if possible; repetitions are largely ignored. Often one boils down long sentences into a condensed gist translation.

The actual translating is best done not from the bare words but from the musical score. Although a surtitler does not need advanced skills in score-reading, it is important to see the ways in which the composer has set the words, and particularly the tempo. Words that are sung rapidly need to be translated very economically.

Surtitling is therefore one of various forms of song translation where considerations like respect for the semantic and stylistic integrity of the ST, often important in translation, may be overruled.

See also: Functional Approaches to Translation: Skopos Theory; Musical Semiotics; Performance in Culture; Poetry: Stylistic Aspects; Rhyme; Subtitling; Translation and Genre: Drama; Translation and Genre: Literary; Translation: Pragmatics; Translational Stylistics.

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Songhay Languages

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The name Songai (also Songhay, Songhai, Sonrai) refers to a range of lects spoken mainly along the Niger River in Mali and Niger, as well as in Burkina Faso, and centering around major towns in the area. There are three major varieties: Western Songai (which includes Koyra Chiini, the town language of Timbuktu, and Djenne Chiini, spoken in Djenné), Central Songai (which includes Humburi Senni, with Hombori as the major city, and Kaado), and Eastern Songai (with Koyraboro Senni as a major lect) with Gao as a major urban centre. The Gao variety has been designated as the standard for Songai in Mali. The total number of speakers in these countries is estimated to be at least 1.1 million. Zarma (Dyerma), which is spoken by some 2 million people mainly in Niger and Nigeria, and Dendi, with around 72 000 speakers mainly in Niger and Benin, are closely related, but constitute separate languages. In addition, there are varieties in Mali and Algeria

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whose grammatical structure is similar to Songai, but whose lexical structure is rather deviant. Their speakers, who are culturally Tuareg, are known under a variety of names, e.g., as Tasawaq or Tadaksahak in Mali, and Korandjé in Algeria.

According to Greenberg (1963), Songai constitutes one of the six primary branches of the Nilo-Saharan phylum. Nicolaï (1990) has argued that Songai is nongenetic in origin, with a Tuareg (Berber) variety playing a major lexifying role. The documentation of the Songai cluster has improved dramatically as a result of a series of monographs by Nicolaï (1981) and Heath (1998, 1999a, 1999b).

The spreading of the Songai lects probably is related to the expansion of the Song(h)ai Empire from the 9th century until the late Middle Ages. Areal contact with neighboring languages belonging to different language families, such as Mande, Kwa, Gur (all Niger-Congo), and Berber (Afroasiatic) appears to have resulted in considerable typological variation within this cluster. Thus, whereas Central Songai varieties such as Humburi Senni or Kaado are tonal, western varieties such as Koyra Chiini appear to be nontonal. Also, in Western Songai varieties, SVO order appears to be common, with markers for mood, aspect, and negation occurring between the subject and the verb, and with complements other than the object following the verb. However, the object precedes the verb in Central and Eastern Songai varieties, which also use a transitive marker before the object noun phrase. All Songai lects appear to use postpositions. Nominal modifiers tend to follow the head noun, but possessors precede the latter. The use of a one-term deictic marker appears to be a more common areal phenomenon, also attested in neighboring Mande languages. Affixational morphology is somewhat restricted (derivational morphology in the verb, for example, appears to involve mainly causative and centripetal marking), but cliticization of morphemes is highly common in Songai, frequently resulting in a mismatch between phonological and grammatical words. Logophoric marking, as a reference tracking mechanism and evidential hedging strategy, is also used across sentence boundaries; compare Heath (1999a: 322–328).

See also: Burkina Faso: Language Situation; Mali: Language Situation; Niger: Language Situation; Nilo-Saharan Languages.

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Edward Adolf Sonnenschein was born in London, England, on November 20, 1851. He studied at London and Oxford Universities, graduating in classics in 1875. From 1877 to 1881 he worked in Glasgow, and in 1881 he was appointed head of Kelvinside Academy, but he resigned within the year. In 1883 he was made Professor of Latin and Greek at Mason College, Birmingham. Together with J. P. Postgate, he founded the Classical Association – in the defence of classics – in 1903. Sonnenschein died on September 2, 1929.

Sonnenschein's main linguistic work was done in Latin philology, grammatical terminology, and comparative Indo-European syntax, but he also engaged in the political debates of his day. His work on Latin covered editions of Plautus, studies of the subjunctive, and Latin metre. His terminological work falls into two main periods – the first from about 1886 to 1899, the second from about 1909 to the 1920s. *The soul of grammar*, his contribution to comparative Indo-European syntax, appeared in 1927.

In his brush with schoolteaching, Sonnenschein was struck by the wide variation in grammatical terminology: he asked "Why should verbal forms . . . be called by as many different names as there are languages in which they are studied?" (*Journal of Education*,

whose grammatical structure is similar to Songai, but whose lexical structure is rather deviant. Their speakers, who are culturally Tuareg, are known under a variety of names, e.g., as Tasawaq or Tadaksahak in Mali, and Korandjé in Algeria.

According to Greenberg (1963), Songai constitutes one of the six primary branches of the Nilo-Saharan phylum. Nicolaï (1990) has argued that Songai is nongenetic in origin, with a Tuareg (Berber) variety playing a major lexifying role. The documentation of the Songai cluster has improved dramatically as a result of a series of monographs by Nicolaï (1981) and Heath (1998, 1999a, 1999b).

The spreading of the Songai lects probably is related to the expansion of the Song(h)ai Empire from the 9th century until the late Middle Ages. Areal contact with neighboring languages belonging to different language families, such as Mande, Kwa, Gur (all Niger-Congo), and Berber (Afroasiatic) appears to have resulted in considerable typological variation within this cluster. Thus, whereas Central Songai varieties such as Humburi Senni or Kaado are tonal, western varieties such as Koyra Chiini appear to be nontonal. Also, in Western Songai varieties, SVO order appears to be common, with markers for mood, aspect, and negation occurring between the subject and the verb, and with complements other than the object following the verb. However, the object precedes the verb in Central and Eastern Songai varieties, which also use a transitive marker before the object noun phrase. All Songai lects appear to use postpositions. Nominal modifiers tend to follow the head noun, but possessors precede the latter. The use of a one-term deictic marker appears to be a more common areal phenomenon, also attested in neighboring Mande languages. Affixational morphology is somewhat restricted (derivational morphology in the verb, for example, appears to involve mainly causative and centripetal marking), but cliticization of morphemes is highly common in Songai, frequently resulting in a mismatch between phonological and grammatical words. Logophoric marking, as a reference tracking mechanism and evidential hedging strategy, is also used across sentence boundaries; compare Heath (1999a: 322–328).

See also: Burkina Faso: Language Situation; Mali: Language Situation; Niger: Language Situation; Nilo-Saharan Languages.

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Sonnenschein, Edward Adolf (1851–1929)

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Edward Adolf Sonnenschein was born in London, England, on November 20, 1851. He studied at London and Oxford Universities, graduating in classics in 1875. From 1877 to 1881 he worked in Glasgow, and in 1881 he was appointed head of Kelvinside Academy, but he resigned within the year. In 1883 he was made Professor of Latin and Greek at Mason College, Birmingham. Together with J. P. Postgate, he founded the Classical Association – in the defence of classics – in 1903. Sonnenschein died on September 2, 1929.

Sonnenschein's main linguistic work was done in Latin philology, grammatical terminology, and comparative Indo-European syntax, but he also engaged in the political debates of his day. His work on Latin covered editions of Plautus, studies of the subjunctive, and Latin metre. His terminological work falls into two main periods – the first from about 1886 to 1899, the second from about 1909 to the 1920s. *The soul of grammar*, his contribution to comparative Indo-European syntax, appeared in 1927.

In his brush with schoolteaching, Sonnenschein was struck by the wide variation in grammatical terminology: he asked "Why should verbal forms . . . be called by as many different names as there are languages in which they are studied?" (*Journal of Education*,

1886: 169). Why couldn't the terminology of grammar be simplified and unified? Out of this simple idea Sonnenschein developed the 'Parallel Grammar Series' (PGS), a set of textbooks written to a scheme not unlike Ratke's, ensuring uniformity of terminology and classification and of scope, size, and type. When the series was officially complete (more volumes were added later) it comprised over 25 volumes covering eight languages.

After the turn of the century, Sonnenschein conceived the idea of forming a Joint Committee on Grammatical Terminology (JCGT), with representatives from eight professional associations, to further the cause. The JCGT reported in 1911 and converted itself into a standing committee to monitor the reforms.

Despite opposition (e.g., Arnold, 1910) the JCGT co-operated with like-minded colleagues in other countries, notably France and the United States (Hale, 1913). As with the PGS, Sonnenschein published grammars of his own to promote the new terminology. By the 1920s Sonnenschein had extended his scheme to include six further 'oriental' Indo-European languages (Oriental Advisory Committee, 1920).

Sonnenschein's last major publication, *The soul of grammar*, pointedly borrowed its title from Jespersen (1924: 344–347). It consists of two major parts, one devoted to 'case and case-phrases,' the other to 'moods and tenses.' Here, Sonnenschein argued that "There is . . . such a thing as a common Indo-European syntax" (Sonnenschein, 1927: 115) and tried to make a case for cases in English (six in all). Jespersen, like Sweet, would have said that English has no case in any conventional sense (cf. Hudson, 1995).

It is a mark of Sonnenschein's success that many elementary textbooks at the end of the 20th century had still not reduced the number of cases they postulate to fewer than four.

See also: Case Grammar; Jespersen, Otto (1860–1943); Linguistic Terminology; Proto-Indo–European Syntax; Ratke, Wolfgang (1571–1635); Sweet, Henry (1845–1912).

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Sonoron Languages *See:* Uto-Aztecan Languages.

Sorbian

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Sorbian is one of three branches of the West Slavic languages comprising Lower Sorbian and Upper Sorbian (the other two branches being the Czech-Slovak and the Lechitic). 'Sorbian' thus serves as a convenient cover term for one or both of the Sorbian literary languages and their respective dialects. The Lower Sorbian (hereafter, LSo) and the Upper Sorbian (USo) literary languages constitute supradialectal norms generally used in writing and public or mass communication (print media, radio, and television); in informal settings Sorbs (both Lower and Upper) tend to speak the dialect characteristic of their native village, with occasional admixtures of literary elements and German vocabulary. Sorbian as defined here is spoken today as a native language entirely within the borders of the Federal Republic of Germany (from 1949 to 1990, within the borders of the former German Democratic Republic); more precisely, it is spoken completely within the eastern German region of Lusatia (LSo *Łužyca,* USo *Łužica,* German *die Lausitz*), situated partly in the German state of Saxony (*Freistaat Sachsen*) and partly in the state of Brandenburg (see **Figure 1**). The Brandenburg portion includes what is traditionally known as *Lower Lusatia* (German *Niederlausitz*), while the Saxon portion includes most of *Upper Lusatia* (German *Oberlausitz*). These geographic designations are sometimes applied to the languages spoken there, whence the terms 'Lower Lusatian' and 'Upper Lusatian' in lieu of 'Lower Sorbian' and 'Upper Sorbian,' respectively. The Sorbian-language area, like the Sorbian speech community itself, has shrunk considerably in the past 100–150 years, so that it now extends at most only about 90 kilometers north-south and some 55 kilometers from west to east inside Lusatia proper. The Lower Sorbs call themselves *Serby* in their own language but reveal a preference for the appellation *Wenden* 'Wends' in German; the Upper Sorbs call themselves *Serbja* (*Sorben* [or, more specifically, *Obersorben*] in German). Descendants of Sorbs (now all English-speaking) who settled in the American state of Texas (some 60 kilometers east of the state's capital city, Austin) in 1854 describe their heritage as 'Wendish.' As far as anyone has determined, all Lusatian Sorbs – to the extent that they still speak some form of Sorbian – are bilingual in Sorbian and German and have been so since the early decades of the 20th century. Partly as a result of this universal bilingualism, ethnic Sorbs have tended increasingly to become unilingual German-speakers.

Estimates of the current number of native Sorbian speakers vary. An ethnosociological poll conducted by the Institute of Sorbian Ethnography (*Institut za serbski ludospyt*) in 1987 suggested 67 000 as the maximum number of Sorbian speakers in both Lower and Upper Lusatia (Faska, 1998: 20). A more recent compendium of USo grammar puts the number of USo speakers at no more than 53 600 (Schaarschmidt, 2002). Assuming that such estimates are accurate, one is led to surmise a maximum of 13 400 speakers of LSo (67 000 minus 53 600), a figure that is not substantially at odds with the estimate of 16 000 LSo speakers cited by Šatava on the basis of data also collected in 1987 (Šatava, 1994: 198). The overwhelming majority of today's native LSo speakers are more than 60 years old; consequently, the LSo dialects are expected to be extinct within the next 15–25 years (Jodlbauer *et al.*, 2001: 204). Schaarschmidt reckons that USo should be extinct by the year 2070; however, given current efforts at language maintenance, the USo literary language and at least some of its dialects (notably the so-called 'Kamjenc' [German: Kamenz] dialect of the approximately 15 000 Catholic Sorbs northwest of Budyšin [Bautzen]) stand a good chance of surviving well beyond the year 2100 (Schaarschmidt, 2002: 5–6).

The center of LSo literary and cultural activity (including radio and television broadcasting) is the city of Chośebuz (Cottbus); the center of USo literary and cultural activity is the city of Budyšin (Bautzen). This reflects the emergence of these two cities as 'dialect centers' in the 17th–18th centuries, owing to the fact that: (a) the majority of those educated Sorbs who translated (mostly religious) texts from German into Sorbian hailed from, or from the vicinity of, these cities; and (b) these cities already occupied major economic and political positions in Lusatia at that time. The first cohesive text written in Sorbian that we know of is the so-called 'Budyšin Oath' (*Budyska přisaha*) or 'Wendish Citizen's Oath' (*Bürgereid Wendisch*) dating from the year 1532. The early production of longer Sorbian texts is connected with the spread of the Protestant Reformation in Lusatia and the ensuing Thirty Years' War (1618–48). The first Sorbian religious text, as far as we know, is an eastern LSo translation of the New Testament of Martin Luther's Bible, which was written by hand in 1548. The first Sorbian printed book is a LSo collection of church hymns and a small Lutheran catechism published by the preacher Albin Moller in 1574. The first printed book in USo is a translation of

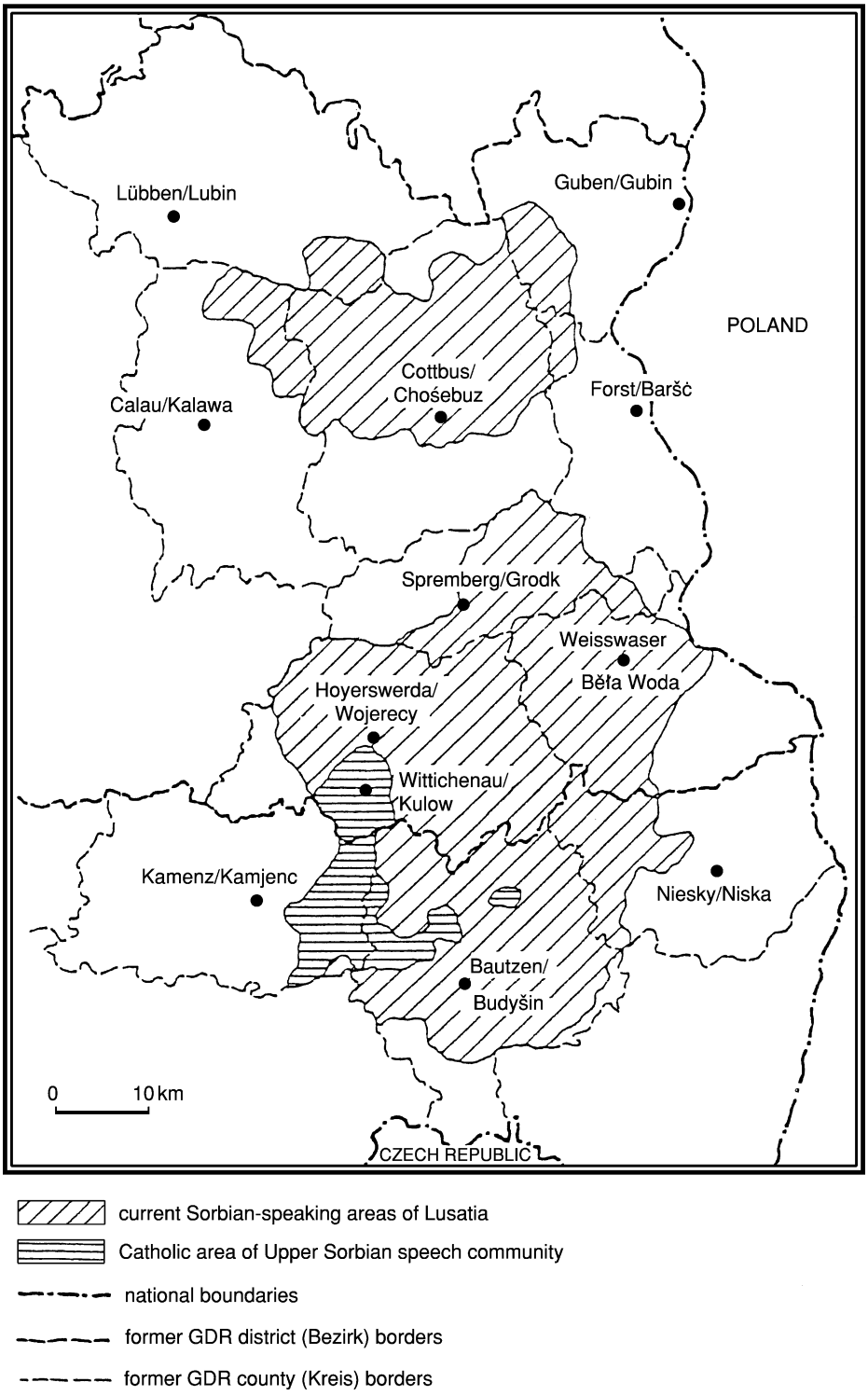

Figure 1 Sorbian speech communities. Schiller K J and Thiemann M (1979), *Stawizny Serbow* (vol. 4), Bautzen: Domowina, with permission.

the Lutheran catechism published by the preacher Wenzeslaus Warichius in 1587. Such 16th-century texts already exhibited varying degrees of German lexical and grammatical influences (e.g., Sorbian use of the demonstrative pronoun/adjective as a reflection of the German definite article).

Because Protestantism did not completely take hold among the Upper Sorbs, Budyšin emerged as a dialect

center only for the USo Protestants; among the USo Catholics, the dialect spoken in and around Kulow (Wittichenau) emerged in the 17th century as the basis for a Catholic variant of a nascent USo literary language. The dialectal basis for this variant eventually broadened in the direction of a West Sorbian Catholic dialect situated in the vicinity of Chrósćicy (Crostwitz). Thus, by the 18th century, two literary languages – one of them with two variants – existed among the Sorbs: LSo, Protestant USo, and Catholic USo.

Like German books printed at the time, the earliest Sorbian publications were printed in German blackletter, or Fraktur. Sorbian spelling was based on sound correspondences with German graphemes or phonetic approximations of them. Thus, the German trigraph **ſch** might correspond to the graphemes *ř, š,* or even *ž* (representing palatal continuants) in today's USo orthography. The palatal affricates, in contrast, were graphically influenced to some extent by Polish – **cz** was used where today one finds USo *č* or *ć*. For example, in Warichius's catechism of 1597, we find **The dzeſacz kaſni Bohſche** (in contemporary USo orthography: *Te dźesać kazni Bože*) 'God's ten commandments' (cf. Schuster-Šewc, 1967: 52). Around the middle of the 19th century, efforts were made to reconcile the Catholic and the Protestant variants of literary USo by standardizing their orthographies. The resulting orthography, set forth in the 1848 publication of *Hornjołužiski serbski prawopis z krótkim rěčničnym přehladom* ('Upper Lusatian Sorbian orthography with a brief grammatical overview') by Christian Traugott Pfuhl (Křesćan Bohuwěr Pful), incorporated Czech and Polish conventions – use of diacritics like the Czech háček (*č, ě, ř, š, ž*) and the Polish acute accent (*ć, dź, ń, ó*) as well as the Polish velar *l* (*ł*) – and was therefore labeled 'analogical.' The new orthography, however, was also **etymologically** based, introducing graphemes – particularly in word-initial consonant clusters – that had no phonetic value: *łowa* → *hłowa* 'head,' *cyć* → *chcyć* 'to want,' *dźe* → *hdźe* 'where,' *zać* → *wzać* 'to take.' On the one hand, the etymologically based orthography has since led to a number of artificial spelling pronunciations; on the other hand, it has made written USo more readily interpretable for those familiar with other Slavic languages. Moreover, it disambiguates a large number of homophones – e.g., *wóz* 'wagon, car,' *łós* 'elk,' *hłós* 'voice,' and *włós* 'hair' – all of which are pronounced [u̯úˀs]. LSo remains less reflective of etymology, cf. LSo *cu* 'I want,' *źo* 'there,' *ned* 'right away,' and *cora* 'yesterday' vs. USo *chcu, hdźe, hnydom,* and *wčera,* respectively. An USo spelling reform was introduced again in 1948. Several USo orthographic conventions have been adopted for LSo (*inter alia,* representing palatalization by means of the letter *j* rather than an acute accent—*ńod-* → *mjod* 'honey,' *ńasć* → *njasć* 'to carry'; cf. Schuster-Šewc, 1996: 253 and 260). LSo influence on USo spelling can be seen in the substitution of word-initial *ch* for earlier *kh* (USo *khodźić* → *chodźić* 'to go'; LSo *chójźiś* 'idem').

Today's USo alphabet consists of the following graphemes: *a, b, c, č, d, dź, e, ě, f, g, h, ch, i, j, k, ł, l, m, n, ń, o, ó, p, r, ř, s, š, t, ć, u, w, y, z, ž.* The letters *v* and *x* occur in foreign names. The letters *č* and *c′* represent the same phoneme /tʃ/ while reflecting different etymologies; the same holds true for the letters *ł* and *w* (phonetically [u̯]). The letter *ř* occurs only after *k, p,* and *t* and is pronounced like *š* except where *tř* constitutes a digraph representing the phoneme /c′/ (e.g., *tři* /c′í/ 'three'). Today's LSo alphabet includes: *a, b, c, č, ć, d, e, ě, f, g, h, ch, i, j, k, ł, l, m, n, ń, o, p, r, ŕ, s, š, ś, t, u, w, y, z, ž, ź.* Unlike USo, LSo alphabetizes *ch* with *c*, rather than after *h*. In 1995, the LSo Language Commission relegated *ó* (phonetically [ɛ] or [y] after labials and velars) to language-teaching materials, replacing it with *o* (Starosta, 1999: 19).

Both LSo and USo exhibit grammatical features that set them apart from other contemporary Slavic languages. The LSo verb paradigm still includes the supine found in early Slavic. USo retains a rich system of tenses – present, preterite (also called 'aorist' if the verb is aspectually perfective, 'imperfect' if it is imperfective), future, perfect, and pluperfect; in addition, the literary language and a number of USo dialects retain the iterative preterite tense (formally identical to the conditional mood). The LSo dialects exhibit only one past tense, formed with the auxiliary *byś* 'to be' and the *ł*-participle; literary LSo, in contrast, exhibits all the tenses of USo, artificially (re)created and phonologically adapted. The Sorbian grammatical category of number is expressed as singular, dual, and plural, which is marked both on the noun or pronoun and on the verb. The dual is gradually giving way to the plural in the dialects, often surviving only exceptionally after the quantifier 'two' (USo *dwaj, dwě*) with plural agreement in the verb (*Dwě knize su na blidźe leželi* in lieu of literary USo *Dwě knize stej na blidźe ležałoj* 'Two books lay on the table'). Nouns (substantive and adjective) and pronouns exhibit six cases – nominative, genitive, dative, accusative, instrumental, and locative. A vocative form exists in USo, but only for masculine nouns (*Šćěpan* → *Šćěpano! Šćěpanje!*) and one feminine noun – *mać* (*maći!*) 'mother.'

Sorbian word order is basically SOV (Subject-Object-Verb); however, compound verb tenses and

the clitic status of the auxiliary verbs usually produce a 'bracket construction' like that found in German (so-called *Rahmenkonstruktion*). Sorbian subordinate clauses, in contrast, generally do not imitate the German clause-final placement of finite verbs.

The LSo and the USo dialects are connected by a zone of 'transitional' dialects. Here, LSo lexical and morphophonological features increase and USo ones decrease as one moves from south to north, while USo features increase and LSo ones decrease as one moves from north to south. Although this might suggest a single dialectal continuum (hence, a single Sorbian language), in fact, the degree of mutual intelligibility between LSo and USo proper is perceptibly less than that which exists today between Czech and Slovak.

See also: Czech; German; Germany: Language Situation; Poland: Language Situation; Polish; Slavic Languages; Slovak.

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Sound Change

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Sound change refers to changes in pronunciation of words or morphemes over time when these changes seem to be attributable to phonetic and phonological causes, not morphological, semantic, or cultural. Pronunciation changes due to the latter factors have other designations, for example, analogical leveling, expressive change due to sound symbolism, spelling pronunciation, and so on (*see* **Sound Symbolism**).

Introduction

Sound change manifests itself in many ways. When reading older literature one becomes aware that certain words are used in rhymes which do not rhyme in 20th-century pronunciation, as, for example, in the following lines from Chaucer's *Knight's Tale:*

> But mercy, lady bright, that knowest weel [='well']
> My thought, and seest what harmes that I feel.

The vowels in these words 'well' and 'feel,' which are [ɛ] and [i], were both [eː] in Chaucer's speech.

Table 1 Cognate words

English	*Italian*
foot [fʊt]	piede [piɛde]
fish [fɪʃ]	pesce [peʃːe]
flat [flæt]	piatto [pjatːo]

Regional dialectal differences must be due to sound change if it is allowed that the same word must have had a uniform pronunciation at some point in the past, for example, presence versus absence of postvocalic *r's* in American versus British English: 'beer' is [bɪɹ] in the USA but [biə] in British Received Pronunciation; similarly, [tʃɛɹ] and [tʃeːə], respectively.

On a much broader scale of 'dialect' differences, an examination of the pronunciation of cognate words in related languages (**Table 1**) also suggests the action of sound change.

Within a given language, morphemes that have a different pronunciation in different morphological contexts (e.g., due to the addition of affixes) give evidence of sound change that occurred in one morphological environment and not another (**Table 2**).

Such changes are said to exhibit 'morphophonemic alternations.'

Finally, some cases of contextually determined variation in the phonetic form of a given phoneme may be a manifestation of sound change, for example, the phoneme /t/ may be realized as [t^h] or as [ʔ] in some American dialects:

(1) trɛntən/ [t^hɹɛ̃ʔn̩]

Table 2 Sound change and morphological context

extreme [ɪkˈstɹim]	extremity [ɪkˈstɹɛmɪti]
repose [ɹɪˈpouz]	repository [ɹɪˈpazɪtɔɹi]
act [ækt]	actual [ækʃəl]

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act [ækt]	actual [ækʃəl]

The Importance of Sound Change

A systematic analysis of such evidence of sound change and other forms of language stimulated the development of linguistic science at the beginning of the 19th century and led to the development of the comparative method which permitted the reconstruction of languages' past. On the assumption that sound change must be happening in the 20th century as it has in the past, researchers in language acquisition have been motivated to examine the errors of first and second language learners in order to discern possible parallels between variation that is diachronic (across time) and synchronic (at one point in time).

Physiologists often gain valuable insights into the workings of the healthy body by studying the diseased body. Parallel to this strategy, many researchers regard sound change as a failure of speech communication, that is, a failure to convey a pronunciation norm, and examine it for hints on how speech production and perception – both their physiological and the cognitive aspects – work normally and successfully.

The Literature of Sound Change

The documentation of sound change is enormous and represents one of the great scientific treasures of linguistics. From comparative grammars of language families as well as the vast literature giving descriptions of the phonemic and morphophonemic systems of single languages, it is possible to extract much valuable information on sound change. Unfortunately the digging is hard in this quarry because there is no standardization of terminology or phonological symbols, and the methods of presenting the data vary widely. A few of the more common forms of sound change are reviewed here with examples of each.

Assimilation

This is a change of a speech sound so that it becomes more similar or identical to another adjacent sound:

(2a) 'contend' is derived from the original Latin morphemes
com + *tendere* 'with' + 'stretch, strain'; the final *m* of *com* became *n* by assimilating to the place of the following *t*.

(2b) Italian *notte* comes from the Latin stem *noct-* 'night'; here the c (= [k]) assimilated completely to the following t.

The overwhelming majority of sound changes are assimilations.

Dissimilation

This is a change of a speech sound so that it becomes less like another sound in its vicinity or even disappears entirely, for example, 'pilgrim' comes ultimately from the Latin *peregrīnus* 'foreign' (from which the English 'peregrination' is derived). At some time in its history one of the two original *r's* dissimilated and became *l*. A similar dissimilation relates 'colonel' to original *colonnello* 'column (of soldiers)'; though still spelled with two *l*s, it is pronounced with only one still intact.

Loss of a Sound

This may occur by 'syncope,' 'apocope,' and so on, depending on where in the word the loss occurs; for example, English 'every' is often pronounced as [ɛvɹi] without the medial vowel.

Epenthesis

Epenthesis is the insertion of a sound in the middle of a word, for example, 'arithmetic' is occasionally pronounced with the medial [-θm-] cluster broken up by an inserted schwa [ə]. Some commonly cited cases of epenthesis, for example, the introduced [p] in '*warmth*' [wɔɹmpθ], are best considered cases of assimilation: the [p] is the result of the latter portion of the [m] assimilating to the voicelessness and the elevated velum of the following [θ].

Haplology

This is the loss of one of two successive sounds or sound sequences that are the same or identical, for example, Latin *nutrix* 'nurse' derives from the stem *nutri-* plus the feminine agentive suffix *-trix,* that is, *nutri* + *trix*. One of the two successive identical syllables *tri* was lost. In English the term 'mineralogy' from 'mineral' + *ology* shows haplology with respect to two original successive syllables that were similar but not identical.

Metathesis

This is the transposition of two adjacent sounds. In Old English the source of the word 'wasp' had two varying forms, *wæsp* and *wæps* (as did its Indo-European source **wopsā* and **wospā)*. Similarly, Old English showed variant forms *āscian* and *ācsian* for 'ask.' In some nonstandard dialects of American English this word may be pronounced [æks].

The Process of Sound Change

Among those who study sound change, some of the greatest controversies arise over how and why sound

Table 3 Examples of sound correspondences between Greek and the ancient Germanic languages as covered by Grimm's Law[a]

Greek	*Germanic*	*English*
poûs, **pod**ós	**fôt**s (Gothic)	foot
grâ**ph**ein	gra**b**an (Gothic)	dig, cut (engrave)
to	**þ**at (Gothic)	that
o**d**oûs, o**d**ó**nt**os	**t**un**þ**us (Gothic)	tooth
thugátēr	**d**aúhtar (Gothic)	daughter
kánna**b**is	**h**en**pr** (Old Norse)	hemp, cannabis
génus	**k**inn (Old Norse	beget, family, kin
kholé	**g**all (Old Norse)	bile, gall

[a]Relevant correspondences are highlighted in bold.

change takes place. In fact, these disputes have been raging for well over a century, since approximately the neogrammarian revolution in the mid-1870s. No discernible consensus has been reached yet. This short article attempts to convey some of the origins of these disputes and their parameters.

Although speculation about sound change can be found as early as Plato's *Cratylus* (*see* **Plato and His Predecessors**) and was very common throughout the 18th century, it was not until the pioneering work of philologists such as Samuel Gyarmathi (*see* **Gyarmathi, Samuel (1751–1830)**), Rasmus Rask (*see* **Rask, Rasmus Kristian (1787–1832)**), and Jakob Grimm (*see* **Grimm, Jacob Ludwig Carl (1785–1863)**), that a rigorous, systematic study of sound correspondences between cognate words of different languages was undertaken. What has come to be known as Grimm's Law (Grimm, 1822), but was first proposed by Rasmus Rask in 1818 (*see* **Sound Laws**), documented a fairly regular (but not exceptionless) correspondence between Greek voiceless stops and Germanic voiceless fricatives: Greek p, t, k = Germanic f, þ(= [θ]), h(= [x]); Greek voiceless aspirates and Germanic voiced stops, ph, th, kh = b, d, g; Greek voiced stops and Germanic voiceless stops, b, d, g = p, t, k. Some examples are given in Table 3.

Two fundamental assumptions about sound change started the controversy. The first is the fairly commonplace observation that sound change seems not to happen all of a sudden. There has never been a report in history that, 'Today on November 23, 1753, we all ceased pronouncing nasal consonants after vowels and instead made the vowel distinctively nasal.' This leads to the belief that sound change occurs so gradually as to be virtually undetectable.

The second belief arose when Hermann Grassmann (*see* **Grassmann, Hermann Günther (1809–1877)**) and Karl Verner discovered in the 1860s and 1870s rules for two major classes of exceptions to Verner's Law. The impact of this achievement on the philological community of the time cannot be overestimated. For more than four decades philology had accepted, with Grimm, that sound change, whatever its causes, showed the same messiness in application as other aspects of human behavior; there were generalizations to be made but there were inevitably exceptions to these general statements. When Grassmann and Verner showed that even the exceptions (at least a major part of them) could be accounted for by a general rule, they came to believe that sound change operated mechanically and without exception.

As a consequence of sound change applying mechanically and without exception – that is, that all eligible words were affected by it – it was supposed that sound change must progress in a phonetically gradual way. In opposition to the neogrammarians and their view that sound change applied mechanically and without exception were the traditional philologists who insisted that 'each word has its own history' (and thus defies a rule-based account).

The neogrammarians were aware of certain exceptions to the sound changes they discovered, but usually attributed them to psychological and cultural factors (analogy and borrowing from other dialects), which they acknowledged could override the forces that propelled these phonological changes.

In the 20th century, many linguists, the intellectual descendants of the neogrammarians, acknowledge that sound change does not apply without exception, but they still adhere to the notion that it is phonetically gradual and suppose that, for example, the change of the original Indo-European voiceless stops (preserved in classical Greek) changed to the Germanic voiceless fricatives through a process of gradual weakening of the stop closure. (Even if adherence to the doctrine of the exceptionless of sound change has lessened, virtually everyone agrees that the concept was useful heuristically and had a profound effect on the development of linguistics as a rigorous discipline.) On the other hand, there is a renewed acceptance of the traditional philological notion that some or all of the gradualness of sound change – which makes it imperceptible – comes about because a given sound change moves gradually through the lexicon affecting first a few words, then more, and then, possibly, most or all eligible words. This is known as 'lexical diffusion' (Wang, 1977). Furthermore, a sound change can create pronunciation variants which connote social class membership, such that two or more alternate pronunciations are available to a speaker, for example, 'floor' as [flɔ] or [flɔɹ]. Speakers might then fluctuate between one form and another, depending on what sort of social impression they would like to convey. A change in social valence of one variant could allow it to spread gradually at the expense of the other (Labov, 1972). In a pivotal

work, Weinreich *et al.* (1968) advocated, among other things, that a strict distinction be made between how a new pronunciation norm starts vs. how it spreads (from word to word, from speaker to speaker, from one socially marked style of speech to another). Some of the imperceptible gradualness, then, could be in the latter domain (*see also* **Weinreich, Uriel (1926–1967); Labov, William (b. 1927)**).

The Occurrence of Sound Change

Teleology

There have been many theories regarding why sound change takes place. Among the many early speculations on the matter, now discredited, were that the speech organs evolved to necessitate the change, that migrations to different climates (colder regions, windy regions) caused a change in speaking habits. Among the theories still current in the early 1990s, some important divisions remain. One of these is between those that characterize sound change as teleological or purposeful and those that do not. Another is whether or not it is thought that sound change improves a language in some way. Many purposes have been posited behind phonological change, most of them operating unconsciously. Speakers change their pronunciation, it is claimed, to make the act of speaking easier (i.e., to reduce energy expenditure), to make speech clearer for the hearer, to optimize the structure of the language (the grammar) in a variety of ways, and therefore to make it easier to learn, to process, and to remember.

There is no doubt that speakers do vary the amount of energy they put into speaking; the speech of someone who is tired or ill is often poorly articulated and thus harder to understand. It is also a common observation that speakers may change aspects of their pronunciation in anticipation of the needs of the hearer, for example, hearing-impaired or nonnative listeners, or when the environment or the channel utilized, for example, a telephone line, is noisy. However, it is not clear in such cases whether speakers are introducing a new pronunciation norm as opposed to trying to convey the community norm to the best of their ability. Sound change proper should be limited to cases where there is a change in pronunciation norm.

Among the hundreds of ways that speakers are claimed to change the structure of their language in order to optimize it are the following:

1. To make the segment inventory more symmetrical, for example, although Old English had voiced and voiceless stops, it had only voiceless fricatives; Middle English added voiced fricatives, thus making the voiced/voiceless contrast symmetrical among the obstruents.
2. On the assumption that there is something unusual or difficult in making syllables terminating in consonants and especially consonant clusters, any simplification of syllable endings is viewed as a move toward optimization; for example, in North American English 'can't' is often pronounced [kæ̃t]. Many languages spoken in Southeast Asia are known to have undergone remarkable simplifications of the syllable structure, such that by the 20th century some allow only open syllables (those not terminated by a consonant).
3. Languages are said to eliminate phonological contrasts that serve little communicative function, that is, where they are redundant. Thus it has been observed that, of the four nasal vowels of Modern French / ɛ̃ œ̃ ɑ̃ ɔ̃/, /œ̃/ serves to differentiate so few words that it is merging with /ɛ̃/.
4. To simplify the phonological rules governing morphophonemic alternation, for example, around the 9th century French had a rule distinctively nasalizing just the low vowels before a following nasal in the same syllable; by approximately the 13th century this rule had been generalized and thus simplified so that all vowels were nasalized in such an environment.

The problem with analyses such as these and with hundreds of similar ones is that there are so many possible structural features of a language – and occasionally its cultural or political environment – which can be invoked after the fact to 'explain' a given change, that it is often difficult to discern any rigor or discipline in such explanations. It would help if there were statistical studies showing that, in an unbiased sample of languages, those with a given structural feature underwent a certain type of change at a rate greater than chance – change in a direction judged to represent an optimization.

Structural linguistics introduced a new element into speculations about sound change, namely, the underlying structure of a language, which is often posited to be quite distinct from the patterns and elements directly observable. This underlying structure has been viewed as the relations between phonological elements by the Prague School (*see* **Structuralist Phonology: Prague School**), where this type of theorizing about language change started around the 1930s, or as rules of grammar by generative phonology (*see* **Generative Phonology**), and its descendants. In fact, so different are the proposals that different generations of structural linguists have made about a language's underlying structure, that there has never

Table 4 Sanskrit and Prakrit consonant clusters

Sanskrit	*Prakrit*	*English*
ʃuʂka	suk^{h}:a	dry
karpūra	kap:ūra	camphor

Table 5 Hindi consonant clusters

Stem	*Suffixed form*	*English*
nəmək	nəmkin	salt, salty
k^{h}əp+ək+i	k^{h}əpti	crazy

been a sufficiently stable and long-lived theoretical base on which to launch extensive and wide-ranging research on sound change.

Sound Change and Language Improvement

The claim that sound change brings about an improvement to the language in which it occurs is independent of the claim that there is teleology. As with the evolution of species, many might believe that individuals who survive at the expense of others in the face of environmental pressures are in some way better adapted, but they would still not suggest that there was any teleology, any ultimate goal, in determining the direction of evolution. Invoking principles similar to evolution, Lindblom proposed that there are universal 'environmental' pressures helping to shape the sound systems of language and has presented one of the few rigorous statistical studies in support of this: Lindblom and Maddieson (1988) demonstrated that languages utilized simple segment types (e.g., [p, l, j, a]) before utilizing complex segment types (e.g., [t^{w}, p', k͡p, ã]). Most languages use exclusively simple segment types.

Some have suggested that there is an inherent teleological element in sound change without there being any net benefit from such change; language users implementing change for the sake of change – similar to their change in fashions of clothes and automobiles from one year to the next (Postal, 1968).

Whatever good does come to a language from sound change, it must be localized in time and to a particular domain of language structure, because the evidence suggests that there seems to be no net drift of all human languages toward a common sound pattern. The fate of consonant clusters between Sanskrit (*see* **Sanskrit**) and Modern Hindi (*see* **Hindi**) illustrate this. Sanskrit had a fairly rich set of medial consonant clusters; according to some these are relatively complex phonological structures and liable to change. Prakrit, which developed from Sanskrit, simplified virtually all of these clusters and changed them to geminates (Table 4).

However, in Modern Hindi, a descendant of Sanskrit through Prakrit, there are some very common morphological processes which involve deletion of a interconsonantal schwa [ə], thus giving rise to complex clusters again. In some cases, the form with a cluster came from concatenated morphemes that 20th-century speakers are no longer aware of (Table 5).

While it is certainly not the norm that phonological processes are eventually undone, there seems to be nothing except chance that would prevent it.

Phonetics and Sound Change

Phonetic studies of speech have been applied to issues of sound change for well over a century. Some of the first instrumental phonetic studies were motivated by a desire to explain sound change (e.g., Rousselot's 1891 dissertation). One important finding is common to all these studies; there is a remarkable similarity to the variability found in details of pronunciation – that is, in speech production – by 20th-century speakers and sound changes that took place in centuries past. Some ventured the opinion that the variation found was ongoing sound change, sound change 'on the hoof,' as it were (see Labov, 1981). Some studies have again emphasized the isomorphism between diachronic and synchronic phonetic variation, but have taken a different path after that (Ohala, 1993).

A great deal of variation is found in speech production, it is noted, but this by itself does not constitute sound change, that is, a change in pronunciation norms, because there is evidence from speech perception studies that listeners are usually able to normalize such variant forms and deduce the norm intended by the speaker. For example, the fricative [s] when produced before a rounded vowel like [u] (as in the name 'Sue') is 'colored' a bit to sound less like [s] in other vocalic environments and more like [ʃ]. This change in [s] is caused inadvertently by the assimilation of the lip shape to that of the following vowel [u]. Nevertheless, listeners have no trouble identifying this variant as the phoneme /s/ as long as they detect the /u/ and can 'blame' it for the distortion. Such perceptual normalization must be similar to those operating in perceptions based on other sensory modalities, for example, vision, where viewers successfully normalize for variations in the size, color, and shape of objects viewed from different distances, different ambient lighting, and different angles. However, such phonetically caused perturbations of speech sounds make speech potentially ambiguous to the listener, who has to 'parse' the contextual distortion with the context and not with the given speech segment. Although

usually successful in doing this, listeners occasionally fail. In these cases of parsing errors, listeners perceive the contextually changed segment as it is heard, that is, changed, and this becomes the basis for their subsequent changed pronunciations. Further elaborations of this account of sound change as listeners' parsing errors suggest an explanation for dissimilation.

In contrast to most prior accounts of sound change, this one attributes the change to the listener, not the speaker. The speaker causes the variation, which gives rise to potential ambiguity in the acoustic-auditory signal, but this variation only leads to sound change due to the misapprehension by the listener. The error of the listener is unmotivated, probabilistic, and nonteleological, just like inadvertent errors by medieval scribes or modern typists copying manuscripts or students taking lecture notes. The change is phonetically abrupt, although its subsequent spread, mediated by nonphonetic factors (psychological mechanisms such as analogy and social mechanisms, as discussed above), could be gradual. A further advantage of this account is that it has demonstrated how certain sound changes can be simulated in the laboratory. A disadvantage is that only a relatively small subset of all the types of sound changes that interest historical phonologists have been dealt with in laboratory studies, and thus, a large part of its case is a promissory note.

Trends in Research on Sound Change

Nineteenth-century linguistics *was* historical linguistics. Synchronic studies existed but were usually not at the center of the linguistic community's attention. In the first quarter of the 20th century, structural linguistics changed this, and synchronic studies dominated. In the 1990s it may be said that, with attention being given to sound change by sociolinguistics, by those in language acquisition, by the phonetic sciences, and in the theoretical domain by generative phonology and its heirs, it is again one of the most active and hotly debated research areas in linguistics.

See also: Phonetics, Articulatory; Generative Phonology; Grassmann, Hermann Günther (1809–1877); Grimm, Jacob Ludwig Carl (1785–1863); Gyarmathi, Samuel (1751–1830); Hindi; Labov, William (b. 1927); Phonetic Pedagogy; Plato and His Predecessors; Rask, Rasmus Kristian (1787–1832); Sanskrit; Sound Change: Phonetics; Sound Laws; Speech Perception; Structuralist Phonology: Prague School; Weinreich, Uriel (1926–1967).

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Sound Change: Phonetics

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The fact that sound changes is undisputable, but that only a limited set of sound change occurs in the world's languages and many such changes recur across typologically diverse languages has puzzled historical linguists since the advent of the comparative method. Thus, for example, assimilation (1) is commonly found in the world's languages.

(1)	Latin		Italian
	octo	>	otto 'eight'
	noctem	>	notte 'night'
	septem	>	sette 'seven'
	somnus	>	sonno 'sleep, dream'

Equally puzzling is the fact that sound change often displays directionality effects. For example,

usually successful in doing this, listeners occasionally fail. In these cases of parsing errors, listeners perceive the contextually changed segment as it is heard, that is, changed, and this becomes the basis for their subsequent changed pronunciations. Further elaborations of this account of sound change as listeners' parsing errors suggest an explanation for dissimilation.

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	octo	>	otto 'eight'
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	septem	>	sette 'seven'
	somnus	>	sonno 'sleep, dream'

Equally puzzling is the fact that sound change often displays directionality effects. For example,

the majority of assimilation tends to be anticipatory (also referred to as regressive). That is, for a sequence of C_1C_2, it is more likely for C_1 to take on the features of C_2 than vice versa. Even more common are cases of nasal assimilation (2) where a nasal invariably agrees in place of articulation of the following stops, never the preceding one.

(2) English

in-possible	>	i[m]possible
in-tolerable	>	i[n]tolerable
in-compatible	>	i[ŋ]compatible

While one of the crowning achievements of historical linguistics is arguably the discovery of ways to reconstruct the history of languages via the comparative method, the comparative method *per se* has nothing to say about why certain sound changes should be more prevalent than others, nor can it explain why asymmetric directionality effects of sound change exist. The comparative method simply does not require the linguist to understand why languages are structured as they are or behave as they do. Words and their constituent sounds are treated more or less as abstract algebraic entities devoid of physical substance. Thus, the comparative method is analogous to 'a quasi-mathematical operation, involving implicit (and qualitative, not quantitative) estimations of probability of events and what is, in effect, the application of optimization theory' (Ohala, 1993: 237). While some leading historical linguists continue to advocate the view that reconstructed forms are simply parts of a formulae for relating sets of cognates and should not be regarded as representing phonetic structure (Bloomfield, 1914: 274 ff.; Meillet, 1964: 39 ff.), most historical linguists are not completely blind to the need for an explanation for the cause of sound change. For example, it is often implicitly assumed that the posited reconstructed forms and the accompanying sound changes must also be within the bounds of the plausible, where plausibility is generally determined inductively, that is, by what the linguists have previously encountered in other human languages. Historical linguists also often rely on the notion of phonetic plausibility. To this end, historical linguists generally turn to phoneticians for answers.

Phonetics, broadly defined, is the study of the production and perception of speech. There are two main aspects of phonetic research: taxonomic vs. scientific phonetics. Taxonomic phonetics concerns mainly the articulatory aspect of speech. It provides linguistics with the terminology and conceptual framework for describing speech sounds and their natural classes. As an area of research, taxonomic phonetics reached its zenith in the late 19th century through the efforts of phoneticians such as Alexander Melville Bell, Otto Jespersen, Paul Passy, Henry Sweet, and Wilhelm Viëtor. The basic descriptive system has not changed very much since. Unlike taxonomic phonetics, scientific phonetics is a vibrant and growing discipline that focuses on developing methodologies and theories of phonetics toward a better understanding of the working of speech. The marriage between scientific phonetics and historical linguistic research on sound change is what Ohala calls 'experimental historical phonology' (1974).

The union of scientific phonetics and historical linguistics is mainly inspired by two truisms derived from speech research: the infinite variability of speech and the parallelism between such phonetic variation and sound change. That speech shows tremendous variability has been evident to phoneticians as early as Pānini. Equally important, however, is the realization that the variation is often lawfully determined. This restrictiveness of phonetic variation leads many researchers to posit phonetic theories to explain the observed regularities. The application of phonetic theories to explaining sound change is made possible by the second observation, namely, the often observed similarity between phonetic variation and sound changes. For example, previous phonetic research has revealed that the fundamental frequency (F_0) on vowels is often nondistinctively higher following voiceless consonants than voiced ones (e.g., Hombert *et al.*, 1979). Similarly, historical linguists have pointed out that, in East and Southeast Asian languages, a higher tone develops after what had been the voiceless consonants and lower tone after the voiced ones (e.g., Edkins, 1853: 6–54, esp. 47; Maspéro, 1912). These types of similarities are repeatedly observed as instrumental studies and perceptual studies of speech accumulate, which eventually prompted the phonetically minded historical linguists to posit a potential causal relationship between the two (e.g., Haudricourt, 1954). This in turn led phoneticians to apply phonetic theories to the explanation of sound change.

Not all variations constitute sound change, however. On the one hand, the Neogrammarians viewed sound change as the result of microscopic changes in the production of speech, which gives rise to the notion of articulatory drift and the view that sound change is gradual and unperceivable (Bloomfield, 1933). Ohala (1974 et seq.), on the other hand, contends that sound change is mainly perceptually driven and can be demonstrated in the laboratory. In particular, Ohala (1993) argues that variation in perception caused by the confusion of acoustically similar (but sometimes articulatorily different) speech sounds may constitute a (mini-)sound change, but not so for variation in production. Variation in production,

however, may still play an important role in the development of sound change. In particular, when a listener fails to correct the perturbations (e.g., from coarticulation) in the speech signal and takes the signal at face value, his conception of the pronunciation might differ from the intended one. Ohala refers to this as 'hypo-correction.' A canonical example of hypo-correction is the emergence of umlaut in the history of Old English. Umlaut takes place when a back vowel is fronted by a front vowel or a palatal glide in the following syllable. In the case of Old English, the plural suffix *-i* in pre–Old English created a front allophone of the back vowels in the root. The listener hypo-corrected, perhaps due to the failure in detecting the final front vowel (the conditioning factor), and the fronted back vowel subsequently became phonemic when the conditioning environment is lost (e.g., *muːs-i* → *myːs* 'mice').

(3)

Pre-OE	OE	Mod. English
*muːs	muːs	mouse
*foːt	foːt	foot
*toːθ	toːθ	tooth
*gans	goːs	goose
*mann	mann	man

Pre-OE	OE	Mod. English
*muːs-i	myːs	mice
*foːt-i	feːt	feet
*toːθ-i	teːθ	teeth
*gans-i	geːs	geese
*mann0i	menn	men

Examples of hypo-corrective sound change are many, including regressive assimilation (Ohala, 1990), tonogenesis (e.g., a tonal contrast emerges from a historically prior voicing contrast), the development of distinctive nasal vowels (i.e., contextually nasalized vowels become distinctive nasal vowels; ṼN > Ṽ; Beddor *et al.*, 1986), the rise of emergent stops (e.g., *Samson* > *Sampson*; Ohala, 1997), nasal effacement (e.g., Late Latīn *ansa* > Milanese *asa* 'handle, loop, occasion'; Ohala and Buzà, 1995), nasalization-induced lowering (e.g., *fine* [fin] but *fin* [fɛ̃] in French; Beddor *et al.*, 1986) and velar softening (e.g., Lung chow *kjaa*: Po-ai *tʃaa* 'rice seedlings'; Guion, 1998).

Not only do listeners fail to normalize variation in production sometimes, they may also overanalyze and incorrectly attribute an intended phonetic cue as contextual. This mechanism of sound change is referred to as 'hyper-correction.' Hyper-corrective sound changes invariably involve only phonetic features that manifest themselves over fairly long temporal intervals, such as labialization, aspiration, retroflexion, pharyngealization, the voice quality called 'glottalization,' and place of articulation. Only such stretched-out features may encroach on adjacent segments thus creating an ambiguity as to where the feature is distinctive and where fortuitous. A classic type of hyper-correction is dissimilation. Thus, in the history of Sanskrit and Greek, when a root contains two aspirated stops the first dissimilates to an unaspirated stop (i.e., Grassmann's Law). What appears to have happened is that the listener identified only a unique source for the laryngealization, which spanned across multiple syllables in PIE. As a result, aspiration is hyper-correctively eliminated from all aspirated stops except the last.

(4a)	PIE		Sanskrit	
	*b**hu**d**h**yetoy	>	b**u**d**h**yatē	'is awake'
	*b**he**b**h**owd**h**e	>	bubōd**h**a	'was awake'
(4b)	PIE		Greek	
	*p^{h}ak^{h}ús	>	pak^{h}ús	'thick'
	*k^{h}ep^{h}alé:	>	kep^{h}alé:	'head'

Ohala's listener-oriented misperception based explanation of sound change (or what Steriade (2001) refers to as the 'innocent' view of sound change) not only offers great insights into the mechanism of the actuation of sound change in general, but also resolves an important embarrassment for the traditional Neogrammarian view of sound change. The main tenet of the Neogrammarian account of sound change is that sound change is gradual, regular, and exceptionless. Yet it has been repeatedly recognized that there is a class of changes that is sporadic and abrupt (Bloomfield, 1933). These so-called minor sound changes include dissimilation and metathesis. As illustrated above, Ohala's hyper-correction model provides an explanation as to why dissimilatory sound change may take place. Blevins and Garrett (1998, 2004) apply the same mechanism to account for metathesis (Classical Greek *gambrós* > South Italian Greek *grambó* 'son-in-law'). Both types of minor sound changes are the results of the listener failing to correctly identify the source of some long stretched-out phonetic cue. In the case of dissimilation, the listener resolves the ambiguity by reducing the number of conditioning factors, while in the case of metathesis, the listener incorrectly localizes the source of the ambiguity, resulting in an apparent sound transfer.

An important difference between hypo- and hyper-corrective sound changes is in the role of the conditioning environment. In hypo-corrective sound change, the conditioning environment is often lost at the same time as the conditioned change occurs since failure to detect the conditioning environment is a direct cause of the listener failing to implement normalization of a contextual-induced perturbation in the first place. The conditioning environment in a hyper-corrective sound change, on the other hand, crucially may not be lost

at the same time as the conditioned change since the listener must be able to detect the conditioning factor before he may, albeit erroneously, attribute an imagined perturbation to the conditioning environment.

In recent years, a renewed interest in the phonetic explanation of sound change has resulted in several attempts to reevaluate the merits of the listener-oriented misperception view of sound change. For example, Steriade (1999) asserts that the innocent view of sound change fails on two counts. First, patterns of perceptual confusion found in the laboratory do not always match up with attested sound changes. Second, sound change seems to favor outcome that is perceptually optimizing. Note, however, that perceptual confusion is not always bidirectional (e.g., Guion, 1998; Ohala, 1983, 1997), thus it is not at all surprising that sound change may show an asymmetric directionality effect as well. In addition, while the benefit of applying laboratory findings to the explanation of sound change is great, one must exercise great caution in interpreting laboratory results. A variety of factors may influence the outcome of an experiment (e.g., the nature of the stimulus presentation, the method of subject response, etc.). Thus, the discovery of discrepancies between laboratory results and sound change cannot be taken at face value as a definitive failure of the Experiment Historical Phonology program. Another aspect of the listener-oriented model of sound change which has come under increased scrutiny is the listener's role in deciding the direction of a change. Steriade (1999) proposes that linguistic innovations must be channeled in the direction that is least likely to yield blatant departures from the norm through some mechanism of the phonological grammar (e.g., the P-map). Blevins (2004) recognizes a similar gap in Ohala's original model and adds a third mechanism called **Choice**, which refers to the situation where the listener chooses among multiple phonetic representations with distinct phonological representation.

In sum, the cross-pollination of ideas between phonetics and historical linguistics has proved to be beneficial to both disciplines. The study of sound change thus has consistently provided the raw materials for phonological typologies and phonetic explanations while historical linguists, in turn, use these constructs in their hypotheses about sound change trajectories and in their reconstructions.

See also: Historiography of Linguistics; Neogrammarians; Phonetics: Overview; Sound Change; Speech Perception; Speech Production.

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Sound Laws

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'Sound law' is a loan translation of the German *Lautgesetz*. This terminology derives from the 19th century, when the elucidation of sound laws was self-consciously equated with discoveries of the natural sciences, such as Boyle's Law or the laws of gravity. A sound law is defined as a descriptive rule formulating the input and output of a usually language-specific sound change under specified conditions. To modern historical linguists the term sound law connotes strict adherence to the regularity principle (i.e., the belief that sound laws have no exceptions), but this was not always the case. For much of the 19th century sound laws were understood merely as general tendencies, mainly due to the many unmotivated exceptions they seemed to admit. But gradually, principled explanations for these exceptions were discovered too, accompanied by significant advances in the study of phonetics. By the 1870s a consensus had emerged in favor of a more rigorous methodology, and after the discovery of Verner's Law (1875; published 1877), the Neogrammarian position on sound change was made explicit: "every change, inasmuch as it happens mechanically, takes place according to *exceptionless laws*" (Osthoff and Brugmann, 1878: xiii; their emphasis). Several notable Indo-European sound laws are discussed below.

An important early breakthrough was Grassmann's Law (1862), discovered by the renowned linguist and mathematician Hermann Grassmann. Early Indo-Europeanists had puzzled over such cognate pairs as Skt. *bhárati* 'bears' : Go. *baíran* 'bear', which showed the usual correspondence Skt. *bh-* : Go. *b-*, and Skt. *bándhati* 'binds' : Go. *bindan* 'bind', which reflected an unexpected Skt. *b-* : Go. *b-*. Internal evidence from Sanskrit posed a similar problem: since the root *dā-* 'give' made a reduplicated present 3 sg. *dádāti* 'gives', from *dhā-* 'put' one would expect **dhádhāti*, but the attested form is *dádhāti*. Grassmann's insight was that in a sequence of two aspirated stops, the first stop lost its aspiration in Sanskrit (*DH...DH* > *D...DH*). Dissimilation of aspirates was also demonstrable for Greek; cf. pres. 3 sg. *títhēsi* 'puts' < pre-Greek **thithḗti* (: Skt. *dádhāti*, to PIE **$d^h eh_1$-* 'put'). Despite the striking similarities displayed by these and other forms, Grassmann's Law is not a common innovation of Indo-Iranian and Greek; rather, the two branches reflect parallel independent developments (cf. Mayrhofer, 1986: 112ff.).

Among the significant discoveries of the 1870s was the Law of Palatals (*Palatalgesetz*), an Indo-Iranian development whose underlying conditions were clarified independently by several scholars. Sanskrit seemed to show an unmotivated alternation of *k* and *c* [tʃ] before *ă*; cf. *kr̥-* 'do', reduplicated 3 sg. perf. *ca-kā́r-a* 'did'. A similar alternation was displayed by *g* and *j* [dʒ] (*gr̥-* 'wake' : *jā-gā́ra* 'is awake'; cf. YAv. *jaγāra*) and *gh* and *j* (*ghas-* 'eat' : *ja-ghā́s-a* 'ate'). Eventually it was shown that *c* and *j* appeared before *ă* when this vocalism corresponded to *ĕ* attested in IE cognates; cf. the enclitic particle Skt. *-ca* 'and' = Lat. *-que* ; Skt. *jāgā́ra* = Gk. 3 sg. perf. *egrḗgore* 'I am awake' (< **egḗgore*); Skt. *jáni-* f. 'woman' : OE *cwene*, OPruss. *genna* 'id'. The only plausible explanation was that early Indo-Iranian still had the vowel **e*, which caused palatalization of (post-*satəm* merger) **k*, **g*, **g^h*, just as *i* had palatalized **k* to *c* [tʃ] in forms such as the Skt. enclitic *cid* (= Lat. *quid* 'what'). Palatalization applied only before the front vowels **ĭ* and **ĕ*, so that *k* was preserved in forms such as Skt. *ka-* 'who', from an earlier **ko-* (< **k^uo-*). Only after palatalization did**ĕ*, **ă*, **ŏ* merge into **ă*, so that PIE **-k^ue-* 'and' and **k^uo-* 'who' appear in Sanskrit as *-ca* and *ka-* respectively. The Law of Palatals elegantly confirmed that **ĕ*, **ă*, **ŏ* were to be reconstructed for Indo-Iranian, and thus also for Proto-Indo-European.

Before the Indo-Iranian merger of mid and low vowels, another sound change is known to have operated in this branch: Brugmann's Law (1876, 1879), whose initial formulation is due to the Indo-Europeanist Karl Brugmann. From comparative evidence it was clear that short *o*-grade of the root was proper to certain Indo-European categories, such as the perfect singular (e.g., Gk. 3 sg. perf. *lé-loip-e* 'left'; *dé-dork-e* 'saw'), and to certain derived stems, such as the causative (e.g., Lat. *moneō* 'warn' < **mon-éi̯e/o-* 'cause to think'). Comparable forms in Sanskrit sometimes displayed a corresponding *-a-*, as in 3 sg. perf. *da-dárś-a* 'saw' (= Gk. *dédorke*), but elsewhere showed an unexplained long *-ā-* instead, as in 3 sg. perf. *cakā́ra* 'did' and causative 3 sg. pres. *māráyati* 'kills' (< **more̯i̯e/o-* 'cause to die'). Brugmann hypothesized that in the development of Indo-Iranian, PIE **o* was lengthened to **ō* in *open syllables* (syllables ending in a vowel), and that thereafter **ō* merged with *ā*, thus PIE**k^ue.k^uó.re* > *cakā́ra*, **mo.ré.i̯e.ti* > *māráyati*, but **de.dór.ḱe* > *dadárśa*. Important further discoveries eliminated a number of apparent exceptions to this rule, such as 1 sg. perf. *cakára* 'I did' < **k^uek^uórh$_2$e*, causative 3 sg. pres. *janáyati*

'begets, bears' < *ĝonh$_1$éi̯eti, where the former presence of laryngeals was shown to have blocked application of Brugmann's Law. The scope of this law has been much debated since Brugmann's time; a widely accepted version restricts the rule to lengthening of PIE *o in open syllables before the resonants *r, *l *m, *n, *i̯, *u̯, and the sibiliant *s, though other formulations are used as well.

Evidence for Bartholomae's Law (1882) is adduced mainly from Indo-Iranian, though this development is often attributed to PIE. It was observed by the renowned Iranist Christian Bartholomae that when a morpheme such as the past participle suffix *-tá-* was added to Sanskrit roots ending in a voiced aspirate, aspiration spread to the end of the cluster and the voiceless consonant became voiced; cf. *yudh-* 'fight' + *-tá-* → *yuddhá-* 'fought'; *labh-* 'grasp' : *labdhá-* 'grasped'. The assimilation rule *$D^hT > DD^h$ may also be seen in formations where Grassmann's Law has applied, e.g., *budh-* 'awaken' (< PIE *b^hud^h-) : *buddhá-* 'awakened'; *dah-* 'burn' (< PIE *d^heg^{uh}-) : *dagdhá-* 'burned'. Bartholomae's Law is evident in Avestan as well: IIr. *augh- 'speak solemnly' + 3 sg. middle ending *-ta* > Gathic Av. *aogədā* 'he spoke'. The existence of Indo-European suffix doublets such as *-tro-/*-d^hro-, *-tlo-/*-d^hlo-,*-tmo-/*-d^hmo- is thought to point to the earlier operation of Bartholomae's Law in PIE, e.g., *(-D^h)-tlo- → *(-D)-d^hlo-.

In recent decades further sound laws have been discovered due to the clarification of the PIE laryngeal theory. Significant for Greek is Rix's Law (Helmut Rix, 1970), which illuminates this language's treatment of word-initial PIE laryngeals before a syllabic liquid or nasal. Rix demonstrated that in the development of Greek an inherited sequence of the structure *HR̥C-* underwent resyllabification, with the result that PIE */h$_1$R̥C-/ > Gk. eRC- PIE */h$_2$R̥C-/ > Gk. aRC-, and PIE */h$_3$R̥C-/ > Gk. oRC-. Examples include PIE */h$_1$r̥sk̂e-/ 'go' > Gk. *érkhomai* 'I go' (cf. Skt. *r̥cháti* 'goes'); */h$_2$r̥ĝ-rók̂ / 'bright' > Gk. *argrós > argós* (cf. Skt. *r̥jrá-*); */h$_2$r̥t/ĝók̂/ 'bear' > Gk. *árktos* (cf. Skt. *r̥ksa-*); */h$_3$n̥bh-l̥-/ 'navel' > Gk. *omphalós* (cf. OIr. *imbliu*). Cognate with this last example are Lat. *umbilīcus* 'navel, projection, center' and *umbo* 'boss, center of a shield'. These forms are seen as evidence for Rix's Law in Latin, where normally syllabic *m̥, *n̥ > *em*, *en;* cf. also Lat. *unguis* 'nail' < */h$_3$n̥g^h-u-/ (to Gk. *ónuks* 'nail' < */h$_3$n̥g^h-/); Lat. *amb* 'around, about' < */h$_2$m̥b^h-/ (to Gk. *amphí*, Skt. *abhí*, OHG *umbi* 'around').

The reconstruction of PIE laryngeals has helped solve a long-standing problem of Germanic as well. *Verschärfung* ('hardening') refers to the process by which PIE *-i̯- and *-u̯- developed to PGmc *-jj-* and *-ww-*, yielding *-ddj-*, *-ggw-* in Gothic and *-ggj-*, *-ggv-* in Old Icelandic; cf. Go. *waddjus*, OIcel. *veggr* 'wall' < PGmc *wajju-*; Go. *glaggwuba* 'carefully' beside OIcel. *glǫggr* 'sharp-minded', OE *glēaw* 'sharp-sighted, keen', OS OHG *glau* 'smart' < PGmc *glawwa-*. A comparison of IE cognates reveals that most Verschärfung cases may be traced to root-forms ending in a laryngeal, e.g., the PIE root *u̯ei̯h$_1$- 'wind, twist' underlies Skt. *váyati* 'weaves', past ptcp. *vītá-* (< *u̯iH-ta-*); cognate is Go. *waddjus* 'wall' (< PGmc *wajju-*), ultimately from a root noun *u̯oi̯h$_1$-/ *u̯(e)i̯h$_1$- 'wickerwork'. As shown by JayJasanoff (1978), the development of PGmc *jj* and *-ww-* in such forms was probably triggered by the loss of an intervocalic laryngeal, with the resulting hiatus filled by a euphonic glide. This new sequence yielded geminate glides in Proto-Germanic, which then developed independently to *-ddj-*, *-ggw-* in Gothic and *-ggj-*, *-ggv-* in Old Icelandic. Compare the development of the Germanic verb for 'hew', whose IE cognates include Lith. *káuti* 'strike' and OCS *kovati* 'forge': pre-PGmc *kau̯h$_2$-e/o > *χau'a-* (reflecting hiatus due to laryngeal loss) > *χauwa-* (hiatus filled by euphonic glide) > PGmc *χawwa-* (reinterpretation of *-uw-* as phonological geminate) > OIcel. *hǫggva*, OE *hēawan*, OHG *houwan* 'hew, strike'.

See also: Germanic Languages; Indo–Iranian; Latin; Neogrammarians; Phonological Change in Optimality Theory; Phonological Change: Lexical Phonology; Verner's Law.

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Sound Symbolism

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Sound symbolism is said to be present when a speech sound seems to correlate with an object in the real world. The correlation may take the form of 'onomatopoeia' or 'mimesis,' where a sound originating from an animate or inanimate source is reproduced more or less accurately by the human articulatory organs as a lexical item.

The correlation may also be prompted by a vague feeling of 'aptness' within a given speech community. For example, words with initial *tw*-may be felt to express the concept of plucking or tweaking in English: *tweak, twang, twinge, twist, twiddle*. Such a shared cultural response to the sound and meaning of words is known as 'phonesthesia,' the above list of words being 'phonesthemes.'

In general, sound symbolism is culturally bound, and onomatopoeic and synesthetic elements do not pass across unrelated languages.

Although sound symbolism is generally accepted as a phenomenon of language, the actual ratio of words in English that are expressed by sound symbolic elements is disputed by linguists. Some feel that language is mainly arbitrary and that sound symbolism is a mere fringe phenomenon (Saussure); others aver that language is inherently sound symbolic and always striving to equate sound with sense (Bolinger, 1965; Wescott, 1980). A similar question about whether the English language is growing more or less sound symbolic or whether it maintains a 'steady state' equally remains unanswerable.

The term 'iconism' is sometimes used to express the tendency for language to equate sound and meaning (Wescott, 1971). Linguistic iconism is therefore an alternative term for sound symbolism. The word 'icon' was first used with regard to language by the American philosopher C. S. Peirce (1839–1914). Often in linguistic debate, the arbitrary nature of language is called 'symbolism' and is opposed to the nonarbitrary iconism or sound symbolism. Thus, the general term 'sound symbolism' is a little unfortunate, but is widely used and recognized by linguists to represent the nonarbitrary quality of language.

Onomatopoeia

Onomatopoeia or mimesis is the function whereby the sound of a word mimics a sound occurring in the real world (e.g., *miaow, hiccup, plop, cluck, burp, atishoo*, etc.). An onomatopoeic word often denotes the source of the sound (e.g., *cuckoo, crow* [originally *craw*, which echoes *caw*], *kazoo, hurdy-gurdy*).

None of these words are perfect copies of the sounds as they exist in the world, as human speech mechanisms have their limitations. This can be clearly seen when observing the spectrogram of a domestic cat miaowing and that of an English-speaker saying /mjiaʊ/: The two spectrograms show completely different patterns.

Reduplicatives

Reduplicative words are often onomatopoeic and express an ongoing repetitive sound. Reduplicatives fall into three groups:

1. words that are based on rhyming combinations: *clap-trap, hodge-podge, bow-wow, hubble-bubble*
2. words that are true repetitions and often denote the source of the sound, especially in child language: *quack-quack, ba-ba, moo-moo, chuff-chuff, puff-puff*
3. words with vowel alternation, also known as 'apophony' or 'vowel gradation': *chitter-chatter, tittle-tattle, ding-dong, pitter-patter, tick-tock*.

In the great majority of this type of reduplicative, the initial vowel of the first word is the high front vowel /ɪ/, whereas the second element displays a lower vowel /a/ or /ɒ/.

All three types of reduplicatives occasionally have examples with an extra linking syllable: *ding-a-ling*; *clinkety-clink*; *clippety-clop*.

Phonesthemes

J. R. Firth coined the term 'phonestheme' (adjective 'phonesthetic') to describe certain phonological features that are associated with social and personal attitudes within a speech community. (Many modern linguists deviated from Firth's adjective phonesthetic; (Bolinger 'phonesthematic'; Wescott 'phonesthemic.') Such social and personal attitudes are formed through recurring experiences in certain contexts.

> 'The validity of a phonestheme is, in the first instance, contextual only: if it fits the meaning of the word in which it occurs, it reinforces the meaning, and conversely, the more words in which this occurs, the more its own meaning is strengthened' (Samuels, 1972: 46).

This mutual strengthening means that phonesthetic groups may grow larger through time, either through

Figure 1 This figure illustrates a phonestheme network that may be extended indefinitely. Reading from left to right, the following phonesthemes may be identified: Initial phonesthemes: *sc-* 'one who shirks work or duty,' *sc-* 'light movement,' *sl-* 'sliding movement,' *du*-dull, defective,' *du-* 'dull, stupid,' *cl-* 'clinging action,' *sw-* 'movement through air.' Final phonesthemes: *-ip* 'sudden, quick movement or sound,' *-ump* 'dull, unattractive,' *-ump* 'rounded object or collection of objects,' *-oop* 'parabolic shape or movement,' *-ing* 'resonant sound.' Vowel phonesthemes: i /ɪ/ 'swiftness' *slip, nip, i* /ɪ/ 'high pitch' *ring, sing, u* /ʌ/ 'dull, dud' *dull, dud.*

initial phonesthetic clusters (alliteration) or final clusters (rhyme) (see below).

Initial Phonesthemes

Initial phonesthemes may be divided into three groups:

Initial Single Consonant C

- *d*-foolish, dull: *daft, dead, dense, dim, dithery, dizzy, dopey, dotty, dozey, drippy, droopy, dud, duff, dull, dumb, dunce, dupe*

The pejorative force of initial *du-* /dʌ/ can be clearly seen from the above list (see also **Figure 1**).

Initial Double Consonant CC This is the most common type of phonestheme in English, and of this type, *sl*-is perhaps the most highly phonesthetic group of all, with few words that cannot be fitted into one of the phonesthetic categories listed below.

There are two distinct phonesthemes in this *sl*-group:

1. *sl*-attack – physical or verbal: *slag, slam, slander, slang, slap, slash, slate, slaughter, slay, slight, sling, slog, slug, slosh, slur*
2. *sl*-sliding movement: *slalom, sledge, sleigh, slick, slide, slip, slither, sloop, slope, slouch, slump* (see **Figure 1**).

- *sl* – slimy wet substances: *slime, slop, slosh, sludge, slurry, slush*
- *sl* – eject or add water: *slake, slobber, sluice, slurp*
- *sl* – indolence, carelessness: *slack, slattern, sleazy, slob, slut*
- *sl*–cunning, crafty: *sleuth, slippery* (customer), *slick* (operator), *sly.*

A final small group may be included: *sl*-slim, thin: *slender, slim, slit, sliver*

When adjusted in this way, it turns out that 91% of English words beginning with *sl-* are phonesthetic.

A less obvious phonestheme is *sw-* movement through air or water: *sway, sweep, swerve, swim, swing, swish, swivel, swoosh*. To this list could be added *swan, swallow*, and *swift*, as these birds move swiftly through air or water.

Dwight Bolinger has noted the interesting fact that the initial *st*-phonestheme may express the two opposed concepts of movement and arrest (1965):

- *st*-movement: *stamp, stampede, start, startle, step, stimulate, sting, stir, stomp, stray, stream, stride, stroll, strut*
- *st*-arrest: *stall, stay, steady, stick, stop, stub, stump*.

Subcategories of these two groups may be identified as follows:

- *st*-movement – attacking action: *stab, stamp, stampede, stick, sting, storm, strafe, strike, stun*
- *st*-arrest – reliable, steadfast: *stable, stalwart, staunch, steadfast, steady, stolid, stout, strong, sturdy*
- *st*-arrest – implacable, rigid: *starchy, steely, stern, stiff-necked, strait-laced, strict, stubborn, stuffy.*

Initial Treble Consonant CCC-:

- *spr*-spring, spread out: *sprawl, spray, spread, sprinkle, sprig, spring, sprout*
- *spr*-spirited, energetic: *sprightly, spry, springy, spree, sprint*
- *str*-effort against obstruction: *strain, stress, stretch, strive, struggle* (see below)
- *str*-stretch out, scatter: *straddle, straggle, strand, stray, stream, stretch, strew, string* (out).

It is interesting to note that the two categories of both spr- and str- phonesthemes express the similar concepts of 'energy' and 'striving,' and 'stretching or spreading out.' This could lend some weight to the argument that it is the difficulty of articulation of these initial consonant clusters that helps reflect the semantics of this group of words (see below). With these groups could be compared *scr*-eke out, struggle to exist: *scrabble, scrape, scratch, scrimp, scrounge*. The notion of struggling to survive by *scrimping and scraping* is common in English, and this collocation reflects the 'vowel alternation' or 'apophony' seen in so many English reduplicatives.

Final Phonesthemes

As with initial phonesthemes, three groups may be identified:

Final Vowel Plus Consonant V+C Final plosives function as phonesthemes, expressing contact between two objects or surfaces. A voiceless plosive such as *-p* denotes actions that strike and then glide off: *slap, clap, rap, tap, flap, lap*. Voiced plosives, however, denote striking that stops in or on something: *dab, grab, stab, nab, daub* (Bolinger, 1965).

The *sw-* group provides a useful illustration of how a final plosive suggests contact. *Sway, swerve, swim, swing* all express movement with no final contact, whereas *swap, swat, sweep, swipe, swoop* suggest movement with final contact. The verb *swap* originally referred to the slapping together or swapping of hands over a bargain struck; hence, the collocation to *strike* a bargain. In this sense of the verb *swap*, the original phonesthetic force has been lost as no one now considers the original meaning. There is, however, a current dialectal verb, *swap* (Sussex), meaning 'to cut down long grass with a swap-hook.'

Final voiceless plosives may also express a sudden sound: *clack, click, cluck, crack, tick, whack*. A duller, more muffled sound may be denoted by a voiced plosive: *pad* (along), *thud*.

Another way in which the plosives /d/ and /t/ are used phonesthetically is to represent, respectively, a relatively gradual and a relatively abrupt process in English past tense endings:

> '*Spilled* seems more natural than *spilt* in *The water spilled drop by drop over the rim*; *spilt* more natural than *spilled* in *The milk spilt all over the floor when she dropped the pitcher*' (Bolinger and Sears, 1981: 130)

The voiced sound of /d/ is less abrupt than the voiceless sound of /t/ in: *jolt, volt, bolt, halt, dealt* (a blow).

The velar nasal /ŋ/ in final position denotes a resonant, long-lasting sound: *bang, bong, clang, ding, dong, gong, ping, ring, sing, song, ting, twang*. This final nasal sound also illustrates the 'synesthetic' qualities of many phonesthemes, namely, the ability to denote nonauditory experience. 'Synesthesia' or 'cross-modal association' is clearly present in several words with final *-ng*. *Cling* suggests the physical hanging onto something for a space of time, whereas *hang* whereas can refer to physical suspension, such as a man hanging on a gibbet or merely hanging around (i.e., being physically present for a space of time). *Tang* suggests a strong taste that remains or hangs around in the mouth; a *pong* remains in the nose, and a *pang*, although sudden, may remain physically in the body or metaphorically in the heart. In fact, the final *-ng* phonestheme represents all the different senses, but, as one would expect, expresses no action or movement apart from the verb *swing*, where the movement nevertheless is not abrupt but takes some time, thus fitting in with the *-ng* group.

Final Vowel Plus Two Consonants V+CC This group of final phonesthemes ends with two written consonants that are realized as one speech sound (e.g., *-ash* /aʃ/), with the preceding vowel here functioning as an integral part of the phonestheme.

The group *-ash* /aʃ/ denotes impact (sometimes violent) with a giving surface of some kind: *bash, clash, crash, dash* (*against*), *gnash, hash, lash, mash, plash, smash, splash, trash, thrash*. The final fricative sound in this group suggests contact with a soft or giving surface; thus, *swish* represents the movement through air of a curtain, lady's dress, an animal's tail, a whip etc., or movement through water of a boat or a

fish. A similar effect may be seen in *swoosh*; albeit here, the movement seems a little more violent (e.g., the swoosh of a rocket taking off). Finally, the *swash* blow in fencing, delivered downward to the body, travels through the air and then comes in contact with the giving surface of *flesh*.

Such final fricatives contrast with final plosives, which suggest contact with a hard surface: *tap, knock, whack, pat, skid, thud*. There seems to be an underlying pattern in the use of final plosives and fricatives to suggest contact with a hard or soft, unobstructive surface in *skid, skim, ski*. Here *skid* suggests violent contact with a hard surface, *skim* suggests movement across a surface without friction or contact with a soft surface such as skimming the top of the milk, whereas *ski* with no final consonant is paralleled by *fly*, whereas movement is completely free and unimpeded without contact of any sort (compare: *swipe, swish/swoosh, sway*).

Another group has two final consonants that are realized as two separate speech sounds, and often as in the group above, the preceding vowel is an integral part of the phonestheme. A phonestheme of this type is *-ump*, which expresses two distinct concepts:

- *-ump* /ʌmp/, clumsy unattractive: *bump*(*kin*), *chump, dump, frump, grump*(*y*)
- *-ump* /ʌmp/ a rounded object or collection of objects: *bump, clump, dump, slump, stump* (see Figure 1).

Final Vowel Plus Three Consonants V + CCC In this group, all three consonants are realized as three speech sounds as *-umble* /ʌmbl/, repeated awkward movements: *bumble, fumble, stumble, tumble*. Once again, the pejorative force of /ʌ/ can be seen as in *-ump* above.

Vowel Phonesthemes (Phonetic Symbolism)

As far back as 1922, Otto Jespersen observed that the high, front vowel /i/ has a diminutive force as in *wee, teeny*, whereas the low back vowel /ɑ/ has an augmentative force as in *vast, large*. The diminutive suffixes *-ie*, *-kin*, and *-ling* also use the /i/ phonestheme. Jespersen also noted that /i/ is expressive of a very short time, as in the phrase *in a jiff, jiffy* as well as *quick, swift, vivid, blitz* (1922: 402).

Subsequently in 1929 Edward Sapir coined the term 'phonetic symbolism' to describe the fact that some words 'sound bigger' than others. His innovatory experiment to test subjects' reactions to a pair of nonsense syllables *mil, mal* 'table' for the concepts 'small,' 'large,' has led to a whole series of similar experiments. These later experiments have investigated many other synesthetic or cross-modal associations expressed by the vowels /i/ /ɑ/. Fischer–Jørgensen (1967) added to Sapir's original experiment the following set of associations using CVC monosyllables as Sapir had done: bright/dark, angular/round, hard/soft, light/heavy, tense/relaxed, tight/loose, narrow/broad, and thin/thick. Fischer-Jørgensen gained positive correlations in all these areas of perception, and Tarte and Barritt (1971) also saw a 'striking orderliness' in results using elliptical or triangular figures of different size to match with CVC monosyllables, identical apart from the vowel /i/ /ɑ/. The conclusion drawn from these and other similar experiments is that certain vowel sounds tend to group in semantic clusters, and in the case of the high front vowel /i/ and lower back vowels /ɑ/ /ɔ/, these clusters are in definite opposition (French, 1972).

When looking at the lexicon of English, certainly the high front vowels /i/ and /ɪ/ are very marked in their ability to express the concept of 'smallness,' especially small objects. Gulliver was placed among the *wee* men of *Lilliput* and would have been regarded as a *pipsqueak* among the giants of Brobdingnag. This vowel has also assisted meaning change; for example, *pittance*, a scanty allowance, originally denoted any pious donation whether great or small, and a *miniature*, originally an image painted with minium or vermilion, has come to mean a small painting. The word *minuscule* is often spelt *miniscule* under the influence of the *mini*-prefix. It is noticeable that many musical instruments that are capable of playing low-pitched notes have English names containing half-open or open vowels: *organ*, *horn, trombone, double bass, harp, tuba, cor anglais*, (*kettle-*) *drum, marimba*; other instruments characterized by high pitch have names containing close or half-close monophthongs or diphthongs with close end points: *violin, fiddle, fife, flute, cymbals, piccolo, tin whistle*.

Phonestheme Networks

Phonestheme groups have a tendency to ramify in networks throughout the language, forming what Bolinger called 'word constellations.' Such constellations consist of groups of words sharing similar meanings and linked by alliteration (shared initial phonestheme clusters) and rhyme (shared final phonestheme clusters). The ramifying network of phonesthetic words illustrated in Figure 1 could be extended indefinitely (see also Bolinger, 1965).

Wales (1990), using tables compiled by the phonetician A. C. Gimson, identified sequences of vowels and consonants in English that have significant phonesthetic or expressive possibilities. Many such sequences have their roots in Germanic and Old English; for example, /sk/ suggesting fris*k*y movement

in Middle English: *skip* (probably from Old Norse), *skim* (from Old French), *scuttle* (dialectal), *skid* (17th century), *scurry* (19th century), *scoot* (19th century U.S.), *skedaddle* (19th century), (Wales, 1990; see also Figure 1).

This *sc- sk-* group illustrates the point that a phonestheme group can develop from a phonestheme nucleus of Old English roots, which have perennially attracted new words through borrowing, blending, alliteration, and rhyme, and the perceived similarity of meaning. Professor Michael Samuels put this more simply: "A phonestheme may grow from minor coincidental identification between a few roots to much larger patterns" (Samuels, 1972: 47). The words *scamper, skedaddle, scoundrel, scallywag, skulk, scrimshank, skive* are all labeled 'etymology unknown' or 'etymology uncertain' in modern dictionaries. They all share in common the meaning 'swift, light movement,' thus associating them with the initial *sc- sk-* group. There is, however, a further association of 'swift, light movement away from one's responsibilities and duties'; hence, the pejorative sense of these words, a sense that is even present in the original *skip* 'to skip one's duty' (see Figure 1). These additions illustrate well the 'larger patterns' that such a phonestheme may acquire through time, and perhaps *scab*, 'a disloyal trade unionist,' could be added here also.

Examples of borrowing are Anglo–Indian *cushy* 'comfortable, soft,' German *strafe* 'to punish,' Norwegian *slalom* 'a downhill ski race.' All these words fit into phonesthetic groups: *cushy, cu-* /kʊ/- /kʌ/- 'comfortable, soft, cuddly, cushion'; *strafe st-* 'attack': *slalom sl-* 'sliding movement.' To these may be added Greek *Stoic* 'a follower of the philosopher Zeno,' for this word could also fit into *st-* 'reliable, steadfast.' This latter example illustrates the unimportance of original etymology, as *Stoic* derives from Greek *stoa* 'a porch,' this being the porch under which Zeno sat when teaching his disciples.

Blends

Over the centuries, 'blending' has played a significant role in the production of phonesthetic and slang neologisms. This process whereby words are linked together by similarities of initial and final clusters has probably been underestimated (Jespersen, 1922). Such blends motivated by phonesthetic forces are drawn into phonestheme networks.

- *bat* (1205) × *mash* (1000) > *bash* (1641)
- *clap* (1375) × *crash* (1400) > *clash* (1500)
- *smack* (1746) × *mash* (1000) > *smash* (1778)

The above dates show the earliest occurrence recorded in the OED.

Phonesthetic blends account for many words recorded in both the OED and modern dictionaries as of 'uncertain, obscure, or unknown origin.' The highly phonesthetic *sl-* group records *slaister* 'to plaster in a wet or dirty manner' (of obscure origin); *sleer* 'to look askance' (of obscure origin); *slodge* 'to trail or drag the feet' (imitative?); *slouse* 'to wash with a copious supply of water' (suggested by *sluice* and *souse*?). Apart from *slaister*, the above words are now obsolete even in dialect. They do illustrate, however, what Bolinger termed the 'iconic drive' in language to make the sound conform to sense. The above blends can be analyzed by attaching them to the appropriate *sl-* phonestheme:

- *slaister*: *plaster* + *sl-*, 'eject or add water' + *sl-* 'indolence, carelessness'
- *sleer*: *leer* + *sl-*, 'sliding movement'
- *slodge*: *trudge* + *sl-*, 'indolence, carelessness,' + *sl-* 'sliding movement'
- *slouse*: *souse* + *sl-*, 'eject or add water.'

Universality of Sound Symbolism

It is generally acknowledged by linguists that certain forms of sound symbolism function across different language groups. In most cases, the evidence for sound symbolism crossing related languages is more readily available than that for unrelated languages.

Onomatopoeia

Certain words that mimic animal or bird sounds, although not absolutely identical, do show marked similarities across language groups. The sound of the cuckoo is perceived and transcribed somewhat similarly across different languages: English *cuckoo*, Fre *coucou*, Sp *cuclillo*, Italian *cuculo*, Rumanian *cucu*, German *Kuckuck*, Greek *kókkyx*, Ru *kukushka*; non-Indo–European: Hu *kakuk*, Finnish *käki*. Showing a similar marked resemblance is the sound of a cock crowing: English *cock-a-doodle-doo*, Swe *kuckeliku*, Dan *kykeliky*, Fre *cocorico*, Sp *coquelico*. Similar to English too are the words for noises made by an Italian sheep *bè*, a Turkish duck *vakvak*, and a French turkey *glouglou*.

Human sounds too can have similar transcriptions, (e.g., the /r/ in snore: German *schnarchen*, Du *snorken*, Latin *stertere*, Fre *ronfler*, Sp *roncar*, Ru *šeptat'*, Hu *horkolni*, Turkish *horlamak*). Similarly the /s/ in whisper: German *wispern* and *flüstern*, Norw *hviske*, Latin *susurrāe*, Fre *chuchoter*, Sp *cuchichear*, Ru *šeptat*, Hu *súgni, susogni, suttogni*.

Many sounds, however, are transcribed quite differently as the following set of reduplicatives show:

- The sound of a dog barking: English *bow-wow*, Ira *amh-amh*, Serb–Cr *av-av*
- The sound of a bell ringing: English *ding-dong*, German *bim-bam*, He *tsil-tsul*
- The sound of a door banging: English *bang*, Du *plof*, Ru *bats*.

A similarity here lies in the reduplicative structure and the initial plosives in the case of a bell ringing and a door banging, but apart from this the words are quite different.

Phonesthemes

Sets of phonesthemes cluster together forming groups in specific semantic fields, and as these groups are formed by social and personal attitudes, they vary from language to language. Experiments to investigate whether phonesthemes occur across languages have been very inconclusive. Equally, experiments to investigate the narrower area of vowel phonesthemes or phonetic symbolism have also come to the conclusion that the connotations of these sounds are not shared among language groups.

However it has been noted that, in a tonal language such as Cantonese, high pitch connotes smallness, and the /i/ phonestheme has a high pitched second formant. In addition, diminutives expressed by the /i/ suffix do seem to pass across language communities: English *-y*, *-ie*, *-kin*, *-ling*; Du *-ie*, *-je*; Greek *-i-*; Goth *-ein*; Swiss German *-li*; Italian *-ino*; Sp *-ico*, *-ito*, *-illo*. It has also been suggested that the words *mama* and *papa* may work as partial universals, and this is perhaps a case of /ɑ/ expressing the concepts of 'warm, round, soft.' Woodworth (1991) examined deictic elements in 26 languages for evidence of the /i/ *near* /ɑ/ *far* dichotomy. Her results showed a high correlation in some unrelated languages in this group, and she concluded that this forms some basis for a relation between the vowel quality of proximal and distal forms and their meaning language universally.

The enormous number of world languages means that research into possibilities of even partial universals in sound symbolism must necessarily proceed at a slow pace. So far, no true universals in sound symbolism have been found, although, as stated above, near universal elements like *mama papa* and certain deictic elements have been cited.

Sound Symbolism in Poetry and Literature

Sound symbolism always has been pervasive in poetry. When Alexander Pope said that in poetry, "the sound must be seen to echo the sense," he was stating a poetic commonplace.

Sound symbolism may be used to effect a certain intonation when reading a line of poetry either aloud or silently, and often the enforced intonation will echo the sense of the line. The following lines from Pope's *An Essay on Criticism* (1711) illustrate the above point:

> When Ajax strives some Rock's vast weight to throw
> The Line too labours, and the Words move slow.

The reader is forced to slow down when coming to these lines for a number of reasons, thus echoing the difficulty and slowness of the task described. The difficulty of transition from one identical (or similar) sound to the next makes the first line very obstructive. 'Ajax-strives,' 'strives-some,' 'weight-to' are syllables in poetry as opposed to everyday discourse and so must be pronounced without the elision of casual speech. Thus, enforced pauses between these syllables slow down the line (Epstein, 1978).

The word 'strives' forms part of the phonestheme group *str-*, difficulty or obstruction: *strain*, *straggle*, *stretch*, *struggle*, *stricture*, (and with prefix) *restrict*, *constrict*, *obstruct*.

The combination of these sound symbolic factors enables Pope to produce a couplet that is a verbal icon of the process in question.

Another example of Pope's exploitation of the 'public' performance of poetry, which precludes everyday elision also appears in *An Essay on Criticism*:

> And ten low Words oft creep in one dúll Liṅe

Enforced pauses must take place between 'And-ten,' 'low–Words,' and 'dull-Line,' whereas *dull* carrying as it does the *du-* /d/- 'dull' phonestheme must be stressed in a reading of this line.

James Joyce in *Ulysses* used nonlexical onomatopoeia, (e.g., *Pprrffrrppff* to represent the sound of farting, and *krandlkrankran* to express the sound of a clanking Dublin tram; Attridge, 1984). He also used lexical onomatopoeia and phonesthemes in such a way that the words work both onomatopoeically and phonesthetically, as well as semantically drawing other words by means of alliteration and rhyme into the imitative network: 'Clock clacked,' 'jingle-a--tinkle jaunted,' 'One rapped on a door, one tapped with a knock.'

Similarly, he evoked music: 'Brightly the keys, all twinkling, linked, all harpsichording.' Twinkling associates with tinkling, thus linking sight and sound; twinkling also reinforces brightly, and the words *twinkling* and *linked* contain the /I/ phonestheme the has connotations of small, bright, and

light (in weight). Thus, the high-pitched sound of the playing is phonesthetically suggested by the rhyming /Iŋk/ sound, which not only suggests tinkling but possibly also the *pink-a-pink* of a piano.

Secondary Sound Symbolism

The functions usually recognized as primary sound symbolism are onomatopoeia and phonesthemes including vowel phonesthemes otherwise known as phonetic symbolism. There are, however, forms of secondary sound symbolism that work within language communities. Four of these involve allusion to words not actually uttered by the speaker, whereas a fifth and a sixth harness, respectively, intonation and facial expression in appropriate ways.

Spoonerisms

These slips of the tongue are attributed to the Reverend William Spooner (1844–1930), who is reputed to have said, "May I sew you to another sheet?" for "May I show you to another seat?" The *metathesis* or reversal of *s* and *sh* produced a sentence that has no nonsense words and is grammatically correct, but comical in the given context of utterance. He also said "beery wenches" for "weary benches," and no doubt many of his 'mistaken' spoonerisms were created for comic effect. Invented spoonerisms are a form of witticism such as that produced by the poet Algernon Swinburne who wrote to his female cousin "By Merest Dozen" for "My Dearest Cousin" (Jakobson and Waugh, 1979). Another witty spoonerism using a double metathesis is 'Wait till the nun signs Shelley' for 'Wait till the sun shines Nelly.' Most spoonerisms work on the metathesis of one or more initial sounds, but occasionally a blend may be used as in 'We all jumped on him like a toad of bricks,' *toad* here being a blend of *ton/load*.

Rhyming Slang

Rhyming slang is found in Australia and the United States, as well as in London as the famous Cockney rhyming slang. There is a sense in which rhyming slang may be interpreted as a sort of inverted spoonerism, where a comical phrase completely unsuitable in the context of utterance may be reinterpreted to mean something quite different. The reinterpretation depends on a substitution of the initial letter of the second element of the phrase; thus: *trouble and strife* 'wife,' *Derby Kelly* 'belly,' *apple and pears* 'stairs,' and *dickie bird* 'word.' The second element is easy enough to guess simply by running through all the rhyming words and picking the one that fits the context of utterance. As with phonestheme networks, this retrieval system depends upon sound (rhyme) and meaning in a real-world context. The rhyme is not always perfect, (e.g., *brass tacks* 'facts'), but in Cockney pronunciation, this would no doubt rhyme well, and in fact, there was a British TV program entitled *Brass Tacks*. Rhyming slang, like phonestheme networks, gives an insight into the way that the mental lexicon is stored and retrieved by means of sound and meaning.

Malapropisms

Malapropisms are slips of the tongue that occur when one word is mistaken for another similarly sounding word. They take their name from a character in Sheridan's play *The Rivals* – a Mrs. Malaprop who constantly produces such slips of the tongue, thus rendering her language *malaprop*.

Malapropisms are often amusing: *refractory table* 'refectory table' (newspaper misprint), *sitting gills* 'City and Guilds' (job application), *capable of withstanding pleasure* 'pressure' (TV newscaster), *physicist heal thyself* 'physician' (Bible reading), and '*Bach had an old spinster in the attic on which he used to practice*' 'spinet' (child's exam answer).

Cascara sugar 'caster sugar' and *garlic coffee* 'Gaelic coffee' are obvious malapropisms, whereas *bashed* or *smashed potato* for 'mashed potato' look more like variants as they both use the final *-ash* phonestheme 'contact (often violent) with a giving surface or substance.' Talking of *midges* instead of 'midgets' and speaking of the *tang* of the guitar for 'twang' are not true malapropisms as these words belong to the *mi-* 'small' and *-ng* 'lasting sound, taste etc.' phonestheme groups. The retrieval here although faulty is colored by associative phonesthetic forces connected with meaning, as well as by sound.

True malapropisms work on retrieving words from the mental lexicon on sound alone, whereas near-miss retrievals such as *midges* for 'midgets' indicate a retrieval based on sound and meaning. From such examples, as with rhyming slang and phonestheme networks, the inference may be made that the lexical storage system is cross-indexed for both sound and meaning.

Folk Etymology

Folk etymology, sometimes known as popular etymology, occurs when the origin of a word is lost or forgotten and another etymology that seems likely or fitting is substituted in the popular consciousness. The meanings of some words that have come to us from the Old English period are based on folk etymology. OE *scam-fæst* 'confirmed in shame' has now come to mean 'shame-faced,' taking the sound of

face and the connotation of blushes. In the same way, OE *brydguma* 'bridegroom' has as its second element the obsolete word *guma* 'man,' so the substitute word *groom* 'boy, male child' was used as being close in sound and meaning. These words show a slight change in form that has come about by a reinterpretation of their etymology. As with *fæst* and *guma–groom*, homophones or near homophones are often involved in folk etymology. Examples are: *free reign* for 'free rein,' *guidewires* for 'guy wires,' and colloquial *choky* for Hindustani *chauki* 'a police station.' The correlation of sound and meaning then, plays an important part in producing folk etymology, and this can be seen in a final example, *run amuck* for Malaysian *amok* 'a kind of nervous frenzy among the Malays.'

Intonation

Intonation is obviously sound symbolic when used in a sentence such as 'I've been waiting for $^{\text{a-a}}\searrow$ ges' or 'I haven't see her for $^{\text{yea}}\searrow$rs.' In both cases, the emphasis and slow enunciation of *ages* and *years* symbolize the sense of the slow passing of time. A similar use of lengthened intonation is used in the song title 'It's been a h-a-r-d d-a-ys night.' A person could be described as 'a-w-f-u-ll-y boring' where the slow intonation echoes the slow passing of time with a bore and reinforces the long /ɔ/ sound also found in the phonestheme group *brawl*, *sprawl*, *drawl* 'stretched out.' Conversely, one can snap out a command 'quick, quick, quick!' using the swift /ɪ/ phonestheme. Intonation may also go up or down as in the following short sentences echoing a parent's reaction to exam results.

'He's come $\nearrow^{\text{top}}$!' or 'He's come $\searrow_{\text{bottom}}$.'

Gesture

It has been noted that words with initial *vi*-usually denote 'intense ill temper' and that the force of this word group is due in part to the accompanying facial expression, where the labiodental /v/ is immediately followed by the spread vowel /i/, which exposes the teeth behind the lips in a sort of grimace. Such words as *vicious*, *villain*, *vindictive*, *vehement*, *vitriolic*, *vinegary*, *vixenish*, *vile* require a grinning animal-like expression indicative of aggression (Bolinger, 1965). A similar facial expression would accompany words with initial *sni-*: *sneer*, *sneak*, *sneap* (Shakespeare's 'sneaping winds') *snip*, *snitch*, *snide*.

A rising intonation usually indicates surprise, shock, or horror expressed by *oh!* or *aaagh!*, whereas delight is expressed by *ooh!* In both cases, the eyebrows will be raised and the mouth open to a greater or lesser extent. A falling intonation, however, expresses depression, disappointment, or perhaps respect or reverence. In these cases, the head will be lowered and the mouth closed.

The Iconicity of Language

Linguists such as Bolinger and Wescott speak of the iconicity of language, and by this they mean the dynamic drive of language to correlate sound and meaning.

Sound symbolism certainly is very pervasive in language in both its primary and secondary forms, and phonesthemes in particular are very widespread in English. Poets have always recognized and used sound symbolism, and now with modern psycholinguistic research that tests subjects' reactions to sounds, and modern linguistic research looking at the lexicon itself, more and more data are being gathered to prove scientifically what before was only subliminally felt.

In his article 'Linguistic iconism,' Roger Wescott (1971) posited several theories concerning the symbolic/iconic development of language. One he called 'the steady state theory' whereby the arbitrary (i.e., symbolic) function of language is balanced by the nonarbitrary iconic drive of language. As words change their meaning through time or their sounds through sound changes, so they lose their sound symbolism. However, new words are coined to fill the gaps, and if a word group becomes too iconic, as perhaps is the case with *sl-*, so new blends and coinages are short-lived. This would seem to echo the outcome of Plato's famous dialogue *Cratylus* where neither Hermogenes (supporter of the arbitrary nature of language) or Cratylus (supporter of the nonarbitrary position) seems to win. Without more detailed research, both synchronic and diachronic, it is impossible to say whether such a 'steady state' exists in language. However, it is possible to say that sound symbolism acts as a creative force within English and all other languages in the world.

See also: Gesture and Communication; Iconicity; Ideophones.

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South Africa: Language Situation

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Official Languages

Apartheid was a defining feature of South African society, politics, and linguistic practice for much of the 20th century. The post-apartheid democracy instituted in 1994 ushered in many changes whose consequences are already evident in the early 21st century. These changes are likely to change the social and linguistic hierarchies in the long term. The country's new constitution of 1996 surprised most observers by its recognition of 11 official languages. **Table 1** lists these languages according to numbers of speakers, according to the last census of 2001.

Of the official languages, 9 belong to the Bantu subfamily of the Niger Kordofanian languages, and 2 to the Germanic family. The Bantu languages of South Africa fall into two main linguistic subgroups, designated Nguni and Sotho, plus two other languages, Tsonga and Venda. The Nguni languages (Zulu, Xhosa, Swati, Ndebele) are largely mutually intelligible, as are the Sotho languages (Pedi (Northern Sotho), South Sotho, Tswana). Tsonga and Venda are not mutually intelligible, either with each other or with the other languages. Many of these languages have official status in neighboring territories, where they are majority languages: Swati in Swaziland, Sotho in Lesotho, and Tswana in Botswana. Ndebele, Tsonga, and Venda are also found in large numbers in neighboring countries: Ndebele in Zimbabwe, Tsonga in Mozambique, and Venda (to a smaller extent) in Zimbabwe and Zambia. The two Germanic languages, Afrikaans and English, are not mutually intelligible, but do share a great deal of cognate lexis. Afrikaans is not always described as a Germanic language, as several linguists have considered it to be a semi-creole. However, reports of mutual intelligibility with Dutch and the ability of ordinary South Africans of diverse backgrounds to service Dutch call centers based in Cape Town suggest that the case for creolization may have been overstated. **Table 2** is a regrouping of these languages according to the 'clusters' they belong to. The table also indicates alternate forms by which these languages may be designated.

Of the 11 official languages, two were official state languages in the apartheid era – Afrikaans and English. The other nine had official status in one

Table 1 The official languages of South Africa in 2001 by numbers of mother-tongue speakers

Language	*n*	*%*
Zulu	10 677 306	23.8
Xhosa	7 907 154	17.6
Afrikaans	5 983 426	13.3
Pedi	4 208 982	9.3
Tswana	3 677 016	8.2
English	3 673 197	8.1
South Sotho	3 555 189	7.9
Tsonga	1 992 207	4.4
Swati	1 194 428	2.6
Venda	1 021 759	2.2
Ndebele	711 818	1.6
Other	217 297	0.4
Total	44 819 779	

(source: *Statistics South Africa*.)

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Table 2 The official languages of South Africa in 2001 by linguistic grouping and number of mother-tongue speakers

Nguni languages:		
Zulu	10 677 306	23.8 (isiZulu)
Xhosa	7 907 154	17.6 (isiXhosa)
Swati	1 194 428	2.6 (siSwati; Swazi)
Ndebele	711 818	1.6 (isiNdebele)
Total	20 490 706	45.6
Sotho languages:		
Pedi	4 208 982	9.3 (sePedi; North Sotho; seSotho sa Lebowa)
Tswana	3 677 016	8.2 (seTswana)
South Sotho	3 555 189	7.9 (seSotho sa Borwa)
Total	5 441 187	25.4
Germanic languages:		
Afrikaans	5 983 426	13.3
English	3 673 197	8.1
Total	9 656 623	21.4
Other Bantu languages:		
Tsonga	1 992 207	4.4 (xiTsonga; Shangaan)
Venda	1 021 759	2.2 (lu Venda)
Total	3 013 966	6.6
Other languages	217 297	0.4
Total	44 819 779	

Table 3 The four most common languages in each province

Province	*Most common language*	*Second most common*	*Third most common*	*Fourth most common*
Eastern Cape	Xhosa (5.4)	Afrikaans (0.6)	English (0.2)	S.Sotho (0.2)
Free State	S. Sotho (1.7)	Afrikaans (0.3)	Xhosa (0.2)	Tswana (0.2)
Gauteng	Zulu (2.0)	Afrikaans (1.3)	S. Sotho (1.2)	English (1.1)
KwaZulu-Natal	Zulu (7.6)	English (1.3)	Xhosa (0.2)	Afrikaans (0.1)
Limpopo	Pedi (2.8)	Tsonga (1.2)	Venda (0.8)	Afrikaans (0.1)
Mpumalanga	Swati (1.0)	Zulu (0.8)	Ndebele (0.4)	Pedi (0.3)
Northern Cape	Afrikaans (0.6)	Tswana (0.2)	Xhosa (0.1)	English (0.02)
North West	Tswana (2.4)	Afrikaans (0.3)	Xhosa (0.2)	Sotho (0.2)
Western Cape	Afrikaans (2.5)	Xhosa (1.1)	English (0.9)	Sotho (0.03)

(or more in the case of Xhosa) of the apartheid homelands.

Distribution of the Official Languages

Table 3, extrapolated from the 2001 census, shows the four most common languages per province and their numbers in millions (rounded off to the nearest 100 000).

In terms of L1 speakers per province, Table 3 shows that Zulu is in the lead (in KwaZulu-Natal), followed by Xhosa (in the Eastern Cape), Pedi (in Limpopo), and Afrikaans (in the Western Cape). The information in Table 3 can be used to show the approximate distribution of the official languages of South Africa. Table 4 shows the number of provinces in which each language is the most common, second most common, and so on. Using a weighting system of 4 points for the most common language, 3 for the second, 2 for the third, and 1 for the fourth most common languages, a ranking of the distribution of languages is possible.

Table 4 shows that Afrikaans is the language most widely distributed as a home language, followed by Xhosa. Zulu, which has the most mother-tongue speakers in the country, comes third according to provincial distribution as home language, and English is fourth. (In this article, the terms 'L1,' 'home language,' and 'mother tongue' are used synonymously.)

Unfortunately, the census statistics do not give information on the use of second languages. It is likely that English, Afrikaans, and Zulu would rank highly here. English is the most visible and audible language at governmental functions, political rallies, administration, and the upper echelons of business and education. There are also reports of incipient language shift to English among some Black South African families (see de Klerk, 2000). These factors make English a much more important language than these tables indicate. On the other hand, Afrikaans and

Table 4 The distribution of home languages per province

Language	*Most common language per province*	*Second most common*	*Third most common*	*Fourth most common*
Afrikaans	2	4	–	2
Xhosa	1	1	4	–
Zulu	2	1	–	–
South Sotho	1	–	1	3
English	–	1	2	2
Tswana	1	1	–	1
Pedi	1	–	–	1
Swati	1	–	–	–
Tsonga	–	1	–	–
Ndebele	–	–	–	1
Venda	–	–	–	1

African languages are very much alive on individual radio stations, in music, some newspapers (chiefly Afrikaans, Zulu, and Xhosa), primary education, and, to a lesser extent, on television.

Other Languages

The authochthonous (or 'most indigenous') languages of Southern Africa are in fact the Khoe-San (Khoisan) languages. These do not have official status, since their speakers have undergone language shift to Afrikaans or a Bantu language. They do have a degree of recognition as heritage languages, used for symbolic purposes. For example, the South African coat of arms carries its motto in a Khoe-San variety. Tony Traill (2002) describes the Khoe-San languages as a phylum of three unrelated groups (Northern, Central, and Southern) whose unity is more presumed than demonstrable, given the paucity of historical linguistic materials. Khoe-San languages survive to a slightly better degree in Namibia and Botswana.

South African Sign Language is an offshoot of British Sign Language, having been introduced to Cape Town by the nuns of the Irish Dominican Order in the 1860s (Aarons and Akach, 2002: 131). It is specifically mentioned in the constitution as a language to be supported by PANSALB, a government body for language promotion, because of its cultural and educational importance. For this reason and because of its use on national television in translating the news, it is sometimes informally described as the 'twelfth official language.'

Indian languages have been prominent in South Africa since 1860, with Tamil speakers reaching a maximum of about 153 645 in 1970, followed by Bhojpuri-Hindi (Bhojpuri), Gujarati, Urdu, and Telugu. These languages are now in decline, with speakers mostly having shifted to English, though many elderly bilingual speakers can be found. Malay was once prominent as one of the languages of the slave community brought from mainly the East Indies to the Cape, but it has been largely replaced by Afrikaans. Of the languages of the relatively small Chinese communities, Cantonese (Yue Chinese), Hakka (Hakka Chinese), and Mandarin (Mandarin Chinese) are prominent.

Among European languages other than the official ones, German and Portuguese are the most prominent, with smaller numbers for Dutch, Italian, Greek, and so forth. Post-apartheid openness has seen French (initially introduced in the 17th century by Huguenot refugees, only to undergo shift to Afrikaans) reintroduced, this time via francophone emigrants from different parts of Africa. Greater tolerance of African migration (beyond laboring in the mines) has seen Swahili emerge as a language to be occasionally heard on South African streets and in homes, as well as African varieties of French, English, and Portuguese.

Of classical languages, Latin, Greek, Sanskrit, Hebrew, and Arabic are prominent in mainly religious spheres.

Lingua Francas and Multilingualism

There is a high degree of multilingualism among South Africans, with many Black people – especially from the Gauteng area – claiming a command of as many as eight or nine languages (see Mesthrie, 2002: 12–13). Most people with a high school education use English as a lingua franca in formal domains and when conversing with someone they do not share a home language with. Afrikaans was a rival lingua franca for this purpose, and remains so to a decreasing extent. Other languages like Zulu or Afrikaans also function as a lingua franca, especially in informal and non-public contexts. A pidgin language, Fanakalo (Fanagalo) was prototypically used in some parts of the country in asymmetrical communication between employer and employee or in transactions in shops, petrol stations, and the like. It was a useful lingua franca of the mines, which drew on speakers of a few score languages of South Africa and several neighboring countries. Fanakalo uses a simplified Zulu lexis, with a grammar that appears to show greater influence from English than any other language. With the end of the era that spawned asymmetrical communication between Black and White, Fanakalo is slightly on the decline. The association of this pidgin with exploitation and inequality have precluded it from remaining the 'official' lingua franca of the post-apartheid mining industry. What will replace it remains to be seen.

At a more egalitarian level, when Black South Africans from different language groupings converse with each other at an informal level, one of the following may be used: (a) Zulu as lingua franca (if it is known by interlocutors), (b) code-switching between languages known by interlocutors and (c) 'township' lingua francas typically associated with young males – Tsotsi Taal (Tsotsitaal) (or Flaitaal) and Isicamtho (Camtho).

Current Initiatives

The extent to which the generous constitutional proposals regarding language are able to be implemented is still a subject of debate. Skeptics wondered about the so-called 'escape clause' in the constitution specifying that official languages are to be used in government, taking into account practicality, expense, and other circumstances (clause 3). There is also an openness of interpretation possible in clause (4), "all official languages must enjoy parity of esteem and must be treated equitably," in which 'equitable' seems to be distinguishable from 'equal.'

As a vision towards national unity and language maintenance, there is little room for discontent with the constitutional provisions. The key question for applied linguists and educators is the extent to which the new constitutional flexibility on language can be put into effective practice. In some respects, language policy and practice have been in flux in the post-1994 era, with many sectors still experimenting with the most effective and the least divisive language options. Current steps towards a national plan are now underway, with a languages bill being put before parliament. This bill ('The national language policy framework,' final draft November, 2002), which was devised by the Department of Arts, Culture, Science and Technology, would bind all government structures to a multilingual mode of operation. A 'Language in education policy' document was issued by the Ministry of Education (July, 1997) as part of the National Educational Policy Act (27 of 1996). It places emphasis on at least two languages for performance assessment and promotion. Questions about the relative roles of the mother tongue as opposed to English (and to some extent Afrikaans) as medium of instruction in schools have still to be settled. In 2004, the Minister of Education called for the use of mother-tongue instruction for three years before a switch to English as the medium of instruction (assuming this to be the language chosen by school governing bodies). The paucity of this term has concerned many applied linguists, who would favor a longer period of mother-tongue instruction. Finally, in terms of the 'Language policy for higher education' (November, 2002), tertiary institutions had to submit plans to the Ministry of Education in 2004 showing their commitment to multilingualism in their institutions.

See also: Afrikaans; Fanagolo; Khoesaan Languages; Southern Bantu Languages; Xhosa; Zulu.

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South African Lexicography

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The first monolingual dictionary of South African English was *Africanderisms* (1913), compiled by a Methodist minister and amateur linguist, Reverend Charles Pettman. It contained definitions of the uniquely South African words he encountered, such as *veld*, *induna*, *mealie*, and *impala*. These entries were supported by illustrative quotations, in a style similar to that used by the *Oxford English Dictionary*.

Fifty-five years later, Rhodes University's Professor William Branford made the next serious attempt to document and define South African English. In 1968, he pioneered a small project to collect samples of South African English. This material, archived on thousands of handwritten or typed cards, has provided a wealth of data for various South African English dictionaries of note: Jean Branford's popular *Dictionary of South African English* (1978), the scholarly *Dictionary of South African English on Historical Principles* (1996), and, more recently, the *South African Concise Oxford Dictionary* (2002), which is an indigenized version of the 10th edition of the *Concise Oxford Dictionary*.

With 5000 entries, supported by 47 000 quotations, the *Dictionary of South African English on Historical Principles* is the result of the most extensive and detailed research ever undertaken into the history of English in South Africa. Coverage extends from the 16th century to the present day and entries include spoken as well as written forms of the language. The dictionary includes words derived from various languages which have influenced English in South Africa: Dutch, Afrikaans, and the Malayo-Indonesian, Indian, Khoisan, Nguni, and Sotho languages. Everyday words such as *robot*, *indaba*, *braai*, and *naartjie* are defined together with the language of the townships (*mellow yellow*, *spaza*, *stokvel*), local music terms (*kwela*, *mbaqanga*, *sakkie-sakkie*), mining vocabulary (*cocopan*, *cheesa-stick*, *mine-dump*), and apartheid terminology (*group areas*, *homeland*, *immorality*).

> The dictionary attempts to map and illustrate the complex landscape of that variety of English which is particular to South Africans – words borrowed from the many languages of South Africa, English words which have acquired particular senses here, and words coined for local phenomena (Silva, 1996: vii).

Recent research has highlighted the fact that South African English is not one monolithic variety, but is made up of several subvarieties, which developed along ethnic lines as a result of the apartheid policy of racial segregation. Thus, researchers have identified Black South African English (Gough, 1996), South African Indian English (Mesthrie, 1992), Cape Flats English (Malan, 1996) and Afrikaans English (Watermeyer, 1996). A notable publication in this regard is the *Lexicon of South African Indian English* (1992), compiled by the well-known sociolinguist Professor R. Mesthrie.

Other research has explored Black South African English and various subdivisions of it, e.g., Xhosa English (De Klerk, 2002) and Tswana English (Van Rooy, 2002). The different varieties of South African English do share certain core features and it is these common lexical and syntactic features that the purist might wish to term 'South African English.' However, South African lexicographers are faithful to the tradition of descriptive rather than prescriptive lexicography, and correctness is defining what is 'generally and widely used by the speakers of the language.' So it may well be that in future South African English dictionaries will have to be more inclusive, in order to capture the complex and dynamic nature of this variety of English.

Since 1994 and the scrapping of apartheid, contact between language and ethnic groups is less fraught and new lexical items are being added to South African English at an exciting rate. One of the latest of these is the very descriptive 'vuvuzela,' a term for the loud horn heard at soccer matches.

In a multilingual country such as South Africa, English is the mother tongue of a small minority, but it is used in the public domain by the vast majority, for whom it is just one of many languages in their repertoire. It is axiomatic, therefore, that English in South Africa is in a state of flux and the lexicographer has to monitor the country's linguistic scenario with an open mind and a keen eye to capture the nuances of this evolving picture.

See also: African Lexicography; English Lexicography; South Africa: Language Situation.

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South and Southeast Asia: Scripts

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Indic Writing

Introduction

One of the major families of scripts used in the world today derives from the system of writing first substantially recorded in Indian inscriptions of the 3rd century B.C. Historically, a great many different scripts belonging to this Indic family are attested (cf. Grierson, 1903–1927), and even today it remains exceptionally fully represented (Daniels and Bright, 1996: 371–484). Although the introduction of Islam into South Asia has resulted in the widespread diffusion there of the Arabic script to write Urdu and other languages of Pakistan, alongside these newcomers in India itself and the immediately surrounding countries of South Asia, no less than ten different scripts of indigenous origin remain in official use (see **Figure 1**) to write 13 different modern languages belonging to the Indo-Aryan and Dravidian language families, including the national languages of India, Bangladesh, Nepal, and Sri Lanka.

Figure 1 Four different scripts used to write the value '1/4 annas' in English, Hindi, Telugu, and Urdu on a postage stamp of the former state of Hyderabad.

From a quite early period, the Indic writing system also became diffused across most of Southeast Asia, in conjunction with the spread of Indian religions and cultures to that region. Numerous local adaptations of the system were developed there to write the local languages of this very diverse area, which include representatives of the Austronesian, Austroasiatic, Tai, and Tibeto-Burman language families. While some of these are now obsolete, partly as a result of the later diffusion into the region first of the Arabic script with the coming of Islam, then of the Roman script as a consequence of European colonization, the modern Southeast Asian scripts of Indic origin continue to include those used to write the national languages of Cambodia, Thailand, Laos, and Burma (Myanmar).

This article is intended to provide an overview of the historically salient common features of the Indic family of scripts, while also drawing particular attention to the distinctive typological features within the family exhibited by the modern standard scripts of South and Southeast Asia. The early spread northward of the Indic writing system into Central Asia and its continued presence there in the form of the modern Tibetan script are dealt with separately elsewhere (*see* **Tibet: Scripts**).

Early Writing in India

The primary association of the Indic writing system is with the Indo-Aryan languages mostly spoken in the northern plains of the Indian subcontinent, where they constitute a rather well defined subfamily of the Indo-European group (Masica, 1991; Cardona and Jain, 2003). While Indo-Aryan is attested over a long historical time span, distinctive cultural factors are associated with the linked issues of its historical

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One of the major families of scripts used in the world today derives from the system of writing first substantially recorded in Indian inscriptions of the 3rd century B.C. Historically, a great many different scripts belonging to this Indic family are attested (cf. Grierson, 1903–1927), and even today it remains exceptionally fully represented (Daniels and Bright, 1996: 371–484). Although the introduction of Islam into South Asia has resulted in the widespread diffusion there of the Arabic script to write Urdu and other languages of Pakistan, alongside these newcomers in India itself and the immediately surrounding countries of South Asia, no less than ten different scripts of indigenous origin remain in official use (see Figure 1) to write 13 different modern languages belonging to the Indo-Aryan and Dravidian language families, including the national languages of India, Bangladesh, Nepal, and Sri Lanka.

Figure 1 Four different scripts used to write the value '1/4 annas' in English, Hindi, Telugu, and Urdu on a postage stamp of the former state of Hyderabad.

From a quite early period, the Indic writing system also became diffused across most of Southeast Asia, in conjunction with the spread of Indian religions and cultures to that region. Numerous local adaptations of the system were developed there to write the local languages of this very diverse area, which include representatives of the Austronesian, Austroasiatic, Tai, and Tibeto-Burman language families. While some of these are now obsolete, partly as a result of the later diffusion into the region first of the Arabic script with the coming of Islam, then of the Roman script as a consequence of European colonization, the modern Southeast Asian scripts of Indic origin continue to include those used to write the national languages of Cambodia, Thailand, Laos, and Burma (Myanmar).

This article is intended to provide an overview of the historically salient common features of the Indic family of scripts, while also drawing particular attention to the distinctive typological features within the family exhibited by the modern standard scripts of South and Southeast Asia. The early spread northward of the Indic writing system into Central Asia and its continued presence there in the form of the modern Tibetan script are dealt with separately elsewhere (*see* **Tibet: Scripts**).

Early Writing in India

The primary association of the Indic writing system is with the Indo-Aryan languages mostly spoken in the northern plains of the Indian subcontinent, where they constitute a rather well defined subfamily of the Indo-European group (Masica, 1991; Cardona and Jain, 2003). While Indo-Aryan is attested over a long historical time span, distinctive cultural factors are associated with the linked issues of its historical

evolution through different linguistic stages and the recording of these in writing. These are somewhat different from those familiar from the Middle East and Europe, where there have been long and intimate connections between writing and religious and cultural prestige.

In Indian civilization, by contrast, a marked preference throughout premodern times was given to the oral transmission of both sacred and literary texts. The Vedic hymns from around the start of the first millennium B.C., which are the oldest record of Indo-Aryan, were always preserved orally. The same was true of the vast early literature in Sanskrit, which derived from them, including the very sophisticated work of the early Brahmin phoneticians and grammarians, of whom the most famous is Pāṇini (4th century B.C.). Dissident religious movements such as Jainism and Buddhism signaled their opposition to the authority of the Vedas and the Brahmins through rejecting the Old Indo-Aryan medium of Sanskrit in favor of the later Middle Indo-Aryan languages called Prakrits, which include Pali, the sacred language of southern Buddhism. But in the earlier stages of these religions, too, scripture was typically transmitted through memory.

Writing was thus long typically associated in India only with the practical functions of administration or business. This appears to have been the case with the earliest Indian writing of all, the still undeciphered Indus Valley script, and is certainly true of the entire period before the early first millennium A.D., when the evidence for the evolution of writing derives very largely from the epigraphic evidence of royal inscriptions preserved on rock or other materials impervious to the destructive effects of the Indian climate (Salomon, 1998). The first substantial body of such evidence is found in the rock inscriptions set up by the great Buddhist ruler Ashoka (d. 223 B.C.), whose empire covered most of the subcontinent.

The Ashokan inscriptions, whose decipherment in the early 19th century was the key to the understanding of the development of Indian writing, are composed in different local Prakrits. Those located in the northwest are in the Prakrit called Gandhari, and are written in the Kharoshthi script (Figure 2). Although original in its organization, in its graphic appearance, with cursive characters running from right to left, this script clearly shows the influence of Aramaic, the chancery language of the Persian Achaemenid empire, which had earlier long controlled this region, and it has been suggested that the name 'Kharoshthi' (Sanskrit *kharōṣṭhī*, literally 'ass's ear'), may itself be of Iranian origin, with the sense of 'script of the realm' (Salomon, 2003: 93). Confined in its subsequent usage over the next few centuries to northwest India and adjacent regions of inner Asia, Kharoshthi (Das Gupta, 1958) marks only an interesting dead end from the viewpoint of subsequent Indian writing systems and therefore does not call for separate treatment here.

The Brahmi Script

All modern Indic scripts derive from the monumental Brahmi script used in the majority of the Ashokan inscriptions (Dani, 1968). Normally written from left to right, this is similar in internal organization but very different in appearance from Kharoshthi. It has been suggested that Brahmi too may have been inspired by Aramaic writing, but the evidence for this is less certain (Salomon, 2003: 87–89), and Indian scholars have naturally preferred to emphasize the originality of its creation. The name 'Brahmi' (Sanskrit *brāhmī*) indicates its early association with the creator god Brahma.

Whatever the arguments that may be advanced over the origin of individual letter shapes, the Brahmi script (like its relative Kharoshthi) certainly marks a quite new development, which is systemically different from the consonantal syllabaries used to write the Semitic languages of the Middle East. The unsuitability of these systems for Indo-European languages with their fundamental contrasts of vowels as well as of consonants was solved in the west by the invention of the Greek alphabet with its redesignation of certain Semitic letters to denote the vowels as independent graphic units fully equivalent to the consonants.

In India, the Brahmi and Kharoshthi scripts evolved a different solution. Most Prakrit syllables are open, most usually of the pattern CV. Here the consonant letter (*akṣara*) is treated as the primary graphic element. As opposed to the random order of

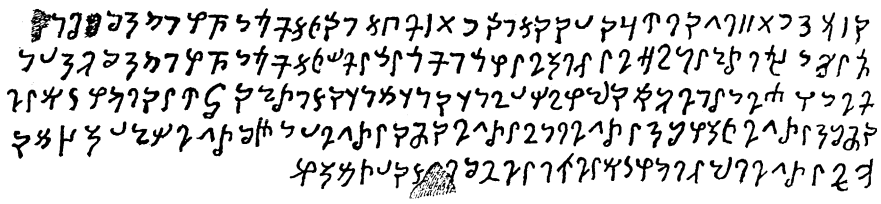

Figure 2 Kharoshthi script.

the Semitic and Greco-Roman writing systems, these are arranged in the Brahmi syllabary to follow the sophisticated classification of Sanskrit phonemes by the ancient Indian linguists. Their key distinction between five places of articulation (velar, palatal, retroflex, dental, labial) and five types of articulation (voiceless unaspirated, voiceless aspirated, voiced unaspirated, voiced aspirated, nasal) underlines the fundamental formal structure of virtually all subsequent Indic scripts. Closed syllables and clusters of consonants are generally infrequent in Prakrit. In the two commonest sequences of the pattern CVCCV, the medial CC consists either of a doubled consonant, where the script does not mark the gemination, or has as its first element a nasal, elegantly indicated by a diacritic mark.

The great innovation of Indic writing is its systematic indication of vowels. In the common CV units, vowel distinctions are indicated by the use of signs (*mātrā*) attached to the consonant letter, with the absence of a special vowel-sign economically marking the presence of the commonest vowel *-a*. The absence of this 'inherent vowel' is therefore logically marked by a special sign. Only independent vowels in V syllables that are word-initial or that occur internally in hiatus are indicated by special independent letters, systemically similar to the consonants and placed alphabetically before them. In terms of its generic type, therefore, the Brahmi script, like all its derivatives, is to be classed neither as a pure syllabary nor as a full alphabet, but as an intermediate category for which the name 'alphasyllabary' has come to be generally preferred.

Whatever the history of its invention (Gupta and Ramachandran, 1979), the Brahmi script (Figure 3) therefore first emerged as an already very sophisticated writing system, ideally suited to recording the language for which it was designed. As with all other writing systems, this original fit has been disturbed by subsequent phonetic changes or by the need for more or less substantial modification to write languages of a fundamentally different type. What makes the history of writing in India so remarkably is that these natural future developments were preceded by a prior process of classicization. This entailed rather profound systemic implications.

Figure 3 Rock inscription of Ashoka in Brahmi script.

The early success of Buddhism in India, which is particularly associated with the reign of Ashoka, was followed by its progressive displacement by a revived Brahminical Hinduism, culminating in the Gupta empire of the 4th–5th centuries A.D. Linguistically, this process was manifested in the replacement of the Prakrits by Sanskrit as the language of administrative record. The writing system therefore had to be adapted backward, as it were, to write the older language. As explained in 'Sanskrit in Nagari' below, some of the intrinsic phonetic complexities of Sanskrit, notably its relatively abundant sequences of consonants, could only be graphically realized at some enduring systemic cost.

Central Asian Brahmi

Of the two variants of Central Asian Brahmi, Southern Brahmi was used to write Khotanese, while Northern Brahmi was used for Tumshuqese and, occasionally, Sogdian. Both types were used to write Sanskrit, and the northern variant was also used for Tokharian and Uigur (Old Turkish).

Southern Brahmi Used for Khotanese

The Khotanese documents are written in a variety of different styles. The formal, or square, ductus, was used in all periods of the language for Buddhist literary texts. It is found in numerous calligraphic, chronological, and local variants. The earliest Old Khotanese variants are characterized by rounded corners and curved lines, while the later Old Khotanese variants usually have pointed corners and straight lines, a style that is also common in Middle and Late Khotanese. The cursive ductus, too, is found in numerous variants.

There are two vowel signs not found in Sanskrit: a pair of superscript dots ⟨-ä⟩ probably denotes a mid high vowel /ə/. A pair of superscript crossed curved lines ⟨-ei⟩ denotes a diphthong that probably resulted from the combination of $a + \ddot{a}$, different from $ai < a\text{-} + i$, but the distinction between *-ei* and *-ai* was lost early on.

The 'subscript hook,' a curly or curved line beneath an *akṣara* (commonly transcribed as an apostrophe, e.g., ⸗ ⟨pyu'⟩) may have indicated rhotacization of the vowel.

The Khotanese Brahmi was only partly adapted to the phonological system, and several ligatures not found in Sanskrit manuscripts were invented to express specific non-Sanskritic sounds and sound combinations: ⟨tc⟩ = /ts/, ⟨ts⟩ = /ts^h/, ⟨js⟩ = /dz/, ⟨ys⟩ = /z/, ⟨rr⟩ = rolled *r* (?).

Double ⟨tt⟩ was used (irregularly) to distinguish intervocalic /t/ from /d/, written single ⟨t⟩.

In the oldest manuscripts, unvoiced /ʃ/ and /ʂ/ are not distinguished from voiced /ʒ/ and /ʐ/, both being written ⟨ś⟩ and ⟨ṣ⟩. Gradually, there was a tendency to use double ⟨śś⟩ and ⟨ṣṣ⟩ for and, while /ʒ/ and /ʐ/ were always written with single ⟨ś⟩ and ⟨ṣ⟩. From Middle Khotanese on, the unvoiced pair was written ⟨ś⟩ and ⟨ṣ⟩, while the voiced pair was written with the 'subscript hook,' e.g., ⟨śi'⟩ and ⟨ṣi'⟩ = /ʒi/ and /ʐi/.

Already in the earliest manuscripts, ⟨ky⟩ and ⟨gy⟩ are interchangeable with ⟨c⟩ /tʃ/ and ⟨j⟩ [dʒ]. Syllabaries, complete or select signs only, are common in Khotanese manuscripts.

Northern Brahmi Used for Tumshuqese and Sogdian

This form of northern Brahmi contains a number of *akṣara*s also found in Uigur Brahmi, which have not yet all been satisfactorily interpreted, but probably denote several of the sounds that had no expression in the Khotanese Brahmi. These include signs for *δ* and *γ*, *w*, *z*, *ź*(*ž*), (*ʒ*), *xš*, perhaps also *γ̆*/*γ*^{w}. Several of these *akṣara*s have not yet been identified, due to the small corpuses, differing practices seen in the different manuscripts, and, probably, different usages in the three languages (because of different phonological systems). For instance, in the Tumshuqese *Karmavācanā*, *azu* 'I' is spelled ⟨asu⟩, but later ⟨azu⟩. Sogdian ⟨āžuṃ⟩ *āžun* living being' was borrowed into Uigur and Tumshuqese in this spelling, but we also find Sogdian ⟨āṣuṃ⟩ and Uigur ⟨āśuṃ⟩.

Northern Brahmi Used for Tokharian and Uigur (Old Turkish)

Tokharian and Brahmi contains a set of consonant signs (not complete) that duplicates the regular ones and are usually transliterated underscored ⟨<u>ka</u>⟩. In Tokharian, these signs are commonly assumed to have inherent -*ä*, but are also used in *virāma* position; conversely, consonant signs without corresponding duplicate signs are spelled with ⟨-ä⟩ in *virāma* position. The only such character used in Tumshuqese is ⟨<u>ra</u>⟩, which appears to take the place of ⟨rä⟩.

Uigur Brahmi uses ligatures with ⟨-y-⟩ to express front (umlauted) vowels, e.g., ⟨kyo⟩ = *kö*.

North Indian Scripts

Modern Northwestern Scripts

Before turning to the description of Nagari, the most important modern Indian script, and the one that most fully exemplifies the implications of the Sanskritization of Indian writing, attention may be drawn to a less commonly noticed development in the opposite direction of simplification. This is chiefly exemplified by the commercial shorthands (Figure 4), generically labeled 'Mahajani' (Hindi *mahājanī* 'mercantile'), which are now increasingly obsolete, but which were formerly used for many centuries as business and revenue scripts in a great variety of regional forms. Best exemplified for the northwest (Leitner, 1883), these characteristically dispense with most modifying vowel signs, although vowel letters are sometimes erratically inserted as *matres lectionis*. Like most shorthands, they are accordingly easier to write quickly than to read accurately, hence the proverbial misreading of graphic ⟨bb 'jmrgy bṛbh bhj djy⟩, i.e., *bābā ajmēr gayā baṛī bahī bhēj dījiyē* 'the "master has gone to Ajmer, send the big ledger,' as *bābā āj mar gayā baṛī bahū bhēj dījiyē* 'the master died today, send the chief wife!' (Grierson, 1899: 3).

There was also formerly in existence a category of fully voweled scripts, again particularly well represented in the northwest, which might be termed 'semi-learned' in view of their intermediate typological position between these commercial shorthands on the one hand and the learned northern scripts of the Nagari type on the other. Now mostly obsolete, these semi-learned scripts once included the Kaithi script associated with the scribal Kayasth caste of northern India (Grierson, 1899), the Khojki script of the Khoja Ismaili Muslims of western India (Shackle and Moir, 1992: 34–42), and the Hindu-Sindhi script abortively promulgated by the British in the late 19th century.

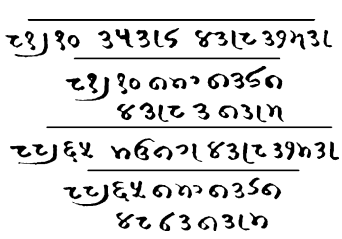

Figure 4 Mahajani writing.

The most successful survivor of this group is the Gurmukhi script (Shackle, 2003: 594–598), which has sacred associations with their scriptures (Panjabi *gurmukhī* 'belonging to the Guru-guided ones') to the Sikhs, and which is today the standard script for writing Panjabi in India. Although the letter shapes of the Gurmukhi script are similar to those of Nagari, its organization is generally closer to the original model of Brahmi than to the classicized norms of Nagari with their insistence on the special writings of consonant groups as graphic clusters. The doubled consonants so generally retained from Middle Indo-Aryan in Panjabi (unlike most New Indo-Aryan languages) are thus indicated as in Brahmi by writing a single consonant versus the clusters obligatory in Nagari, so Panjabi ⟨makhan⟩ = *makkhan* 'butter' versus Hindi ⟨makkhan⟩. A modern Gurmukhi refinement, doubtless inspired by the Arabic *tashdīd* used in Urdu orthography, indicates such doubling by a superscript semicircle (*addhik*), but its use remains erratic.

The number of letters is also reduced, to 35 as compared to the 43 in Nagari, through the reduction of the basic vowel letters to three and the absence of consonant letters distinguished only for Sanskrit; and in place of the consonant clusters that swell the graphic inventory of most Indian scripts, Gurmukhi adds to its basic consonant letters only a few subscript marks, to indicate *-r* and *-h* (and a rarely used *-v*). It may also be noted that the number of Panjabi consonant phonemes is reduced from the usual Indo-Aryan set by the reduction of voiced aspiration to tone, so written Gurmukhi ⟨ghoṛā⟩ 'horse' is realized as ⟨k'òṛā⟩ with partial devoicing and low-rising tone. Since the incidence of the Panjabi tones is largely predictable, their historical Gurmukhi spelling is only partially comparable to the more elaborate adaptations of the Indic writing system to write the fully tonal languages of Southeast Asia that are considered in section 'Tonal Scripts' below.

Sanskrit in Nagari

The more typical post-Brahmi line of development is best illustrated by reference to Nagari, both the most widely spread modern north Indian script and the most prestigious as the result of its long particular association with Sanskrit. As the best documented of the Indian scripts, the evolution of Nagari (Singh, 1991) is associated with the elaboration of Brahmi norms, as writing in India was adapted from its original association with Middle Indo-Aryan to provide a close representation of the syllabically much more complex structures of classical Sanskrit (Salomon, 2003: 75–78), the sacred language of revived Hinduism. The more immediate ancestor of the north Indian scripts is the imperial Gupta script of the 4th–6th centuries A.D. From this script are derived the Khotanese and the modern Tibetan script, while its numerals are the direct ancestor of the Arabic numerals, which were in turn transmitted to Europe. By the 11th century A.D., the Gupta script had developed into the script whose standard status in northern India is indicated by the name 'Nagari' (*nāgarī* probably meaning 'city script'), and whose characteristic square-shaped syllabary reflects its typical writing by pen with Indian ink. The alternative name Devanagari (*dēvanāgarī* 'script of the city of the gods') indicates the particular association with Sanskrit which has important implications for its organization.

The inventory of signs was extended to include letters and diacritics to mark a number of archaic features peculiar to Sanskrit, such as the syllabic liquid *ṛ* or the triple distinction of sibilants. The order of the syllabary is illustrated in Figure 5. The indepen-

Figure 5 Nagari as used for Sanskrit.

dent vowels come first, followed by the five key classes of 25 consonants, then the eight other consonants and semi-vowels. The alphabetical arrangement according to vowel length and consonantal position, aspiration, and voicing, reflects the sophistication of the Sanskrit phoneticians. All consonant letters are regarded as containing the inherent vowel *-a*, with other vowels in CV syllables being variously indicated not only by following strokes (for *-ā, -ī*), but also by a preceding stroke (for *-i*), by subscripts (for *-u, -ū, -ṛ* and the three very rare following vowels), by superscripts (for *-ē, -ai*), or by following strokes with superscripts (for *-ō, -au*). Simple vowels are alphabetically preceded by nasalized vowels, indicated by a superscript dot (*anusvāra*) and by vowels followed by a voiceless *-ḥ* (*visarga*).

In contrast to Middle Indo-Aryan, Sanskrit has numerous closed CVC or CCVC syllables. In order to accommodate the resulting frequent sequences of two (less often of three) consonants, a quite elaborate inventory of some 170 conjunct clusters was developed, in which a part of the first consonant is typically joined to a full form of the second, although there are instances in which the first element is graphically dominant and others in which the elements are hardly discernible. A considerable element of complexity running counter to the natural logic of the original writing system is thus introduced, while further conventions are used to mark the very common Sanskrit combinations with *-r-*, with a short subscript stroke being used to indicate postconsonantal *-r-*, while a special convention denotes closed syllables ending in *-r* by a superscript hook (*rēpha*) written above the following consonant. The difficulty of reading Sanskrit is considerably increased by the conventions of word sandhi, in which the final letter of one word in a verse or sentence is combined by a careful set of rules with the initial letter of the next, resulting in long graphic sequences joined by a continuous horizontal line from which the letters appear to hang.

Modern Languages in Nagari

This convention was continued in the writing of Hindi and other New Indo-Aryan languages in Nagari until it was abandoned in favor of Western-style word division with the introduction of printing to India from the early 19th century onward. The indigenous vertical stroke used as an equivalent of the full stop was amplified by the borrowing of English punctuation marks, along with such graphic devices as bold or italic styles, although the distinction in the Roman script of capital and lower-case letters has remained alien to the principles of Indic writing.

Other modern innovations in the Nagari script as used for Hindi (Lambert, 1953; Shackle and Snell, 1990: 26, 35–37) include the distinction of additional consonants by use of a subscript dot. These include the marking of *ḍ ḍh* to indicate the retroflex flaps *ṛ ṛh*, and of *k kh g j ph* to mark sounds found in Persian and English loans, *viz., q kh g z f*. In writing the numerous *tatsama* loans from Sanskrit, on the other hand, Hindi follows the example of most other modern Indian languages in preserving the Sanskrit spellings even where phonemic distinctions have long been lost, as in the case of the retroflex *ṇ* and *ṣ*. Similarly, as in most other modern scripts, the battery of conjunct consonants continues to be employed to write Sanskrit loans, in spite of their considerable awkwardness for printing or typing (though they are more easily computer-generated).

Both the most ambiguous and the most cumbrous features of Hindi orthography concern the writing of consonants in non-CV contexts. The absence of the inherent vowel *-a* must be indicated in Sanskrit by a short subscript stroke (*virāma,* Hindi *halant*), a resource often employed in printed Hindi to indicate the first member of graphically awkward consonant combinations. As a consequence of post-medieval phonetic change, Hindi has lost postconsonantal *-a* in nearly all final and many medial positions, rendering the use of *halant* redundant if at the cost of ambiguity. Thus, in native words, written ⟨kara⟩ and ⟨karanā⟩ correspond to *kar* 'do!' and *karnā* 'to do.' But in loans from Perso-Arabic and English, the *tatsama* system of conjunct clusters, including the superscript *rēpha* (H *rēph*), is generally employed, so for example *farz* 'duty,' *vārḍ* 'ward,' *kartā* 'creator' are spelled ⟨farja, vārḍa, kartā⟩. A double system of orthography also prevails in the writing of noninitial clusters composed of nasal with homorganic plosive, for which two conventions are in simultaneous use, either that already established in Brahmi of using a superscript mark of nasalization, or the alternative use of a conjunct consonant, hence for *hindī* 'Hindi' alongside the preferred ⟨hiṃdī⟩, the spelling ⟨hindī⟩ is also possible (Figure 6). Another superscript mark of

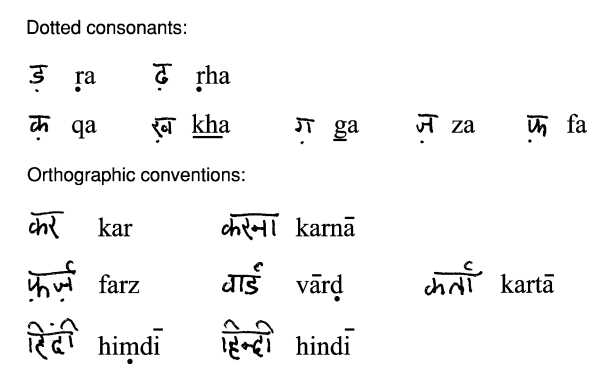

Figure 6 Nagari as adapted for Hindi.

(*candrabindu*) is used to indicate vowel nasalization, which is phonemically distinctive in Hindi.

Although Marathi and Nepali share the Nagari script, their autonomy from Hindi is jealously preserved. A distinctive typeface is used in printed Marathi, which employs numerous orthographic conventions not found in Hindi, including an additional letter for retroflex *ḷa*, added to the end of the syllabary (as is also done in the Gujarati and Oriya scripts). The separate status of Nepali as a national language is symbolically demonstrated by the extensive use of the *halant* and conjunct consonants to indicate the absence of the inherent *-a*, and by deliberate preference for conjuncts rather than marks of nasalization to write nasal clusters.

Other North Indian scripts

Still more distinctive are the proudly preserved separate scripts used to write other north Indian languages. The other modern north Indian scripts (Masica, 1991: 137–351; Salomon, 2003: 80–83) share with Nagari the tendency for handwriting to be closely linked to printed forms, i.e., to be only semicursive in nature. Their autonomy is guaranteed by a visual appearance so distinctive as to prevent ready mutual comprehension (Figure 7).

John 3:16 in Hindi:

क्योंकि परमेश्वर ने संसार से ऐसा प्रेम रखा कि अपना एकलौता पुत्र दे दिया, कि जो कोई उस पर विश्वास करे, नष्ट न हो, परंतु शाश्वत जीवन पाए।

⟨kyoṃki parameśvara ne saṃsāra se aisā prema rakhā ki apanā⟩
kyoṃke parmeśvar ne sansār se aisā prem rakhā ke apnā
⟨ekalautā putra de diyā, ki jo koī usa para viśvāsa kare,⟩
eklautā putr de diyā, ke jo koī us par viśvās kare,
⟨naṣṭa na ho, paraṃtu śāśvata jīvana pāya.⟩
naṣṭ na ho, parantu śāśvat jīvan pāe.

John 3:16 in Panjabi (Gurmukhi)

ਕਿਉਂਕਿ
ਪਰਮੇਸ਼ੁਰ ਨੇ ਜਗਤ ਨੂੰ ਅਜਿਹਾ ਪਿਆਰ ਕੀਤਾ ਜੋ
ਉਹ ਨੇ ਆਪਣਾ ਇਕਲੌਤਾ ਪੁੱਤ੍ਰ ਬਖ਼ਸ਼ ਦਿੱਤਾ ਤਾਂ ਜੋ
ਹਰੇਕ ਜੋ ਉਸ ਉੱਤੇ ਨਿਹਚਾ ਕਰੇ ਹਲਾਕ ਨਾ ਹੋਵੇ
ਪਰ ਸਦੀਪਕ ਜੀਉਣ ਪਾਵੇ

John 3:16 in Gujarati

કેમ કે દેવે જગત પર એટલી પ્રીતિ કરી
કે તેણે પોતાનો એકાકીજનિત દીકરો આપ્યો,
એ સારુ કે જે કોઈ તેના પર વિશ્વાસ કરે તેનો
નાશ ન થાય, પણ તે અનંતજીવન પામે.

John 3:16 in Bengali

কারণ ঈশ্বর জগৎকে এমন প্রেম করিলেন যে, আপনার
একজাত পুত্রকে দান করিলেন, যেন, যে কেহ তাঁহাতে
বিশ্বাস করে, সে বিনষ্ট না হয়, কিন্তু অনন্ত জীবন পায়।

John 3:16 in Oriya

କାରଣ ଈଶ୍ୱର
ଜଗତକୁ ଏତେ ପ୍ରେମ କଲେ ଯେ ସେ ଆପଣା
ଅଦ୍ୱିତୀୟ ପୁତ୍ରଙ୍କୁ ଦାନ କଲେ, ଯେପରି ଯେ କେହି
ତାହାଙ୍କଠାରେ ବିଶ୍ୱାସ କରେ, ସେ ବିନଷ୍ଟ ନ
ହୋଇ ଅନନ୍ତ ଜୀବନ ପ୍ରାପ୍ତ ହୁଏ ।

Figure 7 North Indian scripts.

The modern Gujarati script is a more recent offshoot from Nagari (which is still employed for printing Old Gujarati texts), being a 19th-century standardization of the local semi-cursive hand, hence its distinctive lack of the Nagari horizontal word stroke. Rules for word division in Gujarati follow Marathi rather than Hindi norms in such matters as the writing of postpositions together with their preceding noun.

In the northeast, the separate status of the proto-Bengali script is attested from at least ca. 1000 A.D., although the standardization of the spikily elegant modern Bengali script dates, as with Nagari, from the 19th century. Although similar in systemic organization to Nagari, the Bengali script (Banerji, 1919) masks numerous unpredictable phonetic realizations that are the result of a considerable process of phonetic change. The same script is also used to write the phonetically more conservative Assamese, which is distinguished from its more prestigious neighbor by a few minor but distinctive graphic conventions. The Oriya script is a separate offshoot from proto-Bengali, in which the letter shapes are dwarfed by large circular flourishes describing 'umbrellas' above them. As in the case of the south Indian scripts, notably the neighboring Telugu (see 'Dravidian' below), which the Oriya script superficially resembles, these are thought to originate from the need imposed by the traditional local method of writing by incising with a stylus on palm leaves to avoid horizontal strokes likely to tear the leaf.

The fundamental structural features described for Nagari govern these three scripts also, besides others surviving until the 20th century, like the Sharada script formerly used to write Sanskrit by the Brahmins of Kashmir. All, for instance, share the distinctive rules of historical spelling for Sanskrit *tatsamas* as a separate orthographic subsystem, also like the different set of rules for the phonetic realization of the graphically inherent *-a,* although the various phonemic structures of Gujarati, Bengali, Assamese, and Oriya naturally determine particular local orthographic conventions. While in no modern country are so many parallel writing systems in use as in India, there is little prospect of a reduction in their number, since following from the development of print capitalism and a modern education system during the 19th century, scripts have become very powerful cultural symbols of regional linguistic identity. At a broader level, the successful resistance of the north Indian scripts to the challenges offered by the Arabic and Roman scripts is, while certainly not unaffected by religious chauvinism, undoubtedly also due to their accuracy and economy in indicating such typical features of north Indian languages as contrastive consonantal aspiration or the key phonemic distinction between retroflex and dental articulation, which other systems of writing can be only clumsily adapted to express by means of diacritics.

South Indian Scripts

The most obvious generic difference between the scripts of southern India and most of the northern scripts (other than the special case of Oriya) is that the letter shapes are typically rounded or circular rather than square in appearance (Figure 8). These differences in outward form, originating from the preferred use in the south of palm leaves as a writing material, are, however, on the whole more significant than differences in structural organization. This rule of difference in visual form but virtual identity in system is naturally particularly true of scripts used in the south (Sivaramamurti, 1966) to write Sanskrit, whose most important classical exemplar is the Grantha script, widely used from about the 6th century B.C. down to recent times.

(a) Sinhala

(b) Telugu

(c) Kannada

(d) Malayalam

(e) Tamil

Figure 8 South Indian scripts.

Sinhala

The Grantha script was a significant influence in the complex evolution of the script used to write Sinhala (Gunasekhara, 1891: 3–66), the southernmost of the Indo-Aryan languages, which has developed independently of the main northern bloc since its first establishment by emigration to Sri Lanka around the 5th century B.C. Since Sri Lanka is the one place in South Asia where Buddhism survived as the dominant religion, the Sinhala script is also used there for writing Pali.

The full Sinhala script (*misra hodiya*) accordingly possesses the full set of Sanskritic letters, used in writing Sanskrit and Pali loanwords. But Sinhala itself has lost numerous distinctions, notably that between aspirated and unaspirated consonants, while developing new contrasts of its own. The extended inventory of vowels includes both short and long *æ e o,* each distinguished by new letters and diacritics in the simplified classical Sinhala syllabary (*elu hodiya*), which also adds four letters for the special Sinhala half-nasal consonants *ng, nd, nd, mb* and the retroflex *ḷ*.

Dravidian

The Dravidian languages of peninsular south India (and northern Sri Lanka) were the first non-Indo-Aryan languages to which the Indic writing system was successfully adapted. All these scripts are ultimately derived from the same Brahmi source, through different lines of descent in which the script associated with the Pallava dynasty of the 3rd–8th centuries A.D. plays an especially important role. There is a visually distinctive script (Bright, 1998; Krishnamurti, 2003: 78–89) for each of the four major modern Dravidian languages, Telugu, Kannada, Malayalam, and Tamil (the official state languages respectively of Andhra Pradesh, Mysore, Kerala, and Tamilnadu) and any attempts to rationalize the distinctions between them have been quickly countered by the embattled partisans of local ethnolinguistic identities.

The long coexistence of the Dravidian languages with Indo-Aryan has to some extent helped overlay the fundamental differences of the two language families in grammar and native vocabulary. Thus, on the one hand, the characteristic Indo-Aryan distinction of retroflex from dental consonants is itself plausibly explained by early Dravidian influence, while on the other the prolonged influence of Sanskrit has shaped the higher registers of all the Dravidian languages in varying degrees. Dravidian phonetic structures (marked by a preponderance of CV syllables and by consonant combinations mostly consisting either of geminates or of combinations with liquids or beginning with homorganic nasals) have a high degree of intrinsic compatibility with the basic principles of writing originally developed for Middle Indo-Aryan, and this compatibility has come to be reinforced by the adoption of many further devices of the familiar Sanskritic type.

Telugu

The clearest instance of these characteristics is provided by the script used to write Telugu, situated in the northeast of the Dravidian territory and long in close contact with Indo-Aryan. The script is descended from the medieval script used to write both Telugu and Kannada, which belongs to a different branch of Dravidian. Nineteenth century standardization resulted in the two modern scripts being carefully distinguished from one another. The Telugu script (Krishnamurti and Gwynn, 1985: 3–37) is now markedly circular and curly in appearance, while the equally elegant Kannada script is somewhat more linear.

The standard Dravidian distinction between long and short *e* and *o* is marked in the Telugu script, although (unlike Sinhala) it does not possess special vowel signs to mark the modern phonemic distinction of *æ* (from *ē*). The inherent vowel *-a* is indicated by a tick (*talakaṭṭu*) placed over most consonants, with its cancellation for an unvoweled consonant being indicated by a distinct superscript. The placing of other vowel signs is typically more restricted than in Nagari, usually above or after the consonant, partly no doubt as a consequence of the special rules for writing consonant combinations, which are discussed below.

As with all adaptations of the Indic writing system to non-Indo-Aryan languages, the chief redundancy concerns the inbuilt graphic distinction of the two aspirated series *kh ch ṭh th ph* and *gh jh ḍh dh bh* from the corresponding unaspirated letters. So while the Telugu script's consonant inventory is of the Indo-Aryan type, the aspirate letters regularly written in loans are not systematically realized in pronunciation. Their subsidiary status is graphically indicated in the formation of many of them by the addition of a diacritic to the corresponding unaspirated letter.

The most notable systemic divergence of the Telugu script from the northern norms exemplified by Nagari concerns the writing of consonant combinations (**Figure 9**). Those whose first element is a homorganic nasal are written in the usual way with the nasal sign *anusvāra,* though this is here a full circle looking like an independent letter rather than a superscript dot as in the northern scripts. But whereas Nagari writes geminates and other consonant combinations by juxtaposing a truncated form of the first element with a fuller form of the second to

Nagari:

स त	sa + ta	=	स्त	sta
स व	sa + va	=	स्व	sva
त र य	ta + ra + ya	=	त्र्य	trya
पुस्तक	pustak(a)		'book'	
स्वतंत्र्य	svatantry(a)		'independence'	

Telugu:

స	sa + ta	=	స్త	sta
స వ	sa + va	=	స్వ	sva
త ర య	ta + ra + ya	=	త్ర్య	trya
పుస్తకం	pustakaṃ		'book'	
స్వతంత్ర్యం	svatantryaṃ		'independence'	

Figure 9 Nagari-Telugu contrasts.

which most vowel diacritics are typically attached, the Telugu script prefers to write the full form of the first element, to which vowel diacritics are attached, with the second element being added as a subscript after the vowel diacritic. Many of the commonest of these subscripts are graphically distinct from the base forms, and combinations with *-r* are written with a subscript placed before the first consonant.

Tamil

From another line of descent has resulted the modern script used to write Malayalam. This script, with its full set of Indo-Aryan letters, is structurally fairly similar to the Telugu script, although the Malayalam language is most closely related to Tamil, the Dravidian language that has the longest recorded history and is the one least influenced by Indo-Aryan in its core features.

In keeping with this separate identity of Tamil, which has been emphasized by an often chauvinistic Dravidian nationalism, the Tamil script is very different from all the other Dravidian scripts in many features of its organization, and represents the most radical restructuring in South Asia of the Brahmi system. Tamil writing is first attested in inscriptions of the 2nd century B.C. (Mahadevan, 1971), with the modern script recognizably emerging around the time of the Chola dynasty in the 11th century A.D. Its basic organization (Hart, 1992: ix–xx) continues to reflect the original development of the script to write classical Tamil, so that later features are not always represented.

Letters and diacritics (Figure 10) are used to distinguish the usual 10 Dravidian vowels, including short and long *e* and *o*. The 33 Indo-Aryan consonant letters are much more radically reduced in the Tamil script, to only 18. Within the five core classes, there are separate letters only for the voiceless stops *k c ṭ t p* (in modern Tamil often realized as voiced consonants), alternating in the alphabetical order with the corresponding nasals *ṅ ñ ṇ n m*. These are followed by the four liquids *y r l v*, then by the distinctive Tamil approximant *ẓ* (also transliterated *l̲*), the retroflex *ḷ*, and the letters transliterated *r̲* and *n̲*, which were originally alveolars phonemically distinct from both the retroflex and the dental series. Five extra letters are added to this set from the Grantha alphabet to write the sounds *j ṡ s h kṣ* in Sanskritic and other loanwords.

The recasting of the Tamil script as an alpha-syllabary of appreciably distinctive type within the Indic family is further exemplified in the extensive use of the superscript dot (*puḷḷi*) for the systematic denotation of unvoweled consonants, including the first member of consonant combinations, other than the homorganic nasal indicated by a circle as in Telugu. The complexities involved in the writing of all other South Asian scripts through the use of conjunct consonants are thus neatly eliminated. The further standardization in 1978 of the forms of vowel signs (also carried out in Malayalam) has helped bring the Tamil syllabary rather closer than other South Asian scripts to the alphabetic model, though it remains distinguished from that model by the continuing graphic subordination of the vowel signs to the consonant letter that heads the syllable.

Southeast Asian Scripts

Writing in Southeast Asia

Indic scripts were introduced to the islands and mainland of Southeast Asia in the early centuries of the first millennium A.D. as a part of the complex process of the transmission of Indian civilization, which constitutes such a historically remarkable instance of peaceful cultural diffusion. The paleographic record (De Casparis, 1975) shows a variety of early Indic scripts to have been in local use, at first mostly for the writing of Sanskrit, with a characteristic predominance of the southern Pallava type.

Both the great linguistic diversity of Southeast Asia and the complexity of its early history, in which numerous kingdoms and empires permeated first by Hindu then in the countries of the mainland by Buddhist religious and cultural values vied with one

அ	ஆ	இ	ஈ	உ	ஊ				
a	ā	i	ī	u	ū				
எ	ஏ	ஐ	ஒ	ஓ	ஔ				
e	ē	ai	o	ō	au				
க	ங	ச	ஞ	ட	ண	த	ந	ப	ம
ka	ṅa	ca	ña	ṭa	ṇa	ta	na	pa	ma
ய	ர	ல	வ						
ya	ra	la	va						
ழ	ள	ற	ன						
ḻa	ḷa	ṟa	ṉa						
க	கா	கி	கீ	கு	கூ				
ka	kā	ki	kī	ku	kū				
கெ	கே	கை	கொ	கோ	கௌ				
ke	kē	kai	ko	kō	kau				

Additional letters (borrowed from Grantha):

ஜ	ஸ	ஷ	க்ஷ	ஹ
ja	sa	ṣa	kṣ	ha

Figure 10 Tamil script.

another for local supremacy, mean that it is not always possible to discern in detail how the Indic writing system was variously adapted to write Southeast Asian languages, beginning with the Old Mon inscriptions dating from the later part of the first millennium A.D.

Here only the principal systemic differences dictated by the variety of indigenous language types are outlined. As a necessary preliminary, it should be observed that Southeast Asian languages possess neither the characteristic Indic distinction between retroflex and dental, nor the full set of Indo-Aryan contrasts of voicing and aspiration.

As a result, while these features of the system may be graphically preserved as necessary to write Sanskrit and Pali loanwords, they are essentially redundant to the writing of Southeast Asian languages. At the same time, the numerous Indic loanwords from Sanskrit and Pali constitute an important subsystem in all Southeast Asian writing systems, with special pronunciation rules often very different from those mechanically suggested by their preserved Indian spellings

Non-tonal Scripts

The linguistic divergence from Indo-Aryan norms is least marked in the case of the Austronesian languages of insular Southeast Asia, with their typical absence of tonal features and general preference for simple syllabic structures of the CV type. For writing these languages, there were formerly in use a large number of local scripts (Kuipers and McDermott, 1996), but all have been made obsolete or obsolescent by the general spread of the Roman script to write Indonesian, Tagalog, and the associated local languages of Indonesia and the Philippines. Historically, the most significant is the Kawi script used until the early 20th century to write Javanese (Dumont, 1923) until its modern replacement by Roman. This is a straightforward syllabary similar to South Indian scripts in its use of subscripts to write consonant clusters, but of a distinctive sloping style (Figure 11), with a restricted set of consonant letters, which instead of the Indic alphabetic order follows the saying *hana caraka, data sawala, padha jayanya, maga bathanga* 'There were two emissaries, they began to fight, their valor was equal, they both fell dead.'

Cambodian, which belongs to the Mon-Khmer branch of the quite different Austroasiatic family, is also a non-tonal language. But the Cambodian script is considerably more complex than those devised for the insular languages of Southeast Asia. Not only is the proportion of vowel to consonant phonemes in Cambodian intrinsically very different from the Indo-Aryan system for which Indic writing was devised, but further complexities have been introduced by the considerable phonetic changes that have taken place over the centuries since the script was first devised.

In contrast to the modern scripts of South Asia, Cambodian and the other three standard modern Southeast Asian scripts of Indic origin (Figure 12)

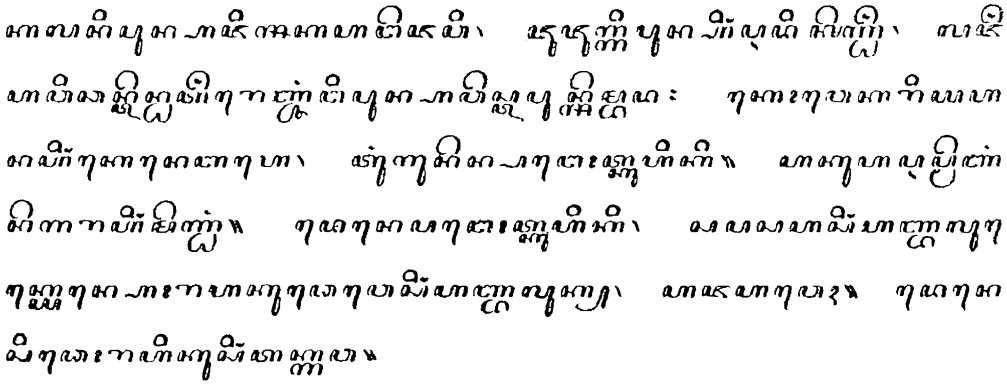

Figure 11 Javanese in Kawi script.

do not mark word division by spacing. The Cambodian script (Huffman, 1970) follows the familiar principles of the alphasyllabary, with the second members of the consonant clusters that are frequent at the beginning of syllables indicated by special subscripts and with vowel signs written in various positions around the main consonant. Except in Indic loans, however, the letter added to the alphabetic series to write the glottal stop is used to introduce all initial vowels. The formal internal organization of the Cambodian syllabary is otherwise also of the Indic type, but the restricted number of consonant phonemes means that the aspirated and retroflex series are largely redundant, while a much expanded inventory of 21 vowel signs is needed to represent the rich inventory of vowel phonemes. A further systemic complexity results from the modern pronunciation of the original voiced consonants ⟨g j d b⟩ as unvoiced /k c t p/ but with breathy phonation of the following vowel, which may itself be pronounced quite differently from the vowel written with the same sign after an original voiceless consonants, so, for example, written ⟨kā⟩ corresponds with phonetic /ka:/ but written ⟨gā⟩ is realized as phonetic /kiə/ with special phonation.

Tonal Scripts

Many of the distinctive features outlined for Cambodian are also true of the other Southeast Asian scripts, including the use of the glottal stop as the bearer of initial vowels, the addition of extra vowel signs to accommodate a larger vowel inventory, the redundancy of many consonants except to preserve the historical spellings of Indic loanwords, and the further complexities introduced by phonetic changes since the individual scripts were first evolved in the early medieval period as adaptations of the Old Mon writing system.

But Thai and Lao, both members of the Tai language family, as well as Burmese, belonging to the Tibeto-Burman family, are also languages with a high proportion of monosyllabic words distinguished from one another only by phonemically distinctive tones, for which Indic writing provided no intrinsic method of indication. In the case of the Thai script (Danvivathana, 1987), the innovative use of superscript signs to indicate tones – apparently the first use of tonal marks in any of the world's writing systems—is traditionally attributed to King Ramkhamhaeng (d. 1298). The modern form of the script is, however, due to the reforms of later kings down to the 20th century, Thailand being the only country in the entire Indic script region (other than Tibet) never to have been subjected to European colonial rule. As in Cambodian, secondary phonetic developments in the language since the original devising of the script have resulted in a complex system in which the five modern tones are indicated not only by the four tone signs but also by initial consonants, so that while, for example, written ⟨k⟩ represents phonetic /k/, written ⟨k g gh⟩ all represent phonetic /kh/ but with different tonal implications. This preservation of historical spellings results in 44 consonant graphemes representing only 21 consonant phonemes, as opposed to a much closer match between 19 vowel signs and 21 vowel phonemes.

Lao is closely related to Thai and employs a similar-looking script (Diller, 1996), which like the Cambodian script successfully saw off brief attempts by the former French colonial administration to give official currency to the Roman script, as had been done in Vietnam. The preponderance of consonant letters intrinsic to most Indic writing systems has, however, been reduced in the modern Lao script by the elimination of historical doublets, resulting in only 27 consonant graphemes for the 20 Lao consonant phonemes.

The Burmese script (Roop, 1972) was also originally developed from the Old Mon script, but along

(a) Combodian

ចាស់ផ្ទះក្នុងស្ថាបត្យកម្មសាច់សំពត់ តាំងពីរដ្ឋ ដោយប្រៀប
ប្រៀប ស្រាប់តែថ្ងៃ ២ ២ ២ សម្ងឹងទៅ ១ ១ ១

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South Asia as a Linguistic Area

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Introduction

The roughly 450 languages of South Asia belong to four different language families: Indo-European, Dravidian, Austroasiatic, and Sino-Tibetan. There are three small isolates, Burushaski, Nahali, and Kusunda (probably extinct). Speakers of Indo-Aryan (IA) languages constitute 78% of the inhabitants of South Asia, followed by Dravidian (DRAV) speakers with 20%; speakers of Austroasiatic, i.e., Khasi and Munda (MU), and Tibeto-Burman (TB) languages together do not constitute more than 2%. The number of speakers is reflected in the space devoted to languages in the sprachbund literature. Emeneau, the first authority on the subject, wrote about 'India as a linguistic area' (1956). Although Nepal and Bhutan also belong to South Asia, languages of the Himalayas are seldom included in the sprachbund literature, nor are languages of Nagaland or Meghalaya.

I shall first look at the features most often mentioned as characterizing the area. After a brief summary of the history of the field, I shall discuss the possibility of interpreting the linguistic data as evidence for earlier settlement patterns and migrations. The last section stresses the need for more detailed investigation of subareas.

Areal Features

The following features are mentioned in most of the literature on the South Asian sprachbund:

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I shall first look at the features most often mentioned as characterizing the area. After a brief summary of the history of the field, I shall discuss the possibility of interpreting the linguistic data as evidence for earlier settlement patterns and migrations. The last section stresses the need for more detailed investigation of subareas.

Areal Features

The following features are mentioned in most of the literature on the South Asian sprachbund:

- retroflex consonants
- OV word order
- converbs ('conjunctive participles')
- compound verbs
- the quotative
- morphological causatives
- dative subjects.

Retroflex Consonants

All the major languages of South Asia have a phonemic opposition between retroflex and dental consonants (Ramanujan and Masica, 1969). Many IA and most DRAV languages also have retroflex ṛ, ṇ, and ḷ. There are no retroflexes in Assamese and in South MU nor in Indo-European. Kuiper's (1967) demonstration of the increasing frequency of retroflex consonants in the successive books of the *Rigveda* is generally accepted as proof of DRAV substratum influence.

OV Word Order

The second feature, OV word order, holds for languages from Pakistan to Assam and from Nepal to Sri Lanka. The only two exceptions are Kashmiri (IA) and Khasi (AA), which are both VO. However, OV word order also characterizes the languages of Central and Northeast Asia, including Korean and Japanese.

Converbs

This feature has been extensively discussed in the sprachbund literature. But although most languages of the subcontinent have at least one converb (conjunctive participle, gerund), there are considerable differences in detail. The most general or sequential converb can fulfill a number of functions, depending on the existence of more specific converbs. Hindi has only one form (*-kar/-ke*), which has a broad range of applications. The following examples illustrate sequential, modifying, and causal interpretations of the Hindi and Tamil general converbs.

(1) HINDI (IA)

a. us-ne nahaa-**kar** khaanaa khaa-yaa
he-ERG *bathe*-CONV *meal* *eat*-PFV:3SG:MASC
'Having bathed he ate his meal'

b. vah dhauṛ-**kar** aa-yaa
he *run*-CONV *come*-PFV:3:SG:MASC
'He came running'

c. vah raat din kaam kar-**ke** biimar par ga-yaa
he *night* *day* *work* *do*-CONV *ill* *fall* GO-PFV:3SG:MASC
'He fell ill because he worked day and night'

(2) TAMIL (DRAV)

a. avan iŋkee va-**ntu** enn-ai.k kuuppiṭṭ-aan
he *here* *come*-CONV I-ACC *call*:PT-3SG:MASC
'He came here and called me'

b. avan ooṭ-**i** va-nt-aan
he *run*-CONV *come*-PT-3SG:MASC
'He came running'

c. maẓai pey**tu** kuḷam niṛai-yum
rain *fall*:CONV *pond* *fill*-FUT:3SG:NEUT
'It rained and (therefore) the pond will fill'

Most languages have a simultaneous or modifying converb different from the conjunctive participle, which is often reduplicated. See the following examples with Hindi (1b), and Tamil (2b).

(3) ORIYA (IA) baṭɔre ja-**u** ja-**u**
'walking along the road'
MALTO (DR) eek-**no** eek-**no** paawno
'walking along the road'
ATHPARE (TB) huk-**sa** huk-**sa** abe
'he came down barking'

(The sequential converbs are Nepali *-ii, -era*, Oriya *-i, -iki,* Malto */-ka/* + person markers, Athpare *-ung* after finite markers.) The eastern IA languages (Assamese, Bengali, Oriya) moreover have a conditional converb, as do most Dravidian languages.

(4) ASSAMESE (IA) mɔi aahi-**le** 'if I come'
ORIYA (IA) se asi-**le** 'if he comes'
TAMIL (DR) maẓai peyt-**aal** 'if it rains'
KANNADA (DR) avaru oodid-**are** 'if he studies'

Santali has nonfinite forms in *-kate* and *-te* (5a); the quasi-converbs carry finite tense-aspect and person markers, though they lack the finite marker *-a* (5b).

(5) SANTALI (MU)

a. calak'-calak'-**te** mit'-ṭaŋ
go:MID-REDPL-CONV.SIM *one*-CLASS
toyo-ko ɲɛl-tiok'-ked-e-a
jackal-S:3PL *see-reach*-PT-O:3SG-FIN
'While they were walking, they got sight of a jackal'

b. kɔṭɛc'-ked-e-**khɔn** ḍaŋgra-dɔ-e
castrate-PT-O:3SG-ABL *bullock*-TOP-S:3SG
luṭkum-en-a
fat-PT:MID-FIN
'Since they castrated it, the bullock became fat'

The South Asian picture is far from uniform, and the number of converbs can vary from one to ten or more (e.g., Hayu), although three or four is the norm. Converbs are even more characteristic of Central and Northeast Asian languages, where converbal forms mark all types of adverbial subordination. Moreover, converbs seem to go together with OV word order (Ethiopian Semitic and Quechua). So do adnominal 'relative participles,' which are sometimes mentioned together with converbs as an areal trait of South Asia.

Compound Verbs

South Asian languages form compound verbs consisting of the general/sequential converb form of the main verb (V1) followed by a finite form of a second verb (V2). The second verb, which also occurs as a full verb, is semantically bleached, but not fully grammaticized. The inventory of second verbs listed in grammars differs somewhat from language to language, and – as the list is not closed – also from author to author. The most frequent V2s include:

1. directionals with the full verb meanings 'go', 'come';
2. disposals that express that something is done away with, such as 'throw', 'send', 'put aside';
3. verbs that express the suddenness or unexpectedness of an event, such as 'fall', 'rise';
4. 'give' and 'take' have auto- and other-benefactive meanings as V2.

(6) MARATHI (IA)
sagḷe kaagad mi phaaṛ-un ṭ**aak**-le
all paper I tear-CONV V2:THROW-PT
'I tore up all the papers'

BENGALI (IA)
se mar-e **ge**la
he die-CONV V2:GO:PT
'He died'

KANNADA (DR)
avaru sattu-**hoo**-daru
s/he die:CONV-V2:GO-PT:3PL(HON)
'He died'

The terminology used for this construction is rather inconsistent. Apart from a plethora of names for the V2 (explicator, vector, aspectivizer, light verb), some authors use the term *serial verb* instead of compound verb. Sometimes constructions with phasal verbs (which are not semantically bleached and often combine with the infinitive) and grammaticized forms are included.

As with converbs, a closer look at compound verbs yields a rather diverse picture. First, the shape often differs from the canonical 'V1-CONV + V2 finite' pattern. Some languages have developed new converb suffixes or an optional long form. The new or long forms are used in clause combining, but not in compound verbs. Thus Hindi and Panjabi never have the converbal suffixes *-kar* or *-ke* in compound verbs, but use an old form now reduced to the bare stem of V1 (see *par ga-yaa* in (1c)); Oriya never has *-iki* or *-ikɔri*; Koḍava never has the converb in *-iti*, but the old converb, which is identical with the past stem (see the Tamil and Kannada examples above).

(7) ORIYA (IA)
pila-mane pɔṛh-**iki** ghɔr-u
child-PL *study*-CONV *house*-ABL
bahar-**i-gɔl**-e
go.out-CONV-V2:GO:PT-3:PL
'After studying the children went out of the house'

KOḌAVA (DR)
ava seebɨ tind-**itɨ**
she apple eat:PT-CONV
cat**tɨ-pooc**-i
die:PT:CONV-V2:GO:PT-3
'She ate the apple and died'

Santali root compounds look much like the Hindi and Panjabi forms. Languages that make little use of converbs often have finite markers on both verbs, such as Kurukh and some MU and TB languages.

(8) SANTALI (MU) tɔl-**uric′**-ked-e-a-e
tie-V2:FIRM-PT-O:3SG-FIN-S:3SG
'he tied him up firmly'

KURUKH (DR) iirk-an-**cicc**k-an
see:PT-1SG-V2:GIVE:PT-1SG
'I looked after it'

PARENGI(MU) silay-ing-**ta'y**-ing
sew-1SG-V2:GIVE-1SG
'sew for me!'

CAMLING(TB) c-ung-**pak**-ung-a
eat-1SG-V2:PUT-1SG-PT
'I ate it up'

Second, the inventory and semantics of second verbs sometimes differ in substantial ways from more canonical patterns, especially in MU and N-DRAV. The unusual V2s include Santali *jaora* 'gather', *uric′* 'make firm', *ɛsɛt′* 'close', *nyam* 'find', *aŋga* 'dawn', and Kurukh *xacc-* 'break', *biʔ-* 'cook'. Tamil also has unusual second verbs, and even the common ones show irregular semantics, often conveying purely emotional meanings.

Compound verbs of the form "V1-CONV + V2 finite" are typical of Altaic (with V2 called postverb, descriptive verb, or auxiliary). Turkic and Mongolic languages share the second verbs mentioned under (a) to (d) above. But unlike South Asian languages they make regular use of postural verbs as atelicizers or durative markers. Otherwise the use of second verbs in languages in the northern part of India appears to be more similar to Turkic-Mongolian than to South Dravidian, though further detailed studies are needed.

Quotatives

Quotatives of the form 'say'-CONV, such as Bengali (IA) *bole*, Nepali (IA) *bhanera*, Telugu (DR) *ani*, Santali

(MU) *mente,* and Sora (MU) *gamle* correspond to Uzbek (TURKIC) *deb*, Mongolian *geǰ* (and to Ethiopic Inor *barə* Quechua *nishpa*). There is nothing remarkable about the development into complementizers, which are then used together with verbs characterizing speech or mental acts, or with onomatopoetic words. The development from 'say' to complementizer is also attested in African languages and Creoles. It is an ongoing process that can be observed in South Asia, and not all languages are at the same stage. The last stage, comparatives marked by the quotative, is attested only in some languages of Nepal (e.g., Newar, Nepali) and South Dravidian. Further detailed studies are necessary to describe the use of quotatives in the single languages and to distinguish borrowings from internal developments.

Morphological Causatives

All languages of South Asia show morphological causatives, and most have secondary or indirect forms.

(9)	HINDI (IA)	*siikh- / sikhaa- / sikhwaa-* 'learn /teach / have taught'
	KASHMIRI (IA)	*con- / caavun- / caavinaavun-* 'drink / give to drink / let give to drink'
	MALAYAL (DR)	*oṭi- / oṭikk- / oṭippik-* 'break (intr/tr) /let break'

The patterns differ toward the east, where prefixes prevail. AA languages thus conform to their relatives in Southeast Asia: Khasi *tip / pn-tip* 'know / inform', *iap / pn-iap* 'die / kill', and Sora *jum / a-jumjum* 'eat / feed'. TB languages of the east also have prefixes, e.g., Mao Naga *apo / so-pho* 'break (intr/tr)'; Mikir *thì* 'die', *pe-thì* 'kill', *pa-pe-thì* 'let kill'. In some languages, double causatives can receive a simple causative interpretation; Kharia (MU) *ḍoko* 'sit down', *ob-ḍo-b-ko-yoʔ* (CAUS-sit-CAUS-sit-PTII) 'he made him make her sit' or 'he made him sit' (Zide and Anderson, 2001: 521, 523).

Morphological causatives, including double causatives, are also found in the languages of Central and Northeast Asia.

Dative Subjects

This construction is familiar from some European languages such as Latin and German. An experiencer is coded by the dative (in Eastern IA languages by the genitive), and the dative constituent behaves like a subject in some respects (Verma and Mohanan, 1990).

(10)	HINDI (IA)	bacce-**ko**	ṭhaṇḍ	lag	rahii	hai.
		child-DAT	*cold*	*feel*	PROG:FEM:SG	*is*
		'The child is/feels cold'				
	TAMIL (DR)	ena-**kku**	kuḷiraa	iru-kk-utu.		
		he-DAT	*cold*	*be*-PRES-3SG:NEUT		
		'He is/feels cold'				

The construction is less prominent in MU and TB; some languages even lack a dative or an oblique case marker. Nevertheless, it counts as a strong areal feature; as in contrast to the constructions mentioned above, it does not exist in Altaic languages. As it is not typical of Sanskrit, DRAV is usually considered a likely source.

Other Features

Several other features were claimed to be characteristic of South Asia, but most were dropped later, e.g., aspirated consonants, nasalized vowels, classifiers, ergative constructions, no prefixes, no verb for 'have'. The proposed features were evaluated by Masica (1976: 187–190); most of them turned out to be irrelevant or of little relevance for the South Asian linguistic area. Classifiers and echo formations were suggested in Emeneau's pioneering article 'India as a linguistic area' (1956). Emeneau erroneusly considered classifiers, which occur especially in eastern and central India, as borrowings from IA into the individual MU and DRAV languages. But classifiers clearly have swept over from Southeast Asia. Emeneau's conclusion probably has to be ascribed to the fact that the classifiers of MU and N-DRAV languages often have an IA shape; i.e., the morphemes are borrowed, but the function is not.

Most South Asian languages have a construction in which a word is reduplicated, replacing the first consonant (sometimes also the following vowel), so that the second word constitutes an echo of the first one. The echo expresses 'and such things', e.g., Tamil *kudirai-gidirai* 'horses and such things'. The consonants used in echo formation are distributed in areal patterns (see map in Trivedi, 1990: 80–81). Dravidian languages of the south show exclusively *k, g;* Orissa and Bengal have *p, ph* or *ṭ*. The patterns are independent of genetic affiliation; compare Oriya (IA) *iskul-phiskul* 'school and such', *cini-phini* 'sugar and such' with Ho (MU), *ɔpis-pɔpis* 'office and such'; Bengali (IA) *ghusur-ṭusur* 'pigs and such' with Nocte (TB) *san-ṭan* 'sun and such', and Santali (MU) *bɔkɔp-ṭɔkɔp* 'brothers and such'. Emeneau considered this feature to be borrowed from DRAV, as he took it to be otherwise unknown in Indo-European. (It is rare in IE, though not in Altaic; Turkish *kitap mitap* 'books and such things', Uzbek *nån pån* 'bread and other baked goods').

A more promising candidate seemed to be the Sanskrit particle *api,* corresponding to Tamil *-um*, which has five functions reconstructable for Proto-Dravidian: 1. additive focus, 'also', 2. 'and', 3. 'even', 4. totality with numerals ('every'), 5. together with question words it yields indefinite pronouns. Emeneau found the five functions in all

subgroups of DRAV, but only in a few modern IA languages (e.g., Marathi, Oriya). As not all functions exist in early Vedic, he concluded that the functions of Sanskrit *api* developed by analogy with the DRAV model (Emeneau, 1980: 218). No parallels in MU or TB are mentioned. Nevertheless, it is one of the few features that Masica considers to be area-defining, though the criteria are not further discussed and remain unclear. The bundle of functions 1.5. is far from rare for a particle meaning 'also, even', and parallels could be cited from Altaic and many other languages.

History of the Field

South Asia counts as a classic example of a linguistic area. As early as the 19th century, Indologists noticed some common traits between IA and DRAV. The discussion centered around the question of whether IA could have adopted certain features from DRAV, e.g., retroflex consonants or converbs. Sanskritists have at all times tried to minimize such possible influence and proposed internal developments (Hock, 2001). Emeneau, doing intensive research on DRAV, was the first to put the comparison on a more solid base. In his early article 'India as a linguistic area,' he came to the conclusion that "the languages of the two families, Indo-Aryan and Dravidian, seem in many respects more akin to one another than Indo-Aryan does to other Indo-European languages" (1980: 119–120; 1956). His definition of the term *linguistic area* as "an area which includes languages belonging to more than one family but showing traits in common which are found not to belong to the other members of (at least) one of the families" is still useful, in contrast to his later proposals. In the introductory article to the reprint volume (Emeneau, 1980), he critically reviews his own earlier work and adds the conditions: For a feature to be area-defining it has to be "pan-Indic and not extra-Indic" (1980: 2). Only if several such features are found and the area is delimited by a bundle of near isoglosses can the linguistic area, in his view, be considered established. A second step has to show the origin of the areal features and their distribution. If a feature can be reconstructed for language X, it must have been borrowed into language Y.

The newly formulated conditions turn out to be problematic. If a South Asian areal trait must not be extra-Indic, most of the proposed features have to be abandoned. But this criterion does not seem to have been taken too seriously anyway; few researchers have bothered to look outside the borders of South Asia. This is true even of Emeneau himself, as evidenced by his proposals for classifiers and echo words as areal traits. And the criterion of pan-Indianness was not tested. Areal relevance was mostly claimed on the basis of a few examples from IA and DRAV, sometimes adding one or two examples from a MU language. Isogloss bundles were not shown, as Emeneau remarks: "Unfortunately I know of no demonstration of such a bundling of isoglosses" (1980: 128).

In an important article, Kuiper (1967) examined Vedic and Sanskrit texts that could shed light on the origin of the South Asian linguistic area. He investigated the appearance of retroflex consonants, converbs ('gerunds'), and the development of the quotative *íti* in IA. Regarding retroflexes, he comes to the conclusion that prehistoric bilingual speakers of IA – presumably native speakers of a Dravidian language – reinterpreted IA allophones in terms of their native system, thus establishing a novel phonemic distinction in IA. Kuiper further traces the gradual increase of converbs in the successive *Rigveda* texts and ascribes the development again to bilinguals, who would have used converbal constructions first in colloquial speech, from where it crept into more formal registers. The Sanskrit particle *íti* 'thus' originally introduced quotations and is attested in initial position in Vedic texts. Gradually it became post-quotative by analogy with the Dravidian 'say'-CONV, and in later Sanskrit this was the standard.

A further influential article was Southworth's contribution to the volume edited by himself and Apte (1974). Southworth found that the frequencies of retroflex consonants in modern IA languages decreases from west to east. Western IA languages such as Marathi, Gujarati, and Panjabi show a ratio of 3:1 for dentals and retroflexes, which corresponds to the ratio in DRAV, but Bengali has 12:1 (1974: 212). Southworth interprets this, together with gender marking, as evidence for a DRAV substratum in the west; the lower number of retroflexes and the presence of classifiers is interpreted as a reflex of a TB substratum in the Ganges delta and the east. The assumption that the distribution of features today mirrors the situation that obtained 2000 years ago is of course problematic.

The first comprehensive and systematic study on some features in South Asia and beyond, Masica's *Defining a linguistic area: South Asia* (1976), has become a standard text. Whereas earlier publications on the sprachbund were confined to demonstrating shared features of South Asian languages (if not just IA and DRAV), Masica's concern was to find out to what extent these features are purely South Asian. The results are rather devastating for the sprachbund hypothesis if based on the conditions formulated by Emeneau: of the five traits investigated, only one, namely dative subjects, turned out to be specific for South Asia. The other four

– morphological causatives, OV word order, converbs, and compound verbs – are equally characteristic of most languages of Central and Northeast Asia, as already mentioned. Researchers have since also spoken of an Indo-Turanian area.

The idea of a South Asian sprachbund is thereby not invalidated. The clustering of the two essential features, dative subject and retroflexes, together with shared idioms and semantics (Emeneau, 1980: 236, 250; Masica, 2001: 258) and the OV characteristics, some of which demonstrably spread from South Asian centers, together add up to the often perceived 'Indianness' of South Asian languages.

Historical Evidence

One of the aims of identifying linguistic areas is to find evidence for earlier settlements and migrations. Documentation of South Asian languages reaches back to the second millennium B.C. for Sanskrit and back two millennia for Tamil, but little is known about earlier stages of MU and TB. And in spite of the early attestations of IA and DRAV, the substratal influence of the latter on the former remains controversial. According to Hock (2001), IA and DRAV were typologically more similar at the time of the earliest contacts than is commonly assumed. Similarities such as the combination of finite marked forms, as still preferred in North and Central Dravidian, have been demonstrated by Steever (1993) for older stages of South Dravidian. Many of the South Asian traits could be retentions, being strengthened of course by area-specific preferences. Hock criticizes the still prevailing practice of drawing conclusions from comparisons of Sanskrit with (mainly) modern South Dravidian, ignoring older traits of Dravidian and setting aside 2000 years of history.

Even the DRAV origin of retroflexes, a seemingly solid cornerstone of the substratum hypothesis, has been questioned. This also casts doubt on the general assumption that Dravidians were the inhabitants of the Indus Valley at the time the Indo-Aryan infiltration into South Asia started. Witzel (1999) posits a 'Para-Munda' substratum of the oldest IA documents, i.e., the Vedic texts, which originate from the valley.

More recent influences can be traced by means of quantitative areal investigations. Hook (1987), trying to get "at the grain of history," reports an interesting finding from a questionnaire investigation. In the returns from south of Goa, all subordinate clauses were preposed; the percentage gradually decreased toward the northwest, i.e., with the distance from the Dravidian model. West of the Indus, all clauses were postposed. This pattern is independent of the fact that OV word order typologically often goes together with preposed clauses and demonstrates the fading out of a typical feature toward the edge.

A quantitative analysis of this type can sometimes show the areal spread of a trait, though not its origin. The inference from present-day frequencies to situations 2000–3000 years back (Southworth, 1974) is hardly reliable. Hook's endeavors to trace the possible origin of compound verbs on the basis of frequency counts lead to no satisfying results. Today compound verbs are most abundant in the Ganges plains (Hindi 15–20% of total verbs, modern Bangla 10–13%, modern Marwari 13–18%). But comparison with the situation in 16th century Bangla (2%) and Marwari (1.5%) shows this to be a recent phenomenon (Hook, 2001: 109). If borrowed at all, the further development of the construction must be ascribed to internal forces. Hook's answer to the question of what we can conclude from the present-day distribution of the compound verb in the languages of South Asia is: "Not much." (2001: 110). Various processes of borrowing, internal developments, and even of loss are possible scenarios.

Much of the linguistic history of South Asia remains in the dark. Shifts in language have not been uncommon, and in some cases have occurred more than once, e.g., from MU to DRAV to IA. Widespread bilingualism and multilingualism have repeatedly lead to pidginization and the development of lingua francas, such as Calcutta-Hindustani or Hindi-Urdu in Bombay. Nagamese, based on IA Assamese, has become the mother tongue of the Tibeto-Burman Kachari. It is at present the only common medium of speakers of the 30 or so Tibeto-Burman Naga languages. Sadari, a Hindi based pidgin, has become the language of identification for groups who have abandoned their former DRAV or MU tongues. Some of the modern literary languages may have started out as pidgins too, as Southworth (1971) suggests for Marathi.

Historical investigations are restricted to what has been accepted into the written language. But written texts are far from an ideal basis for areal investigations, and written norms are especially conservative in South Asia. At all times, the spoken language has differed a great deal from the written one, and borrowings must have been much more abundant than texts reveal. Present investigations into languages used for everyday communication show remarkable structural convergences in some areas. The most well-known case is Kupwar, as described by Gumperz and Wilson (1971). The contact situation between Kannada, Marathi, and Urdu at the border between Maharashtra and Karnataka has lead to one single grammatical system with language-specific lexemes. This study also reveals another characteristic of linguistic areas: structural traits, especially in syntax, are largely unconscious and easily borrowed, whereas there may be considerable resistance toward lexical

borrowing, especially if the language functions as a means of identification.

Subareas

Setting up isoglosses simply on the basis of the occurrence of a feature, as in Masica (1976), is apparently not an adequate technique for showing the intricate patterns of a linguistic area. In Masica's map of the dative subject, for example, the isogloss for this construction includes the northeastern corner of India. The map does not show that this feature is mainly restricted to IA and that numerous small languages of the area have not adopted it. As Masica himself notes (1976: 172), the isogloss maps do not show the gradual fading out of features. They also do not indicate different codings. If causatives are marked by suffixes in the west, but by prefixes in the east of the subcontinent, this is highly relevant for areal studies.

One of Masica's four Indo-Altaic isoglosses deviates from the others: The line for secondary causatives runs approximately along the 84th meridian, i.e., cutting off Bihar, parts of Orissa, and the northeastern provinces from the rest of South Asia. This line is indeed relevant, though not primarily for the feature intended by Masica. Double causatives do exist to the east of it. East of the 84th meridian, two areas can be set off: (A) a former contact zone between TB, AA, and DRAV, stretching from eastern Nepal to Orissa, and (B) the predominantly TB northeast. Only a few of the more than 100 languages of those tribal areas have been described, and hardly any of them has been considered in areal studies. The Non-IA languages from Nepal to Orissa (zone A) are characterized by a complex verbal morphology, which is not characteristic of the TB relatives farther north and east and may be due either to MU, which seems to have had a complex morphology at all times (Zide and Anderson, 2001), or to an unidentified third substratum (referred to, e.g., in Hook, 2001: 124; Witzel, 1999: 40). Different from the converbal structures typical of OV languages, much of the complex pattern of person and tense-aspect marking is retained in subordination in MU languages, in Kurukh, and in Kiranti languages of eastern Nepal. Sometimes only the finite or final marker is missing, as in Santali and Athpare. It seems that long contact between DRAV, MU, TB, and possibly other language groups have lead to an area little affected by the rest of South Asian language developments (Ebert, 1999: 392).

Subareas have been claimed for the Khondmals, for Jharkhand, for the Northwest Frontier, and others. This does not invalidate the hypothesis of a South Asian linguistic area, just as sharing the OV characteristics with Central Asia does not. We should not be surprised to find subareas within subareas without clear boundaries. "Sprachbund situations are notoriously messy," as Thomason and Kaufman (1988: 95) put it. But we should not look for "pan-Indic and not extra-Indic" features, as Emeneau suggested. Instead, research must concentrate on more detailed investigations of certain phenomena, such as compound verbs or converbs, which show uneven frequencies and idiosyncratic forms in subareas. The clustering of features in certain subareas is characteristic of linguistic areas, just as is their diffusion into a number of unrelated languages.

See also: Austroasiatic Languages; Bengali; Burushaski; Dravidian Languages; Hindi; Indo–Aryan Languages; Indo–European Languages; India: Language Situation; Pakistan: Language Situation; Sino-Tibetan Languages; South and Southeast Asia: Scripts; Sri Lanka: Language Situation.

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South Asia: Religions

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Introduction

South Asia is a multilingual and multireligious region. Currently, the major indigenous religions in the region are Hinduism, Sikhism, Jainism, Buddhism; Zorashtranism and Islam are imported religions. Additionally, there are many variants of these major religions and many diverse local belief systems, which show a mixture of beliefs of diverse systems. The dynamic historical, linguistic, and geographic landscapes have created a complex, mind-boggling, but fascinating panorama of languages of religions in South Asia.

Multilingualism in South Asia adds a complex and distinctive character to the relationship between languages and religions. One of the striking features of the language of religion in this region is that there is no fixed equation of one linguistic form for one religion. Many languages are used to express one religion and one language is used to express many religions. For example, Christianity is expressed through English (in India, Pakistan, Bangladesh, Sri Lanka, among others), Portuguese/Konkani (in Goa), Tamil (in Tamilnadu), Hindi (in India), Simhala (in Sri Lanka), Urdu (in Pakistan), and Bangla (Bengali) (in Bangladesh), etc. Similarly, Hindi is used to express not only Hinduism, but also Buddhism, Christianity, and Jainism. Moreover, within the same religious community, different languages are used to perform different religious functions, thereby creating a diglossic situation. Additionally, there are various registers of regional religious languages such as Arabicized, Persianized, and Sanskritized varieties of Hindi, Marathi, Sindhi, etc.

Any discussion on the language of religion in South Asia must take into account the above-mentioned complexities of the relationship between language and religion in the region in order to understand the variation within each of the systems of religion related to the (a) the definition of language of religion, (b) the linguistic strategies to express religious content, (c) the notion of efficacy of religious code, (d) language of the scriptures, (e) sacred scripts, and (f) authority and authentication of religious language.

The following questions need to be raised in the context of South Asia:

1. Why is there variation in the language of religion? Why are there several languages used for one religion?
2. Is the choice of languages random? What are the determinants of language choice?
3. How do languages of religions vary across time?
4. When a new religious code is introduced to carry out the function of the earlier code (which functioned as the religious code), what happens to the earlier code? Why do they coexist?
5. Which authority implements and authenticates the change?
6. Does the authority remain constant across time?
7. When one religious code is replaced by another, do the structure of the linguistic code and religious content undergo change?

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These questions will be discussed in the context of the dynamics of the diachronic and synchronic sociocultural history, religious beliefs, language ideologies, and authority. The discussion is divided into ten sections:

1. A profile of languages of religions in South Asia.
2. Historical developments of languages of religion.
3. Ideology and power hierarchy: the ancient and the medieval period.
4. Ideology, power hierarchy, and language choice in contemporary South Asia.
5. Modernization, composite identities, and ideology of language mixing.
   The question of functional transparency.
6. The impact of multiple linkage on the structure of the languages: linguistic convergence.
   Genres of religious discourse.
7. Authority.
8. Script as a determinant of religious language.
9. Contributions of the religious language to linguistics.
10. Conclusion.

Before we proceed to discuss the languages of religions in South Asia, it is necessary to briefly describe the constituents of language of religion. There are three basic components of language of religion: its form or linguistic structure, its religious content, and its function (see Figure 1).

The combination of these three varies across religions. Even within the same religion, it changes across time. It will be shown that the patterns of variation in the choice of codes across time and space can be explained in a straightforward fashion within the framework of the ideology and hierarchy of language power.

The following discussion demonstrates that in South Asia, different languages are perceived as powerful in different domains. Even within the same domain of religion, not all languages are perceived as equally powerful. At any given point in time, there is a hierarchy of power of linguistic codes to express a particular religion. The choice of the code for expressing a particular religion is determined by the code's degree of power. The power of a code to express a religion as well as the hierarchy are determined by the ideology of the religious communities. The ideology is implemented by the 'authority,' which serves as the medium or mechanism through which the choice of the codes for particular religions is institutionalized.

The ideology and the authority change across time and space; consequently, the power hierarchy of the codes is restructured. It will be shown that the use of one code for many religions and the use of many codes expressing one religion have an impact on the structure of the codes as well as on the religious content.

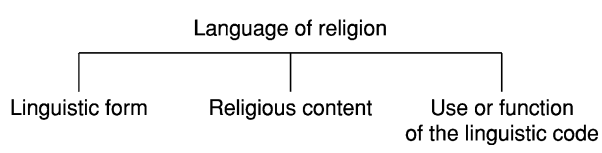

Figure 1 Language of religion.

A Profile of the Languages of Religions in South Asia

The population in South Asia is diverse and the degree of concentration of different religions varies across different regions. India's population can be broken down into the following religious groups: Hindus approximately 83%, Muslims roughly 11%, Christians approximately 3%, Sikhs about 2%, Buddhists roughly 0.75%, and Jains less than 0.5%. Other religions constitute less than 0.5% of the population. In contrast, Pakistan and Bangladesh have a relatively larger concentration of Muslims and a significantly smaller percentage of the Hindu and other religious communities. Sri Lanka has a larger Buddhist community compared to India and Pakistan. Similarly, the distribution of languages varies significantly across South Asia. While a major concentration of Indo-Aryan languages is observed in North India, Pakistan, Bangladesh, Nepal, and Sri Lanka, the Dravidian languages are primarily concentrated in South India and Sri Lanka. Tibeto-Burman languages are dominant in the northeastern regions in South Asia (India, Nepal, Tibet, and Bangladesh).

Distribution of Languages Across Religions

The current distribution of languages across religions is given in the following figures.

Figure 2 shows that English, as well as other languages that were not used earlier, are now used to express Hinduism. Within these languages, two varieties are observed, one that shows a marked influence of Sanskrit and the other that does not (e.g., Dravidian, and other NSA [New South Asian] languages). It

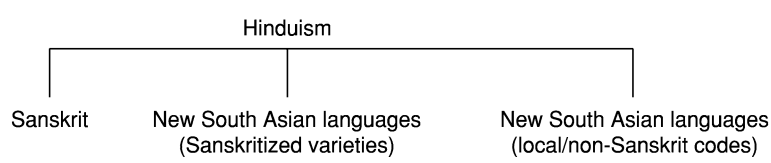

Figure 2 Hinduism.

is also important to note that the languages that are typically not used for Hinduism are Arabic, Persian, Portuguese, Pali, and Arabicized and Persianized varieties of modern South Asian languages. However, here a distinction is made between a language and its writing systems, for example, the Persian script was used for the Sanskrit religious texts in Kashmir by the *pandits* (see Pushp and Warikoo, 1996).

As shown in Figure 3, the languages of Islam are Arabic, Persian, Urdu, and Arabicized or Persianized NSA languages. The languages that are typically not used for Islam are Sanskrit, English, Portuguese, Pali, and Sanskritized or 'Englishized' varieties of modern South Asian languages.

Pali and NSA languages are used for Buddhism. Sanskrit, Arabic, Persian, and Sanskritized, Arabicized, or Persianized varieties NSA languages are not used (Figure 4).

While Portuguese, Latin, Syriac, English, and NSA languages are used for Christianity, the use of Sanskrit, Arabic, Persian, and Pali is strictly prohibited (Figure 5).

While the language of the Sikh scripture (Guru Granth Sahab) is a combination of Old Panjabi (Lahanda) and Khadi Boli, modern Panjabi is readily used for religious discourses in current South Asia (Figure 6).

The language of old Jain scriptures is Ardhamāgadhī (Middle Indo-Aryan). However, its use is largely replaced by the NSA languages. A large literature is written in Kannada and Hindi (as well as other NSA languages) (Figure 7).

The choice of a language for a religion is not random. Although more than one language is used for Hinduism, Islam, Buddhism, and Christianity, some languages are typically excluded from the list of options. Furthermore, it needs to be noted here that the pattern of languages shown in the above figures has not been constant through the history of these religions. For example, the use of NSA languages for these religions is relatively recent (for the most part after 1200 C.E.). Also, the use of Sanskrit and Arabic, the classical languages of Hinduism and Islam, respectively, which was more restricted in the medieval period, is on the rise in contemporary South Asia. The use of English for Hinduism has a history of almost 200 years. The use of English for the religious discourse of Hinduism was enhanced by the English discourses of Vivekānanda (19th century), as well as by the mystic saints such as Aurobindo (20th century). Moreover, the English translations of the Vedas (Max Muller in particular) propagated understanding of the Hindu texts in the west. The term 'Hinduism' (the Persian word Hindu with the English suffix) was legitimized during the 19th century. A large number of exchanges of concepts and lexicon between Sanskrit and English took place during this time. However, the use of English was largely restricted to the philosophical and religious discourse, and the use of Sanskrit and regional languages in the ritual performances of Hinduism was common.

Historical Development of Languages of Religions in South Asia

The following discussion outlines the major historical developments that contributed to the emergence of many languages for each of the religions.

The medieval period (after 1200 C.E.) marked a major shift in the pattern of languages used to express religions. Before this period, the status 'language of religion' was enjoyed for the most part by one language for one religion. For example, the classical languages such as Sanskrit (for Hinduism), Arabic/Persian (for Islam), Pali/Hybrid Sanskrit (for Buddhism), and Ardhamagadhi (for Jainism), and Latin (for Christianity) were considered to be the linguistic codes endowed with the 'power' or efficacy to express their corresponding religions. Other South Asian languages were excluded from the domain of religion. During the period 1200–1700 C.E., mystics and saints from various parts of India such as Bāsavaṇṇā (12th century C.E.) in Karanataka, Jnāneśwar (13th century C.E.) in Maharashtra, the Aḷvars and Nammāḷvār in Tamilnadu (14th and 15th centuries C.E.), Mīrābāī, and Tulsīdās in the north (15th century C.E.), Nānak and Kabīr (16th century C.E.) among others, independently argued for the legitimacy of nonclassical and vernacular languages. They composed their religious poetry in vernacular regional languages such as Marathi, Tamil, Rajasthani, Awadhi, and Khadi Boli/Old Hindi. The mystics and saints were the integrators (see e.g., Ramanujan, 1973; Ranade, 1933) who, on the one hand, liberated the religions from the constraint of the linguistic form of their expression, and elevated the status of the vernacular languages on the other. For further discussion on the medieval Bhakti movements, see Dwivedi (1964),

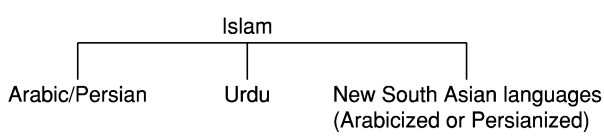

Figure 3 Islam.

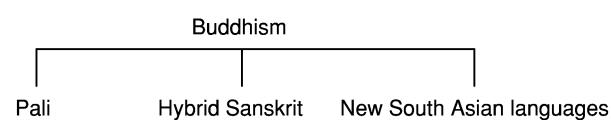

Figure 4 Buddhism.

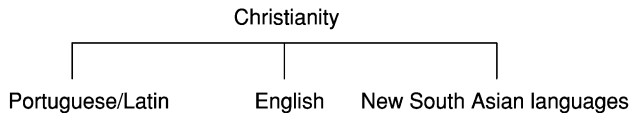

Figure 5 Christianity.

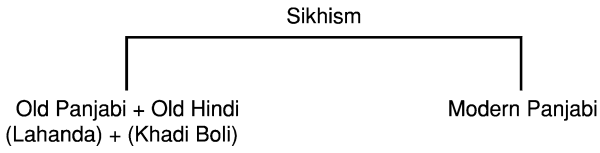

Figure 6 Sikhism.

Nagendra (1973), Shukla (1929), and Varma (1947). The classical languages had become virtually inaccessible to the common people by this period. The use of NSA languages for religions brought the scriptures to the common people in their own languages.

The other major historical development during the medieval period was the translation of the scriptures (which were in the classical languages) into New South Asian vernacular languages. The impetus for translation came from the following:

1. The common people needed access to the scriptures and religions.
2. The Syrian, Roman Catholic, and the Protestant missionary activities in South Asia included conversion of the South Asian population to Christianity of these denominations. To facilitate this, it became necessary to translate the bible into local South Asian languages. The first Bible translation in the local (Konkani) language was *Doutrina Crista* (1622 C.E.) by the English Jesuit priest named Thomas Stephens. Large-scale conversions to Christianity continued throughout the British rule after the 18th century (see Hooper, 1963), which resulted in translations of the Bible into NSA languages. Thus, the use of languages other than the earlier languages of religion became prominent after the medieval period.
3. Buddhist texts, which were translated into Tibetan in the 7th century C.E., began to be used as the Buddhist canonical texts in the medieval period.
4. Although Arabic continued to occupy the central place in the orthodox mosque, several versified bilingual glossaries (Arabic to local languages) termed *Khaliq bari* or Sufi poetic romances and hymns were composed in modern South Asian Languages (Schimmel, 1973). The Qur'an was first translated into Persian in 1737 and later into several Urdu versions that inspired translations of the Qur'an in numerous South Asian languages (Tamil, 1873; Gujarati, 1879; Telugu, 1938; Kannada, 1949). It is important to note that the language of Buddhism in Sri Lanka and India remained the same, i.e., Pali and Hybrid Sanskrit (a Sanskritized variety of Middle Indo-Aryan), while the language of Sikhism, a mixture of Old Panjabi and Lahanda, was supplemented by modern Panjabi. Translations of Jain scriptures into Kannada and Hindi (in addition to other NSA languages) allowed use of many languages for the religion.

These historical events provide a background for understanding the use of the NSA languages for their corresponding religions. However, in order to better understand (a) the rationale for the coexistence of the earlier classical languages and the new South Asian languages as the religious codes, (b) why Hinduism, Buddhism, Christianity, and Jainism allowed the use of more than one language for its expression while Islam did not, and (c) why classical languages as well as the NSA languages are used in both the secular and religious domains, it is essential to go beyond the historical facts. In the following discussion, I will show the importance of ideology in answering these questions.

Ideology and Power Hierarchy: The Ancient and the Medieval Period

The discussion in this section will demonstrate that the variation and change in the pattern of the choice of languages for expressing religions is determined by the ideologies about the language of religion at different points in time in different religious systems. The change in ideology modifies the power hierarchy and consequently the choice of the language.

Current research on language ideology and power (Bourdieu, 1991; Fairclough, 1989; Fowler *et al.*, 1997; Hodge and Kress, 1988, among others) have shown beyond doubt that ideology, which is a system of beliefs, practices, and representations in the interest of an identifiable class in the society, creates linguistic power hierarchies. In the context of language of religion, I define ideology as the system of beliefs about the (a) linguistic form, (b) religious content, and (c) the function of language of religion at a given point in time within a community. In other words, it is the system of beliefs about the interrelationship among the three components (i.e., its form, content, and function/use) of the religious language.

Figure 7 Jainism.

The ideology provides a rationale for the choice of a particular language for expressing a particular religion. This framework ideology does not treat ideology exclusively as 'a distortion in perception of social and economic relations' (Luke, 1998: 366). The variability in each of these components of language of religion is explicable on the basis of the underlying ideology. This framework (a) allows the coexistence of many ideologies of diverse groups within the society, (b) provides a mechanism to identify diachronic changes in the ideology and thereby in language choice, and (c) explains variation in the language choice across religions.

The following discussion will address the issue of language choice in three major periods: ancient (pre-medieval), medieval, and contemporary. The historical evolution of language of religion (with its variability) discussed earlier, as well as its current situation, is explicable within the framework of language ideology and power.

First, let us look at the power hierarchy of religious languages in the ancient period (2000 B.C.E. through the medieval period) in South Asia. As mentioned earlier, Sanskrit was considered to be the only legitimate language of Hinduism. No other languages (Indo-Aryan or Dravidian) were viewed as appropriate to express Hinduism. In other words, Sanskrit was perceived as powerful while other languages were viewed as powerless. The ideology, which sanctioned this power hierarchy, viewed the language of religion as the divine code (*devavāṇī*,), which alone was endowed with the power or efficacy of expressing the ultimate truth (*satya*). The Vedas, the ancient Sanskrit texts, were viewed as the first 'revelations' of the early sages (*ṛṣis*) that were orally transmitted to the following generations as the truths about the phenomenal reality and its foundation in the higher reality, which lies beyond human conceptualization and thought. The term 'mantra,' literally 'that which protects when meditated upon,' had multiple meanings such as, 'the sacred formula (the Vedic hymns addressed to the deities),' 'verses recited at the Vedic rituals,' etc. The Vedic theologies of sound attributed the origin of the universe to the phonic sound and claimed that the language of the Vedas had the power of creation. When uttered flawlessly, it was assumed, the *mantras* had the power to bring about the intended results for the sacrificer (the performer of the Vedic ritual) (for further discussion on *mantra*, see Staal, 1989). The purity of the language was assumed to be the prerequisite for the success of the ritual. Thus the religious language was defined on the basis of both its linguistic structure and its content. This ideology sanctioned Sanskrit as the language of Hinduism to the exclusion of other languages. Similarly, a few centuries later (but before the medieval period), Islam treated Arabic alone as the language of religion. The Qur'an was believed to be the literal word of God revealed through the Prophet Muhammad. Pali and Hybrid Sanskrit remained the languages of Buddhism, and Ardhamāgadhī was considered to be the language of Jainism. Christianity was expressed exclusively through Syriac (in Kerala) and Latin (in the Roman Catholic churches in the south, mostly the western coast of India). In general, the language of the scriptures was viewed as the only appropriate form for expressing the corresponding religion. Similarly, the scriptures were the only source of the legitimate religious beliefs, and the function of the religious language was to express, promote, and follow the religious beliefs presented in the scriptures. There was no variation allowed in the form, content, and the religious function of the language. This ideology gave enormous power to the classical languages, while the regional languages were left totally powerless. Thus, it may be argued that it was the ideology that determined the choice of the classical (as opposed to the regional) languages for expressing religions in the ancient period.

The medieval period marked a major change in the ideology as well as the power hierarchy of religious languages. During this period, the ideology of what constituted language of religion changed significantly. Primacy of the religious content over the linguistic form (structure) was well accepted by the mystics and saints (as well as the religious communities). It was the religious content that was considered to be the differentia of the religious language and all languages, including Sanskrit and NSA languages, which were viewed as equally powerful and appropriate to express religious content. The plea of Jnāneśwar (13th century C.E.), who argued for the equality of all linguistic codes, was for legitimizing the NSA languages as legitimate languages of Hinduism (for further discussion, see Ranade, 1933). Jnāneśwar, who used Marathi, as opposed to Sanskrit for his commentary on the Bhagavadgītā, strongly argued that Marathi, a regional language, would win over the people with its power as it is clear from the following quote from Jnāneśwarī 6.14:

> madzā maraṭhātSi bolu kautuke, parī amṛtātehī paidzā djinke, aisī akṣare rasike, meḷawīna.

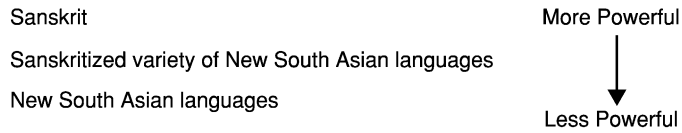

Figure 8 Power hierarchy: medieval period.

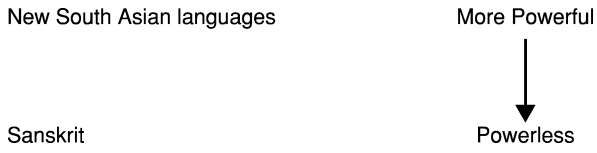

Figure 9 Power of hierarchy, expression of regional identity.

> 'My speech is Marathi indeed, but my composition for the connoisseurs will be so effective that it will surpass even ambrosia.'

This ideology can be called the sacralization of the secular codes. In other words, this ideology granted power to nonclassical regional Indian languages and sanctioned their use for expressing Hinduism. Moreover, this ideology also legitimized the use of more than one language (regional languages) for expressing Hinduism. The process of sacralization of new South Asian languages was expressed through two major trends, one that marked Sanskritization of New South Asian languages, thereby approximating them to Sanskrit by borrowing linguistic features of Sanskrit, and the second, their de-Sanskritization. Although both trends emphasized the legitimatization of the NSA languages in the religious domain, their assumptions and impact significantly differed from each other. The first trend of Sanskritization implicitly assumed superiority of Sanskrit over NSA codes and resulted in the development of a commonly shared Sanskritized register of NSA languages, thereby causing their convergence. In contrast, the intentional de-Sanskritization of the NSA languages asserted the legitimacy of NSA codes as well as the regional religious identity of the users as well as of Hinduism. The two power hierarchies given in Figure 8 and Figure 9 articulate the different linguistic realizations of the same ideology of the sacralization of the secular NSA codes.

Note that in Figure 9, it is shown that when the regional identity of the religion and of the users of the code was to be accentuated, Sanskrit was powerless since it did not express any regional variety of Hinduism; rather, it expressed the pan-South-Asian Hinduism (for further discussion, see Pandharipande, 2001).

The question regarding the simultaneous maintenance of Sanskrit and NSA languages as religious codes was solved by the religious community being diglossic. While Sanskrit was used in pan-South-Asian rituals (sacrifices, weddings, funerals, etc.), regional languages were used in household rituals and personal or regional rituals or worship ceremonies.

In the case of Christianity, the Bible translations allowed the use of NSA languages for Christianity. While Latin and Syriac continued to be used as the languages of Roman Catholic and Syrian Christianity, the use of Portuguese, English, and NSA languages became prevalent in Catholic and Protestant churches. Diglossia was introduced whereby Latin, Syriac, Portuguese, and English were used by the elite and the NSA languages were used by the new converts of the lower classes (for further discussion on Christianity in South Asia, See Brown, 1982; Shackle, 2001). The ideology was similar to that for Hinduism. It was the religious content that gave the identity as religious language to a code. The linguistic structure by itself was not viewed as endowed with particular efficacy.

In contrast to the above, Islam did not recognize NSA languages as legitimate codes for Islam. Arabic continued to occupy the central position as the language of Islam even though the local NSA languages had developed their Arabicized varieties. While those varieties marked the religious identity of the Muslim community, they were excluded from the rituals in the mosque. The ideology that justified this exclusion of the NSA languages from the traditional rituals was based on the understanding that the Qur'an is God's word transmitted to humans through the Prophet Muhammad. Therefore, the correct language of Islam had to be Arabic. Thus diglossia of Arabic and NSA languages marked the language of Islam as well.

In the case of Buddhism, NSA languages (including Tibetan in Tibet) (*see* **Buddhism, Tibetan**) were accepted as the religious codes, though Pali and Hybrid Sanskrit remained major languages of the Buddhist canon (for further discussion on Tibetan Buddhism, see Williams, 2001).

This shows that the ideologies were varied across religious systems, which gave rise to diverse power hierarchies and allowed use of many languages for one religion. It also pointed out that the ideologies were responsible for the emergence of diglossia as a strategy of maintenance of more than one code in the same religious domain. An interesting point to note

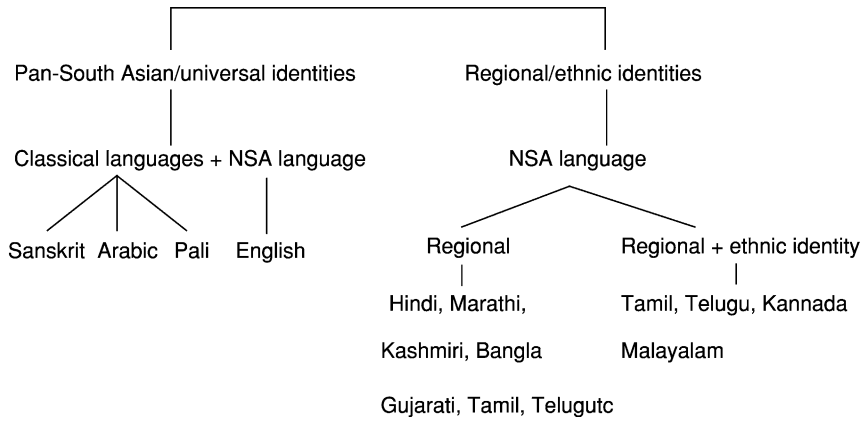

Figure 10 Heteroglossia of identities.

here is that the NSA languages were used for Hinduism, Christianity, Islam, and Buddhism. However, the use of the classical languages such as Sanskrit, Arabic, Latin, and languages such as Persian, Portuguese, and to a large extent English was restricted to their corresponding religions. No crossover of these languages to other religions is observed in medieval and contemporary South Asia.

Ideology, Power Hierarchy, and Language Choice in Contemporary South Asia

Although the patterns of language choice in the medieval and the contemporary periods in South Asia may seem similar, they are not the same. The most striking difference between the two patterns is that the domain-related diglossia that existed in the medieval period seems to be breaking down in contemporary South Asia. The languages are crossing over their earlier domains. In fact, at least two apparently contradictory processes seem to be currently operating in South Asia. For example, NSA languages are more readily used in the domain where earlier exclusively classical languages (Sanskrit for Hinduism, Arabic for Islam, Latin/Syriac for Christianity, Pali for Buddhism, etc.) were used in the more orthodox religious context such as weddings, funerals, naming ceremonies, etc. Moreover, religious sermons are readily delivered in the NSA languages mixed with the classical languages. This process, as mentioned earlier, can be called sacralization of the NSA languages. In contrast, the classical languages such as Sanskrit and Arabic are being revived in the secular context in contemporary South Asia. The English language, which was earlier excluded from the domain of Hinduism, is readily acceptable within the community for philosophical discussions, sermons, and theological discourses. Mixing NSA languages with English is seen as a strategy to popularize religious beliefs (of Christianity, Hinduism, Neo-Buddhism, and Islam) among the masses of diverse groups using mutually unintelligible languages.

These developments can be explained on the basis of the ideology regarding religious language. Within contemporary South Asia, the choice of a language for a particular religion is not determined by the social domain, but rather by its function, i.e., the socioreligious identity that it symbolizes. In contemporary South Asia, religion is one of the major symbols of social identity. South Asian society is largely divided on the basis of religion. Thus, Hinduism, Islam, Christianity, Sikhism, etc. mark not only the religious groups, but also the social groups. Embedded within the same religious/social group there are other identities such as the pan-South Asian religious/social group, regional religious/social groups, etc. Additionally, the regional groups are further divided along ethnic lines such as Aryan, Dravidian, etc. Each language expresses a particular type of religious/social group identity. The choice of a language is determined by the intended identity and power of the language to express it.

The correspondence here is not necessarily between the social domain and the linguistic code; rather, it is between the code and the identity. I would call this heteroglossia of identities. The connection between the codes and the identities is showed in Figure 10.

The classical languages Sanskrit, Arabic, and Pali symbolize the larger pan-South-Asian or Hindu, Muslim, and Christian and Buddhist universal identities (religious as well as social), respectively.

In contrast, NSA languages express the regional religious/social identities. For example, the use of Hindi for Christianity, or Bangla for Islam, and Tamil for Hinduism as religious codes express the regional version of their corresponding religions. Therefore, when the pan-Hindu identity is to be expressed, the most powerful code is the classical language.

The regional NSA languages are powerless in this context. On the other hand, if the regional identity is to be expressed, the power hierarchy is reversed. Regional languages, and not the classical languages, are powerful. It should be noted here that the use of English for Christianity is similar to the classical languages. However, the use of Syriac and Latin is also marginally maintained in some churches in Kerala. This is what I call the heteroglossia of identities.

The heteroglossia of identities include micro-level identities in many cases. It is interesting to note here that the regional languages (similar to the medieval period) use one of the two registers, one that shows the influence of the corresponding classical language and the other without it. For example, the use of Sanskritized Hindi or non-Sankritized Hindi can be readily used to express regional religious/social identity. Additionally, various dialects of Hindi are also used to express Hinduism. The choice of a language in this case is determined by the religious theme. In the northeastern part of India, Sanskrit is used for the Vedic rituals and chants, while in non-Vedic regional rituals NSA languages are used. The language of recitation and chanting is determined by the theme of worship of a particular deity. For example, for the worship of the Rāma, the language is generally Awadhī while for the worship of Kṛṣṇa, the language is generally Braj (the northwestern variety of Old Hindi). This choice is based on the languages of the sacred texts for the respective deities. While Rāmcharitmānas, a sacred text for Rāma is in Awadhī (northeastern variety of old Hindi), the texts for Kṛṣṇa are in Braj (for the discussion on thematic diglossia, see Pandharipande, 1992). However, in South India, the use of the regional languages, devoid of any Sanskrit influence, indicates intentional dissociation from the Indo-Aryan Hindu tradition and assertion of the Dravidian identity (for further discussion, see Hart, 1976; Narayanan, 1994; Zvelebil, 1974; **Zvelebil, Kamil V. (b. 1927)**).

The use of English (as opposed to Latin, Syriac, and Portuguese) for pan-South-Asian Christianity is becoming more common as the knowledge of the traditional languages for Christianity is rapidly decreasing.

Modernization, Composite Identities, and Ideology of Language Mixing

The ideology of heteroglossia is a consequence of modernization, a phenomenon that is characterized as the process of globalization as well as localization at the same time (Appadurai, 1996; Hall, 1996). While globalization (marked by technologization, Englishization, and homogenization) results in undermining, and, at times, obliterating differences within and across societies, it also causes emergence of local identities expressed by age-old symbols. While Sanskrit, Arabic, and Pali express the pan-South-Asian or universal Hindu, Muslim, and Buddhist identities, respectively, they diffuse those regional and ethnic differences that are embedded within the broad labels of Hinduism, Islam, and Buddhism. This increased awareness of the particular or local identities is symbolized and expressed by the use of regional languages.

The phenomenon that has not received attention in current research is mixing languages within the same event. For example, in a typical wedding ritual (in Maharashtra state in India), the priest conducts the ritual in Sanskrit while the concluding ritual of blessing the newly wedded couple (*mangalāṣṭaka* 'the eight auspicious verses') is in Marathi, while the content of the wedding invitation card can be in English. Another typical example of mixing of languages is the popular religious sermons delivered to the public on television or in the open air theater. The local language (for example, Hindi, Marathi, or Gujarati) is the primary language of the sermon. However, the use of Sanskrit quotations from the Hindu scriptures are abundant. English vocabulary is also mixed with the primary language of communication.

The reason for this mixing is that identities in South Asia (universal and local) do not exist mutually exclusively; rather, they exist simultaneously. The South Asian multilingual community consists of multiple identities, each performing an individual function. Each language symbolizes one identity. The use of Sanskrit in the above two events of Hinduism indicates the pan-South-Asian or universal Hindu identity of the group, the use of Marathi articulates the regional identity, and the use of English allows communication with the larger group with many mutually unintelligible languages. The use of English vocabulary in the public (popular) religious sermon is a strategy to express religion in common people's language, which contains a large body of English vocabulary.

Another interesting case of mixing languages is where Sanskrit, the classical language of Hinduism, is mixed with other NSA languages in the most secular context. For example, the logo of the insurance company owned by the government of India (Bharatīya Vimā Company) is in Sanskrit. It is a direct quote from one of the most prominent scriptures of Hindus (the *Bhagavadgītā* 9:22), *yogakṣemaṁ wahāmyaham,* 'I take care of their needs / I provide them security (who depend on me).' In the original text of the *Bhagavadgītā*, God Krishna advises Arjuna, his

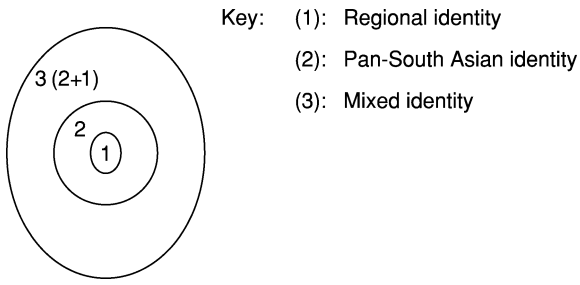

Figure 11 Religious and language identities.

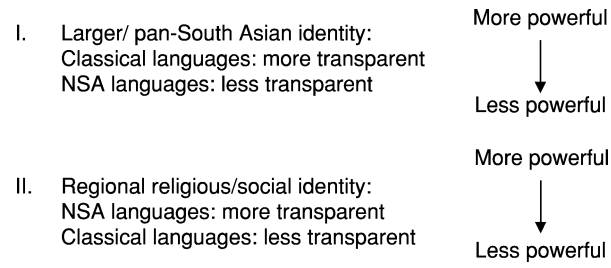

Figure 12 Functional transparency of regional and classical languages.

friend and devotee, to depend on him because God always takes care of those who depend on him. This quote is the appeal to the people to have faith in the insurance company. In the advertisement of this insurance company, this quote occurs in Sanskrit while the rest of the text in various NSA languages.

Another example of the Sanskrit quote is from a Hindu scripture, *Bṛhadlraṇyakopaniṣad* (1.3:28) *tamaso mā jyotirgamaya*, 'Lead me from the darkness to the light.' In the original scripture, this is a prayer to God to remove ignorance and bestow knowledge on the person offering the prayer. However, this quote is used as the caption in an advertisement of fabric for men's suits. The intended meaning is, 'Let the knowledge be dawned that this fabric is indeed the best. Let the ignorance about the quality of the fabric be alleviated.' This phenomenon of using religious language for promoting commercial products (the most secular purpose) is fairly common in South Asia. The linguistic form (Sanskrit) and the literal meaning of the religious language both serve the secular purpose. This process can be called the secularization of the religious language.

The ideology that justifies these three cases is based on the following two assumptions about the religious language: (a) religious language symbolizes religious as well as secular/social identity and (b) the identity of the NSA community at large is a composite one that allows use of multiple languages to express those identities.

While the innermost circle (1) in Figure 11 expresses the local/regional religious/social identity, the circle (2) expresses the broader, pan-South-Asian religious/social identity. The outer circle (3) expresses the composite identity of the religious community, which embeds the other two identities.

The Question of Functional Transparency

While NSA languages are readily used for different religions, the classical languages (Sanskrit, Arabic, Persian, and Pali) are restricted to their corresponding religions. For example, Sanskrit is not used for Islam or Christianity and Arabic is not used for Hinduism or Christianity. The reason is that these languages are perceived as functionally transparent, i.e., they are the languages of the ancient scriptures of their corresponding religions and they have always been unique markers of their corresponding religions. Therefore, their affinity with the respective religions was viewed as almost exclusive. In contrast, the NSA languages have not been functionally transparent. They came on the scene much later and their affinity with a particular religion was relatively less transparent (i.e., they each were used for more than one religion). Therefore, in the medieval period, they were chosen for Bible translations as well as for the translations of the Qur'an. This is the reason why in contemporary South Asia, the classical languages are used to symbolize the pan-South-Asian identity of their corresponding religions and religious/social communities. NSA languages are not used in this context since they cannot uniquely mark one religion or religious identity because they are used to express many religions (i.e., they are not functionally transparent). In contrast, regional languages, and not the classical languages, are functionally transparent with respect to the regional identities. Therefore, NSA languages are used to symbolize regional religious/social identities. The language with a higher degree of functional transparency has more power to carry out that function than the language with lower functional transparency. Moreover, the language with higher functional transparency (*vis-à-vis* a particular religion) is less likely to cross over to other religions (see Figure 12).

The Impact of Multiple Linkage on the Structure of the Languages: Convergence

The history of South Asia shows that different linguistic codes have been used for different religions. It has been demonstrated (Pandahripande, 1992, 2001) that languages undergo change when they are used for different religions, i.e., they develop different registers.

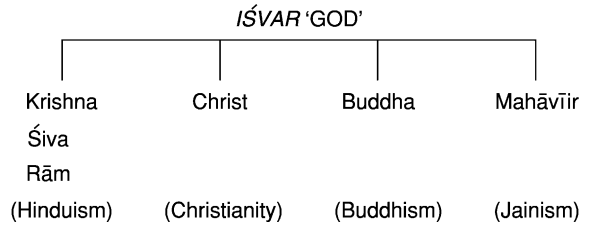

Figure 13 Different interpretations for *Iśvar* 'god' in different religious systems.

For example, when Hindi is used for Christianity, Islam, and Buddhism, it develops Christian, Islamic, and Buddhist registers, respectively. These registers differ from one another primarily in the religious vocabulary, which varies across religions (for further discussion, see Pandharipande, 1992). The major impact of the use of one language for many religions was that these languages developed a set of vocabulary (which was commonly shared by different religions), the meaning of which was contextually determined. For example, the term *Iśvar* 'god' is interpreted differently in different religious systems, as shown in Figure 13.

In addition, the major impact of the use of NSA languages for many religions is seen in their convergence. Each of the major NSA languages developed similar varieties such as Sanskritized (for Hinduism), Arabicized or Persianized (for Islam), and Englishized (for Christianity) forms that share linguistic features (mainly religious themes and vocabulary). For example, note the Sanskritized Hindi (1a) and (1b) and Tamil (2) in the examples below:

Hindi:
Tulsīdās' (15th century C.E.) *Vinay Patrikā* (*pad*: 43). The underlined portion in the examples is in Sanskrit (Omprakash, 1971: 126):

(1a) vedabodhita-karma-dharma-dharaṇī-dhenu-vipra-sevaka-sadhumodakari
Veda-instructed-action-duty-earth cows-Brahmins-servants-saints-joy giver
'He makes the whole world (earth), cows, Brahmins, and servants happy by performing actions, (religious) duties which are instructed by the Vedas.'

The following example illustrates modern religious prayer in Hindi:

(1b) jay jagadīś hare, svāmī jay jagadīś hare
bhaktajano ke sankaṭa pal me dūra kare.
'Victory to you Hari, who is the lord of the world. O Hari, you are the controller, the lord of the world. You instantaneously remove the troubles of your devotees.'

Tamil :
The following example is from Thirugnasambandhan (1992: 119):

(2) muttukkaḷalum iva naṛpavalannaḷāum
kōttukkalanta tamiḻḻ api samskṛtena
ettikkilum bhavatu hāralateva baddhā
puttikku matkṛtir iyam sudṛṣam vibhāṣā.
'May my composition where Tamil and Sanskrit are mixed and strung together like pearls and excellent corals mixed and strung together in a garland be an embellishment for the intellect everywhere.'

It is important to note here that the use of the different languages has had an impact on the religious content as well. As the medium changed, the message did too (Pandharipande, 1992). The use of NSA languages included metaphors, narratives, and religious themes that were not necessarily part of the earlier scriptures in their corresponding classical languages.

Genres of Religious Discourse

The multiple linkage of religious languages has created an intricate network of genres of religious discourse that provides a framework to determine the language choice in a particular type of religious discourse. Over time, new genres were introduced, coexisted, and at times were replaced. Similarly, the languages chosen for those genres also underwent changes. Although it is difficult to provide a comprehensive survey of the entire range of the genres for each religion, a brief sketch will be presented of the genres in the Hindu religious discourse. The ancient genre of Vedic hymns, rituals, and *mantras* were in Sanskrit poetry, while the philosophical as well as theological discourses, teachings, and dialogues of the *Upaniṣads*, and the *Sūtra* literature were in Sanskrit prose. Similarly, the critical scholarly commentatorial expository discourse was also in Sanskrit prose. A large body of *Stotra* (literally, prayers of praise of deities) literature in the post-Vedic period was in a stylized form of poetry. However, after the 7th and 8th centuries C.E., New South Asian and regional languages began to be used for the transcreation of the Sanskrit classics, e.g., *Jnāneśvarī* (13th century C.E., a commentary/transcreation of the *Bhagavadgītā* in Marathi, Villiputtur Āḷvār's Tamil *Mahābhārata* (1400 C.E.), Kampaṇa's Tamil version of the *Rāmāyaṇa*, *īrāmāvatāram* 'The descent of Rāma,' Tulsīdāsa's Awadhi version of the *Rāmāyaṇa*, *Rāmacaritmānas* (16th century C.E.), etc. Moreover, extremely popular and powerful devotional literature in the premedieval and medieval period was primarily composed in poetry in the regional languages, for

example, the *Vacanas* (in Kannada), *Dohe* and *Padas* (in Old Hindi and Rajastani), etc. Additionally, *Kīrtan* and *Bhajan* established some of the new genres of devotional poetry in regional languages.

A Śaivite woman mystic saint Lalleshvari from Kashmir composed her devotional poetry in the Kashmiri language (Kachru, 1981: 15) in the native form of the meter called *Vāk*.

Authority

The authority that authenticates ideologies and thereby the choice of religious languages in South Asia is dynamic. Traditionally, mystics, saints, church, and Muslim mullahs have been perceived as authorities in determining the choice of religious languages for religions. However, their perception of religious language has changed over time. Thus the mystics of the ancient period did not allow the use of NSA languages, while those in the medieval period did. In contemporary South Asia, mystics and saints do use a mixture of many languages! However, it should be noted here that the mixture of languages is more readily allowed in the oral discourse on religion than in the religious rituals and written discourse.

Although the traditional authority of saints and mystics continues to play a role in authenticating the choice of a code as religious in contemporary South Asia, the 'social magic' (Bourdieu, 1991) is the media that constructs, communicates, and promotes religious languages as symbols of religious/social identities. More specifically, the visual (TV) and audio programs on and about religion play a major role in the communication as well as authentication of religious languages as symbols of identities. For example, Sanskrit (in the religious rituals, mostly weddings) expresses the pan-South-Asian Hindu identity, while the use of a regional language in a prayer at home symbolizes regional Hindu identity.

In addition to this process of symbolization, the linguistic structure of the languages used in the programs is authenticated and gradually institutionalized as religious languages. For example, the languages used by the saints in the religious discourse on television or in the movies on the religious epics are accepted as authentic languages of religion. The most interesting case is that of the TV series on the Hindu epics, the *Rāmāyaṇa* and the *Mahābhārata*. The language of the epics in these series is Hindi mixed with Sanskrit. However, the genre is new. The vocabulary, syntax, and the symbols depict a novel composite of a genre that is intentionally constructed to re-create the ambiance of the ancient period. Although this genre has no precedent in history, it is well accepted as an authentic religious code of Hinduism by religious as well as secular communities. Just as the use of NSA languages was authenticated by the religious scriptures composed by the mystics in NSA languages in the medieval period, the use of the Sanskrit mixed with Hindi and of Sanskrit and NSA language mixing in secular advertisements is authenticated and institutionalized by their presentation on television (for further discussion on authority in religious language, see Pandharipande, 2006).

Script as a Determinant of Religious Language

Some South Asian languages of religions are written in more than one script. For example, Panjabi and Sindhi are written in both Devanagari and Perso-Arabic scripts; Kashmiri has three scripts (Sharada, Devanagari, and Perso-Arabic); Maithili has two scripts: Devanagari and Kaithi; Konkani has three scripts: Devanagari, Roman, and Kannada. This situation raises the question of the choice of the script for a particular religious language.

Although a definite correlation between a script and religion in South Asia does not always exist, some correspondences are generally observed. Devanagri, due to its historical connection with Sanskrit, the language of the ancient Hindu scriptures, is traditionally associated with Hinduism. However, it is important to note that it is neither used exclusively for Hinduism, nor is it the only script used for the language of Hinduism. Many translations of the Bible in Devanagari are currently used in Christian churches. Moreover, the scripts of NSA languages (Tamil, Malayalam, Telugu, Bangla, Kannada, Gujarati) are used to express Hinduism. The interesting point is that Devanagari is generally chosen for Hinduism if the religious language has other scripts such as Perso-Arabic or Roman. For example, the Perso-Arabic script marks the identity of Islam in Kashmir, i.e., Kashmiri religious literature of Islam is written in the Perso-Arabic script, while the Devanagari script is identified with Hinduism, i.e., the Kashmiri Hindu scriptures were written in the Devanagari script at one point in time.

However, Pushp (1996: 22) points out that the Hindu religious texts such as the Upaniṣads, the epics (the *Rāmāyaṇã* and the *Mahābhārata*) were rendered in the Persian script as well. In contemporary South Asia, the distinction between Hindi and Urdu is to a large extent based on the difference in the scripts. While Hindi in the Devanagari script is the marker of Hinduism, Urdu with the Perso-Arabic script has become the pan-South-Asian Islam. Similarly, the Devanagari script differentiates Hindu

Konkani from Christian Konkani in Goa, which uses the Roman script (see Miranda, 1978).

An interesting situation is noted with the script of the languages of Sikhism. It is the Gurumukhi script and not the language that is the differentia of the religious literature. While the *Ādi Granth* (the oldest scripture of Sikhism) is in the Panjabi and Old Hindi mixed language, the Sikh religious literature from the 17th–19th centuries is in Braj Bhāṣā. Modern Panjabi is becoming the language of contemporary Sikhism. Despite the diversity of languages, the Sikh literature (in all of the above languages) is typically recorded in the Gurumukhi script. While the Perso-Arabic script is generally associated with Islam, the correlation between the two is not invariable. Muslims in Bengal prefer to use the Bangla script over Perso-Arabic to write Bangla. Similarly, the Ismāīlī Muslims use Gujarati (language and script), which has replaced the earlier script derived from Sindhi. While the Devanagari script is accepted as the script of the canonical Buddhist scriptures in India, Sri Lanka, and Tibet, the use of the Tibetan script is most common in Tibet. Similarly, while the Devanagari script is well accepted for Jainism, other scripts such as Kannada and Telugu are very commonly used as well.

In general, when more than one script is used, there is digraphia. While one script indicates the pan-South-Asian identity of the religion, the other script or scripts indicate the regional and religious identity. For example, the Devanagari script indicates the pan-South Asian Hindu identity, other scripts (of the regional languages) indicate regional Hindu identity. Similarly, the Perso-Arabic script indicates the pan-South-Asian Muslim identity, while other scripts indicate the regional identity (Bangla, Gujarati, etc.). While the Roman script symbolizes Christian identity, other South Asian scripts indicate South Asian and regional Christian identities. Devanagari identifies pan-South-Asian Hindu, Buddhism, and Jainism; other scripts symbolize their regional variants.

Contributions of the Religious Language to Linguistics

The study of religious language in South Asia has made significant contributions to the field of linguistics in four major areas: (a) language analysis (grammatical tradition), (b) theory of translation, (c) literary criticism, and (d) language contact, ideology, convergence, and identity. In the preceding sections, the discussion has focused on (c) and (d). This section will primarily concentrate on (a) and (b).

Grammatical Tradition

The impetus for language study, i.e., phonetics, grammar, and metrics came from the religious goal of understanding the scriptures (the *Vedas,* which were perceived as the repository of all knowledge). *Vyākaraṇa* 'grammar' was considered one of the auxiliary disciplines (*Vedānga*) for the proper study of the *Vedas*. Pāṇini (*see* **Panini**), in his monumental treatise on Sanskrit grammar, claims that the immediate purpose of grammar is to provide principles that distinguish correct forms from incorrect ones. However, Patanjali (*see* **Patanjali (2nd Century B.C.)**) in *his Mahābhāṣya* 'the great commentary' claims the following as the goals of grammar: (a) *rakṣā*, preservation (in their pure form) of the scriptures, transformation of inflectional affixes appropriately for the religious ritual context (*ūha*), correct recitation of the scriptures, (*āgama*), a simple way of language learning (*laghu*), disambiguating meaning of words beyond doubt (*asaṃdeha*). Pāṇini's grammar presents a systematic, complete, and theoretically consistent analysis of the Sanskrit language. Modern linguistics acknowledges *Aṣṭādhyāyī* as "the most complete generative grammar of any language yet written" (Kiparsky, 2001: 384). Pāṇini's grammar provided a descriptive mechanism and analytical tools for the later grammars of vernacular languages in South Asia, and for comparative linguistics in the 18th century after the discovery of Sanskrit by William Jones. The system of classification of the language into four groups, i.e., (a) *Aṣṭādhyāyī,* (b) *Śivasūtras* (an inventory of phonological segments), (c) *Dhātupāṭha* (a list of 2000 verbal roots), (d) *Gaṇapāṭha* (a list of lexical items that follow rules without a clear logic of the system) became the basis for describing South Asian languages. Furthermore, the division of the 4000 grammatical rules into metarules (*paribhāṣā*) and operational rules (*vṛtti*) and the concept of the domain of their operation (*adhikāra*) are some of the most significant insights that modern generative grammar owes to *Aṣṭādhyāyī*.

Additionally, the debates regarding the inherent (*Vedānta* school of Hinduism) vs. conventional relationship (*Nyāya-Vaiśekika* school) between word and meaning were rooted into the philosophical (and religious) conceptualizations of the world and language. Moreover, the controversies regarding the nature of (*Vedic*) language and its cognition clearly show that the study of language was largely influenced by views of (ultimate) reality and the role of language in understanding it, thereby accomplishing the goal of life. For example, while the unit of linguistic analysis was viewed by both the Vedāntins and the Pūrvamīmāṃsakas, as *vākya* 'sentence,' the Vedāntins considered language as assertive of facts (from which the knowledge of the physical and the ultimate transcendent reality [*Brahman*] could be gained), while the Pūrvamīmāṃsakas viewed it as injunctive (from which the knowledge of the accurate performance of the Vedic

rituals could be obtained). For the Vedāntins, *Brahman* was perceived as one indivisible reality, which is revealed in all aspects of the phenomenal world, and language (with its diverse components) represents the phenomenal reality, which reveals the ultimate one. Bhartṛhari (*see* **Bhartrhari**), a 6th century C.E. Vedāntin, proposed that the meaning (of a sentence) is an indivisible and noncomponential linguistic symbol *sphoṭa* (literally, that which bursts forth) that is revealed through, but not divided into words. The cognition of the meaning of a sentence is not sequential (i.e., word by word), rather, it is sudden (*sphoṭa*), similar to the recognition of *Brahman*, which is revealed through the multifaceted reality. Thus language study was embedded within the larger goal of life (to understand the ultimate reality).

In contrast to this, the Pūrvamīmāṃsakas perceived the ultimate reality as componential, and language representing it as componential as well. Their theory of cognition of sentence meaning was that the sentence meaning is divided into word meanings, the sequential cognition of which leads to the understanding of the sentence meaning (for further discussion, see Matilal, 1990).

Another example of the impact of the religious goal on the study of language is the Christian missionaries in South Asia, who wrote grammars of regional languages for the purpose of the Bible translation from English into South Asian languages. The grammars written by the missionaries (for example, the Baptist missionary William Carey's grammars of Marathi and Bengali) mark a major turn in the South Asian grammatical tradition. They analyzed South Asian languages within the framework of Latin and English grammars. These two distinctly different grammatical traditions (Hindu and Christian) have coexisted in South Asia until recently. The Sanskrit and the Latin/English grammatical systems, in their effort to fit the South Asian languages into their respective molds, have failed to take into account their distinctive sociocultural and linguistic character.

The need to constantly evaluate and standardize the Bible translations into languages of the world (including South Asian languages) led the British and Foreign Bible Society (1804) and the American Bible Society (1816) to promote the study of the South Asian languages in their cultural context. Under the influence of modern descriptive linguistics in America, Kenneth Pike and Eugene Nida of the Summer Institute of Linguistics (SIL; established in 1934), the methods of applied linguistic analysis were applied to minority languages across the world including South Asia.

The grammars produced by the SIL show more culturally sensitive analysis of South Asian languages compared to the grammars of the missionaries in the 19th century. The surveys conducted by the SIL to access the patterns of language use are extremely useful for sociolinguistic studies on literacy, multilingualism, and second language proficiency. A notable survey is the *Survey of northern Pakistan*, a joint publication of SIL and the National Institute of Pakistan Studies of the Quaid-I-Azam University (O'Leary, 1992).

Translation

Bible translations in South Asian languages have contributed to the theory of translation. The issue of defining translation equivalence (though ignored in the early 19th century) was raised in the SIL. The relative importance of structural, semantic, and functional equivalence in translation was systematically discussed in Nida (1964) (*see* **Nida, Eugene Albert (b. 1914)**). One of the richest areas of research in South Asian languages of religion is the translation of the sacred texts of Hinduism. While almost all of the major scriptures (the *Vedas*, the *Upaniṣads*, the epics, the *Bhagavadgītā*) are translated and 'transcreated' in the regional languages, not much attention has been paid to the authenticity of translation. The authenticity of the religious text (original or translated) has always been determined (in the history of Hinduism) by the religious authority of the translator (for example, if the translator is a saint/mystic, then the translation is viewed as authentic). The Hindu tradition has not discussed the issue of standardization of translation of scriptures independently of the translator. In fact, the language of the saints and the mystics of the 15th–20th centuries became the standard for the tradition, which has treated translation as a strategy to contextualize the eternal truth for the particular community at a particular time and place.

As noted earlier, Islam and Sikhism do not treat translations of their respective original scriptures (Qur'an and Granth) as scriptures, while Buddhism, similar to Hinduism, treats the religious authority of the translator as the parameter for judging authenticity of the translated text.

The View of Language

The beliefs about language presented in the Pali canon of Buddhism, Tripitaka 'the three baskets' (which is the scripture of the Theravāda (the instruction of the elders) branch of Buddhism) explain why Buddhism in South Asia (as well as in other parts of the world) does not restrict transmission of religion to one language.

It is difficult to extract the exact words of the Buddha due to the oral tradition. Therefore, we rely on the teaching of the Buddha to understand his views on language. The Buddha did not accept any

inalienable relationship between a word (linguistic form) and its referent (function or meaning). According to the Four Noble Truths of Buddhism, it is the impermanence of phenomena, and the attachment to the impermanent is believed to be the cause of suffering. Language, similar to other phenomena, is impermanent/conventional. The relationship between the linguistic form and meaning (function) is conventionally determined. The same meaning can be expressed in different forms. The Buddha did not accept the privileged position of Sanskrit and allowed the use of dialects for the religious discourse. Buddha himself used a Middle Indo-Aryan dialect (Magadhi), which later came to be identified as Pāli. Language was viewed as an impermanent tool to convey the Four Noble Truths. Therefore, one should not be attached to it. What made language meaningful was the experience of the speaker. The early Buddhist teaching was in Pāli, while the later Buddhist texts around the beginning of the Christian Era, such as *Mahāvastu*, (of the Mahāsānghika Lokottaravādin sect), and the *Saddharmapuṇḍrika Sūtra* (the Lotus Sūtra of the Mahāyāna sect) were composed in Sanskrit (Buddhist Hybrid Sanskrit; Edgerton, 1953), which showed influence of contemporary vernacular Middle Indo-Aryan dialects. The hybrid Sanskrit does not fully adhere to Pāṇini's (5th century B.C.E.) rules of grammar. In contemporary South Asia, regional languages are used for the transmission of Buddhism.

Conclusion

The present discussion points out that in a multilingual and multireligious region such as South Asia, the choice of a language to express a religion is determined by the ideology concerning the function of the religious language and the relative power of the language(s) to carry out that function. It also demonstrates that the ideology changes across time, which restructures the hierarchy of power of languages and consequently affects the choice of languages for expressing religions. It is further shown that the ideology is implemented through two mechanisms: authority and the degree of functional transparency of the language. Therefore, ideology, authority, and functional transparency should be treated as mechanisms of change in the structure and function of religious languages in particular, and languages in general. Furthermore, the discussion shows that the same ideology can be expressed in two mutually exclusive and at least apparently opposite processes. For example, the ideology of using NSA languages for religious expression (in the medieval period) was expressed in two linguistic processes of Sanskritization and de-Sanskritization. This challenges the current theory of ideology that assumes that one ideology is realized in promoting only one structural realization.

The discussion shows that authority is not static: it changes over time. Moreover, even if the authority remains the same, it licenses different ideologies at different points in time.

It is argued with evidence that when one language is used for different religions, its linguistic form will change (recall the various registers of Hindi). Similarly, when one religion is expressed in many languages, the religious content changes as well. In particular, it is shown that the use of the NSA languages to express religion has produced convergence of NSA languages across language families. This is an interesting case of linguistic convergence of languages through the development of shared religious registers (Sanskritized), where languages (of Indo-Aryan and Dravidian families) converge via Sanskrit without direct mutual contact. A similar case of convergence of NSA languages is seen in their anglicization (in contemporary South Asia), which results in the emergence of anglicized registers of NSA languages. What is different about this convergence is that the converging languages are not necessarily in contact with each other.

The concept of heteroglossia explains the choice of a language in modern South Asia, and, more importantly, it demonstrates that distribution of languages is in a multilingual society is not always explicable on the basis of diglossia where the choice of a code is determined by the social domain of language use. It is argued that the choice is determined by the religious and social identity that is intended to be expressed by the language.

Finally, the discussion shows that the sociolinguistic conditions (the ideology, authority, and functional transparency of the code) that determine a code as a language of religion may change at different points in time.

Figure 14 summarizes the discussion on the choice of the code for expressing a religion at three major points in time. In the first period, the form, content, and function are viewed as invariable since the languages chosen for expressing religions at this time are the classical languages or the languages of the scriptures.

In the medieval period (column II), the ideology changed, allowing variation in the form and keeping the content perceived as invariable. As long as the religious content was maintained, the form that expressed that content was perceived as religious. The function of the religious language also remained the same as before. The NSA languages (along with the earlier classical/scriptural languages) were chosen as religious languages. Diglossia was the mechanism that allowed maintenance of both the classical and

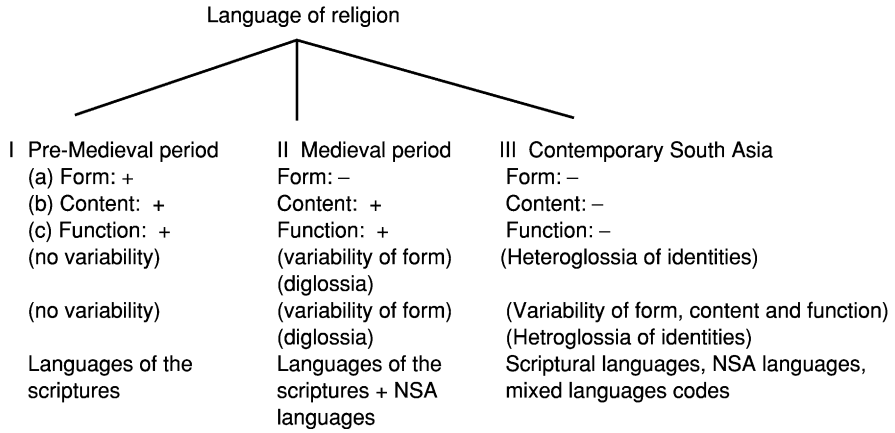

Figure 14 The choice of the code for expressing a religion at three major points in time. + indicates nonvariability; – indicates variability.

the NSA languages. In the third (contemporary) period (see column III), the choice of the language for expressing a religion is determined by the identity of the religion or community. The form, content, and function are variable, thus allowing languages to cross over the religions as well as the boundaries of the secular and the sacred.

This framework illustrates that different religious communities and cultures may vary in their ideology concerning the composition of the three components of the language of religion, and thereby the choice of the religious codes may vary as well.

Some Issues in Languages of Religion in South Asia

The discussion in the preceding sections shows that sociopolitical conditions contributed to the emergence of multiple linkages of languages and religions. However, in order to fully understand the social and linguistic dynamics of the multiple linkages, it is necessary to understand the issues related to translation of religious texts from one language into another, the transcreations of the religious texts into different languages, and the relationship between the linguistic form and its social function. Some of the major issues are: (a) how does the target language (i.e., the language into which the text is being translated) accommodate the new religious content? In other words, what linguistic strategies or mechanisms are used for this process of establishing a new alignment of the linguistic form with the function/meaning? (b) Which rationale authenticates the change, and what are the social and religious practices that promote acceptance of this change?

The language of religion in South Asia provides a rich ground for cross-linguistic, cross-cultural, and cross-religious studies, which have only just begun (see, Pandharipande, 2006).

See also: Bangladesh: Language Situation; Bhartrhari; Buddhism, Tibetan; Christianity in South Asia; Hindi; Hindu Views on Language; India: Language Situation; Islam and Arabic; Nepal: Language Situation; Nida, Eugene Albert (b. 1914); Pakistan: Language Situation; Panini; Patanjali (2nd Century B.C.); Sanskrit; South Asia as a Linguistic Area; Sri Lanka: Language Situation; Zvelebil, Kamil V. (b. 1927).

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South Georgia and South Sandwich Islands: Language Situation

Editorial Team

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South Georgia and the South Sandwich Islands are situated in the southern sector of the Atlantic Ocean, some 1400 km east of the Falkland Islands. With the exception of a brief period during the Falklands War in 1982, when Argentina occupied them, the islands have been under British administration since 1908. There is no indigenous population and the only permanent settlement is on South Georgia, where a group of scientists from the British Antarctic Survey has had its base since March 2001, when it took the base over from a small military garrison that had been posted there after the Falklands War. The British Antarctic Survey also has a biological station on Bird Island, off the northwest end of South Georgia. The South Sandwich Islands are completely uninhabited. South Georgia and the South Sandwich Islands are an overseas territory of the United Kingdom, also claimed by Argentina. They are administered from the Falkland Islands by a commissioner representing the British government. The laws of the United Kingdom apply on the islands and English is the official language – the islands' motto is, however, in Latin: *leo terram propriam protegat* (let the lion protect its own land).

See also: Antarctica: Language Situation.

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See also: Antarctica: Language Situation.

South Philippine Languages

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Introduction

South Philippine languages form one of three major language groups found in the Philippines, all of which belong to the Western Malayo–Polynesian branch of the Austronesian family. The South Philippine language family includes the Subanon, the Danao, and the Manobo subgroups. The Subanon subgroup is spoken on the Zamboanga peninsula of Mindanao, the Danao subgroup is spoken in central Mindanao, and the Manobo subgroup is spoken in central and eastern Mindanao. Two other groups of languages spoken in the Philippines are not South Philippine languages but are more likely related to languages of Indonesia and Malaysia. These languages, found in the southern Philippines, are the South Mindanao languages, spoken in southern Mindanao, and the Sama languages, spoken on the Zamboanga peninsula and the Sulu Archipelago (see Table 1).

Although considerable research has been devoted to identifying and grouping languages of the southern Philippines, less effort has been spent on describing the grammar of these languages. Most of the available descriptions, completed in the 1960s and 1970s, emphasized phonology, verb morphology, sentence structure, and discourse features. A number of important findings from cross-linguistic studies in the 1980s resulted in significant reanalyses of the basic verbal sentences of Philippine languages. The outcome is that the sentence type traditionally called the 'goal-focus' construction was confirmed to be the basic transitive sentence. Later studies have also suggested that the 'actor-focus' construction is not one but two distinct sentences types: an active intransitive sentence (in which the verb is semantically intransitive) and an antipassive construction (in which the verb is semantically transitive). The few descriptions of languages in the southern Philippines completed after the 1970s generally reflect these reanalyses and also provide more information about syntactic processes, giving attention to the function and behavior of constructions as well as their structure.

In the following discussion, grammatical relations are labeled as follows: the only grammatical relation of a single-argument sentence is S, the more agent-like grammatical relation of a transitive sentence is A, and the less agent-like grammatical relation of a transitive sentence is O. Case markers are morphemes that formally distinguish between A and O in a transitive sentence. These markers form three patterns: nominative–accusative (henceforth 'nominative'), ergative–absolutive (henceforth 'ergative'), and tripartite. In the nominative pattern, S and A are marked the same, but O is marked differently; in the ergative (ERG) pattern, S and O are marked the same, but A is marked differently; in the tripartite pattern, S, A, and O are each marked differently. In a split ergative pattern, S, A, and O display ergative case

Table 1 South Philippine, South Mindanao, and Sama languages[a]

South Philippine	*South Mindinao*	*Sama*
Subanon subgroup	Bilic	Sama
Eastern Subanun – Central Subanen, Northern Subanen, Lapuyan Subanun	Blaan – Koronadal Blaan, Sarangani Blaan	Sibuguey Sama, Northern Sama, Western Sama, Central Sama, Southern Sama
Kalibugan – Kolibugan Subanon, Western Subanon	Tboli	Yakan
Danao subgroup	Tiruray	Yakan
Maguindanao – Maguindanaon	Tiruray	Jama Mapun
Maranao-Iranon – Ilanun, Maranao	Bagobo	Jama Mapun
Manobo subgroup	Giangan	Abaknon
North Manobo – Binukid, Higaonon, Kagayanen, Cinamiguin Manobo		Abaknon
Central Manobo		
East Central Manobo – Agusan Manobo, Dibabawon Manobo, Rajah Kabunsuwan Manobo		
South Central Manobo – Obo Manobo		
Ata-Tigwa – Ata Manobo, Matigsalug Manobo		
West Central Manobo – Ilianen Manobo, Western Bukidnon Manobo		
South Manobo – Cotabato Manobo, Sarangani Manobo, Tagabawa Manobo		

[a]Based on data from McFarland (1980).

marking in some sentences and nonergative case marking in others. If S, A, and O are all marked the same, the forms are said to be neutralized for case.

Phonology

South Philippine, South Mindanao, and Sama languages have relatively straightforward phonemic inventories. Vowel systems have four, five, six, or, more rarely, seven vowels. Consonants consist of voiced and voiceless stops (including glottal stop), a few fricatives (often /s/ and /h/), nasals, /l/ and a rhotic (which, depending on the language, is a flap, /ɾ/ or /ɽ/, or a trill, /r/), and the semivowels /w/ and /j/. Some of the Sama languages also have /d͡ʒ/. Long vowels and geminate consonants are common. Word stress occurs on the penultimate or, less commonly, the ultimate syllable and may or may not be predictable, depending on the language.

In the Subanon and Manobo subgroups and in the Sama languages, intervocalic consonants (C), particularly /l/, tend to be deleted over time. This appears to be the source for two common phonological features noted in these languages: long vowels (V) and the syllable V(C). In a significant number of Philippine languages, an epenthetic glottal stop is inserted in syllable onsets (but not codas) when no other phonetic material is available; however, this strategy is apparently not available when an intervocalic consonant is lost in these languages. Thus, the loss of an intervocalic consonant opens a pathway for the resulting sequence of vowels to become long vowels or to coalesce into a new vowel: e.g., /o/ + /i/ → /e/ in Obo Manobo (Khor and Vander Molen, 1996: 31) and /aː/ + /i/ → /æ/ and /a/ + /u/ → /ɔː/ in Northern Subanen (Daguman and Sanicas-Daguman, 1997: 103). The loss of /l/ or some other intervocalic consonant also seems to be the source for word-medial V(C) syllables, also noted for Subanon and Manobo subgroups and Sama languages. Only Maguindanaon allows a word-initial V(C) syllable (the facts are not available for Maranao). Thus, syllable types for Maguindanaon, Obo Manobo, Northern Subanen, and Southern Sama are CV(C) and V(C).

On the other hand, the loss of a mid-central vowel in the South Mindanao subgroup has led to the development of word-initial CCV(C) syllables. For Tboli, the loss appears to have occurred in words beginnings with CV syllables. For Blaan, it occurred in words beginning with CVC syllables. This claim is based on the fact that in Tboli, a mid-central vowel can be inserted optionally after the first consonant of the root (e.g., *btang* ~ *betang* 'to fall') (Forsberg, 1992: 6), but in Blaan, the mid-central vowel is inserted optionally before the first consonant of the root (e.g., *bgang* ~ *ebgang* (adj.) 'broken') (Sally Winter, personal communication). Thus, syllable types for South Mindanao languages are CV(C) and CCV(C). Word-initial CCV(C) syllables also occur in Maranao but are limited to homorganic nasals followed by stops: e.g., /mb/, /nd/, /ŋk/, /ŋg/ (no occurrences of /mp/ or /nt/ are listed in McKaughan and Al-Macaraya (1996)).

Three other phonological features are also notable. One is a unique set of phonological alternations triggered by the syntactic category marker *G-* in Subanon languages. These alternations involve change in voicing, nasalization, point of articulation, spirantization, and deletion of *G-*, depending on the identity of the following consonant (Sanicas-Daguman, 1996: 63–64) (see later, Morphology). The second notable feature is neutralization of contrast between /a/ and certain other vowels in Manobo languages. Specifically, in several Manobo languages, /a/ contrasts with all vowels only in the last two syllables of a word. It never occurs in any syllable to the left of the penultimate. When /a/ moves into one of these positions, it is replaced by one particular vowel: e.g., /a/ → /o/ in Obo Manobo (Khor and Vander Molen, 1996: 30), /a/ → /e/[ə] in Western Bukidnon Manobo (Elkins, 1963), and /a/ → /ɔ/ in Matigsalug Manobo (Elkins, 1984). The third feature is the tendency for high vowels in Maguindanaon to lose their moras under certain conditions, such that high vowels surface as palatalization and labialization on preceding consonants (if they are the first vowel in the sequence) or as glides of diphthongs (if they are the second vowel in the sequence) (Lee, 1964; Skoropinski, 2004).

Morphology

Morphology tends to be more complex in South Philippine languages than in South Mindanao and Sama languages. Taking verbal morphology as an example, South Philippine languages display a fairly extensive range of verbal affixes, some of which undergo complex phonological alternations. These affixes function as portmanteau morphemes, signaling a variety of syntactic and semantic information. The most common information is transitivity (intransitive vs. transitive), dynamism (dynamic vs. stative), and the semantic role of S or O. Aspect, mood, and, less commonly, tense are marked on the verb, but for at least one South Philippine language (Obo Manobo), a mood contrast (realis vs. irrealis) is signaled by clause-level clitics, as well as by verb affixes. Other types of information that may be marked on the verb are abilitative, habitual, reciprocal, distributive, and multiple participants. South Mindanao and Sama languages typically take fewer verbal affixes, and at

least some tense, aspect, and mood contrasts are indicated by words or clitics, rather than by verbal affixes. On the other hand, Sama languages gain in complexity through the ubiquitous presence of the affix *pa-*, which attaches to many verb stems and performs several functions. Most commonly, *pa-* creates new words and adds arguments to the sentence (e.g., an agent to a basic verbal sentence or a causer to a causative construction).

Three other morphemes are also of interest. The first is the Subanon syntactic category marker *G-*, undoubtedly the single most interesting morphophonological feature of this subgroup. The marker *G-* attaches to nouns and to all lexical constituents of noun phrases (NPs), marking the constructions as nominals. Evidence suggests that *G-* is the final consonant of an old case marker that over time became phonologically attached to the first consonant of the following nominal; it has subsequently been reanalyzed as a syntactic category marker, i.e., a nominal marker in the literal sense.

The second morpheme of note is the verbal affix *-an*. This affix occurs in most Philippine languages and functions as a valence increaser, i.e., it occurs on a verb when an oblique NP, usually a location, a recipient, or a beneficiary, is promoted to the O argument (direct object) (see later, Syntactic Processes). Although *-an* performs this function in certain Sama languages (Southern Sama and Balangingi Sama), in these languages it also has a second function – that of verb classifier. As a verb classifier, *-an* occurs on some but not all verbs when O is a patient (PAT). (For most semantically transitive verbs, a patient is the unmarked choice for O; consequently, *-an* cannot be functioning as a valence increaser when it cross-references an O patient.) Since *-an* occurs on some, but not all, verbs when O is a patient, it divides verbs into two classes, those that require *-an* when O is a patient and those that do not. This function of *-an* seems to be unique to the Sama subgroup.

The third morpheme is the Yakan clitic *-in*. This clitic occurs on NPs and nominalized sentences and has two functions. First, it signals that a nominal is definite (DEF). In Yakan transitive (TRANS) sentences, O must be definite but not A. Consider Example (1) (Brainard and Behrens, 2002: 42):

(1) tinnennun we′ dende bunga-samahin
-in-tennun we′ dende bunga-sama-in
TRANS-weave ERG woman *bunga-sama*.type-DEF
'a woman wove the *bunga-sama* type of weaving.'

Second, *-in* marks S of a single-argument sentence (i.e., term (TRM)), whether or not S is definite (Example (2)) (Brainard and Behrens, 2002: 52):

(2) lakkes kura′-in
fast horse-TRM
'a/the horse is fast.'

A phonologically identical morpheme that appears to have a similar function also occurs in Balangingi Sama (Gault, 1999: 18).

Morphosyntax of Basic Sentence Types

South Philippine, South Mindanao, and Sama languages display typical Philippine-type sentence structure: sentences are verb-initial and main verbs usually take an affix that cross-references one, and only one, NP in the sentence (i.e., S in a single-argument sentence and O in a transitive sentence). Sentences that express identity, attribute, possession, location, and existence are usually verbless. Sentences that express states may pattern like verbless sentences (in which case the state is coded as an adjective), or like verbal sentences (in which case the state is coded as a stative verb). Sentences that express actions are verbal sentences and are grouped into four types: active intransitive, transitive, antipassive, and passive. The active intransitive sentence has a semantically intransitive verb; all the other sentence types have semantically transitive verbs (or verbs that pattern like semantically transitive verbs).

In some Philippine languages, transitive sentences have two word orders: VAO and VOA. Traditionally, this pattern has been explained in terms of phonology (i.e., the phonologically shorter argument precedes the phonologically longer one) or in terms of morphology or topicality (i.e., a pronoun precedes a full NP); however, neither explanation has accounted for all the facts. Brainard and Vander Molen (2003) suggested that the VOA sentence is a word-order inverse (a voice construction first proposed by Givón (1994)). Selection of the VOA inverse construction over the VAO active construction is determined either by a person hierarchy (if only first and second persons are involved) or a topicality hierarchy (if only third persons are involved), or a combination of both hierarchies (if first, second, and third persons are all involved). If full NPs as well as pronouns are involved in the selection, then the hierarchy looks like that in Figure 1. In general, if A outranks O on the hierarchy, the VAO active construction is selected, but if O outranks A, the VOA inverse construction is selected.

First person > Second person > Third person > Pronouns > Full noun phrases

Figure 1 Person–topicality hierarchy governing VAO and VOA selection.

Antipassives and passives are detransitivized constructions, i.e., constructions in which one grammatical relation of a transitive sentence has been demoted to oblique or deleted. In Philippine antipassives, O of the transitive counterpart is demoted or deleted. Although the demoted NP is often indefinite, it may be definite. Following demotion or deletion of O, A becomes S. In a Philippine passive, A of the transitive counterpart is obligatorily deleted, and following deletion, O becomes S.

Two types of passives occur in Philippine languages: a morphological passive and a nonmorphological passive. In the morphological passive, the verb takes stative affixes, but in the nonmorphological passive, the verb takes the same affixes that occur on it in a transitive sentence. Thus, the only difference between a nonmorphological passive and a transitive sentence is the obligatory absence of A in the passive. As it happens, some Philippine languages have both types of passives. The factors determining the selection of one passive over the other appear to be language specific and have not yet been fully investigated.

With the identification of the goal-focus construction as the basic transitive sentence, case-marking patterns have undergone reexamination. In South Philippine and Sama languages, case marking displays either a consistently ergative pattern or a split ergative pattern (the precise details of the split ergative patterns vary from language to language). In South Mindanao languages, nominal markers do not function as case markers, although pronouns are marked for case.

At this point, it may be useful to compare actual data from representative languages. When discussing nominal markers, only the marking of S, A, and O will be considered.

Maguindanaon

Common nouns and personal names are marked for case and display an ergative pattern (see Table 2) (it is unclear if the VOA inverse is possible when A and O are both full NPs). Pronouns are also marked for case (see Table 3). In a VAO active construction, second-person pronouns have a tripartite pattern, but third-person pronouns have an ergative pattern. In a VOA inverse construction, second-person pronouns have an ergative pattern (for all other persons, either A or O does not occur in the construction). Maguindanaon has five types of verbal sentences: active intransitive, VAO active construction, VOA inverse construction, antipassive, and passive. Example (3) is an active intransitive sentence (Bruce Skoropinski, personal communication):

(3) lemu aku saguna
leave 1SG now
'I will leave now.'

Selection of a VAO active construction (Example (4); Bruce Skoropinski, personal communication) and a VOA inverse construction (Example (5); Fleischman, 1986: 30) is governed by a person–topicality hierarchy identical to that in Figure 1 (in the following examples, COMP means 'completed aspect'):

(4) in-umbal-an ku seka sa liplanu
COMP-make-BEN 1SG 2SG OBL airplane
'I made you an airplane.'

(5) in-enggat aku nengka kanu walay nengka
COMP-invite 1SG 2SG OBL house GEN.2SG
'you invited me to your house.'

Example (6) (Fleischman, 1986: 30) is the antipassive. (Example (7) is its transitive counterpart.)

(6) min-umbal aku sa liplanu sa leka
COMP-make 1SG OBL airplane OBL OBL.2SG
'I made an airplane for you.'

(7) in-umbal ku su liplanu sa leka
COMP-make 1SG ABS airplane OBL OBL.2SG
'I made the airplane for you.'

The Maguindanaon passive is a nonmorphological passive. Compare the passive in Example (8) (Bruce Skoropinski, personal communication) with its transitive counterpart in Example (6):

Table 2 Maguindanaon case markers

Noun type	*Marker*		
	S	*A*	*O*
Common nouns			
Definite	su	nu	su
Indefinite	i	na	i
Personal names	si	ni	si

Table 3 Maguindanaon pronouns

Person/ number	*VS sentence, S*	*VAO sentence*		*VOA sentence*	
		A	*O*	*O*	*A*
Singular					
1	aku	ku	–	aku	–
2	ka	nengka	seka	ka	nengka
3	sekanin	nin	sekanin	–	nin
Plural					
1INCL	tanu	tanu	–	tanu	–
1DU	ta	ta	–	ta	–
1EXCL	kami	nami	–	kami	–
2	kanu	nu	sekanu	kanu	nu
3	silan	nilan	silan	–	nilan

(8) in-umbal su liplanu sa leka
COMP-make ABS airplane OBL OBL.2SG
'the airplane was made for you'

Obo Manobo

Obo Manobo has two types of transitive sentences, a VAO active construction and a VOA inverse construction. Case marking of common nouns and personal names in both constructions is identical and displays a consistently ergative pattern (see Table 4). Pronouns are also case marked (see Table 5). In a VAO active construction, first- and second-person pronouns have a tripartite pattern and third-person pronouns have an ergative pattern. On the other hand, in a VOA inverse construction, first-person plural exclusive pronouns and second- and third-person pronouns have an ergative pattern. (The pronouns *nikoddi* '1SG' and *niketa* '1PL.INCL' have recently come to notice and also appear to be possible for A in VOA constructions, although this needs to be confirmed.) Obo Manobo has six types of verbal sentences: intransitive, VAO active construction, VOA inverse construction, antipassive, morphological passive, and nonmorphological passive. Example (9) (Edna Vander Molen, personal communication) is an active intransitive sentence:

(9) od usok ka diyon to baoy
IRR enter 2SG there OBL house
'you will enter into the house'

Table 4 Obo Manobo case markers

Noun type	*Marker*		
	S	*A*	*O*
Common nouns			
Definite	idda (so)	(tadda) to	idda (so)
General	ko/do	to	ko/do
Specific	ko (so)/do (so)	to	ko (so)/do (so)
Personal names			
Singular	si	ni	si
Plural	onsi	onni	onsi

Examples (10) and (11) (Vera Khor, personal communication) show, respectively, a VAO active construction and a VOA inverse construction:

(10) od suntuk-on din sikkow
IRR hit-PAT 3SG 2SG
'he will hit you'

(11) od suntuk-on ka nikandin
IRR hit-PAT 2SG 3SG
'he will hit you'

Selection of the active construction and the inverse construction is controlled by a person–topicality hierarchy identical to that in Figure 1. Obo Manobo is notable in that both constructions are possible for most person combinations. Word-order inverses have also been noted for Agusan Manobo, Matigsalug Manobo, Sarangani Manobo, Tagabawa Manobo, and Western Bukidnon Manobo. Example (12) is the antipassive. (Example (13) is its transitive counterpart (Ena Vander Molen, personal communication):

(12) od tampod iddos anak to tali
IRR cut ABS child OBL rope
'the child will cut a rope'

(13) od tompoddon to anak iddos tali
od tampod-on to anak iddos tali
IRR cut-PAT ERG child ABS rope
'the child will cut the rope'

Examples (14) and (15) (Ena Vander Molen, personal communication) are, respectively, a morphological passive and a nonmorphological passive (Example (13) is the transitive counterpart):

(14) od ko-tampod iddos tali
IRR PASS-cut ABS rope
'the rope will be cut'

(15) od tompoddon iddos tali
od tampod-on iddos tali
IRR cut-PAT ABS rope
'the rope will be cut'

Table 5 Obo Manobo pronouns

Person/number	*VS sentence, S*	*VAO sentence*		*VOA sentence*	
		A	*O*	*O*	*A*
Singular					
1	a	ku	siyak	a	–
2	ka	du/ru	sikkow	ka	nikkow
3	sikandin	din/rin	sikandin	sikandin	nikandin
Plural					
1INCL	ki	ta	siketa	ki	–
1EXCL	koy	doy/roy	sikami	koy	nikami
2	kow	dow/row	sikiyu	kow	nikiyu
3	sikandan	dan/ran	sikandan	sikandan	nikandan

Tboli

Tboli common nouns and personal names are not marked for case, but pronouns are and display a split case-marking system (see Table 6) (some pronouns have allomorphs, not all of which are listed in Table 6). The first split occurs between singular and plural forms. Singular forms have a tripartite pattern. The second split occurs between plural forms: all plural forms except first-person inclusive have a nominative pattern, and first-person inclusive forms are neutralized for case. Table 6 shows the distribution of pronouns in affirmative sentences. A notable feature of Tboli is that the negation of a sentence triggers a change in pronoun sets for S and O. This change also alters the case-marking pattern slightly (see Table 7). In negated sentences, singular first and second persons still display a tripartite pattern, but singular third persons now display a nominative pattern. All other persons except first-person plural inclusive continue to display a nominative pattern; first-person plural inclusive continues to be neutralized for case (the alternation of pronouns in affirmative and negated sentences does not occur in Blaan). Examples (16)–(19) illustrate the changes in pronouns. When a single-argument sentence is negated, S changes only when it is a singular third person (Examples (16) and (19) from Lillian Underwood (personal communication); Examples (17) and (18) from Forsberg (1992: 101, 102)):

(16) mung-e
go-1SG
'I'm going along'

(17) là mung-e
not go-1SG
'I'm not going along'

(18) mung
go
'he is going along'

(19) là mung-en
not go-3SG
'he is not going along'

When a transitive sentence is negated, O changes when it is any person except third-person singular and first-person plural inclusive (Examples (20) and (21); Porter, 1977: 114, 115):

(20) nwit Kasi ou elem bulul
TRANS.take Kasi 1SG to mountains
'Kasi took me to the mountains'

(21) là nwit Kasi dou elem bulul
not TRANS.take Kasi 1SG to mountains
'Kasi didn't take me to the mountains'

As might be expected, word order is relatively rigid and a primary means of distinguishing between A and O in transitive sentences; however, when S, A, or O is an expanded full NP, the NP moves to the end of the sentence, and a coreferential pronoun is left in the normal sentence position (Example (22); Forsberg, 1992: 57) (in the following example, PREP means 'preposition'):

(22) kól le$_i$ bélê me
arrive 3PL PREP 1PL.EXCL
[kem tau dmadu]$_i$
PL person INTRANS.plow
'the men who are to plow have arrived to us'

If both A and O are expanded NPs, both NPs move to the end of the sentence, with A coming last. Coreferential pronouns are left for A and O in their normal positions (Example (23); Porter, 1977: 99) (in the following example, SPEC means 'specific'):

Table 6 Distribution of pronoun sets in affirmative Tboli sentences[a]

Pronoun	*Person/number*		
	S	*A*	*O*
Singular			
1	-e	-u	ou/o
2	-i	-em	uu/u
3	ø	-en	du
Plural			
1INCL	tekuy	tekuy	tekuy
1DU	te	te	tu
1EXCL	me	me	mi
2	ye	ye	yu
3	le	le	lu

[a]Based on data from Forsberg (1992: 22), with permission.

Table 7 Distribution of pronoun sets in negated Tboli sentences

Pronoun	*Person/number*		
	S	*A*	*O*
Singular			
1	-e	-u	dou/do
2	-i	-em	kóm
3	-en	-en	du
Plural			
1INCL	tekuy	tekuy	tekuy
1DU	te	te	kut
1EXCL	me	me	kum
2	ye	ye	kuy
3	le	le	kul

(23) eted le$_i$ lu$_j$ [yó kem
deliver 3PL 3PL SPEC PL
ngà lemnek]$_j$ [yó kem
child small SPEC PL
tau lemwót gu leged]$_i$
person INTRANS.come from upstream
'the people from upstream delivered the small children'

If only one expanded NP is present at the end of a transitive sentence, it always refers to O (Example (24); Porter, 1977: 98):

(24) eted le lu$_i$ [yó kem ngà lemnek]$_i$
deliver 3PL 3PL SPEC PL child small
'they delivered the little children'

Expanded NPs in Blaan do not change sentence position.

Southern Sama

Southern Sama common nouns and personal names display a consistently ergative case-marking pattern. For common nouns and personal names, S and O have no case marker, but A is obligatorily marked by *heh*. For pronouns, all persons except plural third persons display an ergative pattern (see Table 8). Plural third-person pronouns are neutralized for case. Note that phonological contrast is minimal for first-person plural exclusive: S, A, and O are identical except for word stress (represented in Table 8 by an acute accent). When A is a pronoun in a transitive sentence of type 1 (see Examples (26) and (27)), it is also obligatorily marked by *heh*. Southern Sama has five types of verbal sentences: active intransitive, transitive type 1, transitive type 2, antipassive, and passive. Example (25) is an active intransitive sentence (Trick, 1997: 126):

(25) pasód anak-anak ni lumah
enter child OBL house
'the child will enter into the house'

Table 8 Southern Sama pronouns

Pronoun	*Person/number*		
	S	*A*	*O*
Singular			
1	akú	ku	akú
2	kow	nu	kow
3	iyá	na	iyá
Plural			
1INCL	kitabí	tabí	kitabí
1DU	kitá	ta	kitá
1EXCL	kamí	kámi	kamí
2	kam	bi	kam
3	sigá	sigá	sigá

Transitive sentences are of two types. Transitive sentence type 1 is more morphologically complex, compared to type 2, because the verb must occur with the affix *ni-* (or its allomorph *-in-*), A is either a full NP or a pronoun and must be preceded by the ergative marker *heh*, and word order may be VAO or VOA, with VOA being the more common order (transitive type 1, Examples (26) and (27), VOA and VAO order, respectively; Trick, 1997: 128):

(26) sinampak eroh heh anak-anak
sampak-in- eroh heh anak-anak
slap-TRANS dog ERG child
'the child will slap the dog'

(27) sinampak heh anak-anak eroh
sampak-in- heh anak-anak eroh
slap-TRANS ERG child dog
'the child will slap the dog'

Transitive sentence type 2 is morphologically simpler: the verb never occurs with *ni-*, A must be a pronoun and is never preceded by *heh*, and word order is obligatorily VAO (Example (28); Doug Trick, personal communication) (similar pairs of transitive sentences have also been noted for Balangingi Sama, Pangutaran Sama, and Yakan):

(28) sampak-ku eroh
slap-ERG.1SG eroh
'I will slap the dog'

Example (29) (Trick, 1997: 132) is the antipassive. (Example (30) (Trick, 1997: 132): is its transitive counterpart.)

(29) ngan-dugsuh aku sowa
AGT-stab ABS.1SG snake
'I will stab a/the snake'

(30) ni-dugsu-an sowa heh-ku
TRANS-stab-PAT snake ERG-ERG.1SG
'I will stab the snake'

Passive sentences in Southern Sama are nonmorphological passives (Example (31); Trick, 1997: 133); compare Example (31) with its transitive counterpart, Example (29):

(31) ni-dugsu-an sowa
TRANS-stab-PAT snake
'the snake will be stabbed'

Syntactic Processes

Although syntactic processes have been investigated in a few languages, e.g., Sama, Yakan, and Northern Subanen, this is an area of Phillipine linguistics that still needs more research. What has been noted to date is that South Philippine, South Mindanao, and Sama languages, like all Philippine languages, allow

an oblique NP to be promoted to O (i.e., direct object), although languages vary as to which semantic roles may undergo promotion. The promoted NP is always cross-referenced by an affix on the verb. A variation of this process occurs in some Sama languages. In cleft constructions in Philippine languages, S and O are the only arguments eligible to be the head of the construction, in which case they are usually cross-referenced by a verbal affix. For certain verbs, however, the verbal affix may cross-reference an oblique NP. For these NPs, morphological and syntactic evidence shows that the cross-referenced NP has changed its relation to the verb, but has not become a grammatical relation (i.e., O). (This process has been noted for Southern Sama and Yakan. In Southern Sama, a similar process also occurs in antipassive constructions.) For those languages in which other syntactic processes have been described (e.g., relativization, clefting, raising, coreferential deletion, and control of second-position clitics), the following preliminary generalization can be made: in South Philippine languages, control of syntactic processes seems to be more or less evenly distributed between A and O in transitive sentences, but in Sama languages, control for nearly all of these processes (including second-position clitics) is governed exclusively by O in transitive sentences, making the Sama languages highly syntactically ergative languages. As for all Philippine languages, S is always the syntactic control in single-argument sentences.

See also: Austronesian Languages: Overview; Case; Ergativity; North Philippine Languages; Syntactic Constructions; Malayo-Polynesian Languages; Philippines: Language Situation.

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South Siberian Turkic *See:* Turkic Languages.

Southeast Asia as a Linguistic Area

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Mainland Southeast Asia – the Area, Its Languages and Language Families, Its History

Mainland Southeast Asia geographically covers the area of Vietnam, Laos, Cambodia, Thailand, Myanmar, peninsular Malaysia, and southern and southwestern China. This area is characterized by at least two millennia of lively exchange and interaction among speakers of languages that belong to no fewer than five families: Sino-Tibetan, Mon-Khmer (a subfamily of Austroasiatic), Tai (the core group of the Tai-Kadai languages), Hmong-Mien (also called Miao-Yao) and Chamic (Malayo-Polynesian subfamily of Austronesian). The families forming the core of mainland Southeast Asia as a zone of

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Table 1 Subgrouping of Mon-Khmer (MK) languages (according to Diffloth & Zide, 1992)

Northern	Khmuic (N Laos/N Thailand)	Khmu, Mal-Phrai, Mlabri
	Palaungic (N Laos/N Thailand, E Burma, SW Yunnan)	Eastern: Riang dialects, Danau Western: Waic, Angkuic, Lametic
	Khasian (NE India)	Khasi
Eastern	Khmeric	Khmer
	Bahnaric (35 languages in Central and S Vietnam, S Laos, E Cambodia)	South: Srê, Mnong, Stieng, Chrau Central: Bahnar, etc. West: Brao (Lave), Nya-heuny (Nyaheun), etc. North: Rengao, Sedang, etc.
	Katuic (Central Vietnam/Laos, NE Thailand, N Cambodia)	West: Kuy, Bru, Sô, etc. East: Katu, Pacoh, Ngeq, etc.
	Pearic (Central Cambodia; affiliation uncertain)	Samrê, Pear, Sa-och (Sa'och), Chong
Viet-Muong (is probably a branch of Eastern MK)		Vietnamese, Muong, etc.
South	Monic	Mon (Myanmar, Thailand), Nyahkur (E Central Thailand)
	Aslian (interior Malaysia, 16 languages)	Senoic: Semai, Temiar; North: Kintaq, Jahai (Jehai), Batek; South: Mah Meri (Besisi), Semelai; Jah Hut
	Nicobarese (Nicobar Islands, may be another direct branch of MK)	Four subgroups

Table 2 Subgrouping of Tai languages (according to Li, 1977; for more information, see Edmondson and Solnit, 1997)

Southwestern	Ahom (Assam/India; extinct) Central Thai (= Siamese) East Central: Black Tai (Tai Dam) (N Vietnam), Red Tai (Tai Daeng) (North Central Vietnam), Phu Tai (Phuan) (Laos/Thailand) Khamti (NW Myanmar; Assam) Lanna (N Thailand): Mueang, Northern Thai, Yuan Lao (Laotian, including Isan in Thailand) Lue (Lü) (called Dai in China; situated in Yunnan) Shan (SE Myanmar, Thailand) Southern Thai White Tai (Tai Dón) (N Vietnam) etc.
Central Tai	Nung (on both sides of the Chinese-Vietnamese border), Southern Zhuang (China, Zhuang Autonomous Region), Tho (= Tay and Caolan; NE Vietnam, S China)
Northern Tai	Bouyei (Buyi), Saek (Central Laos near Vietnamese border, NE Thailand), Northern Zhuang (across S China)

contact-induced convergence are Mon-Khmer, Tai, Hmong-Mien and Sinitic. The Hmong-Mian languages are divided into the Hmong (Miao) and the Mien (Yao) subfamilies. They are spoken in small areas of southern China and in northern Vietnam, Laos, and Thailand. The architecture of the other families is presented in Tables 1–3: Table 1 is on Mon-Khmer, Table 2 on Tai, and Table 3 on Sinitic.

The present linguistic situation in mainland Southeast Asia is the result of extensive migrations, the rise and fall of many kingdoms, and innumerable contact situations (on the historical facts, see Wyatt, 1982). In the first millennium A.D., the inhabitants of this area had contacts with China and India. Vietnam, in the east, was governed by China between 179 B.C. and 938 A.D., while the west and the south were influenced by Theravada Buddhism through the mediation of the Mon (cf. the large corpus of Sanskrit and Pali words in modern Thai and Khmer). The geography of mainland Southeast Asia and its large rivers in particular directed migration from southern China toward Thailand, Laos, and Vietnam. Apart from Chinese and Indian influence, the first millennium A.D. is characterized by the steady emergence of greater political structures. At its end, we find the state of Vietnam, the kingdom of Champa (on the coast of central Vietnam; Austronesian: Chamic), the Khmer empire of Angkor, the kingdoms of central and northern Thailand, and the Burmese kingdoms of Mon and Pyu. At about the same time, numerous speakers of Tai languages migrated from inland southern China (Guizhou, Guangxi) to the south and changed the balance in the north towards the Tai population, which simultaneously became an important reservoir of manpower and a potentially dangerous rival for the adjacent kingdoms. Cambodia moved its center of gravity from Angkor further south to Phnom Penh, and the newly developed Thai kingdoms of Sukhothai (?1240–1438) and Ayudhya (1351–1767) were characterized by intensive contact and presumably by a considerable proportion of bilinguals. As a consequence, there is a high degree of structural similarity and some lexical similarity between the two languages. Finally, the migration of a considerable number of Hmong-Mien from southern and southwestern China to Laos, Vietnam, and Thailand started in the middle of the 19th century.

Table 3 List of Sinitic languages/dialects (Chappell, 2001: 6)

Northern Chinese (N China, W China, par of central China, Sichuan basin, Guizhou and Yunnan provinces)
Xiāng (Xiang Chinese) (Hunan province)
Gàn (Gan Chinese) (Jiangxi province)
Wú (Wu Chinese) (coastal area of lower Yangze River in the provinces of Jiangsu, Zhejiang and Anhui)
Mǐn (Min Nan Chinese) (Southern coastal province of Fujian and the island of Taiwan, Leizhou peninsula plus Hainan island)
Kèjiā or Hakka (Hakka Chinese) (scattered throughout SE China in small communities in the Yuè and Mǐn areas)
Yuè (Yue Chinese) (Guangdong and Guangxi provinces; Cantonese)
Recently identified dialect groups:
Jìn (Jinyu Chinese) (Shanxi province and Inner Mongolia)
Pínghuà (Guangxi)
Huī (Huizhoun Chinese) (in parts of Anhui, Jiangxi and Zhejiang provinces)

Given the long-lasting and very complex patterns of interaction among speakers of a large number of languages from different families, structural convergence comes as no surprise. Studies dealing with mainland Southeast Asia from an areal perspective are Huffman (1973), Clark (1978), Capell (1979), Clark (1989), Matisoff (1991), Bisang (1992), Bisang (1996), and Enfield (2003). Huffman (1986) is an excellent bibliography on the languages and linguistics of this area.

General Properties of the Languages of Mainland Southeast Asia – the Relevance of Pragmatics

Mainland Southeast Asian languages are characterized by a high degree of indeterminateness, which as a consequence endorses the relevance of pragmatic inferencing and produces a special type of pragmatics-oriented grammaticalization (see 'Indeterminateness and the Role of Pragmatics' below). The pragmatics-oriented character of grammaticalization may be one reason for a syllable-based morphology (see 'Syllabic Morphology' below). Another consequence of this type of grammaticalization may be the comparatively weak correlation between the lexicon and individual lexical items (see 'Versatility' below).

The above pragmatics-based properties will be discussed in this section. Two additional general properties will be treated in the subsection 'Directional Verbs, Coverbs and TAM Markers, and Syntactic Patterns' with the necessary language-specific details. The properties are the existence of rigid syntactic patterns with fixed functionally determined positions and the functional motivations of these patterns.

Table 4 Some nonobligatory categories in mainland SE Asian languages

Verb	*Noun*
Person/Number	Number
Tense/Aspect/Modality (TAM)	Noun class
Transitivity (transitive vs. intransitive)	Reference (definite, specific, indefinite)
Diathesis	Relationality (possession)
Causativity	Case

Indeterminateness and the Role of Pragmatics

East and mainland Southeast Asian languages are well known for their indeterminateness, i.e., their lack of obligatory categories (Bisang, 1992, 2001, see also context dependency in Enfield, 2003: 55). One famous instance is the lack of obligatory arguments. In the following example from Modern Standard Chinese (Mandarin Chinese), the agent argument *wǒ* 'I' and the patient argument *tā* 'he' are no longer mentioned in the second clause with the predicate *jiàn* 'see' because they are already known from the previous context.

(1) wǒ$_1$ bú jiàn tā$_2$ yǐ shì sān
I *NEG* *see* *he* *already* *be* *30*
shíduō nián; jīntiān ø$_1$ jiàn ø$_2$ le
more *year* *today* *see* *PF*
'I haven't seen him for more than 30 years. Today [**I**] saw [**him**]'
(from Lu Xun, *Kuangren riji* [*Diary of a Madman*], second sentence).

Dropping arguments (prodrop) is not the only instance of indeterminateness. There are also a large number of grammatical categories which are optional (cf. Table 4), i.e., the speaker is not committed to select a particular subcategory (e.g., past, present, or future) from a particular obligatory category (e.g., tense).

Indeterminateness implies that grammatical categories which are expressed obligatorily in other languages must often be inferred from the context in mainland Southeast Asian languages. If these categories are expressed, however, they are very often expressed by lexical items which occur in a special syntactic position of a construction where they get reanalyzed as grammatical markers. This type of grammaticalization differs from grammaticalization as described in the literature by dint of the vast functional range of many markers (see 'Classifiers' and "The Verb 'Come to Have'" below) and the lack of a form–meaning correspondence (see 'Directional Verbs, Coverbs and TAM Markers, and Syntactic Patterns'). The mainland Southeast Asian languages show that a high degree of abstraction (semantic

generality, cf. Bybee, 1985) does not automatically lead to morphological reduction (see 'Syllabic Morphology' below); in other words, the semantic integrity of a linguistic sign is not fully reflected in its phonological integrity (Lehmann, 1995). The high functional range of individual markers is sometimes observed within an individual language, sometimes across languages. In the latter case, individual languages select certain domains out of the whole inferential potential of a marker common to a wider contact zone (see 'Directional Verbs, Coverbs and TAM Markers, and Syntactic Patterns' on verbs with the meaning 'finish' and the end of "The Verb 'Come to Have'").

The high relevance of pragmatics led to a more general discussion of the relevance of syntax in mainland Southeast Asian languages. Diller (1988) talked about "pragmatically organised syntax" in the context of Thai and other languages. Huang (1994) argued, against Huang (1984), that the interaction of syntax and pragmatics is subject to typological variance:

> There seems to exist a class of language (such as Chinese, Japanese, and Korean) where pragmatics appears to play a central role which in familiar European languages (such as English, French, and German) is alleged to be played by grammar. In these 'pragmatic' languages ... (Huang, 1994: xiv)

Syllabic Morphology

Mainland Southeast Asian languages are characterized by or drift towards a morphology whose smallest meaningful element is the syllable. This definition encompasses the well-known monosyllabism of languages such as Chinese (Mandarin Chinese) or Vietnamese (each syllable has its own meaning) but it also covers such cases as Thai or Khmer, which easily accept strings of semantically unanalyzable syllables, as in the elegant word for 'restaurant' in Thai (*pháttaakhaan*) or in Khmer (*phòːcənìːəṭṭhaːn*).

This does not mean that subsyllabic morphology does not exist in mainland Southeast Asia, but the integration into that area seems to engender a drift towards syllabic morphology. This can be illustrated by Mon-Khmer. Vietnamese, which was under the strong influence of monosyllabic Chinese for more than a millennium (see above), has completely lost its subsyllabic morphology, while Khmer, which had weaker contacts with China and was even able to transfer a lot of its vocabulary to Thai, probably has the richest morphology within the Mon-Khmer family (on Khmer morphology see Jenner and Pou, 1980–1981; Haiman, 1998). In spite of this, Khmer morphology is basically a lexical phenomenon, i.e., the affixes are not used productively. The productive strategies are all based on products of grammaticalization (as described in the subsections 'Classifiers,' 'Directional Verbs, Coverbs and TAM Markers, and Syntactic Patterns,' and "The Verb 'Come to Have'"). In addition, Khmer subsyllabic morphology is characterized by the following two properties: (1) a large number of Khmer affixes lack functional consistency, i.e., the same marker can express different functions depending on its base (the prefix *prə-* marks causativity/factivity, change of word class and reciprocity); and (2) the same function can be expressed by different affixes (e.g., derivation of nouns from verbs belongs to the functional range of the following affixes: *k-*, *s-*, *m-*, *N-*, *bvN-*, *kvN-*, *svN-*, *-b-*, *-m-*, *-n-*, *-vmn-/-vN-*) (Bisang, 2001: 195–200).

Versatility

The term 'versatility' refers to the fact that the occurrence of a given linguistic item is not limited to a single syntactic position (Matisoff, 1969). A word's freedom to occur in the N-position as well as in the V-position is one instance of versatility. In the extreme case of Late Archaic Chinese (5th–3rd century BC), any lexical item can take the verbal position, even a proper name:

(2) Late Archaic Chinese (Zuo, Ding 10)
Gōng Ruò yuē: ěr **Wú wáng** wǒ hū?
Gong Ruo say you Wu king I Q
'Gong Ruo said: "Do you want to deal with me as **King Wu** was dealt with?"'
(King Wu was murdered. → "Do you want to **kill** me?")

Versatility may also enhance grammaticalization in the sense that full lexemes can take positions associated with grammatical functions. As is typical of versatility, one lexical item can take different functions depending on the construction in which it is used. Thus, the verb *ʔaoy* 'give' in Khmer can occur as a coverb (3), as a causative verb (4), or as an adverbial subordinator (5). The same applies to Vietnamese *cho* 'give' and to Thai *hây* 'give' (cf. Bisang, 1996: 577–578).

(3) kɔ̀ət baək tvìːə(r) **ʔaoy** khɲom
he open door give.COVERB I
'he opens the door for me'

(4) mdaːy-mìːŋ sovaṇ(ṇ) **ʔaoy** svaːmɤy cùːn
aunt Sovan give.CAUS husband give a lift
phɲiəv tɤ̀u phtɛ̀əh
guest Vd:go house/home
'Aunt Sovan had her husband bring the guests back home' (Bisang, 1992: 440)

(5) khɲom khɔm thvə̀:-ka:(r) ʔaoy
I *try* *hard work* *so that.*COMP
ʔo:pùk khɲom sɔpba:y-cʋt(t)
father *I* *be-pleased*
'I am working hard so that my father will be pleased.'

The versatility of lexical items may turn out to be another consequence of the high relevance of pragmatics in the sense that the positioning of lexical items into syntax is governed to a lesser or to a greater degree by pragmatics.

Some Individual Structural Properties of the Languages of Mainland Southeast Asia

This section will mostly refer to one or more of the following languages: Chinese (Mandarin Chinese) (Sinitic), White Hmong (Hmong Daw) (Hmong-Mien), Vietnamese (Mon-Khmer), Thai (Tai) and Khmer (Mon-Khmer). Apart from word order; classifiers; directional verbs (Vd), coverbs (COV), and TAM markers derived from verbs; and different functions of the verb 'come to have,' there are other characteristics of mainland Southeast Asia as a zone of convergence which will not be discussed here. I would like to refer to relational nouns (nouns such as Thai *nâa* 'front' in adpositional function with the meaning 'in front of'), causatives marked by the verbs 'make, do' and 'give, allow' in Vietnamese, Thai, and Khmer (Bisang, 1992: 42–44; see also example (4) above), passivelike constructions with a tendency to adversative meaning, complementizers and adverbial subordinators derived from verbs such as 'say,' 'give' (cf. example (5) above), 'finish' and others, and, finally, comparative constructions based on verbs with the meaning 'surpass' (e.g., in Cantonese, Thai, Vietnamese).

Word Order

The large majority of the languages belonging to the mainland Southeast Asian convergence zone are VO (verb middle, including Chinese [Mandarin Chinese]). The noun phrase is subject to variance. While Chinese (Mandarin Chinese) is consistently head final, Thai and Khmer are consistently head initial. Hmong and Vietnamese are head initial with the exception of the classifier phrase, which follows the Chinese (Mandarin Chinese) example. There are prepositions (coverbs) in all the languages; Chinese also has postpositions (relational nouns, i.e., nouns in adpositional function). Since numerals covary with classifiers, there is no extra column for them in Table 5.

Classifiers

Classifiers are minimally used with numerals, where their presence is overwhelmingly compulsory in mainland Southeast Asian languages. Thus, a Chinese (Mandarin Chinese) noun like *xìn* 'letter' must take a classifier (*fēng*) if it is counted:

(6) sān fēng xìn
three CLASS *letter*
'three letters'

There is an implicational correlation between the existence of a classifier and the lack of obligatory number distinction (transnumerality): "Numeral classifier languages generally do not have compulsory expression of nominal plurality, but at most facultative expression" (Greenberg, 1974: 25). Since nouns in mainland Southeast Asian languages only denote a concept without any commitment to number, one of the functions of the classifier is to make that concept accessible by individuating it, i.e., by highlighting one of its conceptual boundaries which qualify it as a unit (Bisang, 1999). The semantic criteria for highlighting a concept also classify that concept. Typical criteria for classification are material (animate, abstract, inanimate), shape (one-/two-/three-dimensional), consistency (flexible, hard or rigid, discrete), size (big, small), location (classifiers for plots of land, countries, gardens, fields, etc.) and spatial arrangement (Allan, 1977). Other criteria are based on physical, functional, and social interaction with the concept to be classified (Denny, 1976).

Classification can not only be used to individuate a concept by highlighting some of its properties; it can also be used for identifying one or more relevant objects denoted by a concept. While identification can take place without referring to individuation – one can identify an 'apple' without referring to its conceptual boundaries – it seems difficult to individuate it without simultaneously identifying it.

Table 5 Word order in mainland southeast Asia

	Verb/Object	*Adposition*	*Demonstrative*	*Classifier*	*Possessor/Genitive*	*Relative Clause*
Chinese	VO	Prep/Postp	DemN	CIN	GenN	RelN
Hmong	VO	Prep	NDem	CIN	NGen	NRel
Vietnamese	VO	Prep	NDem	CIN	NGen	NRel
Thai	VO	Prep	NDem	NCl	NGen	NRel
Khmer	VO	Prep	NDem	NCl	NGen	NRel

Departing from classification, one can thus establish the following hierarchy:

(7) classification > identification > individuation

Identification can be used either to mark the definiteness or specificity of a concept (referentialization) or to make it accessible for construction with for example a possessor or a relative clause (relationalization).

Taking together the functional range of classifiers in mainland Southeast Asia, there are no fewer than four functions: classification, individuation, referentialization, and relationalization. These functions are not equally distributed across Southeast Asia. The minimal functions operating in all the languages are classification and identification. Table 6 provides a survey (Bisang, 1999).

The following examples from Hmong illustrate the functions of classification/individuation (8a) and of relationalization (possession) (8b).

(8a)	peb	rab	riam
	three	CLASS	*knife*
	'three knives'		
(8b)	nws	rab	riam
	he	CLASS	*knife*
	'his knife'		

The referential function of classifiers is more difficult to show because this needs a lot of text. Once a concept is introduced, it can be marked as definite, sometimes by the classifier alone, sometimes by classifier plus demonstrative, sometimes only by the demonstrative (for more, see Bisang, 1999: 152–153). It is, however, necessary to point out that reference marking is not compulsory. Thus, an unmarked noun can get any possible referential interpretation depending on context.

Directional Verbs, Coverbs and TAM Markers, and Syntactic Patterns

Markers derived from lexical items used for expressing directionality, adpositional functions, and tense-aspect-modality (TAM) are widespread in mainland Southeast Asia.

The direction taken by a state of affairs can be overtly expressed with directional verbs (Vd). Verbs belonging to this category have the meanings of 'come,' 'go,' 'move upwards,' 'move downwards,' 'move into,' and 'move out of.' In Khmer, there is a maximum of three slots (9), while Thai has only two slots and Vietnamese only one.

(9)	kɔ̀ət	yɔ̀ːk	ʔʏyvan **coh**
	he	*take*	luggage *move. down*.DIR
	cën	**mɔ̀ːk.**	
	move. out.DIR	*come*.DIR	
	'He takes [his] luggage down and out [of his room upstairs towards the speaker]'		

Verbal lexemes in adpositional function are called coverbs (COV) (see Clark, 1978). An instance of the verb 'give' in that function is discussed in the subsection 'Versatility.' Other frequently used verbs are 'be at' (locatives or directionals), 'arrive' (directionals), 'move along something' (path), 'use' (instrumental), 'be equal to' (work as, do something in the function of), and 'replace' (instead of). The following example is from Vietnamese:

(10)	tôi	làm	việc	**ở**	Sài gòn.
	I	*do*	*work*	*be.at*.COV	*Saigon*
	'I work in Saigon'				

Verbs in the function of TAM markers can occur in the preverbal position or clause finally (in Chinese [Mandarin Chinese], there are also the three TAM markers *-le*, *-zhe* and *-guo*, which are suffixed to the verb). The verb 'finish' in clause-final position, which is very widespread, is briefly looked at in this subsection (see also the next subsection on 'come to have'). In Chinese (Mandarin Chinese), the clause-final marker *le* (derived from *liǎo* 'finish') marks a wide range of functions from perfect to the pragmatic function of reference to a preconstructed domain (Li *et al.*, 1982; Bisang and Sonaiya, 1997). Thai *lɛ́ɛw*, which is borrowed from Chinese *liǎo* 'finish,' is an aspectual marker highlighting event-initial or event-final temporal boundaries. The functions of Hmong *lawm* (again related to Chinese *liǎo*) or *tas (lawm)* 'finish,' Vietnamese *rồi* 'finish,' and Khmer *haəy* (nowadays only used as a TAM marker, but cf. its transitive form *bɔŋhaəy* 'finish') cover the same functional range as *le* and *lɛ́ɛw*. Unfortunately, there is no detailed comparative analysis available.

If directional verbs, coverbs, and TAM markers are part of the same state of affairs, they follow a fixed pattern of word order (cf. serial unit in Bisang, 2001) described in Table 7 and illustrated by example (11) from Khmer.

Table 6 Functions of classifiers in individual languages

I. *Classification & individualization*
Modern Standard Chinese (Mandarin Chinese) (classifiers with numerals and demonstratives)
Vietnamese (individualization, but not necessarily in the context of counting)
II. *Classification & individualization & referentialization*
Thai (secondary function in combination with stative verbs in N-CLASS-ADJ)
III. *Classification & individualization & relationalization*
Cantonese (yue Chinese) (classifiers can be used in possessive and relative constructions)
IV. *Classification & individualization & referentialization &* relationalization
Hmong (with referentialization being a secondary function)

(11) kɔ̀ət **ba:n** yɔ̀:k ʔʏyvan **coh**
the be.able.TAM take luggage move.down.DIR
cëŋ **mɔ̀:k.** **ʔaoy** khɲom.
move.out.DIR come. DIR give.COV I
'he was able to bring [his] luggage down and out [of his room upstairs towards the speaker] to/for me.'

As can be seen from Table 7, the structure of the serial unit follows a certain areal clustering. Vietnamese, Thai, and Khmer, in the south, follow exactly the same pattern. Chinese (Mandarin Chinese), in the north, differs with regard to the following three properties: preverbal coverbs, TAM markers immediately after the verb and COV–Vd word order. Hmong lies in between. It shares the former two word order properties with Chinese (Mandarin Chinese) and the last property with the southern languages.

The above word order is not arbitrary even if one looks at languages spoken outside mainland Southeast Asia with comparable structures (Bisang, 2001: 202–214). It can be accounted for in terms of semantic generality as introduced by Bybee (1985). Increasing semantic generality of a marker is related to compatibility with more lexical stems and to greater morphosyntactic fusion with the stem. Thus, maximally general grammatical categories are prototypically expressed inflectionally. Although there is no iconic correlation between the degree of semantic abstraction and morphological attrition in mainland Southeast Asia (see 'Syllabic Morphology' above), there is a form–meaning iconicity if one looks at the relative distance of the markers to the main verb. The further away a marker is from the main verb the more general it is. Directional verbs and coverbs still have enough semantic weight to be incompatible with many verbs. This is not the case with the semantically more general TAM markers. Therefore, TAM markers are situated at a greater distance from the verb than coverbs and directional verbs. Coverbs and directional verbs seem to share about the same degree of generality. Consequently, we find COV-Vd as well as Vd-COV.

The Verb 'Come to Have'

There is an excellent study on the grammaticalization of the verb 'get, come to have' from an areal perspective in mainland Southeast Asia in Enfield (2003). Verbs such as Chinese (Mandarin Chinese) *dé*, Hmong *tau*, Vietnamese *được*, Thai *dây*, or Khmer *ba:n* with that meaning induce a large number of different inferences depending on the context. Enfield (2003) translates these verbs with 'come to have.' This translation is more adequate than the one with 'get' because it does not imply an agentive subject.

Although 'come to have' verbs occur preverbally as well as postverbally, a look in this subsection at their preverbal functions will be enough to illustrate the rich inferential potential. Their basic meaning in this position is that the state of affaires expressed by the main verb is true or applies "because of something else that happened before this" (Enfield, 2003: 292). A set of inferences depends on whether the state of affairs denoted by the verb is understood as [+wanted] or [−wanted]. If it is wanted, we get either an abilitative (be able) or a permissive (be allowed) inference (12); if it is not wanted, we get a strong deontic (must, have to) interpretation (13).

(12) Hmong (Mottin, 1980; Bisang, 1992: 241):
koj mus deev hluar nkauj,
you go court girl
koj puas **tau** nrog tham?
you Q PFV with.COV talk
'you courted the girl, did you [manage to] talk to her?'

(13) Chinese (Mandarin Chinese) (in its deontic function, *dé* 'get' becomes *děi*):
tā **děi** xuéxi zhōngwén.
s/he must learn Chinese
'S/he must learn Chinese'

Many grammarians of individual languages describe 'come to have' verbs as past markers. In spite of this, past is only another possible inference, but not a clear-cut grammatical category. The following Khmer example from Enfield (2003: 314) can also trigger other temporal inferences in other contexts:

(14) khɲom **ba:n** rìəp-ka:(r)
I get.TAM marry
ta:m prəpèynì: khmae(r)
according.to.COV custom Khmer
'I married according to Khmer custom'
(could mean in other contexts 'I would/will get to/have to marry . . .')

A fourth inference, treated only marginally by Enfield (2003), is emphasis of the truth. This

Table 7 Positions within the serial unit

Chinese	TAM	COV	V-TAM	COV	Vd	TAM
Hmong	TAM	COV	V TAM	Vd	COV	TAM
Vietnamese	TAM		V	Vd	COV	TAM
Thai	TAM		V	Vd	COV	TAM
Khmer	TAM		V	Vd	COV	TAM

inference is related to the fact that for the agent to be able to 'come to have' a given state of affairs, that state of affairs needs to be true.

(15) Hmong (Mottin, 1980: 94):

saib	yog	leej	twg	**tau**
look	*be*	*man*/CL	*which*	PFV
ua	txhaum	zoo li cas	lawm?	
make	*mistake*	*like.this*	PERF	

'[we want to] see who [really] made such a mistake'

In spite of their rich inferential potential, most languages show preferred inferences or even completely exclude certain inferences. Thus, the meaning of preverbal 'come to have' in Chinese (Mandarin Chinese) is conventionalized into deontic modality. Vietnamese prefers the abilitative or permissive interpretation but is compatible with a must-interpretation. Thai and Khmer are more open, with a functional core of abilitative/permissive and past. Hmong shows a certain preference for past (Enfield, 2003: 319) but certainly does not exclude abilitative/permissive inferences.

Conclusion – Factors Leading to a Zone of Convergence

Mainland Southeast Asia is characterized by a special type of pragmatics-oriented grammaticalization and by a number of shared products of grammaticalization and syntactic patterns. The structural convergence observed in this zone is the result of a very complex interaction of cognitive (semantic and pragmatic) factors with social mechanisms of diffusion extended over a large number of different individual situations of contact. Language-internal cognition-based processes of change are combined with and sometimes enhanced or interrupted by contact-induced changes. When it comes to social factors, any of the social models accounting for the cross-linguistic diffusion of structural properties presented in the literature can contribute their part. Thus, the diffusional pattern of the properties relevant for mainland Southeast Asia as a zone of convergence is most likely a joint product of social networks, leaders of linguistic change, and invisible-hand processes (*see* **Contact-Induced Convergence: Typology and Areality** for more information on these social mechanisms).

See also: Areal Linguistics; Austroasiatic Languages; Cambodia: Language Situation; Burma: Language Situation; Clitics; Contact-Induced Convergence: Typology and Areality; China: Language Situation; Grammaticalization; Malaysia: Language Situation; Mon-Khmer Languages; Police Questioning; Pragmatics: Overview; Remediation of Language Disorders in Children; Thailand: Language Situation; Sino-Tibetan Languages; Tai Languages; Vietnamese; Vietnam: Language Situation.

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Southern Bantu Languages

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Introduction

Southern Bantu languages include Bantu languages spoken in South Africa, Swaziland, Lesotho, Botswana, Zimbabwe, and southern Mozambique. The term 'southern Bantu languages' is usually taken to refer to the geographical-referential classification, and hence as not implying genetic relations, of the following languages and language groups: the Nguni group (including Zulu, Xhosa, Swati, Ndebele), the Sotho-Tswana group (including Northern Sotho, Sesotho [Sotho, Southern], Tswana), the Tswa-Ronga group, the Imhambane group, and also Shona and Venda. The Bantu languages of Angola and Namibia, such as Herero or Wambo, are usually not included under southern Bantu, but are referred to as southwestern Bantu. In terms of Guthrie's (1967–1971) classification, southern Bantu languages are grouped as zone S. The designation 'southern Bantu languages' was re-enforced by Doke's monograph with the same title published in 1954.

Historically, the southern Bantu languages provide the endpoint of the so-called Bantu expansion, a period of migration and contact of more than 2000 years, during which Bantu languages slowly came to be spoken throughout the larger part of sub-Saharan Africa. The origin of the Bantu expansion lies in the Nigeria-Cameroon borderland, and the direction of the expansion was hence southwards and ended with Bantu languages reaching the southern African coastline about 1,500 years ago, coming from eastern and central Africa. Speakers of southern Bantu languages have probably shared an extended, and extensive, period of contact with speakers of Khoisan languages present in southern Africa when Bantu languages arrived. The differentiation of distinct Bantu languages, and the establishment of standardized forms occurred more recently. From the 19th century onwards, written literature was produced in the larger southern Bantu languages, and several are among the dominant languages in the countries where they are spoken. For example, all nine Bantu languages of the national languages of the Republic of South Africa (in other words, all national languages except for English and Afrikaans) are southern Bantu languages.

Southern Bantu languages have played an important part in the history of Bantu studies. While the earliest descriptions of Bantu languages are from west-central and eastern Africa, scholarship in southern African Bantu languages provided the impetus for a number of early comparative Bantu studies

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(Lichtenstein, 1808; Bleek, 1862, 1869; Torrend, 1891). Bleek (1862) is credited with coining the term 'Bantu' based on the plural form for 'people' in Xhosa and in many other Bantu languages. In the 20th century, a major figure in the study of southern Bantu languages was Clement Doke, who produced numerous grammatical descriptions of southern Bantu languages and also proposed an analytical system for the description of Bantu languages, which became particularly influential in South Africa (Doke, 1935). Due to the official status of nine southern Bantu languages in South Africa and an increase in institutions of tertiary education, there is currently a wealth of new linguistic scholarship in southern Bantu languages, often with particular emphasis on lexicography, computational linguistics, and applied linguistic topics such as language policy and language teaching. Most of the southern Bantu languages with large numbers of speakers (Zulu, Xhosa, Northern Sotho, Sesotho, Tswana) have, often recent, comprehensive reference grammars and dictionaries, as well as a range of teaching materials for schools and independent learners.

Classification

The southern Bantu languages are, following Guthrie (1967–1971), classified into six groups within zone S (cf. Gowlett, 2003).

The Shona group (S10) comprises six clusters: Korekore, Zezuru, Manyika, Karanga, Ndau, and Kalanga. A standardized form of Shona based on the Korekore, Zezuru, and Karanga varieties is used as an official language in Zimbabwe. In addition to Zimbabwe, languages of the Shona group are also spoken in parts of Mozambique and Botswana (Kalanga). There are close to 9 million speakers of Shona.

The Venda group (S20) only includes Venda, spoken by around 800 000 speakers in South Africa's Northern Province and adjacent southern Zimbabwe. Venda is an official language of South Africa.

The Sotho-Tswana group (S30) includes Tswana, Northern Sotho, and Southern Sotho, all of which are cover terms for a number of related varieties. Sometimes also Lozi, spoken in western Zambia and Namibia's Caprivi strip, is classified as a Sotho-Tswana language. Standard forms of these languages are based on a majority variety, and smaller varieties are often threatened with marginalization. Tswana is an official language in Botswana and South Africa, with about 4 million speakers. Northern Sotho, also Sesotho sa Leboa, is spoken in the northeast of South Africa by about 3.6 million speakers and is an official language of South Africa. Southern Sotho, or Sesotho, with more than 4 million speakers, is spoken in Lesotho and South Africa and it is an official language in both countries.

The Nguni group (S40) is divided into Zunda varieties and Tekela varieties. Among the Zunda varieties are Xhosa, Zulu, and Zimbabwean Ndebele. Xhosa includes a number of different varieties. Zulu, with around 10.7 million speakers, and Xhosa, with around 7.2 million speakers, are official languages of South Africa. Zimbabwean Ndebele has official status in Zimbabwe. The Tekela varieties include Swati, South African Ndebele, and the smaller languages Phuthi and Lala (Lala-Bisa). Swati has around 1.6 million speakers and is an official language both in Swaziland and South Africa. The southern variety of South African Ndebele is an official language in South Africa, spoken by around 0.6 million speakers.

The Tshwa-Ronga group (S50) includes Tshwa, Tsonga, and Ronga, all of which are spoken in Mozambique. Tshwa, with 0.7 million speakers, is also spoken in Zimbabwe, and Tsonga, with more than 3 million speakers, is also spoken in South Africa, where it is an official language.

The Inhambane, or Copi, group (S60) includes two languages spoken in the Inhamabane area of Mozambique: Copi (Chopi), with around 0.5 million speakers, and GiTonga, with around 0.3 million speakers.

Structural Features

Phonologically, southern Bantu languages are characterized by symmetric five (e.g., Nguni) or nine (e.g., Sotho) vowel systems, two tonal distinctions (high vs. low), and complex consonant systems, often including a three-way distinction between voiceless-aspirated, voiceless-unaspirated, and voiced stops and affricates, as well as several series of prenasalized consonants. A number of southern Bantu languages have borrowed click consonants from Khoisan languages during an extended period of contact, e.g., Xhosa, which has dental [ǀ], alveolar [!] and lateral [ǁ] clicks (written as *c*, *q*, and *x*). A comparatively untypical Bantu feature of southern Bantu languages are depressor consonants, an often phonologically heterogeneous group of consonants that cause a following high tone to lower, as in the Zulu example below, where the depressor consonant /z̪/ in the plural prefix causes the following high tone to shift to the following syllable, resulting in a different tone pattern:

Table 1 Noun class prefixes in southern Bantu languages

Class	*Shona*	*Venda*	*Sesotho*	*Zulu*	*Tsonga*	*Copi*
1	mu-	mu-	mo-	um(u)-	mu-	in-
2	va-	vha-	ba-	aba-	va-	va-
3	mu-	mu-	mo-	um(u)-	mu-	in-
4	mi-	mi-	me-	imi-	mi-	mi-
5	Ø-	ḷi-	le-	i(li)-	ri-	di-
6	ma-	ma-	ma-	ama-	ma-	ma-
7	chi-	tshi-	se-	isi-	xi-	tshi-
8	zvi-	zwi-	di-	iẓi-	svi-	si-
9	N-	N-	N-	iN-	N-	(N-)
10	N-	dziN-	di(N)-	iẓiN-	ti(N)-	ti(N)-
11	ru-	lu-	-	u(lu)-	ri-	li-
12	ka-	-	-	-	-	-
13	tu-	-	-	-	-	-
14	(h)u-	vhu-	bo-	ubu-	vu-	wu-
15	ku-	u-	go-	uku-	ku-	ku-
16	pa-	fhu-	fa-	(pha-)	ha-	ha-
17	ku-	ku-	go-	(ku-)	ku-	-
18	mu-	mu-	mo-	-	mu-	-
19	svi-	-	-	-	-	-
20	-	ku-	-	-	-	-
21	zi-	ḍi-	-	-	ji-	-

(1) *ìsíhlàlò* 'chair' *ìẓìhlâlò* 'chairs'

Morphologically, southern Bantu languages, like the majority of Bantu languages, are characterized by their noun classes, and the agreement, or concord, system built on it, as well as by complex verbal morphology. Nouns are grouped into 15 to 20 noun classes that are morphologically marked by a noun class prefix, usually of CV shape and sometimes accompanied by a pre-prefix vowel (see Table 1).

The noun class of the head noun triggers class agreement of dependent nominals, as well as subject and object concord (agreement) morphology in the inflected verb. The term agreement, although well established, can be misleading, as subject and object markers can function as subject and object, and no overt lexical NP is needed for a well-formed sentence, as the following Zulu example (from Poulos and Bosch, 1997) shows:

(2) ngi-zo-ba-sebenz-el-a
SM1sg-FUT-OM2-*work*-APPL-FIN
'I will work for them'

In addition to subject and object markers, inflected verbs can show morphological marking of negation, tense, aspect and mood, typically prefixed to the verbal base. The verbal base consists of a root that may be suffixed by several derivational suffixes (so-called extensions), such as applicative, causative, stative, reciprocal, or passive. The following examples from Tswana show how causative and applicative extensions can be used to increase the number of nominal complements of the verb (adapted from Creissels, 2004):

(3a) ng-wàná ó nó-lé má-šì
NP1-*child* SM1 *drink*-PERF NP6-*milk*
'the child drank milk'

(3b) kè nó-s-ítsé ng-wàná má-šì
SM1sg. *drink*-CAUS-PERF NP1-*child* NP6-*milk*
'I made the child drink milk'

(3c) kè nó-s-éd-ítsé Dimpho ng-wàná má-šì
SM1sg. *drink*-CAUS-APPL-PERF *Dimpho* NP1-*child* NP6-*milk*
'I made the child drink milk in Dimpho's place'

A number of morphological features found in southern Bantu languages are not, or only rarely, found in other Bantu languages. In the domain of nominal morphology, these include the use of derivational suffixes for diminutives and feminines (e.g., in Zulu *-ana* and *-kazi*: *indoda*, 'man' and *indodana*, 'son'; *imbuzi* 'goat' and *imbuzikazi*, 'she-goat'), and the replacement of the locative classes by a locative prefix *e-*, a locative suffix *-(i)ni*, or a combination of both. Within verbal inflection, several southern Bantu languages show a distinction between so-called conjoint and disjoint verb forms (sometimes also called definite/indefinite or long/short forms) (Creissels, 1996); for example, in Zulu, verbs in the perfect tense may end in *-e* (short) or *-ile* (long) (Doke, 1963: 335):

(4a) si-bon-e abantu
SM1pl-*see*-PERF *people*
'we saw people'

(4b) si-ba-bon-ile abantu
SM1pl-OM2-*see*-PERF *people*
'we saw (them) the people'

The difference in use of the two forms depends on different factors, among them whether the verb is final in the verb phrase, as in (4b), where the object marker functions as the object of the verb, and the overt NP *abantu* following the verb is hence not part of the VP.

In terms of syntax, southern Bantu languages, like most Bantu languages, have unmarked SVO order (see the examples in (3), above), but, especially in interaction with subject and object markers, the word order is syntactically comparatively free, and rather more constrained by information structure considerations. As an illustration of this, the following Xhosa examples show unmarked subject-verb

order (5) and inverted verb-subject order (6) used to focus the subject *ábántwánà*, 'children', either existentially like in this example, or contrastively, as in (7). Note that the subject marker in (6) and (7) is of the locative class 17 and thus does not show agreement with the subject (Du Plessis and Visser, 1992: 130–131):

(5) ábá-ntwánà bá-yà-ngénà
NP2-*children* SM2-ya-*enter*
'the children enter'

(6) kù-ngénà ábá-ntwánà
NP2-*children* SM2-ya-*enter*
'there enter children'

(7) kù-sèbénzà ámá-dódà, háyi ábá-fázì
SM17-*work* NP6-*men* *not* NP2-*women*
'there are men working, not women'

Although the major southern Bantu languages, those with large numbers of speakers and official status, are comparatively well-described, for a number of smaller southern Bantu languages, some of which are endangered, very little information exists, and descriptive studies are urgently needed. In a wider perspective, the contribution southern Bantu languages can make to general and theoretical linguistic studies has only begun to be fully addressed, and remains to be developed in all areas of linguistic research in the future.

See also: Argument Structure; Bantu Languages; Botswana: Language Situation; Gender, Grammatical; Gender; Lesotho: Language Situation; Mozambique: Language Situation; Shona; South Africa: Language Situation; Swaziland: Language Situation; Xhosa; Zimbabwe: Language Situation; Zulu.

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Space: Semiotics

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In a commonly accepted definition coming from Peirce (1867) and quoted in Umberto Eco (1973), a sign is something that, for someone, takes the place of some other thing under some report or to some title. The sign takes the place of the object (Peirce, 1867). The question here is, therefore, how can space make a sign, to substitute for an object?

By extent we mean **that which has a length, a breadth and a depth, without inquiring whether it is a real body or only a space** (Descartes, 1628). For Leibniz, absolute space is the "pure *extensum*," that which possesses all magnitude and no situation (Leibniz, 1679). According to Newton, space is **absolute** or **relative**, **passive** or **active**. Relative (active) space (the interval) takes a place in the absolute (passive) space (unrelated to anything external); it is a **mobile dimension or measure of absolute spaces** (Newton, 1687). As finitude (magnitude) takes place in infinitude (beyond the measure, open process), the limited (the closed line, the limit between an interior and an exterior) carves in the unlimited (beyond the line, open surrounding). But, according to Kant, space is not a thing or a substance, but an ***a priori* form**; it allows us to know our external reality. In space we represent to ourselves the objects on which we act; **that is where we determine their shape, their magnitude and the relationships between them** (Kant, 1781).

The possibility that a space substitutes for an object comes therefore from the fact that it is the prerequisite for the exteriority, simultaneity and juxtaposition of the objects; the prerequisite for their relation, coexistence and integration. And this prerequisite implements not only the opposition of the material and the immaterial, but also that of the continuous and the discontinuous, the homogeneous and the heterogeneous, the here and the elsewhere.

Thus, if the sign affords one object in the place of an other, the space offers a possible place for this object. And, if this is true, the place can substitute for the object. The dialectic of the absence and the presence (in a here or an elsewhere) implies tis of the void and the full (in a limited or an unlimited space), where the full presupposes the void (Barthes, 1967; 1970) and receives passive or active values, coded by traits, according to systems of exchanges.

Even the most elementary organisms practice exchanges of information with their environment (Sebeok, 1991). These exchanges consist in announcing and/or perceiving a presence. The information is not, however, received without some action in return. Every presence is conjunctive or disjunctive, familiar or strange. The other is a prey or a danger, and arouses attraction or indifference, alliance or rejection. Every organism explores its environment and tries to respond adequately to the events taking place there.

Every organism makes itself a model of its environment: a model with which it interprets the events surrounding it, just as it exhibits a reaction, a parry or an evasion. Responding to what happens, averting the danger or seizing the prey, then means organizing positions and distances, and bringing forward appearances. A fairly advanced organism misleads its prey or wards off danger by appearing to merge with its setting. Resemblances can be deceptive.

The capacity for processing information depends on the capacity for filtering information material. The structure of an organism is defined by its boundaries; these form an interface that organizes the exchanges between an individualized internal space and a surrounding exterior which is the source of information and the site of assimilable energy-bearing materials. Every organism lives by activities of exploration and active collection; the energy-receiving systems, the information system, and the system of action on the environment are interdependent. Transport, positioning and orientation are behaviors of approach to and avoidance of a source of energy or information. To ensure the coherence of its actions, the organism must extract invariants from its sensory universe and transform sensory energy into information.

The human being, as an advanced organism, develops rules of behavior from its models of the environment, rules that enable it not only to interpret current events and ward off the dangers of the present world, but also to make hypotheses about future events and to propose a vision of possible worlds in which those dangers would be averted, a vision in which variations of form might be related to the measure of invariant forms.

These possible worlds are projected on the basis of an interpretation of events traversing existing systems of relations; they are sketched in a prefiguration in which to be together supposes the sense of a beyond. By the projection of relations between identity and difference the danger is sublimated; it is controlled in the relations instituted between the here and the elsewhere. The semiotics of human space thus fits well, as Saussure wished, into a social psychology. It shows how such psychology is territorial.

Thus the semiotic function begins with the capacity to anticipate a relation between actions and to infer one from the other (Piaget, 1978). Representation extends space beyond the limits of the perceptual field, and permits not only the imagining of an object in its absence, but the internalizing of an action (semiotic function) and the expression of adapting of the actions to objects that resist them (pragmatic function).

In space, objects are not merely perceived by a reading of their respective properties, but gain meaning through the actions applied to them (Piaget and Inhelder, 1947). The perception of the material reality of things concerns their topic neighborhoods. It reconstructs upon symbolized objects the result of an action in the space of real objects (Piaget and Inhelder, 1947). In this sense, resulting from action, it is a reproduction of a form, the principle of the existence of objects for us, beyond our immediate perceptual field (Pellegrino, 1985). The links between actual and virtual space distinguish links in absentia and links *in praesentia* for the knowledge of a place.

The link between the actual object and virtual objects can also be conceived as the link between the actual process and the system of places that makes it possible. Within the space of our relations it refers to the link between possible places and occupied positions. The position is the result of the action of positioning, like putting the object in an empty existent place, in the sense that it occupies space in comparison to other positions. One can thus better understand how the fact of positioning is articulated and extended by the fact of the available places, in the sense of having places to distribute objects as means to a potential action. The way of positioning is also a way of opposing; in positioning an object, one has to impose it and sometimes remove another object, sometimes even displacing an opposing object to the point of threatening the other's position (Pellegrino, 1986).

The available place is bounded in reference to others according to a grammatical form giving to the placed object an *emerging surface* (Foucault, 1969), a value and rules regulating other objects occupying different positions. The different places are thus structured by spaces that determine them: there is a space of centration (from which the subject acts), a space of objects (which is aimed at by the subject), and a space of reference (in relation to which the subject situates himself and evaluates his action). Spaces of centration, spaces of object and spaces of reference determine places that are superimposed or mutually excluded, that are intertwined or intersected, open or closed to each other. These places offer virtual positions ordered in their connexities and disconnexities by the partition and composition of spaces.

Playing upon the availability of places, positioning becomes specific by resemblance or difference, by analogy or homology, in a classification or a hierarchy. Thus they establish actual links with others: according to composition within a neighborhood, according to complementary relations between intercalated and ordered positions, according to functional or formal relations, according to oriented and equilibrated flows. There are four modes of spatialization: topic (composition and decomposition of places); iconic (resemblances and differences between them); quantic (numeric and metric quantities); and organic (formal locations and functional attributions). Each position in a place is thus actualized by two opposing modes (Pellegrino, 1992).

Attribution procedures take origin in the synthesis of partition (decomposition), displacement (relation), and comparison (transposition), which aim at measuring the content of the sets in question. Positionings themselves are not always static. They can also be dynamic and connected by displacements. The routes they take, such as flows and diffusions, back-and-forth movements, avoidance and crossing, focalizations and polarizations, are supports of placements in correspondence (references and inferences).

With these coexisting modes of spatialization, spaces impose their structures upon meaning. Much more, these modes of spatialization are sources of speech and writing: in the grammar that composes a

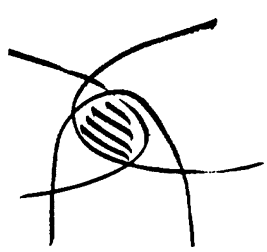

Figure 1 A centered place articulating the encounter of several spaces by superpositions and multiple intersections.

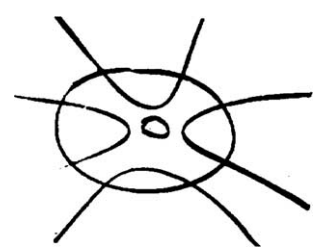

Figure 2 A centered place by inclusion (embedding) and exclusion (intercalation). By the articulation and the superposition of these two modes of spatialization, the most centered place in one space is at the same time excluded by the others.

sentence, in the economy of a text, in the path of a discourse, in the tropes in which reinforcements and transgressions are formed, as in the poetic work of a language (Pellegrino, 2000). Within forms of simultaneity and succession, they impose a grammar, with syntactic rules of composition, conjunction, and disjunction of combinative elements; a grammar that offers possible positions in a succession ordered by a system of places that imposes a beginning and an end, intervals inside of which, according to the norms of speaking a language, sequences of utterance have to complete a well-formed whole, expressing a well-conceived, just as much as well-expressed, argument.

But the spatialization of language, its expansion and the distribution of its constituents in a text, also expresses a style. The frequency of terms employed in a text, their sequence, and their iteration form a complex stylistic space. The assemblage of linguistic elements follows therefore several regimes of places: that of the rules of the grammatical correction of the sentence; that of the order descriptions and arguments stated in the narration or the discourse; that of their stylistic distribution in the parts of the text.

Indeed, it seems therefore reasonable to affirm that the semiotics of space, linking up with the semiotics of time, lies at the very foundation of all semiotics (Prieto, 1995). If the one does not exist, nothing exists (Plato, 370 B.C.). Separation, the basis of all space, precedes order, the basis of all argument. Unification of the separated as separated, composition of the multiple, exists as the condition of all possible inference, calculation of the diverse. And therefore nothing exists without space. The extent, the substance which, once informed and transformed by man, becomes space, i.e. the form which, by reason of its articulations, may be of use with a view to meaning (Greimas, 1976). Space reduces the complexity of the extent with the divisions that it effects in its articulations of meaning.

See also: Kinesics; Proxemics; Semiosphere versus Biosphere; Social Semiotics.

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Spain: Language Situation

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While the Spanish language is pre-eminently the language of Spain that, according to the 1978 constitution, all Spaniards (approximately 40 million) have the duty to know and the right to use throughout the national territory, some 40% of Spanish citizens also use at least one other language. Post-Franco Spain has emerged as a decentralized and plurilingual state with advanced language planning legislation. Turell (2001) distinguishes between, on the one hand, what she terms 'established' minority languages, which are

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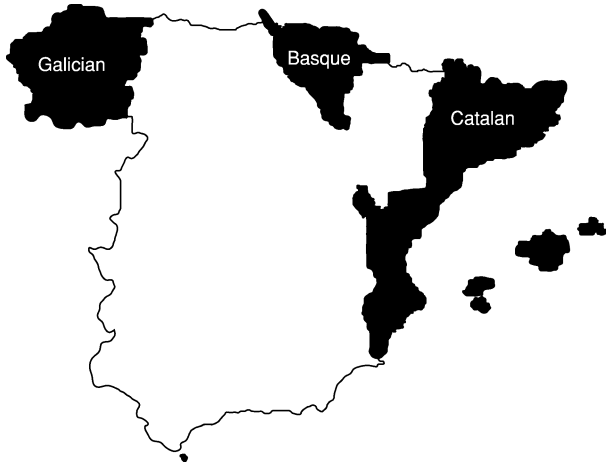

Figure 1 Major minority languages.

Catalan, Basque, Galician (all three co-official with Spanish in the territories where they are spoken) (Figure 1), Asturian (*bable*), Aragonese (*fable*), Aranese (Gascon), Romani (*caló*), Jewish, and sign language, and, on the other, those which belong to recent immigrant communities (for example, Arabic variants, English, Portuguese). The Constitution left the task of defining what counts as a minority language to Spain's Autonomous Communities, which, through statutes and language planning laws drawn up in the early 1980s, have been extremely proactive in promoting individual languages and varieties of these languages. (For a review of this legislation, see Siguan, 1992, and Mar-Molinero, 2000.)

Nonetheless, these (often considerable) efforts have not always succeeded in halting or reversing language shift toward Spanish. In 2001, for example, UNESCO modified its classification of Galician from 'potentially endangered language' to 'endangered language' as inter-generational transmission was failing. This is also the case for Basque; however, the Basque-medium element of the education system has in part compensated for this loss by creating first-generation speakers of the language. Of all the established minority languages in Spain, Catalan is the most vital, and with the expansion of the EU it is fighting for recognition as an official language; yet scholars (see, for example, Atkinson, 2000) see considerable danger in the long term from its powerful contact neighbor, Spanish.

Spanish is a major world language with more than 400 million speakers over four continents, who largely share a supra-regional norm and a broadly phonemic orthography, although, as Butt and Benjamin (1994: vii) note, it is relatively unstandardized compared to, say, French and German. Standardization is partly regulated by the language academies (of which the *Real Academia Española* is one of 22 representing the whole Spanish-speaking world) and largely by style guides (*libros de estilo*) used by the media and certain professions such as clinical medicine. With an estimated 30 000 new terms entering the language each year, many of which are short-lived in areas such as information technology, these institutions play an important role in adjudicating between competing variants. A prime mechanism in Spanish for lexical creation is the assimilation of borrowings, principally nowadays from English, through affixation. For example, 'to scan (a document)' is assimilated to the phonology and morphology of Spanish by pre- and suffixation in *escanear* (to scan), *un escaneo* (a scan), *un escáner* (a scanner). Such processes are contributing to a degree to the regularization of the language. All new verbs are in the *–ar* conjugation, and some of these are even displacing *–er* and *–ir* variants; for example, *promocionar* is ousting *promover*. In Spain, regional variation, while still present, is giving way through dialect levelling to social variation. The principal regional distinction is between northern varieties of Spanish, which distinguish in their pronunciation between *caza* /kaθa/ and *casa* /kasa/ and the southern varieties, which, like those of Latin American Spanish, are characterized by *seseo* and make no such distinction. The other main distinguishing feature, the *yeísmo* of the southern varieties (an absence of opposition between *pollo* and *poyo*; the north would use /poʎo/and /pojo/), is now permeating northern Spanish.

Prominent in the latter quarter of the twentieth century has been the emergence of user-related varieties of the language, such as the language of young people (e.g. *cheli*). Notable also has also been the use of Spanish to reflect an increasing egalitarianism rather than the sharp social stratification of, say, the Francoist period. This can be seen in the widespread use of the familiar T pronoun (*tú, vosotros/as*), with formal V (*Vd./Vds.*) now primarily used to mark deference to age or the constraints of a formal domain (such as certain types of meetings). It can also be seen in the vastly increased use of gender-neutral language in, for example, the media. Spanish speakers have been much quicker than say, the French, to create and adopt feminine forms of certain professions to refer to their female incumbents, e.g. *la primera ministra* (see Stewart, 1999: 31ff).

Spain has recognized the need to promote Spanish both in international organizations (where it does not enjoy the same status as, say French or English) and as an important second language that is currently growing in strength. In 1991 it followed the example set by institutions such as the Alliance Française, the Goethe Institut, and the British Council and started setting up a network of *Institutos Cervantes* throughout the

world as well as a website dedicated to the promotion of Spanish.

See also: Basque; Catalan; Galician; Minorities and Language; Spanish.

Language Maps (Appendix 1): Map 141.

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Spain: Lexicography in Iberian Languages

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Introduction

Spain has seven main autochthonous languages that are currently recognized to different degrees: official (Spanish), co-official with Spanish in some of the areas where they are spoken (Catalan, Basque, Galician), locally recognized as co-official (Aranese), and not officially recognized (Asturian, Aragonese). Starting in medieval times, historical events consolidated Spanish as the language of culture in most of the regions forming present-day Spain. That fact gave rise to a diglossic situation in which Spanish was assumed as the high variety (used in official and written domains), while the other languages were relegated to low and spoken registers. Hence, whereas lexicography in Spanish shows a development very similar to other socially healthy Romance languages, the linguistic diglossia influenced the cultural development of the other languages mentioned above, and consequently also their lexicographic tradition. Except for Catalan, which managed to counteract the diglossic effect to a greater extent than the other languages, the lexicographic output of most of the minority languages in present-day Spain has been hindered for a long time by the social and political dominance of Spanish.

Spanish

The earliest works on the Spanish lexicon were medieval glosses such as the *Glosas Silenses* (c. 10th century) and Mozarabic and Latin–Spanish alphabetical glossaries, which date between the 12th and 15th centuries. The Renaissance was characterized by the proliferation of Latin–Spanish dictionaries (which laid the foundations for later monolingual dictionaries), bilingual dictionaries between Spanish and other modern languages, and specialized vocabularies in areas like medicine or agriculture. A noteworthy work of that period is *Universal vocabulario en latín y en romance* by Alfonso de Palencia, which was published in 1490 and is considered a link between medieval and modern lexicography. The most remarkable works are, however, the two dictionaries authored by Elio Antonio de Nebrija, which initiated a new lexicographic tradition. They are the *Vocabulario latino-español* and the *Vocabulario español-latino*, and were compiled in 1492 and 1495, respectively.

The earliest monolingual general dictionaries were compiled in the 17th century; the most prominent of these was *Tesoro de la lengua castellana* (1611) by Sebastián de Covarrubias. Beginning in the 18th century, there was a general perception among intellectuals that Spanish was declining as a language of culture (the so-called Golden Century in Spanish literature had been two centuries earlier), and this feeling led to the creation of the Spanish Royal Academy

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See also: Basque; Catalan; Galician; Minorities and Language; Spanish.

Language Maps (Appendix 1): Map 141.

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(*Real Academia Española,* RAE) in 1714. RAE compiled two outstanding dictionaries. Between 1726 and 1739 it published *Diccionario de Autoridades*, remarkable in its time for its extensive use of literary and scientific sources and its coverage of both medieval and contemporary language. Forty years later, in 1780, RAE also published *Diccionario de la lengua castellana* (*DRAE*), a dictionary that had been initially conceived as the short version of *Autoridades,* but that ended up being used as the basis for several monolingual Spanish dictionaries. DRAE identified Castilian Spanish as the standard for Spanish until its 15th edition (1925), when regionalisms from other Spanish-speaking areas in Spain and America were also introduced.

Other dictionaries of that period are also worth noting, such as *Diccionario castellano con las voces de ciencias y artes,* compiled by Esteban de Terreros between 1786 and 1793, a dictionary that has been frequently neglected but which is of indisputable lexicographic value. From the 19th century, *Nuevo diccionario de la lengua castellana*, compiled in 1846 by Vicente Salvá, and *Diccionario nacional o gran diccionario clásico de la lengua española*, published by Ramón Joaquín Domínguez in 1847, are today considered leading exponents of the best lexicography developed during that time.

The 20th century was a period of large and exceptional lexicographic productions. Among them we note *Diccionario de construcción y régimen de la lengua castellana,* an eight-volume dictionary devoted to Spanish syntactic constructions, authored by Rufino José Cuervo and published throughout a period of more than 100 years (between 1886 and 1988). Equally worthy of mention are the two multivolume etymological dictionaries, *Diccionario crítico etimológico de la lengua castellana,* edited by Joan Coromines between 1954 and 1957, and *Diccionario críticio etimológico castellano e hispánico*, compiled between the years 1980 and 1991 by Joan Coromines and José A. Pascual. Also worth mentioning is Samuel Gili Gaya's *Tesoro lexicográfico* of 1947, which is a thesaurus of all Spanish dictionaries that had been published between 1492 and 1726. In addition to these remarkable works, Spanish lexicography in the 20th century also experienced a proliferation of general-user dictionaries, the most notable of which are the *Diccionario de uso del español*, by María Moliner, published in 1966, and *Diccionario del español actual* by Manuel Seco and his colleagues, which appeared in 1999. Function-specific dictionaries (synonyms, inverse, terminology, or neology), and bi- or multilingual dictionaries were also compiled at that period. A number of dictionaries were published in electronic format, like DRAE 1992 edition or Moliner. Moreover, RAE started working on corpus linguistics-based projects for lexicography, and now its two corpora of historic and contemporary Spanish (CORDE and CREA) are available online, together with a database system (called BusCon) for dictionary look-up.

Catalan

As in Spanish, medieval lexicography in Catalan is represented by glosses and Latin– or Hebrew–Catalan alphabetical glossaries (14th–15th centuries). The Catalan Renaissance also parallels the Spanish one in that it is characterized by the compilation of specialized glossaries, modern language bilingual vocabularies, and Latin–Catalan dictionaries. Within this period, we find Joan Esteve's *Liber elegantiarum*, which appeared in 1489 and is the first Catalan vocabulary with lexicographic intention, and Gabriel Busa's *Diccionari llatí-català i català-llatí*, 1507, which is based on the lexicographic work in Spanish by Nebrija. Onofre Pou's dictionary, entitled *Thesaurus puerilis* and published in 1575, is also worth noting in that period because of its influence on subsequent work.

At the end of the 15th century, political developments brought Catalan into an acute diglossic situation that led to the so-called 'Decadence.' Lexicographic work in Catalan during this period is represented by only three Latin–Catalan dictionaries: *Fons verborum et phrasium* by Antoni Font (1637), *Thesaurus verborum ac phrasium* by Pere Torra (1640), and most remarkably, *Gazophylacium catalano-latinum* by Joan Lacavalleria (1696). All of these remained influential throughout the next century. The Decadence extended into the 18th century, when Catalan was banned from legal and educational spheres. The perception of decline resulted in dictionaries that aimed at preserving the language. At that same time, the claims of a Port Royal-inspired movement in favor of using the student's own tongue for teaching, led by Baldiri Rexach, motivated the authors of a number of Catalan–Spanish dictionaries. Under the Enlightenment influence, there were attempts to emulate RAE work in several unsuccessful projects, but no monolingual dictionary of Catalan was ever published during that period.

The 19th century is known as the *Renaixença* (literally, 'rebirth'). There was an enthusiasm for reviving Catalan as a language of culture, which was reflected in the proliferation of dictionaries, both

dialectal and general. Noteworthy works of that period are the two-volume *Diccionario catalán-castellano-latino*, a collective work published between 1803 and 1805 by Esteve, Bellvitges, and Juglà, and *Diccionari de la llengua catalana*, 1839–1840, by Pere Labèrnia, which is considered the dictionary of the *Renaixença*. Both of them are trilingual (Catalan–Spanish–Latin). Further, the positivist tendencies of those times led to the compilation of comprehensive dictionaries on historic-comparative principles. Good examples are the posthumously published compilations of Marià Aguiló and Josep Balari. This interest extended into the initial decades of the 20th century and culminated with the impressive work of Josep Maria Alcover and Francesc de Borja Moll: the 10-volume *Diccionari Català-Valencià-Balear*, which was published between 1926 and 1962. *Alcover-Moll*, as it is popularly called, is a unique work among all Romance languages. It covers all Catalan dialects (old and modern), and provides etymological, patronymic, and toponymic information.

A major concern among Catalan intellectuals at the beginning of the 20th century was to establish a prescriptive standard for Catalan that would help consolidate it as a modern language. This resulted in Pompeu Fabra's *Diccionari general de la llengua catalana*, a 1932 dictionary that was regarded as normative by the Institute for Catalan Studies (*Institut d'Estudis Catalans*, IEC). Other major concerns in 20th-century Catalan lexicography were avoiding Spanish interference, communicating with other languages, and normalizing Catalan in all spheres, including technical and scientific fields. After Franco's death, these concerns led to a profusion of monolingual, bilingual, terminology, and neologism dictionaries, many of which are available in electronic format.

The main monolingual onomasiological dictionaries today are Enciclopèdia Catalana's *Gran diccionari de la llengua catalana* (1998) and *Diccionari de la llengua catalana* (1995), which is a normative dictionary compiled by IEC based on Fabra's work. More function-specific products also exist (synonym, abbreviation, pronunciation, frequency, and inverse dictionaries), as well as unique works, like the nine-volume etymological *Diccionari etimològic i complementari de la llengua catalana*, published between 1980 and 1991, and the six-volume *Onomasticon Cataloniae*, published between 1989 and 1997. Both were authored by Joan Coromines. IEC is currently sponsoring the ambitious project of a corpus-based, comprehensive, and descriptive dictionary of contemporary Catalan.

Galician

Early diglossia in Galicia had already placed its culture in a weak situation in the Middle Ages. Until the 18th century there was only one Galician vocabulary, compiled c. 1536 by Bachiller Olea. The 18th century featured the work of three unpublished lexicographers: Martín Sarmiento, who reached a level unsurpassed until the 20th century; Juan Sobreira, who conceived a dictionary based on DRAE; and Xosé Andrés Cornide. The first published dictionaries appeared in the second half of the 19th century, during a movement favorable to Galician regeneration. They were *Diccionario gallego-castellano,* published by Francisco Javier Rodríguez in 1863; *Diccionario gallego*, authored by Juan Cuveiro in 1876; and *Diccionario gallego-castellano* (1884) by Marcial Valladares. These three dictionaries, which still took Spanish as a point of departure, were of lower quality than the unpublished lexicographic work of the previous century.

Lexicographic production in the 20th century experienced a rebirth in the post-dictatorship 1980s. The first dictionaries completely in Galician appeared at this time. In 1982 Galician attained status as a joint official language, and orthographic standards were created by the Royal Galician Academy (*Real Academia Galega*, RAG) and the Galician Language Institute (*Instituto da Lingua Galega,* ILG). In 1986, two remarkable general dictionaries were published by private companies (Estravis and Xerais). The first normative dictionary, *Diccionario da Lingua Galega,* was compiled by RAG and ILG in 1990. More specialized dictionaries (learners', bilingual, synonyms) appeared in the 1990s, together with terminological vocabularies. However, Galician lexicography of that period reflected the social controversy regarding the official orthographic norm, which was accused of being based too much on Spanish and too little on a Portuguese or a more genuine historic-etymological view.

Currently, Galician lexicography is benefiting from corpus projects like CORGA and the Corpus of Modern Galician, which provided the evidence for the *Tesouro Informatizado da Lingua Galega*, which is available online.

Basque

Basque lexicography has been affected by the fragmentation between Eastern and Western dialects (spoken in French and Spanish domains, respectively) and by the diglossic situation of the language, which meant that Basque was not a written language, and

therefore was not used in official and scientific domains, until the 16th century. These facts made codifying Basque a controversial task, which is reflected in its lexicographic tradition. The first dictionary was an unpublished Basque–French work by Silvain Pouvreau, dating from the 17th century, which covered only Eastern dialects. A century later, in 1745, Manuel Larramendi published *Diccionario trilingüe del castellano, bascuence y latín*, a Castilian–Basque–Latin dictionary that included all dialects and introduced several neologisms to fill onomasiological gaps in technical and scientific domains. Worth mentioning in the 19th century are José Francisco Aizkibel's Basque–Spanish *Diccionario basco español euskeratik erderara biurtzeko ì̀ztegia*, which appeared in 1883, and *Dictionnaire basque–français*, the unpublished Basque–French dictionary by Maurice Harriet. At the beginning of the 20th century, in 1905, the two-volume *Diccionario vasco–español–francés* by Resurreción María Azkue was published. This remarkable dictionary is trilingual and contains oral, written, dialectal, and historical data as well as some new terminology.

A unified orthography for Basque was approved by the Basque Academy (*Euskaltzaindia*) in 1968, and the first monolingual dictionaries for Basque appeared in the 1980s. They are *Gaurko euskara idatziaren maiztasun hiztegia*, a dictionary of frequencies edited by Ibon Sarasola in 1982, and *Hauta-lanerako euskal hiztegia*, also by Sarasola, a dictionary based on the literary tradition from 1750 to 1964 and published between 1984 and 1995. Euskaltzaindia has recently published the eight-volume *Diccionario general vasco*, *Orotariko euskal hiztegia* (1987–2004), a descriptive and general dictionary of Basque compiled from a diachronic corpus that is available on CD-ROM. Euskaltzaindia is currently working on a normative unified lexicon (*Hiztegi batua*). Work on terminology and neologisms is also being carried out mainly by UZEI (Basque Centre for Terminology and Lexicography). Its most important product is *Euskalterm*, a publicly available terminological database. Other more function- and audience-specific dictionaries have also been produced, mostly by private companies.

Asturian

The first known attempts to compile an Asturian dictionary were made in the 18th century by Gaspar Melchor de Xovellanos, Francisco Caveda y Solares, and Carlos González de Posada. Their work, most of it now lost, remained unfinished and unpublished. Language codification was also a major concern for 19th-century intellectuals in Asturies. Several of them, such as Juan Junquera Huergo and Julio Somoza, developed lexicographic work aiming at a standard dictionary, but this too remained unpublished. Only dialectal compilations were published in that century, along with the first Asturian–Galician dictionary, *Vocabulario de las palabras y frases bable*, by Apolinar Rato y Hevia de Argüelles (1891), which has been widely criticized for its inaccuracy.

The first half of the 20th century featured other unpublished dictionaries (by Pepín de Pría and Fernán Coronas, among others) and several dialectal glossaries, some of remarkable quality, such as *Vocabulario del bable de occidente*, by Bernardo Acevedo y Huelves and Marcelino Fernández y Fernández, and *El bable de Cabranes*, by María Josefa Canellada. After the dictatorship, the production of dialectal glossaries increased, and a considerable number of Asturian-Spanish dictionaries were published. In 1980, the Asturian Language Academy (*Academia de la Llingua Asturiana*, ALlA) was founded, and in 1981 it established the Asturian orthographic norms. Also significant is the fact that some publishing companies, such as Trabe, started developing work on Asturian lexicography in a consistent way. In 2000, ALlA published the first normative dictionary, *Diccionariu de la Llingua Asturiana,* a general dictionary that includes new terminology and neologisms. Other important works are the Asturian–Spanish bilingual dictionary *Diccionariu asturianu-castellanu, castellanu-asturianu* compiled by Juan José Vicente in 2002, the remarkable *Diccionario general de la lengua asturiana*, a dialectal dictionary published in 2003 by Xosé Lluis García Arias, and the *Diccionario de sinónimos y equivalencias castellano-asturiano*, a dictionary of synonyms appeared in 2004 and authored by Luis Alberto Prieto García. A large-scope etymological dictionary is currently being developed by Xosé Lluis García Arias.

Aragonese

Glosas Emilianenses (11th century), which has long been considered to be written in Spanish but is, in fact, written in Aragonese, constitutes the first lexicographic work (and written text) of a Romance language in the Iberian Peninsula. Despite such an early production, the decline of Aragonese power in the 15th century caused the cultural recession of that language and resulted in an extremely sparse lexicographic production until the 19th century. The vocabulary of Gerónimo de Blancas, *Índice donde se declaran*

algunos vocablos aragoneses, appeared in 1641 and is the only work worth mentioning for that period.

In the 19th century, two Aragonese–Castilian dictionaries were published: *Ensayo de un diccionario aragonés-castellano*, compiled in 1836 by Mariano Peralta, and *Diccionario de voces aragonesas*, compiled in 1859 by Jerónimo Borao. Other bilingual or dialectal vocabularies attest a renewed interest in Aragonese at the beginning of the 20th century. However, during the Franco dictatorship, Aragonese lexicography was developed mainly in the domain of academic research. Such is the case of the vocabulary *Vocabulario del alto-aragonés* by Pedro Arnal (1944) and two Antoni Maria Badia i Margarit works, *Contribución al vocabulario aragonés moderno* (1948) and *El habla del valle de Bielsa* (1950).

After Franco's death, there was a gradual increase of lexicographic production. In 1987, Aragonese orthographic norms were approved. There were a number of dialectal vocabularies and terminological lexicons that appeared, either published independently or as part of wider works, such as *Gran enciclopedia aragonesa* (*Great Aragonese Encyclopedia*). Several Aragonese–Castilian dictionaries appeared at that time, including *Diccionario aragonés. Aragonés-castellano y castellano-aragonés* (1992) by Rafael Andolz Canela, and the *Vocabulario básico bilingüe aragonés-castellano y castellano-aragonés* (1997) by Antonio Martínez Ruiz. Nevertheless, no general monolingual dictionary exists yet. The project *Tresoro d'a Luenga Aragonesa*, currently ongoing, aims at creating a public-domain database containing all Aragonese words in texts published between the 17th and 20th centuries. Its initial product is *Endize de bocables de l'aragonés*, an index of 90 000 inflected forms that was published in 1999 by the Institute for High Aragon Studies (*Instituto de Estudios Altoaragoneses*); this work is also available on CD-ROM.

Aranese

Lexicographic work in Aranese started late and is scarce. In fact, Aranese was not a written language until the end of the 19th century. At that time, some Occitan and Gascon dictionaries had already been compiled, but none on the Aranese dialect existed. The first works on Aranese lexicon appeared in the 20th century: Jusèp Condò Aranese's vocabulary (1914) appeared in *Butlletí de dialectologia catalana* (Bulletin of Catalan Dialectology), and *Vocabulario aranés*, the dissertation of Joan Coromines, was published in 1931. Aranese orthography was created in 1983 based on the norms of the Institute for Occitan Studies (*Institut d'Estudis Occitans*). In the 1990s, the *Conselh Generau d'Aran* (Aranese Government) published several dictionaries of different kinds, including *Petit diccionari*, an Aranese–Spanish–Catalan–French general dictionary by Frederic Vergés, and other terminological works, most of which are at least trilingual (Aranese–Catalan–Spanish) because of the Aran Valley political situation.

See also: Basque; Catalan; Galician; Spain: Language Situation; Spanish.

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Spanish

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Spanish is the standard language of over 300 million people in Spain, Equatorial Guinea, and 18 states in Latin America; it is also widely used in the United States, Israel, and in Western (former Spanish) Sahara. The standard is based on, and almost identical with, the Romance speech of Old Castile, which is why non-Castilians tend to call it *castellano* rather than *español* and sometimes resent its privileged status; for according to the Spanish constitution, all Spaniards have the obligation to learn it and the right to use it, which has made both its use and its name serious and even dangerous political issues in areas where many people are native speakers of another language (*see* **Catalan; Basque**), or of the *bables* of Asturias.

History

The Romans came to Spain during the Punic Wars of the late third century B.C. Their language has been spoken in the Peninsula ever since (*see* **Latin; Romance Languages**). Iberian Romance languages only began to acquire separate names and identities in the 13th century; until then it is simplest to envisage one single though heterogeneous Romance speech community throughout the Peninsula. The Romance (*mozárabe*) of bilingual Arabic–Romance areas was probably barely influenced by Arabic and similar to that of Christian areas. The traditional writing techniques survived as the official written standard till the early 13th century, but the techniques used then in the first texts exclusively prepared in the new written form ('Old Spanish') are based on unofficial experimentations that can be traced from the 11th century. Later in that century it was decided in the Kingdom of Castile (which included Leon and Galicia) to base their written standard on the speech of Castile. This written standard was extended to Aragon and Catalonia after the union of Spain in 1479, even though Aragonese and Catalan already had written standards of their own, and was the only written form exported to the New World. In the 18th century the newly founded Spanish Academy standardized written Castilian almost definitively. The spread of spoken Castilian is less easy to chart; many people fluently speak Catalan, Aragonese, Leonese, or Galician, but read or write only Castilian.

Phonetics and Phonology

Standard Castilian has 18 consonantal phonemes: /b, p, d, t, g, k, f, θ, s, x, tʃ, m, n, ɲ, l, ʎ, ɾ, r/. /ʎ/ has almost entirely delateralized to merge with /j/, often realized as [ʒ] or [dʒ]; word-initially it derives from /pl-/ or /kl-/ (e.g., Latin *clavem*, Spanish *llave* 'key'; cf., Portuguese *chave* ([ʃ-]), Italian *chiave* ([kj-]), French *clef*). Voiced plosives occur only breathgroup-initially or after nasal consonants, being so outnumbered by the fricative allophones used elsewhere that some linguists prefer to annotate the phonemes as /*β*, ð, *γ*/. Preconsonantal nasals are homorganic. /s/ is realized [z] before a voiced consonant. In most of Andalucia and all of America there is no distinction made between /θ/ and /s/; usually they merge as syllable-initial [s] and syllable-final [-h] (or ø), but in parts of rural Andalucia as [θ]. The phonemic status of the two semi-vowels /w/ and /j/ is controversial; they might be allophones of /u/ and /i/, respectively. There are only five vowels: /a, e, i, o, u/. Rising diphthongs are much more common than falling. Schwa is not found, but synalepha at word boundaries is normal (*diez y once* /djeθionθe/ [djéθjónθe] 'ten and eleven'). The preferred syllable structure is CV (ca., 56% of syllables), which overrides word boundaries (e.g., *cual es*, 'which is' [kwa + les]). Stress is largely predictable, given morphological information; many monosyllables are clitic. Intonation rarely varies more than an octave.

Morphology

The only nominal inflection is plural marking [-s] (postconsonantally [-es]). All nouns in use have to be either masculine or feminine gender, and adjectives display number and gender concord. There is an extensive system of verbal inflections; verbs are marked for number and person concord with their subjects. Several paradigms are in opposition according to mood, aspect, relative time, and subjective attitude, in ways still not entirely understood. The citation form is the infinitive, which always ends in a stressed theme vowel + [-r]. The majority end in [-ár], including all neologisms other than those with the inchoative affix *-ecer*; the rest end in [-ér] or [-ír], conjugations most of whose other inflections are shared. Second person singulars tend to end in [-s], first person plurals always in [-mos], and third person plurals always in [-n]. Several verbs have systematically patterned variation in their stems, e.g., stressed [je] versus unstressed [e] (*tener* [tenér] 'to have'; *tiene*

[tjéne] 'he has'), or stem-final [θ] before front vowels versus [θk] before others (*conocer* [konoθér] 'to know'; *conozco* [konóθko] 'I know'). Irregular verbs usually belong to the [-er] or [-ir] category, combining irregular stems with regular inflections. Many verb forms employ auxiliaries, whose repertoire is numerous for progressives, while only *haber* is available for the perfect (thus *he venido pensando* 'I've been thinking'; *venir* 'come'); perfects are rarely used at all in northern Spain. Adverbs are formed off feminine adjectives with *-mente*. Derivational morphology is widely used; ostensible diminutives (*-illo*, *-ito*, and others) can be added to any nominal form with almost any meaning (depending on context and intonation); class-changing suffixes are used uninhibitedly (e.g., *-al* turns nouns into adjectives); meaningful prefixes are common, and the fashion for Verb + Plural direct object compounds with agentive meaning is spreading (e.g., *el tocadiscos*, literally 'the play-records,' 'the recordplayer').

Syntax

Sentences need no overt subject, e.g., *comíamos* 'we were eating,' *llueve* 'it's raining.' Some linguists unhelpfully postulate an underlying subject here. Adjectives follow nouns if clarifying the reference of the NP, and precede it if the reference is already clear; if in doubt, listeners take the order to be NA. There is no general fixed order of verb and noun phrases; in general, the known precedes the unknown. Thus, *Juan llegó* 'John arrived,' if John has already been discussed, and *llegó Juan* if arrivals but not John have been discussed. SV order is never obligatory; VS is obligatory in *wh*-questions, outside the Caribbean, and normal in subordinate clauses (*la casa en que vivía mi madre* 'the house my mother lived in'). OV order is obligatory when clitic pronouns accompany finite verbs (*la vi*, 'I saw her'). A preposed nominal direct object requires a clitic copy, and in speech an indirect object in any position often has the same effect. Direct objects with particular reference, if misidentifiable otherwise as subjects, take a preposed *a* (*a la reina la vio, vio a la reina*, both 'he saw the Queen'); since *a* marks both direct/and indirect objects, and several Spanish speakers make no formal differentiation between direct and indirect object pronouns either, this direct/indirect distinction may be lapsing. The only preposition that can normally link nouns within a noun phrase is a correspondingly meaningless *de*. Articles are preposed: the so-called 'definite' article (*el*, *la*, *los*, *las*) is also used in generalizations; partitive use is often marked by the lack of any article.

The use of subjunctive or indicative mood is usually grammatically determined (e.g., *pido que* 'I ask for' is always followed by subjunctive), but the so-called 'past subjunctive' can also be used in subordinate clauses for already-known material; the 'past' subjunctive (which has two usually interchangeable paradigms) is in fact atemporal. Grammatically reflexive *se* is often used with passive or 'impersonal middle' meaning (*se abrió la puerta* 'the door (was) opened'); occasionally, in VS sentences of this type but not SV, a plural subject is preceded by a verb with singular concord (sometimes *se vende manzanas*; usually *se venden manzanas*; never **manzanas se vende*, 'apples for sale'), but this is nowhere the normal usage; linguists have tried and signally failed to analyze this *se* as a subject.

Vocabulary

The most startling fact about Spanish for an English speaker is the presence of two words for 'to be': *estar* (<Latin *stare* 'stand') and *ser* (suppletively < *sedere* 'sit,' and *esse* 'be'), only approximately distinguishable as being used for individual circumstances and general statements, respectively (and roughly vice versa when used as passive auxiliaries). Linguistic atlases, currently fashionable, show that lexical usage is noticeably not geographically standardized; fish have different names, and the same word may be applied to different fish, in different ports, for example. Latin America has naturally adopted many local words of Indian provenance. Although the inherited vocabulary has been enriched by borrowings from Basque, Arabic, Catalan, French, Italian, Renaissance Latin, Nahuatl, Quechua, English, etc., most neologisms are more commonly formed via derivational morphology or semantic shift.

The Future

Spanish has wide geographical variation but remains a single speech community with a general standard for all to style-shift toward in formal situations, for the Latin–American standard is very similar to the European and will remain so, given mass communications. Local variations grow beneath the standards, however. For example, bilingual Aymara speakers in Bolivia have adopted the Aymara evidential system into their Spanish morphology, and Guarani speakers in Paraguay have adopted Guarani nominal tense-markers (e.g., *mi noviakue*, literally 'my girl-friend-past,' 'my former girlfriend'). Areas that aspirate or lose final /s/ have thereby lost a second person singular inflection and acquired homonymy with the third

person forms and use subject *tú* more in compensation; the formal second person (third person morphology, with subject *usted*(*es*)) is anyway decaying in some places but strong in others, and the system varies greatly in America. The study of linguistics in Spanish universities is now flourishing, lively, and fashionable, putting Spain (temporarily, perhaps) in the vanguard of modern Romance linguistics. There is still a great deal to discover and explain. For that reason a bibliography largely confined to English-language works is necessarily partial and parochial.

See also: Basque; Catalan; Indo–European Languages; Latin; Romance Languages; Spain: Language Situation; Spain: Lexicography in Iberian Languages.

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Spanish North Africa: Language Situation

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Spanish North Africa comprises the last remains of Spanish colonialism in Africa. When Morocco became independent in 1956, Spain gave up most of its territories on the North African coast, but retained control of the cities of Ceuta and Melilla, as well as a number of smaller islands off the Moroccan coast: the islands of Alhucaimas, Velez de la Gomera, and the Chafarinas Islands, as well as the uninhabited island of Perejil, northwest of Ceuta. The Spanish claim over Perejil is strongly disputed by Morocco, and the island was under Moroccan control after an invasion in 2002. As the only part of the European Union in Africa, Spanish North Africa is attracting a considerable number of migrants from all over Africa.

Except for about 300 people on the islands (mostly military personnel), the 128 000 inhabitants of Spanish North Africa live in Ceuta (79 000 inhabitants) and Melilla (59 000 inhabitants), including 34 000 Moroccans and 1500 Jews. The official language of Spanish North Africa is Spanish, but Spoken Moroccan Arabic plays an important role as the language of the Moroccans living in Spanish North Africa, as well as those who live in Morocco, but come to Ceuta or Melilla on a daily basis for work. While the eastern part of Ceuta, for example, is culturally and linguistically Spanish dominated, the western part, closer to the Moroccan border, is strongly influenced by Arab culture and language. Arabic is also taught in schools.

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See also: Morocco: Language Situation; Spain: Language Situation.

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Spärck Jones has been active in information retrieval and natural language processing since the late 1950s. She received her Ph.D. thesis from Cambridge in 1964, on the subject of *Synonymy and semantic classification*, which was published (by Edinburgh University Press) only in 1986. Over the course of her career, she has published (including co-edited and co-authored works) seven other books. She has also made contributions to research in machine translation, the modeling of users and agents, speech applications, and automatic summarization.

Spärck Jones is a distinguished experimental scientist, with an empirical approach well-suited to the problems she has addressed. For example, in retrieving documents from a collection, an important goal is to develop a statistical measure that will identify words that will discriminate the document from other documents in a collection. Language is such that relatively few words will occur often, while relatively many words will occur rarely (a phenomenon known as Zipf's Law). In her classic 1972 paper, 'A statistical interpretation of term specificity and its application in retrieval' (*Journal of Documentation 28*, 11–21), Spärck Jones developed a measure (inverse document frequency, or 'idf') which characterizes the discriminative power of a word in terms of the inverse of the number of documents the word occurs in, thereby penalizing words that are common across documents and favoring words that are unique to a document. When idf is combined with a measure of the word's frequency in a document (called 'tf'), the result is a formula called 'tf.idf' (for 'term-frequency times inverse document frequency'). It has proved to be very widely used and cited in document retrieval, text comparison, and in general in many computational linguistics tasks that select and weight terms in a document.

Another seminal contribution has been in collaboration with Stephen Robertson (now at Microsoft Research Cambridge). In 1976, they jointly developed a probabilistic model of weighting of documents in terms of relevance to a user's information need. The Robertson–Spärck Jones weighting scheme has been incorporated into a relevance weighting formula (called 'Okapi BM25') used in most of the systems that participate in the Text Retrieval Conference (TREC), an annual conference in which the key groups working on information retrieval compare their tools on common tasks. Spärck Jones and Robertson continue to work together exploring other applications of their probabilistic model.

Spärck Jones has been influential in the design of the TREC conference, which, through large-scale collaborative experiments with a focus on evaluation, has resulted in substantial improvements in our understanding of information retrieval, in turn helping transform the way we access information. In *Evaluating natural language processing systems: An analysis and review* (Springer-Verlag, 1996), Spärck Jones and her colleague Julia Galliers have helped lay out a framework for language processing system evaluations. Spärck Jones has also made fundamental contributions to other evaluation forums, including evaluation of question-answering and automatic summarization systems.

See also: Computational Linguistics: History; Machine Translation: Overview.

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Spatial Variation (Geolinguistics)

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The awareness of one's own speech community (*see* **Speech Community**) brings with it, almost inevitably, a consciousness of those who speak differently elsewhere. In cases of languages with very small populations of speakers, this may mean being conscious of neighboring groups who use an entirely different (and unintelligible) language (*see* **Isolated Language Varieties**), but in many (perhaps most) cases, nearby communities speak varieties that are sufficiently similar to ours to be (at least in part) mutually intelligible but at the same time different enough to be noticed as such (*see* **Language Families and Linguistic Diversity; Language/Dialect Contact**). Since the ancient Greeks (at least), we have evidence that speakers of a larger area who considered themselves all speakers of 'Greek' were conscious of those who spoke 'the same language' but differently, that is, the various city-states of Ancient Greece (*see* **Greek, Ancient**):

> Thus geographic diversity was the first observation ever made in linguistics: it determined the initial shape of scientific research on language matters, even among the Greeks; true, they only paid attention to the variation among the different Hellenic dialects, but in general their interest did not extend beyond Greece itself. (de Saussure, 1983: 262, my translation)

Since most speakers' conception of what constitutes 'a language' is largely based on nonlinguistic criteria (*see* **Language Attitudes**), it is hardly surprising that laypeople's conception of what is (or is not) 'the same language' as theirs often has more to do with sociocultural or political constructs than with specific linguistic features (*see* **Linguistic Features**). This is not to imply that there are no empirical differences between neighboring varieties but rather that those features that are selected (from among many possible differences) as representing a distinction between geolects are typically quite an arbitrary set (*see* **Ethnicity**).

Variation in Animal Communication

Within animal communication systems we find regional differences in, for example, birdsongs (*see* **Dialects in Birdsongs**). That is to say, while many species seem to be genetically predestined to produce and recognize different songs, the exact forms that songs take will often vary from place to place. For certain species of birds, at least, a convincing case can be made for the ecological adaptation of certain acoustic patterns to certain types of physical environment (Handford, 1988). The analogous view of linguistic variation, a sort of 'geographic determinism' whereby the features of human speech varieties could be correlated with particular climates or terrains, gained a certain popularity in 19th-century notions of language variation but has been largely rejected by modern linguistics.

Being much more complex than even the most sophisticated systems of birdsong, human speech systems tend to vary through space in ways that are only indirectly related to geographical features (*see* **Spatiality and Language**). Since speakers' lects tend to resemble more closely the speech of those people they talk to more often and more intensely, and since physical geography is one factor among many that condition the frequency and intensity of human communication, it is natural that geographic features play a role in language variation, but this conditioning is necessarily indirect rather than causal (*see* **Environment and Language**).

Physical and Human Geography

There is obviously nothing inherent about a hilly landscape or a cold rainy climate that favors any particular set of linguistic features, but if similar geographic and climatic conditions favor (or simply coincide with) migrations and contacts among populations, then there can arise the perception of a link between physical geography and linguistic variation. This point can be illustrated by a distinction that is often drawn in Latin American Spanish (*see* **Spanish**) between what are traditionally called 'highland'

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(*tierras altas*) and 'lowland' (*tierras bajas*) or coastal varieties, which for a number of salient features correspond respectively to more conservative north-central varieties and more innovative southern varieties of Peninsular Spanish. While a number of striking parallels can be drawn, especially between linguistic features of southern Spain and those of coastal and Caribbean Latin American Spanish, these are best understood as a result of human contact and communication: during the colonial period, the coastal areas of Latin America remained in closer commercial and social contact with the southern Spanish port of Seville, the principal center for shipping and trade with the New World. Although the Latin American highlands may have indeed received a good portion of their initial Spanish settlement from linguistically conservative central-northern Spain, if these inland varieties remained relatively distinct it was because of their lack of direct contact with the many linguistic innovations that spread from Andalusia via the shipping routes to the ports and coastal areas of Latin America.

In other words, physical geography as a factor conditioning linguistic variation is always secondary to human geography. In fact, as Britain (2002) points out, we can distinguish three different types of space: Euclidean (or objective geometric) space, social space (as shaped by human agency), and perceived space (our environments as constructed by everyday practice). Natural barriers (such as mountain ranges) or natural channels of communication (rivers, etc.) can of course play a role, but only inasmuch as they affect human interactions through trade, travel, commerce, or cultural contact. At times the same natural feature (for example, a significant body of water) can either favor or impede contact between populations, depending on whether it coincides or not with political, social, commercial, or ecclesiastical boundaries (*see* **Language Politics**) that are – or are perceived to be – significant for a given community.

Techniques for Studying Spatial Variation

According to Jaberg, 'linguistic geography' fundamentally consists in

> transposing the study of a language from a point into space, in no longer envisaging a linguistic fact as strictly localised, in its creation or in its evolution, but rather considering it in relationship with other centres of creation, placing it in its geographic surroundings, of establishing its *area*. (1947, my translation, original emphasis)

But how exactly is this abstract goal to be attained? We have an array of techniques for studying language varieties as 'points' in geographical space (Pop, 1950), with or without internal variation or stratification, but not all of these can be directly transferred to the study of the geographic dimension of language (*see* **Language Surveys**).

Although individual geolects can be (and often are) usefully depicted in monographic studies of individual speech communities (be they municipalities or entire regions), the serious examination of geographic variation by its very nature requires surveys carried out at different points across the area studied (*see* **Language Spread**). These surveys are most often of the traditional 'closed questionnaire' type (*see also* **Dialect Atlases**), although semidirected interviews have also been used successfully (cf., for example, Dulong and Bergeron, 1980; Fernández-Ordóñez, 2004). While it is possible to simply survey linguistic forms from a range of points and display the collected forms on a base map of the region studied (as done, for example, by Gilliéron and Edmont, 1902–1910 and in most traditional linguistic atlases since then; *see also* as well as **Dialects: Early European Studies**), the resulting 'display maps' can be very difficult, if not impossible, to interpret meaningfully since the mass of data cannot be synthesized coherently without reading each form on the map and comparing it with its neighbors. In practice, display maps, while traditionally considered the most faithful to the linguistic data (although the assumption that fieldworkers' transcriptions are completely 'faithful' to subjects' production is of course somewhat debatable), need to be supplemented with some additional technique for representing differences between neighboring geolects, if geolinguistic variation is to be understood with any overall coherence (*see* **Dialect Atlases**).

Isoglosses and Isogloss Bundles

Since the birth of linguistic geography in the 19th century, the most widely used mechanism for representing geographic differences in linguistic data has been the isogloss (from the Greek for 'same speech'), an imaginary line traced on a map separating points where a difference in some given feature is detected while grouping together points that share the same value for the feature in question (Pop, 1950). While isoglosses can in principle be drawn for linguistic features of any type (phonetic, phonological, morphological, syntactic, or lexical; *see* **Standard and Dialect Vocabulary**), the most common in many studies of linguistic geography have been phonetic and lexical isoglosses, which in turn correspond to those features that predominate in the most widespread conceptions

of what constitutes a 'dialect' (both from the point of view of laypeople's impression of what a dialect is and from that of traditional dialectologists' definitions): pronunciation differences and vocabulary differences.

The number of possible isoglosses is potentially very large, in theory perhaps infinite, and in practice limited by the number of items collected in the survey questionnaire or interviews, the number of features that can be isolated and mapped among these data, and above all by the time and resources that can be devoted to mapping them. Thus it is most often the case that the isoglosses corresponding to different features do not necessarily coincide neatly to delimit clear dialect areas. For this reason, special importance is traditionally given to 'bundles' of isoglosses, that is, places where a number of isoglosses coincide (or nearly so) in the zones that they separate (*see* **Language and Dialect: Linguistic Varieties**). On this view, a large number of isoglosses that fall (roughly) along the same path should indicate a significant division between dialect areas, or even related languages, while individual isoglosses (or smaller numbers of them) spread out over a given territory would represent the more gradual transitions characteristic of dialect continua or dialect chains (*see* **Dialect Chains**).

The importance attributed to isogloss bundles is, however, completely dependent on the variables chosen to map as isoglosses, a choice that is in turn determined by those features that are surveyed in the first place (i.e., included in an atlas questionnaire or gleaned from interview data). Since the features that end up separated by isoglosses are typically chosen for their (assumed) potential to differentiate geolects, the dialect zones that are delimited by isogloss bundles are, in the final analysis, somewhat circularly determined by the methods used and by researchers' input assumptions about the variables that are considered relevant. Some traditional dialectologists are reported to have traced 'dialect boundaries' amid a myriad of partially contradictory isoglosses according to their own intuition as to "where they knew they should be," based on, for example, settlement patterns or historical divisions, a procedure which thus completes the methodological circularity that underlies the whole concept of the 'isogloss bundle.' That said, there are some remarkably robust isogloss bundles that undeniably correspond to important divisions in the geographic distribution of geolectal variants, for example the large number of isoglosses that fall at the Gironde estuary where it empties into the Atlantic in southwestern France and that coincide in dividing Occitan (Languedocien or *langue d'oc*; *see* **Occitan**) from northern French (or *langue d'oïl*; *see* **French**) varieties.

Dialectometry and Electronic Cartography

Dissatisfied with the relative methodological subjectivity on which the notion of 'isogloss bundle' depends, authors of more recent studies have turned toward statistically informed methods that undertake to calculate measures of linguistic distance between geolectal varieties. Collectively called dialectometry, these methods allow for a more objective appreciation of which geolects are more similar and which are more different, but at a more basic level these analyses are still dependent on the available data used as raw input for the various calculations, data that are in turn the product of methodological choices as to which variables (linguistic forms and features) are selected to be surveyed in the first place (Goebl, 2004).

The computer technologies that make dialectometry a practical option for current research allow another important advance in our ability to understand spatial or geographic linguistic variation: automatic cartography (often called Geographic Information Systems, or GIS), which allows for the rapid production of geolinguistic maps based on geolect forms and features that are stored and organized in electronic databases. While considerable human effort is required to construct such databases and especially to populate them with consistent and accurate data, once the data are available in the appropriate digital format, they can be used to produce a wide variety of different maps, synthesizing many different linguistic variables, exploring possible correlations between different linguistic features using a range of different algorithms, and mapping their relative geographic distribution almost immediately (Kretzschmar, 1999). The time savings, compared to traditional cartographic methods, is in the range of several orders of magnitude and in practice means that researchers can explore and test geolinguistic hypotheses that are more sophisticated and more detailed than would have been imaginable in the context of precomputerized, paper-based dialectology. Data from predigital geolinguistic surveys can also be useful when collated and compared using GIS techniques, as Pato (2004) does for the morphosyntax of conditional forms in northern Spanish varieties.

These new automatic cartography methods can be applied to linguistic survey data collected specifically for this purpose, from the macrolinguistic scale of the Varilex project (Ueda and Takagaki, 1995), which allows lexical variation from major Spanish-speaking cities in more than 20 different countries to be dynamically mapped online 'on the fly' (Ruiz Tinoco,

2002) (*see* **Corpora in Studies of Variation; Spanish**, and **Standard and Dialect Vocabulary**), to the microlinguistic level of the *Atlas linguistique audiovisuel du Valais romand* (*ALAVAL*), which presents data, including audio and video interview clips, for just 52 Francoprovençal (Franco-Provençal) speakers at 26 points in one region of Switzerland and in neighboring French and Italian valleys (Diémoz and Maître, 2000; *see also* **Switzerland: Language Situation; France: Language Situation**, and **Italy: Language Situation**). Similar methods can also be applied to data collected for creating linguistic atlases of the more traditional printed kind, simultaneously yielding data for automatic cartography, which transcends the limits of the printed atlas (Bauer and Goebl, 2000; *see* **Rhaeto Romance**). Another recent approach, dialect topography, eschews direct fieldwork in favor of using postal questionnaires with a large enough number of respondents to obtain data on social as well geographic variation (Chambers, 2001).

Another technique used in representing geographic relationships in linguistic data is the gravity model, which models the effect of one geolect on another as a function of their respective population size and their distance from one another (Britain, 2002). The effect that a larger speech group will exert on a smaller one was originally based on calculations adopted and adapted (as is often the case) from human geography, but it quickly became apparent that in order to account for relations between geolects, the model needed to include a measure of preexisting linguistic similarity between the two varieties.

Whatever the sources of data available, and whatever the techniques used for displaying them on maps, it is important not to lose sight of the fact that dialect cartography is not an end in itself but rather a starting point: maps can only portray linguistic reality; real explanation requires further human interpretation of maps, in combination with social and historical knowledge of the communities in question and of course linguistic knowledge of the speech varieties portrayed (see Catalán, 1975 and Fernández-Ordóñez, 2001 for good examples of such promising methods for historical dialectology). Linguistic geography can be an important part of the puzzle of understanding language variation, but it is only part of the puzzle.

Conclusions

Whatever the methods used to study spatial variation in language and whatever the technical means used to represent the results, the basic human observations that underlie linguistic geography remain constant: the speech patterns of each community simultaneously resemble and are distinct from those of nearby communities, and as the distance between communities grows, the differences between speech varieties increase while similarities decrease. Spatial variation in language is thus intimately related to human geography as well as to language history and language management (*see* **Language Planning and Policy: Models** and **Language Maintenance and Shift**). Linguistic geography was one of the earliest areas of research in which modern linguistics set out a research program distinct from historical philology, which dominated the study of language until the mid-19th century (*see*), and it remains a field in which 21st-century research continues to contribute to our knowledge of language and linguistic varieties.

See also: Corpora in Studies of Variation; Dialect Atlases; Dialect Chains; Dialects: Early European Studies; Dialects in Birdsongs; Environment and Language; Ethnicity; France: Language Situation; French; Greek, Ancient; Isolated Language Varieties; Italy: Language Situation; Language and Dialect: Linguistic Varieties; Language Attitudes; Language Families and Linguistic Diversity; Language Maintenance and Shift; Language Planning and Policy: Models; Language Politics; Language Spread; Language Surveys; Language/Dialect Contact; Linguistic Features; Occitan; Spanish; Spatiality and Language; Speech Community; Standard and Dialect Vocabulary; Switzerland: Language Situation.

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Spatiality and Language

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Scholars are increasingly aware of the importance of going beyond our traditional notion of language to look at how people employ a range of semiotic resources in organizing and interpreting meaning. One of these resources is space. Space is central in the creation and communication of status and power relations in many cultures, mapping a "complex web" (Massey, 1994: 265) of domination and subordination as well as solidarity and co-operation. The distribution of interacting persons in space can instantiate particular systems of social inequality, conventionalizing differences between people, and making such delineations material and substantive, as well as anchoring them within historical practice. Certain spatial configurations can make participation impossible for some. Space and place are important resources in the construction of gender relations cross-culturally, as feminist geographers and anthropologists have noted (Moore, 1986; Women and Geography Study Group, 1997; Lawrence and Low, 1990). Foucault (1977) has analyzed the role of space in social disciplining, for example, in restricting the mobility and access of certain members of society. Limitations on access and mobility are directly related to the acquisition of particular knowledge domains, language forms, and often to participation in political process. As new, technologically-mediated spaces for communication become available this process of unequal access has become recognized with the term 'digital divide.' Space is a powerful resource for making abstract relationships concrete, and for organizing hierarchies of meaning and creating essentialized, exclusive categories. However, these categories are not necessarily interpreted uniformly, nor are they unproblematically reproduced.

Spatial relationships and spatial frames of reference are cross-linguistically variable, and it is important to study language use in context. This requirement necessarily means paying attention to the space in which language is used, and how this space is organized and interpreted. What forms of language are appropriate here and who can use them? How is the interpretation of a particular language form dependent on the space in which it is produced? How is language used to express spatial relationships? How is the meaning of

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Spatiality and Language

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Scholars are increasingly aware of the importance of going beyond our traditional notion of language to look at how people employ a range of semiotic resources in organizing and interpreting meaning. One of these resources is space. Space is central in the creation and communication of status and power relations in many cultures, mapping a "complex web" (Massey, 1994: 265) of domination and subordination as well as solidarity and co-operation. The distribution of interacting persons in space can instantiate particular systems of social inequality, conventionalizing differences between people, and making such delineations material and substantive, as well as anchoring them within historical practice. Certain spatial configurations can make participation impossible for some. Space and place are important resources in the construction of gender relations cross-culturally, as feminist geographers and anthropologists have noted (Moore, 1986; Women and Geography Study Group, 1997; Lawrence and Low, 1990). Foucault (1977) has analyzed the role of space in social disciplining, for example, in restricting the mobility and access of certain members of society. Limitations on access and mobility are directly related to the acquisition of particular knowledge domains, language forms, and often to participation in political process. As new, technologically-mediated spaces for communication become available this process of unequal access has become recognized with the term 'digital divide.' Space is a powerful resource for making abstract relationships concrete, and for organizing hierarchies of meaning and creating essentialized, exclusive categories. However, these categories are not necessarily interpreted uniformly, nor are they unproblematically reproduced.

Spatial relationships and spatial frames of reference are cross-linguistically variable, and it is important to study language use in context. This requirement necessarily means paying attention to the space in which language is used, and how this space is organized and interpreted. What forms of language are appropriate here and who can use them? How is the interpretation of a particular language form dependent on the space in which it is produced? How is language used to express spatial relationships? How is the meaning of

space revised when the same space is used for very different activities? What role does space play in understanding multiple modalities in the production of meaning? Space is an integral part of talk and an important resource in the ordering of social experience. In many societies narratives of place organize history, memory, and moral ideas (Hoem, 1993).

While not surprising that linguists and linguistic anthropologists have focused primarily on language, language is not always the most important tool in shaping habits of interpretation. Duranti has shown the importance of looking at multiple 'codes' and 'channels' in the production of meaning in "a cultural space that is never neutral" (1992: 657). Space and its allocation are often more salient guides to status relations than speech in Pacific societies (see Duranti, 1994 for Samoa; Keating, 1998 for Pohnpei). The role of nonverbal ritual in communicating ideas and making them explicit is well attested, particularly the role of space and the body in displaying and assessing social meanings as well as in organizing and interpreting frameworks of participation. Studies on social deixis have shown the importance of understanding the social organization of the space in which language is used. As Hanks (1990) shows, the interpretation of Yucatecan deictic forms equivalent to English 'here' and 'there' depends not only on immediate spatial coordinates, but on local cultural practices that enrich physical spaces with social meanings.

Correlations have been found between how space is expressed linguistically and other, non-linguistic cognitive operations, such as solving spatial puzzles or replicating spatial arrays. Languages commonly organize spatial reference into systems that have been described as relative or absolute. A relative system uses concepts like right side and left side, which are based on the body in space. An absolute system relies on cardinal points of the landscape such as north and west, and is not dependent on the body. Scholars have found a correlation between the way language is used to talk about space ("it's to the left" or "it's to the north") and the way speakers remember spatial arrays in order to recreate them (Levinson, 1992, 1996). Spatial conception is central to aspects of thinking and reasoning, and spatial metaphors are often used in talking about time, music, mathematics, emotions, and social structures. These metaphors themselves create specific cultural notions of space. It is common though not universal to find that the right side or right hand is valued over the left, and similarly that 'above' is more highly valued than 'below,' 'front' than 'back,' as spatial relationships are imbued with social value. In a typical Purum house (Burma), for example, domestic space is divided into right/left, male/female quarters, with higher value attributed to areas and objects associated with right/male and lower value associated with left/female.

Space is an important component of sign languages. In the gestural-visual system of a sign language, a set of handshapes and movements are produced within a limited signing space in the area of the head and torso. While words in spoken languages are produced sequentially, a visual spatial language makes possible a combination of simultaneously occurring components from several spatial dimensions (Klima and Bellugi, 1991). Space is used to communicate time and to indicate role and reference. Space is used in both sign and spoken languages to communicate shape, distance, size, and other relationships.

The spatial structure of buildings can embody knowledge of social relations, and reflect ideals about relationships between women and men within the family and in society. A house can serve as a "memory palace" or mnemonic key for the remembrance of the past (Fox, 1993: 4). In Maori culture spatial coordinates of a house are linked to coordinates of time (Van Meijl, 1993). Bourdieu describes the house as a book that children are socialized into through their bodies, and where they learn a particular vision of the world read by the body (Bourdieu, 1977: 90). Arbitrary social differences are spatially realized in patterns within dwellings, in ceremonial houses, and in segregated workplaces.

In the Pacific Island nation of Pohnpei, Pohnpeians use spatial relations as an important tool in formulating the local idea of social inequality. This system includes specifying the meaning of relationships between bodies in space, topographical relations of sea level and mountain heights, the built environment, and spatial relations in language (Keating, 2000, 2002). For Pohnpeians both vertical and horizontal space encode social status such that precise relative rank can be constituted by an individual's location in space. Each part of the *nahs* or feasthouse has a name and a status attached to it; specific locations as well as entryways and posts are reserved for certain high status individuals. In the feasthouse, the rank of even invisible beings is materialized; deities and ancestor spirits are located in space behind where the chief and chieftess sit, the highest and furthest inward location. Here space is a signifier for time, as the past (ancestors) is simultaneously located within the present. Although status relationships are also produced through choosing specific language forms, horizontal spatial organization is able to categorize with more specificity in this case.

New communication technologies are creating spaces for communication and new forms of access to others in ways that are altering our relationship to space and how we use language, as well as the constitution of our speech communities. The radio or telephone, for example, transcends the sound transmitting constraints of proximal space. In many parts of the world, the radio bridges not only geographical space but also the boundary between public and private space. Computer-mediated space supports new ways to manipulate language structure and performance. For the linguistic minority Deaf community, the Internet and the invention of the web camera have increased and enabled new connections between deaf people who are geographically dispersed throughout the majority hearing community. For the first time deaf people can communicate using manual visual language, in many cases their native language, across vast distances in space. Using webcams and computers for signed language, a language that depends on interpreting visual spatial relationships between hands and the body (including facial movements), involves the development of new linguistic and sociolinguistic practices, including learning about and adjusting to how virtual space is crucially different from real space (Keating and Mirus, 2003). Signers reorient deictic references to the way technology has altered relationships between multiple communicators in two-dimensional space, for example, transforming the communication of the concept 'behind' in three dimensional space to mean 'beside' in two dimensional space. Orienting to the web camera's gaze parameters, signers modify signs. The sign 'baby,' for example, (usually produced slightly above or at waist level) is produced with the hands almost at chin level. Signers exploit new possibilities for communicating messages. For example, the webcam depicts something like a hand close to the lens as very large. Signers exploit this property of the lens as a new resource – size of manual articulator – for emphasis and clarity. Other properties of the webcam permit innovations in participant frameworks and the transmission of particular types of visual information across locales. Socializing children into interpreting an image on a computer monitor as an active conversational partner and how to interact with this partner are also important aspects of the incorporation of computer-mediated space technology into the communicative practices of a community.

Space is one of the means by which society is produced and interpreted by its members. Daily behavior creating and created by institutions takes place within both temporal and spatial boundaries. Yet space is often taken for granted or ignored. We should be aware of how space can obscure certain relations of power and access as well as organize language interactions; space is not neutral or 'natural.' Semiotic systems are important instruments through which ideas about social life are produced in communities of people; the relative importance of space vs. language and how visual and verbal signs work together and in opposition, as well as the roles of individuals in this process, have only begun to be investigated.

See also: Cognitive Linguistics; Cognitive Semantics; Cognitive Technology; Sign Language: Interpreting.

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Speaker Recognition and Verification, Automatic

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Principles of Speaker Recognition

General Principles and Applications

Speaker recognition is the process of automatically recognizing who is speaking by using the speaker-specific information included in speech waves (Furui, 1989; Furui, 1997; Rosenberg and Soong, 1991) to verify identities being claimed by people accessing systems; that is, it enables access control of various services by voice. Applicable services include voice dialing, banking over a telephone network, telephone shopping, database access services, information and reservation services, voice mail, security control for confidential information, and remote access of computers. Another important application of speaker recognition technology is for forensic purposes (Kunzel, 1994).

Speaker identity is correlated with physiological and behavioral characteristics of the speech production system of an individual speaker. These characteristics exist both in the spectral envelope (vocal tract characteristics) and in the suprasegmental features (voice source characteristics) of speech. The most commonly used short-term spectral measurements are FFT/LPC-derived cepstral coefficients and their regression coefficients (Furui, 1981). As for the regression coefficients, typically, the first- and second-order coefficients, that is, derivatives of the time functions of cepstral coefficients, are extracted at every frame period to represent spectral dynamics. They are respectively called the delta-cepstral and delta-delta-cepstral coefficients.

Speaker Identification and Verification

Speaker recognition can be classified into speaker identification and speaker verification. Speaker identification is the process of determining from which of the registered speakers a given utterance comes. Speaker verification is the process of accepting or rejecting the identity claimed by a speaker. Most of the applications in which voice is used to confirm the identity of a speaker are classified as speaker verification.

The basic elements of a speaker recognition system are shown in **Figure 1**. In the speaker identification task, a speech utterance from an unknown speaker is analyzed and compared with speech models of known speakers. The unknown speaker is identified as the speaker whose model best matches the input utterance. In speaker verification, an identity is claimed by an unknown speaker, and an utterance of this unknown speaker is compared with a model for the speaker whose identity is being claimed. If the match is good enough, that is, above a threshold, the identity claim is accepted. A high threshold makes it difficult for impostors to be accepted by the system, but with the risk of falsely rejecting valid users. Conversely, a low threshold enables valid users to be accepted consistently, but with the risk of accepting impostors. To set the threshold at the desired level of customer rejection (false rejection) and impostor acceptance (false acceptance), data showing distributions of customer and impostor scores are necessary.

The fundamental difference between identification and verification is the number of decision alternatives. In identification, the number of decision alternatives is equal to the size of the population, whereas in verification there are only two choices, acceptance or rejection, regardless of the population

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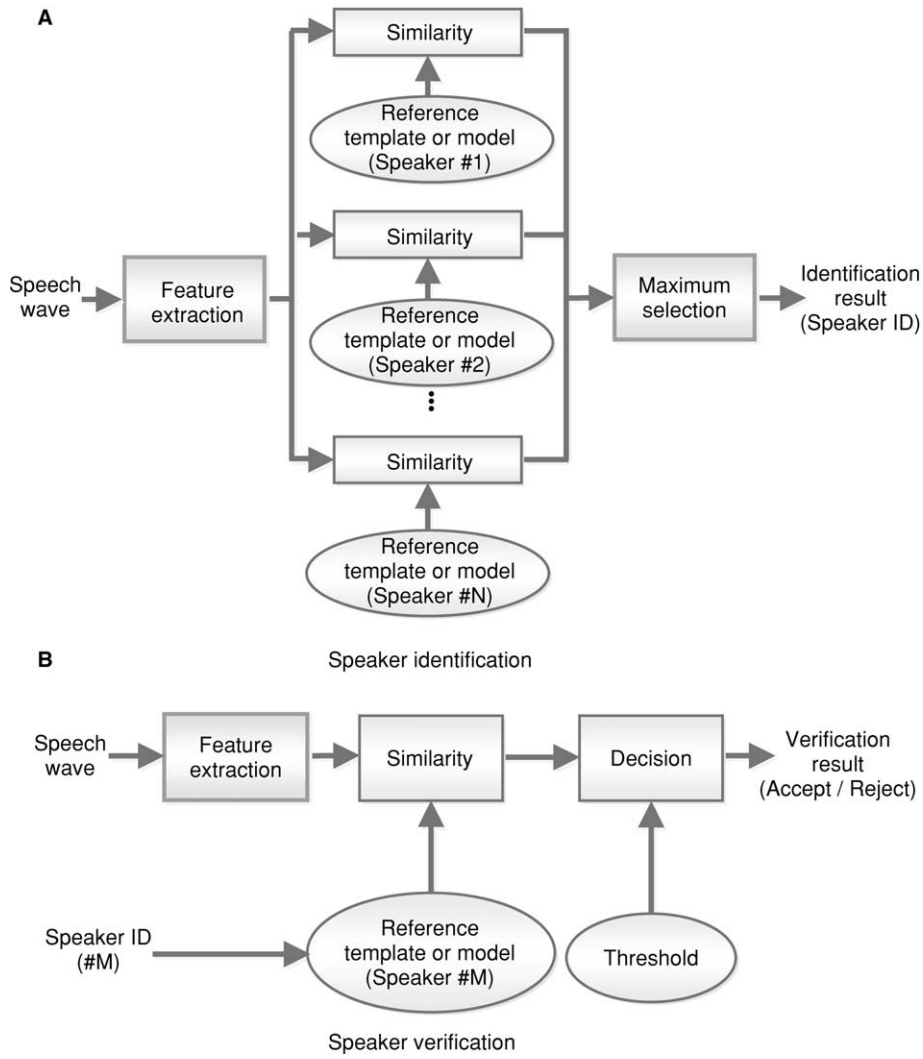

Figure 1 Basic structures of speaker recognition systems.

size. Therefore, speaker identification performance decreases as the size of the population increases, whereas speaker verification performance approaches a constant independent of the size of the population, unless the distribution of physical characteristics of speakers is extremely biased.

There is also a case called 'open set' identification, in which a reference model for an unknown speaker may not exist. In this case, an additional decision alternative, 'the unknown does not match any of the models,' is required. Verification can be considered a special case of the 'open set' identification mode in which the known population size is one. In either verification or identification, an additional threshold test can be applied to determine whether the match is sufficiently close to accept the decision, or if not, to ask for a new trial.

The effectiveness of speaker verification systems can be evaluated by using receiver operating characteristics (ROC) curve adopted from psychophysics. The ROC curve is obtained by assigning two probabilities, the probability of correct acceptance (1−false rejection rate) and the probability of incorrect acceptance (false acceptance rate), to the vertical and horizontal axes respectively, and varying the decision threshold (Furui, 1989). The detection error trade-off (DET) curve has recently become popular, in which false rejection and false acceptance rates are assigned to the vertical and horizontal axes respectively (Bimbot *et al.*, 2004). The error curve is usually plotted on a normal deviate scale. With this scale, a speaker recognition system whose true speaker and impostor scores are Gaussians with the same variance will result in a linear curve with a slope equal to −1.

The DET curve representation is therefore more easily readable than the ROC curve and allows for a comparison of the system's performances over a large range of operating conditions.

The equal-error rate (EER) is a commonly accepted overall measure of system performance. It corresponds to the threshold at which the false acceptance rate is equal to the false rejection rate.

Text-Dependent, Text-Independent, and Text-Prompted Methods

Speaker recognition methods can also be divided into text-dependent (fixed passwords) and text-independent (no specified passwords) methods. The former require the speaker to provide utterances of keywords or 'key sentences,' the same text being used for both training and recognition, whereas the latter do not rely on a specific text being spoken. The text-dependent methods are usually based on template/model-sequence-matching techniques in which the time axes of an input speech sample and reference templates or reference models of the registered speakers are aligned, and the similarities between them are accumulated from the beginning to the end of the utterance. Since this method can directly exploit voice individuality associated with each phoneme or syllable, it generally achieves higher recognition performance than the text-independent method.

There are several applications, such as forensic (Kunzel, 1994) and surveillance applications, in which predetermined keywords cannot be used. Moreover, human beings can recognize speakers irrespective of the content of the utterance. Therefore, text-independent methods have recently attracted more attention. Another advantage of text-independent recognition is that it can be done sequentially, until a desired significance level is reached, without the annoyance of the speaker having to repeat keywords again and again.

Both text-dependent and text-independent methods have a serious weakness. That is, these security systems can easily be circumvented, because someone can play back the recorded voice of a registered speaker uttering keywords or key sentences into the microphone and be accepted as the registered speaker. Another problem is that people often do not like text-dependent systems because they do not like to utter their identification number, such as their social security number, within the hearing of other people. To cope with these problems, some methods use a small set of words, such as digits as keywords, and each user is prompted to utter a given sequence of keywords which is randomly chosen every time the system is used (Higgins *et al.*, 1991; Rosenberg and Soong, 1987). Yet even this method is not reliable enough, since it can be circumvented with advanced electronic recording equipment that can reproduce keywords in a requested order. Therefore, a text-prompted speaker recognition method has been proposed in which password sentences are completely changed every time (See the section Text-Independent Speaker Recognition Methods below).

Text-Dependent Speaker Recognition Methods

Text-dependent speaker recognition methods can be classified into DTW (dynamic time warping) or HMM (hidden Markov model) based methods.

DTW-Based Methods

In this approach, each utterance is represented by a sequence of feature vectors, generally, short-term spectral feature vectors, and the trial-to-trial timing variation of utterances of the same text is normalized by aligning the analyzed feature vector sequence of a test utterance to the template feature vector sequence using a DTW algorithm. The overall distance between the test utterance and the template is used for the recognition decision. When multiple templates are used, distances between the test utterance and the templates are averaged and used for the decision.

HMM-Based Methods

An HMM can efficiently model the statistical variation in spectral features. Therefore, HMM-based methods have achieved significantly better recognition accuracies than DTW-based methods (Naik *et al.*, 1989).

Text-Independent Speaker Recognition Methods

In text-independent speaker recognition, generally the words or sentences used in recognition trials cannot be predicted. Since it is impossible to model or match speech events at the word or sentence level, the following three kinds of methods shown in **Figure 2** are being actively investigated (Furui, 1997).

Long-Term-Statistics-Based Methods

As text-independent features, long-term sample statistics of various spectral features, such as the mean and variance of spectral features over a series of utterances, have been used (**Figure 2A**). However, long-term spectral averages are extreme

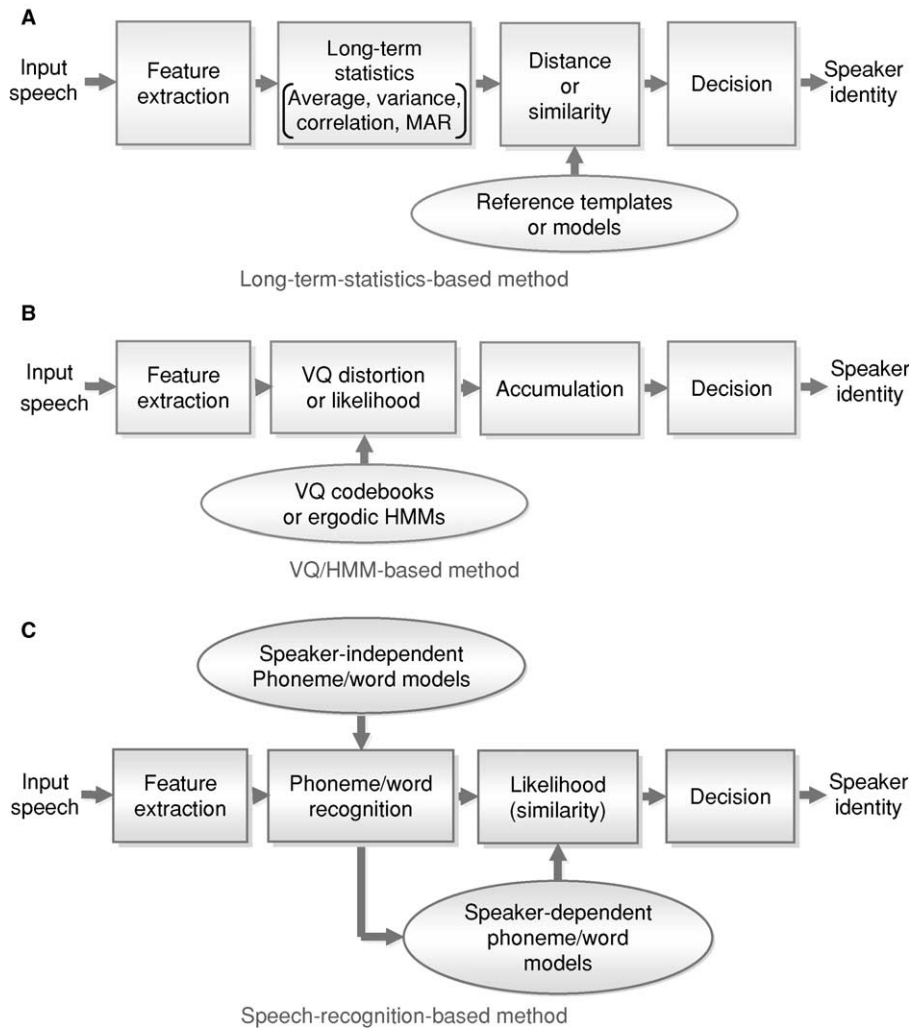

Figure 2 Basic structures of text-independent speaker recognition methods.

condensations of the spectral characteristics of a speaker's utterances and, as such, lack the discriminating power of the sequences of short-term spectral features used as models in text-dependent methods. In one of the trials using the long-term averaged spectrum (Furui *et al.*, 1972), the effect of session-to-session variability was reduced by introducing a weighted cepstral distance measure.

Studies on using statistical dynamic features have also been carried out. Multivariate auto-regression (MAR) models have been applied to the time series of cepstral vectors to characterize speakers, and good speaker recognition results have been obtained (Montacie *et al.*, 1992; Griffin *et al.*, 1994). It was reported that the optimum order of the MAR model was 2 or 3, and that distance normalization using *a posteriori* probability was essential to obtain good results in speaker verification.

VQ-Based Methods

A set of short-term training feature vectors of a speaker can be used directly to represent the essential characteristics of that speaker. However, such a direct representation is impractical when the number of training vectors is large, since the memory and amount of computation required become prohibitively large. Therefore, attempts have been made to find efficient ways of compressing the training data using vector quantization (VQ) techniques.

In this method, VQ codebooks, consisting of a small number of representative feature vectors, are used as an efficient means of characterizing speaker-specific features (Li and Wrench, 1983; Matsui and Furui, 1990; Matsui and Furui, 1991; Rosenberg and Soong, 1987). In the recognition stage, an input utterance is vector-quantized by using the codebook

of each reference speaker; the VQ distortion accumulated over the entire input utterance is used for making the recognition determination (Figure 2B).

Matsui and Furui (1990, 1991) tried a method using a VQ-codebook for long feature vectors consisting of instantaneous and transitional features calculated for both cepstral coefficients and fundamental frequency. Since the fundamental frequency cannot be extracted from unvoiced speech, there are two separate codebooks for voiced and unvoiced speech for each speaker. A new distance measure was introduced to take into account intraspeaker and interspeaker variability and to deal with the problem of outlier in the distribution of feature vectors. The outlier vectors correspond to intersession spectral variation and to the difference between phonetic content of the training texts and the test utterances. It was confirmed that, although the fundamental frequency achieved only a low recognition rate by itself, the recognition accuracy was greatly improved by combining the fundamental frequency with spectral envelope features.

In contrast with the memoryless VQ-based method, nonmemoryless source coding algorithms have also been studied using a segment (matrix) quantization technique (Juang and Soong, 1990). The advantage of a segment quantization codebook over a VQ codebook representation is its characterization of the sequential nature of speech events. Higgins and Wohlford (1986) proposed a segment modeling procedure for constructing a set of representative time normalized segments, which they called 'filler templates.' The procedure, a combination of K-means clustering and dynamic programming time alignment, provided a means for handling temporal variation.

Ergodic-HMM-Based Methods

The basic structure is the same as the VQ-based method, but in this method an ergodic HMM is used instead of a VQ codebook. Over a long timescale, the temporal variation in speech signal parameters is represented by stochastic Markovian transitions between states. Poritz (1982) proposed using a five-state ergodic HMM (i.e., all possible transitions between states are allowed) to classify speech segments into one of the broad phonetic categories corresponding to the HMM states. A linear predictive HMM was adopted to characterize the output probability function. He characterized the automatically obtained categories as strong voicing, silence, nasal/liquid, stop burst/post silence, and frication.

Gauvain *et al.* (1995) investigated a statistical modeling approach, where each speaker was viewed as a source of phonemes, modeled by a fully connected Markov chain. Maximum *a posteriori* (MAP) estimation was used to generate speaker-specific models from a set of speaker-independent seed models. The lexical and syntactic structures of the language were approximated by local phonotactic constraints. The unknown speech is recognized by all of the speakers' models in parallel, and the hypothesized identity is that associated with the model set having the highest likelihood. Since phonemes and speakers are simultaneously recognized by using speaker-specific Markov chains, this method can be considered as an extension of the ergodic-HMM-based method.

Matsui and Furui (1992) compared the VQ-based method with the discrete/continuous ergodic HMM-based method, particularly from the viewpoint of robustness against utterance variations. They found that the continuous ergodic HMM method is far superior to the discrete ergodic HMM method and that the continuous ergodic HMM method is as robust as the VQ-based method when enough training data is available. However, when little data is available, the VQ-based method is more robust than the continuous HMM method. They investigated speaker identification rates using the continuous HMM as a function of the number of states and mixtures. It was shown that the speaker recognition rates were strongly correlated with the total number of mixtures, irrespective of the number of states. This finding means that using information on transitions between different states is ineffective for text-independent speaker recognition.

Rose and Reynolds (1990) investigated a technique based on maximum likelihood estimation of a Gaussian mixture model (GMM) representation of speaker identity. This method corresponds to the single-state continuous ergodic HMM. Gaussian mixtures are noted for their robustness as a parametric model and for their ability to form smooth estimates of rather arbitrary underlying densities. The VQ-based method can be regarded as a special (degenerate) case of a single-state HMM with a distortion measure being used as the observation probability.

Speech-Recognition-Based Methods

The VQ- and HMM-based methods can be regarded as methods that use phoneme-class-dependent speaker characteristics contained in short-term spectral features through implicit phoneme-class recognition.

In other words, phoneme-classes and speakers are simultaneously recognized in these methods. On the other hand, in the speech-recognition-based methods (Figure 2C), phonemes or phoneme-classes are explicitly recognized, and then each phoneme(-class) segment in the input speech is compared with speaker models or templates corresponding to that phoneme (-class).

Savic and Gupta (1990) used a five-state ergodic linear predictive HMM for broad phonetic categorization. In their method, after frames that belong to particular phonetic categories have been identified, feature selection is performed. In the training phase, reference templates are generated and verification thresholds are computed for each phonetic category. In the verification phase, after phonetic categorization, a comparison with the reference template for each particular category provides a verification score for that category. The final verification score is a weighted linear combination of the scores for each category. The weights are chosen to reflect the effectiveness of particular categories of phonemes in discriminating between speakers and are adjusted to maximize the verification performance. Experimental results showed that verification accuracy can be considerably improved by this category-dependent weighted linear combination method.

Rosenberg *et al.* (1991) tested a speaker verification system using four-digit phrases in actual field conditions, with a banking application input speech that was segmented into individual digits using a speaker-independent HMM. The frames within the word boundaries for a digit were compared with the corresponding speaker-specific HMM digit model and the Viterbi likelihood score was computed. This computation was done for each of the digits making up the input utterance. The verification score was defined to be the average normalized log-likelihood score over all the digits in the utterance.

Newman *et al.* (1996) used a large vocabulary speech recognition system for speaker verification. A set of speaker-independent phoneme models were adapted to each speaker. Speaker verification consisted of two stages. First, speaker-independent speech recognition was run on each of the test utterances to obtain phoneme segmentation. In the second stage, the segments were scored against the adapted models for a particular target speaker. The scores were normalized by those with speaker-independent models. The system was evaluated using the 1995 NIST-administered speaker verification database, which consists of data taken from the Switchboard corpus. The results showed that this method could not out-perform Gaussian mixture models.

Text-Prompted Speaker Recognition

In this method, key sentences are completely changed every time (Matsui and Furui, 1993; Matsui and Furui, 1994b). The system accepts the input utterance only when it determines that the registered speaker uttered the prompted sentence. Because the vocabulary is unlimited, prospective impostors cannot know in advance the sentence they will be prompted to say. This method not only accurately recognizes speakers, but can also reject an utterance whose text differs from the prompted text, even if it is uttered by a registered speaker. Thus, a recorded and played-back voice can be correctly rejected.

This method uses speaker-specific phoneme models as basic acoustic units. One of the major issues in this method is how to properly create these speaker-specific phoneme models when using training utterances of a limited size. The phoneme models are represented by Gaussian-mixture continuous HMMs or tied-mixture HMMs, and they are made by adapting speaker-independent phoneme models to each speaker's voice.

In the recognition stage, the system concatenates the phoneme models of each registered speaker to create a sentence HMM, according to the prompted text. Then the likelihood of input speech against the sentence model is calculated and used for the speaker verification determination.

Normalization and Adaptation Techniques

How can we normalize intraspeaker variation of likelihood (similarity) values in speaker verification? The most significant factor affecting automatic speaker recognition performance is variation in signal characteristics from trial to trial (intersession variability or variability over time). Variations arise from the speaker him/herself, from differences in recording and transmission conditions, and from noise. Speakers cannot repeat an utterance precisely the same way from trial to trial. It is well known that samples of the same utterance recorded in one session are much more highly correlated than tokens recorded in separate sessions. There are also long term trends in voices (Furui *et al.*, 1972; Furui, 1974).

It is important for speaker recognition systems to accommodate these variations. Adaptation of the reference model as well as the verification threshold for each speaker is indispensable to maintain a high recognition accuracy for a long period. In order to compensate for the variations, two types of normalization techniques have been tried – one in the parameter domain, and the other in the distance/similarity

domain. The latter technique uses the likelihood ratio or *a posteriori* probability. To adapt HMMs for noisy conditions, various techniques including the HMM composition (PMC: parallel model combination) method, have proved successful.

Parameter-Domain Normalization

As one typical normalization technique in the parameter domain, spectral equalization, the so-called 'blind equalization' method, has been confirmed to be effective in reducing linear channel effects and long-term spectral variation (Atal, 1974; Furui, 1981). This method is especially effective for text-dependent speaker recognition applications using sufficiently long utterances. In this method, cepstral coefficients are averaged over the duration of an entire utterance, and the averaged values are subtracted from the cepstral coefficients of each frame (CMS; cepstral mean subtraction). This method can compensate fairly well for additive variation in the log spectral domain. However, it unavoidably removes some text-dependent and speaker-specific features, so it is inappropriate for short utterances in speaker recognition applications. It was shown that time derivatives of cepstral coefficients (delta-cepstral coefficients) are resistant to linear channel mismatch between training and testing (Furui, 1981; Soong and Rosenberg, 1988).

Likelihood Normalization

Higgins *et al.* (1991) proposed a normalization method for distance (similarity or likelihood) values that uses a likelihood ratio. The likelihood ratio is the ratio of the conditional probability of the observed measurements of the utterance, given the claimed identity is correct, to the conditional probability of the observed measurements, given the speaker is an impostor (normalization term). Generally, a log-likelihood ratio indicates a valid claim, whereas a negative value indicates an imposter. The likelihood ratio normalization approximates optimal scoring in Bayes' sense.

This normalization method is, however, unrealistic because conditional probabilities must be calculated for all the reference speakers, which requires large computational cost. Therefore, a set of speakers, 'cohort speakers,' who are representative of the population distribution near the claimed speaker has been chosen for calculating the normalization term. Another way of choosing the cohort speaker set is to use speakers who are typical of the general population. Reynolds (1994) reported that a randomly selected, gender-balanced background speaker population outperformed a population near the claimed speaker.

Matsui and Furui (1993, 1994a) proposed a normalization method based on *a posteriori* probability. The difference between the normalization method based on the likelihood ratio and that based on *a posteriori* probability is whether or not the claimed speaker is included in the impostor speaker set for normalization; the cohort speaker set in the likelihood-ratio-based method does not include the claimed speaker, whereas the normalization term for the *a posteriori*-probability-based method is calculated by using a set of speakers, including the claimed speaker. Experimental results indicate that both normalization methods almost equally improve speaker separability and reduce the need for speaker-dependent or text-dependent thresholding, compared with scoring using only the model of the claimed speaker (Matsui and Furui, 1994a; Rosenberg, 1992).

Carey and Parris (1992) proposed a method in which the normalization term is approximated by the likelihood for a world model representing the population in general. This method has an advantage that the computational cost for calculating the normalization term is much smaller than the original method since it does not need to sum the likelihood values for cohort speakers. Matsui and Furui (1994a) proposed a method based on tied-mixture HMMs in which the world model is made as a pooled mixture model representing the parameter distribution for all the registered speakers. The use of a single background model for calculating the normalization term has become the predominant approach used in speaker verification systems.

Since these normalization methods neglect absolute deviation between the claimed speaker's model and the input speech, they cannot differentiate highly dissimilar speakers. Higgins *et al.* (1991) reported that a multilayer network decision algorithm makes effective use of the relative and absolute scores obtained from the matching algorithm.

A family of normalization techniques has recently been proposed, in which the scores are normalized by subtracting the mean and then dividing by standard deviation, both terms having been estimated from the (pseudo)imposter score distribution. Different possibilities are available for computing the imposter score distribution: Znorm, Hnorm, Tnorm, Htnorm, Cnorm, and Dnorm (Bimbot *et al.*, 2004). The state-of-the-art text-independent speaker verification techniques associate one or several parameterization level normalization (CMS, feature variance normalization, feature warping, etc.) with a world model normalization and one or several score normalizations.

HMM Adaptation for Noisy Conditions

Increasing the robustness of speaker recognition techniques against noisy speech or speech distorted by a telephone is a crucial issue in real applications. Rose *et al.* (1994) applied the HMM composition (PMC) method (Gales and Young, 1993; Martin *et al.*, 1993) to speaker identification under noisy conditions. The HMM composition is a technique to combine a clean speech HMM and a background noise HMM to create a noise-added speech HMM. In order to cope with the problem of the variation of the signal-to-noise ratio (SNR), Matsui and Furui (1996b) proposed a method in which several noise-added HMMs with various SNRs were created, and the HMM that had the highest likelihood value for the input speech was selected. A speaker decision was made using the likelihood value corresponding to the selected model. Experimental application of this method to text-independent speaker identification and verification in various kinds of noisy environments demonstrated considerable improvement in speaker recognition.

Updating Models and *a Priori* Threshold for Speaker Verification

How to update speaker models to cope with the gradual changes in people's voices is an important issue. Since we cannot ask every user to utter many utterances at many different sessions in real situations, it is necessary to build each speaker model based on a small amount of data collected in a few sessions, and then the model must be updated using speech data collected when the system is used.

How to set the *a priori* decision threshold for speaker verification is another important issue. In most laboratory speaker recognition experiments, the threshold is set *a posteriori* so that the equal error rate (EER) is achieved. Since the threshold cannot be set *a posteriori* in real situations, we have to have practical ways to set the threshold before verification. It must be set according to the relative importance of the two errors, which depends on the application.

These two problems are intrinsically related each other. Furui (1981) proposed methods for updating reference templates and the threshold in DTW-based speaker verification. An optimum threshold was estimated based on the distribution of overall distances between each speaker's reference template and a set of utterances of other speakers (interspeaker distances). The interspeaker distance distribution was approximated by a normal distribution, and the threshold was calculated by the linear combination of its mean value and standard deviation. The intraspeaker distance distribution was not taken into account in the calculation, mainly because it is difficult to obtain stable estimates of the intraspeaker distance distribution from small numbers of training utterances. The reference template for each speaker was updated by averaging new utterances and the present template after time registration. Matsui and Furui (1996a) extended these methods and applied them to text-independent and text-prompted speaker verification using HMMs.

High-Level Speaker Recognition

Recently, high-level features such as word idiolect, pronunciation, phone usage, prosody, etc., have been successfully used in text-independent speaker verification. Typically, high-level-feature recognition systems produce a sequence of symbols from the acoustic signal and then perform recognition using the frequency and co-occurrence of symbols. In Doddington's idiolect work (2001), word unigrams and bigrams from manually transcribed conversations were used to characterize a particular speaker in a traditional target/background likelihood ratio framework. Campbell *et al.* (2004) proposed the use of support vector machines for performing the speaker verification task based on phone and word sequences obtained using phone recognizers. The benefit of these features was demonstrated in the 'NIST extended data' task for speaker verification; with enough conversational data, a recognition system can become 'familiar' with a speaker and achieve excellent accuracy. The corpus was a combination of phases 2 and 3 of the Switchboard–2 corpora. Each training utterance in the corpus consisted of a conversation side that was nominally of length 5 minutes (approximately 2.5 minutes of speech) recorded over a landline telephone. Speaker models were trained using 1–16 conversation sides. These methods need utterances of at least several minutes long, much longer than those used in conventional speaker recognition methods.

Relationship with Other Speech Technology

Speaker characterization techniques are related to research on improving speech recognition accuracy by speaker adaptation (Furui, 1991), improving synthesized speech quality by adding the natural characteristics of voice individuality, and converting synthesized voice individuality from one speaker to another. Studies on automatically extracting the speech periods of each person separately from a dialogue/conversation/meeting involving more than two

people have appeared as an extension of speaker recognition technology (Gish *et al.*, 1991; Siu *et al.*, 1992; Wilcox *et al.*, 1994). Increasingly, speaker segmentation and clustering techniques are being used to aid adapting speech recognizers and for supplying metadata for audio indexing and searching.

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Specific Language Impairment

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Introduction

Since research on specific language impairment (SLI) started a few decades ago it has become evident that although the majority of children appear to learn language quickly and effortlessly, there are some for whom this is not the case. SLI is characterized by the early onset of language difficulties, which then persist and become 'out of line' with age and cognitive development. Children with SLI have problems from the outset of the language-learning process. Instead of reaching early developmental milestones on schedule and then encountering specific difficulties (e.g., in grammatical morphology or entering a period of extremely slow development), these children are in fact slow from the beginning, i.e., all children with SLI come from the population of late talkers (Conti-Ramsden, 2003). It is a hallmark of SLI that these children are late in acquiring their first words and their first word combinations and thus, difficulties and protracted development are present from the emergence of language.

Prevalence and Diagnosis

SLI is currently diagnosed using exclusionary criteria. That is, language impairment must be present without obvious cause such as nonverbal learning difficulties (although see later), hearing impairment, frank neurological disability, or autism. It is a developmental disorder and as mentioned previously language difficulties must be evident at a young age. Interestingly, it is a relatively common disorder as it is thought to affect between 5% and 7% of the population (Tomblin *et al.*, 1992) with boys being more affected than girls at a ratio of 2:1 (Bishop, 1997).

There are a number of different definitions of what constitutes a language impairment in practice at any one time. Tomblin and colleagues concluded that language scores falling below 1.25 SD from the normative mean (approx. 10th centile) was a 'gold standard' for language impairment (Tomblin *et al.*, 1996). Often, however, academics and clinicians use 1 SD as a threshold. Children are usually required to fall below the normal range on at least one test of language. The level of nonverbal IQ needed for a diagnosis of SLI is more controversial. While many researchers favor scores of 85 points (1 SD) or higher, UK educational practice as well as DSM-IV (American Psychiatric Association, 1994) deems a score above 70 (2 SD) rather than above 85 to indicate a lack of generalized learning difficulty. There have also been questions raised regarding the use of thresholds (for example, do children with IQs of 86 and language scores of 84 really have SLI?) and also conversely with discrepancy or difference measures where children must have an IQ–language difference of a certain magnitude (Bishop, 1997). Recent studies have also questioned the relevance of nonverbal IQ in the diagnosis of SLI, both because IQ in children with SLI appears to decline over time (Botting, forthcoming) and because clinically those with higher and lower IQs might have identical needs (Bishop, 1997).

Despite the fact that SLI is the current term used in research and education, psychiatric diagnostic manuals use different terminology. DSM-IV (American Psychiatric Association, 1994), for example, uses the term 'developmental language disorder' and ICD 10 (World Health Organization, 1992) the terms 'expressive developmental language disorder' and 'receptive developmental language disorder' (see the section 'SLI Is Not Homogenous' below for a description of expressive/receptive disorders).

Characteristics of Children with SLI

Children with SLI are late talkers but not all late talkers are children with SLI. There are many children who are referred to as 'late talkers' who subsequently develop age-appropriate language skills and these children are not thought to have SLI (although later complex language and literacy skills might be affected; see e.g., Rescorla, 2002). Equally, children who have learned language and then suddenly lose these skills are more likely to have an acquired language disorder caused by trauma, illness, or other psychiatric conditions. Unlike children with autism, children with SLI do not show difficulties with social relationships at a young age, usually have no difficulty on theory of mind or perspective-taking tasks and do not have rigid or obsessive behaviors. Thus their nonverbal communication tends to be notably better than their actual language.

A number of the language difficulties seen in SLI appear to be syntactic in nature, and the majority of children with SLI learning English seem to have particular difficulty with verb morphology. Thus failure to mark tense accurately, make appropriate subject–verb agreement, and use of auxiliaries are all areas of difficulty for those children with SLI learning English. Figure 1 shows transcripts of real dialogues between mothers and their three- and four-year-old children

1. Pronoun case error with finite form
Mother: "I thought she was at school."
Child: "Er, her* is!" [error: her = she]
Mother: "she is."
Child: "she is." [imitating]
Use of an accusative pronoun (her) for the subject of a finite third person verb form (is). The adult target is a nominative case pronoun (she).

2. Missing auxiliary
"I ∅* staying there right here." [error: ∅ = am]
Omission of the auxiliary form "am" inflected for agreement (first person singular) and tense (present).

3. Missing copula
"Aah, ∅* that a little boat?" [error: ∅ = is]
Omission of the copula form "is" inflected for agreement (third person singular) and tense (present).

4. Missing third person-*s*
"That go* this way." [error: go = goes]
Omission of the third person present marker-s. The target form is "goes" instead of the uninflected form "go."

5. Missing infinitival particle *to*
"Want ∅* take it out." [error: ∅ = to]
Omission of the infinitival particle *to*. The target is "I want to take it out."

6. Missing regular past tense-*ed* inflection
Child: "And he empty* the bin." [error: empty = emptied]
Mother: "Did he?"
Use of an uninflected form (empty) instead of the regular past tense form (emptied).

7. Past tense overregularization
Mother: "Then what did Mommy do?"
Child: "Catched* it." [error: catched = caught]
Use of an overregularised form (catched) instead of the target irregular past tense form (caught).

Figure 1 Examples of syntactic errors.

with SLI that include typical examples of these type of errors.

However, many children also have semantic difficulties, either with word finding (Dockrell *et al.*, 2001) or understanding meanings and inferences (Botting and Adams, forthcoming). Indeed, these other areas of difficulty might contribute to the syntactic impairments often seen. Recently, phonological short-term memory and nonword repetition tasks (in which novel words are repeated immediately after presentation – see below) have been highlighted as possible markers for SLI because a large proportion of children with SLI show very poor ability in this area (Gathercole and Baddeley, 1990; Bishop *et al.*, 1995).

SLI is not Homogenous

It is universally recognized that SLI is not a homogenous condition but is an umbrella term for a number of different clinical types. A number of different classification systems have been devised (Conti-Ramsden and Botting, 1999; Rapin and Allen, 1987). However, the enduring categories used appear to be those referring to the terms 'expressive (or production/output) difficulties' and 'receptive (or comprehension/understanding) difficulties.' There is general acceptance that the majority of children with SLI have expressive difficulties but that these can be present in isolation or combined with receptive difficulties. Recently, a third subtype has received much attention. These are children in whom pragmatic language difficulties, i.e., their social use of language, are the most prominent disability. These children are currently referred to as having pragmatic language impairment. They would previously have been described as having semantic–pragmatic disorder, but this term is less used following research and clinical opinion that suggested semantic difficulties were no more common in this group than in other subtypes of SLI (Bishop, 1998).

Theories about the Causes of SLI

The last few decades have witnessed a shift in the theory of the possible causes of SLI. In parallel with those theories governing normal language acquisition, this shift has been away from environmental causes and toward a more genetic and biological point of view. It has been noted that SLI often runs in families (e.g., Tallal *et al.*, 1989) and the latest investigations are attempting to isolate this apparent heritability. A large body of evidence is being gathered that supports the role of genes in the etiology of SLI although it is acknowledged that the genetic basis of the disorder is likely to be complex (Bishop *et al.*, 1995). It is also acknowledged that there is likely to be an interplay between environmental and genetic/biological factors in the expression of SLI.

Over the years a number of theories have been developed to account for possible causes of SLI. Each of these theories has its distinct features but most can be classified under two major headings: processing theories versus linguistic theories. In general, linguistic theories of SLI assume that language and language structures are innate and independent, sometimes with a grammar 'module' being a hardwired part of neurodevelopment. In contrast, processing theories of SLI take a more interactionist stance, in which language develops dynamically in interaction with external stimuli, and in relation to other systems such as cognition.

Linguistic theories of SLI are inevitably derived from Chomskyan theory, whereby SLI is proposed to manifest deficits in, immaturity of, or the absence

of innate grammatical modules. Thus, it is thought that children with SLI develop selective impairments that affect specific components of universal grammar. And to some extent, this appears to be the case. Children with SLI appear to have problems with morphosyntax, thus omitting syntactic morphemes at a rate greater than their mean length of utterance would predict. Theories have tried to specify the nature of this problem by proposing missing features (Gopnick, 1997), problems with tense and more recently agreement and tense (Wexler *et al*., 1998), and problems with agreement only (Clahsen, 1989). Within this theoretical framework, Van der Lely (1994) has suggested that although morphosyntax appears to be particularly prone to impairment, children with SLI have difficulties with a broader range of syntactic structures and relations, particularly the interpretation of thematic roles.

The above theories have been challenged by processing theories of SLI. This perspective suggests that the observed deficits in grammar are the result of difficulties with processing abilities. Furthermore, it underlines the fact that children with SLI appear to have difficulties beyond grammatical morphemes and grammatical relations. Children with SLI have difficulties acquiring words in the first instance. They also have difficulties formulating sentences and retelling stories. Theories have varied in their specific approaches and explanations. It has been suggested that children with SLI have phonological short-term memory deficits (Gathercole and Baddeley, 1990), more general working memory deficits (Montgomery, 2000), an overall slow processing system (Kail, 1994), and auditory perception impairments (Tallal *et al*., 1985).

At the same time, there has been a line of research challenging the 'specific' nature of SLI. Interestingly, a number of studies have identified nonverbal difficulties in children with SLI such as mental imagery and hypothesis testing (see Leonard, 1998 for a review). Interest in the application of computer models to the understanding of language learning and disorders suggests that the language difficulty is not isolated in development but may affect and be affected by other systems (Thomas and Karmiloff-Smith, 2002). Processing theories are consistent with a wider notion of SLI (without specificity to language only) while linguistic theories find this type of evidence more difficult to reconcile with their approach.

The Development and Prognosis of SLI

It used to be thought that SLI was a short-term, preschool delay in language learning. Although this may be true for a proportion of children experiencing language delay, recent follow-up studies have shown that language difficulties can persist well into adolescence and even adulthood (Clegg *et al*., forthcoming; Stothard *et al*., 1998). Longitudinal studies have also suggested that the language profiles of individual children can change over time (Conti-Ramsden and Botting, 1999) as well as their nonverbal functioning (Botting, forthcoming). Persistent language impairment has been associated with poorer reading and school progress (Snowling *et al*., 2001) as well as with social and psychiatric difficulties (Beitchman *et al*., 2001; Conti-Ramsden and Botting, 2004). Research into the lifelong effects of SLI is only just beginning and the findings so far have not been consistent. It appears, nevertheless, that it is possible for people with SLI to have a good quality of life, find employment, and establish long-term relationships. Often language difficulties are not noticeable because of improvement, strategy use, and the accommodation of behavior to get around the difficulty (i.e., not putting oneself into situations where language impairment becomes obvious).

Useful Contacts Regarding SLI

Afasic (Association for All Speech and Language Impaired Children), 2nd floor, 50–52 Great Sutton Street, London, EC1V 0DJ.

Association of Speech and Language Therapists in Independent Practice, Coleheath Bottom, Speen, Princes Risborough, HP27 0SZ.

I CAN, 4 Dyer's Buildings, Holborn, London, EC1N 2QP.

NAPLIC (National Association for Professionals Concerned with Language Impairment in Children), c/o Speech and Language Therapy, Parsons Green Centre, 5–7 Parsons Green, London, SW6 4UL.

Royal College of Speech and Language Therapists, 2 White Hart Yard, London, SE1 1NX.

See also: Autism and Asperger Syndrome: A Spectrum of Disability; CHILDES Database; Classical Tests for Speech and Language Disorders; Developmental Relationship between Language and Cognition; Language Disorders: 19th Century Studies; Language Disorders: 20th Century Studies, Pre-1980; Phonological, Lexical, Syntactic, and Semantic Disorders in Children; Remediation of Language Disorders in Children.

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Specificity

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The notion of specificity entered contemporary linguistics through the door of philosophy of language and semantics. It has played an increasingly important role in semantic theory as well as in work on the syntax–semantics and morphology–semantics interfaces. For the semanticist, specificity is interesting because of its relevance to theories of reference; for the syntactician and morphologist, specificity is relevant to phenomena such as differential object marking (clitic doubling as well as special case markings), weak islands, and multiple wh-questions.

Specificity was brought onto the scene in order to make subtler distinctions within the class of noun phrases (NPs) when the definite/indefinite distinction proved insufficient for characterizing the rich semantic, pragmatic, syntactic, and morphological phenomena that drive the drawing of boundaries within the realm of NP semantics. Farkas (1994, 2002a) distinguished three subtypes of specificity: scopal, partitive, and epistemic. Below I characterize each, and then briefly discuss why they have to be distinguished and what a common denominator among them might be.

Scopal specificity concerns the question of whether an NP is interpreted within the scope of a quantifier, a negation, or an intensional predicate (nonspecific) or outside it (specific). The referent of a scopally nonspecific NP varies in a way that is determined by the operator in whose scope the NP finds itself.

(1) John wants to marry **a Norwegian girl**.

(2) He met **her** last year.

In (1), under the wide scope reading of the boldface NP, its referent is constant across the alternatives introduced by *wants;* under the narrow scope reading, it is not. Example (2) is an appropriate continuation of (1) only under the former interpretation. The particular properties of a scopally nonspecific NP depend on the operator in whose scope the NP is interpreted. Thus, the interpretation of the wide scope reading of the indefinite NP in (3) is the same as the wide scope reading of the indefinite in (1); under its narrow scope reading, however, there is now covariation between students in the class and languages spoken.

(3) Every student in this class speaks **a foreign language**.

The languages and the students who speak them inhabit the same 'world' in (3), whereas in (1), under the narrow scope (scopally nonspecific) reading of the indefinite, the question of where the (relevant) Norwegian girl exists is more complex.

Narrow scope relative to negation, exemplified in (4), is different from both these cases.

(4) John hasn't seen **a/any Norwegian girl**.

In many languages, among them English, indefinite NPs within the immediate scope of negation are specially marked, in English by the determiner *any*. The fate of NPs within the immediate scope of negation is part of the web of phenomena studied under the rubric of negative polarity items (NPI).

Scopal specificity, under its present characterization, is a relative notion: An NP may be within the scope of some operator *O* (and therefore scopally nonspecific relative to *O*) but outside the scope of some other operator *O'* (and therefore scopally specific relative to *O'*). This is indeed what we find in cases of intermediate scope, discussed in Fodor and Sag (1982) and Farkas (1981), and exemplified in (5).

(5) Every professor gave an A to every student who translated **a difficult poem by Pindar**.

Here the indefinite *a difficult poem by Pindar* may be interpreted as scopally nonspecific relative to *every professor* but as scopally specific relative to *every student*. Under this interpretation, for every professor there was a particular poem such that that professor gave an A to every student who translated that poem. Intermediate scope interpretations of sentences such as (5) have played an important role in the discussion of the proper treatment of NP scope.

The term nonspecific NP is sometimes used for a class of NPs that has a special scopal property, namely that of having to be interpreted together with the predicate that the NP in question is an argument of. These NPs have necessarily narrow scope relative to any operator that scopes over their predicate. Carlson (1977) showed that existential bare plurals in English are examples of such NPs. Existential bare plural NPs are exemplified in (6). Their scopal inertness (i.e., the fact that they always scope with their predicate and thus do not participate in scopal ambiguities in the presence of other operators) is exemplified in (7) and (8), which can only be interpreted with the bare plural within the scope of negation and the universal, respectively.

(6) John saw **spots on the floor**.

(7) John didn't see **spots on the floor**.

(8) Everybody saw **spots on the floor.**

Scopal specificity as discussed here is independent of definiteness because, as shown in (9), a definite NP may be interpreted within the scope of an operator and therefore may be scopally nonspecific:

(9) Every student invited **the girl sitting to his right**.

There is, however, a marked tendency for definite NPs to be interpreted as having widest scope, and such NPs are never scopally inert.

Partitive specificity (Enç, 1991) concerns the question of whether an indefinite NP refers within a discourse-familiar group (specific) or not (nonspecific). *Some ghosts* in (11) (Enç, 1991) is partitive-specific, whereas in (10) it is not:

(10) There are **some ghosts** in this house.

(11) **Some ghosts** live in the attic; others, in the basement.

The crucial property that makes the indefinite in (11) partitive-specific is that its referent is a subset of the referent of the indefinite in (10). In this example, partitivity is not marked morphologically: The two indefinites are formally identical. In the case in which (10) precedes the utterance of (11), the partitivity of the indefinite in (11) arises contextually. When (11) is uttered out of context, the indefinite is interpreted just as the one in (10). There are, however, NPs called overt partitives that **must** receive a partitive-specific interpretation, such as the boldface NP in (12).

(12) **Some of the ghosts** live in the attic; others, in the basement.

This example is used felicitously only if uttered in a context that has established the existence of some ghosts that can provide the set, a subset of which is referred to by the partitive in (12). Finally, note that partitive specificity is incompatible with definiteness. Changing *some ghosts* to *the ghosts* in (11) enforces a nonpartitive interpretation; the definite has to refer to all the ghosts introduced in (10).

Epistemic specificity (Fodor and Sag, 1982) concerns the question of whether the speaker has an intended referent in mind (specific) or not (nonspecific). The former interpretation is forced on the indefinite in (13) by the continuation in (14); the latter interpretation is forced by the continuation in (15):

(13) **A student** cheated.

(14) **He** is John.

(15) We don't know who **he** was.

The referent of epistemically specific NPs is constant across the speaker's (or addressee's) epistemic alternatives; that of epistemically nonspecific ones is not. In the case of the former interpretation of the indefinite in (13), the speaker has a particular student in mind, whereas, in the case of the latter, she does not. Whether an indefinite NP receives an epistemically specific interpretation or not is greatly influenced by the context in which the NP occurs. Note that, epistemic nonspecificity is compatible with definiteness. Thus, the boldface definite in (16) is most likely to be interpreted as epistemically nonspecific:

(16) **The last person to leave the room** will switch off the lights.

Scopal matters as well as issues connected to overt partitive specificity have been assumed to fall within the realm of semantics proper. Whether epistemic specificity is a matter of semantics narrowly construed, and thus enters into determining truth conditions, or whether it should be relegated to the realm of pragmatics is a controversial issue. Ludlow and Neale (1991) argued for a pragmatic approach, contra Fodor and Sag, claiming that the utterance of (13), under an epistemically specific interpretation, would be judged as true even if it turned out that there was indeed a student who had cheated but that the cheater was not the student the speaker had in mind.

A notion of specificity closely related to epistemic specificity is involved in characterizing *a certain* indefinites, exemplified in (17).

(17) **A certain student** cheated on the exam.

Such specific indefinites are, intuitively, antifree-choice items, signaling that there is a particular intended choice of value, even though neither speaker nor addressee must necessarily be in a position to identify it at the time of the speech act. In Farkas (2002b), it is argued that this type of specificity is characterized by the existence of the possibility of the unique identification of the intended referent.

I turn now to the reasons for keeping these various subspecies of specificity apart. Fodor and Sag note that, because scopal interaction is irrelevant to (13), epistemic specificity must be independent of scope. The independence of partitivity from scopal and epistemic specificity is shown by (18) and (19).

(18) John wants to marry **one of Steve's sisters** (he doesn't care which).

(19) **One of Steve's sisters** cheated (we have to find out which).

The overt partitive-specific NP in (18) may be interpreted within the scope of the intensional predicate *wants*, and the continuation in parentheses forces this scopally nonspecific interpretation. The overt partitive

in (19) may be interpreted as epistemically nonspecific, an interpretation that is forced by the continuation in parentheses. Thus, partitive specificity does not entail either scopal or epistemic specificity.

In (20), fashioned after a famous example due to Geach, the indefinite may be scopally nonspecific relative to the predicate *believes* but epistemically specific as far as Cob is concerned:

(20) Cob believes that **a witch** ate his tomatoes. He believes **her** name is Martha..

The referent of *a witch* is chosen from among the entities that populate Cob's version of reality, rather than the speaker's, making it scopally nonspecific. Cob may, however, have a particular witch in mind, whose identity is constant throughout his epistemic alternatives, making the NP epistemically specific. This example shows that epistemic specificity does not entail scopal specificity.

Distinguishing these various versions of nonspecificity is easier than finding what they have in common. A possible common denominator underlying these three notions is that of stability/instability of reference. The differences among the three notions arise because the parameters against which stability is measured are different in each case. Thus, scopal specificity concerns stability/instability relative to parameters introduced by the scope-taking operator. In the case of scope relative to an intensional predicate such as *want*, for instance, scopally specific NPs are stable as far as the alternatives introduced by the operator are concerned, whereas the reference of scopally nonspecific NPs varies relative to these alternatives. Similarly, in the case of scope relative to a universal quantifier, scopally specific NPs have a stable reference relative to the variable bound by the universal, whereas scopally nonspecific NPs covary with it.

Epistemic specificity concerns stability/instability across a cognitive agent's epistemic alternatives. If an NP is epistemically specific relative to a particular cognitive agent, its value is constant relative to the alternatives that the agent considers to be viable candidates for reality. Under an epistemically specific interpretation of *a student* in (13), for instance, the speaker is the relevant cognitive agent and, in all the alternatives she considers possible, the identity of the cheater is the same. Under an epistemically nonspecific interpretation of the NP, all the speaker is committed to is the existence of a cheater, and therefore the referent of the NP is not constant across the epistemic alternatives that she is publicly committed to. In the case of partitives, the stability/instability of reference concerns the freedom we have in choosing possible values. Partitive specificity involves the necessary contextual narrowing of possible value choices to a subset of a previously introduced set, whereas nonpartitive indefinites do not involve such a restriction. The restriction involved in partitivity is akin to that characterizing definiteness, having led to the postulation of partitives as a special, intermediate rung on the scale from indefinites to definites.

See also: Definite and Indefinite; Descriptions, Definite and Indefinite: Philosophical Aspects; Extensionality and Intensionality; Partitives; Polarity Items; Proximatives; Scope and Binding: Semantic Aspects.

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Speech

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This article aims to offer a panoramic view of the topic of speech, as a complement to the general articles on language in this encyclopedia (for more specific discussion of individual sectors in this very broad area, *see* **Phonetics: Overview**; **Phonology: Overview**; **Psycholinguistics: Overview** and **Applied Linguistics: Overview and History**). Emphasis is given here to areas of speech that are less directly concerned with general linguistic theory as such. It is immediately apparent that no single discipline can hope to offer a complete account of all the different facets of speech that are of potential scientific interest. Within the main domain of this encyclopedia, the sister sciences of phonetics and linguistics obviously lie at the core of the study of spoken language. However, whereas spoken language is certainly a pre-eminent focus of phonetics and linguistics, those subjects by no means exhaust the study of speech. Many other disciplines exist for which speech is a partial interest, and each of these brings its own unique perspective to the overall study of speech. In fact, speech as a subject is at the intersection of well over 50 different disciplines, each with a professional contribution to make to its study. A fuller understanding of the nature of speech may therefore emerge from considering this wider range of disciplines – including, but also well beyond the linguistic sciences alone – that can illuminate different facets of speech.

Leaving aside the universal utilities of mathematics, logic, philosophy, statistics, cybernetics, and mechanics, which, though contributing pervasively useful concepts have little that is unique to say about speech as such, there are three groups of sciences that have a more specific relevance. These are the life sciences, the social sciences, and the physical sciences. The life sciences include at least 14 disciplines with a degree of professional interest in speech, its development, and its disorders. These are anatomy, audiology, biology, dentistry, genetics, medicine, neurology, otorhinolaryngology, pathology, phoniatrics, physiology, psychiatry, speech/language/hearing pathology, and speech/language/hearing therapy.

The social sciences contribute some 30 disciplines that draw some of their data, even if sometimes rather indirectly, from speech. These are applied linguistics, anthropology, communication, comparative linguistics, conversational analysis, descriptive linguistics, dialectology, discourse analysis, historical linguistics, historical phonology, languages, language learning, linguistics, literary theory, music, nonverbal communication, oratory, paralinguistics, philology, phonetics, phonology, poetics, psycholinguistics, psychology, rhetoric, semiotics, sign language, sociolinguistics, sociology, and writing systems (including printing and notation). Some readers may be surprised to see the inclusion of writing systems within speech as a subject. The rationale for this (and of course an opposing view is not untenable) is that writing ultimately derives, historically and semiotically, from spoken language.

The physical and engineering sciences are also well represented in the spectrum of disciplines that take a direct interest in speech. Fifteen such disciplines include acoustics, aerodynamics, artificial intelligence, computing, electrical engineering, electronic engineering, experimental phonetics, forensic phonetics, human/computer interaction, natural language processing, physics, signal processing, speech science, speech technology, and telecommunications engineering.

Note that a superordinate/subordinate relationship may seem to obtain between some of the larger disciplines mentioned in the three groups, such as medicine as an overarching subject and anatomy, physiology, neurology, and pathology as component disciplines. The view taken here is that the apparently subordinate disciplines have all evolved to an arguably independent status, whereby the identity of their practitioners is habitually described in terms such as *I'm a neurologist* rather than *I'm a doctor*. The same argument perhaps applies to the individual subdisciplines of linguistics and phonetics, such as phonology and sociolinguistics, each of which can be claimed to have matured into an independent discipline over the past half-century. The autonomous status of phonology is exemplified in Goldsmith (1995), and that of sociolinguistics in Coulmas (1997). Morphology, syntax, semantics, and pragmatics are assumed still to be seen as subcomponents within linguistics, as illustrated in Aronoff and Rees-Miller (2001), though at least the last three of these are currently building toward a more autonomous standing. However, the accuracy of the classification of a given discipline as having an independent professional status perhaps matters less than its identification as a contributor of analytic (or other) terms to the vocabulary of speech as an inherently multidisciplinary subject. Finally, there is the historical, biographic dimension of writers, scholars, researchers, and inventors who, for over some 2000 years and more, have influenced

the development of phonetics and linguistics, and of these other contributory disciplines (as described, for example, in Weir (1990)).

Phonetics is normally thought of as one of the linguistic sciences and has historically concentrated on describing the substance of spoken language – that is, the articulatory, auditory, and acoustic patterns of sound that manifest the phonological code of the language concerned (*see* **Phonetics: Overview**; **Phonology: Overview**). Speech science is the experimental study of speech, and speech science and phonetics overlap in the subject usually called 'experimental phonetics,' which formerly, until the mid–20th century, was referred to as 'instrumental phonetics' (Hardcastle and Laver, 1997). Some would claim a more ambitious scope for phonetics, suggesting that it includes not only the substance of spoken language, but also formal and abstract aspects of the phonological code as such. In this wider view, phonetics (in the broad sense) is the superordinate subject that includes phonetics (in a narrow interpretation) and phonology. In such a view, the relationship between phonetics and linguistics is one wherein phonology is the overlap between them (Laver, 2000a).

In the broadest view of all, it has occasionally been suggested that phonetics should be seen as the scientific study of all aspects of speech, standing at the intersection of all subjects with any professional contribution to make to such a study (e.g., Laver, 1994, 2001). But even in this extreme formulation, the field of speech has grown so wide that the most that phonetics can reasonably hope to achieve is to learn enough about the other contributory disciplines to understand their fundamental concepts and their methodologies, in order to be able to work on a profitable interdisciplinary basis with specialists in each discipline. Speech technology is a salient example of such a necessarily interdisciplinary collaboration. This will be discussed in more detail (see later, Speech Technology), but the design and implementation of a computer-based interface that allows a human user to communicate by speech with a machine could not be achieved solely on the basis of phonetic and linguistic knowledge about speech. Prerequisites for developing a successful interface for human–computer interaction through speech include skills in human factors; in system design and software programming, from computer science; in computational linguistics, from the union of linguistics, logic, cognitive psychology, artificial intelligence, and computer science (Mitkov, 2003); in acoustics, from physics (Stevens, 1998); and in signal processing and hardware design, from electronic engineering. Similarly, speech and language pathology would be very much less effective as a discipline if it did not add to its phonetic and linguistic knowledge about speech an extensive understanding of the biological basis for speech, from speech science and medicine (Barlow, 1999; Windsor *et al.*, 2002), and a familiarity with pedagogic techniques of rehabilitation. Just as specialists in speech technology and speech pathology need adequate exposure to phonetics and linguistics, phoneticians working with speech engineers or speech pathologists and therapists need some acquaintance with the disciplines that provide basic input to these subjects.

The requirement to be able to hold intelligible professional conversations with colleagues in such a broad spectrum of disciplines has direct consequences for the advanced training of phoneticians, and phoneticians in the 21st century are therefore often obliged to try to become familiar with wide-ranging aspects of the life sciences, the physical sciences, and the engineering sciences, if they are to hold their own in multidisciplinary research collaborations.

Why People Study Speech

In a cognitive perspective, perhaps the most significant reason for studying speech is that speech is the carrier of language, the vehicle for reflective thought. The mental life of the human species might be merely a welter of emotion and unconsidered reaction if it were not for the gift of language, with its facility for framing conceptual propositions, ranging from the simple and the concrete to the complex and the most highly abstract. Equally, language is the essential articulation of the cognitive machinery of society, as embodied in the traditional and contemporary institutions of literature, education, science, commerce, law, and government.

Another reason for studying speech is that speech is the most interactive of all social human skills. People's personal experience of social life would undoubtedly have a very different form if the human species had not developed the ability to communicate through speech, because people use speech to initiate, calibrate, negotiate, and consolidate their social relations with others. In this social sense, speech is worth studying because more is learned about the social meaning of what it is to be human. In this same vein, speech is worth studying in order to find out what is universally characteristic of human beings as a species (Hauser, 1966), versus the specifics of a given culture and its language. By extension, it is worth learning what is general to a community, versus what counts as idiosyncratic variation at a personal level. Looking at pronunciation, for instance, it may be asked why (a question that will be revisited later)

the spoken languages of the world seem to use only a quite limited selection of contrasting sound patterns, from the total range of sound types that the speech apparatus is capable of producing. As a further generalization, the languages of the world tend to share broadly similar sound types from this restricted set of possibilities. More is learned about the communicative principles of language by exploring the criteria behind the selections made by linguistic evolution in this area. At the level of the relationship between a speech community and the speakers that make up that community, more is learned about the relationship between individuals and society by knowing how the speech of the members simultaneously serves both to mark their membership within the (regional and social) speech community and to individuate them within the community.

Specialists in some disciplines would also say that speech is the most complex skill that human beings ever attain. From a biomechanical point of view, for example, the timing and gradation of the neuromuscular control of the 80 or so (mostly paired) muscles that serve the so-called speech apparatus are especially complex. By comparison with the subtle, rapid, and coordinated actions necessary to produce speech, most muscular skills of coordination seem less demanding. To produce speech at a normal speaking rate, the brain has to issue some 1400 motor commands per second to the muscles of the speech apparatus. In terms of the complexity of the neuromuscular programming and monitoring of the physical movements involved, the skill of speaking outranks even the skills involved in taking part in Olympic slalom skiing, in world championship table tennis, or in the Tchaikovsky piano competition. Yet all normal speakers display this apparently effortless skill, sometimes for hours per day, for every day of their adult lives. It takes normal children some years to acquire the skills of speech production and perception, by a combination of innate and imitative processes, but, once a child has learned them, the skills of speech are lifelong, and are lost only through pathology or trauma.

Speech is hence a classic instance of the more general problem of the voluntary neuromuscular control of serial order underlying skilled actions (Lashley, 1951). If it were known how the brain controls the sequence of articulatory actions for speech, a paradigm could be formulated for understanding many aspects of the control of highly complex neuromuscular activities, such as walking over rough terrain, hand/arm/eye coordination in reaching for objects at arm's length, visually tracking erratically moving targets, or maintaining balance and forward momentum while surfing on a breaking wave. This claim, that the neuromuscular control of speech could act as a paradigm for understanding many rhythmical nonspeech activities, such as walking, has, however, been subjected to an important caveat. Kent (2004) argued that the muscles used in speech systems are in fact unique in their genetic, developmental, functional, and phenotypical properties, and thus differ in important ways from other muscles. He reported on investigations by a number of researchers who showed that some craniofacial and laryngeal muscles, for instance, differ quite markedly, both from other muscles in humans and from muscles in other animals; these differences reside in the unique properties of mixed populations of muscle fiber types, some of which have very fast contraction capabilities and prolonged resistance to fatigue. These properties serve the special needs of speech well, and Kent explored the idea that some aspects of these muscular differences may reflect a unique human specialization for speech.

The Functions of Speech

In a biological perspective, speech is a secondary function, notwithstanding its sophisticated communicative complexity. Spoken language exploits a biological apparatus that evolved to serve more primary functions, such as breathing, biting, chewing, sucking, swallowing, and clearing the throat. In particular, it seems more than plausible that the articulatory movements of speech organs, such as the tongue, developed evolutionarily from the matrix of movements involved in the chewing and swallowing movements used in feeding (Hiiemae and Palmer, 2003). The later development of speech for the function of propositional communication probably had its origin in the vocal signaling that expresses basic biological states, such as hunger and pain; affective states, such as contentment and distress; and informative states, such as assertions of aggression, affiliation, and personal identity. At the early stage, the development of human vocal signaling was on a par with the vocal signaling characteristic of animals such as the higher primates (*see* **Cognitive Basis for Language Evolution in Non-human Primates**).

If listeners of a prelinguistic era tended consistently to modify their own behavior as a result of interpreting such vocal signaling, as a sign of some state being experienced by the speaker, and speakers became aware of such a linkage, then it is possible to believe that this could have been the beginning of the development of a semiotic code of spoken communication based on a growing vocabulary of such signs. The association between a state experienced by a speaker, such as hunger, and the uttering of a vocal signal that a listener has come to understand as typically

co-occurring with this need plausibly evolves into a situation whereby the vocal signal is taken to function as a request for the listener to supply food. Additional factors are obviously also necessary, such as suitable intelligence on the part of the listener, and perhaps the existence of a rudimentary social organization that prompts the listener to adopt an altruistic role. The next evolutionary step toward making vocal signaling into a conventional semiotic code would be to make the vocal sign independent of the true state of the speaker, thus enabling the speaker to manipulate the reactions of the listener – for example, by pretending to be hungry, distressed, or aggressive, etc. At this stage, the communicative functions embodied in vocal signaling could as easily have been achieved by manual signaling, in a primitive type of sign language. That the development of communication in the human species was shaped more primarily toward the use of the vocal channel, rather than the gestural channel, was probably motivated by the practical advantage enjoyed by vocal signaling of leaving hands and eyes free for other simultaneous use (*see* **Sign Language: Semiotic Approaches**). A step of much greater scale would then have been necessary for a symbolic code to have evolved such that it could be described as language in its modern sense, however. In a truly linguistic code, the link between sign and referent needs not only to be arbitrary, but also to show double structure. This duality of structure characteristic of the spoken code of language consists of two levels of structure in the signs used. The elementary signs of spoken language (consonants and vowels) are combined into longer sequences (such as a word), in which it is the sequence rather than the constituent elements that carries meaning, through an arbitrary and conventional reference to some physical or abstract entity. In their turn, words can be combined into an indefinite number of longer sequences (phrases and sentences), the structural sequence of which carries meaning over and above the meanings of the constituent words.

This elaborate machinery of spoken language can potentially be used for a multitude of communicative purposes, such as stating propositional concepts, negotiating social relationships of great subtlety, persuading, dissimulating, or making excuses and promises. But it is perhaps salutary to reflect that the majority of purposes served by speech in everyday interaction (such as communicating greetings, partings, or salutations; expressing social solidarity, affection, unhappiness, or irritation; and establishing individual identity by performing introductions) may not be so very distant in function from those early displays of more basic biological and affective needs.

The formal linguistic study of speech treats language as literally disembodied, with differences among individual speakers being disregarded. But in reality, every utterance of spoken language has to be performed, on some speaker's actual vocal apparatus, and perceived, by some listener's actual auditory system. Understanding the way in which speech is produced and perceived makes it possible to reach a clearer understanding of the nature of spoken communication in general, which is a richer interchange of information than that ever conveyed by spoken language alone. (Most of the comments offered in this article so far have focused on speech production, but it deserves emphasis that understanding the acoustic and physiological basis of the human auditory system is perhaps one of the most challenging tasks facing student phoneticians, given that the ear, with its related neurological support, is by far the most complex of all sensory organs (Warrington, 1999; Møller, 2000).)

Every utterance of spoken communication consists of at least three strands of speech production: the articulatory events that represent the patterns of spoken language, the speaker's tone of voice on the occasion of the utterance, and the general voice quality of the speaker. All three strands communicate information for the listener to process auditorily. Spoken language communicates the verbal message constructed by the speaker, tone of voice communicates the speaker's affective and emotional state, and voice quality indicates the identity of the speaker. The strands of speech supporting spoken language and tone of voice are subject to interpretation, which depends on the conventions of the speaker's speech community. Just as the phonetic basis of spoken language varies from one culture to another, so (though to a lesser extent) do the interpretive conventions associated with tone of voice. For example, imitating another's utterances in a falsetto voice in one culture may count as an accusation of whining complaint; in another culture this may serve as an accusation of boasting, and in yet another, uttering a phrase in a falsetto voice can act as an honorific device, acknowledging respect for the listener addressed.

Voice quality has two substrands to it. One is the organic foundation of the speaker's vocal apparatus, in that the dimensions and geometry of the vocal organs genetically inherited from the speaker's parents inevitably add a certain coloring to the sound of the voice. As listeners, people have come to rely on a certain correlation between the external, physical appearance of a person (based on the same genetic inheritance) and the sound of the voice that the person produces. A loud, deep, resonant voice (heard on the telephone, for instance) is usually taken to

indicate that the speaker is a large, adult male. The listener may occasionally be disconcertingly wrong in reaching this conclusion, however. This is because of the plastic nature of the second substrand of voice quality. Overlaid on the organic foundation of a person's voice is the habitual, long-term pattern of phonetic use of the vocal apparatus that the speaker has learned to adopt. A given speaker's voice may be characterized by a habitual tendency to constrain the pitch of the voice to a low register, or to speak consistently loudly, or to produce strong nasality, or to keep the lips in a rounded position throughout speech, or to pronounce all voiced consonants and vowels with whispery phonation, etc. (Laver, 1980; Gobl and Ní Chasaide, 2003). This second element of voice quality often characterizes a whole speech community and can therefore mark regional or social groupings (*see* **Voice Quality**).

The accent of a speech community can be reflected in all three strands – the pronunciation of spoken language, the patterns of tone of voice, and the phonetic component of voice quality. The American English accent of the Bronx in New York and the British English accents of speakers from Birmingham and Liverpool are marked by a habitual long-term voice-quality adjustment that tends to keep the back of the tongue elevated during speech (technically called 'velarization'). Such a tendency to constrain the articulatory activities of the body of the tongue has its impact on the way that individual vowels are pronounced, in this case compressing the utilization of the vowel space in an upward and backward direction. Since vowel quality also functions to represent the phonemes of spoken language, and partly to carry information about the affective or emotional state of the speaker through tone of voice, it follows that the communicative value of any given phonetic vowel quality is quite complex. It also follows that the instinctive sense that patterns of tone of voice have the same communicative value in all cultures, as a universal feature of human communication, may be quite misplaced, as mentioned previously. The aspects of tone of voice that do more plausibly carry a degree of universal interpretability are those that are dependent on endocrinal biochemical states, such as extreme fear.

The Scope of a Descriptive Theory of Speech

In the light of the three strands of speech, each with their corresponding information about different aspects of the speaker, what should be the ideal scope of a descriptive theory of speech? From the point of view of a **linguistic** motivation for a comprehensive description of the substance of spoken language, such a theory should obviously be able to describe the phonetic basis for the differentiation of words and other linguistic units in every known human language. From the perspective of a **sociophonetic** motivation, the theory should be able to describe the phonetic regularities that serve to distinguish one accent from another accent, and that make each language sound different from other languages. Equally, the theory should be able to describe the way that speakers change the formality of style of their speech according to the types of listeners whom they are addressing, and the context of situation in which they are speaking. From a **paralinguistic** viewpoint, the descriptive competence of the theory should extend to being able to characterize the phonetic events that are conventionally used as signals of attitude and emotion in each culture, together with the phonetic cues conventionally used to claim and yield the floor in the control of speaking-turns in conversational interaction in each culture. Finally, for **extralinguistic** purposes, the theory should be able to account for the phonetic phenomena that are taken to mark each individual speaker's personal attributes of physical identity, personality, and regional origin.

Given these prescriptions for the descriptive scope of an ideal theory of speech, it is perhaps relevant to pose the question of how the capabilities of existing theory match such requirements. It is probably fair to suggest that the linguistic capabilities of modern phonetic theory are fairly comprehensive, within the limits of the known languages of the world. The sociophonetic requirements are much less well served, with the attention of researchers beginning to turn only around the early 1990s to the need to be able to account for sublinguistic differences between accents, and style being still a relatively new area of investigation. Paralinguistic investigations of tone of voice are not at the time of writing competently described on any comprehensive basis for any culture, and the description of extralinguistic properties of speakers, such as the quality of their voices, remains a minority interest (Laver, 2000b).

One sector in the study of speech in which extralinguistic research is beginning to accelerate, however, is in speech technology, wherein the characteristics of individual speakers constitute both a challenge (in speech synthesis) and a problem (in speech recognition). Another sector in which interest in the extralinguistic properties of speakers' voices has always been central is speech pathology. The role of both of these sectors in future developments in the study of speech is discussed further in the following sections.

Variation and Change in Speech

Spoken language is a social organism, and its evolution, like that of other more directly biological organisms, changes through both (apparently random) drift and adaptation to circumstance. Speech patterns act as a strong index of membership of social groups, and one major adaptive influence toward evolutionary change is a shift in the patterns of relative dominance (through invasion, fashion, or economic influence, say) between social groups. As one social group becomes dominant over another, the accent of the dominated group tends to change toward that of the dominating group. On a timescale longer than that of the life of an individual speaker, the accents of speech communities are hence in a continual state of flux. As participant observers, linguists can glimpse these patterns changing in their individual detail, but the global shifts in pattern are available only to the analyst in the mirror of history. There might be success in understanding authentic pronunciations of Shakespeare's English, but it would be harder to understand Chaucer's English without interpretive help. With the passage of time, and the right social conditions of lack of interaction, the accents of initially comparable speech communities can drift progressively apart, eventually to the point of mutual unintelligibility of separate languages. The English spoken in Britain and America, similar around 1600, has not yet reached such extremes of divergence, largely because of the maintenance of contact through trade and technology.

At the level of individual speakers, some reasons have already been given why speakers sound different from each other, and why the tone of voice of a speaker on different occasions might sound different because of his or her affective or emotional condition. But the voice of an individual speaker also changes throughout life, in growth from childhood to maturity, and from maturity to old age (Mackenzie Beck, 1997). One of the most striking phenomena in the general experience of speech is the way that the voices of males and females change with age, basically due to their sex-specific patterns of anatomical development. In childhood, there is not a great deal of difference between the voices of boys and girls that can be explained by sex-specific aspects of differing dimensions of the vocal apparatus, until the children approach puberty. Such prepubertal differences as there are between the voices of girls and boys are likely to have a phonetic rather than an organic basis, as children begin to learn to reproduce patterns of speech signaling the adoption of social roles specific to gender. Once puberty sets in, however, the voices of boys and girls tend to diverge swiftly, for organic reasons. In the case of boys at puberty, the dimensions of the larynx change very rapidly (typically within a few months), with the length of the vocal folds nearly doubling and the average pitch of the voice halving. In the case of girls, the change in laryngeal dimensions is much smaller. The increase in length of the vocal folds in pubertal boys is of the order of 1 cm, whereas the increase in pubertal girls is only about 3 to 4 mm. The result is that young men's voices drop markedly in average pitch by comparison with their prepubertal state, but voices of young women drop only slightly. As a very broad generalization, the average pitch of young male adolescents is about an octave lower, compared to the average pitch of young female adolescents.

The voices of children (of both sexes) and adult women thus have more in common than do the voices of young boys and adult men, at least in terms of the influence of laryngeal dimensions. This is true not only when comparing laryngeal development, but also when considering the relationship between the dimensions of speakers' vocal tracts. The lengths of adult male vocal tracts are characteristically longer, on average, than are those of adult female vocal tracts. These differences of overall vocal-tract lengths between typical male and female vocal tracts can be treated as the product of a simple scaling factor. However, the relative proportions of different sections of adult female and adult male vocal tracts cannot be treated in the same way, in the sense that the ratio of pharynx length to mouth-cavity length is greater for males than for females (Fant, 1966). One consequence of this is that the vocal tracts of women cannot simply be regarded as typically being smaller than those of men by a simple scaling proportion, and this is one organic basis for the different perceptual quality of women's and men's voices. The dimensions and relative geometry of the vocal tracts of children are proportionally related to those of women in terms of the ratio of the length of the pharynx to that of the mouth section. The growth profile of young men beyond puberty then changes the ratio and increases the nature of the difference between their voices and those of women of the same age cohort.

The voice also changes in older age (Linville, 2001). One of the principal changes, beginning in the 20s, is progressive calcification of the vocal cartilages, including those of the larynx, making them less flexible. In later age (from about 50 or so in women and about 60 in men), the muscular tissue of the vocal folds tends to atrophy to a certain extent, and to lose some of its elasticity, so that the vibratory pattern of the folds in phonation becomes less efficient. The muscles and cartilages of the chest are similarly affected, and the respiratory support for speech

becomes less able to be finely coordinated. The progressive result is that the quality of the voice of extreme old age is typically characterized by inefficient phonation (often sounding whispery, and sometimes hoarse), with a restricted range of pitch, and weak loudness. Male and female voices differ with regard to pitch level in old age. The average pitch level of men's voices tends to rise slightly from ages 65 through 85, but the average pitch of older women's voices tends to be more or less unaffected.

A person's voice also changes on a shorter timescale than across the whole of a lifetime. An obvious example of a more ephemeral change, though still of potentially long duration, is when the speaker develops a laryngeal disorder that affects the quality of the voice. These disorders may have a functional cause. Teachers, factory workers, or anyone obliged to speak very loudly for long periods against a noisy background can develop nodules on the vocal folds through habitual use of overvigorous phonatory habits, giving the voice a rough quality. Vocal abuse of this sort can usually be remedied with the help of speech therapy. A rough voice that persists for more than a short period may alternatively have its origin in a pathological condition, requiring diagnosis by a laryngologist, who may prescribe treatment ranging from phonosurgery, radiotherapy, and chemotherapy to speech therapy, or some combination of these (Colton and Casper, 1996). Once again, there seems to be a difference in the susceptibility of men and women to the more potentially life-threatening of these disorders, with more male patients than female patients being diagnosed as suffering from laryngeal cancer. Happily, cancer of the larynx is one of the most treatable forms of cancer, given sufficiently early diagnosis.

Structural anomalies of the vocal tract, such as being born with a cleft palate, also directly affect the quality of the voice and speech. Structural anomalies tend to be repaired surgically in early and middle childhood, with speech therapy being available for help with learning the speech patterns appropriate to the changed structure, if necessary. A more drastic problem occurs in disorders of the vocal tract such as intraoral tumors, which usually require either surgery or radiotherapy or both. The challenge for the speech therapist after surgery, if the anatomical structure of the vocal tract has been significantly changed, is then to help patients to restore the intelligibility of their speech to an acceptable and useful level. The vocal apparatus is extremely versatile, however, and with the help of the therapist and compensatory articulatory strategies, many patients successfully learn new patterns of articulation that produce auditorily intelligible speech.

The more ephemeral changes in a person's voice happen when short-term illness strikes, such as respiratory infection, tonsillitis, or temporary laryngitis. On a yet shorter term basis, conditions such as fatigue, excitement, and inebriation also affect the voice.

It is a truism that no single speaker ever pronounces a given syllable in precisely the same way twice, at a microscopic acoustic level of analysis. There are both systematic and random reasons for this variation. Systematically, the pronunciation of a given syllable will vary with the linguistic context in which it occurs. This linguistic context is defined by factors such as word stress, the numbers of other syllables in the same word, the numbers of other words in the same rhythmic or intonational phrase, the place of the syllable in the rhythmic or intonational phrase, the particular type of intonational pitch contour being applied to the phrase, the placement of the pitch contour within the speaker's general pitch range, the choice of overall loudness used, the place of the syllable in the overall utterance, the style of speech, and the overall rate of speaking the utterance (not to mention the factors exploited for differences of tone of voice). When all of these factors are permuted, and all of the noticeable gradations of each factor are included, the total number of perceptually distinguishable variations becomes extremely large.

The pronunciation of a given syllable by an individual speaker also varies acoustically on a quasi-random basis, even when all other factors are stabilized by trying to repeat exactly the same phrase twice in exactly the same way. This is perhaps understandable, recalling that the detailed strategies of neuromuscular control are largely outside conscious access. For an exact copy of a particular utterance to be produced successfully, every single muscular contraction of the muscles of the vocal organs, from the respiratory system to the articulatory system, would have to reproduce the same pattern, with precisely the same timing, on the second occasion.

Motor Equivalence and Perceptual Equivalence in Speech

A more revealing version of the speaker's task of reproducing a copy of a given utterance is one wherein the speaker must reach a target configuration of the vocal tract from a variety of starting configurations. This is comparable to the task of a fielder in baseball throwing a ball from any part of the field of play to reach first base, where the means will be conditioned by the spatial relationship between the fielder's current location and that of first base, but

where the end (the ball arriving at first base) is constant. In order to succeed in conquering this problem, the brain of the fielder/speaker must compute and execute a neuromuscular plan of action that takes account both of the (highly contingent) starting configuration of the relevant muscular apparatus and of the transformations of this necessary to reach the state that will achieve the desired result. For the brain to succeed in such a task, it is clearly out of the question to propose that a neural blueprint for every possible separate neuromuscular command is stored in long-term memory. The storage capacity of the brain is simply not sufficient, with only some 10 000 million nerve cells. The neuromuscular principle underlying such a task of achieving specific ends through contingent means was discussed by MacNeilage (1970), in his account of the work of psychologists such as Hebb (1949: 153–157):

> Although it has been neglected by linguistically oriented models of speech production, the problem of accounting for 'a variability of specific muscular responses, with circumstance, in such a way as to produce a single result' has been recognized by some psychologists as a 'ubiquitous fundamental psychological problem' and the phenomenon has been termed 'motor equivalence.' [MacNeilage, 1970: 186]

The principle underlying motor equivalence is inconsistent with a simplistic model of speech production that merely selects the appropriate neuromuscular command pattern from a colossal store of neural blueprints. An alternative is that people store some more limited set of target representations, and have general strategies for moving from a starting configuration through some designed trajectory to the desired final state (Laver, 1991: 23–84). What is most surprising, perhaps, is that listeners – despite the extraordinary number of possible acoustic variations that they hear from different speakers of different sexes, of different ages, of different accents, on different occasions – can nevertheless succeed in decoding the intended messages, and usually without apparent difficulty. A phenomenon that might be called 'perceptual equivalence' could be thought to underlie such a versatile performance. That successful speech communication necessarily demonstrates the simultaneous solution of the joint problems of motor equivalence and perceptual equivalence is a commentary on the robustness of the strategic design reflected in the skills involved in speech.

The Sound Patterns of Spoken Language

A remarkable aspect of speech as a manifestation of spoken language, as noted earlier, is that the distinctive, phonemic differences between accents of a given language (Kretzschmar, 2004; Wells, 1982), between different languages of the same language family, and indeed between unrelated languages from different language groups (Ladefoged, 2005) are so (relatively) minor. Compared with the enormous range of sounds that the human vocal apparatus is capable of making, the known languages of the world seem to exploit a quite limited fraction of different sounds and to organize them into contrasting phonemic systems of (very broadly) comparable size.

In an investigation of the sound systems in the University of California Los Angeles Phonological Segment Inventory Database (UPSID) database of 317 languages selected as representative of the language families of the world, Maddieson (1984: 7–9) explored the size of phonemic inventories involved. At the smallest end of the range were Rotokas (an Indo-Pacific language) and Hawaiian (an Austro-Tai language), with phonemic inventories of only 11 segments (6 consonants and 5 vowels) for Rotokas and 13 segments (8 consonants and 5 vowels) for Hawaiian. At the largest end of the range was !Xũ (Kung-Ekoka), a Khoisan language of southern Africa, with 141 segments (95 consonants and 49 vowels). The statistically typical size of a combined consonant and vowel inventory for a language in the UPSID database was between 20 and 37 segments, with 70% of the 317 languages falling in this range. The average number of segments used contrastively by the languages of the database was 31. Given that the languages of the UPSIDdatabase are in fact representative of the spread of languages in the world, as intended, then such a small range of size of phonemic inventory for more than two-thirds of the languages concerned is noteworthy.

Within the small range of inventory size, the sounds exploited are not so very different from one language to another, in general. Almost all languages exploit [t], [n], and [s] among their consonants, and very many use the vowels [i], [a], and [u], for instance. A very small number of spoken languages use click sounds as consonants, and none makes contrastive use of percussive sounds created by clashing the teeth together, or scrapive sounds produced by grinding the teeth, or snoring sounds. None is known to use falsetto phonation in contrast to normal voice for linguistic purposes. Many cultures use some of these sound types for paralinguistic purposes of communicating emotion or affect, but their use as linguistic elements of spoken language as such is unknown.

How has this relative standardization come about, and on what principles might the human species have chosen such a limited range of contrastive patterns from the full vocal range? The adjective

'anthropophonic' has been used to refer to the concept of the 'full vocal range' of the sound-making capabilities of the human vocal apparatus, and this label will be adopted here for convenience of discussion. The first point to make is that the anthropophonic potential of the vocal apparatus is distributed unevenly through articulatory space, as it were, in that the relationship between articulatory adjustment and auditory consequence is not standard in all articulatory zones. In some zones, a small articulatory adjustment produces a large auditory difference (such as at the alveolar ridge and the front teeth, in the production of sounds like [s] in *sin* and the voiceless dental fricative sound in initial position in *thin*); in other zones, a small articulatory adjustment makes not much difference (such as at the soft palate, in the articulation of sounds such as [k] in *kin*). It is clearly of benefit to the functioning of a robust communicative system that the evolution of spoken language should have preferred the latter to the former, so that speakers were relieved of the need to maintain maximum articulatory precision. Equally, the selection of these more stable relationships between articulation and perception might be thought to ease the listener's task of decoding speech, by reducing the apparent variety of articulatory performance. Finally, the natural beginnings of a categorial structure to the perceived inventory of speech tokens could plausibly emerge from such islands of articulatory/auditory stability. Stevens (1972) referred to these relationships as indicating 'the quantal nature of speech.' (Ohala (1989) also edited a theme issue of the *Journal of Phonetics* on this topic, which is recommended to the interested reader.)

The remaining four points to make are based partly on three publications by Lindblom (1983, 1986) and Lindblom and Maddieson (1988). The first is that the choice from the anthropophonic potential has to ensure adequate perceptual contrast if the sounds chosen are to sustain a distinctive function in the code of spoken language. Evolutionary pressure in the development of effective communication would have acted against the selection of sound types that were difficult to distinguish consistently, such as a voiceless fricative sound made with the tongue tip against the inner surfaces of the upper front teeth, versus a similar but slightly different sound made with the tongue tip between the teeth. The next point is that the sounds chosen have to display ecological robustness, in that they have to maintain their distinctiveness when pronounced against a background of environmental noise, including competing speech from other speakers. Next, the production of such sounds has to show ease and economy of articulatory performance, without pushing the articulatory system to the limits of anthropophonic complexity. Finally, the sounds chosen ideally have to be readily modifiable to the needs of the communicative situation, and to be capable of being said more rapidly or slowly, more softly or loudly, and with higher or lower pitch, without undue effort.

Any system of speech sounds that displayed all five of the characteristics discussed here would presumably be optimally easy to learn, easy to use, and robust in the face of masking by noise. However, it is difficult for any individual language to satisfy the full set of criteria simultaneously, and most languages therefore show a degree of compromise in their evolutionary obedience to these different principles. Combining the fact of continual sound change in language with the observation that the contrastive utilization of speech sounds by languages tends to choose from the same fraction of the anthropophonically available sounds, it is evident that as the sound system of a language changes, the sounds chosen are likely to show trading relationships among the five criteria listed.

The ubiquitous tool used by phoneticians for the description of the variety of sounds in the 6500 to 7000 different languages of the world is the International Phonetic Alphabet. This is revised from time to time by the world body of phoneticians, the International Phonetic Association (IPA, 1999). But it has to be said that the majority of changes nowadays rather reflect developments of descriptive phonetic theory, together with an acknowledgment of the needs of professions such as speech/language therapists and pathologists, more than the relatively infrequent discovery of sound types being put to novel distinctive or contextual use in some newly researched language. This latter possibility of new discoveries becomes slowly even more remote as the last few speakers of a regrettably increasing number of endangered languages die, and some existing languages of minority populations languish under political pressure from speakers of more populous languages (Grenoble and Whaley, 1999).

The Integration of Speech with Other Channels of Communication

The context of everyday speech is normally that of conversational communication in a face-to-face situation. In face-to-face conversation, speech is only one of the different channels of information carrying communicative significance. Gesture, head movements, posture, interpersonal proximity, eye contact and gaze direction, and facial expression all play their part in conversational communication under conventions of interpretation that are just as culturally

specific as are those of tone of voice. What counts as comfortable proximity in a formal conversation may differ radically from culture to culture, with a given distance between two unacquainted interlocutors being simultaneously sensed as uncomfortably remote and formal by a speaker from a Middle Eastern culture, and distressingly overfamiliar by a speaker from North America. The proximity and posture taken up by interlocutors in a conversation can signal their view of their relationship as clearly as do the tone of voice used and the linguistic messages exchanged. The nonvocal message communicated by proximity and posture reinforces (or sometimes contradicts) the vocal messages of spoken language and tone of voice. In either event, the nonvocal and the vocal channels of communication together comprise an integrated communication system (Laver, 2002).

The timings of gestures, head movements, eye contacts, gaze direction, and facial expression tend to be synchronized, so that the nonvocal actions of an interlocutor in a conversation are managed as an integrated performance. It would then be somewhat surprising if the vocal actions of speech were performed out of synchrony with this multichannel nonvocal performance, and thus vocal and nonvocal actions tend to be prescribed by the same orchestral score, as it were. Emphatic hand gestures tend to coincide in time with the use of devices of vocal emphasis, such as the intonational changes of pitch associated with sentence stress, as do head movements. Signals of eye contact and facial expression are often used as floor-management devices to effect (or resist) the exchange of speaker role in conversational turn-taking. To withhold eye contact at the end of an utterance, while simultaneously constraining an intonational fall in pitch to end less than maximally low in the pitch range, is conventionally to deny the listener the opportunity to take over the speaking turn, in conversations in English-speaking cultures, for instance.

Speech Technology

Although conversational communication in a face-to-face situation is the norm for the vast majority of spoken interactions, the spread of telecommunications means that telephone conversations with remote interlocutors is a thoroughly normal, everyday experience for many more than a billion people. The telephone has the potential to become the prime means of exposing many people to a communication-technology revolution that may, in the longer term, be comparable in social impact to the invention of mechanized printing – namely, the development of human–computer interaction through speech technology. In particular, the telephone is playing an important familiarizing role in exposing people to speech technology in the form of automated operator services that incorporate both automatic speech recognition and speech synthesis in rudimentary forms of conversational dialogue. Partial automation already exists, for example, in British Telecom's Directory Enquiry services: the operator connects the caller to a speech synthesis system to read back the number asked for. In the United States, several fully automated services exist, including an automated 'collect call' facility ('reverse charges,' in British vocabulary). It seems likely that, following this familiarization, users will more readily adopt speech technology facilities in office automation and in the workstations in clinical and educational applications under development in laboratories.

Automatic speech recognition systems have been demonstrated to be capable of recognizing sentences of continuous speech from a variety of speakers, in tasks with constrained vocabularies of some thousands of words, in applications as diverse as travel inquiries and medical report generation. Systems that recognize words pronounced in isolation have vocabularies in excess of 100 000 words, and can be used for text generation on more or less random topics. They allow a user to generate and edit text faster than an average hunt-and-peck two-finger typist can type, but are not as fast as professional typists. With speech recognition systems of this scale of competence, many applications are becoming feasibly cost-effective; although the pattern of industrial growth in this technical area is still slower than enthusiasts had predicted, North America, Japan, and Europe are already seeing fairly numerous commercial developments (*see* **Speech Recognition, Automatic: History**).

To illustrate the place of speech technology in overall developments in the study of speech in general, consider the case of speech synthesis: do specialists in the disciplines concerned with speech technology know enough about speech to construct a synthetic voice that could be mistaken for a genuinely human voice? To the extent that this cannot yet be achieved except by using small segments of recorded human speech concatenated together, not enough is known about the scientific basis for speech production. Using concatenated excerpts from real speech gives a quality that is close to natural, but usually still fails to adapt to specific local demands for microadjustments of intonation and related aspects of tone of voice that would be necessary for complete naturalness.

The ideal generic capability of speech technology should be the development of an effective text-to-speech (TTS) conversion system for any of the world's natural languages with a writing system,

with a performance comparable to that of an experienced human reader of that language. In the case of English, this could be interpreted as the capacity to design and build a TTS system able to generate a natural, intelligible, acceptable, and usable pronunciation of any well-formed sentence capable of being written in English by any nontechnical writer. No TTS system currently available, however, completely fulfills this description for every sentence it could be called on to pronounce. Guarantees of natural quality, of full linguistic intelligibility, and of widespread user acceptability are all (even if only slightly) beyond the reach of every system built to date. An ultimate test of a TTS system would be to require it to read a novel aloud, such that the sentences attributed to individual speakers in the story were convincingly pronounced in a tone of voice appropriate to all possible style markers in a narrative text, as in *"Run for the fire brigade!," she cried in a distraught and fearful voice*. Paralinguistic analysis is perhaps many decades away from being able to specify a full catalogue of such tones of voice, so that they could be exploited by rule in a TTS system.

In setting targets for the performance of synthesis systems, it is helpful to distinguish between two intersecting axes: quality and habitability. In terms of the quality axis, the output of a synthesis system can be perceptually compared with human speech, and rated comparatively on dimensions of naturalness, intelligibility, and comprehensibility. Naturalness is a scale running from fully natural through naturalistic to fully synthetic. Naturalness, moreover, is not the same as intelligibility. A synthetic voice can be fairly intelligible, but thoroughly unnatural (as in the case of most existing synthesis systems). It can also be relatively natural but nevertheless unintelligible (as in the case of a muffled human voice heard and identified as human – but not understood – through a closed door). When a synthetic voice is relatively but not fully natural, it can be called 'naturalistic.' A version of the Turing test could be proposed to distinguish between 'natural,' 'naturalistic,' and 'synthetic' classifications of a given voice. For a voice to be classed as 'natural,' human listeners would have to be certain that the voice originated from a human speaker. For it to be classed as 'naturalistic,' it would be necessary for them to be uncertain about whether the voice originated from a human speaker. For it to be classed as 'synthetic,' listeners would have to be certain that the voice did not originate from a human speaker. The best synthesis systems available at the time of writing could reasonably be described as 'natural in patches' (*see* **Speech Synthesis**). Such systems can reach intelligibility levels that, at best, are intermittently equivalent to those that characterize a human reader. However, intelligibility is not a feature that resides only in the speaker, whether human or machine. It is also conditioned by attributes of the listener, and what counts as guaranteed intelligibility for a native listener will not necessarily achieve the same performance in the perception of a foreign listener. Whether synthesis of a natural quality is ultimately a desirable facility in speech output systems is debatable. It could be argued, for example, that it will always be preferable for human listeners to know that they are listening to a machine rather than to another human. There are many possible ways of ensuring the latter, however, and setting natural quality as a research objective for synthesis is seen as a useful strategy for making speech synthesis available to the widest range of different speech technology applications.

The testing of the intelligibility of synthetic speech, at the level of the lexical identifiability of individual words, is well developed.The testing of the comprehension of synthetic speech, in terms of successful communication of the semantic and pragmatic import of the complete message transmitted, at the level of the phrase, sentence, or whole text, has scarcely yet begun. Well-established techniques exist for such testing of comprehension, in fields such as foreign-language testing, which are likely to be a valuable future source of methodology for speech synthesis interests.

In terms of the habitability axis, it is possible to distinguish between issues of acceptability and those of usability. The quality factors of naturalness, intelligibility, and comprehensibility inevitably color both of these habitability topics. Acceptability issues concern the speech-mediated relationship between the user on the one hand, and the TTS system treated as a quasi-human interlocutor on the other. Salient among acceptability issues are therefore matters to do with the perceived identity and attributes of the quasi-human synthetic speaker, based on voice type. Cosmetic factors of pleasantness, perceptual factors of robustness in the face of ambient noise (including other speech), and general factors of cognitive comfort all play their part here. Usability issues impact both the willingness of a human user to interact with a TTS system as an information device, and the efficiency of the combined system made up of user and TTS system addressing a given task. Usability is thus a product of the interaction between the system, the user, and the task. It involves ergonomic considerations and productivity aspects of effectiveness of task completion. Relevant issues here include those of dialogue structure and management, the clarity of the user's understanding about the system's knowledge of the relevant semantic and linguistic aspects of the task

universe, and the system's ability to adapt to changing informational conditions. The methodology to establish and calibrate such factors of habitability is still underdeveloped in many respects, and constitutes an urgent task for the discipline of speech technology.

The Future of Speech Research

The key development in speech research since about 1960 has certainly been the advent of the computer. Its arrival has brought a new dimension to the study of speech, not just in enabling developments in speech technology. A major consequence has been that the nature of what counts as possible data has changed. The scale of plausible speech data once consisted largely of what an individual analyst could gather through personal, face-to-face interaction with informants. Experimental conclusions were usually justified on the basis of sets of informants that seldom exceeded 30 individual speakers. The range of variation in such data was therefore usually restricted, and it was hard to be confident that the data represented the properties of speech in general, rather than solely those of the speech of the specific informants in the experiment.

The arrival of computers of economic cost and substantial processing power, supported by large-scale funding for collaborative interdisciplinary projects in speech technology, has had the result that the collection of speech data and its organization into manipulable databases have required operations on a quite different scale. It is not uncommon to read a research report of a study on the production of a particular type of consonant, say, in which several thousands of tokens were collected, automatically processed, and analyzed acoustically, by computer. The robustness of conclusions drawn on this basis is of a quite different order from that of earlier, inevitably sparser work.

Research on speech was represented at the beginning of this article as a necessarily interdisciplinary enterprise. The most significant disciplinary development in speech research over the second half of the 20th century was undoubtedly the growth in the alliances of phonetics with speech science, on the one hand, and with the engineering and information sciences, on the other. The first of these alliances provides the foundation for what promises to be a significantly improved understanding of the biological and physical bases of speech. The second alliance promises a transformation in the relationship between humans and machines. The 21st century should therefore show a flowering of some of the broad interdisciplinary potential of speech research.

See also: Applied Linguistics: Overview and History; Cognitive Basis for Language Evolution in Non-human Primates; Phonetics: Overview; Phonology: Overview; Psycholinguistics: Overview; Sign Language: Semiotic Approaches; Speech Recognition, Automatic: History; Speech Synthesis; Voice Quality.

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Speech Accommodation Theory and Audience Design

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Accommodation theory is an approach to language style developed by the social psychologist Howard Giles and associates since the 1970s. Accommodation is "the adjustment of one's speech or other communicative behaviours *vis-à-vis* the people with whom one is interacting" (Giles, 2001). Initially called Speech Accommodation Theory (SAT), it was broadened in the 1980s to encompass wider aspects of interaction under the label of Communication Accommodation Theory (CAT).

In its early stages accommodation theory was concerned with the causes and consequences of the convergence or divergence of speech styles. The model proposed that speakers accommodate their speech to their addressee in order to win their approval (Giles and Powesland, 1975). This means that the common form of accommodation is convergence, by which speakers shift their style of speech to become more like that of their addressees. A range of experiments (e.g., Giles and Smith, 1979) demonstrated how speakers converge with other each other on a number of levels such as speech rate, accent, content, and pausing. Studies have shown that convergence tends to be positively evaluated by recipients, being registered as a desire for social integration, identification, and approval. Giles, Taylor, and Bourhis (1973) found that in the bilingual context of Montreal, the amount of effort a speaker was perceived to have made in language choice between French and English affected how highly they were evaluated.

Classically, convergence occurs when a speaker intends to converge; linguistic analysis shows that this has indeed occurred; and the psychological climate of the interaction is one of interpersonal association (Giles, 2001). Convergences have been categorized under various distinctions, usually binary. A convergence may be upward or downward, depending on the relative social status of the interlocutors; full or partial, depending on how far a speaker moves

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toward her interlocutor; symmetrical or asymmetrical, depending whether the shift is unilateral or not.

Alternatively, instead of converging, speakers may maintain their style of speech or even diverge from their addressee. Divergence is regarded as a tactic of intergroup distinctiveness, by which individuals or groups differentiate themselves from other individuals or groups. As later studies have shown, however, there is no automatic interpretation of the meaning of convergence, as it can in some circumstances be construed as psychological divergence.

The social psychological aspect of accommodation theory became increasingly complex as it tried to encompass facts such as these that do not sit easily with simple convergence or divergence. The theory originally suggested that the greater the desire for approval, the greater would be the convergence. Some early experiments (e.g., Street, 1982) do show that. However, Giles and Smith (1979) found that speakers can converge too much, causing addressees to react unfavorably to what they may feel is patronizing or ingratiating behavior. Conversely, addressees need not always disapprove of divergence.

Riders to the theory have proliferated, especially in the comprehensive refinements by Thakerar *et al.* (1982), Coupland *et al.* (1988), and Giles *et al.* (1991). Thakerar *et al.*'s (1982) three-dimensional model of accommodation allows for a complex range of options and remains a core statement of the sociopsychological foundation of the theory. They introduced a distinction between psychological and linguistic accommodation, including the possibility that a speaker may converge linguistically while diverging psychologically.

Coupland *et al.* (1988) expanded accommodation to a wider set of attuning strategies, specifically in health- and age-related communication, by which communicative dimensions other than language are accommodated to a speaker's perceptions of an interlocutor. Giles *et al.* (1991) explored the distinctions that have been made in accommodation theory, providing a detailed historical view of the development of the theory to that time. Further aspects of convergence and divergence are characterized, including uni- versus multimodal and subjective versus objective accommodation. They acknowledge the possibility that, given the multiplicity of linguistic and extralinguistic features involved in any interaction, a speaker may converge in some features and diverge in others.

The weight of accommodation theory's apparatus thus expanded in the 1980s to cover the more nuanced findings that were emerging through empirical work. Elaboration of the theory has not extended greatly since then, doubtless in part because the models had already become very complex and not easily capable of further refinement. However, the basic insights of accommodation remain sound: that speakers accommodate their style to their audience. If we understand accommodation encompassing any style shift that occurs in response to an audience, the theory is a powerful explanatory model of style. It goes beyond the descriptive taxonomy and nondirectional correlation in earlier sociolinguistic approaches to propose an explanation of what causes style shift. Shepard *et al.* (2001) provide a review of accommodation studies to the end of the 20th century. Contemporary research continues to use the accommodation framework as an approach to a variety of sociolinguistic issues such as gender-related accommodation by children (Robertson and Murachver, 2003) and accommodation in intergenerational communication (Williams and Garrett, 2002).

To linguists, early accommodation theory's chief deficiency was its linguistic naïveté, dealing largely in quasilinguistic parameters such as speech rate or utterance length, or intentionally unsophisticated ratings of whole accents. By the 1980s some sociolinguists came to accommodation theory to explain the patterns they were finding in their study of specific linguistic features. Conversely, both social psychologists (e.g., Giles, 1973) and sociolinguists (e.g., Bell, 1984; Coupland, 1984) had critiqued the accepted Labovian paradigm (1966) that held that style was controlled by the amount of attention paid to speech. Major studies by Bell (1982) and Coupland (1984) were early examples of a more fine-grained sociolinguistic analysis that utilized the insights of accommodation theory (see also Trudgill, 1981).

The most widespread approach to style in sociolinguistics (Eckert and Rickford, 2001) has been audience design, which has close parallels to accommodation theory, but arose disciplinarily from (socio)linguistics rather than social psychology. Developed by Bell (1984), who derived the term from Clark (Clark and Carlson, 1982), audience design proposes that speakers' style choices are primarily a response to their audience. The framework has been summarized (Bell, 1997, 2001) under nine headings:

1. Style is what an individual speaker does with a language in relation to other people. Style is essentially interactive and social, marking interpersonal and intergroup relations.
2. Style derives its meaning from the association of linguistic features with particular social groups. The social evaluation of a group is transferred to the linguistic features associated with that group.

Styles carry social meanings through their derivation from the language of particular groups.

3. The core of audience design is that speakers design their style primarily for and in response to their audience. Audience design is generally manifested in a speaker shifting her style to be more like that of the person she is talking to – convergence, in terms of accommodation theory.
4. Audience design applies to all codes and levels of a language repertoire, monolingual and multilingual.
5. Variation on the style dimension within the speech of a single speaker derives from and echoes the variation that exists between speakers on the social dimension. This axiom claims that quantitative style differences are normally less than differences between social groups.
6. Speakers show a fine-grained ability to design their style for a range of different addressees, and to a lessening degree for other audience members such as auditors and overhearers.
7. Style shifts according to topic or setting derive their meaning and direction of shift from the underlying association of topics or settings with typical audience members.
8. As well as the responsive dimension of style, there is the initiative dimension, where a style shift itself initiates a change in the situation rather than results from such a change. Sociolinguists have drawn attention to this distinction at least since Blom and Gumperz's (1972) proposal of situational versus metaphorical styles. In responsive style shift, there is a regular association between language and social situation. Initiative style trades on such associations, infusing the flavor of one setting into a different context, in what Bakhtin (1981) has called 'stylization.' Language becomes an independent variable that shapes the situation.
9. Initiative style shifts are in essence referee design, by which the linguistic features associated with a group can be used to express affiliation with that group. They focus on an absent reference group rather than the present audience. This typically occurs in the performance of a language or variety other than one's own (cf. Rampton's concept of crossing, 1995).

Audience design has been applied in detail as a framework by, for example, Rickford and McNair-Knox (1994) in their study of style shifting by an African American teenager. It has also been contested on a variety of grounds – the priority it gives to social variation over style (Finegan and Biber, 1994), its disregard of the role of attention to speech (Labov, 2001), and in particular, its inadequate attention to the active, constitutive role of language in interaction (Coupland, 2001; Schilling-Estes, 2004). Later developments in audience design (e.g, Bell, 2001) have countered by stressing the proactive nature of language style in identity formation and presentation. Responsive and initiative style are treated as different but concurrent dimensions of language usage, manifesting the structure/agency duality familiar in social theory. This accords both with the stress in contemporary social theory on language as constitutive, and with the dialogical theory of Bakhtin (1981). The range of linguistic analysis in audience design has also been increasingly extended to include qualitative and cooccurrence analyses as well as quantification (Bell, 1999).

The state-of-the-art reader edited by Eckert and Rickford (2001) brings together a wide range of contributions on accommodation theory, audience design, and other sociolinguistic approaches to style. Subsequent work (e.g., Coupland, 2001; Schilling-Estes, 2004) combines strengths from different approaches, including audience design and accommodation theory.

See also: Ethnolinguistic Vitality; Identity and Language; Sociolinguistic Crossing.

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Speech Act Verbs

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Definition and Terminology

The term 'speech act verbs' has variously been defined as applying either to all verbs used to refer to any type of verbal behavior or to the much smaller subset of verbs expressing specific speaker attitudes. According to the first, more encompassing definition, verbs such as *to claim*, *to promise*, *to threaten*, *to praise*, *to boast*, *to complain*, *to say*, *to whisper,* and *to interrupt* all count as speech act verbs, whereas the last three of this set are excluded by the second and stricter definition. The terms 'illocutionary verbs,' 'verbs of communication,' and 'verbs of saying,' which have been used as synonyms of 'speech act verbs,' have likewise been defined in either a more or less inclusive fashion. Because verbs such as *to say*, *to whisper*, and *to interrupt* do not lexicalize speaker attitudes, they are semantically less specific than speech act verbs in the narrow sense of the term. For this reason, this contribution is concerned only with speech act verbs that lexicalize combinations of speaker attitudes.

Speech act verbs are used to refer to situations characterized by the following features or situational roles: a speaker (S), a hearer (H), a set of speaker attitudes, and an utterance (Utt) mostly containing a proposition (P). These four elements are part of any situation referred to by speech act verbs and constitute the unifying feature of the meaning of these verbs (Verschueren, 1980: 51–57; 1985: 39–40; Wierzbicka, 1987: 18; Harras *et al.*, 2004: Intro.). They distinguish them from other elements of the lexicon, especially from other types of verbs. Adopting the terminology used by Harras *et al.* (2004) here I call the type of situation referred to by all speech act verbs the 'general

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Speech Act Verbs

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resource situation type.' Special types of situations referred to by speech act verbs are called 'special resource situation types.'

Classes of Speech Act Verbs

Special resource situation types constitute the framework for the classification of different types of speech act verbs. They are built up from specifications of the role of the utterance and of the speaker attitudes, which are both elements of the general resource situation type. The set of speaker attitudes may be specified as consisting of the speaker's attitude to the proposition, the speaker's intention, and the speaker's presuppositions. The speaker's propositional attitude may be further specified as S's taking P to be true, S's wanting P, S's evaluating P positively or negatively, and so on. Specifications of the speaker's intention include S's intention to make H believe something or to get him/her to do something. Examples of specifications of the speaker's presuppositions are S's presupposition that H does not know P, that H will do P in the normal course of events, and that H is able to do P. The role of the utterance is specified by properties of the propositional content. These include the event type of P (that is, whether P is an action, event, or state of affairs), the agent of P (in the case that P is an action), and the temporal reference of P (specifically, whether P precedes, coincides with, or follows S's uttering P).

Figure 1 shows the different types of specifications of each of the elements of the general resource situation type. Following a procedure proposed by Baumgärtner (1977: 260–264), the specifications in

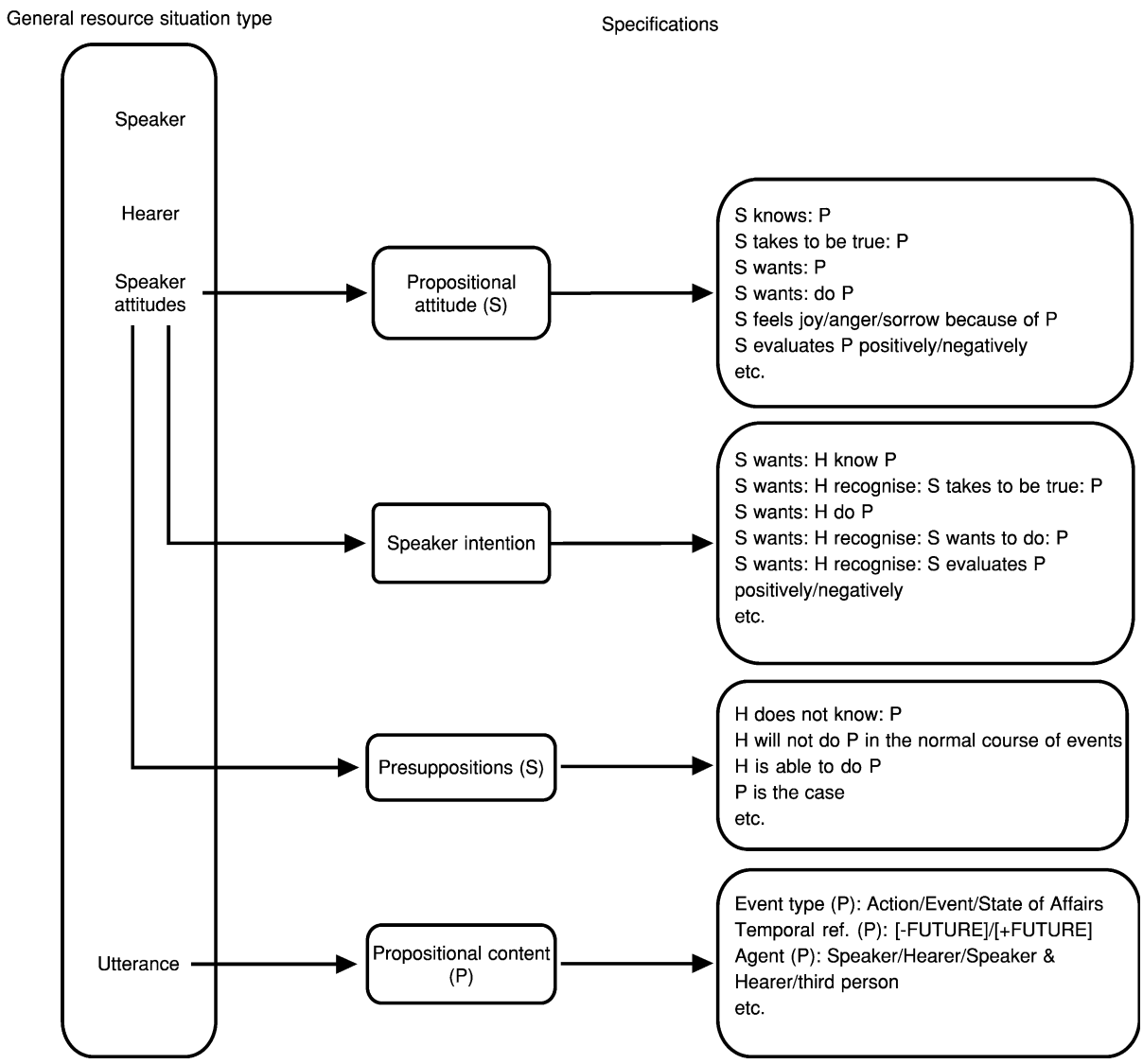

Figure 1 Specification of the elements of the general resource situation type.

Figure 1 are obtained from a comparison of sentences containing speech act verbs. The well-formedness of some of these and the ill-formedness of others shows which elements are relevant to the meaning of the verbs they contain. For example, a comparison of the sentences *I order you to leave the room*, **I order you to have left the room*, and **I order you for me to leave the room* shows that *to order* lexicalizes the specification 'future action of H' for the properties of the propositional content.

Different combinations of specifications of the different kinds of speaker attitudes and of the properties of the propositional content constitute special resource situation types, which are referred to by distinct types of speech act verbs. The combinations listed in Table 1 represent situations that are referred to by specific types of verbs. Elements of the situations referred to are also components of the meaning of the corresponding verbs. If the assertives and information verbs in Table 1 are subsumed under the larger class of representatives and verbs expressing emotions are grouped together with those expressing evaluations, all speech act verbs in Table 1 may be classified as belonging to one of four main classes: representatives, directives, commissives, and expressives. These correspond to four of the main types of speech acts distinguished by Searle (1975: 354–361). In addition, there exists a fifth class of verbs that may be used to refer to speech acts, which Searle called 'declarations.' These are speech acts in which a particular institutional fact is brought about by a speaker who has the authority to do so because he or she is a representative of a particular institution. The performance of declarations does not involve any particular speaker attitudes apart from the speaker's being willing to bring about the relevant institutional fact.

Table 1 Classes of speech act verbs

(1a)	**Assertives:** *claim, assert* . . .,	
	Propositional attitude (S):	S takes to be true: P
	Intention (S):	S wants: H recognize: S takes to be true: P
	Presupposition (S):	H does not know: P
	Event type (P):	Action/Event/State of Affairs
	Temporal reference (P):	[-FUTURE]/[+FUTURE]
(1b)	**Information Verbs:** *inform, tell, impart, communicate*, etc.	
	Propositional attitude (S):	S knows: P
	Intention (S):	S wants: H know: P
	Presupposition (S):	H does not know: P
	Event type (P):	Action/Event/State of Affairs
	Temporal reference (P):	[-FUTURE]/[+FUTURE]
(2)	**Directives:** *ask* (*sb. to do sth.*), *order, request* . . . ,	
	Propositional attitude (S):	S wants: P
	Intention (S):	S wants: H do P
	Presupposition (S):	H will not do P in the normal course of events
		H is able to do P
	Event type (P):	Action
	Agent (P):	Hearer
	Temporal reference (P):	[+FUTURE]
(3)	**Commissives:** *promise, guarantee, pledge, vow* . . . ,	
	Propositional attitude (S):	S wants to do P
	Intention (S):	S wants: H recognise: S wants to do P
	Presupposition (S):	P is in the interest of H
	Event type (P):	Action
	Agent (P):	Speaker
	Temporal reference (P):	[+FUTURE]
(4a)	**Verbs Expressing Emotions:** *rejoice, complain, scold* . . . ,	
	Propositional attitude (S):	S feels joy/anger/sorrow because of P
	Intention (S):	S wants: H recognise: S feels joy/anger/sorrow because of P
	Presupposition (S):	P is the case
	Event type (P):	Action/Event/State of Affairs
	Temporal reference (P):	[-FUTURE]
(4b)	**Verbs Expressing Evaluations:** *praise, criticise* . . . ,	
	Propositional attitude (S):	S evaluates P positively/negatively
	Intention (S):	S wants: H recognise: S evaluates P positively/negatively
	Presupposition (S):	P is the case
	Event type (P):	Action
	Agent (P):	Hearer or Third Person
	Temporal reference (P):	[-FUTURE]

Table 2 Different types of classifications of speech acts/speech act verbs

Austin (1962)	*Vendler (1972)*	*Searle (1975)*	*Bach & Harnish (1979)*	*Allan (1994)*
Expositives	Expositives	Representatives	Constatives	Statements
Commissives	Commissives	Commissives	Commissives	
Exercitives	Interrogatives	Directives	Directives	Invitationals
	Exercitives			Authoritatives
Verdictives	Operatives	Declarations	Effectives	
	Verdictives		Verdictives	
Behabitives	Behabitives	Expressives	Acknowledgements	Expressives

Source: Allan (1998: 11).

Accordingly, declaratives, that is verbs used to refer to declarations, differ from other kinds of speech act verbs in that they lexicalize no speaker attitudes other than the speaker's intention to bring about a particular institutional fact. Examples of declaratives include *to absolve*, *to baptize*, *to bequeath*, *to condemn*, *to excommunicate*, *to fire*, *to nominate,* and *to resign*.

Other classifications have much in common with Searle's taxonomy. Austin's (1962: 150–163) classification of speech act verbs, for example, comprises five classes (expositives, exercitives, commissives, behabitives, and verdictives, which approximately correspond to Searle's representatives, directives, commissives, expressives, and declarations, respectively). Vendler's classification was based on Austin's. Due to the fact that Vendler distinguished two types of exercitives (interrogatives and genuine exercitives) as well as two types of verdictives (operatives and true verdictives), his classification consists of seven rather than five classes (Vendler, 1972: 16–25). Bach and Harnish divided speech acts into six general categories. Four of these (constatives, directives, commissives, and acknowledgements) "correspond roughly to Austin's expositives, exercitives, commissives and behabitives respectively, and closely to Searle's representatives, directives, commissives and expressives" (Bach and Harnish, 1979: 40–41). Taken together, the remaining two classes, effectives and verdictives, correspond to what Searle called "declarations." Using H's evaluations as criteria, Allan (1994: 4125; 1998: 10–11) distinguished four types of speech acts. Statements include speech acts such as denials, reports, and predictions (Searle's representatives) as well as promises and offers (Searle's commissives). Invitationals are a subset of Searle's directives and include speech acts such as requests, suggestions, exhortations, and warnings. The rest of Searle's directives are grouped together with his declarations into a class called 'authoritatives.' Expressives, finally, include greetings, thanks, apologies, and congratulations. Table 2 compares the classifications discussed.

Speech Acts and Speech Act Verbs

The examples considered so far suggest that the meanings of speech act verbs may be described in terms of properties of speech acts. The components of speech acts and those of speech act verbs do indeed display substantial overlap. This may be observed from the fact that the components of the meanings of speech act verbs correspond to at least five of the seven components of illocutionary force that serve to determine under which conditions a particular type of speech act is both successful and nondefective (Searle and Vanderveken, 1985: 12–20). These correspondences are summarized in Figure 2.

In spite of these correspondences, special resource situation types do not suffice to capture the meaning of all speech act verbs. Examples of verbs whose meanings cannot completely be described in terms of elements of special resource situation types are *boast*, *flatter,* and *lie*. In addition to the attitudes of a resource situation speaker, these verbs lexicalize different types of evaluations by a speaker who uses these verbs to describe the speech act of the resource situation speaker. Following Barwise and Perry (1983: 32–39), here I call the situation in which a speaker describes an act performed by a resource situation speaker the 'discourse situation.' As Figure 3 shows, the discourse situation comprises the same types of elements as the resource situation: a speaker, a hearer, and an utterance containing a proposition. The meaning of verbs such as *boast*, *flatter,* and *lie* comprises elements of a resource as well as a discourse situation. For example, *boast* lexicalizes not only a positive evaluation of P (one of S's own actions or properties)

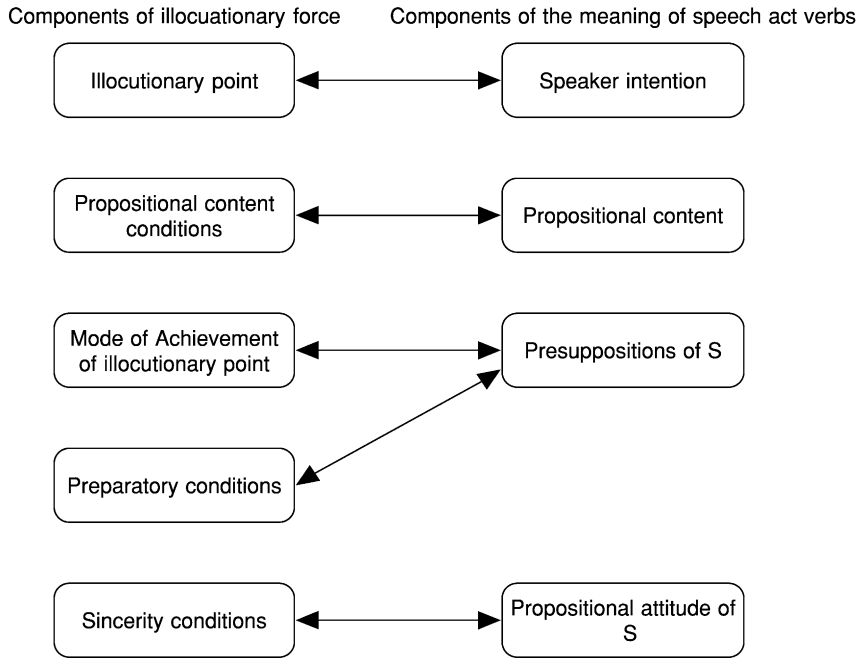

Figure 2 Correspondences between components of illocutionary force and components of the meaning of speech act verbs.

by the speaker of the resource situation but also a negative evaluation of the resource situation speaker's positive representation of P by a discourse situation speaker. In particular, a discourse situation speaker describing a resource situation speaker's act of self-praise by means of the verb *boast* thereby indicates that he or she considers the resource situation speaker's positive representation of P to be exaggerated. Similarly, *flatter* and *lie* lexicalize a combination of attitudes of a resource situation speaker as well as a discourse situation speaker's evaluation of the speech act performed by the resource situation speaker as being strategic (*flatter*) or insincere (*lie*). These examples show that for many illocutionary verbs, there is no corresponding speech act. Nor may any type of speech act be referred to by a corresponding illocutionary verb. An example is the apparent lack of a special illocutionary verb in English to refer to an act in which a speaker predicts a future event that he or she considers to have negative consequences. Although there are special illocutionary verbs to describe such acts in German (e.g., *unken*) and Russian (e.g., *karkat*), the relevant act has to be referred to in English by less specific verbs such *predict*, *foretell,* and *prophesy*, whose meanings do not include an evaluative component.

The lack of a one-to-one correspondence of speech acts and speech act verbs also becomes evident from the fact that some verbs are systematically ambiguous among several illocutionary points (Vanderveken, 1990: 168). For example, *to promise* may be used to refer to acts of threatening (as in *I promised him that he would be punished if he did not come back in time*), acts of promising (as in *I promised to help him*), and acts of assuring somebody of something (as in *I promised her that she would be free tomorrow* uttered by a speaker who is not the agent of P but only a confident news bearer). Other examples are *warn* and *advise*, which may both be classified as being either representatives (verbs used to denote an act of telling somebody that something is the case) or directives (verbs used to refer to an act of telling somebody to do something to avoid an imminent danger) (Searle and Vanderveken, 1985: 183). In spite of Austin's claim that speech act verbs are a good guide to speech acts (Austin 1962: 148–149), the absence of a one-to-one correspondence between speech acts and speech act verbs indicates that differences in the meaning of speech act verbs are "a good guide but by no means a sure guide to differences in illocutionary acts" (Searle, 1975: 345).

Performativity

Some speech act verbs can be used not only to denote but also to perform a particular speech act. To test whether a given speech act verb may be used in this way, Austin suggested that it be substituted for the variable *x* in the formula 'I (hereby) x . . .'. Any verb that may be used as a part of this formula may be used performatively (Austin, 1962: 67). Examples of

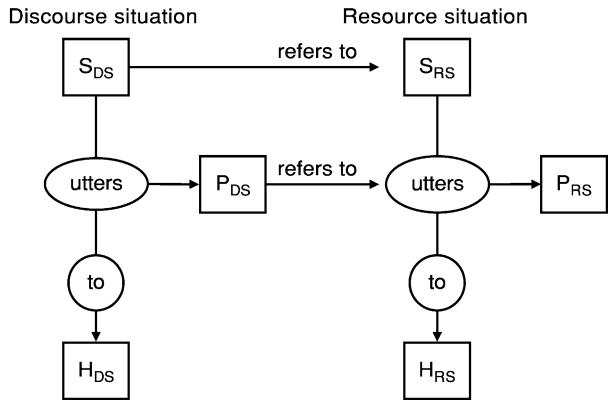

Figure 3 The inventory of situational roles of the discourse and the resource situation (S_{DS}, discourse situation speaker; S_{RS}, resource situation speaker; P_{DS}, proposition uttered by S_{DS}; P_{RS}, proposition uttered by S_{RS}; H_{DS}, discourse situation hearer; H_{RS}, resource situation hearer). From Harras *et al.* (2004: 10); used with permission of Walter de Gruyter, GmbH. & Co.

performative verbs are *to order*, *to promise*, *to inform*, *to criticize*, and *to assert*. The performative formula is often part of the institutionalized procedure by which a speaker brings about a particular institutional fact. Consequently, declaratives may generally be used performatively as in *I hereby name this ship the* '*Queen Elisabeth*' and *I appoint you chairman*. Other types of speech act verbs can be used performatively only if they may be used in utterances that do not require an additional linguistic or nonlinguistic action for a particular speech act to be performed. For example, a speaker may promise a hearer to help him or her solely by uttering a sentence such as *I promise to help you tomorrow*. By contrast, an act of convincing somebody that something is the case requires more than a speaker's uttering a sentence such as ?*I convince you that Beowulf is the single most important work of English literature*. This difference accounts for the fact that *to promise* may be used performatively, whereas *to convince* may not (Harras 2004: 152–154).

See also: Performative Clauses; Situation Semantics; Speech Acts; Speech Acts: Definition and Classification.

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Speech Acts

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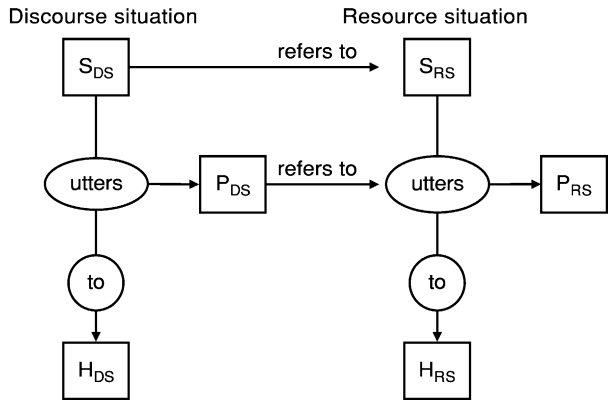

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within the framework of social institutions and conventions. Put in slogan form, saying is (part of) doing, or words are (part of) deeds.

J. L. Austin

The Performative/Constative Dichotomy

In the 1930s, a very influential school of thought in philosophy was logical positivism, developed by a group of philosophers and mathematicians principally in Vienna. One of the central doctrines of logical positivism is what is now called 'the descriptive fallacy,' namely, the view that the only philosophically interesting function of language is that of making true or false statements. A particular version of the descriptive fallacy is the verificationist thesis of meaning, namely, the idea that 'unless a sentence can, at least in principle, be verified (i.e., tested for its truth or falsity), it was strictly speaking meaningless' (Levinson, 1983: 227). On such a view, sentences that are not used to make verifiable or falsifiable propositions are simply meaningless (*see* **Carnap, Rudolf (1891–1970)**).

It was against this philosophical background that Austin set about to develop his theory of speech acts (Austin, 1962). He made two important observations. First, he noted that some ordinary language sentences such as those in (1) are not employed to make a statement, and as such they cannot be said to be true or false.

(1a) Good afternoon!
(1b) Is he a Republican?
(1c) Come in, please.

Secondly and more importantly, Austin observed that there are ordinary language declarative sentences that similarly resist a truth-conditional analysis. The point of uttering such sentences is not just to say things, but also actively to do things. In other words, such utterances have both a descriptive and an effective aspect. Accordingly, Austin called them 'performatives,' and he distinguished them from assertions, or statement-making utterances, which he called 'constatives.' In other words, performatives are utterances that are used to do things or perform acts, as in (2), whereas constatives are utterances that are employed to makes assertions or statements, as in (3).

(2a) I christen/name this ship the Princess Elizabeth.
(2b) I now pronounce you man/husband and wife.
(2c) I promise to come to your talk tomorrow afternoon.

(3a) My daughter is called Elizabeth.
(3b) A freshly baked loaf doesn't cut easily.
(3c) Maurice Garin won the first Tour de France in 1903.

Unlike those in (3), the declarative sentences in (2) have two characteristics: (i) they are not used intentionally to say anything, true or false, about states of affairs in the outside world, and (ii) their use constitutes (part of) an action, viz., that of christening/naming a ship in (2a), that of pronouncing a couple married in (2b), and that of promising in (2c). In addition, there are two further differences between (2a–b) and (2c). The first is that while (2a–b) is part of a conventional or ritual behavior supported by institutional facts (see also Strawson, 1964), (2c) is not. Secondly, while the performative verb, that is, the verb naming the action while performing it in (2a–b) is in general an essential element and cannot be omitted, it can in (2c). In other words, whereas, for example, we cannot christen/name a ship without using the verb *christen* or *name*, we can make a promise without using the verb *promise*, as in (4).

(4) I'll come to your talk tomorrow afternoon.

Performatives can further be divided into two types: explicit and implicit. Explicit performatives are performative utterances that contain a performative verb that makes explicit what kind of act is being performed. By contrast, implicit performatives are performative utterances in which there is no such verb. Thus, the performatives in (2) are explicit ones, and the performative in (4) is an implicit one.

Austin also isolated a number of syntactic and semantic properties of explicit performatives in English: (i) explicit performatives contain a performative verb, (ii) the performative nature of such a verb can be reinforced by adding the adverb *hereby*, and (iii) explicit performatives occur in sentences with a first-person singular subject of a predicate (verb) in the simple present tense, indicative mood, and active voice.

However, as Austin himself was aware, there are exceptions. Explicit performatives can sometimes take a first-person plural subject, as in (5); a second-person singular or plural subject, as in (6); and a third-person singular or plural subject, as in (7). In addition, there are cases where the explicit performative verb is 'impersonal,' that is, it does not refer to the speaker, as in (8). Furthermore, as (6), (7), and (8) show, explicit performatives can occur in sentences where the verb is in the passive voice. Finally, as (9) indicates, they can also occur in sentences of present progressive aspect.

(5) We suggest that you give up smoking immediately.

(6) You are fired.

(7) Passengers are hereby requested to wear a seat belt.

(8) Notice is hereby given that shoplifters will be prosecuted.

(9) I am warning you not to dance on the table.

Austin's Felicity Conditions on Performatives

As already mentioned, it makes no sense to call a performative true or false. Nevertheless, Austin noticed that for a performative to be successful or 'felicitous,' it must meet a set of conditions. For example, one such condition for the speech act of naming is that the speaker be recognized by his or her community as having the authority to perform that act; for the speech act of ordering, the condition is that the speaker have authority over the addressee; and finally, for the speech act of promising, one condition is that what is promised by the speaker must be something the addressee wants to happen. Austin called these conditions 'felicity conditions,' of which he distinguished three types, as shown in (10).

(10) Austin's felicity conditions on performatives
(10a) (i) There must be a conventional procedure having a conventional effect.
(10a) (ii) The circumstances and persons must be appropriate, as specified in the procedure.
(10b) The procedure must be executed (i) correctly and (ii) completely.
(10c) Often
(i) the persons must have the requisite thoughts, feelings and intentions, as specified in the procedure, and
(ii) if consequent conduct is specified, then the relevant parties must so do.

Violation of any of the conditions in (10) will render a performative 'unhappy' or infelicitous. If conditions *a* or *b* are not observed, then what Austin described as a 'misfire' takes place. For instance, in England, a registrar conducting a marriage ceremony in an unauthorized place will violate condition *a (i)*, thus committing a misfire. The same is true for a clergyman baptizing the wrong baby, because in this case, condition *a (ii)* is not fulfilled. Next, as an illustration of a violation of condition *b (i)*, consider the case of a bridegroom not saying the exact words that are conventionally laid down for a Church of England marriage ceremony. As to condition *b (ii)*, it dictates that the procedure be complete. Thus, in making a bet, the bet is not 'on' unless *You are on* (or something with the same effect) is uttered by the addressee; in Austin's terminology, this counts as a satisfactory 'uptake,' the absence of which will again cause a misfire. Finally, if condition *c* is violated, then what Austin called an 'abuse' is committed (including, but not only, cases of insincerity). Examples include: congratulating someone when one knows that he or she passed his or her examination by cheating (condition *c (i)*); making a promise when one already intends to break it (condition *c (ii)*); and marrying without intending to consummate the marriage (see also Sadock's (2004) discussion of these conditions in terms of misinvocation, misexecution, and abuse).

Locutionary, Illocutionary, and Perlocutionary Speech Acts

The initial distinction made by Austin between performatives and constatives was soon to be rejected by him in favor of a general theory of speech acts. In fact, as pointed by Levinson (1983: 231), there are two internal shifts in Austin's arguments. First, there is a shift from the view that performatives are a special class of sentences/utterances with peculiar syntactic and semantic properties to the view that there is a general class of performatives that encompasses both explicit and implicit performatives, the latter including many other types of sentences/utterances. The second shift is from the performative/constative dichotomy to a general theory of speech acts, of which the various performatives and constatives are just special sub-cases (*see* **Speech Acts and Grammar**).

What led Austin to abandon the performative/constative dichotomy? In the first place, he noted that like performatives, constatives are also subject to the felicity conditions stated in (10). Consider the so-called 'Moore's paradox,' illustrated by (11).

(11) ?Princess Diana died in a fatal car crash in Paris with Dodi Al Fayed, but I don't believe it.

This utterance is infelicitous because it violates condition *c (i)* in (10) above. In the same vein, if someone utters (12) when he or she knows that John does not in fact have a wife, then its presupposition will not go through (*see* **Presupposition**). The reason the presupposition fails to carry through is that condition *a (ii)* in (10) above is not adhered to.

(12) I'm sure John's wife is a feminist.

Secondly, Austin observed that performatives and constatives may be impossible to distinguish even in truth-conditional terms. On the one hand, there are 'loose' constatives that may not be assessed strictly by means of truth conditions, as in (13). On the other hand, there are utterances like those in (14) that pass the *hereby* test and therefore are performatives by definition but that nevertheless are used to state or assert. In these cases, the performatives must be counted simultaneously as constatives. On the basis of such evidence, Austin concluded that constatives are nothing but a special class of performatives, and

that the two-way distinction between performatives, as action-performers, and constatives, as truth-bearers, can no longer be maintained.

(13a) France is hexagonal.
(13b) The fridge is empty.
(13c) New York is sixty miles from where I live.

(14a) I hereby state that Da Vinci started to paint *Mona Lisa* in 1503.
(14b) I hereby tell you that the bill is right.
(14c) I hereby hypothesize that there is water on Mars.

Consequently, Austin claimed that all utterances, in addition to meaning whatever they mean, perform specific acts via the specific communicative force of an utterance. Furthermore, he introduced a three-fold distinction among the acts one simultaneously performs when saying something, as illustrated in (15):

(15) (A speech act's three facets)
(i) Locutionary act: the production of a meaningful linguistic expression.
(ii) Illocutionary act: the action intended to be performed by a speaker in uttering a linguistic expression, by virtue of the conventional force associated with it, either explicitly or implicitly.
(iii) Perlocutionary act: the bringing about of consequences or effects on the audience through the uttering of a linguistic expression, such consequences or effects being special to the circumstances of utterance.

A locutionary act is the basic act of speaking, which itself consists of three related sub-acts: (i) a phonic act of producing an utterance-inscription; (ii) a phatic act of composing a particular linguistic expression in a particular language; and (iii) a rhetic act of contextualizing the utterance-inscription (Austin, 1962). The first of these three sub-acts is concerned with the physical act of producing a certain sequence of vocal sounds (in the case of spoken language), or a set of written symbols (in the case of written language). The second refers to the act of constructing a well-formed string of sounds/symbols (a word, phrase, or sentence in a particular language). The third sub-act is responsible for tasks such as assigning reference, resolving deixis, and disambiguating the utterance-inscription lexically and/or grammatically (*see* **Deixis and Anaphora: Pragmatic Approaches**).

The illocutionary act refers to the fact that when we say something, we usually say it with some purpose in mind. In other words, an illocutionary act refers to the type of function the speaker intends to fulfill, or the action the speaker intends to accomplish in the course of producing an utterance; it is also an act defined within a system of social conventions. In short, it is an act accomplished in speaking. Examples of illocutionary acts include accusing, apologizing, blaming, congratulating, declaring war, giving permission, joking, marrying, nagging, naming, promising, ordering, refusing, swearing, and thanking. The functions or actions just mentioned are also commonly referred to as the illocutionary 'force' (or 'point') of the utterance. Illocutionary force is frequently conveyed by what Searle (1969) called an 'illocutionary force indicating device' (IFID), the most direct and conventional type of which is an explicit performative in the form of (16) (where Vp stands for performative verb). Indeed, the term 'speech act' in its narrow sense is often taken to refer exclusively to illocutionary acts (*see* **Speech Acts: Definition and Classification**).

(16) I (hereby) Vp you (that) S

It should be mentioned at this point that the same linguistic expression can be used to carry out a wide variety of different speech acts, so that the same locutionary act can count as having different illocutionary forces in different contexts. Depending on the circumstances, one may utter (17) to make a threat, to issue a warning, or to give an explanation.

(17) The gun is loaded.

In fact, Alston (1994) has argued that the meaning of a sentence consists in its having a certain illocutionary act potential (IAP) that is closely and conventionally associated with its form. On this view, to know what a sentence means is to know what range of illocutionary acts it can be conventionally used to perform.

Conversely, the same speech act can be performed by different linguistic expressions, or the same illocutionary force can be realized by means of different locutionary acts. The utterances in (18), for example, illustrate different ways of carrying out the same speech act of requesting.

(18) (At ticket office in railway station)
(18a) A day return ticket to Oxford, please.
(18b) Can I have a day return ticket to Oxford, please?
(18c) I'd like a day return ticket to Oxford.

Finally, a perlocutionary act concerns the effect an utterance may have on the addressee. Put slightly more technically, a perlocution is the act by which the illocution produces a certain effect in or exerts a certain influence on the addressee. Still another way to put it is that a perlocutionary act represents a consequence or by-product of speaking, whether intentional or not. The effect of the act being performed by speaking is generally known as the perlocutionary effect. There is

an extensive literature on the differentiation between locutionary, illocutionary, and perlocutionary acts (see e.g., Sadock (2004) for a survey).

J. R. Searle

Searle's Felicity Conditions on Speech Acts

Just as its truth conditions must be met by the world for a sentence to be said to be true, its felicity conditions must also be fulfilled by the world for a speech act to be said to be felicitous. Searle (1969) took the view that the felicity conditions put forward by Austin are not only ways in which a speech act can be appropriate or inappropriate, but that they also jointly constitute the illocutionary force. Put in a different way, the felicity conditions are the constitutive rules – rules that create the activity itself – of speech acts (*see* **Principles and Rules**). On Searle's view, to perform a speech act is to obey certain conventional rules that are constitutive of that type of act. Searle developed the original Austinian felicity conditions into a neo-Austinian classification of four basic categories, namely (i) propositional content, (ii) preparatory condition, (iii) sincerity condition, and (iv) essential condition. As an illustration of these conditions, consider (19).

(19) Searle's felicity conditions for promising
(i) propositional content: future act A of S
(ii) preparatory: (a) H would prefer S's doing A to his not doing A, and S so believes
(b) It is not obvious to both S and H that S will do A in the normal course of events
(iii) sincerity: S intends to do A
(iv) essential: the utterance of e counts as an undertaking to do A

where S stands for the speaker, H for the hearer, A for the action, and e for the linguistic expression.

The propositional content condition is in essence concerned with what the speech act is about. That is, it has to do with specifying the restrictions on the content of what remains as the 'core' of the utterance (i.e., Searle's propositional act) after the illocutionary act part is removed. For a promise, the propositional content is to predicate some future act of the speaker, whereas the preparatory conditions state the real-world prerequisites for the speech act. In the case of a promise, the latter are roughly that the addressee would prefer the promised action to be accomplished, that the speaker knows this, but also that it is clear to both the speaker and the addressee that what is promised will not happen in the normal course of action. Next, the sincerity condition must be satisfied if the act is to be performed sincerely. When carrying out an act of promising, the speaker must genuinely intend to keep the promise. Notice that if the sincerity condition is not fulfilled, the act is still performed, but there is an abuse, to use Austin's term. Finally, the essential condition defines the act being performed in the sense that the speaker has the intention that his or her utterance will count as an act, and that this intention is recognized by the addressee. Thus for a promise, the speaker must have the intention to create an obligation to act. Failure to meet the essential condition has the consequence that the act has not been carried out.

Searle's Typology of Speech Acts

Can speech acts be classified, and if so, how? Austin (1962) grouped them into five types: (i) verdictives: giving a verdict, (ii) exercitives: exercising power, rights or influence, (iii) commissives: promising or otherwise undertaking, (iv) behabitives: showing attitudes and social behavior, and (v) expositives: fitting an utterance into the course of an argument or conversation. Since then, there have been many attempts to systematize, strengthen, and develop the original Austinian taxonomy (Bach and Harnish, 1979; Allan, 2001; Bach, 2004). Some of these new classifications are formulated in formal/grammatical terms, others, in semantic/pragmatic terms, and still others, on the basis of the combined formal/grammatical and semantic/pragmatic modes (see Sadock (2004) for a review) (*see* **Speech Acts: Definition and Classification**; **Pragmatics: Overview**). Of all these (older and newer) schemes, Searle's (1975a) neo-Austinian typology remains the most influential. Under Searle's taxonomy, speech acts are universally grouped into five types along four dimensions: (i) illocutionary point, (ii) direction of fit between words and world, (iii) expressed psychological state, and (iv) propositional content (see also Searle (2002)). The five types of speech acts are further explained next.

(i) Representatives (or assertives; the constatives of the original Austinian performative/constative dichotomy) are those kinds of speech acts that commit the speaker to the truth of the expressed proposition and thus carry a truth-value. They express the speaker's belief. Paradigmatic cases include asserting, claiming, concluding, reporting, and stating. In performing this type of speech act, the speaker represents the world as he or she believes it is, thus making the words fit the world of belief.

(20) The Berlin Wall came down in 1989.

(ii) Directives are those kinds of speech acts that represent attempts by the speaker to get the addressee to do something. They express the speaker's desire/wish for the addressee to do something. Paradigmatic

cases include advice, commands, orders, questions, and requests. In using a directive, the speaker intends to elicit some future course of action on the part of the addressee, thus making the world match the words via the addressee.

(21) Put the cake in the oven.

(iii) Commissives are those kinds of speech acts that commit the speaker to some future course of action. They express the speaker's intention to do something. Paradigmatic cases include offers, pledges, promises, refusals, and threats. In the case of a commissive, the world is adapted to the words via the speaker himherself.

(22) I'll never buy you another computer game.

(iv) Expressives are those kinds of speech acts that express a psychological attitude or state of the speaker such as joy, sorrow, and likes/dislikes. Paradigmatic cases include apologizing, blaming, congratulating, praising, and thanking. There is no direction of fit for this type of speech act.

(23) Well done, Elizabeth!

(v) Declarations (or declaratives) are those kinds of speech acts that effect immediate changes in some current state of affairs. Because they tend to rely on elaborate extralinguistic institutions for their successful performance, they may be called institutionalized performatives. In performing this type of speech act, the speaker brings about changes in the world; that is, he or she effects a correspondence between the propositional content and the world. Paradigmatic cases include (officially) opening a bridge, declaring war, excommunicating, firing from employment, and nominating a candidate. As to the direction of fit, it is both words-to-world and world-to-words.

(24) I object, Your Honor.

Illocutional point (or speech act type), direction of fit, and expressed psychological state can be summarized as in (25).

(25)

Illocutionary point/Speech act type	Direction of fit	Expressed psychological state
representative	words-to-world	belief
directive	world-to-words	desire
commissive	world-to-words	intension
expressive	none	variable
declaration	both	none

Indirect Speech Acts

What is an indirect speech act? Most of the world's languages have three basic sentence types: declarative, interrogative, and imperative. In some languages, the three major sentence types are distinguished morphologically and/or syntactically; as instances, compare Somali, Greenlandic, or Lakhota (Lakota) (see Huang (2006) for further discussion). The three sentence types are typically associated with the three basic illocutionary forces, namely, asserting/stating, asking/questioning, and ordering/requesting, respectively.

In the case of a direct match between a sentence type and an illocutionary force, we have a direct speech act. In addition, explicit performatives, which happen to be in the declarative form, are also taken to be direct speech acts, because they have their illocutionary force explicitly named by the performative verb in the main part (or 'matrix clause') of the sentence. On the other hand, if there is no direct relationship between a sentence type and an illocutionary force, we are faced with an indirect speech act. Thus, when an explicit performative is used to make a request, as in (26), it functions as a direct speech act; the same is the case when an imperative is employed, as in (27). By comparison, when an interrogative is used to make a request, as in (28), we have an indirect speech act.

(26) I request you to pass the salt.

(27) Pass the salt.

(28) Can you pass the salt?

In short, the validity of the distinction between direct and indirect speech acts is dependent upon whether or not one subscribes to what Levinson (1983: 264, 274) has called the 'literal force hypothesis' – the view that there is a direct structure-function correlation in speech acts and that sentence forms are direct reflexes of their underlying illocutionary forces.

There are, however, problems at the very heart of the literal force hypothesis. One is that there are cases of speech acts where even the direct link between performative verbs and speech acts breaks down. Consider (29).

(29) I promise to sack you if you don't finish the job by this weekend.

In (29), the performative verb is *promise*, but the force that is most naturally ascribed to this speech act is that of either a threat or a warning. This shows that, contrary to the literal force hypothesis, we cannot always identify speech acts, even with sentences containing a performative verb.

Secondly and more importantly, as also pointed out by Levinson (1983: 264), most usages are indirect. The speech act of requesting, for example, is very rarely performed by means of an imperative in English. Instead, it is standardly carried out indirectly.

Furthermore, there are probably infinitely many varieties of sentences that can be used to indirectly make a request, as shown in (30).

(30a) I want you to put the cake in the oven.
(30b) Can you put the cake in the oven?
(30c) Will you put the cake in the oven?
(30d) Would you put the cake in the oven?
(30e) Would you mind putting the cake in the oven?
(30f) You ought to put the cake in the oven.
(30g) May I ask you to put the cake in the oven?
(30h) I wonder if you'd mind putting the cake in the oven?

As to how to analyze indirect speech acts, there are roughly three approaches. The first is to assume the existence of a dual illocutionary force (as proposed by Searle, 1975b). On this assumption, indirect speech acts have two illocutionary forces, one literal or direct, and the other nonliteral or indirect. While the literal force is secondary, the nonliteral force is primary. Next, whether an utterance operates as an indirect speech act or not has to do with the relevant felicity conditions. For example, (28) both infringes the felicity condition for a question and queries the preparatory condition for a request. This explains why it can function as an indirect speech act, whereas (31), for instance, cannot; the reason is that in the case of (31), felicity conditions are irrelevant.

(31) Salt is made of sodium chloride.

Finally, on Searle's view, because a speaker's performing and an addressee's understanding an indirect speech act always involves some kind of inference, the question is how this inference can be computed. Searle's suggestion is that it can be computed along the general lines of the rational, cooperative model of communication articulated by Grice (1989) (*see* **Inference: Abduction, Induction, Deduction**; **Grice, Herbert Paul (1913–1988)**; **Cooperative Principle**).

One interesting characteristic of indirect speech acts is that they are frequently conventionalized (see, e.g., Morgan, 1978). This can be illustrated by the fact that of various, apparently synonymous linguistic expressions, only one may conventionally be used to convey an indirect speech act, as illustrated in (32).

(32a) Are you able to pass the salt?
(32b) Do you have the ability to pass the salt?

Under Searle's analysis, both (32a) and (32b) would be expected to be able to perform the indirect speech act of requesting, because (i) they are largely synonymous with (28), and (ii) they, too, inquire about the satisfaction of the addressee-based preparatory condition for making a request. But this expectation is not fulfilled.

Searle's response to this puzzle is that there is also a certain degree of conventionality about indirect speech acts, and that this may be accounted for in terms of conventions of meaning/usage. Inspired by this insight, Morgan (1978) developed the notion of 'short-circuited implicature' to cover inference involved in cases like (28) (*see* **Implicature**). While the relevant implicature is in principle calculable, in practice it is not calculated in cases like these. From a linguistic point of view, the conventionality here is correlated with the possible occurrence of *please*. While *please* can be inserted before the verb *pass* in (26)–(28), it cannot in (32), as shown in (33).

(33a) I request you to please pass the salt.
(33b) Please pass the salt.
(33c) Can you please pass the salt?
(33d) ?Are you able to please pass the salt?
(33e) ?Do you have the ability to please pass the salt?

Furthermore, the conventionality indicated by *please* in (33a) and (33b) is one of meaning, hence the speech act of requesting is performed directly. By contrast, the conventionality signaled by *please* in (33c) is one of usage, and thus we have an indirect speech act.

A second, rather similar, approach is due to Gordon and Lakoff (1975). In their analysis, there are inference rules called 'conversational postulates' that reduce the amount of inference needed to interpret an indirect speech act. Thus, in the case of (28), if the interpretation as a question cannot be intended by the speaker, then the utterance will be read as being equivalent to his or her having said (26), thus resulting in the performance of the indirect speech act of requesting. Stated this way, the conversational postulates proposed by Gordon and Lakoff can be seen as another reflection of the conventionality of indirect speech acts. As to the similarities and differences between Searle's and Gordon and Lakoff's analyses, the major similarity is that both accounts assume that the interpretation of indirect speech acts involves inference as well as conventionality; the major difference concerns the question of balance, namely, how much of the work involved in computing an indirect speech act is inferential and how much is conventional.

Finally, in contrast to the inferential models we have just discussed, there is the idiom model. In this model, sentences like (28) are semantically ambiguous, and the request interpretation constitutes a speech act idiom that involves no inference at all. On this view, (28) is simply recognized as a request, with no question being perceived. This is the position taken by Sadock (1974). There are, however, problems with this analysis, too. One is that it fails to

capture the fact that (in contrast to what is the case for idioms) the meaning of an indirect speech act can frequently (at least in part) be derived from the meaning of its components (the technical term for this is 'compositionality'; *see* **Frege, Gottlob (1848–1925)**); in addition, these would-be 'idioms' turn out to be quite comparable cross-linguistically (something which idioms are not). For example, an utterance like (34) may be used, with the same force as in English, in its Arabic, Chinese, German, or Modern Greek versions to indirectly request the addressee to switch on the central heating system (of course, always depending on the context).

(34) 'It's cold in here.'

A further problem is that in the idiom model, an interpretation that takes into account the literal meaning or the direct illocutionary force of an indirect speech act is not allowed. This, however, leaves examples like (35) unexplained.

(35) A: Can you pass the salt?
B: Yes, I can. (Here it is.)

Why, then, do people use indirect speech acts? One answer is that the use of indirect speech acts is in general associated with politeness. Indirect speech acts are usually considered to be more polite than their direct counterparts (see the considerable literature on the analysis of speech acts, especially the work on face-threatening acts (FTAs) like requests, complaints, and apologies in the tradition of Brown and Levinson's (1987) classical 'face-saving' politeness model *see* **Face**; **Politeness**; **Pragmatic Acts**).

Speech Acts and Culture

Cross-Cultural Variation

Many speech acts are culture-specific. This is particularly so in the case of institutionalized speech acts, which typically use standardized and stereotyped formulae and are performed in public ceremonies. A good example is provided by the speech act of divorcing. In some Muslim cultures, under the appropriate circumstances, the uttering of a sentence with the import of (36) three times consecutively by a husband to his wife will *ipso facto* constitute a divorce. By contrast, in Western cultures, no one (no matter what his or her religion is) can felicitously use (36) to obtain a divorce.

(36) 'I hereby divorce you.'

But how about non-institutionalized speech acts? First of all, as said above, any given speech act may be culture-specific. Rosaldo (1982), for example, observed that the speech act of promising has no place among the Ilongots – a tribal group of hunters and horticulturalists in the Philippines. She attributes the absence of this speech act in the conceptual repertoire of the Ilongot to a lack of interest in sincerity and truth in that community. The Ilongot, argues Rosaldo, are more concerned with social relationships than with personal intentions. On the basis of anthropological evidence such as this, Rosaldo claims that the universality of Searle's typology of speech acts cannot be maintained. Another example of this kind has been reported for the Australian aboriginal language Yolngu. According to Harris (1984: 134–135), there does not seem to be any speech act of thanking in the Yolngu speaker's repertoire.

Conversely, a given speech act may be present only in certain cultures. For example, in the Australian aboriginal language Walmajari, one finds a speech act of requesting that is based on kinship rights and obligations. The verb in question is *japirlyung* (Hudson, 1985), and the speech act may be called 'kinship-based requesting,' because it conveys a message meaning roughly 'I ask/request you to do X for me, and I expect you to do it simply because of how you are related to me'. Thus, for the speakers of Walmajari, it is very difficult to refuse a kinship-based speech act of requesting (see also Wierzbicka, 1991: 159–160). 'Exotic' speech acts such as the kinship-based requesting do not seem to be present in other East Asian or Western cultures.

Secondly, given a particular situation, pertinent speech acts are carried out differently in different cultures. For instance, in some East Asian and Western cultures, if one steps on another person's toes, one normally performs the speech act of apologizing. But apparently this is not the case among the Akans, a West African culture. As reported by Mey (2001: 287, crediting Felix Ameka), in that culture, such a situation does not call for apologies but calls for the expression of sympathy: "The focus is on the person to whom the bad thing has happened rather than the person who has caused the bad thing" (Mey, 2001: 287). Another example: while in English, thanks and compliments are usually offered to the hosts when leaving a dinner party, in Japanese society, apologies such as *o-jama itashimashita* 'I have intruded on you' are more likely to be offered by the guests. A similar speech act of apologizing is performed in Japanese upon receiving a present, when a Japanese speaker is likely to say something like *sumimasen* – the most common Japanese 'apology' formula or one of its variants. Conversely (as pointed out by many authors), apologies can be used in a much broader range of speech situations in Japanese than in English.

Thirdly, in different cultures/languages, the same speech act may meet with different typical responses. For example, a compliment normally generates acceptance/thanking in English, but self-denigration in Chinese, Japanese, or even Polish. A typical compliment/response formula in Chinese would be something like (37).

(37) A: ni cai zuode zhen hao!
B: nali, nali, wo bu hui zuocai.
A: bie keqi. ni cai zhende zuode hen hao!
B: ni tai keqi le.
A: 'You cook really well!'
B: 'No, no, I don't really know how to cook properly.'
A: 'Please don't be too modest. You really cook very well.'
B: 'You're too kind.'

The same is even more true in Japanese. According to Mizutani and Mizutani (1987: 43), "[T]he Japanese will never accept a compliment without saying *iie* ['no']". Given the general Japanese reluctance to say 'no' under almost any other circumstances, the compliment response pattern is rather striking.

Fourthly, the same speech act may differ in its directness/indirectness in different cultures. Since the late 1970s, a great deal of research has been conducted on how particular kinds of speech acts, especially such face-threatening acts as requests, apologies, and complaints are realized across different languages (*see* **Face**). Of these investigations, the most influential is the large-scale Cross-Cultural Speech Act Realization Patterns Project (CCSARP) (Blum-Kulka *et al.*, 1989). In this project, the realization patterns of requesting and apologizing in German; Hebrew; Danish; Canadian French; Argentinean Spanish; and British, American, and Australian English were compared and contrasted. In the case of requests, the findings were that among the languages examined, the Argentinean Spanish speakers are the most direct, followed by the speakers of Hebrew. The least direct are the Australian English speakers, while the speakers of Canadian French and German are positioned at the midpoint of the directness/indirectness continuum. Building on the CCSARP, strategies for the performance of certain types of face-threatening acts in a much wider range of languages have since been examined. These languages include Catalan, Chinese, Danish, Dutch, French, German, Greek, Hebrew, Japanese, Javanese, Polish, Russian, Thai, Turkish, four varieties of English (British, American, Australian, and New Zealand), two varieties of French (Canadian and French), and eight varieties of Spanish (Argentinean, Ecuadorian, Mexican, Peninsular, Peruvian, Puerto Rican, Uruguayan, and Venezuelan). As a result of these studies, it has now been established that there is indeed extensive cross-cultural variation in directness/indirectness in speech acting, especially in the realization of face-threatening acts (FTAs), and that these differences are generally associated with the different means that different languages utilize to realize speech acts (*see* **Intercultural Pragmatics and Communication**). These findings have undoubtedly contributed to our better understanding of cross-cultural/linguistic similarities and differences in face-redressive strategies for FTAs (see Huang (2006) for detailed discussion).

Interlanguage Variation

A number of studies have recently appeared that explore speech acts in interlanguage pragmatics. Simply put, an interlanguage is a stage on a continuum within a rule-governed language system that is developed by L2 learners on the way to acquiring the target language. This language system is intermediate between the learner's native language and his or her target language (*see* **Variation in Second Language Acquisition**).

Some of these studies investigate how a particular type of speech act is performed by non-native speakers in a given interlanguage; others compare and contrast the similarities and differences in the realization patterns of given speech acts between native and non-native speakers of a particular language. The best studied interlanguage is that developed by speakers of English as a second language. Other interlanguages that have been investigated include Chinese, German, Hebrew, Japanese, and Spanish (see Huang (2006) for further discussion).

A few recent formal and computational approaches to speech acts and speech act theory are worthy of note. One important theoretical development is the integration of speech acts with intensional logic, resulting in what is called 'illocutionary logic' (Searle and Vanderveken, 1985; Vanderveken, 1994, 2002). Similarly, Merin (1994) has endeavored to produce an algebra of what he calls 'social acts.' Finally, recent formalizations of various aspects of speech act theory in artificial intelligence and computational linguistics can be found in Perrault (1990), Bunt and Black (2000), and Jurafsky (2004) (see also Sadock, 2004).

See also: Austin, John Langshaw (1911–1960); Carnap, Rudolf (1891–1970); Cooperative Principle; Deixis and Anaphora: Pragmatic Approaches; Face; Frege, Gottlob (1848–1925); Grice, Herbert Paul (1913–1988); Implicature; Inference: Abduction, Induction, Deduction; Intercultural

Pragmatics and Communication; Mood, Clause Types, and Illocutionary Force; Politeness; Pragmatic Acts; Pragmatics: Overview; Presupposition; Principles and Rules; Second Language Acquisition: Phonology; Speech Acts: Definition and Classification; Variation in Second Language Acquisition; Wittgenstein, Ludwig Josef Johann (1889–1951).

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Speech Acts and Artificial Intelligence Planning Theory

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Language and Action

Language is complicated. The scope of the current encyclopedia shows that clearly enough – if you read all the thousands of articles in this encyclopedia you still won't really know how language works.

Attempts to write computer systems that can process language simply emphasize this point. To write a computer system that can analyze or generate unrestricted natural language requires a collection of complex algorithms and data structures – speech recognizers and generators, lexica, sets of morphological and morphophonemic rules, grammars, parsers, logical form builders, inference engines – linked to vast amounts of background knowledge. To make matters worse, all of this knowledge has to be deployed in ways that make it robust when speakers or writers defy the conventional rules of their language. Language is complicated, and building computer systems that can understand and produce it is difficult.

If language is so complex, why do we use it? Because it is an extremely efficient way of getting information from one person to another, and in particular because it is an extremely efficient way of getting someone else to do what you want (or at any rate, of getting them to know what you want them to do: getting them to actually do it is yet another step). Since most human beings do not appear to possess telepathic powers, we cannot have direct access to what someone else believes, knows or wants, so making someone else aware of what we want is extremely challenging. The ability to convey new concepts by extending our vocabulary, and to produce new combinations of concepts at will simply by using new combinations of words, mean that we can use language to convey almost any wish that we can conceive of.

Getting someone else to understand what you want them to do is extremely valuable, since if they know what you want them to do, there is a reasonable chance that they will do it – certainly more chance than if they **don't** know what you want. So language provides devices for letting other people know what you want.

English, for instance, makes a distinction between assertions, which are normally used for conveying what you want your hearer to believe some proposition; questions, which are used to indicate that you want your hearer to provide you with information that you lack; and commands, which directly denote actions that you would like the hearer to carry out.

Assertions, questions, and commands have characteristic surface properties. Simple English questions, for instance, conform to a pattern where the utterance starts with an auxiliary verb, followed by the subject and then the remainder of the sentence. Other languages employ other markers, but most languages have some sort of surface marker for distinguishing between the utterance types. Working out what the speaker wants, then, should just be a matter of spotting and interpreting the surface markers.

The situation is, however, more complicated than that. People use utterances which look like questions to make statements or request actions (1); they use utterances that look like assertions to seek information or to request actions (2); and they use utterances that look like commands to seek information or, more infrequently, to make statements (3):

(1a) Do you know what time it is? (uttered standing underneath the station clock ≈ You're late)
(1b) Could you make me a cup of cocoa? (≈ Please make me a cup of cocoa)

(2a) I don't know where the milk is (≈ Please tell me where the milk is)
(2b) The door's open (uttered when someone has knocked ≈ Come in)

(3a) Tell me where the cocoa powder is kept.
(3b) Just accept that I'm right and you're wrong (≈ I'm right and and you're wrong)

Searle (1969), following suggestions by Austin (1962), introduced the notion of speech acts to explain that the production of utterances in appropriate circumstances can have 'real world' consequences. In some cases, Searle's speech acts have an effect on the external world simply by being performed. If a registrar says, at the end of a properly conducted ceremony, 'I now pronounce you man and wife,' then from that moment on those two people **are** man and wife: performing the linguistic action has actually changed the world. If you say 'I promise to do the washing up,' then from that moment on you are under an obligation to do the washing up. Simply performing the act transforms the world in ways that go beyond just changing the information that is available to the hearer.

In most cases, however, one cannot work out the ramifications of producing an utterance unless a great deal is known about the context in which it is produced. In particular, one may have to know about what the speaker knows and believes about the world in general, and about what they know and believe about the hearer's knowledge and beliefs

(including the hearer's knowledge and beliefs about the speaker's knowledge and beliefs, and . . .), as well as about the speaker's likely goals in the current situation. It seems, then, that if you want to build a computer system that can take part in an unrestricted dialogue with a human, you will have to provide it with the ability to reason about actions, knowledge, and beliefs.

Artificial Intelligence Planning Theory

How important is for a computer system that can take part in unrestricted dialogues to be able to handle cases (1–3)? If people don't actually produce utterances like these very often, then maybe there is no need to equip systems with the ability to handle them.

In order to find out how important it is for a system to be able to cope with particular phenomena, system designers often carry out 'Wizard of Oz' (WoZ) experiments to find out what users actually want to do. It is worth investigating whether it is always clear what a user means by every utterance they produce. If it is, then at least for practical dialogue systems there is no need to worry about the issues raised by (1–3).

In a WoZ experiment the experimental subject has access to input and output devices (keyboard and screen, microphone and speakers . . .) which are apparently connected to a software system that can carry out some task. The subject asks questions, and the system responds appropriately. By keeping a transcript of the dialogue between the subject and the system, you can obtain a great deal of information about user behavior: what sort of language they use, what sort of tasks they try to perform, what sort of information they want, and so on.

Of course, if you do the experiment **before** you build your program then there cannot be a system that carries out the task. Instead there is an experimenter who has access to the information that the desired system would have provided. The experimenter responds to the user by filling in slots in canned phrases, which are then typically played back to the user via a text-to-speech system to preserve the illusion that the response is being provided by a software system.

The point of such experiments is to find out how users would interact with an ideal system. If you know what your users would really like, you know what you have to aim for.

WoZ experiments consistently show that people habitually use **indirect** constructions when seeking information. We say 'Do you know when the next train to Buxton is?' to mean 'When is the next train to Buxton?'; we say 'Can you tell me which platform it goes from?' to mean 'Which platform does it go from?'; and so on.

We will return to **why** people use such circumlocutions below. The first task is to work out how you could produce a computational system that could spot that someone who says 'Do you know the time?' may be interested less in whether you know the time than in what the time is (though note that there are circumstances in which a question like this may be intended to mean exactly what its face value indicates, so you cannot just introduce a set of one-to-one translations).

The key observation in computational work in this area is that Searle's description of speech acts looks rather like the way actions are represented in planning theory in artificial intelligence (AI) (Cohen and Perrault, 1979; Allen and Perrault, 1980; Cohen and Levesque, 1980). Given that what is needed is a way to link linguistic actions to external actions in order to achieve what the speaker actually wants, and that AI planning theory provides a way of stringing external actions together to achieve specified goals, the idea of using existing approaches to planning in order to handle speech acts is very tempting.

The STRIPS Formalism

The approach to planning that underpinned early AI work on speech acts arose from attempts to enable robots to make plans by building sequences of basic actions in order to achieve complex goals. This work is usually illustrated by 'blocks world' examples – examples involving a robot with a single 'hand' which can be moved around until it is over a desired point in the work space, raised or lowered, and opened or closed. The reason for concentrating on this domain is that it is simple enough to support experiments using different planning algorithms, but also rich enough to illustrate most of the problems that arise in more complex domains.

Early AI work on planning starts from the observation that actions involve relations between situations (Fikes and Nilsson, 1971; Hart *et al.*, 1972). If you want to make a plan out of primitive actions, then there are two things you need to know about each possible action: under what circumstances it can be performed, and in what ways it changes the world. These are not the only things that matter – you might, for instance, be concerned about how long an action takes, or what resources it consumes – but they are the key issues.

Fikes and Nilsson (1971) presented a representation language for describing actions and an algorithm for constructing sequences of actions to achieve

specified sets of goals. The original presentation of the STRIPS (Stanford Research Institute Problem Solver) formalism was fairly dense, but the essence is captured by saying that what matters about an action is the conditions under which it can be performed (its preconditions) and the propositions that it makes true (its effects). The original STRIPS notation divided the effects into an add list of propositions that will become true after the action is performed and a delete list of propositions that will become false. This division becomes rather awkward when you try to apply this framework to speech acts, so in this article we will simply talk about the effects, some of which may be negated. It turns out that adding a set of 'subactions' which specify how you actually carry out this action is useful, e.g., that in order to grasp something you have to run the motor that controls the gripper. This was not present in the standard formulation of the STRIPS schemata, but is crucial when you try to apply AI planning theory to linguistic action, so the initial presentation of this work will include it.

A typical blocks world action, for instance, might look as follows:

action(*grasp*(*X*),
  preconditions([*handEmpty*, *clear*(*X*),
    on(*X*, *Y*)]),
  effects([*holding*(*X*), *clear*(*Y*), *not*(*handEmpty*),
    not(*on*(*X*, *Y*))]),
  subActions([*close*(*switch*17)])

This action schema says that (i) you can grasp an object X if your hand is empty, X is clear, and it is resting on some other object Y; (ii) once you have grasped X then you will be holding X, and Y will be clear, and your hand will no longer be empty, and X will no longer be on Y; and (iii) the way to perform a grasping action is to turn on the relevant motor when you are in the right position.

This representation of grasping is very rough. The assumption that as soon as you grasp something you have taken its weight, so that it is no longer resting on the surface where it was when you grasped it, is open to debate. The need for dual terms is irritating (why are *handEmpty* and *holding*(*X*) both required? Surely my hand is empty precisely when I am not holding anything). Nonetheless, this approach to action descriptions has been at the core of nearly all approaches to planning since the original papers about STRIPS.

Given a set of action schemata of this kind, there are a number of ways of constructing sequences of actions that will transform an initial state of affairs so that it matches some specified set of goals. We will examine two of these ways here, the 'state space search' and the 'plan space search.'

In the state space search, you may decide to construct a plan by trying different actions and examining the different states of affairs that they lead to. This approach, which was taken in most early work on planning, is known as 'state space search' because it involves looking at the different states that would be produced by various partial plans.

There are two basic strategies for carrying out state space planning:

- Backward chaining: You can look for an action *A* whose effects contain something that matches one of your goals *G*. If you could perform this action, then *G* would become true, so this looks like a good candidate as part of a plan for achieving at least one of your current goals. Unfortunately, it may not be possible to perform *A* in the current situation, because one or more of its preconditions may not be satisfied. But if you add the currently unsatisfied preconditions to the set of open goals, then you may be able to find actions which would achieve them and hence allow you to perform *A*, and achieve *G*.
- Forward chaining: You can look for an action *A* which is performable in the current situation, and see whether the result of performing it would be any better. You may have some measure of whether you are getting closer to your goals, or you may do this blindly, just trying things out at random to see what happens.

Backward chaining seems, at first sight, to be more sensible, since it involves looking for actions that can be seen to have some direct connection with the desired outcomes. There are, however, many situations in which backward chaining fails, and there is a substantial literature on techniques for combining the best of both strategies, and for avoiding the problems that arise with simple-minded backward chaining.

Recent work on planning in robotics domains takes a slightly different approach, the plan space search (Blum and Furst, 1997; Kambhampati, 1997; Bonet and Geffner, 2001). Instead of looking at the states of affairs that would be produced by different partial plans, you look at underspecified plans and try to reason about ways to improve their utility. An underspecified plan for making a meal, for instance, might consist of the **unordered** set *prepare starter, prepare main course, prepare dessert*. Given such a skeleton, you might refine it by deciding on the order in which you want to carry out these actions, so you might decide that the starter should be prepared first, and then the main course, and then the dessert. Or you might refine it by choosing what main course to have, and then choosing starters and desserts that will complement this main course, and only then deciding on the order in which to prepare them.

Plan space search originates with work on planning by analogy (Carbonell, 1983) and on metaplanning (Stefik, 1981a, 1981b). As with state space search, you can search backward or forward or use some combination of both. Plan space search seems to be very effective for problems where the effects of an action can be checked by direct inspection, but if the consequences of some action can vary depending on the situation in which it is carried out, then state space search may be a better choice.

The STRIPS formalism can be employed in any domain where actions can be characterized in terms of preconditions and effects. Is it possible to give such characterizations of linguistic actions?

Suppose, for instance, you wanted to describe what is involved when you inform someone of some fact. Consider the following schema:

$$
\begin{aligned}
&\mathit{action}(\mathit{inform}(S, H, P),\\
&\quad \mathit{preconditions}([\mathit{believe}(S, P),\\
&\qquad\qquad \mathit{not}(\mathit{believe}(S, \mathit{know}(H, P)))])\\
&\quad \mathit{effects}([\mathit{believe}(H, P),\\
&\qquad \mathit{believe}(S, \mathit{believe}(H, P))])\\
&\quad \mathit{subActions}([\mathit{state}(P')])
\end{aligned}
$$

This says that for a speaker S to successfully inform a hearer H of some proposition P, the speaker must believe P, and the speaker must not believe that the hearer already knows P. After the action is successfully performed, then H will believe P and S will believe that H believes P. In order to carry out such an action, you have to utter some sentence P' that encodes the proposition P.

Much of this seems reasonable enough. In particular, it draws out some of the distinctions between informing somebody about something; simply saying it to them (which you can do at any point: you can say 'I used to own a green cat' at any moment, but you cannot inform anybody that you used to own a green cat unless you actually did, which is unlikely to be the case); and reminding or nagging them about it – if you say 'You haven't done the washing up' in a situation where it is clear that your hearer knows they haven't done it, you are nagging them, not informing them. Furthermore, the suggestion that after you have informed someone of P then they will believe it, and you will believe they believe it, also seem reasonable. So it looks as though linguistic actions can be described within this framework:

$$
\begin{aligned}
&\mathit{action}(\mathit{nag}(S, H, P),\\
&\quad \mathit{preconditions}([\mathit{believe}(S, P),\\
&\qquad\qquad \mathit{believe}(S, \mathit{know}(H, P))])\\
&\quad \mathit{effects}([\mathit{believe}(H, P),\\
&\qquad \mathit{believe}(S, \mathit{believe}(H, P))])\\
&\quad \mathit{subactions}([\mathit{state}(P')])
\end{aligned}
$$

$$
\begin{aligned}
&\mathit{action}(\mathit{query}(S, H, P),\\
&\quad \mathit{preconditions}([\neg(\mathit{believe}(S, P)),\\
&\qquad\qquad \neg(\mathit{believe}(S, \neg(P))),\\
&\qquad\qquad \mathit{believe}(S, \mathit{know}(H, P)\\
&\qquad\qquad\qquad \vee \mathit{know}(H, \neg(P)))])\\
&\quad \mathit{effects}([\mathit{believe}(H,\\
&\qquad\qquad \mathit{want}(S, \mathit{know}(S, P)\\
&\qquad\qquad\qquad \vee \mathit{know}(S, \neg P))))])\\
&\quad \mathit{subActions}([\mathit{question}(P')]))
\end{aligned}
$$

Knowledge, Belief, and Action

Suppose you had a set of action schemata of this kind and you wanted to use them for planning what to say, or for interpreting what has been said to you. Is it possible to use any of the standard planning algorithms?

Consider, for instance, a situation in which you want to express your annoyance that I have not done the washing up. You might decide that nagging me about it would relieve your feelings. In order to do this, you have to carry out the following actions:

1. You have to verify that the preconditions hold, i.e., that you believe I haven't done it and that you believe I know I haven't done it.
2. You have to find a form of words that says that I haven't done it.

It seems very unlikely that you could check the preconditions by inspection of some description of the world. For blocks world problems you can just look at the current configuration of the blocks and see whether something is clear. This just isn't going to work when the preconditions are concerned with beliefs, and nested beliefs, and negated beliefs. Verifying the preconditions of an action like *nag* requires to you to carry out inference about your own and your hearer's knowledge and belief.

This requirement is even more marked when we consider how you would choose which action to perform in the first place. Informally, nagging someone about doing the washing up involves some chain of reasoning like the following:

1. Steven hasn't done the washing up, even though it's his turn.
2. He'll do it if I make him feel guilty about it.
3. He'll feel guilty about it if he becomes aware that I know that he knows that he hasn't done it even though it's his turn.
4. So I'll say "You haven't done the washing-up" in an appropriately bad-tempered manner.

Note the complex nesting of who knows what at step 3. To make someone feel guilty you have to let them know them know that you are **mutually aware**, or something pretty close to it, of the relevant facts. Note also that you probably don't have to say 'You

haven't done the washing up, even though it's your turn.' You and your hearer would both know that there was a mutually agreed rota of domestic tasks, and you would expect him to add the fact that you are now mutually aware that he hasn't done the washing up to this shared knowledge to arrive at the conclusion that you want him to feel guilty.

There are a lot of loose ends in this informal discussion (particularly concerning the notion of mutual knowledge [Moore, 1984; Fagin and Halpern, 1989]), but it should be clear that once you start reasoning about the preconditions and effects of even quite simple speech acts you need to be able to carry out inference about nested knowledge and beliefs.

A great deal of AI work on reasoning about knowledge and belief has built on Hintikka's (1962) observation that if you write down a set of rules for this task, they tend to look like rules of some modal logic. Consider, for instance, the following fairly intuitive observations about knowledge and belief:

1. If you know something it must be true (note the difference between 'I used to believe that the earth was flat, but now I realize I was wrong' and 'I used to know that the earth was flat, but now I realize I was wrong.' As soon as you realize that you were wrong, you have to downgrade your previous opinion from knowledge to belief, because you can't know something that isn't true).
2. You can carry out reasoning with what you know and believe. If you believe that it is Steven's turn to do the washing up, and you believe that he has not done it, then you can add the proposition that he has broken the rules of our arrangement to your belief set.
3. You can reflect on what you know and believe. For me to be confident about writing an article about speech acts, for instance, I have to believe that I know something about the topic. Simply knowing about the topic will not suffice: I have to **believe** that I know about it. (Of course, my belief that I know about the topic may be ill founded, but that would not stop me. What matters is my belief that I know about it.) How did I come by this belief? By reflecting on what I know about it, and deciding that the sources from which I have gained my knowledge are reliable.

If you try to turn these into a set of axioms as the basis of a logic of knowledge and belief, you will end up with something like the following:

(i) $\forall X \forall P(know(X, P) \rightarrow \mathrm{P})$

(ii) $\forall X \forall P(know(X, P) \rightarrow bel(X, P))$

(iiia) $\forall X \forall P \forall Q((know(X, P) \,\&\, know(X, P \rightarrow Q)) \rightarrow know(X, Q))$

(iiib) $\forall X \forall P \forall Q((bel(X, P) \& bel(X, P \rightarrow Q)) \rightarrow bel(X, Q))$

(iva) $\forall X \forall P(know(X, P) \rightarrow know(X, know(X, P)))$

(ivb) $\forall X \forall P(bel(X, P) \rightarrow bel(X, bel(X, P)))$

(v) $\forall X \forall P(bel(X, bel(X, P)) \rightarrow bel(X, P))$

(i) and (ii) say that whatever you know must be true and that you will believe anything you know, (iiia) and (iiib) say that you can carry out inference over your knowledge and beliefs, (iva) and (ivb) say that you can introspect about what you know and believe, and (v) says that you trust your own beliefs (there is no need for a version of [v] dealing with knowledge, since this would follow directly from [i] anyway).

These axioms look very similar to the standard axioms of modal logic, so that it may be possible to reason with them using techniques that have been developed for modal logic. This is attractive in itself, since it means that there may be no need to devise new inference engines for dealing with knowledge and belief. It becomes even more appealing when you realize that the STRIPS notation for actions is itself a shorthand for a modal logic. Modal logic is concerned with notions of possibility and necessity, which are interpreted by introducing a notion of 'accessible possible worlds.' Roughly speaking, some proposition is possible if you could imagine being in a situation where it is true. Of course, exactly what you can imagine depends on who you are. This variation is captured by allowing different accessibility relations between possible worlds – if you are prepared to suspend the laws of physics, then you can imagine a world in which objects can travel faster than light; if you are prepared to suspend the details of the physical structure of the universe we live in but not the general laws of physics, you can imagine a world in which objects can travel faster than 300 000 km/s.

The notion of possible worlds doesn't **explain** what is meant by saying that something is possible, since there is a clear circularity here. But it does provide a framework for considering different notions of possibility, and it has been widely used when trying to develop inference mechanisms for reasoning about possibility (and necessity, since a proposition P is necessarily true exactly when its negation is not possible: $nec(P) \leftrightarrow \neg(poss(\neg(P))))$.

It is easy to see a connection between the STRIPS notation for actions and the idea of possible worlds. If you could perform an action A whose effects include the proposition P then P would be true in the

world that resulted from performing *A*. So if the set of possible worlds is taken to be the set of states of affairs that could be obtained by performing one of the available actions, the logic that is defined by the STRIPS operators is just standard modal logic. Actually, it's not quite that simple, because the standard STRIPS notation exploits a default assumption that propositions don't change their truth value unless some action explicitly changes it. This assumption has to be added to modal logic, and doing so makes things a bit more complex, but the basic ideas are fairly similar.

If reasoning about knowledge and belief and reasoning about actions can both be done by exploiting the same mechanisms, then it should be possible to combine the two very smoothly. Just define different notions of accessibility and use the same engine.

The idea that you could combine reasoning about actions and reasoning about beliefs in this way was explored in Moore (1984), and was further developed for reasoning about speech acts by Appelt (1985). If you can describe speech acts by using a STRIPS-like formalism which talks about knowledge and belief in the preconditions and effects lists, and you have a general framework for reasoning about actions, knowledge, and belief, then surely you have a way of reasoning about speech acts.

Problems

Just how good is this kind of formalism for describing speech acts? Is it possible to use this kind of approach for determining whether 'The door's open' is a simple statement of fact or an invitation to come in, or whether 'Could you pass me the salt?' is a straightforward inquiry about the hearer's capabilities or a request to be passed the salt?

It is clear that something of this kind underlies these indirect utterances. Utterances like these do lead to different consequences in different situations, and the reason why they do so is that their function is to satisfy epistemic preconditions of some action within a larger plan. Why would someone who wanted to know the time say 'Do you know the time?' What they really want to do is to ask 'What is the time?' but they know that their hearer won't be able to answer this question unless they have the required information. So before asking the question they really want answered, they make sure that their hearer is in a position to answer it. But if the hearer is capable of reasoning about why the speaker asked the preparatory question, and hence taking a shortcut whereby they answer both the preparatory question and the substantive one – 'Yes, it's nearly 11' – then they are also capable of reasoning about why the speaker wanted to ask the substantive question in the first place, and hence saying 'No, but it's OK, they haven't called last orders yet.' (In English pubs the bar staff make it pretty clear when closing time is approaching and you only have a few minutes left to order a drink.)

The need for such an approach is thus evident, with a substantial body of work attempting to provide computer systems that embody these ideas reported in Cohen *et al.* (1990). There remain, however, two open questions: (i) does characterizing a set of speech acts within some AI planning framework provide a useful link between the simple surface meaning and the speaker's goals, and (ii) if it does, are current AI planning algorithms good enough to make use of these distinctions?

The answer to the second of these questions is simple. No existing AI planner can carry out all the inference required for linking 'Do you know the time?' to 'It's OK, they haven't called last orders.' Plan space planners cannot even attempt to solve this kind of problem, since they rely on static analysis of the relations between preconditions and effects. Descriptions of speech acts are extremely underspecified, and determining the consequences of even a fully determined utterance in a given context can require arbitrary amounts of epistemic reasoning. As such they are not susceptible to this kind of static analysis. Backward-chaining state space planners, however, can be adapted for this problem. The key observation here is that you cannot generally verify the preconditions of a speech act by inspection. In many cases, you have to try to **prove** that the preconditions hold. If your inference engine is allowed to construct hypothetical proofs by taking the effects of actions as things that wouldbe true if the action were performed, you can integrate planning and reasoning in a fairly seamless way (Field and Ramsay, 2003, 2004).

Even so, if you combine the difficulty of carrying out epistemic reasoning over a nontrivial knowledge base at all with the extra complications that arise from ensuring that you have a coherent plan, then the task can become extremely challenging. To solve it using current planners, you need a library of known plan schemata to have any real hope of responding within an acceptable period of time.

If the planning activity is in general so complex, does introducing a set of fine-grained speech acts make it any easier? If there were surface markers to distinguish nagging from reminding, and reminding from informing, and informing from lying, then things would be much easier. If you said 'I am now nagging you about the washing up,' or 'I am now asking you whether you know the time in preparation for asking a supplementary question about what time it is, in order to know whether it's too late to buy

another drink,' then the planning and plan recognition tasks would be greatly simplified. But people don't talk like that, except in situations where it is crucial to avoid any potential for ambiguity (legal cases, military operations). In everyday situations we say 'You haven't done the washing up' and 'Do you know the time?' and rely on the hearer to infer what we actually want them to do.

If you knew that someone was asking a preparatory question, then you could try to reason about what they were planning to do next. If you knew someone was nagging you then you could try to think of an excuse. The trouble is that the surface form does not provide any very strong steer in the matter. 'You haven't done the washing up' and 'You haven't done anything wrong' don't carry very clear markers saying that the first is likely to be a nag and the second is likely to be a reassurance. To work out which is which, you have to carry out some fairly complex inference about who knows what, about likely obligations, and about likely goals. Once you have done this, you will be most of the way to understanding what the speaker really wants. The work you have to do in order to identify which speech act was performed is exactly the work that identifying the speech act helps you avoid doing.

A number of authors have therefore suggested being less ambitious about the range of speech acts that should be axiomatized. Bunt (2000), for instance, suggests restricting attention to the acts that have recognizable surface forms – asserting, questioning, commanding. When you look closely at these actions, however, you see that the preconditions and effects are rather bare. There are almost no constraints on the circumstances in which you can assert something; you can say 'I used to own a green cat' whenever you like. And because there are no constraints on when you can say it, there are also very few completely reliable effects. The only reliably predictable effect is that if I was actually listening, then we will share the knowledge that you said it, though neither of us need believe that it's actually true. It seems likely, then, that while the use of AI planning theory, particularly in conjunction with the use of libraries of common epistemic plans, will help us in building slightly more flexible dialogue systems, a number of foundational issues about why linguistic actions have any nontrivial effects remain unanswered.

See also: Austin, John Langshaw (1911–1960); Modal Logic; Mood, Clause Types, and Illocutionary Force; Speech Act Verbs; Speech Acts; Speech Acts: Definition and Classification; Speech Acts, Literal and Nonliteral.

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Speech Acts and Grammar

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Language as Action: Performatives vs Constatives

J. L. Austin (1962), in his posthumously published book *How to do things with words* was the first to introduce the idea of speech acts (SA), analyzing the relationships between utterances and performance. His first goal was to point out the limitations of truth conditional semantics, i.e., the (logical positivist) view of language that places truth conditions as central to language understanding. Austin was convinced that we do not just use language to **say** things (make statements), but also to **do** things (perform actions). He formalized this opposition in his so-called performative hypothesis (which he would later abandon) by contrasting two types of utterances: constative utterances, or constatives, and performative utterances, or performatives (*see* **Speech Acts**).

Constatives are essentially like the classical statements. Their function is to describe some event, process, or state of affairs. The proposition that is expressed can be either true or false. Some examples are given in (1). Note that actually, at the time of this writing, at least one of these utterances is false.

(1) a. I'm driving a green car.
b. I have four children.
c. I am expecting a baby.

By contrast, performatives are utterances that have no truth conditions (see below), but this does not mean that they are meaningless, as illustrated by the examples in (2) (from Truckenbrodt, 2004).

(2) a. I sentence you to 2 years in prison.
b. I name this ship 'Liberté.'
c. I accept your offer.
d. I promise to pick you up at the airport.
e. I warn you not to come to my house again.
f. I advise you to stop smoking.

Formally, the utterances in (1) and (2) are alike. They are all declarative sentences, in the first person singular, and use the present tense. They do not, however, do the same job. While the utterances in (1) are statements, the utterances in (2) are used to perform an action, i.e., to do something (promising, warning, advising, etc.), rather than to say that something is or is not the case. To be successful, the performative must be issued in a situation that is appropriate, in all respects, for the act in question: if the speaker does not meet the conditions required for its performance, then the utterance will be 'unhappy,' 'void,' or 'infelicitous' (Austin, 1975: 14).

The conditions of 'happiness' of performative utterances (later called felicity conditions, see below) state how and when utterances are valid, in a real situation. A performative can be unhappy in two ways:

- The circumstances and conditions in which the utterance is performed are not appropriate (incorrect uttering of the formula, the actors involved do not meet the conventional requirements, the speaker is joking, etc.), in which case the act in question is not successfully performed at all, i.e., it is not achieved; or
- The utterance is issued insincerely (such as when I say *I promise* and have no intention of keeping it), in which case the act **is** achieved but with abuse of the procedure (I have promised but will not follow my promise).

Summing up, performatives are different from constatives in at least two ways (see also Truckenbrodt, 2004). First, performatives are used to do something, they create new facts (other than the fact that someone has said that something is or is not the case). Thus, a judge saying (2a) under the right circumstances in court creates the fact that the hearer is sentenced to 2 years in prison. An authorized person saying (2b) in the right circumstances creates the fact that the ship now has a name. Likewise, by saying (2c) the speaker creates a fact of commitment to accept the offer. By promising, as in (2d), a promise has been made that has consequences. Similarly, in (2e), the listener has been warned; and in (2f), the listener has been given advice. These facts may seem to be relatively similar to the fact created by a statement (*viz.*, that someone has said that something is true). Nevertheless they are different. As Austin clearly indicated, for example, an explicit promise as in (2d) is not, and does not involve, the statement that one is promising. It is an act of a distinctive sort, the very sort named by this particular performative verb (*to promise*). Of course one can promise without doing so explicitly by using the performative verb *promise*, but if one does use it, one is, according to Austin, making explicit what one is doing but not stating that one is doing it.

The second way in which performatives are different from constatives is that performatives cannot be said to be true or false. If the utterances in (2) are performed under the appropriate circumstances, there is no issue of them being true or false. If they

are made under the right circumstances, and by the right person, they may be said to be automatically true, in a certain sense. But if they are not made under the appropriate circumstances, they do not become false; rather they become unhappy or void, as shown above. It is clear that this is different from a statement being false. Instead, the statement represents an attempt to perform an act of the relevant kind, but an attempt that does not work out.

What About Grammar?

Performatives normally involve a first person subject (typically *I*) and a performative verb, as in (2) above (where the performative verbs are *promise*, *name*, etc.). Working with examples of everyday language to show how performances can happen, Austin (1975: 151) claimed five general classes of performative verbs (even though he admits that the distinction between various kinds of utterances is not always clear):

1. Verdictives, which give a finding or verdict by a jury, arbitrator, or umpire (sentencing, pleading, pronouncing, etc.).
2. Exercitives, which are the exercising of a power, right, or influence (appointing, voting, ordering, urging, advising, warning, etc.).
3. Commissives, which commit you to an action, including declarations or announcements of intention (promising, announcing, opening, declaring, etc.).
4. Behabitives, expressing attitudes about social behavior (apologizing, congratulating, commending, condoling, cursing, challenging, etc.).
5. Expositives, which make plain how utterances fit into conversations or arguments (I reply, I argue, I concede, I illustrate, I assume, etc.).

Performatives moreover tend to use the simple present tense and are indicative (*I promise I'll come tomorrow*). This is because they are pronounced for the purpose of acting on a real situation, and thus they usually cannot refer to past events. Nevertheless, performatives are also regularly found in the passive voice, as in (3) (from Austin, 1975: 57).

(3) You are hereby authorized to pay.
Passengers are warned to cross the track by the bridge only.
Notice is hereby given that trespassers will be prosecuted.

Noteworthy about these examples is that they contain the adverbial *hereby*. The insertion of this adverb is indeed often suggested as a test meant to distinguish performatives from constatives. All utterances in (2) allow the presence of *hereby* (see [4]), while the constatives in (1) do not (see [5]).

(4) a. I *hereby* sentence you to two years in prison.
b. I *hereby* name this ship 'Liberté.'
c. I *hereby* accept your offer.
d. I *hereby* promise to pick you up at the airport.
e. I *hereby* warn you not to come to my house again.
f. I *hereby* advise you to stop smoking.

(5) a. # I'm *hereby* driving a green car.
b. # I *hereby* have four children.
c. # I am *hereby* expecting a baby.

This difference between constatives and performatives is found across languages. In French *par la présente* works like English *hereby*, the German counterpart is *hiermit*, the Dutch one is *bij deze(n)*, the Spanish one is *por la presente*, etc.

As mentioned above, it is not absolutely necessary to actually pronounce the performative verb *to promise* to perform the action of promising. In principle, utterance (6a) will probably have a similar effect on the hearer as does utterance (2d), repeated here as (6b) for convenience.

(6) a. I'll pick you up at the airport.
b. I promise to pick you up at the airport.

Thus, in some sense, all verbs can be performatives. To account for this, Austin refined his classification: the utterances called performatives above are now called explicit performatives. These are distinguished from primary performatives, in which the performative part is implicit, as in (6a). Austin eventually realized that explicit constatives function in essentially the same way as performatives. After all, a statement can be made by uttering *I assert* . . . or *I predict* . . ., just as a promise or a request can be made with *I promise* . . . or *I request* . . . In addition, the utterances in (7) illustrate that explicit constatives can cooccur with *hereby*, and that they are automatically true, which makes them totally identical to explicit performatives, whereas the corresponding primary performatives to (7) are statements, not actions (see [8]).

(7) a. I (hereby) tell you that I am not traveling to the U.S. next week.
b. I (hereby) assert that this president is the most stupid one we ever had.

(8) a. I am not traveling to the U.S. next week.
b. This president is the most stupid one we ever had.

As pointed out by Thomas (1995), Austin's performative hypothesis convincingly documented the fact that people do not use language just to make

statements about the world: they also use language to perform actions that affect the world in one way or another. However, the position that **only** performative verbs could be used to perform actions turned out to be untenable. Thomas (1995: 44–46) gives three different reasons for the collapse of Austin's performative hypothesis.

- There is no formal (grammatical) way of distinguishing performative verbs from other sorts of verbs. Like all other verbs, performatives can be plural as well as singular, they can be written and spoken, they do not have to be in the first person, nor is it essential that they be in the active mood.
- The presence of a performative verb does not guarantee that the specified action is performed. One can indeed use the verb *to promise* to actually perform a threat, rather than a promise, as in *I promise things will go wrong for you if you don't go to bed immediately!*
- There are ways of doing things with words that do not involve using performative verbs. Indeed, for a great many very common acts such as offering, boasting, expressing an opinion, hinting, insulting, etc., it would be most odd to use a performative verb. In addition, there are also acts for which the language does not even have a performative verb, such as letting the cat out of the bag, putting one's foot in it, pulling someone's leg, etc.

As a consequence, Austin completely abandoned his original distinction between constative and performative utterances; instead, he distinguished between the truth conditions of statement and those of the action it performs. In other words, the proper distinction is that between locutionary and illocutionary acts.

Locution, Illocution, Perlocution

In addition to providing the insight that utterances are used to perform actions, speech act theory assumes that speakers are simultaneously involved in three different speech acts when uttering a sentence:

1. a locutionary act: the act of using words to form sentences, those wordings making sense in a language with correct grammar and pronunciation.
2. an illocutionary act: the intended action by the speaker, the force or intention behind the words, within the framework of certain conventions.
3. a perlocutionary act: the effect that an utterance has on the thoughts, feelings, attitudes, or actions of the hearer.

These acts are not parts, but dimensions of a speech act, which means that they cannot be performed in isolation. Any utterance will always exhibit all of these different dimensions. Thus, in order to have a speech act one needs a meaningful linguistic expression (locution), that is produced, one, with some kind of function or communicative purpose in the speaker's mind, such as making a statement, an offer, an explanation, a threat, etc., (illocution), and two, with some intended effect on the hearer, such as to get the hearer to perform some action, or to have her/him understand a problem, etc., (perlocution). Bach (2003) illustrates this with the example given in (9):

(9) The bar will be closed in five minutes.

In uttering (9), a bartender would be performing the *locutionary* act of saying that the bar (i.e., the one he is tending) will be closed in 5 minutes (from the time of utterance). In saying this, the bartender is performing the illocutionary act of informing the patrons of the bar's imminent closing (and perhaps also, and not unimportantly, the act of urging them to order a last drink). Finally, the bartender also intends his utterance to produce further effects, by performing the perlocutionary acts of causing the patrons to believe that the bar is about to close and of actually getting (and not just urging) them to order one last drink. He is performing all these speech acts, at all three levels, just by uttering the above words.

Of these three dimensions, the one most discussed is the illocutionary act (also referred to as the illocutionary force). The term 'speech act' has indeed come to refer exclusively to this kind of act, which thus corresponds most closely to the notion of performative described above, as they can (but need not) be performed by means of a performative formula.

What About Grammar?

Generally speaking, there is a close and predictable connection between locution and illocution of an utterance. That is, all competent (adult) speakers of a language can mostly predict or interpret the intended illocutionary force of an utterance with reasonable accuracy. As pointed out by Thomas (1995: 50), "human beings simply could not operate if they had no idea at all how their interlocutor would react (...)." Most typically, the sentential moods declarative, interrogative, and imperative (*see* **Mood and Modality in Grammar**) are used with the functions shown in Table 1 (based on Truckenbrodt, 2004) .

However, this relation between form and function only works in the typical cases (and it remains questionable whether these cases are the most frequent ones). Clearly, we cannot say: a declarative has by

Table 1 Relationship between form and function of speech acts

Syntactic form	*Illocutionary act*	*Illocutionary force*
Declarative	Statement	Speaker commits to content
Interrogative	Question	Request for information
Imperative	Command	Attempt to get listener to do something

definition the function of a statement, or an interrogative has by definition the function of a question (see below). This means that sometimes things can go wrong, mostly because the same locutionary act can have different illocutionary forces. For instance, depending on the context of utterance, (10) – a declarative – could count as a prediction, a promise, or a warning.

(10) I'll be back.

The most obvious way to help the hearer recognize the intended illocutionary force of an utterance is by using an explicit illocutionary act. Explicit acts contain a so-called IFID or illocutionary force indicating device, i.e., an expression naming the act. In most cases, this is a performative verb that explicitly names the illocutionary act being performed (I *warn* you that, I *predict* that, I *promise* that, etc.). While speakers do not always make their speech acts this explicit, still the context may force them to identify the speech act being performed. This is illustrated in the (constructed) telephone conversation in (11) (from Yule, 1996: 49–50).

(11) Him: Can I talk to Mary?
Her: No, she's not here.
Him: I'm asking you – can I talk to her?
Her: And I'm telling you – SHE'S NOT HERE!

In this scenario, each speaker describes the illocutionary force of their utterances. Most of the time, however, no performative verbs are mentioned. Yule (1996) mentions some further IFIDs that can draw the attention to the illocutionary force being employed, such as word order, stress, intonation, changes in voice quality, etc.

Of course, to be recognized, the utterance should also be produced under certain (conventional) conditions for it to count as having the intended illocutionary force; that is, it should meet a number of felicity conditions, a notion that was developed by Searle (1969), building on Austin's original work. In addition to the general conditions on the participants (such as that they understand the language being used and that they are not play-acting or uttering nonsense), Searle distinguishes preparatory, propositional, sincerity, and essential conditions, differing as to the function of the speech act at hand. Example (12) illustrates the conditions for the act of *promising* (Searle, 1969: 62ff; as cited in Saeed, 2003: 229):

(12) Conditions for promising
[where S = Speaker, H = Hearer, A = the future action, P = the proposition expressed in the speech act, *e* = the linguistic expression]
a. Preparatory 1: H would prefer S's doing A to his not doing A and S believes H would prefer S's doing A to not doing A.
b. Preparatory 2: It is not obvious to both S and H that S will do A in the normal course of events.
c. Propositional: In expressing that P, S predicates a future act of S.
d. Sincerity: S intends to do A.
e. Essential: the utterance *e* counts as an undertaking to do A.

Thus, the preparatory conditions for a promise should guarantee that when I promise to do something, the event will have a beneficial effect on the hearer, and second, it will not happen by itself. So, telling one's spouse *I'll be home at six* when leaving for work might not be considered a typical promise, unless I usually come home at seven or eight and my spouse would like me to come home earlier. The propositional condition reflects the fact that the content of the utterance has to concern a future event – I cannot promise something that already has happened – and that the future event will be an act of the speaker – I cannot promise my family that our neighbor will do the dishes tonight. Related to these conditions is the sincerity condition: when I promise to do something, I really must intend to carry out the future action – I cannot genuinely promise that I will be home at six if I already know that I have a meeting starting at six! Finally, the essential condition covers the fact that by uttering my promise, I commit myself to the obligation of carrying out the future action.

According to Searle, the conditions related to the speech act of promising are of general applicability and thus it should be possible to establish rules of this type for every speech act. Searle does so for some eight additional speech acts: requesting, asserting, questioning, thanking, advising, warning, greeting, and congratulating. Thomas (1995: 95ff), however, criticizes Searle's endeavor and raises four interrelated sets of problems with respect to these rules:

- It is not always possible to distinguish fully between one speech act and another (partly because the conditions specified by Searle only tend to cover the central or most typical usage of a speech act verb).

- If we attempt to plug all the gaps in Searle's rules, we end up with a hopelessly complex collection of *ad hoc* conditions.
- The conditions specified by Searle may exclude perfectly normal instances of speech act, while they would permit anomalous uses.
- The same speech act verb may cover a range of slightly different phenomena and some speech acts do indeed overlap; Searle's rules do no account for this.

Categorizing Speech Acts

Any language has probably several hundred verbs that can be used to describe a kind of action that can be performed with an explicit or an implicit speech act. Is there a plausible way of grouping all these different speech acts into categories? In contrast to Austin's (1962: 109ff) first, very tentative classification, based on actual performative verbs (a classification which he did not consider definitive), Searle's (1976) categorization of speech acts into five types, each with their general function, has become a classic, and is still often referred to today. Its main improvement with respect to Austin's is probably that it clearly separates the notion of speech act from that of speech act verb. In other words, "the existence or nonexistence of [a speech act verb (or performative verb)] cannot be a criterion for the existence or nonexistence of a particular speech act" (Mey, 2001: 117) (*see* **Speech Acts: Definition and Classification**).

1. Representatives commit the speaker to something's being the case, to the truth of the expressed proposition, typically statements, assertions, conclusions, descriptions, etc., such as *The earth is flat; It's cold here; Chomsky didn't like butterflies*.
2. Directives are attempts by the speaker to get the hearer to do something. They express what the speaker wants; typical representatives are commands, orders, requests, suggestions, etc., such as *I warn you to stay away from my house!; Mum, can I have a cookie, two please?*
3. Commissives commit the speaker to some future course of action. They express what the speaker intends: typically, promises, threats, refusals, offerings, etc., such as *I promise that I'll be home at six; I'll be back; I will not marry you*.
4. Expressives are used to express the psychological state of the speaker. They state what the speaker feels and can be statements of joy, pain, sorrow etc., but also expressions of thanking, apologizing, welcoming, congratulating, etc., such as *I congratulate you on winning the race; I'm really sorry; YESSS!*
5. Declarations effect immediate changes in the institutional state of affairs, i.e., they change the world via the utterance. The speaker has to have a special institutional role, in a specific context, in order to be able to perform a declaration appropriately; typical examples include excommunicating, declaring war, marrying, firing from employment, nominating, etc.

Searle uses a mix of criteria to establish these different types; these include the act's illocutionary point, its fit with the world, the psychological state of the speaker, and the content of the act (cf. Saeed, 2001: 228–229; Mey, 2001: 119–126). The illocutionary point is the purpose or aim of the act; it corresponds most closely to the definition of the speech act types given above. The fit concerns the direction of the relationship between language and the world: should the words conform to the world (representatives, expressives) or is it the world that should conform to the words (directives, commissives), or be changed by the words (declaratives)? The psychological state relates to the speaker's state of mind or attitude toward events: e.g., does the speaker believe what is uttered in the speech act, or not? Finally, the content is directly related to the propositional felicity condition described above.

What About Grammar?

An alternative way of classifying speech acts is to take their structure as a point of departure. In their cross-linguistic analysis of speech acts, Sadock and Zwicky (1985: 160) note "that most languages are similar in presenting three basic sentence types with similar functions and often strikingly similar forms." These three basic sentence types are the declarative, the interrogative, and the imperative. Roughly, they can be described as follows: The declarative is used for making announcements or declarations, stating conclusions, making claims, telling stories, and so on. The interrogative is used to gain information; it asks for a verbal response from the addressee. The imperative is used for making requests, giving orders or advice, making suggestions, and the like; its use is meant to influence the course of (future) events. While there are many differences in detail between individual languages, there seems to be "an easily recognized relationship between the three structural forms (declarative, interrogative, imperative) and the three general communicative functions (statement, question, command/request)" (Yule, 1996: 54), as illustrated in (13):

(13) a. She eats an apple. declarative/statement
b. Does she eat an apple? interrogative/question
c. Give me her apple! imperative/command

Whenever there is such a direct relationship between the sentence type and its communicative function, we are faced with a direct speech act. Whenever the relationship between structure and function is indirect, we are dealing with an indirect speech act. Thus, an interrogative used to ask a question is a direct speech act (as in 13b), but an interrogative used to inquire about a capability (*could, can*) or willingness (*would*) in order to elicit information (14a) or to make a request (14b, 14c) represents an indirect speech act (*see* **Speech Acts, Literal and Nonliteral**).

(14) a. Could you tell me whether she's eating an apple?
b. Can you give me the salt, please?
c. Would you give me your suitcase, Madam?

The examples in (14) actually display "a typical pattern in English whereby asking a question about the hearer's assumed ability (*Can you?*, *Could you?*) or future likelihood with regard to doing something (*Will you?*, *Would you?*) normally counts as a request to actually do that something" (Yule, 1996: 56). The same goes for other languages (such as Dutch, French, German, Spanish, and so on) where similar patterns are displayed.

From a more general point of view, indirectness is a universal phenomenon (Thomas, 1995: 119). It can be used to make one's language more or less interesting; to increase the force of one's message, to reach competing goals; and to be more polite or to save one's face (see Thomas, 1995: 143–146) (*see* **Face**). Indirect speech acts, in particular, are generally associated with greater politeness than are direct speech acts. However, it is not possible to assess politeness out of context. The linguistic form, as well as the context of utterance, and the relationship between speaker and hearer, all play a role in rendering a speech act more or less polite (or impolite; see Thomas, 1995: 155–157) (*see also* **Politeness; Pragmatics: Overview; Pragmatic Acts**).

See also: Mood and Modality in Grammar; Politeness; Pragmatic Acts; Pragmatics: Overview; Speech Acts; Speech Acts: Definition and Classification; Speech Acts, Literal and Nonliteral.

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Speech Acts, Literal and Nonliteral

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There has been a long and fierce battle between the communication-oriented philosophers of language and the formal linguistics theoreticians regarding the priority of language as a means of expressing thought over a vision of language as an instrument of communication. The philosopher Dummett, in a conciliatory tone, has attempted to demonstrate that both positions – in their radical assumption that the other view is misguided – are wrong and that the two ideas about language are compatible. According to Dummett (2003), the idea that language is used to communicate presupposes the view that language is a way of expressing (or articulating) thoughts. The idea that language is merely an instrument of the expression of thought, in his view, collapses when we consider solipsistic uses of speech acts (a person's writing a reminder to himself and hanging it on a kitchen wall, or a person's trying to find an answer to his own question). Such solipsistic uses still presuppose a derived idea of communication.

In this article, we grant that language is primarily an instrument of thought (enabling the articulation of thought); however, we also think that language is an instrument of social action. An utterance U expressing the thought X performs an action A if, by the expression of X, a certain configuration of elements (roles, rights, duties) is changed from state S to state S' (A) (S' being a function of A) not as a result of the indirect consequences of the thought X but as a result of the socially recognized effects of vocalizing it, brought about by the recognition of the thought X and of the official position that the speaker of U has taken by publicly vocalizing such a thought. A speech act is not brought into effect unless a thought X expressed by an utterance associated with X is recognized as having been in the mind as well as in the mouth of a speaker. Suppose I have the ability to decipher Sally's intentions by reading her mind, and her thoughts contain a sentence S conventionally associated with a speech act A; nevertheless, the silent utterance (her thought) has no social effect, as its vocalization has not been heard in public.

Speech acts have their effects not only because certain persons have appropriate thoughts, but mainly because these thoughts have been publicly expressed by means of utterances, that are socially noticeable events, bound to have certain conventional social consequences. A speech act A is normally brought into effect by means of a device that indicates illocutionary force, essentially some linguistic means conventionally adopted to vocalize a certain thought that, once it is vocalized in public, becomes associated with an action A. There has been a long controversy as to whether moods are in some ways associated with certain illocutionary forces, resulting in the abandoning of the respectable and reasonable orthodoxy that declarative sentences, interrogative sentences, and imperatives are normally associated with certain actions, such as expressing thoughts, asking questions, and modifying other people's behavior (Levinson, 1983). Very luckily, a number of linguists, including Geis (1995) and Capone (2003), have returned to the orthodoxy. It would be unreasonable to suppose that distinctions of mood have no semantic counterparts, as that would require admitting the vacuity of certain fundamental linguistic distinctions. If there are linguistic distinctions, these must have semantic work to do, and it is reasonable to expect them to be related to illocutionary forces, at least of basic types (very generically specified). This article follows Geis in distinguishing between the *literal speech act* performed in virtue of uttering a sentence having a certain mood and the *full, context-dependent cognate speech act*. The full, context-dependent speech act, in this author's opinion, is still a function of the corresponding literal speech act, context playing a role in further determining the illocutionary force of the utterance. The role pragmatics plays in fully determining the content of a speech act in context is to add features of meaning to the underdetermined speech act; thus, it is always possible

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to return from the contextualized speech act to the literal speech act by subtracting the features added by the context. Contextual transformations, in this author's view, are **conservative**, and the basic meaning structure can be identified both at the beginning and at the end of the transformation.

The full import of a speech act is determined by the interaction between the literal speech act and the context of use. As Mey says:

> Speech acts, in order to be effective, have to be situated. That is to say, they both rely on, and actively create, the situation in which they are realized. Thus, a situated speech act comes close to what has been called a speech event in ethnographic and anthropological studies (Bauman and Sherzer, 1974): speech as centered on an institutionalized social activity of a certain kind, such as teaching, visiting a doctor's office, participating in a tea-ceremony, and so on. In all such activities, speech is, in a way, prescribed: only certain utterances can be expected and will thus be acceptable; conversely, the participants in the situation, by their acceptance of their own and others' utterances, establish and reaffirm the social situation in which the utterances are uttered and in which they find themselves as utterers (Mey, 2001: 219).

I will call fully contextualized speech acts 'pragmemes,' on the basis of terminology by Mey (2002). A pragmeme is a speech act – an utterance associated with a goal (and an intention to bring about such and such effects), which is to modify a situation and change the roles of the participants within that situation or to keep the roles the same while bringing about other types of effects, such as exchanging or assessing information, or engaging in an interactional episode whose significance lies in the production of social gratification or, otherwise, social bonds.

Such a speech act is *situated*, which means that the specific form the utterance takes, interacts with features of the cotext and with the situation of utterance (*see* **Context, Communicative**), including the rules entailed by such a situation, that jointly determine (or contribute to determining) the global significance of the act in question. Given a sequence of utterances – literally interpretable as having a certain meaning and a certain goal – features of the situation of utterance, in the form of pragmatic reasonings based on the Gricean maxims (*see* **Maxims and Flouting**), will complete or expand the minimal proposition presented by the utterance, anchoring it to the discourse in question; other features of the context of utterance, in the form of defeasible or otherwise noncancellable aspects of meaning, will transform the literal signification of the utterance into a situational signification, removing ambiguities and imposing the stamp of the situation on the utterance, making certain rules of interpretation relevant to it and constituting a set of constraints that strictly enforce certain readings by discarding or eliminating other, irrelevant interpretation options.

A pragmeme is a situated speech act (Mey, 2001: 94) in which both the rules of the language and the rules of society intervene in determining meaning, intended as a socially recognized object sensitive to social expectations about the situation in which the utterance to be interpreted is embedded. A pragmeme always requires three types of embedding: the embedding of an utterance in a context of use, with an aim to determine the referential anchors that complete the signification of the utterance; the embedding in rules that systematically transform whatever gets said in a context into whatever is meant there; the embedding in the cotext, whose features are transferred onto the utterance by eliminating semantic or otherwise interpretable ambiguities and enriching further its (range of) interpretations, by making them more specific.

This article now discusses another example of language use in which the macro aspects of the situation contribute to transforming the illocutionary potential of an utterance. Capone (2005) discusses the utterance 'I saw you' in the context of a story by the Italian novelist Italo Calvino. Within the theoretical apparatus of Gricean pragmatics, the author argues that the standard illocutionary force of the utterance (both in the Italian and in the English version) is that of an accusation. There are, however, special contexts in which the utterance acquires particular illocutionary forces.

Let's look at the game played by children, usually under 10 years old, called hide-and-seek. In this game, one of the children has to count up to (say) 20, facing a wall or a tree and with his or her eyes shut. Upon finishing the count, he or she must then look for the other children. When he or she spots one of them, he or she has to call out 'I saw you' and then runs back to the place where the game started (wall or tree). The child who arrives there first wins. Now, what is the import of 'I saw you' in this situation? Do we proceed from literal meaning until we arrive at the socially situated meaning? Do the literal meaning and the socially situated meaning diverge? It is not altogether clear to me that we are faced here with a crucial divergence. But what is the socially situated meaning of 'I saw you'? We can assume that in the situation of the game, from an informational point of view 'I saw you' is totally purposeless, as visual contact ensures in the standard case that it is obvious to both the speaker and the addressee that the latter has been spotted (of course, there may be situations in which a physical obstacle prevents this mutual vision). In the game, however, the purpose associated with the utterance

is to start a sequence in which the children start running at the same time to the place where the game started. In its performative aspects, the utterance roughly amounts to 'Let's start running.' The socially embedded meaning is not at odds with the literal meaning – after all, the assertion 'I saw you' provides the reason that the running sequence is initiated.

Another situation in which it is possible to observe utterances such as 'I saw you' is the classroom. The teacher notices that Michelangelo (his favorite student) whispers the answer to a question to his desk mate. The teacher says 'I saw you.' This is not just an utterance of blaming but an order to Michelangelo to stop doing what he has been doing. How can this speech act be transformed into the pragmeme 'Stop prompting'? It is the social situation, the rules and expectations about students' obligations and teachers' tasks, that promote the *inhibitive interpretation* of 'I saw you.' In this context, it is out of the question that the utterance could count as a compliment – such an interpretation simply cannot occur. In fact, even though the teacher thinks highly of Michelangelo and also admires him for helping his fellow students and even though Michelangelo knows that the teacher has this positive opinion about him, it is unlikely that he will choose a tortuous path of individual interpretation and proceed from considerations about his teacher's high esteem for him to the interpretation that the speech act counts as a compliment. Michelangelo will almost certainly prefer to follow the social path of interpretation rather than construct his own individual path. Thus, he is able to work out that in fact the teacher, despite his high opinion of him, wants Michelangelo to stop prompting answers to his desk mate. This example nicely instantiates the view that the context is the total social setting in which the speech event takes place, the meaning of an utterance being determined by its place in an interactional sequence. It also provides support for Mey's view that users and their language are at the core of all things pragmatic, the world of users being the very condition for doing pragmatics (Mey, 2001: 29).

See also: Context, Communicative; Grice, Herbert Paul (1913–1988); Implicature; Maxims and Flouting; Pragmatic Acts; Principles and Rules; Principles and Rules; Speech Acts; Speech Acts and Grammar; Speech Acts: Definition and Classification.

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Speech Acts: Classification and Definition

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See also: Context, Communicative; Grice, Herbert Paul (1913–1988); Implicature; Maxims and Flouting; Pragmatic Acts; Principles and Rules; Principles and Rules; Speech Acts; Speech Acts and Grammar; Speech Acts: Definition and Classification.

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language, which is that of expressing or articulating thoughts, before we can move on to the public function of language, which is to express communicative intentions to obtain a number of effects on other people and on society. Thus, this view reconciles opposite stances to language.

We have to distinguish 'locutionary,' 'illocutionary,' and 'perlocutionary' acts. A locutionary act is the vocalization of a sentence endowed with a certain meaning. For example, an actor on the stage vocalizes a locutionary act, because the meaning that the utterance has, is not interpreted as being a display of the speaker's intention. An illocutionary act is an utterance proffered with the intention to change the context, updating it with a certain public intention to do things or modify the hearer's cognitive state. A perlocutionary act is an utterance that achieves the speaker's intention, not directly through the expression of that intention, but **as a consequence** of the display of a speaker's intention to do something. For example, an anonymous letter to the police may have as its point the (perlocutionary) intention to jam the police activities and divert the course of justice.

In this article, I contend that there is a general algorithm mapping a sentence type to a literal speech act; in other words, there are conventions of language use associating certain forms with certain speech acts. This is certainly the case of 'performatives' (e.g., *I promise to come tomorrow*; *You are fired*; etc.), forms which **unambiguously** express a certain illocutionary intention and the utterance of which counts as carrying out certain social actions. When a performative formula is used by a person having certain socially recognized characteristics (status, power, etc.) in an appropriate context, then a certain social action is carried out in virtue of the speaker having proffered the formula in that context. The case of utterances that do not wear their illocutionary potential on their sleeves is less certain, in that the context can shape the final illocutionary force of the utterance. However, it is useful, in my opinion, to think of the language system as providing default conventions whereby proffering a certain utterance, in virtue of a convention of use, counts as performing a certain speech act, unless the context intervenes to enrich the force of the utterance further. The basic objections to this view (counterexamples to basic correlations) can be answered by having some weak conventions of language use map utterances to very generic illocutionary forces that can be enriched further by the specification of the full context in which the utterance is situated.

It is useful here to abandon the view that there are sentences whose illocutionary potentials can be studied in isolation, and to replace it with one in which, although the very basic contribution of linguistic semantics is not dismissed altogether, one specifically studies speech acts in actual interaction, embedding them in large portions of context having the function of incrementing the illocutionary potential of a certain sentence. We will thus move on to a higher unit of linguistic analysis: the 'pragmeme.' We may provisionally define the pragmeme in this way:

> Take an utterance U of a sentence S in a cotext S′, S″, S‴, Sn, or a sequence Sq of utterances, uttered in a situation of utterance C, in which the language users know that the sequential placement of U or Sq contributes to the illocutionary force in virtue of a rule of language use pertaining to that limited area of use. Then the utterance of U or Sq in the cotext S′, S″, S‴, Sn and in the situation C will transform U or Sq into a pragmeme Pr having a certain illocutionary force IF partially determined by the semantic import of the sentence in question, by referential pragmatic enrichments and explicatures, and by the final transformation due to the contextual and cotextual elements of the sequence S′, S″, S‴, Sn, in C.

As can be noted, in the definition above we have avoided the ordinary assumption that there is a one-to-one mapping between an utterance (consisting of a single sentence) and an illocutionary act, preferring the general case in which a sequence of sentences (or utterances) counts as the vocalization of a single speech act (*see* **Pragmatic Acts**).

Before moving on to the important issue of speech act classification, it is important to try to settle the perennial question of whether speech acts can or cannot be reduced to truth-conditional meaning. In fact, speech act theory, as worked out by Austin (1962), seems *prima facie* to challenge the view that semantics can be reduced to truth-conditional meaning, because at least a number of speech acts (e.g., promises, directives, requests, etc.) do not represent thoughts or facts, but are instructions to change the world in a manner specified by the speech act at hand. In fact, Gazdar (1979) and Levinson (1983) persuasively write that speech acts are best described as transformations from a certain context to a new one (*see* **Austin, John Langshaw (1911–1960)**; **Speech Acts**). Of course, there are advantages to glean from this perspective, but it has not been demonstrated, according to a number of authoritative scholars, that a speech act does not express a thought, the intention on the part of the speaker to carry out a certain action. Surely, a person who asks a question expresses the wish to know a certain answer; a person who proffers a directive vocalizes the wish that the world be changed in such-and-such a way; a person who utters a promise expresses the thought that he or she will act in a certain manner in the future that will

create some advantages for the hearer. I believe that all this is indisputable, and I am not sure how it can be reconciled with the drastic view proposed by Austin and then followed by Levinson (1983) that speech acts cannot be reduced to truth-conditional meaning. After all, having a thought amounts to creating a state of affairs (albeit enveloped in the mind) that surely can be expressed by truth-conditional semantics, as this is specifically intended to describe states of affairs, either in the world or in the mind (and states of affairs in the mind are in the world, as a consequence of the fact that the mind is in the world).

One way to reduce speech acts to truth-conditional meaning is through partitions (Higginbotham, 1995). Consider a question such as 'Is John at home?' Because the question just admits two possible replies (Yes, he is; No, he is not), the speech act is associated with the partition [He is at home/he is not at home], which expresses the basic truth-conditional import of the question. A crucial observation to make, following Schiffer (2003), is that while we can happily say that the question is associated with this partition, it is not clear (and it is possibly wrong to think) that we are entitled to say that the question means what the partition means. At least, this is not the way we would ordinarily speak. More complicated are questions such as 'Which boy did you see in town?' where the partition consists of all the reply options related to the domain of the boys present in town (for all those boys, we have to consider the reply option [I saw x/ I did not see x]).

I tentatively propose another way to solve the problem of speech acts' reduction to truth-conditional meaning, by recourse to modal notions. Consider the following sentence:

> Go and buy some bread.

This sentence can be represented in the following way:

> In a world *w* that is maximally similar to the actual-world, such that the obligations imposed by the speaker on the hearer in virtue of linguistic conventions and of social conventions (for example, the institutional role played by the speaker or the kind of obligations under which the hearer has put himself are fulfilled, the hearer (or the recipient of the speech act in question) buys some bread.

Of course, this is no more than a sketch of a possible solution, but I am persuaded that it goes some way toward remedying the dichotomy between assertions and nonassertive speech acts, while allowing us to retain a more commonplace notion of meaning than that advocated by Higginbotham and his followers, using the plain and salutary intuitions by Schiffer.

It is now time to move on to a basic classification of speech acts. Let us start with 'assertions.' A speaker S asserts P: (a) if he or she believes he or she knows that P is true (or he or she feels justified in believing that P is true), and (b) if he or she further believes that the proffering of the assertion will effect a substantial change in hearer H's information state. The presupposition of an assertion P (which is not to be treated as a 'reminder') is that (a) the hearer does not know P, and (b) either he or she is interested in knowing P, or even in the case when he or she would prefer not to know P, the speaker has a moral duty to inform H of P. Part of the dynamics of asserting P is that the speaker believes that H can use the information contained in P to make plans for successful action. Although the assertion P amounts to an implicit claim on the part of the speaker that he or she knows that P is true, it is not necessary for the speaker to actually know that P is actually true in order to make such an assertion. What is indispensable is that the speaker has (subjective) reasons to believe that he or she has good grounds for asserting P. Neither is it necessary that the speaker should stick to his or her asserted proposition after it has been demonstrated through an evidential procedure that it is wrong. He or she can change his or her mind about P and retract the assertion, although by doing so he or she must give reasons for entertaining a different thought. 'Expressives' are to be treated separately from assertions because they are disclosures of the reality of the mind and of the heart, and are not verifiable except by reference to the consonance of a speaker's behavior with such disclosures. 'Directives' express the speaker's wish that the hearer do such-and-such a thing and are uttered with the presumption that the hearer is under some obligation to carry out the action in question (status and roles within an office or an institution determine the right to utter the directive in question). 'Requests' also express the speaker's wish that the hearer behave in such-and-such a way. Requests are not licensed by the formal rights acquired by being part of an institution, but by the obligations contracted by the hearer throughout previous interaction. 'Promises' are revelations of future behavior on the part of the speaker from which the hearer will glean some advantages. Promises concern actions that have been presumably solicited by the hearer (or by someone close to the hearer) (*see* **Speech Acts and Grammar**).

See also: Austin, John Langshaw (1911–1960); Pragmatic Acts; Pragmatics: Overview; Speech Acts and Grammar; Speech Acts.

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Speech Aerodynamics

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From a mechanical point of view speech may be regarded as the conversion of slow air pressure variations into the rapid air pressure variations called 'sound.' Sound is created when the air under pressure is released; releasing it at regular intervals creates the periodic pulsation known as voicing; releasing it suddenly creates the transient impulses of stop bursts; releasing it in a sustained way over a span of a few tens of milliseconds creates the turbulence of affricates and fricatives; completely stopping the release creates the attenuation of sound found in stops. The creation and the management of these slow pressure variations and the generation of the air flow that produce the audible turbulence and impulsations are studied in speech aerodynamics. This article will review some of the basic aerodynamic principles applicable to speech and present some phonological data that are consequences of them.

As an aerodynamic mechanism, the vocal tract consists of a set of chambers connected by valves to each other and ultimately to the air space outside. Some of these chambers come with piston-like structures that can effect a change in their volumes (see **Figure 1**). The volume of the pulmonic cavity can be changed by the movements of the chest wall and the diaphragm. Virtually all human speech is superimposed on the expiratory phase of respiration when the chest wall contracts to elevate the air pressure in the lungs. In the production of ejectives and implosives, the larynx (and to some extent the pharyngeal walls) change the volume. During clicks (velaric ingressives) downward movements of the body of the tongue act to change the volume of the air trapped between the tongue and the palate (*see* **Phonetics, Articulatory**).

Certain phonetic and phonological universals are derived simply from the way these chambers are connected and the operation of their valves. For example, given that, of the two openings to the nasal cavity, only the velic valve is capable of complete closure – the nostrils remain permanently open – the obstruent character of any sound made that connects to the nasal cavity will be inhibited. Clicks are made with a mechanism that is independent of the other cavities and so can be made with simultaneous voicing, nasalization, etc.

Aerodynamic Principles

Pressure and Volume

In the following discussion, the unit of air pressure, 'cm H_2O' refers to the height of a column of water displaced by pressure impinging on the water. It is the most common unit used in phonetics for this purpose. This unit is similar to the unit of mm Hg (mercury)

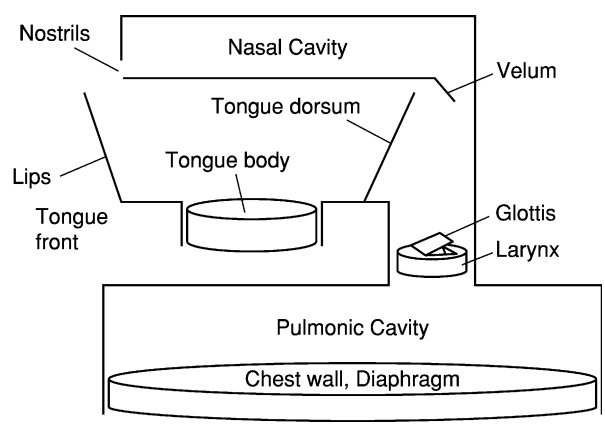

Figure 1 Schematic representation of the speech mechanism as a system of chambers connected by valves. Some of the chambers have piston-like structures that can alter their volume.

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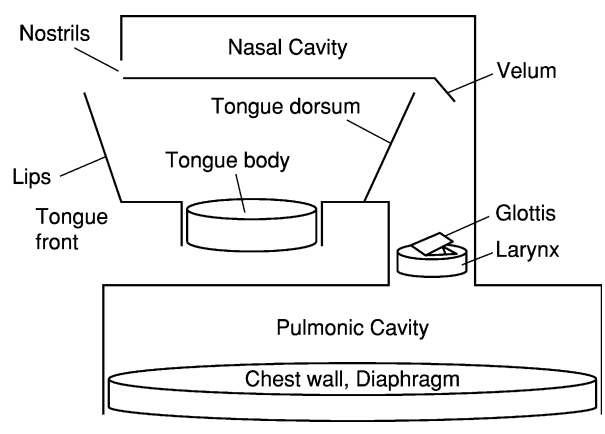

Figure 1 Schematic representation of the speech mechanism as a system of chambers connected by valves. Some of the chambers have piston-like structures that can alter their volume.

used in meteorology and can be directly translated into it: 1 cm $H_2O = 0.736$ mm Hg. What the height of a column of mercury in a barometer reflects is the pressure of all the air above us, the atmosphere, which presses down on the surface of the earth. Thus it must be kept in mind that, in reality, even when the vocal tract is completely open, as for a vowel, there is air in the vocal tract and it is under pressure, 'atmospheric pressure,' and equal to about 1030 cm H_2O. Usually, for convenience, the pressure in the vocal tract is expressed relative to atmospheric pressure, that is, 10 cm H_2O lung pressure + 1030 atmospheric pressure = 1040 cm H_2O absolute.

The pressure of a given mass of air varies inversely with the volume it occupies. (This is the well-known Boyle-Mariotte's Law, but here temperature is neglected, assuming adiabatic conditions, that is, where pressure changes take place without any change in temperature.) This relation may be expressed mathematically as in (1), where P_1 and V_1 are the initial pressure and volume, respectively; P_2 and V_2, the same parameters later:

(1) $P_1V_1 = P_2V_2$
$P_2 = P_1 \times (V_1/V_2)$

Thus, for example, if during the production of an ejective stop the starting oral pressure and volume are 1030 cm H_2O and 100 cm^3, respectively, and the oral volume is reduced by 2 cm^3 (by raising the larynx or constricting the pharyngeal walls) to 98 cm^3, the pressure that will result will be:

(2) $P_2 = 1{,}030 \times (100/98)$
$P_2 = 1{,}051$ cm H_2O

Thus, this oral pressure, expressed relative to atmospheric pressure, will be $1051 - 1030 = 21$ cm H_2O. In fact, oral pressures during ejectives have been recorded in the range 10–21 cm H_2O and so we can conclude that they involve reductions in oral cavity volume of the order of 1–2 cm^3.

Pressure and Mass of Air

For a given volume, pressure increases directly with the mass of the air. This relation may be expressed mathematically as in (3), where M stands for the mass of the air (expressed in appropriate units):

(3) $P_1/M_1 = P_2/M_2$
$P_2 = P_1 \times (M_2/M_1)$

Air Flow

The volume of air that will flow from one cavity to another, depends on the size (principally the cross-dimensional area) of the channel between them and the difference in the pressures in the two cavities, as characterized in (4), where U is the volume velocity (expressed in cm^3/sec), A is the cross-dimensional area of the channel the air flows through and P_1, P_2 are the pressures on either side of the channel; c is a constant:

(4) $U = A \times (P_1 - P_2)^a \times c$
$U = A \times \Delta P^a \times c$

The exponent, a, varies between 0.5 and 1, depending on the nature of the flow; it is 1 when the flow is smooth (technically, 'laminar') and 0.5 when flow is turbulent. In the conditions found in speech production, that is, what is called 'nozzle flow,' this number may vary continuously between these two extremes. Naturally, the direction of air flow will always be from the cavity with greater pressure to that with lesser pressure, that is, when U is positive the flow is from the region with pressure P_1.

Particle Velocity

The velocity of air, v, (called 'particle velocity') is equal to the volume of air flowing per unit time in a given direction divided by the cross dimension of the channel, as given in (5):

(5) $v = U/A$

Thus if 100 cm^3 of air flows through the channel formed between the tongue and the palate during an /s/, with cross-dimensional area of 0.1 cm^2, the velocity will be:

(6) $v = (100\ cm^3/sec)/(0.1\ cm^2)$
$v = 1{,}000$ cm/sec

Particle velocity is important because it is related to the degree of turbulence in the airflow and hence the intensity of frication noise.

Intensity of Turbulence

Many treatments of speech aerodynamics introduce the concept of the Reynold's number to explain when airflow becomes turbulent and noisy. The Reynold's number for a given condition of airflow is a dimensionless number that is the product of several factors: the diameter of channel the air passes through, the viscosity and density of the air, and, most notably, particle velocity, v. Under ideal laboratory conditions, when the Reynold's number exceeds a certain threshold the airflow changes abruptly from smooth or 'laminar' to turbulent. However, in irregularly-shaped channels like the vocal tract and with air flow that usually has a turbulent entry into the vocal tract (when passing through the glottis), there is some degree of turbulence at almost any velocity. Under such conditions the relationship between particle

velocity and the degree of turbulence and hence frication noise is highly complex and nonlinear. Suffice it to say that, other things being equal, as the velocity of the airflow increases, the resulting noise level from the turbulence increases monotonically. Other factors which enhance the intensity of frication noise from turbulence are as follows:

1. The presence of an obstacle, technically a 'spoiler,' in the path of the moving air. The upper incisors constitute a highly effective spoiler and, thus, account for the intense noise associated with sibilant fricatives (i.e., those made at the dental, alveolar, retroflex, or palato-alveolar places of articulation).
2. The presence of a resonating cavity downstream of the turbulence. Thus, the most forward-articulated fricatives like [ɸ f θ] have much less intensity than those articulated further back such as [ç x χ].

Vibratory Action and the Bernoulli Effect

The Bernoulli effect is easily demonstrated: in each hand hold two long strips of flexible paper (e.g., newspaper) such that in hanging down they face each other and are about 3 to 5 cm apart. Then blow down between the strips of paper. They will come together and commence to vibrate. Vocal cord vibration (voicing) – and possibly the vibration of parts of the tongue during trills – is initiated in a similar way. The Bernoulli effect accounts for the force which sucks the vocal cords together when air flows through them. Bernoulli's Law is usually given as (7) where ρ is the density of the air, P is the pressure normal to the direction of airflow, and U, as before, is the volume velocity of the airflow:

$$(7)\quad P + \frac{1}{2\rho}U^2 = \text{constant}$$

When U increases, P decreases, possibly to the point where it is negative with respect to ambient pressure, and thus, the sides of the channel (the vocal cords) through which the airflows can be sucked together. Then the pressure behind the constrictions blows the vocal cords apart again, and the cycle of closing-opening commences. However, after vibration is initiated, the closing of the vocal cords is due in part to the elastic recoil of the tissue, not exclusively to the sucking action of the Bernoulli effect. To the extent that elastic restoring forces operate in vocal cord vibration, the mechanism constitutes a 'relaxation oscillator' and works on principles similar to those causing the regular rocking of the weight on the escape vent of certain designs of pressure cookers. Glottal pulsation occurring when the rest state has the vocal cords pressed together, for example, creaky voice, derives from the vocal cords operating primarily as a relaxation oscillator; the Bernoulli effect plays little part.

Some Phonological Consequences

Voicing and Devoicing

Voicing and Stops Voicing (vibration of the vocal folds) requires (a) an appropriate configuration of the vocal cords, that is, that they be adducted and have an appropriate tension and (b) that there be sufficient airflow through the glottis and pressure drop across the glottis. Anything which reduces the airflow would therefore tend to inhibit voicing. This is the case with obstruents which block the free flow of air and which have often been noted as disfavoring voicing. Many languages have only voiceless obstruents; few have only voiced ones.

Some elementary calculations can give a better 'feel' for this phenomenon. Assuming an initial oral cavity air mass of 100 mass units, *m.u.* (1 m.u./cm^3), oral air pressure, P_o, equal to atmospheric = 1030 cm H_2O, subglottal pressure $P_s = 1040$ cm H_2O, we can calculate how much air, ΔM would have to be added to the oral cavity in order to raise the oral pressure to the level of subglottal pressure, such that the pressure drop across the glottis would be $P_s - P_o = 0$. The procedure is as follows (where P_1 = initial P_o and P_2 = resulting P_o):

$$(8)\quad \begin{aligned} &(M_1 + \Delta M)/100 = P_2/P_1 \\ &(100 + \Delta M)/100 = 1040/1030 \\ &\Delta M = ((1040/1030) \times 100) - 100 \\ &\Delta M = 1 \text{ m.u.} \end{aligned}$$

Thus adding only 1 m.u., approximately 1 cm^3 of air, would raise oral pressure to a level typically encountered for subglottal pressure. Next, we may ask how long it would take for this pressure level to be reached. Typical values for glottal airflow during speech are 100 to 150 cm^3/sec. Taking the value of 100 cm/sec, we see that 1 cm^3 would be added in:

$$(9)\quad \frac{1 \text{ cm}^3}{100 \text{ cm}^3/\text{sec}} = \frac{1}{100}\text{sec} = 0.01 \text{ sec}$$

This value, 0.01 sec or 10 msec, is approximately the duration of a single glottal period in an adult male voice. Thus, even if other factors are favorable to voicing, for example, the configuration of the vocal cords, a stop would become voiceless within about 10 msec of complete oral closure simply due to this aerodynamic constraint. This value would not change appreciably if smaller or larger starting values for air mass (oral volume) or glottal flow rate were used. But this cannot be the whole story, because voicing can be maintained in obstruents for a much longer interval

than 10 msec. An implicit assumption made in this calculation was that there was no expansion of the oral cavity. In fact, this is an unrealistic assumption. First, there can be 'passive' expansion due to the natural compliance or yielding of the walls of the vocal tract. Just like a balloon, the vocal tract 'gives' when pressure impinges on its surface. There is evidence that passive expansion allows voicing to continue during the closure of stops some 80 msec for labials, 65 msec for apicals, and 50 msec for velars – this variation correlates with the amount of surface area in the vocal tract behind the constriction which the air pressure impinges on. Second, there can be 'active' expansion of the vocal tract. The jaw and the larynx may be lowered in order to create more room for the air accumulating in the oral cavity. As one can infer from (9), voicing may be prolonged during a complete stop by about 10 msec for each 1 cm^3 of extra room created by expansion of the oral cavity.

Plausibly, the origin of voiced implosives in Sindhi can be traced in part to this constraint. As shown in Table 1, one of the principal sources of Sindhi implosives were earlier voiced geminate stops. Implosives, by definition, involve an active expansion of the vocal tract, one consequence of which is a lowering of oral pressure. One might imagine that the maintenance of voicing for the long interval required by gemination would entail active expansion. (However, due to subsequent phonetic change, the Sindhi implosives need not be fully voiced today.)

Another option in the face of the inhibition of voicing during geminate stops is to let them become voiceless. This is evident in the morphophonemic alternations from Nobiin (Southern) Nubian given in Table 2. Interestingly, the same data show that the devoicing does not affect labials, presumably because – as indicated above – they have the greatest surface area and thus the greatest potential for expansion during the closure.

A further reflection of the influence of place of articulation on the potential for continued voicing during stops may be found in the incidence of gaps in stops inventories. In most languages employing a voicing contrast, the voiced and voiceless stops appear in symmetrical pairs at each place of articulation (excluding glottal stops). But there are exceptions. Sherman (1975), in a review of the phonological descriptions of a controlled sample of languages, found 87 languages which made use of voicing in stops but which had one or more gaps in their stop inventories. Table 3 gives his results of the incidence of stop gaps tabulated by voicing and place. The table shows clearly that in the voiced series back-articulated stops are most often missing, presumably because they have less possibilities for expansion of the post-constriction space in order to accommodate the glottal airflow. (In the voiceless series, labials are most often missing, but this is probably due to their having no downstream resonating cavity and consequently very weak bursts.)

The same pattern holds for glottalic consonants, that is, among voiced implosives, velars are most often missing and among ejectives (necessarily voiceless), labials.

Voicing and Fricatives Following the reasoning presented so far, one might think that, although stops tend to inhibit voicing, there should be less of a problem regarding maintenance of voicing during fricatives because, instead of all the glottal air accumulating behind the constriction, some of it is vented. But in fact, fricatives appear to be an even less hospitable environment for voicing than stops; the asymmetry favoring voicelessness in fricatives is about three times larger than in stops. This does not mean that the reasoning about the effect of aerodynamic constraints on voicing in fricatives is wrong, rather that not only the requirements for voicing must be taken into account, but also those for frication. To optimize the aerodynamic conditions for voicing, we should have oral pressure, P_o, much less than subglottal pressure, P_s, that is, the difference in these pressures, ΔP_{glot}, should be maximized:

Table 1 Development of Sindhi implosives from Prakrit voiced geminate stops[a]

Prakrit	*Sindhi*	*Translation*
*pabba	paɓuɳi	lotus plant fruit
gaddaha	gaɗahu	donkey
-(g)gaṁtʰi†	ɠaɲɖʰi	knot
bʰagga	bʰaːɠu	fate

[a]Varyani (1974).
†This 'ṁ' is in the conventional transliteration of the Devanagari *anusvara* best regarded as symbolizing a nasal consonant homorganic to the following obstruent.

Table 2 Morphophonemic data from Nubian showing the effect of gemination and place of articulation on voicing[a]

Noun stem	*Stem + 'and'*	*Translation*
fab	fabːɔn	father
sɛgɛd	sɛgɛtːɔn	scorpion
kadz	kat tʃːɔn	donkey
mug	mʊkːɔn	dog

[a]Bell, W H (1971).

Table 3 Incidence of gaps in stop inventories according to place of articulation and voicing in 87 languages showing one or more missing stops[a]

	Labial	*Apical*	*Velar*
Voiceless	34	0	0
Voiced	2	21	40

[a]From Sherman (1975).

$$(10)\ \Delta P_{glot} = (P_s - P_o) = \max$$

But to optimize frication, we should have oral pressure much higher than atmospheric pressure, P_{atmos}, that is, the pressure drop across the oral constriction, ΔP_{oral}, should be maximized:

$$(11)\ \Delta P_{oral} = (P_o - P_{atmos}) = \max$$

One condition requires oral pressure to be as low as possible, the other to be as high as possible. Obviously both cannot be satisfied simultaneously. To the extent that voicing is maintained, the degree of frication is less than it might be; if frication is maximized, then voicing is threatened. In fact, it is well known that voiced fricatives always have less intense frication noise than their voiceless counterparts and on nonsibilant fricatives, for example, [β v ð ɣ], the frication is frequently so weak as to be barely detectable. Such sounds are often better described as frictionless continuants.

Frication

Approximants (glides) constitute narrowing of the vocal tract without inherently constituting obstruents. Nevertheless, they may cross the threshold into obstruents if produced with higher air flow.

The sonorant consonants [j w l ɹ], which by definition are nonobstruents, are usually voiced. However, simply by becoming voiceless, without any shift in the configuration of the oral articulators, they become the fricatives (and obstruents) [ç ʍ ɬ ɹ̥]. This happens due to the increased airflow passing through the narrow constriction created by these consonants – the increased airflow being caused by the greater opening at the glottis. It is possible to get a rough idea of why this happens. A typical approximant supraglottal opening, *A*, is 0.4 cm^2. When voiced, it might have a volume velocity, *U*, of 100 cm^3/sec. This would yield a particle velocity, v, as calculated in (12):

$$(12)\ v = \frac{U}{A} = \frac{100\ cm^3/sec}{0.4\ cm^2} = 250\ cm/sec$$

Now when this same approximant is made voiceless, the airflow increases substantially due to the open glottis, which lowers resistance to the expiratory flow; values of the order of 700 cm^3/sec would not be unusual. This would result in a much higher v and consequently greater turbulence:

$$(13)\ v = \frac{700\ cm^3/sec}{0.4\ cm^2} = 1750\ cm/sec$$

It is the higher volume velocity through the open glottis that leads to the higher particle velocity of the airflow through the supraglottal constriction, which leads to greater turbulence and, thus, the obstruent character of the voiceless approximant.

In the history of English and in contemporary dialects, there is evidence that sonorant approximants after stops (the position where they would be produced with higher airflow) have often resulted in fricatives or affricates. Historically *actual* had a palatal glide after the stem-final /t/: /ækt + juəl/; today the /tj/ sequence is realized as the affricate /tʃ/. Apical stop + *r* has a similar fate in some dialects of American English: *truck* [tʃɹʌk], *tree* [tʃɹi]. In initial position, the voiceless glottal fricative [h] is typically just a voiceless copy of whatever follows. Thus in English the [h] before the palatal approximant [j] is the palatal fricative [ç], for example, /hju/ = [çju] 'hue.' Similarly, in Tenango Otomi (Otomí, Tenango) (Blight and Pike, 1976) the phoneme /h/ is realized as a voiceless nasal before a nasal consonant, and as the fricatives [ɸ] and [ç] before /w/ and /j/, respectively.

There are many other sound patterns in language that can be traced directly, or indirectly to aerodynamic principles, including the phonetic factors that inhibit or facilitate spreading nasalization and the devoicing of vowels and glides. Some sophisticated computer models of speech aerodynamics have been devised and are being actively used by researchers interested in integrating phonetics and phonology.

See also: Phonetics, Articulatory.

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Speech and Language Community

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'Language community' and 'speech community' are constructs developed by scholars of language to refer to a social aggregate within which language is used. Over a century or more of discussion, scholars have differed as to whether the two terms referred to the same type of social formation or two different types. They have also differed as to whether the 'community' is to be understood as an empirically describable object in the world, or as an abstraction or idealization; whether to focus on speakers' knowledge or on their practice – or some combination; whether the aggregate should be considered from the perspective of its homogeneity or its internal diversity; and, most recently, whether the aggregate can be understood as a social whole – a bounded social universe – or whether it can only be understood as part of some larger field of social (and linguistic) relationships. Within these debates lurk different ontologies of language, society, and their relationship.

Briefly put, then, the problem of defining and identifying the speech community (and/or related terms) is both a theoretical and a methodological problem. The problem is theoretical because it concerns the locus and nature of the forces that shape language(s). What kinds of social relationship or grouping are implicated in what kinds of linguistic system, subsystem, or practice – and vice versa? Do the specifics of social organization matter, or is society no more than a prerequisite and general constraint on what really counts, a neuropsychology of language? The problem is methodological because it concerns where to locate and focus one's research. What is the arena within which to investigate how language is structured? Where should one look, to see how language takes form as social action?

Large though these questions loom in linguistic anthropology, outside this field they are not always seen as problematic. To some commentators it has seemed obvious that the 'speech community' must be an ethnic group that 'has' a single common language. This view is associated with the romantic nationalism of the late-18th-century scholar Johann Gottfried Herder, who maintained that a language is the natural hallmark, and the most precious possession, of a people (*Volk*) or nation, reflecting its special spirit and identity. To Herder's heirs, scholarly and lay, it has seemed natural to suppose that language itself creates – or automatically reflects – community: that there is always some aggregate of people who could be said to 'share' a language and who must, by virtue of that fact alone, share a cultural tradition, feel that they 'belong' together, and participate jointly in a social formation of some specifiable type – a people (or ethnic group, or nationality). In contrast, many linguistic anthropologists and sociolinguists problematize these connections, resisting the assumption that there is any 'natural' relationship between language and community that maps linguistic facts onto social groupings in some universal way. In arguments that have been foundational to our discipline, Franz Boas maintained that language, race, and culture are independent classifications of humankind, and that the distribution of particular linguistic forms does not necessarily predict the distribution of

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other social and historical facts. Since Boas's time the issues under debate have become more subtle, but the central theme remains. How languages and linguistic varieties map onto people, activities, and social relations – and how the social constructs may depend on linguistic practice – are the central problems we must address, along with their constituent terms such as 'community of speakers.'

This article first traces two threads in the history of 20th-century scholarly writings on 'speech community,' up to approximately the 1970s. During this period scholarly debate turned on the relationship between individual and society, and on whether to focus attention on what members of a community have in common or on how they differ. I then turn to some more recent discussions and issues, such as the notion of 'communities of practice,' language's relation to social networks, distinctions between 'language community' and 'speech community,' and debates about the relevance of conflict-based (as opposed to consensus-based) social theories. Finally, I consider whether 'communities' can be conceived as wholes or only as parts.

The Homogeneous Speech Community

Let us begin with Ferdinand de Saussure's 'mass of speakers' (*masse parlante*, rendered as 'community of speakers' in the widely distributed Baskin translation of the 1916 *Course in general linguistics* [1966: 77, 78]). The *masse parlante* is the social collectivity that is necessary for language (*langue*) to exist in the real world. This collectivity is the foundation of the 'social fact,' the social conventions that establish linguistic signs as vehicles for semiosis. In emphasizing the social nature of language, and the importance of the 'social fact' for linguistic theory, Saussure moved away from the individualistic focus of some prominent earlier linguists such as the Neogrammarian Hermann Paul. For Saussure, language as a structured system is collective rather than individual, and because it is collective it is not subject to personal will or the vagaries of individual action. (The history of intellectual links between Saussure, Paul, and other scholars, particularly William Dwight Whitney, is actually more complex but need not concern us here.)

As a collectivity, Saussure's 'mass of speakers' is neither structured nor internally differentiated, and it has no social properties that would lead to differentiation in its participants' language (*langue*, the representation of linguistic structure). Instead, the collective consciousness exerts pressure on individuals to conform. All representations of language in individual brains are essentially alike, so that a language is like a book whose (virtually) identical copies are deposited in the minds of its speakers. According to the *Course* (Saussure, 1966: 13–14), "[language is] a grammatical system that has a potential existence in each brain, or more specifically, in the brains of a group of individuals. For language is not complete in any speaker; it exists perfectly only within a collectivity." As the locus of a synchronic collective consciousness, imagined as if extracted from time and action, the 'social mass' can only be an abstraction, a virtual community rather than a real one. (Later in the *Course*, Saussure suggests (1966: 223) that the 'linguistic community' is generally an ethnic unity. This passage stands quite apart from his discussion of linguistic structure, however.)

Readers today may find that Saussure's discussion of linguistic systematicity as a matter of mental representations in an abstract, undifferentiated virtual community has much in common with a well-known statement in Chomsky's *Aspects of the theory of syntax* (1965: 3): "Linguistic theory is concerned primarily with an ideal speaker-listener in a completely homogeneous speech community, who knows its language perfectly…" Like the *masse parlante*, Chomsky's speech community is an abstraction, not a misperception of an empirical world in which human communities are not perfectly homogeneous. In this view the speech community is little more than a precondition for language, whose locus – and here Chomsky departs from Saussure – is not in the collectivity but in the 'mind/brain' of the individual speaker. So strong is this emphasis on the biological individual, and so downplayed is the speech community, that linguistics is to be conceived as a branch of cognitive psychology.

In contrast to these views of the speech community as an idealization, Leonard Bloomfield's classic definition (in *Language*, 1933: 29) places the speech community in an empirical world of economic practicality that makes it homogeneous: "A group of people who use the same system of speech-signals is a **speech community**. Obviously, the value of language depends on people's using it in the same way" [emphasis original]. The value, that is, for a social division of labor where producers with different skills rely on a common code to coordinate the exchange of their products – or so Bloomfield supposed. Notice that this community is envisioned as socially and economically diverse, but uniform in (monolingual) language. Bloomfield's statement is about society as well as about language, and it makes an empirical claim.

How would this linguistic conformity come about? People who interact frequently will tend to speak alike, Bloomfield believed, because language acquisition is based on imitation and behavioral

conditioning. Arising out of the density of communication, which has made participants speak alike, a speech community would be distinguished from its neighbors by breaks in the frequency or intensity of interaction. (In practice, Bloomfield seems usually to have identified the speech community with a tribe or ethnic group – though not, incidentally, with a culture-bearing group, which he suggested was broader.) Within the community there can be 'lines of weakness,' slight differences in the frequency of interaction, corresponding to subgroups with slightly different forms of speech. As an example, Bloomfield cited Sapir's work on male and female speech in Yana. But although he mentioned that the differences between male and female speech in Yana are systematic – a point Sapir had stressed – Bloomfield did not discuss how 'lines of weakness' might give rise to differences that were systematic or conventional, rather than random. To propose that differentiation might be conventional would require the linguist to distinguish between the knowledge of linguistic forms and their use in acts of speaking, a distinction Bloomfield's behaviorist psychology did not easily support.

Anthropologists and linguists have long since discarded Bloomfield's behaviorist psychology of language. More durable, however, has been his notion that the speech community – the social site for linguistic description – is defined by interaction frequency. In his early works, John Gumperz identified the 'speech community' (or 'linguistic community' – in the early 1960s the terms were interchangeable) with some large social unit having a definite boundary around the outside and dense, frequent interaction inside. Unlike Bloomfield's, however, Gumperz's speech community could be multilingual. Its presumably dense interaction did not automatically produce homogeneity. So, in a study of a north Indian village, Gumperz (1958) suggested that Bloomfield's concept needed to be refined so as to distinguish between different kinds of communicative interaction: those that lead to behavioral convergence and those that do not. Despite regular patterns of interaction, the residents of this village did not all speak alike, and the study dealt with the social setting of these linguistic differences.

Similar lessons can be drawn from his work on convergence and creolization (Gumperz and Wilson, 1971), a study of language repertoires in a Maharashtran village whose population included speakers of Kannada, Telugu, Urdu, and Marathi. As a result of long-term proximity, the local varieties of these languages had changed, the authors concluded, in ways that made them more like each other. While the paper is justly known for this argument about grammatical convergence – even utterly unrelated languages may converge in several areas of linguistic structure if their speakers happen to live together for long enough – the convergence can only be described because other aspects of language have remained distinct. In fact, the villagers considered it important to maintain the linguistic distinctness of population subgroups in their multilingual community, and to differentiate between contexts of language use.

The Speech Community as the Organization of Diversity

As Gumperz's work illustrates, a new focus on linguistic diversity within communities began to emerge in the 1960s in studies of language contact, dialectology, and change. Led by Gumperz, Dell Hymes, Uriel Weinreich, and William Labov, the new work attacked the identification of structuredness with homogeneity (Weinreich *et al.*, 1968: 101). The speech community was now redefined as "a field of action where the distribution of linguistic variants is a reflection of social facts" (Gumperz, 1968: 383). Structure in the speech community rested on the organization of diversity, not merely on the replication of uniformity; its linguistic variation was not just random (Hymes, 1974: 75). The perspective recalls Durkheim's discussions of organic solidarity, where it is precisely people's complementary differences that bind them together, as opposed to mechanical solidarity, where social cohesion rests only on similarity. Thus multilingualism is not chaos, nor is it necessarily a transient or abnormal condition. Instead, it can represent an orderly social consensus.

This vision of speech community places multilingualism, multidialectalism, and communicative repertoires on center stage for observation and analysis, not on the periphery. The repertoire and its deployment in communicative practice are now seen as the crucial place where the relationship between language and social organization lies. Here we might observe how ways of speaking are linked with, and constitute, social groupings and identities, and how ways of speaking are situated in social activities. 'Community,' in the sense of sharing and commonality, lies in the interpretation, not the production, of behavioral forms (including speaking). What is shared is knowledge of how the differences in ways of speaking are organized.

As one of many examples, Hymes pointed to Paraguayan multilinguals who switch between Spanish and Guaraní according to the intimacy or distance of the communicative context. Gumperz (1964), meanwhile, compared the repertoires of two communities, one in India and one in Norway; the two communities' quite different social structures were

reflected in the different ways their linguistic repertoires were organized. In each community, members did not equally command all varieties, yet they understood when and where a code might be used – what its social implications were. Elsewhere, the Vaupés region of the northwest Amazon basin offers a particularly compelling example of the organization of linguistic diversity, since the social organization of the region has traditionally depended on a principle of linguistic exogamy: language is a badge of membership in one's patrilineal descent group, within which one may not marry. The marriage relationships that connected these groups and organized them in communities had to be contracted with persons whose linguistic 'badges' differed (see Jackson, 1974). Residential communities necessarily included spouses having different linguistic affiliations, and individuals were highly multilingual.

Notice, however, that if linguistic diversity does not prevent the formation of community in a social sense, then – by the same token – using the same language does not automatically create it. Illustrating this point, Gumperz (1979) described the communicative difficulties faced by a South Asian immigrant and a British interviewer. Despite the fact that their English was grammatically quite similar, the two interlocutors never succeeded in interpreting one another's responses, or in establishing a common understanding of the interview's purpose. As the example showed, using the same language (in the sense of 'denotational code') does not guarantee shared interpretation of the discourse's social import. Hymes (1968), meanwhile, in a survey of linguistic and anthropological literature, assembled a massive array of counterexamples challenging the Herderian assumption that common language reveals common ethnicity. Only in ideology must linguistic and ethnic boundaries coincide.

In the course of these arguments, Hymes and Gumperz sifted through some aspects of language and speaking that had often been assumed to coincide, yet (as they showed) could vary quite independently of one another. These distinctions must remain important in any adequate account of the social setting of linguistic practice:

- knowledge of a code (or, linguistic variety); i.e., the ability to interpret the denotational and predicational value of a symbolic system;
- behavior – the deployment of that code;
- claims to affiliation with a code, and claims to knowledge of it;
- knowledge of 'rules of use,' i.e., understanding the social distribution and appropriate deployment of codes.

Thus one might claim affiliation with a language one does not speak, as did an Italian-American student of mine who wrote a paper entitled 'Why can't I speak my language?' The Yana woman of Sapir's day could interpret all the forms of 'male speech' even if she never uttered them. (Actually, she might utter them if she quoted a male character while telling a story; but she would not produce these forms while speaking in her own social persona.) And rules of use may distinguish among addressees and contexts, even if the addressee does not reply in the same code – as when I reserve a special way of speaking for my pet cat's ears alone.

The recognition of linguistic diversity and its engagement with the structuring of social relations opened up vast areas of sociolinguistic research. As that research proceeded, however, and the sociolinguistic conception of speech community was to be operationalized, new questions arose. In particular, if speech communities are supposed to be objects of empirical description, how are they to be identified? If the community is delimited by some radius of shared knowledge, exactly what is shared? How much knowledge must be shared, and by whom? Recognizing that 'shared knowledge' can never be all-inclusive, Gumperz proposed that what the speech community shared was knowledge relevant to some significant number of social situations. But what is a significant number, and what makes a social situation significant? Consider, for example, gender-segregated initiation systems where initiates learn special linguistic varieties – such as male initiates in Walbiri and other societies of aboriginal Australia. Perhaps Walbiri women were aware that such varieties existed, but they were in no position to control them, or even to know the details of the appropriate situations of use. Some kinds of knowledge depend on a person's position in a social structure and access to situations in which a particular code is used.

To address this problem, one might envision a hierarchy of speech communities, or overlapping communities, depending on the scope of shared knowledge. In a study of creole language use in Guyana, Rickford (1986) pointed out that the ability to recognize linguistic indices of broad social categories was shared not only within the community of Cane Walk but also within larger communities, even in the whole country, while more subtle sociolinguistic meanings were known only more narrowly. The difference in social scale involved not only a difference in the amount and delicacy of sociolinguistic knowledge but also a difference in evaluative schemata. But if the 'speech community' is taken to delimit the social unit within which linguistic diversity is socially constituted and accounted for – an

empirical object that is also the locus of its own explanation – rather than marking the bounds of a particular study with specified goals, then speech communities may well **seem** to be discrete units, although it is only the researcher's approach that makes them so. It is tempting, moreover, for researchers to slip back into older notions of 'community' and to take a village, or an ethnic group – or a village as localized instantiation of ethnicity – as the sole unit of description.

Finally, how does one investigate knowledge, and how does one determine whether knowledge is shared? To what extent is the relevant knowledge available to conscious articulation, or is it embedded in practice? It is all too easy to take a few informants' claims as being an analysis of the relevant groups, varieties, and uses of language – and so to mistake a particular participant's ideology of language for a description and analysis. One solution has been to abjure informants' explicit analyses, except insofar as they identify some locality or grouping, such as a town or a neighborhood, within which to describe linguistic practices. This is the approach taken by Labov and his followers, who emphasize empirical reliability via consistent interview protocols and representative samples of community members. Labov's speech community (1972: 120–121) is defined not by members' producing the same linguistic forms in the same way, but rather by "participation in a set of shared norms; these norms may be observed in overt types of evaluative behavior, and by the uniformity of abstract patterns of variation which are invariant in respect to particular levels of usage." While 'shared norms' may suggest shared ideas and values, what looms larger in Labov's work are norms of use (statistical norms). It is the patterns of linguistic variation – i.e., overlapping patterns of usage, within a controlled sample of contexts – which he puts forward as the crucial evidence of participation in the speech community.

The speech community described in Labov's most recent book (2001) is Philadelphia, represented by samples of speakers from five neighborhoods and a random sample from the city telephone directory. These samples do not actually represent the city, however, because they were purposely restricted to American-born whites. Other speakers, including Philadelphia's large African-American and Latino populations, are excluded because, Labov argues (2001: 506), they do not share in the same patterns of linguistic variation. The purpose of the study, and rationale for the sampling decisions, was to explore linguistic change in the local vernacular English, not to describe all linguistic practice in the city. The question remains, however, as to whether the presence of nonwhite and nonnative speakers is or is not relevant to currents of change.

Observe that this 'speech community' is defined in terms of sharing in a particular pattern of language use – a single 'local vernacular' whose manifestation varies principally in whether a speaker is leading or lagging in its ongoing currents of change, and whether the speech situation is such as to reveal the vernacular most clearly. These variations distinguish among genders and socioeconomic classes within the set of native white Philadelphians, but it is only in that sense that they describe linguistic diversity. Whatever analysis one might envision of the linguistic practices of the city's broader ethnic and racial composition – an analysis that would need to consider multilingualism, multidialectalism, and the social organization of exclusion and avoidance – is precluded from this approach and this conception of 'speech community.' (One might ask, however, whether 'community' is the best rubric for the larger analysis.)

These questions about boundaries, sharing, and the relationship of meaning to practice have given rise to some alternative formulations of the object(s) of study. By the mid-1980s, ethnographically oriented scholars were beginning to reconsider the social theory underlying then-current analyses of linguistic repertoires and social actors, and to rethink concepts such as 'community' and 'class.'

Speech Networks and Communities of Practice

In a large city it cannot be taken for granted – as indeed it should not anywhere – that the social ties most relevant to linguistic practice are geographically concentrated. Residence, work, recreation, and other activities may be dispersed, and one person's set of social contacts may differ from another's. Network analysis, an approach first developed in urban anthropology and sociology, tracks the webs of personal relationships wherever they occur, starting from an individual and that person's interlocutors. The analysis collates and compares such person-anchored networks and considers how they may reflect or influence linguistic practice. For example, networks may be relatively closed (members have more contacts with each other than with outsiders) or relatively open (less overlap among individuals' social ties). In an early use of the network approach, Gumperz (1964) argued that these properties of networks accounted for differences between the linguistic repertoires of two communities, one in India and one in Norway. Another way to compare networks concerns whether ties are strong (multiplex – an individual has many kinds of relationship with the same

person) or weak (relating to the other person in only one situation). Lesley and James Milroy (1992, and elsewhere) have proposed – initially from research on linguistic variation in spoken English in inner-city neighborhoods in Belfast – that close-knit networks with many multiplex ties foster linguistic conservatism, while weak ties are vehicles of linguistic change. Emphasizing close-knit networks' importance as the site of (emergent) shared experience, Gumperz and the Milroys have linked them with notions of 'community,' although Gumperz also calls open networks 'communities' and maintains they still hold something in common.

A related construct is the 'community of practice,' a grouping that is based on participation in some activity or project. As with network analysis, the point is that any 'shared' understandings are accounted for as products of joint experience and coconstructed relationships. As Eckert and McConnell-Ginet write (1992: 464), "ways of doing things, ways of talking, beliefs, values, power relations – in short, practices – emerge in the course of this mutual endeavor." Participation in the activity, and members' definition of it, distinguish this grouping from older notions of community. This approach is especially useful, the authors find, for studying gendered language practices. Because activity-based groups such as football teams, armies, and boards of directors are likely to have a predominantly male membership, while secretarial pools and aerobics classes mainly draw women, these groups' distinctive linguistic practices easily become associated with gender (Eckert and McConnell-Ginet, 1992: 472). A focus on community of practice asks how an activity, a group, an individual as participant, and the meanings of linguistic practices mutually constitute one another.

Both these constructs, speech network and community of practice, suit a social theory in which 'community' is not assumed *a priori*; instead, it has to be achieved. Recently, Duranti (1997: 82) defined the speech community itself in this vein, as "the product of the communicative activities engaged in by a given group of people" – and the work of Ochs, Duranti, and their associates has emphasized the detailed study of activities and social interactions as communicative practices. This emphasis on the emergent character of social relations and the understandings connected with them resembles the ways many anthropologists have rethought the concept of 'culture.' Where older concepts of speech community, in their focus on the distribution of knowledge, presented a relatively static picture in which knowledge was unaffected by the action that applied it, discussions of community of practice and speech network permit a view of culture as public, negotiated, and located in interactional space rather than in a sort of mental museum.

Ideologized Representations and Imagined Communities

Eckert's mention of meaning and beliefs reminds us that sociolinguistic 'knowledge' is not just a tape recording of utterances, but an ordered, cognized, and filtered set of representations. Our interpretations of the linguistic practices around us depend not only on what is actually said, but also on stereotypes we have built up out of our experience – built and (re)configured (Agha, 1998; Irvine and Gal, 2000; Silverstein, 2003). Thus, in a discussion of honorific language in Tibetan, Javanese, and elsewhere, Agha shows how speakers' ideologies of deference, social hierarchy, and linguistic 'purity' lead to asymmetric distributions of linguistic forms across social categories – aristocrats and peasants, for example, deploy different constellations of forms – and these usages yield, in turn, stereotypes of speaker identity and rank (Agha, 1998: 166). Although Agha and Silverstein emphasize that the stereotypes are based on evidence – grounded in participants' discriminable experiences of language use – the stereotypes can also overwhelm the input, influencing the interpretation of utterances that do not precisely conform to them. Since people's experiences differ, and since interpretations also reflect the interpreter's position in society – and these differences pertain even to coparticipants in a particular activity group – cultural stereotypes and sociolinguistic knowledge cannot be perfectly 'shared.'

The object of study in this line of research reaches beyond the immediate. Distinguishing between representations that are experience near and those that are experience far, we must explore the latter in their own right. The people I imagine as co-inhabitants of my social world, including those I envision as past and as potential interlocutors – as well as those I know I will never meet and those I hope to avoid – are a population not limited to the history of my actual contacts. A recent strand of research on speech communities has considered these distant and imagined relationships. For example, Spitulnik (1996) examined the role of Zambian radio programs, whose audience may imagine itself a community of shared listening practices. In the circulation of 'public words,' such as catchphrases from well-known programs and announcers, listeners repeat the expressions that show their familiarity with the broadcast, and so constitute a colistenership with people they have never met. 'Hello Kitwe?' – a channel-checking expression with which the broadcaster based in the

Zambian capital tries to transfer operations to a broadcaster based in the provincial city Kitwe – when repeated in a crowded shop by a customer trying to get attention, arouses knowing smiles in other customers who recognize the phrase (Spitulnik 1996: 168).

The social groupings defined by the circulation of 'Hello Kitwe,' and by a radio broadcast's audience (actual or potential), are perhaps more often counted as 'publics' than as 'communities.' The terminological difference stems from the impersonal character of the 'public,' which is linked to its potentially large scale as an arena of communication and signals its connection with political institutions. As Gal and Woolard (2001: 1) wrote, "the work of linguistic representation produces not only individualized speakers and hearers as the agents of communication, but also larger, imagined social groupings, including . . . publics. Such representational processes are crucial aspects of power, figuring among the means for establishing inequality, imposing social hierarchy, and mobilizing political action." Our lives, including many aspects of linguistic practice, are affected by these representational processes and the actions they lead to, sometimes at a considerable distance.

Notice now that the publics imagined from different social standpoints may not define the same sets of people, and may fail to coincide with any concretely traceable social network. Zambian policy makers, like many others in Africa, distribute radio broadcasting – schedules and topics – among seven 'official Zambian languages' plus English, according to a model that equates language with ethnicity and region. Since most listeners are multilingual and some languages far outreach the ethnic populations they supposedly identify, actual audiences for a program are often quite different from the ethnic communities imagined in radio policy. Of course, the propensity to identify (homogeneous) language with ethnicity and region has a wide distribution and a long history, taking us back at least to the Herderian formulations mentioned early in this article. The same kind of equation underlies Benedict Anderson's otherwise brilliant discussion (1991) of the nation as 'imagined community' – imagined as the readership of newspapers and novels published in standardized languages and distributed via the mechanisms of print capitalism. As if it were an ethnic group writ large and mediated by print capitalism, this 'community' resembles the Saussurean homogeneous speech community in that Anderson assumes the population is monolingual in 'their' language, whose slight phonetic variations do not interfere with reading. This community is doubly imaginary, then – in its members' imagination and in Anderson's. It exists only in an ideology that imagines the standardized language of the nation-state as the common natural resource of its citizenry, so that linguistic diversity is interpreted either as something trivial, or as deviance and inadequacy. Images of the nation, and of the 'authentic' citizen, are at stake.

A good example is the debate over an orthography for Haitian Créole/Kreyòl (Schieffelin and Doucet, 1998). The spelling of the language's name illustrates the problem: the contest between those who see 'Créole' as fundamentally French – and speakers of standard French as the most authentic citizens – and those who see 'Kreyòl' as fundamentally other. The authors ask (1998: 303): "What is the real, authentic kreyòl? Thus, who is the real, authentic Haitian – the dominated 'Africanized' masses or the dominant 'Frenchified' elites? Is there a 'pure' kreyòl? . . . The sound system leads directly into the core of the debate about social classes, legitimacy, and authenticity."

Those who reject the Herderian formulation of language-based community must nevertheless recognize its prevalence in many parts of the world as the ideological grounds for political, territorial, and other kinds of claims. Silverstein (1996, 1998) therefore distinguished between 'language community,' which is based on its population's allegiance to norms of some 'shared' specified denotational code (such as a prescriptive standard) – conceived as 'their language' – and 'speech community,' based on indexical facts of repertoire deployment and their associated norms of use. The distinction recalls our two earlier threads in the conception of 'speech community,' the Saussurean and the sociolinguistic, but it places the former in the realm of ideologies of allegiance and the latter in the realm of situated experience. Although this pluralistic view of community is appropriate for many kinds of analysis, Silverstein (1996) showed its particular utility in understanding the dynamics of language contact in North American ethnohistory. The spread of European languages and their eventual dominance over indigenous ones took place within local settings which had varying social histories and shifting allegiances.

This analysis depends on looking at social (and linguistic) relationships of different kinds and on different scales. In the contact zone, indeed anywhere, 'language community' and 'speech community' do not identify the same population. Yet, the social dynamics of each kind of community affects the other. As Silverstein (1998: 401) put it, they are dialectically constituted cultural forms. Moreover, localized forms of speech and local social ties are in a similarly dialectical relationship with larger-scale, even global, currents. The proponents of *francophonie*, for example, must contend with local social dynamics and

multilingual scenes, while populations in localities as disparate as Québec and Rwanda contend, in turn, with *francophonie*'s language-based claims to their allegiance. The 'local' is itself an emergent construct, produced in relation to larger-scale processes. In sum, speech communities and language communities are different; neither stands alone; and an account of either must look outside its bounds.

The View across the Boundary

Questions about the speech community's boundary have already been raised with respect to the scale of analysis – a gradient in which face-to-face social groups, where everyone knows a great deal about everyone else, are embedded in larger settings where people are less well acquainted or not actually encountered at all. The question of boundaries is not just a matter of scale, however, but also of opposition. If, for example, boardrooms and Tupperware parties define different communities of practice and if they are associated with gender, then their relationship is one of opposition, not merely of random difference. And while it could be argued that gendered practices, however divergent they might be, are nevertheless part of some larger 'community' whole, any community X is only identifiable in relation to some population that is not-X. Even in face-to-face interaction, the participants establish their distinct identities as well as their commonalities.

Interaction is thus as much a process of differentiation as of accommodation. The crucial question is what kinds of differentiation and accommodation are produced, and by what semiotic means, in each empirical case. A similar question was asked decades ago about the signs distinguishing different ethnic groups. In *Ethnic groups and boundaries*, Fredrik Barth argued (1969: 10) that "ethnic distinctions do not depend on an absence of social interaction and acceptance." Instead, the persistence of an ethnic boundary depends on people's defining themselves in opposition to others whom they know. Similarly, Labov's classic research on Martha's Vineyard showed that the residents' speech forms were being reconfigured because – after the island's economy shifted away from fishing and toward the tourist trade – the contrast between native islanders and visiting mainlanders increasingly outweighed the islanders' internal divisions. Apparently, the Vineyard dialect was diverging from mainland speech because of, not in spite of, increased contact.

Following these precedents, Irvine and Gal (2000) argued that attention to boundaries and processes of differentiation should replace the concept of 'speech community,' which was overburdened with problematic baggage. Descriptions framed in terms of the 'speech community' tend to privilege a particular scale or type of social organization and to preclude exploring relationships that extend beyond its boundary. Moreover, many scholars now disavow the consensus-based social theory that underlay much earlier sociolinguistic and linguistic discussion of 'community' and discouraged attention to processes of exclusion, conflict, and domination. Rickford and the Milroys, for example, have proposed that conflict models of social class account better for the observed patterns of sociolinguistic variation than the consensus model can. In a related vein, Morgan (2003) argued that "speech communities are recognized as distinctive in relation to other speech communities.... They come into collective consciousness when there is a crisis of some sort, often triggered when hegemonic powers consider them a problem... Speech community represents the location of a group in society and its relationship to power." This emphasis on crises and power relations external to the community is borne out in Morgan's writings on the discursive practices of African-Americans, especially women.

Social life includes both agreement and conflict, sometimes both at once. In our joint work, Susan Gal and I have tried to capture this complexity by focusing on (linguistic) differentiation as a semiotic process that accommodates, but does not in itself entail, contestation. This complex process, we argue, includes a principle of fractal recursivity: an opposition that has been understood at one level of relationship can be projected onto other levels, yielding subcategories and supercategories. Thus the same process accounts for the possibility that linguistic varieties, social identities, or any other sociolinguistic formation may sometimes be seen as (sub)divided, but sometimes as unified. For example, in research on rural Wolof speech patterns I have proposed (Irvine, 1990) that a principle which (ideologically) distinguished the speech of high and low Wolof castes applied recursively. Applied within the high caste it marked subtler distinctions of rank; applied between languages it distinguished Wolof from French, to the latter's disadvantage.

We focus on differentiation because difference and distinction are what makes possible the logic of relations on which society and language depend. Just as Jakobson and Sapir showed for language, society too consists in relations and fields, not things. A focus on 'community' that does not look across the grouping's boundaries tends to obscure the relational logic that organizes a social field, by overemphasizing what people have in common and treating its object of study as an autonomous thing, rather than an artifact

of the researcher's approach. No community is an island.

Conclusion

Researchers investigating the relationships of language, culture, and social life need ways to think about the social aggregates in which those relationships are located. Most authors refer – whether loosely or rigorously – to some sort of 'community.' As we have seen, however, definitions of 'speech community' have varied widely, and many scholars now argue that it cannot be entirely self-contained as an object of study. Just as most anthropologists no longer see 'culture' as a homogeneous object that can exist in isolation (and should not be treated as if it did), we realize that speech communities are related to other social formations that intersect with them, or are incorporated within them, or contrast with them, or include them. A crucial step away from the speech-community-as-ethnic-island approach is to see language community as distinct from speech community, and the two in dynamic relationship – a step that puts the Herderian formulation in its (ideological) place.

Nevertheless, the word 'community' invokes an aura of consensus and common cause, even if you try to define it in some other way. It is tempting, therefore, for 'community' – whether researcher's or participant's construct – to conflate, or slide among, at least three quite different axes of relationship: homogeneity and difference, consensus and conflict, solidarity and distance. Just as difference is not the same thing as conflict, so any conflation of homogeneity, consensus, and solidarity under the rubric of 'community' is misleading. It is all the more so when language is added into the mix, as if languages were based upon – or could produce – these qualities of community. These issues ought to be disentangled.

Even if its technical utility is limited, however, 'community' is a term it is hard to do without. Its various formulations each address something of interest as to how the practices that make social relationships rely on systems of signs. Although the scholar who looks for standardized off-the-rack technical terms will not find one here, there is much to be gained from exploring the surrounding debates.

See also: Communities of Practice; Ethnicity; Linguistic Anthropology; Linguistic Ethnonationalism; Society and Language: Overview; Speech Community.

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Speech and Thought: Representation of

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Introduction

This article addresses the *Representation* of Speech and Thought (henceforth RST). The overwhelming focus will be RST in literature, but many of the principles can be extended to the representation of speech – and even of thought – in other varieties and genres: journalism, records of parliamentary debates, commissions of inquiry and committees, police interviews, etc. Still it is worth noting at the outset that literary representation of speech and thought emerges from the potential in all written languages – a potential of inestimable value – to record ('capture', render inspectable) in semipermanent form (hence usable at later times and in different places) what someone said at one particular time and place. More remotely yet, written records of speech must derive, as a counterpart, from the reporting of others' communicative acts that is so important a part of spoken and sign languages.

RST is therefore bound up with writing rather more than is always acknowledged. Younger readers, fully of the digital age, may be puzzled that these opening remarks about the power to record or represent speech are not focused on audiotape recording and digitized sound files, now very widespread means of representing speech. But this article is about an affordance of the much earlier and more culture-changing technological breakthrough, the development of writing, and literary authors' rich repertoires of means for presenting characters' words on the page. Little further mention will be made of Internet literature or Web-based fiction; but it may be noted in passing that modern technology is such that there is nothing to stop a Web-based fiction writer from using sound files for some or indeed all of the discourse categories shortly to be described (characters' direct speech, indirect speech, narratorial discourse, etc.). One literary format of increasing importance that might here merit further comment is the audio novel, widely used by travelers and the print-weary: typically using just one performer as teller, they deserve fuller study to see how they resolve the tricky problem of conveying direct speech and the narratorial forms distinct from each other. And then how do they cope with those passages of FID or combined discourse (to be described later), where the voices of narrator and a character are impossibly mixed or calqued? Nowhere do Bakhtinian ideas of the polyphony or clash of voices seem more palpably applicable. The potential 'reoralization' of the written genres of the novel and the short story, triggered and sometime perhaps prompted by the spread of audio-books, may come to require extensive scholarly treatment.

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literature in English, although there is no reason to suppose that RST and its subtle subtypes do not flourish in all the languages with a developed literary tradition; certainly it has been extensively studied and discussed in most European languages, and cross-linguistic studies are increasingly proposed, where much of the interest lies in comparing and contrasting the formal exponents of distinct subtypes (in particular the tense-aspect requirements in FID) and indeed whether certain subtypes are prominent in one literature while nonexistent in another, or developed much later, and so on.

Direct Speech and Indirect Speech

Direct Speech

> "My dear Mr. Bennet," said his lady [Mrs Bennet] to him one day, "have you heard that Netherfield Park is let at last?"
> Mr. Bennet replied that he had not. (Jane Austen, *Pride and prejudice*, chap. 1)

In the canonical forms of both direct and indirect speech today (henceforth DS and IS, respectively), a fundamental distinction is made between the reporting or inquit clause, in which the speaker of the reported material is identified and cast as the subject of a verb of communication, and the reported clause, in which that speaker's message is presented. The reported clause of direct speech is usually set off, by speech marks at its boundaries, from the reporting clause; and sentence-initial reporting clauses may be followed by a comma or colon. The reported clause is understood to give the speaker's actual words, *verbatim*, hence all the deictic elements (pronouns, tense, time and place expressions) within the clause or fragment reflect the speaker's deictic center, at the time of speaking, as in Mrs Bennet's speech. Here, the present tense is used for events/states that are true at the time of Mrs Bennet's speaking, she denotes herself by first-person pronouns (here *my*) and her addressee by second person pronouns, and all evaluations (*My dear … at last*) are entirely hers. Mr Bennet's reply is rendered in IS – which specifically denotes the segment *that he had not* – and this, like the reporting clause *Mr Bennet replied* that precedes it, is wholly based on the narrator's deictic perspective and as a result uses a third-person pronoun to denote the reported speaker and past tense. Various DS features are difficult or impossible in IS; here, for example, if Mr Bennet had echoed his wife's formulaic endearment this would be problematic within an IS construction:

> ? Mr. Bennet replied that (his) dear Mrs Bennet, he had not.

Terms like 'difficult' and 'problematic' are often applied here, where in canonical DS and IS the linguist is usually quite prepared to specify what is grammatical or ungrammatical. The manipulations of what is possible or acceptable in variant free forms of IS (in modern English at least) make firm grammaticality judgments particularly difficult in this area.

The reporting clause in DS can follow the reported speech, and in such cases there is scope for inversion of the verb and (usually) nonpronominal subject in the reporting clause. Or the reporting clause is 'flanked' on either side by direct speech:

> "Kitty has no discretion in her coughs," said her father; "she times them ill." (*Pride and prejudice*, chap. 2)

In present-tense feature-article journalistic reporting, such inversion within the reporting clause is frequent and possible even where that inquit clause comes first (again, provided the subject is nonpronominal):

> Adds Smith, "The key to utilizing a mammogram to its fullest potential is by getting a high-quality screening performed by a competent clinician … ." (*USA Today* 19 July 2001)

Although opening and closing inverted commas remain a standard marker of direct speech in all written varieties, many 20th-century fiction writers dispense with them, instead marking the onset of a character's turn of talk by a new line, an indent, and a long dash. But for those writers who retain reporting clauses with direct speech, it is important to note that they provide more than a perfunctory speaker-attribution: they often carry information about the speaker's emotions or attitude and may include information about gesture, facial expression, or body movement, all of which may be evaluative or indexical.

Indirect Speech

Whereas DS supplies the reported speaker's actual wording, IS relays only the content, gist, or illocution of the actual or implied DS utterance (implied in all cases of fictional IS, where there is no actual DS precursor). In indirect speech with a sentence-initial reporting clause, no graphic devices set off the reported material from the reporting clause, but the reported clause is introduced by a complementizer or subordinator (commonest is *that*, as in the Austen sentence above: *Mr. Bennet replied that he had not*). Where the reporting clause comes first, as in this example, complementizing *that* is often ellipted (cf. obligatory *que* in comparable French constructions), whereas more semantically specific ones cannot be: *if*, *whether*, and *wh*-words introducing indirect questions and exclamations. In the case of IS reports of

requests and other directives, *that* may or must be replaced by an infinitival construction, with raised reported clause subject: compare *She asked that he shut the door / She asked him to shut the door* and *She told him to leave at once/ *She told that he leave at once*.

The reported clause gives a version, and not the precise wording, of the original speaker's utterance, but all deictic elements now conform to the spatio-temporal coordinates of the narrator or reporter, already responsible for the reporting clause. Thus the original speaker of the reported clause is now denoted by third-person pronouns, and time and place expressions are to be interpreted relative to the narrator/reporter.

(1) Mrs Bennet asked whether he had heard that Netherfield Park was let at last.

The grammar of IS entails a wholesale adoption of the deictic orientation of the narrator. All deictic indicators that might appear in a character's direct utterance, keyed to the character's assumed point in space and time (in addition to tense and personal pronouns, words like *here*, *today*, *this*, and *now*), will be displaced by deictic indicators, which makes sense from the narrator's perspective (typically, the 'nonproximate' deictic forms: *there*, *on that (same) day*, *that*, *then*). Among the deictic indicators must be included the use in DS of a few verbs of specific directional movement, implying movement toward or away from the speaking character (*Come here!*; *Go away!*); by contrast in IS the movement verbs will be directionally nonspecific or, like other deictic elements, oriented to the narrator.

Although DS and IS are in a sense equivalent and - alternative forms, there are also asymmetries involved, particularly in fictional and literary contexts. For example, normally a conversational utterance will have just one DS form, but may have several IS versions, varying from each other in minor ways. Compare (1) above with other IS versions, (2) and (3):

(2) Mrs Bennet asked whether Mr Bennet had heard that Netherfield Park had finally been let.

(3) Mrs Bennet asked her husband whether he had been told that someone had finally taken Netherfield Park.

By the same token, when contemplating an IS sentence, several distinct possible DS versions can be proposed, without any certainty as to which if any was the actual source: any of (1), (2), or (3) could 'derive' from the following (among others) rather than Austen's actual formulation above:

(1)' Mrs Bennet said "Have you heard that Netherfield Park has been rented at last?"

It should be stressed that such variations of 'source' (DS) or of 'derived' (IS) forms are particularly associated with fictional narrative (where, for example, there simply is no actual DS counterpart of the IS construction that the writer has composed). In nonfictional contexts, the *vraisemblance* or 'faithfulness' standard may be set much higher, so that IS reporting of speakers may be required or expected to match closely the wording of the real DS source, to limit misrepresentation. In extreme cases or genres (e.g., when giving witness evidence in a criminal trial), IS may be disallowed.

When contemplating Direct Speech (and to diminishing degrees when considering each of the other forms to be discussed in this article), at least two binary distinctions need to be considered: is the text in which it appears literature or nonliterary; and is it hypothetical or actual (e.g., fictional DS may be used in philosophical and moral arguments). On that basis we can distinguish DS in novels and in philosophical arguments, letters recording personal experience, and hard news journalism or Hansard-like parliamentary records. The literary-and-actual is a less-exploited category, but there are enough novels that incorporate if only fleetingly famous individuals and some of their reliably documented utterances for this to be a real category. What distinguishes the nonliterary and actual from the literary and the hypothetical is that there is some process of transcription prominent in the former, and by contrast some kind of invention prominent in the latter (although neither variety is *purely* transcriptional or inventive).

Some Major Points of Difference between Direct and Indirect Speech

Indirect discourse maintains the tense of the encompassing narrative (in traditional English fiction, this is past tense; in some contemporary literature, this may be present tense). Direct discourse is in present tense, the norm for natural conversation of which it is a simulation. First- and second-person pronouns in the direct version, denoting the speaking character and their addressees, contrast with gender-appropriate third-person pronouns in the indirect version, being the narratorial designations of those characters (a large exception to this are those stories where the narrator is also a story participant and is accordingly designated within the story by first-person pronouns; a rarer exception are 'you-narratives'; but even in these exceptions, the pronouns denoting addressees, in the former case, and those for seemingly representing the narrator, in the latter case, diverge from the

direct I-you pattern. The two patterns are *I-him/her/them* and *you-[all accusative forms]* respectively. One general upshot is that English indirect forms are more explicit than the direct ones with respect to the gender of the addresser and addressee.

It has been traditional to describe the reporting and reported clauses in DS and IS as syntactically related to each other differently; in typical IS where the reporting clause comes first, they are syntactically related hypotactically, with a clear sense of matrix and embedded clause; but in DS the relation is paratactic, with the reported clause as nonembedded complement. But the most suitable grammatical description is certainly a matter of debate (see Huddleston and Pullum, 2002: 1023–30, for arguments). But it is clear that 'robustly paratactic' DS constructions, such as imperatives and exclamatives, resist incorporation into IS format. Thus when in Joyce's 'The Dead' Mr Brown takes a first sip of his whiskey and the text runs (using DS):

-God help me, he said, smiling, it's the doctor's orders.

it is hard to devise a truly plausible IS version:

?/* He smilingly cried that God should help him but it was the doctor's orders.
?/* God would help him, he said, it was the doctor's orders.

None of the 'colorful' idiosyncratic and dialectal qualities of the speech or thought of a character who is reported directly survive the transfer to a canonical IS version; the speech undergoes a kind of translation, into the language of the narrator, and the latter is conventionally (but not obligatorily) 'standard', 'neutral', detached, a superior knower even if they do not assert 'omniscience'. The narrator is sole authority, solely responsible, for the wording of both components, reporting and reported, of the IS construction. By contrast there is an explicit division of authority in DS constructions, with the reported speaker solely responsible not merely for the sense but also the actual wording of the reported material.

Still, it is worth emphasizing that what is certainly lost, in IS reporting, is not 'colorful language' necessarily, but 'the *character's* (possibly colorful) language'. That is to say, typically and conventionally, especially in literary fiction, narrators are more 'neutral' and formal than the characters of whom they tell. But this is only a convention or pronounced tendency and will be overridden in many particular cases. One is the novel *The adventures of Huckleberry Finn*, where Huck himself, as first-person narrator, reports nonstandardly the presumably standard speech of some of the protagonists in his story.

A Minor Variant of Direct Speech: Free Direct Speech

Where direct speech is presented without accompanying a reporting clause, it is given the more specific label free direct speech (FDS) by some analysts. In just this respect (lack of the reporting, inquit or 'framing' clause), FDS is like FIS, but in other respects it is really only a variant of DS (no difference is assumed or demonstrable between the exact content of DS and FDS versions) and not an independent category as the free indirect ones are. Reflecting its status as a variant, there are only slightly different functions or effects achieved by FDS that are not achieved by all DS. An alternative conceptualization would be to note that, unlike IS, the *inquit* clause is not essential or integral to a direct speech report, and that therefore those direct speech reports with a framing clause are the supplementary variant (ADS – attributed direct speech, in contrast with the unattributed form, which might now be labeled simply DS).

Often in cases of FDS the reporting clause is as close as the adjacent sentence. Or one reporting clause introduces (hence has 'scope' over) a series of (distinct) utterances from an individual, so that the technically FDS sentences are so created for purposes of textual economy as in ellipsis cohesion. More interesting may be sequences of FDS dialogue, typically between two parties (metronomic speech), where speaker change and speaker identification must be inferred by the reader, and with less than full certainty. Where DS has the reporting clause following, some analysts label the speech FDS, by analogy with parenthetical framing clauses in FID (see following).

Free direct speech may also be exploited to give the impression of rapid interchanges (as in fictional dialogue in Hemingway, Ivy Compton Burnett, etc.). Constructions that have the appearance of DS are widely used in print newspaper headlines (particularly tabloids), although it often transpires that the 'speech' is the creation of a copy editor who has rephrased one participant's most forceful remarks in more pithy and dramatic style or has synthesized the more subtly expressed views of several protagonists. By convention strict fidelity to the speaker's precise words is not always expected or required, but misrepresentation and trivialization are recurrent risks in this pursuit of entertaining, sales-generating copy.

NRSA and NV

Two categories have been proposed (by Semino and Short, 2004) as lying at the most indirect end of the speech representation continuum: these are

NRSA, narrative report of speech acts, and NV, narrator's representation of voice. The former, a more established and accepted category, equivalent to what McHale (1978) called 'diegetic summary', covers those reports of speech in which the content is severely abridged (to the point where arguably there is no genuine speech representation) but a scant indication of the type of illocutionary or perlocutionary force of the act is provided:

> All evening they argued and quarreled over how best to economize.
> Mary's father stepped in with congratulations. (Graham Greene, *Brighton rock*, p. 137)

As the most indirect form of speech representation, NRSA is a useful device for novelists who wish to keep firm control on the narrative, but at the cost of creating a non-scenic detachment from the living voices of particular speaking characters. NRSA is suited to an aggregative and abridged recording of views, particularly where these are in broad agreement, as in summarizing the view of a committee or even a large meeting

> [For hours] 8,000 hunt supporters . . . made themselves heard . . . . They vowed to go on protesting until the government reversed its plan to ban hunting with dogs. (*The Guardian*, 29 September 2004)

Whereas in NRSA utterances one arguably reaches the limit of speech representation, often with only a slight indication of the actual wording of the anterior speech, with NV (narrator's representation of voice) attention has turned away from representation altogether, to simply reporting that the activity of talking has occurred. NV covers those occasions where the narrative reports that an individual spoke, but "we are not given any explicit indication as to what speech acts were performed, let alone what the form and content of the utterances were" (Semino and Short, 2004: 44), or there is "summary reference to speech events that involved a large number of participants" (Semino and Short, 2004: 45). This new category (and even more so its near equivalent in thought-reporting, NI, discussed later) proved useful to Semino and Short, whose interest was in a corpus-based comparative study of frequencies of distinct types of category-use in a corpus of fiction, journalism, and (auto)biography. Two NV examples are given in bold here:

> We **exchanged a few words lazily.** (Conrad, *Heart of darkness*, p. 28)
> **After talks in Belgrade**, Mr Milosevic said he fully agreed with the international peace plan. ('Milosevic backs Hurd peace plea', *Guardian*, 5 December 1994)

Free Indirect Speech

> A conversation then ensued, on not unfamiliar lines. Miss Bartlett was, after all, a wee bit tired, and thought they had better spend the morning settling in; unless Lucy would at all like to go out? Lucy would rather like to go out, as it was her first day in Florence, but of course, she could go alone. Miss Bartlett could not allow this. Of course she would accompany Lucy everywhere. Oh, certainly not; Lucy would stop with her cousin. Oh, no! That would never do! Oh yes! (E. M. Forster, *A room with a view*, Penguin, p. 36)

At this point we must turn to the phenomenon that alone justifies dwelling on the topic of RST at such length in an encylopaedia of linguistics – a phenomenon interest in which, as a topic of some theoretical importance to linguistics, was greatly stimulated by German scholars of the Sprachseele school and linguists such as Charles Bally and Marguerite Lips in the early 20th century, the latter calling it *le style indirect libre*. Since then this narratological hybrid, lying somewhere between but apart from either the wholly narrated, or the reported, or the direct representation of speech, has acquired many names in different languages, including: *erlebte Rede*, represented speech, combined discourse, quasi-direct discourse, and free indirect speech (FIS).

FIS is the narratorially most fascinating of styles of discourse reporting, carrying some of the formal features of both character-expressive DS and narrator-expressive IS. FIS is a blending of the IS or narratorial options for tense, pronouns, and graphological non-removedness, but the DS or characterological options in syntax (especially noticeable in interrogatives and imperatives and exclamations), in its dispensing with complementizers, and its adoption of the character's space/time deixis, expressive lexis, and subjective modality.

But FIS is not simply a judicious combination of DS and IS features, nor simply some middle way between these two. Both DS and IS are accompanied by a framing or matrix clause: canonical FIS eschews one altogether (noncanonical FIS, with reporting clause present, is discussed later). Thus FIS is 'a bit of both' DS and IS, but also 'a bit of neither'. FIS styles of speech representation, then, are neither direct nor indirect according to orthodox prescriptions, but mixings or mergings of narratorial indirectness with characterological directness. And despite the earlier comparisons with DS and IS, the mode that FIS most crucially complements or contrasts with is PN (pure narrative: pure in the sense of being the narrator's direct address of the reader, without any traces of the words actually spoken or thought by characters; hence PN is chiefly reports of events and

actions, and descriptions). Where uncertainty arises for the reader in the evaluating of possibly FIS phrasings, the confusion is one between character voicing and narratorial voicing. Between DS, IS, and FIS we finally have only variations in the fullness or editedness of rendering of the same individual's voice; but where we cope with the risk of confusing FIS and PN we are in danger of misattributing or misidentifying two entirely different voices and two different individuals, the character and the narrator.

If there is one linguistic feature that seems noticeably more prominent in FIS than in alternative modes of discourse representation, it is modality. FIS is marked by frequent use of modal verbs (*must*, *should*, *had to*, *could*, *might*, *would*) and sentence adverbials (*certainly*, *perhaps*, *maybe*, *surely*, *of course*, etc.) expressing judgments about the likelihood or necessity or desirability of some action or state transpiring. All such modality discloses the character's needs and wants and is frequently woven into contestable judgments. Postponing further discussion of the functions of FIS to a more inclusive section on FID generally, we turn to cases of indirect speech report with parenthetical inquit verb.

Preposed Reported Clauses: IS or FIS?

Of considerable interest are all cases where the reporting clause follows the reported one, and the latter has the 'backshifted' tense and distal or narratorial deictics that would suggest IS:

Could he accompany her home, he asked.
What an appalling summer she was having, she said.

These are not standard IS: both have, in the reported component, the syntactic inversions of direct questions and exclamations respectively, whereas with framing-clause-first IS noninversion of elements is the norm. Neither of the two cited sentences, if simply reversed, would be regarded as canonical IS, particularly in light of more grammatically unified alternatives. Thus both

He asked could he accompany her home.
She said what an appalling summer she was having.

would be judged nonstandard or dialectal, by contrast with 'standard' IS:

He asked if he could accompany her home.
She said that she was having an appalling summer.

But whereas *He asked could he accompany her home* might be classed simply as nonstandard IS, there are grounds for treating *Could he accompany her home (he asked)* as FIS, the belated reporting clause being processed by the reader only when the reported speech has already been understood to express the words and 'voice' of the character denoted by *he*, albeit expressed within the narratorial deictic regimen. As for the treating of *He asked could he accompany her home* as nonstandard IS, again it is hard to see a definitive formal or criterial basis for specifying where such nonstandard IS shades into some form of FIS (consider more character-expressive versions such as *He asked could he please please please accompany her home*).

Returning to the 'standard' IS sentences earlier, with reporting clause first, it is evident that a 'mechanical' inversion of the reporting and reported clauses of the kind possible in relation to DS utterances (She said "I'm lost!" ⇔ "I'm lost!" she said) yields ungrammatical forms:

*If he could accompany her home, he asked.
*That she was having an appalling summer, she said.

To be grammatical, the complementizer must be removed, and subject–verb inversion must apply in the reported question, but those steps move the reported clauses closer to direct speech, i.e., into the notional territory of FIS, than would otherwise be the case. And like FIS and DS sentences (and unlike those in IS) the reported clauses are also grammatically independent. One is drawn to conclude that where speech is reported using the narrator's tense and pronoun selections and with the reported clause preceding the inquit clause, there is no option of normal IS, and the only reason for withholding the label FIS from such cases would be adherence to the view, as axiomatic, that any within-sentence *inquit* clause cancels free indirect status.

Representation of Thought: Direct, Indirect, Free Indirect

Direct and Indirect Thought

In English literary fiction, all the speech representation categories discussed above have become matched, over the last 200 years or so, by loosely equivalent ones for the representation of thought. Indirect thought was the first to become widespread, but it is convenient to begin with direct thought (DT), which purports to give an accurate record of a character's verbalized thoughts. And like DS, which tends to be far more coherent, free of the repetitions, false starts, and other phenomena reflective of limited planning time than actual speech, so DT also, by convention, denotes a form of thought reporting that observes the norms of sentential grammar (e.g., expressing 'complete' ideas or propositions).

> He looked very tall on the darkening grass, and the thought crossed her mind, "He is like a weed." (K. Mansfield, *At the bay*, chap. 1)

> She looked up at the pale sky, and all she thought was, "Yes, it was the most successful party." (K. Mansfield, 'The garden party')

DT is used for self-addressed, self-instructing conclusions, at moments of crisis, high emotion, and revelation. In the reporting frame, forms of the verb *think* are commonest, but other verbs and formulations are found, including *say* without a reflexive pronoun. In context, Elizabeth Bennet's words that follow are clearly DT:

> With the mention of Derbyshire there were many ideas connected. It was impossible for her to see the word without thinking of Pemberley and its owner. "But surely," said she, "I may enter his county without impunity, and rob it of a few petrified spars without his perceiving me." (*Pride and prejudice*, chap. 42)

Like all thought-reports, DT is indicative of a narrator who is 'intrusive' and even 'omniscient' (although the suitability of the latter term is now much debated), one who claims and demonstrates exceptional inward knowledge of characters' minds and motives. Even in fiction, 'full' DT with reporting clause preceding is rare; less rare is DT with the reporting clause falling medially (as above) or later, so that the construction is partly or wholly FDT. Unlike Austen in the preceding example, few writers use quotation marks or even an indented new line to mark off the DT from any reporting of its source.

As noted earlier, DT is normally reserved as a label to describe text that represents character-expressive thought, but does so while conforming to the prescriptions of standard grammar, without abrupt fractures or jumps in the flow of structure or sense. Where those constraints seem to be absent, and we feel we are reading a transcript of the mind uncensored and unedited and freely associating, it is customary to refer to this mode as interior monologue (or 'very free' direct thought); literary critics often call it 'stream of consciousness'. In the novels of Woolf and Joyce, and especially in the latter's *Ulysses*, extensive direct thought of this kind is deployed brilliantly, to characterize individuals in all the fecundity and heterogeneity of their thoughts and desires; the mode is exceptionally effective in displaying and dramatizing the depth of human reflexivity – our ability to think about several things at once, to see significance or mutual relevance in disparate things, and to think *about* how we think about such things. Here, for example, is the opening of Molly Bloom's famous interior monologue, which comes at the end of *Ulysses*:

> Yes because he never did a thing like that before as ask to get his breakfast in bed with a couple of eggs since the City Arms hotel when he used to be pretending to be laid up with a sick voice doing his highness to make himself interesting for that old faggot Mrs Riordan that he thought he had a great leg of and she never left us a farthing all for masses for herself and her soul greatest miser ever was actually afraid to lay out 4d for her methylated spirit telling me all her ailments she had too much old chat in her about politics and earthquakes and the end of the world let us have a bit of fun first God help the world if all the women were her sort down on bathingsuits and lownecks of course nobody wanted her to wear them I suppose she was pious because no man would look at her twice. (Joyce, *Ulysses*)

Indirect Thought

As in IS, in indirect thought there is a framing or reporting clause identifying the individual who is the source of the reflection, and a following clause of reported thought.

> She blushed at the very idea [of accidentally meeting Mr. Darcy], and thought it would be better to speak openly to her aunt than to run such a risk. (*Pride and prejudice*, chap. 42)

Constructions of this form, in the narration rather than within direct speech, with initial reporting clause, are not particularly frequent in literature – especially when one has excluded instances (such as the following, in bold) that in context are IS and not IT:

> Mr. Bartell D'Arcy . . . praised very highly the leading contralto of the company but Miss Furlong thought **she had a rather vulgar style of production**. (Joyce, 'The dead')

In many constructions, the reporting clause is followed by something – e.g., a preposition – rather than the default subordinator *that,* and this preposition is in turn perhaps followed by a nonfinite clause or only a phrase: *she wondered at . . . , he thought of the way . . . , she told herself of*, etc.

> He thought of how she who lay beside him had locked in her heart for so many years that image of her lover's eyes when he had told her that he did not wish to live. (Joyce, "The dead")

In such cases, the passage may be felt to be shading toward the 'more indirect' mode than that of IT, namely NRTA (see later discussion), with its more summarized or rephrased representation of a character's thoughts. As in the cases of IS with noninitial reporting clause discussed earlier, it is often more appropriate to classify as free indirect thought (FIT) those cases of apparent indirect thought report where the reporting clause is medial or final. In the first of

the following examples, the FIT status of the bolded words is supported by the fact that in the context the preceding sentences are also clearly Mrs Ramsay's FIT rather than narratorial:

> No. He could not say it right. He could not feel it right. **But why not?** she wondered. (Woolf, *To the lighthouse,* Penguin, p. 16)

> Odious little man, thought Mrs Ramsay, why go on saying that? (Woolf, *To the lighthouse,* p. 19)

Free Indirect Thought

As in FIS, FIT combines linguistic markers reflective of the narratorial function (such as narrative tense, use of pronouns as if participants are being named from the narrator's point of view) with some or all of the expressive and subjective reflections of the character's voice (here, in the realm of thought, the character's 'inner' voice). Like FIS, the additional absence (in nearly all cases) of a governing, utterance-initial reporting clause is important. The text therefore has some of the appearance of narrative, but in the detail it is very much a voicing of the character's mentality, in the character's words. And, again, the absence of reporting clause erases some of the impression of clear hierarchy, of an external teller and an observed character being told about. The sense of thoughts being reported is displaced by a sense of thoughts being disclosed, of mental reaction and reflection shown in the course of its being experienced. A very powerful effect of alignment of narrator and character can be achieved, if fleetingly: FIT is, it should be stressed, a relational category: it often draws its strength from its difference from adjacent Narrative, DT, or IT material:

> The possibility of meeting Mr. Darcy, while viewing the place, instantly occurred. **It would be dreadful!** She blushed at the very idea, and thought it would be better to speak openly to her aunt than to run such a risk. (Austen, *Pride and prejudice*, End of chap. 42)
> It seemed to her such nonsense – inventing differences, when **people, heaven knows, were different enough without that**. **The real differences**, she thought, standing by the drawing-room window, **are enough, quite enough**. (Woolf, *To the lighthouse*, Penguin, p. 13)

And there is always something necessarily surreptitious and covert about it, by comparison with its neighboring types: the latter through punctuation and reporting clauses and tense and pronoun forms make quite explicit their direct or indirect status, respectively. Like DT, FIT is used for moments of heightened emotion or insight or resolve, but also for moments or thoughts that are implicitly buried deeper within the character's psyche than DT material, and thus less amenable to full-sentence first-person expression – in some cases, sufficiently deeply buried that (we infer) the character will not go on record as explicit source of the thought.

It has become customary to talk of the 'free' in FDS, FIT and so on, as meaning 'free of a framing clause in which who speaks or thinks is explicitly identified'; but in practice one encounters degrees of freedom. On the one hand a parenthetical reporting clause does not govern, syntactically, whatever clause precedes it, and such clauses can have all or some of the word-order, deixis, modality and lexical subjectivity of the character in quasi-direct form, to the point that readers will confirm that the 'voice' or intonation of the character seems to predominate: largely free, then, at least until the reporting clause is encountered. On the other hand many grammatically complete utterances that combine character expressivity with narratorial tense- and pronoun-selections – thus, canonical FIT or FIS – have explicit indications, in adjacent sentences, of the particular character who is the source of the thoughts or speech: only free very locally, then, and not when cotext is fully taken into consideration. Ultimately those occasions of FID and FDD that are of most interest to literary linguists are those where uncertainty over the answer to the question 'who speaks here, who thinks here?' persists even after a thorough rereading – where some ambiguity remains as to whether a judgment or insight is the narrator's or the character's, or that of one character and not another. And such uncertainties are often connected to the content and intent of the represented comment or judgment: if this appalling remark was intended seriously it must be from the character, but if intended ironically it is probably the narrator's. 'Undecidable' free forms – particularly free indirect ones – foreground uncertainties in readers' knowledge of characters and narrator. Consider the following extract, for example, which comes late in Lawrence's *Women in love*, when a womanservant confirms to Gudrun that her former lover, Gerald Crich, has, as suspected, perished in the Alpine cold. The final sentence seems largely to be the womanservant's FIT, but it may have something of the narrator's voice in it, and even something of Gudrun's own thoughts (as in the preceding Gudrun FIT); and is it not, in a sense, a fair comment on Gudrun?

> "Il est mort?"
> "Yes – hours ago."
> Gudrun did not know what to say. What should she say? What should she feel? What should she do? What did they expect of her? She was coldly at a loss.
> "Thank you," she said, and she shut the door of her room. The woman went away mortified. Not a word, not a tear – ha! Gudrun was cold, a cold woman. (Lawrence, *Women in love*, chap. 31)

A final remark is in order concerning the importance of forms of thought representation in modern literature, notwithstanding the degree of artifice or counterfactuality entailed in purporting to report the contents of another person's mind. For although new technologies and art forms have come along, diverting attention away from literature, the latter retains a particular special status as a forum for the exploration and dramatization of consciousness. It is then as much an opportunity as a difficulty that, by contrast with the establishment of DS as the normal way of relaying other's heard utterances, thoughts are represented in more various ways. Thought is such an amorphous entity, seemingly a cover term for a range of mental activities only some of which are remotely capturable with the linearity of language, that no single format of presentation has emerged as the standard. Many commentators would argue that there can be no such thing as 'thought transcription' truly on a par with 'speech transcription', and that at best thoughts can be described, not transcribed (just as body movements might be described but not transcribed). Another major distinction concerns genres of use: although speech representation is central to a host of human activities and institutions, thought representation has been largely confined (with exceptions in, e.g., biography and personalized journalism) to the realms of literary fiction. In fact thought representation is a distinguishing feature of modern literature and one of its chief assets; despite all the advances in neurological and cognitive science, perhaps no other cultural form is so powerful at appearing able to make available to us other peoples' minds, and the unlimited movements of consciousness. High in the roll call of great novelists who have given us, via thought representation, insights into the chaotic architecture of others' minds and the oceanic storms of emotion and desire that may rage therein are Dostoyevsky, Proust, Joyce, and Woolf. But the examined mental life has been a literary interest since the earliest times, and only became more entrenched, a preoccupation, in the modernist period, roughly contemporaneously with an explosion of interest in psychology and psychiatry ushered in by the work of William James, Freud, and Jung.

Discourse Categories as Superordinate to Speech and Thought Modes

So far in this article, the major categories of speech representation have been discussed separately from those of thought representation, and there are certainly good reasons for doing so. On the other hand, as has been clear in the foregoing, there are many similarities of form, and some of effect also, between the core speech categories DS, FIS, IS, and NRSA and counterpart core thought ones of DT, FIT, IT, and NRTA. Accordingly a useful practice has developed of replacing the terms *speech* and *thought* by a superordinate one, *discourse*, giving rise to a set of superordinate labels (especially DD, FID, and ID), and in the remainder of this article these portmanteau terms will sometimes be used. But it remains true that in the actual reading of a text one encounters not ID but something that is clearly either IS or IT (and only rarely – but interestingly – is assignment of an utterance to the 'S' or the 'T' scale undecidable). So in analysis the more precise labels are preferable.

Who Speaks, Who Thinks?

In the reading and analysis of literary (and other) narratives, it is often crucial to determine who is underlyingly responsible for the words – possibly implied to have been spoken, or simply thought – that one encounters. With regard to FIS and FIT, the question amounts to the following: 'To whom do we attribute these spoken words or articulated thoughts?' The 'Who is saying/thinking this?' question is useful to keep in mind, because FID is a very open category. Despite the foregoing list of usual indicators of FID, there is no single *necessary* feature of FID, which you have to have in order for a phrase or clause to qualify as FID. Narratives in the present tense (where there will be no tense difference between direct and indirect discourses) or with first-person narrators can just as easily contain FID as other types. As Leech and Short (1981: 328–33) show in the following two examples, a single character-attributed expletive, or even a single character-expressive punctuation mark, can in suitable context signal the presence of FID rather than narratorial indirect discourse:

> He said that the bloody train had been late.
> He told her to leave him alone!

We assume that the *bloody* is the character's (*He*), and not the narrator's, and similarly that at least the exclamation mark is the character's. These examples highlight another interesting uncertainty of FID examples: the lack of a decisive indication of the mode's extent. Thus in the first example, 'how much', before and after the word *bloody*, is also essentially attributable to the character? And in the second example, is the entire clause 'leave him alone!' FID, or only 'alone!', or merely the exclamation point?

Finally, how all-encompassing should FID and similar discourse-representing categories be conceived

to be? A traditional distinction (from Genette) has proposed separate answers to the questions 'Who speaks?' and 'Who sees?,' the former giving rise to the range of speech and thought presentation categories, the latter being addressed by specification of various kinds and degrees of focalization. But this division is by no means universally accepted among narratologists and stylisticians. It is so often the case that, for example, FIT goes hand in hand with focalization from the viewpoint of that character, that it seems that only in exceptional cases are the two noticeably distinct or held apart. Or some have wondered whether all cases of focalization as encoded or expressed in the text cannot be reinterpreted as kinds of FID. On the other hand those who argue that it is useful to address focalization choices separately from speech and thought presentation ones are also, in effect, arguing for a more delimited notion of ID and FID; they maintain that we should not include, under ID or FID, cases of narrative report that adopt or express only the character's spatio-temporal viewpoint, their orientation, without any of the character's (outer or inner) words.

Testing for FID

Two simple framing or commutation tests can be helpful in probing for the FID status or (or otherwise) of doubtful extracts. Those frames are (to support a PN – purely narratorial – or ID categorization):

> **I, the narrator, tell you, the reader** [insert text to be probed, unmodified]

and, alternatively (to support categorization as FID):

> [insert text to be probed, with any pronouns referring to the putatively discoursing character converted to first person, and with tenses converted to the present tense of thinking/speaking], **the character remarks, to themself or to other characters.**

Any sentence, or sentence part, can be put to these framing tests to help clarify their FID or PN status. But it has to be conceded that the shorter the fragment to be probed, the more difficult is this test to use; and FID does not invariably come in clause-size chunks. Still, to see how on longer fragments the test can be useful confirmation, consider these sentences from an early point in Gabriel's final revery in 'The Dead':

> Perhaps she had not told him all the story.(1) His eyes moved to the chair over which she had thrown some of her clothes. . ..(2) Poor Aunt Julia! She, too, would soon be a shade . . . (3)

Taking these slightly out of order, the second of these sentences is clearly narratorial: although it fits the narratorial frame quite unexceptionally, it is clearly ludicrous if explicitly cast as characterological, via the second frame:

> My eyes move to the chair over which she has thrown some of her clothes, the character remarks (to himself).

Conversely, sentence (3) is almost as incontestably characterological, FIT. Finally, the first sentence *Perhaps she had not told him all the story*, taken alone would seem to pass both the narratorial and characterological probe test: good evidence that, in theory, the sentence could be either narrator's suggestion or character's speculation. Again, context and cotext (and content: despite his rather protracted interrogation of her, it would be in Gabriel's character to fear or suspect that not even Gretta had been entirely honest with him) make it overwhelmingly more appropriate to read this potentially ambiguous observation as Gabriel's, in FIT.

As much as anything else, it is the modality in this last example – *Perhaps she had not told* etc. – and the expressive evaluation in the previous example – *Poor Aunt Julia! She, too*, etc. – that encourage us to assign FID interpretations. In seemingly narrative text, FID has the capacity to 'put back' all the immediacy and subjectivity and expressivity that otherwise, in standard ID, gets edited out. And this 'restored' subjective expressivity can extend to eccentricities of spelling and writing in general, reflecting the nonstandardness of the character: such features are comfortably accommodated in some kinds of FID. All of this amounts to a restoration of the colorful individuality of characters' direct expression. We feel FID to be more vivid and colorful than PN and ID report because both the latter tend to be more detached, sober, restrained, and standard-English-speaking than the words of the character *in situ*, undergoing the experience and talking and thinking their way through that experience in frank and uninhibited ways. Of course the latter is an *effect* of direct experiential reaction, but no less significant for that.

As elsewhere in narrative study, it is the perception of difference (here between character speech and narrator speech) that is the true criterion. And in some narratives, as in the novels and stories of Henry James, where narrator and characters seem to share a single lect so that contrasts scarcely arise at lexico-grammatical levels at all, the differences can only be painstakingly derived from a reader's assessment of protagonists and their discourse (e.g., its varying degrees of reasonableness).

FID: Functions and Effects

Perhaps no other feature of literary language has attracted as much attention from so broad a range

of critics and linguists in the last 100 years as FID. Some have especially emphasized the 'dual voice' effect of FIS: notably in the work of Ullman, Pascal (1977), and McHale (1978), as well as in various of Bakhtin's writings. Others, developing ideas in Benveniste and Hamburger, have dwelt on the 'unspeakability' of the FID sentence and of narrative sentences generally (especially Banfield, 1982). For Banfield, narration is unspeakable because, unlike discourse (which is both communicative and expressive), it is a text with neither a genuine addressee (nor any textual traces of one) nor a genuine expressivity-disclosing speaker. FID, in partial contrast, carries abundant expressivity (that of the character), but still no genuine I-you communicativity, and as a result remains unspeakable. Depending upon how the object of study – the novel, for example – is viewed, both or all of these seemingly disparate claims are defensible and insightful. And it certainly seems likely that the 'disappearance' of the teller from heterodiegetic narratives, the bleaching out of the narrator as a felt presence in the text and denoted by prominent use of the first person singular pronoun and by evidentials, may have created the conditions in which free indirect effects could first emerge.

FID can be related to such fundamental literary distinctions of narrative method as those between showing and telling, or the neo-Platonist terms *mimesis* and *diegesis*. Mimesis presents 'everything that happened' as this might be perceived by a witness within the scene (thus a partial and far from comprehensive account). Stanzel (1981) noted that it typically comes with internal character focalization. Diegesis presents everything that a detached external reporter decides is worth telling – a reporter who is able to reflect, reorganize, and decide upon the point or teleology of the story prior to narrating it. In terms of mimesis and diegesis, FID amounts to a mimetic diegesis (a telling that shows or presents aspects of the character's 'own' words or thoughts). In particular it is a showing that does not, by comparison with DD forms, draw so much attention to itself or to the fact that it is a showing. As a device for character portrayal by covert showing, FID can be related to a more thoroughgoing narrative strategy for showing character, known as Mind Style, in which the whole style of a passage or section seems to reflect the quality of someone's mind – usually the mind of a focalizing character (*see* **Mind Style**).

But there are numerous ways of characterizing FID, in fact, and these varied characterizations reflect the various functions that, in different circumstances, it can serve. It has been called substitutionary narration; combined discourse; 'contaminated' narrative, a tainting or coloring of the narrative; and dual voicing. Yet another approach is to view FID as a strategy of (usually temporary or discontinuous) alignment, in words, values, and perspective, of the narrator with a character. The idea of alignment does not prescribe whether that closeness of narrator to character is used for purposes of irony, empathy, as a vehicle for stream-of-consciousness or the clashing of two voices, or some other purpose.

Like McHale and others (Pascal, 1977; Ginsberg, 1982), Jefferson recognized that a key source of the impact of the FID sentence is its ambiguous mixture of proper narrative and proper speech or thought:

> The dual voice of FID which is responsible for the superficially realist effect of immediacy is also an ambiguity which is highly unrealistic. From a realist point of view, FID is a doubly disconcerting use of language: its ambiguities cut it adrift from the two points at which we commonly imagine language to be anchored to reality, the speaker and the referent. It is neither fully expressive nor fully referential, and this *invraisemblance* differentiates it most profoundly from other forms of reported discourse. (Jefferson, 1981: 42)

By *invraisemblance* Jefferson alludes in part to FID's lack of *vraisemblance*: the effect or convention of faithful and 'realistic' representation of the real world that many novels foster and many readers demand. The *invraisemblance* of FID stems from the fact that it gives rise to sentences such as *Perhaps she had not told him all the story*, and *She too would soon be a shade* and *Yes, the newspapers were right* which, in just those forms and with just those referential commitments, none of us in the discoursing of everyday lives, including our storytellings embedded in conversations, could ever actually say. FID sentences are in this sense unsayable or unspeakable, impossible to anchor to one speaker at one place and time, because they are impossibly divided between two distinct speakers (narrator and character) and anchorages. Following Bakhtin/Voloshinov, critics have argued that in some of these cases the represented speech or thought is 'reaccented' by the representing narrator, so that two distinct accents, dialects, or intonations (which are never neutral, always evaluative) are held in a rich, unresolved tension. Certainly on some occasions, the clash of (character's and narrator's) sentiments within the FID passages is so palpable that a kind of internal conflict or mutual contradiction seems to be enacted.

Carefully handled FIT rendering can contribute to a subtle narrative presentation of characters' thoughts,

in which the reader's awareness that a narrator is relaying those thoughts (even though narrator-oriented tense and pronoun choices are made) is thoroughly backgrounded. No matter how audacious or unreasonable the character's views become, no narratorial voice of 'true judgment' intrudes to censure the character or to dissociate itself from the character and *alert* the reader to the errors being broadcast. But actually FIT is often most powerful where the articulated ideas are *not* glaringly at odds with the narrator's assumed stance. Rather than by insulting or at least ignoring the reader's intelligence by imposing a narratorial gloss on the character's thoughts (there is no guarantee that the narrator is wiser, fairer, and more consistent than the characters, but that is the usual expectation), narration involving copious FIT – particularly when, as noted earlier, there is little reliably or blatantly to distinguish what the narrator might have reported in their own voice from what the character may have privately thought – may challenge the reader's intelligence and moral sensibility or discernment. And in exercising that discernment we may have help only from juxtaposition: e.g., of one character's self-serving evaluations with actual outcomes or other characters' actions. Such effects are continually achieved in the novels of Henry James.

Finally, another indicator of the exceptionality of FID is the way that it often presents particular challenges to the translator. Translation of FIS and FIT passages creates all kinds of challenges – e.g., when expressing what might be rendered in English as *How she loathed him!* in a language such as Finnish, which has only one gender-neutral third-person singular personal pronoun, *hän*. Or it may be that the prohibitions on introduction of character-expressive features into a sentence with ID tense and deictic selections may be rather stricter in the target language than in the source language (or vice versa) creating further incommensurabilities.

'Beyond' IT: NRTA and NI

The work of Leech and Short (1981), and very recently Semino and Short (2004), has done much to develop a systematic typology of speech and thought (and latterly, writing) representation categories relevant to English. Most of the categories they propose are widely adopted, but the two 'most indirect' ones for thought representation, merit further comment (the counterpart ones for speech, NRSA and NV, were discussed earlier). They are NRTA and NI. NRTA denotes narrative report of thought acts, and is roughly parallel to Cohn's category of psychonarration, in which the heterodiegetic narrator remains in the foreground throughout, even adds some general observations not originating in the character ("as others [...] had done before him"). In NRTA, then, there is a highly indirect report of a character's or characters' thought, in which the content is noticeably summarized and cast in narratorial terms. Very often an NRTA sentence serves to introduce a passage of more character-expressive discourse. In the following example, an NRTA sentence (here in bold) is flanked by FIT ones:

> She had consented to go away, to leave her home. Was that wise? **She tried to weigh each side of the question**. In her home anyway she had shelter and food; she had those whom she had known all her life about her. O course she had to work hard, both in the house and at business. (Joyce, 'Eveline', *Dubliners*)

The new internal narration (NI) category has been proposed for "reports of mental states and changes that involve cognitive and affective phenomena but that do not to amount to specific thoughts" (Semino and Short, 2004: 132), that is, reports of mental activity that is even less a matter of inner speech than NRTA instances. The examples include the following (which all need to be imagined in appropriate contexts):

> *Jim envied Mr Mulvaney;*
> *The phrase made me a little sad;*
> *I couldn't get the image out of my head.*

That there is narrational activity of this kind, where a character's affective or evaluative response is conveyed in nonspecific terms, is widely accepted. But whether this amounts to *thought*-presentation, where 'thought' denotes 'the reported words or wording that we treat as having run through the character's or narrator's head', is more open to question. It is not claimed or assumed that the actual words *envy* or *sad* or *can't get the image* registered on the consciousness of the individuals here reported experiencing these emotions or reactions, any more than if the text reported *Jim pummeled Mr Mulvaney* it would imply that the word *pummel* crossed Jim's consciousness. For that reason, some analysts prefer to categorize such examples on the other side of a watershed setting apart thought representation from narration, i.e., on the narration side. These examples are then treated as more about narration, mental response narration perhaps, than thought presentation – as indeed the NI labeling partly recognizes. They are judged not to sit comfortably within the same grouping as DT, FIT, and IT (where NRTA is regarded as

the outlier or 'most indirect' category). Whatever classification is adopted, the recent study of Semino and Short suggests that NI-type narrations of mental reactions are by some way the most frequent means of thought presentation (presentation, not representation, is significantly their preferred term) in modern fiction, biography, and journalism. They therefore merit further analyses and appropriate classification on a comprehensive narrational scale that might encompass the whole range from discourse representation, through narrative report, description, and comment (Bonheim, 1984).

Conclusion

As a topic in narratology and literary linguistic analysis, speech and thought representation will continue to dwell on the different ways and effects of rendering direct speech in fiction and on the subtly changing ways that writers are finding to create mergers, blends, alignments, and clashes of voices and viewpoints within FID. The point is worth emphasizing that all six main speech and thought representation types (DS, IS, FIS; DT, IT, FIT) are effects as much as they are stable formats defined by essential criteria (DS is in the present tense of actual speech, but so too can narration be; it may or may not have quotation marks, be set out on the printed page on a new line, with indentation, at each change of speaker, and so on). And in various ways just what is 'licensed' or acceptable in each of these mutually defined formats changes in step with larger changes in the status and function of literature, with changes of technology and living conditions, and especially in the face of the rivalry from alternative (and themselves changing) modes of cultural production and consumption, such as film, theater, and television. In short what is grammatical in each of these formats has shifted over time, and to some degree will continue to, and such shifts are both a cause and an effect of readers' changing literacy skills in this area – their adjusted ability to read and accept such a format as an effective rendering of a character's articulated thoughts, or of such thoughts interwoven with a narrator's distinct (and variably sympathetic or critical) viewpoint.

See also: Mind Style.

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Speech Application Language Tags

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Introduction

Speaking and listening is so fundamental that people take it for granted. Every day, people ask questions. They give instructions. Speaking and listening are necessary for learning and training, for selling and buying, for persuading and agreeing, and for most social interactions. For the majority of people, speaking and understanding spoken speech is simply the most convenient and natural way of interacting with other people.

So, is it possible to speak and listen to a computer? Yes.

Emerging technology now enables users to speak and listen to the computer. Speech recognition converts spoken words and phrases into text, and speech synthesis converts text to human-like spoken words and phrases. While speech recognition and synthesis have long been in the research stage, three recent advances have enabled speech recognition and synthesis technologies to be used in real products and services: (1) faster, more powerful computer technology; (2) improved algorithms using speech data captured from the real world; and (3) improved strategies for using speech recognition and speech synthesis in conversational dialogues, enabling users to speak and listen to the computer.

Motivation for Speaking and Listening to a Computer

Speech applications enable users to speak and listen to a computer . . .

- despite physical impairments such as blindness or poor physical dexterity. Speaking enables physically impaired callers to access computers. Callers with poor physical dexterity (who cannot type) can use speech to enter requests to the computer. The sight-impaired can listen to the computer as it speaks. When visual and/or mechanical interfaces are not an option, callers can perform transactions by saying what they want done and supplying the appropriate information. If a person with impairments can speak and listen, that person can use a computer.
- to bypass the limitations of small keyboards and screens. As devices become smaller, our fingers do not. Keys on the keypad shrink – often to the point where people with thick fingers press two or more keys with one finger stroke. The small screens on some cell phones may be difficult to see, especially in extreme lighting conditions. Even PDAs with QWERTY keyboards are awkward. (*QWERTY* is a sequence of six keys found on traditional keyboards used by most English and Western European language speakers.) Users hold the device with one hand and 'hunt and peck' with the forefinger of the other hand. It is impossible to use both hands to touch-type while also holding the device. By speaking, callers can bypass the keypad (except possibly for entering private data in crowded or noisy environments). By speaking and listening, callers can bypass the small screen of many handheld electronic devices.
- if the device has no keyboard. Many devices have no keypad or keyboard. For example, stoves, refrigerators, and heating and air conditioning thermostats have no keyboards. These appliances may have a small control panel with a couple of buttons and a dial. The physical controls are good for turning the appliance on and off and adjusting its temperature and time. Without speech, a user cannot specify complex instructions such as 'Turn the temperature in the oven to 350 degrees for 30 minutes, then change the temperature to 250 degrees for 15 minutes, and finally leave the oven on warm.' Without speech, the appliance cannot ask questions such as, 'When on Saturday morning do you turn the heat on?' Any sophisticated dialogue with these appliances will require speech input. And speech can be used with rotary phones, which do not have a keypad.
- while callers work with their hands and eyes. Speaking and listening are especially useful in situations where the caller's eyes and/or hands are busy. Drivers need to keep their eyes on the road and their hands on the steering wheel. If they must use a computer when driving, the interface should be speech only. When driving machines that require their hands to operate controls and their eyes to focus on the machine activities, machine operators can also use speech to communicate with a computer (although it is not recommended that you hold and use a cell phone while driving a car). Parents and caregivers with children in their arms may also appreciate speaking and listening to a doctor's web page or medical service. If a person can speak and listen to others while they work, they can speak and listen to a computer while they work.
- at any time during the day. Many telephone help lines and receptionists are available only during

working hours. Computers can automate much of this activity, such as accepting messages, providing information, and answering callers' questions. Callers can access these automated services 24 hours a day, 7 days a week via a telephone by speaking and listening to a computer. If a person can speak and listen, they can interact with a computer any time during the day or night.

- with instant connection without being placed on 'hold.' Callers become frustrated when they hear 'your call is very important to us' because this message means they must wait. 'Thanks for waiting, all of our operators are busy' means more waiting. When using speech to interact with an application, there are no hold times. The computer responds quickly. (However, computers can become saturated, which results in delays; but these occur less frequently than with callers waiting for a human operator.) Because many callers can be serviced by voice-enabled applications, the human operators are freed to resolve more difficult caller problems.
- using languages that do not lend themselves to keyboarding. Some languages do not lend themselves to data entry using the traditional QWERTY keyboard. Rather than force Asian language users to mentally translate their words and phrases to phonetic sounds and then press the corresponding keys on the QWERTY keyboard, a much better solution is to speak and listen. Speech and handwriting recognition will be the key to enabling Asian language speakers to gain full use of computers. If a person can speak and listen to an Asian language, they can interact with a computer using that language.
- to convey emotion. In an effort to enhance written text in order to convey emotions, callers frequently use 'emoticons' – keyboard symbols to convey emotions – to enhance their text messages. Example emoticons include :) for happy or a joke and :(for sad. With speech, these emotions can be conveyed naturally by changing the inflection, speed, and volume of the speaking voice.
- to use multiple channels of communication between user and computer. Speech enhances traditional GUI user interfaces by enabling users to speak as well as click and type, and hear as well as read. Multimodal user interfaces will improve the exchange of information between users and computers by transferring information in the most appropriate mode – speech for simple requests and simple answers, and GUIs for complex requests and graphical and pictorial answers.

Languages for Speech Applications

This new environment led to the creation of VoiceXML, an XML-based declarative language for describing the exchange of spoken information between users and computers and related languages. The related languages include the Speech Recognition Grammar Specification (SRGS) for describing what words and phrases the computer should listen for and the Speech Synthesis Markup Language (SSML) for describing how text should be rendered as verbal speech. VoiceXML is widely used to develop voice-only user interfaces for telephone and cell phone users.

VoiceXML uses predefined control structures, enabling developers to specify what should be spoken and heard, but not the low-level details of how those operations occur. As is the case with many special-purpose declarative languages, developers sometimes prefer to write their own procedural instructions. Speech Application Language Tags (SALT) was developed to enable web developers to use traditional web development languages to specify the control and use a small number of XML elements for managing speech. In addition to telephony applications, SALT can be used for multimodal applications where people use multiple modes of input – speaking, as well as typing and selecting (pointing).

SALT

The SALT Forum, originally consisting of Cisco, Comverse, Intel, Microsoft, Philips, and SpeechWorks (now Nuance), published the initial specification in June 2002. This specification was contributed to the World Wide Web Consortium (W3C) in August of that year. In June 2003, the SALT Forum contributed a SALT profile for Scalar Vector Graphics (SVG) to the W3C.

The SALT specification contains a small number of XML elements enabling speech output to the user, called prompts, and speech input from the user, called responses. SALT elements include:

- *<prompt>* – presents audio recordings and synthesized speech to the user. SALT also contains a prompt queue and commands for managing the presentation of prompts in the queue to the user
- *<listen>* – recognizes spoken words and phrases. There are three listen modes:
  - *Automatic* – used for recognition in telephony or hands-free scenarios. The speech platform, rather than the application, controls when to stop the recognition facility.

- *Single* – used for push-to-talk applications. An explicit stop from the application returns the recognition result.
- *Multiple* – used for 'open-microphone' or dictation applications. Recognition results are returned at intervals until the application makes an explicit stop.

- *<grammar>* – specifies the words and phrases a user might speak
- *<dtmf>* – recognizes DTMF (telephone touch-tones)
- *<record>* – captures spoken speech, music, and other sounds
- *<bind>* – integrates recognized words and phrases with application logic
- *<smex>* – communicates with other platform components

SALT designers subsetted the SALT functionality into multiple profiles that are implemented and used independently of the remaining SALT modules. Various devices may use different combinations of profiles. Devices with limited processor power or memory need not support all features (for example, mobile devices do not need to support dictation). Devices may be tailored to particular environments (for example, telephony support may not be necessary for television set-top boxes). While full application portability is possible within devices using the same profile, there is limited portability across devices with different profiles.

SALT has no control elements, such as *<for>* or *<goto>*, so developers embed SALT elements into other languages, called host languages. For example, SALT elements may be embedded into languages such XHTML, SVG, and JavaScript. Developers use the host language to specify application functions and execution control, while the SALT elements provide advanced input and output using speech recognition and speech synthesis.

Architectures for SALT Applications

Users interact with telephony applications using a telephone, cell phone, or other mobile device with a microphone and speaker. The hardware architecture for telephony applications, illustrated in Figure 1, contains:

- *Web server* – contains HTML, SALT and embedded scripts. The scripts control the dialogue flow, such as the order for playing audio prompts to the caller.
- *Telephony server* – connects the IP network (and the speech server) to the telephone network.

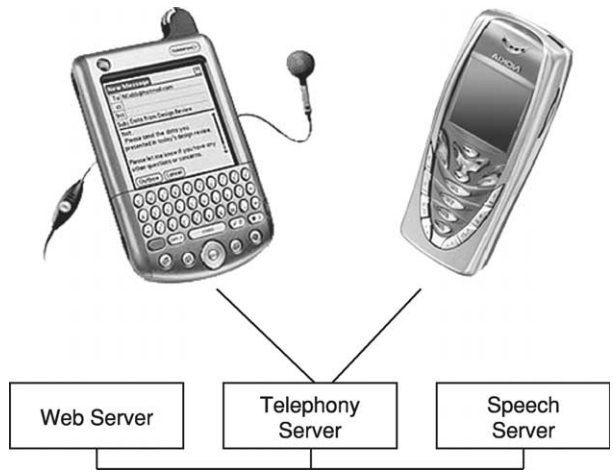

Figure 1 Hardware architecture for telephony applications.

- *Speech server* – contains a speech recognition engine that converts spoken speech into text, a speech synthesis engine that converts text to human-sounding speech, and an audio subsystem for playing prompts and responses back to the user.
- *Client devices* – device to which the user listens and speaks, such as mobile telephones and telephony-enabled PDAs.

There are numerous variations for the architecture shown in Figure 1. A small speech recognition engine could reside in the user device (for example, to recognize a small number of command and control instructions), or it may be distributed across the device and speech server (the device performs DSP functions on spoken speech, extracting 'speech features' that are transmitted to the speech server that concludes the speech recognition processing). The various servers may be combined or replicated, depending upon the workload. And the telephony server could be replaced by Internet connections to speech-enabled desktop devices, bypassing the telephone communication system entirely.

Some mobile devices – and most desktop devices – have screens and input devices such as keyboard, mouse, and stylus. These devices support multimodal applications, which support more than one mode of input from the user, including keyed text, handwriting and pen gestures, and spoken speech.

Telephony and Multimodal Applications Using SALT

Figure 2 illustrates a sample telephony application written with SALT elements embedded in HTML. The bolded code in Figure 2 will be replaced by the

```
01 <html xmlns:salt="http://www.saltforum.org/2002/SALT">
02   <!--  Example electronic form (system directed)  -->
03   <!--  © 2004 by Larson Technical Services  -->
04 <head>
05   <!-- SALT Add-in to Internet Explorer object -->
06   <object id="SpeechTags"
07       CLASSID="clsid:33cbfc53-a7de-491a-90f3-0e782a7e347a"
08     VIEWASTEXT>
09   </object>
10 <!-- salt: Importing the namespace for the implementation -->
11   <?import namespace="salt" implementation="#SpeechTags" />
12 </head>
13 <body onload="intro.start();">
14  <!-- HTML FORM -->
15  <form id="Form1">
16     <input style = "display:none" id="iptFromCity"  />
17     <input style = "display:none" id="iptToCity"  />
18 </form>
19 <!-- SPEECH OUTPUT -->
20 <salt:prompt  id="intro" onComplete = "askFromCity.start();">
21     Hello, welcome to the Travel Reservation Application
22 </salt:prompt>
23 <salt:prompt  id="askFromCity" onComplete = "lsnFromCity.start();">
24    Where do you want to travel from?
25 </salt:prompt>
26 <salt:prompt  id="askToCity" onComplete = "lsnToCity.start();">
27    Where do you want to travel to?
28 </salt:prompt>
29 <salt:prompt  id="goodbye">
30        You chose to travel from
31         <salt:value targetelement ="iptFromCity"    targetattribute = "value"/>
32        to <salt:value targetelement = "iptToCity" targetattribute = "value"/>.
33        Your transaction has been submitted
34 </salt:prompt>
35 <salt:prompt  id="progressiveHelpToCity"  onComplete = "lsnToCity.start();">
36    Do you want to travel from New York, Chicago, or San Francisco?
37 </salt:prompt>
38 <salt:prompt  id="progressiveHelpFromCity" onComplete = "lsnFromCity.start();">
39    Do you want to travel to New York, Chicago, or San Francisco?
40 </salt:prompt>
41 <salt:listen id="lsnFromCity" onreco="askToCity.start();"
42       onnoreco = "progressiveHelpFromCity.start();"
43       onsilence = "progressiveHelpFromCity.start();">
44   <salt:grammar id="gram1" name="gram1">
46               xmlns="http://www.w3.org/2001/06/grammar" root="FromCity">
47       <rule id="FromCity" scope="public">
48         <one-of>
49           <item>New York</item>
50           <item>Chicago</item>
51           <item>San Francisco</item>
52         </one-of>
53       </rule>
54     </grammar>
55   </salt:grammar>
56   <salt:bind targetelement = "iptFromCity" value="//"/>
57 </salt:listen>
58 <salt:listen id="lsnToCity" onreco="goodbye.start();"
59      onnoreco = "progressiveHelpToCity.start();"
69      onsilence = "progressiveHelpToCity.start();">
61   <salt:grammar id="gram2" name="gram2">
62     <grammar version="1.0"  xml:lang="en-US"
63              xmlns="http://www.w3.org/2001/06/grammar" root="ToCity">
64       <rule id="ToCity" scope="public">
65         <one-of>
66           <item>New York</item>
67           <item>Chicago</item>
68           <item>San Francisco</item>
69         </one-of>
70       </rule>
71     </grammar>
72   </salt:grammar>
73   <salt:bind targetelement = "iptToCity" value="//"/>
74 </salt:listen>
75  </body>
76 </html>
```

Figure 2 Telephony application written using SALT Tags. The bolded code will be replaced in Figure 3.

```
01 <html xmlns:salt="http://www.saltforum.org/2002/SALT">
02   <!--  Example electronic form (user directed)  -->
03   <!--  © 2004 by Larson Technical Services  -->
04 <head>
05   <!-- SALT Add-in to Internet Explorer object -->
06   <object id="SpeechTags"
07       CLASSID="clsid:33cbfc53-a7de-491a-90f3-0e782a7e347a"
08     VIEWASTEXT>
09   </object>
10 <!-- salt: Importing the namespace for the implementation -->
11   <?import namespace="salt" implementation="#SpeechTags" />
12 </head>
13 <body onload="intro.start();">
14 <!-- HTML form -->
15 <form id="Form1">
       Travel Reservation Application <br/>Click and speak </br>
       Departure City
16     <input id="iptFromCity" type = "text" onFocus="askFromCity.start();"  /><br/>
       Destination City
17     <input id="iptToCity" type = "text" onFocus="askToCity.start();" /> <br/>
       <button type="button" name="Done" onclick="goodbye.start();">
              Done
       </button>
       <input type="reset" value="Reset" />
18 </form>
19 <!-- SPEECH OUTPUT -->
20 <salt:prompt  id="intro">
21      Hello, welcome the Travel Reservation Application
22 </salt:prompt>
23 <salt:prompt  id="askFromCity" onComplete = "lsnFromCity.start();">
24    Where do you want to travel from?
25 </salt:prompt>
26 <salt:prompt  id="askToCity" onComplete = "lsnToCity.start();">
27   Where do you want to travel to?
28 </salt:prompt>
29 <salt:prompt  id="goodbye">
30        You chose to travel from
31         <salt:value targetelement = "iptFromCity" targetattribute = "value"/>
32        to <salt:value targetelement = "iptToCity" targetattribute = "value"/>.
33        Your transaction has been submitted
34 </salt:prompt>
35 <salt:prompt  id="progressiveHelpToCity"  onComplete = "lsnToCity.start();">
36   Do want to travel to New York, Chicago, or San Francisco?
37 </salt:prompt>
38 <salt:prompt  id="progressiveHelpFromCity" onComplete = 'lsnFromCity.start();'>
39    Do you want to travel from New York, Chicago, or San Francisco?
40 </salt:prompt>
41 <salt:listen id="lsnFromCity"
42       onnoreco = "progressiveHelpFromCity.start();"
43       onsilence = "progressiveHelpFromCity.start();">
44   <salt:grammar id="gram1" name="gram1">
45     <grammar version="1.0"  xml:lang="en-US"
46               xmlns="http://www.w3.org/2001/06/grammar" root="FromCity">
47       <rule id="FromCity" scope="public">
48         <one-of>
49           <item>New York</item>
50           <item>Chicago</item>
51           <item>San Francisco</item>
52         </one-of>
53       </rule>
54     </grammar>
55   </salt:grammar>
56   <salt:bind targetelement = "iptFromCity" value="//"/>
57 </salt:listen>
58 <salt:listen id="lsnToCity"
59      onnoreco = "progressiveHelpToCity.start();"
60      onsilence = "progressiveHelpToCity.start();">
61   <salt:grammar id="gram2" name="gram2">
62     <grammar version="1.0"  xml:lang="en-US"
63              xmlns="http://www.w3.org/2001/06/grammar" root="ToCity">
64       <rule id="ToCity" scope="public">
65         <one-of>
66           <item>New York</item>
67           <item>Chicago</item>
68           <item>San Francisco</item>
69         </one-of>
70       </rule>
71     </grammar>
72   </salt:grammar>
73   <salt:bind targetelement = "iptToCity" value="//"/>
74 </salt:listen>
75  </body>
76 </html>
```

Figure 3 Multimodal application written using SALT tags. The bolded code in Figure 3 replaces the bolded code in Figure 2.

bolded code in Figure 3, which illustrates the same application as a multimodal application.

Figure 3 illustrates a typical multimodal application written with SALT and embedded in HTML. In this application, the user may either speak or type to enter values into the text boxes. Note that the code in Figure 3 is somewhat different from the code in Figure 2. This is because many telephony applications are system-directed (the system guides the user by asking questions that the user answers), while, as

with visual-only applications, multimodal applications are often user-directed (the user indicates which data will be entered by clicking a mouse or pointing with a stylus and then entering the data).

Programming with SALT is different from programming traditional visual applications in the following ways:

- If the developer does not like how the speech synthesizer renders text as human-understandable voice, the developer may add Speech Synthesis Markup language (SSML) elements to the text to provide hints for the speech synthesis system. For example, the user could insert a <break time = "500ms"/> element to instruct the speech synthesizer to remain silent for 500 milliseconds. SSML is a W3C standard and is used by both SALT and VoiceXML 2.0/2.1.
- The developer must supply a grammar to describe the words and phrases users are likely to speak. Grammars help the speech recognition system recognize words faster and more accurately. SALT (and VoiceXML 2.0/2.1) developers specify grammars using the Speech Recognition Grammar Specification (SRGS), another W3C standard. An example grammar is illustrated in Figure 2, lines 44–54. Application developers should spend effort in fine-tuning the specification of grammars to recognize words frequently spoken by the user at each point in the dialogue, as well as fine-tuning the wording of the prompts to encourage users to speak those words and phrases.
- Speech recognition systems do not understand spoken speech perfectly. (Even humans occasionally misunderstand what others say.) In the best circumstances, speech recognition engines fail to accurately recognize 3 to 5% of spoken words. Developers compensate for poor speech recognition by writing event handlers to assist users in overcoming speech recognition problems. They prompt the user to speak again, often rephrasing the question differently so the user responds by saying different words. Example event handlers are illustrated in Figure 2, lines 35–37 and lines 38–40. Developers may spend as much as 30 to 40% of their time writing event handlers that are needed occasionally but are essential when the speech recognition system fails.

Comparison of SALT with VoiceXML

SALT and VoiceXML enable very different approaches for developing speech applications. SALT tags control the speech medium (speech synthesis, speech recognition, audio capture, audio replay, and DTMF recognition). SALT tags are often embedded into another language that specifies flow control and turn-taking. On the other hand, VoiceXML is a standalone language that controls the speech medium as well as flow control and turn-taking.

In VoiceXML, the details of flow control are managed by an a special algorithm called the Forms Interpretation Algorithm. For this reason, many developers consider VoiceXML a 'declarative' language. On the other hand, SALT is frequently embedded into a procedural programming language. Many developers consider the programming languages into which SALT is embedded to be 'procedural.' It should be noted, however, that SALT can be used as a standalone declarative language by using the assignment and conditional features of the <bind> statement. Thus, SALT can be used in resource-scarce platforms such as cell phones that cannot support a host language. For details, see section 2.6.1.3 in the SALT specification.

While SALT and VoiceXML make it easy to implement speech-enabled applications, it is difficult to design a quality speech application. A HTML programmer easily learns how to write SALT applications, but designing a usable speech or multimodal application is still more of an art than a science. Balentine and Morgan (2004) and Cohen *et al.* (2004) present guidelines and heuristics for designing effective speech dialogues. A series of iterative designs and usability tests are necessary to implement speech applications for users to both enjoy and use efficiently to perform their desired computer tasks.

Conclusion

It is not clear when this article was written if SALT will overtake and replace VoiceXML as the most widely used language for writing telephony applications. It is also not clear if SALT or some other language will become the preferred language for developing multimodal applications. The availability of high-level design tools, code generators, and system development environments that hide the choice of development language from the speech application developer may minimize the importance of programming language choice.

See also: Speech Interface Design.

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Relevant Website

http://www.saltforum.org – SALT forum.

Speech Community

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Independently of theoretical orientation, the goal of scholars in attempting to formulate the conceptual foundations of the notion of speech community is to capture the forces that interact in the natural process of language-based group formation. In this connection, language is viewed as an intricately structured multifunctional system acting within the domains of communication, organization of thought, social interaction, group identification, symbolic integration, and even discrimination and social exclusion of the powerless. Three components can be discerned in the three principal lines of thought found in the relevant literature. First, as a necessary condition for a speech community, the existence of shared linguistic systems or abstract structural patterns is universally assumed. The existence of social norms of use and interpretation, on the one hand, and of a set of social attitudes towards language, on the other hand, are both complementary conditions, each of which can be emphasized in different ways. These three components, depending on the analyst's point of view, determine the perceived size of a speech community, increasing or decreasing the number of participants included in it. Each scholar captures part of the complex reality of real-world speech communities in a unique way.

Reflecting different views of the relationship between language and society, formulations of the concept of the speech community have evolved together with the development of language sciences. These characterizations take account of and intersect linguistic, geographical, ethnic, and social boundaries.

Summary of Concepts of Speech Community

The principal conceptual views of the speech community are associated with three paradigms of language studies: Structural Linguistics; Sociology of Language and Ethnography of Communication; Labovian Sociolinguistics. Bloomfield (1961/1933), Hockett (1958), and Lyons (1973/1970) are the leaders of the first line of definitions; Gumperz (2001/1962, 1972/1968), Fishman (1971), and Hymes (1972/1967, 1981/1974) lead the second thread; the third strand is due to Labov (1989, 1975/1972). Because these three groups represent different theoretical paradigms, it is inevitable that their views of the speech community are, at the same time, conflicting and complementary: they deal with articulated language and organization of society, two features that distinguish humans from other animals. But, each type of definition brings into focus different aspects of human language on the formal, political, social, interactional, and symbolic integration planes, reflecting the authors' perspectives on the relationship between language and society. Some viewpoints emphasize formal or political configurations, while others highlight social or interactional circumstances, and still others attempt to achieve equilibrium between social and formal aspects.

Definition of Speech Community in Structural Linguistics

The underlying characteristic common to definitions of the speech community within the framework of Structural Linguistics is **the existence of the same language within the community.** According to Bloomfield (1961: 29), "a group of people who use **the same system** of speech-signals is a *speech-community*"; for Hockett (1958: 8), "each language defines a *speech community*: the whole set of people who communicate with each other, directly and indirectly, via the **common language**"; for Lyons (1973: 326), "*speech community* [is] all the people who use **a given language (or dialect)**."

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study of internal structure, these scholars take into account, on the one hand, language as a formal mechanism, that is, the abstract structure underlying utterances (Lyons, 1973: 15); and, on the other hand, language as a political mechanism, functioning through the politically and culturally important abstract system known as standard language (Lyons, 1973: 19). Bloomfield (1961: 42) admits social factors into the definition of speech community by mentioning interaction when he states: "a speech-community is a group of **people who interact by means of speech** (...), therefore, is **the most important kind of social group**." Nonetheless, Bloomfield's definition (1961: 52) stresses the existence of a single language from the formal and political points of view, but not in its communicative function. He states: "our survey of differences within a speech-community has shown us that the members of a speech-community may speak so much alike that anyone can understand anyone else, or may differ so much that persons who live some distance apart may fail to understand each other." Furthermore, he goes on to note: "we speak of French and Italian, of Swedish and Norwegian, of Polish and Bohemian as separate languages, because these communities are politically separate and use different standard languages, but the differences of local speech-forms at the border are in these cases relatively slight" (Bloomfield, 1961: 54). Hockett (1958: 8) recognizes that "the boundaries between speech communities are not sharp," but nonetheless affirms that "most polyglots belong primarily to one speech community, and have only partial control of any other language, but there are occasional exceptions." He also states that (Hockett, 1958: 8) "in many cases the boundaries of a speech community coincide with political boundaries," although, according to him, different sorts of situations can be found: on the one hand, "Switzerland, a single political unit, includes speakers of four different languages: French, German, Italian, and Ladin (or Rhaetho-Romance)"; on the other hand, "English, as single language, is spoken not only in Britain (...)" but also in the United States. Furthermore, Hockett (1958: 9–10) also notes that when there are linguistic changes due to immigration or invasion, both of which may lead to new speech-habits and to misunderstanding, "we must then say that each subcommunity has become an independent speech community with **its own language**." This shows once again that the existence of a single language – in the formal and/or political sense of the term – is fundamental to the definition of speech community from the point of view of Structural Linguistics.

Definition of Speech Community in Sociology of Language and Ethnography of Communication

Gumperz, Hymes, and Fishman, departing from the structural approach, consider that the presence of more than one language does not necessarily imply the existence of more than one speech community. In the first definition of this group, Gumperz states that "a basic definitional property of speech communities is that they are *not* defined as communities of those who 'speak the same language' ... but, rather, **as communities set off by density of communication or/and by symbolic integration** (...) ***regardless of the number of languages or varieties employed***" (Fishman, 1971: 234). Gumperz, Hymes, and Fishman assume that the existence of at least one shared linguistic system is a necessary, but not a sufficient, condition for the characterization of a speech community and introduce a new feature common in subsequent definitions, namely, **shared knowledge of norms of use and interpretation of language**.

For Gumperz (2001: 43, 44, 1972: 463), a speech community is "any [monolingual or multilingual] human aggregate characterized **by regular and frequent interaction by means of a shared body of verbal signs**." (...) "Regardless of the linguistic differences among them, the speech varieties employed within a speech community form a system because they are related to **a shared set of social norms**." For Hymes (1981: 51), "a speech community is defined (...) as a community **sharing knowledge of rules for the conduct and interpretation of speech**. Such sharing comprises **knowledge of at least one form of speech, and knowledge also of its patterns of use. Both conditions are necessary**." For Fishman (1971: 232), "a speech community is one, all of whose members share **at least a single speech variety and the norms for its appropriate use**."

The definitions proposed by these three scholars are consistent with their theoretical approach, taking social norms for language use as their primary focus. According to Hymes (1972: 53-54), "speech is (...) taken as a surrogate for all forms of language, including writing, song and speech-derived whistling, drumming, horn calling, and the like. Speech community is a necessary, primary term in that it postulates **the basis of description as a social, rather than a linguistic, entity**." Social norms for language use and interpretation require communicative competence, reaching beyond knowledge of the abstract grammatical structures underlying speech acts to knowledge of social and linguistic rules of interaction including, for example, how and when to ask questions, to

whom younger speakers may put questions, which questions require an answer and which are merely rhetorical, whether another question can be superposed on the interlocutor's utterance, etc. The emphasis on the communicative and interactional aspects of language can be seen once more in the following words of Hymes (1972: 54): "the sharing of grammatical (variety) rules is not sufficient. There may be persons whose English I can grammatically identify but whose messages escape me. I may be ignorant of what counts as a coherent sequence, request, statement requiring an answer, requisite or forbidden topic (. . .), etc."

Definition of Speech Community in Labovian Sociolinguistics

Labov's (1989: 2, 1975: 120–121, 248) definition of speech community includes two features involved in previous attempts, but he widens their scope and, as a result, changes the focus. To the shared social norms of language use, Labov (1975: 248) adds "a set of social **attitudes** towards language." To the notion of linguistic system he adds the concept of abstract patterns of variation reflecting **orderly heterogeneity**. For Labov (1975: 120-121), "the speech community is not defined by any marked agreement in the use of language elements, so much as by participation in a set of shared norms; **these norms may be observed in overt types of evaluative behavior, and by the uniformity of abstract patterns of variation** (. . .)."

As we have seen in previous suggested characterizations, the definition of speech community given by Labov is consistent with the author's theoretical orientation, namely, Sociolinguistics or, more specifically, Quantitative Microsociolinguistics, Labovian Sociolinguistics, or Theory of Language Change and Variation. This approach has had great impact on sociolinguistic studies, especially in Brazil (Matos *et al.*), the United States, and Canada. Labov (1975: 184) states, "if there were no need to contrast this work with the study of language out of its social context, I would prefer to say that this was simply *linguistics*." The focus of Labovian Sociolinguistics is on language as an inherently variable system, the relationship between variation and change, and the effect of norms of social evaluation on language change. In a nutshell, it is an attempt to construct a theory of language change, characterized by Labov (1994: 5) as "a set of propositions that relate general findings about language change to general properties of human beings or of human societies." According to Labov (1994: 5), "to explain a finding about linguistic change will mean to find its causes in a domain outside of linguistics: in physiology, acoustic phonetics, **social relations**, perceptual or cognitive capacities." Furthermore, for Labov (2001: 514), the "Golden Age Principle," expressed as "*at some time in the past, language was in a state of perfection*," makes clear the existence of a uniform social attitude with respect to language, in turn revealing constant linguistic change within speech communities. Social features, in the sense of "**patterns of social stratification, style shifting, and subjective evaluations**" (Labov, 1989: 2), are, therefore, of fundamental importance in the Labovian approach, given that they are one of the elements external to linguistic structure that help to comprehend the mechanisms of variation and change that have an important role "in the makeup of the speech community" (Labov, 2001: 515).

Feelings, Dimensions, and Types of Speech Communities

The feeling of belonging to one or another speech community depends on the speaker's viewpoint, and language scholars have tried to capture and understand this feeling. For example, people from Brazil – a huge South American territory colonized by Portugal from 1500 to 1822 – may feel that they belong to the Brazilian speech community when they seek to highlight their unique identity with respect to the European Portuguese speech community, their main linguistic ancestor. Shared social norms of language use and interpretation play a role here, because those in Brazilian speech community are partially different from those in other Portuguese language speech communities, especially European Portuguese.

A good example of different social norms is the use of the pronoun *você* 'you (sg)'. This peculiar cross between a personal pronoun and a term of address is found in both communities, but the social norms associated with it are different in the spoken and written varieties of the language in the two countries. Within the set of forms with second person reference, in Portugal *você* 'you (sg)' is used in the asymmetric situation of a speaker with higher social status addressing a person of lower status. In Brazil, however, *você* 'you (sg)' is used among speakers of the same status in the Southeastern and Midwestern regions, and in more formal or less reciprocal interaction in the Southern and Northeastern regions, **but it does not mark an asymmetrical relationship of superior to inferior.** In written Brazilian Portuguese, *você* 'you (sg)' is the most frequent. It is often found, for example, in bank advertisements, an improbable context in Portugal, where zero would be preferred to refer to the reader. As far as the linguistic system is concerned, the lexical item *você* 'you (sg)' is part of the common

Portuguese language, but from the point of view of usage norms, this item separates Brazil and Portugal into two different communities. The difference is so salient that it can cause difficulties in dialogue between speakers from the two nations, and Brazilians often find bank advertising, and even posted signs, in Portugal to be very strange. In spoken personal interaction, European Portuguese speakers regularly use the name of the addressee as a form of reference to the second person, while many Brazilians would use *você* 'you (sg)'. To Brazilians, this Portuguese usage seems anomalous or reminiscent of baby talk and can even cause lack of comprehension when first heard. In Brazil, it is only used between parents and small children, especially in scolding. Facts such as these illustrate the position of Gumperz, Hymes, and Fishman, who all affirm that mere knowledge of grammar is a necessary, but not a sufficient, condition for the characterization of the notion of speech community.

Observing matters from another angle, Brazilians arriving in Portugal from, say, Germany, would feel that they are part of the wider Portuguese linguistic speech community currently consisting of Portugal, Brazil, Angola, Mozambique, São Tomé e Príncipe, Cape Verde Islands, Guinea-Bissau, Eastern Timor, and Macao. One of the features that unifies this macro community is the existence of Portuguese as an official language. This feeling of community crosses geographic borders, and does not take into account the existence of social norms of language use or evaluation. It is based essentially on the **symbolic integration** function of Portuguese as an official language. The feeling of speech community unity is also a result of the mutual intelligibility of technical and scientific written language and on the partial mutual comprehensibility that can be achieved in face-to-face interaction despite the undeniable structural and pragmatic differences. Even Gumperz (1972: 463), whose definition of speech community includes "regular and frequent interaction by means of a shared body of verbal signs," also affirms that "linguistic communities may consist of small groups bound together by face-to-face contact or may cover large regions, **depending on the level of abstraction we wish to achieve**." Hockett (1958: 8), in turn, states: "some speech communities of today are extremely large. English has several hundred million native speakers, and millions with some other native language have learned English for business, professional, or political purposes. Russian, French, Spanish, German, Chinese, and a few others also have vast numbers of speakers." Thus, when thinking of language on a macro level, as a political organism and a system sharing general formal similarities, both Gumperz and Hockett come to the same conclusion and capture the feeling of community, despite the fact that their thought is guided by theoretical paradigms with different primary focuses.

Each of the Portuguese-speaking countries contains various other speech communities. The internal structure of each group depends on the existent linguistic varieties, the role of these varieties in linguistic interaction, the symbolic role they play, and the social evaluation of the linguistic differences involved.

Brazil, for example, is a country of enormous dimensions, with an area of 8 511 965 km^2 that represents 48.33% of South America. It constitutes a macro speech community of about 180 million speakers, the vast majority of whom have Portuguese as their mother tongue and their official language, for whom it is also the language of media, government, and education (Scherre, forthcoming). Thus, Brazilians posses a system of verbal signs used in normal face-to-face interaction that marks their identity and establishes symbolic integration. With respect to the characterization of the notion of speech community, all of these facts serve as clear illustrations of the applicability both of the positions of Bloomfield, Hockett, and Lyons on the one hand, and of Gumperz, Hymes, and Fishman on the other.

As in other communities in which the standard language, or the codified norm, is more a function of social class than of interactional context, in Brazil we find so-called instruction in the mother tongue, or teaching of Portuguese for students whose first language is Portuguese. In fact, what is taught is the normative or standard grammar of Portuguese, using pedagogical textbooks based on certain European norms that are not valid even for contemporary Brazilian written texts. Because standard Portuguese is the collective reference and goal, many Brazilians exhibit low linguistic self-esteem, revealed by social attitudes and linguistic evaluations such as *falo português errado* 'I speak wrong Portuguese' or *o português é uma língua difícil* 'Portuguese is a difficult language.' Furthermore, most Brazilians exhibit overt evaluative behavior with respect to features that are indicators of social class. They reject regular variable linguistic phenomena that are more frequent in the speech of people without social prestige, such as variable number concord, or in country speech, such as the retroflex realization of /r/. Thus, in addition to 'orderly heterogeneity,' Brazil also shows 'a set of social attitudes towards language' that are uniform and function as additional features of identification within the Brazilian Portuguese speech community. These facts serve as clear illustrations of the applicability of Labov's definition of the speech community.

Brazil also has other speech communities formed by small indigenous populations, with a total of

about 230 000 speakers and 190 languages, and by the descendants of immigrant workers who came to Brazil after the 18th century and, with varying degrees of success, attempted to maintain a symbolic link with the homeland, most notably through the use of German, Italian, and Japanese. According to Rodrigues (2000: 10), the most widely spoken minority language in modern Brazil is Japanese, with an estimated 400 000 speakers (0.24% of the total population), while the indigenous languages with the greatest number of speakers are Guaraní, with about 30 000 speakers (0.018%), Tikúna, with about 23 000 speakers (0.014%), and Kaingáng with about 20 000 speakers (0.012%). Rodrigues (1986: 83–86) states that to the northeast of the Amazon Basin there is collective and individual multilingualism. In this region, people of the Eastern Tukáno indigenous group normally speak three to five languages, and some have mastered eight to ten languages. In this region, one of the social norms, having the function of facilitating interaction and identification of the indigenous groups involved, is knowledge of several languages with no language mixture. For the characterization of this speech community, the definitions of Gumperz, Hymes, and Fishman seem more relevant. Nonetheless, Labov's position, especially with respect to "a set of social **attitudes** towards language" is clearly applicable. Because language is a strong mark of cultural identity for them and because they consider their own language to be 'the good language', indigenous speakers also exhibit "**overt types of evaluative behavior,**" without a codified norm (Emmerich, 1991). This is a matter of norms within the speech community, and not of mere normative patterns, as pointed out by Eckert (2000: 31) in her discussion of Romaine's (1982) critique of Labov.

Guinea-Bissau, with about one million inhabitants on its 36.125 km^2 of West African soil, illustrates another type of Portuguese language speech community that validates the definitions discussed above in the 'Summary of Speech Concepts' section. According to Couto (1994: 45–46), alongside Crioulo Upper Guinea, a Portuguese-based Creole, there are more than 15 African native languages in the country, including Fula, Balanta, Mandinga, Manjaco, and Papel. Crioulo Upper Guinea is spoken by more than 50% of the population as a contact language, especially in the cities and surrounding areas, and by about 10% as the vernacular language. Portuguese itself is the official language, the language of the schools, and the language of the government. Couto (1994: 45) states: "The entire history of Guinea-Bissau is written in Portuguese." Guinea-Bissau acts as and is identified as a speech community in which group identity is established through the mother tongue, symbolic integration is established by the official language, and inter-group communication is made possible by a contact language. Thus, there are linguistic and social norms shared by the community members.

Rupture, Creation, and Continuity of Speech Communities

Brazil and Paraguay – two large speech communities within South America – constitute good examples of mobility of social groups and consequently of speech communities. This sort of mobility is present in all human groupings, but becomes more significant in countries that undergo invasions with subsequent restructuring on the ethnic, ethical, cultural, religious, and linguistic levels.

Invaded in 1500, Brazil was home to millions of indigenous people and possessed a vast richness of linguistic diversity. According to Rodrigues (1986: 18–19), hundreds of different languages were spoken at the time and, although there are still about 190 of them left, they are totally unknown to most Brazilians. Nowadays, there are only small indigenous communities. Brazilians now consider their country to be completely monolingual in Portuguese, but it has in fact always been basically multilingual, and Portuguese had not yet achieved dominance as late as 1750. In the region of São Paulo, the Língua Geral Paulista was widely spoken, as was the Língua Geral Amazônica in the North, although it is today found only in small areas under the name Nheengatu, or 'good language' (Rodrigues, 1996). History attests the dominance of versions of Língua Geral throughout all social levels and in both the private and public spheres. Portuguese "was learned by those few who attended Catholic schools and was used in written documents and in ceremonies, having more of an official than a public character" (Villata, 1998: 33). In this context, "the Portuguese made an effort to alter symbolic meaning of Portuguese language prior to the actual separatist moves, when the Amerindian language was recognized as a useful vehicle for signaling the distinctiveness of the Brazilian nation-state" (Urban, 1994/1991: 325). The use of indigenous-based Língua Geral was forbidden, with heavy linguistic repression beginning in the second half of the 18th century. The presence of other languages was again repressed in the first half of the 20th century through the proscription of teaching and use of the native languages of European immigrants. Thus, in the context of the upheaval created by the European invasion, there was a reorganization of speech communities, with the imposition and appropriation of Portuguese as the mother tongue due to

linguistic repression, together with two further developments with significant import on the social plane: the removal of the Portuguese royal family to Brazil in 1808, and the institution of Portuguese as the official language in 1890 (Bortoni-Ricardo, 1985: 14–21).

The structural boundaries between Brazilian Portuguese sociolects and dialects are not clearly demarcated. Bortoni-Ricardo (1985: 9–10) notes that, in Brazil, "most of the nonstandard features of the language are characteristic of gradient rather than a sharp stratification." One may say that linguistic varieties form a continuous ramp. There is mutual intelligibility from north to south, from east to west, even at the end-points of the rural/urban continuum, represented, on the one hand, by speakers with little or no education from isolated rural communities and, on the other hand, by urban speakers with 15 or more years of schooling. Although communicative misunderstandings may occur, the differences on the social and regional axes impede communication no more than do differences in vocabulary among different professions in urban areas.

Paraguay's linguistic history is partially different from that of Brazil. Although both countries started out with similar linguistic constellations, they are now radically different. Colonizers brought Spanish to Paraguay, and from the resultant contact a Língua Geral based on Guaraní emerged. This modified version of Guaraní – Guaraní, Paraguayan – is now the mother tongue of 90% of the population. It is the pride and joy of the nation and is a basic element in Paraguayan identity. Together with Spanish, the first official language, Guaraní – elevated to status as an official language in 1991 – now functions in all spheres of life. Urban affirms (1994: 310) that in Paraguay the situation is: "two languages/one social group identification." He goes on to state that "approximately (...) one half are fluent in both Spanish and Guaraní, with the majority of the remainder (40–45%) being monolingual in Guaraní, with only a small portion (<10%) monolingual in Spanish." This is quite different from the situation in Brazil, where, beginning in 1750, in Urban's terms (1994: 313), "the semiotic pressure to project a one language/one culture/one people relationship" has prevailed. What happened in Paraguay involves the continuity of the speech community, broadened by the presence of Spanish, without the dramatic rupture that occurred in Brazil. Urban (1994: 325) states that, "in Paraguay the Spanish did not move decisively against Guaraní, although they had moved against the Jesuits and, hence, against the Indians. At the time of independence in 1811, the indexical value of Guaraní was in keeping with its symbolic value. It was spoken by a majority of Paraguayans."

Final Remarks

In the 'Summary of Concepts' section, I presented an overview of three lines of definition of the concept of the speech community, all of which attempt to capture the complex linguistic and social networks typical of human agglomerates. Many scholars have discussed the concept of speech community and especially Labov's view of it. Milroy (1980), for example, argues that the concept of social class is fundamental in the implementation of Labov's definition, but does not capture the reality of certain communities that function in terms of 'local loyalty'. For such communities, according to Milroy (1980: 14), "membership of a group labeled 'lower-middle class' does not necessarily form an important part of a person's definition of his social identity. Yet smaller-scale categories are available to which people feel they belong and which are less abstract than social classes." Milroy (1980: 14) proposes that the term *community* should be limited to "cohesive groups to which people have a clear consciousness of belonging." Nonetheless, Milroy's (1980: 18) most basic insight is that in these communities speakers "perceive their language or dialect as a powerful symbol of group identity, despite long-term pressures from the standardized code." It is the local language that functions as an index of **symbolic integration**, and not the standard language or standardized code. Milroy (1980: 17–18) cites as examples "working-class communities" in Norway and "low-status" Belfast speakers. Furthermore, she states "examples can be quoted as divergent as Lowland Scots in Southern Scotland, Catalan in Spain, Canadian French in Canada, Black English in United States, and the whole range of low-status vernaculars in British and European cities." Although social class may not be the best parameter for analysis in these cases, it is clear that both "a set of social **attitudes** toward language," in the terms of Labov (1975: 248; 1989: 2), and the existence of **orderly heterogeneity** are fundamental in attempting to capture the feeling of speech community in these groups. Milroy's (1980) considerations thus reinforce the view that no single definition can account for the whole of reality insofar as speech communities are concerned; scholars must seek out complementary aspects of the definitions if their goal is to understand the whole set of linguistic phenomena. Hudson (2001: 27) advocates a similar perspective when he states that all of the definitions we have considered "are 'correct,' since each of them allows us to define a set of people who have something in common linguistically – a language or dialect, interaction by means of speech, a given range of varieties and rules for using them, a given range of attitudes to varieties and items." Thus,

each scholar makes a relevant contribution to the construction or identification of the intricate mosaic made up of people, language, and society.

See also: Bilingualism; Multilingualism: Pragmatic Aspects; Portuguese; Social Class and Status; Speech and Language Community; Structuralism.

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Speech Development

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The development of speech occurs over several years, typically commencing with the prelinguistic speech-like vocalizations at infancy and continuing with speech production and the refinement of phonetic abilities throughout childhood.

To date, the study of speech development has been challenging due to, among other things, the necessity for multidisciplinary scientific input, the importance of generating comprehensive and explanatory theoretical frameworks, and the innovative methodological procedures required for experimentation with infants and young children. Research has tried to shed light on the contribution of neural, motoric, perceptual, cognitive, anatomical, linguistic, emotional, and social parameters guiding the ontogenetic

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To date, the study of speech development has been challenging due to, among other things, the necessity for multidisciplinary scientific input, the importance of generating comprehensive and explanatory theoretical frameworks, and the innovative methodological procedures required for experimentation with infants and young children. Research has tried to shed light on the contribution of neural, motoric, perceptual, cognitive, anatomical, linguistic, emotional, and social parameters guiding the ontogenetic

path of speech. Some of the core theoretical questions that have been addressed include the following:

- To what degree can the development of spoken language be attributed to innate knowledge and universal language properties vs. constraints imposed by the child's biological and cognitive systems as well as the linguistic and social systems to which he or she is exposed?
- How does anatomical/physiological and motor skill maturation influence speech development?
- How does the infant enter the speech code?
- How do ongoing changes in the perceptual abilities of children influence the development of speech?
- How are speech perception and production shaped by the ambient language?
- What is the size of the early units of speech (i.e., words, syllables, segments, and gestures)?
- Is there continuity between prelinguistic vocalizations and subsequent developments in speech production?
- What is the phonetic content of children's productions?
- How does the emergence of phonological systematicity influence children's speech output?
- What is the order of acquisition of particular sounds?
- What is the temporal extent of speech development?

The development of speech production requires mastery of perceptual and motor skills by the child. The following sections present some of the developmental milestones in the perceptual and production abilities of infants and children in light of selected key factors (e.g., anatomical constraints and experience with the native language) that influence in important ways the development of this unique human capacity. The discussion follows advances in the acquisition of segmental and prosodic components of speech during the first year of life and throughout childhood.

Anatomical/Physiological Maturation and the Development of Speech

Important developments in anatomical and neurophysiological structures occur during infancy and childhood. Over time, maturation of the functions of the nervous system, the auditory system, and vocal tract subsystems relate to significant developments in the perceptual and production abilities of children; these gradually approximate and eventually reach the abilities of adult speakers.

The vocal tract anatomy of infants up to 3 months is substantially different from that of adult humans and resembles more closely that of nonhuman primates. Some of its major characteristics include (a) a gradual rather than a right-angle bend of the orophrarynx, (b) an elevated position of the larynx that results in a short vocal tract and a close approximation of the epiglottis to the velum (the so-called engagement of the larynx and velopharynx), (c) a short pharyngeal cavity and a relatively broader oral cavity compared to the adult one, and (d) a large tongue in relation to the size of the oral cavity.

These major differences between the infant and adult vocal tract have important consequences for the first vocalizations that infants make. The close proximity of the laryngeal and velopharyngeal structures leads to nasal vocalizations. The size and placement of the tongue, in addition to immaturity of its intrinsic musculature, result in a very restricted set of sounds mainly produced by front–back piston-like tongue movements.

A major landmark in developmental anatomy begins at approximately the fourth month of age when there is a restructuring of the vocal tract that starts to resemble that of the adult human. The facial skeleton grows downward and forward, increasing the size of the vocal tract and allowing the tongue to move more freely. In addition to the dramatic changes in vocal tract structure, which result in the production of a larger variety of sounds, maturation of the intrinsic muscles of the tongue allow more refined lingual movements and shapes during sound production. Further, greater influence of the supralaryngeal muscles on the vocal folds allow increasing contrasts of pitch. During this period of vocal play, the infant explores the vocal tract and updates sensory information about the changes occurring in the oral and pharyngeal cavities.

The development of the vocal tract continues throughout childhood. As the child grows older and his or her body size increases, the musculoskeletal system that underlies speech production develops considerably. Descend of the laryngeal cartilages into the pharynx and changes of their positioning continue during the first 5 or 6 years. A major change relates to the significant increase in the length of the vocal tract; data on 8- and 12-year-old girls, for example, suggest a 10–15% increase in vocal tract length between these two ages (Goldstein, 1980). Growth of vocal tract structures, development of the respiratory system, development of motor skills, and increased experience with the spatiotemporal properties of speech production relate to ongoing changes in articulatory patterning and the acoustic characteristics of speech during childhood.

Significant developments in the nervous system also occur during infancy. A left hemisphere bias for auditory speech sound processing appears as early as

the third month of age. General maturation of the motor regions of the cortex that support infant vocalizations occur during the fist year of life. Important landmarks in infant vocalizations (i.e., cooing, babbling, and the onset of meaningful speech) have been associated with discontinuities in neural and/or vocal tract development (Kent and Miolo, 1995).

Infants' special sensitivity to speech may also relate to the development of the auditory system. The onset of auditory functioning occurs during the last trimester of gestation and provides newborn infants with prenatal experience with some properties of human speech. The fetus is mainly exposed to the prosodic characteristics of human speech as its mother's body acts as a low-pass filter (i.e., allowing low but attenuating high frequencies). Such prenatal *in utero* experience may be responsible for the preference infants show toward human speech but also a bias toward the voice of their mother and the prosodic patterns of her native language. Maturation of the auditory system occurs over time and may to some degree be responsible for differences in the perceptual mastery of some speech sound contrasts.

The Speech Signal and the Infant: Challenges and Early Perceptual Capacities

Fluent speech is continuous and highly variable. Several words may be produced without interruption, but the adult listener can segment and recognize individual words relatively effortlessly. The lack of clear or reliable boundaries between words in the speech signal constitutes a fundamental challenge for the infant, who needs to segment the continuous stream of speech in order to extract words and understand meaning. This segmentation problem is further intensified by the large variability present in the speech signal. This can be due to interspeaker differences in production (i.e., variability among speakers of the same or different age or sex); it can also be due to variability among utterances of the same individual due to contextual effects, prosodic factors such as stress position, rate effects, environmental conditions such as the presence of noise, emotional state, and so on. The task of the infant is to recognize the underlying similarities in sound patterns and identify different productions of the same token as the same word.

Speech perception by the adult listener is greatly facilitated by the redundancy present in the speech signal. Even in the presence of adverse conditions (e.g., noise), parts of the signal may be recovered as the listener utilizes acoustic information shared by neighboring regions of the signal and integrates this with linguistic and conceptual knowledge. At the early stages of language learning the young listener lacks such top-down processing capacities while the presence of variability in the speech signal may further complicate the perceptual process.

Despite the challenges the acoustic signal presents to the infant, speech perception research during the past 30 years has shown that the infant possesses a remarkable capacity to discriminate phonetically relevant acoustic contrasts from the first weeks of life. This impressive ability is founded in the presence of two early perceptual capacities, categorical perception and perceptual constancy, which assist the infant in discriminating speech contrasts and in ignoring nonsignificant variation in sound production. Experimental work has provided evidence that infants, similarly to adults, perceive consonantal contrasts (in place, manner, and voicing) in a categorical manner. Categorical perception refers to the ability to discriminate easily among sound differences across categories but not within categories and is advantageous since sensitivity to cross-category differences will assist the listener in learning the contrastive sounds of his or her language. At the same time, insensitivity to within-category differences helps the listener cope with variability during different productions of the same sound. Furthermore, perceptual constancy enables listeners to treat sounds as similar despite changes that may have a considerable influence on their acoustic characteristics (e.g., a change in speaker or rate). Experiments have shown that infants can normalize for talker differences during the perception of vowels – that is, they can perceive the same vowel spoken by male speakers, female speakers, and children. They can also compensate for changes in speaking rate and context in the perception of some consonantal contrasts (see Vihman, 1996). Such a perceptual capacity will assist the infant to disregard linguistically irrelevant variation and relate differences in speech sounds to differences in meaning. Evidence of categorical perception and perceptual constancy at infancy indicates that babies enter the world equipped with those perceptual capacities that enable them to begin processing the speech signal, cope with some significant aspects of variability in speech, and make distinctions that are necessary for speech perception.

Speech Perception by the Young Listener: The First Year and Beyond

Impressive perceptual achievements together with dramatic changes in infant speech perception mark the first year of life. During the first 6 months infants show the capacity to discriminate many native and nonnative speech sound contrasts and potentially any

sound contrast found in the world's languages. Infants can discriminate voicing contrasts, place and manner of articulation distinctions, as well as vowel contrasts. An early ability to discriminate prosodic features, such as differences in intonation and stress patterns, is also evident (for a review of studies, see Jusczyk, 1997).

Following an initial language-general perceptual capacity, a shift toward a language-specific pattern in speech perception occurs. Increasing experience with the ambient language leads to a decline in sensitivity to nonnative contrasts, which occurs earlier for vowels (by 6 months of age) than for consonants (in the latter half of the first year). Kuhl (1993) claimed that as infants gain experience with tokens of the native vowels they reorganize an initially universal vowel space divided by universal psychoacoustic boundaries to a language-specific one. Organization of native vowel categories occurs around prototypes (i.e., instances that are more central or typical) that act as 'perceptual magnets' attracting surrounding vowels and warping the perceptual space. The perceptual magnet effect may explain the decline in sensitivity to nonnative vowel contrasts as the strong perceptual pull of prototypical on less prototypical vowel tokens inhibits discrimination. Infants exposed to different languages show this effect only for their native language vowels; thus, experience with the ambient language helps the infants to organize their vowel space so as to include the categories that are typical of their native tongue.

A gradual decline in the sensitivity to some nonnative consonantal contrasts occurs in the latter half of the first year (Vihman (1996) and Jusczyk (1997) provide a review of research findings). For instance, English learning infants can discriminate selected Hindi and Nthlakapmx (Thompson) contrasts at 6–8 months; fewer are able to do so at 8–10 months and hardly any at 10–12 months.

While a decline in sensitivity to nonnative contrasts is evident, infants between 6 and 9 months of age demonstrate sensitivity to phonetic, phonotactic, statistical, and prosodic properties of the native language. For instance, infants prefer words that contain native and more frequent segments. English-learning infants prefer words with the predominant trochaic (strong/weak) stress pattern of their mother tongue. During this period, infants also develop the capacity to segment the input into distinct words implementing multiple cues. Research has shown that at 7½- to 8-month-old English-learning infants rely on prosodic information such as the predominant metrical pattern of their language (i.e., trochaic) and statistical/distributional information present in the input to identify word boundaries. Further cues are exploited subsequently between 9 and 10½ months, when infants use allophonic and phonotactic information to locate boundaries and extract words (Jusczyk, 1999).

The previous discussion indicates that developmental changes in speech perception culminate in the latter half of the first year. Several concurrent events appear to be closely linked and can function to facilitate acquisition of the native language. Attenuation of sensitivity to nonnative contrasts occurs at approximately the time when receptiveness to the structural properties of the native language increases. These changes indicate that infants begin to tune into the sound patterns of the native language. Perceptual reorganization involving loss of categories that are infrequent in the input can facilitate the learning of language-specific phonological contrasts. The infant's increasing sensitivity to structural and statistical regularities of the native language facilitates segmentation and extraction of words from fluent speech. Indeed, all this occurs at the same time as another major developmental landmark – the onset of word recognition at approximately 8–10 months. As infants improve their segmentation abilities and recognize a larger number of words, the store of lexical items in the mental lexicon increases. All these milestones have important consequences for further developments in language acquisition in the second year of life, when meaning and intentional communication become increasingly important for the child.

Children's speech perception capabilities continue to develop after the first year. Some of the factors that influence later developments in speech perception relate to maturation of the auditory system, the link between the perceptual and production capacities of the child, as well as linguistic and cognitive development.

Attainment of the complete set of language-specific phonemic contrasts is gradual and adult-like perceptual patterns appear at approximately 4 or 5 years. Children may encounter difficulties with some phonemic contrasts; for instance, /θ/ and /f/ or /r/ and /w/ remain difficult to discriminate at age 3 and beyond. Differences in the placement of phonemic boundaries between adults and children also exist. Boundaries are refined as children grow older; for instance, differences in the placement of the /r, w/ phonemic boundary reduce with the increasing age the child (i.e., from 3 to 5 years). A reduction of the voice onset time (VOT) difference needed for the discrimination between voiced vs. voiceless stops also occurs with age; perception becomes adult-like at 6 years of age (see Vihman (1996) for a review of the studies).

Developmental changes in how children process speech also occur. For example, children in their

second year of life begin processing speech incrementally, i.e., they become able to recognize words using partial (word initial) phonetic information. This is a characteristic of adult speech processing and its development in children relates to lexical growth. Differences in cue weighting strategies between adults and children are also evident. For identification of the /sV/ vs. /ʃV/ contrast, adults appear to give more weight to the spectral characteristics of the fricative noise, whereas children give more weight to the vowel-onset transitions (Nittrouer, 1996). Such evidence may relate to the adoption of more global perception strategies by children vs. more analytic ones by adults, necessitating the use of more vs. less transitional information, respectively.

Interest in the perceptual developments of children older than 1 year has in part arisen as a consequence of research interest in understanding children's production errors. Children's mispronunciations could potentially be related to a misperception of adult words and therefore to differences in word representation. However, evidence indicates that children can perceive contrasts they cannot yet produce and may also make relevant distinctions in their productions, although these may be different from adult contrasts.

Units and Representations

Two major candidates for infants' early representational units of speech have been suggested: the syllable vs. a smaller sized unit, namely the segment or feature. The remarkable abilities of very young infants to discriminate a variety of speech sounds initially led to interpretations that assigned considerable phonetic detail to infant representations. It was suggested that infants could discriminate segments or features. However, different interpretations were possible for some of the findings; for example, infants may detect differences between stimuli because they pay attention to particular parts of the whole syllable; a simple detection of differences between stimuli does not presuppose a detailed analysis of such differences. An alternative account has recently favored the syllable as the unit of representation and perceptual processing. Jusczyk (1997) reviewed findings of several studies and suggested that there is no evidence to indicate segmental representation of speech in the first 6 months of life; for instance, studies have shown that newborns can detect changes in the number of syllables but not in the number of segments. Further arguments in favour of the syllable are reviewed in Vihman (1996), together with experimental findings that have been inconclusive, making it difficult to draw firm conclusions about the size of the early representational units of speech.

Onset of word comprehension at 8–10 months is associated with the beginnings of the formation of a lexicon in the latter half of the first year. Although little is known about infants' early representations of words, it has been suggested that these may not be fully specified in terms of phonetic detail because a small lexicon does not require detailed representations for successful discrimination between the lexical items stored. The word or syllable may thus be the early perceptual unit. As the lexicon expands, more fine-grained details are necessary for lexical differentiation and thus representations in terms of segments or features are required. A relationship between lexical density and the level of detail in representation of lexical items has thus been suggested.

The word as the first production unit (i.e., the unit of contrast in a child's early phonological organization) has also been put forward. Progression toward the segment as the unit of phonological organization relates to vocabulary growth and occurs over time (Studdert-Kennedy, 1987). The emergence of phonemic units may occur in a self-organizing way (see models by Kent (1992) and Lindblom (1992)). The relative early disappearance of phonological processes that apply to the whole word and the persistence of processes that apply to individual segments may be interpreted to suggest the emergence of segments as organizational units over the course of the first years of life (Vihman, 1996).

In line with this, accounts of the developmental course of motor skill maturation and coarticulatory patterns have argued for an initial larger-sized speech production unit (i.e., the syllable) and the gradual emergence of smaller sized units (i.e., gestures). Babbling and first word production can be viewed as organized over the holistic, undifferentiated syllable resulting from recursive global opening and closing gestures of the vocal tract (MacNeilage and Davis, 1990). As the need for greater differentiation of movements arises so that the repertoire of words is increased, productions become more refined and greater variation in articulatory gestures is achieved. Maturation of motor skills and practice with new articulatory movements gradually lead to the production of independent gestures that can be coordinated with other gestures. Advances in the combination of gestures and their appropriate spatiotemporal organization occur over time and eventually lead to adult-like performance.

Speech Production: The First Year

During the first year of life, the vocal development of infants shows regularities that have been chronologically demarcated in stages. These regularities occur

for the majority of normally developing infants irrespective of language background, although there may be individual variability and overlap in the vocalizations appearing between stages. Transition between stages is thus typically not abrupt and the onset of a new stage is marked by the introduction of new types of vocalizations. Several stage systems have been proposed (for a summary, see Vihman (1996) and Kent and Miolo (1995)) and the following description draws primarily from Oller (1980), Stark (1980), and Locke (1983):

- Stage 1 (0–2 months): This period is associated mainly with sounds indicative of discomfort or distress, such as cry and fussing, and 'reflexive' vocalizations, such as grunts, coughs, and burps, attributed to involuntary motor patterns and in general immature control of bodily functions. Although speech-like vocalizations are rare, some nonreflexive, nondistress sounds do occur, usually produced with normal phonation but limited resonance and resembling nasalized vowels or syllabic nasals.
- Stage 2 (2–4 months): Known as the 'cooing and laughter' stage, this period is characterized by the appearance of the first comfort sounds produced voluntarily, usually in interaction with a caregiver. Vocalizations are typically produced at the back of the mouth due to the proximity of the tongue and palate in this area and may include velar consonant-like (fricative) sounds. Toward the end of this stage, the appearance of sustained laughter emerges.
- Stage 3 (4–6 months): During this period of 'vocal play,' the infant explores a whole range of the sound production possibilities offered by its vocal tract. This period is characterized by the infant's increasing control over the laryngeal and supralaryngeal structures and a marked increase in supraglottal constrictions. Vocalizations include yells, squeals, and growls resulting from manipulation of intensity and fundamental frequency. Exploration of periodic and aperiodic sound sources and consonantal constrictions result in the production of a variety of sounds, including bilabial and ingressive uvular trills ('raspberries' and 'snorts') as well as various friction noises and nasal murmurs. This period also marks the onset of vowel sounds that are more adult-like and of marginal babbling consisting of rudimentary consonant–vowel syllables that lack the temporal regularity of canonical babbling.
- Stage 4 (6–9 months): This period of 'canonical' babbling is characterized by the production of consonant–vowel syllables with regular timing characteristics. Temporal regularity is achieved by the cyclic alternation of closing and opening gestures producing consonant–vowel sequences resembling syllable production by adults. Both single consonant babbling (e.g., [ba] and [da]) and reduplicated babbling (e.g., [mama] and [bababa]) can occur. Although these reduplicated sequences may sometimes resemble words of the native language of the infant, there is no evidence that the child has assigned meaning to these sequences, and they cannot therefore be considered to constitute words.
- Stage 5 (9–14 months): The 'variegated babbling stage' is marked by the onset of more complex vocalizations in the form of sequences of CV syllables produced with an alternation of different consonants and vowels. During this period, reduplicated babbling also occurs. A considerable increase in the proportion of variegated babbling takes place at approximately 12–14 months, when infants produce long sequences with distinctive sentence-like intonation patterns. This is known as 'jargon babbling,' and the overlaid intonation pattern resembles the production of statements or questions in adult speech. It is at this time that the onset of word production also occurs.

Note that the claim that stages 4 and 5 are sequential (i.e., that the stage of reduplicated babbling is followed by a stage of variegated babbling) has been challenged by research showing that already from the onset of multisyllabic babbling (i.e., between 6 and 9 months), there is considerable overlap between reduplicated and variegated babbling. A single stage (6–12 months) in which reduplicated and variegated babbling develop in parallel has been proposed by Kent (see Kent and Miolo, 1995).

The Phonetic Content of Early Vocalizations

Anatomic–physiological factors constrain vowel production during the first year of life. Although considerable variability in individual patterns has been noted, a predominance of fronted, central, or lower vowels has generally been reported in infant productions (but note the high frequency of back vowels at the cooing stage due to the anatomy of the vocal tract and the back resting position of the tongue during vocalizations from a mainly supine position). The high vowels /i/ and /u/ are generally not frequent in babbling, possibly due to their dependence on vocal tract restructuring and the formation of two distinct vocal tract cavities. The infrequency of back vowels may also relate to increased coordinative requirements between the lips, tongue, and jaw. In

general, a change from a more centralized to more spread out vowel space has been noted toward the end of the first year.

The development of consonant production in the first year of life is marked by a change from laryngeal to supralaryngeal constrictions and from back to more anterior articulations. Although glottal [h, ʔ] and velar/uvular consonants are typically more frequent in earlier stages, during the second half of the first year there are marked changes in consonantal frequency. The most frequent consonants in infant babbling are stops (e.g., b, p, and d) and nasals (e.g., m and n). The glottal [h] appears in high frequency, continuing its presence from earlier stages. Manners such as liquids, fricatives, and affricates are infrequent. A predominance of anterior sounds, labials and alveolars, over velars is also evident (Locke, 1983).

A further significant change that occurs during the first year relates to the vowel-to-consonant (V-to-C) ratio. Vowels predominate in the earlier stages and gradually reduce to reach a 2:1 V-to-C ratio toward the end of the first year. This ratio is still high compared to adult speech, indicating a predominance of vowels in infant vocalizations. The most frequent syllabic frames that accommodate vowel and consonant production are V and CV (see Kent and Miolo (1995) for a review of relevant literature).

A tendency for certain co-occurrence patterns between consonants and vowels has also been observed in babbling (i.e., co-occurrence between front consonants with front vowels, back consonants with back vowels, and labials with central vowels). Such patterns can be modeled in terms of biomechanical constraints on the speech production mechanism. According to the frame/content theory (MacNeilage and Davis, 1990) cycles of mandibular oscillations in babbling serve as the syllabic frames onto which segmental gestures (i.e., syllabic content) are overlaid. Co-occurrence patterns are due to coordination constraints between the lips, tongue, and jaw; these limit articulatory changes within or between syllables.

Finally, there is evidence that the ambient language influences production during the prelinguistic period (see review of relevant findings in de Boysson-Bardies (1999) and Jusczyk (1997)). Prosodic aspects of vocalizations appear to show effects from the native language from very early on. Adults can recognize vocalizations of 8- and 10-month-old infants learning French from those of infants learning Arabic; discrimination is based on features such as phonation type and pitch characteristics. A predominance of falling patterns produced by English-learning infants but evidence of rising patterns by French-learning infants during reduplicated vocalizations suggests influence from the dominant intonational patterns of the native language. Differences in the vowels, consonants, and syllable structures produced by infants from different linguistic backgrounds have also been found to correspond to tendencies of the native language. An influence of native language input on consonant–vowel co-occurrences has been noted; for instance, Swedish infants' production of alveolar stops occurs with a variety of vowels and not just front vowels, as in the productions of infants in other languages. These findings indicate that in addition to biomechanical constraints on the speech production system, experience with the language plays a significant role in the sound co-occurrences produced by infants.

From Babbling to Speech

Opposing accounts have been proposed for the period marking the development from babbling to the onset of first words. Jakobson's (1941) well-known discontinuity view was founded on claims that (a) babbling was prelinguistic and completely unrelated to the onset of meaningful word production and subsequent phonological development; (b) a silent period could sometimes intervene between these two developmental stages; (c) the repertoire of sounds in babbling was random and extremely varied, consisting of any possible human sound; and (d) the majority of these sounds disappeared in the production of first words. Recently, the discontinuity view has been critically challenged and evidence has accumulated in support of continuity between babbling and early word production. Evidence of temporal overlap between babbling and first word production in the speech of many children has disconfirmed the postulation of an intervening silent period. Continuity is supported by the close relationship between the sound repertoire of babbling and early word production. The most frequent consonants in babbling also occur most frequently in early word production; fricatives, affricates, and liquids, which are the least frequent consonants in babbling, are also infrequent in early word production (Locke, 1983). Prosodic continuity between babbling and early word production has also been documented.

However, a decrease in the frequency of alveolars and an increase in the frequency of labials in early words compared to babbling may be considered as evidence of regressive behavior, supporting a discontinuity view (MacNeilage *et al.*, 1997). This suggests that although there is undoubtedly a close relationship between sounds and sound patterns in early word production and babbling, there are some instances of dissimilarity between these two developmental stages possibly attributable to the adoption of simpler articulatory patterns at the time when

there is increasing emphasis on using sound to convey meaning. At the same time, new developments can be expected in the sound repertoire of early words as the need for more distinctions in meaning arises. For instance, a more expanded vowel space is exploited in early words, resulting in an increase in the vowel types used and the inclusion of high front and back vowels. The overall characteristics of babbling (including rhythmicity, the opportunity it offers infants for repetitive practice and feedback, and its phonetic content) contribute to subsequent developments in spoken language.

Speech Production after the First Year: Toward Phonological Systematicity

At the end of the first year, impressive qualitative and quantitative changes in the vocal repertoire of infants occur. This period is marked by an increase in the frequency of babbling, the appearance of protowords, and the first real words. Adult-like jargon sequences with no consistent form or meaning can co-occur with protowords (i.e., forms that display some phonetic and semantic consistency but have no clear relationship to adult target words), as well as first words, which relate to the adult word model relatively consistently in terms of form and meaning. Examples of early words produced by 10- to 15-month-old infants from various linguistic backgrounds (English, Swedish, German, Japanese, etc.) and of protowords are provided in Vihman (1996: 242–248). Some sample forms include: protowords by English-speaking children: [pwi], [ʔʌgæ]; early words in English: [gaga], [dɔgi] for doggie, [be(be)], [pipe] for baby; French: [(h)ailo] for allo 'hello,' [ta] for tiens 'here'; Japanese: [wawa] for wanwan 'doggie,' [koje] for kore 'this'; Swedish: [gɔ:ka] for klocka 'clock,' [bɔmbə] for blomma 'flower.'

Despite the lack of a clear temporal boundary between babble and speech due to the co-occurrence of forms, a transition toward intentional communication is evident in this period, with advances in the referential use of words generally occurring in the second year. The first 50-word period (approximately 1 year [1;0] to 1 year 6 months [1;6]) is marked by phonetic variability in the production of words and lack of systematic sound contrasts. Contrasts may begin lexically (i.e., they appear between whole words) and generalize gradually. Early words show an increase in the use of 'true' consonants (i.e., consonants other than glottals and glides), a higher frequency of labials, and a higher frequency of stops compared to fricatives. Stops, nasals, and glides are common. Increased frequency and accurate production of the high vowels /i/ and /u/ occurs. The syllable structure is typically simple (e.g., CV and VC); reduplicated CVCV sequences are common for some children. Early word production can include instances of progressive idioms – that is, more advanced forms than the rest of the child's words produced with segmental accuracy, such as accurate production of the [pr] cluster in 'pretty' but not in other words. Such forms can be frequently followed by regression – that is, the production of simpler forms such as [piti] or [bidi] for 'pretty'. Initially accurate productions may relate to children's more advanced perceptual and articulatory abilities compared to their phonological system. Selectivity or avoidance of words is also characteristic of this period as children select or avoid particular words on the basis of their phonological characteristics. Avoidance patterns may relate to words containing sounds not yet available in the child's system, words containing difficult sounds, clusters, or words of particular length. Further developmental changes occur during this period (e.g., increase in the types of sounds and phonotactic structures produced) and reflect emergent phonological organization linked to developments in the mental representation of words.

Following the first word period, progress toward phonological systematicity occurs at the time when there is a rapid growth in productive vocabulary. Children acquire the phonemic contrasts of their ambient language over several years, including their preschool and school years. Mastery of vowels commonly occurs by the end of the third year (see Hanford-Berhardt and Stemberger (1998) for vowel development in a variety of languages). Typically, acquisition of stops, nasals, and glides precedes acquisition of liquids, fricatives, and affricates. Research on English has shown that although by age 4 years, a considerable amount of the native sounds are acquired, mastery of some sounds, such as dental and alveolar fricatives as well as postalveolar fricatives and affricates, occurs well after 4 years and may not be achieved until 7 or 8 years of age. A late development concerns the acquisition of clusters spanning a period from 4 to 8 years. Initial stop + liquid clusters are acquired earlier (4 or 5 years of age) than fricative + liquid clusters in English (7 years of age). Initial three-consonant clusters are also late to acquire (i.e., by 7 years of age) (Stoel-Gammon and Dunn, 1985).

At the same time, children's reproduction of adult words includes systematic changes in target sounds, sequences, and syllables. These can be attributed to immaturity of the auditory and articulatory systems as well as limitations in the processing abilities of children. Such constraints may explain some of the similar patterns that have been observed in children's reproduction of adult words in several languages, indicating some degree of similarity in children's

development of phonological organization. Children's approximations to adult words have been typically described in terms of phonological rules or processes (Ingram, 1986). Although the psychological reality and explanatory power attributed to these processes have been challenged (Stoel-Gammon and Dunn, 1985), they can provide a useful framework for the description of children's reproduction of adult words and for the study of phonological disorders. Recently, emphasis has shifted toward constraint-based theories of phonological acquisition and possible applications in phonological disorders (Hanford-Berhardt and Stemberger, 1998).

Three major categories of processes are usually identified: substitution processes, assimilation processes, and syllable structure processes. The majority of examples presented here are from Yavas (1998), Vihman (1996), and Kappa (1999); their exact transcriptions are reproduced here. Further examples and audio files demonstrating some of these processes are from the 'paidologos' project, which investigates cross-language aspects of phonological development.

Substitution processes involve the replacement of classes of sounds present in adult words by classes of sounds that are part of the child's productive repertoire. Relevant processes within this category include the following:

1. Stopping: Stops replace fricatives or affricates at corresponding places of articulation. The execution of a simpler ballistic movement occurs in place of a more complex fricative articulatory configuration requiring increased articulatory precision and control.
   - English: [tʌn] 'sun,' [dam] 'jam,' [mu:b] 'move'
   - Greek: /'zesti/ → ['deti] 'warmth,' /'feta/ → ['peta] 'slice,' /'kaltsa/ → ['kata] 'sock'
   - Spanish: [sopa] → [topa] 'soup'
   - Turkish: [sen] → [ten] 'you'

2. Fronting: Velar or palatal sounds are replaced by alveolar/dental sounds. More advanced rather than posterior articulations are favored. Fronting of other sounds may also occur.
   - English: [su] 'shoe,' [ti] 'key,' [sɪp] 'ship,' [tʰɛtɪn] 'kitten'
   - Greek: /'kola/ → ['tola] 'glue,' /'sima/→ ['θima] 'sign (n),' /'kasa/ → ['taʃa] 'box of storage'
   - Portuguese: [ʃapew] → [sapew] 'hat'
   - Turkish [ʃu] → [su] 'that'

3. Liquid gliding: Liquids /r, l/ are replaced by glides /j, w/. A more vowel-like articulation results.
   - English: [wæbɪt] 'rabbit,' [wʊk] 'look,' [jʌv] 'love'
   - Greek: [ku'tala] → [ta'taja] 'ladle'
   - Portuguese: [amarɛla] → [amajɛja] 'yellow'
   - Turkish: [para] → [paja] 'money'

4. Vocalization: liquids /r, l/ are replaced by vowels in final position.
   - English: [tebo] 'table'

Assimilation processes refer to contextual influence induced on particular sounds. As a result, segments become more similar to neighboring sounds. In this category are the following processes:

1. Consonant harmony: A change in the place or manner features of a consonantal segment occurs under influence from a noncontiguous consonant. The direction can be either regressive (right to left) or progressive (left to right).
   - English: [pap] 'top', [dɔd] 'dog', [gɔg] 'dog', [lɛloʊ] 'yellow', [meilmaksɨz] 'mailboxes'
   - Greek: /'kato/ → ['kako] 'down,' /so'fia/ → [fo'fia] (proper name), /pe'tai/ → [pe'pai] 'it flies'

2. Final devoicing: Production of a target final voiced obstruent without voicing.
   - English: [bæk] 'bag,' [nos] 'nose'

3. Prevocalic voicing: Production of a target voiceless obstruent with voicing in the context of a following vowel.
   - English: [do] 'toe,' [bi] 'pea'
   - Greek: /to'tos/ → [do'do] (proper name), /'poði/ → ['bodi] 'leg,' /'teseɾa/ → ['deselo] 'four'

Syllable structure processes refer to modifications of the syllable structure of adult words so that complexity is reduced. They reflect a tendency toward the production of basic CV syllables. This category includes the following processes:

1. Final consonant deletion: Final consonants or consonant clusters are deleted in the child's production.
   - English: [kɪ] 'kid,' [dɛ] 'desk,' [mɪ] 'milk'
   - Spanish: [aɾbol] → [abo] 'tree'
   - Portuguese: [lapis] → [lapi] 'pencil'
   - Greek: /fos/ → [po] 'light,' /'kokoras/ → ['kokora] 'rooster'

2. Reduction of consonant clusters: Simplified production of clusters by deletion of one of its members. Usually, the member deleted is a sound that is considered relatively difficult in production and is acquired later in the child's productive repertoire.
   (i) s + consonant: In the /s/ + stop or nasal clusters, typically the /s/ is deleted and the stop

or nasal is produced. Reductions where the /s/ is retained do occur, however. In the /s/ + approximant clusters, either of the members can be deleted.

- English: [tap] 'stop,' [nel] 'snail,' [saɪl] 'smile,' [lɪp] or [sɪp] 'slip'
- Greek: /'spiti/ → ['piti] 'house'

(ii) consonant (not /s/) + approximant: The approximant is usually deleted and the consonant is produced (articulation of /r/ may vary across languages; e.g., tap, trill productions may occur).

- English: [fi] 'free,' [pe] 'play,' [piɹi] 'pretty,' [baks] 'blocks'
- Greek: /klei/ → [cei] 's/he cries,' /'trome/ → ['tome] 'we eat,' ['ce(n)dɹo] → ['cendo] 'center,' /'kitɹino/ → ['titino] 'yellow'
- Portuguese: [bruʃa] → [buʃa] 'witch'
- Spanish: [kɹus] → [kus] 'cross'

(iii) s + stop + approximant: The fricative and approximant are usually deleted in three consonant clusters.

- English: [tit] 'street,' [pæʃ] 'splash'
- Greek: /'kastɹo/ → ['kasto] or ['χato] 'castle'

3. Epenthesis: This involves the insertion of a segment in a word, thus changing its syllabic structure. An alternative strategy for the simplification of clusters can involve the epenthesis of a vowel between the consonantal members of the cluster.
   - English: [bəlu] 'blue,' [pəliz] 'please'
   - Greek: [bluza] → [belula] 'blouze,' [ble] → [bele] 'blue'

4. Unstressed syllable deletion: An unstressed syllable is deleted, especially in multisyllabic words. Both pre- and post-tonic syllables can be deleted. Deletion of unstressed syllables may be due to their reduced perceptual salience compared to stressed syllables.
   - English: [nænə] 'banana,' [tɛfon] 'telephone,' [ɛfənt] 'elephant'
   - Greek: /kara'mela/ → ['mela] 'candy,' /'katse/ → [ka:] 'sit down,' /pa'putsi/ → [ba'bu:] 'shoe,' /paɣo'to/ → [pa'to] 'ice cream'
   - Spanish: [eskoβa] → [kowa] 'broom'
   - Turkish: [ɨspanak] → [panak] 'spinach'

5. Reduplication: Repetition of an adult target syllable in the child's production of a word. This usually results in an appropriate number of syllables but a simplified production of the target word.
   - English: [kaka] 'cat,' [dada] 'dog'
   - Greek: /ki'mame/ → [ma'mame] 'I sleep,' /ka'pelo/ → [pe'pelo] 'hat'

The previous description is not exhaustive. Additional processes applying to a variety of sounds and positions in the word may occur; their frequency may differ among languages. Some examples include the following:

Backing: Anterior dental/alveolar sounds are replaced by velar sounds. Backing of other sounds may also occur.

- Japanese: /tamago/ [kamako] 'egg'

Devoicing: Devoicing of target voiced sounds.

- Greek: ['dama] → ['tama] 'female partner'

Frequently, more than one processes can co-occur in children's productions. For example, the production of target 'cherry' as [dɛwi] involves fronting, stopping, prevocalic voicing, and liquid gliding.

The temporal extent of phonological processes varies. Well-known accounts of the chronology of phonological processes in English include those by Stoel-Gammon and Dunn (1985) and Grunwell (1987). The former provides a categorization of processes into those that disappear by 3 years (i.e., unstressed syllable deletion, final consonant deletion, velar fronting, consonant harmony, reduplication, and prevocalic voicing) and those that persist after 3 years (i.e., cluster reduction, epenthesis, gliding, vocalization, stopping, depalatalization (palatal fronting), and final devoicing). Despite differences in details, many similarities exist between the two accounts and a closer look of the analyses shows that those processes whose domain of application is the word or syllable (e.g., reduplication, consonant harmony, and unstressed syllable deletion) are early processes typically disappearing by approximately the age of 3 years. Processes that affect the segment commonly persist after the third year and some of them can be evident many years later (e.g., 8 or 9 years of age). One of the earliest processes is reduplication, which is common during the first 50-word stage and disappears approximately by age 2 years. On the other hand, stopping is a late process in English and can persist up to 5 years or older for some segments (e.g., /θ, ð/). Gliding of /l/ and /r/ is another late process that can persist beyond age 5 years. Specific clusters (e.g., three consonant clusters) may also be reduced in the speech of some children, aged 8 or 9 years.

Despite similarities between languages, language-specific differences in phonological processes and their chronology exist. For example, whereas gliding of /r/ and /l/ is typical in English, in Italian and Greek /r/ is frequently substituted by [l] (e.g., Greek /'tesɾa/ → ['tesela] 'four'). Differences in the segmental inventories of languages may also relate to differences in the chronology of processes; for example, stopping disappears early in Portuguese but not in English, possibly due to the absence of /θ, ð/ from the consonantal inventory of Portuguese (Yavas, 1998). Furthermore, cross-language differences in the order of acquisition of phonemes may relate to differences in lexical phoneme frequency and phoneme sequence frequency. English children acquire /t/ earlier than /k/, in contrast to Japanese children, who acquire /k/ earlier than /t/. In addition, fronting errors for /k/ are more frequent in English, whereas backing errors for /t/ are more frequent in Japanese. These patterns are in accordance with the higher frequency of /t/ in English and /k/ in Japanese (Beckman *et al.*, 2003). They may also relate to vowel context because back vowels are more frequent in Japanese and front vowels in English (Boysson-Bardies, 1999). The potential influence of vowel context is in line with evidence showing that consonant–vowel sequences in which there is place co-occurrence between the consonant and vowel have higher frequencies than the independent frequencies of their components in adult lexicons in several languages and in children's early word productions (MacNeilage *et al.*, 2000). Such patterns may relate to physiological and biomechanical factors and may explain observed error patterns in English-speaking children (i.e., more errors for /t/ in the environment of back vowels and for /k/ in front vowel contexts). Further research is needed on a variety of languages in order to obtain important insights into the order of acquisition of segments, common vs. language-specific phonological processes, and their temporal extent and to gain an understanding of underlying factors explaining the similarities and differences observed.

Toward Mature Gestural Patterns: Developing Motor Skills and Coarticulation

The development of speech motor skills spans several years and includes advances in motor control, refinement, and adaptation of motor skills at a period when there is ongoing anatomical/physiological and cognitive maturation. Development of movement control for speech production includes advances toward independent control of articulators and the production of gestures that can be precisely coordinated and combined in novel ways. Conclusive evidence is still elusive regarding exactly when the child achieves such independence in articulatory gestures and the coordination needed for mature speech. However, there is evidence that development and refinement of motor skills for speech production does continue throughout childhood and reaches adult levels at approximately puberty. Developmental changes in VOT production highlight the importance of maturing control over different articulatory systems and of appropriate timing of articulatory events. At first, children generally produce short-lag VOTs for all stops. Differentiation between the voiced and voiceless categories is gradual and occurs over time. Research on English-speaking children has shown that after the initial short-lag stage, an increase in the VOT of target voiceless stops occurs, which at the ages of 3–7 is longer than that of adults. Adult-like VOT values for voiced and voiceless stops are reached at approximately 11 years of age. Generally, the voiceless aspirated stops show wide ranges and high variability; such variability decreases between 5 and 11 years of age, suggesting increasing articulatory precision as a result of maturation of motor skills. Such a long developmental course stems from the increased aerodynamic requirements, the simultaneous control required for the glottal and supraglottal systems, and the need for appropriate temporal phasing between articulatory gestures during VOT production.

Further differences in coproduction (i.e., the spatiotemporal overlap between gestures) between adults and children suggest that children need to master the coordination and timing of their articulators so that they produce coarticulatory patterns in accordance with those observed in adult speech. Experimental results have provided varied evidence regarding the degree of coarticulatory effects found in child speech. This may be due to differences in theoretical viewpoint or methodological design. Studies on sibilant–vowel sequences produced by 3- to 7-year-old children and adults showed greater within-syllable coarticulatory effects for younger children compared to older ones and adults (Nittrouer *et al.*, 1989). This is compatible with a view of a larger organizational unit in child speech that is gradually refined into smaller units (e.g., gestures) as motoric skills develop. Production may thus proceed from a more holistic to a more analytic level.

Coarticulatory effects vary as a function of the phonetic identity of segments and therefore the articulators involved in the production of particular sequences. Some gestural patterns may mature earlier than others due to the earlier presence of particular

gestures in the productions of children. For example, gestures for stop-vowel sequences, reflecting opening–closing jaw movements, may be coordinated more precisely earlier. Adult-like coarticulation patterns have been reported for 3- and 5-year-olds for CV sequences with bilabial consonants (i.e., when articulatory gestures for the bilabial and the vowel are not mechanically linked). On the contrary, age-related differences in coarticulatory effects were evident in sequences with /d/ (i.e., when both the consonant and the vowel involved a lingual gesture) (Sussman *et al*., 1992). Thus, mastery of precise coordination of independent articulators may precede that of mechanically linked ones. Refinement of gestural organization and attainment of mature adult-like coarticulatory patterns may take several years (e.g., patterns of overlap in /r/V sequences change with increasing age, such as from 6 to 10 years, due to both perceptual and motor constraints).

Motor skill maturation may also be implicated in the temporal patterning of speech. Children speak more slowly than adults and with greater temporal variability. It is at approximately puberty that the temporal structure and organization of speech becomes adult-like. During this long time of development, changes do not simply involve temporal shortening of segments. More complex modifications are evident depending on a variety of factors (e.g., the sound involved and its context).

Prosodic Development

The acquisition of prosodic features constitutes a complex phenomenon requiring mastery of coordination between the respiratory, laryngeal, and supralaryngeal systems and relating output to linguistic structure and situational context in order to convey relevant grammatical, pragmatic, and affective information. Several prosodic features may be acquired early (e.g., adult-like intonation may appear in the late babbling period). However, refinement of prosodic features may occur over several years, leading to relatively comprehensive mastery of finer-grained aspects much later, at approximately puberty.

Some of the prosodic patterns that characterize infants' vocalizations during the first year of life include an increase in the duration of vocalizations, an increase in F0 range, and a predominance of F0 contours with a falling termination (Kent and Miolo, 1995). A first link between prosody and affective meaning may be assumed during the period of cooing vocalizations. Generally, pitch patterns in the early part of the first year may relate to physiological constraints and be associated with emotional expression; later developments from 9 months [0;9] to 2 years [2;0] involve associations between intonational patterns and meaning. At the end of the first year, receptive and expressive regression in prosodic patterns may indicate prosodic reorganization, marking a shift from a prelinguistic to a linguistic stage in prosodic development (Snow and Balog, 2002). A decline in the sensitivity of nonnative tonal contrasts occurs at 0;10–1;0. Regression in production can include infrequent use of falling contours despite their early acquisition. Such regression may also be attributed to articulatory constraints imposed by developments in segmental acquisition and early word production at the end of the first year.

Intonation

A biological bias toward the early acquisition of falling tones has been suggested. The predominance of falling contours can be attributed to biomechanical and aerodynamic factors (i.e., a decrease in subglottal pressure or a relaxation of the laryngeal muscles leading to less tense and shorter vocal folds toward the end of vocalizations). The later and more gradual development of rising tones has been attributed to greater physiological effort (i.e., tension or lengthening of the vocal cords and increase in subglottal pressure toward the end of vocalizations) or to the complexity of the linguistic functions performed by such contours in languages such as English. Acquisition of complex contours has been documented to occur last and show variability (Crystal, 1986; Snow and Ballog, 2002).

Cross-language data indicate that despite a possible physiological basis for the early development of falling tones, language experience plays a significant role in the developmental path of intonation already from the second half of the first year of life. Research on the acquisition of the falling tone by English-speaking chidren aged 1 and 4 years old has also shown that, similarly to adults, falling intonation by 4 year olds, but not 1 year olds, requires active speech production mechanisms and cannot be accounted for solely on the basis of physiological constraint models (Snow, 2004).

Although adult-like nuclear tones may appear as early as the late babbling period for some children, acquisition of basic nuclear tones and correct production of intonational contrasts generally appear when children start producing meaningful speech. Several studies have shown the use of an increasing number of contours by children aged 12 or 13 months (Crystal, 1986). During the single-word utterance stage, children can intentionally manipulate

intonation contours to signal different grammatical, attitudinal, and discourse meanings. For example, they can use falling vs. rising contours to express statements vs. requests by the age of 17 months. They can also use intonation to mark grammatical boundaries at 17 or 18 months of age. In general, grammatical use of intonation appears to coincide with the transition to syntax. Further advances in the comprehension and realization of intonational patterns appear to continue throughout childhood.

Stress and Rhythm

Further insights into the complex task of associating segmental and prosodic features have been obtained from research on stress. Although there is evidence of the use of appropriate acoustic parameters for stress marking in prelinguistic infants, significant developments in the acquisition of stress occur between 3 and 5 years of age and full establishment of the stress patterns of the ambient language does not occur until many years later, at approximately 12 years (Crystal, 1986).

Babbling infants from English-speaking environments can modulate relevant acoustic parameters (i.e., intensity, duration, and fundamental frequency) for stress marking (Davis *et al.*, 2000). However, control of stress in children's productions may not be fully established until some years later; for example, variability in stress marking has been reported for 2-year-olds but not 3- or 4-year-olds. Thus, development relates to increased stability in the production of stress. Evidence that 2-year-olds also produce unstressed syllables with significantly longer durations than older children and adults is in agreement with work by Allen and Hawkins (1980) that suggested that younger children encounter difficulties in reducing unstressed syllables (for a review of relevant studies, see Vihman, 1996). The development of the durational aspects supporting the stressed–unstressed contrast is relatively slow. Allen and Hawkins suggested that unstressed syllables in early words are overarticulated because they contain peripheral vowels and fully articulated consonants. In general, the absence of reduced syllables and the slower rate of speech produced by 2-year-olds result in the perception of a more syllable-timed rhythm. Although there is evidence of reduced syllables in the speech of 3-year-olds, variability has been reported in the proportion of accurately reduced syllables. Children achieve an increase in the rate of production and a higher number of reduced unstressed syllables producing more adult-like rhythmic patterns by the age of 4 or 5 years. Further developments, however, continue for some years and extend until late childhood.

The development of phonological rhythm has been associated with a tendency toward the establishment of a trochaic stress pattern in children's words. In support of this, evidence of a greater tendency for children to drop initial unstressed syllables in English and other languages has been reported. However, there is also influence from the predominant rhythmic pattern of the ambient language; for instance, use of iambic patterning (i.e., weak/strong stress pattern) has been reported for French infants at the 25-word stage. The fact that English-learning infants at the same stage also show variability in rhythmic patterns (probably due to competing models at the word and phrase levels; e.g., baby vs. a doll) suggests that further developments in the use of the trochaic pattern as a preferred frame in production may occur at the time of syntactic organization (Jusczyk, 1997).

Tone

There has been relatively limited research on the acquisition of tones; therefore, generalizations about the developmental course of tone perception and production need to be made with caution. More research has been carried out on Asian than African languages. On the basis of research findings during the past 35 years, some core observations can be made. Before 12 months of age, (i) infants can comprehend some of the linguistic uses of tone, and (ii) accurate production of tones precedes accurate production of segments. In addition, high tones are generally acquired earlier than low tones, whereas acquisition of lexical tones precedes acquisition of tone sandhi (see Crystal (1986), Vihman (1996), and Handford-Bernhardt and Stemberger (1998) for reviews of research studies). Evidence from Lao children between the ages of 3 and 15 years indicated that there were no errors on tones, although segmental errors persisted until 9 years of age. Data from Mandarin-speaking children at the one-word stage also showed correct reproduction of tones despite inaccuracies in the segmental content of the words. Evidence of earlier acquisition of nonrising tones in Mandarin has also been reported. Rapid acquisition of tones over a period ranging from 1;2 to 1;9 has been reported for one Cantonese-learning child. At the end of this period (1;10), tonal errors were rare but the segmental system was still undeveloped. Recent data from a large number of Cantonese-learning children showed that only 2 of 268 children between 2;0 and 5;11 made errors on tones. However, evidence of tonal errors at later ages (e.g., 4 years) has been reported for Latvian. Tonal sandhi rules may present problems until age 5 years and older. However, earlier acquisition of tone sandhi may occur in African languages, in

which tone is mainly grammatical and more tone sandhi exists (Handford-Bernhardt and Stemberger, 1998). Finally, evidence from a Sesotho-learning child indicates that acquisition of accurate tone marking varies for particular classes of morphemes (e.g., by age 2 years for subject markers and after 3 years for verb roots).

In general, earlier acquisition of tones compared to segments (mainly consonants) suggests that they are mastered with relative ease by children. Despite some similarities in the order of acquisition of tones among some languages, evidence of variability hinders general conclusions. Variability at different stages of tone acquisition can be due to individual differences among children, differences in language-specific tonal systems, the effect of tonal sandhi, and the interaction of tones with other aspects of the prosodic systems acquired (e.g., intonation and rhythm). Clearly, further cross-linguistic research is necessary for a comprehensive understanding of the acquisition of tones.

Conclusion

The development of speech presents the young learner with multiple challenges. To meet these, he or she enters the world with several genetically determined capacities, a bias toward language, the ability to learn, and the ability to use experience to shape development toward the ambient language. Early auditory sensitivity to speech sound contrasts and categorization abilities, biomechanical constraints, anatomical maturation of the auditory and speech production systems, neurological development and maturation of motor skills, an interaction between perceptual and production abilities, cognitive and linguistic development, experience with the ambient language, and development of social and emotional capabilities are some of the key parameters that play a significant role in the development of speech. Research during the past 30–40 years has provided important insights into the development of perceptual and production abilities of children. Many important questions remain to be addressed; toward this end, our understanding of the development of speech will benefit from greater research emphasis on the acquisition of different languages. In addition, further acoustic and articulatory studies, improved methodological designs, and advances in experimental techniques and data analysis will contribute significantly toward the discovery of spoken language. Many theoretical and methodological challenges toward comprehending the gift of speech in children remain.

See also: Phonetics, Acoustic; Infancy: Phonological Development; Prosodic Aspects of Speech and Language; Speech: Biological Basis; Speech Perception; Speech Production.

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Speech Errors as Evidence in Phonology

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Introduction

Speech error data have been used to argue for the psychological reality of many linguistic constituents (Fromkin, 1971; Stemberger, 1983; Dell, 1995). The most commonly occurring errors involve the units of phoneme, word, and morpheme. Speech errors also usually involve the interaction of two constituents in the utterance. For example, segmental errors frequently involve the confusion of onset segments between words (e.g., /sɛrɪŋ/ for 'getting' in 'getting such bad luck'). Interactions between constituents almost always involve two constituents of the same type (e.g., noun, syllable onset). Phonological speech error data focus on errors involving phonological constituents (e.g., segments, features) and prosodic positions (e.g., onset, nucleus, stress).

Speech error data are commonly collected in one of two ways. Spontaneous or naturally occurring speech errors are collected in normal communicative situations, such as everyday conversations or radio broadcasts. Experimentally elicited speech errors are collected under laboratory conditions and usually focus on creating segmental errors. There are two common procedures for eliciting segmental speech errors: the SLIPS technique and tongue twisters (see Baars *et al.*, 1975; Shattuck-Hufnagel, 1992). The SLIPS technique uses phonological priming to increase error rates (from <1% in normal speech to 5–10% in SLIPS). In the SLIPS procedure, a participant sees a series of word pairs containing the phonological contrasts of interest (e.g., /t/ and /k/ in tap cab, top cap, tall cave) and then sees a word pair that reverses the contrast (e.g., call take) and is cued to produce the reversal pair. Phonological tongue twisters also create speech errors at above normal rates (2–10%). Phonological tongue twisters typically use a four-word sequence that alternates a target contrast (e.g., top cap cop tab).

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Speech Errors as Evidence for Phonological Structure

Both naturally occurring errors and experimentally elicited errors provide evidence for the prosodic

structures of phonological representation proposed by phonologists. Evidence for the influence of phonological features on speech errors comes from the fact that errors between segments that are similar (and thus share many phonological features) are more common than errors between segments that share fewer phonological features (van den Broeke and Goldstein, 1980). Evidence for features can also be found, though rarely, in speech errors that appear to involve the rearrangement of individual phonological features. Fromkin (1971) presents the error /glir plu/ for 'clear blue' as an error involving [voice] only.

Analogous errors occur that involve the rearrangement of a single segment, syllable onset, syllable rime, and whole syllable (Fromkin, 1971). For example, the error /frɪʃ gɑto/ for 'fish grotto' involves the misproduction of a single segment constituent, distinct from the syllable onset constituent. Complex syllable onsets can also act as a unit in speech errors, as in /ske pel/ for 'pay scale.' Among naturally occurring phonological errors, where the probabilities of different error types have been examined, the most common errors involve a single phoneme. Errors involving whole syllables or subsyllabic constituents are less common.

Speech Errors as Evidence for Phonological Constraints

Interactions between segments in speech errors largely happen between segments in identical position within the word, syllable, and prosodic structure. For example, Shattuck-Hufnagel (1992) found that errors were most likely between segments that shared word onset position and stress. She used tongue twisters that were specially constructed to vary stress and position in the word between similar segments. For example, the tongue twister 'parade fad foot patrol' put the similar pair /p, f/ in shared word initial position, but different stress position. Shattuck-Hufnagel (1992) found errors were less frequent when the segments were not both word onsets (e.g., word onset and a word medial syllable onset). Errors were also less frequent with a difference in syllable stress (e.g., word onset in a stressed syllable and word onset in an unstressed syllable, as in 'parade fad foot patrol').

It has also been claimed that speech errors respect the phonological/phonotactic patterns of the language. For example, in the error /tæp stɑbz/ for 'tab stops,' the exchange of /p/ with /b/ also changes the voicing of the plural morpheme, as required by English phonology. Dell *et al.* (2000) systematically examined phonological constraints on speech errors using tongue twisters. They found that facts of language phonotactics, such as /h/ only appears as a syllable onset in English, are rarely violated in elicited speech errors. Errors that changed the prosodic position within the syllable of other segments occurred much more frequently. (For example, /f/ or /s/, which can be either an onset or a coda in English, changed from onset to coda in an error much more frequently than /h/. In addition to true phonotactic constraints from English, Dell *et al.* (2000) also examined artificial phonotactic constraints that existed only within the context of the experiment (e.g., /ʃ/ only ever appears as an onset in the words used in the experiment). Dell *et al.* (2000) found that in these experiments, the experiment specific, artificial phonotactic constraints were also infrequently violated. Since errors in general usually preserve the within-syllable position of the error segment, Dell *et al.* (2000) hypothesize that the mechanisms that maintain syllable position in speech errors are the same mechanisms that prevent errors that create phonotactically illegal sequences. Since phonotactic constraints are always present in the use of language, they have a strong effect on speech error outcomes. Less robust phonotactic generalizations, like ones within a set of experiment stimuli or within a single stimulus item (such as '/s/ is a syllable onset in this word'), have a weaker effect on speech error outcomes.

Cross-Linguistic Speech Errors

While most of the research on phonological speech errors has used English-language data, some studies have explored how cross-linguistic differences influence speech errors. For example, evidence for the psychological reality of the Arabic root-and-pattern morphological structure has been found. Speech errors by Arabic speakers rearrange the segments within a root morpheme far more frequently than speech errors by English speakers or German speakers rearrange the segments within a word (Berg and Abd-El-Jawad, 1996). For example, a Jordanian Arabic speaker's production of /milih/ when the intended word was /hilim/ 'dream' contains a word internal rearrangement of consonants in the root morpheme. Interestingly, this error also changes the prosodic position of the consonants (by switching an onset with a coda). Word-internal segment rearrangement errors like this in Arabic are less sensitive to syllable structure constraints than errors that rearrange segments between two different words. For between-word errors, Arabic is similar to English in respecting prosodic position. This suggests that word-internal root consonant rearrangement errors in Arabic apply at the consonantal root level of representation, which is a level that is specific to the morphology of root-and-pattern languages.

Chen (2000) examined speech errors in Chinese. The phonological inventory of Chinese is much more limited than English, which reduces the need for subsyllabic units in the analysis of Chinese. As a result, it may be that Chinese speakers utilize syllable-sized chunks in processing. Syllable-sized chunks are also reflected in the Chinese writing system. Thus, syllable unit errors are likely to be more frequent in Chinese than in English. Chen (2000) found that syllable errors do occur relatively frequently in Chinese, and at a rate that is higher than predicted from analyzing syllable errors as errors involving multiple subsyllabic units.

The Validity of Speech Error Data

All of the phonological speech error data discussed thus far was collected using phonetic transcription. Phonetic transcription is limited as a research tool in many ways. The transcription system itself is inherently segmentally based, and transcription depends on the perception of the listener (Boucher, 1994). Thus, the apparent abstractness of phonological speech errors may follow from perceptual biases in the listener rather than real abstractness in the data. Recent research has begun to address this issue by examining speech errors instrumentally, using the tools of phonetics.

Mowrey and MacKay (1990) examined muscle fiber activation in the production of tongue twisters and found a wide range of variation in production. Aberrant muscle activations were found that were appropriate for the normal production of an incorrect segment. However, much smaller aberrant muscle activations were also found, suggesting that partial or gradient errors frequently occurred. These gradient errors were frequently imperceptible to the experimenters.

Frisch and Wright (2002) conducted an acoustic study of voicing errors in fricatives. They found cases of partial voicing or devoicing of fricatives. They also found a systematic bias in their perception of fricative voicing errors. Almost any amount of voicing of a fricative resulted in the percept of a voiced fricative, while complete voicelessness was required to get a perception of a voiceless fricative. Thus, a transcription-based study of speech errors would have concluded that errors from a voiceless fricative to a voiced fricative were much more common than the reverse, even though that was not true acoustically.

Pouplier (2003) examined speech articulation during the production of speech errors using electromagnetic midsagital articulometry (EMA) to track tongue movement. Pouplier found that many errors cannot be explained as the rearrangement of abstract phonological constituents. Many errors were found that reflected partial activation of gestures, resulting in incomplete movement of an articulator that was imperceptible to listeners. These errors also often resulted in gestural sequences that were abnormal, and thus phonotactically illegal.

Together, these instrumental studies of speech errors call into question the validity of speech error evidence as evidence for traditional notions of phonological constituents and constraints as nonquantitative, abstract symbols governed by inviolable rules. However, speech error evidence is not unique in this regard. Research in other domains of phonetics and phonology has also found that phonological competence may be quantative and grounded in less abstract phonetic categories. This suggests that speech error data will continue to provide converging evidence for the structure and organization of the phonological system within and across languages.

See also: Experimental Phonology; Handling Variation in Speech and Language Processing; Phoneme; Phonology in the Production of Words; Researching Naturally Occurring Speech; Speech Errors: Psycholinguistic Approach; Speech Production; Syllable: Phonology.

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Speech Errors: Psycholinguistic Approach

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Introduction

Natural speech is far from perfect: it is replete with filled and unfilled hesitations and errors. A speech error is a mismatch between what we intend to say and what we actually say. This article focuses upon mismatches involving the sounds of the language, called slips of the tongue, and will not cover hesitations in speech. Speech errors made by nonbrain-damaged speakers resemble the errors made by speakers with brain damage, and the study of both sorts of error has revealed a great deal about how humans produce language, and about the relation between language and the brain. This article focuses on the speech of nonbrain-damaged speakers.

Classification of Speech Errors

Speech errors can be classified according to the units of processing and types of mechanism involved.

The units involved in slips of the tongue range from phrases, through words (e.g., saying 'pass the **pepper**' instead of 'pass the salt'), morphemes, and phonemes (e.g., saying '**fl**ock of **b**ats' instead of 'block of flats'), to features (e.g., saying 'turn the kno**p**' instead of 'knob'). Mechanisms include anticipations (e.g., saying 'the **m**irst of May' instead of 'the first'), perseverations (e.g., saying 'God rest **r**e merry gentlemen' instead of 'God rest ye'), exchanges (e.g., 'Guess whose **mind** came to **name**?' instead of 'name came to mind'), substitutions ('Get me a **fork**' instead of 'knife'), and blends (saying 'chung' for 'children' and 'young').

Two particular types of speech error deserve special mention. Spoonerisms are errors where the initial consonants of words have exchanged. They are named after the Reverend Dr William Archibald Spooner (1844–1930), Warden of New College, Oxford, who was particularly prone to making this sort of error (and indeed, may have suffered from a mild developmental language disorder). Some examples of alleged errors made by Dr Spooner are:

(1) You have wasted the whole term → You have **t**asted the whole **w**orm.

(2) The Lord is a loving shepherd to his flock → The Lord is a **sh**oving **l**eopard to his flock.

Note that in both of these examples the error strings produced form words; these errors are therefore possible instances of the lexical bias effect described below.

Malapropisms are named after Mrs Malaprop, a character in Richard Brinsley Sheridan's play *The Rivals*. Mrs Malaprop often used grand words incorrectly, such as saying 'epitaphs' for 'epithets' and 'reprehend' for 'apprehend.' Following Fay and Cutler (1977), the term has been used for all phonological word substitutions that inadvertently arise from processing difficulty, rather than ignorance, such as:

(3) Liszt's Hungarian Rhapsody → Liszt's Hungarian **restaurant**

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There are two main techniques for collecting speech errors. The first method involves recorders noting speech errors they observe in everyday life. This methodology has two advantages. First, it is

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Speech Errors: Psycholinguistic Approach

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naturalistic. Second, it enables a comprehensive corpus of all types of error to be built up. The disadvantage of this technique it is that is prone to bias. Observers may be more likely to observe certain types of error (e.g., sound-level errors might be less noticeable than word-level errors), and they may also be less likely to remember and record certain types of error.

The second method of collecting errors, laboratory-based induction, involves the presentation of words on a display device (now a computer screen, previously a memory drum) with the participant's task usually being to name word pairs as rapidly as possible. The participant makes an error on a small proportion of errors (e.g., reading BARN DOOR as 'darn bore'). The advantages of this methodology are that it is easy to collect a relatively large number of errors of the sort the experimenter is interested in (here spoonerisms), and that it is possible to have some element of control over the errors made. The disadvantages are that the technique is more intrusive, the errors involve some element of reading, and the types of error that can be observed are restricted.

Fortunately, the evidence provided by these methods is convergent. Analysis of recorded speech suggests that observer bias effects are not large, although they obviously remain a concern.

Interpretation of Speech Errors

Speech production comprises conceptualization, formulation, and encoding (Levelt, 1989). Conceptualization involves determining what to say – we create the message. Formulation involves translating the message into a linguistic form, and has two aspects: syntactic planning and lexicalization (the process whereby word concepts are turned into sounds). Finally, execution involves detailed phonetic and articulatory planning. Speech errors have informed our understanding of all of these stages.

It is important to note that the occurrence of slips of the tongue is not random. In particular, some sorts of errors that could occur do not (e.g., we do not observe function words exchanging with content words). This order is the basis for explaining how and why errors arise in terms of a model of speech production. The basic idea is that for an error to occur, the two elements of the error (intended and actual outcome) must be simultaneously active at the same level of processing. For example, words exchange with words, but content words only exchange with other content words, and function words with other function words; content words do not exchange with function words, or vice versa. This finding is extraordinarily robust: in my corpus of several thousand speech errors, there is not a single instance of a content word exchanging with a function word. This observation supports the idea that content and function words are from computationally distinct vocabularies that are accessed at different levels of processing.

There are also very different constraints on word and sound exchange errors. Sounds only exchange across small distances, whereas words can exchange across phrases; words that exchange tend to come from the same syntactic class, whereas sound exchange errors are not constrained in this way, but instead swap with words regardless of their syntactic class.

Syntactic Planning

The extension of this type of argument led to the development of the standard, or the Fromkin–Garrett, model of speech production. Consider the following famous example from Fromkin (1971, 1973):

(4) a *weekend* for MANIACs → a *maniac* for WEEKENDs

The capital letters indicate the primary sentence stress and the italics secondary stress. The error left the stress unchanged, suggesting that stress is generated independently of the particular words involved. Note also that the plural morpheme '-s' remained where it was originally intended to be: it did not move with 'maniac,' but instead was stranded. Furthermore, the plural morpheme was realized as /z/, not /s/, so that the plural ending sounds consistent with the word that actually came before it, not with the word that was originally intended to come before it. This error is an example of accommodation to the phonological environment.

In Garrett's model (**Figure 1**) there are two major stages of syntactic planning. At the earlier functional level, word order is not explicitly represented. The semantic content of words is specified and assigned to roles such as subject and object. At the positional level, words are explicitly ordered. There is a dissociation between syntactic planning and lexical retrieval. There is a further dissociation within lexical retrieval: Garrett argued that content and function words play very different roles in language production, with content words being selected at the functional level, whereas function words are not selected until the positional level.

In this model, word exchanges occur at the functional level. As only the functional roles of the words and not their absolute positions are specified at this level, word exchanges are constrained by syntactic

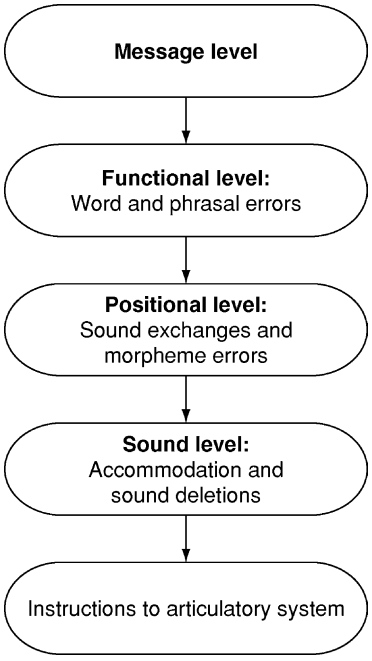

Figure 1 Garrett's model of speech production.

category but not by the distance between the exchanging words. Next we generate a syntactic frame for the planned sentence. The phonological representations of content words are then accessed from the lexicon using the semantic representation. Content words are then inserted into the syntactic planning frame, where final positions are specified to form the positional level. The function words and other grammatical elements are then phonologically specified to give the sound-level representation. Sound exchanges occur at this stage and, as their absolute position is now specified, such errors are constrained by distance.

Garrett's model accounts for a great deal of the speech error evidence, but a number of subsequent observations suggested that some aspects of it might not be correct. First, it is not at all clear that speech production is strictly serial. There is clearly some evidence for at least local parallel processing in word blend errors, which must be explained by two (or more) words being simultaneously retrieved from the lexicon, as in (5). More problematically, we find blends of phrases and sentences (e.g., [6]). Furthermore, the locus of these blends is determined phonologically, so that the two phrases cross over where they are most similar in sound, suggesting that the alternative messages are processed in parallel from the message to the sound levels (Butterworth, 1983).

We also observe cognitive intrusion errors where material extraneous to the utterance intrudes into it. The message level can intrude into lower levels of processing, producing nonplan-internal errors (e.g., [7]). These errors are often phonologically facilitated, meaning that they are more likely to occur if the target word and intrusion sound alike (Harley, 1984). The names of objects or words in the outside environment can also intrude into speech, producing environmental contamination errors (e.g., [8]). Once again we find that phonological facilitation of environmental contaminants occurs more often than one would expect by chance (although to a lesser degree than with other cognitive intrusions).

(5) Utterance: It's difficult to **valify**. (Targets: validate + verify)

(6) Utterance: I'm **making the kettle on**. (Target 1: I'm making some tea. + Target 2: I'm putting the kettle on.)

(7) Utterance: Have you got your **key** in? (Target: Have you got your car in? Context: The speaker reported that he had considered adding why he wanted to know whether the other person had their car in – because the speaker wanted a lift to fetch the key.)

(8) Utterance: Get out of the **clark**. (Target: Get out of the car. Context: The speaker was looking at a shop front in the background that had the name 'Clark's' printed on it. The speaker reported that he was not aware of this at the time of speaking.)

Lexical Access

There is an emerging consensus that lexicalization is a two-stage process. When we produce a word, processing moves from the semantic level to an intermediate level containing lemmas, which are specified syntactically and semantically. We then retrieve the phonological forms of these words in a stage of phonological encoding. There is a great deal of evidence supporting the two-stage hypothesis.

Fay and Cutler (1977) observed that there were two distinct types of whole-word substitution speech error: semantic substitutions, such as (9) and (10), and form-based substitutions, such as (11) and (12):

(9) fingers → **toes**

(10) husband → **wife**

(11) equivalent → **equivocal**

(12) historical → **hysterical**

Fay and Cutler argued that the existence of two types of word substitution suggests that the processes of word production and comprehension use the same lexicon, but in opposite directions. Items in the lexicon are arranged phonologically for spoken word recognition, so that words that sound similar are

close together. The lexicon is accessed in production by traversing a semantic network. Semantic errors occur when traversing the decision tree, and phonological errors occur when the final phonological form is selected. Although the idea that lexicalization occurs in two stages appears to be supported by evidence from other sources such as picture naming, tip-of-the-tongue states, studies of people with anomia, and brain imaging, there is nevertheless some dissent (Caramazza, 1997; Caramazza and Miozzo, 1997).

Feedback in Speech Production

Is there reverse information flow when we choose words? Models based primarily on speech error data see speech production primarily as an interactive process involving feedback (e.g., Dell, 1986; Dell and Reich, 1981; Harley, 1984; Stemberger, 1985) because speech errors show evidence of multiple constraints, called familiarity biases and similarity effects.

Familiarity bias is the tendency for errors to produce familiar sequences of phonemes. In particular, lexical bias is the tendency for sound-level speech errors such as spoonerisms to result in words rather than nonwords (e.g., 'barn door' being produced as 'darn bore') more often than chance would predict. Although we would expect some sound errors to form words sometimes by chance, Dell and Reich showed that this happens far more often than is expected by chance. This interaction between lexical and phonological processes has been shown both for naturally occurring speech errors (Dell, 1986; Dell and Reich, 1981) and in artificially induced spoonerisms (Baars *et al.*, 1975). Some aphasic speakers show lexical bias in their errors (Blanken, 1998).

Similarity effects arise when the error is more similar to the target than would be expected by chance. In mixed substitution errors the intrusion is both semantically and phonologically related to the target (e.g., [13] and [14]). We find mixed errors far more often than would be expected by chance alone (Dell and Reich, 1981; Harley, 1984; Shallice and McGill, 1978). We also find similar results in artificially induced speech errors (e.g., Baars *et al.*, 1975; Motley and Baars, 1976) and in errors arising in complex naming tasks (Martin *et al.*, 1989).

(13) comma → **colon**

(14) calendar → **catalogue**

Similarity effects are problematical for serial models such as Fay and Cutler's. The basic model must be modified in one of two ways. Butterworth (1983) proposed that a filter or editor checks the output to see that it is plausible; it is less likely to detect an error if the word output sounds like the target should have been, or is related in meaning. Such a mechanism, although it might be related to comprehension processes, is not considered to be parsimonious.

There is instead an emerging consensus among speech production theorists that lexicalization can be described by spreading activation in an interactive activation model. Dell (1986), Harley (1993), and Stemberger (1985) proposed different versions of the same basic model.

Dell's Interactive Model of Speech Production

Dell (1986) proposed an interactive model of lexicalization based on the mechanism of spreading activation. Items are slotted into frames at each level of processing. Processing units specify the syntactic, morphological, and phonological properties of words. Activation spreads from the sentence level, where items are coded for syntactic properties, through a morphological level, to a phonological level. At each level, the most highly activated item is inserted into the currently active slot in the frame. The flow of activation throughout the network is time dependent, so that the first noun in a sentence is activated before the second noun. Feedback between the phonological and lexical levels gives rise to lexical bias and similarity constraints.

The model gives a good account of the origin of word- and sound-level errors. Several units may be active at each level of representation at any one time. If there is sufficient random noise, an item might be substituted for another one. As items are coded for syntactic category and position, the other units that are active at any one time tend to be similar to the target in these respects.

The Tip-of-the-Tongue State

The failure to produce at all is the ultimate speech error. A tip-of-the-tongue (TOT) state is a noticeable temporary failure of lexical access, where the word can take some considerable time to be produced, if it is at all. In a TOT state, you know you know the word, but cannot access the sounds.

Brown and McNeill (1966) were the first to examine the TOT state experimentally. They induced TOTs by reading people definitions of low-frequency words (e.g., [15], which defines 'sextant'):

(15) 'A navigational instrument used in measuring angular distances, especially the altitude of the sun, moon, and stars at sea.'

Brown and McNeill found that a sizable proportion of people will be placed in a TOT state by this task. Furthermore, in a TOT, partial information about the target word, such as the number of syllables, the initial letter or sound, and the stress pattern, can sometimes be retrieved. People also sometimes produce near phonological neighbors such as 'secant,' 'sextet,' and 'sexton'; these other words that come to mind are called interlopers.

The tip-of-the-tongue state is readily explained as success of the first stage of lexicalization but failure of the second stage. In support of this idea, Vigliocco *et al.* (1997) showed that grammatical gender can be preserved in TOT states in Italian. That is, even though speakers cannot retrieve the phonological form of a word, they can retrieve some syntactic information about it. Two theories have been proposed to explain why the second stage of lexical access fails in TOTs. Brown and McNeill (1966) proposed the partial activation hypothesis, which states that the target items are inaccessible because they are only weakly represented in the system. Burke *et al.* (1991) provided evidence in favor of this model from experimental and diary studies. They argued that the retrieval deficit involves weak links between the semantic and phonological systems. The blocking hypothesis, first proposed by Woodworth (1938), states that the target item is actively suppressed by a stronger competitor. Jones and Langford (1987) used a variant of the Brown and McNeill task known as phonological blocking to test this idea. They presented a phonological neighbor of the target word and showed that the presence of this neighbor increases the chance of a TOT state occurring, whereas presenting a semantic neighbor does not. They interpreted this as showing that TOTs primarily arise as a result of competition. However, the same pattern of results is found with these materials when the blockers are not presented, suggesting that the original results were an artifact of the materials (Perfect and Hanley, 1992; Meyer and Bock, 1992).

Harley and Bown (1998) showed that TOTs are more likely to arise on low-frequency words that have few close phonological neighbors. This finding fits a partial activation model of the origin of TOTs rather than an interference model. Indeed, phonological neighbors appear to play a supporting rather than a blocking role in lexical access. So far, then, the TOT data best support the partial activation hypothesis.

The Freudian Slip

Freud argued that slips of the tongue are "a window to the mind" in that they provide insight into the hidden, repressed desires and opinions of speakers. In part of a general treatise on action slips, or parapraxes, Freud (1975) noted the occurrence of slips of the tongue, and proposed that they revealed our repressed thoughts. In one of his examples, a professor said in a lecture, "In the case of female genitals, in spite of many *Versuchungen* [temptations] – I beg your pardon, *Versuche* [experiments]…." Not all Freudian slips need arise from a repressed sexual thought. In another example he gives, the President of the Lower House of the Austrian Parliament opened a meeting with "Gentlemen, I take notice that a full quorum of members is present and herewith declare the sitting closed [instead of open]!" Freud interpreted this as revealing the president's true thoughts, which were that he secretly wished a potentially troublesome meeting closed. Such errors have come to be known as Freudian slips. Ellis (1980) reanalyzed Freud's collection of speech errors in terms of a modern process-oriented account of speech production. The problem with the Freudian interpretation is that most (if not all) of the examples he provides are more simply accounted for in terms of the simple cognitive mechanisms described above. There is no need to invoke complex motivational systems as well. Nevertheless, a small number of errors might be true Freudian slips. It is certainly the case that thoughts can intrude into overt speech, as is shown by the following example (16) from Harley (1984):

(16) Utterance: I've **eaten** all my library books.
(Target: I've read all my library books. Context: The speaker was hungry and thinking of getting something to eat.)

See also: Pauses and Hesitations: Psycholinguistic Approach; Speech Errors as Evidence in Phonology; Spoken Language Production: Psycholinguistic Approach.

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Speech Genres in Cultural Practice

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Foundations

The beginnings of a systematic discrimination among speech genres may be traced to the efforts of Jacob and Wilhelm Grimm in framing their great collections of German oral narrative. In the introductions to their various works on *Märchen*, legends, and mythology, the Grimms delineated a relational series of narrative genres based on the correspondence of the respective genres to 'real life' and actual people, places, and events, expressive tone, and the modes of cognitive, affective, and interpretive engagement each type elicits from its audiences. Owing to the pioneering nature of their work, their scholarly credentials, and the great popularity of their collections, the Grimms' threefold distinction of fairy tale, legend, and myth attained a canonical status among students of oral narrative that persists to this day (Grimm, 1844; Grimm and Grimm, 1816–1818).

The Grimms' classificatory efforts may be seen as an early manifestation of the scientizing of philology, of which Jacob especially was an ardent advocate. As folklore likewise came to aspire to scientific status, classification became one of the hallmarks of methodological rigor. Building upon the Grimms' model and the burgeoning of scientism more generally, classification assumed a central place in folklore, commonly as part of a three-phase program consisting of collection, classification, and analysis. Analysis amounted largely to the study of textual histories, based upon the systematic comparison of variants and versions of particular folklore items. Accordingly, the preponderance of efforts devoted to classification were in the service of such genetic, text-historical research.

Vladimir Propp offered his seminal work of genre definition, *The morphology of the folktale* (1928) as a critical corrective to prevailing approaches to classification in folklore. Propp was a vigorous advocate of the importance of classification to scientific study but dismissive of the classificatory efforts of the philological folklorists. Consistent with the Russian Formalist commitment to exact description (or specification) of literary phenomena on formal, constructional grounds – how is it made? – and to plot (*sjuzhet*) as the formal arrangement of constituent elements, Propp advanced a definition of the Russian magic tale in terms of the underlying plot structure that was constitutive of the genre. The constituent elements were the functions – actions, functionally defined – of the *dramatis personae*. The definitional model consisted of a syntagmatic structure of 31 functions, each defined by its place in the sequence. Certain functions were obligatory, others optional, and the model allowed for the recursive repetition of certain plot sequences. For political and linguistic reasons, Propp's work was inaccessible to Western scholars for three decades, but with the publication of an English translation in 1958 (revised in 1968), it quickly became a charter document for scholars in a number of disciplines (including linguistics, anthropology, and folklore), generating widespread interest in the formal definition and analysis of oral genres.

Generic problems (though not the term), played a certain operational role in the Americanist tradition of Boas and his intellectual heirs, though the concept was seldom the focus of critical examination in their work. Given the centrality of texts in the Boasian tradition, rooted in the philological foundations of Boasian anthropology, discriminations among orders of texts was at times seen to be a necessary task, at least for certain purposes. In general, however, Boas was distrustful of generic distinctions. In his comparative investigations of the narrative repertoires of

North American peoples, Boas discovered that particular themes and motifs might diffuse with some degree of independence, to combine and recombine with other elements in a variety of shifting ways. In larger scope, by whatever criteria one might employ to make generic distinctions between myth and folktale for example, Boas perceived that there is "a continual flow of material from mythology to folktale and *vice versa*" (1940: 405). Boas's distrust of various attempts to discriminate between narrative genres was further bolstered by his perception that such distinctions did not remain consistent for specific narratives across cultural boundaries; once again, by whatever criteria the distinction was attempted, narratives that were clearly genetically related might appear in one group's repertoire to belong to one class and in the neighboring group's repertoire to another. Hence, Boas attributed the "somewhat indefinite" use of the terms 'myth' and 'folk-tale' to "a lack of a sharp line of demarcation between these two classes of tales" (1940: 454).

There is, however, one basis for discriminating between myths and folktales to which Boas is prepared to accord a degree of legitimacy and productiveness – this is a distinction purportedly "given by the Indian himself," between two types of tales, one that relates events that happened during a formative period in the history of the world, namely, myths, and a second that relates events set in "our modern period," that is to say, history (1940: 454–455). Concerning this purportedly native-based distinction, Boas reminds us that here too historical and comparative investigation reveals movement between the two categories and that, from his analytical point of view, this way of sorting out narrative genres is no better founded than those devised by scholars. It does, however, have the advantage of corresponding "to concepts that are perfectly clear in the native mind," a critical corrective to *a priori* and ethnocentric discriminations.

The most prominent use of generic distinctions in the Boasian tradition occurs in the organization of text collections. Perusal of these collections, however, reveals that the grouping of texts within their pages is frequently quite *ad hoc*, without discussion of the conceptual basis of the respective sections. The distinction between myths and tales/historical narratives attributed by Boas to North American cultures generally has some shaping effect on text collections, but other sorting principles such as grouping by informant may also be found.

In British social anthropology, which was little influenced by the philological tradition that shaped Americanist anthropology, genre figured not at all, with the important exception of Bronislaw Malinowski's writings on the culture of language in the Trobriand Islands. Malinowski's effort in 'Myth in primitive psychology' (1948: 101–108) to organize his treatment of Trobriand narrative in terms of "the natives' own classification and nomenclature" marks a pioneering departure from inherited perspectives on genre. Malinowski, as is well known, discovered a tripartite system of narrative types among the Trobrianders: (1) *kukwanebu*, individually owned, told for entertainment in sociable occasions and for encouraging the growth of recently planted gardens, formally marked by a 'short ditty' at the end, and enhanced in the telling by performance elements such as special voice qualities, mimicry, and audience response; (2) *libwogwo*, not confined to a specific season, regarded as true, dealing with subjects of intense interest concerning actions and events redounding to the credit of an individual, lineage, or community; and (3) *liliu*, sacred narratives that come into play when a rite, ceremony, or social or moral rule demands justification, the warrant of antiquity, reality, and sanctity, and believed to recount the real cause that has brought about the moral rule, social grouping, custom, or rite in question.

Malinowski insists that an ethnographically valid description must take as much account of contextual factors – both cultural and situational – as textual ones: "The stories live in native life and not on paper, and when a scholar jots them down without being able to evoke the atmosphere in which they flourish he has given us but a mutilated bit of reality" (1948: 104). Still further, the understanding of any class of narratives demands attention to its place in the overall system of narrative genres. This principle is what motivates his elucidation of all three classes of Trobriand narrative as a prolegomenon to the analysis of myth. In the face of Malinowski's ethnographic contextualism, however, it is a testimony to the enduring power of the Grimms' classic typology that he assimilates the Trobriand genres to the three canonical forms they identified by glossing *kukwanebu* as 'fairy tales', *libwogwo* as 'legends' (though also as 'historical accounts' and 'hearsay tales'), and *liliu* as 'myths'.

Conceptions of Genre

Etic Versus Emic Perspectives

Boas's interest in generic distinctions that are salient "in the mind of the American native," "given by the Indian himself," and Malinowski's pioneering account of Trobriand narrative genres, elucidated in terms of locally defined and named categories, adumbrate a relativist, ethnographic orientation to genre

and genre systems as to be discovered. This focus on indigenous distinctions, expressed in native terms, contrasts significantly with approaches to genre definition that view it as an essentially analytical, classificatory operation, the province of scholars, of little conscious interest to the people who produce the generically regimented discourse. The direction pointed by Boas and Malinowski were not widely or systematically pursued until the late 1960s and 1970s (Ben-Amos, 1976), stimulated by an upsurge of interest in classification as an ethnographic problem and in ethnographic perspectives on language in society and culture. Indigenous systems of classification represented a significant focus of structuralism and also of ethnoscience, guided by a reorientation from etic to emic perspectives in the study of culture and by the analytical rigor of structural-semantic analysis. And genre was from the beginning a key concept in the development of the ethnography of speaking, viewed as a nexus of interrelationships among the constituents of the speech event and as an organizing framework for speaking practice.

Perhaps the most comprehensive and methodologically influential study of an indigenous genre system was Gary Gossen's analysis of Chamula genres of verbal behavior, which combined the perspectives of ethnoscience, structuralism, and the ethnography of speaking (Gossen, 1972). Gossen's study is exemplary in its systemic and comprehensive scope, its close attention to Chamula Tzotzil terms and glosses, and its correlation of the Chamula speech genres with other aspects of society and culture (Figure 1).

The domain of people's speech (*sk'op kirsano*) includes three general types of speech: ordinary speech (*loʔil k'op*), speech for people whose hearts are heated (*k'op sventa šk'išnah yoʔnton yuʔun li kirsano*) and pure (or true) speech (*puru k'op*). These supercategories, in turn subsume a range of speech genres, as illustrated in the accompanying figure. The taxonomy has a number of systemic organizing principles. As we move, for example, from ordinary speech to speech for people whose hearts are heated to pure speech, the genres are marked by increasing formal elaboration (repetition, parallelism, metaphorical couplets), redundancy, and invariance, with the genres of pure speech – and especially ancient words – constrained by an ideology of fixity and

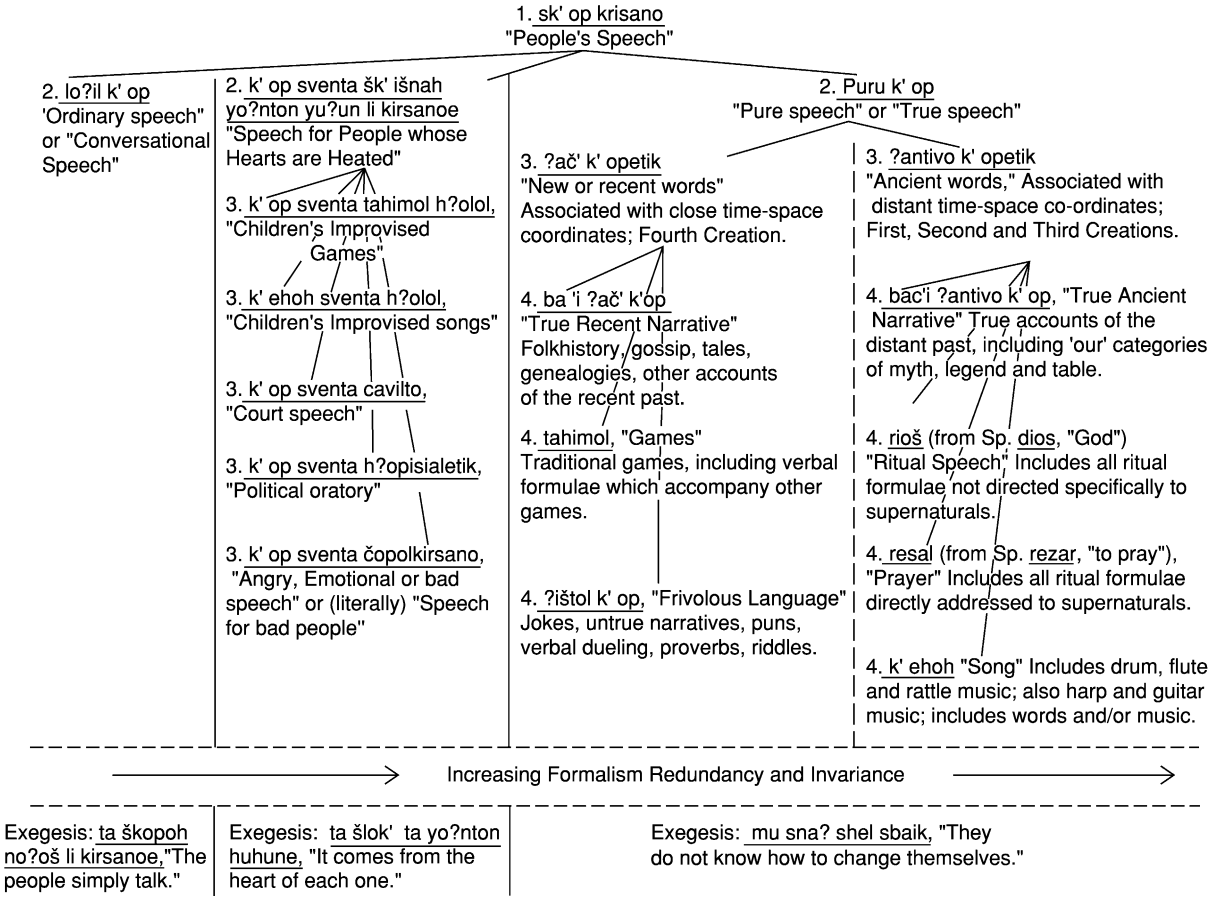

Figure 1 Chamula genres of verbal behavior, with permission from The American Folklore Society.

authoritativeness. These gradient features are all indices of increasing heat, the energizing force of the Chamula cosmos, deriving from Our Father the Sun. Heat, in Chamula culture, is a metaphor for power, control, order, weightiness. It is correlated with the life cycle, in which an individual accrues heat in the process development from babyhood to full, mature adulthood, and with gender, with men having more heat than women.

The simple parallel structures of children's improvised games both expresses and indexes their increasing heat, and prepares them for the mastery of still more heated and formally elaborated genres as they mature into adulthood. Only the most potently mature and ritually able men can perform the most heated genres of ancient words. The full range of social and cultural correlatives of Chamula genres extends well beyond these few dimensions, suggesting how the ethnographic elucidation of a genre system in culture-specific terms may serve as a revealing vantage point on society and culture more generally.

Not all cultures, to be sure, exhibit as high a degree of metapragmatic awareness as the Chamula, for whom 'people's speech' is a cultural focus. Ethnographic research has made clear that there is a great deal of variability both across and within speech communities with regard to the naming and recognition of speech genres and the organization and coherence of genre systems. The taxonomy that Gossen elicited from his Chamula consultants represents only those categories and relationships on which consultants agreed; other named genres escaped that consensus. And once we reach the fuzzy fringes of generic coherence, at the point where the orderliness of a genre system begins to unravel, we face the question of just how much of a community's speech economy is generically encompassed. Some scholars, including Bakhtin, insist that there is no utterance that is not organized by genre, while others find it more productive to restrict the aegis of genre to named and generally recognized discursive forms (see 'Genre in Context' below).

Ontology and Epistemology of Genre

One of the most widely employed and durable criteria for defining and discriminating among genres is the ontology and epistemology of the worlds they represent. The Grimms, for example, distinguished between narratives that are set in the "perceivable and conceivable natural world" from those that mirror forth an "incredible, uncanny world." In a similar vein, Boas, posited as "perfectly clear" in the minds of Native Americans a distinction between narratives recounting conditions and events that occurred during a formative point in the history of the world, that is, myths, and narratives that are set in the contemporary world, namely, history. There are many cases in the ethnographic record of locally defined genre distinctions based on like ontological and epistemological distinctions.

The positing of such categorical distinctions as "perfectly clear," however, should not be allowed to obscure those situations in which the ontology of the represented world is blurred, ambiguous, or contested. Indeed, the ambiguation of the represented world may serve as an expressive resource. The tall-tale, for example, depends for its effect on the gradual dislocation of ontological and epistemological expectations, appearing initially to be set in the real world, but carried by its narrative trajectory toward a world of hyperbolic unreality. Or, a given genre may serve as an expressive vehicle for epistemological contemplation and debate. Some considerations of legend, for example, suggest that this genre is more about problematizing categorical epistemological distinctions between the natural world and the uncanny world than about resolving them, a forum for epistemological speculation rather than resolution.

Matters of generic ontology and epistemology have attracted renewed interest among contemporary scholars, stimulated by Bakhtin's notion of chronotope (Bakhtin, 1986: 42), literally 'time-space,' the configuration and interrelationships of time and space that distinguishes – indeed, Bakhtin suggests at times, defines – genres. Recall the Chamula genre system, discussed in the preceding section, in which there is a macro-level distinction between new (or recent) words (*ʔač' k'opetik*), associated with "close time-space coordinates and the Fourth Creation," and ancient words (*ʔantivo k'opetik*), associated with "distant time-space coordinates and the First, Second, or Third creations."

The concept of chronotope is suggestive on a number of grounds. While most considerations of the ontology and epistemology of genres – including some of Bakhtin's own – center on narrative genres, Bakhtin extends the perspective to all speech genres, suggesting that "every genre has its methods and means of seeing and conceptualizing reality, which are accessible to it alone" (Medvedev and Bakhtin, 1978: 133). Genres, then, by means of their chronotopic orientations, become mechanisms for perceiving, conceiving, communicating about, and interpreting particular aspects of the world. They establish temporal and spatial horizons and naturalize ways of perceiving and communicating about them.

Most significantly, perhaps, Bakhtin's notion of chronotope is part of a larger epistemological framework that revolves around what he and his colleagues

identify as the "two-fold orientation in reality" that determines genres: one constituted by the chronotopic configuration of the discourse, the second by its situational context of production and reception (Medvedev and Bakhtin, 1978: 130–131). The interaction between the two orientations, then, offers an illuminating vantage point on the epistemology of genre, in regard to the linguistic and other semiotic means by which it is communicatively managed. Understandably, the pragmatics of deixis and other forms of indexicality is a primary focus of such explorations, centering on what Michael Silverstein terms the "nomic calibration" of speech event to text (Silverstein, 1993: 52).

Genre as Functional Variety or Style

A productive nexus of convergence between linguists and anthropologists interested in the social uses of language is style, encompassing the functional varieties of language associated with kinds of speakers, situational contexts, or types of utterance. The concept of genre has assumed an increasing place in this area of inquiry.

Charles Ferguson, whose work has been especially influential in the investigation of linguistic varieties, offers a concise and useful formulation of the working assumptions implicit in the study of the principal types of linguistic variety that have organized much of sociolinguistic research: dialect, register, and genre (Furguson 1994: 18–21). With regard to dialect: "A group that operates regularly in a society as a functional element . . . will tend to develop identifying markers of language structure and language use, different from the language of other social groups." With regard to register: "A communication situation that recurs regularly in a society . . . will tend over time to develop identifying markers of language structure and language use, different from the language of other communication situations." And with regard to genre: "A message type that recurs regularly in a community . . . will tend over time to develop an identifying internal structure, differentiated from other message types in the repertoire of the community."

While Ferguson frames his definitions in terms of the processes of conventionalization, the factors underlying the development of the indexical ties between linguistic and social elements, we may also consider these varieties as speech styles, along the lines suggested by Dell Hymes (1989). In these terms, a speech style is a conventionalized constellation of systemically related, co-occurrent linguistic features that contrasts with other such constellations in its indexical reference to speakers, situations, or utterance types. Characterization of a genre style, then, requires specification of the salient features that operate as diagnostic markers of that genre. Ritual wailing (*zõ*) among the Shokleng Indians of Brazil, for example, displays the following features:

1. Semantico-referential: the subject matter of ritual wailing is the death of kinsmen and affines and the affective state of the speaker as a result of that death;
2. Phonological: on the sound level, ritual wailing is marked by a sing-song intonation pattern, creaky voice quality throughout, and 'broken' voice, that is, rapid-fire glottal stops coupled with intonational modulation used intermittently on certain protracted vowels;
3. Syntactic: the syntax of ritual wailing is notably complex, with rearrangement of constituent clauses.

Taken together, these features characterize Shokleng ritual wailing as a speech style (Urban, 1985).

There are several important points to be made about genre as speech style. First, it is necessary to keep in mind that the distinctions among dialect, register, and genre are essentially analytical distinctions among dimensions of speech indexicality, and there is considerable potential overlap among the three. While it is certainly useful to recognize the various discourse types in a community's repertoire and their constituent features, and, more importantly, perhaps, to be aware that the differences are salient for members as well as analysts, it remains the case that genres may be associated in varying degrees – even quite closely – with particular kinds of speakers and situational contexts of use.

Consider the cries of Mexican market vendors, for example (Bauman, 2004: 58–81). While the calls and spiels by which vendors cry their wares may be considered and described as genres, we might equally well identify them as dialect forms, insofar as they are linked to the social category of vendors, and as registers, insofar as they are closely associated with recurrent situational contexts, namely, market days.

Local labels and category systems for ways of speaking may be keyed to any – or several – of the indexical ties between language and context. In the Chamula taxonomy of people's speech, considered earlier, for example, we may note that the contrast between 'children's improvised songs' and 'court speech,' the former combining aspects of social dialect and genre, the latter foregrounding register.

It is also worth emphasizing that notwithstanding the conventional associations that may obtain between genres, users, or situations of use, these ties are not definitive, as it is of the nature of genres that they may be used and recognized outside their customary or originary contexts. The Cuban market cry,

or *pregon*, for example, has become a resource for popular song, the best known of which is the widely recorded and disseminated 'El Amanecero,' wholly detached from the market vendors and market days with which the genre is associated. In a related fashion, selected features of a genre style may be incorporated into discourse regimented by other genre styles to impart a touch or coloration of the genre from which they are abstracted. Academics, for example, are generally familiar with lectures that smack just a bit – or more than a bit – of sermons.

The relationship between register and genre also figures centrally in conceptions of genre in the systemic functional linguistics (SFL) of M. A. K. Halliday, Ruqaiya Hasan, and their colleagues, with a strongly applied bent. Halliday defines register as "a configuration of meanings that are typically associated with a particular situational configuration of field," i.e., the focus or topic of the communicative activity, tenor, i.e., participants and their relationships, and mode, i.e., the role of language in the situation (Halliday and Hasan, 1989: 38–39). Register includes as well the linguistic features that give expression to those meanings, and, reflexively, to the register itself. Genre, then, is the schematic structure, the sequence of purposive, goal-oriented stages through which the register values are mobilized in use, in the production of particular orders of text (Halliday and Hasan, 1989: 53–68). As in other approaches to genre we have considered, descriptions of genre in SFL specify the obligatory and optional elements of the structure, their sequence, their recursive iterability, and so on. And again, SFL distinguishes between structure, the global, sequential structure of the generically regimented text, and texture, the organization of linguistic devices that endow a text with cohesion.

There is an element of ambiguity in the SFL conception of genre deriving from an ambiguity in the conception of text. Halliday views a text as "an object in its own right," a bounded, coherent, cohesive package of meanings, and as "an interactive event, a social exchange of meanings" (Halliday and Hasan, 1989: 11). Thus, some of the texts that figure in SFL analyses of genre are conventional, bounded, unitary (monologic) stretches of discourse: nursery tales, recipes, letters, academic reports, etc. Here, the analysis focuses on schematic structure and texture of particular generic forms and their textual realizations and especially the ways in which they realize the structural potential of the genre. But other analyses consider social-interactional routines of various kinds, such as service encounters or telephoning for appointments, and the resultant analytical descriptions amount to the act sequence or scenario of the speech event.

Also geared closely to pedagogical application, the conception of genre that figures in that line of applied linguistics known as English for Special Purposes (ESP) is grounded in situational contexts of language use. But whereas the relationship of genre to speech events in SFL is mediated through register, in ESP genre is **defined** not as a functional variety but as a class of events. According to John Swales (1990: 58), "a genre comprises a class of communicative events, the members of which share some set of communicative purposes." Genre, in these terms, is goal oriented, directed toward the fulfillment of some rhetorical, functional end, which in turn has a shaping influence on the schematic structure of the discourse "and constrains the choice of content and style"; genre, that is, is organized in terms of form–function interrelationships.

The study of genre in ESP tends to focus on language in academic and professional settings and to foreground two principal dimensions of generic form: schematic structures, described in terms of 'moves,' and surface level stylistic features, especially syntactic features such as sentence length, nominalization, prepositional phrases, and the like. Notwithstanding the definition of genres as classes of communicative events, the framing of structural elements as 'moves' is the closest that ESP analysis comes to event-ness, insofar as it suggests a series of purposive acts that make up the scenario of an event. In practice, the substantive focus of genre-oriented analysis in ESP turns out to be on textual forms of various kinds, usually written, in academic and professional settings, such as research articles, dissertations, sales promotion letters, job application, and legislative documents.

Genre as Solution to Recurrent Communicative Problems

Most of the conceptions of genre treated thus far conceive of genre as a nexus of the linguistic and the social, but with primacy accorded to the former. Contrastive in this regard is the approach to genre proposed by Thomas Luckmann (1995) and his colleagues (Günthner and Knoblauch, 1995) from the vantage point of social-constructivist sociology and the sociology of knowledge. Luckmann defines communicative genres as socially constructed communicative models for the solution of recurrent communicative problems. In Luckmann's view, some of the communicative work of social actors consists of spontaneous communicative acts, in which the speaker manages a communicative task in an ad hoc, contingent manner. In other situations, however, a social actor draws from his or her stock of socially acquired knowledge a ready-made, conventional

model that seems to fit the communicative task at hand, consistent with the speaker's intentions. Such conventionalized solutions have coalesced out of repeated engagement with recurrent communicative problems to the point where they have become routinized and more or less obligatory and have entered the social stock of knowledge, though, like all knowledge, they will be differentially distributed within society. The communicative problems for which genres provide routinized solutions "tend to be those which touch upon the communicative aspects of those kinds of social interaction which are important for the maintenance of a given social order" (Luckmann, 1995: 228). Within the broad scope of those aspects of social life that are communicatively constituted, in Luckmann's view, genres occupy the "hard core," the regularized and routinized sector of communication in social life.

What is important to the social order will be historically and cross-culturally variable, and so, then, will repertoires of communicative genres, although we may anticipate certain universals or broad tendencies, founded in the universality of the human condition. As social regimes for the solution of recurrent communicative problems, genres will integrate social and communicative elements. In Luckmann's conception, genre represents a comprehensive framework for the integration of:

1. situational factors, i.e., types of recurrent communicative situations: is the genre obligatory, optional, frequent, acceptable, proscribed in a given type of situation?
2. social factors, i.e., aspects of the social organization of participation and protocols for the management of interaction;
3. communicative means, i.e., linguistic, paralinguistic, prosodic, kinesic, formulaic, etc.
4. topical or thematic elements.

For the description and analysis of these constituent elements, Luckmann refers to – and relies upon – analytical methods and approaches drawn from the adjacent disciplines concerned with the relevant aspects of communication in context, such as linguistics, linguistic anthropology, folklore, the sociology of communication, and so on.

Within the broad domain opened by their conception of genre, Luckmann and his colleagues identify several problems of special interest. Luckmann's own work has focused on reconstructive genres, such as gossip and narrative, that serve as communicative means for reconstruction and reflexive engagement with events and social interactions; events are transitory, and reconstructive genres endow them with tangible, replicable substance and coherence. Also of interest is genre as a framework for the regimentation of perspective-setting and perspective-taking in the reciprocal calibration of perspectives: the routinized nature of genre and its place within the social stock of knowledge serves to align participants to each other and to the social agendas with which they are engaged.

Dialogic Approaches to Genre

One of the most influential of current approaches to genre in social life is that of the Russian theorist of language and literature, Mikhail Bakhtin. Bakhtin's conceptions of genre have proven especially stimulating and productive among linguistic anthropologists, who have built upon and elaborated various aspects of his theoretical framework.

Bakhtin's interest in genre derives from his core notion of utterance, the basic unit of language in use. Language, in Bakhtin's view, is realized in concrete utterances, the intersubjective, joint accomplishment of a speaker (or author) and an interlocutor. One of Bakhtin's concerns, then, is to identify what constitutes an utterance as a unit: bounded, coherent, whole. The concept of genre, in Bakhtin's framework, provides a critical perspective on this problem. "Each utterance," Bakhtin writes, "is individual, of course, but each sphere in which language is used develops its own *relatively stable types* of these utterances. These we may call *speech genres*" (Bakhtin, 1986: 60).

We may note in this definition that genres are grounded in spheres of activity: the generic regimentation of discourse, in Bakhtin's schema, represents a constitutive feature of domains of social practice. Spheres of activity likewise define semantic or thematic fields, which inform the content of the speech genres that organize those domains. In addition to spheres of activity, genre is inextricably bound up with functional style. "Functional styles," in Bakhtin's view, "are nothing other than generic styles for certain spheres of human activity and communication" (Bakhtin, 1986: 64), that is, they are generically organized – indeed, generically constituted. Style is one aspect of the formal organization of genre; compositional structure is the other: "all our utterances have definite and relatively stable typical *forms of construction of the whole*" (Bakhtin, 1986: 78). And finally, genre is an organizing framework for participation in communicative interaction. A key notion here is *addressivity*, a fundamental aspect of utterance. Every utterance, in Bakhtin's conception, is addressed to someone, in anticipation of a response. It follows, then, that "each speech genre in each area of speech communication has its own typical conception of the addressee, and this defines

it as a genre" (Bakhtin, 1986: 95). In sum, genre, for Bakhtin, is the nexus of domains of activity, content, style, compositional structure, and structures of communicative participation.

What is it that renders a generically organized utterance a bounded whole? First, says Bakhtin, is "a *change of speaking subjects*, that is, a change of speakers." Genres, then, regiment speech exchange – turn taking and access to the floor – at the same time as they frame the utterance. Second, genre incorporates various modes for the finalization of the utterance, opening the "possibility of responding to it." Finalization is determined by three factors:

1. semantic exhaustiveness of the theme, a matter of coherence;
2. the speaker's plan, or speech will, manifested primarily in the choice of a particular speech genre;
3. the mechanisms of closure inherent in genre-specific compositional structures.

The essential importance of the finalization of the utterance lies in its effect of opening the possibility of responding to it; the formal finalization effected by generic boundedness is a metapragmatic invitation to response, a key basis of the dialogic principle (Bakhtin, 1986: 71–77).

If genre provides a framework to account for the boundedness of utterances, it provides as well for the transcendence of those boundaries, that is, in Bakhtinian terms, for the dialogic qualities of the utterance. Dialogue is the central principle of Bakhtin's conception of language, the relational dynamic by means of which society is communicatively constituted and language is socially constituted. Bakhtin's abiding concern was with the ways in which all discourse resonates with "the words of others," that is, with the ways that any utterance presupposes and responds to prior utterances and anticipates future ones. For Bakhtin, this dialogic process is both a matter of communicative practice (the intersubjective work of producing dialogic relationships) and of the concomitant links that are thus established between and among utterances as they circulate through society and through time. In Bakhtin's conception, dialogue extends far beyond a simple dyadic exchange: rather, "each utterance is filled with echoes and reverberations of other utterances to which it is related by the communality of the sphere of speech communication" (Bakhtin, 1986: 91). With regard to genre, dialogic relationships are manifested especially in the reciprocal generic organization of utterance and response, in the alignment of an utterance in its production to the generic type, which has shaped prior utterances of the same type, and in the assimilation of genres to other genres, especially in what Bakhtin terms secondary genres, which "absorb and digest various primary (simple) genres" (Bakhtin, 1986: 61–62).

Linguistic anthropologists have developed upon Bakhtin's dialogic approach to genre as a vantage point on speech indexicality. To Bakhtin's recognition of the importance of addressivity and of genre as a mechanism for the regimentation of participation in communicative interaction, these scholars bring a more systematic perspective on the social organization of participation, adapted principally from Erving Goffman's (1981) approach to participant roles and structures; to his fertile insight into genre as an orienting framework for the dialogical alignment of utterances, they bring a more systematic perspective on textuality, entextualization, and contextualization; and to his essentially literary frame of reference, they bring an ethnographic empiricism that seeks to elucidate the dynamics of dialogicality in specific social, cultural, and historical contexts (see 'Genre in Context' below).

Central Problems in the Study of Speech Genres

What Counts?

The various conceptions of genre reviewed in the preceding sections raise a number of fundamental questions concerning the nature of genre, perhaps the most fundamental of which is what order (or orders) of linguistic phenomena genre comprehends. What counts for the purposes of generic description, classification, or analysis?

For most classic conceptions of genre, the answer is simple and apparent: texts. A genre is a typological category for the classification of texts, themselves conceived essentially as verbal objects. Indeed, because much generic classification has been in the service of archiving, indexing, or the organization of published text collections, the objects of such classification have been text-artifacts, the physical inscriptions of verbal texts (Silverstein, 1993: 38). Not all classificatory or typological approaches to genre center on texts, however. A communication-centered approach, for example, may conceive of genre as a class of message types (Ferguson, 1994); a functional one may center on genre as a class of end-oriented communicative events (Swales, 1990). In Bakhtin's dialogic framework, a speech genre is a type of utterance, a bounded stretch of spoken discourse that coincides with a turn-at-talk. At the same time, however, utterance is an interactional unit, or an intersubjective one, insofar as it is addressed to an

interlocutor and anticipates a response. In assessing conceptions of genre, then, it is important to attend to the objects of generic systems.

Another consideration having to do with what kinds of things are comprehended by genre is what counts as a token of the generic type. In most conceptions of genre, there is an assumption, tacit or explicit, of wholeness or completeness: types are conceived in terms of their full realization. In formal characterizations of genres, where the genre is described or defined in terms of its constituent elements, analysts may make a distinction between obligatory elements, which make up the irreducible minimal form of the genre, and optional elements, which may be present but need not be for the text to count as legitimate. Propp's formal definition of the Russian magic tale is a classic case in point; Halliday and Hasan's distinction between the obligatory and optional elements of a generic structure potential is another.

Given the normative, typological set toward wholeness in conceptions of genre, it is perhaps not surprising – though on reflection it is striking – that there is almost no considered treatment of incompleteness, of a lack of generic closure. In a noteworthy exception, Hanks, using Bakhtin's notion of finalization, distinguishes between lack of finalization that rests on the absence of necessary formal constitutents, and lack of finalization which recognizes that any utterance is open to revision and reformulation. He notes that the former may be finalized by interpretive uptake, notwithstanding the formal "blank spots," while the latter remains the condition of any utterance (Hanks, 1996a: 243–246). Hanks' observations raise the related question of whether wholeness is considered to be a matter of production only, or involves the relationship between production and reception. Formal perspectives on wholeness tend toward the former; interactional and interpretive ones open out toward the latter.

A further dimension of the problem of wholeness or completion that is highlighted by interactional approaches has to do with monologic perspectives on production versus perspectives that allow for – or even take as a generalizable given – participant co-production. Most approaches to genre, as to text, are implicitly monologic: generically organized texts (or utterances, or messages) have one 'author.' Again, social interactional and dialogic approaches open the way to consideration of various dimensions of co-production, whether it is a matter of multiple participants jointly and interactionally producing the full text (consider knock-knock jokes as a simple case in point), of what students of language in interaction call recipient design, or of the interrelated and intersubjective dynamics of production and interpretation.

Strongly contrastive with typological, classificatory conceptions of genre that serve to categorize verbal forms of one sort or another – texts, utterances, events, etc. – are more practice-oriented perspectives that conceive of genre as a guiding framework for communicative practice. Luckmann's notion of genre as a solution to a recurrent communicative problem is one such approach. In Hanks's conception of genre as a relatively stable prefabricated aspect of practice to which participants have access as they enter into and sustain engagement in communicative interaction (Hanks, 1996a: 233), or Briggs and Bauman's (1992) conception of genre as an orienting framework for the production, reception, and circulation of texts, genre consists of cognitive schemata. Texts and utterances remain important, not as the primary objects comprehended by genre, but as the products of communicative practice aligned to genre.

Closely related to the question of what kinds of phenomena are subsumed by generic categories is an additional 'what counts?' question, namely, what part of the linguistic domain within a society or speech community is encompassed by genre? What is the reach of genre within the overall linguistic economy?

The most broadly inclusive view is that all discourse is generically organized – there is no verbal practice that escapes generic regimentation. Bakhtin is a proponent of this view. In his conception of genre, it is essentially axiomatic that all linguistic production is generically organized, a corollary of the principle that all communication is dialogically – that is, socially – constituted. This principle is certainly difficult to demonstrate empirically, and those descriptive accounts that seem to be all encompassing, such as Gossen's taxonomy of Chamula genres, actually include a large, amorphous super-category that is generically undifferentiated, such as ordinary speech.

More empirically and practically useful is the position that genre encompasses the routinized or schematized forms of communicative practice, those that have been crystallized in social usage and that have become part of the pool of social knowledge, intersubjectively recognized by participants. Genre, in this conception, contrasts with spontaneous or emergent communication, organized on the spot to answer communicative contingencies for which there are no ready-made and readily accessible models (Hanks, 1996a: 233; Luckmann, 1995). Certainly, empirical investigations of genre have tended to focus on the relatively clear-cut and strongly routinized regimes of speech production, content to relegate

the spontaneous and emergent forms to some residual category such as 'everyday language' or 'ordinary speech.' More difficult to recognize and grasp are those utterances that fall between the poles, such as genres still in the process of coalescing into routinized regimes, or utterances marked by formal features that characterize this or that routinized genre, sufficient to endow them with the coloration of genre, but not to establish them as fully realized tokens of the generic type (Hymes, 1989).

Relevant to these considerations as well is the relationship between the scope of the generic field and the metapragmatic awareness of participants. The problem has at least two dimensions, one having to do with the sociology of knowledge, the second with cultural focus. The simple mapping of a system of genres onto a culture or a society or a speech community rests on an assumption of cultural homogeneity and a general pool of cultural knowledge held by all. Such assumptions are clearly untenable by the best standards of the sociology of knowledge, which demands that we investigate empirically and specify closely what the sociology of genre might be in any social formation. Note, for example, that Gossen's breakthrough description of Chamula genres of verbal behavior is actually an account of that portion of the genre system on which at least six of seven male informants agreed. Gossen found other named forms of verbal behavior among the Chamula, but without agreement about where they fit in the overall system or information on how Chamula women discriminate among orders of people's speech. Note also that the preponderance of accounts in the ethnographic literature on genre report the knowledge of experts, cultural specialists with a more detailed and nuanced view of ways of speaking than most lay people command. Studies of genres that are key communicative resources within specific institutions, such as education or law or curing, have the virtue of specifying what the social base of these resources may be. It is also important to bear in mind the distinction between recognition of a genre and the competence to use it. To be sure, generic competence must include as well the knowledge and ability to be an audience member, to receive and interpret a generically organized utterance. Thus the question of the scope and reach of genre must take account of social distribution, degrees of expertise, recognition versus productive competence, the sociology of participation, and other like considerations.

Just as there are differences within social groups with regard to the scope and reach of genre, there are differences across cultures in the scope and articulation of the generic field. Ethnographers of speaking are understandably drawn to places where speaking is a cultural focus, where there is a relatively high degree of metapragmatic awareness of and reflexive engagement with ways of speaking. In such milieux, the generic field is more extended, more complex in its organization, more nuanced in its generic discriminations. One has only to compare the exuberant attention to ways of speaking in Afro-Caribbean societies, for example, to the laconic disinclination toward talk about talk in the Canadian Maritimes (Abrahams and Bauman, 1971; Bauman, 2004: 109–127).

Genre in Context

Virtually all of the conceptions of the metapragmatic scope of genre considered in the preceding section go beyond the definition of what counts as genre and the delineation of the domains of communicative practice that are organized in generic terms to the examination of genre in terms of wider fields of interrelationship. In broadest scope, genre may be conceived as an indexical field, implicating a range of associational relationships. The inventory of contextual factors and relations treated in the literature is broad; different theories foreground different aspects of context and dimensions of interrelationship.

Perhaps the most general contextualist perspective uses genre as a vantage point on culture and history more generally, as a key to the elucidation of larger cultural systems. This approach is consistent with – indeed, continuous with – the philological foundations of Americanist linguistic anthropology. Gossen's Chamula study is a case in point, and there are many others. As one would expect, the approach is most productive in the ethnographic description of societies in which ways of speaking represent a cultural focus, heavily ideologized, a criterion for individual and social differentiation, a resource for virtuosic display in performance, the focus of reflexive evaluation, and so on. Work of this kind generally treats the field of genre systemically as well, articulating genres in relation to each other within the overall communicative economy, that is to say, genres in the context of other genres.

A second broad perspective on context considers genre in terms of domains of use, conceived as spheres of activity, fields, institutions, or situational contexts. These constructs are all well-established sociological, anthropological, or phenomenological frames of reference for taking account of the nexus of purposeful activity, social organization, and cultural formations. In their various ways, they offer conceptual vantage points on the engagement and mutual alignment of participants, meaningful contexts for action, and orienting frameworks for the production and

interpretation of discourse. That is to say, they are part of social theory more generally, adapted to considerations of genre, but not as a rule a primary focus of genre theory itself.

Those conceptions of genre that tie it to register, itself defined in terms of recurrent situational contexts, assign the most explicit weight to this dimension of context, but situational contexts of use are fundamental to a much broader range of genre-centered considerations. One especially productive line of investigation examines the varying ways in which and degrees to which particular genres in a speech community may be formatively adapted to their immediate contexts of use. In the most comprehensive study of this kind, Briggs (1988) examines a range of speech genres in Northern New Mexico and elucidates a continuum from the close situational grounding of historical discourse and proverbs to the markedly loose coupling of prayers and religious songs to the immediate, specific contexts in which they are performed. Analysis of this kind requires close attention to the formal means and device by which discourse may be anchored to its context of use, such as deictics, phatic gestures to interlocutors, reflexive references to the act of communication itself, or any other. Such contextualization cues will vary across genres. Likewise, it requires close attention to forces that work in the opposing direction, that is, to how different kinds of generic regimentation may render an utterance or a text relatively impervious to and detachable from the situation in which it is used, such that form or meaning remains relatively constant from one context to another. It is illuminating in this regard to track the use of what is considered to be the same genre across different kinds of situational context, recalling, as we must, that notwithstanding conceptions that define genres in terms of specific situational contexts, it is in the very nature of genre to be recognizable outside those conventional settings. Empirical investigation reveals clearly that certain genres in any given community's repertoire may be adapted to multiple contexts. Myths that are primarily performed in shamanic rituals among the Warao of Venezuela may also be rendered in other modes, such as pedagogy or competitive exchange (Briggs, 1993). Such rekeyings of genre often elude description, obscured by the tendency to concentrate attention on the primary, default context or frame with which a specific genre is conventionally associated. For any given iteration, the intertextual field reaches back to antecedent utterances at the same time that it anticipates prospective ones. This is true, to be sure, within speech events as well as across them. Within a single event, we might think of the antecedent (that is, presupposed) and anticipated (that is, entailed) discursive context of any utterance as making up its **co-text**: in the case of a lecture, for example, the introduction of the speaker by a host sponsor or the question and answer period that follows the talk.

In the case of the Warao myths, however, our purview has extended beyond the individual situational context. While the empirical point of departure is the situational context or speech event, recontextualizations of the kind we have been considering establish relationships of intertextuality that transcend the individual situation, fields of textual interrelationship consisting of the various instantiations of a generic model. These generic relationships, however, represent but one order of intertextuality that extends the reach of discourse beyond the bounded speech event. Irvine's (1996) pioneering analysis of the dialogues implicated in the performance of *xaxaar*, a Wolof genre of insult songs sung to new brides, elucidates an intertextual field that begins with discussions between patrons and the griot singer who is to compose and perform the song, continues with the core performance at the ceremony in which the new bride moves to the groom's family household, and reaches ahead to a range of contexts in which the song is reperformed, discussed, evaluated, and so on.

One corollary of this field of intertextual relationships is that *xaxaar*, as a genre, also implicates a complex set of participant roles and structures: patrons and griot in the preliminary discussions, griot, bride, and other audience members in the wedding ceremony, various members of the community who talk about the performance and its meanings in the aftermath. Here the convergent perspectives of Erving Goffman (1981) on the interaction order and dialogic approaches to genre come together in the recognition that genres implicate sets of participant roles and participant structures, presupposed frameworks of mutual alignment, both within and between situational contexts of use. Bauman (2004: 128–158), for example, has analyzed a series of genres for which the process of actualization involves a mediational relay, setting up a complex set of participant roles and structures requiring the decomposition of classic dyadic speaker-hearer or performer-audience models.

Institutional contexts come to the fore most commonly in functionally oriented explorations. There is a growing literature, for example, on the role of laments in the assuagement of grief, tying poetic form to ritual function, and a sizable body of work on political oratory and social control, likewise linking form to function. In explorations of genre in SFA and ESP, both of which have a strong orientation toward practical application, certain institutional contexts, especially education, loom especially large;

pedagogical and expository genres such as the school essay and the research proposal are viewed as at least partly constitutive of the educational institutions in which they figure.

Normative Types Versus Emergent Forms

Typological approaches to genre are characteristically framed in terms of static categories, normative, bounded, and complete. In an effort to provide a critical corrective to these static typological approaches, genre theorists – especially those oriented toward practice – have turned increasingly to conceptions of genre that view genre as flexible, contingent, and emergent, a discursive accomplishment rather than the realization of a norm. These contrastive dynamics may be framed in a variety of ways; many are alternative or complementary perspectives on contextualization, discussed in the preceding section.

One salient dimension of fixity versus flexibility has to do with the relative tightness or looseness of the associational linkage between a given genre and a corresponding order of situation. For some genres, the association is so close that the event cannot be considered fully realized, authentic, or legitimate in the absence of its authorizing genre. Indeed, the tie may be so fundamental that the genre and the event may be labeled by the same term: the lecture, once again, is a case in point. It is close associations like this that enable definitions of genres as types of events. At the opposite end of the scale, certain genres may be so strongly proscribed within or incompatible with the conventional expectations of particular kinds of events that the likelihood of their occurrence approaches the vanishing point: a dirty joke during a Baptist religious service, for example. In between these two poles there will be in any speech community a sliding scale of expectation and appropriateness with regard to the occurrence of a given genre in a given situational context. It is essential to bear in mind, however, that genres remain recognizable outside their conventional contexts, and to be open to surprising and creative uses of genres – or failure to use them – where such usage is unexpected or even proscribed, demands special accounting, may even have the capacity to transform the context itself. The early Quakers' refusal to swear judicial oaths, for example, was deeply shocking to all observers and brought down severe penalties on those who refused to swear, but led ultimately to the acceptance of affirmation as the functional equivalent of oaths in British and American judicial proceedings.

Much the same kind of associational variability may obtain between a given genre and a particular kind of social role or relationship. Consider the roles of sports announcer, or toastmaster, or carnival barker, all defined in terms of the production of particular genres, or so-called joking relationships, which are instantiated through the use of licensed insults of a kind not sanctioned between people who do not stand in that relationship. Other roles may be associated with certain genres, which are nevertheless not constitutive of that role: after-dinner speakers often tell jokes, but need not.

Another consideration keyed to situational contexts of use is whether the use of a given genre is scheduled or spontaneous. Scheduling, that is, performance at a specified time and place, is especially conducive to coordinated participation, for performers, audience members and other participants. Scheduled events are often cultural performances, occasions on which a community's values and symbols are placed on display before an audience: festivals, feasts, fairs, rituals, spectacles, theatrical enactments, and the like. Such events tend also to be programmed, with a relatively set sequence of constituent acts: the collect comes before the mass, the introduction of the speaker precedes the lecture, the acceptance speech follows the nominating speech, and so on. In certain cases, the use of a given genre may be programmed without being scheduled; a greeting occurs at the beginning of an encounter, a leavetaking ends it. Other genres may be spontaneous. These tend not to be the obligatory ones: telling a joke, for example, during the course of a sociable encounter.

If we shift our focus from situational to discursive context, other significant dimensions of fixity versus flexibility come to the fore. In particular, in dialogic conceptions of genre as an orienting framework for the production and reception of particular kinds of texts which will be bound together in a relationship of intertextuality, the calibration of that intertextual relationship offers us a vantage point on the dynamics of normativity and emergence in discursive practice. The correspondence between a particular utterance and the generic schema – or other exemplars of the generic class – is never perfect. Contingent elements of contextualization inevitably come into play, creating links to the co-text, the ongoing social interaction, functional agendas, and other contextual factors that interact with generic orienting frameworks in shaping the production and reception of the utterance. These in turn will affect the ways in which the constituent features of the generic framework are deployed, opening the way to generic reconfiguration. Thus, generic intertextuality necessarily involves the production of an intertextual gap (Briggs and Bauman, 1992). The calibration of the gap – its relative constriction or amplification – has significant correlates and effects. Certain acts of communication

may achieve generic orthodoxy by hewing closely to generic precedent and aligning the utterance to conventional practices for achieving routine ends under ordinary circumstances. Think of the boilerplate templates for the generation of legal documents – wills, contracts, leases, and the like. By contrast, stretching the intertextual gap allows for the adaptation of generic frameworks to emergent circumstances and agendas, such as the parodies of political speeches that flower during election campaigns. Such adaptive transformation may involve manipulation of any of the formal, functional, and thematic elements by which an utterance may be tied to generic precedents or to the assimilation of an utterance to more than one genre, blending the formal and functional capacities of each of the genres thus invoked. Such generic mixing may yield what Bakhtin designates as "secondary genres," which "absorb and digest various primary (simple) genres" (Bakhtin, 1986: 62), assimilating them to more encompassing generic structures. Oratory is a good case in point, as characteristically incorporating stories, aphorisms, proverbs, or other genres. Or, they may yield various hybrid forms out of the merger of two primary genres, such as the cante-fable or the riddle tale, which are themselves conventional genres. Also possible is a more *ad hoc* generic blending, produced in response to emergent circumstances, such as the mythically structured narrative of personal experience told by Pete McGuff to the young Edward Sapir in the course of an ethnographic encounter (Silverstein, 1996).

The calibration of intertextual gaps offers a useful vantage point on the ideology and politics of genre. Within any speech community or historical period, genres will vary with regard to the relative tightness or looseness of generic regimentation, but certain genres may become the objects of special ideological focus. Prescriptive insistence on strict generic regimentation works conservatively in the service of established authority and order, while the impulse toward the widening of intertextual gaps and generic innovation is more conducive to the exercise of creativity, resistance to hegemonic order, and openness to change. These factors will be closely tied as well to hierarchies of value and taste (which genres are evaluated as relatively higher, better, more beautiful, more moral) and to the social regimentation of access to particular generic forms (who can learn them, master them, own them, perform them, and to what effect).

There is a temporal, sequential dynamic implicit in these processual perspectives on emergence, intertextuality, hybridization, and the like, that represents a significant departure from the static, atemporal perspective of classic typological approaches. Temporality becomes more explicit and broader in scale in a developing line of inquiry that focuses on the social history of genres (e.g., Hanks, 1987; Kuipers, 1998). There are three principal – and allied – rubrics under which the history of genres as social practice has been concentrated: the advent of modernity, the spread of literacy, and the experience of colonialism. At its most productive, this work combines precision of generic description in each phase of historic transformation, awareness of form-function-meaning interrelationships, and rigorous historiography.

See also: Addressivity; Boas, Franz (1858–1942); Cohesion and Coherence: Linguistic Approaches; Context, Communicative; Deixis and Anaphora: Pragmatic Approaches; Dialogism, Bakhtinian; Ethnoscience; Genre and Genre Analysis; Grimm, Jacob Ludwig Carl (1785–1863); Halliday, Michael A. K. (b. 1925); Herder, Johann Gottfried (1744–1803); Indexicality: Theory; Interactional Sociolinguistics; Languages for Specific Purposes; Linguistic Anthropology; Malinowski, Bronislaw Kaspar (1884–1942); Metapragmatics; Narrative: Linguistic and Structural Theories; Performance in Culture; Propp, Vladimir Iakovlevich (1895–1970); Speech Acts: Definition and Classification; Structuralism in Anthropology; Style.

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Speech Impairments in Neurodegenerative Diseases/Psychiatric Illnesses

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The ability to speak using the structured rule-governed system of language is a uniquely human characteristic. With an ease and simplicity that is regularly taken for granted, spoken communication imparts information regarding a speaker's message by orchestrating the language domains of semantics, syntax, morphology, phonology, and pragmatics. Typically one thinks of the spoken message as being contained solely within this linguistic code. However, there is also a great deal of information conveyed through associated paralinguistic content as well as through the motor processes of the speech act itself. The speech signal is essentially a highly interlinked and well-organized conglomeration of acoustic energy that can be represented by time, frequency, and intensity information. These domains allow for quantitative physical measurement of the signal as well as qualitative perceptual judgments by listeners. Such qualitative and quantitative assessments of speech each provide a wealth of information about an individual, ranging from his or her sex, age, and cultural and socioeconomic background, to physical health and emotional state.

The process of speech production itself, that is, the generation of the appropriate sounds necessary to convey a speaker's message, is inordinately complex. Simply put, this intricate process involves the coordination of over 100 individual muscles, numerous cranial and spinal nerves, cortical and subcortical neural areas, and the cognitive processes necessary to generate meaningful sound combinations from the raw

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The ability to speak using the structured rule-governed system of language is a uniquely human characteristic. With an ease and simplicity that is regularly taken for granted, spoken communication imparts information regarding a speaker's message by orchestrating the language domains of semantics, syntax, morphology, phonology, and pragmatics. Typically one thinks of the spoken message as being contained solely within this linguistic code. However, there is also a great deal of information conveyed through associated paralinguistic content as well as through the motor processes of the speech act itself. The speech signal is essentially a highly interlinked and well-organized conglomeration of acoustic energy that can be represented by time, frequency, and intensity information. These domains allow for quantitative physical measurement of the signal as well as qualitative perceptual judgments by listeners. Such qualitative and quantitative assessments of speech each provide a wealth of information about an individual, ranging from his or her sex, age, and cultural and socioeconomic background, to physical health and emotional state.

The process of speech production itself, that is, the generation of the appropriate sounds necessary to convey a speaker's message, is inordinately complex. Simply put, this intricate process involves the coordination of over 100 individual muscles, numerous cranial and spinal nerves, cortical and subcortical neural areas, and the cognitive processes necessary to generate meaningful sound combinations from the raw

physiological materials. That is, when respiration, phonation, articulation, resonance, and prosody are combined in a well-executed manner, the end product is a clear and meaningful speech code that contains a message. However, a breakdown anywhere in these interdependent physiological systems, spanning from the diaphragm to the cortex and to the outermost border of the lips, can lead to measurable changes in the speech acoustic output. The neurological and physiological substrates necessary for speech production may be altered by a wide variety of neurological or psychiatric disease processes, often altering the final acoustical properties of speech in a somewhat predictable manner. Hence, measurable information in the acoustic output of individual patients may provide valuable clues for diagnosing certain diseases, following the course of disease progression, assessing response to medical treatment, or a combination of these.

Certain voice features may change in healthy people as a result of their emotional state (e.g., anger), fatigue, or pharmacological intervention (e.g., in response to the sedative effects of alcohol). In addition, changes in speech and voice patterns may reflect certain pathological changes resulting from disease processes. For example, in 1817, James Parkinson described individuals suffering from the disease that today bears his name as showing changes in their speech that made them "become scarcely intelligible" (Parkinson, 1817).

Although the voice and speech production changes associated with various diseases are readily detected on a perceptual level, studying them in an objective and quantitative manner can be a logistically difficult task. Systematic attempts to classify and measure voice characteristics date back to the 1960s. Not surprisingly, these analyses were often compromised by the limitations of the technology of the time. With the advent of modern computing platforms and applications, and with affordable access to high-fidelity digital recording techniques, the analysis of voice acoustical properties has become more accurate, reliable, practical, and relatively inexpensive.

Recording and Data Processing Equipment

It is now possible to record research-quality acoustic information directly to a computer hard drive using a high-quality microphone, an external analog-to-digital converter (e.g., a sound card), and a simple digital connection. The acoustic signal is captured by the microphone (preferably a condenser microphone with response characteristics in the 20–20,000-Hz frequency range), converted to digital code by the sound card (i.e., preferably an external device that does not rely on the computer for power, processing, or clock information), and transmitted to the computer via simple digital connection (e.g., Firewire/USB). In this way the data can be stored in digital format and analyzed for their acoustic content without a loss of information. Recording quality is affected by the equipment and should be sufficiently high to capture and accurately represent the acoustic properties of the human voice. A sampling rate of at least 22 kHz with 16-bit intensity quantization is both appropriate and widely available.

Because a great number of different measurements can be made from a short sample of speech, the software package used for analysis is dependent on the needs of the researcher and his or her particular area of interest. There are many commercially available (e.g., Kay Elemetrics Computerized Speech Laboratory, Kay Elemetrics Corp., 2004) as well as free 'shareware' programs available (*PRAAT*; Boersma and Weenik, 2004) for computerized speech analyses. These programs generally provide a package of recording, manipulation, and analysis tools with easy-to-use graphic user interfaces, designed to extract frequency, intensity, and time measures from acoustic samples.

Neurobiology of Speech Production in Common Neurodegenerative Disorders

The production of speech is a voluntary process that relies heavily on motor areas in the prefrontal cortex, the primary motor cortex, premotor cortex, associative motor areas, and Broca's area. Important connections that lead to the transfer of cortical motor commands to the lower motor neurons include the corticobulbar and corticospinal tracts, collectively known as the internal capsule. Typically, localized damage to these upper motor neurons results in spastic dysarthria, whereas damage to the lower motor neurons results in a flaccid dysarthria (Duffy, 1995).

Of the many subcortical structures, the one crucially involved in any voluntary motor activity, including speech production, is the basal ganglia and its functional circuitry. The basal ganglia include several nuclei: the caudate, putamen, two parts of globus pallidus (internal and external) and two compartments of substantia nigra (pars reticulata and pars compacta), subthalamic nucleus, ventral tegmental area, and nucleus accumbens. Of these, the caudate and putamen are, together, referred to as the striatum. The striatum receives its major afferents from cortex (excitatory glutamatergic projections) and substantia nigra pars compacta (dopaminergic projections). The major output structure of the basal ganglia is

the thalamus (especially the ventrolateral portion), which in turn provides feedback and modulates cortical activity. The basal ganglia exert influence on the thalamus via two pathways; a direct pathway, which sends inhibitory signals, and an indirect pathway, to which it sends excitatory signals (Murdoch, 2001). Although the exact role of separate components of the basal ganglia on speech is poorly understood, the system is known to be responsible for maintaining postural stability and static muscle contraction – providing a framework for voluntary skilled movements and the regulation of amplitude, velocity, and the initiation of movements, as well as sequencing of movements (Duffy, 1995). Damage to the basal ganglia can often result in either hypokinetic or hyperkinetic dysarthria.

Another structure that also plays a role in speech production, especially the fluency of speech production, is the cerebellum. The cerebellum has connections with both primary and premotor cortex via the ventral thalamic nuclei, and it also gains access to the corticobulbar and corticospinal tracts (Duffy, 1995). It is able to coordinate and modify both planned and ongoing speech movements. Damage to cerebellum produces an ataxic dysarthria.

Voice and speech production reflect complex motor activity, thinking processes, and emotional processes. Therefore, certain neurological disorders related to those processes tend to affect speech as well. As a consequence, language, speech, and voice analysis may provide a noninvasive and inexpensive window into underlying neurological pathologies.

Speech and Voice Acoustic Characteristics in Neurodegenerative Diseases

Parkinson Disease

Parkinson disease (PD) is a progressive neurodegenerative disorder that affects the motor system and cognitive functioning. The selective destruction of the nigrostriatal dopaminergic neurons leads to a disruption of the basal ganglia circuitry, thus leading to the outward symptomatic presentation associated with the disease. The underlying pathology is manifest in several classic motor symptoms: bradykinesia (motor slowness), akinesia (difficulties in movement initiation), rigidity (stiffness in muscles), and resting tremor, which occurs in the absence of voluntary motor behavior (Barbeau, 1986). The underlying neurodegeneration is also associated with affected speech musculature compromising muscles responsible for respiration, laryngeal control, and articulation. The associated speech and voice impairment in PD is collectively termed hypokinetic dysarthria. Perceptually, hypokinetic dysarthria is characterized by monopitch, monoloudness, reduced stress, imprecise consonants, and inappropriate silences. In addition, hypokinetic dysarthria is characterized by hoarse, breathy quality of voice and short rushes of speech (Darley *et al.*, 1972). The acoustic findings of Parkinsonian speech, reflecting monopitch and monoloudness, include a decrease in fundamental frequency (F_0) variability and range, with increased F_0 variability found on vowel prolongation tasks, and a decrease in maximum intensity range and laryngeal respiratory coordination deficits (e.g., voice onset time). In addition, there is a smaller distinction between different vowel productions as measured from decreased acoustic differentiation and resonant energy transitions in vowel–consonant production than in control subjects, reflecting the imprecise consonant production (Goberman and Coelho, 2002).

Interestingly, hypokinetic dysarthria is the only type of dysarthria characterized by increased speed of reading, most likely related to the phenomenon of festination. The increased reading rate is achieved by compromising articulation accuracy. However, with the progression of the disease, this compensation is not sufficient to maintain typical speech rate. As the disease process becomes more severe, articulation is less precise, and reading rates become slower. The inability to initiate movement of articulators is reflected in the increased number and duration of pauses. Prosody measures are characterized by decreased intensity variability and fundamental frequency variability, adding to the perceptual monotonous and reduced loudness of Parkinsonian speech.

Huntington Disease

Huntington disease (Huntington chorea) is a genetic neurodegenerative disease that affects the basal ganglia and parts of the cortex. The selective destruction of GABAergic neurons within the caudate nucleus, and later the substantia nigra, leads to the disruption of the basal ganglia system, and ultimately disinhibition of the thalamus (Murdoch, 2001). The cardinal symptom of the disease is chorea, a variety of uncontrollable involuntary movements, accompanied by bradykinesia of voluntary movements and dementia later in the course of the disease (Strange, 1996).

These involuntary movements interfere with speech production. Speech deficits frequently associated with Huntington disease are known collectively as hyperkinetic dysarthria. Perceptual analysis of choreic speech is predominantly characterized by intermittently harsh voice with a strain-strangled voice quality. In addition, imprecise consonants, prolonged intervals,

irregular pitch fluctuations, variable speaking rate, inappropriate silences, distorted vowels, and uncontrolled variations in loudness have also been reported (Darley *et al.*, 1972).

Acoustically, vowel prolongation tasks have revealed the presence of lower-frequency segments, vocal arrests, and reduced maximum vowel duration, as well as an increased standard deviation of fundamental frequency in patients with Huntington disease (Ramig, 1986; Zwirner *et al.*, 1991). Some studies revealed normal values for shimmer and jitter accompanied by low values of harmonic-to-noise ratio (Ramig, 1988), whereas others found jitter to be significantly higher in a Huntington diseased voice, with the other perturbation measures unchanged (Zwirner *et al.*, 1991).

A number of acoustic studies have focused on the speech motor timing deficits in this disease. The most prominent features observed in a consonant vowel production within the context of a sentence included increased variability of sentence utterance duration and voice onset time (Hertrich and Ackermann, 1994). The measurements of alternating motion rates also revealed increased syllabic durational variability as well as increased syllable duration (Ackerman *et al.*, 1995).

Progressive Supranuclear Palsy (Steele-Richardson-Olszewski Syndrome)

Progressive supranuclear palsy is a neurodegenerative disorder characterized by the presence of neurofibrillary tangles and cerebral atrophy, and with the exception of the frontal lobes, the cortex is generally unaffected. However, degeneration is observed in a number of subcortical nuclei, including parts of basal ganglia (subthalamic nucleus, substantia nigra, and globus pallidus), red nucleus, and superior colliculli, as well as in a number of brain stem nuclei (Duffy, 1995).

The symptomatic picture of the early stages of the disease is very similar to PD. Patients experience rigidity, bradykinesia, and postural instability. The distinguishing feature, usually developing later in the course of the disease, is a gaze palsy that manifests as a paralysis of vertical downward gaze. Speech disturbances are not typically the predominating complaint in most patients at the time of the diagnosis, and they may take a form of generalized dysarthria with the presence of dysphagia. However, there is no single type of dysarthria characteristic for the disease. Usually patients present with a mixed dysarthria with varying degrees of hypokinetic, spastic, and to a lesser extent, ataxic elements (Duffy, 1995). Interestingly, the presence of dysarthria becomes a useful way to distinguish between PSP and PD. Perceptually, the prominent speech characteristics related to the PSP occur more often than in PD and include monopitch hoarseness, nasal emission, excess and equal stress, hypernasality, imprecise articulation, and slow rate (Duffy, 1995). To date, there is a marked lack of systematic, quantitative studies of voice changes in patients with Progressive Supranuclear Palsy.

Multiple Sclerosis

Multiple sclerosis (MS) is a progressive inflammatory neurodegenerative disease. The main pathology involves destruction of myelin and myelin-producing oligodendrocytes, which result in an accumulation of sclerotic plaques and impaired neural transmission. The destruction leads to multiple white-matter lesions throughout the brain stem, cerebrum, and cerebellum. As a consequence, a variety of symptoms can be observed ranging from motor and sensory disturbances to visual symptoms and cognitive impairments (Smith and McDonald, 1999).

Depending on the location of the lesions, patients with MS often present with a variety speech impairments. In general, the mixed form of dysarthria, including spastic and ataxic components, has been most often reported in MS. On a perceptual level, the most frequently observed characteristics of voice and speech were changes in loudness control, voice quality, articulation, emphasis, and pitch control (Darley *et al.*, 1972).

In an acoustic analysis of a sustained vowel phonation, voice samples of patients with MS were characterized by increased long-term phonatory instability, as measured by fluctuations of fundamental frequency and amplitude (Hartelius *et al.*, 1997). Temporal characteristic as measured by alternating motion rate (AMR) and sequential motion rate (SMR) tasks were shown to be a distinct features in MS patients. In general, voice samples of people diagnosed with MS were distinguished by longer gap duration and slower diadokinetic rate for both AMRs and SMRs, as well as longer syllable duration, observed in AMRs. In addition, analysis of energy characteristics revealed reduced vocal intensity in MS group (Tjaden and Watling, 2003). However, only a few attempts have been made to quantify the observed speech changes using systematic measurements such as acoustic analysis.

Acoustic Speech Characteristics in Psychiatric Diseases

Methods of acoustic quantification have also been applied to the speaking behaviors of persons with psychiatric disorders, most notably depression and schizophrenia. This avenue of research makes

inherent sense, as much depressive and schizophrenic symptomatology is assessed clinically using subjective rating scales designed to elicit verbal responses. Under these circumstances a number of rating items from which the clinical impressions are made are influenced by linguistic and paralinguistic aspects of the interview process. For example, in depression, the Hamilton Rating Scale for Depression (HSRD; Hamilton, 1980) guides the clinicians' judgment in rating depressed mood, psychomotor retardation, and anxiety based on subjective assessments of speech, voice, and communication. Similarly, the Positive and Negative Symptom Scale (PANSS; Kay, 1987) for schizophrenia contains a number of rating items related to speech and verbal behavior. Specific items related to clinical evaluation of the client's speech are found in the assessment areas of excitement, blunted affect, emotional withdrawal, poor rapport, lack of spontaneity and conversational flow, stereotyped thinking, motor retardation, disturbance of volition, poor attention, and preoccupation. Both the PANSS and the HRSD are considered gold standards for clinical assessment of their respective disorders, and the inclusion of such a large number of items related to spoken communication behavior indicates the pervasiveness of these traits in schizophrenia and depression.

Schizophrenia

Predominantly negative-symptom schizophrenia (NSZ) can be characterized by a number of atypical reductions in observed behavior, including communication behavior. Classically observed outward manifestations in spoken (e.g., linguistic production) and pragmatic/paralinguistic (e.g., body language, intonation, and prosody) aspects of communication are related to affective flattening, anhedonia, alogia, and avolition (the *Diagnostic and Statistical Manual of Mental Disorders* summarized characterization of NSZ), implying an effect on both affect and cognition. Atypical communication can have an effect on clinical assessment, as it may influence rater scoring on a number of items from subjective behavioral rating scales (e.g., PANSS) including items such as blunted affect, emotional withdrawal, poor rapport, social withdrawal, reduced flow of conversation, and motor retardation, to name a few (Alpert, 1996). Although these rating scales are invaluable in their ability to help clinicians assess symptomatology, the addition of objective and quantifiable measures of disease severity and therapeutic treatment response are desirable and possible through speech and voice acoustic measurement.

In the most basic terms, physical quantitative measurements of communication behavior, using aspects of frequency, intensity, and time, support and extend the clinical impressions of atypical communication used clinically (Alpert, 1996). This adds clinical value by providing repeatable quantification of observed symptomatology.

The literature surrounding acoustic investigations in persons with schizophrenia has revealed a number of consistent themes. Flat affect, alogia, and asociality (as measured by the PANSS scale) are strongly related to restricted speech output, monotonous speech, pause in speech, energy variation, utterance duration, and inflection (both in dB and Hz) (Dworkin, 1996; Alpert *et al.*, 1997, 2000; Puschel *et al.*, 1998). In addition, acoustic measures have shown great promise in identifying treatment response by demonstrating a larger treatment effect than those seen with traditional rating scales (Alpert, 1996). It has also been demonstrated that specific measures of acoustic inflection are sensitive enough to differentiate between antipsychotic compounds (Olanzapine vs. Haloperidol; Remoxipride vs. Haloperidol), whereas rating scales were not able to detect this difference (Alpert M, Smith R C, Pouget E R, Allan E, and Sisson C, unpublished data). Bidirectional changes in the speech acoustic characteristics between drug conditions have also led researchers to the conclusion that different mechanisms of drug action that may be at work, though rating scales were not able to make this distinction (Alpert *et al.*, unpublished data; Alpert *et al.*, 2002). Acoustic measures were able to separate the different drug groups at outcome while the rating scales failed to show a difference.

In a recent acoustic investigation in our laboratory, we have successfully demonstrated measurable differences in cognitive behavior and motor slowing by comparing persons with NSZ to a control group. Speech pause behavior in a simple counting and picture description task have indicated that average pause length was indicating of motor retardation, whereas global measures of pause were indicative of the increased cognitive linguistic demands of the picture description task. The analyses of longitudinal within-subject change data from this study are still ongoing.

Major Depression

The relationship between subjective estimates of the severity of major depression and observed qualitative or quantitative changes in speech production has been documented in a number of investigations. For example, Stassen *et al.* (1998) found a strong correlation between change in clinical ratings of symptom severity and several key voice acoustic measures. This finding was consistent in more than 74% of the researchers' patients undergoing inpatient

pharmacologic treatment for severe Major Depressive Disorder (MDD). Stassen *et al.* (1998) reported that fundamental frequency amplitude and mean pause duration were among the voice acoustic variables that most closely tracked with improvement in symptom severity, as measured by the 17-item HDRS (Hamilton, 1980) over the first few weeks of treatment. The former acoustic measure relates to the muscular and respiratory effort exerted to control phonatory intensity and rate, whereas the latter measure relates to motor timing and the execution of speech movements. These findings corroborate earlier reports that increased speech pause time and total speech time are associated with higher scores on the HDRS and other scales of psychomotor speed and subject self-rating of mood (Teasdale *et al.*, 1980; Hardy *et al.*, 1984). Longitudinal design studies by Ellgring and Scherer (1996) and Stassen (1998) have demonstrated similar results, using measures of speech rate, pause duration, and minimum fundamental frequency.

Regardless of the specific pharmacologic mechanisms of action of the antidepressant medications used in these studies, several speech acoustical measures consistently track with subtle changes in symptom severity. Moreover, these measures seem to be sensitive to early symptomatic improvement, as well as to the degree of response to drug intervention (Stassen *et al.*, 1998). The observed changes seen in these voice acoustical measures quite likely reflect changes in the modulation of both serotonergic and dopaminergic neurotransmitter systems in response to treatment of MDD. Previous literature supports the conclusion that two general aspects of speech and voice, specifically, motor timing and fundamental frequency, are closely related to mood states as measured by both subject self-report and clinician-administered rating scales (Stassen *et al.*, 1998).

The Clinical Utility and Application of Speech and Voice Acoustical Analyses

Acoustic correlates of neurological and psychiatric disorders have a realistic potential to provide complementary, sensitive methods for the early detection of the onset, progression, and severity of several disease states, as well as providing a means to objectively track symptomatic changes induced by therapeutic intervention (e.g., behavioral or pharmacological therapy, or both). There are no known risks related to the use of voice signal capture and analysis. On the contrary, a speech behavioral assessment may provide a rapid, nonintrusive, inexpensive, and relatively effort-free way to obtain objective data regarding disease progression and treatment response. It is noninvasive by nature, and in carefully controlled circumstances, it can provide a large amount of meaningful data. In addition, because altered communication ability is both bothersome and frustrating for so many patients who suffer from the diseases described above, the measurement of an improvement in speech quality is both desirable and encouraging for patients and families alike.

Despite the promising potential applications of this technology, the available literature on this subject remains equivocal and fraught with contradictory results. This variability in published results may actually reflect the high sensitivity of the measurements, the complexity of the speech production system, and the intersubject as well as intrasubject variability inherent in this type of research. Thus, there is a need for more normative data related to acoustical changes associated with neurodegenerative diseases, and improved consistency in methodology across laboratories, so that future results are more readily comparable.

Certain normative profiles have been recently provided in an article by Kent and colleagues (2003) and may help with enhancing the clinical utility of the acoustic analyses of voice disorders. Once the normative rules are applied in experiments across different laboratories, what today is perceived as conflicting results may in the future yield information about different aspects of the same disease. In summary, the acoustic analysis of voice is a research technique with great potential as a diagnostic tool for a variety of neurological and psychiatric disorders.

See also: Classical Tests for Speech and Language Disorders; Specific Language Impairment; Speech Processes in Dysarthria.

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Speech Interface Design

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The term 'speech interface design' refers to crafting a spoken interaction between a human and a computer. As humans, we are all familiar and comfortable with speech as a mode of communication. We 'interface' with other humans by speaking (using speech output) and by listening (using speech input). We call this interaction a conversation. When designing a speech user interface for a computer, the goal is to emulate a conversation convincingly enough that the person interacting with the computer can use what he or she has learned in a lifetime of conversations.

Designing a speech user interface is similar to designing any other interface for a human–computer interaction. A good design relies on using principles of user-centered design, and many of these same principles and techniques can be applied to speech interfaces. For example, it is important to know as much as possible about the people who will be using the application (the users) and to involve them in all stages of the design process. Once a prototype of the

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new application is ready, it is important to test it with users and to iterate on the design. For general background information on user-centered design and usability testing, see Baecker and Buxton (1987), Nielsen (1993), Cooper (1995), and Preece *et al.* (2002).

Although there are similarities with other types of human–computer interfaces, speech interfaces have unique features. Because speech is such a familiar mode of communication for people, users have a certain set of expectations when speaking with a conversational partner. For a speech interface designer, the biggest design challenge is that people expect their conversational partner to understand the meaning of their words. Human listening is not just about decoding sounds; it is also about shared context and comprehension (Clark, 1993).

There are some excellent examples of speech user interfaces that are effective conversational partners. In these systems, the computer 'speaker' seems to remember contextual information and gives the impression of understanding what the user is saying. For example, several airlines use speech applications to handle telephone reservations or lost baggage tracking (Cohen *et al.,* 2004). These systems are a substantial improvement over previous interactive voice response (IVR) systems that relied solely on telephone keypad input. Instead of pressing 1 for this and 2 for that, users can speak natural language phrases, such as "I'd like to travel from Boston to New York." Speech applications have also been used effectively in situations where users' hands and eyes are busy. For example, a number of maintenance and repair applications have emerged, as well as applications to help people when sorting packages and doing other forms of other inventory management.

Not all speech applications are conversational in nature. Some are dictation systems that allow users to create typed text simply by speaking. These systems usually require some work on the users' part to train the system to recognize more accurately the sound of their voice. Although some dictation systems are intended for general text input (for example, typing a letter to your mother), others are tuned for specific domains, such as medical specialties (e.g., radiology) or legal dictation.

In general, it is effective to use speech applications for situations when a user's hands and eyes are busy doing another task. Likewise, speech input is useful when there is no keyboard available for text entry, such as when interacting with a computer over a telephone. Speech input is also a valuable means of interaction for people with certain types of physical disabilities that limit the use of their hands or for users who are not comfortable typing. Speech output is particularly liberating for people with visual impairments. In addition, it can be used to grab users' attention or to embody a particular personality for a computer system or character.

Although speech seems like it might be the ideal way to communicate with a computer at any time, there are situations when it is best not to use a speech user interface. For example, speech output is ineffective for delivering large amounts of information. Not only is it difficult for users to maintain the information in their short-term memory but people can also read much faster than they can listen. Speech input can also be problematic when the speaker is not in a private environment or when there are other voices in the background that might interfere with speech recognition.

The balance of this article addresses the steps necessary to design an effective speech interface. These steps include modeling the task the users will be accomplishing, listening to how they speak when accomplishing the task with another human, refining the task model, and selecting an appropriate technology. Once these steps are accomplished, the heart of the work for a speech interface designer is to design the dialogue – in other words, craft the prompts that the system will 'speak' and prepare the system for what the users will most likely say in response. Lastly, there should be a series of tests for the system, initially in the lab with users given a set of predefined tasks to accomplish, and ultimately out in a real-world environment with users accomplishing real tasks. In between the various forms of testing, a designer needs to allocate time to refine the design and make changes based on what is learned from the results of the testing.

Model the Task

The first step in a successful speech interface design is to model the task that will be enabled with speech technology. Modeling requires the designer to sketch out the logical steps that make up the task, along with the pieces of information that need to be exchanged to complete each step. With a speech application, each interaction between the system and a user is often referred to as a 'turn.' Thus, the 'task model' tries to capture the expected number of turns, as well as the vocabulary that is required to support the information exchange during those turns. It is important for the designer to take into consideration possible alternate flows because not all users approach the task in the same way. For example, when making a flight reservation, some users select a flight based exclusively on time schedules, whereas others

opt for airline loyalty and price points, accepting any flight time that meets their criteria for loyalty and price.

The model needs to operate within the set of constraints for the application. Constraints usually include the business goals for creating the speech application, as well as the requirements resulting from either the environment that users may find themselves in (e.g., noisy environment) or from the users themselves (e.g., the majority of users will be over 65 years old and uncomfortable with technology). For example, if one of the business goals is to cross-sell related items when a customer makes a purchase by calling into a speech-enabled call center application, the designer will want to incorporate a turn that involves the system suggesting related items that are on sale today.

Listen

After one has a rough model of the task, the next step is to educate oneself on how people talk in the domain of the task. One does this by listening to users who are doing an activity that is as close as possible to the target task. Keep in mind that the vocabulary and sentence structure used in graphical computer applications or in printed material may be quite different from the way people actually speak about a task. For example, imagine that you want to provide a speech interface to a calendar. Printed calendars and on-line calendars typically show day, week, and month views of calendar appointments. They always show days of the week and numbered dates. As soon as you listen to two people talk about appointments and scheduling, however, you learn that they only use numbered dates occasionally. The more common way to discuss dates with other people is to use relative descriptions: "What do you have a week from Monday? Are you busy this Thursday? What about the next day?" The concept of relative dates is completely absent from paper-based and on-line calendars; however, when speaking, users will expect to be able to use them.

With a little creativity, one can find or create situations in which two people can talk about the task for which one is creating a speech interface. Although one might want to plan out the interactions a little bit, care must be taken not to use scripts or memorized phrases. The goal of this type of listening is to allow people's natural social instincts to drive the dialogue. If at all possible, record the natural dialogues because they will serve as the basis for the speech interface design. Listening in this way is called a 'natural dialogue study.' Using natural dialogue studies, one can learn about the following:

- concepts used when talking about the task that are absent in other media
- common vocabulary used when talking about the task
- tone of voice that is considered polite in the context of the task
- sentence structure typical for the domain
- patterns of interaction
- methods people use to give one another feedback.

Refine the Task Model

With a sound understanding of how people speak in the domain of the application, the designer needs to go back to the task model and modify it based on what was learned from the natural dialogue studies. Doing so will most likely require adjustments to the vocabulary, as well as the flow for turn taking. In addition, the designer probably now has sufficient information about the types of users who will be interacting with the system to define a set of user characteristics. Some characteristics include comfort level with technology, frequency of interactions with the system, and motivation (e.g., entertainment, information browsing, or goal-oriented), as well as any additional user demographic information. When deciding on the general tone of the spoken application (e.g., financial applications should incorporate a more serious tone than a restaurant directory), the designer should consider the user characteristics, as well as the targeted platform for the solution (e.g., PDA, telephone, or cell phone) and the domain of the application. In most cases, the application will be designed to run on any telephone (land line or cell), and so the designer should focus on the harder of the two conditions, the cell phone, to make sure the application will run smoothly in this challenging environment for speech recognition. The designer will also have to decide whether to use a directed or an open-ended style for the interaction. The two most important factors that influence the style of the interaction are the type of system prompts that are written and the voice talent selected to record them.

Select the Technology

Although good interaction design in a speech application can compensate for certain shortcomings in speech technology (e.g., the lack of complete accuracy), if a certain baseline level of accuracy is not achieved, usually above 85%, the application will most likely not succeed. The level of accuracy depends on the choice of the underlying speech technology. As mentioned in the speech technology articles

(*see* **Speech Recognition: Statistical Methods**), speech recognition systems rely on three primary types of supporting files: an acoustic model, a vocabulary, and some form of grammar. In smaller command-and-control systems, such as a stock purchasing telephone application, the grammar is defined explicitly through a series of rules. For tasks that need to accept a much wider range of input – for example, software that supports dictation of medical reports – the 'grammar' is statistically defined and is referred to as a statistical language model (SLM). Because the input is more predictable, small-vocabulary grammar-based systems are more accurate than large-vocabulary SLM-based systems and thus should be used exclusively when working in challenging environments, such as noisy mobile phone usage. The advantage of a SLM is that it allows users greater flexibility in what they can say.

Another decision the designer will have to make is whether or not to allow barge-in. When barge-in is not enabled, the speech recognizer does not start listening until the end of the system prompt that is currently playing. If barge-in is enabled, it starts listening right away, and the user can interrupt the system at any time. Most systems these days support barge-in; however, because most users are not familiar with speech technology and are conditioned to think that interrupting speech is impolite (even if it is only a computer speaking), it is best to design natural pauses in long system prompts to give users the opportunity to interrupt without speaking over the prompt.

Whenever possible, it is a good idea to work with the speech technology vendor to ensure that the vocabulary, language model, and acoustic model accurately reflect the task, users, and environment. In most cases, the acoustic model cannot be modified without great cost and without making special arrangements with the vendor; however, the acoustic model is built with the intention of covering a wide range of situations. This is a good feature, because if only unaccented speech in a quiet setting was used to build the model, imagine the accuracy if it were used for workers who speak heavily accented English on a factory floor. In addition, the language model should be tuned to any particular phrasings used in the domain.

The last technology decision that the designer will have to make is whether or not to use any synthetic speech in the system. Synthetic speech, also known as text-to-speech (TTS), is speech produced by computer (*see* **Speech Synthesis**). Given that today's synthesizers still do not sound entirely natural, the choice whether to use synthesized output, recorded output, or no speech output is often a difficult one. Although recorded human speech is much easier and more pleasant for users to listen to, it presents a technical challenge when the information being presented is dynamic. For example, recorded speech cannot be used to read people their e-mail messages over the telephone. This is because the text is not known in advance and thus cannot be prerecorded. Most systems on the market today use recorded speech for system prompts that do not change and synthesized speech for dynamic text.

Design the Dialogue

The first step in designing a dialogue for a speech user interface is to review the data collected in the listen phase. Even an informal natural dialogue study provides a starting point for designing the four major components of the dialogue: prompts, input grammar for user commands, feedback, and error handling.

Prompts

Prompts are the instructions that the computer speaks to the user. A series of studies have shown that users unconsciously attribute personality traits to computers that speak, whether or not the designer intends for this to happen (Reeves and Nass, 1996; Cohen *et al.,* 2004). Given this factor, it is a good idea to design 'personality' into the dialogue from the outset. When designers consider the personality of the interaction, they make decisions about the wording of the prompts, the use of personal pronouns, and the sound of the voice that speaks the system prompts. The design should be dependent on the task and should be consistent with the brand experience one wants to present to users. Here are several sample prompts:

(P1) Computer: "Welcome to the ABC Bank-by-phone system where you can check your balance, pay a bill, or transfer money. Please say 'Check Balance,' 'Pay Bill,' or 'Transfer Money.'"

(P2) Computer: "Welcome to ABC Banking. Do you want checking, savings, or something else?"

(P3) Computer: "How can I help you?"

Because speech takes a long time to listen to, prompts need to be as short as possible to convey the necessary information. People are most likely to understand prompts if they do not use jargon and stick with the vocabulary, tone, and sentence structure observed in the natural dialogue study.

Prompts fall along a continuum from directed to open ended. Although speech manufacturers' literature often states that a directed dialogue is "a conversation with a goal," in reality, most directed dialogues

do not feel like conversations at all. With a directed dialogue, the system prompts direct the user what to say (hence, the name directed dialogue), as in (P1). Alternatively, a directed dialogue may be constructed like a form-filling application where the user is prompted for pieces of information to fill in the 'blanks' on the form. Here is an example of this style of interaction:

Computer: "Welcome to the Phone Travel Company. What city are you traveling to?"
User: "San Francisco."
Computer: "What city are you traveling from?"
User: "New York."
Computer: "On what day will you be traveling?"
User: "Saturday, May 6th."
Computer: "Around what time of day would you like to leave?"
User: "Around 5 p.m."

Open-ended prompts, such as "How can I help you?" (P3 above), invite users to speak a wider range of options. They enable more natural dialogues, but are also the most likely type of prompt to cause errors. People frequently will say things that the computer cannot understand. Often, the best tradeoff is to write moderately directed prompts, such as the second example (P2), which give users clear guidance about what to say, but still offer some degree of naturalness.

The type of interaction that is easiest for users and feels the most natural is a mixed initiative system. In this style, the system and the user take turns initiating the communication, depending on the flow of the conversation and the status of the task. With a mixed initiative system, the prompts can fluctuate between open-ended prompts and more directed prompts, depending on the context. If the user is encountering several speech recognition errors in a row, a good design will fall back to a constrained and directed style of interaction to move the conversation forward. When the consequence of the action is important – for example, when making money transfers or financial purchases – it is good to use a directed style to ensure that there is no ambiguity: "You wish to purchase 1000 shares of Omaha Mutual, please say yes or no."

Input Grammars

Once the computer has prompted a user, an input grammar governs what the computer can 'understand.' Grammars must be written in a formal grammar language that is dependent on the type of speech recognizer being used. If one is writing an application written in the Java (TM) programming language and using the Java Speech Grammar Format (Java Speech, 1998), for example, a snippet of an input grammar might look like this:

```
<command> = [<action>] <object> [please];
<action> = (I want) | (give me) | (let me have) | (go to);
<object> = ([my] checking [account]) | ([my] savings
   [account]) | (something else);
```

When faced with the second banking prompt (P2) above, the computer will be able to accept user commands, such as the following:

User: Checking please.
User: Savings account.
User: Let me have my checking account.
User: I want something else.

As the complexity of the grammar increases, so does the probability that the speech recognizer will make errors.

Feedback

Once the user has spoken a command, feedback is used to let the user know that the speech recognizer correctly decoded the speech (or not). Continuing with the banking example, feedback resulting from the user command, "Checking please," might be:

Computer: "Accessing checking."

It is common for feedback and prompts to be combined in order to move the dialogue forward as quickly as possible. For example:

Computer: "Accessing checking. Do you want balances, check history, or something else?"

Another important function of feedback is to let the user know if the computer is waiting for input or is busy processing input that it recently received. In conversations, timing is critical. People read meaning into pauses. Unfortunately, processing delays in speech applications often cause pauses in places where they do not naturally belong. For example, users may interpret a system silence, as they would in a human–human interaction, to mean that they were not heard or not understood. Doing so normally causes them to repeat themselves, which can lead to cascading problems in the interaction. It should be made clear to the user when the system is busy dealing with a request so that he or she does not speak again yet.

Error Handling

If the speech recognizer or the user does make an error, a well-designed speech user interface always

provides a way to correct the error. For example, an error correction grammar might be written to allow users to say things such as:

User: "Uh Oh!"
User: "Go back."
User: "That's not correct."
User: "No, I wanted savings."

The error correction strategy can also be explained in the prompt/feedback statement:

Computer: "Accessing checking. Say 'go back' if this is incorrect. [short pause] Do you want balances, check history, or something else?"

Error correction itself requires feedback so that the user knows that the error was acknowledged and corrected. For example, if the user says "go back," the feedback "sorry" might be combined with the more directed instructions on how to proceed:

Computer: "Sorry. Please say 'checking,' 'savings,' or 'other.'"

Usually, the command grammar is modified at this point to restrict input only to the exact words specified in the prompt to increase the likelihood of recognition success. Once the desired function is determined, the system could present the user with an example of a valid utterance.

Computer: "Would you like to buy, sell, or check stock prices?"
User: "I would like to sell."
Computer: "To sell a stock, you could say, for example: Sell 100 shares of GE at the market price."
User: "Sell 35 shares of Market Goods at the market price."

Test

Involving users throughout the design process of a speech application is crucial. A natural, effective interface can only be achieved by understanding how, where, and why target users will interact with the application. Testing early and discovering problems before too much effort has been put into the implementation saves time and money. Once a preliminary application design is complete, a wizard-of-oz study can help test and refine the interface. The speech data collected from this study can be used to help develop the grammar or, in the case of a natural language understanding system, to statistically train the engine on potential utterances. In these studies, a human wizard – usually using software tools – simulates the speech interface while interacting with users. In good wizard-of-oz studies, most users do not realize they are actually interacting with a human who is playing recorded responses. Major usability problems are often uncovered by these types of simulations.

Because computer tools are usually necessary to carry out a convincing simulation, wizard-of-oz studies are more time consuming and complicated to run than natural dialogue studies. If a prototype of the final application can be built quickly, it may be more cost effective to move directly to a usability study. A usability study assesses how well users are able to carry out the primary tasks that the application is designed to support. With speech applications, usability studies are particularly important for uncovering problems due to recognition errors, which are difficult to simulate effectively in a wizard-of-oz study, but are a leading cause of usability problems. Conducting such a study requires at least a preliminary software implementation. The application need not be complete, but some of the core functionality must be working. Usability studies can be conducted either in a laboratory or in the field. Study participants are typically presented with one or more tasks that they must figure out how to accomplish using the application. Additionally, the effectiveness of an application's error recovery functionality must ultimately be tested in the environments in which real users will be using the application. A good way to do this for telephone applications is to allow the new speech application to go live for a certain number of callers and to listen in on the interaction.

Final Tuning

Testing with real users accomplishing real tasks in a realistic environment will provide information that allows the designer to modify the grammar and prompts as necessary. Occasionally, live testing reveals that the wording of certain prompts consistently produces responses from users that were not predicted and thus are not modeled correctly in the grammar. Or, it could be that adjustments to the dialogue flow are necessary.

If testing goes on long enough to allow the same user to interact with the system more than once, it is useful to examine the log for significant differences between the first and second interaction to determine how much learning takes place or if each call is like a first call. If learning is taking place, the designer might want to include helpful hints on how to speak to the system, which can be removed over time. In addition, if users are hesitating before speaking or

after speech has been initiated, the amount of time to pause for silence detection can be increased.

Conclusion

Designing an effective speech user interface is an iterative process. Not even the most experienced designer will craft a perfect dialogue in the first iteration. To ensure that the system will be used over time, focus on users and do not be afraid to modify the design as new data are collected. Observe users during the task modeling phase to understand who they are and what are their goals. Listen carefully to users while conducting natural dialogue studies to determine how they speak in the context of the task. Test the design with target users to ensure that the prompts are clear, that feedback is appropriate, and that errors are caught and corrected. In addition, when testing, verify that the design is accomplishing the business goals that were set out to be achieved. If problems are uncovered during the test, revise the design and test again. By focusing on users and iterating on the design, one can produce an effective, polished speech interface design.

See also: Speech Recognition: Statistical Methods; Speech Synthesis.

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Speech Perception

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Introduction

When we listen to speech, our aim is to determine the meaning of the acoustic input. Only very rarely is a listener – usually some kind of speech scientist – concerned with the sounds of speech instead of with the content. Yet the study of speech perception has largely dealt with how listeners tell phonemes – the sounds of speech – from one another. Why is this so?

Phonemes are, by definition, the minimal units that distinguish between words, i.e., between one meaning and another. Listeners may know tens, indeed hundreds of thousands of words, and may still be able to learn new words effortlessly on a daily basis. However, languages construct this vast stock of words from, on average, only around 30 separate phonemes (Maddieson, 1984; see **Figure 1**). Thus, there is both parsimony and validity in the speech perception research program. Parsimony, because study of the perceptual cues to a few dozen phonemes is tractable in a way that study of the perceptual cues to individual words is not, and validity, because understanding how listeners tell, say, a /b/ from a /p/ informs us about the recognition of all word pairs that differ in these phonemes. It is important to realize that this research focus on cues to phonemic identity did not proceed from an assumption that phonemes necessarily played a role as units of speech perception. In fact, there have been many competing proposals concerning the basic unit of speech perception, all more or less unsatisfactory (Klatt, 1989), from units below the level of the phoneme (phonological features) to above it (diphones, syllables) to no sublexical unit at all. Rather, the phonemic research focus was the result of rational task analysis: to understand speech, listeners need to recognize words, and the process of recognizing words involves distinguishing a word from all other words that are its closest neighbors in the vocabulary – *word* from *bird*, *ward*, *work*, and so on. By making such distinctions, the listener

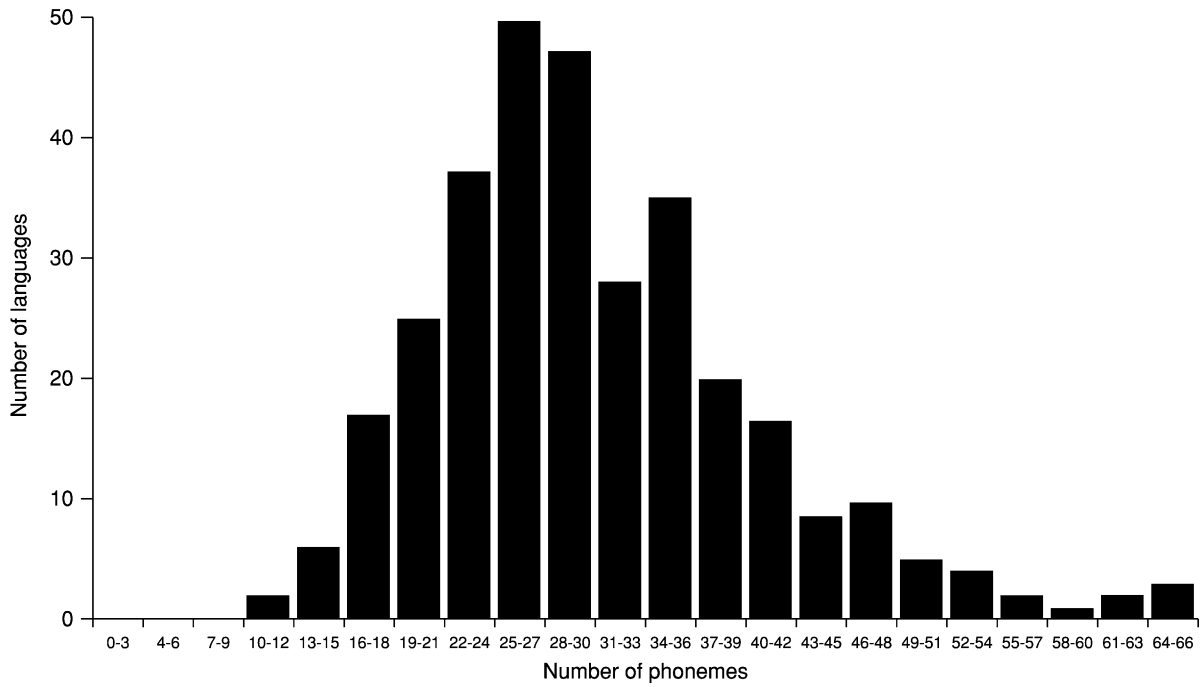

Figure 1 Distribution of phoneme inventory size across the representative sample of 317 languages analyzed by Maddieson (1984). The average number of phonemes is 31.

is effectively making decisions that are phonemic in nature.

True to the history of speech perception research, therefore, this review is organized first by phonemic category and the type of information that enables listeners to recognize members of each category; following sections deal with the principal theories that have driven speech perception research; and we conclude with a section on how this body of research relates to the recognition of the larger, meaningful units that really concern listeners.

Phoneme Perception

Phonemes in Real Speech

If words can indeed be viewed as a sequence of phonemes, it might seem reasonable to assume that these sounds are concatenated one after another in the speech stream. This is far from the case. Speech signals are continuous and it is hard to discern where one word ends and the next begins, let alone locate the borders of individual phonemes (see Figure 2). An analogy concocted by Hockett (1955: 210) still appears in most introductory textbooks: phonemes in speech are like colored Easter eggs moving on a conveyor belt to be crushed by a wringer. The wringer smears out the eggs so that no part of the conveyor belt is exclusively covered by the remains of one particular Easter egg. As a consequence, the coloring of one egg is mixed with the colorings of the surrounding eggs. This analogy is intended to convey that the speech signal is neither separable nor invariant. It is not separable because no part of the speech signal is exclusively influenced by one phonological unit. It is not invariant because adjacent – in fact even nonadjacent – phonemes are coarticulated, so that acoustic correlates of a given phoneme vary. Therefore, running speech is completely different from, for instance, Morse code, in which invariant acoustic signals are concatenated. In making this important point, the lack-of-invariance argument may sometimes be exaggerated. Some phoneme classes – for example, voiceless fricatives – can have quite salient and local cues (see the different tokens of /s/ in Figure 2). Others, however, show a great deal of variation. Stop consonants are a case in point; exactly the same stretch of speech can be heard as /p/ before one vowel, but as /k/ before another (see Figure 3). Vowels can also be highly coarticulated; thus the second formant (F2) in a vowel will generally be higher after alveolar consonants than after labial consonants, corresponding to the higher F2 locus in alveolar than in labial consonants.

Sources of variance arise both within and between speakers. Not only the phonetic context in which a phoneme occurs, but also the rate of speech and the speech register (from formal and careful to casual and careless) can affect how that phoneme is realized

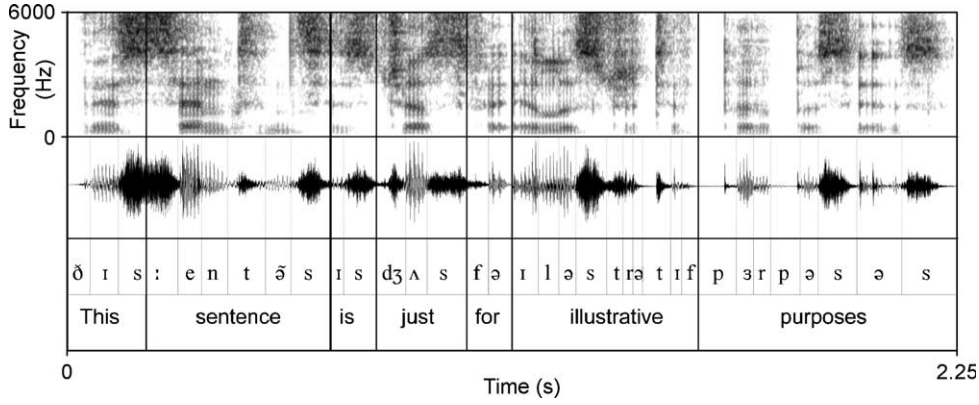

Figure 2 An oscillogram and spectrogram of the sentence *This sentence is just for illustrative purposes* spoken by an adult male native speaker of British English born in Scotland.

within the utterances of a given speaker. So too can the degree of prosodic prominence within the sentence of the word in which the phoneme occurs. Variance between speakers arises most noticeably from physiological differences, e.g., in that the formant frequencies of vowels reflect the resonances of the vocal tract. The resonances are lower the larger the vocal tract; thus children produce higher formant frequencies than adults, and adults also differ. Further interspeaker variance is introduced by dialectal variation.

Variability may sometimes be so extensive that, superficially, a phonemic contrast is blurred. For instance, most languages that use nasals in word-final position allow the place of articulation to be assimilated to the place of a following consonant; the final consonant of *sun* may be pronounced /n/ in *suntan*, /m/ in *sunbathing*, /ng/ in *sunglasses*. In running speech, sounds may be deleted (e.g., the word *just* in Figure 2 contains no [t]) or inserted (an utterance of *something* may contain cues consistent with a /p/ between the two syllables, or an utterance of *pensive* may contain cues consistent with a /t/).

All of this variability makes the perception of cues to phonemes a nontrivial task for listeners. A large body of early speech research was dedicated to the search for invariant acoustic properties of phonemes. This enterprise may be reckoned unsuccessful with respect to its ultimate goal. Nevertheless, these efforts have certainly succeeded in finding acoustic properties, or cues, that correlate with certain phonemes or phoneme classes. This body of work represents a cornerstone of the study of speech perception and describes the basic cues for the recognition of phoneme classes and distinction within these classes.

Vowels Vowels are usually the parts of the speech signal containing local maximal amplitudes and periodicity caused by the vibration of the vocal folds. With these two cues, vowels can be reasonably well distinguished from consonants (see Figure 2). The vocal fold vibration gives rise to a periodic source signal with a large number of harmonics. This source signal is then filtered by the vocal tract (*see* **Speech Production**). The vocal tract amplifies some of the harmonics due to its resonance characteristics. Regions with amplified harmonics are called formants. The frequencies of these formants depend on the exact shape of the vocal tract, that is, on tongue position and shape, the position of the jaws, etc., (*see* **Speech Production**). Accordingly, vowels can be distinguished from one another by their steady state formant frequencies. The vowel system of a particular language is often presented in a two-dimensional vowel space with first-formant frequency on the ordinate and the second-formant frequency on the abscissa. This representation gives rise to a vowel triangle with the vowels [u] as in *shoe*, [i] as in *she*, and [a] as in *shah* as corners. Other vowels can be associated with different positions in this vowel triangle. Accordingly, listeners can identify vowels by computing the position in formant space (Nearey, 1989).

A number of facts complicate this simple picture. First, some languages also use diphthongal vowels, which are characterized by a formant movement throughout the vowel (as the vowel in *shy*). These diphthongs are usually contrasted to steady-state monophthongs, though categorization of vowels as either diphthongal or monophthong is in fact often difficult. Second, cues to vowel identity are also provided by duration – even in languages that do not distinguish long from short vowels – and by dynamic properties of consonant (C)-vowel (V) and VC transitions. Evidence for the importance of transitions comes from studies with so-called silent center CVC syllables, in which the steady-state portion of the vowel has been replaced by silence. Despite this

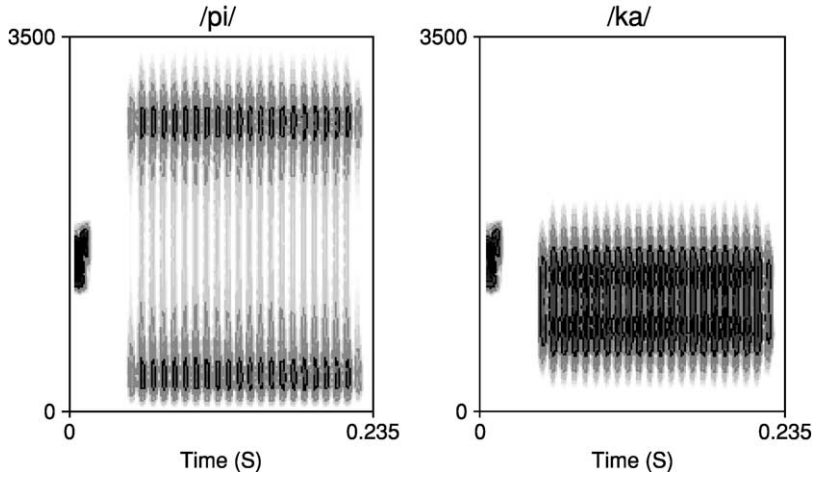

Figure 3 Two synthetic syllables with the same noise burst at the onset as used by Liberman (1996: Chap. 3). The two syllables are perceived as /pi/ and /ka/, that is, with different stop sounds, despite the identical noise burst.

gross mutilation of the vowel, identification accuracy is only slightly impaired. This cannot simply be attributed to a 'good-continuation' interpolation strategy over the silent part of the syllable that effectively restores the steady state, because silent-center syllables are still well identified if the onset and offset stem from different speakers. Instead, the dynamic consonant–vowel properties seem to carry higher-order invariants for vowel identification (Strange, 1999).

Sufficiency of one type of cue of course does not render other types of cue superfluous; it is clear that listeners can exploit both static and dynamic information in vowel perception.

Semivowels and Stops – Dynamic Consonants The classes of semivowels and stop consonants share the property of being defined by articulatory and hence formant movement. The labial stop [b] and labial glide [w] show similar formant transitions. The difference between the two sounds lies in the speed of the formant movement, which is faster for the stop than the semivowel. The semivowel [w] could be described as lying between the vowel [u] and the stop [b]; the stop has a fast rate of formant movement, the vowel has no or only a small amount of inherent movement, while the semivowel has a moderate amount of movement (Liberman, 1996: Chap. 6). Within the stop and semivowel classes, distinctions can be described by the concept of locus (Liberman, 1996: Chap. 5). Thus, [b] and [w] are associated with a labial place of articulation, while the corresponding [d] and [j] are associated with a alveolar place of articulation. Formant movements originate at the appropriate locus for each place or articulation, with especially the second and third formant being relevant for place distinctions. However, the actual onset of the formant frequencies will not be invariant (see Figure 2, with different formant-transition onsets in *purposes* for /pɜ/ and /pə/). The onset of the formant frequency is codetermined by the vowel. This has led to the concept of locus equations, which allow the place of articulation to be inferred based on formant-onset frequency and steady-state vowel frequency (see Sussman *et al.*, 1998, and the associated commentaries for strength and weaknesses of this concept).

Another well-studied distinction is the case of the voicing contrast for stops. English, for instance, contrasts voiced with unvoiced stops, as in *bath* versus *path*. The main cue for this distinction is voice-onset time (VOT). VOT is the temporal disparity between the onset of the opening of the vocal tract and the period movements of the vocal folds. The acoustic cues that arise as a consequence of this timing difference will be, in the case of a negative VOT (the onset of voicing then precedes the opening of the vocal tract), a 'prevoice bar,' a low-frequency hum. In case of a positive VOT, an aperiodic release burst is followed by aspiration. The exact location for which listeners switch from perceiving a voiced to a voiceless stop is language-specific, with some languages making a three-way distinction between prevoiced, unvoiced, and unvoiced aspirated stops.

Nasals and Fricatives – Static Consonants Nasals and fricatives share the attribute of having a stationary part. In Figure 2, which shows an example of running speech, six examples of [s] and one [n] can be seen. In all cases, a short but nevertheless reasonably stationary portion of the speech signal may be observed. Nasals are generally characterized by a

low-amplitude, low-frequency voiced signal (caused by an antiresonance; *see* **Speech Production**). Voiceless fricatives, in contrast, contain high-frequency noise. In the case of voiced fricatives, this noise is accompanied by a low-amplitude voicing. Within-class differences are signaled by spectral properties. For fricatives, lower fricative noises signal a more retracted place of articulation.

However, formant transitions in surrounding vowels also contribute to the identification of nasals and fricatives. For the case of prevocalic nasals, formant transitions in the vowel seem to be the most important cue. For postvocalic nasals and fricatives, the formant transitions become less important, while the importance of the steady-state spectral cues increases. The identification of nasals is, however, further complicated by reductions in running speech, such as assimilation, or deletion with nasalization of the previous vowel (as in the second nasal in *sentence* in Figure 2).

Laterals and Rhotics The recognition of laterals, e.g., [l] in the English word *lap*, and rhotics, e.g., [ɹ] in the English word *wrap*, is especially complicated. First of all, implementation of an /l/–/r/ contrast varies strongly across languages. In American English, the contrast is carried mainly by the frequency of the third formant. In Hungarian, the /l/–/r/ contrast is a contrast between a lateral and a trill, which is mainly carried by the presence or absence of amplitude modulation. While laterals can be defined phonetically, rhotics in different languages can be so different that some have retreated to the position that "the terms rhotic and 'r-sound' are largely based on the fact that these sounds tend to be written with a particular character . . . namely the letter 'r'" (Ladefoged and Maddieson, 1996: 215). This diversity is countered chiefly by the fact that these sounds seem to replace one another in related languages, or even in different accents of the same language.

In a given language, both /l/ and /r/ often vary in their pronunciation as a function of position in the syllable. Moreover, large interindividual sociophonetic and geographic variations are especially salient for these phonemes. Finally, the acoustic manifestations of the difference between [l] and [r] in English are particularly nonlocal. Reliable acoustic differences between words containing [l] and [r] may extend for more than one syllable to the left and right. As such, the perception of these segments proves to be a challenge for models that assume that spoken language must be recognized via identification of phonemes.

Trading Relations A list of cues to phoneme identity invokes an overly simple picture of speech perception: the perceptual system computes certain values, such as VOT, and then a language-specific mechanism applies simple rules such as (if [VOT $>$ 0.02s] $\Rightarrow$ voiceless). Alas, the speech signal is both too poor and rich to support such simple decision making. The signal is too poor in that, as described above, it lacks clear invariant properties that are reliably associated with a given speech sound. But secondly, it is also too rich, because a multitude of cues exist for each contrast. Consider the intervocalic voicing contrast in English *rabid* vs. *rapid*. Lisker (1986) lists no fewer than 16 cues to this distinction, including length of the preceding vowel, closure duration, and pitch contour. This redundancy partly compensates for lack of invariance, because information in one dimension can be 'traded' against information in another. Thus, a VOT more consistent with *rapid* may be over-ridden if the length of the preceding vowel strongly cues *rabid*. Note that it is in part due to this redundancy that a reasonably comprehensible signal may remain even after quite extreme deformation of the speech signal, for instance, silencing of the center of vowels.

Categorical Perception

As an empirical phenomenon, categorical perception is probably the most-oft replicated effect in speech perception. Consider the way in which the onset of the second formant crucially distinguishes [da] from [ba]. If in a sequence of synthetic syllables the second formant's onset frequency is varied continuously from a low [ba]-like value to a high [da]-like value, one should expect that listeners would report hearing the syllables becoming progressively more [da]-like. However, this is not what happens. Instead, listeners first report hearing token after token of [ba], and then suddenly change to reporting [da]. Only a small subset of stimuli is perceived ambiguously, that is, sometimes as [ba] and sometimes as [da] (see Figure 4).

In a classic experiment Liberman (1996: Chap. 10) evaluated both the categorization of such a continuum and the discrimination of sounds along this continuum in an ABX task (in which listeners hear three stimuli and decide whether the third is identical to either the first or the second). Listeners showed little ability to discriminate stimuli that were identified as the same phoneme, while they succeeded in between-category discrimination. This finding was of particular interest because it contrasts with the relation of identification and discrimination in other auditory perception domains. In pitch perception, for instance,

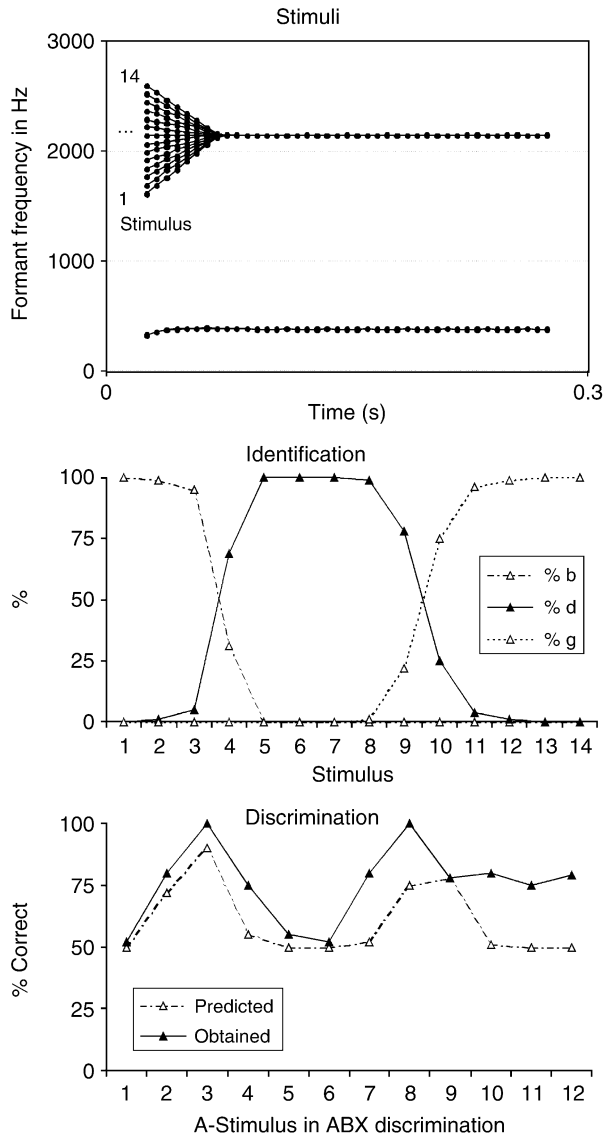

Figure 4 Illustration of categorical perception after Liberman *et al.* (reprinted in Liberman, 1996). The upper panel shows the stimuli 1–14, differing in the second formant transition. The middle panel shows the identification of the stimuli as either /ba/, /da/, or /ga/. The lower panel shows the results of a two-step discrimination task, in which stimulus one had to be discriminated from stimulus three. The figure shows that discrimination peaks coincide with category boundaries, but also that discrimination is generally better predicted by categorization.

discrimination performance exceeds identification performance: listeners can discriminate more than 1000 pitches, but have difficulty forming more than seven categories reliably. Moreover, the categoricality of perception was also found to disappear when formant transitions were presented without a vowel context. Consequently, there is no sharp discontinuity in perception, but each 'chirp' is perceived as equally different from neighboring members of the continuum. This finding further suggested that categorical perception was speech-specific.

Later findings, however, undermined this claim. For VOT contrasts, it has been shown that the boundary effects rest on discontinuities in auditory processing (*see* **Categorical Perception in Animals**). Moreover, the success of within-category discrimination is always better than chance, and more importantly, depends on the task and its implementation. The steepness of identification functions may, hence, be more aptly attributed to categoricalness at a decision rather than a perceptual level (see the chapters in Harnard, 1987).

The steepness of identification functions also varies with the speech contrast tested. Perception of vowels tends to be more continuous and within-category discrimination is easier to elicit. However, discrimination nevertheless seems more difficult if one of the two vowels to be discriminated is close to a prototypical vowel in a given language. This perceptual-magnet effect was supposed to be specific for speech perception (Kuhl, 1991). Later developments, however, cast doubt on the perceptual-magnet effect as such, and its specificity to human speech perception (e.g., Kluender *et al.*, 1998).

Two further findings in the categorical perception tradition indicate that the identification of a given stimulus varies with its environment (see the chapters in Harnad, 1987, for reviews). The first, an effect of the immediate environment of a speech sound, is called selective adaptation: an ambiguous stimulus between [ba] and [da] is perceived as [ba] if it is preceded by multiple [da]s, but as [da] if it is preceded by multiple [ba]s. This was explained by the assumption of specialized detectors for features that were subject to fatigue if repeatedly activated by an input; subsequent investigations, however, showed that adaptation can be explained by a combination of simple contrast effects with auditory adaptation. The second such effect, reflecting an influence of the larger-scale environment, is the effect of stimulus set range. If a stimulus set contains a good example of [ba] but only bad examples of [da], listeners will be more likely to identify intermediate stimuli as [da] than if the continuum ranges from a 'good' [da] to a 'bad' [ba]. Recently, a specifically lexically conditioned range effect has been discovered. Norris *et al.* (2003) exposed listeners to two lists of words and nonwords. One list contained some words ending in a 'good' [s] and other words ending with a 'bad' [f], while the other list contained words ending in 'good' [f] and a

'bad' [s]. Similar to the range-effect phenomenon, listeners exposed to the list with the 'good' [s] and the 'bad' [f] were more likely to perceive an ambiguous fricative as [f] than listeners exposed to the other list. In contrast to simple range effects, however, this only occurred if the unclear fricatives were embedded in words and not if they were embedded in nonwords. This indicates that lexical knowledge was used to shift the category boundary. Overall, these effects indicate that listeners have flexible phonetic boundaries, which can change based on influences of the immediate and the overall acoustic–phonetic context as well as based on lexical influences. The fact that languages change over time, and that pronunciation of speech sounds changes not only within a speech community but in the speech of individual members of the community (*see*), further underscores the flexibility of category boundaries.

Context Effects

Listeners' experience of variability in speech produces efficient compensation for variance-adding influences. Ladefoged and Broadbent (1957) presented test words embedded in the sentence *Please say what this word is* to listeners who had to decide whether the test word was *bit*, *bet*, *bat*, or *but*. A test word perceived primarily as *bit* in isolation was perceived predominantly as *bet* when presented in context of a carrier sentence with a lowered first formant. Thus, listeners judged vowels not only by their absolute formant frequencies, but also in relation to the formant frequencies in the surrounding words: if the test word was presented in the sentence with lowered F1, this as it were increased the perceived F1 in the test word, leading to the percept of a lower vowel. (Phonologically low vowels are associated with high F1 frequencies.)

Not only relational cues, such as formant frequencies in the surrounding words, but also intrinsic cues lead to such vowel normalization. For instance, f0 and higher formants may represent a frame against which absolute formant frequencies are evaluated. Other approaches argued for distance or ratio measures (e.g., [F1–f0] or [F2/F1]) as possible invariants over varying absolute values of formant frequencies. In a comparative study, Nearey (1989) showed that the strongest effects seem to be caused by relational properties, although – in keeping with the redundancy and multiple determination of speech perception – intrinsic vowel information also plays a role.

Compensation also occurs for within-speaker variation due to phonetic context. Lindblom and Studdert-Kennedy (1967) found that vowels with the same center frequencies were judged as more [back] – corresponding to a lower perceived F2 – in a [dVd] context than in a [bVb]. Similar effects have been observed for liquid-stop, fricative-stop, fricative-vowel, and vowel-nasal contexts (see Holt and Kluender, 2000 for a review). Likewise, compensatory influences have been observed for speech rate; a formant movement of a given duration is more likely to be perceived as [ba] if it is followed by a long vowel, as [wa] if it followed by a short vowel. A physically long vowel signals a slow rate of speech, so that a transition of a given length appears to signal a relatively shorter formant movement in such a context (Miller and Liberman, 1979).

Although these context effects impressively attest to listeners' ability to undo the introduction of variability in speech production, casual speech still holds sources of variance that challenge models of speech perception, such as segment deletions and reductions of phonological forms. Little is yet known about the perceptual resolution of such processes.

Theories of Speech Perception

The task of any theory of speech perception is to integrate the facts of segment perception as just laid out into a coherent framework. Two questions have been central for theories of speech perception. First, is there an innate specialization for speech perception that sets it apart from 'ordinary' auditory perception? Second, does speech recognition take speech production into account? In a certain way, the answer to the second question has to be yes. Speakers and listeners communicate efficiently, which necessarily implies that the listeners can make sense of the production mechanisms. Theories differ as to whether this parity between speaker and listener also implies that the listener takes into account the mechanism that produces speech in speech perception.

Motor Theory The motor theory of speech perception holds that speech is perceived via recognition of the speaker's intended phonetic gestures. Developed at Haskins Laboratories during the 1950s and 1960s by Liberman and colleagues (see Liberman, 1996: Chap. 1), the theory arose from the team's findings that percepts evoked by speech sounds seemed not tightly coupled to acoustic properties. However, there was correspondence to articulatory gestures; thus uniting the onsets of [ki] and [ku] was the fact that in both cases the tongue body obstructs the airflow in the back oral cavity. Articulatory measurements indicating that speech gestures themselves depend strongly on context resulted in later versions of the theory positing a more abstract invariant, the neural commands that initiated articulation.

According to motor theory, speech perception depends on a specialized module that is part of humans' biological endowment for language, not dissimilar to the echo-location ability that enables bats to navigate in the dark. This module captures all auditory stimuli that seem linguistically relevant before 'ordinary' auditory percepts arise. The module uses an internal speech synthesizer to determine which motor commands are most likely to account for the speech input, a process called analysis by synthesis. Such a mechanism can account for the context dependencies and trading relations described above; the internal synthesizer produces the same dependencies in its resynthesis attempts as occur in natural speech. Due to the emphasis on speech gestures, motor theory also accounts naturally for the influences of visually perceived speech on speech perception (*see* **Audio-visual Speech Processing**).

Additional evidence for motor theory comes from studies that indicate a difference between speech and nonspeech perception. The phenomenon of categorical perception was therefore an important finding for early motor theory. Another effect held to show that 'speech is special' is duplex perception; if the formant transitions of the second and third formants of a CV syllable are presented to one ear and the rest of the syllable to the other, the syllable is perceived as an integrated whole. These formant transitions are heard as nonspeech chirps, just as in isolation; nevertheless, they can be integrated with the rest of the syllable to determine whether the syllable is perceived as, say, [da] vs. [ga]. The signal is effectively heard twice, as speech and as nonspeech (hence the term **du**plex perception). An auditory theory might account for an integration of the signals at both ears, but would seem to predict a triple percept, of each of the two parts separately plus the integrated percept. Duplex perception seems to be better accounted for by a distinction between speech perception and auditory perception.

Motor theory's claim that such phenomena are unique for speech perception and/or human listeners is, however, hard to maintain. With respect to categorical perception, within-category discrimination is often possible, and the sharpness and most probable location of category boundaries seem to be shared between human and nonhuman listeners. Context effects, trading relations, and duplex perception have been observed with nonhuman listeners and/or nonspeech sounds. Such observations do not, of course, contradict the assumption that speech perception rests on specialized mechanisms. The auditory abilities of nonhuman listeners may indeed allow some speech perception, but this does not imply that human listeners perceive speech by the same means. However, positing a very powerful innate speech analyzer is unparsimonious. Further, motor theory suggests that the neural substrate for speech perception differs from that for nonspeech perception. If the capture of a sound by the speech-perception system prevents alternative auditory perception, this module should be located early along the auditory neural pathway. Current investigations, however, indicate a great overlap of speech and nonspeech perception in terms of neural substrate in these early cortical areas (Scott and Wise, 2004).

Direct-Perception Theory The theory of direct perception of speech (e.g., Fowler, 1996) also maintains that the perception of speech is tightly linked to production mechanisms. Based on Gibson's theory of direct perception, the theory holds that perceptual systems have evolved to perceive the sound-causing structures directly using higher-order invariants. A well-known example of an higher-order invariant is a cue for size in vision: an object on a checkered surface covers the same number of squares whatever the distance between observer and object. Similarly, the movements of the articulators are supposed to give rise to higher-order invariants that allow them to be perceived directly. Thus, the direct-perception theory and motor theory both assume that the perceptual system recovers speech gestures from the signal. However, in the direct-perception theory this is achieved without an innately specified speech synthesizer.

By referring to articulation, direct-perception theory accounts for context effects and trading relations in the perception of speech just as motor theory does. According to the direct-perception account, the evidence that motor theorists hold to show a perceptual difference between speech and nonspeech is actually an effect of meaningfulness. The nonspeech sounds under investigation were not environmental sounds, as speech is, but meaningless constructed sounds. The importance of ecological significance of the sounds under investigation was buttressed by the finding that duplex perception occurs for meaningful nonspeech sounds such as a slamming door (see Fowler, 1996). Given that the direct-perception theory does not argue that speech is special, evidence for human-like perception of speech by nonhuman species is not problematic for the theory.

To distinguish direct-perception theory from more general accounts (see below), it is necessary to show that speech-perception phenomena cannot be accounted for by either an auditory or general learning explanation. One piece of such evidence derives from the multimodality of speech perception. The McGurk effect (*see* **Audio-visual Speech Processing**) shows

integration of auditory and visual speech, and similar integration arises when perceivers hear and feel – with their hand on the lips of a speaker – a syllable. Just as with visual speech, haptic speech codetermines the ultimate percept. The absence of opportunity to learn the association between felt and heard gestures – we rarely touch each other's lips during conversation – speaks against a general learning account and by implication in favor of the direct-perception account. The principal weakness of the direct-perception account, however, is that it is questionable that higher-order invariants indeed specify speech gestures; little progress has been made in underpinning this part of the theory.

General Auditory and Learning Account The assumption that speech perception relies on general auditory and perceptual-learning abilities (Diehl *et al.*, 2004) is more a framework than a theory. This approach denies specialization for speech perception and excludes reference to production in perception. The challenge for this approach is to account for the exquisite attunement of listeners to the dynamic properties of speech production; it is addressed by reference to evidence of perception-based constraints on production (see, e.g., Ohala, 1996). Despite large differences across languages in the size of vowel inventories, for example, vowel systems seem to place vowels in the vowel space so as to maximize perceptual distance, and hence minimize confusability between vowels. Motor theorists' arguments that the structure of phonetic categories – with a large number of potential cues, each individually unreliable – can only be captured by reference to production is countered by pointing out that categories without invariant features are not unique to speech (consider Wittgenstein's category *game*). Context effects, likewise, are not unique to speech perception, but are typical for perception in general. For some context effects and trading relations, auditory processing seems indeed to be sufficient (*see* **Categorical Perception in Animals**).

From Phonemes to Words

To arrive at an utterance's interpretation, listeners must in effect segment the continuous input and identify the sequence of individual words comprising it. These two processes are interdependent.

Segmentation

Word boundaries in running speech are similar to phonetic categories in that there is no reliable acoustic cue analogous to the white space which marks word boundaries in written text. In Figure 2, there are three visible pauses. All of these pauses occur in front of voiceless stops, and in only one case (the onset of *purposes*) does the pause correspond to a word boundary. Even worse, the word boundary between *this sentence*, does not even coincide with a phoneme boundary, as the two occurrences of /s/, before and after the word boundary, are produced as a single geminate fricative. However, just as phonetic categories make up for the lack of invariance by a large number of potential cues, there are multiple, in large part language-specific, cues to word boundaries.

A first class of cues is physically 'in the signal' and based on fine phonetic detail. For example, voiceless stops in English are generally unaspirated, but in word-initial, position will be aspirated. Figure 2 provides an example with a longer VOT for the first /p/ in *purposes*. Listeners can hence distinguish, for example, *ice cream* from *I scream* based on the phonetic properties of the [k]-sound. Embedded words, such as *cap* in *captain*, may also be recognized on the basis of fine phonetic detail: f0 contour and duration of the syllable [kæp] differ between instances of the intended one-syllable and two-syllable word. This type of effect constrains the possible architecture of prelexical processing: the fine phonetic detail must be retained in order to allow subphonemic detail to influence lexical segmentation (see McQueen *et al.*, 2003).

Currently, there are at least three accounts for how phonetic detail is used. First, an episodic account assumes that there are no prelexical units, but that the lexicon consists of episodic traces of words. For the case of embedded word, a *cap* from *captain* will not produce a good fit with the episodic traces stored for occurrences of the word *cap*. Second, an allophonic model would postulate different phoneme-sized prelexical units for different instances of the same phoneme, depending on position within a syllable. Finally, a prosodic account proposes that fine phonetic detail in f0 and duration are subject to a prosodic analysis, which is used to guide segmentation. Note that the last two accounts are not necessarily competitors, but may capture different, temporal and spectral, aspects of fine phonetic detail.

A second class of cues to word boundaries is statistical in nature. Phonotactic constraints prohibit certain sequences syllable internally (e.g., /mr/ cannot occur syllable internally in English or Dutch). Other sequences are probabilistically associated with word boundaries (e.g., many words or few words begin in such a way). Moreover, such cues need not be restricted to adjacent phonemes: vowel harmony cues in languages such as Finnish can indicate to listeners where word boundaries occur. All such cues are

language-specific, as also are the rhythmic cues that listeners use to segment speech (stress rhythm in stress languages, etc.). Listeners are able to exploit all these types of boundary cues (see McQueen and Cutler, 2001).

Finally, lexical competition also contributes to segmentation. Consider the utterance *ship inquiry*. The first two syllables correspond to the word *shipping*, the next to *choir*. This, however, leaves *y* unaccounted for. This parse would be prevented if word candidates compete for activation, and this competition also influences word segmentation. Then, both *ship* and *inquiry* would inhibit the candidate *shipping*, while the parse *shipping* and *quiry* would only contain one lexical candidate that may inhibit activation of other items. All current models of spoken-word recognition incorporate some such process (*see* McQueen and Cutler, 2001, and **Speech Recognition: Psychology Approaches**).

Models of Spoken-Word Recognition

Models of word recognition aim to account for the retrieval of long-term memory information given the perceptual input. There is consensus on at least three issues: activation, parallelism, competition. All models make use of the activation metaphor: word candidates can be activated in a graded fashion. In contrast to look-up from a printed dictionary, the process is not a one-to-one search and comparison between input and stored knowledge, but instead multiple word candidates are activated in parallel. Activated candidates then compete for recognition. The models differ on many issues of architecture, which are discussed in more detail in **Speech Recognition: Psychology Approaches**.

In what follows, we give a short impression of existing models of spoken-word recognition. Each model has its specific merits and weaknesses, as the models differ in their primary motivation. This makes the models partly incommensurable. Models can be compared, however, with respect to their basic units and assumptions.

TRACE TRACE (McClelland and Elman, 1986) assumes that speech input activates phonetic features, which in turn activate phonemes, and these in turn activate word nodes. These three levels are linked by facilitatory connections in both directions. Thus, the feature 'nasal' activates the phoneme nodes [n], [m], and [ng]; the phoneme node [n] activates the word node for *neat*, *nose*, *narrow* etc. Once a word is sufficiently activated, facilitation can flow from the word node back to the phoneme nodes for each segment in the word. Within each level, candidates (features, phonemes, or words) compete with one another via inhibitory connections. TRACE was the first model to posit such an active process of inhibition between word candidates. The most controversial aspect of TRACE is, however, the assumption of facilitating top-down connections from lexicon to prelexical nodes. This form of feedback, however, does not seem to be functional (facilitation flows from the most activated word candidate; as this word is already most activated, it needs no further assistance to win the competition; Norris *et al.*, 2000) and the behavior of the model does not crucially depend on the top-down connections.

In order to account for time invariance, TRACE duplicates the phoneme and word level multiple times. Thus, [n] in the nth 'input slot' activates *nose* in the lexicon aligned with the nth slot, *ant* in the lexicon aligned with the (n–1)th slot, and so on. This solution of the time invariance problem necessitates a forbidding number of connections between word nodes, because every word node is duplicated multiple times and has inhibitory connections to all other word nodes. In consequence, modeling with TRACE is only tractable with a small lexicon.

Shortlist Shortlist (Norris, 1994) models word segmentation and recognition in continuous speech, and allows simulations with a realistic lexicon of tens of thousands of words. These features probably make it the most complete model of word recognition. In its current form, the model's weakness is that it relies, as a simplifying assumption, on a phonemic input pattern.

The model assumes that word units are activated by match with bottom-up input and inhibited by bottom-up mismatch, thus accounting for evidence that even in long words, phonological mismatch in one segment can have powerful effects (Norris *et al.*, 2000). Shortlist differs from TRACE both in this utilization of mismatch information and in the absence of top-down feedback.

Once a number of candidates are activated, a shortlist of candidates is generated, and these are wired into a purpose-built interactive-activation network, where inhibitory connections between candidates induce competition. In order to achieve segmentation, the model uses, besides the competition, attested constraints and perceptually relevant cues to word boundaries (see 'Segmentation').

MINERVA2 Goldinger's (1998) model of an episodic, exemplar-based lexicon assumes no prelexical level; in consequence, the question of feedback does not arise. The episodic lexicon consists of episodes of words in which a 'name' part of a given episode was assumed to be invariant, while other parts encoded

varying situational contexts and voices. A given stimulus causes different traces to resonate depending on overlap with the input. If multiple instances of the same word have been presented before, the echo will be relatively 'abstract': multiple traces differing in voice and context information will be activated, with voice and context activations canceling each other out. If only a few episodes are available, the echo will entail a large amount of voice and context information. The model accounts well for the amount of phonetic detail that listeners replicate in repeating speech: more phonetic detail is retained for low-frequency words, or nonwords presented only rarely in a training phase, than for high-frequency words, or nonwords presented often in training.

One weakness of the model is that it claims to be a model of word recognition without speaker normalization. In its current form, however, speaker and word information are completely separated in memory. Given that both vowel identity and speaker identity determine, for instance, formant values in vowels, the model implicitly assumes a prelexical level at which vowel identity and speaker identity influences on the speech signal are distinct. This separation is exactly what normalization achieves, and hence the input to the model is not more realistic than the input that is used to drive models involving normalization.

Neighborhood Activation Model The neighborhood activation model (NAM) (Luce and Pisoni, 1998) allows specific predictions of competition between word candidates. In its current form(s), the model is severely limited by being implemented only for words with three segments. It assumes a prelexical processing stage with allophonic recoding of the acoustic input without activating feedback from a lexical level.

The model incorporates a recoding process in which a string of segments as initial input is fed through a known confusion matrix established for CV and VC syllables. This gives rise to graded activations of multiple allophone candidates for every segment, and accordingly, to the activation of multiple candidates. Not only the target word itself is activated, but also its phonetic 'neighborhood.' This allows the model to account for evidence from phonetic priming experiments for similarity-based activation and inhibition. The dynamics of the competition process depend on the neighborhood density and the balance of the frequency of the target word and its neighboring competitors. Lexical selection is achieved by a choice rule that takes into account the (frequency-biased) pattern of activation across the competitor set.

Distributed Cohort Model The distributed cohort model (DCM) (Gaskell and Marslen-Wilson, 1997) is currently the only model that relates phonological and semantic representations (though this topic has attracted considerable attention in theories of speech production, *see* **Spoken Language Production: Psycholinguistic Approach**). It posits phonological feature values presented in serial fashion as input, these to be processed by a recurrent network and mapped onto distributed patterns in the lexicon.

Different lexical knowledge domains, namely semantics and phonology, are represented in parallel. Competition between word candidates arises not through lateral inhibition, but because of limited capacity in the lexical networks. Words are not represented by word nodes, but different words make use of the same units in the semantic and phonological networks. It follows that the dynamics will be different in the phonological domain than in the semantic domain. While representations in the phonological domain slowly converge on the phonological representation of a word as it unfolds itself, the semantic network shows a more chaotic behavior. This is a consequence of the fact that words such as *captain* and *captive* share phonological features but have little semantic overlap.

Adaptive Resonance Theory From the framework of adaptive resonance theory (ART), a number of models have been proposed that deal with word recognition and segmentation (e.g., Grossberg and Myers, 2000), though no model with a large vocabulary based on this framework has been presented to date. ART assumes that recognition depends on the development of a resonant cycle between word-level representations and prelexical representations. This involves online feedback from the lexical to the prelexical level activating the corresponding phoneme units, which in turn activate the lexical unit. The nature of this feedback is, however, different from that in TRACE. Here the resonance is crucial because lexical nodes cannot reach more than subliminal levels of activation without it.

The model is able to accept either features or phonemes as input. It uses no 'slots' for the input; input is presented in continuous time. In principle, this should allow ART to capture the role of temporal detail in the segmentation and competition process.

Summary

Our understanding of the human perception of speech sounds and recognition of words has grown considerably over the last decades and will continue

to grow. It has become apparent that phoneme perception exploits multiple and diverse cues, and draws on immediate and distant acoustic–phonetic context. However, the recognition of speech sounds is probably not achieved without some uncertainty, and as a consequence, the recognition of words entails the activation of multiple candidates that compete for recognition.

At the same time, basic issues have not been resolved. Do we perceive speech as sound or as gestures? Is there a prelexical unit that is used to access the lexicon, and if so, what form(s) should it take? Does the lexicon contain abstract information, or does it consist of a multitude of concrete episodes? The differing theories can be aptly described as research programs that are difficult to compare. Significant progress may be achieved if, for instance, abstractionist models try to account for the evidence that motivates episodic models – exquisite memory for phonetic detail – while episodic models address the evidence that speaks for normalization and for generalization of phonetic knowledge across words. Hybrid models that can account for both these sets of evidence may set the tone for the next generation of word perception models. In the domain of phoneme perception, gestural theories have to address the question of how gestures can actually be perceived, while a more general account needs to accumulate constraints in order to become more testable.

See also: Audio-visual Speech Processing; Categorical Perception in Animals; Speech Production; Speech Recognition: Psychology Approaches; Spoken Language Production: Psycholinguistic Approach.

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Speech Processes in Dysarthria

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In an era when the terms 'speech' and 'language' were used interchangeably, and Broca and Wernicke's constructs of 'aphemia' and 'aphasia symptom complex' found harmonious reconciliation in localizationist theories of language, Kussmaul (1881) broke tradition by asserting that the seat of speech is most likely not confined to a cerebral convolution. Furthermore, unlike his contemporaries, he drew a clear distinction between the neurological disorders of speech and language. In what is conceivably the first classification of neurogenic communication disorders, he defined as separate from aphasia a group of articulation disorders that were due to organic or psychic disturbances of the central nervous system (CNS). These articulation disorders he labeled dysarthria, which were to be distinguished from the dyslalias that resulted from peripheral lesions and/or malformations of the articulators or the cranial nerves (Grewel, 1957).

Overall, Kussmaul's broad neurological roadmap, albeit provocative for its time, did not much more than delimit the concept of dysarthria, confining it to the CNS apart from language and functional/organic speech disorders. It was not until later that more refined neurological classification schemes began to also assert a coupling between the still fairly amorphous dysarthria symptom complex and etiologies that were bound within levels or components of the central nervous system. For example, Zentay (1937), Froeshels (1943), and Luschsinger and Arnold (1949) classified the etiologies associated with dysarthria at four levels within the central nervous system (the corticobulbar, cortico-strio-pallido-rubro-bulbar, frontopontine, and cerebellar levels). Growing consideration of speech processes, other than 'articulation,' as well as a broadening array of 'dysarthric' symptoms needing theoretical cover, soon stretched and refined the four-level classification schemes to include the peripheral nervous system (PNS) and subdivisions within the neuroanatomic levels. The classifications of Peacher (1950) and Grewel (1957), perhaps, best embodied this trend. In seminal papers, these authors formulated what even by today's standards can be regarded as a modern neurological perspective on dysarthria.

Peacher and Grewel defined dysarthrias, with the exclusion of developmental, somatic, or psychogenic speech disorders, as disturbances of the speaking system resulting from neurological disorders that involve the cortical, subcortical, brainstem, and spinal levels. Physiologically, the aforementioned disorders were proposed to yield distinct motor deficits that in turn patterned different dysarthria types. Those enumerated in Grewel's theory included dysarthrias associated with flaccid or spastic paralysis, rigidity, discoordination, lack of sensation, difficulty with praxis, and disinhibition (as seen in echolalia).

Though conspicuous in some places of their theory, the objective to link the varied phenomenology of dysarthria to neuroanatomical levels was not the sole organizing principle in either of the aforementioned frameworks. This is because the proposed divisional lesions of the nervous system that they argued were capable of framing a dysarthria type were also undergirded by views concerning the neuroanatomical levels of the 'normal' speech mechanism if not the various processes that partake in it. The theoretical requirement that a neuroanatomical map of dysarthria would be consistent with that underlying normal speech processes was perhaps most strongly articulated by Peacher (1950). He argued that while clinically, it might be anticipated that dysarthria presents varying degrees of dysfunction in articulation, phonation, resonation and respiration, speech rhythm needs inclusion as well. He felt its incorporation was justified in view of normal speech data reported by Stetson (1932) who had shown that

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speech rhythm was 'peripherally' dependent on the respiratory cycle. He further cited clinical evidence including Monrad Krohn's (1947) observation of 'dysprosody' in extrapyramidal disorders as well as the well-known failure of rhythm to develop in the congenitally deaf.

While Peacher assigned a critical role to the 'peripheral' processes of audition and respiration in speech rhythm, he also hypothesized this function to be dependent on integrative functions, which, like those for speech, if disturbed produce deficits that are to be distinguished from dysarthria. Here Peacher's general account of the speech process as well as his classification differs from that of Grewel. Borrowing from Froment (1924), Grewel conceived speech to unfold in two successive stages: that of praxis and that of execution. This latter process, defined as the release of a series of reflexes, was dependent on intact sensibility and required coordination of the successive stages of the speaking procedure (respiration, phonation, articulation). Along these lines, Grewel, unlike Peacher, defined, as was shown above, apraxia of speech as a subtype, albeit at the margins, of dysarthria. In addition, in further contrast with Peacher, Grewel accorded the (integrative) processes of attention and memory a more penetrating role in speech. In his view, disturbance in these processes could complicate the dysarthric symptoms.

Finally, apart from these theoretical differences, Peacher and Grewel both claimed that a neurological perspective on dysarthria lacked diagnostic power and therapeutic relevance if it was not also complemented by detailed speech analysis. In this regard, they proposed some procedural guidelines for the diagnosis of dysarthria and provided an initial broad description of the speech symptoms in the various dysarthria types. Even so, realizing that descriptions of dysarthric speech were subjective and at best impressionistic, Peacher (1950) called for a resurveying of the entire field using principles of experimental phonetics and speech pathology.

Though not yet employing an experimental method, Darley *et al.* (1969a, 1969b) attempted to do just that in the first systematic and comprehensive study of the audible characteristics of the dysarthrias. The raw data in this investigation comprised reading samples of 212 patients with dysarthria whose neurological diagnosis fell in one of seven categories: pseudobulbar palsy, bulbar palsy, amyotrophic lateral sclerosis, cerebellar lesions, parkinsonism, dystonia, and choreoathetosis. These neurological disorders were a likely choice, as they had been the subject of earlier dysarthria investigations in some form or another. Listening to the tapes, Darley and his colleagues tried to capture the distinct phenomenology of the dysarthrias, not within neuroanatomic levels as had been done before, but within the audible domain. Toward this goal, they conceptualized a series of speech and voice dimensions along which to rate the speech samples. These dimensions were not inspired by a phonetic or prosodic theory, but rather by the requirement that they could be more or less directly perceived, reflect a minimum of interpretation and data reduction, or in other words had high face validity. A direct consequence of this phenomenological approach was that prosodic processes such as coarticulation, resyllabification, syllable lengthening/shortening, and pitch declination remained largely outside the scope of the analysis. Also, similar to what occurred in the neurological perspective on dysarthria before, the initial set of dimensions quickly had to be expanded to more fully capture the diverse universe of the audible symptoms in dysarthria.

Ultimately, Darley *et al.* settled for 38 dimensions along seven major categories. They included pitch (level, breaks, tremor, or mono), loudness (level, decay, alternating, excessively varied, or mono), vocal quality (harsh/wet hoarseness, continuous/transient breathiness, strained voice, hypo/hypernasality, and nasal emission) audible aspects of respiration (forced inhalation or exhalation, audible inspiration, grunt at end of expiration), prosody (rate, short phrases, increased overall/segmental rate, variable rate, reduced/excessive stress, silences, short rushes of speech), and articulation (imprecise consonants, vowel distortion, prolonged/repeated phonemes, irregular articulatory breakdown). In addition, speech samples were rated along two overall dimensions: intelligibility and bizarreness. Overall, it can be seen that apart from the general impression dimensions, the perceptual categories rated by Darley *et al.* tapped dysfunction(s) along more or less the same major components/processes of speech, as were outlined within the neurological perspective on dysarthria.

The results of Darley *et al.*'s (1969a) investigation revealed imprecise consonants, pitch level, monopitch, mono-loudness, rate, and hypernasality to be prominent across the groups. Interestingly, consonants appeared more vulnerable than vowels. The results further showed that for a given neurological disease, not only did a single dimension turn out to be unique, also the cooccurrence of several dimensions was distinct. The five basic 'perceptual' patterns that thus were found were given physiological labels and termed flaccid, spastic, ataxic, hypokinetic, and hyperkinetic dysarthria. This labeling, reminiscent of that fashioned by the neurological perspective on dysarthria, found further elaboration and justification in Darley *et al.* (1969b, 1975). In Darley *et al.* (1969b), they mapped the cooccurrent

Table 1 Clusters of dysarthric speech dimensions and proposed associated neuromuscular deficits (Darley *et al.*, 1969b)

Cluster	*Deficit*
Articulatory inacccuracy	Inaccurate direction of movement
Prosodic excess	No direct physiological implication
Prosodic insufficiency	Restricted range of movement
Articulatory/resonatory incompetence	Impaired force of muscle contraction and reduced range of movement
Phonatory stenosis	Biased hypertonus
Phonatory/reonatory incompetence	Reduction in contraction force
Phonatory–prosodic insufficiency	Hypotonia

dimensions (clusters) on neuromuscular deficits. They are summarized in Table 1.

As can be seen there, Darley *et al.* (1969b, 1975) asserted a movement deficit as the basis for each cluster except for prosodic excess. Later, in their now classic monograph, Darley *et al.* (1975) went on to define the dysarthrias along with apraxia of speech within the concept of motor speech disorders. Unlike Peacher and Grewel, before, they drew a clear separation between apraxia of speech and dysarthria. Apraxia of speech in their view involved a deficit in one of three hierarchically organized conceptual motor stages (processes), including purpose formulation, movement planning, and programming that were separate, physiologically and anatomically, from the processes that involve movement execution (and control) and considered within the response province of dysarthria. The former processes were, except for the global cortical process of purpose formulation, considered left lateralized and had no direct neuromuscular implication or a prosodic consequence. Dysarthric processes, on the other hand, involved motor execution at the exclusion of sensory processes and were relegated to upper motor neurons (bilaterally), as well as extrapyramidal, cerebellar, and lower motor neurons.

The Mayo Classification has remained the gold standard in motor speech disorders for almost 40 years. Duffy's (1995) recent update of the theory added unilateral upper motor neuron dysarthria to the classification, but was otherwise faithful to Darley *et al.*'s founding principles. Like Darley *et al.*, he underscored the need for a strict adherence to a 'perceptual' roadmap guiding the classification of dysarthria and a pure motor interpretation of its neurophysiological underpinnings in accordance with a three-stage model of speech production, involving cognitive-linguistic, programming, and execution phases.

Within the last decade, Van der Merwe (1997) and Boutsen (Boutsen, 2003; Boutsen and Christman, 2002) have challenged some basic tenets of the Mayo classification. In line with research showing that the cerebellum and basal ganglia (BG) are involved with cognitive, linguistic, and motor aspects of speech, they argue that a sharp distinction between apraxia of speech and dysarthria is not tenable even in neurophysiological terms. In addition, underscoring the sensorimotor nature of speech, they assigned a pivotal role to audition and proprioception in speech disorders and argued that context specificity plays a role in motor speech disorders. Boutsen maintained in this regard that speech contexts variably tap into prosodic goals that are intrinsic or extrinsic to the language. His theory further argues that those strategies (processes) that serve goals across linguistic domains in a language-specific manner are predominantly elaborated by left hemisphere–right cerebellar circuitry, while those that serve to communicate pragmatic effect are lateralized in right hemisphere–left cerebellar circuitry. Accordingly, dysarthrias, if lateralized, may show differential impairment of these processes. In addition, in line with evidence that the role of the BG and the cerebellum changes fundamentally from childhood to adolescence, this theory predicts that the processes in adult dysarthria may not have much bearing on those observed in developmental dysarthria.

See also: Classical Tests for Speech and Language Disorders; Speech Impairments in Neurodegenerative Diseases/Psychiatric Illnesses.

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Speech Production

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Introduction

The act of speech communication involves exchanging a complex set of codes between a speaker and a listener. These codes carry semantic information about the meaning of a spoken utterance in relation to an ongoing dialogue; social information about the speaker's dialect and possibly socioeconomic status; physical information about the speaker's gender, age, and size; and psychological information about the speaker's emotive state and mood. The 'production of speech' is concerned with how these codes are transmitted to the listener as movements of the vocal organs that give rise to an acoustic signal. In the 'perception of speech,' we are concerned with how the codes are recovered by the listener from a combination of the acoustic signal and the listener's knowledge of the language.

Studies of speech production are carried out in many different disciplines, including phonetics, linguistics, cognitive science, computer science, electronics, neurology, anatomy and physiology. Studies in many of these disciplines are concerned with both normal and disordered speech production. Data from slips of the tongue and other performance errors in normal speakers have been especially influential in developing our understanding of the different components that are involved in producing spoken language.

Because the study of speech production is so interdisciplinary, it is not surprising that it has relied on a wide range of types of experimental analyses and techniques. From a psycholinguistic and cognitive science perspective, speech production models are often developed using indirect analyses of speech production, such as measurements of reaction time to visual and/or auditorily presented stimuli. Phoneticians tend instead to be more concerned with direct measurements of the configuration and movements of the vocal organs and their relationship to the acoustic speech signal. These second types of analyses have been made possible by advances in the last 50 years of various instrumentation for quantifying the production of speech. Some of the most important of these include: aerometry for measuring air-pressure and airflow in the vocal tract; electrolaryngography for measuring vocal fold contact and vibration; direct fiber-optic laryngoscopy and transillumination, which can be used to measure the area between the vocal folds; palatography for measuring the extent of contact of the tongue against the palate; electromyographic techniques for recording the level of electrical activity in the muscles that innervate the vocal organs; X-ray microbeam and kinematic techniques for measuring the positions and movements of the tongue, lips, and jaw; and most recently, magnetic resonance imaging (MRI) techniques that have produced some of the sharpest images of the vocal organs ever seen. Analyses from all these experimental techniques are fundamental to 'articulatory synthesis,' which involves building a machine that can speak using an anatomical model of the vocal tract. The importance of articulatory synthesis and computer models of speech production is that they provide another source of evidence for verifying models of normal and disordered speech production.

There are good reasons for breaking down the task of speech production into a number of processes that operate largely independently of each other. It is common in much of the speech production literature to make a distinction between a conceptual or 'ideation' stage on the one hand, in which an idea to produce speech is formulated, and 'linguistic programming' on the other, in which the idea is represented in terms of linguistic categories. Within linguistic programming, a further distinction can be made between

'grammatical' and 'phonological' programming. The first of these is responsible for assembling a syntactic structure that is appropriate for the speaker's intended utterance, while phonological programming builds an abstract representation of the utterance's sound structure. Both grammatical and phonological programming must access a 'lexicon' containing a list of morphemes with links to their syntactic, semantic, and phonological information. Linguistic programming is often distinguished from the 'motor programming' stage of speech production that is responsible for producing a set of commands that result in coordinated movements of the vocal organs.

In the first section of this article, we begin by considering the interaction between grammatical programming, phonological programming, and the lexicon in terms of two influential models of speech production: the Weaver model developed by William Levelt and recent exemplar theories of speech production. Within that section, we will also consider the contribution of prosody to the linguistic and phonological stages of speech production.

As we will see at various points in this review, speech is inherently variable; an examination of both articulatory and acoustic records would show clear differences between two productions of the same words, even when produced by the same speaker under exactly the same conditions. Prosody causes one type of 'structure-dependent' or 'vertical' variability that comes about because of the way in which the same speech sound varies when it occur in different hierarchical positions of the syllable or in different positions of larger phrases. Another type of 'horizontal' variability that is discussed in the section on coarticulation is due to the sequential arrangement of speech sounds.

In the final section, 'motor programming,' we will have to consider how the brain manages to control the hundred or so muscles that are activated per second in producing speech. Of importance here – in light of what is known about immediate compensation, i.e., the ability to achieve the same speech goal even when some of the vocal organs are artificially prevented from doing so – is how the muscles are coordinated to achieve different speech tasks. This analysis will consider the importance of feedback and 'feedforward' in stabilizing the speech production system. Another area to be considered here is the space in which speech production is planned – whether this is in the form of articulatory or auditory targets, for example.

There are a number of areas of investigation in speech production that we will not be able to consider here. Firstly, we will not include much discussion about the neurological aspects of speech – that is, the extent to which cognitive processes of speech production can be linked to specific areas of activity in the brain. Secondly, detailed discussion of disorders of speech are beyond the scope of this article. Thirdly, we will not be able to discuss those aspects of speech production that communicate mostly personal (social, physical, psychological) information referred to earlier. Finally, while nonvocal aspects of speech communication such as head-movements, body movements, facial expression, eye contact, and body movements all contribute to the sets of meanings that are exchanged in speech communication, a detailed consideration of these is also beyond the scope of this article.

The Grammar, the Lexicon, and Prosody

The Weaver Model

The most complete model of speech production – in the sense that it attempts to cover all the stages of speech production (beginning with the formulation of an idea to speak through to the movement of the vocal organs) – is the Weaver model developed by William Levelt over a number of years. As Levelt *et al.* (1999) note, the arguments for many aspects of the model are based mostly on latency data, i.e., on indirect measurements of speech production from various kinds of naming experiments. 'Weaver' stands for 'Word-form Encoding by Activation and VERification'; a schematic outline of the model is shown in Figure 1. Weaver is a top-down model in that information flows from more to less abstract levels of speech production.

The Weaver model adopts the idea from earlier research of slips of the tongue that there is a sharp distinction between grammatical and phonological programming and that the mental lexicon is accessed first for grammatical information to fill an emerging syntactic structure and then again separately for phonological information to fill the emerging phonological structure. There is a similar division in the lexicon in which the information about the word's syntactic properties, known as its 'lemma,' is stored separately from its 'word-form,' which includes specifications about its morphology and phonology.

A lemma is activated by a set of semantic concepts. For example, a picture of a ball might activate a number of semantic concepts such as 'round,' 'used in games,' 'inanimate,' and so on, and each activated lexical concept activates the lemma to which it is attached. A number of candidate lemmas are therefore initially active, and whichever one receives the highest level of activation is the one that is selected to be inserted into an emerging syntactic frame.

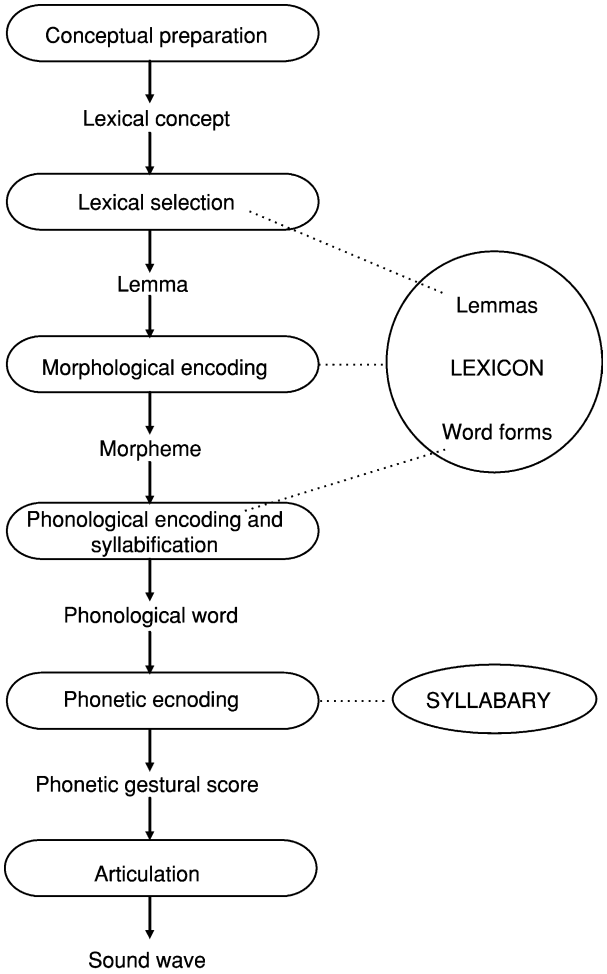

Figure 1 The Weaver model of speech production. Adapted from Levelt *et al.*, 1999.

The selected lemma then activates the corresponding word form that includes information about its phonemic composition, a representation of the number of syllables, information about which syllable has primary word stress, and information about its morphological composition, including, for example, a division into a stem and any number of affixes. Only one word form per lemma is activated, the only exception to this being if the semantic concept has two synonyms (such as 'couch' and 'sofa'). Word-frequency is built into the system only to the extent that the access is slower for words of low frequency (those that tend to be less frequently used) than those of high frequency.

For each selected lemma of the utterance, a morphological frame is built into which the phonological information is slotted. The morphological frame is essentially a placeholder for each morpheme. For example, 'unkind' has two morphological placeholders: the affix ('un') and the stem ('kind').

Syllabification comes about when the phonological information stored in the lexicon – that is, the number of syllables, a word-stress pattern if the stress-pattern is irregular, and the lemmas' phonemes – are associated with the morpheme placeholders. Syllabification follows the maximum onset principle, in which as many consonants as possible are syllabified with a following vowel, provided that the resulting sequence can legally begin words. If more than one word-form has been retrieved, syllabification can cross word boundaries – and therefore word-final consonants can be syllabified with a following word-initial vowel in this model (so the /t/ in 'get us' is syllabified with 'us').

The output of the phonological program is, therefore, a string of phonemes structured hierarchically into syllables and morphemes. There is then a 'phonetic implementation' of this program in which articulatory routines for syllables that are stored in a syllable lexicon or 'syllabary' are accessed. The syllabary is assumed to contain articulatory routines only for the most frequently produced syllables (and so procedures are needed to compute those that occur infrequently). There are also mechanisms for further modifying the loudness, pitch, and duration parameters of stored articulatory syllables to take into account some of the effects of sentence prosody (see the section 'Utterance-Level Prosody' in this article). Various proposals have been made for the need to include a mechanism for monitoring speech production internally – this is an evaluation of the intended speech utterance before the vocal organs move creating auditory feedback. Based on various experiments, this would correspond to internal monitoring mechanism operates when a lemma's phonological form in the lexicon is activated.

Exemplar Theory

Weaver and many other speech production models based on performance errors adopt the idea from generative phonology that there is a phonological grammar and a component for phonetic implementation that is independent of the words in the lexicon. The grammar contains a set of rules that will apply to words in the lexicon irrespective of any word-specific properties such as the frequency with which they occur.

Recently, exemplar theory and usage-based based phonology (Bybee, 2001; Pierrehumbert, 2003) have challenged the idea that there is a phonological grammar with rules applying across the board to lexical items. The proponents of other models also argue against the idea that the lexicon only contains nonpredictable, phonological information

for distinguishing words' meanings in terms of their sounds.

In exemplar and usage-based phonology, a good deal of phonetic information – that is, phonetic detail below the level of the phoneme – is stored as part of the word's lexical representation. In contrast to generative phonology, a word is not a minimal, context-free abstract arrangement of symbols. Instead, it is a storage unit or multidimensional probability distribution for the set of exemplars of that word that have been experienced by the speaker/hearer. The exemplars are trajectories in a multidimensional auditory space (Johnson, 1997), and phonemes emerge from points in this space at which the words' exemplars give rise to dense regions of intersection. Since the relationship between a word and its exemplars is probabilistic, frequency information is represented in the lexicon in two different ways. First, as in the perceptual magnet theory (Iverson and Kuhl, 1995), exemplars at the center of the distribution are more representative of the particular word as spoken in the community than are exemplars at the edge of the distribution. Second, information about the frequency with which words occur is an emergent aspect of this model, because low-frequency words, being heard and produced less often, will be associated with fewer exemplars and hence characterized by less stable and more malleable probability distributions.

As far as phonotactics are concerned, in generative phonology these tend to be all-or-none; a sequence of phonemes can either begin words (e.g., /spr/, as in 'spring') or it cannot (e.g., /sfr/ is illegal in English because there aren't any words that begin with this sequence of phonemes). This type of all-or-none phonotactic principle is also at the heart of the syllabification of the Weaver model considered earlier: the syllabification has to work out whether a string of consonants is phonotactically legal and then place a syllable boundary accordingly. In exemplar theory, by contrast, the legality of a sequence of phonemes is not binary but gradient and depends on the likelihood with which a sequence is found in the lexicon. Accordingly, speakers don't make categorical judgments about the well-formedness of a syllable (see Beckman and Edwards, 2000 for supporting evidence from child language acquisition), and proponents of exemplar theory consider it implausible that speakers categorically divide up phonemes into syllables based on the maximum onset principle as in the Weaver model.

A word in exemplar theory may well be represented as an abstract label in the lexicon, but this label is associated probabilistically with all the tokens or exemplars of that word that have ever been heard during a speaker's lifetime. In speech production (Pierrehumbert, 2003), the exemplar to be produced is selected from a random sampling of the exemplars for that word label, and because the association between a word and its exemplars is probabilistic, the exemplar selected is most likely to be nearer the center (i.e., the most probable exemplar) of the distribution. The production goal is then assumed to be 'executed with noise.'

It is clear that the notion of a syllable of stored articulatory routines in Weaver is at odds with exemplar theory for at least two reasons: first, the idea of an articulatory routine being stored seems to preclude the possibility that it can vary probabilistically, and second, because the articulatory characteristics of the syllable would vary in exemplar theory across words of different frequency, even if they are of the same phonological structure.

Utterance-Level Prosody

We consider here briefly some aspects of utterance-level prosody partly because these are not integral parts of the current Weaver or exemplar models of speech production reviewed above and partly because these have important implications for modeling variability considered in the next section.

Changes to an utterance's timing, pitch, and loudness can be used to communicate emotions like anger, happiness, and surprise. These modifications can also be used linguistically to distinguish between words (word-level prosody) or to add new meanings to utterances (utterance-level prosody). Prosodic effects usually extend over, and modify, more than a single consonant or vowel; this is why the units of prosody are sometimes called 'suprasegmentals.' Word-level prosody includes at least how words are represented in terms of their syllable structure and stress pattern, and these types of representations are included in the Weaver model reviewed earlier. Utterance-level prosody includes 'intonation' and sentence-stress or 'accentuation.' Intonation can change the meaning of an utterance by turning a statement into a question in many languages. But intonation can also change meanings without affecting the syntax, which suggests that they must be independent of each other in a speech production model. For example, in producing the following sentence:

I don't collaborate with anyone

The pitch usually falls on 'anyone' in many accents of English to convey the meaning 'I work alone.' Now consider a context like:

A: Have you thought of working with Peter?
B: I don't collaborate with anyone

If 'anyone' is produced with a falling-rising pitch, the meaning is very different, one of selection: although B is still willing to collaborate with someone, it certainly wouldn't be with someone like Peter whom he regards with some disdain. A model of speech production must therefore include a component containing a number of different intonational melodies or 'tunes' that are associated with words, or the 'text,' of the utterance. The domain over which this association is made is often known as a 'prosodic phrase.' The shortest prosodic phrase is a single-word monosyllabic answer like 'yes' or 'no,' and it can extend across several words, as the examples above show.

The choice of prosodic phrasing can also be independent of syntax. It's quite possible to produce A's question as two prosodic phrases (and hence two intonational melodies) with a prosodic phrase boundary after 'of' that might be used in a context like 'have you thought of working with' – (gasp of incredulity) – 'Peter?' to indicate that this would indeed be a surprising thing to consider doing. But prosodic phrasing clearly can reflect syntactic cohesion. This is shown by the title of a recent book by Lynne Truss, *Eats, shoots and leaves*. When this is said as one prosodic phrase (analogously in orthography, without commas), the meaning might be that (a panda) eats both shoots and leaves, but to communicate the other syntactic form of eating, shooting someone or something, and leaving, the same utterance would be likely to be said as three prosodic phrases.

Accentuation specifies how prominent words are in a prosodic phrase. This specification is closely linked with intonation, but nevertheless independent of it, as the earlier example with 'anyone' shows: although 'I don't collaborate with anyone' can be produced with two different intonational melodies, the two most prominent or accented words of the utterance are the same ('collaborate' and 'anyone' in both cases). Accentuation can also be varied independently of syntax to contribute its own layer of meaning. Consider saying the sentence 'I don't like classical music' on its own. Usually this would be done with all words except 'don't' being accented to the same degree. On the other hand, in a dialogue like:

A: Have you listened to Beethoven recently?
B: I don't like classical music.

the most prominent word is 'like,' and both 'classical' and 'music' are said without any prominence and are deaccented. They are deaccented because as long as B realizes that Beethoven was a composer of music, then 'classical music' is part of the shared, understood information evolving in the discourse and so is put into the background in spoken communication using this device. Because the same sequence of words in the same prosodic phrase can be produced with these different accentuation patterns, accentuation must also operate independently of syntax in a model of speech production.

Variability

Speech is inherently variable. The same utterance, word, and sounds can be said even by the same speaker in a multitude of different ways. Variability can be considered to be a necessary aspect for communicating multiple layers of meaning effectively. The multiple layers of meaning are derived not only from words standing in a certain syntactic relationship to each other, but also because intonation, accentuation, and prosodic phrasing all contribute their own levels of meaning to the utterance and to the relationship of the utterance's meanings to those established in an ongoing dialogue. The skilled listener decodes effortlessly all the meanings that are communicated in parallel, but at the same time, there is a limiting effect imposed on the speaker in that much of speech production is necessarily serial: words, after all, have to be said in a certain sequence one after another, and although speech sounds can and do overlap with each other in time, there is a necessary serial order here as well (so that 'cat' remains distinguishable from 'tack'). The way in which communicating meanings in parallel can be reconciled with the limiting effect of serial order in speech production is to make speech sounds highly 'context-sensitive' – that is, dependent on the context in which they occur. We consider in the following sections some of the main sources that contribute to context-sensitivity at different levels.

Hyperarticulation and Hypoarticulation

The theory of hyperarticulation and hypoarticulation (or H&H theory), developed by Björn Lindblom over a number of years (Lindblom, 1990), models variability as a tension between the speaker's natural tendency to economize on speech effort and the listener's need for speech to be produced clearly. The first of these, also known as 'hypoarticulation,' is evident in the production of forms like 'hambag' for 'handbag.' This is a form of hypoarticulation, because the more complicated /ndb/ sequence is simplified to /mb/, where the nasal and following stop share the same place of articulation. Hypoarticulation tends to occur to the extent that meaning is not compromised for the listener; thus, 'handbag' can be reduced in this way precisely because it is very unlikely that the sequence of sounds corresponding to 'hambag' could be anything other than the object designated

by 'handbag.' Similarly, 'fast speech' can be said without the final /t/ on 'fast' because even with this impoverished information, the listener can easily recover 'fast' from 'fas' in such a context. 'Hyperarticulation' comes about when speech is produced with a greater than usual amount of distinctiveness or clarity. When a person's name is said for the first time, this would almost certainly be hyperarticulated, especially if the person is not known to the listener. Here, the listener has no contextual cues of any kind that would make the name more predictable, and so the speaker has to make sure that all the information for decoding the name is contained in the acoustic signal. According to Lindblom, speech varies continually between the speaker's desire to *hypo*articulate and the need at the same time to *hyper*articulate so that the meaning of the utterance is not compromised. H&H theory has also been used to explain why certain types and patterns of sounds occur in many different languages with regularity, and it is also very relevant for explaining some of the mechanisms of historical sound change.

Variation between hypoarticulation and hyperarticulation doesn't just depend on the listener's ability to predict; it also depends on factors such as the formality of the speaking situation. For example, Hawkins (2003) gives various examples of the production of 'I don't know,' noting that 'dunno' is preferred either in informal situations or to convey a certain degree of insolence in more formal ones. These words could even be reduced to little more than three weak, nasalized vowels heavily overlaid with sentence-prosody; in the appropriate situational and social context, listeners nevertheless manage to recover the meaning 'I don't know.'

Variation and Prosody

A large degree of variability due to hypoarticulation and hyperarticulation is played out through the utterance's prosodic structure. For example, because in Germanic languages accented words usually communicate points that are especially important to the listener for understanding what is being said – that is, they tend to be 'points of information focus' – they are usually hyperarticulated and produced with the greatest degree of clarity. On the other hand, because function words and grammatical words like 'it,' 'he,' 'should,' and 'and' are usually entirely predictable from the context, they are almost always unaccented and hypoarticulated. In German, 'mit dem Auto' ('with the car') is hardly ever produced as four distinct syllables; it is much more commonly produced as 'mim Auto' or even 'm Auto.'

As far as lexical stress is concerned, an unstressed syllable tends to be hypoarticulated, leading again to a reduction or deletion of any, or all, of its constituent speech sounds. In the spontaneously produced 'government support,' the last two syllables of 'government' might be produced as just a long nasal consonant, while 'support' might become more or less homophonous with 'sport.'

Prosody imprints many other types of context-sensitive signatures on the production of speech. The last syllable in a prosodic phrase is typically lengthened in many languages, including English, and there is now increasing evidence from various speech production studies that consonants are strengthened at the beginning of prosodic phrases. Consonant strengthening is manifested as the tendency for stricture – that is, the extent to which the vocal tract is obstructed – to increase. Thus, when 'tap' occurs at the start of the prosodic phrase, there is greater contact of the tip of the tongue against the roof of the mouth than when it doesn't. There's also some evidence that this effect is manifested lower down the prosodic hierarchy, so that there is slightly greater contact for the /t/ of 'tap' where it begins a word than in a word like 'attack,' where it doesn't. Information about the position in a prosodic phrase is also communicated in some languages by the way in which an intonational melody is synchronized with the text or words of the phrase. An intonational melody is in most frameworks considered to be made up of a number of smaller phonological units known as 'pitch-accents' that cause local pitch peaks and pitch troughs that can be seen acoustically in a display of the fundamental frequency contour. In many languages, pitch-accents that occur early in a prosodic phrase tend to have fundamental frequency maxima that are synchronized late in the syllable and vice-versa.

The position of a speech sound also varies depending on its position in the syllable. In many languages, consonants at the beginning of syllables are produced more distinctively and are overlapped or coarticulated (see the next section) less with a following vowel than those at the end of the syllable. But there are also many manifestations of syllable-position that are not explicable in terms of such strengthening effects, and these can be specific to languages and dialects. For instance, in many accents of English, there are two very different kinds of /l/: at the beginning of syllables (as in 'leaf'), /l/ is produced with a contact of the tongue tip against the alveolar ridge; in final position, this contact tends to be much weaker and overlaid with a raising of the back of the tongue known as 'velarization.'

Coarticulation

The type of phonetic variability discussed above is largely 'structure-dependent' in that it comes about because of the organization of a sound into larger units like syllables, words, and prosodic phrases. Thus, the velarization of /l/ is brought about by the structural position of /l/ in the syllable and not by the arrangement of sounds in sequence or by 'coarticulation.' Coarticulation, or coproduction, means that speech sounds in sequence are produced in at least a partially overlapping manner. For example, producing the last two sounds of 'pan' involves, among other things, changing from an oral vowel /a/, in which the velum is raised, to a following nasal consonant /n/, in which the velum is lowered. But because the velum can't move instantaneously from raised to open, it already starts to lower during the /a/, making the vowel nasalized well before the tongue tip touches the alveolar ridge for /n/. The production of /a/ is therefore influenced by, or said to be coarticulated with, the following /n/; it is because of coarticulation that the /a/ in 'pan' is phonetically very different from the /a/ in other contexts such as 'pad.' Coarticulation is ubiquitous, and because speech sounds can be communicated at a faster rate if they overlap with each other in time, some theorists, including proponents of the motor theory of speech perception, have argued that coarticulation is necessary to ensure that speech is produced sufficiently rapidly.

'Anticipatory coarticulation' comes about when a sound is modified due to the influence of another that follows (as when /a/ is influenced by /n/ in 'pan'). An example of anticipatory coarticulation using lip-aperture data obtained from an electromagnetometer system is shown in Figure 2. These lip-aperture data show two averaged trajectories in a sequences /məbi/ (solid) and /məba/ (dotted). In

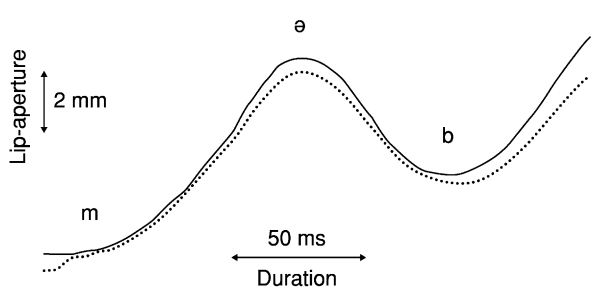

Figure 2 Lip-aperture (as estimated by subtracting the vertical heights of transducers attached to the upper and lower lip respectively) in a sequence /məbi/ (solid) and /məba/ (dotted) produced by a female speaker of (Australian) English. Higher positions on the vertical axis represent greater lip-aperture (greater distance between the transducers attached to the upper and lower lips).

producing /i/, the lips are a good deal closer together than in /a/, and as Figure 2 shows, this influence extends anticipatorily across the preceding /əb/ sequence. In 'perseverative coarticulation,' the influence derives from a preceding sound: in English, /t/ in 'boots' tends to be produced with rounded lips due to the influence of the preceding lip-rounded /u:/ vowel.

In many models (discussed in further detail later in this article), anticipatory and perseverative coarticulation are thought to arise at different stages in speech production. Anticipatory coarticulation is often assumed to be more closely associated with the planning stage of speech production, whereas perseverative coarticulation is instead attributed to the inertia and sluggishness in moving the vocal organs within a sufficiently short time. However, there is now evidence to show that that perseverative coarticulation is also largely planned, but to a much lesser degree than anticipatory coarticulation.

Context-Variant Theories of Coarticulation in the 1960s and 1970s Although a word like 'won' can be represented as three separate phoneme size units, there is nothing in the speech signal to suggest that their unambiguous separation is analogous to the separation between letters on a printed page. Similarly, although printed words are clearly demarcated from each other by at least one intervening blank space, vocal performance is continuous across word boundaries, and there is often nothing in either articulatory or acoustic records of speech that demarcates where one word ends and the next begins. Since the late 1960s, theories of coarticulation have been concerned with this wider problem of the rift between invariant nonoverlapping phonemes on the one hand and the continuum of vocal performance on the other. In context-variant theories of coarticulation, the assumption is that speech is planned in terms of units like phonemes that are free of the influences of context, but that these context-free units are then modified by adding phonetic detail. Thus, 'soon' and 'see' are assumed to be represented at some abstract stage of speech production with the same context-free unit /s/ that would be modified by the rules of coarticulation, resulting in a lip-rounded production of /s/ in 'soon' (due to the influence of the following rounded vowel) but not in 'seen.'

One of the earliest and best known context-variant theories is that of Henke (1966), who developed a two-dimensional computer model of the vocal tract controlled by an independent time function. The input to the model is a string of phonemes; each phoneme is described by an invariant articulatory representation.

Rules of anticipatory coarticulation are expressed as a 'look-ahead mechanism' that scans one phoneme ahead to make corresponding adjustments to the articulatory representation of the current phoneme. Specifically, the feature-matrix defining the /s/ of 'soon' would be modified to include the feature [+round] (produced with rounded lips). In subsequent coarticulation models incorporating a look-ahead mechanism (e.g., Daniloff and Hammarberg, 1973), anticipatory coarticulation is also thought to apply in this look-ahead way, but only as long as the anticipated feature doesn't contradict any of the features of a phoneme to which the anticipated feature is attached. So while the [+round] feature could attach itself to the first three consonants in 'stroop,' it could not attach itself to the [i:] vowel of 'pea' in 'pea-soup' because [i:] is inherently specified as being [−round]; i.e., to be produced with spread lips – and sounds obviously can't be simultaneously produced with a rounded and spread-lip configuration.

Numerous studies in the 1960s and 1970s were concerned with establishing the extent of look-ahead and the related issue of what factors caused coarticulation to be blocked or diminished. An earlier and influential model by Kozhevnikov and Chistovich (1965) had provided evidence that speech – and by inference coarticulatory spreading – is produced in sizes of articulatory syllables, where an articulatory syllable includes one or more consonants and a following vowel irrespective of any intervening syllable or word-boundaries. However, this model was shown to be incompatible with an influential study by Öhman (1966). He provided evidence for 'trans-consonantal vowel coarticulation': V_2 can and does influence V_1 (i.e., across syllable-boundaries, assuming the vowels are in separate syllables) and vice-versa in a V_1CV_2 sequence.

Other studies showed that the domain of look-ahead coarticulation could not be defined in terms of anything as simple as whether features were contradictory. For example, Benguerel and Cowan (1974) showed that unrounded vowels are nevertheless slightly rounded when they precede rounded vowels. Other studies showed that coarticulation is more complicated than filling in details provided by anticipatorily copied features. Consider a sequence like /ipi/ in which /i/ must be specified for tongue body raising while /p/ is unspecified for any lingual activity (because it is a labial consonant). According to an anticipatory feature-copying account of coarticulation, the tongue body raising feature should spread to the medial labial consonant /p/. In fact, electromyographic studies suggest that the degree of tongue body raising is not maintained to the same degree across these high vowels – that is, during the production of the /p/ consonant, the tongue body is lowered, even though there is nothing in the feature matrix, nor in its modification after copying the tongue-body features from /i/, to explain why this should happen (Engstrand, 1983).

A more general problem with feature-spreading accounts of this kind is that the output doesn't get us very much closer to vocal performance. As some have argued (e.g., Fowler, 1990; Pierrehumbert, 1990), this is largely because coarticulation is being explained using devices that belong to phonology and that are not appropriate for phonetic modeling. Phonology, like syntax, deals with operations on discrete sets of categories that can to a large extent be expressed in terms of rewrite rules that take a set of symbols as an input and derive some form of symbolic output. Phonetics on the other hand, has to model physical events, such as how vocal tract movements are related to an acoustic speech signal. Because we can't have a rule that converts a symbol into something physical, it is never clear how a speech plan made up of symbols – even ones with lots of phonetic detail – could ever actually get the vocal organs to move.

Context-Invariant Theories of Coarticulation The objection raised in the previous paragraph is one of the factors that led Fowler to propose a context-invariant theory of coarticulation. In context-invariant models, there are two core principles: first, a phoneme is a physical, dynamically changing event of vocal tract movement, and second, phonemes are invariant, which means that the aspects of their articulatory properties remain the same in all contexts – in spite of the effects of coarticulation and prosody-dependent variation described earlier. It is because of this second principle that phonemes can be 'directly perceived' by the listener.

These ideas are most explicitly formulated in Fowler's action theory and direct realist model of speech perception, which is inspired partly by Gibson's (1966) theory of direct perception. It is also based on studies by Öhman (1966) in which it is hypothesized that consonants and vowels are produced by largely independent subsets of the vocal tract musculature. In Fowler's (1984) model, consonants and vowel phonemes are defined by independent articulatory gestures known as 'coordinative structures' that overlap with each other in time. In earlier versions of this model, coarticulation was assumed to come about not because phonemes are modified in any sense but because of the temporal overlap of completely autonomous coordinate structures, one for each phoneme. Thus, in the production of 'see,' the coordinative structures for /s/ and /i:/ are not modified but coproduced (produced simultaneously). At faster

rates of speech, the extent of overlap is increased, and accordingly, more of the vowel is covered up by the consonant and vice-versa. Because phonemes increasingly cover each other up at faster rates of speech, they **appear** to shorten. Thus, although a faster production of 'see' is likely to be several tens of milliseconds shorter than a slow production, the shortening doesn't come about through changing the articulatory strategies that underlie /s/ and /i:/. This is because these articulatory strategies are assumed to be invariant (the second principle), and the shortening is entirely attributable to their greater overlap in time. The same argument applies to compensatory shortening in which vowels **appear** to shorten when measured acoustically before consonant clusters (e.g., 'sixths') than before singleton consonants (e.g., 'six'). The acoustic shortening is only an illusion that comes about because the articulatory strategies cover each other up at faster rates.

The strong version of this theory predicts that segments are never deleted (i.e., a phoneme is always physically instantiated). So even at very fast rates of production, 'support' always remains distinct from 'sport,' and if they seem to be homophonous even to skilled experimental phoneticians, this is only because they are not measuring the differences in the right way.

A model like Fowler's, in which articulatory duration is invariant, makes a very different prediction about the extent of anticipatory coarticulation than does the feature-spreading model considered earlier. If the articulatory duration is fixed, the time at which lip-rounding begins should be fixed or time-locked relative to some other event in the vowel. Some evidence in favor of the time-locked model is provided in Bell-Berti and Harris (1981). Subsequent experiments, including Perkell and Chiang (1986), have suggested instead a compromise between a feature-spreading and a time-locked model.

Fowler's direct realist view of speech perception takes over the idea that speech is perceived with reference to how it is produced from the motor theory of speech perception. A central difference, however, is that the motor theory holds that speech is perceived with reference to the listener's own motor (articulatory) system, while in Fowler's direct realist model, consonants and vowels are **directly** perceived in the acoustic signal. This is done essentially by factoring the acoustic signal into the separate coordinative structures that were produced by the speaker. Consider, for example, the production of /ki:/ ('key') in which the body of the tongue for /k/ is considerably fronter than before a back vowel in /ku:/ ('coo'). In both cases, the listener decodes the same coordinative structure for /k/ by subtracting out the vowel coordinative structure. This subtraction of independently produced coordinative structures is analogous to perceiving a child on a horse that moves up and down on a merry-go-round. The two types of motion (vertical and circular) fuse to cause the child to move along a complex cycloid path, but this is not what viewers perceive; a viewer instead perceives both the vertical and the circular movement **independently of each other** (analogously, consonants and vowels are independently perceived because they are independently produced events).

Many of the ideas of Fowler's coproduction model are incorporated into the 'task-dynamic theory of speech production' developed by Saltzman and Munhall (1989), which provides a computationally explicit model of coarticulation. In this model, a phoneme is made up of one or more abstract 'tract variables' that define the extent of constrictions along the longitudinal axis of the vocal tract. A tract variable for /p/ is specified as lip-closure that in turn is achieved by the coordinated activity of a number of independently controlled articulators that cooperate to achieve this task. The coarticulatory influence of speech sounds in sequence depends on the extent to which the overlapping gestures share articulators. For example, in a /VbV/ sequence, the vowels and intervening labial consonant are produced using largely different sets of articulators (the tongue body for the vowels; the lips for /b/). For this reason, they perturb each other minimally when they overlap with each other in time. On the other hand, there is considerably more spatial perturbation between the vowels and the consonant in a /VgV/ sequence because /g/ and the vowels compete for the same articulator (the tongue dorsum).

The competition between segments that share largely the same articulators is resolved in Saltzman and Munhall's (1989) task-dynamic model by a 'blending' of the segments that depends on the 'articulatory strength' of the two segments being merged or blended (Fowler and Saltzman, 1993). In some cases, blending might consist of a form of averaging. For example, the blending of an alveolar /t/ and a dental /θ/ might be resolved as a place of articulation that is somewhere between alveolar and dental. Articulatory strength defines how resistant a segment is to coarticulatory influences; in general, the more resistant a segment, the greater its influence on neighboring segments (i.e., coarticulatory resistance and dominance are roughly inversely proportional). So the outcome of blending is always in favor of the segment that is articulatorily stronger.

The idea of articulatory strength can be traced back at least to Bladon and Al-Bamerni's (1976) model of 'coarticulatory resistance,' in which segments are

weighted for the extent to which they resist coarticulation. In the last 20 years, Recasens has carried out various electropalatographic and kinematic investigations of the relationship between coarticulatory resistance and dominance, which he expresses in terms of a 'degree of articulatory constraint' (DAC) value (see e.g., Recasens, 1999). For example, palatal consonants are generally associated with a high DAC value, presumably because the tongue body movement is very constrained when the tongue dorsum is in a raised and front position (as for palatals). Accordingly, palatals tend to block vowel-to-vowel coarticulation in VCV sequences or at least far more than do alveolars in which the tongue dorsum can still adopt the configuration for the vowels while the tongue tip is raised to the alveolar ridge for the production of the consonant.

The Window Model of Coarticulation The idea that segments are inherently resistant to coarticulation is central to Keating's (1990) window model of coarticulation, but here there is a greater emphasis on phonetic aspects of coarticulation and their relationship to phonology. The width of the window in this model is essentially a summary of the range of permissible variation of the features that make up abstract, subphonemic units or extrinsic allophones (these are units that include language or dialect-specific phonetic detail). Keating's model also adopts the idea of coarticulation resistance from Bladon and Al-Bamerni (1976), that subphonemic units are differently specified for the extent to which they resist coarticulation. But an importance difference is that for Keating the range of allowable variation is at the feature level. In the case of /s/, for example, there will be a window specifying the range of allowable variation in tongue constriction at the alveolar ridge, another one specifying the range of variation in lip-rounding for /s/, and so on. All these window widths are fixed; that is, they don't vary when /s/ occurs in different contexts. Window widths are not universal; they vary idiosyncratically between languages and dialects, and they depend partly on whether a feature is phonemic, i.e., used for meaning distinctions in a language. Thus, in English the window width specifying velum height in vowels is large, partly because the oral–nasal distinction isn't phonemic in English. Because, on the other hand, the oral–nasal distinction **is** phonemic in French vowels, the corresponding window must be narrow to avoid confusions between e.g., /vɛ/ 'vais' meaning 'go') and /vɛ̃/ ('vingt,' meaning 'twenty'). At the same time, Keating emphasizes that window widths don't just depend on phonemic contrasts but may be idiosyncratic to languages or dialects. Thus, although both Russian and Japanese have a basic five-vowel phonemic contrast, the range of phonetic vowel variation is much greater in Russian; this would be modeled by specifying features of Russian vowels for wider windows than those of Japanese.

The extent of coarticulatory overlap between segments depends on how close a 'trajectory' passes to the edge of a window. This is illustrated in Figure 3, which shows a hypothetical trajectory of velum height through three windows, one each for the three segments in 'man.' For /m/ and /n/, the window is narrowly specified for a lowered velum position (the windows are narrow for these segments to avoid confusion with /b/ and /d/, respectively). Production of velum height for this word is defined by the trajectory that follows more or less the shortest possible path through the windows. Being flanked by two nasal consonants with a narrowly specified window for a lowered velum, the trajectory necessarily passes around the edge of the window for /a/, which represents the maximum amount of allowable velum opening for this vowel, and as a result, /a/ is heavily nasalized. But the extent of nasalization in /a/ isn't as extreme as for /m/ or /n/, because the window width for /a/ specifies that the maximum allowable nasalization is less than that of nasal consonants. In terms of this model, the diminution of lip-rounding in /s/ of /usu/ or of tongue-body raising in /p/ of /ipi/ considered earlier (see the section 'Context-Invariant Theories of Coarticulation' earlier in this article) would come about because their windows are less than the maximum possible extent of lip-rounding or tongue-body raising, respectively.

The window model is one of the first to provide a systematic account of 'underspecification.' In much of phonology, a segment is assumed to be unspecified for a feature if it is not used for meaning distinctions. Thus, English vowels are lexically unspecified for nasality, which means that it doesn't matter as far as meaning distinctions are concerned whether the velum is raised or not during their production. In some of the context-variant theories reviewed earlier, anticipatory coarticulation essentially involves

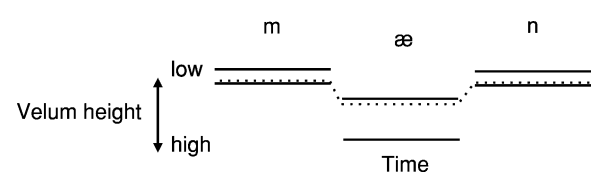

Figure 3 Keating's window model. The horizontal line represents the edges of the windows within which variation of velum height (vertical dimension) can occur for the three segments /mæn/ ('man'). The dotted line shows the hypothetical trajectory that is calculated for velum height in producing these three segments.

copying features into unspecified slots. So in a production of 'ban,' the nasal feature that is specified for /n/ is copied into the unspecified oral/nasal slot for /a/, an action that turns /a/ into a nasal vowel. One of the problems with this account was alluded to at the end of the section 'Context-Variant Theories of Coarticulation in the 1960s and 1970s,' earlier in this article: coarticulation is being modeled in terms of symbols, procedures, and a grammar that belong to phonology, whereas this type of change is at least partly a consequence of the physical and temporal properties of speech production that are best modeled in terms of windows specifying a permissible range of variation.

Coarticulation that arises at the level of trajectories through windows is distinguished sharply in Keating's (1990) model from phonological rules that change features; one of the distinguishing properties is that phonological rules tend to be all-or-none or 'categorical.' Consider, for example, a language like Japanese, whose consonant clusters in the lexicon are obligatorily homorganic – that is, there are words like 'tempura' and 'bento' with /mp/ and /nt/ clusters that have the same place of articulation, but there are no Japanese words built from consonant sequences like /mt/ with different or heterorganic places of articulation. What happens, then, when Japanese speakers are asked to produce a blend from two words that could potentially result in a heterorganic sequence? The answer is that they generally make it homorganic, and categorically so (Stephenson and Harrington, 2002). In a blending experiment, Japanese listeners hear hypothetical town names like 'Rundo' and 'Makapa' and are asked to say a new name consisting of a combination of the first syllable from the first word followed by all noninitial syllables from the second word (thus, 'run+kapa,' in this example) as quickly as possible. But rather than producing the blend as /runkapa/ with a heterorganic /nk/ they instead produce /ruŋkapa/ in which the consonants in the /ŋk/ sequence have the same velar place of articulation. This change from what must have been /nk/ at some abstract level in the production system in which the two separate words are specified to homorganic /ŋk/, is mostly categorical. That is, there isn't a wide range of variation between the alveolar /n/ and the velar /ŋ/ – speakers on the whole just produce /ruŋkapa/ and not something between this and /runkapa/.

Compare this study of Japanese with a number of recent articulatory experiments designed to investigate assimilation of place of articulation in English (e.g., Holst and Nolan, 1995). The analysis of utterances like 'ten cars' shows that some of the time there is complete assimilation in which the consonants across the word boundary are homorganic as in /tɛŋkɑz/; sometimes there is no assimilation resulting in heterorganic /tɛnkɑz/; but sometimes speakers produce an /n/ which is between the two, i.e., with simultaneous alveolar and velar closures. This is a very different outcome from the experiment in Japanese, and one of the ways of expressing these language-dependent differences is to say that whereas assimilation is phonological and categorical in Japanese, in English it is phonetic and involves constructing one of a number of possible paths through a fairly wide place of articulation window for /d/ in word or syllable-final position.

Coarticulation, H&H, and Locus Equations Most investigations of coarticulation have shown that there is a good deal of variability in the extent of coarticulation: there are differences in the magnitude and direction of coarticulation between speakers, possibly even between age groups and (as the preceding section showed), between languages and perhaps even their dialects. There is also considerable variation in coarticulation across speaking style. This, according to the H&H theory discussed in the section 'Hyperarticulation and Hypoarticulation' earlier in this article, is to be expected. The goal of speaking is not to achieve articulatory or acoustic invariance, but is instead to communicate meanings to the listener within a certain social and situational context. In general, greater coarticulation is a form of hypoarticulation that is likely to be more prevalent either when the meaning is not compromised (because it is predictable from context) and/or in more relaxed speaking situations. The findings that coarticulation itself should show considerable variation is, then, entirely consistent with H&H theory.

In recent years, some of these relationships between speaking style, variability, and coarticulation have been quantified using data from second formant frequency transitions in consonant–vowel sequences. In general, an F2 transition is influenced both by the place of articulation of the consonant and the phonetic quality of the vowel. In producing /bi:/ ('bee') for example, there is an extensive F2-transition from a low value for labial consonants to a high value for high vowels. The outcome of increasing the extent of coarticulation between these sounds is a diminished transition. This is because if /b/ is influenced by /i:/, then its F2-starting point shifts towards the high value associated with /i:/; and if /i:/ is influenced by /b/ (this is sometimes called 'vowel undershoot'), then the high F2 value for /i:/ shifts towards the lower value associated with the preceding /b/. Various experiments have shown exactly this type of diminution in the extent of the F2-transition with a less formal or

less clear speaking style, indicating greater coarticulatory overlap between the consonant and vowel. Some of these differences have also been formulated in recent years in terms of so-called 'locus equations,' which provide one measure of the extent of the coarticulatory influence of vowels on consonants.

Motor Programming

Coordination of Muscle Activities

Speech production involves making precise and fast changes of vocal-tract configurations by orchestrating a multitude of muscle actions in the spatial as well as in the temporal domain. For the production of a bilabial closure, the articulators involved are the upper lip, the lower lip and the jaw carrying the lower lip upwards. For achieving the task of completely occluding the vocal tract with the lips, these articulators exhibit many 'degrees of freedom' in the amount to which each articulator contributes to the task; that is, in a vowel-bilabial-vowel sequence, a bilabial closure may be achieved with a range of different lip-jaw movements depending on contextual differences in the identities of the flanking vowels (see Saltzman and Munhall, 1989). Therefore, although the distance moved by the respective articulator varies with the context, the externally defined goal is achieved in a relatively invariant way. The involved muscle actions are generally assumed to be controlled and coordinated by organizing them into 'coordinative structures or synergies' instead of each muscle being controlled individually and continuously (see the section 'Context-Invariant Theories of Coarticulation' earlier in this article).

One very important property of speech production is that muscles and muscle groups unite in order to execute a specific task. This muscle linkage is not a hard-wired control of muscle compounds. It is defined functionally in a task-specific flexible manner with a fixed sequencing of individual muscle activities. Another phenomenon that can be explained by the organization of speech organs in coordinative structures is 'motor equivalence,' which refers to the finding that the same goal is reached in more than one way by the composite articulators compensating for each other (see Figure 4). For example, a bilabial closure can be achieved by moving the jaw, the lower lip, or the upper lip to a greater degree. Studies of 'perturbation' provide one of the most important experimental paradigms for studying 'compensatory behavior.' In studies of perturbation, an articulator or structure is either impeded for a longer stretch of time (static perturbation) or the ongoing motor act is perturbed suddenly and unexpectedly (dynamic perturbation). Static perturbations occur naturally, for example, when speaking with a pipe in the mouth; speakers produce near-normal speech despite the lower jaw being fixed by compensatory movements of other articulators. Similar results have been found experimentally by positioning bite-blocks of different sizes between the molars (see Lindblom *et al.*, 1979) or by inserting a thick artificial palate (e.g., Hamlet and Stone, 1976).

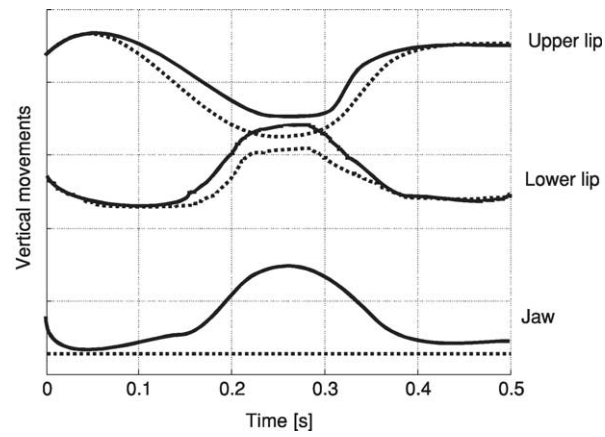

Figure 4 Possible combinations of upper lip, lower lip, and jaw movements for the achievement of a bilabial closure. Solid line: with jaw involvement; dotted line: with fixed jaw.

Dynamic perturbations can be induced by a small motor – in most experiments, attached to the jaw – that can be activated during some trials to generate a small load. A relatively new method is an inflatable artificial palate that dynamically changes its thickness and therefore the target region, e.g., for oral fricatives (see Honda *et al.*, 2002). The aim of applying these techniques is to determine (1) which articulators belong to a coordinative structure, (2) the task-specific spatial and temporal organization, (3) the biomechanical properties of the perturbed limb, and (4) the role of auditory and sensory feedback in the speech production process (see the next section in this article).

Responses to different kinds of perturbation have the following properties:

- Compensatory reactions are usually task-specific. In one of the most influential experiments, Kelso *et al.* (1984) recorded movements of jaw, upper and lower lip, and muscle activity of the tongue (EMG of genioglossus) during multiple repetitions of the utterances 'It's a /bæb/ again' or 'It's a /bæz/ again.' The mandibular closing movements towards the word-final consonants /b/ or /z/ were perturbed by a downward torque on a low percentage of trials. For the bilabial only, the lip muscles were activated in response to the perturbation, and the upper lip

compensated for the impeded lower-lip movement, whereas the tongue only reacted when the jaw movement towards the apical fricative /z/ was disrupted. These results give evidence for a short-term, task-specific organization of muscles into groups for producing a specific phoneme.

- Compensations are functional and successful, i.e., the intended target is usually achieved and the produced sound is intelligible. This shows that temporal and spatial amendments due to a load or structural perturbation are within acceptable limits.
- Compensatory movements are affected by the biomechanics and linkages of the system. For example, if the jaw is perturbed during sustained vowels, the same amount of force applied to the jaw causes larger displacements of the jaw in the vertical direction than in the horizontal (Shiller *et al.*, 2002) because of the limb-specific biomechanical stiffness.
- Compensations occur very rapidly: latencies amount to about 20 ms for responses to sudden perturbations; compensation occurs approximately at the second trial for producing a given sound in the case of static perturbation. On the one hand, the shortness of the reaction time suggests that the movement trajectories are not cognitively reorganized when disrupted, but that the reaction is instead triggered at a more peripheral neural control level. On the other hand, the compensatory movement is triggered too slowly to be controlled by a simple peripheral reflex involvement. Because the latencies also vary with the timing and the load of the perturbation, a reflex-like reaction can be excluded. The fast reaction time and successful compensation even at the first perturbed trial suggest that sensory information from the periphery plays a major role in ensuring that articulatory targets are achieved. An alternative explanation assumes that the short reaction time is achieved by regulating properties of the neural linkages between the composite articulators of a synergy (Gomi *et al.*, 2002).

The Role of Feedback

The above findings on perturbation suggest that speech is monitored online using feedback from sensory information. Online sensory information is not included as a basic control mechanism in 'motor program theories' (for an excellent summary of speech production models, see Kent *et al.*, 1996), which assume that a ready-made plan of an utterance is executed by the speech organs rather in the same way that computer programs are executed, without any immediate feedback required (when a program is executed without any feedback, it is known as an 'open loop' system).

In contrast, in 'feedback systems,' information from the periphery regarding the output of the system is used to modify the system's behavior to ensure that movement goals are achieved. Feedback is available for the speaker from auditory, tactile, and proprioceptive receptors. For example, assuming the tongue is the structure to be controlled, the input to the feedback model is the neural command to the tongue muscle, and the output is the resulting tongue movement. If there is a difference between the intended and the actual tongue movement, this sensory information is received by a control center after a small time delay, and then a motor command is sent to correct the discrepancy. The term 'closed loop' implies that once the command to move has been issued, no further action of the command center is needed, because feedback modifies the input command to control the outcome. These models have been challenged on several grounds: apart from evidence that the sensory feedback (auditory as well as tactile) is probably too slow for online monitoring of the ongoing movement, it has also been found that a disruption of feedback channels (trigeminal nerve block, topical anesthesia, and noise masking) affects the production of speech only very slightly so that 'online continuous feedback' might only play a direct role either when the motor system is unexpectedly perturbed or in motor learning.

That short latency proprioceptive feedback loops are likely to contribute to speech movement production in a 'discontinuous' manner has been shown by means of a 2-D biomechanical tongue model by Payan and Perrier (1997) (based on the 'Equilibrium Point Hypothesis' of Feldman (1966)). Articulatory targets are not planned in, for example, a constriction-based space but as threshold lengths of the involved muscles. Because the precise trajectory of the movement between two targets in this theoretical framework is a consequence of the mechanical and dynamical properties of the speech apparatus, online monitoring via feedback is only required at the target phases.

'Feedforward' models, often combined with feedback loops, have been proposed because they allow faster error correction than pure feedback systems. In these models, predictive adjustments at the periphery are made by means of an internal representation of the relations between motor commands and physical (proprioceptive, articulatory, or auditory) outputs (for example, there might be a neural representation of the expected auditory signal generated by current vocal-tract states before speech production is executed). Therefore, the difference between feedback and feedforward models is that whereas feedback models make use of sensory information for

correction during or after a planned speech event, in feedforward systems a prediction is made of the feedback that is expected from a set of motor commands (for an extensive overview on internal models for general motor control, see Jordan and Wolpert (1999)). Based on this prediction, a correction can be made to the motor commands before they are executed.

Even so, it is generally agreed that 'auditory feedback' is far too slow to play a crucial role in online error correction of the relatively quick speech movements. Several experiments have shown that after some adaptation time, auditory feedback leads to slightly more acceptable productions and improves the quality of compensations due to unexpected perturbation as compared to masked or delayed auditory feedback.

The Nature of the Motor Plan/Target Because the units of the speech motor program are not directly observable, their properties can only be indirectly inferred. An important issue in the ongoing discussion is whether these units are represented in the brain in different modalities (e.g., auditory, orosensory, and postural spaces) or in only one mode. Closely related to this debate is the question of what kind of information (e.g., visual, auditory, sensory) is necessary for an infant to establish these units.

The models of 'articulatory phonology' and the 'direct realist theory' discussed earlier reject the notion that speech production and perception use different modalities. Because the articulatory gesture serves as the 'common currency' for the communication between the listener and the speaker (see Goldstein and Fowler, 2003), the linguistic and phonological codes "are not lost in the vocal tract and reconstituted by the perceiver," and no translation is necessary between multimodal representations.

Articulatory phonology and direct realist theory has been criticized on several grounds, including that it cannot explain how infants acquire speech without an internal representation or mapping between the motor actions of the vocal tract and the acoustical consequences of these actions. The emergence of phonological categories and their combination into words from the babbling stage would seem to be hampered without the influence of an auditory model of persons who have already mastered speech acquisition. The importance of auditory feedback in speech acquisition is evident from the difficulties deaf children have in producing intelligible speech, while postlingually acquired hearing loss in adulthood affects the quality and stability of already acquired sound categories only very slightly (Guenther and Perkell, 2004).

Motor learning with recourse to auditory reinforcement was successfully simulated by the neural network DIVA model (Directions Into Velocities of Articulators), which translates orosensory goals into movements (see e.g., Guenther, 2003; Guenther and Perkell, 2004). During the babbling phase, synaptic weights are tuned according to the tactile, proprioceptive, and auditory feedback provided by randomized movements. In a first stage, the mapping between the orosensory space and articulatory movements is learned by random movements of the speech articulators, which causes orosensory feedback. The resulting mapping is closely related to coordinative structures and can therefore explain compensatory behavior; raising the tongue tip causes proprioceptive sensations in the tongue and jaw muscles and tactile sensations at the alveolar ridge. In this way, the baby learns that a close contact between the tongue tip and the alveolar ridge can be achieved by different degrees of tongue and jaw involvement, i.e., motor equivalence. The second stage involves the establishment of the speech sound map, which contains multidimensional auditory target regions (rather than points) for the speech sounds that the baby has encountered so far. When the babbling infant is producing a speech sound, the projections between the auditory and orosensory dimensions are continuously readjusted during the learning process to achieve a target region for acceptable variants of given phoneme, e.g., with a wide range of tongue height but a small range of bilabial aperture variation for the bilabial stop. Once these mappings are established, online auditory feedback is no longer needed, but the targets of this model are defined in a planning space with auditory and orosensory dimensions. Planning a movement towards an orosensory goal involves the computation of articulatory changes to carry out the intended changes in the auditory parameters, i.e., planning occurs in the auditory domain.

In contrast to the DIVA model, the perception and production of articulatory gestures in articulatory phonology is achieved without any recourse to auditory feedback. Infants first learn to distinguish between the actions of discrete organs and imitate these actions from adults. Here the puzzle is how infants can imitate actions such as tongue protrusion. They cannot see their own tongue, and they cannot feel the tongue of the adult. Goldstein and Fowler (2003) argue that imitation of an action can only be achieved by a baby because he or she perceives the distal actions, i.e., extracts the distal events from information acquired optically or acoustically, and imitates them. Information from acoustics without articulation is ambiguous and does not provide enough information for motor learning. Moreover,

the acoustics as well as the motor commands are very different for an adult with a large vocal tract and a baby, but the gestures, e.g., tongue dorsum backing, are the same for an adult and an infant. Because gestures are the common currency of perception and production, no mapping between representations is needed. Whether acoustical information is important for specifying various types of phonological units is still a matter of discussion between the proponents of the two theories, and as Goldstein and Fowler (2003) point out, "the final experiments on this question have not yet been performed."

See also: Coarticulation; Prosodic Aspects of Speech and Language; Prosodic Cues of Discourse Units; Speaker Recognition and Verification, Automatic; Speech Perception.

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Speech Recognition, Audio-Visual

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Overview and Motivation

The recent algorithmic advances in the field of automatic speech recognition (ASR) together with progress in natural language understanding and speech synthesis have allowed the deployment of many automatic systems for speech-based human–computer interaction. Of course, these systems require highly accurate ASR to achieve successful task completion and user satisfaction, which in general is attainable in relatively quiet acoustic environments and for low-to medium-complexity recognition tasks. However, current ASR still lags in performance compared to humans, as discussed in Lippmann (1997), and lacks robustness to acoustic noise, its accuracy degrading significantly, especially under acoustic channels or environments mismatched to its training data.

To improve ASR, a number of researchers have recently been investigating additional signals as a complementary speech information source to the acoustic signal produced by the human vocal tract and traditionally used in ASR systems. For example, vocal cord vibration can be captured by a throat microphone, as in Graciarena *et al*. (2003), whereas a bone-conductive microphone can capture speech-induced skull vibration, as discussed in Zhang *et al*. (2004). By far, however, most attention has focused on exploiting speech information present in the video of the speaker's mouth region. Such signal is clearly not affected by acoustic noise, and is often available in recordings, or can be captured in certain practical scenarios of human–computer interaction by desktop computers, 'intelligent kiosks,' inside automobiles, 'smart rooms,' or when wearing specially designed audio-visual headsets as the one described by Huang *et al*. (2004). Employing visual information for ASR is known as automatic lipreading, and more often as automatic speechreading, since much speech information is located in the whole lower face and not only in the lips. In practice, the visual channel is used to augment the acoustic signal, resulting in audio-visual ASR (AVASR).

Research interest in AVASR has been motivated by the bimodality of human speech perception (Campbell *et al*., 1998). Indeed, humans combine audio and visual information in deciding what has been spoken, which is especially noticeable in noisy environments, where the visual benefit to speech intelligibility has been quantified in studies such as by Sumby and Pollack (1954). The bimodality of speech

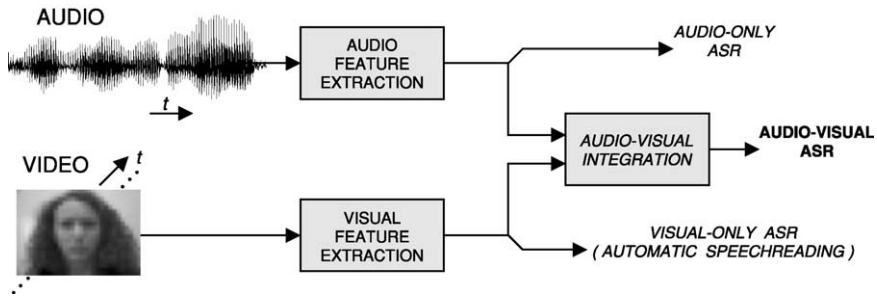

Figure 1 The main processing blocks of an audio-visual automatic speech recognition system. Visual feature extraction and audio-visual integration represent added components, compared to audio-only speech recognition. Different approaches for their design are reviewed in this article.

perception also becomes clear in the McGurk effect, first demonstrated by McGurk and MacDonald (1976) (see also Massaro and Stork, 1998): for example, when the spoken sound /ba/ is superimposed on video of a person uttering /ga/, most people perceive the sound /da/. In addition, visual information is particularly important to the hearing impaired, who typically lipread well. There are three key reasons why vision benefits human speech perception (Summerfield, 1987): it helps with source localization, it provides speech segmental information, and most importantly, the video contains information about the place of articulation. This is complementary to the acoustic information, as it helps disambiguate phonemes with the same manner of articulation, which therefore are difficult to tell apart by acoustics alone. For example, the unvoiced consonants /p/ and /k/ can be easily distinguished visually, because the first is a bilabial and the second a velar, i.e., their production involves different visible articulator movements of the lips and tongue, respectively.

It is therefore not surprising that exploiting visual speech information in ASR has received significant interest. The first AVASR system reported in the literature was built by Petajan (1984). He used image thresholding to obtain binary mouth images from the input video, which were then analyzed to extract mouth height, width, and other features, subsequently used as visual input to ASR. He was then able to classify isolated words within a small vocabulary set, uttered by a single speaker, by using these visual features and dynamic time warping (Rabiner and Juang, 1993). For joint audio-visual recognition, Petajan employed the visual system as a means to rescore *N*-best word hypotheses of audio-only ASR.

Since then, a number of researchers have developed AVASR systems of increasing complexity. Their systems vary in a number of areas, most importantly the visual feature extraction, the choices of speech classes and ASR classifier used, as well as the approach used in combining the visual with the acoustic features (see also Figure 1). The reported systems are developed on a variety of databases and recognition tasks, ranging from single-speaker, nonsense syllable or small-vocabulary isolated-word recognition to speaker-independent, large-vocabulary continuous speech recognition. A review of the most commonly adopted techniques in these systems can be found in Stork and Hennecke (1996); Chen and Rao (1998); Chibelushi *et al.* (2002); and Potamianos *et al.* (2003). In the remainder of the article, we briefly discuss the main approaches in the design of the AVASR components.

Feature Extraction

The first critical issue in the design and implementation of AVASR systems is the choice of visual features and their robust extraction from video. Visual speech information is mostly contained in the speaker's mouth region; therefore typically the visual features consist of appropriate representations of mouth appearance and/or shape. Of course, for visual feature extraction to commence, first the speaker's face has to be located in the video, followed by the detection of the mouth region and possibly of the lip contours, as well as their appropriate normalization.

Face detection has attracted significant interest in the literature, with a number of different techniques applied. In most AVASR systems, statistical approaches are employed to classify regions of the video as belonging to the face or nonface classes (for example, see Sung and Poggio, 1998). These techniques can be further enhanced to detect facial features such as lip points, nostrils, and eyes, that can help locate the mouth region of interest (ROI), and to estimate the head pose in order to provide ROI normalization (Potamianos *et al.*, 2003).

Once the ROI is located, a number of algorithms can be used to obtain lip contour estimates, if such contours are required for visual feature extraction. Some popular methods for this task are snakes (elastic

curves represented by control points) and templates (parametric curves, such as parabolas), both fitted to the desired characteristics of the mouth image by an iterative minimization algorithm (Aleksic *et al.*, 2002). Alternatively, statistical models of the mouth shape, such as active shape models, or joint statistical models of the mouth shape and appearance (the so-called active appearance models) can be used for estimating the contours. These models are obtained by performing a principal component analysis (PCA) on vectors containing the coordinates of a training set of points that lie on the shapes of interest, with tracking achieved by an iterative fitting algorithm (Dupont and Luettin, 2000).

Following the above steps, visual features can be extracted from the speaker's video. Such features capture the mouth ROI appearance, the mouth shape, or both (see also Figure 2). In the appearance-based approach, the low-level representation of the mouth ROI pixels is considered as informative for speechreading, and placed into a vector. Subsequently, a number of image compression or pattern classification techniques are applied to it, in order to reduce its dimensionality; for example, PCA (Bregler and Konig, 1994), the discrete cosine transform (Potamianos *et al.*, 2003), linear discriminant analysis, etc. In contrast, the shape-based approach assumes that most speechreading information is contained in the shape of the speaker's lips (inner and outer contours), or more generally in the face contours. This information is typically represented by geometric- or model-based features. The former are typically the height, width, perimeter, and area within the contour, as in Adjoudani and Benoit (1996), whereas the latter are obtained in conjunction with one of the parametric or statistical lip-tracking algorithms discussed in the previous paragraph (snake radial vectors, parabola parameters, active shape model), as in Dupont and Luettin (2000), for example. Often, appearance and shape features are combined by simply concatenating them, or by using a joint statistical model.

Unfortunately, little work exists in the literature that compares the AVASR performance of the appearance and shape-based approaches. In general though, appearance-based features avoid lip contour tracking, which is computationally expensive and unfeasible for low-quality videos, but are believed to be more speaker-dependent than shape-based features.

The extracted visual features are often postprocessed in order to improve ASR performance; for example, dynamic speech information can be captured if the feature vector is augmented by its first- and second-order temporal derivatives. Furthermore,

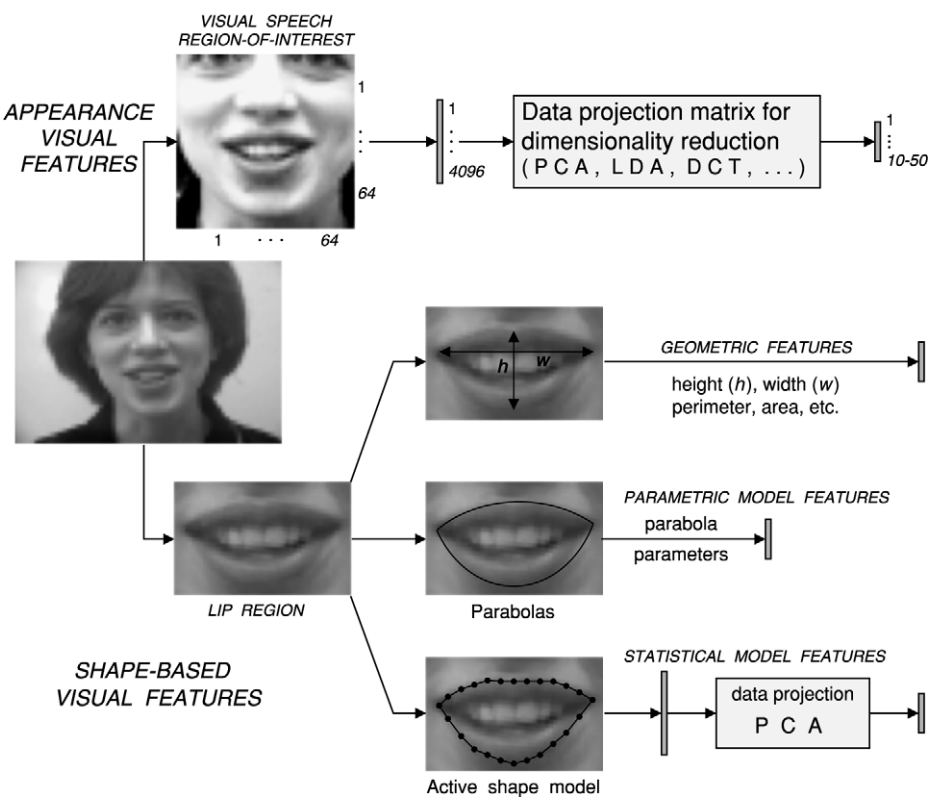

Figure 2 Examples of visual features used in the literature for automatic speechreading and audio-visual speech recognition. Appearance-based, geometric, parametric, and statistical shape-based features are schematically depicted.

interpolation of the visual features from the video rate (typically 25 or 30 Hz) to the acoustic feature rate is often employed to allow easy audio-visual integration. The acoustic features are usually generated at 100 Hz, and in most AVASR systems reported in the literature, they consist of mel-frequency cepstral or linear prediction coefficients (Rabiner and Juang, 1993).

Recognition

The second critical issue in the design of AVASR systems is the integration (fusion) of the acoustic and visual features into the recognition process. This should be designed in a way to ensure that the resulting system achieves a recognition performance superior to its single-modality counterparts, i.e., audio-only and visual-only ASR, and hopefully by a large margin in order to justify the added complexity of visual capture and processing. A number of audio-visual fusion techniques have been considered in the literature for this purpose and are described here. Of course, their AVASR implementation varies, depending among others on the choice of speech classes and the classifier used in the recognition process. Common choices are discussed next. Finally, examples of successful application of these techniques in AVASR are presented at the end of this section.

Visual Speech Classes and Classifiers for ASR

Current state-of-the-art ASR systems typically use sub-phonetic classes as the basic recognition units. Such classes are obtained by decision-tree modeling of the neighboring phonetic context (Rabiner and Juang, 1993), and in most large-vocabulary systems are in the order of a few thousand.

The same classes can of course be readily used in visual-based ASR. However, it is worth mentioning that the video signal contains significantly less speech information than noise-free audio, since not all phonemes are distinguishable using visual information. As a matter of fact, only clusters of phonemes, referred to in the literature as visemes, can be visually distinguished from each other. Indeed, the approximately 42 phonemes of American English are grouped into about 15 visemes, for example one of which is the bilabial viseme {/b/, /m/, /p/} (Stork and Hennecke, 1996). The members of this group look visually the same, as their production involves identical lip movement. This fact has motivated several researchers to use visemic or subvisemic classes for automatic speechreading. However, the majority of AVASR works assume identical classes for both acoustic and visual system components, thus making their integration easier.

In ASR the classes of interest are 'hidden,' observed only through a sequence of speech informative features. To obtain these classes, and subsequently the sequence of spoken words, statistical classifiers are used. In most systems, these are hidden Markov models (HMMs), with their class-conditional probability distributions – also known as 'emission' or observation probabilities – being Gaussian mixture models with diagonal covariances (Rabiner and Juang, 1993). Most researchers use such HMMs in AVASR, but alternative models are also often employed, such as artificial neural networks (Heckmann *et al.*, 2002), support vector machines, and HMMs with discrete observation probabilities.

Audio-Visual Integration

As mentioned above, various information fusion algorithms have been considered in the literature for AVASR. Although their implementation varies depending on the choices of features, classes, and classifiers used, one can broadly group them into feature fusion and classifier fusion methods (see also Figure 3).

Feature fusion techniques employ a single classifier that operates on multimodal feature vectors, such as

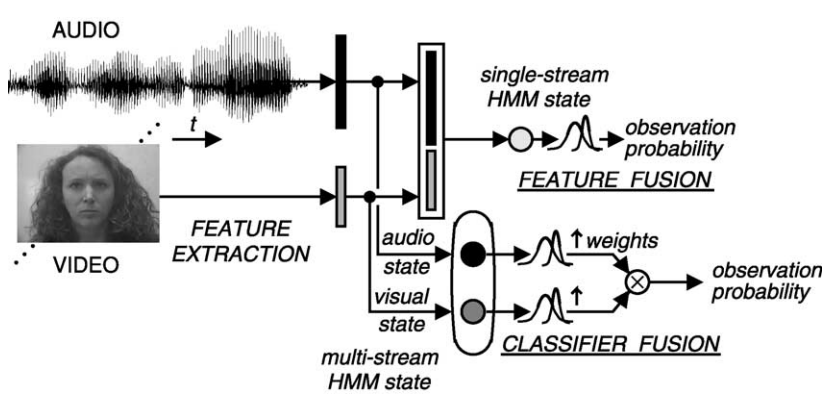

Figure 3 HMM-based feature and classifier fusion for audio-visual integration.

Figure 4 Example video frames of four audio-visual databases collected at IBM Research, left-to-right: using a specially designed audio-visual headset (Huang *et al.*, 2004), and color cameras in studio-like conditions, offices, and cars.

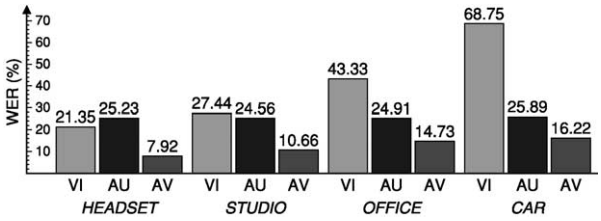

Figure 5 Examples of visual modality benefit to ASR for multiple speaker recognition of connected digit strings for the four databases of **Figure 4**, under noisy audio. Visual-only, audio-only, and audio-visual word error rates (WER), %, are shown.

the concatenated vector of time-synchronous audio and visual features, or any transformation of them in an appropriate space, as for example the 'dominant' and 'motor' recording fusion discussed by Teissier *et al.* (1999), or the enhancement techniques proposed in Girin *et al.* (2000). In contrast, classifier fusion algorithms utilize the output of the audio and visual classifiers to jointly estimate the hidden speech classes of interest. Typically, this is achieved by linearly combining the observation log-likelihoods of the individual classifiers into a joint audio-visual classification score, using appropriate weights that capture the reliability of each single-modality classifier. Such a combination typically occurs 'in parallel' using the mechanism of the so-called multistream HMM. Alternative approaches also exist, for example combining the classifiers 'in cascade,' by using one or both modalities to rescore the top N ranked outputs of the most reliable modality. One such approach is the discriminative model combination algorithm.

Most practical AVASR systems use the multistream HMM as a model for audio-visual fusion. In most cases, the emission probability combination occurs at the frame level, or equivalently the class level (i.e., HMM state). Some researchers have also considered combination at a coarser level, namely at the phone, syllable, or even the word level. Such combination can easily be accommodated using appropriate extensions to the multistream HMM framework. Typically, two single-modality three-state phone HMMs are combined, giving rise to a nine-state composite HMM, also known as a product or coupled HMM (Nefian *et al.*, 2002). In both cases, HMM parameters can be easily obtained using maximum-likelihood estimation or discriminative training, as in traditional HMMs (Rabiner and Juang, 1993). Of particular interest is the estimation of the weights that are used to combine the probabilities of the two streams of interest. Such can be derived by discriminative training, or by seeking optimal performance of the combined system on a held-out set. The weights can be globally set for an entire database, or vary based on local estimates of the audio and visual signal quality, and/or reliability measures of the two single-stream classifiers.

Results

Numerous works report AVASR results on various audio-visual databases. We briefly mention the work at IBM, where a number of bimodal corpora have been collected and performance of audio vs. audio-visual ASR has been benchmarked. Four such representative sets are depicted in **Figure 4**, collected in various domains, and using different sensors. Examples of typical performance gains achieved in noisy audio conditions due to the inclusion of the visual modality into ASR are depicted in **Figure 5**. These gains approximately correspond to 69%, 58%, 41%, and 37%, relative reduction in word error rate for the four domains (left-to-right); in all cases, connected digit strings are recognized. Notice that the visual-only performance degrades as the visual channel becomes more challenging (headset to car domain).

Summary and Discussion

In this article, we reviewed the basic techniques used for incorporating visual speech information into automatic speech recognition. We particularly focused on the issues of visual processing and audio-visual integration, which constitute two additional components over traditional audio-only systems. We also presented examples of recognition results that demonstrate the significant benefit of the visual modality to speech recognition.

The field of AVASR is relatively young, but nevertheless significant progress has been accomplished over the past 20 years. Concerning the practical

deployment of this technology, several obstacles have been slowly lifting, with audio-visual systems starting to exhibit real-time performance and improved robustness. Nevertheless, open research issues still remain in both visual processing and audio-visual integration components.

Finally, it is especially interesting to note that many of the algorithms described in this article are directly applicable to a number of other audio-visual speech technologies: for example, speech synthesis, emotion recognition, speech activity detection, speaker recognition, and speaker localization, among others (Chen and Rao, 1998; Yehia *et al*., 1998; Cosatto and Graf, 2000; Aleksic and Katsaggelos, 2005). These technologies are key to human–computer interaction, and incorporating the visual modality – whenever available – promises to make such interaction more natural and robust.

See also: Speech Perception; Speech Recognition, Automatic: History; Speech Recognition: Psychology Approaches; Speech Recognition: Statistical Methods.

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spoken speech, and respond as if it were an intelligent being. This anthropomorphism of HAL made the general public aware of the potential of intelligent machines. In the famous *Star Wars* saga, George Lucas extended the abilities of intelligent machines by making them mobile as well as intelligent and the droids such as R2D2 and C3PO were able to speak naturally, recognize and understand fluent speech, and move around and interact with their environment, with other droids, and with the human population at large. More recently (in 1988), in the technology community, Apple Computer created a vision of speech technology and computers for the year 2011, called Knowledge Navigator, which defined the concepts of a Speech User Interface (SUI) and a Multimodal User Interface (MUI) along with the theme of intelligent voice-enabled agents. This video had a dramatic effect in the technical community and focused technology efforts, especially in the area of visual talking agents.

Today speech technologies are commercially available for a limited but interesting range of tasks. These technologies enable machines to respond correctly and reliably to human voices, and provide useful and valuable services. While we are still far from having a machine that converses with humans on arbitrary topics like another human, many important scientific and technological advances have taken place, bringing us closer to the Holy Grail of machines that recognize and understand fluently spoken speech. This article attempts to provide a historic perspective on key inventions that have enabled progress in speech recognition and language understanding and briefly reviews several technology milestones as well as enumerating some of the remaining challenges that lie ahead of us.

From Speech Production Models to Spectral Representations

Attempts to develop machines to mimic a human's speech communication capability appear to have started in the second half of the 18th century. The early interest was not on recognizing and understanding speech, but instead on creating a speaking machine, perhaps due to the readily available knowledge of acoustic resonance tubes that were used to approximate the human vocal tract. In 1773 the Russian scientist Christian Kratzenstein, a professor of physiology in Copenhagen, succeeded in producing vowel sounds using resonance tubes connected to organ pipes (Kratzenstein, 1782: 358–380). In 1791 Wolfgang von Kempelen in Vienna constructed an Acoustic-Mechanical Speech Machine (Dudley and Tarnoczy, 1950) and in the mid-1800s Charles Wheatstone (Wheatstone, 1879) built a version of von Kempelen's speaking machine using resonators made of leather, the configuration of which could be altered or controlled with a hand to produce different speech-like sounds, as shown in Figure 2.

During the first half of the 20th century, work by Fletcher (Fletcher, 1922) and others at Bell Laboratories documented the relationship between a given speech spectrum (which is the distribution of power of a speech sound across frequency), and its sound characteristics as well as its intelligibility to a human listener. In the 1930s Homer Dudley, influenced greatly by Fletcher's research, developed a speech synthesizer called the VODER (Voice Operating Demonstrator) (Dudley and Watkins, 1939), which was an electrical equivalent (with mechanical control) of Wheatstone's mechanical speaking machine. Figure 3 shows a block diagram of Dudley's VODER,

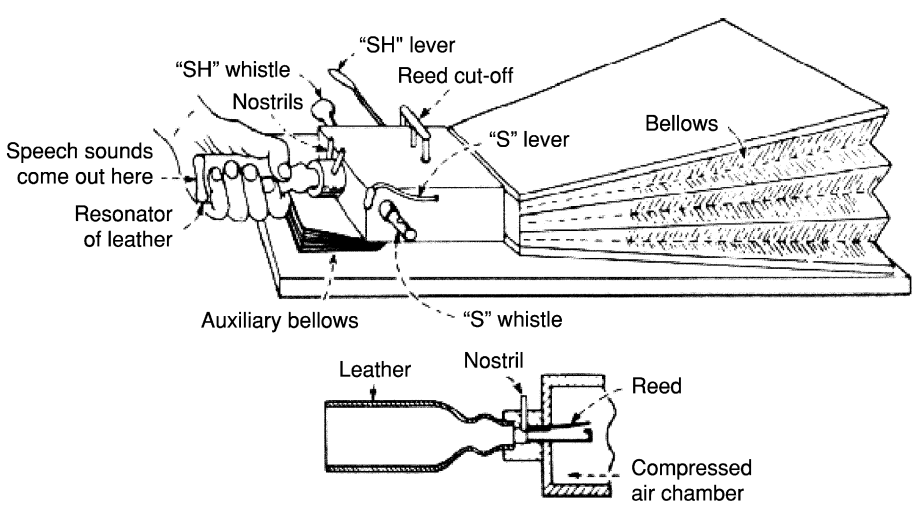

Figure 2 Wheatstone's version of von Kempelen's speaking machine (from Flanagan, 1972).

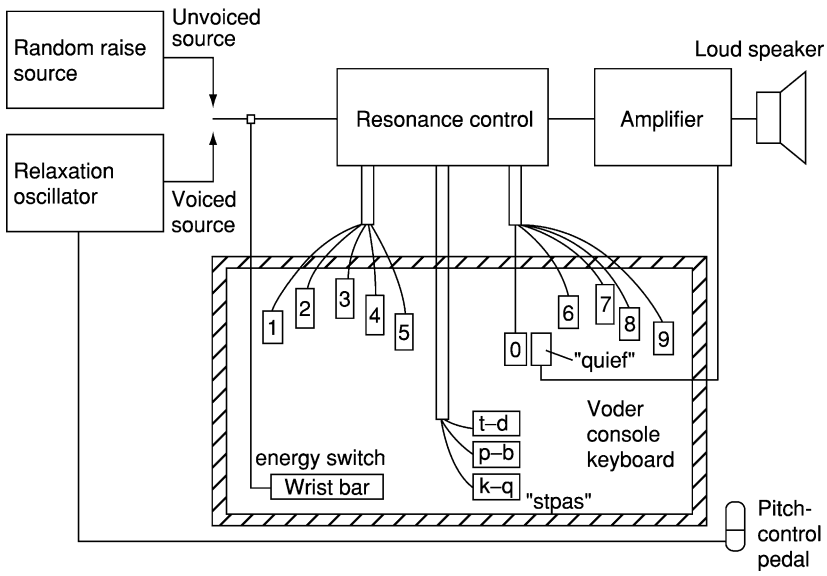

Figure 3 A block schematic of Homer Dudley's VODER (From Dudley *et al.,* 1939).

Figure 4 The VODER at the 1939 World Fair in New York City.

which consisted of a wrist bar for selecting either a relaxation oscillator output or noise as the driving signal, and a foot pedal to control the oscillator frequency (the pitch of the synthesized voice). The driving signal was passed through ten bandpass filters whose output levels were controlled by the operator's fingers. These ten bandpass filters were used to alter the power distribution of the source signal across a frequency range, thereby determining the characteristics of the speechlike sound at the loudspeaker. Thus to synthesize a sentence, the VODER operator had to learn how to control and 'play' the VODER so that the appropriate sounds of the sentence were produced. The VODER was demonstrated at the World's Fair in New York City in 1939 (shown in Figure 4) and was considered an important milestone in the evolution of speaking machines.

The pioneering work of Harvey Fletcher and Homer Dudley firmly established the importance of the signal spectrum for reliable identification of the phonetic nature of a speech sound. Following the convention established by these two outstanding scientists, most modern systems and algorithms for speech recognition are based on the concept of measurement of the (time-varying) speech power spectrum (or its variants such as the cepstrum), in part due to the fact that measurement of the power spectrum from a signal is relatively easy to accomplish with modern digital signal processing techniques.

Early Automatic Speech Recognizers

Early attempts to design systems for automatic speech recognition were mostly guided by the theory of acoustic-phonetics, which describes the phonetic elements of speech (the basic sounds of the language) and tries to explain how they are acoustically realized in a spoken utterance. These elements include the phonemes and the corresponding place and manner of articulation used to produce the sound in various phonetic contexts. For example, in order to produce a

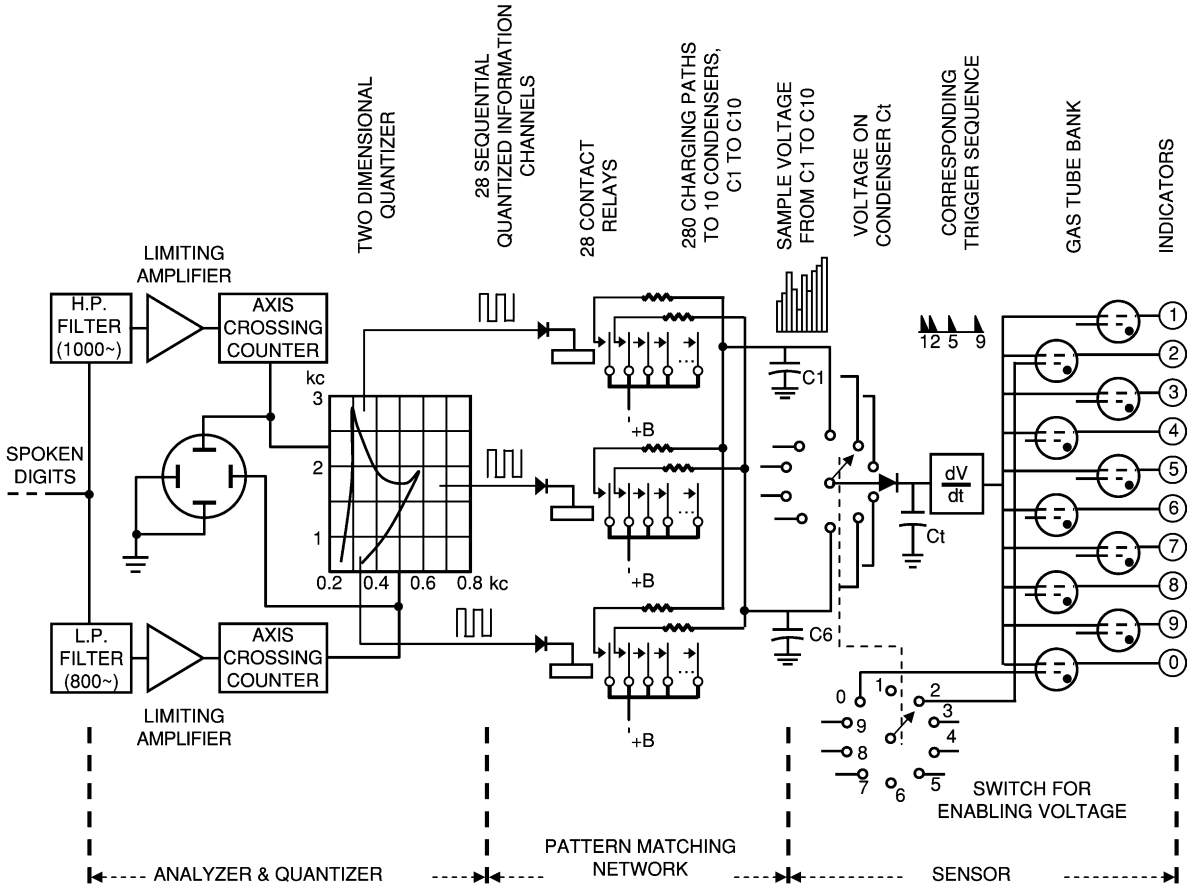

Figure 5 Block schematic of digit recognizer circuits (from Davis *et al.,* 1952).

steady vowel sound, the vocal cords need to vibrate (to excite the vocal tract), and the air that propagates through the vocal tract results in sound with natural modes of resonance similar to what occurs in an acoustic tube. These natural modes of resonance, called the *formants* or *formant frequencies,* are manifested as major regions of energy concentration in the speech power spectrum. In 1952 Davis *et al.,* of Bell Laboratories built a system for isolated digit recognition for a single speaker (1952) using the formant frequencies measured (or estimated) during vowel regions of each digit. Figure 5 shows a block diagram of the digit recognizer developed by Davis *et al.,* and Figure 6 shows plots of the formant trajectories along the dimensions of the first and the second formant frequencies for each of the ten digits, 1–9 and 0, respectively. These trajectories, in which time was an implicit parameter, served as the reference pattern for determining the identity of an unknown digit utterance as the best matching digit.

In other early recognition systems of the 1950s, Olson and Belar of RCA Laboratories built a system to recognize 10 syllables of a single talker (Olson and Belar, 1956) and at MIT Lincoln Lab, Forgie and Forgie built a speaker-independent 10-vowel recognizer (Forgie and Forgie, 1959). In the 1960s, several Japanese laboratories demonstrated their capability of building special-purpose hardware to perform a speech recognition task. Most notable were the vowel recognizer of Suzuki and Nakata at the Radio Research Lab in Tokyo (Suzuki and Nakata, 1961), the phoneme recognizer of Sakai and Doshita at Kyoto University (Sakai and Doshita, 1962), and the digit recognizer of NEC Laboratories (Nagata *et al.,* 1963). The work of Sakai and Doshita involved the first use of a speech segmenter for analysis and recognition of speech in different portions of the input utterance. In contrast, an isolated digit recognizer implicitly assumed that the unknown utterance contained a complete digit (and no other speech sounds or words) and thus did not need an explicit segmenter. Kyoto University's work could be considered a precursor to a continuous speech recognition system.

In another early recognition system Fry and Denes, at University College in England, built a phoneme recognizer to recognize 4 vowels and 9 consonants (Fry and Denes, 1959). By incorporating statistical information about allowable phoneme sequences in

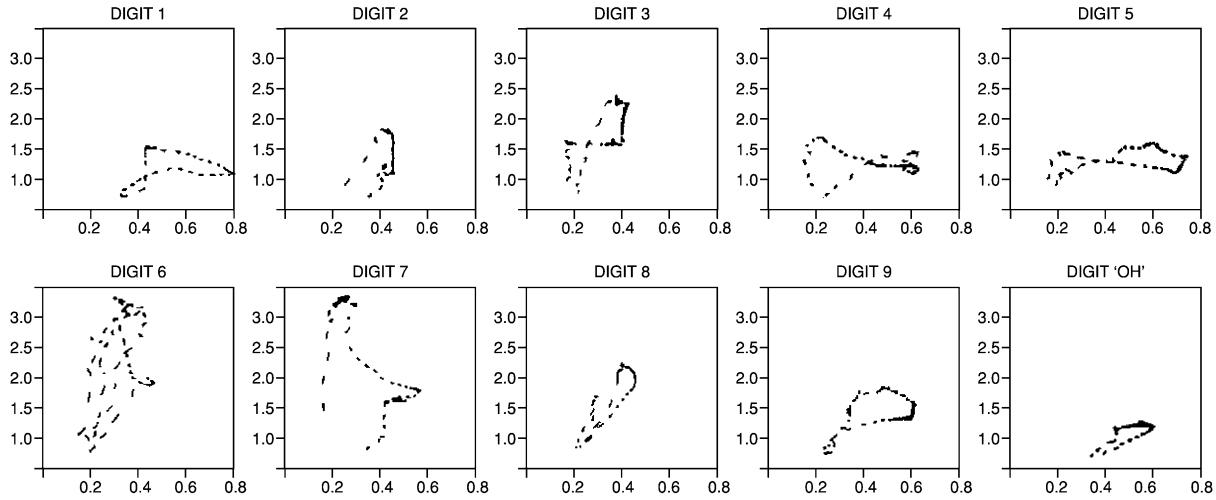

Figure 6 Photographs of formant 1 vs. formant 2 presentation of the digits. (from Davis *et al.,* 1952).

English, they increased the overall phoneme recognition accuracy for words consisting of two or more phonemes. This work marked the first use of *statistical syntax* (at the phoneme level) in automatic speech recognition.

An alternative to the use of a speech segmenter was the concept of adopting a *non-uniform time scale* for aligning speech patterns. This concept started to gain acceptance in the 1960s through the work of Tom Martin at RCA Laboratories (Martin *et al.,* 1964) and Vintsyuk in the Soviet Union (Vintsyuk, 1968). Martin recognized the need to deal with the temporal nonuniformity in repeated speech events and suggested a range of solutions, including detection of utterance endpoints, which greatly enhanced the reliability of the recognizer performance (Martin *et al.,* 1964). Vintsyuk proposed the use of dynamic programming for time alignment between two utterances in order to derive a meaningful assessment of their similarity (Vintsyuk, 1968). His work, though largely unknown in the West, appears to have preceded that of Sakoe and Chiba (1978) as well as others who proposed more formal methods, generally known as dynamic time warping, in speech pattern matching. Since the late 1970s, mainly due to the publication by Sakoe and Chiba, dynamic programming, in numerous variant forms (including the Viterbi algorithm, Viterbi 1967, which came from the communication theory community), has become an indispensable technique in automatic speech recognition.

Technology Drivers since the 1970s

In the late 1960s, Atal and Itakura independently formulated the fundamental concepts of Linear Predictive Coding (LPC) (Atal and Hanauer, 1971; Itakura and Saito, 1970), which greatly simplified the estimation of the vocal tract response from speech waveforms. By the mid-1970s, the basic ideas of applying fundamental pattern recognition technology to speech recognition, based on LPC spectral estimation methods, were proposed by Itakura (1975), Rabiner and Levinson (1979), and others.

Also during this time period, based on his earlier success at aligning speech utterances, Tom Martin founded Threshold Technology, the first company to attempt to commercialize speech recognition technology, and developed the first real ASR product called the VIP–100 System. The system was only used in a few simple applications, such as by television faceplate manufacturing firms (for quality control) and by FedEx (for package sorting on a conveyor belt), but its main importance was the way it influenced the Advanced Research Projects Agency (ARPA) of the U.S. Department of Defense to fund the Speech Understanding Research (SUR) program during the early 1970s. Among the systems built by the contractors of the ARPA program was Carnegie Mellon University's (CMU) Harpy (Lowerre, 1986), which was shown to be able to recognize speech using a vocabulary of 1011 words with reasonable accuracy. One particular contribution from the Harpy system was the concept of doing a graph search, where the speech recognition language is represented as a connected graph derived from lexical representations of words, with syntactical production rules and word boundary rules. In the Harpy system, the input speech was first analyzed to produce a time-dependent parametric representation and then segmented into sounds. The segmented parametric representation of speech was then subjected to phone template matching using the Itakura distance (Itakura, 1975). The

graph search, based on a beam search algorithm, compiled, hypothesized, pruned, and then verified the recognized sequence of words (or sounds) that satisfied the knowledge constraints with the highest matching score (smallest distance to the reference patterns). The Harpy system was perhaps the first to take advantage of a finite state network to reduce computation and efficiently determine the closest matching string. However, methods that optimized the finite state network (FSN) (for performance as well as to eliminate redundancy) did not come about until the early 1990s (Mohri, 1997).

Other systems developed under DARPA's SUR program included CMU's Hearsay(-II) and BBN's HWIM (Klatt, 1977). Neither Hearsay-II nor HWIM (Hear What I Mean) met the DARPA program's performance goal at its conclusion in 1976. However, the approach proposed by Hearsay-II of using parallel asynchronous processes that simulate the component knowledge sources in a speech system was a pioneering concept. The Hearsay-II system extended sound identity analysis (to higher level hypotheses) given the detection of a certain type of (lower level) information or evidence, which was provided to a global 'blackboard' where knowledge from parallel sources was integrated to produce the next level of hypothesis. BBN's HWIM system, on the other hand, was known for introducing interesting new ideas such as a lexical decoding network incorporating sophisticated phonological rules (aimed at phoneme recognition accuracy), its handling of segmentation ambiguity by a lattice of alternative hypotheses, and the concept of word verification at the parametric level. Another system worth noting of the time was the DRAGON system by Jim Baker, who moved to Massachusetts to start a company with the same name in the early 1980s.

In parallel to the ARPA-initiated efforts, two broad directions in speech recognition research started to take shape in the 1970s, with IBM and AT&T Bell Laboratories essentially representing two different schools of thought as to the applicability of automatic speech recognition systems for commercial applications.

IBM's effort, led by Fred Jelinek, was aimed at creating a voice-activated typewriter (VAT), the main function of which was to convert a spoken sentence into a sequence of letters and words that could be shown on a display or typed on paper (Jelinek *et al.,* 1975). This type of speech recognition task is generally referred to as *transcription.* The recognition system, called Tangora, was essentially a speaker-dependent system (i.e., the typewriter had to be trained by each user). The technical focus was on the size of the recognition vocabulary (with dictation in office correspondence as the primary application), and the structure of the language (the grammar). IBM addressed the issue of grammar from a statistical decoding perspective; statistical syntactical rules were used to describe how likely, in a probabilistic sense, was a sequence of language symbols (e.g., phonemes or words) that could appear in the speech signal. The set of statistical grammatical or syntactical rules was called a *language model,* of which the *n-gram* model, which defined the probability of occurrence of an ordered sequence of n words, was the most frequently used variant. Although both the n-gram language model and a traditional grammar are manifestations of the rules of the language, their roles were fundamentally different. The n-gram model, which characterized the word relationship within a span of n words, was purely a convenient and powerful statistical representation of a grammar. Its effectiveness in guiding a word search for speech recognition, however, was strongly validated by the famous word game of Claude Shannon (1948) that involved a competition between a human and a computer. In this competition both the computer and the human are asked to sequentially guess the next word in an arbitrary sentence. The human guesses based on native experience with language; the computer uses the accumulated word statistics to make its best guess based on maximum probability from the estimated word frequencies. It was shown that once the span of the words, n, exceeded three, the computer was very likely to win (make better guesses as to the next word in the sequence) over the human player. Since their introduction in the 1980s, the use of n-gram language models, and their variants, has become indispensable in large vocabulary speech recognition systems.

At AT&T Bell Laboratories, the goal of the research program was to provide automated telecommunication services to the public, such as voice dialing and command and control for routing of phone calls. These automated systems were expected to work well for a vast population (tens of millions) of talkers. The focus at Bell Laboratories was in the design of a speaker-independent system that could deal with the acoustic variability intrinsic in the speech signals coming from many different talkers, often with notably different regional accents. This led to the creation of a range of speech clustering algorithms for creating word and sound reference patterns (initially templates but ultimately statistical models) that could be used across a wide range of talkers and accents. Furthermore, research to understand and to control the acoustic variability of various speech representations across talkers led to the study of a range of spectral distance measures (e.g., the Itakura distance [Itakura, 1975] and statistical modeling

techniques [Juang *et al.* 1986]) that produced sufficiently rich representations of the utterances from a vast population. (As will be elaborated in the next section, the technique of mixture density hidden Markov models [Juang, 1985; Lee *et al.,* 1990] has since become the prevalent representation of speech units for speaker independent continuous speech recognition.) Since applications such as voice dialing and call routing usually involved only short utterances of limited vocabulary and consisted of only a few words, there was an emphasis of the research at Bell Laboratories on what is generally called the *acoustic model* (the spectral representation of sounds or words) over the language model (the representation of the grammar or syntax of the task). Also, of great importance in the Bell Laboratories' approach was the concept of *keyword spotting* as a primitive form of speech understanding (Wilpon, 1990). The technique of keyword spotting aimed at detecting a keyword or a key phrase of some particular significance that was embedded in a longer utterance where there was no semantic significance to the other words in the utterance. The need for such keyword spotting was to accommodate talkers who preferred to speak in natural sentences rather than using rigid command sequences when requesting services (i.e., as if they were speaking to a human operator). For example, a telephone caller requesting a credit card charge might speak the sentence 'I'd like to charge it to my credit card' rather than just say 'credit card.' In a limited domain application, the presence of the key-phrase 'credit card' in an otherwise naturally spoken sentence was generally sufficient to indicate the caller's intent to make a credit card call. The detected keyword or key-phrase would then trigger a prescribed action (or sequence of actions) as part of the service, in response to the talker's spoken utterance. The technique of keyword spotting required extension of the usual pattern recognition paradigm to one that supported hypothesis testing.

The IBM and AT&T Bell Laboratories approaches to speech recognition both had a profound influence in the evolution of human-machine speech communication technology of the last two decades. One common theme between these efforts, despite the differences, was that mathematical formalism and rigor started to emerge as distinct and important aspects of speech recognition research. While the difference in goals led to different realizations of the technology in various applications, the rapid development of statistical methods in the 1980s, most notably the hidden Markov model (HMM) framework (Jelinek, 1976; Levinson *et al.,* 1983), caused a certain degree of convergence in the system design. Today, most practical speech recognition systems are based on the statistical framework and results developed in the 1980s, with significant additional improvements in the 1990s.

Technology Directions in the 1980s and 1990s

Speech recognition research in the 1980s was characterized by a shift in methodology from the more intuitive template-based approach (a straightforward pattern recognition paradigm) toward a more rigorous statistical modeling framework. Although the basic idea of the hidden Markov model (HMM) was known and understood early on in a few laboratories (e.g., IBM and the Institute for Defense Analyses (IDA) [Ferguson, 1980]), the methodology was not complete until the mid-1980s and it wasn't until after widespread publication of the theory (Levinson *et al.,* 1983; Ferguson, 1980) that the hidden Markov model became the preferred method for speech recognition. The popularity and use of the HMM as the main foundation for automatic speech recognition and understanding systems has remained constant over the past two decades, especially because of the steady stream of improvements and refinements of the technology.

The hidden Markov model, which is a doubly stochastic process, models the intrinsic variability of the speech signal (and the resulting spectral features) as well as the structure of spoken language in an integrated and consistent statistical modeling framework (Rabiner and Juang, 2004). As is well known, a speech signal is inherently highly variable (due to variations in pronunciation and accent, as well as environmental factors such as reverberation and noise). When people speak the same word, the acoustic signals are not identical (in fact they may even be remarkably different at the acoustic level), even though the underlying linguistic structure, in terms of the pronunciation, syntax and grammar, may (or may not) remain the same. The formalism of the HMM is a probability measure that uses a Markov chain to represent the linguistic structure and a set of probability distributions to account for the variability in the acoustic realization of the sounds in the utterance. Given a set of known (text-labeled) utterances, representing a sufficient collection of the variations of the words of interest (called a training set), one can use an efficient estimation method, called the Baum-Welch algorithm (Baum, 1972), to obtain the 'best' set of parameters that define the corresponding model or models. The estimation of the parameters that define the model is equivalent to training and learning. The resulting model is then used to provide an indication of the likelihood (probability) that an

unknown utterance is indeed a realization of the word (or words) represented by the model. The probability measure represented by the hidden Markov model is an essential component of a speech recognition system that follows the statistical pattern recognition approach, and has its root in Bayes's decision theory (Theodoridis and Koutroumbas, 2003). The HMM methodology represented a major step forward from the simple pattern recognition and acoustic-phonetic methods used earlier in automatic speech recognition systems.

The idea of the hidden Markov model appears to have originated in the late 1960s at the Institute for Defense Analyses (IDA) in Princeton, N.J. Len Baum referred to an HMM as a set of probabilistic functions of a Markov chain, which, by definition, involves two nested distributions, one pertaining to the Markov chain and the other to a set of the probability distributions, each associated with a state of the Markov chain, respectively (Baum, 1972). The HMM model attempts to address the characteristics of a probabilistic sequence of observations that may not be a fixed function but instead changes according to a Markov chain. This doubly stochastic process was found to be useful in a number of applications such as stock market prediction and crypto-analysis of a rotary cipher (an encryption device widely used during World War II). Baum's modeling and estimation technique was first shown to work for discrete observations (i.e., ones that assume values from a finite set and thus are governed by discrete probability distributions) and then for random observations that were well modeled using log-concave probability density functions. The technique was powerful but limited. Using a representation theorem by Fan (Liporace, 1982), Liporace, also of IDA, relaxed the log-concave density constraint to include an elliptical symmetric density constraint (thereby including a Gaussian density and a Cauchy density). Baum's doubly stochastic process started to find applications in the speech area, initially in speaker identification systems, in the late 1970s (Poritz, 1982; Liporace, 1982). As more people attempted to use the HMM technique, it became clear that the constraint on the form of the density functions imposed a limitation on the performance of the system, particularly for speaker independent tasks where the speech parameter distribution was not sufficiently well modeled by a simple log-concave or an elliptically symmetric density function. In the early 1980s at Bell Laboratories, the theory of HMM was extended to mixture densities (Juang, 1985; Juang *et al.*, 1986) that have since proven vitally important in ensuring satisfactory recognition accuracy, particularly for speaker independent, large vocabulary speech recognition tasks.

The HMM, being a probability measure, was amenable for incorporation in a larger speech decoding framework which included a language model. The use of a finite-state grammar in large vocabulary continuous speech recognition represented a consistent extension of the Markov chain that the HMM utilized to account for the structure of the language, albeit at a level that accounted for the interaction between articulation and pronunciation. Although these structures (for various levels of the language constraints) were at best crude approximations to the real speech phenomenon, they were computationally efficient and often sufficient to yield reasonable (first-order) performance results. The merger of the hidden Markov model (with its advantage in statistical consistency, particularly in handling acoustic variability) and the finite state network (with its search and computational efficiency, particularly in handling word sequence hypotheses) was an important, although not unexpected, technological development in the mid-1980s.

Figure 7 shows a finite state composite model for the utterance 'show all alerts,' constructed from several context-dependent subword models that represent the corresponding phoneme-like speech units (including a unit for silence [sil] that can occur at the beginning and end of the sentence, as well as at the end of any word in the sentence, as might occur during a pause in speaking). The finite state graph is realized as a Markov chain for calculation of the likelihood, based on the observation sequence (the spectral representation over time) of an unknown utterance. Note that each node in the graph is associated with a probability distribution which accounts for the variability in realizing the corresponding phoneme-like sound. The likelihood that an utterance was generated by the finite state network represented by the model is computed as a sequential sum of local likelihoods related to the elementary units of the composite model. This sequential sum is obtained as a result of optimal state alignment, via a dynamic programming procedure, to maximize the match between the labeled units and the corresponding

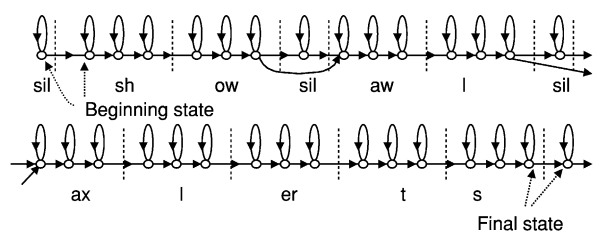

"Show all alerts" modeled as phones: ϕ-**sh**-ow, ϕ-**ax**-l, ax-**l**-er, l-**er**-t

Figure 7 A composite finite-state network for the utterance 'show all alerts.'

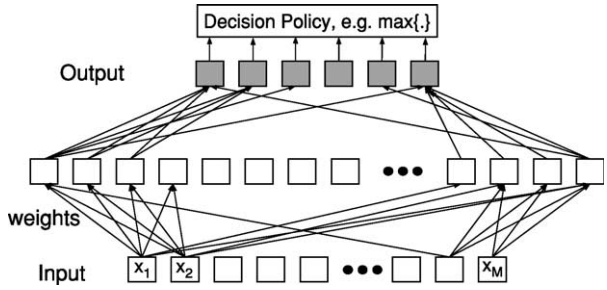

Figure 8 Multi-layer perceptron.

portions of the speech observations. At any given time, there are a number of hypothesized units whose likelihoods are to be evaluated and the determination of sound identity is based on the maximum likelihood value (or score of the match). The number of hypothesized units for match and that of the paths for search can be at times astronomical and thus may require efficient computational algorithms to solve the problem. A tool called FSM (finite-state machine library), which embodies the above finite state network in a unified transducer framework for incorporation of weighted search was developed in the mid-1990s (Mohri, 1997).

Another technology that was reintroduced in the late 1980s was the idea of artificial neural networks (ANN). Neural networks were first introduced in the 1950s, but failed to produce notable results initially (McCullough and Pitts, 1943). The advent in the 1980s of a parallel distributed processing (PDP) model, which was a dense interconnection of simple computational elements, and a corresponding 'training' method, called error back-propagation, revived interest in the old idea of mimicking the human neural processing mechanism. A particular form of PDP, the multi-layer perceptron, shown in Figure 8, received perhaps the most intense attention then, not because of its analog to neural processing but due to its capability in approximating any function (of the input) to an arbitrary precision, provided no limitation in the complexity of the processing configuration was imposed. If a pattern recognizer is viewed as one that performs a function that maps an input pattern to its class identity, the multi-layer perceptron was then a readily available candidate for this purpose. Early attempts at using neural networks for speech recognition centered on simple tasks like recognizing a few phonemes or a few words (e.g., isolated digits), with good success (Lippmann, 1990). However, as the problem of speech recognition inevitably requires handling of temporal variation, neural networks in their original form have not proven to be extensible to this task. Ongoing research focuses on integrating neural networks with the essential structure of a hidden Markov model to take advantage of its temporal handling capability.

In the 1990s a number of innovations took place in the field of pattern recognition. The problem of pattern recognition, which traditionally followed the framework of Bayes and required estimation of distributions for the data, was transformed into an optimization problem involving minimization of the empirical recognition error (Juang *et al.,* 1997). This fundamental change of paradigm was caused by the recognition of the fact that the distribution functions for the speech signal could not be accurately chosen or defined, and that Bayes' decision theory would become inapplicable under these circumstances. After all, the objective of a recognizer design should be to achieve the least recognition error rather than the best fitting of a distribution function to the given (known) data set as advocated by the Bayes criterion. The concept of minimum classification or empirical error subsequently spawned a number of techniques, among which discriminative training and kernel-based methods such as the support vector machines (SVM) have become popular subjects of study (Juang *et al.,* 1997; Bahl *et al.,* 1986; Vapnik, 1998) and have found applications in speech recognition.

The success of statistical methods revived the interest from (D)ARPA at the juncture of the 1980s and the 1990s, leading to several new speech recognition systems including the Sphinx system from CMU (Lee, 1988), the BYBLOS system from BBN (Schwartz *et al.,* 1989) and the DECIPHER system from Stanford Research Institute (SRI) (Murveit *et al.,* 1989). CMU's Sphinx system successfully integrated the statistical method of hidden Markov models with the network search strength of the earlier Harpy system. Hence, it was able to train and embed context-dependent phone models in a sophisticated lexical decoding network, achieving remarkable results for large-vocabulary continuous speech recognition.

With the support of DARPA, evaluation of speech recognition technology for a wide range of tasks and task vocabularies was diligently pursued throughout the 1990s and into the twenty-first century. Such evaluations were mostly based on the measurement of word (and sentence) error rate as the performance figure of merit of the recognition system. Furthermore, these evaluations were conducted systematically over carefully designed tasks with progressive degrees of difficulty, ranging from the recognition of continuous speech spoken with stylized grammatical structure (as used routinely in military tasks, for example, the Naval Resource Management task); to transcriptions of live (off-the-air) news broadcast, for example, North American Business news, which involves a fairly large vocabulary over 20 000 words;

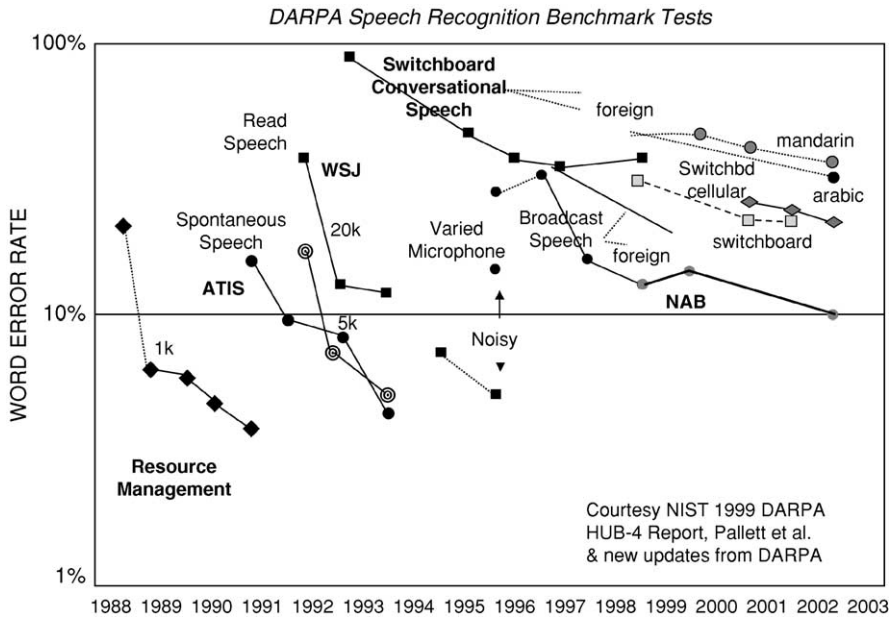

Figure 9 DARPA benchmark evaluation of speech recognition for a number of tasks.

and conversational speech. Figure 9 shows a chart that summarizes the benchmark performance of various large vocabulary continuous speech recognition tasks, as measured in formal DARPA and National Institute of Standards and Technology (NIST) evaluations (Pallett *et al.*, 1995). In the chart, the task of Resource Management involves a rigidly stylized military expression with a vocabulary of nearly 1000 words. ATIS is a task that involves simple spontaneous speech conversation with an automated air travel information retrieval system; although the speech is spontaneous, its linguistic structure is rather limited in scope. WSJ refers to transcription of a spoken (read) paragraph from the *Wall Street Journal;* the vocabulary size could be as large as 60 000 words. The Switchboard task is one of the most challenging ones proposed by DARPA. The speech is conversational and spontaneous, with many instances of the so-called disfluencies such as partial words, hesitation, and repairs. The general conclusion that can be drawn from these results is that conversational speech, which does not strictly adhere to linguistic constraints, is significantly more difficult to recognize than task-oriented speech that follows strict syntactic and semantic production rules. Also, the evaluation program showed that increasing the amount of speech data used for estimating the recognizer parameters (i.e., the size of the training set) always led to reductions of word error rate. (It is a well-accepted target that in order for virtually any large vocabulary speech recognition task to become viable, the word error rate must fall below a 10% level).

In the 1990s great progress was made in the development of software tools that enabled many individual research programs all over the world. As systems became more sophisticated (many large vocabulary systems now involve tens of thousands of phone unit models and millions of parameters), a well-structured baseline software system became indispensable for further research and development to incorporate new concepts and algorithms. The system that was made available by the Cambridge University team (led by Steve Young), called the Hidden Markov Model Tool Kit (HTK) (Young *et. al.*), was one of the most widely adopted software tools for automatic speech recognition research. Other widely available tool kits for HMM modeling of speech include the Sphinx System from Carnegie-Mellon University. (http://cmusphinx.sourceforge.net/sphinx4/), and the HMM toolkit from Mississippi State University (http://www.isip.msstate.edu/projects/speech/).

Toward a Machine that Communicates

Most speech recognition research, up to the 1980s, considered the major research problem to be one of converting a speech waveform (as an acoustic realization of a linguistic event) into words (as a best-decoded sequence of linguistic units). Many researchers also believed that the speech-to-text process was the necessary first step in the process that enabled a machine to be able to understand and properly respond to human speech. In field evaluations of speech recognition and understanding

technology for a range of tasks, two important things were learned about the speech communication process between humans and machines. First, potential users of a speech recognition system tended to speak natural sentences that often did not fully satisfy the grammatical constraints of the recognizer (e.g., by including out-of-vocabulary [OOV] words, non-grammatical constructs, ill-formed sentences, etc.), and the spoken utterances were also often corrupted by linguistically irrelevant noise components such as ambient noise, extraneous acoustic sounds, interfering speech, etc. Second, as in human-to-human speech communications, speech applications often required a dialog between the user and the machine to reach some desired state of understanding. Such a dialog often required such operations as query and confirmation, thus providing some allowance for speech recognition and understanding errors. The keyword spotting method (and its application in AT&T's Voice Recognition Call Processing (VRCP) System, as mentioned earlier), was introduced in response to the first factor while the second factor focused the attention of the research community on the area of dialog management. Many applications and system demonstrations that recognized the importance of dialog management over a system's raw word recognition accuracy were introduced in the early 1990s with the goal of eventually creating a machine that really mimicked the communicating capabilities of a human. Among these systems, Pegasus and Jupiter developed at the Massachusetts Institute of Technology under Victor Zue were particularly noteworthy demos (Glass and Weinstein, 2001; Zue *et al.*, 2000), and the How May I Help You? (HMIHY©) system at AT&T developed by Allen Gorin was an equally noteworthy service that was introduced as part of AT&T Customer Care for their Consumer Communications Services in 2000 (Gorin *et al.*, 1996).

Pegasus is a speech conversational system that provides information about the status of airline flights over an ordinary telephone line. Jupiter is a similar system with a focus on weather information access, both local and national. These systems epitomized the effectiveness of dialog management. With properly designed dialog management, these systems could guide the user to provide the required information to process a request, among a small and implicit set of menu choices, without explicitly requesting details of the query, e.g., such as by using the dialog management phrase "please say morning, afternoon, or evening" when time frame of the flight was solicited. Dialog management also often incorporated imbedded confirmation of recognized phrases and soft error handling so as to make the user react as if there was a real human agent rather than a machine on the other end of the telephone line. The goal was to design a machine that communicated rather than merely recognized the words in a spoken utterance.

The late 1990s was marked by the deployment of real speech-enabled applications, ranging from AT&T's VRCP (automated handling of operator-assisted calls) and Universal Card Service (customer service line) that were used daily (often by millions of people) in lieu of a conventional voice response system with touch-tone input, to United Airlines' automatic flight information system by SpeechWorks and AT&T's "How May I Help You? (HMIHY)" system for call routing of consumer help line calls. Although automatic speech recognition and speech understanding systems are far from perfect in terms of the word or task accuracy, properly developed applications can still make good use of the existing technology to deliver real value to the customer, as evidenced by the number and extent of such systems that are used on a daily basis by millions of users.

Summary and Outlook

Figure 10 shows a timeline of progress in speech recognition and understanding technology over the past several decades. We see that in the 1960s we were able to recognize small vocabularies (10–100 words) of isolated words, based on simple acoustic-phonetic properties of speech sounds. The key technologies that were developed during this time frame were filter-bank analyses, simple time normalization methods, and the beginnings of sophisticated dynamic programming methodologies. In the 1970s we were able to recognize medium vocabularies (100–1000 words) using simple template-based, pattern recognition methods. The key technologies that were developed during this period were the pattern recognition models, the introduction of LPC methods for spectral representation, the pattern clustering methods for speaker-independent recognizers, and the introduction of dynamic programming methods for solving connected word recognition problems. In the 1980s we started to tackle large vocabulary (1000–unlimited number of words) speech recognition problems based on statistical methods, with a wide range of networks for handling language structures. The key technologies introduced during this period were the hidden Markov model (HMM) and the stochastic language model, which together enabled powerful new methods for handling virtually any continuous speech recognition problem efficiently and with high performance. In the 1990s we were able to build large vocabulary systems with unconstrained language models, and constrained task syntax models for continuous speech recognition and

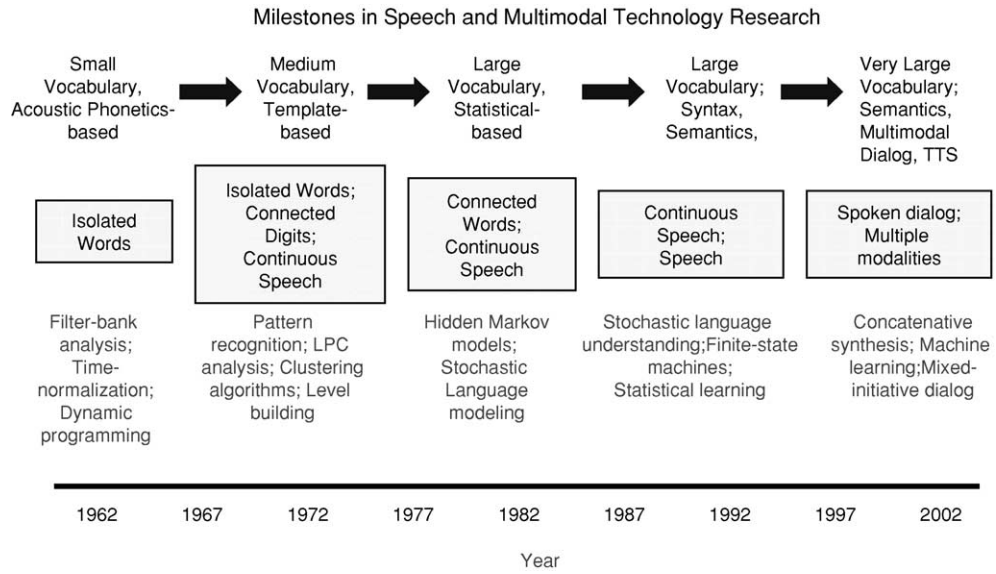

Figure 10 Milestones in speech recognition and understanding technology over the past 40 years.

understanding. The key technologies developed during this period were the methods for stochastic language understanding, statistical learning of acoustic and language models, and the introduction of finite state transducer framework (and the FSM Library) and the methods for their determination and minimization for efficient implementation of large vocabulary speech understanding systems. Finally, in the last few years, we have seen the introduction of very large vocabulary systems with full semantic models, integrated with text-to-speech (TTS) synthesis systems, and multi-modal inputs (pointing, keyboards, mice, etc.). These systems enable spoken dialog systems with a range of input and output modalities for ease-of-use and flexibility in handling adverse environments where speech might not be as suitable as other input-output modalities. During this period we have seen the emergence of highly natural concatenative speech synthesis systems, the use of machine learning to improve both speech understanding and speech dialogs, and the introduction of mixed-initiative dialog systems to enable user control when necessary.

After nearly five decades of research, speech recognition technologies have finally entered the marketplace, benefiting the users in a variety of ways. Throughout the course of development of such systems, knowledge of speech production and perception was used in establishing the technological foundation for the resulting speech recognizers. Major advances, however, were brought about in the 1960s and 1970s via the introduction of advanced speech representations based on LPC analysis and cepstral analysis methods, and in the 1980s through the introduction of rigorous statistical methods based on hidden Markov models. All of this came about because of significant research contributions from academia, private industry, and the government. As the technology continues to mature, it is clear that many new applications will emerge and become part of our way of life—thereby taking full advantage of machines that are partially able to mimic human speech capabilities.

The challenge of designing a machine that truly functions like an intelligent human is still a major one. Our accomplishments to date are only the beginning and it will take many years before a machine can pass the Turing test, namely, achieving performance that rivals that of a human.

See also: Speech Recognition: Statistical Methods.

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Speech Recognition: Psychology Approaches

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What could be simpler than perceiving and recognizing speech? Without any real effort, we identify half a dozen spoken words per second, almost immediately understand the message generated by the sentence they form, and often elaborate appropriate verbal and nonverbal responses before the utterance ends. However, empirical investigation reveals that the perceptual and cognitive mechanisms involved in recognizing speech are far from obvious. The computational complexity that listeners face is experienced first hand by second-language learners and by speech scientists trying to build speech-recognition machines. The problem originates mainly from the nature of the speech signal itself.

Main Properties of the Speech Signal

The fact that speech is conveyed in the auditory modality has dramatic implications for the psychological operations underpinning its recognition. Auditory language processing and written language processing are subjected to such different constraints that the models put forward to account for one or the other overlap only minimally. Over the past 50 years, research in speech recognition has focused on the constraining effects of three main properties of the auditory signal: sequentiality, variability, and continuity.

Sequentiality

One of the most obvious disadvantages of the auditory system compared to the visual system is that the distribution of the auditory information is solely under the speaker's control. From the listener's perspective, the speech signal is transient, and there is no such thing as auditory regressions, in which listeners can replay the words or sentences they just heard. The timing constraints on how speech sounds reach our ears have direct consequences for the time course of speech processing. Because we cannot hold more than a few syllables or words at a time in our auditory short-term memory, word and sentence processing must take place sequentially, in real time. For a large part, listeners are extremely good at keeping up with the rapid flow of speech sounds: Marslen-Wilson (1984) showed that words in sentences are often

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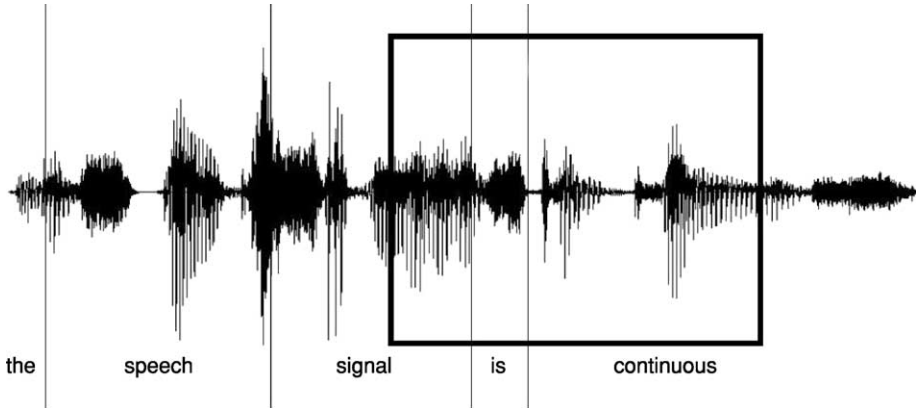

Figure 1 A waveform of the spoken sentence 'the speech signal is continuous,' with the boundaries between words indicated by vertical lines. Note the absence of any consistent word-boundary cues in the signal. An approximation of the amount of speech that can be held in our acoustic short-term memory is shown in the rectangle.

recognized as early as 200 ms after their onset. However, the sequential nature of speech processing is a feature that many models have struggled to implement, not only because it confronts the modeler with a choice between online (and probabilistic) decision and delayed commitment, but also because the problem is compounded by the lack of clear boundaries between words.

Continuity

The inspection of a speech waveform does not reveal clear correlates to what the human ear perceives as word boundaries (Figure 1). Abrupt drops in sound intensity do not reliably correlate with word boundaries; they often simply indicate syllable boundaries or articulatory gestures involving mouth closure, which are often found in some stop consonants. Yet the absence of boundary markers hardly seems to pose a problem for everyday listening, as the subjective experience of speech is not one of continuity but, rather, of discreteness, i.e., a string of words. The passage from continuity to discreteness constitutes a computational challenge that has usually been referred to as speech segmentation.

Segmentation problems are not limited to finding boundaries between words. At the sublexical level, too, where boundaries between phonemes are blurred by coarticulation, some form of segmentation must occur. Appropriate segmentation between phonemes is important for mapping the signal onto phonemic categories. Likewise, at the sentential level, segmentation between larger units, such as phrases or clauses, allows ideas and concepts to be processed separately. As suggested earlier, segmentation at all levels must be considered within the constraints imposed by the sequential unfolding of the speech input. Thus, by and large, for a speech-recognition model to be viable, segmentation between phonemes, words, and sentential units must be envisaged as an operation taking place online.

Variability

Perhaps the most challenging feature of the speech signal is its high degree of variability. Not even mentioning the differences arising from accented speech, the number of ways in which a word can be pronounced – and hence the resulting number of acoustic stimuli – is virtually infinite. Gender, age, health, mood, speech rate, sentential context, etc., have substantial effects on the articulation of phonemes. Such a degree of variability makes template-based recognition, where each possible instance has its own representation in long-term memory, a very unlikely possibility.

Even more critically, the realization of individual phonemes depends on the phonemes surrounding them. For example, the articulation of the phoneme /d/ in /di/ is surprisingly different from that in /du/. So are the resulting acoustic tokens. This contingency stems primarily from the biomechanical constraints imposed by the shape and muscular arrangement of the vocal tract forcing a speaker to coarticulate phonemes, that is, to overlap the articulation of one phoneme with that of the phonemes around it. Coarticulation is easily experienced when saying *see* or *sue*, in which the articulatory movements pertaining to the vowel can be felt (and seen) even before the onset of the consonant. The lack of a clear mapping between portions of the acoustic signal and individual phonemes has often been referred to as the lack of invariance problem. Although sometimes used in speech machine recognition, individual representations for all possible phoneme successions (e.g., all possible diphones) constitute a rather uneconomical

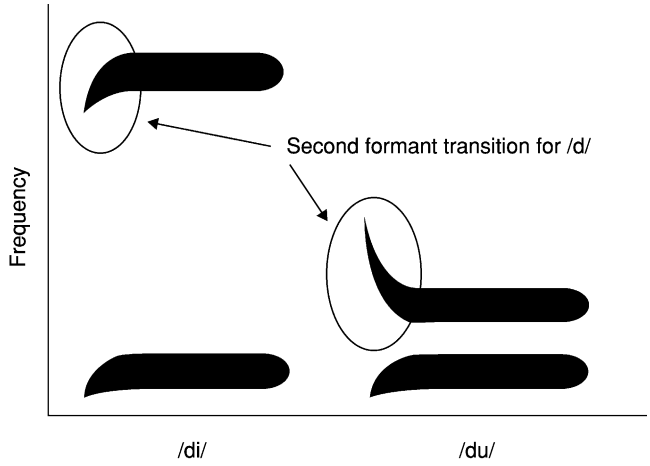

Figure 2 Schematic spectrogram for the syllables /di/ and /du/. Note the acoustic dissimilarity between the second formant transition of /di/ and that of /du/. Yet the onset of the two syllables is perceived as /d/.

way of dealing with phoneme variability. However, as will be described later, none of the alternative solutions proposed by psycholinguists so far have proved entirely satisfying either (Figure 2).

Modeling the Psychology of Speech Recognition

The three features of the speech signal reviewed above provide a constraining ground for psychological theories of speech recognition. Because of the degree of complexity in modeling speech recognition as a whole, from phoneme perception to sentence understanding, models have often confined their investigation to one of three processing levels: sublexical, lexical, and sentential. Below, we follow the same structure.

Speech Perception (Sublexical Units)

From Variable Acoustics to Discrete Phonemes The lack of simple one-to-one mapping rules between the physical signal and phonemes (about 40 in English) amounts to a problem of perceptual constancy: how can a listener match an infinity of acoustic exemplars with one and only one among 40 phonemes? A first possibility is that each phoneme is recognized as a unique combination of phonetic features, and each phonetic feature is acoustically invariant. For example, each of the phonetic features making up the phoneme /b/ (stop, voiced, bilabial) would have a relatively constant acoustic signature across exemplars. A configuration of phonetic-feature detectors, possibly specified at the neural level, would then maximally respond to that particular phoneme and lead to its identification. Although attractive, this conceptualization fails to account for the fact that acoustic events suffer from the variability problem to some extent too since, as illustrated earlier, a stop burst can be interpreted as /p/ or /k/ depending on the following vowel.

Another possibility is that listeners categorize the speech input into discrete phonemes not so much because they have mapping rules about how to perceive them but because they know how to produce them. The motor theory, devised by Liberman *et al.* (1967), posits that speech sounds are perceived by reference to the articulatory gestures used to produce them. Here, an acoustic event (e.g., the burst from the above example) is correctly mapped onto a particular phonetic feature (e.g., bilabial) because the listener implicitly knows which auditory stimulus typically results from the articulation of which event. The motor theory can help explain how listeners deal with some acoustic-variability problems and it provides a satisfactory account of a number of perceptual phenomena. For instance, the categorical perception of stop consonants – e.g., the perception of an acoustic continuum ranging smoothly from /p/ to /k/ as either a clear /p/ or a clear /k/ – would result from the knowledge of the typical articulatory gestures involved in uttering the sounds (Figure 3). However, the motor theory suffers from a number of weaknesses. First, the link between phonemes and articulatory gestures turns out to be just as variable as that between phonemes and the acoustic signal. Thus, as such, the motor theory cannot fully solve the lack-of-invariance problem. Second, some perceptual phenomena (e.g., categorical perception) that were initially attributed to a link to production have been found in populations lacking the production component, such as nonhuman primates and young infants. Finally, as elegant as it appeared, the theory

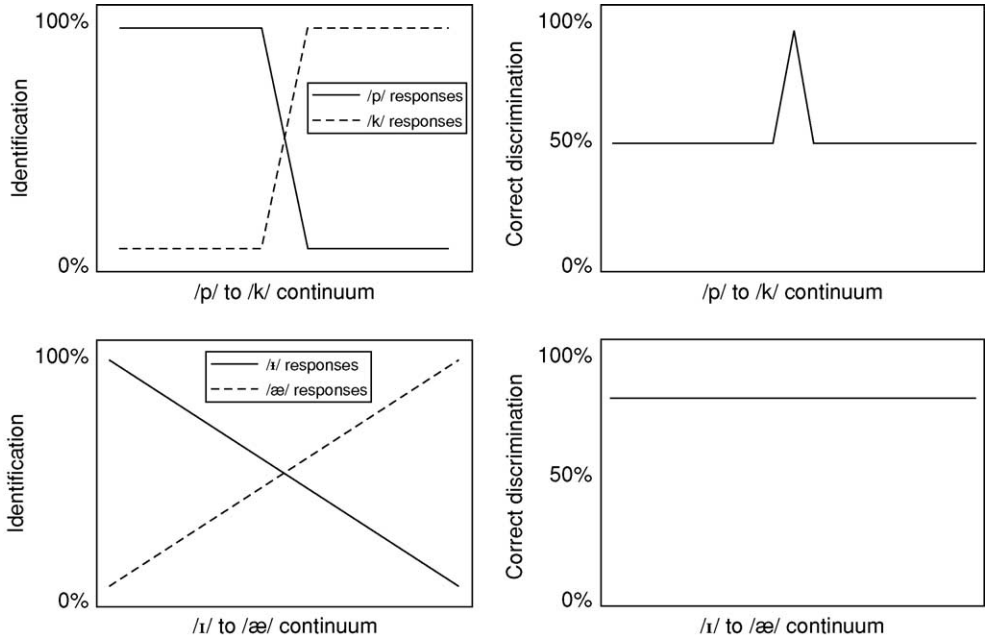

Figure 3 Schematic patterns of identification (left) and discrimination (right) for categorical perception (top two panels) and continuous perception (bottom two panels). When an auditory continuum (e.g., from /b/ to /k/) is perceived categorically, the listener experiences a sharp perceptual boundary between categories and finer discrimination around the boundary than inside the categories. When a continuum (e.g., from /ɪ/ to /æ/) is perceived continuously, identification functions mimic the smooth physical changes in the stimulus and discrimination is roughly the same along the entire continuum.

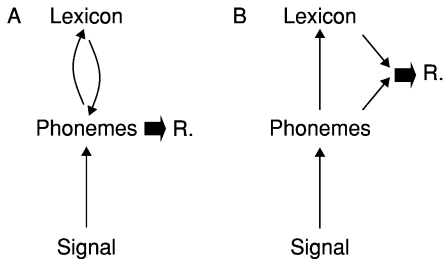

Figure 4 Illustrations of two approaches to phoneme perception. (A) Phoneme perception is influenced by top-down connections from the lexical level, e.g., McClelland and Elman (1986) and Samuel (1997). (B) Phoneme perception is assisted but not modified by lexical knowledge, e.g., Norris *et al.* (2000). R represents the level at which the phoneme-perception response is generated.

never managed to fully specify the nature of the perception–production link that was at its core and the nature of the stored motor patterns.

Subsequent theories have downplayed the direct link to the production component, but not necessarily the reference to articulatory gestures. Fowler (1986), for instance, suggested that the articulatory gestures corresponding to specific phonemes can be recovered from the speech signal itself. This position, which is based on the assumption that the speech input is much richer and informative than previously thought, offers a more ecological approach than the motor theory because it places an emphasis on the signal rather than abstract mental representations. Since the original formulation of the motor theory, both production-based and auditory theories of speech perception have been proposed, but none so far has produced a fully satisfactory account of how the perceptual system solves the invariance problem.

Bottom-up and Top-down Information Flows The search for perceptual mechanisms able to extract invariant representations from a variable signal can be substantially facilitated (bypassed?) if we consider the proximal context in which phonemes usually occur, namely, words. In this view, the analysis of the signal, whether it is based on acoustic, phonetic, or articulatory processing, is supplemented by top-down lexical knowledge. Collaboration between bottom-up and top-down processes not only reduces the acoustic variability problem, it also allows acoustically degraded phonemes to be identified. For example, a phoneme (e.g., /s/ in *cigarette*) could be recognized even if mispronounced (e.g., /ʃ/) because of the constraining lexical context in which it is heard (Figure 4).

While the contribution of lexical knowledge to speech processing is undeniable, it is unclear whether lexical knowledge truly affects perception (creating auditory illusions) or simply produces a postperceptual bias (i.e., a preference for what ought to be

heard, i.e., a known word). Following the observation that a lexical context can produce powerful phoneme illusions, Samuel (1997) contends that phonemic processing has both bottom-up and top-down components. In contrast, in their MERGE model, Norris *et al.* (2000) appeal to both logic and computer simulations to show that efficient speech perception can be achieved without top-down connections, and do so at a lower computational cost. While both sides of the debate have had countless supporters and detractors, the true remaining ground to win seems to be about not only a definition of what constitutes perception (the actual boundary between bottom and top), but also an account of the time-course of bottom-up and top-down effects. Norris' group, for instance, claims that, while lexical feedback does not alter speech perception during online tasks, it does so over longer periods of time, e.g., in the course of word and sound learning.

Is Speech Perceived as a String of Units? Describing the speech input as a sequence of phonemes might be convenient for modelers, but not everyone agrees that phonemes are perceptually relevant in speech recognition. As noted before, acoustic variability casts serious doubts on the perceptual reality of phonemes. Phonetic features and articulatory gestures have been described as important building blocks in speech perception as well, but they too have proved somewhat unsatisfactory. The search for perceptual units is important because it ultimately allows one to specify a finite number of sublexical units serving as intermediary representations between the signal and lexical representations.

Perhaps the most popular alternative to phonemes and subphonemic features is the syllable. Being articulatorily relatively stable, syllables do not suffer from acoustic variability as much as phonemes. Savin and Bever (1970), for example, found that listeners were faster at detecting syllable targets than their initial phonemes, suggesting that syllables are primary perceptual units while phonemes are derived from them. Moreover, syllables are psychologically more intuitive to listeners than phonemes because of their contribution to the rhythmic nature of speech. In this respect, languages with an essentially syllabic rhythmic structure, such as French, are particularly good candidates for syllabic perception. The role of syllables in the perception of non-syllable-timed languages is less clear. The perception of languages based on a alternation between strong and weak syllables, such as English and Dutch, seems to involve a combination of syllabic information and prosodic cues. Japanese listeners, on the other hand, appear to exploit the moraic rhythm of their language (morae are units whose structure and size are intermediate between those of syllables and phonemes).

Nowadays, evidence for not only phonemes, syllables, and morae, but also for disyllables and feet is pitted against the possibility that perceptual units are simply emergent properties of the interaction between bottom-up and top-down knowledge (Goldinger and Azuma, 2003). While the intensive research on the units of speech perception has not yet yielded a consensus, it has at least generated important questions for future investigation:

1. Is there one or several perceptual units?
2. Are these units universal or language-specific?
3. If units are language specific, is their involvement dictated by the language we hear or the language we speak?
4. What role do perceptual units have in lexical access?

Spoken-Word Recognition

Early research in speech perception had a clear bottom-up agenda, in that it focused almost entirely on the mapping between the signal and sublexical units. This approach was legitimately motivated by the observation that listeners are very good at categorizing phonemes in the absence of any lexical or contextual information. Subsequent research attempted to bridge speech perception and spoken-word recognition around the notion of sublexical units. If there are such things as sublexical or perceptual units, how do they contribute to lexical access? This question, in turn, drew attention to issues of architectural structure, lexical representations, and flow of information.

Intermediate Representations The ultimate consequence of lexical access is the activation of a unique word representation stored in long-term memory, making available not only its phonological content but also its meaning. Models that do not postulate intermediate representations between the signal and lexical representations have often done so at the cost of great redundancy in the lexicon or out of computational simplicity or (e.g., the Logogen model, Morton, 1969). Most likely, some form of intermediate representations mediates the signal and the lexicon. As mentioned earlier, the most likely candidates so far have been the phoneme and the syllable. Most models, either by default or by choice, have included a phoneme layer in their mapping algorithm. While phonemes suffer from acoustic variability, a great deal of empirical evidence supports their involvement at some level of processing. For example, recognition performance can be predicted from phoneme-based

estimates of a word's lexical neighborhood – the number of similar-sounding words differing from the target word by one phoneme (e.g., the Neighborhood Activation Model, NAM, Luce and Pisoni, 1998). However, the effects attributed to a phoneme layer can often also be accounted for by smaller units, such as phonetic features, or even from competition within the lexicon. As an alternative, syllables have the advantage of providing a more parsimonious approach to lexical activation. Indeed, initiating lexical access on every syllable rather than every phoneme reduces the amount of spurious lexical activity considerably. This benefit is particularly important when the words appear in connected speech, as will be discussed later. A problem with the syllabic-parsing approach, however, is that the concept of syllabary (i.e., a putative memory store of all common syllables in the language), which it often implies, has not received strong empirical support (Figure 5).

Although the evidence for intermediate representations, on the whole, far outweighs the evidence against them, the nature, number, and contingencies of such intermediate units are still subject to debate. The possibility that intermediate units and perceptual units are one and the same thing is also being considered. Interestingly, this would imply that input-to-lexicon mapping mechanisms could very well differ from one language to another, with languages featuring large intermediate units being computationally more efficient than languages relying on smaller units.

Lexical Activation and Competition Both intuitively and empirically, spoken-word recognition appears to be about discriminating an uttered word from other words held in long-term memory. Models have formalized this discrimination process by emphasizing two key notions: activation and competition. Activation is thought to be an early processing stage whereby lexical entries mapping the unfolding input are activated – independent of whether or not this process is mediated by intermediate units. Competition between activated lexical entries is then essentially a pruning mechanism whose result is to isolate a single candidate for recognition.

Activation itself can be more or less constrained. For instance, the Cohort model (Marlen-Wilson, 1987) and the Metrical Segmentation Strategy (MSS, Cutler and Norris, 1988) restrict activation to particular locations in the speech stream, such as words' onsets (if known) or strong syllables. In these models, upon hearing the word *temper*, words like *taste*, *terror*, *temporal*, etc. would be briefly activated, but not words like *potential* or *percent*, because these overlap later portions (Cohort) or start with a weak syllable (MSS). In contrast, TRACE (McClelland and Elman, 1986) and Shortlist (Norris, 1994) allow any portion of the input to activate lexical representations. Thus, in the above example, even late-occurring fragments would result in some activation. While the latter solution might seem computationally less economical, it does not have to postulate separate segmentation mechanisms to locate word boundaries, as these are naturally identified as a result of the activation/selection process.

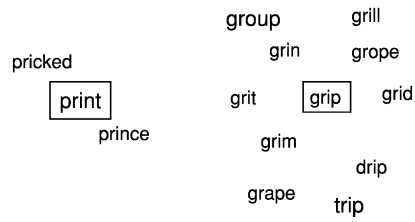

Figure 5 Examples of favorable and unfavorable lexical neighborhoods. A word in a favorable neighborhood (e.g., *print*) is recognized easily because it has few similar-sounding neighbors and these are relatively low frequency – frequency is schematically represented by the font size. A word in an unfavorable neighborhood (e.g., *grip*) is recognized less easily because it has many similar-sounding neighbors and some of them are relatively high frequency.

In all models, however, a large number of nontarget candidates are activated in the initial mapping stage. An important question arises as to whether the deactivation of such candidates is a passive consequence of an increasingly accurate match between the unfolding input and the lexicon, or the result of a more active competition process between activated candidates. Mutual inhibition between lexical candidates, which is often referred to as lateral inhibition, is only found in TRACE and Shortlist, in which entries tightly fitting the input not only get activated most, but also reduce the activation of entries with a less good fit. Selection in Cohort and NAM is a more input-driven affair, with the activity of nontarget words passively decaying as their fit with the signal diminishes. However, NAM imposes a form of lexical penalty to word candidates belonging to a densely populated area of the lexicon: words with many similar-sounding and high-frequency neighbors are recognized more slowly than words in a sparser neighborhood. A later instantiation of NAM, called PARSYN (short for Paradigmatic and Syntagmatic, Luce *et al.*, 2000), has more fully formalized such competition effects by including lateral inhibition between lexical neighbors. In fact, PARSYN pushes the inhibitory architecture one step further by assuming inhibition not only within the lexicon but also between the lexicon and sublexical units.

Although quite different in their architecture and processes, the above models have evolved in

complexity over the years in an attempt to account for a growing list of perceptual and cognitive phenomena related to speech processing. While they may have lost some testability in the process, they have contributed to our understanding of how spoken-word recognition is molded by both the acoustic signal and the listener's lexical knowledge and expectations.

Fluent Speech and Sentence Comprehension

Phonemes and words are rarely heard in isolation. They usually constitute the building blocks of sentences, which are themselves often heard in richly contexualized conversations. The impact of sentential and contextual information on word and phoneme recognition has been demonstrated on several occasions. For instance, while the intelligibility of the words making up a sentence is high – or at least appears so – when the sentence is played in its entirety, it drops dramatically when the words are excised from the sentence and played in isolation. Similarly, when an acoustically degraded phoneme renders a word ambiguous (**eel*, where the asterisk denotes the degraded phoneme), the sentential context usually takes over. In this example, *wheel* is heard more often than *peel* in *It was found that the *eel was on the axle* and vice versa in *It was found that the *eel was on the orange* (Warren and Warren, 1970). The intervention of higher-order knowledge is also manifest when a segmentation problem occurs. Listeners are likely to hear *straight issue* rather than *stray tissue* at the end of the sentence *How much we should pay for health care is not a* ... and the opposite at the end of *The detectives realized that the discarded scarf was not a* ... These phenomena, of course, must be analyzed in the context of the transient nature of the signal, which, as we saw earlier, imposes severe constraints on processing the time course.

Segmenting Words from Fluent Speech The acoustic signal of a typical sample of conversational speech contains few noticeable interruptions, and these are far less reliable indicators of word boundaries than are blank spaces in the written language. While the continuous nature of speech hardly seems to pose a problem for everyday listening, it constitutes a challenge to speech scientists. Speech segmentation has traditionally been tackled from two standpoints. According to one, important cues to word boundaries can be found in the signal itself. While many of these are acoustic (e.g., silent pauses, intonation contour, allophonic specificity), others are based on statistical regularities. For example, phonemes that are rarely found next to each other in the words of a language (e.g., /fh/) tend to be perceived as word boundaries when heard in connected speech (e.g., *tough hero*). Because such regularities often depend on the phonological structure of a particular language, the cues used in the segmentation of one language might not be the same as those used in the segmentation of another language.

An alternative approach to speech segmentation gives lexical knowledge and contextual information a critical role in determining likely word boundaries. Here, lexical candidates activated in multiple locations in the speech signal compete for a parsing solution that does not leave any fragments lexically unaccounted for (e.g., *great wall* is favored over *gray twall*, because *twall* in not an English word). For utterances in which lexical information cannot provide proper disambiguation, semantic, syntactic, and pragmatic expectations can sometimes compensate (cf. the *straight issue* vs. *stray tissue* example in the previous section) (**Figure 6**).

Since there is compelling evidence that both types of segmentation mechanisms contribute to segmentation, the debate has shifted from finding **which** segmentation cues are available to describing **how** sublexical, lexical, and contextual sources of information interact when present in combination. For instance, when sublexical cues conflict with contextual expectations (e.g., *stray tissue* being pronounced as *straight issue* in a context favoring the former), is there by-default reliance on higher-level information? The problem is made even more complex by the fact that the time of arrival of some of these cues can stretch over the entire length of an utterance (e.g., sentential context), whereas that of others is confined to a phoneme or two (e.g., allophony, phonotactics).

Although fluctuations in lexical activity during speech segmentation have been extremely hard to measure experimentally, powerful online tools have recently started to become available. Electrophysiological devices, for example, are capable of tracking important changes in brain activity over the course of a spoken sentence (see Van Petten, 1995, for a summary of early findings). Eye-tracking procedures, too, have allowed progress to be made in modeling the time-course of speech recognition. By monitoring a participant's eye movements over a visual display while he or she is hearing spoken instructions (e.g., *Move the red square under the blue circle*), it is possible to determine how fast word recognition happens. Because it bypasses any motor commands associated with manual responses (e.g., button push), eye-tracking allows considerably more accurate time resolution than other behavioral methods (e.g., phoneme monitoring, word spotting, lexical decision). Using eye-tracking, Allopenna *et al.* (1998) showed that, upon hearing a spoken word (e.g., *beaker*),

Syntactic expectations
- The children /lʌv#sparks/ (love sparks)
- The child /lʌvs#parks/ (loves parks)

Semantic inferences
- How much we should pay for health care is not a /streɪt#ɪʃu/ (straight issue)
- The detectives realized that the discarded scarf was not a /streɪ#tɪʃ/ (stray tissue)

Lexical knowledge
- /greɪt#wɔl/ (great wall)
- */greɪ#twɔl/ (gray twall)

Probabilistic phonotactics
- /koref#hɪst/, with /fh/ having low within-word frequency
- */korefh#ɪst/

Lexical stress
- /ɪn#'tenʃən/ (in tension), where strong syllables are treated as word initial
- */#ɪn'tenʃən/ (intention)

Allophony
- /teɪks#p^{h}eərs/ (takes pears), with /p/ aspirated
- /teɪk#speərs/ (take spares), with /p/ unaspirated

Figure 6 Types of information that listeners can use to segment words from fluent speech. In conversational settings, these sources of information are found in combination and often converge. Asterisks represent unlikely segmentation solutions given a particular type of cue.

listeners temporarily activated not only words that shared the onset of the test word (e.g., *beetle*) but also words that shared its rhyme (e.g., *speaker*). The relative time-course of the two sets of competitors differed, however. The target word and the onset competitor were fixated to an equal extent as early as 200 ms after the onset of the target, with fixations to the onset competitor dropping around 400 ms onward. Fixations to the rhyme competitor were observed between 300 and 800 ms. These findings are critical not only because they demonstrate that lexical access closely shadows the unfolding of the speech signal but also because they provide strong empirical evidence that multiple and overlapping candidates are considered simultaneously during speech processing and segmentation (Figure 7).

Syntactic Parsing Phoneme categorization, word segmentation, and lexical access are only the necessary steps before an utterance can be understood. A critical stage linking word recognition to sentence comprehension is called syntactic parsing, that is, the assignment of the words of a sentence to their respective syntactic category (noun, verb, adverb, etc.) and the clustering of these words into phrases and clauses (the syntactic tree). The importance of assigning words to their correct syntactic categories is often unintentionally illustrated in newspaper headlines, i.e., *Police seek orange attackers*, whose meaning can be quite different if *orange* is treated as a noun or an adjective (Harley, 2001). The structuring of words into phrases and clauses is even more crucial because it involves making decisions over much longer stretches of a sentence. For instance, in *When Jane eats food gets thrown*, *food* tends to be treated by default as the object of *eats* rather than the subject of *gets*. In the context of the sentence, this interpretation is incorrect, hence leading the listener astray, or 'up the garden path' as it is commonly referred to. Parsing must be undone and attempted again, following a different syntactic tree this time.

Two major questions about syntactic parsing arise. First, what is the time-course of syntactic parsing? Do listeners assign words to syntactic categories and to phrases as they hear them or do they leave their options open and wait until the end of the sentence to commit to a particular parsing? Second, is parsing a solely syntactic process, driven by rules of grammar, or does it allow contextual information to influence the online construction of the syntactic tree? In the garden path model (Frazier, 1987), the initial parsing of an incoming sentence is exclusively and autonomously driven by syntactic principles, with little regard for contextual or thematic information. In most situations, this first stage is sufficient. However, when this initial parsing results in interpretative ambiguities or contradictions with the context, it needs to be revised to integrate nonsyntactic information. The primacy of syntactic rules has been illustrated in a number of eye-tracking experiments conducted with written materials. For instance, fixation durations are longer and eye movements more complex in a sentence like *I know Peter left* than in *I know Peter well* because a syntactic principle called minimal attachment, which aims for syntactic simplicity, dictates that *Peter* should be treated as the object of the main verb *know*, not the subject of another clause. Thus, the disrupted eye movements suggest that the

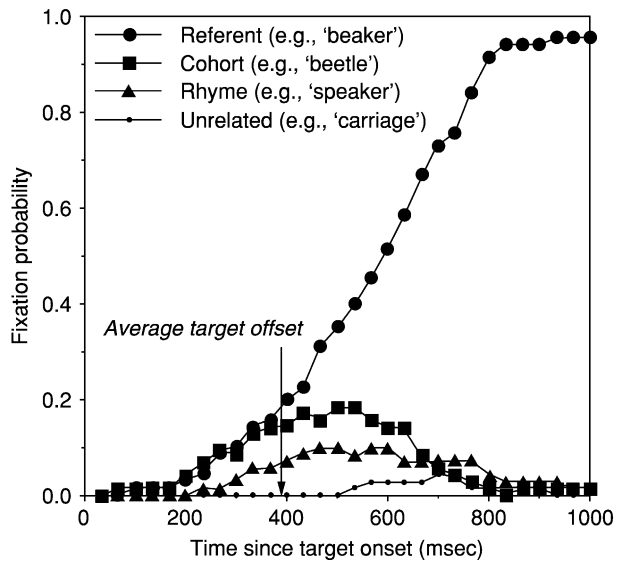

Figure 7 Probability of fixating various items in a visual display while hearing *Pick up the beaker*. Note the temporary activation of the item sharing its initial portion with the referent (*beetle*) and of that sharing its rhyme (*speaker*). Reprinted from *Journal of Memory and Language 38,* Allopenna, Magnuson, and Tanenhaus, 'Tracking the time course of spoken word recognition using eye movements: Evidence for continuous mapping models,' p. 428, Figure 4, Copyright 0749-596X/98 (1998) with permission from Elsevier.

The horse raced past the barn fell.
The man who whistles tunes pianos.
The old man the boat.
The man who hunts ducks out on weekends.
We painted the wall with cracks.
The criminal confessed his sins harmed many people.
The cotton clothing is usually made of grows in Mississippi.
When Fred eats food gets thrown.
I know the words to that song don't rhyme.
She told me a little white lie will come back to haunt me.
Until the police arrest the drug dealers control the street.
The cotton clothing is made of grows in Mississippi.
Have the students who failed the exam take the supplementary.
The raft floated down the river sank.
I convinced her children are noisy.

Figure 8 Examples of garden-path sentences.

initial stage of parsing is purely syntactic and integration with the rest of the sentence takes place in a subsequent, corrective stage (Figure 8).

This autonomous and serial approach to parsing is often pitted against constraint-satisfaction models, which advocate interactive and parallel parsing operations (e.g., Trueswell and Tanenhaus, 1994). Here, lexical, semantic, and pragmatic information is thought to contribute, online, to the selection of the most appropriate syntactic construction – the one offering the best fit given syntactic and nonsyntactic constraints. The critical aspect on which these models differ from autonomous views pertains to the nature of the minimal-attachment principle. For constraint-satisfaction models, a syntactic parse following the minimal-attachment principle is only one among several constructions under consideration. In fact, strong contextual information may very well cause the language user to bypass syntactic preferences altogether. Tanenhaus *et al.* (1995) showed this convincingly by monitoring participants' eye movements over a visual display while they heard the sentence *Put the apple on the towel in the box*. An autonomous approach to parsing predicts that, regardless of the visual context, *on the towel* should always be interpreted as the destination of the verb phrase – at least initially – because this construction is syntactically simpler. However, eye-movement trajectories revealed that this was the case only if the visual display did not provide cues for the alternative construction, i.e., one in which *on the towel* is the location of the object to be picked up rather than its destination. When the visual display made the syntactically simpler construction unlikely, listeners adjusted their gaze accordingly. Thus, syntactic parsing appears to be a fully interactive process that integrates various sources of information online.

Conclusion

Research on the perceptual and cognitive aspects of speech recognition has progressed substantially in the past 20 years. Owing to more sophisticated and flexible models, together with new experimental techniques, our understanding of how listeners handle the properties of the speech signal mentioned at the beginning of this chapter (sequentiality, continuity, and variability) has become more complete and, hopefully, more accurate. In the process, however, it has also become evident that answers to some questions can only be gained cross-disciplinarily. Connectionist approaches to speech recognition have already demonstrated the benefit of integrating cognitive psychology with informatics and neurosciences. Likewise, a description of the speech signal and the syntactic complexity of its higher-order representation can only profit from cross-talks with the acoustic and linguistic sciences. The increasingly common integration of behavioral techniques and neuroimaging is an encouraging illustration of this trend.

See also: Audio-visual Speech Processing; Discourse Processing; Phonological Awareness and Literacy; Sentence Processing; Speech Recognition, Audio-Visual; Speech Recognition, Automatic: History; Speech Recognition:

Statistical Methods; Spoken Language Production: Psycholinguistic Approach.

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a dialog between a person and a machine) and the response to that utterance from the machine. Figure 1 shows such a sequence of events, which is often referred to as the speech dialog circle, using an example in the telecommunications context.

The customer initially makes a request by speaking an utterance that is sent to a machine, which attempts to recognize, on a word-by-word basis, the spoken speech. The process of recognizing the words in the speech is called automatic speech recognition (ASR) and its output is an orthographic representation of the recognized spoken input. The ASR process will be discussed in the next section. Next the spoken words are analyzed by a spoken language understanding (SLU) module, which attempts to attribute meaning to the spoken words. The meaning that is attributed is in the context of the task being handled by the speech dialog system. (What is described here is traditionally referred to as a limited domain understanding system or application.) Once meaning has been determined, the dialog management (DM) module examines the state of the dialog according to a prescribed operational workflow and determines the course of action that would be most appropriate to take. The action may be as simple as a request for further information or confirmation of an action that is taken. Thus if there were confusion as to how best to proceed, a text query would be generated by the spoken language generation module to hopefully clarify the meaning and help determine what to do next. The query text is then sent to the final module, the text-to-speech synthesis (TTS) module, and then converted into intelligible and highly natural speech, which is sent to the customer who decides what to say next based on what action was taken, or based on previous dialogs with the machine. All of the modules in the speech dialog circle can be 'data-driven' in both the learning and active use phases, as indicated by the central Data block in Figure 1.

A typical task scenario, e.g., booking an airline reservation, requires navigating the speech dialog circle many times – each time being referred to as one 'turn' – to complete a transaction. (The average number of turns a machine takes to complete a prescribed task is a measure of the effectiveness of the machine in many applications.) Hopefully, each time through the dialog circle enables the customer to get closer to the desired action either via proper understanding of the spoken request or via a series of clarification steps. The speech dialog circle is a powerful concept in modern speech recognition and understanding systems, and is at the heart of most speech understanding systems that are in use today.

Basic ASR Formulation

The goal of an ASR system is to accurately and efficiently convert a speech signal into a text message transcription of the spoken words, independent of the device used to record the speech (i.e., the

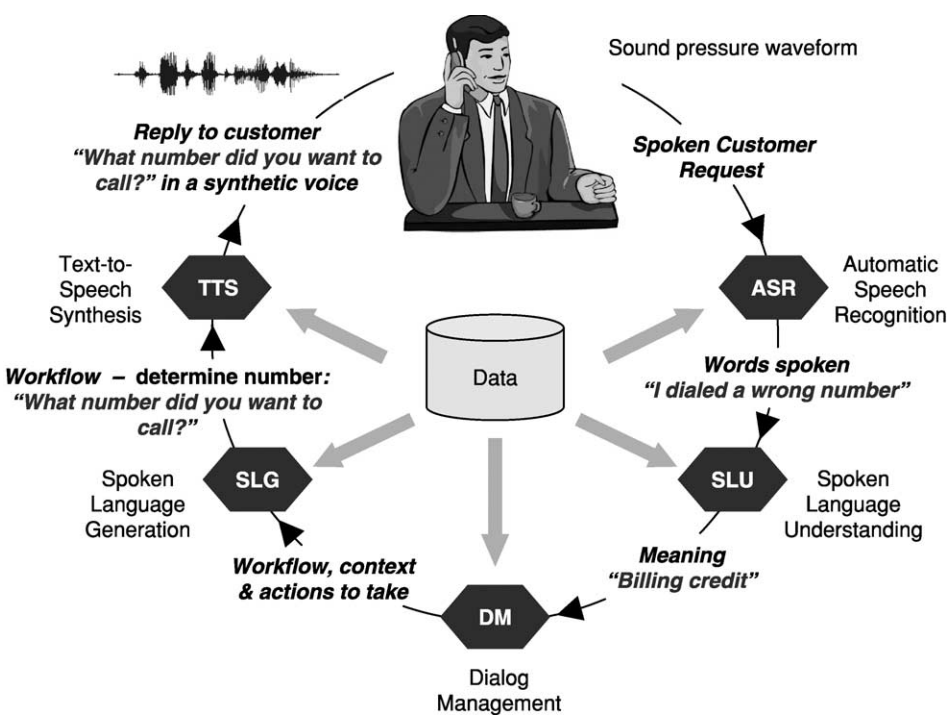

Figure 1 The conventional speech dialog circle.

transducer or microphone), the speaker, or the environment. A simple model of the speech generation process, as used to convey a speaker's intention is shown in Figure 2.

It is assumed that the speaker decides what to say and then embeds the concept in a sentence, W, which is a sequence of words (possibly with pauses and other acoustic events such as uh's, um's, er's, etc.). The speech production mechanisms then produce a speech waveform, $s(n)$, which embodies the words of W as well as the extraneous sounds and pauses in the spoken input. A conventional automatic speech recognizer attempts to decode the speech, $s(n)$, into the best estimate of the sentence, $\hat{W}$, using a two-step process, as shown in Figure 3.

The first step in the process is to convert the speech signal, $s(n)$, into a sequence of spectral feature vectors, X, where the feature vectors are measured every 10 ms (or so) throughout the duration of the speech signal. The second step in the process is to use a syntactic decoder to generate every possible valid sentence (as a sequence of orthographic representations) in the task language, and to evaluate the score (i.e., the *a posteriori* probability of the word string given the realized acoustic signal as measured by the feature vector) for each such string, choosing as the recognized string, $\hat{W}$, the one with the highest score. This is the so-called maximum *a posteriori* probability (MAP) decision principle, originally suggested by Bayes. Additional linguistic processing can be done to try to determine side information about the speaker, such as the speaker's intention, as indicated in Figure 3.

Mathematically, we seek to find the string $\hat{W}$ that maximizes the *a posteriori* probability of that string, when given the measured feature vector X, i.e.,

$$\hat{W} = \arg\max_{W} P(W|X)$$

Using Bayes Law, we can rewrite this expression as:

$$\hat{W} = \arg\max_{W} \frac{P(X|W)P(W)}{P(X)}$$

Thus, calculation of the *a posteriori* probability is decomposed into two main components, one that defines the *a priori* probability of a word sequence W, $P(W)$, and the other the likelihood of the word string W in producing the measured feature vector, $P(X|W)$. (We disregard the denominator term, $P(X)$, since it is independent of the unknown W). The latter is referred to as the acoustic model, $P_A(X|W)$, and the former the language model, $P_L(W)$ (Rabiner *et al.*, 1996; Gauvain and Lamel, 2003). We note that these quantities are not given directly, but instead are usually estimated or inferred from a set of training data that have been labeled by a knowledge source, i.e., a human expert. The decoding equation is then rewritten as:

$$\hat{W} = \arg\max_{W} P_A(X|W)P_L(W)$$

We explicitly write the sequence of feature vectors (the acoustic observations) as:

$$X = \mathbf{x}_1, \mathbf{x}_2, \ldots, \mathbf{x}_N$$

where the speech signal duration is N frames (or N times 10 ms when the frame shift is 10 ms). Similarly, we explicitly write the optimally decoded word sequence as:

$$\hat{W} = w_1 w_2 \ldots w_M$$

where there are M words in the decoded string. The above decoding equation defines the fundamental statistical approach to the problem of automatic speech recognition.

It can be seen that there are three steps to the basic ASR formulation, namely:

- Step 1: acoustic modeling for assigning probabilities to acoustic (spectral) realizations of a sequence

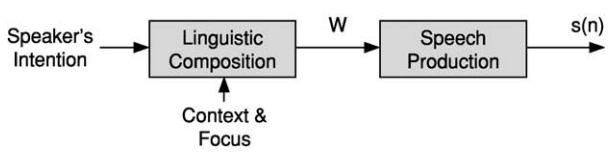

Figure 2 Model of spoken speech.

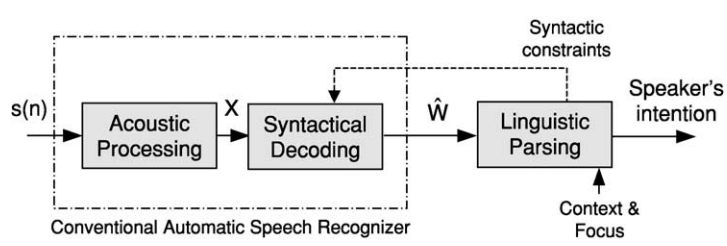

Figure 3 ASR decoder from speech to sentence.

of words. For this step we use a statistical model (called the hidden Markov model or HMM) of the acoustic signals of either individual words or subword units (e.g., phonemes) to compute the quantity $P_A(X|W)$. We train the acoustic models from a training set of speech utterances, which have been appropriately labeled to establish the statistical relationship between X and W.

- Step 2: language modeling for assigning probabilities, $P_L(W)$, to sequences of words that form valid sentences in the language and are consistent with the recognition task being performed. We train such language models from generic text sequences, or from transcriptions of task-specific dialogues. (Note that a deterministic grammar, as is used in many simple tasks, can be considered a degenerate form of a statistical language model. The 'coverage' of a deterministic grammar is the set of permissible word sequences, i.e., expressions that are deemed legitimate.)
- Step 3: hypothesis search whereby we find the word sequence with the maximum *a posteriori* probability by searching through all possible word sequences in the language.

In step 1, acoustic modeling (Young, 1996; Rabiner *et al.*, 1986), we train a set of acoustic models for the words or sounds of the language by learning the statistics of the acoustic features, X, for each word or sound, from a speech training set, where we compute the variability of the acoustic features during the production of the words or sounds, as represented by the models. For large vocabulary tasks, it is impractical to create a separate acoustic model for every possible word in the language since it requires far too much training data to measure the variability in every possible context. Instead, we train a set of about 50 acoustic-phonetic subword models for the approximately 50 phonemes in the English language, and construct a model for a word by concatenating (stringing together sequentially) the models for the constituent subword sounds in the word, as defined in a word lexicon or dictionary, where multiple pronunciations are allowed). Similarly, we build sentences (sequences of words) by concatenating word models. Since the actual pronunciation of a phoneme may be influenced by neighboring phonemes (those occurring before and after the phoneme), the set of so-called context-dependent phoneme models are often used as the speech models, as long as sufficient data are collected for proper training of these models.

In step 2, the language model (Jelinek, 1997; Rosenfeld, 2000) describes the probability of a sequence of words that form a valid sentence in the task language. A simple statistical method works well, based on a Markovian assumption, namely that the probability of a word in a sentence is conditioned on **only** the previous N–1 words, namely an N-gram language model, of the form:

$$P_L(W) = P_L(w_1, w_2, \ldots, w_M) = \prod_{m=1}^{M} P_L(w_m | w_{m-1}, w_{m-2}, \ldots, w_{m-N+1})$$

where $P_L(w_m|w_{m-1}, w_{m-2}, \ldots, w_{m-N+1})$ is estimated by simply counting up the relative frequencies of N-tuples in a large corpus of text.

In step 3, the search problem (Ney, 1984; Paul, 2001) is one of searching the space of all valid sound sequences, conditioned on the word grammar, the language syntax, and the task constraints, to find the word sequence with the maximum likelihood. The size of the search space can be astronomically large and take inordinate amounts of computing power to solve by heuristic methods. The use of methods from the field of Finite State Automata Theory provide finite state networks (FSNs) (Mohri, 1997), along with the associated search policy based on dynamic programming, that reduce the computational burden by orders of magnitude, thereby enabling exact solutions in computationally feasible times, for large speech recognition problems.

Development of a Speech Recognition System for a Task or an Application

Before going into more detail on the various aspects of the process of automatic speech recognition by machine, we review the three steps that must occur in order to define, train, and build an ASR system (Juang *et al.*, 1995; Kam and Helander, 1997). These steps are the following:

- Step 1: choose the recognition task. Specify the word vocabulary for the task, the set of units that will be modeled by the acoustic models (e.g., whole words, phonemes, etc.), the word pronunciation lexicon (or dictionary) that describes the variations in word pronunciation, the task syntax (grammar), and the task semantics. By way of example, for a simple speech recognition system capable of recognizing a spoken credit card number using isolated digits (i.e., single digits spoken one at a time), the sounds to be recognized are either whole words or the set of subword units that appear in the digits /zero/ to /nine/ plus the word /oh/. The word vocabulary is the set of 11 digits. The task syntax allows any single digit to be spoken, and the task

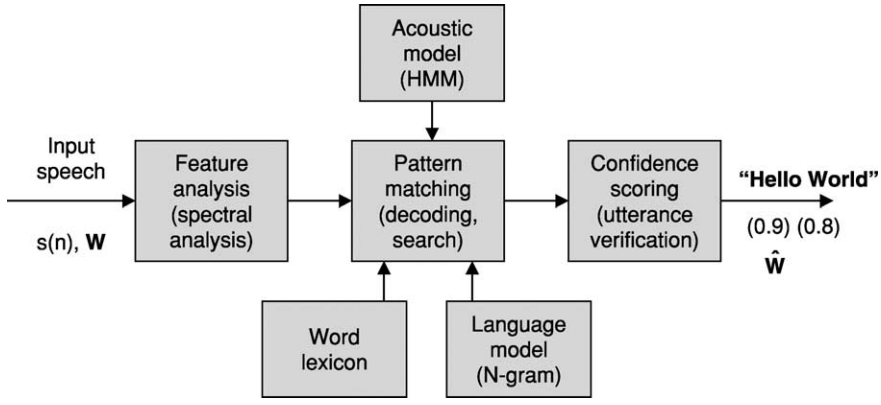

Figure 4 Framework of ASR system.

semantics specify that a sequence of isolated digits must form a valid credit card code for identifying the user.

- Step 2: train the models. Create a method for building acoustic word models (or subword models) from a labeled speech training data set of multiple occurrences of each of the vocabulary words by one or more speakers. We also must use a text training data set to create a word lexicon (dictionary) describing the ways that each word can be pronounced (assuming we are using subword units to characterize individual words), a word grammar (or language model) that describes how words are concatenated to form valid sentences (i.e., credit card numbers), and finally a task grammar that describes which valid word strings are meaningful in the task application (e.g., valid credit card numbers).
- Step 3: evaluate recognizer performance. We need to determine the word error rate and the task error rate for the recognizer on the desired task. For an isolated digit recognition task, the word error rate is just the isolated digit error rate, whereas the task error rate would be the number of credit card errors that lead to misidentification of the user. Evaluation of the recognizer performance often includes an analysis of the types of recognition errors made by the system. This analysis can lead to revision of the task in a number of ways, ranging from changing the vocabulary words or the grammar (i.e., to eliminate highly confusable words) to the use of word spotting, as opposed to word transcription. As an example, in limited vocabulary applications, if the recognizer encounters frequent confusions between words like 'freight' and 'flight,' it may be advisable to change 'freight' to 'cargo' to maximize its distinction from 'flight.' Revision of the task grammar often becomes necessary if the recognizer experiences substantial amounts of what is called 'out of grammar' (OOG) utterances, namely the use of words and phrases that are not directly included in the task vocabulary (ISCA, 2001).

The Speech Recognition Process

In this section, we provide some technical aspects of a typical speech recognition system. Figure 4 shows a block diagram of a speech recognizer that follows the Bayesian framework discussed above.

The recognizer consists of three processing steps, namely feature analysis, pattern matching, and confidence scoring, along with three trained databases, the set of acoustic models, the word lexicon, and the language model. In this section, we briefly describe each of the processing steps and each of the trained model databases.

Feature Analysis

The goal of feature analysis is to extract a set of salient features that characterize the spectral properties of the various speech sounds (the subword units) and that can be efficiently measured. The 'standard' feature set for speech recognition is a set of mel-frequency cepstral coefficients (MFCCs) (which perceptually match some of the characteristics of the spectral analysis done in the human auditory system) (Davis and Mermelstein, 1980), along with the first- and second-order derivatives of these features. Typically about 13 MFCCs and their first and second derivatives (Furai, 1981) are calculated every 10 ms, leading to a spectral vector with 39 coefficients every 10 ms. A block diagram of a typical feature analysis process is shown in Figure 5.

The speech signal is sampled and quantized, pre-emphasized by a first-order (highpass) digital filter with pre-emphasis factor α (to reduce the influence of glottal coupling and lip radiation on the estimated

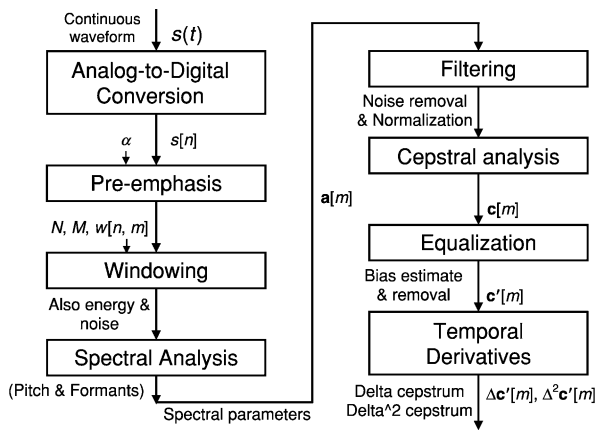

Figure 5 Block diagram of feature analysis computation.

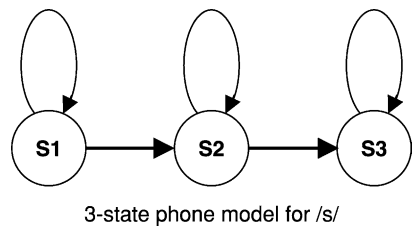

Figure 6 Three-state HMM for the sound /s/.

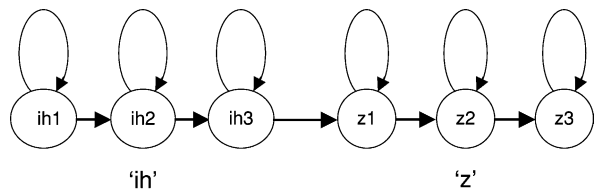

Figure 7 Concatenated model for the word 'is.'

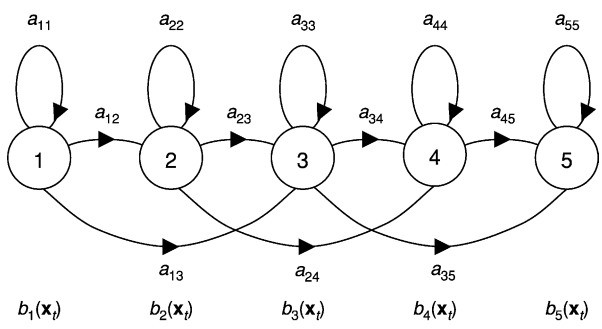

Figure 8 HMM for whole word model with five states.

vocal tract characteristics), segmented into frames, windowed, and then a spectral analysis is performed using a fast Fourier transform (FFT) (Rabiner and Gold, 1975) or linear predictive coding (LPC) method (Atal and Hanauer, 1971; Markel and Gray, 1976). The frequency conversion from a linear frequency scale to a mel frequency scale is performed in the filtering block, followed by cepstral analysis yielding the MFCCs (Davis and Mermelstein, 1980), equalization to remove any bias and to normalize the cepstral coefficients (Rahim and Juang, 1996), and finally the computation of first- and second-order (via temporal derivative) MFCCs is made, completing the feature extraction process.

Acoustic Models

The goal of acoustic modeling is to characterize the statistical variability of the feature set determined above for each of the basic sounds (or words) of the language. Acoustic modeling uses probability measures to characterize sound realization using statistical models. A statistical method, known as the hidden Markov model (HMM) (Levinson *et al.*, 1983; Ferguson, 1980; Rabiner, 1989; Rabiner and Juang, 1985), is used to model the spectral variability of each of the basic sounds of the language using a mixture density Gaussian distribution (Juang *et al.*, 1986; Juang, 1985), which is optimally aligned with a speech training set and iteratively updated and improved (the means, variances, and mixture gains are iteratively updated) until an optimal alignment and match is achieved.

Figure 6 shows a simple three-state HMM for modeling the subword unit /s/ as spoken at the beginning of the word /six/. Each HMM state is characterized by a probability density function (usually a mixture Gaussian density) that characterizes the statistical behavior of the feature vectors at the beginning (state s1), middle (state s2), and end (state s3) of the sound /s/. In order to train the HMM for each subword unit, we use a labeled training set of words and sentences and utilize an efficient training procedure known as the Baum-Welch algorithm (Rabiner, 1989; Baum, 1972; Baum *et al.*, 1970) to align each of the various subword units with the spoken inputs, and then estimate the appropriate means, covariances, and mixture gains for the distributions in each subword unit state. The algorithm is a hill-climbing algorithm and is iterated until a stable alignment of subword unit models and speech is obtained, enabling the creation of stable models for each subword unit.

Figure 7 shows how a simple two-sound word, 'is,' which consists of the sounds /ih/ and /z/, is created by concatenating the models (Lee, 1989) for the /ih/ sound with the model for the /z/ sound, thereby creating a six-state model for the word 'is.'

Figure 8 shows how an HMM can be used to characterize a whole-word model (Lee *et al.*, 1989). In this

case, the word is modeled as a sequence of $M = 5$ HMM states, where each state is characterized by a mixture density, denoted as $b_j(\mathbf{x}_t)$ where the model state is the index j, the feature vector at time t is denoted as $\mathbf{x}_t$, and the mixture density is of the form:

$$
\begin{aligned}
b_j(\mathbf{x}_t) &= \sum_{k=1}^{K} c_{jk}\mathcal{N}[\mathbf{x}_t, \mu_{jk}, U_{jk}] \\
\mathbf{x}_t &= (x_{t1}, x_{t2}, \ldots, x_{tD}),\ D = 39 \\
K &= \text{number of mixture components in the density function} \\
c_{jk} &= \text{weight of } kth \text{ mixture component in state } j, c_{jk} \geq 0 \\
\mathcal{N} &= \text{Gaussian density function} \\
\mu_{jk} &= \text{mean vector for mixture } k,\ \text{state } j \\
U_{jk} &= \text{covariance matrix for mixture } k, \text{ state } j
\end{aligned}
$$

$$\sum_{k=1}^{K} c_{jk} = 1, \quad 1 \leq j \leq M$$

$$\int_{-\infty}^{\infty} b_j(\mathbf{x}_t)d\mathrm{x}_t = 1, \quad 1 \leq j \leq M$$

Included in Figure 8 is an explicit set of state transitions, a_{ij}, which specify the probability of making a transition from state i to state j at each frame, thereby defining the time sequence of the feature vectors over the duration of the word. Usually the self-transitions, a_{ii}, are large (close to 1.0), and the skip-state transitions, a_{13}, a_{24}, a_{35}, are small (close to 0).

Once the set of state transitions and state probability densities are specified, we say that a model λ (which is also used to denote the set of parameters that define the probability measure) has been created for the word or subword unit. (The model λ is often written as $\lambda(A, B, \pi)$ to explicitly denote the model parameters, namely $A = \{a_{ij}, 1 \leq i, j \leq M\}$, which is the state transition matrix, $B = \{b_j(x_t), 1 \leq j \leq M\}$, which is the state observation probability density, and $\pi = \{\pi_i, 1 \leq i \leq M\}$, which is the initial state distribution). In order to optimally train the various models (for each word unit [Lee *et al.*, 1989] or subword unit [Lee, 1989]), we need to have algorithms that perform the following three steps or tasks (Rabiner and Juang, 1985) using the acoustic observation sequence, X, and the model λ:

a. likelihood evaluation: compute $P(X|\lambda)$
b. decoding: choose the optimal state sequence for a given speech utterance
c. re-estimation: adjust the parameters of λ to maximize $P(X|\lambda)$.

Each of these three steps is essential to defining the optimal HMM models for speech recognition based on the available training data and each task if approached in a brute force manner would be computationally costly. Fortunately, efficient algorithms have been developed to enable efficient and accurate solutions to each of the three steps that must be performed to train and utilize HMM models in a speech recognition system. These are generally referred to as the forward-backward algorithm or the Baum-Welch re-estimation method (Levinson *et al.*, 1983). Details of the Baum-Welch procedure are beyond the scope of this article. The heart of the training procedure for re-estimating model parameters using the Baum-Welch procedure is shown in Figure 9.

Recently, the fundamental statistical method, while successful for a range of conditions, has been augmented with a number of techniques that attempt to further enhance the recognition accuracy and make the recognizer more robust to different talkers, background noise conditions, and channel effects. One family of such techniques focuses on transformation of the observed or measured features. The transformation is motivated by the need for vocal tract length normalization (e.g., reducing the impact of differences in vocal tract length of various speakers). Another such transformation (called the maximum likelihood linear regression method) can be embedded in the statistical model to account for a potential mismatch between the statistical characteristics of the training data and the actual unknown utterances to be recognized. Yet another family of techniques (e.g., the discriminative training method based on minimum classification error [MCE] or maximum mutual information [MMI]) aims at direct minimization of the recognition error during the parameter optimization stage.

Word Lexicon

The purpose of the word lexicon, or dictionary, is to define the range of pronunciation of words in the task vocabulary (Jurafsky and Martin, 2000; Riley *et al.*, 1999). The reason that such a word lexicon is necessary is because the same orthography can be pronounced differently by people with different accents, or because the word has multiple meanings that change the pronunciation by the context of its use. For example, the word 'data' can be pronounced as: /d/ /ae/ /t/ /ax/ or as /d/ /ey/ /t/ /ax/, and we would need

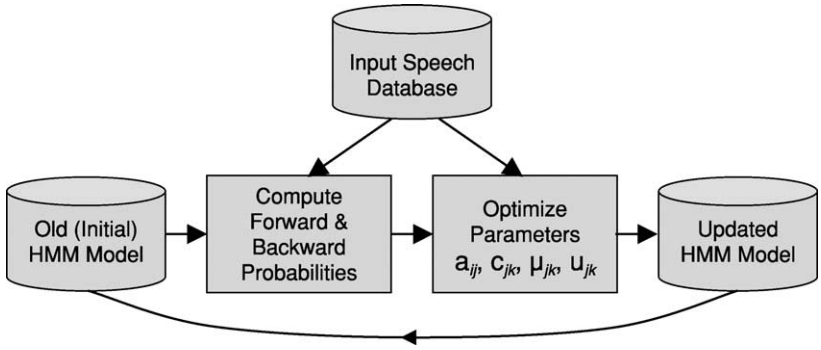

Figure 9 The Baum-Welch training procedure.

both pronunciations in the dictionary to properly train the recognizer models and to properly recognize the word when spoken by different individuals. Another example of variability in pronunciation from orthography is the word 'record,' which can be either a disk that goes on a player, or the process of capturing and storing a signal (e.g., audio or video). The different meanings have significantly different pronunciations. As in the statistical language model, the word lexicon (consisting of sequences of symbols) can be associated with probability assignments, resulting in a probabilistic word lexicon.

Language Model

The purpose of the language model (Rosenfeld, 2000; Jelinek *et al.*, 1991), or grammar, is to provide a task syntax that defines acceptable spoken input sentences and enables the computation of the probability of the word string, W, given the language model, i.e., $P_L(W)$. There are several methods of creating word grammars, including the use of rule-based systems (i.e., deterministic grammars that are knowledge-driven), and statistical methods that compute an estimate of word probabilities from large training sets of textual material. We describe the way in which a statistical N-gram word grammar is constructed from a large training set of text.

Assume we have a large text training set of labeled words. Thus for every sentence in the training set, we have a text file that identifies the words in that sentence. If we consider the class of N-gram word grammars, then we can estimate the word probabilities from the labeled text training set using counting methods. Thus to estimate word trigram probabilities (that is the probability that a word w_i was preceded by the pair of words (w_{i-1}, w_{i-2})), we compute this quantity as:

$$P(w_i|w_{i-1}, w_{i-2}) = \frac{C(w_{i-2}, w_{i-1}, w_i)}{C(w_{i-2}, w_{i-1})}$$

where $C(w_{i-2}, w_{i-1}, w_i)$ is the frequency count of the word triplet (i.e., trigram) consisting of (w_{i-2}, w_{i-1}, w_i) that occurred in the training set, and $C(w_{i-2}, w_{i-1})$ is the frequency count of the word duplet (i.e., bigram) (w_{i-2}, w_{i-1}) that occurred in the training set.

Although the method of training N-gram word grammars, as described above, generally works quite well, it suffers from the problem that the counts of N-grams are often highly in error due to problems of data sparseness in the training set. Hence for a text training set of millions of words, and a word vocabulary of several thousand words, more than 50% of word trigrams are likely to occur either once or not at all in the training set. This leads to gross distortions in the computation of the probability of a word string, as required by the basic Bayesian recognition algorithm. In the cases when a word trigram does not occur at all in the training set, it is unacceptable to define the trigram probability as 0 (as would be required by the direct definition above), since this leads to effectively invalidating all strings with that particular trigram from occurring in recognition. Instead, in the case of estimating trigram word probabilities (or similarly extended to N-grams where N is more than three), a smoothing algorithm (Bahl *et al.*, 1983) is applied by interpolating trigram, bigram, and unigram relative frequencies, i.e.,

$$\hat{P}(w_i|w_{i-1}, w_{i-2}) = p_3 \frac{C(w_{i-2}, w_{i-1}, w_i)}{C(w_{i-2}, w_{i-1})} + p_2 \frac{C(w_{i-1}, w_i)}{C(w_{i-1})} + p_1 \frac{C(w_i)}{\sum_i C(w_i)}$$

$$p_3 + p_2 + p_1 = 1$$

$$\sum_i C(w_i) = \text{size of text training corpus}$$

where the smoothing probabilities, p_3, p_2, p_1 are obtained by applying the principle of cross-validation. Other schemes such as the Turing-Good

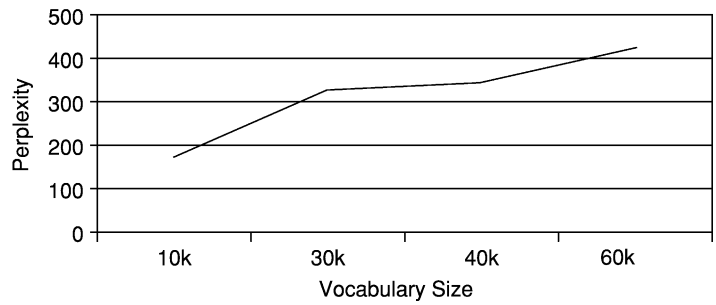

Figure 10 Bigram language perplexity for Encarta Encyclopedia.

estimator, which deals with unseen classes of observations in distribution estimation, have also been proposed (Nadas, 1985).

Worth mentioning here are two important notions that are associated with language models: perplexity of the language model and the rate of occurrences of out-of-vocabulary words in real data sets. We elaborate them below.

Language Perplexity A measure of the complexity of the language model is the mathematical quantity known as language perplexity (which is actually the geometric mean of the word branching factor, or the average number of words that follow any given word of the language) (Roukos, 1998). We can compute language perplexity, as embodied in the language model, $P_L(W)$, where $W = (w_1, w_2, \ldots, w_Q)$ is a length-Q word sequence, by first defining the entropy (Cover and Thomas, 1991) as:

$$H(W) = -\frac{1}{Q}\log_2 P(W)$$

Using a trigram language model, we can write the entropy as:

$$H(W) = -\frac{1}{Q}\sum_{i=1}^{Q}\log_2 P(w_i|w_{i-1}, w_{i-2})$$

where we suitably define the first couple of probabilities as the unigram and bigram probabilities. Note that as Q approaches infinity, the above entropy approaches the asymptotic entropy of the source defined by the measure $P_L(W)$. The perplexity of the language is then defined as:

$$PP(W) = 2^{H(W)} = P(w_1, w_2, \ldots, w_Q)^{-1/Q} \quad \text{as } Q \to \infty.$$

Some examples of language perplexity for specific speech recognition tasks are the following:

- For an 11-digit vocabulary ('zero' to 'nine' plus 'oh') where every digit can occur independently of every other digit, the language perplexity (average word branching factor) is 11.
- For a 2000-word Airline Travel Information System (ATIS) [Ward, 1991], the language perplexity (using a trigram language model) is 20 [Price, 1990].
- For a 5000-word *Wall Street Journal* task (reading articles aloud), the language perplexity (using a bigram language model) is 130 [Paul *et al.*, 1992].

A plot of the bigram perplexity for a training set of 500 million words, tested on the Encarta Encyclopedia is shown in Figure 10. It can be seen that language perplexity grows only slowly with the vocabulary size and is only about 400 for a 60 000-word vocabulary. (Language perplexity is a complicated function of vocabulary size and vocabulary predictability, and is not in any way directly proportional to vocabulary size).

Out-of-Vocabulary Rate Another interesting aspect of language models is their coverage of the language as exemplified by the concept of an out-of-vocabulary (OOV) (Kawahara and Lee, 1998) rate, which measures how often a new word appears for a specific task, given that a language model of a given vocabulary size for the task has been created. Figure 11 shows the OOV rate for sentences from the Encarta Encyclopedia, again trained on 500 million words of text, as a function of the vocabulary size. It can be seen that even for a 60 000-word vocabulary, about 4% of the words that are encountered have not been seen previously and thus are considered OOV words (which, by definition, cannot be recognized correctly by the recognition system).

Pattern Matching

The job of the pattern matching module is to combine information (probabilities) from the acoustic model, the language model, and the word lexicon to find the

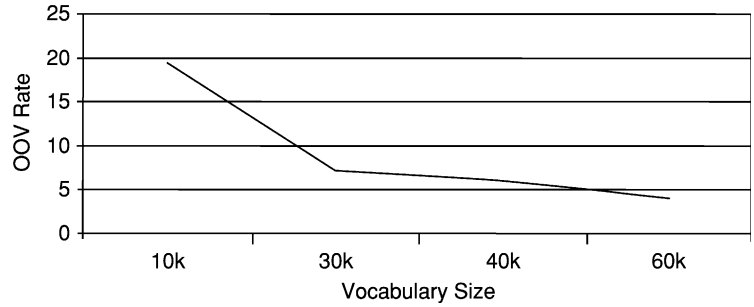

Figure 11 Out-of-vocabulary rate of Encarta Encyclopedia as a function of the vocabulary size.

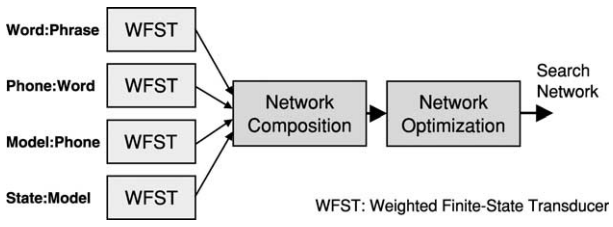

Figure 12 Use of WFSTs to compile FSN to minimize redundancy in the network.

'optimal' word sequence, i.e., the word sequence that is consistent with the language model and that has the highest probability among all possible word sequences in the language (i.e., best matches the spectral feature vectors of the input signal). To achieve this goal, the pattern matching system is actually a decoder (Ney, 1984; Paul, 2001; Mohri, 1997) that searches through all possible word strings and assigns a probability score to each string, using a Viterbi decoding algorithm (Forney, 1973) or its variants.

The challenge for the pattern matching module is to build an efficient structure (via an appropriate finite state network or FSN) (Mohri, 1997) for decoding and searching large-vocabulary complex-language models for a range of speech recognition tasks. The resulting composite FSNs represent the cross-product of the features (from the input signal), with the HMM states (for each sound), with the HMM units (for each sound), with the sounds (for each word), with the words (for each sentence), and with the sentences (those valid within the syntax and semantics of the task and language). For large-vocabulary high-perplexity speech recognition tasks, the size of the network can become astronomically large and has been shown to be on the order of 10^{22} states for some tasks. Such networks are prohibitively large and cannot be exhaustively searched by any known method or machine. Fortunately there are methods (Mohri, 1997) for compiling such large networks and reducing the size significantly due to inherent redundancies and overlaps across each of the levels of the network. (One earlier example of taking advantage of the search redundancy is the dynamic programming method (Bellman, 1957), which turns an otherwise exhaustive search problem into an incremental one.) Hence the network that started with 10^{22} states was able to be compiled down to a mathematically equivalent network of 10^{8} states that was readily searched for the optimum word string with no loss of performance or word accuracy.

The way in which such a large network can be theoretically (and practically) compiled to a much smaller network is via the method of weighted finite state transducers (WFST), which combine the various representations of speech and language and optimize the resulting network to minimize the number of search states. A simple example of such a WFST is given in Figure 12, and an example of a simple word pronunciation transducer (for two versions of the word 'data') is given in Figure 13.

Using the techniques of composition and optimization, the WFST uses a unified mathematical framework to efficiently compile a large network into a minimal representation that is readily searched using standard Viterbi decoding methods. The example of Figure 13 shows how all redundancy is removed and a minimal search network is obtained, even for as simple an example as two pronunciations of the word 'data.'

Confidence Scoring

The goal of the confidence scoring module is to post-process the speech feature set in order to identify possible recognition errors as well as out-of-vocabulary events and thereby to potentially improve the performance of the recognition algorithm. To achieve this goal, a word confidence score (Rahim *et al.*, 1997) based on a simple likelihood ratio hypothesis testing associated with each recognized word, is performed and the word confidence score is used to determine which, if any, words are likely to be incorrect because of either a recognition error or because it

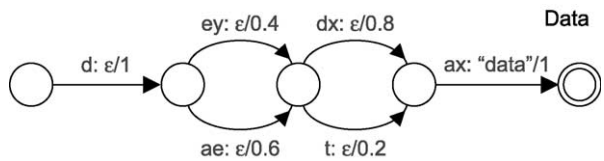

Figure 13 Word pronunciation transducer for two pronunciations of the word 'data.'

was an OOV word (that could never be correctly recognized). A simple example of a two-word phrase and the resulting confidence scores is as follows:

Spoken Input: credit please
Recognized String: credit fees
Confidence Scores: (0.9) (0.3)

Based on the confidence scores (derived using a likelihood ratio test), the recognition system would realize which word or words are likely to be in error and take appropriate steps (in the ensuing dialog) to determine whether an error had been made and how to fix it so that the dialog moves forward to the task goal in an orderly and proper manner. (We will discuss how this happens in the discussion of dialog management later in this article.)

Simple Example of ASR System: Isolated Digit Recognition

To illustrate some of the ideas presented above, consider a simple isolated word speech recognition system where the vocabulary is the set of 11 digits ('zero' to 'nine' plus the word 'oh' as an alternative for 'zero') and the basic recognition unit is a whole word model. For each of the 11 vocabulary words, we must collect a training set with sufficient, say K, occurrences of each spoken word so as to be able to train reliable and stable acoustic models (the HMMs) for each word. Typically a value of $K = 5$ is sufficient for a speaker-trained system (that is a recognizer that works only for the speech of the speaker who trained the system). For a speaker-independent recognizer, a significantly larger value of K is required to completely characterize the variability in accents, speakers, transducers, environments, etc. For a speaker-independent system based on using only a single transducer (e.g., a telephone line input), and a carefully controlled acoustic environment (low noise), reasonable values of K are on the order of 100–500 for training reliable word models and obtaining good recognition performance.

For implementing an isolated-word recognition system, we do the following:

1. For each word, v, in the vocabulary, we build a word-based HMM, λ_v, i.e., we must (re-)estimate the model parameters λ_v that optimize the likelihood of the K training vectors for the v-th word. This is the training phase of the system.
2. For each unknown (newly spoken) test word that is to be recognized, we measure the feature vectors (the observation sequence), $X = [\mathbf{x}_1, \mathbf{x}_2, \ldots, \mathbf{x}_N]$ (where each observation vector, $\mathbf{x}_i$ is the set of MFCCs and their first- and second-order derivatives), we calculate model likelihoods, $P(X|\lambda_v)$, $1 \le v \le V$ for each individual word model (where V is 11 for the digits case), and then we select as the recognized word the word whose model likelihood score is highest, i.e., $v = \arg\max_{1 \le v \le V} P(X|\lambda_v)$. This is the testing phase of the system.

Figure 14 shows a block diagram of a simple HMM-based isolated word recognition system.

Performance of Speech Recognition Systems

A key issue in speech recognition (and understanding) system design is how to evaluate the system's performance. For simple recognition systems, such as the isolated word recognition system described in the previous section, the performance is simply the word error rate of the system. For more complex speech recognition tasks, such as for dictation applications, we must take into account the three types of errors that can occur in recognition, namely word insertions (recognizing more words than were actually spoken), word substitutions (recognizing an incorrect word in place of the correctly spoken word), and word deletions (recognizing fewer words than were actually spoken) (Pallet and Fiscus, 1997). Based on the criterion of equally weighting all three types of errors, the conventional definition of word error rate for most speech recognition tasks is:

$$WER = \frac{NI + NS + ND}{|W|}$$

where NI is the number of word insertions, NS is the number of word substitutions, ND is the number of word deletions, and $|W|$ is the number of words in the sentence W being scored. Based on the above definition of word error rate, the performance of a range of speech recognition and understanding systems is shown in Table 1.

It can be seen that for a small vocabulary (11 digits), the word error rates are very low (0.3%) for a connected digit recognition task in a very clean environment (TI database) (Leonard, 1984), but we

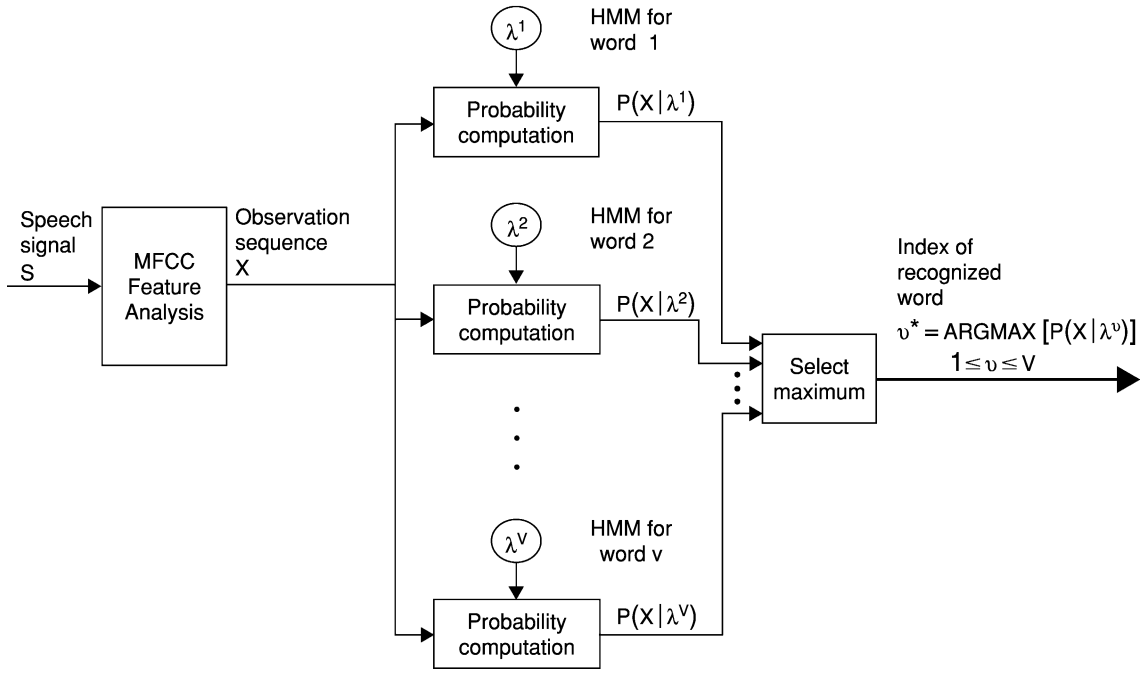

Figure 14 HMM-based Isolated word recognizer.

Table 1 Word error rates for a range of speech recognition systems

Corpus	*Type of speech*	*Vocabulary size*	*Word error rate*
Connect digit string (TI database)	Spontaneous	11 (0–9, oh)	0.3%
Connect digit string (AT&T mall recordings)	Spontaneous	11 (0–9, oh)	2.0%
Connected digit string (AT&T HMIHY)	Conversational	11 (0–9, oh)	5.0%
Resource management (RM)	Read speech	1000	2.0%
Airline travel information system (ATIS)	Spontaneous	2500	2.5%
North American business (NAB & WSJ)	Read text	64 000	6.6%
Broadcast news	Narrated news	210 000	~15%
Switchboard	Telephone conversation	45 000	~27%
Call-home	Telephone conversation	28 000	~35%

see that the digit word error rate rises significantly (to 5.0%) for connected digit strings recorded in the context of a conversation as part of a speech understanding system (HMIHY©) (Gorin *et al.*, 1996). We also see that word error rates are fairly low for 1000- to 2500-word vocabulary tasks (RM [Linguistic Data Consortium, 1992–2000] and ATIS [Ward, 1991]) but increase significantly as the vocabulary size rises (6.6% for a 64 000-word NAB vocabulary, and 13–17% for a 210 000-word broadcast news vocabulary), as well as for more colloquially spoken speech (Switchboard and Call-home [Godfrey *et al.*, 1992]), where the word error rates are much higher than comparable tasks where the speech is more formally spoken.

Figure 15 illustrates the reduction in word error rate that has been achieved over time for several of the tasks from Table 1 (as well as other tasks not covered in Table 1). It can be seen that there is a steady and systematic decrease in word error rate (shown on a logarithmic scale) over time for every system that has been extensively studied. Hence it is generally believed that virtually any (task-oriented) speech recognition system can achieve arbitrarily low error (over time) if sufficient effort is put into finding appropriate techniques for reducing the word error rate.

If one compares the best ASR performance for machines on any given task with human performance (which often is hard to measure), the resulting comparison (as seen in Figure 16) shows that humans outperform machines by factors of between 10 and 50; that is the machine achieves word error rates that are larger by factors of 10–50. Hence we still have a long way to go before machines outperform humans on speech recognition tasks. However, one should

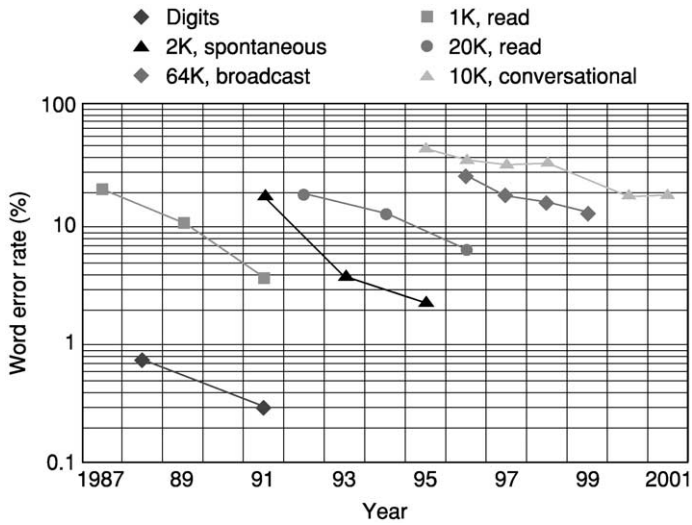

Figure 15 Reductions in speech recognition word error rates over time for a range of task-oriented systems (Pallet *et al.*, 1995).

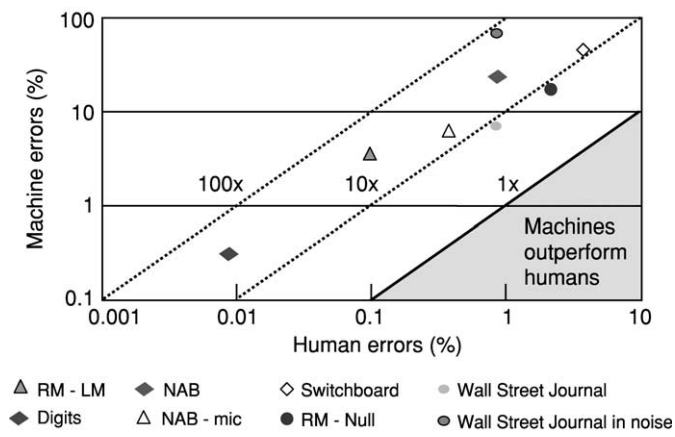

Figure 16 Comparison of human and machine speech recognition performance for a range of speech recognition tasks (Lippman, 1997).

also note that under a certain condition an automatic speech recognition system could deliver a better service than a human. One such example is the recognition of a long connected digit string, such as a credit card's 16-digit number, that is uttered all at once; a human listener would not be able to memorize or jot down the spoken string without losing track of all the digits.

Spoken Language Understanding

The goal of the spoken language understanding module of the speech dialog circle is to interpret the meaning of key words and phrases in the recognized speech string, and to map them to actions that the speech understanding system should take. For speech understanding, it is important to recognize that in domain-specific applications highly accurate understanding can be achieved without correctly recognizing every word in the sentence. Hence a speaker can have spoken the sentence: *I need some help with my computer hard drive* and so long as the machine correctly recognized the words *help* and *hard drive*, it basically understands the context of the sentence (needing help) and the object of the context (hard drive). All of the other words in the sentence can often be misrecognized (although not so badly that other contextually significant words are recognized) without affecting the understanding of the meaning of the sentence. In this sense, keyword spotting (Wilpon *et al.*, 1990) can be considered a primitive form of speech understanding, without involving sophisticated semantic analysis.

Spoken language understanding makes it possible to offer services where the customer can speak naturally without having to learn a specific vocabulary

and task syntax in order to complete a transaction and interact with a machine (Juang and Furui, 2000). It performs this task by exploiting the task grammar and task semantics to restrict the range of meanings associated with the recognized word string, and by exploiting a predefined set of 'salient' words and phrases that map high-information word sequences to this restricted set of meanings. Spoken language understanding is especially useful when the range of meanings is naturally restricted and easily cataloged so that a Bayesian formulation can be used to optimally determine the meaning of the sentence from the word sequence. This Bayesian approach utilizes the recognized sequence of words, W, and the underlying meaning, C, to determine the probability of each possible meaning, given the word sequence, namely:

$$P(C|W) = P(W|C)P(C)/P(W)$$

and then finding the best conceptual structure (meaning) using a combination of acoustic, linguistic and semantic scores, namely:

$$C^* = \arg\max_C P(W|C)P(C)$$

This approach makes extensive use of the statistical relationship between the word sequence and the intended meaning.

One of the most successful (commercial) speech understanding systems to date has been the AT&T How May I Help You (HMIHY) task for customer care. For this task, the customer dials into an AT&T 800 number for help on tasks related to his or her long distance or local billing account. The prompt to the customer is simply: 'AT&T. How May I Help You?' The customer responds to this prompt with totally unconstrained fluent speech describing the reason for calling the customer care help line. The system tries to recognize every spoken word (but invariably makes a very high percentage of word errors), and then utilizes the Bayesian concept framework to determine the meaning of the speech. Fortunately, the potential meaning of the spoken input is restricted to one of several possible outcomes, such as asking about Account Balances, or new Calling Plans, or changes in local service, or help for an Unrecognized Number, etc. Based on this highly limited set of outcomes, the spoken language component determines which meaning is most appropriate (or else decides not to make a decision but instead to defer the decision to the next cycle of the dialog circle), and appropriately routes the call. The dialog manager, spoken language generation, and text-to-speech modules complete the cycle based on the meaning determined by the spoken language understanding box. A simple characterization of the HMIHY system is shown in Figure 17.

The major challenge in spoken language understanding is to go beyond the simple classification task of the HMIHY system (where the conceptual meaning is restricted to one of a fixed, often small, set of choices) and to create a true concept and meaning understanding system.

While this challenge remains in an embryonic stage, an early attempt, namely the Air Travel Information System (ATIS), was made in embedding speech recognition in a stylized semantic structure to mimic a natural language interaction between human and a machine. In such a system, the semantic notions encapsulated in the system are rather limited, mostly in terms of originating city and destination city names, fares, airport names, travel times and so on, and can be directly instantiated in a semantic template without much text analysis for understanding. For example, a typical semantic template or network is shown in Figure 18 where the relevant notions, such as the departing city, can be easily identified and used in dialog management to create the desired user interaction with the system.

Dialog Management, Spoken Language Generation, and Text-to-Speech Synthesis

The goal of the dialog management module is to combine the meaning of the current input speech

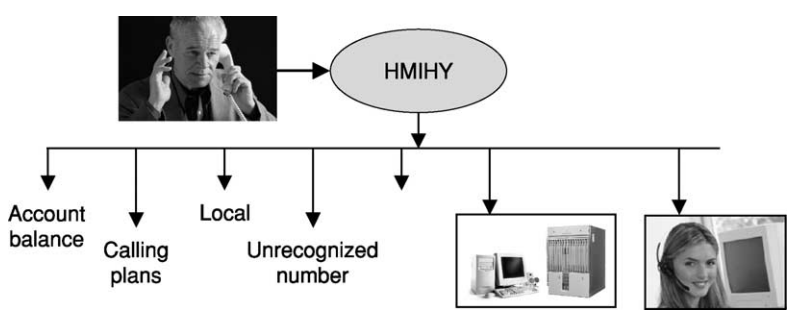

Figure 17 Conceptual representation of HMIHY (How May I Help You?) system.

with the current state of the system (which is based on the interaction history with the user) in order to decide what the next step in the interaction should be. In this manner, the dialog management module makes viable fairly complex services that require multiple exchanges between the system and the customer. Such dialog systems can also handle user-initiated topic switching within the domain of the application.

The dialog management module is one of the most crucial steps in the speech dialog circle for a successful transaction as it enables the customer to accomplish the desired task. The way in which the dialog management module works is by exploiting models of dialog to determine the most appropriate spoken text string to guide the dialog forward toward a clear and well-understood goal or system interaction. The computational models for dialog management include both structure-based approaches (which models dialog as a predefined state transition network that is followed from an initial goal state to a set of final goal states), or plan-based approaches (which consider communication as executing a set of plans that are oriented toward goal achievement).

The key tools of dialog strategy are the following:

- Confirmation: used to ascertain correctness of the recognized and understood utterances
- Error recovery: used to get the dialog back on track after a user indicates that the system has misunderstood something
- Reprompting: used when the system expected input but did not receive any input
- Completion: used to elicit missing input information from the user
- Constraining: used to reduce the scope of the request so that a reasonable amount of information is retrieved, presented to the user, or otherwise acted upon
- Relaxation: used to increase the scope of the request when no information has been retrieved
- Disambiguation: used to resolve inconsistent input from the user
- Greeting/Closing: used to maintain social protocol at the beginning and end of an interaction
- Mixed initiative: allows users to manage the dialog flow.

Although most of the tools of dialog strategy are straightforward and the conditions for their use are fairly clear, the mixed initiative tool is perhaps the most interesting one, as it enables a user to manage the dialog and get it back on track whenever the user feels the need to take over and lead the interactions with the machine. Figure 19 shows a simple chart that illustrates the two extremes of mixed initiative for a simple operator services scenario. At the one extreme, where the **system** manages the dialog totally, the system responses are simple declarative requests to elicit information, as exemplified by the system command "Please say collect, calling card, third number". At the other extreme is **user** management of the dialog where the system responses are open ended and the customer can freely respond to the system command 'How may I help you?'

Figure 20 illustrates some simple examples of the use of system initiative, mixed initiative, and user initiative for an airlines reservation task. It can be seen that system initiative leads to long dialogs (due to the limited information retrieval at each query), but the dialogs are relatively easy to design, whereas user initiative leads to shorter dialogs (and hence a better user experience), but the dialogs are more difficult to design. (Most practical natural language systems need to be mixed initiative so as to be able to change initiatives from one extreme to another, depending on the state of the dialog and how successfully things have progressed toward the ultimate understanding goal.)

Dialog management systems are evaluated based on the speed and accuracy of attaining a well-defined

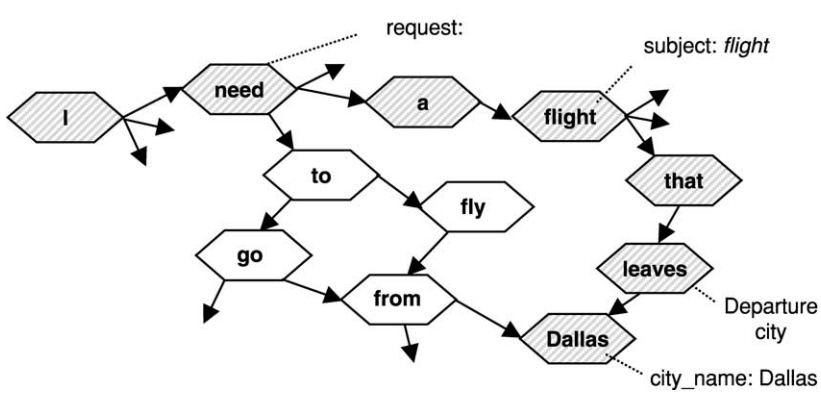

Figure 18 An example of a word grammar with embedded semantic notions in ATIS.

Figure 19 Illustration of mixed initiative for operator services scenario.

task goal, such as booking an airline reservation, renting a car, purchasing a stock, or obtaining help with a service.

The spoken language generation module translates the action of the dialog manager into a textual representation and the text-to-speech modules convert the textual representation into natural-sounding speech to be played to the user so as to initiate another round of dialog discussion or to end the query (hopefully successfully).

User Interfaces and Multimodal Systems

The user interface for a speech communications system is defined by the performance of each of the blocks in the speech dialog circle. A good user interface is essential to the success of any task-oriented system, providing the following capabilities:

- It makes the application easy to use and robust to the kinds of confusion that arise in human–machine communications by voice.
- It keeps the conversation moving forward, even in periods of great uncertainty on the parts of either the user or the machine.
- Although it cannot save a system with poor speech recognition or speech understanding performance, it can make or break a system with excellent speech recognition and speech understanding performance.

Although we have primarily been concerned with speech recognition and understanding interfaces to machines, there are times when a multimodal approach to human–machine communications is both necessary and essential. The potential modalities that can work in concert with speech include gesture and pointing devices (e.g., a mouse, keypad, or stylus). The selection of the most appropriate user interface mode (or combination of modes) depends on the device, the task, the environment, and the user's abilities and preferences. Hence, when trying to identify objects on a map (e.g., restaurants, locations of subway stations, historical sites), the use of a pointing device (to indicate the area of interest) along with speech (to indicate the topic of interest) often is a good user interface, especially for small computing devices like tablet PCs or PDAs. Similarly, when entering PDA-like information (e.g., appointments, reminders, dates, times, etc.) onto a small handheld device, the use of a stylus to indicate the appropriate

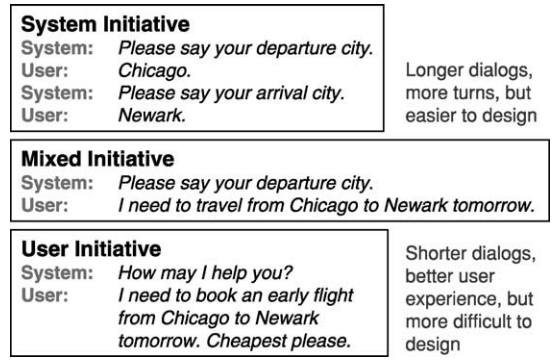

Figure 20 Examples of mixed initiative dialogs.

type of information with voice filling in the data field is often the most natural way of entering such information (especially as contrasted with stylus-based text input systems such as graffiti for Palm-like devices). Microsoft research has shown the efficacy of such a solution with the MIPad (Multimodel Interactive Pad) demonstration, and they claim to have achieved double the throughput for English using the multimodal interface over that achieved with just a pen stylus and the graffiti language.

Summary

In this article we have outlined the major components of a modern speech recognition and spoken language understanding system, as used within a voice dialog system. We have shown the role of signal processing in creating a reliable feature set for the recognizer and the role of statistical methods in enabling the recognizer to recognize the words of the spoken input sentence as well as the meaning associated with the recognized word sequence. We have shown how a dialog manager utilizes the meaning accrued from the current as well as previous spoken inputs to create an appropriate response (as well as potentially taking some appropriate actions) to the customer request(s), and finally how the spoken language generation and text-to-speech synthesis parts of the dialog complete the dialog circle by providing feedback to the user as to actions taken and further information that is required to complete the transaction that is requested.

Although we have come a long way toward the vision of Hal, the machine that both recognizes words reliably and understands their meaning almost flawlessly, we still have a long way to go before this vision is fully achieved. The major problem that must yet be tackled is robustness of the recognizer and the language understanding system to variability in speakers, accents, devices, and environments in which the speech is recorded. Systems that appear to

work almost flawlessly under laboratory conditions often fail miserably in noisy train or airplane stations, when used with a cellphone or a speakerphone, when used in an automobile environment, or when used in noisy offices. There are many ideas that have been advanced for making speech recognition more robust, but to date none of these ideas has been able to fully combat the degradation in performance that occurs under these nonideal conditions.

Speech recognition and speech understanding systems have made their way into mainstream applications and almost everybody has used a speech recognition device at one time or another. They are widely used in telephony applications (operator services, customer care), in help desks, in desktop dictation applications, and especially in office environments as an aid to digitizing reports, memos, briefs, and other office information. As speech recognition and speech understanding systems become more robust, they will find their way into cellphone and automotive applications, as well as into small devices, providing a natural and intuitive way to control the operation of these devices as well as to access and enter information.

See also: Speech Recognition, Audio-Visual; Speech Recognition, Automatic: History.

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Speech Synthesis

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We think of speech as a uniquely human ability. It is the primary medium of exchange for most social interactions among humans, and its evolution from animal communications is still not understood. However, the claim that speech is uniquely human depends on a specific interpretation of what speech is. If we take the view that speech is any acoustic pattern that can be heard by a listener as consisting of a sequence of phonetic segments, then the constraint of being uniquely human is significantly relaxed. It is well known that a variety of different species of nonhuman animals, with a wide range of vocal systems, can produce acoustic patterns that we can hear as speech. From Irene Pepperberg's African gray parrot Alex (*see* **Communication in Grey Parrots**) to the Indian hill mynah bird described by Klatt and Stefanski (1974) to Hoover the talking harbor seal (Friend, 2004), animals can produce acoustic patterns that human listeners can hear and interpret as speech. Although some speech sounds are said to be outside the capability of vocal production by some animals (see Lieberman, 1991 regarding the vowel space limitations of nonhuman primates and dogs), it has been claimed that Alexander Graham Bell trained his dog to produce speech sounds. He trained his dog to growl at a low constant level and then shaped the dog's articulators by hand to generate a few syllables. Bell reported that the culmination of his sky terrier's ability was to produce with a little manual assistance 'ow ah oo ga ma ma' for 'How are you grandmamma?' While speech production is specifically thought of as humans talking, we can think of speech synthesis as the process of producing the acoustic patterns of speech by nonhuman means.

However, at the late date of the early 1900s (ca. 1910), Bell's talking dog was not the first attempt at synthesizing speech. The Frankenstein notion of violating the sanctity of human uniqueness by synthesizing speech dates back to 1791 with Wolfgang von Kempelen's speaking machine (*see* **Kempelen, Wolfgang von (1734–1804)**). As with Bell's canine synthesizer, von Kempelen's was a mechanical synthesizer in which a source of air vibration (from a bellows past vocal chords simulated by an oscillating reed) was shaped by varying the resonance properties of the simulated mouth by covering the mouth with a hand or inserting a thumb. The synthesizer could produce some speech sounds, whole words, and even short sentences.

As early examples of speech synthesizers, Bell's terrier and von Kempelen's speaking machine share some basic principles of human speech production with most current speech synthesizers. These principles of operation are described generally by the source-filter theory of speech production. Using larynxes excised from cadavers, Johannes Muller (1848) observed that the sounds emitted directly from an excised larynx are different from actual speech sounds. Furthermore, these sounds could be rendered more speech-like using a tube to shape the spectral properties of the sound. The source-filter theory of speech production (Fant, 1960; Flanagan, 1972) describes the acoustic speech signal as the result of convolving an acoustic source (either periodic excitation such as voicing or aperiodic noise) with a spectral transfer function (corresponding to the coupled resonators of the vocal tract) and a radiation characteristic function (corresponding to radiation at the lips). Bell's terrier's growling provided a periodic source that was shaped through the vocal tract while Bell manipulated the articulators. In much the same way, speech synthesizers (whether mechanical hardware or electronics or software) combine a source function (either periodic as produced by a model of laryngeal vibration or noise as turbulence produced at the glottis) with a model of changes in vocal tract shape (represented either as resonators, parallel or coupled, or as articulators) to produce a speech waveform. What differs between synthesizers is the method by which this procedure is carried out.

Methods of Speech Synthesis

The modern history of speech synthesis dates back over half a century (see Klatt, 1987 for a comprehensive review) and over that time, encompasses a broad range of different technologies, from simulating vocal tracts to the pattern-playback machine at Haskins Laboratories. However, if we take speech synthesis as depending on some form of source-filter theory, in simulation of human speech production, we exclude some things from the realm of speech synthesis. For example, any simple acoustic reproduction medium such as audio tape or a digitized waveform can easily generate a speech signal. However, there is no model of speech production inherent in this process – a recorded waveform is retransmitted from stored form to some analog of acoustic pressure variation. Thus, while it is possible to reduce the information contained in an acoustic waveform by various coding

methods (e.g., MP3) for efficient storage purposes, the extraction of this kind of parametric description need not be in terms of source-filter theory. On the other hand, it is possible to achieve relatively high efficiency in storing speech encoded in a form that can serve as input to a speech synthesizer. The limit can be seen simply by considering the size of a text document (that can be read aloud by a human) and the corresponding waveform captured in the fidelity of a compact disc.

Taking speech synthesis to be based on the source-filter theory of speech production does not place very strong constraints on the methods of synthesis, clearly. There are currently three methods used to generate synthetic speech. Conceptually, articulatory synthesis is perhaps the most straightforward method. Articulatory synthesizers model the speech production process in terms of the mechanical motions of the articulators and the changes in sound pressure throughout the anatomical structures used in speech production. As such, articulatory synthesizers are intended to closely match the physical process of talking. By contrast, formant synthesizers model speech production in terms of a mathematical description of the acoustic process of speech production (Klatt, 1980). Instead of representing the vocal tract as a physical object with the shape and movement constraints found in anatomy, the vocal tract is represented as a set of resonators. Vocalic and aperiodic sources are represented mathematically as time-varying signals without the specific physical interpretations of pressure, for example. Of course, the resonators in a formant synthesizer correspond to the resonant and filtering acoustic properties of the vocal tract and articulators, but are described more in terms of a transfer function than in terms of area or volume of the vocal tract. Finally, 'analytic' synthesis models generate speech from a parametric source-filter analysis (typically using Linear Prediction Coding, LPC) as the basis. In this approach, the synthesis models a specific acoustic waveform rather than the production process or the acoustic characterization of the production process. However, the model of the utterance is in terms of a hypothetical source function and a vocal tract transfer function or filter to shape the source output. Thus, in all three methods, a synthetic utterance is generated by modeling a real utterance (in the analytic method) or an idealization of a real utterance (as in articulatory or formant synthesis). The primary difference is the derivation and nature of the parameters used in the modeling process.

Articulatory synthesizers are not new (see Klatt, 1987 for reviews) dating back over 50 years. For an articulatory synthesizer, the parameters reflect real time-varying physical properties of the vocal tract during speech production. Although there is generally some control over aspects of the source function, the primary parameters of interest govern the shape of the vocal tract over time that serves to shape or filter the source. Articulation then is typically realized by time-varying descriptions of the vocal tract. These physical properties might be measured using any of a number of radiological methods, for example, recently using magnetic resonance imaging (MRI) of a vocal tract during speech production or other articulatory data. Models such as ASY developed at Haskins Laboratories (Rubin *et al.*, 1981) use parameters specifying the crosssectional (midsaggital) area of the vocal tract in terms of the position of the jaw, velum, tongue body, tongue tip, lips, and hyoid bone. Other current models allow a different specification of vocal tract crosssectional area or a combination of vocal tract constriction areas along with other parameters such as subglottal pressure and source characteristics such as fundamental frequency, F0 (HLsyn, Sensimetrics Corp., 1995). It is interesting to note that this last example, HLsyn translates the articulatory parameters into their formant-synthesis parameter equivalents, making explicit that there is a close correspondence between the articulatory events and the acoustic characterization of those events. In part, one could say that the difference between an articulatory and formant synthesizer is simply the terms in which one wants to think about the process of speech production and the characterization of parameters one wants to use for controlling the synthesizer.

Although there have been a number of formant synthesizers developed and described in past decades (see Klatt, 1980, 1987 for reviews), the definitive model was described by Klatt's (1980) cascade/parallel formant synthesizer. As with an articulatory synthesizer, there is some control over the source function (e.g., the frequency and amplitude of F0 at different time points) but the primary work is carried out by the set of resonators that define the vocal tract transfer function (the filter) at each point in time. In a formant synthesizer, a vocal tract function is specified by setting the center frequencies and bandwidths of a set of resonators. These parameters can be set on a time frame (e.g., 5 ms) that specifies the rate of control of the vocal tract change in the synthesizer. Changing the center frequencies and bandwidths of these resonators over time is functionally equivalent to changing the vocal tract crosssectional area function over time. However, these parameters can be measured directly from a spectrogram of speech rather than from radiographic measurements of the vocal tract of a talker speaking.

In a parallel formant synthesizer, the resonators separately and independently shape the source, with the outputs summed together before the radiation characteristic (simulating the radiation at the lips that rolls off the higher frequencies). The amplitudes of each resonator are set separately and are chosen to match the relative formant peaks in a smoothed spectrum of a target utterance such as a vowel. In a cascade formant synthesizer, the resonators are coupled in series, so the output of one serves as the input for the next. This process more closely simulates the acoustic coupling of resonators in a real vocal tract, automatically adjusting the relative amplitudes of each resonator's contribution. While a parallel synthesizer can, in principle, model the output of a cascade synthesizer, the output has to be more closely matched to the frequency-amplitude profile of the spectrum at each time point, thereby requiring many more amplitude parameters to be set manually (one per resonator). In Klatt's (1980) cascade/parallel formant synthesizer, there are two branches available for synthesis simultaneously – a cascade formant synthesizer and a parallel formant synthesizer – and the outputs of the two branches are combined before the radiation characteristic is imposed.

The advantage of the cascade/parallel formant synthesizer design, aside from the convenience of choosing whichever approach is desired for any particular utterance, is that it is possible to synthesize a syllable such as /sta/ more easily, using the parallel branch to model the fricative /s/ (using a frication source at the simulated constriction), setting resonators to the frequencies of the fricative poles and the cascade branch to more accurately model the /ta/. This ability also allows for more easily and accurately synthesizing mixed-source consonants such as voiced fricatives. Klatt's (1980) description of the cascade/parallel formant synthesizer included an appendix specifying the FORTRAN source code to implement the synthesizer. Since that publication, Nick Ing-Simons and Jon Iles rewrote the synthesizer in C and made it widely available, and there have been a number of other implementations of this synthesizer as well.

In order to synthesize an utterance using either an articulatory synthesizer or a formant synthesizer, it is necessary to model either the process of speech production, or the acoustic consequences of that process. This requirement means that it is necessary to have either anatomical or acoustic data corresponding to the utterance to be modeled, or to components of the utterance. The process of synthesis is one of setting the parameters for the time-varying changes in the source and the time-varying changes in the vocal tract. An alternative method is to actually measure those parameters from an utterance and use the measurements to synthesize an utterance. Linear Prediction Coding (LPC) is a method of speech analysis that is based on source-filter theory, separately estimating on a short-time basis properties of the source function and the vocal tract transfer function (Atal and Hanauer, 1971). LPC analysis fits the short-time spectrum with a linear model based on the assumption that the vocal tract can be represented by a small number of connected, fixed volume tubes and certain constraining assumptions about the source function at any point in time. The result of this analysis is a parametric characterization of the vocal tract transfer function and the source function for each time point in the analysis. The target utterance can then be synthesized by combining the source model with the vocal tract transfer model. The resulting synthetic speech is very high in quality, quite similar in sound to the original utterance, which should not be surprising. Indeed, sometimes this result is referred to as 'resynthesis' of the utterance rather than synthesis, given that the parameters used to drive the synthesis were directly computed from an analysis of the target utterance itself. This form of synthesis is the inverse of the analysis process.

On the surface, this kind of speech synthesis seems extremely close to simply encoding and reproducing speech. Indeed, it seems quite comparable to Fourier analysis and synthesis or wavelet analysis and synthesis. Depending on the window size (in time), Fourier analysis will yield the moment-by-moment power spectra corresponding to any arbitrary waveform. By inversion, Fourier analysis will reconstruct the original wave from a series of these spectral slices. However, Fourier analysis does not make any *a priori* assumptions about the method by which the target waveform was generated. It works as well for speech as for a violin concerto. By contrast, LPC analysis and synthesis makes strong and specific assumptions regarding the source-filter theory of speech production, assuming and estimating the source function and the vocal tract transfer function. In doing so, the parametric model that results from this analysis is in a form that is compatible with most theories of speech production. For example, the results of LPC analysis could essentially set the parameters of a formant synthesizer, whereas the Fourier analysis does not separate out the effects of source and vocal tract transfer function.

This estimation provides two important advantages for synthesis by analysis. First, for the kind of articulatory and formant synthesis systems described, parameters have to be entered on a moment-by-moment basis. For example, for the Klatt synthesizer, parameters have to be entered for every 5 ms of an utterance. Meeting this requirement means that even

synthesizing a 200 ms syllable is a laborious process. However, for LPC synthesis, the parameters are provided as a result of the LPC analysis, making it possible to synthesize much longer utterances, including sentences or discourse. Second, by explicitly modeling separate source and vocal tract transfer functions, the parameters are not only available for direct use in resynthesis of an analyzed utterance, but they are also available for manipulation. This availability means that it is possible to modify parameters corresponding to aspects of prosody or phonetics opening up more possible applications than would be available for simple reproduction of a coded utterance.

Applications of Speech Synthesis

This ability to modify the parametric description of an utterance provides an important way to control the source and acoustic–phonetic characteristics of speech. As a result, one of the most important applications of these speech synthesizers is for research on spoken language. Linguists, cognitive psychologists, engineers, and speech and hearing scientists have used speech synthesis as a basic tool for carrying out experiments. The first basic studies of categorical perception (see Liberman *et al.*, 1967 for a review) were carried out using the Pattern Playback Machine at Haskins Laboratories. Developed as part of a project to construct a reading machine for the blind, the Pattern Playback essentially inverted the operation of a spectrograph. Spectrograms (time by frequency by amplitude graphs) that were hand-painted on a clear acetate belt were converted to speech by converting light shining through the spectrograms into time-varying speech waveforms represented as electrical signals. By making small changes in the painted spectrogram, small changes in the acoustic structure were created. The ability to make small constant changes in the pattern structure of a syllable made it possible to carry out studies that would have been inconceivable otherwise. Liberman *et al.* (1957) used such small systematic acoustic variations to create a series of stimuli varying in initial consonant. They demonstrated that discrimination of these acoustic variations did not monotonically follow the mean frequency of the differences. As frequency increases, for a constant acoustic difference between pairs of nonspeech stimuli, discrimination performance should follow Weber's Law; discrimination performance should diminish, if the frequency range is great enough. Instead, Liberman *et al.* found that discrimination was nonmonotonic, depending more on the phonemic labels given to the stimuli than the frequency range.

Since then, the development of software formant synthesizers has provided substantially more control over a wider range of acoustic parameters, including nasalization, aspiration, frication, and a variety of vocal source parameters. The greater control and the more veridical modeling of speech production make possible a broader range of experiments. For example, using the Klatt (1980) formant synthesizer, it is possible to modify source characteristics to produce convincing versions of different voice qualities that are indistinguishable from recordings (Klatt and Klatt, 1990). Using these parameters, it has been possible to simulate some of the qualities of pathological voices. This level of control makes formant synthesizers an excellent tool for studying a variety of scientific issues concerning phonetic perception, prosody, and vocal characteristics. However, the requirement of specifying large and complicated sets of acoustic parameters every 5 ms limits the length of utterances that can be practically investigated to syllables or short words.

Articulatory synthesis has not been used as much in perceptual work, although it serves an important role in understanding the relationship between speech production and speech signals. The quantal theory of speech production makes very specific claims about the relationship between variation in physical properties of the vocal tract and the acoustic properties of speech (Stevens, 1972). Thus, the ability to systematically manipulate articulatory structures and assess the acoustic and perceptual consequences is important to understanding both speech production and speech perception. Recent studies have explored how various manners of production may be accounted for in this kind of articulatory synthesis. In addition, the development of a theory of articulatory phonology (Browman and Goldstein, 1986) makes the availability of an articulatory synthesizer an important tool for testing aspects of this theory. However, because of the difficulty of measuring the physical properties of the vocal tract during speech production (compared to measuring acoustic properties using spectrograms or the results of LPC speech analysis), the application of articulatory synthesis remains much more restricted and limited to relatively short utterances.

By contrast with formant synthesis and articulatory synthesis, analytic synthesis based on LPC analysis can be used for research with substantially longer utterances. Words, sentences, and even discourse can be analyzed to extract the source and vocal tract transfer function using LPC analysis. These parameters can then be modified to produce the kinds of variations in phonetic quality or voice quality that are typically investigated using formant synthesis. Furthermore, there is sufficient acoustic–phonetic control to be able to enhance the relevant cues as

a perceptual aid in training. Similarly, analytic synthesis is extremely useful for modifying aspects of the suprasegmental structure of speech. Variation in broad phonotactics, rhythm, and intonation has been varied between English and Japanese sentences to investigate language identification (Ramus and Mehler, 1999). The perception of emotional stress was investigated by resynthesizing utterances varying maximum F0 and the range of F0 (Protopapas and Lieberman, 1997) and variation in mean pitch was controlled for different emotional sentences using LPC resynthesis to investigate the cortical lateralization of processing emotional language and syntax (Luks *et al.*, 1998).

LPC resynthesis allows researchers to model speech stimuli more closely on real utterances and still retain control over source and vocal tract transfer function parameters. Moreover, it allows researchers to prepare much longer utterances as stimuli than would be typical using articulatory or formant synthesizers. However, by comparison, manipulation of acoustic–phonetic cues is not as simple as with formant synthesizers. Thus, analytic synthesis tends to be most useful in research on longer utterances investigating prosody whereas formant synthesis tends to be more useful in synthesizing phonetic structure.

In principle, synthetic speech should be useful in applications wherever human speech would serve as the medium of interaction. Any place where a human operator must interact vocally with someone, to the extent that a computer could perform the human's job, synthetic speech would be useful as the output medium, replacing human speech directly. However, the above difference among synthesizers would seem, on the surface, to constrain the relative utility of synthetic speech for human–computer interactions.

On the one hand, it seems plausible that analytic synthesis in the form of LPC resynthesis could be useful for certain voice response applications. Any situation in which a limited set of prerecorded messages is needed, LPC resynthesis might be considered. Rather than store coded and compressed digital recordings of the messages, an LPC synthesis chip together with stored sets of parameters for the messages would be sufficient for a very efficient voice response system. Spoken messages in cars or elevators or at train stations could be produced by LPC resynthesis. One advantage of this approach is that some aspects of the prosody or voice characteristics could be modified either to produce variation in the messages, to fit the emotional tone to a situation (e.g., in various types of emergencies), or to change the vocal characteristics of the talker. David Sedaris in *Dress your family in corduroy and denim* (2004) tells a story in which he ends up 'programming' his sister's parrot to deliver a personal message as his proxy. In this situation, one could use LPC synthesis to deliver a specific message that is known in advance.

On the other hand, this kind of system cannot provide the flexibility of spoken language that would be needed in applications that typically require a human operator. There are many circumstances in which speech is needed, but the messages could not be prerecorded because there is no way to know ahead of time what will be said. In another story, Sedaris laments that the nematode worms that survived the Columbia space shuttle explosion could not talk; if they could, imagine what we could learn about the accident from real eye witnesses. Who could know ahead of time what they would possibly say? Similarly, in Parkhurst's *The dogs of Babel,* a linguist sets out to teach his dog to talk in order to find out what happened when his wife died. However, it is clear that talking is not just making a certain set of human speech sounds. Talking, as opposed to simply relaying a message, depends on a great deal of knowledge about the structure of language.

As the number of messages becomes large, the time and effort of recording all the messages, carrying out an LPC analysis, and storing the parameters becomes prohibitive. Furthermore, in applications where there can be an unlimited number of messages, as in a reading machine for the blind, it is impossible to have a fixed set of analyzed and stored messages. This kind of voice response system requires a different kind of approach than is represented in any of the speech synthesizers. This point is where the generative power of natural language becomes critical – the ability to produce any arbitrary utterance.

A speech synthesizer can be thought of as the engine that generates phonetic and prosodic signals. Given the right set of source and vocal tract transfer function parameters, a speech synthesizer can generate an utterance or set of utterances. In each synthesizer, there are parameters available that can be used to control syntactic prosody, emotional expression, voicing, nasality, manner and place of articulation, and all the other properties that make up the perceptual structure of speech. However, what is missing is the linguistic structure that ties together these parameters to form a coherent utterance. Speech synthesizers only model the source-filter theory of speech production, but none of the linguistic knowledge that exists in a human talker to drive the production process. Clearly then, in order to produce a voice response system with broader abilities, it is necessary to combine a speech synthesizer into a much more complex system. Those systems are called text-to-speech systems.

Text-to-Speech Systems

A text-to-speech system (TTS) takes unrestricted text and 'reads' the text aloud, or at least renders the text into a speech waveform that can then be transmitted or played to a listener. In this respect, a TTS is more like a human reader than an extemporaneous speaker. While this eliminates the problem of formulating a message into a linguistic surface form, there are still a large number of very specific problems that need to be addressed by engineering and linguistic solutions. While a speech synthesis engine can take time-varying parametric descriptions of speech production (in either articulatory or acoustic terms), these descriptions must be generated from the text input.

Consider some of the basic problems faced by a TTS in reading text. Texts do not consist of phonetic transcriptions with diacritic marks. A TTS typically only has available the information in a text to guide pronunciation and manner of speaking. However, the text must be translated into phonological form. The phonological translation must be converted into phonetic segments and these segments must be rendered into synthesizer parameters. This process is a complex one that consists of a series of stages of translation.

First, the text must be normalized. While some punctuation, such as commas and question marks, periods, and exclamation points can be used as prosodic information for pauses and intonation contours, other punctuation such as single and double quotes and abbreviation periods (as in Dr Jones, where Dr is not the end of the sentence) can cause problems. Should acronyms be spelled out aloud (as in ABC) or pronounced as a word (as in UNESCO)? Numbers have to be converted from Arabic numeric form to phonological form. Some abbreviations have to be decoded in context (as in St Marks as Saint Marks vs. Marks St as Marks Street) and fully expanded phonologically. In reading an e-mail message, as it is received, what should be done about the numerous fields for time, date, sender, and routing that can all appear, with strange punctuation? Similarly, in reading web pages (not specifically marked using a speech markup language), there are numerous text formatting characters that must be ignored or used as directives for a web browser that could provide information for a TTS. Depending on the nature of the text to be read, there are numerous specific issues that need to be addressed before the text can be converted to speech. This first stage of text normalization is therefore necessary to render the text input into a form suitable for conversion to phonological form.

A second stage in text-to-speech systems is a syntactic analysis of the utterance. Even a rudimentary syntactic analysis can be important for determining the pronunciation of some words (an attribute vs. to attribute). Content words typically receive intonational accents whereas functors are unaccented. The overall prosody of the sentence may change depending on the syntactic structure. Some aspects of this kind of analysis may be carried out simply by labeling words based on dictionary lookup and then applying a rudimentary parser. However, there are certain pragmatic solutions that can be applied such as using functors to identify phrase boundaries that can reduce the need for a parser.

In order to read any text, it is critical to change the representation from an orthographic form to a phonological form. Even after transformation of numbers and expansion of abbreviations and the elimination of formatting and irrelevant information, the problem of pronouncing spoken words is not simple. In English, the correspondence between spelling and pronunciation is notoriously poor as exemplified by George Bernard Shaw's spelling of 'fish' as 'ghoti' (think of the pronunciation of these letters in enough, women, and motion) in the *London Times*. Moreover, there are a number of loanwords in any language that may violate normal orthotactics and may be pronounced in unusual ways. Similarly, proper names may be pronounced as they would in the language of origin, or as would be dictated by a local dialect, or by some combination. While loanwords are sufficiently standard to be represented as exceptions that can be looked up in a dictionary, it is much more difficult to list out all the proper names and spelling variants that might be encountered in unrestricted text.

Some text-to-speech systems use a combination of approaches to convert the orthographic form of a word into a phonological form. Irregular words can be stored with their pronunciations in a dictionary. In this case, the pronunciation is simply retrieved. However, if the word is not found in the dictionary, spelling-to-sound rules are often used to generate a pronunciation. The rules to convert spellings to sound patterns for English can be extremely complex, containing hundreds of rules that must be applied in specific order. The development of such rule systems is extremely time and labor intensive requiring a trained linguist to analyze spelling and sound patterns in a language. The MITalk system incorporated a dictionary of 12 000 morphemes and a phrase parser (Klatt, 1987).

An alternative approach to spelling-to-sound conversion was proposed by Sejnowski and Rosenberg (1987), who trained a neural network to associate spelling patterns with pronunciation patterns. Although this approach does not require the

construction of explicit rules by an expert, the performance of this system was not as good as a letter-to-sound rule system (Klatt, 1987). Similarly, Dedina and Nusbaum (1991) proposed using an analogy system to generate pronunciations. If a test item was not found in a dictionary associating spellings and sound patterns, a lattice was constructed pairing the spelling of the word with all possible pronunciations from subparts of the spelling that were found in the dictionary. This procedure would construct a set of alternative pronunciations for each letter in a test word. The final pronunciation would be based on finding a path through the lattice that selected the most probable pronunciations. Although this approach yielded performance that was somewhat less than the rule system of a commercially available TTS, it has the advantage of being automatically generated from a lexicon without expert intervention. Furthermore, local accents can be generated simply by using local pronunciations of items in the dictionary, along with the pronunciations of locally frequent proper names.

The word pronunciations must also be modified to take into account local phonological context effects. For example, phonological assimilation effects between words can change the phonetic features of segments. Elision can drop segments from a pronunciation. Stress patterns can change vowel quality. All of these effects come into play after the canonical pronunciations of words have been determined. In addition, prosodic changes in vowel duration, syllable stress, and phonetic effects of pausing all need to be incorporated into the phonetic representation of the utterance. Finally, the prosodic and phonetic information has to be converted into the parameter form that drives the synthesizer engine.

Just as there are different forms of speech synthesizers, there are different forms of text-to-speech systems. Although there have been efforts to develop text-to-speech systems based on articulatory synthesis, these efforts have not resulted in either widespread adoption of any one system or a successful commercial product. The two types of systems that have been developed most extensively are generally called synthesis-by-rule and concatenative synthesis. In many respects, both types of TTS could be considered quite similar up until the actual synthesis is carried out. The nature of the synthesis process itself does not specifically determine how spelling-to-sound conversion is carried out, or whether or not parsing is used to assign syntactic categories to words. The primary difference is in the nature of the process by which phonetic segments are converted into sound.

In synthesis-by-rule systems (Klatt, 1987), phonetic segments are translated into sound by a sets of rule that incorporate the effects of coarticulation on the acoustic properties of phonetic segments. All the context-conditioned variability in acoustic–phonetic structure (Liberman *et al.*, 1967) must be incorporated into rules. In addition, there need to be rules for the phonetic effects of phonological context and prosodic effects (e.g., lexical contrast). These rules applied to phonetic and prosodic descriptions of an utterance result in the sequence of control parameters that can be used as input to a formant synthesizer such as the cascade/parallel formant synthesizer.

In concatenative synthesis (Klatt, 1987), the basic approach is to assemble an utterance by concatenating adjacent phonetic units like beads on a string. Of course, it has been well understood for decades that, while our subjective impression of speech is a sequence of discrete segments (consonants and vowels), the reality is that the acoustic patterns of these putative segments are highly context dependent, having little or no independent perceptual reality. Thus, it is not really possible to synthesize intelligible or natural speech by editing together a series of spoken words, syllables, or even phonemes. Instead, concatenative synthesis operates at the subphonemic level, taking acoustic segments drawn from the transitions between phonemes as the building blocks of an utterance. The synthesis engine is based on analytic synthesis, typically storing the diphones as LPC parameters and smoothing the parameter sequences prior to resynthesis.

The use of diphones as units explicitly acknowledges the context-conditioned nature of phonetic segments by incorporating at least the adjacent phonetic context. The use of diphones requires a large inventory of such building blocks (e.g., with 40–50 American English phonemes, this inventory would require all the legal transitions between pairs). Furthermore, segment quality could be improved by taking such diphones qualified by a broader window of context (e.g., stressed vs. unstressed). Unlike synthesis-by-rule, the process of assembling an utterance from a phonetic description is much less computationally intensive. Instead of applying complicated rule systems to generate parameter sequences, the appropriate units are simply retrieved, the sequences smoothed, and then the speech resynthesized from the parameters.

Recently, there have been a number of significant improvements in concatenative synthesis. PSOLA (pitch-synchronous overlap-add) uses sampling of subphonemic sequences using pitch-period matched windows. By selecting pitch-synchronous segments, and combining them, using an overlapping window technique, it is possible to achieve more natural variations in segment pitch and duration that previously possible. In addition, the use of multipulse LPC

(MPLPC) has improved the parametric representation of diphone segments, subjectively increasing naturalness and intelligibility. Furthermore, although diphone segments are typically selected carefully by hand with individual screening of segments, new statistical techniques can optimize unit selection and application, thereby automating the process of developing a synthesizer and improving voice modeling (Donovan and Woodland, 1999).

There have also been attempts to develop a text-to-speech system based largely on connectionist models of neural networks. One of these systems was sufficiently developed to be roughly competitive with commercial products (Karaali *et al.*, 1998). This system used two different neural networks to compute the pronunciation of an input text. One network computed context-free pronunciations for words using associations between orthographic forms and phonetic transcriptions. The second network modified the pronunciations given the adjacent pronunciations in the context of the utterance. Two additional networks calculated the acoustic parameters that were used to generate the waveform of the target utterance. One network used the pronunciation patterns as input and generated a sequence of segmental durations. The second network generated vocoder parameters based on the durations and the phonetic sequence. The vocoder parameters were then used to drive a standard mixed-source vocoder to produce the speech. The networks were developed using a standard backpropagation training algorithm to associate two sets of patterns. For example, the spelling-to-sound network associated the spellings and pronunciations of 200 000 words in a lexical database. Similarly, the acoustic–phonetic network was trained to associate narrow phonetic transcriptions of a series of sentences with the vocoder parameters produced by coding the speech of a specific talker. Different networks were needed to specifically encode the talker characteristics of different individuals and the resulting speech was extremely natural (Nusbaum *et al.*, 1995). Although this method offers a different approach that has significant benefits in talker modeling and naturalness, it has not been pursued.

Text-to-Speech Synthesis in Languages Other Than English

The complexity of text-to-speech conversion varies considerably depending on the linguistic structures of a specific language. Grapheme-to-phoneme conversion is greatly simplified when dealing with languages characterized by a relatively shallow orthography that exhibit a high spelling-to-sound correspondence such as Italian or Finnish. The conversion task is also simpler in languages that use syllabic script, where each written unit represents a syllable, such as Japanese *kana*. On the other hand, this task is more complex in languages with deep orthography, such as French, or in languages that use a consonant script where vowels are not represented in the writing system, such as Arabic (Arabic, Standard) and Hebrew. Although the phonetic description that is the final product of the conversion process can be represented by the language independent International Phonetic Alphabet (IPA), most computers require a representation based on ASCII characters. Phonetic sets such as the SAMPA, originally designed for European Languages, or the ARPAbet, designed for American English, use computer-friendly ASCII characters but are less powerful and do not cover all languages.

Currently, multilingual commercial TTS systems are available for a large number of languages, including U.S. English, U.K. English, Arabic, Chinese (Mandarin and Min-Nan), Czech, Danish, Dutch, Finnish, French, German (standard), Icelandic, Italian, Japanese, Norwegian (Bokmaal), Portuguese, Spanish, Swedish, and Turkish. Commercial systems include both formant-based synthesizers, containing language-specific rules, and concatenation-based synthesizers containing language-specific databases. Noncommercial multilingual TTS systems have also been developed, although they are available for a smaller number of languages such as English (American and British), German, Japanese and Spanish.

One major development project is the MBROLA system, initiated by the TCTS Lab of the Faculté Polytechnique de Mons in Belgium, aimed at developing a noncommercial, freely available multilingual speech synthesizer. The MBROLA synthesizer is based on diphone concatenation and free databases for different languages are currently available or under development including, but not limited to, Estonian, Hindi, Hebrew, Croatian (Serbo-Croatian), and Telugu, although some are still under development. MBROLA takes as input a list of phonemes and prosodic information. Thus, MBROLA represents an intermediate system between an analytic synthesizer and a full concatenative TTS, although commercial and noncommercial TTS systems that are compatible with MBROLA are available.

In addition to multilingual synthesis systems, some efforts have been undertaken to construct polyglot synthesis systems. Although multilingual synthesis systems can produce speech in more than one language, they are not usually able to switch from one language to another within the same sentence. In contrast, polyglot synthesis systems are designed so they can synthesize mixed-language texts. One benefit of polyglot synthesis systems is that they are able

to handle loanwords and absorbed foreign words that may differ in prosody and pronunciation from original language words.

Applications of Text-to-Speech Systems

We use speech for so many interactions on a daily basis; the major limiting factor in the application of text-to-speech systems is the quality of the speech and the nature of the interface to the system. The easiest form of application for a TTS is where there exists a collection of information in text form and the primary nature of the interaction with the data is simply to have it read aloud. Indeed, the idea of a reading machine for the blind was one of the earliest motivations for a text-to-speech system, and one of the more successful early commercial products developed, the Kurzweil Reading Machine, was designed for that purpose. In any circumstance where a blind person wants access to text information, a text-to-speech system provides a significant benefit. For example, blind programmers used the very low cost Votrax Type-'n-Talk as a substitute for a video terminal, in spite of the low quality of the speech, simply due to the motivation and desire to have an alternative functional display system. A direct extension of this specific application is to provide reading services to sighted people in circumstances where text data cannot be easily displayed. Thus, text-to-speech systems have functioned as display systems for e-mail and news over voice-only telephones. Wherever there is text data and no way to display it visually, a telephone becomes a display system if a text-to-speech system is available.

However, when the input to a TTS consists solely of text, it is not always possible to determine the correct pronunciation of words, or to control the prosody of the speech output. A more fully specified input that makes semantic and pragmatic information available for synthesis can greatly facilitate prosody generation. To some extent, this specification can be achieved by the use of markup languages that use specific tags to control aspects of the synthesized speech such as pronunciation, pitch, rate, emphasis, or pauses. The first attempt to develop a TTS markup language is the SSML (Speech Synthesis Markup Language) developed at the University of Edinburgh (Taylor and Isard, 1996). Recent efforts include the SSML specification developed by the World Wide Web consortium and the SABLE markup language, developed by a consortium involving Edinburgh University, Bell Laboratories, British Telecom, AT&T, Sun Microsystems, and Carnegie Mellon University. In addition to facilitating the control of pronunciation and prosody generation, the use of a standard markup language enables the portability of annotation schemes from one TTS system to another instead of annotation schemes that are platform specific. Speech synthesis markup languages can also serve as the interface between a natural language generator component (NLG) and a synthesizer in concept-to-speech systems (see below), which may become more important when speech synthesis is used in a dialogue system rather than as an audio text-display device.

The next level of application is in circumstances where a person currently interacts with a human operator. Whenever speech interactions take place, there is the potential to replace the human operator with a text-to-speech system, a speech recognition device, and a computer. A variety of telecommunication services such as directory assistance and reverse directory have made use of concatenative synthesis to reduce or eliminate the demands on a human operator's time. For example, as soon as a number is located, speech synthesis can provide a response instead of the human. Moreover, service requests and a variety of orders and transactions over the telephone present target applications for synthetic speech. For years, AT&T researchers have used airline reservations as a model system for automated speech interaction. The combination of high-quality speech recognition with text-to-speech synthesis turns any telephone into a computer terminal for a wide range of applications from text entry and editing to command and control of equipment such as an electrical power plant.

By extension, speech recognition and text-to-speech systems provide important utility in situations where a person's eyes and hands are busy. In a car, a system that reads directions as you are driving, based on a database and global positioning system, is a very useful substitute for a friend in the car with a map. Similarly, there are a number of military applications in which text-to-speech systems could provide a great deal of information over a voice channel about logistical or tactical conditions. In much the same way, text-to-speech systems could provide realtime information to surgeons about patient status or in response to various medical queries.

For people who are unable to speak, text-to-speech systems offer the possibility of a vocal prosthesis. In 1982, a Nova TV program showed Dick Boydell, a man with cerebral palsy – unable to speak more than 'yes' or 'no' for 30 years – use a text-to-speech system to talk and order a pizza over the telephone by himself. Stephen Hawking, the physicist, used DECtalk, developed by Dennis Klatt and the Digital Equipment Corporation, as his voice, as did Klatt himself toward the end of his life. Text-to-speech systems provide an ability to communicate with the

world using speech, but have significant limitations for this purpose. First, the entry of messages is not at all simple, even with full motor ability and a keyboard. While just having the ability to speak is better than the alternative, it slows down the communicative process to have to type in messages. And in some cases, the disease that impairs speaking also impairs typing, requiring alternative means of message entry. Second, people with a need for voice prosthesis express concern over the limited voice quality typically available. Although with concatenative synthesis (and using statistical modeling techniques), it is now possible to more closely match the vocal characteristics of a synthesizer to a particular person, it is seldom done. People think of a voice as an extension of themselves; for example, most women would not want a masculine voice. Moreover, the prosodic variability of most text-to-speech systems is extremely limited. While questions and statements may be prosodically marked, more subtle expressions and emotion are not.

Text-to-speech systems have also been applied in educational settings. Certainly a talking computer is a potential tutor, able to provide information, guidance, and feedback to any student. In this kind of application, the computer can interact with students more like a human teacher using speech. Synthetic speech has also been used for teaching a second language. Commercial products have been developed specifically for language instruction, giving feedback to a nonnative speaker and providing model utterances to be copied. By this model application, text-to-speech systems are now being explored as a possible therapeutic training aid for people with Broca's aphasia. The primary predictor of the success of poststroke therapy is the amount of therapeutic work a patient does at home. A computer avatar therapist who speaks with a TTS can be available at any and all times for a patient at home, increasing the amount of possible therapeutic work.

Text-to-speech systems also been applied to entertainment. The first song sung by a computer was 'Daisy, Daisy,' synthesized in 1961 by Kelly and Lochbaum at the Bell Laboratories. This first attempt was later alluded to in the Stanley Kubrick's movie *2001: a space odyssey* (1968). Just before he is disconnected, as he is regressing, the ship's computer HAL 9000 begins to sing the same song.

Uses of singing voice synthesis include computer games, musical instruction, composition, and as a musicological research tool. Various systems were designed specifically for singing voice synthesis. These systems utilize the same basic methods used for speech synthesis such as articulatory synthesis, concatenative synthesis, and formant-based synthesis. The input to singing voice synthesis systems typically consists of a MIDI file and a text containing the lyrics of the songs to be synthesized. Typically singing voice synthesis systems allow some control over parameters such as vibrato, pitch band, and volume. Singing usually employs a wider range of fundamental frequencies and a wider pitch range than employed in speech. Singing voice synthesis may differ from speech synthesis in the importance of parameters such as these that contribute to the naturalness, expressiveness, and musical quality of the output relative to overall intelligibility.

Evaluation of Synthetic Speech

Although naturalness and intelligibility have improved significantly in recent years, synthetic speech is still not equivalent to natural speech. Perception and comprehension of synthetic speech is still worse than natural speech (*see* **Speech Synthesis: Perception and Comprehension**), and it degrades faster under adverse listening conditions (e.g., noise, distraction, divided attention). There are a number of issues that need to be considered in evaluating the performance of a speech synthesizer or text-to-speech system. At the very least, the quality of synthetic speech can differ in segmental intelligibility, prosody, and naturalness. However none of these is simply determined by the raw signal quality of the system. This quality is certainly one component of the overall performance of a text-to-speech system. Nusbaum and Pisoni (1985) argued that besides signal quality, performance of a text-to-speech system depends on the demands and complexity of the task in which the speech is used, the cognitive limitations of the person using the system, the experience and training of the user, and the linguistic structure and complexity of the message.

When tasks are demanding, the ability to understand synthetic speech is adversely affected. To take an extreme example, Navy pilots, when trying to land on an aircraft carrier while their plane is on fire, reported they did not hear any of the warning sounds or messages. The more that a task demands attention, the harder it will be to understand speech. Conversely, the more experience a listener has with a particular text-to-speech system, the higher the intelligibility of the speech. Blind programmers who routinely used the Votrax Type-'n-Talk, a relatively low-intelligibility synthesizer, reported that the speech quality improved substantially. Indeed, Schwab *et al.* (1985) found that moderate amounts of training produced huge gains in intelligibility that lasted for six months and extended to all the speech produced by the synthesizer. As linguistic structure becomes more complex, the difficulty of comprehension will interact

with segmental intelligibility. But the more redundant the discourse, the easier it will be to understand synthetic speech. However, as synthetic speech becomes used in more sophisticated applications, it will become important to go beyond measures of intelligibility, comprehension, and naturalness and evaluate more social aspects of our perception of synthetic speech.

Challenges for the Future of Synthetic Speech

Synthetic speech today still does not meet the test of the voice of the HAL 9000 computer. But the largest challenges are probably not in the realm of improving the intelligibility or naturalness of synthetic speech. The quality of synthetic speech is nearing the level of natural speech. The challenges are perhaps greatest in the very nature of a text-to-speech system: These systems convert text into a phonological structure that is produced as speech, but these systems do not read. Without real comprehension and without the ability to productively generate language, there will be inherent limitations on the nature of synthetic speech. A segment of the NPR radio program *The Next Big Thing* (NPR, 2003) hit on exactly this limitation: there is a fundamental lack of humanity in the expressiveness of synthetic speech that gives it a mechanical characteristic. Two areas of research offer the possibility of improving this aspect of synthetic speech, concept-to-speech synthesis and emotional synthesis.

Rather than starting with a text as input, as in standard TTS systems, concept-to-speech (CTS) synthesis systems start from semantic/conceptual information generated by a natural language generation system. Speech generation is done either by a complete synthesis or by slot and filler synthesis where a carrier phrase contains slots that can be replaced by a set of prerecorded words. This method is useful for information systems in which the information to be synthesized is generated by the system. In these cases, the system 'knows' the meaning of the information to be synthesized and can avoid the ambiguities inherent in a textual representation. CTS was first proposed as a synthesis method by Young and Fallside (1979). In the last decade there have also been attempts to incorporate more abstract levels of representation such as discourse structure and communicative context into speech production systems. For example the communicative context-to-speech synthesis proposed by Teich *et al.* (1996) that involves a specification of speech functions (statement, question etc.), pragmatic function, and speaker attitude.

Indeed, human speech is not used only for communicating linguistic lexical or propositional content. Vocal characteristics such as pitch, timing, and voice quality (for example, breathy or resonant) can convey a great deal of information about emotion (Murray and Arnott, 1993). The prevalence of emoticons in e-mail messages and other Internet-based communication program attests to the importance of such emotional information. Emotional speech synthesis is also important for the use of synthetic speech as prosthesis for voice-disabled individuals that need to rely on synthetic speech for conveying the same range of information conveyed by human speech. Finally, research has shown that individuals display a range of social responses towards computers (Nass and Moon, 2000). Users' responses to human–machine interfaces may depend not only on how intelligible the speech is, but also on the emotion or other personality characteristics displayed by the speech. Based on research on the acoustic correlates of emotion in human speech, one can specify acoustic parameters correlating with basic emotional categories such as anger, joy, sadness, disgust, or surprise. The effects of emotion on human speech can then be imitated in the synthesized speech. Cahn (1990) has shown that recognizable discrete affect categories can indeed be generated in synthetic speech. There have also been attempts to synthesize emotional speech using a concatenation-based synthesis using diphones from different emotional categories.

As in evaluating the intelligibility of speech, there is no one obvious method of evaluating emotional speech synthesis. Most studies have used a forced choice task in which listeners were asked to determine the emotion displayed out of several alternatives. The alternatives presented and the specific emotions synthesized may affect listeners' responses and lead to results that are different from spontaneous perception of vocal emotion. Other studies have also used ratings of naturalness, believability, and intensity in order to evaluate emotion synthesis. In addition, few efforts have been made toward synthesizing and evaluating variations within the same emotional category (for example, hot or cold anger). In addition to progress in emotional speech synthesis, it will be a challenge for the future to develop systems that are able to generate synthetic speech displaying personality characteristics usually conveyed by human vocal characteristics. Like vocal characteristics associated with emotion, these contribute to the naturalness of speech and may be important for human computer interaction.

Synthetic speech is currently used in a wide and ever widening set of applications, from basic research in linguistics and psycholinguistics to second language teaching and stroke recovery. Many of the promises of the first days of speech synthesis have been realized

in terms of reading machines for the blind and automated voice response systems. However, there is still a long way to go in developing systems that can truly substitute for a human interlocutor.

See also: Communication in Grey Parrots; Kempelen, Wolfgang von (1734–1804); Mark-up Languages: Speech; Speech Perception; Speech Production; Speech Synthesis: Perception and Comprehension; Speech Synthesis: Prosody.

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Speech Synthesis, Perception and Comprehension of

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When research on the perception of synthetic speech began in the early 1970s, speech scientists were primarily interested in evaluating its segmental intelligibility with respect to natural speech. These early studies were done with an eye toward improving the quality of synthetic speech for use in practical applications, such as reading machines for the blind or voice output communication devices. For instance, Nye and Gaitenby (1973) not only tested the intelligibility of synthetic speech against natural speech but also identified the synthetic speech sounds that were difficult for listeners to perceive correctly. They wanted to identify these sounds so that researchers could improve their intelligibility by refining the text-to-speech algorithms that produced them. In this way, speech scientists hoped that the knowledge gained from perceptual research would help them elevate the overall intelligibility of synthetic speech to the same level as natural speech.

Following Nye and Gaitenby's pioneering assessment work, the question of why synthetic speech was more difficult to perceive than natural speech took on an increasingly important role in research on the perception of synthetic speech. Researchers wanted to know if synthetic speech lacked certain characteristics that might be crucial to the perception of natural speech. Establishing what these characteristics might be required knowing more about the perception of synthetic speech than just measuring its segmental intelligibility. Pisoni (1981), for instance, suggested that future research on synthetic speech perception should be carried out in the 10 areas listed in **Table 1**.

Table 1 Needed research on the perception of synthetic speech

1. Processing time experiments
2. Listening to synthetic speech in noise
3. Perception under differing attentional demands
4. Effects of short- and long-term practice
5. Comprehension of fluent synthetic speech
6. Interaction of segmental and prosodic cues
7. Comparisons of different rule systems and synthesizers
8. Effects of naturalness on intelligibility
9. Generalization to novel utterances
10. Effects of message set size

Adapted from Pisoni (1981).

All of these lines of research have been pursued, to varying extents, in the years following Pisoni (1981). The results of this work have shown consistent differences in perception between natural and synthetic speech at every level of analysis (Duffy and Pisoni, 1992; Pisoni, 1997a; Pisoni *et al.*, 1985). These perceptual differences appear to be based primarily on the acoustic–phonetic characteristics of the two types of speech signals. This conclusion is drawn in large part on the basis of research on the perception of synthetic speech produced by rule (Pisoni, 1997a). Algorithms that produce synthetic speech by rule take an orthographic string of letters as input and convert them into speech output by using a set of text-to-speech conversion rules. Using rules to produce speech in this way yields a speech signal that lacks much of the fine-grained acoustic–phonetic variability inherent in natural speech. Furthermore, synthetic speech produced by rule provides only minimal cues to particular segments or sound contrasts. Text-to-speech conversion rules also tend to use highly simplified coarticulation sequences between individual segments, and they often lack appropriate or natural-sounding sentential prosody. The manifest difficulties of perceiving speech with these acoustic–phonetic characteristics have thus led researchers to conclude that, normally, speech perception not only relies on redundant cues to particular segments but also makes use of the natural acoustic–phonetic variability inherent in the speech signal.

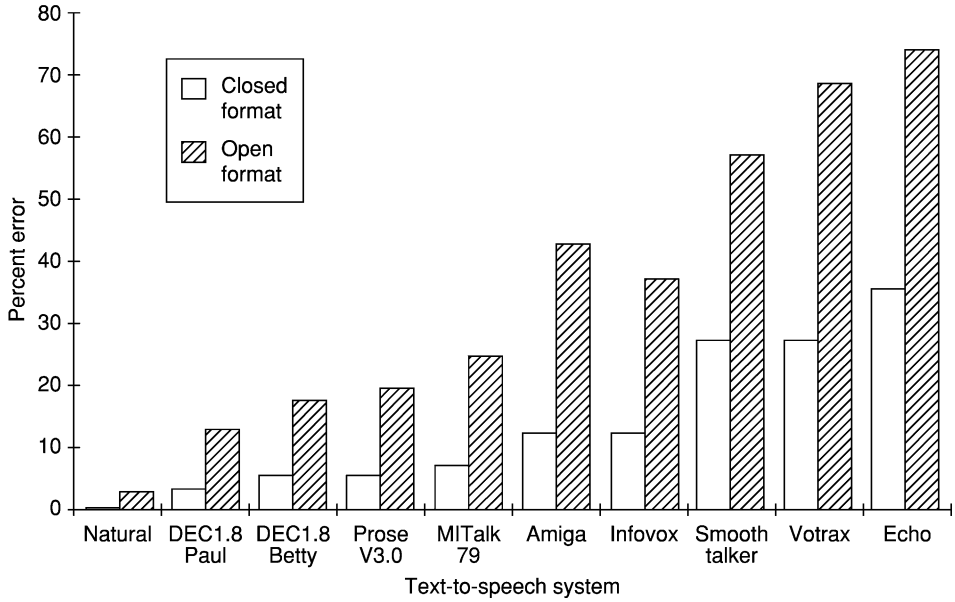

Figure 1 Error rates for word recognition in open- and closed-format MRT, by synthetic voice type. Adapted with permission from Logan J S, Greene B G & Pisoni D B (1989). 'Segmental intelligibility of synthetic speech produced by rule.' *Journal of the Acoustical Society of America 86*, 566–581.

Redundancy and variability in the signal are therefore fundamentally important to the process of speech perception and not just 'noise' that needs to be filtered away through some kind of perceptual normalization process (Pisoni, 1997b).

This article reviews evidence from studies on the perception of synthetic speech that has led researchers to draw these conclusions about normal speech perception. The article is organized around seven empirical findings. These detail the various distinctions that have been found to exist between the perception of natural and synthetic speech, from the earliest intelligibility studies to recent studies on comprehension, perceptual learning, alternative groups of listeners, naturalness, and prosody. The final section concludes with suggestions for potentially fruitful areas of future research in the context of the rapidly changing world of speech synthesis technology.

Finding 1: Synthetic Speech Is Less Intelligible Than Natural Speech

The Modified Rhyme Test

Extensive evidence showing that synthetic speech is less intelligible than natural speech has come from studies that have used the Modified Rhyme Test (MRT) to assess segmental intelligibility (Fairbanks, 1958). The MRT presents listeners with a spoken word and then requires them to select the word they have heard from a set of six response alternatives, all of which differ by only one phoneme. Nye and Gaitenby (1973) first used the MRT to assess the segmental intelligibility of synthetic speech produced by the Haskins Parallel Formant Resonance Synthesizer (Mattingly, 1968). Their study established that listeners made more errors on the MRT for synthetic speech stimuli (7.6%) than they did for natural speech stimuli (2.7%). The MRT has yielded similar results for a wide variety of different speech synthesizers (Greene *et al.*, 1984; Hustad *et al.*, 1998; Koul and Allen, 1993; Logan *et al.*, 1989; Mitchell and Atkins, 1988; Pisoni, 1987; Pisoni and Hunnicutt, 1980; Pisoni *et al.*, 1985).

As early as Nye and Gaitenby (1973), however, it was noted that there are fundamental problems in using the MRT as an evaluative tool to assess synthetic speech intelligibility. Its closed-response set provides a limited number of possible phonemic confusions, and it also does not present all phonemes in equal proportions in the test stimuli. Another problem with the MRT is that it is simply too easy; ceiling effects are frequently obtained when natural or high-quality synthetic stimuli are presented under clear listening conditions. One way to address this problem with the MRT is to eliminate the forced-choice response task. In this 'open-response format' of the MRT, listeners simply respond to each particular word by writing down whatever they think they heard.

Logan *et al.* (1989) used both the 'closed-set' and 'open-set' response formats of the MRT to test the

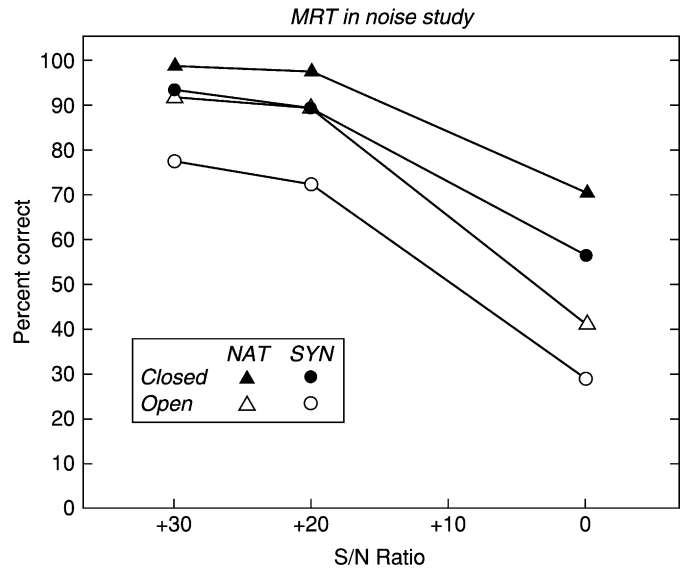

Figure 2 Percentage correct word recognition in open- and closed-format MRT, by voice type and signal-to-noise (S/N) ratio. Adapted with permission from Pisoni D B & Koen E (1981). 'Some comparisons of intelligibility of synthetic and natural speech at different speech-to-noise ratios.' In *Research on speech perception progress report No. 7.* Bloomington, IN: Speech Research Laboratory, Indiana University. 234–254.

segmental intelligibility of 10 different synthesis systems. Figure 1 shows the percentages of errors that Logan *et al.*'s listeners made in identifying words produced by all of these systems in both formats of the MRT. Logan *et al.* also tested the intelligibility of naturally produced items in the same way. Listener error rates were higher for all versions of synthetic speech than for natural speech; they were also higher in the open-set format than in the closed-set format. Logan *et al.*'s results also revealed that the intelligibility of synthetic speech depends on the type of synthesizer being used to produce the speech. The low error rate observed for DECTalk ($\approx 5\%$), for instance, approximated that of natural speech, whereas the error rate for the Echo synthesizer was greater than 30% in the same response format.

Intelligibility of Synthetic Speech in Noise

Although the best forms of synthetic speech may approximate the segmental intelligibility of natural speech under clear listening conditions, their intelligibility decreases substantially in noise. Pisoni and Koen (1981) first tested the effects of noise on synthetic speech intelligibility with an MRT study in which they played natural and synthetic (MITalk) speech stimuli to listeners in various levels of white noise. Figure 2 shows the percentages of words their listeners correctly identified in the different listening conditions. Their results revealed an interaction between the level of noise and voice type: overall, natural speech was more intelligible than synthetic speech, but increasing the level of noise had a significantly greater detrimental effect on the intelligibility of synthetic speech than it had on the intelligibility of natural speech.

Clark (1983) followed up on Pisoni and Koen's (1981) findings by investigating whether noisy listening conditions affected the intelligibility of some synthetic speech sounds more than others. Clark found that although the intelligibility of synthetic vowels was surprisingly robust in noise, the intelligibility of synthetic consonants – especially stops and fricatives – was seriously degraded by noisy listening conditions. However, Clark found that the rank-ordering of the intelligibility of natural and synthetic consonants was the same in noisy listening conditions. Clark therefore concluded that synthetic speech might be considered a 'degraded' form of natural speech, with cues to individual segments that were simply not as perceptually distinctive as their natural counterparts.

However, Nusbaum *et al.* (1984) found that listeners not only had more difficulty identifying synthetic consonants in noise but also often misidentified synthetic consonants in ways that they never misidentified natural consonants. Even in listening to high-quality DECTalk synthesis, for instance, listeners often misidentified /r/ as /b/ – a perceptual confusion that never occurred for natural speech tokens of /r/. Nusbaum *et al.* therefore suggested that some synthetic speech cues could be misleading to the listener as well as being degraded versions of their natural counterparts.

Recent investigations of the perception of synthetic speech in noise have used multitalker 'babble' rather than white noise. Koul and Allen (1993), for instance, incorporated multitalker noise into an open-response version of the MRT, using both natural and DECTalk voices. They found that the intelligibility of synthetic speech deteriorated more rapidly than natural speech under decreasing signal-to-noise ratios. They also found similar perceptual confusions for both natural and synthetic segments – except for the segment /h/, which was often misidentified in DECTalk but rarely confused with other segments in natural speech. Koul and Allen suggested that the babble noise might influence the perception of synthetic speech in this unique way because its acoustic energy is primarily concentrated in lower frequencies rather than evenly spread across the frequency spectrum, as in white noise.

Perception of Formant vs. Concatenative Synthesis

In recent years, speech synthesis technology has relied increasingly on 'concatenative' synthesis techniques (Atal and Hanauer, 1971; Dutoit and Leich, 1993; Moulines and Charpentier, 1990). Concatenative synthesis uses an actual human voice as its source rather than the output of an electronic model of the human vocal tract. Concatenative synthesis algorithms operate by joining together small portions of recorded human speech – typically 'diphone'-sized units, extending from the midpoint of one phoneme to the midpoint of the next – into specified phonemic strings. Impressionistically, synthetic speech produced in this way sounds more natural to listeners than synthetic speech produced by rule; however, the available research has not confirmed that concatenative synthesis is more natural sounding or even more intelligible than rule-based 'formant' synthesis.

Studies assessing the segmental intelligibility of early forms of concatenative (diphone) synthesis, such as RealVoice and SmoothTalker, indicated that they were less intelligible than high-quality formant synthesis systems, such as DECTalk (Logan *et al.*, 1989). Recent diphone-based synthesizers, however, have nearly matched DECTalk in intelligibility. Rupprecht *et al.* (1995), for instance, measured the intelligibility of DECTalk and the diphone-based synthesizer MacinTalk Pro by playing listeners sentences from the Speech Perception in Noise (SPIN) test (Kalikow *et al.*, 1977), as produced by both voices, and then asking the listeners to identify the last word in each sentence. Rupprecht *et al.* found no significant differences in the number of DECTalk and MacinTalk Pro items that listeners correctly identified in this task. However, Hustad *et al.* (1998) also assessed the intelligibility of DECTalk and MacinTalk Pro synthesis in an open-response format MRT and found a slight but significant advantage in intelligibility for the DECTalk voice. They suggested that Rupprecht *et al.*'s failure to find such a difference in their earlier study may have been the result of their listeners relying on higher-level syntactic and semantic cues to identify words in the SPIN sentences.

Venkatagiri (2003) measured the segmental intelligibility of four different concatenative and formant-based speech synthesizers by playing their productions of MRT words in neutral sentence contexts to listeners in two different levels of multitalker babble noise. Venkatagiri found that the synthesis systems that used concatenative synthesis (NextGen and Festival) were significantly more intelligible than the one that used formant-based synthesis (ViaVoice). All these systems were, in turn, significantly more intelligible than FlexVoice, which used a combination of formant and concatenative synthesis. Formant-based synthesizers also outperformed the concatenative synthesizers on vowel intelligibility, whereas the concatenative synthesizers produced more highly intelligible consonant sounds. This pattern of results suggested a trade-off between vowel and consonant intelligibility, depending on the type of synthesis algorithm used. The relatively poor performance of the FlexVoice synthesizer, which combined the formant and concatenative approaches, also indicated that speech synthesis technology had not yet advanced to the point at which it is possible to combine the best perceptual aspects of both production algorithms into one system.

Finding 2: Perception of Synthetic Speech Requires More Cognitive Resources

Lexical Decision

Studies investigating the time course of synthetic speech processing have consistently shown that the poor segmental intelligibility of synthetic speech forces listeners to engage more cognitive resources in order to perceive it correctly. In Pisoni (1981), for instance, listeners performed a speeded lexical decision task in which they heard both naturally and synthetically (MITalk) produced words (e.g., 'colored') and nonwords (e.g., 'coobered'). Pisoni found that listeners consistently took more time to execute this task when they heard synthetic stimuli than when they heard natural stimuli. Since this effect did not interact with the lexical status of the stimulus, listeners evidently had to apply more cognitive resources to the perception of the acoustic–phonetic

surface structure of synthetic strings prior to any higher-level lexical or semantic processing.t

Word Recognition

Manous and Pisoni (1984) found that synthetic speech puts increased cognitive demands on listeners in a word recognition task. Using the gating paradigm developed by Grosjean (1980), Manous and Pisoni presented listeners with synthetically (DECTalk) and naturally produced sentences in which the duration of the final word increased by 50 ms on each successive trial. Thus, listeners heard the first 50 ms of the word on the first trial, the first 100 ms of the word on the second trial, and so on. The authors found that listeners needed to hear, on average, 361 ms of naturally produced words before they could reliably identify them, whereas they needed to hear 417 ms of synthetically produced words before they could identify them with the same level of accuracy. Manous and Pisoni attributed this difference in performance to the poor segmental intelligibility of synthetic speech. Since DECTalk provided less intelligible cues to individual segments than natural speech, listeners needed to hear more of the synthetic speech signal before they could reliably identify whole words.t

Word Recall

Luce (1981) suggested that the difficulty of perceiving the acoustic–phonetic structure of synthetic speech may actually make the subsequent recall of synthetically produced words easier than the recall of naturally produced words. Luce tested this hypothesis by playing listeners passages spoken in both MITalk and a natural voice. After hearing these passages, the listeners answered questions about whether particular words, propositions, or themes had appeared in them. Luce found that the recall of individual words from the synthetic passages was better than the recall of words from the natural passages, even though the recall of more abstract propositions and themes was better when they had been produced in a natural voice. Since recall of synthetic speech improved only at the lexical level, Luce hypothesized that the need to expend greater cognitive effort in word recognition – due to the poor intelligibility of synthetic speech – created more robust representations of synthetic words in memory.

Luce's (1981) initial findings on the perception of connected speech, however, conflicted with the results of subsequent studies on the recall of lists of synthetic words. Luce *et al.* (1983), for instance, found that listeners could recall more items from unordered lists of natural words than they could from unordered lists of synthetic words. The same effect emerged when Luce *et al.* asked their listeners to recall the same lists after they had first memorized a list of digits. Listeners' recall of the digit lists was also worse when they were presented before synthetic word lists. This interaction indicated that both digit and word recall shared the same, limited-capacity store of cognitive processing resources, and that the storage and retention of synthetic words absorbed more of these processing resources than the storage and retention of natural words.

Luce *et al.* (1983) also investigated the serial recall of natural and synthetic word lists. In a serial recall task, listeners must memorize a list of words and then recall them in the correct order. Luce *et al.* found that listeners were best at recalling words that appeared early and late in ordered lists. These 'recency' and 'primacy' effects interacted with the type of voice used; overall, the recall of natural words was better than the recall of synthetic words, but this advantage was significantly larger for words appearing early in the lists than it was for words appearing late. Luce *et al.* hypothesized that this interaction occurred because the storage of synthetic words required more processing and memory resources than the storage of natural words. Late items in the synthetic lists might therefore appropriate memory resources that would otherwise be reserved for the storage of early items. The recall of early synthetic items would then be disadvantaged not only by the fact that they required more memory resources than early natural items but also by the fact that subsequent items in the synthetic lists required more memory resources as well.

Luce and Pisoni (1983) tested these hypotheses by asking listeners to recall mixed lists of words in which five natural words were followed by five synthetic words (and vice versa). The authors only included synthetic words in these lists that closely matched their natural counterparts in segmental intelligibility. They hypothesized that the synthetic words that appeared late in these lists should adversely affect the recall of the natural words that appeared earlier in the same lists. They found that the listeners did recall natural words better than synthetic words but only in positions 2, 3, and 5 of the 10-item lists. Since such differences in recall were found using lists of highly intelligible synthetic words – whose acoustic-phonetic interpretation required minimal amounts of extra cognitive effort – this finding suggested that the processing of synthetic speech at more abstract levels might also require more cognitive processing resources than natural speech.

Finding 3: Perception of Synthetic Speech Interacts with Higher-Level Linguistic Structures

Perception of Words in Sentences and in Isolation

Listeners also appear to compensate for the poor segmental intelligibility of synthetic speech by relying on any available higher-level linguistic information to help them perceive synthetic speech correctly. Hoover *et al.* (1987) demonstrated that the perception of synthetic words in sentences is significantly better than the perception of synthetic words in isolation. They constructed sentences in which the final word could be guessed, on the basis of the preceding words in the sentence, with either high or low probability. They then recorded these sentences – along with the final words, in isolation – in a natural voice and with the Echo II and Votrax synthesizers. The words and sentences were presented to listeners, who were asked to repeat what they heard. Table 2 shows the correct repetition scores for all sentences and words by voice type.

In general, repetition accuracy was higher for sentences than it was for isolated words. This effect was even more pronounced for the high-probability sentences than it was for the low-probability sentences. The percentages of correct repetitions in Hoover *et al.* (1987) indicate that listeners can extract far more information out of linguistic context and sentence structure than they can reliably extract from the synthetic speech signal alone.

Table 2 Percentage of words correctly repeated, by voice type and presentation context

	Single words (%)	*Low-probability sentences (%)*	*High-probability sentences (%)*
Votrax	21.9	35.3	87.8
Echo II	19.5	23.8	77.3
Natural	99.9	100	100

Adapted from Hoover *et al.* (1987).

Although higher-level linguistic information may be particularly helpful to a listener who is attempting to perceive poor-quality synthetic speech, such as Votrax or Echo II synthesis, it may also assist in the perception of high-quality synthetic speech. Mirenda and Beukelman (1987) tested the perception of synthetic words and sentences that were produced by the highly intelligible DECTalk synthesizer and found that correct word identification rates increased from 78% in isolated word contexts to 96.7% in sentences. The percentage correct for sentence stimuli approximated performance on natural speech versions of the same tokens, which was near ceiling at 99.3% correct. In a follow-up study, Mirenda and Beukelman (1990) expanded the range of synthesizers used to produce the sentence and word tokens and found, again, that the sentential contexts improved the intelligibility of all synthetic voices. The best synthesizer in the second study, SmoothTalker 3.0, was a diphone-based system, which approximated the intelligibility levels of natural speech in both isolated word and sentential contexts.

Semantically Anomalous Sentences

Higher-level linguistic information may, in certain cases, actually make the perception of synthetic speech more difficult. Nye and Gaitenby (1974) studied the perception of 'semantically anomalous' sentences, which lack semantic coherence and predictability (e.g., 'The safe meat caught the shade'). They found that correct identification rates were much lower for synthetic words in these sentences (78%) than they were for synthetic words presented in isolation in the MRT (92%). This effect was also proportionally greater for synthetic speech than it was for natural speech; listeners correctly identified 95% of naturally produced words in semantically anomalous sentences and 97% of naturally produced

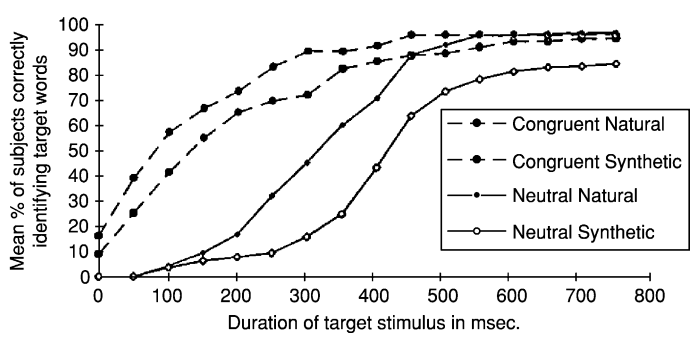

Figure 3 Percentage of synthetic and natural words correctly identified, by duration of target stimulus in congruent and neutral sentential contexts. Adapted with permission from Duffy S A & Pisoni D B (1991). 'Effects of sentence context on the signal duration required to identify natural and synthetic words.' In *Research on speech perception progress report No. 17*. Bloomington, IN: Speech Research Laboratory, Indiana University. 341–354.

words in the MRT. Nye and Gaitenby attributed this effect to the difficulty listeners might have in parsing individual words out of a longer string of words, but they also pointed out that higher-level sentential information might bias listeners toward expecting to hear words that fit into the sentence's semantic context and thus make semantically incoherent words more difficult to recognize, especially if they were produced synthetically.

Gating in Sentences

Duffy and Pisoni (1991) noted that the correct identification rates for both natural and DECTalk speech in Mirenda and Beukelman's (1987) sentence transcription study were close to ceiling levels of performance. They investigated whether higher-level semantic information would affect the high intelligibility levels of these two kinds of speech equally in a gating paradigm. Duffy and Pisoni presented sentences to listeners in which the final, gated words were either in a congruent (e.g., 'The soldiers flew in the helicopter') or a neutral (e.g., 'The people were near the helicopter') context; these sentences were produced in either synthetic (DECTalk) or natural speech.

Figure 3 shows the percentage of correct identifications of the final words, as produced by both natural and synthetic voices, for each presentation of those words at the various gating durations. On average, listeners needed to hear 68 ms more of the synthetic words than the natural words before they could reliably identify them. The effect of voice type interacted significantly with the type of sentence context: Listeners needed to hear 212 ms more of the synthetic words when they appeared in the 'neutral' contexts than when they appeared in the 'congruent' contexts before they could reliably identify them. These results indicated that listeners not only required more acoustic–phonetic information from synthetic speech before they could reliably identify words but also that they drew more heavily on higher-level semantic information in order to compensate for the difficulties incurred in processing the impoverished acoustic–phonetic structure of synthetic speech.

Finding 4: Synthetic Speech Is More Difficult to Comprehend Than Natural Speech

Postperceptual Tests of Comprehension

Studies on the comprehension of synthetic speech have yielded different results depending on whether they have investigated the 'products' or the 'process' of comprehension. Nye *et al.* (1975) tested comprehension by asking listeners to answer multiple-choice questions that were based on a series of passages they had heard produced by either a natural voice or a synthetic voice. They found that the proportion of questions the listeners answered correctly did not vary according to the type of speech they heard. Assessing the products of comprehension with this postperceptual measure did not, therefore, reveal significant differences in comprehension between synthetic and natural speech. However, listeners did take a significantly longer amount of time to answer the multiple-choice questions when they heard the synthetic voice than when they heard the natural voice. Thus, using an on-line measure to gauge the process of comprehension did reveal substantial differences in processing time between the comprehension of natural and synthetic speech.

Subsequent studies using postperceptual measures of synthetic speech comprehension have yielded a similar pattern of results. Ingemann (1978) replicated Nye *et al.*'s (1975) methodology using a more advanced speech synthesizer and found no differences between natural and synthetic voices in the number of multiple-choice questions that listeners answered correctly. Pisoni and Hunnicutt (1980) also assessed comprehension by having listeners answer multiple-choice questions based on passages that they had read, heard spoken by a human voice, or heard spoken by the MITalk text-to-speech system. Pisoni and Hunnicutt found that listeners answered the most questions correctly if they had read the passages, but that the level of their performance did not differ between the natural voice and MITalk conditions.

On-Line Measures: Sentence Verification

Clear differences in comprehension between natural and synthetic speech ultimately emerged with the development of more sophisticated on-line measures of the process of speech comprehension. Manous *et al.* (1985) used a sentence verification paradigm to study the comprehension of synthetic speech. In this paradigm, listeners hear a short declarative sentence (e.g., 'Candles use batteries') and must decide as quickly as possible whether the sentence is true or false. Manous *et al.* combined this task with a sentence transcription task, in which listeners also wrote down each sentence after they verified it. The authors found that reaction times in the sentence verification task were related to the intelligibility of the type of speech in which the sentences were produced, as determined by the number of errors the listeners made in the sentence transcription task. Thus, the difficulty of encoding synthetic speech at the acoustic–phonetic level had a negative effect on the time course of the comprehension processes.

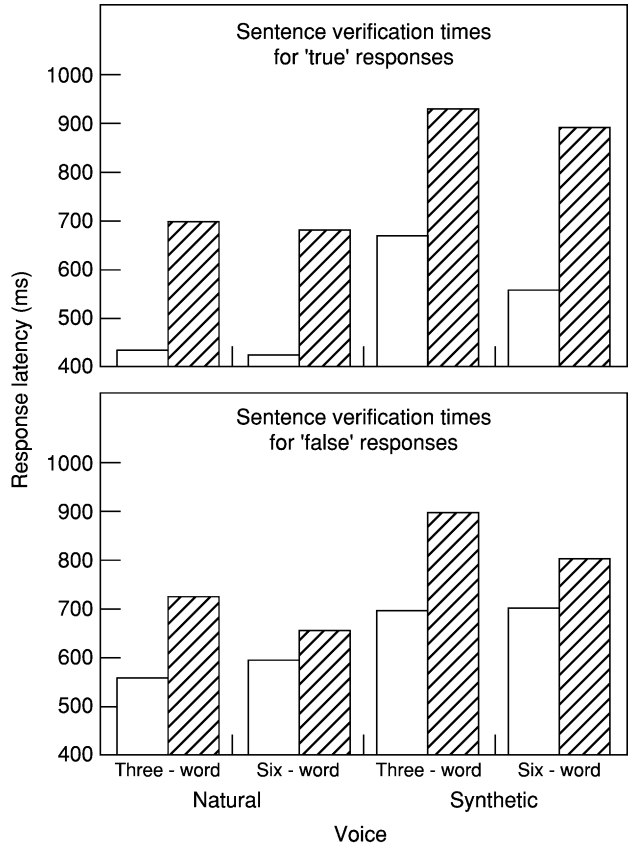

Figure 4 Response latencies for verification of false and true sentences, by voice type and length of sentence. Adapted with permission from Pisoni D B, Manous L M & Dedina M J (1987). 'Comprehension of natural and synthetic speech: effects of predictability on the verification of sentences controlled for intelligibility.' *Computer Speech and Language 2*, 303–320.

Pisoni *et al.* (1987) followed up on Manous *et al.*'s (1985) earlier findings by investigating whether the increased latencies for synthetic speech in the sentence verification task might also result from independent difficulties incurred in processing synthetic speech beyond the level of acoustic–phonetic surface structure. The authors replicated the methodology of Manous *et al.* using a DECTalk voice that did not induce significantly more errors than a natural voice in a sentence transcription task. Figure 4 shows the average response latencies from this study for both true and false sentences, broken down by the type of voice used and the length of the sentence (three or six words). The response latencies for true sentences were significantly higher for the DECTalk voice than they were for the natural voice, despite the close match between the two voices in segmental intelligibility. This finding indicated that DECTalk induced detrimental effects on the comprehension process that had no analogues at the level of segmental encoding. Pisoni *et al.*'s findings thus suggested that even the higher-level structures produced during the comprehension of synthetic speech were more impoverished – or more difficult to interpret – than the same structures produced during the comprehension of natural speech.

Message Complexity and Postperceptual Measures of Comprehension

Some postperceptual measures of comprehension have revealed differences in comprehension between synthetic and natural speech that appear to depend on the complexity of the information being processed. Moody and Joost (1986) asked listeners to answer multiple-choice questions from college and graduate entrance exams about passages that had been presented to them in both synthetic and natural voices. Hearing these passages in natural speech enabled the listeners to answer more of the questions correctly than hearing them in synthetic speech – but only if the questions dealt with the less complicated propositions in the passage. When the questions dealt with the more complex propositions, the number of correct answers the listeners gave was statistically the same, regardless of the type of voice the listeners had heard. Moody and Joost interpreted this result as evidence that listeners had to expend greater amounts

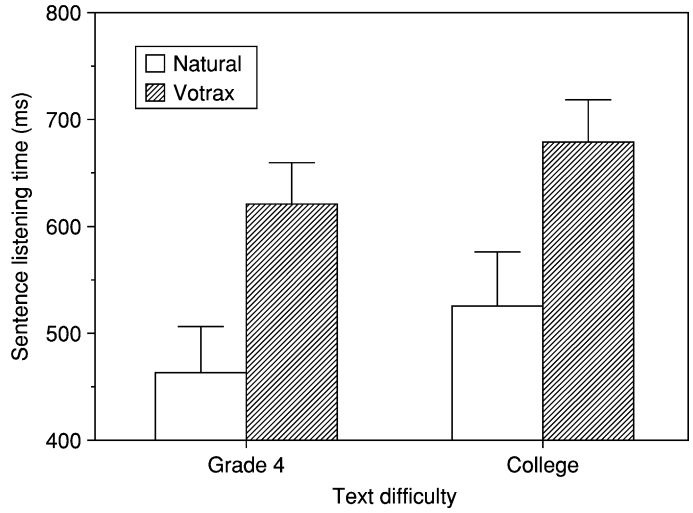

Figure 5 Average sentence-by-sentence listening times, by voice type and text difficulty. Adapted with permission from Ralston J V, Pisoni D B, Lively S E, Greene B G & Mullennix J W (1991). 'Comprehension of synthetic speech produced by rule: word monitoring and sentence-by-sentence listening times.' *Human Factors 33*, 471–491.

of cognitive effort in attempting to understand the more complex propositions in the passage. Similar to Luce (1981), Moody and Joost claimed that the application of these extra cognitive resources gave the listeners more robust representations of these propositions, which made them as easy to recall later as their natural counterparts.

Message Complexity and On-Line Measures of Comprehension

On-line measures have provided a different perspective on the relationship between message complexity and the comprehension of synthetic speech. Ralston *et al.* (1991) asked listeners to monitor for a small set of target words in a short passage presented in both natural and synthetic (Votrax) speech. Afterwards, the listeners answered a series of comprehension questions about different propositions in the passage they had just heard. Ralston *et al.* found that word-monitoring latencies were higher for synthetic words than for natural words, but only when those words appeared in propositions that were more difficult for the listeners to comprehend. Thus, the extra cognitive effort required to comprehend complicated propositions appears to detract from the lower-level process of word recognition, suggesting that both comprehension and word recognition may draw on the same, limited pool of cognitive processing resources.

Ralston *et al.* (1991) also reported results from a novel sentence-by-sentence listening task. In this task, participants listened to a series of sentences and pressed a button once they had understood one sentence and were ready to move on to the next. After listening to all the sentences, the listeners were tested on their memory of particular words or propositions in the sentences they had heard. Figure 5 shows the average amount of time it took listeners to move from one sentence to the next for both fourth-grade- and college-level passages presented in synthetic and natural speech. Listeners in this experiment took significantly longer to complete this task when the sentences were produced synthetically than when they were produced by a human voice. Ralston *et al.* found that sentence-by-sentence listening times were also highly correlated with the segmental intelligibility of each type of speech, suggesting that the time course of comprehension depends in large part on the amount of difficulty incurred in processing speech at the segmental level. However, the level of intelligibility did not account completely for the deficits in processing time, suggesting that independent difficulties in processing synthetic speech persisted beyond the level of acoustic–phonetic interpretation.

Paris *et al.* (1995) followed up on Ralston *et al.*'s (1991) work by asking listeners to shadow (i.e., immediately repeat what they heard) two passages of synthetic (DECTalk) or natural speech. After listening to these passages, the listeners answered a series of true/false questions about words and propositions that appeared in the various passages. Paris *et al.* found that shadowing accuracy was worse for DECTalk than it was for natural speech, even though there were no significant differences in either word or proposition recall between DECTalk and natural speech. The shadowing task thus provided another on-line measure of perceptual processing that revealed perceptual difficulties during the processing of even high-quality synthetic

speech that did not ultimately affect the final product of the speech comprehension process.

Finding 5: Perception of Synthetic Speech Improves with Experience

Improvement on Word and Sentence Recognition

Despite the fact that listeners consistently have more difficulty perceiving and comprehending synthetic speech than natural speech, their ability to perceive synthetic speech typically improves if they simply receive more exposure to it. Nye and Gaitenby (1973) found that listener performance on the MRT improved significantly over the course of their experiment, which included 150 different test words in each of six consecutive testing sessions. In the first of these sessions, listeners incorrectly identified 17.5% of the test words; in the last of these sessions, however, they misidentified only 8% of these words. Comparatively, listener performance on natural speech tokens in the MRT maintained an average error rate of approximately 4 or 5% throughout the six different testing sessions.

Carlson *et al.* (1976) also found that blind listeners' ability to repeat sentences of synthetic speech improved dramatically between the first and the last testing sessions in their experiment. Carlson *et al.*'s listeners heard a unique list of 25 sentences in each of eight separate testing sessions, the final four of which took place 1 week after the first four. The listeners correctly repeated 35% of the sentences in the first session but improved to 77% sentences correct in the final session. The listeners also maintained their improved performance over the weeklong break between the fourth and fifth sessions. The listeners thus demonstrated not only that significant improvements in the perception of synthetic speech can be made with relatively little exposure to it, but also that such improvements can be retained over longer term intervals.

An even more dramatic demonstration of the speed at which exposure to synthetic speech improves listeners' perceptual abilities was reported in Rounsefell *et al.* (1993). In this study, high school students received training on a particular synthetic voice by hearing only three repetitions of three different sentences produced by that voice. Each of these repetitions was followed by a live repetition of the same sentence, in a natural voice, by the experimenter. After this brief training session, the listeners were asked to transcribe a pair of sentences as produced by both a natural voice and the synthetic voice they had been trained on. Listeners who had received training were significantly better than untrained listeners at this sentence transcription task, even though they had only heard nine tokens of speech from the synthetic voice prior to testing.

Limits on the Extent of Perceptual Improvement

Although listeners' perception of synthetic speech may improve rapidly after a few initial exposures, such improvement does not continue indefinitely. Venkatagiri (1994) had listeners perform a sentence transcription task over 3 consecutive days and found that significant increases in improvement tapered off after the second day of testing. However, Venkatagiri noted that a lack of significant perceptual improvement after the second day of testing may have been due to a ceiling effect since the average percentage of correct transcriptions had already improved from 78.2 to 94.1% between days 1 and 2 but could only increase to 96% on day 3. A task that listeners could not perform as well as the sentence transcription task might therefore yield continued perceptual improvements from exposure to synthetic speech over a longer period of time.

Slowiaczek and Pisoni (1982) found that listeners displayed continued improvement in the perception of synthetic speech when tested on an auditory lexical decision task over 5 consecutive days. Figure 6 shows the average response times and the percentages of errors listeners made in this task while listening to both synthetic and natural stimuli for the second through the fifth days of testing. This figure reveals two trends in the listeners' responses to the nonword stimuli: Response times for natural and synthetic items continued to decrease significantly over the 5 days of testing; however, the corresponding proportions of correct responses remained essentially constant for the duration of the study. This pattern suggests that response time measurements might reflect continued improvements in perception even though performance as defined by a coarser-grained behavioral measure, such as response accuracy, may have already reached ceiling.

Improvement in Comprehension

Despite the continued improvement that listeners may display in processing synthetic stimuli in the lexical decision task, it has been shown that the comprehension of synthetic speech can probably never improve to the same level as the comprehension of natural speech. Reynolds *et al.* (2002) demonstrated this by testing listeners on a sentence verification task, using both natural and DECTalk-produced sentence stimuli, over 5 consecutive days. On all 5 days, sentence verification reaction times (RTs) were shorter

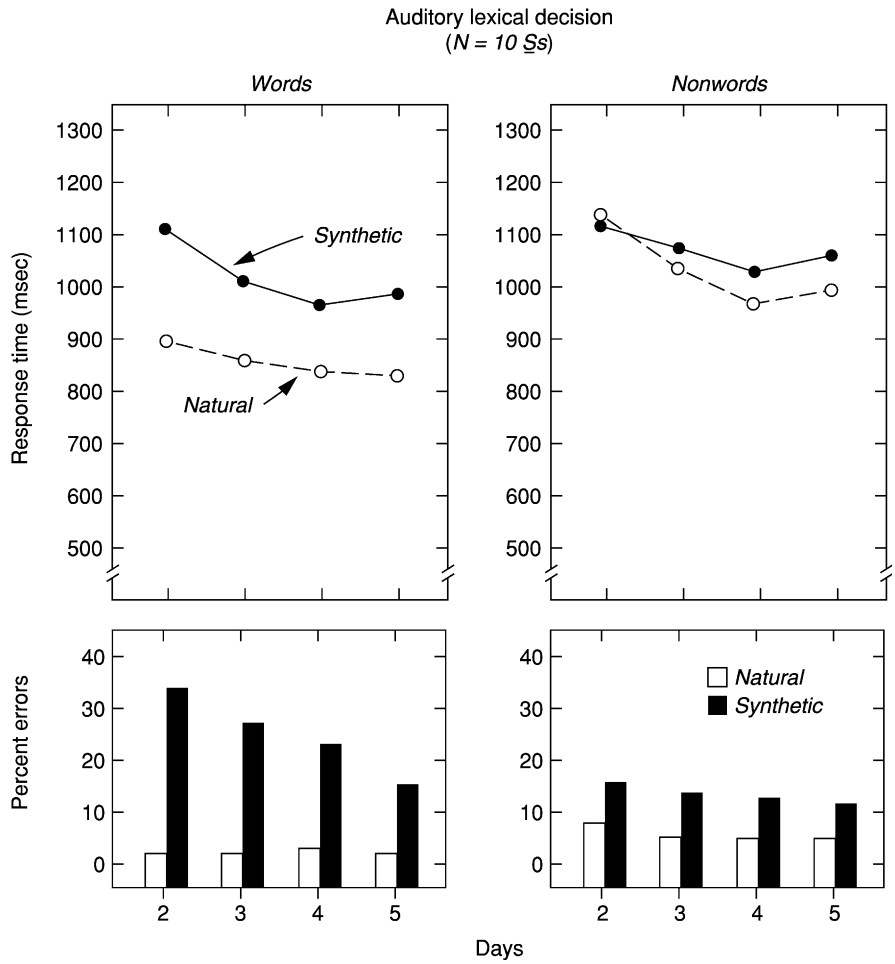

Figure 6 Lexical decision response times and errors for words and nonwords, by voice type and day of study. Adapted with permision from Slowiaczek L M & Pisoni D B (1981). 'Effects of practice on speeded classification of natural and synthetic speech.' In *Research on speech perception progress report No. 7.* Bloomington, IN: Speech Research Laboratory, Indiana University. 255–262.

for natural sentences than they were for synthetic sentences. RTs also decreased significantly for both types of sentences between the first and the last day of the experiment. However, the future course of RT improvement for both types of sentences – as determined by using a regression analysis – indicated that RTs to natural and synthetic sentences would diverge past the fifth day of testing. Although listener performance would continue to improve for both voices, the continued listener improvement on the natural voice would be greater than the continued improvement on the synthetic voice. Hence, no matter how much listeners were exposed to synthetic speech, their ability to comprehend it would still remain worse than their ability to comprehend natural speech, given equivalent amounts of practice listening to both types of voices in the sentence verification testing paradigm.

Perceptual Learning vs. Practice Effects

Schwab *et al.* (1985) found that improvement in the perception of synthetic speech depends on actual exposure to synthetic speech and is not just the result of practice on a particular perceptual task. Schwab *et al.* tested listeners on a variety of perceptual tasks using synthetic (Votrax) speech stimuli and then trained them on the same tasks using either natural or synthetic (Votrax) stimuli. After 8 days of training, they retested all listeners on the same tasks using Votrax stimuli. Schwab *et al.* found that the listeners who had been trained with synthetic stimuli had significantly improved their performance between pre- and posttest. The listeners who had been trained on the tasks while listening to natural stimuli, however, did not improve more than a control group that had received no training on the tasks. Schwab *et al.* thus argued that perceptual improvement

depended on exposure to synthetic speech *per se*, suggesting that listeners became better at extracting acoustic–phonetic information from the synthetic speech signal as they gained increasing amounts of exposure to it. This ability is evidently stimulus specific and cannot be gained by simply being exposed to equivalent amounts of natural speech. Interestingly, Schwab *et al*. ran a follow-up study 6 months after the original training experiment that showed that the group that had been trained with synthetic speech still maintained better levels of performance on a range of perceptual tasks using synthetic stimuli than the group that had been trained with natural speech. The effects of perceptual learning thus have long-term benefits for the perception of synthetic speech.

Improvement on the perception of synthetic speech in a particular behavioral task may also occur without practice on that task, as long as listeners receive exposure to synthetic speech in some form. Reynolds *et al*. (2000) demonstrated that listeners' comprehension of synthetic speech – as measured by their performance on a sentence verification task – can improve in this way. Between a sentence verification pretest and posttest, Reynolds *et al*. trained one group of listeners for 8 consecutive days on a sentence transcription task, in which they heard the same synthetic voice (DECTalk) that they had heard in the pretest. Another group of listeners received no training or exposure to synthetic speech between the pre- and the posttest. The trained listeners showed more improvement on the sentence verification task between pre- and posttest than did the untrained listeners, even though they had not explicitly practiced this task during training.

Generalization of Perceptual Learning

Greenspan *et al*. (1988) adapted the training paradigm developed by Schwab *et al*. to determine whether there were limits on the ability of listeners to generalize their improved perception of a particular set of synthetic speech stimuli in training to novel synthetic speech stimuli in testing. Greenspan *et al*. found that such limitations do exist, in that listeners cannot generalize from training on individual words to improve their perception of whole sentences. In their study, Greenspan *et al*. initially tested listeners on a variety of word and sentence recognition tasks. They then trained one group of listeners on word recognition tasks and another group of listeners on sentence transcription tasks. After 4 days, all listeners underwent the same battery of tests as they had on the first day of the experiment. Greenspan *et al*. found that the listeners who had received training on sentence transcription showed improved performance on both word and sentence recognition on the final day of testing. The listeners who had received training on word recognition, however, only showed improved performance on the word recognition tasks; their performance on the sentence recognition tasks had not improved at all. The failure of the listeners to generalize from individual word training to sentence transcription probably resulted from their inability to parse the word boundaries in a stream of synthetic speech. The ability of listeners to generalize their improvement in sentence transcription to the word recognition task, on the other hand, most likely resulted from the listeners being exposed to a large number of synthetic words in a wide range of contexts during the 4 days of training.

Greenspan *et al*. (1988) also tested the hypothesis that variability in training stimuli crucially determines whether listeners can generalize perceptual improvement in training to novel stimuli in testing. In this study, Greenspan *et al*. trained two different listener groups on the phonetically balanced (PB) word recognition task. After a pretest, one group of listeners received training on this task with novel words, whereas another group received training on only repetitions of words they had already heard in the pretest. In a posttest, both groups of listeners showed improvement in their ability to perceive novel words; however, the group that had heard novel training stimuli showed more improvement than the group that had heard repeated stimuli. Improvement in the perception of synthetic speech thus appears to depend, to a large extent, on the amount of acoustic–phonetic variability in the synthetic speech samples that listeners are exposed to during training.

Finding 6: Alternative Populations of Listeners Process Synthetic Speech Differently

The studies reviewed previously all found consistent perceptual deficits in the processing of synthetic speech by listeners who were college-aged, normal-hearing, native speakers of English. Other studies have found, however, that alternative populations of listeners can have even more difficulty processing synthetic speech than their young, normal-hearing counterparts.

Nonnative Listeners

Greene (1986) found that nonnative listeners of English have significantly more difficulty perceiving synthetic speech (in English) than do native listeners.

Nonnative listeners performed worse than native listeners on the MRT when they heard both natural and synthetic stimuli; however, the performance gap between the two groups increased significantly when they heard the synthetic items. Native listeners were also better than nonnative listeners at transcribing natural and synthetic sentences, but this perceptual advantage did not interact with the type of voice the listeners heard. The nonnative listeners' ability to transcribe synthetic sentences was highly variable but appeared to depend strongly on their proficiency in the English language. Reynolds *et al.* (1996) also confirmed that nonnative listeners have more difficulty perceiving synthetic speech in noise than do native listeners.

Children

Greene and Pisoni (1988) showed that school-aged children have considerable difficulty processing synthetic speech. Both kindergartners and second-graders had less success identifying synthetic words in a picture matching task than they had identifying natural words. The second-graders performed significantly better on this task than the kindergartners, however, indicating that children's ability to perceive synthetic speech improves rapidly as they mature. Greene (1983) also found that fourth-graders were less successful at recalling synthetic words than they were at recalling natural words.

Mirenda and Beukelman (1987) directly compared the performance of adults and children on word and sentence repetition tasks using natural and synthetic stimuli. Children in this study consistently performed worse than adults in repeating both natural and synthetic words, and younger listeners – from 6 to 8 years old – also performed worse than children between the ages of 10 and 12 years in repeating synthetic words. The children's performance improved in the sentence repetition task, suggesting that they, like adults, were able to draw on higher-level linguistic knowledge to interpret whole synthetic sentences. However, since the adults' repetition scores improved more in the sentence transcription task than did the children's scores, adult listeners appeared to be better at accessing and using this higher-level linguistic knowledge than the children.

Using a sentence verification task, Reynolds and Fucci (1998) showed that children also have more difficulty comprehending synthetic speech than natural speech. Reynolds and Jefferson (1999) expanded on this finding by testing child listeners from two separate age groups – 6 or 7 years old and 9–11 years old – in an identical experimental paradigm. They found an equivalent processing advantage for natural versus synthetic sentences for all listeners but also found that the 9- to 11-year-olds verified both kinds of sentences faster than the 6- or 7-year-olds. This pattern of results mirrored the findings of Mirenda and Beukelman (1987, 1990) for similar groups of listeners performing repetition tasks. Thus, the differences in sentence verification times between 6- or 7-year-old and 9- to 11-year-old listeners may be due to the corresponding difficulties each group has in interpreting and encoding the acoustic–phonetic structure of synthetic speech rather than independent difficulties at higher levels of linguistic processing.

Hearing-Impaired and Older Listeners

Most studies investigating older listeners' perception of synthetic speech have been carried out within the context of studying hearing impairment and its potential effects on the perception of synthetic speech. Kangas and Allen (1990), for instance, tested two groups of listeners between the ages of 49 to 64 years in a word recognition task; one group had normal hearing, whereas the other was hearing-impaired. Hearing-impaired listeners performed worse on this task than did normal-hearing listeners. However, there was no interaction between voice type and listener group, suggesting that the poor performance of the hearing-impaired listeners could be accounted for by combining the deficits that synthetic speech and hearing impairment impose independently on normal speech perception processes.

Humes *et al.* (1991) established that age also does not interact with hearing-impaired listeners' perception of synthetic speech. They tested a group of 66- to 73-year-old hearing-impaired listeners and two groups of 19- to 22-year-old listeners on the MRT. One group of 19- to 22-year-old listeners heard the MRT items in the clear, whereas the other heard them through spectrally shaped noise, which was designed to mimic the effects of hearing loss in the 66- to 73-year-olds. Figure 7 shows the percentage of word recognition errors each group of listeners made while listening to the MRT items as produced by natural, DECTalk, and Votrax voices. Although the younger listeners who heard the stimuli in the clear were better at the MRT than either of the other groups of listeners, no significant differences in performance were observed between the hearing-impaired listeners and the young listeners who heard the stimuli through spectrally shaped noise. The decreased level of performance on the MRT by the older, hearing-impaired listeners could therefore

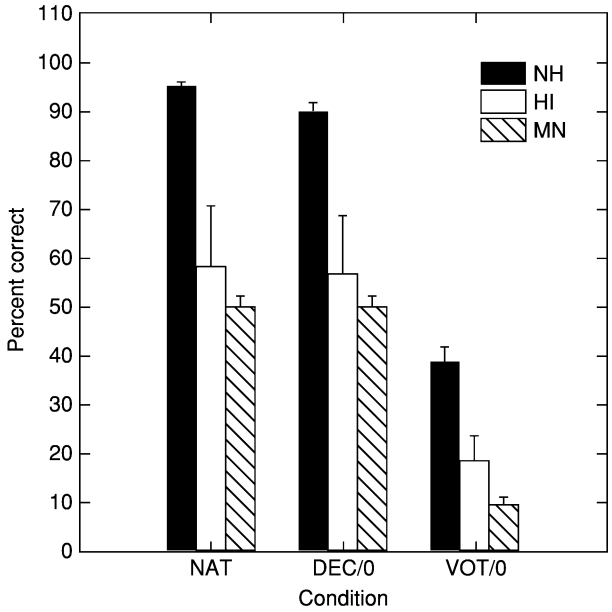

Figure 7 Percentage of words correctly identified on the MRT, by voice type and listener group. NH, normal-hearing; HI, hearing-impaired; MN, masked-noise. Adapted with permission from Humes L E, Nelson K J, Pisoni D B & Lively S E (1993). 'Effects of age on serial recall of natural and synthetic speech.' *Journal of Speech and Hearing Research 34*, 1180–1184.

be accounted for solely by their hearing impairment, independently of their age.

In another study, Humes *et al.* (1993) showed that older listeners (61–76 years old) have more difficulty recalling synthetic words than younger listeners (21–24 years old). However, they failed to find significant differences in performance between older and younger listeners on a sentence transcription task, indicating that the processing of synthetic speech at the segmental level did not significantly deteriorate with age in normal-hearing listeners.

Expert Listeners

Extensive experience listening to synthetic speech can enable listeners to become 'experts' at extracting acoustic–phonetic information from synthetic speech signals. Hustad *et al.* (1998) demonstrated that listeners who had worked with synthetic speech for at least 5 h a day for more than 1 year, identified synthetic words in the MRT significantly better than either speech pathologists or listeners who were unfamiliar with synthetic speech. Hustad *et al.* also found that similar amounts of experience listening to natural speech in an analytic fashion by the speech language pathologists had not improved their perception of synthetic speech beyond the level of the inexperienced listeners.

Finding 7: Prosody and Naturalness Interact with the Acceptability and Intelligibility of Synthetic Speech

Subjective Evaluations and Naturalness

Research on the perception of synthetic speech's prosodic characteristics and naturalness has primarily relied on subjective evaluations of synthetic speech rather than direct behavioral measures of performance in listening tasks. Nusbaum *et al.* (1984) found that listeners tend to prefer natural speech to synthetic speech by simply asking listeners to rate synthetic and natural voices on a variety of impressionistic scales (e.g., interesting vs. boring). They also found that listeners' confidence in their comprehension of synthetic passages was much lower than their confidence in their comprehension of natural passages, even though their performance in a comprehension task did not differ between natural and synthetic voices. This result suggested that subjective evaluations might capture more subtle difficulties in the process of comprehending synthetic speech that could elude postperceptual measures of comprehension.

Terken and Lemeer (1988) found that subjective evaluations of the 'attractiveness' of synthetic speech depend on both its segmental intelligibility and its prosodic characteristics. Listeners judged highly intelligible sentences with natural prosody to be more attractive than those produced in monotone; however, listeners rated low-intelligibility sentences as equally unattractive, regardless of their prosodic characteristics. Terken and Lemeer concluded that the perception of prosody in synthetic speech depends on a high level of segmental intelligibility.

Nusbaum *et al.* (1995) attempted to develop a behavioral measure of 'naturalness' that was independent of intelligibility. They low-pass filtered synthetic and natural speech samples and then asked listeners to identify whether the stimuli had been produced by a 'human' or a 'computer.' Low-pass filtering renders speech unintelligible by removing segmental cues, but it does preserve the prosodic characteristics of the source signal. Using this prosodic information alone, Nusbaum *et al.* found that listeners reliably identified a human voice as human more often than either DECTalk or Votrax speech, and they identified DECTalk speech as human more often than Votrax speech. By equating the naturalness of a voice with the percentage of times it was identified as human in this task, Nusbaum *et al.* concluded that listener identification of the voice source of low-pass filtered speech could provide a reliable, intelligibility-free measure of the perceived naturalness of a voice.

Evaluating Prosodic Quality

Some researchers have used subjective assessments to evaluate the quality of particular prosodic features in synthetic speech. Terken (1993), for instance, found that synthetic speech that included phrase boundaries sounded more natural to experienced phoneticians than synthetic speech without phrase boundaries. Terken also found that scrambling the order of sentences in a naturally produced passage eliminated its perceived naturalness advantage over a comparable synthetic passage. This result indicated that there are discourse-level prosodic structures in passages of natural speech that help them sound natural.

Sanderman and Collier (1996) also investigated the subjective acceptability of implementing certain prosodic rules in synthetic speech. They expanded Terken's (1993) prosodic rule sets and found not only that appropriate prosody becomes a more important contributor to the naturalness of synthetic speech the longer the synthetic speech segment becomes, but also that greater amounts of variability in the implementation of prosodic rules significantly improve the perceived naturalness of synthetic speech.

Appropriate Prosody Improves Comprehension and Intelligibility

Some research has shown that prosody may not only improve the perceived naturalness of synthetic speech but also facilitate its comprehension and intelligibility. For instance, Slowiaczek and Nusbaum (1985) found that incorporating a 'hat pattern' pitch contour into declarative sentences that were produced synthetically improved listener transcription of those sentences – but only if the syntactic structure of each sentence was not predictable. Otherwise, listeners transcribed the sentences equally well when they had a monotone pitch contour.

Sanderman and Collier (1997) also showed that appropriate prosody can facilitate the comprehension of syntactically ambiguous sentences, such as 'I reserved a room in the hotel with the fax.' Listeners are inherently biased toward one interpretation of these sentences over another. When Sanderman and Collier played these sentences to listeners with a prosodic pattern that supported the preferred interpretation, the time it took for listeners to comprehend the sentences decreased in comparison to a neutral prosody condition. When the listeners heard the sentences with a prosodic pattern that conflicted with the preferred interpretation, however, comprehension time increased over the neutral prosody condition. Thus, appropriate prosodic phrasing for synthetic sentences seems to be necessary for the optimal comprehension of synthetic speech, but inappropriate prosodic phrasing may actually make it more difficult, under certain conditions, for listeners to comprehend synthetic speech.

Despite the potential benefits of appropriate prosody to the perception of synthetic speech, Paris *et al.* (2000) found that the sentence-level prosodic cues in even high-quality synthetic speech (DECTalk) did not improve the recall of synthetically produced sentences. However, natural sentence-level prosody did facilitate the recall of naturally produced sentences as well as significantly improve their perceived naturalness and intelligibility. Improving the quality of sentence- and passage-level prosodic structures in synthetic speech thus remains an important step to take toward optimizing its naturalness, intelligibility, and acceptability.

Conclusions and Directions for Future Research

Applicability of Synthetic Speech

Many of the research findings on the perception of synthetic speech have important implications for the practical application of speech synthesis. For instance, the fact that the segmental intelligibility of synthetic speech deteriorates significantly in noisy listening conditions suggests that synthetic speech applications likely have limited utility in noisy work environments, outdoors, or over cell phones. Investigating ways to overcome these limitations on synthetic speech intelligibility, however, can provide some promising avenues for future research. For instance, audiovisual speech synthesis (Cohen and Massaro, 1994; Ezzat and Poggio, 2000) may improve the intelligibility of synthetic speech in noise since visible speech cues have been shown to substantially boost the intelligibility of natural speech stimuli in noise (Sumby and Pollack, 1954). Although viable systems for producing synthetic visual speech do exist, it is not known how the visual-only perception of synthetic speech may differ from the visual-only perception of natural speech. It is also unknown whether synthetic visual speech can improve the intelligibility of synthetic speech in noise as much as natural visual cues improve the intelligibility of natural speech in noise. Answering basic research questions such as these may prove important not only to our future understanding of the utility of audiovisual speech synthesis, but also to our understanding of the visual aspects of natural speech that are important to multimodal perception (Calvert *et al.*, 2004).

The perception of synthetic speech also requires more cognitive processing resources than the perception of natural speech. One increasingly popular

application of speech synthesis is to provide spoken driving directions from computerized navigation systems in automobiles. The drivers who need to understand these spoken directions must do so under a significant cognitive load in frequently noisy listening conditions. Determining how to improve the intelligibility of synthetic speech under these demanding listening conditions should therefore improve the viability and safety of such synthetic speech applications.

The potential for success of any synthetic speech application also depends on the particular listener who is using it. Children, nonnative speakers, listeners with hearing impairments, and the elderly all have more difficulty understanding synthetic speech than young, normal-hearing, college-aged listeners. However, the ability of all listeners to extract information from synthetic speech tends to improve the more they are exposed to it. Extensive exposure to a particular form of synthetic speech, in fact, may enable 'expert listeners' to develop abilities to perceive synthetic speech that far surpass those of listeners who are normally studied in synthetic speech perception experiments. Research on such expert listeners may reveal what upper limits (if any) exist on the human ability to extract information from synthetic speech and may also determine if extensive amounts of listening experience can close the gap in intelligibility between synthetic and natural speech.

Theoretical Implications

The poor intelligibility of synthetic speech produced by rule indicates that those aspects of natural speech that rule-based algorithms fail to capture (e.g., variability, acoustic–phonetic cue redundancy, and sentence-level prosody) play important roles in making natural speech highly intelligible and perceptually robust. 'Concatenative' speech synthesis, however, uses natural human utterances as a voice source and thus incorporates, to some extent, the rich variability and cue redundancy inherent in natural speech. The existing research on the intelligibility of concatenative versus rule-based synthesis (Venkatagiri, 2003) indicates that concatenative synthesis produces highly intelligible consonants, for which it preserves the natural cues and formant transitions, but somewhat less intelligible vocalic segments, in which the discontinuities between concatenated source units typically exist.

The findings reviewed here confirm that the acoustic–phonetic redundancy and variability inherent in natural speech are, indeed, important to perception. However, future research needs to investigate further the differences that may exist in perception between concatenative and formant synthesis, as well as the specific role that acoustic–phonetic variability plays in speech perception. There are many sources of variability in speech (e.g., speaker, dialect, gender, age, emotional state, and social identity) and little is known about how these sources of variability facilitate speech perception and spoken word recognition. Incorporating different sources of variability into synthetic speech provides a straightforward way of testing their effects on speech intelligibility and may, in turn, ultimately provide a valuable means of improving the overall intelligibility of synthetic speech (Stevens, 1996).

Improving the quality of synthetic speech also requires a much better understanding of what makes synthetic speech sound 'unnatural' to most human listeners. Generating appropriate prosodic contours appears to improve the perceived naturalness of synthetic speech, and this in turn appears to increase its perceived intelligibility (Paris *et al.*, 2000). Determining the appropriateness of particular prosodic contours, however, has proven difficult because listeners cannot, in general, describe the prosodic information they perceive in linguistic terms. Thus, future research may have to develop new assessment methods to investigate the indirect effects that prosodic structure has on the processing of synthetic speech (Pisoni, 1997a).

Developing new experimental methods that can target higher-level comprehension processes may also enable researchers to investigate and identify the scope of the detrimental effects of synthetic speech on the human language comprehension system. Duffy and Pisoni (1992) observed that the phonological encoding of speech stimuli must begin before listeners start to interpret message-level information, even though processing at both levels may continue later simultaneously. Synthetic speech makes language processing more difficult at both the phonological and message levels; however, it is unclear whether this is due solely to the difficulty of interpreting synthetic speech at the phonological level, which may have cascading effects on subsequent stages in the comprehension process, or also because of independent processing difficulties incurred by synthetic speech at the stage of message-level semantic interpretation. Developing new behavioral measures that assess higher-level comprehension processes, independently of low-level phonemic encoding effects, could help clarify whether synthetic speech causes perceptual deficits at the level of segmental interpretation alone or whether it also causes independent problems for semantic processing. Examining how these distinct levels of processing interact with one

another in the perception of synthetic speech may shed light on how these levels operate together in the comprehension of natural speech as well.

Considerations such as these on the future direction of research on the perception of synthetic speech reflect the fact that speech scientists will likely have to develop new and more sophisticated behavioral assessment methods to keep pace with the rapid progress of speech synthesis technology. Only in this way can research on the perception of synthetic speech continue to have direct, practical benefits for speech synthesis technology as well as provide a unique opportunity for speech scientists to investigate those features of speech that make the perception of natural speech so robust and the perception of synthetic speech so difficult.

See also: Speech Perception; Speech Synthesis: Perception and Comprehension; Speech Synthesis; Word Recognition, Written.

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Speech Synthesis: Prosody

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Text-to-speech (TTS) systems take unrestricted text as input and produce a synthetic spoken version of that text as output. During this process, the text input must be analyzed to determine the prosodic features that will be associated with the words that are produced. For example, if a sentence of English ends in a question mark and does not begin with a WH-word, that sentence may be identified as a yes–no question and produced with a rising 'question' contour. If the same word occurs several times in a paragraph, the system may decide to realize that word with less prosodic prominence on these subsequent mentions.

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These decisions are known as 'prosodic assignment decisions.' Once they have been made, they are passed along to the prosody modeling component of the system to be realized in the spoken utterance by specifying the appropriate pitch contour, amplitude, segment durations, and so on. Prosodic variation will differ according to the language being synthesized and also according to the degree to which the system attempts to emulate human performance and succeeds in this attempt.

Issues for Prosodic Assignment in TTS

No existing TTS system, for any language, controls prosodic assignment or its realization entirely successfully. For most English synthesizers, long sentences that lack commas are uttered without 'taking a breath' so that it is almost impossible to remember the beginning of the sentence by the end; synthesizers that do attempt more sophisticated approaches to prosodic phrasing often make mistakes (e.g., systems that break sentences between conjuncts overgeneralize to phrasing such as 'the nuts | and bolts approach'). Current approaches to assigning prosodic prominence in TTS systems for pitch accent languages, such as English, typically fail to make words prominent or nonprominent as human speakers do. Since many semantic and pragmatic factors may contribute to human accenting decisions and these are not well understood, and since TTS systems must infer the semantic and pragmatic aspects of their input from text alone, attempts to model human performance in prominence decision have been less successful than modeling phrasing decisions. For most systems, the basic pitch contour of a sentence is varied only by reference to its final punctuation; sentences ending with '.', for example, are always produced with the same standard 'declarative' contour, contributing to a numbing sense of monotony. Beyond these sentence-level prosodic decisions, few TTS systems attempt to vary such other features as pitch range, speaking rate, amplitude, and voice quality in order to convey the variation in intonational meaning that humans are capable of producing and understanding.

Many TTS systems have addressed these issues using more or less sophisticated algorithms to vary prominence based on a word's information status or to introduce additional phrase boundaries based on simple syntactic or positional information. Although some of these algorithms have been constructed 'by hand,' most have been trained on fairly large speech corpora, hand-labeled for prosodic features. However, since prosodic labeling is very labor-intensive, and since the variety of prosodic behavior that humans vary in normal communication is very large and the relationship between such behaviors and automatically detectable features of a text is not well understood, success in automatic prosodic assignment in TTS systems has not improved markedly in recent years. Failures of prosodic assignment represent the largest source of 'naturalness' deficiencies in TTS systems today.

Prosody in TTS Systems

Prosodic variation in human speech can be described in terms of the pitch contours people employ, the items within those contours that people make intonationally prominent, and the location and importance of prosodic phrase boundaries that bound contours. In addition, human speakers vary pitch range, intensity or loudness, and timing (speaking rate and the location and duration of pauses) *inter alia* to convey differences in meaning. TTS systems ideally should vary all these dimensions just as humans do.

To determine a model of prosody for a TTS system in any given language, one must first determine the prosodic inventory of the language to be modeled and which aspects of that inventory can be varied by speakers to convey differences in meaning: What are the meaningful prosodic contrasts in this language? How are they realized? Do they appear to be related (predictable) in some way from an input text? How does the realization of prosodic features in the language vary based on the segments being concatenated? What should the default pitch contour be for this language (usually, the contour most often used with 'declarative' utterances)? What contours are used over questions? What aspects of intonation can be meaningfully varied by speakers to contribute to the overall meaning of the utterance? For example, in tonal languages such as Mandarin, how do tones affect the overall pitch contour (e.g., is there 'tone sandhi,' or influence on the realization of one tone from a previous tone?)? Also, in languages such as Japanese, in which pitch accent is lexically specified, what sort of free prominence variation is nonetheless available to speakers? These systems must also deal with the issue of how to handle individual variation – in concatenative systems, whether to explicitly model the speaker recorded for the system or whether to derive prosodic models from other speakers' data or from abstract theoretical models. Although modeling the recorded speaker in such systems may seem the more reasonable strategy, so as to avoid the need to modify databases more than necessary in order to produce natural-sounding speech, there may not be enough speech recorded in the appropriate contexts for this speaker to support this approach, or the prosodic behavior of the speaker

may not be what is desired for the TTS system. In general, though, the greater the disparity between a speaker's own prosodic behavior and the behavior modeled in the TTS system, the more difficult it is to produce natural-sounding utterances.

Whatever their prosodic inventory, different TTS systems, even those that target the same human language, will attempt to produce different types of prosodic variation, and different systems may describe the same prosodic phenomenon in different terms. This lack of uniformity often makes it difficult to compare TTS systems' capabilities. It also makes it difficult to agree on common TTS markup language conventions that can support prosodic control in speech applications, independent of the particular speech technology being employed.

TTS systems for most languages vary prosodic phrasing, although phrasing regularities of course differ by language; phrase boundaries are produced at least at the end of sentences and, for some systems, more elaborate procedures are developed for predicting sentence-internal breaks as well. Most systems developed for pitch accent languages such as English also vary prosodic prominence so that, for example, function words such as 'the' are produced with less prominence than content words such as 'cat.' The most popular models for describing and modeling these types of variation include the Edinburgh Festival Tilt system and the ToBI system, developed for different varieties of English prosody, the IPO contour stylization techniques developed for Dutch, and the Fujisaki model developed for Japanese. These models have each been adapted for languages other than their original target: thus, there are Fujisaki models of English and ToBI models of Japanese, *inter alia*. The following section specifies prosodic phenomena in the ToBI model for illustrative purposes. The ToBi model was originally developed for standard American English; a full description of the conventions as well as training materials may be found at http://ling.ohio-state.edu/~tobi.

The ToBI System

The ToBI system consists of annotations at four time-linked levels of analysis: an 'orthographic tier' of time-aligned words; a 'break index tier' indicating degrees of junction between words, from 0 (no word boundary) to 4 (full intonational phrase boundary); and a 'tonal tier,' where pitch accents, phrase accents, and boundary tones describing targets in the fundamental frequency (f0) define prosodic phrases, following Pierrehumbert's scheme for describing American English, with modifications; and a miscellaneous tier, where additional phenomena such as disfluencies may be marked. Break indices define two levels of phrasing, minor or intermediate (level 3) and major or intonational (level 4), with an associated tonal tier that describes the phrase accents and boundary tones for each level. Level 4 phrases consist of one or more level 3 phrases plus a high or low boundary tone (H% or L%) at the right edge of the phrase. Level 3 phrases consist of one or more pitch accents, aligned with the stressed syllable of lexical items, plus a phrase accent, which also may be high (H-) or low (L-). A standard declarative contour for American English, for example, ends in a low phrase accent and low boundary tone and is represented by H* L-L%; a standard yes–no question contour ends in H-H% and is represented as L* H-H%. Five types of pitch accent occur in the ToBI system defined for American English: two simple accents (H* and L*) and three complex ones (L*+H, L+H*, and H+H*). As in Pierrehumbert's system, the asterisk indicates which tone is aligned with the stressed syllable of the word bearing a complex accent. Words associated with pitch accents appear intonationally prominent to listeners and may be termed 'accented'; other words may be said to be 'deaccented.' This scheme has been used to model prosodic variation in the Bell Labs and AT&T TTS systems and also as one of several models in the Festival TTS system.

Prosodic Prominence

In many languages, human speakers tend to make content words (nouns, verbs, and modifiers) prosodic prominent or accented – typically by varying some combination of f0, intensity, and durational features – and function words (determiners and prepositions) less prominent or deaccented. Many early TTS systems relied on this simple content/function distinction as their sole prominence assignment strategy. Although this strategy may work fairly well for short, simple sentences produced in isolation, it works less well for longer sentences and for larger stretches of text.

In many languages, particularly for longer discourses, human speakers vary prosodic prominence to indicate variation in the information status of particular items in the discourse. In English, for example, human speakers tend to accent content words when they represent items that are 'new' to the discourse, but they tend to deaccent content words that are 'old,' or given, including lexical items with the same stem as previously mentioned words. However, not all given content words are deaccented, making the relationship between the given/new distinction and the accenting decision a complex one. Given items can be accented because they are used in a

contrastive sense, for reasons of focus, because they have not been mentioned recently, or other considerations.

For example, in the following text, some content words are accented but some are not:

> The **SENATE BREAKS** for **LUNCH** at **NOON**, so i **HEADED** to the **CAFETERIA** to **GET** my **STORY**. There are **SENATORS**, and there are **THIN** senators. For **SENATORS**, **LUNCH** at the cafeteria is **FREE**. For **REPORTERS**, it's not. But **CAFETERIA** food is **CAFETERIA** food.

TTS systems that attempt to model human accent decisions with respect to information status typically assume that content words that have been mentioned in the current paragraph (or some other limited stretch of text) and, possibly, words sharing a stem with such previously mentioned words should be deaccented, and that otherwise these words should be accented. However, corpus-based studies have shown that this strategy tends to deaccent many more words than human speakers would deaccent. Attempts have been made to incorporate additional information by inferring 'contrastive' environments and other factors influencing accent decisions in human speakers, such as complex nominal (sequences of nouns that may be analyzed as 'noun–noun' or as 'modifier–noun') stress patterns. Nominals such as *city **HALL*** and ***PARKING** lot* may be stressed on the left or the right side of the nominal. Although a given nominal is typically stressed either on the right or the left, determining which automatically is an unsolved problem, despite some identified semantic regularities, such as the observation that room descriptions (e.g., ***DINING** room*) typically have left stress and street names (e.g., ***MAIN** Street*), although not avenues or roads, do as well. More complicating in English complex nominals is the fact that combinations of complex nominals may undergo stress shift, such that adjoining prominent items may cause one of the stresses to be shifted to an earlier syllable (e.g., ***CITY** hall **PARKING** lot*).

Other prominence decisions are less predictable from simple text analysis since they involve cases in which sentences can, in speech, be disambiguated by varying prosodic prominence in English and other languages. Such phenomena include ambiguous verb–particle/preposition constructions (e.g., *George moved behind the screen*, in which accenting *behind* triggers the verb–particle interpretation), focus-sensitive operators (e.g., *John only introduced Mary to Sue*, in which the prominence of *Mary* vs. *Sue* can favor different interpretations of the sentence), differences in pronominal reference resolution (e.g., *John called Bill a Republican and then he insulted him*, in which prominence on the pronouns can favor different resolutions of them), and differentiating between discourse markers (words such as *well* or *now* that may explicitly signal the topic structure of a discourse) and their adverbial homographs (e.g., *Now Bill is a vegetarian*). These and other cases of ambiguity which can be disambiguated prosodically can only be modeled in TTS by allowing users explicit control over prosody. Disambiguating such sentences by text analysis is currently beyond the range of natural language processing systems.

Prosodic Phrasing

Prosodic phrasing decisions are important in most TTS systems. Human speakers typically 'chunk' their utterances into manageable units, producing phrase boundaries with some combination of pause, f0 change, a lessening of intensity, and often lengthening of the word preceding the phrase boundary. TTS systems that attempt to emulate natural human behavior try to produce phrase boundaries modeling such behavior in appropriate places in the input text, relying on some form of text analysis.

Intuitively, prosodic phrases divide an utterance into meaningful units of information. Variation in phrasing can change the meaning hearers assign to a sentence. For example, the interpretation of a sentence such as *Bill doesn't drink because he's unhappy* is likely to change, depending on whether it is uttered as one phrase or two. Uttered as a single phrase, with a prosodic boundary after *drink*, this sentence is commonly interpreted as conveying that Bill does indeed drink, but the cause of his drinking is not his unhappiness. Uttered as two phrases (*Bill doesn't drink – because he's unhappy*), it is more likely to convey that Bill does not drink – and that unhappiness is the reason for his abstinence. In effect, variation in phrasing in such cases in English, Spanish, and Italian, and possibly other languages, influences the scope of negation in the sentence. Prepositional phrase (PP) attachment has also been correlated with prosodic phrasing: *I saw the man on the hill – with a telescope* tends to favor the verb phrase attachment, whereas *I saw the man on the hill with a telescope* tends to favor an noun phrase attachment.

Although phrase boundaries often seem to occur frequently in syntactically predictable locations such as the edges of PPs, between conjuncts, or after preposed adverbials, *inter alia*, there is no necessary relationship between prosodic phrasing and syntactic structure – although this is often claimed by more theoretical research on prosodic phrasing. Analysis of prosodic phrasing in large prosodically labeled

corpora, particularly in corpora of nonlaboratory speech, shows that speakers may produce boundaries in any syntactic environment. Although some would term such behavior 'hesitation,' the assumption that phrase boundaries that occur where one does not believe they should must result from some performance difficulty is somewhat circular. In general, the data seem to support the conclusion that syntactic constituent information is one useful predictor of prosodic phrasing but that there is no one-to-one mapping between syntactic and prosodic phrasing.

Overall Contour Variation

TTS systems typically vary contour only when identifying a question in the language modeled, if that language does indeed have a characteristic 'question' contour. English TTS systems, for example, generally produce all input sentences with a falling 'declarative' contour, with only yes–no questions and occasionally sentence-internal phrases produced with some degree of rising contour. This limitation is a considerable one since most languages exhibit a much richer variety of overall contour variation. English, for example, employs contours such as the 'rise–fall–rise' contour to convey uncertainty or incredulity, the 'surprise-redundancy' contour to convey that something observable is nonetheless unexpected, the 'high-rise' question contour to elicit from a hearer whether some information is familiar to that hearer, and the 'plateau' contour ('You've already heard this') or 'continuation rise' ('There's more to come'; L-H% in ToBI) as variants of list intonation and 'down-stepped' contours to convey, *inter alia*, the beginning and ending of topics.

Systems that attempt to overcome the monotony of producing the same contour over most of the text they synthesize do so in the main by allowing users to specify contour variation (as well as phrasing, accent, and other prosodic features) by using some form of markup language within the input text. Recent interest in the production of different TTS voices and of different listener impressions of the state or emotion of the speech being produced has led to some renewed interest in the relationship between pitch contour and speaker personality and speaker state. This research is still in the early stages, but thus far it has not been demonstrated empirically that speaker state (except perhaps for 'boredom'), at least, can be signaled effectively by mere contour variation: voice quality, speaking rate, intensity, and pitch range also must be involved.

Varying Timing and Pitch Range

Two additional prosodic features that TTS systems may vary in attempting to mimic human behavior are timing and pitch range. Timing parameters may include speaking rate and pausal duration between prosodic phrases. Speakers may vary their rate to convey a different interpretation of a particular pitch contour, convey some emotional state, indicate that a phrase should be interpreted as a parenthetical remark, or convey differences in topic structure. Pitch range can also produce different 'meanings' for a given pitch contour or convey differences in discourse/topic structure. It can also indicate differences in a speaker's degree of involvement. In TTS systems, pitch range variation generally involves controlling the expansion and contraction of the overall f0 range for an utterance, parameters that may be calculated in different ways depending on the prosodic model being implemented in the system. For example, if paragraphing is used as a proxy for topic structure, systems will expand their pitch range over the first phrase of the paragraph and conclude with a phrase in a more compressed range.

Predicting Prosodic Features from Text

Once a prosodic model has been chosen for the system, and the prosodic variation that will be supported by the system, how such prosodic variation will be predicted from input text must next be determined. Early TTS systems tended to develop hand-built rule systems to predict prosody assignment based on simple part-of-speech features or more elaborate syntactic parsing. The main limitation of hand-built rule systems has been the difficulty of extending and maintaining them: New rules introduced to address perceived 'errors' in prosody assignment often have unforeseen and undesirable consequences. Also, the use of syntactic parsers has generally been limited by the limits of parser speed and accuracy.

Hand-constructed rule systems for TTS prosody assignment now have largely been superceded by corpus-based techniques, in which relatively large spoken corpora are hand labeled for prosodic features and used as training material for machine learning algorithms, which produce decision procedures automatically based on textual analysis that can also be performed automatically. Typical features used in such corpus-based approaches include the part-of-speech of words in the input, the distance of words from the beginning and end of an utterance, and so on. Automatically derived decision procedures are typically limited by the amount of hand-labeled data available for training, which has led to various attempts at speeding up hand labeling, or dispensing with it altogether, by asking native speakers to assign the prosody they might use if they uttered the sentence they are being asked to label to that sentence.

Automatically derived procedures are also difficult to correct, if 'errors' in their assignment are identified, without simply providing 'correct' examples in sufficient quantity in the training corpus to outweigh the data that have led to undesirable prediction.

Machine learning approaches to accent prediction for TTS have typically used automatic part-of-speech tags (often including the part-of-speech of items in a window around the word whose accent status is to be predicted), distance of the word from the beginning or end of the sentence, and location of punctuation near the word to achieve fairly good performance ($\geq$70% accuracy when tested on labeled human data). More ambitious systems have attempted to identify the word's information status (given or new, contrastive or not) or special constructions, such as complex nominals, preposed modifiers, and discourse markers. Some recent success has been had by including word frequency and mutual information scores into the mix. Still more ambitious systems have been proposed for concept (message)-to-speech systems, in which syntactic, semantic, and discourse information is available during the generation process. However, to date these have not improved over prosodic assignment in text-based systems, largely because the correlation between prominence and other prosodic features and other linguistic information is still not well enough understood to permit more accurate prediction.

Like prominence assignment procedures, phrasing assignment in TTS systems is done either by rule or by corpus-trained procedures. Early phrase prediction in TTS systems relied on spotting key words or punctuation to determine prosodic boundary location: So, this sentence would be produced by a TTS system as two prosodic phrases due to the presence of a comma after 'so'. However, text punctuation is too sparse and often too erratic to rely on entirely for the insertion of natural-sounding phrase boundaries, especially for very long sentences. Also, some punctuation should not signal a major phrase boundary (e.g., *He comes from Little Rock, Ark.*). More sophisticated phrasing prediction procedures have been developed by hand or via machine learning techniques, as discussed previously for prominence decisions. Hand-built rule systems tend to rely on syntactic information produced by a parser, whereas automatically trained techniques tend to rely on simple part-of-speech windows, sentence length, distance of the potential phrase boundary from the beginning and end of the sentence, sentence type (question or declarative), and punctuation. However, some success has been had in recent years by incorporating more sophisticated constituent information together with these simpler features. The intuition behind the correlation of prosodic phrasing and syntactic structure is that boundaries may tend not to occur internal to certain constituents and to divide other constituents from one another. Dynamic information about prior prosodic decisions also represents an important area for future study since, for example, it is less likely that a phrase boundary will appear very soon after a previous boundary; similarly, corpus-based analysis has shown that phrase boundaries occur rarely between two deaccented words. State-of-the-art performance in prosodic phrase prediction is generally reported to be in the low to mid–90s for precision compared to a labeled test corpus.

User-Specified Control of Prosodic Variation

With some degree of explicit user control over prosodic variation, TTS can sound much more natural. This control is accomplished by providing explicit markup capabilities such that users may specify, by script or by hand, how various prosodic parameters should be set for any input text. Systems currently provide this capability via system-specific markup languages. However, markup standards are being adopted gradually that permit some general forms of prosodic control. The most popular of these currently appears to be SABLE, which has been implemented in the Festival TTS system and in the Bell Labs TTS system. Earlier markup languages that contributed to the development of SABLE were JSML (Java Speech Markup Language), SSML (Speech Synthesis Markup Language), and STML (Spoken Text Markup Language). The main limitation of these languages is that they must be mapped to the proprietary languages that existing systems provide, which commonly provide greater prosodic control than the conventional markup language. Until systems begin to be developed for standard markup languages (and until these markup languages include more fine-grained control over prosodic variation, which will involve major agreements on how to define and specify that variation), this dichotomy will remain a problem.

There is considerable practical wisdom indicating that if a TTS system is targeted at a particular application, prosodic and other features can be tuned to this application with good effect. For example, a NYNEX experiment involving a reverse telephone directory showed that the worst performing TTS system could become the most successful by modeling the prosodic behavior of the human attendants whose role was being assumed by the TTS system. In general, if the input to a TTS system is characterizable in advance (e.g., names and addresses,

automobile reservations, and a financial domain) scripts can be devised to use these assumptions to improve performance.

Evaluation

Evaluating TTS systems in general is extremely difficult. Now that most systems are quite intelligible, most testing centers on their naturalness, which is both difficult to define for raters and difficult to attribute to different components of the system. Evaluating algorithms for prosodic assignment has generally been done either through subjective judgment ratings, in which raters may be asked to judge the naturalness of a synthesized sentence with prosodic assignment done by the algorithm under consideration or by some alternate procedure. Or subjects may be asked which of two synthesized utterances they prefer, where prosodic assignment was done in two different ways. Unfortunately, prosodic assignment may interact in unpredictable ways with other components of the system: For example, if the prosodic assignment component correctly specifies that a yes–no question contour be used but the database cannot produce such a contour, the prosodic assignment component may be poorly evaluated in such tests. Assigning 'blame' to various components is in general quite difficult since small failures in components may contribute to a lack of naturalness.

A more objective, but still flawed, approach is to evaluate the prosodic assignment procedure's automatic specification on a hand-labeled test set of human speech. There are always multiple ways of producing any utterance, however. Thus, comparison of TTS output to any single prediction would appear to be too strict a metric. However, it is not clear what kind of comparison to human performance would be more valid. Some have compared their prosodic assignment to the combined production of multiple speakers, but this has clear drawbacks. For example, allowing a phrase boundary in a given sentence wherever one of multiple human speakers produces a boundary can easily result in a sentence with far too many boundaries for any human production. Also, the location of one boundary may depend on the presence of another, so a production including only one may sound distinctly odd. Task-based evaluations have also been attempted with some success, as in the reverse telephone directory evaluation mentioned previously, in which subjects were asked to transcribe the names and addresses the system produced; a TTS system with worse overall intelligibility performed better than other systems when its prosody was changed to model that of the human attendant. However, this modification largely involved simply slowing the rate of the synthesizer. In summary, the evaluation of TTS systems in general, and of prosodic assignment in particular, remains a major research question.

Conclusion

In the current age of corpus-based TTS systems that rely on searching a large inventory of speech for variable-length units to concatenate, with relatively little system modification of prosodic features, effective and realizable prosodic assignment represents a major problem. There are many issues to be resolved regarding how natural-sounding prosody can be assigned, based on text input or even on more information-rich representations. However, if such prosodic variation is not actually possible within a TTS system without degrading the overall quality of the modified speech, the field has a serious problem. Therefore, not only must there be research on how to assign prosodic features more effectively (particularly full pitch contours) but also the overall architecture of the system must make it possible to realize such prosodic assignment in the output speech. Some very natural-sounding systems still cannot produce yes–no question intonation reliably, for example, because too few question contours occur in the system database.

See also: Speech Synthesis; Speech Synthesis: Perception and Comprehension.

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Speech Technologies: Language Variation

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Introduction

This article deals only with the sources and types of variation in speech that affect speech technology systems such as ASR and TTS. A companion article (*see* **Handling Variation in Speech and Language Processing**) looks at how such systems attempt to deal with this variation. Because this article is therefore largely a survey of well-understood linguistic phenomena, almost all the references will be to separate articles in this encyclopedia (*see* **Handling Variation in Speech and Language Processing; Natural Language Processing: Overview; Speech Recognition: Statistical Methods**).

Speech Recognition

Automatic speech recognition (ASR; *see* **Speech Recognition: Statistical Methods**) usually means the conversion of speech waveforms into sequences of words (i.e., text), and does not usually imply any further syntactic (*see* **Parsing: Statistical Methods**) or semantic (*see* **Natural Language Understanding, Automatic**) processing of this text, such as might be necessary in a spoken dialog system (*see* **Computational Language Systems: Architectures**).

Most modern ASR systems have a common architecture. The speech waveform is invariably preprocessed into a sequence of vectors (called feature vectors), each representing the short-term spectral envelope of a section of waveform. Then, a hierarchy of statistical models, usually consisting of a model of word sequences – the language model, usually an n-gram model – a word-to-phone model – the pronunciation lexicon (*see* **Computational Lexicons and Dictionaries**) – and models of phone-sized units of speech – usually hidden Markov models (HMMs) (Huang *et al.*, 2001) – is used to determine the most probable word sequence. Statistical models outperform alternatives, such as rule-based or example-based systems. In the case of HMMs, this is because they are able to learn, from data, not only the average value of the feature vectors associated with a particular unit of speech but also the variation about this average. HMMs are trained on large quantities (several hundred hours) of transcribed speech data and N-gram models are trained on very large quantities of text (e.g., more than 100 million words).

Given a good enough model and sufficient quantities of appropriate training data, statistical models are able to generalize: They can recognize new speech data with word sequences never seen during training. However, when presented with speech that differs too greatly in some respect from the training data, the accuracy can drop dramatically. Understanding the types, sources, and acoustic consequences of variation in speech is therefore important to the developers of ASR systems.

In the early development of ASR systems (*see* **Speech Recognition, Automatic: History**), the focus was on transcription of 'read text' because the primary application of the technology was thought to be dictation machines. More recently, interest has shifted to processing spontaneous speech as found in dialog (whether between humans or between humans and machine). Challenging problems currently under investigation include the transcription of spontaneous telephone conversations, rich transcription' of speech, transcription and annotation of multiparty meetings, and the searching of speech databases (*see* **Spoken Document Retrieval, Automatic**).

Speech Synthesis

The conversion of plain text (such as the paragraph you are reading now) to speech waveforms is known as text-to-speech (TTS) (*see* **Speech Synthesis**). When more information about the text is available (such as the correct syntactic structure or semantic information such as which information is given and which is new in a particular utterance), the task is then sometimes called concept-to-speech. This extra information will be available if the text was automatically generated. Clearly, TTS is the harder problem because any syntactic, semantic, or pragmatic information required by the system must be inferred from the text. This is usually achieved with a combination of rules and statistical models (Jurafsky and Martin, 2000) Most TTS systems construct the synthetic speech waveform using fragments of speech taken from a database of recorded natural speech (from a single speaker); these systems are known as concatenative.

The variability and ambiguity in text can present problems for TTS systems in two ways. First, a single sentence taken out of context will often appear to have more than one 'correct' reading; resolving this ambiguity requires contextual information, which may be available in the preceding sentences or may require knowledge beyond that contained in the text (world knowledge). Typical TTS systems have very little world knowledge. Second, the rules and statistical models used in typical TTS systems are usually optimized or trained on some data set; but,

however large it is, this data set cannot cover all possible words and phrases that will be encountered when running the system. So, just as for ASR, a TTS system must be able to generalize from limited training data.

Other Speech Technologies

As well as recognizing it and synthesizing it, there are other interesting and useful things we can do with speech.

When transmitting speech down a long-distance telephone cable or through the airwaves to and from mobile phones, it is usual to code the speech. This coding achieves both substantial compression (a lower data rate than the original waveform) and robustness to errors introduced by the channel. The coding is usually specifically designed for speech; for example, it might take advantage of a source-filter model and code the source and filter components separately. Because a model of speech is being used (however simplistic), there are potential problems with variation, particularly across speakers.

In voice transformation (also known as voice morphing), the speech of one speaker is manipulated to sound like another speaker (*see* **Voice Modification, Synthetic**). Applications include speech synthesis and film dubbing. Clearly, understanding the factors that make one person's speech differ from another's is crucial when performing voice transformation.

Both ASR and TTS are required for a spoken language dialog system. In such a system, some form of speech understanding must be implemented (*see*). If this involves parsing the input, then the differences between spoken and written language must be taken into account because most parsers are developed for written language only.

Differences between speakers are not always a problem. In the task of speaker recognition, these differences are used to identify, or verify a claimed identity of, the speaker (*see* **Speaker Recognition and Verification, Automatic**).

Variations in the Speech of a Single Speaker

No speech sound is ever produced in precisely the same way twice, even by a single speaker; the dimensions along which we can describe, and perhaps quantify, this variation include the speech production processes and the speaking rate.

Speech Production Processes

We can divide variations in the speech production process into two distinct categories. The first consists of systematic variations due to phonetic context, including allophonic variation and co-articulation; the second category consists of random variations.

Allophonic variation is the systematic variation in the acoustic realization of a phoneme depending on the phonetic context. Examples are that a stop may be released in some situations but not in others (such as before another stop) and that /l/ in English may be realized differently in syllable-initial versus syllable-final positions (light vs. dark). Clearly, such systematic variation should be accounted for in ASR (e.g., by using a different HMM for each type of /l/) and in TTS (by synthesizing the appropriate /l/ in each context).

Co-articulation is the variation in underlying articulator movements depending on context, both left and right. The following example illustrates the process of assimilation (*see* **Assimilation**) in which the [n] has assimilated to the place of articulation of the following bilabial stop [b], thus changing from an alveolar [n] to a bilabial [m].

[hænd]	+	[bæg] →	[hæmbæg]
hand		bag	'hambag'

The [d] has also been deleted. These processes must be realized in TTS and accounted for in ASR. Cross-word effects such as these cannot be handled in the lexicon.

The second category of variation is random changes. These arise because the motor control system of the articulators is imperfect (we cannot exactly repeat an articulatory gesture). Human speech perception has no problem with the acoustic consequences of small random changes because they do not cause categorical changes (*see* **Speech Perception**). Because these changes are not predictable, in ASR they must be left to the low-level statistical component (usually a mixture of Gaussian distributions) to deal with. In TTS, including these variations in the synthetic speech may improve naturalness.

Speaking Rate

At higher speaking rates, the processes just mentioned have an increasing effect on the speech produced. Co-articulation becomes more pronounced and the frequencies of deletions, disfluencies, and mispronunciations all increase.

Differences between Individual Speakers

The speech of two speakers of the same language will exhibit systematic differences that are not attributable to external factors.

It is common in speech technology to make use of the source-filter model (*see* **Phonetics, Acoustic; Speech Production**), which divides the speech production process into two components: the source (e.g.,

the vocal folds for voicing) and the filter (the vocal tract). This model is somewhat simplistic, but it is widely used in speech technologies and it is useful in understanding cross-speaker variation.

Differences in vocal tract geometry, particularly in length, cause shifts in the formant space; a shorter vocal tract (e.g., in female speakers compared to male speakers of the same age or children compared to adults) produces higher formant frequencies. Because the acoustic features used in ASR systems represent the spectral envelope (an approximation to the vocal tract frequency response), the features extracted for different speakers will vary systematically.

The range of F_0 (the rate of vibration of the vocal folds, whose perceptual correlate is pitch) varies across speakers, too. This creates challenges for some ASR systems and all TTS systems. In ASR of non-tone languages, F_0 is almost always ignored; however, in tone languages, where F_0 carries segmental information, it is necessary to model F_0; this raises the problem of normalizing across speakers: one Cantonese speaker's low-rising tone might have a very similar F_0 contour (in both absolute value and in shape) to another speaker's mid-rising tone (*see* **Tone: Phonology**).

The vocal folds (*see* **States of the Glottis**) are also largely responsible for voice quality (*see* **Voice Quality**). In model-based TTS (*see* **Speech Synthesis**), this means a detailed model of the vocal-fold behavior is necessary to capture the individual qualities of any real speaker. In voice transformation (*see* **Voice Modification, Synthetic**), conversion of this aspect of speech is critical.

Variation in Situation

Speakers change many aspects of their speech, both consciously and subconsciously, in response to situational factors.

- Planned versus spontaneous speech. There are important differences between read text (e.g., that of a newscaster), carefully planned speech (e.g., from an experienced public speaker without notes), and spontaneous speech (e.g., a conversation).
- Effect of the listener on the speaker. Studies of human-human dialogue, such as those of the Maptask corpus (Anderson *et al.*, 1991), have been used to discover the effects of speaker familiarity and eye contact between speakers. Other factors that affect speakers include their relationship to the listener (their child, their boss, etc.). Interestingly, when speakers know the listener is a machine, they are more likely to adapt their speech (to become more careful) than if they believe they are talking to a human. This has implications for spoken dialog system designers: if the system is so good that users believe it is a human (*see* **Turing Test**), their speech is more likely to be problematic for the ASR component.
- Disfluencies and related phenomena. Word fragments, repeated word or phrases, and repairs cause problems for ASR systems. Because ASR systems almost always see speech as a string of words to be transcribed and use a simple N-gram model of language, the insertion of non-words or word fragments into the word string causes problems. Should they be transcribed? Can they be treated as real words? How do they affect the language model? (*see* **Handling Variation in Speech and Language Processing**, which considers these questions.) Hesitations and filled pauses are not always speech errors; they may be used by speakers, particularly in dialog, to perform functions such as holding the current turn.
- Dialog versus monolog. In dialog speech (or speech between two or more speakers), there are significantly more disfluencies than in monolog. Speakers overlap their speech significantly; in a small meeting situation, we may find that as many as half of all utterances overlap. Even when recording the speech with close-talking head-mounted microphones, it is very difficult to obtain separate acoustic signals for each speaker. This presents a major challenge for speech recognition systems.

Variations within a Single Language

All languages with large numbers of speakers contain subgroups: accents (*see* **Accent**) and dialects (*see* **Dialect Atlases**).

Variations among different accents include systematic and idiosyncratic changes in word pronunciations. For example, accents of English can be divided into rhotic and nonrhotic varieties. Speakers with rhotic accents (e.g., Scottish English and most accents of North American English) pronounce the [r] at the end of words such as *nicer*, whereas nonrhotic speakers (e.g., of Southern British English) do not. In concatenative TTS systems (*see* **Speech Synthesis**) particularly, it is important for the pronunciation dictionary to closely match the speaker whose speech is being used.

Different dialects of a language can exhibit all the differences among different accents plus differences in vocabulary (*see* **Standard and Dialect Vocabulary**) and syntax. Because speech technology systems tend to be constructed for standard accents and dialects, speakers of nonstandard accents and dialects are

more likely to have difficulty using these systems. The same applies for non-native speakers.

Variations between Languages

Until recently, only a small number of languages had been used in the primary research and development of speech technology; of these, English, particularly North American English, dominated (and still does). When attempts are made to port existing systems to other languages, a number of cross-language differences must be dealt with. Some differences are minor, and the system can ported simply by replacing some of the linguistic resources (e.g., the pronunciation dictionary) or providing new training data. Other differences are more significant, and the system must be changed in a more fundamental way. Systems that must deal with more than one language may be required to automatically detect which language is being spoken (*see* **Language Identification, Automatic**).

Variations across Closely Related Languages

Phoneme Inventory Speech technology systems typically use relatively small phoneme inventories compared to the full set of IPA (*see* **International Phonetic Association**) phonemes. First, almost all systems are designed to deal only with a single language at a time, so only a subset of the IPA phonemes are required. Second, small inventories are inherently preferred. In ASR, this is because a statistical model must be built for every phoneme in every left and right context. If there are 40 phonemes and the context consists of only one phoneme to the left and one to the right, this means around $40^3 = 64{,}000$ models; with 50 phonemes, this rises to 125,000. In TTS, the typical fragment of speech used by concatenative systems is the diphone, which consists of the second half of one phone plus the first half of the following phone. Hence, the number of diphones increases as the square of the number of phonemes.

Morphology Both ASR and TTS require pronunciations for words. In TTS, only the orthographic form is available as input; any extra information required to predict pronunciation (such as part-of-speech (POS) tags; *see* **Part-of-Speech Tagging**) must be inferred by the system. This process of letter-to-sound (LTS) conversion must be automatic because new words will be encountered at runtime; for large-vocabulary ASR, (semi-)automatic methods are also desirable. For languages with productive morphology, automatic morphological decomposition (*see*) can be used to assist LTS because the pronunciations of roots and affixes can be shared across many words and combined to produce pronunciations for complete words. Languages for which morphology is commonly used in LTS include Spanish, German, and Arabic; English, for example, is too irregular. Because systems for English rarely use a morphological component, this must be added when porting to most other languages (*see* **Dictionaries and Inflectional Morphology; Morphology and Language Processing**).

Lexicon and Vocabulary Size Languages with a highly productive morphology can have very large vocabulary sizes. The standard approach used for English ASR and TTS, which is to treat words as atoms and list all (orthographically) distinct words in the lexicon, is not appropriate for such languages. In ASR for these languages, failing to make use of morphology will mean a much higher out-of-vocabulary rate (words appearing in speech to be recognized that are not listed in the pronunciation dictionary of the system).

Languages with writing systems that omit some vowels or do not mark word boundaries create additional problems for speech technologies. New modules must be added to the system to predict these missing pieces of information before words can be looked up in the lexicon.

Syntax In ASR, there is rarely a sophisticated model of syntactic structure. Language is modeled as a string of words with no deep structure, so therefore differences in syntactic structure cause no real problems, although the power of simple n-gram models will vary across languages; for example, n-gram models cannot capture long-range dependencies.

In TTS, however, some syntactic analysis is usually performed. This may be very shallow, such as part-of-speech tagging (*see* **Symbolic Computational Linguistics: Overview**), or somewhat deeper, to discover phrase boundaries, for example. In English, the relationship between traditional syntactic constituents (e.g., noun phrases and verb phrases) and prosodic structure (*see* **Prosodic Aspects of Speech and Language**) is via semantics (*see* **Semantics of Prosody**), so even a deep syntactic analysis is not sufficient. One theory of syntax, Combinatorial Categorical Grammar (CCG) (*see* **Combinatory Categorial Grammar**), is able to generate constituents that better match the information structure, and therefore the prosodic structure, of utterances.

Variations across Distantly Related Languages

When we move to more distantly related languages, further problems are encountered.

Differences in Acoustic Features Tone languages use F_0 to make segmental distinctions. A speech recognition system for a non-tone language will generally not use F_0 information, so it is when ported to a tone language, the front end of the system, which extracts salient acoustic features from the waveform, will need to be modified.

Languages without Existing Linguistic Resources For some languages, there are few or no existing resources, such as large amounts of text data in electronic form or pronunciation dictionaries. These resources must be created, and this is one of the largest barriers to use of speech technologies for these languages. Projects such as the Local Language Speech Technology Initiative (Tucker, 2004) are addressing this problem.

Differences between Spoken and Written Language Even widely spoken dialects of major languages may lack linguistic resources. For example, Levantine Arabic (Arabic, Levantine Bedawi Spoken) is a spoken dialect of Arabic. Because writing in dialect is stigmatized, written Arabic is almost exclusively Modern Standard Arabic, which is significantly different (being a modernized version of Classical Arabic).

Nonlinguistic External Factors

A number of factors can modify speech signals on the way from the speaker to speech technology system.

Transmission Factors

Telephone Speech Telephone networks generally limit the bandwidth of the speech signal they carry (typically limiting the range of frequencies present in the signal to 300–3500 Hz). This reduces the amount of information available to ASR systems. For many male speakers, this also means that the first harmonic (sometimes called the fundamental) of F_0 is lost. Human listeners are able to infer F_0 from the spacing of the remaining harmonics.

Digital channels (which include most mobile and long-distance channels) impose degradation on the speech signal due to the coding and decoding of the signal (Gold and Morgan, 1999). Mobile telephones are frequently used in noisy (e.g., in cars) and reverberent (e.g., in subway stations) environments.

Microphone Different microphones can have surprisingly large effects on the speech signal, to the extent that ASR accuracy can be severely reduced when the microphone used in testing is different from that used to collect the training data.

Environmental Factors

Even before the speech reaches the microphone, it can be corrupted.

Acoustic (Background) Noise A particular problem of far-field microphones (e.g., desk-mounted vs. head-mounted) is the higher level of background noise relative to the speech signal.

Reverberent Environments When multiple paths between speaker and microphone are present (e.g., because of reflections from walls), the signal received by the microphone contains not only the direct-path signal but also weaker, delayed versions. This blurs the information across time and can cause significant degradation in speech quality. In making recordings for concatenative TTS systems, great care is taken to avoid recording these reflected signals (by using a recording studio or anechoic chamber). Far-field microphones also pick up a higher level of these reflected signals than close-talking microphones relative to the direct-path speech signal.

See also: Accent; Assimilation; Combinatory Categorial Grammar; Computational Language Systems: Architectures; Computational Lexicons and Dictionaries; Dialect Atlases; Dictionaries and Inflectional Morphology; Handling Variation in Speech and Language Processing; International Phonetic Association; Language Identification, Automatic; Morphology and Language Processing; Natural Language Processing: Overview; Natural Language Understanding, Automatic; Parsing: Statistical Methods; Part-of-Speech Tagging; Phonetics, Acoustic; Prosodic Aspects of Speech and Language; Semantics of Prosody; Speaker Recognition and Verification, Automatic; Speech Accommodation Theory and Audience Design; Speech Perception; Speech Production; Speech Recognition, Automatic: History; Speech Recognition: Statistical Methods; Speech Synthesis; Spoken Document Retrieval, Automatic; Standard and Dialect Vocabulary; States of the Glottis; Style and Style Shifting; Symbolic Computational Linguistics: Overview; Tone: Phonology; Turing Test; Voice Modification, Synthetic; Voice Quality.

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Speech: Biological Basis

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The biological basis of speech has three main components: the physiology of the vocal tract, the physiology of the perceptual system (primarily the ear but also the eye and, occasionally, other systems), and the neural resources that allow their use for communication. The genetic underpinnings of these functions are beyond the scope of this article, so the functional aspects will be discussed.

Speech, like language, is a biological system (Liberman and Whalen, 2000). Because it is the part of language with a physical realization, the immediacy of the biology is more apparent than it is for syntax and semantics, but it forms a part of that complete biological system. Language is generally considered the defining characteristic of humans, and it will develop in every neurologically normal child with virtually any exposure to linguistic material. The large investment that is made in being able to acquire and use language is justified by the immense rewards for using it, and the severe penalties for being unable to.

Evolution of Speech

Speech clearly evolved for, and presumably along with, language. Even though it is a system that has no clear counterpart in the animal world for its complexity in serving communication, it is, like the elephant's trunk (equally unique in its way; cf. Pinker, 1994), derived from previous capacities. There are some aspects of signaling systems in other animals that are similar to language (*see* **Animal Communication: Overview**; **Animal Communication Networks**), but little that resembles speech. The various sounds made by chimpanzees and other primates are clearly related to some of the sounds used in speech. These include hoots, calls, lip smacking, barks, etc. Gelada baboons are capable of vowel-like vocalizations very similar to the human vowels /a i u/ (Richman, 1976).

One of the most interesting signaling systems in primates is that of the vervet monkeys. They use three distinct alarm calls: short tonal chirps to indicate the presence of a leopard; a high-pitched chatter to signal a python; and a low-pitched staccato grunt to signal an eagle (Seyfarth *et al.*, 1980). The restriction of this signaling system to a small set of messages limits its usefulness in a way that is overcome in speech by the Particulate Principle (Studdert-Kennedy, 2000): language makes use of small, meaningless components (phonemes) that recombine in multiple ways to create meaningful units (morphemes). The size of the vocabulary, therefore, is a multiplicative function of the number of units, unlike a system in which each message needs a separate signal. Only with this feature can spoken language be as powerful as it is.

Speech is presently the primary medium for language in most communities, but sign language is a strong and equally complex alternate system (Emmorey, 2002; Klima and Bellugi, 1979). Thus, there is the possibility that a manual system of communication may have preceded the oral version; this topic will continue to be debated. Given the amount of use humans make of language, it is surprising how little evolutionary change was needed for it. The entire production system, from the lungs to the lips, makes use of structures that are used for other purposes as well: breathing, chewing, kissing. The most notable changes in the physiology are a lower resting position of the larynx in adults, a complex larynx, a more highly innervated tongue, and a bend in the vocal tract that allows for efficient creation of various linguistic sounds. The main bone that is involved in these changes is the hyoid bone, which has come to be connected to other bones only by cartilage to facilitate fine adjustments in the larynx. Since the hyoid bone is not tightly connected to other bones, its position cannot be reliably determined in fossil deposits. Only indirect evidence is available from the archaeological record for changes in this bone.

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The lower resting position of the larynx is evidently ideal for speech, since the larynx is typically lowered for phonation in all animals (Fitch, 2002). It was previously thought that the descended larynx was peculiar to humans (Lieberman, 1984), but recent ethological work has found a similar configuration in other animals, such as the red deer (Fitch and Reby, 2001). In those animals, the function of the descended larynx appears to be that of signaling a larger body size than the animal actually has; during phonation, the larynx is pulled below its resting point, almost to the sternum in some cases. In humans, the function appears to be more tied to ease of articulation, because both males and females lower their larynges. Articulation benefits both in terms of having the larynx near the level necessary for nonnasal phonation (rather than having to lower it as with most other animals; Fitch [2000]) and for enhancing the bend in the vocal tract that allows for a wider range of speech articulation. The extra lowering that occurs in males at puberty may also be in the service of signaling a larger size (Ohala, 1984). Thus, it is likely that the lower resting position of the larynx was achieved after speech was in common use (Whalen, 2002).

The evolution of the larynx, important as it is for the kind of control we see in modern speech, is difficult to assess from the fossil record. The cricoid and thyroid cartilages contain and control the vocal folds, but all three of these structures fail to leave fossil traces. Thus there is indeterminacy here as well.

The development of a flexible tongue was also important. Since greater control of this structure implied more complex innervation, one hypothesis was that the size of the hypoglossal canal (which allows the nerve controlling the tongue to exit the skull) relative to the size of the skull would indicate when this control appeared in evolution (Kay *et al.*, 1998). Later work showed that that there was a great deal of overlap between modern humans and other primates and that the nerve itself could vary in size without any apparent increase in control (for chimpanzees and orangutans). Thus, the timing of this change cannot be determined from the fossil record.

There is less change in the perceptual system specifically for speech than there is in the production system. The auditory pathway is undifferentiated for speech until the cortical level, and our range of hearing, though well suited for the range of sounds used in speech, is not extraordinary among mammalian systems. Whatever evolution took place in service of speech perception, then, is primarily neurological.

Evidence for the evolution of the brain itself is limited largely to studies of brain size and to ethological comparisons with close and distant relatives of humans. Primates have increased in size over the past four million years, but the line that led to modern humans increased brain size more rapidly than expected. Observations of species from mice to elephants are generally predicted by $E = k \times W^{2/3}$ (E = brain weight, W = body weight, k = constant). Apes, hominids, and humans have larger brains than predicted by that rule (Tobias, 1987). Plotting the difference between the actual weight of a primate's brain and E, the equation-based estimate, versus evolutionary time, produces a curve that increases over time. Recent work has shown that this overencephalization is present in the equid line as well (Henneberg, 1998), and that the most recent changes may be due to a decrease in body weight due to a streamlining of the digestive system (Henneberg, 1998). Brain size itself is not a clear indicator of language use, especially since other activities – tool making, hunting, other aspects of culture – were also presumably becoming more complex throughout hominid evolution. Language is generally assumed to support those activities, so the greater-than-expected growth in brain size is likely to be intricately linked with elaboration of the entire range of activity.

Language and speech are primarily lateralized to the left hemisphere of the brain (Branch *et al.*, 1964; Broca, 1865). This is less true for left-handers than for right-handers, and women appear to be more bilateral in their processing than men (Pugh *et al.*, 1996). When competing speech sounds are presented to both ears, those at the right ear are perceived more reliably than those at the left, because the strongest cortical connections for the ears are contralateral (Shankweiler and Studdert-Kennedy, 1967). The reasons for this effect and its time depth are still undetermined.

Human speech can be mimicked by various animals, but this does not indicate a use of language. The most successful mimics are parrots, although claims have also been made for Hoover the talking seal and even dogs and horses. All of these creatures use a vocal tract that is radically different from humans, and so the control must be quite different. Parrots, for example, use their tongues to modulate the signal but also appear to match their fundamental frequency to their most prominent resonance, an articulatory maneuver used only by sopranos in their highest range (Beckers *et al.*, 2004; Patterson and Pepperberg, 1998). Pepperberg (1999) has made stronger claims for the language use of her trained parrots, yielding one of the most convincing examples of word use by animals (Anderson, 2004: 303).

Speech Production

Speech is produced by coordinated action of the lungs, larynx, jaw, tongue, velum, and lips (*see* **Speech Production**). As mentioned, each of these organs contributes to other functions, ranging from the necessary (breathing) to the aesthetic (singing). The neural control of the vocal system is quite complex and is generally separate from that of the other functions. There is a different coupling of muscle activations for chewing than for speech (Moore *et al.*, 1988); chewing is even dissociated from babbling (Moore and Ruark, 1996). This calls into question theories that propose that speech arose out of nonspeech gestures (MacNeilage, 1998). Speech is not only biologically special (unique to humans), it is specialized as well (innervating the same muscles differently depending on whether speech function is involved or not).

For humans, unlike other primates, vocalization is under cortical control. Other primates primarily initiate their vocalizations subcortically and thus have no control over the form of most their vocalizations, though they are able to control some (Jürgens, 1998). Humans have volitional (though usually not conscious) control over every aspect of the speech production process, from breathing up through articulation. The breathing patterns for speech are quite different from those of tidal breathing, with very short intakes and long exhalations, under active control (Lenneberg, 1967; MacLarnon and Hewitt, 1999). The lungs are elastic, like a balloon, so that pressure is generated by this elasticity itself, promoting exhalation. During speech, the chest cavity is held outward to slow the escape of the air (Winkworth *et al.*, 1995); those same muscles can contract to increase pressure, especially as volume decreases.

The larynx provides the voiced source for speech, creating a periodic source by the alternating closure and opening of the vocal folds. The rate of alternation is the fundamental frequency of a sound and is governed by the rate of air flow, the stiffness and density of the folds, and other adjustments in the vocal tract. The cycling movement of the vocal folds is an aerodynamic phenomenon due to elasticity of the folds and variations in air pressure: the folds are forced apart by subglottal pressure, then drawn back together, according to the Bernoulli principle, due to reduced pressure in the air rushing through the glottis.

Speech sounds are overlapped in their production, resulting in coarticulation (e.g., Fowler, 1980; Liberman *et al.*, 1967). This allows for more efficient use of the sound stream but results in an acoustic signal that is highly context dependent. The perceptual system, having evolved in concert with the production system, is prepared to deal with this coarticulation, a fact that has been dubbed 'parity' between the two systems (Liberman and Mattingly, 1985). Rather than treating the context dependence as noise to be overcome, the perceptual system treats virtually all of it as information about the production process.

Neurologically, the area most clearly involved is Broca's area (Brodmann area 44/45), which is essential to voluntary articulation. Motor, premotor, and anterior (insula) areas are involved as well; the cerebellum is involved in fine-tuning the timing of speech. Although recent neural imaging techniques have improved our ability to examine the brain during various tasks, studying speech production is difficult since the movement of the articulators tends to move the head as well, making alignment of the images problematic. Event-related fMRI allows us to overcome this limitation to some extent, but the results so far have been somewhat inconclusive about the exact network of systems that is responsible for speech production. Future refinements should improve our models.

Speech Perception

Speech is primarily perceived through the ear, but the eye has a contribution to make as well (McGurk and MacDonald, 1976; Sumby and Pollack, 1954); both sensory systems, of course, are ultimately represented in the brain. The sense of touch can also be employed, primarily for the deaf, either through the Tadoma method of training (Schultz *et al.*, 1984) or through prosthetic devices that transduce part of the speech signal (Galvin *et al.*, 1999). The integration of the various sensory modalities indicates that speech is flexible enough to be sensitive to a variety of atypical means of presenting the underlying dynamics of the signal (Fowler and Dekle, 1991).

The first challenge that the perceiver faces is discovering whether the acoustic signal contains speech at all. Since language is seldom produced in a completely quiet environment, the listener must sort out what is speech and what is noise or other signals. Some theorists propose that this is done by 'scene analysis' in which the acoustic energy received is allocated to various perceptual categories or streams (Bregman, 1990). However, there are various conditions under which listeners do not follow this sensible path. In duplex perception, part of a syllable is presented to one ear and part to the other. Even though the listener clearly perceives two streams (one at each

ear), the speech information is nonetheless put together into a single speech percept, with a nonspeech percept remaining at the other ear (Rand, 1974; Xu *et al.*, 1997). An even more difficult challenge is found in sinewave speech (Remez *et al.*, 1981), in which the first three resonances that constitute most of the speech information are replaced with time-varying sinusoids. Even though no one perceives this as natural speech, most listeners come to hear the speech it was modeled on, even though the signals obey virtually none of the grouping principles of scene analysis (Remez *et al.*, 1994).

The speech signal is difficult to parse even when identified as such, since there are very few indications of segments in the acoustic stream. The ear can identify and sequence about seven different events per second, but phonemes are conveyed at rates of 15 per second or more. As mentioned in the production section, this is accomplished by overlapping the production so that the coarticulated signal can convey the message more efficiently. This 'encoding' of the signal allows humans to communicate well (Liberman *et al.*, 1967) but creates challenges for machine recognition. Because the perceptual system is expecting context-conditioned variation, it parses the signal so that the perceived linguistic message is close to the original message intended by the speaker. Some theorists have proposed instead that there is a relational invariance in the signal; in particular, Landmark Theory (Stevens, 2002) proposes that regions around major spectral or amplitude change are compared and features extracted from that comparison. Research is continuing to determine whether this conceptualization will produce more accurate automatic recognition and whether it will explain human perception.

Neurologically, the acoustic signal enters the cortex through the primary auditory cortex. From there, it radiates primarily to the posterior superior temporal gyrus (including Wernicke's area [Brodmann 22, along with 39 and 40]). There is evidence for the involvement of motor areas (Wilson *et al.*, 2004). If there is integration with a visual signal, it appears to be supported by a variety of areas (superior temporal sulcus, premotor cortex, and cingulated gyrus, among others; Calvert and Thesen, 2004). Lip reading also induces activation in primary auditory cortex (Calvert *et al.*, 1997). As with production, our ability to assess the entire system with current tools is limited.

Links between Production and Perception

Throughout history, the vast majority of speech has been heard in the immediate vicinity of the speaker. Thus, there was no great impetus for thinking that there might be something unrelated about speech production and perception: the producer is there, so what is perceived is what is produced. However, with the advent of recording devices, it became possible to separate the acoustic signal from the speaker, suggesting that there might be no essential link between the two processes. The invention of the sound spectrograph during World War II led to an enhanced view of the acoustic structure of speech (Potter *et al.*, 1947), further enabling a dissociation between the two processes. This has led to a robust debate in the literature that is still not settled.

For proponents of acoustic theories, that is, those who propose that there is no essential link between production and perception, the fact that the acoustic signal is perceived accurately indicates that only acoustics are needed. Prototypes of phonetic categories are presumed to arise during language acquisition, and sounds are matched to these prototypes (Diehl and Kluender, 1989; Diehl *et al.*, 2004; Guenther *et al.*, 1998; Stevens, 2002). These theories also generally posit that there is nothing special about the processing of speech sounds and that they are perceived by general auditory processes. The categories are necessarily linked to production at some point, since listeners are also speakers, but it is presumed to be a cognitive link.

Other theories of speech perception assert, instead, that there is an immediate and necessary link between the objects of speech production and perception, notably the Motor Theory (Liberman *et al.*, 1967; Liberman and Mattingly, 1985) and direct realist theories (Best, 1995; Fowler, 1986). Here, the parity between speaker and listener is a given since the objects of both are linguistically significant movements of the vocal tract, or 'gestures.' Recovery of gestures is achieved by a specialization (in Motor Theory) or by general processes that are attuned to the distal object (in direct realist theories). Gestures are assumed to be perceived by means of all their attributes, both the usual ones of sound and vision and the unusual ones such as touch (Fowler and Dekle, 1991).

Imitation, especially by infants, reveals a critical role for linking perception of certain actions and production. Although it is possible to envision a system that establishes links between categories (perceptual and productive) in adults, it is hard to see how it is that infants are able to map what they hear onto what they do. Yet infants imitate speech from a very early age, mapping adult productions onto their much smaller vocal tract. It is difficult to see how this is accomplished on purely acoustic grounds.

One intriguing way in which production and perception have been found to be linked in monkeys is the so-called mirror neurons (Rizzolatti and Arbib, 1998). These are cells in the cortex of monkeys that are active both when the animal performs an action and when it sees that action performed (even by a human). They are located very near the homolog of Broca's area, crucial for speech. Mirror neurons have also been found for sound. There are neurons that activate both when a peanut is cracked and when just the noise of a peanut cracking is presented (Kohler *et al.*, 2002). There is a suggestion of mirror neurons at work in human speech perception in the activation of tongue muscles when listening to lingual gestures (Fadiga *et al.*, 2002).

Speech Development

Human infants are ready to learn speech. It takes major neurological disorder or a complete lack of speech input for a child to fail to learn speech. Although this indicates a genetic predisposition to use speech, the exact nature of the genetic component is still being debated. Exposure to speech actually begins before birth, as speech is moderately intelligible even *in utero* (Smith *et al.*, 2003) and some prebirth sounds seem to be remembered (DeCasper *et al.*, 1994). The mother's voice seems to be learned *in utero* (DeCasper and Fifer, 1980), indicating that the neural organization for speech perception may begin prior to birth.

Infants are not capable of producing speech, but they perceive it in interesting ways early on. They discriminate most phonetic distinctions that have been tested (Werker, 2003; Werker and Tees, 1984). These include both distinctions that are in their language environment and many that are not. By about 1 year of age, much of this sensitivity has been lost in favor of phonetic distinctions used in the ambient language. Infants treat speech as a special signal from the beginning, perceiving duplex stimuli in the way that adults do (Eimas and Miller, 1992) and preferentially listening to speech over nonspeech (Vouloumanos and Werker, 2004) even as early as 2 months of age.

Production begins with babbling, typically starting around 6 months of age. Most babbles are of a simple and general nature (Oller, 1980), but they show language-specific effects this early as well (Boysson-Bardies *et al.*, 1984; Whalen *et al.*, 1991). Babbling continues even after the first words are mastered, and the full inventory of sounds typically takes months or even years to appear. Complex sounds are typically mastered later, including liquids (Oller, 1980) and clicks (Herbert, 1990).

Universal Patterns in Speech

Examining the sounds of the world's languages, one finds a remarkable degree of regularity. Vowels and consonants are not drawn arbitrarily from all humanly possible vocalizations. Some patterns contain sounds that are 'easy to make'; others seem to serve listener needs, presenting sound differences that are 'easy to hear' (Ladefoged, 1993).

The interaction of those forces is seen in the structure of phonetic inventories. Small systems lack segments with extreme articulations: for example, Hawaiian has /p k ʔ h m n l w/. Such series resemble the inventories of babbling and early speech. They appear 'elementary' compared with many of the consonants that are found only in very large systems. ũ, for instance, has close to 100 distinctive consonants, half of which are clicks, and nearly 50 vowels and diphthongs.

Vowels pattern similarly. A five-vowel system is likely to use /i e a o u/. Often, such a 'plain' series is matched by one or several additional systems that add an 'elaboration' in the form of a secondary articulation or a phonation type, for example, nasalization or breathy voice. It is significant that small systems recruit only elementary or plain vowels. They seldom substitute secondary for plain articulations, or show a mixture of plain, elaborated, and complex segments (Lindblom *et al.*, 1992).

How such patterns enter the language is not well understood. According to one theory, the seeds of historical sound change are sown by listener errors (Ohala, 1981). Failure to take contextual factors into account often leads to a misidentification of the intended utterance. If, when becoming the speaker, the listener adopts the misidentified form, this initiates a sound change that may spread through the speech community. In this scenario, sound change is like a mutation arising from an imperfect copying of genetic information.

There is a curious parallel between the phonetic variations of speech and the 'fossils' that they leave in phonological systems. Both seem to reflect the tug-of-war staged by the listener's need for clarity, on the one hand, and the speaker's continual propensity to simplify, on the other. Perhaps the law-governed relationships mentioned above between system size and phonetic content imply that sound systems are molded by the same factors that determine the ebb and flow of signal information in speaker–listener interactions: both must meet the criterion of 'sufficient discriminability' (Lindblom, 1990).

Because the forces that shape inventories are still active, it is difficult to determine whether they are part of a Universal Grammar (Hauser *et al.*, 2002)

or are part of a continuously tuned system. The inevitable changes in human languages indicate that there is an expected level of tension between consistent use and adaptation, to new speakers (both infant and adult) and new situations. Speech has served the needs of the 6800 or so extant language communities, and will continue to serve future generations. Like other biological systems, it is still evolving; it will be interesting to see what changes occur in its next two million years.

See also: Animal Communication Networks; Animal Communication: Overview; Evolution of Phonetics and Phonology; Phonological Universals; Speech Development; Speech Perception; Speech Production.

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http://www.eva.mpg.de/ – Max Planck Institute for Evolutionary Anthropology.

Spelling Reform

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The spelling of most languages changes over time. New forms such as *thru, catalog, center,* and *defense* are used alternatively for or replace the older forms *through, catalogue, centre,* and *defence*. Spelling changes are called a reform when the change is drastic, or when the spelling is institutionalized by a well-defined governmental or semigovernmental authority such as a scientific academy or a spelling board. Dictionaries and religious texts may function as authorities, but spelling changes in the form of new editions are hardly ever called spelling reforms.

From a theoretical point of view, spelling change can be considered a change of the balance between the principles on which the system is based. In alphabetic systems, the spelling serves as a solid representative of pronunciation (the phonological principle), but there are also strong tendencies to provide the meaningful elements with a consistent spelling, irrespective of variation in their pronunciation (the morphological principle that leads to paradigm similarity in writing). For instance, the ⟨t⟩ in *action* is not pronounced, but is written because of the morphological relation between *action* and *act*. In this case, the morphological principle has priority over the phonological principle. Otherwise, the spelling of *action* would be *axion* or *aksion*.

Languages naturally receive an increasingly morphological spelling over time. This can be explained in part by language change: spelling does not always follow changes in pronunciation, resulting in a new system that prefers to take morphology as its basic principle. The increasing importance of the morphological principle has also been explained by the fact that reading has priority over writing (Glück, 2000: 497). For a given text, there will be one writer, but many readers. It has been suggested that a morphological spelling system makes reading easier and faster. Speed of reading is needed because silent reading is now preferred to reading aloud. For these reasons, explicit spelling reform may cause the morphological principle to take priority over the phonological principle, even though writers and those who learn to write would prefer a spelling system based on phonology.

Spelling reform is known for its few successes and many failures. The number of proposed spelling reforms is far greater than the number of effective spelling reforms. Successful reform requires careful linguistic consideration; changing one part of the system may unintentionally affect another part of the system. It also requires psycholinguistic research into the effects of spelling change on language processing. Apart from that, diplomacy and political planning is needed because language communities tend to be conservative. Individual users will be reluctant to give up the system they learned (with much effort) and are acquainted with. Sometimes a revolutionary change of society such as the formation of a new nation helps to introduce new writing systems. It is no accident that spelling standards for languages were often formed when nations were formed.

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The driving forces behind a reform or a reform proposal are diverse. There may be *system-internal* motivations that concern difficulties for language users. Writers, readers, learners, or experienced users may feel that it is too hard to establish the relation between spoken and written form. To give some examples: (a) a spelling system with diacritic signs may be considered a waste of time for the writer when the written form is adequately read without such diacritics; (b) for tone languages, a spelling system without explicit marking of stress and tone may be too hard to read and understand; (c) it is hard to learn the code of alphabetic writing in a language such as English, in which the spelling of many everyday words is irregular; and (d) experienced users will develop their own system when the standard spelling does not suffice, as is the case with keyboard phonetic shorthand. When the standard spelling is incomplete or allows variants, it is usually the case that organizations create their own spelling dictionaries to reach consistency.

Such system-internal considerations may lead an authority to simplify the spelling. But whose task will become simpler? The interests of writers, readers, learners, or experienced users do not necessarily point in the same direction. A reformed spelling could simplify writing but complicate reading, or *vice versa*. It could also simplify the task of beginners but complicate the task of experienced users.

Next to system-internal motivations for reform to simplify the task of the language user, there are *external* motivations pro and contra reform. An important argument contra reform is history. Because of spelling changes, all former texts will be outmoded. It may become difficult to read texts written according to the older orthography, and cultural achievements may be lost. Literary works of art may lose value through spelling changes, because the re-spelled form may change homography and intertextual references. A new argument against reform is the help of computers; a spelling system that is difficult to write need not be changed because spell-checkers are available for corrections.

Usually, the intelligentsia is against spelling reform, cf. Fishman (1977: xvi): "Orthographic change represents the abandonment of written tradition and as such it *must* cope with the gatekeepers of written tradition, the poets, priests, principals, and professors, with the institutions and symbols they create and serve, or be destined to oblivion." Orthographic change alters the practical or symbolic advantages and disadvantages of social networks, and as such may be advantageous for one group, but not for another.

Not all external motivations are against reform. As discussed above, change of society may be the driving force of a reform because language groups or nations express their identity through their language. The wish to define a nationwide standard language usually goes hand in hand with government regulation of the spelling. Such spelling reforms concern the distance between the spelling systems for different languages or language varieties. They go both ways: they result in greater similarity between the spellings of cognate countries (for instance, to enhance commercial communication or to protect small languages), or they result in greater distance (for instance, to point up the fact that different nations or cultures are involved).

Other social motives for reform are the fight against illiteracy and the need to raise civilians who can function adequately in democracies. It is no accident that many proposals for spelling reform are put forward during the first stages of nationwide education. At present, the status of writing has been changed by the introduction of computers and the Internet. This requires higher standards of literacy and therefore also a more accessible writing system with the possibility of simplification.

There is no spelling legislation in the United Kingdom or the United States, because spelling standards are implied and need no further codification. In many other countries, a governmental or semigovernmental institution fulfills the task of formulating standard terminology and updating word lists. A spelling law prescribes which publication on spelling or which institute is in charge. The strongest form of spelling legislation is a spelling law that specifies the conventions and includes the dictionary.

Legislation of the spelling or of the installation of a government board is advantageous for language communities because a law protects language users against the preferences of single members of government (Neijt, 2002). Spelling laws provide a stable basis for a long period of time, and form the necessary basis of cooperation between countries that wish to share their written language.

Spelling laws can also be disadvantageous, however. One of the possible drawbacks of spelling regulation by law is that it puts spelling on the political agenda, whereas proposals for spelling reform need scientific underpinning; constructive discussions are more likely to occur between scholars than between politicians. Another drawback is that a law prevents the orthography from evolving naturally through small, cumulative changes. Moreover, changing an orthography via new legislation is more time-consuming and more expensive than changing it solely through

the publication of a new spelling guide. It seems that the details of spelling are better dealt with by an official publication under the auspices of a permanent spelling board than by law.

Some Examples of Spelling Regulation and Recent Reforms

Chinese: After the founding of the People's Republic of China, the government issued lists of simplified sinograms in 1956 and 1964, but Mao Zedong aimed at a more drastic reform: "we must proceed in the direction of phoneticization being taken by all languages of the world" (Seybolt and Kuei-ke Chiang, 1979). The result of this enterprise is Pinyin, the alphabetic transcription of sinograms. Whether or not Pinyin will gradually displace sinograms remains to be seen (Mair, 1996: 205). It would be one of the most far-reaching spelling reforms ever.

Danish: In 1949, there was the abolition of the capitalization of nouns and some other smaller changes.

Dutch: Cooperation between Belgium and The Netherlands has existed since the end of the 19th century considering a joint dictionary. The writing of case endings turned out to be too difficult (Geerts *et al.,* 1977). Simplification in 1934 – and its revocation in 1936 for The Netherlands – issued by successive secretaries of education. In 1947, new rules were laid down in spelling laws cooperatively in Belgium and The Netherlands. In 1954, publication of the accompanying dictionary (which was considered a further reform by the general public). In 1995, new conventions for non-native words, for linking elements in compounds and for diacritic signs (Neijt and Nunn, 1997). In 2003, Surinam accepted the new conventions as well. A new edition of the spelling dictionary with minor changes was issued in 2005. Most of the dictionary is included in the spelling laws of Flanders (the Dutch-speaking part of Belgium) and in The Netherlands.

English: No reforms, but new regional variants such as *honour/honor, apologise/apologize,* and *centre/center,* see Scragg (1974). On the one hand, changes go unnoticed, but on the other, language users are not allowed to use the 'wrong' spelling. In the words of Cook (2004: 178): "A paper of mine was returned with the comment 'American spelling for an American journal': no one has ever required me to use an American accent for an American conference."

French: The Académie Française is the authority on spelling issues. The orthography is also regulated by terminology lists and dictionaries edited by governmental institutions (Institut National de la langue française and Centre de terminologie et de néologie). In 1990, the spelling board of the Académie Française (the Conseil supérieur de la langue française) published a simplified spelling list with variants: optional use of circumflexes in some words (e.g., *août* or *aout* 'August' and *dîner* or *diner* 'dinner'), and ligatures such as ⟨æ⟩ may be written as ⟨é⟩. These variants were not accepted by *Petit Robert*, the standard dictionary in France. The older spelling is still the only one used in the dictionary of the academy (1st edn., 1694, see Academie Francaise). The spelling of Quebec French is regulated in a similar way. A law in 1977 installed the Office de la langue française, which handles terminology (see Banque Terminologique du Quebec).

German: Since 1876, there has been cooperation among the German-speaking countries, with a 'compromise spelling regulation' in 1901 and script reform in 1941. Latin script displaced the German scripts (Gothic, Schwabacher and Fraktur), which were illegible for readers outside the German states (Augst, 1996: 77). A reform was decided upon in 1996 (transitional period until 2005). This reform encountered difficulties because of the intricate political organization (cooperation among Germany, Austria, and Switzerland, but with authoritative Bundesministers in the federal states of Germany) and the linguistic dispute (cf. compromise proposal *Zur Reform der deutschen Rechtschreibung* by the Deutschen Akademie für Sprache und Dichtung, 2002). The main issues are the use of Eszett ⟨ß⟩, spaces in compound verbs (*autofahren* or *Auto fahren* 'to drive a car'), vowels (according to the morphological principle, e.g., *Stängel* 'stick' because of *Stange* 'rod,' or according to the phonological principle *Stengel*), and capital letters in phrases such as *das folgende* or *das Folgende* 'the next' and *im bezug auf* or *im Bezug auf* 'with respect to.'

Japanese: In 1949, the government installed a national spelling board, the Kokugo Singikai. In 1981, this board published a reduced list of characters in which older variants of kanji and kana are dropped.

Lithuanian: At the end of the 19th century, the use of *č* and *š* in prestige books formed the incentive for the American Lithuanian community to use these letters instead of the traditional digraphs *sz* and *cz,* in journals, too (Subačius, 2004).

Norwegian: The original Danish spelling of the main written language, Bokmål, was not adequately understood and used (Gundersen, 1977: 250). Reforms in 1907 (abandoning capitalization of nouns), 1917, 1938, 1959, and 1981 by Royal Decrees (smaller changes). The government is advised by the Norsk Språkråd.

Russia and the Balkans: See Comrie (1996) for an overview. Baldauf (1993) presents extensive

documentation of spelling changes in Russian Turkophone languages between 1850 and 1937 (Azerbaijani Turkish, Bashkir, Karakalpak, Kazakh, Kyrgyz, Crimean Tatar, Tatar, Turkmen, Uighur, and Uzbek). She discusses the link between spelling reform on the one hand, and modernization and the creation of nations on the other.

Spanish: Cooperation between countries via the Real Academia Española in Madrid, which has published new principles and guidelines in *Ortografia de la lengua española* (1999). The spelling dictionary includes only words with a Spanish pronunciation, such that the orthography is almost completely regular. In 1910 and 1955, there was the abolition of several diacritic signs, but there is still debate on how to establish a simpler set of rules. The writer Gabriel García Márquez also pleads for simpler rules for the letters *h, g,* or *j*, and *b* or *v* (Marquez).

Tone languages: Illustrative are Shilluk and Dinka (Nilo-Saharan languages). The orthographies developed by non-native speakers in the early and mid-20th century are inadequate for the needs of native speakers. While the languages are easy to write, they are almost impossible to read fluently because tone and stress, which contribute to the meaning of words and word groups, are not represented. Recently, new orthographies have been developed that make reading easier. Writing, however, is more difficult in the revised spelling (Gilley, 2004).

Turkish: Major spelling reform with a change from Arabic script to Roman script occurred in 1928, after the foundation of the Republic of Turkey in 1923.

See also: Chinese; Danish; Dutch; English in the Present Day (since ca. 1900); French; German; Norwegian; Renaissance Linguistics: French Tradition; Renaissance Linguistics: Spanish Tradition; Russian; Spanish; Spelling Reform Proposals: English; Turkish.

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function: *debt*, *know*, *psalm*, *mnemonic*, *island*, *victuals*. The same vowel sound may be represented by different letters: in the phrase *pretty village women*, for example, all six vowel letters represent the same sound (in many accents at least). The same letter, on the other hand, may represent different sounds, as ⟨a⟩ does in *father washed the cabbage in a basin of salt water*. Removal of these anomalies, spelling reformers claimed, would bring benefits of many kinds. For one thing, Truth would at last prevail, the present orthography being "one great falsehood from beginning to end," as one reformer put it. For another, money would be saved by economizing writing and printing time and space. Above all, it would simplify learning to read and write; and incidentally make learning English easier for foreigners.

Types of Reform

It was not until the 19th century that there arose in the United Kingdom and the United States spelling reform **movements,** with funds and an organization; but many suggestions for reform were put forward during the three centuries before that. The suggestions variously involved either staying with, or augmenting, or replacing, the roman alphabet. They are listed in Brown (1991).

English orthography can be made less odd by an **amended** spelling, with most of the illogicalities and inconsistencies eliminated. This does not, however, solve the difficulty that the number of sounds that have to be distinguished in English is greater than the number of letters in the alphabet. One solution for this is to retain the roman alphabet but to add to the number of digraphs, such as ⟨th⟩, ⟨sh⟩, ⟨ng⟩, ⟨ee⟩, that already exist. Or the alphabet may be augmented by new letters. Or – most radical solution of all – the roman alphabet may be abandoned altogether and replaced by a new, nonroman alphabet.

Amended Spelling

James Howell is perhaps the best-known advocate of an amended spelling. In *A new English grammar* (1662), he put forward a number of simplifying rules; thus, he suggests *som*, *don* (for *some*, *done*), *peeple*, *toung*, *favor*, *tresure*. Familiar to generations of librarians is the scheme of the (USA) 'Simplifyd Speling Board,' which was used in each edition of the Decimal Classification devised by Melvil Dewey (1851–1931) through the 14th (1942).

Another example is 'cut spelling,' one of the schemes advocated by members of the (UK) Simplified Spelling Society. Cut spelling omits many redundant or unnecessary letters, as in the word *spelng* itself, but the general appearance of the traditional word-outline is preserved. Other examples are *larjst*, *finishd*, *problm*, *irelevnt*. A full account is given in Upward (1992).

Digraphic Spelling

James Elphinston, in *Propriety ascertained in her picture* (1787) and a number of other works, proposed a digraphic scheme, which aroused great scorn and ridicule among his contemporaries. Nevertheless the Simplified Spelling Society has adopted the digraphic solution, which is the least demanding of the printer, for its other scheme, 'new spelling' (see MacCarthy, 1964; Ripman and Archer, 1948).

Augmented Roman Spelling

By far the greatest number of schemes come into this category, from the 16th to the 20th century. Notable advocates are Sir Thomas Smith, John Hart, Alexander Gill, Benjamin Franklin, Abner Kneeland, Isaac Pitman, A. J. Ellis, and Ezekiel Rich. New letters were obtained by borrowing from Greek (⟨ε⟩ ⟨η⟩ ⟨χ⟩ ⟨ω⟩) or Anglo-Saxon (⟨ð⟩ ⟨þ⟩), by modifying existing letters (⟨ŋ⟩ ⟨ʒ⟩), and by outright invention (⟨□⟩).

A New Alphabet

The best-known example of a nonroman orthography for English is the Shaw Alphabet, the creation of which was made possible by a bequest made by George Bernard Shaw in his will when he died in 1950. He believed that the imposition of Received Pronunciation (RP) via surface-phonetic orthography would force the lower classes to abandon their inferior dialects (1941; so much for the vaunted Shavian socialism!). A competition was held for the design of a new alphabet. The design submitted by Kingsley Read was selected as the basis of the new alphabet, and a play of Shaw's was published in 1962 with the text in traditional spelling and in the new alphabet on facing pages (see Figure 1).

An experiment in pedagogy, the Initial Teaching Alphabet (ita) of Sir James Pitman (Figure 2), was supposed to ease children into reading English because the shapes of the characters resembled the usual digraphs of 'traditional orthography' (TO). It received some currency in the United Kingdom and slight usage in the United States in the 1960s. Its advocates (e.g., Downing, 1965 for parents; Pitman and St. John, 1969 for researchers) demonstrated the efficacy of ita in accelerating mastery of reading, including the transition to reading TO, but barely addressed, let alone assessed, the transition to **writing** TO (Pitman and St. John, 1969: 180–181); anecdote indicates that people raised on ita do not master standard spelling.

Figure 1 The Shaw Alphabet for Writers. Double lines between pairs show the relative height of talls, deeps, and shorts. Wherever possible, finish letters rightwards; those starred will be written upwards.

The Desirability of Spelling Reform

It may well be that the oddness of English orthography is only superficial, and that the supposed need for reform is based on a misconception. It may be that "English orthography comes remarkably close to being an optimal orthographic system for English" (Chomsky and Halle, 1968). If it is assumed that the function of writing is to represent the sounds of speech in the same way as the sound of music is represented by its notation, then English spelling is gravely deficient and in need of reform. But, while the representation of sound is the end in itself in musical notation, for writing it is only the means to an end, the end being the creation of a visual medium for carrying language. Several analyses of spelling-to-sound correspondences have been published: Wijk (1966), in effect a prolegomenon to the author's spelling reform proposal (Wijk, 1977); Venezky (1970); and Carney (1994). Sound-to-spelling correspondences are detailed by Carney and in Cummings (1988), the former for British, the latter for American orthography.

A fallacy underlying the concept of reform, thus, is the assumption that an ideal orthography reflects the surface phonetics of its language. But if every variety

No.	*Character*	*Name*	*Example*	*No.*	*Character*	*Name*	*Example*
1.	æ	ain	æbl	23.	y	yay	yellœ
2.	b	bee	but	24.	z	zed or zee	zœ
3.	c	kee	cat				
	d			25.	s	zess	as
4.	d	did	dog	26.	wh	whee	whie
5.	ee	een	eech	27.	ch	chay	church
6.	f	ef	fun	28.	th	ith	thin
7.	g	gay	gæt	29.	th	thee	then
8.	h	hay	hay	30.	sh	ish	ship
9.	ie	ide	ies	31.	z	zhee	mezuer
10.	j	jay	jam	32.	ng	ing	sing
11.	k	kay	king	33.	r	er	her
12.	l	el	lip	34.	a	ahd	father
13.	m	em	man		a	ask	
14.	n	en	not	35.	a	at	at
15.	œ	ode	œpen	36.	au	aud	autum
16.	p	pee	pæ	37.	e	et	egg
	q			38.	i	it	it
17.	r	ray	rat	39.	o	og	on
18.	s	ess	sit	40.	u	ug	up
19.	t	tee	top	41.	œ	oot	bœk
20.	ue	une	ues	42.	œ	ood	mœn
21.	v	vee	vois	43.	ou	oun	out
22.	w	way	wet	44.	oi	oin	oil
	x						

Figure 2 The Initial Teaching Alphabet (Pitman and St. John, 1969: 119).

of English were recorded according to its own pronunciation, communication among users of disparate varieties would be impaired; and even if the pronunciation of a standard variety – e.g., RP (as advocated by Shaw), or General American – were chosen for the orthographic standard, then the visual relation of *sign/signature*, *bomb/bombard* would be eliminated.

On a perhaps more frivolous level, reform would remove the possibility of joke spellings like *ghoti* for *fish*, with ⟨gh⟩ as in *rough*, ⟨o⟩ as in *women*, and ⟨ti⟩ as in *nation*; or the spelling of the *cacophony* which often comes from the audience at the beginning of a concert as *cacoughany*.

It could be that it is not so much English spelling that needs reforming as our attitude towards spelling. The 19th-century idea of 'correct' spelling is nowadays accepted without question. A representative of the Simplified Spelling Society has stated that "one of the most important things about writing systems is that people should learn to write a language in an accepted way." On the other hand, a Member of Parliament has said, in the House of Commons, "I want to restore flexibility and liberty to the spelling of our own language. I want to set English free again from the shackles of uniformity which have been imposed upon it." If this could be brought about, it is possible that English orthography would evolve, without legislation or propaganda, into a linguistically optimum form. What has been seen in recent years, though, as a new generation at home with instantaneous international written communication strives for speed in typing above all, is the emergence of a 'keyboard phonetic shorthand' embracing logograms and character names rather than strictly phonetic orthography: *Ill b there @ 4, UB2!* (Cook 2004: 193–203).

See also: English Spelling: Rationale; Spelling Reform.

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Thomas Spence, an English social philosopher and humanist, was born on June 21, 1750 on the Quayside, Newcastle upon Tyne. His father was a simple net maker, and Thomas was one his 19 children. It has never been clearly stated what school Spence attended, because at the age of 10 he decided to help his father in net making. Influenced by his parents, who were radical Presbyterians, Spence started studying the Old Testament. The egalitarian ideas promoted by the Old Testament influenced Spence and shaped his moral values. He could not understand the unresolved contrast between the idea of equality of men conceived by God and the differences that people saw between a sovereign and a common man. Spence opened a school in which he organized a debating club that became a secular pulpit for the spread of his revolutionary ideas. Spence strongly believed in land reforms; he claimed that every parish ought to become a fully autonomic social unit, and that all lands should be nationalized.

Spence perfectly understood that in order to become a credible and trustworthy person, he needed to erase his northern dialect. Spence invented a phonetic alphabet to improve his pronunciation which, later modified, gave the basis for the standard form of English. In Spence's view, the unification of the spelling system was strictly linked with the reform of the political system in a state: one society should use one language. A number of his books were written with the application of his spelling reforms (*The grand repository of the English language* was published in 1775).

One might call him the first British advocate of the equality of social classes, a true proponent of the class war communism. In 1774, Spence became a member of the Newcastle Philosophical Society. One year later, on November 8, 1775, he gave a memorable revolutionary speech entitled *On the mode of administering the landed estate of the nation as a joint stock property in parochial partnership by dividing the rent*. In consequence, Spence was permanently expelled from the society. Then he moved to London, where in 1793 he opened 'The hive of liberty,' a shop where he promoted radical books and pamphlets. In 1794, Spence launched a periodical, *Pig's Meat*, which was suspended; Spence himself was arrested and charged with treason. He spent seven months in prison. Later, he opened a shop again, but this time with soft drinks and tokens.

Spence was a visionary of social reforms in England in his time. He acted against tyrants and strongly advocated women's rights, because he believed that people were righteous, virtuous, and therefore equal. Thomas Spence died on September 1, 1814, at the age of 64.

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Spitzer was born in Vienna. A student of Meyer-Lübke, he was also influenced by Schuchardt and Freud. He became a professor in Bonn (1922), Marburg (1925) and Cologne (1930), and in 1933 was forced to flee from Nazi Germany to Istanbul and then in 1936 to Baltimore (Johns Hopkins University). Defending individual creativity in his studies of historical semantics, Spitzer distanced himself from an individualistic conception of language (the likes of Schuchardt, Vossler, and Croce). Strongly against positivism, and in opposition to both idealistic linguistics and reductionist scientific linguistics, he reached a synthesis between linguistics and critical literature. Proposing a stylistics founded on

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interpretation and intuition, he placed authors' specificity above language facts (Bally), and considered that deviations from the norm in writers' style denoted a historical step.

Spitzer studied individual linguistic styles ('*Sprachstyle*') as well as transverse stylistic languages ('*langues stylistiques*'). Linguistic and philological information served interpretative purposes, in order to 'bridge the gap between linguistics and literary history.' The stylistician first placed himself in the middle of the text and observed it deeply (the inductive phase), and then went through a methodic analysis of a number of parts of the text, in search of indices allowing him to check the starting hypothesis (the deductive phase). This psychological and formal method of the 'inductive–deductive circle' is a constant back-and-forth movement between effective expression and inspiring act.

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See also: Bruneau, Charles (1883–1969); Freud, Sigmund (1856–1939); Meyer-Lübke, Wilhelm (1861–1936); Schuchardt, Hugo (1842–1927).

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Splinters

L Bauer, Victoria University of Wellington, Wellington, New Zealand

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A splinter is a part of a word that, due to some reanalysis of the structure of the original word, is interpreted as meaningful, and is then subsequently used in the creation of new words. As a familiar example, consider the word *alcoholic*. In morphological terms, this is divided into *alcohol* and *-ic*. But this word has been reanalyzed as *alc-* and *-oholic*, and the new splinter *-oholic* (variously spelled) then reoccurs in words such as *chocoholic, spendaholic,* and *shopoholic*.

Splinters are sometimes reanalyzed as words, sometimes as affixes, and sometimes as word-building elements that do not appear to have any particular denotation. For example, *hamburger* was reanalyzed from its original structure of *Hamburg-er* ('of or originating in the city of Hamburg') to *ham-burger*, and *burger* is perceived as a new word (accordingly, *cheese-burger* is perceived as a compound). The *-(n)omics* that we find in *Reaganomics, Clintonomics, Thatchernomics,* etc., appears to have been reanalyzed as an affix or as a combining form (*see* **Neoclassical Compounding**). The *-on* that we find in *dralon, nylon, rayon, xenon* and so on does not carry any denotation, but does contain a connotation of scientific progress, while the final *-x* that occurs in trade names such as *Clorox, Cutex, Kleenex, Pyrex,* and *Tampax* does not appear to have a meaning at all, but seems to mark these words as trade names (see Thornton, 2000). Which of these analyses is perceived

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According to Adams (1973: 147), the term 'splinter' comes from Berman (1961). Adams uses the term specifically to refer to those parts of a blend (*see* **Blend**) that are descended from each of the input words to the blend, though the sources of splinters as given here may be rather wider than that.

See also: Affixation; Blend; Neoclassical Compounding; Word Formation.

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Spoken Discourse: Diachronic Aspects

A Narbona Jimènez, Universidad de Sevilla, Sevilla, Spain

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The written word, in those languages in which it has been established, did not emerge as a means of reflecting spoken language, which is the most powerful generator of constant and inevitable linguistic innovation, alteration, and loss (only **dead** languages do not change) and whose development has been relatively autonomous. However, paradoxically for the language historian, it is possible to discover these changes only through written testaments – always few in number and never absolutely reliable.

This did not go unnoticed by the father of modern linguistics, F. de Saussure, who, in the introduction to his well-known *Cours de linguistique générale* (1985), though he maintained that the spoken and the written were two systems with distinct signs ("*langue et écriture sont deux systèmes de signes distincts*") and that the latter was in itself foreign to the internal system ("*en elle-même étrangère au système interne*"), recognized that we generally know the spoken only via the written ("*nous ne les* [*les langues*] *connaissons généralement que par l'écriture*").

It was only once the technical means became available to record oral speech acts, as well as the situations and contexts in which they take place, that it became possible for the linguist to examine the particular conditions of their production and reception, their contextualizing procedures, and thus their specific organization.

The question of data is thus decisive, and not only for the language historian. As Mary-Annick Morel and Laurent Danon-Boileau state in their book entitled *Grammaire de l'intonation* (1998), there is a world of difference between spoken and written language and the difference is so great that the description of spoken French is often closer to that of an exotic language than to written French ("*De l'oral à l'écrit il y a un monde. La différence est si grande que la description du français oral ressemble plus souvent à celle d'une langue exotique qu'à celle du français écrit*").

This being so, consider the difficulties in trying to understand the oral manifestations of the past based only on clues found within those written sources that have reached us.

It would of course be wrong, however, to suppose that linguistic acts that take place via the phonic–auditory channel and the graphic (visual) media have nothing in common. The reciprocal interrelationships, always dynamic and changing, between **all** varieties of use are becoming increasingly close and intense, and the permeability between oral and written language is particularly marked. Political, economic, and sociocultural factors (the processes of national unity, administrative centralization, increased speaker mobility, industrialization, schooling and literacy, the role of the media, etc.) have enabled new strata of the population to become part of the written culture and to participate in the process of standardization of what we call written language.

We should not simplistically separate spoken language (spoken English, *français parlé*, *italiano parlato*, *español hablado* . . .) from written language, but rather all modalities should be contemplated within one gradual and multiparametrical scale in which, ultimately, the level of accommodation and complicity (or divergence) that exists between those who take part in a given speech act and the register or the discourse tradition will determine the choices made in each case.

The need to revise the history of language from a variationist perspective is, in part, the consequence of

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The need to revise the history of language from a variationist perspective is, in part, the consequence of

the search for traces or vestiges of oral language in the past. It has become necessary, not only to widen the range of the sources that, until relatively recently, have shown a preference for literary texts, but also to effectively consider the reciprocal interrelations that at each stage have existed between the written and the spoken. However, although levels of literacy vary from region to region, we should not lose sight of the fact that those populations able to read and write have been few and far between. Nor should we forget that the researcher studying the early development of written language is almost always groping in the dark, thereby giving rise, for example, to a considerable diversity of opinions of what was spoken in each area of Romania between the 8th and 11th centuries and to what extent it had diverged from written Latin. Nevertheless, it seems clear that advances are unlikely to be spectacular in those areas that would appear to be most relevant in helping us reach a conceptual understanding of oral language, that is, those constructive techniques used in situations of communicative immediacy or proximity. It is not possible to write as we speak (nor, of course, do we speak as we write), no matter how often this desire for such a stylistic ideal may be expressed.

The approximate reconstruction of the phonological system and its changes has been achieved relatively successfully, especially in those languages where texts exist to guarantee continuity and where comparisons can be made with other closely related languages. It is also possible to deduce the differences in accent preferences, when comparing, for example, Italian items such as *popolo* o *tavolo* with the corresponding terms in French (*peuble, table*) or Spanish (*pueblo, tabla*).

The same can be said of the history of lexicon, although the explanation of changes in meaning is somewhat more complex than that of phonetic alteration, involving a simultaneous examination of internal and external causes. At times this task is not excessively problematic. The fact that a derivative of the Germanic *blank* was implemented in most of the Romance languages (fr. *blanc,* it. *bianco,* esp. *blanco*) at the expense of the Latin *candidus*, and that *albus* was preserved only in learned environments, provides semantic evidence, albeit indirect. Similarly, derivatives of *domus* were not adopted as new conceptualizations of *abodes* or *dwellings* emerged, although it is necessary to explain why some opted for *casa* and others for *mansione*.

In most cases, however, the task is an arduous one. It is not easy to establish the limits between a linguistic textual analysis and a critical philological interpretation. Furthermore, it is necessary to have an adequate knowledge of the pragmatic implications of the expressions found in the texts, be they literary or nonliterary. In order to unravel the meaning of one single word, *auze* ('luck', 'fortune'), which disappeared from Castilian texts at the end of the Middle Ages, F. de Bustos Tovar (2000) found it necessary to consider simultaneously the problems of etymology, morphology, discourse analysis, etc. Furthermore, in order to understand something of the mysterious and random future of humans, one cannot forget that the observation of the flight and movement of birds led to the predictions of astrologers based on careful contemplation of the stars. The same author (de Bustos Tovar, in press) adopted a similar approach with the term *mantenencia* ('sustenance', 'support'), derived from *mantener* and common to all Western Romance languages. In all cases, however, it is almost always difficult to ascertain to what extent this is to do with the real vitality of the expressions since this requires data that are not normally found in written texts. Linguistic meaning is permanently subject to two types of tension: between stability and instability, on the one hand, and between what is denoted and the sense it truly offers, on the other hand. All this serves to emphasize the grades and contours or hazy boundaries of meaning.

With the particular discourse syntax of spoken language, however, we must be content with the formulation of plausible hypotheses. Years of research into the particular constructive strategies of *français parlé* have led Claire-Blanche Benveniste and her group to suggest that its syntax is characterized by the special type of organization and planning it implies. In particular, conversational language allows us to see numerous traces and vestiges of the stages of the process of the production of utterances, that is, the successive choices the speaker is faced with before reaching the final product. The paradigmatic accumulation, the continuous stoppings, startings, and detours that take place in the confection of the sequences, and the frequent additions and fillers create a very different climate than that found in written language. All this ultimately has to do with the fact that the oral varieties, particularly the prototypically colloquial ones, are strongly rooted to the conditions needed in a communicative situation in which the exploitation of determinant resources (e.g., prosodic) is decisive for the acquisition of meaning.

Little of this can be retrieved from the writings of the past. One should not, of course, dismiss the possibility of reviving and actualizing the written word. In this way, Alonso (1925) managed to explain the actual meaning of *como que y cómo que*, common expressions (*-¿Cómo que no lo sabías?-¡Como que no lo sabía* ('How come you didn't know? Because I didn't!')) that were already present in medieval

texts. This, however, in no way implies that the past should, nor can, be explained from the reality of the present.

One cannot be careful enough to avoid the hierarchical deformation that often influences explanations. It should be remembered that syntactic variables that are never, or hardly ever, found in the writing of the past should not be considered variants of those that, precisely since they do, are thought of as invariants and, more often than not, **superior**. The difficulty in projecting the principle that Rosanna Sornicola (2002) referred to as the *relatività della variazione* (the possibility of a variationist linguistic approach without reference to homogeneity as a **logically** preceding concept) does not mean that it should be ignored. Whether the dominant Romance word order in basic predicative structures has or has not become S(ubject)–V(erb)–O(bject) and discussions about the preferred argument structures of each language should not be posed in general terms once and for all, but rather should be seen in each case in terms of the particular register, discourse tradition, and communicative situation. Failure to adopt this type of caution leads, for example, to sequences such as *el periódico ¿lo compras tú?* ('Is it you who is going to buy the newspaper? Are you going to buy the newspaper?') being qualified as *dislocated* ('to the left') when they are standard and commonly used in spoken language and with a pragmatic efficiency that cannot be matched by more syntactically controlled forms (*¿compras (tú) el periódico*?). Similarly, without circumspection *allí es donde deberíamos haber ido* ('That is where we should have gone') would be simply interpreted as a split construction 'derived' from *deberíamos haber ido allí* ('We should have gone there') or *que* might be considered as a **weak** relative in common usages (also, incidentally, dating back to the origins of Romance languages) such as *es una mujer que lo primero que destaca en ella es su elegancia* ('The first thing that strikes one about that woman is her beauty').

In general terms, the historical study of spoken language should abandon the prejudiced point of view that considers the maturing process of languages as lineal and unique, a belief that is based precisely on the exclusive or preferential observation of the facts as presented through written texts. The widely held belief that the use of mechanisms of **subordination** has been increasing with time at the expense of **paratactic** resources does not apply uniformly to all types of language. The integration and structuring of utterances (sentential or not) in oral discourse are achieved through various means, some of which have little to do with those described by grammarians whose knowledge is markedly philological.

More may be deduced about the spoken language of the past as the traditional sentential approach to the study of syntax continues to give way to a pragmatic approach. However, despite these advances, including the incipient configuration of historical dialectology and sociolinguistics, there is something that will always remain fundamentally out of reach of language historians: the divergences derived from the different levels of linguistic and communicative competence reached by the given speakers. The varying capacities of individuals to make use, both actively and passively, of the various oral registers (particularly because until fairly recently the written word was available to very few) cannot be gleaned through the written word. In this sense, F. de Saussure is accurate in his observation that writing veils and disguises the spoken language rather than dresses it: "*l'écriture voile la vue de la langue: elle n'est pas un vêtement, mais un travestissement*."

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Spoken Discourse: Morphophonological Aspects

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Introduction

Morphophonology is one of the most complex technical terms used in linguistics. There are debates surrounding not only the terminology ('morphophonology,' 'morphonology,' and 'morphophonemics' are not exact synonyms), but also its specific subject matter, the subject's boundaries, and its status within the general framework of linguistic theory (for a historical survey of the notion, see Kilbury, 1976).

A broad, if not unproblematic, definition of morphophonology includes the study of the phonological shape and structure of morphemes, of morpheme-boundaries and of alternations that have a morphological function in a language (Trubetzkoy, 1929). A certain kind of alternation is recoverable, for instance, in the English verbal opposition *give*~*gave*, in which vocalic quality (ablaut) distinguishes between the tenses. An alternation can remain productive (e.g., substandard *bring*~*brang)*, and in some cases it can coexist with a concomitant marker of the morphological distinction alongside the primary [marker like, for instance, the German singular/plural pair hand~hände 'hand(s)' in which the plurality is additionally marked by the suffix -e] (Van Coetsem and McCormick, 1990).

A great number of studies have taken morphophonological phenomena into account from different perspectives and with differing levels of detail, depending on theoretical complexity, itself closely tied to important changes in practice in phonology and morphology over the last thirty years (see, among others, Dressler, 1985; Maiden, 1991; Singh, 1994; Ito and Mester, 2003). However, very little research has been done on spoken discourse and, more specifically, on utterances produced during actual interactions between people. In fact, previous theories and sets of rules that were proposed in the literature in order to explain alternations are based partly on investigation of written corpora, partly on introspection, and partly on material elicited *ad hoc*, using linguistic questionnaires or laboratory techniques.

As will be illustrated in the following sections, the analysis of how morphophonological alternations function in discourse can actually be very illuminating: it helps in testing the validity of the various theoretical approaches in morphophonology; it facilitates verifying some assumptions about how the speaker interprets the alternations; and it provides us with evidence about the way these phenomena function during actual interactions.

Early Approaches to Morphophonology: Abstraction from Discourse

It is no accident that the two seminal articles of the American morphophonemics school were written by two field-oriented descriptivists interested in Native American languages: Bloomfield (1939) and Voegelin (1935), working on Menomini and Tübatulabal morphophonemics respectively. Since Bloomfield's work, however, researchers in morphophonemics have become mainly interested in the distributional analysis of series of alternations, in order to discover and then formulate rules for the transformation of phonological sequences into morphological ones. Sometimes the succinctness of elegant theoretical approaches not only has obscured the actual speakers behind the language but has led to the use of excessively abstract input and a theoretical apparatus that is too complex. Hockett, at the end of the 1960s, complained about the fact that almost all theorists considered morphophonemes to be true linguistic elements rather than merely a construct existing at a certain level of abstraction as a tool useful for linguistic description and analysis: "If the search for economical morphophonemic notations and rules is going to lead us into this trap in the future as it has in the last couple of decades the price paid for the resulting succinctness of statements is too high" (Hockett, 1967: 221). Even recently, the majority of studies situate morphophonological alternations in spoken language within specific theoretical models at some degree of abstraction, in order to prove the explanatory power of a particular paradigm, or to provide data about how language works (see, for instance, Alderete, 2001; Trón and Rebrus, 2001; Vajda, 2001).

Morphophonology and the Speaker

It is still a matter of debate whether morphophonological rules play a role in speech processing and speech production. Bottom-up (using only acoustic information to decode the speech signal) and top-down processes (the use of semantic and morphosyntactic information) appear to operate together in word identification in conversational speech (Ernestus *et al.*, 2002). It has been demonstrated through experimental research on sound perception and language processing that people tend to hear what they 'should hear' in relation to their knowledge of language, together with the contextual situation and orthography,

Table 1 Metaphonic raising

High mid	/e/	→	/i/				
	/o/	→	/u/				
Low mid	/ɛ/	→	/jɛ/	or	/je/	or	/e/
	/ɔ/	→	/wɔ/	or	/wo/	or	/o/
	/a/	→	/ɛ/	or	/je/		

rather than merely hearing the physical sounds of the speech signal. An experiment on French, for instance, demonstrates that in combinations of morphemes in words like 'absurd,' morphologically analyzable as {ab-}+{surd}, and phonetically as [apsyrd], the realization of /b/ before the unvoiced consonant, as a labial stop, is perceived as [p], but it is analyzed by the speaker as a voiced consonant. In the authors' opinion (Hallé *et al.*, 2000) there are two possible interpretations of the data. The first relies on cohort activation, consistent with the graphic code: the code /b/ is lexically mediated by a cohort of words that are phonetically compatible with the acoustic input spelled with a 'b.' The second hypothesis is based on prefix activation, by means of a morphophonemic code. This second explanation is not as well supported by findings reported in other studies, and, in any case, the role of morphonological code in word recognition is still a matter of debate.

As regards speech production, on the other hand, some studies conducted within the 'slips of the tongue' and 'errors in speech' frameworks (Fromkin, 1971: 40–42) and others on language deficit and language impairment (Macoir and Béland, 1998) support the relevance of morphophonological constraints and segmental units during actual speech production (for more information on morphophonological word encoding in speech production, see Levelt *et al.*, 1999). Thus, it appears that the morphophonological level is at the very least a useful tool for describing some types of performance error and some language impairments.

Evidence from Discourse

The analysis of morphophonological phenomena in spoken discourse can sometimes throw up intriguing anomalies as regards the way language works and consequently prompts new questions about the theoretical accounts. A specific example will be useful here. In a well-documented monograph on morphonology, Maiden (1991) considers metaphonetic alternation in Southern Italian dialects. Metaphony is a type of assimilatory phenomenon, akin to Germanic umlaut, that involves the raising of mid and low stressed vowels (Table 1) when they are followed by unstressed high vowels, /i/ or /u/.

Table 2 Castro dei Volsci inflectional metaphony

	SING	*PL*	
MASC	ʃp**u**sə	ʃp**u**sə	< lat. *spōnsa*(*m*) 'spouse'
FEM	ʃp**o**sa	ʃp**o**sə	
MASC	s**i**kkə	s**i**kkə	<lat. *sĭccu*(*m*) 'dry'
FEM	s**e**kka	s**e**kkə	
MASC	n**wo**və	n**wo**və	< lat. *nŏvu*(*m*) 'new'
FEM	nɔva	nɔvə	
MASC	v**je**kkjə	v**je**kkjə	<lat. *věclu*(*m*) 'old'
FEM	vɛkkja	vɛkkjə	
MASC	**a**wtə	ɛwtə	<lat. *ăltu*(*m*) 'high'
FEM	**a**wta	**a**wtə	

The vocalic alternation resulting from metaphony fulfills a morphological function in that it marks number and gender in noun declension and grammatical person in verb inflection. In some dialects, a neutralizing sound change merges to schwa the vowels that originally caused the metaphony, and metaphony therefore becomes the sole indicator of the morphosyntactic categories, as shown in the example below taken from a Southern dialect (Table 2 Castro dei Volsci, adapted by Maiden, 1991: 166).

The study identifies 16 subtypes of metaphonesis across Italian dialects, differentiated by the height of the input vowel, the structure of the tonic syllable, and the frontness of the conditioning vowel. Based on these parameters, a set of implicational hierarchies of susceptibility to metaphonic assimilation is found crossdialectally: metaphony by /u/ implies metaphony by /i/; metaphony of lower vowels generally implies metaphony of higher vowels; metaphony in closed syllables implies metaphony in open syllables. These hierarchies reflect inherent properties of the phonetic process and it is shown that the morphologization of metaphonesis precedes the neutralization of posttonic vowels, but it occurs prior to the disappearance of metaphonesis as a phonetic process. One of the aims of the study is to prove the intimate synchronic interaction between phonology (phonetic) and morphology, an interaction that is also relevant for the speaker's own interpretation of the language, where the speaker is obviously an ideal speaker. Maiden states that "... morphonology is an interaction such that morphological structures contribute to the integration of phonetic process into a language."

This detailed study seems to be based on data extracted only from the descriptive dialectological literature on Italian metaphony, without including any fieldwork. This kind of data has presumably been elicited using linguistic questionnaires and so does not include spoken discourse, and probably it is not really reliable when it comes to the quality of the documentation regarding specific phonetic details.

Recent studies of some Campanian dialects (Milano, 2002) confirm the implicational hierarchies discovered by Maiden, but, being based on corpora of spontaneous spoken dialects, they allow us to observe some features that cannot be seen using written corpora or questionnaires about lexical usage. In fact, it is shown that during spontaneous speech there are other sporadic instances of palatalized sounds (a phenomenon similar to the one reported in Table 2, line 5), even in nonmetaphonetic contexts (i.e., in the absence of a following unstressed high vowel), and which are not associated with the morphosyntactic categories of gender and number (i.e., ['vɛrkə] <late Lat. *barca*(*m*) 'boat,' [kra'vɛttə] <Fr. *cravate* 'tie'). Furthermore, the palatalized alternant occurs only in a very small number of lexical items. These two findings might make us question whether the phonetic conditioning of this phenomenon is still productive and whether it continues to be morphologically relevant for the speaker's own analysis of the language. They highlight the synchronic relevance of lexical distribution and a partial synchronic fossilization of the phenomenon.

In other cases, the analysis of actual interactions shows that the production of some alternants in a context of morphophonolgical variability may be affected by factors such as certain discourse features, topic of conversation, particular sociolinguistic identity and idiosyncrasies of the speaker, and other aspects such as linguistic consciousness (Como, 2004).

One can, therefore, analyze morphophonological phenomena in discourse from the perspective of sociolinguistics or of language change, as well as from variationist perspectives. For instance, Holes (1986) works on data from natural conversations of a group of 87 literate and illiterate speakers of the Arabic varieties of Bahrain, in a social context of rapid modernization. He considers morphophonological alternants occurring in the verbal paradigm of some spoken Arabic dialects of Bahrain. The study focuses on the sociolinguistic value of the alternation and on variation connected to subject matter, the situation, and speaker identity and motivation for the spread of change.

One can find interesting evidence about morphophonological change, connected to the spoken nature of language, in Pidgin and Creole studies. Romaine (1992: 31) goes so far as to say that "the most striking differences between native speakers and non-native speakers are probably to be found in the morphophonemics." Samarin (1997), questioning this assumption, examines the process of morphophonological condensation (or reduction) of words in the creolization process of Sango, a nativized pidgin of the Central African Republic. Samarin calls into question explanations of reduction phenomena that are based on speaker intention, nativization, fluency, speed of production, naturalness, and style.

See also: Bahrain: Language Situation; Bloomfield, Leonard (1887–1949); Sango; Specific Language Impairment; Speech Perception; Speech Production; Voegelin, Charles Frederick (1906–1986) and Voegelin, Florence Marie (1927–1989).

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Spoken Discourse: Types

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Introduction

By definition, spoken discourse consists of at least two people taking turns who interact in an initiation and response structure (Sinclair and Coulthard, 1992). Some of the most typical features of spoken discourse are personal involvement and real-time constraints. Involvement is generally marked by using first and second personal pronouns; by monitoring the communication channel through rising intonation, pauses, requests for back-channel responses; by giving emphasis to people and their relationship; by reporting speakers' mental processes and by using emphatic particles (*really*, *just*, etc.). Real-time constraints, on the other hand, are highlighted by place and time adverbs, or by verb tense and aspect (Biber, 1986; Tannen, 1982). This description of spoken texts emphasizes the contrast with written texts, which may also be represented by the following oppositions: involvement vs. detachment; maximal use of context vs. maximal background information; inexplicitness vs. explicitness; dependence for effect of paralinguistic and nonverbal channel vs. dependence on lexicalization to establish cohesion; and so on (Tannen, 1982).

Spoken discourse features are not determined by contrast to written discourse features alone. As the range of variation of spoken texts is so great, from trivial conversation to elaborate political speeches, etc., reference is made to a typology of spoken discourse. Discourse types are characterized by different uses of linguistic structures, refer to specific social contexts and situations, to participants having specific roles and status, and are controlled by social rules and conventions.

The main problem with assigning type labels to discourse is whether it should be classified from a structural or from a functional point of view. Researchers have questioned which of the two perspectives is more relevant in a typology of spoken discourse. On one hand, all utterances have a meaning, a purpose, or an intention (the functions of the utterances). On the other hand, the words in the utterance, the linguistic structure, determine its functions. More often than not, the only way to understand the function of the utterance is by referring to situation, discourse structure, and intonation, whereas the linguistic structure of the utterance is the least helpful in this respect.

The next section briefly explores these different approaches. Here, we will use *text* and *discourse* as synonyms. In fact, the two terms have a different background of uses in linguistic studies. According to Virtaten (1990: 447), "*text* is often used of a static concept – the product of a process – while *discourse* is used to refer to a dynamic notion – the process of text production and comprehension. It is the processual approach that naturally takes situational context into account."

Types of Spoken Discourse: A Review of Functional and Structural Approaches

Over the last few years, many studies have attempted to determine the nature and extent of structural and

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Types of Spoken Discourse: A Review of Functional and Structural Approaches

Over the last few years, many studies have attempted to determine the nature and extent of structural and

functional similarities and differences between spoken and written texts, in order to provide some theoretical and empirical prerequisites for comparative discourse research.

Traditionally, and according to rhetorical theory, four basic kinds of discourse exist: narration, description, exposition, and argumentation (De Beaugrande, 1981; Werlich, 1983). These theories emphasize the functional aspects, and the different kinds of speaker contributions are considered prominent. Levelt states that one of the most important features in a typology of texts is the mutual agreement that interlocutors have in the interaction. Levelt (1989: 111–112) affirms that it would be a problem if a speaker "constructs his messages in the framework of the wrong discourse type – for example, if he takes an examination to be a debate, or air-traffic-control discourse to be everyday conversation." Discourse type is established by considering the way the talk is led; for instance if a person talks like a doctor (i.e., speaking of hematoma instead of a bruise) the interlocutor recognizes that the discourse is of the doctor–patient type.

Considering this, Levelt lists some of the different types of discourse as follows: informal everyday conversation, narrations, lectures, examinations and interviews, debates, planning discourse, route direction, radio talk, and therapeutic discourse. One of the main characteristics of informal everyday conversation is "the interlocutors' awareness of informality, of roughly equal rights to the floor, and of the freedom to change topic" (Levelt, 1989: 111). One of the most remarkable differences between informal and formal discourse concerns the turn-taking rules to follow. Heritage (1998: 164) observes that in analyzing interactions one should immediately consider if they involve the use of a special turn-taking organization. In institutional interaction, we normally have a turn-taking organization and the types of contributions speakers are expected to make can be predictable. Consequently, departures from it can be explicitly sanctioned, such as "in meetings when speakers are ruled 'out of order', in the courts when persons are sanctioned for answering when they should not, or failing to answer appropriately, or when children in classrooms are punished for 'shouting out' answers, or talking when the teacher is talking" (Heritage, 1998: 165).

Informal everyday conversation is a label under which many other sublabels could be included. The range of informal everyday conversation is indeed very wide: from chatting with peers to chatting with parents or children, from male to female ways of chatting; from narrations to dialogues, etc. There are some considerable differences between male and female discourse. According to Tannen (1992), one of the greatest differences is the way they report facts: women complain that men tend to tell only the indispensable, whereas men complain that women give too much useless information (see also Carter *et al.*, 2003: 286–287). Tannen thinks this happens because men and women have different approaches to narrations: men see the recounting of incidents as a reporting, while women pay more attention to the metamessage because they feel that recounting experiences is a way to relate to the listener. Another difference between male and female discourse is represented by what Kendall and Tannen (2001: 555) refer to as the taking up of roles of expertise or authority. Men tend to take up this role very often, while women are more likely to avoid it.

An important feature of narrations is interlocutor awareness of the following: "a single speaker has a preferential right to the floor until the narrative is completed. The speaker can count on the suspension of disruptive self-selection by other participants, but has to pay by having to generate a structured sequence of messages" (Levelt, 1989: 111).

A more formal type of discourse includes lectures, examinations, interviews, and debates. Levelt (1989: 112) defines lectures as more serious and impersonal, remarking that when lecturing the speaker is supposed to make his views known to a "spatially marked audience." Examinations and interviews are instead "characterized by a fixed question-answer turn order, in which roles are clearly divided as to who does the questioning and who gives the answers" (Levelt, 1989: 112). Debates are considered to "share much of the question-answer nature of examinations, but the role of questioner is now equally distributed between the participants, and each participant has some thesis to defend" (Levelt, 1989: 112).

The informal vs. formal conversation opposition may also be referred to in terms of institutional vs. noninstitutional interaction. According to Heritage (1998: 164, 175), some features of institutional interaction are the asymmetries of participation and the involvement of the participants in specific goal orientations connected to their institutional identities: doctor and patient, teacher and pupil, etc. For example, in a medical setting, Tannen and Wallat (1993) observed information exchanges between a mother, a child, and a pediatrician. Results showed that the pediatrician used three different registers depending on the three different audiences. She switched from one code to another, using different intonation, voice quality, content, and lexical and syntactic structures. The register used when addressing colleagues and performing diagnostic procedures can be defined as

reporting. It was characterized by flat intonation, rapid rate of speech, relatively low pitch, and the absence of marked facial expressions and gestures. However, when addressing the child she used motherese, as in the following example:

> Doctor: Let me look in your ear. Okay? Do you have a monkey in your ear?
> Child: [laughing] No.
> Doctor: No? . . . Let's see . . . I see . . . a birdie. (Tannen and Wallat, 1993: 39)

Finally, she used everyday conversation register when addressing the mother:

> Mother: It just appears that way?
> Doctor: Yes. It's very . . . it's really . . . it's like floppy you know and that's why it sounds . . . the way it is.
> Mother: She worries me at night (Tannen and Wallat, 1993: 39).

Tannen and Wallat also noticed that the pediatrician suppressed her emotional responses and monitored the amounts and the impact of information imparted. Emotional response to a medical problem by a friend is quite appropriate, whereas a doctor's emotional response could cause the patient to panic.

Another way speakers adapt to institutional contexts is by selecting descriptive terms. For instance, one could use 'cop' in everyday conversation, but when giving evidence in court one would select 'police officer' instead (Sacks, 1979). In medicine, where references to pain are often euphemistic, a patient will be asked 'Is it sore?' instead of 'Is it painful?' (Heritage and Sorjonen, 1994: 174).

The typologies described so far give priority to functional rather than structural analysis: first functional characteristics are isolated, and only later linguistic features are identified on the basis of the predefined functional distinctions. As opposed to this methodology, Biber (1988: 13) noted that even if a set of texts have similar functions, texts may not necessarily have similar forms. On the contrary, if texts share similar linguistic features, they are also expected to have functional similarities, "because linguistic cooccurrence reflects shared function. The order analysis is reversed from previous studies, however. The types are first identified on the basis of their linguistic characteristics and only subsequently interpreted functionally" (Biber, 1989: 4). Biber (1995: 320) also marked the salient difference between text types and registers, and highlighted the linguistic predominance in identifying text types. He noticed that text types are similar to registers in that they "both can be described with respect to their linguistic characteristics and with respect to their situational/functional characteristics. However, these two constructs differ in their primary bases: registers are defined in terms of situational/functional characteristics, while text types are defined linguistically."

His new approach to identifying text types is based on sets of syntactic and lexical features that frequently co-occur in texts. He calls these feature sets, empirically identified dimensions of variation, and the linguistic characteristics of any given text can be specified precisely with respect to each dimension. The dimensions and associated text characterizations provide the basis for his typology. According to Biber (1989: 7), there are 16 main grammatical categories that the linguistic features fall into:

> (A) tense and aspect markers, (B) place and time adverbial, (C) pronouns and pro-verbs, (D) questions, (E) nominal forms, (F) passives, (G) stative forms, (H) subordination features, (I) prepositional phrase, adjectives, and adverbs (J) lexical specificity, (K) lexical classes, (L) modals, (M) specialized verb classes, (N) reduced forms and dispreferred structures, (O) coordination, and (P) negation.

After preliminary analysis, he identifies the five-dimension system to represent communicative functions, in order to deal with all text types (e.g., face-to-face, telephone and public conversation, debates, interviews, broadcast, spontaneous speech, and planned speech). The five dimensions are labelled as follows (Biber, 1989: 10):

1. Involved vs. informational production
2. Narrative versus non-narrative concerns
3. Elaborated vs. situation-dependent reference
4. Overt expression of persuasion
5. Abstract vs. nonabstract style.

He uses quantitative techniques to identify the groups of features that co-occur in texts, and then groupings are interpreted in functional terms. However, Biber (1989: 41) underlines the continuous range of variation among texts and the different score the text may have on each dimension, in a continuous, multidimensional space of variation.

In order to handle this lack of balance between linguistic structure and function, Sinclair and Coulthard (1992) developed a model for spoken discourse analysis, using Austin's speech act theory and Halliday's description of grammar based on a rank scale (they were inspired by Halliday [1961]. Their model first appeared in Sinclair and Coulthard [1975], *Towards an analysis of discourse: the English used by teachers and pupils*, and then in Sinclair and Coulthard [1992]). Sinclair and Coulthard aimed at making a practical and functional description of discourse. They began with classroom settings because of their simple interaction

patterns, and similar discourse rules with other situations, thus creating a system suitable for all discourse analysis. Sinclair and Coulthard observed that in classrooms, the teacher initiated (I) all exchanges, the students responded (R), and the teacher would follow-up (F) on what had been said or done, creating an I-R-F type of discourse. This system is useful as it focuses on the speaker tactics used to determine the purpose of utterances. They define lessons as the greatest unit of classroom discourse, consisting of more transactions formed by the boundary elements, the 'frame': *right*, *well*, *good*, *OK*, *now*. These terms are frequently used by all teachers, and mark the end of one stage and the beginning of the next. The function of the 'focus' (a special kind of statement) in the transaction is to tell the class what is going to happen; and they generally occur after frames. Sinclair and Coulthard are aware that the order of transactions varies for each teacher and there is no restriction on the occurrence of different types.

Types have no defined boundaries; on the contrary, they are characterized by a continuous range of variation, which can be grasped only when observing concrete data. It is impossible to label types without data. Theoretical findings do not always reflect what in effect happens in practice. For example, Basturkmen (2003: 21–22) has investigated the ways the presence and absence of the tutor impacted on the exchange structure of an academic discussion. In contrast to his expectations, his analysis did not show that the authority figure dominated by controlling the interaction, i.e., by initiating exchanges; on the contrary, during interaction in presence of the tutor, half the exchanges were initiated by students. He also observes that the arrival of the tutor made the discussion become more solution-driven rather than idea focused, with a large number of student–student exchanges.

A further example of spoken discourse is sports broadcasting. According to Ferguson (1983), sports broadcasting shows a particular use of syntax and register. He considers it as a discourse genre and analyzes it in terms of register variation. The register is located by the characterization of its occasions of use – such broadcasts start with background information about the game, the occasion, the teams, and so forth; they include components of direct reportage, comment, advertising commercials, and conclude with interviews of players and coaches. These elements are in relatively fixed proportions and relatively fixed sequence, and selected syntactic characteristics are also identified such as simplification (deletion of copula and sentence initial nominals, which give both the lowering of pitch and loudness for parenthetical expressions and structural simplification), inversions ("Holding up at third is Murphy"; Ferguson, 1983: 160), heavy modifiers ("Eddie Yost, *a crackerjack, who was not a power hitter*, . . ."; Ferguson, 1983: 163), result expressions (*for* + noun "He throws *for* the out"; *to* + phrase "And he just keeps alive, reaching out *to* foul-tip one back"; Ferguson, 1983: 161), routines (e.g., giving the count: "One and one"; Ferguson, 1983: 166).

Conclusion

The list of types of spoken discourse taken into account here is in no way complete. Instead, our aim was to emphasize some critical points related to the problem of establishing the typology of spoken discourse, such as the limits and the indistinct boundary of all kinds of typology, and finally the priority of the functional or structural perspective.

Rather than trying to encourage a tolerant attitude conciliating both approaches, or to establish priorities between them, the old chicken and egg story prevails: the problem is deciding which comes first? "The situation we're in (e.g., a committee meeting)? Or the language we use (our committee ways of talking and interacting)?" (Gee, 2003: 11). According to Gee, this reciprocal process through time is just the core of the magic property of language: "when we speak or write we craft what we have to say to *fit* the situation or context in which we are communicating. But, at the same time, how we speak or write *creates* that very situation or context" (Gee, 2003: 11).

See also: Class Language; Classroom Talk; Institutional Talk; Medical Discourse: Doctor–Patient Communication; News Language; Queer Talk; Radio: Language; Sports Broadcasting; Television: Language; Understanding Spoken Discourse.

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Spoken Discourse: Word Order

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A fundamental empirical step in the analysis of word order (WO) in spoken discourse is that of determining the scope of the verbal material within which the order of elements is to be considered. The problem is particularly difficult because spoken material typically appears in patterns that deviate from the 'well-formed' syntactic structures of written language. This deviation can be seen – along the lines of the classical generative focus on syntactic competence – as merely performance based, and too trivial to analyze; or as nontrivial and generated by discourse-conditioned syntactic rules operating on 'well-formed' structures (e.g., discourse deletion rules, as proposed by functionally oriented syntacticians), or it may be – as more recently argued by an increasing number of scholars (cf., Sornicola, 1991; Haiman and Thompson, 1988; Miller and Weinert, 1998) – that spoken structures, with their fragmented syntax, may require an entirely different clause-based (rather than sentence-based) approach to syntax.

Another immediate problem for the student of spoken discourse lies in the terms in which spoken WO is to be formulated. One formulation frequently used by linguists is based on the Greenbergian categories of S(ubject), V(erb), and O(bject) (Greenberg, 1966). The familiar WO universals, however, were explicitly formulated so as to exclude 'marked' sentences: they were based on sentences without pronouns, without missing arguments, and on sentences uttered with 'neutral' intonation. Since this excludes precisely the phenomena typical of spoken language, the regularities that characterize spoken WO are unlikely to emerge from using these categories. The other well-known formulation of the linear order of elements operates with the Prague school

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functional categories (now perhaps more appropriately called cognitive categories) often referred to as 'old/new information,' 'topic/comment,' or 'theme/rheme.' The original Praguian analysis of WO in terms of these categories was carried out mainly on the literary register of Slavic languages and English, as found in written sources. It has since been applied to spoken material, with the inclusion of intonational factors. The tendency to begin an utterance with a topiclike argument group and continuing with a proposition or a comment about this topic has by now been attested in a number of Indo-European 'subject languages,' and it appears to be the main linearization principle in so-called 'topic languages' (Li, 1976). It has also been shown (Ochs, 1979) that this order is typical of the speech of English-speaking children. Since both the study of natural spoken communication and cognitive linguistics are young areas, however, caution must be exercised in formulating WO rules in terms of concepts that await consistent, or at least generally accepted, definitions.

Spoken discourse by definition involves utterance intonation, and therein lies another challenge for WO analysis. Intonation happens to be the youngest area of phonology, and it is difficult to incorporate it into analysis without considerable expertise. Crossdisciplinary expertise, however, is relatively rare; consequently, important intonational cues affecting WO are often overlooked, as intonation goes misjudged, underplayed, or outright ignored in the analysis of WO. Moreover, a prerequisite for intonationally valid analyses is access to reliable auditory data, a factor rapidly becoming addressed but still not standard in spoken WO research.

Spoken language is situated in discourse. WO produced in spoken discourse is affected by a complex interaction of such pragmatic factors as the speaker's assumptions about the interlocutor and about their engagement in discourse, the speaker's subjective judgments and viewpoints, the deictic character of utterance elements, and the role of anaphora. One result of this context dependency is the prevalence in spoken data of elliptical constructions. What sounds like a complete utterance may contain only one or two words, even when the corresponding 'well-formed' sentence in a written or a formal register would have several. In analyzing the order in the spoken utterance, it hardly seems justified to speak of the 'would-be place' of a constituent missing in the spoken structure on the basis of a written version. This factor creates problems for both syntactic analysis and generalizations about WO.

We mentioned above that the source of the original Prague school studies of WO was written language. This is not a trivial point for the analysis of spoken WO, because before selecting the data we must decide how to distinguish spoken language from other varieties of language. The most obvious medium-based opposition – spoken vs. written – is clearly too simplistic. Variation in what is considered a single language can be regional, social, stylistic, idiolectal, or – everything else being equal – it may depend on delicate pragmatic distinctions, such as those of subject matter, the speaker's role in discourse, or the degree of spontaneity vs. preparedness of speech. In languages with a literary and/or normative tradition, the spoken language of some speakers is inevitably contaminated by the literary norm of the written language, which itself may be influenced by literary traditions of times or places far removed from the spoken language under consideration (including literary traditions imported from different language families). Teasing apart the features inherent in spoken and written WOs in a given language requires refined in-depth stylistic, cultural, and historical examination of a kind that has yet to be undertaken with respect to most languages. This raises both the practical question of the sociolinguistic and stylistic parameters used in the selection of the data for the study of spoken WO, and the theoretical question of the role and adequacy of diachronic considerations in the analysis of synchronic states.

We can expect there to be a difference in the occurrence of surface WO variability between languages with grammatically significant WO and those with so-called free WO. In the former, WO freedom within a clause is largely limited to adverbial elements; in the latter, variation is seen in the ordering of all constituents. Our discussion here will center on empirical material from one Indo-European language, Russian, often cited as an example of a 'free WO language.' Russian spoken data began to be actively collected in the late 1950s, predating the massive rise of interest in spoken language in the West by a quarter-century. The term 'spoken Russian' (SR) was firmly established through the appearance of Zemskaia (1973), a comprehensive and still unsurpassed survey of SR, which included a discussion of the salient characteristics of spoken WO (Zemskaia, 1973: 380–402); selected transcripts of the data were published as Zemskaia and Kapanadze (1978). The data were selected with attention to the points mentioned above. They consist of recordings of informal face-to-face conversations and narratives, and as such they represent what Givón (1979a) calls the 'pragmatic mode' of the language; both spontaneous and semirehearsed discourse are included, the latter occurring in ritualized dialogue (e.g., salesperson–customer encounters) and in narratives (Zemskaia distinguishes SR from

planned formal language, written or oral, dubbed 'bookish-literary Russian' [BLR]). Demographically, however, the data were produced almost exclusively by speakers of the literary language, and thus a considerable influence of normative grammar is to be expected. Indeed, the WO in these data shows a mixture of both normative/written and nonnormative/spoken WOs, revealing orders exclusive to SR or those shared by SR and BLR. Audio materials readily available to researchers of SR, however, are rather sparse, Kitaigorodskaia and Rozanova (1995) being one of them. A unique source is found in the growing electronically accessible database of audio texts of different oral genres, speaker ages and dialects of modern Russian edited by Sappok and Bondarko (1988–), which includes spontaneous and semispontaneous dialogue and narratives.

The peculiar syntax of 'spoken style' (as SR was first called) has been recognized since Panov (1962) delivered his forceful defense of spoken language as a legitimate object of linguistic investigation and a system with its own regularities, irreducible to a simplified, sloppy, or corrupted version of literary language. The subject of spoken WO began to be addressed concurrently with the rise of interest in SR (cf., Sirotinina, 1965; Lapteva, 1966; Kovtunova, 1967; and a major treatment in Lapteva, 1976). The question of the units of SR was tackled early on as a prerequisite to syntactic analysis. WO in Zemskaia (1973) is analyzed within so-called utterances, units marked by finite intonation (1973: 217ff.; cf., the intonation-and/or rhythm-based solutions for English in Chafe, 1988, and Halliday, 1989, among others). Based on this definition, (1), for example, is analyzed as three utterances ('//' signifies finite intonation; this and all examples and judgments are those of the sources; for examples from Zemskaia, 1973, only the page number is given in parentheses following the translation; for occasional other sources, examples are followed by full citation information):

(1) ia poslal im // pis'mo // zakaznoe //
I sent them letter registered
'I did send them. A letter. A registered one' (218)

The translation provided here follows Zemskaja's analysis of this message as three utterances. Under this analysis, the first utterance provides evidence of WO regularities within utterance boundaries, while the last two utterances contribute to the study of the sequencing of utterances in SR. It may also be argued, however, that the three utterances are a unit, since they constitute a complete proposition, albeit conveyed as a series of three intonationally independent chunks (compare similar phenomena in children's speech described in Ochs, 1979, or the literary device characteristic of modern prose called 'parcellation'). It may be possible, then, to see the sequence in (1) as a one-unit message, and on that basis try to account for the peculiarities of WO in this message. The way we set unit boundaries thus affects our analysis of WO.

If (1) was a case when intonational boundaries suggested more segmentation than that indicated by propositional considerations, the situation in SR can also be the reverse. An example is (2); taken from a typical SR excerpt in which, according to Zemskaia, only six out of 15 intonationally defined utterances can be analyzed as normative syntactic constructions ('/' signifies nonfinite intonation).

(2) / čto čelovek dolžen khodit' v sutki ne
that man must walk in day not
men'še čem desiat' tysiač šagov delat' //
less than ten thousand steps make
'that one must walk make no less than ten thousand steps a day' (220)

In this utterance fragment, there are two infinitives, 'to walk' and 'to make'; they are separated by several phrases and each of them would be normative with 'must' – but they cannot cooccur in BLR, as they do here. Ignoring intonational cues by positing a clause break after 'walk' and reinterpreting the WO accordingly (i.e., as 'one must walk, [one must] make no less than ten thousand steps a day') would amount to forcing a superficially attractive but incorrect solution. The challenge for the analyst is to determine why, when, and in what order this not uncommon SR pattern occurs (Zemskaia, 1973: 339–347; Lapteva, 1976: 339–351).

Standard literary Russian is often cited as an example of a language that allows different orders of elements within a sentence to satisfy the cognitive 'theme → rheme' requirement. As Sirotinina (1965), Lapteva (1966), Kovtunova (1967), Zemskaia (1973), and others have established early on, however, rhemes in SR are frequently marked not by their sentence-final position but by accentual prominence, and they tend to occur early on in an utterance. Thus the SR utterance (3) would occur in BLR as (4) (we have added here, and elsewhere, when helpful, our own indication of prominent accents, following the autosegmentally oriented approach to Russian intonation suggested in Yokoyama, 2001):

(3) skovoródka upala //
skillet fell
'a/the skillet fell' (249)

(4) upala skovorodka
fell skillet
'a/the skillet fell'

In (3), the rhematic (i.e., newly brought into the current discourse context) subject 'skillet' is accentually prominent (usually bearing a falling pitch accent) and appears first, while in (4), neither word bears accentual prominence and the rhematicity of the subject is encoded in its sentence-final position. The contrast between (3) and (4) shows some of the basic considerations that go into WO analysis in SR: the finite/nonfinite intonational distinction is important for defining the units of analysis, while the presence/absence of accentual prominence is important for at least some WO variation; and the difference between SR and BLR is particularly significant when analyzing WO data. In languages where WO is grammaticalized, the situation may differ. The English translations of (3) and (4), for example, are identical, since VS order is impossible, and in both cases the word 'skillet' must carry a pitch accent, which marks the rhematic element. The difference would have to show up in a different way: a husband may casually explain a noise in the kitchen to his wife as 'A/The skillet fell' (=[3]), while a proper old butler, explaining the same noise to the lady of the house, may deliver the considered response 'A/The skillet has fallen, madam' (=[4]).

The same principle as in (3) applies in longer utterances of SR. Examples (5)–(7) illustrate this, while allowing us to make additional generalizations:

(5) vot krásnoe daite požaluista mne moloko //
PART red give please me milk
'give me that réd milk please' (387)

(6) neveroiátno ėto dlilos' dolgo //
incredibly this lasted long
'this lasted incrédibly long' (388)

(7) otdel'nogo / u nas nét izdaniia //
separate at us is-not edition
'a separate edition we don't have' (391)

In examples (5)–(7), the accentually prominent (as marked) rhematic elements are, respectively, 'red,' 'incredibly,' and *net* 'there isn't.' When such rhematic elements occur early on in a noninterrogatory SR utterance, they may be preceded by items assessed by the speaker as contextually activated; these items carry a rising tone. The accented rhematic element may, in turn, be followed by other material which is unaccented and intonationally indistinct. The contextually activated items here are: the initial *vot*, a deictic particle pointing to the (red) milk carton in (5), and in (7), a group consisting of 'separate,' a contrasted item from the preceding context, and a prepositional phrase involving first-person discourse deixis (an item normally activated in a discourse situation). The postrhematic unaccented portion is a syntactic variable which the speaker evidently treats as informationally lightweight. Syntactic ties are ignored, as the noun phrases 'red milk' and 'separate edition' and the adverbial phrase 'incredibly long' are split by intervening material. Zemskaia states that the rhematic element occurring early in this way can syntactically be part of a noun phrase, an adverbial phrase, an adjective phrase, or a verb phrase (1973: 383ff.). The WO in SR statements observed so far can thus be generalized as follows:

(a) contextually activated items → accentually prominent rhematic item → other items

The concepts 'rhematic' and 'thematic' originated in the analysis of statements, and applying them to nondeclarative sentences is at best difficult. What is uncontroversial, however, is that questions in SR are distinct from those in BLR, in terms of both their intonation and their WO. As opposed to the BLR yes/no question in (8), consider the corresponding SR question (9) (Lapteva's data were hand-recorded and normal punctuation is used; '∨' indicates the boundary between 'two adjacent informational centers,' Lapteva, 1976: 186):

(8) budet li rabotat' professor?
will Q-PTCL work professor
'will the professor work?'

(9) professor ∨ búdet rabotat'?
professor will work
'the professor, will (he) work?' (Lapteva, 1976: 190)

The intonation of (8) is not distinguishable from that of a statement, and its interrogatory nature is understood from the initial position of the question focus (the tense marker) followed by the interrogatory particle *li*. The intonation of (9), on the other hand, is distinctly interrogative, the question focus bearing a rising pitch accent. The first word, 'professor,' bears a falling tone – decidedly not a feature of theme intonation in statements. Lapteva's intuitively defined 'two adjacent informational centers' in yes/no questions of SR evidently refers to the item bearing a falling tone and to the following question focus bearing a rising tone. To be able to refer to them separately, and given the dubious status of concepts such as 'theme' and 'rheme' when applied to questions, I will call the element occurring early on in SR questions of this type with a falling tone the 'q-item.' The q-item in (9) is referentially known to the interlocutors, but this is not a requirement for q-items. This is illustrated in (10), a yes/no question of essentially

the same structure as (9); here, the q-item 'pencil' is clearly new to the discourse situation and the speaker has no referential knowledge of it:

(10) u vas karandasha ∨ nét blizko pod rukami?
at you pencil is-not close at hands
'you don't have a pencil around (by any chance)?'
(Lapteva, 1976: 190)

Examples (10) and (11)–(13) provide additional evidence about interrogatory WO in SR. In (10)–(13), the q-items are not utterance initial; they follow discourse-contextually activated items: in (11), a referentially known personal name (either objectively brought up in the preceding context or subjectively assumed by the speaker to be of concern to the addressee at the moment), and in (10) and (12)–(13), the second-person discourse deixis (normally activated in a discourse situation). A q-item can also be a whole clause, as in (11). The foci of these yes/no questions (marked with pitch accents) occur after the q-items and can be followed by variables, including the clauses to which the q-items syntactically belong, as in (12) and (13):

(11) Ženia čto zavtra edem znáet?
Zhenia that tomorrow we-will-go knows
'does Zhenia know that we're going tomorrow?' (401)

(12) ty musor slýšala kogda uvozili?
you garbage heard when they-took
'you heard when they took the garbage?' (399)

(13) tebe sobaka nrávitsia kogda v dome?
to-you dog appeals when in house
'do you like when there's a dog in the house?' (400)

In (11), the whole clause 'that we're going tomorrow' appears early on, and within this q-item clause, *zavtra* 'tomorrow' occurs early bearing a falling tone, similar to the way the accentually prominent rhematic items occurred early on in (5)–(7). The WO in typical SR yes/no questions such as (9)–(13) can then be described as:

(b) contextually activated items → q-item → question-focus → other items

Note the similarity with (a). The WO in SR wh-questions operates the same way as in (b).

We mentioned at the beginning that one of the challenges for the analysis of WO in spoken discourse is to find appropriate terms in which to formulate the order. It is evident from cases such as (5)–(7) with early rhemes, and from cases such as (9)–(13) with q-items, that WO cannot be described in terms of syntactic units, as in both groups syntactic ties are violated and syntactic units are broken up. In contrast, viewing WO in terms of cognitive categories, and in conjunction with intonation, allows us to make some meaningful generalizations about SR WO patterns that are similar in both statements and questions. If we look at the behavior of contextually activated items, we see that they, too, show consistency when viewed in cognitive terms; consider the patterns in (14)–(17):

(14) bananovyi sok / nevkusno //
banana juice untasty
'banana juice, it doesn't taste good' (258)

(15) Validol nigde v gorode net //
Validol nowhere in town is-not
'Validol, it's nowhere in town' (258)

(16) ėta sumka / podkladka moetsia //
this bag lining washes
'this bag, the lining is washable' (252)

(17) a u nas iantar' / bróšechka
and at us amber broochlet
odna skol'ko stoit //
one how-much costs
'and our amber, just a tiny pin costs a lot!' (313)

In these utterances, there is no syntactic connection between the contextually activated items that appear in the beginning and the following material (note that despite the translations, there are no resumptive pronouns in the Russian originals). Example (14) lacks the expected gender–number agreement between the masculine nominative phrase 'banana juice' and the neuter impersonal predicate, while in (15), 'Validol' (a medicine) appears in the nominative case instead of the syntactically required genitive. In (16) and (17) the initial phrases, which bear nonfinite intonation, are simply linearly linked to complete sentential structures on their right. This relationship closely resembles so-called 'double subject' constructions, extensively documented for Korean and Japanese (e.g., Kuno, 1973). In these languages, the utterance-initial nominals syntactically detached from the following complete sentences are not restricted to spoken grammar, while in Russian, this type of linking is limited to spoken discourse. The placement of accentual prominence in (15)–(17) is clearly on the 'broochlet' and (in unmarked situations) on 'nowhere' and 'lining,' making their WO the same as in (a).

The importance of intonation and the role of deletions is very clear from another typical SR pattern seen in (18)–(20):

(18) a kotoraia v tsentre pust' nám otdadut
and which in center let us give
'and (the one) which is in the center, let them give it to us' (Lapteva, 1976: 150)

(19) riadom s oknom segodnia výpisali //
next to window today they-discharged
'(the one) next to the window, they discharged today' (236)

(20) nad nami živut / v Kíev pereezžaiut //
above us live to Kiev move
'(people) live above us, they're moving to Kiev' (239)

When considered without intonational clues, these sequences are syntactically and semantically implausible (note that despite the translations, there are no resumptive pronouns in the Russian originals). Yet constructions like these are frequent in SR and regularly interpretable as statements about the utterance-initial items (bearing the rising tone typically assigned to thematic material) which serve as arguments (but not necessarily as grammatical subjects) of the following incomplete clauses. Once these factors are taken into consideration, the WO in these constructions can be described. Despite its variable structure (in [18]–[20], respectively, a headless relative clause, a prepositional phrase, and a verb phrase), the front material as a whole is contextually activated, and the order in (18)–(20) is basically the same as in (a).

The extremely common SR pattern illustrated in (21) shows that the same constructions occur in questions. In this yes/no question, the prepositional phrase that functions as the subject of the following verb is its q-item, as is corroborated by the falling tone on 'sled,' while the rising pitch accent is on the question focus (the verb). Once the missing material and the intonational and cognitive cues are taken into consideration, the WO in questions with this SR structure turns out to be parallel to that in (b):

(21) s sankami ne prokhodíl tut?
with sled not passed here
'anybody with a sled passed here?' (236)

In SR, as in other spoken languages, the contextually activated utterance-initial material, regardless of its syntactic structure, may occur with resumptive nouns or pronouns in the following portion, as in (22)–(24):

(22) kartoška / kartošku on ne est //
potato.NOM potato.ACC he not eats
'potatoes, he doesn't eat potatoes' (243)

(23) s vami obedala / kak eë familiia?
with you lunched what her name
'the woman who had lunch with you, what's her last name?' (239)

(24) a respondent / ėto čto?
and respondent this what
'and "respondent," that's what?' (Zemskaia and Kapanadze, 1978: 73)

The resumptive elements do not necessarily duplicate the grammatical case of the front material. In the wh-questions (23) and (24), the first clauses constitute q-items, and the following sentences contain pronouns coreferent with the contextually activated material; in contrast with yes/no questions, the direction of the pitch in the wh-word – the question focus – is falling. The WO in (23) and (24) is the same as that in (9)–(13).

As can be seen from (24), the position of wh-words in SR can be clause final; in (24), the wh-word follows a deictic pronoun *ėto* 'this.' In BLR, the wh-word would appear in the beginning of the question and with a rising tone: *Chto takoe 'respondent'?* 'What is a "respondent"?'

Judging from the examples in Zemskaia (1973), Lapteva (1976), and Zemskaia and Kapanadze (1978), constructions with resumptive nouns or pronouns, which are similar to English left dislocation and French cleft constructions such as *moi, j'sais pas* '(as for) me, I don't know,' often occur in dialogues, and the contextually activated item repeats an item mentioned in the preceding utterance by the interlocutor. This suggests that their function may be to create an explicit discourse linkage in dialogic pairs.

Besides left dislocation, SR is known to have so-called right dislocation. The resumptive material on the right is unaccented, and it differs from the SR left dislocation in that the grammatical case of the added noun phrase is the same as that of the pronoun in the preceding clause; consider (25):

(25) oni vsé takie igolki
they all such needles
'they're all like that, needles' (Lapteva, 1976: 184)

Occasionally, the added noun phrase, still unaccented, appears in appositionlike fashion inside the main clause and immediately after the pronoun. The WO in these utterances follows the pattern in (a).

To summarize (a) and (b), then, the WO of SR utterances defined as sequences ending in finite intonation can be characterized intonationally as material with rising tone → accentual prominence → no accent. In terms of content, these are utterances with a one-unit message, corresponding in normative written grammar to simple sentences with a single proposition and possibly with a relative clause. Cognitively, items with rising tone are either

objectively or subjectively contextually activated; items with accentual prominence are rhematic (in statements) or consist of a sequence of a q-item and a question focus (in questions); and items with no accent are informational lightweights.

We now turn briefly to SR cases roughly corresponding to subordinate constructions in BLR. These usually involve two propositions and imply (but do not necessarily indicate syntactically or morphologically) a temporal, causal, conditional, or some other relationship between them. The WO within each sentence or clause is the same as just summarized, and what is of interest to us here is the relative ordering between the two propositions. When asyndetic, the 'subordinate' clause in SR usually follows the 'main' clause or occurs in the middle of it, as in (26)–(29):

(26) im očen' ponravilos' / v Rige byli //
to-them very appealed in Riga were
'everything was great, they were in Riga' (321)

(27) ia v bol'nitsu zub bolit edu //
I to hospital tooth hurts go
'I'm going to the hospital, my tooth hurts' (325)

(28) lekarstvo-to ia poidu kak nazyvaetsia?
*medicine-*PART *I will-go how called*
'the medicine, I'm going, what's it called?' (328)

(29) gorčitsy v tri ia zakhodil net //
mustard in three I stopped is-not
'mustard, I stopped at three [stores], is nowhere' (337)

The motivation for choosing between postposition, interposition, or occasional preposition of the 'subordinate' clause is not clear. According to Zemskaia (1973: 318–319), there are intonational signs of subordination between the two propositions: the subordinated clause has a faster rhythm and sometimes one of the two clauses is uttered with a lower pitch. Perhaps the clearest sign of subordination is semantic. As Zemskaia (1976: 329) points out, the semantic relationship between the two linked clauses may not have exact equivalents in BLR, as in (28), where no subordinate BLR paraphrase is available. This would mean that SR has not only its own prosody and WO rules, but also its own logic and semantics. The problem of the relative order of the two propositions requires further research.

Subordination in SR sometimes occurs with conjunctions or complementizers, just as in BLR. Their position, however, is not limited to the normative position between the two sentences:

(30) khólodno véter potomu čto
cold wind because
'it's cold, because there's wind' (394)

(31) dovól'na ty gósti prikhodiat k pape kogda?
glad you guests come to papa when
'are you glad when visitors come to dad?' (395)

(32) my v kino ne uspeem /
we to cinema not make
on esli pridet pozdno //
he if comes late
'we won't make it to the movies if he comes late' (397)

Very little has been done with the analysis of such orders. Using the above criteria, it can be observed that an early occurrence of rhematic items in the subordinate clause results in their being placed right after the main clause, leaving the conjunction or complementizer stranded at the end in (30) and (31); this is similar to the way some conjunctions occur utterance finally in Japanese (cf., the Japanese equivalent of [30]: *samui, kaze da kara* '[lit.] cold, wind is because'). In (32), it is the contextually activated element 'he' that takes linear precedence over the conjunction. Using the same cognitive categories while paying attention to the intonational properties of the material may well be a promising strategy for further elucidation of this type of SR subordination.

The SR material discussed above illustrates many of the theoretical and methodological points that are fundamental to the analysis of WO in discourse, an area of research that incorporates several different disciplines. Indeed, the fields of knowledge pertinent to the study of spoken WO have not been exhausted by the considerations offered here, as some data (cases such as [2], for example) point to the need for exploring instrumentally the linearity of attention shifts and our ability to maintain attention on a given event or situation. Further progress in the study of the complex problems posed by WO in spoken language will therefore depend crucially on interdisciplinary cooperation.

See also: Clause Structure in Spoken Discourse; Clefting in Spoken Discourse; Codes, Elaborated and Restricted (Bernstein); Consciousness, Thought and Language; Context, Communicative; Corpora of Spoken Discourse; Deixis and Anaphora: Pragmatic Approaches; Detachment Constructions; Focus; Hesitation Phenomena and Pauses; Information Structure in Spoken Discourse; Intonation and Syntax; Language, Visual Cognition and Motor Action; Linearity/Syntagmatics; Particles in Spoken Discourse; Performance Factors in Spoken Discourse; Planning Strategies and Production of Spoken Discourse; Prosodic Cues of Discourse Units; Relative Clauses in Spoken Dis-

course; Russian; Subordination in Spoken Discourse; Syntax-Pragmatics Interface: Overview; Topic and Comment.

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Spoken Document Retrieval, Automatic

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What Is Automatic Spoken Document Retrieval?

Spoken document retrieval (SDR) aims to provide content-based retrieval of passages from archives of recordings of speech. Thus, SDR refers to the retrieval of spoken material in digital audio files, ordered by relevance to some textual query. In the most common realization, the query consists of a typed sequence of words, a question, or a statement of information need. The spoken documents are previously indexed audio recordings of human speech, which were automatically transcribed by a speech recognition system. The goal of SDR, therefore, is a form of information retrieval – that is, automatically finding those complete documents or excerpts that either directly contain the words and expressions in the query or that are semantically relevant to the information need. Thus, the speech transcription has to be automatic and the retrieval has to be based on a user-supplied query. Retrieval of music, songs, or nonlanguage sounds does not fall into the category of spoken document retrieval. Concise question–answering, where a user would expect to hear a short answer to a question as opposed to being presented with a complete audio document, is also not considered part of the definition of automatic SDR.

The purpose for developing mechanisms that provide access to spoken information is fairly obvious. The availability of inexpensive computers, storage devices, and high-bandwidth transmission capacity has resulted in many large multimedia collections. People have become accustomed to full access to virtually all textual information available on the Internet. Without SDR, access to audio archives, or at least spoken audio collections, would be restricted to those limited documents that have been manually transcribed or indexed with key words. Although a significant fraction of current television and radio broadcasts have manually created transcripts or at least approximate script outlines, a much larger amount of spoken audio recordings are untranscribed because the cost of human transcription is too

high relative to the potential useful value or because they consist of older radio and television 'legacy' productions, for which transcripts were lost or never created.

SDR creates a full search and retrieval capability in a way that is already widely available for text content. This capability is useful in applications such as

- Searching the transcripts of video conferences.
- Accessing portions of taped educational lectures.
- Finding specific content in training audio and video.
- Organizing archived voice mail by spoken content.
- Accessing news of interest from television or radio.
- Archiving meetings as a form of corporate memory and documentation.
- Retrieving audio transcripts from sports and entertainment broadcasts, including practically any talk shows, films, quiz programs, etc. with a significant spoken component.

Problems arise in SDR from insufficient fidelity of the speech recognition transcript, the accuracy of the retrieval matching between the query and the transcript, and the lack of segmentation (i.e., the absence of clear document, story, or passage boundaries in continuously recorded audio streams).

The Basic Approach to SDR

As the first step, an SDR system generates a text transcript from the audio recordings to enable text-based retrieval over these audio documents. The idea is to first apply automatic speech recognition to the audio documents to obtain a text transcript. The transcript recognition units are usually words; however, syllables and phonemes have also been used. Each word in the transcript is marked with the time at which it occurred. In general, SDR is designed to search vast archives of audio documents that have been previously indexed. In the case of a stable collection of audio recordings, speech recognition occurs once before the archive is indexed. In archives that are actively accumulating spoken documents, speech recognition is performed on a continuous basis as the audio stream is captured and saved.

The next phase in the SDR process is information retrieval index creation. To facilitate matching root words with different inflections and morphologies, a stemming process converts all speech-recognized words into their canonical root stems. After removing very frequently occurring words, the so-called 'stopwords,' the remaining word stems are compiled into an inverted index, which allows fast access. Each word stem constitutes an entry in the index, listing all documents in which it was found, the number of times it occurred in the documents, and the time of each individual occurrence. Statistics are kept on the distribution of the words across the documents in the collection for retrieval similarity ranking.

When the indexed archive is accessed, a query indicating the user's information need is expressed as a sequence of words or syntactically complete sentences. Although queries are typically typed, in some situations the query may also be spoken. In a query preprocessing step, the query orthography is normalized with all punctuation and capitalization removed. Thus, for example, after normalization, stemming, and stopword removal, the query *C.I.A.'s use of spy planes in 1985?* might appear as *CIA SPY PLANE NINETEEN EIGHTY FIVE*. The query is then transformed into a sequence (vector) of units of the same type as the indexed transcript recognition units (i.e., words, syllables, or phonemes).

To retrieve spoken documents relevant to a user query, each document in the archive is automatically compared to the query vector to determine how well the document 'matches' the query. The matching function R(Q, D) computes the relevance (R) of a query (Q) to a document (D). A list of the query-relevant audio documents is then returned to the user, where the locations of the matching words are indicated. The list of audio documents or passages is ordered by decreasing similarity between the query and the content (transcription) of the document (Robertson *et al.*, 1996). A typical SDR process is shown in Figure 1.

Evaluation of SDR

Evaluation of SDR systems can be done along different dimensions. The complete system performance can be measured in terms of how well the SDR system retrieves spoken documents, but there are often useful aspects in measuring the performance of the components, notably the speech recognition, segmentation, and text information retrieval modules.

The complete SDR system performance is usually measured in terms of mean average precision (MAP), a measure also widely used for text information retrieval. 'Precision,' in general, is defined as the number of relevant documents retrieved divided by the number of items retrieved. Average precision is a single valued measure that reflects performance over all relevant documents for a given query, rewarding systems that retrieve relevant documents at high ranks. It is defined as the average of the precision value obtained after each relevant document retrieved. When a relevant document is not retrieved, its precision is set to zero.

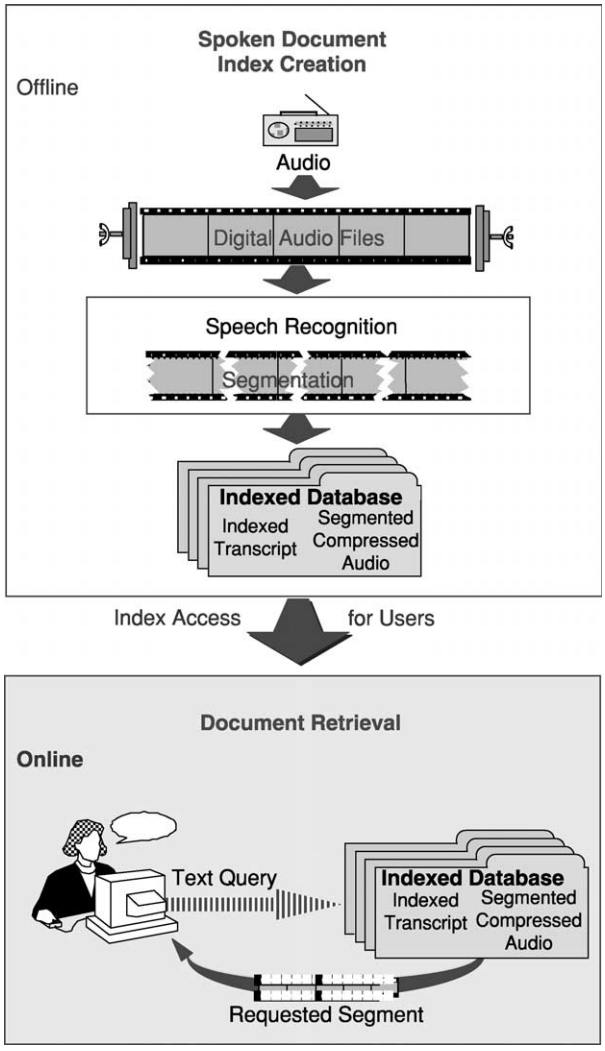

Figure 1 The basic architecture of a spoken document retrieval system.

Formally, for a given query, there are a total of N_r items in the collection that are relevant to this query. Assume that the system retrieves k relevant items and they are ranked as $r_1, r_2, \ldots, r_k$. Then, the average precision is computed as

$$AP = \left\{ \sum_{i=1}^{k} i/r_i \right\} / N_r \qquad (1)$$

MAP is the average of the precision values over a set of queries.

Evaluations use a standardized evaluation format, a common corpus (frequently broadcast news), and test data to ensure different systems and their approaches can be compared fairly. The largest SDR evaluations to date were carried out by the National Institute of Standards and Technology, eventually comprising more than 20 000 broadcast news stories (which translated to approximately 500 h of audio), with 50 queries in a typical evaluation 'task' (Garofolo *et al.*, 2000).

Speech recognition is usually evaluated in terms of the word error rate (WER) in the transcript produced by the automatic speech recognizer. It is defined as the sum of the inserted words, deleted words, and substituted words, divided by the total number of words in a 'perfect' human-transcribed reference transcript.

Publications on SDR will occasionally refer to the term error rate (TER) in speech transcripts, which is similar to WER but ignores all information retrieval 'stop words' (usually a list of very common and function words, which do not contribute to the relevance ranking of a document) in the speech transcripts. A variation sometimes referred to as the STER (stemmed term error rate) also collapses all morphological and inflectional variants of a word into the same stem. For example, in the sentence, 'The large apple was very rotten,' if the recognizer produced an output of 'That large apples were very rotten,' the WER would be 50% (3/6), the TER would be 33.3% (1/3, since 'that,' 'were,' and 'very' are stop words and thus ignored), and STER would be 0 (0/3) because the roots for the words 'large,' 'apple,' and 'rotten' were all correctly preserved. Although it can be argued that TER and STER (or even QTER, which only considers actual query words) are more appropriate measures than WER for the assessment of how good the speech recognition is for the purposes of SDR, in practice all these measures are approximately equivalent (Garofolo *et al.*, 2000).

SDR systems performance evaluation is usually done not only in terms of absolute MAP but also in terms of what degradation is due to the errorful nature of the automatic speech transcription process. To this end, identical systems are evaluated using speech-recognized transcripts vs. perfectly transcribed documents, and the decrease in MAP is reported. Note that some evaluations speak of a 'relative' decrease in MAP, whereas others report absolute decrease in MAP, often leading to confusion in the reader.

Speech Recognition for SDR

The major challenge of automatic speech recognition for SDR is to transcribe real-world data that have not been recorded for SDR purposes. In such material, the audio may be of varying quality, from many speakers, recorded with unknown microphones under widely different environmental conditions, and cover a wide range of topical content. Each of these factors contributes to making the speech recognition problem very challenging.

A speech recognizer is applied to an audio stream and generates a time-marked transcription of the

speech. Time alignment allows pinpointing exactly where each word is spoken. Thus, all query terms or known relevant words can be marked on a timeline of the playback viewer. It is also possible to skip to the relevant portions of a longer document to facilitate efficient playback that skips irrelevant portions within a single audio document (Arons, 1994).

This transcript usually consists of words, but syllables and phonemes can also provide the basic transcription units. The transcript may be phone- or word-based in either a lattice (representing the confidence of each hypothesized word as well as its begin and end time), n-best list (multiple individual transcriptions), or, more typically, a 1-best transcript (the most probable transcription as determined by the recognizer).

Depending on the speech recognition technology and computer hardware used, the automatic speech recognition can take less than real time, such that a 1 hour long spoken document is transcribed in 60 min or less, or the speech recognition can involve multiple passes and take up to several hundred times real time, where many days are needed to process a single hour of speech with high accuracy. The redeeming factor is that this process only needs to occur once, at the time the archive of spoken documents is created.

The main speech recognition issues that affect the performance of SDR are related to (1) the vocabulary size of the automatic speech recognition system, (2) the word error rate of the automatic speech recognition system, and (3) removing nonspeech audio sections from the data.

Vocabulary Size in Automatic Speech Recognition for SDR

Automatic speech recognition systems tend to have fixed vocabularies of words that they can recognize. If the recognizer's vocabulary is small, many words will not be recognized, resulting in an inability to find these words later in the retrieval process. This is known as the out-of-vocabulary (OOV) problem. The OOV rate is the percentage of test set words that are not included in the recognizer's vocabulary and that therefore can never be correctly recognized. The problem is actually compounded by the fact that speech recognition systems tend not to know when they encounter an unknown word that is outside their vocabulary. Instead, they will fill in another word as a substitute, and to preserve continuity in the acoustic and language sequence, often an additional error is made afterwards. Studies have shown that each OOV results in almost one and a half word errors in the transcript (Rosenfeld, 1991). For speech recognizer vocabularies of less than 10 000 words, the OOV rate can be expected to be in the double digits, resulting in significant reductions in transcript accuracy and, consequently, lower retrieval effectiveness.

Although one would like the recognizer to distinguish between as many words as possible, each additional word in the vocabulary also results in additional potential confusions during recognition. As a practical matter, current recognizers are limited to a maximum of 64 000 words, which can be indexed in 16 bits or 2 bytes. A larger vocabulary quickly becomes prohibitively unwieldy, when one considers that a typical trigram language model allows $64\,000^3$ word sequences, even though not all combinations are likely to exist. A larger index, in addition to increasing the storage to 4 bytes per word, also implies a cubic increase in the space necessary for the language model. Fortunately, 64 000 words have been shown to be sufficient for many tasks due to Zipf's power law. In fact, there is only a minimal improvement in the OOV rate when recognizers increase their vocabulary from 51 000 to 64 000 words, where the OOV rate is approximately 1 or 2% (Woodland *et al.*, 2000). Clever selection of the right 64,000 word vocabulary, based on the expected thematic content of the audio, can further reduce the OOV problem (Garofolo *et al.*, 2000).

Even when the speech recognizer vocabulary is too small and actual query terms are not included in it, some of the degradation in the speech transcripts can be mitigated using phonetic search. In general, phonetic search is considered inferior to search on full words, but it can recover errors due to OOV words. The standard approach is to replace each word by an n-gram of phonemes (typically three or more phonemes). Thus, the name missing from the recognizer vocabulary such as 'Albright,' phonetically transcribed as 'ax l b r ay t,' would translate into a search for the phoneme trigrams 'ax l b,' "l b r,' 'b r ay,' and 'r ay t' as if they were words. Of course, an appropriate phone retrieval index would initially need to be constructed from the archived documents (Ng *et al.*, 2000).

Relationship of Word Error Rate to Retrieval Effectiveness

In general, WER is a good predictor of information. It also predicts how well named entities can be extracted (Kubala *et al.*, 1998) – that is, whether names, organizations, places, dates, and numbers can be correctly tagged as such in the speech transcript.

Although it is interesting to see how much information retrieval degrades with respect to a particular recognition word error rate, Figure 2 shows sample experimental data estimating spoken document retrieval effectiveness over a range of transcripts with

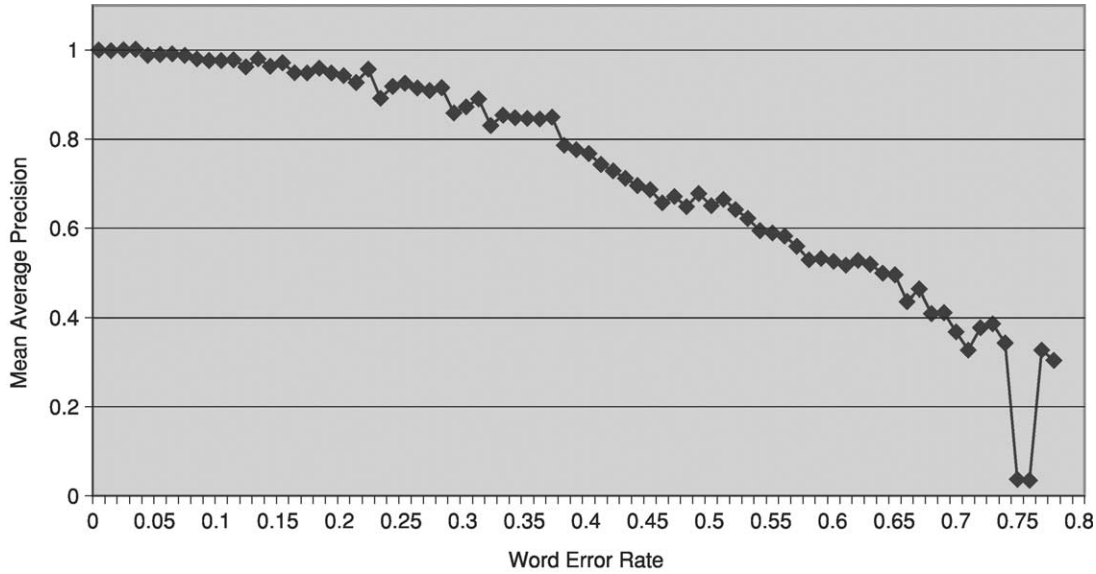

Figure 2 Degradation of retrieval effectiveness as a function of word error rate in a basic SDR system without query or document expansion. Data from Hauptmann and Wactlar (1997) with permission.

different error rates. The figure shows the relationship between information retrieval precision and speech recognition accuracy plotted as relative degradation to retrieval from manually transcribed text documents. The performance of a 'perfect' system is defined by the relevance judgments for documents and queries of a human judge of document relevance. This is equivalent to the WER of 0%. The quality of the information retrieval decreases as the speech recognition word error rate increases. For word error rates less than approximately 25%, the graph shows that retrieval performance degrades very little for transcripts with increasing word error rates and that retrieval is fairly robust to recognition errors. At speech error rates higher than 35%, the information retrieval effectiveness starts to decline noticeably. Similar results were obtained by Woodland *et al.* (2000).

Fortunately, the most accurate recognizers to date on the type of broadcast news data shown in Figure 2 produced a word error rate of approximately 20% for English broadcast news (Johnson *et al.*, 2001). One possible explanation is that the repetition and redundancy of key words in spoken language allow the relevant documents to be retrieved even when a substantial fraction of the words are incorrectly recognized. Once an essential set of correct key words are removed, however, the whole information retrieval paradigm quickly falls apart.

Other data show that modifying the speech recognizer to directly produce a transcript does not work because the speech recognition process depends strongly on the syntactic constraints provided by morphological variants and function words (Hauptmann *et al.*, 1998). There is evidence that allowing a speech recognizer to produce multiple alternate word candidates in the form of a confidence annotation lattice can reduce the effect of words missing from the single 'best guess' word candidate provided by the speech recognizer and thus improve information retrieval effectiveness (Siegler, 1999).

The consensus from a number of published experiments in this area is that as long as speech recognition has a word error rate less than 35%, information retrieval from the transcripts of spoken documents is only 2–10% worse than information retrieval on perfect text transcriptions of the same documents. Speech recognition within a reasonable error range is sufficient to perform information retrieval tasks with only a small decrease in information retrieval effectiveness (Garofolo *et al.*, 2000; Sparck-Jones *et al.*, 2001). Effective retrieval performance in SDR, especially from broadcast news, is thus a perfectly practical proposition.

Removing Nonspeech Audio Sections from the Data

A final contribution of speech recognition is to identify regions in the audio that do not contain speech. Nonlexical information derived directly from the audio, which would not normally be transcribed, can be used to improve SDR systems. Eliminating difficult to recognize sections of the audio track helps retrieval accuracy. Thus, when a system removes commercial advertisements, music, and poor quality audio regions, word transcription accuracy improves because there are fewer misrecognized words that

spuriously match query words during retrieval. Speech recognition approaches can aggregate acoustically similar passages; identify gender of the speaker; detect speech portions recorded by telephone; and identify silence, noise or music, repeated passages, and commercials. Audio repeats can accurately predict the presence of commercials, which can be filtered out before retrieval, and some broadcast structure information can be recovered by analyzing bandwidth, signal energy, and the presence of music. Segmentation of audio streams into coherent passages and browsing can also be improved by including automatically inserting markers for sentence boundaries and speaker turns. Removing music, commercials with speech, song and music, and other irrelevant material can further benefit the retrieval effectiveness for SDR (Johnson and Woodland, 2000). This automatically derived information also assists in the detection of 'document' boundaries in continuous audio streams.

Information Retrieval in SDR

This section provides an overview of the approaches used from the information retrieval side of SDR to improve retrieval efficiency and lessen the effects of incorrect speech transcriptions. The improvements on retrieval effectiveness concentrate on query expansion. If a collection of errorless text documents is available that is comparable to the audio archive, then document expansion and parallel corpus query expansion are also able to improve retrieval.

Query Expansion through Blind Relevance Feedback

It has long been known that longer queries result in higher precision retrieval. Blind (or pseudo-) relevance feedback, common for text retrieval, attempts to augment the query with terms from other relevant documents. For example, the system might take the top 10 documents returned after an initial retrieval cycle and pick the five most 'valuable' terms (according to a defined measure of term value) found in these documents. The assumption is that the top documents are likely to be highly relevant, and important terms in these documents not already in the query should help find other relevant documents. Since the retrieval is automatic, no user decides on the actual relevance of the selected documents or terms; hence, the selection is considered 'blind' or pseudo-relevance feedback. The top valuable terms are then added to the query before it is issued again against the archive. The effect is to make the query longer and richer in the words used to describe the query topic. The optimal number of terms and the optimal number of initial documents to use are dependent on the collection and subject to empirical determination.

Query Expansion through Blind Relevance Feedback from a Parallel Corpus

A variation on this theme is possible if a closely matched parallel corpus of similar documents is available. Similar to blind relevance feedback, the query is first issued to the parallel collection to retrieve highly relevant documents, from which valuable additional query terms are selected before the query is reissued against the spoken document archive. Of course, one can also combine both blind relevance feedback and parallel blind relevance feedback for query expansion.

Document Expansion through Blind Relevance Feedback from a Parallel Corpus

Another improvement in information retrieval for audio documents comes through document expansion, provided a parallel corpus is available. Instead of adding terms to the query, terms from the parallel collection are added to the actual audio document transcripts. This is accomplished by treating each audio document (or a passage from the audio document) as a query into the parallel collection. Again ('blindly') the most similar parallel documents retrieved are assumed to be relevant, and the most valuable terms are extracted from these documents and added to the original audio transcript.

Combined, as shown in Figure 3, these document and query expansion techniques can improve mean average precision by 17% or more. However, depending on the speech transcription error rate, the initial mean average precision, and the type of content, not all techniques work equally well all the time. For example, document expansion does not improve precision when the documents are already almost perfectly transcribed. In the most definitive studies, the degradation in mean average precision given a WER of 25% was reduced to approximately 2% compared to perfect transcription when all methods were combined.

SDR with Unsegmented Audio Data

Although one can think of many different ways to break a continuous audio stream into individual passages, stories, or documents, a simple approach of declaring a story boundary every 30 seconds has proved to be a remarkably good approximation, given that the WER and the lack of punctuation and formatting in speech recognition transcripts prevent many approaches based on linguistic features. To

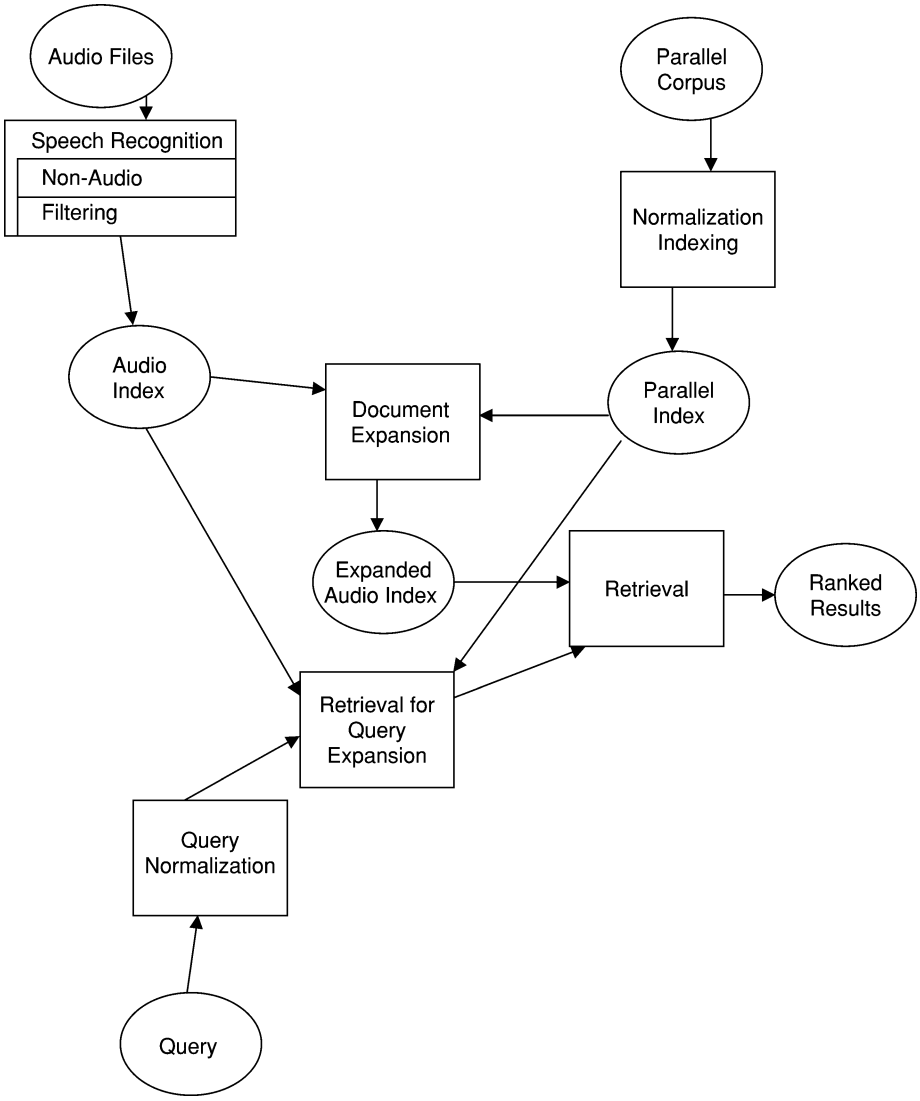

Figure 3 Architecture of a full SDR system with parallel corpus document expansion, blind relevance feedback, and parallel blind relevance feedback.

avoid splitting a passage at some particularly critical junction, the story boundary windows are overlapped by 15 seconds. After retrieval, multiple overlapping windows are merged together for the final result list.

Compared to manually segmented audio documents, the retrieval effectiveness suffers an 8–10% absolute reduction in MAP, despite the use of various query and document expansion techniques described previously (Abberley *et al.*, 1999; Johnson *et al.*, 2001).

Research Trends in SDR

Evaluations of SDR showed that retrieval of audio documents can be extremely effective despite significant error rates in the speech transcripts. This insight resulted in SDR being considered a 'solved' problem, and research interest faded. Although some researchers have examined spoken queries, or heterogeneous collections of spoken, OCR, and text documents, there are two main directions of active research in SDR: cross-lingual SDR and video retrieval.

Cross-Lingual SDR

Cross-lingual SDR attempts to find audio documents spoken (and automatically transcribed) in one language using queries formulated in a different language. The problem becomes one of adequately translating the query with consideration of the of spoken document retrieval. In particular, bad translations and misrecognition of proper nouns can become very problematic so that a multiscale approach

seems promising, which combines word translation with syllable or phoneme translation and retrieval (Meng *et al.*, 2004).

Other variants of the cross-lingual SDR have attempted to use automatically transcribed documents in one language to find matching audio documents in a comparable, parallel collection in another language (Meng *et al.*, 2000). To date, combining SDR and machine translation into cross-lingual SDR still results in substantial degradation of retrieval effectiveness, which varies according to language pair and retrieval approaches used (Federico and Jones, 2003).

Video Retrieval

Video is a rich source of information, with aspects of content available both visually and acoustically. One prerequisite for achieving the goal of video retrieval is the automated information extraction and metadata creation from digitized video. The video retrieval research challenge is to automatically analyze both the visual and the audio component of video and make them retrievable by a user. Once the metadata have been extracted, queries can search the combined metadata of spoken language and visual documents. Since the video and image analysis does not have a well-defined vocabulary like speech recognition, a variety of 'semantic concepts' have been proposed to aid in automatically labeling the content of video shots. A successful approach for video retrieval requires the integration of speech retrieval, semantic concept analysis, and image retrieval (Kraaij *et al.*, 2004; Yan *et al.*, 2004).

Applications Using SDR

One of the fundamental lessons from SDR experiments is that currently achievable WERs in the speech recognition permit effective information retrieval. Using fairly standard information retrieval techniques, the current state of the art in speech recognition is adequate for information retrieval from audio archives. It is not too surprising that some interesting applications have transitioned from the research environments into full daily use.

There are a number of smaller companies that market meeting and lecture browsers that include speech recognition and SDR. The fundamental concept is to record audio and video of a presentation or meeting, analyze the audio, and allow retrieval, browsing, or summarization based on the extracted metadata. However, poor quality audio recording and high error rate transcriptions often make SDR difficult in these environments.

The HP SpeechBot is a successful attempt to index every audio file on the Web and make it available for search on a much larger scale (Thong *et al.*, 2002). It incorporates the basic SDR paradigm, extending it to cover a much richer variety of content and formats than has been studied in research labs. A recent addition to this is the NewsTuner, which is focused on broadcast audio streams available on the Web (Marston *et al.*, 2004).

One of the more ambitions SDR projects is associated with the Survivors of the SHOAH Visual History Foundation, which has videotaped interviews with 52,000 speakers in 32 different languages. These audio tracks are filled with verbal disfluencies, heavy accents by nonnative speakers, age-related pronunciation difficulties, and uncued speaker and language switching. A limited amount of metadata have been manually entered describing the speakers, the locations mentioned, and some content key words. A major effort is under way to convert these video interviews into a fully searchable SDR archive (Byrne *et al.*, 2004).

See also: Speech Recognition, Audio-Visual; Speech Recognition: Statistical Methods; Speech Synthesis.

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Spoken Language Production: Psycholinguistic Approach

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Talking is action. Like most action, it is shaped by motives of many kinds. The study of language production in contemporary psycholinguistics centers on how different kinds of motives affect how people talk or, more broadly, how they convey information in language. In theory, the motives range across intentions to convey particular pieces of information, desires to impress listeners with one's erudition or eloquence, aims to articulate clearly and fluently, and everything in between. All these facets of communication are relevant to understanding language production. In current practice, most research focuses on how speakers accomplish the most rudimentary of their goals: producing utterances in English – or Dutch, French, Polish, or whatever the language of custom may be.

Simple and straightforward though this may seem, it is far from easy to explain how speakers accomplish this action. Producing an effective utterance

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(one that says what the speaker means) in any language demands recruiting and deploying the linguistic resources appropriate for communicating one's thoughts. At the outset, this calls for being able to think in ways that are readily converted into language, or "thinking for speaking" (Slobin, 1996). Secondarily, it means bringing to mind words or morphemes that are suitable for conveying the thought, arranging the words or morphemes in the way the language requires so as to mean to the listener what the speaker means to say, and energizing the arrangements into sound forms through the actions of the speech musculature.

Just in case this process sounds easy, consider it in the following terms. A speaker of English who is about to describe where she lives must think about her residence in terms of some coordinate system that is, minimally, expressible in English and, desirably, comprehensible to an English-speaking listener. A precise way to do this is in terms of latitude and longitude: the house is located at 45.000688° north and 85.375743° west. However, someone who thinks to speak in these terms is unlikely to succeed in communicating information that is useful to a typical listener. A better tactic is to take account of where and why the conversation is taking place and what the listener knows and cares about, to consider what is called 'common ground' (Clark, 1996) in language, experience, and conversational aims. An important component of this form of perspective-taking is the speaker's retrieval of information about the listener from memory (Horton and Gerrig, 2002).

Having sketched some thought with the intention of communicating it, the speaker has the beginnings of what we term a 'message.' To transform the message into language and then into actual speech means retrieving from memory a tiny subset of the more than 45 000 words that an English-speaking high-school graduate knows, arranging them into one or more of the roughly 10^{30} relatively short English sentences, forming the necessary syllables from the 14 000 or so syllables that English includes, and articulating the syllables at a rate of roughly five per second, using more muscle fibers than any other mechanical performance of the human body (Fink, 1986). Speaking could be an Olympic sport were it not so universally mastered.

Because speaking *is* so universally mastered, one tends to take it for granted. To better appreciate this not-so-simple ability for what it is, in this article we examine some of the old and new discoveries of psycholinguistics that illuminate what goes on behind the scenes during mundane speech events. The discoveries rest on observations of spontaneous speech in natural settings, as well as on controlled experimental tests of language production in laboratory settings. In this brief survey, we limit ourselves to the psycholinguistic demands of creating messages, finding words, creating structures, and assembling phrases. For each of these topics, we focus on a few phenomena that disclose hidden challenges that speakers confront in the course of speaking and briefly review what is known about how the challenges are normally surmounted. Our survey neglects some fundamental facets of speaking, including most of the pragmatic and phonological processes that, respectively, start and end individual speech events. For excellent reviews of these topics, see Clark (1996), Dell and Sullivan (2004), and Levelt, Roelofs, and Meyer (1999).

Message-Making

How humans come to have communicative intentions (or intentions of any kind) is an epistemological mystery shrouded in philosophical controversy. How fluent speakers create from their communicative intentions a set of communicable meanings is closer to becoming a scientific problem that is amenable to careful observation and controlled investigation. One way in which the problem is tackled is by comparing the ways in which speakers of different languages go about forming messages. Consider a far-reaching difference between English and Chinese: in order to appropriately use singular and plural nouns and pronouns and the verbs that agree with them, English speakers must engage in rudimentary number cognition in virtually every utterance they produce. In contrast, Chinese speakers can ignore such distinctions because nothing in their language requires them. Are English speakers generally more attentive or sensitive to number differences than Chinese speakers and therefore more likely to include the information in their messages, simply *because* of this language difference?

The intuitive sense in such questions motivates the perennial appeal of an idea made famous by Sapir (1921) and Whorf (1956). According to the 'linguistic relativity' hypothesis, speakers of different languages experience their shared world in different ways, with the differences filtered through the lexical and grammatical devices of language. Slobin's (1996) thinking-for-speaking hypothesis is a more conservative variant of linguistic relativity that is specific to the question of making messages. Thinking-for-speaking implies that speakers must learn to conceptualize the kinds of distinctions that matter in the languages they speak, because the requirements differ among languages. In short, English speakers may have to think-to-speak number in ways that are

unnecessary, and maybe even impossible, for speakers of languages that treat number differently or do not treat it at all (cf. Gordon, 2004).

Unfortunately, the attractions of the linguistic relativity hypothesis are more than matched by the challenges of satisfactorily defining and testing it. Lucy (1992) provided a sympathetic analysis of the definitional problem; Pullum (1989) dispelled the many myths surrounding one familiar Whorfian claim – that Eskimos experience snow differently because their languages seem to have many words for snow. Tests of the hypothesis suffer from pitfalls – inherent in the disparate cultures and environments of people from disparate linguistic backgrounds (for example, the residents of Amazonian jungles differ from the residents of American suburbs in ways that go beyond language), in eliminating the contaminating effects of language from administration and performance of the experimental tests (important because the hypothesis has to do with an enduring impact of language on *nonlinguistic* cognition), and in the ease of interpreting any differences obtained in terms of linguistic relativity. However, there are provocative results consistent with the relativity hypothesis (Roberson *et al.,* 2000; Boroditsky, 2001; Bowerman and Levinson, 2001; Gordon, 2004), as well as continuing controversy (Levinson *et al.*, 2002; Li and Gleitman, 2002).

The properties of messages, as opposed to their contents, have begun to be illuminated in research on referential communication. One such property, a definitional property, is that messages are pre-verbal: they lack most of the trappings of language. The recollections of a victim of transient aphasia offer striking testimony to the absence of words in messages. His experience "was one of being fully aware of the target *idea* yet totally unable to accomplish what normally feels like the single act of finding-and-saying-the-word .... The idea ... was as complete and full as any idea one might have normally, but was not an unspoken mental sentence" (Ashcraft, 1993: 49).

One consequence of the pre-verbal nature of messages is that speakers cannot tell in advance when a message will give rise to linguistic ambiguity, and so speakers do not reliably disambiguate utterances that are made ambiguous by properties of the language. When a scene contains both a baseball bat and a flying (mammal) bat, speakers referring to just one of the objects are likely to call it a *bat*, failing to realize that from a listener's perspective, there are two *bats* (Ferreira *et al.*, in press). This does not seem to be due to sheer egocentricity on the part of speakers, because they do try to avoid ambiguity when it has a perceptual or conceptual basis. People describing scenes that contain the kinds of perceptual or conceptual similarities that make for referential ambiguities (e.g., a large and a small baseball bat) reliably refer to them with discriminating adjectives (e.g., *large* or *small;* Ferreira *et al.*, in press).

To frame messages in ways that are comprehensible to listeners, speakers may have to draw on fairly explicit experience about the kinds of information that listeners need. One supposes that frequent callers to an office in which two men are named Dave typically add the surname; if there is only one Dave or if the caller is unaware of the multiple Daves, the surname may be omitted more often. However, in many circumstances, speakers have to work hard enough merely to transform messages into language that they do not engage in the perspective-taking required to reckon with what listeners do and do not know (Brown and Dell, 1987; Keysar *et al.,* 2003). This transformation into language comprises the coordinated processes of finding words, assembling syntactic structures, and fitting words and structures together.

Finding Words

Words serve to invoke concepts. They do this by using largely arbitrary phonological emblems: the English *rabbit* is *konijn* in Dutch, *lapin* in French, and *królik* in Polish. To bridge the divide between meaning and sound in production, many theories postulate that there is an intermediate retrieval step in the transition from a concept to the sound form that conventionally conveys the relevant meaning. Because messages are not represented linguistically, appropriate words must be located within or retrieved from the vast mental dictionary in a speaker's memory. Word-finding occurs as part of a process of grammatical encoding, during which messages are transformed into abstract linguistic codes. The abstract codes for words are called 'lemmas' (Kempen and Huijbers, 1983; Levelt *et al.,* 1999) or 'lexical entries,' foyers of the mental lexicon (Bock, 1995).

Lexical entries may be located on the basis of meaning, of syntactic category information (e.g., noun, verb), and of the morphological or phonological forms with which they are associated. Entries are therefore accessible from messages, from the structural procedures that play out words into connected speech, and from sound (during comprehension or from recurrence within the production system). These multiple avenues make the lexical entryway a busy intersection in the process of production, as well as in comprehension (Levelt *et al.,* 1999), and the target of research aimed at uncovering how the intersection works. Two issues have received considerable attention: (1) the relative separability of the semantic,

grammatical, and phonological properties of words and (2) facilitation of retrieval by context, codability, and word frequency.

Regarding the separability of semantic, grammatical, and phonological properties, two familiar phenomena from the experience of normal speakers have been turned into tools for exploring how and how well different types of information are linked in the mental lexicon. One phenomenon is the tip-of-the-tongue (TOT) state, in which a known word eludes retrieval. TOT states offer abundant evidence for some separation of what a word means from how it sounds, because speakers can be fully aware of the meaning for which they are seeking a word without being able to come up with the word's form (Burke *et al.,* 1991). Speakers in this state may also report correct word-specific grammatical information, such as syntactic class or grammatical gender information (e.g., Vigliocco *et al.,* 1997). Anomic patients show the same dissociation between retrieval of grammatical information and sound information (Badecker *et al.,* 1995). This means that a speaker of Italian (for example) may know that a sought-for word is grammatically feminine without knowing anything about how the word sounds.

Error in speech is a second familiar phenomenon that also points to a separation of meaning and sound in lexical retrieval. The majority of speech errors tend to involve either whole words (which are retrieved on the basis of meanings in messages) or individual sounds (which are retrieved from lexical entries; Dell, 1995). The implication of this distribution of errors is that production involves processes that manipulate words and processes that manipulate phonemes. Whole-word errors can also reflect these two kinds of processes. Word-substitution errors sometimes show the influence of similarities of meaning (e.g., saying 'tomorrow' instead of 'yesterday') and sometimes of form (e.g., saying 'conversation' instead of 'compensation'). Errors of these and other types have served as the basis for influential theories of word and sentence production in both normal (Fromkin, 1971; Garrett, 1975; Dell, 1986; Garrett, 1988) and aphasic speakers (Garrett, 1992; Dell *et al.,* 1997; Foygel and Dell, 2000).

Another influential approach to word production emphasizes a different kind of evidence for the separation of meaning and sound, evidence about the speed with which the meanings and sounds of words are recovered during the naming of pictured objects (Levelt *et al.,* 1991). A strong intepretation of these data is that the retrieval of semantic and grammatical information strictly precedes the retrieval of phonological information (Levelt *et al.*, 1999). On this point, however, there is controversy. Although models of word production generally agree on a representational separation between lexical entries and phonological form in the mental lexicon (but see Caramazza, 1997), there is mounting evidence that, in the course of production, the temporal separation is not absolute. As candidate words for expressing messages are located, it seems that their corresponding word forms become active even before the speaker settles on which candidate to select.

So although semantic effects tend to be obtained early and phonological effects late during object naming (Schriefers *et al.,* 1990), the impact of phonological information can be observed before the semantically driven processes that settle on what word to use have run their course (Peterson and Savoy, 1998; Cutting and Ferreira, 1999). The concurrent activity of meaning and sound during word production can also be called on to explain errors that combine both semantic and phonological features of intended words (e.g., saying *rat* when *cat* was intended) and the tendency for sound errors to create real words at rates above chance (Dell and Reich, 1981; Dell, 1986; Martin *et al.,* 1989). The concurrent activity of meaning and sound constitutes a challenge to theories that posit discrete stages in word production.

The semantic and phonological properties of words are linked respectively to two powerful forces in word finding: conceptual accessibility and word-form frequency. The meanings of words vary in how specific they are, with some having a rich, coherent set of properties and others a weak and fairly sparse set. Because retrievability depends in part on the goodness of the match between the retrieval context (e.g., the circumstances in which a to-be-named referent presents itself) and the information associated with a word's meaning in memory, contexts with many relevant cues can facilitate naming in comparison to contexts with fewer cues (Griffin and Bock, 1998). Complementarily, words with sparser semantic representations (e.g., proper names and abstract words), are harder to retrieve than words with richer representations (e.g., concrete words), other things being equal (Burke *et al.,* 1991).

The familiarity of words, whether due to the frequency with which they are produced or the age at which they were learned, has long been known to affect how quickly or easily they are uttered. Higher-frequency words are produced faster than lower-frequency word forms (Oldfield and Wingfield, 1965), with an estimated decrease in production latency of roughly 30 msec for each $\log_{10}$ unit of frequency per million words in print (Glaser, 1992). The phenomenon of 'frequency inheritance' suggests that frequency affects the retrieval of word

forms more than access to lexical entries proper. Frequency inheritance refers to a finding that the production of low-frequency words (e.g., *wee*) benefits from the presence in the lexicon of high-frequency homophones (e.g., *we*; Dell, 1990; Jescheniak and Levelt, 1994) that are unrelated in meaning.

Creating Structures

There is more to sentence production than finding individual words. Even the speech that adults address to 9-month-old infants consists predominantly of multiword utterances. Setting aside vocatives and interjections, over 90% of what adults say to babies consists of more than one word (van de Weijer, 1999). The word groups that we produce combine in ways that are much more than the sums of their word parts, thanks to the workings of syntax.

The building of sentence structure is one of the most crucial but least understood facets of language production. This ability is crucial because, without a facility for assembling novel arrangements of words on the fly, speakers would be unable to adapt old thoughts to expression in new settings or to convey new ideas to anyone. Try to imagine freedom of thought with inflexible speech, leaving humans without the linguistic means to express new messages. The topic of structural formulation is also controversial thanks to its natural links to ongoing debates over the linguistic nature of syntax (Harris, 1993) and to the long-standing discomfort of some psychologists with structural abstractions (Bock, 1990). It is undeniable that connected speech is more than a limning of meaning, more than a string of words, and considerably more than "motor habits in the larynx" (Watson, 1913).

Vivid testimony to the structural underpinnings of everyday utterances again comes from the occurrence of speech errors. Intending to say "I got into a discussion with this guy" and instead saying "I got into this guy with a discussion" (Garrett, 1980) illustrates several truisms about the structural scaffolding behind words. First, something more than meaning guides word placement, because the typical products of errors are nonsensical, yet grammatical. Second, there are patterns in errors that disclose the mechanisms of word arrangement. Considering words in terms of their structural form classes rather than their meanings makes it evident that form class (e.g., noun, preposition, adjective) matters a great deal to structural assembly: words that are confused in errors are very likely to represent the same form class, as though the assembly process at some point selects words in terms of their structural rather than their semantic suitability.

Structural features of utterances also come to the fore in explaining the intricacies of that most scorned of topics in English grammar, subject-verb number agreement. Despite its effete overtones, agreement is in fact not only something that speakers do routinely (more than once every few seconds in running speech) but also something they do with surprising accuracy (even 4-year-olds get it right 94% of the time; Keeney and Wolfe, 1972). Consider what is involved in producing subject-verb agreement. First, speakers must understand what constitutes a subject. It is not just the first word or phrase in a sentence, because questions (cf. 'What *is* your name?' and 'What *are* your names?') and subordinate clauses of various kinds put subjects in other positions. Subjects are not associated with specific meanings reliably enough to predict the properties of normal agreement, and even those meanings that are most typical of subjects are no more reliable agreement controllers than atypical meanings (Bock and Miller, 1991). Even nonsensical sentences demand normal agreement: colorless green ideas *sleep*, not *sleeps*, furiously. What is crucial is not meaning, but the structural relationship to the rest of the sentence in which a subject appears. Second, speakers must determine what the verb is and which part of the verb carries number. Finally, there is the problem of determining what the number of the verb should be. There are competing theories about how this is determined (Eberhard *et al.,* in press, provide a review), but a traditional idea is that the number of the subject controls the number of the verb.

How do speakers decide on the number of the subject? Typically, the main considerations are the numerosity of the referent of the subject noun phrase (one or more than one thing), the lexical-grammatical number of the subject noun (singular or plural), and the presence in an utterance of plural nouns that are not the subject. The roles of referent numerosity and grammatical number are fairly obvious: when a referent comprises more than one thing, English speakers are likely to select plural nouns, and plural head nouns make for plural subjects. Nonetheless, the comparative contributions to agreement of the referential underpinnings and lexical contents of agreement controllers fuel a continuing debate (Middleton, Bock and Verkuilen, 2005).

The presence of nonsubject plural nouns in an utterance creates a tendency toward a type of error in agreement called 'attraction.' Attraction is illustrated in the statement, *The time for fun and games are over.* Like other kinds of errors, attraction discloses some of the mechanisms behind normal, error-free language production. Among its most salient properties

are two that point to the structural underpinnings of agreement. First, attraction does not occur willy-nilly, but respects basic structural boundaries: verbs are more attracted to nouns in their immediate structural vicinity than in their immediate temporal vicinity (that is, in the word string). For instance, they are more attracted to nouns within their own clauses than to nouns in other clauses, even when both nouns immediately precede the verb (Bock and Cutting, 1992).

Second, attracted verbs do not simply take whatever number is seemingly dictated by a neighboring noun; by and large, plurals are more likely to create attraction than singulars. Among other implications, this means that attraction is not the mistaken implementation of agreement with something that is not the subject; if it were, errors like *The king of the islands were cruel* (plural attraction) and *The kings of the island was cruel* (singular attraction) should be about equally likely. Because only plural attraction occurs reliably, despite the fact that plural verbs are in other respects less likely to err than singulars (Stemberger, 1985), it seems that what goes wrong is not agreement with the wrong subject, but rather agreement with the right subject that has somehow acquired the wrong number.

Another phenomenon that discloses the properties of the phrase-structure building in which speakers must engage is 'structural priming' (Bock, 1986). Speakers display a small but consistent tendency to echo the structures of utterances they have recently heard or recently said themselves. They do so even when the words and meanings conveyed by the echoed structure change between the first and subsequent occasions of use. These echoes are easy to find in spontaneous speech, as in this interchange from the Switchboard corpus about hanging wallpaper:

> Speaker B: "Repeating patterns <u>is what you have to check for</u> when you buy your paper."
> Speaker A: "Yes."
> •
> A: "That <u>'s what I needed</u> and I didn't think about that. I got a Mickey Mouse print <u>is what I got.</u>"

In this exchange, the same structure displayed in the underlined words of Speaker B ("is what you have to check for") shows up later, twice, in Speaker A's speech, the second time in a comparatively awkward locution ("I got a Mickey Mouse print *is what I got*"). Establishing that the structures behind the words can drive this repetition, experimental work has shown that structural repetition occurs in the absence of lexical repetition (Pickering and Branigan, 1998; Bock, 1989), in the absence of event role similarity (Bock and Loebell, 1990), and even across languages (Loebell and Bock, 2003). It persists across time (Saffran and Martin, 1997; Boyland and Anderson, 1998; Corley and Scheepers, 2002) and over interruptions by other structures (Bock and Griffin, 2000) in both adults and children (Huttenlocher *et al.,* 2002, 2004). Although structural priming is initially enhanced when words are repeated (Pickering and Branigan, 1998; Cleland and Pickering, 2003), the enhancement fades fairly rapidly, leaving a persistent structural effect of the same magnitude that occurs in the absence of lexical repetition (Konopka and Bock, 2005). This suggests separable sources for the lexical and structural effects observed in studies of structural priming.

There are two competing theoretical accounts of structural priming. One (Pickering and Branigan, 1998) rests on activation in so-called combinatorial nodes that are claimed to be responsible for sentence structure. Because combinatorial nodes are linked to words with corresponding syntactic privileges, this approach readily explains the lexical enhancement of structural priming. The second kind of account emphasizes the abstract structure building behind priming and its persistence. An explicit model of the process treats priming as a kind of implicit learning with natural links to language acquisition in children (Chang *et al.*, 2004).

Structure building and lexical selection are heavily dependent on one another. The fact that speakers are more likely to echo a recently heard structure when what they say also repeats a word from a priming structure is one consequence of this dependence (Pickering and Branigan, 1998; Cleland and Pickering, 2003), and it can be interpreted in terms of the bindings that must occur between words and structures at the outset of sentence formulation. A second consequence is related to the fact that some words are easier to retrieve than others: they are more accessible. Accessible information, including accessible words and accessible expressions (Bock, 1982), tends to be produced before less accessible information, provided that there is a structure into which it fits (Bock *et al.,* 2004). That brings us to the topic of incrementality.

Incrementality is a requirement of the processes of spoken language production, simply because the vocal output channel is heavily restricted in what it can do. Words and the syllables that compose them are uttered one at a time: even when two words erroneously blend together in speech (e.g., *slickery, flustrated*), they blend as a single word. The questions this poses for theories of production are (1) how incremental are the psycholinguistic preparation processes

in the run up to speaking, (2) what are the units of incrementation, (3) and what is the target of incrementation. To complicate matters, each of these questions must be addressed for each type of psycholinguistic formulation that goes on in production: included are at least the formulations of messages, words, syntactic structure, phonology (including prosody), and articulation.

Incrementation can be both hierarchical (Yngve, 1960; Kempen and Hoenkamp, 1987) and linear. The distinction between these two types of incrementation was drawn in terms of the timing of eye movements by Bock, Irwin, Davidson, and Levelt (2003). When speakers describe events in single sentences, their eye fixations on specific elements of the events tend to systematically precede the mention of those events during fluent speech (Meyer *et al.*, 1998; Griffin and Bock, 2000). This finding suggests that, at some level, planning may proceed roughly in terms of words or phrases in the order in which they occur. However, the existence of an underlying hierarchical component to planning is suggested by increased gaze durations, longer fixation latencies, and longer latencies to speech at the onset of utterances. This implies that in preparing an utterance, the scope of a plan extends beyond the upcoming word. Similar claims have been made on the basis of patterns of pausing, disfluency, and word repetition during spontaneous speech (Boomer, 1965; Clark and Wasow, 1998).

Conclusion

Until relatively recently, the normal processes of adult language production garnered little systematic attention from either linguists or psycholinguists. The reasons are well known and often recited. How people talk is hard to study (Bock, 1996) and easy to dismiss as a viable scientific problem (Fodor, 1983; Chomsky, 1986). Both of these issues have receded. There are now valid, reliable methods for getting at the underpinnings of production, burgeoning scientific interest in the language production ability, and fertile controversy over its nature.

We conclude with three questions about language production that remain far from a solution. From a linguistic standpoint, one puzzle about language production is how it relates to language comprehension. Linguistic communication works as well as it does because speakers and listeners know the same language, sharing a grammar and lexicon to encrypt and decrypt their ideas with a satisfactory degree of validity. Yet, do the grammar and lexicon function in the same ways during production and comprehension? Assuming a performance grammar, one that participates directly in processing and producing language (Kempen, 1999), at issue is whether any coherent grammar could function in the same ways during understanding and speaking, relying on the same basic mechanisms.

From a psycholinguistic standpoint, the key question about language production is how speakers put their knowledge of language to use *along with* their perceptual, attentional, conceptual, and motor abilities to adequately convey particular meanings at particular places and times to particular audiences. Knowing a language, having a grammar, is just one piece of this intricate puzzle. The grammar must be dynamic and configured in a way that fluently interfaces with a speaker's perceptions (auditory, visual, kinesthetic), thoughts, and other actions (prominently including gesture; McNeill, 1992) to support efficient communication.

The problem of integrating language with other cognitive and motor abilities is at the core of debates about the modularity of language and language processes (Fodor, 1983), a debate that is as relevant to the phenomena of language production as to language acquisition and comprehension (Bock and Kroch, 1989). If language abilities are no different in kind from other mental functions and skills, the question of integration, of interfacing language with other abilities, simply does not arise. What has to be explained, from this perspective, is how the stuff of general cognition can work to yield the human capacity to learn and use language.

If language is different in kind from other abilities – that is, a genetically distinctive human endowment – the explanatory challenge is greater. There is not only the issue of the interface between language and cognition. The nature and origins of the language capacity have to be explained and without the advantages of the animal models that have informed broad theories of human learning, cognition, and action. The development of neuroimaging techniques holds some promise for filling this gap (Indefrey and Levelt, 2000), although the study of production in particular still presents enormous challenges to current technologies. For these reasons, the controversy over modularity continues to be an organizing theme in the psycholinguistic study of language, bearing as it does on the basic questions of who we are as a species and why we talk.

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Sports Broadcasting

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'The media' were established as a distinct object of academic enquiry in the 1970s and only in the last 20 years has it emerged as a recognized field of research in its own right. The Media Studies agenda was, at first, largely political, and the language of news and the structure of the political interview have been widely studied. Sport, as written about in the daily press and as presented on radio and television, has only recently established itself as a subgenre (Whannel, 1992) in the study of the media. It has been largely concerned with the economics and politics of the globalization of sport via live television coverage of such key events as the Olympics for the whole world, the Superbowl for the Americans and the soccer World Cup for everyone else (Werner, 1998). Current interests in sport and the media are dominated by issues relating to the politics of identity (national/gendered/ethnic) in various fields of play and the festive experience of watching sporting occasions as media events (Dayan and Katz, 1992). Fitful attention has been paid to the style and presentation of sports coverage on television (Morse, 1983) but, with the exception of Stephanie Marriott's work discussed below, hardly any detailed linguistic work has thus far been produced.

The characteristic form of broadcast sports-talk is that of continuous commentary on a live-to-air sporting event of some kind. It might be wondered why broadcast events need commentaries. In the very first years of radio broadcasting, it was thought to be enough to place the microphones at strategic points to capture and relay the sounds of the event as it took place. This method was the one used, in 1926, for the first live transmission of the Derby, one of the biggest events in the British flat racing calendar. On the day, however, it rained solidly, the going was soft, and very little could be heard beyond the steady drip of the rain and faint cheering in the distance. Sporting events on radio have to be talked into being, and even television coverage needs a running commentary on behalf of viewers who are not present at the event itself.

How this commentary is done has been examined in Stephanie Marriott's detailed, careful study of the deictic features of television sports coverage. Linguistic deixis is sometimes defined in relation to speakers, but is more correctly understood in relation to the situation and circumstances of utterance. Any worldly situation consists of time, place, and persons; the irreducible components of any human occasion. Talk is unavoidably and always in a situation of some sort;

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deictic expressions of place (here and there), time (now and then) and persons (I, you, we) presuppose the common ground of the situation as given for all concerned. These components however are precisely what cannot be presumed in broadcast forms of talk. The work of maintaining the transparency of the nature of the situation is the task of the commentator, present at the event, on behalf of viewers who are not:

> A. Well that's the worst shot he's played throughout the break. Didn't really get high enough. He could try and split them but he's such a good potter I think it'll be a long blue into one of the corner pockets. Needs it to run a little. So **now** blue into the yellow pocket and if he gets this he will be pushing the pink towards the centre pocket. Well the blue's there.
>
> B. Great chance **now**.
>
> A. Yes and look for the roar if this pink and black goes in. (Mariott, 1995: 349, emphasis added.)

This live-to-air coverage of a world championship snooker match talks through what is visibly happening, from moment to moment, on screen for the viewing audience. Who 'he' (Steve Davies) is needs no gloss at this point, nor that 'the roar' will come from the live audience at the event if the pink and black go in. The meaning of 'pink' and 'black' and of 'long blue' and 'yellow pocket' though odd in transcription are all visibly self-evident at the moment of utterance. The 'long blue' describes the upcoming long shot facing Davies, who must pot the blue ball in the 'yellow' pocket (the pocket nearest the spot where the yellow ball is placed on the snooker table). The commentary, presuming viewers' minimal knowledge of the professional game of snooker, treats the personal and spatial components of the situation as transparently available to the television audience. But what particularly interests Marriott is the temporality of the occasion and its commentary. Live broadcasting reflexively reminds us that **all** talk exists in its **live** enunciatory moment of utterance. The now of the event is not the punctual now of digital time that exists in an eternal present that has no before or after, but a dynamic now in which the emergent present is in motion away from the past and towards the future.

Thus the two deictic 'nows' in the commentary indicate different moments in the unfolding, emerging present: the first 'now' is before the shot on blue, the second comes after it. But it is not a simple matter of before and after, first and second, time as succession. Each 'now,' though enunciated in its present moment, is oriented to the possible implications of what **has** just-now happened, **is** now happening, and **might** just happen next. The living present is the dynamic, moment-in-motion in which the temporalities of past-present-future encounter each other. In bounded, determinate live situations, that start, go on, and end (the basic temporal structure of all sporting events and of all conversations) there is always an intrinsic tension because, from moment to moment, the outcome is uncertain. Will Davies pot the blue? He does. And now the pink? Sports commentary is never, as Marriott shows, a mere description, but offers a continuing interpretation, evaluation, and account of what is seen to be going on. In so doing it is oriented to the experiential significance of the occasion for viewers, on whose behalf it offers its assessments. That significance is something that accumulates in and through the temporal dynamics of the event and its structured, from-start-to-finish now (for further discussion see Marriott, 1997). Live television, Marriott suggests, "lives off the instantaneousness and uncertainty of the moment very much the way we do in actual life."

Having established the temporal characteristics of the phenomenal now of the broadcast sporting occasion and its live-to-air commentary, Marriott went on to examine some of its surprising and unique features as they show up in instant replays:

> Here's a replay. **Now** you see Fittipaldi go out of the picture there and spinning – **Oh! And that's Gerhard Berger**. Well this this this is in effect a replay of Grand Prix that we have seen in these conditions before and I don't know what the answer is but it proves to me that it's a farcical situation (Marriott, 1996: 75).

In this replay from a Formula One car race, the commentator glosses the on-screen shot that replays the moment, a few seconds earlier, that Fittipaldi lost control of his machine. Even as he speaks, the commentator sees, on another monitor, Gerhard Berger spinning out of control on the track. There are thus two 'nows': the 'now' of the televised event (in which 'you [viewers] see Fittipaldi go out of the picture there') **and** the 'now' of the event itself (Gerhard Berger). Both are spoken of in the present tense, and yet the now of Fittipaldi to which television is attending is a moment just past while the now of Berger is the ongoing, live, and in-real-time moment of the race itself. Thus television creates a hitherto impossible, doubled now. Marriott points out that the replay is only of the visual recording (not its sound). What we **see** is the soundless past brought to visual presence. What we **hear** as we witness time regained on screen is the background ambient sound of the ongoing event in real time. But we barely notice this background because we are attending to the foreground commentary that is speaking to the moment just gone. Thus the past has entered into the present to create a now-and-then, a doubled temporality that is peculiar to and dependent on broadcasting's unique capacity

both to transmit live-to-air coverage of events in the world and, at the same time, record them. The doubled now of television is proved in this instance by the way in which the then of Fittipaldi collides with the now of Gerhard Berger, for it takes a moment or so before coverage can cut away from the replay of the first to the second now-and-in-present-time crash.

Marriott's work makes clear that the event-in-itself and the event-of-television are not the same. This disparity has sometimes given rise to anxieties that the latter is somehow a secondary, derivative experience compared with the authentic experience of being present at the event itself (Lang and Lang, 1982). However, Marriott establishes that both the event and the event-of-television are grounded in the same, immediate, shared, phenomenal now. It cannot be claimed that one is more 'live' than the other. Her scrupulous examination of the instant replay discloses the many-sided experiential character of the televised sporting event. Those who are present at the event see less of the action than the television viewer. They have only their own restricted point-of-view and that depends on where they are. The multi-camera coverage of live events offers multiple points of view from a wide range of perspectives (including the aerial blimp shot on big occasions) and, in replays, an impossible doubled temporality in which the event is instantly relived and reexperienced. Today huge plasma screens in sports grounds make those moments available to the crowds at the event so that they too do not miss what television makes available for those who are not there.

There is a nice irony in the fact that the technologies that make replays possible also allow for, in another application, the analysis of talk, including sports talk and the use of instant replays. It had long been assumed that language-in-use could not be systematically examined, because actual talk is a fleeting, transitory thing that lives and dies in the moment of speaking. Moreover, it was generally assumed to be incoherent and clumsy, full of hesitations, mumbles and repetitions in comparison with the tidy, orderly appearance of words in sentences on pages. Both J. L. Austin and H. P. Grice attempted to establish ordinary language as a fit object of enquiry against the prevailing skepticism of Oxford philosophy in the 1950s that regarded it as unfit for conceptual analysis on account of its "ambiguity, misleadingness, vagueness and the incorporation of mistakes and absurd assumptions." Both regarded "ordinary language as a wonderfully subtle and well-conceived instrument which is fashioned not for idle display but for serious (and nonserious) **use** (Grice, 1989: 178–179, 384, emphasis added).

However, the actual study of ordinary language-in-use depended on recording technologies developed in the first place by broadcasters to complement live radio and television transmission. The tape-recorder does something astonishing. It captures the liveness of worldly events and talk as they unfold and preserves them for later transmission and editing in ways that were hitherto impossible. It took the good genius of Harvey Sacks to apply broadcast recording technologies to the empirical study of talk-in-action (Sacks, 1995). Conversation analysis demonstrates in the finest detail what Austin and Grice had both surmised; namely the ordered, orderly character, the communicative logic, of conversation. Marriott's work, drawing on linguistics, pragmatics, and conversation analysis, uses recording technologies to examine their practical application and use by the broadcasters themselves. The management of the live situation is attended to in all aspects of the coverage of sporting and other worldly events, including the live-to-air talk of their professional commentators. Further forthcoming work, building on Marriott, shows how the communicative logic of broadcast commentaries is also implicit in the visual narrative to which they speak (Scannell, 2006).

See also: Austin, John Langshaw (1911–1960); Conversation Analysis; Grice, Herbert Paul (1913–1988); Media and Language: Overview; Radio: Language; Sacks, Harvey (1935–1975); Talk Shows; Television: Language.

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St Christopher (Kitts) and Nevis: Language Situation

Editorial Team

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The Federation of Saint Kitts and Nevis (formerly Federation of St Christopher and Nevis) is located in the northern part of the Leeward Islands in the eastern Caribbean. It comprises two islands in the Leeward Islands group. Both are of volcanic origin, with a lush vegetation. St Kitts is the larger one and more developed of the two.

Christopher Columbus landed on St Kitts in 1493 and named it after St Christopher. He also came to Nevis on his second voyage, calling it Nevis because its resemblance to snowcapped mountains. The first European settlers of these islands were English and appeared on St Kitts in 1623 and on Nevis in 1628. They were followed soon after by the French, which gave rise to an Anglo-French rivalry that lasted for a century. After 1782 the islands came under permanent British control, together with Anguilla, as a self-governing state in association with Great Britain. Anguilla seceded in 1980, and St Kitts and Nevis became independent in 1983.

The original inhabitants of the islands, Arawaks and Carib Indians, were wiped out in a massacre in 1626. From the 1630s onwards, the islands were populated by African people who were brought in as slave workers for the sugar and tobacco plantations. As a result, a rich culture combining elements from Africa, Europe, and native American culture has evolved. The islands now have a population of 38 836 (July 2004 estimate). The residents are predominantly of African origin (90%), as well as British, Portuguese, and Lebanese origin. The official language is English. The local creole language is Leeward Caribbean Creole English (or Kittitian Creole English). The adult literacy rate is 97%.

See also: Anguilla: Language Situation; Pidgins and Creoles: Overview.

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See also: Anguilla: Language Situation; Pidgins and Creoles: Overview.

St Helena: Language Situation

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An uninhabited island in the southern Atlantic ocean until its discovery by the Portuguese in 1502, St. Helena became British East Indian Company territory in 1673 and a British colony in 1834. The island was an major port of call on the Cape route to the Indian Ocean until the opening of the Suez Canal in 1869, when its importance declined. Another role of St. Helena was to host exiles and prisoners of war, the most famous being the French emperor Napoleon Bonaparte, who was exiled to St. Helena in 1815 and died there in 1821. In the first half of the 20th century, Ascension Island and Tristan da Cunha (including Nightingale, Inaccessible, and Gough Island) became part of St. Helena.

The population of St Helena is around 7400. While ethnically a mixed community, including people of African, Chinese, and European background, the sole language of St. Helena is English.

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St Lucia: Language Situation

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St Lucia is located roughly in the centre of the Lesser Antilles, between Martinique to the north and St. Vincent and the Grenadines to the south. St Lucia was originally settled by Arawak and Carib speakers. The first European contact was with the Spanish in the early 16th century. However, it was French speakers from Martinique who established European settlement in 1650. During the following 100 years, the island was contested by French and English colonizers and fell from one to the other more than ten times. Eventually, the British assumed control of St Lucia in 1815, but strong contacts with Martinique remained, and French continued to be used in many domains. After a period of self-government, St Lucia became independent in 1979.

St Lucia's population is estimated at 164 000 (July 2004 est.). The official language is English, and 80% of the population are considered literate in English. However, the long influence of French on the island resulted in the development of the French-based Creole language Patwa or Kwéyòl (Lesser Antillean Creole French), which is still spoken by 75% of the population. At the times of French domination, there probably existed a Creole continuum, ranging from Standard French to Patwa. However, since English has replaced French as the main colonial language of St Lucia, the situation is one of bilingualism, with many St Lucians using Patwa and English in different contexts.

Traditionally, Patwa has been associated with low social standing and has played no role in any formal context. However more recently, after independence, Patwa has come to be viewed more positively and is being used in more public contexts, as well as in primary and adult education, where dictionaries, grammars, and other teaching materials for Patwa have been developed. The contact with English leads to increasing use of English lexical resources for Patwa.

See also: Language Development: Overview; Pidgins and Creoles: Overview.

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St Pierre and Miquelon: Language Situation

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St Pierre and Miquelon is an archipelago situated in the North Atlantic Ocean, south of Newfoundland. It is composed of three principal islands: St Pierre, Miquelon, and Langlade, with four small islands around St Pierre (Le Grand Colombier, Pigeon's Island, Victor's Island, and Sailor's Island). It is the only French enclave in North America, which since 1985 has enjoyed the status of 'territory with special status (*collectivité territoriale à statut particulier*).'

Archaeological discoveries show that the islands were already used as a seasonal base as early as many thousands of years ago by many native peoples, like the Beothuk and the Paleo Eskimo. During the 16th century, the islands were used as a base for seasonal cod fishery by the French of La Rochelle, Granville, Saint-Malo, and the Basque country. The name *Miquelon* was given by Basque fishermen from Saint-Jean de Luz. The French also settled in Saint-Pierre in the 17th century and fought with British colonizers for territorial rights, which resulted in fluctuated ownership. The treaty of 1763 returned the islands back to France, but even after this the islands were attacked by the British, and the locals suffered deportation. It is now a territorial collectivity of France. In the 18th century, the islands provided refuge for Acadian deportees from Nova Scotia.

The population of the islands (6995, July 2004 estimate) is French (who usually have strong patriotic feelings). Many people are originally from the Basque, Breton, and Normandy regions of France. The official language is French. The literacy rate is 99%.

See also: French.

St Vincent and the Grenadines: Language Situation

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St Vincent and the Grenadines are situated in the southeastern Caribbean. The Grenadines comprise some 32 islands (the main, populated islands of which are Bequia, Balliceau, Canouan, Mayreau, Mustique, Isle D'Quatre, Petit Saint Vincent, and Union Island) south of St Vincent, which is the largest in the archipelago.

About 100 years before the first Spanish explorers arrived, the island was settled by Carib Indians, who had been preceded by Arawak settlers. The Carib people resisted European colonists for some time. The first permanent non-Carib settlers were African slaves, who were shipwrecked from a Dutch ship in 1675 and were later absorbed into Carib society. Their descendants became known as Black Caribs, to distinguish them from the native Yellow Caribs. The first European settlement was established by the French in the early 1700s, but the British also fought for the territory.

The economy was based on plantations until 1812, when an eruption of La Soufrière volcano destroyed most of the coffee and cocoa plants. In 1834, the abolitionist movement won; more than 18 000 slaves became free, and the planters called in foreign workers. Hurricanes and another eruption in 1902 destroyed the last plantations.

In 1969 St Vincent became a self-governing state in association with the United Kingdom, and in 1979 St Vincent and the Grenadines acquired full independence.

The number of the islands' inhabitants is 117 193 (July 2004 estimate), a number that has fluctuated with eruptions of La Soufrière.

The official language is English. Local languages are Windward Caribbean Creole English, with a dialect, Vincentian Creole English, as well as a French-based creole (French Patwa or Patois). Education is not compulsory. For many years, schools used only English, but recent years have accepted the use of the local creole in education as well. The literacy rate is 96%.

See also: Pidgins and Creoles: Overview.

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Standard and Dialect Vocabulary

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A dialect is a variety of language that differs grammatically, phonologically, and lexically from other varieties and which is associated with a particular geographical area and/or with a particular social class or status group.

Standardization is the process by which a particular dialect of a language acquires or is assigned functional importance greater than the other dialects and is subject to codification and stabilization. Through these processes it acquires a publicly recognized and fixed form, in which norms are laid down for 'correct' usage as far as grammar, vocabulary, and spelling are concerned (Trudgill, 2003). This can take place over time without involvement of official bodies, as happened with Standard English, or it can take place quite rapidly, as a result of conscious decisions by governmental or other official planning agencies. The results of codification are usually enshrined in dictionaries and grammar books. For English, we can say, further, that Standard English is the dialect of English that is normally used in writing, is spoken by educated native speakers, and is taught to nonnative speakers studying the language.

Strictly speaking, then, standard varieties such as Standard English are just as much dialects as any other dialect. However, the term 'dialect' is often used to refer only to nonstandard dialects, and the opposition between 'standard' and 'dialect' vocabulary in this article must be understood in this sense – standard versus nonstandard vocabulary.

Because of its sociolinguistic history, Standard English has native speakers, which is not necessarily true of standard varieties of all languages. It is also, everywhere in the native-English-speaking world, a social dialect; it is typically spoken natively by speakers toward the top of the social class or social status scale. All other dialects of English can be referred to collectively as nonstandard English and typically have native speakers from lower social class backgrounds.

Nonstandard dialects are typically regional as well as social – they are associated with a particular geographical region. Standard English, on the other hand, is typically nonregional. It is true that Standard English is a polycentric standard variety, with English, Scottish, American, Australian, and other standard varieties differing somewhat from one another, but *within* these different countries, Standard English shows very little geographical variation – although it does have some, as we shall see.

Social and Regional Restriction

By this definition, dialect, i.e., nonstandard vocabulary, consists of lexical items that are not found in the standard variety. For English, such words are not found in the speech of native speakers of Standard English and they are not found in the dictionaries of the language, unless specifically marked 'dialectal.'

It follows, then, that a sure indication that a vocabulary item is nonstandard is that it is both regionally *and* socially restricted. To employ an English example, the nonstandard dialect of Norwich, England, has a verb *to blar*, which means 'to cry, weep.' This is clearly an example of 'dialect vocabulary' in that this verb is not only regionally restricted – to the dialects of this part of England – but is also socially restricted. That is, the proportion of the population of Norwich who are native speakers of Standard English do not normally use this word (although most of them will probably be aware of what it means).

It is words of this regionally and socially restricted type that are typically studied by dialectologists and therefore found in dialect atlases and other publications devoted to dialect study. Trudgill (1999: 124), for instance, presented a map of dialect words for 'girl,' based on the research of the Survey of English dialects, which investigated conservative rural dialects in England in the 1950s and 1960s. The words are *maiden*, in the Southwest, *wench* in the West, *lass* in the North, and *mawther* in East Anglia. However, the dialect word in the South Midlands and South is *girl*. This is probably because, whereas Standard English is today a purely social dialect, its historical origins were in the southeast of England. Similarly, the word used for 'ear' by nonstandard dialect speakers is *lug* in the east and north of England, but *ear* in the south.

In some cases, regionally restricted words are words that were formerly found in all areas, but which have become regionally limited over time. For example, *fall* used to be a general word for 'autumn,' but is now confined to the dialects of the Southwest and Lincolnshire. (It is still also used, of course, in the Standard English of North America.) In other cases, regional variation in lexis may reflect different patterns of language contact. Contact with Old Norse is responsible for northern English dialect words such as *laik* 'play' and *lop* 'flea,' whereas a Dutch influence can be seen in East Anglian dialect words such as *dwile* 'dishcloth' and *push* 'pimple.' The Herefordshire dialect similarly has words of Welsh origin, such as *tallet* 'hayloft.'

Regional without Social Restriction

Dialect vocabulary, then, consists of words that are not used by speakers of the standard variety of the language and which are both regionally and socially restricted. On the other hand, it does not follow that words that are regionally but not socially restricted (in the sense of social class or status) can be referred to as 'dialect vocabulary.' For example, the word *ashet* 'large plate' is regionally restricted within the English-speaking world to Scotland and New Zealand, but in those areas it is used by all speakers, including Standard English speakers, and is therefore in no sense an item of 'dialect vocabulary.' Similarly, *faucet* 'tap' is confined to North American English, but is used there by Standard English speakers. And *plimsolls* 'gym shoes' is restricted to the south and east of England, but is used at all social levels. This is a consequence of the fact, referred to above, that Standard English is a polycentric variety and that it does admit small amounts of regional variation even within specific countries.

Social without Regional Restriction

Because Standard English is a social dialect, it would in principle follow that words that were socially but not regionally restricted would also constitute 'dialect vocabulary.' However, there are no such words. This results from the fact that there is no way in which words can be described as 'standard vocabulary.' It may seem paradoxical that 'dialect vocabulary,' i.e., 'nonstandard lexis' should be a legitimate term but that 'standard vocabulary' should not be, but this is a perfectly natural consequence of the nature of standardization. The vocabulary of Standard English is available to all speakers; we can be sure that dialect speakers in the southwest of England in the 1950s knew and used the word *girl* as well as the word *maiden*.

Similarly, to take the Norwich *blar/cry* example, it could be suggested that *to cry* is a Standard English word, whereas *to blar* is not. However, *cry* is by no means *only* a Standard English word, since there are very many other nonstandard dialects elsewhere in which it is the only word available with this meaning, and even in the working-class nonstandard dialect of Norwich, *to cry* is a perfectly common and frequently used word. Thus, if 'Standard English vocabulary' is supposed to mean 'vocabulary that occurs in the Standard English dialect and no other,' then there is no such thing.

Unlike *mawther,* the word *girl*, despite being the dialect word for 'girl' in the south of England, is not a dialect word as such because it also occurs in Standard English. But crucially for the argument here, it cannot be described as a 'standard' word either, because it is available to all English speakers, including nonstandard speakers, and indeed, as we have seen, in the south of England it is the *only* word available, even to nonstandard speakers.

Style and Register

A further issue concerns vocabulary that is formal and technical and therefore more likely to occur in the speech of educated people. Consider the sentence:

(1) Father was exceedingly fatigued subsequent to his extensive peregrination.

It could be suggested that words such as *fatigued* and *peregrination* are confined to the speech of those social classes who speak Standard English and are therefore 'standard vocabulary.' Further consideration, however, will reveal that what we are seeing here is not a dialect difference – standard versus nonstandard dialect – in vocabulary, but a stylistic difference. Styles (see Trudgill, 2003) are varieties of language viewed from the point of view of formality and which can occur on a continuum ranging from very formal to very informal. Formal styles are employed in social situations that are formal, and informal styles are employed in social situations that are informal. The differentiation then has no necessary connection with social class or status and thus no connection to social dialect.

This becomes clearer if we consider the following sentences in contrast to (1):

(2) Dad was very tired after his lengthy journey.

(3) The old man was bloody knackered after his long trip.

These three sentences have more or less the same referential meaning and differ only in style, with the stylistic differences being indicated by lexical choice: (1) is (ridiculously) formal; (2) is stylistically neutral; and (3) is informal. We cannot, however, say that *peregrination* is 'standard' and that *trip* and *journey* are not. All dialects incorporate different stylistic levels, and Standard English is no different from any other (nonstandard) variety of the language in this respect. Speakers of Standard English have a full range of styles open to them and can swear and use slang just like anybody else. Equally, nonstandard speakers are not single style speakers either. There is no necessary connection between dialect and style and therefore no way in which formal vocabulary

can be considered standard and informal vocabulary nonstandard. Sentence (3) is standard but informal, whereas the following sentence is neutral but nonstandard:

(4) Dad were very tired after his lengthy journey.

Similarly, it could be argued that specialized, technical vocabulary is inherently 'standard.' This is also not so. The sociolinguistic term *register* is generally employed to refer to a variety of language determined by topic, subject matter, or activity, such as the register of physics, the register of law, or the register of football. This is almost exclusively a matter of lexis. However, it would make no sense to identify vocabulary from certain more erudite registers as 'standard,' since the question of register and the question of standard versus nonstandard are in principle entirely separate questions. One can certainly acquire and use technical registers without using Standard English, just as one can employ nontechnical registers while speaking or writing Standard English. There is no necessary connection between the two. Thus,

(5) There was two eskers what we saw in them
U-shaped valleys

is a nonstandard English sentence couched in the technical register of physical geography (Trudgill, 1999).

This type of combination of technical register with a nonstandard variety is much more common in some language communities than others. In German-speaking Switzerland, for example, most speakers use their local nonstandard dialect in nearly all social situations and for nearly all purposes. Thus, it is that one may hear, in the corridors of the University of Fribourg, two theology professors discussing the works of Küng using all the appropriate theological vocabulary with the phonology and grammar of their local dialect.

See also: Dialect Atlases; Orton, Harold (1898–1975); Wright, Joseph (1855–1930).

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Standardization

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Introduction

A 'standard' linguistic variety exists in almost all modern speech communities. Its prestige and legitimacy as 'standard' does not derive from any innate linguistic quality or historical precedence, or even from the fact that it is the most commonly spoken variety. It derives rather from an ideology forged and maintained by social institutions which valorize a particular variety over others and attempt to naturalize its ideological dominance. As Silverstein (1996: 285–286) defines it, "standardization . . . is a phenomenon in a linguistic community in which institutional maintenance of certain valued linguistic practices – in theory, fixed – acquires an explicitly-recognized hegemony over the definition of the community's norm." Researchers thus, ask how a particular variety came to be recognized as the standard, what social, political, and historical conditions made it possible, and what the consequences of standardization are. The study of language standardization, therefore, is less about language itself as function and structure, than it is about ideologies and hegemonies about language, or what is called 'language ideology' (Silverstein, 1979; Woolard and Schieffelin, 1994; Schieffelin *et al.*, 1998; Blommaert, 1999). Critically, linguistic anthropologists recognize that a particular valorization of the given language may actually influence its form, function, and structure, thus reversing the commonsense understanding within the ideology of the relationship between linguistic essence and social value.

The focus on the **process** of language standardization rather than on the standard language makes it immediately clear that the dominance of a particular linguistic variety is never stable or complete. While the imposition of technologies of linguistic uniformity upon the population universally characterizes the phenomenon of language standardization, this does not mean that people automatically accept and speak it. On the contrary, hegemonies are often met with counterhegemonies, and the legitimacy of the dominant language is often challenged and contested by some subgroups of the community that speak a variety

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different from the standard form, which may not even be available to them on 'equal' terms (think, for example, of the scarcity of access to Standard English in the stunning inequalities at the heart of U.S. public and higher education systems). People who speak nonstandard varieties often view the dominant language as a form of (symbolic) domination, and may consider their own linguistic variety as an emblem of solidarity and resistance. In this sense, language standardization is a complex process that includes its own 'failures,' and researchers pay careful attention to how people define themselves as members of groups with specific 'cultures' through language use. Issues of cultural and political identity are central to public debates around language standardization. Consider the examples of English-only policies, and the controversy of 'Ebonics' ('African American Vernacular English [AAVE]', a variety of English spoken by African Americans; Baugh, 2000). It is also the case that institutions, organizations, and agencies may recognize and take into account the failures of language standardization. For example, even when state authorities designate a particular language or variety as the national language, they often recognize that alternatives must be made available to the governed population, as in providing signage and reading materials in Spanish, Chinese, and Vietnamese, as well as in English, in many U.S. cities. The business world, of course, recognizes clearly that the 'standard' language may be woefully inadequate, and Spanish, Chinese and other varieties of the Yellow Pages are common in global cities. Such realities actually have the potential to undermine and eventually transform the symbolic value of the national language in particular localities, and that is, of course, precisely why we see the rise of defensive movements ('English only') at precisely those time and in those places where 'the standard' is in danger of losing its claim to privilege.

Standardization entails complex and dynamic power struggles among competing and divergent language ideologies, promoted by different groups and institutions. Ethnographic studies of language standardization thus pay close attention to the historical, political–economic, and cultural specificity and diversity of the ways in which a particular language came to be standardized and normalized, as well as to strategies, modes, and rationality of resistance and contestation to the hegemony of the standard.

Standardization, Modernization, and Nation-State Formation

The governmental idea of standardizing language is closely connected with the formation of the modern nation-state. In late 18th century western Europe, where the idea of the nation and nationalism was conceived in the strand of Romantic philosophy and philology, thinkers such as Johann Gottfried von Herder (1744–1803) argued that the repository of sovereignty is not the king or the state, but 'the people' or 'the nation,' rooted in a shared culture, tradition, history, and language. Indeed, language played a particularly important role in Herder's idea of the nation and the forging of national identity because he thought of language as the historically accumulated, spiritual essence of the primordial 'culture,' or the organic world view unique to a people. Accordingly, the relationship between standard language and nonstandard variations is conceived in the modern paradigm of the nation-state not as politics of differentiation (as the language standardization model discussed above would have it), but as a natural, phylogenetic branching in which the standard is understood as a historical and linguistic prototype or root from which the variations deviate but are still organically connected. Since the identification of one nation with one language served as a powerful moral ground on which to claim political sovereignty in nationalist movements, this model served nation-state formation not only in western Europe, but also by national subgroups with separatist agendas, as well as colonial and postcolonial populations.

If, as Benedict Anderson (1983) tells us, the nation-state idea is available for pirating, so is the idea of a standard language. In tandem with Herderian, primordial, nationalist rhetoric, language standardization has been one of the crucial projects of national modernity, seemingly obligatory in the context of industrial capitalist takeoff, urbanization, rational-bureaucratic state formation, and the emergence of civil society. In modernizing social institutions, such as education, labor markets, administration, the military, and the media, and in nationalizing the populace as the nation's citizen-subjects, language standardization was associated explicitly with the instrumentalist notions of 'efficiency,' 'progress,' and 'rationality.' The dream of a universal state language is rooted in the image of a well-ordered communication machine (thus our recognition of how an 'Orwellian' language will have its advocates). Governmental projects at all levels have included ideas regarding a standard language. Thus, whether the 'unity' of 'a people's' language is an effect of nationalist imaginings or modern governmentality, a standard language is never identifiable with naturally primordial or primary root language, but is always historically emergent and politically saturated.

Because a modern standard language originated in the core of capitalist modernization in western Europe, many non-Western countries intent on

modernizing have viewed creating a standard national language as essential and a sign of progress and development on a par with the West. In late 19th-century Japan, for example, a language modernization movement evolved out of a keen awareness on the part of the nation's elite of the absence of a standard Japanese, which they perceived as the sign of backwardness. In a contradictory, yet unified, rhetoric that claimed Japan's world status as a modern nation-state akin to those in the West, on one hand, and its particularity and autonomy from the West, on the other hand, modernizing the country was synonymous with modernizing its language (self-consciously asserted to be as unique – as **non**-Western – as Japanese 'civilization'), which meant creating a standard, national language (Inoue, 2002). Likewise, the creation of the Thai national language was part and parcel of the modernization of the Thai nation. A new language – newly **national** – was created by reforming tense and pronoun systems, coining new lexicons, and other changes, in reference to European languages such as English (Diller, 1988). In both the Japanese and Thai cases, language modernization meant approximating European languages, including having one single standard national language.

The Culture of Monoglot Standardization and Linguistic Markets

Language standardization gives privilege, authority, and legitimacy to a particular language variety, and thus creates a hierarchy in which 'nonstandard' varieties, whether they are characterized as accents, dialects, or other languages, are marginalized. Such a linguistic hierarchy is often hegemonic in the sense that it is simply taken for granted by speakers. Even in a society where a multicultural, multiethnic, and multilingual ideal is officially celebrated and advocated, the standardness of language is tacitly assumed and naturalized in such a way that it is associated with moral superiority, class mobility, and 'culture.' For example, Silverstein (1996) calls the United States "a culture of monoglot standardization," in which the function of language is reduced to the 'referential,' a one-to-one correspondence between a word and its meaning – like a dictionary. The fact that language standardization is a sociopolitical process is thus suppressed, and the process of standardization is presented as if it were the consequence of some sort of natural selection in which language achieves the perfect 'fit,' or one-to-one correspondence between the word and its meaning, as more and more speakers agree upon a particular word–meaning correspondence and use it in communicating with each other. The monoglot ideology rationalizes itself as a free market: it takes on a life of its own, operating beyond any one actor's deliberate control. Understanding language standardization as a 'natural' process that goes beyond human control also justifies the existence of hegemonic social institutions such as education, the media, and even academic linguistics, as if they existed simply as transparent transmitters of the 'natural' course of linguistic events, rather than creating and enforcing the standard.

One can recognize a complicit relationship between the monoglot ideal and social reproduction. The hegemony of the monoglot ideology within the nation-state depends upon the degree to which what the French sociologist Pierre Bourdieu (1991) called a 'linguistic market' is nationally integrated. Just like a commodity market, the value of a particular way of speaking is set according to the law of price in that particular market. Bourdieu saw language use as an embodied practice that is habitually acquired over a long period of time ('linguistic habitus'), in a particular social field. Some linguistic habitus maintain or expand their normative value in multiple fields and others lose value. For example, working-class language variations, when used outside of working-class neighborhoods in certain fields such as higher education and the white-collar workplace, would be devalued. This devaluation is a form of symbolic violence in Bourdieu's terms, by which nonstandard speakers are subjected to systematic subordination, with attendant disadvantages in social, political, and economic competition. Critically, however, the subordinated, whose language use is devalued, themselves misrecognize that the standard form, which is an arbitrary effect of power, is somehow inherently superior to theirs, and its legitimacy is voluntarily endorsed even by those most harmed by it. The standard is also reified in the form of a commodity, so that those who do not speak the standard form are made to believe that they can 'own' it through judicious enterprise. The concept of the linguistic market explains how the dominant group achieves social, particularly class, reproduction: since the linguistic habitus of the dominant group is the standard language in major national institutions such as education, government, media, law, and so on, they enjoy a monopoly on linguistic capital, or at least better access and control, by which they further maintain their social dominance through the social and business advantages accruing to their linguistic capital. The monoglot ideal thus serves to reproduce their dominance as they control formal institutions.

Standardization and Contestation

Bourdieu's model has been questioned, however, by Woolard (1985), who asked if it is ever possible for a

linguistic market to be fully integrated nationally. She argued that our ability to understand linguistic hegemony and social reproduction suffers if we limit ourselves, as Bourdieu does, to the level of formal institutions such as public education. Her ethnographic case in point is the bilingual situation in Catalonia, Spain, where "Castilian (called 'Spanish' in Anglophone usage)," the state's official language, coexists with Catalan (Catalan–Valencian–Balear), a regional language. In spite of Castilian's official language status, it is not necessarily completely hegemonic. Catalan is, in fact, positively valued, associated with status, self-confidence, intelligence, and culture by both Catalan and Castilian speakers. Such a valorization of Catalan has to do with the dominant economic status of the Catalan bourgeoisie. While Catalan is not the language of authority in formal institutions, such as the schools and government offices, it has a clear legitimacy and prestige within civil society and in less formal settings. In these settings, people engage in face-to-face encounters with Catalan speakers who are a middle-class presence as managers, residents of 'better' neighborhoods, and small business owners. Thus, the 'national' linguistic market may not reach much of daily life in localities where alternative markets may actually work at odds with the 'price setting' in the national market and potentially undermine the claimed national linguistic hegemony.

Alternative linguistic markets also often entail acts of resistance and contestation. The official language may well be a highly visible target when a subnational group identifies it as the symbol of state's domination and control by what is seen as an alien group in power. Resistance may then take the form of claims of cultural and political sovereignty against the state by means of reviving the subnational group's 'own' language and establishing its linguistic identity. The Basque separatists in Spain are a case in point (Urla, 1988). Although Basques in the autonomous Basque country are legally accorded the right to learn and use Euskara (Basque), Castilian is still, just as in Catalonia, the state's official language even within the Basque country. Basque activists, not surprisingly, promote the use of Euskara in public domains and its official use in formal institutions.

Strategies of Minority Language Groups

As Urla pointed out, however, the Basque linguistic nationalist movement can be better understood based not on notions of primordial essence in opposition to state authority so much as on a notion of modernization. Rational and scientific management, preservation, and development of the Basque language are central in this identity movement. This 'modern' strategy, by which ethnic minorities attempt to establish their linguistic – and, by extension, cultural – identity and autonomy by proving that their language is just as 'modern,' 'logical,' and 'rational' as dominant languages, has been deployed in a wide range of cultural conflicts currently observed in various parts of the world. This strategy logically entails efforts to show that there is a unity and boundedness to 'our,' which is characterized by a single standard. Thus, minority language revitalization movements often subscribe to a monoglot ideology, the same language ideology that the dominant language groups deploy to marginalize variation.

One concrete strategy of minority language revitalization is formal codification through practices of literacy, orthography, dictionary, grammar, or census. In Corsica, a region of France on a Mediterranean island, for example, Corsican speakers live in diglossia: French is used in the official and public domains, and Corsican in those of the private and the domestic. Just like Basque speakers, Corsican language planners' goal is to claim the legitimacy of Corsican as a full, autonomous language, and thus to accord it the same symbolic value as French – as the code of power and authority, to be used in the public and official domains. Language activists focus on literacy and on establishing a standardized orthographic system of Corsican. Jaffe (1996) showed how codification as a strategy to claim linguistic autonomy as an established code with certain cultural values – just like French – is both a form of resistance to the diglossic hierarchy between Corsican and French, but also complicit in that hierarchy.

It is indeed empowering to represent the language as fully coded and as holding established cultural values – solidarity and egalitarianism – unique to Corsican in opposition to French. But this strategy also backhandedly maintains the monoglot ideology that underwrites the dominant position of French: Corsicans claim their ethnolinguistic essence such as intimacy and egalitarianism **only** in opposition to the public and official function of French, continue to confine Corsican to the private and domestic realms, and also deny the vital heterogeneity within the Corsican language.

We find the same predicament and struggle over codification in minority language revitalization movements in linguistic communities around the world, including, for example, Haitian creole (Haitian Creole French) (Schieffelin and Doucet, 1994); Tolowa, a California Indian language (Collins, 1998); and Ebonics (Baugh, 2000). In the Haitian creole case, for example, the debate about which system of orthography to adopt involves a political

debate about the ethnolinguistic roots of the Haitian language. A hybrid of French and African languages, what is the 'origin' of Haitian, and, by extension, what 'people' is the postcolonial nation of Haiti built upon? The politics of language thus centers around how to codify a nation's 'own': what techniques are to be used – orthography, language education? – and what lines are to be drawn – France, Africa, a 'Black Atlantic'? Such cases all clearly demonstrate that the question of how language is to be represented is inseparable from the question of how the nation and cultural identity are represented.

Language Standardization and Transnational Political Economy

As was mentioned above, ethnolinguistic diversity within the nation-state, often accompanied by political claims to cultural autonomy, make a fully integrated **national** linguistic market untenable. But we now recognize that the politics of language is not energized only by forces contained within nation-states: the possibilities both of a hegemonic national standard language and of its contestation by local and autonomy movements are often affected by transnational language movements and cultural-linguistic 'flows.' For example, when key institutions or arrangements within the nation-state – such as public education; labor, consumer, and other markets; the bureaucracy, including regional governance – are not tightly integrated or effectively nationalized, the prestige and authority granted by the state's designated standard language(s) are not necessarily guaranteed. Such 'weak' states and 'developing economies' are, of course, commonly the product of systemic global inequality rooted in the uneven development at the heart of the capitalism as a global social formation.

In Egypt, for example, as an effect of both colonial roots and neocolonial trade, the domestic economic infrastructure has systematically relied heavily on investments and funds from the metropolitan countries. The elite classes – both native and nonnative – which dominate Egypt's political economy are educated in languages such as English, French, and Italian, and proficiency in those languages is widely recognized as linguistic capital for socioeconomic success, notwithstanding the nation's official language, Classical Arabic (Standard Arabic) (Haeri, 1997).

The case of German speakers in Transylvania, Romania, illuminates a similar point (Gal, 1987). While Romania's national language has been Romanian, it is not used in intragroup communication among German speakers. Because of their relatively privileged economic standing within the country and their economically advantageous ties to Germany, one of Europe's economic metropoles, through emigration opportunities, German as a minority language is actively maintained and accorded authority. Although the maintenance of German is in part an act of resistance to Romanian nationalism, the value of German derives also from the group's status and positioning within the broader political economy of the European Union.

Heller's (2003) ethnographic study of the French-speaking minority in Canada also showed how the transnational or global political economy shifts the value of the official language beyond the state's ability to control it. Although French is one of the two official languages in Canada, it does not enjoy the prestige that English does. This is in part due to the fact that the regional economy in francophone areas has been based traditionally on primary industry such as agriculture, fishery, forestry, mining, and industrial labor, which has suffered from continuous stagnation in the last three decades. To use Bourdieu's term, the value of French as linguistic capital within the national linguistic market, in terms of social mobility and economic gain, is lower than English, which is the language of the high-tech and financial industries. There has, however, been a shift in the way French speakers renegotiate their linguistic and cultural identity, as the regional economy has become increasingly linked with the global political economy by, particularly, the development of transnational service industries, such as offshore call centers and heritage tourism. Such service industries take advantage of French in particular and bilingual fluency in general. What defines the shifting – and, now, more positive – meaning of French does not come from the state or even the national political economy, but from the global economy. At the same time, however, as Heller pointed out, it is important to note that this 'improvement' means that francophone ethnolinguistic identity also shifts from an emblem of ethnic and cultural community to a distinct commodity for competitive sales globally.

Language Standardization in Postcolonial States

The phenomenon of language standardization takes on a different kind of complexity and politics in nation-state building among formerly colonized countries. Most of these nations were and are predominantly multiethnic and multilingual, the European colonial borders having been inserted on the basis of logics other than indigenous identities. While some sort of lingua franca, or hybrid variety, existed for interethnic communication, particularly

for trading, the notion of a standard language, or one superimposed on variations, was not necessarily available, or even conceivable, until monoglot linguistic ideology was brought by colonial rulers. The rise of nationalist movements as the predominant form taken by anticolonialism prompted native colonial elites in each colony to conceive their 'own national language' – as opposed to the colonizer's language. This was a critical step in the development of national cultures through the print media and literary arts. Upon formal independence, which came after World War II for most colonies, nation building always considered the creation of a national language as one of the pressing priorities. In many postcolonial nation-states, language standardization involves two interrelated issues. One is the question of whose language, out of multiple languages from a variety of regions and ethnic groups, should be the national language. The other concerns the question of what to do with the language of the colonial administration, in which the colonized elite classes were educated. The claim of 'national' language is deeply embedded both in the anticolonial, nationalist political consciousness, on one hand, and in the modernist aspiration to attain 'one language, one nation,' on the other.

One example can be drawn from India's postcolonial language standardization process (Washbrook, 1991; Lelyveld, 1993; Cohn, 1996). Under British colonial rule from the 18th century until 1947, India's multilingual situation (with no standard language and no systematic indigenous knowledge about the relationship between the languages) was a sign of backwardness, and was therefore to be reformed so as to establish a centralized administrative channel of communication and generally to civilize 'Indians' (a colonial category that was not coterminous with precolonial, indigenous state-imposed statuses). Based on monoglot ideology, colonial rulers produced a systematic colonial knowledge of Indian languages in the form of dictionaries, grammars, lexicographies, and linguistic manuals for colonial administrators. Philological science was also mobilized to classify the languages and to identify their prototype and the cognate relationship among them, so as to determine the basis of the standard form. All of these colonial linguistic knowledges were produced alongside censuses and agricultural, geographical, medical, and anthropological knowledges of the colonial objects.

Particularly notable was the introduction to Indian society of the notion of 'linguistic identity,' or the idea that one language corresponds to one bounded territory (and its people), and that linguistic difference constitutes ethnic difference. In other words, this new knowledge of language categories such as Hindi, Punjabi (Panjabi), and Urdu came to be the basis on which the Indian territory was divided up into mutually exclusive regions. Thus, the colonial discourse actually produced what it claimed merely to be describing: strong regionalism, a critical source of national and regional political conflict to this day. Consequently, English, which has no association with any one Indian region, paradoxically remains preferred as a means of 'national' communication by the national government.

Upon its declaration of independence from the Netherlands in 1945, the Indonesian government designated Bahasa Indonesia (or Indonesian) as its national language (Anderson, 1983; Errington, 2000; Keane, 2003). As a Malay variety, it was originally a lingua franca used by Dutch colonialists for administration, and later became both the symbol and the communicative means of the Indonesian nationalist movement in the early 20th century. But with more than 500 languages spread across 6000 inhabited islands, Indonesia is the ultimate modern, multilingual nation-state. For the majority of speakers, therefore, Bahasa Indonesia is their second language. The choice of Bahasa Indonesia as the national language was based on the fact that it is a translocal language with no concrete connection with any place or any people within Indonesia, or with the Dutch colonizers. Bahasa Indonesia symbolizes the nation's egalitarianism in a paradoxical way: it is everybody's language, accessible to anyone, and at the same time, it is nobody's (first) language, with no ethnolingusitic origin within the nation.

Democratic pluralism, often envisioned as a goal in multiethnic and multilinguistic postcolonial states, is central to the language standardization policy in Zambia, where more than 15 languages are spoken among 73 ethnic groups. As in Indonesia, the critical issue in Zambia's nation building concerned how to negotiate the political tension between the ideal of national unity and that of a national tolerance of diversity (Spitulnik, 1998). While Zambia's official language is English, ethnic languages are put on public display to demonstrate the nation's democratic pluralism. One such public space is radio broadcasting. Spitulnik described how, for example, the equal distribution of airtime to different languages is meant to be the iconic representation of democratic ethnolinguistic pluralism. At the same time, however, because of the differential economic and political status linked to languages, there inevitably exists an understood hierarchy among them. Indeed, this inequality is often reflected in radio programming, so that more prestigious or serious content may be broadcast

in a more valued language, and a less valued language may be relegated to being the medium for broadcasting more frivolous content.

Although these postcolonial sociolinguistic situations might seem extreme and unique, they attest to a general condition of language standardization in that it is never only about language, but always also about politics and identity. Beneath the standard form, there always exist competing ideas and beliefs about language, which can potentially erupt as political and cultural conflicts. Finally, these cases also highlight the importance of situating the matter of language in a broader historical as well as political-economic context.

See also: Language Ideology; Language Planning and Policy: Models; Language Policies: Policies on Language in Europe; Nationalism and Linguistics.

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Stang was a Norwegian linguist who specialized in Baltic languages and comparative Indo-European linguistics and was professor of Slavonic languages at the University of Oslo, 1937–1970. Stang studied comparative Indo-European linguistics in Oslo and Paris, where he attended the lectures of Antoine Meillet, who would remain his scholarly model throughout his life.

Soon Stang became particularly attracted to Slavic and Baltic linguistics, and between 1923 and 1925, he made several study trips to Russia and Lithuania. In 1929, he defended his doctoral thesis *Die Sprache des litauischen Katechismus von Mažvydas* (1929), a study of the oldest extant Lithuanian text. His interest in Indo-European linguistics often led him to older stages of Balto-Slavic, but he also worked on the modern languages as in *Das Fischerlitauisch in Preussen* (1932) which he wrote together with Georg Gerullis.

His main field remained diachronic linguistics, however, and he published philological studies of the languages of particular texts such as *Die westrussische Kanzleisprache des Grossfürstentums Litauen* (1935) and *Die altrussische Urkundensprache der Stadt Polozk* (1939) as well as monographs on topics of Balto-Slavic historical linguistics such as *Das slavische und baltische Verbum* (1942) and *Slavonic accentuation* (1957). All his work on Baltic historical linguistics was summed up in his *Vergleichende Grammatik der baltischen Sprachen* (1966), which remains the fundamental work on the subject.

Stang did not limit himself to Balto-Slavic linguistics, but published comparative studies on other IE languages and treated problems of the IE proto-language itself. (Selected studies are found in Stang, 1970.) His idea that the endings of the IE perfect are closely related to those of the medium has turned out particularly influential and underlies much recent work in IE linguistics. He also published a study on the *Lexikalische Sonderübereinstimmungen zwischen dem Slavischen, Baltischen und Germanischen* (1972), where the influence of Meillet's 'étymologie–histoire des mots' can be seen.

Like the fellow Norwegian linguists of his generation, Stang was never occupied with linguistic theory and throughout his life, he remained a rather orthodox neogrammarian who sought a historical interpretation of data that he gathered not only from texts, but also from field studies. In this respect, he made a lasting contribution to the historical grammar of the Baltic languages.

See also: Balto-Slavic Languages; Indo–European Languages; Latvian; Lithuanian; Meillit, Antoine (Paul Jules) (1866–1936); Slavic Languages.

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States of the Glottis

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Historical Background

The glottis is the opening between the vocal folds in the larynx that is generally thought of as the primary valve between the lungs and the mouth; the states of the glottis are the positions generally considered to characterize the different possible shapes of this opening. In fact, there are two main valves (and a third minor valve) at work in the human larynx, and 'states of the glottis' are perhaps better thought of as 'states of the larynx.' Abercrombie (1967: 26) specifies four basic states of the glottal passage: open, in vibration, narrowed, and closed. The first two categories date back to Holder (1669) and characterize the open or abducted position of the vocal folds for 'breath,' which is akin to normal breathing, and the vibrating or adducted position of the vocal folds for the production of 'voice.' In characterizing sounds in the flow of speech, a very general parallel can be drawn between 'voiceless' flow, with the glottis in the open position of breath, and 'voiced' flow, with the glottis in the vibrating position of voice. The narrowed glottis that Abercrombie refers to is meant to account for 'whisper,' which is noisier than 'breath,' and the closed glottis refers to the state known as a 'glottal stop,' when the passage is closed, allowing no air (either breath or voiced flow) to pass through. Although states of the glottis refer specifically to postures identified within the larynx, they carry implications for physiological functions, including aspects of airflow, during speech.

In the 19th century, Alexander Melville Bell very astutely identified a point of stricture superior to the glottis. What he called the 'super-glottal passage' is open during 'breath,' as is the glottis itself, while the 'super-glottal passage' is contracted during 'whisper,' while the glottis itself remains open (Bell, 1867: 46). Recent research confirms Bell's description, identifying the laryngeal constrictor mechanism as the sphincteric aryepiglottic folds that pull the laryngeal cartilages upward and forward toward the epiglottis when fully contracted, thereby shutting off the airway completely and powerfully (Esling, 1996). This aryepiglottic laryngeal constrictor is active in the narrowing of the immediate supraglottic passage for the production of whisper. A related inferior and less extreme contraction of the constrictor musculature appears to be responsible for arresting airflow through the glottis when the adducted vocal folds (with, in Bell's terms, "conjoined edges") are pressed upon by the immediately superior ventricular folds to produce glottal stop (Esling and Harris, 2003, 2005).

It is well known in the study of the voice that changing pitch (the vibrating frequency of the vocal folds) changes in various ways the perceived quality of the sound that results (*see* **Voice Quality**). The high-pitched version of the neutral modality of voicing has been called 'falsetto' since the writing of Sweet (1877: 3, 1890), who characterized it as the "shrillest form" of the head register, using the terminology 'chest' and 'head' voice proposed by Garcia (1855, 1856), which is still often used in descriptions of the singing voice throughout the 20th century. The term for chest voice proposed by Hollien (1972: 320) and adopted by Laver (1980: 95) is 'modal voice.' Falsetto is a glottal phenomenon, resulting from the adduction of the vocal folds to produce voice but with the addition of enough tilting of the laryngeal cartilages to stretch the vocal folds, making them long and thin. The frequency of vibration (perceived as pitch) is much faster in falsetto because the taut vocal folds only permit vibration along a short portion of their length. Since the vibrating mass of long thin vocal folds is different from the vibrating mass of shorter and thicker vocal folds, the quality of the sound also differs.

The basic states of the glottis defined in the 19th century, therefore, evoke three distinct laryngeal processes that can be considered essential in the physiological description of laryngeal function: glottal abduction/adduction, glottal stretching for pitch, and laryngeal constriction. Breath is an example of glottal abduction; voice and falsetto are examples of glottal adduction; and whisper and glottal stop are examples of the effects of laryngeal constriction. Whisper illustrates laryngeal constriction with glottal abduction, and glottal stop illustrates minimal inferior laryngeal constriction with glottal adduction. Beyond these basic laryngeal states, further combinations are possible, drawing on different permutations of the three principal laryngeal processes.

Elaborations on the Basic States

In contrast to breath and glottal stop, another voiceless state of the glottis can be identified that is partially open but through which no air is flowing. While the state of the glottis for voiceless aspirated oral stops and affricates (during the aspiration phase) is breath, the state of the glottis for voiceless unaspirated oral stops and affricates is a configuration

described as 'prephonation.' Prephonation, as distinct from other voiceless states of the glottis such as breath, is made with the arytenoid cartilages adducted as for modal voice, but with the vocal folds forming a narrowed convex-convex opening during which subglottal air pressure is insufficient to initiate airflow through the partially open glottis while the closure phase of oral articulatory stricture is maintained (Harris, 1999, 2001). While in some languages, word-initial vowels may typically begin with a glottal stop, in English and in Thai, word-initial vowels are usually preceded by prephonation, unless they are heavily stressed.

In addition to glottal stop, a more complete closure of the laryngeal passage is also possible. The most efficient closure of the airway in the human larynx is a complete engagement of the laryngeal constrictor mechanism, known in phonetics as an 'epiglottal stop' (Esling, 1996, 1999). This state of closure has been found to be one of the first 'sounds' that an infant articulates as it learns to control its breathing and swallowing in conjunction with early vocalizations (Esling *et al.,* 2004). Both kinds of stop are referred to as 'unphonated' (Catford, 1990), which implies that no airstream is passing through the glottis. Epiglottal stop occurs as a speech sound in some dialects of Arabic, identified by Hockett (1958: 66) as a 'pharyngeal catch'; in languages of the Caucasus such as Chechen, identified by Catford (1983: 347) as a 'pharyngealized glottal stop,' 'strong glottal stop,' or 'pharyngeal stop'; and in the Pacific Northwest languages, Salish (Carlson *et al.,* 2004) and Wakashan (Esling *et al.,* 2005).

The Nature of 'Compound' States

Bell recognized that aspects of the basic states could be combined. He defined a compound phonatory category of 'whisper and voice heard simultaneously,' which he called 'vocal murmur' (1867: 46). This is the state of 'whispery voice,' which continues to be called murmur in many phonetic descriptions. It combines vocal fold vibrations at the front part of glottis with airflow through the open back part of the glottis, channeled through a variably constricted laryngeal sphincter above the glottis. A parallel compound category, 'breathy voice,' involves no laryngeal sphinctering but otherwise has the same voiced (vibrating) and friction (airflow) components as in whispery voice. Being less impeded laryngeally, breathy voice therefore has a higher rate of airflow (Catford, 1964: 32; 1977: 101; *see* **Phonetic Processes in Discourse**).

To account for the low end of the pitch range, where vocal fold vibrations are slow and sound like individual pulses, modal voice gives way to 'creaky voice.' It is one aspect of what is often called a 'deep' or 'rich, bass' voice. It could be said that the two components combining to produce the quality of creaky voice are voicing at the glottis and constriction at the laryngeal sphincter. Since whisperiness and creakiness are both constricted states, they naturally combine with another constricted laryngeal configuration – harshness – when used as labels for describing voices (*see* **Voice Quality**). Constricted states such as creaky voice (or harshness) are phonated states that are very close to becoming unphonated, i.e., closing off the airway as in a moderate glottal stop or in a full epiglottal stop.

Based on the description of the laryngeal constrictor, there is also a rationale for treating harshness, usually described as a phonation type, as a laryngeal state and for relating different qualities of harshness to glottal pitch (Esling and Harris, 2003, 2005). The three basic laryngeal processes highlighted above – glottal abduction/adduction, glottal stretching for pitch, and laryngeal constriction – can be thought of as combining to produce a set of qualities usually known as varieties of 'harsh voice' but occurring in three distinct pitch ranges. In this way, laryngeal constriction combines with glottal stretching to produce a new set of constricted counterparts to creaky voice, modal voice, and falsetto: low-pitched harsh voice (with aryepiglottic trilling), mid-pitch harsh voice, and high-pitched harsh voice (with extreme degrees of compression in both the postero-anterior constrictor dimension over the glottis and the antero-posterior stretching dimension at the glottis).

All three types are assumed to be voiced (with glottal adduction). The low-frequency component that enhances creaky voice at the low-pitched end of the harsh range is attributed to the vibration of the aryepiglottic folds (which define the laryngeal sphincter over the top of the glottis). Although creak is already low-pitched (typically around 80 to 100 Hz), aryepiglottic fold vibration is detected at about half that number of periods: around 50 Hz. This mode of laryngeal activity has been identified as a contrastive tonal register in the Bai language of China, in opposition to breathy voice, modal voice, and harsh voice without aryepiglottic trilling (Esling and Edmondson, 2002). It is entirely possible that glottal phonation in this mode is creaky, while aryepiglottic fold vibration contributes the impression of harshness. It is significant to note that the location of aryepiglottic stricture is the same place of articulation that accounts for sounds that are labeled 'pharyngeal' or 'epiglottal' in phonetics. Thus, aryepiglottic trilling could also be called a 'pharyngeal trill' articulatorily, in the same way that an epiglottal stop had been referred to earlier by Catford as a pharyngeal stop.

Harsh voice at mid pitch range is aperiodic and may involve an increase in airflow pressure to counteract the tightness imposed by the laryngeal valve. In Laver's account (1980: 129), the most commonly reported correlate of harshness is 'laryngeal tension.' As pitch increases, while maintaining at least as much contraction of the laryngeal constrictor as for harsh voice at mid pitch, the impression of tension becomes extreme, and the state of the glottis that results – high-pitched harsh voice – resembles glottal stop in configuration, except that phonation continues (whereas for glottal stop, phonation ceases). The auditory quality that this combination of tightening mechanisms generates had been referred to in many earlier formulations as 'ventricular voice' (see Laver, 1980), but it is the aryepiglottic folds rather than the ventricular folds (false vocal folds) that are critical to the point of stricture. In this state, the two opposing forces of laryngeal tension – aryepiglottic sphincteric and glottal stretching – act simultaneously to produce the most strained phonation type possible without actually stopping vibration at the glottis. This state of the glottis is falsetto-like in its characteristic high pitch, but the irregular signal that it generates (auditorily tense, i.e., harsh) is related to the sphincteric constriction in the aryepiglottic structures immediately superior to the glottis.

See also: Phonetic Processes in Discourse; Voice Quality.

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Statistical Testing of Variation

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The Study of Linguistic Variation

The quantitative study of linguistic variation originated in the studies conducted by William Labov in New York 1960s and 1970s (e.g., Labov, 1966, 1972). This approach to the study of language in its social context was subsequently extended to a wide variety of languages in communities around the world. The main ideas are that an understanding of language requires an understanding of variable as well as categorical processes and that most of the variation that we witness at all levels of language is systematically constrained by multiple linguistic and social factors that reflect underlying grammatical systems and that both reflect and contribute to the social organization of the communities to which speakers belong. This article focuses on methods of statistical analysis commonly used in the study of linguistic variation, with emphasis on variable rule, or VARBRUL, analysis, a specialized application of the statistical procedure known as logistic regression. Alternatives to VARBRUL, such as the logistic regression modules as implemented in commercial statistical packages, are also briefly considered.

Multivariate Analysis with VARBRUL

Modeling linguistic variation can be carried out by a number of commercial statistical software packages, usually under the name of logistic regression. However, the programs known as VARBRUL have been used most extensively in sociolinguistics, because they have been deliberately designed to handle the kind of data obtained in studies of variation. In particular, VARBRUL allows the researcher to model simultaneously the effects of the multiple factors that may condition a speaker's choice of one or another variant and to determine which factors have a statistically significant effect on that choice and which do not. VARBRUL also provides heuristic tools that enable the researcher to modify hypotheses and reanalyze the data easily to compare alternative models. The statistical bases for the VARBRUL programs are set out in Rouseau and Sankoff (1978) and Sankoff (1988b) and the mathematical basis of logistic regression is explained in detail in Hosmer and Lemeshow (1989). The procedures for using the software are covered in detail in Young and Bayley (1996) and in the documentation that accompanies the programs. The two most widely available versions are GoldVarb for the Macintosh (Rand and Sankoff, 1991) and for Windows (Lawrence, Robinson, and Tagliamonte, 2001).

A full explanation of the steps involved in carrying out a multivariate analysis with VARBRUL is beyond the scope of this article. Hence, the discussion will be limited to addressing several questions that arise in any study, including defining the envelope of variation, testing for significance, interpreting the results, and dealing with the limitations inherent in the program. Readers who wish to pursue the topic in greater depth should consult the extensive literature on variable rule analysis and use of the VARBRUL programs (e.g., Bayley, 2002; Cedergren and Sankoff, 1974; Guy, 1993; Mendoza-Denton, Hay, and Jannedy, 2003; Paolillo, 2002; Rousseau and Sankoff, 1978; Sankoff, 1988b; Young and Bayley, 1996).

Defining the Variable and the Envelope of Variation

The first step in conducting a VARBRUL analysis is to define the variable, including the envelope of variation. That is, what forms count as instances of the variable under investigation and what forms should be excluded from analysis? Are the forms that vary indeed two ways of saying the same thing and are the forms actually variable in all of the environments considered? In many studies, particularly studies of phonological variation, defining the envelope of variation is not a problem. For example, *working* and *workin'* clearly have the same referential meaning, as do *west side* and *wes' side*. Moreover, a considerable body of research has shown that alveolarization of /ŋ/ and consonant cluster reduction, or -t,d deletion, are widespread across English dialects (Labov,

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Statistical Testing of Variation

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The Study of Linguistic Variation

The quantitative study of linguistic variation originated in the studies conducted by William Labov in New York 1960s and 1970s (e.g., Labov, 1966, 1972). This approach to the study of language in its social context was subsequently extended to a wide variety of languages in communities around the world. The main ideas are that an understanding of language requires an understanding of variable as well as categorical processes and that most of the variation that we witness at all levels of language is systematically constrained by multiple linguistic and social factors that reflect underlying grammatical systems and that both reflect and contribute to the social organization of the communities to which speakers belong. This article focuses on methods of statistical analysis commonly used in the study of linguistic variation, with emphasis on variable rule, or VARBRUL, analysis, a specialized application of the statistical procedure known as logistic regression. Alternatives to VARBRUL, such as the logistic regression modules as implemented in commercial statistical packages, are also briefly considered.

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1989). However, it becomes less obvious that variable forms meet the criterion of being two ways of saying the same thing at higher levels of linguistic structure. VARBRUL has been used to analyze variation in syntax, discourse, and code-switching. However, the use of VARBRUL analysis for modeling variation in syntax in particular resulted in considerable controversy. Indeed, the problem of defining what counts as an instance of the variable may affect the study of even such frequently examined variables as the alternation between null and overt subject pronouns in languages such as Spanish, e.g.,

(1) Yo/Ø jugaba fútbol.
'I used to play soccer.'

Matos Amaral and Schwenter (2003) examined the treatment of subject personal pronouns in contrastive contexts, as in the following example from Cameron (1992), where the subject pronoun *yo* 'I' is obligatory:

(2) Ella siempre quirere ir al cine. Yo preferiría estar en casa.
'She always wants to go to the movies. I would prefer to stay home.'

However, as Matos Amaral and Schwenter point out, placement of the adverb *honestemente* 'honestly' before *yo* results in a context where both the overt and the null options are possible:

(3) Ella siempre quirere ir al cine. Honestemente yo/Ø* preferiría estar en casa.
'She always wants to go to the movies. Honestly, I would prefer to stay home.'

Matos Amaral and Schwenter observe that the majority of variationist studies have excluded contrastive contexts (or a subset thereof) from the envelope of variation on the grounds that subject pronouns are obligatory in such contexts (e.g., Bayley and Pease-Alvarez, 1997; Cameron, 1992; Silva-Corvalán, 1994). A number of other studies, however, have included contrastive contexts (e.g., Enríquez, 1984). A discussion of the contexts in which null pronouns are licensed in Spanish is beyond the scope of this article. Nevertheless, questions such as those raised by Matos Amaral and Schwenter have clear implications for quantitative analysis because the results will be affected if we exclude tokens in a context where a variant may occur, even if it does so only rarely.

Identifying Potential Constraints on Variation

The second issue concerns specifying the factors that may influence a language user's choice among variants. In general, it is best to code broadly, provided that each factor group is based on a well-motivated hypothesis. Lucas (1995), for example, investigated the potential effects of eight separate factor groups on the choice of a variant of the sign DEAF in American Sign Language (ASL). As it turned out, most of these groups proved not to be statistically significant. However, the labor of coding for many factors was not in vain. The study demonstrated that earlier beliefs that variation in the form of DEAF is influenced primarily by the location of the preceding sign, a phonological constraint, were at best incomplete. Lucas also demonstrated the previously unsuspected influence on the choice of variant of the grammatical category to which DEAF belongs, a finding that was subsequently confirmed in a large-scale study (Lucas, Bayley & Valli, 2001).

Performing VARBRUL Analysis

Once coding is complete and the data are entered into the program, VARBRUL estimates the factor values (or probabilities) for each contextual factor specified (e.g., the phonetic features of the following environment or the social class to which a speaker belongs). This is done by combining the input probability (p_0, the likelihood that the 'rule' will apply regardless of the presence or absence of any other factor in the environment) with the applicable factor weights from each of the factors in the model (p_1, p_2, ..., p_n), according to the formula:

$$p = \frac{p_0 \times \ldots \times p_n}{[p_0 \times \ldots \times p_n] + [(1 - p_0) \times \ldots \times (1 - p_n)]} \quad (1)$$

The program provides a numerical measure of the strength or influence of each factor, relative to other factors in the same group, on the occurrence of the linguistic variable under investigation. Values range between 0 and 1.00. A value, or weight, between 0.50 and 1.00 indicates that the factor favors use of a variant relative to other factors in the same group. For example, in a recent study of contact between Spanish dialects in the United States, Vélez-Salas *et al.* (2004) investigated the alternation between overt and null pronouns in the Spanish of Puerto Ricans living in San Antonio, Texas, a city where the overwhelming number of Spanish speakers is of Mexican origin. Vélez-Salas *et al.* selected the variable because Caribbean and Mexican Spanish dialects differ markedly the relative frequency of overt pronoun use. In Puerto Rican Spanish, as in other Caribbean Spanish dialects, overt subject pronouns are frequent; in Mexican Spanish, overt subject pronouns are used much more infrequently. Vélez-Salas *et al.* hypothesized that San Antonio Puerto Ricans with extensive Spanish-speaking social and professional

Table 1 The effect of coreference and verbal ambiguity on the use of overt subject personal pronouns by Puerto Rican Spanish speakers in San Antonio, Texas

Factor group	*Factor*	*N*	*VARBRUL Weight*
Coreference	Switch	1654	0.61
	Same	2265	0.42
Ambiguity of the verb form	Ambiguous	646	0.55
	Nonambiguous	3273	0.49
Total/Input		3919	0.36

networks in the local Mexican-background majority community would use fewer overt pronouns than speakers whose social and professional networks consisted primarily of other Puerto Ricans or English-speakers. They also hypothesized that the main linguistic constraints on the use of subject pronouns would operate in much the same way as they have been shown to operate in other communities.

Vélez-Salas *et al.* (2004) coded nearly 4000 tokens for a wide range of factors, including whether a token was the same or different from the subject of the preceding tensed verb and whether the subject was uniquely encoded in the verb form or whether it was potentially ambiguous, e.g., tenía 'I or s/he had'. The researchers hypothesized that, as in other Spanish dialects, the speakers in this study would be more likely to use an overt pronoun when there was a change from the preceding subject than when subject continuity was maintained. They also hypothesized that speakers would be more likely to use an overt pronominal subject in cases when the person was not uniquely encoded in the verbal inflection. The results for these two factor groups are shown in Table 1.

The results of VARBRUL analysis, which show factor weights, or probabilities, of 0.61 for switch reference and 0.42 for co-reference, confirmed the hypothesis that Puerto Ricans living in San Antonio, like speakers of other Spanish dialects, are more likely to use an overt subject pronoun when there is a switch in reference. However, the results disconfirmed the hypothesis that speakers would use more overt pronouns with ambiguous than with non-ambiguous verbs. This factor group, with weights hovering around 0.50 (0.55 for ambiguous verbs and 0.49 for nonambiguous verbs), failed to reach statistical significance.

In addition to calculating values or weights for each factor, VARBRUL calculates the input probability, or corrected mean, which, as noted above, is the overall likelihood that speakers will choose the variant selected as the application value (the value that counts as an application of the 'rule' being investigated). In Vélez-Salas *et al.*'s study, the input probability was 0.36, indicating that these speakers were likely to use an overt pronoun somewhat more often than one third of the time, regardless of the presence or absence of any other factor in the environment.

Measures of Goodness of Fit

The program also provides several measures of goodness of fit between the model and the data. These include the total chi-square, the chi-square per cell, and the log likelihood. The total chi-square measures the degree of interaction among factors from different factor groups. The chi-square per cell figure is simply the total chi-square divided by the number of cells. The lower the chi-square per cell figure, the less likely there is to be interaction between factor groups. As a general rule, a chi-square per cell figure of greater than 1.5 suggests that there may be an interaction between two or more factor groups. For example, in many societies, ethnicity and social class are closely associated. In such cases, it may be necessary to recode the data to remove the interaction (for details on recoding, see Young and Bayley, 1996: 292). Thus, rather than have separate factor groups for ethnicity and social class, it may be better to combine them. For example, two binary factor groups for African-American and Euro-American and for working- and middle-class speakers might be combined to form a single factor group consisting of African-American working class, African-American middle class, Euro-American working class, and Euro-American middle class. Finally, VARBRUL provides the log likelihood statistic, also a measure of goodness-of-fit. Figures closer to zero represent better models than log likelihoods further removed from zero (see Young and Bayley, 1996: 272–273).

Significance Testing with VARBRUL

The factor values and input probability reported in a VARBRUL run provide useful information. They are not sufficient, however, to confirm or disconfirm the hypotheses that led to the inclusion of the factors in original model of variation. The goal of studies of sociolinguistic variation, as in any scientific endeavor, is to develop the most parsimonious model that still accounts for the data. To achieve this goal, we need to test whether the results are statistically significant or whether they might be due to chance. In VARBRUL analysis, achieving the most parsimonious model involves testing whether entire factor groups significantly contribute to the overall goodness-of-fit of the model and testing whether factors within groups differ significantly from one another. Naturally, factors should only be combined where there is linguistic

or social justification for doing so. Guy (1980), for example, in a study of -t,d deletion, found that the VARBRUL weights for regular past tense verbs and past participles did not differ significantly from one another. He combined these forms on the basis of their common underlying morphological structure. It would have made little sense, however, to combine following consonants and vowels, for example, which not only contrast phonologically but have been found in other studies to differ significantly in their effect on deletion.

VARBRUL provides a means of testing whether factor groups contribute significantly to the model of variation by means of a *step-up/step-down analysis*. This involves performing a run with only one factor group and then adding each of the other factor groups to the analysis, one at a time, until all factor groups are included. When the full model with all factor groups is reached, VARBRUL then removes one factor group at a time until only one remains. During each individual run, the factor weights and the log-likelihood are calculated. At the end of the analysis, the program outputs a file with the details of each run and an indication of the best stepping-up run and the best stepping-down run. The factor groups included in the best stepping-up and stepping-down runs should be the same. These are the factor groups that are significant at or above the $p < 0.05$ level (the default significance level in VARBRUL). That is, the odds are no better than 1 in 20 that the factor group is question is not significant. Factor groups that are not included in these runs do not contribute significantly to the variation. The factor weights calculated during these runs are used to report the results of the study.

In addition to testing the significance of factor groups, it is also necessary to test whether individual factors within groups differ significantly from one another. This calculation is done by comparing the log likelihoods of two VARBRUL runs, one with the factor coded as in the original coding scheme, and one with a recode in which the factor is eliminated or collapsed with another factor. The following test is used in order to determine whether the difference between the VARBRUL weights is significant:

$$\chi^2_{\nu\alpha} \approx -2 \times (\text{log likelihood}_1 - \text{log likelihood}_2) \qquad (2)$$

That is, twice the difference in the log likelihoods of the separate analyses performed (1) with and (2) without the factor in question asymptotically approximates a chi-square distribution where ν is the number of degrees of freedom and α is the probability that the effect attributed to the factor in question is greater than would be expected by chance. The degrees of freedom used in calculating the above chi-square statistic are the difference between the degrees of freedom in the two runs. If only one factor is eliminated, there will only be a single degree of freedom used in testing for the significance of that factor.

VARBRUL: Advantages and Limitations

In contrast to the situation in the 1970s when VARBRUL was developed, procedures for doing logistic regression are now widely available. Nevertheless, many, if not most researchers in sociolinguistic variation have continued to use VARBRUL because the program offers a number of advantages. Perhaps most important, in VARBRUL recoding is relatively easy to accomplish. Thus, the statistical model of variation can be repeatedly refined to achieve the most parsimonious explanation and to eliminate any factors or entire groups that do not significantly affect variation. Second, VARBRUL reports results in a manner that is easily interpretable. As shown above, in a binomial analysis, factor weights (or probabilities) between 0 and 0.5 are said to disfavor use of the variant of the dependent variable selected as the application value. Factor weights between 0.5 and 1.0 are said to favor the use of the variant selected as the application value. In contrast, in the logistic regression routines in commonly used commercial software packages such as SPSS, results are given in the form of regression coefficients. Regression coefficients given in SPSS may be converted into probabilities by first calculating the predicted logits and then calculating the probabilities using the logistic function (Rietveld and van Hout, 1993: 332–333). Most variationists, however, are more accustomed to interpreting VARBRUL weights. Finally, cost is also a factor. In contrast to commercial statistical programs, current versions of VARBRUL are available at no cost.

Although VARBRUL offers a number of advantages, it also has serious limitations. First, although it is possible to test for interactions among the many factors that may potentially constrain a speaker's choice of a linguistic variant, unlike the logistic regression procedure in SPSS and other commercial software packages, the program does not do so automatically. Thus, VARBRUL is not necessarily the most efficient tool if interaction is likely to be a main focus of the study, although Sigley (2003) provides a guide to testing interactions with GoldVarb. Second, VARBRUL is best suited for analysis of nominal variables, e.g., presence or absence of a final consonant or a subject personal pronoun. However, many linguistic variables of interest are not nominal, but continuous. For example, Mendoza-Denton *et al.* (2003) examined monophthongization of /ay/ in the speech of television talk show host Oprah Winfrey. The researchers were able to achieve a high level of

inter-rater reliability and they confirmed their auditory analysis with acoustic verification. Nevertheless, they observed that the requirement of VARBRUL that variants be treated as discrete presents a problem when dealing with continuous phonetic phenomena such as vowel variation (Mendoza-Denton *et al.*, 2003: 114–115). Third, like the dependent variable, the factors in a VARBRUL analysis must have discrete values. This requirement poses a particular problem for studies of language development and language change where time is a factor.

VARBRUL and Other Implementations of Logistic Regression

In recent years, a number of researchers have used the logistic regression modules in commercially available statistical packages to overcome some of the limitations of VARBRUL. Young and Yandell (1999), for example, compare results obtained from a general logistic regression model and from VARBRUL. The comparison was undertaken in response to Saito's (1999) critique of Young's (1991) original VARBRUL analysis of -s plural marking by Chinese speakers of L2 English. Saito criticized Young for grouping speakers together by proficiency level rather than considering them individually and for failing to test for possible interactions between proficiency and the preceding segment effect. In the original study, Young (1991) found that proficiency level was statistically significant when all of the data were run together, with high proficiency learners more likely to mark -s plurals than low proficiency learners. He subsequently ran two separate analyses by proficiency level and found that the preceding segment, animacy, and definiteness affected high and low proficiency learners differently.

Young and Yandell reanalyzed Young's original data with the GENMOD procedure in the SAS statistical package (SAS Institute, 1996). The results of the reanalysis were comparable to the original analysis. Both the original VARBRUL analysis and the GENMOD analysis showed that proficiency, noun position, syntactic function, preceding and following segments, and redundancy significantly affected speakers' use of plural -s. In addition, the GENMOD analysis showed significant interactions between proficiency and definiteness, animacy, and the preceding segment.

As we see in Table 2, both VARBRUL and GENMOD show that redundant plural marking in the NP favors -s plural marking for speakers at all levels of English proficiency, as do prenominal modifiers. When all speakers are included in the analysis, following vowels favor -s plural marking. However, this is a rather weak constraint, as indicated by the fact that it failed to reach statistical significance when separate analyses were run by proficiency level. Table 2 also allows us to compare the interactions found in the GENMOD analysis with the results of the separate VARBRUL analyses by proficiency level. For example, in the GENMOD analysis, proficiency by animacy is significant because, as revealed in the VARBRUL analyses by proficiency level, the animacy of the NP affects high and low proficiency speakers differently. For high proficiency speakers, animate NPs favor -s plural marking. For low proficiency speakers, animate NPs disfavor plural marking.

Conclusions

As a result of its ability to handle multiple factors and highly unequal cell sizes, VARBRUL has proven to be extremely useful for analyzing variable sociolinguistic data collected in a wide variety of contexts. Moreover, as shown in the example from Young and Yandell (1999), the results of VARBRUL analysis and the results obtained with the logistic regression module in a commercially available statistical package are comparable. As discussed above, however, VARBRUL has a number of limitations that make in unsuitable for certain types of studies. Among the most potentially problematic limitations is the relative difficulty of testing for potential interactions, which, although most common between social factors, may occur between linguistic factors even in studies of such well-documented variables as consonant cluster reduction (Sigley, 2003). Also, as noted above, VARBRUL is well suited for the study of nominal variables, but it is not suitable for the study of continuous variables such as differences in formant values of vowels in two linguistic environments, or with different speakers as in Mendoza-Denton *et al.* (2003). In such a case, a comparison of means by a simple t-test would be preferable, while in more complicated designs, ANOVA (analysis of variance) would be the appropriate choice (see Reitveld and van Hout, 1993, for details of these tests).

Finally, there is the question of sampling (Sankoff, 1988a). Although early studies of sociolinguistic variation, such as Labov's (1966) study of the Lower East Side in Manhattan, followed rigorous random sampling procedures, representative sampling seems to be less of a concern in many more recent studies. Rather, quota sampling, where the researcher recruits speakers who represent the different social categories of interest, is much more common. Problems can arise, however, if the criteria for inclusion in particular categories are not sufficiently clear. Lucas *et al.*

Table 2 Comparison of VARBRUL and GENMOD results for the analysis of -s plural marking in Chinese – English interlanguage

Factor	*VARBRUL: all speakers*	*VARBRUL: low proficiency*	*VARBRUL: high proficiency*	*GENMOD*
Proficiency	High proficiency favors	na	na	na
Individual speaker	na	na	na	Significant
Redundant plural marking in NP	Redundant marking favors	Redundant marking favors	Redundant marking favors	Redundant marking favors
Syntactic function of NP	Adverbial favors	Adverbial favors	Adverbial favors	Adverbial favors
Position of noun within NP	Prenominal modifier favors	Prenominal modifier favors	Prenominal modifier favors	Prenominal modifier favors
Preceding segment	Vowels, stops, and non-sibilant fricatives favor	Vowels and stops favor	ns	Factor order is fricative > stop > vowel > nasal > sibilant > lateral
Following segment	Vowels favor	ns	ns	Vowels favor
Animacy	ns	Disfavors	Favors	ns
Definiteness	ns	ns	Disfavors	ns
Proficiency × definiteness	na	na	na	Significant
Proficiency × animacy	na	na	na	Significant
Proficiency × preceding segment	na	na	na	Significant

Notes: na, not applicable, either because the factor group was not included in the model (e.g., the interaction factor groups in the VARBRUL analyses) or because the factors in the group were dealt with elsewhere in the model (e.g., when speakers were coded as individual factors, the proficiency factor group was no longer relevant); ns, not significant at $p < .05$.
Sources: Young, 1991: 144–145; Young and Yandell, 1999.

(2001), for example, point out that some early studies of variation in ASL included both Deaf and hearing signers. Given the nature of the Deaf community in the United States, where Deaf children of Deaf parents are seen as language models, it is unclear to what extent studies that include both Deaf and hearing signers can be considered representative of ASL. Regardless of the techniques we use to test for statistical significance, our results can only be valid to the extent that participants are representative of the communities we study.

See also: Corpora in Studies of Variation; Experimental Methods for Study of Variation; Language Change: Probabilistic Models; Language Surveys; Statistics; Variation and Language: Overview.

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Statistics

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Introduction

As an empirical science, linguistics inevitably deals with real-world quantitative data from time to time. This data is sometimes bulky and unmanageable, and it is often not clear straight away what the data does and does not show. Statistics is the mathematical approach to drawing conclusions from such real-world data. This can be productively employed by a linguist who is faced with a mass of figures in order to determine what statements the figures can and cannot support.

When Does a Linguist Need to Use Statistics?

Whenever the data we are evaluating is *not* an 'all-or-nothing affair,' statistics may come into play. For example, if we were to try to establish that a particular speech sound exists in a given language, all we have to do is find one good, well-attested example of that sound occurring in order to establish the existence of that sound in the language. This is an all-or-nothing assessment.

However, if we try to establish that the same sound is *frequent* in that language, we will need to employ statistics, because relative frequency is not an all-or-nothing matter. In this case, we will need some basis of comparison on which to assert that the sound is 'frequent'; we will need a count of instances of that

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Statistics

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sound from some sample dataset of the language; and we will need some test of significance to assure ourselves that the results our statistics produce have not occurred by simple coincidence.

Any empirically based approach to linguistics which deals with large collections of data points, may have cause to employ statistical analysis. An obvious example is the large text collections employed in corpus linguistics. Other examples include the outcomes of psycholinguistic experiments, grammatical elicitation tests, or survey-based investigations.

Basic Statistical Measures

To see what kinds of basic statistical measures can be used in linguistics, let us consider an example experiment. Let us suppose that a number of speakers of English have been presented with a sentence and asked to say whether they consider it an acceptable sentence of English or not. What statistical measures might we use in a very basic analysis of this experiment?

The most basic statistical measure is a *frequency count*. In our example, we would count the number of subjects who said that the sentence is acceptable grammatically and compare this to the number of subjects who said that it is not. The frequency counts for each response are our primary statistics for this set of data.

Frequency counts are often more useful if expressed as a fraction or a percentage. For instance, knowing that 30 people in our experiment considered the sentence to be acceptable is interesting, but not terribly useful. It is much more enlightening if we say that 30 people out of 60 in the experiment consider the sentence to be acceptable, which is equal to one-half or 50%.

The percentage ('how often in a hundred') is a very common way of expressing frequencies in statistics. However, in corpus-based linguistics in particular, it is also common to express the frequency of a phenomenon in terms of *per thousand* words or even *per million words*. This means we do not have to deal with small fractions of a percent. If a particular word-form occurs on average once in a million words of running text, it is easier to say that it has a frequency of one per million words than to say it has a frequency of 0.0001%.

Percentages are of greatest use if we wish to compare two datasets or two subgroups of a single dataset. Let us imagine that we suspect that the sentence we have been investigating may be acceptable in some dialects of English but not others. We might split up our 60 subjects into two groups – speakers of American English versus British English – to compare the frequencies of a subject judging the sentence acceptable in the two groups. If we do not have exactly the same number of Americans as British people among our test subjects, we will have to compare percentages rather than counts between the categories, as is shown in Table 1.

Table 1 Some basic acceptability judgement results

Dialect	*American English*	*British English*	*Totals*
'sentence is acceptable'	22 (63%)	8 (32%)	30 (50%)
'sentence is not acceptable'	13 (37%)	17 (68%)	30 (50%)
Totals	35	25	60

We can see from the percentages what is not obvious from the raw count, that the frequency with which American speakers judge the sentence acceptable (63%) is very similar to the frequency with which British speakers judge it to be unacceptable (68%).

Type-Token Ratio

The type-token ratio is one of the basic measures used in looking at texts with statistical, corpus-based methods. A *token* is any single instance of a word in a text; comparing the number of tokens in the text to the number of types of tokens – where each *type* is a particular, unique word-form – can tell us how large a range of vocabulary is used in the text. For example, the sentence 'The cat sat on the mat' contains six tokens (*the, cat, sat, on, the,* and *mat*) but only five types (*the, cat, sat, on,* and *mat*). So its type-token ratio is $5 \div 6 = 0.83$ types per token.

As a text gets longer, the number of types that have already been encountered increases, and the likelihood of any given token representing a new type falls. For this reason, type-token ratio as a statistic is very sensitive to the length of the text. All other things being equal, a shorter text will have more types per token than a longer text. For instance, we saw above that the ratio for a single sample sentence was 0.83, but for 10 000 words of text it would be much, much lower.

For this reason, when comparing the type-token ratios of different texts, it is a good idea to make sure we are comparing equally-sized samples of the text.

Measuring a Central Tendency

In the simple example we discussed above, each subject was presented with a single sentence and asked to say whether it was acceptable or not. However, in reality, this test might be rather unreliable. We have no way of knowing whether this is a consistent usage

on the part of the subjects, or if it is just a guess. A slightly more sophisticated way to go about it would be to present each subject with a *number* of sentences incorporating the structure we are interested in and elicit a grammaticality judgment for each one.

Combining groups of subjects (for instance, American English speakers versus British English speakers) is more difficult in this case. We cannot simply say that *X* percent of American speakers and *Y* percent of British speakers thought the structure was acceptable, because we don't have yes/no judgments; we have a number (call it *A*) for each subject, which indicates how frequently that subject judged the structure acceptable.

One way to compare groups in this case is to summarize the *A* of a set of subjects to a single value which indicates where the average position – the central tendency – of the group is.

One way of calculating the central tendency in a group is by using the *mean* together with the *standard deviation*. The mean, also known as the average, is the sum of all of the values in a dataset or a subgroup of a dataset, divided by the number of values in that dataset or subgroup. So if we have three speakers of American English who, presented with 50 sentences, have (respectively) judged 37, 46, and 32 of them to be acceptable, then the mean number of sentences judged to be acceptable by this group of subjects is $(37 + 46 + 32) \div 3 = 38.3$.

The standard deviation is a statistic for measuring how spread out around the mean the values in a dataset are. Compare, for instance, the group of American speakers we just discussed with a second group, who judged (respectively) 42, 36, and 37 sentences to be acceptable. The mean value is the same (38.3) but clearly, the second group of subjects seem to have values that are closer to the mean than the first. The standard deviation reflects this.

The standard deviation is calculated as follows:

1. Calculate the deviation of each value in the set (this is equal to the mean of the dataset minus the value).
2. Square each deviation.
3. Find the mean of the squared deviations (add together all the squared deviations, and divide by the number of values in the set minus 1).
4. Find the square root of this mean – this is the standard deviation.

There are a number of variations on the standard deviation procedure used with more complicated datasets. However, the principle remains the same. In practice this, and the other complex calculations described in this article, are almost always done by computer, using programs such as the Statistical Package for the Social Sciences (SPSS) software. SPSS allows the automated calculation of a wide range of statistical procedures, including those covered here. Hence, we will not concern ourselves here with how to perform such calculations manually.

Table 2 shows an example of the mean and standard deviation being used with data from a hypothetical experiment of the type outlined above.

We see from this example that the mean number of sentences containing the structure we are interested in that were judged acceptable is much lower for British subjects than American subjects, but the distribution around the mean, as indicated by the standard deviation, is not much different between the two groups, i.e., while individuals varied in their responses greatly, the difference was less marked for the groups when considered as wholes.

For some purposes the mean and standard deviation are most useful for measuring the central tendency of a dataset; for others, the *median* and *interquartile range* are more useful.

The median is the middle value when all the values of a set are arranged in ascending order (or, if there are an even number of values, the mean of the two middle values). For instance, if we arrange the values from the speakers of American English above in order, we get:

0, 0, 8, 12, 17, 19, 20, 23, 24, 29, 29, 29, 30, 31, 32, 32, 33, **34**, 35, 35, 35, 37, 38, 39, 40, 43, 45, 47, 48, 50, 50, 50, 50, 50, 50

The median (highlighted) is the 18th value on the series – there are 35 speakers, so the 18th speaker is

Table 2 More complex acceptability judgement results

Dialect	*American English*	*British English*	*All*
Number of subjects	35	25	60
Number of sentences each subject judged acceptable (raw counts out of 50)	37, 48, 23, 50, 35, 50, 50, 20, 0, 50, 43, 38, 29, 31, 47, 0, 30, 24, 34, 45, 12, 8, 32, 50, 35, 32, 40, 39, 29, 19, 33, 35, 17, 29, 50.	0, 0, 50, 0, 28, 18, 38, 20, 25, 33, 0, 50, 23, 34, 48, 31, 22, 0, 19, 22, 7, 32, 25, 16, 27.	(see other columns)
Mean for group	32.7	22.7	28.5
Standard deviation for group	14.0	15.4	15.3

in the middle. Similarly, the median for the British English speakers is 23, and for the whole dataset it is 30.5. This is important, because the mean is not necessarily always the best indicator of central tendency in a dataset. Sometimes the median is a more useful measure.

The interquartile range is a way of measuring how spread out around the median the data is. In the same way that the median is found by looking at the value halfway along the ordered list of values, we can look at the data to see what value occurs a quarter of the way along, and three-quarters of the way along. These values are called the lower quartile and upper quartile, respectively, and the difference between them is called the interquartile range.

If we look at the values for all the speakers:

0, 0, 0, 0, 0, 0, 0, 7, 8, 12, 16, 17, 18, 19, **19**, **20**, 20, 22, 22, 23, 23, 24, 25, 25, 27, 28, 29, 29, 29, **30**, **31**, 31, 32, 32, 32, 33, 33, 34, 34, 35, 35, 35, 37, 38, **38**, **39**, 40, 43, 45, 47, 48, 48, 50, 50, 50, 50, 50, 50, 50, 50

There are 60 values altogether, so the median is the mean of the 30th and 31st values (30.5), the lower quartile is the mean of the 15th and 16th values (19.5), and the upper quartile is the mean of the 45th and 46th values (38.5). So the interquartile range is $38.5 - 19.5 = 19$. Again, there are occasions when the interquartile range may characterize a dataset better than either the mean, standard deviation or the median.

Grouped Data

Sometimes we do not know the exact values for each data point. For example, we might not know exactly how many sentences the subjects judged to be grammatically acceptable; we might instead have them classified into groups (Table 3).

In this case, calculating mean, median, standard deviation, and interquartile range is less straightforward than if we know all of the values. However, it is still possible to calculate these measures and to perform other statistical operations on grouped data. Procedures for getting these measures from such data are time consuming and complex, however, and would almost always be undertaken using a computer.

Table 3 Acceptability judgement results as grouped data

Number of sentences judged acceptable	*Number of subjects*
0 to 10	9
11 to 20	8
21 to 30	13
31 to 40	17
41 to 50	13
Total	60

Significance Tests

Most things that we want to measure are subject to a certain amount of 'random' fluctuation. In our example of the acceptability judgments made by American and British speakers of English, our measures of central tendency show that as a group the Americans find the structure more acceptable than the British.

However, some *individual* speakers in both groups have judged all of the sentences to be acceptable (score of 50) or judged all of the sentences to be unacceptable. So although it looks as if national dialect is one factor determining the acceptability of the structure we are looking at, other factors which we haven't yet identified are also playing a part. This could be anything from sex to age to educational background to personal preference.

Given that other factors are affecting our data, making it behave in a basically 'random' way, we have a problem. It may just be a coincidence – a product of the random variations in the values – that the average value for the Americans is higher than the average value for the British. The mean and median seem to show a difference between the two groups of subjects, but is it a real difference or just random chance?

We can use *significance tests*, such as the chi-square test, log-likelihood test or t-test, to assess how likely it is that a particular result is a coincidence, due simply to chance. By convention it is accepted that if there is a 95% chance that our result is not a coincidence, then we can say that the result is *significant*. Sometimes, we will want to be more certain than this that our results are not due to chance. In this case, we might want to ascertain whether our results, for example, are significant at the 99% level, that is, if there is less than a 1% chance that the results are due to error. A score of 95%, while it sounds impressive, means that we have a 1 in 20 chance of claiming significance falsely. By choosing a level of 99% we can be more confident in that result, as we will have only a 1 in 100 chance that we have claimed significance in error. A result that is not significant cannot be relied on, although it may be useful as an indication of where to start doing further research (maybe with a bigger sample of data).

The choice of an appropriate significance test (for example, chi-square or t-test) depends very much on what type of data we have. An example of the chi-square test is given in Case Study Two below.

Sampling

It is very rare that we can work on the full set of all of the data related to a language. Living languages are

typically not finite. So in corpus linguistics, for example, a corpus is only ever a sample of all the language that is produced. Similarly, in experiments involving acceptability judgments or elicitation tests, we can't usually ask every speaker of the language to be a test subject; we must make do with a sample of speakers.

Sampling is an important issue in statistics. Since we want to extrapolate from our sample to the whole population – from our test subjects to the whole population of speakers, or from our corpus to all the texts produced in the language – it is crucial that we get a sample that represents the population as well as possible.

One way to get a representative sample is to sample randomly, so every speaker or text has an equal chance of ending up in the dataset – so ideally, for instance, we would give every English speaker a number, and then use a random number generator on a computer to pick the speakers who were going to respond to our elicitation test. This level of randomness is practically impossible with people, but may be more practicable when choosing texts (e.g., taking a sample of sentences from a corpus, or a sample of texts from an electronic database, or a sample of days from a year's worth of a newspaper).

Another way to get a representative sample, if you wish to look at general language use, is to design your dataset in advance according to criteria that make the data as diverse as you can manage. You might decide, for instance, that you want 10 speakers (five male, five female) from each of a set of age groups you drew up beforehand. Or you might determine in advance that your corpus will be made up of 10% news reportage, 10% prose fiction, 10% academic texts, and so on.

In practice, however, when sampling either speakers or texts, it is often necessary simply to take what is available – since friendly people willing to give you the time to do a questionnaire, or the permission to use their text in a corpus, are sometimes in short supply.

An example of poor sampling would be to do a survey of opinions on nonstandard dialects by putting up a notice asking for people to write down their ideas and send them to you. This is not a representative sample because it is self-selected: only people with strong opinions are likely to get in touch. You might get some interesting responses, but they won't represent the views of the population as a whole! Similarly, you can bias the results of an acceptability judgment survey or elicitation test if your subjects are linguistics students or academics – the responses of people who spend their lives reflecting on language may well not represent the reactions of the typical speaker of the language.

Another example of poor sampling would be to walk up to a random shelf in the library and grab six books to use as your corpus. Books shelved closely together are likely to be similar in style or subject matter or both, so features particular to that type of book will predominate in your corpus.

More Complex Statistics

The statistics and estimates of probability used by some applications in computational linguistics are much more advanced and complicated statistics than those discussed so far. While there is insufficient space to cover such approaches here, it is useful to note that of particular importance to computational linguistics are probabilistic or stochastic models, which are based on manipulating statistics relating to the frequency of different phenomena in language. These models are used to help computers to simulate language production and comprehension tasks that humans perform using only their language faculty. Given the importance of such models, they are outlined, in brief, in this section.

An example of this is part-of-speech tagging, the computer process which analyses words in running text into their part-of-speech categories. One of several approaches to part-of-speech tagging uses a statistical model called a *hidden Markov model* to estimate the most likely part-of-speech category of a word, based on the words and categories around it. The Markov model is a mathematical formula which allows us to combine frequency statistics on different sequences of parts-of-speech to produce a very good prediction of what the unknown part-of-speech is.

Probabilistic models can perform very well on the linguistic tasks we set them, but never perfectly (since they are based on statistics, and therefore may not deal well with phenomena or patterns that are statistically uncommon but do occur from time to time).

Case Studies

There follow two entirely fictional case studies of statistics in use in linguistics. Although these examples are made up and simplified to an extent, many linguists use procedures similar to the ones demonstrated here every day.

Case Study One: Averages in Action

Professor Veebey is discovering corpus linguistics. Using a concordancer to search for all pronoun forms in the SNIFL (**S**elected **N**ovels **I**n **F**amous **L**iterature) and ATCHOO (**A**ncient **T**ext **C**orpus of **H**istorical **O**ratory and **O**des) corpora, he has come up with a very exciting result: the average number of pronouns

Table 4 Pronouns in the SNIFL data

	Text1	*Text2*	*Text3*	*Text4*
No. of pronouns	1024	1541	9943	1358

Mean = 3466.5 pronouns.

Table 5 Pronouns in the ATCHOO data

	File A	*File B*	*File C*	*File D*	*File E*
No. of pronouns	998	1819	854	1225	1362

Mean = 1251.6 pronouns.

in a SNIFL text (Table 4) is much higher than the average number of pronouns in a text from ATCHOO (Table 5)!

SNIFL data mean = 3466.5 pronouns.

ATCHOO data mean = 1251.6 pronouns.

Professor Veebey strongly suspects that this is due to a difference in genre – since SNIFL is made up of prose fiction and ATCHOO is made up of speeches and poetry. But his colleague Professor Seigh disagrees. She points out that he has used the mean, which may not be the best way to measure the central tendency of the data and, before leaving for her lunch, suggests he has a look at the median as well. Professor Veebey goes away and calculates the medians:

SNIFL pronoun counts in order: 1024, 1358, 1541, 9943. Median = 1449.5 pronouns.

ATCHOO pronoun counts in order: 854, 998, 1225, 1362, 1819. Median = 1225 pronouns.

So there is a difference in the median values, but nowhere near as large a difference as there is between the means. This is because the mean for the SNIFL corpus was distorted by the very large pronoun count in Text3. Professor Veebey is a little disheartened by this, but still thinks he might have something interesting. He is sadly disillusioned when Professor Jarver, who's not nearly in such a hurry to get to lunch, looks over his data.

The very first thing she points out is that he has failed to take into account the length of the text; knowing how many words are pronouns is not any use at all unless you know how many words there are altogether. A better way to look at the data would be to compute pronoun frequency in terms of pronouns per thousand words.

Oveall rate of pronouns per thousand words in SNIFL corpus = 114 (Table 6).

Table 6 SNIFL data, expressed 'per 1000 words'

	Text1	*Text2*	*Text3*	*Text4*	*Corpus*
No. of pronouns	1024	1541	9943	1358	13866
Words in text	9330	12461	87459	12561	121811
Pronouns per thousand words	110	124	114	108	114

Overall rate of pronouns per thousand words in ATCHOO corpus = 111 (Table 7).

Professor Jarver notes that the pronoun rates for the corpora as a whole are virtually the same (114 PTW and 111 PTW). Professor Jarver realizes that Professor Veebey's idea might not be so bad, if applied to the right data. So she digs out COFF (**C**orpus **O**f **F**ringe **F**lyers, which was collected by Professor Cowball while on holiday at the Edinburgh festival in 1998) and does a pronoun count for each file in the corpus (each file contains a handful of original texts). Her results are shown in Table 8.

Professor Jarver does not bother working out individual pronouns-per-thousand-words-rates for the separate files (or the separate texts within the files), because they are in general rather small and not terribly interesting. What she's really keen to know is the overall pronoun rate. It turns out that the COFF corpus contains 62 pronouns PTW. This is a *lot* less than in the other two corpora. So here there really might be a genuine genre difference between the general literary style seen in ATCHOO and SNIFL and the style of the promotional flyers collected in COFF. This might be a feature of the short length of COFF texts, or it might turn out to be the result of some other style factor. In any case, Professors Jarver, Seigh, and Veebey will need to do a lot more research – and a lot more statistics – to track down the answer.

Case Study Two: The Swigbal Morpheme Problem

In the 1930s, Professor Moresgood published the standard Swigbal grammar. (Swigbal is a fictitious language.) He observed that the two major dialects of Swigbal differed with respect to the form of the past-tense morpheme on intransitive verbs; North Swigbal formed the past tense with *kal* whereas South Swigbal formed it with *tal*. He also reported occasional use of an archaic form *lal* in both dialects.

Some decades later, Professor Betternot revisited the issue of Swigbal grammar. In her seminal paper, Betternot (1969), she used grammaticality judgments from a speaker of North Swigbal and a speaker of South Swigbal to demonstrate that *kal*, *tal*, and *lal*

Table 7 ATCHOO data, expressed 'per 1000 words'

	File A	*File B*	*File C*	*File D*	*File E*	*Corpus*
No. of pronouns	998	1819	854	1225	1362	6258
Words in text	9003	17521	7387	9997	12714	56622
Pronouns per thousand words	111	104	117	123	112	111

Table 8 Pronouns in the COFF data

COFF file name	*Number of pronouns*	*Number of words*
gstv	21	492
xkam	99	864
yjvb	111	2641
wrnt	72	656
pllq	0	787
qvfr	69	1003
tygr	32	322
qwps	130	1170
trps	101	749
kysh	23	2000
zcku	75	1901
oozb	74	323
mlvk	56	997
Whole corpus	863	13905

were all perfectly acceptable past-tense morphemes in both dialects. The paper was accepted as definitive at the time, in spite of being based upon nothing more than the judgment of one native speaker per dialect.

However, recent work carried out by Professor Wellmaybe seems to show that Moresgood may have been on the right track after all. Although both *kal* and *tal*, as well as *lal*, do occur in both dialects, there seems to be some evidence that *kal* is most frequent in North Swigbal, and *tal* in South Swigbal.

Wellmaybe's sample of Swigbal discourse contains 1118 intransitive past-tense verbs. Breaking them down into categories provides the frequency counts in Table 9.

The question we must ask is whether the difference we see between North Swigbal and South Swigbal in Wellmaybe's data is significant.

For this kind of data, we can use the chi-square test. (We'll see why it's called this later.) In statistical terms, what we want to do is test whether the use of *kal* and *tal* as a variable is independent of the variable of dialect or not.

If the two variables are independent, then Betternot was correct – there is no evidence of a difference between the dialects in this matter. If they are not

Table 9 Swigbal tense data

	Observed instances of the past tense with . . .			*Total*
	kal	*tal*	*lal*	
North Swigbal	250	142	31	423
South Swigbal	241	443	11	695
Total (whole dataset)	491	585	42	1118

independent, then there *is* a difference between the dialects with regard to the past tense.

We start by assuming that the two variables are independent. We then ask, what frequencies would we expect to see in a table like Table 9 if the two variables are independent? We can work out these expected frequencies if we look just at the combined frequencies of *kal* and *tal* for both dialects, and at the total number of instances of the past tense that we have for each dialect.

For both dialects taken together, 43.9% (491 out of 1118) of past tense instances use *kal*, 52.3% (585 out of 1118) use *tal*, and 3.8% (42 out of 1118) use *lal*. If the variables are independent, we would expect these percentages to be reflected in the figures for each individual dialect – if there is not a dialect difference, then splitting up our sample of past-tense utterances shouldn't drastically affect the proportions of each morpheme that occur. So our expected frequencies work out as shown in Table 10 (with decimal places rounded to the nearest whole number of instances).

Remember that a percentage is just a way of expressing one value divided by another as an 'out of one hundred' figure. 186 out of 423 and 305 out of 695 are both equivalent to 491 out of 1118 (43.9%).

We can generalize and rearrange this and say that the expected frequency for any cell is equal to the total for the row the cell is in, multiplied by the total for the column the cell is in, divided by the overall total for the table (the sample size):

Cell's expected frequency =
(row total × column total) ÷ sample size

Clearly, these expected frequencies are different from the frequencies we've actually got in our data. But how different are they, and is the difference significant? We work this out by calculating a statistic called chi-square.

We start by subtracting the expected frequencies from the observed frequencies in each cell of Table 11. The row and column totals are not needed for this calculation, so they have been left off the table.

In this particular case, the differences we get in the North Swigbal row and the South Swigbal row are exactly the same, but with opposite signs – this

is because there are only two rows, and the row totals are fixed, so any increase in one row leads to a same-size decrease in the other row.

We can now calculate an overall statistic for the amount of difference between the observed frequencies and the expected frequencies. We start by taking the square of the value in each cell, as shown in Table 12 (this is done to make all the values positive).

Not all differences between observed and expected frequencies are equally important. For example, the difference between an observed frequency of 4 and an expected frequency of 6 is **2**. There is the same difference between an observed frequency of 125 and 127 – but obviously the difference of 2 is a much bigger deal if the expected frequency is only 6! To account for this, we divide each squared difference by the corresponding expected frequency (Table 13).

If you've been keeping track, you'll know that the values we have now are:

(Observed frequency – Expected frequency) ÷ Expected frequency

The last step is to add up all the values for the table, to get a single statistic that measures how much difference there is between observed and expected frequencies across the table as a whole. This statistic is called chi-square.

Chi-square for the Swigbal data =
$22.02 + 33.55 + 14.06 + 13.43 + 17.14 + 8.65 = \mathbf{108.85}$

The way chi-square is calculated means that it is a standard statistic across all datasets. Statisticians have therefore been able to use the probability distribution of chi-square to create standard tables. We use these tables to work out how large chi-square has to be for there to be a significant difference between the frequencies we observe and the frequencies we'd expect if the two variables (in this case, dialect and past-tense morpheme) were not related.

To know which bit of the chi-square table to look at, we have to measure the size of our table – after all, the importance of a difference of a particular size may mean more or less, depending on how many options there are in a table. We measure the table's size in 'degrees of freedom' (d.f.), which we calculate by multiplying the number of rows minus one by the number of columns minus one – not counting rows and columns that only contain labels or totals. So for this set of data,

$$\text{d.f.} = (3-1) \times (2-1) = 2$$

We want to be at least 95% certain that our results are not due to chance alone. The mathematical way of expressing this is $\alpha = 0.05$ (a 5% chance that our results are due to chance). If we look on the chi-square table for the value for d.f. = 2 and $\alpha = 0.05$, we find the value of 7.81. This means the chi-square for our dataset must be greater than 7.81 for our results to be significant at this level.

The chi-square for the Swigbal data is 108.85, which is higher than 7.81, so we can say with at least 95% confidence that the difference between the observed and expected frequencies is not just due to chance. Since we based our expected frequencies on the assumption that the dialect of Swigbal being spoken did *not* influence the form of the past tense morpheme, we can therefore be at least 95% confident that this assumption was not correct, and that the dialect *does* affect the form of the past tense morpheme.

So we can say that Professor Wellmaybe's data does show significantly that there is a difference between the North Swigbal and South Swigbal dialects.

Chi square does not always demonstrate that a difference is significant of course, as is demonstrated by the case of Professor Appentwill's work on Ranjumi. The Ranjumi language is closely related to

Table 10 Expected frequencies (Swigbal tense data)

	Expected instances of the past tense with . . .			*Total*
	kal	*tal*	*lal*	
North Swigbal	186	221	16	423
South Swigbal	305	364	26	695
Total (both dialects)	491 (43.9% of 1118)	585 (52.3% of 1118)	42 (3.8% of 1118)	1118

Table 11 Chi-square calculation, step 1

	Observed minus *Expected frequencies*		
	kal	*tal*	*lal*
North Swigbal	250 − 186 = 64	142 − 221 = −79	31 − 16 = 15
South Swigbal	241 − 305 = −64	443 − 364 = 79	11 − 26 = −15

Table 12 Chi-square calculation, step 2

$(64)^2 = 4096$	$(-79)^2 = 6241$	$(15)^2 = 225$
$(-64)^2 = 4096$	$(79)^2 = 6241$	$(-15)^2 = 225$

Table 13 Chi-square calculation, step 3

$4096 \div 186 = 22.02$	$6241 \div 186 = 33.55$	$225 \div 16 = 14.06$
$4096 \div 305 = 13.43$	$6241 \div 364 = 17.14$	$225 \div 26 = 8.65$

Table 14 Ranjumi tense data

	Observed and Expected instances of the past tense with...			*Total*
	kar	*tar*	*lar*	
West Ranjumi	O: 80 *E: 74*	O: 11 *E: 18*	O: 9 *E: 9*	101
East Ranjumi	O: 61 *E: 67*	O: 23 *E: 16*	O: 9 *E: 9*	92
Total (whole dataset)	141	34	18	193

Swigbal, and has three similar past-tense morphemes, *kar, tar,* and *lar.* Professor Appentwill has supplied some data that suggests that West Ranjumi and East Ranjumi behave similarly to North Swigbal and South Swigbal with regard to the variation in the past tense. Both dialects favor *kar* over *tar,* but the difference is greater in West Ranjumi than East Ranjumi.

This data is shown in Table 14, together with the expected frequencies calculated from the row, column and table totals.

Observed minus Expected values are calculated in Table 15.

The differences are squared in Table 16.

In Table 17, the results are divided by expected frequencies.

Table 15 Chi-square calculation, step 1

$80 - 74 = \mathbf{6}$	$61 - 67 = \mathbf{-6}$	$11 - 18 = \mathbf{-7}$	$23 - 16 = \mathbf{7}$	$9 - 9 = \mathbf{0}$	$9 - 9 = \mathbf{0}$

Table 16 Chi-square calculation, step 2

36	36	49	49	0	0

Table 17 Chi-square calculation, step 3

$36 \div 74 = 0.49$	$36 \div 67 = 0.54$	$49 \div 18 = 2.72$	$49 \div 16 = 3.06$	$0 \div 9 = 0$	$0 \div 9 = 0$

Finally, the values in Table 17 are added up to find the chi-square = **6.81**.

The critical value is the same as it was for the last dataset, since we are still dealing with 2 degrees of freedom and a 95% confidence that the difference is not due to chance ($\alpha = 0.05$); for the result to be significant, chi-square needs to be greater than 7.81 – but it isn't. Chi-square for this dataset is only 6.81, so there is a greater than 5% probability that these results are just due to chance. Therefore, the apparent effect of dialect on the form of the past tense is not statistically significant.

So while the Ranjumi data make it look as if *kar* is more common in West Ranjumi than East Ranjumi, the statistics tell us that this result just isn't significant – it's back to the drawing board for Professor Appentwill.

See also: Data and Evidence; Linguistics as a Science.

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Steele, Joshua (1700–1791)

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The Honorable Joshua Steele, businessman, phonetician, and humanitarian, was born in Ireland. He lived for a considerable time in London and in 1756 was elected a member of the Royal Society of Arts, later becoming its vice president. He produced but one book (*An essay towards establishing the melody and measure of speech*, 1775), which came out twice; on the second occasion in 1779, it was under the new title *Prosodia rationalis*.

In the second volume of his study of language, the Scottish writer James Burnett, Lord Monboddo, had expressed the view that "the music of our language [is] nothing better than the music of a drum"; (Burnett, 1773–1792); that is, that pitch variation

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played no significant part in the working of the English sound-system. Steele wished to take issue with this; and his book was in the form of an exchange of writings between himself and Monboddo. Steele's contribution, by far the more extensive, provided us with the first sophisticated study of English intonation, and anticipated a number of ideas that were to be fully developed only much later on. For example, he linked the analysis of intonation with that of other constituents of speech, such as rhythm, the 'measure' of his title. He recognized five 'accidents of speech, namely 'accent,' 'quantity,' 'pause,' 'emphasis,' and 'force,' assigning a set of symbols to each of these. His treatment of rhythm saw it as relatively abstract and allowed for a basic pulse of the rhythmical system to coincide with pause, as with the 'silent stress' of later writers. He thereby introduced new possibilities for the analysis and typology of verse structure. Monboddo admitted to being "fully convinced that there is both a melody and rhythm . . . in English" (Steele, 1775).

Steele's essay also had practical objectives, in that he wanted to see the notation system that accompanied his analysis used to 'express and perpetuate' such things as the minutiae of speech as used in performance by distinguished actors of his day.

In midlife, Steele had spent time in Barbados, and in 1781 he traveled back there to run an estate of more than 1000 acres which had become his. He became a member of the council of the island and eventually chief justice. He founded at Bridgetown a society modeled on the London Royal Society of Arts, but it had as a more particular purpose the introduction of reform in the treatment of slaves on Barbados plantations. He himself introduced a system of payment to slaves in his employ and gave them parcels of land on his estate. The subsequent increased prosperity of his business demonstrated to his fellow plantation owners the efficacy of such humane policies. Steele died in Barbados.

See also: Accent; Burnett, James, Monboddo, Lord (1714–1799); Intonation; Quantity; Rhythm.

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Steinthal, Heymann (1823–1899)

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Heymann Steinthal was a German linguist and philosopher of languages. He was born in 1823 in Gröbzig near Bernburg on the Saale and died in 1899 in Berlin. From 1843 Steinthal studied languages, philology, and philosophy in Berlin under teachers such as J. Grimm, F. Bopp, A. Trendelenburg, and H. K. W. Heyse. In 1847 he became a Ph.D. and habilitated in 1849. From 1852 he spent 4 years in Paris and London studying Chinese and African languages. He was appointed an associate ('außerordentlicher') professor in 1862. Steinthal also became close friends with Moritz Lazarus (1824–1903), through whom he was introduced to the psychology of J. F. Herbart. In spite of his high qualifications Steinthal never received a permanent position as a professor, probably due to his Jewish origin.

Steinthal's dissertation *De pronomine relativo* (1847) and habilitation thesis (*Die Sprachwissenschaft Wilhelm von Humboldts,* 1849) were the beginnings of a lifelong struggle with von Humboldt's work, in which also the philosophy of Hegel plays an important part. In 1850 *Die Classification der Sprachen* appeared, typology of languages being one of Steinthal's main interests. In his *Ursprung der Sprache* (1851) the origin of language is explained by means of Humboldt's famous principle underlying everyday speech: language is ***energeia*** ('activity'), not ***ergon*** ('the result of activity'). Steinthal's turn to Herbart's psychology led to a vehement attack on rationalist grammar (*Sprache, Logik und Psychologie,* 1855) as it was represented by K. F. Becker, also a follower of Humboldt. The purpose was to refute the idea that language and thinking are identical and to substitute logic as basic to grammar for the wider scope that psychology could provide. It is noteworthy that Becker's syntactic system remained untouched and was even used by Steinthal. Psychology, the idea of *Volksgeist* (roughly, 'national character'), *innere Form*, i.e., Humboldt's hypothesis that the language determines a people's view of the

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world, (but Steinthal, however, interpreted it the other way around; cf. di Cesare, 1996), and Hegel's notion of superindividuality are manifested in the idea of '*Völkerpsychologie*,' developed in *Zeitschrift für die Völkerpsychologie und Sprachwissenschaft* (20 vols, 1860–1890, jointly edited with Lazarus). It was established as a sociologic discipline in the 20th century. Classification of languages, psychology, logic, grammar, *Völkerpsychologie*, and Humboldt's philosophy are further taken up in publications such as *Die Mande-Neger-Sprachen. Psychologisch und phonetisch betrachtet* (1867), *Geschichte der Sprachwissenschaft bei den Griechen und Römern mit besonderer Rücksicht auf die Logik* (1862), *Einleitung in die Psychologie und Sprachwissenschaft* (1871), and *Über Wilhelm von Humboldt* (1883), to mention a few of them apart from his works on religion, ethics, and Judaism.

As an intellectual Steinthal was a complicated character, of great influence (on H. Paul, W. Wundt, W. Dilthey, and others), sharp eyed, clear, consequent, inquiring, and controversial (A. Marty and W. D. Whitney were two of his opponents), often hypercritical and presumptuous. He certainly contributed to liberating grammar from logical speculation, even if his attempt to apply a psychological theory failed and was hardly less speculative. Like Humboldt he mainly adopted a synchronic perspective in his comparative studies, anticipating a new paradigm to come in respectful opposition to the mighty historic-comparative environment of his time. His typological and historiographical studies (*Geschichte der Sprachwissenschaft,* 1862) are still of interest and useful today.

See also: Adelung, Johann Christoph (1732–1806); Becker, Karl Ferdinand (1775–1849).

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Stemming

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Stemming is the process of removing affixes from a word in order to obtain its stem, and a stemmer is an algorithm that performs this process. The purpose of stemming is the conflation of morphologically and semantically related words. Thus, a stemmer might reduce the words *computed*, *computing*, and *computation* to the stem *comput*. Note that the stem does not have to be an actual word, although it often is.

Stemming is widely used in information retrieval (IR) systems to standardize the vocabulary for indexing and searching. Thus, if a document in a database contains the word *computing* and a searcher's query includes the term *computation*, the use of a stemmer ensures that these are recognized as matching terms. An additional benefit is that the size of the indexing vocabulary is reduced because a document need not be indexed by every variant that it contains.

In principle, a stemmer may remove both suffixes and prefixes. In English, the removal of prefixes is not generally considered helpful (consider the effect of removing the prefixes from *com-pute* and *dis-pute*). In some other languages, prefix removal is more desirable, and, in some, infixes also may need to be deleted. Arabic is a notable example; an Arabic word may consist of an alternation of affixes and stem fragments. Stemmers for such languages are quite complex, and here we focus mainly on straightforward suffix-stripping stemmers.

A typical stemmer does not necessarily just delete characters from a word – it may also need to modify the resulting form to obtain a satisfactory stem. Thus, the deletion of the endings *-ion* and *-ing* from *collision* and *colliding* gives *collis* and *collid* – so one at least of these should be further modified to achieve conflation.

The obvious way to perform stemming is to check the ending of each incoming word to see if any action is needed. The detailed rules may be either expressed in the form of actual program code (hardwired) or set out in one or more tables, with a driver program for comparing each input word against entries in the table. Constraints are generally applied to prevent absurdities such as the reduction of *rant*, *red*, *rent* and *ring* to the stem *r*. Linguistic stemmers do not rely on a prespecified set of endings but, instead, use a machine-readable dictionary to determine the base form of a word.

In 1968, Julie Beth Lovins published a description of a stemmer that uses a table of endings to convert an input word in one step to a raw stem, and then a table of recoding rules to make final adjustments, including the singling of final consonants. The popular Porter's (1980) stemmer removes or modifies endings in five main stages, first dealing with the inflective endings *-s*, *-ed*, and *-ing* and then tackling all the derivational endings. Because of the rather complex organization of the rules, implementations of Porter's stemmer are usually hardwired. The Paice/Husk stemmer (Paice, 1990) uses a single table of rules in which an ending, if found, is either deleted or replaced. The rules are applied iteratively, so that a long ending such as *-ationally* is removed in several stages; in contrast to Porter's method, the number and ordering of the stages are not prescribed.

Stemmers are now available for many natural languages, although this has often involved the development of a specialized algorithm tailored to the features of the language concerned. It may be possible to adapt an existing table-driven stemmer to a new language quite easily, but this still leaves the task of developing the actual rule set. There is now an interest in generating rule sets automatically using a large corpus of texts in the language concerned; hidden Markov models or other statistical approaches may be used.

In view of their widespread use in IR systems, it is natural to assess stemmers by measuring their effects on retrieval performance (RP). Early results reported for English stemmers showed a confused picture, with no evidence of a clear and reliable benefit. Subsequent work, by Krovetz (1993) and by Hull (1996), indicated that stemming is helpful in cases in which the query or the document is short, but otherwise it is not. However, in more highly inflected languages, the benefits of stemming are often much clearer. Note, also, that reduction in vocabulary size may be worthwhile even if RP is not improved at all.

A disadvantage of measuring stemming effectiveness in terms of RP is that it provides no direct information about the causes of poor performance. Hull's investigation included a detailed analysis that revealed some of the factors at work but did not provide clear solutions. Paice (1996) took a different approach to measuring stemmer performance. This entailed taking a text sample, counting the number of understemming errors (failures to conflate) and overstemming errors (wrong conflations), and relating these to the number of pairwise conflations that should have been achieved. This approach is hampered by its reliance on human judgments about which words ought to be conflated; this not only introduces an element of subjectivity into the process, but also makes it very time-intensive, due to the need for manual grouping of thousands of words.

Various attempts have been made to improve the accuracy of stemmers. Krovetz developed a linguistic stemmer (KSTEM) in which dictionary lookup is used to resolve various problems, for example, to decide whether to retain the *e* when an *-ed* ending is removed. In some cases, KSTEM gave slightly better RP results than Porter's stemmer, but overall the picture was unclear. Another factor that can be used to guide a stemming decision is the part of speech of the word concerned, as in Savoy's (1993) stemmer for French.

A typical English stemmer often forms large conflation groups containing words that are only slightly related, thus degrading performance. Xu and Croft (1998) investigated a technique in which the stem groups formed by an existing stemmer (Porter's or KSTEM) were split into smaller groups using term cooccurrence data from a text corpus. They obtained small, but in some cases significant, improvements relative to the baseline stemmers.

Techniques other than affix removal are available for conflating variant forms of words; for instance, Adamson and Boreham (1974) proposed breaking each word into a set of digrams (letter pairs), and computing the degree of similarity between the digram sets for pairs of words.

See also: Affixation; Document Retrieval, Automatic; Inflection and Derivation; Morphology and Language Processing.

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http://www.snowball.tartarus.org – Snowball website.
http://www.comp.lancs.ac.uk/computing/research/stemming – the Lancaster stemming website.

Stephanus, Henricus (1531–1598)

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Henricus Stephanus was a scholar, philologist, and publisher, one of the most important representatives of humanism and the French renaissance of the 15th and 16th centuries, along with Guillame Budé (1468–1540) and Joseph Justus Scaliger (1540–1609). Henri É(s)tienne, the eldest son of Robert É(s)tienne, was born in Paris in 1531 and died in Lyon in 1598. From early on, he attended lectures on classical philology in the Collège Royal of Paris. Apart from Latin, which he knew almost at the level of mother tongue, Henri also learnt Greek, for which he showed a great love and impressive familiarity. The offspring of one of the most well-known publishing dynasties in France, Henri undertook the directorship of the family printing house after his father's death in 1559. His father Robert, who directed the business initially in Paris and then in Geneva, was also engaged as an author, printer, and editor; on the publishing activities of the É(s)tienne family see Pattison (1889) and Widmann (1970).

Henri developed an extraordinary philological activity, which was tightly linked with his publishing. He traveled all over Europe in search of manuscripts, which he later edited und published. He completed no less than 74 editions of works by Greek writers, including many first editions (*editiones principes*); on Henri's editions see Lehmann (1956–1960: I, 82). His name is connected with an edition of *Anacreontea* (1554), which is based on a manuscript that Henri himself discovered in Italy (or Louvain); with the first edition of the fragments of lyric poets (1560); with a collection of epigrams, *Anthologia Planudea* (1566); and last, but not least, with an edition of Plato (*Platonis opera quae extant omnia* [...] *excudebat Henricus Stephanus* [1578]), the pagination of which is still today the standard way of citation. Apart from his Greek editions, Henri also edited 58 Latin and 3 Jewish writers, and he wrote and published 30 books in French and Latin. From the last category of his works, it is worth mentioning the book *De criticis veteribus Graecis et Latinis* (1587), which constituted the first modern history of classical philology.

Well beyond the limits of classical philology, Henri É(s)tienne was well known for his 5-volume dictionary *θησαυρὸς τῆς 'ελληνικῆς γλώσσης* (*Thesaurus Graecae Linguae*), which was published in 1572. As the counterpart of his father Robert's dictionary, *Latinae Linguae Thesaurus* (1543), this one deserved to be considered Henri's most important scholarly achievement. Its compilation was based on excerpts from no less than 140 works by then known Greek writers. Henri attempted to provide a hierarchy of the meanings associated with words, and for each meaning he cited evidence coming from the excerpts. Henri's *Thesaurus* was republished twice during the course of the 19th century, first in London and then in Paris, each edition being enlarged and more complete than the previous one. This piece of work constituted the cornerstone and the foundation of the scientific lexicography of Greek, as well as of the dictionaries of the modern times (cf. Cohn, 1913: 709, 712–713).

See also: Greek, Ancient; Greek, Modern; Lexicography: Overview; Scaliger, Joseph Justus (1540–1609).

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Stephanus, Robertus (ca. 1503–1559)

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Robertus Stephanus (Robert Estienne I), who was born in Paris c. 1503 (or 1498, according to Brandon, 1904: 6) and died in Geneva on September 7, 1559, is known as a printer, a lexicographer, and a grammarian. He was a member of a family of printers (his father, Henri I; his brother, Charles; his father-in-law, Josse Bade Ascensius; and his son, Henri II; *see* **Stephanus, Henricus (1531–1598)**). He studied Greek and Latin and was appointed the king's printer by François I for Hebrew and Latin in 1539 and for Greek c. 1540. In 1547, he was persecuted by the Sorbonne because of his biblical editions: the Bible in Latin (1528), the New Testament in Hebrew (1539), and the New Testament in Greek (1546, and many other editions), and went into exile in Calvinist Geneva (November 1550), where he continued printing until his death.

For biblical editions, Robertus Stephanus used strict philological rules. He also published many works of contemporary grammarians (Melanchthon, Linacre, Erasmus, Sylvius, Cordier, Bovelles, Despauterius, Valla, Budé, Clenardus, and Pagninius).

He gave up editing Calepino's dictionary (although he later published an edition in Geneva in 1553–1554), choosing instead to publish an original lexicographical work in 1531: *Dictionarium, seu Latinae linguae thesaurus, cum Gallica fere interpretatione* (augmented in 1536), a medium-sized dictionary of the Latin language, with a few explanations in French. From this work, he extracted the following works intended for different intellectual requirements and commercial targets:

1. the monumental *Thesaurus linguae Latinae* (1543). Essentially monolingual, with very long lists of quotations, despite a few errors due to Robertus Stephanus's haste in compilation, it remained the reference Latin dictionary for two centuries;
2. two intermediate-level dictionaries: the *Dictionarium Latino-Gallicum (DLG)* (1538) and the *Dictionnaire françois-latin (DFL)* (1539), of which the 1549 edition is considered the foundation of the French lexicography;
3. elementary dictionaries: a *Dictionariolum puerorum* (derived from the *DLG*) and *Les mots françois selon l'ordre des lettres* (derived from the *DFL*).

Robertus Stephanus's lexicographical works are closely linked to the Biblical editions, and his most important goal was always the knowledge of the Latin – not the French – language, for which he promoted a classical and purified use. But Robertus Stephanus also wrote many pedagogical treatises for translation between Latin and French, such as *La manière de tourner toutes espèces de noms latins en notre langue françoyse*, *Les déclinaisons des noms et des verbes*, *La manière de tourner les noms, pronoms, verbes*, and *Traicté de la grammaire françoise* (1557), which, although largely inspired by the grammars of Sylvius (1531) and Meigret (1550), has the pedagogical advantage of offering a very clear and pleasant presentation.

See also: Stephanus, Henricus (1531–1598).

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Stereotype Semantics

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The term 'stereotype' was borrowed from French *edition stéréotype* in the late 18th century to denote printing from a solid metal plate of typeface cast from a mould. In the 19th and 20th centuries, stereotype was metaphorically extended to members of social groups (genders, races, social classes, professions, trades, criminals and other misfits, etc.) deemed to be typified by a set of (often pejorative) characteristics, for example, "as early as two years of age, most children select toys and activities that fit the sex-role stereotypes of their culture" and "Feminists in western developed countries have agitated against mass-media presentations of women that seemed biased, stereotypical, or discriminatory" (*Encyclopedia Britannica,* 2001). Many social groups are identified with a stereotypical jargon or sublanguage.

Against this background, Putnam (1975) proposed stereotype semantics, which I define as follows:

> The meaning of a language expression *e* (typically a lexeme) is not a well-defined set of properties necessarily found in every denotatum for the expression, it is rather a minimum set of stereotypical facts about the typical denotatum.

(Denotation is the relation between language expression *e* and things or events in the model of the world and time spoken of; a denotatum is potentially a referent.) Like prototype semantics, stereotype semantics is an alternative to theories of meaning that postulate a checklist of properties to be satisfied for the correct use of the expression *e* (Fillmore, 1975: 123). For example, the denotatum of *bird* is expected to be bipedal, have feathers, and be capable of flight. But:

- There are several species of flightless birds (e.g., emus, ostriches, and penguins).
- A downy chick and a plucked chicken are featherless but nonetheless birds.
- A one-legged bird and a mutant three-legged bird are also birds.

So the notion of a checklist of essential properties for the denotatum of *e* is problematical.

Putnam's notion of a stereotype incorporates connotation (*see* **Connotation**). Connotations of *e* arise from encyclopedic knowledge about the denotation of *e* and also from experiences, beliefs, and prejudices about the context in which *e* is typically used. Connotations vary between contexts and speech communities independently of sense and denotation: A male chauvinist and a radical feminist will possibly have quite different stereotypes for *man* and *woman* and yet have no difficulty picking the denotatum of one from the other. The relationship between lexical and encyclopedic knowledge is controversial (*see* **Dictionaries and Encyclopedias: Relationship**). Many scholars believe that all information about listemes should be included in the lexicon; others favor a division of labor between the lexicon as a bin for storing listemes and an encyclopedia as a structured database containing exhaustive information on all branches of knowledge. Allan (2001) argued that the lexicon is that part of the encyclopedia, which stores information about the formal, morphosyntactic, and semantic specifications of listemes, and that these are networked with other modules of information in the encyclopedia. Postulating close links between lexical and encyclopedic information nicely accommodates Putnam's notion of a stereotype. For example, the stereotypical bird flies, even though emus, ostriches, and penguins do not; flightlessness is a fact that should appear in the lexicon entries for *emu, ostrich,* and *penguin,* for example, to condition an appropriate interpretation of *the ostrich flew by.* The stereotypical politician is economical with the truth when his or her power or credibility is threatened, but this connotation is part of the encyclopedic data that have no place in the lexicon entry for *politician.* Putnam expressly allows for experts to have considerably more knowledge at their command than their fellows – which raises the interesting question: Do the words *elm* and *beech* have the same stereotype and meaning for a botanist that they do for an inner-city dweller who cannot distinguish an elm from a beech? Presumably not. However, if the botanist were to point out and name an elm, the inner-city dweller would know that that tree is not a beech, even if she or he could still not recognize another elm thereafter.

Similar to the stereotype is the notion of a Gestalt (single mental image). Three examples of the use of Gestalten in perception are:

- Knowing the true configuration of a chair even though we can only ever see parts of it from a single viewpoint.
- Recognizing melody without being conscious of the individual notes from which it is constructed.
- Having a Gestalt of a particular word enables us to 'feel' that it is spelled correctly or incorrectly on a given occasion.

A Gestalt is more like the stereotype in stereotype semantics than it is like the prototype of prototype semantics.

Prototype semantics (*see* **Prototype Semantics**) selects a particular denotatum or a particular sense as the most typical exemplar for a lexeme. Categories such as Rugs and Carpets (corresponding to the lexemes *rug* and *carpet*) or Cups and Mugs (corresponding to *cup* and *mug*) seem to merge gradually one into another, although prototypical exemplars of each category are clearly different (Labov, 1978; Allan, 2001). Lakoff (1972) proposed using fuzzy sets to index the exemplariness of a category member. The prototype is given the value 1.0; the worst example has a value close to 0.0. Although values of fuzzy set membership can be calculated from experiments such as the one described in Battig and Montague (1969), the achieved value is only valid for the tested population at the time of the experiment, not for all speakers of the language and not even for the same subjects on a different occasion. For instance, Rosch (1973) found that the common cold is a very poor exemplar of Disease – which conflicts with the Battig and Montague finding; the disparity is either a function of (1) the different experimental methods (Battig and Montague's subjects generated their own lists, but Rosch gave hers a choice among only six diseases, of which a cold is the mildest) or (2) the proportion of experimental subjects suffering from colds at the time of the experiment, making the cold salient. Rosch claimed that a robin is a good exemplar of the category Bird (lexeme *bird*) for North Americans. It would not be so good for Australians, for whom the emu ranks much higher because the emu is a national icon (similarly with the flightless kiwi for New Zealanders). Battig and Montague's figures demonstrate that a tomato is more of a vegetable than a fruit (0.68 vs. 0.14), but they do not reveal anything new about the meaning of the lexemes *tomato, vegetable,* and *fruit*. A tomato is both a fruit and a vegetable, but mostly it is used like a vegetable. Its characteristics are included in the internalized (cognitive) model of the tomato and contribute to the semantic frame of *tomato*. Prototype theory has no means of representing such facts. Even the poorest examples of a category remain within the category; the fact that an onion is a poor exemplar of a vegetable for a tested population does not change the subjects' perception that it is a vegetable. The prototype in no way defines the category – no one believes that a vegetable is a carrot! Furthermore, categories are independent of related categories with respect to prototypicality. For instance, a guppy is a good exemplar of the category Pet Fish, but it is not a good exemplar of either of the categories Pet or Fish. All in all, prototype semantics has failed to deliver startling insights into semantics (Osherson and Smith, 1981; Pulman, 1983; Kamp and Partee, 1995; Fodor and Lepore, 1996; and, for a contrary view, Lakoff, 1987; *see* **Prototype Semantics**).

Using the following story, Coleman and Kay (1981) discussed the difference between prototypical and typical characteristics (the latter is referred to in the Putnam's definition):

> A young man is involved in an automobile accident in which his father is killed. Seriously injured, the youth is rushed to hospital and a surgeon is called. Seeing the patient, the surgeon exclaims 'Oh my God! I can't possibly operate on my own son!'

The conundrum is founded on the fact that the (stereo) typical surgeon is male, and the surgeon in the story has to be the boy's mother. Coleman and Kay (1981: 36) wrote, "femaleness is by no means a property of TYPICAL surgeons" [*sic*]. Coleman and Kay (1981: 37) equated prototypical properties with denotation and typical properties with a connotation of *surgeon*: "prototypical properties play a role in the meanings of words, while merely typical properties do not". A "female surgeon is no less a surgeon for being female, though female surgeons may be as rare as hens' teeth" (Coleman and Kay, 1981: 36). There is no need to constrain the terms 'prototypical' and 'typical' in this way. The lexicon entry for *surgeon* will identify the lexeme's semantics and be networked with encyclopedic data that (perhaps) contain information on gender bias.

Cruse (1990) offered a different objection to the term 'typical.' He said that prototypicality seems to imply 'well-formedness.' A prototypical bird has two legs, two wings, one beak, and so on; injured birds and mutants do not fit the prototype nor do they fit the stereotype. He then raises the following point (Cruse, 1990: 385):

> Anyone who is fond of collecting edible wild fungi, for instance, will know that well-formed specimens are in the minority: most are damaged, decayed or maggot-ridden, and the finding of an unblemished specimen is an occasion for rejoicing. One might hazard a guess that the typical mushroom is not well-formed.

Cruse's term 'typical' is close in meaning to, if not synonymous with, 'stereotypical' in Putnam's definition. He implied that 'unblemished' mushrooms exist to motivate the prototype, even though the stereotypical mushroom is blemished. Cruse identified a real problem for prototype theory: What is the evidence for the well-formedness of a prototype? Consider the problem Plato identified in *Letter VII*: Perfect geometric figures cannot exist except in the mind, so if a prototypical circle is well-formed, it cannot be based on experience. Yet cognitive semantics

insists that prototypes and stereotypes are based in human experience. Hence, either the foundations of cognitive semantics are misplaced or Cruse is mistaken in suggesting that prototypes are necessarily well-formed. Let us assume that cognitive linguistics is well founded and the well-formedness criterion is wrong.

Cruse may be right in proposing a quality criterion for prototypes: A prototype is as good an example as can be found for the purpose in hand. This implies that the prototype is selected as superior to other denotata. A stereotype is not, hence the description 'typical denotatum' in Putnam's definition. How is 'a (stereo-)typical denotatum of *e*' distinguishable from 'as-good-an-exemplar-as-can-be-found among the class of things denoted by *e*'? Presumably, the stereotype properly includes the prototype. For instance, whatever the stereotype of *vegetable* may be, it properly includes the prototype carrot and the peripheral onion (Battig and Montague, 1969). The stereotypical *vehicle* includes the prototypical car and/or bus together with the peripheral horse-drawn wagon. If this is correct, then we should favor the stereotype in giving the semantics of language expressions.

What about compositionality?

(1) A blue tomato is not a tomato.

Example (1) is easily understood and a possible context for it can readily be imagined; in fact, it is conceivable that blue tomatoes can be bred. If we are to interpret *tomato* in (1) in terms of a typical denotatum, we have an incompatibility to be resolved with the color *blue*. However, there are yellow tomatoes, black tomatoes, and striped tomatoes; but, like flightless birds, they are not typical. A blue tomato, like a bearded woman, is contrary to expectation but not contrary to reason, and the phrase *blue tomato* is not contradictory and can be interpreted by analogy with *blue ball*. There are millions of things that satisfy the description *not a tomato* and certainly no prototype or stereotype for them. This is interpreted in terms of negating the typical denotatum for *tomato*.

The stereotype is a mental image, mental construct, or Gestalt with the attributes of the typical denotatum. The stereotype as the model for attributing intension (or sense) to a lexeme *e* in a lexicon should exclude connotations of *e* – these will be located in a linked encyclopedia entry. The intension (sense) of *e* has all the attributes of the typical denotatum; the recognition of the intended referent of *e* is a matter of identifying something in the world and time spoken of with characteristics that fit with the attributes of the typical denotatum of *e*.

See also: Cognitive Semantics; Connotation; Denotation versus Connotation; Dictionaries and Encyclopedias: Relationship; Dictionaries; Extensionality and Intensionality; Lexicon: Structure; Meaning, Sense, and Reference; Prototype Semantics; Sense and Reference: Philosophical Aspects.

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Stokes, Whitley (1830–1909)

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Whitley Stokes was born in Dublin in 1830 to a prominent Protestant, unionist family. His father and his grandfather had been Professors of Physic (= Medicine) at Trinity College, Dublin. But they had also a strong interest in the Irish language, which was unusual at the time for people of their class; his grandfather had published translations of the New Testament in Irish around the turn of the century. In the Stokes's household congregated those who were active in the Ordnance Survey, including Charles Petrie, Eugene O'Curry, and John O'Donovan.

Stokes graduated from Trinity College with a B.A. in 1851 and then studied law in London, where he was called to the bar in 1855 and where he continued to practice until 1862. His first publication that showed an interest in Irish was a favorable review of Reeves's edition of Adomnan's *Life of Columba* (1857). By then he had met Rudolf Thomas Siegfried, a young German who had studied under Franz Bopp in Berlin and who had visited Johan Kaspar Zeuss in the last year of his life. Siegfried became Professor of Sanscrit at Trinity College, Dublin; it was he who turned Stokes's attention to Irish studies. After Siegfried died of tuberculosis in1863, Stokes gathered together his notes and drafts and published them, first in English and a few years later in German. From then until his death in 1909 there was scarcely a year in which Stokes did not publish a substantial medieval text or a number of articles on early Irish literature. His output was extraordinary, all the more so considering that he spent 19 years, from 1862 to 1881, in the British colonial service in India, far from Irish libraries and the sources from which he was working. When he returned to Ireland on vacation he spent all his time in libraries, transcribing texts, to be translated and published while he was in India.

In 1881 Stokes returned to Europe and went to live in London, continuing to work on Irish matters. While on vacation from India during the 1870s he had established a firm friendship with Ernst Windisch; this resulted in the publication of their *Irische Texte* I–V (1894–1909). Another publication of note is *Thesaurus Palaeohibernicus* (2 vols), which appeared in collaboration with John Strachan in 1901–1903. This is an edition of the Old Irish glosses, most of which had been used for the production of Zeuss's *Grammatica celtica* in 1853.

Stokes was a product of the 19th-century romantic movement. He realized that there was a need for Irish texts to appear in print as quickly as possible and supplied that need. Many of his editions are from a single manuscript, and he tended to omit the poems found in the prosimetra, considering them unworthy of attention. He allowed Kuno Meyer to use his name as a governor of the School of Irish Learning in 1903, but there is no evidence that he ever attended a meeting there. He died in 1909.

See also: Bopp, Franz (1791–1867); Celtic; Strachan, John (1862–1907); Zeuss, Johann Caspar (1806–1856).

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Stokoe, William (1919–2000)

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William C. Stokoe, Jr. (1920–2000) was an American linguist and a pioneer in the study of signed languages. He was born in New Hampshire and educated at Cornell University. Hired in 1955 to teach English at Gallaudet College (now Gallaudet University), the college for the Deaf in Washington, D.C., Stokoe became interested in the linguistic structure of American Sign Language and undertook an analysis of it. In 1960, the University of Buffalo published his book *Sign language structure: an outline of the visual communication systems of the American Deaf* (hereafter SLS), the first published work that applied the analytical techniques of linguistics to a signed language.

In SLS, Stokoe coined the term 'chereme' to denote the sign language counterpart of the phoneme. The chereme is thus the minimal unit of the linguistic system of a signed language, and morphemes can be analyzed as composed of a particular set of cheremes combined in a particular way. Cheremes can distinguish between minimal pairs, just as phonemes can. Thus, the cherology chapter in SLS mirrors the phonology chapter of a description of a spoken language.

In Stokoe's cherological analysis, each sign is made up of three elements: a sig (for signation), the motion component of the sign; a dez (for designator), the handshape component; and a tab (for tabula), the location. The chapters on morphocheremics and morphemics extend the cheremic analysis to larger units (words and morphemes) in a manner parallel to analyses of spoken languages of the time.

At the time of its publication, SLS attracted very little notice among linguists. It was more than a decade later, in the mid-1970s, before linguists began to undertake the systematic study of signed languages. The linguistic literature on signed languages is now extensive and includes analyses of many languages in addition to ASL. Although Stokoe's cheremic terminology has been discarded (it is now usual for sign language linguists to refer to the phonology of signed languages), his insights are still widely accepted, and linguists now generally agree that signed languages have the same basic structure as spoken languages.

Stokoe served as professor and chair of the English department at Gallaudet University; he was founding editor of *Sign Language Studies*, a journal devoted to the study of signed languages; and he continued a lifetime of research on signed languages and their relationship to gesture. In his final publication, *Language in hand: why sign came before speech* (2001), Stokoe argued that the gestures used by early humans evolved into signed language, which in turn gave rise to spoken languages. Thus, he claimed that the origin of all human language is to be found in signed language.

See also: Sign Language: History; Sign Language: Overview.

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Storm was born in Lom, a rural area in the middle of Norway, where his father was a parish priest. After his father's death, Storm and his mother moved to Christiania (Oslo), where they lived under rather poor conditions, and Storm had to work as a teacher while he studied at the university. He received several scholarships to study and travel in Belgium, England, France, Italy, and Spain, and due to his special linguistic ability he learned the languages of the countries he visited with a next-to-native competence. Storm became a professor of Romance and English philology at the university in Christiania in 1873 and was thus the first professor of modern languages in Norway.

Together with Henry Sweet and Edward Sievers, Storm stressed the importance of phonetics and an articulatory–auditory approach in language teaching and language learning. Storm was a supporter of and inspiration for Sweet and Sievers when they wrote their classical introductions to phonetics, but Storm did not publish any theoretical work matching his superb practical command of phonetics. However, his introduction to English philology (1879), especially in its German translation, became a cornerstone in the university curricula of English. His *French dialogues* (1887), translated into several languages, was a milestone in the teaching of modern languages in Western Europe, focusing on giving the pupils a communicative competence in the language they were learning.

Storm put a lasting mark on Norwegian dialectology through his phonetic alphabet *Norvegia*, designed for the transcription of Norwegian dialects. *Norvegia* is quite complicated (originally with 105 symbols and later expanded to more than 150) but has until quite recently been used in the transcription of Norwegian dialects.

Another main field of research for Storm was the Norwegian language, both the spoken dialects and the literary language. His research here is marked by a vast knowledge and solid philological footwork. His studies of the phonetics of Norwegian dialects and of the stylistics of the written language are among the most important and scientific of his time. However, Storm published a number of small books and newspaper articles attacking all sides in the ongoing discussion of language planning in Norway. These publications were characterized by sharp and demagogic polemics and a negative attitude toward language planning, new norms, and their creators. This made him unpopular almost everywhere, and few read and took notice of his scholarly publications on Norwegian.

See also: Dialect Atlases; Norwegian; Phonetics: Overview; Sievers, Eduard (1850–1932); Sweet, Henry (1845–1912).

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Strachan, John (1862–1907)

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John Strachan was a Scotsman, born in Banffshire to a farming family on January 31, 1862. He graduated in classics from the University of Aberdeen in 1881. He spent 1883 at the University of Jena, where he came under the influence of Rudolf Thurneysen. Strachan acquired from Thurneysen an interest in linguistics, and, most significantly, in Celtic studies. Strachan was appointed professor of Greek at the University of Manchester in 1885, and the duties of this post were extended in 1889 to include comparative linguistics. But his interest lay mainly in Celtic studies. He was appointed lecturer in Celtic (an unpaid post) and he founded the first School of Celtic Studies in Britain. From 1887, he began to publish on Latin and Greek philology and particularly on Celtic matters; at first short notes, but by 1892 extending to longer contributions, such as 'The compensatory

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See also: Celtic; Irish Lexicography; Language Loyalty; Meyer, Kuno Eduard (1858–1919); Stokes, Whitley (1830–1909); Thurneysen, Rudolf (1857–1940).

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Peter Frederick Strawson was born on November 23, 1919, in Ealing, a London suburb. He attended Christ's College at Finchley and graduated from the University of Oxford in 1940. That summer he was called up and served in the Royal Artillery until 1946, attaining the rank of captain. He then became Assistant Lecturer in Philosophy at the University College of North Wales in Bangor. In 1947, he became a philosophy tutor at Oxford and from 1948 to 1968 served as Fellow and Praelector in Philosophy at the University College, Oxford. He was elected to the British Academy in 1960. In 1968, he became Fellow of Magdalen College and Waynflete Professor of Metaphysical Philosophy at Oxford. He was knighted in 1977, becoming Sir Peter Frederick Strawson. In 1987, he retired from his Chair and became a professor emeritus to continue his academic travels, lecturing, and writing.

Strawson's important contributions to the study of language, philosophy, and linguistics have concerned meaning and reference. He approached this problem

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from a more empirical perspective than was common among the so-called 'ideal' language philosophers that preceded him. He would become known as one of the premier 'ordinary' language philosophers, along with Gilbert Ryle and J. L. Austin. In his article 'On referring' (1950), Strawson challenged Bertrand Russell's theory of definite descriptions. Strawson argued (1959, 1971, 1992) that material bodies of things and persons are essential to determining the meanings of social speech acts of referring, while Russell (1914) held that things and persons, though perhaps real, cannot be sufficiently grounded for us even to know for certain that they exist. Strawson, by contrast, insisted that things, persons, and events form a kind of basic material in space and time in which symbol systems of language must be grounded. In this argument, Strawson anticipated major themes in linguistics (Lakoff and Johnson, 1999), discourse processing (Glenberg and Robertson, 1999; Roth and Lawless, 2002), perceptual symbol theory (Barsalou, 1999), situational semantics (Barwise and Perry, 1983), conversational analysis (Hindmarsh and Heath, 2003; Streeck, 1996), and general semiotic theory (Oller *et al.*, 2005).

Strawson argued that a fact is not an independent entity that can be identified without the assistance of a proposition. Rather, a fact is merely what is asserted by a true statement. Strawson disputed on this basis the variety of the 'correspondence theory of truth' attributed to positivists such as Tarski (1936/1956). In noting the conceptual nature of facts, as determined by propositional statements, Strawson concurred with C. S. Peirce (1897), who had pointed out that no fact can be singled out for any special attention at all without some means of distinctly representing that fact. Raw facts have no power to identify themselves independently at all. Thus, Strawson was among the first to show that a strict situational semantics driven by raw facts cannot work. On the other hand, Strawson's position also refuted the opposing extreme of those who have attempted to cut representations entirely loose from any moorings to material bodily entities in the space time world, e.g., the early and later theories of syntactic autonomy (Chomsky, 1965; Jackendoff, 1997).

In his work on individuals, Strawson argued that material entities situated in space and time are crucial not only to our being able to define our own identities but also to the possibility of discovering (fixing) the conventional meanings of abstract symbols. While his arguments do not aim for the generality and exactness sought by C. S. Peirce, Strawson independently showed that material entities in space and time are basic and prerequisite to language systems. Although the implications of Strawson's theory of reference have certainly not been universally accepted, his emphasis on linguistic acts as performatives that bear presuppositional weight has had widespread impact. It resonates in the work of ordinary language philosophers, linguists, psychologists, ethnographers, and empiricist of all stripes. The name 'P. F. Strawson' is so closely associated with 'speech act theory' that it is commonly mentioned along with J. L. Austin and John Searle. Strawson also incidentally encouraged the closer investigation of discursive behaviors from a psychological, linguistic, and ethnographic point of view.

See also: Austin, John Langshaw (1911–1960); Chomsky, Noam (b. 1928); Jackendoff, Ray S. (b. 1945); Peirce, Charles Sanders (1839–1914); Piaget, Jean (1896–1980); Reference: Philosophical Theories; Reichenbach, Hans (1891–1953); Russell, Bertrand (1872–1970); Tarski, Alfred (1902–1983).

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Stroop Effect in Language

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The Stroop Task and its Potential for Studying Language

The Stroop effect is the best known phenomenon in cognitive psychology, and may well be the best known phenomenon in all of psychology. In his dissertation, John Ridley Stroop (for a biography, see MacLeod, 1991b) first reported the paradigm that now bears his name (Stroop, 1935). Since then, thousands of studies have employed this task and its variants to study theoretically interesting aspects of attention, learning, memory, and language (see MacLeod, 1991a, for a comprehensive review). The task has also seen widespread use in neuropsychology, for diagnosing attentional problems, and in clinical psychology, for studying anxieties.

The task itself is deceptively simple: you must name the color in which something is printed as fast as possible, the dependent measure being color-naming response time (RT). The key is what the 'something' is – the carrier of the color that must be ignored while you name the color. In his first experiment, Stroop (1935) showed that we can read a word aloud as quickly when it is printed in an incompatible color (the incongruent condition) as when it is printed in familiar black ink (the control condition). Thus, saying 'green' to the word *green* printed in red ink was no slower than when *green* was printed in black. His second experiment was the critical one: here he showed that naming the ink color was dramatically slower for the incongruent condition than for the case where there was no color word at all (the control condition). Thus, saying 'red' to the word *green* printed in red was markedly slower than saying 'red' to a red color patch.

The extra time to name the color when there is an incompatible word present (i.e., the RT difference between the incongruent and control conditions) is known as the Stroop effect, or Stroop interference. This observation would perhaps simply have been seen as an intellectual curiosity were it not for the fact that interference is observed even when the irrelevant item is not a color word. Klein (1964) first made this point by showing a gradient of declining interference as the to-be-ignored words progressively changed from color words (e.g., *blue*) to color-related words (e.g., *sky*) to high frequency words (e.g., *friend*) to low frequency words (e.g., *abjure*) to nonwords (e.g., *evgjc*). Klein's observation opened up the task for use as an indirect measure of word activation. **Figure 1** illustrates several of these conditions, including the congruent condition (introduced later), where facilitation (faster RT than in the control condition) is often observed.

Figure 1 Illustrations of different types of to-be-ignored verbal items in the color-word Stroop task. The task is always to name the print color. The columns indicate (1) unpronounceable nonword letter strings, (2) pronounceable nonwords, (3) high frequency noncolor words, (4) the classic incongruent color words, and (5) the congruent case, where word and color match. Try naming the colors down each column as quickly as possible, being careful not to read the verbal items. You should notice more difficulty (interference) as you move from the first to the fourth column, and then a noticeable easing (facilitation) in the fifth column.

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Stroop Effect in Language

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The Stroop Task and its Potential for Studying Language

The Stroop effect is the best known phenomenon in cognitive psychology, and may well be the best known phenomenon in all of psychology. In his dissertation, John Ridley Stroop (for a biography, see MacLeod, 1991b) first reported the paradigm that now bears his name (Stroop, 1935). Since then, thousands of studies have employed this task and its variants to study theoretically interesting aspects of attention, learning, memory, and language (see MacLeod, 1991a, for a comprehensive review). The task has also seen widespread use in neuropsychology, for diagnosing attentional problems, and in clinical psychology, for studying anxieties.

The task itself is deceptively simple: you must name the color in which something is printed as fast as possible, the dependent measure being color-naming response time (RT). The key is what the 'something' is – the carrier of the color that must be ignored while you name the color. In his first experiment, Stroop (1935) showed that we can read a word aloud as quickly when it is printed in an incompatible color (the incongruent condition) as when it is printed in familiar black ink (the control condition). Thus, saying 'green' to the word *green* printed in red ink was no slower than when *green* was printed in black. His second experiment was the critical one: here he showed that naming the ink color was dramatically slower for the incongruent condition than for the case where there was no color word at all (the control condition). Thus, saying 'red' to the word *green* printed in red was markedly slower than saying 'red' to a red color patch.

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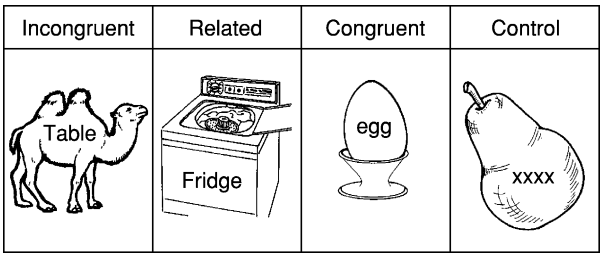

Figure 2 Illustrations of some of the possible conditions in the picture-word task. The task is always to name the picture, ignoring the word. Shown from left to right are an incongruent condition, a semantically related condition, a congruent condition, and a control condition. Interference would be expected for the first two and facilitation for the third, all relative to the fourth (control) condition.

The next step in demonstrating that the Stroop task provides a general way to evaluate ongoing processing was to demonstrate priming in the task. Warren (1972) showed that if a target word to be color named was preceded by related words, then the interference exerted by the target word was reliably increased. As an illustration, if 'elm,' 'oak,' and 'maple' were presented auditorily prior to *oak* in red, then time to say 'red' was slower than for prime words unrelated to the critical target word. This is evidence of identity or repetition priming; perhaps more impressive was his finding that semantic priming – the target was now *tree* in red – also produced substantially increased interference in naming the target's color.

There is one more piece of the puzzle required for use of the Stroop task to study language. In many language-relevant situations, the limited stimulus set of the standard Stroop task – a few colors and their names – poses a significant impediment. Cognitive psychologists have created many task variants (see MacLeod, 1991b), but one has been particularly pivotal in the domain of language: the picture-word task (see, e.g., Lupker, 1979). Here, line drawing pictures are presented in the presence of a word, with the word to be ignored and the picture to be named. Figure 2 illustrates four key conditions using this paradigm, although others are possible. This task has been used widely in language research, and there are now extensive picture-naming norms available (see Szekely *et al.*, 2004).

Using the Stroop Task to Study Language

Klein's (1964) and Warren's (1972) studies gave rise to a veritable cottage industry of color-word and picture-word interference studies aimed at issues central to understanding language, from sound to meaning. This section provides pointers to language-relevant research using the Stroop task.

Word Sound and Form

Early on, Dalrymple-Alford (1972b) demonstrated that when a competing color name was primed acoustically, both types of acoustic relation – initial sound (e.g., *run* for *red*) and terminal sound (*clean* for *green*) – caused interference, although considerably less than actual color words. Note that even just first letters of competing color names (e.g., *r* in green) produce reliable interference, possibly implicating an articulatory component (Regan, 1978).

Tanenhaus *et al.* (1980) showed that if the prime was related orthographically or phonologically, or both, to the irrelevant target word, interference was greater than for unrelated primes. This generalized to both auditorily and visually presented primes. In the picture-word task, Lupker (1982) found that either orthographic or phonemic similarity between the word and the picture's name led to facilitation relative to a nonword, a benefit that he attributed to decreased retrieval time for the picture name. Besner and Stolz (1998) used interference from pseudohomophones (e.g., *bloo*) to argue that a phonological code is routinely computed. Burt (2002) has demonstrated that activation of the identical word via priming produces facilitation but activation of a related word produces interference, arguing that activating competing phonologies plays a role in interference.

Syntax and Part of Speech

Using the picture-word task, Ehri (1977) showed that nouns interfered more than adjectives or functors, suggesting to him that interference was not phonologically based. Pechmann and Zerbst (2002) confirmed this result in the picture-word task, arguing that syntactic and semantic processing overlap early in lexical processing. Taken together with the preceding discussion on phonology, a better suggestion would appear to be that multiple factors contribute to the interference – that it is not readily localized at one level of linguistic analysis. There is little work on syntax and interference, but Schriefers (1993) has shown in Dutch that a difference in noun gender between the word and the picture increases interference.

Semantics

The bulk of the action in linguistic studies using the Stroop task and its analogs has been in the domain of meaning, in line with the Klein (1964) and Warren (1972) studies. Dalrymple-Alford (1972a) confirmed Klein's finding that color-related words interfere more than non-color-related words, but not as much as color words, so relation to color is important in degree of interference. Klein's word frequency

finding, that high-frequency words interfere more than low-frequency words, has been complicated by Burt (2002), who finds the opposite pattern when the words are primed. And in the picture-word task, nonwords also cause less interference than words (e.g., Lupker, 1982). Oddly, whereas an associated word interferes more than an unrelated word with color naming, this does not appear to be the case in the picture-word task. Yet a categorically related word does interfere more than an unrelated word (Golinkoff and Rosinski, 1976). There may well be fundamental differences between these two tasks, a direction for future research.

Possibly the most dramatic meaning effects in the Stroop task have come from research in clinical psychology, and a phenomenon now widely called the emotional Stroop effect. C. MacLeod (2005) describes a large body of research in which personally meaningful concepts can produce enhanced priming. Thus, for example, an arachnophobe shows heightened RT to name the colors of spider-related as opposed to neutral words (Watts *et al*., 1986). Even the threatening of larger beliefs, such as belief in a just world, can enhance interference in color naming of justice-related words (Hafer, 2000). Quite clearly, the Stroop task is extremely sensitive to meaning, whether primed or not.

Bilingualism

There is also a considerable body of Stroop interference evidence relevant to people who speak more than one language. Preston and Lambert (1969) found quite strong interference whether bilinguals had to name the ink colors in the same language as the distracting words or in the other language. Across a fairly large set of studies, a reasonable overall estimate of cross-language interference would be from 66–75% of that within language. Although interference between languages can sometimes be as great as that within languages, this clearly depends on relative familiarity with the two languages in question (Mägiste, 1984).

Beyond the Word

Conrad (1974) was the first to investigate sentence materials in the context of the Stroop task, showing that both meanings of an ambiguous word (e.g., *nickel*) were activated in processing a sentence such as *That nickel is from her coin collection*. She demonstrated this by showing that either the word *metal* or the word *money* interfered with color naming equally, despite only the latter sense being consistent with the sentence. Later work has shown that initial activation may be similar but that, if a time interval is inserted between the sentence and the target, the appropriate word soon wins out and only that word will produce interference.

As another illustration of sentence-level processing, Whitney and Kellas (1984) presented sentences that biased a typical category member (e.g., *The guest saw the bird that landed on the branch – robin*) or an atypical member (e.g., *The guest saw the bird that roasted on the grill – chicken*) vs. a neutral sentence. Regardless of the prime sentence, the typical word always caused interference, whereas the atypical word did not. Other work by Whitney extended this kind of pattern to anaphoric reference. Studies of this form have become frequent in the literature for examining the activation of conceptual language-based information (see MacLeod, 1991a).

Theories of Stroop Interference

Early theories of the processes involved in producing Stroop interference tended to focus on the speed of processing – that words were faster to process for naming than were colors (or pictures), an idea that goes back to Cattell (1886) at the dawn of psychology. This readily accounted for the asymmetry that words interfere with color naming but colors do not interfere with reading, and fit well with Cattell's proposal that word reading became automatic through extensive practice.

Cohen *et al*. (1990) realized this automaticity idea in terms of a formal connectionist model where connection strengths determined by learning produced interference. More recently, Melara and Algom (2003) have argued that discriminability along the two dimensions – word and color – underlies the performance pattern, presenting a formal model based on this notion. In a psycholinguistic vein, Roelofs (2003) has extended the WEAVER++ model of word production to the case of Stroop interference. All of these theories have been quite successful in handling the rich database that now exists on the Stroop effect, a database running from simple behavioral experiments to complex psycholinguistic studies to new work on brain structures involved in interference (see MacLeod and MacDonald, 2000).

Conclusion

The Stroop task provides a valuable tool for understanding how words and more extended linguistic elements are processed and understood. It is generally simple to do a Stroop experiment (for coverage of methodological issues, see C. M. MacLeod, 2005), and the many task variations simultaneously permit flexibility and generalizability.

What is especially appealing about the Stroop task for cognitive psychologists and psycholinguists is its status as an **indirect** measure of language processing. The individual being tested is to name the color or picture, and is expressly not to read the word. So if the word interferes with naming the color or picture, this is seen as not being a strategic effect, given that the individual is trying to ignore the word. To the extent that the interference varies as a function of some manipulation, this can then be taken to index the degree of processing of the verbal material without the biases that appear to be more possible in a direct measure of word processing, such as lexical decision or speeded reading (naming). At the age of 70, the Stroop effect is still going strong.

See also: Bilingualism; Color Terms; Human Language Processing: Connectionist Models; Lexical Phonology and Morphology; Phonology: Overview; Psycholinguistic Research Methods; Reading Processes in Adults; Semantics in Psychology.

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Structuralism

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The term 'structuralism' can be applied to a wide range of approaches in linguistics and in other areas. Each variety of structuralism has its origins in the work of Ferdinand de Saussure, as presented in the *Cours de linguistique générale* (Saussure, 1972, 1983) which was originally published posthumously in 1916. Within linguistics, virtually all approaches are structuralist in that they are concerned with the workings of a linguistic system. However, 'structuralism' is usually taken to refer to a range of approaches which were developed in the first half of the 20th century and largely abandoned following the development of Chomskyan 'generative' linguistics. Outside linguistics, 'structuralism' refers to a more diverse range of approaches in a wide range of fields, including anthropology and literary criticism, which propose explanations of texts, behaviors, and cultural phenomena in terms of a structured system of oppositions, contrasts, and hierarchies.

Structuralism in General

The key property that makes an approach 'structuralist' is that it considers phenomena as **systems**, or the products of systems, rather than as collections of isolated items or in terms of their history.

Many different phenomena have been approached in structuralist terms, but the origin of the notion is in Saussure's approach to the study of language. Features taken to be typical of structuralism appeared in the work of some of Saussure's predecessors and contemporaries, and Saussure never used the terms 'structuralist' or 'structuralism' in his own work. Nevertheless, the work that has been by far the most influential in the development of structuralism is Saussure's posthumously published *Cours de linguistique générale* (Saussure 1972, 1983). This work was not authored by Saussure but compiled from the lecture notes of students who attended the third of three series of lectures given by Saussure in Geneva between 1906 and 1911.

Saussure divided '*langage,*' the whole of language, into '*langue*' and '*parole*' and identified langue as the focus of linguistic study. He made a distinction between diachronic (i.e., historical) studies, which compare langue at different points in time, and synchronic studies, which study langue at one particular point in time. Perhaps the most important observations he made about langue were, first, that there was an arbitrary connection between linguistic signs and what they represent and, second, that the value of a particular unit within the system depends on its opposition to, or how it contrasts with, other units within the system. For example, there is no reason other than historical accident why the English word for a young female human should be *girl* while the French word for the same concept should be *fille*. Further, the existence of the terms *boy* in English and *garçon* in French are required in order for *girl* and *fille* to have the values they do.

Within linguistics, these notions led to a focus on language systems at a particular moment in time (alongside ongoing work on the historical development of languages). Beyond linguistics, it led to the search for similar systems in other areas.

Structuralism outside Linguistics

A wide range of broadly structuralist approaches have been developed in fields such as anthropology, art and literary criticism, biology, ethnology, mathematics, media studies, psychoanalysis, psychology, and sociology. Each of these begins by attempting to analyze the systems of oppositions, contrasts, and hierarchical structures underlying the meanings of the phenomena being studied. In anthropology, for example, Lévi-Strauss aimed to develop a scientific approach to anthropology based on structuralist ideas. His first book (Lévi-Strauss, 1949) proposed an analysis of kinship based on an underlying system of structuralist oppositions. In literary criticism, analyses of literary meanings were based on the assumption that literary texts implied sets of structural oppositions. Texts could then be viewed as similar or distinct based on the underlying structures they implied. Roland Barthes (1957) and others proposed

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analyses of cultural and artistic concepts in structuralist terms, and a new general field of semiotics was developed (Eco, 1976). Much of this work was inspired by the suggestion in the *Cours* that linguistics would eventually be seen as one part of a new science of *semiology*, concerned with the general study of signs. The more recent developments of poststructuralism and deconstruction can be seen simultaneously as both developments and rejections of earlier versions of structuralism. Many of these approaches diverged greatly from developments in linguistics, which retained their focus on the **linguistic** system.

Structuralism within Linguistics

A number of schools of linguistics in the early 20th century built on Saussure's ideas. These included: the Geneva school, where Saussure's ideas continued to be developed for at least three generations; the Copenhagen Linguistics Circle, associated with Hjelmslev's glossematics; Firthian contextualism in London; the Prague School, most famously associated with the work of Trubetskoy, Jakobson, and Martinet; and American Structuralism as developed by Bloomfield, Sapir, and others.

It is often assumed that structuralism came to an end when Chomsky published *Syntactic Structures* in 1957. But Chomsky rejected specific aspects of American (perhaps even more specifically Bloomfieldian) structuralism, in particular the focus on 'surface' forms rather than the underlying cognitive system and the 'taxonomic' approach which aimed to describe languages rather than explain them. Bloomfield aimed to develop a **scientific** approach and his benchmark for scientific methodology was behaviorism, which denied reference to the mind, or mental entities. Chomsky pointed out the extent to which behaviorist explanations were vacuous and that there was considerable evidence for a system of knowledge underlying linguistic behavior. Chomsky also rejected Bloomfield's notion that the careful use of 'discovery procedures' would ensure that linguistics was an objective, empirical science. He argued that strong and clear evidence about the linguistic system could be provided by the intuitions of speakers.

While Chomsky rejected significant aspects of American structuralism, his work and that of later linguists has built on a number of insights provided by structuralists. Chomskyan linguists do not question the value of descriptive work and the descriptive work of structuralists provided a large amount of useful data. Rather, they believe that it is important to go further and to look also for explanations of linguistic phenomena. Some work in the Chomskyan tradition is a development of the work of structuralist linguistics. For example, Chomsky's own work with Morris Halle (Chomsky and Halle, 1968), which analyzed the English phonological system in terms of a number of distinctive features, can be seen as a development of the Prague School work on phonology, which analyzed the sound systems of languages in terms of a series of contrasts. Structuralist linguistics is often assumed to be of only historical interest. But it has left its imprint on more recent work in more than the fairly vacuous sense in which most, if not all, approaches to linguistics assume the existence of a linguistic system.

See also: Behaviorism: Varieties; Bloomfield, Leonard (1887–1949); Chomsky, Noam (b. 1928); Copenhagen School; Firth and the London School; Firth, John Rupert (1890–1960); Geneva School of Linguistics after Saussure; Historiography of Linguistics; Jakobson, Roman (1896–1982); Jakobson, Roman: Theory of the Sign; Linguistics as a Science; Martinet, André (1908–1999); Prague School; Sapir, Edward (1884–1939); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics; Semiology versus Semiotics; Semiotics: History; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Structuralism in Anthropology

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Structuralism in anthropology is the view that meaning in human sociocultural life rests in the positional configuration of elements relative to each other in a structure or system, not in properties of those elements considered in their own right, nor in the elements' ties to forces external to the system. Various modern anthropologists have set forth partly structuralist theories and methodologies, including Sapir (e.g., 1949), other linguistically-oriented Americanists, and Dutch colonial scholars working in the Malay archipelago (de Josselin de Jong, 1977). However, structuralist anthropology as a paradigm is most associated with Claude Lévi-Strauss, who formulated and practiced it from the 1940s onward as an avowed adaptation of linguistic models of phonological order. Structuralism was one of the most influential intellectual movements in the human sciences and humanities in the 20th century.

Lévi-Strauss's Transfer of an Idea from Phonology to Analysis of Culture

Lévi-Strauss's initial exposure to structural linguistics came in the early 1940s, when he attended lectures in which Roman Jakobson outlined phonemes' character as negative, relative positions in a language-specific total configuration of significant distinctions (Jakobson, 1978). The model of language Lévi-Strauss thus acquired was that of *langue* or "linguistic system" set forth by Saussure (1959). In the lectures, Jakobson emphasized the uniqueness of phonological signs, as the only linguistic signs that are purely differential and negative in the Saussurean manner. Linguistic signs of all other levels possess characteristics and functions that are not determined exclusively by their position in a system of other signifiers. Far from heeding this point, Lévi-Strauss saw the phonological model to be directly useful in deepening anthropological understanding of vast areas of human sociocultural life beyond linguistic codes.

Lévi-Strauss applied metaphorically phonological styles of analysis to hundreds of anthropological subjects. Bending the '+' and '−' formalism of feature analysis to characterize whole social relationships, he suggested that in particular societies the moral and emotional quality of ties between different categories of kin is not determined by those kin relations in themselves but by their place in a configuration of other relations (Lévi-Strauss, 1963a). He similarly argued that the categorization of particular kinds of relatives as marriageable and others as unmarriageable (such as the common pattern of categorizing children of a brother and sister as marriageable 'cousins' while categorizing the children of same-sex siblings as unmarriageable 'siblings') in a given society instantiates a society-level distribution of significant distinctions, and that a commitment to relations as such (in the form of a principle of reciprocity, or dependency on others for spouses) is the raison d'être of distinct kin categories and of marriage rules (Lévi-Strauss, 1969a). Regarding totemism (Lévi-Strauss, 1963b), he argued that the point of animal symbols is not the characteristics or usefulness of particular species but their intellectual value as signifiers of relational distinctness itself. Humans look to the distinctness of animal species for analogic markers of social distinction. Generalizing this argument in *The savage mind* (1966), Lévi-Strauss sought to document a pan-human faculty of proliferating classificatory order in relation to all concrete things and qualities in the world, through analogic mapping between sets of categorial distinctions. In numerous works on myth (e.g., Lévi-Strauss, 1969b), he argued that at multiple scales mythological narratives are elaborately organized around basic categorial oppositions between minimal signifying elements (termed mythemes).

Structuralism's Influence in Anthropology

Lévi-Strauss's main ideas, and his work on specific empirical topics, prompted a deepening of anthropologists' imaginativeness in noting interconnections across heterogeneous cultural data. Minimally, structuralism is the heuristic premise that all phenomena in cultural worlds might be interrelated, and that patterning of form (convergences in the shape or position of cultural elements, even in the absence of reflexive commentary about those elements on the part of the people practicing them) is itself evidence of such interrelatedness because it is a basic mode in which interrelatedness exists. This notion was intrinsic to pre-World War II anthropology's emergent understandings of culture (following Boas) or social order (following Durkheim), but Lévi-Strauss's structuralism pushed anthropology further in presenting an explicit alternative to the commonsense ideology that conscious individual psychology is the basic determinant of cultural practices. Even as scholars found serious fault with many of Lévi-Strauss's specific empirical claims and interpretive idioms, in the wake of structuralism it has become routine for

anthropologists to identify far-reaching, nonobvious patterns of interconnection across narratives, rituals, architectural forms, practices of food production and consumption, practices of bodily adornment, geography, cosmology, and other areas of life, where formerly these areas might have been only subjects of descriptive cataloguing. Structuralism gave anthropology new reach in seeing abstract categories or principles in ethnographic particulars. The anthropological topic of taboo, for example, was substantially reconceived following Lévi-Strauss's work on classification, when Leach (1964) and Douglas (1966) proposed structuralist analyses of taboos as enforcing the distinctness of categories in a culturally given system by suppressing interstitial entities, such as taxonomically anomalous animals. Recognition of symbolic logics at work in taboos of particular communities has been central to most subsequent writing on the subject.

Yet absorption of some of structuralism's broad methodological insights has been matched also by emphatic rejections of structuralism as an overall theoretical doctrine in many anthropological quarters. The reasons for this include succession of intellectual generations, resurgence of ideologies of individualism, susceptibility of a famous body of work to stereotypic simplification, and continuing credence given to anthropological theories that do not recognize signification as a universal aspect of human activity. Among anthropologists who do recognize signification as basic to their subject, another influence of structuralism has been its enduring relevance as a foil against which to define other theoretical possibilities.

Errors in the Thesis of Autonomous System

Structuralism's central thesis is the autonomy of system, or the notion that a system of cultural categories is self-identical and self-determining. A system determines its internal elements, and is not determined by them. It is not affected by elements, forces, or systems outside itself, nor does it produce gaps of absent or contrary determination within itself. This autonomy and self-sameness of system is axiomatic to structuralism's methodological prescription of searching out the positional value of cultural elements. An element has a unitary positional value in relation to a set of other elements only to the same degree that there is a single stable and definably bounded system within which that element is embedded (though Lévi-Strauss's own unit of study was often the system of human culture at large). The thesis of the autonomy of system has its *locus classicus* in Saussure's definition of *langue* or "language system, grammar, code." Saussure axiomatically separated linguistic system from language use, from temporality, from system-independent characteristics (e.g., materiality) of the media of signification and of the objects signified, and from the possibility of the simultaneous coexistence of different systems.

To summarize the full range of ways that anthropologists have pushed off from structuralism would probably be to summarize the state of the entire discipline. All currently important theoretical frameworks, though, have in common that they depart from the thesis of autonomous system by recognizing any given structural system to be foundationally dependent on and involved with something other than itself. In various ways, these departures from structuralism turn 'system' or 'structure' into a question rather than a premise.

The most frequent focus of revision has been system's involvement with history and events. Most scholars understand structuralism to be ahistorical. Saussure identified linguistic system as a synchronic phenomenon, existing virtually as if in a slice of time rather than diachronically as an entity whose internal makeup might be inseparable from its having histories and futures different from its present. Saussure further abstracted temporality out of structure by distinguishing *langue* "system, grammar" from *parole* "speech, performance, use." This distinction imagines that structures exist autonomously of events, such as events of signification in which speakers practice structural forms. There is a line of influence from these Saussurean axioms to Lévi-Strauss's views that myths are "instruments for the obliteration of time" or that some societies are culturally oriented to resisting structure-perturbing effects of events. Anthropologists in their empirical work have generally found, however, that all human sociocultural forms are inherently temporal and historical, in various senses. The forms change in time. Sahlins (1985), Robbins (2004), and others have presented structuralist-historical case studies arguing that discernment of broadly Saussurean cultural structures is itself crucial to account for processes of sociocultural transformation. Many scholars have found that system-internal relations at a given time are insufficient to give an account of how a system works or how it is what it is, but rather that its history is a necessary element of a scholarly understanding of that system, in many cases because the cultural forms themselves are internally diachronic and open-ended. If it is recognized that structures exist at a particular present moment temporally rather than virtually, this raises questions such as: How big is the present? What are the ways that a particular 'present' is inherently intertemporal, in the

sense of being connected to and composed of past and future moments that are different from it?

Considerations of temporality are inseparable from considerations of a wider array of ways structure is irreducibly involved with subjectivity and with use-in-context, including sign users' reflexive orientations to their sign systems and signifying practices. The force of Lévi-Strauss's adoption of phonology as a metaphor for culture was to emphasize the nonconscious character of structures. Just as people speak without having overt propositional knowledge of their language's grammatical structures, so too cultural subjects' consciousness (or indeed, their existence) is secondary to the cultural structures in which they live, and may have no necessary place in analysis of those structures. Yet in linguistics, Benveniste (1971) showed that first- and second-person pronouns are elements of linguistic structure that encode the presence of a speaking or listening subject, and Jakobson (e.g., 1971) elaborated this point for the encoding of diverse aspects of a situation of speech use in grammatical shifters. This amounts to recognizing *parole* as irreducibly present in *langue*. In diverse ways, anthropologists have found the perspectives of acting subjects to be integral to cultural structure, often, though, also finding that the relations between structure and subject, between these two and material or institutional worlds, or even between a subject and itself, are not seamless. For example, Valeri (2000) documents tensions between symbolic logic and mortal, bodily conditions of existence underpinning the taboos of a hunting community. Relatedly, scholars have sought in varying ways and with varying success to reconcile perceptions of categorial structure with social dynamics of value, hierarchy (Dumont, 1980), power, and desire. Work in linguistic anthropology documents the structure-creating effects of pragmatic acts of signification, and the structural consequentiality of sign users' reflexive sensibilities and ideologies about the pragmatic organization of sign use (Silverstein, 1976). This work emphasizes the emergent, contingent character of structure, and as such refuses the objectivist reification of structure that Voloshinov (1972) early identified in the Saussurean paradigm and that Bourdieu (1977) later identified in the Lévi-Straussian one. Finally, Bakhtin (e.g., 1981) has become one ancestral icon of the notion that structure is intrinsically heterogeneous, and that signifying acts by definition occur at border zones joining together multiple, even mutually inconsistent categorial systems.

None of these departures from the thesis of autonomous system can viably abandon the idea of system or structure as such, or some other basic idea of durable relational logic. The central empirical, methodological, and theoretical questions of anthropology remain ones of how to give accounts of sociocultural worlds that document the character of existing relational logics, but neither dissolve those logics into nonrelational determination nor reify them as existing transcendentally unto themselves.

See also: Distinctive Features; Jakobson, Roman (1896–1982); Levi-Strauss, Claude (b. 1908); Saussure, Ferdinand (-Mongin) de (1857–1913); Semiotic Anthropology; Structuralism; Structure and Structuralism: Semiotic Approaches.

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Structuralist Phonology: Prague School

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Structuralism: Theoretical and Methodological Assumptions

Most 20th-century humanistic thought notably including semiotics and linguistics as well as the social, behavioral, and cognitive sciences (e.g., sociology, psychology, and anthropology – which the French refer to as *les sciences humaines*) ultimately can be defined and described as belonging to a larger structuralist paradigm originally outlined by Saussure (1966: 16 [1916]), where linguistics was to be part of a larger science called semiology (later to be known as semiotics). Linguistics (as opposed to semiotics) has often been considered to be the better-defined discipline and has even been viewed as the most developed branch within this structuralist paradigm. Within linguistics, the distinction between phonetics versus phonology, the postulation of the phoneme, its various definitions, and the discovery procedures by which it is determined via distinctive features and minimal pairs, etc., have been one of the major cornerstones of structuralism in general and structural linguistics in particular.

Every linguistic theory is the direct result of a specific set of theoretical axioms that is related to how the linguist defines language, defines a linguistic problem, determines the source, kind, and amount of data to be selected and analyzed, chooses a methodology to select and analyze the data, and evaluates, compares, and contrasts the analyses in light of the above. These five criteria basically serve to describe how and what a particular linguist or school of linguistics views as the goals of linguistic research (Tobin, 1990).

Structural linguistics in general and structuralist phonology in particular share a basic definition of language as a hierarchical 'system of interrelated systems which is organized internally and is used by human beings to communicate. **Theoretically,** this definition of language implies a dichotomy between *langue* and *parole*, *langue* being an abstract code composed of signals and meanings and their paradigmatic, or associative, and syntagmatic relations, a complex code that is shared by a community of speakers. *Parole* is the concrete and seemingly chaotic realization of this complex abstract code – exploited by individual speaker – to communicate specific discourse messages in different linguistic and situational contexts. The primary task of the linguist is to postulate the abstract code or system of systems of a language to explain the nonrandom distribution of the linguistic forms of that language in diverse linguistic and situational contexts. **Methodologically,** this definition of language implies a respect for and a reliance on observable empirical data (as opposed to contrived or purely introspective data) culled from discourse and a commitment to deal with the human factor (i.e., the cognitive, perceptual, linguistic and nonlinguistic behavior of human beings) as they are relevant to communication in different linguistic and situational contexts.

Many diverse models of linguistic analysis, both quantitative and qualitative, have been developed to describe, interpret, and explain concrete individual linguistic phenomena (*parole*) according to general, communal, and abstract theoretical principles (*langue*) in various structural guises and under quite different names. The notion of a general structuralist model may be viewed as a theoretical and methodological bridge between the abstract and concrete levels of human linguistic phenomena.

Indeed, one may safely state that a model has been established (a model basically derived from phonology within linguistics) that has been extended throughout the humanities and social or human sciences. This structuralist model for linguistics is illustrated schematically in **Figure 1**.

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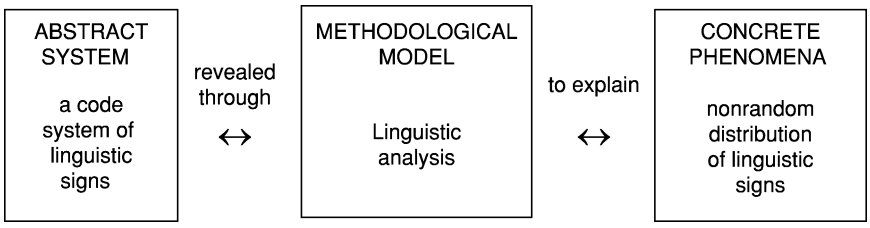

Figure 1 The structuralist paradigm.

Often, this theoretical and methodological model has presupposed an analogy between the model itself and the phenomena it purports to explain. This is not surprising considering the fact that it is the definition chosen for language by the linguist that determines which language phenomena will be selected as being important and relevant for the theory and the analysis. Therefore, the model is predetermined by the theoretical units found in the analyst's definition of language.

Ferdinand de Saussure (1966: 8 [1916]) first maintained that one of the chief tasks of linguistics was to define itself. He further claimed that the objects of study in language are not given in advance, as are the objects of study in other sciences. In short, for linguistics, it is the definition of language espoused by a theory that actually creates the object of study.

The structural model for linguistics that was later extended to other fields and disciplines was originally based on the sound systems of language, namely, the dichotomy between the abstract systems of hypothetical sound units postulated by the linguist and the concrete sounds of language produced and perceived by members of a speech community, which traditionally has been studied under the rubrics of phonology and phonetics, respectively.

More specifically, one may view the dichotomy between phonetics versus phonology in the following way. Phonetics is the description of the way concrete sounds are articulated and perceived – the 'what' and 'how' – of the realized sound systems of languages. Phonology is a postulation of the abstract units of the sound systems of languages (phonemes/distinctive features) as they appear within paradigmatic systems and a description and explanation of their syntagmatic distributions and collocations within and across languages – the 'where' and 'why' of their phonotactic or combinatory distribution. Schematically, one may place phonetics and phonology within the structuralist framework as illustrated in Figure 2.

The theoretical and methodological distinctions between (a possibly autonomous?) phonetics and (a possibly autonomous?) phonology, or the extent to which phonetics may or may not contribute to phonology (or possibly *vice-versa*?) has not always been clearly defined in linguistics and may even be a point of contention between different linguistic approaches.

Structuralist phonology is based on four fundamental theoretical and methodological tenets: (1) The concept of the phoneme composed of distinctive articulatory and acoustic features – sounds that create communicative oppositions – which reflects the abstract level of paradigmatic sound systems in *langue* and underlies the communication factor; (2) The concept of allophones composed of distinctive and secondary or nondistinctive features – sounds that do not create communicative oppositions – which reflects the concrete nonrandom syntagmatic distribution of the variations within a single and specific phoneme and may be related to the human factor; (3) In order to explain why the abstract phonemes of a language may also distribute – like allophones – in a nonrandom manner, we must appeal directly to the human factor in addition to merely classifying the phonemes and their distinctive features that underlie the communication factor; and (4) It is only through the incorporation of the human factor as a means to explain the nonrandom distribution of sounds (beyond the traditional communicative notions of phonemes/allophones and distinctive and secondary features) that a structural analysis can achieve both abstraction (via the postulated units of analysis) and explanatory generality (the ability to explain why these different sound units function and distribute as they do in realized speech in the largest scope possible.

All of the above concepts of system, *langue* versus *parole,* and the distinction between abstract and concrete sound units within paradigmatic systems and their syntagmatic combinations form the foundation of structuralist linguistics and phonology and can be attributed to Ferdinand de Saussure, the 'father' of modern linguistics, who preceded the Prague Circle of linguists who further refined and expanded these concepts in general and in phonology in particular.

Saussurian Phonology

In their usually accepted senses today, the terms 'phonetics' and 'phonology' were basically reversed by

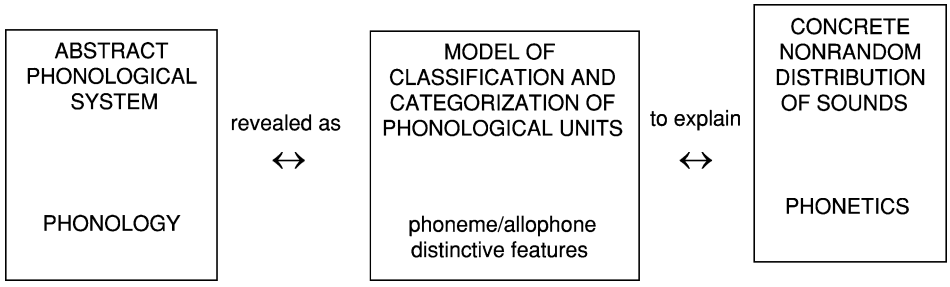

Figure 2 Phonetics versus phonology.

Saussure (1966). Today, what is generally referred to in post-Prague School nomenclature phonetics (i.e., the physiological and acoustic features of sounds and their classification according to those features) was referred to by Saussure as phonology. On the other hand, Saussure defined phonetics in its pre-19th century and 19th century view as an historical science, a study of the diachronic development or evolution of sounds, that is, analyzing speech events and changes over time. Therefore, what Saussure labeled as phonetics (and not phonology) is part of his definition of linguistics as the scientific study of language. Saussure's notion of phonology, however, as consisting of the study of the articulatory mechanism and the various perceptual implications of different speech sounds, all of which do not change, was, therefore, viewed merely as an auxiliary discipline belonging exclusively to the realm of speaking (pre-Prague Circle phonetics). Despite the auxiliary nature of phonology, however, Saussure noted that it served as a necessary tool for dealing with the written forms of language. Linguistic evidence furnished by written forms is valid only when interpreted, thus requiring an understanding of the phonological system of each language, that is, a description of its sounds. Each language, of course, according to Saussure, operates with a fixed number of well-differentiated phonemes.

Saussure laid the foundation for the distinction between phonetics versus phonology (as established by his successors in the Prague School) by establishing the fundamental structuralist concept of system, as well as the dichotomy of the abstract level of *langue* versus the concrete level of *parole*. Furthermore, he laid the groundwork for the teleological, functional, communication orientation adopted by the Prague Circle. Saussure also linked this teleological, functional, communication-oriented approach to the human factor. For Saussure, the description of sounds is directly linked to the articulatory act. The articulatory act is based on two elements that are constant, necessary, and sufficient for the production of sound: expiration and oral articulation (augmented by superimposed vibrations of the larynx or nasal resonances). Thus, Saussurian phonology consisted of the paradigmatic classification of sounds according to their oral articulation and the hierarchical degree of aperture and the organs involved in producing them in a range from total stricture (occlusives) to partial and total opening (vowels) with varied degrees of stricture and opening between these extremes (fricatives, nasals, and liquids). Saussure also recognized the role of the distribution of sounds and the need to study sounds as part of a spoken chain taking the reciprocal relations of sounds into account as part of the study of phonology.

Despite the fact that Saussure predated the sound spectrograph by approximately four decades (and hence the Jakobsonian notion of acoustic distinctive features), his delimitations of sounds within the spoken chain is implicitly based on auditory impressions as well as articulatory movements and mechanisms. If the Saussurian sign was the invariable pairing of signal and meaning, the Saussurian phoneme was the fundamental pairing of the acoustic and the articulatory aspects of the signal. Moreover, for Saussure, oppositions were everything. Therefore, the importance of analyzing phonemes was for the oppositions they created in speech and not only the process through which these oppositions were obtained. Thus, we may view Prague School phonology as a natural extension of Saussurian phonology.

Prague School Phonology

The discipline of phonology was officially presented by three members of the Prague Circle, Roman Jakobson, Sergei Karcevski, and Nikolai Trubetzkoy, at the First International Congress of Linguists at The Hague in 1928. Their primary theses were aimed at distinguishing between the experimental methods of phonetics in observing the individual facts of *parole* and to concentrate on the more general and significant differences and correlations within the structure of the paradigmatic sound systems of *langue*. They outlined the goals of phonology as follows: (1) to establish phonological systems; (2) to account for their significant differences; (3) to find correlations;

(4) to formulate general laws concerning the structure of phonological systems; and (5) to account for historical sound change in terms of a teleological development of a diachronic system.

The Prague Circle concentrated more on the paradigmatic aspects of sound systems, much of the classic research published in the late 1920s and early 1930s in the *Travaux du Cercle linguistique de Prague (TCLP),* although some work was also done on syntagmatic relations related to both possible phonemic combinations and quantitative phenomena (functional load), particularly by Vilém Mathesius, (1929a, 1929b, 1931), who founded of the Prague Circle in 1926. An international conference on phonology was held in Prague in 1930 (whose proceedings were published in *TCLP IV* (1931) and an international committee for phonological research was established which included linguistic circles as well as individual linguists throughout Europe, extending Prague School phonology across international boundaries in France, Holland, Scandinavia, Germany, Austria, and other countries.

The Prague School phonologists differed from Saussure in that they questioned the absolute dichotomy between diachrony and synchrony on the sound level (Fischer-Jørgensen, 1995: 42) and placed the teleological–functional notion of communication at the forefront of phonological analysis, making it the *raison d'être* of phonology. For them, the task of phonology was to discover which differences in sound are related to differences in meaning and to determine how these discriminative elements are related to each other paradigmatically as well as uncover the rules by which they combine syntagmatically to create larger linguistic units such as words and sentences. The underlying force behind phonology as perceived by the Prague Circle is that we speak to be heard and understood, i.e., to communicate, and phonology is the science behind and serves as a reflection of the force of human communication (Jakobson, 1978: 24–25).

As a result of this strong communication basis of Prague School phonology, the notion of the **phoneme** as the minimal psychological and functional phonological unit (signifying distinctiveness or "mere otherness") (Sangster, 1982: 4) became the postulated theoretical abstract sound unit of *langue*. The mutual distinctiveness, or the systematic communicative oppositions between the phonemic units themselves, was then subsequently developed by both Trubetzkoy and Jakobson (as well as by subsequent phonological theorists) into binary and hierarchical articulatory and acoustic distinctive features. Distinctive features allowed for the functional and theoretical oppositions between the phonemic or abstract sound units themselves. These distinctive features – along with the secondary nondistinctive features of allophones – are realized during the speech act of *parole*, but only distinctive features are postulated as part of the abstract code of *langue*.

Distinctive feature theory is perhaps the best-known theoretical construct of Prague School phonology. It, too, like the phoneme and most structuralist concepts, may be viewed as an attempt to postulate abstract categories and constructs that will describe and explain as large and exhaustive amount of concrete linguistic data as possible. Both Trubetzkoy and Jakobson developed sets of 'natural' articulatory and acoustic distinctive features as part of the communication-centered structuralist theory and methodology underlying the work of the Prague Circle.

Trubetzkoy (1931a) postulated three natural classes for vowels (oppositions based on quality, resonance, and prosody) and four for consonants (oppositions of localization, manner of articulation, timbre, and intensity) based on the distinctive feature theory associated with Prague School phonology. For vowels, **the oppositions of quality** included aperture, timbre, rounding, and front versus back; **the oppositions of resonance** included nasalized versus non-nasalized, squeezed versus pure vowels; pharyngeal versus nonpharyngeal sounds; **the oppositions of prosody** included intensity (dynamic – accented versus nonaccented, weak versus strong; and quantity – long versus short, melody (pitch); tone movement and register; as well as oppositions of close contact (Baltaxe, 1978: 72–73). For consonants, **the oppositions of localization** included the different points or places of articulation; **the oppositions of manner of articulation** included voice correlation, correlations based on types of expiration (aspirated/unaspirated, glottalized/nonglottalized, and constriction correlation); **the oppositions of timbre** included palatalized/nonpalatalized, rounded/unrounded, emphatic palatalization/nonemphatic palatalization, emphatic velarization/nonemphatic velarization; retroflex/dental; **the oppositions of intensity** included dynamic (fortis/lenis, squeezed/nonsqueezed (*gedrängt/locker*), strong/weak) and quantity (long/short, geminated/nongeminated) (Baltaxe, 1978: 74–75).

With the advent of the sound spectrograph and subsequent advances made in the field of acoustics, Jakobson (and others) extended the theory of distinctive features to include the acoustic correlates of speech sounds (Jakobson *et al.,* 1952; Jakobson and Halle, 1956). These articulatory and acoustic features have been reduced to a stock of twelve universal binary oppositions which have been used subsequently to analyze the synchronic, diachronic, geographic,

developmental, and clinical phonological systems of individuals and groups representing a wide range of languages and language families. The first nine of these phonological oppositions represent **features of sonority** (similar to the features of quantity and force that are related to the amount and concentration of energy in the acoustic spectrum): vocalic versus nonvocalic; consonantal versus nonconsonantal; compact versus diffuse; tense versus lax; voiced versus voiceless; nasal versus oral; discontinuous (interrupted) versus continuant; strident versus mellow; and checked versus unchecked. The final three features represent **features of tonality** (similar to pitch features and related to the ends of the frequency spectrum): grave versus acute; flat versus plain; and sharp versus plain. Prosodic properties were also studied in detail by the Prague Circle phonologists as vocalic attributes and as features belonging to the larger unit of the syllable or as part of the syllable the mora.

The various feature systems developed by Prague School phonology were used to establish the diverse relationships of opposition that phonemes can have within different paradigmatic systems and syntagmatic contexts. The original distinction postulated for phonemes was one of **correlation** where a certain quality was either **marked** (present) (*merkmal*) or **unmarked** (absent) (*merkmallos*) in members of a number of pairs (such as voicing in the obstruents *p/b, f/v, t/d, s/z*, or vowel length *i/i:, a/a:, u/u:*). The features shared by correlative phonemes constitute an **archiphoneme** (such as the labial stop archiphoneme of *p* and *b* irrespective of the feature of voicing). Noncorrelative oppositions were called **disjunctions** (Jakobson, 1929).

Oppositions can either be **bilateral** or one-dimensional (having two members sharing a single opposition such as the voicing opposition of paired obstruents such as *p/b*), or **multilateral** or multidimensional (having three or more members such as the various places of articulation for a class of sounds sharing a common manner of articulation such as voiceless stops *p/t/k*). Oppositions can either be **isolated** or nonrecurring (such as *r/*) or **proportional** or recurring (such as *p/b, t/d, k/g*).

There are three types of relationships members of an opposition may have: **privative**, **gradual**, or **equipollent**, based on either the presence or absence of a marked/unmarked feature (such as voiced/unvoiced pairs like *p/b*) or the relative degree of the same marked feature (such as vowel height *u-o-(*), or two members are logically equal for the same feature (such as the shared unvoiced property of *p/t, f/k*). In addition, oppositions can be **constant** (both members can occur in the same environment such as voiced/voiceless obstruents in word initial position) or **suspendable** or **neutralized** (such as the neutralization of voicing in German and Russian word-final position where only voiceless obstruents can occur). Where neutralization occurs, it is those features common to both phonemes – the archiphoneme – which appears in its unmarked form which is neutral to the marked feature rather than only signifying its absence.

Another goal of Prague School phonology was the search for general sound laws developed across languages. The most famous of these are the **laws of irreversible solidarity** for the distribution of oppositions across languages, which are believed to be universal: e.g., (1) if a language has back consonants then it has front consonants; (2) if a language has fricatives, then it has homorganic stops; (3) if a language has affricates, then it has homorganic stops and fricatives; and (4) if a language has nasal vowels, then it has corresponding oral vowels. These general sound laws were confirmed by Jakobson's (1941) work in developmental and clinical phonology: (1) children acquire back consonants only after they acquire front consonants; (2) children acquire fricatives only after they acquire homorganic stops, (3) children acquire affricates only after they acquire homorganic stops and fricatives, and (4) children acquire nasal vowels only after they acquire corresponding oral vowels. Jakobson further maintained that the dissolution of aphasic language was the mirror-image of language acquisition: i.e., aphasics lose sounds in the reverse order from which they are acquired.

The Prague Circle viewed diachronic or historical changes in phonology as being related to and even determined by the phonological systems of languages (Jakobson, 1929; 1931a). This represents a teleological or therapeutic approach rather than a mechanistic approach to the establishment and maintenance of the equilibrium of phonemic systems in languages. Some of the processes of phonological change were: phonologization, dephonologization, rephonologization, change in the stock of phoneme combinations, a phoneme may be changed to a phoneme combination, and a phoneme combination may fuse into a single phoneme.

The Prague School phonologists dealt with geographic phonology in two basic ways: Trubetzkoy (1931b) distinguished between three kinds of dialect boundaries: etymological (different pronunciations of the same word within a common vocabulary; phonetic (different pronunciation of the same phoneme within a common phonemic system); and phonological (differences in the phonological system). Jakobson (1931b, 1936), on the other hand, demonstrated that language boundaries and phonological boundaries do not have to coincide, that is, certain phonological

features may be shared by genealogically unrelated languages found in close proximity which are not found in other more distant related languages. Groups of unrelated languages sharing specific phonological features constitute a *Sprachbund,* or a union of languages.

Roman Jakobson, and therefore Prague School phonology, laid the foundation for common laws of solidarity in synchrony, diachrony, developmental phonology, and clinical phonology. Later linguists such as André Martinet, William Diver, and others further sought explanations to explain the connections and the interrelationship between the phylogeny, ontogeny, and the pathology of the development of sound systems in human language in a principled way.

Prague School of Phonology and Beyond

André Martinet took the essentially Prague Circle's notion of the therapeutic view of sound change and further developed it into an explicit and sophisticated functional school of linguistic theory. This functional notion of therapeutic change (the striving for a balance or an equilibrium within the sound system of a language over time as a result of the conflict between the communication and human factors) is rather at odds with the traditional Saussurian synchrony/diachrony dichotomy because, similar to Jakobson and the Prague School, it implies that there is an underlying system in diachrony as well as synchrony in phonology. Martinet (1955) establishes the concept of the 'economy' of sound change in which economy basically refers to the principle of minimal or least effort. While the Prague Circle concentrated on the communication factor, Martinet focused on the human factor.

The introduction of the human factor into phonological analysis (even in the limited guise of Martinet's economy) has several far-reaching theoretical and methodological consequences for the structuralist paradigm: a respect for and reliance on 'real' (as opposed to contrived or totally introspective) language data; the potential importance of frequency counts involving statistics or quantitative methods of linguistic validation; and the need for 'external' (extralinguistic) support as a necessary control for linguistic explanations.

Martinet realized that explanation may not be language internal and that other external factors must also be appealed to. He views these external factors necessary for explanation as being 'historical' in nature rather than appealing directly to the human factor as a primary source for explanation or control. This may be explained by the fact that Martinet only began to incorporate the human factor into his analysis as a function of least effort: i.e., mostly limited to the 'minimax' principle of least effort employed to maintain maximum communication contrasts).

The communication factor adhered to by the Prague School was supplemented by the introduction of the human factor to phonology through the concepts of 'asymmetry' and 'economy of effort' in phonological change by Martinet. He maintained that phonological systems are arranged asymmetrically and changed in such a way that the nonrandom diachronic distribution of sounds reflects the search for equilibrium and harmony within the system as it is affected by the principle of least effort in human behavior. The principle of minimal effort postulated by Martinet implies that speakers strive for a minimal number of phonemes which requires the least amount of effort to be produced and combined in his therapeutic approach to sound change.

William Diver, of Columbia University (where both Jakobson and Martinet taught after World War II), further developed and expanded their ideas in the United States. Diver who basically accepted the Prague Circle's communicative orientation (the concept of the phoneme and the need to establish distinctive features both articulatory and acoustic) as well as Martinet's 'therapeutic' notion of 'economy' and 'asymmetry' (i.e., the inclusion of the human factor in phonological explanation), founded a theory of phonology called Phonology as Human Behavior which combines the communication and the human factors together. Diver (1979, 1995) maintained that there is a constant struggle between our need for maximum communication and our desire for minimal effort, also referred to as 'language synergy' (Tobin, 1990: chap. 3; 1997: 18–23). The communication factor (requiring a large number of maximally distinct linguistic units demanding a great deal of effort) will be in conflict with the human factor (striving for minimal effort), resulting in a synergetic trade-off or compromise between the two. Thus, language may be viewed as a constant struggle and search for maximum communication with minimal effort. This 'minimax' synergetic compromise between the communication and human factors is reflected in the fact that that there is a similar number (20–40) of phonemes of varied proportional degrees of difficulty acquired in a similar order in the languages of the world. Less than 20 phonemes would reduce the communication potential and more than 40 would be difficult to learn, remember, and produce. Therefore, Diver extended Martinet's more limited therapeutic diachronic view of the human factor to that of a means of explaining the nonrandom distribution of phonemes in language in coordination with the teleological needs of communication as originally established by Saussure and the Prague Circle.

Diver and his students also further developed the quantitative analysis of favored and disfavored distributions of phonemes which can be directly related to their degree of relative difficulty and for which additional empirical evidence can be provided by developmental and clinical data (Tobin, 1997) in a way similar to Jakobson (1941). Some of these general sound laws include: (1) Phonemes produced by the apex of the tongue – the most flexible, sensitive, and easiest to control active articulator – are the most numerous and frequent; have the highest functional load; are acquired early; and the process of fronting or apicalization (i.e., nonapical sounds are replaced by apical ones) are among the earliest and most common in first language acquisition and in the clinic; (2) Phonemes produced by the lips and the posterodorsum – which are relatively more difficult to control – are next in number, frequency, and functional load; are acquired both in early and later stages of language development; and the processes of labialization and backing (i.e., nonlabial and nonposterodorsal sounds are replaced by labial and posterodorsal ones) are less frequent, or even idiosyncratic, in first language acquisition and in the clinic; (3) Phonemes produced by the anterodorsum and the glottis – which are the most difficult to control – are the least in number, frequency, and functional load; are acquired relatively late; and the processes of glottalization and palatalization (i.e., nonglottal and nonanterodorsal sounds are replaced by glottal and anterodorsal ones) are among the least frequent, and are considered to be the most idiosyncratic.

The interaction between the human and communication factors is also reflected in the differences of the nonrandom syntagmatic distribution of phonemes in different word positions. Although consonants are more difficult to produce than vowels, the communication distinctions they create are clearer. Therefore, there are more consonants than vowels in all languages, and the most frequent syllable structure in language is CV(C). In word-initial position – where the burden of communication is the highest – there is an almost random distribution of consonants reflecting their different relative degrees of difficulty with a slight favoring of visual–labial phonemes which are perceived both aurally and visually. In word-final position – where the burden of communication is the lowest – there is a highly significant statistical preference for phonemes or clusters of phonemes requiring the least amount of effort to produce: e.g., vowels, or voiceless, apical consonants.

There seems to be a steady progression with regard to the structuralist distinction between phonetics and phonology. Saussure basically provided the notion of system, the abstract level of *langue* versus the concrete level of *parole*, diachrony versus synchrony, and a distinction between 'phonetics' (historical change) versus 'phonology' (the articulatory and acoustic features of sounds. The Prague School subsequently relegated the study of sounds on the concrete level (*parole*) to phonetics and established the new science of phonology to analyze the abstract sound systems of *langue*. This was achieved by introducing the teleological–functional–communication orientation to linguistics. This resulted in the development of modern phonemic analysis and the development of the concept of markedness and distinctive feature theory. Martinet continued this functional approach and began to recognize the role of the human factor as being a crucial part of phonological explanation through the therapeutic view of sound change from the point of view of economy. Diver's approach incorporates the previous work of Saussure, the Prague Circle, and Martinet, but it combines both the human and communication factors together.

Summary and Conclusions

The Prague School's distinction between the study of sounds on the level of *parole* and the investigation of sounds on the level of *langue*, that is, the distinction between phonetics and phonology, was a revolutionary advance in linguistic theory. Thus, the Prague Circle provided a more holistic and systematic approach to linguistic analysis at the expense of the distinction between synchrony and diachrony (at least in the field of phonology). The Prague School introduced the abstract notion of the distinctive phoneme to systematic phonological analysis, thus placing the teleological, functional, communication aspect of the sound system of language at the very forefront of linguistic analysis. This communicative orientation further paved the way for the development of distinctive feature theory as a more abstract, general, and, therefore, scientific method of distinguishing between sounds or phonemes. We may thus view Prague School phonology as the first example of a teleological, functional, communication-oriented structuralist approach to linguistics.

If we view most (if not all) of 20th century linguistics within the generalized theoretical and methodological framework of structuralism, the central role of the Prague Circle becomes clear. The Prague School gave the basic Saussurian tenets of language a theoretical and methodological framework and a direction and purpose. The study of language as an open and flexible system of human communication stratified into mutually interrelated levels and subsystems is the primary legacy of the Prague linguistic circle. Many view the contribution of the Prague Circle in

phonology as its crowning achievement. The Prague School synthesized and formalized the principles of Saussure, thus giving modern linguistics the theoretical and methodological foundation that served as the catalyst for all subsequent structuralist phonological studies within the last 60 years.

See also: Copenhagen School; Functional Discourse Grammar; Glossematics; Information Structure in Spoken Discourse; Phoneme; Jakobson, Roman (1896–1982); Saussure, Ferdinand (-Mongin) de (1857–1913); Sgall Petr (b. 1926); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Vachek, Josef (1909–1996).

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Structure and Structuralism: Semiotic Approaches

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The Term Structuralism

Structuralism designates a number of different tendencies in different disciplines and spans the entire 20th century. The term 'structuralism' is plurivocal: Several movements and trends have used this name, although they belong to different scientific fields and diverge on the theoretic and methodological levels. The term structuralism may be extended to a number of important schools of thought, including the Saussurean Geneva School (Bally and Sechehaye), the Moscow Linguistic Circle (Nikolaj Trubetzkoy and Roman Jakobson) and the Prague Linguistic School (Vilém Mathesius, Jan Mukařovský, and the same Trubetzkoy and Jakobson).

The Prague Linguistic Circle (founded on October 6, 1926) benefited from the participation of some Russian formalists and developed some of the most influential concepts in structuralism and semiotics. (From 1915 to 1916 Russian formalism gravitated around the Moscow Linguistic Center and the Society for the Study of Poetic Language in Saint Petersburg.) The Prague Circle considered verbal language as being irreducible to a code because language is multifunctional, and its structures are inseparable from dynamic and polysemic processes shaped by both intrinsic laws and external social factors. Natural language flourishes thanks to a great plurality of internal languages connected to differences in the social fabric, as well as to a great complex of special and specialized languages. To study natural language implies investigating the different verbal sign systems – including verbal art, i.e., literature – which are not conceived to be separate from nonverbal sign systems of the culture to which natural language belongs.

Another expression of the structuralist approach is Vladimir Propp's (1928) pioneering analysis of a corpus of Russian folktales. Furthermore, an important contribution to the development of structuralism in the Soviet Union was made by the Moscow-Tartu (Estonia) School between the early 1960s and the end of the 1980s, with its specific focus on semiotics of culture and linguistics. The most renowned representatives of the Moscow-Tartu School include Sebastian K. Shaumyan, Viacheslav V. Ivanov, Jurij M. Lotman, Isaak I. Revzin, Vladimir Toporov, and Boris Uspenskij. The term structuralism may also be extended to both American linguistic-cultural studies (associated with Edward Sapir) and formalistic and behavioristic linguistics (represented by Leonard Bloomfield and Zellig Harris).

We may employ the term structuralism to designate the taxonomic approach to verbal language in linguistics, validly represented by André Martinet's theory of double articulation (into monemes and phonemes) of verbal surface structure, as well as Noam Chomsky's generative grammar, which explains surface structure in terms of transformations in deep structure.

Structuralism also designates certain approaches developed in France such as Claude Lévi-Strauss's anthropology, Roland Barthes's semiology, and Algirdas Julien Greimas's semiotic theory.

Structuralism in general is an approach that explains its objects in terms of their connections and relations of dependency or of reciprocal determination. In this sense, structuralism draws on Ferdinand Saussure's thesis that *langue* is a 'form rather than a substance,' which it extends to semiotics. But a crucial element of differentiation among approaches influenced by Saussurean linguistics is the question of the relationship between synchronic connection and the diachronic processes of formation and transformation, i.e., between structure and history. For example, by contrast with the above-mentioned Geneva School, which opposed structure and process, synchrony and diachrony, and structure and dynamics, the French linguist Emile Benveniste considered the idea of contraposition between structuralism and the historic dimension to be untenable. A similar view was expressed by the Prague Linguistic School and Vladimir Propp. An analogous opposition between structure and dynamics was presented by 'generativist structuralism,' or dynamic structural generative linguistics, and supported by the Russian scholar Sebastian K. Shaumyan (1965).

Louis Hjelmslev, the Danish linguist and semiotician who founded the Linguistic Circle of Copenhagen with Viggo Brøndal in 1931, was deeply influenced by the Saussurean approach to signs and language. However, as much as Saussure was Hjelmslev's starting point for his formalized functional theory of language ('glossematics'), he then developed his own approach in original terms and autonomously. The structure of sign is specified in terms of interdependency between two planes, the **expression** plane and the **content** plane that correspond respectively to the Saussurean *signifiant* and *signifié*. But the Saussurean dichotomy is considered on the basis of a trichotomy figuring – in Hjelmslev's description – **matter** or **purport**, **substance** and **form**. 'Purport,' according to Hjelmslev, is an amorphous continuum "on which boundaries are laid by the formative action of language" (1953: 32–33). Any natural language

articulates the shapeless purport of expression and content in a given way. For instance, the human phonic material of purport is divided into different *figurae* (phonemes) by different languages, just as the continuum of the solar color spectrum is divided into different colors. Variables in the two planes are 'expression substance' and 'content substance,' which are articulated by 'expression form' and 'content form' so as to produce a sign in a specific expression substance (e.g., the acoustic material of a natural language) and in a specific content substance (e.g., the semantic content of a text). The structural semantics of Hjelmslev's glossematics opens up new prospects in semiotics – given its applicability to any sign system, verbal and nonverbal – as well as in the philosophy of language.

Structuralism in the Philosophy of Symbolic Forms

The term structuralism is also employed by the German philosopher Ernst Cassirer, whose most renowned contribution to semiotics is his definition of man as 'the symbolic animal,' instead of as 'the rational animal.' Much contemporary research has demonstrated the aptness of such a definition (see Morris, 1971: 402).

Cassirer's notion of structure is connected with his concept of form and with two concepts evidenced in his book of 1910, *Substanzbegriff und Funktionsbegriff*. The formation of concepts (*Begriffsbildung*) is presented in terms of function and form. In Volume I1, *Die Sprache*, of *Philosophie der symbolischen Formen* (1923), language is presented as form and the study of language is conceived as analysis of the functions generating linguistic form. But he adds another notion in his book of 1923: that of symbol. Thus form is 'symbolic form.'

The Kantian matrix of Cassirer's conception of language offers another perspective with respect to the structuralism of Chomsky's Cartesian linguistics. In his writings, Cassirer developed a perspective that may be characterized in terms of linguistic structuralism (see, in particular, his article of 1946 'Structuralism in modern linguistics'). However, unlike descriptive and taxonomic approaches in structuralism, Cassirer stated the need to evidence the formation process of the structure of language rather than stop at the study of preconstituted forms. Structural linguistics as elaborated in Cassirer's later writings may be defined as a dynamical theory in Shaumyan's sense: that is, a theory that does not identify the synchrony of language with statics, but rather concentrates on the dynamical aspect of the synchrony of language. With such a position Cassirer's theory is not only different from structural linguistics of the taxonomical type, but from Chomsky's theory of language as well.

Structuralism in Biosemiotics

Although structuralism is associated with a widespread movement in the human sciences, other areas of research may also be included in the structuralist enterprise, for instance, the mathematical theory of information, the morphogenetic theory of catastrophes developed by René Thom. Also well known is the biosemiotic doctrine of the 'functional cycle' described by the biologist, he too an Estonian, Jakob von Uexküll: this "pivotal model," this "simple albeit not linear, diagram," which "constitutes a cybernetic theory of modeling so fundamental that the evolution of language cannot be grasped without it" (Sebeok, 1994b: 122).

The '*Funktionskreis*' of Jakob von Uexküll's '*Umweltlhere*' (the term 'Umwelt' was introduced in 1909 to denote the subjective world of an organism) may be considered a structural model for the sign process and a basic structure for global semiosis. In the 'functional cycle,' a 'perceptual cue carrier' (*Merkmal*, i.e., signaling behavior) – produced by the 'objective connecting structure' (*Gegengefüge*, i.e., the *interpretatum*, orobject), and represented in the organism by a 'perceptual mark' (i.e., signaling disposition) – is translated by the interpretant sign into an 'operational cue carrier' (*Wirkmal,* i.e., behavioral disposition). This operational cue carrier triggers a behavior inflicting an 'action-mark' onto the 'connecting structure.' In other words, in the functional cycle, the *interpretandum* (that which must be interpreted) produced by the objective connecting structure effectively becomes an *interpretatum* and (represented in the organism by a signaling disposition) is translated by the interpretant sign into a behavioral disposition which triggers a behavior onto the connecting structure.

Concerning the different models of communication, the functional cycle and the other biological models that describe communication as a self-referential, autopoietic, and semiotically closed system (such as the model proposed by Maturana and Varela), are radically opposed to both the linear (Shannon and Weaver) and the circular (Saussure) paradigms. Uexküll's biosemiosic functional cycle has the feature of autonomous closure and therefore reacts dialogically to its environment only according to its internal needs. Consequently, the autopoietic system theory is not incompatible with the communicative process, but rather, with an oversimplified conception of communication as proposed both by the linear model, which describes communication as a linear

causal process moving from source to destination, as well as by the conversation model governed by the turning around together rule. As Maturana suggests, communication understood as a linear process from source to destination or as a circular process, in which the participants take turns in playing the part of sender and receiver, should be conceived as "pre- or anticommunicative interactions" (1978: 54–55).

The importance of approaches to the structures of sign process, which transcend the field of the human sciences is evident if we consider that semiosis is after all terrestrial biosemiosis. A pivotal concept in Thomas A. Sebeok's research (see 1991, 1994, and 2001) is the identification of semiosis and life. On one hand, semiosis is considered as the criterial feature that distinguishes the animate from the inanimate; on the other, sign processes have not always existed in the course of the development of the universe: sign processes and the animate originated together with the development of life. Identification of semiosis and life invests biosemiotics with a completely different role from that conceived by Umberto Eco (1975) when he refers to 'the inferior threshold of semiotics,' or from its more reductive interpretation as a sector of semiotics which, in his view, is a cultural science. In Sebeok's research, semiotics, as global semiotics, is interpreted and practiced as a life science.

Biosemiotic Structuralism and Dialogism

An important contribution to the understanding of communicative structure is given by dynamic and morphogenetic structuralism inspired by early 20th-century biology and the debate connected with the philososphy of vitalism. Self is implied dialogically in otherness, just as the 'grotesque body' (Bakhtin, 1965) is implied in the body of the other. In fact, dialogue and body are closely interconnected. Dialogism cannot be understood separately from the biosemiotic conception of sign. It is indicative that in 1926, Mikhail Bakhtin, for whom dialogue is the embodied, intercorporeal expression of the involvement of one's body with the body of the other (most adequately expressed by the image of the 'grotesque body'), authored an article entitled 'Contemporary Vitalism' (signed by the biologist I. I. Kanaev). In this article, Bakhtin discussed the biological and philosophical subject. Similar to the biologist Jakob von Uexküll and the development of his research, in Bakhtin too, we find an early interest in biology specifically in relation to the study of signs. Uexküll is named by Bakhtin in this article as one of the representatives of vitalism. In reality, Uexküll did not unconditionally undersign vitalism just as he remained constantly critical of conceptions of the behavioristic and mechanistic type. As he was to state in his book of 1934 (cf. Uexküll, 1967), he was not interested in how the organism-machine works but how the driver works. And Uexküll too was to find an explanation to life in the sign.

In 'Contemporary Vitalism,' Bakhtin's criticism of vitalism – the conception that theorizes a special extramaterial force in living beings as the basis of life processes – is directed against Henry Bergson and specifically against the biologist Hans Driesch. The latter stated the difference between life and non-life and interpreted the organism's homeostasis in terms of radical autonomy from its surrounding environment. On the contrary, Bakhtin, in his description of the interaction between organism and environment, opposes the dualism of life force and physical-chemical processes and maintains that the organism forms a monistic unit with the surrounding world.

In his works of the 1920s, Bakhtin criticizes both the vitalists and the reflexologists, as well as Freudianism and mechanistic materialism (specifically, the mechanistic view of the relation between base and superstructure), on the basis of a dialogic conception of the structure of body and sign and of individual consciousness and social dynamics. In Bakhtin's view, each of these different trends is vitiated by false scientific claims which underestimate the dialogic relation between body and world. This results in either dematerializing the living body or physicalizing it in terms of mechanistic relations. Bakhtin's reflection on sign and its dialogical structure is fundamental to his critique. Reference to the sign's dialogical structure contributes to an understanding of living and psychic structures and processes as well as of historical-cultural structural relations and dynamics, such as that between 'base and superstructure' understood in a Marxist sense, and generally interpreted mechanistically. In fact, another contribution for an adequate understanding of structural processes ensues from replacing both unilinear and conclusive mechanical dialectics with the dialogic model. Uexküll's research develops in the same way. For both Bakhtin and Uexküll the process under examination is a semiosic process. Though Uexküll does not use the dialogic model explicitly, we have seen above how it is central to his 'functional cycle.'

Criteria of Difference among Semiotic Approaches to Structure

First Criterion: Conception of the World to Which Structure Belongs

Semiotic approaches to structure and structuralism may be differentiated on the basis of our understanding

of the world – of the universe – to which structure belongs. Semiotics may either merely describe structures and the worlds they belong to, or may reflect upon the conditions of possibility of what Husserl calls 'the already-made-world,' the already-given, already-done, already-determined world. The second approach in semiotics is necessary to critical analysis of the world's current configuration, with a view to alternative planning. In this case, we may claim that semiotics carries out the overall task of what Edmund Husserl calls 'constitutive phenomenology.' As he shows especially in *Erfahrung und Urteil* [*Experience and judgment*], 1948, the aim of constitutive phenomenology is to clarify the entire complex of operations leading to the constitution of a possible world. To investigate how the world is formed means to deal with the essential form of the world in general and not with the effectively existent world. This means to investigate the modeling structures and processes of the human world not simply in terms of factuality, reality, and history, but also in terms of potential and possibility. Such an investigation is specific in the sense that it deals with a species-specific modality of constructing the world. In fact, unlike other animals, the human animal is characterized by its capacity for constructing infinite possible worlds. With Sebeok we may call the human modeling device of the world 'language.' Such a capacity exists uniquely in the human species, because, unlike all other species, only humans are able to construct not just a single world but innumerable real or imaginary, concrete or fantastic ones (cf. Sebeok, 1991a).

Second Criterion: Use of the Notion of 'Code'

Use of the notion of 'code' is symptomatic of differences in semiotic approaches to structure and structuralism. As anticipated, such difference depends on whether a given approach limits itself to merely describing 'the already-made-world' or, instead, reflects upon conditions of possibility. Paul J. Thibault (in the entry 'Code,' Bouissac, 1998: 125) illustrates how this ambivalent notion in semiotics can be used to denote (1) a set of shared rules of interpretation and (2) a 'meaning-making' potential. The first view coincides with a model of communication understood as transmission of information encoded by the sender and decoded by the receiver on the basis of a common code which is neutral, immune to interpretation, and sufficient for communication to come off successfully, what Rossi-Landi (1998 [1961]) ironically calls 'postal package model.' This model, says the entry 'Code,' derives from Saussure's dichotomy between code (*langue*) and individual use (*parole*). It also derives from the first generation of research in information theory (Shannon and Weaver, 1949) and cybernetics (Norbert Wiener, Ross Ashby) and was influential in the development of semiotics in the 1960s and 1970s. Eco (1976) referred to this conception of communication when he distinguished mechanistic communication systems from systems of signification.

The second model of code in semiotics maintains that code and medium have "a significant meaning-making potential" (Bouissac, 1998: 126). This implies that

> Code, in this view, is a semiotic resource – a meaning potential – that enables certain kinds of meanings to be made (in language, in the ways we dress, in our eating rituals, in the visual media, and so on) while others are not, or at least in that code. This view differs from the previous one in two important ways. First the internal-design features of the code – its grammar – have a significant potential for constructing meanings. . . . Second, there is no dichotomy between code and behavior or use (126).

According to the author of the entry 'Code,' representatives of this second view of code in semiotics are Bronislaw Malinowski (cf. Ogden and Richards, 1923), Gregory Bateson (1951), with his model of codification as a multilevel and hierarchical system of contextualizing relations, and Michael Halliday (1984).

The overcoming of the semiotic conceptions of structure connected to the notion of code as a mechanistic communication system, and the transition from communication semiotics to interpretation semiotics are inseparable from the 'rediscovery' of Peirce's semiotics in the 1970s, as results from Eco's book of 1976: indeed, all this is an expression of the confluence between Saussurean 'semiology' and Peircean 'semiotics' (a tendency to "ecumenicalism in semiotics," as says Sebeok, 1979: 61–83). Eco's research may be cited to demonstrate the fortune of the notion of code in the development of semiotics from the 1970s, as well as to evidence Peirce's influence on transformation. Eco's concern with Peirce's semiotics can be traced in his studies to the triadic relation between sign (representamen), interpretant and object, sign production, the mechanism of abduction, interpretation of the text and its relation with the reader, reformulation of the notion of code and of dictionary semantics in terms of encyclopedia, and of Peirce's notion of 'infinite semiosic process.'

In *The limits of interpretation* (1990) and in *Interpretation and overinterpretation* (1992), Eco revisits the question of openness (cf. 1962, 1990, 1992), in terms of 'unlimited semiosis.' In his recent book of 1997, Eco turns his attention to the question of the

Peircean notions of 'dynamical object' and 'ground.' But gradual distancing from Saussurean semiology, i.e., **ontological** structuralism (cf. his critical book *The absent structure*, 1968) – the idea of a binary relation between signifier and signified and between code and message – led Eco to assert the following as early as 1976 (in his paper on Peirce's notion of interpretant delivered at the Peirce Symposium on Semiotics and the Arts at Johns Hopkins University in Baltimore): "I want to make explicitly clear that my present approach has to be labeled *Peircist*" (quoted from Sebeok, 'Foreword,' in Capozzi, 1997: xiii).

According to Eco (1976), a code governs information transition from a source to a destination, but a code alone does not guarantee signification, since a connection cannot be established between (a) a set of signals ruled by internal restrictions of combination, and (c) a set of possible behavioral responses by the destination, without (b) any notion from a set of notions about the state of the world, which can become communicative contents. Systems (a), (b), and (c) are called 's-codes.' An S-code is "a system (i) in which every value is established by positions and differences and (ii) which appears only when different phenomena are mutually compared with reference to the same system of relations" (Eco, 1976: 38). As Proni says in his article (Posner *et al., Semiotik / semiotics* [hereafter *SS*], 2: 2314), Eco synthesizes "the Hjelmslevian and structuralist approach with Peirce's theory of interpretation" (*SS*, 2: 2314). In the words of the entry 'Eco' in *Encyclopedia of Semiotics*:

> In keeping with his trademark hybrid blend of Hjelmslevian and Peircean categories, Eco reduces the two continua of the expression and content planes of Hjelmslev to one continuum; the matter through which semiosis takes place. Semiotic interpretation involves the application of Peircean concepts to define the segmented portions of the continuum serving as sign vehicles for content segments (Bouissac, 1998: 222).

Consequently, another criterion of difference between the semiotic approaches to structure may be their belonging to 'semiotics of code or to 'semiotics of interpretation.

Third Criterion: Difference between 'Code Semiotics' and 'Interpretation Semiotics'

The expression 'code semiotics' alludes to a general model of sign according to which messages are formulated and exchanged on the basis of a code that is defined and fixed antecedently to the actual use of signs. And given that the code is based on a two-way correspondence between *signifiant* (or *signifier)* and *signifié* (or *significatum)*, it calls merely for decodification without involving the risks of interpretation. Code semiotics ensues from a limited interpretation of Saussure's research and reformulates the information, or mathematical theory of communication in terms of the Saussurean sender/receiver model (see Shannon and Weaver, 1949, and Jakobson's model of communication). We know that the Saussurean sign model is grounded in a series of dichotomous pairs comprising the notions of *langue* and *parole*, *signifiant* and *signifié*, diachrony and synchrony, and the syntagmatic and paradigmatic axes of a sentence. This dichotomous view of communication favors the connection between the Saussurean model and the mathematical theory of communication, and therefore, reformulation of this model in such terms as **code** and **message**, **transmitter** and **receiver**. This explains why semiotics of Saussurean derivation has been described as 'decodification semiotics' (Rossi-Landi, 2003 [1968]), or 'code and message semiotics' (cf. Bonfantini, 2004 [1984]).

This model appears ever more inadequate in the light of Peirce's 'interpretation semiotics' (but also Bakhtin's philosophy of language: see Augusto Ponzio, 'Semiotics between Peirce and Bakhtin, in Ponzio, 1990: 251–273), and of social-cultural transformations that tend towards new signifying practices that are intolerant of the processes of polarization between code and message and, in fact, weaken the code's hegemony over the multivoicedness and multiavailability of sign. Moreover, meaning in semiosic processes is inseparable from the work of translation carried out in the process of interpretation, to the point that, with Peirce, we may state that signs do not exist without another sign acting as interpretant.

Structure as '*a priori*' and Structure as 'Interpretive Process' in Semiosis

We may distinguish between two conceptions of structure: in the first case, structure is given *a priori* with respect to semiosis, to sign process or sign relation, which is reduced to codification and decodification; in the second case, structure (for example, in Peirce the triadic structure of sign, or of argument) is inseparable from the effective process of semiosis, that is, from interpretation which is what semiosis consists of.

As Sebeok observes in his article in *Semiotik / semiotics*, 'The evolution of semiosis', the Peircean description (Peirce, 1931–1966, *Collected Papers of Charles Sanders Peirce* [hereafter *CP*], 5: 473) of semiosis or "action of a sign," conceived as an irreducibly triadic process or relation (sign, object, and

interpretant), focuses particularly upon the way the interpretant is produced. Therefore it concerns "what is involved in understanding or teleonomic (that is, goal-directed) interpretation of the sign" (*SS*, 1: 436). In terms of Roland Posner's description mentioned above (*SS*: 1), semiosis calls for the action of something 'purposive.' *Signans* and *signatum*, or, in Saussurean terms, *signifiant* and *signifié*, are part of an irreducibly triadic sign structure.

Peirce himself underlines that the term 'representation' is inadequate to indicate the general reality of the sign. He avers that signs and sign processes are far better described in terms of 'mediation' (*CP* 4: 3), which presupposes the work of interpretation. The sign, more than 'represent' the object to the interpretant, mediates between the object and the interpretant. In other words, the semiosic function is best described in terms of 'mediation' (interpretation) rather than 'representation' (cf. *CP* 4: 3). While the expression *aliquid stat pro aliquo*, that is, 'something that stands for something else, describes the sign relation in dyadic terms, Peirce's definition evidences the irreducibly triadic structure of the sign relationship and places the condition for theorizing the movement of *renvoi* and transferral that characterizes it. Sebeok emphasizes this aspect of Peirce's analysis of sign structures and relations when he says:

> Peirce's definition embodies the core concept of *renvoi,* or transfer, Jakobson's compressed coinage (*Coup d'œil sur le développement de la sémiotique* [1975]) for the celebrated antique formulation, *aliquid stat pro aliquo*, but it contains one very important further feature. Peirce asserts not only that *x* is a sign of *y*, but that 'somebody' – what he called 'a *Quasi-interpreter*' (*CP* 4: 551) – takes *x* to be a sign of *y* (Sebeok, 1979: viii).

Not only is a sign a sign of something else, but 'somebody' a '*Quasi-interpreter*' (*CP* 4: 551) assumes something as a sign of something else. Peirce further analyzes the implications of this description when he says: "It is of the nature of a sign, and in particular of a sign which is rendered significant by a character which lies in the fact that it will be interpreted as a sign. Of course, nothing is a sign unless it is interpreted as a sign" (*CP* 2: 308). And again: "A sign is only a sign *in actu* by virtue of its receiving an interpretation, that is, by virtue of its determining another sign of the same object" (*CP* 5: 569). Semiosis considered from the point of view of the interpretant and, therefore, of sign-interpreting activity, or the process of inferring from signs, may be described in terms of **interpretation**. Peirce specifies that all "signs require at least two *Quasi-minds;* a *Quasi-utterer* and a *Quasi-interpreter*" (*CP* 4: 551). The activity of engendering the sign and that of interpreting it, that is, 'utterance' and 'interpretation,' are essentially interconnected by a relation of continuity and as such describe two faces of the same thought process – nor does the latter necessarily pass through the human brain. The Peircean sign model is today gaining wide consensus in both semiotics and the philosophy of language. It is gradually supplanting the model of semiosis understood mechanistically as codification and decodification – which because of the spread of Saussurean structuralism has extended its influence from linguistics (and semiology) to other human sciences.

Despite consensus around the Peircean sign model, the mechanistic model continues to be applied in semiotic and linguistic studies:

> Nevertheless, the mechanistic model retains a powerful hold on theories of human communication .... For Noam Chomsky, a generative grammar is a system of rules for relating signals to their semantic representations. Chomsky claimed that this pairing of signal and semantic representation corresponds to the idealized competence of the speaker-hearer. This competence specifies the underlying mental mechanism that makes this pairing process possible. This model continues to exert influence (Bouissac, 1998: 126).

Binarism and Triadism in Structuralist Semiotic Approaches

The difference in the structuralist conception between decodification semiotics and interpretation semiotics transcends the opposition between binarism and triadism. Saussurean/Hjelmslevian/Greimasian semioticians, on the one hand, and Peircean semioticians, on the other, do not represent two factions siding either with binarism or with triadism. The heart of the matter does not at all lie in the opposition between binarism and triadism. Instead, the pivotal issue is the opposition between semiotic models of structures that tend to oversimplify things with respect to the complex process of semiosis and semiotic models of structures, which would seem to do more justice to the various aspects and factors of the semiosic process. This is not merely achieved on the basis of an empty triadic form, but rather thanks to the specific contents, the specific categories forming the approach, the typology of sign it proposes, and the dynamic model of structure it offers on describing its objects. The sign model proposed by interpretation semiotics is constructed on the basis of such categories as Peirce's tripartite division of interpretants into 'immediate interpretant.' 'dynamical interpretant,' and 'final interpretant,' his subdivision of the object into 'immediate object' and 'dynamical object,' and his main triadic division of signs into 'symbol,'

'index,' and 'icon,' etc. All the same, it is not triadism that is essential, but the fact that Peirce places the sign in the dynamic context of semiosis (developing the concept of 'infinite semiosis'), and the dialogic relation to the interpretant. Considering such aspects, independently from the question of binarism or triadism, we may associate Peirce with Bakhtin and the former's fundamental notion of 'interpretation' with the latter's fundamental notion of 'answering comprehension.' The merit does not go to the triadic formula. Proof for this is offered by Hegelian dialectics in which triadism, abstracted as it is from the constitutive dialogism of sign life, gives rise to metaphysical, abstract, and monological dialectics. It is odd that in the entry 'Binarism' in *Encyclopedia of semiotics*, the author should propose Hegelian philosophy as a means of overcoming the theory of binary opposition in Lévi-Strauss's structuralism (cf. Bouissac, 1998: 81). Bakhtin, in his 1970–1971 notebooks (Bakhtin, 1979), gives a good explanation of how Hegelian monological dialectics is formed, showing how it is constructed artificially proceeding from a vital and dialogic sign context. In fact, the process consists in taking out the voices (division of voices) from dialogue, eliminating any (personal/emotional) intonations, and thus transforming live words into abstract concepts and judgments, so that dialectics is achieved in the form of a single abstract consciousness. Peirce himself also took a stand against the systemic skeleton of Hegelian analysis, against dialectics understood as a kind of hypochondriac search for an end, a search that is oriented unilaterally instead of being open and contradictory (on the relation between dialogue and dialectics in Peirce and Bakhtin, see Bonfantini *et al.*, 2000).

Monologism and Polylogism in Semiotic Approaches to Structure and Structuralism

The alternative in semiotic approaches to structure and structuralism is not between binarism and triadism, but between 'monologism' and 'polylogism.' Of course, we know that the Saussurean sign model is grounded in a series of dichotomous pairs comprising the notions of *langue* and *parole*, *signifiant* and *signifié*, diachrony and synchrony, and syntagmatic and paradigmatic axes of language. And certainly, this dichotomous view favors the connection between the Saussurean model and the mathematical theory of communication, and therefore, reformulation of this model in such terms as **code** and **message**, **transmitter** and **receiver**.

Signal Structure and Sign Structure

This explains why semiotics of Saussurean derivation has been described as 'decodification semiotics.' Despite their reductive character in relation to signifying and interpreting processes, such concepts as these were thought for quite some time to adequately describe all types of sign processes. They were employed to describe not only simple sign processes of the **signal** type relative to information transmission, but also sign processes of the complex type, the **sign**, in the strict sense, relative to human communication in its universality and in its different aspects. Signals are signs with the least semiosic consistency, that is, at the lowest level of semioticity. Signals presuppose a code, a system of rules with respect to which the relation between interpreted and interpretant is predetermined. But the signal is a constitutive component of signs in general more than just one type of sign. From this point of view, rather than use the term 'signal,' which suggests something separate from sign, 'signality' is more appropriate to indicate the lowest level of semioticity or **signhood**. For example, as much as the verbal sign is characterized by multivoicedness, it too contains a margin of signality. In other words, verbal signs are signals as well under certain aspects, so from a certain point of view, signs too present a univocal relation between interpreted and interpretant. With signality, signs are at the lowest level of interpretation, that of identification or recognition.

As we have proposed in earlier writings, the interpretant sign relative to the signal or signality may be called 'interpretant of identification.' In the case of verbal signs, for example, the interpretant of identification (a) permits recognition of phonemic or graphic contour, (b) identifies semantic content ('immediate interpretant' in Peirce's terminology; 'meaning' versus 'theme' in Bakhtin-Voloshinov's terminology), and, last, (c) identifies morphological and syntactic configuration. The relation of the identification interpretant to the interpreted is univocal and predetermined by a code, similarly to the relation between interpretant and interpreted in signals. But the signal component of the verbal sign does not characterize it structurally as a sign. For this reason, a structural description of the verbal sign limited to such aspects does not account for its specificity as a sign. In other words, like all other signs, except for signals, in *strictu sensu*, the verbal sign too is made of signality, but its structure is not reducible to the latter (cf. Ponzio, 1990 and 1993).

The limit of structuralism proposed by the semiology of Saussurean matrix is not determined by binarism. On the contrary, the limit is that binarism finds expression in the concept of equal exchange between

signifier and signified, in the reduction of complex sign life to the dichotomy between code and message, and consequently in the reduction of signhood to signality. Interpretation semiotics evidences the inadequacy of the sign model subtending decodification semiotics. No doubt 'rediscovery' of interpretation semiotics has been favored by new socio-cultural orientations arising from signifying practices that are intolerant of polarization between code and message, *langue* and *parole*, language system and individual speech. Such signifying practices flourish simultaneously to the weakening of centripetal forces in linguistic life and socio-cultural life generally, which privilege the unitary structure of code over the effective polylogism, plurilingualism, multiaccentuativity, and pluriavailability of signs.

Structuralism in the Generative-Transformational Approach

Similarly to the Saussurean model, the **Chomskyan** model is also dichotomous (competence/performance, surface/deep structure, innate rules/experience), but in this case too the limit of Chomskyan structuralism does not rest at all in the opposition between binarism and triadism. Chomsky's structuralist theory of transformational grammar studies rules of transformation from 'deep structures' to 'surface structures.' As demonstrated by Ponzio (cf. 1992 and 2004, this distinction (introduced in Chomsky, 1965), as well as the previous between 'nuclear' and 'non-nuclear sentences' (Chomsky, 1957), is connected with a very questionable conception of language and knowledge and with an equally questionable method of analysis.

Apart from previous criticism, his limits in linguistics inevitably emerge in the light of a Peircean and Morrisian approach to the study of signs. Chomsky sees no alternative to vulgar linguistic behaviorism (such as Burrhus Skinner's), other than appealing to the rationalistic philosophy of the 17th century, and taking sides with mentalism and innatism. That the Chomskyan conception of language should remain tied to the classical alternatives between consciousness and experience, and rationalism and empiricism, is not devoid of negative consequences for a theory of language, even with respect to such a specialized branch as is syntax. From this point of view, Chomsky's approach is alien to Kantian criticism as much as to the conceptions of Edmund Husserl, Peirce, Ernst Cassirer, Maurice Merleau-Ponty, Charles Morris, etc. Unlike Chomsky's dichotomy between linguistic competence and experience, in modern conceptions after Kant, experience is described as a series of interpretive operations.

These include inferential processes of the 'abductive' type (Peirce) through which the subject completes, organizes, and associates data, which are always more or less fragmentary, partial, and discrete. Experience coincides with these operations, as such, it is innovative and qualitatively superior by comparison with the limited nature of eventual input. After all, experience coincides with competence. What Chomsky (1986) baptized 'Plato's problem' ('how does complete competence derive from limited linguistic experience?') is a consequence of the false dichotomy between competence and experience and of the ensuing conception of experience as a passive state of the subject.

Morris's concept of syntactics as well as the notion of syntax which belongs to it are connected with semantics and pragmatics. Instead, Chomsky's syntax – as well as his phonology and semantics (morphology) – belongs to syntactics equated with syntax, as in Rudolf Carnap, and separated from semantics and pragmatics. As specified in the article 'Syntactics,' by Posner (*SS*, 1: 14ff), and in accord with Charles Morris's conception of the branches of semiotics (syntactics, semantics, and pragmatics), in linguistics, phonology, syntax (in the strict sense), and the morphology of natural language all fall under **syntactics**. With regard to the difference in this sense between syntactics and syntax, Posner observes:

> In many contexts, the Carnapian identification of syntactics with syntax (cf. Carnap 1934 and 1939) is highly misleading. Only in sign systems which do not require a distinction between morphology and syntax is it unproblematic to equate syntactics with syntax. This is the case in sign systems such as numerals and in most of formal languages constructed in logic so far (Posner *et al.*, 1997: Vol. 1, 21).

Posner distinguishes between three aspects of syntactics, which are all present in Morris (1971: 13ff, 23ff, 28f, respectively): syntactics, the study of formal aspects of signs; syntactics, the study of relations of signs; syntactics, the study of how signs of various classes are combined to form complex signs (cf. *SS*, 1: 14). A branch of syntactics, understood as the study of combination rules to form complex signs, is the study of combination rules in a sign system called 'string code.' An example of syntactics, says Posner, is Chomsky's transformational grammar which studies rules of transformation from 'deep structures' to 'surface structures' (cf. *SS*, 1: 30–37).

As demonstrated by Ponzio, Chomsky confuses levels of analysis and mistakes the description of the objects of analysis for the construction of the models of analysis. In this sense, unlike Rossi-Landi's (1998 [1961]) 'methodics of common speech' (see Ponzio,

1990) or Shaumyan's (1965) bigradual theory of generative grammar, Chomsky's structuralism is a unigradual structural theory which fails to distinguish between the **genotypical** (ideal) level and the **phenotypical** (empirical) level of structures. This is a serious limit in Chomskyan generative structuralism.

Chomsky's error is no different from that made by Oxonian analytical philosophy. Representatives of analytical philosophy claimed to describe ordinary, daily, or colloquial language in general. In reality, however, they described the characteristics of a given natural language. Confusion between two levels, the general and abstract level of language, on the one hand, and the particular and concrete level of a given language at a certain moment in its historical development, on the other, is recurrent – and not only in the Oxonian conception or in more recent language analyses inspired by the latter. Chomskyan generative grammar also mistakes the specific characteristics of a given language – yet again English – for the universal structures of human language. The untranslatability of sentences used by Chomsky as examples of his analyses is symptomatic of the problem we are signaling. The structuralistic transformational model proposed by Chomsky confuses elements which in reality belong to two different degrees of abstraction, ideal language, and natural language.

The Role of Interpretation in the Structural Dimensions of Semiosis

Furthermore, Chomskyan theory of linguistic structures denies the interpretive character of the syntactic component of linguistic competence and limits interpretation to phonological and semantic components alone. Consequently, Chomsky separates 'to **generate**' (which concerns relationships between 'deep structures' and 'surface structures') and 'to **interpret.**' He privileges syntax and considers it as an unfounded fundamental, an *a priori* conceived in terms of innatism, freeing it from interpretation and exempting it from the dialogic relation between interpreted and interpretant (see Ponzio, 2004: 42–44).

Thus, Chomskyan grammar with its methodologic suppositions and dualism between competence and experience and between deep structures and surface structures, would not seem to offer a suitable example of syntactics as understood by Posner and in accord with Morris's approach to semiotics.

Ponzio in various writings (1990, 2004) has proposed, as a branch of syntactics that studies combination rules applied to verbal form complexes, a 'structural interpretive linguistic theory' able to 'generate' (in Chomsky's sense) an utterance in terms of its relation to another utterance that interprets it, that acts as its interpretant. In fact, all utterances are engendered, that is, produced, identified, and characterized by their interpretants. According to this approach, the interpretant of a 'sentence' (the dead cell of a linguistic system) or, as we prefer, 'utterance' (the live cell of discourse) is not a deep structure grounded in underlying elementary sequences, but another verbal sign. An interpretant identifying an utterance or any verbal sign whatever is simply 'unexpressed' until the conditions are realized for its expression, its explicitation. We have introduced the expression 'identification interpretant' (cf. Ponzio, 1990) for this type of interpretant which (a) identifies the verbal sign in its phonemic or graphic features, (b) identifies the verbal sign in its semantic content, and (c) identifies the morphological and syntactic physiognomy of the verbal sign.

Given that the three structural dimensions of semiosis (syntactical, semantical, and pragmatical) are inseparable, the interpretant engendered by an utterance or any verbal sign whatever is not only an identification interpretant. It is also an 'answering comprehension interpretant,' which has a special focus on the pragmatical dimension of signs. Without the interpretant of answering comprehension, it is difficult, if not impossible, to recognize the sign at the level of phonemic or graphemic configuration, or morphological and syntactic structure, as well as semantic content. Just as Charles Morris highlighted the presence of syntactics in all aspects of signs, in the same way we must underline that meaning (i.e., the relation between interpreted and interpretant) is also present at the level of identification of the units composing words, phrases, utterances, and texts.

A Pioneer Bigradual Approach to the Genotypic Structures of Language

As stated, a fundamental limit evidenced by Sebastian Shaumyan in Chomsky's transformational model is that it confuses elements which in fact belong to two different degrees of abstraction, ideal language and natural language: Chomsky's model cannot be applied to a natural language different from that elected for his description. This led Shaumyan to contrast his own bigradual theory of generative grammar to Chomsky's unigradual theory: differently from Chomsky, Shaumyan distinguished between two levels of abstraction, genotypic language and phenotypic language.

With his pioneer book of 1961, *Significato, comunicazione e parlare commune* (new edition, 1998), which also anticipates Shaumyan's book *Strukturnaja linguistica* ('Structural linguistics,' 1965), Rossi-Landi much like Shaumyan also proposed a bigradual

approach to language. Rossi-Landi introduced the concept of 'common speech' to indicate operations carried out through speech, considered essential for successful communication among human beings, independently from the obvious complications arising in concrete reality. The assumption subtending this concept is that there exist basic similarities in the biological and social structure of all human communities, beyond all possible historical and geographical differences.

Common speech explains and justifies linguistic difference, variety, and multiplicity in terms of variety in expedients, solutions, and resources offered by each single language to satisfy the social needs of expression and communication common to all languages. And, of course, nothing is ever complete and definitive given that language is continuously developing and transforming. By contrast with those trends that conduct the multiplicity of languages to an *Ursprache,* or to the universal linguistic structures of logos or to a common biological structure, the notion of common speech does not neglect or underestimate what George Steiner (1975) indicated as 'the enigma of Babel,' which alludes to diversity and multiplicity among languages. Common speech as proposed by Rossi-Landi does not imply mythical unity at the origin of all languages, and even less unity of the human species by natural law. The notion of common speech proposes a model; in other words, it is a theoretical construction and not a *direct* description of real processes, though it refers to real processes.

By contrast with the concept of ordinary language developed by the analytical philosophers and the notions of competence and generative grammar proposed by Chomsky, common speech is a model with interpretive functions, a hypothesis to apply to different languages. In other words, rather than **describe** linguistic usage, common speech (or 'speaking') aims to develop a general model able to **explain** linguistic usage, and as such may be applied to all languages. In this sense, that which subtends linguistic usage is not mentalistic or ontologically pre-existent to natural languages in any other way: Rossi-Landi's model is the result of interpretive hypotheses and proposes a conceptual apparatus for the understanding of real linguistic phenomena. With his 'methodics of common speech,' Rossi-Landi's approach to the structural features of languages explains concrete linguistic usage in a given natural language (phenotypic level) in terms of his common speech hypothesis (genotypic level), whose validity increases the more it may be extended to different languages. Rossi-Landi himself guided us toward such an interpretation with the following statement from the foreword to the first edition of *Significato, comunicazione e parlare comune*:

> ... both the claim to a science of sign behavior of the biopsychological or sociological type and competition with the analytical and historical work carried out by glottologists on the facts of the various languages are excluded. It does not follow from this that what I wish to offer is some sort of theory or general doctrine, of the cognitive speculative type, as regards the phenomena under examination. Rather, I merely want to offer a structural background and make an attempt at clarification. To study the a priori in language does not mean to adopt a deductive aprioristic method. (Rossi-Landi, 1998 [1961]: 9)

This is the hypothetical-deductive method or more properly the abductive method, to evoke the Peircean concept of 'abduction,' which explains a given event on the basis of hypotheses concerning the general conditions that make that event possible.

'Critical Structuralism'

In a semiotic perspective we can connote structuralism as 'critical structuralism' insofar as it is concerned with the general conditions that make meaning and communication possible. 'Possible' is understood here in Immanuel Kant's sense and refers to the *a priori* in language, that is, the conditions that make facts possible, rather than the investigation of these facts. This point of view is emblematic of Rossi-Landi's research on the common structures of different natural languages, which he calls common speech (as we have seen). In fact, for Rossi-Landi, 'common speech' has a methodic function. In the light of this interpretation, the study of language is the search for a general methodology of language and of human speaking in its signifying capacity (cf. Rossi-Landi, 1998 [1961]: 158 ff:). Common speech evidences how language functions, signaling those operations that are inevitably performed when we speak. In relation to this aspect, Rossi-Landi's investigation is inspired by Kantian transcendental logic, which he reformulated. But, at the same time, common speech theory goes beyond Kant because it insists on what Kant left aside, that is, the transcendental character of language. Significantly, Rossi-Landi's rereading of Kant was filtered by Ernst Cassirer (in particular his 'Structuralism in modern linguistics'), the 'Kantian Peirce,' and the British analysts. The *a priori* lies in language. Common speech should not be reduced to "expressed linguistic" results, but rather concerns the "internal and hidden structure" of language (*ibid.*: 165).

This concept implicitly refers to the concept of '*innere Sprachform*,' borrowed by Cassirer from

Karl Wilhem von Humboldt and connected with the view of language as *energheia* rather than as product, *ergon*. We could maintain that Rossi-Landi takes an *ante litteram* critical stand against Chomsky's 'Cartesian linguistics' (the title of the latter's 1966 essay in which he attempts to assimilate Humboldt and Kant into his own perspective). Given that Chomsky's conception of language is not free of the classical alternatives 'consciousness/experience' or 'rationalism/empiricism,' his approach is alien to both Kantian critique and its surpassing by abstract rationalism and abstract empiricism.

We must remember that Peirce's semiotics is also connected with Kantian philosophy. In fact, he proposed a 'New list of categories' (*CP* 1:545–559), reinterpreting the *a priori* and the transcendental in linguistic and semiotic terms. Peirce's semiotics is explicitly anti-Cartesian and refuses the rationalism-empiricism dichotomy as unfruitful and abstract (cf. his essays of 1868, 'Questions concerning certain faculties of man' and 'Some consequences of four incapacities,' in *CP* 5:215–263, *CP* 5:264–317, respectively). For Rossi-Landi both the generic opposition of idealism to empiricism and of logico-linguistic inquiry to historicism in the study of the structural processes of signifying is inconsistent and arbitrary. He underlined the importance of Giambattista Vico's historicism for a critique of the Cartesian model of knowledge, which insofar as it was based on evidence and deduction, could not be applied to the historical or 'human' sciences.

Semiotic Structuralism in the Marxist Approach

Another important semiotic structuralist approach that should be mentioned in this overview is Karl Marx's 'protostructuralist' analysis of capitalist economic relations. We shall not refer to French Marxist structuralism (Louis Althusser, Lucien Godelier – the Marxist structuralism of Lucien Sebag, follower of Lévi-Strauss, is a 'discours à part'), but directly to Marx given that his approach is typically semiotic (see Ponzio, 1990: 174–188), even if we must connote it as 'criptosemiotic.'

The study of communication is pivotal in the Marxian critique of political economy. In fact, Marx analyzes commodities as messages and concentrates on explaining the "language of commodities" and the "commodity's arcanum" (see Marx, 1976, 1). As a result of this approach, his critique of political economy overcomes the fetishistic view of things according to which the relation among commodities appears as a natural relation among things and not for what it really is, that is, a specific type of relation among people. As such, Marxian critique is effectively a semiotic analysis which studies the structure of goods as messages not only at the level of exchange but also of production.

A commodity is a commodity not when a product is produced and consumed in its use-value but when it is produced and consumed as an exchange-value, that is, as a message. All this makes economics a sector of semiotics (see Rossi-Landi, 1975).

The structure of the market emerges as a structure of human relations, precisely, the human relations of social production. From this point of view, the Marxian approach to structure is exemplary for semiotics. It indicates that what Marx achieved in his analysis of commodities and capital we must achieve in anthroposemiotics: structures of relations among human individuals must be identified in the place of mere relations among things and individuals reduced to things.

Vice versa, the semiotic approach permits an appropriate use of the notions of structure and superstructure in a Marxist framework. In fact, recurrent difficulties in the study of the relations between structure and superstructure derive from the lack of a mediating element. This mediating element is provided by the totality of sign systems, verbal and nonverbal, operative in all human communities. The pieces in the game are not two, but three: to the modes of production and to the ideological elaboration of the superstructure must be added **sign systems**.

Intersemiotic Translation of Semiotic Approaches to Socio-Cultural Structures

In a semiotic perspective, the structures of nonverbal communication, i.e., the circulation of commodities and the structures of verbal communication, i.e., the circulation of messages, appear as different structures of the same social process, i.e., the communication process. "Man communicates with his whole social organization," writes Rossi-Landi (2003 [1968], Eng. trans.: 67).

This means that all cultural phenomena may be viewed as communicative phenomena based on sign structures and systems, and that human nonverbal communication must be placed alongside verbal communication. Every single cultural fact may be approached and understood as a message assembled on the basis of codes. Therefore, a general theory of society coincides with general semiotics (cf. Eco, 1968). 'The study of any sign-system becomes useful for the study of any other [...] especially because, in studying one system or the other, what one studies is *fundamentally the same thing*' (ibid.: 69).

This becomes clearer when we consider that in the case both of verbal and nonverbal messages semiotics addresses the same problems – the work that produces them and that makes exchange and communication possible. For example, Claude Lévi-Strauss (cf. 1958) used the categories of linguistics in his studies on the rules of matrimony and kinship systems, offering a truly formidable example of the application of conceptual frameworks elaborated in relation to verbal communication to nonverbal communication. Rossi-Landi (2003 [1968]) attempted the opposite procedure: he applied categories elaborated in the study of nonverbal communicative sign structures, that is, the categories of economics in its classical phase with David Ricardo and Marx, to verbal language.

Ontologic and Methodologic Structuralism in Semiotics

All the same, there exists a substantial difference between the approach adopted by Lévi-Strauss and that by Rossi-Landi to problems of communication: it is an example of the difference between ontologic structuralism – criticized by Eco in his book *La struttura assente* ('The absent structure,' 1968) – and methodologic structuralism.

Lévi-Strauss's reasoning is questionable when he justifies his application of categories proper to language to his studies on nonverbal communication in terms of 'recurrent hymns to the *esprit humain*.' This implies reference to a universal unconscious activity and universal structures of the *esprit humain*. As Eco explains, some texts by Lévi-Strauss appeal to "a fundamental combinatory principle at the basis of all codes [...]," to "an elementary mechanism rooted in the functioning of the human mind [...]." Thus the universe of social relations, myths, and language, becomes "the setting for a game which takes place behind man's back and in which he is not involved, if not as an obedient voice which lends itself to expressing a complicated game which surpasses and annuls him as a responsible subject" (296). In other words, human individuals do not determine their own relations; on the contrary, they are 'related' passively according to the universal laws and structures they obey.

Instead, Rossi-Landi recognized human beings as the concrete subjects of history, the responsible agents of culture and communicative systems, which enabled him to formulate his thesis of the **homology** between verbal and nonverbal communication. Linguistic work and nonlinguistic work necessary to the production of physical objects may be placed on the same level. "If we don't want to admit that something *human* can exist for man without the intervention of man himself, we must adhere to the principle that every wealth or value, however understood, is the result of a work that man has performed and can repeat" (Rossi-Landi, 2003 [1968], Eng. trans.: 36).

A global structural semiotic approach must explicate the human being's specific dual character as *loquens* and *laborans*, i.e., the recognized fact that human beings are constructed historically through the production of tools and verbal messages. Methodological structuralism is connected with a homological method which enables us to formulate a unitary definition of the human being as a speaking and working animal, such that these two modes of social behavior are considered homologous.

This structural homology between material and linguistic production throws light on the concept of double articulation in language as described by André Martinet (1960). Transition from the articulation of sentences into words and monemes to the articulation of monemes into phonemes proves to be oriented in the opposite direction from the real processes of linguistic production (cf. Rossi-Landi, 2003 [1968], Eng. trans.: 119–121, 158–159). Speakers carry out linguistic work – phylogenetically and ontogenetically – proceeding from sounds that are initially disarticulate, but that are subsequently articulated into words, phrases, and sentences of increasing complexity. The structural theory of double articulation assumes that language is no more than a formal machine, while neglecting the facts of experience and the needs upon which linguistic behavior depends. It puts aside the problem of the generation of meaning and use of sentences, limiting its approach to describing their constituent parts. With Rossi-Landi we may observe that when we analyze or 'order' (as Martinet says) sentences into words and monemes and monemes into phonemes, we are not saying anything about 'semantic content' which is 'added' at the level of sentences, as opposed to the level of monemes and words, and at the level of monemes as opposed to the level of phonemes. Nothing is said about the human operations through which semantic content is produced. The work of analyzing sentences into words and monemes, and monemes into phonemes, is abstract analytical work that has very little to do with the social linguistic work through which the objects studied by the linguist are originally formed. Nor must abstract analytical work be mistaken for social linguistic work.

An interdisciplinary semiotic approach, or an intersemiotic translation of different approaches to social structures in different fields is favored by a homological scheme for linguistic production, as proposed by Rossi-Landi (cf. ibid.: 118–152). Unlike 'double

articulation theory,' the latter is potentially interdisciplinary because it is intentionally **pre**disciplinary. To refer to a precategorial level with respect to the categorial 'already-made-world' means to question the idea of science as something that has already been formed and defined and to criticize scientific specialization when it loses sight of the human needs for which it was originally developed.

The Human Being's Structuralist Approach as a Semiotic Animal

Any scientific approach considers the world – reality – as being in constant movement and transformation and, in view of this, formulates its hypotheses and laws. The formulation of laws is possible because movements and transformations present constants, states of balance, and systematic and essential aspects, which belong to 'reality,' or the 'world.' This balance or stability in phenomena and in relations among the elements of reality (in organic or inorganic nature and in culture) together with relatively autonomous and isolated systems of elements have an objective existence and consequently constitute the potential objects of our knowledge. Therefore, we must discover and determine not only the laws of the dynamics of movement and development in reality, but also the structural laws of relatively isolated systems in relative balance. We must study the structures of dynamics and the dynamics of structures. Not only is the study of both types of law founded, but such a complementary study contributes to a global image of reality. If we wish to study the (genetic, causal) laws of something's development, we must establish what this 'something' is; and, therefore, it becomes necessary to know the laws of its structure (coexistent, morphologic structure). This gradual knowledge of structure is just as essential as knowledge of the genesis and development of the objects under study.

This is why knowledge of coexistential, morphologic laws is among the most ancient in human history: it dates backs to when human beings learned to differentiate between a plant and another, an animal and another, that is, when they learned to articulate reality on the basis of the capacity to recognize signs, to identify coexistent features which differentiate things. In this sense, as a semiotic animal, the human being is also, as maintains the Polish philosopher Adam Schaff, a 'structuralist animal.' Structuralism is not only the trend of a semiotician, but also of humans as humans.

See also: Anthroposemiotics; Biosemiotics; Body Language; Indexicality: Philosophical Aspects; Indexicality: Theory; Linguistic Anthropology; Semiotics: History; Significs: Theory; Social Semiotics.

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Structures and Processes

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If one wants to capture the properties of a complex object, it is necessary to specify the relations between the elements of which it consists. The sum of these relations is called the structure of the object.

In linguistics, words, sentences, and even entire discourses and texts are thought of as structured objects. Structures are used to specify the internal organization of linguistic objects at every level of description, be it phonological, morphological, syntactic, semantic, or pragmatic. For example, the string *A child broke a window* may be assigned the constituency structure in (1), which assigns a label to individual words and specifies how they are grouped together, a semantic structure along the lines of that in (2), and a prosodic representation like that in (3), where ω represents a prosodic word, Φ a prosodic phrase, I an intonational phrase, and U an utterance.

(1)

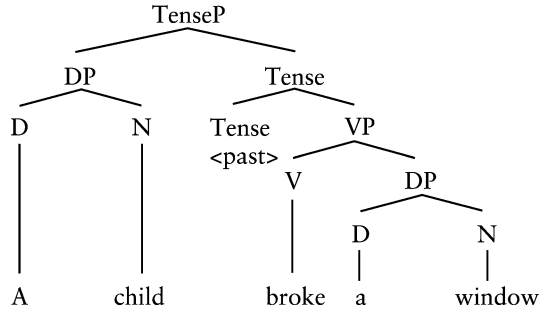

(2) past(break(child21,window45))

(3) $[_U[_I[_\omega$ a child$]$ $[_\Phi[_\omega$ broke$]$ $[_\omega$ a window$]]]]$

Structures are also used to express the internal syntactic, semantic, and phonological properties of words. For example, the verb *break* specifies an event in which *x* causes *y* to enter some state, which might be expressed by a lexical semantic structure as in (4), where each lambda-bound variable represents a semantic role.

(4) break: λy λx CAUSE(x,STATE(y))

The internal phonological structure of the word *window* could be represented as in (5).

(5)

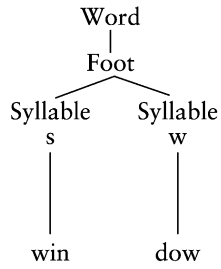

A linguistic process can be thought of as an operation (or rule) that maps one linguistic structure to another. For example, many linguistic theories formalize passivization as a process that changes the way in which a verb's semantic roles (such as Agent and Patient) are mapped onto syntactic structure.

Similarly, processes may affect semantic structures in various ways. For example, the process of suppression can map the semantic representation of the transitive verb *break* in (4) into the one-argument variant in (6), which corresponds to the semantics of *break* in example (7).

(6) break: λy $\exists$x CAUSE (x,STATE(y))

(7) The window broke.

Structures and processes stand in an intricate relation to each other. It is natural to think of a process as being triggered by certain signature properties of a representation; in the absence of these properties, the process cannot apply. For example, because passivization promotes an OBJECT to a SUBJECT, it cannot apply to a verb like *sleep* that lacks an object to begin with:

(8) John slept.

(9) *There was slept.

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Structures and Processes

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If one wants to capture the properties of a complex object, it is necessary to specify the relations between the elements of which it consists. The sum of these relations is called the structure of the object.

In linguistics, words, sentences, and even entire discourses and texts are thought of as structured objects. Structures are used to specify the internal organization of linguistic objects at every level of description, be it phonological, morphological, syntactic, semantic, or pragmatic. For example, the string *A child broke a window* may be assigned the constituency structure in (1), which assigns a label to individual words and specifies how they are grouped together, a semantic structure along the lines of that in (2), and a prosodic representation like that in (3), where ω represents a prosodic word, Φ a prosodic phrase, I an intonational phrase, and U an utterance.

(1)

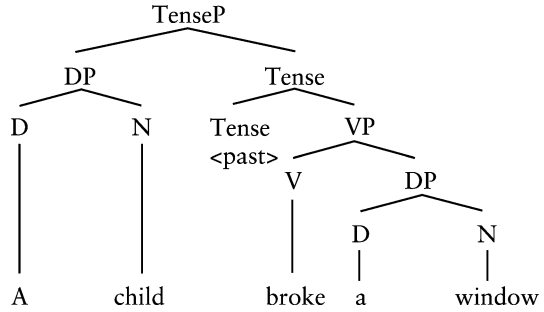

(2) past(break(child21,window45))

(3) $[_U[_I[_\omega$ a child$]$ $[_\Phi[_\omega$ broke$]$ $[_\omega$ a window$]]]]$

Structures are also used to express the internal syntactic, semantic, and phonological properties of words. For example, the verb *break* specifies an event in which *x* causes *y* to enter some state, which might be expressed by a lexical semantic structure as in (4), where each lambda-bound variable represents a semantic role.

(4) break: λy λx CAUSE(x,STATE(y))

The internal phonological structure of the word *window* could be represented as in (5).

(5)

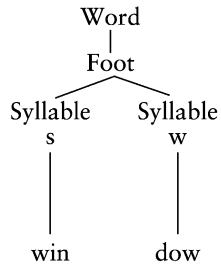

A linguistic process can be thought of as an operation (or rule) that maps one linguistic structure to another. For example, many linguistic theories formalize passivization as a process that changes the way in which a verb's semantic roles (such as Agent and Patient) are mapped onto syntactic structure.

Similarly, processes may affect semantic structures in various ways. For example, the process of suppression can map the semantic representation of the transitive verb *break* in (4) into the one-argument variant in (6), which corresponds to the semantics of *break* in example (7).

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(8) John slept.

(9) *There was slept.

For this reason, linguistic processes are often formalized as a pair, consisting of a structural description and a structural change. Modern constraint-based theories have replaced this kind of formalization by a more modular approach in which very general operations are kept in check by a collection of abstract principles.

A final word of caution. Generative linguists take linguistic structures to be mental objects and assume that these structures are formed and modified by linguistic processes of some sort. However, because linguistic theories generally abstract away from actual language processing, it is an open question to what extent linguistic processes are a direct reflection of mental computation.

See also: Levels of Adequacy, Observational, Descriptive, Explanatory; Rules and Principles.

Sturge–Weber–Dimitri Syndrome and Language

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The association of cerebral leptomeningeal angioma and facial nevus flammeus in the territory of the first branch of the trigeminal nerve ipsilateral to the angioma is known as Sturge–Weber syndrome (SWS). The cases with absence of a facial angioma are usually considered to be variants of the syndrome. This is a rare congenital neurocutaneous syndrome of unknown origin that occurs in both sexes with a frequency of approximately 1 per 50 000 (e.g., Comi, 2003). Sturge first described this disorder in 1879. In 1922, Weber described a similar clinical case and advocated the use of the term 'encephalotrigeminal angiomatosis' to describe it. It is characterized by leptomeningeal angiomatosis, glaucoma, and ipsilateral facial capillary hemangioma (port-wine stain) in the ophthalmic division of the trigeminal nerve (Aicardi, 1992). The facial nevus flammeus is present in 98% of children with SWS and it is visible at birth (Sujansky and Conradi, 1995b). It usually affects the upper eyelid and the forehead. The stain is caused by an overabundance of capillaries just beneath the surface of the affected skin. The angioma is typically located on the parietal and occipital lobes. It has been suggested that the angioma results from the failure of the primitive cephalic venous plexus to regress and properly mature in the first trimester of development (Comi, 2003). Normally, this vascular plexus forms in the sixth week and regresses at approximately the ninth week of gestation.

SWS is also characterized by neurological manifestations, which include focal or diffuse seizures (Kramer *et al.*, 2000), abnormal cerebral glucose metabolism (Lee *et al.*, 2001; Maria *et al.*, 1998; Pfund *et al.*, 2003; Pinton *et al.*, 1997), enlargement of the choroid plexus (Guermazi *et al.*, 2000), progressive atrophy and calcification of the brain (Comi, 2003; Jay, 2000; Shamoto and Chugani, 1997), and recurrent stroke-like episodes (see Thomas-Sohl *et al.*, 2003, for a review of clinical symptoms and management). Hemianopia, progressive hemiparesis, motor deficits, developmental delay, and mental retardation are other dysfunctions associated with this neurological disorder. Mental retardation is present in approximately 50% of children with SWS (Sujansky and Conradi, 1995a) and clinical severity of signs and symptoms varies widely from one patient to another (Maria *et al.*, 1998).

It has been hypothesized that two main complications of SWS may explain the progressive neurological deficits associated with the disorder: the occurrence of seizures and cerebral ischemia. Thus, repeated seizure activity is associated with developmental delay, permanent hemiparesis, and mental retardation. In addition, venous stasis and recurrent episodes of venular thrombosis may be responsible for neurological deteriorations (cerebral calcification, gliosis of the cortex and white matter) and postnatal hemispheric atrophy (Comi, 2003; Kramer *et al.*, 2000; Portilla *et al.*, 2002).

Epilepsy affects over 80% of the children with SWS (Sujansky and Conradi, 1995a; Ville *et al.*, 2002). In a majority of children, onset occurs during the first year of life. Of the children who did not develop seizures during their first 2 years of life, only 14% developed seizures subsequently. It has been suggested that onset of seizures during the first 2 years of life and the presence of uncontrollable seizures are responsible for the developmental deterioration of previously normally functioning children with SWS (Roach, 1992). Thus, according to Sujansky and Conradi (1995a), later age of seizure onset is a favorable prognostic indicator. Contrary to these observations, Kramer *et al.* (2000) showed that cognitive delay is significantly correlated with seizure intensity, rather than the age of onset.

When seizures are unihemispheric and intractable to medication, hemispherectomy is strongly

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When seizures are unihemispheric and intractable to medication, hemispherectomy is strongly

recommended. This type of surgery is used in an attempt to control seizures and to prevent neurological deterioration (Kossoff *et al.*, 2002). Generally, bilateral angiomatosis is a contraindication to epilepsy surgery because a more diffuse region of epileptogenesis, which is not resectable, is more probable and the seizure prognosis may thus be unfavorable (Arzimanoglou *et al.*, 2000; Roach *et al.*, 1994). Nevertheless, according to some authors, epilepsy surgery in SWS should not be used too restrictively (Tuxhorn and Pannek, 2002). Tuxhorn and Pannek presented two bilateral cases of SWS that showed good seizure control and remission of epileptic encephalopathy after functional hemispherectomy.

Language development in SWS has not been well studied. Nevertheless, a few case studies have shown that language impairments associated with this syndrome result principally from epilepsy and following hemispherectomy. Vargha-Khadem *et al.* (1997) described the case of a 9 year old boy diagnosed with SWS affecting the left hemisphere, in which seizure activity is the cause for arrested speech development. This boy, named Alex, experienced his first epileptic episode 6 days after birth. Despite having normal hearing, Alex did not develop speech, and his utterances, at 33 months of age, were still limited to babbling. Furthermore, his intellectual development was globally delayed. Between the ages of 4 and 8 years, Alex attempted to communicate with gestures. At age of 8 years 6 months, Alex underwent a successful left hemispherectomy. Interestingly, 10 months after surgery, Alex suddenly began to develop speech and, by age 10, could converse with copious and appropriate speech. This child achieved remarkable linguistic competence with an isolated right hemisphere and he speaks clearly and fluently with grammatically correct sentences. However, in the domain of receptive language, Alex showed poor comprehension of more complex grammatical sentences, as assessed by the Token Test (De Renzi and Vignolo, 1962) and the Clinical Evaluation of Language Functions-Revised (CELF-R; Semel *et al.*, 1987). Other cognitive dysfunctions have been noted in Alex's case, such as reading, writing, and arithmetic. At age 13, his performance in these cognitive areas was still at the basal level (i.e., <6 years).

Mariotti *et al.* (1998) described the linguistic abilities of a woman with SWS who underwent early removal of her left hemisphere, at age 3. Extensive assessment of her linguistic abilities was conducted when she was 20. In contrast to Alex's case, her performance, when compared to mentally retarded controls matched for age, education, and IQ, showed fluent spontaneous speech with intact pragmatic abilities, normal articulation, prosody, and phrase length, and grammatically correct sentences. Reading and writing on copy were also normal, although writing on dictation was slightly impaired. As in Alex's case, however, she showed a marked impairment in more complex syntactic comprehension of sentences, low IQ, and poor memory span.

These observations in the case of SWS and hemispherectomy indirectly suggest a necessary integrity of the left cerebral hemisphere to adequately process morphosyntactic aspects of language. However, not all authors agree with this interpretation on the issue of cerebral hemispheric specialization of function (e.g., Bishop, 1988; Mariotti *et al.*, 1998; Vargha-Khadem *et al.*, 1997). Rather, they attribute the observed deficits to a low IQ and limited verbal memory span in children with SWS. Mariotti *et al.* (1998) suggested that failure of syntactic tasks could be merely the expression of a generic cognitive impairment (such as poor lexical knowledge) and not of specific linguistic damage. Thus, it is unclear whether the language dysfunction seen in SWS can be ascribed to a low IQ and poor working memory.

See also: Anatomical Asymmetries versus Variability of Language Areas of the Brain; Language in the Nondominant Hemisphere; Language Development: Overview.

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Sturtevant, Edgar Howard (1875–1952)

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Edgar H. Sturtevant was born in Jacksonville, Illinois. He studied at the University of Chicago (receiving his Ph.D. in 1901 with a dissertation on Latin case forms) and later became an assistant professor of classical philology at Columbia University in New York. In 1923 he joined the linguistics faculty at Yale University, which soon acquired a reputation in the United States for its strong linguistics program. In 1924, he was a member of the organizing committee for the founding of the Linguistic Society of America (LSA), in which Leonard Bloomfield and George M. Bolling actively participated.

Sturtevant played a major role at the Linguistic Institutes in the promotion of the study of phonetics, research on Native American languages, and field work on the Modern American English dialects.

Most of Sturtevant's works focus on historical linguistics and classical philology. When it was speculated that the Hittite language (ca. 2000 to 1200 B.C.) was related to the Indo-European language family, Sturtevant became especially absorbed in the investigation of its genealogy. In this endeavor, as was customary at the onset of modern scientific linguistics of that time, the recovery of prehistoric linguistic systems and regularity of linguistic change were sought by the comparative method. His first major paper on this subject was 'On the position of Hittite among the Indo-European languages,' published in *Language* (1926). His position was that Hittite exhibits more archaic traits than the normally reconstructed forms for Indo-European, and hence both Hittite and Indo-European have an earlier common ancestor stage, namely, Indo-Hittite. On the other hand, it was shown that Hittite could be grouped into the Indo-European family after it was demonstrated by Kuryłowicz in 1927 that the language preserved distinct reflexes of the segments postulated in de Saussure's internal reconstructive hypothesis. Sturtevant dedicated himself to the phonological and morphological investigations of the Hittite language.

It should be stressed that while most linguists in the United States at that time were students of historical philology, Sturtevant was a significant figure who contributed to the shift from historical to non-historical

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linguistics in the United States. This position is already visible in his earlier publication, *Linguistic change* (1917). Sturtevant discusses the relation of speech and writing: "[i]n the experience of most of us conversation is trivial and ungrammatical, while written language has some value and is usually correct. . . . As a matter of fact, however, whether we think of the history of human speech in general or of the linguistic experience of the individual speaker, spoken language is the primary phenomenon, and writing is only a more or less imperfect reflection of it." For Sturtevant, linguistics was a discipline that primarily deals with spoken language. It should be noted that de Saussure's distinction between diachrony and synchrony was also being introduced in Europe at that time. In recognition of his contribution to historical linguistics Sturtevant was elected LSA president for 1931.

See also: Hittite; Saussure, Ferdinand (-Mongin) de (1857–1913).

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Style

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> Thanks to words, we have been able to rise above the brutes; and thanks to words, we have often sunk to the level of the demons.
>
> Aldous Huxley, *Adonis and the alphabet*, 1956 (John Gross, 1987: 280).

The Etymology of the Word 'Style'

Etymologically, the word 'style' derives from Latin *stilus*, originally meaning an ancient writing instrument made of metal, wood, or bone. It had a sharp-pointed end for scratching letters on a wax tablet and a blunt end for erasing them; in obsolete English, it was a 'style.' (This spelling with [y] is due to the erroneous notion that it represents the Greek word *stûlos*, meaning 'column.') In an endearing piece on how children should be taught how to write, Quintilian (c. 35–c. 95 A.D.) says:

> As soon as the child has begun to know the shapes of the various letters, it will be no bad thing to have them cut as accurately as possible upon a board, so that the pen (*stilus*) may be guided along the grooves. Thus mistakes such as occur with wax tablets (*ceris*) will be rendered impossible; for the pen will be confined between the edges of the letters and will be prevented from going astray (*Institutio oratoria*, 1920: I.I.27).

The *Oxford English dictionary* has this 14th-century entry: "Seinte Barnabe his body was found in a den . . . with Þe gospel of Mathew Þat he hadde i-write wiÞ his owne stile." (Note the etymologically correct spelling.)

Considering its present-day widespread usage in all kinds of contexts of everyday life, this restricted meaning of 'style' must have gone through a remarkable semantic development. The successive steps in this development are likely to have been the metonymical extension from 'an instrument for writing' to 'a manner of writing,' first in the literal sense of 'a writer's characteristic way of shaping letters,' and next in the figurative and deeper sense of 'a writer's characteristic mode of expression in terms of effectiveness, clarity, beauty and the like.' Though in the five canons of classical Latin rhetoric (see below) style is termed *elocutio*, the metonym *stilus* is also regularly used in the same sense. For instance, in *Brutus*, Cicero (1939) says about the orations of a certain Gaius Claudius that they are so splendid 'that they would seem almost to have been written by an Attic pen' (*ut paene Attico stilo scriptae esse videantur*) (XLV.167). From the context it is obvious that '*Attico stilo*' means here 'in Attic style.' Of course, the translator's word 'pen' is also a metonym for 'a particular

linguistics in the United States. This position is already visible in his earlier publication, *Linguistic change* (1917). Sturtevant discusses the relation of speech and writing: "[i]n the experience of most of us conversation is trivial and ungrammatical, while written language has some value and is usually correct. . . . As a matter of fact, however, whether we think of the history of human speech in general or of the linguistic experience of the individual speaker, spoken language is the primary phenomenon, and writing is only a more or less imperfect reflection of it." For Sturtevant, linguistics was a discipline that primarily deals with spoken language. It should be noted that de Saussure's distinction between diachrony and synchrony was also being introduced in Europe at that time. In recognition of his contribution to historical linguistics Sturtevant was elected LSA president for 1931.

See also: Hittite; Saussure, Ferdinand (-Mongin) de (1857–1913).

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Style

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> Thanks to words, we have been able to rise above the brutes; and thanks to words, we have often sunk to the level of the demons.
>
> Aldous Huxley, *Adonis and the alphabet*, 1956 (John Gross, 1987: 280).

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style of writing,' as in the well-known saying 'The pen is mightier than the sword.'

The Proliferation of Style

However, the semantic history of style does not end here, because in later centuries it was transferred to a great many other contexts. Perhaps this happened because style belongs to the domain of language and its offshoots speaking and writing, and it is a well-known fact that mapping from this domain to other areas of experience is quite common. This is illustrated by examples like 'the **language** of flowers'; '**speaking** colors'; '**telling** figures'; 'their absence **spoke** volumes,' etc. It may have been in this way that style gained widespread currency outside the domain of language. Indeed, a particular style may be attributed not only to painting, architecture, music, or fashion, but to practically any other mental or physical activity, for example, 'a pen-and-ink sketch in Rembrandtesque style'; 'a revival of the Gothic style'; 'Schubert's *Overture in Italian style*'; 'a flamboyant style of dress'; 'an autocratic style of management'; 'a country-style dinner'; 'an aggressive style of play,' etc.

Furthermore, the term 'style' resulting from this semantic transfer may also be used in a kind of absolute sense to refer to a particular type, make or shape of something, e.g., 'these shoes come in all sizes and styles,' or to describe a superior quality or manner as such, e.g. 'the team has simply been beaten by style'; 'the restaurant is a statement of taste and style in fusion,' etc. In sum, a brief questioning of an internet search engine will show that style is omnipresent in practically all domains of human existence.

Some Tentative Thoughts on the Nature of Style

Behind the external features of style, as illustrated by the above-mentioned examples, one usually suspects some conscious or unconscious intention and significance. In other words, it is generally assumed that style has a phenomenal as well as a conceptual element, which, though they can be distinguished, are at the same time inseparably interconnected. For instance, Rembrandt's chiaroscuro technique in his painting and Philip Larkin's repeated use of metonyms in his poetry are clearly recognizable phenomenal aspects of their art, which simultaneously convey a deep conceptual significance. In other words, it seems that style is concerned with the mutually creative interplay between perceptible form and intangible content.

All this also implies that in principle style is associated with humans either as individuals or as a group linked to a specific context of place, time, and culture, and that normally the notion of style is not applied to entities or things that are not the result of some human action. Therefore, unless it is a case of personification, it seems odd to speak of the style of, for instance, a gust of wind or a thunderstorm. Significantly, this sense of human consciousness and agency implies that the attribution of a particular style to some artifact, action, or performance entails all kinds of underlying social, cultural, and ideological implications (Verdonk, 2002: 18–21).

Apart from the above tentative ideas about style, it has so far proved to be very difficult to define it as an abstract concept. Again, this is a problem for nonlinguistic and linguistic style alike (Wales, 2001: 370–372). Indeed, style as the equivocal interface between form and content, or in stronger terms, style as the confrontation between a perceived outward appearance and some assumed intrinsic value, has never ceased to trouble the human mind. At the same time, it is ironic that style is a creation of that very same mind.

For a possible answer to the question of how style ever came into being as an invaluable asset of the human mind, I will now briefly discuss its relationship with rhetoric.

Rhetoric-cum-Style: the Earliest Beginnings

Because style in language is often related to rhetoric and sometimes even equated with it, I will first give a brief account of the potential effect of what might be called proto- or primary rhetoric on the urge for survival of the human species and their social-cultural evolution. This is followed by a somewhat more detailed discussion of the emergence of classical rhetoric in Western culture and of some of its long-lived intellectual and artistic achievements, interspersed with occasional excursions to present-day views whenever this seems relevant and useful.

Rhetoric, then, may be assumed to be as old as human communication. In a general sense, it may be described as a cognitive and emotive drive in people to use language in such a manner as to impress or emotionalize others and then persuade them to adopt or reject a certain viewpoint, or to undertake or refrain from a particular course of action. The target of this persuasive process may also be one's own self. A famous literary example of self-persuasion is the noble Brutus in Shakespeare's *Julius Caesar,* II.1.10–34, who argues himself into the conviction that Caesar must die.

From an evolutionary perspective the ultimate source of this basic impulse, and thus of rhetoric, is likely to have been the instinct of self-preservation, and as such rhetoric may be supposed to have contributed to the preservation of the human species (Kennedy, 1998: 4). The persuasive force of this primary rhetoric was inevitably conditioned not only by **what** was said, i.e., the content, but also by **how** it was said, i.e., the form. Now, this formal aspect or manner of expression, which is inseparably interconnected with its content, and at the same time causally related to a relevant social and communicative context, is the natural predecessor of what later evolved into the concept of style.

In the course of human history, the evolution from relatively simple to more complex cultures raised the level of sophistication of this innate rhetorical-cum-stylistic capacity, which also extended to oral forms of literary expression. For instance, centuries before the introduction of rhetoric as a theory, the culture of the ancient Greeks had a long-established tradition of oral poetry on heroic and mythological topics in which forceful eloquence, i.e., rhetoric, is a stylistic hallmark. Particularly, in the great Homeric epics the *Iliad* and the *Odyssey* (8th century B.C.), verbal agility is invariably put on a par with physical prowess. For example, in the *Iliad*, when Achilles has resentfully withdrawn from the fighting in the siege of Troy, the old charioteer Phoenix points out to him the two vital qualifications of the Homeric hero: 'It was to teach you all these things, to make **a speaker** of you and **a man of action** . . . .' (*Iliad*, Homer, 1950: X.443; my emphasis). After Homer's poetry had been written down in the course of the 7th century B.C., the oratorical style of the epic heroes became a favorite object of study in the training schools for rhetoricians and had a strong influence on the conception of the ideal orator in Greek and Roman civilization (Kennedy, 1999: 6). For instance, some 800 years later, Cicero recalls the same Homeric tale about Phoenix teaching the young Achilles how to be 'an **orator** and **man of action** too' (*De oratore*, Cicero, 1942: III.XV.57).

The Rise of Classical Rhetoric-cum-Style in the Greek City-States

Long before the invention of writing, the extraordinary potency of language must have been a constant source of fascination, because after literate cultures had internalized writing, the rhetorical and stylistic uses of language were often the first topics of theoretical study. Indeed, as Ong has put it, "writing . . . did not reduce orality but enhanced it, making it possible to organize the 'principles' . . . of oratory into a scientific 'art'" (1982: 9). This is exactly what happened in major ancient cultures such as Mesopotamia, Egypt, Palestine, China, India, and Greece (Kennedy, 1998: 115–140). In Western culture, the ancient Greeks developed an elaborately structured system aimed at teaching public speech and written composition, which under the name of 'rhetoric' (short for 'the art of rhetoric') was inherited by classical Rome and became a dominant factor in European culture for more than two thousand years. Obviously, cross-cultural or comparative research work is needed to establish the correspondences and differences between Western and non-Western rhetoric. See, for example, Kennedy (1998).

The theory and practice of rhetoric-cum-style particularly flourished in the 5th and 4th centuries B.C., when new democratic systems of government were introduced in the ancient Greek city-states, of which Athens became the most important. In the political (from Greek *polis* 'city') and judicial institutions of these dawning democracies, vigorous and persuasive self-expression was held to be an essential prerequisite for any position of power and influence. The ensuing social ambition created a booming market not only for itinerant teachers of oratory and rhetoric, known to philosophical history as the Sophists, but also for the establishment of fully fledged schools that provided an education for those who aspired to a place of prominence in public life.

Aristotle's *Art of Rhetoric*

This accumulated practice of oratory brought forth a great many rhetorical handbooks that aimed at developing a theory of eloquence, called in Greek *technē rhētorikē*. Though this phrase is usually rendered as 'the art of rhetoric' (perhaps under the influence of the Latin phrase *ars rhetorica*), Plato, and also Aristotle, had a wider conception of *technē*, which embraced our concepts of art, technique, and skill (Lawson-Tancred, 1991: 264). Initially, the Sophists had defined rhetoric as 'the art of persuasion,' which Aristotle in his seminal treatise *The art of rhetoric* (c. 335 B.C./1926) subsequently changed into the more theoretical formulation "[the function of rhetoric] is not so much to persuade, as to find out in each case the existing means of persuasion" (I.I.14). This implies that if in a particular case the persuasion is unsuccessful, the theory of rhetoric as a whole remains valid.

In addition to promoting rhetoric to a respectable branch of philosophy, Aristotle also treats the process of persuasion as a human and social reality, claiming that the use of the body in self-defense is now superseded by the use of rhetoric because humans are essentially rational beings (I.I.12). Besides, if it is

argued that this verbal capacity can cause a great deal of harm too, it may be countered that this goes for all good and useful things, if they are badly used (I.I.13). Therefore, Aristotle's book may be seen as an apologia for rhetoric to repair the damage to its reputation, for which the Sophists were generally held responsible. Their then leader was Gorgias (c. 483–375 B.C.), who had skeptical views about the possibility of getting to the truth through reason and about the validity of traditional ethical notions such as right and wrong. See Wardy (1996) for an interesting study of Gorgias. These views were ardently propagated by his followers, but unfortunately the instrument they used for it was rhetoric. Of course, there were many, as there would be now, who fully realized the dangers of an accomplishment that could argue that what is wrong is right. It is therefore not unlikely that, as a consequence of this realization, the term 'sophistic' and at least one of the popular senses of 'rhetoric' have become infected by pejorative overtones ever since.

Gorgias must have been a well-known figure in Athens, because Plato named his dialogue *Gorgias* (c. 384 B.C.) after him. It is the earliest example of a bitter attack on rhetoric, which Plato saw as the source of all corruption. Socrates, one of the fictional characters in the dialogue, refuses 'to give the title of art to anything irrational' (465) and voices a number of fierce criticisms: rhetoric is 'no art at all'; it is 'a sort of knack gained by experience' (462); it is 'a branch of something which certainly isn't a fine or honorable pursuit' (463); and it is to be placed 'among the subdivisions of pandering' (463) (Plato, 1960). The question of whether Aristotle wrote his *Rhetoric* in response to Plato's *Gorgias* will probably always remain unanswered.

Techniques of Persuasion: *Ethos/Pathos/Logos* Interconnected by Style

Indeed, whereas previous handbooks had focused mainly on the sophistic persuasive tricks of the oratorical trade, Aristotle's book was the first to provide a theory of public speaking, or civic discourse, founded on psychological, logical, and moral principles. For instance, he divides the means of persuasion or 'proofs' (*pisteis*) into two types (I.II.2):

1. Nontechnical or inartistic proofs such as sworn testimonies, tortures (*sic*), contracts, and the like, which already exist and need not be furnished by the art (*technē*) of the persuader.
2. Technical or artistic proofs that have to be invented by the persuader using the principles of the art of rhetoric.

These artistic proofs, in their turn, can be of three kinds (I.II.3–6; repeated in II.I.1–4):

1. The proof derived from the trustworthy character (*ethos*) of the persuader, that is, the ethical and psychological appeal that the speaker makes to the audience by creating a sympathetic image of him or herself. As Cockcroft has observed: . . . '*ethos*: that is, our character, [includes] our goodwill, our morality, our competence and our emotional authenticity, as perceived by the persuadee' (2003: 43–44).
2. The proof derived from the emotions (*pathos*) induced in the audience. It deals with the gamut of sentiments that the persuader must arouse in the listeners to trigger their favorable reactions. In addition, as Nash has aptly put it, during this process of swaying the audience 'There comes a point . . . when the silent partners in the dialogue – the listeners, the readers – are no longer being told; they start to tell themselves, and in doing so help to shape the rhetoric that persuades them' (1989: 197).
3. The proof derived from logical argumentation (*logos*), which is not about establishing the objective general truth as in hard science, but about finding arguments that rest on generally accepted principles and will therefore be acceptable to the audience (I.I.12).

Incidentally, perhaps Aristotle's motivation for his third proof suggests one of the reasons why rhetoric (and, by implication, style) has ever developed in the human mind. Most things in this world cannot be worded unequivocally, nor are they generally agreed on. Persuasion is then a last resort. This, by the way, fits in with modern discourse studies, which have challenged the idea that there is a direct correspondence between language and reality. Besides, this view of words and the world brings rhetoric and literature more closely together (Hesse, 1992: 21–22).

Returning to the three techniques of persuasion, it will be noticed that they are closely interrelated. Thus, the *logos* of a speech is only effective if it tunes in with the audience's *pathos*, which, in turn, is to a large extent the outcome of the speaker's *ethos*. In this interconnectedness, a specific use of language, i.e. style, plays a crucial role: for example rhetorical figures, like schemes, i.e., patterns of conspicuous regularity of form such as parallelism, repetition, antithesis, etc., which intensify meaning without actually changing it; and, tropes, i.e., patterns involving a conspicuous change of the standard meaning, such as metaphor, metonymy, irony, etc. All these and other figures may well reinforce the emotional appeal of an argument, which must at the same time adequately reflect the speaker's ethical stance as well as the emotions of the audience.

A Modern Instance of how *Ethos, Pathos,* and *Logos* are Interconnected by Style

The epigraph of this article appears to be a case in point:

> Thanks to words, we have been able to rise above the brutes; and thanks to words, we have often sunk to the level of the demons. (Aldous Huxley)

This is a straightforward piece of rhetoric in which the author's *ethos* (I have the professional and moral experience to speak with authority on this issue), his *logos* or argument (language can be used with good and evil intentions), and the readers' presumed *pathos* (the painful awareness that we are naturally inclined to misuse our gift of language), are closely interconnected and reinforced by specific features of style.

The style is sententious because it relies on antithesis, a classical figure of thought that contrasts certain ideas expressed in contrasting words in a formal parallel structure (Wales, 2001: 24). The clash of ideas is set forth by the two metaphorical images 'we have been able to rise above the brutes' and 'we have often sunk to the level of the demons,' which effectively refresh our experience that language can be both a blessing and a curse. The formal parallelism is brought about by some conspicuous repetitive patterns such as the lexical phrase 'thanks to words,' with the first occurrence properly introducing the beneficial effect of language, while the second occurrence is ironically linked up with its harmful use. There is also marked syntactic repetition. The maxim is made up of one compound sentence consisting of two coordinate clauses with basically the same syntactic functions, linked by the conjunction 'and.' One would have expected the antithetical conjunction 'but.' This, however, would not have been compatible with the irony of the repeated phrase 'thanks to words.'

Additionally, the repeated personal pronoun 'we' is rhetorically very effective. It is an instance of its so-called presumptive use, implying that the writer assumes that the reader shares the same values. A further implication of this inclusive 'we' may be that it appeals to the collective voice of universal conscience (Wales, 1996: 62–63).

And, last but not least, Huxley has chosen a very appropriate text type or genre for his rhetorical lament. It is an aphorism, a classical genre, which is usually defined as a pithily and often authoritatively expressed maxim usually relating to some abstract matter.

The Earliest Introduction to Psychology in a Discourse Situation

In his *Rhetoric* Aristotle also provides the earliest introduction to psychology in a discourse situation. By exploring the emotions (*pathos*) that may be awakened in the audience, such as anger, calm, friendship, enmity, fear, confidence, shame, pity, jealousy, etc., he allows the persuader a useful insight into the mechanics of human motivation (II.II–XI). This is followed by a discussion of the effects on the human character of the three ages (youth, prime, old age) and of fortune (birth, wealth, power). These potential characteristics of the audience are useful for the persuader to know with a view to adapting his character (*ethos*) accordingly (II.XII–XVII). Interestingly, the pictures Aristotle presents of youth, prime, and old age appear to be a reflection of the common stereotypical characters of antiquity that can also be seen in the comedies of Menander and his Roman imitators, Plautus and Terence (Kennedy, 1991: 163). The tradition they represented is responsible for the form and style taken by English comedy up to the 19th century, and perhaps even by many present-day sitcoms.

Genre and Style

Because deploying arguments is not only a matter of logic but also of the objective of the persuasion, Aristotle divides rhetoric into three genres or areas of activity in relation to the type of audience: deliberative (political), forensic (judicial), and epideictic (concerned with praise or blame) (I.II.22–III.4). These three genres of oratory became canonical and persisted throughout the long history of rhetoric and even beyond.

The concept of genre, in the sense of a culturally specific type of discourse, like these three kinds of rhetorical speeches or, for that matter, a newspaper article, a business letter, an aphorism, a poem, etc., is highly relevant to style. This is because speakers and writers tend to adapt their language, i.e., their style, in a particular type of discourse to the conventions imposed on it by its social role and setting. This, however, is a reciprocal process, because listeners and readers normally are also tuned in to these socialized stylistic conventions. Thus, once they have made themselves familiar with a particular genre, they have usually also developed a sense of what kind of style they can expect, and therefore they adjust their listening or reading accordingly. On the other hand, both producers and consumers of texts also know that there is not always a one-to-one correspondence between genre and style. For example, novels, advertisements, newspapers, mock epics, etc., may feature an overlapping of different styles. Now, looking at genre from this broad stylistic perspective, some scholars of stylistics have adopted the view that the conventional distinction between 'literary' and 'nonliterary' texts is

in fact unnecessary (Fowler, 1996: 94). For an interesting and plausible cognitive linguistic approach to the role of genre in language and style, see Steen (2002a: 183–209).

Aristotle's Ambivalent View on Style

In the very last sentence of Book II of his *Rhetoric* Aristotle writes: 'It only remains to speak of style and arrangement' (II.XXVI.5). Up to this point Aristotle has not yet said a word about style (*lexis*, in his terminology), though it must have been uppermost in his mind when he was devising his theory of the three modes of persuasion. But he delays a discussion of style to the last, only coming to it in chapters 1–12 of Book III. In fact, there is a theory that Books I–II and Book III may originally have been separate works, and that the final sentence of Book II was added later as a linkage when the three books were made a single treatise (Kennedy, 1991: 302). Anyway, Aristotle, somewhat surprisingly, begins by saying that he has so far ignored the matter of style because in rhetoric the emphasis must be first of all on the logical invention of the most effective arguments, and also because 'it is thought vulgar' (III.I.5). Here his old teacher Plato must have been looking over his shoulder, prompting him that all that should matter is evidence and logic, while style is just empty words. However, then Aristotle goes on to say that since the whole business of rhetoric is to sway opinion, he must pay attention to style, not because it is right but because it is necessary, and also because 'it is of great importance owing to the corruption of the hearer' (III.I.5–6). At this moment it seems that the Sophists have taken Plato's place as his guide, because from here on he discusses style at great length.

Some Highlights from Aristotle's Stylistic Precepts

The main virtues of style are clarity and appropriateness (III.II.2; the latter is repeated in III.VII.2–11). To be clear the speaker or writer should steer a middle course between ordinary and poetic language as appropriate to the subject and the occasion. On the other hand, it is permissible and even recommendable to give one's language a certain strangeness, 'for men admire what is remote, and that which excites admiration is pleasant' (III.II.3). In poetry this often occurs and there it is appropriate. If this artifice is used in prose, it must be concealed, because one must avoid speaking artificially instead of naturally; 'for that which is natural persuades, but the artificial does not' (III.II.4–5).

It will be noted that more than two thousand years later Aristotle's observation that the language of poetry is characteristically 'strange' was to be literally repeated by the Russian Formalists with the phrase *ostranenie* 'making strange.' See Wales (2001: 135) for 'estrangement' and Short (1996: 10–79) for a detailed discussion of the related stylistic concept of foregrounding.

Consequently, the orator must also make proper use of metaphors because they provide clarity, pleasure, and unfamiliarity. "[They] should therefore be derived from what is beautiful either in sound or in signification, or to sight, or to some other sense" (III.II.6–13). Simile, for that matter, is like metaphor. It belongs to poetry, but it is also useful in prose, though with restraint (III.IV.2–3).

In later chapters of his book, Aristotle adds, among others, the requirements of purity or grammatical correctness (III.V.5–7), rhythm (III.VIII), and ornamentation (III.X–XI). With regard to the latter, he returns again to his favorite figure, the metaphor (III.XI), putting a special emphasis on visual metaphors 'which set things before the eyes.' Such metaphors signify activity (*energeia*) as, for instance, in 'The spear-point sped eagerly through his breast' from Homer's *Iliad*.

Finally, the last chapter (III.XII) on style contains a discussion on its suitability to the genres he discussed in Book I: political, judicial, and epideictic. Political oratory resembles a rough sketch and needs little precision, because the larger the crowd, the less the attention paid. The style of judicial oratory should be much more meticulous, involving the smallest degree of rhetoric. Finally, the epideictic style is most like that of written composition.

In subsequent sections of this essay, Aristotle's stylistic precepts of clarity, appropriateness, purity, and ornamentation will be discussed in the light of speech act theory and cognitive linguistics.

The Audience Factor in Classical Rhetoric and Beyond

In spite of Aristotle's earlier mentioned skepticism about the moral integrity of his listeners, his rhetoric and style are definitely audience-directed, in that he evaluates every rhetorical and stylistic device not only in terms of what it **is** but also of what it **does** to the listener. This audience factor and, by extension, the reader factor, completes a threefold communicative framework in classical rhetoric comprising the interaction between a speaker (or writer), a text and an audience (reader). This communicative triangle fits in with some relatively recent developments in literary theory, stylistics, education, composition, textual studies, and discourse studies. However, it should be

noted that the huge theoretical apparatus of rhetoric does not mention a single word about the possibility of an active role of the audience (reader) in the process of meaning production. The audience was only the passive object of the intended persuasive effects of the text.

This situation remained unaltered when the Renaissance humanists rediscovered Aristotle, Cicero, and Quintilian, and also throughout the following centuries things remained as they had always been. Even the most influential literary theories formulated in the first three decades of the 20th century perpetuated this passivity of the reader. In Russian Formalism, the Prague Linguistic Circle, Practical Criticism, and New Criticism, the formal autonomy of the text was fully maintained and there was no role for the reader in the activation of meaning. This situation was to last until the 1970s and 1980s when postformalist theories were advanced, in which a text was no longer seen as an autonomous object but as a discourse, that is, as a contextualized sociocognitive interaction in which meaning is not unidirectional but rather a matter of negotiation between speakers or writers on the one hand and listeners or readers on the other. See Widdowson (1975 and 1992), Fowler (1981), and Carter and Simpson (1989).

The Decline of Greek Rhetoric as a Practice

In 338 B.C. the Greek city-states were subjected to Macedonian rule, which put an end to the democratic institutions in Athens and therewith to the practice of political and forensic rhetoric. Only epideictic oratory could survive; but this tended to degenerate into tedious panegyrics on the Macedonian kings. Paradoxically, though the practice of rhetoric had virtually come to an end, its theory was considerably expanded in the following 250 years of what is now called the Hellenistic period. One of the leading figures in this development was Theophrastus (c. 370–c. 285 B.C.), who had been a pupil of Aristotle and had succeeded him as head of Aristotle's Lyceum. Though his writings have not survived, it is known from other sources that he developed some of Aristotle's ideas considerably and, as the works of some later Roman writers show, his influence on rhetoric was greatest in the areas of style and delivery.

In parallel with this growth in theory, rhetorical training in hypothetical situations became firmly established in the educational system, that is, in the elite establishments for the sons of the well-to-do. Obviously, in the absence of a professional practice, this instruction in rhetoric became entirely formal and, in fact, an end in itself.

The Roman Takeover

Ironically, the history of the rise of rhetoric as a system during the budding democracy of the Greek city-states repeated itself, under broadly similar circumstances, in the Roman Republic in the middle of the 2nd century B.C. During the political deliberations in the Senate and the legal actions in the law courts, the spoken word was predominant and eloquence became an indispensable weapon. So it was an ideal opportunity for the appropriation of the well-tried devices of persuasion provided by the theory of rhetoric and style as devised by the Greeks, and *technē rhētorikē* was Latinized as *ars rhetorica*.

The Ranking of Style in Roman Rhetoric

The Roman rhetoricians regarded style as the most difficult task for the orator (Quintilian, 1921: VIII.13). Thinking up what to say and arranging it is one thing, but finding the most effective words for it is another! It was again Quintilian who was most outspoken, maintaining that without the power of style 'all the preliminary accomplishments of oratory are as useless as a sword that is kept permanently concealed within its sheath' (1921: VIII.15).

Whereas Aristotle, for reasons of his own, relegated the treatment of style to the last part of his *Rhetoric*, the Latin rhetoricians unambivalently rank style (*elocutio* in their terminology) as the third of the five canons or divisions of rhetoric: (1) Invention; (2) Arrangement; (3) Style; (4) Memory; and (5) Delivery. There is no attempt, though, to integrate these elements into a coherent whole. In his most influential work, *De oratore* (55 B.C.), Cicero comes up with a refreshing formulation of these five components of oratory:

> And, since all the activity and ability of an orator falls into five divisions, I learned that he must first hit upon what to say [*inventio*]; then manage and marshal his discoveries, not merely in orderly fashion, but with a discriminating eye for the exact weight, as it were, of each argument [*dispositio*]; next go on to array them in the adornments of style [*elocutio*]; after that keep them guarded in his memory [*memoria*]; and in the end deliver them with effect and charm [*actio*]. (The Latin interpolations are mine.) (Cicero, 1942: I.xxxi.142–143)

The Troubled Relationship between Content and Form (Style)

The metaphorical phrase 'to array them in the adornments (*vestire atque ornare*) of style' raises again the ever recurrent issue of the divide between content (*ratio rerum*) and form or style (*ratio verborum*). It is

a mechanical metaphor suggesting that style is something added. Similar metaphors include 'clothing,' 'dress,' 'coat,' and 'colors,' which have been fashionable for many centuries. For instance, after more than sixteen hundred years, in 1666, in his *Preface to Annus Mirabilis*, John Dryden still gives a full Ciceronian account of the five divisions of rhetoric, describing style as follows: "the third is Elocution, or the Art of clothing and adorning that thought so found [...] in apt, significant and sounding words."

On the other hand, in direct contradiction to his 'dress and ornament' metaphor, the very same Cicero, elsewhere in his *De Oratore* (III.XVI.61), dubs a separation between form and content as an 'undoubtedly absurd and unprofitable and reprehensible severance between the tongue and the brain.' In point of fact, in Greek and Roman rhetoric the divide between the **what** and the **how** was conditional and artificial. It probably originated in rhetorical pedagogy requiring students to analyze texts in terms of content and form. This, too, turned out to become a long-standing tradition. Thus, in 1512 Erasmus of Rotterdam wrote a textbook entitled *De copia verborum ac rerum* ('On the abundance of verbal expressions and ideas'), in which he asked his students to produce as many formal variations as possible of all kinds of sentences. He himself sets the example by coming up with one hundred and fifty different stylistic versions of the Latin sentence '*Tuae literae me magnopere delectarunt*' ('Your letter has pleased me very much'). Obviously, some of the resulting versions will be silly and unusable, but this kind of teaching experiment will increase the student's awareness of the stylistic flexibility of language (Corbett, 1990: 461–462).

Style as Motivated Choice

It will be noted, by the way, that Erasmus's exercise might be seen as a kind of forerunner of one of the present-day popular definitions of style, namely style as choice. In this view, style is seen as the making of conscious and unconscious choices of certain linguistic forms and structures in preference to others that could have been chosen but were not. Obviously, every linguistic choice that is made is codetermined by a wide variety of contextual considerations, such as the genre of text, time, place, the nature of the communicative context, etc. See Wales (2001: 370–372) and Verdonk (2002: 5–6).

These choices, which may also be regarded as stylistic markers, are assumed to be made on particular levels of the structure of language (the text) in relation to the contextual and communicative situation (pragmatics and discourse). Though there are various models distinguishing different numbers of levels, here I will make use of the following six-level model of linguistic structure and discourse. It will be understood that in reality language and discourse are not so neatly organized as they are represented in this diagram, which therefore only serves as a basic groundwork for analysis and discussion. For a detailed account of style in relation to the levels of language and discourse, see Simpson (2004: 5–8).

1. Graphology (typographical features: typeface, punctuation, etc.)
2. Phonology (sounds, rhythm, rhyme, etc.)
3. Lexis (vocabulary)
4. Syntax; grammar (sentence structure, use of tenses, etc.)
5. Semantics (considerations of textual meaning)
6. Pragmatics; discourse (features of external context; communicative situation).

In fact, all these levels are interconnected and interdependent. For example, Charles Dickens's apparently simple choice to put quotation marks, from the level of graphology, around the opening lines of his novel *Hard Times* (1988: 47), has far-reaching consequences on the level of pragmatics and discourse:

> 'Now, what I want is, Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these children. Stick to Facts, sir!'

Though it is a brief example, it features a great many stylistic markers of which, given the scope of this article, I can only point out a few. To begin on the level of discourse, it is a representation of free direct speech of one of the characters. It is called 'free' because the only evidence of the narrator's presence are the quotation marks. Thus, there is no clause in which the narrator reports the speech (as 'He said'), which on the level of discourse would indicate that the character is held in leash by the narrator. On the contrary, by choosing free direct speech, the narrator delegates the point of view to the character, leaving him (assuming for the moment it concerns a man) to speak for himself. This furthermore implies that the narrator does not describe the character but lets him describe himself.

At various points in the text, reference is made to persons, places, and time by means of grammatical and lexical words or phrases like 'I,' 'you,' 'sir,' 'these boys and girls,' and the present tenses of verbs, for example, 'want,' 'is,' 'bring up,' etc. Now, prompted

by their experience of the real world and their knowledge of the stylistic conventions of fiction, readers will understand these linguistic expressions as representations of the people, place, and time in the story, and will act on them as cues to imagine themselves as participating in the situation of the fictional world of the discourse. By persuading readers to assume a presence in the world of the novel, these textual cues or deictics (from Greek 'pointing'), as they are technically called, prompt the following important questions: Who is telling the story? Who is the narrator or character talking to? Where and when do the events take place? And, importantly, from whose point of view is the story told? The deictics in a text may answer this last question, because human beings are cognitively primed to relate space, time, and persons in the world around them to their own subjective position, that is, to view them from their own point of view. A quick look again at the deictics in the above text will show that so far everything in the story world is experienced from the character's perspective, which was already confirmed by the representation of the character's words in free direct speech.

Shifting again to the levels of syntax, lexis, and graphology in relation to other relevant levels, the reader will be struck by the strident shortness of the sentences, and the insistent and monotonous repetition of the word 'Facts,' each time written with a capital, probably to mark the character's emphatic pronunciation of the word. This emphasis becomes even stronger through the repetitive use of the excluding phrases 'nothing but,' 'alone,' and 'nothing else' used in relation to the speaker's cherished 'Facts.'

On the interconnected levels of lexis, semantics, pragmatics, and discourse, when the speaker talks insensitively about the boys and girls as 'reasoning animals,' using the degrading metaphoric images 'plant nothing else, and root out everything else,' as if their minds were the fertile soil in which his Facts could be sown, he dehumanizes the children depriving them of their imagination and emotions.

Finally, back to the level of pragmatics and discourse: the reader may notice the irony in the speaker's insistent reference to **facts** in the opening passage of a work of **fiction**. Anyway, a long time ago the above stylistic choices held enough fascination for this reader to be persuaded by the character's awful rhetoric to enter this fictional world, and to read and reread this great novel.

The Content/Style Issue has Become a Critical Tool and a Literary Game

As is only to be expected, the content/style issue has never ceased to haunt people's minds. For while content and style are definitely assumed to be one, they are still frequently being discussed in terms of two separate entities, which creates the paradox of simultaneously postulating a oneness and a 'twoness.' As it is, this paradoxical thinking has provided considerable scope for creativity in that it has become an evaluative tool in the hands of literary critics as well as a source of inspiration for poets and writers. The following is a perfect illustration of this. In the introduction to her book *The breaking of style*, the American critic Helen Vendler writes:

> To represent style, I use the word 'body' (rather than the perhaps more customary image of dress) because I want to emphasize the inextricable relation of style to theme. Yeats's bravado in 'A Coat' with respect to doffing his 'old embroideries' – 'There's more enterprise / In walking naked' (*Collected poems*, 1956: 125) – suggests, misleadingly, that one *can*, in poetry, walk naked – and that one can easily slough off a style. Nothing could be further from the truth (1995: 2).

This is the poem referred to:

A Coat
I made my song a coat
Covered with embroideries
Out of old mythologies
From heel to throat;
But the fools caught it,
Wore it in the world's eyes
As though they'd wrought it.
Song, let them take it,
For there's more enterprise
In walking naked. (W.B. Yeats, *Collected poems*.)

The poet playfully states his intention that he will remove all stylistic ornamentation from his poetry and allow the content to 'walk naked.' With this metaphor of divestment, Yeats jocularly announces a shift in his earlier style, while at the same time upbraiding certain fellow poets for imitating it. It is evident from the 'coat' metaphor that the poet is making artistic use of the classical style/content divide, and by giving a free rein to his imagination he creates from it his own literary world.

It may be true that Vendler's 'body' metaphor emphasizes less strongly than the classical 'dress' metaphor that style is an additional element, but she does not escape from the inherent paradox mentioned earlier. In fact, the confusion is complete when she appears to miss the ironical point of Yeats's literary game, and criticizes him for doing something she has just done herself. Besides, this poem has become an autonomous literary event, which Vendler cannot use to tackle Yeats on a difference of opinion she has with him in the 'real' world.

The Three Levels or Types of Style (*genera dicendi*)

Though the long lists of precepts in their handbooks may give a different impression, the classical rhetoricians did not aim at a general normative model of style. Thus, in his *Institutio oratoria*, Quintilian writes that the reading of poets, historians, and philosophers is of great service to the orator, though he must not follow these writers in everything because of the obvious differences between the various genres (1922: X.I.27–36). Besides, in oratory, too, there are three different genres to be observed and therewith three different styles: judicial, political, and epideictic. And even within the same genre, the orator must be able to vary his style: "... some things require a gentle and others a violent style, some require an impetuous and others a calm diction, while in some cases it is necessary to instruct and in others to move the audience, in all these instances dissimilar and different methods being necessary" (X.II.23).

However, in spite of the fact that the rhetorical theorists gave the practicing orator a lot of leeway to choose a particular style, they still felt the need to establish a broad framework of three different levels or types of oratorical style:

1. The grand style (*genus grave* or *grande*) features a smooth and ornate arrangement of impressive words. It is an artful style, with figures of speech, and suited to the conclusion of an important oration.
2. The middle style (*genus medium*) is somewhat more relaxed without descending to the most ordinary prose. It is suited to descriptive passages in an oration, its effect being mainly esthetic.
3. The low or plain style (*genus humile*) is brought down to the most ordinary speech of every day. It is suitable for the narrative part in an oration.

This three-part division had already been devised by the Greek Theophrastus, in a work now lost, and was later adopted by the anonymous author of *Rhetorica ad Herennium*, dating from the first century BC and wrongly attributed to Cicero until the 15th century (Cicero, 1954: IV.VIII–XI), and by Cicero in *Orator* (1939: VI.20–XIII.42).

In literature the grand style was regarded suitable for epic and tragedy, the middle style for didactic poetry, and the low style for comedy and pastoral poetry. Virgil's works are often used as an illustration of the three styles: the epic *Aeneid*, the didactic *Georgics*, and the pastoral *Eclogues*. It is striking that, on the one hand, this theory is concerned with particular types of style, and on the other hand with a division into three social classes: warriors (*Aeneid*), peasants (*Georgics*), and shepherds (*Eclogues*). In European literature this tradition continued at least until the Romantic period.

The Four Virtues of Style (*virtutes dicendi*)

In addition there are four virtues of style that are common to all three types. (Compare Aristotle's stylistic precepts discussed earlier.) These, too, were first classified by Theophrastus and later developed in the anonymous *Rhetorica ad Herennium* (Cicero, 1954: IV.XII.17–LV.69), by Cicero in *De oratore* (1942: III.IX.37–LV.212) and Quintilian in *Institutio oratoria* (1921 and 1922: VIII–XI). These stylistic qualities may be briefly summarized as follows:

1. Correctness or purity (*Latinitas*) is mainly concerned with the correct use of language and is therefore on the borderline between grammar and rhetoric. The language must be clear, elegant, and well adapted to produce the desired effect.
2. Clarity (*perspicuitas*) is of course closely allied to correctness. There must be propriety in our words, their order must be straightforward, and the sentences must not be too long. The language will be approved by the learned and clear to the uneducated. There must be no obscurities or ambiguities.
3. Decorum (*aptum*) or the quality of appropriateness is not only a matter of style but of every aspect of an oration. Our style must be adapted to every condition in life, to every social rank, position or age, and a similar distinction must be made in respect of place, time, and audience. Quintilian also adds a moral dimension: it is becoming 'to all men at all times and in all places ... to act and speak as a man of honor' (*Institutio oratoria,* 1922: XI.I.14), which seems to be an early precursor to Buffon's celebrated 18th century dictum '*Le style, c'est l'homme même*.'
4. Ornament (*ornatus*) is concerned with the decorative aspects of style, in particular the figures, which are aimed at adding force to the intended effect and affect. 'Figures' is a general term for any linguistic device or pattern as a result of which meaning is either changed or intensified. The rhetorical figures are traditionally divided into the following:

1. Figures of speech, which, in turn, are subdivided into the following:
   1.1. Tropes (Greek *tropos* 'turn') in which words or phrases are used in such a way that their ordinary meaning is conspicuously changed.

Examples include simile, metaphor, metonymy, and oxymoron, and also figures like hyperbole, irony, and litotes, owing to which meaning cannot be taken literally.
Leech (1969: 74) defines tropes as foregrounded irregularities of content.

1.2. Schemes (Greek *skhēma* 'form, figure') are figures in which words are arranged into particular lexical, syntactic, or phonetic patterns that intensify or enhance meaning without actually changing it. Examples include repetition, chiasmus, antithesis, and zeugma. Schematic patterns of sound include alliteration and assonance.
Leech (1969: 74) defines schemes as foregrounded repetitions of expression.

2. Figures of thought are often loosely associated with the figures of speech, though they are different in their form and function. They have a pragmatic function at sentence or text level in the presentation of the argument or theme to the listener or reader, e.g., rhetorical questions; apostrophe; amplification; and antithesis (Wales, 2001: 152–154). For an example of antithesis, see the analysis of Huxley's aphorism.

The Virtues of Style in Terms of Speech Act Theory

One might argue that rhetoric is concerned with speech in action, so that the virtues of style, which are clearly audience oriented, could provide an interesting point of comparison with speech act theory (Austin, 1962; Searle, 1969). Thus, the stylistic qualities of correctness and clarity are obviously required for a meaningful locutionary act, i.e., the act of uttering a meaningful linguistic expression. The quality of decorum corresponds with the appropriate context, or the so-called felicity conditions, on which the success of the illocutionary act, i.e., the act of conveying some communicative purpose, depends. This is in the present case the rhetorical act of persuasion (Fahnestock, forthcoming).

However, speech act theory is less suited to deal with the stylistic quality of ornament involving figurative language, because it perpetuates the traditional view that such language is deviant and that understanding such language is different from ordinary linguistic processing. Now, recent research in cognitive linguistics has shown that not only is a lot of our language figuratively structured, but so also is much of our cognitive processing. So people understand, i.e., conceptualize, their everyday experiences in figurative terms through metaphor, metonymy, irony, oxymoron, etc., and these codes underlie the way we think, reason, and imagine (Gibbs, 1994: 5). Therefore, it is more profitable to consider the stylistic quality of ornament from the perspective of cognitive linguistics.

The Rhetorical Figures Considered from the Point of View of Cognitive Linguistics

In various writings Aristotle, Cicero, and Quintilian make some casual remarks about the ordinariness of metaphor in everyday language. For instance, Aristotle observes that 'we all use metaphors in conversation' (*Rhetoric*, 1926: III.II.3–6), while Cicero writes that they 'were brought into common use for the sake of entertainment, for even country folk (*sic*) speak of "jeweled vines"' (*De oratore*, 1942: III.XXXVIII.155). And, finally, Quintilian notices that metaphor is 'often employed unconsciously or by uneducated persons (*sic*)' (*Institutio oratoria*, 1921: VIII.VI.4–5). Now, if they had taken this view more seriously with regard to all genres of discourse, they would have been much closer to the present-day view that metaphor, and by implication all figurative language, is an omnipresent phenomenon that forms an integral part of our way of thinking and all uses of language. But, as we know, the ancient rhetoricians rejected the idea of figurative language being 'ordinary' when used for decorative and affective stylistic purposes in rhetoric and literary discourse. To put it differently, the above wording of the stylistic virtue of 'ornament' means that figuration is mainly a matter of embellishing literal language to create a particular stylistic effect.

For instance, the rhetoricians would see the antithetical metaphors 'we have been able to rise above the brutes' and 'we have often sunk to the level of the demons' in Huxley's aphorism as a creative and ornamental way of expressing literal equivalents, for instance, 'we have been able to live as civilized human beings' and 'we have often been cruel and destructive.' In such a view language and mind are independent of each other and both intrinsically literal. This traditional approach to figurative language has been dominant in the humanities in Western culture for thousands of years.

However, in cognitive linguistics things are just the other way round: tropes and schemes, and figures of thought, are no rhetorical byproducts of a process of objective thinking of an independent mind; rather, they are a reflection of how people **construe** their knowledge and experience of the world around them (Lee, 2001: 6–7; my emphasis).

For example, a metaphor (from Greek 'transference') is essentially a device that involves conceptualizing

one domain of experience in terms of another, which implies that every metaphor is founded on a source domain and a target domain. Thus, in the metaphoric images 'we have been able to rise above the brutes' and 'we have often sunk to the level of the demons,' the source domain is people's everyday physical experience of all kinds of spatial orientations, in this case UP-DOWN. The target domains are abstract concepts like VIRTUE ('living a decent life') and DEPRAVITY ('being cruel and destructive'). (Note that it has become a convention to use small capitals for the concepts that underlie a metaphorical expression.) It will be observed that the former concept gets an 'upward' orientation and the latter a 'downward' orientation. This example also shows that source domains tend to be relatively concrete areas of experience and target domains to be more abstract (Lee, 2001: 6).

Note that in Western culture this type of metaphor is quite common. They are based on a mundane source domain related to a particular spatial orientation of the human body and a target domain referring to some abstract concept. For example, HAPPY IS UP; SAD IS DOWN ('My spirits **rose**.' 'He **fell** into a depression.'); HEALTH AND LIFE ARE UP; SICKNESS AND DEATH ARE DOWN ('He is in **top** shape.' 'He is **sinking** fast.' 'He **dropped** dead.'); GOOD IS UP; BAD IS DOWN ('Things are looking **up**.' 'Things are at an all-time **low**.'). (Lakoff and Johnson, 1980: 14–21; Kövecses, 2002: 35–36.)

This cognitive process of using a simpler concept to get to grips with a more difficult one yields what is called a 'conceptual metaphor,' such as HAPPY IS UP. Here is another example: RELATIONSHIPS ARE BUILDINGS ('They have **built** a solid relationship'). Conceptual metaphors must be distinguished from linguistic metaphors, which consist of linguistic elements such as 'built' that derive from the language used for the simpler conceptual source domain such as BUILDINGS in the foregoing example. In this connection, Heywood *et al.* (2002: 35–54) and Steen (2002b: 17–33) make interesting reading.

Of course, the language of writers and poets may be expected to be more creative on this score, but in essence they make use of the same figures and schemes as the nonprofessionals. As the above examples show, metaphors are so common in everyday talk that we hardly seem to notice them. Consider how we ordinarily speak or write about time: 'We are **wasting** time'; 'We have no time **to lose**'; 'We are **running out of** time.' These are all metaphorical expressions or, more precisely, they reveal how in our everyday experience we conceive of time as something that is in short supply, which may result in a conceptual metaphor like TIME IS A LIMITED RESOURCE. When Andrew Marvell writes:

> But at my back I always hear
> Time's winged chariot hurrying near.
> And yonder all before us lie
> Deserts of vast eternity. ('To His Coy Mistress')

he is using the same experiential conceptual metaphor, be it, of course in a much more creative fashion. It is equally important to realize that we, in turn, use the same conceptual metaphor TIME IS A LIMITED RESOURCE in making sense of Marvell's poem (Gibbs, 1994: 6–8). For an interesting cognitive linguistic approach to metaphor in literary prose, see Weber (1995: 32–44) discussing Doris Lessing's short story 'To Room Nineteen.'

Another important figure of speech, or in cognitive linguistic terms a figurative mode of thought, is metonymy (Greek 'name change'; the Latin term is *denominatio*). Metonymy occurs when the name of one thing is given to another thing with which it is closely associated, within one and the same conceptual domain. Consider, for instance, the sentence 'I heard the **piano**.' Obviously, only sounds can be heard, not objects. What is conveyed is that I heard, not the piano as such, but a sound coming from the piano (Taylor, 2002: 112). In cognitive linguistic terms, a metonym involves a process in which one conceptual entity provides mental access to another conceptual entity, within the same domain, in this case THE INSTRUMENT FOR THE PRODUCT (Kövecses, 2002: 145). Some more examples include 'He's got a **Picasso** in his den' (PRODUCER FOR PRODUCT), 'The **sax** has the flu today' (OBJECT USED FOR USER), and '**Exxon** has raised its prices again' (INSTITUTION FOR PEOPLE RESPONSIBLE) (Lakoff and Johnson, 1980: 38).

In cognitive linguistics, the rhetorical figure synecdoche (Greek 'taking together') is regarded as a special case of metonymy. In synecdoche, a part of something is used to refer to the whole, or (more rarely) the whole is used to signify a part. Metonymic concepts like THE PART FOR THE WHOLE are so common in everyday speech that we hardly notice them. Consider, for example, 'All **hands** on deck!' for 'sailors,' 'The **White House** has plans for the economy' for 'the whole system of the U.S. government,' etc. Advertising frequently uses this type of metonymy, e.g., 'Drink your **Heineken** now!' (PRODUCER FOR PRODUCT).

Furthermore, like metaphors, metonyms are the mainstays of novelists and poets. Consider how the poet Philip Larkin uses a string of synecdochic images to evoke the depressingly huge supermarket catering to the trivial needs in the humdrum lives of the working classes:

> The large cool store selling cheap clothes
> Set out in simple sizes plainly
> (Knitwear, Summer Casuals, Hose,

In browns and greys, maroon and navy)
Conjures the weekday world of those

Who leave at dawn low terraced houses
Timed for factory, yard and site. (Philip Larkin, 'The Large Cool Store')

After the enormous amount of attention that has been paid to metaphor in cognitive linguistic research, it appears that now metonymy has come into focus. Interestingly, the hypothesis has been put forward that metonymy is even more fundamental to cognitive and linguistic processes than metaphor, to the extent that many conceptual metaphors are founded on metonymic stimuli. See Panther and Radden (1999) and Steen (2004).

Cognitive Stylistics (Also Called Cognitive Poetics)

One of the valuable spinoffs from cognitive linguistic research is cognitive stylistics, also called cognitive poetics. It is an interdisciplinary study of how readers process literary texts, or perhaps better still, 'of what happens when a reader reads a literary text' (Stockwell, 2002: 5). Probably the main reason many students of style find fresh inspiration in cognitive linguistics is that this approach does not regard language as a separate and independent cognitive faculty, as it is assumed to be in Chomskyan linguistics. On the contrary, cognitive linguists hold that there is a close interactive and meaningful relationship between linguistic and other cognitive abilities, which include thinking, imagination, learning, memory, perception, attention, emotion, reasoning, and problem solving. All these abilities enable humans to survive and make sense of the world around them. From this it follows that cognitive linguistics is thoroughly experiential from a physical, social, cultural, ideological, and emotive point of view.

To put it differently, cognitive linguists seek to explain the formal manifestations of language not only in terms of the cognitive abilities that are their plausible providers, but also in terms of the communicative or discursive functions that such empowered language structures perform (Taylor, 2002: 8–9). Yet another source of inspiration for stylistics and poetics is that cognitive linguistics was (and still is) developed in relation to other cognitive sciences, such as cognitive anthropology, psychology, psycholinguistics, and artificial intelligence. This interdisciplinary approach has yielded completely new concepts, theories, and ideas that will enable students of style and poetics to analyze, describe, and rationalize 'the effects of literary texts on the mind of the reader.' See Gavins and Steen (2003: 2).

In addition to the foregoing cognitive analyses and interpretations of metaphor, metonymy, and other rhetorical figures, cognitive stylistics and poetics also draw on other cognitive concepts, such as schema theory and frames for research into readers' comprehension of texts (Semino, 1997; Emmott, 1997), the concept of figure and ground to account for readers' response to foregrounding (Emmott, 2002; Stockwell, 2002), and a lot of other theoretical concepts from the cognitive sciences that cannot be discussed here because of lack of space. The following collections of essays deal with a wide variety of examples of how cognitive stylistics and poetics can be fruitfully combined with theories and insights from cognitive linguistics and other cognitive disciplines: Csábi and Zerkowitz (2002), Gavins and Steen (2003), and Semino and Culpeper (2002), which all show how the cognitive sciences have breathed new life into stylistics and poetics.

Rebirth of Rhetoric-cum-Style?

To go by the title of an interesting book published nearly fifteen years ago (Andrews, 1992), rhetoric appears to have been reborn. However, in its blurb text this idea of a 'rebirth' is somewhat qualified by the statement that 'the book does not aim to resurrect classical or Renaissance rhetoric, but to remake rhetoric within a contemporary context.'

I think that this very process of adaptation to the needs of the times has shaped the attitude toward rhetoric in all periods of history, dependent on the ongoing changes in government, politics, law, education, the production and reception of the arts – in brief, the changes in the overall social, ideological, and cultural situation. Surely, without this continuous practice of adjustment, classical rhetoric would have faded into oblivion a long time ago. Indeed, there is every reason to believe that the practice and theory of rhetoric-cum-style, in one form or another, will forever be a vital factor in human existence because, as said earlier, 'persuasion' is a cognitive and psychological symptom of human communication.

See also: Aristotle and Linguistics; Classical Antiquity: Language Study; Cognitive Linguistics; Context, Communicative; Creativity in Language; Deixis and Anaphora: Pragmatic Approaches; Emotion: Stylistic Approaches; Figures of Speech; Foregrounding; Genre and Genre Analysis; Iconicity: Literary Texts; Literary Theory and Stylistics; Literature and the Language of Literature; Metaphor and Conceptual Blending; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Orality; Plato and His Predecessors; Poetry:

Stylistic Aspects; Reference: Stylistic Aspects; Rhetoric, Classical; Rhetoric: History; Rhetorical Structure Theory; Schema Theory: Stylistic Applications; Spatiality and Language; Speech Acts, Literal and Nonliteral; Speech and Thought: Representation of; Stylistics, Cognitive; Stylistics: Pragmatic Approaches; Stylistics; Text and Text Analysis; Verbal Conflict.

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Style and Style Shifting

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From the very earliest sociolinguistic studies, it has been clear that style plays a crucial role in language variation. Fischer's seminal study (1958) of the-*ing*/-*in* alternation among schoolchildren in New England, for example, found that they used more of the lower-prestige variant, -*in*, in informal situations such as a conversation and progressively less of this variant in more formal situations, such as reciting a story in class. All of us have some intuitive sense of this in our own lives. We might feel comfortable using certain linguistic features at a dinner party with friends but will edit them out of our speech in a formal job interview.

But what is 'style' exactly? A number of theoretical approaches to explaining the role of style in sociolinguistics have been developed. One of the earliest, represented in Labov (1966, 1972), is the 'attention to speech' model. This approach views style as a function of the amount of consciousness individuals have of their speech in a particular setting. Labov (1966) studied a number of sociolinguistic variables in New York City and designed his interviews to encompass different types of contexts, including conversation, reading of a passage, and reading lists of words that included the relevant variables. He theorized that when speakers were more consciously aware of their speech, as when reading the word lists, they would use more of the prestige variants (e.g., the rhotic pronunciation for postvocalic -r). When they were more relaxed, in 'casual' speech (as identified by the nature of the topic by or certain paralinguistic cues, such as laughter or increased tempo), they would tend to use more lower-prestige variants. The results of Labov's study supported this hypothesis.

Other observations about style came out of this early work. The first was that the effects of style on variation tended to parallel the effects of social class. A variant that occurred more in informal styles also occurred more in the speech of individuals from the lower or working classes. Several researchers (Bell, 1984; Preston, 1991) subsequently pointed out that the amount of variation that corresponds to social factors is larger than that associated with stylistic factors. Another important observation was that of all the styles, the most 'casual' was also the most regular and the least subject to hypercorrections and other phenomena that tended to occur in the most formal styles. This finding led later researchers to focus on capturing the vernacular style as much as possible in their interviews.

Despite the importance of these early observations, the attention to speech model drew a certain amount of criticism. In particular, the unidimensionality of this model is problematic. The model assumes that attention to speech and formality covary with each other and with an increase in use of more prestige variants. However, Wolfram and Schilling-Estes (1998) identified a style that they labeled 'performance speech.' This style is exemplified by the Ocracoke Island, North Carolina, residents they studied, some of whom 'put on' a strong local dialect (unlike their natural conversational style) for tourists as a kind of performance. In these cases we find a style that involves a higher degree of attention to speech, but also a higher occurrence of the less prestigious or less formal linguistic variants associated with the local dialect. Another problem is the difficulty of measuring how much attention is being paid to speech, a factor that was often taken to be self-evident in the early studies or was measured with paralinguistic cues whose significance is ambiguous, such as laughter.

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Subsequent models have attempted to address these shortcomings and to provide a more complete account of style shifting. One of these is the 'speech accommodation' model (Giles and Powesland, 1975; Giles, 1984; Giles, Coupland, and Coupland, 1991). Originally developed by social psychologists, this approach focuses primarily on the social context, on what is going on outside the speaker. The central issue in determining style is not how much attention the speaker is paying to his or her own speech but rather the speaker's relationship to the other interactants in the speech event. Specifically, Giles and his colleagues' studies showed that individuals tend to converge with the speech of the person they are addressing, particularly when they want to position themselves as socially acceptable to their addressee. In other cases, individuals might diverge from the speech of the addressee in order to highlight a separate identity. The speech accommodation model addresses some of the concerns raised by the attention to speech model, but it is somewhat unidimensional in its focus on the addressee.

A similar but more elaborate model is the 'audience design' model, first proposed by Bell (1984). Bell's model also relies on a social frame of reference in which the relationships between the participants are given primary importance. However, he expanded the notion of the addressee to include others who might be listening to the conversation or even generalized others who are not present (termed 'referees'), such as a type of person with whom the speaker wishes to be identified. In this way the model is able to account for style shifts triggered by topic changes, for example. Certain topics may be associated with a well-educated, middle-class audience, while more informal ones may be associated with a peer group that speaks more in the vernacular. Overall, however, the emphasis is on convergence with (or divergence from) the specific addressee or audience present in the interaction. In a later study by Bell (2001), an unusual research design was used in which the gender and ethnic identities of the interviewer and interviewee were manipulated to test the process of accommodation. The study supported the predictions of the audience design model: the sociolinguistic features used were sensitive to the gender and ethnicity of the addressee, in addition to other factors.

A number of other important studies begin from similar perspectives but expand the early theories in some way. Coupland (1980) focused on the speaker's 'presentation of self,' integrating concepts from theories of sociology. In contrast with some of the other early studies, he placed greater emphasis on the functions of stylistic shifts, particularly the strategic use of stylistic variables in discourse. Coupland's presentation foreshadowed some recent approaches focusing on the construction of identity (see discussion below). Finegan and Biber (1994) attempted to explain the specific associations of particular linguistic variables with shifts in the situational context. In particular, they argued that communicative situations contain inherent register variations and posit that more "elaborated" linguistic variables (such as relative clauses) are associated with more literate or decontextualized settings and registers. In this way, they tie together the socioeconomic, stylistic, and linguistic correlates of language variation. In making the claim for a linear relationship between elaboration in linguistic structures, higher socioeconomic status, and formality, however, the Finegan and Biber model is subject to some of the same criticisms that were voiced about the attention to speech model. Their model, for instance, cannot account for situations in which the style relationships are more complex, such as certain types of performances that highlight vernacular features. Milroy (2001) noted some additional problems with the model, including issues over which features constitute elaboration and the difficulty of delimiting terms central to the model, such as 'ease' and 'clarity.'

Subsequent work on style in sociolinguistics sought to integrate style into models that view variation in language as part of the complex linguistic practices through which speakers construct their social identity. Rickford and McNair-Knox conducted a seminal study (1994) on the stylistic shifts by one African-American teenager (Foxy) in California. The researchers found that Foxy clearly shifted style on a number of African-American Vernacular English (AAVE) features in relationship to the race and familiarity of the interviewer and secondarily in response to certain topic shifts. Even though Rickford and McNair-Knox's study is often cited as providing evidence for the audience design model, it also highlights the importance of individual speakers' ways of using language to construct their identities in different contexts, rather than focusing on an entire community's style patterns, as the earliest studies did. The authors discussed at length an earlier interview in which Foxy used fewer AAVE features with the same African-American interviewer who conducted the later interviews. Although this interview initially seems anomalous in terms of Foxy's overall style pattern, the authors showed that in the context of Foxy's individual history, the pattern is explainable. Among other things, Foxy had just completed her first year at a predominantly white high school. Rickford and McNair-Knox argued convincingly for the view of style as "a resource . . ., an interactive and dynamic process" (1994: 264) in which we see a confluence of numerous contextual and interpersonal factors.

Eckert and Rickford (2001) have provided a crucial perspective on style in sociolinguistics, with chapters and critiques by many of the main researchers in this field. This collection encompasses both the history of discussions about style and some predictions for this area of research in the future. Several chapters attempt to define or redefine the primary terms in the discussion of style. Irvine's chapter, for instance, distinguishes register, dialect, and style, with style as the superordinate category for register, which tends to be associated with more established (often specifically labeled) situations. Macaulay provides a discussion of genre, another term used frequently in the literature on style but often not well defined. Yaeger-Dror's chapter explores a number of different terms and concepts in an attempt to delimit some of the 'primitives' of the analysis of style.

In terms of theoretical perspectives, a number of chapters in this collection illustrate the social constructionist approach mentioned earlier. Eckert's chapter, for instance, critiques the attention to speech model, emphasizing the need to locate style within the practices that make up an individual's personal and social identity. In particular, it discusses how the linguistic and other behaviors of particular small cohorts or individuals within a larger social group become salient; these behaviors then provide a window for observing the process by which particular linguistic variables acquire social meaning. Ervin-Tripp's contribution provides an analysis of the rhetorical style of two African-American political leaders, showing how the strategic use of AAVE features reveals complicated manipulations of the established language ideologies for particular effects. Coupland studied a Cardiff DJ and the complex social and attitudinal dynamics evoked by his use of standard/nonstandard and local/nonlocal features. Coupland concluded that speakers are putting together a complex linguistic performance rather than simply responding to specific factors in the situation. Rickford, however, cautions sociolinguists against completely discarding analyses of larger social groups and their styles in favor of a focus solely on the individual and argues for using multiple approaches simultaneously. Eckert and Rickford offer this conclusion about style in their introduction: "As we move toward viewing social life as a continual process of constructing ... categories and identities, style becomes in addition a resource for the process of construction" (2001: 6).

See also: Copula Variation; Formulaic Speech; Identity and Language; IN/ING Variable; Performance in Culture; (R) as a Variable; Respect Vocabulary in Austronesian; Social Psychology and Language; Sociolect/Social Class; Speech Accommodation Theory and Audience Design; Standard and Dialect Vocabulary; Standardization; Vernacular.

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Stylistics

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Definition and Domain

Stylistics is broadly and simply 'the study of style,' a concept that is widely known and used, but that is difficult to define and has many different shadings. What is certain, however, is that its essence is 'distinction,' 'variation,' or 'choice': in any language there is always more than one way of writing or speaking the same (sic) message, but with a different connotation or effect as a result. Stylistics as a discipline takes as its base this essential variation, whether at the level of phonology, grammar, lexis, semantics, or discourse. It differs from sociolinguistics, where style is seen as a variable within a continuously evolving sociolinguistic system, in being concerned with the functional significance of style. It characteristically deals with the interpretation of texts by focusing in detail on relevant distinctive linguistic features, patterns, structures, or levels and on their significance and effects on readers. It presupposes that every linguistic feature in a text has potential significance. It draws its terminology and models from various appropriate branches of linguistics, and one of the commonest collocations and metaphors associated with it is 'toolbox' or 'tool kit.' Since attention is predominantly text centered, stylistics could arguably be a branch of text linguistics; and since it uses linguistic frameworks, it could also be seen as a branch of applied linguistics. It is sometimes also called *literary stylistics or literary linguistics* (see, e.g., Fabb, 1997; Stockwell, 2000) because the most common kinds of texts traditionally analyzed have been literary. It could also be regarded as a branch of poetics, which is primarily concerned with the classification of the essential properties or conventions of genres, or theories of form. There is some overlap in usage, however, and in territory: there are stylistic studies of satire, parody, and humor, for instance.

Nonliterary discourse and varieties or registers are well within the scope of general stylistics or sociostylistics, and spoken as well as written; increasingly attention is being drawn cross-modally to media discourses such as those of film, news reporting, advertising, politics, and hypertexts and to the oral discourses of storytelling and song lyric. The term *linguistic stylistics* is sometimes found, which acknowledges the fact that some stylistic studies are as interested in providing insights into the workings of language and in testing the validity of linguistic models as they are in providing insights into how texts mean. However, it has to be said that a stylistic study of any merit will say as much about (the limitations of) the model as about the text under scrutiny.

Roger Fowler's term for stylistics was *linguistic criticism* (1986), reflecting not only the fact that primacy is assigned to language, but also that the goal of stylistic studies is not simply a mechanistic description of the formal features of texts for their own sake, whether phonological, grammatical, or lexical – a common myth about the early years of stylistics in Britain in the 1960s. Linguistic analysis, however objective or empirical, is no substitute for deductions and judgments. The aim is to find linguistic evidence for a critical judgment; to ground intuitions or hypotheses in a rigorous, methodical, and explicit textual basis; to produce an analysis that is verifiable. Fowler's term, *linguistic criticism,* also implicates stylistics with literary criticism and practical criticism, with their own focus on relating analysis to textual interpretation, but usually more broadly. A related term to Fowler's is *practical stylistics* (see Widdowson, 1992). Both literary criticism and stylistics can thus be seen as subdisciplines of hermeneutics, but stylistics is as much focused on *how* texts mean, as on *what* they mean, even though the goal may well be a specific literary-critical reading. Unlike literary critics, however, stylisticians must be concerned with language, and stylistics provides a metalanguage for principled and systematic discussion of it, in its concern also to avoid subjective or impressionistic judgments based on unverifiable intuitions. Not that good literary criticism is vague or impressionistic.

Stylistics in Britain at least has tended to fight shy of evaluation, of what is good or bad style, possibly as a reaction against the prescriptivist Leavisite tradition of literary criticism and notions of the canon. Assessments are indeed made, but of the effectiveness or appropriateness of specific stylistic features to their perceived function or contribution to the totality of interpretation. Stylisticians have to be wary, however, of making oversimplistic iconic equations between language forms and functions or meanings (the so-called enactment fallacy), despite the characteristic symbiosis in poetry in particular between form and meaning. For, as Simpson rightly argues (2004: 2), linguistic features 'do not of themselves constitute a text's meaning', but act as a 'gateway' to its interpretation. It therefore follows that more than one interpretation is possible. In recent years it has certainly been the case that stylistics has developed a harder edge and engaged in critique. For example, many stylistic studies draw their frames of reference from

critical theory (e.g., postcolonialism and the writings of Foucault on *discourse*) and feminist stylistics is an important subbranch (see Mills, 1995). This has exposed areas of bias, inequality, and subjectivity where ethical issues can be raised. Very significantly, as a result of Roger Fowler's interest from the 1980s onward in critical linguistics, stylistics began to place emphasis on language and texts located and functioning in particular social, ideological, and political practices and has exposed linguistic ambiguity and obfuscation. So it has come increasingly to overlap with the Faircloughian critical discourse analysis (CDA), by which it has also been much influenced. But stylistics has always stressed the inseparability of form and content, which underpins the CDA approach, and the impossibility of a neutral or unmarked style. Deidre Burton's piece (1982) on the grammatical choices in Sylvia Plath's *The Bell Jar* could indeed be seen as a forerunner of CDA, in its argument for a radical stylistics that actually effects social change. In turn, CDA tends to use the 'tool kit' approach of stylistics as part of its methodology.

Stylistics in Academia

Because of its interface with many other different kinds of disciplines, stylistics tends to find itself both marginalized and appropriated at both one and the same time in higher education in the United Kingdom. Stylisticians have tended to find themselves caught between a literature and linguistic divide that has been slow in narrowing. At the end of the 1970s the Poetics and Linguistics Association (PALA) was founded by a group of like-minded scholars (including Ronald Carter, Roger Fowler, Mick Short, and Katie Wales) to provide a common forum and to legitimize stylistics as a professional discipline. The name of the association was chosen to reflect Roman Jakobson's famous statement that "a linguist deaf to the poetic functions of language and a literary scholar indifferent to linguistics are equally flagrant anachronisms." By the end of the 20th century, PALA had grown worldwide, with an annual conference and its own international journal, *Language and Literature*, which produces an annual resume of the year's work in stylistics.

As a branch of applied linguistics, stylistics even today may or may not be studied in the United Kingdom as part of a linguistics degree; with an emphasis on literature, it may or may not be part of an English or modern languages degree, although increasingly it features as a component of courses introducing students to critical theories and practices for text analysis and most recently as a component of creative writing courses. In the future this will undoubtedly mean that more attention will be paid to the pragmatic evaluation of style and the rhetoric of composition. Stylistics is increasingly studied as part of an English language degree, because of its popularity with English-speaking linguists researching aspects of English language, both synchronically and diachronically. English language degrees are themselves now flourishing as a result of the increased attention paid to English language studies in the last decades of the 20th century at the advanced level, and stylistics has accordingly found itself a receptive audience among secondary-level teachers and students of both language and literature.

The attraction of stylistics in the pedagogic context, namely that it combines a knowledge of the principles of language and usage with a critical interest in the interpretation of texts, has long been known outside the United Kingdom, in institutions and courses from Europe to Japan (e.g., those run by the British Council) where the language and literature of second languages, English in particular, are taught. The argument of those involved in pedagogical stylistics is that it enables students to be more aware of, and to be more explicit about, language features and use and at all levels of phonology, graphology, grammar, lexis, meaning, and discourse by providing them with an appropriate framework and vocabulary: the 'tool-kit.' It also helps students to be more independent in their judgments, by forming their own interpretations of literary texts based on close readings and to be more confident in articulating them. Some teachers believe that stylistics helps students to improve their own writing skills, as well as their reading skills, but empirical evidence for this is hard to find. The stylistics approach has always been very accessible, practical, and interactive, and publications in this area have focused on teaching materials (see, e.g., McRae, 1998; Widdowson, 1992). Rewriting exercises of the kind practiced in pedagogical stylistics (e.g., from prose to verse, changing perspective or focalization) have refreshingly found their way into United Kingdom textbooks like Rob Pope's (1995). With the increasing interest in English in China in recent decades, stylistics has become a major discipline; here as elsewhere, it has proved a staple of translation studies in both ancient and modern languages as well as English (see further Shen, 1995).

A Brief History of Stylistics

Already it can be seen that stylistics continually overspreads any firm discipline boundary because of its

engagement with other related disciplines across the arts, humanities, and even social sciences. Historically this has resulted in what can be termed a paradigm shift, although many concepts and strategies remain central or are continually being reassessed or even revived.

It is difficult to pinpoint the exact beginning of stylistics, because of its probable multinational origins at different times. One major root lies in the earlier study of *elocutio* in Western and European rhetoric, concerned with stylistic devices and patterned language such as schemes and tropes, which still plays a significant part in the teaching of composition in higher education in the United States. Other aspects of rhetoric remain of significance (e.g., its concern with the skills of public speaking as a means of persuasion, as having an effect on the audience). A general interest in rhetoric has recently been revived from a cognitive stylistics perspective (see further later discussion). The term *stylistique* was introduced by Charles Bally (1909), a pupil of Ferdinand de Saussure, and interest spread across Europe aided by the work of Leo Spitzer in particular (1928, 1948). Spitzer's interest tended to be writer centered: style seen as revealing the soul of the writer, and with an aim to find the creative principle of the text (expressive stylistics). His concept of the *philological circle* has been more enduring and is characteristic of the stylistician's procedure still today: constantly and delicately moving between hypothesis, linguistic analysis of data, and critical explanation and aesthetic response, with a revised hypothesis if necessary. Later continental stylistics in France aligned itself with semiotics, narratology, and philosophy; in Germany it acquired a diachronic and nonliterary emphasis. (For useful summaries of preoccupations in present-day *Stilistik* in Germany, see Sowinski, 1999; for *la stylistique* in France, see Molinié, 1997.)

In the 1960s stylistics took hold in Britain and the United States, given impetus from developments in descriptive linguistics, particularly grammar. The United States led the way in international journals of stylistics, notably *Language and Style* and *Style*. Michael Halliday proved a key figure in Britain (and subsequently Australia), first of all with his scale and category grammar, and also his concept of register as a situational use of language. But it is his later systemic-functional model of grammar that persistently provides one of the most popular tools in stylistic analysis, because of its comprehensive set of lexico-grammatical categories that label mental processes, verbal and material actions and so are able to tackle full-length naturalistic texts more easily than a generative grammar. His idea of *transitivity* in particular also underpins many writings in feminist stylistics and CDA.

Early stylistic studies of the 1960s in Britain and the United States were much influenced by the newly discovered early 20th-century works of the Russian Formalists, the Prague School, and the writings on poetic language and meter by Roman Jakobson; and terms like *parallelism, norm, deviation,* and *foregrounding* entered the stylisticians' vocabulary (see van Peer, 1986 for the latter): concepts and terms recently revived with a cognitive slant by Cook (1994). Leech (1969) happily blended Formalism and *elocutio* in his schematic reassessment of patterned language and metaphor in poetry. There was certainly a tendency in the early days of stylistics, later corrected, to study poetic texts, particularly those showing a high degree of linguistic creativity or experimentation. Jakobson's notion of literariness was much debated and still is, although stylisticians today tend to agree with literary critics in seeing a continuum of literariness in language across nonliterary as well as literary discourses (whether high or noncanonical). They tend to argue also that cultural expectations about what makes a text literary are as highly significant as prototypical linguistic, metrical, and textual features. Nonetheless, there are those who would argue, in line with Jakobson's emphasis, that literary texts have a different social function from nonliterary texts (see Widdowson, 1975, 1992; Verdonk, 2002); and it is certainly the case that aesthetic uses of language remain of central interest in stylistics, and studies of poetic form and prosody provide a flourishing subbranch of the discipline.

At around the same time there was also a brief flirtation with generative grammar as a model, because of its then interest, for example, in deviation, by the violation of selection rules or by degrees of grammaticalness, particularly in modern poetic texts such as those by e. e. cummings. The inheritance of generative grammar, however, as indeed of Formalism, proved more robust in generative metrics and in later evolved studies of metrical form (see, e.g., Fabb, 1997).

From the outset in Britain stylistics tended not to be writer centered. Although concerned with the concept of *narrator,* it showed little interest in authorial intention, as in traditional literary criticism. Periodically, however, there has been interest in stylistic features that mark an author's *idiolect* or voice print across an oeuvre or in changes of style between early and later works or that indicate provenance, especially in computational stylistics and forensic stylistics, where cases of disputed authorship arise. There has also been an implicit awareness that any choice or selection of stylistic features must have been

the author's. The concern in the 1960s and early 1970s was very much with the reification of the text as an artifact (formalist stylistics). One inheritance of this is the implicit assumption that the text under scrutiny is coherent and cohesive.

However, with the development in the 1970s of disciplines such as discourse analysis and pragmatics in linguistics on the one hand and reception aesthetics and reader-response criticism in literary theory on the other, stylistics shifted its focus to the text in its interactive discourse context (functional stylistics, discourse stylistics, or contextualized stylistics) and to the reader as constructing the meaning of the text, rather than as simply the decoder of a given message or single or eternal truth encoded by the writer. There was a more explicit recognition that the parameters of the situational context contributed to a text's meaning, and that therefore contextualization needs to be part of the theory or model. The writings of the Russian linguist philosopher Mikhail Bakhtin, newly discovered and translated in the West, gave a refreshing boost in the 1980s to the study of the style and structure of prose fiction in a sociostylistic context and introduced the notion of *intertextuality*, texts and their voices in a creative dialogue with others. Prose fiction inevitably lent itself to macrodiscoursal approaches, such as *focalization* or *point of view* and *speech and thought presentation* (see Leech and Short, 1981), which continue today, aided by the advent of corpora for empirical testing and verification. However, stylisticians are still firmly committed to linking macrostructures to the micro, specific linguistic features themselves. Burton (1980) led the way in the stylistic analysis of drama by applying a comprehensive discourse model matching fictive dialogues against real-life conversational practices. This was later followed in many studies by the application of pragmatic models of politeness and speech act theory. Herman (1995) remains the most comprehensive analysis of drama from different perspectives, recognizing that drama's discourse context is characteristically complex.

Certainly, in general, the awareness of context meant that a diachronic stylistics could valuably develop, matching trends in pragmatics, with a sensitivity to nuances of style and significance in texts grounded in a sociohistorical, rather than simply in an ahistorical context; and taking into account differences of reader or audience expectations from earlier periods (see, e.g., Adamson, 2000). A diachronic stylistics also looks at the historical development of significant stylistic devices, such as free indirect speech and thought. The increasing awareness in pragmatics also of the need to embrace a cross-cultural perspective, for example in politeness theory, is influencing many studies in contrastive rhetoric, especially those embedded in English as a Foreign Language pedagogy and also drawing inspiration from the field of genre analysis.

Current Trends in Stylistics—and the Future?

Stylistics today is still broadly concerned with the creative negotiation of meaning and affect between texts, contexts, and readers, and this emphasis has been reinforced by developments not only in pragmatics, but also in cognitive linguistics. The 1990s saw an emerging interest in the application of relevance theory (relevance stylistics): phenomena such as poetic metaphors leading to extra interpretive effort on the part of the reader. In what is called cognitive stylistics, or cognitive poetics more generally, there is a strong interest in the actual reading **process** (rather than the end **product**) and how specific linguistic features or textual elements trigger a reader's understanding and the mental creation of the world of the text, especially in fiction (see Emmott, 1997; Werth, 1999); also in the understanding and processing of metaphors and the manipulation of prior mental schemas and frames of knowledge (see Semino and Culpeper, 2002). As with other strands of stylistics, the most interesting research tests the strength of the cognitive models much as illuminating the text under discussion. Cognitive linguistics in general breaks down the traditional binary opposition between *literal* and *figurative* meaning, which is appealing to stylisticians. In its history it has contested many such oppositions, inherited from the worldview of a Saussurian structuralism (e.g., *text* vs. *context*; *literary* vs. *nonliterary*; *mimesis* vs. *diegesis*).

Although a focus on process is to be welcomed, for the future, however, stylistics must continue to concern itself as much with the social, cultural, and historical contexts as the cognitive and take more notice of global discourse communities, rather than Anglocentric, in which texts are constructed and construed, and to the diverse nature of real readers and reading publics. Recent work at the University of Nottingham on spoken corpora under the direction of Ronald Carter has highlighted the creativity of ordinary speech, but there is also still a great need for the stylistic analysis of computer-enhanced large-scale corpora of a range of text and discourse types and from different periods and also for a stylistic perspective on lexical phenomena such as collocations and formulas in such corpora: all under the heading of a corpus stylistics. The new aesthetic multimodal genres of video games and Internet literature

also await more attention. Literary theorists have long prophesied the replacement of the study of literature by cultural studies. Stylistics is well placed to move into the analysis of forms of cultural production other than written texts.

Conclusion

As this account of stylistics illustrates, Lecercle (1993) is right to state, on the one hand, that no one has probably ever known exactly what the term *stylistics* comprises, yet, on the other hand, that the discipline is forever being reborn. Those engaged in stylistics see this as a strength, as in other disciplines that continually reassess their models and theories, and they embrace its eclecticism with zeal. That there is no one way to do stylistics might be disconcerting to some. However, stylistics is no different from many other disciplines at the present day in that there is continual cross-fertilization of ideas across subject boundaries and the stretching of its own boundaries at the same time. And although models may change or vary, the fact remains that those stylistic studies that are the most illuminating provide scrupulous insights into both the workings of language and the interpretations of texts that remain plausible and convincing to new generations of readers.

See also: Critical Discourse Analysis; Literary Theory and Stylistics; Literature and the Language of Literature; Poetry: Stylistic Aspects; Stylistics, Cognitive; Stylistics: Corpus Approaches; Stylistics, Feminist; Stylistics: Pedagogical Applications; Stylistics: Pragmatic Approaches.

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Stylistics, Cognitive

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Cognitive stylistics is a relatively new, rapidly developing field of language study that attempts to describe and account for what happens in the minds of readers when they interface with (literary) language. It focuses on a variety of texts, both persuasive and rhetorical, that appear in all kinds of social domains. It is, however, most readily and most often applied to the analysis of literary texts, ranging from the popular to the canonical. Cognitive stylistics is thus crucially concerned with reading, and, more specifically, with the reception and subsequent interpretation processes that are both active and activated during reading procedures. Hence, at its core, cognitive stylistics sets out to answer two main questions: first, what do people do when they read? And second, what happens to readers when they read? Implicit in these questions is the role that unconscious and conscious cognitive and emotive processes play when an individual or group of individuals interface with a linguistic text that has been purposely designed with the aim of eliciting certain emotions in a reader.

The Evolution of the Field

Cognitive stylistics can be said to have evolved primarily from literary stylistics, a field also known as literary linguistics. Literary stylistics is the systematic study of (literary) language and (literary) style. Its roots are located in the classical rhetorical and poetic work of Aristotle. Modern literary stylistics, however, as practised in the late 20th century, took many of its cues from the Jakobson-inspired work of the early-20th-century Russian Formalists and Czech Structuralists. For much of that century, stylistics was primarily a formal affair, with text and language playing a dominant role. Slowly but surely, however, readers and their contexts began to play an equally important role in interpretation and meaning-making. The notion of 'context,' still crucial in current cognitive stylistics, refers not just to the sociocultural context of a reading situation, i.e., questions pertaining to who speaks, to whom, where, and so on, but also to an emotive-cognitive context. Contextual developments in linguistics on the one hand, in the form of functional and cognitive approaches to language study, and the somewhat similar contextual developments in literary studies on the other hand, in the form of reading reception and phenomenology, heralded a parallel need in stylistic scholarship for a rigorous and replicable account to be given for the mental processes, as well as the already existing linguistic ones, that come into play during reading.

The main difference between mainstream literary stylistics and cognitive stylistics is that whereas the former focuses almost exclusively on language, style, and other formal linguistic aspects of processing, the latter expands on these 'bottom-up' processing features, and also considers the cognitive, affective, and mnemonic aspects of 'top-down' processing. This addition is something that literary stylistics had not previously dealt with in any systematic or meaningful way. In hindsight therefore, it can indeed be said that literary stylistics, with its bottom-up input, was crucial to the way cognitive stylistics developed, and indeed to how it is still developing today. The field of cognitive stylistics has also been influenced by other academic disciplines, some outside the humanities. The most relevant of these are cognitive psychology, discourse psychology, and, most prominently, cognitive linguistics.

Cognitive stylistics builds on the linguistic-analytic rigour of literary stylistics by attempting to account for and describe the cognitive and mental processes that underpin and channel aspects of meaning-making. This is especially the case in the reception of written (literary) language. As Semino and Culpeper put it, "cognitive stylistics is the way in which linguistic analysis is systematically based on theories that relate linguistic choices to cognitive structures and processes" (2002: ix). In effect, therefore, cognitive stylistics is centrally concerned with trying to describe, define, and account for the role of cognition and emotion in reading procedures. In this sense it can be seen as a kind of discourse psychology for the humanities: a search for the cognitive and emotive sources of aesthetic persuasion for inter-subjective ends, rather than exclusively for sociological ones.

Cognitive stylistics, however, when conducted properly, does not treat literary texts as mere linguistic data. Rather, sensitive cognitive stylisticians will at all times be aware and mindful of the aesthetic nature of the text they are analyzing. This sensitivity, required for any interpretative-analytic approach to a work of art, including literature, must also attempt to manifest itself in the above mentioned 'inter-subjective' interpretations that span the meaning-making realties of the individual reader and like-minded groups of readers. At no time, therefore, can one speak merely of 'readers' or 'a' reading, despite the physiological, and oftentimes cultural, similarities that can sometimes exist between readers or reading communities. Hence, in cognitive stylistics, reading processes are

neither wholly subjective nor wholly objective, but are instead inter-subjective and, as such, are dynamic and context-determined.

The term 'cognitive stylistics' is also used interchangeably, and oftentimes somewhat confusingly, with the term 'cognitive poetics.' An ongoing debate between the key scholars in the field finds the stylistics group drawing on cognitive and discourse psychology, while the poetics group relies on the work of American West-coast cognitive linguists (e.g., Lakoff and Johnson, 1980, 1999; Lakoff and Turner, 1989; Turner, 1991, 1996; and Fauconnier and Turner, 2003). Despite there being some truth in the claim that cognitive approaches to stylistics and poetics are dissimilar, this difference is far more theoretical than it is factual. In practice, there is no substantial divide between the work currently being conducted under these two labels. This can be seen in a number of ways, one of which is the fact that cognitive linguistics is itself, to a large extent, grounded in the work of cognitive psychology. An example of this is Rosch's (1978) work on prototypes and categories, which formed the base for similar work conducted later in cognitive linguistics, which subsequently fed into cognitive stylistics. Similarly, one can also point to the much earlier Gestalt psychological roots of the 'figure and ground' analysis which has informed and shaped certain aspects of cognitive linguistics, especially cognitive grammar.

The division between cognitive poetic and cognitive stylistic approaches has fueled discussion as to which term best serves to describe the field. The latter has several advantages. The term 'stylistics' focuses on the importance of the crucial bottom-up aspects of style in meaning-making, which can get lost in the study of language once the term 'cognitive' has entered into the equation. The use of the term 'stylistics' therefore reflects the constant need to pay attention to the **interaction** between bottom-up and top-down processes in reading procedures and not to lose sight of the textual input completely. The term 'cognitive stylistics' strikes an optimum balance, since the word 'cognitive' covers the top-down aspects of processing, while the word 'stylistics' covers the bottom-up aspects. The result of this is a focus on that which truly matters, namely, attempting to observe, describe, and define the relationship and the interaction between the two processes in diverse single and multiple reading contexts.

By comparison, the term 'poetics' does not adequately capture or represent the formal nature of language and style that must be addressed in any analysis employing linguistic/stylistic criticism, be it feminist, pragmatic, pedagogical, computational, corpus, historical or, as in this case, cognitive. Furthermore, the term 'cognitive poetics' is already in use to describe Reuven Tsur's work, which tends to focus much more on the perceived effects observed in texts by readers (1992). A further distinction in Tsur's work is that it is centrally concerned with how poems and literary texts might convey emotions through a variety of mechanisms, including, for example, rhythm and meter (1998). Perhaps the greatest difference, however, is that whereas cognitive stylistics by and large tries to identify similarities in the effects and processes that a certain group of readers might undergo, Tsur's cognitive poetics attempts to focus on aspects of individuality, uniqueness, and creativity in reception processes. This he often does by including a quantitative empirical approach to the study of literature, something that many cognitive stylisticians currently do less frequently.

Literature

Despite the relative newness of the discipline, a number of engaging and interesting books have already been written. These include Stockwell's (2002) monographic work, which describes and applies a number of cognitive stylistic tools to a large number of literary texts, and also the edited volumes by Semino and Culpeper (2002) and Gavins and Steen (2003), the latter of which is a companion volume to Stockwell's work.

In these works, and in a number of journal articles, scholars draw on different sources to produce cognitive stylistic analytic frameworks. These include ideas from (1) cognitive linguistics, (2) text and narrative theories, and (3) artificial intelligence. The first of these includes cognitive stylistic analyses of cognitive metaphor (Crisp, 2003; Freeman, 1993, 1995); cognitive parable (Burke, 2003); cognitive grammar (Hamilton, 2003); mental spaces (Semino, 2003); figures and grounds (Stockwell, 2003); and prototypes (Gibbs, 2003).

The second group, text and narrative-based analysis, includes cognitive stylistic work on plot reversals in narrative texts (Emmott, 2003), which in turn is grounded in Emmott's earlier (1997) monographic work. Drawing on insights from discourse analysis and artificial intelligence, this work considers how readers construct and maintain mental representations of fictional characters and contexts. A further example in this category is Gavins's (2003) examination of difficult and bizarre reading conditions within a text world theory framework. Gavins's main theoretical framework relies on Werth's (1999) monographic work on text world theory which, taking into account both bottom-up and top-down processes in fiction and nonfiction reading, seeks to provide a

replicable framework where entire discourses can be systematically analyzed. Such discourse-based approaches, which attempt to look at whole texts instead of just text fragments, as the cognitive linguistic group often does, have been influenced by studies in both narrative discourse and discourse psychology.

Third are cognitive stylistic studies that have taken their cue from artificial intelligence. The majority of these find form in schema theory analyses. Some influential studies include Verdonk's (1999) work on Larkin's poetry and Cockcroft's (2004) work on rhetoric (which mainly focuses on Aristotle's ethos, pathos, and logos). In addition to these articles, two monographs, one by Cook (1994) and one by Semino (1997), devote much attention to schema theory analyses of poetry.

Conclusion

The field of cognitive stylistics is still very much in its formative years. What happens in the brain, mind, and body of a reading individual when he or she interfaces with a text, and especially a literary text that has been designed thematically and stylistically to produce emotion in the reader, is not a question that will be answered either quickly or easily. Theoretical advances in cognitive linguistics, cognitive psychology, and discourse psychology, as well as in artificial intelligence and neuroscience, will undoubtedly drip-feed into the field of cognitive stylistics as it develops, thus helping to illuminate the interactive roles that bottom-up and top-down processes play in a variety of subjective and inter-subjective literary discourse processing situations.

Where literary stylistics is concerned with language and literary studies, cognitive stylistics has added a third and crucial psychological dimension to this binary matrix, namely the field of cognitive neuroscience. For all intents and purposes therefore, cognitive stylistics is, by its very nature, working toward the development of a cognitive – and plausibly, in time, even neural – theory of (literary) reading processes. This necessary and predictable inclusion of a cognitive and emotive dimension, given the direction of current studies in psychology and linguistics, makes cognitive stylistics a worthy, and indeed a quite logical, descendant of literary stylistics.

See also: Emotion: Stylistic Approaches; Literature and the Language of Literature; Literature: Empirical Studies; Narrative: Cognitive Approaches; Narrative: Linguistic and Structural Theories; Schema Theory: Stylistic Applications; Style; Stylistics: Corpus Approaches; Stylistics, Feminist; Stylistics: Pedagogical Applications; Stylistics: Pragmatic Approaches; Stylistics; Text World Theory.

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Stylistics, Feminist

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Feminist stylistics is concerned with the analysis of the way that questions of gender impact on the production and interpretation of texts. However, in order to do this type of analysis it is not enough to consider solely the text itself and the type of language which is used. What has been termed second-wave feminist analysis (broadly speaking, the feminism of the 1960s and 1970s which concentrated on the analysis of sexism and the oppression of women) examined, for example, the way that female characters or male characters are represented, especially in relation to sexist stereotyping (Sunderland *et al*., 2002); the use of the so-called generic pronoun 'he' and the use of generic nouns especially in relation to sexism; and the use of derogatory lexis in relation to women in texts (Schultz, 1990). However, it has become clear that feminist stylistics needs to move beyond this type of textual analysis and examine beyond the phrase and sentence, in order to example discourse-level features, for example, the way that direct or indirect speech is used for male and female characters and the impact that this has on whose voice is believed in texts (Caldas-Coulthard, 1994); the way that particular collocations tend to occur when referring to women or men (Carroll and Kowitz, 1994); or the way that a text addresses its readership in gendered terms (Mills, 1994a). Furthermore, it is necessary to go beyond the text itself and examine the types of judgment which are made of female authors and their writing, and the impact that this has on whether their books remain in print. In all of these levels of analysis it is necessary to acknowledge that the meaning of individual items or even of wider discourse-level features cannot be assumed to be inherent to those particular elements themselves, but that they are subject to interpretation on the part of the reader. These interpretative processes are not simply within the control of individual readers but rely on a range of ideological information about gender which circulates within the wider society or within particular communities of practice (Eckert and McConnell-Ginet, 1998, 1999). Thus, rather than assuming that notions of gender are simply a question of discriminatory messages about sex difference embedded in texts, feminist stylistics is concerned with unraveling the complex messages which may be deduced from texts and also with analyzing the way that readers piece together or resist these messages. In addition, this new form of discourse-level feminist analysis, which is often termed third-wave feminism, is keenly aware that not all women (or men) are the same, and therefore it is necessary to analyze the social, across-the-board discriminations which seem to apply to women as a whole, but also to examine more local manifestations of stereotyping and resistances to such ideologies (Eckert and McConnell-Ginet, 2003).

Sexism has been a key concern of feminist linguists, but it has become more and more difficult to pin down what sexism consists of and to agree that certain words or phrases are unequivocally sexist (Dunant, 1994). While feminist linguists still concern themselves with the type of vocabulary which is used to describe female characters in texts, there is a sense in which they have moved to describe a wider range of features which contribute to certain messages being constructed about women. Furthermore, they have recognized that there are forms of indirect sexism which draw on irony and humor which are more difficult to identity than the direct sexism which was the focus of second-wave feminist analysis (Mills, 2002). Feminists have also moved stylistic analysis from the literary sphere to analyze a wider range of texts, for example, newspapers and advertisements. Kate Clark analyzed the types of language that are associated with the representations of women in tabloid newspaper in relation to sexual violence, which she asserts tend to blame the victim rather than the perpetrator (Clark, 1998). Instead of simply analyzing vocabulary, Clark analyzed the transitivity patterns (that is, who does what to whom) in these texts

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Feminist stylistics is concerned with the analysis of the way that questions of gender impact on the production and interpretation of texts. However, in order to do this type of analysis it is not enough to consider solely the text itself and the type of language which is used. What has been termed second-wave feminist analysis (broadly speaking, the feminism of the 1960s and 1970s which concentrated on the analysis of sexism and the oppression of women) examined, for example, the way that female characters or male characters are represented, especially in relation to sexist stereotyping (Sunderland *et al*., 2002); the use of the so-called generic pronoun 'he' and the use of generic nouns especially in relation to sexism; and the use of derogatory lexis in relation to women in texts (Schultz, 1990). However, it has become clear that feminist stylistics needs to move beyond this type of textual analysis and examine beyond the phrase and sentence, in order to example discourse-level features, for example, the way that direct or indirect speech is used for male and female characters and the impact that this has on whose voice is believed in texts (Caldas-Coulthard, 1994); the way that particular collocations tend to occur when referring to women or men (Carroll and Kowitz, 1994); or the way that a text addresses its readership in gendered terms (Mills, 1994a). Furthermore, it is necessary to go beyond the text itself and examine the types of judgment which are made of female authors and their writing, and the impact that this has on whether their books remain in print. In all of these levels of analysis it is necessary to acknowledge that the meaning of individual items or even of wider discourse-level features cannot be assumed to be inherent to those particular elements themselves, but that they are subject to interpretation on the part of the reader. These interpretative processes are not simply within the control of individual readers but rely on a range of ideological information about gender which circulates within the wider society or within particular communities of practice (Eckert and McConnell-Ginet, 1998, 1999). Thus, rather than assuming that notions of gender are simply a question of discriminatory messages about sex difference embedded in texts, feminist stylistics is concerned with unraveling the complex messages which may be deduced from texts and also with analyzing the way that readers piece together or resist these messages. In addition, this new form of discourse-level feminist analysis, which is often termed third-wave feminism, is keenly aware that not all women (or men) are the same, and therefore it is necessary to analyze the social, across-the-board discriminations which seem to apply to women as a whole, but also to examine more local manifestations of stereotyping and resistances to such ideologies (Eckert and McConnell-Ginet, 2003).

Sexism has been a key concern of feminist linguists, but it has become more and more difficult to pin down what sexism consists of and to agree that certain words or phrases are unequivocally sexist (Dunant, 1994). While feminist linguists still concern themselves with the type of vocabulary which is used to describe female characters in texts, there is a sense in which they have moved to describe a wider range of features which contribute to certain messages being constructed about women. Furthermore, they have recognized that there are forms of indirect sexism which draw on irony and humor which are more difficult to identity than the direct sexism which was the focus of second-wave feminist analysis (Mills, 2002). Feminists have also moved stylistic analysis from the literary sphere to analyze a wider range of texts, for example, newspapers and advertisements. Kate Clark analyzed the types of language that are associated with the representations of women in tabloid newspaper in relation to sexual violence, which she asserts tend to blame the victim rather than the perpetrator (Clark, 1998). Instead of simply analyzing vocabulary, Clark analyzed the transitivity patterns (that is, who does what to whom) in these texts

and a range of other linguistic features in order to examine the complex process whereby blame is insinuated. Rather than assuming that particular vocabulary items contain sexist meaning, Carroll and Kowitz (1994) examined the process whereby meaning accrues to words which have gendered reference. They used a concordance of a text database and examined, for example, the way that the term 'woman' collocates (or keeps company) with words such as 'busy' and 'beautiful,' in contrast to the words which collocate with 'man' such as 'important' and 'rich.' They argue that these collocations give the words 'man' and 'woman' different values or associations which lead to their different ranges of connotative meaning. They also look at words including 'husband' and 'wife' and show that these two terms do not occur equally frequently in texts, with 'wife' occurring much more frequently. Thus, 'wife' is assumed to be a word that can occur in a possessive relation to other words (e.g., 'Mike's wife,' 'Mike and his wife'), whereas 'husband' does not occur in these positions as frequently. Thus, rather than assuming that any negative or derogatory meanings that occur in relation to women are contained within particular lexical items, they show that meanings accumulate from the type of 'company' a word keeps. If a term such as 'single-parent' is used in the context of children's problem behavior or in the context of poverty, then it will start to develop negative connotations. Here feminist stylistics examines discriminatory practices in texts, but is less interested in making stark clear-cut generalizations about vocabulary used for men and women; here analysis is focused on the complex process whereby certain words begin to develop negative connotations.

Transitivity has been analyzed by a number of feminist stylisticians, most notably by Deirdre Burton, in her analysis of Sylvia Plath's writing (Burton, 1982). Burton's work aimed to show that there are particular verbal choices which are, as she put it, 'disenabling' for women; that is, when women represent themselves as 'acted upon' by others, rather than 'acting' themselves, for example when authors use verbal choices such as 'he hit her' or 'she was hit by him' rather than 'she called the police.' By looking at the types of verbal choices made by female authors across large chunks of text, Burton is able to argue that the meaning of a text is constructed out of these repeated patterns. Wareing has taken this work further in her analysis of romantic novels, arguing that even when female characters act strongly, they are often acted upon in sexual scenes (Wareing, 1994). She therefore argued that we need to analyze the way that there may be a range of different transitivity choices within literary texts depending on the context.

Rather than simply analyzing the way the vocabulary items construct particular characters, some feminist linguists have argued that we need to analyze the point from which characters are viewed, since if characters are viewed negatively by the narrator, this will color the reader's judgment of them. Semino (2002) has analyzed the mind style of particular narratives and the way that this is constructed from a range of different linguistic elements. Other feminists have argued that we need to analyze how the text addresses the reader, either by direct address (addressing the reader as 'you') or by indirect address, for example, assuming that certain information can be considered to be common sense or shared (Mills, 1994a; Montgomery *et al.*, 2002). A dominant reading is one which the text constructs as the self-evident interpretation for the text, and this reading may be composed of ideological information. However, readers may find that they wish to construct a resisting reading of the text, informed perhaps by feminist thought (Fetterley, 1978). The interpretation that we construct of a text will therefore be a complex negotiation between reader and text with neither of them wholly determining the meaning. Other feminist linguists have analyzed texts in terms of the scripts and scenarios that seem to be governing the narrative events; for example, Crowther and Leith (1994) examined the way that in TV nature programs the use of stereotypical terms such as 'harem' to refer to animal groupings set up certain narrative pathways within the program, drawing on stereotypical assumptions about gender difference.

Thus, while feminist stylistics is still largely concerned with discriminatory practices within the process of production and reception of texts, it is much more subtle in its analysis and has recognized the need for more context-sensitive analyses that can draw on extratextual as well as textual features. Rather than simply analyzing pronouns or vocabulary choice, feminist stylistics analyzes the way that discourse-level phenomena such as reader positioning and point of view are constructed from linguistic features, and it is the complex interaction of these features that leads to particular interpretations of texts.

See also: Gender; Stylistics; Transitivity: Stylistic Approaches.

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Relevant Website

http://www.shu.ac.uk – Discourse Analysis Online.

Stylistics: Corpus Approaches

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Introduction

Stylistics, which may be defined as the study of the language of literature, makes use of various tools of linguistic analysis. Corpus linguistics is opening up new vistas for the study of language, and there are interesting similarities in the approaches of stylistics and corpus linguistics (*see* **Stylistics**). Stylistics is a field of empirical inquiry, in which the insights and techniques of linguistic theory are used to analyze literary texts. A typical way to do stylistics is to apply the systems of categorization and analysis of linguistic science to poems and prose, using theories relating to, for example, phonetics, syntax, and semantics. Theories and techniques of analysis from other areas of study, such as sociolinguistics, pragmatics, cognitive linguistics, and historical linguistics, are also brought to bear on texts. These approaches are typified by the work of Leech and Short (1981) and Short (1996).

The empirical approach of stylistics relies on the evidence of the language in a work of literature. Corpus linguistics, also an empirical approach to linguistic description, relies on the evidence of language usage as collected and analyzed in corpora (*see* **Corpora**). Burrows (2002) pointed out some underlying similarities of approach: "Traditional and computational forms of stylistics have more in common than is obvious at first sight. Both rely upon the close analysis of texts, and both benefit from opportunities for comparison." (The use of computers in the study of style is covered in other entries in the encyclopedia: *see* **Authorship Attribution: Statistical and Computational Methods**.) As linguists and stylisticians have become more aware of the possibilities offered by corpus resources and techniques, there have been increasing numbers of studies published that suggest that the coming together of these fields can be fruitful (e.g., Stubbs, 2005). It is therefore surprising that, apart from some important studies described here, there is little use of language corpora, or of the techniques of corpus linguistics, in the study of literary style. However, the use of corpora is becoming more widespread and more mainstream, as various barriers

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to the uptake of these approaches are overcome. Among the important areas of current activity, at least two different approaches (corpus annotation and norm analysis) can be discerned.

Corpus Annotation

Corpus annotation involves investigating a particular linguistic feature by taking (or making) a corpus – a sample or complete collection of the texts to be studied in electronic form – and conducting a thorough and exhaustive analysis of a particular feature as it occurs in this corpus. The results of the analysis are normally inserted into the electronic text as tags, or annotations. This activity of linguistic analysis and text annotation is similar to the procedures involved in word-class tagging, parsing, and other forms of linguistic annotation, which are widespread activities (*see* **Treebanks and Tagsets**). In this case, the interest is more specifically in the annotation of literary texts, or in the annotation of discursive and stylistic categories (see also Leech *et al.*, 1997). Indeed, these stylistic annotations may make use of and build on syntactic tagging already inserted in the corpus.

There are typically three outcomes of this process. First, the exhaustive analysis of a whole text or corpus is a more empirically sound procedure for discovering linguistic phenomena, compared to choosing examples; annotation of the electronic text forces the analyst to test and refine the system of categorization to account for all cases. Second, it is possible to extract statistics relating to frequency, distribution and co-occurrence of forms from the annotated text. Third, an annotated corpus is obtained, available for studies aiming to replicate or further develop the research, and usable for other areas of literary or linguistic research.

This approach of corpus analysis is exemplified by the work in the United Kingdom at Lancaster University, on the forms of speech, thought, and writing presentation in a corpus of texts. Leech and Short (1981) developed a system of classification for speech presentation in the novel (*see* **Speech and Thought: Representation of**). A project to test and refine this theory by attempting to apply it systematically to real data in a corpus was carried out over a number of years (Semino and Short, 2004) was carried out over a number of years. A corpus of modern British English narrative texts was constructed, representing fiction, news reports, and biographical writing. The corpus was then manually analyzed such that each occurrence of any type of reporting or presentation of a language event was categorized and annotated in the corpus. This enabled the analysts to test the adequacy of the theoretical model against real data. It forced them to account for all relevant phenomena found in the texts, not just the interesting examples that they had chosen to retrieve. It also made possible qualitative and quantitative comparisons between the different text types. Among the findings of the project were the discoveries that it is necessary to adapt the model so that there are different scales for the presentation of speech, thought, and writing, and that attempts to describe these phenomena together, as reported discourse presentation, risks missing the specificity of the presentation of the different modes. The distributions of the various forms were mapped across the text types, new categories were discovered, some categories were merged, and numerous correlations between rhetorical function and stylistic choices were noted (Semino and Short, 2004). It should be noted that this project contrasted literary and nonliterary narrative texts, and also contrasted 'highbrow' and 'lowbrow' texts within the genres. The assumptions underlying the category of 'literature' and its subtypes are by no means fixed or uncontroversial, and the techniques and practices outlined here were also applied to nonliterary texts and to texts whose 'literariness' is under investigation. Using corpora, Carter (2004) revealed linguistic creativity in everyday talk, and the work of the Lancaster stylisticians has continued with the analysis of spoken conversation (Semino and Short, 2004).

Norms, Deviations, and Collocations

A second approach, which makes use of a corpus for stylistic research, is to study literary effects in texts by using the evidence of language norms in a reference corpus. These effects can often be described as deviations from the norms of language use. The norms can be studied in a fairly straightforward way by looking in a large corpus. According to Stubbs (2005), "individual texts can be explained only against a background of what is normal and expected in general language use, and this is precisely the comparative information that quantitative corpus data can provide. An understanding of the background of the usual and everyday – what happens millions of times – is necessary in order to understand the unique." So, for example, if a particular word or phrase (or a particular type of usage or meaning of a word or phrase) is thought to be an exclusively literary form, then it can be searched for by automatic or semiautomatic procedures in a corpus of nonliterary texts in order to test this hypothesis.

A related area of increasing interest is the notion of 'semantic prosody.' Computational techniques can show patterns of co-occurrence of lexical items (collocations) and grammatical forms (colligations).

Several corpus linguists have used evidence of these patterns to study creativity in language, both in fiction and in everyday usage (Sinclair, 1987; Carter, 2004; Hoey, 2005; Stubbs, 2005), and the work of William Louw is of particular importance for stylistic studies.

Louw (1993), following on from the work of Firth and Sinclair, developed a new methodology for analyzing literary effects through the study of collocations. The method is based on the idea that certain words, phrases, and constructions become associated with certain types of meaning due to their regular co-occurrence with the words of a particular semantic category. To put it another way, the habitual collocates of a word give it a semantic coloring, which becomes part of the meaning of the word. For example, Sinclair (1987) discovered that the subjects of the phrasal verb 'set in' are almost always unpleasant things (e.g., *rigor mortis had set in*). This allows the possibility to evoke unpleasantness simply through employing the phrasal verb, without using other evaluative words or phrases. Louw (1993) described how the word 'utterly' is used in this way in the Larkin poem *First sight*, and developed a general theory of how the reader's feeling for semantic prosody can be exploited for ironic effect. Louw argued that an explanation or an analysis of the semantic prosodies associated with particular words is not generally accessible to our intuition. Such prosodies are essentially phenomena that can only be revealed computationally, and their extent and development can only be properly traced by computational methods.

Applications of the notions of collocation, colligation, and semantic prosody are also being developed in the current work of Michael Hoey, whose theory of lexical priming adds a cognitive dimension and can be used to account for creativity in language (Hoey, 2005). Speakers and hearers associate meanings with words not just because of their intrinsic meaning, but also because of the linguistic contexts in which they become habituated to speaking and hearing them. In this way words are primed for certain uses and meanings. For Hoey, creativity involves a selective overriding of the word's primings. The ways in which these primings are created by habitual usage can be found in corpora, and thus the source of the creativity can be studied in an empirical way. Interestingly, this work finds links not only between corpora and the study of style and creativity, but with cognitive aspects of language use as well (*see* **Stylistics, Cognitive**).

Resources, Tools, and Methods

If corpus linguistics and stylistics are so suited to each other in these ways, why is there not more work on the interface of these fields? Why do we still talk only about the potential for this area? There are several reasons why the potential for the use of corpora in stylistics has not been exploited to any large extent. For historical and institutional reasons, practitioners of stylistics, with training in more traditional methods of humanities research, may not be skilled or well equipped to use computers in their research. Furthermore, there is a lack of good quality, usable electronic texts and it is difficult to find and evaluate what is available. Though many texts can be found somewhere in electronic form, there is enormous variation in editorial principles, file formats, text-encoding practices, documentation, and quality control. This means that it is difficult to have confidence in the quality, consistency, and integrity of many electronic texts. Users often need a high level of familiarity with text encoding, tagging schemes, text processing, and text analysis software, along with an ability to deal with often complex generic computer hardware and software, in order to do the simplest things with texts on a computer. There is a lot of scope to develop textual resources and software to make research easier.

At a more philosophical level, there are trends of resistance to all of the more scientific, mathematical, and empirical studies of literature, and the use of computers may seem to epitomize the nonliterary and nonhumanist approach to literature. This view is dramatized in David Lodge's novel *Small world: an academic romance* (1985), when a researcher reveals to a novelist the results of a statistical analysis of his style, and as a result the novelist is unable to write creatively again. Though stylisticians are not generally antiscientific, there are some for whom computational procedures are a step too far. Although it can be argued that the use of computers for analyzing electronic versions of texts and for establishing evidence of linguistic norms in language use is merely a means of verifying and refining empirical statements and findings, some see the danger of research becoming preoccupied with computational procedures and with the encoding and annotation of electronic texts, leading to a regrettable lack of attention to textuality and the meaning.

Willie van Peer warned of the dangers of looking at language out of context:

> When stylistic features of a text have been transformed into numerical form, they acquire a status that actually prevents them from being perceived as language-for-communication as such. That is to say, in the very act of transforming textual qualities into counts, their essential process-like character is irretrievably lost. [. . .] Thus no level of (mathematical) sophistication is able to overcome the problem that the processes of meaning constitution have been eliminated before the analysis is undertaken. [Van Peer, 1989: 302]

Similar criticisms are voiced from within the field of corpus linguistics. Sinclair (2004), in particular, stressed the importance of not forgetting about the text and meaning.

Another important barrier to work with electronic texts is the fact that intellectual property rights, which aim to safeguard the rights of authors, present significant obstacles to academic research. In the real world (*pace* David Lodge) living writers are unlikely to be unexpectedly confronted with statistical analyses of their work, because making or copying an electronic version of their texts without permission is usually illegal.

Conclusion

As empirical work in linguistics increasingly makes use of language corpora, then stylistics and corpus linguistics are likely to continue to converge and overlap. Technical advances and improved resources are making the exploitation of electronic texts a more mainstream activity in stylistics. Large-scale projects to produce digital libraries of high-quality texts are underway, which should overcome many of the current difficulties in finding reliable texts on the web. The establishment of important international standards and guidelines for good practice in text encoding, such as Extensible Mark-up Language (XML) and the Text Encoding Initiative (TEI), should help improve the quality and reliability of literary texts and corpora in electronic form (*see* **Mark-up Languages: Text**). With standardization of formats and procedures, we can hope for powerful, flexible, and usable software tools for the analysis of literary texts and language corpora. Theoretical objections to the use of corpora in the study of the language of literature will doubtless remain, but it is to be expected that corpus linguistics will prove to be a useful addition to the stylistician's toolkit.

See also: Authorship Attribution: Statistical and Computational Methods; Corpora; Mark-up Languages: Text; Speech and Thought: Representation of; Stylistics, Cognitive; Stylistics; Treebanks and Tagsets.

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Stylistics: Pedagogical Applications

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Definition

Pedagogical stylistics is stylistics applied to classroom contexts or any other context that involves the objective of promoting the learning of how language works. It deals with the practicalities of description, interpretation, and evaluation (Short, 1996) and abides by the distinction that has been made between 'stylistics applied' and 'applied stylistics.' Whereas the former involves works that develop theories of text processing, using real readers to test them, the latter identifies problems within a text and looks for a theory that best offers a solution (cf., Clark and Zyngier, 2003 for an overview). Pedagogical stylistics aims at promoting students' awareness of how language works formally and functionally so as to

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Another important barrier to work with electronic texts is the fact that intellectual property rights, which aim to safeguard the rights of authors, present significant obstacles to academic research. In the real world (*pace* David Lodge) living writers are unlikely to be unexpectedly confronted with statistical analyses of their work, because making or copying an electronic version of their texts without permission is usually illegal.

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Stylistics: Pedagogical Applications

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Definition

Pedagogical stylistics is stylistics applied to classroom contexts or any other context that involves the objective of promoting the learning of how language works. It deals with the practicalities of description, interpretation, and evaluation (Short, 1996) and abides by the distinction that has been made between 'stylistics applied' and 'applied stylistics.' Whereas the former involves works that develop theories of text processing, using real readers to test them, the latter identifies problems within a text and looks for a theory that best offers a solution (cf., Clark and Zyngier, 2003 for an overview). Pedagogical stylistics aims at promoting students' awareness of how language works formally and functionally so as to

enable them to perceive the subtleties of linguistic choices present in a text and the effects that these choices produce in readers. To this purpose, it uses tools derived from linguistics. The notion of text here may not be restricted to the written form. It can be extended to other cultural artifacts such as cinema and theatre. Equally, the notion of reader can be extended to viewers as well. Influenced by Critical Discourse Analysis and Language Awareness programs, more recent developments in pedagogical stylistics have been moving toward students' empowerment and emancipation in reading, responding, and writing. Based on Clark (1992: 118–119), by 'empowerment' pedagogical stylisticians mean "the process by which students become aware of what the conventions are, where they come from, what their likely effects are, and how they feel about them . . . [Emancipation is] using the power gained through awareness to act" in order to promote independent readers who are able to account for their interpretation from a linguistic perspective. Because it involves the five skills of language learning [reading, writing, speaking, listening, and thinking/processing (McRae, 2001)], pedagogical stylistics takes into account pragmatic, cognitive, and linguistic functions within social and cultural contexts.

Historical Background

Preservice programs for language teachers have had a long history and a longer bibliography for the many different approaches that have been developed since the advent of modern linguistics with Ferdinand de Saussure. The same does not apply to teachers of literature. Strangely enough, since the study of literary texts became a discipline in the 19th century, there has been a consensual agreement that the teaching of literary texts does not require training nor does analysis need explicit tools and strategies. According to Graff (1987: 1), "there were no 'academic literary studies' in America or anywhere else until the formation of language and literature departments in the last quarter of the nineteenth century," although "the use of literature as a vehicle of education goes back to ancient times." He adds: "But the idea that literature could or should be taught – rather than simply enjoyed or absorbed as part of the normal upbringing of gentlefolk – was a novel one and no precedents existed for organizing such an enterprise."

Since its institutionalization as a discipline to at least 30 years ago, the teaching of literature followed the long established model, which Freire (1970) called the 'banking education.' From this perspective, learners were seen as containers to be filled by teachers. The more the teachers filled the containers, the better educators they would be. The more passively the learners allowed themselves to receive information, the better the learners. In this context, learners were receivers and keepers of files. Training for the job was not considered relevant. In a typical literature class, the teacher pointed out **the** meaning of the text to a very silent audience of note takers. Research followed the Hermeneutic tradition, using theoretical developments in literary theory to produce new readings of texts. Empirical research was not contemplated.

When the literary text crossed the borders of the discipline to be used in EFL classrooms, the main objective was to enable learners to translate canonized texts in order to acquire a 'better' cultural model. Literary texts were then considered a kind of secular scripture. Merit – not the making – of the work was assumed. In this sense, Widdowson's (1975) *Stylistics and the teaching of literature* should be regarded as a landmark. It inaugurated a route linking the study of literature to the study of language through stylistics, creating a porosity, which allowed advances in one area to flow into the other. Since 1975, many works have contributed to change and have strengthened this link. A direct consequence has been the shift of focus from the work and the author to that of the language of literary texts. This change is indebted to the paradigmatic change introduced by the Russian Formalists in literary theory in the first quarter of the 20th century. If, on the one hand, this move concentrated on the materiality of language and inspired a series of textbooks on how to use literary texts in language classrooms, on the other hand, it has also favored the divide between what is called 'the study of literature' and 'the use of literature as a resource.' However, their most powerful contribution to pedagogical stylistics has been the notion of literariness. The interest now was not on **what** a text means but **how** it comes to mean.

Despite the move toward taking an interest in what makes verbal art, it was still believed that literary texts contained meanings that had to be extracted by the teacher and passed on to the student so as to make this student a 'morally better' person. As a consequence, the project of promoting independent critical readers constantly failed. These are questions that entail ideologically bound answers and involve educational, political, and economic decisions about the profession and the discipline.

Rosenblatt (1938) conveyed concern about the way teachers were being trained and literature was being taught, insisting on the need to elicit emotional responses from the students. Her work can be considered one of the first studies from a student-oriented perspective. But thus far it has not found its place in

a history of pedagogical stylistics. One of the problems of tracing this history arises from the fact that it is not too clear, having branched out in different centers at the same time. The three places where stylistics seems to have been taking shape in the late 1950s were the universities of Edinburgh (with McIntosh, Halliday and Firth), and of Hull (with Fowler), and the United States, as evidenced by the Indiana Conference organized by Sebeok in 1958, which resulted in Jakobson's 'political manifesto' for stylistics. But it was not until J. R. Firth's 1959 talk about style at the University of Edinburgh, followed by a British Council Conference, that the teaching of literature from a stylistics perspective really began to be systematized (Sinclair, 1966; Traugott and Pratt, 1980). By then, the use of literature as a resource for language learning had become a powerful method for EFL students. According to Carter and Walker (1989: 2), "non-native speaking students [of English] already possess in many cases an analytical knowledge of the target language and may therefore be more alert to the ways in which patterns of language are exploited in a literary text."

In Widdowson's seminal work, he pointed out that "the teaching of literature is concerned not with the transmission of facts and ready-made interpretations but with the development in the learners of interpretative procedures which can be applied to a range of language uses, both literary and nonliterary, which they encounter inside and outside the formal learning situation" (1975: 84) and provided practical exercises in literary understanding. This publication opened gateways to a large number of practical applications and checklists, which are used in many of today's classrooms.

Gradually, pedagogical stylistics became a language-based, student-centered, activity-minded, and process-oriented method of dealing with literary (and, in many cases, nonliterary) texts. Despite the strong British-oriented perspective of its beginnings, as evidenced in the choice of the title of Brumfit's collection (1983), by the end of the 20th century pedagogical stylistics expanded worldwide and is now being used in different countries and with different languages.

One of the central aspects of pedagogical stylistics is that it has always tended "to examine topics at the 'interface' of language studies and literary criticism ... [and in so doing, it] attempts to build bridges between these traditionally divided disciplines," as the blurb to Birch (1989: i) points out. Having once established this bridge, pedagogical stylistics sees how it can find a way into the classroom.

In short, pedagogical stylistics will always depend on the notion that style "crucially involves choice: it rests on the fundamental assumption that different choices will produce different styles and thereby different effects" (Verdonk, 2002: 6) in any kind of text. This perspective implies that pedagogical stylistics is concerned with all kinds of texts and that to become a critical reader the student will have to rely on formal features and functional significance (Wales, 2001).

Strands in Pedagogical Stylistics

Mainly interested in helping students develop a more systematic approach to texts, pedagogical stylistics has tended to use literature for the teaching of language rather than to capture the relationships between the social structure and the linguistic realizations of this social structure. Collie and Slater (1987: 10), for instance, stated that "the overall aim, then ... is to let the student derive the benefits of communicative and other activities for language improvement within the context of suitable works of literature." But there have also been more recent developments concerned with sensitizing students to the use of metalanguage in literature. In this respect, it draws on developments in Language Awareness and Critical Discourse Analysis to help students verbalize the ideological implications of linguistic choices. Empirical research in pedagogical stylistics has also been under way (cf., Clark and Zyngier, 2003 for an overview). Table 1 shows three different strands in which literary texts have been used in the classroom. These strands are not necessarily self-excluding, as much overlapping takes place.

Strand 1: The Content and Context of Literature

Most widely practiced by literature teachers with a hermeneutic tradition, Strand 1 is generally based on survey and historical inquiry. Among its main objectives we can list (some items on this list are from Durant and Fabb, 1990):

- to familiarize readers with acknowledged great works and writers;
- to study works of minority writers or other non-canonical production;
- to learn about the development of a national cultural tradition;
- to produce critical views on works seen as part of the history of literatures in English and/or of a literary tradition.

Besides anthologies, a representative textbook states that the objective here is to make students "actually read what are sometimes difficult texts, while at the same time giving them some help with literary history, biography, differences in genre, technical literary terminology and literary criticism" (Gower and Pearson, 1986: vi). Strand 1 in the

Table 1 Three strands of practice

	Strand 1: Content and Context	*Strand 2: Language through Literature*	*Strand 3: Literary Awareness and/or Intervention*
Objective	Learn about text, author, times, convention, history, etc.	Acquire knowledge of and about the language of literary texts (from language acquisition to understanding literary discourse)	Develop critical reading by manipulating texts
Methodology	Product-oriented; top-down	Product and process oriented; top-down/bottom-up, using linguistic theory to understand the workings and implications of language	Process-oriented; bottom-up
Bridges	Literary theory; cultural studies	Linguistics (descriptive and critical)	Linguistics (descriptive and critical); Cognitive Psychology
Materials	Anthologies; selected works, etc.	Textbooks with theoretical explanations; checklists; exercises	Textbooks with creative activities gradually leading into theory

teaching of literary texts, then, remains somewhat remote from the objectives of pedagogical stylistics.

Strand 2: Language through Literature

Teachers here aim at the study and acquisition of language through the medium of literature. That is, literature is seen as part of the language experience, which encompasses all levels: from phonology, grammar, and lexis to the investigation of the text as discourse and culture, or, to put it in other terms, from language acquisition to the understanding of the aesthetic and ideological implications of linguistic choices. This strand covers positions like that of Duff and Maley (1990: 3), whose aim is to "... explore further the use of literary texts as a language teaching resource rather than as an object of literary study as such," or the viewpoint that "the linguistic resourcefulness which typifies much literary discourse creates a valuable nexus for exploring forms, structures and concepts in English language" (Simpson, 1997: 2). But it can also be extended to positions like those of Carter and Long (1987: 1), who suggested that "the main purpose is to help students to use response to language as a basis for reading and appreciating authentic literary sources." The methods used are manifold and may include computational analyses. Tribble and Jones (1990: 72) showed how "the application of concordancing to the teaching of literature can be a fruitful area for classroom research and teaching/learning." On the other hand, it can also include nonliterary texts, such as advertisements. Another powerful resource has been checklists provided by textbooks, which connect lexical items to discourse frameworks in order to reveal ideological postures.

Strand 3: Literary Awareness and/or Intervention (Language Manipulation)

The main assumption here is that creative writing and metacognition are part of the literary experience. Strand 3 practices see sensitivity to the text as a process, which involves the reader as a constructor and experiencer. This is the fundamental principle that underlies the concept of Literary Awareness (Zyngier, 1994). This strand is based on the idea of intervention in tune with Pope (1995), who held that "The best way to understand how a text works is to change it: to play around with it, to intervene in it some way ..., and then to try to account for the exact effect of what you have done." This practice promotes writing and rewriting exercises to point out the creative role of the reader in the construction of any text. It tries to help learners consider what has not been done in order to highlight what has: a proposition that lies at the core of Hallidayan linguistics. It is believed that this method illuminates many issues such as textual appropriation, point of view, and ideology, enabling a more critical reading.

It must be pointed out that methodologies and approaches are affected by the contexts in which they are used. Although teachers and researchers today may have been sensitized to contextual influences, the tendency in pedagogical stylistics to focus on the microcosm of the classroom still prevails. Both language and literary awareness have contributed greatly to the sensitization of learners to linguistic phenomena and to the development of learners' metacognitive skills. Both attempt to empower learners. But empowerment requires more than the ability to think critically – it calls for critical action. Pedagogical stylistics cannot be restricted to a rationalization about methods and approaches.

The literature/language teacher must be aware of the social project in which and for which she or he is working. Teachers are part of the group Giroux (1992) called 'transformative intellectuals,' who promote an environment that enables the participants to reflect on their day-to-day life and the society to which they belong. In tune with Critical Discourse Stylistics, their methodologies should also aim at a textual reading, which discloses issues such as race, gender, class, rights, and institutions, how these relations and perspectives are expressed, and how they function in society (e.g., to persuade, dominate, express solidarity, warn). The challenge pedagogical stylistics must face is to provide a more culturally engaged and explicit perspective that may set the agenda for future research and practice. The main objective here is to move away from the fiction of a neutral and apolitical classroom and to concentrate on the context in which teaching takes place.

There are some basic questions about the educational system and the society that produces and reproduces social and cultural inequalities that affect and are affected by education that cannot be overlooked. Some of these questions are: How does one

- come to self-understanding?
- situate oneself in history?
- relate questions of knowledge to power?
- understand the limitations and constraints of institutions?

Thus far, very few scholars have been involved in the research of teaching literature and pedagogical stylistics. The field is vast and complex. Especially in a different cultural setting, as Kramsch (1993: 131) remarked, "Foreign language learners have to be exposed to different types of texts, from the most conventional to the most particular, but if they are eventually to find their own voice in the foreign language and culture, literary texts can offer them models of particularity and opportunity for the dialogic negotiation of meaning." Literature is the language of representation *par excellence* and, in line with critical linguistics, we can say that it is language used as social practice for social transformation. The study of literature as a critical experience stimulates a process of self-reflection and may lead the experiencer to perceive the ideologies and assumptions coded behind propositions. Pedagogical stylistics is an area of inquiry whose complexities are still to be probed.

Techniques

There are no formulas or clear-cut ways into a text. Because reading is involved, many of the techniques used for language teaching and developing reading skills are also used in a stylistics class. Different textbooks contribute with interesting and creative ways to help sensitize students to the nuances of a writer's use of language. Most of these activities are student-centered, aiming at students' awareness of how language is patterned, how it means and functions, and what effect it has on the reader. In general, the areas these techniques cover are as follows: word choice, syntax, cohesion, sound patterning, visual representation, semantics, dialect, register, genre, function, participants, processes, and circumstances (cf., Pope, 1995: 192–202) The techniques mostly used include cloze procedure (cf., van Peer, 1989: 282), rewriting from one discourse into another, gap-filling, creative writing, group quizzes, summarizing, turning one genre into another (e.g., prose into poetry and vice versa), reconstructing from fragments, scrambled words and sentences, ranking, predicting, role playing, writing projects, etc. It is not the type of technique or method that is used that matters. The challenge lies in testing their efficiency empirically.

New Directions

Out of the multiple possibilities of research areas and special interest for pedagogical stylistics, at least three can be pointed out at this stage:

1. Corpus analysis and new technologies, which show how the concern with significant patterns of language can be seen through computing and how these findings can help students support literary interpretations (Carter and Walker, 1989: 47–54). Computers are also being tested as a powerful tool for web-based pedagogical stylistics courses by researchers at the University of Lancaster (Short and Archer, 2003).
2. Empirical studies, which use the principles and methods of Empirical Science of Literature (cf., contributions to the Internationalen Gesellschaft für Empirische Literaturwissenschaft (IGEL) conferences, many of which have been published in journals such as *Poetics, Poetics Today*, and *The Empirical Study of the Arts*). Instead of subjective interpretations, studies in this area will borrow research instruments from psychology and the social sciences to gather data based on which readers' responses and interpretations can be understood and validated. More attention must be given to the way verbal art affects readers and how and why students are moved by texts. Studies on the role of affect in the processes of literary comprehension will necessarily contribute to the teaching of literature (Miall and Kuiken, 2002).

3. Cognitive stylistics and cognitive linguistics, a new and exciting field, which may illuminate how the student's mind works, how sense is made. According to Green (2000: 49), "analysis cannot be sufficient unless some form of 'mental representation' or 'mental space' is posited." Pedagogical stylistics may benefit from this area when investigating how students read, how they arrive at interpretations, how they process metaphors, and how their thinking is structured. This is especially relevant when comparing EFL/ESL students and readers of English as a first language in regard to metaphor processing and the understanding of irony. Are there universal mental structures or to what degree are they context dependent? Some applications of pedagogical stylistics, which stem from cognitive linguistics, have already found their way into the classroom (Stockwell, 2002).

These three areas show how pedagogical stylistics can be both challenging and inviting, remaining an integrated territory, where the student's affective, cognitive, cultural, social, linguistic, and historical dimensions are taken into account. Pedagogical stylistics remains true to its initial assumption: "to develop an awareness of significance beyond the immediate impression ... to give more precise focus to this awareness by drawing attention to textual features of the composition" (Widdowson, 2002: 162). What it has developed with the years is a concern of how texts function as social practice. In both situations, pedagogical stylistics offers students tools for substantiating their responses based on the way language works in context.

See also: 20th Century Linguistics: Overview of Trends; Applied Linguistics: Overview and History; Cognitive Linguistics; Cognitive Science: Overview; Computational Stylistics; Corpus Linguistics; Critical Applied Linguistics; Critical Discourse Analysis; Hermeneutics; History of Linguistics: Discipline of Linguistics; Language Education: Language Awareness; Modern Linguistics: 1800 to the Present Day; Pragmatics: Overview; Russian Formalism; Second and Foreign Language Learning and Teaching; Text and Text Analysis.

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Stylistics: Pragmatic Approaches

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Introduction

Pragmatics is typically defined in contrast with semantics. While both semantics and pragmatics are concerned with meaning, semantics deals with abstract and relatively stable meanings within the linguistic system, and pragmatics concerns itself with variable aspects of meaning which are derivable from utterances within contexts of use. As such, pragmatics can be, and often is interpreted, as covering a wide range of contextual factors, including, for some researchers, aspects of sociolinguistics, conversational turn-taking and narrative structure (see Traugott and Pratt, 1980), and cognitive poetics (see Radwańka-Williams and Hiraga, 1995).

Mainstream pragmatics; however, tends to focus on one or more of four models of language in use: Grice's cooperative principle and conversational maxims, Austin's speech act theory, Brown and Levinson's politeness principle, and Sperber and Wilson's relevance theory. These models are all originally developed with reference to nonliterary uses of language. In literary stylistics, pragmatic approaches fall broadly into two areas. First, there are those that take a general contextualized approach to understanding the reading of literary texts. These approaches overlap to some extent with reader response theories, and are outlined in the section on wider literary reading contexts below. Second, there are those that use the particular pragmatic models mentioned above and apply them to literary texts, sometimes innovating on the complexities of problem solving and developing the models themselves, in order to account for literary communicative processes. Within this second area, there is a further distinction to be made between work that applies the pragmatic models to examples of communicative interaction between fictional participants in literary texts, and work that addresses the nature of the interaction between writer and reader. Some work addresses both of these communicative situations, and indeed views the complexity of embedded interactions as characteristic of the literary text. Examples of the application of specific pragmatic models are outlined here in the sections on speech act theory, Grice's pragmatics, and politeness. The stylistic applications of relevance theory are discussed in a separate entry (*see* **Relevance Theory: Stylistic Applications**), and so are not considered here.

Speech Act Theory

In speech act theory, an utterance is defined as an illocutionary act with recognizable syntactic form. In addition, the utterance has a locutionary force relating to the intention of the speaker, and an effect on the hearer. Speech acts, according to the theory, fall into various categories such as representatives (i.e., stating what is believed to be a fact), verdictives (evaluating an event or situation), commissives (i.e., promising), declarations (bringing about a state of affairs, i.e., marrying). At different stages of its development, the theory has posited different sets of categories; and those given here are just a few examples. An important difference between types of speech acts is that some are truth conditional, and others simply have appropriateness conditions (also known as felicity conditions). Representatives are typically truth conditional in that the speaker is committing to the truth of his/her assertion, while declarations depend for their success on certain contextual factors; the declaration, 'I now pronounce you man and wife' is only valid if uttered in culturally appropriate circumstances by a person invested with the authority to marry.

In various pragmatic accounts of literature, a central concern is to define literature as what seems to be a rather a peculiar type of speech act; fiction appears to make assertions, but clearly without truth

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In various pragmatic accounts of literature, a central concern is to define literature as what seems to be a rather a peculiar type of speech act; fiction appears to make assertions, but clearly without truth

conditions. Austin himself claimed that his theory did not apply to, "non-serious uses of language" such as poetry (see Levin, 1976). This view was elaborated by Searle (1979; see also Genette, 1990) and provoked a heated debate with deconstructionist critical theorists, who saw his characterization of literature as 'parasitic' upon the 'normal' use of language as a fundamental theoretical flaw (see Derrida, 1988; Rabinowitz, 1995). Others have taken a more constructive view, arguing that speech act theory can be developed in relation to literary communication.

Van Dijk (1976) does this by introducing the notion of speaker-hearer possible worlds, or S-worlds, which are relative, in terms of their truth conditions, to the individual speaker or hearer. The illocutionary force of the speaker is thus to change the S-world(s) of the hearer, but in literature there is a range of possible interpretations from which the hearer chooses the one that best matches his/her S-worlds. Literary speech acts, in van Dijk's view, do not function as acts whose intended outcomes are practical changes, but simply give access to the writer's S-worlds in the same way as saying how you feel or telling a joke might result in shared feelings and evaluations.

Levin (1976) discusses Ohmann's (1971, 1973) notion that literary utterances are mimetic of non-literary utterances, allowing the reader to construct a fictional situation that to some degree resembles his/her experience of reality. Levin, clearly influenced by generative grammar, goes further than Ohmann in proposing a higher-level implicit sentence in the deep structure of poems that announces its overarching illocutionary force of constructing a fictional world. The deep structure of the first line of Yeats's poem *Byzantium* is, for Levin, '[I imagine myself in and invite you to conceive a world in which I ask you] What shall I do with this absurdity?' with the words in parentheses omitted in the surface structure of the poem. Levin also suggests that literary features such as meter, rhyme, assonance, etc., in the poetic locutionary act signal the unusual nature of its illocutionary force.

Traugott and Pratt (1980) also take a speech act approach to the literary text, based in part on Pratt's earlier book (Pratt, 1977), giving an overview of work in this area, and like Levin and Ohmann, arguing that literary speech acts are mimetic of non-literary speech acts. They offer several possibilities for the illocutionary force of the literary speech act, such as the intention to give pleasure, to establish shared understanding and values, to teach, and conclude by suggesting that literature allows for many communicative functions. Further detail of the aspects of their approach based in Pratt's earlier work is given in the following section.

Grice's Pragmatics

The aspects of Grice's theory relevant to this discussion concern his model of conversational interaction as dependent upon a cooperative principle along with four conversational maxims. According to this model, speakers and hearers in successful conversational exchanges engage in cooperative behavior that is manifested by adhering to, and trusting that the other participant is adhering to the maxims of quality, quantity, relation, and manner. The maxim of quality requires that a speaker should assert only what she or he believes to be true. The maxim of quantity involves giving just the right amount of information for the purpose of the utterance, neither too much nor too little. The maxim of relation requires us to use appropriate utterances relevant to the preceding discourse, and the maxim of manner requires us to give separate pieces of information in a clear and helpful order. Of course, people do not always behave cooperatively in conversations, and according to Grice, the cooperative principle breaks down when participants fail to adhere to, or violate the maxims. Violating the maxim of quality, for example, results in lying. Even when the cooperative principle is upheld, the maxims can be flouted for particular effects. Metaphor and irony, for example, are said to flout the maxim of quality, giving rise to certain implicatures (implications discernibly intended by the speaker).

Pratt (1977), also summarized in Traugott and Pratt (1980), suggests that in the literary text, the cooperative principle is relaxed, and that this relaxation is enabled by the use of fictional characters and implied narrators (distinct from authors) as speakers. Referring to the third and fourth sentence of *Tristram Shandy*, Pratt reveals that Shandy's utterances violate all four of the maxims in numerous ways, implicating the author's intention to amuse the reader by enacting the ramblings of an uncooperative speaker. In another example, Pratt discusses Benjy, the retarded narrator of *The sound and the fury*, describing a game of golf in barely recognizable terms. Benjy's narrative fails to give enough information, and lacks indication of causal relationships between events. Pratt reads this as leading to an implicature on the part of Faulkner to the effect that Benjy's (or such people's) perspective is interesting because it is so different from our own.

Politeness

Brown and Levinson's (1987) model of politeness was developed to complement Grice's pragmatics, and to account for utterances which appear to violate the cooperative principle although participants still

appear to be engaged in cooperative behavior. Some violations of the maxim of quality, for example, involve lying to avoid being rude to a hearer, and indirect requests similarly seem to violate the maxim of manner in order to avoid causing offence with a more direct equivalent. In this model, Brown and Levinson invoke the notions of positive and negative face. In polite exchanges, participants attend to positive face needs by attempting to meet one another's desires, and attend to negative face needs by not impeding or imposing on these desires. Departures from the conventions of the politeness principle involve what are termed face-threatening acts. Just as adhering to the politeness principle might involve violating the cooperative principle, performing a face-threatening act might conform to the cooperative principle. The two principles might operate in tandem, but will often require different verbal behaviors.

Simpson (1989) makes use of the cooperative principle in an analysis of Ionesco's play *The lesson*. His argument is less to do with what Ionesco might be communicating through the use of stage characters than with the use of politeness strategies as indicators of character construction and development. He discusses the interaction between two characters, a professor and his pupil, who meet for the first time early in the play. Tracing their conversations through the acts, Simpson shows that the professor begins as a diffident character and gradually becomes dominant in the relationship, while the pupil, who makes a confident start, becomes passive. These changes are signaled primarily through their linguistic exchanges; the professor, for example, hedges and apologizes at the beginning of the relationship, but by the end is performing 'bald on record' face-threatening acts.

Leech (1992) takes a similar approach, using politeness theory in an analysis of Shaw's play, *You never can tell*, focusing in particular on the conflicting requirements of the cooperative and politeness principles, and examining the characters' attempts to resolve these conflicts in various ways, often to comic effect. Other uses of politeness theory in analyses of literary texts include works of Sell (1991b), Herman (1995), Kopytko (1995), and Lafuente Millán (2000).

Wider Literary Reading Contexts

Other pragmatic approaches address wider questions about the literary text and the literary reading process, making less use of the traditional pragmatic models, but still insisting on an attention to context and literary function as necessary to any explanation of literature. In several of these approaches explicit reference is made to literary pragmatics as a discipline that seeks to restore the significance of context in literary linguistics, and the consideration of works of literature as communicative acts, following the decontextualizing trends of New Criticism and the antiintentionalist ethos of late 20th-century critical theory, (see Sell, 1991a; Engler, 1991; McGann, 1991); Engler (1991), for example, rejects what he sees as one type of pragmatic approach to texts, which assumes determinate readings and commonality of readers' experiences, and privileges authorial intention, but he also rejects literary theoretical notions of interpretive communities (Fish, 1980) determining the direction of interpretation, arguing instead for a focus on the 'collaborative nature of textuality.' Lecercle (1999) sees the literary reading process as one that self-consciously raises questions about interpretation, arguing that reading itself *is* a kind of pragmatics.

How Literary Texts Work

Much of contemporary literary pragmatics is concerned to define literature as having a special functional and communicative status, yet at the same time operating on principles recognizably similar to those of nonliterary discourses. In this sense, a range of broadly pragmatic work approaches the literary text with the same questions as the speech act theorists of literature discussed earlier, but without recourse to the speech act model.

Van Peer (1991) introduces the notion of the homiletical texts and discourse, which occur outside of institutional situations. Literature, in van Peer's view, along with other texts and discourses, is homiletical, and is therefore functionally vague. Homiletical texts generally have one or two of three characteristics: they are reflective, socially cohesive, or entertaining. Literary texts can be defined as having all three of these characteristics, and this combination, along with its homiletical status is what makes literature unique.

Generic conventions are pragmaticized in Chapman and Routledge (1999) by using the idea that readers entertain a set of presuppositions in approaching different types of fiction; for example, detective fiction. Just as in other nonfictional types of discourse, presuppositions can fail. Presupposition failure in a conversation between friends might lead to communicative problems, and will probably violate truth conditions; 'My dog needs a walk,' existentially presupposes that I have a dog, and violates truth conditions if I do not. In literature, on the other hand, Chapman and Routledge argue there is 'greater pragmatic flexibility,' allowing for generic deviations from normative sets of presuppositions for communicative effect. Paul Auster's

postmodern novel *City of glass* is said to do this in various ways; for example, in manipulating narrative point of view, blurring the distinction between narrator and author and thus problematizing the notion of identity in a manner that would not be possible in nonliterary discourse.

What Literary Readers Do

The other side of the contextual question involves the role of the reader and the act of interpretation. Most work in this area challenges the notion that a text is simply a set of linguistic structures available to any reader able to decode them, and explores interpretive variability and the contextual factors influencing individual interpretations.

An example of this approach is Verdonk (1991), where the concern is with poetry as an act of communication that cannot only be determined by its form. The contexts relevant in a reading of a poem include, for Verdonk, the broad cultural environment of its reading, and the reader's knowledge of literary conventions and literary form. Formal features of literary language such as parallelism and deviation are said here to trigger pragmatic processing, but the direction of this processing will be determined by its context. For a more specific and localized account of the relationship between linguistic form and interpretation, see Alonso's (1995) analysis of responses to a short story by Katherine Mansfield.

The reader's cultural environment is a significant contextual factor in the interpretation of literary texts. A detailed account of culturally influenced reading is given in Ben-Porat (1991), with reference to Israeli readers' interpretations of a 12th-century poem that describes a city of beauty and grandeur, without naming the city as Jerusalem. Ben-Porat shows how Israeli students given an unseen exercise on the poem easily interpret the reference to Jerusalem, in spite of a rather different experience of the contemporary city. Their readings are attributable to a culturally constructed concept of the city, shaped, in part, by descriptions in other works of literature.

Avant-garde, modernist, and postmodern texts, in which forms and conventions, including linguistic forms, are manipulated to an extent not usually encountered in nonliterary contexts, pose a challenge to the reader of literature. The interpretation of these texts also holds particular interest for the literary pragmaticist. Enkvist (1991); for example, considers more experimental literary texts, such as Dadaist poems, which defy interpretation in the deviation from recognizable linguistic form. He suggests that these genres are simply the endpoint of a literary function which aims to maximize the work entailed in the reading process. For Enkvist, most utterances involve intelligibility (linguistic well-formedness), comprehensibility, and interpretability, but literature, to varying degrees, prioritizes interpretability, sometimes at the expense of the other two factors. The successful reader of literature is able to construct a text world that makes some sense in spite of this difficulty, and the literary text thus gives rise to aesthetic tension.

Conclusion

The examples of pragmatic approaches to literature given here show that the range and purpose of literary pragmatics is wide. Some approaches take the technical apparatus of nonliterary pragmatics as a starting point, arguing that, with some adjustments, a case can be made for considering literary texts in terms of speech act theory, the cooperative principle and the politeness principle. Others abandon the pragmatic models altogether, but still aim to characterize literary effects with reference to literary function and the literary reading process. A central feature in all of the work is its attempt to establish literary works as acts of communication that relate, sometimes obliquely, to acts of communication in nonliterary discourses.

See also: Cooperative Principle; Intention and Semantics; Literary Pragmatics; Literature and the Language of Literature; Politeness; Pragmatics: Overview; Relevance Theory: Stylistic Applications; Relevance Theory; Semantics–Pragmatics Boundary; Speech Acts; Truth Conditional Semantics and Meaning.

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Subcultures and Countercultures

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Subcultures: Background

One of the assumptions implicit in the term 'subculture' is the lower, subordinate, or deviant status of social groups that receive this label. Many groups labeled as subcultures have lower social status due to class, ethnicity, linguistic background, or other social factors (e.g., poor and working class people, ethnic minorities). In other cases groups considered subcultures see themselves or are seen by others as deviant (e.g., gays and lesbians, drug users). Unlike communities, subcultures are characterized by their transience, their informality, and the absence of the sort of kinship ties that typify communities. They are commonly perceived to embody an oppositional stance to the normative ideals of mainstream adult society (Thornton, 1997). In an attempt to refine the term subculture, Gordon (1947) lists speech patterns, particularly pronunciation and inflection, and clothing as the two most readily identifiable indices of subcultures.

The study of subcultures has its origins in the Chicago School during the 1940s and 1950s and reflected a sociological interest in human behavior in an urban environment, especially as this manifested itself in deviant and delinquent behavior (Cohen, 1955). Subcultures were seen as the key to explaining and understanding deviance as normal behavior. As a result, quite of bit of the research focused on urban male youth gangs and jazz musicians (Becker, 1963).

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In the 1970s and 1980s, there was shift toward structural explanations for the emergence of subcultures. The Birmingham Centre for Contemporary Cultural Studies (CCCS) moved away from the study of youth gangs to focus primarily on style-based working-class youth cultures such as punks, skinheads, Teddy boys, mods, and rockers (Gelder and Thornton, 1997). The work of Hall and Jefferson (1976), Hebdige (1979), Clarke (1976) and others interpreted the emergence of youth subcultures as a response to the breakup of traditional working-class communities and their relocation to modern housing estates during the 1950s (Cohen, 1972). Criticism of the CCCS focused in part on the lack of concern with the involvement of girls and women in subcultures (McRobbie, 1980). McRobbie (1984, 1994) went on to describe how girls and young women have long used style as a form of resistance to mainstream sexual norms and notions of femininity.

In the 1990s and 2000s, the term subculture came to be used in a much wider sense to describe any group of people who orient to norms of behavior, values, beliefs, consumption patterns, and lifestyle choices that differ to varying degrees from those of the dominant, mainstream culture. It could describe loose groupings of people with shifting boundaries who share little more than similar lifestyles or consumption patterns (e.g., metrosexuals, Nascar dads). It can also include groups of people who share sexual practices (e.g., LGBT, or lesbian, gay, bisexual, and transgendered people), or spiritual beliefs (e.g., Neo-pagans, Wiccans).

The increasingly broad scope of what counts as a subculture has led some researchers to question its utility and to call for a reconceptualization or replacement of the term (Muggleton and Weinzierl, 2004). The breakdown of identities rooted in class, ethnicity, gender, and locality has led to the emergence of more fleeting, temporal 'tribal' identities (cf. Maffesoli, 1996). Bennett (1999) argues that contemporary style-based youth cultures lack the forms of organization, cohesiveness, and stability of subcultures and should more accurately be called 'neo-tribes.'

Setting aside theoretical debates about the continued efficacy of the term, we can identify several general categories of people who are labeled with it: those who are oriented to a set of shared ethnic practices (e.g., Italian Americans), those who are oriented to a set of beliefs or values rooted in religious beliefs (e.g., Janists, Sunni Muslims), those whose members share a number of regional cultural practices (e.g., Bavarians in Germany), and those who are defined largely in terms of fashion, music, and lifestyle consumption patterns (e.g., Goths, video gamers, ravers, straight edge).

Lifestyle-based subcultures (especially those centered around music and clothing) are probably the most widely recognized type in postmodern industrialized societies, although they lack the cohesion and stability of traditional subcultures. Young people who orient towards a hip-hop lifestyle (characterized by consumption of rap music and a baggy dress style) may also participate in wider club culture and enjoy techno music. The choices available to consumers allow them to experiment with different identities and to select lifestyles that are not indicative of a specific class background (e.g., the New Age Travellers discussed in Hetherington, 1998). Bennett (1999) says that this signals a new sort of subcultural tradition in which there is less of a fit between visual style and musical taste.

When subcultures become recognized and identified by media elites, marketing, and/or academics, they are assigned a name that may eventually enter popular discourse (e.g., Modern Primitives). In some cases this naming accompanies a moral panic or burst of sensationalist articles and discussions in the popular media surrounding a particular subculture (e.g., British soccer hooligans, Goth culture in the wake of American high-school shootings; see Cohen, 1987). Often times the names given to subcultures have historical origins. The term 'hooligan,' now used to describe rowdy bands of soccer fans, originated in 19th century Britain (Pearson, 1983). Lanham (2002) recycled the term 'hipster' from the 1950s Beat Generation to describe groups of politically liberal, fashion conscious, middle-class American college graduates who began gentrifying undesirable urban neighborhoods in the 1990s. He also attributed to them an entire slang, including terms like 'deck' (cool) and 'fin' (not cool) whose currency among hipsters is questionable.

Subcultures are increasingly translocal, that is, not limited to a specific country or region. The Internet and the globalization of media and mass consumerism allow subcultural trends to spread rapidly from one country to another. Hip-hop culture, a style- and music-based youth subculture that emerged in New York City in the 1970s, has spawned local rap artists and rap scenes all over the United States, Asia, and Europe (Boucher, 1998; Cornyetz, 1994; Cutler, 2002). The Internet also allows for the creation of virtual subcultures made up of individuals who never meet face-to-face (Bassett, 1995), such as the large, on-line subcultures of people devoted to developing the languages of the novelist J. R. R. Tolkein (Qenya, Elvish and others) or languages from the Star Trek television series, such as Vulcan.

In the postmodern age, subcultures are increasingly lifestyle oriented. People rely on lifestyle magazines

(e.g., *Outdoor Magazine, O, Car and Driver*) and the products these magazines promote in order to express their subcultural affiliations. Wheaton and Beal (2003), for example, point to the role that windsurfing and skateboarding magazines play in providing and circulating cultural knowledge and displaying subcultural capital.

The Language of Subcultures

Subcultures (and countercultures) often have distinctive language patterns. The way people talk expresses an affiliation with a certain group and set of social practices, and a simultaneous rejection of others. Speech markers (speech features that carry social significance, cf. Labov, 1972) are one of the ways that members of a subculture can signal their affiliation with the group. Speech markers may include an argot or a set of words and expressions unique to the group. Surfers have special terms like 'dropping in' to describe the act of stealing someone else's wave. Heroin addicts refer their drugs as 'shit' or 'junk' (Polsky, 1967). In other cases, the language marking a subculture may also include phonological, morphosyntactic, prosodic, and paralinguistic patterns. Aside from a whole set of hip-hop terms, some hip-hoppers use grammatical forms that originate in African–American English, such as the zero copula (e.g., You___ the man). Immigrant subcultures have speech patterns that reflect their native language heritage as well as different patterns of social interaction. Labov (1972) describes how the *r*-less pronunciation of 'car' and 'cart' in New York City is indicative of lower-class speech.

In some cases the speech markers groups use to distinguish themselves are remarkably subtle. Eckert (1989) focuses on two groups of oppositionally defined students in a Midwestern American high school: 'jocks,' who orient to middle-class values and the corporate culture of the school, and 'burnouts,' who identify with working-class culture and the community outside the school. She found that a young person's affiliation with each of these categories was positively correlated with vowel patterning. Jocks and burnouts express their respective stance towards school culture in their use of the vowel (uh) as in 'butter': Jocks tend to use the standard central variant [ʌ] whereas burnouts are more likely to use the back rounded variants [ɔ] or [ʊ].

In other cases, linguistic features may occasionally index particular stances like toughness or intellectual superiority. Bucholtz (2001) describes the linguistic practices of science fiction/fantasy fans, young people who consume a range of science fiction comic books, novels, films, and television shows, and participate in fantasy role-playing games. Linguistically, members of science fiction/fantasy subcultures mark themselves by way of 'superstandard' English that indexes intelligence, humor, and nonconformity as well as opposition to dominant colloquial styles.

Countercultures

Countercultures are often described as radical groups of people who reject established social values and practices and who embrace a mode of life opposed to the mainstream. Countercultures emerge in the wake of dramatic economic and social developments. They are reactions to social dislocation and alienation from society. Countercultures share many similarities with subcultures, but rather than modifying dominant values and norms, they seek to reconstruct an alternative social order that rejects or subverts those values and norms. Some historical examples include the Bohemians (19th century European artists, writers, and disenchanted people of all sorts who wished to live a nontraditional lifestyle), or the Beatniks (a group of young artists and writers in New York City who espoused nonconformity and existentialism during the 1950s). Currently the term has its strongest historical associations with those who advocated a communal or nomadic lifestyle, renounced corporate nationalism and the Vietnam War during the 1960s and 1970s, and embraced aspects of Eastern religions such as Buddhism and Hinduism (i.e., the hippies). The late 1960s also spawned a number of radical political movements committed to the eradication of institutionalized racism and government oppression in the United States (the Black Panthers, the Weathermen, and the Symbionese Liberation Army). The punks in Britain and the United States during the 1970s and 1980s could be classified as a counterculture, although this term is not usually applied to them. Many punks rejected consumerism, espoused anarchy, and lived illegally in squats or abandoned buildings.

There have been few examples of movements that could be classified as countercultures in the 1990s and 2000s. One is the anticorporate globalization movement that organizes protests (e.g. Seattle, 1999; Genoa, 2001) against transnational corporations and trade liberalization institutions such as the World Trade Organization, the World Bank, the International Monetary Fund, and the G8. By some estimates well over one million people attended anticorporate globalization protests between the 1999 protest in Seattle and the Genoa action in 2001, excluding the millions participating in the anti-IMF general strike in Argentina in May of 2000 (George *et al.,* 2001). But as is characteristic of postmodern subcultures, these

groups are very fluid, difficult to define, and lacking in an identifiable organizational structure.

Countercultural markers such as tattoos, body piercing, drug use, and unconventional clothing have become so much a part of mainstream, commodified youth culture that they have lost much of their subversive value. The increasingly sophisticated marketing industry is ever more quick to identify, label, and package nonconformist lifestyle trends, quickly rendering them part of the mainstream. One way that a counterculture can express its disaffection with mainstream norms is through the adoption of an antilanguage involving the conscious distortion of conventional language via metathesis (altering the order of sounds or syllables), mixing, borrowing, or by changing the meaning of words. Some examples include 'verlan,' a youth language in France involving the reversal of syllables, and the language of urban youngsters ('wahuni') in Dar Es Salaam consisting of arcane instances of linguistic mixing, borrowing, and relexification in Swahili, English, and other languages (Blommaert, 2003).

Conclusion

As Muggleton and Weinzierl (2004) argue, 'subculture' continues to be a convenient way to describe more unconventional aspects of youth culture, but it does little to help us comprehend the diverse range of youth groups in today's so-called postmodern world. Scholarly work on subcultures must take into account calls to reformulate and replace outdated notions of subcultures so that they are more applicable to the experiences of youth in the 21st century.

See also: Society and Language: Overview.

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Subgrouping Methodology

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Given a group of related languages (in this discussion, the term 'language' is used in the somewhat inexplicit sense familiar from historical linguistics, and not in the sense of a mental grammar, as in the generative tradition), that is, languages whose surface forms can be derived by regular sound correspondences from a reconstructed ancestor protolanguage, the task of subgrouping is to determine which of the languages share portions of their history to the exclusion of other members of the group. For a group of languages A, B, C for which we can reconstruct Proto-ABC, the claim that A and B form a subgroup means that there is an intermediate protolanguage Proto-AB between the attested languages and Proto-ABC, and that in the period from Proto-ABC to Proto-AB, there was no distinction in what would ultimately become these two languages – they were the same language.

In principle, it is simple to determine whether the AB versus C subgrouping is valid. If there are any innovations shared by AB in their history from Proto-ABC to the attested languages, and there are none shared by either A or B with C, then A and B form a subgroup to the exclusion of C. Only shared innovations, and not shared retentions from the protolanguage, are relevant to determining subgrouping, since shared retentions in no way reflect a common period of development to the exclusion of other languages. In other words, assuming an AB subgroup, it may be the case that A and C share features retained from Proto-ABC due to the fact that B has undergone innovations subsequent to the split of A and B.

It follows from the irrelevance of shared retentions to the subgrouping problem that the **number** of traits shared by two languages can have no bearing on subgrouping argumentation. It may be the case that A and C look very similar, in terms of their phoneme inventory, for example, whereas B has a very different inventory, with little in common with either A or C. However, if the commonalities of A and C reflect retentions from Proto-ABC, and the traits of B reflect innovations since the A-B split, then the high number of traits shared by A and C has no bearing on subgrouping.

While the logic of this methodology is straightforward, its application in practice can be quite difficult. Determination of shared innovations proves to be difficult since the most common types of language change, by definition, happen over and over again. So, it is possible that A and C both show, say, assibilation of *t to [t^s] before [i], but that this reflects parallel but independent events after the split of AB versus C.

The ordering of changes can sometimes be used to exclude the possibility that a change in two attested languages reflects a shared innovation. If it can be shown, for example, that the assibilation in B must have followed another innovation that belongs strictly to B, and not to A, then we can conclude that the assibilation in the two languages reflects two independent changes.

Even this method is subject to complications, however, since a change may result in a productive phonological process. Suppose that A and B do in fact inherit a shared assibilation change. Now suppose that the change produces a synchronic phonological rule /t/ > [t^s]/___i. If, in a subsequent change, B simplifies consonant clusters, so that *tri ends up as *ti, then the latter form undergos assibilation to [t^si]. The cognate word in A, which does not have the cluster simplification, will be [tri]. The form in B shows assibilation that crucially depends on a simplification subsequent to the split of A and B, but the rule of assibilation is a common inheritance.

Another difficulty that arises when a shared innovation is obscured by further developments in one of the languages can be illustrated as follows. Suppose that word-final *n reconstructed for Proto-ABC is lost in both A and B, but not in C. This looks like a shared innovation, but suppose that B also has lost Proto-ABC *m, which is retained in A. Now we have to decide if, in the history of B, there was a single change involving the loss of both final nasals, and thus independent of the change in the history of A, or whether A and B share the loss of final *n in their history, with the subsequent loss of *m in B being a later change. This latter hypothesis clearly complicates the historical phonology of B, but may nonetheless be correct. Again, we can try to find ordering arguments to show that, in B, the two nasals were lost at different times, but such arguments may not be forthcoming.

See also: Neogrammarians; Long-Range Comparison: Methodological Disputes.

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Subjective and Objective Measures of Variation

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Within the field of sociolinguistics, the study of language variation has relied predominantly on *objective* measures of variation. That is, researchers examine the forms that tokens (or *variants*) of a variable take, the percentage of occurrence of each variant (in terms of both language-internal and language-external factors), the constraints on that occurrence, and the distribution of a given variable across social groups. A complementary approach to examining variation involves *subjective* measures. Such examination requires the measurement of subjects' impressions of and attitudes toward language variation, often in conjunction with objective measures in either the subjects' varieties or the varieties of the speakers used as stimuli.

There have been several different methods of examination of subjective variation, encompassed by a large volume of research on language attitudes. One of the earliest methods was the matched guise technique (Lambert, 1966). This method involves the use of a single speaker in two (or more) 'guises,' with the presumption that if different reactions are accorded to different guises, then subjects are reacting solely to language varieties, rather than to idiosyncratic qualities in speakers' voices. Since this work, many such studies have been undertaken (see Giles and Coupland, 1991), and a great deal of work in the social psychology of language continues to measure subjective variation. For instance, work using Giles' Communicative Accommodation Theory framework (Giles, 1973) has demonstrated that speakers often accommodate their speech toward *perceived* (or subjective) features, rather than actual, objective features in interlocutors' varieties (Beebe, 1981).

Within the field of sociolinguistics, researchers looked at subjective variation using a number of methods. Perceptual dialectology examines subjects' subjective placements of dialect boundaries. Among the many language attitudes studies discussed in Lippi-Green (1997) is Rubin (1992), in which subjects perceived nonnative features in the speech of a speaker and performed worse on comprehension tests if they thought they were listening to a foreigner, compared to those who thought the speaker was American.

Similar to Rubin (1992), Williams *et al.* (1972) revealed that teachers perceived nonstandard features in the speech of children if they were led to believe that the child was African-American, but not if they were (correctly) told that the child was White. Niedzielski (1999) showed that subjects perceive nonstandard features in speakers' speech if they believe that the speaker belongs to a group for which that feature is a stereotype. Furthermore, this study revealed that subjects' self-stereotypes lead to misperceptions of features in their own variety.

Social factors have been taken into account in work on speech perception in phonetics. For instance, Janson (1986) shows that categorical perception is affected by language change, such that younger speakers undergoing the change perceive phonemic category boundaries differently from older speakers.

These studies indicate that there is not a strict correlation between actual variation in a speech community and the variation that is perceived by its speakers (and others). The measurement of subjective variation is important not only for linguists examining areas such as speech perception and language change, but also for researchers in areas such as education, speech therapy, and language policy.

See also: Language Attitudes; Speech Technologies: Language Variation.

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Subjects and the Extended Projection Principle

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The Subject

The Intuitive Notion

Aristotle (350 B.C.) defines subject and predicate as the counterparts that form a simple sentence. There is in a simple sentence a binary split between a referential naming part, the subject, and a characterizing part, the predicate.

The binary split is grammatically marked in various language-specific ways. Take (1) as an example.

(1) $[[\text{Mona Lisa}]_{\textbf{subject}}\ [\text{is smiling away}]_{\textbf{predicate}}\ ]_{\textbf{proposition}}$

The left-hand part is the subject. It is a reference carrier and represented by a name, a pronoun, or a nominal phrase. As reference carriers, all subjects get the same label (DP in generative grammars). The right-hand part is the predicate. It may be represented by a variety of categories. Its function is not referential but characterizing.

The more recent perspective on the subject–predicate construction is attributed to Frege (1879) and it develops in the following way. The predicate can be considered as a function that accepts the referential subject as its argument. The application of the predicate function to the subject argument equals the statement or proposition. This entity (proposition) has a new and distinctive characteristic. It has a truth value. It is true or false. From this point of view, the predicate function projects subject arguments on truth-valued statements. As a function, the predicate may be said to represent a property. The predicate property corresponds with an indefinitely extended class of imaginable possible events or state of affairs. All members of the set share the same characterizing property, which is given with the predicate.

The predicate assigns a property to the subject. However, the subject–predicate construction is more than property assignment only. Property assignment to the subject has an additional specific function. It instantiates the predicate in a single case such that the new construction must be true or false. This is crucial. The relation in a subject–predicate construction creates a new syntactic entity and that entity is distinguished by its truth-value property. As Aristotle (350 B.C.: Book I) pointed out, this truth-value property is the new and decisive characteristic of the subject–predicate construction.

Property Assignment

Property assignment as such needs not have the truth-value effect. There may be other reference-carrying parts within the proposition. They attract a property assignment as well, but they are not subjects. For example, the property assignment to 'any visitor' in (2) limits the predicate set, but is not offered as a point of instantiation.

(2) [Mona Lisa]-DP is smiling away at any visitor

The example in (2) can be rephrased as in (3).

(3) [Any visitor]-DP is being smiled away at by Mona Lisa

The predicates in (2) and (3) are somewhat differently qualified (active versus passive), but the two persons referred to, 'Mona Lisa' and 'any visitor', get assigned the same properties, say the charming one and the charmed one. These properties that a predicate head assigns to its arguments are commonly called theta roles. Each one of the theta roles is fit to function as a point of instantiation and a point to check for a true/false value, but if and only if it is assigned in the subject construction. This much may suffice to highlight the difference between implied property assignment to the nonsubject arguments and the explicit property assignment to the subject argument.

The subjects in (2) and (3) have a different property assigned to them by the predicate. The subject 'Mona Lisa' in (2) gets the property agentive argument. The subject 'any visitor' in (3) gets the property receiving, beneficient argument. Yet, although different, the subjects have their grammatical function in common. Each one brings its property (implied by the predicate) to the fore as the decisive moment for the truth value of the subject–predicate construction.

The Extended Projection Principle

So far, age-old plausibility considerations have been used to argue that a true/false value constitutes the defining requirement for a proposition. The logical truth-value requirement reappears as a grammatical well-formedness condition. The predicates in grammar require a local element that indicates and licenses their predicate status. At the same time, the predicate licenser involves the grammatical requirement that a subject should be present. If the DP subjects in (1)–(3) were left out, the remaining predicates would of course no longer function as parts of a proposition. At the same time, the predicative remnants are, without

any logical reflection, no longer interpretable as acceptable clauses either. That well-formedness failure can be described in mere grammatical terms. One must say that the 'smiling' predicates in (1)–(3) contain a local licenser, the auxiliary/copula 'is'. Let the category of the auxiliary/copula be labeled as a head I^o (Inflection). I^o projects into a phrase IP and it selects in (1)–(3) the predicate as its complement. At the same time, the auxiliary/copula element requires a specifier DP phrase on the left. See the phrasal diagram in (4). The IP phrase requires a specifier DP. Consequently, the grammatical well-formedness conditions of the IP relate predicate and subject, as respectively the complement and the specifier of I^o.

(4)

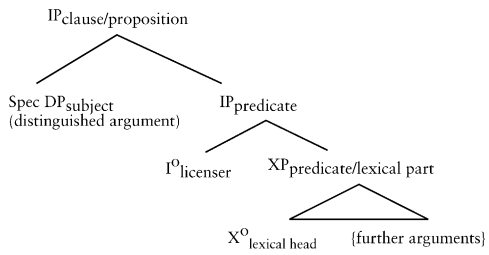

The definition of subject and predicate as specifier and complement of an I^o projection is known as the Extended Projection Principle, often abbreviated as EPP (Chomsky, 1981: 40f; Rothstein, 1983; Chomsky, 1986: 166). One could consider the I^o projection as the canonical form for the subject–predicate construction. The propositions of logical form correspond with the I^o projection in grammatical form. In general, a head X^o with lexical content will license its arguments as complements within its XP phrase. This is the Projection Principle and it serves to guarantee a semantically coherent interpretation of XP phrases. In addition, the predicate XP phrase will have a licenser I^o that announces a special or privileged argument position outside of the lexical predicate phrase in (4). In a sense, the licenser I^o extends the XP domain of argument licensing with Spec.I.

Configurational Prominence of the Subject Argument

A Uniform Configurational Prominence (EPP)

The Extended Projection Principle implies that all points where a speaker commits himself to an explicit truth value must be of the same IP type and form. Grammar would not admit to degrees of subjecthood or to degrees of explicit predicate instantiation. All cases of the subject–predicate relation are to be treated as configurations of an extended projection IP. If it were possible to define the subject in a uniform configurational way over all constructions and all languages, the propositional logic of natural language would be straightforward. Moreover, and grammatically more interestingly, if subjecthood were definable by a uniform configurational prominence throughout, secondary subject properties could be made to follow from that same configurational prominence.

Such secondary subject properties are, for example, the subject's antecedency in anaphoric phi-relations {verbal agreement, reflexivity, control} in (5) and the wider scope of quantifiers in (6).

(5) She convinces **herself** **to** visit the Louvre

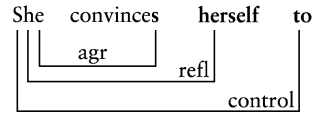

(6) each woman considered some pictures
(for every woman, there are at least some pictures that she considered)

The phi-feature antecedency and the wider quantifier scope follow if the subject c-commands the other arguments. The subject strictly c-commands the predicate if it is within the first phrasal configuration above the predicate (Reinhart, 1976; see also Chomsky, 1986: 164f). It may now follow from configurational prominence that any subject is the possible antecedent for further arguments in the predicate, whereas the reverse cannot hold. The sentence in (7a) cannot be acceptably rephrased as the one in (7b).

(7a) Mona Lisa liked herself
(7b) *she, herself, liked Mona Lisa

A quantifier on the subject may easily lead to a distributive reading for some argument, whereas the reverse does not hold. The sentence in (8a) will as such never be intended to mean that one should think of one and the same set of pictures as in (8b) (see Reinhart, 1983: 193).

(8a) each woman considered some pictures
(8b) *there were some pictures considered by each woman

In principle, grammatical properties of the subject should be derived from its configurational prominence. A further discussion of the EPP from various points of view is given in Svenonius (2002).

Secondary Predicates

The uniform configurational view on subject prominence (EPP) postulates a simple relation between grammatical form and the propositional status of a clause. The question is whether the EPP can be maintained. Here is the problem. Each natural language contains a score of various subject–predicate relations and the I^o projection for the EPP is hardly ever present in an obvious way. Moreover, English is comparatively

rigid on phrasal configurations, but other languages are less so and some seem to have hardly any phrasal configuration at all. For this problem and a defense of a configurational approach, see Baker (2001). Does then at least English have a phrasal configuration sufficiently tight to allow a uniform definition of the subject–predicate relation? It may be, but only by an extensive appeal to the theory of grammar. The originally intuitive notion of subjecthood is traded in for the EPP, and the presence and absence of an EPP configuration can only be considered within a whole theory of configurational syntax. Consider the bracketed parts in (9) and (10). They do suggest a predicate that is related to a subject, whereas an IP split as in (4) seems to be lacking most of the time.

(9a) finite verb subject
she [– smiles away]
(9b) infinitival raised subject-to-subject
she seems [– to smile at me]
(9c) infinitival raised subject-to-object
I believe her [– to smile away]
(9d) infinitival accusative subject
I saw her [– smile at me]
(9e) infinitival subject in *for/to* complement
I long for her [–to smile to me again]
(9f) subjects in *for/with* absolutives
with her [–smiling] my day was made
(9g) small clause resultative subject
that smile made her [– my heroine]
(9h) small clause subject with '*as* predicate'
I consider her [– as a flirt]
(10a) infinitival controlled subject
she intends [– to flirt]
(10b) predicate adjunct
Mona Lisa did not consume the carrots [– unwashed]

The bracketed predicates marked by a finite head (9a) or by the elements *to*, and *-ing* in (9b), (9c), (9e), and (9f), allow a separate negation. This tallies well with the truth-value property that should hold for all subject–predicate constructions. The same argument raises a problem in (9d), (9g), and (9h). These small clause predicates do not have the possibility of a separate negation. They can be denied but only by a negation placed on the matrix predicate. A strange, but unmistakable effect of this matrix negation is that precisely the bracketed part seems to be at issue, as shown in (11).

(11) I did not believe her to smile at me ≅ (I believed her not to smile at me

The same holds in (10b), where the matrix negation is realized. It seems more or less taken for granted in (10b) that carrots were on the menu and were consumed. The point of the denial is that neither these carrots, nor Mona Lisa herself, could qualify for the small clause predicate 'unwashed'. The sentential stress falls into the matrix predicate and within that matrix predicate it focuses the small clause predicate phrase. The denial, although placed on the matrix predicate, concerns the small clause predicate and takes the rest of the predicate for granted. This effect of matrix negation holds for the bracketed subparts in (10). An exception is the absolutive sentential adjunct in (9f): it requires a local negation, a negation element within the bracketed predicate; see (9f and 12).

(12) with Mona Lisa [– not smiling]

The small clause predicates can be negated and they require a subject that controls the phi-relations mentioned in (5), but the small clause predicates do not seem to contain an I^o projection.

Dummy Subjects and the Subject Configuration

All bracketed subparts in (9) select a DP subject that is positioned outside the (small clause) predicate. This can be demonstrated by means of so-called dummy subjects. Dummy subjects are selected as DP subjects by certain predicates, for example 'to snow' or 'to be obvious' as in (13).

(13a) it is snowing
(13b) it is obvious that Mona Lisa smiles

Dummy subjects are 3rd person singular pronouns that have no predicate assigned property (no theta role). Their message is 'instantiate this predicate here and now.' As (14) shows, dummy subjects do not allow a wh-variant.

(14a) *what is snowing?
(14b) *what is obvious that Mona Lisa smiles?

The predicates in (13) can appear as secondary predicates, as in (15). They continue to select the idiomatic dummy subject elements. The dummy element in (15a) clearly fits into a Spec.I, but less obviously in the other examples.

(15a) finite verb subject
it [– snows/is obvious that . . .]
(15b) infinitival raised subject-to-subject
it seems [– to snow/to be obvious that . . .]
(15c) infinitival raised subject-to-object
I believe it [– to snow/to be obvious that . . .]
(15d) infinitival accusative subject
I saw it [– snowing]
(15e) infinitival subject in for/to complement
I long for it [– to snow all day]
(15f) subjects in for/with absolutives
with it [– snowing] my day was made
(15g) small clause resultative subject
that smile made it [– snow/obvious that . . .]
(15h) small clause subject with 'as predicate'
I consider it [– as obvious that . . .]

The relevance of the dummy subjects is stressed in Rothstein (2001).

A dummy subject is a rather idiomatic phenomenon, but grammatical theory should preferably offer a configurational definition of subject that explains the parallel between I°-marked predicates and small clause predicates and that rules in dummy subjects. This is possible and leads to a few surprising reanalyses.

Koopman and Sportiche (1991) successfully reargued the predicate (VP) internal subject hypothesis. The lexical projection would already realize a propositional structure as indicated in diagram (16). For references and a survey of direct empirical arguments supporting the VP-internal subject hypothesis, see McCloskey (1997). Let now the merely lexical propositional structure VP as a whole be selected, for example by the I°. Then subject raising applies. See the transformational derivation of subjecthood by subject raising in (16).

(16)

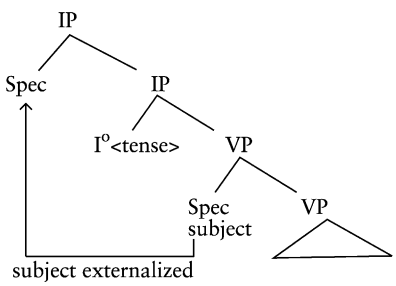

Subjecthood by subject raising may hold for small clauses as well. A raising of the small clause subject into a matrix construction ends in a matrix object position *I [make her] [– happy]*. Fortunately, there are parallels between the subject and object position that may save the parallel between the I° subject and the small clause subject.

A quarter of human languages, according to an estimate in Bybee (1985: 30–31) based on a judicious 50-language sample, has verbal agreement for both structural arguments. The ambition of present-day configurationalism, which goes under the name Minimalism (Chomsky, 1995), aims to place subject as well as object in parallel configurations and outside the VP (explaining the object agreement).

The analysis of the object as a kind of small clause subject can be extended by analyzing affected objects as subjects of a resultative small clause (Postal, 1974; Hale and Keyser, 2002), as in (17).

(17) Mona Lisa cleaned the carrots ≅ Mona Lisa made the carrots clean

The use of intermediate subject configurations as in the causative analysis of resultative objects is manifest in serial languages (Déchaine, 1993).

Selectional Prominence of the Subject Argument

The configurational approach, especially in its 'minimalist' variant (Chomsky, 1995), stands for a considerable amount of phrase structure manipulation.

Within generative grammar, there are alternatives: Lexical Functional Grammar (Bresnan, 2001), Head Driven Phrase Structure Grammar (Sag and Wasow, 1999), and the proposal by Williams (2003) avoid the proliferation of phrasal structure and the associated system of argument to specifier movement. They all turn to the semantic properties that a predicate assigns to its arguments. These semantic properties are plausibly selected from a highly limited and prospectively universal set of options, so-called theta roles {agent, cause, affected object, affected person, goal, result, location} (Keenan and Comrie, 1977; cf. Sect. 1.3). There is a hierarchy among the theta roles. The agent theta role is selected for subject prominence in the unmarked case. Passive endings on the predicate may change the hierarchy effect, but only in a limited way. The usual subject theta role that is blocked for the passive-marked predicate, may either no longer be expressed at all, or it must take the form of an oblique adjunct 'by Mona Lisa' in (18). The new subject is either an impersonal dummy subject, or the argument that is next to the hierarchy in theta roles 'the visitor.'

(18) the visitor is smiled at by Mona Lisa

Since the selection of the subject argument follows from the hierarchy of theta roles, there is an option. Subject properties may follow from the subject configuration, as defined by the Extended Projection Principle, or they may follow more directly from theta role prominence. Antecedenthood for verbal agreement, reflexivity, or control may follow either from theta role prominence or from a configurational effect of that prominence.

A direct interpretation of subjecthood in terms of theta-role prominence offers a descriptive advantage. There is less configurational reanalysis of the string as in (20) above and all grammars with full or partial nonconfigurationality fit in easily. Part of this advantage is short-lived. The interpretative rules for syntactic function interact and lead to new complexity; see for instance Ristad (1993).

Typology

Survey of Properties

A more mundane, less theoretical, approach to the notion 'subject' has been tried out as well. Keenan

(1976a) lists 30 possible properties of subjects. There are all kinds of variation and there is no shared minimal subset of properties sufficiently theory-free that could be used as a straightforward observational check on subjecthood. Keenan's contention is the somewhat weaker claim that a DP in a clause must be the subject if it displays clearly more of these prototypical subject properties than a competitor. His main point is that surveys in comparative grammar, in which subjecthood figures highly, are by no means an exercise in global impressions. They are an empirically serious matter. Explaining the diversity of subject properties between languages is no less challenging than explaining the subject diversity within a specific language. Keenan divides his subject properties in three subsets: (1) semantic, (2) syntactic, and (3) pragmatic.

1. Keenan's semantic subject properties are the theta roles that a predicate may assign to its subject. Those roles are plausibly selected from a highly limited and prospectively universal set of options, as mentioned in the previous section. The semantic subject properties deal with theta hierarchy and its exceptions in so-called ergative and split-ergative languages.
2. Keenan's syntactic subject properties are the pronominal phi-features of the subject (number, person, gender) for verbal agreement, reflexives, and control (Schachter, 1976), illustrated in (5).
3. Keenan's pragmatic subject properties deal with the subject that must at the same time be definite, old information, and function as presumed or running discourse topic.

Pragmatic Subject Properties

A telling case of pragmatic subject properties is the subject in Sesotho (a Bantu language) as analyzed by Demuth (1989). The subject in the Sesotho system must be at the same time the definite presumed old information topic. Hence subject arguments cannot be questioned. Nevertheless and as usual, the agentive a role is preferred subject property. If one now would like to ask a 'who dunnit' question in Sesotho, the subject–predicate structure must be changed into the parallel construction 'by whom was it done.' And that is what happens; see (19) (Demuth, 1989: 67).

(19a)	*mang	o-pheh-ile	lijo?	
	who	sm-cook-prf	food?	
	(who cooked the food?)			
(19b)	lijo	li-pheh-il-o-e	ke	mang?
	food	sm-cook-prf-PASS-m	by	who?
	(the food was cooked by whom?)			

Subject-changing transformations succeed in maintaining the status of the subject as preordained old topic. The Sesotho case was brought up by Demuth in a discussion about the learnability of subject-changing transformations. As Demuth pointed out, the learnability of subject-changing transformations may relate to the discourse functions such transformations have. As a discourse device, passive is central in Sesotho. Sesotho children below the age of 3 show themselves as little masters in subject-changing constructions. By comparison, passive plays a more marginal role in English, and it is acquired later.

A comparable subject-changing issue appears in Keenan's (1976b) analysis of Malagasy, an Austronesian language on Madagascar. The subject in Malagasy must also function as an old information argument. Curiously, the subject is now the only argument that may appear as a relative pronoun. By consequence, if one would like to relativize an argument, it must be made subject and a subject-changing transformation is called for. Fortunately, and perhaps not by accident, Malagasy, like all Austronesian languages, is strong in subject-changing transformations.

Tagalog (Schachter, 1976) marks a single argument in each clause as the most prominent one. All other arguments have an oblique case. The prominent argument drops that oblique case and appears with a fixed single element *ang*. One might think of it as a topic marker. The obligatory prominence marking by *ang* co-occurs with a marking on the verb. This is reminiscent of the subject–verb relationship, but there is no verbal agreement by means of phi-features. The dependent marking on the verb indicates the theta role of the prominent argument. It is rather an indication of voice (active and various kinds of passive). The verb is in the initial position and the subsequent argument order is free without any obvious configurational structure. Schachter hesitates to welcome the prominent argument in Tagalog as the subject. The interesting reason is that all subject attributes that follow from the external position of the configurational subject are lacking. The single and grammatically marked prominent argument has no wide quantifier scope, is not the antecedent of reflexives, and is not the controlled argument in subordinates. The questioned argument, though, must have the prominent status and the relative clause is formed by dropping the prominent argument, because of its identity with the antecedent of the relative clause. See (20), adapted from Schachter (1976: 495).

(20) the woman will take some rice for the child out of the sack

subject marker – verb { <agent> <goal> <direction> <beneficent> }

(s/a)alis **ng** *babae* **ng** *bigas* **sa** *sako* **para-sa** *bata*

<agent> mag- ← ang

<goal> -s ← ang

<direction> -an ← ang

<beneficent> ipag- ← ang

- Only one of the arguments drops its (oblique) case for the topic marker *ang*.
- The verbal inflection subsequently expresses the theta role of the topic.
- The verb is in initial position. The linear order of the arguments is free.

Both Bantu Sesotho and Austronesian Tagalog have in principle a predicate-selected argument with unique prominence. At the same time, the prominent argument is bound to function as topic (old information argument) in Sesotho or as focus (new information argument) in Tagalog. Both systems combine the most prominent argument status with a topic or focus function. They succeed in doing so because of a high flexibility of the verbal paradigm. The selection of the prominent argument by the verb may target any standard argument, as a result of the variety of passive-like endings on the verb. These endings indicate whether the prominent argument is an agent, a beneficiary, a goal, or a location. Verbal systems with such a variety of passive-like endings are called applicative (Baker, 1988).

There are several languages that require a systematic marking of topic or focus. They may or may not collapse subject and topic marking. See Li and Thompson (1976). The parallel between propositional logic and clausal grammar is less clear in topic-oriented languages, since the topic need not be an argument of the predicate head at all. Predicates are no longer instantiated by means of argument prominence and the notion subject does not apply.

Conclusion

Subject–predicate relations appear in a variety of phrasal configurations and morphological markings see (9), (10). Moreover, they may be further associated consequences for reflexives, control of infinitival complements, coordinate structure reductions, subject-drop, switch reference phenomena, effects of quantifier scope, unstressed topic-hood requirements, long wh-movement restrictions, and so on. This constructional variety appears within the grammar of specific languages and it appears between them in comparative grammar. Yet it is a crucial property of human language to construct complex signs with a true/false value. Consequently, a theory of syntax that holds water should explain how this feat is arrived at by grammar and what its further distributional consequences are. Preferably, all subject–predicate variations in syntax should derive (naturally) from a single representation or a single descriptive device. Syntactic analysis may show how subjecthood is a privileged form of argument saturation and how that construction leads to the grammatical form for propositions with true/false values. No doubt such an ideal subject/predicate analysis will require syntactic tinkering for each new construction. Fortunately, the various syntactic workshops or programs in generative syntax offer all kinds of options. These alternatives are sometimes thinly veiled parallels, sometimes purposely incompatible. The syntacticians by their very ambition change the notion subject anyway. Initially, 'subject' was a plausible intuition about a few simple grammatical structures. On closer inspection, it turns into a somewhat unwieldy problem that legitimately involves the set up of the whole theory of syntax. Moreover, as far as the facts are concerned (and their reconstruction in grammatical theory), we are faced with chaos that continues to rise. This is as such of course not an objection to the notion subjecthood, nor is it a reason for dismay.

See also: Aristotle and Linguistics; Chomsky, Noam (b. 1928); Command Relations; Complex Predicates; Comrie, Bernard (b. 1947); Configurationality; Control and Raising; Cross-Linguistic Comparative Approaches to Language Acquisition; Frege, Gottlob (1848–1925); Generative Grammar; Grammatical Relations and Arc-Pair Grammar; Hale, Kenneth L. (1934–2001); Head-Driven Phrase Structure Grammar; Lesotho: Language Situation; Lexical Functional Grammar; Linguistic Universals, Chomskyan; Malagasy; Minimalism; Predication; Projection Problem; Propositions; Reinhart, Tanya; Serial Verb Constructions; Syntactic Development; Tagalog; Tense, Mood, Aspect: Overview; Thematic Structure; Truth Conditional Semantics and Meaning.

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Subordination

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Definition

In a general sense, if an element α is subordinate to an element β, it is less prominent than β and usually α is dependent on β. In grammar, subordination is a pervasive phenomenon and occurs in many different guises. Consider the following example:

(1) I thought [$_{\text{Clause}}$ that [$_{\text{NP}}$ the endless storm] was frightening]]

Here, in the noun phrase *the endless storm* the head is the noun *storm*. It is preceded by the determinative *the*, which renders the phrase definite, while *endless* furnishes additional descriptive information about the head. In phrase structure, all elements are subordinate (although in different ways) to the head. The string *that the endless storm was frightening* is a subordinate clause. A defining characteristic of subordination (also called hypotaxis) is that the subordinate element or string is syntactically at a lower level in the overall structure than the element or string it is subordinate to. Thus in (1) *that the endless storm was frightening* is subordinate because it functions as the direct object of the verb *think*, which forms part of the main clause. In this article, I use the term 'subordination' in the narrower sense of clause linking, that is, as a grammatical phenomenon in which a clause is linked to another clause (or in some cases a phrasal head).

Markers of Subordination

When a clause is subordinate to another clause, the subordination is often marked. This can be done in a variety of ways.

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Subordinators

In the sentences that follow, the subordinate clauses (in italics) are linked to their host, the main clause, by an overt subordinator (in boldface):

(2) ***when*** *they arrived* all hell broke loose

(3) we liked the play ***because*** *the acting was superb*

(4) he never calls you ***although*** *he says he likes you very much*

(5) he claims ***that*** *the trains that go to Edinburgh are running on time*

(6) I don't know ***whether*** *they will cancel the appointment or not*

(7) the committee will decide ***if*** *you're suitable for this position*

(8) it is entirely appropriate ***for*** *you to comment on his management style*

The items *that, whether, if,* and *for* are often called complementizers because they introduce clauses that function as a complement to a verb or some other head. Some linguists have argued that a subset of items traditionally regarded as subordinators are prepositions; they then reserve the class of subordinators for only *that, whether, if,* and *for* (see, e.g., Huddleston, Pullum *et al.*, 2002).

Word Order

Subordination can also be signaled by changes in the canonical order of words as in (9), which shows English subject-auxiliary inversion:

(9) *had I known about her qualifications*, I would have offered her the job

The italicized clause is interpreted as carrying conditional meaning.

Compare (9) with (10), in which, this time, subject-auxiliary inversion is a feature of the main clause interrogative, whereas the subordinate interrogative clause in (11) has the expected word order of subject, auxiliary, and main verb:

(10) which books should I read?

(11) nobody seems to know *which books I should read*

In (11) the subordination is in actual fact jointly marked by the canonical word order of subject, auxiliary, and main verb, and the *wh*-phrase, which is associated with ('moved from') the direct object position following the verb *read*. An initial *wh*-phrase on its own is not enough to signal subordination, as (10) shows.

In Dutch, subordinate clauses have a different word order from main clauses. Compare (12) and (13):

(12) Willem heeft de kat vermoord
Willem has the cat murdered
'Willem has murdered the cat'

(13) ik denk dat Willem de kat heeft vermoord
I think that Willem the cat has murdered
'I think that Willem has murdered the cat'

Consider also the example in (14) from German, in which the predicative adjective phrase *krank* 'sick' would normally follow the verb in a main clause (*er ist krank*) (König and van der Auwera, 1988: 102).

(14) *weil* *er* *krank* *ist*, kann
because he sick is can
Fritz nicht mitkommen
Fred not come along
'because he is sick, Fred cannot come along'

Subordination is often signaled by desententialization (Lehmann, 1988), as in the following sentence in which the subject of the subordinate clause is missing (and, in addition, the verb form is nonfinite; this is discussed later).

(15) I want *to emigrate to Australia*

Verb Forms

Clauses may be finite, nonfinite, or verbless. Nonfinite and verbless clauses are always subordinate because they cannot stand on their own, as the following examples illustrate.

(16) *having taken a shower*, Fred was now ready to go out

(17) Sally had to walk home, *her car a wreck*

Clauses containing subjunctive verb forms are also always subordinate. Indeed, as Palmer (1987: 90) reminds us, "the term subjunctive is a translation into Latin from the Greek *hypotaktike*, which means 'subordinate'"; see also Lyons (1969: 312), who remarks that "for the traditional grammarian the subjunctive was the mood of subordination *par excellence*." In many languages, these verb forms are triggered by a verb in the main clause that expresses modal meanings such as factual remoteness, possibility, and unreality. Thus, in Spanish the verb *esperar* 'hope' takes a subordinate clause with a subjunctive verb:

(18) espero que el pueda venir
hope.I that he can.SUBJ come
'I hope that he can come'

Another way in which verb forms can signal subordination is through the phenomenon of switch

reference. Consider example (19) from Noonan (1985: 80–81), who noted that in Lango:

> [i]n ordinary subordinate clauses, both indicative and subjunctive, a verb inflected for third person must have a prefix indicating whether the subject of the subordinate clause is the same or different from the subject of the CTP [complement-taking predicate]. In the third person singular perfective, the prefix indicating same subject (SS, non-switch reference) is *è-*, and the unmarked prefix indicating a third person singular subject (which can be interpreted as switch reference) is *ó-*.

Thus, in (19) the subject of *ècégò* is *dákó* (non–switch reference), but in (20) the subject of *òcégò* cannot be *dákó* (switch reference).

(19) dákó òpòyò ní
woman remembered.3.SING.SUBJ COMP
ècégò dɔgólá
closed.3.SING.SS door
'the woman$_1$ remembered that she$_1$ closed the door'

(20) dákó òpòyò
woman remembered.3.SING.SUBJ
ní òcégò dɔgólá
COMP closed.3.SING.SUBJ door
'the woman$_1$ remembered that she$_2$ closed the door'

(Here SS indicates same subject.) This phenomemon is only possible in subordinate clauses.

Here are some Quechua examples from Cole (1982):

(21) Kitu-man chaya-shpa-mi
[Quito-ALL arrive-ADVLR.SS]-VAL
rijsi-ta riku-rka-ni
acquaintance-ACC see-PAST-1.SING
when I arrived in Quito, I saw a friend'

(22) ñuka Kitu-man chaya-jpi-mi
[I Quito-ALL arrive-ADVLR.DS]-VAL
rijsi riku-wa-rka
acquaintance see-OBJ.1-PAST.SUBJ.3
'when I arrived in Quito, a friend saw me'

(Here ALL indicates allative; ADVLR.SS indicates adverbializer, same subject; ADVLR.DS indicates adverbializer, different subject; and VAL indicates validator.) In these examples, the inflections on the verb at the end of the subordinate clause signal whether its subject is the same or different from that in the main clause.

Scope, Intonation, Semantic Linking, and Grammatical Category Dependence

Consider (23)

(23) I didn't go to the gallery because I wanted to meet Sue

This sentence is ambiguous. Under the first reading, the reason for my not going to the gallery was that I wanted to meet Sue in some other location. Under the second reading I **did** in fact go to the gallery, but the reason for my going there was not that I wanted to meet Sue but some other reason (we can continue the sentence in (23), saying *but because I wanted to see the pictures*). The difference between the two readings has to do with the scope of the negative element in the main clause. Under the second reading, it extends into the subordinate clause; under the first reading it does not. Notice that under the first reading there is an intonational break just before the subordinate clause, and there are thus two intonation contours for this complex sentence. For the second reading, there is just one contour. We thus see that a main and a subordinate clause, in addition to having overt markers of subordination, can be linked by the semantic notion of scope of negation.

Consider next a Russian example of intonational linking (Haiman and Thompson, 1984: 516):

(24) Alik ne xodit (PAUSE) spotykajas' (Russian)
Alik NEG walk stumbling

This sentence can be glossed in two ways, depending on whether there is a pause between *xodit* and *spotykajas*. If there is a pause, then (24) can be translated as 'Alik doesn't go because he stumbles' (i.e., with a subordinate clause), whereas without the pause it means 'Alik doesn't walk with a stumble.'

Semantic linking refers to meaning links that can be established between clauses, such as the mention of the same people or entities. The term grammatical category dependence (GCD; Van Valin, 1984) can be defined as a dependence between clauses in terms of voice, mood, tense, pronoun reference, and so on. Van Valin cites an example from Jacaltec (Craig, 1977):

(25) ch-in xubli an
NPAST-1.SING.ABS whistle 1P
x-Ø-(h)in-tx'ah-ni xil
PAST-3.ABS-1.SING.ERG-wash-SUFF CLASS
kape an
clothes 1P
'I washed the clothes whistling'

(Here NPAST indicates nonpast, ABS indicates absolutive, ERG indicates ergative, SUFF indicates suffix, and CLASS indicates classifier.) Van Valin (1984: 546) notes that

> the verb in the first clause must be in the neutral nonpast tense form, and the two clauses must have the same subject. The tense interpretation for the whole sentence is a function of the tense inflection of the verb in the second clause; there is therefore G[rammatical] C[ategory] dependence between the clauses.

Main Clause Phenomena

Emonds (1970, 1976) discusses a number of syntactic operations (transformations) that can only take place in root (i.e., main) clauses. Green (1976) dubbed these operations main clause phenomena (MCP). Among them are subject-auxiliary inversion (SAI), tag question formation (TQF), adverb preposing (AP), and topicalization (TOP). Here are a few illustrative examples (from Emonds, 1976: 21):

(26a) why weren't they cooperative? (SAI)
(26b) *she doesn't know why weren't they cooperative?

(27a) Mary had come, hadn't she? (TQF)
(27b) *Bill wanted to know whether Mary had come, hadn't she?

(28a) under no conditions may they leave the area. (AP)
(28b) *if under no conditions may they leave the area, how can they pay their debt?

(29a) these steps I used to sweep with a broom. (TOP)
(29b) *have I shown you the broom (that) these steps I used to sweep with?

Green (1976: 397) argues that, in fact, MCP can occur in subordinate clauses as well, provided certain conditions are met: "the embeddability of so-called MCP is influenced not only by syntactic forms and semantic functions, but also by pragmatic functions, by what a speaker is trying to do in using a particular syntactic form to express something." This view was endorsed by Bolinger (1977).

No Overt Marker of Subordination

Subordination can also be achieved without overt markers of subordination, as in the well-known cases of *that* – omission in English complement clauses:

(30) I believe (that) the monarchy won't survive for much longer

Here the string of words following *believe* can stand on its own, but should nevertheless be regarded as a subordinate clause by virtue of the fact that it functions as the direct object of *believe*.

Consider also:

(31) do that again and I'll punch you

Here the imperative clause seems to be coordinated with the clause *I'll punch you*, but it is interpreted as a conditional adjunct clause, that is, as *if you do that again*.

Circularity

Some linguists have pointed out (Haiman and Thompson, 1984; Thompson, 1985: 86) that one problem of using the phenomena discussed so far to identify subordination is that it may lead to circularity: "Why is this clause subordinate?" "Because it is introduced by a subordinator." "Why is it introduced by a subordinator?" "Because it is subordinate." Where possible, we therefore need to look for additional identifiers of subordination, as in (13), which combines the use of a subordinator with a change in word order. According to Palmer (1987: 97), it is the fact that the subordinate clause can follow or precede the main clause (compare also (2) and (3)) that distinguishes it from the coordinated clause, as in (32) and (33):

(32a) John came, although Mary stayed at home
(32b) although Mary stayed at home, John came

(33a) John came, but Mary stayed at home
(33b) *but Mary stayed at home, John came

However, this test does not always work, as when the element *for* is the subordinator:

(34) John laughed, for he was a fool
(35) *for he was a fool, John laughed

Palmer is forced to say that *for* is not a subordinator, even though it functions in the same way as the causal subordinator *because*.

The circularity problem has led some linguists to conclude that there is no meaningful grammatical notion of subordinate clause (Thompson, 1985: 86):

> '[S]ubordinate clause' is not a grammatical category at all. That is, there does not seem to be a single function or even a group of functions that we can think of this 'category' as having been designed, as it were, to serve. So the term 'subordination' seems to be at best a negative term which lumps together all deviations from some 'main clause' norm, which means that it treats as unified a set of facts which we think is not a single phenomenon. For these reasons, we have found it more fruitful to tease it apart into its component parts and try to determine what are the discourse motivations that underlie each of these components.

Some of these components have already been discussed (see also Haiman and Thompson, 1984: 511). For a discourse approach to subordination, see Matthiessen and Thompson (1988). For a typological approach see Cristofaro (2003: 2) where subordination is regarded as "a particular way to construe the cognitive relation between two events, such that one of them (which will be called the dependent event) lacks an autonomous profile, and is construed in the

perspective of the other event (which will be called the main event)."

Types of Subordinate Clause

Subordinate clauses can be classified as follows.

Content Clauses

The label 'content clause' was introduced by Otto Jespersen (1933) and was adopted in Huddleston, Pullum *et al.* (2002) to designate a type of clause that assumes a typical clause function, such as subject, direct object, and complement of a preposition. (Because content clauses often occur in NP positions, they have been called nominal clauses; cf. Quirk *et al.*, 1985: 1048.) They can be introduced by such elements as the complementizers *that, whether, if,* and *for* (examples are shown in (5)–(8)) or by *wh*-words (e.g., *I don't know* ***what*** *you mean*).

Comparative Clauses

As their name suggests, comparative clauses express a comparison between two terms. Here are some examples.

(36) these days Ben likes syntax more *than he did last year*

(37) the French are as mad *as the English are*

Relative Clauses

Relative clauses are used to postmodify noun heads.

(38) this is the camera *that we bought in America*.

(39) we invited Harry's father, *who loves barbecues*

The relative clause in (38) is a restrictive relative clause; it singles out a particular camera from the universe of discourse. In contrast, in (39) we have a nonrestrictive relative clause, so called because the clause does not serve to identify a unique entity in the universe of discourse.

Adjunct Clauses

Adjunct clauses furnish circumstantial information that is supplementary to the proposition expressed by the main clause. The subordinators that introduce adjunct clauses can signal a wide variety of meanings, among them 'time' (*when, while, since*), as in (2); 'reason' (*because since, as*), as in (3); 'concession' (*(al)though, (even) though*), as in (4); 'condition' (*if*), as in (40); 'result,' as in (41), and 'purpose,' as in (42) (this is by no means an exhaustive list of the meanings that can be expressed).

(40) *if you cook tomorrow* I will take you to the theatre

(41) the prisoners will be released *so that more space will be available*

(42) *in order that we can finalize the arrangements* all employees are requested to work overtime

Degrees of Subordination

Subordination is a matter of degree. First, clauses that are merely juxtaposed are paratactically linked, as in (43).

(43) Tim fell. He broke his arm.

Although there is an obvious semantic (causal) link between the first and second sentences in this example and co-reference is established through the use of the pronoun *he*, which may (but need not) refer back to Tim, grammatically neither sentence is subordinate to the other.

Consider next adjunct clauses, as in (40)–(42). These are clearly part of their containing sentences and subordinate in the sense of not being able to occur on their own and in furnishing nonessential information, but they are nonembedded. What this means is that they are not constituents (arguments) of some unit of the sentence, other than the sentence itself. In sentences containing adjunct clauses, more than one assertion is being made. Thus in (41) the assertions are *the prisoners will be released* and *more space will be available*. Another example of nonembedding is (25), which similarly displays dependence, but by virtue of grammatical category linking, not embedding. The combination of features [+dependent, −embedded] is termed 'cosubordination' in Van Valin (1984: 546), following Olson (1981). This is contrasted with subordination, which he regards as [+dependent, +embedded], and coordination, which can be characterized as [−dependent, −embedded]. Care should be taken with this terminology: some authors use the term 'hypotaxis' to mean what Van Valin called cosubordination (see, e.g., Matthiessen and Thompson, 1988: 283).

Matters are different for content clauses that function as complements in a sentence, for example, the *that*- clause in (5). These are said to be embedded, in this case in the verb phrase whose head requires a clausal complement. When embedding occurs, the complex sentence expresses just one assertion. In the case of (5): *X claims Y*.

Observe that it is necessary to recognize levels of embedding. Thus, the relative clause *that go to Edinburgh* in (5) is more deeply embedded than its

containing clause *that the trains that go to Edinburgh are running on time* because it is part of its subject NP. Levels of subordination can be signaled by intonation through intonational linking (see above). Consider the pair of sentences (45) and (46) (Bolinger, 1984: 410), as contrasted with (44):

(44) if you need it when you get there call me

(45) if you need it, when you get there call me

(46) if you need it when you get there, call me

Without any clues as to which intonation is intended, (44) is ambiguous; but with commas indicating intonational breaks, the *when* clause is either taken to be subordinate to *call me*, (45), or to *if you need it* (46). Notice also that the word *there* ends on a lower pitch in (46) than in (45).

Subordination versus Other Grammatical Notions

How can we distinguish subordination from other grammatical phenomena such as modification, complementation, and coordination?

Modification and complementation are both types of dependency and, as such, involve subordination. To clarify this, consider the noun phrase *the frightening storm that battered our house*. The head here is *storm*, and we will say that the element *the* and the string *that battered our house* are both dependent on the head and modify it; hence, they are subordinate to it in the wider sense. But only the relative clause is subordinate in the narrower sense used here, as involving a clause linked to a host.

Consider next (47) and (48):

(47) their discussion *of the problem* did nothing to cool tempers

(48) the fact *that he manipulated his audience* was beyond doubt

The subject noun phrase in (47) is headed by the noun *discussion*. It is preceded by the determiner *the* and followed by the prepositional phrase *of the problem*, which functions as a complement (cf. *they discussed the problem*). In (48), the *that* clause is said to be an appositive clause (in that it specifies the content of the head noun *fact*). It too functions as a nominal complement. In (47) there is subordination, in the narrow sense, in the shape of modification, whereas in (48) we have subordination in the wide **and** narrow senses of the term.

Subordination is distinguished from coordination. The latter links units at the same level, as in [*the vicar*] *and* [*the actress*], in which two noun phrases are coordinated and neither NP is subordinate to the other. Previously we came across an example in which a particular kind of coordination resembles subordination from a semantic point of view. Several linguists have argued that subordination and coordination cannot easily be distinguished. Thus, the Dutch grammarian Kruisinga (1932: 501) noted that "[i]t is perhaps hardly necessary to observe that the distinction between coordination and subordination is a relative one, allowing of intermediate cases." Huddleston (1984: 380, 382–383) makes similar comments. In Quirk *et al.* (1985: 927–928) the idea of gradience between subordination and coordination is worked out in detail. They posit six syntactic criteria (not ranked in order of importance) to characterize coordinating conjunctions. The more criteria a particular item conforms to, the more it is like a coordinating conjunction and the less it is like a subordinating conjunction. (Most of the examples that follow are from Quirk *et al.*, 1985: 921).

Criteria

1. The item can only occur at the beginning of a clause.

(49a) John plays the guitar, **and** his sister plays the piano

(49b) *John plays the guitar; his sister **and** plays the piano

2. In a sequence of coordinated clauses A and B, when B contains the item, B cannot precede A.

(50a) they are living in England, **or** they are spending a vacation there

(50b) ***or** they are spending a vacation there, they are living in England

3. A sequence of coordinating conjunctions is impossible, whereas subordinating conjunctions and conjuncts **can** combine with other linkers.

(51a) *he was unhappy about it, **and but** he did as he was told

(51b) he was unhappy about it, **and yet** he did as he was told

(51c) he asked to be transferred, **because** he was unhappy **and because** he saw no prospect of promotion

4. The item can link clauses but also predicates and other types of constituents.

(52a) I [may see you tomorrow] **or** [may phone later in the day]

(52b) *he [did not spend very much], **so that** [could afford a trip abroad]

Table 1 Co-ordination-subordination gradient

Criteria		*a*	*b*	*c*	*d*	*e*	*f*
Coordinators	*and, or*	+	+	+	+	+	+
	but	+	+	+	+	±	−
Conjuncts	*yet, so, nor*	+	+	×	+	−	−
	however, therefore	−	+	−	−	−	−
Subordinators	*for, so that*	+	+	+	−	−	−
	if, because	+	±	−	−	−	−

Source: Quirk *et al.* (1985).

5. The item can link subordinate clauses.

(53a) I wonder [whether you should go and see her] **or** [whether it is better to write to her]
(53b) *they didn't stay [although they were happy], **but** [although they were bored]

6. The item can link more than two clauses.

(54a) the battery may be disconnected, the connection may be loose, **or** the bulb may be faulty
(54b) *Kate watched television, **but** Gerry was reading, **but** Pete was singing

These criteria are then used to construct the matrix in Table 1 (see also Van Valin, 1984).

See also: Complement Clauses; Constituent Structure; Co-ordination; Mood, Clause Types, and Illocutionary Force; Relative Clauses.

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Subordination in Spoken Discourse

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Introduction

The distinction between main and subordinate clauses does not apply straightforwardly to unplanned spoken language. One difficulty is that it was developed with respect to sentences, but sentences are not useful in the analysis of unplanned speech. For detailed discussion, see Miller and Weinert (1998: Chap. 2) and Sornicola (1981), and for the opposing view, see Chafe (1994: 139–145). Another difficulty in subordination is that the distinction is based in part on syntactic and in part on discourse properties. Examples of the former are constructions that occur in main clauses but not in subordinate ones; examples of the latter are clauses that cannot stand on their own. When clauses such as *though she knew Bill might turn up* or *which she turned down* occur on their own as the first clauses in texts, the texts are incomplete and uninterpretable. Clauses such as *which she turned down* can constitute complete contributions to conversations, but not as the first utterance. Consider (1).

(1) Speaker A *so Jane had a proposal from Bill*
Speaker B *which she turned down*

Clauses such as *Eric wrote Jane a letter* occur as the very first contribution to a text or in the middle of a text. But a text consisting just of the clause *which she turned down* is incomplete in syntax and meaning.

Main and Subordinate Clauses in Written Language

Syntactic Subordination

In written texts, main and subordinate clauses are syntactically quite distinguishable. Main clauses are never embedded; certain types of subordinate clause – restrictive relative clauses and complement clauses – are always embedded. In (2a) the restrictive relative clause, in bold, is part of the phrase *the book you lent me*; in (2b) the complement clause is part of the verb phrase *heard that you had retired*; in (2c) the complement clause is part of the noun phrase *the rumor that you had retired*.

(2a) I haven't finished the book **you lent me**
(2b) We heard **that you had retired**
(2c) We heard the rumor **that you had retired**

Main clauses allow an extensive range of constructions: They can be declarative as in (3a), interrogative (as in 3b), imperative as in (3c); they allow tag questions as in (4a), subject-verb inversion with negatives as in (4b), and the fronting of prepositional phrases as in (4c).

(3a) Bill arrived unannounced
(3b) Did Bill arrive unannounced?
(3c) Arrive unannounced!

(4a) Bill arrived unannounced, **didn't he?**
(4b) **Never has Bill** arrived unannounced
(4c) **Into the house came Bill**, unannounced

Subordinate clauses do not allow the same range of constructions as main clauses. Relative clauses, complement clauses, and adverbial clauses all exclude, for example, interrogative syntax.

(5a) *I hated the book **which did you say you liked it?**
(5b) *She said **that did they find a suitable house?**
(5c) ***If were they at the party**, I didn't see them

Even in written English some types of subordinate clause are more subordinate than others; the negative-inversion construction in (4b) is excluded from relative clauses and adverbial clauses but allowed in complement clauses – *The inspectors reported that never had they been so astonished*.

Discourse Subordination

A second type of subordination relates to discourse and is signaled by the use of anaphoric pronouns, ellipsis, and conjunctions. Consider the anaphoric pronouns in (6), in bold. *They* refers back to *the keen students*, *he* refers back to *the professor*, and *then* refers to the time at which the assignment was submitted. The clauses with anaphoric pronouns can only be interpreted with respect to the preceding clauses and are discourse subordinate.

(6) The keen students decided to submit the assignment to the professor on Thursday. **They** thought **he** would **then** allow **them** to go home. **He** didn't.

(7) illustrates the linking of clauses with conjunctions (shown in bold).

(7) The workers demanded better conditions and went on strike. **Consequently** the management locked the workers out. **However**, the workers summoned reinforcements and picketed the factory.

The clauses with *Consequently* and *However* have to be interpreted with respect to the preceding clauses and are discourse subordinate.

Main and Subordinate Clauses in Unplanned Speech

Unplanned spoken English (and other languages) does not permit such a clear-cut distinction between main and subordinate clauses. Speakers use a higher proportion of main clauses; clauses that look like subordinate clauses function as main clauses; clauses that look like subordinate clauses have the word orders typical of main clauses in writing; unplanned speech contains combinations of clauses that are not related as main clause–subordinate clause.

Main Clauses in Speech; Subordinate Clauses in Writing

(8a–c) demonstrate the use of main clauses in English and French for purposes that would require a subordinate clause in writing.

(8a) OK we install it there's no guarantee it'll work
(8b) je serais à ta place je partirais tout de suite [French]
I would-be in your place I would-leave immediately
(8c) I saw him I didn't speak to him though

(8a), with the particle *OK* followed by the clause *we install it* has the force of the written version *Even if we install it, there's no guarantee it'll work*. The first main clause does the work of a conditional-concession clause.

In (8b) the connection between the two main clauses is signaled by the Imperfect Future forms of the verb *serais* and *partirais*. The first expresses a remote condition, and in writing would be *Si j'étais* 'If I were.' The second conveys the resulting state of affairs. Otherwise, each clause is syntactically and semantically complete.

In (8c) a main clause conveys a concession – *I didn't speak to him though*. The clause comes second but *though* is not a subordinating conjunction. (Compare *although I didn't speak to him*.)

Adverbial Clauses Functioning as Main Clauses

(9a–c) show apparent adverbial clauses of reason, condition, and time functioning as main clauses.

(9a) Speaker A: they go to X now do they not the school?
Speaker B: yeah cos it's indoors
(9b) Right if you listen to me carefully, you are going to be asked questions about Y
(9c) I was bringing in the shopping when the dog jumped up and knocked the bag of bottles out of my hand

(9a) is from conversation. Speaker B produces an apparent adverbial clause of reason modifying the clause which would be the answer to A's question: *they go to X*. Of course Speaker A could have uttered the whole chunk *they go to X cos it's indoors*. (The reference is to a swimming pool.)

Such *cos/because* clauses function almost like main clauses. They allow tag questions – *cos it's indoors isn't it*, adverb fronting – *everyone had a laugh cos into the pool jumped a dog*, and negative inversion – *cos never had the pool been so busy*. In contrast, adverbial clauses of reason preceding main clauses have restricted syntax; for instance, adverb fronting is not possible: **because into the pool jumped a dog, everyone scrambled out*.

(9b) is from an interview in a police station. The *if* clause is not an adverbial clause of condition but a frequently used device for giving instructions. It is widely used by medical staff talking to patients, for example. Although functioning as an imperative main clause, it has the same restricted syntax as ordinary adverbial clauses.

In (9c) *when the dog jumped up* looks like an adverbial clause of time. However, it allows main-clause constructions (adverb fronting – *when into the pool jumped the dog*, tag questions – *when the dog knocked the stuff out my my hand, didn't it?*) and functions like a main clause. *When* adverbial clauses typically describe an event preceding the event described by the main clause: *when the dog jumped up I dropped all the shopping*. In (9c) it describes the event following. *When* is not a subordinating conjunction but coordinates the clauses.

Clause Combinations and Unintegrated Syntax

Speakers and writers combine clauses but in different fashion. In edited writing, clauses are integrated. Unplanned speech has *Sue likes crosswords and Bill hates them* or even *Sue likes crosswords* [pause] *Bill hates them*. One complete clause follows another complete clause. *And* is not necessary; the connection is the anaphoric link between *them* and *crosswords*.

Planned writing might have *Sue likes, and Bill hates, crosswords*, deriving from *Sue likes crosswords* and *Bill hates crosswords*. The 'recipe' is: take *Sue likes* from the first clause; insert a comma; take *Bill hates* from the second clause; put in a comma; take the two instances of *crosswords*, insert one after the second comma and delete the other. The integrating of the clauses is clear.

In writing, relative clauses are integrated into noun phrases. Suppose we have the noun phrase *some eggs* and the clause *you're not sure about the age of the eggs*. To integrate the clause into the noun phrase, replace *of the eggs* with *whose*, substitute *whose* for *the*, and move *about whose age* to the beginning of the clause. This produces the written structure *some eggs about whose age you're not sure*. What was produced in speech (during a television program on cookery) was *some eggs you're not sure about their age*. The clause *you're not sure about their age* is discourse-subordinate; *their* refers back to, and the clause modifies, *some eggs*. Whether the clause is a relative clause is a moot question.

A number of constructions contain clauses that are not obviously related as main clause and subordinate clause. Consider the examples in (10).

(10a) what you do is put a spile into the barrel
(10b) I'll just give the mixture a little stir because what happens is things tend to settle a bit
(10c) What we're doing we're hanging them up to dry

(10a) is a classic WH cleft. The free relative clause *what you do* is the subject of *is*. The complement of *is* is the nonfinite clause *put a spile into the barrel*. This clause is well integrated into the overall construction; it has no subject noun phrase and no tense, person, or number, just the bare verb stem. (10b) is the WH cleft typical of unplanned speech. The complement of *is* is a complete clause with overt subject *things* and a verb *tend* with tense, person, and number. However, the tense of *tend* is controlled by the tense of *happens*; that is, the clause is not entirely free. It can stand on its own, whereas *what happens is* requires, and has, a complement; the complement is simply not integrated into the general construction.

In (10c) the clause *what we're doing* and the second clause, *we're hanging them up to dry*, are merely juxtaposed. The second clause is not the complement of *is*, has its own subject noun phrase, and has a verb marked for tense, person, and number. As in (10b), the tense and aspect of *'re doing* controls the tense and aspect of *'re hanging*, and *what we're doing* is incomplete because *what* points forward to something, which has to be specified. The second clause specifies the something. *Subordination* is not the appropriate term for this loose connection but rather *cosubordination* (Van Valin and La Polla, 1997) is.

Finally we turn to (11).

(11) Everyone knows Helen Liddell how hard she works

The main clause is *Everyone knows Helen Liddell*. The clause *how hard she works* cannot be the direct object of *knows*, because verbs have one direct object and the direct object of *knows* is *Helen Liddell*. The *how* clause is connected with the main clause in that *she* is co-referential with *Helen Liddell*. This type of referential linkage, however, does not demonstrate that the *how* clause is embedded in the main clause, because referential linkage operates across sentence boundaries in written language.

Conclusion

Constructions analogous to those in (8) through (11) are found in unplanned speech in other languages, along with other clauses. Heath (1985: 104) talks of the choppy, fragmented character of the syntax in spoken data from an Australian Aboriginal language, Ngandi, and warns against forcing the data into the mold of clear-cut sentences and clauses. His warning is as necessary in 2004 as it was in 1985.

See also: Clause Relations; Configurationality; Structures and Processes; Subordination.

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Subtitling

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Language transfer for television, cinema, and video receives increasing attention. More than a problem, audiovisual translation (AVT) is a solution and an asset in multilingual exchanges – both cultural and informational exchanges.

There are three fundamental issues in the AVT field, namely, the relationship between verbal output and pictures and soundtrack, between a foreign language/culture and the target language(s)/culture(s), and finally between the spoken code and the written one.

The Nature of Subtitling

Several forms of AV language transfer exist. The best known are dubbing, subtitling, voice-over, and live interpreting. However, other forms also are used on special occasions, such as surtitling in certain opera houses and theaters, or for specific target groups, such as audio description for the blind and visually impaired.

Subtitling is an overt type of translation: the original version can be heard at the same time as the viewer reads the one or two lines, thus enabling criticism from anybody with the slightest knowledge of the source language.

Subtitles are condensed translations of original speech, which appear as lines of text usually positioned toward the bottom of the screen or vertically on the side of the screen. They can be either interlingual (or open caption) from one language or several in the case of multilingual films, to another, sometimes to two other languages (bilingual subtitling as occurs in Finland, Belgium, and Israel), or intralingual (or closed caption), within the same language, e.g., for the deaf and hard-of-hearing, and sometimes to help migrants, for instance, to learn or to improve their command of their new language. For example, TV5 in French-speaking countries broadcasts films with French subtitles, BBC4 in Great Britain with English subtitles, STV4 in Sweden with Swedish subtitles, etc. Different tools are available for this task. These include Teletext, in widespread use, and DVB format (Digital Video Broadcasting), a more advanced form of closed caption which requires a decoder external to the television set. Closed subtitling is selected by the individual viewer on a remote-control unit.

Open subtitles when used are not optional: They are a physical part of the film or the television picture. They can sometimes be transmitted separately, for instance, at festival screenings.

In addition to the two main types of subtitling, we can also mention

- Reduced subtitling, dealing with news or live events, such as sport programs. The purpose of this special variant of subtitling is not to give a full translation of what is being said, but to provide a summary, a shortened or quick commentary.
- Live or real-time subtitling, used in various types of interviews, debates, or special events, such as President Clinton's hearing in the U.S. Supreme Court for sexual harassment in 1998. But of course writing at the same speed as normal speech is not easy, even with special 'chord keyboards' that allow the typist to press two or more keys at the same time, i.e., to key syllables and even whole words instead of only individual letters. Moreover, the differences between spoken and written language should be taken into account, so that the written version is slightly more formal and condensed. Subtitlers, just like conference interpreters, must first understand what the speaker intends to say. This makes great demands on their power of analysis and memory of the meaning expressed orally.

The Evolution of Subtitling

Subtitles evolve out of intertitles, which were used until the 1920s as devices to convey film dialogue, explanations, or commentaries to the audience. Text was printed on paper or cardboard, filmed, and inserted between sequences. Like modern subtitles, these intertitles attempted to communicate a complete idea, and punctuation was used to facilitate the reading. In the era of silent films, the translation of the original intertitles was a relatively easy task – the source text being already in a written condensed form.

The arrival of the 'talkies' films from 1927 onward led to the gradual disappearance of intertitles, and the problem of language transfer in the film industry took on new dimensions. The major production companies were already highly dependent on selling their films abroad. At first, several versions of the same film were shot in different languages using different teams of actors. Then, filmmakers found a different solution by letting other actors speak the parts translated into the target language and replacing the original soundtrack by the new recording: Thus, dubbing was born. However, subtitling also developed further during the same period.

Different methods were tried, from the mechanical and thermal methods to the photochemical method, the optical method, and, at the end of the 1980s, laser burning. Since the 1980s, the process of planning, preparing, and generating subtitles, for cinema and television, has become more and more computerized. Fully electronic systems enable translation, editing, and time-coding to be done at the same computer-based workstation. In 1997, a Windows-based subtitling unit was launched, providing not only all the technical functions but also linguistic aids (built-in dictionaries, spelling and grammar checkers, etc.).

The Process of Subtitling

The Constraining Factors

A certain number of medium-defined constraining factors must be taken into consideration to get 'good' subtitling.

Temporal Constraints Reading speed, undoubtedly the main limiting factor, is usually slower than talking speed. But this is subject to great variation. Reading speeds can be affected by the viewers' education, age, reading habits, and attitude to the topics of programs or films. The complexity of the linguistic and factual information of the subtitles can also affect readability. For instance, high lexical density, condensation with no redundancy, and too few cohesive devices call for added exposure time of the subtitles and slow down the reading process. Furthermore, it has been assumed that identical subtitles are easier to read from a cinema screen than from a television (TV) set or a VHS (Video Home System) recording. The size of the screen, the differences in resolution (pixels), and the frame rate (24 frames per second at the cinema; 25 on television (PAL and SECAM systems), analogue video productions, and DVD; 30 frames/second in the NTSC–TV system in the United States, South America, and Japan) might explain the differences, or at least the feeling that you need about 30% more time to read subtitles on a TV screen than on a big cinema screen. Another feature affecting readability is the genre of AV products. You can anticipate the story and guess the dialogue in a love affair, while you need all the information in a documentary on oil rigs. Because of all these parameters, it is difficult to standardize presentation rates, even though subtitlers must take into account the different target audiences that could be exposed to their work. The rule of thumb on subtitle speeds is that the number of subtitles in an average 90-minute film is 900 for the cinema version, 750 for the video version, and 650 for the television version.

Spatial and Visual Constraints News, current affairs programs, interviews, and many documentaries are often packed with information, and faces often dominate the screen. The subtitles should not then interfere with the composition of the picture and should not compete for the viewers' attention. Therefore, a few questions must be asked here: What is the possible length of the line? How many lines can be used? What should be the positioning and duration of the subtitles? Although precise timing is usually defined in terms of subtitle-speech synchronization, eye-movement studies have proved that subtitling that does not pay attention to shot changes makes viewers start rereading the subtitles and could cause perceptual confusion.

In addition to these constraints, there are two other important factors: translation policy and working conditions. Translation policy here means conventions, norms, and directives made explicit by the broadcaster, the subtitling company, or the film producer or distributor: how do you deal with swearwords and taboos, dialectal and sociolectal features of speech, registers (especially in the shift from spoken to written code), or songs? Translation policy is related to the role played overtly or not by the company: For instance, a public TV channel may accept a social and linguistic role (promoting certain standards), while a commercial TV channel would consider only audience ratings. To facilitate the translation assignment, a company might buy programs and also require a master list (script of a TV show or a film containing a shortened text of the actors' lines in the original or a pivot language, usually English), or a post-production list (text prepared or edited after the shooting, with descriptions of the action and language notes), or a dialogue list (in addition to the dialogue, it offers information on the implicit sociocultural allusions and connotations, explains punning and word play, gives correct spelling of proper names, elucidates the meaning of colloquialisms and dialectalisms, etc.). All these data and information help subtitlers because usually their working conditions – tight deadlines, low wages – are not optimal for researching documentation, or terminology, and also because, as mentioned above, subtitles are always challenged.

To conclude this discussion of the constraining factors, I would like to stress the multi-semiotic dimension of an AV production. There are four main sets of signs:

1. the verbal auditory signs, including mainly dialogue and background voices, with their intonation, prosody, delivery, etc.
2. the nonverbal auditory signs, comprising natural sounds, laughs, sound effects, music.
3. the verbal visual signs, made up of the subtitles and different kinds of captions: shop and road signs, street names, newspaper headlines, letters, menus, placards, posters, etc.
4. the nonverbal visual signs, including composition of the image, takes with different camera positions and movements, types of shots, lighting, editing (overall rhythm), use of colors, clothing, body language, gestures, facial expressions, proxemics, etc.

The relationship between all these semiotic systems is complex. In a situation comedy (1) is dominant; a musical deals mainly with (2); (1) prevails in a 'talking head' program; a horror or adventure film uses especially (4), etc. In this relationship, the signs can be complementary, in contradiction (i.e., a gesture (4) opposed to what is being said (1)), equivalent, redundant, etc.

Whatever the case, the appropriate subtitling must appear in synchronicity with AV elements – synchronicity between auditory signs and subtitle content, between image and layout of the subtitles, and between camera takes and subtitle rates.

Stages of the Work

In some companies and countries, subtitling is atomized between a translator who phrases the subtitles and a technician, with little or no knowledge of the source language, who does the spotting or cueing (defining the in and out times of individual subtitle) and feeds the translated subtitles into the computer. In such a division of labor, the rate of errors is high. But, in most cases, thanks to technology, the work is now done by the same person who breaks up the dialogue into short sentences and formulates the subtitles, the times being marked in hours, minutes, seconds, and frames. Subtitlers work at a personal computer connected to a video recorder, a time coder, and a keyer to generate the subtitles on the screen.

When scanning a film or copying a video, it is important that the copied version on video has the same time code as the original supplied by the client. Because of the different frame rate, in a 100-minute film the discrepancy between film and video amounts to 4 minutes. Therefore, one frame/second has to be added during the scanning process. Once an in-house master copy with an identical time code has been made and the subtitler has watched the film or TV program (with the dialogue list), the actual translation starts as does the cueing – one of the most important stages of the work, striking a balance between the rhythm of the AV production, the speech rhythm of the characters, and the viewers' reading rhythm and expectations. When the subtitles are completed, they are, ideally, proofread, and then edited (checking how precisely dialogues and subtitles match, how each line fits the context, whether the subtitles are easy to read, and then making the necessary changes). Next, they are converted for the laser engraving (for film material) or recorded for broadcasting or distribution. If there is no dialogue list, the subtitlers must work from the screen, relying on their eyes and ears. In this case, the decoding effort can be heavy and difficult. These questions need to be addressed in many situations: Who commissions the translation? How are the subtitlers selected? Who does the proofreading? Who controls the final output?

Strategies

When subtitlers have decided how to interpret the dialogue and what to translate, taking into account all the AV elements, they segment the utterances into subtitles, keeping in mind target-audience reading abilities. To find target-language equivalents and correct and appropriate subtitles adapted to the recipients, they have different strategies at their disposal:

Reducing: Reduction can be either partial or total.

- *Condensing (*or *compressing)*. Redundant occurrences and oral features can be left out; numbers can be given by a figure and not in letters; fewer letters can be used (e.g., 'huge,' instead of 'immense' – h/u are smaller than m); paraphrasing allows a concise sentence, etc.
- *Elimination*. Parts of the contents in a verbose scene or a fast speech can be cut, especially when they are supported by AV information.
- *Omitting*. Repetitions, reiterations (e.g., of greetings), tautologies, tag questions, terms of address can be left out.

These three strategies are often combined. For example, condensing frequently implies omitting. The volume and level of reduction vary according to the pace of the original, the number of cuts, the complexity of the text, the genre, and the medium: the amount of reduction is more limited in documentaries than in fiction, and more limited in TV news than in video recordings.

Simplifying the syntax (complex sentences with embedded propositions can be transformed into two or three simple sentences; transposition can be used, e.g., a phrase can be changed into nominalization; active constructions can be used instead of passive

ones; a proper name can be substituted by a pronoun; a series of questions and answers can be replaced by a statement, etc.). And *simplifying the vocabulary* (use of hyperonym; shift in the lexical register; leveling out or neutralization of marked words; substitution of a brand name by a generic term, etc.).

Summarizing: Two or three cues of a dialogue can be merged into a single line; dislocation can be used, etc.

Expansion, including *explicitation,* adding information to explicate a term or a meaning, e.g.,

Do you go to Madame Tussaud?
Vas-tu au musée de cire?
Do you go to the wax museum?

and *adaptation* or dynamic equivalence, condensation, naturalization, e.g.,

They married right after graduation
Ils se sont mariés après l'examen
They married after the examination

e.g.,

After graduation
Après les oraux
After the oral exams.

All these strategies are interrelated, e.g., paraphrasing going hand in hand with simplifying or sometimes expansion; nominalization with omitting; simplifying with expansion, etc. In all cases, the subtitlers must select what to keep, what to change, and what is relevant and necessary in a given context.

For specific problems, such as translating cultural items, wordplay, idioms, and metaphors, other strategies could be added (borrowing, literal translation, calques, etc.). But the general rule is always readability: The appropriate amount of condensation, omissions, and so on does not depend only on linguistic elements; they should facilitate comprehension and not make subtitles more difficult to process.

Design

To ensure legibility of fixed subtitles, a number of problems, to be discussed below, need to be overcome. However, so far, there is no unified code of subtitling practices that would establish a clearly outlined standard for high-quality subtitles. What follows mixes different actual practices, and the values given are a rough mean value.

Positioning Subtitles are usually at the bottom of the screen; in certain cases, they can be placed in the upper part because important visual information or original captions are displayed at the bottom. In cinema screening, they are presented centrally, while on TV they can be centered or left aligned, or right-justified for languages such as Arabic. The following is an example of left-justification:

We all hope
you are feeling much better.

Next, an example of center-justification:

We all hope you are
feeling much better.

And an example of right-justification:

We all hope you are feeling
much better.

Legibility and Duration The maximum number of characters (letters and spaces) per subtitle line ranges between 30 and 40 characters, depending on the standard (cinema or television) and the target audience (children, fast-reading young people, the educated, the hard of hearing, the elderly with slower reaction time, etc.). Beyond 40 characters, the font size requires a reduction, making legibility more difficult.

Subtitles for the cinema are white; for television, they can be presented in different colors (white, yellow, etc.) and sometimes against a dark strip (grey or black). In intralingual subtitles, different colors are used to identify characters, or noises. Typefaces and letter spacing also affect legibility.

The average reading speed of TV viewers is between 2 1/2 and 3 words per second or 90–180 words per minute. Therefore, a full two-liner with 14–16 words should remain for a maximum time of approximately 5 1/2 seconds; a full one-liner should be kept for about 3 seconds, and 1 1/2 lines for about 4 seconds. The minimum duration for a simple-word subtitle is 1 1/2 seconds. Film subtitles require about 30% less reading time. The problem for cinema and TV is keeping subtitles on the screen long enough to allow reading time but not too long, to prevent re-reading.

Subtitles appear up to one-quarter of a second after the start of speech so that the viewer has time to identify the speaker, but this rule does not usually apply to monologues or narrative sequences. In such cases, the in-time of the subtitle is synchronized with the onset of the utterance.

Subtitles should not be left on the screen for more than 2 seconds after the end of a dialogue or a monologue. Finally, they should disappear at least four frames before a cut or a shot change, and be inserted no earlier than three frames after the cut to avoid a flashing effect.

Number of Lines Where the amount of text and the time available make a two-liner the better option, the upper line is usually shorter than the lower one.

Indeed, there is no simple answer to the question of how to divide up the text between the two lines, but what is important, for reasons of readability, is that lines should be divided, as far as possible, according to sense blocks, i.e., words connected by semantics, logic, or grammar should be written in the same line.

When a sentence must be carried over into two or more subtitles, usage differs from country to country and from one television channel to another. In some places, a dash can be used at the end of an unfinished subtitle and at the beginning of the next. In other places, the only indication is the absence of a full stop and the use of a small letter at the beginning of the second subtitle.

At least four frames are inserted between two consecutive subtitles. This time break is necessary to signal to the brain the disappearance of one subtitle and the appearance of another.

Linking subtitles and line breaks have been investigated empirically but with a limited volume of data, and because several factors are involved, results are unclear.

Punctuation and Other Conventions The overriding principle concerning punctuation, italics, capitals, abbreviations, etc., in subtitles is that they should help viewers understand the meaning and avoid any form of irritation (viewers are unable to go back and reread what they have missed). Commas, colons, semicolons, exclamation marks, uppercase letters, etc., are used in different ways and with different frequency in different companies. Thus, suspension dots can indicate hesitation, interruption and/or sentence continuation.

To test the suitability of all the practices mentioned in this section, research studies and surveys should be carried out more systematically.

Quality

To sum up, we can claim that different factors influence the quality of the subtitlers' work.

The features of the subtitles. The accuracy of the subtitles must be considered along with the sound and the images. Two sets of characteristics help to produce optimum results: the scripto-temporal features that define legibility (types of font, positioning, number of characters per line, duration on the screen, etc.) and the textual features that define readability (subtitles as semantic, syntactic, and idiomatic units; application of different strategies; obligation to select the appropriate register; use of relevant punctuation, etc.). All these features are strongly target-oriented, taking into consideration the reading speed rates and cognitive efforts of the audience.

The organizational factors. Translators are not the only experts in AV communication. Producers, distributors, broadcasting decision-makers, etc., also have their own interests and expectations. They determine the working conditions of the translators (access to a dialogue list, time pressure, technical tools, and credit and copyright, etc.). Quality is the key word in subtitling and the result of a cooperation that should acknowledge the role and the place of AVT in cinema, television, and video.

The sociocultural implications of the translation. Another factor that could also change the perception of subtitling is its influence on language learning and reading skills. There is as yet no study correlating illiteracy and reading subtitles, but the fact remains that we are reading television. Where subtitling is the dominant form of AVT, a viewer watching all the programs would read more than 200 novels of 300 pages per year. On the other hand, a few studies have already shown that subtitling can improve the learning of phonemes, intonation, accent, and expressions in a foreign language. Furthermore, some research has emphasized the potential importance of subtitles in the language education of the deaf and hard-of-hearing.

Another implication is the linguistic role of the AV media. At different times, literature, the school, or the printing press were the institutions where language norms were established and disseminated. Television and the Internet are beginning to fulfill that function. By blurring the borders between the written and the oral, subtitling compels us to question what norm(s) are to be used and to what extent oral features change traditional views of the written language.

Another linguistic-political implication of subtitling could also be to strengthen the dominance of English, as a pivot language facilitating international program exchanges and as a way to display more and more anglicisms and English interference.

Cinema, video, public television channels, satellite television, and commercial television channels do not play an absolutely identical part in all these implications.

See also: Dubbing; Song Translation; Voice-Over.

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Subtraction

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Morphological subtraction includes a number of phenomena which may be viewed as taxonomically distinct. Four of these are treated briefly below. Subtraction has long been a problem for theoretical linguistics, which has preferred to deal with forms rather than omitted material, as well as for psycholinguistics, where the processes involved in subtraction have not been clear. However, recent approaches such as prosodic morphology show signs of being able to incorporate the phenomenon into standard descriptions. Subtraction has to be distinguished in principle from purely phonological sandhi phenomena in which individual segments may be deleted at morphological or syntactic boundaries (e.g., in Tunica, an unstressed vowel at the end of a morph is deleted before a morph-initial glottal stop, so that from *ʔaka* 'enter' + *ʔuhki* 'he did' we derive *ʔakʔuhki* 'he entered' – Haas 1946), though in practice this distinction may be difficult to apply consistently.

Subtractive Morph

A subtractive morph is the label given in structuralist studies to instances where the removal of a particular piece of form has an effect parallel to the addition of morphological form elsewhere in the language. A typical case can be found from French adjectival marking.

French adjectives agree with the noun they modify for number and gender. Here we are concerned with gender agreement, and will accordingly just use singular forms (though the plural forms in the instances shown below are not different in isolation). The set of

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adjectives in (1) shows that there is some regularity in the relationship between the masculine and the feminine form (although there are other adjectives which do not show agreement in the same way).

(1) Gloss	Masculine	Feminine
'bad'	movɛ	movɛz
'big'	gʁɑ̃	gʁɑ̃d
'cool'	fʁɛ	fʁɛʃ
'deep'	pʁofɔ̃	pʁofɔ̃d
'false'	fo	fos
'gentle'	du	dus
'happy'	œʁø	œrøz
'long'	lɔ̃	lɔ̃g
'naughty'	meʃɑ̃	meʃɑ̃t
'small'	pəti	pətit
'white'	blɑ̃	blɑ̃ʃ

The point about the examples in (1) is that it is not possible to predict the final consonant in the feminine form from the masculine form; it is, however, possible to predict the masculine form from the feminine form – delete the last consonant. This subtractive analysis has to be seen against the background of a system where the derivation of the feminine form from the masculine form is additive in the written language (which represents a historically earlier form of French). There is some evidence (Fink, 1985) that French L1 speakers do not use the rule of subtraction to create masculine forms of adjectives, and such psycholinguistic counter-indications to the most economical analysis bedevil analyses based on subtraction (see Bauer, 1997: 479 on Maori passive endings). Really good examples of subtraction of this kind are correspondingly hard to find, and most of those in the literature seem to be synchronically dubious or of a rather different nature.

Another example comes from Tohono O'odham (formerly called Papago), where the perfective of regular verbs is derived from the imperfective in the way shown in (2) (from Hale, 1965).

(2) gloss	imperfective	perfective
'descend'	'huɖuɲ	'huɖ
'shell corn'	'kɯliw	'kɯl
'split'	'taːpan	'taːp
'ascend'	'tʃiʂaʒ	'tʃiʂ
'vaccinate'	'tʃɯkid	'tʃɯki
'give'	'maːk	'maː

While it is not intended to question the validity of the above analysis, note that the subtractive analysis depends upon there not being any other form from which either of the forms listed in (2) might be derived as well as on the irregular segmental material deleted by the rule, so that it is frequently difficult to be sure of the validity of such an analysis from a few examples. Hale does not comment on speakers' reactions to these forms, but the subtraction illustrated in (2) is part of a wider phenomenon that is treated within a prosodic morphology framework by Hill and Zepeda (1992).

Truncation

Truncation is the removal of some material prior to subsequent affixation. It can be illustrated from the English material in (3).

(3) base (if a word)	*-ate* verb	derivation with *-ate*	derivation with truncation of *-ate*
–	graduate	graduation	graduand
–	inoculate	inoculator	inoculable
–	nominate	nominative	nominee
–	terminate	terminator	terminable
value	valuate	valuator	valuable

Because a whole suffix *-ate* is removed in forming the words in the last column of (3), it appears that this type of truncation is purely morphological. However, its origins may be partly etymological (as with *graduand*) and partly phonological, since it seems that it is the final stress or disyllabic suffix that brings about the shortening. If the subtraction could be shown to be entirely phonological and automatic, it would cease to be considered subtraction and become a form of apocope in sandhi.

In many Muskogean languages, there is truncation before subsequent affixation, but only in certain morphological instances, so that it is less clear that this is truncation rather than an instance of a subtractive morph. Relevant examples are given in (4) (from Broadwell, 1993).

(4) singular verb	plural verb	gloss
balaaka	balka	'lie down'
cokkalika	cokkaka	'enter'
ononkalika	ononkaka	'climb'

Back-Formation

Back-formation is the formation of a new word by the deletion of an affix or supposed affix rather than by the addition of an affix. *Exhibitor* is derived from *exhibit*, but *edit* is derived from *editor* by the deletion of the *-or*.

Clipping

Clipping is the process of removing material from a word while retaining the denotation of the original but leading to a less formal style: *photo* from *photograph* is a case of clipping (or is a clipping). This

process seems to be driven by the prosodic phonology of the material that remains rather than by any morphological principle or by the phonological nature of the material that is deleted.

In a number of well-known cases, the clipping is then embellished (Bauer and Huddleston, 2002) by the addition of a suffix or suffix-like element, so that we get *foot-ball* giving rise to *footy*. Again the phonology of the output seems to drive this process, leading in this particular instance to a preferred word pattern containing a strong–weak foot.

This process may be particularly widespread in hypocoristics, which are also influenced by child-language phonology. *Archie* from *Archibald*, *Betty* from *Elizabeth*, *Peggy* from *Margaret* and other similar forms are morphologically iconic in that the diminution of form reflects the diminution of social distance, but the amount of material deleted and the use or nonuse of the final *-y* is almost certainly determined by the phonological form of the output word.

Blends (*see* **Blend**) seem to be constrained in fundamentally similar ways.

See also: Back-Formation; Blend; Morphology: Optimality Theory; Morphopragmatics; Nonmorphological Word Formation; Prosodic Morphology.

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Sudan: Language Situation

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The approximately 29 million inhabitants of Africa's largest country, Sudan, speak at least 135 distinct languages belonging to three different language families, Afroasiatic, Niger–Congo, and Nilo–Saharan (compares Figures 1 and 2). Sudan's current political boundaries were established at the end of the 19th century and the beginning of the 20th century. In 1899, the country was placed under the jurisdiction of Britain as well as Egypt in nominal recognition of the historical claims of the khedive of Egypt, though reserving supreme civil and military authority to an offical nominated by the British colonial government. This so-called 'Condominium Period,' which lasted until the country's independence on January 1, 1956, was preceded by the Turco–Egyptian period, which

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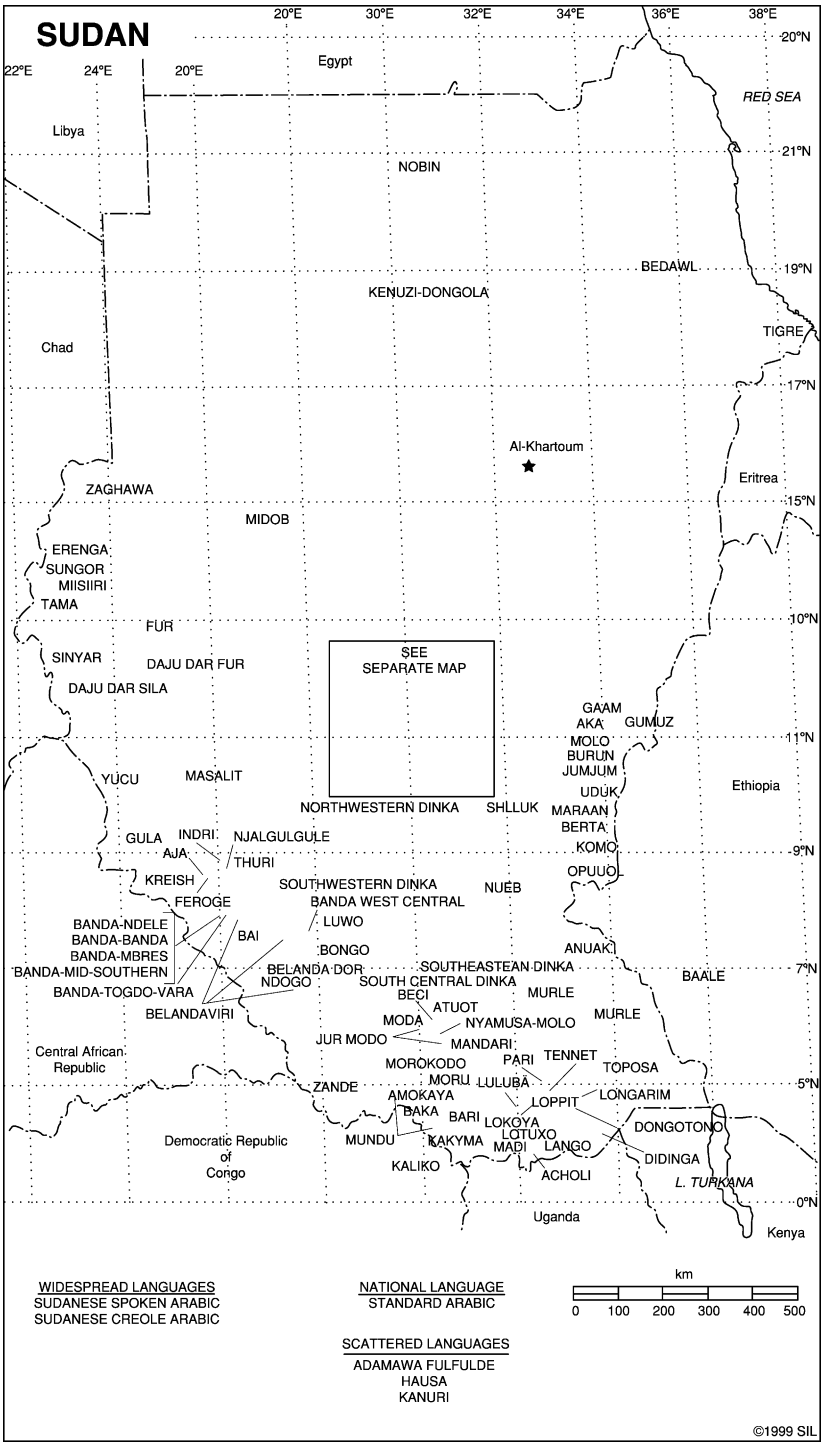

Figure 1 Sudan languages.

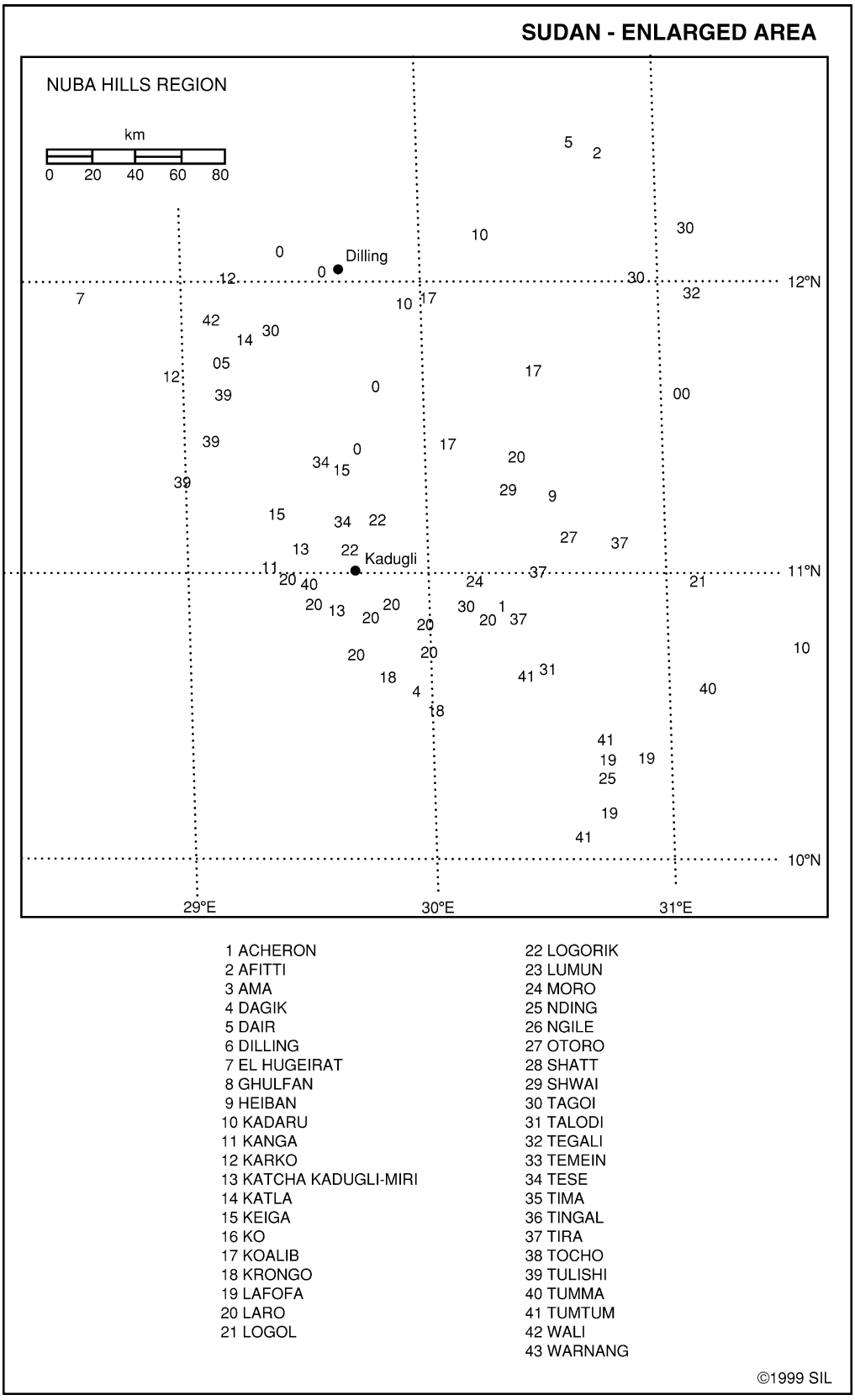

Figure 2 Sudan languages – enlarged area.

began in 1821; prior to this era, the Sudan did not form a unified political entity. During Turco–Egyptian rule, Arabic spread as the language of administration in northern and central Sudan. Because of the government's desire for a southward expansion, in order to have access to human resources (slaves) and ivory, male adults from the Blue Nile and the Nuba Mountains were captured and recruited for the army. It was probably in the multilingual garrison camps in the southern Sudan that pidginized versions of Sudanese Arabic emerged that came to be known as 'Nubi' and 'Juba Arabic.' Nubi subsequently became the mother tongue of certain communities that today are also spread over Kenya, Sudan, and Uganda.

The unpopular Turco–Egyptian regime was replaced in 1881 by the Mahdist State, which ruled over two-thirds of Sudan until 1898, when the British, in the scramble for Africa, took over power in Sudan. The British colonial government developed a policy that aimed at the checking of the Arabic language as well as Islam in southern Sudan. In line with a more general policy in their colonies, the colonial government stimulated not only the use of English as an official language, but also the installment of local or regional languages in the educational system. At the Rejaf Conference (1928), for example, six intergroup languages from southern Sudan were selected for development and for use in schools: Bari, Dinka, Ndogo, Nuer, Shilluk, and Zande. Schools in southern Sudan were run mainly by missionaries; nongovernmental schools in the north and missionary schools in the south were only placed under the responsibility of the government in Khartoum in 1957.

Even before independence (1956), the legislative assembly of the country had stated that Arabic should be the official language of the entire country. It also stated that the southern provinces were indivisibly part of Sudan, and this was to be reflected eventually in a new language policy. After independence, northern intellectuals played a significant role in the development and empowerment of Arabic in the south. This policy resulted in the virtual exclusion and neglect of the remaining Sudanese languages. This move was further enhanced by 'Arabizing' secondary and university education in the entire country in the following decades. In the late 1960s, Arabic became the official language of instruction in government schools throughout the country, although at the National Conference for Education in Khartoum it was ordained that southern vernaculars written in Arabic script could be used as media of instruction in the first two years of education in the rural areas of the southern provinces; starting from the third year, however, Arabic should be the medium. From 1972 onward, final examinations in Grade 6 took place in Arabic throughout the country. The issue of language policy and planning in Sudan thus underwent rather dramatic changes in the course of the 20th century.

Arabic probably had spread across Sudan ever since the 8th century, also reaching more remote parts of the (future) country, for example, in the west, between the 16th and 19th century. In areas such as Darfur, Arabic had already developed into an important *lingua franca* before the 19th century. Among several individuals in the region, e.g., ethnic Fur or Daju, this situation resulted in a gradual shift toward Arabic as the primary language of communication, often accompanied by loss of the original first language.

The Sudanese language policy after independence, whereby the crucial instrumental (and integrative) role of Arabic was emphasized and the role of other Sudanese languages (or English) was reduced, had a partly negative effect on attitudes towards local and regional languages. As in other parts of the world, urbanization had an additional catalyzing effect on language attitudes. The studies by Miller and Abu-Manga (1992) and Mugaddam (2002) clearly show that second-generation migrants in the greater Khartoum area, for example, are less likely to acquire the first language of their parents. Although there are differences in language solidarity between the various ethnic groups, there is a clear tendency among second-generation speakers to use Arabic as the first language. In this respect, Khartoum is comparable to many other major urban centers in Africa. In such multilingual areas, there is a strong tendency to switch to the national language of the country (or to an important regional *lingua franca*) for daily communication purposes.

Whereas today Sudanese Arabic is used widely in the streets, in the markets, and in government and educational institutions across the country, vernaculars are used mainly within their immediate speech communities, although there are differences in language attitudes between the different generations as well as between ethnic groups (Mugaddam, 2002). For example, Sudanese from Darfur, the Nuba Mountains, or northern regions use more Arabic in their everyday communication than do ethnic groups from the south.

Southern resistance against the predominant role of Arabic and the Islamicization of the entire country resulted in a civil war in Sudan between 1955 and 1972 as well as between 1983 and 2004. In the Addis Ababa Peace Agreement (1972), Arabic was recognized as the official language, and English was recognized as the principal language for the southern region (without prohibiting the official use

of languages that may serve as practical nesessities for the executive and administrative functions of the regions). In the same year, the 'Language Survey of Sudan' was initiated by the Institute of African and Asian Studies at the University of Khartoum (after similar surveys had been conducted in Ethiopia, Kenya, Tanzania, and Uganda) in order to investigate patterns of language use with an eye on future language policies. The Addis Ababa Peace Agreement did not fully realize its objectives because of the renewed outbreak of civil war in the south in 1983. Interestingly, although subsequent Sudanese governments did not support the official use of languages other than Arabic, nongovernmental organizations in Sudan developed orthographies and produced primers over the past recent decades for more than 60 different languages.

In 2004, a peace protocol was signed by the government of Sudan and the Sudan People's Liberation Movement. This so-called 'Naivasha Peace Protocol' also contains important statements concerning the linguistic situation in Sudan: (1) All the indigenous languages are national languages that shall be respected, developed, and promoted; (2) The Arabic language is the most widely spoken national language in Sudan; (3) Arabic, as a major language at the national level, and English shall be the official working languages for national government business and for instruction in higher education; (4) In addition to Arabic and English, the legislature of any subnational level of government may adopt any national language(s) as additional official working language(s) at its level; and (5) The use of either language at any level of government or education shall not be discriminated against.

Patterns of language use in modern Sudan suggest that many local languages are facing imminent death if nothing is done to implement this new language policy and to sustain linguistic and cultural diversity in the country.

Languages

Figures with respect to the number of speakers for some languages in Sudan date back to the early 1950s, while for others, the most recent census goes back to the early 1990s. Moreover, languages assumed to be extinct such as Birgid (Birked), still appear, in fact, to have speakers. Consequently, some of the figures below are unreliable, and this fact should be borne in mind with regard to them.

Acheron (?)
Acholi (27 000)
Afitti (4512)
Aja (200)
Aka (200)
Ama (70 000)
Anywak (52 000)
Arabic (Sudanese Arabic: at least 15 million; Nubi? Juba Arabic?)
Atuot (50 000)
Avokaya (15 000)
Baale (5000)
Bai (2500)
Baka (25 000)
Banda-Banda (?)
Banda-Mbrès (?)
Banda-Ndélé (?)
Banda, Mid-Southern (?)
Banda, Togbo-Vara (?)
Banda, West Central (3000)
Bari (226 000)
Baygo (?)
Bedawi (951 000)
Belanda Bor (8000)
Belanda Viri (16 000)
Beli (6000)
Berta (22 000)
Berti (?)
Birked (?) not extinct
Boguru (?)
Bongo (5000 to 10 000)
Burun (18 000)
Dagik (38 000)
Dair (1000)
Daju (Daju Dar Fur 70 000 to 90 000, (Daju Dar Sila, Shatt, Liguri?))
Didinga (58 000)
Dilling (5295)
Dinka (ges.ca. 1,35 million); Northeastern/Padang (320 000); Northwestern (80 000); South Central/Agar (250 000); Southeastern/Bor (250 000); Southwestern/Rek (450 000))
Dongotono (?)
El Hugeirat (1000)
Erenga (?)
Feroge (8000)
Fongoro (extinct?)
Fulfulde (90 000)
Fur (500 000)
Gaam (40 000 to 80 000)
Ghulfan (16 000)
Gula (200 to 2000)
Gule (?)
Gumuz (40 000)
Hausa (418 000)
Heiban (4412)
Homa (?)
Indri (700)
Jumjum (25 000 to 50 000)

Jur Modo (15 400)
Kadaru (7000)
Kakwa (40 000)
Kaliko (10 000)
Kanga (8000)
Kanuri (195 000)
Karko (12 986)
Katcha (74 935)
Katla (14 208)
Keiga (6072)
Kelo (?)
Kenuzi-Dongola (180 000)
Ko (2683)
Koalib (44 258)
Komo (10 000)
Kreish (16 000)
Krongo (21 688)
Lafofa (5140)
Lango (20 000)
Laro (40 000)
Logol (2600)
Logorik (2000)
Lokoro (28 000)
Lokoya (12 392)
Lumun (?)
Longarim (3623)
Lopit (50 000)
Lotuxo (135 000)
Luluba (15 000)
Luwo (80 000)
Mabaan (25 000 to 50 000)
Ma'di (18 000)
Mandari (35 812)
Mangayat (400)
Masalit (145 000)
Midob (50 000)
Miisiiri (?)
Mittu (?)
Mo'da (600)
Molo (100)
Moro (70 000)
Morokodo (3400)
Moru (70 000)
Mündü (23 000)
Murle (60 000)
Nding (3513)
Ndogo (20 000)
Ngile (38 000)
Njalgulgule (900)
Nobiin (295 000)
Nuer (740 000)
Nyamusa-Molo (1200)
Opuuo (300?)
Otoro (13 000)
Shatt (15 000)
Shilluk (175 000)
Shwai (3500)
Sinyar (between 5000 and 10 000)
Sungor (15 000)
Tagoi (13 000)
Talodi (1500)
Tama (?)
Tegali (36 000)
Temein (10 000)
Tennet (4000)
Tese (1400)
Thuri (6600)
Tigre (683 000)
Tima (6000)
Tingal (8000)
Tira (40 000)
Tirma (1000)
Tocho (3800)
Togoyo (extinct?)
Toposa (100 000)
Torona (extinct?)
Tulishi (8628)
Tumma (6500)
Tumtum (7300)
Uduk (20 000)
Wali (500?)
Warnang (1100)
Yulu (3000)
Zaghawa (102 000)
Zande (350 000)

See also: Afroasiatic Languages; Arabic; Language Policy in Multilingual Educational Contexts; Lingua Francas as Second Languages; Niger-Congo Languages; Nilo-Saharan Languages.

Language Maps (Appendix 1): Maps 39, 40.

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Sumerian

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Sumerian – a long-dead language isolate documented throughout the Middle East, in particular in the south of what is now Iraq – rivals ancient Egyptian as the earliest written language. The first sources date to the late 4th millennium B.C.E. and the last to the 1st century C.E. When the language ceased to be spoken is uncertain: some estimates date this to the early 2nd millennium B.C.E. It was subsequently an elite language, used only in royal, ritual, and scholarly contexts. The language's users referred to it as *eme gir*, possibly meaning 'native tongue', the term *Sumerian* being an anglicization of Akkadian *Šumeru*. The grammar outlined here is based on documents from the far south in the late 3rd millennium B.C.E., benefiting from unpublished work by Bram Jagersma, but it applies broadly to other places and periods.

Phonology

Fifteen consonants are used in transliterating Sumerian: <b, d, g, g̃ (/ŋ/ as in ***sing***), ḫ (/x/ as in *lo**ch***), k, l, m, n, p, r, s, š (/ʃ/ as in ***sh**ip*), t, z>. The language also had at least two weak consonants <y, ʾ (/ʔ/ glottal stop)>, which were subject to phonological change or loss in certain environments, and eight vowel phonemes, short and long <a, e, i, u>. Neither vowel length nor weak consonants are indicated in transliteration. These alphabetic representations should be regarded as approximations. Vowel assimilation, both anticipatory and perseverative, is extensive, resulting in considerable allomorphic variation.

Word Classes

Nouns and verbs are the primary open word classes. In addition to numerals, the language has small closed classes of adjectives, adverbs, conjunctions, circumpositions, and interjections, as well as related sets of pronouns (personal, demonstrative, indefinite, interrogative, and reflexive) and determiners (possessive, demonstrative, and an indefinite). Most determiners cliticize to whatever class of word precedes them, as do plural marking and case marking. In the cuneiform script used to record Sumerian, lexical words are typically written logographically and all function morphemes (bases, clitics, and affixes) phonographically. Signs that constitute a word are linked by hyphens in transliteration, as are enclitics to their host. Given our uncertainty about the phonological form of many words, transliteration is simply a sign-by-sign representation of what was written.

Morphology

In terms of morpheme segmentation, Sumerian is more agglutinating than fusional. Inflectional affixation is restricted to verbs. Like verbs, nouns and adjectives can have reduplicated bases. Possibly, in nouns this expresses universality, in dynamic verbs iterativity, and in stative verbs intensity; its function in adjectives is unclear.

New nouns are mainly formed by compounding; new verbs are formed as by multiword expressions in which a noun and verb combine as a semantic unit, resulting in many three-place transitive predicates, such as:

ǧiš tag
wood touch
'touch wood to something (i.e., sacrifice something)'

Nouns and Phrases

Nouns are marked for gender, although this distinction appears morphologically in only the pronominal morphemes and syntactically only in restrictions that relate to plural and case marking. The gender distinction is between human (people and deities) and nonhuman (animals and inanimates), with some socially conditioned exceptions; in addition, nonhuman pronominal morphemes can refer to groups of people or deities. Only human nouns are marked for number.

At the level of the noun phrase, the language is left-headed, the sequence in outline being:

noun, modifier(s), determiner, plural marker, case marker

although the indefinite and most demonstrative determiners do not occur with modifiers.

Case markers typically indicate the syntactic role of the phrase in the clause. The core functions of the subject and direct object are marked by the ergative (*e* = transitive subject) and absolutive (Ø = intransitive subject and transitive direct object). Zero-marking is also used for personal pronouns as subject of both intransitive and transitive verbs. Noun phrases with a noun as head consequently follow ergative-absolutive alignment, whereas those with a personal pronoun as head follow nominative-accusative alignment. Personal pronouns occur infrequently (expressing emphasis or contrast); the language has person-number-gender (PNG) affixes in the finite verbal forms that index these core functions.

Table 1 Sumerian noncore case morphemes

Phrase-final enclitic		*Translation guide*	*Equivalent verbal prefix*	
Local				
Dative (human only)	*r(a)*	'to/for'	Dative	*a*
Directive (nonhuman only)[a]	*e*			
Dative (human only)	*r(a)*	'in(to) contact with'	Directive[a]	*i*
Directive (nonhuman only)[a]	*e*			
Dative (human only)	*r(a)*	'on(to)'	Directive[a]	*i* and
Locative (nonhuman only)	*ʾa*			*y* (>*e*)
Locative (nonhuman only)	*ʾa*	'in(to)'	Locative (nonhuman only)	*n(i)*
Terminative	*š(e)*	'to(ward)'	Terminative	*ši*
Ablative	*ta*	'from'	Ablative	*ta*
Comitative	*d(a)*	'(together) with'	Comitative	*da*
Manner				
Equative	*gin*	'like'	None	
Adverbiative	*eš*	'in the manner of'	None	

[a]The directive is sometimes referred to as the locative-terminative.

Table 2 Sumerian finite verb[a]

Extra-inflectional prefixes	*Noncore prefixes*	*Core affixes and verbal base*
a(*l*) or *i*	Noncore PNG	Core PNG
Clause connective: *nga*	Dative	Verbal base
Cislocative: *m*(*u*)	Comitative	Aspect: *e*(*d*) or Ø
Middle passive: *ba*	Ablative or terminative	Core PNG
	Directive or locative	

[a]PNG = person-number-gender marker.

Table 1 shows the noncore adverbial case markers, arranged to reflect their relationship with a more nuanced set of morphemes incorporated in finite verbal forms. Like case markers, the verbal prefixes are postpositional in that they can be preceded by a noncore PNG prefix (see Table 2).

A further case marker, the genitive, is typically adnominal, marking noun phrase to noun phrase relations. It encompasses a much wider semantic field than possession. Genitive noun phrases may occur in the modifier(s) slot:

bad$_3$	iri	kug-ga-ka-ni
bad	iri	kug = ak = ani = Ø
wall	city	holy = GEN = POSS.3.SING = ABS

'her wall in the Holy City'

(In this example, the first line is a transliteration of the script, in which the subscript numeral in *bad*$_3$ is a modern convention that distinguishes between homophonous signs; the second line is a morphemic representation, in which = marks a clitic boundary.) This example indicates two characteristics of the script: (1) There is not always a one-to-one correspondence between morpheme and sign and (2) the reduplicated writings of consonants often appear to have no phonological implications.

When genitive noun phrases express only possession, they have two characteristics: They are in complementary distribution with possessive determiners, and they can be shifted to the beginning of the clause, in which case a possessive determiner then is added to the original phrase (NHUM stands for nonhuman):

e$_2$-a	ni$_2$	
e = ak	ni	
temple = GEN	awesomeness	
gal-bi	gal = bi = Ø	great = POSS.3.NHUM = ABS

'the temple's great awesomeness'

Here the genitive is written *a*, the form used when it is not followed by a vowel.

Verbs and Clauses

Given that the dependents of a verb can be expressed in pronominal form by verbal affixes, a clause can consist only of a finite verb. However, in a clause that includes noun phrases, the language is right-headed, the typical order being subject(–object)–verb.

A few verbs are irregular, having a different base depending on aspect and/or number; they can be divided into two major classes: reduplicating and suppletive. Plural bases are restricted to suppletive verbs; they are mostly used with a plural intransitive subject or direct object and thus follow ergative-absolutive alignment.

The Sumerian aspect and/or tense categories are difficult to reconstruct. Many Sumerologists have adopted instead two terms used by Akkadian grammarians, *ḫamṭu* ('quick') and *marû* ('fat'). However, the principal distinction in finite verbal forms may be

Table 3 Sumerian core (subject and direct object) affixes in finite verb

	Intransitive	*Transitive*			
	Both aspects	*Completive aspect*		*Incompletive aspect*	
	Subject suffix	*Subject prefix or circumfix*	*Direct object suffix*	*Direct object prefix*	*Subject suffix*
1 HUM SING	*en*	*ʾ*	*en*	*ʾ*	*en*
2 HUM SING	*en*	*y*(>*e*)	*en*	*y*(>*e*)	*en*
3 HUM SING	Ø	*n*	Ø	*n*	*e*
3 NHUM	Ø	*b*	Ø	*b* or Ø	*e*
1 HUM PL	*enden*	*ʾ . . . enden*	*enden*	*me*	*enden*
2 HUM PL	*enzen*	*y*(>*e*) . . . *enzen*	*enzen*	—	*enzen*
3 HUM PL	*eš*	*n. . .eš*	*eš*	*nne*	*ene*

between completive and incompletive aspects (*ḫamṭu* and *marû,* respectively). Nonfinite forms are more nuanced and have stronger temporal connotations, distinguishing between completive (typically with past reference), habitual (typically with present reference), and incompletive (typically with nonpast reference).

Stative verbs are excluded from incompletive aspect and only context indicates whether they have past or nonpast reference. In nonfinite verbal forms, intransitive stative verbs are in completive aspect and transitive ones are in habitual aspect. The copular verb is also excluded from incompletive aspect. It conjugates like an intransitive verb and is attested in both enclitic (prefixless) and independent forms.

Nonfinite verbal forms function as verbal adjectives and nouns, and in nonfinite relative and adverbial clauses (for example, of purpose and time). Their inflection comprises a prefix expressing negation, base reduplication, and an aspect suffix (*ʾa* = completive; Ø = habitual; *ed(a)* = incompletive). In addition, irregular verbs have a different base in incompletive aspect.

As Table 2 indicates, the morphology of finite verbal forms can be much more complex, although a form may be as simple as a prefix, a base, and a subject affix. In addition to the base changing of irregular verbs, finite intransitive forms are marked for aspect with a suffix and transitive forms are marked with the morphology of the core PNG affixes. Setting aside plural PNG affixes, some of which are poorly attested whereas others are circumfixes, Table 3 shows that alignment in completive aspect follows ergative-absolutive principles; in incompletive aspect, it is nominative-accusative in the first and second persons but tripartite in the third person.

Partly on morphological grounds and partly because they have clausal scope, further bound morphemes can be regarded as clitics. These include an enclitic relativizer-complementizer *ʾa* and a set of proclitics that either connect clauses, such as *u* 'after', or change mood or polarity (CISL stands for cislocative):

ḫu-mu-na-ab-šum$_2$-mu
ḫu=mu-nn-a-b-šum-u
M=CISL-3.SING-DAT-DO.3.NHUM-give-SUBJ.3.SING
'he must give it to him'

This example illustrates a further characteristic of the script: There is not always a one-to-one correspondence between sound **syllable** and sign, [nab] being written <na-ab> and [mun] being written simply as <mu>. The transitive subject prefix is an instance of perseverative assimilation from *e* to *u*.

Neither the cohortative (first person) nor the imperative (second person) distinguishes aspect, having instead hybrid forms that combine completive bases with incompletive direct object affixes. Both delete the singular intransitive and transitive subject and can therefore be regarded as following nominative-accusative alignment. The imperative is further irregular in that it is formed not with prefixes but with suffixes.

Resources

The most comprehensive grammar of Sumerian is Attinger (1993: 141–314), although in places it requires familiarity with an earlier, subsequently expanded, publication, Thomsen (2001). No full print dictionary has been published; a web-based dictionary is under development.

See also: Akkadian; Mesopotamian Cuneiform Script.

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Relevant Websites

http://www-etcsl.orient.ox.ac.uk/ – Electronic Text Corpus of Sumerian Literature.
http://psd.museum.upenn.edu/ – Sumerian web-based dictionary.

Summarization of Text, Automatic

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Introduction

The goal of automatic text summarization is to take a source document as input, extract information content from it, and present the most important content to the user in a condensed form in a manner sensitive to the user's or application's needs. This goal has been pursued in research and development activities since the 1950s. With the rapid growth of on-line information and services in the 1990s, research and development in this field has grown considerably in scope and importance. In addition to the practical interest, summarization is of interest as an application that potentially involves many different aspects of natural language processing, including both analysis and generation of text.

Summarization by humans is familiar to us in everyday life, from abstracts of scientific papers, newspaper headlines, highlights of meetings, bulletins such as weather forecasts and stock market updates, abridged books, biographies, video clips, maps, etc. Summarization by machines is somewhat less familiar, but there are a number of research systems in use today that produce summaries of various kinds. In addition to summarizers of Web search engine results, there are systems that can produce summaries of multimedia news broadcasts, aids to physicians that summarize and compare the recommended treatments for a patient in the medical literature, systems that can summarize meetings based on audio recordings, summarizers that build biographical dossiers of people from information on the web, a tool that builds book summaries for hand-held displays, a summarizer that shortens text and then synthesizes it as speech to help the blind, etc. Columbia University's Newsblaster system shown in **Figure 1**, has, for the last several years, automatically produced news summaries by fusing information from multiple news reports on the web.

Terminology

Let us first begin with some basic terminology. One dimension of summarization has to do with the extent to which the summary contains information from the source. An **extract** is a summary consisting entirely of material copied from the input. An **abstract** is a summary at least some of whose material is not present in the input, e.g., subject categories, paraphrase of content, etc. Abstracts that include new sentences that were not in the source rely on some form of natural language generation.

Another dimension has to do with what sort of purpose the summary serves. An **indicative abstract** provides a reference function for selecting documents for more in-depth reading. Thus, a summary that only provided a short headline for a radio broadcast would be indicative. An **informative abstract** covers all the salient information in the source at some level of detail. The indicative/informative distinction is a prescriptive distinction, intended to guide professional abstractors. Thus, professional abstractors are instructed to use indicative abstracts for less-structured documents such as editorials, essays, opinions, or for lengthy documents, such as books, conference proceedings, annual reports, etc., whereas informative abstracts are generally used for other documents. In the case of reports of scientific investigations, indicative abstracts should contain information about an article's purpose, scope, and approach, but not results, conclusions, and recommendations; informative abstracts, on the other hand cover all these different aspects. Finally, a **critical abstract** evaluates the subject matter of the source, expressing the abstractor's views on the quality of the work of the author, as in the case of a movie preview or book review. Given the difficulty of getting a computer to understand natural language text, having it offer an opinion on a source is not considered an appropriate task for a machine, and thus critical summaries by machines are not on the horizon.

Yet another terminological distinction has to do with the audience of a summary. **Generic** summaries are

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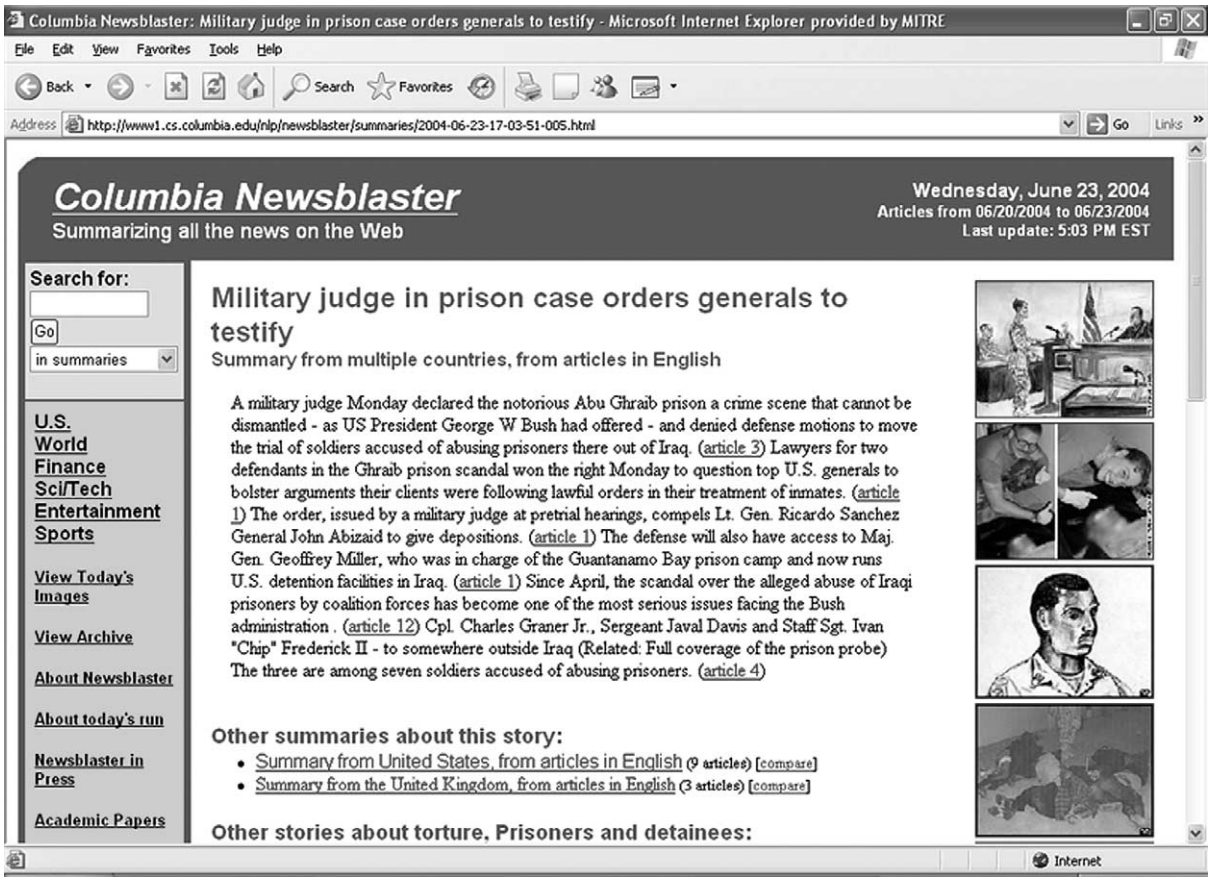

Figure 1 Columbia University's Newsblaster.

aimed at a broad readership community. **Topic-focused** summaries (also known as tailored, user-focused, or query-focused summaries) are tailored to the requirements of a particular user or group of users. Summaries tailored to the user's interests can be based on full-blown models of the user's interest, profiles recording subject area terms, or a specific user query (as in summaries tailored to search engine users).

The main business of a summarizer is, of course, the condensation of information. The compression rate (or reduction rate), is usually measured in terms of length, e.g., a fixed number of sentences or words, or the summary length divided by the source length. In carrying out this condensation, a summary needs to satisfy two informativeness criteria: (i) the summary needs to be faithful to the source, in terms of representing its information content, and (ii) the summary needs to be relevant to the needs of the user and task. The need to represent information content of a source leads to a notion of salience of information in the source. Even in the case of a generic summary, there is some implicit audience for the summary; in the case of a topic-focused summary, the particular user's interests need to be taken into account. A topic-focused summarizer needs to take into account the influence of the user as well as content of the document, and can include a parameter to control the relative weights of these two factors.

In addition to informativeness, a summary needs to be coherent. In the case of an extract, when the extracted sentences are far apart in the text, the gaps between them can result in incoherence. Anaphors present in an extracted sentence will need to have their referents present in the summary, otherwise they will dangle. Particular structures in the source, such as tables, lists, etc., need to be recognized, otherwise incoherence will result. Finally, in the case of abstracts that rely on natural language generation, there is a need to ensure that the new text generated is coherent, as well as grammatical. In some applications, however, where fragmentary output is acceptable, such as summaries on cell-phones where short phrases may be desired, coherence may be less of an issue.

Human Abstractors

Among the communities of people who write summaries for a living are professional abstractors working

for abstracting services and information publishers. In addition, researchers, journalists, editors, and news analysts at various newspapers and industry newsletters, editors at scientific journals, etc., may carry out summarization as part of their jobs. The few insights we have about how abstractors carry out their tasks comes from several sources: (i) codification of abstractors' best practices in terms of prescriptive guidelines, (ii) studies of abstractors working in a laboratory setting, (iii) analysis of the structure of abstracts of scientific articles, and (iv) mapping of certain sets of abstracts to their source texts. I now briefly discuss these sources of information.

Guidelines

Expert knowledge on how to write effective abstracts has been codified into guidelines by Cremmins (1996). Since abstractors work at high speeds, they avoid trying to build a deep understanding of the text (as a student might), instead searching for key content that can be used in the abstract. In a scientific article, the abstractor will initially focus on sections identifying key components such as the purpose, scope, methods, results, and conclusions. This information is then transformed and then synthesized into a draft abstract. The draft abstract is eventually revised to ensure that the maximum amount of relevant information has in fact been packed into the available compression. These revisions involve editing operations such as dropping redundant and vague terms, substituting terms with other prescribed ones, adjusting references, using standard terminology, making context-dependent lexical adjustments, and a variety of cut-and-paste operations.

Abstracting Behavior

Studies of professional abstractors in a laboratory setting (Endres-Niggemeyer, 1998), where the abstractors were asked to think aloud as they worked, indicate that they do not read the document from start to finish. Instead, abstractors use the structural organization of the document to skim the document for relevant passages, which are fitted together into a discourse-level representation of the key components. The skimming for relevant passages exploits specific shallow features such as cue phrases (especially in-text summaries), location of information in particular structural positions (beginning of the document, beginning and end of paragraphs), and information from the title and headings. In the synthesis phase, abstractors tend to cut and paste from the source text. While they do use generalization operations that provide information that characterizes source information in more general terms, they stay close to the text rather than summarize it in their own words.

Analysis of Empirical Abstracts

Several studies of existing bodies of abstracts produced by professional abstractors reveal key components common to them. For example, Liddy (1991) elicited information from professional abstractors as to the key components they thought were found in abstracts, and then tested which of these components were actually present in a corpus of 276 abstracts of articles reporting empirical research. She found that abstracts in the corpus were characterized by the following key components: purpose, hypotheses, methodology, subjects, results, conclusion, and references. Such key components reflect the interaction of prescriptive guidelines with genre-specific discourse-level organizing principles that allow for effective summarization.

Relation of Abstracts to Sources

Since humans construct abstracts by interpreting source documents, the relationship between the two is a key issue relevant to automatic summarization. Studies that compare summary sentences with source sentences for similarity of content reveal that a majority of summary sentences are indeed very similar to source sentences, suggesting that they are cut and pasted from the source.

In making such comparisons, similarity can be automatically assessed by a program that does pair-wise comparisons of summary sentences and source sentences based on content word overlap, i.e., after throwing out function words such as determiners, prepositions, pronouns, and other words on a stop-list. Such an analysis of sentences in terms of its content words (and/or phrases) represented in some form and possibly their frequencies is called a **bag-of-terms** representation. (In such representations, terms are often normalized by stemming, i.e., by shaving off inflectional affixes.)

The extent to which cutting and pasting occurs, and the exact form of it, depends on a number of factors, including the type of instructions and training given to the abstractors, and the extent to which they are instructed to use their own words. Kupiec *et al.* (1995) discovered that 79% of summary sentences in a corpus of 188 summaries written by professional abstractors had similar content to a source document sentence. Studies have also exposed the type of cut-and-paste operations involved; for example, Jing and McKeown (1999) found from a small study of 15 human-written summaries that 78% of summary sentences could be traced to specific cut-and-paste operations from the source document, including sentence truncation and sentence aggregation, lexical paraphrasing, generalizations and

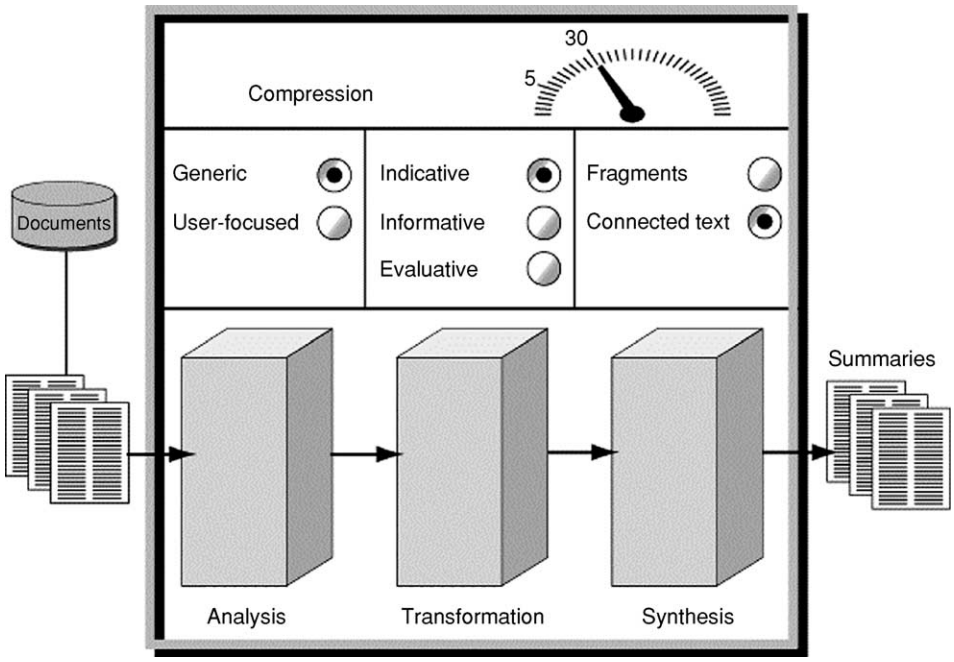

Figure 2 Abstract architecture for summarization; from Mani (2001) with permission.

specializations of information in the source, and sentence reordering.

Challenges

The insights derived from the above sources have helped guide some of the research in automatic summarization. However, many more studies are needed, both of professional abstracting techniques as well as analysis of corpora consisting of abstracts produced by professional abstractors along with their source documents. There are many open questions. For example, how do the strategies vary with different compression rates? What is the minimum level of understanding of the subject matter needed to produce an abstract? How much do professional abstractors working within a given organization and following the same set of guidelines differ in their abstracts? Such studies can only help improve summarization systems.

Summarization Approaches: Overview

Overall, one can conceive of a summarizer as comprising three possibly interleaved phases: (i) analysis of the source text to produce an internal representation, (ii) transformation of the internal representation into a condensed summary representation, and (iii) synthesis of the resulting summary from the internal representation. The summarizer carries out a variety of condensation operations, primarily **selection** of elements, **aggregation** (or merging) of elements, and **generalization** (substitution of elements with more general ones). An abstract architecture for summarization is shown in Figure 2.

There are two broad classes of summarization approaches. The shallow approaches aim at sentence extraction, and use relatively simple methods that do not require extensive amounts of linguistic knowledge. The synthesis phase in such approaches is primarily aimed at smoothing the text to address gaps and dangling references, by including a window of previous sentences or by adjusting references (discussed below). Linguistic knowledge used in analysis does not have to be extended for each domain. Deeper approaches aim at producing abstracts. Here synthesis involves natural language generation, which requires some coding of knowledge for each new domain.

Producing Extracts

Early Approaches

The earliest approaches to automatic summarization grew out of Luhn's work (1958) Luhn laid the foundations for a statistical approach to summarization based on examining the frequency of content words in the document. Low-frequency terms were removed, and sentences were weighted based on the density in the sentence of the resulting set of significant terms. This was based on dividing each sentence into segments bracketed by significant terms not more than four nonsignificant terms apart. Each segment was scored by taking the square of the number of bracketed significant terms divided by the total number of

bracketed terms, and the score of the highest scoring segment was taken as the sentence score. The highest weighted sentences were then included in the summary.

Edmundson (1969) extended Luhn's work to look at other features in addition to term frequency: cue words that were suggestive of information salience (e.g., *significant*, *impossible*, *hardly*), document title and heading words, and the position of sentences in the document (sentences under headings, near the beginning or end of a paragraph or the document). He conducted a number of experiments using linear combinations of features, where each feature was given a particular weight. He found that the three additional features outperformed word frequency measures in comparison against manual summaries, with position in the document being the best individual feature and term frequency the worst; a combination of cue words, title, and position features outperforming other combinations and the individual features.

Modern Approaches

Subsequent work has used a richer model of term frequency, counting morphological variants as tokens of the same term, and normalizing for the length of the document as well as the overall frequency of the term in a corpus of documents. Later work has also reinforced Edmundson's observation that term frequency is less informative than features such as position, cue words, or title information. Cue words (and phrases), including in-text summaries (e.g., *in summary, the purpose of this article is, in conclusion*) tend to be genre-specific; scientific articles will use different cue phrases to signal salient information compared to, say, TV news. Most systems use genre-specific rules for extracting cue phrases.

Discourse-Level Features Additional features that have been investigated include discourse-level features. I discuss two classes of features here: those based on text cohesion and those based on text coherence.

Text cohesion (Halliday and Hasan, 1976) has attracted a great deal of interest in automatic summarization. Text cohesion involves relations between words, word senses, or referring expressions, which determine how tightly connected the text is, and it is expressed in terms of links in text, called ties, which express semantic relationships. Text cohesion includes grammatical cohesion, involving linguistic relations such as anaphora, ellipsis, and conjunction; and lexical cohesion, which involves relations such as reiteration, synonymy, and hypernymy (e.g., *dog* is-a-kind-of *animal*). There is evidence (Irwin, 1980) that having more cohesive ties influences the summarizability of texts.

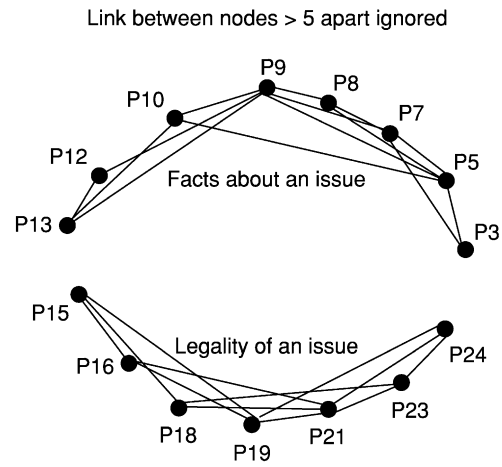

Figure 3 A graph representing cohesion links between paragraphs (Salton *et al.*, 1997).

A natural way of representing text cohesion for computational purposes is capturing it in the form of a graph structure. Here the nodes are text elements, and the edges are links between text elements. Typically, the text element chosen is a word, though smaller elements like word-stems or larger elements like phrases and sentences or paragraphs may be chosen instead. The relations involved are the cohesion relations described above. The basic idea of representing texts in terms of graphs is that the topology of the graph will reveal something interesting about the salience of information in the text. In particular, nodes that are connected to lots of other nodes are likely to carry salient information. Graphs where the nodes are paragraphs and the relations are those of similarity of content between paragraphs (computed in terms of a measure of bag-of-terms vocabulary overlap) have been used for summarization by Salton *et al.* (1997). Here paragraphs that are connected to many other paragraphs (i.e., bushy nodes in the graph) with a similarity above a particular threshold (set by trial and error) are considered salient, since they would very likely contain topics discussed in many other paragraphs. A graph generated by such methods is shown in Figure 3.

The representation of cohesion relations is closely related to the problem of segmenting a text into topics. A topic may be thought of as a text segment that is about one main concept. In Figure 3, two topics are shown emerging from the graph. Segmentation methods that break up text into topical regions based on similarity between successive blocks of text (Hearst, 1997) have been used in summarization in a variety of approaches.

I now turn to **text coherence**. There have been a large number of theories of text coherence, based on representing the overall structure of a multi-sentence

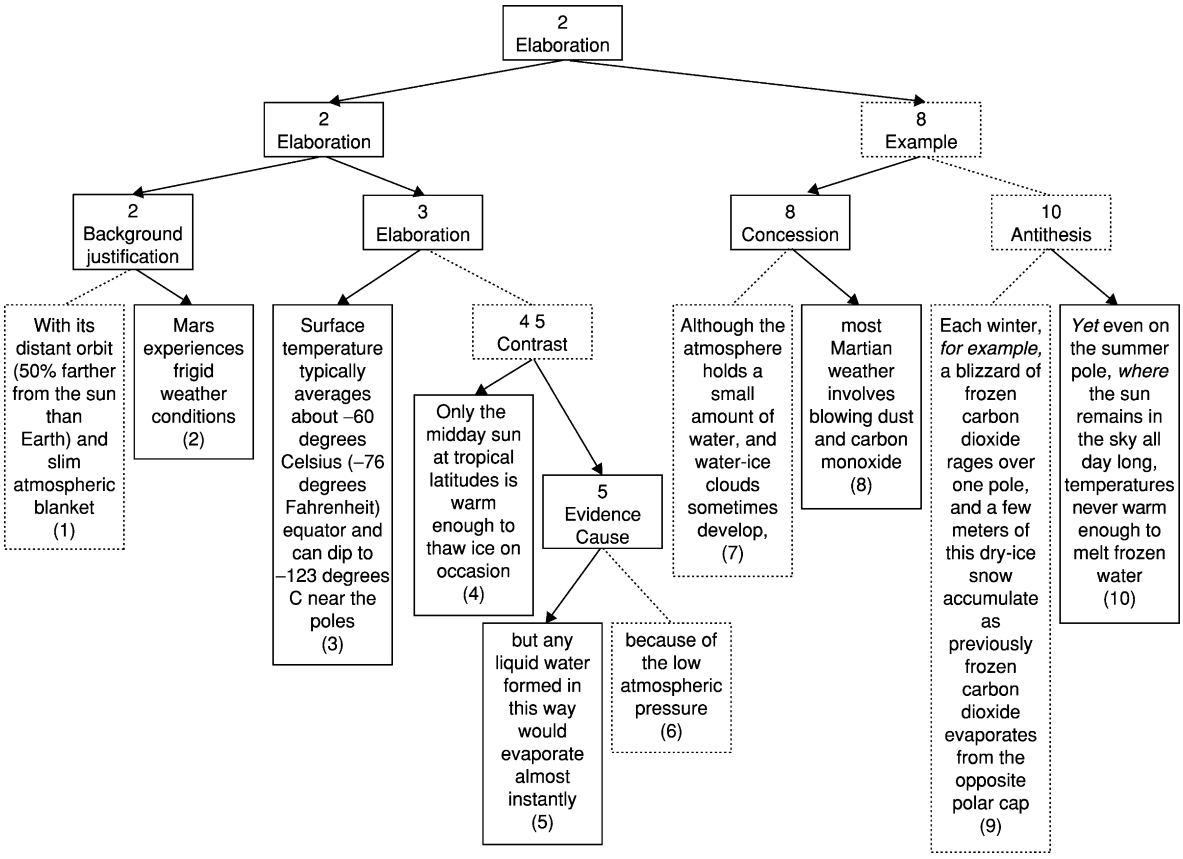

Figure 4 A RST tree for a text; from Marcu (1999).

text in terms of macro-level relations between clauses or sentences. A sample text annotated using coherence relations based on rhetorical structure theory (RST) (Mann and Thompson, 1988) is shown in Figure 4. The subject here is the weather on Mars.

RST assumes that most rhetorical relations reflect asymmetric relationships between a nucleus unit (which is more central to the writer's goals) and a satellite unit (which is ancillary to the writer's goals, indicated with dotted boxes in Figure 4). Assuming that nuclei are more salient than satellites, salience of information in the text can be determined by having each parent node identify its nuclear children as salient, promoting them to the parent's level. The salience of an elementary discourse unit (a terminal node) is determined by how high in the tree it gets promoted. Based on this simple promotion method, we have the following ranking of clauses in order of decreasing discourse salience: $2 > 8 > \{3, 10\} > \{1, 4, 5, 7, 9\} > 6$; here clauses in parentheses are equally ranked. This means that if we want a four-sentence summary, the one below will be produced:

Mars experiences frigid weather conditions.
Most Martian weather involves blowing dust or carbon dioxide.
Surface temperatures typically average about −60 degrees Celsius (−76 degrees Fahrenheit) at the equator and can dip to −123 degrees C near the poles.
Yet even on the summer pole, where the sun remains in the sky all day long, temperatures never warm enough to melt frozen water.

The key finding here (Marcu, 1999) on a small collection of five texts is that there is a strong positive correlation between the nuclei of the RST tree for a text and what subjects believe are the most important units of text. While this falls short of a full comparison against summaries, the results are nevertheless encouraging.

A program to automatically construct RST trees developed by Marcu first hypothesizes possible rhetorical relations between elementary discourse units based on the presence of discourse markers, and then uses a search procedure to find all discourse trees compatible with the constraints, using this information to score each tree, returning the tree with maximal weight. The program has been evaluated only on the collection of five texts, where it was found that the program's trees did not correlate well with those of the analysts.

The challenge in defining RST trees is deciding on the rhetorical relations; discourse markers may be absent (as in the second and third sentences of Figure 4), and the precise relation may not be clear. An annotation experiment by Marcu and his colleagues found high inter-judge agreement in human annotation of a corpus of 90 texts; however, this involved expert annotators who were allowed to revise the annotation instructions based on joint discussion and agreement.

Discourse-based information is overall of great interest to summarization. The challenges faced by research include getting a better handle on discourse processing, in terms of consistent definitions of discourse structure and accurate and efficient implementation of it.

Framework for Sentence Extraction We can summarize our discussion of shallow methods in the following framework. The analysis phase of summarization involves feature extraction. The transformation phase involves feature combination, with weighting of different features. The synthesis phase involves sentence selection to produce a rough draft, and revision of this draft to improve coherence of the output summary. The problem of extracting sentences is thus viewed as one of sentence weighting, based on finding an appropriate set of sentential features and a feature combination method. We can characterize the sentence weighting, as a first approximation, in terms of a weighted sum of the values of abstract features found in the sentence, expressed by Equation (1):

$$\begin{aligned} Weight(S) := {} & \alpha \times Location(S) + \beta \times CuePhrase(S) \\ & + \chi \times ThematicTerm(S) \\ & + \delta \times DiscourseSalience(S) \\ & + \gamma \times RelevantTerm(S) \end{aligned} \tag{1}$$

Here S is a sentence. *Location* is the weight assigned to a sentence based on its position, e.g., whether it occurs in initial, medial, or final position in a paragraph or the entire document, or whether it occurs in prominent sections such as the document's introduction or conclusion. *CuePhrase* is the weight assigned to the sentence based on the presence of cue phrases in it. *ThematicTerm* is the weight assigned to a sentence based on the presence of high-frequency terms, where the frequencies are normalized in some way. *DiscourseSalience* is the weight assigned to the sentence based on its salience in terms of topics, cohesion relations, or rhetorical structure. *RelevantTerm* is the weight assigned to a sentence in terms of presence in it of information that is also in the title, headline, initial paragraph, or the user's profile or query. The Greek letters denote tuning parameters that identify the relative importance of each of the features. This set of abstract features is hardly exhaustive; they could be expanded to include sentence length, presence of proper names or citations, etc.; the key, in the shallow approach, is discovering good features.

Corpus-Based Approaches The attractiveness of Equation (1) lies in its simplicity. Many sentence extraction techniques in use today are based on this model. However, determining what features to consider, as well as what particular weight a feature should have, is a real issue. The latter determination is likely to be very genre-dependent; for example, material at the end of the text may be important in scientific articles (e.g., in the conclusion), whereas the first few sentences may be important in a news story. In TV news, a preceding segment before a commercial may provide summary information in terms of a preview of the next story to come. Approaches that are trainable based on a corpus of texts in the genre for which summaries are desired, are therefore of considerable interest.

In such approaches, the corpus consists of source documents and their summaries. The system extracts features from each sentence of each source document, constructing an array of feature values, called a feature vector. For example, the vector [1.0 0 0.6 0 0.3] may represent a sentence with value 1.0 for *Location* (e.g., it might be in the introduction), value 0 for *CuePhrase* (it contains no cue phrases), value 0.6 for *ThematicTerm* (e.g., it contains three highly frequent terms out of its five content words), value 0 for *DiscourseSalience*, and value 0.3 for *RelevantTerm*.

Each feature vector is labeled as summary-worthy or not based on whether the source document sentence is considered a summary sentence or not. These labeled feature vectors are fed to a machine-learning program, which tries to learn, from the positive and negative examples provided, rules or functions that will discriminate summary-worthy feature vectors from others. A held-out set of documents is then tested against the rules, with the sentences in the test documents converted to feature vectors, with the rules identifying those sentences that are summary-worthy.

There are a number of issues that have to be addressed in taking a corpus-based approach. The choice of corpus is critical. Its size, the availability of summaries (either extracts or abstracts), and the quality of the summaries (in terms of compression rate, adherence to abstracting guidelines, and overall coherence of the abstract) are obviously important. Discovering the right set of features for a particular problem is an art, and is usually based on prior

research and trial and error, though a machine can certainly help in this process.

Since the learning requires training data where a source document sentence is labeled as summary-worthy based on comparison with the summary, the labeling method is also important. If the summary is an extract (i.e., a set of extracted sentences), then a source sentence can be labeled as summary-worthy if it is found in the extract. If the summary is an abstract, there are a number of choices of labeling methods. The abstract can be mapped back to the source text via an alignment program, yielding an extract. Otherwise, each source document sentence can be compared for similarity of content with the abstract as a whole, or with each sentence of the abstract, based on some bag-of-terms vocabulary overlap measure.

The choice of learning algorithm is not as challenging a problem, as there are many such algorithms available freely, allowing for easy comparison of different algorithms. Consider, for example, a Bayesian sentence classifier from the abovementioned work of Kupiec *et al.* (1995). The classifier needs to compute the probability of a sentence s being included in extract E, given the sentence's feature-value pairs, i.e., $P(s \in E|F_1, \ldots, F_n)$. Using Bayes's Rule, this is equal to the probability of seeing the features given that the sentence is in the extract, multiplied by the prior probability $P(s \in E)$ of a sentence belonging to the extract (i.e., the compression rate), divided by the prior probability of seeing the features. This idea is formally expressed in Equation (2a), which can be approximated as Equation (2b).

$$P(s \in E|F_1,\ldots,F_n) = \frac{P(F_1,\ldots,F_n|s \in E)P(s \in E)}{P(F_1,\ldots,F_n)} \quad (2a)$$

$$P(s \in E|F_1,\ldots,F_n) \approx \frac{\prod_{j=1}^{n} P(F_j|s \in E)P(s \in E)}{\prod_{j=1}^{n} P(F_j)} \quad (2b)$$

To simplify matters, the features can be discretized as Boolean-valued (1 or 0).

To train a sentence classifier for topic-focused summaries, the *RelevantTerm* feature in Equation 1 has to be specified. Clearly, the learner has to learn how to summarize a document with respect to any topic (or query), not just summaries specific to topics found in training. One way to address this is to use specific topics during training, but to allow for *RelevantTerm* features that could potentially characterize any topic. A topic representation can be produced by analyzing a textual description of a topic, or it can be generated from an analysis of documents relevant to a topic. In the latter case, the top content words can be extracted from each of those documents, based on comparing the distribution of term frequencies in the document and the corpus, and these words and their frequencies can be used to represent the topic. As a *Relevant-Term*, the topic-focused summaries can use a *keyword* feature, namely, terms occurring in sentences labeled as highly similar to the topic representation.

Generic summary rule, generated by C4.5Rules learner:
If the sentence is in the conclusion and it is a high tf.idf sentence
Then it is a summary sentence

Topic-focused rule, generated by AQ learner:
If the sentence includes 15..20 keywords
Then it is a summary sentence

Figure 5 Examples of learned rules; from Mani and Bloedorn (1998).

Mani and Bloedorn (1998) compared the performance of generic and topic-focused summarizers constructed using machine-learning methods. They used a corpus of texts in computational linguistics (the *cmp-lg* corpus). The corpus consisted of 198 pairs of full-text sources and author-supplied abstracts (with an average compression of 5%). While the best learners for generic summaries had an accuracy of 67%, the best learners for topic-focused summaries had an accuracy of 90%; this may be attributed to the usefulness of the keyword feature for topic-focused summaries, and points to the relative difficulty of generic summarization compared to topic-focused summarization. **Figure 5** shows some examples of learned rules.

It is possible to formalize the summarization learning problem in terms of a statistical approach to machine translation (MT). The source sentences and summary sentences can be viewed as a (monolingual) parallel corpus. The best summary f for a document d can be represented, as in Equation (3), as the summary s that maximizes the product of two terms: an informativeness (fidelity) term that finds the probability of getting d as a source document for s, and a coherence (well-formedness) term that computes the probability of the summary s (from Berger and Mittal, 2000):

$$f = \underset{s}{\operatorname{argmax}}(P(d|s) \cdot P(s)) \quad (3)$$

Equation (3) allows informativeness and coherence to be traded off. For example, a summary that is a list of keywords may be highly informative, but viewed as incoherent; as more function words and 'glue' text is added to the summary to make it coherent, it may be relatively less informative at a particular

compression. In computing the probabilities in Equation (3), Berger and Mittal (2000) use a bag-of-terms model, e.g., a summary *s* that has more words in common with a document *d* will be preferred. Richer representations than this direct MT approach can clearly be accommodated, for example, based on abstract transfer rules that decompose the mapping from source to summary into a sequence of syntactic tree-transformations (Knight and Marcu, 2000).

Corpus-based approaches to summarization are a very active field of research, in keeping with corpus-based approaches to computational linguistics in general. Even though summarization systems have little grasp of the meaning of the text they are summarizing, progress has been made in recent years in this area. Nevertheless, only a handful of (relatively small) summarization corpora are available at this time.

Improving Summary Coherence Our overall framework for sentence extraction assumes that a draft summary is automatically revised so as to improve coherence. This is in keeping with human abstractors, who, as we mentioned earlier, revise draft summaries. It would be preferable, instead, to take coherence into account earlier in the process, or to trade off informativeness against coherence, as Equation (3) suggests. However, a key problem with automatic summarization is the lack of coherence of the overall summaries, due to dangling anaphors, for example.

To deal with dangling anaphors in a revision phase, one can exclude all sentences that begin with anaphors (possibly sacrificing key summary content), or one can include a window of previous sentences (sacrificing compression), or one can seek to automatically adjust references. Reference adjustment operations include name aliasing (substitution of a proper name with a name alias if the name is mentioned earlier), pronoun expansion (expansion of a pronoun with a co-referential proper name in parentheses), indefinitization (replacement of a definite NP with a co-referential indefinite if the definite occurs without a prior indefinite), and specialization/generalization (replacement of descriptions with more specific/general ones).

These kinds of adjustments presuppose a degree of robust coreference, e.g., of a pronoun and its antecedent (*the dog . . . it*), or proper name or definite NP and its antecedent (*the dog . . . Fido*, *Fido . . . the dog*). While there are a number of methods for establishing co-reference, it is hard to carry out accurately, as it requires a variety of linguistic knowledge sources that interact, including morphological, syntactic, semantic, and discourse information. For generalization/specialization, the use of a thesaurus is required. However, generic thesauri usually have word senses that need to be tuned or augmented so as to be relevant to the domain at hand.

Gaps can be dealt with by simple compression-sacrificing methods, such as including lower-ranked sentences between selected sentences, or including the first sentence of a paragraph if subsequent sentences have been selected. Models based on discourse analysis, while computationally more expensive, can also be used to ensure that the gaps occur only at discourse segment boundaries.

In summary, coherence approaches in sentence extraction tend to occur as an afterthought, and are usually not well integrated into the summarization process. Discourse processing is a major challenge here that needs to be addressed.

Producing Abstracts

As mentioned earlier, an abstract is a summary at least some of whose material is not present in the input, e.g., subject categories, paraphrase of content, etc. Abstracts can involve inferences made about the content of the text; they can reference background concepts, i.e., those not mentioned explicitly in the text. By providing a degree of generalization, abstracts can result in summarization at a much higher degree of compression than extracts. While there are a variety of different methods for producing abstracts, for reasons of space, I will focus here on two kinds of abstracts: cut-and-paste abstracts and template-based abstracts.

Cut-and-Paste Abstracts

I pointed out earlier that professional abstractors use cut-and-paste operations to assemble a summary from material in the source document. Such cut-and-paste operations can be automated (Jing and McKeown, 1999; Mani *et al.*, 1999; Knight and Marcu, 2000). Cutting and pasting operations can be based on a corpus of articles and their corresponding aligned sentences in the articles' abstracts. This provides a probability that a phrase should be eliminated, compressed, or left unchanged. A variety of different cut-and-paste operations have been investigated: reference adjustment (discussed earlier), sentence compression, and sentence aggregation.

Sentence compression involves the lopping off of syntactic constituents, based on one or more criteria, such as the type of constituent, whether it is in a syntactically obligatory role, its cohesion score, its probability of being eliminated, etc.

Sentence aggregation rules add descriptions for people, merge sentences together, and carry out various syntactic smoothing operations. As an example of sentence aggregation, a relative clause introduction

rule turns a VP of a (nonembedded) sentence whose subject is co-referential with an NP of another sentence into a relative clause modifier of the first sentence's NP, e.g., "*the virus, which* ***infected only unclassified computers****, destroyed no data*," where the constituent in bold is pasted in from the source. Other examples of sentence aggregation rules include copying and inserting relative clause modifiers (e.g., *Smith, who* ***first discovered the virus****,*), or appositive modifiers of proper names and definite NPs (e.g., *Peter G. Neumann,* ***a computer security expert familiar with the case*** *...*, *The network,* ***named ARPANET****, is ...*).

Cutting and pasting methods can be used in a variety of different ways. They can be invoked in a revision stage of summarization, where an initial draft summary is constructed and then additional background information from the source is added to it using cut-and-paste operations. In such an approach (Mani *et al.*, 1999), sentences from the source that are highly ranked by the sentence classifier and that describe entities that are also described by sentences in the summary are good candidates for cutting and pasting into the corresponding summary sentences. In an empirical evaluation involving revision of topic-focused summaries, (Mani *et al.*, 1999) show that cutting-and-pasting increases informativeness without compromising readability; the cutting enhances readability, whereas the pasting increases informativeness.

Overall, cut-and-paste abstracts require accurate syntactic parsing, along with discourse analysis; these syntactic operations need to be guided by informativeness measures inferred from a corpus. The necessity of using a corpus to guide the cutting and pasting cannot be overemphasized; arbitrary deletions of constituents, for example, can be misleading and dangerous.

Template-based Abstracts

Template-based abstracts summarize information by filling in slots of templates. The templates are then rendered in natural language. As an example, consider the generation of abstracts for documents on crop agriculture (Paice and Jones, 1993). Table 1 shows the template that their summarizer seeks to instantiate.

The slots are filled by pattern-matching rules. To generate text, canned text templates are used into which names chosen for the slots in Table 1 are inserted. For example, the two canned text templates *This paper studies the effect the pest PEST has on the PROPERTY of SPECIES* and *An experiment in TIME at LOCALITY was undertaken* could produce the abstract *This paper studies the effect the pest G. pallida has on the yield of potato. An experiment in 1985 and 1986 at York, Lincoln and Peterborough, England was undertaken.*

Table 1 Template slots for crop agriculture domain (from Paice and Jones, 1993)

Concept	*Definition*
Species	The crop species concerned
Cultivar	The varieties used
High-level property	The property being investigated, e.g., yield, growth rate
Pest	Any pest that infests the crop
Agent	Chemical or biological agent applied
Influence	e.g., drought, cold, grazing, cultivation system
Locality	Where the study was performed
Time	Years when the study was conducted
Soil	Description of soil

In general, templates used for producing abstracts have been widely used in summarization. Templates can be simple or complex, and several templates may exist for a document (e.g., multi-event templates). Salience is determined based on particular slots, or distance from key concepts in a background concept knowledge base. Recent work in information extraction has developed methods for learning template-filling patterns from annotated corpora as well as expanding seed patterns with information from unannotated corpora. Generation can used canned text, or it can use grammar rules for realizing various linguistic choices (so-called deep generation). Canned text patterns are recommended when there are only a few cases to consider, whereas more complex outputs require the generality of linguistic rules. Generation systems can also avail of corpus statistics in terms of preferring various realizations.

At the same time, templates require customization for specific types of input data, and a template-based summarizer will only work for inputs in a particular domain. Inaccurate template fills can produce inaccurate or nonsensical abstracts, as Paice and Jones (1993) found. The use of deep generation can risk inappropriate lexical choice. For example, in summarizing recommended drug dosage from the medical literature, an abstract that says *high dosage levels are recommended* would be dangerously misleading when summarizing specific dosage levels discussed with various qualifications.

Multidocument Summarization

Multi-document summarization (MDS), as the name indicates, involves summarization of collections of related documents. This is a technology that has become increasingly relevant given the availability of large on-line text collections and the need to condense them. Usually, higher compression rates are required

here, and this is perhaps an area where producing abstracts is more important.

The collections can vary considerably in size, and different methods are suggested for different input sizes; for example, a system might cluster the documents into small sets before summarizing. A naïve extension of single-document summarization based on concatenating single-document summaries of each document is faced with the problem of redundancy, in the form of repetition of information across documents. MDS therefore requires fusion of information across documents.

We can broadly distinguish two classes of approaches. Shallow approaches are based on passage extraction and comparison, with redundancy removed by bag-of-terms–based vocabulary overlap comparisons. The deeper approaches use template extraction and comparison, and carry out syntactic and semantic comparison of passages.

Shallow Approaches

Relevance Versus Redundancy In the case of topic-focused multi-document summarization, there may be multiple text passages that are highly relevant to a topic, but many of these passages may be redundant, containing highly similar information. This sort of problem is endemic in news reports, where similar information is repeated across multiple news sources and over multiple news reports over time. One way of addressing this problem is to explicitly model the redundancy among passages. Consider the case where an initial passage has been found to be highly relevant to a topic. The remaining passages can then be re-ranked so as to maximize their dissimilarity from one seen so far.

This idea can be expressed in a formula for maximal marginal relevance (MMR) (Carbonell *et al.*, 1997). MMR is defined in Equation (4), where Q is the topic (or a key passage, in the case of a generic summary), R is the relevant set of passages, S is the scanned subset of R (i.e., the passages already included in the summary), and $R \backslash S$ is what is left of R once S is removed. When λ is zero, the maximally diverse ranking of passages is obtained; when λ is 1, relevance to topic alone determines the ranking of documents. The setting of λ is, in general, left to the application.

$$MMR(Q, R, S) = \underset{D_i \in R \backslash S}{\operatorname{argmax}}(\lambda\, sim_1(D_i, Q) - (1-\lambda) \max_{D_j \in R} sim_2(D_i, D_j)) \qquad (4)$$

Cohesion-based Models The cohesion-based approaches discussed earlier can also be applied to MDS. As shown in Figure 3, paragraphs that are connected to many other paragraphs with a similarity above a particular threshold are considered salient, since they would very likely contain topics discussed in many other paragraphs. Salton *et al.* (1997) discuss such graphs constructed based on similarity of passages across documents.

More fine-grained approaches to cohesion that rely on word-level links can also be applied, e.g., with the nodes being term occurrences in the text and the links being relations of co-reference, synonymy and hypernymy. Instead of directly comparing the two cohesion graphs, which is computationally very expensive, the most important regions of each graph can be found by propagating salience information across the graph. The highly weighted regions of each graph can then be compared across texts to find out commonalities and differences. The comparison method looks up the words in the highly weighted regions and intersects them across documents, building a set of **Common** topic-focused terms. The terms in highly weighted regions in each document that are not in **Common**, are topic-focused terms **Unique** to each document. The most heavily weighted sentences in **Common** (or *Unique*) can be presented as a summary of commonalities (or differences).

Alternatively, pairs of sentences can be aligned based on similarity of terms covered in **Common**. Figure 6 shows aligned sentence pairs from two documents.

Application: Biographical Summarization The possibility of a program trolling through a large corpus gathering important information about people or other entities offers interesting opportunities for multi-document summarization. Figure 7 shows a three-sentence summary of information about the person Vernon Jordan, summarized automatically by a biographical summarizer from a collection of 1300 news documents.

The biographical summarizer finds 607 sentences which mention *Jordan* as a person name; 78 appositive phrases describing Vernon Jordan that fall (using a thesaurus) into two semantic groups: *friend* and *adviser*; 65 sentences with *Jordan* as logical subject, filtered based on verbs that are strongly associated in a background corpus with the deep subjects *friend* or *adviser*, e.g., the verbs *testify, plead, greet*. Note that there is still a degree of redundancy between *presidential friend* and *Clinton adviser,* but the program is not able to detect that.

Overall, the shallow approaches to MDS are able to home in on common content, characterizing and (especially in the case of MMR) eliminating redundancy. They are also able to achieve high levels

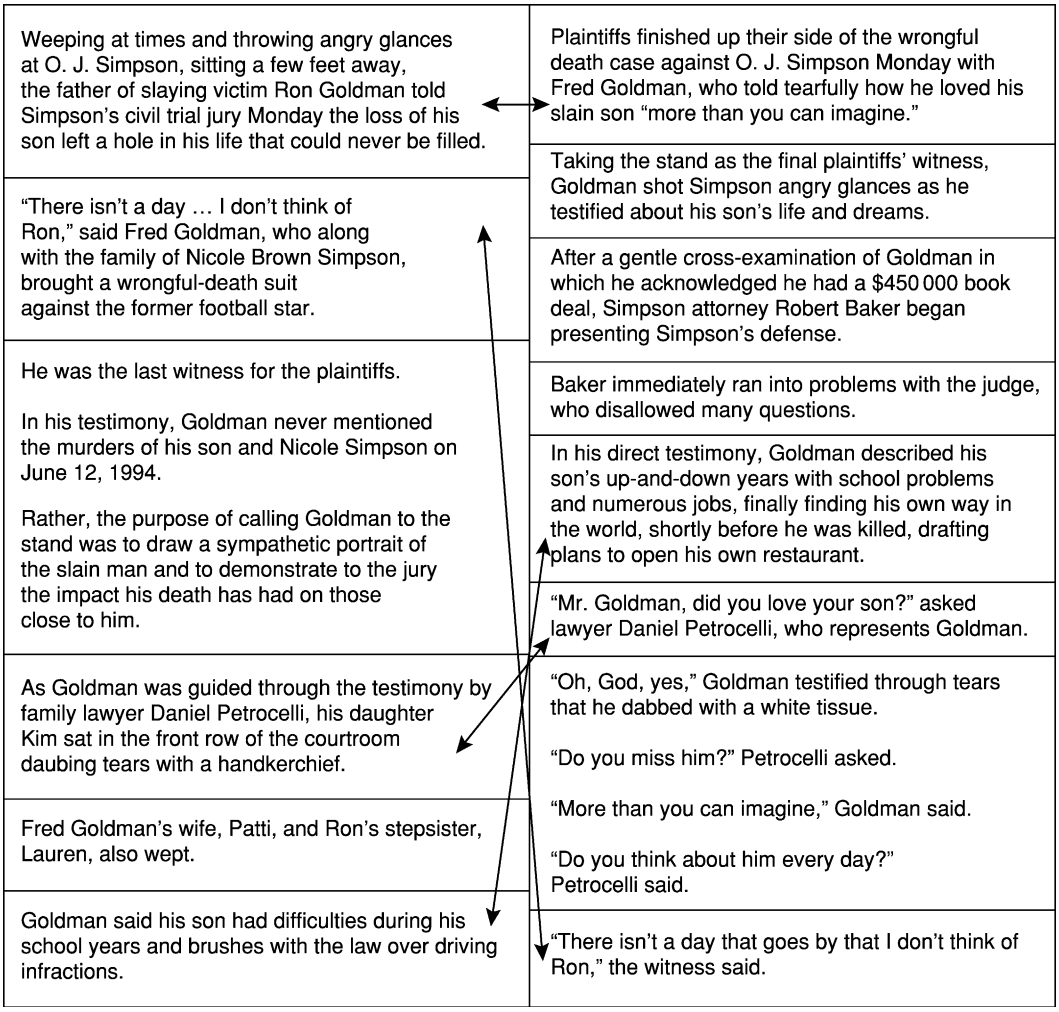

Figure 6 Commonalities across pairs of documents; from Mani (2001), with permission.

of compression. They are unable, however, to characterize the nature of differences in content, or to accurately distinguish between events occurring at different times or places.

Deep Approaches

I will discuss two approaches here. The first tries to merge information by considering paraphrases. The second compares and merges templates.

Paraphrasing As mentioned earlier, a system might first cluster a large collection of documents to be summarized into smaller sets of documents. However, a shallow MDS approach that would extract representative sentences from each cluster could contain information that is not common across all sentences in the cluster. A more fine-grained approach is needed to represent common content. Barzilay *et al.* (1999) describe some of the methods used within the Newsblaster system shown in Figure 1. Their approach intersects sentences in the cluster to identify phrases common across a majority of paragraphs in the cluster. This intersection operation is carried out by first parsing the sentences, then comparing the parse trees based on paraphrasing rules. These rules include active versus passive forms, classifier versus appositive expressions, e.g., *Pentagon speaker* and *speaker from the Pentagon*, etc. Rather than simply listing the set of cluster intersection strings, a sentence generator is invoked to combine their associated trees to yield a sentence. Thus, the clause *McVeigh was formally charged on Friday with the bombing* and the phrase *Timothy James McVeigh, 27*," would be fused together using cut-and-paste methods to yield *Timothy James McVeigh, 27, was formally charged on Friday with the bombing*." Such paraphrasing rules involve deeper knowledge, as they reference both syntactic and semantic information.

Template Comparison Template-based methods for producing extracts can be naturally extended to multi-document summarization. Templates filled

Vernon Jordan is a presidential friend and a Clinton adviser. He helped Ms. Lewinsky find a job. He testified that Ms. Monica Lewinsky said that she had conversations with the president, that she talked to the president.

Figure 7 A three-sentence biographical summary from 1300 documents; from Schiffman *et al.* (2000).

The afternoon of Feb 26, 1993, Reuters reported that a suspected bomb killed at least five people in the World Trade Center. However, Associated Press announced that exactly five people were killed in the blast.

Figure 8 A multi-document summary based on a contradiction operator; from Radev and McKeown (1998).

from each document in the collection can be compared, with differences between the documents being characterized in terms of template comparisons. Discrepancies between template fills can arise, depending on a variety of factors. For example, in the case of news reports, information may arise at different times, and earlier information may be corrected in a later report; otherwise, differences may be due to different points of view on an event. Consider a template for terrorism events, one that lists the perpetrator, victim, type of event, location, dates, etc. Templates that have the same incident location but that originate from different sources and have one other slot in the template differing in value across the documents can be considered as expressing a contradiction.

The work of Radev and McKeown (1998) defines various text-structuring operators. Each operator takes a pair of templates and yields a more salient merged template. The contradiction operator applies to the above case of a contradiction, using a variety of heuristics to resolve the contradiction. For example, the value of the number of victims can be lowered across two reports from the same source, suggesting that the old information is incorrect; if it goes up, the first report had incomplete information. Finally, the most salient merged templates are chosen for realization using natural language generation. Here each template maps no more than one paragraph, to help control compression. Figure 8 shows an example output.

Summarization Evaluation

Evaluation of summarization evaluation has always been a challenging problem, for several reasons:

- There might not be a unique correct answer in terms of the correct summary. There is always the possibility of a system generating a good summary that is quite different from any human reference summary used as an approximation to the correct output. Summarization is similar, in this respect, to other output technologies such as machine translation and speech synthesis.
- Humans asked to summarize texts show little agreement with each other, as shown below.
- Since humans may be required to judge the system's output, this may greatly increase the expense of an evaluation. An evaluation that could use a scoring program instead of human judgments is preferable, since it is easily repeatable, allowing machines to be trained to improve the score.
- It is important to be able to evaluate summaries at different compression rates. An evaluation at 5% compression may reveal very different results from one at 25%. This increases the complexity of the evaluation.

As will be shown, these problems can all be addressed in part. There are two classes of evaluation methods that can be considered for summarization (as well as for natural language processing systems in general): intrinsic and extrinsic methods. Intrinsic methods test the system in itself, in this case, as a summarizer. Extrinsic methods test the summarizer in the context of some other task, such as information retrieval, question answering, database filling, etc.

Intrinsic Methods

In intrinsic methods, both coherence and informativeness can be tested. **Coherence** can be judged by subjective grading (e.g., a 1–3 scale) on specific criteria, such as grammar, style, conciseness, understandability, acronym expansion, etc. Criteria can also be tailored specifically to extracts (dangling anaphors, gaps, etc.) or abstracts (ill-formed sentences, inappropriate lexical choices, etc.). Automatic scoring has a limited role to play here, though more recent grammar checking tools may be useful.

Informativeness measures the extent to which a summary preserves information from a source or a reference summary. Therefore, one measure of the informativeness of a summary is the assessment of how much information from the source is preserved in the summary. Another informativeness measure is how much information from a reference summary is covered by information in the system summary. I shall discuss this below. Usually, system summaries are compared for informativeness against some baseline, as well as in comparison with humans; here agreement among humans is taken as an upper limit on summarization accuracy. I now turn to the issue of agreement among humans in summarization.

Factors Influencing Summary Variability When a subject is given specific instructions on how to construct a summary, the space of possible summaries is constrained by such instructions. The human summary may be supplied by a document's author, or by a subject asked to construct an abstract or extract. When a subject is used to construct a reference extract, she may be required to judge every sentence for summary-worthiness. Alternatively, the subject may be told to pick the top c% of the sentences in the document. Or, the subject may be told to rank all (or the top c% of) the sentences in the document; such instructions really produce sentence rankings rather than summaries *per se*. Note that the subject may be required to extract clauses or paragraphs, or arbitrary-sized passages, instead of sentences. Alternatively, instead of an extract, the subject might be asked to produce an abstract, with various instructions as to how those abstracts should be constrained in terms of compression rate, target length, coverage, etc. The different compression instructions can make a considerable difference in the quality and consistency of the resulting summaries.

Studies of Human Agreement Previous studies, most of which have focused on extracts, have shown evidence of low agreement among humans as to which sentences are good summary sentences. Rath *et al.* (1961) found that subjects asked to extract 20 sentences from each of 10 *Scientific American* articles agreed with each other only 8% of the time. Salton *et al.* (1997) found that two subjects showed only 46% overlap in their extracts when asked to extract at least five paragraphs from each of 50 articles from an encyclopedia. However, there is also evidence that judges may agree more on the most important sentences to include.

When subjects disagree, a system can be compared against majority opinion, most similar human summary (optimistic) or least similar human summary (pessimistic) (Salton *et al.*, 1997). Another possibility is to compare the system summary against a pool of alternative reference summaries collectively treated as a single reference summary.

Measuring Informativeness Measurements of informativeness can use subjective grading in terms of specific criteria, but it is more common to measure sentence recall, namely how many of the reference summary sentences the system summary contains. For example, if a reference summary has 10 sentences, and the system summary got four of them, recall would be 0.4. Sentence precision can also be measured, namely the number of reference summary sentences in the system summary. Thus, if the system summary had 20 sentences, and four of them were in the reference summary, the precision would be 0.2. (Note that when the reference and system summaries are of the same length, sentence precision is equal to sentence recall.) Sentence recall and precision are mainly applicable to sentence extracts, not abstracts. However, a sentence recall measure is not sensitive enough, since for a summary n sentences long it can distinguish between only $n+1$ scores, allowing summaries that are quite different in content to be given the same scores (Donaway *et al.*, 2000).

Content-based similarity measures based on bag-of-terms overlap can work on both extracts and abstracts. These bag-of-terms measures can be enriched by comparisons of longer terms, and they can be useful for comparing extracts. The disadvantage is that they do not discriminate very well between summaries that involve differences in meaning expressed by synonymy, hypernymy, negation, word ordering, paraphrasing, etc. that may arise, especially in the case of abstracts. An alternative is to compare system and reference summaries based on the atomic propositions (semantic content) that are common to them. However, automating such an approach is a challenge, in part because of the many different ways a core proposition can be expressed in natural language.

The SUMMAC text summarization evaluation Question and Answer task (Mani *et al.*, 2002) used a recall measure tailored to topic-focused summaries. Given a document and a topic, the idea is that an accurate topic-focused summary of the document would contain answers to questions that cover obligatory information that needs to be present in any document judged relevant to the topic. For example, a document relevant to prison overcrowding might contain an answer to a question about the names of prisons involved. Given the source document with answers to such topic questions marked up, the humans judged the summary in terms of recall of the marked-up answers (i.e., answer recall). Mani *et al.* (2002) discovered an informativeness ratio of answer-recall accuracy to compression of about 1.5.

The Document Understanding Conference (Over and Yen, 2004) has conducted evaluations of single and multi-document summarizers since 2001, based on comparisons against reference summaries. The 2003 evaluation defined four tasks: the first one was a very short (10-word) single-document summary, called the headline task. The other three tasks involved topic-focused multi-document summaries. System summaries were presented side-by-side with reference summaries in an interactive tool. System summaries were judged for coherence based on subjective grading on various criteria. To assess informativeness, the judges were asked, for each elementary

discourse unit in the reference summary, to mark one or more units in the system summary that covered the same content as the reference summary unit, with the extent of coverage being defined by a five-point scale. The systems were judged less informative than human summaries on all the tasks, with most systems being indistinguishable from one another. The results also indicate, in keeping with prior research, that in news articles, using a summary baseline of the leading sentences is often hard to beat. This is because many news stories are written with an inverted pyramid structure, with the latest and most important information presented first.

Automatic Scoring The SUMMAC Question Answering task developed an automatic scoring program that measured the content similarity between system and the marked up answers in reference summaries using four different bag-of-terms overlap measures. The correlation between system rankings on these latter measures and those on the human-assigned answer-recall measures was very high. More recently, Lin and Hovy (2003) developed a recall measure inspired by recent work on machine translation evaluation. Instead of doing bag-of-terms comparisons, the scorer compares words (unigrams), pairs of words (bigrams), trigrams, and quadrigrams (and combinations) in common, along with a bonus based on how short the system summary is. It was found that the system rankings based on unigrams correlated well with the informativeness measures of DUC judges. Longer *n*-grams did not yield such a result, perhaps because the reference summaries involved summaries in the abstractors' own words, resulting in fewer phrases in common with the mainly extractive system summaries.

Extrinsic Methods

The idea of an extrinsic summarization evaluation is to determine the effect of summarization on some other task. The variety of tasks to which summarization can be applied is in fact very large, and will expand as computer technology continues to evolve. I will first illustrate several example tasks here:

If the summary involves instructions of some kind, it is possible to measure the efficiency in executing the instructions. A summary can also be assessed for usefulness with respect to some information need or goal, such as finding documents relevant to one's need from a large collection, routing documents, producing an effective report or presentation using a summary, etc. When a summarizer is embedded in a larger system, such as a system for question-answering, it is possible to test how much the question-answerer is improved through the use of summarization. When a summary has to be used in preparation of a report, one can measure the amount of effort required to post-edit the summary.

Relevance Assessment In relevance assessment, a subject is presented with a document (retrieved by a search engine) and a topic, and asked to determine the relevance of the document to the topic. There have been a number of studies of the influence of summarization on accuracy and time in relevance assessment. The SUMMAC evaluation (Mani *et al.*, 2002) provided relevance assessment by 51 subjects of the output of 16 summarization systems that carried out single-document summaries of news articles. Results showed that summaries at relatively low compression rates (generic summaries at 10% of source length, and topic-focused summaries as short as 17% of source length) reduced relevance assessment time by 40% (for generic summaries) to 5% (for topic-related summaries), with no statistically significant degradation in accuracy. Systems that performed most accurately in the production of topic-focused summaries used statistical methods involving term frequency and term co-occurrence statistics, and vocabulary overlap comparisons between text passages; they extracted similar sets of sentences. However, for generic summaries, the systems (which relied in this case on inclusion of the first sentence of the news article) were indistinguishable in accuracy.

One limitation in this evaluation (and many others) is the restriction of the genre to newswire texts, and the fact that such a task could be addressed by extracts, without requiring abstracts.

Reading Comprehension Another interesting paradigm for extrinsic evaluation is in reading comprehension. Here the subject first reads source documents or summaries and then answers multiple-choice tests, which are then automatically scored against an answer key. Morris *et al.* (1992) used four Graduate Management Admission Test (GMAT) reading comprehension exercises. They measured how many of the answers the subjects got correct under different conditions, including a full-text condition (where the subjects were shown the original passages), an extract condition (where the subjects were shown automatically generated 20% and 30% generic extracts from the passages, based on either Edmundson's method or random sentence selection), an abstract condition (where the subjects were shown a generic human abstract of about 25% compression created by a professional abstractor instructed to create informative abstracts), and a control no-text condition (where the subjects had to pick the correct answer just from seeing the questions, without seeing the

passages themselves). The results showed that the performance of the extracts based on Edmundson's method as well as the informative abstracts were comparable to the full-text condition, with the random and no-text conditions being significantly below the full-text performance. However, the number of exercises in this study was very small, and the exercises being summarized tended to be very short.

Intrinsic Versus Extrinsic Methods

The choice of an intrinsic or extrinsic method depends on the goals of the developers, funders, and consumers of the summarization technology. In general, at early stages of the technology cycle, intrinsic evaluations are recommended, with an emphasis on evaluation of summarization components; as the technology matures, task-based tests of the system involving real users become more important. Extrinsic evaluations have the advantage of assessing the utility of summarization in a task, so they can be of tremendous practical value to a funder or consumer of summarization technology. However, they are less useful to developers in terms of offering feedback as to how they might improve their systems. This can be somewhat alleviated when a system's performance in an intrinsic evaluation predicts performance in an extrinsic one.

New Areas

Multimedia and Multimodal Summarization

As we move into the vast information universes of the 21st century, summarization of some kind becomes indispensable as a method of managing information. Increasing quantities of multimedia information are becoming available for online access. The ability to summarize the content of imagery, video, and audio along with text is thus very crucial. New genres of communication are becoming widespread, including the use of e-mail and chat. The transcripts of a variety of dialogues are being recorded, including telephone conversations, meetings, etc. The linguistic analysis of these different genres and information sources is of considerable interest. At the same time, multimedia interfaces are increasingly used for communication, along with handheld devices such as cell phones and personal digital assistants (PDAs). The study of the human–computer interfaces in such systems is also of growing interest.

Summarization in such environments can be extremely powerful. For example, a multi-document summarizer that examines both databases and news sources to report the latest developments in weather, agricultural prices, or other such topics in very short text or spoken messages or a map display for a cell phone could be extremely valuable to people in different communities around the world. The techniques for text summarization we have discussed here are broadly applicable to multimedia summarization as well, though the particular features depend on the media and genre. Systems today can summarize TV news broadcasts as well as meeting dialogues and telephone conversations.

However, the effectiveness of summarization in such applications depends on progress toward accurate audio, image, and video understanding. These latter areas still lag behind text understanding.

Summarizers have also been used in displays on PDAs and cell phones (here, topic-focused summaries and fragment output is often preferred). In addition, they have been tailored for cell phone output, where, for example, short sentences without proper names are preferred for more understandable speech output. Summarization in such environments requires an adequate linguistic characterization of the relevant genres and communication modes.

Narrative Summarization

The success of summarization is predicated on adequately capturing information content. An ability to do this can avoid inappropriate content selection as well as summary incoherence. Getting a machine to understand and summarize human narratives has been a classic challenge for both natural language understanding and artificial intelligence. Central to all narratives is the notion of time and the unfolding of events (chronologies), as well as the global discourse structure of the narrative and the emotional significance of various outcomes. Research in this area has begun creating corpora with manual and automatic annotation of events and their temporal anchoring (i.e., when the events occur), as well as aspects of the discourse structure of narratives. These research efforts should allow summarizers to create timelines summarizing information about one or more entities in a document collection over time, as well as summarize different threads of a story.

There has been considerable progress in temporal information processing, and research on discourse models of narrative has been an active field within linguistics. Systems that process this kind of information are able to deal with implicit information (temporal anchors and markers of narrative structure are often missing) as well as vagueness (e.g., *recently*, *last summer*). The understanding of spatial references is, however, somewhat less developed than

that of temporal reference. Plot understanding has not been successfully addressed, with the solutions developed to date being highly domain-specific as well as inefficient. These areas offer challenges to future research.

Conclusion

Automatic summarization is an active field with many interesting problems. The basic frameworks for summarization of extracts and abstracts have been well established and explored over the last four decades. There are several areas where capabilities need to be improved:

- Further studies of human abstracts and abstractors, as well as the analysis of large corpora of source texts and their summaries, are needed to stimulate further progress. Here, the quality of the abstracts, and consistency of guidelines used by abstractors are critical.
- Summarization evaluation needs to be explored much more. The field has been limited by an inordinate amount of attention being paid to the summarization of news, where it has been found that forming a baseline summary from the leading sentences of a news article has been hard to beat. Further progress in evaluation can come from the study of other genres, including scientific text, legal text, e-mail, chat, etc.
- Improved linguistic characterizations of different genres of text is needed, along with techniques for automatically interpreting information about these genres. Developing genre-specific discourse models, for example, is likely to result in major advances.

Overall, the extraordinary developments in information technology and the vast information horizons of the future make summarization a very valuable and engaging research area.

See also: Information Extraction, Automatic; Named Entity Extraction; Natural Language Processing: System Evaluation; Text Retrieval Conference and Message Understanding Conference.

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Summer Institute of Linguistics

P Frank, SIL International, Dallas, TX, USA

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SIL International is a faith-based organization that studies, documents, and assists in developing the world's lesser-known languages. SIL's work contributes to the well-being of the peoples whose languages it helps develop and to the national and international understanding of the richness of human languages. The organization works in partnership with governments, nongovernmental organizations, universities, and local communities. SIL's staff share a Christian commitment to service, academic excellence, and professional engagement. SIL makes its services available to all without regard to religious belief, political ideology, gender, race, or ethnic background.

SIL (formerly known as the Summer Institute of Linguistics) began as a small summer linguistics training program in 1934 with two students (see **Figure 1**). Its linguistic investigation now exceeds 1800 languages, spoken by over 1.2 billion people in more than 70 countries, with staff from more than 60 countries.

History

The organization began from William Cameron Townsend's concern and vision for people in lesser-known language groups. Townsend worked cross-culturally in a Mayan village in Guatemala, learned Cakchiquel, carried out educational and development work, and promoted Bible translation (see **Figure 2**). After years in Guatemala, he expanded his concern to include the many other linguistic-minority peoples of the world. SIL was founded in 1942 and promoted his philosophy of 'threefold service': to serve others scientifically, materially, and spiritually.

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Figure 1 1934 'Camp Wycliffe' class in session. © SIL International. Reproduced with permission.

Figure 2 Cameron Townsend and his wife Elvira in front of their village house in Guatemala. © SIL International. Reproduced with permission.

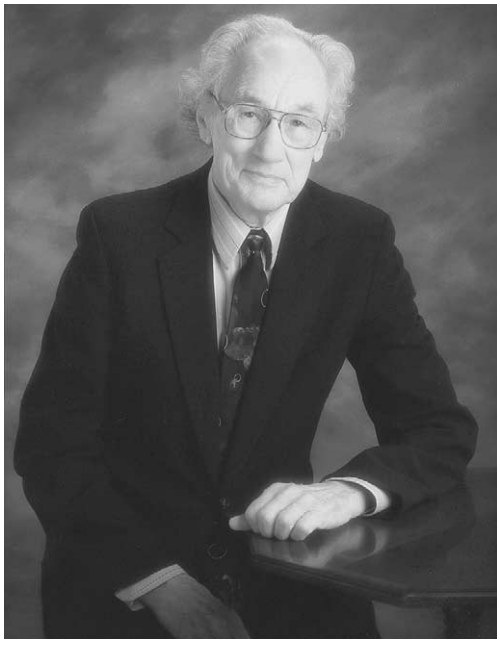

Figure 3 Kenneth L. Pike. Photo by Angela Carlson. © SIL International. Reproduced with permission.

Ken Pike was one of the early leaders of SIL and became one of SIL's best-known members (see Figure 3). Pike developed the terms 'etic' and 'emic,' which have since become foundational concepts in linguistics and anthropology. Over the course of 65 years he published 258 articles and books.

Partnership

SIL works with many government agencies and academic institutions around the world. One key international partnership is with UNESCO. UNESCO granted consultative status to SIL in 1992, and in 1997 SIL was granted special consultative status with the United Nations through the Economic and Social Council. In 1998 SIL was admitted into formal consultative relations with UNESCO (see Figure 4).

Personnel

SIL's staff come from more than 60 countries. Each staff member is motivated and unified by the belief

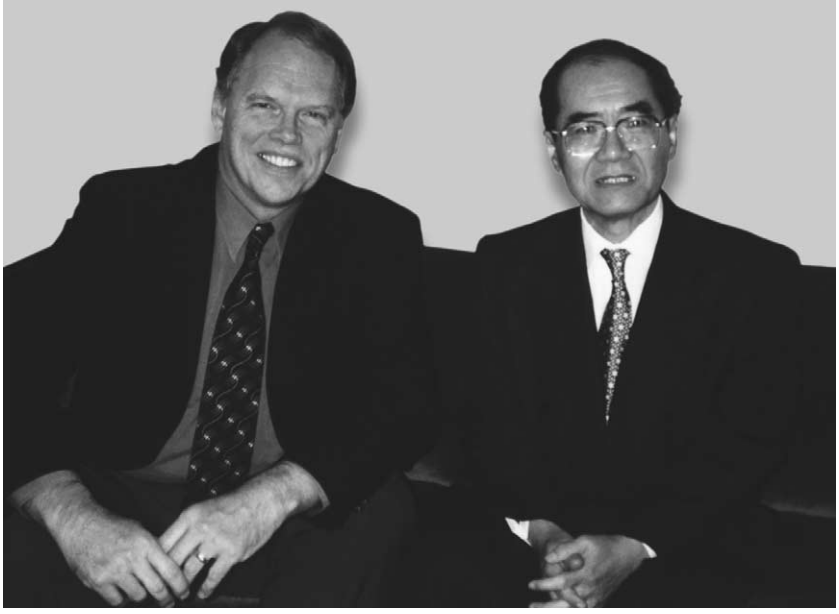

Figure 4 John Watters, SIL Executive Director (left) and Koichiro Matsuura, Director-General, UNESCO. © SIL International. Reproduced with permission.

that every person is created in the image of God and has value and dignity. Understanding and respect are basic in every effort, whether at the local community level or with the national government. SIL workers seek to build partnerships for development in such individual specialties as linguistics, language survey, literacy, translation, training, and practical community help.

Languages

SIL focuses primarily on unwritten and under-documented languages. The people who speak these languages are often marginalized from national life, in geographic, social, and economic isolation and disadvantage. The study of these languages gives practical help to the local people and also contributes to broader knowledge in academic disciplines such as linguistics, anthropology, and ethnomusicology. SIL is committed to publishing its academic research by widely distributing the results on the Internet and to libraries, universities, governments, and international agencies.

SIL is a leader in the study of the world's endangered languages through language survey and documentation. Where possible, SIL facilitates language development to prevent the extinction of languages and cultures. SIL's premier publication, *Ethnologue*, is a comprehensive catalog of the more than 6900 living languages in the world (see Figure 5).

Language Technology

SIL provides resources to help field workers organize and analyze language and culture data and prepare the results for publication. These resources include software (see Figure 6) and fonts, the LinguaLinks resource library, and other textbooks and publications.

SIL's Non Roman Script Initiative is a research and development team whose mission is to provide guidance, information, and research and development to facilitate the use of non-Roman and complex scripts in linguistic study, translation, literacy, and publishing. SIL is collaborating with UNESCO in their Initiative B@bel with the goal of helping protect languages in danger of disappearing and promoting multilingualism on the Internet.

Literacy

The ability to read is not an isolated intellectual skill; it is the key to personal, local, and national development. Literacy in SIL distinctively focuses on developing programs in lesser-known and endangered languages and emphasizes using the mother tongue as the gateway to basic literacy. SIL's vision is to see literacy become a sustainable community value with the ownership of literacy goals and activities in the hands of the people.

SIL also assists local, regional, and national agencies that are developing formal and informal

Figure 5 *Ethnologue*, available online at www.ethnologue.com. © SIL International. Reproduced with permission.

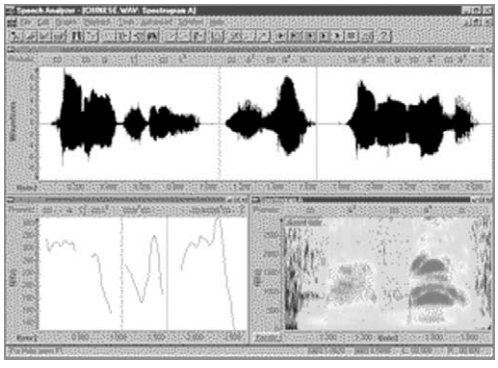

Figure 6 The Speech Analyzer program for acoustic analysis. © SIL International. Reproduced with permission.

education in vernacular languages. Such cooperation promotes multilingual education and enables new advances in the complex field of educational development in multilingual and multicultural societies.

Translation

In many parts of the world, SIL works in partnership with local speakers to adapt or translate literature for publication on nutrition, farming, health (including HIV/AIDS) (see Figure 7), and some or all of the Bible (see Figure 8). SIL's involvement and the scripture translation goals for each language are decided in close interaction with church and community leaders and other partnership groups or organizations.

Training

SIL, in partnership with institutions and organizations worldwide, offers training for applied linguistic fieldwork at more than 20 locations in North and South America, Europe, Africa, Asia, and Australia. Topics for courses include phonetics, phonology, grammar, language learning, linguistic field methods, cultural anthropology, sociolinguistics, literacy, translation, and language program planning. Classes are taught by professional staff with a broad range of field experience and a commitment to high academic standards. Graduates of these training programs are working on six continents, serving as SIL staff or in partner organizations. In addition, SIL staff conduct workshops within communities to train local leaders in language-related topics, enabling them to become trainers themselves (see Figure 9). The local language is used as the medium of instruction whenever applicable.

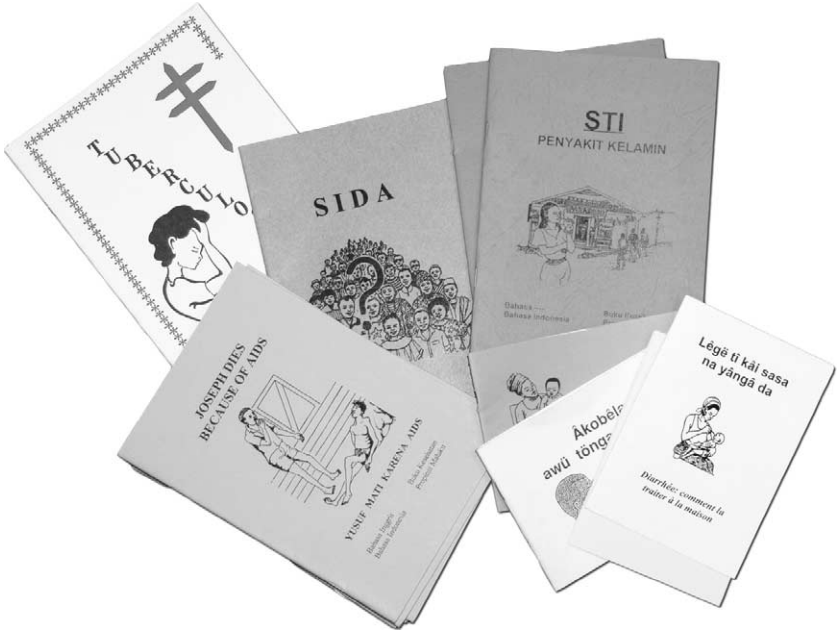

Figure 7 Books translated into vernacular languages by SIL and local colleagues on critical health issues such as clean water, hygiene, HIV/AIDS, and malaria. © SIL International. Reproduced with permission.

Figure 8 An SIL worker and local colleagues translating the Bible into a language of Cameroon. © SIL International. Reproduced with permission.

Community Service

One of SIL's goals is people-centered development. For that reason the organization gives priority to training local people in ways that help them develop their full potential. SIL also integrates language and literacy skills with other forms of community development. The development of written materials on health care, agriculture, spiritual growth, sanitation, and other topics requested by local communities is combined with practical training.

Funding

Resources for the work of SIL are provided primarily by affiliated organizations in various parts of the world. Major contributors include member organizations of Wycliffe International, which have the goal of promoting the translation of Christian scripture into the world's languages where appropriate. Grants from private corporations and foundations as well as funding from various government agencies have assisted SIL in its literacy and other related projects. In addition, most SIL workers develop individual funding resources for particular projects and personal support.

Vision for the Future

SIL's greatest contribution in the future will be building capacity for language development at local, national, and international levels. Research, resources, training, and facilitation will be the hallmarks of SIL's involvement worldwide. SIL does not have the capacity to directly impact all of the world's minority groups where language development is needed. Empowering speakers of these languages is fundamental but must be complemented by service to governments (particularly with regard to bilingual and multilingual education), fostering and equipping of nongovernmental organizations, and advocacy for minority language development in the international arena, where fundamental polices are formed that impact national legislation and practice (see Figure 10). Last, foundational

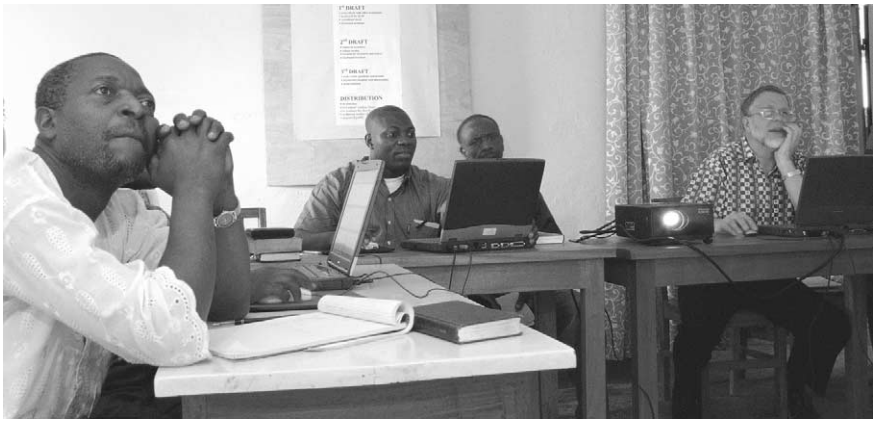

Figure 9 An SIL training workshop for Nso (Lamnso') language speakers of Cameroon. © SIL International. Reproduced with permission.

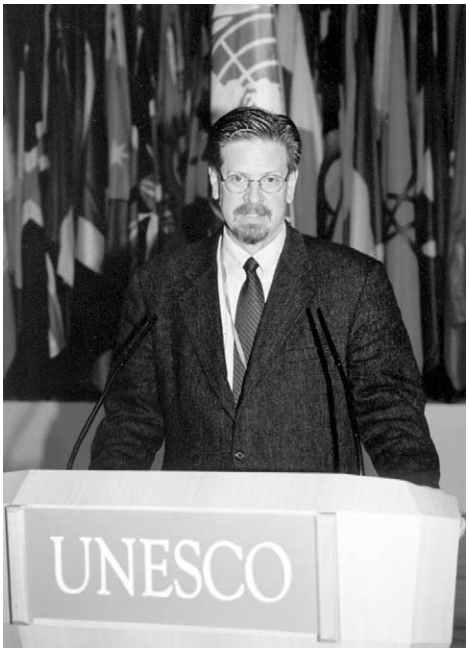

Figure 10 SIL engages with the United Nations, governmental agencies, and nongovernmental organizations as advocates for minority languages and their speakers. © SIL International. Reproduced with permission.

research in language-related disciplines and documentation of languages will continue as SIL's core contributions in the 21st century.

Acknowledgments

SIL International kindly granted access to various documents describing aspects of the organization's work and other resources that have been included in this article.

See also: Approaches to Translation, Linguistic; Approaches to Translation: Relevance Theory; Bible Translation into Lesser-Known Languages; Computers in Field Linguistics; Ethnologue; Language Adaptation and Modernization; Minority Languages: Education; Nida, Eugene Albert (b. 1914); Pike, Kenneth Lee (1912–2000); Tagmemics.

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Sumu *See:* Misumalpan.

Suppletion

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The term 'suppletion' is used to describe two distinct but related phenomena. In its original use, suppletion designates the diachronic process by which the inflectional paradigms of two unrelated words are fused to give rise to a new word with a mixed paradigm. This is what happened, for example, when the Old English verbs *gān* 'to go' and *wend* 'to turn' mixed their paradigms to give rise to the modern *go* with the *go/went* alternation. In more recent literature, suppletion is often used to describe a type of allomorphy, where some forms of a word are based on different stems that are not synchronically related.

Note that suppletion in the first sense is one of the factors that can give rise to suppletion in the second sense, but that there is no one-one relationship; a paradigm may become synchronically suppletive because of the loss of some productive phonological alternation, in which case it is not suppletive in the diachronic sense. In the remainder of this article, we concentrate on suppletion in the more recent, synchronic sense.

The Types of Suppletion

The most common variety of suppletion is 'stem suppletion': the inflectional paradigm is split in areas containing inflectional forms based on the same stem. In each area, the forms of the word appear with the usual inflectional affix, but the stem is different from one area to the next. In French, for instance, the irregular verb *aller* 'to go' uses the stem *i* for the future and the conditional (FUT 1SG *i-rai*, 2SG *i-ras*, 3SG *i-ra*, etc.) but the stem *aille* for present subjunctive singular (1SG *aille*, 2SG *aille-s*, 3SG *aille*), presenting a suppletive alternation, where a regular verb like *aimer* uses the stem *aime* for both areas (FUT 1SG *aime-rai*, 2SG *aime-ras*, 3SG *aime-ra*, etc.; SUBJ 1SG *aime*, 2SG *aime-s*, 3SG *aime*).

In some cases, suppletion can target an isolated form such as the English present 3SG form *is* in the paradigm of *be*. In this particular case, the inflectional form could be analyzed as a suppletive stem *i* followed by the present 3rd singular affix *s*. But an isolated suppletive form can also resist analysis in terms of stem and inflectional affix: in Spanish, even though the 1SG of the present indicative is uniformly marked by a final *–o* (*–oy* for monosyllabic verbs), the verb *saber* 'to know' displays a suppletive form *sé* without the suffix *–o*. This form cannot be decomposed into a suppletive stem and a regular affix; the entire form is suppletive. This type of irregularity can be described as 'inflectional form suppletion.'

Suppletion is usually considered to be an inflectional phenomenon because it presupposes the presence of a paradigm in which the suppletion takes place. Nevertheless, suppletive stems can also be found in word formation. In Latin, for example, the deverbal noun ending in *-or* derived from *ferre* 'to bear' is *lator*. This is formed on its suppletive 3rd stem *lat-*, which is also used to build *latum*, the supine form of *ferre* (an inflectional form). In this example, suppletion occurs in word formation as well as in inflection. In this light, stem alternations such as *Glasgow/Glaswegian* or *Indiana/Hoosier* could be contrived as stem suppletion; however, without an inflectional paradigm, the distinction between suppletion and synonymy is difficult to define: *Australia/Aussie* is parallel to the previous pairs while *Aussie* is merely a synonym of the nonsuppletive *Australian*.

Linguists considering affixes as signs also apply the concept of suppletion to inflectional or derivational affixes. For inflection, in English, the regular inflectional affix for plural is *-s* (*cat/cats*) while some plurals are formed with the suffix *-en* (*ox/oxen*). For word formation, in French, inhabitant names are derived from the city names through different suffixes (*-ien*: *Paris* → *parisien*, *-ais*: *Marseille* → *marseillais*, *-ois*: *Lille* → *lillois*, *-ain*: *Toulouse* → *toulousain*, etc.). These suffixes could be analyzed as suppletive allomorphs of a single morpheme.

Suppletion and Stem Allomorphy

Among cases of stem allomorphy, suppletion is the extreme case where no synchronic relation can be found between the allomorphs. Alternatively, some stem allomorphies can be reduced to phonological alternations. In German, word final obstruents are devoiced creating predictable allomorphies in the paradigm of nouns *Tag* [tak] 'day,' *Tage* [tagə] 'days.'

Linguists disagree about the adequate description of intermediary cases where the stems are phonologically similar, but no productive phonological rule can account for the alternation. At one end of the spectrum, some linguists propose that all variations of shape (*feel/felt*, *make/made*, *ring/rang*, etc.), should be considered rule-governed allomorphies, and only the cases of complete dissimilarity (*go/went*, *be/were*) should be considered suppletive (Chomsky and Halle, 1968). At the other end, others make no distinction between nonpredictable allomorphies, and treat all irregularities in the same way (Pinker, 1999). This amounts to treating alternations such as *make/made*

as suppletive. Under such a view, suppletion has nothing to do with phonological dissimilarity. It may even be argued that two identical stems can enter a suppletive relation: the irregularity of an English verb like *cut* resides precisely in the absence of change between present and preterite (*cut/cut* and not *cut/cutted*).

Suppletive Stems and Exponence

In inflectional paradigms, suppletion typically targets a natural class of forms associated with a morphosyntactic or morphophonological property. The selected class usually involves the most salient semantic contrast with the rest of the paradigm (Bybee, 1985). Veselinova (2003) showed that this kind of split occurs mainly in terms of tense/aspect, suppletive imperatives, or verb number. There seems to be some bias in the distribution of this typical stem suppletion in terms of genetic (suppletive imperatives in Afroasiatic and Caucasian languages) and areal (tense/aspect in Europe and verb number in North America) groupings. As the split involves natural classes, this leads to considering the stems with marked exponence as suppletive and unmarked as the base.

However, some languages (20%, mostly concentrated in Europe according to Veselinova) exhibit stem suppletion where some sets of forms associated with a suppletive stem do not constitute a natural class in term of semantic, syntaxic or phonological features. In Spanish, for example, the description of the verb *hacer* 'to do' needs two stems for sets of forms without clear common properties: *haga* for the present subjunctive and the present indicative 1st singular; and *hace* for the rest of present indicative, the imperfective, the imperative, the infinitive, and the gerund.

To describe this kind of stem suppletion, Aronoff (1994) proposed to consider these types of stems as forms without meaning, 'morphomes.' The morphomes are purely morphological objects: phonological sequences without associated semantic or syntaxic features, indexed to appear in specific paradigm zones.

The Distribution of Suppletive Stems

If suppletion were a random phenomenon, it should be possible that stem suppletion targets completely different sets of inflectional forms for different words giving rise to a large number of irregular inflection patterns. However, irregular inflection patterns are usually a lot less varied than is *a priori* conceivable.

This limitation of suppletion has long been recognized for languages with rich inflectional morphology. The paradigm of an irregular word is usually described by giving its 'principal parts': a set of forms sufficient to identify suppletive stems and infer the rest of the paradigm (e.g., in Latin, *fero, ferre*, *tuli*, and *latum* are the principal parts of *ferre* 'to bear'). Manuals for teaching English as a foreign language all use the plain form, the preterite and the past participle as the principal parts of a verb (setting apart auxiliaries and modals). Descriptions using principal parts suggest that verbs uniformly use the same stem in definite zones of the paradigm. Thus conjugation can be, described by associating each verb with a collection of stem slots corresponding to these zones. Suppletion is then limited to the use of distinct stems for each slot.

In French, all suppletion patterns in verbs can be described using 12 stem slots, but massive gaps in the suppletion patterns are observed (less than 0.01% of possible patterns actually exist). Even though, for instance, three slots are needed to describe the present indicative ($Slot_1$: singular; $Slot_2$: 3rd plural; $Slot_3$: 1st and 2nd plural), no French verb exhibits the same stem in $Slot_1$ and $Slot_3$ while presenting a different stem in $Slot_2$. Bonami and Boyé (2003) proposed that these gaps in the suppletion patterns are the result of a further organization of the stem slots by a network of default relations. Each idiosyncratic stem occupies a connected territory in the network.

The Causes of Suppletion

As with irregularity in general, token frequency is an important factor favoring suppletion. On the one hand, suppletion being an idiosyncrasy, it needs to be memorized; a language learner needs to be sufficiently exposed to the suppletive forms to be able to detect them and store them. On the other hand, the words appearing most frequently are the most likely to become irregular.

Suppletion is thought to happen in two contexts: etymological suppletion, when two distinct words with similar meanings come to be used in the same sense but for different parts of the inflectional paradigm, while the rest of their paradigms drops in frequency, creating the impression of a unique word being used; and nonetymological suppletion, when a regular phonological alternation dies away and is reanalyzed as allomorphic alternation, and in turn as suppletive alternation.

Maiden (1992) showed that some cases of nonetymological suppletion were not the product of the reinterpretation of a phonological alternation but that of a novel allomorphy. In Old Italian, stem-invariant verbs such as *fuggire* 'to flee' were subjected to allomorphic alternation based on a proportional analogy with *leggere* 'to read.' In his observation of

Romance languages, novel allomorphies seem to be correlated with stem slots. The same slots seem to be also used in etymological suppletion, and both types of suppletion appear to involve a high degree of solidarity between the inflectional forms based on the same slot.

See also: Inflection and Derivation; Morphological Change, Paradigm Leveling and Analogy.

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Suriname: Language Situation

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Suriname (population about 440 000) is a country with enormous wealth, in terms of both natural resources and languages. The official language of the state is Dutch, which is a reflection of the fact that from 1667 until 1975 Suriname was a Dutch colony; and also of the fact that roughly 300 000 people of Surinamese descent live in the Netherlands (and thus are predominantly Dutch-speaking). Traffic between the two states by the Surinamese is constant and regular. In total, Suriname is home to 19 languages spoken by communities of different sizes who see themselves as a political, ethnic, or cultural unit, and who have Surinamese nationality and most of whom have representation of some kind in the political and economic sphere. These languages fall into three main categories: (1) indigenous Amerindian languages (**Figure 1**); (2) English-based creole languages; and (3) Eurasian languages that were imported from Europe and Asia. The following overview gives each of the languages followed by two numbers in parenthesis: first the size of the ethnic group (E), then the number of speakers (S); where these coincide, only one number is given. The location of the rural groups is given on the map; the Eurasian languages are all spoken in the urban centers.

- Indigenous Amerindian languages: In the Cariban family, there are Kari'na (Carib) (E: 2500; S: ca. 1200) Trio (2000); Wayana (300); Akurio (E: 50; S: 2); Tunayana (E: 80; S: fewer than 10); and Sikiïyana (E: 60; S: fewer than 10). In the Arawakan family Lokono (Arawak) (E: more than 1000; S: ca. 700) and Mawayana (Mapidian) (E: 80; S: 3) are spoken.
- English-based creole languages: Sranantongo (Sranan) is spoken as a lingua franca. In the Eastern Maroon language group (listed here in order of their relatedness to Sranantongo), Ndyuka (Aukan) (ca. 20 000), Aluku (a dialect of Aukan; ca. 2000), Paramaccan (another dialect of Aukan; ca. 3000), and Kwinti (ca. 300) are spoken. Among the Western Maroon languages, Saramaccan (ca. 25 000) and Matawai (a dialect of Saramaccan; ca. 1500) are spoken. Both include a high count of lexical items from Portuguese.
- Eurasian (European and Asian) languages: Among European languages, Dutch is spoken, along with a local variety called Surinamese Dutch. Asian languages spoken are Sarnami (Surinamese Hindi) (a koiné based on Bhojpuri, Magahi, and Avadhi) (E: ca. 130 000); Surinamese Javanese (Javanese) (E: 60 000); and Kejia (Hakka Chinese) (spoken by Hakka Chinese immigrants) (E: ca. 10 000; S: ca. 5000).

In addition to the 19 languages and dialects listed above, there is a small community of Lebanese who use Arabic, generally only in a religious context; practically all younger Lebanese are mother-tongue speakers of Dutch and Sranantongo, thus this community is subsumed under the larger Dutch/Sranantongo-speaking groups. Further, some more recent immigrant language communities have been present in Suriname for less than two or three decades, namely Portuguese-speaking Brazilians (mostly gold miners); Guyanese, who speak Creolese and/or English (Guyanese Creole English); Haitians, who speak Haitian Creole French; and an increasingly large group of newly arriving Chinese immigrants,

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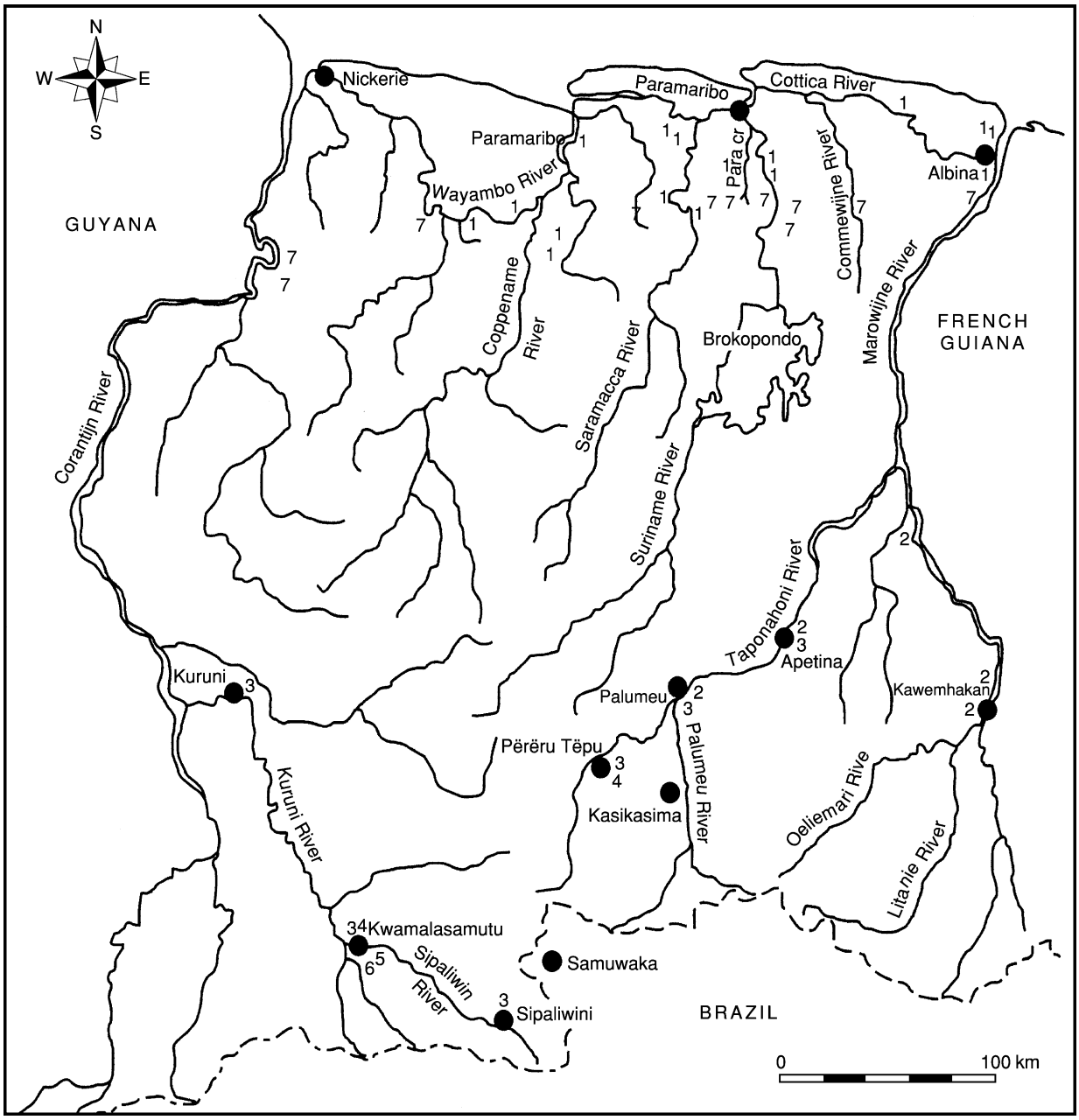

Figure 1 Map showing the approximate location of the Amerindian languages of Suriname. LEGEND: 1, Kari'na (Carib); 2, Wayana; 3, Trio; 4, Akuriyo; 5, Tunayana; 6, Sikiiyana; 7, Lokono (Arawak).

who speak Cantonese (Yue Chinese) and Mandarin Chinese; linguistically, socially, and economically these latter should be distinguished from the descendants of the Chinese indentured laborers who began arriving in Suriname from 1853 onwards (Tjon Sie Fat, 2002).

Language Use

Dutch, the sole official language, is used in politics, education, and in the media. Politicians may use Sranantongo and/or one of the Asian-based languages to create empathy between themselves and the people they represent. Dutch, as the prestige language, is used for written and audiovisual media, although mainstream television does devote a few hours of broadcasting a week to programs in Sranantongo; in addition, the East Indian population (called Hindustani in Suriname), who are economically more secure than most other groups, have acquired television stations in recent years and broadcast films and programs in Hindi (and/or Urdu), and to a lesser extent, current affairs

programs in Sarnami (which literally means 'Suriname (language)'). There is one Javanese television station that broadcasts mainly Indonesian soap operas, and several radio programs with political aims are broadcast in (Surinamese) Javanese. There is one Chinese daily newspaper published in modern literary Chinese. One radio station, based in Galibi, broadcasts in Kari'na, and there are two Maroon radio stations in use that broadcast in Saramaccan and Ndyuka. Much of Surinamese television now broadcasts films from North America without synchronization or subtitling, a fact that has contributed to an increase in the knowledge of English among the urban population.

The medium of education is Dutch, and given that there is compulsory primary-level education, the literacy rate in Suriname is around 90%. While ethnic languages are typically spoken at home in the urban centers, the language of the playground is Sranantongo. The main foreign languages taught at secondary school are English and Spanish. Since joining the Caribbean Community (CARICOM) in 1995, which is an English-speaking body, successive Surinamese governments have made it a priority to strengthen the teaching of English in schools.

Three main languages are used in the literary sphere in Suriname: Dutch (often interspersed with Surinamese Dutch elements), Sranantongo, and Sarnami. Most novels are written in Dutch, much poetry is written in Sranantongo and Sarnami, and a few volumes of poetry have been written in Surinamese Javanese. All other literary expression in Suriname is found in the oral traditions of all the ethnic groups. For a complete history of literature in Suriname, both oral and written, see van Kempen (2003).

Apart from the official status of Dutch, Suriname can be characterized as a country without an active language policy. The (unofficial) national language, that is, the lingua franca of Suriname, is the English-based creole language Sranantongo (literally, 'Suriname language') and is spoken with differing degrees of fluency by the majority of the population. Sranantongo is spoken as a mother tongue by many urban creoles and by many rural Amerindian communities in the northern part of the country; those Amerindian and Maroon inhabitants of the interior who have more sustained contact with the urban centers speak some Sranantongo, whereas the majority of these communities do not. The most conservative Sranantongo, which has significantly fewer loanwords from Dutch, is spoken in the districts of Coronie and Para. The level of bilingualism between Dutch and Sranantongo is high in the urban centers, and there is vibrant code-switching between the two languages. Likewise there is wide-scale code-switching between Sarnami, Dutch, and Sranantongo, between Surinamese Javanese and Sranantongo, and to a lesser extent between (Surinamese) Kejia, Sranantongo, and Dutch. The Maroon and Amerindians of the interior, because of their more isolated locations, are more often monolingual, or bilingual only in languages from the same language family, so that code-switching is not a relevant category there.

In general, in Suriname within one's own ethnic group in an informal setting, one uses the vernacular language if the participants in an event are monolingual, or Sranantongo and/or Dutch, or a code-switched version of these. In practically all formal situations, such as the workplace, administration, banks, and post offices, Dutch is the preferred language. If a speaker chooses to address someone in a formal situation in Sranantongo, then he or she is signaling that he or she perceives the listener as being uneducated. Thus, in the urban centers, given the high prevalence of bilingualism or multilingualism – albeit in different languages, depending on the ethnic background of the interlocutors – the choice of language one uses to address an interlocutor is an indicator of the speaker's real or perceived own social status as well as that of his or her interlocutor. An overview of language use and more detailed descriptions of the languages in Suriname can be found in Carlin (2001), Carlin and Arends (2002), and Charry *et al.* (1983).

See also: Arawak Languages; Cariban Languages; Dutch; Guyana: Language Situation; Pidgins and Creoles: Overview.

Language Maps (Appendix 1): Map 60.

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Suzhou Wu *See:* Chinese.

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Akira Suzuki was born in Nagoya, Japan, in the late Edo period (1603–1868). His father was a soldier serving the Owari branch of the Tokugawa Shogun family. He practiced medicine first, then started studying Confucian literature. He resided in a house different from the main mansion and thus had the nickname *Hanareya*, meaning 'separate house'. At the age of 29, he became an apprentice of Norinaga Motoori, one of the most influential traditional Japanese grammarians at the time. Suzuki's major publications are as follows: (1) *Hataraki kotoba kiretuduki no hu* (established circa 1803) 'A chart of the conclusive and non-conclusive forms of conjugating words,' (2) *Gengyo sisyu ron* (1824) 'A theory of four types in language,' and (3) *Gago onzyoo ko* (1816) 'Reflections on the phonology of the noble words.' In *Gago onzyoo koo*, Suzuki noted that onomatopoeia plays an important role in the etymology in Japanese.

Hataraki kotoba kiretuduki no hu was never published and was circulated as a draft. Suzuki refined his master Norinaga Motoori's work on verbal conjugation and proposed eight (in the first draft) to seven (in the third and final draft) classes for the patterns of verbal conjugation in Japanese. *Hataraki kotoba kiretuduki no hu* had long been considered as being inspired by Haruniwa Motoori's *Kotoba no yatimata* 'Eight ways of words' (1808), an extensive study of the patterns of verbal conjugation in Japanese. Later, through a close examination of different versions of *Hataraki kotoba kiretudukino hu*, Motoki Tokieda (1900–1967) proved that Suzuki's work in fact inspired Haruniwa Motoori and that Suzuki should be considered as a predecessor of Haruniwa Motoori, a son of Norinaga Motoori.

In *Gengyo sisyu ron,* Suzuki classified syntactic categories into the following four groups: (1) *Tai* (nouns), (2) *Arikata* (stative predicates), (3) *Siwaza* (nonstative/eventive predicates), and (4) *Te-ni-o-ha* (noninflecting case particles and postpositions). Suzuki essentially followed the same vein as his master Norinaga Motoori in making a distinction between *te-ni-o-ha* and the other three categories, noting the following difference between *te-ni-o-ha* and the other classes shown in **Table 1**.

Table 1 Suzuki's dichotomy of lexical items in *Gengyo sisyu ron* (1824)

te-ni-o-ha	*Others (nouns and predicates)*
have no reference	have reference/meaningful content
'voices'	words
morphologically dependent	morphologically independent; words on their own
like ''strings'' (that pierce through and gather gems)	like ''gems''
like ''hands using the 'containers (that is, non-*te-ni-o-ha* categories)' ''	like ''containers''

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Suzhou Wu *See:* Chinese.

Suzuki Akira (1764–1837)

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Akira Suzuki was born in Nagoya, Japan, in the late Edo period (1603–1868). His father was a soldier serving the Owari branch of the Tokugawa Shogun family. He practiced medicine first, then started studying Confucian literature. He resided in a house different from the main mansion and thus had the nickname *Hanareya*, meaning 'separate house'. At the age of 29, he became an apprentice of Norinaga Motoori, one of the most influential traditional Japanese grammarians at the time. Suzuki's major publications are as follows: (1) *Hataraki kotoba kiretuduki no hu* (established circa 1803) 'A chart of the conclusive and non-conclusive forms of conjugating words,' (2) *Gengyo sisyu ron* (1824) 'A theory of four types in language,' and (3) *Gago onzyoo ko* (1816) 'Reflections on the phonology of the noble words.' In *Gago onzyoo koo*, Suzuki noted that onomatopoeia plays an important role in the etymology in Japanese.

Hataraki kotoba kiretuduki no hu was never published and was circulated as a draft. Suzuki refined his master Norinaga Motoori's work on verbal conjugation and proposed eight (in the first draft) to seven (in the third and final draft) classes for the patterns of verbal conjugation in Japanese. *Hataraki kotoba kiretuduki no hu* had long been considered as being inspired by Haruniwa Motoori's *Kotoba no yatimata* 'Eight ways of words' (1808), an extensive study of the patterns of verbal conjugation in Japanese. Later, through a close examination of different versions of *Hataraki kotoba kiretudukino hu*, Motoki Tokieda (1900–1967) proved that Suzuki's work in fact inspired Haruniwa Motoori and that Suzuki should be considered as a predecessor of Haruniwa Motoori, a son of Norinaga Motoori.

In *Gengyo sisyu ron,* Suzuki classified syntactic categories into the following four groups: (1) *Tai* (nouns), (2) *Arikata* (stative predicates), (3) *Siwaza* (nonstative/eventive predicates), and (4) *Te-ni-o-ha* (noninflecting case particles and postpositions). Suzuki essentially followed the same vein as his master Norinaga Motoori in making a distinction between *te-ni-o-ha* and the other three categories, noting the following difference between *te-ni-o-ha* and the other classes shown in Table 1.

Table 1 Suzuki's dichotomy of lexical items in *Gengyo sisyu ron* (1824)

te-ni-o-ha	*Others (nouns and predicates)*
have no reference	have reference/meaningful content
'voices'	words
morphologically dependent	morphologically independent; words on their own
like ''strings'' (that pierce through and gather gems)	like ''gems''
like ''hands using the 'containers (that is, non-*te-ni-o-ha* categories)' ''	like ''containers''

Suzuki's dichotomy between *te-ni-o-ha* elements and non-*te-ni-o-ha* elements had much influence on Motoki Tokieda, who proposed a dichotomy for syntactic categories, dividing the lexicon into '*si*' (content words) and '*zi*' (functional elements). This dichotomy shares the same insight as the current syntactic theory (see Chomsky and Lasnik, 1993 for references), where the lexicon is divided up into lexical/thematic categories and functional categories.

The subdichotomy between stative and nonstative predicates proposed by Suzuki inspired a modern traditional Japanese grammarian Kenzi Ishigaki (1914–1947), who discovered a correlation between the stativity of predicates, and the alternation of the genitive case particle *no* and the nominative marker *ga* in an adnominal clause modifying a nominal head (see Ishigaki, 1942).

See also: Fujitani Nariakira (1738–1779); Japanese; Japanese Lexicography; Japan: History of Linguistics; Motoori Haruniwa (1763–1828); Motoori Norinaga (1730–1801); Tokieda, Motoki (1900–1967).

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Swadesh, Morris (1909–1967)

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Morris Swadesh, a highly regarded linguistic anthropologist, is perhaps best known for his creation in the 1950s of glottochronology and lexicostatistics, methods for dating the divergence of related languages. He was born in 1909 in Holyoke, Massachusetts, of Russian Jewish parents, from whom he learned Yiddish. As an undergraduate he studied German and French at the University of Chicago. His career as a linguist started as a student of Edward Sapir at Chicago and then at Yale University, where he completed his Ph.D. dissertation in 1933 on the semantics of Nootka (a Native American language spoken in Southwestern British Columbia, Canada). He also published papers on the phonology, morphology, and syntax of Nootka, and a book in collaboration with Sapir, *Nootka texts* (1939). After completing his dissertation, he remained at Yale to work on synchronic phonological theory and American English grammar until 1937, when he was appointed Assistant Professor at the University of Wisconsin–Madison.

Building on the works by Sapir and others, he made important contributions through his papers 'The phonemic principle' (1934) and 'A method for phonetic accuracy and speed' (1937), which clarified the certain aspects of phonemic analysis.

Swadesh also became interested in linguistic change, which he first explored by looking at its relation to phonetic complexity and then through comparative analyses of lexicons. Starting in 1950, he introduced a controversial statistical method to measure the degree of relatedness among language varieties, and over several years he elaborated his quantitative methodology of lexicostatistics and the glottochronological method to date ancestor languages. In his well-known paper 'Lexico-statistic dating of prehistoric ethnic contacts' (1952) he argued that a basic 'noncultural' vocabulary of items tends to resist replacement at a relatively constant retention rate of about 81% over 1000 years. He compiled a vocabulary list that came to be known as the 'Swadesh list' of 215 words, which later was revised to 200 and finally 100 words (Swadesh, 1955). While various critiques were made, for example, regarding the assumption that one can construct a set of noncultural words for all languages without being biased by Western notions of what are

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basic words, and whether a universally constant rate of retention can be established for changes in this list, his method served as a useful starting point for historical linguistic investigations of previously unwritten languages and generated many comparative analyses in the years to follow. He died in 1967 while working on his last major work, *The origin and diversification of language* (1971), which outlined his theory of the evolution of vocabulary imitation and sound symbolism and presented his analysis of language divergence.

During World War II he served as a linguist for the War Department in New York City, then he became Associate Professor at City College of New York in 1948. In 1949, however, City College abruptly decided not to renew his appointment. In that same year, he had been investigated by the McCarthy Committee and indicted for his past membership in the Communist party and for public statements and activities viewed as sympathetic to the party. After losing his teaching position at City College, in 1956 he moved to Mexico City, where he served as professor at the Instituto de Historia, Universidad Nacional Autónoma de México, and the Escuela Nacional de Antropología e Historia, where he continued to do research and publish. He died of a heart attack in 1967. A list of Swadesh's writings was compiled by Stanley Newman (1967).

See also: Language Change: Probabilistic Models; Long-Range Comparison: Methodological Disputes; Nuuchah-nulth; Sapir, Edward (1884–1939).

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Swahili

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Introduction

Swahili is a Bantu language spoken by over 50 million (first- and second-language) speakers in East Africa, including Tanzania and Kenya, where it is a national language, and parts of Somalia, Uganda, Rwanda, Burundi, the Democratic Republic of Congo, and Mozambique. In terms of classification, Swahili belongs to the Sabaki group of the Northeast Coast Bantu languages, and it is part of group G of Guthrie's (1967–1971) referential classification. Like many Bantu languages, Swahili has elaborate noun class and agreement systems, and complex verbal morphology.

Language History

Swahili has been spoken on the East African coast since approximately 800 A.D., after Bantu-speaking people from the Great Lakes region reached the coast. The earliest Swahili speakers, after the language separated from those Sabaki languages most closely related to it, probably settled in northern Kenya on the mouth of the river Tana. Due to the maritime trading of the Swahili, the language became

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established in Swahili settlements along the coast from Mogadishu in the north to Cap Delgado in the south. Still today, the majority of first-language speakers of Swahili live on the East African coast of Tanzania and Kenya and the adjacent islands. Through continuous contact with Arab traders, many Swahili became Muslims, and a large number of loanwords from Arabic have entered the language over the centuries, leading sometimes to the mistaken believe that Swahili is a mixed language. The Swahili coastal city-states became important centers of the Indian Ocean trade, and in the wake of increasing political and economic power, Swahili poetry flourished, in particular in the Lamu (Kiamu), Pate (Kipate), and Mombasa (Kimvita) dialects, with the earliest surviving Swahili manuscripts, written in Arabic script, dating to the first half of the 18th century. In the 19th century, Zanzibar became part of, and indeed the capital of, the Sultanate of Oman, and the Zanzibar Swahili dialect Kiunguja became more prestigious. During this period, Swahili traders established trade routes into the area beyond the coast, and the language spread with it. During the colonial period, Swahili was used as a language of administration, especially by the German colonialists in Tanganyika, but it was also a language of interethnic communication in the anticolonial struggle. After independence, Swahili became the national language of Tanzania and Kenya, in both countries sharing the status as official language with English. In Tanzania, and to a lesser extent in Kenya, Swahili is widely used in public administration, education (especially primary education), and the media. Especially in the urban centers, Swahili is increasingly the first language of younger Tanzanians and Kenyans. Swahili is also used to varying degrees in Somalia, Uganda, Rwanda, Burundi, Democratic Republic of Congo, and Mozambique. Outside of East Africa, there are Swahili-speaking communities in the Gulf states and in many Western countries, including the UK (often East-African Indians), and Swahili is taught as a foreign language in language schools and universities throughout the world.

Standard Swahili

There are a number of Swahili dialects spoken today, including the dialects of the Lamu archipelago (Kiamu, Kisiu, Kipate) and Kimvita, associated with classical Swahili literature, and Kiunguja, the dialect of Zanzibar town. Chimwiini and Bajuni, the traditional Swahili dialects of the Somali coast, are currently highly endangered due to the displacement of the Swahili-speaking communities in Somalia, and there are today probably more speakers in Kenya. Comparatively little is known about the more southern Swahili dialects such as Kingome spoken on Mafia island. A distinct variety of Swahili is also spoken in Lubumbashi and the Shaba province in the Democratic Republic of Congo. More recently, distinct urban varieties of Swahili are emerging, for example, the mixed code Sheng of Nairobi. The most important variety of Swahili today is the so-called Standard Swahili (*Kiswahili sanifu*). Since the beginning of the 19th century, various bodies, political and missionary, have made proposals for the development of a standard variety of Swahili. Missionaries began to write Swahili in Roman script, and in 1930 the British-run Inter-territorial Language Committee established the standard form of Swahili based on Kiunguja, which is used today. After independence, strong efforts were made by East African governments to develop Swahili further through research as well as through vocabulary development and standardization, e.g., through the *Baraza la Kiswahili la Taifa* (National Swahili Council) and the *Taasisi ya Uchunguzi wa Kiswahili* (Institute for Swahili Research) in Tanzania. While the development and status of Swahili is often, and rightly, cited as a successful example for the use of an African language as a modern national and official language in postcolonial Africa, it is also leading to an increasing endangerment of Swahili dialects and many of the about 200 languages spoken in Kenya and Tanzania, a problem which has been addressed only recently.

Structure

Swahili exhibits typical Bantu structural characteristics such as an articulated noun class system and morphologically marked agreement between different constituents of clauses and sentences. The morphology is complex and Swahili is often classified as an agglutinating language. Word order, especially within the sentence, is syntactically comparatively free and often motivated by information structure. A remarkable difference from most other Bantu languages is the absence of tone in Swahili.

Noun Classes

A noun class system can be thought of as being halfway between a grammatical gender system as in German or French, and classifier systems as found, for example, in Thai or Chinese. In Swahili, every noun is assigned to a specific noun class, and noun classes are in general marked by a class prefix. Thus, for example, the word *mtoto* 'child' consists morphologically of the noun class prefix *m-* and the stem *-toto*. Noun classes often express number

Table 1 Swahili noun classes and agreement

Class	*Noun class prefix*[a]	*Example word*	*Concord*[b]	*Relative concord*	*Possessive concord*	*Dem prox*	*Dem ref*	*Dem non-prox*
1	m	mtu 'person'	a/yu	ye	wa	huyu	huyo	yule
2	wa	watu 'people'	wa	o	wa	hawa	hao	wale
3	m	mti 'tree'	u	o	wa	huu	huo	ule
4	mi	miti 'trees'	i	yo	ya	hii	hiyo	ile
5	ji	jicho 'eye'	li	lo	la	hili	hilo	lile
6	ma	macho 'eyes'	ya	yo	ya	haya	hayo	yale
7	ki	kiti 'chair'	ki	cho	cha	hiki	hicho	kile
8	vi	viti 'chairs'	vi	vyo	vya	hivi	hivyo	vile
9	n	ndege 'bird'	i	yo	ya	hii	hiyo	ile
10	n	ndege 'birds'	zi	zo	za	hizi	hizo	zile
11	u	ubao 'board'	u	o	wa	huu	huo	ule
14	u	uhuru 'freedom'	u	o	wa	huu	huo	ule
15	ku	kuimba 'to sing'	ku	ko	kwa	huku	huko	kule
16[c]	pa		pa	po	pa	hapa	hapo	pale
17[c]	ku		ku	ko	kwa	huku	huko	kule
18[c]	mu		mu	mo	mwa	humu	humo	mule

[a]Noun class prefix is also used for adjective agreement.
[b]Concord is used as SM, OM (except in class 1, where SM = *a-*, OM = *m(w)-*).
[c]There are no words in classes 16–18; these are only used in agreement.

distinction, so that *watoto*, with a different noun class prefix *wa-*, means 'children.' It is customary in Bantu linguistics to group noun classes according to a numerical system first proposed by Bleek (1869) (see Table 1).

Swahili has 16 different noun classes, which have a more or less transparent semantic base. Nouns in classes 1 and 2 denote only humans (but not all humans are in class 1/2), class 14 is used to refer to abstract qualities, class 15 has verbal infinitives, and classes 16–18 are locative classes. For the remaining classes, the semantic base is less obvious. For example, class 3/4 contains a number of words denoting plants and trees, class 9/10 contains names of animals, and class 6 contains liquids. However, in all of these, there are many words that do not fit a semantic characterization. Another use of the noun classes is for nominal derivation, by shifting nouns from one class to the other. For example, shifting nouns into class 7/8 denotes diminutive: *kitoto* 'a small child,' while class 6 can be used to express a group of individuals, rather than just plurality: *fisi* (class 10), 'hyenas,' *mafisi* (class 6) 'a pack of hyenas.'

Agreement

The noun classes are important for the agreement system of Swahili, as adjectives, demonstratives, and relative clauses show their syntactic relationship with their nominal head through agreement affixes, or concords. Similarly, verbal agreement morphology marks subjects and objects of the verb. For example, in (1), the demonstrative pronoun and the adjective show their syntactic relation to the head noun *vitabu* (of class 8) by the concord morpheme *vi-*.

(1) vi-tabu vi-le vi-zuri
books *those* *beautiful*
'those beautiful books'

The shape of agreement affixes is not always identical with the noun class prefix. While the agreement morpheme is identical to the noun class prefix in the case of adjective agreement, with demonstratives, it may have a different shape, as for example with a class 6 head noun, where the noun class prefix is *ma-*, but the agreement morpheme of the demonstrative is *ya-* (see Table 1 for an overview of these forms in all classes):

(2) ma-chungwa ya-le ma-zuri
oranges *those* *beautiful*
'those beautiful oranges'

Verbs show agreement with subjects and objects, by means of subject (SM) and object markers (OM), as in (3):

(3) m-toto a-li-wa-angali-a wa-zazi w-ake
child SM1-PAST-OM2-*look_at*-FIN NP2-*parents* CD2-*his/her*
'the child looked at his/her parents'

The term 'agreement' in relation to verbs can be misleading, as no overt noun phrases are needed for a grammatical sentence; in (4) the subject and object

marker function more like pronouns in languages like English:

(4) a-li-wa-angali-a
SM1-PAST-OM2-*look_at*-FIN
's/he looked at them'

The subject marker is an obligatory part of the inflected verbs in most tenses, while the object marker is (near) obligatory with human objects, but is used according to semantic and pragmatic considerations (for example, to indicate a specific object or discourse topic) with all other classes.

A number of aspects of the Swahili agreement system pose interesting problems from a theoretical perspective, for example the resolution of agreement with conjoined NPs, or the exact characterization of the status of object agreement. Furthermore, the relation of the Swahili agreement system to the systems of other Bantu (and indeed non-Bantu) languages provides a good testing ground for comparative and historical studies.

Verbal Morphology

Inflected Swahili verbs are, as already seen above, morphologically comparatively complex. In a morphological template for Swahili verbs, ten positions can be identified. Not all of these positions can be filled at the same time, but normally, at least positions 2, 4, 8, and 9 are filled (as in example [5]). Six and seven positions are filled in (6) and (7):

1	2	3	4	5	6
Pre Initial Neg	SM	Post Initial Neg	Tense Marker	Relative Marker	Stem marker
	7 OM	8 Verbal Base	9 Final	10 Post Final Plural	

(5) wa-ta-som-a
SM2-FUT-*read*-FIN
'they will read'

(6) wa-na-o-ku-j-a
SM2-PRES-REL2-STEM-*come*-FIN
'they who come'

(7) ha-wa-ta-ku-ambi-e-ni
NEG-SM2-FUT-OM2-*tell*-FIN-PL
'they will not tell you (pl.)'

In addition to inflectional morphology, verbs can be modified by a number of derivational suffixes, or extensions, suffixed to the verbal root before the final. For example, the causative of *soma* 'read' is *somesha* 'cause to read, teach.' Verbal extensions change the meaning of the base verb and in many cases interact in complex ways with the valency of the base. Among the most productive extensions in Swahili are passive (*-w-*), causative (*-ish-*, *-esh-*), applicative (*-i-*, *-e-*), neutro-passive (*-ik-*, *-ek-*), separative (*-u-*, *-o-*), reciprocal (*-an-*), and stative-positional (*-am-*). The surface forms of these morphemes is determined by phonological processes such as vowel harmony. For example, *funga* 'tie, open,' *fungua* 'untie, close,' *fungia* 'tie for/with someone/something,' *fungika* 'be closable,' *fungana* 'fasten together,' *fungwa* 'be closed,' *funguliwa* 'be opened' (separative and passive), and *fungiana* 'tie for each other' (applicative and reciprocal). The last two examples show that more than one extension can be used. The exact meaning and function of extended verbs depends very much on the meaning of the base verb and on the (syntactic and nonsyntactic) context in which they are used.

Syntax

The basic word order of Swahili in the phrase is head-modifier, and SVOA in the sentence (8). However, word order can be changed to adapt to the specific discourse-pragmatic situation. Often focused elements are placed at the right periphery of the sentence or phrase, and topicalized elements at the left periphery (9, 10, adapted from Ashton, 1947: 301):

(8) Asha a-li-m-kut-a Juma njia-ni.
Asha SM1-PAST-OM1-*meet*-FIN *Juma* 9.*street*-LOC
'Asha met Juma in the street'

(9) ndoo hizi zi-jaz-e ma-ji
10.*buckets* *these* OM10-*fill*-SUBJ NP6-*water*
'these buckets, fill them with water'

(10) zi-jaz-e ma-ji ndoo
OM10-*fill*-SUBJ NP6-*water* 10.*buckets*
'fill the buckets (not tin cans) with water'

Within the noun phrase, a common strategy to change word order is so-called possessor raising, where in a genitive construction the possessor, which normally follows the possessed, is fronted. In (11), within the subject NP, *mtoto yule* is possessor-raised (cf. *mambo ya(ke) mtoto yule yamenichosha*). In (12), *Sudi* is possessor-raised (cf. *wale wanaojua tabia ya(ke) Sudi*):

(11) m-toto yule ma-mbo yake
NP1-*child* *this* NP6-*affairs* *his*
ya-me-ni-chosh-a
SM6-PERF-OM1sg-*make_tired*-FIN
'as for this child, his affairs make me tired'

(12) . . . hasa wale
. . . *especially* *those*
wa-na-o-m-ju-a Sudi tabia yake
SM2-PRES-REL2-OM1-*know*-FIN *Sudi character his*
'. . . especially those who know Sudi's character'
(Kibao, 1975: 50)

Note that in (12), the object marker agrees with *Sudi*, which is not actually the structural object of *-jua*. Similarly, Maw (1970) reports that in sentences such as (11), 'subject' agreement both with subject, as in (11), but also with the possessor-raised topic are possible (i.e., *amenichosha*). As mentioned above, further work is needed on the analysis of agreement.

Another area of interaction between word order, syntactic function, and agreement are so-called locative inversion structures. In (13), the locative is fronted and the logical subject follows the verb (cf. *watu wengi wamelala humu nyumbani*). Note that the subject marker agrees with the locative phrase, making it the grammatical subject. In (14), the subject marker 'agrees' with an unexpressed locative, and the subject follows the verb (cf. *hotuba mbali mbali zikatolewa*):

(13) humu nyumba-ni m-me-lal-a
in_here *house*-LOC SM18-PERF-*sleep*-FIN
watu wengi
people *many*
'many people are asleep in this house'
(Ashton, 1947: 300)

(14) pa-ka-tol-ew-a hotuba mbali mbali
SM16-CONSEC-*take_out*-PASS-FIN *speeches* *different*
'and there were held different speeches'
(Kibao, 1975: 50)

Like with many Bantu languages, the formal study of Swahili syntax is only at its beginning, and many constructions, including some of the ones mentioned here, await further analysis.

See also: Argument Structure; Bantu Languages; Gender, Grammatical; Kenya: Language Situation; Niger-Congo Languages; Tanzania: Language Situation.

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Swales, John (b. 1938)

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John Swales is one of the inventors of the field of literacy studies and a prominent researcher in this area. His focus is on English for academic purposes, particularly for advanced graduate students, a group he had worked with for many years at the University of Michigan as director of the English Language Institute. He is currently a professor of linguistics there.

Swales was born in 1938 in South London and received his B.A. and M.A. in psychology from Cambridge in 1964. He then 'drifted into' applied linguistics through English as a foreign language (EFL), a profession he picked "as a way of seeing the world, as much as anything." Swales began to see the world in the 1960s, first in Italy, then Sweden, and finally Libya, where he became head of the University of Libya English Department. He moved back to England in 1970 to teach at the University of Leeds but returned to Africa 3 years later, this time as director of English Language Services at the University of Khartoum in Sudan. He stayed in that position for 5 years, after which he returned to England as a senior lecturer at the University of Aston. In 1985, he moved abroad again, this time to the University of Michigan.

Unusual for an academic, Swales does not hold a Ph.D., but he has more than made up for that lacking through 15 single and coauthored books. These range from textbooks (Swales and Feak, 2004) to theoretical works (Swales, 1990), ethnographies of communication (Swales, 1998), and, of all things, a field guide for birds (Kielb *et al*., 1993).

Like all good EFL teachers, Swales was also a learner of the cultures of his students and the interaction between those cultures and language learning. To understand the challenges involved, he developed the concept of 'discourse community,' a group that uses specific communication patterns to achieve common goals. A central feature of all discourse communities is their use of specific genres; in fact, the normative use of common genres and common generic norms helps define a discourse community. Academics, or perhaps specific disciplines, are obvious cases, and one goal of students, particularly graduate students, is to enter such a community. However, the concept is not limited to academics; Swales's most famous example is the Hong Kong Study Circle, a philatelic group he belonged to specializing in Hong Kong stamps.

Current literacy theory is rooted in the insight that it is possible to determine what makes first written communication successful by examining it with a sociolinguistic sensibility (i.e., uncovering associations between textual forms and social purposes). This approach is often traced to Michael Halliday's (1977) sociosemiotic linguistics. However, Swales's notion of discourse community emphasizes generic norms, and thus recalls Labov's (1973) formulation of 'speech community.' The resulting emphasis on social processes over formal features has allowed useful tie-ins to influential educational, although not specifically linguistic, concepts such as 'communities of practice' (Lave and Wenger, 1991).

See also: Halliday, Michael A. K. (b. 1925); Labov, William (b. 1927).

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Swaziland: Language Situation

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English and SiSwati are the official languages of Swaziland. The majority of the population speaks SiSwati as a first language whereas English is learned as a second language in Schools. Both languages are taught in Schools and are used in the media (radio, television broadcasting and print media). The two languages differ in status, however. English enjoys dominant status as the language of written and oral communication in the corporate business environment, education sector, the judiciary and media. The dominant status of English is so complete in the education sector that all subjects (except SiSwati itself) are taught in English. And passing English is a requirement for admission to university. In print media, there are two daily newspapers in English and only one weekly newspaper in SiSwati. Television broadcasts are all in English except for one daily news broadcast in SiSwati and the occasional culture program. There is also an English radio service whose programs target the youth, especially the urban youth.

SiSwati is a language spoken by people who call themselves EmaSwati, who are found principally in the Kingdom of Swaziland and in the Republic of South Africa. Nationals of Swaziland refer to their country as KaNgwane, which means 'the place of Ngwane' (Ngwane is the name of one of their legendary kings). The language is called SiSwati by its speakers, but it is also referred to as IsiSwazi.

The exact number of speakers of SiSwati is not known, since no scientific survey has ever been undertaken to determine this. It is estimated that there are 1 million speakers in the Kingdom of Swaziland and 1.6 million speakers in the Republic of South Africa.

SiSwati is largely an oral language, with written SiSwati less common. Radio is by far the most pervasive medium of mass communication: one in South Africa (Lingwalagwala FM) and one in Swaziland (Swaziland Broadcasting Service). Both radio broadcasts have overlapping coverage, but of the two, the South African radio station reaches all parts of Swaziland, whereas the Swaziland radio station only reaches some parts of South Africa. According to the South African Broadcasting Service (SABC) media sales report, Lingwalagwala reaches an audience of about 1.5 million listeners per week. In television broadcasts, SiSwati use is restricted to news broadcasts and the occasional culture program. In Swaziland there is a daily news broadcast in SiSwati the evening.

Despite being largely an oral language, SiSwati is not used in all discourse contexts. It is officially not a language of instruction or examination at all levels of education, except in the instruction or examination of SiSwati itself. SiSwati is thus not a language of academic discourse. It is also not a language of corporate business discourse, where the tendency is to speak English.

Writing in SiSwati is mostly restricted to official publications from government departments and nongovernmental organizations, as well as mass communication literature. For example, literature on public health and community development is available in SiSwati published by government departments and nongovernmental organizations. Another large source of SiSwati publications is the education sector in the form of school textbooks and school readers for the teaching of SiSwati language and literature.

As can be expected, there are various dialects of SiSwati, which have arisen partly as a result of language contact. Within Swaziland, there are two main dialects: the Shiselweni dialect and the standard dialect. The Shiselweni dialect is influenced by IsiZulu, since it is in the region that borders the Zulu-speaking area (KwaZulu-Natal Province in the Republic of South Africa). The most salient properties of the Shiselweni dialect are phonological. For example, where the standard dialect exhibits affricates, the Shiselweni dialect will reflect stops, as in the following contrasts.

(1)	umuntfu	umundu	'human being'
(2)	Sidzakwa	sidakwa	'drunkard'
(3)	indvodza	indodza	'man'
(4)	sitfunti	sithunti	'shadow'

There are other dialects, but they have received less attention. For example, a distinct dialect exists along the Swaziland–Mozambique border that is influenced by XiTsonga, a language spoken in Mozambique.

See also: Media and Language: Overview; South Africa: Language Situation; Southern Bantu Languages.

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Sweden: Language Situation

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Sweden has a population of about 9 million, for 90% of whom Swedish is the mother tongue. Swedish, though not *de jura* the official language, is used dominantly in administration, education, media, and public life. There are a number of minority languages, both historical and new immigrant languages, and five of the former (Finnish, Sami, Meänkieli, Yiddish, Romani) received official minority language status in April, 2000. This minority status gives the speakers of the first three the right to use them when dealing with authorities in designated areas, as well as being able to insist on preschool and elderly care in these languages. It also encourages government to undertake work specifically to improve conditions for the five official national minorities and to help safeguard and develop their languages, and teaching of these minorities and their languages is stipulated in the national curriculum.

The five selected languages have all existed in Sweden for centuries, in the cases of Finnish and Sami for as long as Swedish. Today there are about 450 000 first-generation and second-generation Finns in Sweden, but there are no exact figures on how many of them have Finnish as their mother tongue, as comprehensive data on ethnicity and language preference have not yet been collected in Sweden (all subsequent figures are estimates).

The Sami number around 15 000 in the Swedish part of Sápmi (an area covering mainly the western side of the northern half of Sweden), and it is thought that at least half can speak Sami. South Sami, North Sami, and Lule Sami are the dominant varieties – Pite Sami and Ume Sami are also still spoken, but with only a handful of speakers, each is threatened with extinction. All of these varieties are covered by the Minority Language Act. There are provisions in some regions for Sami children to receive tuition in Sami language, culture, and heritage (in both designated Sami schools and regular schools). The Sami Parliament works pro-actively to promote Sami, and Umeå University teaches courses in Sami both at beginners' level and for native speakers.

Meänkieli, or Tornedalen Finnish, is spoken mainly in the north of Sweden in the area bordering Finland. It has derived from standard Finnish, with heavy influence from Swedish, and is spoken by between 40 000 and 70 000 people. A certain revival of interest in the language has taken place over the last 20 years, and there are now several books published in Meänkieli. Pajala municipality, alongside various interest groups, works to promote the use and learning of Meänkieli, and it is taught at some institutions of higher education.

There are about 17 000 to 25 000 Jews in Sweden and about 4000 of them are thought to have a thorough knowledge of Yiddish. Many more can understand but not speak it, and many have no comprehensive knowledge but use certain words and expressions daily.

Romanys are known to have lived in Sweden since at least the 16th century. Their language is mostly a spoken vernacular, and many varieties, or dialects, exist. It is estimated that there are about 15 000 to 20 000 Romanys in Sweden, and the minority language status incorporates all varieties of Romani.

Along with the historical minority languages, many newer immigrant languages are spoken, bringing the total of languages in Sweden to nearly 200. After Finnish, the largest groups include Norwegian, Danish, and languages of the former Yugoslavia. All students in primary or secondary education with a mother tongue or 'home-language' other than Swedish have the right to receive 'home-language tuition' (*hemspråksundervisning*), following a law passed in 1977.

Knowledge of English is relatively high, and many people speak a second foreign language in addition. English is taught from the age of 6 or 7. Pupils are encouraged to take up German, French, or Spanish in secondary school.

With English becoming increasingly influential, and an unprecedented influx of immigrants, a parliamentary report into the current state and future development of language in Sweden was undertaken in 2002 (*Mål i mun*). In April, 2002, the report recommended that the position of Swedish be strengthened, that everyone's right to (their own) language be safeguarded, and that learning of other languages be promoted. Work on a language law, which is expected to follow the report's recommendations, is currently underway.

See also: Finland: Language Situation; Saami.

Language Maps (Appendix 1): Map 136.

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http://modersmal.skolutveckling.se

Swedish

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Swedish is spoken natively by ~8.5–9 million people in Sweden and by ~250 000–300 000 people in Finland. It is a Germanic language, part of the North Germanic branch, along with Norwegian, Danish, Icelandic, and Faroese. There is a fair degree of mutual intelligibility between Swedish and the other so-called mainland Scandinavian languages. The early historical stages of the North Germanic languages are normally divided into an eastern group (the dialects of the present Norway, Iceland, and Faroe Islands) and a western group (the dialects of Sweden and Denmark), As the language situation developed and Danish and Swedish crystallized as two separate languages, a north–south division became increasingly appropriate. The year 1526 is normally taken as the beginning of Modern Swedish, at which time Sweden won independence from Denmark and the first Swedish translation of the New Testament began to be circulated.

The language was originally written in runes carved in stone, but early Christian missionaries brought the idea of writing on parchment and with it the Latin alphabet. There are books preserved from as early as the beginning of the 13th century. The modern Swedish alphabet contains 28 letters; the same as those of the English alphabet, except that there is no 'w' and there are three additional letters at the end of the alphabet (å, ä, and ö). Swedish underwent a spelling reform in 1906 and its spelling is now quite regular, though there are a few sounds that can be represented in a number of different ways, most notoriously /ʃ/, which can be spelled *sk*, *sj*, *stj*, *skj*, *ch*, and *sch*, and /j/, which can be spelled *j*, *gj*, *hj*, *dj*, and *lj*.

Phonologically, Swedish is characterized by a relatively large number of vowels. The 18 vowels are frequently grouped into nine pairs; the main difference within each pair is length, but there are also associated differences in quality. Standard Swedish does not have phonemic diphthongs, though the pronunciation of long vowels may involve some diphthongization. The consonants are also realized as long or short, with little or no difference in quality. Long sounds may only occur in stressed syllables and every stressed syllable must contain either a long vowel or a long (or double) consonant. When any of the consonants /t d s n l/ immediately precede /r/, the two consonants are then realized as a retroflex, /ʈ ɖ ʂ ɳ ɭ/, respectively.

Swedish, apart from the Swedish spoken in Finland, makes a distinction that is often referred to as tonal, i.e., there is a difference between Accent I (or *akut accent*) and Accent II (or *grav accent*). The distinction is one of word accent. The difference between the two accents is mainly one of pitch, but Accent II, which is limited to bi- and polysyllabic words, has an effect of some secondary stress on the syllable immediately following the syllable with main stress. There are a number of minimal pairs in the language, distinguished only by Accent I versus Accent II, as in Examples (1a) and (1b), where I or II indicates the type of accent (abbreviation: DEF, definite):

(1a) ˈtomten — ˈˈtomten
yard.DEF — gnome/father Christmas.DEF

(1b) ˈanden — ˈˈanden
duck.DEF — spirit.DEF

Swedish verb morphology is relatively simple, with no agreement marking in any tense. The present–past distinction is made morphologically, whereas perfect aspect is marked by the auxiliary *ha* 'have,' followed by a form of the verb referred to as the 'supine.' For passive, there is both a morphological and a syntactic version, and a number of subtle factors influence the choice between the two. A paradigm for the verb *kittla* 'tickle.INFINITIVE' is provided in Example (2) (SG, singular; PL, plural; PRES, present; PERF, perfect; S PASS, BLI PASS, morphological and syntactic passive; FEM, feminine):

Mål i mun. SOU 2002: 27.
Nationella minoriteter och minoritetsspråk (2003). Faktablad Justitiedepartementet, Juni.

Relevant Websites

http://www.sweden.se
http://www.spraknamnden.se
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http://www.sametinget.se
http://modersmal.skolutveckling.se

Swedish

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yard.DEF — gnome/father Christmas.DEF

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duck.DEF — spirit.DEF

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(2)	SINGULAR	PLURAL	PRESENT	PAST	PERFECT (PRES)	*-S* PASSIVE	*BLI* PASSIVE
1	jag	vi	kittlar	kittlade	har kittlat	kittlas	blev kittlad
2	du	ni					
3	hon(FEM)	de					

Noun phrases, on the other hand, have richer morphology, including agreement marking on modifiers. The masculine and feminine genders have merged into one, usually referred to as common gender (or *utrum*) and marked by *-n* in singular, which contrasts with neuter, marked by *-t*. In the plural and definite noun phrases, the gender distinction is neutralized. Definiteness is marked morphologically on nouns, and a singular count noun in its definite form can function as a referential noun phrase without any need for a syntactic determiner (see Examples (3a)–(3c)); without the definiteness marking, a syntactic determiner is required for the noun to function as a full noun phrase, as illustrated by Examples (4a) and (4b). When a modifier precedes the noun, a syntactic determiner is also required. In most cases, the noun retains its morphological marking, giving rise to so-called double definiteness, as Examples (5a)–(5c) show. Most modifiers show agreement with respect to gender (in singular indefinite), number, and definiteness. This is illustrated for definite noun phrases (Example (5)) and for indefinite ones (Example (6)). The definite–indefinite distinction on modifiers is commonly referred to as a weak–strong distinction in the literature. Case marking is found only on pronouns in Swedish (DEF, definite; COM, common; NEUT, neuter; INDEF, indefinite).

(3a) gris-en
pig-DEF.COM.
'the pig'

(3b) djur-et
animal-DEF.NEUT
'the animal'

(3c) gris-ar-na
pig-PL-DEF.PL
'the pigs'

(4a) en gris
a.COM pig
'a pig'

(4b) ett djur
a.NEUT animal
'an animal'

(5a) den ren-a gris-en
the.COM clean-DEF pig-DEF.COM
'the clean pig'

(5b) det hungrig-a djur-et
the.NEUT hungry-DEF animal-DEF
'the hungry animal'

(5c) de ren-a gris-ar-na
the.PL clean.DEF pig-PL-DEF.PL
'the clean pigs'

(6a) en ren gris
a.COM clean.COM.SG.INDEF pig
'a clean pig'

(6b) ett hungrig-t djur
a.NT hungry-NEUT.SG.INDEF animal
'a hungry animal'

(6c) två hungriga grisar/ djur
two hungry.PL pigs/ animals
'two hungry pigs/animals'

There is also a participle form, distinct from the supine, that is used attributively and predicatively and that agrees in gender and number, in a way similar to adjectives; this is illustrated in Examples (7a) and (7b) (PART, participle):

(7a) Brevet är skrivet
letter.DEF.NEUT be.PRES write.PART.NEUT
för hand.
by hand.
'The letter is written by hand.'

(7b) ett slarvigt skrivet
a.NEUT carelessly write.PART.NEUT.SG
brev
letter
'a carelessly written letter'

A striking property of Swedish is also that the possessive determiner exists in a reflexive and a nonreflexive form. The reflexive is used roughly in those environments in which a pronoun replacing the whole noun phrase would have to occur in its reflexive form. In Example (8a), then, *Björn* is eating someone else's sandwiches, whereas in Example (8b), he is eating his own sandwiches (POSS, possessive; MASC, masculine; REFL, reflexive):

(8a) Björn$_i$ äter hans$_j$ smörgåsar. [i ≠ j]
Björn eat.FIN POSS.MASC sandwich.PL
'Björn is eating his sandwiches.'

(8b) Björn$_i$ äter sina$_i$ smörgåsar.
Björn eat.FIN POSS.REFL.PL sandwich.PL
'Björn is eating his (own) sandwiches.'

The possessive reflexive agrees with its noun for number and gender much like an adjective; it does not, however, mark the gender of the possessor, unlike the nonreflexive form.

Like the other North Germanic languages, Swedish is a verb-second language. This means that main clause word order is built around the finite verb in the second position. The initial phrase will either be the subject or will have some special information structural status, such as topic or focus, or will be an adverbial phrase, often a so-called scene-setting adverbial phrase. Some examples are provided in the following sentences:

(9a) Philip gillar matematik.
Philip like.PRES mathematics
'Philip likes mathematics.'

(9b) Dinosaurier gillar Nils.
Dinosaur.PL like.PRES Nils
'Nils likes dinosaurs.'

(9c) Under sängen hittade Ellen
under bed.DEF find.PAST Ellen
inte några sockor.
not some sock.PL
'Ellen didn't find any socks under the bed.'

Any phrasal constituent can then precede the finite verb, including clauses, as illustrated in Example (10):

(10) Att han måste ha hjälm när
that he must have.INF helemet when
han cyklar gillar Robin inte.
he cycle.FIN like.FIN Robin not
'Robin does not like the fact that he has to wear a helmet when he cycles.'

The word order in the part of a main clause that follows the finite verb is usually described as relatively firm, with the order shown in Example (11):

(11) Main clause word order:
INITIAL CONSTITUENT → FINITE VERB → SUBJECT → ADVERBIAL → NEGATION → NONFINITE VERBS → OBJECTS/COMPLEMENTS

There is, however, some variation in word order also in this part of the sentence, motivated by factors such as information structure and scope. For instance, the subject *Robin* and the negation in Example (10) could change places.

The word order in subordinate clauses differs from that in main clauses in that the verb does not normally occur in second position, and it can only do so under certain very specific circumstances. Instead, the finite verb follows the subject and adverbials – in particular, the negation. The subordinate version of Example (9c) would then be as in Example (12):

(12) ...att Ellen inte hittade några
that Ellen not find.PAST some
sockor under sängen.
sock.PL under bed.DEF
'... that Ellen didn't find any socks under the bed.'

Naturally, there are many Swedish dialects, two of which deserve mention here. The first is the Swedish spoken natively in Finland: this dialect is quite distinct from the Swedish spoken in Sweden in phonology, lexicon, and syntax, one of the most striking differences being the lack of the two tones previously described (*akut accent* and *grav accent*). The other variety of Swedish of note is spoken in a small area roughly in the middle of Sweden; this dialect, *Älvdalen*, is closer to older forms of Swedish in that it preserves more morphological marking (for instance, case marking and agreement on the finite verb).

Sweden has long had a generous immigration policy and hence speakers of a large number of languages now live in Sweden. Though it is a controversial issue, there have been claims that a new variety of Swedish is emerging, namely, that spoken natively by children born in Sweden to parents who are not native speakers of Swedish. In the literature, a number of terms have been used to refer to this variety of the Swedish language, the most neutral being *Svenska på mångspråkig grund* 'Swedish on a multilingual basis.'

In 1786, *Svenska Akademien* 'The Swedish Academy' was set up to promote the purity of the language. The Academy continues to be responsible for publishing the major monolingual Swedish dictionary, *Svenska akademiens ordbok*, available online at www.saob.se. The Academy has also published a four-volume grammar of Swedish (see Teleman *et al.*, 1999). An excellent collection of corpora of Swedish, written and spoken, modern and historical, is publicly available at *Språkbanken* 'the language bank' at Gothenburg University (spraakbanken.gu.se).

See also: Danish; Faroe Islands: Language Situation; Finland: Language Situation; Germanic Languages; Iceland: Language Situation; Norse and Icelandic; Norwegian; Norway: Language Situation; Runes; Sweden: Language Situation.

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George Bernard Shaw, in the Preface to *Pygmalion* (1916), wrote of Henry Higgins that he was not a portrait of Henry Sweet, but that "there are touches of Sweet in the play." On the other hand, C. L. Wrenn, in his 1946 memorial of Sweet to the Philological Society, viewed "Shaw's *Pygmalion* as presenting in Professor Higgins a dramatic portrait of Sweet which is true in substance as well as showing many of his external qualities" (Wrenn, 2002: 529). Many regard Sweet as the greatest British linguist of the 19th century, a reputation he achieved in his own lifetime among continental scholars, but not at home.

Sweet was born into a middle-class family in London – his father was a barrister-at-law. His first experience of higher education was of Germanic philology at Heidelberg (1864). After a period in a business office, during which he became acquainted with Rask's *Anglo-Saxon grammar* and Alexander Melville Bell's *Visible speech*, he entered Balliol College, Oxford (1869). While still an undergraduate, he published for the Early English Text Society his edition of King Alfred's translation of Gregory's *Pastoral care* (1871). But, in 1873, he graduated with a fourth-class degree, marking the beginning of a series of academic rejections that colored his professional life. Two more significant early publications came quickly, his groundbreaking *History of English sounds* (1874) and *An Anglo-Saxon reader* (1876), which has persisted as a classic textbook in successive editions until the present day. These were followed by his unsuccessful application for the position of Chair of Comparative Philology at University College, London.

The period to 1885 saw a succession of further philological publications. The *Handbook of phonetics* (1877) marks the scientific beginning of the discipline. Five more books distinguished Sweet as Britain's leading Anglo-Saxonist: The *Anglo-Saxon primer* (1882), which, like the *Reader*, continues as a classic textbook, and his editions of *The Epinal glossary* (1883), King Alfred's translation of Orosius' *History* (1883), *Selected homilies of Ælfric* (1885) and *The oldest English texts* (1885). In the meantime he had also published his *First Middle English primer* (1884) and *Second Middle English primer* (1885). The same year saw the publication of the *Elementarbuch des gesprochenen Englisch*. He applied as a candidate for the Merton Professorship of English Language and Literature at Oxford and was once again passed over.

In the next 15 years, Sweet's attention was concentrated less on Old English studies and more on phonetics and grammar. His most notable productions include the *Primer of phonetics* (1890), the *Primer of spoken English* (1890), the *New English grammar* (1892, 1898), *The practical study of languages* (1899), and *The history of language* (1900). In the same period, among other works on Old English, is his *Second Anglo-Saxon reader, archaic and dialectal* (1887). In 1901 he made himself a candidate for the Oxford Professorship of Comparative Philology, and was yet again rejected by the academic establishment. However, the university did then appoint him Reader in Phonetics, which was to be his only academic posting. Before his death in 1912, he published *The sounds of English: An introduction to phonetics* (1908).

Many of those who knew him testify that Sweet was burdened all his life by a naïve outspokenness ('violent candour'; Wrenn, 2002: 516), which in later life, after so many disappointed attempts to achieve academic recognition, appeared as bitterness. Given the inherent conservatism of academic structures, together with the brilliant and pioneering nature of his own work, this acerbity may have been a factor in his long record of academic rejection. His career nevertheless was two careers: that of Anglo-Saxonist, and that of linguist. As an Anglo-Saxonist, he was the great pioneer of Old English dialectology, beginning with the apparatus in his 1871 edition of Alfred's Gregory. He also championed the viewing of historical linguistics in terms of the phonetic method. As a linguist, he was the creator of scientific phonetics, and seems (by 1877) to have anticipated Jan Baudouin de Courtenay's elucidation of the phoneme concept, although without that term. Sweet's 'broad Romic' notation served as the original basis for the IPA alphabet.

See also: Aelfric (fl. 987-1010); Bell, Alexander Melville (1819–1905); English, Middle English; English, Old English; Evolution of Phonetics and Phonology; Experimental and Instrumental Phonetics: History; Genetics and Language; Historical and Comparative Linguistics in the 19th Century; Jones, Daniel (1881–1967); Phoneme; Phonetic Classification; Phonetic Pedagogy; Phonetic Transcription: Analysis; Phonetic Transcription: History; Phonetics, Articulatory; Phonetics: Field Methods; Phonetics: Overview; Phonology–Phonetics Interface; Pitman, Isaac, Sir (1813–1897); Rask, Rasmus Kristian (1787–1832); Shaw, George Bernard (1856–1950); Sound Change: Phonetics; Sound Change; Spelling Reform Proposals: English; Spelling Reform; Welsh; Western Linguistic Thought Before 1800.

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Switch-Reference

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One of the most important purposes for which human beings use language is to describe a sequence of related events, for example, in telling a story, reporting what happened, making plans, or explaining how to do something. The term 'switch-reference' refers to one of the ways available in some languages of the world for specifying the links between events in discourse sequences such as these. The 'switch-reference system' of such a language provides its speakers with a set of verb markers from which they must choose, to indicate whether or not the events share the same major protagonist. Often the switch-reference system also enables speakers to distinguish other ways in which the events may be related, for example, with respect to their setting in time or space or a causal connection between them. The precise definition of switch-reference has been considered a difficult and controversial question. This is partly because the grammatical systems which the term has been used to label differ in their formal characteristics depending on whereabouts in the world the language is spoken, and partly because it has been hard to provide a precise and general delimitation of the meanings and functions of switch-reference systems.

Switch-Reference

The term 'switch-reference' was coined by William Jacobsen (Jacobsen, 1967). He used it to describe

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One of the most important purposes for which human beings use language is to describe a sequence of related events, for example, in telling a story, reporting what happened, making plans, or explaining how to do something. The term 'switch-reference' refers to one of the ways available in some languages of the world for specifying the links between events in discourse sequences such as these. The 'switch-reference system' of such a language provides its speakers with a set of verb markers from which they must choose, to indicate whether or not the events share the same major protagonist. Often the switch-reference system also enables speakers to distinguish other ways in which the events may be related, for example, with respect to their setting in time or space or a causal connection between them. The precise definition of switch-reference has been considered a difficult and controversial question. This is partly because the grammatical systems which the term has been used to label differ in their formal characteristics depending on whereabouts in the world the language is spoken, and partly because it has been hard to provide a precise and general delimitation of the meanings and functions of switch-reference systems.

Switch-Reference

The term 'switch-reference' was coined by William Jacobsen (Jacobsen, 1967). He used it to describe

systems in Native American languages that indicate relationships of identity or difference between participants playing similar roles with respect to successive narrated events. In a description of the Hokan-Coahuiltecan family of Native American languages, he gave the much-quoted definition: "Switch-reference consists simply in the fact that a switch in subject or agent (...) is obligatorily indicated in certain situations, by a morpheme, usually suffixed, which may or may not carry other meanings in addition" (Jacobsen, 1967: 240).

Example (1) illustrates the switch-reference system found in the Native American language Mojave (Mohave) (Munro, 1980: 145):

(1a) nya-isvar-k iima-k
when-sing-SS *dance-TENSE*
'when he_i sang he_i danced'

(1b) nya-isvar-m iima-k
when-sing-DS *dance-TENSE*
'when he_i sang he_j danced'

The Mojave switch-reference system consists of two morphemes, *-k* and *-m*, which are suffixed to the verb of an adverbial clause such as 'when he sang' in order to indicate whether the subject of that clause is the same as the subject of the following main clause. If *-k* is used, the same reference is indicated, whereas if *-m* is used, a different reference is indicated.

The abbreviations SS and DS in example (1) are commonly used to indicate the 'same subject' (or coreference) marker and the 'different subject' (or disjoint reference) marker in the switch-reference system. The two clauses related by switch-reference are also distinguished terminologically. The clause containing the verb with switch-reference marking (*nya-isvar-k/m* in (1)) is normally referred to as the 'marked' or 'dependent' clause, and the other clause (*iima-k* in (1)) is called the 'controlling,' 'independent,' or 'referential' clause. Jacobsen (1983: 152–154) gives a historical survey of terminological variants.

Recently, the term 'switch-reference' has come to be used in a more general sense by some researchers to refer to the referential relationship between sequentially ordered subjects in discourse in languages such as Spanish, where choice between an overt pronoun subject and a null subject often seems related to whether there has been a switch in subject reference. We will not be concerned with this usage of the term here, but will restrict ourselves to consideration of switch-reference systems as traditionally defined, that is, those that are morphologically marked on non-nominal expressions and clearly form a grammatical subsystem of the language.

The Distribution and Origins of Switch-Reference Systems

As well as being found in numerous North American languages, with respect to which it was first described, switch-reference systems have been identified in South America, in many of the non-Austronesian languages spoken in Papua New Guinea, and in numbers of Australian and African languages. Outside these areas, so far relatively isolated reports of switch-reference have been made, for a small number of Austronesian, Caucasian, Turkic, and Asian languages.

General articles on the distribution and typological characteristics of switch-reference can be found for North America (Jacobsen, 1983), Australia (Austin, 1981), Africa (Wiesemann, 1982) and Papua New Guinea (Roberts, 1997) (see also Stirling, 1993 for a general typological survey). Examples of the North and Central American language families for which switch-reference systems have been described include Hokan-Yuman, Muskogean, and Uto-Aztecan languages, and Jacobsen (1983) describes them as stretching chiefly across the Southwest and Great Basin regions and including areas of California. In South America, there is a broad areal scattering of switch-reference with language families including Quechuan, Panoan, and Tupi-Guaranian. In Australia, languages with switch-reference stretch from the West Coast across to Queensland, and include Warlpiri, Diyari (Dieri), Mparntwe Arrernte, Pitjantjatjara, Yankunytjatjara, Dalabon (Ngalkbun), and Alyawarra (Alyawarr). In Africa, most work has been done on Bantu languages of the Grasslands region of Cameroon, such as Bafut and Noni (Noone), but switch-reference has also been identified in Lango, spoken in Uganda. The most extensive areal survey to date has been done by Roberts (1997) for Papua New Guinea. He surveys 169 languages of which 122 (72%), from at least 51 families, are found to have switch-reference systems, and on this basis suggests that Papua New Guinea is home to the most concentrated and diverse collection of languages with switch-reference in the world (Roberts, 1997: 102).

Austronesian languages identified as having switch-reference include one in Papua New Guinea, Dami (Marik) (Roberts, 1997: 114), and a number of languages of Vanuatu, of which the best described is Lenakel (Lynch, 1983). In Eurasia, the Caucasian languages include Chechen, Ingush, Lak, and Darga (Nichols, 1983), Turkic languages are represented at least by Tuva (Tuvin), and switch-reference has also been identified for Nivkh, spoken in the Sakhalin region (Bergelson and Kibrik, 1995).

Isolated examples of other languages have from time to time been described as having switch-reference, or at least something functionally akin to it, and the list presented here is representative rather than comprehensive.

Switch-reference is a type of grammatical phenomenon subject to areal diffusion, that is, switch-reference systems tend to be found in geographically adjacent languages, which need not be related genetically and which may differ in the way the switch-reference relation is marked. This has been shown for Native American languages (Jacobsen, 1983) and for Australian languages (Austin, 1981) and is discussed by Roberts (1997) for the Papuan languages of Papua New Guinea, where he correlates presence of switch-reference, which is found mostly in the mountainous highland regions, with the Trans New Guinea Phylum, but also describes a number of cases where genetically unrelated languages have acquired switch-reference systems apparently under the influence of their neighbors.

Across languages, the origins of switch-reference morphemes are diverse. For particular languages or language groups, the origins of the morphemes may be suggested by their homophony with other grammatical markers in the language. For most Australian languages and some Native American languages, switch-reference morphemes are related to nominal case inflections, with SS marking being associated with nominative or ergative case and DS marking associated with locative or allative case (Austin, 1981). Switch-reference markers may also be derived from verbal agreement markers; tense, aspect, or modality markers; subordinating clitics or conjunctions; and a number of other sources.

The grammatical phenomena identified as switch-reference in these geographically and genetically diverse languages share the characteristic that for some types of syntactic relation between clauses in the language, a choice of morphemes is obligatorily made and used to indicate reference relations between nominal arguments in the two clauses thus related. These morphemes are situated not on the nominal arguments thus related but on the verb, or more rarely, they appear as independent morphemes, normally in the position for clausal clitics or conjunctions. However, there are some characteristic differences between the types of systems that are found in different regions, and the more important of these will be discussed in 'Typological Characteristics of Switch-Reference Languages' and 'Problems of Definition: The Functions of Switch-Reference Systems.'

Typological Characteristics of Switch-Reference Languages

The Formal Marking of Switch-Reference

The majority of switch-reference languages are head marking, freely allow omission of arguments, and lack elaborate gender or noun class systems. For most languages with switch-reference systems, the order of the major clausal constituents follows the pattern subject-object-verb (SOV). Languages with this pattern of clausal constituent ordering tend to prefer suffixation to prefixation and generally order modifiers before heads; hence syntactically dependent clauses come before independent main clauses. For this reason, in most languages with switch-reference systems the marking is by suffixation on the verb of a syntactically dependent clause that precedes the controlling clause. When switch-reference occurs in a language which does not have SOV constituent order, the ordering characteristics of the switch-reference marking also alter. For example, the Austronesian language Lenakel has SVO constituent ordering, and switch-reference is by prefixation, with the switch-reference-marked clause following the independent main clause.

Crosslinguistically, the SS marker is consistently the unmarked coding choice: it is typically morphologically less complex and may be zero-marked in opposition to overtly marked DS, or the DS marker may require the presence of additional overt indication of the referent (e.g., an overt full NP or extra agreement marking), whereas SS marking often occurs with a zero subject.

The Syntactic Relation between the Two Clauses

The switch-reference relation holds between two clauses that are syntactically related and, normally, linearly adjacent; some languages allow 'clause-skipping,' where, for example, a sequentially ordered set of subordinate clauses may all be marked with respect to a final main clause, so that some of these are not strictly adjacent to their controlling clause (e.g., Chickasaw; Walker, 2000). The controlling clause is never syntactically subordinate to the marked clause.

Crosslinguistically, there are two major types of syntactic relation in which the two clauses may stand. The first is where the marked clause is subordinate to the controlling clause. It may be an adverbial clause, a complement clause, a relative clause or an 'adjoined relative clause' of the kind found in Australian languages. This type of relation is most

prevalent in the switch-referencing languages of North America and Australia. The second type is where the marked clause and the controlling clause are in a looser relation of clause chaining, parataxis, or conjunction. In clause chaining constructions, a string of dependent medial clauses is followed by a final independent clause. The medial clauses are marked for switch-reference but lack some or all of the verbal inflection characteristic of independent clauses, such as tense, mood, and agreement. The final clause is not marked for switch-reference but does have finite verb inflection, and this is assumed to apply to the entire clause chain. Clause chains may be very long; up to 20 clauses per chain have been noted in the literature. This second type of relation between switch-reference clauses is characteristic of Papuan languages. Example (2) is from the Papuan language Amele (Roberts, 1997: 104):

(2) ija Malolo uqa=na ka jic ana-g
1SG Malolo 3SG=of car road mother-3SG.POSS
ono=nu sum-udi
there=for wait-3s.DO(SS)
ne-ce-b tobo-co-min
come.down-DS(SEQ)-3SG climb.up-DS(SEQ)-1SG
bi-bil-igin
DUR-sit-1SG.SIM.DS
bel-ow-an
go-1DU-YESTP
'As I waited there (yesterday) on the main road for Malolo's car he came down and I climbed in and off we went.'

The abbreviations SIM and SEQ stand for 'simultaneous' and 'sequential' temporal relations between the event described by the clause so marked and the event described by the following clause. 'Problems of Definition: The Functions of Switch-Reference Systems' below discusses the incorporation of such meaning distinctions into switch-reference systems.

Switch-reference marking is normally restricted to some subset of the range of clause linking syntactic relations the language exhibits. Within the switch-reference-marked range of relations, switch-reference systems may distinguish distinct pairs of morphemes corresponding to different types of syntactic relations between the two clauses (distinctions are also made on the basis of secondary meanings, as discussed in the next section). For example, Chickasaw has distinct pairs of SS and DS markers for clauses in subordinate as opposed to paratactic relations. Thus, choice of a particular switch-reference morpheme may indicate the type of syntactic relation between the two clauses as well as the other functions it has.

Problems of Definition: The Functions of Switch-Reference Systems

All languages have ways of 'tracking the reference' of nominal arguments through a stretch of discourse, and most have ways of distinguishing continuity from discontinuity of major arguments in syntactically related clauses. For example, in English a repeated subject in a subordinate or conjoined clause is typically omitted, while a new subject is given overt expression. Switch-reference has been seen as belonging to this broad functional category of reference tracking or topic continuity (Givón, 1983), and the desire to distinguish switch-reference from other devices for tracking the reference of nominal arguments through the discourse has led to a concern with definitional issues. Thus in 1981, a major symposium on switch-reference was held at Winnipeg, Canada, and took as its goal the delimitation of switch-reference and identification of its parameters of variation cross-linguistically (Haiman and Munro, 1983; see also Foley and Van Valin, 1984).

Two ways in which switch-reference is clearly distinguishable from other reference tracking devices are that switch-reference is marked not on the nominal arguments whose reference is tracked, but elsewhere in the clause, and that switch-reference morphemes must occur regardless of whether they are actually required for disambiguation of reference, i.e., when the two NPs related are both third person.

A narrow general definition of the function of switch-reference marking that has been assumed quite widely is that the switch-reference morphemes indicate obligatory coreference or disjoint reference between the subject NPs of the two clauses in the switch-reference relation. Henceforth the term 'pivot' will be used to identify the nominal arguments that are related as having coreference or disjoint reference by the switch-reference marking. This characterization thus restricts the domain of the switch-reference relation to pivots in a particular grammatical function, that of subject, and restricts the relation indicated to that of referential binding. Such a definition highlights the exotic nature of switch-reference, as marking information about nominal reference via a verbal category (Haiman and Munro, 1983: ix).

Although pervasive, such a characterization of switch-reference fails to capture its functional complexity, as is shown in 'The Pivot NPs and the Referential Relation Between Them' and 'Nonreferential Functions of Switch-Reference Systems.' More recent general characterizations of the function of

switch-reference systems have tried to accommodate the whole range of its functions crosslinguistically. Switch-reference is seen as having the clause as its domain and as expressing a relationship between two clauses or between the events described by two clauses, which indicates continuity or discontinuity between them along a number of parameters. The most important parameter is reference of the major protagonist, but other parameters may be distinguished, such as the temporal and spatial location of the event and its status as having actually occurred or not (Roberts, 1988; Ariel, 1990; Stirling, 1993; Huang, 2000). The fact that switch-reference is not marked on nominal arguments reflects the fact that it provides information about the clause as a whole.

The Pivot NPs and the Referential Relation Between Them

Examples of switch-reference systems that relate not only subjects but also NPs in other grammatical functions have been identified in a few Native American languages including Capanahua, a Panoan language spoken in Peru (Jacobsen, 1967), and in a number of Australian languages including Warlpiri (Simpson and Bresnan, 1983). Capanahua is notable because nonsubject arguments in both the marked and the controlling clause are important: it has six DS suffixes, two of which imply the identity of the subject of the marked clause with the object of the controlling clause, and one of which implies the identity of the object of the marked clause with the subject of the controlling clause. Better described is the Warlpiri system, where the subject of a switch-reference-marked infinitival clause is related by the switch-reference marking to some argument of a preceding controlling clause. The four Warlpiri switch-reference morphemes and their functions are listed below:

–*karra*: the subject of the marked clause is coreferential with the subject of the controlling clause.
–*kurra*: the subject of the marked clause is coreferential with the object of the controlling clause.
–*rlajinta*: the subject of the marked clause is coreferential with that of the controlling clause, and the event described by the controlling clause is an **accidental** consequence of the event described by the marked clause.
–*rlarni*: the subject of the marked clause, if not overt, is the same as the oblique dative argument of the controlling clause.

For some other languages, it has been argued that the definition of the switch-reference pivot should not be strictly the syntactic subject but should appeal to notions of agentivity or topicality of noun phrases. A key set of examples here are those where the controlling clause is an impersonal construction or some other construction with a 'referentially deficient' subject (such as inalienably possessed body parts or weather constructions). In such cases, the switch-reference marking is often SS, even though technically the subjects of the two clauses are not coreferential, reflecting the continuation of the major relevant protagonist. That is, typically the switch-reference system uses DS marking for a new agentive, fully referential subject and SS marking to indicate that no new agentive, fully referential subject has been introduced. Exactly how this is described depends on the language and the researcher, with claims being made variously that for some languages the switch-reference pivot may be required to be not merely the syntactic subject, but agentive as well (Stirling, 1993); more rarely that switch-reference operates simply in terms of the agent of the clause, whatever grammatical function it fulfills; or that the switch-reference pivot should be defined as the topic of the clause. For Barai (Olson, 1981), it is argued that there are two switch-reference systems, one of which operates in terms of grammatical subject and one in terms of topic.

Whether the pivot NPs are defined in terms of grammatical function, semantic role, or discourse status, the relation between them may be complicated if they are neither strictly identical nor completely different, that is, where the reference of one NP includes that of the other or they overlap in reference (Wiesemann, 1982; Stirling, 1993). Such a situation typically occurs where the inclusive NP is plural and the other NP identifies some member(s) of the set, but also includes cases where there is a part–whole relationship between the referents of the two NPs. In such cases, a range of strategies is found crosslinguistically, and it may be relevant whether the inclusive NP is in the marked or controlling clause, with the possible relations of referential overlap listed below.

(a) Marked-NP includes Controlling-NP
(b) Marked-NP is included in Controlling-NP
(c) Marked-NP overlaps with Controlling-NP.

Although reportedly there are languages where all these cases require DS marking (e.g., Pima, Huallaga Quechua), crosslinguistically, SS marking is frequently used for cases of referential overlap, either as a requirement of the grammar or optionally on the basis of the way the speaker chooses to present the events. In some languages, including many North American and some Papuan and Australian languages, it makes no difference whether the inclusive NP is in the marked or controlling clause; SS marking

is general (Huichol, Martuthunira Martuyhunira) or possible (Maricopa, Mojave) in either case. In other languages, including many Australian and Papuan languages, SS marking is restricted to cases where the inclusive NP is in the marked clause (a); if the relation of inclusion is the other way around with the inclusive NP in the controlling clause, and (b), DS marking must be used (Diyari, Amele, Ono, Suena). The reverse does not generally occur, i.e., SS marking allowed just when the inclusive NP is in the controlling clause, although it has been reported for a few languages such as Yankunytjatjara. Sometimes the relation of inclusion may be determined by cultural factors such as kinship relations rather than simply by referential relations (as in Mparntwe Arrernte; Wilkins, 1988: 166), and in some cases the person of the pivot NP is relevant to whether SS or DS is used, with agreement in person or presence of first person, making SS marking more likely. A few languages solve the problems of referential inclusion by using both SS and DS marking at the same time on the same verb (Irumu: Tuma-Irumu; Roberts, 1997).

Nonreferential Functions of Switch-Reference Systems

Switch-reference systems frequently offer more than one pair of morphemes to choose from, and the additional meaning typically concerns the temporal relation between the two events. The most common distinction is whether these events occur simultaneously or in temporal sequence. (Example (2) in 'The Syntactic Relation Between the Two Clauses' illustrated a system with such a distinction.) In this respect, switch-reference systems can be compared to other verbal morphology whose sole function is to distinguish simultaneous from sequential events, as in Swahili, where the prefix *ka-* indicating a sequence of consecutive events is contrasted with the prefix *ki-*, which indicates interrupting contingent or simultaneous events (Hopper and Thompson, 1980: 281). Other meanings may be associated with particular choices in a switch-reference system as well. These tend to concern logical or epistemic relations between the events, involving notions of expectation, causality, purpose, condition, and contrast.

In addition, in many switch-reference languages the DS marker may be used even though the switch-reference pivots are coreferential, to indicate a discontinuity in some other parameter of the event sequence being described. For example, the events may differ in spatial location, in temporal location, in whether they actually occurred, or in whether they have an agentive controller. A crosslinguistic survey of such cases is given in Stirling (1993) and they are discussed in a range of works including Roberts (1988). Apparently anomalous DS marking may also be used to indicate the beginning of a new discourse unit (Stirling, 2001).

Theories of Switch-Reference

A number of theories of switch-reference have been proposed within the domains of syntax, semantics, and pragmatics.

Finer (1985) proposed a formal grammar of switch-reference within a version of government binding theory called generalized binding. His account was based on a subset of switch-reference systems from Native American languages and was a formal encoding of the view that switch-reference is a relation between subject NPs that happens to be mediated by other elements of the clause. He assumed that switch-reference is a syntactic relation to be accounted for by the binding theory in an analogous way to reflexive pronouns. Information about switch-reference starts off encoded in an abstract operator in the ultimately unrealized constituent of COMP, with the SS marker treated as a generalized anaphor, while the DS marker is seen as a generalized pronominal; the syntactic–semantic information encoded by the abstract operator percolates through to the subject nominals of the two clauses and has the effect of marking them with identical or disjoint referential indices, while the phonological information affects the realization of the verb.

Following on from Finer's account, a number of treatments of switch-reference have been proposed in more recent approaches to generative grammar, including the principles and parameters approach and the minimalist program (Nichols, 1999; Broadwell, 1997; Watanabe, 2000; Déchaine and Wiltschko, 2002). While these differ in detail, all accounts proposed within Chomskyan syntactic frameworks crucially make the assumption that switch-reference is universally a purely structural local relation marked on a subordinate clause and best accounted for in terms of configurational properties of the sentence and c-command relations. Broadwell (1997) considers data from clause chaining languages, which appear to offer significant counter-examples, and argues that they can be reanalyzed as subordination: a key issue for the viability of these approaches is thus the syntactic status of medial clauses within clause chaining languages, and it remains controversial as to whether they can be assimilated to syntactic subordination, with most researchers working on these languages remaining skeptical (cf. Roberts, 1997). Chomskyan syntactic accounts have so far made no attempt to handle nonlocal switch-reference relations and referential overlap or other functional

complexities discussed in 'Problems of Definition: The Functions of Switch-Reference Systems.'

Tsujimura (1987) proposed a theory for switch-reference within the framework of categorical grammar. She formalized the insight that SS can be considered as 'agreement' and DS as 'disagreement.' She showed how her account can handle the switch-reference systems of Tairora, Hopi, and Warlpiri. In particular, she provided an account for switch-reference systems which mark reference relations involving nonsubject NPs.

In Stirling (1993), a formal theory of the syntax and semantics of switch-reference was proposed within the framework of unification categorial grammar, which associates a syntax based on categorial grammar with a semantics based on discourse representation theory. This account formally encoded the idea that switch-reference has the clause as its semantic domain and indicates agreement or disagreement between parameters of the events described by the clauses it relates, most importantly referential relations between major protagonists but also other parameters. The formal treatment was illustrated with an account of the switch-reference system of the Papuan language Amele, and was claimed to generalize to a range of switch-reference systems, in particular clause chaining systems and systems with complex nonreferential functions.

Huang (2000) suggests a way of incorporating some of the insights of Stirling (1993) within his neo-Gricean pragmatic theory of anaphora: any speaker who intends to indicate continuity of the eventuality (including coreference of pivots) will use SS marking; use of DS marking will generate implicatures to the effect that some change must be at issue.

Considerable work has also been done on switch-reference and related phenomena within the framework of lexical functional grammar, as part of a general theory of anaphoric binding and control (Simpson and Bresnan, 1983; Dalrymple, 1993).

Related Phenomena

The term 'obviation' has been used to describe switch-reference systems of the Warlpiri type, which tracks other arguments in the clause as well as subjects (Simpson and Bresnan, 1983). Simpson and Bresnan see this system as part of the more general phenomenon of 'control,' i.e., restrictions on the interpretation of unexpressed arguments in a syntactically dependent clause in terms of the interpretation of arguments in the main clause. Obviation systems are ones that exclude certain possible controllers.

This use of the term 'obviation' should be distinguished from its use in work on Algonquian languages, in which personal pronoun systems make a distinction between a 'proximal' third person, which is central to the discourse, and an 'obviative' third person (also called a 'fourth person'), which is peripheral to the discourse.

Similar to both obviation and switch-reference are 'logophoric' systems. In these, a NP in a dependent clause takes a special pronominal form to indicate its coreferentiality with a NP in a controlling clause. The dependent clause is constrained semantically to be a context of reported speech or mental or psychological state. Switch-reference and logophoric systems may cooccur in the same language.

Switch-reference marking of the clause chaining type is related in complex and interesting ways to 'serial verb' constructions.

Future Work

Detailed descriptive work on switch-reference languages at the discourse level remains limited, but would be highly desirable so that the interaction between the choice of switch-reference morpheme and semantic, pragmatic, and stylistic factors may be properly determined. For example, Walker's (2000) study of switch-reference in Chickasaw conversation, illustrated switch-reference markers being used even in the course of code-switching between Chickasaw and English. Continued work on more fully comprehensive typological and syntactic studies would also be beneficial.

See also: Binding Theory; Control and Raising; Discourse Anaphora; Topic Chaining Constructions.

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Switzerland: Language Situation

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Switzerland, surrounded by Germany, France, Italy, Austria, and Liechtenstein, is a small central European state with 7.3 million inhabitants (80% of whom have Swiss citizenship) and a total area of 41 293 km^2. Its geographical centre lies in the central alpine massif; the larger cities and the industrial centers are situated in the northern plateau, in the so-called Mittelland (Geneva, Lausanne, Berne, Zurich), and north of the Jura chain (Basel).

There are four national languages in Switzerland, each of which is spoken in a different area: German in northern, central and eastern Switzerland, French in the west, Italian in the area south of the Alps, and Romansch in the alpine southeast (**Figure 1**).

According to the most recent census, Switzerland has the following language distribution: German 63.9%, French 19.5%, Italian 6.6%, Romansch 0.5%, and others 9.5%. Around 20% of Switzerland's population is foreign (including nonnaturalized Swiss-born descendants of immigrants), which accounts for the fact that some foreign languages (e.g., Serbo-Croatian and Turkish) are more strongly represented than the national language Romansch.

The German-Speaking Area

Historically, from the late Middle Ages, Switzerland comprised a confederation of German-speaking cantons or states that ruled a couple of French- and Italian-speaking territories. Only following the influence of French revolutionary ideas and an invading French army (1798), and finally after the foundation of the modern federal state (1848), did Switzerland officially become a multilingual country.

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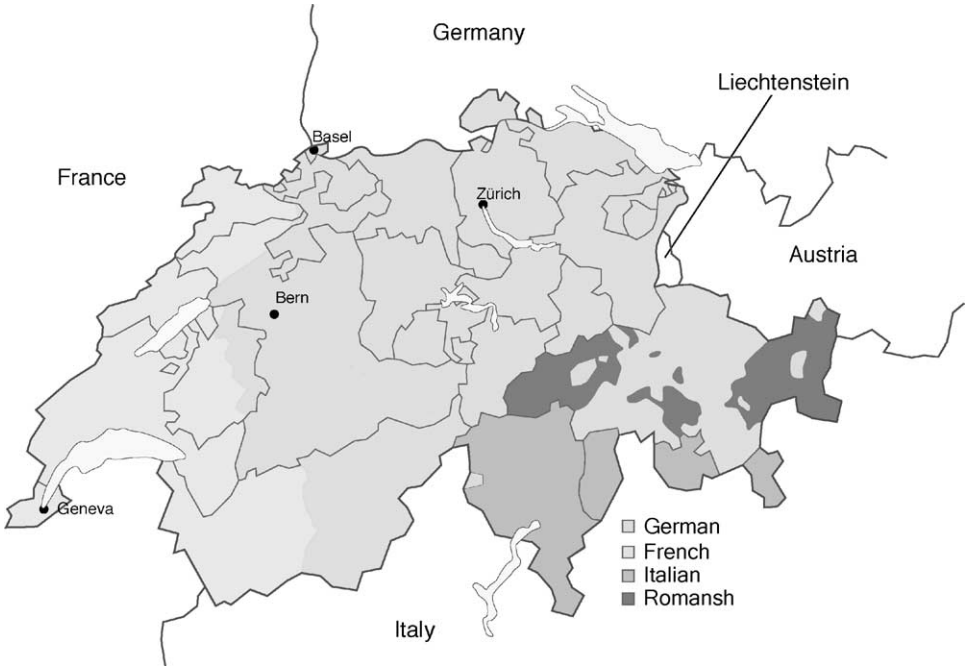

Figure 1 Map showing distribution of languages in Switzerland.

compared with 80 million German-speaking Germans and eight million German-speaking Austrians.

In German-speaking Switzerland there is a profusion of distinct Alemannic dialects, collectively called *Schweizerdeutsch* (Swiss German) (Alemannisch). A characteristic feature of the language situation is diglossia, the use of dialect and Standard German side by side. Standard German is used for most written functions and such highly formal spoken genres as public lectures or university and school teaching, whereas local dialects are used for almost all other spoken purposes. Swiss Standard German is quite similar but not identical to Standard German as it is used in Germany or Austria. There are differences on all linguistic levels, i.e., on the phonetic, morphological, syntactic, and especially the lexical levels. These differences are summarized under the term 'Helveticism.' They are typical of the Swiss variety of the pluricentric German standard language.

The French-Speaking Area

French-speaking Switzerland (called 'Romandie') with roughly 1.4 million speakers is the only linguistic area in Switzerland where dialects (called 'patois') are of almost no importance anymore. Romandie is part of the wider French language community and has widely adapted to the central French language policy. This policy aimed to standardize French grammar, lexicon, and pronunciation, which weakened the regional French languages and dialects considerably. Hence, the dialects of French-speaking Switzerland, which mostly belonged to the Franco-Provençal language, have pretty much died out. At a rough estimate, only 1% to 2% of the population still have some knowledge of their local dialect, mostly of them living in Catholic regions, i.e., the cantons of Valais, Fribourg, and the Jura.

The decline of the dialects is also due to negative stereotypes towards all deviations from the standard French of the Ile de France, with Paris as its center, which generally prevails in the French-speaking areas. In Switzerland, the decline of dialects started in the 17th century, at first in the Protestant cities of Geneva and Neuchâtel, and finally began to spread to the countryside with increasing speed after the French revolution. Since the first half of the 20th century, the use of patois has been forbidden in the schools of French-speaking Switzerland. Colloquial standard French gradually took the place of the patois.

Similar to the situation in the German-speaking area, the standard French spoken in Switzerland has some national and regional differences compared to the French spoken in France. Some of these differences derive from older French norms, others are influenced by former dialects, and a relatively small number are borrowings from German. With the 1997 publication *Dictionnaire suisse romand: particularités lexicales du français contemporain* by André Thibault these differences have been officially codified. Thus, French-speaking Switzerland is a national center of the pluricentric French language.

The Italian-Speaking Area

Approximately 550 000 inhabitants speak Italian as their first language. Around half of them are Italian immigrants, who have settled in all the linguistic areas of Switzerland, while the other half, Italian-speaking Swiss, mostly live south of the Alps in the cantons of Ticino and Grigioni. The linguistic repertoire of the Italian-speaking Swiss population includes local dialect, regional dialect, regional Italian and standard Italian. The dialects are part of North Italian Lombardic (Lombard). Until the 1970s, their local dialect was the first language for the majority of Italian-speaking Swiss. After that, young people gave up their dialect for regional Italian, mainly in the industrial centers of southern Ticino.

Standard Italian was rarely used for oral communication until the middle of the 20th century. It was used mainly as a written language. Comparable to German in German-speaking Switzerland, it was spoken only in highly formal situations, such as political assemblies, public lectures, or funerals. Lack of practice led to an attitude of reserve and insecurity in using standard Italian. This has changed only in the past 30 years.

The Romansch-Speaking Area

The Romansch-speaking population is the smallest language group in Switzerland, containing fewer than 50 000 persons, who live predominantly in the numerous valleys of the canton of Graubünden (Grisons/Grigioni). The language territory of the Romansch-speaking population is not continuous any more but is interspersed with German-speaking areas. As the majority of the Romansch population is bilingual (Romansch/German), the number of Romansch speakers is generally decreasing. In contrast to the other national languages, Romansch is not supported by a larger language community outside Switzerland. Other than within national borders, it is spoken only in a few linguistic enclaves of northeast Italy. Therefore the Romansch language is threatened by extinction.

The isolation of the alpine valleys led to the development of five distinguishable idioms (Sursilvan, Sutsilvan, Surmiran, Puter, and Vallader), each of them with its own written conventions. In 1982 an artificial single written language for all five idioms, known as Rumantsch Grischun, was created to try to stop the erosion process.

Multilingualism

In Switzerland, only a small minority of the population is genuinely multilingual. The knowledge of further national or foreign languages is normally acquired at school. Until the end of the 20th century, all schoolchildren had to learn at least one additional national language. Now, in view of the increasing importance of English as a world language, English is taught at all school levels as an additional language. In some cantons of the German-speaking area, English has recently become the first additional language to be taught at primary and secondary school, with French following as a second additional language.

See also: Bilingualism; French; German; Italian; Language Planning and Policy: Models; Multiculturalism and Language; Rhaeto Romance; Variation in French; Variation in German.

Language Maps (Appendix 1): Map 140.

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Syllabic Constituents

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The term 'syllabic constituents' refers to the subgrouping of segments within the syllable. The issue of whether the syllable contains such constituents has been controversial among phonologists. One view is that the syllable has no internal constituents but consists of the segments themselves (Kahn, 1976; Clements and Keyser, 1983). Another view divides the syllable into three constituents: onset, nucleus, and coda (Hockett, 1955; Haugen, 1956; Davis, 1988). The onset is a constituent comprising the syllable-initial consonant or consonant cluster; the nucleus consists of the vowel or syllabic consonant and is considered the peak of the syllable; and the coda contains the syllable-final consonant or consonant cluster. Under this view, the nucleus is an obligatory constituent of the syllable. A third view posits a bipartite division of the syllable into onset and rhyme (or 'rime'), where rhyme comprises the syllable peak (usually a vowel) and any postpeak consonants within the syllable. While the onset-rhyme division is attributed to Pike and Pike (1947), arguments for the division are provided by Halle and Vergnaud (1980) and Selkirk (1982). Proponents of rhyme structure disagree as to whether the rhyme formally consists of the labeled constituents, nucleus and coda. A more minimalist view of syllable constituents can be found in the moraic approach to the syllable as developed in the work of Hayes (1989), in which morae alone comprise the constituents of the syllable.

A wide variety of evidence has been presented to argue for syllabic constituents. Possibly the strongest evidence for the division into onset, nucleus, and coda (as well as rhyme) comes from phonotactic constraints. Other evidence for this division can be gathered from allophonic distribution as well as from phenomena such as speech errors and language games. On the other hand, evidence from syllable weight has been provided to motivate the moraic view of the syllable.

First, phonotactic constraints, often viewed as the primary evidence for syllabic constituents, are those constraints found on the sequence of segments in a given language. Many phonologists (Fudge, 1969; Selkirk, 1982) have noted that in English, there are constraints holding over the first two phonemes of a syllable if both are consonants. For example, if two consonants appear at the beginning of the syllable, they cannot both be sonorant consonants. But, there are virtually no constraints if the first two phonemes of a syllable consist of a consonant followed by a vowel. The constraints holding over the first two consonants suggest that they comprise a single unit or constituent, the onset, while the lack of such constraints over a consonant followed by a vowel indicates that they are in separate parts of the syllable. On this view, the domain of phonotactic constraints is the syllabic constituent. Phonotactic arguments have been given by Selkirk (1982) to argue for the constituency of the nucleus and coda in English. For example, the constraints that hold between the vowel and a following offglide in English (e.g., [ay] is a possible sequence but not [ew]) argue for their comprising the peak (or nucleus) of the syllable, and the restrictions that hold among the consonants in consonantal sequences at the end of a syllable (e.g., they cannot be of rising sonority) argue for the constituency of the coda. Furthermore, the argument from phonotactic constraints has been used to justify the rhyme as a constituent of the syllable. Researchers such as Halle and Vergnaud (1980) and Selkirk (1982) have observed that there are restrictions on what nucleus can precede what coda. In an English syllable containing a diphthong followed by a consonant cluster, the consonant cluster must consist of coronal consonants (e.g., 'kind' [kaynd] vs. the phonotactically impossible *[kaymp]).

An important issue that arises in the use of phonotactic constraints as a diagnostic for syllabic constituency concerns the particular nature of the phonotactic constraint. Davis and Hammond (1995) specifically argue against the use of phonotactic constraints that reference identity, OCP-type constraints, as a diagnostic for constituency. They note that these may hold between adjacent or nonadjacent phonemes that do not otherwise seem to comprise a single constituent. Both Davis and Hammond (1995) and Blevins (1995) note that it is sonority-based phonotactics that are the diagnostics. As observed by Blevins, in an English CCV sequence, the sonority value of the second consonant is restricted by the first one, not by the following vowel, thus suggesting that the first two consonants comprise a constituent. Another issue that arises in the discussion of the phonotactics of English and other languages is the patterning of s-clusters. For example, English syllables can begin with /sp/, /st/, and /sk/, but there are no non-s-obstruent clusters at the beginning of the syllable. This evidence has led to suggestions that these s-clusters in English are phonologically single segments (Selkirk, 1982), but they could just as well be analyzed with the initial /s/ of the cluster phonologically outside of the syllable.

A second type of evidence bearing on syllabic constituents comes from allophonic distribution, namely the distribution of the variant pronunciations of a phoneme. It is not uncommon for allophones of a phoneme to be associated with certain positions within the syllable. Consider, for example, one pattern of the distribution of light and dark (velarized) /l/ in American English. Light /l/ occurs at the beginning of the syllable and as the second consonant in a syllable-initial consonant sequence (e.g., as in 'play'). Dark /l/ occurs at the end of the syllable and as part of a syllable-final consonant sequence (e.g., as in 'help'). One way to account for this distribution is by reference to syllabic constituents: light /l/ occurs as part of an onset and dark /l/ as part of a coda. Another case of allophonic distribution that seems to refer to syllabic constituents is German obstruent devoicing, which has been analyzed as occurring when the obstruent is in coda position (Vennemann, 1978). However, some researchers (Blevins, 2003) have contended that such cases of allophonic distribution are better understood by position within the phonetic string rather than by invoking syllabic constituents.

Third, two types of external evidence that have been used to motivate syllabic constituents are evidence from speech errors (i.e., slips of the tongue) and language games. Speech errors often involve the movement of a phoneme or the exchange of phonemes or sequences of phonemes. Given this indication, researchers such as Shattuck-Hufnagel (1983), Laubstein (1987), and Davis (1988) have pointed out that the speech error evidence from English can be used to support the onset, nucleus, and coda as syllabic constituents. Among the common transposition errors (cited by Davis, 1988 and references therein) are ones involving phoneme reversals such as the actual examples 'caught torses' for 'taught courses,' 'bud begs' for 'bed bugs,' and 'stick neff' for 'stiff neck.' In these errors, syllable-initial elements exchange with one another, vowels exchange with one another, and syllable-final elements exchange with one another. Laubstein (1987: 342) concludes, based on her investigation of such naturally occurring speech errors, that they support the division of the syllable into onset, nucleus, and coda, though not the rhyme. She maintains that "the [speech] errors support a root syllable node that is trinary branching, dominating an initial consonant or consonant cluster, a vowel or vowel glide sequence, and a final consonant or consonant cluster." While the speech error evidence for syllabic constituents is suggestive, it is not conclusive given that there are some speech errors that indeed involve the exchange of other subsyllabic elements (such as 'cassy put' for 'pussy cat').

Researchers such as Davis (1988, 1989), Barlow (2001), and Yip (2003) have brought language game data to bear on the issue of syllabic constituents. An underlying assumption is that if a language game requires the movement of phonemes or the insertion of phonemes, it does so in a way that reflects constituent structure. For instance, Davis (1989) contends that Pig Latin, in which the initial consonant sequence moves to the end of the word (e.g., pig → igpey and blast → astbley), provides evidence for the constituency of the onset in English. A caveat with the use of language games as evidence for constituency is that not all users of language games manipulate the language game in the same way. Barlow (2001) shows that some users of English Pig Latin only move the initial consonant of a consonant cluster to the end of the word, and moreover, speakers are quite inconsistent in their treatment of the coronal onglide in words like 'cute.' Thus, evidence from language games on their own may be inconclusive on specific issues of syllabic constituency.

Finally, a type of evidence that has played an important role in the discussion of syllabic constituency comes from processes that are sensitive to syllabic weight, such as the assignment of stress. Many languages divide syllables into two types according to syllabic weight: light syllables and heavy syllables. Heavy syllables are typically those that have a long vowel or a syllable-final consonant. A light syllable typically ends in a short vowel. Stress is then attracted onto some heavy syllable. In Latin, stress falls on a penultimate syllable if it is heavy, otherwise on the antepenultimate. This proof seems to support the rhyme as a constituent of the syllable, since a heavy syllable would be one that has more than a single element in the rhyme. Detailed examination of the typology of stress (Hayes, 1995), however, shows that in some languages only a long vowel makes a syllable heavy and not a coda consonant. This proof is somewhat problematic for the onset-rhyme division of the syllable, since not all heavy rhymes are treated alike. Instead, such phenomena have been used to motivate the moraic view of the syllable (Hayes, 1989) that abandons onset-rhyme division. On this view, the mora is considered a unit of syllable weight, such that a short vowel forms a single mora, a long vowel constitutes two morae, and a coda consonant may or may not be moraic depending on whether they make a syllable heavy. In Latin, thus, stress falls on the penultimate syllable if it contains a long vowel or if it ends in a consonant, that is, if it is bimoraic; otherwise, stress falls on the antepenultimate syllable. Within the moraic view of the syllable, the issue of the constituency of the onset is an independent matter. While

Davis (1990) argues that syllable-initial consonants can still comprise a constituent within the syllable, most advocates of the moraic approach (McCarthy and Prince, 1995) assume that the syllable initial consonants are adjoined to the syllable and do not form an independent constituent on their own.

One of the reasons that the issue of syllabic constituency has remained controversial is that detailed examinations of individual languages often point to inconsistencies. Ideally, in a single language, a variety of weight sensitive processes which, in addition to stress may include compensatory lengthening, reduplication, and aspects of tonal phonology, will treat all syllables with coda consonants alike, either as bimoraic or monomoraic. However, researchers such as Hyman (1992) have noted moraic mismatches whereby one weight-sensitive process in a language treats a CVC syllable as bimoraic but a different weight-sensitive process treats that same syllable as monomoraic. In this connection, Yip (2003) has provided a variety of examples where in a single language the same prenuclear glide may be treated as an onset element or a nucleus element depending on the speaker and the process involved. Such phenomena have led to suggestions that syllable structure is process specific, as in Vennemann (1988). A formal analysis of this view can be developed within optimality theory (Rosenthall, 1997 and Rosenthall and van der Hulst, 1999) where the realization of moraic elements is contextually dependent.

See also: Phonemic Analysis; Phonology: Optimality Theory; Syllable: Phonology; Word Stress.

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Syllable: Phonology

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The syllable is sometimes defined as an uninterrupted unit of the spoken language, which typically consists of a vowel sound flanked by one or more consonants. For example, *mad* [.mæd.] is an example of a word consisting of one syllable, and *basic* [.beɪ.sɪk.] of a word consisting of two. (Note that the dots in the phonetic transcriptions indicate the breaks between syllables.) The presence of consonants flanking the vowel is not a precondition on well-formed syllables, because a syllable can consist of a vowel only, e.g., *I* [.aɪ.]. In many languages it is possible to have syllables built around a consonant and not a vowel, e.g., the second syllable in *able* [.eɪ.bl̩.], in which [l̩] has the same function as a vowel. (The [l̩] here is an example of a syllabic consonant – indicated with the diacritic under the [l]). This article discusses the role of the syllable in phonology.

Phonological Representations

The English word *grand* [.gɹænd.] has at first approximation the following phonological representation. Here and below 'σ' refers to the syllable.

(1)

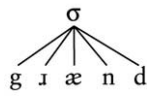

The representation in (1) consists of five segments, which are simply abbreviations for the corresponding feature matrices Considerable work in phonology has shown that the syllable in (1) is made up of smaller units, e.g., onset, nucleus, coda, and rhyme (*see* **Syllabic Constituents**). A typical representation along these lines for the word *grand* is depicted in (2):

(2)

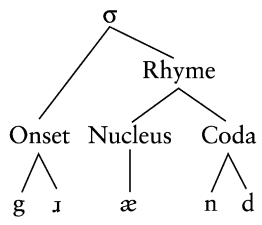

(3)

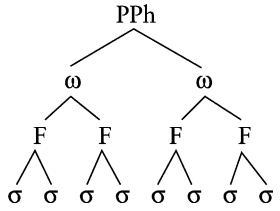

It is usually assumed in the literature that the syllable is universal in the sense that all languages have them. A further assumption is that the syllable occupies a fixed position in the universal prosodic hierarchy (see (3); Booij, 1983, Nespor and Vogel, 1986); thus, the constituent 'σ' is dominated by the foot (F), which in turn is dominated by the phonological word (ω). The latter constituent is situated under the phonological phrase (PPh).

Evidence for the Syllable

The reason the syllable is an indispensible unit in phonology is that many phonological generalizations can only be made insightfully by referring to it and not to other units. For example, phonological rules must often refer to syllable boundaries. A typical example is the rule in German and Dutch known as final devoicing, which applies to all obstruents:

(4) $[-\text{sonorant}] \rightarrow [-\text{voice}] \ / \ _]_{\sigma}$

In the formalization in (4) '$]_{\sigma}$' refers to the right edge of a syllable. The effects of this rule can be observed in German examples like *Tag* [.taːk.] 'day' vs. *Tag-e* [.taː.gə.] 'day + plural'. In the singular the underlying /g/ devoices to [k] because it is syllable-final and in the plural the /g/ surfaces as [g] because it is syllable-initial. The reason the rule in (4) cannot be stated so that it applies at the end of a word is because its effects can also be seen word-internally. For example, the [g] in the English word *rugby* surfaces in German as [k] (i.e., German [ʀakbi]) because this segment is syllable-final in German before a consonant. An analysis of the rule in (4) without syllables would be disadvantageous because it would be forced to treat the environments 'at the end of a word' and 'before a consonant' as a disjunction, i.e., /____{#, C}. Such disjunctions are problematic because a word boundary and a consonant do not form a natural class. It should be noted that the rule in (4) has been argued to apply not at the end of a syllable but within a subsyllabic constituent like the coda (recall (2); see Vennemann, 1978; Hall, 1993 for discussion).

Other phonological properties that take the syllable as the domain are stress and tone. For example, in Latin a trisyllabic word is stressed by the following rule: The penultimate syllable is stressed if it is heavy (i.e., consists of a branching rhyme); if the penult is light (i.e., the rhyme is not branching) then the antepenultimate syllable is stressed. Note that a reformulation of the Latin stress rule would be awkward if no reference to the syllable were made.

A similar argument for the syllable comes from phonotactics. For example, in English no word begins with [mɹ] and no word ends with [tm]. These phonotactic constraints for English refer to syllable edges and not to word edges because only the former can capture nonoccurring word-internal sequences, e.g., [tmɹ]. The reason there are no English words like [ɑtmɹə] is that the [tmɹ] sequence cannot be parsed without violating the phonotactic constraints mentioned earlier. Thus, the parsing [.ɑt.mɹə.] would have [mɹ] in syllable-initial position and the parsing [.ɑtm.ɹə.] would have [tm] in syllable-final position. Note too that [tm] and [mɹ] are well-formed sequences when a syllable break falls between the two segments, e.g., [mɹ] in *emerald* and [tm] in *utmost*.

Although the role of the syllable as a phonological unit was denied in Chomsky and Halle (1968), a number of researchers both before and after recognized its importance (e.g., Pike and Pike, 1947; Haugen, 1956; Fudge, 1969; Vennemann 1978).

Sonority

An important principle regarding phonotactics is based on the notion of sonority, where the sonority of a segment is defined roughly as its loudness relative to other sounds produced with the same length, stress, and pitch (see Ladefoged, 1993). An example of a sonority hierarchy (from Clements, 1990) is presented in (5):

(5) Sonority hierarchy ('>' = 'more sonorous than'):
vowels > glides > liquids > nasals > obstruents

In the hierarchy in (5) vowels are the most sonorous segments followed in descending order by glides, liquids (rhotics and laterals), nasals, and obstruents. Many linguists have observed that the segment occupying the nucleus in (2) (also called the peak) is the most sonorous element in the syllable, whereas the onset tends to increase the sonority inwards toward the nucleus, and the coda tends to decrease in sonority away from the nucleus. These tendencies are captured in the following principle (from Selkirk, 1984 and much earlier work, e.g., Sievers, 1901; Jespersen, 1904; Vennemann 1978; Hooper, 1976):

(6) Sonority Sequencing Generalization (SSG):
In any syllable, there is a segment constituting a sonority peak that is preceded and/or followed by a sequence of segments with progressively decreasing sonority values.

The SSG is illustrated with the English word *grand* in (7):

(7)

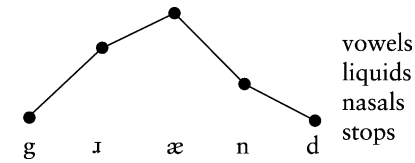

By contrast, a syllable such as [.ɹgænd.] is not well formed in English because the sonority profile of an initial [ɹg] sequence is not in line with the SSG:

(8)

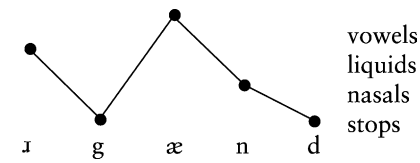

One of the difficulties with the SSG is that it does not permit words like *axe* [.æks.], because it requires that there should be a descending sonority slope in the coda. (In this example the syllable ends in a sequence of two obstruents, which are equally sonorous). Many languages allow for syllables that display even more dramatic SSG violations, e.g., Russian [.rta.] 'mouth (gen.sg.)', Polish [.te.atr.] 'theater'. Some researchers have argued that the SSG holds exceptionlessly in English (and in languages like Russian and Polish) and that in words like *axe* the final segment is extraprosodic (or extrametrical, or extrasyllabic). In terms of phonological representations, an extraprosodic segment is one that is not associated with the syllable. The general idea of extraprosodicity originally arose in the context of stress assignment, where it was argued that simpler rules of stress assignment could be stated if initial and/or final syllables/segments are ignored (*see* **Metrical Phonology** and **Word Stress**). Extraprosodicity has also been argued to hold for English in initial position in words like *stop*, in which the initial [st] cluster appears to violate the SSG. Thus, according to this view the [s] in *stop* is extraprosodic, and there is no SSG violation. The literature on extraprosodicity is vast; the reader is referred to Hall (2002) for discussion and for arguments against the kind of extraprosodicity described earlier. Other researchers have argued that [s] + stop sequences in words like *stop* are not sequences of two separate sounds, but instead that they consist of two articulations attached to a single X slot on the skeletal tier. Thus, on this view [s] plus stop sequences are examples of complex segments (*see* **Complex Segments**), and therefore a word like *stop* would not violate the SSG.

The Sonority Hierarchy in (5) makes reference to five categories of sounds. A number of studies have argued that it should make finer grained distinctions as well. For example, it is often assumed that

fricatives are more sonorous than stops, that rhotics like /r/ are more sonorous than laterals like /l/ and that high vowels are more sonorous than low vowels. It is often assumed that the Sonority Hierarchy is universal, but many researchers have proposed language-specific hierarchies. The question of what segment types are present in the Sonority Hierarchy is clearly related to how the term *sonority* is defined. See Hooper (1976), Selkirk (1984), Vennemann (1988), Clements (1990), and Ladefoged (1993) for various proposals.

Syllable Typology and Markedness

Many linguists have observed that certain syllable types are more common in the world's languages than others. For example, if we consider the four syllables V, CV, CVC, and VC, there are only four attested language types, as illustrated in (9) (see Blevins, 1995):

(9)

	V	CV	CVC	VC
Hua	no	yes	no	no
Maori	yes	yes	no	no
Klamath	no	yes	yes	no
English	yes	yes	yes	yes

This table reveals that there are some languages like Hua, which only have one syllable type, namely CV, whereas other languages like English allow for all four. Despite the variation among languages, it is possible to make the generalization that all languages have CV syllables (Jakobson, 1962). CV is therefore considered to be the least marked syllable (*see* **Markedness**).

A number of important cross-linguistic generalizations can also be made about syllables with complex onsets and/or codas. For example, if clusters of n Cs are possible in onset position (where $n \geq 2$), then n-1 C or Cs are also possible in onset position. A similar statement can be made for codas: if n Cs are possible in coda position (where $n \geq 1$), then n-1 C or Cs are also possible in the same context (see Greenberg, 1978). Similar kinds of generalizations can be made concerning the sonority of segments in syllable margins. For example, if a language allows complex onsets of the form liquid + obstruent, then the same language will allow onsets of the form obstruent + liquid, e.g., Russian [.rta.] 'mouth, gen. sg.', [.tri.] 'three'.

Cross-linguistic markedness generalizations can also be made concerning the syllable peak (Blevins, 1995). For example, vowels are the least marked peak, whereas consonants are more marked in this position. Thus, there are languages like Bulgarian in which all syllable peaks are vowels, and languages like English in which both vowels and consonants can serve as peaks, but no language restricts syllable peaks only to consonants. Among the vowels, low vowels like [a] make better peaks than high vowels like [i]. Among the consonantal peaks, liquids are less marked than nasals and nasals are less marked than obstruents, the rarest of all syllable peaks, e.g., Imdlawn Tashlhiyt Berber [tf̩tx̩t] 'you sprained' (see Dell and Elmedlaoui, 1985).

Syllabification

Most researchers assume that phonological representations with syllables as in (1) and (2) are not present in the underlying representations and that syllable structure is assigned in the course of the derivation. The main reason for this assumption is that the syllable is predictable. Evidence for the predictability of syllabification is that minimal pairs involving contrastive syllabification (e.g., V.CV vs. VC.V) are absent altogether in most – if not all – languages. Although exceptions to this generalization have been argued to exist (e.g., in Arrernte, see Breen and Pensalfini, 1999), it nevertheless remains true that in the vast majority of natural languages syllabification constrasts like the one described earlier do not exist.

One question that has been discussed in the literature on syllables is the formal mechanism by which syllable structure is assigned to segments within words (see Kenstowicz, 1994 and Rubach, 1999 for current surveys). The basic division among such syllable structure algorithms is between ones in which syllables are assigned by rule (Kahn, 1976) and by template matching (Ito, 1989). According to the latter approach a sequence of segments is scanned in a particular direction from one word edge (i.e., from right to left or from left to right), and successive segments are assigned to slots in a syllable template. To illustrate the right-to-left mapping of a syllable template consisiting of an onset and a rhyme, consider a word like *zebra* /ziːbɹə/. First, the template matches onto the syllable /bɹə/, and then onto the syllable /ziː/. Rule-based approaches posit a set of rules having a similar formal status to other phonological rules, which associate syllable constituents with segments. On this approach the example /ziːbɹə/ is syllabified in the following way: first, two separate rhyme positions are associated with the /iː/ and /ə/, respectively, after which /z/ and /bɹ/ are associated with two separate onset nodes. Note that in both approaches onsets are maximized. For example, the sequence /ziːbɹə/ is syllabified [.ziːbɹə.] in a language like English (and not [.ziːbɹə.]) because [bɹ] is a permissible onset; however, a word like *party* /pɑɹti/ will be parsed [.paɹ.ti.] and not [.pa.ɹti.] because the

sequence [ɹt] cannot surface as an onset due to the SSG violation. It should be noted that syllabification in Optimality Theory (Prince and Smolensky, 1993) is analyzed instead as the interaction of various universal constraints (*see* **Syntax: Optimality Theory**).

Ambisyllabicity

The discussion in syllabification implies that VCV is parsed universally as V.CV, but a number of researchers have argued that the intervocalic C in this context can be ambisyllabic, i.e., it belongs to two syllables. The representation in (10) depicts an ambisyllabic consonant:

(10)

Linguists who have argued for ambisyllabic consonants include Kahn (1976) and Rubach (1996) for English, Clements and Keyser (1983) for Efik, and Wiese (1996) for German.

Kahn (1976) argues that the rules governing the distribution of the allophones of /p t k/ in American English require reference to ambisyllabic structures. Thus, in his treatment, /p t k/ surface as aspirated in absolute syllable-initial position, but /t d/ surface as flapped when ambisyllabic, e.g., the /t/ in *city* ([sɪɾi]). In German it is often assumed that lax vowels like [ɪ] never occur in syllable-final position (e.g., Wiese 1996). If this is the correct environment, then it suggests that the /t/ in a word like *Bitte* [bɪtə] 'request' is syllable-final. However, the same /t/ is aspirated, which is typical of syllable-initial voiceless stops. The solution to this apparent paradox (which is adopted by Wiese 1996 among others) is that the segment in question is ambisyllabic, as in (10).

It needs to be emphasized that ambisyllabic structures in phonology are controversial. For example, Kiparsky (1979) and Jensen (2000) argue that the rule of flapping in American English referred to earlier applies not to ambisyllabic /t d/, but instead to /t d/, which are internal to a foot (*see* **Metrical Phonology**).

Conclusion

In this article it has been demonstrated that the syllable is an important unit in phonology. The article presented phonological arguments for the syllable and showed that the notion of sonority is essential for an understanding of phonotactic patterns. Generalizations concerning the types of syllables found in the languages of the world and the way in which languages syllabify sequences of sounds within words were discussed. The article concluded with a brief discussion of ambisyllabicity.

See also: Complex Segments; Constraint, Pragmatic; Markedness; Metrical Phonology; Phonology: Optimality Theory; Syllabic Constituents; Syntax: Optimality Theory; Word Stress.

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Syllable: Typology

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In many languages, there is substantial evidence that speech sounds are organized into syllables. In slow speech, words may be uttered syllable by syllable, and the syllabic position of segments and features tends to remain constant in speech errors. In speech disguise and language play, syllables are manipulated, and a range of sound patterns requires reference to the syllable as domain, to syllable edges, or to subsyllabic constituents (Blevins, 1995).

This article reviews the range of syllable types in the world's languages in relation to sound patterns or properties typically associated with syllables. These include sonority, general phonotactics, feature-based phonotactics, and weight. The purpose of this article is to demonstrate the extent to which syllable types vary crosslinguistically, and to highlight crosslinguistic generalizations. In each case, exceptions to universal tendencies are noted, as are languages with sound patterns at the typological extremes.

The following discussion makes use of some standard terms that are applied to the description of syllables. The 'nucleus' or 'peak' refers to the syllabic element or elements within the syllable and contains the sonority peak; the term 'onset' refers to elements preceding the nucleus, and 'coda' to elements following the nucleus. The term 'rime' refers to a constituent made up of the nucleus and coda. The symbol C denotes a nonsyllabic segment, V a syllabic segment, R a sonorant consonant and T an obstruent consonant.

Sonority

The syllable is often thought of as a unit that organizes speech sounds in terms of their intrinsic sonority. A rough definition of sonority is the loudness of a sound relative to the energy used to produce that sound. Vowels are highly sonorous sounds, while voiceless stops have low sonority. Most phonologists and phoneticians agree on a sonority scale in which low vowels are the most sonorous segments, followed in decreasing sonority by mid vowels, high vowels, high glides, liquids, nasal stops, fricatives, and oral stops. Sonority is often claimed to play a role both in the overall contour of syllables, and in the range of segments which can serve as syllable peaks or nuclei.

At the level of overall syllable sonority profiles, there is a strong tendency for syllables to rise in sonority or remain steady up to the sonority peak, and to remain steady or fall in sonority thereafter. This tendency is sometimes referred to as the Sonority Sequencing Generalization (SSG) or the sonority sequencing principle. Hawaiian, a language with only open syllables, obeys the SSG, since there is always a sonority rise from the nonsyllabic onset to the syllabic nucleus. Within the nucleus, sonority may remain steady or fall. In Yawelmani, where any single consonant may occur as onset or coda, there are also no exceptions to the SSG. A crosslinguistic generalization that emerges is that the SSG is obeyed in all languages which allow only a single consonant to precede and/or follow the syllable nucleus. Examples of languages supporting this generalization are given in **Table 1**. (In all tables, nongenetic language groups are given in parentheses in the 'Family' column.)

In languages where syllables may begin or end in a consonant cluster, adherence to the SSG is less

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Table 1 Sonority sequencing generalization: obeyed in all languages with simple onsets and simple codas

	Language/Data source	*Family*	*Sample syllable types*	
(C)V(V)	Bilua Obata (2003)	(Papuan)	i.nai.nae.ko	'to prepare'
(C)V(V)(V)	Banawà[a] Buller *et al.* (1993)	Arawan	u.fa.bu.ne	'I drink'
			ba.due	'deer sp.'
			buei	'die'
(C)V(V)	Hawaiian[b]	Austronesian/Polynesian	a.lo.ha	'love'
	Pukui & Elbert (1971)		ōō.pū.he.a	'quiet, calm'
(C)VʔV	Tarahumara[c]	Uto-Aztecan/	a.ká	'sandal'
	Lionnet (1972)	Sonoran	uʔ.sú	'grandmother'
CV(X)	Yawelmani[d]	Yokuts	mt.jt.net.naʔ	'I was made tired'
	Newman (1944)			
CV(V)(C)	Karuk (Karok)[e]	(Hokan)	ʔa.ra:r	'person'
	Bright (1957)		fi:.pa.jav	'straight'
(C)V(X)	Lele[f]	Afro-Asiatic/	ŋ.lèé.sì.kaŋ.di	'I ate meat here'
	Frajzyngier (2001)	Chadic	am.du	'he kept her'
			túg.sú	'k.o. grass'
			è, éè	'go,' 'go-FUT'
(C)V(V)(C)	Yupik Jacobsen (1984)	Eskimo-Aleut/Eskimo	a.cu.raq	'aunt by marriage'
			aa.luu.yaaq	'swing'
			uug.nar	'vole'

[a]Onsetless syllables are all of the form V, with simple nuclei. CVVV syllables only occur word-finally, and the final vowel is always /i/. Buller *et al.* (1993) interpret word-initial Vs and word-final /i/ of VVi as extraprosodic segments.

[b]Tautosyllabic VV sequences in Hawaiian include all long vowels, possibly clusters of falling sonority, e.g., /ai/, /au/, /ae/, /ao/, etc., and /iu/. Long vowels are written with macrons. By some analyses (e.g., Schütz, 1981), some V_1V_2 clusters where V_1 is long and V_2 is short may also be tautosyllabic: e.g. *āāina* 'land.'

[c]Vowels in Tarahumara may be checked by glottal closure or unchecked. It is unclear whether to treat this glottalization as a vowel feature, or as an independent coda consonant. Within the word, there is morphologically conditioned reduction of certain vowels to schwa or zero. Recent loans into Tarahumara have word-initial clusters and final consonants, but the SSG is still observed.

[d]Yawelmani has CV:C syllables in a limited number of contexts: where the verbal *-lsa:, -sa:* causative/repetitive suffix is involved, e.g., in *nine:lsa:hin* 'get (him) to keep still several times' (cf., *nini:-* 'keep still'); in *-wiyi-/witi-* verbs indicating extended events, e.g., *pa:lwiyi-* 'overspread slowly' (cf., *palwiyi-* 'overspread quickly'); and in loans, e.g., *gaxt:n* 'box.'

[e]Unstressed phrase-initial ʔV is optionally elided in Karuk, resulting in phrase-initial clusters. Compare phrase-initial *kva:t* or *ʔakva:t* for /akva:t/ 'raccoon.'

[f]Lele has a single syllabic consonant *ŋ* 'I' which occurs as an independent V syllable, without onset or coda. Lele also has productive closed syllable shortening, by which /(C)V:C/ surfaces as (C) VC. Long vowels are written as doubled letters.

regular, as illustrated in Table 2. In Cheke Holo, with only open syllables, we find syllable types V, CV, and TRV and strict adherence to the SSG. However, in Leti, with maximal CCV:C syllables, initial RT clusters violate the SSG. Similar splits are found for languages with complex codas: in both Ndjébbana (Djeebbana) and Yir Yoront, maximal syllables are CVCC, but in the former, complex codas are limited to RT, while in the latter, word-final TR sequences are also found.

Well-studied Indo-European languages which violate the SSG include Russian and Czech, with word-initial RT clusters, and Romanian, with word-final TR clusters. Extreme violations of the SSG occur in Georgian, a Kartvelian language, where word-initial tautosyllabic prevocalic clusters include /zrd/, /mkrt/, /msχv/, and /mcvrtn/. Violations of the SSG in these and many other languages have inspired numerous strategies for maintaining strong versions of the SSG in which the offending consonants are treated as headless or degenerate syllables (which do not count for weight, stress, or tone); as segments prosodically licensed by the foot, word, or phrase; or as unsyllabified morae. For details of these and other strategies, see papers in Féry and van de Vijver (2003) and the comprehensive treatment of syllable appendices in Vaux (2004).

Interestingly, however, there is little evidence from psycholinguistic experiments or native speaker intuitions that suggests that these cases are anything other than true violations of the SSG. Whatever the status of these surface violations of the SSG, one clear generalization which emerges from crosslinguistic surveys is that exceptions to the SSG are found only in languages which allow consonant sequences to precede or follow the syllable nucleus. There do not appear to be any languages in which a complex nucleus itself violates the SSG (e.g., no instances of monosyllabic /aia/, /aua/, etc.), or in which a CV or VC sequence violates the SSG where V is a syllabic segment and C a nonsyllabic segment.

Table 2 Variable adherence to sonority sequencing generalization in languages with complex onsets or complex codas

	Language/Data source	*Obeys SSG?*	*Family*	*Sample syllable types*	
$(C_1^2)V(V)$	Cheke Holo[a] White *et al.* (1988)	yes	Austronesian/Western Oceanic	e.lo	'to float'
				kai.ka.fli	'flash on & off'
				kmai.kma.ji	'eat a varied meal-RED' (RED = reduplication)
$(C_1^2)V(V)(C)$	Leti van Engelenhoven (1995)	no	Austronesian/Central-Malayo-Polynesian	o.a	'you'
				pni.nu	'fool'
				rka:.lu	'they shout'
				sra:t	'main road'
				rstp.le	'they sail'
$(C)V(C_1^2)$	Ndjébbana[b] McKay (2000)	yes	(Australian/Non-Pama-Nyungan)	n.ka.la	'fork'
				ran.ba	'beach'
				kalk.bet	'northern black wallaroo'
$(C)V(C_1^2)$	Yir Yoront[c] Alpher (1991)	no	Pama-Nyungan	pam, am	'person'
				ŋo.jo, o.jo	'I'
				melt	'animal, bird'
				patl	'clean, bald'

[a]Syllable-initial CC clusters in Cheke Holo (a.k.a. Maringe) are TR, where T is an obstruent and R a sonorant. The only other CC clusters which occur in the native vocabulary are word-medial nonhomorganic NN clusters, e.g., *emno* 'be limp'. These are assumed to be tautosyllabic, based on the syllabification of other clusters. Closed syllables do occur loans from Pidgin, as in e.g., *devol, fren, kikibol, wenesde*.

[b]In addition to the syllabic nasal, which forms a V syllable of its own in Ndjébbana, there is one vowel-initial word reported: *a.rab.ba* 'and, but,' a variant of the more common *ka.rab.ba*.

[c]It is inclear whether VCV in Yir Yoront is consistently syllabified as V.CV or VC.V. Dropping of initial consonants in Yir Yoront is typical with pronouns and other particles postconsonantally, and in phrase-initial positions. Otherwise, word-initial vowels are not found. Final CR clusters are distinct from final CvR sequences, where 'v' = schwa. See Alpher (1991: 14–15) for further discussion.

Sonority is also assumed to play a role in defining segments which can serve as syllable nuclei. In many languages, including all the languages in Table 1 with the exception of Lele, syllable peaks are limited to vowels. In other languages such as Lele in Table 1 and Ndjébbana in Table 2, syllable nuclei include vowels and nasal consonants. In modern American English, syllable nuclei include vowels, liquids, and nasals, while an extreme case of consonant syllabicity is described for Imdlawn Tashlhiyt Berber (Tachelhit) (Dell and Elmedlaoui, 1985), where any vowel or consonant, including voiceless stops, can serve as a syllable nucleus in the appropriate segmental context.

In general, if a segment with a relatively low sonority value can serve as a syllabic nucleus in a language, then any segment of greater sonority can also serve as a syllabic nucleus. However, languages like Lele and Ndjébbana, which have syllabic nasals but not syllabic liquids, are well represented crosslinguistically and such systems, as exemplified within Bantu, appear to be quite stable. If evidence comes to light that syllabic liquids are systematically excluded in languages of this type, then the universal role of the sonority scale in defining possible syllable peaks will have to be reevaluated.

Sonority has also been taken to play a role in limiting single-member onsets to low-sonority segments, and single-member codas to high-sonority segments. However, there is ultimately no secure empirical basis for such generalizations (Blevins, 2004). No language limits onsets to obstruents, nor does any known language ban all sonorants from onset position. Although there are some languages in which single codas are limited to particular sonorants, these patterns do not cover contiguous ranges on the sonority scale. For example, in Manam, an Oceanic language, where only nasals are possible codas, liquids /l/ and /r/ must be prohibited from coda position, which raises problems for a sonority-based account. See Blevins (2004), where convergent evolution is shown to account for the preponderance of nasal codas in the world's languages.

General Phonotactics

A variety of general constraints on the form of syllables has been proposed, including: the requirement that syllables must have onsets; a prohibition against syllables with codas; and constraints against consonant clusters within the syllable. These three constraints are claimed to encode three corresponding crosslinguistic tendencies: the preference for syllables with onsets over those without; the preference for open syllables over closed ones; and the preference for syllables with simple consonantal onsets or codas over those with clusters in the same positions. As with proposed

sonority constraints on single-member onsets and codas, the empirical basis for such generalizations is somewhat weak.

Though many have claimed that CV syllables are the least marked syllable type, few if any of the world's languages have only CV syllables, where C is a single nonsyllabic segment, and V is a (short) syllabic segment. As shown in Table 1, languages with only open syllables typically have optional onsets. In addition, most of these languages allow long vowels, diphthongs, or checked vowels, which can be analyzed as complex nuclei. The rarity of CV-only languages forces one to question the association between syllable typology and proposed markedness constraints.

In many of the world's languages, words begin with vowels, with no evidence of an onset requirement. And in a few rare cases (e.g., Eastern Arrernte), even medial VCV sequences appear to defy the onset constraint, being syllabified as VC.V (Breen and Pensalfini, 1999). Rules of consonant epenthesis do not appear motivated by the onset constraint (Blevins, forthcoming). And the claim that such tendencies are emergent under reduplication is also difficult to reconcile with patterns like those found in Cheke Holo and other languages of the Solomon Islands, where base-initial (C)VCV strings are reduplicated as (C)V.V strings with medial onsetless syllables (Blevins, 2003).

At the same time, there are many languages where words freely end in consonants, with no evidence of an open-syllable preference. In at least two different language families, there is evidence of a preference for closed, not open syllables. In Olgol/Oykangand, a Paman language of Cape York, there are no open syllables in the native vocabulary. In several different subgroups of Austro-Asiatic, all words end in consonants. This was true of Dvaravati Old Mon, and holds for the modern Palaungic, Khmuic, and Aslian branches, where final open syllables do not exist except in borrowings. Again, the claim that a tendency towards open syllables is emergent under reduplication is also difficult to reconcile with patterns like that found in at least one dialect of Southern Oromo (Borana-Arsi-Guji Oromo), a Cushitic language of Kenya, where base-initial CV strings are reduplicated as CV*m*.

The empirical support for constraints against complex onsets and codas appears to be based on languages in which certain clusters are split by epenthetic vowels. However, there appear to be just as many languages in the world which tolerate the same cluster types, as well as languages such as Georgian in which the extremely long clusters noted above are tolerated without epenthesis. Hence, it is incumbent on proponents of constraints against complex onsets or codas to argue that these constraints are not language specific, as they in fact appear to be.

The preference for V or CV syllables does characterize early stages of language acquisition, a point that has sometimes been taken to support a preference for open syllables and a dispreference for clusters in the grammar. However, it is widely accepted that such early patterns reflect production difficulties in coordinating distinct consonantal gestures, and have no ultimate effect on the form of the adult grammar.

Feature-Specific Phonotactics

The distribution of laryngeal and place features is also claimed to be sensitive to syllable structure. For instance, numerous languages show neutralization of obstruent voicing or place contrasts in word-final and preconsonantal position. In many cases, this type of sound pattern can be captured with reference to syllable-final position, or neutralization within the syllable coda. However, recent work on word-based phonotactics also draws attention to the numerous languages where neutralization is not syllable based (Steriade, 1999a, 1999b). A prime example is the common neutralization of retroflex and nonretroflex coronals, which occurs in word-initial and postconsonantal positions, but not in postvocalic positions. Since postvocalic contexts include V.CV as well as VC.C and VC##, a purely syllable-based generalization is not possible.

While it is often the case that the class of possible syllable codas is more restricted than the class of syllable onsets, this is not always the case. In Kashaya, glottalized sonorants only occur in coda position, making the class of possible codas larger than the class of possible onsets.

Weight

Many languages distinguish between 'light' and 'heavy' syllables for the purposes of stress patterns, tone patterns, or metrical traditions. The most common divisions of syllable weight involve only the syllable rhyme and ignore the syllable onset. Of these, the most common divisions for stress are those in which VV is heavy and V is light, or where VV and VC are heavy and V is light. For tone, where heavy syllables are those with two (or more) tone-bearing units, the situation is slightly different. The most common division is one where VV is heavy and V is light, or where VV and VR are heavy, and V and VT are light (R a sonorant, T an obstruent).

No language appears to have more than a three-way contrast in rime weight for the purposes of stress.

A language that exhibits the maximal three-way contrast is Klamath (Klamath-Modoc), where syllables with long vowels are heaviest, followed by closed syllables, followed by light open syllables. On the other hand, there are languages such as Cayuvava (Cayubaba), where no long vowels, diphthongs, or closed syllables occur, and which have only a single 'light' syllable type.

A few languages are described in which syllable weight is sensitive to syllable onset. One language of this type is Pirahã (Múra-Pirahã), where the heaviest syllables are TVV (where T is a voiceless obstruent), and these are heavier than DVV (where D is a voiced consonant), which are in turn heavier than VV syllables without onsets. The complete six-degree weight scale is TVV > DVV > VV > TV > DV > V, and represents one of the most complex scales described for a stress system (Everett and Everett, 1984).

In languages in which morae and not syllables are the stress- or tone-bearing units, there appears to be no upper limit on the number of morae within a syllable. Although many languages have an upper limit of two morae per syllable, trimoraic syllables are also found in many unrelated languages, including Japanese, Estonian, and Hawaiian. Gilbertese (Kiribati) *raoim* 'your tranquillity' has four morae, and nothing in Gilbertese rules out the unattested five-mora syllable /a:oim/.

Recent work on syllable weight (Gordon, 2002, 2004) demonstrates that the most common weight systems for tone and stress are grounded in phonetic properties relevant to the realization of these features. For stress, overall acoustic energy is relevant, while tone systems are characterized by high-sonority weight units capable of carrying fundamental frequency contours with some degree of perceptual salience. These findings are consistent with the fact that some languages with tone and stress have distinct weight systems. The same facts suggest that the search for a universal unified theory of syllable weight for stress and tone is misguided.

See also: Quantity; Syllabic Constituents; Syllable: Phonology.

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Symbolic Computational Linguistics: Overview

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Computational linguistics (CL) refers to a collection of topics that lie at the intersection of linguistics, computer science, mathematics, psychology, philosophy, and/or neurophysiology. The name is applied equally often to research that uses computers or mathematical methods as tools in the course of what is otherwise purely theoretical linguistic investigation, as it is to research on the construction of computational devices that perform useful linguistic tasks. The latter type of research, however, is often referred to more specifically as natural language processing (NLP). CL also formerly included research on applications of computing to traditional humanistic disciplines – as alternatives to or extensions of textual concordances, for example – but this is perhaps more accurately described as literary computing.

'Symbolic' computational linguistics refers to one of three particular perspectives on computational linguistics:

1. The study of language as a symbolic system in the profound sense of this term as it was used in early artificial intelligence research, most notably by Alan Newell and Herbert Simon. In their view, a computer simulation of such a system, which would include some internal representation of meaning, could be said to understand language. Such philosophically strong claims have become increasingly rare in CL, although the term 'natural language understanding' is still applied to natural language processors that pay particular attention to meaning and reasoning.
2. A view of language, normally of human language processing (*see* **Human Language Processing: Symbolic Models**), that can be counterposed with subsymbolic models of language comprehension, of which connectionist models of human language processing are the most common instances. Here, the term, 'symbolic' is used somewhat disparagingly in reference to the unlikelihood of finding physiological manifestations of logical expressions, trees, or other discrete algebraic structures in the brains of human subjects.
3. A diverse body of research devoted to natural language processing in the absence of statistical pattern recognition techniques (*see* **Language Processing: Statistical Methods**). This is a false dichotomy, as a great many statistical methods use the same symbolic representations, either directly annotated with numerical parameters, or through some structure-preserving embedding (called a 'kernel method') into a large-dimensional vector space.

These three perspectives are, of course, related. Symbolic representations of meaning, in the sense of the second perspective, were by far the predominant choice of the symbolic systems of the first perspective. This predominance is often attributed to early work by Marvin Minsky and Seymour Papert that clearly delineated some limitations of perceptron networks, an early form of connectionist model. These same symbolic representations are the very close historical antecedents of those used today in the symbolic CL of the third sense. All of them endeavor to remain faithful to the descriptive devices of prevalent theoretical models from psychology or linguistics, even when those devices can claim no straightforward correspondence to human neurophysiology.

A Road Map of Symbolic CL

Figure 1 depicts an example of the stages in generating a phone string to be spoken from an initial conceptual goal in a typical symbolic NLP system. The diagram is organized according to the different levels of linguistic representation involved in this task, called concept-to-speech synthesis. Nearly all symbolic CL research can be thought of either as an elaboration of the algorithms or representations involved in some aspect of this process (or its reverse, spoken language understanding), or as an investigation into how humans accomplish the same. The honorary exception is research on the structure of writing systems, which has applications to text-to-speech synthesis (*see* **Speech Synthesis**).

We can imagine that an agent begins with a goal that it must satisfy. Planning refers to the construction of a strategy for attaining that goal. CL becomes involved when the agent must communicate with other agents in order to delegate tasks from this strategy or to obtain information that it needs to proceed through it. When human agents are involved, all of the agents must observe a number of conventions for that communication to proceed naturally, some of which must be taken into account during planning (*see* **Speech Acts and Artificial Intelligence Planning Theory**). In addition, in each turn of the dialogue, the agents must use an utterance that adheres to a different but equally important set of conventions that govern the connection between its form and its intended meaning. This latter set of conventions is loosely known as grammar, although it is possible to speak of several grammars in a process as comprehensive as

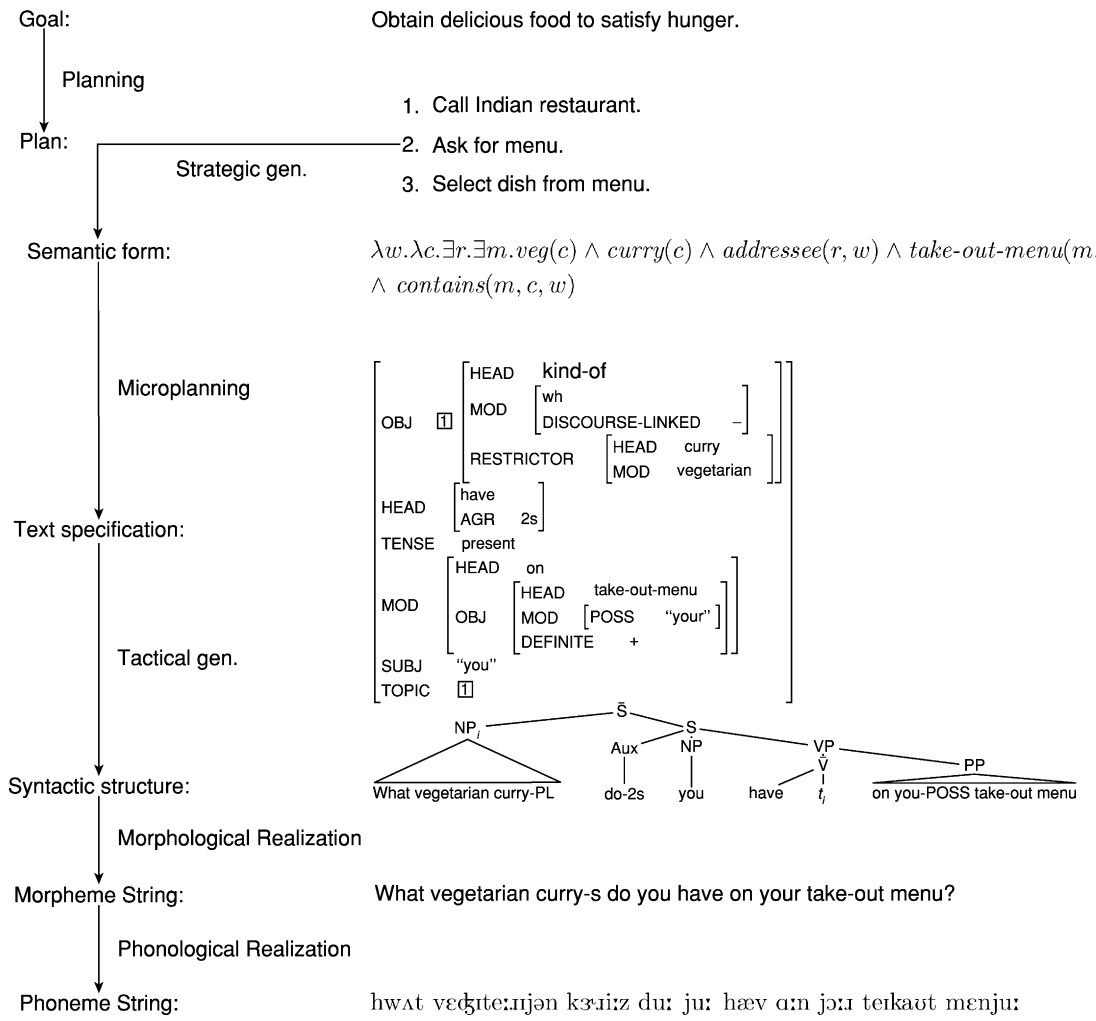

Figure 1 A schematic of symbolic computational linguistics in the context of concept-to-speech synthesis.

concept-to-speech synthesis. Each grammar then governs a specific connection between two levels of linguistic structure. Syntax, in its most general usage, refers to the study of form in the more superficial of any two such levels as an encoding of some meaning, whereas semantics refers to the study of form in the less superficial level, particularly as it is used to convey the meanings of the more superficial level's forms more directly. In their more specific (and in linguistics, more common) usage, syntax and semantics refer to the two specific levels shown in Figure 1, which stand in exactly this relationship.

After planning comes generation, the production of a string of words for a planned utterance. Generation is typically distinguished into two phases. The first, strategic generation, is essentially an extension of planning into linguistic structure. This is particularly necessary for long utterances or the generation of textual documents rather than speech, in which the information conveyed must be sequentially and coherently organized. The second, tactical generation, or surface realization, actually uses the syntactic rules and lexicon of a grammar to choose words and to place them into a particular order. Most generation systems include a third, intermediate stage, sometimes called microplanning, during which the natural language expressions that refer to entities in the discourse are chosen (*see* **Generating Referring Expressions**), and component phrases are combined into more complex sentences in a process called aggregation. Complex sentence structure, although not appropriate in every circumstance, has proved to be a necessary means of conveying the relative importance of different pieces of information.

The reverse of surface realization, in which a string of words is analyzed into a semantic form, is known as parsing. Some of strategic generation is effectively reversed by discourse segmentation and discourse parsing, in which the overall plan of a document and the roles of its sentences are determined. The reverse of referring expression generation is called reference resolution, an important part of which is

determining the antecedents of certain very context-dependent expressions, such as pronouns (*see* **Anaphora Resolution: Centering Theory Approach**). Although meaning representations are generally designed to be unambiguous, natural language is often ambiguous, even with the best of planning strategies. Ambiguity resolution, which determines which of several possible meanings was intended, therefore forms a very large part of spoken language understanding. Ambiguity resolution, reference resolution, and the various forms of reasoning that are applied to semantic forms in this direction of processing are collectively known as semantic interpretation.

Morphological realization builds words that bear the properties that syntactic structure requires them to have. Among the Indo-European languages, this classically involves attaching suffixes indicating person, number, and gender onto verbs, which must agree with those of their subjects, and case, number, and gender onto adjectives, which must agree with those of the nouns they modify. Prior to realization, these properties are often represented as bundles of abstract feature-value pairs, so this process involves finding the right reflexes of these features (morphophonemic, or, for text generation, morphographemic, correspondence), and the right order in which to combine them (morphotactics; *see* **Morphology and Language Processing**). English has a remarkably simple morphological system, but Finnish and Arabic both have very complicated ones and have had a remarkable impact on computational morphology research.

Once the necessary sequences of morphemes have been realized, phonological realization determines how their pronunciations will change in that context. Pronunciation can change as a result of either word-internal combination with other morphemes, or word-external juxtaposition with other inflected words. To many researchers, the holy grail of computational linguistics is speech-to-speech machine translation, in which spoken input in one language is translated to another language and automatically synthesized by a computer. Among nonstatistical approaches to this task, a common one is to attach a spoken-language-understanding system to a content-to-speech synthesizer at their plan/meaning ends, through a system of transfer rules that account for various mismatches between the two language-specific meaning representations. With certain closely related languages, some researchers attempt to use a common meaning representation for both languages, called an interlingua representation (*see* **Machine Translation: Interlingual Methods**).

There is an overwhelming amount of evidence that humans do not generate their own speech in such a modular, pipelined fashion, and, indeed, suitably efficient NLP systems would not be able to adhere to this view internally either. In English spoken language processing, for example, the relative importance of information can be altered in a sentence either by changing word orders through more complex sentence structures, and/or through the use of special adverbs and conjunctions such as 'basically' and 'although' (*see* **Discourse Markers**), and/or through the use of a different prosodic intonation contour, in which the pitch of the speaker's voice changes. No single linguistic level in Figure 1 mediates all of these factors. Similarly, in some languages, aggregation could not be undertaken without proper consideration of the available derivational morphemes, which alter the parts of speech and meanings of the words to which they attach. The tricks of the trade are nevertheless presented in the literature as departures from the point of view depicted here, largely because the vocabulary we have inherited from linguistic theory for describing these systems implicitly assumes it (*see* **Modularity**).

Manners of Representation

As alluded to in the preceding section, the most lasting contribution of symbolic CL research has been the formal representations of linguistic information that it has proposed. These continue to be used today, even in areas wherein purely nonstatistical methods have long since been abandoned. The representation types proposed can be broadly classified into logical, graphical, and featural. The most salient alternative to using one of these representations is the string. Strings are easy to overlook because they are the first symbolic representation that we learn for language at a very young age, but mathematically, they are one of only two algebraic structures that are associative (xy appended to z is the same as x appended to yz), but not commutative (xy is not the same as yx). The other such algebraic structure is matrix multiplication; the deep structural correspondence between these two algebras has not been utilized nearly as much as it should be.

Strings were the basis for the first probabilistic models applied to linguistic data. These appeared in the realm of automatic speech recognition, whereby knowledge of the relative frequencies of all three-word sequences, called trigrams, can be used to correct recognition errors by an acoustic model. Classically, these probabilistic trigram models were called language models by electrical engineers, although this term can now refer to models that are linguistically much richer than three-word sequences. Strings also played a pivotal role in early generative linguistics. The early work of Noam Chomsky on syntactic structures defined a

system of transformations, i.e., rules that can locally rewrite parts of strings according to their context. Contextualized string rewriting is still a staple of phonological rules. These are equivalent to finite-state transductions (see later, Finite-State Machines) if every transformational rule can apply no more than a bounded number of times to its own output (Johnson, 1972), which is generally the case in phonology.

Another common alternative, particularly in information retrieval, is the 'bag of words' model, in which only the number of each kind of word is retained – not even the order. A bag of words for a document can be represented by a vector in which each dimension corresponds to a word type (either a word, or the class of all words with the same lexical stem), and the value at that dimension is the number of instances of that word type appearing in the document. A common method for comparing the similarity of two documents is to compute the cosine of their corresponding vectors.

Logical

First-order predicate logic (*see* **Frege, Gottlob (1848–1925)**) is the noble ancestor of mathematical logic, and its varision extensions are still the representation of choice among semanticists for the meaning of natural language expressions. Systems that deal with natural language in more restricted domains, however, such as travel reservations, banking transactions, etc., generally use a featural representation.

Propositional Logic The language of propositional logic begins with a collection of propositional variables that represent statements about the world (in a human language, supposedly) that are either true or false. These include statements for which truth value may vary as a function of time or other aspects of context. For example, *Felix is a cat* depends on whether the name 'Felix' refers to a cat or a dog, and *Felix is sitting on a mat* may depend on Felix's position as a function of time. It may even include statements for which we do not know a truth value, provided that it makes sense to assign them one. *Felix is thinking of tuna* has a truth value, for example, even if we do not have access to Felix's thoughts, but a question such as *What is Felix thinking of?* does not have a truth value, regardless of what Felix is thinking of or even whether Felix is thinking. A valuation is a function that assigns a truth value to every propositional variable in our collection, taking all necessary aspects of context into account.

This picture by itself is rather uninteresting, because the valuation is doing all of the work – nothing about the name of a propositional variable tells us whether its corresponding statement is true or false.

Table 1 Natural language constructions and their decompositions in propositional logic[a]

Construction	*Formal expression*
A 'and' *B*	$\phi \wedge \psi$
A 'or' *B*	$\phi \vee \psi$
'if' *A* 'then' *B*	$\phi \rightarrow \psi$
'not' *A*	$\neg\phi$

[a]*A* and *B* are truth-valued statements in natural language; ϕ and ψ are their respective formal expressions in the language of propositional logic.

Rather than associate every statement we might wish to express with a variable, then, the language of propositional logic allows us to decompose some constructions in natural language into a formal combination of one or more variables. Instead of associating a single variable with *Felix is a cat and Felix is sitting on a mat*, for example, we can combine the variable for *Felix is a cat*, p, with the variable for *Felix is sitting on a mat*, q, in the expression, $p \wedge q$. Similarly, *If Felix is a cat, then Felix is thinking of tuna* can be associated with the formal expression, $p \rightarrow r$, where r is the propositional variable for *Felix is thinking of tuna*. There are four natural language constructions that can be so decomposed in propositional logic, as shown in Table 1. What really makes this worthwhile is that we still only need a valuation to interpret these. Propositional logic comes equipped with an automatic means of telling us the truth value of any formal expression formed by any combination of variables and these four connectives, or modes of combination, given just the valuation. This automatic means is reflected in a deductive system, which consists of rules that each guarantee the truth of certain expressions based on the truth of other expressions. To most people, a logic actually refers to the deductive system, not to the language of expressions. Another branch of mathematics, called model theory, studies the algebraic relationships that the automatic means of determining truth induce among the different expressions of the underlying formal language. Of particular importance is Boolean algebra (*see* **Boole, George (1815–1864)**), the algebra that models classical propositional logic (see later). These four connectives – conjunction, disjunction, implication, and negation – are sometimes called Boolean connectives. Despite the advent of propositional logic, semanticists are still gainfully employed because (1) there are far more interesting formal decompositions of natural language than these four connectives and (2) even in the case of these four, our use of them in natural language often results in meanings not predicted by the machinery of propositional logic.

$$\frac{\phi \quad \psi}{\phi \wedge \psi}\ \wedge I \qquad \frac{\phi \wedge \psi}{\phi}\ \wedge E_1 \qquad \frac{\phi \wedge \psi}{\psi}\ \wedge E_2$$

$$\frac{\phi}{\phi \vee \psi}\ \vee I_1 \qquad \frac{\psi}{\phi \vee \psi}\ \vee I_2 \qquad \frac{\phi \vee \psi \quad \phi \rightarrow \chi \quad \psi \rightarrow \chi}{\chi}\ \vee E$$

$$\frac{\begin{array}{c}\overline{\phi}^{u} \\ \vdots \\ \bot\end{array}}{\neg\phi}\ \neg I^{u} \qquad \frac{\neg\phi \quad \phi}{\bot}\ \neg E$$

$$\frac{\begin{array}{c}\overline{\phi}^{u} \\ \vdots \\ \psi\end{array}}{\phi \rightarrow \psi}\ \rightarrow I^{u} \qquad \frac{\phi \rightarrow \psi \quad \phi}{\psi}\ \rightarrow E$$

Figure 2 The inference rules of minimal propositional logic.

Accepting the idealism of propositional logic for the moment, one particular rule of importance in propositional logic's deductive system tells us that, given the truth of $\phi \rightarrow \psi$ and ϕ, we may conclude that ψ is also true. This rule is so important that it has a name, modus ponens. It allows us not only to prove the truth of individual statements, but also to consider a collection of statements, called a theory, and then to think of all of the statements that logically must follow from them. This use of logic has become paramount among mathematicians, its continued relationship with natural language semantics being relegated to a pastime of formal linguistics. Assuming the existence of a constant $\bot$ that represents contradiction, we can describe the deductive system of minimal propositional logic as shown in Figure 2. Modus ponens appears there as $\rightarrow E$. The E-rules are elimination rules that produce a consequent (below the line) from which the connective under examination has been eliminated. The I-rules are introduction rules that produce a consequent with an extra such connective relative to their antecedents (above the line). In the case of $\neg I$ and $\rightarrow I$, a hypothetical deduction or premise, u, is assumed within the proof of the antecedent, and then discharged when the respective introduction rule applies – u cannot be used anywhere else in the proof. A tautology is a fact derivable with no premises, i.e., with no undischarged hypothetical deductions. It can also be thought of as a fact derivable from an empty theory. Tautologies are always true, with any valuation.

Certain basic tautologies cannot be derived in minimal logic, most notably the law of the excluded middle, $p \vee \neg p$, and the law stating that anything can be proved from falsehood, $\neg p \rightarrow (p \rightarrow q)$. When minimal logic is extended with this rule:

$$\bot/\phi EFSQ$$

EFSQ and the law of the excluded middle are both rendered with the name of the rule elided to the rule itself. When we instead extend minimal logic with this rule:

$$\neg\neg\phi/\phi\neg\neg$$

we obtain a classical logic, which can derive the law of the excluded middle as well. When researchers refer to propositional logic, they are usually referring to either classical or intuitionistic logic. Intuitionistic logics are particularly popular in logical approaches to computing, including computational linguistics.

First-Order Predicate Logic First-order predicate logic is obtained from propositional logic by making two major changes. First, we carry the level of linguistic decomposition one step further. Rather than using variables to refer to primitive truth-valued statements, such as *Felix is sitting on a mat*, we use them in predicate logic to refer to the entities in the world that are mentioned in those statements. A variable would be used to refer to the mat that Felix is sitting on, for example. An assignment function, which replaces valuations, maps these variables to elements of a domain, the collection of entities in the world. We also add constants, which always refer to the same entity regardless of the assignment function, such as Felix. Expressions for truth-valued statements are then obtained by applying predicates to zero or more variables and constants. The predicate for *sit* could take either one or two arguments, depending on how location is encoded in the expression, but one of them would definitely be the constant, *Felix*. An interpretation tells us which domain element every constant stands for and when each predicate is true, as a function of its arguments' domain elements. An interpretation also interprets functions as mapping from one domain element to

another. An expression for *Felix chases Felix's tail*, for example, might be *chase*(*Felix*,*tail*(*Felix*)), wherein *tail* is a function symbol that maps the domain element for *Felix* to the domain element for his tail.

The second major change involves the introduction of quantifiers. Natural language has many quantifiers (*see* **Quantifiers: Semantics**), but standard first-order logic considers only two: universal quantification ($\forall$), which corresponds to *every* or *all*, and existential quantification ($\exists$), which corresponds to *some* or the indefinite article *a*(*n*). One possible expression for *Felix is sitting on a mat*, for example, would be $\exists m.\mathrm{mat}(m) \wedge sit(Felix, m)$. In this formula, the quantifier is identified with the variable that it changes the interpretation of (m), called a bound variable, and then the formula over which this change is effected, called its scope, is explicitly stated. Note that common nouns such as *mat* are generally not expressed as constants, but rather as properties – one-argument predicates – with a quantified variable argument.

The deductive system for either classical or intuitionistic logic can be extended to one for first-order predicate logic by adding elimination and introduction rules for *forall* and $\exists$. This logic is called 'first-order' because the quantifiers quantify over elements in the domain. A second-order logic would permit quantification over sets of elements; a third-order logic would permit quantification over sets of sets of elements, etc.

Higher Order Logic and the Lambda Calculus Predicate and propositional logics can be extended in several ways. Many incorporate extra connectives for expressing necessity, possibility, and belief (*see* **Modal Logic**). A more general extension based on the simply typed lambda calculus captures modal operators as well as all of the higher order extensions of predicate logic, and is widely used in semantics and computational semantics research. The language of the simply typed lambda calculus begins with a set of basic types, consisting in linguistic applications of at least *e* for entities, and *t* for truth values, but often of other types for representing various aspects of the context of an utterance, or possible worlds, hypothetical states of the world, or context as it could have been. The set of all types is formed by computing the functional closure of these basic types. The type $e \rightarrow t$, for example, would be assigned to the properties that encode common nouns, such as *mat*, because they map entities to truth values. Quantifiers and quantified noun phrases are generally given higher order types, such as $(e \rightarrow t) \rightarrow t$, which are also included. Often a bracketed notation is used in place of arrows, with $\langle e, t\rangle$ for $e \rightarrow t$, and $\langle \langle e, t\rangle, t\rangle$ for $(e \rightarrow t) \rightarrow t$.

A typed language assigns a type to each of its expressions. The languages of propositional and predicate logic have no explicit type systems, but they bear a certain resemblance to the expressions of the lambda calculus. This language also has variables and constants, but it has one set of each for each type. Because some types are functional, these are all of the primitive components that we need. Predicates such as *mat*, for example, can be treated as constants of type $\langle e, t\rangle$. Even Boolean connectives such as $\neg$ or $\wedge$ can be treated as constants of type $\langle t, t\rangle$ and $\langle t, \langle t, t\rangle\rangle$, respectively. Expressions in the lambda calculus are formed by successive applications and abstractions over the variables and constants of the language. An application applies an expression of a functional type to an expression with a matching argument type: *mat* can be applied to the *e*-typed variable, x, or to the *e*-typed constant, *Felix*, because it has the type $\langle e, t\rangle$, thus yielding a *t*-typed expression $mat(x)$ or $mat(Felix)$ (even though Felix is not a mat), respectively.

Abstraction is where the innovation of the lambda calculus is to be found. Our usual mathematical notation for defining functions, such as $f(x) = x + 3$, tells us only that f is a function by demonstrating to us an instance of its usage as a function with the dummy argument, x – nothing about the name indicates this, except the unwritten convention that f, g, and h are generally used as function names. Just as predicate logic uses the symbols $\forall$ and $\exists$ to indicate explicitly that a variable will have a quantified interpretation within an explicit scope (as opposed to agreeing that the names a, b, and c will always be used for universally quantified variables), the λ operator of the lambda calculus defines a function over explicitly bound argument variables. For any τ-typed expression, ϕ, and any σ-typed variable, x, we can abstract ϕ to an expression, $\lambda x.\phi$, with the functional type $\langle\sigma,\tau\rangle$. Thus $\lambda x.\phi$ does not even require a conventional name like f – its structure tells us that it is a function, and that occurrences of x within ϕ (if there are any) refer to the argument passed to the function.

The language of the simply typed lambda calculus can be viewed as a generalization of predicate logic because quantified formulas such as $\forall x.\phi$ can be represented as $every(\lambda x.\bar{\phi})$, where *every* is a constant of type $\langle\langle e, t\rangle, t\rangle$, and $\bar{\phi}$ is the corresponding generalization of ϕ. This notation separates the meaning of the quantifier from its syntactic use as a variable binder. Thus, we can also speak of $some(\lambda x.\bar{\phi})$, $most(\lambda x.\bar{\phi})$, etc., all of which have some effect on the interpretation of x within $\bar{\phi}$. When natural language quantifiers are treated in this way, essentially as properties of properties, then they are known as generalized quantifiers. Like predicate logic, an assignment function is required to tell us how to interpret unbound variables. The collection of

domains, one for each type, that enumerate for us the entities in the world of that type is called a frame, and is used along with an interpretation to form a model for this language. The lambda calculus is a set of rules that can be applied to these expressions, much like the deductive systems of propositional and predicate logic. Unlike the rules of logic, however, the aim of the lambda calculus set of rules is not to prove the truth of expressions – many expressions in this language have types other than t, after all – but rather to reduce expressions to simpler but still equivalent forms. Of particular note are three axioms of this calculus, i.e., rules with no antecedents that state the primitive steps of the reduction:

1. α-Reduction, or α-conversion: every expression can be reduced to an expression in which variables have been consistently renamed. For example, $\lambda x.mat(x)$ can be α-reduced to $\lambda y.mat(y)$.
2. β-Reduction: every application of a function can be reduced to substitution of the argument for the bound variable of the function. For example, $\lambda x.mat(x)\,)(m)$ can be β-reduced to $mat(m)$ by substituting m for the occurrences of x in the body of the lambda expression.
3. η-Reduction: certain abstractions are vacuous. For example, $\lambda x.mat(x)$ can be reduced to just mat.

Of these, β- and η-reduction are the most important. Both contain side conditions to ensure that eliminating a λ and its bound variable through argument substitution or deletion will not accidentally bind or unbind other variables, and this is achieved through α-conversion. An expression that can be made no simpler by this calculus is said to be in $\beta\eta$-normal form. For example, $every(mat)$ is the $\beta\eta$-normal form of $every(\lambda x.(mat)(x))$.

An important property of the calculus, called the Church–Rosser property, is that if A can be reduced to either B or C, then there is a D to which both B and C can be reduced. This means that reduction steps can be applied in any order, because the same ultimate result will be obtained.

Substructural Logics In standard classical or intuitionistic logic, premises can be used any number of times (including zero). Another common variation gives propositional or predicate logic a sensitivity to the number of times that premises can be used in a deduction. Proof systems for these linear logics are sometimes used for deriving semantic forms from syntactic structures, because they capture an intuition that lexical items and phrases can and must be used exactly once in such a derivation (*see* **Compositionality: Semantic Aspects**). This can be combined with a sensitivity to the order of premises in a deduction, by distinguishing left-implication (written \) from right-implication (written /). So, in the case of sequences x, x/y or y/x, x, it is possible to derive y, but not in the case of x/y, x or x, y/x.

Categorial grammars use such an ordered variant of propositional logic (specifically, the multiplicative fragment of noncommutative linear logic) for representing the syntactic derivations of grammaticality. In this approach, all but a few semantically primitive syntactic categories are replaced by order-sensitive, linear implications. Verb phrases, for example, generally receive a category such as $np\backslash s$, which means that they combine with noun phrases on their left to form sentences. Proofs that witness the derivation of the sentential category, s, are then sometimes used in place of trees as representations of syntactic structure, although they normally cannot be read with the same seriousness of commitment to the existence or absence of specific constituent phrases. Categorial grammars typically associate expressions from a typed higher order logic with every syntactic category in a derivation, which means that logical representations are being used both in the syntax and in the semantics (*see* **Semantics in Categorial Grammar**). Combinatory categorial grammar uses an implicational notation for its categories similar to that of categorial grammar, but it is a string algebra for mildly context-sensitive languages (see later, Featural), not a logic.

In knowledge representation and planning, it is generally the set of inference rules or implications available for inference that is extended, rather than the underlying formal language of first-order logic (*see* **Inference: Abduction, Induction, Deduction**). Neither of the two most well-known extensions, the situation calculus or the event calculus, has been widely used in computational linguistics until recently. The event calculus is now being used by semanticists as a means for reasoning about aspect in nominals (Hamm and van Lambalgen, 2004), but even this has not yet found its way into more computational work.

Description Logics One trend that has greatly influenced both knowledge representation and symbolic CL has been the development of designer description logics for reasoning through conceptual classifications of entities in the world. Fundamentally, description logics are simply modal logics with better marketing, but syntactically, they normally take the form of simple constraint systems for describing complex objects. These are the same kinds of constraint

languages used in symbolic CL to reason about large-scale featural representations, as well as about logical expressions. Much of what is published under the rubric of 'computational semantics' is actually very syntactic work on devices for assembling logical expressions that can subsequently be interpreted and reasoned with. Increasingly, the CL community has opted not to use the means of combination that exist within the logics of expressions (such as β-reduction within the lambda calculus), but to treat these expressions as trees of subterms that are assembled by conjoining descriptions about them (*see* **Underspecification**). In this treatment, a description logic is used for the descriptions, and the intended models of these descriptions are expressions from the underlying logic used in the semantics.

Discourse Representation Theory Discourse representation theory (DRT) can be thought of as a predicate logic with parochial conditions of scope and variable binding in order to better reflect the behavior of anaphoric expressions in natural language. It is also the first, and still one of the few logical approaches to natural language that treats entire texts as the basic unit of interpretation, rather than sentences in isolation. The latter is typified by Montague semantics, to which DRT was a reaction, historically.

Superficially, sentence boundaries may not seem to play a significant role in semantic interpretation, because in many circumstances, they can be treated as though replaced by a coordinating conjunction, such as *and*. The sequence of sentences, *John knows Mary. He loves her.*, probably does have the same meaning as *John knows Mary and he loves her.*, namely, the conjunction (with Boolean $\wedge$) of the meanings of the individual clauses. The situation becomes rather more complicated in the presence of quantifiers, however. In the case of *A man knows Mary. He loves her.*, the variable representing *he* must be bound by the existential quantifier introduced by the indefinite article *a*. This means that the scope of quantifiers can, in principle, extend beyond the sentence(s) in which they are lexically realized. In the case of *Exactly one boy knows Mary. He loves her.*, however, the uniqueness of the quantifier does not extend to the variable representing *he*, i.e., there are not even other boys who know Mary but do not love her. Perhaps the most essential contribution of DRT to natural language semantics was in showing that introducing a referent into a discourse and predicating on an already introduced referent require two very different treatments in a formal logic.

Logic Programming As attractive as logic is as a flexible and formal expressive device, it does not have much to recommend itself in terms of tractability. Recognition with Lambek categorial grammars was recently proved to be NP(nondeterministic polynomial time)-complete, and many of the proof search and inference problems that we would like to solve in other logics are simply undecidable. Another use of logic has been to encode search problems from more tractable formalisms in order to combine the advantages of both.

The basic algorithms for parsing with context-free grammars (CFGs; see later, and *see* **Chart Parsing and Well-Formed Substring Tables**) were known by the early 1970s. The subsequent search for more elegant and expressive means of writing this kind of grammar coincided with the development of a class of declarative programming languages called logic programming languages, of which Prolog is still the best known example. The idea that a grammar could be viewed as a program written in such a high-level language was a great source of inspiration for symbolic computational linguistics throughout the 1980s. This view, often called 'parsing as deduction,' after the title of a well-known paper on this subject, has since been routinely misinterpreted as 'parsing is deduction,' with the result that the flurry of recent developments in algebraic and functional programming have left symbolic CL behind. Prolog is still widely used in symbolic CL, in spite of the existence of these other programming paradigms, notably constraint programming techniques such as constraint handling rules (Morawietz, 2000), as well as logic programming languages that are arguably better suited to order-sensitive deductions (Polakow, 2001).

Prolog compilers come equipped with a macro notation that hides the encoding apparatus necessary to simulate CFG recognition with Prolog's standard proof search. Grammars written in this notation, called definite clause grammars, are expanded at compile time by converting each nonterminal symbol into a Prolog predicate that contains two extra arguments, representing a difference list. These delimit the starting point and ending point of the substring consumed by that nonterminal. The grammar in Figure 3A, for example, is expanded into the Prolog program in Figure 3B. No parsing algorithm needs to be provided. Definite clause grammars automatically use a top-down, depth-first algorithm simply by using Prolog's built-in search strategy.

There is no equivalent encoding standard for surface realization from CFGs in Prolog. Indexing semantic forms in a lexicon is a much more difficult task, compared to looking up words. A very common method, semantic-head-driven generation (Shieber *et al.*, 1990), proceeds top-down from the goal (usually, the category for sentence and a semantic form) to

A	B
s → np, vp.	s (A, B) :-np (A, C), vp (C, B).
np → det, n.	np (A, B) :- det (A, C), n (C, B).
vp → v, np.	vp (A, B) :- v (A, C), np (C, B).
det → [the].	det ([the | A], A).
n → [man].	n ([man | A], A).
np → [mary].	np ([mary | A], A).
v → [sees].	v ([sees | A], A).

Figure 3 A definite clause grammar (A) and its expansion into a Prolog program (B).

a pivot, the lowest node in the parse tree that has the same semantics as the goal, and then proceeds bottom-up back to the root node of the tree, recursively generating all of the nonpivot daughters top-down at each step. Pivots are generally heads of constituents, which are useful to find early because they contain information about how to combine the syntactic and semantic properties of their arguments. This combination of top-down and bottom-up processing makes generation less prone to nontermination, but is not as transparently encodable in Prolog's built-in search strategy.

Graphical

Graphical representations use graphs, with sets of vertices connected by edges (*see* **Graph Theory**), either to represent dependencies among various entities or to represent states in a process. In symbolic CL, they are used for both.

Trees: Context-Free Grammar Derivations A tree is a connected, acyclic graph. A phrase structure tree, as shown in Figure 4, depicts the assignment of constituency to the substring of a grammatical phrase or sentence. This substring can be read from the vertices at the bottom of the tree (leaves), and is known as the yield of that tree. Each (in this case, labeled) nonleaf vertex corresponds to a constituent, and there is an edge connecting that vertex to each of its subparts, often known as daughters. Constituents are not very easy to define formally, but they appeal to a combination of intuitions about semantic interpretation, grammatical intersubstitutability, lexical items, word order, and constraints on discontiguity that are meant to indicate how a natural or intuitive grammar should refer to the component parts of a phrase. The local shape of a phrase structure tree is often determined in deference to certain regularities of constituent structure observable across major phrasal categories (*see* **X-Bar Theory**).

Phrase structure trees are also a way of representing derivations of a string relative to a context-free grammar (*see* **Chart Parsing and Well-Formed Substring Tables**). Context-free grammars are perhaps the

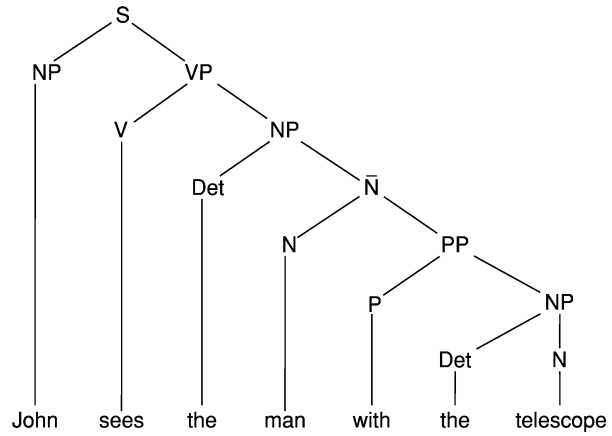

Figure 4 A phrase structure tree with the yield *John sees the man with the telescope*. Although this string admits two readings, the tree tells us that *telescope* modifies *man*, not *sees*.

oldest form of grammars for human languages, said to date back to the classical Sanskrit grammars of Panini and Patanjali, although the preoccupation there with rule ordering and default reasoning in grammar specification (*see* **Rule Ordering and Derivation in Phonology**) gives those grammars a very different feel compared to their modern analogues. In the mid-20th century, transformational models of grammar rejected the adequacy of CFGs for describing the syntax of human languages, but only for reasons that were either informally sketched or simply mistaken. Interest returned to this issue in the late 1970s and early 1980s, during which several specific constructions (cross-serial verb dependencies in Dutch and Swiss German, reduplication in Bambara morphology) were definitively shown to be outside the grasp of context-free languages.

Trees: Augmentation and Reification Phrase structure trees nevertheless continue to be widely used as representations of syntactic structure. When augmented with additional arcs that indicate movement of constituents from one position in the tree to another, they can be used to model the so-called derivational approaches to syntax, which are generally not context free. When they are annotated to indicate vertices where other trees can be adjoined *in situ*, they become suitable representations for tree-adjoining grammars (TAGs). TAGs characterize a class of mildly context-sensitive languages (*see* **Chart Parsing and Well-Formed Substring Tables**), which include some non-context-free languages, and have been argued to include all human languages (*see*). Alternatively, the simple atomic labels of CFGs, such as noun phrase (NP) and verb phrase (VP), can be replaced with more complex labels, typically feature structures (*see* **Syntactic Features and Feature Structures**),

which, without further constraint, lead to formalisms that admit non- context-free languages. This is the approach taken by lexical functional grammar (LFG) and head-driven phrase structure grammar (HPSG), for example.

Phrase structure trees also remain widely used, with or without these modifications, as derivations from grammars that have been annotated with numerical parameters. The values of these parameters are statistically estimated from corpora of trees (*see* **Parsing: Statistical Methods**; **Parsing and Grammar Description, Corpus-Based**; **Treebanks and Tagsets**), and then used to assign probabilities to the membership of individual strings in the language. Here, the common choice of CFG as the underlying grammar formalism is generally ascribed to efficiency. CFGs admit a dynamic programming algorithm for recognition that runs in $\mathcal{O}(n^3)$ time in the length of the input, as compared to the $\mathcal{O}(n^6)$ algorithm for TAGs, and the undecidability of recognition in unrestricted transformational or feature-structure-based approaches. In addition, not every human language has been proved to be non-context-free, so it may be the case that CFGs are an adequate means of syntactic expression for all but Dutch and Swiss German. This question is still open for English, for example. A CFG can also be viewed as defining an approximation language that contains some non-context-free language of interest plus some ungrammatical strings. If a numerically parameterized CFG can assign probabilities at or near zero to those ungrammatical strings, then the language it induces is arguably a very accurate approximation. The debate over the context freeness of natural language transpired before the use of probability density functions became commonplace in computational linguistics, so the tradeoff between these two points of view still remains poorly understood from a theoretical standpoint.

Looking across the various uses of phrase structure trees, it is important to observe that, in some cases, they are being used to represent derivations relative to strings, usually derivations of membership in a set of strings, whereas in other cases, they serve as first-class objects, which can be tested for membership in a set of trees. The most important difference between strings and tree-based representations of strings is that the additional structure in trees makes those representations nonassociative.

Notions such as context-free languages, context-free grammars, etc. were coined under the assumption that languages are sets of strings. TAGs, on the other hand, view phrase structure trees as objects in their own right that can be substituted into and adjoined to each other. A famous theorem proves that regular languages over trees have yields corresponding to context-free languages over strings. It is actually possible to define tree automata, analogous to string automata (discussed later; see Finite-State Machines), that walk over the vertices of trees to verify their well-formedness. Context-free string languages are also precisely the languages definable by a logic called monadic second-order (MSO) logic. Elucidating the connection between logical descriptions of trees and linguistic theory is currently an active area of research within symbolic CL (Rogers, 1998).

In syntax, optimality theory also considers trees to be objects of study, augmenting their actual construction with a system of constraints that ranks otherwise well-built trees according to how many constraints of grammar they violate. Computational research on optimality theory, however, generally focuses on its phonological applications (*see* **Phonology: Optimality Theory**), in which the objects of study are pairs of strings, and their constraint systems are implemented with finite-state string transducers (see later, Finite-State Machines).

Trees: Variations for Freer Word-Order Languages

Among freer word-order languages, phrase structure trees do not enjoy anything close to the same hegemony over syntactic representation, because of the difficulty in conflating all of the evidence concerning word order, semantic interpretation, etc. onto a single notion of constituent in a single representation. Where trees are used, their branches are often crossed or tangled, in which case they cannot serve as representatives of context-free derivations. In many other approaches, more than one tree is used, thereby allowing for the various criteria for constituency to be separately represented. These include computational work based on autolexical syntax or (*see* **Sgall Petr (b. 1926)**) based on the theoretical work of the Prague linguistic circle (*see* **Jakobson, Roman (1896–1982)**; **Mathesius, Vilém (1882–1945)**; **Trubetskoy, Nikolai Sergeievich, Prince (1890–1938)**). In the latter case, however, the trees differ from phrase structure trees in that every node in the tree is labeled by a word, with heads connected to their arguments or modifiers (Figure 5). Even with fixed word-order languages and single-tree representations, this variety of tree, called a dependency tree, has become quite commonplace in computational linguistics, because it is lexically very well grounded, with the number of nodes being, in most cases, strictly bounded by the number of words in the string to be recognized. The various approaches that use this sort of tree are now collectively referred to as dependency grammar. Symbolic approaches to parsing with dependency grammars, particularly in freer word-order languages, are generally constraint based, which is to say that they

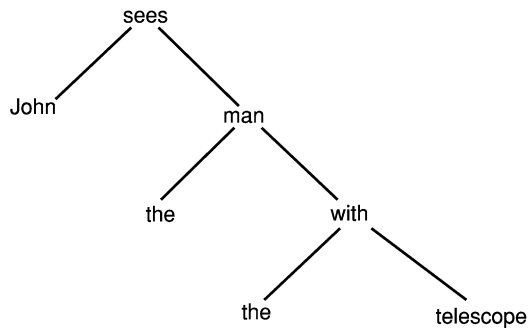

Figure 5 A dependency structure tree with the yield *John sees the man with the telescope*. Unlike the phase structure tree in Figure 4, every node is labeled with a word. Non-leaf nodes are heads, and their daughters are the heads of their arguments. Again, the structure imposed by the tree disambiguates the reading of the sentence.

compute all possible parses by computing the closure of a much richer set of combinations than those implicit in CFG rules (Dechter, 2003) over a much richer set of constraints than 'grammatical substring.' Morphological inflections generally play a very important role in these languages, as do pragmatic distinctions, such as whether a phrase represents given or new information. Word-order restrictions also play a role; there are few, if any, languages with no word-order restrictions whatsoever. What makes freer word-order languages 'freer' is that these restrictions do not uniquely determine a solution, or cannot be stated relative to the usual inventory of phrasal categories that fixed word-order languages use, such as NPs and VPs. Word-order rules stated relative to different categorial inventories, particularly those that are founded in more superficial observations about word order and are orthogonal to semantic interpretation, are called linearization rules (*see* **Word Order and Linearization**).

Trees: Nonsyntactic Uses In addition to syntactic structure, trees are often used to represent derivations from word-formation rules in morphology (*see* **Syntax of Words**) and from prosodic structure in phonology (*see* **Intonation and Syntax; Word Stress**). They are often what guide the composition of logical forms for semantics, and can be annotated with other roles, such as topic and focus, to serve as pragmatic representations as well.

Concept Ontologies Another kind of graphical representation is the so-called ontology. There is very little ontological about them – they are more accurately referred to as epistemological networks. These networks organize concepts (not words) into networks according to primitive semantic relations, most notably the 'IS-*A*,' or hyponymy, relation. Concept *C*1 is a hyponym of *C*2 iff all instances of *C*1 are also instances of *C*2. An example is shown in Figure 6, which is taken from WordNet, currently the most widely used such network in computational linguistics. *Hydromel*, *milk*, etc. are hyponyms of the more general concept, *beverage*. Other relations, such as 'part of' (meronymy) or 'substance of,' are also defined in the network. These networks are used to calculate semantic distances so that applications may 'back-off' their probability estimates to include semantically related concepts that often appear in similar syntactic contexts. Words that denote concepts nearer to the concept, *beverage*, for example, are a better guess for the denotation of the direct object of the verb *drink* than are concepts that are further away.

Semantic distance is generally calculated as an empirically determined distortion of path length, but perhaps the most interesting variation from the standpoint of symbolic CL is the use of least upper bounds. A least upper bound of elements *A* and *B* is the lowest (most specific) concept that is connected to both *A* and *B* from above, i.e., of which both *A* and *B* are both hyponyms. The least upper bound of *milk* and *ginger beer*, for example, is *beverage*, but the least upper bound of *milk* and *honey* is *food*, and the least upper bound of *milk* and *morphine* is the very general concept, *object*. We can then use the depth of the least upper bound, i.e., the length of the shortest path between the least upper bound and the all-encompassing root concept, *entity*, as a measure of how related the two terms are. *Milk* must be semantically closer to *ginger beer* than to *morphine* because its least upper bound with respect to *ginger beer* is deeper.

Concept ontologies can also be found in formal research on lexical semantics (*see* **Lexicon: Structure; Lexical Semantics: Overview**), and bear a very close relationship to the type systems that are used with many featural representations.

Finite-State Machines The third major use of graphical representations in symbolic CL is the finite-state machine. These machines consume strings as input, and either produce a yes/no answer as to whether the string belongs to some language (a finite-state automaton) or produce one of several output strings corresponding to the input according to some relation (a finite-state transducer). In either case, the vertices of the graph correspond to states in the process of consuming the input, and the edges correspond to the consumption of one symbol or token from the input. Figure 7, based on Antworth's (1990) morphology of English, depicts a finite-state automaton that approximates the recognition of well-formed English

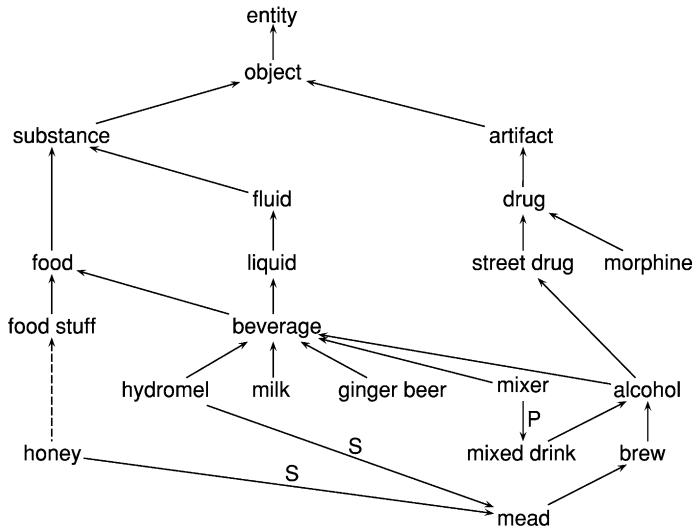

Figure 6 A portion of the WordNet ontology. Hyponyms are listed below their concepts and are connected with unlabeled lines; meronyms are denoted by the label 'P' and substances are denoted by the label 'S.' Least upper bounds appear as upward joins of edges.

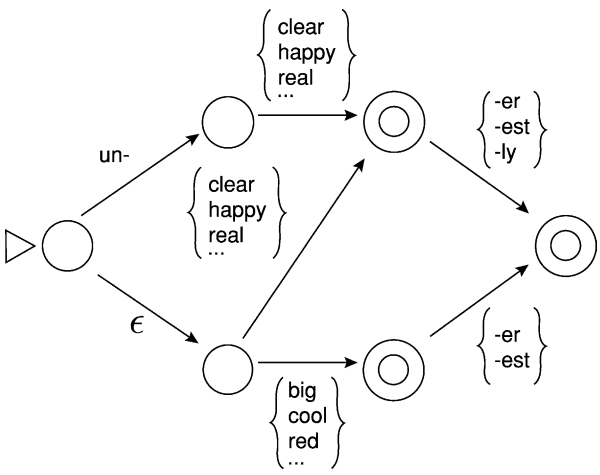

Figure 7 A finite-state automaton that approximates the recognition of well-formed English adjectives, based on Antworth's (1990) morphology of English. Adapted from Jurafsky and Martin (2000), with permission.

adjectives, wherein the tokens consumed are morphemes or adjectival roots. Some finite-state machines have edges called jump arcs, labeled here with ε, which consume no input on transition.

Finite-state automata recognize exactly the regular languages (*see* **Chart Parsing and Well-Formed Substring Tables**), and finite-state transducers encode exactly the regular relations. Both of these can be combined to form larger machines using a variety of operations that are closed under regular families, such as concatenation, union, composition (in the case of regular relations), and intersection (in the case of regular languages). Although their worst-case running time is exponential, this can be reduced to linear time if the machine can be determinized. A deterministic finite-state machine is one in which there are no jump arcs, and no two edges with the same source state consume the same input. In general, finite-state transducers cannot be completely determinized, but they are often not used to simulate the actual machines that they encode. Instead, they can be used to represent compactly sets of string mappings, particularly when the states or edges can be annotated with probabilities (weighted transducers). Combining these sets to find the most probable mapping for some input is extremely fast in practice, due in large part to some very efficient algorithms for composing two weighted transducers, and minimizing the number of states in a weighted transducer (Mohri, 2004).

Finite state machines are widely used in computational morphology and phonology, and are used to model turn taking and error recovery in grammars of spoken discourse within limited conversational domains. Transducers are also used for text analysis in speech synthesis and the study of writing systems. Weighted transducers are widely used to implement language models in automatic speech recognition.

Featural

Feature structures are a kind of record structure consisting of pairs of features or attributes and values. As shown in Figure 8B, they can also be thought of as graphs with labeled vertices and edges. Although the graph-based notation is very difficult to cope with on a large scale, it is perhaps more indicative of the original motivation for using feature structures: theoretical models of mentation as spreading activations in networks of directed, i.e., labeled, associations.

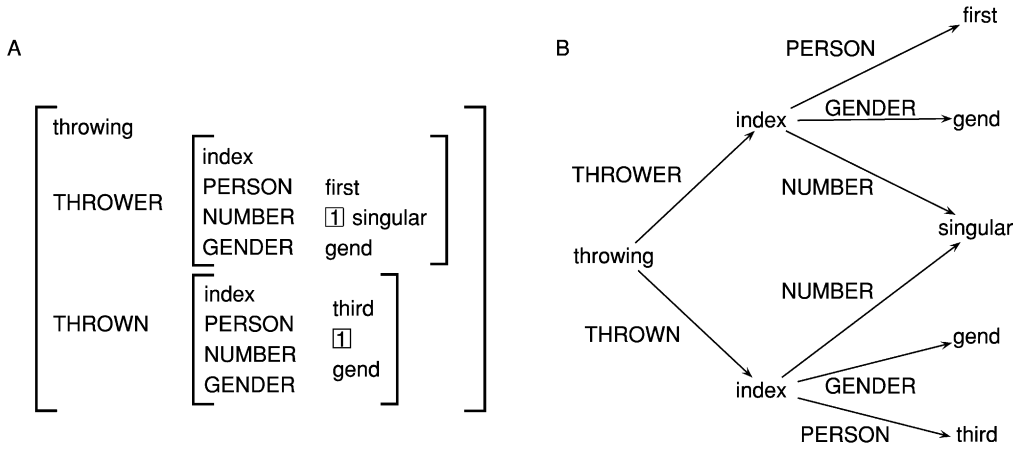

(C) *throwing* ∧ THROWER:(*index* ∧ PERSON:*first* ∧ NUMBER:(*N* ∧ *singular*) ∧ GENDER:*gend*)
∧ THROWN:(*index* ∧ PERSON:*third* ∧ NUMBER:*N* ∧ GENDER:*gend*)

(D) THROWER:(PERSON:*first* ∧ NUMBER:(*N* ∧ *singular*)) ∧ THROWN:(PERSON:*third* ∧ NUMBER:*N*)

Figure 8 Two common depictions of feature structures, an attribute-value matrix (A) and a labeled graph (B), with two descriptions (C)and (D) that depict them.

The record-based notation in Figure 8A is sometimes called an attribute-value matrix (AVM) in linguistics, although it is not a matrix in any mathematical sense. Regardless of the notation used, feature structures also allow for structure sharing, in which two attributes have (extensionally) the same value. This is a stronger statement than saying that two attributes have indistinguishable values, which is in turn stronger than saying that they have consistent values. In Figure 8, for example, the two GENDER features have indistinguishable values, but they are different (more precisely, there is no evidence to conclude that they are the same). The two NUMBER features, on the other hand, really do have the same value. The choice of representation is often underdetermined by the empirical evidence, but it can have formal consequences when feature structures are unified or inequated.

Feature structures are often no more formally defined than this, with no clear statement of the range of possible values for each feature, and no indication of which features are permitted to co-occur in the same feature structure. To explicate either of these properly, the feature structures must be typed. The treatment of typed feature structures given here mostly follows Carpenter (1992) and conventional practice in head-driven phrase structure grammar. Type systems for feature structures look a great deal like the concept ontologies discussed previously. They are partial orders consisting only of 'IS-*A*' links, although hyponyms are here referred to as subtypes, and the all-encompassing root concept/type is called 'top' (written ⊤) rather than 'entity.' Large HPSGs can have as many as 8000–10 000 types. With each type, we associate a collection of appropriate features. Every feature structure of that type must bear all of its appropriate features (along with a value), and cannot bear any other features. In the most general setting, the values of features are typed feature structures. Even atoms, such as *third* or *singular*, as in Figure 8, are taken to be typed feature structures, whereby these types have no appropriate features.

Each appropriate feature also has a value restriction, of which the type of that feature's value must be a subtype. These constraints on allowable combinations of features and types are called an appropriateness specification, and they can also be used to constrain co-occurrences of features in the same feature structure. A signature is a partial order of types together with an appropriateness specification. Figure 9 depicts a signature that might have induced the feature structure in Figure 8. Appropriateness makes the internal structure of a feature structure much more predictable as a function of the signature, which makes both of them less error prone. The greatest benefit of appropriateness, however, is that it allows us to describe both of them very tersely. In large grammars, typed feature structures can have as many as 100 000 vertices, so instead we use a description logic (as discussed previously) to refer to them. Descriptions consist of types, variables, and negative constraints called 'inequations,' which prohibit structure sharing. The descriptions can be closed under conjunction (∧) and disjunction (∨), as well as feature selection, which means that we can apply parts of a description to a particular feature's value. Appropriateness allows us to infer much of the

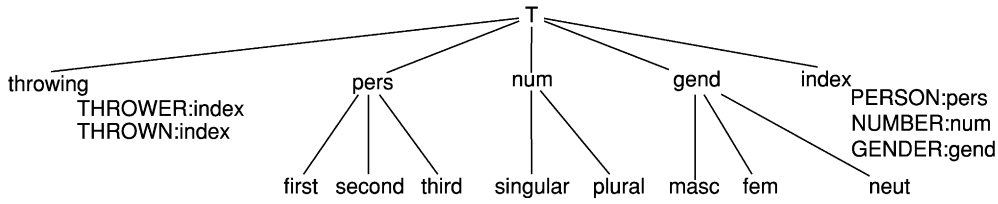

Figure 9 A signature for the feature structure in Figure 8.

$$\begin{bmatrix} \text{throwing} & \\ \text{THROWER} & \begin{bmatrix} \text{index} & \\ \text{PERSON} & \text{first} \\ \text{NUMBER} & \text{singular} \\ \text{GENDER} & \text{gend} \end{bmatrix} \\ \text{THROWN} & \begin{bmatrix} \text{index} & \\ \text{PERSON} & \text{third} \\ \text{NUMBER} & \text{singular} \\ \text{GENDER} & \text{gend} \end{bmatrix} \end{bmatrix} \sqsubset \begin{bmatrix} \text{throwing} & \\ \text{THROWER} & \begin{bmatrix} \text{index} & \\ \text{PERSON} & \text{first} \\ \text{NUMBER} & \boxed{1}\ \text{singular} \\ \text{GENDER} & \text{masc} \end{bmatrix} \\ \text{THROWN} & \begin{bmatrix} \text{index} & \\ \text{PERSON} & \text{third} \\ \text{NUMBER} & \boxed{1} \\ \text{GENDER} & \text{neut} \end{bmatrix} \end{bmatrix}$$

Figure 10 Two feature structures that stand in the subsumption ($\sqsubset$) relation. The second structure contains all of the information in the first, plus two more specific types at the GENDER features, and a structure-sharing relation that is consistent with the first structure's type assignment, though absent.

structure that goes unstated in a description, which allows us to make the descriptions shorter. Rather than refer to the feature structure in Figure 8 with the description in Figure 8C, for example, we can use only the description in Figure 8D – the appropriateness of Figure 9 can fill in the rest. This makes grammars more readable, because only the relevant parts of potentially very large feature structures are selected for discussion at any point in a grammar.

Because types are partially ordered, and because some feature structures can have more structure sharing than others, it is possible to speak of feature structures as being partially ordered as well. We say feature structure F subsumes feature structure G iff G conveys all of the information that F does, plus possibly more. Figure 10 shows two feature structures that stand in this relation. Provided that the type system is a join semilattice, it is possible to compute a greatest lower bound of two consistent feature structures with respect to subsumption. This is the dual of the least upper bound mentioned previously (q.v., Concept Ontologies), and corresponds to finding the least informative feature structure that consistently combines their information. The process of computing the greatest lower bound is known as unification (*see* **Unification: Computational Issues; Unification, Classical and Default**), and it is attractive in linguistic settings because each word of a sentence can be viewed as contributing a part of the syntactic or semantic information that the entire sentence conveys. Any kind of agreement, between a subject and a verb, for example, or between an anaphor and its referent, is a prime candidate for a unification-based analysis, since each component of the agreement may only be constrained in its usage by part of the information that they together uniquely convey.

Unification is the fundamental operation performed by nearly every feature-structure-based application in linguistics, but it is often embedded into a number of different control strategies. HPSG uses constraints of the form $\forall\ F.F \sim \tau \rightarrow \phi$, where F is a description variable, τ is a type, and ϕ is a description (which usually contains a reference to F). These principles of grammar state that every F that has type τ or one of its subtypes must also satisfy the description ϕ. Every nondisjunctive description has a unique least-feature structure that it describes, called a 'most general satisfier,' and these constraints are enforced by unifying every τ-typed feature structure with the most general satisfier of ϕ. If ϕ is disjunctive, then the constraint is enforced by nondeterministically iterating through all of ϕ's nonunique minimal satisfiers, until one of them unifies with F.

Grammar formalisms such as HPSG that use these constraints to express principles of grammar are sometimes called constraint-based formalisms, but recognition in these formalisms is nearly always driven by a deductive backbone that the constraints merely augment. In the case of HPSG, that backbone is generally an extended phrase structure rule formalism in which every category is a description of a typed feature structure. Figure 11 provides an example of such a rule. In principle, variables can share structure not only within a single feature structure, but also

(*Mother* $\wedge$ *phrase* $\wedge$ SYNSEM:LOCAL:CAT:(HEAD:*Head* $\wedge$ SUBCAT:*MSubCat*)

$\Longrightarrow$ (*ArgDtr* $\wedge$ *non_word* $\wedge$ SYNSEM:*ArgSynSem*)

(*HeadDtr* $\wedge$ *phrase* $\wedge$ SYNSEM:LOCAL:CAT:(HEAD:*Head* $\wedge$ SUBCAT:[*ArgSynSem* | *M SubCat*]))

Figure 11 An extended phrase structure rule based on the head-subject schema from head-driven phrase structure grammar. Typed feature structure descriptions appear in place of phrase structure categories, and variables are shared across descriptions. The square brackets are a common shorthand for lists.

across daughters of the same rule, and between the mother and a daughter, as shown in Figure 11. Variable sharing in rules such as this is enforced by unification. It is also possible to embed typed feature structure descriptions into a logic programming language such as Prolog for a more flexible degree of control.

Typed feature structures have been used in every level of linguistic representation. Their oldest use in linguistics was in phonetics, for which, borrowing from work on category perception in psychology, they were used with only binary-valued (+/−) features to classify the basic phones of English. Unification played no major role here. Their widespread use in syntax began in the late 1970s with work by Martin Kay, who was interested in a data structure that would support unification more flexibly than the terms of standard first-order logic did. In morphological analysis, finite-state transducers are often extended to emit strings that encode feature structures in order to track agreement and other abstract properties at the morphology–syntax interface. They also figure very prominently in planning and semantics within restricted domains. Interlingua representations are mainly feature structures (*see* **Machine Translation: Interlingual Methods**).

See also: Anaphora Resolution: Centering Theory Approach; Boole, George (1815–1864); Chart Parsing and Well-Formed Substring Tables; Compositionality: Semantic Aspects; Discourse Markers; Frege, Gottlob (1848–1925); Generating Referring Expressions; Graph Theory; Human Language Processing: Symbolic Models; Inference: Abduction, Induction, Deduction; Intonation and Syntax; Jakobson, Roman (1896–1982); Language Processing: Statistical Methods; Lexical Semantics: Overview; Lexicon: Structure; Machine Translation: Interlingual Methods; Mathesius, Vilém (1882–1945); Modal Logic; Modularity; Morphology and Language Processing; Natural Language Understanding, Automatic; Parsing and Grammar Description, Corpus-Based; Parsing: Statistical Methods; Phonology: Optimality Theory; Quantifiers: Semantics; Rule Ordering and Derivation in Phonology; Semantics in Categorial Grammar; Sgall Petr (b. 1926); Speech Acts and Artificial Intelligence Planning Theory; Speech Synthesis; Syntactic Features and Feature Structures; Syntax of Words; Treebanks and Tagsets; Trubetskoy, Nikolai Sergeievich, Prince (1890–1938); Underspecification; Unification, Classical and Default; Unification: Computational Issues; Word Order and Linearization; Word Stress; X-Bar Theory.

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Syncategoremata

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The History of the Distinction

The medieval distinction between syncategorematic terms ('syncategoremata,' such as 'and,' 'or,' and 'not,' which merely combine other terms) and categorematic terms ('categoremata,' such as 'man,' 'Socrates,' and 'animal,' which can be predicated of things) dates back to the 6th-century grammarian Priscian, who in his *Institutiones Grammaticae*, who in his in turn, attributes the idea to certain 'dialecticians.' Syncategoremata were commonly recognized by Stoics and Neo-Platonics (Pinborg, 1972: 60). However, Peripatetic dialecticians could also take their cue from Aristotle's relevant remark on the copula (the verb 'is' or its equivalent, joining subject and predicate), when he says that it is in itself "nothing, but co-signifies some combination, which cannot be thought of without the components" (*On Interpretation*, 16b24–25). In any case, according to Priscian, the dialecticians he refers to characterized syncategoremata in a similar way: such terms merely cosignify, in contrast to verbs and nouns, which, when combined, make a complete expression. With the emergence of the distinctive logical and grammatical literature of the Middle Ages in the 12th century continuing through the late 15th and early 16th centuries, discussions of syncategoremata became part of the characteristic genres of this literature (Sweeney, 2002), in which our medieval colleagues developed ever more sophisticated characterizations of syncategorematic terms, their distinction from categorematic terms, their function, and their nature. According to Norman Kretzmann's (1982) periodization, we can distinguish the following main stages in the medieval career of syncategoremata:

1. Their emergence as the focal points of certain logical or semantic relationships or special problems of interpretation (in the 12th century, especially the latter half)
2. Their identification as a distinguishable set of topics worthy of development in separate treatises typically called syncategoremata (from the last quarter of the 12th century to the last quarter of the 13th century)
3. Their assimilation into general treatises on logic, sometimes as a group but sometimes dispersed in ways designed to associate particular syncategoremata with more general topics in logic to which they are appropriate
4. Their absorption into the sophisma literature (discussions of logical puzzles generated by problem sentences, the so-called 'sophismata'), in which a particular syncategorema may serve as the germ of a paradox the interest of which is often associated with metaphysics or natural philosophy more than with logic or semantics proper (from the first quarter of the 14th century to the disintegration of scholastic logic).

With the decline of scholastic logic, the logical treatises specifically devoted to syncategoremata or to sophismata focusing on the problems generated by syncategoremata became gradually extinct along with the rest of the characteristic logical literature of the Middle Ages. Yet, the distinction between categorematic and syncategorematic terms has never become entirely forgotten, and it keeps recurring in various guises also in modern philosophy. However, the most sophisticated accounts of the distinction are still to be found in the medieval literature, which is the focus of the rest of this article.

Syntactic and Semantic Criteria of Drawing the Distinction

It is interesting that Priscian's remark involved two different and by no means equivalent criteria for distinguishing syncategorematic and categorematic terms. On what may be called the 'syntactic' criterion, categorematic terms are those that can function as subjects or predicates of propositions so that their combination yields a complete proposition, whereas syncategorematic terms cannot be subjects or predicates. On the 'semantic' criterion, however, syncategorematic terms are those that merely cosignify (i.e., signify in combination with some other term) but that in themselves do not signify anything. Apparently, the syntactic criterion provides a good test for sorting various parts of speech into either of the two members of the division. However, even if the criterion works, it does not seem to provide a principled reason why certain parts of speech behave in one way or the other. The semantic criterion seems to provide such a reason, but as it stands, it is rather vague.

Indeed, on closer inspection even the syntactic criterion does not seem to fare much better. First, in the appropriate context any part of speech can be a subject or a predicate. For example, the preposition 'of' or the negation 'not,' which are certainly obvious candidates for being regarded as syncategorematic, can be used as subjects in the sentences '*Of* is a preposition' and '*Not* is a negation,' where they are

taken to stand for themselves (and other token phrases of the same type) or, as medieval logicians would put it, in 'material supposition.' (Cf. the modern distinction between mention and use.) Accordingly, later medieval authors sometimes refined the syntactic criterion by adding the requirement that syncategorematic terms are those that cannot be subjects or predicates when used 'significatively' (i.e., in their proper function) and not with the intent to take them for themselves. However, this refinement clearly indicates that the distinction primarily applies not to words per se but, rather, to their different uses. This point is further reinforced by the fact that parts of speech that on the simple syntactic criterion would be deemed syncategorematic in some of their uses can be subjects or predicates even when taken significatively. For instance, adjectives that cannot serve as subjects on their own can be predicates (e.g., contrast the grammatical 'A man is brave' with the ungrammatical 'A brave is a man'), and they can have substantive uses (in Latin marked by the neuter gender), in which they can even serve as subjects (as in the Latin sentence, *Album est coloratum* '[What is] white is colored,' but even in English we can say, 'Blue is a soothing color'). Furthermore, logicians, who were primarily interested in the semantic features of syncategoremata, would not regard adjectives and adverbs as syncategorematic without further ado.

Therefore, to distinguish such terms from syncategoremata pure and simple, they introduced a further distinction. The two most influential authors of the 13th century on this topic, William of Sherwood and Peter of Spain, both distinguished 'pure categoremata' (i.e., subjects and predicates) from their dispositions or determinations (Peter of Spain, 1992: 38–41; William of Sherwood, 1941: 48). However, they also distinguished those dispositions of subjects and predicates that belong to them insofar as they are subjects and predicates (such as 'signs of quantity,' i.e., quantifiers), the pure syncategoremata, and those dispositions that belong to the things that are signified by subjects and predicates regardless of the fact that they are subjects and predicates. The latter are just categorematic dispositions of pure categoremata, such as adjectives and adverbs. For example, in the proposition 'Every wise man is running,' the pure syncategorematic term 'every' is a determination of the subject term of this sentence in relation to the predicate, determining that the sentence is true only if the predicate applies to everything that falls under the subject. Thus, 'every' applies to the subject insofar as it is the subject of the predicate of this sentence. However, the determination 'wise' pertains to 'man' regardless of what the latter is subjected to and how. This determination merely determines that of all man only the wise are considered (i.e., those things that have the property signified by the adjective).

Thus, adjectives and adverbs, even in their purely adjectival or adverbial uses, on this criterion are no longer regarded as pure syncategoremata, even if they cannot be self-standing subjects or predicates. Rather, they are regarded as categorematic parts of complex subjects and predicates signifying the dispositions of the things signified by nouns and verbs, the principal parts of such complex subjects and predicates.

Further refinements of the distinction were provided by the nominalist philosophers of the 14th century (*see* **Nominalism**), such as William Ockham, John Buridan, and Albert of Saxony, with reference to their conception of a 'mental language,' a natural system of representation constituted by mental concepts, the mental acts of a human mind to which spoken or written parts of speech are systematically subordinated, rendering these spoken or written signs meaningful (*see* **Mentalese**). In this setting, any part of a spoken or written language is said to signify immediately the concept to which it is subordinated, and it is said to signify ultimately the object or objects conceived by means of the concept to which it is subordinated (Buridan, 2001: xxxiv–xli). However, since some concepts have only the function of combining simple concepts into complex ones (e.g., a mental copula or conjunction), or just to modify the representative function of other concepts (e.g., a mental term-negation), but in themselves do not have the function of representing any objects, such concepts themselves are syncategorematic in mental language. Thus, the purely syncategorematic terms of spoken or written languages will be those that are subordinated to such syncategorematic concepts.

For example, as Buridan (2001: 234) remarks,

> The copulas 'is' and 'is not' signify different ways of combining mental terms in order to form mental propositions, and *these different ways [of combining] are in their turn complexive concepts*. . . . And so also the words 'and,' 'or,' 'if,' 'therefore,' and the like designate *complexive concepts* that combine several propositions or terms at once in the mind, but nothing further outside the mind. These words are called purely syncategorematic, because they signify nothing outside the mind, except along with others, in the sense that the whole complex consisting of categorematic and syncategorematic words does signify the things conceived outside the mind, but this is on account of the categorematic words.

Buridan's younger contemporary, Albert of Saxony (1974: f. 2v), provides further clarification of what we should understand by the significative function of syncategorematic terms when he observes:

> If the terms 'every,' 'no,' etc. are taken materially, then they certainly can be subjects or predicates of propositions, as when we say 'Every is a universal sign,' or 'Or

> is a [disjunctive] conjunction,' or 'No is an adverb,' or 'And is a copulative conjunction.' For in these propositions these words are not taken significatively, since *they do not exercise the function [non exercent officium] which they were imposed to exercise*. So, in the proposition 'Every is a universal sign,' 'every' does not distribute anything, in 'No is an adverb,' 'no' does not negate anything, and likewise, in 'And is a copulative conjunction,' 'and' does not copulate anything; therefore, in these propositions these terms are taken not syncategorematically, but categorematically.

Therefore, syncategorematic terms, when they are taken significatively, are imposed to exercise the logical functions of modifying the semantic functions of categorematic terms with which they are construed on account of being subordinated to mental acts that exercise these functions on the mental level. Indeed, as Albert of Saxony (1974: f. 3r) notes, this is precisely the reason why in their significative function they cannot be subjects of predicates. Thus, Albert presents the semantic distinction on the mental level as the ultimate reason for the syntactic criterion of the distinction on the spoken level. Indeed, later medieval treatises (in the late 14th and early 15th centuries) on concepts and mental language, such as those by Thomas of Cleves, Paul of Gelria, or Peter of Ailly, draw the distinction as pertaining directly and primarily to acts of the mind. These authors describe 'mental categoremata' as being acts of conceiving of some objects, as opposed to 'mental syncategoremata,' which are rather different modes or ways of conceiving of the objects conceived by the former (Bos and Read, 2001: 14, 54–57, 96, 130; Peter of Ailly, 1980: 18–19; see also the previous quote from Buridan). From this characterization, and from the common medieval doctrine that the semantic functions of spoken and written terms are determined by the semantic functions of the concepts to which they are subordinated, we get as a simple corollary the usual semantic and syntactic features of (pure) syncategoremata, namely that they are cosignificative rather than significative on their own, and that taken significatively they cannot be referring terms of propositions.

Although the distinction drawn in these terms was not in vogue in early modern philosophy, it is significant that John Locke would characterize the parts of speech he calls 'particles' (but that his medieval colleagues would recognize as syncategoremata) as being "marks of some action or intimation of the mind" – that is, some mental operation on ideas of the mind (Locke, 1995: bk. IV, c. 7, n. 4). Later, Immanuel Kant would describe pure concepts of understanding as 'logical functions,' directly preparing the way for Gottlob Frege to describe quantifiers as 'second order concepts' (i.e., as concepts operating on concepts).

Philosophical Significance of the Distinction

Syncategorematic terms present a particular problem for those philosophers who would take the primary function of elements of a language to be the signs or names of things. For in the case of syncategorematic terms, we just do not seem to have obvious candidates among things in the world for these terms to name. Nevertheless, medieval realists, such as Peter of Spain or William of Sherwood, or the modistic grammarians of the 13th and 14th centuries, such as Thomas of Erfurt (for further references, see Zupko, 2003), who professed a close parallelism between *modi significandi* (modes of signifying), *modi intelligendi* (modes of understanding), and *modi essendi* (modes of being), assumed in their ontology certain modes of being or dispositions of things corresponding to the modes of signifying determined by modes of understanding conveyed by syncategorematic terms. Therefore, in this framework, syncategorematic terms do have counterparts in reality: the modes or dispositions of things that 'prompt' us to conceive of and hence signify things in certain ways.

Although these philosophers, logicians, and grammarians were careful to attach only a certain diminished degree of reality to these dispositions, nevertheless, it was precisely their 'ontological liberalism' that prompted William Ockham and his nominalist followers discussed previously to identify syncategoremata primarily with the mental acts modifying the representative function of categorematic concepts. For in this nominalist framework, syncategorematic terms simply have no extramental counterparts: the complex expressions they form with categorematic terms signify only the things signified by the categorematic terms, but in different ways. Thus, for example, as Buridan explicitly concluded, the proposition 'God is God' and the proposition 'God is not God' signify extramentally exactly the same thing as the term 'God' does, but this does not render these expressions synonymous; they signify the same thing differently because of the different syncategoremata signified by them in the mind (Buridan, 2001: 234). This is how late-medieval nominalists were able to have a parsimonious ontology along with a sufficiently 'fine-grained' semantics, by making the necessary semantic distinctions on the conceptual and not on the ontological level.

In addition to these and similar ontological considerations, the reinterpretation of the medieval distinction had even more far-reaching consequences in

early modern and modern philosophy with Kant's reclassification of a number of traditional metaphysical concepts, such as substance and accident, cause and effect, existence, necessity, and possibility, as concepts of pure understanding – that is, as logical functions or syncategoremata. Kant's considerations, especially those concerning existence, directly paved the way for Gottlob Frege's analysis of the notion of existence as a second-order concept, the existential quantifier, which in turn could immediately be exploited by the anti-metaphysical program of logical positivists, such as Rudolf Carnap (1959). Accordingly, without the recent reevaluation of the concepts of existence, possibility, and ontological commitment in the framework of modern possible-worlds semantics, metaphysics probably still could not be regarded as the legitimate philosophical subject in analytic philosophy it has become in the past few decades. As even this example shows, our actual understanding of the medieval distinction still has fundamental significance in our considerations concerning the relationships between language, thought, and reality.

See also: Concepts; Mentalese; Nominalism; Nominalism; Objects, Properties, and Functions; Semantic Value.

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Synchronic and Diachronic Variation

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Background

This article discusses alternative ways of saying the same thing, and the generalizations that apply to this linguistic variation both at present and across time. It is the alternative expressions available at a given time that provide the foundations for processes of language change.

Generally speaking, language can be analyzed both synchronically, as it is at a particular point in time, and diachronically, as it changes across time. Introducing these terms in his *Cours de linguistique générale* (1916), Ferdinand de Saussure notes: "Everything that relates to the static side of our science is synchronic; everything that has to do with evolution is diachronic" (de Saussure, 1916 [1978: 81]).

The historical study of language also presupposes the study of periods of time understood as synchronous and therefore static. An individual speaker, de Saussure maintains, is always confronted with language as a state. More recently, however, sociolinguistic research has shown that language existing at a particular time need not be viewed as static and invariant. This supports the everyday observation that the same meaning can be expressed in various ways under different circumstances. Alternative expressions are most obvious in vocabulary. In English we can choose, for instance, between *answer* and *reply*, *courteous* and *polite*, or *mobile* and *cell phone*. Syntactic

early modern and modern philosophy with Kant's reclassification of a number of traditional metaphysical concepts, such as substance and accident, cause and effect, existence, necessity, and possibility, as concepts of pure understanding – that is, as logical functions or syncategoremata. Kant's considerations, especially those concerning existence, directly paved the way for Gottlob Frege's analysis of the notion of existence as a second-order concept, the existential quantifier, which in turn could immediately be exploited by the anti-metaphysical program of logical positivists, such as Rudolf Carnap (1959). Accordingly, without the recent reevaluation of the concepts of existence, possibility, and ontological commitment in the framework of modern possible-worlds semantics, metaphysics probably still could not be regarded as the legitimate philosophical subject in analytic philosophy it has become in the past few decades. As even this example shows, our actual understanding of the medieval distinction still has fundamental significance in our considerations concerning the relationships between language, thought, and reality.

See also: Concepts; Mentalese; Nominalism; Nominalism; Objects, Properties, and Functions; Semantic Value.

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Synchronic and Diachronic Variation

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Background

This article discusses alternative ways of saying the same thing, and the generalizations that apply to this linguistic variation both at present and across time. It is the alternative expressions available at a given time that provide the foundations for processes of language change.

Generally speaking, language can be analyzed both synchronically, as it is at a particular point in time, and diachronically, as it changes across time. Introducing these terms in his *Cours de linguistique générale* (1916), Ferdinand de Saussure notes: "Everything that relates to the static side of our science is synchronic; everything that has to do with evolution is diachronic" (de Saussure, 1916 [1978: 81]).

The historical study of language also presupposes the study of periods of time understood as synchronous and therefore static. An individual speaker, de Saussure maintains, is always confronted with language as a state. More recently, however, sociolinguistic research has shown that language existing at a particular time need not be viewed as static and invariant. This supports the everyday observation that the same meaning can be expressed in various ways under different circumstances. Alternative expressions are most obvious in vocabulary. In English we can choose, for instance, between *answer* and *reply*, *courteous* and *polite*, or *mobile* and *cell phone*. Syntactic

structures similarly have variant realizations: *there are apples in the bowl/there's apples in the bowl*, *I don't want anything/I don't want nothing*.

The systematic study of synchronic linguistic variation goes back to the rise of sociolinguistics in the 1960s. In studies of linguistic variation, the variant forms expressing the same meaning constitute a linguistic variable. Since these variants have the same basic content, the choice of one over another is not made on semantic grounds. The variant forms typically correlate with other linguistic elements and external variables such as the speaker's age, sex (often viewed in terms of the social notion of gender), social class or other group membership, and register or contextual style.

Since variation in pronunciation readily fulfills the requirement of semantic equivalence, it has received by far the most attention in sociolinguistics. A much studied issue in Englishes around the world is the realization of the suffix *-ing* (as in *singing*, *dancing*) or, using sociolinguistic notation, the (ing) variable, which can be pronounced either with a velar nasal [ŋ] or an alveolar nasal [n]. Syntactic variables (such as the *was/were* and multiple-negation variables illustrated above) have also attracted research, as has morphological variation, including issues such as the choice between the two-part negator *ne* ... *pas* and simple *pas* in French.

Morphophonemic variation is of particular interest in languages with a rich inflectional system such as Finnish, in which reduced forms can alternate with full ones. This happens, for instance, with the first- and second-person pronouns *minä* 'I' and *sinä* 'you', which in colloquial speech are reduced to [mæ] and [sæ], respectively. In historical studies, phonological variation often falls outside the scope of empirical research, and morphological and syntactic alteration are investigated even in a language such as English, which shows a sharp reduction in inflectional variation over the centuries.

Lexical variation has received less attention by sociolinguists, partly since it may not always be easy to show that two or more words have precisely the same meaning. Another reason for sociolinguists' relative lack of interest in lexical variation may be their concentration on variation within localized dialects. By contrast, there is a long tradition in the study of lexical variation in dialectology, which has produced dialect atlases mapping regional dialect forms, especially in languages spoken in Europe or of European descent. In recent years, lexical variation has found a place in sociolinguistic studies of language and dialect contact. They explore issues ranging from the choice between *running shoes*, *runners*, and *sneakers* or between *soft drink* and *pop* in Canadian English to the number of loan words from Arabic, French, and English in Wolof speakers' vernacular usage in Senegal.

Variation in discourse patterns has also been studied by sociolinguists to some extent, although the notion of a linguistic variable as a choice between variant forms is not always directly applicable to discourse. Many studies have instead focused on the frequency of use by different social groups, e.g., men and women, of forms such as tag questions and other pragmatic expressions (e.g., *tu sais*, *vous savez*, *n'est-ce pas* in French, and *you know*, *you see*, *I mean* in English). Larger issues such as gender and social class differences in the use of politeness strategies and speech styles have also been reported.

Sociolinguistic research has come of age in that it has produced some major generalizations about linguistic variation across languages and language communities robust enough to qualify as sociolinguistic facts. Most of the facts about linguistic variation discussed below present discoveries made within the quantitative paradigm. This branch of sociolinguistics is also known as variation theory because it analyzes linguistic variation and as correlational sociolinguistics because it connects linguistic and social variation. The use of the term 'social' is here applied to a whole range of external factors that are found to correlate with linguistic variation. More recently, the term 'social dialectology' has come to be used to mark the close relation between sociolinguistics and traditional dialectology – after all, both fields investigate linguistic variation.

This article also views sociolinguistic facts from a diachronic perspective. It shows that these generalizations based on present-day data hold for the past and can be demonstrated for earlier stages of historically well-documented languages. For reasons of space, and reflecting the amount of empirical research available, most of the historical illustrations come from English. A seminal work in the field is Suzanne Romaine's monograph *Socio-historical linguistics* (1982), which discusses relativization strategies in Older Scots as a case of synchronic variation sensitive to register differences. The genres studied by Romaine included official and legal prose, literary and epistolary prose, and verse of different kinds. A few more words will be said about historical variation studies before comparing the present with the past.

Historical Sociolinguistics

In recent years, historical sociolinguists have put the general findings made on present-day linguistic variation to the test of time. The basic assumption for doing so is based on a uniformitarian notion, which can be formulated as follows: "the principles

governing the world . . . were the same in the past as they are now" (Lass, 1997: 25).

Language change presupposes variation. It can therefore be argued that since human languages have changed, they must have varied in the past. However, the uniformitarian notion does not license any direct application to the past of modern sociolinguistic constructs such as social class. It merely implies that since social variation and interaction pattern with linguistic variation today, we have every reason to expect that to have been the case in the past as well. What the patterns themselves were remains an empirical issue. The empirical study of sociolinguistic facts of the more remote past is confined to languages with a written history that gives access to variable linguistic data. For the majority of the world's languages, such data unfortunately do not exist. For most European vernaculars, reconstructing language use in its social context is a question of time depth: even the late medieval sources may often be too fragmentary to provide a reliable basis for sociolinguistic investigations.

As far as English is concerned, the situation begins to look brighter from the 15th century onward when full vernacular literacy, the ability to both read and write, starts to spread outside professional circles. According to David Cressy's study based on people's ability to sign their names, an average of 10% of men and 1% of women could both read and write in England in 1500. By 1700, the corresponding figure had risen to 40% for men and 25% for women. As literacy studies give an idea of the kind of people whose language has been recorded in writing, they constitute a vital part of the historical research relevant for sociolinguists. A deeper understanding of the social circumstances of the past is provided by research into social, economic, cultural, and demographic history. The scholarship in these fields is of course limited by the data sources available but less so than in historical linguistics, where actual language data are required.

What was written and, more importantly, what has survived from the later Middle Ages onward is nevertheless quite impressive. A long diachronic continuity can be traced for vernacular genres such as statutes, a vast array of documents of different kinds, religious and secular instruction, the Bible, medical and other scientific writings, chronicles and histories, fiction and drama, and personal correspondence. Structured, computerized collections of texts (corpora) that contain chronological data from different time periods have proved invaluable for historical sociolinguistics.

Electronic corpora make it comparatively easy to obtain quantitative data on linguistic variation. Below is a computer-generated list (concordance) that presents all instances of the two alternative subject forms, *ye* and *you*, of the pronoun *you* that Thomas Elyot uses in a passage of *The Governor* (1531), one of the texts included in the *Helsinki Corpus of English Texts*. Each line begins with information encoded in the electronic text, which here includes the period of writing (E1 = 1500–1570) and a page reference to the source text. The sample concordance shows that in this passage the author preferred the traditional subject form *ye* in 10 cases out of 14 but also used the incoming form *you* four times.

E1 150: in this wise; Be **you** angry and loke that
E1 150: and loke that **you** sinne nat. And
E1 151: trespas, or, if **ye** do nat, strike me
E1 151: of the booke that **ye** wrate. And diuers
E1 153: howe worthy had **you** ben (if god had
E1 153: a christen prince, **ye** mought haue showed
E1 154: treasure suppose **ye** shulde I nowe haue,
E1 154: and kept money as **ye** exhorte me to do?
E1 154: said Cyrus, sende **ye** some man, whom ye
E1 154: ye some man, whom **ye** best truste, with
E1 155: P155 loke that **ye** take me for a man
E1 155: accounte, if **ye** can, how moche
E1 155: said, Howe thinke **you**, Cresus, haue I nat
E1 155: I nat tresure? And **ye** counsailed me that

Corpora consisting of many genres such as the *Helsinki Corpus* provide information on usage-based differences in language variation and change. In recent historical sociolinguistic work, this information is supplemented by designing corpora that enable the study of user-based variation. Personal letters, in particular, supply material produced by individuals whose life-histories have also been recorded for posterity. Material like this allows the correlation of language variation with speaker variables. One such resource is the *Corpus of Early English Correspondence*, compiled for the study of the social embedding of language change in Renaissance English.

Sociolinguistic Facts

Linguistic Variation Is Not Categorical

Perhaps the broadest generalization that can be made based on modern sociolinguistic research is that links between linguistic variables and other variables correlating with them are probabilistic (more or less) rather than categorical (either present or absent). The use of the (ing) variable is probabilistic, firstly, because English speakers use both the alveolar and the velar variant and, secondly, because they do so to varying degrees. There is no change under way, as neither variant appears to be gaining ground at the expense of the other. The fact that the social and linguistic embedding of variant forms in general is a

matter of more or less also provides the key to understanding the diffusion of linguistic changes across time and speech communities.

Present-day sociolinguists use an apparent-time construct to capture real-time change under way. The apparent-time model is based on the finding that alternative expressions for the same thing coexist in varying proportions in different speaker generations. When there is a change in progress, incoming and outgoing variants are both found in the speech community, but younger speakers typically show higher frequencies of the incoming form and older speakers lower. Analyzing the frequencies of the variants from different age-groups reveals the spread of the incoming variant, which can be depicted by an S-curve (see below).

Often changes are slower than can be measured using the apparent-time model. The basically probabilistic nature of linguistic variation and the gradualness of change can be captured when the linguistic variable is plotted diachronically against the external variable of real time. Figure 1 presents the replacement of the traditional subject pronoun *ye* by the object form *you* in 16th-century English. The data come from the *Corpus of Early English Correspondence*. The historical subject form *ye* prevails until the 15th century, but *you* is already attested in the data. It begins to spread in the first half of the 16th century, and the process accelerates in the second half, reaching completion at the beginning of the 17th century, when *you* has replaced *ye* in the material. The process forms an S-curve across time. The probabilistic nature of linguistic variation prevails, however marginally, even with completed changes such as this one, as the earlier form continues to occur in archaic contexts such as the Christmas carol 'Oh, come all *ye* faithful.'

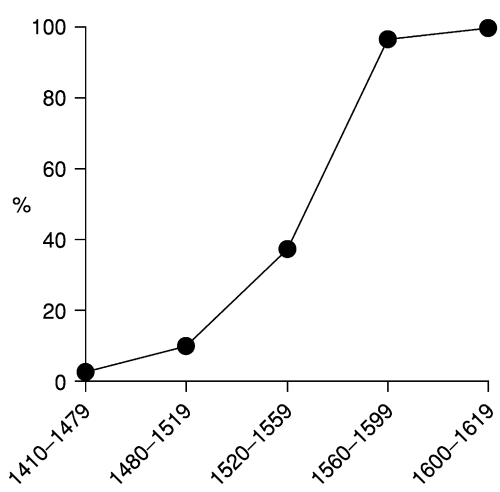

Figure 1 Replacement of subject *ye* by *you*. Frequency of *you* between 1410 and 1620. Adapted from Nevalainen and Raumolin-Brunberg (2003: 60) with permission.

Many Factors Govern Linguistic Variation

Being probabilistic, a linguistic variable may be sensitive to a whole range of other variables, linguistic and social, each exerting a different degree of influence on how it is realized. The (ing) variable is typically represented by the alveolar [n] in the speech of working-class groups but frequently by the velar [ŋ] in the speech of middle-class groups, for instance, in Trudgill's Norwich study (1974). The alveolar variant is favored in casual speech and the velar one in formal styles. Similarly with linguistic factors, [n] is more common when (ing) is a verbal suffix, but [ŋ] tends to persist when it is part of a noun, as in *icing* or *ceiling*. Sociolinguists make use of multivariate statistical tools such as VARBRUL to measure the varying impacts of social, stylistic, and linguistic factors such as these on the choice of variant forms.

Differences in sensitivity to other factors can also be seen when a linguistic variable is not stable but is undergoing change: the process is completed by certain groups of speakers and in certain contexts earlier than in others. This process could be visualized by tracing the change in each context separately. Figure 2 illustrates how the final nasal was progressively lost in the English determiners *mine* and *thine*, which were shortened to *my* and *thy* between the 14th and the 17th centuries. The change was first completed in contexts where the determiner preceded a noun beginning with a consonant; next came nouns beginning with <h>, and

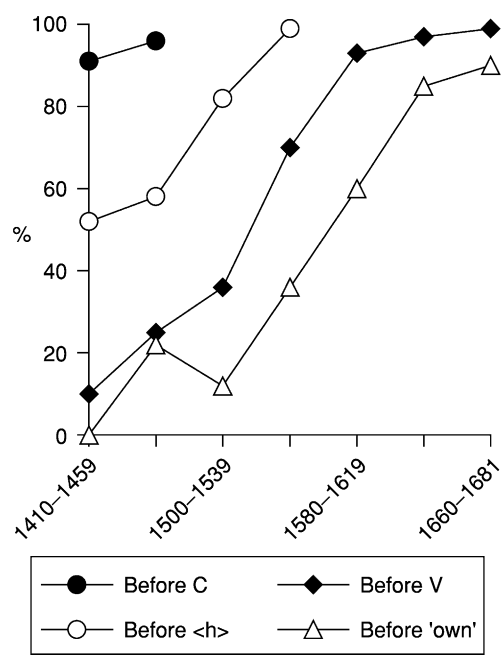

Figure 2 Replacement of *mine/thine* by *my/thy*. Frequency of *my/thy* in four contexts between 1410 and 1681. Adapted from Nevalainen and Raumolin-Brunberg (2003: 62) with permission.

then vowel-initial nouns. *Mine* and *thine* prevailed longest before *own*.

Linguistic Variables Are Socially Unique

Linguistic variables are sensitive to other factors, both linguistic and social, in different ways, which make them socially unique. The social profiles of linguistic variables are unique in that no two variables are exactly identical in terms of their linguistic and social embedding. There are a large number of factors that can pattern with people's linguistic choices. They range from the speaker's domicile, gender, age, and ethnicity to their socioeconomic class and social-group memberships and to style and register.

Frequent use of a particular linguistic form may be indicative, say, of social class in one speech community but not necessarily in another. This is the case of the English (r) variable, the pronunciation of postvocalic /r/ in words like *fourth* and *floor*. It is pronounced in most varieties of American English, but variation prevails, for instance, in New York City, where (r) is usually pronounced by higher status groups but less frequently by lower. This does not, however, mean that socioeconomic status is not a relevant variable in /r/-pronouncing communities. The distinction between higher and lower status groups can be indicated by other linguistic variables, such as (ing) and multiple negation (as in *I don't want nothing*).

The relevant social factors themselves can also be expected to vary from one speech community to the next, and combine in different ways. Distinctions based on region, for instance, are marked in the English spoken in England but less clear-cut in Australia. In practice, the social and pragmatic details of actual variation may be impossible to capture in fine detail, but the general point about the social uniqueness of linguistic variables emerges even with a limited number of social factors and also characterizes processes of language change. Moreover, there is no predictable connection between the outcome of a linguistic change and the scatter of social factors determining its course.

This generalization basically also applies to linguistic changes that diffuse from their region of origin across the language community. The use of *you* as a subject form started to spread from London in the 16th century, and it was promoted by the City and the Royal Court alike. In contrast, the short determiners *my* and *thy* spread from the north of England, and when they reached the capital they first gained ground among the merchants in the City of London, but took more time to make their way to the Court. These two examples illustrate differences in the regional and social embedding of two changes whose time courses partly coincided, although the diachronic trajectory of *my* and *thy* was less steep than that of *you*. That their histories are unique is also accentuated by the fact that their diffusion has been traced in personal letters produced by the same sets of informants: people and groups of people participated in ongoing changes to different degrees in the past, just as they do today.

Linguistic Variation Shows Gender Differences

The notion of social uniqueness applies to the combination of social factors associated with linguistic variables. It does not imply that certain individual factors could not have a similar effect on language variation and change at the macro level. The sex (or, in social terms, gender) of the speaker has often been found to account for linguistic variation better than social class. Gender differences are linked with linguistic prestige in numerous studies across languages as diverse as Arabic, Canadian French, Finnish, Persian, Spanish, and Mandarin Chinese. For stable linguistic variables that vary according to social class – such as (ing) and multiple negation in English – these studies show that women regardless of age and social status favor standard or supralocal forms, whereas men typically display higher frequencies of nonstandard or local forms. For this generalization to apply, however, both sexes must have access to the same linguistic repertoires: if women do not have the same educational opportunities as men, they cannot acquire the same prestige forms.

Gender differentiation also emerges diachronically, in language change. It is typically the case that women more readily than men promote incoming forms if these forms are associated with the standard or a wider, supralocal usage. Men, by contrast, tend to retain local forms (and therefore make good informants on local or regional usage). The innovative role of women in language change appears, for instance, in New Zealand English, where the success of phonological innovations, both prestige and vernacular, has been attributed to their first being adopted and endorsed by women. Taking an example from a non-Indo-European language, predictable gender differences also emerge in the morphophonemic changes that have been in progress over the last few decades at Virrat, a small rural town in Finland: women led all eight changes studied tending toward the norms of standard Finnish.

Similarly, women proved to be the leaders of 11 out of the 14 historical changes investigated in Renaissance English. The changes were all processes of supralocalization, and included the rise of the subject form *you* and the short determiners *my* and *thy* discussed above. However, they also included the

disappearance of multiple negation, that is, the replacement in negative clauses of combinations such as *not* … *no/never* by *not* … *any/ever*. In personal letters, this process could be traced back to the 16th century, and it was systematically led by men. At the time, women did not have the same opportunities for formal education as men, and for this reason could not spearhead changes that had their origins in formal registers of language use. Women emerged as the leaders of those changes that took place outside learned or professional language use, and so were instrumental in shaping the supralocal vernacular of their time.

Some of the patterns of discourse variation detected in modern synchronic research have also been replicated for the past. This is the case of markers of personal involvement such as first- and second-person pronouns, modal auxiliaries, and first-person evidential verbs (*assume*, *believe*, *doubt*, *find*, *guess*, *suppose*, *think*, etc.). Just as today, these features were used more frequently by women than by men in the 17th century. Women were found, for instance, to use *I think* more in all recipient categories investigated: when writing to their nuclear family members (parents, children, and spouses), to other family members, to close friends and to other, more distant recipients.

Variation Is Sensitive to Macro- and Micro-level Factors

Linguistic variables are susceptible not only to global factors such as the speaker's social class, age, gender, ethnicity, and geographical location but also to social networks and other local variables. Linguistic indexing of local social practices is an everyday experience. Institutional settings, for instance, may give rise to the formation of groups characterized by linguistic ingroup indicators. A study of an American high school identified two groups of students: those who had a positive attitude to school and its activities and those who actively dissociated themselves from school values. These group memberships were found to correlate with linguistic variation better than social class distinctions.

A number of social network analyses have been carried out, ranging from Australian Aboriginal adolescents and the inhabitants of an Austrian Alpine village to three working-class communities in Belfast and rural migrants to a Brazilian city; from British black adolescents and an island community in French West Indies to inner-city Detroit African-Americans and Melanesians in New Caledonia. A person's social network represents the sum total of the relationships he or she has contracted with other people. Some predictions can be made on the basis of social network structures concerning linguistic variation. Loose-knit networks, arising from contacts people contract with a variety of individuals, promote linguistic diversity and facilitate change. Language maintenance, in contrast, is fostered by networks in which people have many contacts with the same individuals in their different capacities, for instance, as neighbors and workmates.

Close-knit networks are easier to reconstruct for the past than loose-knit ones, where much of the necessary ethnographic information may not be available. A historical example of a close-knit network is the late 10th century Winchester School, a monastic community, which exerted a direct impact on Old English religious vocabulary. A case in point is also the *Spectator* magazine circle centered around Joseph Addison, which set a model for prose style in early 18th-century England.

Loose-knit social networks contribute to cities being typically the centers from which linguistic features diffuse to other localities. This is the case today with phonological variables such as the Northern Cities Shift, a series of related vowel changes associated with urban speech in the northern United States. In England the merger of initial fricatives such as /θ/ and /f/ in *thin* and *fin* has spread from London to other cities. It has been recorded in Norwich in East Anglia, in Sheffield, Derby, and Middlesbrough in the north of England, and even in Glasgow in Scotland.

The historical role of cities as centers of linguistic innovation and dialect leveling is also well documented. Most changes that have been studied empirically and that spread throughout England in the Renaissance period were promoted either by the City of London, the Royal Court or by both, or were given new impetus for their supralocalization by the capital. Paris displays a similar trend. Dialect leveling took place in the French capital early on due to immigration and dialect contact, and the élites sought to distinguish their language from that of the lower ranks. Parisian French started to make its way to other parts of France in the late Middle Ages. In Japan, the dominant center of political and cultural influence shifted from the Kyoto region in the west to Edo (present-day Tokyo) in the east in the 17th century, and the focus of linguistic prestige shifted accordingly. Modern Tokyo continued as the center from which standard literary forms spread to the rest of country.

Reflecting urban mobility and weak network ties, linguistic innovations can easily travel from one urban center to another. Uvular /r/ is reported to have jumped even across language boundaries in western Europe. In France it is traced back to the Royal Court in the 17th century, from which it moved to such urban centers as Bordeaux, Marseille, and Toulouse, but also found its way to the Dutch spoken in the Hague, to the German spoken in Cologne and Berlin, to Danish in

Copenhagen and Norwegian in Bergen. It reached Copenhagen in the late 18th century and the south of Sweden at the end of the 19th century. Innovations like this can bypass the countryside between urban centers: apical /r/ is still found in French regional dialects in the speech of the oldest generation.

The Principle of Contingency

One of the major findings of modern sociolinguists is that each linguistic variable is in principle socially unique. Whatever the speakers' motives that give rise to synchronic variation are, this variation provides the prerequisite for language change. It follows from these premises that linguistic changes have no single path of transmission but can pattern differently even with respect to the same social factors. This indeterminacy also extends to the relationship between linguistic and social factors in language change: "Factors determining the course of linguistic change are drawn from a pattern of social behavior that is not linked in any predictable way to the linguistic outcome" (Labov, 2001: 503). Put differently, Labov's Principle of Contingency states that the linguistic details of changes in progress are basically independent of their social embedding.

See also: Accent; Age: Apparent Time and Real Time; Corpora in Studies of Variation; Dialect Atlases; English, Early Modern; Gender and Language; Gender, Grammatical; IN/ING Variable; Interactional Sociolinguistics; Migration and Language; Panel Studies and Language Variation; Particles in Spoken Discourse; (R) as a Variable; Social Class and Status; Sociolect/Social Class; Spatial Variation (Geolinguistics); Standard and Dialect Vocabulary; Statistical Testing of Variation; Style and Style Shifting; Syntactic Variation; Variation and Formal Theories of Syntax, Chomskyan; Vernacular.

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Syncretism

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Definition

The term **syncretism** refers to the situation where a single inflectional form corresponds to multiple morphosyntactic feature values. The Old Irish noun paradigm in **Table 1** illustrates some representative instances.

Old Irish distinguishes five values for case (nominative, accusative, genitive, dative, vocative) and three values for number (singular, dual, plural). Multiplying out the logical possibilities yields a grid of 15 case-number distinctions (NOM SG, ACC SG, etc.). However, because of syncretism in the paradigm, there are only five distinct forms: *fer*, *firu*, *feraib*, *fir*, and *fiur*. There is syncretism of case (ACC/VOC PL *firu*), of number (DU/PL DAT *feraib*), as well as forms which combine different case and number values (*fir* serves for GEN SG and NOM PL, *fer* serves for NOM/ACC/VOC SG, ACC/GEN/VOC DU, and GEN PL).

In practice, most observers require some language-internal evidence that a particular morphosyntactic distinction is morphologically relevant in order to identify syncretism. For example, a value which is syncretic in one morphosyntactic context may be distinct in another, as with nominative and accusative in Old Irish, which are syncretic in the singular and dual but not in the plural. Or they may be syncretic in one lexeme but not in another; thus, nominative and accusative are syncretic in the singular of *fer*, but distinct for some other Old Irish nouns, e.g., *tuath* 'nation.NOM.SG,' *tuaith* 'nation.ACC.SG.'

Table 1 Declension of Old Irish 'man'

	SG	*DU*	*PL*
NOM	fer	fer	fir
ACC	fer	fer	firu
GEN	fir	fer	fer
DAT	fiur	feraib	feraib
VOC	fir	fer	firu

The significance of syncretism lies in what it can tell us about the structure of morphosyntax and morphology. If one holds that identity of form is a reflection of identity of function, then syncretism provides evidence for otherwise hidden aspects of feature structure. For example, the fact that dual and plural are collapsed in the form *feraib* might be used to show the relevance of a number value 'nonsingular,' which is in turn subdivided into dual and plural. On the other hand, some syncretic patterns involve the collapse of functionally incongruent values (e.g., GEN SG and NOM PL *fir*), and may be used to argue that morphological structure is independent of morphosyntactic structure.

Development of the Notion

The term *syncretism* applied to language first turns up in August Pott's (1836) *Etymologische Forschungen auf dem Gebiete der Indo–Germanischen Sprachen* [Etymological investigations on Indo–Germanic languages], where it is used in both a synchronic sense (as outlined above) and a diachronic sense, i.e., where originally distinct inflectional forms have fallen together over time. In the course of the 19th century, syncretism was largely treated as a diachronic problem, culminating in Delbrück's (1907) study of case syncretism in the Germanic languages. In the 20th century, the synchronic dimension came to the fore, starting with Jakobson (1936) and Hjelmslev (1935–1937), who developed the idea that syncretism could be used to explore the inner workings of morphosyntactic features. Syncretism continues to play a significant role in the construction of contemporary models of morphology, such as Network Morphology (Evans *et al.*, 2001), Paradigm Function Morphology (Stump, 2001), and Distributed Morphology (Noyer, 1997).

Typology

Although syncretism might be seen as deviation, a violation of a straightforward mapping of grammatical function onto morphological form, it is nevertheless endemic in inflectional systems. It is prob ably fair to say that, if a language has inflectional

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Table 2 Third person possessive pronoun in Laal (Boyeldieu, 1982: 14)

	SG	*PL*
MASC	ðā:r	ðè:rí
FEM	ðò:g	ðè:rí
NEUT	ðà:ná	ðuà:ná

Table 3 Third person gender–number prefixes in Seneca (Chafe, 1997: 563)

	SG	*DU*	*PL*
MASC	ha-	hni-	hati-, hęn-
FEM	ye-	kni-	wati-, węn-
NEUT	ka-, w-, y-	kni-	wati-, węn-

morphology, it is likely to display syncretism. The most commonly affected features, crosslinguistically, are case, person, gender, and number.

Case syncretism most typically affects the core cases used to express subject and object. One pattern involves collapse of core case distinctions, as in the nominative/accusative syncretism of Indo–European neuters (compare the neuter form of the Latin adjective 'good,' *bonum*, which combines nominative and accusative, with the masculine, which has a separate form for nominative, *bonus*, and for accusative, *bonum*). The same pattern may also occur in ergative ~ absolutive systems. For example, in the Daghestanian language Tsakhur (Kibrik, 1999), pronouns have absolutive/ergative syncretism (e.g., *zɨ* 'I.ERG/ABS'), while nouns maintain distinct forms for these two cases (e.g., *baIčar* 'idiot.ABS,' *baIčar-ē* 'idiot.ERG').

Cross-linguistically, there is often a correlation with animacy: high animacy arguments favor maintenance of a distinct object case form, while low animacy arguments favor a distinct agent case form. (Animacy here is broadly construed, with number, word class, person, and specificity also playing a role.) Both these tendencies are manifested in so-called split ergative languages. The other major pattern of case syncretism involves the collapse of one of the core cases (typically accusative or ergative) with some noncore case, as in the well-known accusative/genitive of the Slavic languages (e.g., Russian *eë* 'her.ACC/GEN' vs. *žen-u* 'wife-ACC,' *žen-y* 'wife-GEN') or the ergative of the Chukotko–Kamchatkan language Koryak (Žukova, 1972), which is syncretic with the locative for nouns which denote specific human individuals (*anjana-k* 'grandmother-ERG/LOC' vs *anja-ta* 'a grandmother-ERG,' *anja-k* 'a grandmother-LOC'). Finally, case syncretism between non-core cases is also found (especially in Indo–European languages), but the patterns tend to be language-specific, in keeping with the varied repertory of noncore cases cross-linguistically.

Syncretism of person most often affects nonsingular values, typically combining first and second or second and third person. For example, the Chibchan language Ika (Frank, 1990) has 1PL/2PL syncretism (e.g., *a-tšuana* 'we/you.PL saw'), while the Papuan (Trans-New Guinea phylum) language Amele (Roberts, 1987) has 2PL/3PL syncretism (e.g., *feigan* 'you.PL/they saw'). Where verbs mark both subject and object, one often finds the collapse of subject person distinctions in the presence of certain object values. For example, in the Papuan (Sepik–Ramu family) language Yimas (Foley, 1986), second and third person singular subject are distinct in intransitive verbs, but syncretic in transitive verbs with a third person object, e.g., *nan-tayŋcut* 'you.SG/he see(s) him' versus *ma-wat* 'you.SG want,' *na-wat* 'he wants.'

Gender syncretism shows a decided tendency to affect nonsingular values. For example, in Laal, an unclassified language of Chad (Table 2), masculine and neuter are syncretic in the plural; in the Iroquoian language Seneca (Table 3), feminine and neuter are syncretic in the plural; and in the Nilotic language Turkana (Table 4), masculine and neuter are syncretic in the dual and plural (the alternative forms are for [±RESTRICTIVE], a feature akin to definiteness).

Number syncretism shows a decided tendency to unite nonsingular values. For example, in the Australian language Bininj Gunwok (Gunwinyguan family; Evans, 2003), pronominal prefixes regularly distinguish three number values, while free pronouns distinguish only two: compare the subject prefixes *ngi-* '2SG,' *nguni-* '2DU,' *ngurri-* '2PL' with the free pronouns *ngudda* '2SG' and *wudda* '2DU/PL.'

It should be noted, however, that purely language-specific patterns of syncretism are also common. In part, these can be traced to the morphologization of originally accidental patterns of homophony. For example, Kuryłowicz (1949) attributes the syncretism of second and third person singular in the Old Scandinavian present tense indicative verb conjugation to the analogical extension of a pattern that originally appeared in one class of verbs as the result of regular sound change.

Formal Issues

To describe syncretism in a morphological analysis, two approaches are possible, underspecification and stipulation.

With underspecification, the morphological exponent is undefined for some feature, and so is compatible with multiple values of that feature. Consider

Table 4 Gender–number prefixes in Turkana (Dimmendaal, 1983: 217) (restricted, unrestricted)

	SG	PL
MASC	e-, lo-	ŋi-, lu-
FEM	a-, na-	ŋa-, na-
NEUT	i-, ni-	ŋi-, lu-

Table 5 Latin second declension (singular)

	Masculine 'slave'	*Neuter 'war'*	*Neuter 'crowd'*
NOM SG	serv-us	bell-um	vulg-us
ACC SG	serv-um	bell-um	vulg-us
GEN SG	serv-ī	bell-ī	vulg-ī
DAT/ABL SG	serv-ōō	bell-ōō	vulg-ōō

gender syncretism, as illustrated in Table 2, Table 3, and Table 4. We might treat gender as a composite of two subfeatures, [±HUMAN] and [±MASC], where masculine = [+HUMAN, +MASC], feminine = [+ HUMAN, −MASC], and neuter = [−HUMAN, −MASC]. The masculine/feminine syncretism seen in Laal could thus be described by saying that the form *δè:rí* is underspecified for [±MASC]. In this use of underspecification, syncretism is a direct mirror of the natural class represented by [+HUMAN]. Alternatively, underspecification can be used to generate 'elsewhere' forms. For example, the masculine/neuter syncretism of Turkana might be described by saying that the prefixes *ŋi-* and *lu-* are underspecified for both [±HUMAN] and [±MASC], while the prefixes *ŋa-* and *na-* are fully specified as [+HUMAN, −MASC]. In this approach, *ŋi-* and *lu-* are simply default plural prefixes used to fill out the undefined portions of the paradigm; the fact that they combine specifically the values masculine and neuter is of no significance.

With underspecification, syncretic patterns are not directly defined by morphology, but are rather a by product of natural classes of morphosyntactic values. In a model of grammar where morphology plays only a limited role, this is a desirable outcome. However, there is some evidence that the complexity of syncretic patterns may be too great to rely solely on underspecification, suggesting that at least some types of syncretism are best described through morphological stipulation. The main challenges posed to underspecification come from two phenomena.

First, there are instances of syncretism for which no plausible natural class of morphosyntactic values could be assumed. For example, in the Cushitic language Dhaasanac (Tosco, 2001), the person–number–gender paradigm of verbs displays a maximum of two forms, one for 1SG/1INCL PL//3SG MASC/3PL and one for 2SG/2PL/3SG FEM/1PL. This opposition is morphologically systematic, as is shown by the variety of ways in which it is manifested (consonant or vowel alternation, suffixation, prefixation), depending on tense-mood and on the lexeme itself, e.g., *leeði* ~ *leeti* 'fall down.PERF,' *seð* ~ *sieti* 'walk. PERF,' *ʔuufumi* ~ *ʔuufeeni* 'cough. PERF,' *yes* ~ *ces* 'kill.PERF.' Each form combines disparate morphosyntactic values, which cannot be reduced to any obvious natural class. While it might be possible to treat one of these as an 'elsewhere' form, the combination of values found in the other form must still be accounted for.

Second, some examples show evidence of an internal asymmetry, that is, the syncretic form looks as if it is really the exponent of one of the component values. In some of these cases, underspecification is insufficient as a descriptive mechanism. Consider the singular paradigm of second declension Latin nouns in Table 5. Masculines have a distinct nominative in *-us* and accusative in *-um* while neuters have nominative/accusative syncretism, typically with the ending *-um*, though some nouns have *-us*. Thus, the syncretic nominative/accusative of neuters looks like the accusative (*-um*) for some nouns and like the nominative (*-us*) for others. The distribution of forms across the three paradigm types does not lend itself to analysis in terms of underspecification, since *-um* and *-us* would need sometimes to be underspecified for the distinction between accusative and nominative, and sometimes be specified distinctly as accusative or nominative.

Such examples appear to require morphological devices in addition to underspecification. The first suggests the need for stipulated classes of morphological values, i.e., there is an overt rule which states that certain distinct values are grouped together ('morphomes' in the sense of Aronoff, 1994). The second example suggests the need for rules of referral, which state that the form for one value is the same as the form for another value, e.g., that the accusative takes the form of the nominative in nouns of the *virus* type. The existence of such stipulated morphological devices does not invalidate the notion of underspecification, but rather supplements it, and provides some evidence for the autonomy of morphology.

See also: Inflection and Derivation; Markedness; Neutralization.

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Synesthesia

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Synesthesia (also spelled synaesthesia), from Greek *syn* ('with') and *aesthesis* ('sensation'), means 'the union of senses' and has the same root as the word *anesthesia* 'without the use of the senses.' It has been widely established that synesthesia occurs when an individual receives a stimulus in one sensory modality and experiences a sensation in another. However, synesthesia usually occurs within the same modality, e.g., color-grapheme synesthesia wherein individuals perceive colors when presented with achromatic digits or letters (Baron-Cohen *et al.*, 1993; Elias *et al.*, 2003). Thus, we could say that synesthesia takes place when ordinary stimuli elicit extraordinary conscious experiences.

Throughout history efforts have been made to make sense of the phenomenon behind the term by such as Pythagoras, Plato, or Aristotle, and later by Baudelaire, Rimbaud, Rimsky-Korsakov, Scriabin, Kandinsky, Nabokov, Einstein, Messiaen, Hockney, Feynman, and so on (van Campen, 1997; Ione and Tyler, 2004). However, synesthesia has been interpreted in many different ways (Galeyev, 1999). It was consigned to abnormality, philosophy, or metaphor for centuries; but on the other hand was recognized as a physiological fact because for some individuals, certain stimuli cause synesthetic responses or synesthetic perception. The challenge is to find at what level synesthesia is taking place: as (1) intersensorial connections or bonds in the psyche when used to describe the result of its manifestations in specific fields such as arts; or as (2) phonetic tropes and stylistic figures, relative to semantic intersensorial transfers. But these two levels are deeply linked, showing proof of the inseparability of categories, concepts, and experience (Lakoff and Johnson, 1999).

As a rhetorical figure, synesthesia consists in giving something a quality it cannot have: e.g., the parts of *white voices* are perceived by different senses. In the case of literary synesthesia, three types of study have been considered (Erzsébet, 1974):

- The analysis of sensorial combinations in the rhetoric of a single poet, within the framework of characterization of his/her individual style. For example, works on Oscar Wilde by Ullmann, on Heine by Silz, on Baudelaire by Roeding, on Montale by Rosiello, and on Ungaretti by Gutia.
- The study of synesthesia finds parallels in the style of different poets. For example, in the work on Keats and Byron by Ullmann, or on Eminescu, Arghezi, and Sadovaenu by Mancas.
- The elaboration of a comprehensive view about the synesthetic characteristic of a literary school or a certain period: The Renaissance and Baroque, or Romanticism, for instance.

In the linguistic interpretation of synesthesia, we must distinguish both the psycho-physiological process and its linguistic projection.

Synesthesia in Thought

The study of synesthesia could be divided in two general groups that overlap. First, synesthesia proper, i.e., when the stimulus of a sensorial input induces sensation in a different sensory module. Second, cognitive or categorial synesthesia entails synesthetic addition to the categorial systems of each individual or culture. Thus, synesthesia makes an interesting topic of investigation in that the subject matter is an internal, mental state whose existence we can infer from the findings of behavioral testing. But the growing interest in synesthesia has led to numerous experimental studies that rely upon self-reports given by subjects with synesthesia, and upon objective quantification of data gathered under traditional methods of experimental psychology or neuroscience. Varying criteria have been applied to the diagnosis of synesthesia, although in general, scientists have always differentiated clinical synesthesia from metaphor, literary tropes, sound symbolism, and deliberate artistic contrivances that employ the term to describe multisensory joinings.

Synesthesia proper has defined neurological components (Cytowick, 1993, 2002; Lovelace *et al.*, 1999; Grossenbacher *et al.*, 2001) and is believed to pass on genetically through X-chromosomes (Cytowic, 1995; Harrison, 2001). The percentage of synesthetic human beings varies according to the kind of synesthesia we are referring to (Day, 1996, 2004). It is estimated that we can find one "basic (cognitive) synesthete" (who perceives e.g., colored letters) in every 500 people; one "proper synesthete" (who perceives e.g., colored musical sounds or colored tastes) in 3000; and one "multiple synesthete" (multiple synesthetic experiences) in 15 000. It is possible that more than half of the human race are "basic synesthetes" that consider high sounds as bright and low sounds as dark (Day, 1996). And it might be possible that all human beings are synesthetic at

birth (Baron-Cohen and Harrison, 1996; Harrison, 2001).

Cytowic (1995) proposed five criteria for the diagnosis of a type of clinical synesthesia called ideopathic or developmental synesthesia as opposed to acquired forms of clinical synesthesia such as drug-induced synesthesia, epileptic synesthesia, and synesthesia due to acquired brain lesions:

- Synesthesia is involuntary but elicited.
- Synesthesia is projected. If visual, a photism will appear outside the body in the region close to the face.
- Synesthetic percepts are durable and discrete. The associations for an individual synesthete are stable over his/her lifetime: if a sound is blue, it will always be blue.
- Synesthetic experience is memorable. Many synesthetes exhibit hypermnesia (prodigious memory).
- Synesthesia is emotional in nature. A synesthetic experience is accompanied by a sense of noetic certitude.

Synesthesia is a conscious experience of systematically induced sensory attributes that are not experienced by most people under comparable conditions (only by synesthetes). It is considered by many as a normal brain process that is prematurely displayed to consciousness in a minority of individuals. At the other extreme, we find Merleau-Ponty's belief (1962) that synesthetic perception is something that we unlearn (probably through a pruning effect), though we are unaware of it because scientific knowledge shifts the center of gravity of experience so that we unlearn how to see, hear, and generally speaking, feel. Ramachandran and Hubbard (2001) saw synesthesia as a window into perception, thought, and language. Rich and Mattingley (2002) showed that synesthesia has been considered a reaction to physical stimulus, but they also prove that it can be activated with the mere thought of a particular stimulus or concept.

Within cognitive synesthesia, certain groups of things that our individual cultures teach us to set together or categorize in certain way, or specific conceptual structure – such as letters, numbers, or the names of persons – also have some kind of sensorial addition, such as a smell, a color, or a flavor. The most common forms of cognitive synesthesia entail elements such as characters written in color, numbers, time units, and musical notes or chords. For example, a person could perceive different colors with different spoken vowels or consonant sounds.

The pairings between eliciting stimuli and the resulting synesthetic experiences differ widely between synesthetes. For any given synesthete, there appears to be high consistency of the pairings over time (Baron-Cohen *et al.*, 1987, 1993; Odgaard *et al.*, 1999; Dixon *et al.*, 2000; Lyons, 2000; Mattingley *et al.*, 2001). But many brain studies locate this phenomenon in distinct areas of the brain (Cytowic, 2002). Functional imaging studies have shown that areas within the ventral pathway that normally register shape, color, and words are activated in synesthetes, but in addition, there is also parietal activity, which for the most part has been downplayed (Robertson, 2003). Some have argued that the automaticity and consistency of the synesthetic experience represent direct connections between cortical feature maps, perhaps through synaptic connections that fail to undergo normal synaptic pruning during development. This explanation of synesthesia is consistent with findings from a number of behavioral experiments suggesting that synesthetic binding precedes attention (Robertson, 2003).

Synesthesia in Language

The opinions of linguists concerning the concept of synesthesia can be contradictory:

1. Taking interest in the acoustic synesthesia, conferring sensorial properties to the sounds of speech, to the names of the days and the months and so on (Slawson, 1968, 1985).
2. The sphere of synesthesia is limited only to sensorial fields, e.g., *white stillness, velvet warmth*. This sphere can be widened to the sensorial combinations proper, but also the associations between abstract notion and a sensory impression, e.g., *sweet desire, blue slyness* (Erzsébet, 1974).
3. In synesthesia, semantically incompatible components are subordinated to a common dominant notion of the sensorial field, containing combinations of different sensations of elements belonging to the same sensorial field, e.g., the oxymoronic *blind light, dumb song* (Erzsébet, 1974).

Some consider that if the elements of the combination are semantically compatible, as in *silent night, the rustle of the red poppy*, we cannot speak about 'synesthesia' – which is a syntactic relation between semantically incompatible elements, denoting sensations from different sensorial spheres (Ward and Simner, 2003). According to a widespread view, synesthesia results from semantic transfer of a feature based on the similarity of two concepts. Some consider it completely subordinated to metaphor. Others postulate that it is produced by the transfer of the name based on simultaneous contiguity of the sensations, thus pointing out the relationship of

synesthesia with metonymy. Different researchers propose different models of this intersensorial phenomenon. Some take a diachronic perspective such as Williams (1976), Classen (1993) or Evans and Wilkins (2000), and others a synchronic perspective e.g., Ullmann (1964), Day (1996), Cacciari (1998), or Bretones (2001).

In Ullmann's view, synesthesia is at the borderline between the category of direct name-transfer based on synesthetic similarity and the association of a concrete sensation with an abstract notion; name-transfer based on simultaneous sense-contiguity. Ullmann (1964) claimed the possibility of a basic pattern of activation for synesthesia:

> [F]urther investigations might also reveal that the movement of synaesthetic metaphors is not haphazard but conforms to a basic pattern. I have collected data for the sources and destinations of such images in a dozen nineteenth-century poets, French, English and American, and have found three tendencies which stood out very clearly: (1) transfers from the lower to the more differentiated senses were more frequent than those in the opposite direction: over 80 per cent of a total of 2000 examples showed this 'upward' trend; (2) touch was in each case the largest single source, and (3) sound the largest recipient. (Ullmann, 1964: 86).

Less differentiated senses would be smell and taste, and the most differentiated ones hearing and vision. Ullmann proposed the following model of synesthesia:

smell/taste → hearing/vision → touch

This model is followed by Day (1996), but others disagree with his ranking (Cacciari, 1998; Bretones, 2001). Classen (1993), in a study fundamentally based on observations, determines the following synesthesic-metaphoric rank in English:

hearing → vision → smell → taste → touch

Day investigated this pattern and tried to determine the synesthetic metaphors used in English through corpus analysis (1996) and the study of human subjects (2004). He obtained data from the language in written texts and electronic sources such as The World Library's Greatest Books Collection, The Oxford Text Archive, and Project Gutenberg (Day, 1996). Using the percentages of concurrence of each synesthetic metaphor, Day (1996: 8) obtained the following pattern:

hearing
→ vision → smell → temperature → taste → touch

Synesthetic transfer is considered one of the most common types of metaphoric transfer – the transmission of information from one sensory modality to another (Williams, 1976: 463). Recent work on metaphor makes it clear that many of our most basic concepts (and our reasoning via those concepts) are **embodied**. Lived experiences in the body inspire and constrain the way we conceive and articulate many of our other experiences (Lakoff and Johnson, 1999; Bretones, 2001). "Metaphor, with its capacity to introduce a sensory logic at the semantic level is a way to fill this gap [...] since metaphors allude to a more complex scenario of interrelated meanings and experiences of the world" (Cacciari, 1998: 128).

One should not believe that all our knowledge about our sensory and perceptual experiences can be captured in a set of independent – or even interrelated – verbal categories; nor that sensory/perceptual experiences themselves reduce in any simple manner to a list of attributes. Still, the study of synesthetic metaphor may serve as a useful model (Marks, 1978). Being approachable through psychophysical analysis, synesthetic metaphors not only permit ready quantification, but enable us to assess development trends in the ways that at least certain aspects of such metaphors are interpreted. A psychophysics of synesthetic metaphor may eventually reveal much about perception and language (Marks, 1983, 2000). To appreciate the depth and extent of human metaphorical capacity will thus demand cognitive, psychological, and physiological analyses of phenomena such as synesthesia.

See also: Cognitive Linguistics; Cognitive Semantics; Metaphor: Psychological Aspects; Semantics in Psychology.

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Synesthesia and Language

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Sharing a Greek root with anesthesia, meaning 'no perception,' synesthesia (*syn* 'together' + *aisthēsis* 'perception') means 'joined perception,' wherein two or more senses are coupled such that a voice, for example, is not only heard but also felt, seen, tasted, or even sensed in multiple modalities. Individuals who undergo such automatic crossmodal perceptions are called 'synesthetes.' For a long time, synesthesia endured reflexive hostility from critics, who insisted it could not possibly be real, at best conceding the subjective experience as nothing more than a learned association or metaphoric speech. Doubts regarding its genuineness as a neurological phenomenon have been thoroughly answered.

Cytowic (1997, 2002a) elucidated general properties: synesthetic experience is involuntarily elicited, consistent, memorable, affect laden, perceptually simple, and spatial. Stroop interference confirms that synesthetic associations are automatic (Smilek and Dixon, 2002) whereas lawful segregations such as perceptual grouping, popout, and stereoptic fusion confirm their early perceptual nature (Ramachandran and Hubbard, 2001a; Palmeri *et al.*, 2002), and xenon, PET, and MRI methods have diversely shed light on the functional landscape of synesthetic experience. The phenomenon is more common than once believed, occurring in at least one in 2000 individuals by population prevalence estimate (Baron-Cohen *et al.*, 1996) and ten times as many by less sound surveys. Forty percent have more than one type of synesthesia (polymodal), and females predominate by more than three to one.

Despite an overall impression that synesthetic experiences are perceptual, some two-thirds of instances are actually triggered by hearing, reading, or thinking of letters, integers, or words (Table 1).

We first review evidence that graphemes and phonemes – the building blocks of language – can trigger synesthetic experiences of color and taste. Secondly, we consider the interplay between synesthesia and concept formation. We conclude that synesthesia is not a mere curiosity in a few brains, but widespread with broad implications and possible use as an experimental probe for understanding metaphor and language evolution.

Colored Graphemes

The naming convention of putting synesthetic sense before its stimulus yields the terms 'color-lexical,' 'color-graphemic,' and 'color-phonemic' synesthesia. Graphemic is the most common type, wherein letters, numerals and, less often, punctuation, Braille, and musical symbols automatically evoke color sensations; phonemes trigger just 10% of cases. Individuals characteristically describe colors in precise detail (e.g., 'dirty, dull yellow' or 'deepest violet with sparkles'). Colors remain consistent over years, whereas nonsynesthetes asked to generate letter–color associations are only about 30% consistent after an interval of a week. Consistency over time is the most commonly used measure of authenticity. An example of colored graphemes is shown in Figure 1.

Word colors are variously derived from constituent graphemes. In some, the first letter dominates, thus *psychology*, *photograph*, and *poetry* all share the same color as the letter P. Other synesthetes base word colors on consonant or vowel composition. A double dissociation exists between consonant and vowel influences on word color (Ward *et al.*, 2005), demonstrating how synesthesia can inform theories of language by suggesting, in this instance, that consonant–vowel coding may be an intrinsic property of graphemic representation (see also Ward and Romani, 2000).

Upper- and lower-case letters usually, but not always, evoke identical colors, whereas Arabic numerals are seen differently from Roman ones. Navon figures reveal attentional influences: for example, a black numeral 5 target composed of smaller 2s is seen

Table 1 Typological distribution

Graphemes → Color	68.8%
Time Units → Color	23.3%
Music Sounds → Color	19.2%
General Sounds → Color	14.0%
Musical Notes → Color	10.6%
Phonemes → Color	10.6%
Tastes → Color	7.1%
Smell → Color	6.9%
Pain → Color	6.3%
Sound → Taste	5.6%
Personalities → Color	4.8%
Touch → Color	3.9%
Temperatures → Color	2.7%
Vision → Taste	2.3%
Sound → Smell	1.6%
Vision → Sound	1.6%
Orgasms → Color	1.1%
Vision → Smell	1.1%
Vision → Touch	1.1%

A distribution of the types of synaesthesia based on 588 cases. Approximately 40% of individuals have multiple types of synaesthesia. For simplification, the table does not include types of synaesthesia affecting less than 1% of the sample.

Figure 1 An example of a synesthete's colored graphemes.

as green, say, when the subject attends to the global configuration, but as orange when attending to its constituent 2s. As each synesthete has idiosyncratic associations, experiments must be tailored to the individual; nonetheless, regularities do exist. Synesthesia is also observed for scripts that do not use the Roman alphabet (see e.g., Mills *et al.*, 2002).

Sir Francis Galton first noted synesthesia's strong heritability in 1883 (Baron-Cohen *et al.*, 1996) and contemporary evidence suggests that mammalian neonates, including humans, are born with synesthesialike responses (Maurer, 1997). Yet graphemes and words are cultural symbols acquired later in life. Because synesthesia takes on an extraordinary variety of forms, any general theory must account for it in terms of both neural development and acquired experience (e.g., of one's own particular language).

Gustatory Phonemes

One can only speculate about the relative rarity of synesthesia induced by phonemic patterns (Table 1). Grapheme recognition exists from about age 3 to 4 years (Frith, 1985). Possibly, color-graphemic synesthesia begins as color-phonemic and then undergoes conceptual reorganization according to accepted phoneme-to-grapheme conversion rules and literacy acquisition. There is no *a priori* reason why infant synesthetic brains should not undergo the same reorganization pressures as others. Prospectively testing this conjecture would be difficult but not impossible.

Subject JIW tastes flavors in his mouth whenever he hears, reads, speaks, or thinks about words (Ward and Simner, 2003). *Safety* tastes of "toast lightly buttered," *Phillip* tastes of "oranges not quite ripe." As with other types of synesthesia, his sensations are stable over time and he is significantly more consistent than controls asked to generate or memorize word–food associations. Detailed analysis of his word–taste associations shows that words containing common patterns of phonemes (rather than graphemes) tend to produce the same taste. For example, *marriage*, *village*, and *college* all contain a common phonemic rhyme and all elicit a taste of sausage sandwiches. In contrast to color-graphemic synesthetes, there is no relationship between the taste assigned to graphemes and that assigned to words, and words sharing the first letter tend not to produce the same taste.

Notably, not only do words with similar phonemes evoke similar tastes but also the phonemes tend to be present in the form of the word corresponding to that taste. Thus, *Sydney* tastes of kidney, *auction* tastes of Yorkshire Pudding, *super* tastes of tomato soup, and so on. It is as if the phonological forms of food-related vocabulary have served as a template for deriving synesthetic associations for other words. This again points to the need for better understanding of the interplay between innate and environmental factors. This trend is found for all other known cases, comprising three cases from the historical literature and seven published contemporary cases (see Ward *et al.*, 2005).

What biological reason could explain why graphemic properties preferentially elicit color whereas phonological ones elicit tastes? Ramachandran and Hubbard (2001a) proposed an 'adjacency theory.' In color-graphemic synesthesia, they emphasized that the grapheme recognition region on the left fusiform gyrus lies adjacent to area V4, which concerns color perception. Only left V4 activates in individuals who see color in response to spoken words (Nunn *et al.*, 2002). Synesthetes might plausibly cross-activate these regions because of either unusual projections or lack of inhibition between them. Others have similarly referred to the assumed cross-activation of grapheme and color regions in synesthetes as a breakdown of modularity (Baron-Cohen *et al.*, 1993) or as anomalous binding of modules (Cytowic, 2002b, 2003).

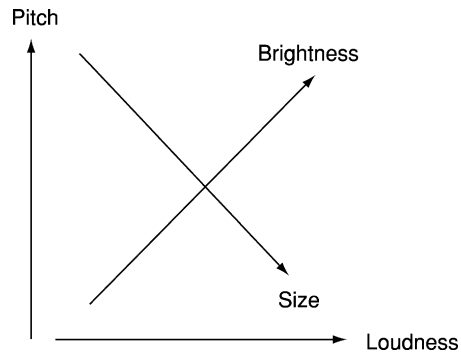

Figure 2 The higher the pitch and/or louder the sound the 'brighter' it is judged to be, and the lower the pitch and louder the sound the 'larger' it is judged to be.

The gustatory cortex is bilaterally located in the frontal and parietal opercula and the insula. This is certainly not adjacent to the grapheme recognition region on the left fusiform gyrus, perhaps explaining why graphemic properties of words have little influence on synesthetic tastes. Nor are the Wernicke phonemic regions any closer. Even though all sensory modalities and the visceral milieu are represented in the insula, which also responds to both speech perception and production (Wise *et al.*, 1999), adjacency alone appears inadequate as a general synesthetic mechanism. As the phonological associations derive from a single semantic category, 'food,' we may speculate on the necessary recruitment of additional brain areas (for example, anterior temporal regions supporting semantic memory). One inference follows that synesthesia does not localize to a discrete locus in the sense of classical neurology but rather is supported by a network of structures (Cytowic, 2002a, 2003).

Structure versus Meaning

We have so far concentrated on the internal structure of words – both graphemic and phonological. But what about meaning? Marks (1978) showed that systematic correspondences exist among dimensions of a given sense for synesthetes and nonsynesthetes alike. For example, both say that louder tones are brighter than soft tones, higher ones are smaller than lower ones, and that low tones are both larger and darker than high ones. The perceptual similarities that yield such orderly relationships among pitch, loudness, brightness, and size (Figure 2) can be described in psychophysical terms such as temporal coding or opponent processing, and may be rooted in fundamental similarities of phenomenal experience. For example, von Békésy (1959) first noted physiological similarities between hearing and touch.

Figure 3 A painting of two bars of music from a music-to-color synesthete.

Figure 3 is an illustrative painting of two bars of music from a synesthete, in which different shades, shapes and positions may correspond to different notes.

The demonstration of regular congruences between many (though not all) qualitative aspects of experience in different modalities has led to the idea of a continuum from perception → synesthesia → metaphor → abstract language, as perceptual similarities, synesthetic equivalences, and metaphoric identities in turn become available to the more abstract knowledge that is embodied in language (Cytowic, 2002b; Marks *et al.*, 1987; Ramachandran and Hubbard, 2001b). For example, a tone of 2000 Hz may be labeled 'high' pitched and one of 100 Hz labeled 'low' pitched. Why do we use a spatial metaphor for pitch? The pitch–space association is not strictly linguistic, because Stroop-like interference exists between pitch and space in perceptual judgment tasks (Bernstein and Edelstein, 1971) and infants are sensitive to this correspondence (Wagner *et al.*, 1981). In this instance, a basic crossmodal correspondence has entered into metaphorical language and has perhaps even influenced the development of Western musical

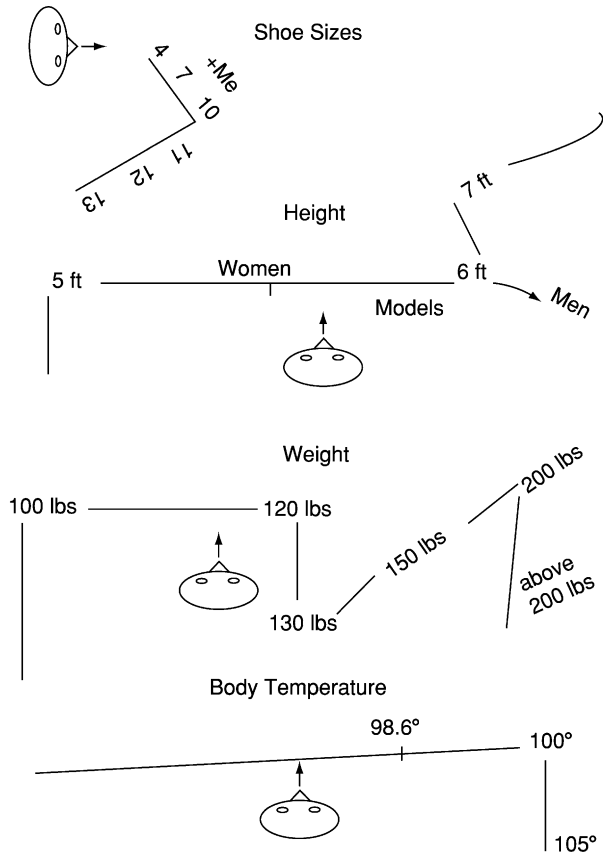

Figure 4 An example of spatial 'forms' for shoe sizes, height, weight, and body temperature, reprinted from Cytowic (2002a), MIT Press.

notation (increasing pitch associated with higher position on the stave).

An even stronger claim is that these correspondences could have provided an early protolanguage during human evolution (Cytowic, 2002b; Ramachandran and Hubbard, 2001b). Humans seem able to agree crossculturally upon the assignment of certain symbols to represent objects (see, e.g., Davis, 1961) or upon how one domain can be expressed in terms of another (e.g., colors and emotions; D'Andrade and Egan, 1974). Kohler (1947) presented participants with two shapes and asked them to decide which one was called 'takete' and which one was called 'maluma.' Participants tended to associate rounder visual forms with 'maluma,' and more angular forms with 'takete.' This trend appears to be crosscultural insofar as a group of people in Tanzania showed a similar associative bias.

Even though each synesthete's responses are idiosyncratic, their associations are not arbitrary. Although our understanding of this is incomplete, many researchers concur that the orderly topographic mapping characteristic of many cortical areas likely underlies this nonarbitrariness. Synesthetic associations may lay bare other properties of cognitive

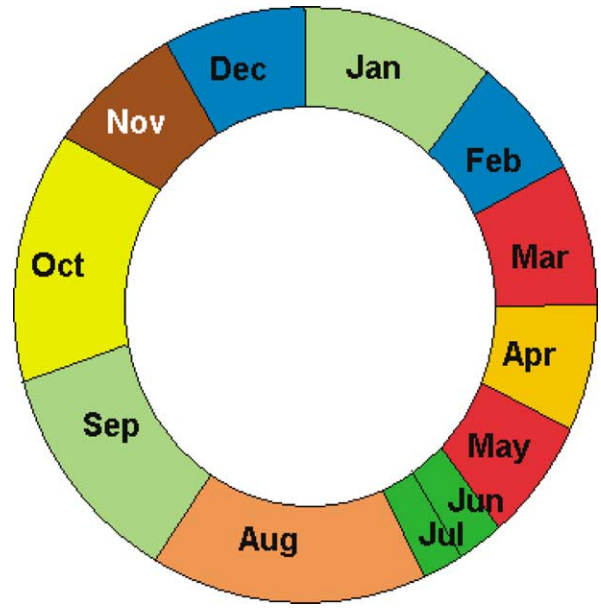

Figure 5 A colored spatial form for months of the year.

representation that may not be immediately apparent to the nonsynesthete. This is considered in the final section below.

Semantic Categories as Synesthetic Inducers

Certain semantic categories may have a privileged status in synesthetic induction. Such categories include numbers and other ordinal representations (days, months, etc.), vocabulary used to denote perceptual categories (e.g., color words, food names), and names of familiar people, which may be imbued with color via their affective status to the perceiver.

The term 'number form' is somewhat of a misnomer given that the configurations concern not only integers, but any concept involving serial order. Thus, the perceptual qualities of spatial location, shape, and, often, color become synesthetically joined to semantically ordered sets such as integers, months, days, the alphabet, shoe sizes, temperature, and so forth (see Figures 4 and 5 for examples). Ordinality and configuration both suggest participation of the angular gyrus in this type of synesthesia. There is evidence that we all implicitly represent numbers in a visuospatial format: nonsynesthetes are faster at making judgments about small numbers (e.g., 1, 2) with their left and faster at making judgments about larger numbers (e.g., 8, 9) with their right hand (see, e.g., Dehaene *et al.*, 1993).

A special category for synesthetes experiencing color is color names – red, yellow, green, etc. Gray *et al.* (2002) report that some synesthetes cannot

inhibit a word's conceptual color. Thus, *red* may evoke a red synesthesia despite all other R words being green. In other cases, *red* may elicit a green synesthesia – a phenomenon the authors call the 'alien color effect.' It possibly arises from competition between different levels of representation (graphemic versus lexical-semantic) in the process of mapping synesthetic color.

Gustatory synesthetes presented with food names (e.g., *beef*, *cheese*) typically experience the appropriate sensation (e.g., the word *cheese* elicits a cheesy taste). There is little evidence for an 'alien taste effect' in which the word *cheese* would produce a taste of beef. Meaning appears more operative in gustatory than in color synesthesia, and although phonological factors influence synesthetic taste, the phonemic patterns themselves derive from the words used to represent the semantic category of food, as pointed out above.

Another special semantic category is people's names (Ward, 2004; Weiss *et al.*, 2001). GW experiences people's names as colored depending on whether she is personally familiar with anyone so christened. Using colors to describe people is a common feature of many natural languages (Asch, 1955). However, GW does so significantly more consistently than controls and shows Stroop-like interference when the names are printed in incongruous ink colors. Perhaps the emotional context determines both the presence of color and the particular color evoked by acquaintances. Indeed, GW reports synesthetic colors with other emotional words (e.g., hatred, marriage). This case again illustrates the interaction between language and more basic crossmodal correspondences between color and emotion.

In conclusion, there is likely to be a reciprocal relationship between synesthesia and language. At one level, the representational units of language (graphemes, phonemes, and words) may acquire a perceptual dimension in the minds and brains of synesthetes. At another level, the existence of seemingly universal crossmodal correspondences may guide both the formation of certain types of synesthetic correspondence (e.g., between number and space, pitch and lightness) and also the way that we speak about and conceptualize the world around us.

See also: Color Terms; fMRI Studies of Language; Numbers: Calculation.

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www.syn.ucl.ac.uk – research group site.

Synonymy

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Synonymy is the semantic relation of sameness of meaning either among lexical items or among sentences or propositions, although the latter is also called **paraphrase**. Here we pay particular attention to lexical cases of synonymy. Although synonyms technically have 'the same meaning,' in the everyday use of the term *synonym*, we're usually quite happy to accept as synonyms items with similar, but not identical, meaning. If we did not, thesauri would be short books indeed, because most semantically similar lexical items differ by some dimension or degree of meaning and use. This is because language generally avoids lexical synonymy. Before turning to synonym avoidance, we first consider the properties of synonyms.

Substitution and Synonymy

In logical terms, two propositions are synonymous, or paraphrases of one another, if they have exactly the same truth conditions. In other words, in any situation in which one of the propositions is true, the other must be true, too, and if one is false, then the other is false, too. This means that synonymous propositions are mutually entailing, as is the case for the following sentences (1) and (2):

(1) Tor bought a book from Ulla.
(2) Ulla sold Tor a book.

The proposition expressed by (1) entails the proposition expressed by (2) and *vice versa*, so (1) and (2) are logically synonymous. When defining **logical synonymy** in expressions that are not propositions (such as words), the usual definition is that synonyms are expressions that can substitute for each other in a sentential context without changing the truth conditions of its proposition. Using this diagnostic, we can demonstrate that the verbs *close* and *shut* overlap in meaning (3a and 3b), but are not absolutely substitutable (3c and 3d), and thus not completely synonymous.

(3a) Ingmar {closed/shut} his eyes.
(3b) The door {closed/shut} behind us.
(3c) They closed the meeting with a song.
?They shut the meeting with a song.
(3d) We closed the bar. (= 'We drank until the bar closed' – among other readings)
We shut the bar. (= 'We blocked access to the bar')

The term *full synonymy* is used for words that are logical synonyms in all of their senses. Such synonymy is rare, and is typically found only in words with a rather narrow range of senses, such as some duplicate scientific or species names. For example, the plant

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name *gorse* refers to exactly the same set of things as *furze* (i.e., a certain yellow-flowered shrub). More common and more polysemous words tend to be synonymous for some of their senses, but not others. For example, in (3) *close* and *shut* share the sense (or senses, if the causative is treated separately) 'to (cause something to) move in order to cover an aperture,' but only *close* has a sense that means 'to bring to an end.' Such logical synonyms can be called **sense synonyms** (but more often than not they are just called *synonyms*).

If we limit our attention to sense synonyms, it is still rare that two words are substitutable for each other in every possible context. Still, many words have similar senses (and denotation) without having exactly the same meaning. For example, *forest* and *woods* (or the British English *wood*) share many aspects of their meaning, but there are things that are forests that one would not call *woods*, and vice versa. Such partial sense similarity is called either *near-synonymy* or *plesionymy* (Cruse, 1986). Near-synonyms may be substitutable in particular contexts, but are not substitutable across a range of contexts.

Many discussions (especially philosophical ones) of synonymy are limited to the above types, in which substitutability is judged only with reference to the truth conditions of the sentences in which the words are substituted – hence the label *logical synonyms* (they are also called *cognitive synonyms*). The notion of substitutability can be extended, however, to consider other, nondenotative aspects of meaning and usage. For example, *child* and *kid* are sense synonyms, but they differ in formality. Thus if *kid* is substituted for *child* in an utterance, then the range of social situations where that utterance is appropriate changes. On this expanded notion of substitutability, logical synonyms may differ in a variety of ways, including those in the following list. (For others, see Palmer, 1981; Hirst, 1995; Murphy, 2003.)

- register: *train – choo-choo*; *salt – sodium chloride*
- implicature: *mislay – lose*; *manage to* [verb] – *succeed in* [verb + *ing*]
- dialect: UK *motorway* – US *highway/freeway*
- affect (speaker's attitude): *freedom fighter – rebel*; *skinny – slender*
- collocation: *ret – steep* (in the sense of 'soak in order to soften': *ret flax* and *steep chilies* but not #*steep flax* or #*ret chilies*)

Taking into consideration all of the various ways in which substitution of a word or phrase might change the communicative import of an utterance, it is difficult to find words that are completely synonymous in all of these dimensions. One possible example is the aforementioned *furze* = *gorse*, which, at least in southern England, are used with exactly the same denotative meaning and no discernable difference in formality, dialect, register, and so forth. Nevertheless, it can still be argued that they are different, in that *gorse* is the more commonly heard name, *furze* is more frequently found in place names, and most individuals use (and possibly know) only one of the terms.

The substitutability diagnostic is also weakened in everyday use of the term *synonym* when the criterion used is 'substitutability' rather than 'mutual substitutability.' For example, *happy* and *elated* are listed as synonyms in many thesauri, but their substitutability is unidirectional, because *elated* is a more specific term than *happy* (we could say that *elated* is a **hyponym** of *happy*), as demonstrated in (4):

(4a) Britt is elated. → Britt is happy. (Thus, we can't say: *Britt is elated, but she's not happy.*)
(4b) Britt is happy. Britt is elated. (So, we can say: *Britt is happy, but she's not elated.*)

This section has demonstrated that there is a considerable gap between the logical definition of synonymy and common ways that linguists and nonlinguists use the term *synonym*. So, while it is perfectly possible that a language has words that overlap in meaning, those word meanings do tend to differ in some aspect, either by having other senses, incompletely overlapping in sense, or differing in some aspect of nondenotative content.

Avoidance of Synonymy

Languages come to have synonyms in a variety of ways. For example, they may be borrowed from other languages or dialects (e.g., *chic-stylish*) or arise via different morphological processes (e.g., *poor-penniless-impoverished*) or different metaphors (*high-stoned*). Yet just as nature abhors a vacuum (*pace* Pascal), language abhors absolute synonymy (Cruse, 1986). For a language to have two words that do exactly the same job is inefficient, but furthermore, it is pragmatically prevented. It is in human nature to assume that choices are made rationally, and so if we choose between one form and another to express a particular meaning, then we assume that there must be reasons why we should prefer one choice over the other. Similarly, we assume that there is a rational explanation when another person chooses one word over another, and so we assume that the word they have chosen is more appropriate to the context than the one that they didn't choose. These pragmatic forces encourage the introduction or maintenance of differences between word meanings, such that when a new word is introduced into one's (or one's language's) vocabulary, we act on the

assumption that it must differ in meaningful ways from any words already in the vocabulary (Bréal, 1900; Clark and Clark, 1979).

Avoidance of synonymy is so strong that in some cases different spellings or pronunciations of the same word are used for different senses of the word. For example, in some varieties of American English, the British pronunciation of *vase* [va:z] has been imported, but it is only for vases that are important or valuable in some way. So, there is a contrast in meaning between [va:z] and [ve:s], shown in (5):

(5a) The museum has acquired a precious Ming [va:z] / [ve:s].
(5b) The [ve:s] (#[va:z]) the flowers came in was horrid, so I threw it away.

So while a language's vocabulary expands, so does its range of lexical meaning differentiations. Thus, avoidance of synonymy is a key motivator of semantic change.

Current Approaches to Synonymy

The role of synonymy in theories of lexical organization varies according to whether the theory posits semantic relations as part of lexical representation or if such relations are derived via relational principles. An example of the former is the WordNet model (*see* **WordNet(s)**) of lexical organization (Fellbaum, 1998), in which the base level of organization in the lexicon is composed of semantically similar 'synsets' (i.e., synonym sets). These groups of synonyms enter as one into other relations, such as hyponymy and contrast. In other approaches, synonymy is usually derived on the basis of similarity of meaning, by which if two words have identical semantic representations (or similar enough representations for a particular context), then they are synonyms. Murphy (2003) takes a contrary position – that synonyms (and other semantic relations) are derived via a pragmatic principle 'relation by contrast.' In this case, synonyms are sets of words that are similar in all contextually relevant ways except their form.

Synonymy is also a central concern in the applied fields of lexicography (e.g., Apresjan, 2000) and computational linguistics (e.g., Edmonds and Hirst, 2002). Both fields are concerned with distinguishing between near-synonyms, either to more precisely define and differentiate semantically similar words, or to allow for automatic selection of the most appropriate word for a context (e.g., in machine translation).

See also: Hyponymy and Hyperonymy; Lexical Fields; Lexicon: Structure; Paradigm versus Syntagm; WordNet(s).

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Syntactic Constructions

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Introduction

There is currently much theoretical debate concerning the existence and nature of grammatical CONSTRUCTIONS: conventional pairings of form and function. The term *construction* has a long tradition within descriptive grammars, being used to characterize, for example, relative clauses, passives, topicalization, and so on, cross-linguistically. Recently, some theorists have argued that constructions are epiphenomenal, apparent only because of an interacting set of universal, fixed principles with parameters selected on a language-particular basis (Chomsky, 2000); however, the term is still widely used within all linguistic frameworks.

The majority of linguists, recognize the existence of conventional, learned pairings of form and function at least in some cases. For example, each of the following constructions are part of native English speakers' repertoire of their language. Each has unusual quirks in either its formal properties or its semantic interpretation (or both) that make it ill suited for universal status (the stranded preposition construction is unusual not in that it is prescriptively dispreferred, but that it is only found in a few Germanic languages).

As an example of an unusual pattern, consider the Covariational Conditional construction in Table 1 (e.g., *The more you think about it, the less you understand*). The construction is interpreted as involving an independent variable (identified by the first phrase) and a dependent variable (identified by the second phrase). The word *the* normally occurs at the beginning of a phrase headed by a noun. But in this construction it requires a comparative phrase. The two major phrases of the construction resist classification as either noun phrases or clauses. The requirement that two phrases of this type be juxtaposed without conjunction is another nonpredictable aspect of the pattern. Because the pattern is not strictly predictable, a construction is posited that specifies the particular form and semantic function involved (Fillmore *et al.*, 1988).

Over the past two decades, a new theoretical approach to language has emerged that treats constructions as central. Many linguists with varying backgrounds have converged on several key insights that have given rise to a family of approaches, here referred to as *constructionist* approaches (Croft, 2001; Culicover, 1999; Culicover and Jackendoff, to appear; Diessel, 2001; Fillmore *et al.*, 1988; Fillmore *et al.*, in progress; Gleitman, 1994; Goldberg, 1995, 2006; Jackendoff, 2002; Kay and Fillmore, 1999; Lakoff, 1987; Langacker, 1987, 1991; Michaelis and Lambrecht, 1996; Tomasello, 2003). Constructionist approaches embrace the traditional view that patterns such as passive, topicalization and relative clauses are conventional pairings of form and (semantic or discourse) function – *constructions*. At the same time, constructionist approaches share certain foundational ideas with the mainstream 'generative' approach that has held sway for the past several decades (Chomsky, 1965, 1981, 1995, 2000). Both general approaches agree that it is essential to consider language as a cognitive (mental) system; both approaches acknowledge that there must be a way to combine structures to create novel utterances, and both approaches recognize that a nontrivial theory of language learning is needed.

What Counts as a Construction

Some constructionists aim to limit the use of the term CONSTRUCTION to apply to just those grammatical patterns that combine two or more elements; the elements may be either lexical or phrasal, allowing for both lexical and phrasal constructions (Sag *et al.*, to appear). Other theorists apply the term more inclusively to describe any conventional pairing of form and function, including individual morphemes and root words along with idioms, partially lexically filled and fully general linguistic patterns. Examples of each of these types are given in Table 2.

According to the more inclusive use of the term construction, any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, many constructionist approaches

Table 1 Productive or semiproductive constructions that are unusual cross-linguistically and must be learned on the basis of the input

time *away* construction	*Twistin the night away*
What's X doing Y?	*What's that fly doing in my soup?*
Nominal Extraposition construction	*It's amazing the difference!*
Mad Magazine construction	*Him, a doctor?!*
N P N construction	*house by house; day after day*
Stranded preposition construction	*Who did he give that to?*
Covariational Conditional construction	*The more you think about it, the less you understand*

Table 2 Examples of constructions, varying in size and complexity; form and function are specified if not readily transparent

Morpheme	e.g., *im-, dis-,-ment*	
Word	e.g., *armadillo, remote, or*	
Complex word	e.g., *Daredevil, shoo-in*	
Idiom (filled)	e.g., *Going great guns*	
Idiom (partially filled)	e.g., *Jog* <someone's> *memory*	
Ditransitive (double object) construction	Form: Subj [V Obj1 Obj2] (e.g., *Mike gave her a book; He baked her a carrot cake.*)	Meaning: transfer (intended or actual); see text
Passive	Form: Subj aux VP_{pp} (PP_{by}) (e.g., *The asparagus was chopped by the chef*)	Discourse function: to make undergoer topical and/or actor non-topical

argue that patterns are stored even if they are fully predictable as long as they occur with sufficient frequency (Barlow and Kemmer, 2000; Bybee, 1995; Tomasello, 2003).

Even basic sentence patterns of a language can be understood to involve constructions. That is, the main verb can be understood to combine with an argument structure construction (e.g., transitive, intransitive, ditransitive constructions, etc.) (Goldberg, 1995). The alternative is to assume that the form and general interpretation of basic sentence patterns of a language are determined by semantic or syntactic information specified by the main verb. The sentence patterns given in (1) and (2) indeed appear to be determined by the specifications of *give* and *put* respectively:

(1) Mike gave her a book.

(2) Laura put her coat on the table.

Give is a three argument verb. An act of giving requires three characters: a giver (or agent), a recipient, and something given (or 'theme'). It is therefore expected to appear with three phrases corresponding to these three roles. In (1), for instances, Mike is agent, she is recipient, and a book is theme. *Put*, another three argument verb, requires an agent, a theme (object that undergoes the change of location) and a final location of the theme's motion. It appears with the corresponding three arguments in (2). However, although (1) and (2) represent perhaps the prototypical case, in general the interpretation and form of sentence patterns of a language are not reliably determined by independent specifications of the main verb. For example, it is implausible to claim that *sneeze* has a three argument sense, and yet it can appear in (3). The patterns in (4)–(6) are likewise not naturally attributed to the main verbs:

(3) "He sneezed his tooth right across town." (*Andrew's loose tooth*, Robert Munsch)

(4) "She smiled herself an upgrade." (D. Adams, *Hitchhiker's guide to the galaxy,* Harmony Books)

(5) 'We laughed our conversation to an end.' (J. Hart. 1992, *Sin* NY: Ivy Books)

(6) "They could easily co-pay a family to death." (NYT, 1/14/02)

Examples need not be particularly novel to make the point. Verbs typically appear with a wide array of complement configurations. Consider the verb *slice* and the various constructions in which it can appear (labeled in parentheses):

(7a) He sliced the bread. (transitive)
(7b) Pat sliced the carrots into the salad. (caused motion)
(7c) Pat sliced Chris a piece of pie. (ditransitive)
(7d) Emeril sliced and diced his way to stardom. (*way* construction)
(7e) Pat sliced the box open. (resultative)

In all of these expressions, *slice* means to cut with a sharp instrument. It is the argument structure constructions that provide the direct link between surface form and general aspects of the interpretation such as something acting on something else (7a), something causing something else to move (7b), someone intending to cause someone to receive something (7c), someone moving somewhere (7d), someone causing something to change state (7e) (Goldberg, 1995, 2006). Although most linguists agree that constructions are required for unusual patterns, constructionists invoke constructions for the basic, regular patterns of language as well.

The Functions of Constructions

Different surface forms are typically associated with slightly different semantic or discourse functions. Take for example, the *ditransitive* construction, which involves the form, Subj V Obj1 Obj2 (e.g., (1), (8b), (9b)). The ditransitive form evokes the notion of transfer or 'giving.' This is in contrast to possible paraphrases. For example, although (8a) can be used to mean that Liza bought a book for a third party because Zach was too busy to buy it himself, (8b) can only mean that Liza intended to

give Zach the book. Similarly, although (9a) can be used to entail caused motion to a location (the book is caused to go to storage), the ditransitive pattern requires that the goal argument be an animate being, capable of receiving the transferred item (cf. 9b, 9c). As is clear from considering the paraphrases, the implication of transfer is not an independent fact about the words involved; rather, the implication of transfer comes from the ditransitive construction itself.

(8a) Liza bought a book for Zach.
(8b) Liza bought Zach a book.

(9a) Liza sent a book to storage.
(9b) Liza sent Stan a book.
(9c) ??Liza sent storage a book.

In addition to semantic generalizations, there also exist generalizations about *information structure* properties of the construction, or the way in which a speaker's assumptions about the hearer's state of knowledge and consciousness at the time of speaking is reflected in surface form. In particular, there is a reliable statistically tendency for the recipient argument to have already been mentioned in the discourse (often encoded by a pronoun) as compared to prepositional paraphrases (Arnold *et al.*, 2000; Erteschik-Shir, 1979; Thompson, 1990).

A difference in formal expression typically signals a difference in function. Consider, for example, the Left-dislocation and topicalization constructions in English, which at first may appear to be synonymous:

(10) The giraffe, the mouse saw it. Left-dislocation

(11) The giraffe, the mouse saw. Topicalization

Using the parsed version of the Switchboard Corpus, Gregory and Michaelis (2001) document subtle distinctions between them. The majority of the referents of the fronted NP in TOP are previously mentioned and yet do not persist as topics. The opposite holds for LD's. Thus, the left-dislocation construction is TOPIC ESTABLISHING, whereas the topicalization construction tends to be used for MORIBUND TOPICS.

Languages typically have such special constructions that allow for noncanonical packaging of information. To take another example, Lambrecht (1994) defines SENTENCE FOCUS (SF) CONSTRUCTIONS as constructions that are formally marked as expressing a pragmatically structured proposition in which both the subject and the predicate are in focus. He describes several properties of SF constructions. The function of SF constructions is presentational – namely, to present an entity or an event into the discourse (cf. also Sasse's [1987] entity-central vs. event-central thetic sentences). An English SF construction that introduces an event into the discourse is characterized by having pitch accent only on the logical subject, and not on the predicate phrase, as in (12a, b, c).

(12) Context: What happened?
(a) Her KID is sick.
(b) Her BIKE broke down.
(c) ZACH called you.

The subject in this construction is not topical and cannot be pronominal. For example, (13) can only be interpreted with a narrow focus on the subject argument (an ARGUMENT FOCUS reading) and does not permit a sentence focus interpretation:

(13) HE is sick. (possible context: A: Is she sick?
B: No, HE is sick)

The predicate in the SF construction typically has semantics that are compatible with presentation, with SF constructions crosslinguistically favoring certain unaccusative verbs such as *arrive*, *come*, *die*, and *disappear*. The same function, indicated in English by sentence accent, is marked by different formal means in other languages. The need for a full range of expressive power motivates the existence of marked construction types such as the SF construction.

Facts about the use of entire constructions, including register (e.g., formal or informal), dialect variation, etc. may be stated as part of the construction as well. Constructionist approaches provide a direct way of accounting for these facts, since constructions specify a surface form and a corresponding function.

The Form of Constructions

In order to capture differences in meaning or discourse properties between surface forms, constructionist theories do not derive one construction from another, as is typically done in mainstream generative theory. An actual expression typically involves the combination of at least half a dozen different constructions. For example, the expression in (14) involves the list of constructions given in (15a–15f):

(14) [What did Liza buy the child?]

(15a) *Liza, buy, the, child, what, did* constructions (i.e., words)
(15b) Ditransitive construction (See Table 1 for general description; instantiated by the combination of *what* and *Liza buy the child)*
(15c) Question construction (formed by combining initial *wh- word* with the Subject-Auxiliary construction and clause with a "missing" argument)
(15d) Subject-Auxiliary inversion construction (instantiated by *did Liza*)

(15e) VP construction (instantiated by [*buy the child*])
(15f) NP construction (instantiated by *What*, *Liza*, and *the child*)

Note that 'surface form' need not specify a particular word order, nor even particular grammatical categories, although there are constructions that do specify these features. For example, the ditransitive construction in (11) and discussed above is characterized in terms of a set of argument types. The overt order of arguments in (11) is determined by a combination of a verb phrase construction with the Question construction, the latter of which allows for the 'theme' argument (represented by *What*) to appear sentence initially.

Constructions are combined freely to form actual expressions as long as they are not in conflict. For example, the specification of the ditransitive construction that requires an animate recipient argument conflicts with the meaning of *storage* in (9c) resulting in unacceptability. The observation that language has an infinitely creative potential is accounted for, then, by the free combination of constructions.

Conclusion

The constructionist approach takes a somewhat different view of what is universal about language than mainstream generative approaches. Linguists generally talk of certain constructions as existing in many languages, e.g., the passive construction, relative clause construction, or question construction. However, two constructions in different languages can be identified as instances of the same construction if and only if their form and function is *identical* once other constructions in the language that may differ are factored out. In point of fact, this rarely occurs except in cases of shared diachronic history or language contact (Dixon, 1984; Dryer, 1997; Kim and Maling, 1999; Lambrecht, 1994; Zhang, 1998). As Tomasello (2003) notes, what is truly remarkable is the degree to which human languages differ from one another, given that all languages need to express roughly the same types of messages. Constructional approaches anticipate such fairly wide variability across languages (Croft, 2001; Garry and Rubino, 2001; Van Valin and LaPolla, 1997). Explanations for cross-linguistic generalizations are sought by appealing to general cognitive, pragmatic, and processing factors (e.g., Goldberg, 2003, 2005).

See also: Construction Grammar.

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Syntactic Development

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Theoretical Approaches

The syntax of human language is complex, and yet young children developing language typically acquire their system with relative ease and, for some aspects of syntax, in a relatively short time period. Children demonstrate some knowledge of the syntax of their language when they combine words productively, that is, they use combinations that are new, not just imitations, or when they show understanding of different combinations. Understanding the case markers associated with the grammatical roles of subject and object and using these forms in their own utterances is also evidence for syntactic knowledge. Children can understand different structural combinations before they use them in their own speech. This understanding has been demonstrated using experimental techniques such as asking children to act out sentences with toy animals or inanimate objects to represent the grammatical roles (e.g., the active 'The cat chased the dog' versus the passive 'The dog was chased by the cat'), picking out the matching sentence from a set of pictures, or discriminating different sentence patterns using the preferential looking paradigm.

Data and theory are not separable in discussions of syntactic development. Explanations of how children acquire the syntax of their language depend on different theoretical assumptions. According to the Universal Grammar (UG) approach, associated with Chomsky, there are innate principles of human language that limit the structure of human language and guide its acquisition. In addition, parameters restrict variation across languages; the parameters have limited options, usually two. The universal principles become accessible to the child early in the acquisition process; the parameters are set with minimal exposure to the input language. During the course of acquisition, a child may deviate from the syntax of the adult language but only in ways that languages differ from each other; the principles act as constraints. The focus in this approach is the adult language system, the target for acquisition. In contrast, the emergent grammar and usage-based approaches are input-driven, data-driven accounts. The assumption is that children gradually build up the syntactic categories and structures of their language based on the cues available in the input, for example, frequency or regularity of specific constructions. The focus is the process of building up a grammar as the child-learner becomes more familiar with the distribution patterns in the input language.

UG principles should be accessible to children regardless of the language being acquired, and so research with different types of languages is necessary to provide support for the principles. Crosslinguistic research is also necessary for determining the role of specific language characteristics in the acquisition process, for example, how particular properties of a language facilitate or delay acquisition of particular structures. In the following sections, a number of

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topics are introduced: early word combinations, the category of verb, verb argument structure, word order and case marking, the prodrop parameter, question formation, passive structures and restrictive relative clauses.

First Word Combinations

When children first join words together, often as early as 18 months, there is evidence that the word sequence is a planned unit; for example, a single intonation contour can be detected, as discussed by Clark (2003). The first combinations represent components of basic events in the child's world and are described in terms of the semantic relations they represent, rather than syntactic. For example, 'throw ball' is an Action–Object sequence. They can also be described in terms of their function; for example, 'more juice' is a request (see examples in Clark, 2003: Table 7.3). Some of the first sequences may be learned as unanalyzed chunks. Others represent a slot and frame pattern, a semi-formulaic pattern such as 'Where's ___.' A number of different items could fit into the slot in this schema.

Following from the first combinations, syntactic development is evident as children demonstrate knowledge of word categories by using words appropriately in different constructions. The development of multiword combinations by one child is illustrated in a study by Lieven *et al.* (2003), who compared the multiword combinations of a two-year-old child produced in one hour with those combinations that she had produced in previous sessions. The child was taped for one hour a day, five days a week, for six weeks, from the age of 24 months. In the last session, 37% of the multiword utterances were novel; most of these differed from the closest match identified in previous sessions by the substitution of one word (or morpheme) in an existing pattern, or schema. Three of these are listed in (1).

(1a) I want___.

(1b) Where's _____.

(1c) That's a _____.

Syntactic Categories and Verb Argument Structure

The syntactic categories of verb and noun are universal in the UG approach, part of the innate knowledge of language. In the construction grammar approach, awareness of the cooccurrence of words in different constructions, that is, the distributional properties, assist children to build up the abstract categories from specific examples. Tomasello (2003), for example, argued that children do not have an innate category of verb. He proposed that children first use a verb only in the construction in which it is heard (the 'verb island hypothesis'). Such verb-specific organization seems to be a feature of the early syntactic combinations of children's utterances.

In discussing the mapping of syntactic categories onto language specific input, Pinker (1994) argued for 'semantic bootstrapping.' He proposed that a set of innate linking rules map innately specified syntactic categories onto innate semantic categories. For example, the agent of an action, if available in a structure, will be linked to the subject role. From this initial mapping, recognition of the distribution properties of the subject would allow the child to link other semantic roles to subject, as in 'I like it' in which the subject has an experiencer role. A major problem with the semantic bootstrapping hypothesis is that the subject role in children's first multiword combinations is frequently a nonagent, and so is not likely to bootstrap children into the system.

Each verb is associated with an argument structure. A verb used transitively requires two syntactic arguments (noun phrases), a subject and an object. Transitive sentences frequently encode a caused action, as in 'He threw the ball,' in which 'he' is the agent causing the ball to move by the act of throwing. Motion verbs have one argument, the subject; however a goal argument may be added to indicate the end point of the motion, as in (2a), or a locative argument to show where the activity took place, as in (2b). In contrast, the verb 'put' requires three arguments, subject, object, and locative, as in (2c). In order to use a verb appropriately, a child must know the argument structure of the verb, as well as whether it has more than one argument structures, for instance, as does 'grow,' which is transitive in 'She grew some flowers' and intransitive in 'The flowers grew.' A number of proposals have been made as to how this knowledge is acquired.

(2a) He ran to the park.

(2b) She walked in the park.

(2c) The child put the car on the table.

The verbs that are used first tend to be those that are frequent in the input, which, in English, include 'do,' 'make,' and 'go.' These are referred to as general-all-purpose verbs, 'light' verbs or path-breaking verbs (Ninio, 1999). One view of how children learn the argument structure of verbs is that they attribute a meaning to a verb from the nonlinguistic context

and associate that verb with the particular sentence structure (frame) in which it is heard. A new verb that seems to overlap in meaning will then be used in a similar frame. Thus verbs are linked on the basis of semantic similarity, and this connection determines how they are used. The 'syntactic bootstrapping' hypothesis (Gleitman, 1990) presents another view. Because there is a close link between the meaning of a verb and the syntax, it is suggested that the syntax acts like a 'mental zoom' to help children interpret a new verb. That is, the sentence frame in which a new verb appears contributes to the child's meaning of the verb. Knowing, for example, that a verb with two noun arguments typically encodes a causal element, as in 'He dropped the book,' helps a child assign a causal meaning to the verb.

The plausibility of syntactic bootstrapping is evident from a study on the use of 25 verbs in different syntactic frames in the speech of 57 mothers to their children aged one to two years. Naigles and Hoff-Ginsberg (1995) showed that the verbs in different semantic categories appeared in different syntactic frames, and that individual verbs could be distinguished by the set of frames in which they appeared. That is, the input provides a child with a model for the semantic-syntax link. There is also support from experimental data. Using a preferential looking task, Naigles (1996) showed that toddlers make use of syntactic bootstrapping by the age of 24 months. That is, they interpreted a novel verb differently depending on the number of noun phrases accompanying it. A causal interpretation was given to a verb with two arguments and a spontaneous interpretation to the same verb with one argument. In another study by Naigles, when children were presented with a familiar verb in an odd sentence frame for that verb, for example 'The zebra goes the lion' or 'The zebra brings to Noah,' two-year-olds modified the meaning of the verb to fit the sentence frame, interpreting the first sentence as the causative 'The zebra makes the lion go,' and the second as 'The zebra brings something to Noah.' That is, the two-year-olds were frame compliant; in contrast, adults are verb compliant, relying on the known meaning of the verb to interpret such odd sentences.

Children do occasionally overgeneralize verbs, using them in nonadult-like structures, as shown in 'I'll disappear it' for 'I'll make it disappear.' Here the intransitive verb 'disappear' is used causatively in a transitive structure. Such overgeneralizations have been reported in a number of languages including English (Bowerman, 1982), Portuguese (Figueira, 1984), and Thai (Yumitani, 1998), with more intransitive verbs used in transitive structures than the reverse.

Word Order and Case Marking

Languages rely on word order or morphological cues (subject-verb agreement or case marking), or a combination of factors to encode the syntactic arguments. These cues provide the focus for children's developing knowledge of argument structure relevant to their language. In English, there are strict ordering restrictions for the subject (S) and object (O) in relation to the verb (V). The subject comes before the verb; the object follows. Data from studies using preferential looking tasks have shown that children are able to distinguish different word orders by the age of 24 months.

Not all languages have such a rigid word order. In Turkish, the subject can be positioned before or after the verb, as can the object; thus six orders are possible: SVO, SOV, OSV, OVS, VSO and VOS. An accusative case marking on definite objects in Turkish allows the object to be identified whatever its position. However, this flexibility means that the child needs to learn the case form and its function. Within a language, there may be specific variations on word order; for example, pronominal objects are placed before the verb in French while lexical objects follow. Bates and MacWhinney (1989) reported data from 13 languages, comparing the cues used by children and adults to identify the subject and object in transitive sentences in their language. Slobin (1982) compared the ages at which children acquiring English, Turkish, Serbo-Croatian, or Italian could interpret transitive sentences appropriately. The Turkish children were successful at the youngest age, 24–28 months, whereas the Italian and English were comparable in performance only at 32–36 months and the Serbo-Croatian at four years of age. Slobin credited the transparent case system of Turkish as facilitating understanding of the transitive structure. Processing local cues (case marking) to identify syntactic arguments appears to be easier than processing word order for a young child. However, when the case markers are variable in form, as in Serbo-Croatian, the task of identifying the case markers will be more complex.

Children's preferences for word order may not always match the model provided in the input, as shown in a study on double object constructions with Korean children. By the age of four, Korean children interpret OSV word order by relying on the nominative case marker to identify the subject and the accusative case marker to identify the object. Before that age, the first noun is typically taken to be the subject and the second noun the object. In a study by Cho *et al.* (2002) to test Korean children's understanding of word order and case marking, the test sentences contained two objects, a direct object

with accusative case and an indirect object with dative case. The sentences included either two animate objects, as shown in (3a), or two inanimate objects, as shown in (3b). (The dative case form is *hanthey* for animate nouns and *ey* for inanimate nouns).

(3a) So-hanthey kom-ul
Cow-DAT bear-ACC
mile-ceu-llay-yo?
push-BEN-FUT-SENTENDER
'Will you push the bear to the cow?'

(3b) Moca-ey sonswuken-ul
cap-DAT handkerchief-ACC
tencye-cwu-llay-yo?
throw-BEN-FUT-SENTENDER
'Will you throw the handkerchief at the cap?'

The children, aged from four to seven, performed better on the sentences in which the dative object followed the accusative object (AD) than when it preceded it (DA), which is the order in which the event happens, with the dative object as the endpoint of the action. Cho *et al.*, referred to this result as the iconicity hypothesis. Of interest is that in the speech of mothers to children for three dyads over a six-month period when the children were aged three years, the dative-first order (DA) was the most frequent when both objects were included in the sentence. (In Korean, an object is often omitted; see next section). The children's preferred order did not match the order modeled most frequently in the input, indicating that children move beyond the input, and may follow different strategies from adults.

The Prodrop Parameter and Argument Ellipsis

Within the UG approach, determining what counts as evidence for the setting of a specific parameter is often debated because performance factors interact with syntactic knowledge and so it is not always clear whether the parameter is set. For example, in Italian, as in a number of other languages, a pronoun subject ('I,' 'you,' 'we') can be omitted. This language variation is captured by the prodrop parameter: languages are either + prodrop or − prodrop.

Because children do not know which language they will acquire, it is assumed that they start with the same default setting and with limited experience set the parameter appropriately for their language. Children acquiring both types of language omit subjects in their early verbal utterances, leading to the conclusion that the parameter is yet to be set by children acquiring English, a nonprodrop language. Valian (1991), however, examined the number of subjects dropped by children acquiring Italian and children acquiring English and found that Italian children omitted twice as many subjects as children acquiring English. This difference in the number of nonovert pronominal subjects across the two languages was argued to support the view that the parameter had been already set. Valian explained the nonovert subjects in the speech of the children acquiring English as a performance limitation. That is, children's limited memory and processing skills affect how many syntactic arguments they produce.

A usage-based explanation for nonovert subjects is that children become sensitive to patterns of increasing length in the input language and build up knowledge about whether subjects are required or not, based on their experience. In addition to pronominal subject ellipsis, many languages also allow lexical arguments to be omitted, and not just subjects. Korean, Chinese, Japanese, Sesotho (Sotho, Southern), Warlpiri, and Inuktitut are just some of the languages that allow lexical arguments to be nonovert. In these languages, a sentence might consist of just a verb, or a verb with modifiers. Yet, a transitive verb such as the verb for 'eat' will be interpreted as 'Someone ate something.' The identity of any missing argument is inferred from the linguistic or nonlinguistic context. Ellipsis of lexical arguments is usually given a discourse explanation, for example, de Bois (1987) proposed that ellipsis is linked to Preferred Argument Structure; old (assumed) information in discourse is often assigned to the subject slot of transitive verbs, whereas new information is assigned to the intransitive subject or the transitive object. When adults omit arguments, it is generally old information that is omitted. In their early utterances, children also seem to omit information that can be assumed from context. Children acquiring a language that allows arguments to be nonovert gradually learn the constraints that are relative to that language as their knowledge of discourse linking strategies develops. In a case marking language, the case markers will not be available if the arguments are nonovert. This unavailability will have an impact on how readily children master the case forms and their function and thus may delay their syntactic knowledge.

Questions

Questions in English involve inversion: the auxiliary appears before the subject noun phrases as in the 'yes-no' question 'Are you hungry?' Information questions also include a wh-word such as 'where,' 'who,' 'what,' 'when,' and 'why.' The wh-word appears before the inverted auxiliary as in 'Where did she go?' Proponents of UG argue that question formation is too difficult to learn on the basis of

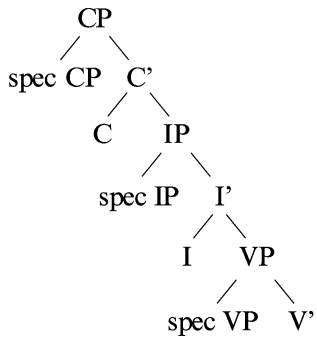

Figure 1 Structure showing I in relation to C.

patterns in the input and that errors would be predicted to be frequent. Question formation relies on a UG principle of movement, a structure dependent principle since the element to be inverted is not determined by linear order but by its structural position. For example, in the question 'Who did Mary want to invite?' the questioned element represented by 'who' is the logical object of the verb 'invite' and must be moved from the object position following the verb. The element to be moved varies, so that from the structure 'The boy who is reading a book is hungry,' the second 'is' is moved to form the question 'Is the boy who is reading a book hungry?' The moved element is the auxiliary in the main clause.

In this account, the elements in the I position are moved to the C position (see Figure 1). IP stands for Inflection phrase and CP for complementizer phrase. An auxiliary verb or a modal is moved from the I position to the C position, as in 'Can she stay?'; if there is no auxiliary or modal to move, as in 'They eat,' the auxiliary 'do' is used as a default to be inserted into I so that it can move to C, as in 'Do they eat?' The features of tense and person are generated in the I node, as are modals. The verbs 'have' and 'be,' both of which act as lexical verbs, are generated in the VP, and move to I in order to be moved to C in question formation, as in the question 'Is Teddy in the box?' Tense, number, and person are marked on the inverted element, not the lexical verb.

Young children acquiring English first produce wh-questions such as 'What you doing?' and 'Where this goes?' These do not have overt auxiliaries. Later, questions appear with inversion, such as 'What are you doing?' but these may appear alongside non-inverted auxiliaries such as 'What you can do?' [You can hear examples of a type of error in which a wh-word remains in its original position and is copied in sentence initial position; listen to the examples on two short video clips available from the LSA archives at the University of Georgia website. The videos 'What you think what she said' and 'Who do you think who's in the box?' were submitted by Stephen Crain, Rosalind Thornton, and Graciela Tesan. They show footage of two-year-olds asking questions.] Many proponents of UG support a continuity approach; they argue that the universal principles are available to children from the early stages; for question formation, it would be the principle of movement that controls inversion. To explain the deviations from the adult grammar, it is argued that while the principal is available to the children, they do not have all the language-specific properties, for example, knowledge of the features of tense, number, and person (Santelmann *et al.*, 2002).

Usage-based explanations offer another explanation as to why some questions appear with inverted auxiliaries while others do not: the frequency of specific constructions in the input influences which combinations show inversion. If a child hears a combination of a specific wh-word with a specific auxiliary, she will learn the combination as a unit. In the data reported by Rowland and Pine (2000) from transcriptions of Adam when he was aged 2; 3–4; 10, only three specific combinations of wh-word and auxiliary were used first, both with and without inversion: 'How can,' 'What's,' and 'Why is.' Other combinations of wh-word and auxiliary appeared only in one form, either the inverted or noninverted form. In 55 one-hour transcripts of Adam over the period studied, combinations of wh-word + auxiliary not previously inverted by Adam started to show inversion based on the frequency with which a model was provided in the input. Once children master question formation in simple sentences, it would be assumed the knowledge would generalize to complex sentences. (Adam is one of the three children in Roger Brown's classic study. The Adam files can be accessed on the CHILDES database [MacWhinney and Snow, 1985]).

Experimental findings also show that frequency in the input can help children form a more abstract representation of the role of auxiliary, necessary knowledge for question formation. Valian and Casey (2003) trained children aged 30–38 months over a period of four weeks by modeling or repeating a question; these children were better able to imitate questions after the training than were children who received no such training. The children were also better able to use auxiliaries that had not even been used in the training, indicating that the abstract representation for the role of auxiliaries develops as children attend to the structures in the input.

Passives

Passive structures are not frequent in the speech of children under the age of three who are acquiring

English; nor are they very frequent in the input. In interpreting passives, children who are acquiring English typically go though a stage of choosing the first noun as the agent. Thus for the sentence 'The cat was chased by the dog,' the first NP, 'the cat' will be chosen, incorrectly, as the agent. To account for the apparent late acquisition of passives, Borer and Wexler (1987), following the UG approach, proposed that the principles underlying movement are late in maturing. They argued that A-chains (argument chains) are not formed early in the acquisition process and thus verbal passives are not produced by young children, although adjectival passive such as 'The box is broken' are. A-chains are formed to link a moved element to its logical position; thus when an object is moved to subject position to form a passive an A-chain is formed. However, verbal passives are frequent in the speech of young Sesotho children (Demuth, 1989). They are also frequent in the input to Sesotho children, and this frequency seems to be the influencing factor in their early acquisition. Similarly, passives are frequent in the input to children acquiring Inuktitut (Allen, 1996; Allen and Crago, 1996) and in the input to children acquiring Quiche Mayan (Pye and Quixtan, 1988) and in both of these languages, children use passives more than children acquiring English. Thus, data on the acquisition of passives does not provide support for the maturation hypothesis.

Relative Clauses

A restrictive relative clause functions as a modifier of one of the arguments in the main clause. For example, in (4a), the relative clause 'that bit the cat' modifies the main clause object 'the horse.' In (4b), the relative clause modifies the main clause subject 'the dog.' In (4c), the relative clause also modifies the main clause subject but that noun functions as the object of the relative clause verb 'chased' and so can be referred to as an object-extracted relative clause.

(4a) The dog chased the horse that bit the cat.

(4b) The dog that chased the cat is a poodle.

(4c) The dog that the cat chased is a terrier.

Many of the early experiments testing children's knowledge of relative clauses adopted an act-out task using full relative clause structures as in (4). Some relative structures were found to be more difficult to interpret than others. Although there was some inconsistency across studies, relative clauses modifying the main clause subject were generally harder to interpret than object relative clauses, possibly because the embedded clause interrupts the flow of information. In addition, children were typically found to interpret an object relative clause as if it were conjoined to the main clause (Tavakolian, 1981). That is, sentence (4a) would be interpreted as 'The dog chased the horse and the dog bit the cat' rather than 'The horse bit the cat and it was this horse that the dog chased.'

Hamburger and Crain (1982) modified the standard act-out procedure to create felicitous conditions. They argued that findings from studies using the standard act-out task underestimated the knowledge children have about relative clauses. Since a restrictive relative clause identifies a specific referent, they provided two examples of each animal. The children could then pick the one that met the description provided in the relative clause, e.g., two horses would be provided for sentence (4a). They tested only relative clauses of the type shown in (4a). The results showed that although the accuracy of the five-year-olds was better than for the three- and four-year-olds tested, even the younger children were better able to understand the structures than in previous studies using the standard act-out task.

Children acquiring English start to produce relative clause structures spontaneously at age two. Clark (2003) gives a number of examples from her son at that age. They include 'I leave it over there where I eat supper' and 'I'm going to show you where Mr Lion is.' These early structures are not always full relative structures, but function in the same way, introducing modifying information to a preceding or assumed noun. As Clark points out, common features of these early relative clauses is that they are placed at the end of the sentence and lack a relative marker such as 'that' or 'who.'

In a study on spontaneous relative clauses produced by four English-speaking children aged from 1;9–5;2, Diesel and Tomasello (2000) identified 75% of the examples produced by the children at age two as presentational relative clauses. A presentational structure is used to introduce new information. Examples included: 'Here's a mouse go sleep' and 'That's a turtle swim.' Both examples show reduced relative structures. Most lacked a relative marker and did not contain a clause embedded in another, the characterization of a relative structure. Instead, they were one-clause structures. In addition, most examples included intransitive verbs, so limiting the number of arguments expressed. In the input to the children, 54% of the relative structures were presentational. Thus, the children had frequent models from which to extract semiformulaic patterns into which different items could slot.

Conclusion

The acquisition of the syntax of a language is not instantaneous. However, there is clear evidence that by the age of three, children know a lot about the syntax of their language. Knowledge of complex sentence structures, not covered in this review, continues to develop after this age. Different perspectives are taken on how syntactic knowledge develops. Proponents of UG propose that universal principles guide the child in the acquisition task; they argue that children extend beyond their experience with a particular language. Proponents of data driven and emergent grammar approaches argue that children learn from the data provided by the language; language specific properties guide the acquisition process. How children's spontaneous productions and how their performance on experimental tasks is interpreted are very much dependent on the theoretical assumptions made.

See also: Argument Structure; Brown, Roger William (b. 1925); CHILDES Database; Chomsky, Noam (b. 1928); Control and Raising; Creativity in Language; Cross-Linguistic Comparative Approaches to Language Acquisition; Discontinuous Dependencies; Ellipsis; Grammar; Language Acquisition Research Methods; Language Development: Morphology; Language Development: Overview; Principles and Parameters Framework of Generative Grammar; Relative Clauses; Slobin, Dan Isaac (b. 1939); Syntactic Constructions; Verbs; X-Bar Theory.

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Syntactic Features and Feature Structures

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Classical grammars approach grammatical analysis essentially as a problem of classification, as Matthews (1991: Sect. 10) observes. An utterance is divided into parts, which are assigned to word classes and then subclassified in terms of their 'accidents' or properties. A fundamentally similar conception of grammatical analysis is incorporated in modern feature-based grammars. Modern approaches have developed more complex and somewhat more imposing constraint languages and formal representations. But underlying this feature technology is a core of relatively straightforward claims and hypotheses. Foremost among these is the idea that grammatical properties and dependencies – local and nonlocal – can be described in terms of complex-valued features. It is the use of complex feature values to express grammatical dependencies that principally distinguishes approaches such as GPSG, LFG, and HPSG from models that attribute the 'flow' of feature information to constituent-structure displacements or other mechanisms.

A second key idea is that feature matching within an endocentric phrase need not be confined to the word-class features that define major categories such as noun, verb, and adjective. All feature-based approaches provide strategies, of one sort or another, which allow a phrase to share the inflectional properties of its syntactic head. These strategies allow the number features of a noun to be shared with the noun phrase that it heads, and permit the tense and agreement features of a verb to be shared with the verb phrase or clause that it heads. The resulting syntactic analyses are, so to speak, 'bushy,' as the feature information at a given node tends to be relatively dense, but there are comparatively few nodes between the 'root' and 'leaves' of an analysis.

Feature-based approaches also tend to regulate grammatical dependencies *constructively*, by consolidating the properties of heads and arguments, agreement targets, and controllers, and even 'fillers' and 'gaps.' In most approaches, the elements in a grammatical dependency are identified as the same structure. The early feature-based accounts, described by Shieber, 1986, identify feature structures by applying a symmetrically destructive *unification* operation. In more recent accounts, the elements in a grammatical dependency are interpreted as 'co-descriptions' of a common structure. This reflects a general shift to a description-based perspective, in which grammatical expressions, such as rules, constraints, or entries, are interpreted as *descriptions*, and objects such as trees and/or feature structures are interpreted as structures that *satisfy* those descriptions. This separation has led to the development of feature logics for grammatical description (Johnson, 1988; King, 1989; Carpenter, 1992), providing a point of contact between feature-based approaches and other deductive grammar formalisms, such as the Lambek calculus.

The Structure and Distribution of Feature Information

To a great extent, the form of a syntactic analysis reflects assumptions about the organization and distribution of morphosyntactic information. In simple terms, feature-based models adopt comparatively simple constituent structures and more articulated feature structures, whereas transformational accounts assume relatively simple feature bundles, but highly complex constituent structures. This contrast can be traced to different ideas about the distribution of features.

The prerequisites of a feature-based approach are fully present in standard theory transformational grammars, which contain atomic features, complex symbols, and a lexical insertion rule whose nondistinctness condition (Chomsky, 1965: 121) anticipates operations like unification. Nevertheless, the descriptive potential of these devices is severely constrained in the standard theory by the fact that complex values

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are confined to the preterminal level on which they are introduced. Similar constraints on the distribution of morphosyntactic properties likewise determine the form of analyses in late transformational models, such as Chomsky, 1995.

Syntactic analyses in these accounts are much more 'spindly' than those in feature-based models, as the information at any given node tends to be sparse, but there are many more nodes over which information is distributed. This organization reflects the view that word class features are fundamentally different in character from other types of lexical or inflectional properties. This view in turn can be traced to the fact that the 'morpheme class marks' in Harris (1951: 263) only represent word class and contrasts between simple and complex expressions. This focus on word class and phrase type was retained when Chomsky (1970) recast Harris' distributional model as X-Bar Theory. The X-bar conventions thus provide a general mechanism for matching the word-class features of an endocentric phrase and its syntactic head. These conventions do not, however, regulate the compatibility of other types of features. Within the transformational paradigm, this has led to the wholesale reclassification of inflectional properties as word-class features, associated with various types of abstract formatives. Reclassifying traditional properties such as tense or aspect as features of functional heads allows these properties to be regulated by the restricted X-bar conventions. Agreement properties are similarly balkanized into a sequence of abstract formatives, each with a category that corresponds to a traditional agreement feature.

The Role of Complex-Valued Features

Feature-based models take a more conservative view, in which the properties traditionally associated with a word class are directly assigned to the lexical items in that class. Verbal properties, such as tense, aspect, mood, and voice, are directly associated with verbs, and nominal properties such as person, number, gender, and case are associated with nouns. However, the key innovation in feature-based approaches involves the use of complex feature values to regulate grammatical dependencies. The analysis of subject-verb agreement provides a useful illustration. The subject agreement demands of an English verb such as *skis* may be expressed by assigning *skis* a complex-valued SUBJ(ECT) attribute that contains the features that represent third person and singular number. In a simple feature system, these might be [PER 3] and [NUM *sg*]. Agreement between *skis* and *he* in (1) is then keyed to a requirement that the subject features associated with the verb must be compatible with the grammatical features of its syntactic subject. The details of this analysis vary across approaches, though the leading idea is that the properties of the agreement 'controller' *he* and the agreement 'target' *skis* must contain no features that conflict. In the early feature-based models described in Shieber (1986), this is regulated by first assigning the subject *he* and the verb *skis* the partial feature structures in (1). The compatibility of these structures is then determined by unifying them, which defines the structure associated with *he skis* in (1)

(1) Agreement via complex-valued agreement features

In models such as LFG (Kaplan and Bresnan, 1982) or HPSG (Pollard and Sag, 1994), the agreement constraints in the entries for *he* in (2a) and *skis* (2b) are interpreted as partial descriptions of an agreement matrix. Compatibility between the agreement properties of *skis* and those of its syntactic subject is determined by interpreting the constraints in (2a) and (2b) as descriptions of the same feature structure, in accordance with the constraint stated informally in (2c).

(2a) *he*: {(per = 3), (num = *sg*), (gend = *masc*)}
(2b) *skis*: {(subj per = 3), (subj num = *sg*) . . . }
(2c) A verb's subj features describe the same structure as the features of its syntactic subject.

On either a unification- or description-based alternative, agreement is a symmetrical relation, unlike the asymmetrical 'copying' relations assumed in many transformational accounts. There is no requirement that agreement properties must be uniquely associated with the agreement target or controller, or that either element must in any sense be more informative than the other. Symmetry is widely viewed as a virtue, as order-independent formalisms fit particularly well with incremental models of comprehension or production. Nevertheless, it remains to be seen whether a symmetrical approach can provide illuminating analyses of all of the cases that motivate the traditional distinction between agreement 'controllers' and 'targets' (Corbett, 1991).

The introduction of complex-valued features overcomes many of the descriptive limitations of simple phrase structure systems, as originally noted in Harman (1963). For example, the subcategorization demands of a transitive verb can be represented straightforwardly by a complex-valued OBJ(ECT) attribute. The verb's demands will be satisfied if its OBJ properties are compatible with the properties of its syntactic object, where compatibility can again be determined in unification- or description-based

terms. Nonlocal dependencies can likewise be described by means of a chain of local dependencies involving complex-valued attributes.

In the subject raising example in (3a), the expletive *it* occurs as the subject of *seems* but ultimately satisfies the valence demands of the embedded weather verb *raining*. The term 'raising' reflects the fact that transformational descriptions of this pattern tend to introduce *it* as a syntactic subject of *raining*, which is then advanced to the matrix subject position by means of constituent-structure displacements. Complex-valued features permit an account of this pattern in terms of a sequence of identities. The idea is just that the SUBJ features of a subject-raising verb are interpreted as describing the same feature structure as the SUBJ features of its complement, in accordance with (3c). If, as often assumed, *seems, have*, and *been* are all classified as subject-raising verbs, then the SUBJ features of *seems* will describe the same structure as the SUBJ features of *have*. The SUBJ features of *have* will describe the same structure as the SUBJ values of *been*, and the SUBJ features of *been* will in turn describe the same structure as the SUBJ features of *raining*. Through this chain of identities, the SUBJ demands of each of the verbs in (3a) will come to describe the same structure. In order to satisfy the demands of *raining*, this structure must be the structure associated with the expletive subject *it*. Hence *seems* must select *it* in (3a).

(3a) It seems to have been raining.
(3b) The subject-raising (SR) verbs in English include *seem*, *have*, and *be*.
(3c) A SR verb's SUBJ features describe the same structure as its complement's SUBJ features.

Complex-valued features also permit the description of grammatical dependencies that span potentially unbounded domains, as initially demonstrated by the treatment of extraction constructions in GPSG (Gazdar *et al.*, 1985). The principle is the same as in the treatment of raising constructions, though different grammatical attributes may mediate between a 'filler' and 'gap.'

Compatibility and Identity

Individual feature-based approaches differ in a variety of technical respects, such as the relative informativeness of the structures that are taken to satisfy a grammatical description. Whereas structures in LFG are 'minimal' solutions to a set of constraints, a structure in HPSG is assumed to be specified for any properties that are appropriate for structures of its type. The organization of structures into hierarchies of 'types' is another distinctive characteristic of HPSG accounts.

A number of more general issues also arise within the broad class of feature-based formalisms. One basic issue concerns the use of unification or identity to model grammatical 'compatibility.' It has often been observed that a single element appears to be able to satisfy multiple, conflicting demands if it is neutral for the conflicting features. In German, for example, a verb form such as *kaufen* allows either the 1pl subject *wir* or a 3pl subject such as *sie*. This correlates with the fact that *kaufen* is compatible with both *wir* and *sie* in the coordinate structure in (4).

(4) ...*weil wir das Haus und sie den Garten kaufen*.
...because we.1pl the house and they.3pl the garden bought
'...because we bought the house and they the garden.'

As Ingria (1990) notes, 'destructive' operations like unification would be expected to eliminate the feature neutrality that allows *kaufen* to combine with *wir* and *sie* in (4), since unifying the agreement features of *kaufen* with the features of either subject will yield an agreement matrix with person features that conflict with those of the other subject. A similar issue arises on a description-based alternative that interprets the SUBJ features of *kaufen* as describing the same structure as the features of *wir* and *sie*, since no consistent structure can satisfy the properties of *kaufen*, *wir*, and *sie*. Ingria proposes that compatibility is more appropriately regulated by a 'nondistinctness' check. However, a simple check would sacrifice feature-based accounts of nonlocal dependencies. It is the identification of SUBJ values in (3a) that associates *seems* with the subject demands of *raining*. If the SUBJ features of a raising verb need only be nondistinct from those of its complement, nothing would ensure a higher verb 'inherits' SUBJ features of a lower verb.

There is a variety of options between distinctness and identity, and there is as yet no clear consensus regarding the best general solution to the challenge that Ingria articulates. One possibility is that the properties of a head and dependent are, in effect, 'consolidated upward' and associated with the constituent formed by combining the head and dependent. On this alternative, the third structure in (1) would be associated with the sentence *he skis*. The subject-verb agreement constraint would require that SUBJ properties of *skis* in (2b) and the properties of *he* in (2a) must both describe this structure. If, as in (4), a verb is affiliated with multiple clauses, its SUBJ properties would be required to describe the structure

associated with each clause. The properties of a subject would also be required to describe the structure associated with the clause that contains it. But nothing would enforce the compatibility of subjects in different clauses. The SUBJ features of each verb in (3a) would likewise be required to describe the structures associated with the verb phrases under which it is embedded. However, nothing would require an embedded structure to satisfy the properties of a higher verb. Thus, the SUBJ structure associated with the matrix verb phrase in (3a) would satisfy the SUBJ features of *raining*, but the SUBJ structure associated with the verb phrase headed by *raining* would not satisfy the agreement demands of *seems*.

In short, a transitive relation is required to 'propagate' compatibility demands over a nonlocal domain, and identity is a canonically transitive relation. However, relations weaker than identity (or operations less symmetrically 'destructive' than unification) might ultimately be more appropriate for regulating grammatical dependencies within a feature-based approach. One might then ask whether token-identity is ever really needed. The constraints in (2c) and (3c) both interpret two descriptions as referring to the same structure, and identity statements are generally interpreted as requiring token identity of structures. Yet it is by no means clear that the same compatibility demands will not be enforced if identity constraints are satisfied by type-identical structures. In effect, this amounts to moving identity out of feature structures and confining it to the constraint language of a feature-based approach. The treatment of other logical operators provides a model. Karttunen (1984: 30) introduces negative constraints on pair nodes that 'prevent the nodes from ever becoming alike.' In description-based models, a negative (or disjunctive) constraint is interpreted as describing a family of satisfying structures. There are no negative or disjunctive structures, just negative or disjunctive descriptions of structures. This type of reinterpretation can also be applied to identity, so that there are no reentrant (token-identical) structures, only identity constraints, which are satisfied by type-identical structures.

In summary, the classification of features and the relative complexity of feature structures and constituent structures are issues that clearly distinguish feature-based approaches from transformational alternatives. Within the class of feature-based models, one can identify strategies for describing grammatical dependencies, model-theoretic perspectives on grammatical analysis, and a number of formal and empirical questions that these strategies and perspectives raise.

See also: Functional Categories; Head-Driven Phrase Structure Grammar; Lexical Functional Grammar; Unification, Classical and Default; X-Bar Theory.

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Syntactic Variables and Variable-free Syntax

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Introduction

Chomsky's influential analysis of human language in terms of Transformational Grammar argued two points. The first was that the lowest levels of what later became known as the Chomsky Hierarchy of formal language classes characterizable by both rule types and automata, namely the Finite State Languages and the Context-Free Languages, could not adequately capture the phenomenon. The second was that rules of a different kind, called Transformations, were appropriate for the purpose.

Transformations were defined as tree-modifying rules, and were not initially identified with any specific level in the Chomsky hierarchy, although they were soon shown to lie at the highest level. Some of them included variables over sequences of words and constituents. Such rules showed a tendency to 'overgenerate' – that is, to allow strings that were not allowed in the language under analysis (or indeed in **any** language) – and to require the specification of attendant constraints and conditions to confine the grammar to generating all and only the legal sentences.

Work in theoretical linguistics then began to proceed along two paths. On the first path, the emphasis was on descriptive adequacy, in the sense of generatively accounting for all and only the sentences of any given language, and on analyzing the constraints themselves, in the reasonable expectation that this process would reveal important generalizations. This approach tended to be accompanied by a corresponding reduction in the variety of the transformational rules themselves to a small number of operations of great generality involving variables. This approach, which was led by Chomsky himself, was the direct descendant of Transformational Grammar, and was essentially 'top-down' or phenomenological in orientation, emphasizing the Autonomy of Syntax – that is, its independence as an object of study from other modules such as semantics or the processor, a position that Chomsky defended in a series of philosophical works starting with *Cartesian Linguistics* (1966).

On the other path, the emphasis was on identifying grammar formalisms of lesser expressive power, without the use of variables, from which the behaviors described by constraints on transformations would emerge without requiring explicit stipulation.

It is this sense of the term 'variable-free syntax' that is the present concern. (The term is sometimes used in a quite different sense within some categorial approaches stemming from Montague Grammar to refer to a much stricter regimen pioneered by Szabolcsi and Jacobson, forbidding the use of variables in logical forms, in order not to compromise the Montagovian model-theoretic doctrine of the nonessential nature of logical forms in semantics. The relation of this work to variable-based and variable-free approaches in the present sense is discussed by Dowty (1993). This work is discussed in **Categorial Grammars: Deductive Approaches**.

The emphasis on this other path was on explanatory adequacy, in the sense of reducing the degrees of freedom in the theory, and on parallels between rules of syntax and semantic interpretation. There was a widespread tendency toward Lexicalization of grammar, and an active involvement of computational linguists and psycholinguists in defining the theory of grammar.

These two approaches coexisted, fairly amicably though not always with complete mutual understanding, for a number of years, assimilating each other's discoveries from time to time. There are clear signs that these two programs will soon converge on a unified explanatorily adequate theory.

Variables in the Theory of Syntax

Transformations are defined by Chomsky in terms of a Structural Analysis and a Structural Change. The first of these defines the set of phrase-structure trees to which the transformation may apply in terms of a Proper Analysis, which can be thought of as defining sequences of category labels obtainable by making a 'cut' across all branches of the tree. The Structural Change then specifies a rearrangement of the elements of the proper analysis in terms of elementary transformations of substitution, deletion, and adjunction. For example, the phrase structure tree underlying passive sentence *Johnnie was loved by Frankie* is obtained from the phrase structure tree that also underlies the active *Frankie loved Johnnie* by an (optional) transformational rule that might be written (simplifying various original notations) as follows:

$$
\begin{array}{llllllll}
(1) & \text{SA:} & NP_1 & Aux & V & NP_2 & \Rightarrow & \\
 & \text{SC:} & NP_2 & Aux & be & en & V & (by\ NP_1)
\end{array}
$$

(The realization of both active and passive sentences involves further applications of an Affix Hopping transformation.) Similarly, the transformation that derives relative clauses such as *(the man) who likes Frankie*, (*the man) who Frankie likes* and *who Frankie said Johnnie likes* from canonical clauses

might be written (again simplifying) as the following *Wh*-movement transformation, where *Wh* is the category of relativized elements like *who(m), to whom*, etc.:

(2) SA: *X* *Wh* *Y* *Z* ⇒
SC: *Wh* *Y* *X* *Z*

Unlike the former rule (1), rule (2) makes use of a variable *Y*, which ranges over sequences of categories corresponding to such nonconstituent prefixes as *Frankie likes* and *Frankie said Johnnie detests* among infinitely many others, including the null or empty string. (It is worth noting that there is a certain obscurity in transformational rules like the above as to what structure relates *X, Y*, and *Wh*. This obscurity is only partly corrected by certain global conditions, such as that deletions should be recoverable and that transformations do not change meaning, in the sense that it is not clear how the rule itself embodies or imposes the latter condition.)

As Chomsky himself pointed out, rule (2) overgenerates, because the variable *Y* can also match category sequences underlying clause prefixes like *Frankie likes Johnnie and* to yield ungrammatical relative clauses such as the following:

(3) (a man) *who Frankie likes Johnnie and

Chomsky accordingly proposed an A over A condition on rule (2), forbidding the movement of *Wh*-elements of type NP (PP, etc.) out of elements of type NP (PP, etc.). Ross and others went on to identify an extensive catalog of specific Constraints on *Wh*-movement, including the Coordinate Structure Constraint, the Fixed Subject Condition, and the cynically named Clause-Non-Final Incomplete Constituent Constraint, which respectively exclude the following examples, which would otherwise be allowed by (2):

(4a) (a man) *who Frankie likes and Johnnie detests him
(4b) (a man) *who Frankie said that detests Johnnie
(4c) (a man) *who Frankie proved to that she could sing

Many of these constraints had a highly specific stipulative character. For example, the Coordinate Structure Constraint, which rules out (3) and (4a), carries an Across-the-Board exception to allow (5a) and a further Same-Case condition on the exception to forbid (5b):

(5a) (a man) who Frankie likes and Johnnie detests
(5b) (a man) *who Frankie likes and detests Johnnie

Much subsequent work within the Chomskean mainstream followed, attempting to identify significant generalizations over such constraints.

Meanwhile, Kimball, and Peters and Ritchie had shown that, once transformations as conceived by Chomsky were fully specified formally, they were of a class characterizing the highest level of the language hierarchy, level 0 or the recursively enumerable languages, equivalent in automata theoretic terms to a Universal Turing Machine. This also led to a search for linguistically plausible ways of restricting transformations to at least generating decidable recursive sets.

However, a far more important effect of this work was to focus renewed attention on the importance of making grammars fully formal, and on the danger of inadvertently allowing huge expressive power in the theory. (Even the Type 1 (Context-Sensitive) subset of the decidable recursive sets include members with wildly unnatural properties, such as the nonconstant-growth language a^{2^n} (discussed by Joshi). The result was to revive interest in the more general question of identifying as low a bound as possible on the expressive power required to capture the syntax of natural languages with strong adequancy.

The answer to that question is the same as for an artificial language such as a programming language, namely: whatever power is required to support the Compositional Semantics of that language. This is not terribly helpful, since we have a very limited formal grasp of natural language semantics. However, the fact that the syntax of programming languages and logics (which include languages capable of expressing any Turing machine-computable function) is essentially entirely context-free caused a number of researchers to question the wisdom of starting with such a powerful class of rules as transformations in the first place. Such observations revived interest in the question of exactly where on the language hierarchy natural languages fell, and in the question of whether there were other, possibly much less expressive, grammar formalisms from which the constraints of TG would follow without stipulation. Much of this work had the effect of eliminating the use of variables in the transformational sense, although it is also stressed that mere elimination of such variables from the transformational account is not of itself enough to limit the capacity of TG to generate all recursively enumerable sets. Peters and Ritchie's proof still goes through, as Friedman points out.

Moves to Restrict Expressive Power

A key observation due to Emonds and Kimball was that *Aspects*-style transformations came in two distinct varieties that they distinguished respectively (and slightly nonoverlappingly) as 'structure-preserving' or 'cyclic,' and 'root' or 'last-cyclic.' The former class included transformations such as passive, (1),

that apply to elements local to the domain defined by the Transformational Cycle (essentially that of the tensed verb), and were characterized by moving things to positions that were already licensed by rules in the grammar – for example full passives like *Frankie was loved by Johnnie* are homomorphic to nonpassive predicatives like *Frankie was serious by inclination*. For Kimball at least, the former class was also identified by not involving the use of variables. (Emonds classified wh-movement as structure-preserving, involving a base-generated COMP.)

These observations suggested a number of simplifications to TG. First, if the first kind of transformation was local to a headed domain, and only produced structures that were already captured in the base grammar, then the corresponding constructions might as well be handled there via Base-Generation, without the involvement of such a potentially more powerful class of rules. As a corollary, the involvement of lexically headed local domains suggested that this base-generative component could be lexicalized. Either tactic would have the advantage of eliminating the unclarity in rules like (1) as to exactly what structure was implicated in the output of the rule. These implications were influentially taken up by Brame and Bresnan.

Second, these observations focused attention more narrowly on constructions like *Wh*-movement and rules involving variables like (2). While Emonds' particular characterization of them as structure-preserving rules made use of transformational variables, and appeared to stretch the definition of structure-preservation undesirably, it also suggested that a base-generative treatment should be possible. (This is a suggestion that Chomsky partly took up in proposing a cyclic analysis, and which Bresnan opposed. However, variables are still used under Chomsky's proposal to define a 'subjacency' constraint to keep the transformation bounded, rather than explicit lexicalization.)

In this connection, it is interesting that the computational linguists Thorne, Bratley and Dewar and Woods, in line with a suggestion implicit in Kuno, had already proposed a form of base-generative grammar embodied in a type of parser that Woods named the Augmented Transition Network (ATN). The ATN grammar used a surface grammar of English comprising context-free rules represented as finite-state automata whose state transitions were associated with operations of a fixed set of registers or storage locations representing the underlying deep structure or meaning representation. Since these operations could be arbitrary LISP expressions, the ATN was in principle Turing Machine-Equivalent. However, the fact that its operations were limited to a fixed set of registers directly embodied the structure-preserving property of cyclic transformations such as passive (1), as Bresnan pointed out. Moreover, the transformations that involved sequence variables, like *Wh*-movement (2), involving nonadjacent elements, were handled in a strikingly novel way by a register computation. At the point in the base-generative recursive transition network where a 'moved' element such as a relative pronoun was encountered, a marker was transferred to a special register called HOLD. The rules defining the nounphrase and other 'movable' argument types were augmented with an extra transition allowing a marker of that type to be retrieved from the HOLD register in lieu of an *in situ* argument. One of the attractions of this computational approach is that it made the process of parsing transformations entirely incremental: the work of transformations was done on the fly, at the point in the left-to-right process where the information relevant to the transformation became available.

This mechanism anticipated the interpretation of movement in terms of coindexation in later Transformational Grammar, and was seen by Woods himself as offering a way to constrain *Aspects*-style transformations. The ATN led to a number of extensions of of base-generative grammars using structural Unification, following a proposal by Kay, including Bresnan and Kaplan's Lexical-Functional Grammar (LFG) and Pollard and Sag's Head-driven Phrase Structure Grammar (HPSG). However, unification like TG makes essential use of variables ranging over structures, and it is easy to write dismayingly simple unification grammars that generate non-constant-growth languages like a^{2^n}, as Berwick and Weinberg showed.

However, Woods made another, orthogonal, suggestion about how the power of grammars could be limited when he suggested that the predominantly nesting behavior of multiple dependencies could be captured by making the ATN HOLD register a stack, or push-down store, from which more recently stored elements must be retrieved before earlier ones can be accessed. Since a context free surface parser already uses a stack to control recursion, this restriction did not in itself limit the Turing-machine power of ATNs. Nor was it clear how to handle the known exceptions to dependency nesting. However, it was a strikingly simple mechanism for constraining movement without the use of structural variables that has many echoes in the accounts that followed

Nearly Context-Free Grammars

One early response to the renewal of interest in low-expressive power grammars for natural language was Gazdar's Generalized Phrase Structure Grammar (GPSG), which showed that almost all of the facts about English that had appeared to call for a

transformational analysis, including agreement, the structure-preserving or bounded constructions, wh-movement, and at least some varieties of deletion under coordination, could be captured using entirely context-free rules, on the assumption that grammatical categories like NP and VP were bundles of Attribute-ValuePairs, where attributes were constants such as *number* and whose values were constants such as *plural* or variables over such constants, rather than the arbitrary structures of full unification grammar. Crucially, one such attribute, called SLASH, whose value could be a category name like NP, identified the category in question as having an argument of that category extracted from the structure it dominated. Crucially, the SLASH feature could pass from the parent node of a rule to an offspring node. Thus as well as the standard rule (6a) expanding S, GPSG allowed rule (6b), meaning that an S with an extracted NP could be rewritten as an NP and a VP with an extracted NP:

(6a) *S* → *NP VP*
(6b) *S/NP* → *NP VP/NP*

(The attribute-value pair ⟨SLASH, *NP*⟩ is written */NP*. CPSG nonterminals such as *VP/NP* denote constituents of type *VP*, and should not be confused with the category written the same way in Categorial Grammar, which is the type of a function *into VP* – that is, that of a transitive verb.) Further rules either introduce such slashes, as in (7a), pass them on to arguments of the VP, as in (7b) and (7c), or realize the SLASH feature as either the empty string, as in (7d), or as a trace.

(7a) *N* → *N Wh S/NP*
(7b) *VP/NP* → V_{14} *NP/NP*
(7c) *VP/NP* → V_{15} *S/NP*
(7d) *NP/NP* → ε

(V_{14} and V_{15} are preterminals for transitive and sentential complement verbs, respectively.) This grammar allows derivations such as the following:

(8a)

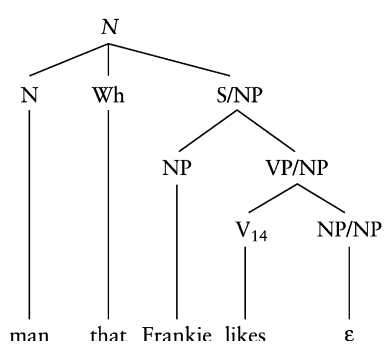

(8b)

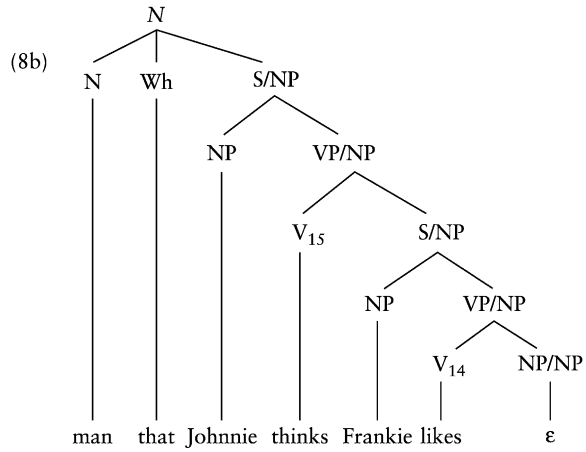

On the assumption that coordination was a rule that could combine any categories of the same type, and that S, VP, and S/NP were all distinct types, GPSG captured the Coordinate Structure Constraint on extraction, the Across-the-Board Exception to that constraint, and the Same-Case Condition on that exception, together with the corresponding facts about rightward extraction under coordination, among other significant generalizations. For English, at least, it went a long way toward providing a full grammar of long-range dependency without the use of transformations or transformational variables.

However, there were known phenomena involving multiple dependencies that made it seem highly likely that more power would be required. One was the existence of constructions with multiple dependencies. In particular, so-called Verb-raising Constructions in Germanic presented examples of constructions that obligatorily **crossed** arbitrary numbers of long-range dependencies between infinitival verbs and their arguments in verb-final constructions. Such crossing dependencies were known to be beyond the strong generative capacity of CF grammars. As in the case of the ATN HOLD register, it was not immediately clear how to generalize the GPSG SLASH feature so as to allow multiple dependencies without increasing expressive power too far.

Meanwhile, two other ways of generalizing context-free grammars while retaining low expressive power had been proposed within computational linguistic frameworks. Tree-Adjoining Grammar (TAG), first proposed by Joshi, Levy, and Takahashi, was extended by Joshi and Levy to cover unbounded dependencies using a mechanism that amounts to base-generated coindexation. TAG takes two types of elementary tree as its building blocks. The operation of Substitution combines initial trees representing the local domain of a head such as a verb or a noun.

The operation of Adjunction combines auxiliary trees with (possibly derived) trees and is the distinctive operation of the formalism. An example of topicalization will show the general idea (the notation is from a later, lexicalized version of theory). An initial tree α_1 defines one possible local domain for a transitive verb *like*, in which the object is in topic position and is coindexed with an empty extraction site. An auxiliary tree β_1 represents the domain of the verb *thinks*. Other initial trees $\alpha_{2,3}$ are the NP arguments of the verbs, and combine by substitution. The crucial part of the derivation lies in the operation of adjunction, which has the effect of 'splitting' the S node in α_1, and 'Chomsky adjoining' β_1, 'stretching' the base-generated dependency between the topicalized object and the embedded verb:

(9)

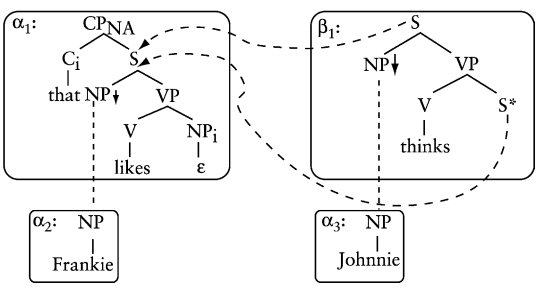

The following derived structure, in which the adjoined β_2 is circled, results:

(10)

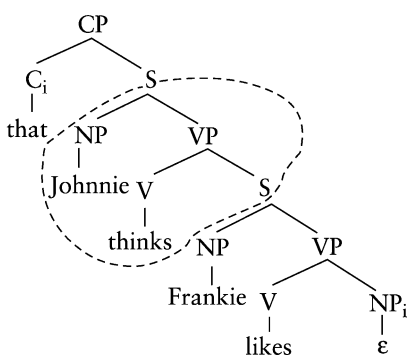

Since this derived tree is of an appropriate kind for further adjunctions of auxiliary trees like β_1, the unbounded nature of topicalization and relativization is captured. The adjunction operation is the principal source of the trans-context-free expressive power of TAG.

A second generalization of lexicalized context-free grammar, based on Categorial Grammr (CG) was called **Combinatory Categorial Grammar** (CCG). In CCG, syntactic heads are associated with a functional type defining their local domain. For example, the transitive verbs *likes* and *thinks* are written as follows, defining them as function from NP and S, respectively, on the right into functions-from-NPs-on-the-left-into-S (these slashes should not be confused with the GPSG SLASH feature notation defined above):

(11a) likes := $(S\backslash NP)/NP$: *likes*'
(11b) thinks := $(S\backslash NP)/S$: *thinks*'

Since all linguistic categories in CCG are syntactically defined only as to their type, rather than as a syntactic structure, CCG categories, rules, and derivations are accompanied by a logical form associated via a colon operator. Logical form is the only representational level that is countenanced in CCG

The proposal behind CCG was to use a single category such as (11a) to determine **both** the local dependency between a verb an an *in situ* object **and** the unbounded dependency between that verb and an extracted object such as a topic or relative pronoun. (Ades and Steedman explicitly related this idea to that of using the 'same' stack to mediate recursion and unbounded movement in an ATN.)

In order to capture unbounded dependency, besides the standard CG context-free operations of (forward and backward) function application, such as (12a), CCG includes rules of Functional Composition, such as (12b), and rules of Functional Substitution/Connection (first proposed by Szabolcsi for the analysis of Parasitic Gaps), such as (12c), in conjunction with lexical (forward and backward) type-raising of all argument categories, as in (12d), including relative pronouns, as in (12e), (again, logical forms are included, using the notation of the λ-Calculus with concatenation as application):

(12a) *Forward application (>):*
$X/Y : f\ Y : a \rightarrow X : fa$
(12b) *Forward composition (>**B**):*
$X/Y : f\ Y/Z : g \rightarrow X/Z : \lambda z.f\ (gz)$
(12c) *Forward crossed substitution* (>**S**):
$(X/Y)\ /\ Z : f\ Y/Z : g \rightarrow X/Z : \lambda z.fz\ (gz)$
(12d) *Nominative lexically type-raised NP category:*
we := $S\ /\ (S\backslash NP)$: $\lambda p.p$ *we*'
(12e) *Relative pronoun category:*
who(m), that := $(N\backslash N)\ /\ (S/NP) : \lambda p \lambda n \lambda x.(nx) \wedge (px)$

(Other syntactic operators corresponding to structure-preserving transformations have been proposed by Bach and Jacobson.) Although the CCG notation for rules uses variables *X, Y* over syntactic categories, this is a nonessential use as an abbreviation over a finite set of single category types, distinct from the transformational use of variables. And although

the λ-terms of logical form use variables, these are not **syntactic** variables in the relevant sense. Again, the general idea can be understood from the following derivations, in which rules of (forward and backward) application are indexed with unadorned arrows, (forward) composition is indexed $>\mathbf{B}$, (forward, lexical) type-raising is marked $>\mathbf{T}$:

(13)
$$\begin{array}{cccc}
\text{man} & \text{that} & \text{Frankie} & \text{likes} \\
\overline{N} & \overline{(N\backslash N)/(S/NP):} & \overline{S/(S\backslash NP):}\,{>}\mathbf{T} & \overline{(S\backslash NP)/NP:} \\
man' & \lambda p\lambda n\lambda x.(nx)\wedge(px) & \lambda f.f\ frankie' & \lambda x\lambda y.likes'xy \\
 & & \multicolumn{2}{c}{\overline{S/NP : \lambda x.likes'x\ frankie'}\,{>}\mathbf{B}} \\
 & \multicolumn{3}{c}{\overline{N\backslash N : \lambda n\lambda x.(nx)\wedge(likes'x\ frankie')}\,{>}} \\
\multicolumn{4}{c}{\overline{N : \lambda x.(man'x)\wedge(likes'x\ frankie')}\,{<}}
\end{array}$$

(14)
$$\begin{array}{ccccccc}
\text{man} & \text{that} & \text{Johnnie} & \text{says} & \text{Frankie} & \text{likes} \\
\overline{N} & \overline{(N\backslash N)/(S/NP):} & \overline{S/(S\backslash NP):}\,{>}\mathbf{T} & \overline{(S\backslash NP)/S:} & \overline{S/(S\backslash NP):}\,{>}\mathbf{T} & \overline{(S\backslash NP)/NP:} \\
man' & \lambda p\lambda n\lambda x.(nx)\wedge(px) & \lambda f.f\ johnnie' & \lambda x\lambda y.say'xy & \lambda f.f\ frankie' & \lambda x\lambda y.likes'xy \\
 & & \multicolumn{2}{c}{\overline{S/S : \lambda x.say'x\ johnnie'}\,{>}\mathbf{B}} & \multicolumn{2}{c}{\overline{S/NP : \lambda x.\text{likes}'x\ frankie'}\,{>}\mathbf{B}} \\
 & & \multicolumn{4}{c}{\overline{S/NP: \lambda x.say'(likes'x\ frankie')johnnie'}\,{>}\mathbf{B}} \\
 & \multicolumn{5}{c}{\overline{N\backslash N : \lambda n\lambda x.(nx)\wedge(say'(likes'x\ frankie')\text{johnnie}')}\,{>}} \\
\multicolumn{6}{c}{\overline{N : \lambda x.(man'x)\wedge(say'(likes'x\ frankie')\text{johnnie}')}\,{<}}
\end{array}$$

The composition rules (in particular the fact that they can apply to n-ary functions up to some small fixed n, and that 'crossed' composition rules that mix the directionality of the input functions are allowed) are the principal source of the trans-context-free power of CCG.

A further formalism called Head Grammar (HG) comes from Pollard, who generalized CFPSG using a distinctive 'wrapping' operation (quite unrelated to the WRAP rule of certain varieties of CCG) to handle multiple dependencies. Pollard's wrapping rule is closely related to the notion of adjunction in TAG, and is the main source of its trans-context-free power.

Joshi and Steedman showed that TAG and CCG provided dramatically simple accounts of crossing dependencies in Dutch and related languages, which had by then been proved to be not even weakly context-free, thereby showing that both formalisms were of strictly greater than context-free power. Joshi, Vijay-Shanker, and Weir in a series of papers from 1985 to 1994, showed that all three of these grammar formalisms were weakly equivalent to each other and to Linear Indexed Grammar (LIG), a restricted form of Indexed Grammar in which a single stack-valued feature can be passed from a single nonterminal on the left-hand side of a production rule to a single daughter on the right-hand side, optionally accompanied by the pushing or popping of the stack-value. The proof of Vijay-Shanker and Weir (1994) shows weak equivalence by proving the following sequence of containment relations between the sets of languages generated by CCG, LIG, HG, and TAG:

(15) CCL $\subseteq$ LIL $\subseteq$ HL $\subseteq$ TAL $\subseteq$ CCL

Vijay-Shanker also showed that the characteristic automaton for this class of grammars and languages was a generalization of the Push-Down Automaton (PDA), called the Embeded Push-Down Automaton (EPDA). Weir showed on this basis that there was an infinite hierarchy of languages, grammars, and automata, of strictly less than context-sensitive power, characterizing what Joshi called Mildly Context-Sensitive Languages, of which the above class was the least powerful member after CF languages themselves. A number of results including polynomial ($O(n^6)$) worst-case parsing complexity for all four formalisms follows from the equivalence proofs, which are constructive. The significance of this result is that standard parsing algorithms based on dynamic programming can be applied.

A word of caution is in order in interpreting these important results. Weak equivalence does not entail strong equivalence. Even strong equivalence between formalisms does not mean that they are indistinguishable for linguistic purposes. For example, because in CCG *in situ* arguments are handled with the same slash as extracted ones) there is a very simple construction (given by Steedman), in which the multiple arguments of a function category are represented by a single stack-valued feature, which will yield a strongly equivalent LIG for any CCG. However, the LIG that results from, say the CCG fragment for the Dutch construction, is quite counterintuitive. Gazdar in fact concluded his attempt to analyze the construction by conjecturing that there could be no strongly adequate LIG for it, and that the much greater expressive power of full IG would be required. It seems in short that CCG and TAG are better-adapted to the expression of the relevant generalization.

There are other linguistically and computationally significant differences to bear in mind between

these formalisms. For example, the Principle of Combinatory Type-Transparency of Combinatory Categorial Grammar (CCG) guarantees that the syntactic composition and type-raising operations illustrated in (13) and (14) always correspond to semantic function composition and type-raising. It follows that a semantic interpretation is always immediately available when any constituent is formed. By contrast, the operation of adjunction in TAG sometimes corresponds to semantic composition, as in (9), but sometimes to application, as in the formation of the corresponding simple complement '*Johnnie thinks Frankie likes Manny*,' (which is formed by adjunction at the root node, rather than substitution).

Nor does adjunction fully implement CCG composition. Strongly adequate capture of certain extractions such as the following analog of (10) that in CCG are accomplished by exactly the same variety of composition as in (13) and (14) have been argued to require a generalization of basic TAG to the tree-local version of multicomponent TAG:

(16) (The man) that Johnnie said Frankie liked a picture of

These differences may present problems for any straightforward implementation of incremental semantic interpretation in TAG parsing. It also remains unclear whether the natural generalizations of CCG are the same as those of TAG.

However, these differences are less important than the fact that both formalisms are nearly context-free, in the sense that they reside at the lowest level of expressive power above context-free that has yet been identified among the mildly context-sensitive languages identified by Joshi.

Conclusion: Toward a Unified Theory of Grammar

The crucial operations of adjunction in TAG, and Composition in CCG superficially resemble the Generalized Transformations (sometimes called Double-Based Transformations) of Chomsky's first version of Transformational Grammar, as Frank has pointed out, in that they apply to combine two grammatical objects. However, they differ crucially from the original generalized transformations. First, they are not Structure-Dependent Rules: their operation is entirely conditioned by the type of a single constituent node to which they apply. Second, they do not create domains over which singulary movement transformations (whether cyclic or not) can create new dependencies. Instead they merely project the dependencies that have been defined once and for all in the lexicon. These dependencies include unbounded dependencies, defined either via elementary trees like ($9\alpha_1$) in the case of TAG, or via the logical form of a higher-order category like that of the relative pronoun in (12d) in CCG.

It is interesting in this connection to compare the weakly LIG-equivalent theories with the modern version of TG, as defined in the Minimalist Program (MP) of Chomsky, which continues to define long-distance dependencies with unlexicalized singulary transformational rules of movement explicitly or implicitly using variables. Under Stabler's definition of Minimalist Grammar (MG), these have been shown by Michaelis to be equivalent to a more powerful version of TAG called Set-Local Multicomponent Tree-Adjoining Grammars (SMCTAG). While such grammars are LCFRSs with such desirable properties as constant-growth, they are very expressive, and can generate such unnatural non-LILs as the 'quadruple copy language' *WWWW*. It remains unclear whether or not such additional expressive power is needed for any truly syntactic phenomenon of human language, but in either case it seems clear that all of the theories considered here will soon converge on a single level in an extended Language Hierarchy, and perhaps even on a single unified theory of grammar.

See also: Categorial Grammars: Deductive Approaches; Combinatory Categorial Grammar; Island Constraints; Lexical Functional Grammar; Long-Distance Dependencies; Minimalism; Montague Semantics; Semantics in Categorial Grammar; Transformational Grammar: Evolution.

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Syntactic Variation

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Approaches to Studying Syntactic Variation

Broadly speaking, there are three ways to study variation in syntax. The first is to simply describe the variation as alternative syntactic structures expressing fundamentally 'the same thing.' The second is to analyze the variation as the reflex of an alternation between different underlying grammatical rules. The third is to motivate the variation as a reflex of cognitive or functional constraints operating on speakers and in an interaction. Each of these tends to be associated with somewhat different research methods, but the approaches can be combined in a single investigation. At different stages in their enquiry, researchers might first describe the possible variants, and then expand the basic description to explore a variety of possible constraints on those variables. Depending on the analyst's predisposition and their training, the constraints they explore may be other formal linguistic factors, or they may be functional or discourse constraints.

All three methods often deploy quantitative evidence in support of their analysis and this use is increasingly the norm as large corpora become available for a wide variety of languages and software improvements make such corpora easier to access. However, it is also possible to find accounts of syntactic variation that are based on a single researcher's intuitions. Impressionistic or intuitive descriptions of syntactic variation serve a useful purpose as 'book marks' when they appear in descriptions of lesser spoken languages (the primary goal of the analyst may be to provide a grammatical outline of an endangered language before it disappears). As such, they can be valuable indicators of places where a grammar is not well understood, and encourage subsequent researchers to undertake productive new work. Such impressionistic or idiosyncractic descriptions are, however, of questionable use and validity when they constitute the sole evidence for, say, a subtle, theory-internal point. As the examples to be discussed in this article will show, syntactic variation is deeply intertwined with constraints from many other linguistic domains (and sometimes social factors, too). Consequently, analyses based on decontextualized, constructed sentences leave many important factors dangerously under-determined.

This article provides a brief overview of three schools of research that are concerned with accounting for variability in syntactic structures. Analyses of syntactic variation based on impressionistic data will not be examined because of the problems just mentioned. Neither will examples of developmental syntactic variation (variation as consequence of a child learning her L1; adult attrition of an L1; L1 interference on a late acquired L2). These issues are all covered in other articles. This article outlines some key concepts in the study of syntactic variation as practiced by variationist sociolinguists. It proceeds to compare and contrast formal and functional analyses along those key dimensions.

Key Variationist Concepts

Two key concepts for the study of syntactic (as for any other) variation are the definition of a variable, and the notion of inherent variability in the grammar. A linguistic variable is an abstract notion that is realized by multiple ways of saying the same thing. It is clear with most phonological variables that variants are semantically equivalent (*left wing* means the same as *lef' wing*), but semantic equivalence may be fuzzier with syntactic variables since syntax, semantics, and discourse structure are all so intimately connected. It is now widely agreed that rough semantic or discourse function equivalence is an appropriate standard for including a syntactic variable in a study.

Inherent variability replaces the notion of 'free variation.' Formerly, if it was unclear when speakers chose one variant over others, linguists described the variants as being in free variation. But Uriel Weinreich and William Labov showed that 'free' variation is an under-analysis of the data. All variables subjected to rigorous study show some linguistic or social constraints on the distribution of their variants. 'Free variation' has been superseded by the idea that variability is an inherent property of the grammar. Consequently, the linguist's job is as much to describe variable structure as invariant structure.

Descriptive and Variationist Perspectives on Syntactic Variation

Differences between the syntax of spoken and written varieties of a language are becoming more widely recognized. Computerized corpora and the search/extraction techniques associated with these have played a role in defining these interests, as too have advances in speech technology, in which systems are

increasingly expected to be able to simulate natural dialogue.

Pioneers in the description of syntactic variation in use, such as Jenny Cheshire, Jim Miller, and Andrew Pawley, have come to the field from a range of backgrounds – variationist sociolinguistics, structural linguistics, and fieldwork in non-standard or lesser spoken languages. Careful attention to the patterns emerging from what has sometimes been seen as 'performance errors' in natural speech, enable linguists to do three things:

1. recognize aspects of the grammar of a language that had previously been ignored (e.g., Cheshire's work on lone *when* clauses, Pawley's on clause-initial ellipsis);
2. identify changes in progress (e.g., Rickford, and Britain on *as far as… is concerned*);
3. contribute to the development of theory in grammaticalization (e.g., Miller's work on the perfect), or formal syntax (e.g., Adger and Smith's work on subject-verb agreement and negative concord).

Most quantitative sociolinguistic studies of syntactic variation are fundamentally descriptive; their results are presented so as to engage most directly with general principles about the diffusion of variation in a speech community. There is some question about whether syntactic variables are constrained by the same kinds of sociolinguistic principles as phonological variables are. The real time record may make it clear that a particular syntactic change is in progress, as e.g., Sankoff and Laberge showed with respect to cliticization of the irrealis marker *bae* in the Tok Pisin verb phrase. However, the change may not be associated with the kind of steady stratification by speaker age that phonological changes in progress are associated with. This may be because syntactic innovations sometimes have a lexical quality (and we add items to our vocabulary throughout our lives).

Another finding relevant to variationist sociolinguistics is the typical absence of stratification by social class or social network for syntactic variables that represent changes in progress. It is not clear why this lack should be true, but may have something to do with how (in)accessible syntactic structure is to the average person for meta-linguistic comment compared to pronunciation.

Competing Grammars Approach to Syntactic Variation

Connections between the study of syntactic variation and formal theories of syntax have been explored in most depth by researchers working within formal, generative frameworks. Anthony Kroch's work has been influential in this field. Kroch undertook a quantitative analysis of variation in word order in French and English and in possessor marking in Portuguese. He concluded that the diachronic pattern of variation supported two propositions: first, the constant rate hypothesis, i.e., changes move through both favoring and disfavoring contexts at a steady rate, and second, variation results from competition between different grammars.

The second proposition is attractive to formal linguists because it essentially removes variation from the grammar (cf. inherent variability), arguing instead that when a speaker uses different word orders, they are drawing on different underlying grammars. In the terminology of Minimalism, for instance, a feature might be strong in one grammar and weak in another; this shift will lead to differences in overt movement, so speakers may produce functionally equivalent structures that differ in the order of their constituents. This analysis runs counter to the notion that variation is inherent to the grammar; under this account, syntactic variation is essentially the same as code-switching for the multilingual speaker.

An important feature of Kroch's work has been the emphasis on triangulation. It may be possible to model a single variable within a Minimalist theory of syntax, but the most careful work within this paradigm makes its case for competing grammars by showing that multiple, independent syntactic variables converge in just the way a particular syntactic theory would predict.

In her work on syntactic variables in a contact variety of French, Ruth King argues that borrowed lexical items carry with them specific syntactic structures, and that this (rather than language mixing) is what accounts for the unique behavior of prepositions in Newfoundland French. Though King works within a generative framework, in principle her conclusion about the lexical basis of syntactic variation and change is theory-neutral and might be compatible with other formal theories such as HPSG.

Functional Perspectives on Variation

Like variationist sociolinguistics, functional syntax does not accept the competence/performance distinction. As sociolinguistics generally does, functional syntax uses data from natural corpora rather than elicited production or attitudinal data. Functionalists account for variation in terms of general cognitive principles, or specific interactional factors emerging in different communicative contexts. Speakers' attitudes, stance, intersubjectivity, information flow, and turn-taking are all central components in a functionalist account of grammar. Like

some formal syntax approaches to variation, a functionalist account may actually remove variation from the domain of grammar, and conclude that subtle differences involving the face-to-face situation, topic of conversation or state of mind of the speaker exhaustively account for any variation observed. A functionalist approach differs fundamentally from variationist sociolinguistics and formal linguistics in that even though it may concede that variability is an inherent property of language (perhaps by virtue of the inherent dynamism of interaction and language in use), it posits no underlying or underived structure. One implication of this is that there is nothing analogous to the (socio)linguistic variable in functional syntax.

Notwithstanding, connections between grammaticalization theory and functionalist approaches to syntactic variation abound and grammaticalization theory is open to a diachronic sense of derivation, even if it rejects the notion of synchronic derivation.

Conclusion

Many syntactic phenomena that would (under some perspectives) be seen as variables, in fact defy a purely formal or purely functional account. The distribution and form of overt and null arguments (which many formal linguists have argued is a pragmatic phenomenon and not syntactic at all) shows a cross-linguistic tendency to be sensitive to quintessentially functional factors (e.g., recency or salience of mention) but researchers may model the variation within a formal framework. Conversely, the motives postulated for formal reanalysis are often functional, e.g., ambiguity causing speaker and hearer to associate an utterance with different underlying structures. Some of the most interesting work on syntactic variation (and change) embraces multiple causes, and argues that the direction of change is best predicted when underlying grammar and functional considerations converge.

See also: Clause Structure in Spoken Discourse; Constant Rate Hypothesis; Copula Variation; Corpora in Studies of Variation; Corpora of Spoken Discourse; Functional Discourse Grammar; Functionalist Theories of Language; Grammaticalization; Microparametric Variation; Second Language Attrition; Spoken Discourse: Diachronic Aspects; Statistical Testing of Variation; Variation and Formal Theories of Language: HPSG; Variation and Formal Theories of Syntax, Chomskyan; Variation in Child Language; Variation in First Language Acquisition; Writing Variation into Formal Grammars.

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Syntax of Words

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Theoretical approaches to morphology in the generative tradition can be characterized by the tendency to either reject syntax explicitly as a theoretical model or embrace syntax and evolve in tandem with it. It seems safe to say that the study of inflection and word formation has benefited greatly from this tension, in that it has resulted in a greater understanding of what morphology has in common with sentence structure and what makes it distinct.

This tension between syntactic and antisyntactic views of morphology can perhaps be traced back to American structuralism, in which Hockett (1954) distinguished three models of morphology: item and arrangement (IA), item and process (IP), and word and paradigm (WP). In the IA model, morphemes within words are ordered both linearly and hierarchically, much as words are within a syntactic analysis. IP models, in contrast, eschew linear and hierarchical ordering; instead, complex words are derived from bases to which morphological rules or processes are applied. WP, mentioned only in passing by Hockett but later developed in more detail by Matthews (1972), also dispenses with linear order and hierarchical structure, treating words within a matrix of cross-classifying characteristics such as person, number, and tense. Whereas syntactic treatments of morphology within the generative tradition are direct descendants of the structuralist IP model, antisyntactic theories bear much in common with IP and WP conceptions.

Within the generative tradition, inflection was from the first treated as a syntactic phenomenon, with Affix Hopping being among the earliest of Chomsky's (1957) transformations. The transformational analysis of other forms of word formation followed shortly thereafter, with Lees's (1963) analysis of nominalizations as a transformational phenomenon; in this sort of analysis, transformations apply to a sentential base such as (1a) to create the corresponding nominalization in (1b):

(1a) the Romans destroyed the city
(1b) the destruction of the city by the Romans

The transformational line of analysis was pursued within the framework of Generative Semantics; in this framework, which associated deep structure with semantic representation, a seemingly monomorphemic word such as *kill* could be derived from a syntactic structure

[NP [CAUSE [BECOME [NOT [NP ALIVE]]]]]

by means of a Raising transformation (McCawley, 1973). Levi (1978) is a relatively late and quite sophisticated treatment of compounding and nominalization within this tradition.

As a reaction to the Generative Semantics framework, Chomsky's (1970) 'Remarks on nominalization' signals both a break with the syntactic treatment of word formation and the true birth of generative morphology as a separate theoretical field. Indeed, early generative treatments of morphology (Halle, 1973; Jackendoff, 1975; Aronoff, 1976) are careful to distinguish morphology from syntax as a separate component with a distinct set of rules and principles. This independence was proclaimed in the Lexicalist Hypothesis (also called the Lexical Integrity Hypothesis), stated in its strongest form by Lapointe (1980), namely that syntactic rules cannot refer to morphological categories or features. Aronoff's (1976) seminal work on word formation is in line with the Structuralist IP tradition, with word formation rules (WFRs) applying to bases to derive complex words.

Even among avowed lexicalists, however, rules of word formation soon came to resemble rules of syntax. Roeper and Siegel (1978) was an early attempt to account for the structure and interpretation of English synthetic compounds such as *truck driver* by means of a lexical transformation; although such a transformation operated within the confines of the word formation component, it generated synthetic compounds by moving a postverbal complement into a preverbal position. The transformation is shown in Figure 1.

Similarly, Lieber (1980), Williams (1981), and Selkirk (1982) all proposed lexicalist treatments of word formation that borrowed the form of rules – this time phrase structure rules – from syntactic theory. Selkirk (1982: 66), for example, proposes word structure rules for English such as:

(2a) $A \rightarrow N\ A^{Af}$
(2b) $N \rightarrow A\ N^{Af}$

These theorists also made use of the syntactic term 'head,' giving it a uniquely morphological definition (DiSciullo and Williams, 1987: 26):

[[empty] + verb + affix] [$_{X+N}$ + word] W ==> [[+word] + verb + affix] W
1 2 3 4 5 4 2 3 Ø 5

Figure 1 Compound rule (Roeper and Siegel, 1978: 209).

Definition of 'head$_F$' (read: head with respect to the feature F): The head$_F$ of a word is the rightmost element of the word marked for the feature F.

Although these rules and principles range over a set of categories (X^0, Af) that are not syntactic, form structures that are distinct from those of syntax, and refer to linear order (e.g., 'rightmost' in the definition) in a way that syntactic rules do not, the rule types themselves are clearly syntax inspired.

Taking place at roughly the same time as these early phrase structural theories, advances in phonology in the form of autosegmental theory led to structural treatments of nonlinear and nonconcatenative morphology. Significant in this tradition is McCarthy's (1979) analysis of Semitic root and pattern morphology, Marantz's (1982) treatment of reduplication, and Lieber's (1984) analysis of consonant mutation. Marantz, for example, proposed that reduplication is affixation, with the reduplicative affix taking the form of a bare skeleton composed of consonants and vowels that are filled in by autosegmental spreading; these analyses allowed nonconcatenative morphology to be subsumed under phrase structural theories of word formation.

Early lexicalist theories of generative morphology led in the early 1990s to a veritable war concerning the relationship between syntax and morphology, with positions ranging from the militantly lexicalist to the staunchly syntacticalist; the debate hinged on whether morphology should constitute a distinct module of the grammar wholly segregated from syntax or should be completely integrated into the syntax, subject to syntactic rules. Anderson's (1992) *A-morphous morphology* can be placed at the lexicalist end of the scale. Rejecting the notion of morpheme entirely, Anderson proposed a theory in which word formation processes apply to lexical items, the output being morphosyntactically complex but internally unstructured items; once the notion of morpheme was dispensed with, so too did linear order and hierarchical structure fall by the wayside. Beard's (1995) Lexeme Morpheme Base Morphology is another framework that rejects a syntactic approach to morphology.

In contrast, Lieber (1992), working within the Principles and Parameters framework of syntax and following the ideas of Sproat (1985), proposed that morphology was nothing but syntax: if the X-bar theory of phrase structure was modified in small ways, the parameters determining the order of head-complement, head-specifier, and theta role assignment could be set just once per language, thus predicting the sort of word formation we might expect to find in a language. Deviations from the predicted order were dealt with in the morphology, as in the syntax, with movement rules. For example, in English, complements follow heads; a movement analysis is therefore required to derive the complement-head order that we find in synthetic compounds such as *truck driver.*

Both extreme positions have, of course, been subjected to critique. Booij (2002: 32), for example, provided evidence against Anderson's A-morphous framework, namely that internal structure of derived words must remain visible in order for pluralization to apply correctly in Dutch. Borer (1998: 163) pointed out, on the other hand, that Lieber's attempt to reduce morphology to syntax succeeds only at the expense of making changes to X-bar theory that are not independently necessary for syntax; in other words, morphological principles insidiously creep back in, even in the most militantly antimorphological treatments.

Lying somewhere between the syntactic and antisyntactic poles is Distributed Morphology (Halle and Marantz, 1993). In this framework, word structure is hierarchical and morphosyntactic features are supplied in the syntax but the phonological forms of morphemes are inserted late in a derivation (after syntax) and may not be isomorphic with the morphosyntactic structure.

In spite of problems, syntactic treatments of various aspects of inflection and word formation have persisted and even proliferated since the early 1990s. Ackema (1995), for example, pursued the idea that morphology is a separate component of the grammar but that syntactic principles nevertheless apply within it. Thus, movement rules and binding principles are active below the word level, from which Ackema attempted to explain the properties of the passive and perfect constructions in Germanic and of auxiliary selection in Dutch.

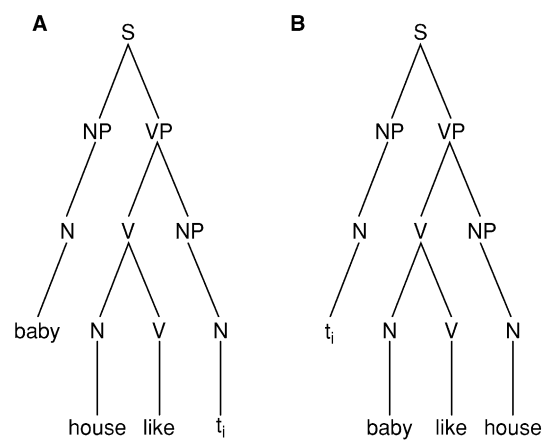

Figure 2 Noun incorporation. (A) is a potential noun incorporation in Mohawk but (B) is not (Baker, 1988).

Syntactic treatments of morphology have also given rise to analyses of more exotic forms of word formation. Baker (1988) used the principles of Government-Binding theory to derive the properties of noun incorporation in languages such as Mohawk. For example, that Figure 2A is a potential noun incorporation in Mohawk but Figure 2B is not follows from the fact that Head Movement, a species of the general rule Move Alpha, is subject to the Empty Category Principle, which requires that a trace of movement be properly governed. Hale and Keyser (2002) proposed an incorporation analysis of English conversion verbs such as *saddle* and *shelve*. Rice (2000: 28) argued convincingly that the complex properties of templatic morphology in the Athapaskan family of languages could be made to follow from a syntactic account in which the verb has a complex hierarchical structure (see Figure 3).

Syntactic approaches to word formation continue to evolve, just as syntactic theory does. Recent Minimalist developments have begun to filter into the analysis of inflection and word formation. For example, in DiSciullo (2002) morphology and syntax are not isomorphic; nevertheless, they share the structural properties of dominance and precedence, as well as the basic relation of asymmetry that underlies such relations as c-command, 'complement of,' and 'specifier of.' Julien (2002), on the other hand, argued that morphology and sentential syntax should not be distinguished. In her analysis of tense and aspect marking, bound morphemes occur freely as heads in syntactic structures, and morphology is subject to such Minimalist-inspired principles as obligatory binary-branching and leftward movement. The payoff, she suggested, is that it becomes possible to predict correlations that seem to exist cross-linguistically between the form of tense-aspect marking (prefixing or suffixing) and basic clausal word order.

It is interesting that, even in these most recent developments, the tension persists between those theorists who wish to separate morphology from syntax, even while borrowing principles from syntax, and those who wish to merge the two completely.

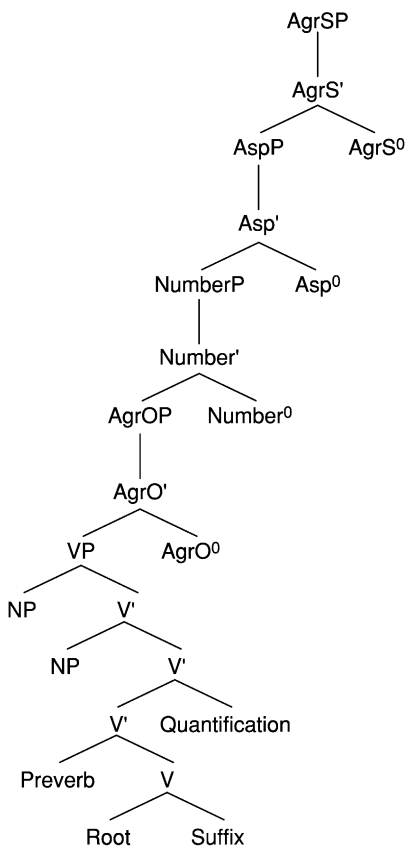

Figure 3 The complex hierarchical structure of verbs in the Athapaskan languages (Rice, 2000: 28).

See also: Incorporation; Morphology in Parallel Distributed Processing; Morphology in Pidgins and Creoles; Morphology and Language Processing; Morphology: Optimality Theory; Morphology: Overview.

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Syntax: Optimality Theory

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Some Basic Issues

Optimality Theory (OT) was originally developed for dealing with phonological problems, abandoning the assumption that grammatical constraints are inviolable (Prince and Smolensky, 1993, 2004; McCarthy and Prince, 1995). The fundamental new ideas were then soon adopted in other grammatical domains, too, in syntax (Grimshaw, 1997; Ackema and Neeleman, 1998; Grimshaw and Samek-Lodovici, 1998; Barbosa *et al*., 1998; Dekkers *et al*., 2000; Legendre *et al*., 2001) as well as in morphology (Legendre, 2000; Wunderlich, 2001).

The main innovations of OT can be summarized as follows:

1. Grammatical constraints can conflict with each other and are violable under certain conditions (not inviolable, as assumed before).
2. Grammatical constraints are ordered according to their respective weight (not equally ranked).
3. Different rankings of constraints are responsible for differences between individual grammars or languages. (What was formerly conceived as grammatical parameters is now reconstructed as constraints being differently ranked.)
4. A construction is grammatical (not only by virtue of its own properties, or by virtue of its generative history, but rather) if it wins the competition in a candidate set, because it satisfies best the higher-ranked constraints.

At first sight, many phenomena that had troubled linguists over years seemed to be good candidates for application of OT, such as variation in word order, selective blockings, morphological gaps, repairs, or the emergence of unmarked forms. However, as soon as one starts to analyze these phenomena more systematically, many important theoretical questions have to be answered. Must all the constraints belong to a universal set of constraints, or can there be language- or even construction-specific constraints, which are based on the instantiation of lexical categorization? Is it possible to represent cumulative constraints in situations where the effects of individual constraints seem to be added up? Which restrictions over constraints are necessary? Given the concept that each reranking of constraints defines a possible grammar, how can one avoid the problem of overgeneration of grammars? And how complex does the OT architecture develop, if one assumes an infinite set of candidates, each with its own internal structure? Is it possible to restrict the set of possible candidates, that is, to define some relevant set of candidates? How is optionality to be dealt with (where more than one candidate seems to be optimal), and how is

Syntax-Phonology Interface

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Numerous phonological patterns have syntactically conditioned environments. In Italian, the gemination rule known as Raddoppiamento Sintattico applies to the second of two adjacent words only under certain specific syntactic conditions. For example, it applies between a verb and an adverb (1a) and between a noun and an adjective (1b), but it does not apply between a complex noun phrase and following adjective (1c) or between a noun and following complex adjective phrase (1d) (Nespor and Vogel, 1986):

(1a) parlo b:ene
'he spoke well'

(1b) devi comprare delle [mappe [di [citta v:ecchie]NP]PP]NP
'you must buy some maps of old cities'

(1c) devi comprare delle [mappe [di citta]PP vecchie]NP
'you must buy some old maps of cities'

(1d) devi comprare delle [mappe [di citta [molto vecchie]AP]PP]NP
'you must buy some maps of very old cities'

Numerous different aspects of syntactic structure have been found necessary to the description of phonological patterns, including syntactic bar level (e.g., Selkirk, 1982), heads vs. nonheads (Nespor and Vogel, 1986), and syntactic sisterhood or other configurational properties such as constituent command (c-command) (Kaisse, 1985). What is equally significant is that other aspects of syntactic structure have not been found to play any role; syntactic category (e.g., noun vs. verb), for example, or morphosyntactic features such as finiteness or tense appear in and of themselves never to be accessed by phonology.

The Characterization of Rule Domains

Since the pioneering work of Selkirk (1982), the dominant approach to syntactically conditioned phonology has been through the mediation of prosodic structure. Syntactic structures are the basis for generating phonological phrase structure, although configurationally they can be very different in any given case. Phonological patterns make reference solely to prosodic structure.

As initially proposed by Selkirk and developed further by Nespor and Vogel (1986) and Hayes (1989), prosodic structure (p-structure) is composed of the specific hierarchy of prosodic constituents in (2) (it is often assumed – see, e.g., Nespor and Vogel, 1986) – that the hierarchy of prosodic units extends below the word level to include the metrical constituents of foot and syllable. However, in light of many differences between metrical units and those that function as rule domains, a number of researchers have suggested that the two constituent types belong to separate hierarchies (Selkirk, 1986; Zec, 1988; Inkelas, 1990); for present purposes we may safely ignore the lower end of the prosodic hierarchy because only the constituents at and above the word level bear any relation to syntactic structure):

(2) phonological word
phonological phrase
intonational phrase
utterance

Each phonological rule applies within a selected prosodic domain.

As an illustration, the noun phrase from (1b) is reproduced with prosodic structure represented below:

(3)

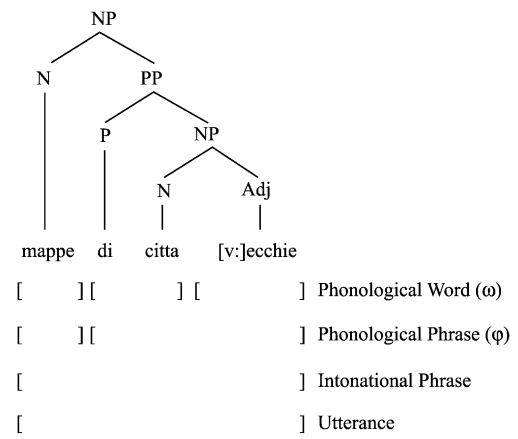

The rule of raddoppiamento sintattico applies within the phonological phrase.

The prediction of approaching syntactically conditioned phonology through prosodic structure is that no matter how many syntactically conditioned phonological processes a language has, all will apply in one of the four domain types available to the language. Thus far, not many languages have been studied that have a large set of phrasal phonological alternations. This is an area in which rich descriptive work on individual languages is sorely needed.

The Impact of Surface Syntactic Structure on P-Structure

Although research into phrasal phonology is in some ways still in its infancy, the available data suggest two

major sources of syntactic influence on p-structure: end-based mappings, in which the beginnings or ends of major syntactic constituents define phonological phrase boundaries, and configuration-based mappings, in which words in a sentence are assigned to phonological phrases on the basis of their syntactic configurational relationships to one another.

End-Based Mappings

End-based mappings (Chen, 1987) impose phonological phrase junctures at the designated edge (either left or right) of syntactic constituents of a selected bar level, e.g., X" (XP). This approach has lent itself naturally to Optimality Theory, in which alignment constraints are responsible for the syntax-phonology mapping. An end-based mapping that targets the left edge of a maximal projection creates a phonological phrase break not only between each pair of consecutive maximal projections but also between a head and following XP complement, in a head-initial language. Italian fits into this language type, as shown in (2); so does Chi Mwi:ni (Swahili), as analyzed by Selkirk (1986), for example. In a head-final language, the same setting would cause complements and heads to phrase together, as documented for Korean by Cho (1990). The mirror-image situation occurs when it is the right edge of maximal projections that induces phonological phrase boundaries.

The expectation in an end-based mapping would be that phonological phrases will have a strict syntactic definition at one end but will be syntactically loose, i.e., quite variable in definition, at the opposite end. Scenarios of exactly this kind are documented in Shanghai by Selkirk and Shen (1990).

Configuration-Based Mappings

Configurational mapping algorithms are sensitive to relationships like sisterhood, c-command, and branchingness, i.e., properties of the hierarchical structure of a sentence rather than simply the locations where the edges of the constituents occur.

Evidence supporting configurational algorithms comes from languages in which branching syntactic constituents phrase differently from nonbranching ones. In English, for example, the Rhythm Rule, which retracts the first of two clashing primary stresses, operates within phonological phrases (Nespor and Vogel, 1986). It applies between a verb and adverb, for example, as in (4a), but not between a verb and a following complex adverbial phrase (4b):

(4a) rabbits [réproduce quìckly]$_{\phi}$
(4b) rabbits [rèprodúce]$_{\phi}$ [quíckly and prolifically]$_{\phi}$

Similar effects have been observed for verbs and branching vs. nonbranching objects and for adjectives and following noun phrases. The differential phrasing of branching vs. nonbranching syntactic constituents of comparable bar levels follows from a bottom-up mapping with a minimal size constraint on phonological phrases, as proposed in Zec and Inkelas (1990) or, nonderivationally, via a violable constraint requiring each syntactic constituent of a given bar level – e.g., XP – to correspond to a phonological phrase, with additional constraints guaranteeing that phonological phrases will not exceed or fall below a given size (see, for example, Truckenbrodt, 1999).

The expectation in a configuration-based mapping is that phonological phrases should basically be coextensive with syntactic constituents, *modulo* interference from recursive syntactic structure. Configuration-based algorithms have difficulty phrasing together words that are not syntactic sisters (as is easily accomplished in end-based algorithms) and need embellishment in such cases. However, end-based mappings based on a single edge – left or right – have difficulty in capturing the effect of syntactic branchingness and constituency on phonological phrasing.

Function vs. Content Words

Virtually all work on the syntax-phonology interface has recognized the difference between function and content words. Only the latter – prototypically nouns, verbs, adjectives, adverbs – universally acquire the status of phonological words (see, for example, Nespor and Vogel, 1986). Function words are often prosodically dependent, obligatorily joining in the same prosodic constituent – word or phrase – as an adjacent content word. This can have ramifications for stress or accent, which function words often lack, even in languages in which all content words must be accented; it can also have ramifications for phonological phrasing. Klavans (1985) documented a number of cases in which function words phrase differently than a content word in the same syntactic position would; function words can famously be prosodified with words of the syntactic constituent that they head, as is the case with the reduced auxiliary *is* in English: [*Ellen's*]$_{\phi}$ [*arriving tonight*]$_{\phi}$, where under no syntactic analysis does *is* bear a closer syntactic relationship to the subject than to the verb phrase.

The function/content word asymmetry also affects the computation of branchingness. In English, Hausa,

and Serbo-Croatian, for example, phonological phrase formation has been shown to be sensitive, not directly to the syntactic complexity of a syntactic constituent, but rather to the number of phonological words it contains. An example is Serbo-Croatian topicalization, which is subject to the constraint that the topic must be a branching phonological phrase (Zec and Inkelas, 1990). Topics consisting of only one phonological word are judged ungrammatical, as in (5b).

(5a) [[taj]ω [čovek]ω]NP voleo = je Mariju
that man loved = AUX Mary
'that man loved Mary'

(5b) *[[Petar]ω]NP voleo = je Mariju
Peter loved-AUX Mary
'Peter loved Mary'

'Heavy NP shift' in English is another well-known example of this kind.

Phonological Effects on Syntax

Syntax-phonology mapping is often thought of as unidirectional; indeed, many researchers assume, with Pullum and Zwicky (1988), that syntax is phonology free. However, a growing body of evidence suggests that phonology can also influence syntax, in the sense that particular syntactic configurations are allowed only if they would be phonologically well formed. The best-known examples are those in which phonological considerations influence word order, as in Serbo-Croatian topicalization. Other evidence for phonological constraints on syntax comes from the placement of second position clitics, notorious for having to follow the first word in some syntactic domain (see, for example, Zec and Inkelas, 1990; Halpern, 1992). In many cases it turns out that what clitics must follow is not the first syntactic terminal element in that domain but the first phonological word. This is illustrated for Serbo-Croatian by (6a) and (6b), which both mean 'that man presented her with it' and show that in Serbo-Croatian, second position clitics may follow either the first syntactic constituent ('that man') or the first syntactic word ('that'):

(6a) taj čkovek=***joj=ga=je*** poklonio
that man=*her=it=aux* presented

(6b) taj=***joj=ga=je*** čkovek poklonio
that=*her=it=aux* man presented

If, however, the first syntactic element happens not to be a phonological word, as is the case with the proclitic initial preposition in (7), second position clitics must follow not that element but the next. Sentences (7a), (7b), and (7c) all mean 'the piano is in this room.' In (7a), as in (6a), the clitic follows the first syntactic phrase. In (7b), the clitic follows the first syntactic element, resulting in ungrammaticality; in (7c), the clitic follows the first phonological word.

(7a) u = ovoj = ***je*** sobi klavir
in = this = *is* room piano

(7b) *u = ***je*** ovoj sobi klavir
in = *is* this room piano

(7c) u = ovoj sobi = ***je*** klavir
in = this room = *is* piano

The contrast between (7b) and (7c) shows that the syntactic positioning of clitics is sensitive to phonological word structure.

Directions of Future Research

Future work on the phonology-syntax interface will be illuminated by investigation of language types that have thus far been understudied in this respect, especially nonconfigurational languages. The growing interest by semanticists in focus and intonation will also surely inform the phonology-syntax connection in important ways.

See also: Syntax-Semantics Interface.

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Syntax–Pragmatics Interface: Overview

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Conflicting Priorities

Since the inception of generative grammar, formally oriented researchers have been aware of the significance of pragmatic factors for adequately describing/theorizing about the domain of syntax. Morgan (1975) and Gazdar (1980), for example, pointed to the inescapable pragmatic influence on sentence structure. This dependency of syntax on pragmatics, however, had largely been ignored by generative syntacticians for quite some time because they had been preoccupied by their quest for universal grammar. In contrast to this, functionally oriented thinkers considered communicative demands to be the primary motivation for grammar. Reflecting this state of affairs, there have been two general, major approaches to the syntax–pragmatics interface. The first is syntactico-centrism, which relegates pragmatics to the status of a secondary linguistic system, excluded from the self-contained syntactic component (or grammar in general). The second approach is pragmatico-centrism, which relegates syntax to derivative role and makes pragmatics central. However, a third approach, the syntax–pragmatics alliance, in which different degrees or depths of interaction between syntax and pragmatics are accommodated, has resurfaced recently, in particular from within the generative orientation.

Interface in Retrospect

The Centrality of Syntax

Proponents of syntactico-centrism are Gazdar and Klein (1977), Chomsky (1986), and Carston (1998). These researchers were agnostic about the exact nature of the interaction between syntax and pragmatics (especially the actual mechanisms involved) and treated pragmatics as a postgrammatical filter. Gazdar and Klein allocated a placeholder in the syntactic structure, to be filled with an extragrammatical pragmatic condition to determine the acceptability of the structure. Chomsky (1986) included pragmatics (use of language) as one agendum of linguistic inquiry, but considered the elucidation of language structure (knowledge of language) and its acquisition as having the priority status. Carston designated pragmatics as supplying a selection criterion for a particular sentential structure from a set of sentences with equivalent truth conditions (for example, *A dog bit you*/*You were bitten by a dog*/*It was a dog that bit you*). The criterion is based on the amount of 'processing effort' in the sense of the Relevance Theory (Sperber and Wilson, 1986; *see* **Relevance Theory**).

The Centrality of Pragmatics

Pragmatico-centrism is represented by Givón (1979) and Hopper (1987). Givón considered that loose, paratactic pragmatic discourse structures (the pragmatic mode) gave rise to tight, grammaticalized syntactic structures (the syntactic mode). The differences between the two are illustrated by the following (nonexhaustive) opposing characteristics: (1) topic-comment versus subject-predicate structure, (2) loose conjunction versus tight subordination, (3) slow versus fast rate of delivery, (4) word-order-based on old/new information versus case functions, and (5) absence versus elaborate use of grammatical morphemes. The opposing pairs are mirrored by the disparities observed between pidgins versus creoles, child versus adult language, and informal versus formal speech (*see* **Morphology in Pidgins and Creoles**; **Language Development: Overview**). To the extent that the first members of these pairs are considered to be 'prior,' the primacy of the pragmatic mode is justified. Even more radical is Hopper, who claimed that grammar is 'emergent' in the sense that discourse gives rise to and shapes structure (or regularity) as an ongoing

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ineffability to be dealt with (where no candidate seems to be optimal)? Can OT also cover the phenomenon of gradient grammaticality? And last but not least, how can an OT grammar be learned? (This last issue is dealt with in Tesar and Smolensky, 2000.)

Many of these questions have been addressed in the phonological OT literature (Kager, 1999; McCarthy, 2004), as well as in the OT syntax. Lack of space prevents me from addressing these questions in detail. Moreover, note that OT syntax can be performed in the shape of several distinct morphosyntactic theories, such as Government and Binding theory (GB) or Minimalist Program (MP) (Grimshaw, 1997; Barbosa *et al.*, 1998; Müller, 2000; Legendre *et al.*, 2001), Lexical Functional Grammar (LFG; Bresnan, 2000, 2001), Lexical Decomposition Grammar (LDG; Wunderlich, 1999; Stiebels, 2000), or Role and Reference Grammar (RRG; Nakamura, 1999).

If one steps from phonological to morphological and finally to syntactic optimization, an important problem arises concerning the question of serial or parallel optimization. Under the parallel view, which is prevailing among researchers, even a rather complex construction is evaluated in one step, the different subaspects performed simultaneously, whereas under the serial view, several local optimizations (of the word, or of the clause) are performed cyclically. Kiparsky (2000) argues for the cyclic model as most realistic for the semitic verb morphology (distinguishing optimal stem and optimal word), see also Blevins (1997) and McCarthy (2000). On the basis of detailed analyses of various phenomena (including remnant movement, superiority, reflexives and binding, pied piping), Müller and co-workers argue for local, i.e., cyclic, optimization in the syntax (Heck and Müller, 2000; Müller, 2002; Fischer, 2004).

The candidate set is generated on the basis of a given input (underlying form). In the classic OT (the so-called correspondence theory), each candidate (a potential output) is evaluated according to faithfulness: dependence constraints penalize the occurrence of elements (or features) in the output that do not have a correspondent in the input, maximality constraints penalize the presence of elements (or features) in the input that do not have a correspondent in the output, and identity constraints penalize a featural mismatch between input and output. Needless to say, further constraints are needed to check the linear ordering in the output, whether some morpheme or constituent is initial or final, or whether it is immediately to the left or to the right of the verbal root/the finite verb, and so on. Grimshaw (1997) holds that the input for a syntactic evaluation must be some representation of meaning, for instance an LF representation; the same should hold for morphological evaluations. However, Heck *et al.* (2002), in discussing several examples of dependent as well as movement structures, come to the conclusion that input can be dispensed with in OT syntax. They argue that syntax is information-preserving, while phonology is not. This conclusion, however, crucially depends on a specific conception of syntax; it does not hold for LFG or LDG.

In the remainder of this article, more illustrative OT examples are given that concern syntactic movement, the constitution of optimal words, the selection of optimal case, the effects of harmonic alignment, and the selection of optimal agreement. The last section considers some further developments.

Syntactic Movements and Repairs

The pioneering work in OT syntax is Grimshaw (1997, manuscript 1994), dealing with the sentence structure of English (including interrogatives, *wh*-movement, *do*-support and negative-induced inversion) within GB. Observe that only the last of the sentences in (1) is grammatical.

(1a) *They will read what?
(1b) *Will they read what?
(1c) *What they will read?
(1d) What will they read?

The set of candidates based on the input 'read(they, which books)' includes structural representations of all potential strings constituted by the given items. Among the constraints Grimshaw assumes are the following:

(2) STAY: Do not move.
OP-SPEC: Operators are realized in SPEC position.
OBL-HD: Heads must be lexically filled.

The evaluation in Table 1 shows that two movements (in violation of STAY) are needed in order to satisfy the higher-ranked constraints. (The constraint columns are ordered from left to right; '*' indicates a violation, while '*!' indicates a fatal violation. The optimal candidate is indicated by '☞'.)

The same set of constraints explains the negative-induced inversion in (3) (Grimshaw, 1997: 401).

Table 1 Interrogatives in English (Grimshaw, 1997: 378)

Candidates	*OP-SPEC*	*OBL-HD*	*STAY*
a. [$_{IP}$ they will [$_{VP}$ read what]]	*!		
b. [$_{CP}$ will$_k$ [$_{IP}$ they t_k [$_{VP}$ read what]]]	*!		*
c. [$_{CP}$ what$_i$ [$_{IP}$ they will [$_{VP}$ read t_i]]]		*!	*
☞ d. [$_{CP}$ what$_i$ will$_k$ [$_{IP}$ they t_k [$_{VP}$ read t_i]]]			**

(3a) *She said that she would work this hard under no circumstances again.
(3b) She said that under no circumstances would she work this hard again.

Besides movement, many kinds of repairs have been investigated in OT syntax. They involve the introduction of empty elements such as expletives or *do* in English *do*-support. Another example of repair is the German *ersatzinfinitive*, which is the neutralized form of a past participle governing an infinitive (4b). This construction does not appear with durative verbs such as *bleiben* 'remain' (4c).

(4) German *ersatzinfinitive*
(4a) *Ich habe das Buch lesen gewollt.
I have the book read.INF want.PASTP
(4b) Ich habe das Buch lesen wollen.
I have the book read.INF want.INF
'I wanted to read the book.'
(4c) Die Leute sind stehen geblieben.
the people are stand.INF remain.PASTP
'The people remained standing.'

The solution proposed by Schmid (2002) makes use of the constraints in (5).

(5a) MORPH: morphological selectional properties of lexical items must be observed.
(5b) *PASTP/+INF.MOD: the past participle of a modal verb must not be a sister of a VP whose head is an infinitive.
(5c) *PASTP/+INF.DUR: the past participle of a durative verb must not be a sister of a VP whose head is an infinitive.

The avoid constraint is split into a family of constraints according to hierarchically ordered subclasses of verbs governing an infinitive; some are ranked higher than MORPH, while others are ranked lower. This is a standard solution for category-specific syntactic regularities (Table 2).

Lots of other syntactic problems have been discussed in the OT framework: long extraction, topicalization and focusing, word ordering in the German middle field, pied piping, quantifier scope, anaphoric binding, and resumptive pronouns.

Table 2 German *ersatzinfinitive* (Schmid, 2002: 145)

Candidates	**PASTP/ + INF.MOD*	*MORPH*	**PASTP/ + INF.DUR*
a. [[$_{VP}$ ... lesen$_{INF}$] gewollt$_{PASTP}$]	*!		
☞ b. [[$_{VP}$ ... lesen$_{INF}$] wollen$_{INF}$]		*	
☞ a. [[$_{VP}$ stehen$_{INF}$] geblieben$_{PASTP}$]			*
b. [[$_{VP}$ stehen$_{INF}$] bleiben$_{INF}$]		*!	

Optimal Words

An inflected word is constituted by various inflectional affixes attached to a stem. One point in question is how the ordering of affixes can be described best: is it possible to predict the ordering of affixes on the basis of a syntactic structure (according to the mirror hypothesis proposed by Baker), or are there language-specific templates that integrate all the idiosyncratic properties of individual languages? Many languages show patterns deviating from syntactic predictions, but on the other hand, the templatic account misses generalizations that one would like to make. The proponents of Minimalist Morphology (Wunderlich and Fabri, 1995) claim that inflectional affixes are (bound) lexical items that can be freely attached to a stem, thus yielding elements of a candidate set, which are evaluated by means of a constraint ranking.

Yimas, a language of Papua New Guinea, is a good case for illustration because it shows some variation as to how pronominal affixes are realized on the verb (Foley, 1991; Wunderlich, 2001). Besides free pronouns (always unmarked for case), Yimas exhibits ergative (E), accusative (A), and nominative (N) prefixes in the 1st and 2nd person, as well as ergative and nominative prefixes and dative (D) suffixes in the 3rd person. With transitive verbs, only E or A affixes show up, the former in case of 3rd person objects (6a), and the latter in case of 1st or 2nd person objects (6b); the marked case is always closer to the stem. However, in the combination 1Ag/2Pat one finds either a pronominal gap with the free variant of the pronoun instead (6c), or a repair phenomenon, namely a fused morpheme (6d).

(6) Transitive verbs in Yimas
(6a) Ergative pattern:
na- mpu- tay pu- ka- tay
3sgN- 3plE- saw 3plN- 1sgE- saw
'They saw him.' 'I saw them.'
(6b) Accusative pattern:
pu- ŋa- tay ma- ŋa- tay
3plN- 1sgA- saw 2sgN- 1sgA- saw
'They saw me.' 'You saw me.'
(6c) Gap in the combination 1Ag/2Pat:
ipa kul-tay (*ipa-kul-tay, *ipwa-kay-tay)
1pl 2plA-saw 1plN-2plA-saw 2plN-1plE-saw
'We saw you(pl)'
(6d) Fused morpheme in the combination 1Ag/2sgPat:
ipa kampan-tay (*ipa-nan-tay,
1pl 1E/2sgA-saw 1plN-2sgA-saw
*ma-kay-tay)
2sgN-1plE-saw
'We saw you(sg)'

With ditransitive verbs, the dative is only possible in case of 3rd person recipients (7a); otherwise the recipient is marked accusative, so that ergative and accusative can be combined (7b). In the combination of 1st and 2nd person (Ag or Rec), one finds either a gap (7c) or the same fused morpheme as above (7d). (VI represents the gender class.)

(7) Ditransitive verbs in Yimas
(7a) Ergative pattern plus D:
uraŋ k- ka- tkam-r- mpun
coconut.VIsg VIsg- 1sgE- show-PERF-3plD
'I showed them the coconut'
(7b) Three-partite pattern N-E-A:
uraŋ k- mpu- ŋa- tkam-t
coconut.VIsg VIsg- 3plE- 1sgA- show-PERF
'They showed me the coconut'
(7c) Gap:
ipa uraŋ k- kul- tkam-t
1pl coconut.VIsg VIsg- 2plA- show-PERF
(*k- nan- ŋa- tkam-t)
VIsg-2plE-1sgA- show-PERF
'We showed you(pl) the coconut'
(7d) Fused morpheme:
uraŋ k- mpan- tkam-t
coconut.VIsg VIsg- 1E/2sgA- show-PERF
(*k- ka- nan- tkam-t)
VIsg-1sgE-2sgA-show-PERF
'I showed you(sg) the coconut'

In the context of a modal prefix, nominative turns to ergative, as shown in (8).

(8) Modal prefixes in Yimas
(8a) ama-tmuk-t
1sgN-fall-PERF
'I fell down'
(8b) ant-ka-tmuk-t
POT-1sgE-fall-PERF
'I almost fell down.'
(8c) pu-ŋa-tpul
3plN-1sgA-hit
'They hit me.'
(8d) ka-mpu-ŋa-tput-n
LIKE-3plE-1sgA-hit-PRES
'They are going to hit me.'

The constraints that can deal with the observed distribution include the following:

(9) Morphological constraints in Yimas (slightly simplified). ('M' indicates the morphological or word domain.)
(9a) MAX(arg)$_M$: all arguments are realized by pronominal affixes.
(9b) *(arg)$_M$/+FOCUS: avoid pronominal affixes for arguments that bear the feature [+FOCUS]
(9c) PERSON: the higher person is realized closer to the stem (scale: $1 > 2 > 3$).
(9d) DEFAULT: every linking domain displays the default linker (nominative).
(9e) NOM-INITIAL: nominative prefixes only appear word-initially.
(9f) CASE: the less marked case is realized closer to the stem (scale: ACC > ERG).
(9g) IDENT(person): all person features have identical values in the input and the output.

Most of these constraints follow from universal conditions. It is better to realize an argument pronominally than nominally, and it should be realized in the closest possible domain (which is the word in Yimas) (9a). However, an argument that introduces a new referent in the discourse, or is questioned or relativized (all three situations could be described by the feature [+FOCUS]), should not be realized by a pronominal affix, because pronouns generally are less suitable to bear focus (9b). *(arg)$_M$/+FOCUS thus automatically restricts MAX(arg)$_M$. The person scale $1 > 2 > 3$ (or $1, 2 > 3$) is universal, but how it interacts with ordering problems is free (9c). (In Maung, a language of Australia, it is the lower person that is realized closer to the stem Donohue, 1998.) All case systems include nominative as the default case (9d). The nominative prefixes of Yimas are nearly identical to the free pronouns and probably originate from cliticization; this explains why (9e) holds (called EDGEMOST in Legendre, 2000). The markedness scale ACC > ERG is universal, but again, the way it interacts with ordering problems is free (9f). Finally, IDENT (person) is also universal.

The requirements of PERSON and CASE conflict with each other in case of the 1Ag/2Th (or 1Ag/2Rec) combination, and here the position of IDENT(person) in the constraint-ranking is decisive. In Yimas, a gap is more easily tolerated than neutralization of person (while in Dalabon, a language of Australia, neutralization is preferred: a 1st person object can be realized by a 3rd person prefix Evans *et al.*, 2001). However, which of the two arguments then becomes gapped in the morphology is still open. Only if one adds the ranking MAX (ACC) » MAX(ERG) ('Realize ACC/ERG') does one obtain the desired result, as shown in Table 3. We will turn to these constraints in the next section.

Conflicting alignment constraints leading to gaps (or repairs) have also been considered by Legendre (2000) and Gerlach (2002), who studied the formation of clitic sequences in South Slavic and Romance, respectively.

Optimal Case

Syntactic clauses are usually headed by a verb, which can have several arguments: one (intransitives), two (transitives), three (ditransitives), or even four or five (causativized ditransitives, and so on). One major issue is therefore the set of conditions that regulate case, realized by pronominal affixes or by morphological case; one may also regard syntactic positions of arguments as a realization of 'abstract case.' Most accounts consider the semantic roles of arguments as the determining factor. However, a purely structural account is possible under the assumption that the arguments of a predicate are strictly ordered

Table 3 A gap introduced by conflicting ordering constraints: evaluation in the combination 1Ag/2plRec (or 1Ag/2plTh without the first 3N-prefix)

Candidates	*PERSON*	*CASE*	*ID(PERSON)*	*MAX(arg)$_M$*	*MAX(ACC)*	MAX(ERG)
3N-1E-2A	*!					
3N-2A-1E		*!				
3N-3E-2A			*!			
3N-1E				*	*!	
☞ 3N-2A				*		*

(normally, of course, controlled by some semantic conditions, but often also idiosyncratically). In many instances (such as causativization), the argument hierarchy can be read off from the decomposition of the complex predicate. Lexical Decomposition Grammar (LDG, Wunderlich, 1997; Wunderlich and Lakämper, 2001; Stiebels, 2002) assumes that this hierarchy inheres abstract case, which is then realized by morphological or syntactic means.

The argument roles of a hierarchy can be encoded by means of two relational abstract case features: [+hr] 'there is a higher role,' and [+lr] 'there is a lower role' (similar to an earlier proposal by Kiparsky). The highest argument is [−hr] ('there is no higher role'), and the lowest argument is [−lr] ('there is no lower role'); in addition, depending on the presence of further arguments, the positive features are encoded. Thus, canonical encoding yields the following theta-roles (lambda abstractors over arguments):

(10) Abstract case features:
(10a) intransitives: λx verb(x)
[−hr,−lr]
(10b) transitives: λz λx verb(x,z)
[+hr,−lr] [−hr,+lr]
(10c) ditransitives: λz λy λx verb(x,y,z)
[+hr,−lr] [+hr,+lr] [−hr,+lr]

However, single features can be overridden by specific lexical assignments, which often reflect semantic conditions. For instance, dative-subject verbs such as German *gefallen* or Icelandic *likar* (both 'like') can be characterized by (11) and thus suggest the experiencer-reading 'The highest argument behaves as affected.'

(11) Lexical assignment in the presence of abstract case:
λz λx verb(x,z)
[+hr,−lr] [+**hr**,+lr]

The same features (but only those with positive values) are used to characterize overt case:

(12) DAT: [+hr,+lr]
ACC: [+hr]
ERG: [+lr]
NOM: [ ]$_{case}$

Observe that dative is only compatible with the medial argument of ditransitive verbs or the lexically marked argument in (11), while accusative is compatible with more arguments (including all those that could in principle be realized by dative). Finally, nominative as the maximally underspecified case is compatible with all arguments. Therefore, further constraints are necessary; this approach to case thus calls for OT. In this framework, lexical items with the format of (10) or (11) constitute the input, and the relevant output candidates have to show some pattern of overt case.

The relation between input and output is minimally determined by faithfulness (MAX); in addition, markedness controls that not too many features are realized.

(13a) MAX(+F): Every feature [+F] in the input has a correspondent in the output.
(13b) *[+F]: Avoid [+F] in the output.

The rankings MAX(+hr) $\pi \gg$ *[+hr] and *[+lr] π MAX (+lr) characterize a pure accusative system, while the reverse rankings characterize a pure ergative system. However, dative can appear in both types of system, which has to be guaranteed by a further constraint (MAX(+hr,+lr)), which ranks above both MAX(+hr) and MAX(+lr). Moreover, lexically assigned features should have precedence (14a) (see also Woolford, 2001), nominative should appear for reasons of economy (14b), and the morphological cases of a local domain should be distinct (14c).

(14) General case constraints
(14a) MAX(lexF): every lexically assigned feature in the input has a correspondent in the output.
(14b) DEFAULT: every linking domain displays the default linker (nominative).
(14c) UNIQUENESS: each linker applies only once in a local domain.
(14d) MAX(+hr,+lr): every feature combination [+hr,+lr] in the input has a correspondent in the output.

Wunderlich (2003) shows that this inventory is also sufficient to characterize all case patterns occurring in

Table 4 Lexically marked distransitive verbs

	z	y	x	MAX (lexF)	DEFAULT	UNIQUENESS	MAX (+hr, +lr)	MAX (+hr)	*[+lr]	MAX (+lr)	*[+hr]
☞	DAT	ACC	NOM				*		*	**	**
	ACC	DAT	NOM	*!			*		*	**	**
	DAT	DAT	NOM			*!			**	*	**
	ACC	ACC	NOM	*!		*	**			***	**

Table 5 Passive of lexically marked ditransitive verbs

	z	y	MAX (lexF)	DEFAULT	UNIQUENESS	MAX (+hr, +lr)	MAX (+hr)	*[+lr]	MAX (+lr)	*[+hr]
☞	DAT	NOM				*	*	*	*	*
	NOM	DAT	*!			*	*	*	*	*
	DAT	ACC		*!		*		*	*	**
	DAT	DAT		*	*			**		**

German and Icelandic, provided that all noncanonical case patterns are characterized by additional lexical features. Moreover, these two languages share the same constraint-ranking (although Icelandic exhibits by far more marked case patterns). How this constraint-ranking works is illustrated here for lexically marked ditransitive verbs and their passives (Tables 4, 5).

(15) Lexically marked ditransitive verbs:

(15a) weil der Arzt den Patienten
because the.NOM doctor the.ACC patient
einem Test unterzog
a.DAT test exposed
'because the doctor exposed the patient to a test'

λz	λy	λx	EXPOSE(x,y,z)
lexical	**+lr**		
default	+hr	+hr	−hr
	+lr	+lr	

(15b) weil der Patient einem Test
because the.NOM patient a.DAT test
unterzogen wurde
exposed was
'because the patient was exposed to a test'

λz	λy	∃x	EXPOSE(x,y,z)
lexical	**+lr**		
default	+hr	+hr	
	+lr		

Stiebels (2000, 2002) bases her typology of linking systems on the inventory given in (13) and (14). Further OT work on optimal case includes Nakamura (1997, 1999) in RRG and Woolford (2001) in GB.

Harmonic Alignment

Harmonic alignment is an OT concept that captures implicational generalizations (Prince and Smolensky, 1993). Suppose a scale X > Y, next to a scale a > b > . . . > z. Then harmonic alignment of the two dimensions is the pair of the following scales:

(16a) X/a ⊃ X/b ⊃ . . . ⊃ X/z
(16b) Y/z ⊃ . . . ⊃ Y/b ⊃ Y/a

A possible interpretation is that X and Y are linguistic entities, where X is more frequent or more expressive or less marked than Y. The elements of the other scale are possible contexts, ordered according to salience. Then X/a ('X in the context of a') is less marked than X/b, whereas Y/a is more marked than Y/b. What is more marked is likely to be more avoided. Therefore, the constraint alignment is a pair of constraint hierarchies:

(17a) *X/z ≫ . . . ≫ *X/b ≫ *X/a
(17b) *Y/a ≫ *Y/b ≫ . . . ≫ *Y/z

Aissen (1999) was the first who applied this concept to morphosyntactic phenomena. She assumed subject > object as the first scale, and the animacy or definiteness scale as the contextual scale. Silverstein (1976) observed that ergative is often restricted to 3rd person as opposed to 1st or 2nd person, to inanimates as opposed to humans, or to indefinites as opposed to definites, thus characterizing various kinds of ergative split. A similar, but reversed split is found with objects: accusative is often restricted to 1st or 2nd person, to animates or to definites; this is analyzed in OT by Aissen (2003).

Aissen's account is rather complicated, and it fails to give a conceptually and empirically satisfying solution. The main reason is that she appeals to grammatical roles (subject, object) rather than case features. Stiebels (2000, 2002) proposes to make use of the scale [+hr] > [+lr] instead: "It is better to mark a lower argument (an object) than a higher argument (the subject)." Given the salience scales 1, 2 > 3, animate > inanimate, definite >indefinite, pronoun > noun, imperfect > perfect, harmonic alignment then yields the constraint hierarchies in (18) without further complications. (For convenience, +hr is abbreviated as ACC, and +lr is abbreviated as ERG.)

(18a)	*ERG/1,2	≫ *ERG/3	*ACC/3	≫ *ACC/1,2
(18b)	*ERG/ +ANIM	≫ *ERG/ −ANIM	*ACC/ −ANIM	≫ *ACC/ +ANIM
(18c)	*ERG/ +def	≫ *ERG/ −def	*ACC/ −def	≫ *ACC/ +def
(18d)	*ERG/ +pro	≫ *ERG/ −pro	*ACC/ −pro	≫ *ACC/ +pro
(18e)	*ERG/ −perf	≫ *ERG/ +perf	*ACC/ +perf	≫ *ACC/ −perf

Effects that are based on these universal tendencies are found in the inventory of pronouns or pronominal affixes ('emergence of the unmarked'), as well as in all sorts of case splits. Yimas (see 'Optimal Words') has accusative affixes in the 1st and 2nd person, but lacks them in the 3rd person (according to *ACC/3 ≫ *ACC/1,2). A similar case is Dyirbal, a Pama-Nyungan language of Australia (Dixon, 1994): pronouns of the 1st and 2nd person can only be marked for accusative (*-na*), while demonstratives as well as nouns can only be marked for ergative (*-ŋgu*). Such a language allows for four different case patterns with transitive verbs: ERG-ACC, ERG-NOM, NOM-ACC, and NOM-NOM; each is signaling a certain salience distribution of subjects and objects.

Hindi also displays these four case patterns: ergative is restricted to perfect, whereas accusative is only found with human, specific animate or definite inanimate objects.

(19) The four-way case-split of Hindi (Mohanan, 1994)

(19a) niinaa-ne baalikaa-ko uthaa-y-aa.
Nina.F-ERG girl-ACC lift-PERF-M
'Nina lifted up a/the girl.'

(19b) niinaa baalikaa-ko uthaa-eg-ii.
Nina.F.NOM girl-ACC lift-FUT-F
'Nina will lift up a/the girl.'

(19c) niinaa-ne roTii khaa-y-ii.
Nina.F-ERG bread.F.NOM eat-PERF-F
'Nina ate bread.'

(19d) niinaa kelaa khaa-eg-ii.
Nina.F.NOM banana.M.NOM eat-FUT-F
'Nina will eat a banana.'

A split can also occur between two coexisting case-linking devices. Warlpiri, another Pama-Nyungan language of Australia, shows ergative case on nouns and pronouns, but accusative-based agreement: *-rna* '1sg' agrees with the subject of both intransitive and transitive verbs (20a, 20b), while *-ju* '1sg' agrees with the object (20c); consequently, *-ju* has to be classified as accusative (A), and *-rna* as nominative (N).

(20) Ergative case and accusative agreement in Warlpiri (Andrews, 1985: 106f.)

(20a) Ngaju ka-rna parnka-mi.
1.NOM PRES-1sg.N run-NONPAST
'I am running.'

(20b) Ngajulu-rlu ka-rna-ngku nyuntu nya-nyi.
1-ERG PRES-1sg.N-2sg.A you.NOM see-NONPAST
'I see you.'

(20c) Ngaju ka-npa-ju nyuntulu-rlu nya-nyi.
1.NOM PRES-2sg.N-1sg.A you-ERG see-NONPAST
'You see me.'

Such a mixed system in which head-marking exhibits the accusative type and case-marking the ergative type is found in several languages, whereas the reverse constellation does not exist. This fact again follows from harmonic alignment, if we consider the agreement morpheme as a bound pronoun ($pron_M$): the two scales ACC > ERG and $pron_M$ > pron ('Morphological realization is preferred') induce the constraint hierarchies *ACC/pron ≫ *ACC/$pron_M$ and *ERG/$pron_M$ ≫ *ERG/pron, so that a split with ACC only on pronouns and ERG only on affixes is ruled out.

Zeevat and Jäger (2002) propose a functional explanation of the effects of harmonic alignment. They argue that the contextualized constraints, such as those in (18), emerge from statistical generalizations about the perceived linguistic input rather than being part of grammar. However, an unequal distribution of ACC and ERG in the data must have been produced by speakers prior to learners' perception. The assumption of a cognitive rationale of the scales to be combined therefore seems more plausible.

Optimal Agreement

Grammatical agreement is a phenomenon in which word forms that co-occur in a clause exhibit covariation. Inflected forms often agree with respect to their

values of number, gender, or person, as can be seen from the contrasting examples in (21). All items in (21a) refer to a single (feminine) entity, whereas in (21b) they refer to a plural (masculine) entity.

(21) French
(21a) La^{fsg} fille^{fsg} est^{3sg} belle^{fsg}.
'The girl is beautiful.'
(21b) Les^{pl} garçons^{mpl} sont^{3pl} beaux^{mpl}.
'The boys are handsome.'

Languages that use rich agreement often allow more freedom in word order, as can be seen from the following example from Latin.

(22) Grandia per multos tenuantur flumina rivos.
(Ov. *Rem*. 445)
big.npl to numerous.mpl.ACC dissolve.3pl
river.npl stream.mpl.ACC
'Big rivers dissolve into numerous streams'

However, the extent to which agreement is observed differs from language to language. Besides languages that show multiple agreement, there are also languages that avoid agreement under specific conditions or in certain domains, as well as languages that lack agreement altogether.

Some languages exhibit an agreement split with respect to number, similar to the various types of case splits discussed in the preceding section. Georgian shows plural agreement only with animate subjects (23b), whereas Classical Arabic does not allow plural agreement for nonpronominal postverbal subjects, where instead the neutralized singular form is found.

(23) Georgian (Harris, 1981: 21)
(23a) Burt-eb-i gorav-s/ *gorav-en.
ball-pl-NOM roll-3sg/ roll-3pl
'The balls are rolling.'
(23b) Knut-eb-i *gorav-s/ gorav-en.
kitten-pl-NOM roll-3sg/ roll-3pl
'The kittens are rolling.'
(24) Classical Arabic (Aoun *et al*., 1994: 197, 205)
(24a) Naam-a /*naam-uu l-ʔawlaad-u.
slept-3sg.m / slept-3pl.m DEF-children-NOM
'The children slept.'
(24b) *Naam-a /naam-uu hum.
slept-3sg.m / slept-3pl.m PRON.pl.m
'They slept.'

Ortmann (2002) provides an OT analysis of these phenomena. He assumes the expressivity scale +pl > [ ] ('Plural is more informative than underspecification') and the two salience scales animate > inanimate, pronoun > noun. Harmonic alignment yields the two markedness scales in (25).

(25a) *(+pl)/inan ≫ *(+pl)/anim
(25b) *(+pl)/noun ≫ *(+pl)/pron

The interpretation of these avoid constraints is that it is more marked to realize plural for referents of low salience than for those of high salience. Interpolating these constraint hierarchies with the relevant MAX constraint (MAX(+pl)$_{S\text{-}AGR}$: 'Realize plural in the subject agreement') yields the possible rankings in (26).

(26a) MAX(+pl)$_{S\text{-}AGR}$ ≫ *(+pl)$_{S\text{-}AGR}$/inan ≫ *(+pl)$_{S\text{-}AGR}$/anim
(unrestricted agreement: German)
(26b) *(+pl)$_{S\text{-}AGR}$/inan ≫ MAX(+pl)$_{S\text{-}AGR}$ ≫ *(+pl)$_{S\text{-}AGR}$/anim
(restricted agreement: Georgian)
(26c) *(+pl)$_{S\text{-}AGR}$/inan ≫ *(+pl)$_{S\text{-}AGR}$/anim ≫ MAX(+pl)$_{S\text{-}AGR}$
(no agreement: Chinese)

Languages thus differ with respect to different cut-off points regarding the various possible salience scales, and, of course, they can also make different choices with respect to subject agreement, object agreement, and possessor agreement.

Ortmann (2000, 2002) also deals with another phenomenon. Hungarian (unlike English or German) avoids NP-internal plural agreement. Attributive adjectives do not agree with the noun (27a), and in the context of a numeral, which inherently contains the concept of plurality, the noun must not be marked for plural (27b). However, demonstratives (outside of DP) agree with the noun (27c).

(27) Hungarian plural agreement (Ortmann, 2000, 2002)
(27a) gyors hajó-k
fast ship-pl
'fast ships'
(27b) öt hajó
five ship.sg
'five ships'
(27c) Ez-ek a hajó-k gyors-ak.
this-pl DEF ship-pl fast-pl
'These ships are fast.'
(27d) Az öt hajó gyors.
DEF five ship.sg fast.sg
'The five ships are fast.'
(27e) Az öt nagynéni sör-t isz-ik
DEF five aunt.sg beer-ACC drink-3sg
/ *isz-nak.
/ *drink-3pl
'The five aunts drink beer'

Moreover, subject agreement strictly respects the value of number instantiated on the head element of the subject DP or DemP (27c–27e). This latter fact

Table 6 Evaluation of Hungarian antiagreement with pronominal possessor

	*(+pl)$_{P\text{-}AGR}$/noun	MAX(+pl)$_{P\text{-}AGR}$	*MULT-PLUR	MAX(+pl)	*(+pl)$_{P\text{-}AGR}$/pron
PRON.3sg house-P.3sg		*!		**	
☞ PRON.3sg house-P.3pl				*	*
PRON.3pl house-P.3sg		*!		*	
PRON.3pl house-P.3pl			*!		*

Table 7 Evaluation of Hungarian antiagreement with nominal possessor

	*(+pl)$_{P\text{-}AGR}$/noun	MAX(+pl)$_{P\text{-}AGR}$	*MULT-PLUR	MAX(+pl)	*(+pl)$_{P\text{-}AGR}$/pron
aunt.3sg house-P.3sg		*		**!	
aunt.3sg house-P.3pl	*!			*	
☞ aunt.3pl house-P.3sg		*		*	
aunt.3pl house-P.3pl	*!		*		

suggests cyclic optimization: first, the DP is checked (with the nominal head being singular in (27d, 27e) despite the cardinality > 1, and the resulting information is taken as input for subject agreement.

Ortmann proposes the constraint *MULTIPLE-PLUR(DP) (DP-referents receive only one realization of 'plurality' within the DP), which penalizes any uneconomic plural assignment in the DP. This constraint also interacts with a plurality split in the Hungarian possessor agreement, which results in so-called antiagreement; actually, the DP-internal possessor never agrees with the agreement information on the head noun, as shown in (28).

(28) Hungarian possessor antiagreement (Ortmann, 2002: 170)

(28a) az ö ház-uk
DEF PRON.3sg house-POSS.3pl
'their house'

(28b) a nagynéni-k ház-a
DEF aunt-pl house-POSS.3sg
'the aunts' house'

In harmony with the salience split (of Classical Arabic) as discussed above, it is better for the head noun to agree with a pronoun than with a full noun, and because of *MULTIPLE-PLUR(DP) dominating MAX(+pl), only one plural marking should appear in the DP. (MAX(+pl) summarizes the requirements for morphological and syntactic realization.) Table 6 and Table 7 illustrate how the effects of antiagreement come about by the constraint ranking.

The morphology and syntax of agreement is certainly one of the aspects in which languages differ widely, this topic thus being one of the most interesting parts of linguistic typology.

Further Developments

In contrast to classic OT, Stochastic OT (Boersma, 1998; Boersma and Hayes, 2001) constraints are ranked on a continuous scale: every constraint is assigned a real number, which determines the ranking between them and is a measure for the distance between them. For each evaluation, the placement of a constraint is modified by adding a noise with normal distribution, so that the actual placement of the constraints after adding this noise value can vary if the constraints are close to each other. However, if the constraints are more distant, a categorical ranking results. This account can incorporate linguistic variation that was outside the scope of classic OT. Bresnan *et al.* (2001) study the role of person in active–passive variation. In Lummi (Straits Salish, British Columbia), for example, the person of the subject argument cannot be lower than the person of a nonsubject argument (the star in Table 8 represents ungrammaticality). The same constraints that result in a categorical effect in Lummi are then shown to give rise to statistical preferences in English, which are modeled in stochastic OT.

Besides OT syntax, also OT semantics has been developed, which is concerned, among others things, with the interpretation of pronouns (Hendriks and de Hoop, 2001). Integrating the two perspectives (speaker-oriented: what is an optimal form? and hearer-oriented: what is an optimal interpretation?), Blutner (2001) proposed Bidirectional OT, which has been formalized by Jäger (2002, 2004). All candidates are <form, meaning> pairs, and the optimal candidate wins the competition of independent variation of both meaning and form. (In the weak version

Table 8 Active–passive variation in Lummi and English

	Lummi		*English*	
	active	*passive*	*active*	*passive*
1,2 subject, 3 object	obligatory	*	frequent	rare
3 subject, 1,2 object	*	obligatory	rare	frequent

of bidirectional OT, the evaluation is recursive.) This account offers an adequate solution of blocking phenomena, such as **more cheap* in the presence of *cheaper*, and it singles out <*cause to die*, cause death in indirect way> vs. <*kill*, cause death in direct way> as optimal pairs. Lee (2001) explains the 'emergence of the unmarked' effect on word order in scrambling languages (free word order freezes into a fixed, canonical order under certain circumstances) using bidirectional optimization. Bidirectional OT is promising in various domains because it allows for a unified account of optionality and ineffability on the one hand, which are problematic for production OT, and of ambiguity and uninterpretability on the other hand, which are problematic for comprehension OT (Beaver and Lee, 2004).

See also: Pragmatics: Optimality Theory; Phonology: Optimality Theory.

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Syntax–Pragmatics Interface: Overview

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Conflicting Priorities

Since the inception of generative grammar, formally oriented researchers have been aware of the significance of pragmatic factors for adequately describing/theorizing about the domain of syntax. Morgan (1975) and Gazdar (1980), for example, pointed to the inescapable pragmatic influence on sentence structure. This dependency of syntax on pragmatics, however, had largely been ignored by generative syntacticians for quite some time because they had been preoccupied by their quest for universal grammar. In contrast to this, functionally oriented thinkers considered communicative demands to be the primary motivation for grammar. Reflecting this state of affairs, there have been two general, major approaches to the syntax–pragmatics interface. The first is syntactico-centrism, which relegates pragmatics to the status of a secondary linguistic system, excluded from the self-contained syntactic component (or grammar in general). The second approach is pragmatico-centrism, which relegates syntax to derivative role and makes pragmatics central. However, a third approach, the syntax–pragmatics alliance, in which different degrees or depths of interaction between syntax and pragmatics are accommodated, has resurfaced recently, in particular from within the generative orientation.

Interface in Retrospect

The Centrality of Syntax

Proponents of syntactico-centrism are Gazdar and Klein (1977), Chomsky (1986), and Carston (1998). These researchers were agnostic about the exact nature of the interaction between syntax and pragmatics (especially the actual mechanisms involved) and treated pragmatics as a postgrammatical filter. Gazdar and Klein allocated a placeholder in the syntactic structure, to be filled with an extragrammatical pragmatic condition to determine the acceptability of the structure. Chomsky (1986) included pragmatics (use of language) as one agendum of linguistic inquiry, but considered the elucidation of language structure (knowledge of language) and its acquisition as having the priority status. Carston designated pragmatics as supplying a selection criterion for a particular sentential structure from a set of sentences with equivalent truth conditions (for example, *A dog bit you*/*You were bitten by a dog*/*It was a dog that bit you*). The criterion is based on the amount of 'processing effort' in the sense of the Relevance Theory (Sperber and Wilson, 1986; *see* **Relevance Theory**).

The Centrality of Pragmatics

Pragmatico-centrism is represented by Givón (1979) and Hopper (1987). Givón considered that loose, paratactic pragmatic discourse structures (the pragmatic mode) gave rise to tight, grammaticalized syntactic structures (the syntactic mode). The differences between the two are illustrated by the following (nonexhaustive) opposing characteristics: (1) topic-comment versus subject-predicate structure, (2) loose conjunction versus tight subordination, (3) slow versus fast rate of delivery, (4) word-order-based on old/new information versus case functions, and (5) absence versus elaborate use of grammatical morphemes. The opposing pairs are mirrored by the disparities observed between pidgins versus creoles, child versus adult language, and informal versus formal speech (*see* **Morphology in Pidgins and Creoles**; **Language Development: Overview**). To the extent that the first members of these pairs are considered to be 'prior,' the primacy of the pragmatic mode is justified. Even more radical is Hopper, who claimed that grammar is 'emergent' in the sense that discourse gives rise to and shapes structure (or regularity) as an ongoing

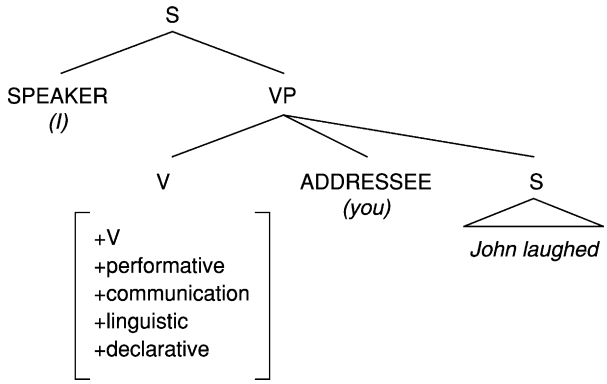

Figure 1 Ross's performative hypothesis: In a declarative sentence, there is an extra layer of syntactic projection with a phonetically empty speech act verb taking a null subject (speaker) and object (addressee).

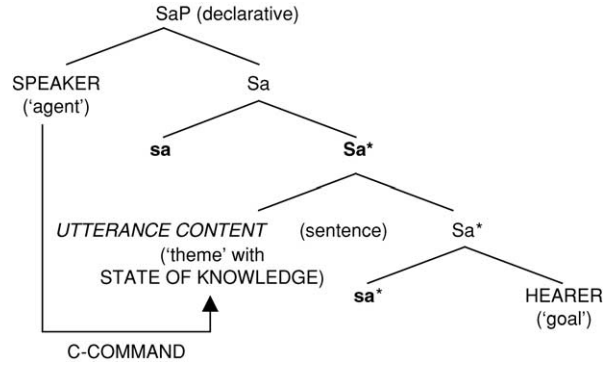

Figure 2 The neoperformative hypothesis: A declarative sentence structure is projected by the speech act head (sa, speech act; sa*, 'lower shell' structure of the SaP. SaP, speech act projection). Adapted from Speas and Tenny (2003).

process. An emergent structure is neither determined nor fixed – it is constantly open and in flux. In this view, grammar is simply a name given to certain categories of observed repetitions in discourse.

Classical Attempts at Syntax–Pragmatics Integration

Classical variants of the syntax-pragmatics alliance are the proposals by Ross (1970) and Gordon and Lakoff (1971). Ross suggested that on top of a declarative sentence, there is an extra layer of syntactic projection with a phonetically empty speech act verb taking a null subject (speaker) and object (addressee), as shown in Figure 1. His performative hypothesis was an attempt to represent pragmatic aspects as syntactic constituents. However, as is well known, Ross's approach fails to distinguish the following two sentences in terms of truth conditions: *John laughed* (a contingent fact) and *I claim that John laughed* (true when uttered). With the recent development of more elaborate syntactic apparatuses, Ross's idea has been reincarnated, as described in the next section.

Gordon and Lakoff (1971), who employed conversational postulates as a component for a transderivational rule. To derive (1) *why paint your house purple?* from (2) *why do you paint your house purple?*, the conversational postulate 'Unless you have some good reason for doing *x*, you should not do *x*' is supposed to be entailed by the logical structure of (2), a class of contexts, and a set of conversational postulates. Their approach was an attempt to constrain syntactic derivation pragmatically. According to Green (2004), Gordon and Lakoff confused a speaker's intentions and beliefs with semantic matters of truth. Although it is true that the contextual use-interpretation relation associated with a linguistic form is dependent on the speaker's and addressee's beliefs and intentions about one another's beliefs and intentions, Gordon and Lakoff's approach obscured this aspect.

Pulling All That Together

Syntactico-centrists do not at all deny the relevance of pragmatics for syntax; the interaction between syntax and pragmatics is simply not a central concern for them. But why not? (See Newmeyer, 1998). Also, as suggested by Givón (1995), pragmatico-centrists need to take syntactic structure seriously. After all, some items of the pragmatic mode are made available courtesy of **syntactic** mechanisms assembling constituents in accordance with some ordering or combinatory criteria. Because syntax and pragmatics interact with, influence, and complement one another, it would be desirable if we could devise ways to synthesize the two. Recent attempts at achieving such a goal are illustrated in the next section.

Interface Now: The Syntax–Pragmatics Alliance Revisited

Functional Categories and Pragmatics

With the advent of functional categories in the Chomskyan Principles and Parameters framework (e.g., Agr and D heads projecting AgrP and DP) (*see* **Principles and Parameters Framework of Generative Grammar; Generative Grammar**), a path was cleared for the inclusion of abstract syntactic elements in a structural description. Researchers investigating languages with topic-focus structures quickly embraced the creation of pragmatically oriented functional

categories (such as Focus Phrase), which opened up possibilities for describing languages, such as Hungarian, that had evaded a rigid English-centered theoretical mold (e.g., Hörvath, 1985; Kiss, 1995; see also Szendröi, 2004).

The invention of pragmatically oriented functional heads (as seen, e.g., by Cinque, 1999) soon came to include **syntactic** projections for speech act (**sa**), evaluativity (**eval**), and evidentiality (**evid**) (Speas and Tenny, 2003). As an example embodying such a neoperformative hypothesis, compare Figure 2, which represents a declarative sentence structure projected by the **sa** head. The pragmatic roles, Speaker (the 'agent' of a speech act), Utterance Content (the 'theme'), and Hearer (the 'goal'), are not primitives but defined structurally: Speaker c-commands state of knowledge within utterance content, making Speaker the locus of the point of view. From the declarative structure, a syntactic transformation derives an interrogative structure, as shown in Figure 3. Hearer is now the closest c-commander for state of knowledge and the point of view is attributed to Hearer. Imperative and subjunctive **sa** structures are shown in Figures 4 and 5 respectively.

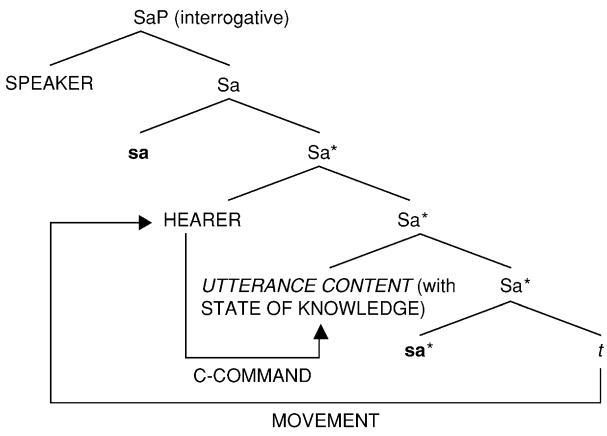

Figure 3 A syntactic transformation deriving an interrogative structure from the declarative structure.

The motivation for such speech act projections (SaPs) is the fact that languages, out of many possible illocutionary acts, grammaticalize only up to five or six distinct types. More significantly, there appear to be agreement-like phenomena involving Speaker and Hearer, for example, the Arabic complementizer '*inna* and the morpheme *nuwa* in Mupun (Mwaghavul), respectively.

What is peculiar about SaPs is the lack of correspondence between actual speech acts and the particular, syntactically defined speech act structures. Thus, the Utterance Content of any syntactic type (*modulo* the choice of tense) can, in principle, be embedded under a given SaP, and its speech act property is determined by the SaP's configurational characteristics. Because, for example, Speas and Tenny recognized the multifunctionality (claim, promise, request, etc.) of the declarative SaP, they needed but lacked an additional interpretive mechanism to determine the **actual** speech act type of the SaP.

Let us consider the following direct/rhetorical question: *Who can defeat Godzilla?* Embedding this within either the interrogative or declarative SaP structure seems to superficially guarantee the desired interpretations. Why, then, can the imperative sentence, *(you) beware of Godzilla!*, not be subjunctive (since both are [-finite])? The difference between the two seems to hinge on their pragmatically determined conventional use. This means that, to obtain proper embedding of Utterance Content within an SaP structure, the speech act type of Utterance Content needs to be determined **prior to** such embedding. That seems to render the pragmatic relevance of SaP structures questionable. Speas and Tenny appeared to be

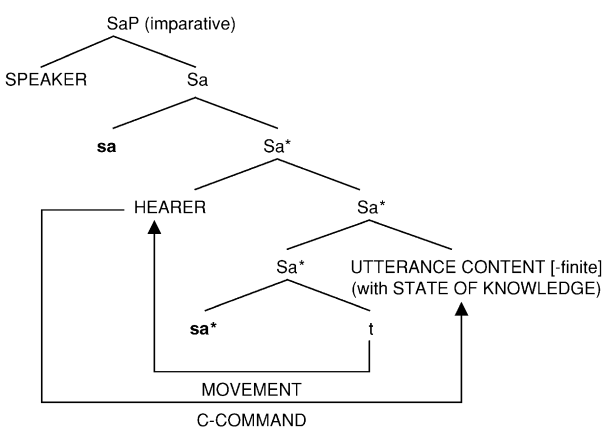

Figure 4 A syntactic structure for an imperative sentence.

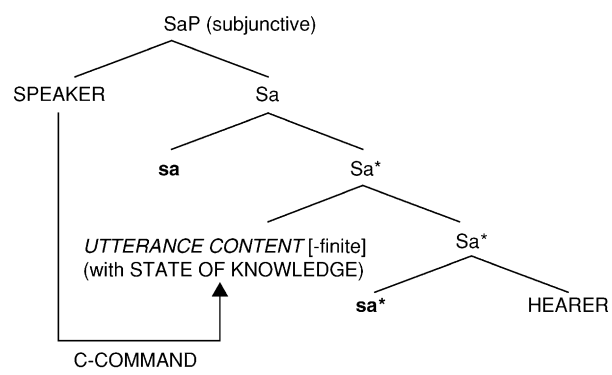

Figure 5 A syntactic structure for a subjunctive sentence.

preoccupied with a narrow range of pragmatico-syntactic phenomena (e.g., agreement, point of view, etc.); also, they seemed to be hampered by their **exclusive** reliance on syntactic concepts, from which pragmatic notions are **unidirectionally** obtained as derivatives.

An Inclusive Theory of Grammar and Pragmatics

Another way to implement the syntax-pragmatics alliance is by employing what Fukushima (2002) called an "inclusive theory of grammar," such as a framework like Head-Driven Phrase Structure Grammar (HPSG) (see Pollard and Sag, 1994; Sag *et al.*, 2003; *see* **Head-Driven Phrase Structure Grammar**). Here, grammar is a collection of linguistic constraints on lexical and nonlexical linguistic signs (words and phrases), expressed via feature structures (with FEATURE-value pairs). The linguistic constraints are **both** grammatical (phonology, category, **and** content) and pragmatic (context). An example of such a set of constraints or properties is the lexical sign *John* in Figure 6. The sign *John* satisfies the following constraints: It is a noun (syntax), used to refer to a third-person singular referent (semantics), who bears the name *John* (pragmatics). (The shared structures are indicated in Figure 6 by [1], showing the identity of feature values.) In such a feature structure, linguistic constraints are imposed on linguistic signs **simultaneously** and **nondirectionally**. No privilege, for example, is given to syntactic over pragmatic information.

Let us see how such a framework can be called on to handle speech acts. The illocutionary force of warning, for example, is rendered as in Figure 7. It says that a linguistic sign with the phonological shape [1] can be uttered by a speaker [2] to an addressee [3]. This is done in order to bring about a state of affairs in which the speaker's uttering [1] to the addressee results in the addressee's becoming aware of a danger, originating from some unspecified element [4]. Thus, the same technical apparatus both is used as a grammatical description and serves to elucidate illocutionary conditions.

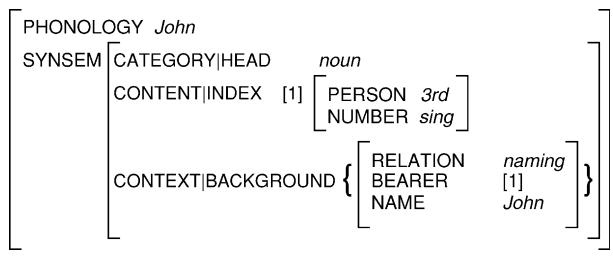

Figure 6 An inclusive theory of grammar: The lexical sign *John* as a set of constraints.

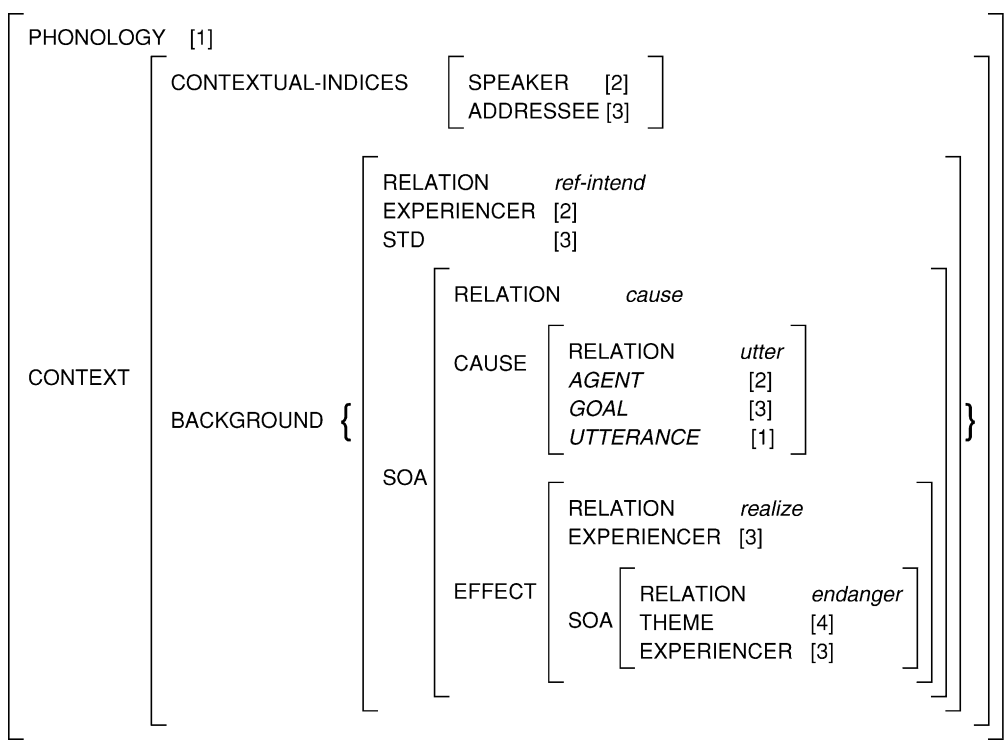

Figure 7 The illocutionary force of warning; SOA (state of affairs) is roughly equivalent to a proposition, and ref-intend is shorthand for the sequence of predicates *intend-recognize-intend-believe*. Adapted from Green (2000).

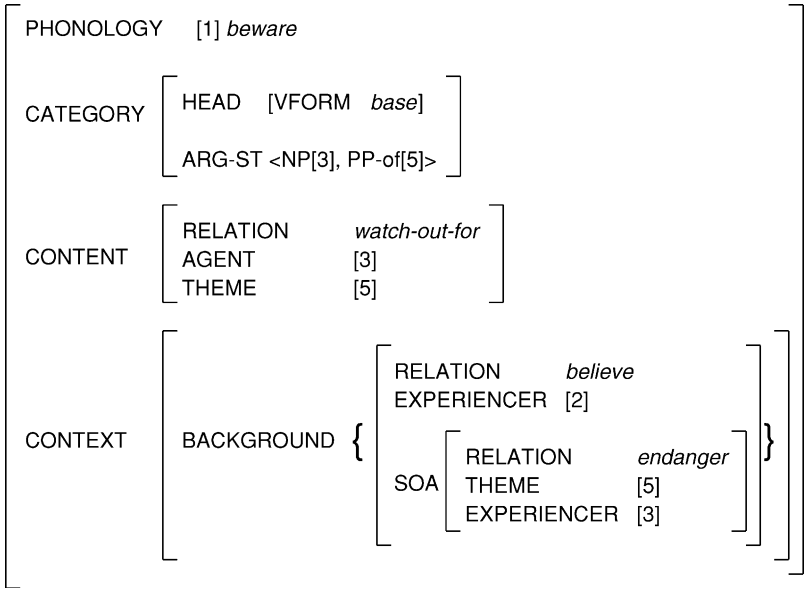

Figure 8 The lexical definition of *beware*. Adapted from Green (2000).

Based on this, we can account for the behavior of lexical items with restricted syntactic distribution, such as the verb *beware*: *Beware of Godzilla!* and *I want you to beware of Godzilla* but not **I'm confident I'll beware of Godzilla*. As part of its lexical definition, *beware* makes reference to the pragmatic condition on warning in Figure 7, as indicated in Figure 8. The lexical definition tells us that *beware* is a verb that is used uninflected and takes two arguments, $NP_{[3]}$ and $PP_{[5]}$. The subject [3] watches out for the object [5], and the speaker [2] believes that the object endangers the subject.

An extended version of HPSG simultaneously accommodates constructional (syntactic), clausality (semantic), and illocutionary (pragmatic) aspects of sentences (Ginzburg and Sag, 2000; Ginzburg *et al.*, 2003, the latter another instance of the neo-performative hypothesis) and allows us to solve our previous question-imperative dilemma. First, the *illocutionary-relation* type *ask-relation* is normally associated with a *clausality* type *question*. Given that there is no contextual infelicity, the direct question is simply a question. Second, the *illocutionary-relation* type *assert-relation* is normally associated with the *clausality* type *proposition*. One illocutionary condition (similar to Figure 7) that is associated with the direct question construction allows it to be a rhetorical question. With that, a conversational implicature (in BACKGROUND) – arising from the fact that uttering the direct question (*ask-relation*) in a given context is insincere – helps establish a new connection between the *illocutionary-relation* type *assert-relation* and the clausality type *question*, overriding the default association between *ask-relation* and *question* (*see* **Implicature; Mood, Clause Types, and Illocutionary Force**). In contrast, no illocutionary condition would allow the imperative construction (of the *clausality* type *outcome*) to be compatible with subjunctive use. This type of account is available due to the inclusiveness of the HPSG architecture, in which grammatical information and pragmatic information can be brought together and synthesized under a single structural representation.

Summary

A syntactic theory that claims to be a viable basis for explaining language use in real time cannot avoid the issue of the syntax–pragmatics interface. After some 30 years of neglect, attempts have now resumed to identify the proper ways of approaching the problems existing in this domain (although so far, no definitive conclusions have been reached). Such attempts need to consider (nonexhaustively) questions regarding (1) ways of representing pragmatic information in conjunction with a structural description; (2) ways of accommodating the psycholinguistic properties of language processing, in particular incrementalness and speed; and (3) the adequacy of the performative hypothesis (see Kühnlein *et al.*, 2003b).

See also: Constituent Structure; Cooperative Principle; Declarative Models of Syntax; Functional Categories;

Functionalist Theories of Language; Generative Grammar; Generative Semantics; Head-Driven Phrase Structure Grammar; Implicature; Language Development: Overview; Minimalism; Mood, Clause Types, and Illocutionary Force; Morphology in Pidgins and Creoles; Pragmatic Determinants of What Is Said; Pragmatic Presupposition; Presupposition; Principles and Parameters Framework of Generative Grammar; Relevance Theory; Speech Act Verbs; Speech Acts and Grammar; Speech Acts: Definition and Classification; Speech Acts; Syntactic Features and Feature Structures; Variation and Formal Theories of Language: HPSG; Word Order and Linearization.

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Syntax–Semantics Interface

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'Syntax' in this article refers to the organization of the words in a sentence and to the set of rules or constraints that organize words into sentences. 'Semantics' refers to the meaning of words and sentences and to the rules or constraints by which the meanings of sentences are built from the meanings of words. It is widely believed that the ability to combine words (and morphemes) to build more complex

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meanings from these syntactic combinations is a hallmark of human languages. Modeling this ability is one of the central aims in linguistics. The study of this ability is the study of the interface between syntax and semantics, and answers to this question distinguish the major current theoretical frameworks.

The Model of Perfection: Artificial Languages

To understand the issues that have occupied researchers, it is useful to compare natural languages with artificial or formal languages: Whether or how natural languages differ essentially from artificial languages helps classify current views. Artificial or formal languages are typically explicitly designed to be 'perfect' in the following sense. For each way of combining two or more syntactic expressions, there corresponds a unique way of combining the meaning of the expressions that are syntactically combined. Technically, an isomorphism can be defined between the syntactic and semantic components of formal languages. As a result, the meaning of formulas of arbitrary complexity is easily and unambiguously read from their syntactic surface organization. The formal language used to express referring expressions in arithmetic provides a simple example of this 'perfection.' The following are the syntactic formation rules for addition and multiplication.

- Syntactic rule 1: Number names and number variables are syntactically well-formed expressions called terms.
- Syntactic rule 2: If a and b are syntactically well-formed expressions, so is $\ulcorner(a+b)\urcorner$.
- Syntactic rule 3: If a and b are syntactically well-formed expressions, so is $\ulcorner(a*b)\urcorner$.

To each of these syntactic rules there corresponds a well-defined semantic rule.

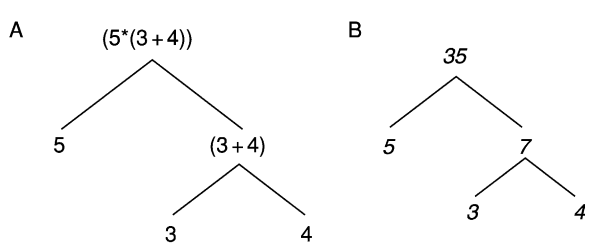

Figure 1 The parallel between (A) syntactic composition and (B) semantic composition in the language of arithmetic.

- Semantic rule 1: Terms refer to numbers.
- Semantic rule 2: A formula of the form $(a+b)$ refers to the sum of the referent of a and the referent of b.
- Semantic rule 3: A formula of the form $(a*b)$ refers to the product of the referent of a and the referent of b.

The one-to-one correspondence between the syntactic rules and the semantic rules unambiguously indicates which computations are needed to obtain the referent of an expression of any complexity. Arithmetic expressions wear the needed computations to derive their referents on their sleeves, so to speak. As the two trees in Figure 1 informally depict, we can establish a one-to-one correspondence between syntactic computations and semantic computations. Such correspondences are known as homomorphisms or isomorphisms between syntax and semantics, depending on whether two different syntactic rules may or may not have the same semantic import. Only homomorphisms are relevant for natural languages.

The hypothesis that the interface between natural languages' syntax and semantics works like that of formal languages goes back to the German mathematician Gottlob Frege (although it is not clear that Frege held that view; see Pelletier, 2001). Frege's principle, the principle of compositionality, is defined as:

> Principle 1. Compositionality Principle (Frege's principle): The meaning of an expression is a function of the meaning of its parts and the way the parts are combined.

More operationally, since Montague (1974), the principle is understood to mean that we can establish a one-to-one correspondence or homomorphism between syntactic and semantic operations (see Janssen, 1997, for a good review). The models of the interface between the syntax and semantics of natural languages that have been proposed in the last 30 years can be profitably categorized on the basis of:

1. Whether they claim that natural languages differ **essentially** from the language of simple arithmetic formulas, that is, whether there is a homomorphism between the syntax and semantics of natural languages.
2. Whether the claimed correspondence (if any) must exist between syntactic **rules** and semantic **rules** (as Montague originally claimed) or between the syntactic and semantic **structures** that these rules output.

Where Natural Languages Seem Imperfect

Interfacing syntax and semantics would become a rather trivial task if natural languages' syntactic rules/constraints/structures paired with their semantic rules/constraints/structures as straightforwardly as in the case of the language of simple arithmetic. If natural languages are as 'perfect' as the language of simple arithmetic, they are not obviously so. Thus, claiming that there is no 'important theoretical difference' between formal and natural languages, as Montague (1974: 188) did, is a bold and noteworthy claim. Below are sentences that illustrate some of the mismatches (the 'imperfections') typical of natural languages. Discussions of how to appropriately model the interface between the syntax and semantics of these and similar classes of sentences has occupied much of the literature in the last 30 years.

(1a) It seems that John is tired.
(1b) John seems to be tired.

(2a) Who(m) did John see?
(2b) Jean a vu qui?
Jean has seen who(m)

(3a) Everyone loves someone.
(3b) $\exists x(\text{human}'(x) \wedge (\forall y(\text{human}'(y) \rightarrow \text{love}'(y, x))$
(3c) $\forall y(\text{human}'(y) \rightarrow \exists x(\text{human}'(x) \wedge (\text{love}'(y, x))$

(4a) Mary played.
(4b) Mary will play.

(5a) Mary began the beer.
(5b) Mary enjoyed the novel.

Sentence (1b) is an example of what is called (subject-to-subject) raising and, at least at a coarse level of analysis, is truth-conditionally equivalent to (1a). In both cases, the referent of *John* is the semantic argument of the meaning of the VP (*be*) *tired*; but only in sentence (1a) is *John* the subject of that VP. A consequence of this common semantics but distinct syntax is that the same combination of a subject and a VP does not seem to always have the same semantic import. In the case of the embedded clause of sentence (1a), that syntactic combination means the application of the VP meaning to the subject's meaning; in the case of *John* and *seems to be tired* in sentence (1b), it appears that it does not because the referent of *John* does not appear to be a semantic argument of the meaning of *seems to be believed*. In other words, more than one semantic function might correspond to the combination of an NP and a VP.

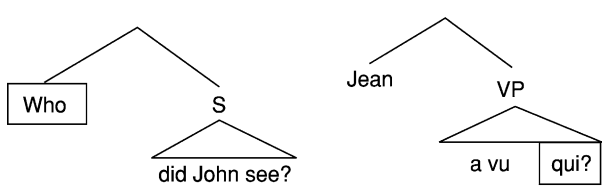

Figure 2 The difference between (A) English-style and (B) French-style questions.

The second example's relevance is slightly different. Let us assume that the meanings of questions expressed by sentences such as (2a) can be represented as in (6).

(6) for which animate x, John saw x

Then the surface structure of (2a) mirrors the semantic structure of (6). But the surface structure of the corresponding French sentence in (2b) (and other interrogative utterances in *in situ* languages) does not mirror its semantic structure (assuming that the semantics of English and French questions is the same). The difference is most easily seen in Figure 2. The syntactic position of *who* matches the semantic position of its translation in (6). Syntactically, *who* takes as its right sister a tree whose root is labeled S (its syntactic scope); semantically, the denotation of *who* is an operator that takes a propositional function as operand (its semantic scope). But *qui*, which is embedded within the verb phrase in French does not match its semantic scope (at least on the surface). No homomorphism seems to exist between syntactic and semantic structures for *in situ wh*-questions (although a homormorphism might still exist between syntactic and semantic rules).

Sentences such as (3a) have been at the center of many theories of the interface between the syntax and semantics of natural language. Such sentences are semantically ambiguous. According to one reading, there is at least one person that everybody loves, say *Gandhi*. Another reading is one in which, for each individual, there is at least one person he or she loves, but not all individuals need love the same entity; to each his or her own loved ones. The two first-order predicate logic formulas in (3b) and (3c) represent these two distinct readings. (*Everyone* and *someone* are understood here as equivalent to *every x that is human* and *some x that is human*; *human′*, *love′* and other′ expressions represent the meaning of the corresponding English words.) If we believe that these different readings correspond to different meanings of sentence (3a) (an assumption which may be challenged; see later discussion), sentences such as (3a) seem to contravene the claim that natural languages are 'perfect' because (3a) appears to have only one syntactic structure. We thus, have at least two semantic functions for combining a quantified direct

object with the verb: one in which the semantic output is such that the subject has wide scope over it and one in which the semantic output does not force the subject to have wide scope over it. Contrary to the homomorphism hypotheses, there does not seem to be a unique semantic rule for every grammatical combination (here, the combination of verbs and direct objects).

The sentences in (4) exemplify the same problem as the sentences in (2) but within a single language. Under the assumption that, semantically, tense operators take propositions or event descriptions as operands (see Dowty, 1979; de Swart, 1998), the morpho-syntactic structure of (4a) does not match its semantic structure (even leaving aside the occurrence of the subject outside the verb phrase). The morpho-syntactic expression of the tense operator is a suffix on a word (the verb *play*), whereas its semantic translation takes a full event description or proposition as argument – something typically expressed as a VP or clause – as informally shown in (7).

(7) TENSE [EVENT DESCRIPTION/ PROPOSITION]

Example (4b) shows that English is not only 'illogical,' it is not systematic, in that the same semantic function (tense operators) can be expressed as an independent word that takes a verb phrase as complement or as a suffix on the verb.

Finally, example (5) illustrates that what is literally expressed does not provide all the intuitive semantic content we ascribe to utterances. What Mary began in (5a) is *drinking the beer* and in (5b) *reading the book* (possibly *writing the book*). Semantic content seems to have to be interpolated between the semantic translation of the verb and the semantic translation of the direct object, a phenomenon dubbed 'coercion' in the computational semantics literature (Moens and Steedman, 1988; Pustejovsky, 1995).

Theories of the Syntax–Semantics Mismatch

Existing grammatical frameworks make different hypotheses about how the syntactic–semantic mismatches mentioned in the previous section can be resolved and about how artificial languages' perfection is reflected in natural languages. We can distinguish at least three general hypotheses; each is currently actively being explored.

- Hypothesis 1. Deep Split Structural Isomorphism (DSSI): Natural languages' imperfection is true of the surface syntactic structure of sentences. But strings can be assigned different structures at different levels of representation, and, for each kind of semantic relation, there is at least one level at which syntactic structures match very closely (if not entirely) the relevant aspects of semantic structures.
- Hypothesis 2. Natural Language Perfection (NLP): Natural languages' imperfection is only apparent. A single semantic combination rule can in fact be assigned to every combination of syntactic expressions (although the syntactic category of natural language expressions might then need to be flexibly assigned).
- Hypothesis 3. Imperfections Reflect the Architecture of Grammars (IRAG): Natural languages' imperfection is the result of their architecture (or even the architecture of the mind). Syntax and semantics are independent generative systems that are related through correspondence rules. Although there are regularities in how structures generated by one system are related to structures generated by the other, no homomorphic relation can be expected.

Proponents of these hypotheses typically focus on distinct subsets of the mismatches mentioned in the previous section. The DSSI hypothesis, for example, which goes back at least to the 1960s (see Lakoff, 1971), does not focus on coercion phenomena. The IRAG hypothesis, on the other hand, does not focus on quantifier scope mismatches. How easily each approach can tackle the **entire** set of mismatches or even whether they should (i.e., whether these mismatches form a natural class) is unclear at this point. This section focuses on the mismatches that each hypothesis models and, in particular, those mismatches whose analyses are easiest to present briefly.

The Deep Split Structural Isomorphism Hypothesis

The descriptive import of the DSSI hypothesis is most easily seen in typical analyses of examples (3a) and (4). Maintaining the DSSI hypothesis in the face of these surface mismatches leads to the claim that sentence (3a) has two distinct syntactic structures at the LF level of representation (often called

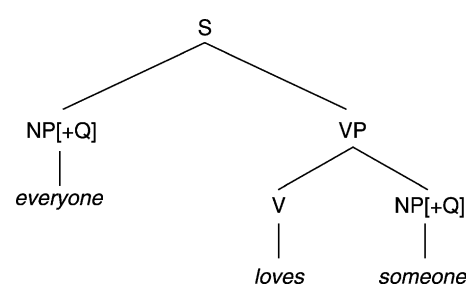

Figure 3 The s-structure representation of sentence (3a).

L(ogical)-F(orm)), but a single syntactic structure at another level (often called s-structure) (see May, 1985; see Chomsky, 1995, and subsequent work in the Minimalist Program for a slightly different, but conceptually similar, model of these phenomena). Technically, these distinct structural analyses are generated by using two sets of rules, a set of context-free rules (e.g., those in (8) for sentence (3a)) and one or more additional (transformational) rules such as that in (9). In (8), the notation NP[±Q] is used as a variable to range over all NPs, whereas NP[+Q] ranges over only NP quantifiers. In (9), t_i is a placeholder that indicates where the NP quantifiers moved from and is called a trace. (These rules are adapted from Chierchia and McConnell-Ginet, 2000.)

(8a) S → NP[±Q]VP
(8b) VP → V NP[±Q]|VP
(8c) NP[+Q] → Det N|everyone|someone
(8d) Det → every|a
(8e) N → man|woman
(8f) V → loves

(9) $[_S \ldots \text{NP}[+\text{Q}] \ldots] \Rightarrow [_S \text{NP}[+\text{Q}]_i [_S \ldots t_i \ldots]]$

The context-free rules in (9) generate the single s-structure-level syntactic tree in Figure 3. Subsequent applications of the transformational rule in (9) results in the two LF-level syntactic trees in Figures 4 and 5, depending on which of the NP[+Q] is targeted first. The two relevant readings of sentence (3a) now receive two distinct representations at one level of representation, and the homomorphism principle can be maintained if we assume the semantic interpretation of sentence (3a) is read from its LF representations. (Strictly speaking, homomorphisms require that 'operations' be defined in both domains put into correspondence, e.g., syntax and semantics. Thus, the output structures for which an homomorphism exists must be reanalyzed in terms of a local tree-building operation. Alternatively, the notion of order-homomorphism between structures outputed by the grammatical rules can be used, the relevant order being here tree-inclusion; see Cohn, 1981.) Compare the relative depth of embedding of the two quantified NPs in Figures 4 and 5 with that of the corresponding quantifiers in the first-order predicate logic formulas for the two readings of sentence (3a) in Figures 6 and 7.

The distinction in morpho-syntactic encoding that tense morphemes receive both within English and crosslinguistically is subject to a similar kind of analysis for proponents of the DSSI hypothesis. The homomorphism hypothesis can be maintained because a single surface expression can have two different structures at two distinct levels of representation. In particular, tense can have syntactic scope over the structure that denotes an event description (or proposition) at one level of representation (the d-structure, or its equivalent in the Minimalist Program) but not at another level of representation. The common structure of sentences (4a) and (4b) at the d-structure level is represented in Figure 8.

The distinct surface expression of the morpheme encoding tense in sentences (4a) and (4b) follows from operations similar to the transformational rule in (9) and the assumption that these operations are sensitive to the distinction between affixes such as *-ed* and free morphemes such as *will*. The contrast in the encoding of time in English is only the tip of the iceberg. Different tenses and various aspect markers may vary in their surface expression within a single language and across languages. The strategy just outlined can be applied generally to all these cases (see Cinque, 1999, for one of the most detailed explorations of this possibility).

Similar accounts are provided for the data set in (2). More generally, the claim that 'deep down' the interface between syntax and semantics is more transparent than what surface strings suggest requires

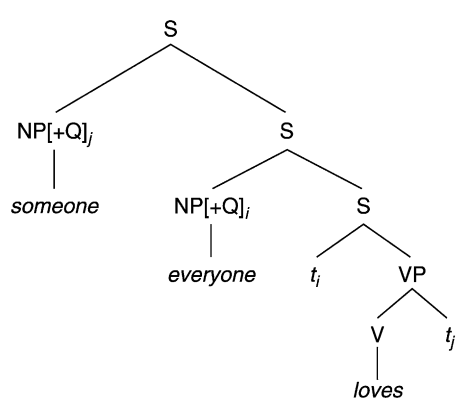

Figure 4 LF structure for the wide-scope existential reading of sentence (3a).

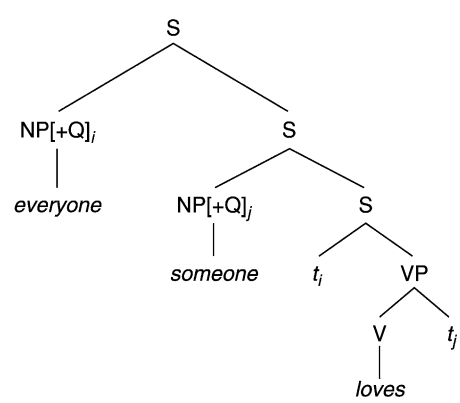

Figure 5 LF structure for the narrow-scope existential reading of sentence (3a).

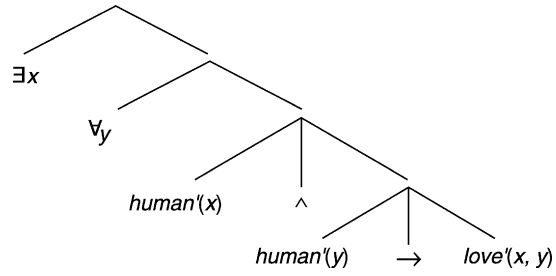

Figure 6 A tree representation of the wide-scope existential reading of sentence (3a).

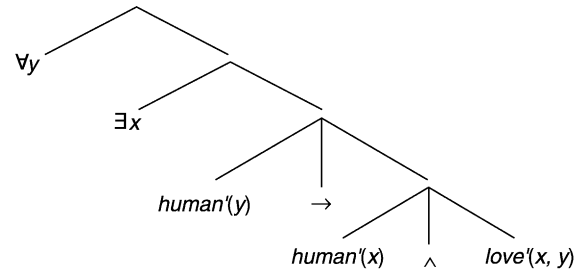

Figure 7 A tree representation of the narrow-scope existential reading of sentence (3a).

providing each surface string with several distinct syntactic analyses:

- An analysis that allows predicate–argument relations (including predicate–argument relations of tense, aspect, and modal operators) to be homomorphically read from the syntactic tree (e.g., an analysis that reads the tense predicate/VP argument relation from the syntactic structures of trees such as the one in Figure 8, i.e., from structures **before** verb stems move).
- An analysis that allows quantifiers and other scoping relations that do not involve a predicate-argument relation (focus vs. 'presupposed,' topic vs. comment, and so forth) to be homomorphically read from another syntactic tree (e.g., an analysis that reads the quantifier/scope relation from the syntactic structure of trees such as the ones in Figures 4 and 5 i.e., from structures that **result** from moving the NP quantifiers.)
- An analysis that represents the structure of the surface string.

To mediate among these analyses, successive applications of a general rule similar to (9) is posited. Morphemes, words, or phrases whose semantic interpretation contravenes their surface syntactic position must be moved to or from a position where the semantic interpretation of the local syntactic structure that they participate in can be easily read. For example, to account for the event description or propositional nature of the semantic argument of the past tense operator in sentence (4a), the past tense morpheme takes as syntactic complement at d-structure a structure that includes the verb stem for *play*, in conformity with its semantic constituency; subsequent movement of the verb stem ensures that it combines with the syntactically higher affix to form the surface verb form *played*. Similarly, the quantifiers *everyone* and/or *someone* in sentence (3a) are assumed to 'covertly' move to a position in which their semantic scope is easier to read from the local tree they are part of. As a result, the syntactic notion of hierarchical

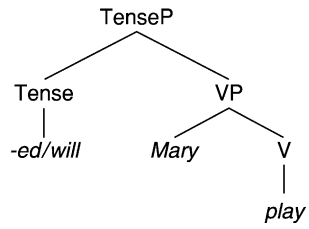

Figure 8 The d-structure representation of sentences in (4).

superiority (or c-command) matches the semantic notion of wide scope (at least in the traditional first-order predicate calculus representation of scope dependencies). Note that, the mapping of syntactic tree configurations onto semantic configurations must precede the movement operation in the case of the movement of the verb stem, but must follow the movement operation in the case of the movement of quantifiers. (Alternatively, the syntax-to-semantics mapping targets the position of the moved constituent, or head of a chain in the sense of Chomsky, 1981, for quantifiers, but targets the position of the trace of the moved constituent for verb stems and raised NPs such as *John* in (1b).)

In theories that follow the just-outlined general model of the interface between syntax and semantics, one syntactic structure can be provided from which the relevant part of semantic representations can be homomorphically read. But, there is no **single** such structure, a state of affairs that is seen by some as effectively abandoning the spirit of Frege's compositionality principle (Jacobson, 2002). But, proponents of the DSSI hypothesis have stressed that the kind of structural operations and configurations necessary to model sentences such as (3a) or (4) are at play in syntactic processes that do not bear on the interface between syntax and semantics. Strictly syntactic constraints might thus provide independent evidence for the semantically more complex DSSI hypothesis (see May, 1985; Hornstein, 1995). Whether the adduced similarities between strictly syntactic constraints

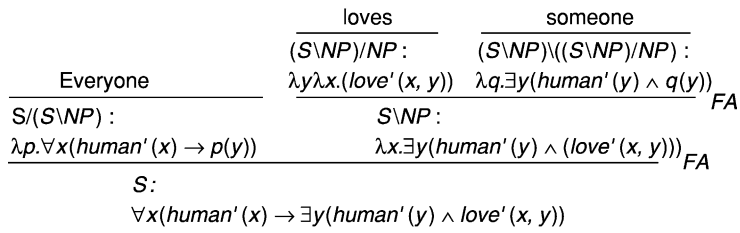

Figure 9 Derivation of the semantic representation of the narrow-scope existential reading of sentence (3a).

and the operations/structures presented in this section are sufficient to weaken Frege's principle remains a subject of debate.

The Natural Language Perfection Hypothesis

Hypothesis 2 answers the interface challenge by denying that natural languages have any real imperfections or that natural languages relate their syntax and semantics in a qualitatively distinct manner from artificial languages. The impression of imperfection comes merely from too simple a view of the rules available to combine natural language expressions and the erroneous reification of the notion of syntactic constituent structure. The compositionality of natural languages, in this view, pertains to the pairing of a set of semantic and syntactic rules (the rule-to-rule hypothesis of Bach, 1976), not to a pairing of the structures that these rules output. In contrast to the DDSI hypothesis, the NLP hypothesis claims that the homomorphism between syntax and semantics need not be split into two partial homomorphisms (to infer from surface expressions predicate–argument relations and operator–scope relations). It also claims that the syntax–semantics correspondence is best understood in terms of syntactic and semantic rules rather than between syntactic and semantic structures (local tree configurations, *modulo* the previously mentioned caveats). The NLP hypothesis goes back at least to Montague's work. It has been adopted by several different theories (e.g., Klein and Sag, 1985; Steedman, 2000; Copestake *et al.*, 2001); it is the hallmark of the Categorial Grammar/Lambek Calculus tradition. Steedman (2000) provides one of the most articulate versions of this approach. In his analysis of example (3a), as is common to all approaches that assume that the translation from syntactic structure/categories to semantic structure/categories is local (the rule-to-rule hypothesis), each expression is assigned both a syntactic and semantic category, and each combinatorial rule affects both the syntactic and semantic categories of the expressions it combines. Syntactically, *loves* is taken to be a functor that must combine with a direct object NP to its right and a subject NP to its left to form a sentence. This syntactic subcategorization is written (S\NP)/NP. For illustrative purposes, quantified NPs such as *everyone* and *someone* are treated syntactically as either NPs or functors that must combine with a VP to their right to form a sentence or with a verb to their left to form a VP. This second syntactic subcategorization is written S/(S\NP) and (S\NP)\((S\NP)/NP), respectively. Semantically, *love* denotes a predicate missing two arguments, and *everyone* and *someone* denote predicates missing one argument each. Making use of λ-abstraction to model unsaturated argument positions, the meaning of *love* can be represented as:

$$\lambda y.\lambda x.\mathrm{love}'(x, y)$$

and that of *everyone* and *someone* as

$$\lambda p.\forall x(\mathrm{human}'(x) \rightarrow p(x))$$

and

$$\lambda q.\exists y(\mathrm{human}'(y) \wedge p(y))$$

respectively. Three principles of combination are relevant to modeling sentences (3a) (a few more universal principles, plus language-specific constraints on these principles, are the only other things that are needed to model the interface between the syntax and semantics of natural languages, according to this view):

- Function application, the combination of an argument/complement and a predicate/functor: Combining (in that order) x and $y\backslash x$ or y/x and x yields a y.
- Type-raising, making an argument/complement into a predicate/functor: An expression of category x can be assigned to the category $y/(y\backslash x)$ or $y\backslash(y/x)$.
- Function composition, composing two functors: Combining (in that order) two functors x/y and y/z yields x/z.

The derivations of the two relevant readings of sentence (3a) are given in Figures 9 and 10. (For ease of exposition, type-raising operations are assumed to have applied in the lexicon and are not represented.) The interpretation of sentence (3a) in which the existential quantifier has narrow scope over the

Everyone	loves		
$S/(S\backslash NP)$: $\lambda p.\forall x(human'(x) \rightarrow p(x))$	$(S\backslash NP)/NP$: $\lambda y\lambda x.(love'(x, y))$	*FC*	someone
S/NP : $\lambda y.\forall x(human'(x) \rightarrow (love'(x, y))$			NP $\lambda q.\exists y(human'(y) \wedge q(y))$
S: $\exists y(human'(y) \wedge (\forall x(human'(x) \rightarrow love'(x, y))))$			*FA*

Figure 10 Derivation of the semantic representation of the wide-scope existential reading of sentence (3a).

universal quantifier follows from two uses of function application (*FA* in Figure 9; standard steps that simplify the resulting semantic formulas are omitted). The interpretation of sentence (3a) in which the existential quantifier has wide scope over the universal quantifier follows from the use of function composition first and then the use of functional application (*FC* and *FA* in Figure 10).

The two possible derivations of sentence (3a) outlined in Figures 9 and 10 clearly obey Frege's principle and the rule-to-rule hypothesis. To each syntactic combination of two of its substrings corresponds a unique combination of the semantic representations of those two substrings. Leaving aside a few additional complexities, modeling the other mismatches previously mentioned, takes a similar form under this view. Alternative derivations (leading to either distinct surface expressions of the same semantic content or distinct semantic content for the same surface expressions) stem from the (at times nondeterministic) interaction of a handful of combinatory principles (function application, various forms of function composition, and type-raising). Proponents of the NLP hypothesis, thus, provide rule-based, truly compositional models of the interface between syntax and semantics. Whether operations posited by such models, like the operations/structures posited by DSSI models, have independent, purely syntactic justifications remains controversial.

The Imperfections Reflect the Architecture of Grammars Hypothesis

The IRAG hypothesis, which is more recent and less fleshed out than the previous two hypotheses, takes the interface challenge to reflect a deep truth about the architecture of natural languages (if not the mind). In this view, natural languages are 'imperfect' because each level of analysis (syntax and semantics) has its own 'agenda,' so to speak, and although these 'agendas' are typically aligned, they need not be. The analysis of the sentences in (5) given in Jackendoff (1997) (see also Sadock, 1991, for an early proposal) best illustrates this hypothesis. The context-free rules in (8) account for the (simplified) syntactic structure of sentence (5a), as shown in the tree in Figure 11.

Two sets of correspondence rules link the syntactic structure diagrammed in Figure 11 or that of the more explicit expression of its content in sentence (10a) and their common semantic representation. (*Begin* is assumed here to denote a two place predicate whose two arguments are an actor and a type of action; informally, BEGIN′(*x* actor, *y* action).)

(10a) Mary began drinking the beer
(10b) Mary began reading the book

The rules for interpreting the more explicit versions of sentences (5) in (10) are informally formulated as follows.

1. Interpret *begin* as BEGIN′.
2. Interpret the denotation of (definite) direct object NPs as semantic arguments of the denotation of verbs.
3. Interpret VP complements of verbs as denoting action arguments of the interpretation of verbs.

To model the 'nondefault' correspondence between the syntactic relation of the verb and its direct object and their semantic relation in sentences such as (5), Jackendoff posits rule 4 as an alternative to rule 2.

4. Interpret NP as *F(Int(NP))* (i.e., as the unspecified activity denoted by *F* and involving the interpretation of *NP*).

The application of rules such as rule 4 must be further constrained so as to not apply in the 'default' case (see Sadock, 1990, for suggestions and Jackendoff, 2002, for more details).

The IRAG hypothesis resembles the DSSI hypothesis in claiming that syntactic structures are linked to semantic structures (*modulo* the previously mentioned caveats) and that correspondence rules take the form: Configuration X in syntax corresponds to configuration Y in semantics. But it views the assumption that semantic structures can **always** be read from syntactic structures (as in the DSSI hypothesis)

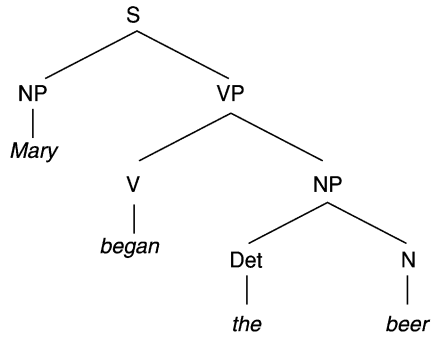

Figure 11 The syntactic structure of sentence (5a).

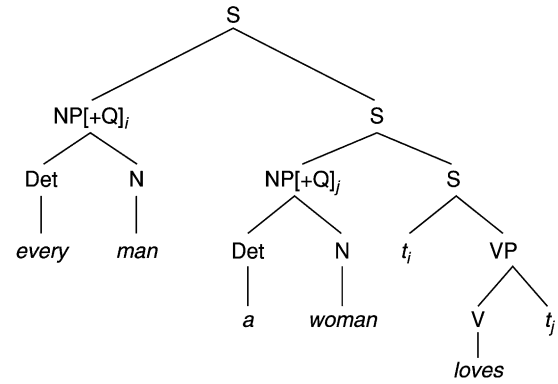

Figure 12 LF structure for the narrow-scope existential reading of sentence (11).

or the syntactic formation rules that have applied (as in the NLP hypothesis) as an illusion created by the existence of default correspondence rules. The IRAG hypothesis also ressembles the NLP hypothesis in positing a direct pairing of syntactic and semantic types (NPs and F(Int(NP)) in rule 4, or the syntactic category and meaning of lexical items). But it insists that syntax and semantics are independent generative systems that derive their outputs on their own, and thus it views mismatches not as illusions but as evidence for this architectural independence or representational modularity (Jackendoff, 1997).

Shaking Things Up

How Specified Is Grammatical Meaning?

All the approaches discussed in the previous section presume that grammatical meaning (the output of interfacing the syntactic and the semantic components of a grammar) is a message whose content is similar to a logician's proposition (or its conceptual equivalent). The relevance of some of the examples in (2)–(5) to models of the interface between syntax and semantics depends on this presumption. Consider example (3a). The existence of one surface syntactic structure but two readings for this sentence is part of what motivates the DSSI hypothesis and the postulation of multiple syntactic levels of representations. Similarly, the two sequences of rules deriving the two readings of sentence (3a) sketched in Figures 9 and 10 presuppose that these two readings **are** the output of interfacing syntax and semantics. Examples of coercion such as (5) are only relevant to the uncovering of the architecture of grammar if the addition of the 'missing' material is believed to be a grammatical matter. If it is not, grammatical nondefault correspondence rules of the kind that rule 4 exemplifies are not needed to rectify the mismatch.

Recent work in computational semantics challenges traditional assumptions about the semantic output of grammars and, as a consequence, has altered the relevance of some of the examples in (2)–(5). A fair amount of work, in particular, challenges the view that the semantic output of grammar rules or constraints is fully specified and argues that this output is underspecified. (Cooper, 1983, is a precursor of that computational work. Philosophers of language and neo-Gricean semanticists have also challenged this view, e.g., Recanati, 1993; Levinson, 2001; some of their conclusions parallel those drawn by computational semanticists.) Two main areas of research have focused on whether scopal relations in sentences such as (3a) are grammatically underspecified and whether semantic type mismatches such as in (5) are resolved grammatically. The results of this research are:

- Many scopal relations may not be determined by grammatical rules or constraints, and their determination might involve postsemantic processes.
- The syntactic relation between a head and a complement (e.g., a verb and its direct object) may not correspond semantically to the relation between a predicate and an argument (even leaving aside quantificational NPs). The corresponding semantic relation may be indirect, as, for example, the relation between a predicate and an argument of an argument of . . . an argument.

The difference between underspecified and fully specified semantic representations can be illustrated using tree diagrams. A fully specified semantic representation can be diagrammed as a set of fully connected trees, as in the case of Figures 6 and 7 for the first-order predicate calculus representations of the two relevant readings of sentence (3a). As discussed earlier, the DSSI hypothesis claims that the relative hierarchical position of the quantifiers in these semantic representations matches that of their syntactic expression at the LF level of analysis (see

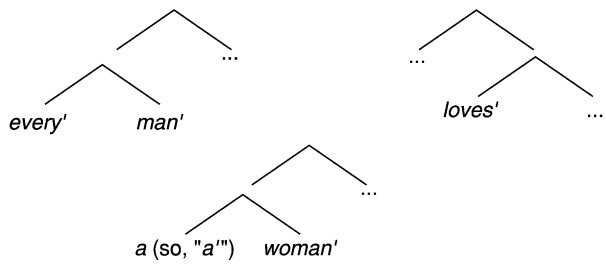

Figure 13 The underspecified semantics of sentence (11).

Figures 4 and 5). Similarly, sentence (11) (a slightly more complex version of (3a)) would receive as **one** of its LF analyses under the DSSI hypothesis the tree configuration in Figure 12.

(11) Every man loves a woman.

Underspecified semantic representations, on the other hand, can be diagrammed as a less than fully connected tree. The semantic output of parsing sentence (11), for example, would be a set of three partial trees, as Figure 13 illustrates.

Each treelet in Figure 13 can receive a compositional semantics (alternatively, each rule used to build the treelets can be paired with a semantic rule). The leftmost tree can be interpreted as:

$$\lambda p.(\forall x(\text{man}'(x) \rightarrow p(x)))$$

(the ... in the treelet is translated as a lambda-abstracted variable); the middle tree as:

$$\lambda q.(\exists y(\text{woman}' \wedge q(y)))$$

and the rightmost tree as:

$$\lambda y \lambda x.(\text{love}'(x, y))$$

This is very similar to what proponents of the NLP hypothesis would do: Each such treelet's meaning can be derived through functional application. But the semantic correlate of syntactically combining a verb and its direct object or a VP and its subject is merely the set union of these constituents' meanings. The semantic interpretation of these underspecified meanings is often said to be simply the set of fully connected semantic trees that can be built from these treelets. (Reyle, 1993, provides a possible direct model–theoretic interpretation of underspecified semantic representations.)

Now, because the semantic output of grammars is not a **single** fully connected tree, the structure of the syntactic tree cannot reflect the structure of the semantic representation. Thus, such frameworks can assume a single syntactic structure as the output of the syntactic component of grammars – for example, the tree in Figure 14 for sentence (11), given the

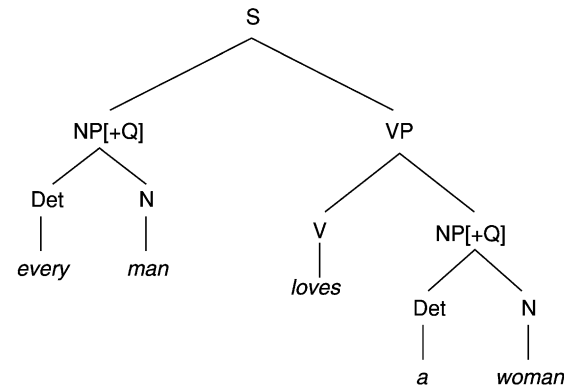

Figure 14 The syntactic structure of sentence (11).

phrase structure rules in (8) – while maintaining a rule-to-rule hypothesis.

The analysis of sentences that involve coercion follows parallel lines. Egg *et al.* (2001), for example, argued that the semantic interpretation of sentences such as (5) does not include additional semantic material (i.e., the direct object is not grammatically interpreted as *drinking the beer* and *reading the book*). Rather, the semantic output is a partial tree specification. The predicate *begin'* is required to dominate the interpretation of its complement (i.e., to include the interpretation of its complement within its second argument), but is not required to **immediately** dominate it, leaving open the possibility that pragmatic processes will interpolate conceptual content between the two. Nonstandard grammatical correspondence rules such as rule 4, whose sole purpose was to interpolate such conceptual content, would now become otiose.

Where Does the Meaning Come From?

Another assumption of the first two hypotheses we have reviewed is that the nature of the meaning carried by a lexical item differs from that encoded by syntactic structures or rules. Words (or morphemes) carry substantive meanings, whereas syntactic structures or rules only serve to combine or put these substantive meanings together. This division of labor is quite clear in the two derivations of sentence (3a) represented in Figures 9 and 10. The meanings of words carry the quantificational and predicative meanings; the rules only fill in the missing arguments in these lexical meanings (providing values for lambda-abstracted variables). Syntactic rules or structures in such a view do not **carry** meaning; they merely glue or combine meanings carried by words or morphemes.

The last 20 years have seen the emergence of another view that holds that syntactic structures **do**

carry meaning, too, at times (see Fillmore *et al.*, 1988; Ginzburg and Sag, 2001, for early and most articulated examples of this line of research). Syntactic structures thus can **both** glue meanings together and/or carry meaning on their own. Convincing evidence that syntactic structures, rules, or constructions carry meaning, is hard to come by because it is almost always possible to assign the meaning assigned to a syntactic construction to some lexical material within the sentence. But Ginzburg and Sag (2001) presented data (see also Huang, 1982) that suggest that syntactic structures do carry meaning. They show that fronting the *wh*-phrase, as English often does, as in (2a), has an effect on meaning. Fronted *wh*-phrases cannot have wider scope than their surface position. In contrast, *wh*-phrases that remain in position are freer in their scoping possibilities. In particular, they can have scope over the matrix clause when a question is embedded after verbs such as *know* and *ask*. The contrast between the Chinese (Mandarin Chinese) sentence in (12) (from Huang, 1982), in which the *wh*-phrase has remained in position, and its two possible interpretations indicated in its English translations illustrates the difference. The English *wh*-phrase has been fronted in both translations, and its scope is determined by its surface position. But the Chinese *wh*-phrase, which remains in place, can vary in scope. The different interpretative possibilities of the Chinese example and its English translations do not seem due to differences in **lexical** meaning between *shei* and its English counterpart *who*. Rather, it seems to follow from the different syntactic structures in which the two words occur (or the operations they undergo), thus suggesting that syntactic structures or rules contribute more to meaning than the glue for (substantive) lexical meanings.

(12) [Zhangsan [zhidao shei mail-le shu]]
Zhangsan know who buy-ASP book
'who does Zhangsan know bought books? /
Zhangsan knows who bought books'

Although much work has been devoted in the last 30 years to developing more precise architectures for the interface between syntax and semantics and finding data that support them, garnering convincing evidence that favors one hypothesis to the exclusion of the others has been hard. The difficulty partly stems from the fact that the proposed models are sufficiently rich to account for most of the data. Choosing among them is, therefore, more a matter of elegance or some intuitive notion of simplicity than sheer descriptive adequacy. Furthermore, research has often focused on existence proofs (proof that some phenomenon can or cannot be accounted by one (version of) a model) or on relatively small grammar fragments for which explicit syntactic and semantic rules or constraints are provided. Two recent trends suggest better model evaluation might soon be available. First, several researchers now use data on human online sentence processing or word access as additional sources of evidence (see Steedman, 2000; Jackendoff, 2002). Second, large-scale implemented grammars that output both semantic and syntactic representations have developed in the last decade and might therefore allow the large-scale testing of the models on a realistic portion of natural languages, such as the ParGram project within Lexical-Functional Grammar and the LinGO project within Head-driven Phrase Structure Grammar.

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http://lingo.stanford.edu – LinGO project within Head-driven Phrase Structure Grammar.

Syria: Language Situation

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Although Arabic is the official language of Syria, considerable linguistic variation exists in the forms of Arabic spoken and also in the wealth of language minority communities represented in the country. Syria has a population of approximately 18 million with a literacy rate of 76%.

Arabic diglossia exists in Syria as in other Arab countries. So-called higher varieties, including Classical Arabic and Modern Standard Arabic, are used alongside what some consider lower colloquial varieties, which themselves are represented by local dialects. North Levantine Arabic (Arabic, North Levantine Spoken) (also referred to as Lebanese-Syrian Arabic) is an urban standard dialect based on the speech of those living in Damascus. North Levantine Arabic is commonly heard in broadcasting. Mesopotamian Arabic (Arabic, North Mesopotamian Spoken), spoken in Eastern Syria, is very similar to many Iraqi varieties of Arabic, while Najdi Arabic (Arabic, Najdi Spoken), spoken in the Syrian desert, is similar to certain varieties of Arabic spoken in Iraq, Jordan, and Saudi Arabia.

Kurdish (Kurmanji) represents the largest language minority community with an estimated 1.5 million speakers. Although Kurdish was used for publication and broadcasting during the French Mandate from 1920 to 1946, today Arabic is used in mass media and educational instruction within the Kurdish community.

South Azerbaijani speakers in Syria, referred to as Turkmen, form a community of 100 000. Circassian (also known as Adyghe) is a North Caucasian language that is spoken by approximately 40 000. Numerous Circassian families have been displaced from villages in the Golan Heights. Domari speakers number approximately 10 000. The Domari, referred to as Muslim Gypsies, trace their origins to India in the 18th century and are spread out in communities in North Africa and the Middle East.

Members of three language minority groups also form a large part of the Christian community in Syria. Armenian is spoken by an estimated 350 000, many who live in and near Aleppo. Armenians work as professionals or in business, small industry, or crafts. Assyrian (Assyrian Neo-Aramaic) (also known as Neo-Syriac) is spoken by approximately 45 000 in 35 villages along the Khabur River, an important tributary of the Euphrates River. Assyrian is lexically influenced by Akkadian, the ancient language of Assyrians and Babylonians; however, it shares considerable similarity

Ginzburg J & Sag I (2001). *Interrogative investigations: the form, meaning, and use of English interrogatives*. Stanford: CSLI Publications.
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Although Arabic is the official language of Syria, considerable linguistic variation exists in the forms of Arabic spoken and also in the wealth of language minority communities represented in the country. Syria has a population of approximately 18 million with a literacy rate of 76%.

Arabic diglossia exists in Syria as in other Arab countries. So-called higher varieties, including Classical Arabic and Modern Standard Arabic, are used alongside what some consider lower colloquial varieties, which themselves are represented by local dialects. North Levantine Arabic (Arabic, North Levantine Spoken) (also referred to as Lebanese-Syrian Arabic) is an urban standard dialect based on the speech of those living in Damascus. North Levantine Arabic is commonly heard in broadcasting. Mesopotamian Arabic (Arabic, North Mesopotamian Spoken), spoken in Eastern Syria, is very similar to many Iraqi varieties of Arabic, while Najdi Arabic (Arabic, Najdi Spoken), spoken in the Syrian desert, is similar to certain varieties of Arabic spoken in Iraq, Jordan, and Saudi Arabia.

Kurdish (Kurmanji) represents the largest language minority community with an estimated 1.5 million speakers. Although Kurdish was used for publication and broadcasting during the French Mandate from 1920 to 1946, today Arabic is used in mass media and educational instruction within the Kurdish community.

South Azerbaijani speakers in Syria, referred to as Turkmen, form a community of 100 000. Circassian (also known as Adyghe) is a North Caucasian language that is spoken by approximately 40 000. Numerous Circassian families have been displaced from villages in the Golan Heights. Domari speakers number approximately 10 000. The Domari, referred to as Muslim Gypsies, trace their origins to India in the 18th century and are spread out in communities in North Africa and the Middle East.

Members of three language minority groups also form a large part of the Christian community in Syria. Armenian is spoken by an estimated 350 000, many who live in and near Aleppo. Armenians work as professionals or in business, small industry, or crafts. Assyrian (Assyrian Neo-Aramaic) (also known as Neo-Syriac) is spoken by approximately 45 000 in 35 villages along the Khabur River, an important tributary of the Euphrates River. Assyrian is lexically influenced by Akkadian, the ancient language of Assyrians and Babylonians; however, it shares considerable similarity

with Aramaic (Western Neo-Aramaie). Aramaic, with some 15 000 speakers, is facing obsolescence. Although the language of Christ and the lingua franca of the Holy Land 2000 years ago, it is only spoken in three small villages north of Damascus: Maloula, Jabadin, and Bakha. Aramaic is still used in liturgies in Syrian Orthodox and Catholic Churches.

French and English are two foreign languages spoken in Syria. The use of French has decreased and is not used as widely as in neighboring Lebanon, and, as elsewhere in the Arab world, English is slowly spreading due to modernization and privatization.

See also: Arabic; Aramaic and Syriac; Code Switching and Mixing; Kurdish; Variation in Arabic Languages.

Language Maps (Appendix 1): Map 104.

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Syriac

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Syriac is a form of Aramaic, a Semitic language whose many dialects have been in continuous use since the 11th century B.C. Syriac is by far the most attested dialect of Aramaic. It is used today in two forms: Classical Syriac, which is a literary form of the language, and Vernacular Neo-Syriac, which consists of many regional dialects. Syriac is used by Christian communities in the Middle East, known as Syriacs, Assyrians, Chaldeans, and Maronites; and in the Indian state of Kerala, primarily as a liturgical language, by communities known as the St Thomas Christians. There are today only a few hundred speakers of Classical Syriac, fewer than one million speakers of Vernacular Neo-Syriac, but over 10 million who consider Classical Syriac their liturgical language. Classical Syriac exists in two main dialects, West Syriac and East Syriac, the difference between them being minor phonological variations.

Historically, the earliest dated Syriac inscription is from 6 A.D., and the earliest parchment, a deed of sale, is from 243. The earliest dated manuscript was produced in November 411, probably the earliest dated manuscript in any language. Within a few centuries from its origin, Syriac produced a wealth of literature that surpassed all other Aramaic dialects. Early literature was produced in Mesopotamia, especially in and around Edessa, by pagans, agnostics, Jews, and Christians. The literature of the first three centuries consists mostly of anonymous texts whose date and origin cannot be established. The 4th century witnessed the first major writings that survive to this day. The 5th to 9th centuries mark the Golden Age of Syriac, with more than 70 important known authors, not counting numerous anonymous works and lesser authors. These writings cover philosophy, logic, medicine, mathematics, astronomy, alchemy, history, theology, linguistics, and literature. Under the Arabs, Syriac was the vehicle by which the Greek sciences passed to the Muslim world, and later to Europe through Spain, marking Syriac as an important stage in the history of world civilization. As Arabic began to replace Syriac as the primary language of the Middle East, Syriac became less prominent but has continued to be used until today.

The Syriac writing system makes use of three scripts. The oldest, known as Estrangelo 'rounded,' was fully developed by the 5th century. Later, two geographic scripts derived from it: West Syriac, whose proper name is Serto, and East Syriac. Early Syriac writing consists of consonants and long vowels only. In the 7th century, a vocalization system was developed and lent itself to Hebrew and Arabic. At the time of Genghis Khan (12th century), the Mongolian script was derived from Syriac.

The phonology of Syriac makes use of 22 consonants, three of which are *matres lectionis* (glottal stop, *w*, and *y*), and seven vowels (five in the case of West Syriac). Six consonants, known by the mnemonic *bgdkpt*, undergo spirantization, where the plosives become fricatives. Traditionally, stress has been assigned to the penultimate syllable in West Syriac, and the final syllable in East Syriac. Syllabification employs long open (CVV) and closed (CVC) syllables. The short vowel of a CV syllable is almost always deleted.

The morphology of Syriac is based on root-and-pattern morphology, in addition to suffixation,

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The morphology of Syriac is based on root-and-pattern morphology, in addition to suffixation,

prefixation, and circumfixation. Most roots consist of three consonants, although two- and four-consonantal roots exist. Roots that do not contain any of the *matres lectionis* are called 'strong,' and those containing *matres lectionis* are called 'weak' and for the most part undergo various phonological processes. Most words are derived according to a CV template and a vocalism.

Verbs exist in two tenses: perfect, denoting past tense, marked by zero or one suffix; and imperfect, denoting future tense, marked by a circumfix. The imperative is marked by the suffix part of the imperfect circumfix. Closely related to verbs are the participles and the infinitive. Verbal affixes mark number (singular, plural), person (1st, 2nd, 3rd), and gender (masculine, feminine).

Nouns exist in three states: 'absolute' is the basic form and in early Syriac used to indicate nondetermination; 'emphatic,' by far the most frequent, is marked by a gender-sensitive suffix and is used to mark determination; and 'construct' (joining two nouns) is used primarily to mark a genitive like relation. Adjectival forms are formed mostly by one or more suffixes, those with fewer suffixes belonging to earlier periods of the language. More complex nouns are formed by formative prefixes, and may also contain suffixes.

Personal pronouns either stand on their own, or are in the form of suffixes; they are also either in subject form or object form. Demonstrative and interrogative pronouns stand alone. The relative pronoun is in the form of a prefix.

The sentence structure does not put hard constraints on word or clause order, though idiomatic construction is not very free. Nominal sentences have a noun, an adjective, or an adverbial expression as a predicate. Copulative sentences are joined together with a conjunction in the form of a prefix (in the case of 'and') or a stand-alone word (in the case of 'or'). Syriac also uses relative clauses, marked by the prefix *d*, indirect interrogative clauses, marked by a particle, and conditional clauses, also marked by a particle.

The Syriac lexicon is either arranged by root, or in a quasialphabetical order (in the latter case, derivations of the verb with prefixes appear in the unprefixed 3rd singular masculine form). The primary Syriac lexica in use were all composed in the 19th and early 20th centuries.

See also: Semitic Languages.

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Systematicity

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It is something of a commonplace that linguistic capacities are systematic: very roughly, that understanding a sentence entails understanding certain other sentences related to the first. Likewise, it is something of a commonplace that the best way to account for this fact is by supposing that linguistic meaning is compositional: again roughly, that to understand a sentence, it suffices that one understand the meanings of the words it contains and its syntactic structure. This explanatory hypothesis in turn accounts for much of the reason why compositionality is widely regarded by linguists and philosophers of language as a bedrock constraint on theories of meaning. But the real story about systematicity is rather more complicated. To begin with, the term 'systematicity' is far from univocal. A quick glance at the philosophical literature in which it has figured so prominently in recent years reveals at least three different senses of the term in common use. Since only confusion can result from running these different senses together, we will start by distinguishing them. Then we will assess the plausibility of various systematicity claims and their broader theoretical significance, giving special attention to the question of compositionality.

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Some Varieties of Systematicity

The first and arguably primary notion of systematicity concerns the capacity to process language. More specifically, our linguistic capacity is processing-systematic (p-systematic, for short) if and only if the capacity to understand (know the meaning of) a sentence s in a language L confers the capacity to understand (know the meaning of) a range of sentences $s_1^* \ldots s_n^*$ in L such that each s_i^* is structurally related to s in an appropriate way (Fodor and Pylyshyn, 1988; Hadley, 1994; Cummins, 1996). For example, anyone who understands the sentence *John loves Mary* thereby also understands the sentences *Mary loves John*, *John loves John*, and *Mary loves Mary*. The latter three sentences are appropriately structurally related to the first sentence in virtue of the fact that each of the three sentences can be transformed into the first sentence by permuting or substituting co-occurring words of the same grammatical category (here, the proper nouns *John* and *Mary*). A broader notion of p-systematicity can be arrived at by dropping the co-occurrence restriction, allowing for the substitution of co-categorical words not contained in the initial sentence. Structural relatives of *John loves Mary* in this more liberal sense include, in increasing order of distance, sentences like *John loves Elvis*, *Mary kicks Bridget*, and *Fred bombs Falluja*. The corresponding, stronger p-systematicity claim states that understanding a sentence s confers the capacity to understand a range of sentences $s_1^* \ldots s_n^*$ such that each s_i^* is structurally related to s in the sense described above, and each word occurring in s_i^* is contained in the speaker-hearer's lexicon.

According to a second sense of the term, systematicity is a property of language itself, rather than a property of linguistic understanding. Since systematicity of this sort has to do with the expressive power of language, as opposed to the processing power of language users, we'll call it representation-systematicity. The basic idea is analogous to the notion of systematicity with which we began: a language L is representation-systematic (r-systematic) if and only if L can express a proposition p provided that L can express a range of propositions $p_1^* \ldots p_n^*$ such that each p_i^* is structurally related to p in an appropriate way (Fodor and Lepore, 1991). The relevant structural relation on propositions can be illustrated with the same examples used above. Assuming L is r-systematic, if the proposition that *John loves Mary* is expressible in L, then so are the trio of propositions that *Mary loves John*, that *John loves John*, and that *Mary loves Mary*. Each member of the trio is structurally related to the initial proposition (that *John loves Mary*) because each can be transformed into the latter by permutation or substitution of co-occurring constituents expressed by words of the same grammatical category. As before, the class of propositions structurally related to the initial proposition can be expanded to include the propositions that *John loves Elvis*, that *Mary kicks Bridget*, and so on, by dropping the co-occurrence constraint on constituents. According to the strengthened r-systematicity thesis, a language can express a proposition p only if it can express a range of propositions $p_1^* \ldots p_n^*$, where each p_i^* is structurally related to p in the manner described above, and each constituent of p_i^* is expressible by a word in the language.

Finally, a third notion of systematicity – what we will call grammar-systematicity – also denotes a property of language, but a different property than the one just described. Whereas representation-systematicity is a metasemantic property, grammar-systematicity has a broader metalinguistic scope, encompassing both syntax and semantics. A language L is grammar-systematic (g-systematic) if and only if s is a grammatical sentence of L provided that any s^* structurally related to s is a grammatical sentence of L (Johnson, 2004). Since the relevant notion of structural relatedness between sentences is the same as that implicated in the definition of processing-systematicity, the same examples will serve. The fact that *John loves Mary* can be transformed without loss of grammaticality by permuting or substituting words of the same category, whether drawn from that sentence or from elsewhere in the lexicon, supports the claim that English is g-systematic.

Claims to the effect that natural language is systematic in any of these three ways – processing based, representation based, and grammar based – have a good deal of face plausibility. But before evaluating such claims, we need to scrutinize the above definitions more closely. In particular, we need to consider what it is for two words to belong to the same grammatical category. Pending some clarification of this issue, the concept of structural relatedness, and with it the very idea of systematicity, will remain somewhat obscure (Johnson, 2004). And a non-circular (i.e., systematicity independent) standard of sameness of category is not easy to formulate. Even the relatively fine-grained category of proper nouns, for example, seems too heterogeneous to support a robust claim of systematicity, as witnessed by the sentence *Julia sang the lead in 'West Side Story'* and its anomalous permutational variant *'West Side Story' sang the lead in Julia*. Given the plurality of constraints – syntactic, semantic, and phonological – on lexical substitution, better candidates for grammatical

category-hood are going to be hard to come by (Harris, 1951).

How deep a problem this amounts to, however, depends to some extent on what notion of systematicity one is working with. In the case of grammar-systematicity, for example, the difficulty seems serious enough to warrant skepticism about the substance of the claim that language is g-systematic (Johnson, 2004). Processing-systematicity, on the other hand, is a different story. Since it is impossible to understand an anomalous sentence, it is plausible to suppose that understanding a sentence confers understanding of any structural variant of that sentence, provided that the variant in question is interpretable at all. Similar considerations apply to the case of representation-systematicity (Fodor and Lepore, 1991). It is plausible to suppose that the capacity of language to express a proposition entails the capacity to express any structural variant of that proposition, provided that the variant in question exists and is not anomalous. But this sort of strategy seems to be unavailable in the case of grammar-systematicity. Obviously, it won't do to say 'The structural variants of a grammatical sentence are grammatical, unless they are not.'

Be that as it may, it remains plausible that language is systematic in all three of the ways canvassed above, at least to a modest extent. Consider the following theses:

- *Minimal p-systematicity.* Understanding a sentence *s* entails understanding some structural variants of *s*.
- *Minimal r-systematicity.* If a language *L* can express a proposition *p*, then *L* can express some structural variants of *p*.
- *Minimal g-systematicity.* If *s* is a grammatical sentence, then some structural variants of *s* are grammatical.

Systematicity claims of this sort are hard to resist, given the apparent ease of generalization from the case of *John loves Mary* and its close variants. Whether language is p-systematic, r-systematic, or g-systematic in any stronger sense (e.g., whether 'many' can be strengthened to 'all') is an open question. But for the purposes of addressing the question of compositionality in natural language, these weak claims are enough to start with.

Explaining Systematicity

The idea that language is compositional, like the idea that language is systematic, can be formulated in various ways (*see* **Compositionality: Semantic Aspects**). According to one version, the principle of compositionality is a claim about our semantic competence, namely, that understanding the words in a sentence and the syntax of the sentence typically suffices for understanding the sentence. This is epistemic compositionality (e-compositionality). On another, more metaphysical, construal, the principle concerns language itself. It says that the meaning of a sentence typically supervenes on the meanings of the words in the sentence plus its syntax. We will call this ontic compositionality (o-compositionality). As noted above, systematicity is widely cited as a reason to believe in such principles. The connection between them, however, is more complex and attenuated than it may first appear. To start with, both e-compositionality and o-compositionality have to do mostly with semantics, and nothing else. As a result, considerations of g-systematicity, a broadly metalinguistic property, are of little significance. Instead, an argument to the best explanation from systematicity to compositionality will take one of two forms: either from p-systematicity to e-compositionality, or from r-systematicity to o-compositionality.

The line of argument from r-systematicity to o-compositionality is straightforward. We begin by assuming that a language *L* expresses the proposition *p*. This is equivalent to the claim that there is a sentence *s* in *L* that expresses *p*. According to compositionality, the meaning of *s* is determined by the meanings of the words in *s* plus the syntax of the sentence. The same goes for structural variants of *s*, the meaning of which will be structural variants of *p*. If we suppose that *L* is compositional, then we get a ready explanation of the fact that *L* expresses a proposition *p* only if it expresses structural variants of *p*.

The line of argument from p-systematicity to e-compositionality is trickier. In order for the supposition that semantic competence is compositional to explain why that competence is systematic, it should follow from that supposition that the competence in question is systematic. But this is patently not the case. Assume that you understand a sentence *s*. The goal is to infer from this assumption that you understand structural variants of *s* as well. But the principle of e-compositionality says only that understanding the words and syntax of *s* suffices for understanding *s*; it does not say that understanding *s* suffices for understanding the words and syntax of *s*. Yet the latter assumption – the principle of reverse compositionality (Fodor and Lepore, 2001; Fodor, 2002) – is precisely what is needed in order to conclude, via the principle of compositionality, that understanding a sentence entails understanding its

permutational variants. The amended argument is straightforward. If you understand *s*, then by reverse compositionality, you understand the syntax of *s* and the words occurring in *s*. These words can be re-ordered, *modulo* categorial constraints, within that syntactic structure to yield permutational variants of *s*. By compositionality, since you understand the words and syntactic structure of those variants, you also understand the variants. Hence, even if linguistic competence were compositional, that alone would not explain why it is systematic; one also needs to assume that it is reverse compositional.

A natural response to make at this juncture is that the phenomenon of p-systematicity warrants both e-compositionality and reverse e-compositionality. One problem with this move, however, is that the principle of reverse compositionality is probably false (Robbins, forthcoming). At a minimum, every theory of meaning on the market today, including the most austere versions of truth-conditional semantics, is incompatible with it (*see* **Meaning: Overview of Philosophical Theories**). For example, it's possible to know the truth-conditions of the sentence *Pet fish have tails* without knowing that *pet* refers to pets and *fish* refers to fish. All one needs to know about the NP *pet fish* is that it refers to pet fish, and that fact is consistent with the assumption that *pet* refers to fish and *fish* refers to pets. Hence, if the truth-conditionalist story is correct, one can know the meaning of *Pet fish have tails* without knowing the meanings of *pet* and *fish*. And non-truth-conditional accounts of meaning are in the same boat.

What's needed to escape this quandary, it seems, is a slight weakening of the thesis of minimal p-systematicity. Rather than saying that understanding a sentence strictly necessitates understanding some of its structural variants, we might say instead that instances of the first type of understanding are typically accompanied by instances of the second type. Such a pattern can be readily explained by the principle of compositionality together with a similarly watered-down form of reverse compositionality, according to which understanding a sentence is typically accompanied by an understanding of its syntax and the words contained therein. This in turn reveals how the systematicity of our semantic competence, however minimal in extent, militates in favor of its being compositional.

See also: Compositionality: Semantic Aspects; Meaning: Overview of Philosophical Theories.

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Systemic Theory

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Origins of Systemic Theory

Systemic, or systemic–functional, theory has its origin in the main intellectual tradition of European linguistics that developed following the work of Saussure (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics**). Like other such theories, both those from the mid-twentieth century (e.g., Prague school (*see* **Prague School**); French functionalism) and more recent work in the same tradition (e.g., that of Hagège), it is functional and semantic rather than formal and syntactic in orientation, takes the text rather than the sentence as its object, and defines its

permutational variants. The amended argument is straightforward. If you understand *s*, then by reverse compositionality, you understand the syntax of *s* and the words occurring in *s*. These words can be reordered, *modulo* categorial constraints, within that syntactic structure to yield permutational variants of *s*. By compositionality, since you understand the words and syntactic structure of those variants, you also understand the variants. Hence, even if linguistic competence were compositional, that alone would not explain why it is systematic; one also needs to assume that it is reverse compositional.

A natural response to make at this juncture is that the phenomenon of p-systematicity warrants both e-compositionality and reverse e-compositionality. One problem with this move, however, is that the principle of reverse compositionality is probably false (Robbins, forthcoming). At a minimum, every theory of meaning on the market today, including the most austere versions of truth-conditional semantics, is incompatible with it (*see* **Meaning: Overview of Philosophical Theories**). For example, it's possible to know the truth-conditions of the sentence *Pet fish have tails* without knowing that *pet* refers to pets and *fish* refers to fish. All one needs to know about the NP *pet fish* is that it refers to pet fish, and that fact is consistent with the assumption that *pet* refers to fish and *fish* refers to pets. Hence, if the truth-conditionalist story is correct, one can know the meaning of *Pet fish have tails* without knowing the meanings of *pet* and *fish*. And non-truth-conditional accounts of meaning are in the same boat.

What's needed to escape this quandary, it seems, is a slight weakening of the thesis of minimal p-systematicity. Rather than saying that understanding a sentence strictly necessitates understanding some of its structural variants, we might say instead that instances of the first type of understanding are typically accompanied by instances of the second type. Such a pattern can be readily explained by the principle of compositionality together with a similarly watered-down form of reverse compositionality, according to which understanding a sentence is typically accompanied by an understanding of its syntax and the words contained therein. This in turn reveals how the systematicity of our semantic competence, however minimal in extent, militates in favor of its being compositional.

See also: Compositionality: Semantic Aspects; Meaning: Overview of Philosophical Theories.

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Systemic Theory

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Origins of Systemic Theory

Systemic, or systemic–functional, theory has its origin in the main intellectual tradition of European linguistics that developed following the work of Saussure (*see* **Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics**). Like other such theories, both those from the mid-twentieth century (e.g., Prague school (*see* **Prague School**); French functionalism) and more recent work in the same tradition (e.g., that of Hagège), it is functional and semantic rather than formal and syntactic in orientation, takes the text rather than the sentence as its object, and defines its

scope by reference to usage rather than grammaticality. Its primary source was the work of J. R. Firth and his colleagues in London (*see* **Firth and the London School**). As well as other schools of thought in Europe such as glossematics it also draws on American anthropological linguistics, and on traditional and modern linguistics, and on traditional and modern linguistics as developed in China.

Its immediate source is as a development of scale and category grammar. The name 'systemic' derives from the term 'system,' in its technical sense as defined by Firth (1957); system is the theoretical representation of paradigmatic relations, contrasted with 'structure' for syntagmatic relations. In Firth's system–structure theory, neither of these is given priority; and in scale and category grammar this perspective was maintained. In systemic theory the system takes priority; the most abstract representation at any level is in paradigmatic terms. Syntagmatic organization is interpreted as the 'realization' of paradigmatic features.

This step was taken by Halliday in the early 1960s so that grammatical and phonological representations could be freed from constraints of structure. Once such representations were no longer localized, they could function prosodically wherever appropriate. The shift to a paradigmatic orientation added a dimension of depth in time, so making it easier to relate language 'in use' to language being learnt; and it enabled the theory to develop both in reflection and in action – as a resource both for understanding and for intervening in linguistic processes. This potential was exploited in the work done during the 1960s on children's language development from birth through their various stages of schooling.

Systems and Their Realization

The organizing concept of a systemic grammar is that of choice (that is, options in 'meaning potential'; it does not imply intention). A system is a set of options together with a condition of entry, such that if the entry condition is satisfied one option, and one only, must be chosen; for example, in English grammar, [system] 'mood,' [entry condition] finite clause, [options] indicative/imperative. The option selected in one system then serves as the entry condition to another; e.g., [entry condition] indicative, [options] declarative/interrogative; hence all systems deriving from a common point of origin (e.g., [clause]) are agnate and together form a 'system network.' At the present stage of development, system networks for English grammar in computational form contain about 800 systems. An entry condition may involve the conjunction of different options; hence a system network is not a taxonomic structure but has the form of a lattice.

The system has one further component, namely the 'realization statement' that accompanies each option. This specifies the contribution made by that option to the structural configuration; it may be read as a proposition about the structural constraints associated with the option in question. Realization statements are of seven types:

1. 'Insert' an element (e.g., insert subject);
2. 'Conflate' one element with another (e.g., conflate subject with theme);
3. 'Order' an element with respect to another, or to some defined location (e.g., order finite auxiliary before subject);
4. 'Classify' an element (e.g., classify process as mental: cognition);
5. 'Split' an element into a further configuration (e.g., split mood into subject + finite);
6. 'Preselect' some feature at a lower rank (e.g., preselect nominal group: human collective); and
7. 'Lexify' an element (e.g., lexify subject: *it*).

When paths are traced through a system network, a 'selection expression' is formed consisting of all the options taken up in the various functional components. As the network is traversed, options are inherited, together with their realizations; at the same time, new realization statements continue to figure throughout. The selection expression constitutes the grammar's description of the item (e.g., the particular clause so specified); it is also, by reference to the network, the representation of its systemic relationship to other items in the language – since the grammar is paradigmatic, describing something 'consists in' locating it with respect to the rest (showing its total lineage of agnate forms).

Other Basic Concepts

Systemic theory retains the concepts of 'rank,' 'realization,' and 'delicacy' from scale and category grammar. 'Rank' is constituency based on function, and hence 'flat,' with minimal layering; 'delicacy' is variable paradigmatic focus, with ordering from more general to more delicate; 'realization' (formerly 'exponence') is the relation between the 'strata,' or levels, of a multistratal semiotic system – and, by analogy, between the paradigmatic and syntagmatic phases of representation within one stratum. But in systemic theory, realization is held distinct from 'instantiation,' which is the relation between the semiotic system (the 'meaning potential') and the

observable events, or 'acts of meaning,' by which the system is constituted.

The shift to a paradigmatic orientation led to the finding that the content plane of a language is organized in a small number of functionally defined components which Halliday labeled 'metafunctions.' According to this theory the grammar of natural languages evolved in simultaneously (a) 'construing' human experience (the 'experiential' metafunction) and (b) 'enacting' interpersonal relationships (the 'interpersonal' metafunction), both these being underpinned by (c) the resources of (commonsense) logic (the 'logical' metafunction; (a) and (c) are grouped together as 'ideational'). The stratal role of the lexicogrammar lies in mapping these semantic components into a unitary construct, one that is capable of being linearized; in doing this, the grammar (d) 'creates' its own parallel universe in the form of discourse (the 'textual' metafunction). These metafunctions define the dimensions of semantic space; and since they tend to be realized by different structural resources – experiential meanings segmentally, interpersonal meanings prosodically, logical meanings in iterative structures, and textual meanings in wave-like patterns – they also determine the topological formations that are characteristic of human speech.

A systemic grammar is therefore 'functional' is three distinct though related senses:

1. Its 'explanations' are functional: both the existence of grammar (why grammar evolved as a distinct stratum), and the particular forms that grammars take, are explained in terms of the functions that language evolved to serve.
2. Its 'representations' are functional: a structure is an organic configuration of functions, rather than a tree with nodes labeled as classes.
3. Its 'applications' are functional: it developed as an adjunct to practices associated with language use, requiring sensitivity to functional variation in language ('register' variation). These considerations both relate it to, and at the same time distinguish it from other functional theories.

Other Features of the Theory

Like the Firthian linguistics from which it evolved, systemic theory is oriented towards language as social process; the individual is construed intersubjectively, through engagement in social acts of meaning. This is not incompatible with a cognitive perspective, which has been adopted in some systemic work (notably Fawcett 1980); but it does rule out any claim for 'psychological reality.' Halliday formulated this general stance as 'language as social semiotic,' thereby also locating systemic theory in the thematic context of semiotics, defined as the study of systems and processes of meaning. The relation between language and other sociocultural phenomena is then modeled on that of realization (the perspective here is Firthian rather than Hjelmslevian; *see* **Hjelmslev, Louis Trolle (1899–1965)**): language 'realizes' culture in the way that, within language, sound realizes wording, and the realization of wording in sound, in its turn, realizes meaning.

It follows from this that systemic theory gives prominence to discourse, or 'text'; not – or not only – as evidence for the system, but valued, rather, as constitutive of the culture. The mechanism proposed for this constitutive power of discourse has been referred to as the 'metafunctional hookup': the hypothesis that (a) social contexts are organic–dynamic configurations of three components, called 'field,' 'tenor,' and 'mode': respectively, the nature of the social activity, the relations among the interactants, and the status accorded to the language (what is going on, who are taking part, and what they are doing with their discourse); and (b) there is a relationship between these and the metafunctions such that these components are construed, respectively, as experiential, as interpersonal, and as textual meanings. Register, or functional variation in language, is then interpreted as systemic variation in the relative prominence (the probability of being taken up) of different options within these semantic components.

In fact such register variation (spoken/written, commonsense/technical, transactional/expository, . . . and so on) lies on the continuum between system and text; the characteristic of systemic work is that it brings all parts of this continuum under focus of attention. Analogously, it encompasses both speaker and listener perspectives (in computational terms, text generation, and parsing – there are, for example, no nonrecoverable operations such as deletion), and both synoptic and dynamic orientations; and uniquely among current theories, it assigns as much value to interpersonal and textual meaning as to ideational. On the other hand, in other respects systemic work is notably ill-balanced; there has been little study of morphology and phonology, and a disproportionate amount of research relates to English. These reflect on the one hand the contexts of its own development, especially the kinds of application for which it has been sought out; and on the other hand its requirement of comprehensiveness, demanding a coverage which is at once both broad and deep.

Development of Systemic Theory

The outlines of systemic theory were formulated in London in the 1960s by Halliday together with Huddleston, Hudson, and others, and others, and in application to Bernstein's work by Hasan, Mohan, and Turner; other significant input came from the application of systemic concepts in curriculum development work, in the analysis of scientific writings and of natural conversation, and in descriptions of a number of Asian and African languages. The theory was further developed in the 1970s: by Fawcett, Berry, and Butler in the UK; by Halliday and Hasan; and by Gregory and his colleagues in Toronto. Since 1980 systemic work has expanded considerably in various directions (artificial intelligence, child language development, discourse analysis and stylistics, and language education). It is typical of systemic practice that major extensions both to description and to theory have taken place in these 'applied' contexts; for example, the very large systemic grammars of English that now exist in computational form (PENMAN 'Nigel'; COMMUNAL), and the extensive studies of children's writing and of the language of educational texts in science, history, and other subjects that have been carried out by Martin and his colleagues in contexts such as the New South Wales Disadvantaged Schools Program.

Since 1980, further studies have been devoted to languages other than English, notably Chinese (Fang; Hu; Long; McDonald; Ouyang; Zhang; Zhao; Zhu), French (Caffarel), Indonesian (Sutjaja; Wirnani), and Tagalog (Martin); and work in text generation has begun to take in Chinese and Japanese (Matthiessen *et al.,*) and German, French, and Dutch (Bateman; Steiner). In English, Halliday's *Introduction to Functional Grammar* brought together some of his studies begun in the late 1960s (1967/68); and advances were made in all areas of the grammar: experiential (Davidse; Martin), interpersonal (Butler; Thibault), and textual (Fries; Hasan; Matthiessen). Matthiessen (1992a) presented a system-based account of English grammar, deriving from materials he had written to accompany the 'exporting' of Nigel.

Many general theoretical discussions have appeared (Fawcett; Halliday; Lemke, etc.), as well as new theoretical underpinning of key areas, especially lexicogrammar, discourse semantics (*see* **Discourse Semantics**), and text structure (Matthiessen; Martin; Berry; Hasan, etc.). Matthiessen's (1992b) account of register theory emphasizes the integrative character of systemic work: while there are often alternative interpretations, especially where new problems are being addressed, these are not detached from their overall context in language and in linguistics. Thus there is no disjunction between grammar and discourse, or between the system and the text.

With the strengthening of what Halliday calls the 'grammatics' (that is, theory of grammar as metatheoretic resource), systemic writings have increasingly foregrounded the constructive power of grammar; this is reflected in numerous studies which began with the 'critical linguistics' of the late 1970s (Fowler *et al.*; Kress and Hodge; subsequently Butt; Hasan; Kress; Lemke; Martin; McGregor; O'Toole; Thibault; Threadgold; cf. Threadgold *et al.,* 1986, and the new journal *Social Semiotics*). In a large-scale investigation of natural conversation between mothers and their preschool children, Hasan and Cloran (1990) have developed semantic networks to explore the effects of social factors on children's learning styles, and their consequences for education. Martin's work on register and genre (1992) extends the constructivist model of language to include strata of genre and ideology. It is in this overall perspective that language becomes central to the educational initiatives of Martin, Rothery, Christie, and others in Australia; compare also the work of Carter *et al.* in the LINC ('Language in the National Curriculum') program in the UK.

In 1974 Fawcett organized the first systemic workshop, at the West Midlands College of Education, with 16 participants from four centers in the UK. Since then the workshop has been an annual event; the first international workshop was the ninth, held in Toronto (York University) in 1982. In the 1990s, now as 'International Systemic (or Systemic–Functional) Congress,' meetings have been held at the University of Stirling (1990) and at the International Christian University in Tokyo (1991); in addition, regular national systemics seminars are held in Australia, in the UK, and in China. The newsletter *Network* provides information on these activities, along with short articles, reviews, bibliographies, and conference reports. The regularly updated *Select Bibliography of Systemic Linguistics* now lists about 800 books and articles. Selected conference papers from 1983, 1985, 1986, 1988, 1989, and 1990 have appeared in published form (see Bibliography).

Influences and Trends

In the period from its inception in the early 1960s the main influences on systemic theory (other than those coming in via specific applications such as computational linguistics) have come from Lamb's work in stratificational grammar and from Sinclair's in discourse and in lexical studies. Lamb and Halliday collaborated regularly over a number of years. Sinclair had been an originator of scale and category

grammar and his subsequent work exploited this, though in a complementary direction to Halliday's: Sinclair builds the grammar out of the lexis, whereas Halliday builds the lexis out of the grammar. Other input has come from Labov's quantitative methodology (though not his general perspective on language and society; *see* **Labov, William (b. 1927)**); from the theory and practice of corpus linguistics (Quirk (*see* **Quirk, Charles Randolph, Professor Lord (b. 1920)**); Svartvik *et al.*; more recently Sinclair); from other work in functional linguistics (especially Thompson); and from poststructuralist semiotics in general.

A feature of systemic work is that it has tended to expand by moving into new spheres of activity, rather than by reworking earlier positions. This reflects an ideological perspective in which language is seen not as unique or *suigeneris* but as one aspect of the evolution of humans as sociocultural beings. Thus input often comes from outside the discipline of linguistics: from current theories in fields such as anthropology, literature, and neurology, and from developments in more distant sciences. Much systemic linguistics reflects transdisciplinary rather than disciplinary thinking in its approach to problems of language.

This orientation appears in some present trends and likely future directions.

For example:

- Systemic grammatics as model for other semiotic systems, especially forms of art: not only literature (Butt; O'Toole; Thibault; Threadgold) but also music (van Leeuwen; Steiner), visual imagery (Kress and van Leeuwen), and painting, architecture, and sculpture (O'Toole).
- Further developments of register theory to investigate the linguistic construction of knowledge and structures of power.
- Using available corpus data and programs to test hypotheses about the probabilistic properties of systems (Nesbitt and Plum; Halliday and James).
- Further development of language-based educational programs, in initial literacy, secondary 'subjects,' teacher education, language in the workplace, etc.
- Natural language processing, modeling systems of meaning (knowledge systems), and developing integrated generation and parsing programs, including multilingual ones.
- Further work in deaf sign (Johnston) and development of systemic research in neurolinguistics and the discourse of aphasia, dementia, etc.
- Greater emphasis on studies of the expression plane in a general systemic context.

Just as systemic theory is itself a variant of a broader class of theories (functional theories, perhaps with 'system-structure theories' as an intermediate term), so it itself accommodates considerable variation. Gregory's 'communication linguistics' foregrounds structures of knowledge and presents a dynamic 'phase and transition' model of discourse; Fawcett's computational modeling contrasts in various ways with that of Matthiessen and Bateman; Martin's register theory, with genre as a distinct stratum, contrasts with Hasan's view of register as functional variation realizing different values of contextual variables. This kind of variation in 'metaregister' is one of many ways in which systemic theory appears as a metaphor for language itself.

The standard introduction to systemic linguistics has been Berry (1976/77). Other introductory or summary works are Monaghan (1979), Halliday and Martin (1981), Butler (1985), Morley (1985), and, an original work in Chinese, Hu *et al.* (1989). The work now appearing with the New South Wales Disadvantaged Schools Program is an excellent source for the systemic grammar of English, as also is Butt *et al.* (1990–); other workbooks are in the course of preparation. Three further introductory studies that are largely completed are Halliday and Matthiessen, on the history of systemic linguistics; Matthiessen and Halliday, a general account; and Thibault, on grammar and discourse. These will give an overview of theory and practice as current in the mid-1990s.

See also: Discourse Semantics; Firth and the London School; Labov, William (b. 1927); Prague School; Quirk, Charles Randolph, Professor Lord (b. 1920); Saussure, Ferdinand (-Mongin) de (1857–1913); Saussurean Tradition in 20th-Century Linguistics.

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Oswald Szemerényi was born in London on September 7, 1913 but taken to Budapest on the outbreak of war and brought up in Hungary. He had a brilliant university career and was appointed to the Chair of Indo–European Linguistics at Budapest in 1947. After the war he at first actively supported Communist reforms, but was alienated by subsequent events and took the opportunity of a stay in the Collegium Hungaricum in Rome to apply for repatriation to England, where he came with his wife and son in 1948.

He worked for the BBC and Reuters, and then held a number of university posts in London from 1952 onward; he was appointed Reader in Greek at Bedford College in 1957, and Professor of Comparative Philology at University College in 1960. Here he flourished for another five years; but the limited

interest shown in the subject in London was partly responsible for his accepting an offer of a similar appointment in Freiburg, which he held until his retirement in 1981. He was elected a Fellow of the British Academy in 1982.

Szemerényi's approach to his subject, both in research and teaching, is data-led rather than theory-driven. Characteristic emphases are that:

1. the comparatist needs a first-hand knowledge of a wide range of Indo–European languages;
2. this knowledge is the springboard for a two-way process of reconstruction: the way up from the daughter languages to the parent language is made possible by the comparative method; and the way down from the parent language to the daughter languages (i.e., the reconstruction of outlines of the prehistory of a given language) then becomes a matter of inference;
3. the reconstructions are attempts to recover linguistic reality; although capable of refinement, they are not merely summaries of observed correspondences;
4. descriptive study logically takes precedence over historical; the 'concept of language as a system of systems' and linguistic typology are of particular importance to the comparatist.

The principles are stated in his London inaugural lecture of 1960, *Trends and tasks in comparative philology*, and put to further use in the Freiburg inaugural of 1966, *The New look of Indo–European*, in which a combination of comparative method and linguistic typology leads him to reject the prevailing orthodoxy that the parent language possessed three or four 'laryngeals' (*h*-type sounds) and only a single vowel *e*, and to argue for a single *h* and normal five-vowel system *a e i o u*. His position on this as on many other questions may be termed 'radical conservative,' and the subject has benefited from his challenge to a number of neoorthodoxies.

His principal books are listed below. The four volumes of *Scripta minora* bring together much of his other best known and most important work, including a host of etymological studies, which together constitute one of his most impressive achievements. It is a serious loss to the subject that the *Introduction to Indo–European philology*, conceived on a larger scale than the *Einführung*, has had to be abandoned; but see the bibliography in 1991a. There are full bibliographies in Szemerényi 1987 (by subject) and 1991b (chronological), and an autobiography (1991b).

See also: Indo–European Languages.

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T

Taboo

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The main biblical 'taboos' involve sex and food, although there are other prohibitions as well. Leviticus (Chapter 12 and following) is primarily a code of moral and ritual laws whose motivation is 'holiness.' Since a major concern of the writers of the Levitical text seems to have been the creation of rules that would shape the identity of the emerging nation, these passages state over and over again a claim that the Israelites are 'different' than the surrounding cultures. As a result, they established rules by which Israelites could and should define themselves.

Within the biblical construct, segregation of both persons *and* things is a primary consideration. For instance, Leviticus 19:19 prohibits the wearing of cloth combining wool and linen. This prohibition is considered a prime example of a divine statute that has no rational explanation, and Jewish philosophers have attempted to rationalize its intent. Since biblical writings emphasize the differences between the Israelite community and all others, prohibitions against and penalties for illicit relations, homicidal cult practices, and magic probably exist for the same reason as the cloth and food prohibitions: separation and distinction from the neighboring tribes whose perceived idolatrous and immoral practices were to be avoided. The verses that deal with illicit sexual relations, for example, are encased by an introduction that castigates the Egyptians and Canaanites for the depravity of their sexual practices. Total destruction and exile is the threat if these laws are not followed.

The list of prohibited sexual relations begins with the prohibition against a man 'uncovering the nakedness' of his father, followed by 12 categories of forbidden *females*:

- Mother
- Father's wife, brother's wife, and uncle's wife
- Maternal and/or paternal sister
- Son's or daughter's daughter or daughter-in-law
- Stepmother's daughter by the same father
- Paternal or maternal aunt
- Woman and her daughter (and their female descendants) and woman and her sister.

Other sexual prohibitions follow:

- Intercourse with menstruating women
- Adultery
- Sacrifice of 'seed' to Moloch
- Male homosexuality
- Bestiality of male and female.

One salient feature of all of these biblical laws is that the juridical texts are addressed exclusively to *males*: males are subjects of the incest prohibitions and, for the most part, females are objects. That is to say, specific blood-kindred and marriage-kindred females are cited as forbidden to the relevant *males*.

There seems to be a correspondence between the sexual prohibitions and rules about cooking, hunting, or sacrificing. For example, the rule against boiling a kid goat in its mother's milk parallels the prohibition against a male child having intercourse with his mother. Similarly, laws that prevent certain kinds of acts ('taking' a mother bird and her fledglings and then sending away the mother bird) correspond to the prohibitions against a man 'taking' a woman and her mother.

One reason incest rules find their parallel in rules about hunting, cooking, or sacrificing is that food and eating often serve as metaphors for sexual activity, and such metaphors can and do structure human behavior. Thus, in interpreting the prohibition against cooking a kid goat in its mother's milk, it is implied that one shall not put a mother and her son into the same pot, any more than into the same bed. Indeed, there are a number of biblical narratives in which the role of the kid goat serves as a symbolic substitute for a male child.

See also: Bible; Food: Semiotics; Judaism; Metaphor: Philosophical Theories; Religion: Overview; Taboo Words.

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Taboo Words

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The Nature of Taboo

The English word *taboo* derives from Tongan *tabu*. It entered the language towards the end of the 18th century. In this context, the word refers generally to forbidden behavior and includes such things as bans on naming dangerous animals, food restrictions, prohibitions on touching or talking to members of high social classes, and injunctions involving aspects of birth, death, and menstruation. Taboo items are avoided because they are thought to be ominous, evil, or somehow offensive to supernatural powers. To violate a taboo automatically causes harm (even death) to the violator and perhaps his or her fellows. However, taboos do not always involve the possibility of physical or metaphysical injury. Old Polynesia also has evidence of the sorts of taboos on bad manners with which readers of this encyclopedia will be more familiar; in other words, social sanctions placed on behavior that is regarded as distasteful, or at least impolite, within a given social context (cf. Allan and Burridge, 2005: Chapter 1). The taboos of contemporary Western society are of this nature. They rest ultimately on traditions of etiquette and are intimately linked with social organization. A taboo word in a language such as modern-day English is avoided, not because of any fear that harm may befall either the speaker or the audience, but because the speaker could lose face by offending the sensibilities of the audience. Some speakers would claim that to utter taboo terms offends their own sensibilities, because of the supposed unpleasantness or ugliness of the taboo terms themselves. In this context, euphemism is the polite thing to do, and dysphemism (or offensive language) is little more than the breaking of a social convention.

Individual societies differ with respect to the degree of tolerance shown towards any sort of taboo-defying behavior. This depends on their values and belief systems at the time. It was not so very long ago that some transgressions against Western taboos were severely punished, by methods such as imprisonment, hanging, or burning at the stake. In Britain up until the end of the 17th century, blasphemy was punishable by burning. There are still people who would take such biblical commandments as Leviticus 24:16 literally: "He that blasphemeth the name of the Lord, he shall surely be put to death, and all the congregation shall certainly stone him." And even though few in this technically advanced and (for many) secular 21st century would admit to the sort of fear and superstition that they associate with the taboos of exotic and unenlightened peoples, there are many in it who carry talismans when they travel, avoid walking beneath ladders, knock on wood, and believe in lucky and unlucky numbers. For some people, talking about a disease is enough to bring on specific symptoms, and medical students are notorious for discovering that they manifest the symptoms of whatever disease they happen to have been studying. Words can also have curative power. Thus, doctors have had to admit that many cited cancer cures have nonrational explanations.

The kinds of topics placed under taboo change over time (*see* **Taboo, Euphemism, and Political Correctness**). Since the 1980s, English speakers have shown a growing apprehensiveness of how to talk to and about others, particularly those perceived to be disadvantaged or oppressed. There has been a gradual establishment of legally recognized sanctions against what could be described as '-IST language.' The new taboos are sexism, racism, ageism, and religionism, so that sexist, racist, ageist, and religionist language is not only contextually dysphemistic, but also legally so. These taboos have now come to replace the relaxing of laws against profanity, blasphemy, and (sexual) obscenity.

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Taboo Words and the 'Naturalist Hypothesis'

Words are symbolic. The correlation between their form and their meaning is largely arbitrary. Shakespeare was right: "That which we call a rose, by any other name would smell as sweet." There is no natural or necessary connection between the shape of the word *rose* and its meaning 'beautiful fragrant flower.' There is, therefore, no *a priori* basis for distinction between the mentionable euphemism and the unmentionable taboo term. It is mysterious why a euphemistic expression like *I'm going to the loo* has fewer unpleasant connotations than its corresponding taboo term *I'm going for a piss*. The difference presumably derives from the 'naturalist hypothesis' (Allan, 1986: Chapter 2.8); in other words – a persistent belief that the form of an expression somehow communicates the essential nature of whatever it denotes; in Sir James Frazer's words: "... the link between a name and the person or thing denominated by it is not a mere arbitrary and ideal association, but a real and substantial bond which unites the two ..." (Frazer, 1911: 318). It is for this reason that taboo terms are often said to be unpleasant or ugly sounding, and why they are described as 'dirty words.' It also explains their ability to "chill the flesh and raise gooseflesh," as Wyld (1920: 387) observed.

Taboo terms are contaminated by the taboo topics to which they refer, and any euphemism will itself become tainted with time. The degree of contamination perceived in the denotatum ranges on a scale that has at one end fear and contempt, and at the other little worse than low social esteem. A simple example is English *undertaker*. The word once meant 'odd-job man' ('someone who undertakes to do things'), and it was recruited as a euphemism for a person taking care of funerals. However, once used in the taboo context of death, it narrowed very rapidly to the taboo sense alone. It has now been replaced by euphemisms such as *mortician,* and more recently *funeral director*. Compare the rapid narrowing of the word *coffin* from 'a box' to 'a box in which a corpse is buried or cremated.' The once euphemistic *toilet* (from French *toile* 'cloth'), as in *going to the toilet*, is now a direct term and may well disappear entirely, as has *necessary house*. It has already been superseded by *bathroom* or *restroom* in American English and *loo* in spoken British and Australian English. Words denoting sexual activity such as *rape, consummation, erection, copulation, intimacy, orgasm, intercourse, climax, ejaculation, erection, interfere with*, and *seduce* were once quite general terms. However, in all cases the sexual sense now dominates and the euphemistic sheen has now faded.

Taboo areas of the lexicon perpetually generate this sort of narrowing and deterioration of meaning. The result is a constant turnover of vocabulary for words denoting taboo concepts. Very few euphemisms that have degraded in this way into taboo terms come back from the abyss, even after they have lost their taboo sense. This promotes an ever-changing chain of vocabulary for words denoting taboo concepts. It is also apparent that the length of this chain can be directly correlated with the severity of the taboo. For example, the vocabulary for bodily effluvia, sex, and tabooed body parts surely manifests significantly more synonymy than one finds anywhere else in the English lexicon. Here we are dealing with literally thousands of euphemisms. English alone is reported to have accumulated more than 1000 terms for 'penis,' 1200 terms for the 'vagina,' 800 for 'copulation,' and over 2000 for 'prostitute'.

Such is the salience of taboo terms that innocent vocabulary may also be affected, simply because of association. *Regina* makes some people feel uncomfortable because of its phonetic similarity to *vagina,* and they avoid it. *Cunny* (or *cony*) 'rabbit' dropped from the lexicon because of the taboo homonym meaning 'cunt.' Gender, sexuality, disability, and especially race are now so highly charged that speakers will shun anything that may be interpreted as discriminatory or pejorative – and this includes blameless bystanders that get in the way. The word *niggardly* has no etymological connections with the taboo term *nigger,* yet many Americans now sidestep the expression. The effects of taboo can also work across languages. In the Nootka Indian language of Vancouver Island, British Columbia, the English word *such* so closely resembles the Nootka word meaning 'cunt' that teachers find it very difficult to convince their students to utter the English word in class. Similar reports of crosslanguage effects have been reported elsewhere.

The Case of Naming Taboo

'To say a tabooed name is to assault the owner of the name, and requires sanctions to be brought against the offender. Punishment for violation of a taboo can be in the form of religious propitiation of an offended spirit, payment of goods to an offended party, or exchange of goods to restore harmony between the guilty and the injured. Breaking the taboo can lead to death by murder, or suicide due to shame' (Holzknecht, 1988: 45).

Throughout history, people have attributed supernatural powers to names, and naming forms a special case of word taboo. One of the fears about names is their magical power, hinted at in proverbs like *speak*

of the devil and he comes running, and in the avoidance of names for diseases, dangerous things and animals, gods, and powerful men.

Personal names (that is, 'true names') are taboo among peoples in many parts of the world. This is also a fear-based taboo. Sorcerers and enemies can harm a person whose true name they know; knowledge is power. A name is regarded as an inalienable part of the name bearer, not just a symbol but the verbal expression of his or her personality. Other properties of personal representation such as mind, spirit, soul, shadow, and reflection are often treated in the same way (cf., Chappell and McGregor, 1996). This can have repercussions for the grammar as illustrated in the following example from Pitjantjatjara (Central Australia):

(1) ngayu-nya ini
1.sing-ACC name
'my name'

(2) ngayu-nya mara
1.sing-ACC hand
'my hand'

(3) ngayu-ku karli
1.sing-POSS boomerang
'my boomerang'

Because 'true' names are so closely associated with their name-bearer as to be a proper part of him or her, in some societies (for example, traditional Austronesia) there are strict taboos preventing two living persons from going by the same name. Furthermore 'true' names are often secret, rendering euphemistic names necessary for public naming and addressing. For English, such taboos are observed only for *God* or *Christ,* and then only inconsistently.

When Name Taboo Extends into Word Taboo

In many societies, names of the dead are (or were until recently) taboo. Sometimes the ban extends to those personal names which the dead person may have given to others. Violations of such taboos are believed to cause misfortune, sickness, and death; they may also cause offense to living descendants. Although native English-speaking communities do not have such fearsome taboos, there are many euphemisms for the topic of death and the dead.

Naming taboo can have far-reaching consequences when names are or derive from common words. Simons (1982) described how in a sample of 50 Austronesian languages known to have some sort of naming taboo, 25 of these involve common word taboo. In a further 18, words resembling tabooed names are themselves subject to taboo. For example, if the tabooed name is *Ikio,* then the word *kio* 'bird' is tabooed. The effect of this is that on the island of Malaita as much as 59% of the everyday vocabulary is taboo for some people. Euphemisms are thus created via semantic shifts of existing words, circumlocution, borrowing from another language, and phonological modification (*see* **Taboo, Euphemism, and Political Correctness**). Sounds can turn up in unexpected places, and they mutate unexpectedly. The situation can be compared to the change in English from *shit* to *shivers* or *fuck* to *fudge*. Because the lexicons of these languages are so unstable, it is often difficult to determine the chronology of linguistic changes that have occurred. Even genetic connections between languages can be obscured.

Aboriginal Australia provides another example of the effects of naming taboo on vocabulary. In many traditional Australian Aboriginal communities, any kind of vocabulary item, including grammatical words, can be proscribed if it is phonetically similar to the name of a dead person. Replacement vocabulary is created using synonyms from the language's own repertoire (or from an auxiliary repertoire of 'respect language'), semantic shifts of existing words, compounding, circumlocution, borrowing from a neighboring language, and in some cases a hand sign or gesture. Some languages have special vocabulary items to be used in place of proscribed words, sometimes a kind of 'whatsitsname' / 'whatchamacallit' word or one that is reserved especially for the purpose of name-avoidance.

A striking illustration involves the changes to the first person pronoun in some dialects of the Western Desert. On the death of a man named *Ngayunya,* these languages replaced the pronoun *ngayu* 'I/me' with *nganku*. Subsequently this term was itself tabooed and replaced by either English *mi* or by *ngayu* borrowed back into the language from dialects where it had never been tabooed (cf., Dixon, 1980: 29). This shows that the taboo on a word may cease after some years have passed, allowing it to come back into use. This recycling is one of the very few ways in which a tabooed item can itself become a euphemism. Indeed, Alpher and Nash (1999) claimed that, where we are in a position to check the history, such cases of tabooing have always proved to be temporary. The taboo on a word may cease after some months, or one or two years, have passed, allowing the word to come back into use. Moreover, it appears that there is no absolute prohibition on mentioning the name of a dead person. Vocabulary is taboo for only those people who stand in a certain relationship with the deceased. Locals can continue to use the taboo forms out of earshot of the bereaved family.

As earlier described, taboos and attitudes towards taboo violation do change over time. Societies like those of Aboriginal Australia and Austronesia are not closed to innovation and are certainly not closed to importing cultural elements from outside. Many of these old taboos have been affected by the spread of Western ideas and are now disappearing.

See also: Connotation; Politeness Strategies as Linguistic Variables; Taboo, Euphemism, and Political Correctness.

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Euphemism and Taboo

Examples of euphemism (Greek *eu* 'good, well' and *phêmê* 'speaking') are wide ranging: medieval Dutch physicians used to write of *figs in the secret passage* to denote 'piles'; 19th-century Victorian moral code created 'invisible' words like *inexpressibles, unmentionables,* and *unhintables* so that those in polite society could avoid uttering *legs*, *trousers,* or *underclothing*; some people still say *crumbs* instead of *Christ*; many newspapers still print *c**** and *f****; politicians speak of *community charges*, *levies,* or even *voluntary contributions* rather than of *taxes* or *tolls*; *prairie oysters, mountain oysters*, and *fry* sound more appetizing than *calf's testicles*; *lemon fish* and *flake* far tastier than *shark*; companies *downsize*, *rightsize*, or implement an *RIF* (= reduction in force); 1998 was the 'Year of the Older Person' (not 'The Year of the Old Person'); the push for nonsexist usage has rendered words like *stewardess* and *actress* taboo for some people, and so on.

As these few examples illustrate, euphemism is characterized by avoidance language and evasive expression. In contemporary Western society it is linked closely with social organization and is therefore entwined with concepts of politeness and face. Generally social interaction is oriented toward behavior that is courteous and respectful, or at least inoffensive. Participants have to consider whether what they are saying will maintain, enhance, or damage their own face, as well as be considerate of and look after the face needs of others. Hence, we can define a euphemism as follows:

> A euphemism is used as an alternative to a dispreferred expression, in order to avoid possible loss of face: either one's own face, or though giving offense, that of the audience, or of some third party. (Allan and Burridge, 1991: 11)

What is described here as 'a dispreferred expression' is one that is not desired or appropriate on a given occasion. Typically it denotes a taboo topic and so might alternatively be called 'a taboo term'. A speaker (or writer) uses a euphemism to escape disapproval and to avoid offending the hearer (or reader) or even some third party (an eavesdropper or bystander). Some speakers would also claim that the obnoxious nature of taboo terms is offensive to their own sensibilities.

In its original conception, as borrowed from Tonga, the word *taboo* (or *tabu*) refers to forbidden behavior, in particular, behavior believed to be dangerous to certain individuals or to the society as a whole. In this context violations of taboos are expected to have dire consequences and euphemism can be literally a matter of life or death (*see* **Taboo Words**).

As earlier described, taboos and attitudes towards taboo violation do change over time. Societies like those of Aboriginal Australia and Austronesia are not closed to innovation and are certainly not closed to importing cultural elements from outside. Many of these old taboos have been affected by the spread of Western ideas and are now disappearing.

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Euphemism and Taboo

Examples of euphemism (Greek *eu* 'good, well' and *phêmê* 'speaking') are wide ranging: medieval Dutch physicians used to write of *figs in the secret passage* to denote 'piles'; 19th-century Victorian moral code created 'invisible' words like *inexpressibles, unmentionables,* and *unhintables* so that those in polite society could avoid uttering *legs*, *trousers,* or *underclothing*; some people still say *crumbs* instead of *Christ*; many newspapers still print *c**** and *f****; politicians speak of *community charges*, *levies,* or even *voluntary contributions* rather than of *taxes* or *tolls*; *prairie oysters, mountain oysters*, and *fry* sound more appetizing than *calf's testicles*; *lemon fish* and *flake* far tastier than *shark*; companies *downsize*, *rightsize*, or implement an *RIF* (= reduction in force); 1998 was the 'Year of the Older Person' (not 'The Year of the Old Person'); the push for nonsexist usage has rendered words like *stewardess* and *actress* taboo for some people, and so on.

As these few examples illustrate, euphemism is characterized by avoidance language and evasive expression. In contemporary Western society it is linked closely with social organization and is therefore entwined with concepts of politeness and face. Generally social interaction is oriented toward behavior that is courteous and respectful, or at least inoffensive. Participants have to consider whether what they are saying will maintain, enhance, or damage their own face, as well as be considerate of and look after the face needs of others. Hence, we can define a euphemism as follows:

> A euphemism is used as an alternative to a dispreferred expression, in order to avoid possible loss of face: either one's own face, or though giving offense, that of the audience, or of some third party. (Allan and Burridge, 1991: 11)

What is described here as 'a dispreferred expression' is one that is not desired or appropriate on a given occasion. Typically it denotes a taboo topic and so might alternatively be called 'a taboo term'. A speaker (or writer) uses a euphemism to escape disapproval and to avoid offending the hearer (or reader) or even some third party (an eavesdropper or bystander). Some speakers would also claim that the obnoxious nature of taboo terms is offensive to their own sensibilities.

In its original conception, as borrowed from Tonga, the word *taboo* (or *tabu*) refers to forbidden behavior, in particular, behavior believed to be dangerous to certain individuals or to the society as a whole. In this context violations of taboos are expected to have dire consequences and euphemism can be literally a matter of life or death (*see* **Taboo Words**).

Taboos Western-style, however, are selective. Typically they rest on traditions of etiquette and are therefore set by social parameters such as age, sex, education, social status, and the like. The taboo topics English speakers are most familiar with are avoided because they are felt to be embarrassing or offensive under certain social circumstances. Whether you *micturate, powder your nose, go to the washroom, take a leak, a piss,* or *a pee*, the choice is a matter of appropriate style. Such taboos may be observed in private, but they are their strongest in the public domain. In this context euphemism is matter of good manners.

Not all euphemisms arise in response to taboo, however. In their ability to place whatever it is they designate in a favorable light, many are simply alternatives for expressions speakers prefer not to use on a given occasion. For example, Clause 28 of the Melbourne Metropolitan Planning Scheme has several references to the *accommodation of stationary vehicles*. For the document's author this phrase presumably has more positive connotations, or at least fewer negative connotations, than either *parking places* or *car spaces*. Such euphemisms are positive expressions that are used to enhance the denotatum (in other words, what is being referred to), perhaps even to amuse. There are often no real taboo counterparts – *potholes* are simply upgraded to *pavement deficiencies*, *dried beans* to *Alaskan strawberries*.

Types of Euphemism

The following offers a brief classification and examples of the main sources of euphemism. All involve some kind of verbal disguise. They are by no means mutually exclusive, however, and many fall into more than one category; for instance, euphemistic expressions such as *at the evening of one's days, the autumn* or *the winter of one's life* for 'old' are both metaphorical and long-winded.

Shortening

Many euphemisms are made by shortening a word. There are a number of different processes:

- Clippings like *jeeze* and *gee* for 'Jesus', *bra* for 'brassiere' (both end-clipped), and the archaic *nation* for 'damnation' (this is fore-clipped)
- Acronyms like *snafu* for 'situation normal, all fucked up'
- Abbreviations like *S.O.B.* for 'son-of-a-bitch' or *pee* for 'piss'. Also *f –* and *s –* instead of 'fuck' and 'shit'
- Omissions like *There's the pot calling the kettle black* where *arse* is missing from the end; also *I need to go,* which omits *to the lavatory,* and *past it,* which omits something like 'one's prime'. Some omissions substitute nonlexical expressions (dashes, asterisks) for the dispreferred term; for example, Grose's dictionary (1811) uses four asterisks as a synonym for the 'vagina'. The spoken counterparts to dashes and asterisks are noises like *mhm, er-mm*.

Circumlocution

Long-winded expression can be effective linguistic camouflage. Often it involves a type of componential analysis, whereby the senses of taboo terms are unpacked and each of the meaning components are listed. The resulting periphrasis functions as a euphemism, such as *postconsumer secondary material* for 'garbage', *excrementitious human kidney fluid* for 'urine', and *solid human waste* for 'faeces'.

Remodeling

The sound of words can be changed to disguise something that is offensive. This can involve various processes (of largely verbal play):

- Phonological distortion, whereby speakers intentionally distort the pronunciation of words; for example, expressions for 'Christ' such as *cripes, crust, crumbs, crikey*; also *heck* from 'hell' and *shite* from 'shit'
- Blending involving portmanteau words such as *strewth* from 'God's truth', *zounds* from 'God's wounds', and *drat* from 'God rot'
- Reduplication whereby syllables or letters of words are repeated; for example, *jeepers creepers* for 'Jesus Christ', *twiddle-diddles* 'testicles', *tuzzy muzzy* 'vagina', and *rantum-scantum* 'copulate'
- Alliteration and rhyming (slang) such as *om-tiddly-om-pom* and *umpti-poo* for 'toilet', *jimmie-riddle* 'piddle, piss', *bristols [Bristol cities]* 'titties/breasts', and *Brahms [and Liszt]* 'pissed, drunk.'

Semantic Change

A number of semantic processes can be used to create new euphemisms:

- Metaphor involves the pairing up of a taboo topic with another (usually pleasurable) notion. Sometimes chains of figurativeness are established; for example, euphemisms to do with 'old age' include *riper years* (or at a *ripe old age*), *mellow*, *mature*, *the golden years* (and *the golden agers*), *sunset years*, *twilight years,* and so on.
- General-for-specific is a common (metonymic) strategy whereby taboo items are substituted by

very general or abstract words; for example, euphemisms like *nether regions*, *chest*, *loin,* and *groin* shift focus to the general area where unmentionable body parts are roughly situated.

- Elevation involves the substitution of words with more pleasing connotations. For example, *crafted* implies that something has been produced meticulously and probably by hand and is more positive than *made* or *manufactured*, *blend* is more positive than *mixture*, *standard* more positive than *average*.

External Borrowing

Using words borrowed from other languages to function as euphemisms is characteristic of many languages. French and Latin provide English with many of its euphemisms for bodily effluvia, sex, and the associated acts and bodily organs; for example, *perspire* instead of *sweat*, *expectorate* instead of *spit*, *defecate* and *faeces* instead of *shit*.

Internal Borrowing

Euphemisms can also be borrowed from different sublanguages. Technical jargon provides euphemisms such as *treponemal disease, luetic disease, spirachoetal disease* for 'syphilis'. The antithetical strategy is the use of slang items like *cupid's measles* for 'syphilis'.

Dysphemism and Orthophemism

Whereas the term *euphemism* is well known and has wide currency, dysphemism (Greek *dys* 'bad, unfavorable' and *phêmê* 'speaking') rarely appears in ordinary language. It is, roughly speaking, the counterpart of euphemism and can be defined as follows:

> A dysphemism is a word or phrase with connotations that are offensive either about the denotatum and/or to people addressed or overhearing the utterance. (Allan and Burridge, in press: Chapter 2)

Dysphemism involves the verbal resources for being offensive, being abusive, or just plain letting off steam. Like euphemism, it is motivated by fear and distate, but also by hatred and contempt. Speakers resort to this type of expression to talk about people and things that frustrate and annoy them and that they disapprove of and wish to humiliate or degrade. Dysphemistic expressions therefore involve curses, name-calling and any sort of derogatory comment directed toward others to insult or wound them. They also include exclamatory swearwords; in other words, expletives used to release frustration or anger. Like euphemism, dysphemism interacts with style and has the potential to produce stylistic discord; for example, if someone at a formal dinner party were to publicly announce '*I'm off for a piss*,' rather than saying something like '*excuse me for a moment*'.

Dysphemism employs most of the same strategies as euphemism, but there is one main difference. Whereas (vague) general-for-specific euphemisms are commonplace, dysphemism is more likely to employ a (blunt) part-for-whole strategy; for example, *tits* for 'breasts' (versus euphemistic *chest*) or figurative epithets like *he's a prick* (versus the legalistic euphemism *person* for 'penis'). Other differences are predictable. The use of borrowed terms, circumlocution, or technical jargon is usually dysphemistic when it is perceived by the audience to be befuddling gobbledygook.

The concepts of euphemism and dysphemism imply the presence of direct terms that are neither sweet-sounding, evasive, overly polite (euphemistic) nor harsh, blunt, offensive (dysphemistic). Such expressions might be described as orthophemisms (Greek *ortho* 'proper, straight, normal' and *phêmê* 'speaking'). As alternatives to offensive expressions, orthophemisms, like euphemisms, will typically be preferred; in other words, desired or appropriate terms. An example of all three language expressions would be *pass away* (the euphemism), *croak* (the dysphemism), and *die* (the orthophemism). However, these descriptions are problematic because what determines them is a set of social attitudes or conventions that may vary considerably between dialect groups and even between individual members of the same community. Given there is such complexity and variety of opinions and attitudes, we are unlikely to ever find uniformity of judgment between speakers of even very similar social backgrounds. There can be no such thing as 'Everyman's euphemism' or 'Everyman's dysphemism'. X-phemisms (the union set of euphemisms, orthophemisms, and dysphemisms) are primarily determined from evaluating an expression within the particular context in which is it uttered. For example, the term *die* is direct and in some contexts might well be the neutral and mundane orthophemism. However, in another more personal context it might also conjure up an image that some people would find just too vivid. On that occasion it would be offensive, or dysphemistic. On the other hand, a blunt expression like *croak* can also be euphemistic between certain individuals. Its flippancy detracts from the seriousness of death, which makes it preferable to a more direct term like *die*. A jocular approach to death is offensive only if it can be expected that the hearer would regard it as such.

Even though the choice between alternative expressions will always depend on context, ordinary people do perceive expressions to be somehow intrinsically X-phemistic. For example, terms for *die* such as *pass*

away and *sleep* are euphemistic, whereas *croak* and *peg out* are not. In the British survey Millwood-Hargrave (2000), participants were asked to respond to the perceived 'strength' of 28 swearwords. No context was provided. Yet, participants were clear about the severity of these words, and the researchers were able to put together a broad topography of swearwords across all groups. Modern dictionaries also treat expressions as if they were intrinsically dysphemistic when they indicate offensive connotations of particular entries. The *Encarta World English Dictionary*, for example, recognizes three degrees of offensiveness: insulting, offensive, and taboo. Out of context this sort of 'sensitive handling' employs a type of good etiquette gauge by which is determined the X-phemistic value of an expression without reference to the context of use. Those who compile dictionaries of euphemisms and dysphemisms (like Ayto, 1993; Green, 1996) also base their collections on the prejudiced social attitudes to the situation in which they believe a given expression is uttered. What is envisaged is something like a 'middle-class politeness criterion': in order to be polite to a casual acquaintance of the opposite sex in a formal situation in a middle-class environment, a speaker would normally be expected to use a euphemism or orthophemism rather than the dispreferred counterpart, or dysphemism (cf. Allan and Burridge, in press: Chapter 2). This is the criterion that is automatically assumed in the public domain, for example in writing, where the exact composition of one's audience is not likely to be known. Etiquette demands that in this context language be chosen carefully and consciously with a respectable (and probably mixed) middle-class audience in mind.

Changing Taboos

> . . . if you were driving in your car, somebody cuts you up in your car, if they shout and call you a f-ing idiot, or a bloody idiot or whatever, fair enough. If they start putting your racial background into that, it's unacceptable. [Interview Black British family, North London, Millwood-Hargrave, 2000: 20]

In English-speaking societies profanity and blasphemy still provide the basis for fairly potent dysphemistic expressions, though with the increasing secularization of these communities clearly not as potent as they once were. However, as some taboos relax others come to replace them. English now has many expletives, insults, and abusive epithets that name bodily emissions, tabooed body parts, and sexual pastimes. Moreover, contemporary English-speaking societies have evolved new taboos to do with gender, sexuality, disability, and especially race and ethnicity. These topics are now so extremely charged, they have sparked many different forms of avoidance behavior. There is a new apprehensiveness and shunning of anything, especially established vocabulary, that may be interpreted as discriminatory or pejorative. The push for equality and equal opportunity has given rise to legally enforceable fairness, sensitivity, and tolerance, and sanctions against what might be dubbed *-ist* language (such as sexist, racist, ageist, religionist language) have come to replace relaxing laws against profanity, blasphemy, and (sexual) obscenity.

The British report Millwood-Hargrave (2000) mentioned earlier provides qualitative and quantitative evidence for the linguistic fallout from these new taboos. Research carried out jointly by the Advertising Standard Authority, the British Broadcasting Corporation, the Broadcasting Standards Commission, and the Independent Television Commission tested people's attitudes to swearing and offensive language. The results revealed that the least-offensive were words involving verbal play such as 'baby talk' (*poo* and *bum*) and rhyming slang (*berk*). Ranked slightly higher were the profanities (*God, Jesus Christ*) followed by expressions relating to sexual and bodily functions (expletives such as *shit* and *fucking hell* and sexual references such as *shag* and *pussy*). At the top of the scale of severity was derogatory language toward minority groups, including people with disabilities, those from different religious faiths, homosexual men and women, ethnic minorities – 'most severe' of all was racial abuse.

The evolving nature of taboo is reflected in changes to dictionary-making conventions. Dictionaries originally included religious and racial swearwords and omitted sexually obscene words, but the last century saw mounting pressure on editors to alter, or even omit altogether, political and racial definitions of words. Robert Burchfield (1989) recounted the fierce debates in the early 1970s over the decision by the *Oxford English Dictionary* to include the opprobrious senses of the word *Jew*. Lakoff (2000: 39–40) discussed a dispute between the publishers of the *Merriam-Webster's Collegiate Dictionary* (10th edition) and members of the African American community over the definition of *nigger*. The dictionary had indicated the offensive connotations of term but only after the initial neutral definition of *nigger* as 'black person'. Those disputing the definition wanted the word listed primarily as a 'slur' with the derogatory sense part of the principle denotation. When the *Encarta World English Dictionary* first appeared in 1999, it was described by reviewers as 'extremely sensitive to political correctness' (David Isaacson, 1999, Radio WMUK, 102.1 FM) and 'PC in the extreme' (Quinion, 1999).

Equally revealing of changing taboos is the behavior of the self-appointed guardians of the language such as Dr. Thomas Bowdler. In the early 19th century, he and his sister set out to expurgate Shakespeare. They produced the 'Family Shakespeare' from which, as was announced on the title page, "those words and expressions are omitted which cannot with propriety be read aloud in a family" (cf. Hughes, 1991: Ch. 11). Bowdlerism, as it came to be known, targeted profanity and sexual explicitness and led to the progressive sanitizing of a range of works. Allan and Burridge (forthcoming) described a more recent case of bowdlerism by the New York State Education Department whereby the English literary texts for the Regents exam were cleansed of any references to race, religion, ethnicity, sex, nudity, alcohol, and profanity. The targets of the modern-day bowdlerites are different, but the cleaning-up activities remain the same – only the definition of 'dirt' has shifted.

Political Correctness and X-Phemism

Although modern dictionaries of euphemism (such as Ayto, 1993) include politically correct (or PC) expressions among their entries, many accounts of nondiscriminatory language in handbooks such as Banks and Mulder (1996) expressly deny the language they are recommending is euphemistic. The reasons they offer are twofold.

For one, there is the view that politically correct usage calls for a more precise and accurate use of language. The argument goes: because women can also chair meetings, *chairperson* is not euphemistic, it is simply accurate. Moreover, many handbooks add that political correctness is also a straightforward matter of calling groups by the names they prefer. The terms *married* and *de facto spouse* only include those relationships that can be sanctioned by legal or quasi-legal marriage; in other words, heterosexual relationships. A term such as *partner* sidesteps that issue and is therefore more representative. The term *queer* is preferred by many because it is seen to include groups such as bisexuals and transsexuals, which *gay* and *lesbian* do not.

Secondly, there is the view that politically correct language is a form of public action. By drawing attention to form, it forces us to sit up and take notice. The use of 'generic' *she*, for example, can be intentionally distracting. Or the use of *he/she* and *him/her* is intended, by some at least, to be deliberately clumsy. As Dwight Bolinger put it (although not in a PC context), the double pronoun 'refuses to take the back seat that all languages serve for pure anaphora' (1980: 96). Moreover, politically correct terms also deliberately highlight certain aspects of these particular groups' identity. When members of the Black community campaigned for *African American,* it was to emphasize not genetics or color, but the historical roots of a group that now forms part of the United States, thus bringing the name into line with those of other ethnic minorities such as Japanese American and Italian American groups.

These accounts of PC-motivated language change fall well within the realm of euphemism. The use of inappropriate styles for naming and addressing is dysphemistic and likely to affront the hearer's face; appropriate naming and addressing is polite and therefore euphemistic. If political correctness has to do with extending to others the common courtesy of naming them as they would prefer to be named, then this is straightforwardly euphemistic (or at least orthophemistic) behavior. But there is also more to euphemism than simple politeness. Certainly euphemisms are motivated by the desire not to be offensive, and so they have positive connotations; at the least they seek to avoid too many negative connotations. But euphemisms are often more than 'linguistic fig-leaves'. Many euphemisms for death, for example, do more than just cover up abhorrent reality. They emphasize different aspects of the physical event of death and dying; for example, death as a journey (*pass away*) or death as the beginning of new life (*go to a better place*). The image they offer is then one of consolation. Furthermore, in the mouth or pen of a political satirist, euphemisms are often deliberately provoking. A political allegory such as Jonathan Swift's *Gulliver's Travels* is at one level a children's story and at another one of the most blistering satires of the human condition ever written (cf. Allan and Burridge, 1991: Ch. 10). Similarly, PC-inspired euphemism aims not to disguise or conceal unpleasant reality, but to compel its audience to go beyond the simple content of the message and to challenge assumptions that some assume are in-built and immutable aspects of their language.

The reluctance of writers to view PC language as part of euphemistic behavior stems from the deterioration of the term *euphemism* itself. For many people 'euphemism' is now the pejorative label they attach to language they believe to be value laden and deliberately obfuscating. They associate it with unwanted jargon that they suspect is used primarily to befuddle and disguise ordinary and inconvenient facts. It really is very much an Orwellian-inspired view of euphemism that has come to dominate public discussion. Part of this Newspeak image is the notion that all euphemism is deodorant language used primarily to cover over unpleasant realities. In this way it has become a double-edged sword, used by *both* supporters and critics of PC language to back their respective

positions. In their nondiscriminatory language handbook, Banks and Mulder (1996: 34) state that "responding to others with care and sensitivity involves describing people accurately, from an informed position. Euphemisms, or unnecessarily vague terms patronise people". In the other camp, critics of political correctness, impatient with what they see as a pretense that sweeter words produce a sweeter world, scorn political correctness precisely because they argue it *is* just euphemism; for example, Robert Hughes's (1993: 18–19) famous description of PC language is as a kind of "linguistic Lourdes, where evil and misfortune are dispelled by a dip in the waters of euphemism".

Because the choice between alternative expressions will always depend on context, politically correct language will inevitably be both euphemistic and dysphemistic, more strikingly so because of its overtly political nature. *Deaf* is preferable to *hearing-impaired* for those who identify with *Deaf Pride*. Some women feel affronted and wrongfully excluded by compounds like *chairman*; others are quite happy to remain *Madam Chair* because they understand *chairman* to be an idiom denoting the office of chairperson. Australian Aborigines reportedly show no strong aversion to using terms such as *blackfella, Abo,* and *boong* among themselves (Eagleson *et al*., 1982: 157). In certain contexts, African Americans can call one another *nigger* with impunity (Lakoff, 2000: 105). In the mouths of outsiders these terms remain highly offensive, but not in the mouths of those speakers with 'natural cover'; in other words, those who because of their group identity are not presumed to have malign motives for expressing themselves in a potentially offensive way (Loury, 1993: 615). In this way it is possible to reclaim pejorative language; for example, the successful reevaluation by certain groups of the derogatory semantics of words such as *wog* 'Caucasian Australian who is not Anglo-Celtic' as evident in the success in Australia of movies like *Wogs out of Work* and *Wog Boys*. Other examples of reclaimed vocabulary include *bitch, nigger,* and *queer.*

X-Phemism and Language Change

Sociology has Knight's Law: 'Bad talk drives out good'. Economics has Gresham's Law: 'Bad money drives out good'. Linguistics has a similar Law of Semantic Change: 'Bad connotations drive out good' (*see* **Connotation; Taboo Words**). Euphemisms frequently degenerate into dysphemisms through contamination by the taboo topic. If society's prejudiced perceptions continue to bubble away, eventually the euphemistic value will be undermined, and the negative connotations will reattach themselves, and a new euphemism must be found.

For example, such is the stigma surrounding mental illness that any euphemism for the condition will quickly degenerate into dysphemism. This gives rise to a type of lexical treadmill effect. The word *insanity* derives from Latin *in-* 'not' + *sanus* 'healthy'. Now confined to 'mentally unsound', it originally had a much broader domain encompassing all bodily organs and their functions. Today even the word *sane* has narrowed under the influence of *insane* to designate a mental condition only. *Crazy* was once applicable to all manner of illness, but is now also restricted to mental illness alone. The history of the word *deranged* illustrates a typical path of development for euphemisms. Originally from a verb meaning 'to disturb, disarrange', it could be qualified with the modifier *mentally* to refer to people who were 'disturbed in the mind'. But once used in the context of mental illness, the word soon became contaminated and now without the modifier has narrowed to the 'mad' sense alone. The adjective *mental* has also been affected. Dictionaries still list 'pertaining to the mind' as its central sense, but 'denoting a disorder of the mind' is always given as a secondary meaning, as are colloquial senses 'mad' and 'foolish' (compare *be/go mental*, and *become a mental patient*). There are signs that *disordered* and *afflicted* are moving in the same direction. Though still requiring a modifier like *mentally* to refer specifically to psychiatric illness, this is now becoming their normal context of use. And although dictionaries define *sick* as 'affected by any disorder of health', in slang usage the word has narrowed to 'mental ill health', frequently with overtones of 'perversion' (compare *sicko* and *sicknik*).

The names for establishments holding mental patients are subject to the same pejoration and narrowing of meaning. A striking illustration is *asylum*. In Latin the word meant 'place of refuge, retreat', a sense still retained in *political asylum*. At first it appears to have been used of an institution for debtors and criminals; but was later broadened to include the orphaned, the blind, the deaf, and also the mad – when it required some sort of qualifier such as *lunatic*. These days the ordinary understanding of *asylum*, at least in reference to a building, is now specifically 'institution for the care of the insane'.

Political Correctness and Self-Censorship

PC language is politically motivated, and that means it will attract more attention and more resistance than most euphemisms – terms (both PC and non-PC) are politically loaded. It is also euphemism that is

perceived to arise directly out of linguistic intervention. Speakers dislike linguistic change, especially if it smacks of deliberate manipulation. Moreover, PC-motivated name changes are viewed by many as 'the thin end of the wedge' that will work to fragment society into different factions and special-interest groups. This hostility is further fueled by the media hyperbole and misrepresentation that has accompanied the PC debate. Yet, political correctness has been very effective in getting people to alter their language habits, far more effective than other kinds of prescriptive practices. Generic *he* (as in *if a student wants to, he can collect the readings early*) and terms such as *chairman, man-made, lady doctor, woman priest,* and *authoress* are rarely encountered these days.

It is difficult to assess the degree to which the changes are the direct consequence of recommendations made by handbooks and style guides (cf. Pauwels, 1993: 115 on the implementation of non-sexist language planning). These are only ever guidelines and rely on people's own personal decisions to alter their language. And although there have been formal speech codes imposed on some U.S. campuses and other kinds of official prohibitions making it an offense to use expressions deemed sexist, racist, homophobic, or anti-Semitic, these sorts of legal restrictions are by no means commonplace and speech codes are difficult to enforce anyway (Lakoff, 2000: 111).

Societal shifts will always have linguistic repercussions, especially for the lexicon, and PC-driven changes are therefore partly a form of natural linguistic evolution in the face of more general social change. But specifically the issue here is one of the voluntary limitation on speech. As Loury (1993) described it, political correctness has created a climate of tacit censorship. One of the reasons for people's hostility toward political correctness is that a violation of PC protocol can become an inquiry into their character. When people without 'natural cover' express themselves in an 'incorrect' way, there is always the danger that their audience will judge them on what is known about the character of others who have spoken in a similar way, and this can mean true racists, true homophobes, true misogynists, whose motives *are* malevolent. People are always mindful of what an expression might 'sound' like. They will not risk being misunderstood. If advocates of diversity insist that Australian Aborigines be referred to as Koories, then the safest thing is to adopt the PC-approved terminology. Of course if the group itself want this label, then this also becomes a matter of simple civility. (However, this is never a straightforward matter. The term "Koori" is a controversial one, and not all Aboriginal groups wish to go by that name. Political correctness battles are often as much about who has the power to name as the naming itself – who decides the identity of a group and its wants and interests.)

This behavior is no different from the sort of conscious or unconscious self-censoring speakers engage in generally, especially where taboo is involved. Most significant here is the relative saliency of taboo terms. Any derogatory or unfavorable denotation or connotation within language expressions will dominate the interpretation of their immediate context (see Osgood *et al.*, 1957; MacWhinney *et al.*, 1982; Allan and Burridge, 1991: 21–24; *see also* **Connotation; Taboo Words**). One reason that speakers are always quick to drop the homonyms of taboo terms is that they simply won't risk appearing to use a taboo term when none was intended. For example, those in polite society in the 19th century were so fearful of any seeming impropriety that they avoided the terms *leg* and *breast*, even when speaking of a cooked fowl, referring instead to its *dark meat* and *white meat*. In the case of a failure to follow a PC regime there is more at stake, as evident in the now shocking nature of those flippant references to *niggers* and *chinks* that were once second nature to writers like Rudyard Kipling. Use non-PC terms now and doubts are raised about your basic moral commitments – the safest course to steer is clearly one that carries the PC stamp of approval.

Final Remarks

For reasons of fear and or distaste, all human groups have taboos of one kind or another on certain diseases and aspects of death. For the same reasons, all experience anxieties over those body parts, bodily functions, acts, and actions that answer to the 'call of nature'. Verbal taboos, even those imposed by purely social conventions, serve direct human interests by avoiding the things that threaten to cause distress and offense. Taboos exist to strengthen social cohesion. Private dysphemism in the form of swearing might relieve the frustration and distress of the swearer, but other forms of dysphemism make for discord. In the case of avoidance speech styles such as the 'mother-in-law' languages once used extensively in Aboriginal Australia, conflict is prevented where relationships are sensitive and threaten to disorganize the family unit. Relationships with in-laws are notoriously difficult in all societies, and these 'mother-in-law' languages and similar taboos on naming and addressing are grounded in the desire to maintain social harmony in what human communities recognize to be the most difficult area of intrahuman relationships. In today's vastly diverse democratic societies the practical problems of maintaining

dialogue means attention to face-saving is now more critical than ever, if our heterogeneous societies are to be able to negotiate their way through the tensions and differences.

Euphemism provides the verbal escape hatch for speakers confronting the problem of how to talk in different contexts about things that might embarrass them, frighten them, or that are for some reason just plain difficult. These include body parts, bodily functions, sex, lust, anger, notions of social status, hate, dishonesty, drunkenness, madness, disease, death, dangerous animals, fear, God, the supernatural – and since the 1990s, the problem of how to talk to and about others, particularly others perceived to be disadvantaged or oppressed. There will always be cross-cultural and historical differences, but they are superficial. Underlying motivations remain the same. All euphemisms (and dysphemisms) communicate an attitude both to the hearer and also to what is spoken about. In politically sensitive taboo areas, where words can transform into creedal cudgels, there is much more at stake. PC language communicates a political attitude, and that is what makes its expression so volatile.

See also: Connotation; Face; Politeness; Taboo Words.

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Taboo: Verbal Practices

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'Verbal taboo' might be broadly conceived to comprehend a spectrum of linguistic practices ranging from euphemism, the deliberate 'softening' (Cameron, 1995: 73) through lexical substitution or other means of negative associations of words that deal with prohibited or stigmatized subjects, to more systematically structured replacement of normal forms that relate to such subjects as defined within particular speech communities, with other forms understood to specially index, and thus draw attention to, those very subjects and tokens of their occurrence. Despite the wide range of phenomena that might fall under this rubric, the designation '(verbal) taboo' has tended to be used mainly with reference to practices in which suppression and replacement of forms is extensive, highly systematized with reference to definable contexts of occurrence (normally both presupposed and configured by the usage), and accompanied by heightened consciousness and

dialogue means attention to face-saving is now more critical than ever, if our heterogeneous societies are to be able to negotiate their way through the tensions and differences.

Euphemism provides the verbal escape hatch for speakers confronting the problem of how to talk in different contexts about things that might embarrass them, frighten them, or that are for some reason just plain difficult. These include body parts, bodily functions, sex, lust, anger, notions of social status, hate, dishonesty, drunkenness, madness, disease, death, dangerous animals, fear, God, the supernatural – and since the 1990s, the problem of how to talk to and about others, particularly others perceived to be disadvantaged or oppressed. There will always be cross-cultural and historical differences, but they are superficial. Underlying motivations remain the same. All euphemisms (and dysphemisms) communicate an attitude both to the hearer and also to what is spoken about. In politically sensitive taboo areas, where words can transform into creedal cudgels, there is much more at stake. PC language communicates a political attitude, and that is what makes its expression so volatile.

See also: Connotation; Face; Politeness; Taboo Words.

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objectification, including labeling or typification, of the practices involved on the part of members of the speech community. Nevertheless the difficulty of strict demarcation of an heuristic category of this sort necessarily remains. (For the entry of the term 'taboo' into Western circulation from Polynesian contexts see Shore, 1989; for its introduction into and circulation in scholarly usage, partly in the articulation of questions of civilization, development, and social order, see, e.g., Freud, 1913; Webster, 1942; Douglas, 1969).

Verbal taboo may be only one dimension of multimodal practices involving substitution of ordinary acts and linguistic forms by others that mark the relevance and structure the current situation of communication as one of a particular kind. Australian Aboriginal in-law avoidance practices mark contextual relevance or co-presence of persons in certain relationships through the use of avoidance language registers by those in the relationship (and also, to varying degrees, by others signaling their recognition of it). Special linguistic usages go along with a range of proxemic and other interactional markers: persons in certain relationships may speak but only observing the constraints of avoidance register; they may only face away from and never toward each other; they may accordingly not transfer things directly but preferably through third parties or through types of transfers that sometimes encode gender-based or other differentials between persons in the relationship. Similar respect or avoidance practices among the southern Sotho of southern Africa (Kunene, 1958) require that a daughter-in-law observe modesty before her father-in-law (and husband's other male relatives) in dress, in not suckling her baby in his presence, in not being close to him or touching him or his intimate property, in not using his personal name, and in using a respect language register, the extraordinary character of which is constituted, in part, by the use of (otherwise) obsolete Sotho words, and of borrowings from neighboring languages.

Australian avoidance language registers usually involve the substitution of a fairly small number of lexical forms by other forms that language-users recognize as belonging to the special register. Though claims about the extent of such substitute registers vary (see Dixon, 1971; Haviland, 1979; Rumsey, 1982), in many languages even more pervasive than lexical substitution was the use of register markers, affixed to or infixed in a wide variety of word classes, that served to repeatedly mark the situation as one of a particular kind (e.g., in Jawoyn (Djauan), Ngalakkan (Ngalakan), and other southern Arnhem languages the infix *-bong'-*, part of an avoidance register characterized by the use of adjectival and verbal designations emphasizing smallness, softness and delicacy of voice volume). Such "nonreferential indices" that "signal the structure of the speech context" (Silverstein, 1976: 30) cannot be characterized as different ways of saying the same thing in avoidance register as one would otherwise; they are not semantically equivalent to anything else because they have no semantic (i.e., denotational) value, only a situation-indexical, pragmatic one. There is also typically some modification of grammatical forms used to index interaction with avoidance relatives (e.g., nonsingular number for a single referent, a crosslinguistically ubiquitous way of marking deference and/or sociological distance, as noted, e.g., by Brown and Levinson, 1978, and Silverstein, 1976, 2003), and use of highly solicitous and nondirective speech, sometimes spoken as if directed to a third party but understood to relate to the avoidance relative's wants and activities. In Merlan (1997) such multimodal indices, far from literally amounting to avoidance, are taken as required indices of total orientation to the relationship.

Among kinds of denotational categories frequently subject to taboo are personal names (Frazer, 1911: 293–239). The marking out of personal names for taboo treatment is overdetermined in instances where this prohibition overlaps with the fact of affinal relationship to the name-bearer, and where taboo is enjoined, generally or upon certain categories of persons, following the bearer's death. In the Sotho case referred to (Kunene, 1958), in addition to using a respect register to her husband's father and male relatives, a woman does not use her husband's father's name (sensitivity concerning the use of affines' personal names is widespread cross-culturally), nor does she use words related or similar to his name (similarities in both sound and meaning are at issue), but may construct a referring term for him by using one of the standard respect vocabulary forms. For example, the name Mojapela (*ja* 'eat,' *pela* 'rock-rabbit') is substituted by a name composed of two respect (*hlonepha*) forms, Mofutatase (*futa* = hlo. 'eat,' *tase* = hlo. 'rock-rabbit'). Kunene (Kunene, 1958: 162) characterizes the broadest implications thus: where a man's name is Moeti, his daughter-in-law may be expected to avoid "not only the common noun *moeti* (traveller), but also *eta* ('travel'), *leeto* ('a journey'), *maeto* ('journeys'), *etela* ('journey towards, visit'), *etile* (perfect of *eta*), *etisa* ('cause to visit'), *etelana* ('visit one another')" – in other words, a range of grammatically, and lexico-semantically linked forms that the woman feels (Kunene, 1958: 162) are sufficiently similar to his name to warrant avoidance.

In Australian Aboriginal societies, the names of the recently deceased (however the pairing of person and name had been determined; the cultural sources and kinds of names were various) were/are tabooed, at least for a period of time (after which names are sometimes restored to use; see e.g., McKnight, 1975). Name tabooing usually seems to involve the suppression of homophones or words deemed similar to the name of the deceased. For Central Australia, Nash and Simpson (1981) document what they term a 'metapragmatic shifter,' a form /kumunjayi/ (and lectal variants) that serves as a regular substitute for the name of the recently deceased, any persons of the same name (such persons may, however, change their commonly used names following the death of a name sharer), and for a range of words or forms homophonous, or nearly so, with the name of the recently deceased person. Thus this single form may be used as the substitute denotational form for a recently deceased woman named Alice, as well as for the town of Alice (Springs), for example. Other forms of name substitutes are also innovated and disseminated, e.g., upon the death of a man named *Walpajirri*, which means 'hairy-nosed bandicoot'), is introduced the substitute descriptive term *ngarlkirdingarnu* '*Acacia sp*.-eater'). Nowadays, English given names are also among the kinds of names regularly replaced for a time by the general substitutive form /kumunjayi/.

Dixon (1971) uses the fact of many-to-one ratio of everyday (Guwal) to mother-in-law (Djalnguy) vocabulary in Dyirbal, north Queensland, to illuminate lexicosemantic description (e.g., of the differential markedness of transitivity in the two registers). Merlan (1982) shows how in Mangarrayi (Mangarayi), Roper River, Northern Territory, the avoidance register involves not only some lexical substitution of ordinary nouns (thus, roughly, retention of the ordinary grammar), but further, standard use of habitual verbal constructions in place of more direct referring expressions (e.g., 'the one who eats gum' instead of a single nominal expression for 'emu'). These examples of avoidance and taboo registers provide evidence for analysis of the pragmatic force of grammatical categories. (See also Meillet, 1921 and Bonfante, 1939 for examples of lexical and grammatical implications of word taboo in Indo-European).

Tabooing practices (linguistic and other) are widely reported for Austronesian speech communities (Simons, 1982). Keesing and Fifi'i (1969) summarize observances among the Kwaio, comprising about 6000 people of Central Malaita, Solomon Islands, at the time of study. Persons are members of descent groups, which are land-owning and ritual units. From ancestors of each group emanates power, which is a resource for the living. Ancestors vary in the degree to which they are venerated, and intensification of veneration occurs over time for only a few. Importance of a person at time of death is a factor correlated with eventual ancestral prominence, but only one. Propitiatory pigs, called *foʔota*, are consecrated to ancestors, and any individual's ritual position is largely defined by the pigs he raises. A dead ancestor is known by the name of *foʔota*, or pigs consecrated to him, in lieu of the name by which he (or a family cluster of ancestors) was known in life. In tabooing, then, at issue is not the name of the ancestor, but of substitute *foʔota* denotational forms, the use of which (and sometimes of related forms and euphemistic expressions, names of ancestral burial shrines) would be taken to infringe the sacredness of the ancestor (*adalo*) who had become an object of veneration for a descendant kin group. The prominence of an ancestor may accumulate posthumously according to the proliferation and spread of descendants who venerate him, in a kind of feedback mechanism. The potency of such an ancestor who has left many descendants may intensify until such time as the *foʔota* pigs dedicated in his name become so sacred that they may only be eaten by adult males of the descent group (and sometimes members of its nonagnatic genealogical segments).

Kwaio say the ancestor himself ordains tabooing of his *foʔota* name(s) and related forms, communicating this via divination, which is undertaken within the kin group following some illness or misfortune. Keesing and Fifi'i discuss name forms and view tabooing probabilistically rather than absolutely, the likelihood of tabooing varying with the singularity or generality of name forms, the grammatical category or categories of parts of names, cultural connotations of name bases, and other factors. Because a descent group shares an array of common ancestors and a locale (or set of locales), and tabooing becomes recognized as social fact in and following certain events (rituals, divinations, etc.) conducted in the name of the descent unit, processes of tabooing and related practices will have a recognizable spatial distribution. Certain other processes (kin group segmentation, outmarriage) will have consequences for the sociospatial distribution of word taboo. Keesing and Fifi'i briefly describe how those intending to visit a locale are warned not to use particular taboo forms to certain people, providing some insight into the ways in which taboos are sustained both by insiders and outsiders with respect to a localized descent group (and networks of associated people) as well as communicated across social space. Keesing and Fifi'i suggest that, while tabooing is widespread in Oceanic settings, the foci of sacredness and proscription are diverse and historically mutable. But a general principle

underlying practices of taboo, they suggest, may be a strength of relationship between a name and a person bearing the name (whatever particular kind of social fact a name may represent within a given social context, see Kripke, 1972; Diffloth, 1980 on names in Semai, Malaysia).

In Chinese and some other east and Southeast Asian languages, verbal taboo largely evokes the notion of words that are homophonous (sometimes this means segmentally but not tonally identical) with others that designate or connote something dangerous, feared or inauspicious. Avoidance of these is paralleled by practices of verbal preference: a word may be used because it sounds like another that has positive connotations. In Chinese the number four, *si*, is often avoided because it sounds like the word *si* 'die' (though these words have different tones, and their written characters differ). The number eight is highly preferred (in advertisements, business names, etc.) because it is a near homophone with the word 'get rich.' Pictures for birthdays and for New Year's often feature a picture of a large fish, because the word fish (*yu*) sounds like the word *yu* (abundance, prosperity). Similar kinds of avoidances and preferences obtain in Japanese and Vietnamese (Kindaiti *et al*., 1988; Ngô Đưc Thọ, 1997), underlain by the structural fact of abundant (segmental) homophony of words. While the structural fact of near or complete homophony is common to many languages (English among them), it is not everywhere the basis for such avoidance and preference. But where it is, these examples suggest there is a hierarchy of phonological characteristics that count for purposes of establishing near homophony, such that, for example, segmental phonology counts more than tone. There may also be some hierarchy of characteristics within segmental phonology. (See Haas, 1964 for discussion of issues of sound similarity interlingually).

In Japanese, *imi kotoba* 'taboo words' may be conditioned topographically, for instance, some ordinary words are proscribed and others substituted in the high mountains (hence an association with particular occupations such as hunting and woodcutting), and on the high seas. (Franklin, 1972 describes a ritual language used on Mt. Giluwe, Southern Highlands, Papua New Guinea, in association with the high-altitude harvesting of pandanus. This register is one of a number of forms of word tabooing that are ranged by the Kewa under practices of *sa pi agaa* 'hidden speech'). In Japanese, word avoidance is also triggered by the dissonance of certain word meanings with occasions: hence at a wedding speakers tend to avoid words meaning 'leave,' 'exit,' 'send back,' 'sever,' and 'suffer.' Sensitivity to occasion intersects with that toward homophony, conditioning the avoidance in business contexts of words such as *nashi* 'to have nothing, to nullify' and thus also of the homophone *nashi* 'pear' (Kindaiti *et al*., 1988).

In Chinese, homophonous taboo pairs (such as 'four' and 'die' above) remain paired across dialects, despite dialect differences in pronunciation, a stability conditioned by the constancy of the respective written forms across dialects (A. Kipnis, personal communication). For Sotho, Kunene (1958: 165) notes that a woman may write down words she avoids speaking, suggesting that a less direct pragmatic force is attributed to the written modality.

Verbal taboo involves a diverse set of practices, but also presents us with some cross-cultural regularities, e.g., in the nature of some of the metapragmatic characterizations of the practices involved (where softening, avoidance, etc. are common). It offers a series of pragmatic speaker-user evaluative and value-laden perspectives on belief and linguistic as well as other practice. It highlights issues in the circulation and standardization (or otherwise) of registers across social populations, the set of factors in relation to which linguistic taboos come to be recognized as social facts, the relation of linguistic and nonlinguistic dimensions of practice, and it offers a field for consideration of pragmatic and metapragmatic differences between written and spoken forms.

See also: Silence: Cultural Aspects; Taboo, Euphemism, and Political Correctness; Taboo Words; Taboo.

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Tacit Knowledge

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As Louise Antony and Norbert Hornstein (2003: 6) suggest, two of Chomsky's most significant philosophical contributions lie in his revival of mentalism in the philosophy of mind and rationalism in epistemology. Linguistics is the study of the system of knowledge possessed by speakers both innately (*see* **Innate Knowledge**) and in the relatively steady state condition of linguistic maturity. This knowledge is a kind of tacit knowledge. The aim of this article is to clarify some of the psychological and epistemic aspects of tacit knowledge, primarily as it is relevant to Chomskyan linguistics. As a psychological attitude, tacit knowing is distinguishable both from garden-variety kinds of propositional attitudes like believing and desiring (what I call full propositional attitudes) and from nonpropositional states or skills typically classified as instances of knowing how. The epistemic role of tacit knowledge in the broader issue of knowledge of meaning is discussed, and a more positive understanding of tacit knowing, with its distinctively epistemic gloss, is tentatively offered.

The Early Debate

It was clear to both Chomsky and his early critics that the kind of knowledge of language that speakers

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As Louise Antony and Norbert Hornstein (2003: 6) suggest, two of Chomsky's most significant philosophical contributions lie in his revival of mentalism in the philosophy of mind and rationalism in epistemology. Linguistics is the study of the system of knowledge possessed by speakers both innately (*see* **Innate Knowledge**) and in the relatively steady state condition of linguistic maturity. This knowledge is a kind of tacit knowledge. The aim of this article is to clarify some of the psychological and epistemic aspects of tacit knowledge, primarily as it is relevant to Chomskyan linguistics. As a psychological attitude, tacit knowing is distinguishable both from garden-variety kinds of propositional attitudes like believing and desiring (what I call full propositional attitudes) and from nonpropositional states or skills typically classified as instances of knowing how. The epistemic role of tacit knowledge in the broader issue of knowledge of meaning is discussed, and a more positive understanding of tacit knowing, with its distinctively epistemic gloss, is tentatively offered.

The Early Debate

It was clear to both Chomsky and his early critics that the kind of knowledge of language that speakers

possess, if any, is not explicitly held. Speakers do not know explicitly the general principles to which human languages conform, or the grammars of the specific languages of which they are speakers. Chomsky and his early critics differed, however, on what they took to be the implications of that straightforward idea.

Critics argued that the invocation of psychological attitudes, especially knowing, was at best misleading and at worst wrong. The general objection is that the cognitive relation involved in the explanation of linguistic capacity, if indeed there is such a cognitive relation, cannot be that of knowing, because that cognitive relation does not sustain the connections constitutive of knowledge (see, e.g., Stich, 1971: §4; Quine, 1972: 442; Devitt and Sterelny, 1999: 139; Dummett, 1991: 95–97). More specifically, early critics held that the states that underlie our ability to use language are, for most competent speakers, wholly unconscious, and when known, say by linguists, are known only indirectly through scientific theorizing. But, they contend, if one is to be ascribed a certain piece of knowledge, that knowledge should be recognizable 'from the inside' and not merely ascribable as a result of scientific theorizing. Let us says that having a full propositional attitude is constrained by a 'self-knowledge constraint,' according to which self-knowing is a distinctive, nontheoretical way of coming to know of one's attitudes and their contents.

Chomsky considers such objections (Chomsky, 1980, 1986) and replies as follows:

> I have been speaking of "knowing English" as a mental state . . . [But] to avoid terminological confusion, let me introduce a technical term devised for the purpose, namely "cognize," . . . In fact I don't think that "cognize" is very far from "know" . . . [Cognizing] is tacit or implicit knowledge, a concept that seems to me unobjectionable . . . Cognizing has the structure and character of knowledge, but may be and in the interesting cases is inaccessible to consciousness. (Chomsky, 1980: 70–71)

The thrust of Chomsky's answer, then, is that if 'knowledge' offends, a technical term can be employed whose sense lacks precisely the offending features; but, continuing the response, the theoretical concept thereby introduced ought not to be thought of as fundamentally different from knowledge: it is knowledge, but it is unconscious, or not self-known.

Tacit Knowing vs. the Full Propositional Attitudes

We can see here an oversimplification of what might be involved in an account of the nature of propositional attitudes. There seems to be room to acknowledge both that speakers' knowledge of language does not sustain the connections constitutive of knowledge and the full propositional attitudes and that, nevertheless, tacit knowledge is unobjectionable. The debate is oversimplified in turning only on a single, blunt constraint of self-knowledge. In what follows, I will try to enrich the debate by indicating considerations for thinking of tacit knowing as a propositional attitude without construing it as a full propositional attitude.

What more might be added to the understanding of the fully propositionally attitudinal to bring out its deep constitutive differences with tacit knowing? To begin with, we may take note of a pervasive feature of cognitive psychological theorizing, namely, that it construes the mind as modular: as segmented into mental components that use systems of encapsulated information that are inaccessible to conscious thinking, that are dedicated to representing highly structured or eccentric domains, and whose deployment is fast and mandatory (cf. Fodor, 1983). For the proponent of the idea that knowledge of language is a kind of tacit knowledge, the language faculty is itself, to a first approximation, such a modular system (Chomsky, 1986: chapter 1 [especially note 10]; Higginbotham, 1987; *see* **Cognitive Science and Philosophy of Language**).

The general properties of modular systems stand in sharp contrast with basic properties of the full propositional attitudes. The full propositional attitudes are inferentially integrated (Stich, 1978; Evans, 1981) and so can draw upon, and can be drawn upon, by a range of other full propositional attitudes (so they are neither encapsulated nor inaccessible) without regard to subject matter (so they are not dedicated). Although belief fixation may not be voluntary, it seems not to be mandatory in the sense in which the operation of modular systems is. The latter is a compulsion by psychological law; the former is something like a compulsion by reason (more on this below). Finally, the operation of the full propositional attitudes can be painfully slow. Reasoning can take a long time. These differences show that, on its own, the self-knowledge constraint is quite incomplete as to what is distinctive about the way that the information contained in the language faculty is held.

The point about modularity concerns primarily the nature of the attitude of tacitly knowing. But consider as well what Gareth Evans (1982) has called the 'generality constraint,' which pertains to the objects of the full propositional attitudes, thoughts or propositions, and their constituents, concepts (*see* **Concepts**). According to the generality constraint, concepts possess an inherent generality that mandates their recombinability with appropriate concepts of

other logical categories; slightly more formally, thoughts are closed under logico-syntactic formation rules, up to conceptual incoherence or anomaly (cf. Peacocke, 1992: 42).

Now, no explanatory point seems to be served by imposing such a constraint on the representation of the information deployed in the language faculty. Speakers tacitly know the grammar that they do; knowledge of that grammar is deployed in some way or other, through the actions of mechanisms implementing algorithms that deploy the grammatical information tacitly known, so as to allow the acquisition, production, and perception of linguistic forms. Insisting that the constituents of the representation of linguistic information be subject to the generality constraint in no way illuminates the explanatory role of tacit knowing.

The reason can be clarified by thinking about the basic theoretical aims and motivations for both the full propositional attitudes and their contents. The full propositional attitudes and their contents are the fundamental theoretical entities in the conceptualization and explanation of the epistemic and practical successes and failures of agents. The explanations trace and assess the complexes of reasons for which agents believe and act, and implicitly evaluate those complexes, and agents, against an ideal of rational epistemic and practical functioning. The notions of epistemic and practical responsibility get their grip here, in the gap between actual and ideal. Since rational inference requires the interactions of attitudes and the recombination of concepts in a variety of ways, attitudes and contents must be such as to sustain the actual evaluations of epistemic status of agents in their inferential practices (Rattan, 2002: §4). The requirements that the full propositional attitudes be inferentially integrated and that concepts obey the generality constraint reflect these normative dimensions of the roles of attitudes and contents.

These ideas suggest, then, a deep point of contact with the self-knowledge constraint: that constraint will be relevant, like inferential integration and generality, insofar as it reflects fundamental features of rational practice. And surely it does. Reflecting on one's attitudes is a way of increasing the rational status of those attitudes. But if reflection plays that rational role, then it must be that our access to our attitudes is reliable and possessed of entitlement (cf. Burge, 1996); our access to our own minds must in the most basic cases be knowledge. Demanding that the attitudes and their contents be self-known, then, is part of a general account of the full propositional attitudes and their contents that construes them so that they may play their role in conceptualizing and explaining the normative statuses of agents.

Tacit Knowing vs. Knowing How

But it may be objected that for all that has been said so far, tacit knowing may not be a kind of content-bearing state at all; given the deep differences between tacit knowing and the full propositional attitudes, tacit knowing simply seems not to be a genuine mental attitude toward contents.

The objection can be elaborated by insisting that speaking a language is not a matter of knowing propositions at all. As Michael Devitt and Kim Sterelny put it:

> [C]ompetence in a language does not consist in the speaker's semantic propositional knowledge of or representation of rules. It is a set of skills or abilities . . . It consists in the speaker being able to do things with a language, not in his having thoughts about it. (Devitt and Sterelny, 1999: 187)

Perhaps there are no states of knowing the facts about the language – no knowing the rules or grammar of the language. A speaker no more knows the rules of the grammar than one who can ride a bike knows the laws of mechanics governing balance and maneuver. The language faculty is a faculty of knowing how to speak a language. Call the proponent of such a view the 'knowing-how theorist.'

Of course it cannot be denied that speakers do know how to speak the language; but the knowing-how theorist must justify the idea that attributions of knowing **how** are not just species of attributions of knowing **that**, as certain syntactic and semantic evidence suggests (Stanley and Williamson, 2001). Again, it looks as though the knowing-how theorist simply misses the point: although speakers know how to speak the language, that is not an explanation, but a description of what needs to be explained (cf. Higginbotham, 1994). But let us suppose that the knowing-how theorist is proposing an alternative explanation, one that does not appeal to tacit knowing. The knowing-how theorist has at least two significant hurdles to overcome.

First, suppose it is granted that tacit knowing does not have the direct role in rationalizing conceptualizations and explanations that the full propositional attitudes do. There still seems to be nothing to prevent thinking of tacit knowings as having the same attitude-content structure that the full propositional attitudes do. The attitude is not, admittedly, understood as playing a certain rational role, but it still may have a regular and lawlike causal role, and that would seem to be enough to think of there being something attitude-like – a distinctive way in which the information is held – in the picture. (Indeed this is the usual understanding of the attitudes in causal functionalism;

see, for example, Lewis, 1972.) This, for example, is what we might like to say about animals and their attitudes. They fail to have states that satisfy the normative constraints that the full propositional attitudes do, but it would be theoretically heavy handed to say that they do not have states that are very much belief- and desire-like.

Again, serving the aims of rationalizing explanations may require that contents be individuated at the level of Fregean sense rather than reference; this is the point of 'Frege's Puzzle' (Frege, 1892). But if tacit knowings fail to figure directly in these kinds of rational phenomena, then their contents may legitimately be exempted from having the general properties that the contents of attitudes that do so figure must have. The contents of tacit knowings may be Russellian, or have a limited need for cognitive difference without difference in reference (*see* **Sense and Reference: Philosophical Aspects**). These constituents of contents, objects and properties, presumably do not obey the generality constraint, so there are ways in which contents may be involved yet fail to be like the contents of the full propositional attitudes. The issues here are complex, and I mean only to flag the general issue about the individuation of the contents of tacit knowings and how that may serve to distinguish them from the contents of the full propositional attitudes.

Second, perhaps the proponent of knowing how thinks that the explanation of linguistic ability is merely dispositional, like the explanation of the shattering of a glass by appeal to its fragility. Here, there is some categorical, microstructural, property of the glass that, simplifying tremendously, explains why in conditions of the appropriate sort, the glass shatters. In a like manner the knowing-how theorist may appeal to the categorical neurophysiological ground of linguistic dispositions as comprising a nonintentional explanatory level. This idea, however, is subject to all the general objections that favor functional explanations over neurophysiological ones. It neglects a tradition of thinking about psychological explanations as involving multiple – computational, informational, algorithmic, and implementational – levels (see Marr, 1982; Peacocke, 1986). Indeed the functional states will be realized by neurophysiological states, but the explanation will be cashed out at some level that abstracts from neurophysiological description.

What Is Tacit Knowledge?

So far tacit knowing has been negatively characterized, by being distinguished from both the full propositional attitudes and knowing how. But how are we to understand the nature of tacit knowledge in more positive terms? Tacit knowing plays a role in the explanations of linguistic acquisition, perception, and production. The described capacities are epistemic in character. Their explanations are part of more elaborate explanations that seek to understand the general phenomenon of communication, including its substantial pragmatic elements. To keep the discussion manageable, I will ignore the more elaborate problems. As well, I will focus only on the problems of linguistic perception and linguistic production. I mean only to gesture roughly at the kinds of considerations that are involved.

According to these explanations, speakers are able to make knowledgeable sound-meaning pairings for sentences because they have information about the phonological, syntactic, and semantic – grammatical – properties of the expression-types that make up those sentences. This information is drawn on by perceptual and production mechanisms. Simplifying immensely, production mechanisms take inputs from intentions to say that p, and make available to a speaker, through the use of the grammatical information, expression types that mean that p. Perceptual mechanisms take acoustic inputs and, through the use of grammatical information, impose grammatical properties on them, eventuating in an experience of meaning, on the basis of which meaning judgments are made (cf. Fricker, 2003). A fully fleshed out epistemology of meaning would explain the epistemic differences between knowing one's own meaning in production and knowing others' meanings in perception by, for example, considering how the inputs to production and perception, respectively, allow for different kinds of mistakes in the eventuating judgments about meaning.

Let us assume that information is deployed in speakers' linguistic epistemic achievements (so these achievements are not examples of knowing how), and that this information is tacitly rather than explicitly held (so it is not an example of a full propositional attitude). Still, why must we accept that this information is known rather than just truly believed? The question is difficult and fundamental. I offer here some potential lines for understanding.

Suppose, as I have been suggesting, that tacitly held information or content is involved in the explanation of linguistic capacities. Two things are of note here about this information. First, these representations have been formed by a reliable mechanism – one that uses speakers' innate representations of Universal Grammar – that reproduces the grammatical information represented in the minds of speakers in one's community. In normal environments, acquiring these representations will equip one to come to judge

knowledgeably the meanings of other speakers. Second, once one moves away from folk conceptions of public language, it is plausible to think of the facts about which language one speaks as settled by one's grammatical representations or I-language (Chomsky, 1986: Chapter 2; Higginbotham, 1991; Barber, 2001; *see* **E-Language versus I-Language**). Judgments about what one means oneself will then be reliably produced, again as outlined above; and since the facts about one's language are determined by one's grammatical representations, they will be reliably produced by the facts that determine the language one speaks. It seems that as a phenomenon at the level of the full propositional attitudes, knowing our own meanings and knowing the meanings of others, when we do, is not an accident.

We can think of the foregoing as giving the outlines of a philosophical explanation of what might be called the success-presupposing features of the explanation of our linguistic capacities. The explanations are not success neutral (see Burge, 1986, who attributes the phrase to Bernard Kobes), in that the explanations are explanations of epistemic capacities that are generally presumed to be successful. But if that is right, we are in a position to say something about why the information tacitly held is knowledge. Unless that information were known, rather than just truly believed, it would seem to be a mystery why drawing on that information in perception and production leads in general to knowledge. So one suggestion is that the status of the information as knowledge comes from the distinctive explanatory role of the tacitly held information in explanations of our generally epistemically successful linguistic capacity.

That's one pass at vindicating the attribution of knowledge. But perhaps something deeper can be said. Here we can return to Chomsky's rationalism. Sometimes Chomsky's rationalism seems to be a genetic rationalism that emphasizes the innate character of Universal Grammar, vindicating an early modern doctrine of innate ideas (*see* **Innate Ideas**). But there is another way to think of this rationalism, in which it emerges as a more full-blooded epistemic doctrine. In this way of thinking, at some point in the evolution of humankind, minds came into a cognitive relation with certain abstract structures, with very valuable combinatorial properties. These abstract structures are languages. We have already seen that the tacit is not the realm of epistemic and practical responsibility. So the status of knowledge for tacit representations will not accrue as a result of some personal-level achievement. The status of knowledge for the representations that underlie our linguistic capacity derives instead from a natural attunement of the modular structures of the human mind to the abstract combinatorial structures of language.

See also: Cognitive Science and Philosophy of Language; Concepts; E-Language versus I-Language; Innate Ideas; Innate Knowledge; Sense and Reference: Philosophical Aspects.

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Tadadjeu, Maurice (b. 1950)

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Maurice Tadadjeu was born in 1950 in Dschang into an important family among the Yemba people. Early in school, he wondered why he had to study French wars – what would that help him do? His nationalist pride in Cameroonian identity and language had begun. At Libermann College, he became a leader in the Boy Scout movement which taught him the principles of leadership. The college developed a language program in which he could document his mother tongue Dschang (Yemba). So he opted to study linguistics. During a scholarship program in the United States, he discovered pan-Africanism, which opened his mind to the possibilities of Language Planning in his own country.

Upon return to his country in 1978, he started talking to his friends, particularly those in government, about his vision of studying the African languages spoken in Cameroon. In 1979 he organized the first meeting of representatives of all languages to agree upon symbols with which to write their languages. As a result, it was discovered that in fact there are more than 250 African languages spoken in Cameroon, representing all the major language families on the continent. To explore possibilities of developing writing systems and school materials he created PROPELCA (Projet de Recherche Opérationnel pour l'Enseignement des Langues au Cameroun). With great imagination and creativity the group developed strategies on how to go about changing attitudes of authorities toward a policy of mother tongue education in schools – mainly Tadadjeu's contribution – developing writing systems, testing them by writing school materials, training schoolteachers, finding schools and parents willing to let their children participate in such teaching in the mother tongues, previously unthinkable in Cameroon (though not in other African countries).

It took only two years to achieve the first positive results: the children could learn English or French better if taught the basis of reading and writing in their mother tongue. At the end of the school year, they had learned more of the official language than the children who were taught monolingually in the foreign language. This project gave impulses and ideas to generations of students in the Linguistics Department, spurred dissertations, and slowly changed the attitude of a whole nation. As a result of Tadadjeu's lobbying, in 1996, the new Cameroonian Constitution admitted the existence of Cameroonian languages and guaranteed the right to their use in schools. In 1998 a law was created to that effect.

Cameroonians are regaining pride in their heritage and mother tongues. The vision and untiring efforts of Maurice Tadadjeu are being heard in Africa and beyond. In this way the results of his inspiration and personal efforts are slowly changing the African continent, giving place to the rich cultural heritage of the many African people groups, their thinking expressed in their languages, and at the same time making place for the people with such values to work together, to become true multilingual nations that pull together because they find it advantageous to do so.

See also: Cameroon: Language Situation; Language Education Policies in Africa.

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Tadzhik *See:* Tajik Persian.

Tagalog

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Tagalog, spoken in the Philippines, is a member of the Austronesian group of languages. The Austronesian languages are descended from Proto-Austronesian, which is believed to have developed on the Asian mainland and to have been brought to Taiwan by around 6000 B.C., whence its descendents spread through the Philippines and Indonesia eastward to the islands of the Pacific. The earliest documents in Tagalog date from a few decades after the first Spanish colonization in 1564. The pre-Hispanic Tagalogs had a syllabary called *Alibata*, which has been recorded, but if there was any written literature, none of it survives. The end of the 16th century and the beginning of the 17th saw the publication of a catechism *Doctrina Cristiana*; a magnificent and thoroughgoing dictionary, a grammatical description, and a textbook that purports to teach Spanish to Tagalog speakers. These provide good documentation of what Tagalog was like at the time, and indeed the language of these texts is readily understandable today. Other literature, mostly poetry, dates from the middle of the 19th century. It was only in the beginning of the 20th century that prose literature and other types of writing were published in Tagalog. Education in the medium of Tagalog was not introduced until the 1960s, and to this day, English predominates as the medium of instruction at all levels.

Tagalog has a unique status among the more than 100 indigenous languages of the Philippines in that it is the national language alongside of English. Although English still predominates in the Philippines as the language of education, public affairs, and formal occasions, Tagalog is increasingly coming into use in these settings, particularly in those areas in which Tagalog is spoken natively. At the time of the Philippine Commonwealth, Tagalog was spoken by less than a quarter of the population of the Philippines. To avoid political controversy among the speakers of other languages, the fiction was adopted that this language, with some modification of vocabulary taken from other major Philippine languages, was an amalgam of these languages. As such it was called 'Pilipino.' In the 1970s, a new fiction was adopted, that the amalgamation of Philippine languages that was to serve as the national language was composed of a larger number of the indigenous languages than Pilipino had been, and this new language was termed 'Filipino.' However, the terms 'Pilipino,' 'Filipino,' or 'Tagalog' all refer to one and the same language, and all three terms are commonly used to refer to it.

Tagalog is spoken indigenously in the Manila region and in the provinces surrounding it. As such, it is the language associated with the seat of Philippine power and culture, and has acquired a special cachet or prestige. In the last few decades, Tagalog has spread far beyond its original home to urban areas to the south and the north, especially those that have seen a large influx of immigrants from other regions, although in Mindanao there is strong competition from Cebuano, and in the north competition from Ilocano. However, at this point, Tagalog has become the native language of approximately one-third of the population of the Philippines and is ever increasing in number of speakers. In addition, Tagalog press, TV, and cinema, and most importantly, population mobility, have spread the knowledge of Tagalog throughout

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Tagalog, spoken in the Philippines, is a member of the Austronesian group of languages. The Austronesian languages are descended from Proto-Austronesian, which is believed to have developed on the Asian mainland and to have been brought to Taiwan by around 6000 B.C., whence its descendents spread through the Philippines and Indonesia eastward to the islands of the Pacific. The earliest documents in Tagalog date from a few decades after the first Spanish colonization in 1564. The pre-Hispanic Tagalogs had a syllabary called *Alibata*, which has been recorded, but if there was any written literature, none of it survives. The end of the 16th century and the beginning of the 17th saw the publication of a catechism *Doctrina Cristiana*; a magnificent and thoroughgoing dictionary, a grammatical description, and a textbook that purports to teach Spanish to Tagalog speakers. These provide good documentation of what Tagalog was like at the time, and indeed the language of these texts is readily understandable today. Other literature, mostly poetry, dates from the middle of the 19th century. It was only in the beginning of the 20th century that prose literature and other types of writing were published in Tagalog. Education in the medium of Tagalog was not introduced until the 1960s, and to this day, English predominates as the medium of instruction at all levels.

Tagalog has a unique status among the more than 100 indigenous languages of the Philippines in that it is the national language alongside of English. Although English still predominates in the Philippines as the language of education, public affairs, and formal occasions, Tagalog is increasingly coming into use in these settings, particularly in those areas in which Tagalog is spoken natively. At the time of the Philippine Commonwealth, Tagalog was spoken by less than a quarter of the population of the Philippines. To avoid political controversy among the speakers of other languages, the fiction was adopted that this language, with some modification of vocabulary taken from other major Philippine languages, was an amalgam of these languages. As such it was called 'Pilipino.' In the 1970s, a new fiction was adopted, that the amalgamation of Philippine languages that was to serve as the national language was composed of a larger number of the indigenous languages than Pilipino had been, and this new language was termed 'Filipino.' However, the terms 'Pilipino,' 'Filipino,' or 'Tagalog' all refer to one and the same language, and all three terms are commonly used to refer to it.

Tagalog is spoken indigenously in the Manila region and in the provinces surrounding it. As such, it is the language associated with the seat of Philippine power and culture, and has acquired a special cachet or prestige. In the last few decades, Tagalog has spread far beyond its original home to urban areas to the south and the north, especially those that have seen a large influx of immigrants from other regions, although in Mindanao there is strong competition from Cebuano, and in the north competition from Ilocano. However, at this point, Tagalog has become the native language of approximately one-third of the population of the Philippines and is ever increasing in number of speakers. In addition, Tagalog press, TV, and cinema, and most importantly, population mobility, have spread the knowledge of Tagalog throughout

the nation, so that only few people, and those mostly in the oldest generation, do not have at least a passive knowledge of Tagalog. Further, although loyalty to the native language is strong in the Philippines (few of the indigenous languages are in danger of dying, even though some have small numbers of speakers), it is becoming increasingly acceptable to use Tagalog in social settings (even in non-Tagalog regions), where family members and guests use Tagalog instead of the native language. This usage usually occurs on the part of native sons, who have moved to Tagalog-speaking regions for employment, or their children. Many have become dominant in Tagalog. Speaking in Tagalog in a group where everyone else is speaking the native language is not remarked upon, and in fact, there is a certain prestige attached to speakers who do this, as it is a sign of having made good in the outside world. Abroad, Tagalog has become the mark of Philippine national identity and is used by Filipinos with other Filipinos, no matter what region they come from, and internally, Tagalog is well on its way to becoming the lingua franca of a multilingual nation.

What Tagalog Is Like

Tagalog has a simple phonology. The consonants, vowels, and diphthongs are as follows (Table 1). Note that there are long and short vowels: the long vowels are marked with an accent.

Glottal stops in standard Tagalog occur only before a pause. If a word with a glottal stop at the end of it occurs in a phrase with another word following it, the glottal stop is lost, and there is compensatory lengthening of the preceding vowel:

> *Walaʔ* 'not' + *na* 'any longer' produces *walá na* 'no longer'

The spelling system ignores important parts of the phonology and does not recognize long versus short, although pedagogical texts use a cumbersome system to indicate these partially. The system also does not indicate /ʔ/. The palatals /c/, /j/, and /ʃ/ are written *ts*, *dy*, and *sy* respectively. The phoneme /ŋ/ is written *ng:*

> /cinílas/ *tsinilas* 'slippers'; /jip/ *dyip* 'jeep';/ʃa ŋ á pala /*sya nga pala* 'by the way'

Table 1 Tagalog phonology

Consonants					*Vowels and Diphthongs*			
p	t	(c)	k	ʔ	i,í			u,ú
b	d	(j)	g	h	(e, é)		(o,ó)	
m	n		ŋ			a,á		
	s, ʃ				iw			uy
w	l, (r)	y					ay, aw	

At the time the Spaniards first came to the Philippines, Tagalog clearly did not have this phonological system. The phonemes in parentheses in Table 1 show sounds that have been added to Tagalog since that time. This addition is proven not only by comparing Tagalog with other Philippine languages (i.e., doing historical reconstruction) but also by the treatment of loanwords from Spanish at the early time and the modern time. An example is the Spanish word for 'hat' *sombrero*, which was borrowed twice in Tagalog: once early on and then again later. These two words are now perceived to be two different lexical items and refer to different things, but their phonemic make-up show how Tagalog has expanded its phonology: it has added /o/ and /e/, it has come to allow a consonant clusters with /r/, and has come to allow a vowel other than /a/ to occur three or more syllables from the end:

> *sambalílu*ʔ, 'conical sun hat of the native variety' *sombréro* 'western hat'

Not all of this is due directly to Spanish influence. Much has to do with internal developments in Tagalog itself, but the contact with Spanish was a catalyst or facilitated some of these developments, in that Spanish words pronounced closer to the Spanish pronunciation made certain rare combinations or types more common.

In grammar, Tagalog is characterized as a synthetic rather than an analytic language (English is an example of an analytic language). In Tagalog, single words containing a root plus affixes of all sorts express what in analytic languages would be expressed by a phrase. For example, the single word *pápapagparikitin* 'will cause him or her to make a fire' expresses what in English takes seven words to express. The root here is *dikit* (the initial /d/ is changed to /r/ by rule that says /d/ between vowels is often changed to /r/).

The verbal system in Tagalog expresses the relation between the verb and a word it refers to: the word referred to may signify the agent, the place, the beneficiary, the instrument, the patient, the thing moved, or the indirect object (depending on the affix). The verb contains what in English would be a verb and a preposition. An example is the root *pútol* 'cut':

(1) (agent) Ako ang ***púpútol***
I the-one-who will-cut
nang táliʔ.
object-maker string
'Let me be the one ***to cut*** the string.'

(2) (patient) ***Putúlin*** mo ang táliʔ.
Cut-it by-you the string
'***Cut*** the string.'

(3) (local) ***Putúlan*** mo nang
Cut-from-it by-you object-marker
kóntí ang kék.
little the cake
'***Cut*** a little ***from*** the cake.'

(4) (benefactive) ***Ipútol*** mo
Cut-for by-you I
ako nang kék.
object-marker cake
'***Cut*** the cake ***for*** me.'

(5) (instrumental) Itong kutsilyo ang
This knife the-one-that cut-with-it
ipangpútol mo
by-you on string
'***Cut*** the string ***with*** this knife.'

Cutting across this system of voice or prepositional-like affixes is a system of four-way inflections that expresses time (past or present as opposed to future), ongoing or iterative action, as opposed to a single action, and an imperative inflection, which is also used to express dependence, optatitivity or uncertainty. For example, sentence (1) above exemplifies future tense, (6a) below exemplifies noncompleted action, (6b), past action, and (6c), uncertain action:

(6a) Ako ang láging
I the-one-who always cut
púmupútol nang táliʔ.
object-maker string
'I am the one who is in charge of cutting (literally, always ***cuts***) the string.'

(6b) Síno ang
Who the-one-who did-cut
pumútol nang táliʔ?
object-maker string
'Who (purposely) ***cut*** the string?'

(6c) Baká ***pumútol*** siya nang táliʔ.
lest cut he object-marker string
'He ***might*** just ***cut*** the string.'

Perfective action is not expressed by verbal inflections but rather analytically (by a phrase).

(6d) Matagal **na** akong
long-ago has-been I
pumútol nang táliʔ.
cut object-maker string
'It **has been** some time since I (*purposely*) *cut* the string.'

(6e) Alas sayis **na** ako
o'clock six have-done I
púpútol nang táliʔ.
will-cut object-maker string
'At six o'clock I ***will have cut*** the string.'

There is a large number of derivational affixes that interact with the above-mentioned inflectional affixes to produce verbal forms with a wide number of meanings. Some of these affixes are applicable to almost all roots, some are more limited in their distribution. The most productive are the causative affix *pa-* and the potential affix *ka-*, both of which are addable to almost all roots that take verbal affixes. More than one derivational affix may occur within a verb. There are affixes that transitivize intransitive verbs, others that form verbs of reflexive action, those that form plurals, those that indicate an action done by two together, by more than two together, actions done as a favor, actions involving another, actions done by accident, and so forth. There is also a large number of adjective and nominal derivations.

Here are a few examples from the root *sáma*, a small percentage of the total number of derivational forms that occur with this root:
No derivational affix, 'go along':

(7) Ayó kong ***sumáma***
not-want I go-along
'I don't want to ***go along***.'

With *pag-*, transitivizer: 'take something. along somewhere':

(8) ***Magsáma*** [=-um-+pag + sáma] ka nang
Bring-along you object-marker
táʔo pagpunta mo doʔ on.
person when-go you there
'***Bring*** someone ***with you*** when you go there.'

With *pa-*, causative:

(9) Hindí mo siyang dápat
Not by-you him should
pasamáhin.
cause-him-to-accompany
'You should not ***allow him to come along***.'

With *ka-*, potential action:

(10) Hindí ka ***makákasáma*** [=future active + potential + sáma]
Not you will-be-able-to-go-along
kung íiyak ka.
if cry you
'You won't ***be able to come*** along if you are going to cry.'

With *kápa-*, accidental and causative action:

(11) ***Nápasáma***[= past-passive + ká- accidental action + pa- causitive + sáma] yung
Was-accidently-caused-to–go-along that
papel sa dala-dala ko
paper with thing-brought my
'I accidentally took that piece of paper together with the thing I was bringing (That piece of paper ***got caught up with*** the things I was bringing)'.

With *pag-*, 'do together':

(12) San Miguel, ang bir na may
San Miguel the beer that there-is
pinagsamáhan [= past + local-passive + pag- + sáma].
be-companions-over-it
'San Miguel, the beer people have ***companionship over (while drinking).***'

Influences on Tagalog and Tagalog's Influence on Other Languages

Tagalog, as a language of wider communication and as a spreading language, is being simplified. Simplification is most marked in urban areas, and the process is gradually spreading to the provinces. It undoubtedly begins from errors made by people (immigrants from non-Tagalog regions or Filipino Chinese) who learn Tagalog as a second language and are imitated by native speakers. One simplification is the loss of contrast between long and short vowels in certain syllables, leading to the loss of contrast between the accidental and the potential conjugations, e.g., *nápasáma* of example (11) above is pronounced /napasáma/ (which in conservative Tagalog has no meaning). Similarly, *mábibili* 'someone might buy it' (the accidental passive future) is pronounced /mabíbili/. Thus, the contrast is lost between *mábibili* 'someone might buy it' and *mabíbili* 'is able to buy it' Another aspect of this simplification is that there is a tendency to drop many of the productive derivations, which are very much alive in conservative Tagalog and exclude any vocabulary but that of the highest frequency. This tendency is exacerbated by the secondary role of Tagalog *vis-à-vis* English in public life and in education.

Mutatis mutandis, Tagalog influences the other indigenous languages of the Philippines. These other languages are replete with Tagalog loanwords that stem from the language's widespread use in the media. In some areas, Tagalog has a more intimate effect. In Samar, for example, where a large portion of the population has work experience in the Manila area and Manila has an especial cachet, the regional language is spoken by many younger people with a clearly observable Tagalog intonation. In the urban parts of the Cebuano speech area, where the managerial class is largely composed of immigrants from Tagalog regions who have learned Cebuano as a second language, complexities of Cebuano syntax that have no analogue in Tagalog are lost or regularized, and this syntax has spread to the younger generation of Cebuano natives who have no Tagalog connection (*see* **Cebuano**).

See also: Austronesian Languages: Overview; Cebuano; Education in a Multilingual Society; Indonesia: Language Situation; Language Education Policies in the Pacific; Language Policy in Multilingual Educational Contexts; North Philippine Languages; Philippines: Language Situation; South Philippine Languages.

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Born in Bologna on June 18, 1903, Carlo Tagliavini studied law, Romance philology, and linguistics (*glottologia*) at the University of Bologna. As a student he learned Rumanian and published a grammar and reader of this language in Germany when he was only 20 (1923a, 1923b). In 1924, he obtained his Ph.D. with a thesis on comparative grammar. In 1926, he published a monograph on the Ladin dialect of Comelico; throughout his life, he remained strongly attached to the Ladin dialects. For a period he was a lecturer in Bologna (1926–1927), lecturer for Italian and Spanish in Nijmegen and Tilburg (1927–1929), and professor of Romance linguistics in Budapest (1929–1935); in 1935, he was appointed professor of linguistics and Romance philology (occasionally also Germanic philology) at the University of Padova, where he stayed until his retirement in 1973, and where he formed many generations of Italian linguists and Romance scholars. He died on May 31, 1982 in Bologna.

Tagliavini was a specialist of the Romance languages, especially of Italo–Romance, Rhaeto–Romance (Rhaeto–Romansch), and Balkano–Romance (he also published on Spanish and Portuguese), but he was equally well at home in Germanic philology and general linguistics. In the 1920s, he also published articles on American Indian languages (Chiquito [Chiquitano] and Luiseño). As a result of his well-organized teaching at Padova, he produced a number of carefully documented and comprehensive manuals of Romance linguistics (1st edn. 1949), Germanic philology (1968), Italian linguistics, general linguistics (1936), and also of Latin historical phonology and morphology. These manuals contain a wealth of bibliographical references, and systematically organized factual information. The manual of Romance linguistics was updated and revised by the author over a period of some 25 years; it was translated into German and into Spanish, and is still used as a textbook for courses in Romance linguistics. Tagliavini had an active or passive mastery of a wide variety of languages (Indo–European, Semitic, and Finno–Ugric), and possessed an encyclopedic knowledge of the language sciences (he contributed important linguistic entries to the *Enciclopedia Italiana*, and he was the author of a linguistic chronicle in the popularizing journals *Le lingue estere* and *Oggi*). He took a keen interest in the history of linguistics (especially in empirical achievements; cf. 1963 and 1968), and had compiled a very rich archive of photographs of linguists. Tagliavini showed special interest in historical and comparative linguistics; the diachronic perspective underlies his dialectological work on Ladin (1926, 1934, 1944) and Albanian (1937), and his onomastic studies (1957, 1981).

See also: Germanic Languages; Italian; Rhaeto Romance; Romance Languages.

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Tagmemics

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Tagmemics refers to a species of structural linguistics that eventually outgrew the tenets of its own categorization as a 'slot and class' grammar, and now inhabits an eclectic space in linguistic history and inquiry that defies easy labeling. Its theoretical foundations are derived primarily from the research and methodologies of American linguist Kenneth L. Pike (1912–2000).

Tagmemics is founded upon the conceptualization of the 'tagmeme.' In its original meaning, tagmeme (by way of Leonard Bloomfield) referred to the smallest meaningful unit of grammatical structure in a language. In Pike's reformulation, the tagmeme becomes simply any 'unit in context,' and may denote any item or phenomenon in human communication, whether phonological, morphological, syntactical, or rhetorical (i.e., 'above the sentence') – or, indeed, beyond language use itself, in the behavior of the human community at large.

For Pike, a tagmeme is to be described in terms of four component features or cells: slot (where the unit may or must appear), class (what type or kind of unit it is), role (the rules that govern or describe how the unit functions), and cohesion (the relationship between the unit and other units and how they interact and influence each other). 'Slot' is related to position; 'class' comprises a set of replaceable/substitutable elements; 'role' refers to purpose and the impact of the unit in its location; and 'cohesion' is the relevant background that offers constraints and correlations for components of the tagmeme. A simple tagmemic analysis of the sentence, *Joan hit Michael* would look like this:

> *Joan* is a member of the class Proper Noun Root, and fills the Subject slot of Actor; whereas *Michael*, another member of the class Proper Noun Root, fills the slot of Adjunct (or Object), which has the role of Undergoer. *Hit* serves in the slot of Predicate and conveys Action in its role. Cohesion is involved in this analysis by providing the background information that illuminates such features as verb tense, number in subject, etc.

Put simply, tagmemic linguistic inquiry produces a series of four-celled analyses that identify the function of constituent tagmemes within a particular language phenomenon, e.g., a sound, word, sentence, or text that facilitates the movement from an 'etic' or outsider view toward an 'emic' or insider view of the subject of the inquiry.

Pike began his linguistics career as a virtually self-taught translator among the Mixtec of Mexico, eventually seeking more formal education in linguistics under the tutelage of Edward Sapir (1884–1939) at the University of Michigan. Under Sapir's mentoring, Pike was led to certain theoretical axioms and practical insights, all motivated by the premise that language and communication can only be fruitfully studied in the context of lived human behavior. This conviction has roots both in Sapir's own anthropological orientation and in Pike's concern to solve the practical challenges of Bible translation within primarily oral cultures.

In his earliest work and publications, ca. 1937–1942, Pike had focused on phonetics, attempting to assist translators associated with the Summer Institute of Linguistics. Their projects entailed the daunting task of understanding and describing phonology, morphology, and syntax among preliterate peoples whose languages had yet to be codified – lacking any guide to sound, lexicon, or grammar by which linguists could successfully enter their language community and attempt skillful translation of Biblical texts.

While devising practical tools of inquiry for identifying and charting similarities and differences in such target languages, Pike intuited that the resolution of translators' challenges lay both beyond the sentence in discourse and beyond discourse itself in the sociocultural frameworks in which language is used. Pike and his colleagues thus began to formulate tagmemics as a linguistics-cum-anthropology-cum-rhetoric based upon the centrality of language use to the building and preservation of human community, personal identity, and social order.

In 1948, Kenneth L. Pike began in earnest his search for a syntactical counterpart to the phonological and morphological terms 'phoneme' and 'morpheme' – a concept at the sentence level or above which could function as a key identifying unit in the same way that these well-established terms had functioned. The pursuit of what came to be known as the tagmeme resulted in Pike's seminal work of three volumes, *Language in relation to a unified theory of the structure of human behavior* (1954–1967). This expansive work articulates the heart of tagmemic theory, whose axioms foreground the epistemological role of culture and behavior at both the macro and micro levels of human community and language.

For Pike, and other prominent tagmemicists such as Robert Longacre, Alton Becker, and Linda Kay Jones, this means that linguistics must eschew formalisms and abstractions that result in purely mechanical or mathematical models of language as

'systems.' Pike referred to this tendency in late 20th-century language study as the fallacy of 'autonomous linguistics,' whose inquiries typically began with presuppositions and ended with propositions that sidestepped the quite essential and meaningful linkage between linguistic inquiry and the way human beings experience the world through the mediation of language. The dominance of transformational/generative linguistics, with its conceptions of competence and grammaticality, has frequently been cited as an exemplar of this unwarranted stance in tagmemic literature.

The impetus for this expansion of tagmemic theory beyond the usual limits of linguistic work was for Pike a nagging epistemological question: how is it that we can recognize persons, ideas, objects without knowing everything about them? As Pike explained colloquially, tagmemic theory staked its claims on the belief that essential to the description of human behavior as we live it must be the ability to recognize a friend even though she has just had Weetabix for breakfast, had restyled her hair, and replaced her automobile with another. What is it about a 'unit,' i.e., any sentence, person, event, situation, object, or concept that allows one to recognize and describe it with tolerable adequacy? As he pursued the implications of his questions further, Pike could no longer treat language as *sui generis*, an autonomous phenomenon that could be studied in isolation from other, nonlinguistic human behavior.

Among the most important axioms Pike offered fledgling tagmemicists was the principle that all language users inevitably view the world in repeatable units, but choose to focus upon them as particles (discrete bits), waves (merging of units and overlapping borders that change over time), or fields (as points in a set of relationships). Pike posited that each of these perspectives may and must come into play in a discourser's understanding and are not to be misunderstood as mutually exclusive. But, each perspective has its limitations as well.

An exclusively particle view of the world may yield nothing but discreteness: unconnected, decontextualized, randomized bits of experience; an exclusively wave view may yield nothing but unstable, ever-shifting strings and combinations of experience that resist articulation and registry; an exclusively field perspective may yield nothing but a mere scaffolding of relational abstractions that bear no substantive, tangible connection to the components of language or life that otherwise orient and order our perceptions and experience.

Pike further argued that every unit of thought or behavior to be well described must be characterized in these three ways: (a) how it differs from everything else in its class; (b) what its range of variability is, i.e., how much it can change and still be itself; and (c) what range of contexts can appropriately contain it, i.e., its distribution among other systems. Within tagmemics, any unit of human experience can (and ultimately **must**) be described through this ultimately trimodal structure.

Perhaps the most influential, and potentially long-enduring, concept invented by Pike is his evocation of the distinction (and the complementarity) between emic and etic viewpoints. Pike coined the terms from the endings of the words, phon**emic** and phon**etic**. The emic view is the perspective of the insider, the native, and is concerned with the contrastive, patterned system within a universe of discourse – its subtleties, its secrets; the emic view is intuitive to the person who possesses it. The etic view of a unit, by contrast, is the perspective of the outsider who looks for universals and generalizations – its predictabilities and linear surface features; the etic view assembles 'facts' without, perhaps, the ability to discern their relevance or, indeed, their priority in a system. The emic view is the view we expect from a participant within a system; the etic view is the view we expect of the alien observer. Both vantage points yield valuable data, but the etic must derive its authority to speak knowledgeably from interaction, even mastery, of the emic.

The overriding goal of any tagmemic inquiry is thus this movement from an etic and toward an increasingly emic understanding of language, text, person, or experience. Emicity and Eticity are thus considered as paradigmatic experiences within the human community and help define a range of human communication successes and challenges.

Eticity comprises the exterior, the detached, reality-as-appearance, founded upon outsider objectivity. Initial etic inquiry typically yields particles whose wave or field relationships (i.e., situatedness) to other particles are undetected, indistinct, or ambiguous and which must be identified before progress can be made toward emic understanding.

Emicity comprises the deeper, reality-as-experience, founded upon insider subjectivity. Etic inquiry, informed by incrementally more accurate and comprehensive account of particles as experienced within wave/field relationships by insiders in a language community, yields ever closer approximation of the community's meaning.

Tagmemics *qua* linguistics is ultimately a theory of discourse founded upon certain axioms about human behavior and language use that foreground the situatedness of all communication and the necessity of viewing every act of discourse as a form-meaning

composite inseparable from communicators, their audiences, and the varied worlds they may construct and inhabit through the use of language. Tagmemics is unique among 20th-century language theories in its preference for identifying universals and in its assertion that its axioms hold true for all of human behavior. It therefore offers insights not only into linguistics, but also into the epistemology of literacy as such, and also into the complexities of human psychology and anthropology.

Like 19th-century French linguist, Ferdinand de Saussure, Pike's rejected the positivism of his day and asserted that language study required not only a science but also an anthropology. At times, tagmemics indeed seems almost entirely an anthropological endeavor, its linguistics performed in the service of understanding better the human community and its varied behaviors.

The continuing influence and impact of tagmemics is to be found in contemporary rhetorical theory, particularly in the United States, where it has been employed to facilitate the acquisition of writing skills, and to provide writing instructors with a comprehensive means of teaching style, audience, argument, and exposition with a greater sensitivity to the situatedness of communication. Pike's theories came to the attention of his University of Michigan colleagues Richard Young and Alton Becker in the 1960s, and together they began the task of harvesting Pike's insights for a 'modern theory of rhetoric,' a theory most fully articulated in their 1970 textbook, *Rhetoric: discovery and change*. Seeking to free rhetoric and writing instruction from a moribund 'current-traditional' model, the authors' broad purpose was to restore invention to its proper place at the heart of practical rhetoric and to reconceive writing as a discovery, i.e., 'problem-solving' process that could be assisted by the systematic heuristic tools Pike developed for tagmemic theory.

From the tagmemic point of view, every rhetor's task is inevitably analogous to the kinds of challenges 'alien' translators in a new cultural environment encounter: locating a point of entry into a particular language ambiguity, problem, or challenge that will provide a true bridge for nonthreatening exchange and that, therefore, might make possible meaningful change. Thus, in tagmemic terms, a rhetorical task involves deliberately compensating for a default etic or outsider's perspective on data under consideration, and employing heuristics that assist a communicator in approximating an emic or insider's perspective conducive to reaching the projected audience.

As a rhetorical theory, tagmemics has faced opposition to its assertion that its axioms hold true not only for language inquiry but for all of human behavior. Nevertheless, tagmemic linguists and rhetoricians continue to investigate and pursue inquiries that illuminate the taxonomic, epistemic, and heuristic functions of language in human discourse toward the project of building an ever-more comprehensive theory of human behavior.

See also: Phoneme; Bloomfield, Leonard (1887–1949); Morpheme; Pike, Kenneth Lee (1912–2000); Sapir, Edward (1884–1939); Summer Institute of Linguistics.

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Tahitian

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Tahitian belongs to the Eastern Polynesian branch of the Oceanic subgroup of the Austronesian language family. Its nearest relatives are other Central Eastern Polynesian languages, such as Tuamotuan, Marquesan, and Cook Islands Maori.

Until the early 19th century, Tahitian was spoken by the entire population of the Society Islands, and it remained the main language for most of that century. Annexation by France (in 1880) and educational and social policies have contributed to the decline of Tahitian, particularly in the capital, Pape'ete. At the same time, Tahitian has become the lingua franca of the Marquesas, Tuamotus, Austral Islands, and other parts of French Polynesia, at the expense of their respective indigenous languages, and it is now estimated to have 150 000 speakers, including some 5000 residents of New Caledonia.

Tahitian has been an official language of French Polynesia, along with French, since 1978, but more *de jure* than *de facto*. It is taught in a small way up to university level. There is a substantial amount of Tahitian language radio and television programming, but no newspaper. The recent (2004) election of a government committed to more independence from France may bring about changes in the use and status of Tahitian.

Tahitian had no traditional written form and was first recorded by 18th-century explorers such as Bougainville and Cook. The latter was responsible for introducing into English the loanwords *taboo* and *tattoo*, from Tahitian *tapu* and *tatau*. A Roman-based alphabet was devised by English-speaking missionaries in 1815 and has remained in use relatively unchanged. Reliable reference works are currently available only in French.

An unusual feature of Tahitian was the custom of 'pi'i,' by which everyday words that constituted parts of chiefs' names were considered taboo, and in many cases the change became permanent. Tahitian is also unique among Pacific languages in having an academy (Fare Vana'a), founded in 1974, that aims to standardize, develop, and promote the language.

The phoneme inventory of Tahitian consists of nine consonants (f, h, m, n, p, r, t, v, and glottal stop) and 10 vowels (a, e, i, o, u, ā, ē, ī, ō, ū). There are no consonant clusters, and syllables are open. In writing, vowel length and glottal stop have often not been marked systematically. Some modern writers and publishers use a macron to indicate a long vowel and an apostrophe to indicate the glottal stop, as recommended by the Fare Vana'a.

There is very little morphophonemics, and most grammatical functions are performed by affixation or the use of pre- and postposed particles. Pronouns distinguish four persons (including first-person inclusive and exclusive) and three numbers (singular, dual, and plural). There are two categories of possession, depending largely on whether or not the possessor has control over the fact of possession. In noun phrases, the order is head + attribute. The basic word order is VSO:

'ua	tai'o	'oia	i	te	puta	rahi
ASP	read	he	OBJ	the	book	big

'he read the big book'

See also: French Polynesia: Language Situation; Hawaiian.

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'ua	tai'o	'oia	i	te	puta	rahi
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'he read the big book'

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Tai Languages

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Geographical Location and Number of Speakers

Tai languages are spoken by over 70 000 000 people across a wide area of Asia that extends from Vietnam in the east to India in the west. The most important member of the family is Thai, the national language of Thailand, which accounts for approximately two-thirds of all Tai speakers. The second highest national concentration is in China, where there are an estimated 15 000 000 speakers, mainly in the southwest. Smaller Tai-speaking populations live in northern Vietnam, Laos, Burma, and northern India.

The Tai language family comprises three branches: southwestern, central, and northern. The southwestern group extends over the widest geographical area and includes the national languages of Thailand and Laos, plus Shan and Khün (spoken in northern Burma); Lü (China-Burma border); Khamti (Burma-India border); and Black Tai (Tai Dam), White Tai (Tai Dón), and Red Tai (Tai Daeng) (Laos-Vietnam border). The central and northern branches are geographically more homogeneous, languages from both groups being spoken in both northern Vietnam and southern China. Central Tai includes Tho (Tày), Longzhou, and Nung, while Northern Tai includes Wu-ming (Northern Zhuang), Yoi (Dioi), and the Bouyei (Pu-yi) languages of China.

Wider Affiliations

Certain lexical and grammatical similarities between the Tai and Chinese languages led linguists in the 19th century to assume that the two groups were related, and until the 1940s this was the widely accepted view. Since then, however, most authorities have come to believe that there is no such genetic link and that any similarities are due to borrowings. The wider affiliation of Tai languages has been the subject of considerable scholarly debate. In 1942, Paul Benedict first linked Tai languages to a small group of languages spoken on the island of Hainan and in southwestern China, for which he coined the term 'Kadai'. Whereas the Tai-Kadai link is, today, accepted by many – but not all – linguists, Benedict's attempt to relate Tai-Kadai languages to the polysyllabic, nontonal, Austronesian (or Malayo-Polynesian) languages of the South Pacific, under the term 'Austro-Tai,' has proved more controversial.

History

Researchers on comparative Tai dialects estimate that the parent language, Proto-Tai, dates back approximately 2000 years. Speakers of this language were once thought to have originated in China and migrated southward, but today the border area between Vietnam and China's Guangxi province is regarded as a more likely origin. From the 8th century A.D., Tai speakers began to migrate westward and southwestward, gradually driving a wedge between the Mon-Khmer speaking peoples then dwelling in what is now Thailand. Around the 11th century, all Tai languages were affected by the Great Tone Split. Essentially, this had the effect of creating additional tones while reducing the number of initial consonant sounds. The effects of this can be seen in a number of Tai writing systems; in Thai, for example, it accounts for the fact that a single tone mark can represent two distinct tones.

Typological Characteristics

The Tai languages are noninflected tonal languages with a basic monosyllabic lexicon. Among the different branches, a single lexical item will often show differences in the initial consonant, vowel, or tone; thus, the word for 'six' is *hok* in several southwestern Tai languages, but is *sok*, *rok*, *lok*, or *huk* in the central and northern branches, depending on the language. Even closely related languages within the same branch are frequently mutually unintelligible because of differences in phonology and certain basic vocabulary items.

The word order in most Tai languages is subject-verb-object, with adjectives following nouns. In Khamti, however, the order is subject-object-verb, probably due to the influence of neighboring languages from other families. Geographical location has also influenced the source of loan words; Tai languages spoken in Vietnam and China have borrowed from Chinese, and members from the southwestern branch have drawn lexical items from Sanskrit and Pali.

The writing systems have been similarly influenced; some central and northern Tai languages are written in Chinese characters, whereas southwestern Tai languages are written in alphabetic scripts that can ultimately be traced back to a south Indian origin. Many Tai languages, however, have no writing system and, with small numbers of speakers and little cultural prestige attached to them, they are in serious danger of becoming extinct.

See also: Burma: Language Situation; China: Language Situation; India: Language Situation; Lao; Laos: Language Situation; Southeast Asia as a Linguistic Area; Thailand: Language Situation; Vietnam: Language Situation.

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Taiwan: Language Situation

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Events of the past century have dramatically changed the language situation in the Chinese province Taiwan, a truly multilingual country of multilingual speakers. Having begun the 20th century as a territory of Japan, Taiwan came under Chinese suzerainty by mid-century, and it continues to be the seat of government for the offshore Republic of China 中華民國 (ROC), which is now renewing commitments in support of minority languages. History attests that four language families have enjoyed their moments of dominance in this island territory, and these same four families are represented today. Some writers use the word 'Taiwanese' to refer to one of the languages of Taiwan; however, this usage is uninformed at best and chauvinistic at worst.

Austronesian languages have been spoken throughout the big island, Formosa, and on various smaller islands since prehistoric times. Approximately two percent of the current Taiwanese population speaks these autochthonous languages, especially in villages of the central and eastern mountains of Formosa; some are robust languages of daily colloquial use, while others are merely ritual languages. By subgroup, Atayalic languages are spoken in highland villages of Ilan and surrounding counties, Tsouic languages are spoken in villages stretching from the hills above Taitung and along the Pingtung-Kaohsiung border northward to southern Nantou county, and Paiwanic languages, which are the most widespread, are spoken throughout the south, in the central highlands, and along the east coast south of Hualien. The ROC officially recognizes 11 autochthonous Austronesian ethnic groups, and their official roman-script names are used here, although many alternate names (in roman, Chinese, and Japanese scripts) have been used. Of these 11, Thao and Kavalan (both Paiwanic) are being maintained in ritual contexts but are no longer colloquial languages of daily usage. The other officially recognized autochthonous languages are Atayal (Atayalic); Paiwan, Amis, Bunun, Pyuma, Saisiyat (Paiwanic); Tsou, Rukai (Tsouic); and Yami (Bashiic). Only Yami, which is spoken by the Tao people primarily on Orchid Island, is not a Formosan language proper; it is more closely related to the languages of the northern Philippines. Taroko (also called Truku or Sediq) is often said to be a separate Atayalic language, but sometimes it is described as a dialect of Atayal; the official recognition of Taroko is somewhat ambiguous. Fieldworkers in Taiwan have identified other Austronesian languages and dialects (e.g., Pazeh), but all are described as moribund or nearly extinct. The ROC has recently implemented affirmative-action policies for students who speak Austronesian mother tongues.

See also: Burma: Language Situation; China: Language Situation; India: Language Situation; Lao; Laos: Language Situation; Southeast Asia as a Linguistic Area; Thailand: Language Situation; Vietnam: Language Situation.

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The ROC interprets archaeological evidence as suggestive of ancient Sinitic language use on Formosa; however, historical records indicate that today's Min Nan Chinese 閩南語 (autonymically, Bân-lâm-gú) and Hakka Chinese 客家語 speakers are descended from 17th-century immigrants from the Chinese mainland. Min Nan speakers have been in the Pescadores (Penghu) Islands 澎湖群島 at least as long. Min Nan Chinese (locally known as Holo or Hoklo but also known as Amoy, Hokkien, or Fujianese language) is the mother tongue of two-thirds of Taiwan's population, and many Taiwanese speak it as a second language. Beyond Taiwan Province, Min Nan is the indigenous and dominant language in the Kinmen (Quemoy) 金門列島, Wuchiu 烏坵嶼 and Matsu 馬祖列島 island groups, which, though politically part of the mainland Fujian province, are also administered by the ROC. An important lingua franca, Min Nan is the second most common language in terrestrial television broadcasts, and the Amoy Bible is popular among certain Christians. On the other hand, Hakka Chinese is strictly an emblematic language of the Hakka ethnic group that is used in their villages on Formosa. Many ethnic Hakka (by some estimates, about half) have lost the ability to speak Hakka, especially in urban areas, but a Hakka language revival is currently underway, and Hakka-language radio programs enjoy increasing popularity. In contrast, Mandarin Chinese (locally Guoyu or Kuoyü 國語 but also known as Huayu 華語 or Putonghua 普通话), which is historically the third Sinitic language of Taiwan, became a language of significant immigration in 1949, when the ROC made Taipei its government seat. Before that time, very few families in Taiwan spoke Mandarin at home, even though Mandarin was, as it is now, the official language of the ROC government and the language of school instruction. However, in the years since the ROC's removal to Taiwan, aggressive language standardization, effective education, and centrally controlled mass media have resulted in more than 95% of Taiwanese becoming fluent speakers of Mandarin, as either a first or second language. Mandarin is the overwhelmingly dominant language of television, and, with the exception of small children and some older people, it is understood throughout Taiwan. The ROC continues the traditional writing of Mandarin, in contrast with the use of simplified characters in the People's Republic of China 中华人民共和国 (PRC). Taiwan publishers also continue the use of the Zhuyin Fuhao 注音符號, also known as bopomofo ㄅㄆㄇㄈ, the Chinese system of phonetic writing developed in the early 20th century. Primarily used for teaching proper pronunciation to Mandarin-speaking children, the Zhuyin characters have also been used to write Austronesian languages, most notably in church hymnals and popular guide books.

A third language family is represented by Japanese, the official language of Taiwan from 1895 until 1945. Taipei University was one of the original imperial universities of Japan, and educated Taiwanese became fluent Japanese speakers. This enculturation was so effective that Japan permitted many Taiwanese to retain their Japanese citizenship after the war. Thousands of older Taiwanese are still capable of speaking Japanese. Business and cultural ties with Japan remain strong. Japanese is a popular foreign language of study among young people, and both young and old enjoy Japanese language television and films.

Indo-European languages and roman script orthographies have been in Taiwan since the Portuguese named the big island Ihla Formosa. A Spanish outpost was also established in the north. The Dutch colonized western Formosa in the 17th century, establishing schools and devising Sinckan writing, a roman script, for writing some of the Austronesian languages spoken near Tainan. However, the Dutch colony eventually failed, and no European colonial language ever became permanently established. In the 19th century, English-speaking missionaries introduced the popular Peh-oe-ji roman script, in which Taiwan's first newspaper was published, in Min Nan Chinese, from 1885 to 1970. Min-Nan-language Bibles written in Peh-oe-ji are currently available. English has become the territory's most popular foreign language, and strong political and commercial ties with the United States reinforce the current use of English.

A typical Taiwanese, depending on her or his age, ethnicity, education, and social network, speaks a selection of the above-mentioned languages. Other languages spoken in Taiwan tend to be associated with resident aliens. One exception is Arabic, which arrived with the large group of Islamic Chinese who arrived in 1949. The deaf of Taiwan use an indigenous sign language that is distinct from the well known American, Chinese, and Japanese standards.

See also: Austronesian Languages: Overview; China: Language Situation; Chinese.

Language Maps (Appendix 1): Map 124.

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Tajik Persian

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Tajik Persian (self-designation (*zabon-i*) *forsi-i tojikī*; also called Tajik, Tajiki, Tojikī, and Tadzhik) is the variety of Persian used in Central Asia (*see* **Persian, Modern; Persian, Old**). Since the 1920s, Tajik has been fostered as the national literary language of the Tajik Soviet Socialist Republic (since 1991, the Republic of Tajikistan). It is also spoken in parts of Uzbekistan (notably the cities of Bukhara and Samarkand) and is the vernacular of the Bukharan Jews. It is the common written language and contact vernacular in the mountain region of Badakhshan, where people speak a variety of very different Iranian languages (*see* **Iranian Languages**). The so-called Tajiks of southwestern Xinjiang in China speak Sarikoli and Wakhi, not Persian. Tajik has been written in a modified Cyrillic script since 1940. Speakers number at least 5 million.

History

Persian spread to Central Asia from its home on the Iranian plateau during the 8th century C.E., as the language of Iranian converts attached to the invading Arab Muslim armies. At the autonomous Samanid court of Bukhara (9th–10th centuries), Persian was patronized as the literary language and displaced the indigenous Iranian language, Sogdian (a descendent of which, Yaghnobi, survives in the mountains of western Tajikistan). As a written language, Persian of Central Asia was hardly distinguishable from Classical Persian of Iran, Afghanistan, and India up until the early 20th century. However, invasions and settlement by Turkic peoples (most recently, the Uzbeks) in the Oxus basin and its foothills interrupted the dialect continuum; spoken Persian of Central Asia evolved independently of Persian of Iran, and northern dialects in particular were strongly influenced by Turkish speech. Persian speakers of the region came to be called Tajiks (from a Middle Persian word meaning 'Arab'), in contradistinction to Turks.

After the Russian revolution, in accordance with Soviet nationalities policy, an ethnic Tajik republic was established and a literary language called 'Tajik' was engineered on a vernacular base close to the Uzbekized spoken Persian of Bukhara and Samarkand (these Tajik cultural centers, ironically, were incorporated in the Uzbek Soviet Socialist Republic). During the period ~1948–1988, Tajik lost much of its prestige, vocabulary, and domain of use, to Russian. With *perestroika* and *glasnost'* came a revival and re-Persianization of the national language, which continues (at a slower rate) in post-Soviet Tajikistan; policies include the replacement of Russian vocabulary by Persian (both native coinages and loans from Persian of Iran), and teaching of the Perso–Arabic writing system in schools.

Tajik is fundamentally Persian in grammar and core vocabulary, though generally closer to the spoken Persian of Afghanistan (e.g., Kaboli dialect) than to Standard Persian of Iran. The following descriptions highlight features that differ substantially from Standard Persian, in particular the elements of convergence with Turkic types characteristic of the bulk of Tajik literature in the Soviet period.

Phonology and Orthography

The Tajik sound system is shared almost entirely with that of Uzbek. Its Cyrillic orthography is basically Russian specific, and is illustrated here only when it involves modified or ambiguous characters.

The consonant inventory differs from that of Persian only in two features: [q] <ҚҚ> and [ɣ] <ғ> are distinct phonemes (they have collapsed in the Persian of Iran), and labiodental [v] tends toward bilabial [*β*] or [w] in the environment of rounded vowels. The affricates [tʃ] <ч> and [dʒ] <ҷ> will

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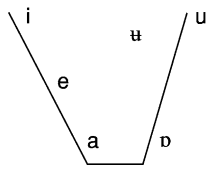

Figure 1 Tajik vowels.

be transliterated as *č* and *j*, [j] <й> will be transliterated as *y*, and <ҳ> [h] will be transliterated as *h*.

The six-vowel system has diverged considerably from Standard Persian (see **Figure 1**). Length has been neutralized in most dialects (including literary Tajik) and replaced by a contrast between 'stable' [e, ы, ɒ] and 'unstable' vowels [i, u, a]. In Cyrillic, [ū] is written ӯ (transliterated *ū*); *i*, written as и, has a variant ӣ (transliterated *ī*). These accents do not represent length: *ū* shows a different quality from *u*, and *ī* is used for *i* in word-final position to distinguish a (stressed) morphological syllable from the (unstressed) enclitic of *izofat* (see later, Morphology and Noun Phrase Syntax). The vowel [e] represents early New Persian [eː]; [ы], sounding between [u] and [y], represents early New Persian [oː] and is shared with Uzbek, in which it corresponds to Turkic [y] or [ø]. The vowel [ɒ] <о> is a rounded form of Standard Persian [ɑ]. The three 'unstable' vowels correspond to the 'short' vowels of Persian, but [i] and [u] additionally represent the corresponding 'long' vowels.

Examples of modern correspondences in Tajik and Persian, respectively, are *kitob*, *ketâb* 'book'; *imrūz*, *emruz* 'today'; *Bedil*, *Bidel* 'name of a poet'; *na-budem*, *nabudim* 'we were not'; and *šuda*, *šode* 'having become' (the final [a] is not raised in Tajik). The yotated letters ё, ю, and я represent the syllables *yo*, *yu*, and *ya*; Cyrillic е stands for *e* after a consonant, *ye* initially or after a vowel.

Morphology and Noun Phrase Syntax

There is no grammatical gender in Tajik and only a limited distinction between humans and nonhumans in the plural suffixes *-ho* (any noun) and *-on* (humans and higher animals), and in third-person singular personal pronouns, as follows: *vay* (general), *ū* (literary), *in* (dialect) 'he, she'; *on* (literary), *in*, [*h*]*amin* (colloquial), *vay* (dialect) 'it'; *onho* (general), *in*[*h*]*o* (colloquial), *vay*[*h*]*o* (dialect) 'they' (all classes). The deferential pronoun *ešon* (cf. Persian *išân*) 'he, she' (lit. 'they') has been replaced in Tajik by *in kas* 'this person.' Plural pronouns, which may refer deprecatingly or deferentially to a singular (SG) person, can add plural (PL) suffixes as 'explicit plurals': *mo*/*mo-yon*, *mo-ho*, *mo-hon* 'we, I/we'; *šumo*/*šumo-yon*, *šumo-ho* 'you' (SG)/'you' (PL; see later, discussion of verb endings).

The basic noun phrases (NPs) are the nominal *izofat* (IZ; Persian *ezâfe*), e.g., *qišloq-i Alijon* 'Alijon's village' (village-of Alijon), and adjectival *izofat*, e.g., *qišloq-i kalon* 'the big village' (village-big); in both types, the head is linked to a following modifier by the enclitic *-i*. There are no articles; an indefinite NP may be marked by the numeral *yak* 'one' and/or the 'specific' (SPEC) enclitic *-e*; a definite NP (supplying old information) is distinguished only in the object (OBJ) position, by the enclitic *-ro*. A direct object that is familiar to the speaker, but not to the listener, is marked by both enclitics, as shown in the following examples:

pisar-ro did-am
boy-OBJ see.PAST–1SG
'I saw the boy.'

yak pisar(-e) did-em
one boy(-SPEC) see.past–1PL
'We saw a boy/some boy or other.'

pisar-e-ro did-em
boy-SPEC-OBJ see.PAST–1PL
'We saw a (certain) boy.'

Other case relations are expressed through prepositions (including *bar* 'upon' and *be* 'without,' no longer active in Persian), postpositions, and circumpositions (inflectional suffix *izofat*):

qayčī kati noxun girift-am
scissors with nail take.PAST–1SG
'I cut my nails with scissors.'

az ibtido-i paxta-činī in-taraf
from start-IZ cotton-picking this-side
'Since the start of cotton-picking.'

A superlative as modifier may precede the head noun (as in Persian), or may follow it:

šahr-i kalon-tarin-i tojikiston
city-IZ larg-est-IZ Tajikistan
'The largest city of/in T.'

Nouns take the singular after a number. A classifier may intervene, most commonly the enclitic *-ta* or *-to* 'fold, item,' as in *yak-ta zan* 'one woman' and *sad-to kurta* 'a hundred shirts' (or *yak-sad kurta* 'one hundred shirts').

The simplex tenses of Tajik verbs are the same as in Persian, except for the vowel of the present/imperfect prefix, and of the first-person plural and second-person plural personal endings, as in *me-kun-em* 'we do' and *kard-ed* 'you did.' The second-person plural form may also add an 'explicit plural' supplement (cf. preceding discussion of pronouns) derived from the pronominal

enclitic *-ton*, as in *šin-eton*, *rafiq-on* 'sit down, friends' (*ŝined + ton*). In compound tenses and moods, Tajik verbal morphology has expanded beyond that of Persian. Three progressive tenses are formed on the past participle of a desemanticized *istodan* 'to stand' (in the following examples, verb glosses in bold type indicate an apparent 'past participle' (PP) not forming part of a tense, which is used extensively as a nonfinite verb form (gerund) in verbal conjuncts):

bača-ho ovoz xonda istoda-and
child-PL song **sing** stand.PP-be.3PL
'The children are singing' (present progressive).

An epistemic mode of the indicative (called 'nonwitnessed,' or 'evidential') also has three tenses. Thus, the regular perfect may function as an evidential present:

vay sayohat-ba rafta-ast
he journey-on go.PP-be.3SG
'He went/has gone on a trip (– so I surmise/am told).'

Note here the Persian preposition as a Turkish-style postposition. This mode also includes progressive tenses:

šumo yak asar-i nav navišta istoda-buda-ed
you one work-IZ new **write** stand.PP-be.PP–2PL
'You've been writing a new work (– so I gather/see).'

Here the form expresses a mirative, i.e., the appreciation of a fact not previously known.

The conjectural mood uses an augmented (AUG) form of the past participle in *-agī* to form tenses expressing a probable situation or event (IMPERF, imperfect):

yagon kor-i ganda karda-gi-st
some deed-IZ bad do.PP-AUG-be.3SG
'He must have done something bad' (past).

dast-u rū me-šusta-gi-st-ed
hand-and face IMPERF-wash-AUG-be–2PL
'(I imagine) you'll want to freshen up' (present/future).

The future participle (infinitive + adjectival formative *-ī*) is used in a quasifuture tense, and adjectivally, much more than in Persian:

xohar-am ba maktab omad-an-ī bud
sister-my to school come-INF-ADJ be.PAST
'My sister was eager to go to school.'

From an intransitive verb, the sense is active, and with a human subject, usually connotes intention. From a transitive verb, the sense may be passive (NEG, negation):

jo-ho-i no-guft-an-ī
place-PL-IZ NEG-say-INF-ADJ
'Unmentionable places; locations not to be divulged.'

The augmented past participle (also of progressive tenses) is extensively used in ways (and positions, i.e., preceding the head) similar to use in Uzbek participles, to express what, in Persian, would often be a relative clause:

gurexta-istoda-gi-ho
flee-stand.PP-AUG-PL
'Those who are/were fleeing; the fugitives.'

ana kitob-i ovarda-gi-am
here book-IZ bring.PP-AUG-my
'Here is the book that I brought.'

duxtar kurta-i me-dūxta-gi-aš-ro
girl shirt-IZ IMPERF-sew.PP-AUG-her-OBJ
ba modar-aš nišon dod
tomother-her sign give.PAST
'The girl showed the shirt that she was/had been sewing to her mother.'

The Lexicon

Nominal and adjectival compounds are formed with suffixes and prefixes, some of them different from (or more productive than) their Persian counterparts. Thus *-nok* denotes something having the quality of the base noun, as in *foida-nok* 'beneficial, profitable' (*foida* 'use, profit') and *sado-nok* 'vowel' (*sado* 'sound, voice'); *ser-* 'sated, full' indicates an abundance of the base noun, as in *ser-gap* 'garrulous' (*gap* 'talk'), and *to-* 'up to, until' produces, e.g., *to-inqilob-ī* 'prerevolutionary' (*inqilob* 'revolution,' *-ī* is the relative adjective formative); this use of the preposition *to* (unknown with Persian *tâ*) is probably calqued on similar use of Russian *do* 'up to, until.' Other Russian calques use Tajik *sar* 'head' by analogy with the Russian prefix *glav-*, as in *sar-muhandis* 'chief engineer' (Russian *glav-inžener*). Most derivatives from Russian loans freely use Tajik Persian formatives, as in *bolševik-ī* 'Bolshevik' (adjective).

Transitivizing denominal verbs and causatives (CAUS) (obtained by infixing *-on-*) are more productive than in Persian, as in, *kollektiv-on-idan* 'to collectivize.' They may also be formed from complex and composite verbs:

papiros dar me-gir-on-ad
cigarette in IMPERF-take-CAUS–3SG
'She lights a cigarette.'

(Compare *dar me-gir-ad* 'it catches fire.') In some complex verbs, the preverbs *dar* and *bar* are attached to the verb stem: *me-dar-o-y-ad* 'he comes in' (cf. Persian *dar mi-â-y-ad*).

Characteristic of Tajik are conjunct verbs (serial verbs), of which the progressive tenses are grammaticalized instances. There are some 18 lexically

established conjunct auxiliaries (corresponding to models in Uzbek) that, in regularly conjugated tenses, furnish adverbial 'modes of action' for the nonfinite participle (semantically, the main verb):

dars-i nav-ro navišta girift-em
lesson-IZ new-OBJ **write** take.PAST–1PL
'We copied down the new lesson' ('take': self-benefactive).

nom-i xud-ro navišta me-dih-am
name-IZ own-OBJ **write** IMPERF-give.PRES–1SG
'I'll jot down my name (for you)' ('give': other-benefactive).

berun-ho-ya toza karda rūfta parto!
outside-PL-OBJ clean **make sweep** throw.IMP
'Sweep all the outside nice and clean!'

The preceding example demonstrates a double conjunct construction: the auxiliary *partoftan* 'to throw (away), toss' adds the sense of thoroughness or completion (*-ya* is a dialect variant of *-ro*, and *toza kardan* 'to clean' is a typical Persian-type composite verb).

Syntax

Verbal conjuncts, mostly of Uzbek inspiration, compete in other ways with the Persian syntax of subordinate clauses introduced by conjunctions; e.g., the favored construction for the modal verb *tavonistan* 'to be able' is as follows:

man rafta (na-)me-tavon-am
I **go** (NEG-)IMPERF-can.PRES–1SG
'I can(not) go.'

Also embedded in the literary language is the nominalization of sentential complements through infinitives, as in the following example:

mo {kujo raft-an-i xud-ro}
we {where go-INF-IZ own-OBJ}
me-don-em
IMPERF-know.PRES–1PL
'We know where we are going' (. . . our going-where).

Uzbekisms in colloquial and northern dialect usage include the question (Q) enclitic *-mi* and possessive NPs, with (dative) *-ro* replacing the *izofat* construction (OBL, oblique):

muallim-a [-ro] pisar-aš raft-mī?
teacher-OBL boy-his go.PAST-Q
'Has the teacher's son left?'

These features were not admitted into literary Tajik, and even some of the accepted Uzbekisms are fading from post-Soviet Tajik writing.

See also: Iranian Languages; Persian, Modern; Persian, Old; Russian; Sogdian; Turkic Languages; Uzbek.

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Tajikistan: Language Situation

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Languages

Tajikistan, the smallest republic of Central Asia, bordering Uzbekistan, Kyrgyzstan, Afghanistan, and China, has been an independent state since 1991 and has a population of over 5 million (1989 census: 5 092 603).

Since the 1920s, its national language has been Tajik (Tajik Persian, Tajiki, *zaboni tojik*, *tojikî*). Tajiks constitute more than 60% of the population. Tajik, a variety of Persian (Farsi), but an independent language in the political sense, belongs to the West Iranian group of the Iranian branch of Indo-European. The variety predominantly spoken in Tajikistan is the southern, only moderately Uzbekicized dialect. Almost a million Tajik speakers live in neighboring Uzbekistan; smaller Tajik groups exist in Afghanistan and China.

Turkic-speaking groups make up about one fourth of the population of Tajikistan. The Turkic language of the Uzbeks, who constitute 23.5% of the population, dominates the northern part of the republic, including the Ferghana valley, with the second largest city Khojand (formerly Leninabad). There are also smaller groups of Kirghiz, Kazakhs, Turkmens, Tatars, and Uyghurs. The number of Russians, who made up 7.6 percent of the population in 1989, has now decreased. There are numerous other linguistic minority groups.

Speakers of some Eastern Iranian languages, Yaghnabi (Yagnobi) and Pamir languages, have remained unassimilated by their Persian- or Turkic-speaking neighbors. Badakhstan, Tajikistan's mountainous eastern province, is the home of the Iranian languages of the Pamir group: Shughni (40 000), Wakhi (7000), Yazgulami (Yazgulyam) (4000), and so forth. The speakers of Yaghnabi, who are now scattered, formerly inhabited the high mountain valley of the Yaghnab River.

Language Policy

With the division of Soviet Turkestan in 1929, the Tajiks were officially divided from the Uzbeks, with whom they had much in common. In the Soviet era, they also lost contact with Persian-speakers abroad. The Arabic alphabet was abandoned in favor of a modified Roman alphabet for Tajik. A Cyrillic-based alphabet was introduced in 1940.

The language policy of the 1930s and 1940s led to a situation in which Russian came to dominate public life. The proportion of Russians in Tajikistan grew rapidly, whereas the proportion of Tajiks decreased from 80% to about 50%. The capital Dushanbe (Stalinabad), largely created by Russian immigrants, remained a predominantly non-Tajik city.

The privileged position of Russian in society was increasingly criticized. The reforms of the 1980s enabled the Tajiks to oppose the current language policy and to organize a strong language movement. A language-status law passed in 1989 declared Tajik to be the state language. After Tajikistan's declaration of independence, a new language law was passed (1992) aimed at replacing Russian as the language of government and higher education. The government even allowed some freedom for education and publication in the Pamir languages. There was a strong language movement in favor of sociolinguististic reforms and of reducing the Slavic and Turkic dominance. The plans even included, and still include, a return to the Persian-Arabic writing system in the near future. Though the language reform efforts have lost some strength since then, efforts continue to reduce borrowings of Russian and Uzbek origin in Tajik and to introduce vocabulary from Persian of Iran.

See also: Persian, Modern; Tajik Persian.

Language Maps (Appendix 1): Map 107.

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Talk Shows

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Introduction

The talk show is a highly confrontational discursive genre, a widely influential media phenomenon, as well as a politically and morally controversial form of entertainment. Few discursive practices of popular broadcast culture have been more contentious and subject to cultural and scholarly examination in recent years than the talk show, particularly the television talk show.

The very notion of talk show raises issues concerning the boundaries between talk (prototypically dialogical) and show (prototypically monological), between public and private, between collective and personal experience, between expertise and experience, between interpersonal and mass communication, between information and entertainment, between discrete and overlapping identities ('me,' 'you,' 'us,' 'them'). According to Munson (1993), the term 'talk show' combines two different, often contradictory, rhetorical paradigms by associating interpersonal conversation (belonging to the pre-modern oral tradition) with the mass-mediated spectacle (emerging in modernity). As a result, a public-colloquial language (Leech, 1966) has developed, which is modeled in varying ways upon the practices of conversational speech, through a process of 'conversationalization' of public discourse (Fairclough, 1995).

Brief Historical Survey

The talk show is a modern Anglo-Saxon institution that may be seen to echo certain pre-modern sociocultural practices of purposeful conversation. According to Burke (1993: 114–115) 16th century Italy had the academy, a discussion group for intellectuals, with fixed membership and fixed days for meetings. The 17th century saw the emergence of its French counterpart, the *salon*, a semi-formal social occasion organized by a hostess, normally once a week, for a mixture of ladies and men of letters. In England, the equivalent social institutions flourished in the 18th century in the form of the more informal coffee-house, the assembly, and the club.

The origin of talk shows was tracked down by Munson as early as the 1930s when interactive talk radio started to emerge in the United States and listeners were invited to phone in. Two particular formats developed in the 1960s, namely all-talk and all-news radio programs, which were intended as services to the listening community rather than stations in the traditional sense. Since the listeners were potential customers, controversial and sensationalized talk soon developed to attract them. 'Confrontalk' (Hutchby, 1996) became a syndicated television talk genre in the 1960s.

Phil Donahue was the first to adapt the audience participation talk show (also termed "audience discussion program" and "studio debate program") from radio to television in 1967. His show initiated what is known today as daytime talk show or tabloid talk show. This format was consolidated by Oprah Winfrey from 1984 as a sort of modern update of women's service magazines in the late 19th century in that it often tackles women's issues and targets mainly an audience of housewives. American talk shows such as *Oprah Winfrey, Ricki Lake,* and *Montel Williams* have been gradually exported to the U.K., to several European countries, and to most countries in South America. As a result of an increasing decentralization of the media, a transition from debate programs to talk shows occurred in Europe in the 1980s.

Defining Talk Shows

There are three main reasons why it is a very challenging task to define talk shows: they represent rapidly changing hybrid media phenomena, they display intertextuality through overlaps with other mediatized forms of talk, and they endlessly reconstruct themselves by violating and transgressing their own discursive conventions. The talk show displays a hybrid broadcast discourse in which patterns of communicative and social behavior can be associated with more than one discourse type, through overlaps with other mediatized forms of talk, such as interviews, debates, sitcoms, game shows, and quiz shows. To capture its distinctive features it is essential to explore the sociocultural environment and the contextual factors that generated it and that continue to shape it. The latter are principally the television show format, setting, time frame, and goal; the show host's personal profile, agenda, and general orientation; the participants' backgrounds, goals, and their relations.

In talk shows the interpersonal talk is geared to public debate using partly conversational, partly institutional discursive conventions and strategies, which involves blurring the boundaries between traditional dichotomies, such as public vs. private, collective vs. personal experience, expertise vs. experience. This is why the talk show discourse was

labeled quasi-conversational by Gregori-Signes (2000b), and semi-institutional by Ilie (1999, 2001). Talk shows display a certain gradation of discursive features in terms of institutionalization, with conversational features at the informal end of the speech continuum, and institutional features at the formal end. Depending on the personality of the show host, the nature of the topic, the general background and views of the participants, as well as the type of audience, talk show participants combine spontaneous and purposeful talk, non-institutional and institutional roles, non-controlled and host-controlled talk, interlocutor-oriented, message-oriented, and multiple audience-oriented talk (Ilie, 2001).

Characteristic Features of Talk Shows

Characteristically, talk shows bring together, through the mediation of a host, a guest panel (experts and lay participants), a studio audience and occasionally an audience of 'callers.' The following are some of the key features of talk shows:

1. As audience-oriented mediatized events, talk shows target simultaneously a multiple audience made up of the directly addressed audience of interlocutors, the on-looking studio audience, and the overhearing audience of TV-viewers.
2. Both experts and lay people are often present as show guests. Much of the program's focus has to do with the interchange between them.
3. The show host, usually a media personality, is monitoring most of the discussion by stimulating, guiding, and facilitating the participants' roles and contributions to the program (for information exchange, confrontation, and entertainment).
4. Each episode of the program focuses on a particular topic of social, political, or personal concern. Confrontation and conflicting opinions are usually guaranteed by the selection of topics and of participants.
5. Personal experience and common sense have considerable status and increasingly appear as forms of knowledge that are opposed to expertise and to dominant discourses (of power, race, gender, etc.).
6. The discursive strategies of talk shows are: interview, narrative, debate, game, confession, testimony.
7. These programs are usually inexpensive to produce, particularly because they are not part of prime-time broadcasting.
8. Most programs are either broadcast live or recorded in real time with little editing.

A systematic account has been given by Ilie (2001) of the correlation between the discursive and linguistic features that single out talk shows as a broadcaster-controlled, host-monitored, participant-shaped, and audience-evaluated speech event. The institutional prerequisites of the talk show underpin its situational and discursive constraints. The situational constraints concern talk-related restrictions, such as time restrictions and agenda restrictions, speaker-selection restrictions and turn-taking restrictions. The discursive constraints are reflected in talk-framing patterns, such as the predetermined topic schedule, conventionalized beginnings and closings, as well as recurrent breaks. The semi-institutional aspect of talk shows is manifested in less predictable topic and subtopic shifts, interruptions, unprompted participant interventions, audience-oriented repetitions and audience-oriented questions.

The hybrid nature of the talk show can profitably be examined by adopting a comparative perspective since they exhibit both conversational features (belonging to non-institutional discourse, such as regular conversation) and institutional features (belonging to institutional discourse, such as news interviews and public debates), as indicated in Table 1. The recurrence and distribution of the two sets of features vary according to the particular framing of each talk show, including the personalities and life-roles of the show guests, the charisma and authority of the show host, and the expectations raised by the particular character of the show in question.

In strictly linguistic terms, talk shows exhibit specific features with regard to the discursive organization of talk, the sequence of adjacency pairs and turns, and the participants' question-asking and question-answering roles. These features pertain partly to conversational, i.e., non-institutional discourse, and partly to institutional discourse, as shown in Table 2; the semi-institutional nature of this double dependency is what characterizes talk show interaction.

Typology of Talk Shows

Five major criteria have been used in varying ways by talk show scholars to identify and distinguish between various talk show formats: (i) discussion topics (from contemporary political issues to social or moral problems); (ii) categories of participants, particularly in terms of social and popularity status (celebrities or ordinary members of the public); (iii) broadcasting time (early morning, daytime, or late night); (iv) organizational and interactional frameworks (staging conventions and seating configurations for show guests and audience); and (v) ethical considerations (the producers' and hosts' moral concerns).

Table 1 Discursive Features of Talk Shows as Semi-institutional Discourse

Conversational features	*Institutional features*
Private setting (pre-filmed scenes in show guests' homes)	Public/institutional setting (TV studio)
Relatively homogeneous form of talk	Non-homogeneous form of talk
Spontaneous talk (less topic-centered)	Purposeful talk (more topic-centered and goal-oriented)
Lower topic control and predictability	Higher topic control and predictability
Communicative and interactional goals	Communicative, interactional, and institutional goals
No particular talk-related restrictions (flexible turn-taking, topic and subtopic shifts)	Particular talk-related restrictions (time-limitation, speaker-selection, and turn-taking design)
Non-institutional/real-life roles (parent, child, etc.)	Institutional roles (panelist, expert, etc.) and non-institutional roles (parent, child, etc.)
Spontaneous role-switching (initiated by the show guests)	Monitored role-switching (controlled by the show host)
Equal participant status	Unequal participant status
Equal speaking rights	Unequal speaking rights
Interlocutor as both addressee and addressor	Multiple audience as addressee (onlooking audience and overhearing audience)
Interlocutor-oriented talk	Message- and multiple audience-oriented talk
Non-hierarchical role-distribution	Hierarchical role-distribution
Symmetrical power relations	Asymmetrical power relations
Relatively weak talk/topic control	Strong talk/topic control

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Table 2 Linguistic Features of Talk Shows as Semi-institutional Discourse

Conversational features	*Institutional features*
No particular talk-framing patterns	Particular talk-framing patterns
No particular role-related openings and closings	Role-related openings and closings performed by the show host
Informal introductions of and by the participants	Formal and semi-informal introductions of the participants by the show host
Non-monitored speaker-selection and turn-taking (unplanned interventions)	Monitored speaker-selection and turn-assignment
No explicit metalinguistic patterns for various stages of the interaction (negotiated turn-taking slots, next speaker selection, and topic agenda)	Explicit metalinguistic patterns for various stages of the talk show (monitored turn management, next speaker selection, commercial break announcements)
No deliberate use of performative utterances for institutional goals	Deliberate use of performative utterances for institutional goals
Fairly symmetrical question-asking roles	Asymmetrical question-asking roles
Conversationally framed questions (primarily interlocutor-oriented)	Institutionally framed questions (primarily audience-oriented)
Argumentatively used non-answer eliciting questions (e.g., rhetorical questions)	Evaluatively used non-answer eliciting questions (e.g., rhetorical questions); audience-oriented questions (e.g., expository questions)
Interlocutor-oriented repetitions (self-repetitions, allo-repetitions)	Audience-oriented repetitions (addressee-shifting repetitions, message retargeting repetitions)

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According to the first criterion, Krause and Goering (1995) distinguish three categories of talk shows in the United States: the news/political analysis talk show (*Meet the Press*), the entertainment talk show (*The Tonight Show*). and the social issue talk show (*Sally Jesse Raphael*, *Oprah*). By applying the first two criteria, Carbaugh (1988) distinguishes between personality-type and issue-type

talk shows. Other authors, like Charaudeau and Ghiglione (1997), resort mostly to the first criterion to distinguish between monothematic and polythematic talk shows. The third criterion is widely used by scholars to distinguish between early morning talk shows (*Ricki Lake*), daytime talk shows (*Oprah Winfrey, Geraldo Rivera*), and late night talk shows (*David Letterman*). By applying the first three criteria, Haarman (1999: ix) distinguishes three broad categories of talk shows: the evening celebrity format (*Jay Leno's Tonight*), the issue-oriented format (*Oprah*), and the audience discussion format (*Kilroy*). In respect of the fifth criterion, namely ethical considerations, talk shows fall into two subtypes according to Richardson and Meinhof (1999: 125): exploitative, like *Jerry Springer*, which sacrifice human dignity to media entertainment requirements, and non-exploitative, like *Kilroy*.

Taking into account the changing talk show formats over the last fifteen years, Soulages (2002: 319–320) uses a combination of the first, second, and fourth criteria to distinguish three categories: 'first generation' talk shows (of the 1980s, discussing public issues), reality shows (of the early 1990s, probing into the private sphere), and 'second generation' talk shows (of the late 1990s, confession and confrontation-based).

It is important to note that, although the fundamental characteristics of talk shows are easily recognizable across cultures, it seems possible to identify cultural nuances that distinguish talk shows according to their country of origin. The situational contexts of the British, American, Italian, and French talk shows, for example, differ widely. The parodically conceived British *The Dame Edna Experience* (Tolson, 1991), the American *Tonight Show,* and the Italian *Maurizio Costanzo Show* (Mininni, 1990; Mininni and Annese, 1999) represent quite different realizations of the same, or similar, basic formulas. Intracultural differences are equally important to examine as intercultural ones. The interaction in French cultural talk-shows, such as *Apostrophes*, *Bouillon de culture,* and *Bibliothèque Médicis* follows the tradition of the French *conversation de salon* (Charaudeau, 1991; Charaudeau and Ghiglione, 1999), whereas a typically French hybrid talk show such as *Ciel mon mardi* is a mixture of serious *débat* (political discussions), *reality-show* (accounts of true life experience), and *variétés* (musical performances and jokes) (Mazdon, 1999). To some extent these stylistic differences can be accounted for by deliberate choices operated by the respective broadcasting producers. However, deliberate or not, such choices also concern audience preference and expectations, and thus constitute a revealing perspective on the culture itself.

Methodological Approaches to the Study of Talk Show Discourse

Talk shows have been examined from a variety of perspectives, including cross-disciplinary and cross-cultural approaches. They have recently become the focus of attention in media and cultural studies, as well as feminist studies. A growing number of discourse and conversation analysts are using social interactional perspectives in their studies of talk show interaction.

Scholars such as Mininni (1990), Mininni and Annese (1999), Montgomery (1991), Calsamiglia *et al.*, (1995), Hutchby (1996, 1997), Thornborrow (1997, 2001), Ilie (1998, 1999, 2001), Gregori-Signes (2000a, 2000b), Simon-Vandenbergen (2000), Myers (2001), Honda (2002), and Rama-Martínez (2003) make use of (empirical and/or theoretical) discourse and/or conversation analytical approaches to describe the mediated participant interaction in the co-construction of stories and identity roles, turn-taking strategies, closings, interruptions, personal deixis, non-verbal communication, argumentative functions of question-response sequences, management of disagreement and conflict, and male–female discursive behavior. Tolson (1991, 2001) uses Halliday's (1978) sociolinguistic theory to examine the relationship between talk as performance and the production of identities in broadcasting.

Scholars from the fields of media and cultural studies, as well as feminist studies, such as Carbaugh (1988), Masciarotte (1991), Munson (1993), Abt and Seesholtz (1994), Livingstone and Lunt (1994), Peck (1994, 1996), Krause and Goering (1995), Shattuc (1997, 1999), Mazdon (1999), and Mittell (2003) have often concentrated on the analysis and/or critique of the talk show as a media genre, as a political phenomenon, and on its impact on ordinary viewers. Carbaugh (1988) and Munson (1993) use performance theories as their underlying theoretical framework.

A number of media scholars, such as Priest (1995) and Shattuc (1997) on the one hand, and White (1992, 2002) and Peck (1996) on the other, are particularly concerned with two complementary strategies of the talk show, namely confessional framing and therapeutic framing respectively. Peck's (1994) approach focuses on racism as an important issue in the discourse of many talk shows. Keyes (1999) provides an ethnographic perspective on the theatrically staged role of the studio audience on *Shirley*, a Canadian talk show.

Psychologists, such as Nabi and Hendriks (2003), have concentrated particularly on audience response and reception of talk show messages. Guzman (1996) makes a qualitative analysis of the role of the studio audience in daytime talk shows by applying a theoretical model derived from Berger and Luckmann's (1966) social construction of reality.

See also: Context, Communicative; Gesture: Sociocultural Analysis; Interactional Sociolinguistics; Interjections; Planning Strategies and Production of Spoken Discourse; Register: Overview; Understanding Spoken Discourse.

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Tamambo

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Introduction

Tamabo [*tama^{m}bo*] (Malo) is the predominant dialect of the language of the island of Malo (previously known as St. Bartholomew) in northern Vanuatu, in the southwest Pacific (**Figure 1**). It is spoken by at least 3000 people including those living on Malo, and those who have settled on the nearby 'big' island of Espiritu Santo and in Port Vila. It is learned as a first language by most children on the island, although Bislama (Vanuatu pidgin) is strengthening in almost all social contexts. Tamabo was originally the dialect of the western side of Malo; the dialect of the east [*tamapo*] is now used by no more than a handful of older speakers, although some words from that dialect are heard in several old dance songs. There is no written literature in the language, except for some copies of Presbyterian mission publications dating from the 1890s. Nevertheless, a strong oral tradition of storytelling has been maintained, and activities reflecting *Kastom* (traditional custom) such as dances, and 'fighting sticks' contests [*ma^{n}ja*] are enjoying renewed interest and participation.

Grammatical Overview

The language is Oceanic (Austronesian); it belongs to the Northern Vanuatu linkage, and appears similar to languages of nearby Tangoa, Araki, and south Santo. Tamabo can be regarded as conservative in that it shares many of the same structural characteristics widely distributed among Oceanic languages, and many of which are posited for Proto-Oceanic (POc).

Tamabo is a nominative-accusative language, and the unmarked word order of the clause is Agent-Verb-Object or Subject-Verb. Sentence types other than the declarative are based on the unmarked declarative form. Basic clauses are most commonly verbal clauses that indicate a non-future/future contrast. There are also verbless clauses where the predicate is a noun phrase, a numeral, or a prepositional phrase. Basic noun phrase structure is similar to that outlined for POc (Lynch *et al.*, 2002: 75) with the noun as head, preceded by an article (retained only in some syntactic environments in Tamabo), and an optional premodifier such as a quantifier, and followed by an optional modifier or demonstrative. It is an agglutinating language with considerable derivational morphology and valency-changing affixes.

Lexically, many words in the language are reflexes of words posited for POc. Other characteristics common to many Oceanic languages are reflected in

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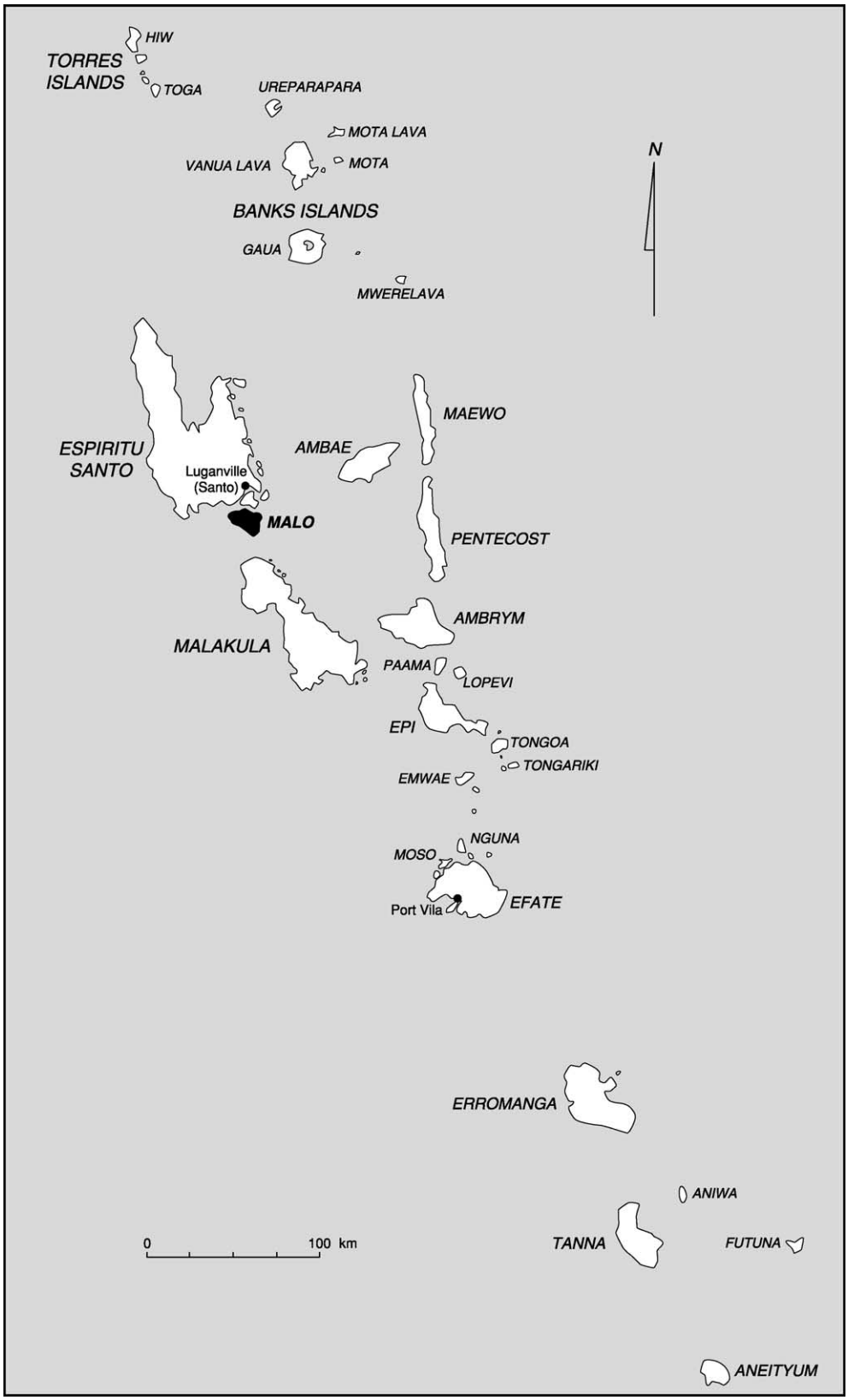

Figure 1 Malo Island within Vanuatu.

Tamabo: they include a subject proclitic on the verb root, marking of inclusive and exclusive distinctions in pronouns, spatial concepts 'seaward' vs. 'inland,' 'up direction' vs. 'down direction' (depending on location on island) indicated by particular verbs and/or location nouns, possessive constructions with noun phrases reflecting the semantics of alienable and inalienable possession, and 'tail-head' linkage of clauses in procedural narrative.

Phonology

Tamabo reflects many of the consonants of the reconstructed POc paradigm (Lynch *et al.*, 2002: 63) with little or no phonetic change. Voiced stops are prenasalized.

Bilabial		Dental-alveolar		Pre-palatal	Velar	
b	b^w	t	d	ɟ	k	
m	m^w		n			ŋ
β	$β^w$		s		x	
			r			
			l			

Like POc, there is a five-vowel system, sequences of unlike vowels are permitted, and syllable structure is primarily (C)V.

Orthography

The four prenasalized stops are written as b, bw, d, j. Fricative /β/ is written as v, the additionally labialized fricative as w; /x/ is represented by h, /m^w/ by mw and /ŋ/ as ng.

Examples of Particular Grammatical Characteristics

Productive Derivations from Affixation, Reduplication, and Compounding

Affixes to nouns

-ha *noun-like quality*	dodo → dodo-ha	'night' → 'be cloudy/dark'
-a *nominalization*	luhu → luhu-a	'hide'→ 'refuge'
vo- *female*	natuku → vo-natuku	'my child/son' → 'my daughter'
ta- *person belonging to*	ta-Alotu 'Santo person'	
vu- *tree*	vu-talaua 'sago palm tree'	
lo- *plural (trees only)*	lo-vu-talaua 'sago palm trees'	
ra- *female plural/leaf*	ra-vavine 'women'; ra-talaua 'sago palm leaf'	

Reduplication of nouns and verbs

hinau → hina-hinau	'thing' → things
mata → mata-mata	'eye' → 'signs'
bange → bange-bange	'stomach' → 'pregnant'
mana → mana-mana	'laugh' → 'friendly'
sahe → sahe-sahe	'go up' → 'keep going up'
tau → tau-tau	'put s.t in place' → 'put many things in place'

Compounding (noun + noun; noun + verb; verb + verb)

mara-rohai 'man-leaf/leaves'	→ 'medicine man'
mata-suri 'eye-follow'	→ 'be jealous'
bosi-mate 'turn-die'	→ 'extinguish (lamp)'

Valency Changing Affixes

-hi, -si 'applicatives'; ma- 'agentless passive'; va-/vaha- 'causative', and vari- 'anti-passive'

sora → sora-hi	'talk' → 'talk about s.t.'
lua → lua-si	'vomit' → 'vomit on s.t.'
duru → ma-daru	'split s.t.' → 'be split'
mauru → vaha-mauru	'be alive'→ 'save life'
hati → vari-hati	'bite s.t.' → 'inclined to bite'

Serial Verb Constructions for a Variety of Functions

Action in specified direction

vavine	le-hilo	le-sahe
woman	*ASP-look*	*ASP-go.up*
ta-vonavu	mo-dono	mo-jivo
belong-Malakula	*3.sing-sink*	*3.sing-go.down*
ana	tarusa	
PREP	*sea*	

'while the woman was looking up, the Malakula man drowned in the sea'

Comparative

heletu	niani	mo-suiha
pig	*this*	*3.sing-strong*
mo-liu-ra		
3.sing-win.over-O.3PL		

'this pig is the strongest of them'

Continuative aspect

ku-vano	ku-le	ovi,	ku-ovi
1.sing-go	*1.sing-ASP*	*stay*	*1.sing-stay*
mo-vano	mo-vano . . .		
3.sing-go	*3.sing-go*		

'I went and I was waiting, I kept on and on waiting . . .'

Completive aspect

voi	mo-mule	mo-iso
mum	*3.sing-head.home*	*3.sing-finish*

'mum has already gone home'

Non-result

ka-te	soari-a,	ka-sai-a
1PL-NEG	*see-OBJ.3.sing*	*1PL-search-OBJ.3 sing*
mo-tete		
3.sing-negative		

'we didn't see it, we searched for it to no avail'

Possessive Constructions

Classifiers for inalienable possession

no-	personal property	
	no-da vanua	'our (INCL) house'
ma-	drinkable	
	ma-m reu	'your (sing.)water (to drink)'

ha- edible
ha-mam vetai 'our (EXCL) bananas'
bula- living things (animals, crops + things regarded as 'living')
bula-ra toa 'their chickens'; bula-ku redio 'my radio'

Overlap between constructions or classifiers
no-ku nunu 'my photo' (that I own)
nunu-ku 'my photo' (of me)
bula-na dam 'his yam/s' (growing)
ha-na dam 'his yam/s' (to eat)

Hierarchy of Individuation: Kin Terms/Proper Names→ Animate→ Inanimate

Differentiation of kin/proper names vs. common nouns
— *comitatives* mai/mana
Voi mai Alis vavine atea mana mwera atea
'Mum and Alice' 'a girl and a boy'

— *possessive linkers* ni/i *indicating 'status' of possessor*
naho-ni mama vuti-ni Abae tamanatu-i vavine ridi
face-POSS dad *hill/s-POSS Ambae.* *husband-POSS woman DEF*
'dad's face' 'the hills of Ambae' 'the woman's husband'

— *prepositions* hini/ hina
hini Air Vanuatu hina siba
'with Air Vanuatu' 'with a knife'

Differentiation of animate vs. inanimate
— *quantitative verbs*
tamalohi na-were heletu na-were sala mo-were
person 3PL-be.many *pig 3PL-be.many* *road 3sing-be.many*
'many people' 'many pigs' 'many roads'

— *prepositions* telei/ana
telei-au telei bula-ku vuria ana tano
'to me' 'to my dog' 'to the garden'

See also: Affixation; Austronesian Languages: Overview; Bislama; Classifiers and Noun Classes: Semantics; Compound; Endangered Languages; Inflection and Derivation; Reduplication; Serial Verb Constructions; Vanuatu: Language Situation.

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Tamil

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Tamil is the Dravidian language with the most ancient literary tradition in India, dating from the early centuries A.D. or before. The earliest (3rd–1st century B.C.) inscriptions of Tamil are found in caves used by Buddhist and Jain monks, in a form known as Tamil *Brahmi* script. The earliest text in Tamil is a grammar, the *Tolkaappiyam*, which describes *centamiṟ* (Old Tamil) with both literary and colloquial (*koDuntamiṟ*) dialects, spoken in what is now Tamilnadu and Kerala, in South India. An early and original poetic literature, known as *Sangam* Tamil, has survived in the form of various anthologies; these early texts show few borrowings from Sanskrit, and minimal Brahmanic or 'Hindu' influences. After Old Tamil, a Middle Tamil literature can be distinguished, marked by diverse influences, including increasing Aryanization, Buddhism, and Jainism. Two epics, the *Cilappatikaram* (The lay of the ankle bracelet) and *Manimekalai* (The girdle of jewels), a Buddhist work, date from the 4th–6th centuries A.D., and the *Tirukkural*, known to every Tamil and considered by many to be the apex of their literary genius. In the 6th–9th centuries, *bhakti* devotional poetry (the hymns of the Alvars and Nayanars), devotional literature honoring Vaishnava and Shaiva saints, developed, then spread as a phenomenon across India.

From this period until the arrival of Western colonizers and missionaries, Tamil literature reflects pan-Indian norms devoted to philosophical and religious writings, with little originality (and heavy Sanskritization) except for the poetry of Kampan. After the consolidation of colonialism, Tamil literature shows more influences of Western, especially English, ideas. But the development of English education in India also stimulated resistance to these norms and a

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renaissance and revival of Tamil, focusing on purifying the language of Indo-Aryan and other loan words.

The Tamil language has had its current standard written form since the thirteenth century, when codified again in the grammar *nannuul*, composed (according to some accounts) by the Jaina monk Pavanandi. But due to increasing diglossia (Britto, 1986), spoken Tamil dialects have now diverged so radically from earlier norms, including the written standard (LT, or Literary Tamil; Arden, 1942) that no spoken dialect (regional or social) can function as the koiné or lingua franca. Since LT is never used for authentic informal oral communication between live speakers, there has always been a need for some sort of spoken 'standard' for inter-dialect communication, and what has evolved has been hastened by the development of modern communication, especially the 'social' film, which is the chief disseminator of this 'standard spoken Tamil' (SST). This form (Schiffman, 1999), based on the everyday speech of educated non-Brahman Tamils, is understood wherever Tamil is spoken, including Sri Lanka, Malaysia, and Singapore.

The sound system of Tamil consists of a ten-vowel system with long and short *i* and *iː*, *e* and *eː*, *a* and *aː*, *o* and *oː*, and *u* and *uː*. The diphthongs *ai* and *au* are found in LT but are not usual in ST; a few loan words contain *au*, but often these can be represented by *avu* as in *pavuŋɖu* 'pound.' The vowel *u* has an unrounded variant [ɯ] that occurs after the first syllable, and there are also nasalized variants [ã], [õ], as well as nasalized versions of [ẽ] and [ũ], all found in final position only (as the result of deletion of final nasals in SST, but not in LT).

In LT, as in Proto-Dravidian, there was a series of six stop consonants: velar *k*, palatal *c*, retroflex *ʈ*, alveolar *t̲*, dental *t*, and labial *p*. The apical stops *ʈ* and *t̲* could not occur in initial position. In non-initial position, all stops were voiced after nasals (i.e., they were phonetically *g, j, ɖ, d̲*, *d*, and *b*), and intervocalically, unless geminated, they were laxed (i.e., phonetically *h, s*, flapped *ɾ*, flapped *r*, *ð*, and *v*). Since these variants are in complementary distribution, no contrast between voiced and voiceless consonants (and the fricative variants) existed. In modern SST, because of borrowings, voiced consonants occur in other environments than these, so the phonological system now has voiced stops, though the orthography lacks provisions for this.

Today because of the loss of the alveolar contrast, modern SST only has contrasts between five points of articulation in consonantal stops, with voiced variants in many loan words (but also in onomatopoeic expressions, of which there are many). Nasal consonants (despite orthographic symbols for all six positions) are only *m*, *n*, and retroflex *ɳ*. In the area of laterals and rhotics, there is confusion. Proto-Dravidian surely had contrasts between *l* and retroflex *ɭ*, and *r* and *ɻ* a 'retroflex frictionless continuant' symbolized variously in transcriptions, but for which we prefer *ɹ*, but because of the loss of the intervocalic alveolar stop contrast (*t̲*), which is flapped [r] in modern speech, orthographic symbols for three r's exist. Furthermore, the retroflex continuant *ɹ*, which happens to be the final segment in the name 'Tamil' (*tamiɹ*) is often not maintained in speech in many dialects, merging instead with *ɭ*, *g*, and even *y*. But sociolinguistic pressure to maintain this sound, seen as quintessentially *Tamil*, results in much variation in its maintenance. As for glides, both *y* and *v* (which varies sometimes to [w]) are found.

Grammatically, Tamil can be characterized as 'agglutinative,' with long chains of easily-identifiable morphemes concatenated as suffixes. Noun morphology is fairly simple (there is no grammatical gender), and noun phrases require no agreement with adjectives and nouns. A seven-case system with a nonfinite set of postpositions recruited from lexical items both nominal and verbal, completes the picture. Example:

anta periya	*viiʈʈ-ukk-pakkattu-le-*	*rundu*
That large	house-DAT-near	LOC + ABL

'From the vicinity of that large house'

The verbal system is morphologically more complex, with various inflectional and derivational morphemes concatenated as suffixes. Example:

avarai	*eppaʈiyoo*	*anuppu-*	*vittu-viʈa-*	*veeŋʈum*
he-ACC	somehow	send	CAUS-COMPL-	MODAL

'Somehow or other, (we) have to get rid of him'

Syntactically, word order is SOV and left-branching. Grammaticalization processes have resulted in the incorporation of certain lexical verbs into the morphology of the verb as 'aspectual' markers, a phenomenon typical in many South Asian languages.

See also: Case; Dravidian Languages; Grammaticalization; India: Language Situation; Language Education: Correctness and Purism; Malaysia: Language Situation; Singapore: Language Situation; Sri Lanka: Language Situation; Standardization.

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Tamil Linguistic Tradition

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Speakers of Tamil – there are at present 60 million of them, mostly in South India – like to call their language the 'second classical language of India.' This implicit comparison with Sanskrit is based on the existence of a corpus of ancient texts, both literary and theoretical, the exact date of which is still very much controverted (see Wilden, 2002). The most ancient reliable sources of information on Tamil are the Tamil-Brāhmī inscriptions, some of which apparently date back to the third century B.C. (Mahadevan, 2003). As far as the corpus of texts is concerned, it is often said that its core was composed in the early centuries of this era, but there is no ancient written testimony, and we have to rely on indirect evidence. The literary part of the corpus consists mainly of two genres: love poems and war poems (see Ramanujan, 1985, for a sample). The theoretical part of the corpus is a collection of treatises, which seem to have a double function. They are, for a part of them, grammars of a language that can be called 'classical Tamil.' They are also tools for understanding a literature. The treatise considered to be the most ancient, the *Tolkāppiyam*, consists of three books, devoted respectively to *eḻuttu* ('letters'), *col* ('words'), and *poruḷ* ('[poetical] matters'). More recent treatises try to fit themselves in a fivefold scheme, where *poruḷ* has been further subdivided, with autonomous books being devoted to *yāppu* ('metrics') and *aṇi* ('ornaments'). What can be called 'grammar' in a restricted sense – and what would come closer to the Sanskrit *Vyākaraṇa* – is to be found in the two books on 'letters' and 'words,' and it has to be borne in mind that for many of their users they appeared as ancillary to an ultimate goal, which was the mastering of poetry (*ceyyuḷ*). Another important consideration is that the Tamil interest in language took place in a context of diglossia – as in many places in India – and that even when grammarians say that they have examined not only *ceyyuḷ* but also '[ordinary] usage' (*vaḻakku*), this does not necessarily mean a descriptive interest in real vernaculars. As far as the absolute chronology is concerned, the first book of *Tolkāppiyam* describes a writing system – making use of a dot (*puḷḷi*), for example, to distinguish between *ka* and *k* – that seems to fit with what epigraphists have found in the third stage of the "evolutionary development of the medial vowel notations" (Mahadevan, 2003: 231). This does not mean, however, that the whole book was composed at that time. The most probable hypothesis is that the *Tolkāppiyam* is a patchwork that reached its current form when a final compilation was made (see, for instance, discussions in Zvelebil, 1973).

A bare-bones description of the contents of *Tolkāppiyam* should mention at least that the most important topic in its first book is 'sandhi' (*puṇarcci*), which is what takes place at the juncture of two items, A and B. The various possibilities considered are, to mention the main cases, whether A and B are nouns *(peyar)* or verbs *(viṉai)*, whether the relationship between them has to do with case *(vēṟṟumai)* or not, whether A ends in a vowel *(uyir)*, in a consonant *(mey)*, or in an overshort *u (kuṟṟiyalukaram)*. The detailed analysis expands into hundreds of possibilities, because tentative general rules are often contradicted by exceptions for specific words (see Subrahmanya Sastri, 1930). As far as the second book is concerned, its main topic is a presentation of the two main and two secondary parts of speech: noun, verb, particle (*iṭaic col*, literally 'intermediate word'), and 'proper words' (*uric col*). An important parameter, common to noun and to verb, is the *tiṇai* ('class'), which can have two values and is further subdivided into five *pāl* ('genres'): masculine, feminine, and epicene plural (subdivisions of the *uyartiṇai* 'higher class'); plus neuter and neuter-plural (subdivisions of the *aḵriṇai* 'nonclass'). As presented by one rule, the most clear manifestation of the *pāl* of a noun is seen not in the noun itself but in the verb that accords with it (standing as its predicate).

In many respects, the *Tolkāppiyam* can only be apprehended now as the mythical origin that the Tamil grammatical tradition has chosen for itself, and which became fixed – in its text, if not in its interpretation – in the age of commentators, which starts, seen from our times, with Iḷampūraṇar, probably in the 12th century. That age was preceded by an age of lost treatises, such as that by Avinayaṉār, which is said to have almost eclipsed the *Tolkāppiyam* in its time (see Vijayavenugopal, 1968). This age also saw the advent of the *Vīracōḻiyam*, a Tamil grammar built on a Sanskrit model, which was not really followed. The age of commentators, considered to continue until the 18th century, was dominated by a (sometimes) implicit dialogue between the commentators of the *Tolkāppiyam* and those of *Naṉṉūl*, a 13th-century grammar that tried to be a synthesis of its predecessors. This dialogue took place in a South India where the religious landscape had changed several times, and this is probably the reason why some commentators wanted to view the supposedly unique author of the *Tolkāppiyam* as being himself the disciple of an even more mythical grammarian,

the vedic rishi Akattiyar (Agastya) (see Chevillard, 2000a). That age of commentators was followed by the age of editors, in the 19th and 20th centuries.

See also: Dravidian Languages; India: Language Situation.

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One of the most prominent sociolinguists and discourse analysts, Deborah Tannen has contributed immensely to the analysis of spoken discourse by examining aspects of conversational style, gender, frames, poetic features, narratives, and argument. Her primary focus has been on social interaction, and more recently on gender and family communication. Besides her academic success, Tannen has reached out to the general public, writing linguistic books and articles that have attracted media attention and have led to her appearance on American television, radio, and cable shows.

Tannen received an M.A. in English literature from Wayne State University in 1970. However, the 1973 Summer Linguistic Institute in Michigan was pivotal in her becoming a linguist. As Tannen said in an interview, the Institute's theme of Language and Context, and especially a course taught by Robin Lakoff, captured her heart and her imagination. Tannen was

the vedic rishi Akattiyar (Agastya) (see Chevillard, 2000a). That age of commentators was followed by the age of editors, in the 19th and 20th centuries.

See also: Dravidian Languages; India: Language Situation.

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One of the most prominent sociolinguists and discourse analysts, Deborah Tannen has contributed immensely to the analysis of spoken discourse by examining aspects of conversational style, gender, frames, poetic features, narratives, and argument. Her primary focus has been on social interaction, and more recently on gender and family communication. Besides her academic success, Tannen has reached out to the general public, writing linguistic books and articles that have attracted media attention and have led to her appearance on American television, radio, and cable shows.

Tannen received an M.A. in English literature from Wayne State University in 1970. However, the 1973 Summer Linguistic Institute in Michigan was pivotal in her becoming a linguist. As Tannen said in an interview, the Institute's theme of Language and Context, and especially a course taught by Robin Lakoff, captured her heart and her imagination. Tannen was

further inspired to earn her Ph.D. in linguistics under Lakoff at the University of California, Berkeley. Two other Berkeley professors played a fundamental role in her development: John Gumperz, and Wallace Chafe, while another influence was Erving Goffman. Work by Gumperz and his students, Maltz and Borker, on crosscultural communication, was the fundamental block on which Tannen built her theory of gender interaction as crosscultural communication, published in her highly acclaimed book, *You just don't understand: women and men in conversation* (1990). Chafe and Goffman influenced her work on schemata, frames, and footing, theories on which she built and expanded in her publications (1993a, 1994a) that focus on social interaction. Upon her graduation in 1979, Deborah Tannen was hired at Georgetown University, where she is one of only four professors holding the distinguished rank of University Professor. In addition, she has been a fellow at the Center for Advanced Study in the Behavioral Sciences in Stanford, California, and the Institute for Advanced Study in Princeton, New Jersey.

Tannen has been a prolific scholar and has published 19 books and over 100 academic articles. Several of her books have received numerous prestigious awards and have become *New York Times* best sellers. She has received grants from the National Science Foundation, National Endowment of the Humanities, and more recently from the Sloan Foundation for a project that examines conflict and parental identities at work and at home of middle-class, dual-career couples. In addition, she is the associate editor of *Language in Society* and serves on the editorial boards of many other linguistics journals.

In addition to her immense linguistic contributions, Tannen has published poetry, short stories, and personal essays. She has also written two plays: 'Sisters' and 'An Act of Devotion,' which was included in *The best American short plays: 1993–1994*.

Tannen exemplifies the linguist who feels that academic knowledge is not and should not be the privilege of the few. In 2005, she received the prestigious Linguistic Society of America award for 'Linguistics, language, and the public.' She has popularized many aspects of sociolinguistics and has raised the public's awareness of the importance of linguistics in personal relationships and the workplace.

See also: Cultural and Social Dimension of Spoken Discourse; Frame Analysis; Gender and Language; Interactional Sociolinguistics; Narrative: Sociolinguistic Research.

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Tanzania: Language Situation

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Introduction

The United Republic of Tanzania (formally the United Republic of Tanganyika and Zanzibar), covering 945 087 sq. km, is situated in southeastern Africa. It borders Uganda and Kenya on the north, including the shores of Lake Victoria. On the east, it has about 1000 km of coastline plus the offshore Indian Ocean islands of Pemba, Zanzibar, Mafia, and Kilwa (once a city-state). On the south, it borders Mozambique, Malawi, and Zambia. The River Ruvuma defines the border with Mozambique. Tanzania also shares Lake Malawi with Malawi and Mozambique on the south. On the west, Tanzania borders the Democratic Republic of Congo (separated by Lake Tanganyika), Rwanda, and Burundi.

Tanzania's population was estimated to be around 36 million as of July 2001. Only 23 percent of the population lives in urban areas, with a moderate increase in the urban population from 18 to 23 percent in 2002 (2002 Population and Housing Census). This ranks Tanzania as one of the least urbanized countries in sub-Saharan Africa. These statistics have an effect on language use and language shift in Tanzania.

Tanzania is a multiethnic and multilingual country. It is the only African country where speakers of the four Greenbergian phyla for African language classification converge demographically. The distinctive language families spoken in Tanzania are Niger-Congo (Bantu), Nilo-Saharan (Nilotic), Khoisan, and Afroasiatic (Cushitic). Ethnographically, SIL (2004) has identified 137 primary languages for Tanzania. Of those, 135 are living and 2 are extinct. Nonindigenous languages that are also active in Tanzania include English (which serves as the coofficial language), Asian languages (primarily Arabic, Persian, Hindu, Urdu, and Gujarati), Somali, and French.

History of Language Development in Tanzania

The language situation in Tanzania today has been shaped by four principal sources: (1) the Swahili language – a standard form based on the Unguja dialect and now a lingual franca and official language of Kenya and Tanzania; (2) the English language as introduced by the British colonial administration and missionaries after World War I and consolidated in the following domains: administration, civil service, legislation, higher education, the judicial system, the media, and international trade and diplomacy; (3) the indigenous African languages, comprising Bantu, Cushitic, Khoisan, and Nilotic languages; and (4) nonindigenous languages used by immigrants, including Arab and Indian languages, Somali, and French.

Precolonial Era

There have been speakers of Khoisan 'click' languages (Hadza and Sandawe) in some part of central Tanzania since the 1st and 2nd centuries A.D. Archaeological evidence suggests that these early Khoisan people migrated gradually into the western part of southern Africa, where they have multiplied to their current levels (Ehret, 2000: 290). The Southern Cushitic languages of the Iraqw cluster and Ma'a are also believed to have arrived in Tanzania by the 1st millennium A.D. (Nurse and Hinnebusch, 1993: 21). The presence of Nilo-Saharan speaking peoples, represented by the Luo and Maasai around the eastern side of the Lake Victoria basin and in the vicinity of Mount Kilimanjaro are extensions of the Eastern Sudanic subbranch of the Nilo-Saharan phylum.

The Bantu languages as spoken in Tanzania today are linked to the Eastern Bantu branch of the Niger-Congo family. They were brought to Tanzania by the descendants of the proto-Bantu peoples who moved into Great Lakes region around the 3rd century B.C. and proceeded into present-day Uganda, Kenya, and Tanzania. Others went as far as Zambia and parts of southern Africa. Ehret (2000: 295) notes that Bantu expansion proceeded at the expense of Khoisan and Cushitic languages. This is an ongoing process, as recently observed in the case of Rangi (F.30 in Guthrie's 1967–71 classification of Bantu languages) swallowing the Cushitic language of Burunge (Stegen, 2003: 2). The outcome of these historical processes, though complex, paved the way for the current distribution of most of Tanzania's indigenous languages, including Swahili. The early Swahili-speaking area forms a nearly continuous belt along the coastal line from the Tanga to Mtwara regions together with the offshore islands in the Indian Ocean. As early as the 18th and 19th centuries Swahili spread inland along the caravan trade route as far as Tabora in western Tanzania and Ujiji on Lake Tanganyika. Its development into a lingua franca and ultimately the national language is covered in Whiteley (1969) and Nurse and Spear (1995).

Colonial Era

Like most other African countries, Tanzania was exposed to various foreign influences during the

colonial period. German colonial language policy encouraged the use of Swahili in commerce, the military, administration, and education. Swahili prospered during the German administration, receiving extensive attention from administrators, missionaries, and linguists seeking to study it and promote its use. English was rarely used until 1918, when parts of the country became part of the British mandate following World War I. The British influence and a nationalistic movement between 1919 and 1961 led to a bilingual English–Swahili language policy. English became the language of the schools and administration. During the 40 years of British rule Tanzania joined the anglophone camp in the international arena. Swahili enjoyed institutional and local support as a lingua franca and 'sub-official' language. The losers were the vernacular languages.

English and Swahili harmoniously divide between them key domains such as education, legislation, trade, the media, and national forums. Swahili is used in primary schools and the lower courts. English is preferred in higher education and administration. English overrides Swahili in its privileged status as the language of the Tanzanian elites. However, the power and influence of Swahili among the majority of Tanganyikan and Zanzibarian people has never been underestimated by nationalistic leaders. Swahili was idolized as a symbol of the 'African-ness' of the society (Blommaert, 1994) and this sensibility was carried over to postcolonial times. It was a driving force behind declaring Swahili a national and official language. Swahili became the language of the parliament and the mainstay of language policy and planning in independent Tanzania.

Postcolonial Era

The state of Swahili in the postindependence era is a success story that comes at the expense of both the ethnic community languages and English. However, it has been observed that powerful Swahili has failed to obliterate vernacular languages, but managed to limit them to mere 'home' and secluded domains such as culture identities, i.e., in rituals and folklore (Mekacha, 1993).

English and Swahili remain the country's undisputed formal languages, with the latter assuming the additional role of a lingua franca across Tanzania and between neighboring ethnic communities. The educational domain has become a battleground in the demarcation of roles between English and Swahili, and the perennial debate over whether to use English or Swahili in postprimary education is still active. No consensus has been reached between government authorities (who once exerted much effort to 'nationalize' Swahili) and pro-Swahili activists. Pro-English factions see the language as a doorway to the world's knowledge and economy. Others want to see Swahili replace English as a medium of instruction and thus forge a path towards a monolingual society and presumably solve the proficiency crisis (Yahya-Othman, 1990). Current economic and cultural realities seem to leave the Tanzanian people no choice but to become effectively multilingual. Effective language policy must be flexible enough to accommodate both internal and external economic and culture changes.

Other Foreign Languages in Tanzania

French-speaking immigrants from the Democratic Republic of Congo, Burundi, and Rwanda and the influx of asylum seekers and musicians from these countries contribute to a growing number of first-language speakers of French in Tanzania. Some are employed to teach French in private schools. There are also numerous French teachers at Dar es Salaam University and teacher training colleges. Alliance Française and the British Council are two culture centers geared to promoting and maintaining French and English language and culture in Tanzania. Although Germany ruled Tanzania in the early colonial period, German has had no impact on language use in modern Tanzania. However, there are a few scholars who graduated from German universities that have a working knowledge of German.

Linguistic Profile of the Indigenous Languages in Tanzania

All four phyla of African languages have been identified in Tanzania. The following is the distribution of each phylum with emphasis on the primary languages or language clusters. We will examine these phyla through the following branches: Cushitic, Khoisan, Southern Nilotic, and Bantu.

Cushitic

The Afroasiatic family is represented in Tanzania by the Cushitic subfamily. Tanzania is the only sub-Saharan country where speakers of the Southern Cushitic languages are present. Around four languages of the Iraqw cluster, with fewer than 1 million speakers, have been documented so far (see Hayward, 2000).

Khoisan

The smallest of the phyla in terms of distribution and population is the Khoisan group. The ancient Hadza (with about 400 current speakers) and Sandawe (about 10 000 speakers) in central Tanzania

are isolated cases of the Khoisan phylum outside the present main Khoisan-speaking territory of southwestern Africa.

Southern Nilotic

The Southern Nilotic branch of the Nilo-Saharan languages extends from Kenya down to northern Tanzania. A total of four main languages, Luo, Maasai, Datooga, and Ndorobo (Aramanik), with almost a million speakers, make up this branch. It occupies an area between the east of Lake Victoria bordering Kenya and northern Tanzania at the foot of Mount Kilimanjaro.

Bantu

The Bantu branch of the Niger-Congo language family has the largest group of speakers (95% of Tanzanians speak a Bantu language) and greatest number of languages (over 120 in Tanzania). It occupies a vast area, covering roughly three-quarters of Tanzania and its off-shore islands in the Indian Ocean. The major groups of Bantu languages as spoken in Tanzania (and elsewhere) are illustrated in Maho (2003) and more specifically in Nurse and Hinnebusch (1993).

Chaga/Taita Clusters (E60) Chaga (Chagga) is spoken on and in the vicinity of Mount Kilimanjaro in Tanzania.

West Tanzania Languages (Zone F) This group comprises Sukuma, Nyamwezi, Sumbwa, Kimbu, and Bungu. These are spoken in western Tanzania.

Rufiji-Ruvuma Languages (Zone P 10) This group includes Ndengereko, Ruihi (Rufiji), Matumbi, and Ngindo;
(P20) Yao, Mwera, Malone, Ndonde and Mabiha, Ndendeule;
(N10) Ngoni, Matengo, Mpoto, and Tonga.
It is spoken across southern Tanzania from the Indian Ocean to Lake Malawi.

Lacustrine (Western Highlands) (D60) Ruanda, Hangaza, Rundi, Ha, Subi (Shubi), Rutara, Haya, Dzindza, and Kerewe Suguti;
(E25) Jita, Kayak, and Rudi: Libya East Nana;
(E40) Curia, Zahakis, and Natal.
This group is spoken around Lake Victoria.

Lake Corridor (M10) Pimple, Runway, Fiat, Rung and Mamboed;
(M20) Wanda, Mange, Nihau, Mallet Safeway, Iwa, and Tambo;
(M30) Nyakyusa or Konde [Nyakyusa-Ngonde], etc.).
These are spoken in southwestern Tanzania and into Zambia and Malawi.

Swahili Dialects of Tanzania

Swahili in Tanzania consists of seven geographically based dialects (including Unguja, which has been formalized and designated as the standard dialect in Tanzania and Kenya):

- Standard Swahili/Unguja (G42)
- Pemba (G43a)
- Mafia/Mgao (G43d)
- Kae (G43c)
- Mtangata (G42c)
- Vumba (G42h)
- Tumbatu (G43b).

State of the Art

Market forces have obliged many Tanzanians to master basic communication skills in English to work in even junior positions in tourism, finance, and business. The continued teaching of English (whether formally or informally) consolidates and provides a positive environment for much-sought links with development agencies and donors, investors, and tourists, and provides a common language for the international exchange of technologies, conferences, trade, and international forums.

The relationship between Swahili and English is often asserted to be one of conflict rather than complement (Rubanza, 1995: 81). Some language activists have been lobbing to make Swahili mandatory at all levels of education. The conflict between a 'patriotic' allegiance to Swahili and the pragmatic and realistic demands of market forces has compelled decision makers to be hesitant about supporting pro-Swahili activists' demands. Public opinion in Tanzania agrees. There is a hardening of feeling against the use of Swahili as a medium of education even in primary schools. The Tanzanian government has recently allowed English-language primary schools to operate, and their popularity reflects the desire of the general public to remedy the low English-proficiency level in Tanzania.

There is a danger that allowing English proficiency to drop at the expense of Swahili will divide the nation into a privileged minority who are qualified to work in the world market and a majority who will be left to find work within localized public domains. The current low level of English competence at post-primary levels in Tanzania is largely the fault of a teaching methodology that does not emphasize communication skills (see Kipacha, 1993). Advocates of

English feel that there is no harm in Tanzanians mastering more than one or two languages when this can allow them to expand their horizons and open the door to the world. And in fact multilingualism and multiethnicity are the norm for the majority of Tanzanians today.

Conclusion

Tanzania is a Swahili-speaking society, at least in the public domain. English enjoys a privileged status as the language of international contact, international academia, and diplomatic discourse. Studies show that speakers of ethnic languages are declining but still surviving. The present challenge for Tanzania is how to achieve a mastery of English and Swahili on the one hand and preserve ethnic 'heritage' languages on the other. This paradox will continue to engage Tanzanian nationalists, language activists, and the public at large.

See also: Cushitic Languages; Khoesaan Languages; Nilo-Saharan Languages; Swahili.

Language Maps (Appendix 1): Maps 41, 42.

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Tariana

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The Tariana language belongs to the Arawak language family (*see* **Arawak Languages**). It is spoken by about 100 people in the multilingual linguistic area of the Vaupés River Basin (northwest Amazonia, Brazil). This area is known (Aikhenvald, 2002b; Sorensen, 1967) for its multilingual exogamy: one can only marry someone who speaks a different language and belongs to a different tribe. People usually say: 'My brothers are those who share a language with me' and 'We don't marry our sisters.' The other languages in this area belong to the Tucanoan family, and they are still spoken by a fair number of people. The basic rule of language choice throughout the Vaupés area is that one should speak the interlocutor's own language. Descent is strictly patrilineal, and consequently, one identifies with one's father's language group. There is a strong cultural inhibition against 'language-mixing,' viewed in terms of lexical loans. In its grammatical and semantic structure, Tariana combines a number of features inherited from proto-Arawak, with the areal influences from Tucanoan in the form of grammatical calques and diffused patterns.

Tariana was once a dialect continuum spoken in various settlements along the Vaupés river and its tributaries. The Tariana clans used to form a strict hierarchy (according to their order of appearance as stated in the creation myth: see Aikhenvald, 1999). Lower-ranking groups in this hierarchy (referred to as 'younger siblings' by their higher-ranking tribes people) would perform various ritual duties for their 'elder siblings.' Each group spoke a different variety of the language. The difference between these varieties is comparable to that between Romance languages.

As the Catholic missions – and with them white influence – expanded, the groups near the top of the hierarchy abandoned the Tariana language in favor of the numerically dominant Tucano language. This process started in the early 1900s. The Tariana language is spoken nowadays just by people from two subtribes of the lowest-ranking group Wamiarikune, in two villages, Santa Rosa and Periquitos. The varieties are mutually intelligible. Most children are not learning Tariana any more. Innovative speakers of Tariana have more Tucanoan-like features in their language than traditional speakers. A literacy program in Tariana is presently under negotiation.

Tariana is a polysynthetic language, agglutinating with some fusion. It has mostly suffixes, with just a few prefixes. Constituent order depends on pragmatics. Younger speakers tend to put the verb last in the sentence, just like speakers of Tucano. There are mainly postpositions, with just one preposition (borrowed from Portuguese).

Tariana has 27 consonants (including a series of aspirated stops and pre-aspirated nasals and glide) and 15 vowels (*a, i, e, u*, each with a long and a nasal counterpart), *o* (with a nasal counterpart), and high central *ɨ*. Accent is distinctive and of pitch type, as a result of Tucanoan influence.

Underived adjectives form a closed class of about 30 members, while classes of nouns and verbs are open. Verbs divide into transitive and intransitive active, which take prefixes cross-referencing their subject (A/Sa). As is typical for an Arawak language, the same set of prefixes marks possessor on inalienably possessed nouns and the argument of postpositions. Intransitive stative verbs do not take any cross-referencing markers. Unlike any other Arawak language, grammatical relations in Tariana are also marked with cases: topical non-subject case *-nuku,* focused subject case *-ne/-nhe*, instrumental case *-ine*, and locative case *-se*. This case system for marking core syntactic functions was developed under the Tucanoan influence. The case markers result from the reanalysis of locative suffixes of Arawak origin. A member of any word class can occupy the intransitive predicate slot.

The locative and the instrumental cases can combine with the non-subject topical case if the constituent is topical (thus yielding a peculiar instance of 'double case').

Tariana has a complex system of more than 40 classifiers that are used as agreement markers on adjectives, as derivational affixes on nouns, and also as numeral and as verbal classifiers; a slightly different system of classifiers is used with demonstratives. A two-way gender opposition (feminine vs. the rest) is used in personal pronouns (third singular and all plural forms, thus contravening established universals) and in verbal cross-referencing. Classifiers are an open class, since any noun with an inanimate referent can be used as a 'repeater' (or 'self-classifier'). Repeaters can be used to mark the agreement with a topical noun while grammaticized classifiers are used for unmarked agreement.

There is an obligatory distinction between singular and plural for nouns with animate referent. Nouns with inanimate referent often refer to substances, and classifier suffixes are attached to them to specify

singular reference. For instance, *episi* means 'iron as a substance', while *episi-da* (iron-CLASSIFIER: ROUND) means 'axe' and *episi-kha* (iron-CLASSIFIER:CURVED) means 'wire'. Number agreement is optional for inanimate nouns.

The Tariana verb has a plethora of moods and aspects. It has an elaborate system of marking information source, known as evidentiality. Tariana distinguishes visual evidentials (something seen), non-visual evidentials (something heard, or smelled, or felt by touch), inferred evidential (something inferred based on visible results: as one infers that it has rained on the basis of puddles); assumed evidentials (based on general knowledge), and reported evidential. Three tenses (present, recent past, and remote past) are combined with evidentials. Traditional stories are typically cast in remote past reported evidential, and autobiographical narratives in visual evidential. Non-visual evidential is used to relate the actions of evil spirits that are not 'seen', and dreams of ordinary people, while prophetic dreams by omniscient shamans are cast in visual evidentials. A reduced set of evidentials is used in questions, while imperatives have just one, reported, evidential (meaning 'do something on someone else's order'). This unusually complex evidentiality system has been largely calqued from Tucanoan languages.

A complicated system of serial verb constructions expresses aspectual, directional, and sequential meanings, and also reciprocal and associative meanings. There are three types of causatives. Morphological causatives are formed on intransitive verbs. The same morpheme on a transitive verb indicates an advancement of a peripheral argument of the transitive verb to the core, and/or complete involvement and topicality of the O argument. Periphrastic causatives (indirect causation) and serial causative constructions (direct causation) are used to form causatives of transitive verbs.

When several clauses are combined to form one sentence, all but the main clause are marked differently depending on whether their subject is the same as, or different from, that of the main clause. This feature (known as switch-reference) is shared with the Tucanoan languages.

A detailed reference grammar is in Aikhenvald (2003). Aikhenvald (2002a) is a comprehensive dictionary, while Aikhenvald (1999) contains a text collection and an outline of the Tariana ethnography with an account of the kinship system (which is of Dravidian type).

See also: Arawak Languages; Brazil: Language Situation; Classifiers and Noun Classes: Semantics; Evidentiality in Grammar; Language Change and Language Contact.

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Tarski, Alfred (1902–1983)

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Alfred Tarski (Teitelbaum) (1902–1983) was born on January 14, 1902, in Warsaw, Poland, which was at that time under the occupation of the Russian Empire. He died on October 26, 1983, in Berkeley, California. Alfred was born to the family of Ignacy and Róża (*de domo* Prussak). In 1910 Tarski began to attend the government junior school (Pol. *gimnazjum rządowe*) in Warsaw, and then the 'School of Mazowsze' (Pol. *Szkola Ziemi Mazowieckiej*), also in Warsaw, where he took his graduation exam in 1918. He next studied at the Department of Philosophy of the University of Warsaw under the supervision of Stanislaw Leśniewski (1886–1939); Leśniewski also supervised Tarski's Ph.D. dissertation, which was completed in 1924 and published in Warsaw under the title *O wyrazie pierwotnym w logistyce* (*On the primitive term in logistics*). In

singular reference. For instance, *episi* means 'iron as a substance', while *episi-da* (iron-CLASSIFIER: ROUND) means 'axe' and *episi-kha* (iron-CLASSIFIER:CURVED) means 'wire'. Number agreement is optional for inanimate nouns.

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1925, Tarski completed his higher doctoral degree (Ger. *Habilitationsschrift*) on the philosophy of mathematics, which also was done at the University of Warsaw. At that time he was lecturing at the University of Warsaw on elementary mathematics and logic and was also teaching mathematics at the Stefan Żeromski High School in Warsaw.

In the 1930s, he began his pioneering work on the concept of truth in formalized languages. Alfred Tarski left Poland in 1939, and World War II made his return to Poland impossible. From 1939 to 1941 he lectured at Harvard University; from 1940 to 1941 he was a visiting professor in New York; and from 1941 to 1942 he was a member of the Princeton University Institute for Advanced Study. In 1942, Tarski started his work at the University of California at Berkeley, where he obtained a position in the Department of Mathematics. There, in 1946, he became Professor of Mathematics, establishing a leading center for research and teaching of mathematical logic.

English was Tarski's seventh language. Polish was his native language; he learned Greek and Latin at school; he studied Russian since a great part of Poland was then under Russian occupation. At the beginning of his career, Tarski published his works in French and in German, as these were the languages of diplomacy and science in those days. After emigrating to the United States, Tarski's lectures as well as his publications were entirely in English.

Tarski taught and was a guest lecturer at a number of foreign universities: Mexico (1957); Los Angeles (1967); Catholic University, Chile (1974–1975), London (1950, 1960), the Sorbonne (1955). In 1957 he was the chairperson of the International Union of History and Philosophy of Sciences. Tarski was also a member of many learned societies, such as the American Academy of Sciences, the American Symbolic Logic Society (chairing the society from 1944 to 1946), the British Academy, and the Royal Dutch Academy of Sciences. He supervised 20 Ph.D. dissertations (among others, Mostowski's, Jónsson's, Lim's, Robinson's, Szmielew's, Thompson's, and Feferman's).

Tarski published more than 300 works and seven books, including *Pojęcie prawdy w językach nauk dedukcyjnych* (*The concept of truth in the languages of deductive sciences*) published by Prace Towarzystwa Naukowego Warszawskiego in Warsaw in 1933. In this work, Tarski elaborated upon a materially adequate and formally correct definition of the 'true sentence.' His results were closely related to Goedel's incompleteness theorem. His other books are *Introduction to logic and to the methodology of deductive sciences* (New York, 1946); *Cardinal algebras* (Oxford, 1949); *Ordinal algebras* (Amsterdam, 1956); *Logic, semantics, metamathematics* (Oxford, 1956); *The completeness of elementary algebra and geometry* (Paris, 1967); and *Cylindric algebras* (Amsterdam, 1971). Between the early 1920s and late 1970s, Tarski published his research results in a number of edited and reviewed volumes and journals in the form of scientific papers, abstracts, summaries, project reports, reviews, and contributions to discussions.

It is generally agreed that Tarski's works gave rise to such disciplines as semantics and the model theory, relating formal symbols to set theoretical constructs and enabling researchers to discuss references of symbols and the truth value of a sentence, as well as the meaning of formal expressions from a more general perspective. Patrick Suppes, Tarski's long-time friend and colleague, noted that as a researcher and lecturer Tarski had a passion for very clear communication, stressing

> the elegance of his thought and talk, the strongly aesthetic feelings that came forth in his presentations and writings. He was really a dazzling lecturer and could explain technical subjects to wide audiences in a very clear and accessible way, starting with very simple ideas, gradually building up a full picture. His papers seem much simpler than they really are, because of his passion for organization and clarity. (cited in Duren *et al.*, 1989: 395).

One of Tarski's students, Solomon Feferman, described him as

> a small person having enormous intensity and vitality, and prodigiously productive. He wrote in a very big, bold hand and spoke with a Polish accent. He was a bit old-fashioned, one had the sense; he stood out in that respect in Berkeley, as a kind of master of the old school. (cited in Duren *et al.*, 1989: 399).

Another of Tarski's students, Jon Barwise (Duren *et al.*, 1989: 397), underlined that it was Tarski who singled out the notion of truth and gave it a mathematical formulation in its own right. This became the basis of model theory, which led to questions concerning cardinalities of models of some theories in the Loewenheim-Skolem-Tarski Theorem, or regarding preservation of truth between different models of some theories in the Los-Tarski Theorem. Alfred Tarski was one of the first to make the notion of domain and truth precise. He established a school of mathematical thought in model theory, and a center for research in logic at the school of mathematical logic at the University of California at Berkeley. It is generally agreed that Tarski's work on decidable and undecidable axiomatic systems also made him a forerunner of computer science.

See also: Chart Parsing and Well-Formed Substring Tables

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Relevant Website

www.chruszczewski.info – author's website

Tatar

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Location and Speakers

Tatar (*tatar tělě, tatarča*) is the designation for Kazan Tatar and related dialects belonging to the northern subbranch of the Northwestern or Kipchak branch of the Turkic language family. It is distributed over a huge area, from Ryazan in the west to West Siberia in the east, from the Kirov region in the north to Astrakhan in the south. Most Tatar speakers live between the Volga–Kama triangle and the western slopes of southern Ural. The Republic of Tatarstan (*Tatarstan Respublikasi*) with its capital Kazan is situated in the central part of the Russian Federation, at the confluence of the Volga and the Kama. It borders Bashkortostan in the east, Mari El and Udmurtia in the north, and Chuvashia in the west. This multinational republic has a total population of over 3.8 million, mainly consisting of Volga Tatars (over 50%) and Russians (over 40%). There are also speakers of Chuvash, Mordva, Udmurt, Mari, Bashkir, etc.

Speakers of Misher Tatar live mainly west, southwest, and south of the republic. Kasimov Tatar was formerly spoken farther west, in the Ryazan region, on the territory of the old Kasimov Khanate. Tatar-speaking groups, often descendants of Noghays, still live along the Volga river south of the republic, down to the Astrakhan region. There are also scattered Tatar-speaking groups in other central parts of the Russian Federation. About 1 million Tatars live in Bashkortostan. The Tepter Tatars live along the Ural River.

East of the Ural Mountains, in an area that was once the home of sizeable Turkic-speaking groups, West Siberian Tatar varieties of different origins are still spoken by small groups, about 150 000 persons altogether: the dialects of Irtysh, Tümen, Tura, Tobol, Tara, Ishim, etc. The Baraba Tatars, about 8000 persons, live in the Baraba steppe, between Novosibirsk and Omsk. Tatar is also spoken in parts of Kazakhstan, Uzbekistan, China, etc. The total number of Tatar speakers is about 8 million.

The designation 'Tatar' is ambiguous. Until the end of the 19th century, it was used for all languages of Turkic Muslim groups in Russia. It is still used for Crimean Tatar (Judco Crimean Tatar), which is not identical with Volga Tatar, but a language in its own right. The so-called Tatar minority in China, mostly in Xinjiang (about 5000), consists of descendants of Volga and Crimean Tatars. Groups in Poland, Belarus, and Lithuania, referred to as 'Lithuanian Tatars,' are linguistically assimilated descendants of Noghays and Crimean Tatars. The Tatars of West Siberia partly consist of emigrants from the Volga region. The Baraba Tatars go back to deported Kipchak tribes. The Tatars of Astrakhan and Siberia have strong Noghay elements.

Tatar has long been one of the most firmly established Turkic languages. It has consolidated its position further in the post-Soviet era. The official languages of Tatarstan are Tatar and Russian. Of the Tatars of the Russian Federation, 86% regard Tatar as their mother-tongue.

Origin and History

The designation Tatar is first mentioned in Chinese sources and in Turkic inscriptions of the 8th century. Later on it appears as a Mongol tribal name. Kipchak Turkic groups who arrived in the Volga region with the Mongols adopted it for themselves. It was used for the Turkic and Mongol population in the Golden Horde, also for Turkic groups that arrived later, and finally also for older Turkic groups of the Volga–Kama area.

Tatar is a result of complex linguistic contact processes, the main elements being Kipchak Turkic, Volga Bulgar, Volga Finnic, and Mongolic. Turkic

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groups were probably present on the middle course of Volga River from the 5th century on, absorbing local Finno–Ugric tribes of the region. The Volga Bulgar element was of decisive importance. The powerful Volga Bulgar state was created at the end the 9th century and adopted Islam in 922. The Volga Bulgars assimilated native groups of the region. Both Tatars and Chuvash regard themselves as descendants of the Volga Bulgars. The state was destroyed by the Mongols in 1237 and the Khanate of the Golden Horde was established. Its most important element was Kipchak Turkic, which became the dominant assimilating factor. Volga Bulgars, Finno–Ugric groups, and Mongols shifted to Kipchak. The speakers of the predecessor of Chuvash, however, were not assimilated but preserved their language. After the disintegration of the Golden Horde, the Khanates of Kazan, Crimea, Kasimov, Astrakhan, and Sibir were established. The Khanate of Kazan was annexed by Russia in 1552, whereby Tatars, Bashkirs, and Chuvash came under Russian rule. The West Siberian Tatars are partly descendants of Volga Tatars, who left their homeland in this period. A Tatar Autonomous Soviet Republic was established in 1920. After the Soviet era, the Autonomous Republic of Tatarstan became a member of the Russian Federation.

Related Languages and Language Contacts

The Tatar language is related to Bashkir, Crimean Tatar, Kazakh, Karachay–Balkar, Kumyk, Karaim, etc. Tatar has influenced neighboring languages such as Bashkir, Chuvash, and the Finno-Ugric languages Mari (Cheremis), Mordva, and Udmurt (Votyak). The literary language has also had considerable influence on Turkic languages in Central Asia, e.g., Uzbek. Literary Tatar has to a certain extent served as a model for literary Kazakh. Tatar has been influenced by Russian, particularly in the lexicon. The written language was also used by the small Turkic groups of western Siberia, and thus had a strong impact on their dialects.

Certain features typical of Tatar are already found in the Kuman language as attested in the *Codex cumanicus* (14th century), where the language is even referred to as 'Tatar.' The written language used in the cultural centers of the Golden Horde was Khorezmian Turkic, which had its center in Khorezm on the shore of the Aral Sea and was influenced by local Kipchak and Oghuz Turkic dialects.

This tradition was continued in the Khanates that emerged after the fall of the Golden Horde. It was used, with strong Kipchak elements, as the official language in the Crimea up to the 17th century, when it was replaced by Ottoman (Turkish).

Its use in the Khanate of Kazan was strongly influenced by Chaghatay (Chagatai) and Ottoman. A so-called Volga Turki developed, which is often referred to as 'Old Tatar,' though it must be distinguished from older spoken Tatar. It was used for an emerging Tatar literature based on Chaghatay traditions. Religious works were written in this language up to the mid-19th century.

A more genuinely Tatar written language developed in the second part of the 19th century. It was based on the Kazan dialect, though strongly influenced by Chaghatay. It was also used by Mishers and Astrakhan Noghays and, for some decades, Bashkirs. It was of great cultural importance for all Turkic minorities in Russia. At the beginning of the 20th century, Tatar still had a considerable transregional validity. In the Soviet era, it was limited to a regional national language.

Tatar was written with Arabic script until a Roman-based alphabet was introduced in 1927. In 1939, a variant of the Cyrillic alphabet was adopted. The Christian Tatars in the Volga region had used the Cyrillic script already at the end of the 19th century. In the post-Soviet era, a new Roman-based alphabet has been created, although it has not yet replaced the Cyrillic-based script.

Distinctive Features

Tatar exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation, e.g., *A* = *a/e*. A segment in round brackets only occurs after consonant-final stems. Hyphens are used here to indicate morpheme boundaries.

Phonology

The phonetic basis of modern standard Tatar is Kazan Tatar. The vowel system includes the high-mid vowels *ĕ*, *ŏ*, *ĭ*, *ŏ*, which are shorter and more centralized than the low and high vowels. The vowel *a* of the first syllable is rounded to *å* in the central dialect.

Tatar exhibits the results of systematic vowel shifts. Low vowels of the first syllable have been raised: *e* > *i*, e.g., *min* 'I' (<*men*), *o* > *u*, e.g., *qul* 'arm' (< *qol*), *ö* > *ü*, e.g., *küz* 'eye' (< *köz*). High vowels have been centralized and reduced: *i* > *ĕ*, e.g., *bĕr* 'one,' *u* > *ŏ*, e.g., *qŏš* 'bird' (< *quš*), *ü* > *ŏ*, e.g., *kŏn* 'day' (<*kün*).

Tatar suffixes display front vs. back harmony. The vowel of the suffix depends on the frontness vs. backness of the last stem syllable. The high suffix vowels are *ĕ* and *ĭ*, and the low suffix vowels are *e* and *a*, e.g., *ĕt-ler-ĕbĕz-den* [dog-PL-POSS.1.PL-ABL] (front) 'from our dogs' vs. *at-lar-ĭbĭz-dan* [horse-PL-POSS.1.PL-ABL] (back) 'from our horses.' Rounded vs. unrounded harmony is absent in Standard Tatar, which means that *ŏ*, *ŏ̈*, *u* and *ü* do not occur in suffixes.

Initial *ǰ-* is sometimes found instead of *y-*, mostly in front of *ï* and *i*, e.g., *ǰir* 'place' (cf. Turkish *yer*). In loans originating from Arabic (Arabic, Standard), *ᶜayn* is represented by the voiced fricative *γ*, e.g., *γadet* 'habit' (< *ᶜa:dat*). The consonants that correspond to the affricates *č* and *ǰ* in most other Turkic languages (and are traditionally transcribed so) are pronounced as palatalized fricatives *š′* and *ž′* in Standard Tatar. In front of suffix-initial vowels, stem-final *p*, *q*, and *k* mostly become *b*, *γ*, and *g*, respectively, e.g., *tab-a* [find-PRES] 'finds' vs. *tap* 'find!', *čig-ĕ* [boundary-POSS.3.SG] 'its boundary' vs. *čik* 'boundary.' Various assimilations affect suffix-initial consonants. Thus, the *l* of the plural suffix and the *d* of the ablative suffix are assimilated to *n* after stems ending in nasal consonants, e.g., *uram-nar* [street-PL] 'streets,' *urman-nan* [forest-ABL] 'from the forest.' Nonpermissible consonant clusters are dissolved by means of epenthetic vowels, consonant deletion etc., e.g., *dus* 'friend' vs. *dust-ïm* [friend-POSS.1.SG] 'my friend.'

Grammar

After first- and second-person possessive pronouns the possessive suffix on the head is optional, e.g., *min-ĕm ĕš-ĕm* [I-GEN work-POSS.1.SG] or *min-ĕm ĕš* [I-GEN work] 'my work.' The comparative degree of adjectives takes the suffix *-rAK*, e.g., *ŏzŏn-raq* [long-COMP] 'longer' (cf. Turkish *daha uzun*). The third-person personal pronouns are *ul* 'he, she, it' (with the oblique stem *an-*) and *alar* 'they.' The demonstrative pronouns *bu*, *šušĭ*, *šul*, *tĕgĕ*, *ul* express various degrees of proximity. Approximative numerals are formed with the suffix *-lAp*, e.g., *un-lap* 'approximately ten.'

Tatar has numerous simple and compound aspect-mood-tense forms as well as verbal nouns, converbs, and participles. It has a present tense in *-A* (*-y* after stem-final vowels) plus personal markers, e.g., *kil-e-m[ĕn]* [come-PRES-1.SG] 'I come, I am coming.' The most frequent verbal noun ends in *-(I)w*, e.g., *al-ĭw* 'to take, taking.' An infinitive is formed with *-(I)rGA*, negated *-mAs-kA*. Frequently used converb markers include *-A* (*-y* after stem-final vowels), *-(I)p-* and *-GAč*, e.g., *al-γač* [take-CONV] 'after having taken.' Like most other Turkic languages, Tatar has evidential markers of the type *iken*, e.g., *qayt-qan iken* [return-POSTTERMINAL.PAST EV] 'has obviously returned.' A number of auxiliary verb (postverb) constructions express modifications of the manner of action, e.g., *yan-ïp bĕt-* [burn down-AUX] 'burn down (completely).' Possibility and impossibility are expressed by means of a converb + the auxiliary verb *al-*, e.g., *yaz-a al-* [write-CONV-POSS] 'to be able to write,' *yaz-a al-ma-* [write-CONV-POSS-NEG] 'to be unable to write' (Turkish *yaz-a-bil-* [write-CONV-POSS], *yaz-a-ma-* [write-CONV-POSS-NEG]).

Lexicon

Most basic lexical elements are of Turkic origin. Many loans are of Middle Mongolian, Arabic, Persian, and Russian origin, e.g., *zur* 'big,' *aždaha* 'dragon,' *baqča* 'garden,' *atna* 'week' (Persian), *fikĕr* 'thought,' *taraf* 'side' (Arabic), *stakan* 'glass,' *par* 'steam,' *kuxnya* 'kitchen,' *vrač* 'doctor' (Russian), *uram* 'street,' *dala* 'steppe' (Mongolian). Words of Finno-Ugric origin occur mainly in dialects. Tatar conjunctions are mostly of foreign origin, e.g., *hem* 'and,' *emme* 'but,' *čŏnki* 'for (causal),' *güye* 'as if,' *ki* 'that,' *eger* 'if, when.'

Dialects

Tatar comprises a central dialect group, Kazan Tatar proper. A western dialect group, consisting mainly of Misher Tatar, is spoken in the Volga region outside the republic. An eastern dialect group is spoken in West Siberia. The Irtysh–Tobol dialects hold an intermediate position between Kazan Tatar and other Siberian Tatar dialects. West Siberian dialects often exhibit the changes *č* > *ds* and *ǰ* > *dz* and voicing of intervocalic consonants (like in South Siberia). The vowel shifts are not so strongly developed in these dialects as in Volga Tatar.

See also: Turkic Languages.

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Teacher Preparation: Second Language

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History and Developments

Until the 18th century, the teaching of a second language (SL) was in the hands of governesses and language masters, self-taught experts who had developed particular skills of passing their mother tongue on to others. This tradition may account for the high value that has customarily been attributed to native speakers as particularly competent teachers of a second language. The assumption that a native speaker's competence can be considered a quasi-natural and sufficient preparation for language teachers has only recently been called into question (Medgyes, 1994).

The first forms of organized and more systematic teacher preparation emerged at the end of the 19th century, when governments first began to control and regulate education. The preparation for teaching modern languages at first followed the example of teaching Latin and classical Greek, defining the academic study of literature and language as the knowledge base of teachers. Because the study of second languages was then considered to be the privilege of the educated elite, SL teachers predominantly worked in the upper secondary school and in university-bound educational systems or at universities.

The canonization of literature and language studies as the almost exclusive basis for teacher preparation has received growing criticism since the 1960s, when the need for cross-cultural communication as a consequence of worldwide migration and globalization required that many more citizens be able to communicate with speakers of different languages and cultural backgrounds worldwide (Block, 2004). English has become the international language that has established itself alongside local languages in multilingual contexts. This is why in the 1960s and 1970s second languages, mostly English, were introduced to all European citizens in secondary schools as a mandatory part of the curriculum. By the beginning of the 21st century, almost all European countries have mandated SL programs in the primary schools, and most schools require their students to have studied at least two foreign languages by the end of grade 10, with English being the first SL in almost all cases. The Council of Europe (2001) has taken a leading role in promoting and supporting the education of plurilingual citizens by defining plurilingual competence as a prerequisite for European citizenship. It views "users and learners of a language primarily as 'social agents,' i.e., members of society who have tasks. . .to accomplish" (Council of Europe, 2001: 9).

However, the need for SL education is not just a European, but is also a worldwide phenomenon resulting from massive migrations, the spread of communication technology, and economic globalization. This context provides the background against which initiatives to re-conceptualize the knowledge base of language teacher education need to be understood. What a number of critics have put forward since the 1960s has received growing support: teacher education programs often fail to provide the relevant knowledge base that would enable student teachers to prepare their learners adequately for the tasks outlined above and to support them in coping with the complex demands of SL classrooms.

Just as teaching second languages is a highly diverse activity bound to a particular place in time and realized under specific institutional affordances and constraints, so is the preparation of teachers subject to those constraints. One needs to distinguish, for example, between (1) contexts in which, as in most European countries, the state is responsible for teacher education and in which SL learning represents a core (i.e., mandatory) component in school curricula and (2) contexts in which SL learning has the status of a selective subject with little academic prestige. It matters whether the SL is introduced in the primary school as one mandatory subject to be later followed by a third language and whether a student's career depends on achievements in language learning or whether a SL may (or may not) be chosen as an elective. It makes a difference whether the language taught is the dominant language of the school's culture or whether it is a foreign language. Traditionally,

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European SL teachers not only share their learners' common and/or native language but have themselves also been through the process of learning at least one other language, which makes them bilingual or, more often than not, plurilingual. Preparing teachers who can tap a vast resource of personal and collective language learning experiences will certainly be different from preparing those who lack such experiences. Since it is impossible to take these particularities into account when discussing teacher preparation in the following sections, we focus our arguments on the general issues, principles, and developments of SL teacher preparation.

SL Teacher Education: Defining the Knowledge Base

To this day, little is known about why certain teacher education programs are more effective than others. People have been learning to teach languages for a long time, but only a few have tried to understand the processes or the knowledge and experience that underlie effective teacher preparation: "Thus, most conventional practices in language teacher education have operated like hand-me-down stories, folk wisdom shared as 'truths' of the profession with little other than habit and convention on which to base them" (Freeman, 1996: 351). What we do know, however, supports personal anecdotal observation: The dominant teaching formats at many universities are transmission oriented and, therefore, contradict current ideas of student-centeredness and communicative, task-based methodology, as outlined in Legutke and Thomas (1993) or Ellis (2003). Program components lack a coherent curriculum framework, and to a large extent they fail to integrate courses in education, psychology, or sociology, for example. The practicum, if provided at all, often remains an alien element among university courses. Only in recent years has there been a growing interest in reconceptualizing the knowledge base for SL teacher education (Richards and Nunan, 1990; Richards and Lockhart, 1994; Freeman and Johnson, 1998), which has resulted in an investigation of teacher learning and development in authentic SL learning contexts (see Appel, 1995; Freeman and Richards, 1996; Appel, 2000; Schocker-v. Ditfurth, 2001; Caspari, 2003; Tsui, 2003).

Taking Account of the Complexity of SL Teaching and Learning

Despite this growing interest in SL teaching, we must acknowledge that the "knowledge base is hardly as clearly defined or as widely held as it is in other professions such as law, medicine, accountancy, and architecture" (Freeman and Johnson, 2004: 121). This is because the subject matter for SL teaching covers a heterogeneous field and involves different disciplines, research approaches, contexts of practice, learners and teachers, and social settings. However, unless we *do* agree on a clear idea of what SL teachers need to know and how professional knowledge, skills, and attitudes are developed, the field of SL teaching will not establish itself as a professional, recognized field of study nor will we be able to improve its implementation. The situation becomes even more complex if we include the many changes that have occurred in the last 50 years in the way we view language, language acquisition, the language learner, language teaching methods, and the language teacher. These changes are shown clearly in a historical review undertaken by Larsen-Freeman (1998; see Table 1).

Larsen-Freeman is surely correct in arguing that all of these approaches have some merit, but that none of them reflects the whole picture. This is why she reached this conclusion: rather than search for the one right point of view, "we must redirect the nature of our inquiry to search for wholeness—for more complete understanding of the many facets that comprise these basic constructs in our field. Being aware of the complexity has tremendous implications for how we train teachers" (Larsen-Freeman, 1998: 4). Therefore, as a first step, we need to prepare our student teachers to enable them to understand the complexity of SL teaching and learning in authentic contexts of practice.

Basing Teacher Education on Teaching and on the Person Who Teaches

There is a traditional misconception that all it takes to become a competent SL teacher is to know about relevant publications. Yet, professional action in dynamic situations of practice, such as in a classroom, is characterized by such features as uncertainty, complexity, uniqueness, instability, and value conflict (Schön, 1983). This is why teachers cannot be adequately prepared for their job just by reading relevant disciplinary knowledge. Following Schön (1983) and Freeman and Johnson (1998), we argue that the knowledge base must focus on the activity of teaching itself and on the contexts in which it is done. It must also focus on the person who teaches, because unless knowledge (from whatever source) becomes part of student teachers' ideas of their professional selves, it will not contribute to the quality of learning second languages: SL teachers generate their own personal theories on SL learning that are based on their own language learning experiences and their experiences in particular teaching contexts. Therefore, it would

Table 1 A historical review of language teaching

Linguistics	*Language acquisition*	*Language learner*	*Language teaching*	*Language teacher*
Structural	Habit formation Behaviorism	Mimic	Dialogues Patterns Practice Drills	Performer Model Conductor Cheer leader
Generative	Rule formation (cognitivism)	Cognitive being	Inductive and deductive Exercises	Knower
Social/functional	Interactionism	Social being	Role plays Information Gaps Problem-solving tasks Cooperative learning	Facilitator
Discourse/text/corpus	Constructivism	Meaning-maker	Process writing Language Experience Whole Language Content-based	Negotiator
Critical	Experiential	Political being	Critical Pedagogy Participatory approach Problem posing	Advocate

From Larsen-Freeman, 1998: 4.

be wrong to assume that teachers can be viewed as mere consumers of ideas that have been developed outside language classrooms in related disciplines and may simply be transmitted to them. In the following sections, we ground this basic assumption on relevant research, drawing on learning-to-teach studies and studies on the nature and development of expertise in SL teaching and learning.

The Teacher Learner: How Do Student Teachers Learn to Teach? The views on what counts as professional education can be classified into three major models, according to Wallace (1991). They are described in chronological order, along with the contributions made to each model by research into learning to teach.

Craft Model: Learning as Imitation of a 'Master Teacher' or the Expert Teacher as Model In the craft model, the student teacher learns by imitating the techniques of an experienced professional practitioner and by following his or her instructions and advice. Professional competence is seen as the passing on of expertise from generation to generation. This model is shown in Figure 1.

The drawback to this model is obvious: It does not capture developments in dynamic societies, where change is a basic feature. However, the relevance of the idea of teachers as models should not be dismissed completely. We know from various learning-to-teach studies that student teachers begin their education with images of teaching that they have acquired during their own (language) learning experiences as students (Kagan, 1992; Johnson, 1994). Lortie (1975) termed this process "the apprenticeship of observation." This apprenticeship shapes student teachers' dispositions regarding how to act in the classroom, even if contrary to whatever cognitive knowledge they may have encountered during teacher education. Unless student teachers encounter practice situations in which they experience convincing alternative practices by observing an expert teacher, these imprints are very resistant to change (see results in Schocker-v. Ditfurth, 2001). Student teachers find readings on new approaches to teaching convincing, in regard to their theoretical rationale, but not credible because they cannot imagine how to apply the alternatives about which they read. This is why Fullan is correct in writing that "(t)he main reason for the failure of teacher programs is that they are based on extremely

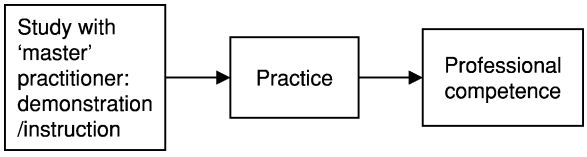

Figure 1 The craft model of professional education. From Wallace, 1991: 6.

vague conceptions. Having an ideology is not the same as having conceptions and ideas of what should be done and how it should be done" (Fullan, 1993: 109).

Student teachers need to see how it can be done in order to be able to develop alternative and more appropriate images of teaching. Therefore, teacher educators need to be positive role models from whom students gradually learn by appropriating the mutually agreed-upon purposes and corresponding practices. However, this concept of 'teacher as model' must not be confused with the mechanical imitation of behavior, which characterizes behaviorist-based teaching. Instead, it is understood in the Vygotskyan sense of learning as relational imitation, expressed in his concept of "the zone of proximal development" (Vygotsky, 1978).

Applied Science Model: Learning as Application of Knowledge The applied science model is probably still the most prevalent model underlying teacher education programs. According to this model, practical knowledge may be developed by the application of scientific knowledge that is conveyed or transmitted to student teachers (in lectures, for example) by those who are experts in the relevant areas. It is up to the recipients of this knowledge to apply the scientific findings by putting them into practice (see Figure 2).

This classical research-development-dissemination (RDD) model of innovation assumes that there are general solutions to practical problems, that these solutions may be developed outside practical situations (at universities, for example), and that solutions can be translated into teachers' actions by means of publications, training, administrative orders, and the like (Schön, 1983). This model ignores the knowledge that student teachers have acquired during their many years as (language) learners (see above), and it does not capture the nature and development of professional competence. It assumes an almost complete separation between research and practice and between those who think and those who do. Through this division of labor, a hierarchy of different kinds of knowledge is established, which reflects a mistrust

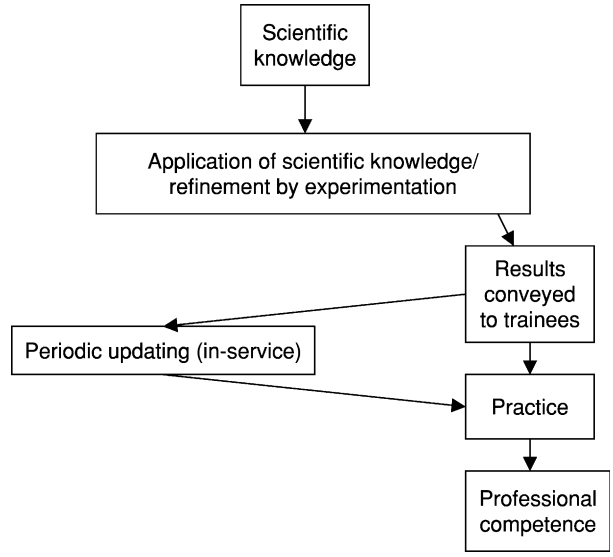

Figure 2 The applied science model of professional education. From Wallace, 1991: 9.

of practitioners who are then reduced merely to applying what has been predefined in the academic and administrative power structure above them.

However, not all the research meant to provide a deeper understanding of SL teaching and learning is relevant for teachers. Appel (1995: xi) illustrated this point when he described how he perceived the relevance of research when he was a novice teacher:

> "Everyday life at school was not about research. Research is controlling the variables; teaching is being controlled by them. At my workplace [secondary school SL classroom] no factors could be isolated. On the contrary, they were hopelessly muddled. Research was about keeping things separate. Life meant everything at once. . . .Research was about being rigorous and consistent. Life was about survival by any available means."

Reflective Model: 'Reflected Practice' to Develop Appropriate Practical Knowledge When teacher educators refer to professional knowledge, they often talk about research-based disciplinary knowledge, which usually forms the basis of teacher education programs for SL teachers. However, it would be impossible to cope with the complex demands of SL classrooms on the basis solely of a conscious application of principles alone, as has been suggested by the applied science model. This idea of teaching as decision making does not capture the whole picture. To be able to cope in complex contexts of practice, another type of knowledge, which Wallace (1991) has called "experiential knowledge" and which Schön (1983)

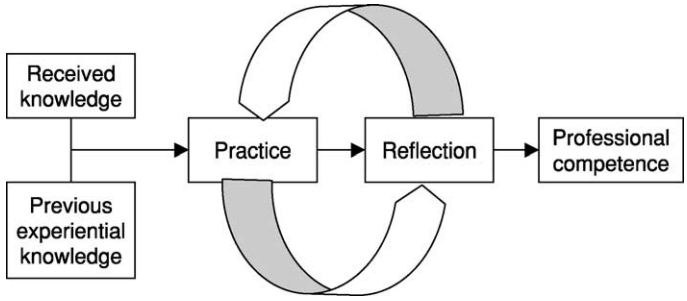

Figure 3 The reflective model of professional education. From Wallace, 1991: 15.

has described as "tacit knowledge in action," is relevant: to be able to cope with the sheer complexity and fluidity of classroom interaction, teachers need routines that will allow them to act competently in a classroom (see Figure 3).

Routines are part of a teacher's practical knowledge. They have been built up through frequent repetitions, and they are executed largely unconsciously. This is why practitioners are often unable to describe their practical knowledge. Because student teachers cannot fall back on corresponding routines, they find it hard to manage the complexity of processes in SL classrooms. It is, therefore, important that they develop their experiential knowledge in authentic practical contexts, so that they gain the opportunity to develop appropriate routines and to put their personal practical theories to the test by putting them through a continuous cycle of action and reflection, as this model suggests. We agree with Tsui (2003: 257) who argued that it is necessary for teachers to be able to articulate this tacit knowing-in-action because the ability to reflect on one's teaching and to share and develop it with the professional community is an aspect of expertise in teaching. Therefore, student teachers need opportunities to develop expertise both by observing expert teachers and by doing their own classroom-based teaching projects.

However, student teachers "are not empty vessels waiting to be filled with theoretical and pedagogical skills. They are individuals who enter teacher education programs with prior experiences, personal values, and beliefs that inform their knowledge about teaching and shape what they do" (Freeman and Johnson, 1998: 401). When teaching for the first time, these prior experiences find expression in classroom routines that they have established as part of their 'apprenticeship of observation.' A learning-to-teach study from the German context (Schocker-v. Ditfurth, 2001) was able to clearly identify the origin of some of these routines (such as the opening of lessons, the use of linguistic markers to lead in a new activity, or even the use of gestures to allocate talking time to students) as being rooted in their own language learning experiences as students. In discussions about their videotaped lessons with their tutor, student teachers became aware of the fact that they had acquired these routines from their former language teachers' repertoire, which they had copied unconsciously while simultaneously rejecting them intellectually.

The Context: What Is the Role of the SL Learning Classroom in Teacher Education?

As we have already demonstrated, it is crucial to include the SL learning classroom into teacher education for various reasons. From studies into teacher knowledge (Appel, 2000) we know that the appropriateness of materials and tasks depends on the perceived value that teachers and their learners associate with them. It is their interactions in the classroom that determine what is made available to be learned. This concept is expressed in the idea of the SL classroom as a 'culture' with particular features that affect the contents and structure of communication: a language class "is an arena of subjective and intersubjective realities which are worked out, changed, and maintained. And these realities are not a trivial background to the tasks of teaching and learning a language. They locate and define the new language itself...and they continually...mold the activities of teaching and learning" (Breen, 1985: 142). This is why Breen's distinction between *task-as-work plan* and *task-in-process* is crucial: Teachers need to be aware of the processes that a task triggers with their learners because the quality and efficacy of a task depend on its use during teaching and learning. Freeman and Johnson are, therefore, correct when they described schools as "powerful places that create and sustain meanings and values.... Thus, it is misleading to see them merely as settings in which educational practices are implemented .... Instead, ... schools and classrooms function as frameworks of value and interpretation in which language teachers must learn to work effectively" (Freeman and

Johnson, 1998: 409). The centrality of the classroom has been confirmed by a recent study on the expertise of ESL teachers (Tsui, 2003): teachers' conceptions and understanding of teaching are grounded and developed in their specific contexts of work. Moreover, their knowledge may not be delineated as separate domains of knowledge; rather, these knowledge domains are 'intermeshed' (Tsui, 2003: 247).

Published Knowledge: What Disciplines Constitute Relevant Subject Matter?

It probably comes as no surprise that attempts to agree on a common definition of what counts as relevant disciplinary knowledge and subject matter for SL teaching and learning have largely failed. The recent commentaries on re-conceptualizing teacher education in the *TESOL Quarterly's* forum (see Yates and Muchisky, 2003; Freeman and Johnson, 2004) are indicative of this state of affairs. Before we turn our attention to the practical consequences this complexity has on organizing learning in teacher education, we give a brief survey of the relevant disciplines as defined in Bausch *et al.* (2003). We subscribe to Freeman and Johnson's (2004: 125) view of SL teaching as not being a discipline but rather, very much like education, "a field of activity" that draws on various disciplines. These disciplines include linguistics, SL acquisition, philosophy of education, learning theory and psychology, literary studies, and cultural studies.

- *Linguistics:* Linguistics describes languages as systems of human communication. This discipline covers many different areas of investigation; for example, sound systems (phonetics, phonology), the study of the basic meaningful forms in language (morphology), sentence structure (syntax), meaning systems (semantics), and how language is used in social contexts (pragmatics, discourse analysis, sociolinguistics). Student teachers need to know not only linguistic subject matter knowledge about the language but also the pedagogical content knowledge (Calderhead, 1991) and the skills it takes to be able to mediate the language to learners. For example, they need to know about and be able to use appropriate interactive strategies, strategies to mediate the meaning of words, appropriate (corrective) feedback to learners, and appropriate language use in tasks. "(A)ny description of the English languages content must be understood against the backdrop of teachers' professional lives, within the settings where they work and within the circumstances of that work" (Freeman and Johnson, 1998: 405). Student teachers need to experience and make sense of what language is, how it is learned, and how this knowledge leads to certain instructional activities that support their learning (Freeman and Johnson, 2004).
- *SL Acquisition:* SL acquisition research investigates how second or foreign languages are learned. Researchers approach the question from different perspectives, but agree that language learning is a dynamic and multidimensional process, which is why sociocultural approaches to researching language acquisition seem more appropriate (on the relevance of SL acquisition theory for language teachers, see Ellis, 2003; Freeman and Johnson, 2004).
- *Philosophy of Education:* Philosophy of education discusses the general principles and purposes of human education, of which the learning of foreign languages is a part. One of these principles, for example, is learner autonomy, which is characterized as the motivation to take charge of one's own learning. To do so, learners need to be able and willing to act independently and in cooperation with others – an attitude that should be fostered in SL classrooms as well.
- *Learning Theory and Psychology:* This discipline describes how and why people learn. For example, it investigates the cognitive differences in the ways individuals learn (= learning styles) and highlights the need for teachers to take these differences into account. It focuses on the relationship between language learning and the age of acquisition or factors affecting the motivation to learn (see Cameron, 2001). This discipline investigates group dynamics and teacher and learner roles and identities.
- *Literary Studies:* This discipline discusses the nature of literary texts as one form of communication. It explores the factors that constitute this type communication, such as the author, the written text, and the reader.
- *Cultural Studies:* This discipline analyzes cultural phenomena and the way they represent cultural meaning. It looks at how representations of cultures are defined by issues of race, gender, and class and incorporates a historical perspective into the analysis. It also considers the process of relating different cultures (intercultural learning).

Principles for Designing and Evaluating Teacher Education Programs

Teachers have to cope with complex demands in SL classrooms. Research on the nature of teaching and findings from learning-to-teach studies suggest that teacher education is best organized according to the following three principles.

Research Approach to Learning: Developing a Multiperspective View on the SL Classroom

To help them understand the complex dynamics that determine language learning in SL classrooms, student teachers learn to develop a research approach to SL learning. They learn to integrate the relevant perspectives on learning and teaching. These perspectives include three domains of knowledge: relevant published knowledge, student teachers' own perspectives on language learning, and the perspective of the practical context.

Experiential Learning: Developing Action-Oriented Models for SL Classrooms

Teacher preparation courses are organized in a way that allows student teachers to experience the very processes that they are supposed to initiate with students in their prospective classrooms: the way learning is organized in these courses corresponds with the conditions of learning they are supposed to create in their prospective classroom. For example, when a course explores the potential of project work for SL learning, student teachers cooperate in teams, choose a research question, use various resources to do their research, discuss and publish the results of their projects, use the target language as their language of communication, and evaluate selected aspects of the process and the product of their cooperation according to mutually negotiated criteria. In doing all of this, they experience the advantages and the drawbacks of cooperative learning. It is hoped that, in this way, they will gradually appropriate the multiple skills that this complex SL learning environment entails.

Experimental Learning: Developing Context-Related Competencies through Cooperation in Cross-Institutional Projects

The ability to develop a research approach to language classrooms implies that teacher preparation needs to overcome the traditional separation of the institutions of school and university. The tradition of language teaching at schools often follows the structure of a textbook and a routine sequence of presentation, practice, and production. This organization of the language learning process often clashes with less controlled, learning-centered approaches to SL teaching and learning, such as the task-based approach (Ellis, 2003). Student teachers need what has come to be called 'dynamic qualifications'; that is, competencies and value judgments, which are the basis for any innovation to be successful. Such competencies include an appreciation of problems that one has identified during the learning process and student orientation, the ability to evaluate one's work, an experimental attitude to practice, and the ability to cope with controlled risks (see Schocker-v. Ditfurth, 2001). This approach is in line with Tsui's research on teacher expertise. It is a characteristic of an expert teacher to be oriented to 'problematization'; that is, the ability to identify and define problems and then to tackle them (Tsui, 2003: 272). For example, student teacher preparation courses that are suitable for developing this attitude focus on the use of technology for SL learning, during which student teachers develop innovative materials and tasks for SL classrooms in cooperation with teachers who are not used to integrating technology in their classroom; or they evaluate textbooks against criteria of task-based language learning, develop alternative tasks, and discuss their findings with the publishers of these textbooks. These examples show that, up to a point, student teachers are proactive persons, agents of change, who develop certain aspects of classroom language learning for a particular and clearly defined context (Schocker-v. Ditfurth and Legutke, 2002).

Models of Teacher Education Environments

Practicum as a Core Component of a Teacher Education Environment

The most radical implementation of a research approach to teacher education is realized within the framework of a practicum. The practicum is no longer simply an addition to the general teacher preparation course work, but rather constitutes its core component. The relevant course work devoted to introducing future teachers to issues of SL teaching, design of materials, and language analysis feeds into the practicum and/or derives its major content from the practicum experience (Schocker-v. Ditfurth, 2001).

In a first sequence of task-driven activities, student teachers are introduced to problematized fundamental constructs and issues of SL learning from published knowledge. They then connect these constructs to their own language learning experiences as language learners in school, thereby exploring their particular apprenticeship of observation. Second, student teachers explore some of these constructs and issues through classroom observation, which, together with the literature discussed in the first phase, provides the basis for interviews of the teachers observed. This approach triggers discussions on the relevance of the constructs; the appropriateness of content and processes for specific groups of language learners; and the choice of materials, tasks, and means of assessment, and the like. Pedagogical content knowledge, therefore, is not misunderstood

as prescriptive knowledge to be applied in practice. Rather, through the learning tasks, a personal and critical reflection on the relevance of the pedagogical content knowledge is fostered, supporting the emergence of a personally plausible and contextually acceptable theory of SL learning. During the last third of this type of integrated practicum, student teachers pursue one personally relevant research question that they try to answer by taking into account both published knowledge and their teaching experience. They are also encouraged to include the view of their learners and the teacher. Using a variety of methods of data gathering and appropriate modes of data analysis, they finally prepare a public presentation of their findings for those students who will follow them in a new cycle of teacher preparation.

Learning Environments with a Classroom-Based Research Component

In this type of learning-to-teach environment, a university course is a core component that is extended by contact with a number of foreign language/second language classrooms in which teachers participate in the teacher preparation work through face-to-face encounters and/or through the Internet. At the same time, the student teachers become part of the school classroom for some time through personal participation and regular communication with the teacher and the SL learners. Student teachers working in self-directed and cooperative groups prepare theme-centered project scenarios that they put into practice in their partner classrooms while pursuing a clearly defined set of appropriate research questions. During the implementation phase, student teachers become responsible for a small group of SL learners (up to five learners) at a time.

What is important in this type of learning environment is that the student teachers learn to navigate various discourses. Seminar discourse requires student teachers to interact with teacher educators, their fellow students, and also their team members on the content and processes of their projects and the appropriate research approach. This discourse, conducted in the target language, is enriched by input from cooperating teachers. At the level of classroom discourse, student teachers have to interact with their partner teachers and with the groups of SL learners they are responsible for during the implementation of their projects. At this level of discourse, student teachers can explore the differences between what seems predictable and doable at the level of seminar discourse and what often proves to be highly unpredictable, and sometimes questionable, in the classroom. Such a research-oriented learning environment counteracts established teacher preparation practice, which exposes students to constructs and theories without giving them a chance to experience its relevance and reflect on its potential for SL learning.

Learning Environments with an Indirect Research Component

The environment with a classroom-based research component described above is very demanding for all parties involved when compared to established teacher preparation coursework. In addition, the systematic cooperation with schools and teachers that it requires is not always easy to realize. Consequently, an alternative is for student teachers to work with classroom data gathered in previous projects. All the data generated – that is, video data from classroom projects, interviews with teachers and students, and log-files of the communication between cooperating teachers and teacher students – can be explored as a means of grappling with and understanding the complexity of language classrooms. As in the previous learning environment, students are simultaneously exposed to appropriate and relevant published knowledge, providing conceptual frameworks to be used when trying to make sense of the data or to be reassessed in view of the classroom data.

Learning Environments Using Participant Observation in Classrooms and/or Video Documents

A further mode of research-oriented teacher preparation can be realized by systematically integrating task-based classroom observations that include the multiple perspectives of the teacher and his or her SL learners. The explorations and presentations of student teachers' perspectives on classrooms in action can be jointly compared to interpretations offered by the teacher and learners. Such interpretative work, again further enriched by published knowledge, can be an important step toward helping student teachers develop their professional selves as teachers.

The models outlined above are not mutually exclusive, but rather are fundamental building blocks of any teacher preparation program, which supplement each other to contribute to the education of student teachers on their journey to becoming professional SL teachers.

Perspectives and Developments

To do justice to the complexity of the factors involved in language learning, it is necessary to foster

a multiperspective view on teacher education, which currently does not define mainstream teacher education practice. In addition, there is a need to think of ways to individualize learning, to take into account differing degrees of experience and commitment of student teachers, thus fostering their engagement in understanding the learning process and promoting critical reflection. A teaching portfolio documenting students' reflections on their learning processes, which some universities have started to introduce, is certainly a possible means toward these goals. What Freeman and Johnson formulate for the teaching of English as a second language (TESOL) and the preparation of teachers of English applies to SL teaching in general: strengthening and improving TESOL presupposes a conceptual clarity about what constitutes TESOL as a field of activity. "Such clarity calls for a more profound and reasoned understanding of what language teachers need to know to do what they do, how these skills and knowledge are learned in professional preparation and through professional development, and how they are practiced with students in classrooms" (Freeman and Johnson, 2004: 125). Such profound and reasoned understanding needs to include substantial research into the beliefs and practices of all components of teacher preparation: Applied linguists, experts in SL acquisition, and professors of literature and cultural studies have always reasserted the importance of their disciplines for teacher preparation without ever having engaged in the research of their own practice – their own classrooms – that are designed, managed, and maintained to contribute to the preparation of teachers (Bartels, 2002).

See also: Communicative Language Teaching; English: World Englishes; Intercultural Pragmatics and Communication; Interlanguage; Language Education Policy in Europe; Language Education: Teacher Preparation; Language Teaching Traditions: Second Language; Nonnative Speaker Teachers; Second and Foreign Language Learning and Teaching; Second Language Studies: Curriculum Development.

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Teaching of Minority Languages

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Focus and Nomenclature

Europe has a rich diversity of languages (Haarmann, 1975). This fact is usually illustrated by reference to the national languages of Europe. However, many more languages are spoken by the inhabitants of Europe. Examples of such languages are Welsh and Basque, or Arabic and Turkish. These languages are usually referred to as minority languages, even when in Europe as a whole there is no one majority language because all languages are spoken by a numerical minority. The languages referred to are representatives of regional minority (RM) and immigrant minority (IM) languages, respectively.

RM and IM languages have much in common, much more than is usually thought. On their sociolinguistic, educational, and political agendas, we find issues such as their actual spread; their domestic and public vitality; the processes and determinants of language maintenance versus language shift towards majority languages; the relationship between language, ethnicity, and identity; and the status of minority languages in schools, in particular in the compulsory stages of primary and secondary education. The origin of most RM languages as **minority** languages lies in the 19th century, when, during the processes of state formation in Europe, they found themselves excluded from the state level, in particular from general education. Only in the last few decades have some of these RM languages become relatively well protected in legal terms, as well as by affirmative educational policies and programs, both at the level of various nation-states and at the level of the European Union (EU) (see 'Beyond Bilingualism' below).

There have always been speakers of IM languages in Europe, but these languages have emerged only recently as community languages spoken on a wide scale in northwestern Europe, due to intensified processes of migration and minorization. Turkish and Arabic are good examples of so-called 'non-European' languages that are spoken and learned by millions of inhabitants of the EU member states. Although IM languages are often conceived of and transmitted as core values by IM language groups, they are much less protected than RM languages by affirmative action and legal measures in, for example, education. In fact, the learning and certainly the teaching of IM languages are often seen by speakers of mainstream languages and by policy makers as obstacles to integration. At the European level, guidelines and directives regarding IM languages are scant and outdated.

Despite the possibilities and challenges of comparing the status of RM and IM languages, amazingly few connections have been made in the sociolinguistic, educational, and political domains. In the Linguistic Minorities Project of the early 1980s, which was restricted to England, an observation was made which still applies to the situation today: "The project has been struck by how little contact there still is between researchers and practitioners working in bilingual areas and school systems, even between England and Wales. Many of the newer minorities in England could benefit from the Welsh experience and expertise" (LMP, 1985: 12). In our opinion, little has improved over the past decades, and contacts between researchers and policy makers working with different types of minority groups are still scarce. Examples of publications which focus on both types of minority language are the dual volumes on RM and IM languages by Alladina and Edwards (1991), and more recently the integrated volumes by Ammerlaan *et al.* (2001) and Extra and Gorter (2001).

As yet, we lack a common referential framework for the languages under discussion. As all of these RM and IM languages are spoken by different language communities and not at statewide level, it may seem logical to refer to them as community languages, thus

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There have always been speakers of IM languages in Europe, but these languages have emerged only recently as community languages spoken on a wide scale in northwestern Europe, due to intensified processes of migration and minorization. Turkish and Arabic are good examples of so-called 'non-European' languages that are spoken and learned by millions of inhabitants of the EU member states. Although IM languages are often conceived of and transmitted as core values by IM language groups, they are much less protected than RM languages by affirmative action and legal measures in, for example, education. In fact, the learning and certainly the teaching of IM languages are often seen by speakers of mainstream languages and by policy makers as obstacles to integration. At the European level, guidelines and directives regarding IM languages are scant and outdated.

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As yet, we lack a common referential framework for the languages under discussion. As all of these RM and IM languages are spoken by different language communities and not at statewide level, it may seem logical to refer to them as community languages, thus

contrasting them with the official languages of European nation-states. However, the designation 'community languages' is already in use to refer to the official languages of the EU, and in that sense occupied territory. From an inventory of the different terms in use, we learn that there are no standardized designations for these languages across nation-states. Table 1 gives a nonexhaustive overview of the nomenclature of our field of concern in terms of reference to the people, their languages, and the teaching of these languages. The concept of 'lesser-used languages' has been adopted at the EU level; the European Bureau for Lesser Used Languages, established in Brussels and Dublin, speaks and acts on behalf of 'the autochthonous regional and minority languages of the EU.' Table 1 shows that the utilized terminology varies not only across different nation-states, but also across different types of education.

Table 1 Nomenclature of the Field

Reference to the People

- nonnational residents
- foreigners, *étrangers*, *Ausländer*
- (im)migrants
- newcomers, new Xmen (e.g., new Dutchmen)
- cocitizens (instead of citizens)
- ethnic/cultural/ethnocultural minorities
- linguistic minorities
- allochthones (e.g., in the Netherlands), allophones (e.g., in Canada)
- non-English-speaking (NES) residents (in particular in the USA)
- *anderstaligen* (Dutch: those who speak other languages)
- colored/black people, visible minorities (the latter in particular in Canada)

Reference to their Languages

- community languages (in Europe versus Australia)
- ancestral/heritage languages (common concept in Canada)
- national/historical/regional/indigenous minority languages versus nonterritorial/nonregional/nonindigenous/ non-European minority languages
- autochthonous versus allochthonous minority languages
- lesser used/less widely used/less widely taught languages (in EBLUL context)
- stateless/diaspora languages (in particular used for Romani)
- languages other than English (LOTE: common concept in Australia)

Reference to the Teaching of These Languages

- instruction in own language (and culture)
- mother tongue teaching (MTT)
- home language instruction (HLI)
- community language teaching (CLT)
- regional minority language instruction versus immigrant minority language instruction
- *enseignement des langues et cultures d'origine* (ELCO: in French/ Spanish primary schools)
- *enseignement des langues vivantes* (ELV: in French/Spanish secondary schools)
- *muttersprachlicher Unterricht* (MSU: in German primary schools)
- *muttersprachlicher Ergänzungsunterricht* (in German primary/ secondary schools)
- *herkunftssprachlicher Unterricht* (in German primary/secondary schools)

Source: Extra and Yağmur (2004: 19).

There is much published evidence on the status and use of RM languages, both in Europe and abroad (e.g., Gorter *et al.*, 1990; *see also* **Minorities and Language**). Baetens Beardsmore (1993) focused on RM languages in western Europe, whereas the focus of Synak and Wicherkiewicz (1997), Bratt-Paulston and Peckham (1998), and Hogan-Brun and Wolff (2003) was on RM languages in central and eastern Europe. Given the overwhelming focus on mainstream language acquisition by IM groups, there is much less evidence on the status and use of IM languages across Europe as a result of processes of immigration and minorization. In contrast to RM languages, IM languages have no established status in terms of period and area of residence. Obviously, typological differences between IM languages across EU member states do exist, e.g., in terms of the status of IM languages as EU languages or non-EU languages, or as languages of formerly colonialized source countries. Taken from the latter perspective, Indian languages are prominent in Great Britain, Maghreb languages in France, Congolese languages in Belgium, and Surinamese languages in the Netherlands.

Tosi (1984) offered an early case study on Italian as an IM language in Great Britain. Most studies of IM languages in Europe have focused on a spectrum of IM languages at the level of one particular multilingual city (Kroon, 1990; Baker and Eversley, 2000), one particular nation-state (LMP, 1985; Alladina and Edwards, 1991; Extra and Verhoeven, 1993a; Caubet *et al.*, 2002; Extra *et al.*, 2002), or one particular IM language at the European level (Tilmatine, 1997 and Obdeijn and De Ruiter, 1998 on Arabic in Europe, or Jørgensen, 2003 on Turkish in Europe).

A number of studies have taken both a crossnational and a crosslinguistic perspective on the status and use of IM languages in Europe (e.g., Husén and Opper, 1983; Jaspaert and Kroon, 1991, Extra and Verhoeven, 1993b, 1998; Extra and Gorter, 2001). Churchill (1986) offered an early crossnational perspective on the education of IM children in the OECD countries, whereas Reid and Reich (1992) carried out a crossnational evaluative study of 15 pilot projects on the education of IM children supported by the European Commission.

Crossnational Perspectives on Community Language Teaching

Across Europe, large contrasts occur in the status of IM languages at school, depending on particular

nation-states, or even particular federal states within nation-states (as in Germany), and depending on particular IM languages being national languages in other European (Union) countries or not. Most commonly, IM languages are not part of mainstream education. In Great Britain, for example, IM languages are not part of the so-called national curriculum, and they are dealt with in various types of so-called complementary education in out-of-school hours (see e.g., Martin *et al*., 2004).

Here we present the most salient outcomes of the Multilingual Cities Project (MCP), a multiple case study in six major multicultural cities in different EU member states (Extra and Yağmur, 2004). The aims of the MCP were to gather, analyze, and compare multiple data on the status of IM languages at home and at school. In the participating cities, ranging from northern to southern Europe, Germanic and/or Romance languages have a dominant status in public life. Figure 1 gives an outline of the project.

Being aware of crossnational differences in denotation (see Table 1), we use the concept of community language teaching (CLT) when referring to this type of education. Our rationale for using the concept of CLT rather than the concepts of mother tongue teaching or home language instruction is the inclusion of a broad spectrum of potential target groups. First of all, the status of an IM language as a 'native' or 'home' language can change through intergenerational processes of language shift. Moreover, in secondary education, both minority and majority pupils are often *de jure* (although seldom *de facto*) admitted to CLT (in the Netherlands, for instance, Turkish is a secondary school subject referred to as 'Turkish' rather than 'home language instruction'; compare also the concepts of *enseignement des langues et cultures d'origine* and *enseignement des langues vivantes* in French primary and secondary schools in Table 1, respectively).

In all countries involved in the MCP, there has been an increase in the number of IM pupils who speak a language at home other than or in addition to the mainstream language in primary and secondary education. Schools have largely responded to this home–school language mismatch by paying more attention to the learning and teaching of the mainstream language as a second language. A great deal of energy and money is being spent on developing curricula, teaching materials, and teacher training for second-language education. CLT stands in stark contrast to this, as it is much more susceptible to an ideological debate about its legitimacy. While there is consensus about the necessity of investing in second-language education for IM pupils, there is a lack of support for CLT. IM languages are commonly considered sources of problems and deficiencies, and they are rarely seen as sources of knowledge and enrichment. Policy makers, local educational authorities, school principals, and teachers of 'regular' subjects often have reservations or negative attitudes towards CLT. On the other hand, parents of IM pupils, CLT teachers, and IM organizations often make a case for including IM languages in the school curriculum. These differences in top-down and bottom-up attitudes were found in all the cities and countries investigated.

From a historical point of view, most of the countries show a similar chronological development in their argumentation in favor of CLT. CLT was generally introduced into primary education with a view to family remigration. This objective was also clearly expressed in Directive 77/486 of the European Community, on July 25, 1977. The directive focused on the education of the children of 'migrant workers' with the aim 'principally to facilitate their possible reintegration into the Member State of origin.' As is clear from this formulation, the directive excluded all IM children originating from non-EU countries, although these children formed a large part of IM children in European primary schools. At that time, Sweden was not a member of the European Community, and CLT policies for IM children in Sweden were not directed towards remigration but modeled according to bilingual education policies for the large minority of Finnish-speaking children in Sweden.

During the 1970s, the above argumentation for CLT was increasingly abandoned. Demographic developments showed no substantial signs of

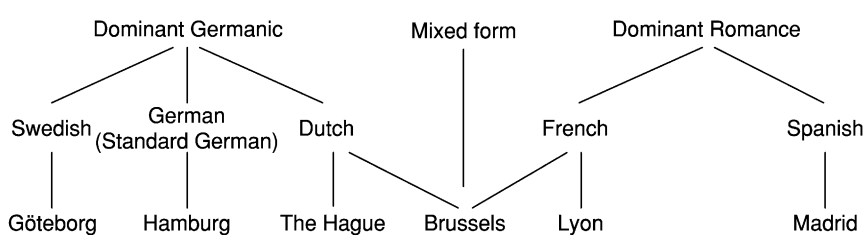

Figure 1 Outline of the Multilingual Cities Project.

remigrating families. Instead, a process of family reunion and minorization came about in the host countries. This development resulted in a conceptual shift, and CLT became primarily aimed at combating disadvantages. CLT had to bridge the gap between the home and the school environment, and to support school achievement in 'regular' subjects. Because such an approach tended to underestimate the intrinsic value of CLT, a number of countries began to emphasize the importance of CLT from a cultural, legal, or economic perspective:

- from a cultural perspective, CLT contributes to maintaining and advancing a pluriform society;
- from a legal perspective, CLT meets the internationally recognized right to language transmission and language maintenance, and acknowledges the fact that many IM groups consider their own language as a core value of cultural identity in a context of migration and minorization;
- from an economic perspective, CLT leads to an important pool of profitable knowledge in societies which are increasingly internationally oriented.

The historical development of arguments for CLT in terms of remigration, combating deficiencies, and multicultural policy is evident in some German states, in particular North Rhine-Westphalia and Hamburg. In most other countries in our study, cultural policy is tied in with the mainstream language to such an extent that CLT is tolerated only in the margins. Cultural motives have played a rather important role in Sweden. It should, however, be noted that multicultural arguments for CLT have not led to an educational policy in which the status of IM languages has been substantially advanced in any of the countries involved in our study.

Derived from Extra and Yağmur (2004), we give a crossnational overview of nine parameters of CLT in primary and secondary education that were taken into account in each of the six countries involved. CLT for primary school children came to an abrupt nationwide end in the Netherlands in 2004 as being 'in contradiction with integration,' and the information presented is therefore in retrospect.

Target Groups

The target groups for CLT in primary schools are commonly IM children, defined as such in a narrow or broad sense. Narrow definitions commonly relate to the range of languages taught and/or to children's proficiency in these languages. The most restrictive set of languages is taught in Spain, i.e., Arabic and Portuguese only, for Moroccan and Portuguese (-speaking) children respectively. A wide range of languages is taught in Sweden and Germany. The Netherlands, Belgium, and France take/took an intermediate position. Sweden and France demand from the target groups an active use of the languages at home and a basic proficiency in these languages. Special target groups in Sweden are adopted children; in Germany, ethnic German children from abroad; and in France, speakers of recognized RM languages. Sweden has the most explicit policy for access to CLT in terms of 'home language' (nowadays, back to 'mother tongue') instead of socio-economic status. The target groups for CLT in secondary schools are commonly those who participated in CLT in primary schools. *De jure*, all pupils are allowed CLT in the Netherlands, independent of ethnolinguistic background; *de facto,* most commonly, a subset of IM pupils takes part. CLT for secondary school pupils is almost nonexistent in Belgium, and limited to Arabic and Portuguese in a few secondary schools in Spain.

Arguments

The arguments for CLT are formulated in terms of a struggle against deficits and/or in terms of multicultural policy. Whereas the former type of argument predominates in primary education, the latter type predominates in secondary education. The vague concept of 'integration' utilized in all countries under discussion may relate to any of these arguments. Deficit arguments may be phrased in terms of bridging the home–school gap, promoting mainstream language learning, promoting school success in other ('regular') subjects, preventing educational failure, or overcoming marginalization. Multicultural arguments may be phrased in terms of promoting cultural identity and self-esteem, promoting cultural pluralism, promoting multilingualism in a multicultural and globalizing society, and avoiding ethnic prejudice. Whereas in the Netherlands and Belgium deficit arguments dominate(d), multicultural arguments tend(ed) to play a greater role in the other countries. Deficit arguments for CLT are almost absent in secondary schools, and multicultural arguments are commonly favored in all countries.

Objectives

The objectives of CLT in primary schools are rarely specified in terms of language skills to be acquired. The vague concept of 'active bilingualism' has been a common objective in Sweden, whereas in Germany and Spain, reference is made to the development of oral and written language skills, language awareness, and (inter)cultural skills. In none of these cases have more particular specifications been introduced. In

contrast, the objectives of CLT in secondary schools are commonly specified in terms of particular oral and written skills to be reached at intermediate stages and/or at the end of secondary schooling.

Evaluation

The evaluation of achievement through CLT may take place informally and/or formally. Informal evaluation takes place by means of subjective oral and/or written teachers' impressions or comments, meant for parents at regular intervals, e.g., once per semester or year. Formal evaluation takes place using more or less objective language proficiency measurement and language proficiency report figures, e.g., once per semester or year. Informal evaluation may occur in lower grades of primary schooling, formal evaluation in higher grades (e.g., in Sweden). In most countries, however, no report figures for CLT are provided throughout the primary school curriculum, and report figures for 'language' commonly refer implicitly to proficiency in the mainstream language. If CLT report figures are given (e.g., in France), such figures commonly do not have the same status as report figures for other subjects. The evaluation of achievement through CLT in secondary schools takes place formally through assessment instruments and examinations. Here, report figures may have a regular or a peripheral status. The former holds in particular for Sweden, Germany, and the Netherlands.

Minimal Enrolment

Minimal enrolment requirements for CLT may be specified at the level of the class, the school, or even the municipality at large. The latter is common practice only in Sweden, and the minimal enrolment requirement for children from different classes/schools in Sweden is five (2003/2004). Secondary schools in Sweden may also opt for CLT if at least five pupils enroll; four pupils are required in the Netherlands. All other countries are more reluctant, with minimal requirements for primary school pupils ranging between 10 and 20 (Germany, Belgium, France), or without any specification (the Netherlands and Spain). In the latter case, enrolment restrictions are commonly based on budget constraints.

Curricular Status

In all countries, CLT at primary schools takes place on a voluntary and optional basis, provided at the request of parents. Instruction may take place within or outside regular school hours. The latter is most common in Sweden, Belgium, and France. Germany, the Netherlands (until 2004), and Spain allow(ed) for two models of instruction, either within or outside regular school hours, depending on the type of language (in Germany), the type of goal (auxiliary or intrinsic in the Netherlands), and the type of organization (in integrated or parallel classes in Spain). The number of CLT hours ranges from 1 to 5 hours. If CLT takes place at secondary schools, it is considered a regular and optional subject within school hours in all countries under consideration.

Funding

The funding of CLT may depend on national, regional, or local educational authorities in the country/municipality of residence and/or on the consulates/embassies of the countries of origin. In the latter case, consulates or embassies commonly recruit and provide the teachers, and they are also responsible for teacher (in-service) training. Funding through the country and/or municipality of residence takes/took place in Sweden and the Netherlands. Funding through the consulates/embassies of the countries of origin takes place in Belgium and Spain. A mixed type of funding occurs in Germany and in France. In Germany, the source of funding is dependent on particular languages or organizational models for CLT. In France, source countries fund CLT in primary schools, whereas the French ministry of education funds CLT in secondary schools.

Teaching Materials

Teaching materials for CLT may originate from the countries of origin or of residence of the pupils. Funding from ministries, municipalities, and/or publishing houses occurs in Sweden, Germany, and the Netherlands, although limited resources are available. Source country funding for CLT occurs in Belgium and Spain. In France, source countries fund teaching materials in primary schools, whereas the French ministry of education funds teaching materials in secondary schools.

Teacher Qualifications

Teacher qualifications for CLT may depend on educational authorities in the countries of residence or of origin. National or statewide (in-service) teacher-training programs for CLT at primary and/or secondary schools exist in Sweden, Germany, and the Netherlands, although the appeal of these programs is limited, given the many uncertainties about CLT job perspectives. In Belgium and Spain, teacher qualifications depend on educational authorities in the countries of origin. France has a mixed system of responsibilities: source countries are responsible for teacher qualifications in primary schools, whereas

the French ministry of education is responsible for teacher qualifications in secondary schools.

The presented overview of given parameters shows that there are remarkable crossnational differences in the status of CLT. There are also considerable differences between primary and secondary education in the status of CLT. A comparison of all nine parameters makes clear that CLT has gained a higher status in secondary schools than in primary schools. In primary education, CLT is generally not part of the 'regular' or 'national' curriculum, and, therefore, becomes a negotiable entity in a complex and often opaque interplay between a variety of actors. Another remarkable difference is that, in some countries, CLT is funded by the consulates or embassies of the countries of origin. In these cases, the national government does not interfere in the organization of CLT, or in the requirements for and the selection and employment of teachers. A paradoxical consequence of this phenomenon is that the earmarking of CLT budgets is often safeguarded by the above-mentioned consulates or embassies. National, regional, or local governments often fail to earmark budgets, so that funds meant for CLT may be appropriated for other educational purposes.

The higher status of CLT in secondary education is largely due to the fact that instruction in one or more languages other than the national standard language is a traditional and regular component of the (optional) school curriculum, whereas primary education is mainly determined by a monolingual *habitus* (Gogolin, 1994). Within secondary education, however, CLT must compete with 'foreign' languages that have a higher status or a longer tradition. It should further be noted that some countries provide instruction and/or exams in nonstandard language varieties. In France, for instance, pupils can take part in examinations in several varieties of Arabic and several Berber languages (Tilmatine, 1997); Sweden offers Kurmanji-Kurdish as an alternative to Turkish. From mid-2004 on, the EU has been expanded with the inclusion of the national languages of 10 new EU countries. This leads to the paradoxical situation that the national languages of, for example, the three Baltic states are supported by more positive action ('celebrating linguistic diversity') in multilingual Europe than IM languages such as Turkish, spoken by many more people across Europe.

CLT may be part of a largely centralized or decentralized educational policy. In the Netherlands, national responsibilities and educational funds are gradually being transferred to the municipal level, and even to individual schools. In France, government policy is strongly centrally controlled. Germany has devolved most governmental responsibilities to the federal states, with all their differences. Sweden grants far-reaching autonomy to municipal councils in dealing with educational tasks and funding. In general, comparative crossnational references to experiences with CLT in the various EU member states are rare, or they focus on particular language groups. With a view to the demographic development of European nation-states into multicultural societies, and the similarities in CLT issues, more comparative crossnational research would be highly desirable.

Beyond Bilingualism: Dealing with Multilingualism at School

In Europe, language policy has largely been considered a domain which should be developed within the national boundaries of the different EU nation-states. Proposals for an overarching EU language policy were laboriously achieved and are noncommittal in character (Coulmas, 1991; *see also* **Language Education Policy in Europe** and **Language Policies: Policies on Language in Europe**). The most important declarations, recommendations, or directives on language policy, each of which concepts carries a different charge in the EU jargon, concern the recognition of the status of (in the order mentioned)

- national EU languages;
- 'indigenous' or RM languages;
- 'nonterritorial' or IM languages.

On numerous occasions, the EU ministers of education declared that EU citizens' knowledge of languages should be promoted (Baetens Beardsmore, 1993). Each EU member state should promote pupils' proficiency in at least two 'foreign' languages, and at least one of these languages should be the official language of an EU state. Promoting knowledge of RM and/or IM languages was left out of consideration in these ministerial statements. The European Parliament, however, accepted various resolutions which recommended the protection and promotion of RM languages and which led to the foundation of the European Bureau for Lesser Used Languages in 1982. Another result of the European Parliament resolutions was the foundation of the European Mercator Network, aimed at promoting research into the status and use of RM languages. In March 1998, the European Charter for Regional or Minority Languages came into operation. The charter is aimed at the protection and promotion of RM languages, and it functions as an international instrument for the comparison of legal measures and other facilities of the EU member states in this policy domain (Craith, 2003).

Bilingual education in national majority languages and regional minority languages has been an area of

interest and research for a long time (Baker, 2001). More recently, local and global perspectives are taken into consideration that go beyond bilingualism and focus on multilingualism and multilingual education. Apart from national majority and regional minority languages, the focus is commonly on the learning and teaching of English as a third language, and in this way on promoting trilingualism from an early age (Cenoz and Genesee, 1998; Cenoz and Jessner, 2000; Beetsma, 2002, Ytsma and Hoffmann, 2003).

As yet, no affirmative initiatives have been taken in the European policy domain of IM languages. It is remarkable that the teaching of RM languages is generally advocated for reasons of cultural diversity as a matter of course, whereas this is rarely a major argument in favor of teaching IM languages. The 1977 guideline of the Council of European Communities on education for IM children (Directive 77/486, dated July 25, 1977) is now outdated. It needs to be put in a new and increasingly multicultural context; it needs to be extended to pupils originating from non-EU countries; and it needs to be given greater binding force in the EU member states.

There is a great need for educational policies in Europe that take new realities of multilingualism into account. Processes of internationalization and globalization have brought European nation-states to the world, but they have also brought the world to European nation-states. This bipolar pattern of change has led to both convergence and divergence of multilingualism across Europe. On the one hand, English is on the rise as the lingua franca for international communication across the borders of European nation-states at the cost of all other national languages of Europe, including French. In spite of many objections against the hegemony of English (Phillipson, 2003), this process of convergence will be enhanced by the extension of the EU in an eastward direction. Within the borders of European nation-states, however, there is an increasing divergence of home languages due to large-scale processes of migration and intergenerational minorization.

The call for differentiation of the monolingual *habitus* of primary schools across Europe originates not only bottom up from IM parents or organizations, but also top down from supranational institutions which emphasize the increasing need for European citizens with a transnational and multicultural affinity and identity. Multilingual competencies are considered prerequisites for such an affinity and identity. Both the European Commission and the Council of Europe have published many policy documents in which language diversity is cherished as a key element of the multicultural identity of Europe – now and in the future. This language diversity is considered to be a prerequisite rather than an obstacle for a united European space in which all citizens are equal (not the same) and enjoy equal rights (Council of Europe, 2000). The maintenance of language diversity and the promotion of language learning and multilingualism are seen as essential elements for the improvement of communication and for the reduction of intercultural misunderstanding.

The European Commission (1995) opted in a so-called White Book for trilingualism as a policy goal for all European citizens. Apart from the 'mother tongue,' each citizen should learn at least two 'community languages.' In fact, the concept of 'mother tongue' referred to the national languages of European nation-states and ignored the fact that mother tongue and national language do not coincide for many inhabitants of Europe. At the same time, the concept of 'community languages' referred to the national languages of two other EU member-states. In later European Commission documents, reference was made to one foreign language with high international prestige (English was deliberately not referred to) and one so-called neighboring language. The latter concept related commonly to neighboring countries, never to next-door neighbors.

In a follow-up to the first European Year of Languages, proclaimed in 2001, the heads of state and government of all EU member states gathered in 2002 in Barcelona and called upon the European Commission to take further action to promote multilingualism across Europe, in particular by the learning and teaching of at least two foreign languages from a very young age (Nikolov and Curtain, 2000). The final Action Plan 2004–2006, published by the European Commission (2003), may ultimately lead to an inclusive approach in which IM languages are no longer denied access to Europe's celebration of language diversity. In particular, the plea for the learning of three languages by all EU citizens, the plea for an early start to such learning experiences, and the plea for offering a wide range of languages to choose from open the door to such an inclusive approach. Although this may sound paradoxical, such an approach can also be advanced by accepting the role of English as a lingua franca for intercultural communication across Europe.

Against this background, the following principles are suggested for the enhancement of multilingualism at the primary school level:

1. In the primary school curriculum, three languages are introduced for all children:
   - the standard language of the particular nation-state as a major school subject and the major language of communication for the teaching of other school subjects;

- English as a lingua franca for international communication;
- an additional third language chosen from a variable and varied set of priority languages at the national, regional, and/or local levels of the multicultural society.

2. The teaching of these languages is part of the regular school curriculum and subject to educational inspection.
3. Regular primary school reports provide, formally or informally, information on the children's proficiency in each of these languages.
4. National working programs are established for the priority languages referred to under (1) in order to develop curricula, teaching methods, and teacher training programs.
5. Part of these priority languages may be taught at specialized language schools.

This set of principles is aimed at reconciling bottom-up and top-down pleas in Europe for multilingualism, and is inspired by large-scale and enduring experiences with the learning and teaching of English (as L1 or L2) and one language other than English (LOTE) for all children in the state of Victoria, Australia (see Extra and Yağmur, 2004). When each of the above-mentioned languages should be introduced in the curriculum, and whether or when they should be subject or medium of instruction, should be spelled out depending on particular national, regional, or local contexts. Derived from an overarching conceptual and longitudinal framework, priority languages could be specified in terms of both RM and IM languages for the development of curricula, teaching methods, and teacher-training programs. Moreover, the increasing internationalization of pupil populations in European schools requires that a language policy be introduced for **all** schoolchildren in which the traditional dichotomy between foreign language instruction for indigenous majority pupils and home language instruction for IM pupils is put aside. Given the experiences abroad (e.g., the Victorian School of Languages in Melbourne, Australia), language schools could become centers of expertise where a variety of languages are taught, in particular if the number of children requesting instruction in these languages is low and/or spread over many schools. In line with the proposed principles for primary schooling, similar ideas could be worked out for secondary schools where learning more than one language is already an established practice. The above-mentioned principles would recognize multilingualism in an increasingly multicultural environment as an asset for all children and for society at large. The EU, the Council of Europe, and UNESCO could function as leading transnational agencies in promoting such concepts. The UNESCO Universal Declaration of Cultural Diversity is in line with the inclusive views expressed here, in particular in its plea to encourage language diversity, to respect the mother tongue at all levels of education, and to foster the learning of several languages from the youngest age.

See also: Bilingual Education; Education in a Multilingual Society; Immigrant Language Education; Language Education Policy in Europe; Language Policies: Policies on Language in Europe; Migration and Language; Minorities and Language; Minority Languages: Education; Multiculturalism and Language.

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Teaching Technologies: Second Language

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Recent progress in technology-enhanced language learning has been concentrated in two broad areas: Multimedia and Information Technologies (IT, also commonly known as ICT, Information and Communication Technologies). Information Technologies came about as the result of advances in computer networking, which fundamentally changed the flow of information at every level of our society. IT became critical in order to manage the vast amount of information. Arising from the continuous developments in computer processing power and increasing storage capacities, digitization of different types of media

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has proliferated, resulting in vast archives of text, audio, graphics, photographs, and video stored in digital form. Computers became powerful enough to integrate these media in the digital form and to handle them seamlessly in a user-friendly manner. Audiocassettes and videotapes are rapidly giving way to digital formats, including CDs, DVDs, and digital media computer servers. More digital cameras are being sold than traditional film-based cameras. The majority of consumer-grade video camcorders now use the digital formats. Language learning venues are also going through a transition. Language students of the 1960s and 1970s diligently visited the audio language laboratory, for class meetings and for homework and self-study. This picture changed and broadened with the advent of the microcomputer and the Internet. Audiotape language laboratories were replaced by media centers that delivered a wide range of audio, video, and multimedia computer resources. The expansion of language learning spaces continues as students use their own computers for their learning without needing to go to computer laboratories. This shift in the learning environment is a direct result of the diminishing size of computer hardware, ubiquitous connectivity to the Internet, and the ever-increasing availability of wireless network connections.

Language teachers have always exploited any technology that would allow them to bring the language and culture alive for their students. Currently, technology serves a variety of functions: a multimedia information and reference channel for exploring the culture and language; a tutor that provides information, practice, help, and instant feedback in a self-paced environment; an assessment tool; a productivity-enhancing means of composing, revising, and disseminating written production; and a way for teachers and learners to communicate and work collaboratively. Older tried-and-true technologies are never instantly replaced by newer ones, but rather they coexist for an extended period of time – not only for reasons of software availability, but because they genuinely work better for the instructional need or for the instructor's approach to teaching. The next section focuses on the major developments and advances that have emerged during the past 10 years and that have influenced the use of technology in language learning and teaching.

Key Developments in the Last Decade

Most successful technology-driven developments in education have paralleled general trends in the corporate and the consumer market. The language profession is no different from other academic disciplines in exploiting the 'generic' tools that have emerged for business and consumers as a result of the Internet, including World Wide Web pages, computer conferencing, and training or learning management systems. In fact, when compared with Computer-Assisted Language Learning (CALL) applications of the 1980s and early 1990s, these generic tools have been embraced with much more enthusiasm than we have ever witnessed with any technology of the past. Whereas the period from 1984 to 1994 in CALL development was characterized by custom programs anchored to local workstations equipped with multimedia peripherals (random-access audio devices, videodisc players, CD drives), many contemporary CALL ventures are moving toward a web-based model of anytime, any-place connectivity to digital resources of all kinds – text, graphics, sound, photos, and video – and more online human-to-human interaction, both synchronous (in real time) and asynchronous (at delayed intervals).

A shift similar to the shift from custom programs to more generic tools is seen in the learning environment. Dedicated language laboratories have been replaced by more general-purpose computer laboratories. Technological advances in hardware, such as higher processing speed of computer chips and increasing capacities of storage devices, have made this shift possible. As the wireless networks become widespread and individuals carry their own computers, many of the learning activities that happened in room-based computer laboratories will inevitably shift to personal portable devices of all kinds, including handheld computers and multipurpose cellular phones.

Exponential Growth of the Internet and the World Wide Web

Without any doubt, the technological advance that has had the greatest impact on the teaching and learning of foreign languages is the exponential growth of the Internet and the World Wide Web. Although the Internet and the Web are frequently used as interchangeable terms, a stricter distinction can be made. The Internet refers to the network of the physical connections and protocols that link computers to one another (an invention attributed to the U.S. government), as distinguished from the Web, which is the Internet-based phenomenon that came into being in 1990, when Tim Berners-Lee created the World Wide Web at a lab in Switzerland by establishing the notion of the Universal Resource Locator (URL), which together with hypertext markup language, forms the basis of current resources accessed by browser applications, such as Internet Explorer. The Internet has spread to many parts of the world,

saturating developed nations and increasingly penetrating countries traditionally at the margins of technological growth. This growth can mean significant access to native speakers and native language and cultures for students in a wide range of target languages except those spoken primarily in areas where speakers have neither a tradition of written language nor a culture of computer usage.

English dominated the Web at the beginning and currently accounts for approximately one-third of the online language population. However, if trends continue as they have in the past several years, the online language populations on the Internet will continue to shift toward a better language balance as Internet technology pervades all regions of the world, especially Africa, Asia, the Middle East, and Latin America. Due to the growth of the Web, personal computer operating systems have become much friendlier to a wider range of languages including nonalphabetical languages and right-to-left languages. (See the section below on Unicode for character handling.)

The Web offers a wealth of authentic linguistic and cultural artifacts usable at many moments in instruction, both during and outside of class, and at all levels. The acceptance of the Web into the foreign language profession was smooth and swift because it was strongly content-driven and no hardware changes were necessary. In fact, no past instructional technology or application has resonated so completely with our profession and been embraced in so short a time as has the Web, not only because of content and ease of use, but because of the potential for building varied communities of learners through good connectivity.

Computer-Mediated Communication

In the early 1990s, the few instructional language projects using the Internet were limited primarily to asynchronous (delayed response) e-mail exchanges and synchronous (real-time) class discussions on local area networks (LANs). During the past decade, the Internet blossomed as a mature communication medium – one even better suited to the instructional goals of language learning. Thus, from the first electronic communication experiments has emerged a new multifaceted domain known as computer-mediated communication (CMC), comprising both synchronous and asynchronous communication modes. In addition to traditional e-mail and LAN-based class discussion, the possibilities now include Instant Relay Chat (IRC) text messaging, graphical chat with sound, threaded discussion, MOOs (Multiple user domain-Object Oriented, environments based on interactive online gaming software), and Internet-based audio and video teleconferencing systems, all of which make possible authentic language learning experiences and radically different learning communities in which language learners are connected to native speakers of their target language.

Since many forms of CMC require text in the electronic form, learners must learn to type in the target language. Though typing in alphabetical languages is a relatively simple task, the issues of typing in nonalphabetical languages are more complex. Teaching students how to use the input systems for languages such as Chinese and Japanese efficiently enough for them to communicate in a spontaneous fashion constitutes a significant inhibition to online communication in these languages. In fact, the instructional use of word processing and the Internet has an impact on the instruction of the orthography by redefining what constitutes the writing ability. In other words, students may not have to be able to write a large number of characters by hand.

Synchronous online exchanges have recently been the object of a great deal of research – analyzing the nature of the language/discourse in CMC, the importance of task in language production, and the nature of the social or intercultural interactions as they occur in this medium. A number of notable experiments in CMC involving foreign language classes in the United States and English learners in Europe have revealed the challenges and benefits of connecting language students with native speakers of the target language. Pennsylvania State's Telecollaboration Project, MIT's Cultura Project, and Vassar's Moossiggang all demonstrate that students are motivated by these collaborative exchanges and engage in productive learning activities that promote authentic use of the language, using the language for authentic communication rather than as the object of study. Despite the reported successes of such projects, significant problems persist: crosscultural misunderstandings, unequal access to technology, mismatches of school calendars, differences in student motivation and rewards leading to disparate levels of commitment, and sound methods of assessment.

Course Management Systems

Course Management Systems (CMSs), also commonly known as Virtual Learning Environments and Learning Managements Systems, have made a major impact on all disciplines at postsecondary institutions. These e-learning systems are designed to provide a flexible, multifaceted environment for creating online course materials. They have been used to supplement face-to-face learning as well as to deliver classes that are conducted completely online. Among

these electronic learning environments, WebCT and Blackboard dominate the market in the United States, Europe, Asia, Australia, and other parts of the world. These 'e-learning' systems combine various modalities under one umbrella: dissemination of course information and content (multimedia materials, links to websites, quizzing), grade book, threaded discussion, and chat – all with password-protected access. Many language teachers who were never attracted to computer technology in the past have found such systems useful because they allow students to engage in meaningful language learning activities outside of class, working either individually or in groups. In addition, they make use of CMSs to manage routine course-administration tasks.

Distance/Online Learning

Much of online learning takes place as an aspect of hybrid environments that combine face-to-face classroom instruction and activities with online exploration and activities. At some institutions, a significant number of face-to-face classroom meetings have been replaced by online exercises and assignments as a cost-saving measure. Other initiatives have a more positive spin toward exploiting online technology. One interesting example of an online language program to supplement regular instruction and to develop and research the best practices for distance learning is Hilde's Witchy World (*Hildes Hexenwelt)*, developed by Uschi Felix (Monash University). Hilde's Witchy World is an experimental distance learning resource for second-year German that is based on a constructivist approach to language learning.

Although technology-enhanced distance language learning as an alternative to face-to-face classroom instruction has been a long-established tradition in Europe, this has not been the case in the United States until very recently. In the United States, schools and universities have begun to look toward joint distance education arrangements, primarily for the less commonly taught languages that cannot be offered economically at a single institution, especially for advanced levels. Through recent projects in Swahili, Yoruba, Arabic, and Hindi, practitioners are beginning to discover how best to deliver online instruction in these languages to students from several institutions. Typically, distance language learning courses utilize a range of technologies to deliver instruction and connect learners and instructors, including Web-based multimedia materials, real-time chat, threaded discussion, and videoconferencing (technology that allows participants at two or more sites to see and hear one another), along with more traditional off-line materials, such as textbooks and audio and video on cassette or disc. Instruction is usually offered synchronously, which helps foster a sense of learner community and provides interactive communicative experiences among learners.

Videoconferencing or teleconferencing itself has changed a great deal in recent years. Once restricted to expensive satellites and dishes, video teleconferencing with multisite audio and video communication has moved to the domain of the Internet. Early basic Internet conferencing applications, such as CU-SeeMe and Netmeeting, have been expanded and improved to provide audio and video communication integrated with other shared media- and computer-based programs. With such technology, it has become possible to offer distance language instruction with a highly interactive face-to-face feel. As with other media-intensive Internet applications, 'bandwidth' (high-speed, high-capacity network connections) is an important and limiting factor and current videoconferencing systems tend to experience periodic problems of audio and video dropouts when Internet traffic is heavy. However, as the bandwidth expands, the capability of teleconferencing technology will improve and become a more viable conduit for language learning.

Even in the traditional arena of language laboratories, there has been a transformation from analog systems to online digital environments. Currently, the market is dominated by language laboratory software run on LAN-based systems as well as browser-based virtual classroom systems for real-time teacher-led learning environments for distance education applications.

Concordancing Programs and Corpora

The instructional use of concordancing programs and corpora for language learning has continued to represent a noteworthy area for development. Originally a discipline largely unrelated to language instruction, corpus linguistics has increasingly been linked to second and foreign language research, yielding a new area of inquiry to inform language teaching and learning practice. Computer software tools – concordance programs – for searching large collections or corpora of natural language (from print or spoken sources) can be used both for autonomous learning activities and for diagnostic and research ends. For example, corpora consisting of texts written by learners of English as a Foreign Language have been useful in systematically identifying errors consistently made by speakers of given languages, allowing teachers to design curricular strategies that specifically address known problems. In other languages, the corpora of authentic texts are being used to allow

students to explore texts to draw conclusions about lexical usage and structural patterns.

L2 Phonology and Speech Recognition

Pronunciation training is an area where technology has been used effectively. When a computer makes a digital recording of a learner's utterances, software analyzes the voice and gives visual feedback in the form of spectrograms and pitch contours. This type of technology was originally developed for speech pathology and phonology research. Computers have become powerful enough to process the sound in real time as the student's voice is recorded.

Speech recognition is another type of speech technology that has been in practice as a dictation tool for professional writers and translators and for persons with disabilities. Such applications are often speaker-dependent systems designed for native speakers. They require 'training' the system to understand accurately the voices of particular individuals. Once trained, the system works remarkably well, converting continuous speech into written text. On the other hand, speech recognition systems for language learners do not require training and thus are speaker-independent. This type of system needs to perform automatic speech recognition to determine the acceptability of voice input. There are some pronunciation training programs available commercially for vocabulary, but the recognition of continuous speech produced by language learners remains difficult, and reviews of those programs by language experts are still mixed. Once this technology evolves further, speech recognition systems have the potential to provide objective feedback for acceptable pronunciation.

Unicode

As computer use spread globally, devising a system of uniform character representation emerged as a pressing issue. Unicode constitutes a significant development in managing characters when multiple languages need to be supported on a computer. Unicode originated in the 1980s at Xerox as a part of a project to develop a multilingual word processor. As described on their website (http://www.unicode.org), the objective of Unicode is to provide a unique number for every character of every language, no matter what the computer platform or program. Recent versions of common operating systems support Unicode. In the character set menu of popular Web browsers, Unicode is available under the names UTF-8 and UTF-16. Once Unicode is widely adopted and standard Unicode fonts become available, Unicode will vastly improve and simplify multilingual computing.

Issues and Concerns

There is always great disparity between predictions for technology in education and the reality of its implementation, between technological advances and the successful use of technology for language learning and teaching, and between language acquisition theory and classroom practice. Added to these perennial problems, CALL developers now also grapple with a number of thorny issues that complicate the implementation of Information and Communication Technologies in language learning.

Coping with Change

The trend in much of instructional technology for language learning and teaching is to make use of existing networks and generalized tool software – exploiting the power of sophisticated environments, backed by corporate resources that ensure continued support for their products. Thus, the emergence of course management and e-learning systems, Internet-based teleconferencing systems, and multimedia presentation and development tools (used by teachers and students alike) has stimulated a move away from custom-programmed applications that characterized CALL in the 1980s and 1990s. The popularity of the Web, with its wealth of authentic materials and its promise of any-time, any-place availability, has had a profound effect in overshadowing custom stand-alone applications Most new development is aimed at Web delivery and e-learning, rather than traditional distribution by CD-ROM or other physical media delivered in a traditional bricks-and-mortar institutional setting. As a result, many complex and sophisticated projects do not attract the necessary resources to migrate programs from old platforms and systems to new ones, and many developers are undergoing a painful process of reinventing old CALL wheels in more undeveloped and restrictive browser-based delivery environments. Web-based CALL templates produced by academic or government groups (such as the Hot Potatoes suite of templates developed by Stewart Arneil and Martin Holmes at the University of Victoria or the MALTED system developed by Paul Bangs and supported by Spain's Ministry of Education) expend great effort and resources to remain viable as platforms and browsers change and evolve.

The Downside of the Web

The Web has proven to be both a blessing and a curse to language teachers and learners. The wealth of authentic material from and about world cultures available via the Web can constitute information overload

for language learners, causing them to struggle to keep their bearings through endless jumps through hyperspace as they attempt to discern good information from bad. There is a tendency to trust the Web as a source of true and accurate information, and often students will naïvely read and quote information as gospel, when, in fact, it is of questionable accuracy. Teachers' efforts to create flexible, up-to-the-minute instructional content on the Web too often fall into neglect, resulting in permanently out-of-date relics, with links that point to pages that have disappeared completely.

Software Development Standards

Because of the open nature of the Web and the resources required for the development of sophisticated software tools and courseware, accessibility, intellectual property rights, reusability, and interoperability have arisen as meaningful issues for developers and educators. In the United States, major ventures have been developing standards for specifying and managing 'learning objects,' defined as identifiable individual elements of instructional materials, in the interest of sharing content and ensuring the continued viability of tools and content as changes in platforms occur. Two major initiatives in the development of learning object standards, IMS (Instructional Management System) and SCORM (Sharable Content Object Reference Model), have champions among some software and course management system developers, but objectively they have had little impact on most instructional software for languages developed by either local academic projects or publishers. Major course management systems, including Blackboard and WebCT, claim conformance to IMS and SCORM standards so that learning objects can be moved to different or upgraded systems, but, in reality, the definition of conformance varies considerably from product to product.

Practice Linked to SLA Theory and Research

In the next decade, greater effort will doubtless be made to link Second Language Acquisition (SLA) theory and research to practice. Technology figures into many solutions to issues raised by current SLA research, including motivation, learner styles and preferences, awareness, authenticity, interaction, feedback, and the social and cultural contexts of language learning. Unfortunately, the field of CALL has not traditionally been the target of rigorous research, partly due to the ever-changing nature of technology. Taken at face value, technology offers many benefits: access to enhanced content, multiple modalities for interaction and communication, opportunities for active learning, potential for feedback and tracking of learner progress, support for diverse learning styles, and increased time spent in productive language learning activities. However, the future of sophisticated, effective applications of technology to language learning depends on applying the theoretical research framework of SLA to CALL development. The research can inform principled development of software and activities with regard to issues of design, effectiveness, outcomes, and learner variables, answering questions such as what forms should feedback take and under what circumstances, what effect does task type have on language production, how do outcomes differ in program-controlled vs. learner-controlled learning systems, and so forth. Much of the research to date, for better or worse, compares the use of CALL with face-to-face instruction. As the domains of SLA theory and CALL become more intimately linked, there will be a greater emphasis on researching technology-based applications in their own right, rather than as alternatives to standard classroom practices.

Furthermore, research on SLA can be conducted in computer-based environments, which provide controlled environments for tracking or recording research data. Many insights about the process of language learning and about language learners will be gained by conducting research using technologies that can completely and accurately capture learner interactions and moves for thorough analysis.

Technological Standards

Few technologies have become standardized worldwide, so we have long been obliged to deal with differences in the way things work in different parts of the world through transformers, plug converters, multistandard devices, and the like.

Problems with different world television broadcast standards, something we hoped would disappear with digital video technologies, have not only persisted, but will certainly not be resolved for some time to come. In the realm of DVDs, the three major broadcast standards we grappled with for playback of video from foreign countries – PAL, SECAM, and NTSC – have been reduced to two – PAL and NTSC – but we now suffer from the additional complication of six regional codes, added to the disc to prevent playback of a DVD produced in one region of the world from playing on a device produced in another region of the world, purportedly to protect the rights of the original producers. Moreover, DVD technology continues to evolve toward different compression standards and new hardware.

Computer-based digital video has fared no better, with a number of competing proprietary standards

for encoding (storing and compressing) video, including MPEG, QuickTime, Real, and AVI, each with its own playback requirements on the local workstation. Nevertheless, the power of video as a teaching medium drives us to adjust to all the technological challenges in the interest of bringing lively, motivating examples of language and culture to our students.

The profession is still fairly far from making a complete transition from established analog and digital formats, primarily VHS cassettes and DVD, to online digital video. The enormous bandwidth required for reliable, high-quality playback of digital video has impeded progress toward widespread delivery of centralized server-based instructional video. Reliably transporting data-intensive video streams through many common computer conduits – busy shared networks, wireless connections, and phone modems – remains a challenge, but one that will be resolved as communication technologies evolve.

Teacher Preparation and the Changing Role of the Teacher

It is often claimed that in new student-centered, technology-rich models of language instruction, the role of the teacher changes from the primary deliverer of instruction at the front of the class to that of an instructional designer and mentor. However, the majority of today's language teachers continue to be the 'sage on the stage' rather than the 'guide on side' envisioned by educational reformers. One of the greatest barriers to this transition is in the lack of effective teacher preparation in using technology for language learning. In order to make full use of technology tools, both preservice and in-service language professionals need to receive appropriate training. It is essential that language professionals not only become familiar with available technology, but feel at ease using various tools. A number of projects, large and small, are trying to define the necessary components and levels of such training (e.g., National Educational Technology Standards (NETS), Information and Communication Technology for Language Teachers (ICT4LT)). Based on the results of these projects, many institutions of higher education offer courses on educational technology or technology modules as a part of language teaching methods courses.

Old Wine in New Skins

Another issue that relates to the lack of teacher preparation in technology is the issue of effecting real changes in the way teachers teach and students learn with technology. When confronted with new technologies, the first impulse has been to transfer old media (especially print) onto computers without imagining new models of presentation and interaction. If one eliminates the posting of print materials and delivery of digital video and audio as an alternative to cassette and disc formats, there is much less innovative use of technology in language teaching and learning than we would like.

As noted above, the recognized need for language teachers to be knowledgeable about technology and CALL applications has resulted in courses and workshops on CALL and teaching with technology for both preservice and in-service teachers. However, despite heightened awareness of technology and the opportunities for change in pedagogical models for language learning, such change is slowed by attitudes, beliefs, and ingrained practices. Thus, we have many isolated experiments with radical technology-driven changes in language teaching and learning, but little movement in the overall profession toward unified methods of language learning with technology.

Importance of Infrastructure

The patterns of use of language learning technology are dictated to a great extent by institutional infrastructure. The ideal technology infrastructure features a variety of venues equipped with up-to-date technology to meet the various needs of students and teachers in the complex process of language instruction: presentation classrooms, computer classrooms, and media centers with stations for individual work and small group rooms for collaborative activities. These spaces are linked to high-speed networks, both wired and wireless, for access to the Internet and they provide access to a panoply of software and digital resources. Support personnel are available to provide assistance to users and to coordinate and maintain resources. To complement these institutional models, learners and teachers increasingly count on personal technologies and connections that enable them to tap into the virtual resources available within traditional educational institutions.

Professional Factors That Affect Technology and Language Learning

General Trends in Language Education

The current use of language learning technology has been shaped by a number of significant trends in language education. The profession has become oriented toward a more holistic approach to language education that moves beyond learning the forms of the language to attaining both language proficiency and developing crosscultural insights and strategies for effective communication with other people.

Performance-based assessment is favored over assessment of factual knowledge and discrete skills. Collaborative group work is valued as an effective learning strategy to provide authentic language experiences. The concept of students as lifelong learners influences us to broaden language curricula with an eye toward development of critical thinking skills in a multidisciplinary context. We have begun to favor student-directed, student-centered learning models over teacher-directed instruction and we are making greater efforts to accommodate different learner styles and strategies and to reach all language learning populations – learners with disabilities, adult learners, and learners in remote locations.

Multimedia and Information and Communication Technologies have an important role to play in all of these trends. Teachers have come to rely increasingly on the richness and depth of authentic multimedia materials for all levels of language learning to challenge students and help them cope with the language and culture that they will confront in the real world. Much of current software design reflects the trend away from the focus on development of discrete skills – reading writing, listening, speaking, culture, grammar, vocabulary – and information, toward an integrative or process approach that encompasses more natural experiences that support the development of multiple skills.

Standards for Foreign Language Education and Technology

Looking toward the new millennium, organizations set out to articulate general principles and measures for language education, including the use of new technologies. The most robust of these standards initiatives is the Common European Framework of Reference for Languages, an extensive reference that presents guidelines for the development of course materials (syllabi, curriculum, instructional materials, and assessment tools), describes what knowledge and skills learners must acquire to communicate in a language and function effectively in the cultural context of the target language, and defines levels of proficiency for language learners at all stages of learning. Specific references to technology are interwoven throughout the document and focus on exploiting new Information and Communication Technologies to promote 'plurilingualism and pluriculturalism,' enable pan-European links and exchanges, and support national and international structures to facilitate autonomous language learning and distance education. These references also focus on training teachers to be competent and confident users of technology for instruction. Though media types addressed in the Framework include a variety of text, video, and audio resources in a number of different formats, computers and computer skills predominate throughout the Framework for delivery of content in the classroom and laboratory, for individual self-instruction, and for conferencing that permits group activities.

In similar fashion, the American Council on the Teaching of Foreign Languages (ACTFL) produced their National Standards for Foreign Language Education, which identified general goals, standards, and progress indicators for language education as well as provided sample activities and learning scenarios. Predictably, the use of a variety of technologies, both traditional and computer-based, is supported in the Standards as a means of strengthening the linguistic skills needed to communicate effectively, interacting with peers and others in the target language, and developing knowledge and understanding of other cultures.

Professional Organizations and e-Journals

One measure of the professionalization of the field is the growing number of national and international organizations that are devoted to technologies and language learning, particularly CALL. These organizations promote the effective use of technology in language learning and serve as conduits for the exchange of expertise and information among professionals. They generally offer a variety of services to their members: conferences, workshops, special interest groups, journals, electronic discussion lists, and special print and electronic publications. The directory of these organizations includes IALLT (the International Association for Language Learning Technology), CALICO (the Computer-Assisted Language Instruction Consortium), EUROCALL (the European Association for Computer-Assisted Language Instruction), APACALL (Asia–Pacific Association for Computer-Assisted Language Learning), and PacCALL (Pacific Computer-Assisted Language Learning Association). These groups have attracted memberships that are broadly international, out of which have grown joint initiatives such as WorldCALL, a periodic worldwide CALL conference supported by many organizations, and FLEAT (Foreign Language Education and Technology), a periodic conference sponsored jointly by IALLT and the Japan Association for Language Education and Technology.

For reasons of economy as well as ease, breadth, and timeliness of dissemination, electronic journals have appeared as respected alternatives for peer-reviewed publication of scholarly work. The premier e-journal for CALL is *Language Learning and*

Technology, a refereed journal for second and foreign language educators that is delivered via the Web free of charge. Other journals offer electronic options (in addition to the printed version) to members and to institutions. For example, CALICO has journal articles from 1983 through 2000 available online, and electronic subscriber services provide access to *System*, a journal for educational technology and applied linguistics.

The Future

Predicting the future of language learning technology is a risky, even foolhardy, undertaking. Pronouncements about the success, failure, or future of any given technology tend to sound absurd 10 or 20 years later. However, based on the past lessons and current trends, some general assumptions about technology and language teaching and learning can be made. The transformation of media to digital forms is certain, as is the move toward greater portability of technology and ubiquitous wireless connectivity to the Internet. As Nicolas Negroponte, chairman of MIT's Media Lab, has said, "We're entering a period where we will be eating, wearing and breathing computers" (*Wired News*, 11 May 2004). But how long it will be before humans can have natural, open-ended conversations with computers or whether realistic virtual-reality language learning environments will ever emerge is anyone's guess. As new technologies emerge, language professionals, inspired by the appeal of the technology and by intuitions based on pedagogical experience, will examine and experiment with them, adopting those that prove fruitful for language learning. Under ideal conditions, the efficacy of adopted technologies will then be confirmed by testing and research.

See also: Adaptability in Human-Computer Interaction; Character Sets; China: Writing System; Computational Linguistics: History; Computer-Mediated Communication: Cognitive Science Approach; Computers in Lexicography; Computer-Supported Writing; Concordances; Corpora; Corpus Lexicography; Digital Fonts and Typography; Discourse Parsing, Automatic; E-Language versus I-Language; E-mail, Internet, Chatroom Talk: Pragmatics; Handwriting Recognition, Automatic; Human Language Technology; Japan: Writing System; Language Education, Computer-Assisted; Language in Computer-Mediated Communication; Multimodal Interaction with Computers; Natural Language Interfaces; Natural Language Processing: Overview; Natural Language Understanding, Automatic; Parsing and Grammar Description, Corpus-Based; Speech Recognition, Audio-Visual; Speech Recognition, Automatic: History; Text Formatting.

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Technical Translation

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Technical Translation and Technical Translators: Definitions

Technical texts can be defined somewhat broadly and refer to a range of subject fields including economics, law, politics, medicine, IT, and media. However, the most widely accepted definition, used in this article, classifies such texts as belonging to applied science, because technology is the application of science. Whereas science is about knowledge and study of natural phenomena, technique is about its application and its know-how. In other words, although science and technology are interdependent, scientific translation is primarily concerned with ideas and professions; technical translation concerns objects and trades, and transfers information about how things are produced and work. Broad areas of technology include mechanical engineering, hydraulics, electrical engineering, electronics and information technology. The spectacular development of technology in recent decades is characterized by two essential features: first, documents are produced exponentially, quickly outdated, and can be circulated globally instantly; second, the complexity of information is deepening into more subfields exclusive to experts. Some of these subfields grow into subject fields of their own. Information technology, because of its virtual basis, its huge growth, wide-reaching application, and commercial development, has thus become an area of its own. It is essentially concerned with transmitting data about data (*see* **Localization**). In traditional technology, such as mechanical engineering, data is transmitted about materials and equipment. Most technical translations transfer information about designing, manufacturing, using, and repairing products within an industrial context. Although such products are created according to general principles in science and technology, they are considered in very concrete, practical, and specific ways to satisfy the needs of the industry. Technical documents also are produced for immediate consumption and generally have short-term use, as technology evolves rapidly and as terminology can vary from place to place, even within one country. This implies that a technical translator must be familiar with basic scientific principles and general technology notions, and also aware of systems used in industry: measurement units, acronyms, symbols and abbreviations, names of commercial products, item description systems, templates and patterns, names, properties, and the use of different materials. Technical translators have to collaborate with experts and engineers both in the source and target languages. They also are cultural mediators, as they have to adapt information to a particular public, context, and market, for particular purposes.

Technical Translation: Past and Present

In many ways, the problem of disseminating scientific knowledge and technical information today is not very different from what it was in the worlds of antiquity, the Middle Ages, and the Renaissance. An international market using a lingua franca (Greek, Latin, English) develops before or in parallel with national markets, and involves mediation from and into vernacular languages, although in the past it often occurred from and into two lingua francas (mainly from Greek into Latin). Scientific writers remained largely anonymous in Europe until the Renaissance, as famous or established scientific figures, such as Euclid, collected the work of others. Their translators were working as anonymously as the authors of the original texts. Not many traces of the ancient Greeks' translation activities are left today. They are more visible in ancient Rome, where successful literary translators were recognized and praised for their work (Plautus, Terence), and professional translations were often done by Greek slaves, from Greek into Latin. The large empires of the ancient world (Egypt, Greece, Rome, China) seem to have dealt with translation in one or two language pairs. The establishment of the Islamic Arab Empire between the 7th and the 13th centuries promoted communication and exchanges with a range of cultures. "The Arabs are credited with initiating the first organized, large-scale translation activity in history" (Baker, 2001: 318). This activity was not confined to literary and religious documents. It extended to many areas, in particular mathematics, astronomy, alchemy, medicine, and chemistry, and a wide array of languages: from Sanskrit, Syriac, Greek, Aramaic, Persian, and other languages, into Arabic. In Europe, Renaissance scientific and technological developments are based on reappropriation of the knowledge of the antiquity through translation. In the 16th century, scientists, educated in a humanist and philological tradition, translated medical and scientific Greek manuscripts into Latin and sometimes into vernacular languages. "Thomas Linacre (1465–1542) Professor of Medicine at Oxford and Janus Cornarius (1500–1588) first Dean of Medicine at Jena scoured

European libraries for Greek medical and scientific manuscripts" (*see* **Translation: History**). Authors also started to write technical treatises in vernacular languages which were sometimes translated into Latin, such as the geographer Sebastian Münster's *Cosmography*, originally written in German in 1544, translated within the next 15 years into Latin, then French, English, Bohemian, and Italian. Power shifted from religious and humanist to scientific subjects, as technology grew and as international organizations developed from the 18th century onward. Language systems aimed at classifying elements of an observable reality and nomenclatures were constructed from the 18th century, in Latin and in vernacular languages, in order to explore this reality. From primarily being a spreading instrument of ideologies, translation became a tool of knowledge dissemination. In the 17th and 18th centuries, the emergence of literary translation theorists (Pope, Dryden, Nicolas Perrot d'Ablancourt) and the high status of literary and religious translation meant that technical translation was somewhat ignored in spite of the fact that an enormous corpus was being translated. Pharmacy and medicine were the most translated areas, whereas traditional crafts, navigation, and agriculture also were in demand with translators. The internationalization of science in the 19th century meant a growing demand for technical translation. Manuals on technical writing appeared at the beginning of the 20th century (the first one in English is thought to be T. A. Rickard's *A guide to technical writing* published in 1908), although most publications on translation concern literary or religious translations (out of 599 entries in the pre-1950 BITRA catalogue, five are devoted to technical translation) (Aixelá, 2004). Science and technology depend on international communication and although 92% of the world's population live in countries where English is not the native tongue, English, as the lingua franca of science, is dominant in technical texts, although not overwhelmingly so as in fields such as information technology. From the end of the mid–20th century, technical texts in English occupied about half of all technical publications. Even though in particular areas such as chemical literature, more than half of published documents are in languages other than English (Pinchuck, 1977: 16), globally, a majority of publications are driven by the North American market. Statistics published in 2002 by the OCLC (On line Computer Library Center) show that 73% of sites are in English. Scientific and technical Web pages comprise 14.2% of all publicly accessible websites, in second position after sites devoted to information (15.5%).

In spite of the increase of professional documents needing to be translated, the status of technical translators still remains low in comparison to that of their literary peers. Technical and scientific translators, mostly anonymous in the past, are still today largely anonymous, in spite of some visibility in multinational institutions such as UNESCO. In a survey conducted in Germany in 1999, 76% of translators and interpreters were found to work essentially on technical texts, whereas economic texts score 12% and legal documents 6%. Yet, in a country in which many universities are offering courses in technical translation, only 43% of them had chosen to specialize in that area when training (Künzli, 2003: 29). Even though these figures may be different in bilingual or multilingual countries where a full range of documents, in particular institutional texts, need to be translated, they reveal two essential features of technical translation in the world: it represents a huge proportion of the translation market and it is not a glamorous occupation even though technical translators are better paid than their literary counterparts. Throughout the 20th century, training in technical translation tended to be in-service, provided by companies or government departments. Some countries with a strong technical tradition such as Germany have provided training in vocational institutions since the early part of the 20th century, but, in most countries, including America, technical translation courses were not integrated into academic programs until the 1990s. With the growth of translation studies, specialized or technical translation courses, particularly short courses at postgraduate level, are developing exponentially.

Technical Translation: Technical Texts, Style, and Translation Strategies

Text Types, Text Forms, and Terminology

In technical translation, the predominant relationship is not between translator and author, as it is in literary translation, but between the translator and the reader (Bédard, 1986: 178), because the primary aim is to communicate the content of the original message, and not to convey its aesthetic value. A technical translator needs to establish the purpose(s) of the text to be translated and assess the target readership (i.e., level of expertise in the subject matter, scope of the publication, cultural context, register). Technical documents are deemed to be informative, universal, and confined in their subject boundaries, but this is not always the case. Although they consist primarily of informative statements, they may contain expressive elements. Technical brochures for example may be persuasive, although primarily informative, as they attempt to convince an engineer to buy new

machinery for example (Hansen, 1997). This persuasive aspect may be subtly integrated in the document and the translator needs to be aware of the source culture and able to adapt it to the target culture. The field of technology frequently interacts with a range of other fields such as science as well as business, law, and media. Technical documents tend to be devised and written in relation to solidly structured information and are generally contained in established text forms, such as catalogues, reports, articles, instructions, manuals, notices, brochures, and patents. Yet, in spite of this relative textual rigidity, most aspects of technical language are not firmly established. Bédard (1986: 8–21) has shown that not only can the purpose of technical texts be ambivalent, the essence of their language is based on a triple myth: the myth of a well-structured, nonliterary language; the myth of a well-established and exhaustive language; the myth of a language used in a uniform way. The style of technical writing should be clear and concise. It is generally not allusive, but literary language, partiularly through metaphors, be they often coined expressions, is present in technical language. In any case, it cannot be fully structured and established in areas that are in constant evolution, technologically and commercially. In addition, although technical language is prescriptive and defined accurately, it is not uniform, as many lexical items have not been standardized. Synonyms are frequently used simultaneously. One term may be normalized but another with the same meaning, supersedes the official acceptation. Some terms or expressions also can be polysemous, such as 'scale' in English, which has different meanings in different subareas of technology. Terminology is always visible and sometimes frightening at first sight, but it is important to not be too fixated on it and to focus on the message and not on the term or terminological unit out of context. A source language term may not necessarily be rendered with an equivalent target language term. A transposition may be necessary, especially if it is new terminology. If there is ambiguity in the source text, the technical translator's task consists of clarifying the original and ironing out vagueness in meaning. In view of the priority given to the clarity of the target message, translation strategies in technical documents tend to be domesticating rather than foreignizing, to use Venuti's phrase, so as to facilitate transparency. Technical texts aim to be concise and translators often use ellipses (mostly of a part of a term or of a cohesive device) as a strategy to remain brief and accurate. Technical documents are often repetitive, and translators rely increasingly on electronic tools to complete their work. Machine translation systems such as Systran and controlled language devised for specific texts and contexts are used by individuals and a number of organizations with varying degrees of success. The most useful devices are memory tools packages such as Trados or Déjà vu, indispensable for terminology management and extraction.

See also: Legal Translation; Linguistic Terminology; Localization; Machine Translation: Overview; Translation: History.

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Teenagers, Variation, and Young People's Culture

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Youth Language as a Linguistic Phenomenon

Before linguists became interested in them, youth languages were generally consigned to the field of special language research or critique, where they were viewed above, all under the aspect of lexicography. However, under the influence of the so-called pragmatic revolution in communication studies, this focus has widened since the 1980s to embrace a many-faceted interest in the linguistic habits and usages of young people and a methodological pluralism in assembling and classifying empirical data.

Research into this field is currently focused on the following areas: the lexicography of youth languages – the compilation of dictionaries based on the assumption of homogeneous usage; the pragmatics of youth languages – forms of greeting and address, particles, forms of intensification; the ethnography of youth languages – expressive and functional modes of group-specific communication based on concrete examples; oral style analysis – stylistic features and pick-'n'-mix techniques in young people's communication; cultural analysis – functional aspects such as generation-specific delimitation and social identity formation, and sociohistorical aspects of the relation between youth languages and standard languages; and comparative study of youth languages – comparison of code-immanent and code-transcending forms and phenomena.

Far from viewing and classifying youth languages as a homogeneous phenomenon, interdisciplinary research reveals a number of different theoretical approaches.

Theoretical Concepts Applied to Youth Language

Variety

Structurally oriented research generally describes youth languages in the German-speaking area as a variety of German (Standard German). Berruto (1987) saw such varieties as characterized by the cooccurrence of linguistic and extralinguistic features, with situational aspects of language use (social as well as functional) impacting on its concrete forms. Accordingly, how a language is spoken depends on the specific social context in which it is spoken (Berruto, 1987; Neuland, 2003c). Research into French (Scherfer, 2003; Zimmermann, 2003) and to some extent into German youth languages (Heinemann, 1987; Ehmann, 1992; Androutsopoulos, 1998) employs a definition based on the concept of linguistic varieties, defining youth language as a secondary variety – viz.,

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as a secondary system modeled on the primary variety and acquired in the course of secondary socialization (cf. Androutsopoulos, 1998). In contrast to primary varieties, secondary varieties derive from a conscious process of selection and depend on individual factors like lifestyle, interests, and images of the self. Consequently, they differ both in the timing and in the underlying intentionality of their acquisition, and their use is generally restricted to contexts in which, or close to which, they were initially used. As a descriptive parameter, linguistic variety can only grasp some of the relevant features of youth languages: it has difficulties not only with the phenomenon of situational and subcultural variation but also with concepts of communicative process.

Slang

Research in the United Kingdom and North America – and to some extent also in eastern Europe – tends to define youth languages as slang (Eble, 2003; Freimane, 2003), thereby assimilating them again to objects of special language research. This is problematic in its consequences, for it inevitably presents young people as a homogeneous group (cf. Menis, 2003), whereas in reality they and their languages manifest the same sociocultural heterogeneity as the adult world (cf. Henne, 1986).

Oral Style

The sociolinguistic concept of oral style (cf. Dittmar, 1997; Hinnenkamp and Selting, 1989; Kallmeyer, 2000) is also used to describe expressive patterns and structures typical of young people. Neuland's suggestion (1987, 2003c) to apply the concept – developed by Birmingham University's Centre for Contemporary Cultural Studies – of subcultural style as a complex group-specific phenomenon has been taken up on several occasions (Schlobinski *et al.*, 1993; Chovan, 2003), with the emphasis on situationally anchored style in a broadly ethnographic sense (cf. Schlobinski *et al.*, 1993: 40). Style is understood here as a holistic category covering a large number of coexistent and cooccurrent features (cf. Augenstein, 1998; Kallmeyer, 2000), an approach that convincingly reflects the dynamics of young people's communication.

The diversity of youth language is also addressed in the concepts of *bricolage*, reflection, and counterreflection formulated by Clarke (1979) and Neuland (1987). *Bricolage* refers to the pick-'n'-mix technique of young speakers, who select individual elements from the standard speech matrix, decontextualize them and recontextualize them in a youth language framework. While *bricolage* is an important factor in the ongoing regeneration and subcultural differentiation of youth languages, the principles of reflection and counterreflection apply to the sociocultural contexts of youth language, in particular its relations to standard language.

Youth Language and Standard Language

Dynamics of Style Formation and Distribution

The cultural-analytic approach to youth language research enables statements to be made about the influence of youth languages on standard language. With regard to the formation of youth language styles, Neuland (2003c), following Clarke (1979), distinguishes three stages that together form a reflexive loop. 'Style formation' refers to the typical changes – in particular pick 'n' mix – introduced by young people into their language. 'Style distribution' refers to the continuous dilution of these sociostylistic usages, especially by commercialization, and their consequent loss in terms of specific sociocultural connotations. This dilution leads to 'style deletion' as the final phase of the loop. Being a loop, however, the process of style dilution and deletion provokes new style formation and the spiral starts up anew.

Nonstandard Language Formation Tendencies

The constantly changing dynamics of youth language also have a discernible innovatory influence on standard language, especially on its lexis. Random samplings of new or extended entries in standard modern dictionaries (e.g., Duden's *Universalwörterbuch*) indicate a significant growth in the material derived from this sector (Neuland *et al.*, 2003). The ongoing codification of typical youth lexis reveals both expansion and differentiation in the standard vocabulary. In contrast to institutionally instigated change from above, this change from below leads to the development of nonstandard language codes. The process is supported by the idealized social image of youth and the covert prestige accorded to their code as a manifestation of the linguistic substandard (cf. Trudgill, 1972).

Common Features of Youth Languages

Despite the variation and heterogeneity of young people's language, common features can be discerned, including specific features recurring in different languages – e.g., forms of greeting and address, stereotypical phrases and particles, metaphorical and hyperbolical structures, prosodic play (clipping and weakening), neologisms and semantic displacements (cf. Schlobinski and Heins, 1998).

At the morphological level an intensive use of phrasal lexemes and productive word formation patterns is evident, leading – especially via creative affix formation – to the development of word sequences and nests as well as neologisms. As far as lexical development is concerned, this maximizing tendency within youth languages can be observed not only in German (cf. Androutsopoulos, 1998; Bachofer, 2003) but also in British, American, and Australian English (Eble, 2003; Menis, 2003) as well as Latvian (Ernstsone, 2003; Freimane, 2003), Chinese (Zhu, 2003), and Thai (Watananguhn, 2003). The *verlan* used by young French speakers (cf. Gadet, 2003; Hefrich, 2003; Scherfer, 2003) stands out from these in its lexical creativity, with semantic displacement adding new connotations to standard lexemes, as well as neologisms (Zimmermann, 2003).

A further apparently universal feature is borrowing. Here two factors govern selection from the source language(s): linguistic contact and social prestige. German and Latvian youth languages have a predilection for anglicisms, and Saari (2003) demonstrated borrowings from Finnish in the language of young Swedes. German–Turkish code mixing (Keim and Cindark, 2003) and switching (Hinnenkamp, 2003) have been observed in the language of young migrants. In creating their own variants, especially style mixing, young people also exploit the innate multilingualism of standard languages. Dialect usages, for example, have been recorded not only in European (Ehmann, 1992) but also in some Asian youth languages (Zhu, 2003).

Typical syntactic features of young people's language have also been described, but their tendency to parallel the oral vernacular of their respective codes suggests that they are less specific to the group concerned. In this context, German youth languages tend to intensify adjectival phrases, increase the use of qualifying particles, and collapse accusative–nominative use of the indefinite article (Bachofer, 2003). Gadet (2003) observed intransitive usage of transitive verbs as well as a high incidence of unconjugated verb forms in French youth languages.

Written and Spoken Forms of Youth Language

Current research into youth language is increasingly focused on describing written as well as spoken usage. Print media are represented in examinations of fanzines (Androutsopoulos, 1998; Watzlawik, 2000), and increasing Internet use has brought analyses of e-mail, chat room and guest book languages (Androutsopoulos, 2003). A predominantly textual linguistic approach is evident, with contrastive description providing insights into stylistic differences in both written and oral youth subcultures.

In addition to classical lexical features, discourse analysis focuses in this context above all on the conversational strategies used by young people, pinpointing and describing a number of typical communicative techniques with (at times overlapping) genres such as taunting, dissing, and backbiting. These are analyzed functionally with regard to their potential for socialization and identity formation (Androutsopoulos and Georgakopoulou, 2003).

Distinctive Features of Written Youth Language

A characteristic of such texts is the transfer of primarily oral characteristics to the written language. These include the use of expressive idioms, the explicit naming or direct address of interlocutors, and introductory discourse particles. Another popular technique is graphic representation of sound variation by means of vowel or consonant doubling or the use of spoken acronyms, which Androutsopoulos (1998) called 'graphemic marking.' The fictional orality which this induces creates an informal, personal atmosphere between writer and reader. Particularly in informal e-media communication, the tendency towards graphic representation of orality is so pronounced that a strict differentiation of spoken from written linguistic features can no longer be consistently maintained.

Distinctive Features of Oral Youth Language

Analysis of oral peer group usage focuses primarily on typical conversational patterns among young people and their function in processes of socialization and (group) identity formation. The bulk of youth language research in German lies in this field. Thus, Chovan (2003) described how the collective associative speech of young people incorporates positive face work and at the same time creates group identity; Branner (2003) investigated provocative activities such as teasing and taunting in groups of girls; Deppermann and Schmidt (2001a) analyzed dissing as an interactive practice for establishing status relations within male peer groups, and the same writers (2001b), along with Hartung (2001), demonstrated the overall cultural divergence of youth discourse from accepted norms of adult conversation. In communication between young people, universal principles of politeness and thematic focus tend to give way to less rigid norms of interaction – or to disappear temporarily altogether – without this necessarily being taken as a sign of uncooperativeness. Thus, in contrast, to intergenerational discourse, its intragenerational counterpart operates within a sort of free space where the scope and limits of interactive

transgression can be tested and defined without fear of automatic sanction.

Functional Aspects of Youth Language

The socializing function of youth language described above has been further subdivided to meet the requirements of various different theoretical and research emphases. Early work in German concentrated on the linguistic features cultivated by young people to distinguish themselves from the adult generation and their representative prototypes – teachers, officials, and politicians – whose linguistic norms were seen as standing for cultural values that young people often totally rejected. More recent eastern European (Ernstsone, 2003; Freimane, 2003) and Asian (Watananguhn, 2003; Zhu, 2003) studies reveal the same focus. Current western European research highlights the heterogeneity of youth subculture (hip-hop, punk, heavy metal, etc.) and the resulting need for distinctive group markers that provide an inward-looking principle of diversity reflecting the outward-looking one. The argument at this point becomes a matter of the aesthetics of reception, and in this light western European youth languages are frequently seen as indicating not only general boundary-defining strategies but also a wealth of group-specific language games, as well as a tendency to exoticize the trivial (Androutsopoulos, 1998).

Summary

No single perspective can adequately describe youth languages and their functions in all their heterogeneity, for these languages are not only a contemporary but also a historical phenomenon, and their impact on their respective standard languages requires diachronic treatment. Youth languages are not confined to certain linguistic systems; they are an international phenomenon existing in many different languages (Androutsopoulos and Scholz, 1998), and as such they can be analyzed contrastively. Their use is always linked to the intention of the speaker and has distinctive functions, among them the formation of individual and group identities. In this respect they must also be viewed as developmental as well as group phenomena. And in a world where youth culture and subcultures increasingly depend on the media and its commercializing tendencies, youth languages are ultimately also a media phenomenon.

Outlook

Against the background of a globalized world, where the spread of youth languages is supported by the influence of the media, the question arises whether the current heterogeneity of cultural and linguistic phenomena will remain or be supplanted by a growing homogeneity caused, for instance, by preferential borrowing from a single source, such as English, that is commonly endowed by young people with superior prestige. Two features common to all youth languages, however, speak against such an internationalizing tendency: their creativity and their identity (both inward and outward looking). In addition, a glance at the development of youth languages in eastern Europe shows that increasing social liberalization can underpin the development of nationally typical, identity-building linguistic structures among young people. The answer to this question, however, is no clearer than the ongoing development of youth languages themselves, and remains a matter for future interdisciplinary research.

See also: Age: Apparent Time and Real Time; Code Switching and Mixing; Code Switching; French; German; Germany: Language Situation; Identity in Sociocultural Anthropology and Language; Language Change and Cultural Change; Language Development in School-Age Children, Adolescents, and Adults; Latvia: Language Situation; Latvian; Politeness Strategies as Linguistic Variables; Reflexivity in Sociolinguistics; Researching Naturally Occurring Speech; Slang, Argot and Ingroup Codes; Slang Dictionaries, English; Social-Cognitive Basis of Language Development; Socialization; Style and Style Shifting; Turkish.

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Telephone Talk

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During its approximately 130-year lifetime, the telephone has become an indispensable element of everyday life in most parts of the world, connecting people who for social and practical reasons are not in auditory reach. Through this medium a 'distinctive and recognizable genre' (Schegloff, 1993: 4548) of talk-in-interaction has developed, namely telephone conversation. Undoubtedly, it is Conversation Analysis (CA) that is to be credited for having made telephone calls an object worthy of linguistic inquiry (*see* **Conversation Analysis**). Although there had been some interest in telephone conversation before (see Schegloff, 1993, for references), it was through Sacks and the subsequent conversation analytic approach that telephone calls came to feature on the linguistic stage. And yet Sacks' interest in telephone calls was sociologically guided, as indicated in his often-quoted phrase, "We can read the world out of the phone conversation as well as we can read it out of anything else we're doing" (Sacks, 1992, V. 2: 548) (*see* **Sacks, Harvey (1935–1975)**). What, however, made telephone calls more appealing for this ethnomethodologically grounded type of sociological investigation than other sources of naturally recorded data was that telephone calls stood up to a number of fundamental (theoretical and methodological) imperatives of CA; most notably, telephone data, through their constitutive lack of visual information for the participants involved, allowed the possibility of *-emic* analyses of the interaction, i.e., the analyst had at his/her disposal the same kind and amount of information that was available to the participants themselves in the interaction. Coupled with additional features, some shared by other types of naturally data recordings (e.g., that they can be subjected to scrutiny as often and by as many analysts as one wishes), others being incidental to the specific sociohistorical setting of that research (e.g., that certain U.S. institutions, such as emergency centers, independently made recordings of incoming calls), telephone talk came to play a pivotal role in the conversational analytic approach.

In a series of very influential papers (e.g., Schegloff, 1968, 1986, Schegloff and Sacks, 1973), powerful analyses were provided and the sequential organization of talk in the opening and closing sections of telephone calls was meticulously established. Openings, it was propounded, comprise four core sequences: (a) summons-answer: the telephone rings and the person called picks up the phone and responds to the calling signal, initiating a working channel of communication and displaying availability; (b) identification/recognition: the identities of caller and answerer are ensured through self-identification or other recognition; (c) exchange of greetings; and (d) exchange of tokens of phatic communion (how-are-yous and responses). Closings, on the other hand, were shown to consist of two core sequences: (a) offering to close (preclosing) and accepting to do so; and (b) exchange of farewells, provided that the preclosing is positioned at "the analyzable end of a topic" (Schegloff and Sacks, 1973: 305). As has been variously stressed, 'canonicity' in this framework does not imply that all calls (not even most calls) unfold in the prototypical way. But variation on the basic format was handled primarily as a means toward unraveling the sequential organization of telephone conversation, either by demonstrably showing it to be a result of structural requirements or by helping in modifying hypotheses about the underlying patterns. When the CA studies on telephone calls got gradually to be known (outside the United States or the CA community), however, variation was also approached from a different angle: to what extent are the CA findings independent of the fact that the data, i.e., American English telephone talk, come from a particular culture only?

In the first two decades after Schegloff's seminal work on openings in the late 1960s, research on telephone calls outside (as well as within) the CA paradigm was not in abundance, and the sporadic studies challenging the CA findings on openings were flawed at least in that they did not rely on recorded telephone calls. By the beginning of the 1990s at the latest, however, the topic of variation was explicitly taken up by a CA proponent, Robert Hopper, most prominently in a book devoted to telephone conversation and focusing, in particular, on openings: "A culture's telephone customs display tiny oft-repeated imprints of community ethos. Ask any traveler, immigrant, or ethnographer about telephone conversations in countries outside the USA. You will hear about differences" (Hopper, 1992: 85). Apart from the late Hopper and his associates, an increasing number of researchers, using recorded data, have been reporting differences, along with similarities, in telephone calls around the world (for references, see Luke and Pavlidou, 2002a). The lion's share of this research deals with openings, whereas to date only a small number of studies on closings is available. One of the reasons for this division of labor is

presumably the complexity of closings, which have to take into account all the preceding talk in the phone call and at the same time face the risk of being redefined as yet another stretch of conversation before ultimately ending the call.

In research on telephone calls in languages other than English, a topic that has inevitably attracted attention has been the language specific options and the way that these are exploited in the accomplishment of the phone call. For example, Park (2002), in her study of Japanese and Korean openings, has demonstrated that the contrastive connectives *kedo* (Japanese) and *nuntey* (Korean), when used in self-identifications, signal that the reason for calling is of immediate concern and give the call a business-like tone. In addition to the language specific means, the particular forms in which the core sequences are realized in different linguistic communities have been explored. Houtkoop-Steenstra (1991), for example, has shown that in Dutch openings the answer to the summons is accomplished through self-identification by name, instead of using something similar to *hello*; moreover, it has been suggested that self-identification is the preferred mode in the Netherlands over other-recognition in the United States – a preference also encountered in other Northern European countries as contrasted to, e.g., Greece. A further issue concerns the relative prominence of the individual components of the canonical opening: although the summons–answer sequence is, by its nature, an obligatory constituent of openings, the greetings or how-are-you sequences seem to get varying relevance across cultures, effecting, among other things, reductions or extensions of the opening. Greetings, for example, have been found to be an integral component of Swedish openings (Lindström, 1994) but dispensable in Greek ones (Sifianou, 2002); phatic utterances of the how-are-you type, by contrast, were shown to be prominent in Greek openings (a point also stressed for Chinese openings [Sun, 2004]), but much less so in German ones (Pavlidou, 1994). This foregrounding of the interactional aspects of communication has been multifariously highlighted, e.g., in terms of the recipients' social status as in *taarof* (ritual politeness) in Persian openings (Taleghani-Nikazm, 2002) or in terms of playfulness and humor (see, e.g., Antonopoulou and Sifianou, 2003, for Greek openings); it also has been shown to affect the organization of closings (for Ecuadorian Spanish, see Placencia, 1997; for Greek, see, e.g., Pavlidou, 1997, 2002).

In contrast to Hopper, who – retaining an intrinsic-to-message view of variation (1992: 72) – claimed that despite divergencies the canonical opening still holds across cultures, other researchers challenge such a "universalist" position. This tension may be resolved if, following ten Have's (2002) proposal, emphasis is given to a functional rather than the structural perspective, which has been more prominent in CA. Of greater consequence, however, seems to be the fact that research on telephone talk has not always been guided by the same motivations and aims as CA, some of it having been called "contrastive cultural analysis"; according to Schegloff (2002), the latter presupposes a within-culture analysis that is grounded in the details of the data and establishes its convergence with the participants' understandings. What is at stake, then, is the transfer of analytical tools developed within one paradigm to a different one without warranting the epistemological prerequisites that necessitated these tools in the first place. Even so, research on telephone talk has occasioned a growing body of naturally recorded data from different linguistic communities and spawned a number of analyses that have proven to be pertinent for areas such as, e.g., foreign language teaching, inasmuch as telephone talk appears to be a sensitive area in intercultural encounters.

Although certain fundamental features of the phone call have basically remained the same (dyadic nature, lack of visual information), the technical apparatus involved has undergone considerable changes over the years (cordless phones, answering machines, automatic number identification, caller's categorization/identification through ringing melodies, etc.), some of which, like caller identification, have direct effects on the structure of the call. Undoubtedly, the most dramatic innovation, encompassing a number of the features just mentioned, has been mobile telephony. Whereas systematic work on the impact of this technology on society is already available, research on the structure of mobile talk based on recorded data is only beginning, so that claims about changes in the organization of conversation (not to mention variations on expectedly different canonical patterns) effected through the transformation of the medium cannot yet be substantiated. Mobile telephony has contested, at least quantitatively, the traditional mode of calling: reports on the spread of mobiles indicate a 'penetration' [*sic*] of over 80% for local markets as different as Hong Kong (cf. Bodomo, 2002) and most West European countries (The Netsize Guide, 2004). By contrast, telephony as a whole seems to have gained impetus and consolidated its place among communication technologies, a place that would otherwise have been most seriously threatened by, e.g., e-mailing.

See also: Conversation Analysis; E-mail, Internet, Chatroom Talk: Pragmatics; Ethnomethodology.

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Television: Language

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The broadcasting of televisual signals to the general public began in the United Kingdom in 1936 but only to a very small number of people within a limited range of London. It was discontinued once the Second World War began. It is therefore probably right to think of television broadcasting as a phenomenon of the postwar period, spreading widely across the world during the 1940s and 1950s. By the 1950s it was firmly established as the dominant mass medium in most developed countries, a position it continues to cling to despite a serious challenge from the Internet.

The development of television both in terms of its organization and of its content initially followed that of the domestic medium it displaced, radio. Like radio, the initial system was a commercial one in the United States and a publicly funded one in the UK and most of continental Europe. Australia, typically, adopted a hybrid of the two, but then did not begin until 1956, three years after commercial television had commenced in the UK. The U.S. Public Broadcasting System, which has operated since 1967, does not have the same funding support or relationship with governments typical of public broadcasting in other countries. It is now most common for television systems to operate a combination of commercial and public broadcasting – the public broadcasting monopolies that operated in many northern and eastern European countries long after advertising became commonplace on British television, disappeared following the arrival of satellite broadcasting, which observed no national boundaries.

The content of early television followed radio in being heavily talk based, not only because this was

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The content of early television followed radio in being heavily talk based, not only because this was

how a medium targeted at the home was seen to operate and what those performing on it were experienced at, but also because the small screens and the low resolution (especially in the United States) did not encourage lavish spectaculars or material heavily dependent on visuals. Even today, with more countries providing high-definition television and screen size growing substantially, it is still a well-supported cliché of media studies that while film is primarily a visual medium, television is an aural one.

John Ellis (2000) has talked of the three ages of television: scarcity, availability, and plenty. In the early stage, which lasted until the late 1970s and in places into the 1980s, public broadcasting was able to flourish in most countries because the electromagnetic spectrum was regarded as a limited resource, the allocation of which needed to be monitored by government agencies and thus the operation of television needed to be conducted in the public interest. Even when the combination of commercial and populist forces introduced services which saw entertainment as their prime motive, regulation constrained them to provide some serious nonfiction content. This was also a period of televisual scarcity in other ways, including the number of competing channels and the hours broadcast each day.

Ellis's televisual age of availability is what most viewers continue to experience. It developed during the 1980s in parallel with other sociopolitical and economic changes emphasizing the centrality of consumer choice. The number of channels proliferated and the previously dominant (in the United States, the big networks; in Europe, public broadcasters) felt much less secure in their role and position. A much greater choice of channels and programs was available through cable and satellite delivery and no longer were single programs likely to be watched by large proportions of the nation. Fragmentation had arrived. The distinction between this age and that of plenty is far from strict. Significant proportions of the European and American population exist in the third age now, thanks to the extra services available through digital delivery and personal digital recorders. Ellis argues that branding has become the way in which plenty is managed, both by identifying particular television services (Discovery, the History Channel) and by extending the reach of individual programs, not only through related spinoff programs, but in the case of the currently popular cooking programs, for instance, through spinoff merchandise (Ellis, 2000: 165–169).

Technological developments are important to this outline, but other devices, most especially the remote control and the VCR, were at least as significant in changing the way in which people watched television. Both remotes and VCRs (now being replaced by DVD recorders) enabled more television to be watched (or surfed) and, where commercial services were concerned, more commercials to be omitted. Since free-to-air commercial television is funded by advertising, this required compensatory actions, of which placements have been the most pervasive. The VCR and the DVD are perhaps more significant for the relationship of television and language because either through off-air recording or sell-through video or DVD, favored broadcast programs can be watched and rewatched and their minutiae savored.

From the beginning, television, like radio, broadcast both fictional and nonfictional programming. Many of the genres of radio transferred: nonfictional programs such as news, current affairs, documentaries, advice programs, and quiz shows; fictional ones such as plays, serials, and comedies; and programs such as variety shows and concerts for which the fiction/nonfiction distinction is not really relevant. The closeness to radio rather than to film acted in conjunction with the quality of the image received and the distracted character of the attention given by viewers to prioritize speech, both the direct-to-camera speech which dominated the nonfiction programming and the indirect which characterized the fictional. For public broadcasting, the important programs initially were the nonfictional ones, with news, current affairs, and documentaries important both for nation building and producing an educated informed electorate. Fictional programs provided entertainment to attract viewers to the channel or, in the case of televised versions of great works of literature, formed part of the 'civilizing mission' of public broadcasters such as the BBC. For commercial programmers the more serious nonfictional programs were required to maintain the licenses necessary to operate, but the fictional shows drew more viewers to be sold to advertisers.

Television news services do attract viewers in large numbers, though; the main bulletins on the more popular free-to-air services are high rating and it is television that most people cite as their principal means for being informed about public affairs; cable news networks survive and thrive during times of crisis. Documentaries are also a popular nonfiction genre with dedicated pay television services, but it is popular history and above all nature documentaries that dominate the grouping. The lighter types of nonfiction programming – quizzes and advice shows – have been the ones which have proliferated and, especially in the age of availability, come to dominate nonfiction programming. Quizzes and game shows, the latter able to take advantage of television's visual capability to test physical as well as intellectual

dexterity, provide valuable occasions to incorporate ordinary people into programming and increase the air of sociability so valuable to a mass medium, as Paddy Scannell (1996) has pointed out for both radio and television. He claims sociability, exemplified in conversation, to be broadcasting's most fundamental communicative ethos (Scannell, 1996: 23), which will be explored further below.

The same incorporation has become the case for advice programs, though this took much longer to occur. It was well into the age of availability when the combined pressures of consumerism and audience inattention to commercial breaks lead to a reconfiguration of advice programs into lifestyle shows. As I discuss elsewhere, lifestyle programs have incorporated house and garden, cooking, holiday, and health programs to guide choices between available products and encourage the maintenance of a continually modulating self defined in large part by these very acts of consumption. Most commonly, such guidance is performed around the bodies of ordinary people who, for example, have their houses or their bodies made over in the course of a program (Bonner, 2003).

Some writers, in particular John Corner, extend the field of documentary to include the newest type of nonfiction television programming, so-called reality television. His argument that the functions of documentary should be extended to include 'diversion' is a convincing one and allows such programs as *Big Brother*, valuing sociability and depending on the willingness of ordinary people to perform 'ordinariness' to camera in the hope of being transformed into celebrities, to be included as part of a continuum of 'documentariness' within nonfiction television (Corner, 2002).

When talking of fictional genres, it is particularly necessary to acknowledge the complexity of the term 'genre.' For television, it is used to refer both to primarily structural and to primarily narrative components. On the one hand, it talks of the form of programs – whether they are continuing serials or more episodic series, or whether if comedies they are sitcoms or sketch shows – and on the other it may refer to the content, either through setting (hospital dramas, westerns), events (law and order shows) or premise (science fiction programs). Steve Neale has argued for considering television programs as engaging in 'multiple generic participation'; thus the British program *Casualty* is both a television series and a hospital drama (Neale, 2001: 4). While certain fictional genres, like spy or western series, go in and out of fashion, others, especially law and order series, hospital dramas, and family sitcoms, remain televisual staples.

Before considering specific ways in which language and television interact, it is necessary to consider two other determinants of televisual programming – scheduling and source of show. Scheduling is a very different affair for the free-to-air channels, which screen a great range of genres, as opposed to pay channels, which may be dedicated to a particular genre. The art of scheduling is to match programs with the most appropriate audiences in terms of maximizing ratings and minimizing costs. For free-to-air the fiction is maintained that television is watched by members of conventional nuclear families – thus, the morning and early afternoon is designed for housewives, late afternoon for children, followed by early evening family viewing, which begins prime time, and then adult viewing as children are put to bed. The address and the language used thus modulate across the course of the day, as does the amount of sex and violence allowed.

Programs are sourced in three main ways: they may be locally made either by the channel or network itself, as is usually the case for news for instance, or by independent companies commissioned by the networks; they may be imported from other nations; or they may be made to a purchased format. The term 'format' can be used simply to refer to what I have previously considered a conception of genre – a magazine show or a sitcom. Here, however, I am using it to refer to a tradable outline of a program which enables, for example, at present more than 100 countries to have viewed *Who Wants to be a Millionaire?*, most of them in local editions. Formats may be used for both fictional and nonfictional programs and while the international trade in complete programs is dominated by the United States (which imports less than any other country), the trade in formats is much less unilateral (see Moran, 1998). Importing the format alone allows a proven success to be adapted to local conditions, not only increasing local employment, but also avoiding the necessity of choosing between subtitling or dubbing foreign languages or having nonlocal versions of, say, Spanish or English dominating the airwaves.

Language Used on Television

The range of language used on television is only a fraction of the range of language used in the societies in which it operates and some of it is specific to the site, but the range has increased over the time that television has existed as a mass medium. Initially, television programs, especially the nonfictional ones, adopted comparatively formal speech and modes of address. The BBC for instance used the dominant educated Received Pronunciation across news,

current affairs, documentaries, and advice programs, even for sporting commentary. Local dialects were permissible for comedy and for fictional programming with claims to social realism, as was the case for early soap operas such as *Coronation Street*. Australian programming both on public and commercial channels preferred voices closer to (RP) British inflections. U.S. networks too called on a limited range of dialects, preferring those dominant among the middle classes in the major production centers of New York and California. The social shifts of the 1960s encouraged a greater range of sounds to be seen as socially acceptable and regional dialects began to be heard even nationally on British television, with similar moves to variation elsewhere. The same forces also encouraged a more casual delivery. Because television, again like radio, is continuously broadcast and primarily received either individually or by small, mainly domestically situated groups, it needs to have ways of attracting attention and managing the intimacy of the ostensible interaction. Of course, it is not an intimate occasion. A person sits in a studio speaking to camera surrounded by a substantial group of unseen other people and addresses an audience which may be numbered in the millions. Or a group of actors perform a script in studios and on location to be compiled into a soap opera episode again received by a vast audience, but this time dispersed across the globe and over a considerable period of time. One of the ways of dealing with this, which applies to the first situation, is to use direct address, talking to the viewer as if they were present face to face for a two-way communication, employing a range of devices including commands that may acknowledge their location ("don't try this at home"), assumptions about shared understandings ("you may have thought you already knew everything about growing begonias, but . . .") and personal salutations ("goodnight from me"). Here the television presenter makes assumptions about viewers from which to construct a monologue that sounds as if it may be dialogic. Again the interaction assumes a sociable role.

Robert Stam has discussed what he calls the 'phantasmatic' relationship between viewer and television presenter, examining especially the "fictive we" (Stam, 1983: 38–39). This refers to a shifting collective named by the television presenter who may appear to speak for the program ("we'll be back after this break"), the nation ("we Americans like to think of ourselves . . ."), or a grouping that includes both television professionals and viewers ("we've all had that experience of . . ."). Despite the fact that those included vary so much, the actual referents remain clear despite their fundamental fictionality.

The peculiarity of the simulated relationship between presenter and television viewer was examined very soon after it became standardized. Donald Horton and R. Richard Wohl coined the term 'parasocial interaction' to describe it in 1956. As they note, "the interaction, characteristically is one-sided, nondialectical, controlled by the performer and not susceptible of mutual development" (Horton and Wohl, 1956: 215) yet it produces an illusion of intimacy. They concentrate on the way presenters of nonfiction programs interact with studio audiences, but acknowledge its applicability for more distant 'lonely viewers' of fictional programs. The term has been taken up to explain the overinvestment of some audience members in the lives of soap opera characters, but is most found in analyses of viewer relations with newsreaders. The common practice of viewers responding aloud to the greetings and farewells of their regular newsreader as if there were indeed an actual relationship between them is seen as indicative.

The various ways in which the simulated copresence of television performer and viewer is referenced is aided significantly by the centrality of 'liveness' to the televisual medium. Whether or not a program is actually broadcast simultaneously with its production, elements of liveness may be claimed by such rubrics as 'recorded live in front of a studio audience.' Elements of liveness, often just linking commentary between prerecorded segments as is the case for news bulletins, are industrially regarded as adding value to a broadcast. The presenter or commentator experiences the events being broadcast at the same moment as the viewer and may share similar emotions – of excitement at a sporting performance or horror at a disaster such as September 11.

The problems of address are not so evident in the many television programs that rely on various forms of interviewing. Most nonfiction programs include interviews as one of the ways in which information is gathered and disseminated. These may be very brief exchanges, as found in the news, where interviews have largely been replaced by sound bites for the more important stories, or the entire content of programs such as celebrity chat shows. The interviewer usually stands as an intermediary between the viewer and the person being interviewed, at times posing questions directly as on the viewers' behalf. Paddy Scannell's (1991: 1) suggestion of the 'double articulation' of broadcasting addressed to those actually present but with the intention of being heard by those attending distantly applies to this as to most television other than the sole presenter speaking to camera discussed above.

Philip Bell and Theo van Leeuwen have categorized media interviews as revelatory, adversarial, or

conversational. They emphasize that these distinctions arise from the relationship between the media institutions and viewers. Adversarial interviewers ask questions of politicians, for example to test their honesty on behalf of the audience constituted as citizens, while conversational interviewers on chat shows test out the foundations of celebrity for the viewers, invoking their concerns if challenged by interviewees (Bell and van Leeuwen, 1994: 222–224). Revelatory interviews are often structured with confession following an introduction to be followed in turn by reflection and testimony (Bell and van Leeuwen, 1994: 93). They are the least common but while Bell and van Leeuwen use a religious radio instance, they can be seen to be the key form for talk shows such as *Oprah*.

Not only is spoken language particularly important for the medium of television generally, but some programs prioritize it even further. Laura Stempel Mumford (1995: 43) has observed of soap opera, "I see the primacy of talk, the telling and retelling of stories, as a function of the programs' concentration on personal relationships and the continual efforts to construct a particular kind of community". Drama series, especially crime ones, are able to include significant action sequences, which reduce the extent to which talk is central, while music programs and sports broadcasts have their key concerns elsewhere, but dramas of relationships, not just soaps but usually also sitcoms, and the majority of other comedy shows rely on what is seen more frequently as the bane of nonfiction programming, the 'talking head.' It is clear that it is those fictional programs which most reflect the domesticity of the site of reception that are dominated by talk.

To say that talk is unimportant for sports programs is only a comparative claim. Although it would be possible for matches and other contests to be screened without commentary, this does not occur and the character of sports commentary is much investigated. Judy Delin (2000) examined the distinctive intonation, used to create excitement, and the consequences of the imbalance of power between commentator and expert, noting how turn taking based on the latter can be overridden by the importance of the description of action.

The talk show built around the intimate problems of selected viewers is a distinctive televisual genre. Much critical reception sees them as providing an embodiment of the feminist slogan 'the personal is the political' through opportunities for ordinary people, especially women, to represent their own problems, though there are concerns about the class relations exhibited when the ordinary people are so regularly working class while the presenters and advisers are middle class. The shows are regarded as one of the key sites for the spread of therapeutic discourse across television. For most of the programs, the double articulation involved assumes that the confession of the problems and the solutions suggested by the experts provide a "talking cure" (Shattuc, 1997) for those present as well as those viewing, though this may not apply to the more confrontational examples, such as *The Jerry Springer Show*. A good representation of the wealth of international critical writing on the field is provided by Tolson (2001).

Confession is a common mode for television not only in the interview context or the talk show. A key feature of reality game shows such as *Big Brother* is the provision of a confession closet where individuals escape from the situation manufactured by the producers to speak directly to the viewers about matters they would rather not be overhead discussing by their fellow participants. While in *Big Brother* the confession is made to the titular figure (and may even involve an interrogation of the confessor), the addressee of the confession in other programs constitutes viewers as privileged if unseen recipients of private information are made public. These are particularly telling instances of the blurring of the public and the private that contemporary television so insistently performs. Although there is no technical requirement for it, the visual resolution of material is often degraded compared to the rest of the program, as if to index its 'secret' dimension.

The development of a new range of programs in the age of plenty with the proliferation of channels all requiring content has led to a need for new names for the genres. Some terms are hybrids of previously separate categories, as is the case with 'infotainment,' while others, such as 'talk shows' and 'reality television,' take one aspect of the new genre and use it for the title. All three of these instances have significant potential for confusion. 'Infotainment' names house and garden or lifestyle programming in the UK and Australia but lighter, more entertaining, current affairs in the United States and continental Europe. 'Talk' is often used to name both social problem and celebrity interview programs. The greatest range is that covered by 'reality TV.' Initially used in the United States to name cheap fly-on-the-wall programs made while riding along with emergency services, it was a little later also applied to game shows which sent ordinary people in as contestants to created situations requiring them to survive physical threats (*Survivor*) or extreme boredom (*Big Brother*) while hoping to outwit their fellows to win fame and fortune. In the United States 'reality television' is now used to name virtually all nonfiction programming other than news, while elsewhere it is restricted to

docusoaps and reality game shows – the term now most common to describe *Big Brother* and its ilk. There has been no need for new names for fictional programs since generic variation here has all been within the existing range.

Language Taken from Television

One of the problems facing the study of television is the difficulty of proving that television influences the behavior of viewers. Even in the heavily researched area of television and violence, the evidence is contradictory. When it comes to the matter of demonstrating that television influences the language of viewers, much of the research works from observation and anecdote or develops from media panics (usually) about the decline in standards or the adoption of foreign locutions. The area is less contentious than the television violence debate or the extent to which televisual junk food advertising encourages childhood obesity, so there are few studies arguing against a televisual component to changing language use.

The most characteristic type of media panic about television's influence on everyday language is nationally inflected and involves perceived threats to traditional speech practices by the adoption, usually by the young, of foreign locutions and slang. The French distaste for the incorporation of English terms and phrases, some of which have a televisual origin, is a variant of this, but because imported television programs are subtitled or dubbed, television is not often singled out for particular attention. In countries that share English with the dominant exporter of television programs, the United States, concern about the spread of 'Americanisms' and the dilution of British or Australian forms of English is more often blamed on television.

Though the percentage of imported American entertainment product is greater for film, the far greater amount of television watched (including films screened on television) leads to television being seen as the principal threat. This is compounded by the television set being the device on which videos and DVDs of imported American entertainment, now including large quantities of 'sell-through' television programming, are watched, often again and again. Unlike film, where series are comparatively rare and appear only after considerable time has elapsed, television characteristically screens programs as series or serials which appear weekly, or even more frequently. This also provides repeated exposure to favored programs and characters, the clothing or speech patterns of which may be emulated and spread throughout particular age-groups and beyond.

One of the few thoroughgoing studies to investigate some of these assertions is Michael Adams's work on *Buffy the Vampire Slayer*. Adams has both analyzed the role of language on and off the program and provided a lexicon of 'slayer slang,' although he is not concerned with the spread of the slang beyond the United States. He claims that "because *Buffy* is so linguistically potent, its cultural influence amounts, in part, to influence on American speech" (Adans, 2003: 11). Much of his argument concerns the way slayer slang spreads rather than starts slang usage, identifying many instances where expressions regarded as quintessentially coming from the 'Buffyverse' have previous more limited appearances; for example, "without denying its rising popularity in general American slang, 'über-' is undeniably a slayer slang prefix" (Adams, 2003: 52). He claims consequences beyond the linguistic in saying that "the show's continual use of slang, not to mention its running commentary on the English language, successfully dignifies teen language and the range of teen experience for which it speaks" (Adams, 2003: 28). 'Bail,' meaning to leave or quit, is an example of one of many slang terms adopted from *Buffy* by young Australians; Adams discusses it as being first used in the *Buffy* film in 1992 and being representative of a common practice of clipping phrases (in this case 'bail out') inherited from the 1960s (Adams, 2003: 39).

Both fictional and nonfictional shows can operate in this way. Jamie Oliver's cooking programs provided a vector for the dissemination of 'mockney' usages, such as 'dodgy' or 'pukka' or the clipped comparative 'easy as,' across Australia not long after his first show aired. Advertising slogans also can be observed transferring readily from television commercials (among other sites) into everyday speech, often passing through comedy sketch shows on the way.

Not producing any level of panic is the similar practice of adopting catchphrases from popular television programs. Most commonly these relate to a particular program, or even a particular character, and can be used to demonstrate allegiances, as would be the case with someone calling on *Star Trek: The Next Generation*'s Jean-Luc Picard's phrase 'make it so.' Occasionally, they can be more thoroughgoing in their televisuality. Perhaps the strongest of these is 'here's one I made earlier,' evident in almost all instructional television programs though most present in cooking shows. It provides testimony to the valuation of liveness and the illusion of instruction happening in real time, since viewers are fully conversant with editing to cover time lapses in other genres. It has now become such a cliché that it is no longer possible for television presenters to use it unironically. Cult programs, such as *Monty Python's Flying Circus*

or *Fawlty Towers*, may provide both long phrases and short references to sketches – 'dead parrot' from the former and 'don't mention the war' from the latter – which are comprehended far beyond the actual audiences for any of the originating shows. The latter phrase in particular is a great favorite with newspaper subeditors.

The importance of talk in soap operas, mentioned above, follows through to a recognized feature of everyday language, the use of television program content to facilitate discussion about other matters. Chris Barker (1999) has explored the way British Asian girls draw on soap opera plots and characters to help manage the ethical and moral dilemmas they face. This follows earlier work on the way people talk about soap opera and use the programs to talk about issues of importance to them (e.g., Hobson, 1989).

The popular adoption of words and phrases from television is now much aided by associated websites. Adams (2003: 6). noted the importance of the various *Buffy* fan-sites not just for disseminating slayer slang but also for developing it and, given the program's writers' attention to such sites, feeding back in to the program Official websites and spinoff merchandise are also involved. The Australian cult sitcom *Kath and Kim* not only coined terms such as 'hornbag' which appeared on aprons and T-shirts and moved into popular usage with aficionados, but also provided a pronunciation section on its website to ensure that viewers could practice the precise intonations of ordinary words like 'issues' as spoken by Kath or Kim ('iss-ewes') or other characters on the program.

It seems likely that more countries will move into the televisual age of plenty, but because most of this plenty is associated with subscription rather than free-to-air television, the greater number and range of programs will not be available to all. Television has been a site for unifying national rituals; in an age of scarcity highly popular programs could be viewed simultaneously by a large cross-section of the population and information and catchphrases from them moved rapidly through societies. Now it takes huge public disasters such as 9/11 or sporting events such as the Olympics to draw these kinds of audience; programs are more commonly seen by small fragments of the population and the linguistic consequences are more limited. Even so and despite the competition from other media for people's attention, television continues to simulate copresence, talking away to us in our domestic spaces about domestic issues, about politics, about our fantasies and our passions and for the most part doing so in a highly sociable manner.

See also: Dialect Representations in Texts; Documentary; Genre and Genre Analysis; Media Panics; Neologisms; News Language; Radio: Language; Slang, Argot and In-group Codes; Sports Broadcasting; Talk Shows.

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Telugu

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Introduction

Telugu is one of the four literary languages of the Dravidian family. It is mainly spoken in the state of Andhra Pradesh in India. According to the official Census of India (1991 report) there were 66 million speakers of Telugu in the country. The state of Andhra Pradesh could be demarcated into four major dialectal regions (North, South, East, and Central). Varieties of Telugu spoken outside this state differ to a good extent from these main dialects. Like many other languages in India, in addition to regional variants, Telugu possesses a good number of social variants too. Both these variations—regional as well as social—are reflected in most of the components of the language viz., lexical, phonological, morphophonemic and grammatical. Telugu script is a derivative of the Southern Brahmi script. Though Telugu words are found in inscriptions dating back to 200 BC, we get the first inscription written entirely in Telugu sentences in 575 AD. The major literary works in Telugu start from the eleventh century BC.

Sounds

Its phonemic system contains native as well as borrowed sounds (from Sanskrit, Perso–Arabic and English sources). All nasals, trills, approximants, and laterals are voiced; all fricatives are voiceless; stops are differentiated both for voicing and aspiration (Table 1). Aspirated stops are found only in educated and Sanskritized speech – even in that, /th/ is rarely found and the /th/ sound in the Sanskrit original is mostly replaced by /dh/ except after /s/. /f/ is found in words borrowed from Perso–Arabic and English sources. /ph/, which is available only in words borrowed by Sanskrit, is generally pronounced as /f/ in non-Sanskritic but educated speech. /s/ and /š/ are mostly merged into /s/ in non-Sanskritized speech. /w/ phonetically varies between [w] and voiced labio dental approximant [ʋ].

Vowel harmony plays an important role in its phonology (Table 2). At allophonic level, the height of a vowel controls the height of the vowel that precedes it (in the preceding syllable), for example, 'cat' */pilli/* > [*pilli*]; 'girl' */pilla/* > [*pIlla*]. Sandhi changes are also very complex in the language. These include short-vowel deletion, assimilation of consonants for place, manner, phonation type, and so on. Application of these extensive Sandhi changes sometimes results in telescoping of several words into long strings. For instance, when some of the Sandhi rules are applied on the underlying form of the sentence: *wēḍi-nīḷ ḷu-lēwu-aṇṭāwu-ā* 'Do you say that there is no hot water?' we get the output as: *wēṇṇīḷḷēwaṇṭāwā*.

Pronouns and Pronominal Categories

Pronouns are differentiated for the features of person, number, human-maleness, and humanness. The pronouns are *nēnu* (1s), *mēmu* (1e-pl), *manamu* (1i-pl), *nīvu/nuvvu* (2s), *mīru* (2pl), *wāḍu* (3s-mh), *adi* (3s-nmh), *wāru/wāḷḷu* (3pl-h), *awi* (3pl-nh) (1 = 1st person, 2 = 2nd person, 3 = 3rd person; s = singular, p = plural; e = exclusive [excludes the addressee], i = inclusive [includes the addressee]; mh = human male, nmh = other than human male; h = human, nh = non-human). This classification of pronouns is fundamental, as it is reflected in the pronominal suffixes that are suffixed to the finite verb stems in forming full verbs (a process also known as 'verbal concord or agreement'). The major allomorphs of the pronominal suffixes are 1s: *-nu*, 1e-pl/1-pl: *-mu*,

Table 1 Consonants

	Labial		*Labio dental*	*Denti-Alveolar*		*Alveolar*	*Retroflex*		*Palatal*		*Velar*	
Stops												
Unaspirated	p	b		t	d		ṭ	ḍ	č	j	k	g
Aspirated	ph	bh		(th)	dh		ṭh	ḍh	čh	jh	kh	gh
Nasals		m				n		ṇ				
Fricatives			f			s	ṣ		š		h	
Trills						r						
Approximants										y		w
Laterals						l		ḷ				

2s: *-wu*, 2pl: *-ru*, 3s-mh: *-du*, 3s-nmh: *-di*, 3pl-h: *-ru*, 3pl-nh: *-yi*. In the category of third-person pronouns, in addition to the remote pronouns given above, we also get proximate and interrogative pronouns. All the third-person pronouns are listed below, along with their oblique forms (that are explained later).

The 2pl and 3pl-nh pronouns are also used as honorific ('respect') pronouns. When honorificness is taken into account, in third person we get extra sets of pronouns that denote different degrees of 'respect.' The sets of pronouns with increasing degree of honorificness are 3s-mh REMOTE *wāḍu atanu/āyana, wāru*; PROXIMATE *wīḍu, itanu/īyana, wīru*; INTERROGATIVE: *ewaḍu, ewaru*; Third-person singular human feminine (as nonhumans are not differentiated for honorificness): REMOTE *adi, āme/āwiḍa, wāru*; PROXIMATE *idi, īme/īwiḍa, wīru*; INTERROGATIVE *ēdi, ewarte, ewaru*. Note that the pronouns with highest degree of honorificness (*wāru, wīru, ewaru*) are originally one of the alternants of the Plural human forms (but the other alternants viz., *wāḷlu, wīḷlu, ewaḷu* are not used as third-person honorific singular forms).

Oblique Forms

Nouns (simple, derived as well as plural forms) and pronouns have both direct and oblique stems. The direct stems are the nominative forms (direct stems of singular nouns and ever-plurals (e.g., *pālu* 'milk') are listed in the lexicon), whereas the oblique stems are used in several of the case inflections. In the case of some nouns, both of these stems are same in form (e.g., *kukka* 'dog': *kukka-ki* 'to a dog'). In the case of all pronouns and some nouns, the oblique stems differ in shape (e.g., *rāyi* 'stone': *rāti-tō* 'with a stone'; *kukka-lu* 'dogs': *kukka-la-ki* 'to the dogs'). The oblique stems of third-person pronouns are given in Table 3. The oblique stems of the personal pronouns are *nā* (1s), *mā-* (1e-pl), *mana-* (1i-pl), nī- (2s), *mī-* (2pl).

Noun

A noun is simple (monomorphemic) (e.g., *kukka* 'dog') or derived (e.g., *donga* 'thief' > *donga-tanam* 'theft'; *moga-* 'male' > *moga-tanam* 'manliness'; *cuṭ-ṭam* 'a relative' > *cuṭṭa-rikam* 'relationship'; *andam* 'beauty' > *anda-gatte* 'beautiful woman'; *tiṇḍi* 'eating'> *tiṇḍi-pōtu* 'glutton'; *jūdam* 'gambling'> *jūdari* 'gambler'). Verbs can give rise to two types of derived nouns: action nominals (e.g., *mūyu* 'to close, cover'> *mūy-aḍam* 'closing, covering'; *pilucu* 'to call'> *pilawa-ḍam* 'calling') or substantive nominals (*mūyu* 'to close, cover'> *mū-ta* 'a cover, lid'; *pilucu* 'to call'> *pilu-pu* 'invitation').

Table 2 Vowels

	FU	*CU*	*BR*
High	i ī		u ū
Mid	e ē		o ō
Low		a ā	

Number

A simple or derived noun can be inflected for plural number by the addition of a plural suffix. The plural suffix has two morphophonemic alternants: *-lu* and *-ḷu*. [e.g., 'dog': *kukka* (sg.), *kukka-lu* (pl.); 'backyard': *peraḍu* (sg.), *peraüu* (pl.); 'cat': *pilli* (sg.), *pillulu* (pl.); 'house': *illu* (sg.), *iḷḷu* (pl.); 'eye': *kannu* (sg.), *kaḷḷu* (pl.)]. Some nouns require their oblique stems to receive the plural suffix [e.g., 'pit': *goyyi/gōyi* (sg.), *gōtu-lu* (pl.); 'horse': *gurram* (sg.), *gurrā-lu* (pl.)].

Case

The direct stem of a singular or a plural noun functions as a noun in nominative case. Other case forms of nouns are obtained by means of several case suffixes and postpositions. Some of them are accusative *-ni/-nu*; dative *-ki/-ku*; instrumental/sociative: *-tō*; ablative *-nunci*; comparative *-kaṇṭe*; and locative *-lō*. The oblique stem of a noun functions as its genitive form (e.g., *nā* 'my', *rāti* 'of stone' [*rāyi* 'stone']). A few postpositions are: *kinda* 'below,' *mīda* 'above,' *lōpala* 'inside,' *mundu* 'in front of, before,' *tarawāta* 'after.'

Numerals

Structure of the numerals follows the general Dravidian pattern. Cardinal numerals 1000, 100, and 1 to 10 are mono-morphemic. They are: *okaṭi* '1,' *reṇḍu* '2,' *mūḍu* '3,' *nālugu* '4,' *aidu* '5,' *āru* '6,' *ēḍu* '7,' *enimidi* '8,' *tommidi* '9,' *padí* '10,' *nūru/wanda* '100,' and *vēyi/veyyi* '1000.' The formula for forming decades is: 2, 3 and so on, followed by 10 (e.g., *nalabhai* [4–10] '40'). The formula for series between decades (e.g., 41–49) is: numeral for decade followed by 1–9 (e.g., *nala-bhai-reṇḍu* [4-10-2] 'forty-two'). Ordinals are derived from cardinals by suffixation of *-awa* (> *ō*) (e.g., *āru-awa* > *ārawa/ārō* 'sixth').

Adjectives and Adverbs

Adjectival forms that function solely as modifiers of nouns or other adjectives (and nothing else) are very few in the language; for example, *ara* 'half,' *pāwu* 'a

quarter,' *ceri* 'each.' These adjectives can be followed only by a noun. The demonstrative and interrogative roots: *ā* 'that,' *ī* 'this,' *ē* 'which,' are also adjectives. They are used before nouns (e.g., *ā pilla* 'that girl', *ē pilla* 'which girl'). Their variants can take various suffixes to give rise to different forms (e.g., *akkaḍa* 'there,' *appuḍu* 'then,' *aṭu* 'that side,' *alāga* 'in that manner,' *awatala* 'on that side,' *anni* 'that many,' *anta* 'that much'). Even the third-person pronouns can be viewed as derivatives of these forms.

Some adjectives are bound and require a suffix or a noun to follow it (e.g., *tella* 'white': *tella-wāḍu* 'white man,' *tella-ni/-ṭi maniṣi*' 'white person,' *tella-gā* 'whitish,' *tella-na* 'whiteness'). A large number of adjectives are derived from other forms such as nouns, adverbs, and verbs. A noun in genitive case always functions as an adjective (e.g., *nā pustakam* 'my book,' *rāti gōḍa* 'stone wall'). Some examples of adjectives derived from adverbs are: *alāṭi maniṣi* 'a person of that type' [*alā(ga)* 'in that manner']; *rēpaṭi pani* 'work of tomorrow' (*rēpu* 'tomorrow'). A majority of nouns function as modifiers when placed before another noun (e.g., *goppa maniṣi* 'great man').

It is difficult to find monomorphemic adverbs. Even the adverbs of time and place such as *ninna* 'yesterday,' *appuḍu* 'then,' are either basically nominals or are derived from adjectival roots. The main adverb deriving suffix is *-gā*, as in *gaṭṭi-gā* 'hard.' Many onomatopoeic words are basically adverbial in function (e.g., *gaba-gabā* 'quickly').

Verb

Like in many other Dravidian languages, verb in this language has the most complex structure. A fully inflected verb contains a verb stem followed by optional suffixes. The stem is simple, derived, or compound. A simple stem is composed of one verb root (e.g., *caccu* 'to die'). A derived stem contains a verbal or nominal root followed by a derivative suffix (e.g., *cam-pu* 'to kill', *cam-pincu* 'to cause to kill'); *ūh-incu* 'to imagine' (from *ūha* 'imagination'). A compound verb stem contains a main verb followed by one or more auxiliary verbs (e.g., *waṇḍu-konu* 'to cook for oneself' [*waṇḍu* 'to cook'], *waṇḍu-kona-bōwu* 'to be about to cook for oneself').

A verb stem is inflected for tense/mode, which takes a further pronominal suffix (in the case of finite verbs). Most of the inflectional suffixes have two or more allomorphs. Some of the finite tense/mode forms are – Imperative: *tinu [<tinu-u]* '(You sg.) eat!' *tinaṇḍi [<tinu-aṇḍi]* '(You pl.) eat!' Negative imperative: *tinaku [<tinu-aku]* >'(You sg.) don't eat!' *tinakaṇḍi [<tinu-aku-aṇḍi]* >'(You pl.) don't eat!' Past: *pilicēnu [<pilucu-ē-nu]* 'I called'; *pilicindi [<pilucu-in-di]* 'It called.' Nonpast/Habitual: *tiṇṭāḍu [<tinu-ṭā-ḍu]* 'He will eat/He eats'; *tiṇṭāmu [<tinu-ṭā-mu]* 'We will eat/We eat.' Durative: *tiṇṭunnādu [<tinu-ṭunnā-ḍu]* 'He is/was eating'. Nonpast Negative: *tinanu [tinu-a-nu]* 'I will not eat'; *pilawaḍu [<pilucu-a-ḍu]* 'He will not call'. Hortative: *tindām [tinu-dā-mu]* 'Let us eat!' Sample paradigms of three regular tenses inflected for all the persons (for the verb *tinu* 'to eat') follow:

	Past	*Nonpast*	*Nonpast Negative*
1s	tinnānu	tiṇṭānu	tinanu
1e-pl/ 1i-pl	tinnāmu	tiṇṭāmu	tinamu
2s	tinnāwu	tiṇṭāwu	tinawu
2pl	tinnāru	tiṇṭāru	tinaru
3s-mh	tinnāḍu	tiṇṭāḍu	tinaḍu
3s-nmh	tinnādi> tinnadi>tindi	tiṇṭundi	tinadu
3pl-h	tinnāru	tiṇṭāru	tinaru
3pl-nh	tinnāyi	tiṇṭāyı	tinawu

Nonfinite verbs do not terminate in a Pronominal suffix. They form nonfinite or subordinate clauses in a sentence. The resulting forms have adverbial, adjectival, or nominal functions. Some of the nonfinite forms are obtained by a single suffix such as: Perfective (e.g., *cadiw-i* 'having read'), Negative Perfective: *cadaw-aka* 'not having read'; Durative: *caduwu-tū* 'while reading'; Conditional: *cadiw-itē* 'if one reads'; Concessive: *cadiw-inā* 'even if one reads.' Some Nonfinite forms are obtained by adding more than one suffix or auxiliary (e.g., *cadaw-aka-pō-tē* 'if one does

Table 3 Third-person pronouns

3rd Person	*Remote*		*Proximate*		*Interrogative*	
	Direct stem	*Oblique stem*	*Direct stem*	*Oblique stem*	*Direct stem*	*Oblique stem*
s-mh	wāḍu	wāḍi	wīḍu	wīḍi	ewaḍu	ewaḍí
s-nmh	adi	dāni	idi	dīni	ēd1	dēni
pl-h	wāru/wāḷḷu	wāri/wāḷḷa	wīru/wīḷḷu	wīri/wīḷḷa	ewaru/ewaḷu	ewarḷ/ewaḷa
pl-nh	aw1	wāṭi	iwi	wīṭi	ēwi	wēṭḷ

not read'). Relative participle forms are adjectival in function – they are: Past: *cadiw-ina* 'one who read, one which was read'; Nonpast: *cadiw-ē* 'one who reads, one which is/will be read'; Negative: *cadaw-ani* 'one who does/did not read, one which is/was not read.' The other important nonfinite forms are Verbal noun (e.g., *cadawaḍam* 'reading'), and Infinitive which forms the basis for many further expansions (e.g., *cadawa*, as in *cadawa-kūḍadu* 'one should not read').

Verbs are classified into different conjugation classes that account for the various morphophonemic changes that they undergo during the process of inflection.

An extensive process of verbal compounding gives rise to forms expressing different kinds of modes. These compound verbs can be classified on the basis of the inflected form of the nuclear verb. Some examples follow. *With infinitive as the nucleus*: Permissive: *cadawa-waccu* 'one may read'; Inceptive: *cadawa-bōyēnu* 'I was about to read'; Potential: *cadawa-gala-nu* 'I can read'; Negative Potential: *cadawa-lē-nu* 'I cannot read'; Negative Past: *cadawa-lēdu* 'One did not read'; Obligative: *cadaw-āli* 'One should read'; Negative Injunctive: *cadawa-kūḍadu* 'One should not read'; Prohibitive: *cadawa-waddu* 'Don't read.' *With past participle as the nucleus*: Benefactive: *cadiwi-peṭṭ-ēnu* 'I read it (for somebody)'; Decisive: *cadiwi-tīru-tānu* 'I will definitely read'; Completive: *cadiwi-wēs-ēnu* 'I finished reading.'

Syntax

Telugu is an SOV language. "It is a nominative-accusative language and hence, the verb agrees with the argument in the nominative case. It has postpositions and the genitive precedes the governing noun. The comparative marker follows the standard of comparison. The complementizer occurs in the right peripheral position. Adjectives and participial adjectives precede the head noun. There are no pleonastic or expletive constructions such as *it* or *there*. It is a pro-drop language. The subject, direct object, indirect object, and adverbial phrase of the finite embedded and matrix sentence may be pro-dropped. There occur clefts in Telugu and the clefted constituent occurs as the rightmost element just as in other Dravidian, Tibeto-Burman languages and Sinhalese" (Subbarao and Bhaskararao, 2004: 161). It has four kinds of nonnominative constructions and different types of verb-less sentences.

Vocabulary

Like many other Dravidian languages, the vocabulary of Telugu contains native Dravidian as well as borrowed vocabulary. The earliest borrowings were mostly from Sanskrit and Prakrit. Some of the borrowings were assimilated to fit the native phonology. Later borrowings came from Perso–Arabic sources through Urdu, Portuguese, and English in that order. Except for the sound [*f*] all the other sounds of the borrowed sources that are not native to Telugu were replaced by nearer native sounds. Because verbal vocabulary is more resistant to accepting borrowals, although borrowing verbal concepts, the corresponding nouns from the source language were borrowed, which were verbalized by means of suffixation (e.g., *ūhincu* 'to imagine' [Sanskrit *ūha* 'imagination'], *ānandincu* 'to enjoy' [Sanskrit *ānanda* 'happiness' or by means of verbal conjuncts (e.g., *ḍraywu-cēyu* 'to drive' [English *drive*]; *pūja-cēyu* 'to worship' [Sanskrit *pūjā* 'workship']).

See also: Brahui; Dravidian Languages; India: Language Situation.

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Template Morphology

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In complex inflectional systems, the morphology of an inflected word may involve more than one affix. In such instances, the sequence of affixes is sometimes variable. For instance, Luutonen (1997: 13) cited the example in (1) as one instance of variable affix order in Mari.

(1) Mari (Uralic)
a. joltaš-em-βlak
friend-my-PL
'my friends'
b. joltaš-βlak-em
friend-PL-*my*
'my friends'

Cross-linguistically, however, instances of this sort are comparatively rare: ordinarily, affix order is invariant. In the Southeastern Tepehuan (Tepehuán Sureste) verb form in (2), for example, the ordering of affixes is fixed.

(2) Southeastern Tepehuan (Tepehuán Sureste) (Uto-Aztecan)
mu-va-tu-vai'
REMOTE.LOCATION-REALIZATION.ASPECT-EXTENT.ASPECT-*drew.water*
'there he then drew water' (Willett, 1991: 46)

In instances of fixed affix ordering, it is natural to ask why the affixes must appear in the observed order. The simplest (and least satisfying) answer is that they just do – that the ordering doesn't follow from any general set of principles, but is simply stipulated by the morphology of the language in question. Template morphology is the name given to affixal morphology whose ordering is assumed to be stipulated in this way.

Southeastern Tepehuan (Tepehuán Sureste) provides a good example of template morphology. Verbal affixes in Southeastern Tepehuan (Tepehuán Sureste) fall into five prefixal and eight suffixal classes, as schematized in Figure 1. In the syntagmatic dimension, the affixes in a given class are rigidly ordered relative to the affixes in every other class; in the paradigmatic dimension, affixes in the same class are mutually exclusive. Affix classes possessing these properties are called position classes. The prefix position classes of Southeastern Tepehuan (Tepehuán Sureste) are given in Table 1: affixes listed in the same box belong to the same position class, and are therefore paradigmatically opposed to each other; the affixes in a given box may combine, in the indicated order, with semantically compatible affixes in the boxes to its right or left. Some affix classes have the special property that they span two or more prefix positions – that is, their members are paradigmatically opposed to any combination of affixes occupying those positions; Stump (2001) discussed these as portmanteau position classes.

Prefix positions					Verb stem	Suffix positions							
5	4	3	2	1		1	2	3	4	5	6	7	8

Figure 1 Southeastern Tepehuan position classes.

Because labeling a system of affixal morphology as templatic implies that there is no independent explanation for the ordering of its affixes, much of the research on systems that have been so labeled is devoted precisely to showing that they are not actually templatic. Bybee (1985) investigated the hypothesis that a verb's affixes are sequenced according to their degree of semantic relevance to the verb, where an inflectional category "is *relevant* to the verb to the extent that *the meaning of the category directly affects the lexical content of the verb stem*" (Bybee, 1985: 15); comparing systems of verb inflection in a 50-language sample, she found a strong positive correlation between a verbal affix's relative proximity to the verb stem and its degree of semantic relevance to the verb. More recently, Rice (2000) presented extensive evidence that Athapaskan verb morphology (long cherished as a textbook example of templatic morphology) is not in fact templatic, but instead exhibits semantically motivated affix ordering. (See McDonough, 2000 for additional arguments against a templatic analysis of Athabaskan verb morphology.)

Not all systems of affix ordering admit such independent explanations, however. Thus, two languages may contrast with respect to their ordering of affixal exponents of the same morphosyntactic properties; for instance, the voice suffix *-he* precedes the tense suffix *-sh* in Albanian *lahesha* 'I was washed,' while the exponent of tense precedes that of voice in Latin *lavābar* 'I was washed' (Stump, 2001: 25). Moreover, a single language may exhibit contrasting affix ordering in different morphosyntactic contexts. In the inflection of Fula verbs, for instance, the first-person singular subject suffix *-mi* appears before an accompanying object suffix in some instances but after it in others, depending on the object's person and number, as the examples in (3) illustrate. Evidence of this kind suggests that at least some morphology must be acknowledged to be templatic. (See Hyman, 2003 for arguments to this effect from the Bantu languages; see Good, 2003 for evidence that templatic structures exist in the domain of syntax as well as morphology.) In addition, languages sometimes place

syntagmatically similar affixes into paradigmatic opposition even though there is no logical incompatibility between them; for instance, there is no reason why the notions of distal location and repetition should be mutually exclusive in their morphological expression in Southeastern Tepehuan (Tepehuán Sureste); the fact that they are can only be attributed to the sort of stipulation embodied by Table 1.

(3) Gombe Fula (Niger-Congo)
  a. mball-u-mi-ɓe'
     help-RELATIVE.PAST.ACT-1SG-3PL.CLASS.2
     'I helped them'
  b. mball-u-maa-mi'
     help-RELATIVE.PAST.ACT-2SG-1SG
     'I helped you (sg.)'
  c. mball-u-moo-mi'
     help-RELATIVE.PAST.ACT-3SG.CLASS.1-1SG
     'I helped him' (Arnott, 1970: Appendix 15)

Template morphology is sometimes contrasted with layered morphology, in which the ordering of affixes is intrinsic. An instance of layered morphology is that of the English word *patronizingly*, in which the ordering of the suffixes *-ize*, *-ing*, and *-ly* is necessitated by the fact that of the three affixes, only *-ize* combines with *patron* (though *patronly* is marginally possible with a different suffix *-ly*) and that of *-ing* and-*ly*, only the former combines with *patronize* (though *-ly* combines with *patronizing*).

Simpson and Withgott (1986) identified six criteria for distinguishing template morphology from layered morphology; these are summarized in Table 2. According to criterion (a), the absence of any marking may be used to signal some property or set of properties in a system of template morphology. (Because the substance of this criterion in no way depends upon the postulation of 'zero morphemes,' I opt here for more theory-neutral terminology than is used by Simpson and Withgott.) Thus, in Southeastern Tepehuan (Tepehuán Sureste), the absence of any affix in prefix position 1 (Table 1) may signal the property set 'third person singular object': the absence of any marking in this position is precisely what distinguishes the form of a transitive verb having a third-singular object from forms of the same verb having some other sort of object. Layered morphology does not involve significative absence of this sort. For instance, there is no derivative of the noun *friend* whose contrast with other derivatives (e.g., *friendship*, *friendly*, *friendless*) is signaled by its lack of any overt mark of derivation. There are, of course, instances of zero derivation in English, but the absence of derivational marking in such forms is not obviously significative: the status of the noun *cook* as a nominal derivative of the verb *cook* isn't signaled by its lack of any derivational marking, but by its nominal morphosyntax (e.g., *the cooks left*), its phonological identity to the verb *cook*, and the fact that its meaning is built on that of *cook*. Indeed, Simpson and Withgott regard zero derivation as a characteristic of layered rather than template morphology (criterion [b]) because the effects of zero derivation very often parallel those associated with overt affixes in systems of layered morphology; for instance, the derivation of *cook* (n.) from *cook* (v.) parallels the derivation of agent nouns in *-er* (e.g. *bake* → *baker*) – which, by other criteria, is an instance of layered morphology.

According to criterion (c), the combination of an affix with a stem exhibits monodeterminacy in the case of layered morphology, but not in the case of template morphology. In instances of monodeterminacy, the morphosyntactic properties of a stem + affix combination are determined (in some sense) by only one of its parts – either the stem or the affix. (Because

Table 1 Verb prefix position classes in Southeastern Tepehuan (Tepehuán Sureste)

5	*4*	*3*	*2*	*1*	*0*
mu- direction toward speaker; remote location	*vi-* polite command				Verb stem
mi- distal location	*va-* realization aspect	*ji-* inception aspect	*tu-* extent aspect	*(ji)ñ-* 1SG object	
(ju)p- repetition	*ca-* temporary aspect	*xi-* imperative		*(ju)m-* 2SG object	
		(ji)x- attributive copula		Ø 3SG object	
				(ji)ch- 1PL object	
ma- distinctiveness aspect				*jam-* 2PL object	
pu- simplicity aspect		*(ji)r-* existential copula		*ja-* 3PL object	
ba- direction away from speaker					
ya- proximate location					

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the substance of this criterion in no way depends upon the potentially controversial conception of headedness assumed by Simpson and Withgott, I opt here for more theory-neutral terminology.) By this criterion, the combinations *super-sonic* and *bak-er* both involve layered morphology: in both instances, the syntactic category of the combination is determined by one of its parts (*-sonic* and *-er*, respectively). By contrast, a Southeastern Tepehuan (Tepehuán Sureste) verb exhibits polydeterminacy: its morphosyntactic properties cannot be deduced from any single part, but only from the sum of its parts.

By criterion (d), layered morphology is subject to the adjacency constraint (Allen, 1978; Siegel, 1978), but template morphology is not. According to this constraint, the addition of an affix to a stem is insensitive to all but the stem's outermost layer of structure. Thus, the formation of an abstract noun from an adjective may be sensitive to the adjective's outermost affix: adjectives give rise to abstract nouns by means of a variety of derivational affixes (*real-ity*, *shy-ness*, *tru-th*), but adjectives having *-al* in their outermost layer of morphology generally require the use of *-ity* (*musicality*, *conviviality*, *actuality*). On the other hand, the choice of noun-deriving suffix is never sensitive to any more internal part of an adjective's morphology; for instance, the fact that *intentional* derives ultimately from a verb (*intend*) is just irrelevant to the choice of morphology for its nominal derivative. In instances of template morphology, by contrast, the addition of an affix sometimes seems to be sensitive to the internal morphology of the stem with which it joins. In the Fula verb forms in (4), for example, both the subject agreement prefix and the object agreement suffix are sensitive to the tense expressed on the verb's stem (i.e., to the first continuous in [4a] and the general future in [4b]); yet the principal exponent of tense in the stems with which these affixes join is not in their outermost layer of structure, in apparent violation of the adjacency constraint.

(4) Fula (Niger-Congo)
  a. 'odɔ̀n-wall-u-no-maa'
     3SG.SUBJ-*help*-FIRST.CONTINUOUS-PRETERITE-2SG.OBJ
     'he was helping you'
  b. 'o-wall-ay-no-ma
     3SG.SUBJ-*help*-GENERAL.FUT-PRETERITE-2SG.OBJ
     'he was going to help you'
     (Arnott, 1970: Appendix 15)

While the adjacency constraint limits an affix's sensitivity to the internal structure of the stems with which it joins, the no-lookahead constraint excludes the possibility that an affix appearing in some word might be sensitive to more peripheral parts of that word's morphological structure. For example, this constraint excludes the possibility that the derivation of an inchoative verb stem from an adjective might involve the suffix *-ize* if that verb stem itself subsequently underwent nominal derivation, but otherwise the suffix *-en*. In instances of template morphology, by contrast, the appearance of an affix in a word is sometimes apparently conditioned by that word's more peripheral morphology (criterion [e]). Thus, in the Fula verb forms in (5), the suffix of the relative future active appears as *-ay* or *-at* depending on the subject agreement properties expressed by the following suffix.

(5) Fula (Niger-Congo)
  a. loot-ay-mi
     wash-RELATIVE.FUT.ACT-1SG.SUBJ
     'I will wash'
  b. loot-at-aa
     wash-RELATIVE.FUT.ACT-2SG.SUBJ
     'you will wash' (Arnott, 1970: 202)

It should be noted, however, that the claim that template morphology violates the adjacency and no-lookahead constraints is only meaningful in the context of a morpheme-based conception of morphology. In a realizational theory of morphology (see Stump, 2001 and references cited there), neither the agreement alternations in (4) nor the tense–affix alternation in (5) is conditioned by a verb's morphological structure; rather, they are conditioned by the morphosyntactic property set with which a verb is associated independently of its structure.

Simpson and Withgott's final criterion relates to the fact that systems of template morphology often allow a predicate to encode more than one of its arguments; for instance, the systems of verb inflection in Southeastern Tepehuan (Tepehuán Sureste) and

Table 2 Criteria for distinguishing between layered and template morphology

	Layered morphology	*Template morphology*
a. Zero morphemes [i.e., significative absence]	No	Yes
b. Zero derivation	Yes [?]	No [?]
c. Contains one root, one head [i.e., monodeterminacy]	Yes	No
d. Adjacency constraint	Yes	No
e. No-lookahead constraint	Yes	No
f. Usually encodes at most one argument	Yes	No

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Fula exhibit both subject and object agreement. Simpson and Withgott's inclusion of criterion (f) implies that some agreement systems are layered. But this raises a more general question: how does the distinction between template and layered morphology relate to the distinction between inflection and derivation? Stump (1997) examined this issue, and concluded that derivation is sometimes layered and sometimes templatic, but that by Simpson and Withgott's criteria, inflection is generally templatic (even if its status as such is inevitably obscured in languages which exhibit fairly little inflectional morphology).

Another important question relating to template morphology concerns the manner in which templatic stipulations on a language's morphology should be represented formally. The unfortunate choice of the template metaphor prejudices the issue in favor of the conclusion that these stipulations take the form of positive output constraints. No one, however, has proposed a theory of inflectional morphology which develops this conclusion with sufficient formal rigor to allow it to be evaluated objectively; such a theory would, in any event, be entirely *ad hoc* in its treatment of templatic stipulations. Another proposal which has enjoyed some favor is that inflectional affixes are functional heads in syntax, so that the ordering of affixes reflects the nesting of functional categories in syntax; this approach is, however, at odds with the widespread existence of language-specific idiosyncrasies of affix ordering for which the corresponding nesting of functional categories lacks any independent syntactic motivation. Another proposal for the representation of templatic stipulations is to equate these with the ordering restrictions implicit in the definition of a language's paradigm function. This is a more satisfactory approach, because the postulation of paradigm functions is independently motivated (Stump, 1997; Stump, 2001); moreover, it directly accommodates a range of otherwise recalcitrant position class phenomena (Stump, 1993), including portmanteau position classes as well as ambifixal position classes (in which prefixes and suffixes are paradigmatically opposed to one another), parallel position classes (whose member affixes are available to more than one affix position in a word's structure), and reversible position classes (whose ordering varies according to the morphosyntactic property set being realized).

See also: Affixation; Inflection and Derivation; Morphotactics; Paradigm Function Morphology; Syntax: Optimality Theory; Word.

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Temporal Logic

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Tense Logic

Tense Logic was introduced by Arthur Prior (1957, 1967) as an aid to elucidating various philosophical problems concerning time. Because it was used to provide formal renderings of propositions originally formulated as natural language sentences, it was natural to consider Tense Logic also as a tool for linguistic analysis in the context of linguistics rather than philosophy. As such, it was soon found to have considerable limitations, which stimulated the development of extensions or alternatives to Tense Logic as it had been conceived originally by Prior.

Syntax of Priorean Tense Logic

Prior took the basic expressions of temporality in ordinary language to be the past, present, and future tenses. For the past and the future, he introduced proposition-forming operators P and F, called **tense operators,** which, when prefixed to any proposition ϕ, yielded propositions that expressed, respectively, the past-tense and future-tense versions of ϕ, for example:

ϕ: It is raining.
$P\phi$: It was raining.
$F\phi$: It will be raining.

(More often, in fact, Prior would render $P\phi$ in the form 'It has been raining', using the present perfect rather than the simple past. In English, this reads more naturally because 'It was raining' seems to refer implicitly to some particular time assumed known.)

Used in combination with the standard connectives of Propositional Logic ($\wedge$, $\vee$, $\rightarrow$, $\leftrightarrow$, $\neg$), Prior's tense operators allowed one to express temporal relationships, e.g., using ϕ for 'John arrives' and ψ for 'Mary leaves',

$P(\phi \wedge \psi)$: John arrived when Mary left.
$P(\phi \wedge P\psi)$: When John arrived, Mary had left.
$F(\phi \wedge P\psi)$: When John arrives, Mary will have left.

This kind of analysis is too crude to capture the nuances of expression possible in natural language. Whereas the formulae $P(\phi \wedge \psi)$ and $P(\psi \wedge \phi)$ are logically equivalent, the sentences 'John arrived when Mary left' and 'Mary left when John arrived' are not. It might be argued, however, that the two sentences share some 'core' semantic content, and that this is what is expressed by the logical formulae. On this basis, Tense Logic is worth studying for the clarity it affords in analyzing at least some aspects of the linguistic expression of time.

Of particular interest is the interaction of the tense operators with negation. The formula $\neg P\phi$ says it has never been true that ϕ; it is not equivalent to $P\neg\phi$, which merely says it has (at least once) been false that ϕ. Reading ϕ as 'The prime minister of the UK is a woman', $\neg P\phi$ is false (because of Margaret Thatcher), whereas $P\neg\phi$ is true (because of all the other prime ministers). The negation of the latter, $\neg P\neg\phi$, says it has never been false that ϕ, and hence that ϕ has always been true. Prior introduced a new operator, H, as an abbreviation for the sequence $\neg P\neg$, and analogously G for $\neg F\neg$. The full set of operators is now

$P\,\phi$: It has been the case that ϕ (on at least one occasion).
$H\phi$: It has always been the case that ϕ.
$F\,\phi$: It will be the case that ϕ (on at least one occasion).
$G\phi$: It will always be the case that ϕ.

Using these, Prior could enunciate tense-logical theses such as $\phi \rightarrow GP\phi$, which says that if ϕ is true now then it will always be the case that ϕ *has* been true.

Semantics of Tense Logic

To express the meaning of the tense operators, we assume that propositions are evaluated as true and false at times, that a proposition may be true at some times and false at others, and that times are ordered by the relations *earlier than* and *later than*:

$P\,\phi$ is true at time t if and only if ϕ is true at some time t' earlier than t.
$H\,\phi$ is true at time t if and only if ϕ is true at every time t' earlier than t.
$F\,\phi$ is true at time t if and only if ϕ is true at some time t' later than t.
$G\,\phi$ is true at time t if and only if ϕ is true at every time t' later than t.

In the standard formal semantics for Tense Logic, a temporal frame is a pair $(T, \prec)$, where T is a set of times, and $\prec$ is a binary relation on T. For $t, t' \in T$, we understand $t \prec t'$ as the formal counterpart of the relation 't is earlier than t''. An interpretation $\mathcal{I}$ over frame $\mathcal{F} = (T, \prec)$ assigns a truth value to each atomic formula at each time in the frame. The fundamental semantic relation is satisfaction of formula ϕ at time t in frame $\mathcal{F}$ under interpretation $\mathcal{I}$, symbolized as $\mathcal{F}, t \models_{\mathcal{I}} \phi$. If this does not hold, we write $\mathcal{F}, t \not\models_{\mathcal{I}} \phi$.

We assume that all such relations are known for each *atomic* formula at each time; the truth values of compound formulae are determined by the semantic rules:

$\mathcal{F}, t \models_{\mathcal{I}} P\phi$ if and only if $\mathcal{F}, t' \models_{\mathcal{I}} \phi$ for some $t' \in T$ such that $t' \prec t$.
$\mathcal{F}, t \models_{\mathcal{I}} H\phi$ if and only if $\mathcal{F}, t' \models_{\mathcal{I}} \phi$ for every $t' \in T$ such that $t' \prec t$.
$\mathcal{F}, t \models_{\mathcal{I}} F\phi$ if and only if $\mathcal{F}, t' \models_{\mathcal{I}} \phi$ for some $t' \in T$ such that $t \prec t'$.
$\mathcal{F}, t \models_{\mathcal{I}} G\phi$ if and only if $\mathcal{F}, t' \models_{\mathcal{I}} \phi$ for every $t' \in T$ such that $t \prec t'$.

(For Boolean compounds with $\wedge$, $\vee$, etc., the standard rules are used.)

Some tense-logical formulae can now be proved to be universally valid, i.e., satisfied at every time in every frame. An example is Prior's formula $\phi \rightarrow GP\phi$. For suppose $\mathcal{F}, t \models_{\mathcal{I}} \phi$, and let $t' \in T$ be any time such that $t \prec t'$. Then the semantic rule for P implies $\mathcal{F}, t' \models_{\mathcal{I}} P\phi$. Because this holds for every $t' \in T$ such that $t \prec t'$, the rule for G gives us $\mathcal{F}, t \models_{\mathcal{I}} GP\phi$, as required. The formulae provable in this way constitute a system known as Minimal Tense Logic, generally designated K_t.

Because the class of all temporal frames imposes no constraints on the nature of the $\prec$ relation, K_t does not provide an adequate basis for reasoning about temporal relationships. It is therefore usual to restrict the class of frames by requiring $\prec$ to satisfy certain structural properties such as transitivity, density, or linearity. A transitive frame $(T, \prec)$, for example, obeys the rule

TRANS $\forall t, t', t'' \in T\ (t \prec t' \wedge t' \prec t'' \rightarrow t \prec t'')$

i.e., if t is earlier than t', which in turn is earlier than t'', then t must be earlier than t''. It can be shown that TRANS *characterizes* transitive frames in the following sense:

The frame $\mathcal{F} = (T, \prec)$ is transitive if and only if $\mathcal{F}, t \models_{\mathcal{I}}$ TRANS for every interpretation $\mathcal{I}$ over $\mathcal{F}$, and every time $t \in T$.

Much attention has been given to the problem of finding tense-logical formulae which correspond to first-order frame properties just as TRANS corresponds to transitivity (Van Benthem, 1991). Not all frame properties have corresponding tense-logical formulae, and conversely, not all tense-logical formulae correspond to first-order frame properties. Thus, there is no first-order characterization of the frames for which $GF\phi \rightarrow FG\phi$ holds; and no tense-logical formula exactly characterizes the *irreflexive* frames, which satisfy $\forall t\ \neg(t \prec t)$.

Extensions of Tense Logic

Increasing the Expressive Power: 'Since' and 'Until'

Sentences such as *John has been happy since Mary arrived* and *John will be happy until Mary arrives* cannot be expressed using Prior's operators. In 1968, Hans Kamp introduced binary operators S and U with the following semantics:

$\mathcal{F}, t \models_{\mathcal{I}} S\phi\psi$ if and only if there is a time $t' \prec t$ such that
(i) $\mathcal{F}, t' \models \phi$, and
(ii) $\mathcal{F}, t'' \models \psi$ for every $t'' \in T$ such that $t' \prec t'' \prec t$.
$\mathcal{F}, t \models_{\mathcal{I}} U\phi\psi$ if and only if there is a time $t' \prec t$ such that
(i) $\mathcal{F}, t' \models \phi$, and
(ii) $\mathcal{F}, t'' \models \psi$ for every $t'' \in T$ such that $t \prec t'' \prec t'$.

Let ϕ stand for 'Mary arrives' and ψ for 'John is happy'. Then $S\phi\psi$ is true now so long as Mary arrived at some past time, and John was happy at every time between then and now – in other words, John has been happy since Mary arrived. Similarly, $U\phi\psi$ is true now if Mary will arrive at some future time, and John will be happy at every time between now and then. This implies John will be happy until Mary arrives, but is not equivalent to it, because the English sentence would also be true if Mary never arrives, so long as John remains happy forever. This can be expressed as $U\phi\psi \vee G\psi$.

Kamp showed that for frames in which the flow of time is ordered like either real numbers or integers, the operators S and U suffice to express every first-order property expressible by means of $\prec$ and quantification over times. In this sense, the logic of S and U is *expressively complete* in a way that the logic of P, F, G, and H is not.

The Indeterminate Future

Although it is natural to suppose that a temporal frame should be linear, the need has frequently been felt for temporal frames with a branching structure. In a linear frame, given two distinct times, one must precede the other: $\forall t, t' \in T(t = t' \vee t \prec t' \vee t' \prec t)$. The most popular form of non-linear structure is a *future-branching* frame, in which each time has a unique linear past, but may have many distinct futures. This is secured by the 'left-linearity' axiom that restricts linearity to times in the past of a given time: $\forall t, t', t''\ (t \prec t'' \wedge t' \prec t'' \rightarrow t = t' \vee t \prec t' \vee t' \prec t)$.

This kind of structure supports reasoning about alternative *possible futures*: it captures the idea that whereas the past is fixed, the future is indeterminate. This means that some future events are inevitable

(occurring in every possible future) whereas others are merely possible (occurring in some but not all possible futures). To quantify possible futures, we introduce modal operators. One way of doing this is as follows: $\Diamond\phi$ says there is a possible future which makes ϕ true now (so ϕ is possible), while $\Box\phi$ says that every possible future makes ϕ true now (so ϕ is necessary). The semantics makes explicit reference to possible futures; a *history* is any maximal linear subset of T, and formulae are evaluated with respect to pairs (H, t), where H is a history and $t \in H$. Semantic rules for the existing operators can be straightforwardly rewritten by incorporating a single history term, as e.g.,

$\mathcal{F}, H, t \models_{\mathcal{I}} F\phi$ if and only if $\mathcal{F}, H, t' \models_{\mathcal{I}} \phi$ for some $t' \in H$ such that $t \prec t'$.

For the new modal operators, we have the rules

$\mathcal{F}, H, t \models_{\mathcal{I}} \Diamond\phi$ if and only if $\mathcal{F}, H', t \models_{\mathcal{I}} \phi$ for some history H' such that $t \in H'$
$\mathcal{F}, H, t \models_{\mathcal{I}} \Box\phi$ if and only if $\mathcal{F}, H', t \models_{\mathcal{I}} \phi$ for every history H' such that $t \in H'$

In these rules, because t is in both H and H', and branching is only into the future, these histories must coincide at least up to t. We can now interpret compound formulae such as

$\Diamond F\phi$	ϕ will be true in some possible future.
$\Box F\phi$	ϕ will be true in every possible future.
$P\Box F\phi$	It was inevitable that ϕ would eventually be true.

Interval Semantics

In the standard semantics for Tense Logic, the elements of a temporal frame are instants, that is, temporal elements lacking duration. A further possibility is to use temporal frames containing intervals as well as, or instead of, instants. This approach has been favored by those seeking to give a logical account of aspect in natural language, which requires us to handle events that take time (Dowty, 1979). The statement *John runs a mile* ($=\phi$) reports the occurrence of an event of several minutes' duration. It seems inappropriate to evaluate ϕ at instants, because there is no instant at which John runs a mile. Instead, interval semantics evaluates ϕ as true with respect to any interval i over which John runs a mile. Because running a mile is an accomplishment (Vendler, 1967), this means that ϕ will not be true on any proper subinterval of i—in contrast to the progressive form *John is running a mile*, which would be true.

Formally, we use frames of form $\mathcal{F} = (I, \prec, \sqsubset)$, where I is a set of intervals, $\prec$ is the 'earlier than' relation on intervals, and $\sqsubset$ is the proper subinterval relation. Accomplishments and activities are distinguished by their different entailments: an accomplishment sentence satisfies the rule

(ACC) If $\mathcal{F}, i \models_{\mathcal{I}} \phi$ and $i' \sqsubset i$ then $\mathcal{F}, i' \not\models_{\mathcal{I}} \phi$,

whereas an activity sentence satisfies

(ACT) If $\mathcal{F}, i \models_{\mathcal{I}} \phi$ and $i' \sqsubset i$ then $\mathcal{F}, i' \models_{\mathcal{I}} \phi$.

The progressive aspect might be regarded as an operator *Prog* for (among other things) converting accomplishments into activities. The following semantic rule for *Prog* is plausible:

$\mathcal{F}, i \models_{\mathcal{I}} Prog(\phi)$ if and only if $\mathcal{F}, i' \models_{\mathcal{I}} \phi$ for some i' such that $i \sqsubseteq i'$,

and this rule has the consequence that if ϕ is an accomplishment (as defined by ACC) then $Prog(\phi)$ is indeed an activity (as defined by ACT). Thus, basic Tense Logic can be enhanced to capture some of the complexities of temporality in natural language.

This analysis only covers cases where $Prog(\phi)$ is true by virtue of an eventually completed occurrence of the event expressed by ϕ. By the so-called 'imperfective paradox', the former can be true without the latter ever becoming true (e.g., if John stops running before the mile is completed). This property can be captured by combining interval semantics with branching time. A history is now a maximal linear set of intervals (where linearity of a set of intervals can be defined in terms of $\prec$ and $\sqsubset$). A more accurate rendition of the progressive is now

$\mathcal{F}, H, i \models_{\mathcal{I}} Prog(\phi)$ if and only if $\mathcal{F}, H', i' \models_{\mathcal{I}} \phi$ for some H, i' such that $i \sqsubseteq i' \in H'$.

Because i is in both H and H', and branching is only into the future, H and H' must coincide at least up to the end of i; thereafter they may – but need not – diverge, allowing for the possibility that the completion of ϕ occurs in a different history from the one in which $Prog(\phi)$ is being evaluated.

Other Forms of Temporal Logic

The systems discussed above may be thought of as variants of Prior's basic Tense Logic, expressing temporal properties and relations by means of operators. Alongside these, there has been a tradition of modeling temporal information in first-order logic, using individual terms as explicit bearers of temporal reference. Whereas classically one might write, say, *Asleep(john)* for *John is asleep*, the *Method of Temporal Arguments* writes *Asleep(john, t)* to say that John is asleep at time t. Tenses are paraphrased using constructions that mirror the semantic rules for

tense operators, e.g., $\exists\, t'\ (t' \prec t \wedge Asleep(john, t'))$ says that 'John has been asleep' holds at t. For events that take time, we use interval arguments, e.g., $Run(john, mile, i)$, where s is the interval over which John runs a mile.

A well-known variant of this method, from Donald Davidson (1967), replaces temporal arguments by terms denoting individual events, e.g., $\exists e(Run(john, mile, e)\ t'\ Occurs(e, i))$, which says that some event e is the running of a mile by John and occurs on interval i. An advantage of this is that it allows us to analyze adverbial modifiers by means of additional event predicates linked by logical conjunction, e.g., $\exists e(Run(john, mile, e) \wedge Occurs(e, i) \wedge In(e, field))$.

Davidson's method is sometimes known as 'event-token reification', because the e terms refer to *event tokens*, i.e., individual occurrences. An alternative form of reification, particularly favored in Artificial Intelligence, involves state and event *types* (Allen, 1984). In this method, $run(john, mile)$ is a *term* denoting the event type 'John runs a mile'; an occurrence of this type on interval i is expressed as $Occurs(run(john, mile), i)$. A separate predicate is used for state-types, e.g., $Holds(asleep(john), i)$, meaning that John is asleep *throughout* interval i. An advantage claimed for this style of analysis is that by allowing quantification over types it enables expression of general temporal knowledge concerning, for example, causality, e.g., $\forall e, s, e', d(Cause(e, s, e', d) \wedge Holds(s, t) \wedge Occurs(e, t) \rightarrow Occurs(e', t + d))$. The first conjunct states that events of type e occurring under condition s give rise to events of type e' after a delay of length d.

See also: Event-Based Semantics; Modal Logic.

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Tense

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Tense is a grammatical category that serves to locate situations in time; it is the basic grammatical category that, together with lexical and other indications of ordering in time, enables the hearer to reconstruct the temporal relation between the speech situation and the situation described in a sentence and to reconstruct the relative order of situations described in a text.

It is important to distinguish among tense forms, the rather abstract grammatical meanings expressed by such forms (semantics of tense), and the actual use and interpretation of tenses in natural discourse (pragmatics of tense).

European languages have more or less elaborate tense systems, whereas many non-European languages lack grammatical tense. In languages without tense, temporal ordering is expressed by nongrammaticalized means (e.g., temporal adverbials) alone and the temporal location of the described situation is not necessarily indicated by linguistic means at all.

On Tense Marking

Tense is usually expressed overtly on the (finite) verb by way of morphological markers (cf. *happen-s* vs. *happen-ed, sing* vs. *sang*) or specific auxiliary words (*will happen, has happened, had happened*), depending on typological properties of the individual language. Auxiliaries in their turn are often functionally specialized tense-carrying verbs (cf. *has, had*) governing a nonfinite (e.g., infinitival or participial) form of

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the main verb. Combinations of tense auxiliaries and nonfinite main verbs are often termed periphrastic (or compound) tenses, as opposed to nonperiphrastic (one-word) tense forms. Nonfinite verb forms by themselves (e.g., *to happen, happening,* the past participle *happened*) do not encode tenses in the stricter sense of finite tense. Tense languages vary with respect to how many tenses they distinguish formally and how their tenses are organized semantically. In general, tense forms that are unmarked from a formal point of view tend to encode the tense that is least marked from a semantic point of view. Thus, the present tense is zero-marked in most European languages; but in many non-European languages a zero-marked form can express present or past time reference, depending on the type of situation (state or process vs. completed event) described by the tensed verb.

The Semantics of Tense: Basic Principles

From a semantic point of view, tenses are abstract meanings locating the time of the situation or eventuality (action, event, activity, process, or state) described in a sentence – the event (E) or situation time – directly or indirectly with respect to some other time, often termed the reference time or the time of orientation (O). In the default case, it is the time of utterance (U; speech time or speaker's now) that serves as time of orientation. That makes tense an inherently deictic category, anchored in the unique utterance situation (*I*, *here*, *now*).

Often, the term 'absolute' is used for tenses that, in their normal use, are anchored directly in the time of utterance, for example, the present (*happens, is happening*), (simple) past (*happened, was happening*), and future (*will happen, will be happening*) tenses in English. Tenses that, in their normal use, locate the situation time with respect to some time of orientation other than the time of utterance are traditionally called 'relative.' (Relative tenses are discussed later, together with the (present) perfect.) This section is concerned with absolute tense and the principles underlying the meaning of tense in general.

Absolute Tenses (Present, Past, and Future)

There are three basic ordering relations between E and U (or O) to be distinguished, corresponding to the three deictic notions of present, past, and future: The described situation may overlap with the time of utterance, it may precede the time of utterance, or it may be located after the time of utterance. These relations are encoded crosslinguistically by the present (1a), past (1b), and future (1c) tenses, respectively.

(1a) the pope is visiting South America
(1b) the pope visited South America a couple of years ago
(1c) the pope will visit South America next month

These three basic tenses may be represented diagrammatically as in Table 1. The definition of present tense given here, although readily covering such sentences as (1a), might seem less appropriate to (1d) in its most usual interpretation, that is, indicating that Anna has the habit of reading Donald Duck.

(1d) Anna reads Donald Duck

Sentence (1d) can be true even if it is not the case that Anna is reading Donald Duck at the present moment. However, (1d) does not refer to a particular action of reading Donald Duck but rather to a property of Anna, namely that she habitually or regularly reads Donald Duck, and this property is claimed to be true of Anna even at those moments when she is not actually reading Donald Duck. The same applies in the case of sentences such as (1e), with a universal time reference.

(1e) water flows down hill

Note that, the past tense is adequately used in (2a), even though John may still be in the garden at the time of utterance; thus, (2b) is a possible continuation.

(2a) half an our ago, John was in the garden
(2b) in fact, he is still there

That is, E in the formulas for the sentences in (1) (Table 1) does not necessarily represent the time of the situation in its totality. With (atelic) activities, processes, and states (such as 'be in the garden'), the 'real' situation may extend beyond E, which in that case represents just one temporal slice of a larger situation of the same type; compare (2a) and Figure 1. But with (telic) events such as 'leave the house' that are defined by a natural end point, E must include that end point; in this case, then, E does represent the time of a completed situation; compare (2c) and Figure 2.

Table 1 Schematic representations of present, past, and future

Sentence number	*Tense*	*Definition*	*Formalism*[a]
(1a)	Present	Situation time overlaps utterance time	E o U
(1b)	Past	Situation time precedes utterance time	E < U
(1c)	Future	Situation time follows utterance time	E > U

[a]o, overlaps; <, precedes; > follows.

(2c) half an our ago, John left the house

For the reasons mentioned, what absolute tense locates with respect to the utterance time could be conceived as a temporal frame or 'time under consideration' that, in its turn, overlaps with the time of the described situation rather than as the situation time itself. In what follows, then, bear in mind that, depending on the situation type and aspectual properties of the sentence, E may represent a complete situation ('perfective viewpoint') or a situation that is cut from a larger situation of the same type ('imperfective viewpoint'). Here, we are in an area where tense interacts with aspect (grammaticalized viewpoint) and *aktionsart* (or actionality; the internal temporal structure of situations). Thus, many languages distinguish formally between perfective and imperfective aspect within the past tense.

Instead of making a grammaticalized three-way distinction among present, past, and future tense, as in (1), many languages make only a two-way distinction between past (E < U) and nonpast; this is the case in, for instance, Finnish. Whether there are languages that have the two-way opposition future versus nonfuture is more controversial, and no languages have been cited with a two-way opposition present versus nonpresent (in which case, the nonpresent would have to be discontinuous in its range). In general, the future tense is less stable as a grammatical category than the past tense; it is often expressed periphrastically.

Many languages make additional grammaticalized distinctions within the past or future based on the amount of time separating E and U, that is, the degree of remoteness between them. For instance, in Cocama (Cocama-Cocamilla), a language of Peru, three degrees of remoteness are distinguished in the past, as shown in (3).

(3a) ritama-ca tuts-ui
town-to go-PAST$_1$
'I went to town today'
(3b) ritama-ca tutsu-icuá
town-to go-PAST$_2$
'I went to town yesterday/a few days ago'
(3c) ritama-ca tutsu-tsuri
town-to go-PAST$_3$
'I went to town a long time ago'

Tenses characterized by different degrees of remoteness are rather rare in European languages but widespread among languages of sub-Saharan Africa, Australia, New Guinea, and many parts of the Americas. A two-way distinction is the most widespread, although up to a five-way distinction has been reliably reported for some languages. Some languages have divisions based on the daily cycle, in particular concerning the past, the most common cut-off point being today versus previous days (hodernial vs. prehodernial past); but mostly the division is less specific (immediate vs. remote past or future).

Another relevant parameter concerning the past or future is (in)definiteness. Some languages make a grammaticalized distinction between the definite and indefinite future, the former referring to a future event, the location of which is given by the context, whereas the latter is used when no specific future time is under consideration. And in English, among other languages, the choice between the simple past and the present perfect is partly governed by the same criterion; for example, (4a) differs from (4b) by indicating that the speaker has a specific past occasion or time in mind.

(4a) did you go to Paris?
(4b) have you been to Paris?

Focal versus Nonfocal Tense Meanings

Viewed from a crosslinguistic semantic perspective, tenses can be conceived as prototypes or idealized conceptual categories (sometimes called 'gram types') that tend to be grammaticalized across languages but whose individual realizations (the individual language-specific grams) may differ from one another in detail while sharing the same focal properties. For instance, the present tense normally establishes a relation of overlap between the event time and the utterance time, as in English (1a) and German (5a).

(5a) das Klima änder-t sich
the climate change-PRES.3.SING PRON.REFL
'the climate is changing'

But German (and many other languages) may also use the present tense under conditions in which the future tense could be used, too, as in (5b). That is, the German present tense covers part of the semantic

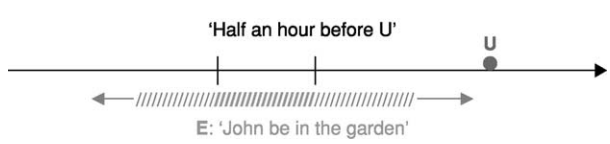

Figure 1 Interpretation of (2a): *half an hour ago, John was in the garden.*

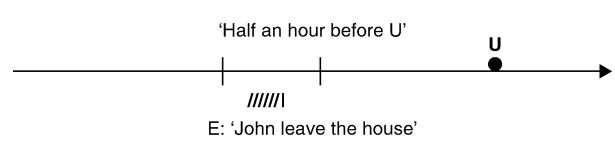

Figure 2 Interpretation of (2c): *half an hour ago, John left the house.*

space that also falls under the periphrastic future tense and that may demand the future tense in English.

(5b) das Klima änder-t sich bald
the climate change-PRES.3.SING PRON.REFL soon
'the climate will soon change/be changing'

However, this use does not represent the focal meaning of the present tense in German or any other language. In a case such as (5b), it depends crucially on the cooccurrence of a future time adverbial (or other contextual information) indicating the location of E (definite future). In (5c), on the other hand, the futurelike interpretation of the present tense hinges on the nature of the described situation.

(5c) mein best-er Kollege verläss-t die Uni
my best-NOM.MASC colleague leave-PRES.3.SING the university
'my best colleague is going to leave/is leaving the university'

The act of leaving, or the end point of that act, lies ahead of the utterance time; but the intention, and probably some preparatory activities, leading up to the final act are taken to hold at the time of utterance. Thus, this kind of (immediate) future is situated between the focal areas of present and future tenses, that is, situations that evidently hold at the time of utterance, on the one hand, and future situations that are predicted but not yet 'initiated' (by intention, decision, or schedule) at the time of utterance, on the other hand; see (5d).

(5d) das Klima wird sich änder-n
the climate will PRON.REFL change-INF
'the climate will change'

A comparison of (5a), (5b), and (5d) shows that, in German as in English, in the absence of other indications of future reference, the future tense is demanded in order to ensure the intended interpretation.

It follows from this discussion that competition between tenses – across languages and within a single language – is a natural phenomenon, to be expected in domains that, viewed from a crosslinguistic perspective, are not focal to the competing tenses. The sentence pair (6a) and (6b) illustrates the same point with respect to another pair of tenses.

(6a) wir wohn-en seit 1990 in Berlin
we live-PRES.3.PL since 1990 in Berlin
'we have lived/have been living in Berlin since 1990'

(6b) vi ha-r boet
we have-PRES lived
i Berlin siden 1990
in Berlin since 1990
'we have lived/been living in Berlin since 1990'

The German sentence (6a) and the Danish sentence (6b) both state that we live in Berlin at the utterance time and that the situation of our living in Berlin goes back into the past until 1990. (In fact, (6b) has a second, existential or indefinite interpretation to the effect that we lived in Berlin for a certain period located between 1990 and the utterance time but not including the latter.) A reference to a situation holding at the utterance time calls for the present tense, whereas a reference to a time span extending backward from and including the utterance (or orientation) time, called the 'extended now,' falls under the focal domain of an anterior or perfect tense, for example, the present perfect in English. In this domain, in which both tenses are motivated, German prefers the simple present, as illustrated in (6a), although the (present) perfect does occur, too; in Danish, however, (as in English) only the perfect is allowed, as in (6b).

Tense in Context: Pragmatics of Tense

Tense is only one of several ways in which languages can convey information concerning location in time; and the lexical resources in any language for expressing location in time are much richer than the grammatical devices. Thus, sentence–initial adverbials such as *in June 2004, yesterday,* and *in 2 months* provide more precise temporal frames for the situation time E than can apparently be done by the past or future tense alone.

(7a) in June 2004, Venus passed the sun
(7b) yesterday, the weather was really bad
(7c) in 2 months, my colleague will leave for Australia

In the examples in (7), the time adverbials restrict or specify the abstract past or future time reference established by the tenses; the tense itself may in fact seem quite redundant because, as far as the location of E is concerned, it does not add anything to the information conveyed by the adverbial. But the examples in (8) and (9) demonstrate that, conversely, tense can help restrict the interpretation of time adverbials: Because *on Sunday* does not specify its relation to the utterance time, it is the finite tense in (8a) and (8b) that indicates which Sunday is meant.

(8a) on Sunday, my colleague left for Australia
(8b) on Sunday, my colleague will leave for Australia

And in (9), with *this week* referring to the week surrounding the utterance time, the tenses specify the location of E with respect to U within that week.

(9a) this week, the Beatles gave a concert

(9b) this week, the Beatles are in town
(9b) this week, the Beatles will give a concert

In other words, tense and frame-setting time adverbials cooperate in narrowing down the temporal location of E. Consequently, they should not point in different directions. Example (10), in which a future time adverbial cooccurs with past tense, does not allow a coherent interpretation – at least not without further context.

(10) tomorrow, Peter left for Glasgow

Often, however, adverbials or other lexical means are not needed in order to identify the time under consideration in sentences concerning past or future time; it may be deduced by pragmatic reasoning, drawing on the linguistic and nonlinguistic context of the sentence. For example, a question such as (11a) would normally be interpreted as referring to the same day or evening and not the entire preceding week or the entire lifetime of the hearer. In (11b) and (11c), each of which contains two sentences, the E of the second sentence is understood as overlapping the situation time of the parenthesized sentence; in narrative discourse, we preferably take the relative order of sentences as mirroring the order of the events described, as in (11d).

(11a) have you had dinner?
(11b) (we spent the summer in Italy –) did you visit your sister?
(11c) (we shall spend the summer in Italy –) will you visit your sister?
(11d) he went to the phone and dialed zero; a woman's voice answered

Relative Tenses and the (Present) Perfect

Relative tenses differ from absolute tenses by locating the situation time E not directly with respect to the utterance time U but as preceding or following a secondary time of orientation O that, in its turn, may precede, follow, or overlap with the utterance time. Because the utterance time does play a role, albeit indirectly, 'absolute-relative' might be a more adequate term, as suggested by Comrie (1985). Compared to anterior (or perfect) tenses, which express the relation 'situation time precedes time of orientation' (e.g., *had happened, will have happened*), grammaticalized posterior tenses, which locate the situation time after the time of orientation (*would happen*), are quite rare. Relative tenses are often periphrastic or have developed from periphrastic forms that combine auxiliary verbs marked for absolute tense (e.g., *had, will have, would*) with a (nonfinite) participial or infinitival form of the main verb.

Table 2 Schematic representations of past perfect and future perfect

Sentence number	*Tense*	*Definition*	*Formalism*[a]
(12a)	Past perfect/ anterior	Situation time precedes orientation time, and orientation time precedes utterance time	E < O < U
(12b)	Future perfect/ anterior	Situation time precedes orientation time, and orientation time follows utterance time	E < O > U

[a]<, precedes; > follows.

Anterior (Relative Past) and Posterior (Relative Future) Tenses

The pluperfect or past perfect (*had happened*) and the future perfect (*will have happened*) belong to the category of anterior tenses; these locate the described situation (E) prior to the time of orientation (O), which, in turn, is located before (past perfect) or after (future perfect) the time of utterance. Compare the formulas in Table 2 and the corresponding examples (12a) and (12b) with the formulas in Table 1.

(12a) (Roald Amundsen and his team left their base camp in October 1911) by the end of December they had reached the South Pole
(12b) (if we start now) we shall have finished the task by five o'clock in the afternoon

In (12a), the cooccurring time adverbial *by the end of December* [*1911*] provides the time of orientation for the past perfect; the tense, then, indicates that the orientation time precedes the utterance time and that the event of reaching the South Pole took place before the end of December 1911; see Figure 3. In (12b), too, the (future) time of orientation ('five o'clock in the afternoon') is indicated by a cooccurring adverbial. In (12c), on the other hand, it is the event described in the first (parenthesized) clause that provides the time of orientation for the past perfect of the second clause; in this case, the time adverbial (*in October* [*1911*]) cooccurring with the past perfect serves as a frame-setting adverbial (as with the absolute tenses), specifying the location of the event

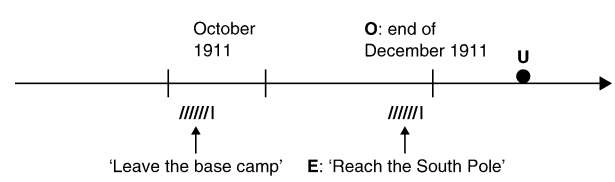

Figure 3 Interpretation of (12a): *by the end of December they had reached the South Pole.*

('leaving base camp') itself rather than the orientation time of the anterior tense; see Figure 4.

(12c) (Roald Amundsen and his team reached the South Pole in December 1911) they had left their base camp in October

In addition to past and future anteriors such as the past and the future perfect in English, grammaticalized expressions of posteriority in the past (see Table 3) are found in many languages; the grammaticalization of future posteriority, however, seems rare. In English, the past posterior is encoded by *would* combined with the naked infinitive; it is used predominantly in indirect or reported speech (or thought), expressing future time relative to the (past) time of the reported utterance, as in (13a).

(13a) (they said) they would start at noon

Past posterior and anterior tenses may even combine into tenses that depend on multiple orientation times. Thus, *would have finished* is the anterior corresponding to the past posterior *would finish*, as in (13b).

(13b) (they said that if they started at noon,) they would have finished the task by five o'clock in the afternoon

Here, the event described as 'start (at noon),' which precedes U, serves as the orientation time (O_1) for the past posterior *would* + infinitive; the time denoted by the adverbial *by five o'clock in the afternoon* follows O_1, as demanded by the posterior, and serves as the time of the orientation time (O_2) for the anterior (infinitive) *have finished*. In the end, then, E (the act of finishing the task) is located prior to O_2, somewhere between noon and five o'clock. That is, the location of E is computed in three steps, as illustrated in Figure 5.

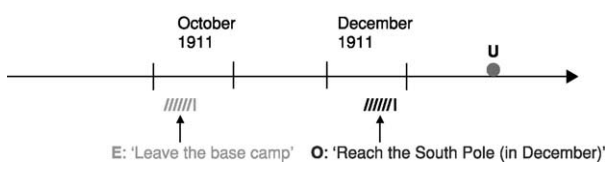

Figure 4 Interpretation of (12c): *they had left their base camp in October.*

Table 3 Schematic representations of past posterior and future posterior

Sentence number	*Tense*	*Definition*	*Formalism*[a]
(13a)	Past posterior	Situation time follows orientation time, and orientation time precedes utterance time	E > O < U
(13b)	Future posterior	Situation time follows orientation time, and orientation time follows utterance time	E > O > U

[a]<, precedes; > follows.

The (Present) Perfect

From a formal point of view, the (present) perfect in English (e.g., *has happened*) differs from the past perfect (*had happened*) merely by the present versus past tense auxiliary (*has* vs. *had*). Correspondingly, as far as its semantics is concerned, the perfect can most adequately be understood as a relative (anterior) tense, differing from the past and the future perfect with respect to the relation between O and U. In the default case, its time of orientation may neither precede nor follow the time of utterance; that is, the time of orientation has to overlap – or be identified with – the time of utterance, as in (14a) and (14b). Thus, the (present) perfect can be represented as in Table 4; compare these formulas with the formulas in Table 2.

(14a) my colleague has left for Australia (so I am alone on the job now)

(14b) I have been waiting for two hours (so I'm leaving now)

The fact that the perfect locates the described event prior to the time of utterance, either directly or by way of an intermediate time of orientation, obviously brings it into competition with the simple past tense.

Tenses sharing the focal semantic properties of the English (present) perfect are widespread in the

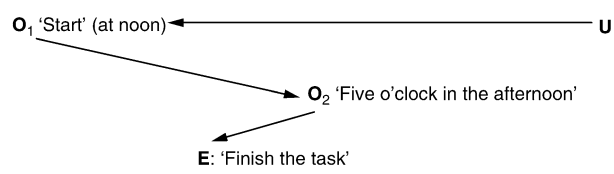

Figure 5 Interpretation of (13b): *we would have finished the task by nine o'clock in the afternoon.*

Table 4 Schematic Representations of Present Perfect

Sentence number	*Tense*	*Definition*	*Formalism*[a]
(14a), (14b)	(Present) perfect/ anterior	Situation time precedes orientation time, and orientation time overlaps utterance time	E < O o U

[a]o, overlaps; <, precedes.

languages of the world. Typically, they have developed from resultative constructions that express that a state obtains at the time of orientation as a result of a preceding event; as a consequence, they typically differ from the simple or general past by not demanding (or not allowing) a more specific location of the situation time, functioning as indefinite pasts, on the one hand, and indicating the current relevance of the past event, on the other; compare the examples in (14) and (15).

(15a) he has gone
(15b) I have invested a lot of money in oil activities

Thus, in contrast to the sentences in (15), the corresponding past tense sentences in (16) demand a context providing a specific temporal frame in the past:

(16a) he went (away)
(16b) I invested a lot of money in oil activities

However, the prototypicality of the (present) perfect varies a great deal across languages. In German, for instance, the present perfect is freely compatible with time adverbials that indicate the location of the event time; that is, it can be used as a definite past, as in (17).

(17) mein Kollege ist neulich/1999
my colleague be.PRES recently/1999
nach Australien gegangen
to Australia go.PP
'my colleague recently/in 1999 went to Australia'

Deviating from the Default Use

So far, we have concentrated on the default uses of the absolute and (absolute-)relative tenses – the (directly or indirectly) deictic use taking the utterance time as the primary point of departure. As with grammatical categories in general, tenses can also be used in non-default ways. One such case is the historical present, as in (18).

(18) yesterday evening, I'm sitting in my office when all of a sudden the whole damn building starts to shake . . .

The initial time adverbial, among other things, indicates that the speaker is talking about past events, and the interpretation of the present tense is adjusted accordingly; that is, the time of utterance is cancelled as the distinguished time of orientation or shifted to the time of the current situation described in the text. Likewise, if someone telephones me and says (19), I am unlikely to interpret this as a description of his or her desires at some point in the past unless I know she or he has a specific past occasion in mind (definiteness condition); rather, I will assume that she or he is talking about the time of utterance, using the present instead of the past to soften the request:

(19) I just wanted to ask you if you could drive me into town today

In both cases, pragmatics 'wins' over semantics, so to speak: Working from the hypothesis that the speaker intends to convey meaningful and relevant information, the hearer may take apparent deviations involving tense as an instruction to interpret the tense in a nonstandard way. It is the same kind of pragmatic reasoning that accounts for free indirect discourse or reported speech, as illustrated in (20).

(20) (Pete didn't want to go/Pete refused to go) now was his last chance to talk to her; his plane left tomorrow . . .

On the face of it, there is a mismatch between the deictic frame-setting adverbials (*now, tomorrow*) in (20), which serve to locate the described situation around or after the time of utterance, and the past tense (*was, left*), which demands an event time prior to the time of utterance. The conflict is solved by interpreting the adverbials from the perspective of the protagonist (Pete), that is, relative to the now of the person whose speech or thought is reported, and ascribing the past tense to the (reporting) speaker, taking it to indicate that the act of thinking or speech whose content is reported in the relevant clauses (and presumably the situations described in those clauses, too) precedes the act of reporting.

In subordinate indirect speech embedded under a past tense verb of saying, English makes use of past tense verb forms in a similar back-shifted way, corresponding to the present tense in direct speech, as in (21). In other languages (e.g., Russian), tense forms remain unshifted in indirect speech; the time of the reported speech act described in the matrix clause simply replaces the time of the reporting utterance as the time of orientation for the present and past tense (logophoric tense).

(21) Pete said he didn't want to go since this was his last chance to talk to her

In certain subordinate clauses, the English past tense may also be used as a relative past (i.e., as an anterior tense) indicating that the situation described in the subordinate clause precedes the event of the matrix clause, irrespective of the relation between the former and the primary time of utterance. Thus, the past tense may in fact refer to an situation that is located after the time of (the reporting) utterance; this will be the case if (22), for instance, is uttered on June 23.

(22) when Anna returns in a fortnight or so, she will probably claim that she arrived on June 25

These observations show that the use and interpretation of tenses in syntactically embedded positions are governed by specific rules, allowing or forcing the event time of the matrix clause to serve as the primary time of orientation for the embedded tense, instead of the time of utterance (speaker's now).

Summary and Outlook

Generalizing over the formulas in Tables 1–4, we can represent the abstract meaning of tense as shown in (23), where Rel symbolizes the basic ordering relations (<, >, and o) and * indicates that the introduction of a secondary time of orientation may be repeated.

(23a) semantically simple tense: E Rel O_1
(23b) semantically composite tense: E [Rel O_2]* Rel O_1

In the default case, the time of utterance serves as the primary time of orientation ($O_1 = U$); but under certain syntactic or pragmatic conditions, O_1 may be some other contextually given time.

Anterior and posterior tenses differ from the simple past, present, and future tenses by being semantically complex. They demand for their interpretation one or more secondary orientation times, depending on their formal complexity.

Finally, it should be stressed that the category tense is strongly intertwined not only with *aktionsart* and aspect but also with modality and the grammatical category mood. Understood in a broad sense, the category aspect covers distinctions between events and resultant states (cf. *to go* vs. *to be gone*), between situations viewed as wholes from the outside and situations viewed from the inside (cf. *to fall asleep* vs. *to be falling asleep*), and between individual events and iterated events or habitual actions (cf. *I went to the opera* vs. *I used to go to the opera*). In fact, the interaction between tense and aspect is so close that pure tense systems are rare in the world's languages; mostly, we encounter mixed tense-aspect systems.

The interrelation between tense and mood/modality is also intimate. Thus, many languages use past and past posterior tense forms to express irrealis or counterfactuality with respect to nonpast time; and (present) perfect tense often acquires evidential (inferential or reportative) meanings. In particular, it can be (and has been) disputed whether future tense is really a tense, given that the epistemic status of the future, as viewed from the speaker's perspective, is necessarily very different from that of the present and the past tense: The speaker cannot know what will be in the same sense that she or he can know what is or has been. This explains the facts that future tense often has a modal origin (e.g., English *will/shall* + infinitive) and that future tense, including the future perfect, irrespective of its origin, tends to develop an epistemic or inferential use referring to present or past time, as illustrated by the German sentence (24a) and the English sentence (24b).

(24a) du wirst müde sein
you AUX.PRES.-2.SING tired be.INF
'you will be/are probably tired'
(24b) we will have finished the task by now

See also: Aspect and Aktionsart; Deixis and Anaphora: Pragmatic Approaches; Grammaticalization; Mood and Modality in Grammar; Pragmatics: Overview; Reported Speech: Pragmatic Aspects.

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Tense and Time: Philosophical Aspects

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As we ordinarily think and talk about time, it is a truism that time passes. Dates, like the events that occur at those dates, are once in the future, then become present, and then recede into the more and more distant past with the passage of time. To think of time as passing, and events as changing with respect to the characteristics of pastness, presentness, and futurity, is to conceive of the transient aspect of time or temporal becoming. The most fundamental debate in the philosophy of time concerns the status of temporal becoming. Do events **really** pass from the future to the present and into the past, as tensed- or A-theorists (derived from McTaggart's 1908, 1927 A-series of past, present, and future moments or events) such as C. D. Broad (1923, 1938), Richard Gale (1968), A. N. Prior (1967), George Schlesinger (1980), Quentin Smith (1993), Storrs McCall (1994), Michael Tooley (1997), William Lane Craig (2000a, 2000b), and others have maintained? Or is the passage of time a myth and an illusion, as B-theorists (derived from McTaggart's B-series of events ordered by the relations earlier, later, and simultaneous) such as Bertrand Russell (1915), J. J. C. Smart (1980), Robin Le Poidevin (1991), D. H. Mellor (1998), L. Nathan Oaklander (2004b) and others have maintained? That is one issue. Another closely connected issue concerns the proper analysis of tense in ordinary language and thought. We express the passage of time (or the myth of passage) by means of tensed discourse and tensed beliefs. For example, we ordinarily say, at different times, that an event will occur, is occurring, and did occur, and it is commonplace to believe that, for example, today is Monday, tomorrow will be Tuesday, and yesterday was Sunday. Two questions of analysis concerning these ordinary tensed sentences and beliefs immediately arise: (1) What is the meaning of tensed discourse? and (2) what are the truth conditions or truthmakers of tensed sentences? A third issue, intimately related to the other two, concerns the reference of temporal indexicals (such as now,' 'yesterday,' and 'tomorrow'). Do temporal indexicals refer directly to some items (such as times or sentence tokens); or do they refer indirectly to items via a mediating sense (such as the property of **presentness**); or do they, perhaps, perform both functions, or neither?

Although these issues are fundamentally metaphysical in nature, the dispute between the A- and B-theorists has, until the 1980s, centered on temporal language. Defenders of the B-view have often argued that since tensed discourse could be eliminated or translated without loss of meaning into tenseless discourse, an adequate account of the nature of time need not countenance any special kind of tensed fact or tensed properties. In other words, the old B-theory of time assumed that a logical analysis of ordinary language that eliminates tensed discourse supported an ontological analysis of time that rejects transient temporal properties of **pastness**, **presentness**, and **futurity**, or any other form of passage. The A-theorist shared that assumption, but argued that since no tenseless translations were successful, temporal becoming in some form or another is necessary in any adequate account of time. A-theorists claim, in other words, that because tensed discourse is ineliminable, the B-theorist is mistaken and tensed properties and facts must exist.

For a variety of reasons, some having to do with arguments in the philosophy of time and some having to do with arguments in the philosophy of language, recent defenders of the B-theory have come to embrace the thesis that tensed sentences cannot be translated by tenseless ones without loss of meaning. The reason for this is clear. It is part of the meaning of sentences reflecting temporal becoming that they change their truth value with the passage of time. For example, a token (or instance) of the sentence type 'I will be celebrating my 60th birthday in the future' is true today, on January 7, 2005, but in six months another token of that sentence will be false. On the other hand, it is part of the meaning of tenseless sentences expressing temporal relations between events that different tokens of the same tenseless sentence have the same truth value whenever they are expressed. Thus, for example, the linguistic meaning of the sentence (S) 'My 60th birthday is future' cannot be captured by (V) 'My 60th birthday is later than January 7, 2005' even if (S) is uttered on January 7, 2005, since (V) is always true, whereas on July 7, 2005 (S) is not.

Nevertheless, recent B-theorists have denied that the ineliminability of tensed language and thought entails the reality of temporal properties or temporal becoming. According to the new B-theory of time, our need to think and talk in tensed terms is perfectly consistent with its being the case that time itself is tenseless. Tensed discourse is indeed necessary for timely action, but tensed facts are not, since the truth conditions of tensed sentences can be expressed in a tenseless metalanguage that describes unchanging temporal relations between and among events.

There are two popular versions of the new B-theory of time, the token-reflexive account (Mellor, 1981) and the date-analysis account (Smart, 1980). On the token-reflexive account the temporal relation between the date at which one says, thinks, or writes down a tensed sentence and the event or thing that it is about provides an objective basis for the truth-value of any tensed sentence. A present-tense sentence token is true if, and only if, it occurs (exists tenselessly) at (roughly) the same time as the event it is about; a past-tense token is true if, and only if, it occurs at a time later than the event it refers to, and so on. Thus, on the token-reflexive account the truth conditions of tensed sentence and judgment tokens are tenseless facts – that is, facts that involve only temporal relations between and among nontensed events.

The date-analysis version of the new B-theory also denies the thesis of linguistic reducibility and claims instead that corresponding to every tensed sentence-token is a tenseless sentence that gives its truth conditions. For example, J. J. C. Smart (1980) claims that

> the notion of becoming present seems a pretty empty notion, and this is even more obvious when we recognize the indexical nature of words like 'present', 'past' and 'future'. When a person P utters at a time t the sentence 'Event E is present' his assertion is true if, and only if, E is at t. More trivially, when P says at t 'time t is now' his assertion is true if, and only if, t is at t so that if P says at t 't is now' his assertion is thereby true" (1980: 11).

The heart of the date-analysis thesis is that temporal indexicals like 'now,' 'this time,' and 'the present,' as used on a given occasion, are referring terms that denote a time. Thus, if a temporal indexical sentence such as 'Event E is now occurring' is uttered at t_1, then it reports an event that is identical with the event reported at any time by the use of the nonindexical sentence 'Event E is occurring at t_1.' On this view, indexicals and proper names such as dates are rigid designators (Kripke, 1980). Thus, a tensed sentence like 'It is now 1980,' uttered in 1980, reports the same fact as the necessary truth reported by 'It is 1980 in 1980' or '1980 is at 1980.' It does not follow, nor is it part of the date-analysis thesis to maintain, that 'It is now 1980' and '1980 is at 1980' express the same proposition or have the same meaning (Beer, 1988). Nevertheless, to know that the truth condition of a tensed sentence token is a function of the date of its occurrence, and what it is about, is to know the meaning of a tensed sentence (Mellor, 1998).

Both versions of the new B-theory have been the subject of considerable debate. Proponents of the A-theory have argued that the B-theory cannot give an adequate account of the truth conditions of A-sentences, whereas B-theorists have denied this (see Oaklander and Smith, 1994, Part I; Le Poidevin, 1998; Smith, 1999; Craig, 2000b; Mozersky, 2000; and Dyke, 2002, 2003a). More recently, Oaklander (2004a) has argued that tensed sentence-tokens and the mind-independent contents they express, while pragmatically useful and perhaps indispensable, are strictly and metaphysically false and couldn't possibly be true since McTaggart's paradox (to be considered shortly) has demonstrated that the A-theory of time is contradictory.

In summary, the issue that now rages between the various camps in the A/B-theory debate concerns the truth conditions of statements that reflect temporal becoming and temporal relations. In this context, truth conditions are truthmakers: the basis in reality for those true sentences that record facts about the transitory and temporal relational aspects of time. Thus, the A/B debate centers on the questions: What, if anything, do the tenses and our use of temporal concepts reflect about the metaphysical nature of time? And, What is the ultimate metaphysical foundation of our experience of succession and temporal relations? To deal with these questions it is necessary to consider McTaggart's paradox.

McTaggart maintained that becoming is an essential feature of temporal reality, since without real passage there is no change, and without change there is no (B-) time. If events simply stand in the unchanging relations of earlier/later than, nothing would first have a property and then lose it. Thus, in order for there to be change, it must be the case that events have the properties of pastness, presentness, and futurity and change with respect to those determinations. McTaggart argued, however, that such change was impossible. For if every event **is** past, present, and future, then since A-characteristics are incompatible, we arrive at a contradiction. Of course, the seemingly obvious way out of the 'paradox' is to appeal to tense: it is not the case that every event **is** (simultaneously or tenselessly) past, present, and future, but rather every event either is past, was future and present; or is present, will be past, and was future; or is future and will be past and present. This way of avoiding the paradox is well taken, but it certainly is not the last word, since we need to understand how the tenses 'is now,' 'was,' and 'will be' are to be interpreted if we are to understand how such an account is to render temporal becoming possible.

A currently fashionable A-view of the tenses is called 'presentism.' According to this view, only the present exists; the past and future are species of unreality, that is, the past and future tenses are operators (with no ontological significance) on present tense sentences (Prior, 1967; Hinchliff, 1996). Given that

only the present exists, there is no longer any problem of how one and the same event (or moment) can have incompatible A-determinations, since there is only one A-characteristic, namely presentness.

Nevertheless, presentism is not without its difficulties. To see why, suppose we start with

FPe & *Ne* & *Pfe*

This is read as '*e* will be past' and '*e* is present' and '*e* was future.' Perhaps there is no contradiction in such a representation of becoming, but we are still left with the question: What are the truthmakers for the first and last conjuncts? More specifically, what is the ontological difference between *FPe* and *PFe,* given that neither 'F' nor 'P' is a predicate that ascribes properties to *e*? Without such an account, the appeal to grammatically consistent tensed statements is a vacuous response to McTaggart's paradox.

The B-theory, in rejecting temporal passage as an objective feature of reality over and above the tenseless existence of events spread along the four-dimensional manifold, avoids McTaggart's conundrum, but it has questions of its own to answer. If events don't really pass, then why do we talk as if they do? And if nothing is really present, then what account can be given on the presence of experience, and our experience of the present? (For a discussion of proposed solutions to these questions see Oaklander and Smith, 1994, Part III; Dyke and Maclaurin, 2003; and Oaklander, 2004b, Part III).

See also: Anaphora: Philosophical Aspects; Essential Indexical; Indexicality: Philosophical Aspects; Type versus Token.

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Tense, Mood, Aspect: Overview

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Most languages have more or less elaborate ways of differentiating grammatically the form of sentences depending on parameters such as the character of the event, state, or process that is related in the sentence, how it relates temporally to the speech act and to other temporal entities, the epistemological and pragmatic character of the speech act and the speaker's degree of commitment. These grammatical devices – typically manifested as inflections on verbs or as periphrastic constructions involving auxiliaries or particles – are traditionally treated in grammars in terms of the grammatical categories of tense, mood, and aspect (often abbreviated as TMA or TAM).

While time is fairly uncontroversially the notional category behind tense (in many languages, the terms for time and tense are identical), mood and aspect are more difficult to pinpoint semantically – in particular, their relationship to broader notions such as modality and aktionsart or aspectuality is controversial. For discussions, *see* **Mood and Modality in Grammar** and **Aspect and Aktionsart**, respectively. Although evidentiality is traditionally subsumed under mood, it is nowadays sometimes seen as a category of its own, with information source as its primary meaning (*see* **Evidentiality in Grammar**).

In actual grammars, the categories tend to shade into each other: grammatical forms tend to combine elements from more than one of them, or to fall in between the definitions. There is also a continuum between grammar and lexicon in particular in the areas of mood and aspect. An alternative approach is thus to downplay the role of the supercategories tense, mood, and aspect and focus more on individual types of markings (gram types) such as futures, perfects, perfectives etc., since this level seems most promising when looking for cross-linguistic generalizations (Dahl and Bybee, 1989). In this connection, the study of the ways in which markings of tense, mood, and aspect develop historically – how they grammaticalize – becomes of particular importance.

A number of articles in this Encyclopedia are devoted to different subtopics within the area of tense, mood, and aspect. The traditional categories and their relationship to the corresponding are discussed in the articles **Tense, Mood and Modality in Grammar**, and **Aspect and Aktionsart**. Future tenses, which are often said to be as much modal as temporal, are treated separately in **Future Tense and Future Time Reference**, while perfects, which have a similar intermediary status between tense and aspect, are discussed together with the related categories of experientials and resultatives in **Perfects, Resultatives, and Experientials**. While the article **Aspect and Aktionsart** discusses the general notion of grammatical aspect and its relationship to lexical semantics and the general taxonomy of temporal entities, the major aspectual gram types are dealt with in **Perfectives, Imperfectives, and Progressives**. For logical and philosophical approaches, *see* **Event-Based Semantics**, **Modal Logic**, **Temporal Logic**, and **Tense and Time: Philosophical Aspects**.

The literature on tense, mood, and aspect is immense. Here, only a few general works are listed; for more comprehensive bibliographies, see the articles listed in the previous paragraph.

See also: Aspect and Aktionsart; Event-Based Semantics; Evidentiality in Grammar; Future Tense and Future Time Reference; Modal Logic; Mood and Modality in Grammar; Perfectives, Imperfectives, and Progressives; Perfects, Resultatives, and Experientials; Temporal Logic; Tense and Time: Philosophical Aspects; Tense.

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Terminology and Terminological Databases

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What Is Terminology?

> Terminologists, maybe even more so than other subject-field specialists, have problems agreeing on the terminology that they use within their own discipline. (Wright and Budin, 1997: 325)

This statement of Wright and Budin was both well put and accurate, for terminology scientists and terminology workers don't use the term *terminology* with an unequivocal definition. In its first meaning, terminology is the "set of designations belonging to one special language" (ISO 1087–1, 2000). This definition is used when we refer, e.g., to the terminology of mechanical engineering or the terminology of medicine. Some experts also differentiate between the set of terms itself and the publication of these terms in (terminological) dictionaries. A second interpretation of terminology refers to the scientific discipline that studies "the structure, formation, development, usage and management of terminologies in various subject fields" (ISO 1087–1, 2000).

A clear distinction between these two meanings of terminology is necessary, not just for the purpose of this article. Following the definitions in the German terminology standard DIN 2342 (2003), of Wright and Budin (1997: 325) and other authors, 'terminology' is the (structured) set of concepts and their representations in a specific subject field. The second meaning of terminology is called 'terminology science' (or terminology studies, but not terminology) and is defined as the scientific discipline dealing with concepts and their representations in special languages.

Why is Terminology so Important Today?

The present age is characterized by an increase in knowledge in almost all technological, economic, political, and cultural fields. Modern communication and publication methods and media allow the swift and broadscale transfer of this knowledge. But the spread of knowledge is not limited to a closed group of specialists or to one language community. Translators and interpreters play an important role in this multilingual communication process across language boundaries.

Since a high percentage of specialized knowledge is documented and published by means of language, correct terminology is a prerequisite for efficient knowledge transfer. All people who are involved in any way with special language texts must deal with the terminology of the domain in question, whether they function as experts who must read and understand texts, as technical writers who produce texts, or as technical translators who transfer their content into another language.

Historical Development of Terminology Science

The need to define and compile terminologies was recognized at the time when special and professional languages were developing. Individual scientists, researchers, and engineers from the 15th century onward have been concerned with the definition and ordering of the knowledge of their respective domain, and with the preparation of terminologies, such as Leonardo da Vinci in engineering, Gottfried Wilhelm Leibniz in mathematics, Albrecht Dürer in geometry, Antoine Laurent Lavoisier in chemistry, Carl Linnaeus in biology, and others. Another pioneer in developing multilingual terminological dictionaries was Alfred Schlomann, who published systematically arranged vocabularies for 17 different subject fields between 1907 and 1932. Each of these comprehensive technical dictionaries was developed by a team of subject field specialists, applying 'terminological' guidelines defined by Schlomann.

Also at the beginning of the 20th century, national and international standards organizations were founded to support technical cooperation by defining and specifying properties of parts and tools. Soon after the establishment of technical committees for standardization, terminological subcommittees were founded to define and standardize the technical vocabulary of the different domains. The dissertation of the young Austrian engineer Eugen Wüster, published in 1931 under the title 'Internationale Sprachnormung in der Technik' ('International standardization of language in technology'), provided the impetus for the foundation of ISA's Technical Committee TC 37 'Terminology and the preparation of terminological principles', which was re-founded after World War II as ISO/TC 37. Wüster was not only the founder of the General Theory of Terminology (see Wüster, 1991 and Picht and Schmitz, 2001), but he was also engaged very much in the creation of the first international terminology standards, improving and testing the standards by elaborating and compiling his systematic terminological dictionary *The machine tool*.

Wüster is often called the founder of the Vienna School of Terminology. Felber (1984) also described the Prague School of Terminology (developed from the

Prague School of functional linguistics) and the Soviet School of Terminology (D.S. Lotte and E.K. Drezen). Basic research in terminology principles and theory took place in Canada, Germany, the United Kingdom and in the Nordic countries in the second half of the 20th century. Today we find terminological activities also in other parts of the world, especially in Spain, France, North and South America, and in China.

The Basic Theoretical Background for Terminology Management

This section will present the basic principles and fundamental concepts treated in terminology science, focusing on those aspects that are essential for performing practical terminology management activities and establishing terminological databases. Of course, this article cannot cover all theoretical and practical aspects. For more detailed treatments of the entire field of terminology studies and terminology management activities, see in particular Arntz *et al.*, 2002; Dubuc, 1992; Felber and Budin, 1989; Sager, 1990; Wright and Budin, 1997, 2001; and Wüster, 1991.

Over time, people who have to deal with terminology have developed methods and procedures for managing terminology. These basic principles governing terminology activities and management have developed into a scientific discipline, which has itself been called 'terminology science' or 'terminology studies'. Both the definition of terminology and the general principles of terminology science deal with concepts and terms. Originally, terminology theorists and researchers adapted the so-called "semiotic triangle" introduced by Ogden and Richards (1923) to explain the relationship between concepts and terms (Figure 1).

The triangle has undergone a long history of modifications and interpretations, and has also been attacked from several quarters as an oversimplification or misrepresentation of the complex relationships that exist between concepts and terms, concepts and concepts, and terms and terms. Despite the criticisms that have been leveled against the triangle, its simplicity makes it an excellent tool for illustrating concept-term relationships to people who are just beginning to identify terms in texts, and to create terminological data entries to document them. Consequently, we will use the triangle to discuss these three elements, bearing in mind that it is just a useful tool and does not necessarily address complex linguistic, cognitive, or philosophical issues.

Object

An object as represented in the triangle in Figure 1 is an entity existing in the world in which we live.

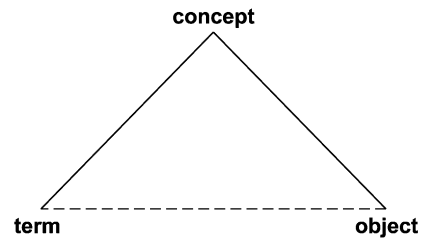

Figure 1 The terminology triangle.

Objects don't have to be concrete objects, e.g., things you can touch, smell, or see. They can also include abstract objects that are not part of the perceivable world, but that are nonetheless *real* components of human thought.

(1) Example of a concrete object: a computer keyboard.

(2) Example of an abstract object: hyphenation.

It is useful to cast a wide definition for the concept of an *object* and to include more complex states of affairs and even processes within the notion of an object. In this sense, objects can even have a sort of propositional nature and be represented by collocations and phrases, such as: 'hyphenation of the current text' or 'format a new diskette'.

Wüster (1991) clarified the notion of the *object* by talking about *individual objects*. He explained that it is not the computer keyboard as such that exists in the world, but rather that there exist numerous individual computer keyboards. The overall class represented by *computer keyboard* comprises a conceptual 'type', for which individual instances of keyboards are 'tokens'.

Concept

Concepts are "cognitive representatives" (Felber and Budin, 1989) for objects, stand-ins, as it were, that arise out of the fact that humans recognize the common characteristics that exist in a majority of individual objects of the same type, and then store these characteristics (e.g., remember them) and use them to impose order on the world of objects, in order to achieve mutual understanding when they communicate with other people. ISO 1087–1 (2000) defined a concept as a "units of knowledge created by a unique combination of characteristics".

Characteristics, as they are understood in this definition, are those properties of the objects in the given class of objects that are used to form and delimit the concept. Modern cognitive science and neuroscience are not in agreement on precisely how concepts are generated or stored in the brain, nor is it totally clear how they come to be associated with specific terms or other conceptual representations. However,

even the strictest empirical research supports the thesis that cognitive units (concepts) are formed in our minds, and we associate these concepts with verbal or nonverbal representations (terms, symbols, etc.).

Concepts are not necessarily bound to specific languages, but the cultural and social background of the human beings who generate the concepts and the environments in which they are used affect the way they manifest themselves in any given situation. Variations in conceptual orientation can reflect cultural and social differences; these are derived from regional differences within a language community, or differences between communities where different languages are spoken, or even different ethnic and class differences between individuals who may only speak variant dialects of the same language, and who live in close contact with one another.

We should also note that one can distinguish between individual concepts and general concepts. An individual concept refers to an individual object, such as the *Starship Enterprise* or the *Cologne Cathedral*, while general concepts comprise the characteristics of a class of objects (*spaceship*, *cathedral*).

Relationships between Concepts and Concept Systems

Concepts can be related to one another based primarily on the characteristics with which they are associated. These conceptual relations can be of a hierarchical or nonhierarchical nature. Hierarchical concept relations can be further divided into generic relations and part-whole relations. Some writers in English speak of hyperonymic or meronymic concept systems.

Generic relations, which are also called logical or abstract relations, are characterized by the fact that a relation can be defined between a broader (superordinate) concept and a narrower (subordinate) concept, such that the subordinate concept contains all the characteristics covered by the superordinate concept, with the addition of at least one additional characteristic. The term designating the superordinate concept is often called a 'hyperonym', and the term designating the subordinate concept is called a 'hyponym'. Concepts that occur at the same level are called 'coordinate concepts', and their terms are called 'co-hyponyms'.

Let us take an example from the evolution of computer hardware.

(3) Example: *printer and laser printer.* A *printer* can be any one of several types of devices that creates an image on paper (or perhaps some other medium, like a T-shirt) representing text or graphics created in a computer program; a *laser printer* is a device that can be defined in precisely this way, with the addition of the characteristic that it uses laser technology to create the image.

Meronymic relations (part-whole, partitive relations) are characterized by the fact that the broader concept (superordinate concept) in this case can be conceptually broken down into its individual components.

(4) Example: A *printer* consists of the *print head, the paper tray, the paper feed, the control panel, the housing, etc.*

Nonhierarchical conceptual relations are defined less frequently than hierarchical ones. These can include, for instance, sequential relations that represent chronological sequences or cause-and-effect relations.

Going beyond comparing just two concepts and looking at many of the concepts or even all of the concepts in a subject field, a conceptual field is created. For these terms to form a concept system, it is necessary to identify a certain order among the concepts. In a closed concept system, i.e. one where all the concepts intended to document a given subject field have been collected, the concepts can be arranged in order according to their concept relation, then each concept is assigned a position number within the system. These systems order concepts according to superordinate and subordinate positions within generic or partitive systems (*x is a y*, or *x has a y*), and they even assign rules for concept behavior at certain nodes in the system. In dynamic systems, meaningful position numbers become problematic because new items are constantly being added at different intersection nodes within the system. In such cases, new views of concept structures can be generated as needed 'at run time,' based on so-called 'parent-child' relationships.

If the intention is to represent a concept system and the concept relations contained in it, it is common to use either a graphical representation or a numerical code. In Europe, it has been common to use tree diagrams to represent generic systems and bracket diagrams for part-whole relations. This distinction has not necessarily been followed in North America, where tree diagrams are commonly used to represent both types of hierarchical relations. When numerical codes are assigned for closed concept systems, the different hierarchical levels (sometimes referred to as levels of abstraction) are assigned different numerical levels. This practice produces numbers where decimal points represent the levels of abstraction. Sometimes dashes are used in part-whole systems to represent levels of meronymic relations. **Figure 2** is an example of a generic system using tree diagrams and notation. **Figure 3** is an example of a part-whole system with a bracket diagram. Sometimes it is useful to create hybrid diagrams showing both generic and part-whole relationships in a graphical or notational system (**Figure 4**).

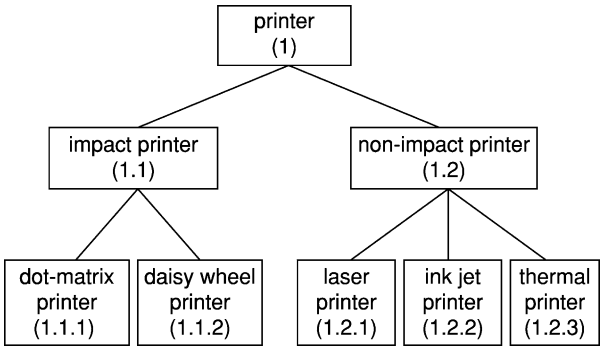

Figure 2 Tree diagram for a generic concept system.

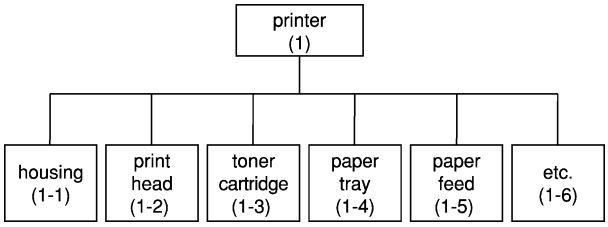

Figure 3 Bracket diagram for part-whole concept system.

Today in many companies and government agencies, information specialists and knowledge engineers are creating what are often called 'ontologies', or 'taxonomies', showing all the major terms and data objects that are managed in the enterprise's databases and documents. These resources look very much like the concept systems mentioned above because they are usually arranged according to generic or part whole principles. They are generally 'open systems' that are constantly under development and consequently don't have position numbers. One special feature of many ontologies is that the individual nodes in the conceptual structure can be associated with rules. For instance, in a concept system for *vehicles*, there might be an axiom (a rule) that states: *All cars with a crankcase year of 1965 or later are subject to emission control regulations in the state of California*. A computer program or intelligent agent on the World Wide Web could use this kind of axiom to find information and even 'make decisions' based on the ontology and the rules embedded in it.

Term

The third corner of the terminology version of the semiotic triangle is represented by the 'term'. ISO 1087-1 defined the term as a "verbal designation of a general concept in a specific subject field". The term serves as the representation of the concept. We can write it down, think it, say it out loud, use it for communication.

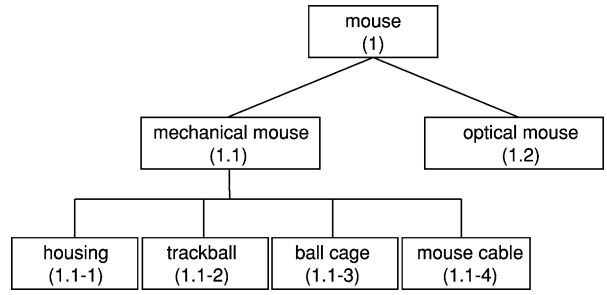

Figure 4 Hybrid concept system for *mouse*.

We use the word 'designation' as a superordinate concept when we talk about terms because there are also other ways to represent terms, e.g., ones that aren't necessarily made up of words, such as symbols, formulas, pictograms, etc.

Example:	H_2SO_4	Sulfuric acid
	™ ®	Trademark, registered trademark
	☎	Telephone
	☠	Poisonous, dangerous
	∞	Infinity

Some terms consist of more than one word. These terms are called multiword terms or compounds. In Germanic languages such as in English and German, multiword terms usually consist of several nouns or adjective noun combinations. The way words combine to form terms varies from language to language.

Example:	
Single-word terms:	printer (Eng); Laserdrucker (Ger)
Multiword terms:	laser printer (Eng); Centronics-Schnittstelle (Ger)
	printer with single-sheet feed (Eng)
	Drucker mit Einzelblatteinzug (Ger)
	serial port (Eng); serielle Schnittstelle (Ger)

Terms always designate class concepts, e.g., *skyscraper* designates all objects that can be defined as buildings that are more than 20 stories tall. Verbal representations of individual concepts (a specific object) are called *names*, e.g., *the Empire State Building* is one specific skyscraper. There is no other building with this name.

There are any number of rules and precedents for forming terms, which we will not outline here (see Arntz *et al.*, 2002; Felber and Budin, 1989; Sager, 1990; Wüster, 1991). As noted above, typical multiword formation patterns differ from language to language (*Typeraddrucker*, *daisy wheel printer*, *imprimante à marguerite*); consequently, the distinction of single and multiword terms is often a fluid one in multilingual terminology management.

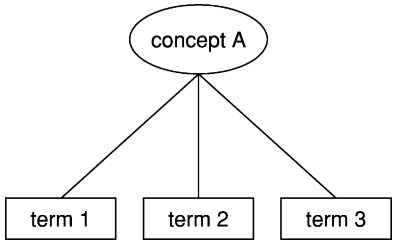

Figure 5 Synonymy.

Relationships between Terms and Concepts

We have seen that the term is the verbal representation of the concept. In special or technical language, it is highly desirable that this relationship be unambiguous, even without contextual reference, which means that one term should be assigned to one concept, creating a condition called *univocality*. When this condition prevails, the meaning of terms is completely clear, even if the term appears without any explanatory context. Of course, this ideal situation is difficult to achieve or enforce. Two problems involving term-concept assignment recur frequently, even in technical and scientific texts:

'Synonymy' exists if two or more terms in a given language represent the same concept. Thus a synonym is a term used to designate the same concept as another term (Figure 5).

(5) Example: enter key, input key, return key, carriage return.

Even though synonymy can compromise communication between experts, it occurs quite frequently in practice. This can happen especially in subject fields where many objects and concepts are still undergoing development. In these kinds of dynamic fields, competing terms are used in parallel until unambiguous terms are gradually established, either through a natural selection process or by conscious standardization. Even when people are aware of these problems, variants can remain in use for long periods of time, based on such factors as natural regional variation or, quite intentionally, company or product-specific efforts to use terminological differences as one means of positioning a product in the market.

In some cases, two or more terms are similar in many ways but don't quite totally cover the same concept. Such terms are call quasi-synonyms and are mutually interchangeable only in certain contexts.

'Homonymy' involves the opposite situation from synonymy: here a term or several terms that have the same external form refer to several concepts. ISO 1087–1 (2000) defined homonymy as a relation between designations and concepts in a given language,

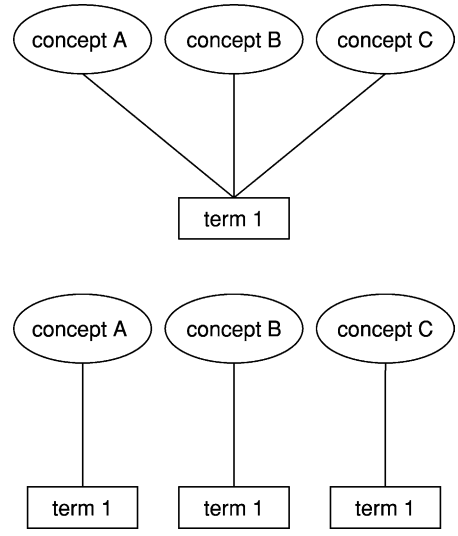

Figure 6 Homonymy and polysemy.

in which one designation represents two or more unrelated concepts (Figure 6).

(6) Examples: mouse (animal) vs. mouse (input device for computers)
stud (horse) vs. stud (fastener) vs. stud (architectural framing member)

In English linguistics and grammar, what we are calling 'homonymy' is frequently viewed either from the standpoint of 'polysemy' (words having multiple meanings) or 'homonymy' (concepts having 'homogenized' names). The same word used metaphorically to designate two different things is a polyseme (e.g., mouse (animal) and mouse (of a computer), or stud (fastener) and stud (framing member), which come from the same original linguistic root. Stud (horse) and the two examples of stud as fastener or framing member are, according to this view, 'true homonyms', because the two usages come from different etymological roots. The top section of Figure 6 illustrates the condition of 'polysemy,' i.e., one term represents several concepts, whereas the second half of the illustration reflects true homonymy, where the same word form just happens to represent different concepts (which is what happens with *stud* the horse and *stud* the fastener). Although the distinction between polysemy and homonymy is considered important in linguistics, in terminology management it is not viewed as highly important, because the two phenomena result in the same pragmatic word behavior: the same word form represents more than one concept. In termbases, we often call these duplicate terms 'doublettes', because the same word may occur as an index two or more times in a concept-oriented termbase, each time with a different meaning.

Homonyms pose huge problems for technical communication. As a consequence, experts are constantly striving to avoid homonyms in technical subject fields. Nevertheless, when new concepts evolve, people like to form new terms for them by combining familiar existing terms or by adopting established terms from general language (e.g., *mouse* for a computer input device), from other related subject fields (e.g., the use of terminology taken from steelmaking and glass-making, applied to plastics), and from other (foreign) languages (e.g., the widespread use of English terminology in other languages for various computer applications and in the World Wide Web). Consequently, homonymy frequently occurs at the interface between specialist domains.

The third phenomenon involving the relationship between concepts and terms that plays a role in multilingual terminology management comprises the transition from one language to another. 'Equivalence' is the relation between designations (e.g., two different terms) in different languages, representing the same conceptual characteristics, and thus the same concepts. Of course, as we have already noted, concepts are influenced by social and cultural conditions, and it is not always possible to establish full equivalence. The problem of incomplete equivalence occurs frequently in general language and in certain specialist domains, such as the language of the law when different language communities possess different legal systems. This is even apparent, for instance, when we compare the legal language used in the United States and in Great Britain: sometimes the same terms are used to mean different things, but in other cases, different terms may be used to designate essentially the same concepts. Old technologies like steelmaking and glass-making tend sometimes to designate dissimilar concepts in different languages, because practice and terminology evolved independently in different language communities; but in newer fields like computer science, AIDS research, and genetic engineering term-concept pairs tend to be much more symmetrical between languages, because scientific and technical development in today's world moves ahead in parallel in most major languages. There is a great deal of borrowing and loan translation, which makes it much easier to establish true equivalence between languages.

Essentially, equivalence constitutes the same phenomenon on an interlingual level (e.g., between two or more languages) that we see intralingually (within the same language) when we talk about synonymy.

Equivalence problems can also occur if we draw up concept systems in two or more languages and then try to just transfer concepts from one language to the other or to compare them without taking potential conceptual or systematic differences into account. Sometimes, hierarchical relations manifest themselves differently in different languages or some concepts are missing in some languages (so-called 'terminological lacunae'). For instance, in the area of toolmaking and die-making, German divides tools and processes into *spannende* and *spannlose Fertigung*: chip-forming and non-chip-forming manufacturing. English, in contrast, thinks of these processes as involving *cutting* and *shaping*, and consequently creates hierarchies for tools and processes that may look very different from concept systems created for the same basic subject field in German. Whenever a new object is invented in the real world, lacunae exist until someone decides what to call the new object in a given language. Frequently, terms will be borrowed from other languages to fill these conceptual holes, but just as frequently, the concept covered by the new term in Language B may not be quite the same as the original concept in Language A.

Terminological Databases

The first attempts to use computer technology for managing terminological data started in the early '60s of the last century. There was an urgent need for national and international institutions and for multinational companies with large translating and interpreting services, because very often a great number of translators had to co-operate in large projects under great time pressure, in order to meet deadlines. Due to the restrictions resulting from the hardware and software components available at that time and due to the organizational infrastructure needed for operating mainframe computers, only economically strong organizations and institutions could afford to implement and maintain their own terminological databases. It is therefore not surprising that the first terminological data banks were set up in large language services belonging to governmental organizations and big enterprises, in standards bodies and in language planning institutions, e.g.:

- LEXIS (Federal Office of Languages, Germany)
- TERMIUM (Language service of the Canadian government)
- EURODICAUTOM (Commission of the European Community)
- TEAM (Siemens AG, Germany)
- AFNOR (French Association for Standardisation)
- BTQ (Office de la langue française, Canada)

Most of these large terminological data banks (term banks) have been maintained and used within their respective institutions down to the present day, so that they contain hundreds of thousands of entries. The terminological data in some of the large data

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HitList Extend New Query

1.	ink-jet printer(1)	BTL - INF90 - 22013

Document 1 Extend New Query Feedback

	Subject	Automation - Computer Science - Data Processing - Information Technology **(AU)** Standardisation - Metrology **(NO)**
EN	Definition	a non-impact printer in which the characters are formed by projecting a jet of ink onto paper
	Reference	ISO 2382-12:1978,Information processing systems:Peripheral equipment
(1)	***TERM***	**ink-jet printer**
	Reference	ISO 2382-12:1978,Information processing systems:Peripheral equipment
	Note	*{DOM}* Data processing:Hardware:Peripheral devices
DE	Definition	Drucker ohne Anschlagemechanismus, der die einzelnen Schriftzeichen mit einem elektronisch gesteuerten Tintenstrahl erzeugt
	Reference	Löbel-Müller-Schmid,Lex DVA
(1)	***TERM***	**Tintenstrahlschreiber**
	Reference	Löbel-Müller-Schmid,Lex DVA
	Note	*{DOM}* Datenverarbeitung:physikalische Träger:Peripheriegeräte
(2)	***TERM***	**Tintenstrahldrucker**
	Reference	Löbel-Müller-Schmid,Lex DVA

Internet

Figure 7 Eurodicautom terminology database.

banks are also accessible for external users on CD-ROM or via the Internet (Figure 7).

The first generation of term banks with their pragmatic and often institution-specific design was succeeded by a research-oriented development which, on the one hand, helped reveal the conceptual weakness of the individual data banks and, on the other hand, created new concepts, which again led to the development of corresponding software. Examples of this trend are the DANTERM database, developed at the University of Copenhagen, and the Ericsson CAT system, used in the language departments of some German companies and governmental organizations. Both systems are based on a concept-oriented approach to terminology management and run on midsized computers. But with the breakthrough of microelectronics and the burgeoning population of (networked) personal computers even in the environment for terminology work, these systems were replaced by PC-oriented terminology management systems. Today, we find client-server terminology databases that allow web-based cooperative terminology work by terminologists and terminology users across the world. But terminology databases are not just used as stand-alone applications for terminology management, they are also integrated into workbench systems and communicate with word processors, publication systems, translation memories, and machine translation systems. Professional features and additional components for project management, data interchange, and term extraction facilitate comprehensive application in larger language, translation, or terminology services (Figure 8).

Design and Implementation of Terminological Databases

The needs of the different user groups involved in developing and retrieving terminology, as well as the organizational environment in which terminology management takes place, have a strong impact on the

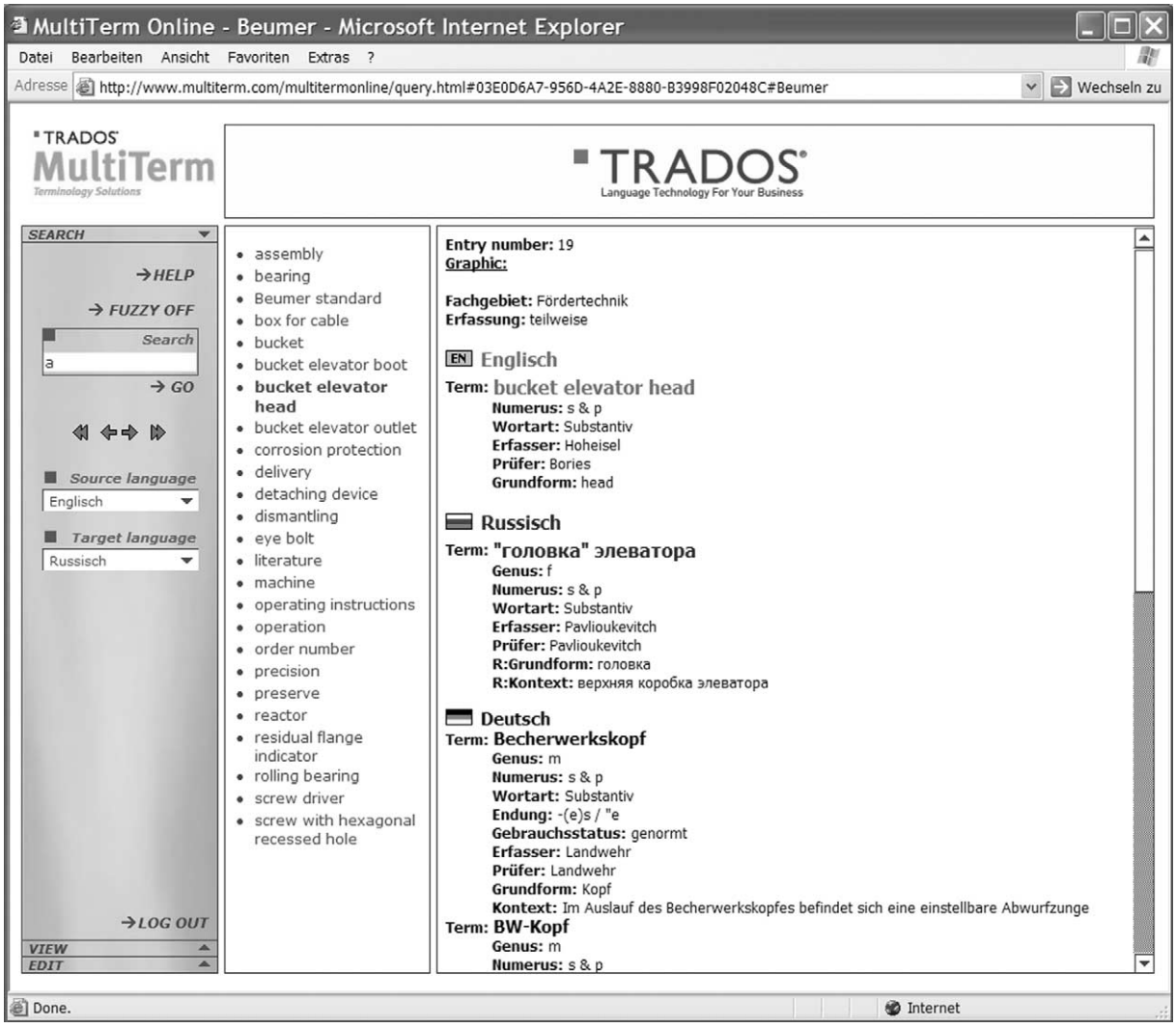

Figure 8 MultiTerm iX web-based sample terminology database.

conceptual design of a terminological database. It is very important to specify the types of data (terminological data categories) that should be managed, and to define the data model (terminological entry structure) that will form the basis of the termbase.

The selection and specification of 'terminological data categories' should be based on ISO 12620 (1999), which lists and describes more than 200 data categories useful for terminology management. According to this standard and other publications dealing with terminology management, terminological data categories can be grouped under various headings, depending on whether they are concept-related or term-related, or contain administrative data.

Concept-related terminological data categories comprise those data elements that refer to the concept underlying a terminological entry or describing the relationship between this concept and other concepts. Typically used concept-related data categories are:

- Definition
- Subject field/domain
- Illustration/symbol/formula
- Classification/notation
- Superordinate concept
- Subordinate concept
- Co-ordinate concept.

Term-related terminological data categories contain those data elements that refer to one particular term representing the concept. The set of term-related data categories must be repeated for each term assigned to the concept, within one language (e.g., for synonyms) or for several languages (e.g., equivalents). Useful term-related data categories are:

TRADOS MultiTerm '95 Plus! - LREC-EX1.MTW <Ansicht>

Datei Bearbeiten Anzeige Suchen Hilfe

Index Englisch | Ziel Deutsch

air bag | air bag | air bag

Eintragsnummer 161
Fachgebiet Technik
Lenoch-Code #TR:
Autor

air bag *Gebrauch norm*
Quelle ISO/DIS 12097-1
Definition A flexible material, forming an enclosed volume that receives the gas from the inflator and restraints the occupant.
D-Quelle ISO/DIS 12097-1
Kontext The actual air bag in an air bag restraint system; typically made of a polyamide fabric, often coated with neoprene on the inside; newer air bags have no coating to facilate recycling.
K-Quelle Schmitt.1992

airbag *Benennungtyp Variante*
Quelle Wyhlidal.1994
Kontext The headform shall strike the test component at a speed of 24.1 km/h or, in the case of components which cover an uninflated airbag, at a speed of 19.3 km/h; this speed shall be achieved either by the mere energy of propulsion or by using an additional impelling device.
K-Quelle ECE-R 21, Annex IV, 1.4.2

bag *Benennungtyp Kurzform*
Quelle Schmitt.1992
Kontext Porosity is characteristic of the bag fabric measurable as gas permeability.
K-Quelle ISO/DIS 12097-1

air cushion *Regionalcode AE*
Quelle Schmitt.1992
Kontext Upon vehicle collision a pyrotechnic gas generator inflates an air cushion (airbag)(...).
K-Quelle Bosch/VDI.1993, S. 718

air bag cushion *Kunde BMW*
Quelle Schmitt.1992

Eintragsnummer

Figure 9 Term autonomy realized in MultiTerm '95 Plus.

- Term (including synonyms, abbreviated form, and orthographical variants)
- Term type
- Context/example
- Grammatical information (gender, part of speech, number)
- Geographical restriction
- Linguistic restrictions
- Register
- Project code/company code.

Administrative data categories refer to the entry as a whole, or to individual concept-related or term-related data categories within this entry. Administrative data categories include:

- Identification number (entry number)
- Date (creation/last update)
- Author (creator/checker/editor)
- Source
- Reliability
- Note/annotation/comment.

The selection and specification of terminological data categories is a very important step in the design of a terminological database. Modifications and re-specifications of data categories are very labor- and cost-intensive when the database is already filled with data.

The next step in designing terminological data bases is the definition of the 'terminological entry structure', i.e., a systematically hierarchical arrangement of data categories. ISO 704 (2000), ISO 12200 (1999) and ISO 16642 (2003) provided good guidance for this data modeling process. Two major principles should be mentioned in this context.

Per definition, a terminological entry has to contain all terminological data related to a given concept (ISO 1087–1, 2000). Therefore, the entry structure has to reflect the principle of 'concept orientation', thus allowing for the maintenance not only of all concept-related information, but also of all terms in all languages with all term-related information within a particular terminological entry. Terminological entries designed according to the principle of term

orientation, which we very often find in bilingual glossaries or dictionaries, are not appropriate for meticulous terminology management and will quickly lead to inconsistent terminology collections that are not very useful, especially if multilingual terminology management is required.

The second important principle of terminological entry modeling is 'term autonomy'. Term autonomy guarantees that all terms including synonyms, abbreviated forms and spelling variants can be documented with all necessary term-related data categories. This approach can be realized by designing the data model in a way that allows the user to create an unlimited number of term sections, or term blocks, containing individual terms and all additional data categories describing the term and its use. Figure 9 shows an example of a monolingual terminological entry following the principle of term autonomy.

See also: Bilingual Lexicography; Definition; Lexicography: Overview; Thesauruses.

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Terminology, Term Banks and Termbases for Translation

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Preliminaries

The relationship of human beings with their environment, as well as with each other, is mediated through language. Where that environment involves specialist knowledge, a special vocabulary – or 'terminology' – develops to allow specialist concepts to be communicated, both in speech and in writing. Through the ages since classical times, translators have played a key role in the transfer of specialist knowledge from one culture to another (Delisle and Woodsworth, 1995: 101–127), not only in the codification of the terms that, to use a popular metaphor, comprise the building blocks of specialist knowledge, but also in their formation in order to fill lexical gaps in the target language through, for example, circumlocution, neology and borrowing (cf. Rener, 1989: 99).

Much of the stock of specialist knowledge is recorded and developed in texts of various kinds for a range of purposes and different audiences. The translators of specialist texts need support in identifying and using the terminology of the relevant subject in both the source and target languages, as the terms and concepts of specialist knowledge are usually acquired as part of formal training. Such information is contained in what are sometimes collectively called 'terminology resources' (TRs) or 'terminology collections' (Wright and Budin, 1997: 325–326); these may be produced by large commercial publishers, companies, international organizations, or by individuals as professionals (including specialist translators) or hobbyists. Typical examples of TRs include alphabetical or thesaurus-type specialist dictionaries, glossaries, nomenclatures, term banks, and termbases. The need for these resources is of growing importance in the age of the 'knowledge society,' characterized by increasing specialization and globalization. Consequently, dictionaries and other codified terminology resources are unable to keep pace, and translators need to be skilled researchers of diverse resources, including documentation, and even compilers of or contributors to terminology collections themselves.

Terminology of Terminology

The term 'terminology' itself requires comment, as it has several senses. It can refer to a set of principles for compiling terminologies according to concept-based methods (compared to the word-based methods of lexicography; see Wright and Budin, 1997: 328), the application of terminological methods, sometimes also called, by analogy with lexicography, 'terminography' (Rey, 1995: 129), a collection of terms within a particular subject field, and lastly, a published collection of the same (mono-, bi-, or multilingual). In this latter sense, a terminology can be paper or electronic, as also 'glossary,' for example.

Two resource types that are, however, exclusively associated with electronic storage and retrieval are term banks (previously 'terminological data bank' or 'terminology data bank') and termbases (sometimes also equated with 'terminological database' or 'terminology database'). Although distinctions have often been blurred in practice, 'term bank' is usually used to refer to a computerized collection of terminological data (e.g., terms, definitions, usage information, etc.) held and compiled by large organizations. 'Termbase' has achieved more recent currency, leading to what might be called a democratization of terminology resources.

Term Banks

Comparing term banks with termbases, Wright and Budin (2001: 878) suggest that term banks, as a customized type of data bank, "frequently involve more complex features [...] than databases," including "multiple applications, interactive file structures and greater system complexity or size." Term banks may be further distinguished by their broad range of intended users and by being accessible to external users on CD-ROM, online by subscription or with free access, although the latter may lead to problems of overload. One well-known example with free access is the European Commission's EURODICAUTOM, a multilingual bank of 5.5 million entries covering subject fields relevant to European Union (EU) policy. A project to amalgamate EU terminology in an even larger interinstitutional term bank comprising the term banks of a number of EU institutions and bodies was begun in 1999 (IATE: Inter-Agency Terminology Exchange). The issue of quality control when dealing with very large amounts of terminological data has long been recognized as problematic in all large term banks (cf. Picht and Draskau, 1985: 144), although more recent practice is designed to improve overall quality through the structuring of data into defined categories and category sets (e.g., ISO 12620, 1999; Wright, 2001a), as well as through validation procedures within organizations.

Although term banks are usually associated with non-commercial organizations, one pioneering

example in the 1970s of a translation-oriented term bank covering many subject fields was coordinated by the German company Siemens: TEAM (Terminologie-Erfassungs- und Auswertungs-Methode/Terminology Evaluation and Acquisition Method). National standards committees such as AFNOR (Association Française de Normalisation) compile term banks for regulatory purposes within particular subject fields for a wide range of user groups including not only translators and terminologists but also documentalists, engineers, students and trainees. Typically, terminology standards such as AFNOR's and BSI's NORMATERM containing French and English standardized terms are only available against payment.

Term banks are also a tool of bilingual language planning. In the Canadian province of Québec, for example, following the establishment of French as the official language in 1974, an interventionist policy was pursued through the Office de la langue française, particularly with respect to terminology, which was deemed essential to the reintroduction of French in the workplace according to Humbley (1997). The three million terms from 200 subject fields in the French/English/French term bank, Banque de terminologie du Québec (BTQ, now Le Grand dictionnaire terminologique), can be interrogated freely online, as sensibly befits its purpose of dissemination. The mainly bilingual term bank of the Terminology and Standardization Directorate of the Canadian Government Translation Bureau, TERMIUM®, containing over one million entries is, however, only commercially available to external users.

In some cases, term banks are the result of interinstitutional and international cooperation. The Nordic Termbank, for instance, is the result of cooperation between the Nordic countries, which are particularly active in terminology, through Nordterm, an association engaged in terminology work, training, and research. Global cooperation within and between the public and private sectors, as well as nongovernmental agencies, has resulted in a number of multilingual term banks (not always called that). Examples include the multilingual 'terminology databases' (TERMITE and others) of the International Telecommunication Union within the UN system, and FAOTERM of the UN's Food and Agricultural Organization. Many, however, still turn out to be multilingual term lists, sometimes assigned to a subject field, but without the contextualizing information that underpins translation decisions.

Some term bank projects date from the times of mainframe computers in the 1960s; expansion was notable in the 1970s (Picht and Draskau, 1985: 138, 141; cf. Felber, 1984: 378–389 for an early inventory of operational and planned term banks). TERMIUM, for instance, arose from a collaboration between the University of Montreal and the Canadian government in the mid–1970s (Hutcheson, 2001). EURODICAUTOM also was launched around the same time based on legacy data from two institutions. Since the 1970s, term bank organizers have been faced with restructuring exercises necessitated by a number of factors including the migration of data for technological reasons, the problem of managing large amounts of interrelated data, and moves toward greater data interchange (Melby, Schmitz, and Wright, 2001).

Termbases

Termbases are more recent than term banks. To a degree, the claim that they are different is a *posthoc* rationalization, which turns out to have some foundation. Termbases have emerged with the increasing **commercial** availability of software tools – customized databases, commonly known as 'terminology management systems' or 'TMSs' – to store and retrieve terms and their associated data on stand-alone personal computers, as well as in networks. The commercial market is expanding, and translators and their employers are often bewildered by the array of products. Evaluation of such systems according to purpose and technical specification, as well as functionality, is therefore of growing importance (Schmitz, 2001).

TMSs are becoming standard tools for the management of terms and their associated data for translation purposes. Once populated with data, the resulting termbases vary considerably in content, structure and format, depending on software functionality, purpose, resources, and the expertise of the compiler(s). Some may be little more than lists of terms and, if bilingual, their equivalents. Others, as also some term banks, may contain a rich mixture of information, i.e., 'metadata,' supporting the user in the linguistic and conceptual use of the term and often referred to as 'elaboration.' Metadata may include linguistic information (e.g., contextual examples; word class; morphological patterns; collocates), conceptual data (e.g., domain or subdomain; definition or explanation), pragmatic data (e.g., preferred and deprecated use, data on synonyms, variants, abbreviations), and, finally, administrative data used for quality control (e.g., dates and sources of data entry and update). However, without further machine processing of conceptual relations, e.g., through structured definitions, termbases cannot yet become knowledge bases that can, say, relate hyponyms to their co-hyponyms and hyperonym.

It is clear that such complex data need careful modeling and management, as the relations between the different data types are of various kinds. A definition may be related to several terms in a relationship of synonymy or equivalence, whereas a contextual example and linguistic information are related to a specific term in a specific language. Synonyms, abbreviations, and variants (e.g. orthographic or geographical: 'converter' – U.K. English, or 'convertor' – U.S. English) are, of course, terms in their own right and in some database designs, we may speak of 'term autonomy' if each synonym, etc. can in turn become the entry term – or a kind of headword in the language of lexicography – accompanied by its associated linguistic and pragmatic data, allowing translators to make important decisions about which term is appropriate in the context of the translation task.

Freelance translators are, in practice, however, often reluctant to invest in a TMS – now often expensively packaged together with other tools as workbenches – to record their own terminological research, because they fear a steep learning curve. In-house translators also show a reluctance to engage in detailed terminology work, although it is often part of their job to record new terms and their usage. Many freelancers store terms in an *ad hoc* way using record cards, word-processing or spreadsheet packages, or even annotations in the margins of their paper dictionaries. However, such solutions have limits with respect to volume and consistency of data in particular (cf. Wright, 2001b). Many university programs for specialist translation now include training with TMSs in their curriculum, including not only technical skills but also principles of good practice for populating the termbase (cf. Wright, 1997).

Organization of Data

Increasingly, each entry – or database 'record' – in both term banks and termbases is organized around the concept or meaning rather than the term, in accordance with the onomasiological principles of terminology. Consequently, all synonyms, variants, and abbreviations as well as equivalents are grouped together in the same entry (thereby avoiding problematic cross-references), working from the content or meaning/concept to the form or term. Polysemes and homonyms therefore require separate entries. Working from the word to the meaning is the traditional method employed by lexicographers: the semasiological approach (Landau, 2001). The thematic organization of terminologies is often contrasted with the alphabetical ordering of dictionaries, but there is clear historical evidence that many early codified collections were thematically organized (cf. Jackson, 2002: 147–148).

A great deal of hard-won terminology data is underexploited because the data cannot easily be reused, i.e., exported and imported to another system compiled for a different purpose and using different subsets of data categories organized in different structures. For example, translators may compile their own termbases in the process of solving *ad hoc* terminology problems and wish to share with colleagues. Large companies may employ a terminology manager to coordinate and validate the work of in-house translators and large numbers of 'suppliers' (i.e., freelancers). Companies or other organizations using different terminology systems may undergo a company merger. And so on. Consequently, much work has been carried out over the last decade or so on developing so-called interchange formats, which aim to facilitate the reuse or 'leveraging' of data (ISO 12200). The extent to which these standards are applied is unclear; research is needed to clarify their utility and practicability.

Terms and Translation: What Counts as a 'Term'?

Terms, as opposed to words, are difficult to define for a number of reasons, including the level of expertise considered, e.g., the expert's 'automated teller machine' compared to the layperson's 'cash machine', and the degree of specialization, e.g., a dictionary of 'science and technology' or a 'terminology of flexography.' Terms are not simply specialist words, as they exhibit many different morphological and syntactic patterns according to language-typological differences, sometimes leading to demarcation problems with multiword terms. Single-word terms can be roots such as 'disease' or compounds such as the German 'Autoimmunkrankheit.' In English, terms formed by compounding are usually multiword, e.g., 'immune system disorder,' whereas in the Romance languages, terms may take on the form of lengthy phrases such as the French automotive term 'électrovanne de commande de démarrage à froid.'

One of the difficulties that specialist translators and terminologists share is knowing when a particular expression is being used in a general or a specialist sense, as many words do 'double duty' as terms and the equivalent may vary accordingly. The word 'mature,' for example, in the collocation 'mature student,' is a term from the U.K. higher education system that denotes a student who has not come directly from school; it not a euphemistic way of referring to a student's advanced age. Whereas at a system level we may say that there is no equivalent for

such culturally bound terms, in the translation of a **text** a solution must be found. Because the solution is likely to be text-specific, it is questionable whether it belongs in a codified collection of terms.

Other tensions that arise from the different nature of terminologies as system and translations as texts include the treatment of lengthy compounds, which tend to get 'clipped' in the creation of texts. So the 'gas valve outlet flange' becomes the 'flange' at the next mention, and the 'water circulating system' becomes the 'system.' Whereas 'flange' can be entered in a terminology as the hyperonym, it makes little sense to enter 'system.' Translators rely instead on their knowledge of how texts are constructed cohesively and use their judgment on the use of clipping in order to avoid overspecification (cf. also Schmitt, 1999: 306).

Specialist translators can in fact be viewed as experts in moving between system and use, between term banks or termbases, on the one hand, and texts, on the other, as well as drawing on running text for contextualized solutions. Future electronic terminology collections are likely to incorporate selected links to provide digital textual support to translators in their task, thereby further distinguishing the needs of translators from those of other users such as domain specialists and trainees.

See also: Dictionaries; Language Planning and Policy: Models; Machine Readable Corpora; Technical Translation; Translation Memories; Translation: Profession.

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Terracini, Aron Benvenuto (1886–1968)

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Aron Benvenuto Terracini, a Professor of Dialectology at the Italian Universities of Turin, Cagliari, Padova, and Milan and at the Argentinian University of Tucumán, was a member of the Accademia Nazzionale dei Lincei. He was one of the most outstanding scholars in dialectology, historical linguistics, and stylistics, as well as a pioneer in cultural and sociolinguistic studies. He studied in Paris with the dialectologist Jules Gillieron and with the philologist Antoine Meillet. During the Second World War Terracini was exiled from Italy to Argentina (1941–1946) because of his Jewish heritage.

As a dialectologist, he directed the Linguistic Atlas of Italy after Matteo Bartoli's death and the journal *Archivio glottologico italiano*. He wrote with Temistocle Franceschi a seminal work on dialect geography, *Saggio di un atlante linguistico della Sardegna* (1964). He combined dialectology and historical linguistics in his book *Pagine e appunti di linguistica storica* (1957), in which he analyzes the substrate of some Italian languages and dialects. He studied the Punic substrate of Latin and supported the hypothesis of a direct connection between the Southern Italian Greek dialects and Continental Greece, against the Byzantine hypothesis. He discovered pre-indoeuropean substrate elements in the Sardinian language by analyzing the etymology of place names. In his work on ancient Sardinian documents, 'Romanità e Grecità nei documenti piu antichi del volgare sardo' (1931), he proposed that Sardinian legal documents had to be written in the vernacular to be understood by the people because the population had limited knowledge of Latin and Greek.

The influence of the German idealistic linguistic school, mainly Karl Vossler, as well as Humboldt's concept of internal form of a language, were crucial in the development of Terracini's stylistic theory, as he presented it in *Analisi stilistica: teoría, storia problemi* (1966). His pioneer book on cultural studies, *Conflitti di lingue e di cultura* (1957), was conceived in Argentina during his exile. He published the first version in Spanish in 1951, but later on he revised it and translated it into Italian. The book is devoted to the study of language contact from both the microlinguistic and macrolinguistic points of view. He deals with issues such as language death, bilingualism, language policy, linguistic prestige, translation, and transcultural relations. He perceives language selection from bilingual into monolingual situations as a kind of mental translation in which one language is adopted. He considers translation as a cultural event in which the translator must create a personal differential grammar. He argues against positivism proposing nonmechanic subjective solutions to cultural innovations by individuals. According to Terracini, the dialogic relationship between nature and culture prompts a language to grow culturally.

See also: Bilingualism; Cultural Evolution of Language; Dialects: Early European Studies; Historiography of Linguistics; Indo–European Languages; Language Change and Language Contact; Prestige, Overt and Covert; Stylistics; Translation: History.

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Tesnière, Lucien Valerius (1893–1954)

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Lucien Valerius Tesnière (see Figure 1), French linguist, slavist, and grammarian, was regarded as the founder of dependency (valence) grammar. He was born in Mont-Saint-Aignan (Seine Maritime) in 1893 and died in Montpellier in 1954.

Tesnière studied comparative linguistics and the Slavic, Germanic, Finnish-Ugrian, and Celtic languages in Paris, Leipzig, and Vienna. In Leipzig he became a member of the linguistic school of Prague, introduced by N. S. Troubetzkoy. He worked as a teacher in Ljubljana and Strasburg. In 1937 he was appointed professor of linguistics in Montpellier, where he remained for the rest of his life.

Tesnière has found a place in the history of linguistics because of his syntactic theory, or the dependency or 'valence' theory that was posthumously published in *Éléments de syntaxe structurale* (1959), originally an attempt to simplify grammar for didactic purposes. Tesnière was critical of traditional grammar, finding it too complicated and comprehensive. He also rejected the subject and predicate as main constituents of the clause, which he regarded as an inadequate rest of Aristotelian logic in traditional grammar.

Tesnière's system is founded on a basic concept, 'connexion.' This simply means the connection of words in a clause, which presents itself to the ear as a 'linear order' extended in time. Quite different is the 'structural order,' which means the hierarchic relation between words. The clause *Alfred parle* ('Alfred is speaking') is a line of words, but to form a clause there must also be a meaningful connection between them. One word is dependant on the other, in this case, *Alfred* on *parle*. In a clause, the finite verb (if there is one) always has the highest rank. All the other words depend on the verb, and then on each other, in a hierarchic chain. Two other principal relations between the words of a clause are 'junction,' coordination with or without conjunctions, e.g., *Alfred et Bernard tombent* ('Alfred and Bernard are falling') and *Veni, uidi, uici*, respectively and 'translation,' e.g., *le livre de Pierre* ('Peter's book'), *un livre intéressant* ('an interesting book'), i.e., the hierarchic structure of phrases with or without prepositions. Tesnière compared the role of the verb in a clause to the valence of an atom: it determines the number of 'actants' (governed or closely connected words), which normally varies from zero ([*il*] *pleut*, 'it rains') to three (*Alfred dit bonjour à Charles*, 'Alfred said good morning to Charles'), thus corresponding to the notion of valence in chemistry. Not so closely connected are the 'circonstants,' usually adverbials (*Alfred part demain à midi*, 'Alfred leaves tomorrow at noon'). Tesnière was the first to use a tree diagram ('stemma') to demonstrate these relations (see Figure 2).

Tesnière's system has had a great impact on today's syntactic theory. It has turned out to be compatible with other disciplines such as grammars based on formal logic as developed by G. Frege (verb – actants ≈ predicate – arguments), generative grammar, structural semantics, and lexicography. However, it also has problems, e.g., with the lack of compatibility between different levels, such as grammatical and semantic valence (cf. Storrer, 1992).

Tesnière is generally regarded as the inventor of dependence grammar. The fact is, however, that the basic idea can be found in German grammar of the 19th century. A very similar hierarchical clause structure (even the term *Dependenz* was used in the same way!) with the verb at the top was outlined in the grammars of M. W. Götzinger (1833), A. Lehmann (1833), F. Kern (1888), and others. Whether these were Tesnière's sources or not, it does not lessen his

Figure 1 Lucien Valerius Tesnière (with permission from Marie-Héléne Tesnière).

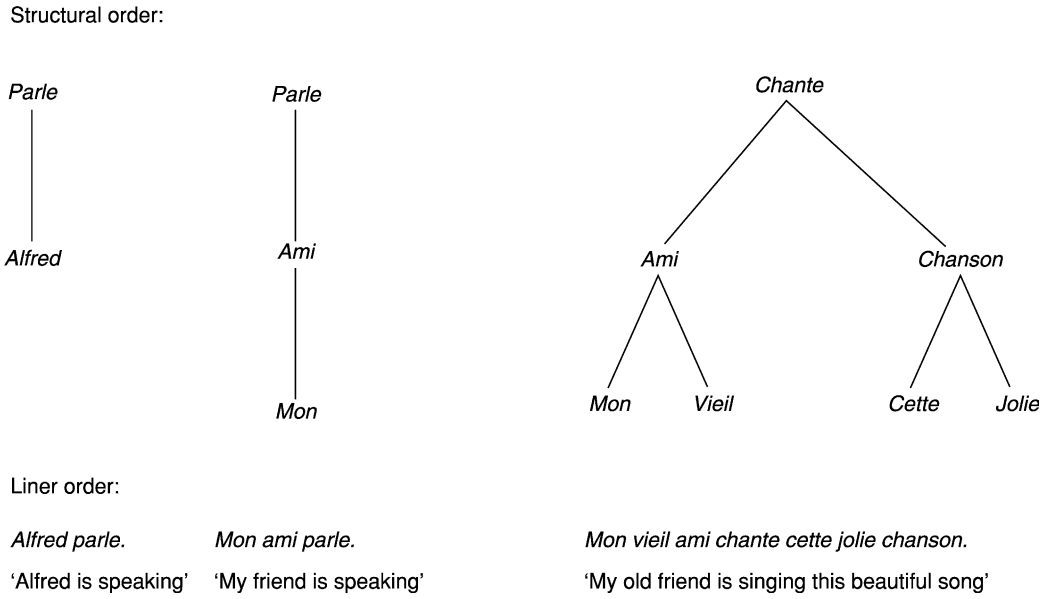

Figure 2 An example of Tesnière's tree diagrams.

achievement, which in any case has by far surpassed the first versions.

See also: Adelung, Johann Christoph (1732–1806); Becker, Karl Ferdinand (1775–1849); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Testimony

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Testimony as a Belief Source

A belief source is a cognitive process that takes certain characteristic mental states as input and yields the representational state of belief as output. In the broadest sense of interest to epistemologists, testimony may be understood as a belief source whose input and output consist, respectively, of (a) reception of another's report about the world and (b) belief in what is reported. As such, testimony has a wide variety of manifestations, ranging from the highly formal to the exceedingly mundane – from taking the word

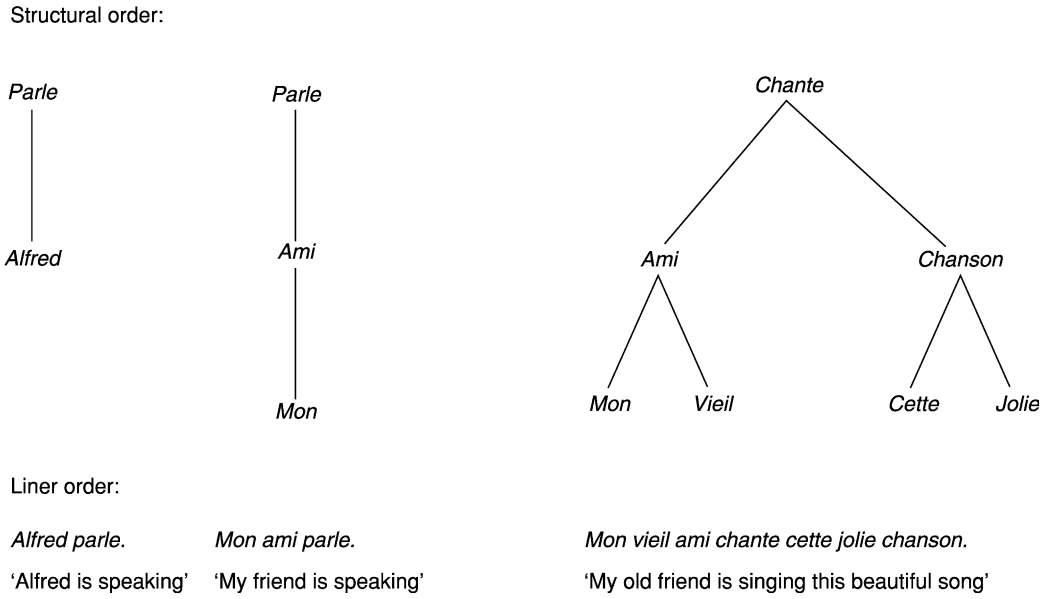

Figure 2 An example of Tesnière's tree diagrams.

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Table 1 Belief sources

Salient input	*Cognitive process*	*Output*
Sensory experience of the world, e.g., having the visual impression of a chair over yonder	*Sensory perception as a belief source*	*New belief about the world*, e.g., believing that there is a chair over yonder
Old belief about the world, e.g., believing that Socrates is a man and that all men are mortal	*Inference as a belief source*	*New belief about the world*, e.g., believing that Socrates is mortal
Old belief about the world, e.g., believing that it was cold on Tuesday	*Retentive memory as a belief source*	*Old belief about the world*, e.g., believing that it was cold on Tuesday
Reception of another's report about the world, e.g., hearing another say that it's raining	*Testimony as a belief source*	*New belief about the world*, e.g., believing that it's raining

of a sworn witness in a legal trial to accepting the nutritional information on a box of cereal.

Reflection on the ubiquity of testimony in this broad sense highlights the importance of language for our representation of the world. Thus, compare testimony with such belief sources as sensory perception, inference, and retentive (as opposed to recollective) memory, which may be characterized roughly as in the first three rows of Table 1.

In the case of the nontestimonial belief sources, description of the salient input need not explicitly mention language. Regarding testimony as a belief source, however, the appeal to language is unavoidable. Reception of another's report about the world quite obviously involves some kind of grasp of another's linguistic act – another's saying that things are thus-and-so, for example – or the linguistic effects thereof, such as the written record of another's say-so. Simply put, much of what we believe about the world would be lost without testimony, and without language, testimony would be lost.

Testimony as a Knowledge Source

Reflection on the ubiquity of testimony also highlights the potential importance of language for our felicitous representation of the world. To many epistemologists, testimony plays a central role in affording us not only mere beliefs about but also knowledge of the way things are, where knowledge is distinguished from mere belief at least partly by virtue of requiring justification or derivation from a proper source. (No matter how firmly one believes that supernatural phenomena exist, for example, one's belief that they do fails to amount to knowledge if it is unjustified or derived from an unreliable belief source such as wishful thinking.) As social creatures, Reid (1764/1997: 193) claimed, "We receive the greatest and most important part of our knowledge by the information of others." Echoing the point, Chakrabarti (1994b: 965) notes that "[w]itnesses in law courts, trusted travelers, historians, scientists, dictionaries, radio news-readers, parents, and computers have told us that something is the case and consequently we have come to *know* that it is so."

Skepticism

This common view is by no means universally held. Locke (1689/1989: 58) considered that "[t]he floating of other men's opinions in our brains makes us not one jot the more knowing, though they happen to be true. What in them was science is in us opiniatrety." Similarly, Barnes (1980: 200), who acknowledges that "we all do pick up beliefs in [a] second hand fashion," expresses the "fear that we often suppose that such scavenging amounts to knowledge." That, he claims, "is only a sign of our colossal credulity: [testimony] is a rotten way of acquiring beliefs, and it is no way at all of acquiring knowledge."

Skeptics such as Locke and Barnes insist that the most we can get when it comes to the connection between testimony and our representation of the world is the last row of Table 1: Testimony, in their view, can at best generate mere beliefs about the world – that is, beliefs that fail the justification or derivation-from-a-proper-source requirement on knowledge. Others, such as Reid and Chakrabarti, insist that the last row frequently describes a knowledge source: for them, what falls in the output box is often new knowledge of the world.

Even if we grant the importance of testimony for a felicitous representation of the world, we may well wonder how it works. Here, there are three questions to be distinguished. First, how more fully are we to understand the salient input to testimony if it is indeed to be understood as a knowledge source? Second, what, if anything, must be added to the salient input to get the total input to testimony as a knowledge source? Third, how are we to understand the cognitive process that leads from the total input to new knowledge of the world?

Perception and Understanding

Regarding the first question, there is little doubt that sensory perception is involved: In receiving another's report about the way things are, one

Table 2 Reductionist model of testimony as a knowledge source

Input	*Cognitive process*	*Output*
(a) Knowledge, acquired through sensory perception of understood linguistic acts (or their effects), that another has reported something about the world, and (b) knowledge that the reporter is trustworthy with respect to his or her report about the world	Inference from input to output	New knowledge of the world

Table 3 Anti-reductionist model of testimony as a knowledge source

Input	*Cognitive process*	*Output*
Knowledge, acquired through sensory perception of understood linguistic acts (or their effects), that another has reported something about the world	Causation of output by input	New knowledge of the world

comes to know that another has reported that things are thus-and-so on the basis of visual, auditory, etc. experience of the physical items that encode the report. However, bare sensory perception does not suffice. Both the monolingual Japanese hearer and the Anglophone hearer might equally perceive through their senses a speaker's auditory deliverance 'I'm tired today,' even though only the latter may count as receiving the speaker's report that he or she is tired today, because only the latter may understand the meaning of the perceived deliverance. Generally, then, the salient input to testimony as a knowledge source amounts to knowledge, acquired through sensory perception of an understood linguistic act (or its effects), that another has reported that things are thus-and-so.

Reductionism and Anti-reductionism

The second and third questions bring us to the heart of the most prominent issue in epistemologists' attempt to understand the nature of testimony as a knowledge source, viz. the reductionist/anti-reductionist debate. Whereas reductionists (Fricker, 1987; Hume, 1777/1995) maintain that testimony as a knowledge source reduces across the board to a species of inference, anti-reductionists (Burge, 1993; Chakrabarti, 1994a; Coady, 1992; McDowell, 1994; Reid, 1764/1997; Strawson, 1994) demur.

The kind of inference to which testimony as a knowledge source reduces, according to reductionists, is inference from the salient input together with knowledge of the trustworthiness of the reporter with respect to what he or she has reported. Hence, reductionists' answer to the second question is that knowledge of the trustworthiness of the reporter must be added to the salient input to get the total input to testimony as a knowledge source. Their answer to the third question is that we are to understand the cognitive process leading from testimony's total input to its output as one of inference. These answers jointly present a model of testimony as a knowledge source that is roughly captured in Table 2.

Anti-reductionists' answer the second question, in contrast, holds that in many cases nothing must be added to the salient input to get the total input to testimony as a knowledge source. Their response to the third question is that the cognitive process leading from testimony's total input to its output is better thought of simply along the lines of causation in general, since inference in particular is not required (although it may in some cases be present). Thus, the anti-reductionist opts for something like the model given in Table 3.

(Stepping outside of the recipient's cognitive processes, it should be noted, the anti-reductionist requires certain external conditions to be satisfied for the output of testimony as a knowledge source to amount to knowledge. Like the reductionist, he or she requires that what is reported be true; he or she further requires that the reporter in fact be trustworthy with respect to his or her report, even though the recipient need not know that he or she is trustworthy.)

Reductionists claim that the anti-reductionist model lends itself all too easily to something like epistemic gullibility and hence fails to serve as a plausible model for testimony as a legitimate knowledge source. Anti-reductionists point to cases in which it is supposedly clear that the reductionist model does not apply, most notably those involving young children's acquisition of linguistic knowledge. (Such acquisition seems to be in large part testimonial, but, say anti-reductionists, it cannot with any plausibility be regarded as typically involving inference from knowledge of the trustworthiness of reporters.) Considerations of this sort have tended to shift the focus of the reductionist/anti-reductionist debate to the question of how to understand testimony as a knowledge source for mature cognitive agents, already possessed of the sort of linguistic knowledge just mentioned (Fricker, 1994, 1995).

Summary

Testimony is undeniably a major source of our beliefs about the world, a fact that underscores the centrality of language for our representational capacities. Many maintain that testimony is also a major source of our knowledge of the world, a contention that implies the centrality of language for our felicitous representational capacities. Even granting this contention, however, there is considerable debate about the nature of testimony. Clearly, it involves knowledge, through sensory perception of understood linguistic acts (or their effects), that another has reported that things are thus-and-so. In the reductionist model, it reduces across the board to inference from such knowledge and from knowledge of the reporter's trustworthiness with respect to his or her report. In the anti-reductionist model, no such reduction obtains.

See also: Cognitive Science and Philosophy of Language; Communication, Understanding, and Interpretation: Philosophical Aspects; Epistemology and Language; Representation in Language and Mind; Thought and Language: Philosophical Aspects.

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Text and Text Analysis

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Communication Through Text and Discourse

People use language to communicate. Language users communicate through discourse. Sometimes, utterances of one word ('John!' 'Okay.' 'Stop!') or one sentence ('I declare the games opened') suffice to get the message across, but usually language users communicate through a connected sequence of minimally two utterances, i.e., discourse. The importance of the discourse level for the study of language and linguistics can hardly be overestimated: "Discourse is what makes us human" (Graesser *et al.*, 1997). It is not surprising, therefore, that the study of text and discourse has become an increasingly important area over the last decades, both in linguistics and psychology.

The term 'discourse' is used as the more general term to refer to both spoken and written language. The term 'text' is generally used to refer to written language. This article focuses on text. Although spoken and written discourse have crucial characteristics in common, the linguistic traditions of the study of written and spoken discourse are very different. 'Monological texts' are traditionally studied in areas such as stylistics, text linguistics, and psycholinguistics, often based on rather specific linguistic analyses and regularly using a quantitative methodology. By contrast, 'dialogical discourse' has long

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been the arena of conversation analysis and sociolinguistics, often focused on qualitative interpretations of individual conversations in context. Over the last 10 years, this situation has begun to change. With the growing availability of spoken corpora and the growing insight that the study of spoken and written discourse should be related because they complement each other (Chafe, 1994), the linguistic study of discourse is becoming less and less restricted to one medium. See, for instance, the overview by Ford *et al.* (2001), who relate linguistic subdisciplines such as grammar and the study of conversation.

A text is more than a random set of utterances: it shows connectedness. A central objective of linguists working on the text level is to characterize this connectedness. Linguists have traditionally approached this problem by looking at overt linguistic elements and structures, thereby characterizing it in terms of cohesion (Halliday and Hasan, 1976; *see* **Cohesion and Coherence: Linguistic Approaches**). By this view, connectedness is localized in the text itself because of explicit linguistic clues, such as pronouns referring to earlier mentioned subjects (cohesion type: *reference*), e.g., *he* refers to *bird-watcher* in (1); or conjunctions, such as *because* in (2) (cohesion type: *conjunction*), which express a causal relation.

(1) The bird-watcher had a great day. He observed a kingfisher and a group of 70 cranes.

(2) The bird-watcher had a great day because he observed a kingfisher and a group of 70 cranes.

(3) The bird-watcher had a great day. A kingfisher and a group of 70 cranes were in the area.

Influential as the cohesion approach has been, the interdisciplinary field of text linguistics and discourse studies is nowadays dominated by the 'coherence' approach: the connectedness of text is considered a characteristic of the mental representation rather than of the text itself (*see* **Cohesion and Coherence: Linguistic Approaches** and **Coherence: Psycholinguistic Approach**). The main reason is probably that a sequence of sentences like (1) or (2) is still interpreted as a perfectly normal piece of text if the cohesive elements of reference and conjunction are absent, as in (3). Hence, the connectedness is not dependent on these overt markers. This does not imply, however, that the linguistic elements signaling text coherence are unimportant.

Although coherence phenomena are of a cognitive nature, their reconstruction is often based on linguistic signals in the text itself. These linguistic expressions are considered 'processing instructions' to language users. For instance, referential expressions, such as pronouns and demonstratives, are used in such a way that interpreters can systematically recover the referential coherence (*see* **Accessibility Theory** and **Discourse Anaphora**). Similarly, connectives (*because*, *however*) and (other) lexical markers of relations, such as cue phrases (*On the one hand*, *on the other hand*) and signaling phrases (*The problem is . . . A solution might be . . .*), make the meaning relations between text segments explicit (*see* **Connectives in Text**). In recent years, the relationship between the linguistic surface code, on the one hand, and aspects of the text representation, on the other hand, has become a crucial research issue in the interdisciplinary field of text linguistics and discourse studies (cf. Gernsbacher and Givón, 1995; Sanders and Spooren, 2001; Graesser *et al.*, 2003).

Text

It follows from the discussion above that, in this article, we consider a text to be a monological stretch of written language that shows coherence. The term 'text' derives from the Latin verb *texere* 'to weave' (hence the resemblance between the words 'text' and 'textile'). But what is it that makes a text a text? This question has been at the center of attention of the fields of discourse studies and text linguistics, especially since the 1970s.

Meaning Rather than Form

In the area of syntax – 'sentence analysis' – the principled discussion on the question of whether syntax is an autonomous and purely formal level of representation is still going on, especially with the recent rise of cognitive linguistics (cf. Langacker, 1986; Jackendoff, 1996) (*see also* **Cognitive Linguistics**). At the discourse level such a discussion is nowadays absent. In the pioneering years of text linguistics, scholars like van Dijk (1972) and Petöfi and Rieser (1973) attempted to describe texts as a string of sentences within the framework of generative grammar. Analogous to the way in which sentence grammars described sentences in terms of their constituents, texts were seen as constituted by sentences. In generative grammar, a sentence is the result of rewriting rules of the form: $S \rightarrow NP + VP$.

In 'text grammars,' a text was regarded as consisting of sentences: $T \rightarrow S1 \ldots Sn$. Similarly, the top of hierarchical text representations was formed by a T (for 'text'), analogous to the S for sentence in generative sentence representations. In psychology, so-called 'story grammars' were developed in the late 1970s (Thorndyke, 1977; Rumelhart, 1977). According to such representations, a 'story' consists of a

setting ("Once upon a time, there was a little girl who lived in the woods with her parents. She was called Little Red Riding Hood.") and an 'episode' ("One day, her mother asked her to bring some food to grandmother ...") and, with the help of the same type of rewriting rules, episodes can in turn be represented as a combination of an 'event' ("Why do you have such a big mouth? she asked.") and a 'reaction' ("The wolf jumped out of bed and ate her."):

Story → setting + episode

Episode → event + reaction

Several scholars have argued that the analogy with sentence grammar is not convincing, among them Brown and Yule (1983) and Wilensky (1983):

> ... while our intuition of 'sentencehood' is a clearly linguistic notion, our intuition of 'storiness' most certainly is not [...]. the notion of 'Story' refers to actions, events, goals, or other mental or conceptual objects. In other words, our intuitions about stories are closer to our intuitions about the meanings of sentences than they are about they are about sentences themselves (Wilensky, 1983: 580).

And indeed, ever since Halliday and Hasan (1976), Hobbs (1979), and van Dijk (1977), it is widely accepted that purely formal or syntactic principles play a far smaller role at the discourse level. It is hard, for instance, to make much sense of the idea of a structurally 'well-formed' but semantically anomalous text. There is a consensus that the well-formedness of a discourse is primarily to do with its meaning – more specifically, with the question of whether the meanings of its component segments can be related together to form a coherent message.

What Makes a Text a Text?

What, then, are the crucial characteristics of text? At present, the dominant stance is that 'coherence' explains best the connectedness shown by texts. Coherence is considered a mental phenomenon; it is not an inherent property of a text under consideration. Language users establish coherence by relating the different information units in the text.

Generally speaking, there are two respects in which texts can cohere (Sanders and Spooren, 2001):

- 'Referential coherence': smaller linguistic units (often nominal groups) may relate to the same mental referent throughout the text (*see also* **Discourse Anaphora**); or
- 'Relational coherence': text segments (most often conceived of as clauses) are connected by coherence relations, such as cause-consequence, between them (*see also* **Clause Relations**).

Both coherence phenomena under consideration – referential and relational – have clear linguistic indicators that can be taken as processing instructions. For referential coherence, these are anaphoric devices such as pronouns, and for relational coherence these are connectives and (other) lexical markers of relations.

Ever since the seminal work of linguists such as Chafe (1976) and Prince (1981), both functional and cognitive linguists have argued that the grammar of referential coherence can be shown to play an important role in the mental operations of connecting incoming information to the existing mental representations. For instance, referent NPs are identified as either those that will be important and topical, or as those that will be unimportant and nontopical. Hence, topical referents are persistent in the mental representation of subsequent discourse, whereas the nontopical ones are nonpersistent. In several publications, Ariel (1988, 2001) argued that regularities in grammatical coding should indeed be understood to guide processing. She studied the distribution of anaphoric devices and suggested that zero anaphora and unstressed pronouns cooccur with high 'accessibility' of referents, whereas stressed pronouns and full lexical nouns signal low accessibility. This cooccurrence can easily be understood in terms of cognitive processes of activation: high-accessibility markers signal the **default** choice of continued activation of the current topical referent. Low-accessibility anaphoric devices, such as full NPs or indefinite articles, signal the terminated activation of the current topical referent and the activation of another topic (*see* **Accessibility Theory**).

'Centering theory' (see Walker *et al.*, 1998 for an overview) makes explicit and precise predictions about the referent that is 'in focus' at a certain moment in a discourse. It even predicts that the degree of text coherence is determined by the extent to which it conforms to 'centering constraints.' Given a clause in which referential antecedents are presented, centering theory predicts the likelihood that an antecedent will be a central referent – which is 'in focus' – in the next clause. The salience of a discourse entity is determined by a combination of syntactic, semantic, and pragmatic factors, such as grammatical role (subject or not), expression type (zero, pronoun, or NP), and discourse topic-hood. Several processing studies have demonstrated the 'psychological reality' of linguistic indicators of referential coherence (see Garrod and Sanford, 1994, and Sanford and Garrod, 1994, for an overview; *see also* **Discourse Processing**).

We now turn to (signals of) 'relational coherence.' 'Coherence relations' are often taken to account for the connectedness in readers' cognitive text

representation (cf. Hobbs, 1979; Sanders *et al.*, 1992). They are also termed 'rhetorical relations' (Mann and Thompson, 1988; *see* **Rhetorical Structure Theory**) or 'clause relations' (*see* **Clause Relations**). 'Coherence relations' are meaning relations connecting, at a minimum, two text segments. A defining characteristic for these relations is that the interpretation of the related segments needs to provide more information than is provided by the sum of the segments taken in isolation (Sanders *et al.*, 1992). Examples are relations like 'cause-consequence,' 'list,' and 'problem-solution.' These relations are conceptual and they can, but need not, be made explicit by linguistic markers, so-called connectives (*because*, *so*, *however*, *although*) and lexical cue phrases (*for that reason*, *as a result*, *on the other hand*) (*see* **Connectives in Text**).

In the last decade, much research in relation semantics and pragmatics has focused on the question of how to taxonomize or classify the set of coherence relations (Hovy, 1990; Knott and Dale, 1994; Pander Maat, 1998; Redeker, 1990; Sanders, 1997). The main reason for this interest is the cognitive interpretation of coherence relations: if they are to be considered as cognitive mechanisms underlying discourse interpretation, it is attractive to find out which more general principles are involved in relation interpretation. While work on the hierarchical classification of discourse relations goes back at least as far as Grimes (1975) and Halliday and Hasan (1976), the idea that a small number of reasonably orthogonal primitives is responsible for the differences amongst coherence relations is more recent. Sanders *et al.* (1992) defined the 'relations among the relations,' relying on the intuition that some coherence relations are more alike than others, and that the set of relations can be organized in terms of more primitive notions, such as polarity and causality. Several types of evidence in favor of such an organization were produced, varying from experiments in which text analysts judged relations (Sanders *et al.,* 1992, 1993; Sanders, 1997), to research on the acquisition order of connectives (Evers-Vermeul, 2005) and processing studies indicating how different coherence relations result in different representations (Sanders and Noordman, 2000; *see also* **Connectives in Text**). In such an account of coherence, connectives and other lexical signals are seen as 'processing instructors.' And indeed, experimental studies on the role of connectives and signaling phrases show that these linguistic signals affect the construction of the text representation (cf. Millis and Just, 1994; Noordman and Vonk, 1997).

In sum, it can be concluded that there is compelling evidence, from both linguistic and psycholinguistic studies, in favor of the view that referential and relational coherence are crucial principles, which make a set of sentences a text.

Text Analysis

Now that we have an idea of what a text is, we can define 'text analysis' as the systematic dissection of a textual unity in its constituent parts and the study of those parts in relation to each other. By consequence, text analysis focuses on the linguistic elements present in the text. Texts may be analyzed with different aims and from several perspectives.

A first text-analytic research goal is of a theoretical nature. It concerns the further development of linguistic theory at the discourse level: how are texts structured? There are now several well-established theories that propose mechanisms by which the meaning of individual sentences can be constructed, but the situation with entire texts is different. Text analysis is of crucial importance to the further development of text linguistics.

A second aim is to provide insight into the cognitive processes of reading and writing, or in the text representation that language users have of a text. In reading research, the role of text structure is an important research topic in which text analyses are used to model both the text structure and the representation that readers make of it (see previous paragraph). In writing research, the role of text analysis has received less attention for a long time, even though Bereiter and Scardamalia (1987) argued for the interaction between psychological models and text linguistic research. They pointed to a deficiency in studies of writing and argued that text analysis had a large role to play in discovering the implicit rules of composition.

A third aim is of a computational linguistic nature: the development of computational models of automatic summarization, text generation, and interpretation. Here, the analysis of natural texts should provide the rule system to arrive at such computational models. Although some theories and models discussed in the sections to follow were explicitly developed in the context of such a computational enterprise (such as **Rhetorical Structure Theory**), computational text analyses are not discussed here (*see* **Natural Language Processing: Overview**).

A fourth aim is the evaluation of text quality in the context of written composition and document design. A text analysis can provide the basis for a comparison of similar texts, enabling researchers to compare the writing ability of the authors (Cooper, 1983). In document design, text analysis can predict areas where readers may have difficulties and where

revision is imperative. It is also used to investigate the relationship between text structure and the successful layout of various documents, even multimodal ones (Delin and Bateman, 2002).

From what perspectives do text analysts try to catch the 'meaning' in text? A first division is that between content-oriented and structure-oriented approaches. 'Content-oriented' approaches to text analysis uncover what an individual text is 'about,' either by starting from the smallest building blocks (propositions) or by characterizing texts on a more global level: the topics and subtopics that are covered. 'Structure-oriented' approaches uncover the meaning relations between the textual building blocks, such as causal, contrastive, and additive relations, but also referential relations. Some approaches provide analytic models that allow for a hierarchical representation representing the whole text in such terms.

Content-Oriented Approaches

Micro- and Macrostructure In the context of a psychological model of text processing, Van Dijk and Kintsch (1983) distinguished between three aspects of text representation: 'microstructure,' 'macrostructure,' and 'superstructure' (*see* **Macrostructure**). Superstructures – representing the global structure that is characteristic of a text type – will be discussed in the section on structure-oriented approaches. Micro- and macrostructure concern the **content** of a text. The basic building blocks of these representations are 'propositions,' i.e., a unit of meaning that consists of a predicate and connected arguments. For instance, the proposition underlying sentence (4) would be (4'), where *see* is the predicate and *he* and *kingfisher* are the arguments.

(4) he sees a kingfisher
(4') (see (he, kingfisher))

The microstructure is a network of propositions like these that represents the textual information in a bottom-up fashion, sentence by sentence. Building on earlier work, van Dijk and Kintsch (1983) presented an influential model of text comprehension, which predicted the information recalled best by readers. For the purpose of text analysis, it is important to focus on another component of the Van Dijk and Kintsch model: macrostructure. On the basis of the microstructure or 'text base,' a macrostructure can be built – an abstract representation of the global meaning structure that would reflect the gist of the text (*see* **Macrostructure**). This is achieved by applying macro-rules to the detailed meaning representation of the microstructure. 'Deletion,' 'generalization,' and 'construction' are such macrorules, which produce macro-propositions: the main ideas in the text (see especially van Dijk, 1980). This idea of producing the macrostructure on the basis of the details of the microstructure is certainly appealing. The results of some experimental processing studies seem to show that macrostructures can predict recall and summarization results: Propositions present in the macrostructure are remembered better than propositions that are 'only' present in the microstructure (Graesser, 1981). Arguably, the theoretical and empirical status of this part of the van Dijk and Kintsch theory is less clear than the microstructure part. This was probably a result of the fact that macrorules were underspecified. In addition, it is not always easy to identify linguistic signals of macropropositions at the surface level of the text, even though titles, headings, abstracts, and topical sentences are mentioned as signalling macropropositional ideas. In recent years, Kintsch (1998) and others have argued that macrostructures can be derived from texts by using 'latent semantic analysis' (*see* **Latent Semantic Analysis**). Here, the meaning of sentences is represented by a vector in a high-dimensional semantic space. Vectors that relate most to the rest of the text can be identified as macropropositions.

Theme and Thematics 'Thematics' is the interdisciplinary study of 'about-ness' in text (*see* **Thematics**). The notion of 'theme' refers to the main idea or topic of the text. For instance, a text can be about a kingfisher or about an ornithologist having a great day. The study of theme has been popular in literary studies. Thanks to the involvement of text linguistics and stylistics, the study of linguistic cues that create thematic meaning has become increasingly important (Louwerse and Van Peer, 2002). For instance, formulations and stylistic figures also emphasize the thematic meaning of a text.

However, regular aspects of formulation, such as the linear order of the information in clauses and sentences, can also contribute to the identification of the theme. A typical linguistic aspect studied in more detail is the way in which the first position in a clause has a special textual status. The terminology is somewhat confusing here, because linguists refer to the information provided in this position with the term 'theme,' whereas any information following this local theme is called 'rheme' (*see* **Theme in Text**). The opening positions of clauses often contain information that guides the reader in constructing a picture of the text as a whole. In linguistics, and especially in systemic functional grammar, sequences of theme–rheme are studied, resulting in patterns of thematic development.

Structure-Oriented Approaches

Most linguistic methods of text analysis focus on the general properties of text structure, abstracting away from the specific content of individual texts. Accounts of text structure usually pay attention to

1. the meaning of the left-right relations between text segments, where the analysis is based on relational and referential coherence; and
2. the hierarchical structure of the text, which accounts for the intuition that the information that is ordered higher in a tree-like representation is more important than the lower information.

Superstructure van Dijk and Kintsch's (1983) model included micro- and macrostructures, which resulted in a representation of the text content, as was discussed above. The third element in their model is the 'superstructure,' which "provides a kind of overall functional syntax for the semantic macrostructures" (van Dijk and Kintsch, 1983: 242). It is the conventional, hierarchical form in which the content of the macrostructure is presented. An example of such a superstructure is that of the type 'news discourse,' in which superstructural categories are distinguished, for example, *headlines, lead, context, event*. Superstructural categories are typically of a global nature in that they organize larger chunks of text rather than consecutive sentences. In addition, a superstructure analysis proceeds top-down: it starts from the highest text level. Superstructures for several other conventional text types were developed, among them the 'Experimental article.' There seems to be a clear parallel here with text type and genre: it would seem logical to expect that stereotypical text types can be characterized in terms of a superstructure (*see* **Genre and Genre Analysis**). Therefore, a text analysis in terms of superstructures is text type-specific by definition.

Clause Relations, Coherence Relations, and Discourse Patterns By contrast, a text analysis based on clause or coherence relations would be generally applicable, independent of text types. It proceeds bottom-up, starting from consecutive clauses. One common relation is called 'problem-solution' or 'solutionhood' (*see* **Problem-Solution Patterns**). See examples (5) and (6).

(5) I'm hungry. Let's go to the Fuji Gardens.

(6) What if you're having to clean floppy drive heads too often? Ask for Syncom diskettes, with burnished Ectype coating and dust absorbing jacket liners.

Mann and Thompson (1986, 1988) treated solutionhood as simply one of the relations, where others have argued that solutionhood was more complex than that (Grimes, 1975; Hoey, 1983; Sanders *et al.*, 1993): "Both of the plots of fairy tales and the writings of scientists are built on a response pattern. The first part gives a problem and the second the solution" (Grimes, 1975: 211). On the basis of clause relations, more complex structures can be built: a 'discourse pattern' (Hoey, 1983) or a 'response pattern' (Grimes, 1975). Hoey (1983) argued that a recurrent combination of clause relations can organize a substantial text fragment, or even a whole text. See the illustrating example from Hoey (1983: 35):

(7) (i) I was on sentry duty.
(ii) I saw the enemy approaching.
(iii) I opened fire.
(iv) I beat off the attack.

Hoey provided several paraphrase tests to recognize the clause relations on which the pattern is based: 'instrument-achievement' with '(iii) thereby (iv),' 'by (iii) . . . ing,' and '(iii) by this means (iv)' (Hoey, 1983: 39–41); and 'cause-consequence' 'because (ii), (iii)' and '(ii) therefore (iii)' (Hoey, 1983: 41–42). Paraphrase tests like these are often a great help for inexperienced text analysts, who find it hard to determine the exact relationship expressed between text segments.

This heuristic to identify discourse patterns is an outstanding example of a text-analytic method in the field of clause and coherence relations. The research in this field discussed earlier in this section has probably been more important for the identification of coherence relations and for the theoretical issues discussed earlier (the nature of coherence, taxonomies of relations, the linguistic expression and processing of relations). However, a very important account has not been discussed so far: rhetorical structure theory.

Rhetorical Structure Theory In the 1980s and 1990s, Mann and Thompson (see especially Mann and Thompson, 1988) presented 'rhetorical structure theory' (RST), a functional theory of text organization developed in the context of linguistics and cognitive science (*see* **Rhetorical Structure Theory**). At the heart of RST are the so-called 'rhetorical relations,' similar to clause or coherence relations, and including relations like 'cause,' 'elaboration,' and 'evidence.' The relations are defined in terms of conditions on the nucleus (the most important segment in a relation), on the satellite (which depends on the nucleus), and their combination, and in terms of the effect on the reader. Relations are identified between adjacent text segments (e.g., clauses) up to the top level of the

text. The top level of an RST tree organizes the text as a whole: a relationship that dominates the total text structure.

Rhetorical structure theory has proven to be a very useful analytic tool. One of its benefits is that it allows for a complete analysis of any text type: expository, argumentative, or narrative. The system has been applied to many real-life texts, among them newspaper articles, advertisements, and fundraising letters (Mann and Thompson, 1992). As a rule, an RST analysis starts with an inspection of the **entire** text. The analysis does not proceed in a fixed way; it proceeds bottom-up (from relations between clauses to the level of the text) or top-down (the other way around) or follows both routes (Mann *et al.*, 1992). The analysis results in a hierarchical structure that encompasses the entire text and has a label attached to each of its branches.

Although RST defines rhetorical relations in a fairly exact way, the assignment of a label is ultimately based on observed 'plausibility.' Four general constraints are the guidelines: 'completedness,' 'connectedness,' 'uniqueness,' and 'adjacency' (Mann and Thompson, 1988: 248–249). How the analysis actually proceeds is left to the intuitions of the analyst and is, in the end, a matter of text interpretation. Still, it has been shown that RST can be applied with a reasonable amount of consensus by expert text analysts (Den Ouden, 2004) and to a certain extent, RST analyses can even be produced automatically (Marcu, 2000).

Procedural Text Analysis Rhetorical structure theory requires a fair amount of text interpretation based on the analysts' overview of the text as a whole. This overview situation may not reflect the way in which writers produce texts. Spontaneously produced texts, especially, are the result of a more incremental process. Sanders and van Wijk (1996) developed 'procedures for incremental structure analysis' (PISA), which incorporates both ideas about written text production and insights from the text analytical literature, especially with respect to hierarchical aspects of text structure. The two texts in example (8) are taken from the PISA corpus. They were written by 12-year-old boys in response to a request to explain who Saint Nicholas is to someone who knows nothing about the subject. The texts are translated from Dutch in a rather literal way, preserving the original punctuation. For the analysis, texts were divided into segments, roughly corresponding to clauses. The hierarchical structures of the texts in (8a and 8b) are shown in Figures 1 and 2.

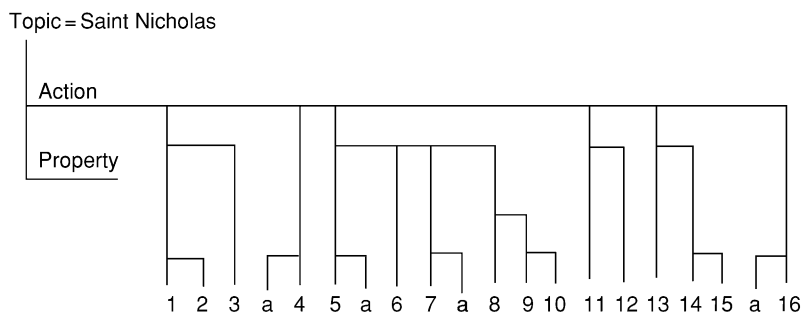

Figure 1 Hierarchical structure of an explanatory text, dominated by a sequence of actions. (Reproduced from Sanders T & van Wijk C (1996). 'PISA – a procedure for analyzing the structure of explanatory texts.' *Text, 16(1)*, 91–132 with permission by Elsevier.)

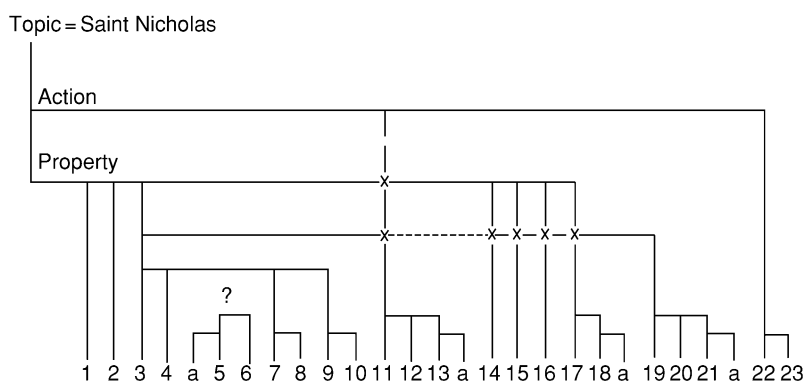

Figure 2 Hierarchical structure of an explanatory text, dominated by referential coherence. (Reproduced from Sanders T & van Wijk C (1996). 'PISA – a procedure for analyzing the structure of explanatory texts.' *Text, 16(1)*, 91–132 with permission by Elsevier.)

(8a) (1) Every year Saint Nicholas comes (2) that is on the 4th of December (3) That day he comes by steamboat (4a) When he arrives in the Netherlands (4) then everyone waves to him (5) At night (5a) when it is pitch-dark (5) Saint Nicholas rides over the roofs with Black Peter (6) and throws lots of presents through the chimney (7) while the children sing a song (7a) such as: Sinterklaas kapoentje . . . (8) Saint Nicholas gives lots of presents (9) but he always gets something in return (10) That is either a carrot for the horse or a bit of water, also for the horse (11) On the fifth of December Saint Nicholas really has his birthday (12) on that day he brings the presents (13) and then he leaves again. (14) He also looks into the red book with the cross on it. (15) There it says whether you have been naughty or not (16a) When Saint Nicholas leaves again (16) the children sing Bye bye Saint Nicholas.

(8b) (1) Saint Nicholas is an old man (2) He has a white-grey beard (3) He has a steamboat with a lot of little black men (4) They are called Black Peter (5a) When it is the fifth of December (5) the time has come. (6) The day of Saint Nicholas is a Big Festival. (7) The Peters have a birch. (8) A birch is a bundle of swishing branches. (9) They also have a sack (10) that is a kind of wool and a shape. (11) The children in all villages and towns got ginger-nuts. (12) And ginger nuts are four-sided blocks, with sugar. (13) That is candy (13a) that children like. (14) Well, Saint Nicholas is an old man, with white hair. (15) He wears a red robe. (16) And wears a sort of shirt. (17) He also has a whitish grey. (18) A grey is a horse. (18a) (noble animal) (19) Just now I was talking about a steamboat. (20) A steamboat is a big ship, (21) a steamboat often has got a big funnel (21a) from which the steam comes. (22) The children sing songs on the fifth of December, (23) that is because there is a big feast.

The texts in (8) illustrate two different ways of arranging information in an explanatory text. The first one follows the **temporal order** of events: first he arrives, then, at night, he rides over the roofs. On December 5, he has his birthday and the children get presents. And then he leaves and the children sing to him. By contrast, the writer of the second text solves the problem of explanation by focusing on the topic of the text. He mentions all kinds of **properties** of Saint Nicholas in a rather associative way: He is old, has a white beard, a steamboat, etc.

Clearly, these two texts differ in their global structure. The first one is dominated by an 'action-line,' a temporal sequence of actions, and the second one is dominated by a 'property-line,' a list of characteristics of the topic. Text structures like these may reflect the way in which the writer has organized the information during the production of the text. For example, the first text can be produced by running through episodic memory; the actions or events are mentioned in temporal succession and the text ends with the closing of an episode. The second text, on the other hand, is probably produced by searching semantic memory in an associative way. It resembles brainstorming; it lists information related to the topic, which is potentially relevant to explain it.

In a series of publications, it has been argued that the product of this text-analytical method is cognitively interpretable because it correlates with pause time distribution during writing (Schilperoord, 1996; Sanders and Schilperoord, 2005) and explains writing development (van der Pool, 1995), sentence-combining results, and problems during writing (van Wijk and Sanders, 1999). The generalizability of an incremental and procedural approach like this is limited; it has specifically been shown to be successful for spontaneously written explanatory texts and judicial letters that were produced without much planning.

Conclusion and Further Research

There are several interesting developments for the research agenda in the years to come. Before we go into detail, a general methodological remark seems in order. Text analyses of corpora of natural language texts have a crucial role to play in text linguistics and discourse studies, because the development of theoretical models of discourse phenomena needs to proceed in interaction with the study of the (sometimes very complex) reality of natural language in use (cf. Emmott, 1997).

Let us now focus on some specific issues that follow from our analysis of the state-of-the-art in the preceding sections. A first important issue is the linguistics/text linguistics interface. There are clear rapprochements between grammarians, (formal) semanticists, and pragmaticists on the one hand and text linguists on the other hand (Sanders and Spooren, in press). Questions to be asked are: what is the relationship between information structuring at the sentence level and at the discourse level? How do factors such as tense, aspect, and perspective influence discourse connections (Lascarides and Asher, 1993; Oversteegen, 1997)? For instance, discourse segments denoting events that have taken place in the past (*The bird-watcher saw a small blue bird near the river. It was a kingfisher*) will typically be connected by coherence relation of the content type, whereas segments in the present/future, which contain many evaluations or

other subjective elements (*Here is that small blue bird again. It must be a kingfisher*), are prototypically connected by epistemic or argumentative relations (*see* **Connectives in Text** and **Evaluation in Text**). This correlation, in turn, should be studied in connection with issues like perspective and subjectivity (Sanders and Redeker, 1996; Pander Maat and Sanders, 2001).

A second obvious issue is the relationship between the principles of relational and referential coherence. Clearly, the two types of principles both provide language users with signals during text interpretation. Theses signal are taken as instructions for how to construct coherence. Therefore, the principles will operate in parallel, and they will influence each other. The question is: How do they interact? Consider a simple example.

(9) John congratulated Pete on his excellent play.
  (a) He had scored a goal.
  (b) He scored a goal.

At least two factors are relevant for the solution of the anaphor *he* in (a/b): the aspect of the sentence, and the possible coherence relations that can be inferred between sentences. Part (9a) has perfect tense, and at the discourse level, the interpretation of one coherence relation is obvious – namely the backward causal relation 'consequence-cause.' The tense of (9b) is imperfect, and at the discourse level several coherence relations can exist, including 'temporal sequence' (of events) and 'enumeration/list' (of events in the game). Hence, the resolution of the anaphor-antecedent relation seems to be related to these two factors. In (9a) *he* must refer to Pete; in (9b), both antecedents are possible: John or Pete. How do aspect and the coherence relation interact in the process of anaphor resolution? And: Is the anaphor resolved as a consequence of the interpretation of the coherence relation? Questions like these were already addressed in the seminal work of Hobbs (1979) and recently taken up again in a challenging way by Kehler (2002). Text analysis of natural texts has a large role to play here: How often do ambiguities like these actually show up in text? What are the heuristics apparently used by language users?

A third issue is the further characterization of genres and text types in terms of their text structure. Genre and text type are both frequently used concepts (*see* **Genre and Genre Analysis**) that are often not defined in articulate text-internal characteristics (see Virtanen, 1992). Now that text-analytic models like RST are available and the theory of different types of coherence relations has matured, it is high time that structural analysis of real-life corpus texts show whether text types differ systematically in their text structure. In a first corpus study (Sanders, 1997), such a correlation was indeed found. 'Informative texts' (in which the writer's goal is to inform the reader about something) were compared to 'expressive texts' (in which the writer's goal is to express his or her feelings and attitudes) and 'persuasive texts' (in which the writer's goal is to persuade the reader of something). It was shown that persuasive texts were indeed dominated by more subjective relations, used by the writer to put forward the argument, whereas encyclopedic texts were shown to be informative because their structure was dominated by more objective relations, in which the writer simply described the content area. The realization of this type of text-analytic work on a larger scale would make notions of text type more concrete, but it also provides an example of the way in which text structural characteristics could be operationalized for the further study of language use, on a par with many stylistic text characteristics.

A fourth and final issue concerns the role of text analysis in text evaluation and document design. Many teachers believe that the best and the worst essays written in class differ in organization. The best one is structured clearly, whereas the worst one is hard to follow. Traditionally, there are few results from research to underpin observations like these. However, this situation has recently improved. For instance, children's explanatory texts showing continuity might be judged better than texts that show discontinuities (Sanders and van Wijk, 1996; van Wijk and Sanders, 1999).There are at least two cognitive reasons to link structure and judgments about text quality: texts are easier to understand without such discontinuities, and discontinuities often point to a lack of text planning during writing (Sanders and Schilperoord, 2005).

The use of text analysis in document design is particularly promising because it not only appears valuable in the study of 'classical' text structure, but it is also a useful basis to investigate the matching of text structure, content, and layout, including visual images (Delin and Bateman, 2002). This type of work shows the way to the text analysis of the 21st century: that of multimodal documents.

See also: Accessibility Theory; Clause Relations; Cognitive Linguistics; Coherence: Psycholinguistic Approach; Cohesion and Coherence: Linguistic Approaches; Connectives in Text; Discourse Anaphora; Discourse Processing; Evaluation in Text; Generative Grammar; Genre and Genre Analysis; Latent Semantic Analysis; Macrostructure; Natural Language Processing: Overview; Problem-Solution Patterns; Rhetorical Structure Theory; Thematics; Theme in Text.

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Text Formatting

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Introduction

The *text formatting* problem, to be solved by software residing on a computer, is to take a sequence of words stored in an input file and arrange them in the same order on as many pages as are needed, subject to the user's commands and his choices on a variety of constraints and options. The pages can be printed on paper at any time, and usually the user is able to see on the computer's screen approximately how the pages will appear when printed. The approximation is usually accurate to the resolution of the computer's screen.

The results the user gets depend on the commands he gives and on the value of the choice he makes for each constraint or option. These commands are given and choices are made by directly or indirectly (see the later discussion on direct manipulation) inserting additional characters, often called *markup*, at appropriate points in the input file. Later in the article, the commands are summarized and a full list of constraints and options is given. In the mean time, the constraints and options are collectively referred to as 'choices.' Telling a formatter to apply a particular option is called *turning the option on* and telling the formatter not to apply a particular option is called *turning the option off*.

For concreteness, the text that you are now reading was formatted in lines that are 3.154 inches (80.1 millimeters) wide, in the Sabon family of typefaces at the 10 point size on lines spaced at 12 points. The text is strictly left to right and is left- and right-justified with hyphenation turned on. The commands issued were mainly for introducing the title, introducing the author's name, introducing sections, introducing

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paragraphs, giving numbered and labeled lists, specifying footnotes, and including figures.

Each formatter worth its salt allows the user to give commands and to set the value of all choices. Some do not allow making some of these choices, e.g., one very popular formatter in its academic, not professional, version does not allow installing automatic hyphenation.

The formatters that are considered in this article are MS Word (Microsoft, 2000), FrameMaker (Adobe Systems Incorporated, 2000), TEX (Knuth, 1988) with LATEX (Lamport, 1994), ditroff (Ossana, 1976; Kernighan, 1982), and the Mozilla browser (Mozilla, 2004). (LATEX is TEX extended by macrodefined commands that implement a collection of aesthetic designs for a variety of document types used by computer scientists.) These are both representative and available, and are widespread in some sense of the word. The online version of this article shows the text of this article formatted by each of these formatters, both with and without hyphenation if possible, in a two-column format that resembles as much as conveniently possible the hard copy you are looking at right now. (The IEEE two-column conference proceedings format was readily available for all the listed formatters except Mozilla. The author is not enough of an expert in all of these formatters to be able to match the encyclopedia's format exactly; so this close match is used instead.)

In this article, each formatter is classified by the choices it makes for the user and what it allows the user to choose.

This article discusses each choice, i.e., constraint and option, by briefly describing both the algorithmic issues involved and the effect each choice has on the appearance of a formatted document. Many of these choices interact with each other.

The plan for this article is:

1. to define some terms;
2. to describe properties of the text to be formatted;
3. to describe the basic formatting algorithms in terms of their effects; and
4. to present each constraint and option in terms of its effect on the formatting algorithm and in terms of its effect on the final appearance of a document.

The focus of this article is strictly on the formatting issues. For details of computer typefaces and typography, *see* **Digital Fonts and Typography**.

Terms

Document The text being formatted is called the *document*.

Input, Output, and Output Lines This article distinguishes between *input* and *output*. The input is a sequence of characters some of which are space, tab, newline, and endfile. The output is a collection of characters each printed at a particular position on a page. A collection of characters with the same horizontal position forms an *output line*. If we consider the characters of one output line listed in order of their vertical positions, then we can talk about the sequence of characters in the output line.

Character Bounding Box, Glyph, Side Bearings, Width, Boundary, and Adjacency See Figure 1 for an output line consisting of the two nonsense words 'Hmg Hmg' printed at a very large size. In this figure, various axes, distances, and properties of the characters are identified, and these are the subject of the following discussion.

In a modern printer that accepts PostScript as its page description language, each character has a *bounding box*, an imaginary rectangle that circumscribes the shape of the character, known also as the character's *glyph*. The bounding box is shown explicitly for only the first 'g'. If the character is not to connect with its neighbors, as is the case with nonscript versions of Latin letters, then to the left and to the right of the bounding box are some regions in which nothing is printed. The region to the left of the bounding box is called the *left side bearing* and the region to the right of the bounding

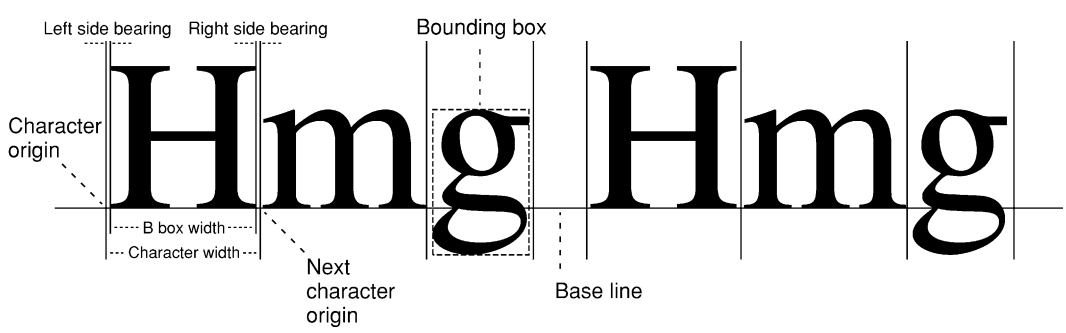

Figure 1 Nonconnected Latin characters with axes.

box is called the *right side bearing*. In this article, the left edge of the left side bearing is called the *left boundary* of the character, and the right edge of the right side bearing is called the *right boundary* of the character. The distance from the left boundary to the right boundary of a character is the character's *width*. Characters within one word, such as each 'Hmg' in Figure 1, are normally printed with their side boundaries touching each other. Two characters with boundaries touching each other are called *adjacent*.

All the characters on one output line are printed on a single *base line*. The intersection of a character's left boundary and the base line is called the character's *origin*. Thus, for a pair of adjacent characters, the origin of the right-hand character coincides with the left-hand character's right boundary.

Figure 2 shows two Arabic characters that connect with each other. For each, the side bearing on the connecting side is zero. As a result, if the connecting pieces of two adjacent connecting characters meet their boundaries over the same range of y values, then when the character's boundaries touch, the characters end up connecting.

Blank A *blank* character in an input line is a space, a tab, a newline, or an endfile character.

Word and Chunk A *word* in either kind of line is a sequence of adjacent nonblank characters. These characters are typically mostly letters and may occasionally include, especially at the end, a punctuation character. However, from the point of view of the formatting process, the nature of the characters is somewhat irrelevant. Of course, the notion of hyphenation is relevant only for words consisting only of letters and possibly one punctuation symbol at the end.

In input to a formatter, words are separated by and delimited by blank characters.

When hyphenation is turned on in a formatting, then, occasionally, a word will be broken into two pieces. Appended to the first piece will be a hyphen character.

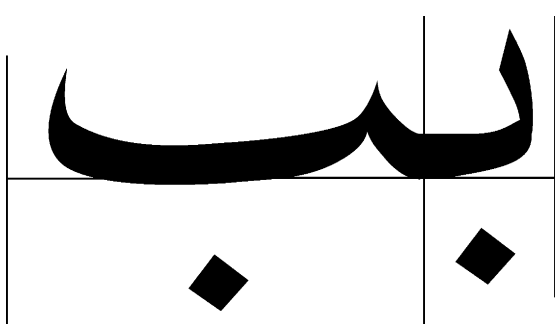

Figure 2 Connected Arabic characters with axes.

The word *chunk* is used in this article to refer to a unit of formatting. Each nonhyphenated word, each first piece of a hyphenated word together with the appended hyphen, and each second piece of a hyphenated word is called a *chunk*.

Space Character Generally, the characters inside a chunk are printed adjacent to each other. When two consecutive chunks are printed on the same output line, the last character of the first chunk is not adjacent to the first character of the second. In Figure 1, the first 'g' at the end of the first 'Hmg' is not adjacent to the second 'H' at the beginning of the second 'Hmg'. The region of the output line between two consecutive chunks, in which no character is printed, is called the *space* between the chunks. The minimum size of a space between chunks is usually about the same as that of a narrow character such as 'i'. This minimum spacing between chunks is often called *the space character* even though nothing is really printed.

More about Output Line An output line of a formatted document then consists of consecutive chunks in a sequence with some nonprinted space in between them. At most the last chunk of a line is the first piece of a hyphenated word together with its appended hyphen. Generally, almost all lines of a document are the same length; the first and last lines of any paragraph may be shorter than this common length.

Output Page An *output page* of a formatted document consists of a sequence of lines. Generally, the number of lines in almost all pages in a document are the same; the first and last pages of a chapter may have fewer lines than others.

Justification and Raggedness When all the lines of a page have text right up to a margin, either left or right, then the lines are said to be *justified* to that margin. Conversely, if all the lines of a page do not meet a margin, either left or right, leaving some space between the chunk closest to the margin and the margin, then the lines are said to be *ragged* at that margin. In most documents, e.g., this article, lines are left- and right-justified. In some Latin-alphabet documents, lines are left-justified and right-ragged. Very rarely, mostly only in poetry, one finds portions of Latin-alphabet documents whose lines are left-ragged and right-justified. One does find portions of documents in which all lines are centered, effectively making the lines left- and right-ragged.

Formatting To use the vocabulary just established, *formatting* can be described as the process of arranging the words of an input document into chunks laid

out in output lines on output pages according to commands, constraints, and options provided and set by the user.

Text Characteristics

The text of a document to be formatted can be in a mixture of human languages, each with its own character set. Some languages, e.g., English, French, German, and Russian, are written from left to right with lines flowing from top to bottom. These are called the *LR* languages. Other languages, e.g., Arabic, Hebrew, and Persian, are written from right to left with lines flowing from top to bottom. These are called the *RL* languages. Still other languages, e.g., Chinese, Japanese, and Korean, are written from top to bottom with lines flowing from right to left. These are called the *TB* languages.

To a formatting algorithm, the specific languages of a document do not matter beyond the direction in which its text is written. Two different languages that are written in the same direction are equivalent from the formatter's point of view, even if they use different alphabets. The different alphabets can be regarded as no more than different typefaces. Therefore, this article talks only about the three directions of text, LR, RL, and TB, and not the actual languages in which the text is written. Of course, the rules for hyphenation do depend on the language of the text.

A document, or more properly, a section of a document, has a *document direction*. For example, a book in English about the Arabic Koran is a left-to-right (LR) document, even though it contains quotations in Arabic. A book in Hebrew about Shakespeare is a right-to-left (RL) document, even though it contains quotations in English. A book in Chinese about the Hebrew Bible is a top-to-bottom (TB) document, even though it contains quotations in Hebrew. The document direction establishes the general flow of lines. It establishes also the side on which various formatting commands are obeyed. For example, if paragraphing means indenting the first line of the paragraph, then in a RL document, that indentation is from the right margin.

Document direction can be changed in the interior of a document. Therefore, there is the notion of the *current document direction at any point*. If a quotation in a language of a different direction is lengthy and is stretching over several paragraphs, it might be convenient to change the document direction for the duration of the quotation, so that the quotation's paragraphs are indented from its correct side.

To be direction independent, this article uses the terms *start* and *end* to designate the sides of a page in which a line starts and ends. Thus, in an LR document the right margin is called 'the end margin,' whereas in an RL document the right margin is called 'the start margin.'

Text in which each language is printed in its own direction is said to be in *visual order*. Although different languages may be written in different directions, all languages are spoken in the same direction, namely forward. Therefore, for ease in input, the convention is that the characters of a mixed-language document are stored in an input file in the order that they are spoken when a knowledgeable reader is reading aloud the visually ordered text of the mixed-language document; this reader knows the rules about reading visually ordered multidirectional text. This stored order of characters is called *time order*. That text is stored in time order means that the characters may be keyed in in the order that they are spoken. It is the job of the formatter to arrange the output so that the text is written in visual order, so that the time ordering is recreated when a person who knows the rules about reading multidirectional text reads the visually ordered output.

Here is an example of a line containing left-to-right English and right-to-left Arabic and Hebrew text displayed in the visual order that is used in the Middle East:

Dana said, "שלום דניאל ، دانيال سلام" to Daniel.

Because this line is in a left-to-right document (this article), it is read in an overall left-to-right direction. Any embedded right-to-left text is read in its left-to-right turn, but from right to left. Thus, this line is read:

1. Dana said, "[*from left to right*]
2. שלום דניאל ، دانيال سلام [*from right to left*] (*salaam danyal, shalom danyel*)
3. " to Daniel. [*from left to right*]

Here is the same line in time order, giving each character in the order it is pronounced when a knowledgeable reader reads aloud the visually ordered line above:

Dana said, "לאינד סולש ، لايناد مالس" to Daniel.

Even if you cannot read the Arabic and Hebrew phrases in between the pairs of English quotation marks, you should be able to see that in the two lines, the directions of their characters are reversed. Note that in the visually ordered line some of the Arabic characters connect to each other, but none of

the Hebrew and Latin characters connect to any other.

Basic Formatting Algorithms

A formatting algorithm is described as occurring over time. Thus, there is always the notion of *current, past*, and *future*. There is the *currently read and processed character or chunk of the input*. There is a *current output line being constructed*; there are the *characters or chunks already inserted into the line*.

There is a *current page being constructed*; there are the *lines already inserted into the page*. The article talks about *output lines being built character-by-character or chunk-by-chunk from left to right* and about *output pages being built line-by-line from top to bottom*. If part of the text flows in a different direction, then the formatter is regarded as having to reorder the characters of this part before inserting them into the lines and the pages, so that when a user reads the constructed lines and pages, the text appears to flow in the proper direction.

The reality is that a page to be printed is described in a page description language such as PostScript (Adobe Systems Incorporated, 1992) or PDF (Adobe Systems Incorporated, 2001). A page to be printed is not necessarily built in this strict left-to-right, top-to-bottom order. However, the results are always equivalent to having been built in this strict order.

A formatting algorithm is classified by the number of *passes* it makes over the input. If an algorithm reads the input only once, it is called a *one-pass* algorithm, etc. An algorithm must have at least two passes if information it needs to format the beginning of of the input cannot be known until it has seen the end of the input. Sometimes, a formatter, e.g., TEX, can simulate an additional pass for a specific purpose by saving in an external file the information that is needed earlier than it is found. This external file is read on the next run of the formatter on the same input.

Describing a formatter requires describing both formatting algorithms and options. Describing each requires understanding the other. To break this vicious cycle, this article describes first vanilla formatting that depends on standard settings of options. Then, an option can be described in detail by describing the effects the option has on vanilla formatting. In the description of vanilla formatting, there are references to some ideas that are described more completely later.

Vanilla formatting deals with ordinary word-by-word unidirectional text that occurs in the interiors of paragraphs. Most any formatter provides ways to achieve special effects, e.g., chapter and section headers; paragraph breaks; centering; indentation; bulleted, enumerated, or labeled lists; footnotes; formulae; tables; etc. Each such feature involves local changes that are quite straightforward to achieve. However, even in these features there are snippets of ordinary text that must be handled by the general formatting algorithms described below.

The simplest formatting algorithm operates on a line-by-line basis. That is, each output line is filled with as many words from the input as is possible given the current typeface size and an adequate minimum spacing between each pair of words. There is a last full word that fits in the output line, and there is its successor word in the input that does not fit in its entirety in the output line. If hyphenation is turned on, this successor word is examined to see if it can be broken into two pieces according to the currently invoked hyphenation rules, such that the first piece together with an appended hyphen fit into the output line being built. If so, the chunk formed by that first piece plus an appended hyphen is added to the output line being built. If there is no suitable way to divide that next word, the output line is ended with the last inserted full word.

Now, if the formatter does not end-justify output lines, the output line is finished, leaving the output with a ragged end margin. If the formatter does end-justify output lines, then the chunks in the output line being built are spread apart with additional space as much as is necessary so that the distance between the start of the first chunk and the end of the last chunk is the line length. Generally, the spreading is done so that the sizes of the spaces between all pairs of chunks are the same.

Line-by-line formatting is used by ditroff, and it appears, because of the variability of spacing from one line to the next, to be that used by MS Word, FrameMaker, and the Mozilla browser. (The manuals or help systems do not discuss this issue, and the author does not have access to any of the source code. In the cases of ditroff and TEX, the author has access to the proprietary and open source code, respectively. Thus, he is able to be certain about the behavior of the algorithms of ditroff and TEX. This observation applies to all claims of appearance of the behavior of an algorithm.)

You may be surprised to learn that HTML (WC3, 1999), the language of the input to Web browsers, such as Mozilla, allows specification of end-justification on a paragraph basis. In the '<p>' markup defining the beginning of a paragraph, if one says '<p ALIGN = "JUSTIFY">', the paragraph at hand is end-justified when displayed by a browser. Mozilla does a reasonable job of justification on a line-by-line basis. However, Netscape forces end-justification for some, but not all, last lines of paragraphs, creating

very large gaps between words in last lines that are less than about 7/8 full.

An enhancement to this simple and any formatting algorithm is to make the space following punctuation a bit longer than that after no punctuation. An enhancement of this enhancement is to make the space following a sentence-ending symbol (e.g., a period) a bit longer than that following a clause-ending symbol (e.g., a semicolon), which in turn, is a bit longer than that following a phrase-ending symbol (e.g., a comma). TEX uses these enhancements and FrameMaker appears to use these enhancements.

The main problem with this simple formatting algorithm is the large variation in the interword spacing from line to line or in the distance from the end chunk to the end margin. When there is end-justification, the interword spacing on each line is computed independently of the interword spacing on all other lines. Thus, there can be large variations between the interword spacing on adjacent lines. Some believe that this variation is ugly. Some find it annoying, and some find it tiring to read, as the mind cannot get used to any one spacing for very long. When there is no end-justification, the space between chunks is uniformly equal to that of the space character. However, there can be large variations in the space after the end word on each line, giving rise to a very ragged end edge of the text.

Turning hyphenation off exacerbates these variations because on average, each line has fewer words and more space to distribute between the words or after the end word. This exacerbation is a problem with formatters with no automatic hyphenation, such as Mozilla and some versions of MS Word. Automatic hyphenation is not even available in some versions of MS Word 2000. (An attempt to turn on automatic hyphenation in the educational version of Word 2000 that this author has fails. Word asks that the user install hyphenation. When the Educational Office 2000 CD is inserted, the user is told that the Professional version must be inserted.) Moreover, based on the appearance of many Word-typeset documents, it appears that many users do not bother to turn automatic hyphenation on.

When the line length is short compared to the typeface size, such as in newspaper columns, the variation in interchunk spacing is even more pronounced. When there is end-justification, the result is what is called *rivers of white space*, with large gaps of space between very few words on a line. Sometimes, only one word can be fit on a line, forcing either a ragged edge in the middle of start- and end-justified text or space between the characters of the one word.

Perhaps the best variation of the basic formatting algorithm is to format a whole collection of output lines, e.g., those of one paragraph, together. This variation is the approach of TEX and thus of LATEX. TEX's algorithm uses dynamic programming to find the choice of line breaks that yields the least variation in spaces between the chunks in the presence of double justification and the least raggedness of the end margin when end-justification is turned off (Knuth and Plass, 1981). Thus, a line may not be as full as it can be. If under the simple line-by-line algorithm, one line has significantly larger spacing between the words than the previous line, it is possible that moving the last word of the first of these lines to the second line will result in interchunk spacing that is more uniform over the two lines. For example, compare the spacing in the two lines:

```
11    22    33    44    55
66666                 77777
```

with that in the two lines of the same length:

```
11       22       33       44
55       66666       77777
```

Even though the '55' fits into the first line, spacing is more uniform in the two lines when the '55' is put into the second line. In this manner, TEX's algorithm tries to find the best assignment of chunks to lines of a paragraph, which results in the most uniform sized spaces in the lines of the paragraph. The result is that TEX's interchunk spacing is the most uniform and pleasing of all formatters.

Formatter Operation

There are two basic flavors of formatters:

1. *WYSIWYG (what you see is what you get), direct manipulation* and
2. *compiled from mark up*.

MS Word and FrameMaker are examples of the former. TEX, LATEX, ditroff, and the Mozilla browser are examples of the latter.

A WYSIWYG, direct-manipulation formatter presents to the user a window containing an approximation of part of one page of the output of the document. The user operates a pointer (e.g., a mouse) to indicate directly where in the page a command is to be obeyed. When a user types characters to be inserted at the pointed-to spot, the characters seem to be inserted one by one directly into a growing line. The result is that when characters are inserted into a new document, the document appears to grow on the screen the same way a typewritten document would grow on paper if the same characters were typed. Of course, the analogy with the typewriter falters when the user

Ditroff input:

```
.SU "FORMATTER OPERATION"
.pp
There are two basic flavors of formatters:
.ll 1
.le
\f2WYSIWYG (what you see is what you get), direct manipulation\fP and
.le
\f2compiled from mark up\fP.
.el
MS Word and FrameMaker are examples of the former. \*(TX, \*(LT,
ditroff, and the Mozilla browser are examples of the latter.
.pp
```

LaTeX input:

```
\section{FORMATTER OPERATION}

There are two basic flavors of formatters:
\begin{enumerate}
\item
{\em WYSIWYG (what you see is what you get), direct manipulation} and
\item
{\em compiled from markup}.
\end{enumerate}
MS Word and FrameMaker are examples of the former. \TeX{}, \LaTeX{},
ditroff, and the Mozilla browser are examples of the latter.

%next paragraph begins here, because a blank input line means "new paragraph"
```

HTML input:

```
<h2>FORMATTER OPERATION</h2>
<p>
There are two basic flavors of formatters:
<ol>
<li>
<i>WYSIWYG (what you see is what you get), direct manipulation</i> and
<li>
<i>compiled from markup</i>.
</ol>
MS Word and FrameMaker are examples of the former. TeX, LaTeX,
ditroff, and the Mozilla browser are examples of the latter.
<p>
```

Figure 3 Inputs with markup.

backspaces to remove characters or when characters are inserted in the midst of an already full page.

At any time, what the user sees on the screen is a close approximation of what would show up on paper if the document were printed at that time. The approximation is supposed to be as good as the screen resolution allows. The user makes changes to the document by what appears to be directly manipulating the document at the places of the changes.

A formatter that compiles from markup translates an input file into page description language commands that print the formatted pages. The input file contains the time-ordered text of the document with commands inserted at the proper places. Each command is applied at the spot it appears to the text that immediately precedes and follows it. These commands are often called *markup*. Figure 3 shows parts of the inputs of this article to the ditroff, LaTeX, and Mozilla formatters. The part shown for each is of the same part of the document, the first paragraph of this section. You see the markup for beginning a section, for beginning a paragraph, for a numbered list, for italicizing text, and, in some cases, for referencing macros to typeset the words 'TeX' and 'LaTeX' in their fancy ways.

Some of the compiled-from-markup formatters have WYSIWYG, direct-manipulation front ends or WYSIWYG previewers that allow at least previewing what will be printed if not direct manipulation.

However, the user must remember that what is manipulated is the marked-up time-ordered input file.

The reality for a WYSIWYG formatter is that the internal representation has the text with markup, this markup being inserted into the internal representation as a result of the user's direct manipulation on the screen image of the document. In other words, if a user indicates that some selected sequence of characters should be italicized, then internally, there is some indication in the internal representation of the selected characters that says they are now italicized; that indication is effectively markup.

The algorithms given in this article are used in each kind of formatter, albeit in a different way. In a compiled-from-markup formatter, these algorithms are used as part of the translation process exactly as described. In a WYSIWYG, direct-manipulation formatter, these algorithms appear to be applied by the formatter on an incremental basis in order to update the appearance of what the user sees on the screen to what it should be after each change to the document. Optimizations are used to try to compute rapidly the change to what is visible to the user without having to format the whole document after each tiny change. The changes appear to be propagated to the rest of the document during idle periods, when the user's input has slowed down a bit.

Constraints and Options

A *constraint* is a physical attribute of formatting that has continuous scale of values. An *option* is feature which may or may not be turned on at any given point of any given formatting. Sometimes a collection of options may be mutually exclusive; only one of them can be turned on at any given time.

Constraints

The main constraints of formatting are the size of the typeface, the spacing of the lines, and the dimensions of the printing area.

The size of a typeface is measured in points, each of which is approximately 1/72 inch or .352778 millimeter. The concept comes from the days in which typesetting was done by assembling *metal pieces of type*, one for each character to be printed, into rows, one for each line to be printed. On the face of each such piece was embossed one reversed character. When ink was spread on the faces of the assembled metal pieces and paper was pressed to the faces, the characters appeared on the paper oriented correctly. The size of a typeface was the common height of these pieces of metal type on which characters were embossed. This height would be a bit bigger than the distance from the bottom of the lowest descender, e.g., the bottom of the 'q', to the top of the highest ascender, e.g., the top of any uppercase letter. This distance is called called *the point size of the typeface*. The most common point size used in books and newspapers is 10. Generally, one does not find smaller than 6 point type, because humans have problems reading text even as small as that. Display type and headlines may be up in the 36 or 72 point range or even higher.

Also the spacing of the lines of the text is measured in points. It is measured by the distance between the baselines of two consecutive lines of the text. Normally, the line spacing is 120% of the current point size; this spacing yields a comfortable single spacing. Thus, for 10 point type, the usual spacing is 12 points. Smaller than that, e.g., at 110% of the point size, looks rather tight. If the spacing is equal to the point size, then a descender on one line may come very close to touching an ascender on the next line. Spacing that is 180% of the point size is called 1.5 spacing and spacing that is 240% of the point size is called double spacing.

The spacing between lines used to be implemented by strips of lead 1 or 2 points wide placed between the assembled rows of pieces of metal. Hence, the difference between the line spacing and the typeface point size is called *leading*. Thus, 10 point type with 12 point spacing has leading of 2 points.

The dimensions of the printing area is usually measured in picas, each of which is 12 points, about 1/6 inch or 4.2333 millimeters. When one is printing single-spaced 10 point text on letter-sized paper, a typical line length is 39 picas or 6.5 inches. At 12 point spacing, a typical number of lines is 51, covering 51 picas or 8.5 inches. On A4 paper, a typical line length might be 38 picas or about 16 centimeters, and a typical number of lines might be 52, covering 52 picas or about 22 centimeters.

Clearly, the larger the printing area, the smaller the line spacing and the point size, the more text can be printed per page. Moreover, the longer the line width and the smaller the point size, the more uniform is the spacing between the chunks on a line, because more chunks can be put into a line. With very short line lengths or large point sizes, one may be put in a situation in which only one or two chunks can be put on a line, and the spacing between chunks in lines varies radically.

The longer the line width and the smaller the text size, the less necessary is hyphenation to reduce the variability of the spaces between chunks on a line.

Options

The main options concern directionality; hyphenation; justification; pagination; and figure, table, and footnote placement.

Directionality The typical document is unidirectional. That is, all of its text is written in one direction. For example, if a document is an English document, then all of its text is written from left to right. That is, the start of an output line is on the left side of a column of lines and the end of a line is on the right side of the same column of lines. In the vanilla formatting algorithm, filling an output line starts at the left margin, and it ends when adding another word would leave its right end sticking out past the right margin. End-justification causes the last chunk on the right end of an output line to end at precisely the right margin of the line.

Conversely, if a document is an Arabic or Hebrew document, then nearly all of its text is written from right to left. (In Arabic and Hebrew, numerals are written from left to right, i.e., a phone number is written with the first dialed digit on the left side. Users of Arabic and Hebrew typewriters have learned to enter numerals backward.) That is, the start of an output line is on the right side of a column of lines and the end of a line is on the left side of the same column of lines. If the vanilla formatting algorithm is applied in the right-to-left direction, filling an output line begins at the right margin, and it ends when adding another word would leave its left end sticking out past the left margin. End-justification causes the last chunk on the left end of an output line to end at precisely the left margin of the line.

There is also the possibility of top-to-bottom writing of text, e.g., for Chinese. In traditional Chinese printing, a line is written from the top of the page to the bottom, with lines laid out from right to left. The details of the vanilla formatting algorithm can easily be adjusted to deal with such top-to-bottom text. Indeed, as is shown in Figure 4 with two layouts of a famous two-line poem by Li Bai, a top-to-bottom layout is identical to a left-to-right layout with the characters rotated 90 degrees counterclockwise.

Alternatively, a document may be multidirectional. The most common multidirectional document is bidirectional, e.g., for a mixture, say, of English with Arabic and Hebrew. Indeed, because of the presence of left-to-right numerals, a plain Arabic or Hebrew document can be considered bidirectional. When formatting a bidirectional document, the assumption is that the entire input is stored in *time order.*

The basic bidirectional formatting algorithm assumes this time-ordered input and needs to know at any time the current document direction and the current text direction. The current document direction is as described in the subsection titled 'Text Characteristics.'

At any time, the current text direction is the direction of the language of the currently considered character. A Latin character is generally left-to-right (a user can declare otherwise for special effects, e.g., to mimic Da Vinci's writing) and an Arabic or Hebrew character is generally right-to-left. A seemingly neutral character, e.g., a period, must be regarded as having the direction of its language; thus, there is a left-to-right period and a right-to-left period.

牀前明月光，疑是地上霜。
舉頭望明月，低頭思故鄉。

牀前明月光，疑是地上霜。
舉頭望明月，低頭思故鄉。

Figure 4 Left-to-right and top-to-bottom layouts of same text.

The basic bidirectional algorithm (Buchman *et al.*, 1985; Knuth and MacKay, 1987; Srouji and Berry, 1992; Berry, 1999; Habusha and Berry, 1990) has a standard unidirectional formatting algorithm first break the time-ordered input into lines, taking into account point size, line length, hyphenation, and justification, as if all the text in the document were left to right. Then on a line-by-line basis, the text of each output line is reordered:

```
for each output line in the document do
  if the current document direction is LR then
    reverse each contiguous sequence of RL
      characters in the line
  else (the current document direction is RL)
    reverse the whole line;
    reverse each contiguous sequence of LR
      characters in the line
  end if
end do
```

You should verify that applying this algorithm to the time-ordered Arabic, English, and Hebrew line:

Dana said, "سلام دانيال ، שלום דניאל" to Daniel.

yields the visually ordered line:

Dana said, "שלום דניאל ، سلام دانيال" to Daniel.

Less common among the multidirectional documents is the tridirectional document. There is an

English

עברית

カタカナ

ひらがな

漢字

Figure 5 Visually ordered tridirectional output.

```
<LR>
English
</LR><RL><Hebrew>
תירבע
</Hebrew>
</RL><LR><Katakana>
カタカナ
</Katakana>
</LR><TB><Hiragana>
ひらがな
</Hiragana>
<p>
<Chinese>
漢字
</Chinese>
</TB>
```

Figure 6 Time-ordered input for tridirectional output.

algorithm assuming all input in time order that lets a unidirectional formatter format the time-ordered input file, and then, it reorganizes the characters of the output so that left-to-right text is written from left to right, right-to-left text is written from right to left, and top-to-bottom text is written from top to bottom (Becker and Berry, 1990). It deals with the two horizontal directions as does the bidirectional formatting algorithm. There is an algorithm for doing the reorganization of the top- to-bottom text after bidirectional formatting is done. This algorithm takes advantage of the fact that all characters in Chinese, Japanese, and Korean have bounding boxes that are squares of the same size; thus, any character fits in the bounding box of another. Figure 5 shows a visually ordered tridirectional English, Hebrew, Japanese, and Chinese document; the English text is printed from left to right from the left margin on one line; the Hebrew text is printed from right to left from the right margin on the next line; the Katakana Japanese text is printed from left to right from the left margin on the next line; and finally the Hiragana Japanese text and the Chinese text is printed from top to bottom at the right margin. Figure 6 shows a stylized time-ordered input for the output of Figure 5; each printed character is shown in its output form, and among this input, there is HTML-like markup defining the language of the text and the applicable document directions. Space constraints do not permit giving the details of the algorithm here.

Justification The most common choice for justification is whether or not there is end-justification. Some formatters offer also the option of end-justification without start-justification. For example, in a left-to-right document, this justification regime is right-justification and ragged-left. Each line is filled with as many chunks as possible and then all the text is shifted to the right so that the last chunk is flush with the right margin. In terms of the variability of the spacing between words and of the space from the start margin to the start chunk of a line, this justification regime, called *start-ragged*, is equivalent to end-ragged.

Hyphenation There are two basic choices concerning hyphenation, turning it on or off. If hyphenation is on, the formatter usually uses a hyphenation algorithm that implements basic English hyphenation rules combined with a dictionary, perhaps the same one that is used for spelling checking. Some formatters offer the possibility of overriding the automatic hyphenation decisions with explicit indications of possible hyphenation points in a word, including that there are none. This indication may be directly in the words in the input file or in a separate file providing the user's hyphenation dictionary. When a formatter offers the feature of overriding automatic hyphenation rules, the feature can be used to cause hyphenation according to the rules of a language other than English. Either a prepass goes through the document inserting explicit hyphenation points in every word according to the other language's hyphenation rules, or the prepass builds a user's dictionary for the words in the document, again according to the other language's hyphenation rules. TEX has a table-driven hyphenation algorithm that is provided with a default table for English. Tables describing the rules for another language can be installed in any formatting run.

Most formatters offer the choice of turning hyphenation on or off. As mentioned, some versions of MS Word 2000 have it, but some do not. In practice, MS Word documents are rarely hyphenated. TEX, ditroff, and FrameMaker have hyphenation, and it is easy to turn on in each. The Mozilla browser has no automatic hyphenation.

Pagination The pagination problem is that of determining when the current page is filled with lines. In the absence of stylistic considerations, the problem is almost identical to that of determining when a line is

filled with words. Basically, if the next line would end up below the bottom margin on a page, the current page is ended; an optional page footer, including an optional page number is issued; a new page is begun; an optional page header, including an optional page number is issued, and then the postponed line is inserted as the first line on the new page. Some complexity comes when for stylistic reasons, we do not want to create *orphan* or *widow* lines. A orphan line is a section header or first line of a paragraph as the last line on a page. An widow line is a last line of a paragraph as the first line of a page. Neither a orphan nor an widow looks good sitting there all by itself.

It is fairly easy to avoid orphan lines. The formatter can examine any section header or any first line of a paragraph and determine if it would be the last line on a page, that is, there is not enough room to print at least two more lines after the section header or at least one more line after the first line of a paragraph. (At least two more lines are needed after a section header to prevent the first line of the section's first paragraph from being an orphan in its own right.) If there is not enough additional space on the page, the section header or first line of a paragraph goes on the next page.

Avoiding widows is more complex, as it requires having determined one line before the last line of a paragraph, that the next line, i.e., the last line of the paragraph, will end up on the next page. If this determination can be made, then a solution is to terminate the page one line sooner and to put both the next to the last line and the last line of the paragraph on the next page. This determination requires either looking ahead or that page breaking be done in a two-pass algorithm. For many formatters, which operate strictly with one formatting pass, the only solution is for the user to notice the widow in one formatting of the document and to then to issue in the next formatting of the document an explicit page break instruction at the right point. The user thus implements a two-pass algorithm manually; that is, after the user's observing the widow and fixing the input, the next run of the formatter is effectively the second pass. When a formatter has a look-ahead or a two-pass algorithm, there is a complexity that shows up only when footnotes, figures, and tables have to be placed automatically, as is discussed in the next subsection.

This article is printed in double-column pages. To a formatting algorithm, each column is a page, albeit a narrow one. The formatter does have to be a bit careful not to give each column its own page number and other header and footer items. Also, it is considered good style to make sure that the lengths of all columns sharing a physical page are the same length.

Placement of Figures, Tables, and Footnotes The general problem is that each figure, table, or footnote may be printed in a place different from that in which it is referenced. A figure or table should appear in its entirety no earlier than the beginning of the page in which it is first referenced. The preference is that a footnote should appear, in its entirety, at the bottom of the page on which it is referenced. However, that may not be possible; there may not be enough room between the footnote reference and the bottom of the page for the entire footnote. In this case, the footnote has to be split over a page boundary. A figure must not be split at a page boundary. A footnote may be split at a page boundary. Tables are a special case; each may be split or not split, depending on the user's taste. Many prefer not to split a table that has vertical lines, and many consider a table with no vertical lines to be splittable. Thus, a figure or nonsplittable table must be printed in its entirety within the margins on one page. Each figure, table, or footnote is what is called a *floater*; that is, it is floated to where it can be printed according to the constraints described below. A figure or nonsplittable table is indivisible and must be printed in its entirety on one page. A footnote or a splittable table may be split at page boundaries.

This article has figures but no tables. The definitions of each of these figures were supplied just after their first references. However, you see them elsewhere. Therefore, these items were floated.

It is assumed that the full figure, table, or footnote is input just after the first reference to it. This way, the formatter is able to read the figure, table, or footnote immediately after encountering the first reference to it. The formatter thus knows how big the footnote, table, or footnote is; and it knows whether the table is splittable. It is assumed also that any captions are part of the figure or table.

There are two basic algorithms for placement of figures, tables, and footnotes:

1. *one-pass greedy* and
2. *multipass, optimizing in some sense*.

In a one-pass, greedy algorithm, after seeing a footnote reference and its footnote, the formatter first reads enough of the text after the footnote to fill out the output line containing the reference. Then, the formatter notes whether there is sufficient room on the current page for the entire footnote. If not, the formatter splits the footnote into two pieces, the part that fits on the current page and the rest. Then it prints the first piece, ends the current page, and arranges for the rest to be printed on the next page as the first footnote. Note that there may be recursion

here as the rest may have to be split over the next page and the pages after that.

In a one-pass greedy algorithm, after seeing a figure reference and its figure, the formatter first reads enough of the text after the figure to fill out the output line containing the reference. Then, the formatter notes whether there is sufficient room on the current page for the entire figure. If so, the formatter prints the figure on the current page and continues normal formatting after the bottom of the figure. If not, the formatter arranges to print the figure on the top of the next page and to move, or to *bubble up*, the text that follows the figure to fill in the space at the bottom of the page that was not big enough for the figure. If the figure is simply too large for any page, then the user must arrange to shrink the picture to fit.

A nonsplittable table is treated as a figure.

The steps of a one-pass greedy algorithm are illustrated by some of the parts of Figure 7 that is used to describe several different formatter's algorithms. Each part, (a) through (e), shows a page on top and the next page in the bottom. An upside-down 'T' represents a reference to the figure or table that follows it. Each of parts (a) and (b) represents a situation in which a figure or nonsplittable table fits on the current page. Parts (c), (d), and (e) represent three steps in the treatment of a one-pass greedy algorithm on a figure that is too big to fit on the current page. Part (c) shows the algorithm discovering that the figure or table does not fit on the current page. Part (d) shows the algorithm floating the figure to the top of the next page. Finally, Part (e) shows the algorithm bubbling the text that logically follows the figure or table to the space on the first page vacated by the figure or table that was floated.

In a one-pass greedy algorithm, after seeing a reference to a splittable table and the table itself, the formatter first reads enough of the text after the table to fill out the output line containing the reference. Then, the formatter notes whether there is sufficient room on the current page for the entire table. If so, the formatter prints the table on the current page and continues normal formatting after the bottom of the table. If not, the formatter prints what it can of the table on the current page, ends the current page, and prints the rest of the table on the top of the next page.

Note that the formatter may have to deal with several floaters at once. Doing so is no real problem, as floaters or their pieces can be merged. There is a slight complexity introduced by having to deal with orphan lines in the presence of floats. It may be necessary to avoid a orphan before a figure, table, or footnote appearing at the bottom of a page.

In a multipass, optimized-in-some-sense algorithm, the algorithm uses the first pass to note all the floaters as well as potential orphans and widows and uses some dynamic programming technique to try to place a floater no earlier than the top of the of the output page in which it is referenced and to balance page lengths while avoiding orphans and widows. Sometimes there can be no optimal solution meeting all the constraints, and a figure or table may float to a page before it is referenced or blank lines not in the input are inserted into the output.

Ditroff uses a one-pass greedy algorithm. TEX and LATEX use a multipass algorithm. Because Mozilla has an unbounded page length, it does not have to float any figure or table. A figure or table is placed where it occurs. Footnotes have to be manually placed either where they are referenced as parenthetical remarks, or as end notes, deferred to the end of the page at hand. Word and FrameMaker appear to use a one-pass algorithm, but there is more discussed below, arising from their WYSIWYG, direct-manipulation nature.

The disadvantage of a greedy algorithm is that it sometimes ends up having to put a floater long after its reference because of an overbooking of floaters all referenced very near to each other. Also, sometimes manual intervention is required to deal with widows and to achieve better placement of floaters by putting some floaters before they are referenced. With a multipass algorithm, these manual interventions should not be necessary.

However, the disadvantage of the multipass algorithm is that a figure or table may end up on a page before it is referenced. Also the floater placement and page breaks are very unstable. It occasionally happens that inserting new text **after** a figure causes that figure to move up, changing floater placement completely. If one has been working hard to get floaters placed in a pleasing manner, and has done so in all previous pages, one can find a change on the current page causing a reorganization of previous pages.

A one-pass greedy algorithm is very stable in the sense that no change can affect the output of the text lying before the change. Thus, while manual intervention is required to achieve optimal placement and widow avoidance, one is assured that once he has achieved the desired formatting of pages up to the current one, no change to what follows can affect this formatting. The user can proceed safely through the document page-by-page, getting each page right before going on to the next page with assurances of the immutability of what has already been gotten right.

Particularly messy is the placement in multiple-column text of figures and tables that are wider than

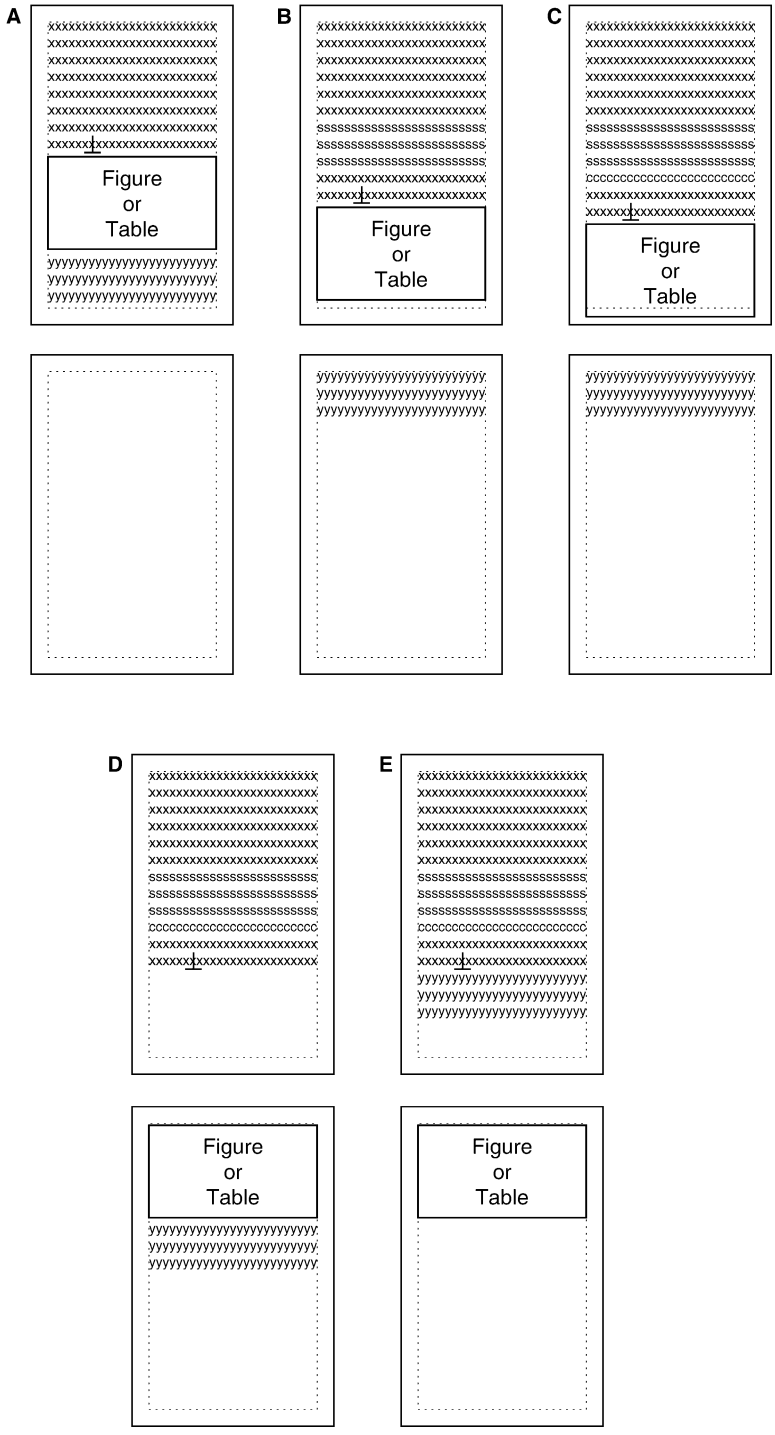

Figure 7 Treatment of figures and tables.

the column width. The placement of a figure or table in one column can have a true side-effect on a neighboring column whose text must flow around the too-large figure or table that extends into its territory.

Clearly, these algorithms and their variants can be used by WYSIWYG, direct-manipulation formatters.

FrameMaker seems to provide the full functionality afforded by a one-pass greedy algorithm. A figure or table that must not or should not be split is put into a *frame*. One may *anchor* a frame to a particular point in the text, usually chosen by the user to be the point in the text that references the

contents of the frame. The three options for frame placement is that it appears:

1. at the top of the page containing the anchor,
2. just below the full line containing the anchor, or
3. at the bottom of the page containing the anchor.

A frame positioned according to choices 1 or 3, at the top or bottom of the page containing the anchor, moves only when the anchor moves to another page, taking the frame with it to the top or bottom of the new page. A frame positioned according to choice 2, just below the full line containing the anchor, is put there below the anchor if there is sufficient room on the current page for the frame. If there is not sufficient room on the current page for the frame, the frame is moved to the first subsequent page that has room at the top for the frame. The room at the top of a page may be reduced by another frame that is already there by virtue of its being positioned at the top of its page. If in addition, the frame has been designated as *floating*, the text that logically follows the frame is bubbled up to fill the space on the current page that was vacated by moving the frame to the next page.

The parts of Figure 7 show 5 steps in the life of a frame containing a figure or table as text is added above its anchor. In each part, the anchor for the frame is the upside-down 'T'. Note that in Step (a), in which the frame fits well within the first page, the text before the frame is all 'x' and the text below the frame is all 'y'. In Step (b), three lines containing all 's' have been added before the frame, pushing the three all-'y' lines to the next page, and the frame still fits within the dotted-line printing margin. In Step (c), one more line, containing all 'c', has been added before the frame, pushing the bottom of the frame to outside the printing margin. Step (d) shows FrameMaker having moved the frame to the top of the next page, and Step (d) shows FrameMaker having bubbled the all-'y' lines to after the anchor in the space on the first page vacated by the moved frame.

In FrameMaker, independently of the above, one can specify that text wrap around a frame that is not as wide as the page in which it sits, in order to make use of the space on either side of the frame.

Microsoft Word seems not to be as flexible as FrameMaker. Also in Word, a figure or table that must not or should not be split is put into a frame. A frame can be anchored to a point on a specific page or to a point in a specific paragraph. A frame anchored to a point on a specific page does not move as the text before it grows or shrinks. Rather the text flows around the frame. That is, lines are moved from before or after the frame to after or before the frame as the text before the frame grows or shrinks.

A frame anchored to a point in a paragraph will be put after that point if there is enough room for the frame on the current page. Unfortunately, the text after the frame is not automatically bubbled up to fill the space vacated by the moved frame. Moreover, there seems to be no way to force this bubbling to occur automatically. One way to achieve this bubbling is for the user to manually move the text after the frame to the space vacated by the moved frame. Another way to achieve the *effect* of bubbling is to anchor the frame to the page to which it will be moved. When the frame is so anchored, the text automatically flows around the frame. The drawback of this simulation of the desired behavior is that if the text that would have been the anchor is moved to another page, the figure is not moved. It's anchored to an absolute position. Under this circumstance, the user must move the figure manually to be anchored in the page that contains the text that would have been the anchor.

Recall the steps that FrameMaker follows through the parts of Figure 7. Basically, for a frame anchored to a point in a paragraph, Word does only Steps (a) through (d), leaving the space vacated by the moved frame to be dealt with manually.

In both FrameMaker and Word, independently of the anchoring of frames and whether or not bubbling is automatic, the user can specify that the text wrap around a frame to fill in the empty space to the side of the frame. When in addition, automatic bubbling occurs, it occurs through the wrapping text.

Further Information

More information about formatting algorithms can be found in Knuth's books about TEX (1986, 1988).

See also: Digital Fonts and Typography; Printing and Typewriting; Typography.

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Text Mining

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Text mining is the discovery of knowledge 'buried' in large collections of textual documents aided by computational methods; it is related to information retrieval (IR) (*see* **Document Retrieval, Automatic**) and information extraction (IE) (*see* **Information Extraction, Automatic**).

A classic example of text mining is the discovery by Swanson (1991) that magnesium deficiency is associated with migraine headaches using the (semi-)automated analysis of the titles of papers in the biomedical literature. The titles of the papers contained separate associations between pairs of concepts including stress, magnesium loss, calcium channel blockers, spreading cortical depression, platelet aggregability, and migraine patients, but in none was a direct link made between magnesium deficiency and migraine. After the discovery made through text analysis, the link was subsequently demonstrated clinically. Swanson described the mining scenario as "complementary research" and showed that the mining of associations between different literatures could yield more fruit in the biomedical sciences by publishing a succession of further similar discoveries.

The term 'text mining' was coined on the basis of a metaphor, and there is much scope for disagreement about what is and is not text mining. Several survey articles have sought to define the field, and to provide indexes to activities and resources in the area. One of these is Hearst (1999a), which compared and contrasted 'text mining' with the related terms 'data mining,' 'database query,' 'information retrieval,' 'computational corpus linguistics,' and 'information extraction.' Hearst pointed out that text mining often includes IE as a filtering step and also that many techniques used so far in text mining are similar to those of computational corpus linguistics. Text mining is done to discover knowledge that is useful for an application, in contrast to the automated acquisition of linguistic knowledge from texts to provide resources for natural language processing (NLP) applications. Common applications are business intelligence (Sullivan, 2001) and knowledge extraction from the literature of the biomedical sciences (Shatkay and Feldman, 2003).

Both Hearst (1999a) and Sullivan (2001) give more details about Swanson's complementary literature research.

Data Mining

The term 'text mining' has recently replaced the earlier 'text data mining,' which gives a clue to the origin of the term. Data mining, or knowledge discovery in databases (KDD), is the search for associations between types of occurrence recorded in databases and is usually associated with commercial applications, such as marketing. An example is the discovery from supermarket till data that those who buy diapers are disproportionately also likely to buy beer for home consumption. It turns out that these purchases are made by fathers, who now have fewer opportunities to socialize outside the home than they had when they were childless. Once this sort of association has been discovered, it can be used for various

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marketing purposes, for example, store design and direct-mail purchase recommendations.

In the fields of databases and management information systems, it is customary to refer to a pyramid in which data sit at the bottom, information lies above, and knowledge sits at the top. Data are the elementary facts recorded in the database, for example, that, in a given transaction, the customer purchased a six-pack of a particular brand of beer. Information is the higher-order facts based on aggregates of the simple data items; for example, knowing that the total sales of beer were up 12% on the previous week might inform a management decision about future purchases or sales promotions, whereas the raw data are only relevant operationally. Data and information can be extracted using a query language, such as SQL, to ask for either individual facts or functions such as the computing of means and sums over the individual facts. Knowledge, on the other hand, can be thought of as information that informs strategic rather than tactical decisions or as new information whose existence was previously unknown. Data mining, the activity of deriving knowledge from data and information, has been described as turning "what you didn't know you didn't know" into "what you know you know."

Association Mining

The association of two data values in a database is stronger the more frequently they occur together, but, if the two values occur separately as often as they do together, the association is less reliable. These aspects of the strength of association are captured in the two measures: *support* and *confidence*. If we label the values A and B, and write a putative association rule $A \Rightarrow B$, these measures can be defined, as in Figure 1, with respect to the transactions t in a data collection D. The support for the rule *diapers* $\Rightarrow$ *beer* is thus the proportion of transactions with {*diapers, beer*} as a subset in the data collection, and its confidence is the ratio of its support to that of just {*diapers*}.

Sequence Mining

A major application of data mining concerns the discovery of temporal patterns, called 'sequence mining.' Trends in values that change over time (time series) may be analyzed into components such as a long-term trend, cyclic and seasonal variations, and random movements. If these separate components can be estimated from a sample, the next movement in the series can be predicted.

Sequential pattern mining is the combination of time series analysis and association mining, in which we seek to discover relationships between different time series. An example is a fall of a given magnitude in one business sector's share prices followed, after a given interval, by a corresponding increase in a different sector.

$$support\,(A \Rightarrow B) = \frac{|\{t \in D : \{A, B\} \subseteq t\}|}{|D|}$$

$$confidence\,(A \Rightarrow B) = \frac{|\{t \in D : \{A, B\} \subseteq t\}|}{|\{t \in D : \{A\} \subseteq t\}|}$$

Figure 1 Definitions of the measures *support* and *confidence*.

Text Mining

Text mining is commonly understood, like data mining, to be an activity that reveals previously unknown knowledge from a large body of text. The individual operations that constitute text mining are as varied as those of data mining. One approach is to preprocess the text, using methods from IR and IE, to turn the textual data into a normalized database form and then to apply standard data-mining algorithms to the database. However, there are also extractive and exploratory techniques that can be applied directly to the text.

Document Warehousing

One difference between text mining and the similar-sounding concept IE is that text mining is conducted on a text collection, whereas IE can be conducted on one document at a time to provide a current-awareness information service. Text mining presupposes a large collection of texts organized uniformly and a system for procuring and managing the collection. In business, this is called a 'document warehouse' (Sullivan, 2001). Among the basic functions that precede mining for interesting knowledge are document collection (e.g., by Web crawling), document conversion from diverse formats to a common annotation scheme, low-level text processing (e.g., tokenization and sentence splitting; Palmer, 2000), part-of-speech tagging, and morphological analysis or stemming. Indexes are created, as in a standard full-text information retrieval system. Sullivan also considered document summarization to be a basic function in a document warehouse.

Mining Operations

Feature Extraction

Commercial tools describe IE and term discovery (Fagan, 1987; Franzi and Anaiadou, 1999) as feature extraction. Both types of technique have been used to

collect textual instances (and variants) of protein and gene names, as well as business names. Term variance is a significant problem in the scientific literature, and dynamic programming (as used in example-based machine translation and in gene sequencing; see Sankoff and Kruskal, 1999) has been deployed to find equivalences between complex terms and acronyms. Consider the conference whose acronym is *NeMLaP*. It can be aligned with the full text name as shown in Figure 2. Two sequences are compared by counting the cost of changing one to the other. Individual insertions, deletions, and substitutions each have a cost, and the costs of different kinds of change can have their own coefficients. In matching acronyms with phrases, the cost of substituting a word with its initial letter, capitalized, is set low, whereas the substitutions of later letters can be penalized. Variants on this scheme can also detect the similarity of reorderings of the words in a compound name.

Classification and Clustering

Given a large document collection, an obvious question to ask is what topics it covers. To find a useful answer, a technique will look for patterns of similarity and difference of content throughout the collection. Two fundamental techniques applicable here and provided by most text-mining software packages are text classification (*see* **Classification of Text, Automatic**) and document clustering. Text classification involves mapping each text to one or more predetermined categories. Frequently, however, the text miner does not wish to make assumptions about how documents should be classified but prefers to discover patterns by unsupervised learning. Document clustering (Everitt, 1980) groups together the documents found to be most alike, comparing vectors of the documents' term frequencies with one another. Variants of clustering produce disjoint or hierarchical clusters or use a neural network to form a self-organizing map (SOM; see Merkl, 2000). Clusters can be visualized (Hearst, 1999b) or can be used behind the scenes in query processing, as described by Baeza-Yates and Ribeiro-Neto (1999).

Using and Extending Ontologies

Feature extraction typically involves matching text strings with the names of known entities as well as pattern matching. If the background knowledge is a simple gazetteer, which maps these strings to a category, then extraction results merely in a classified set of extracted strings. However, if the background knowledge is an ontology linked to a synonym dictionary, the features extracted can be instances in a knowledge base. Many document warehouses annotate documents with ontology-linked metadata (as with the Semantic Web), either by automatic feature extraction or manually. Ontologies are also useful for classified browsing of a document collection, but are expensive to develop and maintain if constructed by intellectual effort. There is considerable interest in the automatic discovery of concepts and conceptual relations, and state-of-the-art approaches use clustering (of words and phrases rather than documents) as well as syntactic pattern extraction (Grefenstette, 1994).

New Methods in Language Processing
Ne__M_____La_____P_____

Figure 2 Aligning the acronym *NeMLaP* with its full text name.

Combining Text and Data Mining

Because the focus of both text and data mining is extracting applicable knowledge from data collections, it is increasingly common to link both textual and nontextual data to generate insights from the relation between the two. Lavrenko *et al.* (2000) reported a text-mining experiment in which stock price movements were analyzed into discrete trends and news stories featuring those stocks were analyzed to generate a Bayesian language model. The model was shown to generate investment recommendations that would produce modest gains, out-performing a random investment strategy. Shatkay and Feldman (2003) reported several studies in which documents from the scientific literature were aligned with gene-sequence data in order to discover gene functions. de Bruin and Martin (2002) defined 'literature mining' or 'automated reading' as a process involving four general subtasks: text categorization, named entity tagging, fact extraction, and collectionwide analysis. The first three are NLP techniques, and the last uses data mining. Clifton *et al.* (2004) showed how the market-basket analysis technique of association mining described here can be used, in combination with prior information extraction, to produce structured topic signatures made of class-labeled named entities that can then be used to identify collectionwide trends in topic salience.

See also: Classification of Text, Automatic; Document Retrieval, Automatic; Information Extraction, Automatic; Natural Language Processing: Overview; Question Answering from Text, Automatic; Summarization of Text, Automatic.

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Text Retrieval Conference and Message Understanding Conference

D Harman, NIST, Gaithersburg, MD, USA

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Text Retrieval Conference

Introduction

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In 1990 the National Institute of Standards and Technology (NIST) was asked to build a very large test collection to enable evaluation of the document (text) retrieval technology being developed as part of the DARPA TIPSTER program (Merchant, 1996). This collection was to be on the order of one million full-text documents: about 100 times larger than the existing nonproprietary test collections for document retrieval. Once the collection was built, NIST proposed that it be made available to the full research community by the formation of the Text Retrieval Conference (TREC) (Voorhees and Harman, 2005). This conference was envisioned to be more than just a workshop; by providing a large test collection, uniform scoring procedures, and a forum for organizations interested in comparing results, it was hoped that comparison across a much wider variety of techniques than any one research group could tackle would be possible.

Since 1992 there have been multiple TREC conferences, co-sponsored by NIST, ARDA, and DARPA, with the number of participating systems growing from 25 in TREC-1 to over 100 in 2004, including participants from more than 15 different countries. The diversity of the participating groups has ensured that TREC represents many different approaches to text retrieval, and the emphasis on individual experiments evaluated in a common setting has proven to be a major strength. Each of the conferences has produced a proceedings containing papers from participating groups giving the details of their experiments.

The initial task in the early TRECs, called the *ad hoc* task, tested the ability of systems to retrieve

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Number: 168
Topic: Financing AMTRAK

Description:
A document will address the role of the Federal Government in financing the operation of the National Railroad Transportation Corporation (AMTRAK).

Narrative:
A relevant document must provide information on the government's responsibility to make AMTRAK an economically viable entity. It could also discuss the privatization of AMTRAK as an alternative to continuing government subsidies. Documents comparing government subsidies given to air and bus transportation with those provided to AMTRAK would also be relevant.

Figure 1 Sample topic statement from TREC-3.

accurate and complete ranked lists of documents in response to fifty information-need statements (see Figure 1 for an example). The task is similar to how a researcher might use a library or a person might search the web. NIST provided the participants with approximately 2 GB of documents and a set of 50 natural language information-need statements (called 'topics' in TREC), and participants returned a ranked list of the top 1000 documents retrieved for each topic, using either automatic or manual methods for producing this list. TREC has followed traditional evaluation methodology for information retrieval; that is, the building of test collections, and evaluation of system results against human judgments. The two major measures used have been precision (percent of system results that are correct) and recall (percent of total correct answers that a system retrieves).

TREC Test Collections

The creation of a set of large, unbiased test collections has been critical to the success of TREC. Like most traditional information retrieval collections, there are three distinct parts to these collections – the documents, the information-needs (topics), and 'right answers' (relevance judgments). The documents are mostly from the news domain, including newspapers and newswire (such as the *Wall Street Journal* and Associated Press). Figure 1 shows one of the TREC topics, illustrating the three main parts to this topic. Each topic has a short title, followed by a (usually) one-sentence description, and finally followed by a much more detailed description of the particular information the user is seeking.

For each topic it is necessary to compile a list of relevant documents – as comprehensive a list as possible. TREC uses a sampling method known as pooling that takes the top N (usually 100) documents retrieved by each system for a given topic and merges them into a pool for relevance judgment. The merged list of results is then shown to the human judges; for example, in TREC-6 there was an average of 1445 documents judged per topic, with about 6% or 92 of these found relevant (Voorhees and Harman, 2000). All of these collections have been made available to the public and are heavily used throughout both the commercial and academic communities.

Additional TREC Tasks

Starting in TREC-4, secondary tasks have been added to TREC. These tasks have either been related to the *ad hoc* task, or have involved completely new areas of research that are related to text retrieval. Below is a brief summary of some of the larger (and longer-running) tasks.

1. Routing/Filtering (1992–2002): given some training material, i.e., relevant documents, find additional relevant documents from new incoming text.
2. Interactive (1994–2003): a task used to study user interaction with text retrieval systems.
3. Spanish (1994–1996) and Chinese (1995–1997): an *ad hoc* task with topics and documents in Spanish or Chinese.
4. Cross-language (1997–2002): an *ad hoc* task to retrieve documents from many languages (such as English, French, German and Italian), using topics in only one language. Additionally this track has been run bilingually from English to Chinese (2000) or Arabic (2001–2002).
5. Spoken Document (1997–2000) and Video (2001–2004) retrieval: an *ad hoc* task using broadcast news or video segments, respectively, as the target documents.
6. Very Large Corpus (1997–2000) and Web (1999–2004): an *ad hoc* task investigating the ability of retrieval systems to handle larger amounts of data (over 100 GB). Special web retrieval tasks have also been run using web samples such as the .gov domain.
7. Question-Answering (1999–2004): an *ad hoc* task in which the systems provide the answers to the topics/questions as opposed to just a ranked list of documents.

The introduction of the various tasks has led to research in new areas of text retrieval. The cross-language retrieval tasks were the first (large-scale) formal testing of retrieval systems in languages other than English and have led to expanded formal evaluations in both Europe (called CLEF) and Asia (called NTCIR). The Spoken Document, Video, and Question-Answering tasks have joined the speech recognition, video, and the natural language

processing communities to the text retrieval community, allowing rich interaction.

For further information on TREC, see the cited references and the TREC web site, which contains online proceedings from each TREC, information on how to get the test collections, and news on ongoing TREC activities.

Message Understanding Conference

Introduction

Information extraction (*see* **Information Extraction, Automatic**) differs in many distinct ways from information retrieval. The goal of the task itself is different in that specific information, such as names, dates, relationships, etc., are to be extracted from documents, as opposed to information retrieval where the goal is to retrieve documents with respect to some user input. The research communities in these two areas come from different backgrounds and training, with the information extraction community drawn largely from groups working in natural language processing. And finally, whereas information retrieval has had standard evaluation procedures since the early 1960s, widespread evaluation in the information extraction community did not start until the 1990s, and this evaluation sprang from the Message Understanding Conference (MUC).

MUC was started in 1987 as a U.S. Navy project at the Naval Ocean Systems Center (NOSC) to investigate the state-of-the-art for message understanding systems, i.e., systems that could process natural language text into some type of structured representation. Twelve organizations participated in a workshop (initially called MUCK), processing with a common set of 10 messages dealing with ship sightings and engagements and comparing notes on the meaning interpretations produced by their systems. Two years later MUCK-II worked with similar messages, but with a clearly defined task, namely to fill a template with event-related information from the messages. A rudimentary quantitative evaluation was made of the systems' ability to produce the expected template fills.

Formalization of Evaluation Methodology

MUC-3 (1991) was sponsored by DARPA and attracted 15 groups through an open call for participation. The evaluation (Chinchor *et al.*, 1993) was considerably more complex than the earlier ones and the domain was much broader, moving from naval messages on highly constrained topics to the general topic of terrorist activity in Latin America. The texts were full text articles of various genres (news stories, political speeches, rebel communiqués, etc.) taken mostly from translations of Spanish-language print and broadcast news sources, with a training corpus of 1300 articles and three test sets containing 100 articles each.

Table 1 MUC-3 answer key template example

0. MESSAGE ID	TST1-MUC3-0080
1. TEMPLATE ID	1
2. DATE OF INCIDENT	03 APR 90
3. TYPE OF INCIDENT	KIDNAPPING
4. CATEGORY OF INCIDENT	TERRORIST ACT
5. PERPETRATOR: ID OF INDIV(S)	''THREE HEAVILY ARMED MEN''
6. PERPETRATOR: ID OF ORG(S)	''THE EXTRADITABLES''/ ''EXTRADITABLES''
7. PERPETRATOR: CONFIDENCE	CLAIMED OR ADMITTED: ''THE EXTRADITABLES''/ ''EXTRADITABLES''
8. PHYSICAL TARGET: ID(S)	*
9. PHYSICAL TARGET: TOTAL NUM	*
10. PHYSICAL TARGET: TYPE(S)	*
11. HUMAN TARGET: ID(S)	''FEDERICO ESTRADA VELEZ''(''LIBERAL SENATOR'')/ ''ANTIOQUIA DEPARTMENT LIBERAL PARTY LEADER'' /''SENATOR''/''LIBERAL PARTY LEADER''/''PARTY LEADER''
12. HUMAN TARGET: TOTAL NUM	1
13. HUMAN TARGET: TYPE(S)	GOVERNMENT OFFICIAL/POLITICAL FIGURE: ''FEDERICO ESTRADA VELEZ''
14. TARGET: FOREIGN NATION(S)	–
15. INSTRUMENT: TYPE(S)	*
16. LOCATION OF INCIDENT	COLUMBIA: MEDELLIN (CITY)
17. EFFECT ON PHYSICAL TARGET(S)	*
18. EFFECT ON HUMAN TARGET(S)	–

The task performed in MUC-3 was to find all terrorist events that occurred in the articles and to extract 18 specific types of information for each event, such as event type, e.g., bombing, date of the event in canonical form, and specific strings from the text, such as the perpetrator of the event. This information was to be output in a template, with one slot for each of the 18 types of information (see Table 1 for an example).

An automated scoring program was centrally administered, incorporating metrics of precision (percentage of correct fills over total fills) and recall (percentage of correct fills over the expected fills based on the answer keys prepared by NOSC). MUC-4 (1992) continued in the Latin American terrorist domain, with fresh data and a more complex template design, plus the establishment of the F-measure as a unified recall-precision metric.

MUC-5 (1993) was a major part of the DARPA TIPSTER program. There were two domains, joint ventures and microelectronics, to allow systems to investigate issues of domain independence, and two languages, English and Japanese, for investigation of language differences. This resulted in four corpora, each about the size of the MUC-3 corpus. The template structure consisted of nested objects, starting with a single top-level template per document, and including slots to point between related objects, with extensive written guidelines for the correct filling of these templates. Eighteen groups completed at least one of the four evaluation tasks, and despite the increase in complexity of the task, groups in general matched or exceeded the MUC-4 scores. Results in Japanese were surprisingly good, often surpassing results in English (Sundheim, 1993).

Movement Toward More General IE Goals

There was a general feeling among the research groups that MUC needed to move towards more general information extraction goals. MUC-6 (Grishman and Sundheim, 1996) (1996) had four tasks, designed to demonstrate task-independent component technologies which would be immediately useful, encourage work to make systems more portable, and encourage work on deeper understanding of natural language. The named entity extraction task, defined as an in-line SGML annotation task, was a major success, with most of the 15 participating groups able to achieve recall and precision over 90%.

Simplified continuations of the template-filling task, with a domain-neutral template element and a scenario template consisting of a three-level object structure (an event level, a relational level, and the template element level) demonstrated that systems could obtain reasonable performance with acceptable amounts of time to port the system to the target domain. The fourth task, that of locating co-references for nouns, noun phrases and pronouns, addressed the desire for deeper understanding of natural language.

MUC-7 (1997) built on the strengths (and tasks) of MUC-6. The named entity task was run in English, Japanese and Chinese, with scores still about 90% in all three languages. The definition of the co-reference task was made sharper. Three different types of template designs were implemented, including the template element and scenario template from MUC-6, and a new, small template to capture relationships between pairs of entities (template element structures).

MUC-7 was the last in the MUC series, with no further MUCs being planned. The Automatic Content Extraction (ACE) evaluations (Doddington *et al.*, 2004) continue exploration of the information extraction arena.

The legacy of MUC is both a powerful evaluation framework for information extraction, in particular for the template-filling task, and the establishment of a large community of natural language processing researchers situating their work firmly within these established evaluation practices. The trend toward heavier use of statistical methods, as opposed to mostly hand-built rule sets and structures, owes a large debt to sizable amounts of gold standard outputs and solid evaluation methodologies that came from MUC. And finally, the commercialization of some information extraction techniques, such as named entity extraction, is due directly to successes in MUC.

See also: Document Retrieval, Automatic; Information Extraction, Automatic; Named Entity Extraction; Natural Language Processing: System Evaluation; Question Answering from Text, Automatic.

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Relevant Websites

http://trec.nist.gov – TREC website.
http://www.itl.nist.gov/iaui/894.02/related_projects/muc/ – MUC-7 proceedings and additional information on MUC.

Text World Theory

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'Text World Theory' is an attempt to unify a number of key ideas about human discourse processing under one analytical framework. Its structure is drawn from a range of diverse disciplines, including possible-worlds logic, discourse analysis, cognitive psychology, cognitive linguistics, and stylistics. The original text-world framework was formulated by Paul Werth during the 1990s, primarily in relation to literary fiction (e.g., Werth, 1994, 1995a, 1995b, 1999). More recently, Text World Theory has been further developed and applied to a broad range of both literary and nonliterary discourses (e.g., Gavins, 2000, 2003, 2006; Hidalgo Downing, 2000; Stockwell, 2002). The basic theoretical premise underlying Text World Theory is that human beings understand discourse by constructing mental representations, or 'text worlds', of it in their minds. The practical aim of the theory is to provide an accurate account of human communication processes, in all their cognitive and psychological complexity. This necessarily means investigating both the discourse itself and the context surrounding its production and reception.

Text World Theory approaches this considerable task by splitting human communication into three manageable levels: the 'discourse world,' the 'text world,' and the 'subworld' (Werth, 1994, 1995a, 1995b, 1999). The first of these levels, the discourse world, deals with the immediate situation surrounding at least one speaker or writer and one or more listeners or readers. These sentient beings are referred to in Text World Theory as the 'participants,' the conscious presence of whom is essential for a discourse world to exist. This is because the discourse world includes not only the participants and the objects and entities that surround them, but all the personal and cultural knowledge that the participants bring with them to a language situation. This knowledge is of central importance to our understanding of human communication, since it has the potential to impact upon both the construction and comprehension of a given discourse. The majority of preceding approaches to discourse study have fought shy of dealing with context, mainly because of the fact that its unwieldy nature at first appears incompatible with rigorous linguistic analysis. Text World Theory, on the other hand, introduces the principle of 'text-drivenness' to provide a manageable route into the systematic examination of context. This principle specifies that, from the vast store of personal knowledge and experience available to the participants, it is the **text** produced in the discourse world that determines which areas are needed to process and understand the discourse at hand. When discussing recent film releases with friends, for example, we need only activate this area of our knowledge. Our experiences of cake decoration or crossing the road remain redundant, unless specifically referred to in the course of the conversation.

Every time a new act of communication occurs, a new and unique discourse world comes into being, the contents and structure of which will depend greatly on the nature of the communication in question. In face-to-face communication, for example, the participants share the same physical space and are able to refer directly to objects and entities in the immediate surroundings. Other nonlinguistic factors, such as body language and intonation, will also play a part in the structure of the discourse and the relative ease with which it is comprehended. There are a number of situations in which the discourse world will be split between two, or even more, spatial and temporal locations. The participants in telephone communication or internet chat room conversation, for example, normally share a temporal location (except in the

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'Text World Theory' is an attempt to unify a number of key ideas about human discourse processing under one analytical framework. Its structure is drawn from a range of diverse disciplines, including possible-worlds logic, discourse analysis, cognitive psychology, cognitive linguistics, and stylistics. The original text-world framework was formulated by Paul Werth during the 1990s, primarily in relation to literary fiction (e.g., Werth, 1994, 1995a, 1995b, 1999). More recently, Text World Theory has been further developed and applied to a broad range of both literary and nonliterary discourses (e.g., Gavins, 2000, 2003, 2006; Hidalgo Downing, 2000; Stockwell, 2002). The basic theoretical premise underlying Text World Theory is that human beings understand discourse by constructing mental representations, or 'text worlds', of it in their minds. The practical aim of the theory is to provide an accurate account of human communication processes, in all their cognitive and psychological complexity. This necessarily means investigating both the discourse itself and the context surrounding its production and reception.

Text World Theory approaches this considerable task by splitting human communication into three manageable levels: the 'discourse world,' the 'text world,' and the 'subworld' (Werth, 1994, 1995a, 1995b, 1999). The first of these levels, the discourse world, deals with the immediate situation surrounding at least one speaker or writer and one or more listeners or readers. These sentient beings are referred to in Text World Theory as the 'participants,' the conscious presence of whom is essential for a discourse world to exist. This is because the discourse world includes not only the participants and the objects and entities that surround them, but all the personal and cultural knowledge that the participants bring with them to a language situation. This knowledge is of central importance to our understanding of human communication, since it has the potential to impact upon both the construction and comprehension of a given discourse. The majority of preceding approaches to discourse study have fought shy of dealing with context, mainly because of the fact that its unwieldy nature at first appears incompatible with rigorous linguistic analysis. Text World Theory, on the other hand, introduces the principle of 'text-drivenness' to provide a manageable route into the systematic examination of context. This principle specifies that, from the vast store of personal knowledge and experience available to the participants, it is the **text** produced in the discourse world that determines which areas are needed to process and understand the discourse at hand. When discussing recent film releases with friends, for example, we need only activate this area of our knowledge. Our experiences of cake decoration or crossing the road remain redundant, unless specifically referred to in the course of the conversation.

Every time a new act of communication occurs, a new and unique discourse world comes into being, the contents and structure of which will depend greatly on the nature of the communication in question. In face-to-face communication, for example, the participants share the same physical space and are able to refer directly to objects and entities in the immediate surroundings. Other nonlinguistic factors, such as body language and intonation, will also play a part in the structure of the discourse and the relative ease with which it is comprehended. There are a number of situations in which the discourse world will be split between two, or even more, spatial and temporal locations. The participants in telephone communication or internet chat room conversation, for example, normally share a temporal location (except in the

case of telephone answering machine messages) but not a spatial one. The discourse worlds of written communication, on the other hand, are often split both spatially and temporally, sometimes over many thousands of miles and many hundreds of years. Some discourse worlds (the reading of a novel, for example) may continue over many months, in a variety of different locations, while others (a passing nod on a crowded train) may be fleeting and minimally detailed. In each case, however, the context surrounding the participants, whether shared or separate, is of paramount importance in the processing of the discourse. Consider, for example, the differing experiences of reading Cædmon's hymn from a projector screen in a lecture hall in New York and reading it from a carved stone crucifix on a cliff top in Whitby, England.

As the participants in the discourse world communicate with one another, they construct mental representations of the discourse in their minds, in which the language being produced can be conceptualized and understood. These mental representations are known as 'text worlds.' The deictic and referential expressions included within a text establish the spatial and temporal boundaries of the text world and specify whether any entities or objects are present. These details, known as the 'world-building' elements of the text, can be seen to form a kind of static conceptual background against which certain activities and descriptions may be played out. These activities and descriptions are known as the 'function-advancing' elements of the text world, the precise nature of which will vary depending on the type of text involved. In narrative texts, for example, actions and events are often in abundance, the function of which is to propel the narrative forward. The function-advancing elements of an instructive text, on the other hand, are likely to include a greater number of imperatives, and so on.

Once a text world has been created, any number of departures from its initial world-building parameters may occur during the discourse process. These departures cause new worlds to be created in the minds of the participants. They constitute the third and final layer of Text World Theory and are known as 'sub-worlds.' A subworld may be created by one of the participants at the discourse-world level. In such cases, the participants are free, particularly in face-to-face communication, to question one another's statements and to clarify any aspect of the discourse they do not understand. When entities at the text world level (referred to as 'characters' in Text World Theory) communicate, however, the reliability of the worlds they create cannot be assessed according to the same criteria as those produced in the discourse world. In Text World Theory terms, worlds created by the participants are 'participant-accessible,' while worlds created by characters are only 'character-accessible.' This logical distinction is one basically drawn between the different ways the participants process worlds created at the different conceptual levels of the framework, and explains why, in some cases, judgment may be reserved on the dependability of the contents of a particular world.

Sub-worlds are created for a variety of reasons but generally fall into one of two broad categories. 'World-switches' (Gavins, 2003, 2006) occur when the temporal or spatial parameters of the text world change. The text may flash backward or forward to a different time zone, or it may switch the spatial location of the world as a concurrent scene is referred to or described. Changes in the temporal parameters of a world often occur in conjunction with a change in the spatial parameters as well. Instances of direct speech and direct thought representation may also cause a world-switch, as present-tense discourse is injected into a past-tense narrative. In each case, a new world is created appropriate to the new time or scene.

Slightly more complex are 'modal worlds' (Gavins, 2003, 2006), which occur whenever some form of modalization is used in a discourse. Modal expressions are usually separated into three categories: 'deontic,' 'boulomaic,' and 'epistemic.' In Text World Theory, the use of each of these creates a corresponding modal world. Deontic modal worlds are created whenever a degree of obligation is attached to a proposition. For example, if I say that someone '**must** keep off the grass' or that they '**should** do the washing up,' a new world is created in which the activity of 'keeping off the grass' or 'doing the washing up' is taking place. Although a participant or character may be expressing their **attitude** to such propositions in the discourse world or the text world, the activities themselves are, as yet, unrealized. A separate, modal world must therefore be created for us to conceptualize both the activity and the world-creator's attitude toward it. Boulomaic modal worlds operate in a similar manner. Whenever a speaker or writer expresses a degree of desire, a separate modal world is created in which the proposition in question can be conceptualized. For example, if I say 'I **wish** I had more days in the week,' the boulomaic modal verb 'wish' causes a new world in which 'more days in the week' exist. This situation is, of course, unrealized and therefore remains in a mental space separate from the main discourse.

Epistemic modal worlds allow us to conceptualize expressions of remoteness in discourse and can occur for a number of different reasons. Instances of

indirect speech, indirect thought, and free indirect discourse all filter a text, however fleetingly, through a new perspective. This perspective thus creates a new world in which the resulting epistemic distance from the initial speaker or writer can be fully conceptualized. Focalized narration in written discourse has a similar effect, since readers are aware throughout that their only access to the text world is through the mind of a character who may or may not be participating in the unfolding events. The character-accessibility of such modal worlds is frequently manipulated by literary authors to create disorienting or deliberately misleading narrative effects. Hypotheticals also cause modal worlds to be created, since they necessarily depict unrealized events at some epistemic distance from the text world. Finally, conditional constructions require separate worlds for us to conceptualize the remote situations they describe. In the sentence 'If you see Paul, tell him he owes me a fiver,' for example, the 'if' marker signals the construction of a remote situation in which the addressee comes into contact with Paul. The 'tell him he owes me a fiver' section of the conditional can be seen to advance this modal world further by providing added detail of the possible future events concerned.

The main application of Text World Theory to date has been to literary discourse (e.g., Gavins, 2000, 2003; Hidalgo Downing, 2000; Stockwell, 2002; Werth, 1994, 1995a, 1995b, 1999), where it provides a systematic framework for investigation of the conceptual structures involved in the processing of certain poetic and narrative devices. Increasingly, however, Text World Theorists are finding new and fruitful ground in nonliterary discourses as diverse as family arguments, verbal directions, media discourse, and Web authoring (Gavins, 2006).

See also: Cognitive Linguistics; Cognitive Science: Overview; Possible Worlds: Philosophical Theories; Possible Worlds: Stylistic Applications; Reference: Stylistic Aspects; Stylistics, Cognitive.

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Texts: Semiotic Theory

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The concept of the 'text' as the artifact generated by a signifying system and open to inquiry has been of singular importance for literary and cultural studies. In a more general sense, the idea of text is the most essential datum upon which a considerable amount of research dealing with signifying systems is based. M. Bakhtin claims that the notion of text is "the primary datum of the human sciences ... the immediate reality (reality of thought and of experience) within which this thought and these disciplines can exclusively constitute themselves. Where there is no text, there is neither object of inquiry nor thought" (Bakhtin, 1986: 103ff.). Textuality could be understood as a cultural product composed of the remains left behind or deposited by the process of semiosis. Moreover, a text is something from which the event of communication can be extracted. Ultimately, a semiotic theory of texts operates as a subcategory of the general science of signs, and has as its premise the same principles and paradigms as the semiotics of verbal discourse.

However, establishing the boundaries and limits of, for example, the semiotics of the literary text is problematic. The scope of what is considered 'literariness' is more the result of tradition and practices than of

indirect speech, indirect thought, and free indirect discourse all filter a text, however fleetingly, through a new perspective. This perspective thus creates a new world in which the resulting epistemic distance from the initial speaker or writer can be fully conceptualized. Focalized narration in written discourse has a similar effect, since readers are aware throughout that their only access to the text world is through the mind of a character who may or may not be participating in the unfolding events. The character-accessibility of such modal worlds is frequently manipulated by literary authors to create disorienting or deliberately misleading narrative effects. Hypotheticals also cause modal worlds to be created, since they necessarily depict unrealized events at some epistemic distance from the text world. Finally, conditional constructions require separate worlds for us to conceptualize the remote situations they describe. In the sentence 'If you see Paul, tell him he owes me a fiver,' for example, the 'if' marker signals the construction of a remote situation in which the addressee comes into contact with Paul. The 'tell him he owes me a fiver' section of the conditional can be seen to advance this modal world further by providing added detail of the possible future events concerned.

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However, establishing the boundaries and limits of, for example, the semiotics of the literary text is problematic. The scope of what is considered 'literariness' is more the result of tradition and practices than of

more formal theories and rule. Unlike other semiotic discourses such as, for example, economic discourse, literary discourse cannot be qualified by a distinctive content. The difficulty arises because the literary quality of a text can vary depending upon the culture and the time period. A text identified as being scientific or philosophical in the Renaissance is understood as being a literary work in a subsequent age. Moreover, there is a debate concerning the verbal sign and the status of the signifying process. The issue is whether to adopt an intentional, or meaning-oriented description of a sign system within a given content or to employ a more global, truth-condition-oriented one that focuses on the signifying process whereby signs are deployed to refer to other signs situated in the real or in a given possible world.

Within the context of a traditional notion, a text is defined as that part of a work that is separate and distinguished from the parts that are close and related to it. Namely, endnotes, commentary, bibliographic references, the page numbering, the data concerning publication and other typographic elements. Such an understanding of the term *text* is linked to its Latin etymology *textus*, which is derived from *texere* 'to weave.' The traditional notion conserves the understanding of a sample of writing as constituting an entire cloth that cannot be partitioned. From this perspective the adjective *original* is often used when dealing with the idea of a text. Textual scholars aim to reconstruct the original text, with the intent of establishing the grounds for interpretations that adhere to a measure of authenticity. Structuralism altered the understanding of the word *text*, in that it was connected to the distinction between *langue* (a language system) and *parole* (the particular utterances produced by the *langue*). Consequently, *text* can be used together with the words *message* and *code* as a way to designate one mode in which signs are constructed in a pragmatic fashion. The word 'text' is frequently used in ordinary language with the implication of an artifact characterized by temporally limited typicality and constituted by combinations and segmentations of time-bound elements such as words, phonemes, graphemes, grammatical rules, and so on.

A 'classic' of semiotics is the work of Charles Morris, which is useful in understanding the semiotic theorizations about texts. For Morris semiosis is a process where signs function as vehicles, interpretants, and interpreters. To this triad of correlates Morris adds a further segmentation of semiosis consisting of (1) syntactics, which analyzes the relation linking one sign vehicle to another one; (2) semantics, which analyzes the relation of signs to objects they represent; and (3) pragmatics, which analyzes the relation between signs and their interpreters (see Nöth, 1995: 50). Consequently, if one studies texts in terms of semiosis, they can be understood as syncretic sign systems that feature a syntactic segment that can be studied from the point of view of phonology and narrative syntax; the semantic dimension (the text's content), as well as the pragmatic or communicative dimension. In essence, the first two aspects underline the text's structural components and deal with their articulation and content forms, while the other aspect underlines the signifying process and focuses on studying their generative processes and interrelations with other texts (Sebeok, 1986: 453–454).

According to M. A. K. Halliday, the semantic system is part of a triad of segments that makes up the linguistic system, the other two being the lexicogrammatical and the phonological. The semantic system itself consists of four elements: the experimental, the logical, the interpersonal, and the textual. Whatever gives rise to text is structured as the expression of all four elements. In his analysis of the nature of text, Halliday does not accept the idea that text is a variety of super-sentence, that is, an object that is greater than a sentence but of the same type. Rather, sentences realize text instead of constituting it, thus establishing text as a semantic concept with a generic structure (Halliday, 1977: 194). Text is perceived as an ongoing process of semantic choice; it is meaning and meaning is choice, a continuous flux of selections (195). A text is realized lexicogrammatically and phonologically, that is, in the lower levels of the linguistic system. Moreover, a text is also the realization of higher segment signifying processes that possess their own means of interpretation, namely, the literary, the sociological, the psychoanalytic, and so on. However, a key element in Halliday's theory is that the social system invents the meanings that its members exchange through the medium of the text, which mirrors "resistance and change in the social system" and remains "the primary channel of the transmission of culture" (Halliday, 1977: 199).

Fredric Jameson observes that textuality has become a "methodological hypothesis whereby the objects of study of the human sciences are considered to constitute so many texts that we decipher and interpret, as distinguished from older views of these realities or existents or substances that we in one way or another attempt to know" (Jameson, 1987: 18). Precisely because the materiality of the text is an intricate structure that distinguishes it from a given context, the concept of the text forces us to consider that the items under investigation are never a datum. If anything, we need to carefully consider the manner in which they were produced, isolated, presented to attention. In fact, for any text, we must think about

signification itself as a problem, rather than as a given. This means that we need to investigate the analysts' methods "not just prior to the inquiry to decide what will be done, but in the process of considering the objects of study themselves" (Culler, 2001: 441). As far as how a text presents itself or is transmitted to posterity is concerned, we can say with Seth Lerer (who is here talking about the English literary tradition) that "to historicize its notion of the author, its conception of the reader, and its idioms of genre, form, and social purpose – is to understand primarily its self-conscious articulation of its modes of making and its media of transmission" (Lerer, 2003: 1253). This notion is closely linked to what John Guillory states about canon formation: "Canonicity is not the property of the work itself but of its transmission, its relation to other works in a collocation of works" (Guillory, 1993: 136).

Texts assimilate the structural characteristics of the signifiers with which they are composed, however, it does not follow that they are conceptually equivalent to the sum of their signifieds. A poem, for example, consists of words that are placed in a series or sequence; but the poem is not merely the total aggregate of the meanings of words. It is for this reason that a poem is interpreted not by focusing solely on its individual structural components, but by conceiving the poem as a single sign. This reasoning achieves a more expansive sense if we foreground it with the semiotic theory of composite modeling proposed by Thomas A. Sebeok and Marcel Danesi, according to whom.

> [C]omposite modeling is the activity of representing complex (nonunitary) referents by combining various signifiers in some specifiable way. Drawings, narratives, theories, conversations, etc., are all examples of composite forms of representation. These are constructed with distinct signifiers that fit together structurally, but which are, as a whole, different from any of their constituent signifiers taken individually. In analogy to atomic theory, a singularized form can be compared to an atom and a composite form to a molecule made up of individual atoms, but constituting a physical form in it own right (2000: 28–29).

Janos Petöfi qualifies textuality as "a property assigned by the analyzer to a linearly ordered object with a basic constituent consisting solely of verbal signs, or having a dominating verbal kern, if it meets the definitory criteria of the analyzer" (1986: 1081). Petöfi adds the following elements to describe some of the main aspects of the definition of texts or discourses:

1. The object consists exclusively of (written or oral) verbal signs, or the object also contains, in addition to (written or oral signs) verbal signs, gestures as its constitutive elements, or the object is made up of arbitrary elementary objects considered as signs.
2. The object is a physically given natural object (a written text, a communicative act recorded on audio- or video-tape, or a configuration of different communicative acts), or the object is a theoretical construct.
3. The object is a linearly-ordered configuration of objects considered as elementary signs, or the object is a nonlinearly-ordered configuration of objects considered as elementary signs.
4. The object is a configuration of objects considered as signs that exceed a certain size, or the object can be considered, as a completed functional unit, regardless of its size (Petöfi, 1986: 1080).

According to Petöfi, a text can be analyzed in a triadic fashion; namely, as (1) a co-textual sequence of signs, (2) a con-textual sequence of signs, (3) a text (1986: 1081). Co-textual investigation refers to, in the specific ambit of a sentence structure, the analysis of the grammatical structure. Con-textual analysis refers to, within the context of a single sentence, investigating the parameters making up the contexts along with the analysis of the speech acts and the specific convention of the different registers. In contextual analysis the interpretative paradigms of sociolinguistics, ethnolinguistics, and pragmalinguistic theory recite a key role. Textual analysis is concerned foremostly with issues and questions pertaining to the interpretability of a specific text.

Daniel Chandler's reflections on the textual fabric of signification encourages us to observe that, in general, a text can be characterized as a network of signs constructed in adherence to codes and subcodes in which we find ingrained cultural practices, beliefs, and values. If anything, codes go beyond specific and separate texts connecting them in an interpretative network system to which both the creator and the consumer of the texts refer. One of the functions of codes is to simplify things with the view of facilitating the communication of ideas. The challenge is that of containing the multiplicity of meanings that a text could generate. This challenge is met by reading the signs of the text in accordance to what we deem as the more plausible codes. While textual codes do not ultimately establish the possible interpretations of texts, the prevailing codes limit them. Social practices function to curtail the meanings that an interpreter seeks to attribute to signs. Codes operate to ensure a 'preferred reading' as opposed to an 'aberrant decoding.' They are not limited to being instruments of communication; if anything they constitute systems of process belonging to related conventions that

function in specific contexts. Under the rubric of textual codes we find scientific codes (including mathematics), aesthetic codes (including the many expressive arts), genre, rhetorical, and stylistic codes, and mass media codes. Under the heading of social codes we find language, corporeal codes, commodity codes, and behavioral codes. The interpretative codes include perceptual codes and ideological codes. These three categories of codification are in their most important features linked to the triad of knowing that the interpreter of a text must possess; namely, (1) the world (social knowledge), (2) the medium and the genre (textual knowledge), and (3) the relationship between (1) and (2) (modality judgments). An example of a textual code is the *genre*. The first observation to be made is that any taxonomy of genres could never fully represent the multiplicity of elements and structures that are contained in texts. Any understanding of what constitutes a genre is the result of a negotiated consensus about the general and specific features of the given cultural product (Chandler, 2002: 159–160).

According to Petöfi, "textuality is not an inherent property of certain objects, but is rather a property assigned by those producing or analyzing them" (1986: 1080). Given this, Winifred Nöth (1995: 332) observes that the definitions of what constitutes a text are potentially numerous, namely, (1) In a much wider sense, texts as cultural messages of any code. From this vantage point, semioticians analyze a great array of cultural phenomena as texts (cinema, music, ceremonies, and so on), and (2) In a more restricted sense, texts as verbal messages. There are subsets of this definition: (a) text or discourse, here the verbal signs that are being studied are either oral or written. Beneviste employed *discourse* when referring to written and oral messages. German semioticians instead used the idea of the text; as well there is the tradition of discourse analysis. (b) text vs. oral discourse. Barthes limits the idea of text solely to written messages. (c) text vs. empirical discourse. In a way similar to the differentiation between *sentence* and *utterance* in linguistics, Teun A. Van Dijk characterizes text as the abstract structure embedded in discourse. (d) text vs. system. According to Louis Hjelmslev, text constitutes the semiotic aspect of process and syntagmatic relations, whereas system is defined as the chosen paradigmatic aspect and (e) text, utterance, enunciation. These elements refer to the text's pragmatic aspect. While enunciation is the specific act of speech production, the resulting act is utterance. Utterance can be defined as a presemiotic expression indicating the result of a speech act, namely, a text or simply a fragment of a text. Consequently, the text resulting from an enunciation includes traces of the speech act in the guise of indexical word items referring to the participants, time, and space of the enunciation (Nöth, 1995: 332).

From the pragmatic perspective, the text is understood as a vehicle of communication; it is the verbal message of an addresser meant for an addressee. This pragmatic view underscores the relationship between the text and its context, one consisting of textual and extratextual elements. Yuri Lotman, in this case, distinguishes between *expression* and *demarcation*. As expression, the text is constructed by means of the signs (*parole*) of the given system (*langue*). What is implied here is that the text is extraneous to the extratextual forms of *langue* that are not present in the text. Demarcation instead refers to the notion that the text is alien to the material signs of the context that are not part of the text. From the vantage point of its internal semantic and syntactic forms, the text is understood as an autonomous and to a limited extent a closed system. The individual signs are assimilated into an *integral sign*, thus creating the systematic unity of the text. According to Lotman, "a text is an integral sign and all the separate signs of the general linguistic text are reduced in the text to the level of elements of this sign" (1970: 22). In Greimas's semiotic theory of the text, the systematic wholeness of the text is explained within the context of *isotopy*.

The term *Textwissenschaften* (text class) is used in German and it concerns all those disciplines where texts play a major role; for example, literary studies, theology, law, history, psychology, philosophy, mathematics, logic, and others. *Textwissenschaften* focuses on analyzing texts that belong to different classes, but not only literary ones. There are three major premises underlying *Textwissenschaften*: (1) The *pragmatic* argument: if a specific role can be assigned to literary texts pragmatically and culturally, it would be erroneous to consider only texts of this type. Being a literary text is not an inherent category, it is instead a "context-dependent functional category which can be assigned to various texts" (Petöfi, 1986: 1086). (2) The *formal* argument: this deals with the macrostructures of texts. "Since very differently structured texts can be used to serve a literary function, no one-to-one mapping is possible between certain macrostructures and literary texts" (1086). (3) The *semantic* or *interpretation theoretical* argument: this refers to both how the interpretation approaches a text and how to assign the same text to different classes.

Hermeneutics is historically understood as one of the most ancient sciences of the text, and consequently it is a predecessor of any semiotic theory of texts (Nöth, 1995: 334). In fact, contemporary hermeneutics positions itself in a domain of inquiry that shares

many affinities with semiotics. The science of interpretation is rooted in philology, theology, and jurisprudence. The art of explaining, interpreting, and translating were central elements in Greek philosophy and mythology. In the *Epinomis* (975c) Plato makes reference to interpretation when discussing divination, which, together with interpretation, can be classified as a hermeneutic art (334). However, although both deal with the uncovering of meaning, divination discovers meanings in things that appear to not have any, while interpretation makes manifest meanings that exist beyond the principal meanings of the text in question. The defining methodological feature of classical text criticism was the focusing on essentially two levels of interpretation: (1) the surface level of the text, where the intent is to clarify the meaning of sentences and words; and (2) the deep level of the text, where the objective is to explain its hidden meanings. This approach was to eventually acquire the designation of allegory. The classical idea of two levels of interpretation gradually gave rise to a multilevel approach employed in Biblical interpretation. Challenged by the difficulty of being lodged between dogmatic readings and the possibility of uncovering new interpretations in the Bible, the Patristic authors cultivated an interpretative mode that has features of a theory of textual codes (Eco, 1984: 147–153).

There are three levels of scriptural exegesis: (1) the letter, where the focus is the grammatical construction; (2) the *sensus*, the meaning that was derived from the narrative context; and (3) the *sententia;* this is the more profound meaning of the text. The letter and the *sensus* constitute the cortex or surface structure. Moreover, the *sensus* is the first stage of the scriptural meanings (literal or historical sense). *Sententia* is the nucleus or deep structure and it envelops the three spiritual senses of the scriptural meanings (tropology or moral, allegory, and anagogy). The tropological level of interpretation refers to the meaning that the Bible has for the earthly life of a person. The allegorical level of meaning concerns the life of Christ and the Church. The anagogical level of meaning deals with the celestial mysteries whose significance will be unfolded in the future. To illustrate this multifold interpretation of the text we need only consider the reading of the Biblical account of Exodus offered by Dante in the 'Epistle to Cangrande.' Historically or literally, the story refers to the Israelites exiting from Egypt during the times of Moses. From an allegorical point of view, we are dealing with Christ's redemption of humankind. The moral (tropological) meaning is the soul's conversion from a state of sin to one of grace. Analogically, the story refers to the soul's movement from the enslavement under terrestrial corruptibility to eternal freedom.

As far as modern hermeneutics is concerned, the interpretation of texts can be achieved with neither induction nor deduction. Instead, textual understanding becomes possible by means of an interpretative model that is characterized by features similar to abduction. That is, the process of explaining things in accordance with assumptions and hypotheses concerning laws that are plausible but unproven. The criteria for establishing a correct interpretation of a text is based on the notion of textual monosemy, where the most relevant element is authorial intent. However, opposed to this is the assumption of textual polysemy, where the emphasis is on the reader's response. Eric D. Hirsch, who is a proponent of textual monosemy, distinguishes between meaning and significance: "*Meaning* is that which is represented by a text; it is what the author meant by his use of a particular sign sequence; it is what the sign represents. *Significance*, on the other hand, names a relationship between that meaning and a person, or a conception, or a situation, or indeed anything imaginable" (Hirsch, 1967: 8). Hans George Gadamer was instead more apt to recognize the role of textual polysemy (a concept that is not inconsistent with Barthes' *semiotropy*, Eco's *open text*, and Kristeva's textual polyphony). In Gadamer's mind, "Not only occasionally, but always, does the sense of the text surpass its own author. Therefore understanding is not mere reproduction but always a productive behavior [...] Understanding is in reality not better understanding [...] It suffices to say that one understands differently, if one understands at all" (cited in Nöth, 1995: 337).

Contemporary semiotic theories of the text are greatly indebted to the research undertaken in various East European centers, and which spawned movements such as Russian Formalism and the Prague Structuralists. Russian Formalism was rooted in two centers, the Petrograd Society for the Study of Poetic Language (Opoyaz), from 1916 to 1930, and the Moscow Linguistic Circle from 1915 to 1921. According to the testimony of Yuri Tynianov and Roman Jakobson, Saussure played a major influential role in Russian Formalism, especially as far as concerns the contrastive interplay between the synchronic and the diachronic, the idea of system, and the concept of 'langue and parole' (Tynianov and Jakobson, 1971: 101–102) The objective was to cultivate a scientific approach to literary and artistic textuality. A central goal was that of establishing the properties of poetry and art as compared with everyday speech and objects. It was from this perspective that Jakobson developed the theory of 'literariness.'

From the vantage point of Russian Formalism, the production of the poetic text was analyzed as an independent process or system that was not to be reduced to its components. In a more focused sense, a strategy that was employed to transform a text into a work of art was that of *device* (*priem*). To be sure, the devices of poetry are central to the process of 'making strange' (*ostranenie*). The result of this process is a cognitive revitalization within the context of automatization, whereby we become familiar with all that which belongs to the experience of the quotidian. In this way the literary text develops as a fluid system by means of assimilating original elements and discarding its automatized components. The Russian Formalists were as interested in internal structural components of textuality as they were in the dimension of expressivity. In fact, Šklovsky underlined the difference separating the story (*fabula*) from the plot (*syuzhet*). While story constitutes the precomposition series of episodes, plot is the aesthetic metamorphosis of the story into a composite narratological series, but it is also the mode that allows the story to become 'strange' (Nöth, 1995: 307–308).

The two main centers of Soviet semiotics are Moscow and Tartu in Estonia. The researchers associated with Soviet semiotics worked in a field of textual inquiry that included language and literature as well as other forms of expression such as the nonlinguistic and audiovisual. As a result, Lotman, who founded the Tartu center, analyzes visual and performative arts as well as linguistic and literary expression. As far as poetological research is concerned, Soviet text semiotics deals with the semantization of the mode of communication, and thus stylistic and metrical elements are afforded a semantic rationale.

The Prague Linguistic Circle, which was formed in 1926, included figures such as Jan Mukařowsky (1892–1975), N. Trubetzkoy (1890–1938), and Roman Jakobson (1896–1982). In their inquiry related to the nature of textuality the Prague School Structuralists underscored the notion that language is not an isolated synchronic system of pure form. If anything, in the words of Mukařowsky, "[T]he basic notion of structuralist thought is that of the interplay of forces, agreeing with and opposing one another, and restoring a distributed equilibrium by a constantly repeated synthesis" (Mukařowsky, 1977: 79). The Prague School Linguists afford major importance to a functional approach to aesthetics and culture. The aesthetic dimension of textuality is born in a dialectical process of foregrounding or deautomatization in opposition to a background of norms and automatization. This notion is ever present in the social context of art. Mukařowsky, in 'Art as Semiotic fact' (1934), explains that the work of art is to be perceived as a sign structure consisting of, "1) a perceivable signifier, created by the artist, 2) a 'signification /= aesthetic object / registered in the collective consciousness, and 3) a relationship which refers to the total context of social phenomena" (in Matejka and Titunik, 1976: 6). The relationship between the internal and extralinguistic ambit of the semiosis of poetic texts was commented upon by Jakobson, according to whom "the concept of the content of poetry is unstable and temporally conditioned … the poetic function, *poeticity* is an element *sui generis*, one that cannot be mechanically reduced to other elements" (in Matejka and Titunik, 1976: 174).

In summary, a Structuralist approach to texts consists of: (1) the rule of immanence, whereby the investigation takes place within a system that is for the greater part forged from a synchronic optic, (2) the rule of pertinence, that is, what is studied are those elements that have a distinctive feature, (3) the rule of commutation, where the commutation test is applied with the objective of establishing systematic oppositions in minimal pairs, (4) the rule of compatibility, the rules that condition the combination of elements in texts, (5) the rule of integration, whereby the elementary units must be assimilated into the totality of the system, (6) the rule of diachronic change, historical change is discerned by means of a synchronic reading of the system, and (7) the rule of function, where the communicative and other functional characteristics of the system are studied (Nöth, 1995: 295–296).

Roland Barthes described the Structuralist approach as being grounded in the processes of segmentation and articulation, the exploration of the elements and of "the syntax of the arts and of discourse." This claim opened text structuralism to the accusation of being a positivist methodology. Barthes countered this critique by indicating that such an approach contained aspects of creativity: "structuralism is essentially *an activity of imitation*, which is also why there is, strictly speaking, no *technical* difference between structuralism as an intellectual activity, on the one hand, and literature in particular, art in general" (Barthes, 1964: 214–215). The privileging of the objectivist myth of structuralism brought about the "death of structuralism" (Nöth, 1995: 296). There are characteristics that distinguish structuralism from text semiotics: the latter privileges meanings and signs while the former focuses on the network of relations. However, according to Jonathan Culler, "In fact the two are inseparable, for in studying signs one must investigate the system of relations that enables meaning to be produced and,

reciprocally, one can only determine what are the pertinent relations among items by considering them as signs" (cited in Nöth, 1995: 297).

Russian Formalism and Prague Structuralism are seen as having played a direct role in the development of French semiotics of the text beginning in the mid-1960s. Paul Perron identifies two main directions of French semiotics: "The first, founded on the Sausserrean–Hjelmslevian legacy, best represented by the work done by Greimas, has become known as the 'Paris School' of semiotics. This school, which concentrates more on syntactic and semantic domains of the discipline, adopts an immanentist attitude to texts" (Perron, 1997: 5). The second direction "is represented by the large number of works that draw their inspiration from a radical questioning of the structural principles defining semiosis. Julia Kristeva and especially Roland Barthes were instrumental in this respect" (6).

In Greimas's research, the primary logical functions present in a text assume a meaning. The actants, or agents, are characterized not by what or who they are but by how they operate and by their involvement in a variety of categorizable domains of action. Greimas's three-pronged point of reference for this sort of analysis consists of communication, desire, and text. The actants are distributed in a dualistic fashion. Moreover, the great quantity of personages in a narrative account is transformed into a signifying system, consisting of Subject/Object, Addresser/Addressee, Helper/Opponent, which becomes the underpinning for the narrative. Narrative in Greimas's mind, precisely because it is a mode of communication, relies on the existence of an Addresser (narrator) and Addressee (narratee). The signifying traces of the Addresser and Addressee are perceived as being an important component of the text. Greimas explored a semantic theory of the text which he called 'generative trajectory.' The objective of this theory is to document the generation of discourses of any signifying system. Greimas identifies a triad of 'autonomous general areas' of interpretation: (1) semionarrative structures, (2) discursive structures, and (3) textual structures. Textual structures rest outside of the generative trajectory because they are foremostly structures of expression rather than of content. The generative trajectory represents discourse production as a system that evolves in different phases, each one possessing syntactic and semantic subcomponents. In other research projects Greimas studied the notion of building a discursive syntax rooted in aspectualities (states of a temporal process – inchoateness, duration, termination – that permit us to envision temporality as a signifying system).

Barthes played an important role in the promotion of the idea of 'text,' one of his most prominent writings about it being 'De l'oeuvre au text' (in *The Rustle of Language*). Barthes posits the advancement of the concept of the text in the context of interdisciplinary dialogues, that is, at once as the result of this encounter and as a reaction to interdisciplinarity. Moreover, for Barthes what is at issue here is not a deep-rooted change but "an epistemological slippage more than a veritable break" (Barthes, 1989: 56). In Barthes' mind, the text and the work are two opposing entities. However, the idea of the text does not substitute or supplant the idea of the work. Instead, the text is something previously unthought and unseen. The text's characteristic is "its force of subversion with regard to the old classifications." Moreover, the text is "what is situated at the limits of the rules of speech act (rationality, readability, etc.)" (Barthes, 1989: 58). Barthes makes a distinction between 'work' and 'text': the work is something that can be located and described, while the text cannot be located nor be counted. All works contain some presence of text; however, the pure text is something that resists locatable presence and analysis. According to Barthes, "we must not permit ourselves to say: the work is classical, the text is avant-garde." The reason for this is that "there can be some text in a very old work, and many products of contemporary literature are not works at all" (Barthes, 1989: 57).

In another writing, 'Young Researchers,' Barthes explains that when we talk about the idea of the *Text* "it is not in order to make it divine, to make it the deity of a new mystique, not to denote a mass, a field requiring a partitive and not a numerative expression: all that can be said of a work is that there is a Text in it" (Barthes, 1989: 73). The implication of Barthes' opposition between work and text is that while a work such as, say, Dante's *Divine Comedy* can be studied as a "product of an authorial intention, with a meaning that had to be sought, and aesthetic unity to be valued," it can also be read as a text, as a product "of sign systems and of intertextuality, instances of intermediate functioning of language, part of historical processes of production and reception" (Culler, 2001: 443).

In essence, when discussing Barthes' concept of the text we need to keep in mind the distinction he makes between "semiology . . . as the positive science of signs" and what he terms "my semiology." For Barthes, language constitutes an oppressive set of rules, literary production is an act of rebellion against language, while semiotics is a creative activity: "Semiology . . . does not rest on a 'semiophysis' . . . and it is also not a 'semioclastry,' [. . .] Rather . . . it is a 'semiotropy' turned toward the sign, this semiology

is captivated by and receives the sign, treats and if need be, imitates it as an imaginary spectacle. The semiologist is, in short, an artist" (cited in Nöth, 1995: 313).

The relevance of Julia Kristeva's research on the concept of the text is generated by means of a new science she calls "semanalysis." Her project came about as a reaction against the fact that, in her own words, "our philosophies of Language, embodiments of the Idea, are nothing more than the thoughts of archivists, archaeologists, and necrophiliacs" (Kristeva, 1984: 13). Against this, and through semanalysis (a combination of semiotics and psychoanalysis), Kristeva seeks to direct the return of the speaking body, replete with its drives and impulses, into language. Kristeva achieves this goal by claiming that the strategies of signification are latent in the body, and by arguing that corporeal impulses are present in language.

An influential concept put forward by Kristeva is the distinction between the semiotic and the symbolic. The semiotic entities, which Kristeva differentiates from 'semiotics,' within the context of sign systems, constitute the bodily impulses as they are made manifest in language, more specifically as features of rhythm and tonality. However, what we would term 'semiotic' is the hidden dimension of meaning within signification which is bereft of the ability to signify. The symbolic, however, is the dimension of signification that does signify, and it is linked to syntactical and grammatical elements. In Kristeva's semanalytic project, the concept of the text plays a pivotal role. Kristeva characterizes the text as "a translinguistic apparatus that redistributes the order of language, relating a communicative 'parole' aiming at direct information to different types of previous synchronic utterances. The text is thus productivity, which means: 1) Its relation to the language in which it is situated is redistributed (destructivo-constructive) . . . 2) It is a permutation of texts, an intertextuality" (Kristeva, 1969: 113).

For Kristeva, language systems and text are diametrically opposed, and where the latter operates as that element which undoes the system: "Submerged in language, the 'text' is consequently . . . that which changes it, which dissolves it from the automatism of its habitual development . . . . The (poetic, literary or other) 'text' digs into the surface of speech a vertical shaft where the models of that significance are sought which the representative and communicative language does not recite even if it indicates them." To the notion of the text immersed in the signifying properties of language, Kristeva adds that the "text is not the communicative language codified by grammar. It is not satisfied with representing or meaning the real. Wherever it signifies . . . it participates in the transformation of reality, capturing it at the moment of nonclosure" (Kristeva, 1969: 8–9).

'Intertextuality' (Latin *intertexto*, 'to intermingle while weaving') is a term used extensively by Kristeva. In 'Word, dialogue, and novel,' for example, Kristeva discarded the traditional concepts of the author's 'influences' and the text's 'sources,' and claimed that all signifying systems are structured in accordance to the way they alter previous signifying systems. Consequently, a literary work is more than the result of a single author's efforts. If anything it is the result of the text's relationship to other texts and to the components of language itself. "[A]ny text," Kristeva tells us, "is constructed of a mosaic of quotations; any text is the absorption and transformation of another" (Kristeva, 1980: 66). In this way, intertextuality constitutes a manner of explaining the role of literary and extraliterary elements without needing to make reference to traditional concepts such as authorship. The notion of intertextuality weakens the idea of the text as self-sufficient entity, and reinforces, instead, the fact that all textual production occurs in the presence of other texts. All texts are, in essence, a seemingly infinite series of connected palimpsests. In Barthes' mind intertexuality permits the text to come into presence, precisely because a text is a "new tissue of past citations." By this Barthes implies that the text is constituted by "[b]its of code, formulae, rhythmic models, fragments of social languages" and so on, all of which "pass into the text and are redistributed within it, for there is always language before and around the text." Barthes reiterates a notion that is key to conflicts with traditional notions of textual authority when he explains that "[i]ntertextuality, the condition of any text whatsoever, cannot, of course, be reduced to a problem of sources or influences; the intertext is a general field of anonymous formulae whose origin can scarcely ever be located; of unconscious or automatic quotations, given without quotation marks" (Barthes, 1981: 39). However, intertexts are not limited to being only 'literary' in that historical and social factors constitute signifying practices that alter and shape literary practices. A text comes into being in the event of its reading. Consequently, the reader's own previous readings, experiences, and place within the cultural environment constitute important intertexts as well. The idea of intertextuality weakens the boundaries of the text, by subverting unity and assimilation and replacing it with a limitless texture of connections, associations, paraphrases, fragments, texts, and contexts.

Gerard Genette elaborated the notion of 'transtextuality' as a more global term than 'intertextuality' (Genette, 1997b). Genette established the outlines of

the notion of transtextuality in *The architext: an introduction,* where he writes that "for the moment the text interests me (only) in its *textual transcendence* – namely, everything that brings it into relation (manifest or hidden) with other texts. I call that *transtextuality*" (Genette, 1992: 81). However, transtextuality is not synonymous with intertextuality, which is part of a textual typology that includes five elements:

Intertextuality This is qualified as "the literal presence (more or less literal whether integral or not) of one text within another" (Genette, 1992: 11). Quoting other texts is an overt intertextual relation, but allusion and plagiarism as well belong to the purview of Genette's definition. David Olson (1991) qualifies text as the cultural object that is the subject of commentary, which constitutes an object of discussion or dialogue; in other terms, the cultural artifact that can be quoted. In the case of the Tartu school, texts function to choose what is to be remembered or forgotten, thus creating a value basis for defining text.

Paratextuality This pertains to the connection linking a text and its 'paratext' – that which surrounds the main body of the text – such as titles, headings, prefaces, epigraphs, dedications, acknowledgments, footnotes, illustrations, dust jackets, and so on; namely, "those liminal devices and conventions, both within the book (peritext) and outside it (epitext), that mediate the book to the reader" (Genette, 1997b: 10). As suggested by the subtitle of Genette's study on paratexts, *Thresholds of interpretation*, paratexts are found at the extreme limits of a text, thus constituting a "zone without any hard and fast boundary on either the inward side (turned toward the text) or the outward side (turned toward the world's discourse about the text)" (Genette, 1997a: 2). The paratext lies between the text and the *hors-texts*, "all the ways in which a text makes itself a book and presents itself as such to its readers, and more generally to the public" (7).

Architextuality This refers to the designation of a text as part of a genre or genres. An *architextual* relation is the one that "links each text to the various types of discourse it belongs to. Here we have the genres, with their determinations that we've already glimpsed: thematic, formal, modal and other" (Genette, 1997a: 2).

Metatextuality This designates an explicit or implicit critical commentary of one text on another text. Genette describes metatext as "the transtextual relation that links the commentary to the text it comments upon. All literary critics, for centuries, have been producing metatexts without knowing it" (Genette, 1997a: 82). We can say that metatext refers in good part to secondary texts that comment upon a text or place it within a larger context. This would include comments, reviews, catalogues, classifications, journals, tables of contents, subject indexes, bibliographies, and so on. Admittedly this category spans from critical texts (comments, reviews), over classificatory texts, to purely arbitrary catalogues.

Hypotextuality (Genette employs the term *hypertextuality.*) This concerns the link between a text and a previous 'hypotext' – a text or genre on which it is based but which it metamorphizes, alters, elaborates, or extends (this involves forms such as parody, spoof, sequel, and translation). *Hypotextual* relations are characterized in a manner that is different from computer-related qualifications. They are constituted by "relationships of imitation and transformation, which pastiche and parody can give us an idea of" (Genette, 1997a: 67). But the overlapping of texts upon texts is to be conceived in a metaphoric or semantic sense.

Intertextuality and paratextuality can be characterized by means of models originating from textual forms qualified by their link to primary texts (that is, titles, references). Metatextuality and hypotextuality are instead to be conceived in connection to more abstract cases of links with primary texts. With an even greater degree of abstraction, architextuality designates the thematic and stylistic characteristics of a text, thus locating it within the larger corpus of texts. What is key here is the idea of 'threshold': this refers to a second-order textuality, functioning at a level that is different from the one in which texts-as-works operate. To be sure, a significant number of texts qualified as being second-order textuality are secondary text. Here 'secondary' refers to the fact that they form a domain of semantic relations 'around,' 'about,' and 'in-between' scholarly texts. Secondary texts assume their currency in virtue of a primary text.

'Hypertext' refers to the structuring of information as a linked network of nodes that allows the reader to navigate in following a direction that is nonlinear. Moreover, hypertext makes it possible for there to be more than one author, a blurring of the author and reader functions, extended works with diffuse boundaries, and multiple reading paths. The term 'hypertext' was originally coined to express the idea of 'nonsequential writing.' But subsequently writers have taken hypertext to be a distinctly electronic technology – one that must involve a computer; that

is, hypertext, as a DBMS that allows one to connect screens of information using associative links. Hypertext is ultimately a software environment setting for cooperative work, communication, and knowledge acquisition. Hypertext software imitates the neurological operations of storing and retrieving data by means of links for immediate access. Hypertext is not, in the end, the exclusive domain of technology. To be sure, hypertext is an organizational paradigm that functions within both a chartaceous and electronic environment.

Umberto Eco has played a major role in elaborating a notion of text that has been highly influential in contemporary semiotic practices. In *Interpretation and overinterpretation,* Eco makes an assertion concerning the signifying nature of texts that sheds important light on his own textological philosophy. In Eco's mind a text constitutes "a device conceived in order to produce its model reader .... A text can foresee a model reader entitled to try infinite conjectures (Eco, 1992: 64). In other terms, Eco affords to the text a signifying autonomy that is to be understood, however, within the context of a larger semiotic web that involves a dialectic relationship between text, author, interpreter, and, in the most general terms, the exterior world of signs. Eco clearly privileges the ontological status of the text when he informs his reader that "[t]o recognize the *intention operis* is to recognize a semiotic strategy. Sometimes a semiotic strategy is detectable on the grounds of established stylistic conventions" (Eco, 1992: 64–65). Eco is essentially reformulating what he had previously written in *The role of the reader*, namely, in each text there is implicit an author who devises a work and who constructs its semiotic strategies: "[I]n the dialectics between the intention of the reader and the intention of the text, the intention of the empirical author has been totally disregarded .... We have to respect the text, not the author as person so-and-so. Nevertheless, it can look rather crude to eliminate the poor author as something irrelevant for the story of an interpretation" (Eco, 1992: 65–66).

It would be fair to say that since *The open work* (Italian edition 1962, English edition 1989), Eco has been concerned with "the dialectics between the rights of texts and the rights of their interpreters" (Eco, 1992: 59). In Eco's view an imbalance has been created in this dialectical relationship with the rights of the interpreter receiving undue privilege, or what he terms 'overinterpretation.' The root of Eco's critique of overinterpretation is explained through the Peircean concept of unlimited semiosis, which Eco elaborates at length. Eco stresses the idea that unlimited semiosis does not imply that textual interpretation is devoid of criteria: "[U]nlimited interpretation concerns systems not processes. A linguistic system is a device which, and by using which, infinite linguistic strings can be produced. If we look at a dictionary for the meaning of a term we find definitions and synonyms, that is, other words, and we can go to see what these words mean, so that from their definition we can switch to other words and so on potentially *ad infinitum*" (Eco, 1997: 59). However, as Eco tells us, texts as the artifact produced by means of what he calls the "manipulation of the possibilities of a system", are not open in a similar manner. Eco's argument is that in the act of creating a text with signifying structures, one necessarily limits the extent to which the linguistics elements can be used. In other terms, "by reducing the possibility of producing infinite strings, a text also reduces the possibility of trying certain interpretations." If a text can withstand a vast number of interpretations, that is not to say that "interpretation has no object." Eco offers a criterion of falsification, inspired by Popper, according to which "if it is difficult to decide if a given interpretation is a good one, and which one is better between two different interpretations of the same text, it is always possible to recognize when a given interpretation is blatantly wrong, crazy, far fetched." Eco articulates the difference between the intentions of each of the author, reader, and text by indicating that given that the text is an instrument whose goal it is to invent the Model Reader, "This Reader is not the one who makes the 'only/right' conjecture. A text can foresee a Model Reader entitled to try infinite conjectures." The basis for establishing a conjecture about the text's intention is that "any interpretation given of a certain portion of a text can be accepted if it is confirmed and must be rejected if it is challenged by another portion of the same text. In this sense the internal textual coherence controls the otherwise uncontrollable drives of the reader" (Eco, 1997: 60).

If the text is produced for a community of readers, the author will unquestionably be aware of the fact that he or she will not be read in congruency with his or her intentions, but rather in accordance with what Eco calls the "social treasury" of the community of readers. By 'social treasury,' Eco implies not solely a specific language as a series of grammatical rules "but also the whole encyclopedia that the performances of the language have implemented, namely, the cultural conventions that the language had produced and the very history of the previous interpretations of many texts, comprehending the text that the reader is in the course of reading" (Eco, 1997: 60).

For Eco the Model and the Empirical Reader are not one and the same: "The empirical reader is you and me, when we read a text. Empirical readers can

read in many ways, and there is no law which tells them how to read, because they often use the text as a container for their own passions, which may come from outside the text, or which the text may arouse by chance" (Eco, 1997: 61). In *Six walks in the fictional woods* Eco suggests that the Model Author is a voice which reveals itself as a "narrative strategy, as a set of instructions which is given to us step by step and which we have to follow when we decide to act as the model reader" (Eco, 1994: 15).

Deconstruction brought about a radical rethinking of text and textuality and it was initiated by Jacques Derrida in a number of writings published from the late 1960s onward. Derrida's concept of deconstruction promoted a particular mode of interpreting a wide disciplinary range of texts that stressed the logical or rhetorical incongruencies between a text and its meanings. For example, the deconstructive turn sought to illustrate, by focusing on the binary operations inscribed in a text, how the oppositions are composed from a hierarchical perspective. However, the hierarchical structure is turned upside down, thus allowing the text to say the contrary of what it had stated in the first place. Finally, the two elements of the opposition are placed within a context of difference where all hierarchical categorizations are abolished.

Deconstruction is in great part synonymous with poststructuralism. The three major sources of the movement are Friedrich Nietzsche, Martin Heidegger, and Ferdinand de Saussure. In the *Course in general linguistics* (1916) Saussure created the foundation for structuralism by documenting concepts such as (1) the arbitrary nature of the linguistic sign, (2) the partitioning of the sign into signifier and signified, and (3) the idea that language is rooted not so much in nomenclature and correspondence as it is in 'difference.' As a consequence, the arbitrary nature of the sign implies the lack of an intrinsic, fundamental basis for signifying a specific idea through a specific word. Thus, the meaning of a word is essentially arbitrary although the meaning is the result of convention and use.

A deconstructive theory of the text pivots on the idea that textuality is the repository of binary oppositions (signifier/signified, presence/absence, literal/figural), of segments of reasoning, of words that are all informed by radical rhetorical and logical incoherencies that cannot be assimilated into a textual harmony or unity. These signifying incompatibilities reveal to the text itself the characteristics of its own difference. That which the text communicates and how it communicates it are estranged from each other. This Derridean view of the textuality can be summed up in Barthes' words, when he suggests that the text is "a tissue of signs, an imitation that is lost, infinitely deferred" (Barthes, 1977: 147).

For Derrida, speech has traditionally been privileged over writing thus leading to the logocentric bias of Western culture. Derrida subsumed the notion of linguistic difference theorized by Saussure and coined the term 'différance.' This term conserves Saussure's idea of noncoincidence and points to the notion of spatial and temporal differing. However, Derrida includes the entire domain of signs under the rubric of 'différance.' Moreover, he refers to this domain as *écriture* (writing), that is, not in the conventional terms of graphic script, but rather in the metaphorical sense of writing as a signifying process or system that contains 'différance.' 'Grammatology' is the science of writing and it entails the study of the relations between terms within a bound signifying system where each of the elements assumes semiotic currency on the basis of its opposition to other elements. This being the case, a text, precisely because it is a signifying system whose textuality is molded by 'différance,' is problematic in that it brings to the fore questions about referentiality and meaning. Derrida concludes that there exists nothing 'outside' the text; moreover, signification is structured from within the semiotic system as an operation of difference. In this way, textual reference is transformed into self-reference. The representation communicated by textuality, according to the logic of deconstruction, is not so much a mimetic performance of the world as it is self-representation, whereby signifying processes hide and unhide themselves thus producing an empty mask of referentiality that cloaks an abyss of linguistic signs. Deconstruction has promoted the rethinking of language and the world from the perspective of textuality, and it is for this reason that it has played a key role in directing the theoretical thinking found in a wide range of disciplines, cultural studies in particular.

What has been said so far has been from within the context of verbal texts. However, the discussion is indeed also applicable to nonverbal texts such as, say, maps and other visual mediums of communications (cinema, television) as well as oral or social conventions of transmission and articulation of meanings. Within the context of cultural semiotics all that which 'belongs' to or which may be accounted for by a particular signifying system is deemed to be a text. Roland Posner (1989) has explained the extension of the notion of text from the vantage point of the written text to the one found in cultural semiotics by underlying three features: (1) the movement from writing to speech: that is, any sequence of words, not only recurring linguistic elements but also spontaneous ones, can be described as text, provided that the content is determined by a code; (2) the movement

from speech to any series of conventional signs: this goes beyond spoken and written signs to any sequence of coded signs whatsoever, such as traffic signs; and (3) the movement from a coded sequence to any coded sign, even if it has not become part of the sequence. Here, the text is essentially anything that could be reproduced. From the perspective of the Tartu school a 'cultural text' is the total aggregate of all the texts in a culture. The cultural text is heterogeneous when its components are ascribed to the linguistic system, the visual system, the behavioral system, and so on, but it is homogeneous when thought of in connection with the culture system.

According to Paul J. Thibault, the text-as-object is essentially a material entity, a cultural artifact that has been generated in and by means of a culturally definable social activity; the text is the result of the social semiotic process that generated it. But as a material product, text-as-object can only be an incomplete archive of the social activities that created it. In Thibault's own terms, "The (written) text is not a form of morse-code which simply stores and transmits preexisting meanings without also transforming them" (Thibault, 1994: 10). The point is that the written text can be characterized as a recontextualization from one signifying system to another. The material permanency of the text obscures the fact that it is a written transcript of an original speech act and in being so it is ultimately always a recontextualization of the signifying components that gave rise to the event (speech, paralanguage, kinesics, gestures, and so on), thus transposing them onto signifying modalities of the second (graphological) system. Along with the phenomenon of the text-as-object, Thibault identifies what he calls 'the semiotic action text,' which is fluid and processual, rather than synoptic and objectlike.

Finally, we have the phenomenon of the 'social text,' that is, a text that is somehow known and understood by a community of people, an overriding text that informs a society. Danesi (2000: 231) proposes as an example of this phenomenon the Christian social text, where we see that it is rooted in a worldview that is informed by the Bible and theological traditions. The Bible being, in the most traditional sense, by means of antonomasia, *the* text. It is for this reason that significant religious dates such as Christmas and Easter are annual events that are celebrated. In the case of Early Modern Europe the Christian text played an important role in structuring the daily activities and behavior of individuals and communities. Emphasis was placed on attending the celebration of Mass, acts of repentance and charity, and, in general, adhering to a code of moral conduct that was dictated by the Bible. The transcendent function characteristic of the Early Modern Christian social text was that of allowing the individual to understand the theological logic behind the idea that each moment of terrestrial existence gradually brought one closer to the event of what was perceived to be one's true destiny, namely, redemption and life after death in the presence of God. However, following the ages of the Renaissance, the Enlightenment, and the Industrial Revolution, the function that belonged to the Christian social text was appropriated by a form of textuality that separated religion from the state, thus creating a social text that was secular and immanent rather than theological and transcendent. In our current civilization the secular text is constituted by signifying systems and networks that create the context for, say, social and work commitments, but where the issue of salvation is compartmentalized in specific and limited domains of daily life. It is only on the occasion of a restricted number of calendar dates, in particular, Christmas and Easter, that the secular text coincides with the traditional theological text.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975); Barthes, Roland (1915–1980); Computational Lexicons and Dictionaries; Computational Linguistics: History; Computational Stylistics; Eco, Umberto (b. 1932); Hermeneutics; Interpretation: Theory; Jakobson, Roman (1896–1982); Legal Semiotics; Media: Analysis and Methods; Media and Language: Overview; Media and Marginalized Groups; Media Panics; Natural Language Interfaces; Natural Language Processing: Overview; Natural Language Processing: System Evaluation; Paris School Semiotics; Political Rhetorics of Discrimination; Political Speeches and Persuasive Argumentation; Politics and Language: Overview; Postmodernism; Poststructuralism and Deconstruction; Russian Formalism; Social Semiotics; Structuralism; Text and Text Analysis; Text World Theory; Visual Semiotics5.

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Thailand: Language Situation

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Multilingualism in Thailand

Located at the heart of Southeast Asia with its 60 million people speaking more than 70 languages, Thailand represents a complex situation of language diversity, the definitive characteristic of the region. Standard Thai, based on a variety of Central Thai, the only official and national language, is used as the medium of instruction in schools and the mass media. The Thai writing system is based on an Indic alphabet originally designed for Sanskrit. Influential languages that have influenced the development of Standard Thai include Pali, Sanskrit, Khmer, Chinese, and English. Other languages of Thailand remain regional or local (minority) languages.

Genetic Classification and Distribution

Languages in Thailand belong to five language families: Tai-Kadai, Austroasiatic, Austronesian, Sino-Tibetan, and Hmong-Mien.

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Genetic Classification and Distribution

Languages in Thailand belong to five language families: Tai-Kadai, Austroasiatic, Austronesian, Sino-Tibetan, and Hmong-Mien.

Tai-Kadai The majority or 92% of the population speak Tai languages. There are 24 Tai languages or dialects distributed all over the country, which are listed below:

Tai languages of Thailand

Kaloeng	Khammuang (Northern Thai) (Yuan)	Lao Khrang
Lao Isan (Northeastern Thai)	Lao Lom	Lao Ngaew
Lao Tay	Lao Ti	Lao Wiang (Lao Klang)
Nyoh	Phuan	Phu Thai
Paktay (Southern Thai)	Seak	Tai Dam (Song)
Tai Lue	Tai Ya	Tai Yai (Shan)
Thai Klang (Central Thai)	Thai Korat	Thai Loei
Thai Takbai	Yong	Yoy

Austroasiatic The more numerous and smaller language groups that are scattered throughout the country are Austroasiatic languages. These are the indigenous languages of Southeast Asia. They comprise 4.3% of Thailand's population. There are 23 major languages, as indicated below:

Austroasiatic languages of Thailand

Bru, western	Chong	Dala-ang (Palaung)
Kasong	Kensiw	Kuy
Khmu	Lamet	Lavue
Mal-Pray (T'in)	Mlabri	Mon
Nyah Kur	Nyeu	Plang
Samre	Sa-oc (Chung)	So (Thavueng)
Vietnamese	Wa	

Sino-Tibetan The Sino-Tibetan languages include seven Chinese dialects found mainly in the towns of the country, except Haw (Yunnanese Chinese), which is spoken by people who settled in the border area in the north; and 14 Tibeto-Burman languages whose speakers are concentrated mainly in the north and northwest of Thailand. Speakers of Sino-Tibetan languages comprise 3.1% of the population.2

Sino-Tibetan languages of Thailand

Chinese dialects:	Tibeto-Burman Languages:	
Cantonese	Akha	Bisu
Hainan	Burmese	Bwe
Hakka	Gong	Jingpo (Kachin)
Hokkien	Kayah, eastern	Kayo
Haw (Yunnanese)	Lahu	Lisu
Mandarin	Mpi	Padong
Teochiu	Pagayaw (Sagaw Karen)	
	Pwo (Pow Karen)	

Hmong-Mien Speakers of the Hmong-Mien or Meo-Yao languages are concentrated mainly in the north of Thailand. They comprise 0.3% of the population. There are two major languages, i.e., Hmong (Black and White) and Mien.

Austronesian The Austronesian speakers are found mainly in southern Thailand. They comprise 0.3% of the total population. There are three major languages, i.e., Malay, Moklen, and Urak Lawoi.

Language Hierarchy and Diglossia

Languages in Thailand are socially related in a hierarchical way (Smalley, 1988, 1994). Each language belongs to a different level and has a role and function in the society.

National Language Standard Thai is the national and official language of the country. It is used as the medium of instruction in schools, the mass media, and on all formal occasions throughout the country.

Regional Languages The four major regional Thai languages are Northern Thai or Kammuang, Northeastern Thai or Lao Isan, Southern Thai or Paktay, and Central Thai or Thai Klang. Each of these is a vernacular language in a local community, as well as a lingua franca among the minority languages in the region.

Local Languages Languages spoken in the local communities are mainly minority languages, which are classified into four groups.

1. Displaced languages are languages that are historically associated with people who have moved from their original homeland to settle in Thailand because of wars, famine, and work opportunities. For some of these migrants, their ancestors were prisoners of war coming from neighboring countries in the early years of the Rattanakosin period (from 1782 onward). The majority of the displaced languages are Tai, for example, Phuan, Song, Phuthai, Lao Wiang, Lao Khrang, Nyoh, Yooy, Kaloeng, etc. Non-Tai languages include Mon and Khmu in central Thailand.
2. Town languages are Chinese and Vietnamese (upper northeastern region).
3. Marginal languages are found near the borders, with the majority of speakers living on the other side of the border. They are languages such as Shan and Khmu in the north, Khmer in the

northeast, Mon (Burmese Mon) in the northwest, and Malay in the south. These languages are spoken across the countries in Southeast Asia

4. Enclave languages are languages spoken by small isolated ethnolinguistic groups who live in the area surrounded by totally unrelated languages and are wholly contained in the country. There is no means to communicate with relatives who live outside these communities. Some are the descendants of people who lived in ancient empires, such as the Nyah Kur who settled in the center of Thailand, and the Chong, Kasong, and Samre in the east near the Cambodian border. Others are the So (Thavueng) on the upper Korat plateau, Gong in the central plain, Lavue, Mlabri, Bisu, and Mpi in the north, and Urak Lawoi and Moklen in the south.

Thai nationals, especially the ethnolinguistic minorities, are bilingual or multilingual. They speak their ethnic language at home with family members and neighbors in the same community and also speak a regional or national language outside their community, depending on the social domain and the people they are speaking to. In schools and government offices, on formal occasions, and in the mass media, Standard Thai is used. However, this diglossic situation is now decreasing, as Thai is being spoken in more and more social settings in the lives of ethnic minorities.

Language Policy, Language Shift, and Language Maintenance

The national language policy is to promote only Standard Thai at all levels of education and in the mass media, including modern economic development, new urban cultures. As a result, the powerful mass media have been playing a vital role in the destruction of indigenous languages and cultures in Thailand. Ethnic minority languages are declining at different rates. Even the major regional Thai languages show signs of contraction, especially in the loss of vocabulary and aspects of grammar, whereas some small languages have been replaced by Thai and have ceased to be the language of the speech community or even the home. Currently, at least 14 languages in Thailand face imminent endangerment: Chong, Kasong, Samre, Sa-oc, Lavua, Nyah Kur, Thavueng, Mlabri, Kensiw, Mpi, Bisu, Gong, Urak Lawoi, and Moken/Moklen (Suwilai, 2001). However, there is a movement to provide a foundation for preservation against the dominant Thai language. The use of the Lanna (Kammuang) writing system has been revitalized and is now taught in some schools. Thai-based orthographies for some ethnic minority languages have been developed for unwritten languages, such as Chong, Nyah Kur, Thavueng, and Gong, so that their speakers can use these orthographies to record their language, in order to slow down the shift to Thai, and to teach the languages to the younger generation as a part of the revitalization and maintenance programs.

See also: Austroasiatic Languages; Austronesian Languages: Overview; Sino-Tibetan Languages.

Language Maps (Appendix 1): Maps 125–127.

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Thelwall, John (1764–1834)

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Studies of John Thelwall's manifold output are beginning to assume significant proportions. The pioneering analyses of his political and literary roles (Thompson, 1963, 1997) have been succeeded by appraisals of his speech theory and practice (Rockey, 1980; Thelwall, 1981) and more recent work on his literary role *vis-á-vis* Wordsworth and Coleridge (Thompson, 2001).

Born in London, the son of a silk mercer, he suffered from a lisp and weak lungs and received elocution lessons from a clergyman, Harvey. He aspired to a literary career, but was forced to take up the law

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Born in London, the son of a silk mercer, he suffered from a lisp and weak lungs and received elocution lessons from a clergyman, Harvey. He aspired to a literary career, but was forced to take up the law

briefly to support his widowed mother. His literary contacts brought him into contact with Henry Cline, anatomy professor at St Thomas' Hospital, whose lectures he attended. His anatomical awareness, combined with his rhetorical interests (which in this period covered much of both normative and pathological intervention), led to his later successful career as an elocutionist between 1803 and 1826. His primary passion in the early 1790s was politics. He was a founding member of the London Corresponding Society – a radical organ of the politically aware urban artisan class. The chief ideas of the radicals of that time being heavily influenced by French Jacobinism, it is not surprising that the British government of the day felt threatened and charged a number of radicals, including Tooke and Thelwall, with treason, though they were, somewhat to their surprise, subsequently acquitted.

Thelwall had also come into contact with Wordsworth and Coleridge through their youthful radicalism. After his release from Newgate prison he wandered the countryside, giving speeches in various parts of the country. He went to visit the Wordsworths in Somerset and was pursued by government spies. He finally sought refuge as a hill farmer in central Wales with his wife and brother-in-law. This experiment soon failed. A wish to pursue his real interest in literature combined with his rhetorical skills, part of his radical political appeal, proved serviceable on the public lecture circuit. He embraced the new patriotism and performed for mass audiences all over England. During these lectures he dealt with several cases of speech impediments and realized there was a living in this. After a short period running an institute in Liverpool he moved to London, where he opened one in Grays Inn Fields, London. He provided plays done by his pupils that were open to the public. These soirees were attended by fashionable London, including Charles Lamb and De Quincy.

In the late 1820s he returned to radical journalism as an editor and financier. This was a disastrous failure. After his death, his second wife published the first volume of a projected two-volume biography. A second volume was to have covered his elocutionary life.

His contribution to the study of the English language and therapeutic elocution rests on his advanced understanding of anatomy, his skill in diagnosing and intervening in speech disorders, including the original (paralleling Steele, whom he did not read till later) analysis of stress-timed rhythm as underlying all spoken English. We have the bare bones of his knowledge in his *Letter to Henry Cline* and various sketches of his lecture notes.

See also: Steele, Joshua (1700–1791); Tooke, John Horne (1736–1812).

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Thematic Structure

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Introduction

The **thematic structure** of a linguistic expression is a partial representation of its meaning, consisting minimally of a semantic relation and its arguments, often elaborated with more detailed semantic and syntactic information. For example, the verb *bake* in sentence (1a) expresses a **bake′** relation between two participants, the Baker (in this case, Jonas) and the product of the baking event or Bakee (in this case, the gingerbread). Using the standard logical notation in which **R** ($x_1, \ldots, x_n$) represents an n-place relation **R** with arguments $x_1, \ldots, x_n$, the thematic structure of (1a) is shown in (1b):

(1a) Jonas is baking the gingerbread.
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(1a) Jonas is baking the gingerbread.
(1b) **bake′** (*Jonas*, *the-gingerbread*)
(1c) **bake′** (Baker: *Jonas*, Bakee: *the-gingerbread*)

The argument positions can be given the explicit labels Baker and Bakee, as in (1c). This notation allows us to distinguish the different roles of the subjects in the intransitive (2a) and (2b):

(2a)	Jonas is baking.	**bake′** (Baker: *Jonas*)
(2b)	The gingerbread is baking.	**bake′** (Bakee: *the-gingerbread*)

The semantic roles played by the participants in the denoted event or state, such as Baker and Bakee, are called **thematic roles** or theta-roles (θ-roles). While (1) and (2) show the thematic structures of sentences, we may abstract away from the fillers of the roles and notate the thematic structure contributed by the verb *bake*: **bake′** (Baker: *x*, Bakee: *y*).

One may distinguish **individual thematic roles** from **thematic role types** (Dowty, 1989). Baker and Bakee are individual thematic roles, since they are specific to one verb. To compare the behavior of thematic roles across many verbs, linguists assign these roles to more general thematic role types such as Agent and Theme. (The term 'thematic role' is often used for such thematic role types, and will be used thus below where it does not invite confusion.) For example, the thematic roles played by the subjects of transitive *bake*, *eat*, and *sing* in (3) have in common that the individual filling the role is normally understood as purposefully causing the event to occur, hence they may be assigned the same thematic role type, one that is often called the Agent role.

(3a)	Jonas is baking the gingerbread.	**bake′** (Agent: *x*, Theme: *y*)
(3b)	Jonas is eating the gingerbread.	**eat′** (Agent: *x*, Theme: *y*)
(3c)	Marie is singing.	**sing′** (Agent: *x*)

The role played by the objects of *bake* and *eat*, often called the Theme thematic role type, involves the participant undergoing some change in virtue of the action: the gingerbread comes into existence as a result of baking (3a) and goes out of existence as a result of eating (3b).

Thematic structure is often conceived as a level of representation intermediate between semantics and syntax. For example, a thematic role type such as Agent has a rough semantic definition on the one hand (see above) and a set of characteristic syntactic properties on the other (e.g., an Agent role typically gets expressed as the grammatical subject rather than the object). Because of this intermediate status, the technical terminology specialized for thematic structure has borrowed from both the semantic and morphosyntactic sides. Terms reflecting the semantic status include the terms Agent, Theme, Goal, and so on that we used above. Terms borrowed from the side of morphological or syntactic expression include the nomenclatures of 'Deep Cases' (Fillmore, 1968; see below) and 'deep grammatical relations' such as 'logical subject/object' and 'underlying subject/object'. Proposals vary but most of them assume that this level of thematic structure has a dual status, interfacing with both semantics and syntax, but not reducible to either one.

The primary function of thematic structure for linguists is to describe and explain the complex ways in which the syntax of a clause depends on the meaning of the main verb or other predicator. A related goal is to explain semantic patterns of lexicalization, that is, to identify any universal and language-specific constraints on possible word meanings.

Pāṇini's *Kārakas*

The classical Sanskrit grammar *Aṣṭādhyāyī* ('Eight Books'), created by the Indian grammarian Pāṇini at a time variously estimated at 600 or 300 B.C. (Robins, 1979: 137) includes a sophisticated theory of thematic structure that remains influential to this day. (This section draws heavily from Kiparsky and Staal, 1969). Pāṇini's Sanskrit grammar is a system of rules for converting semantic representations of sentences into phonetic representations (Kiparsky and Staal, 1969: 84). This derivation proceeds through two intermediate stages: the level of **kāraka** relations, which are comparable to the thematic role types described above, and the level of morphosyntax (see **Figure 1**).

Grammar rules map each of the kārakas to a basic semantic relation and a basic morphosyntactic expression. More specialized variants of both types of rule are specified as well, with the basic relation and basic expression acting as defaults whenever the conditions for the variants are not met.

For example, the kāraka called *apādāna* (Source) has as its basic semantic relation 'the fixed point from which something recedes.' But with certain verbs, *apādāna* is used instead for special relations such as the source of fear, the object of hiding from, hindering,

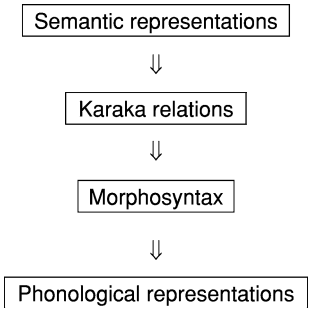

Figure 1 Adapted from Kiparsky and Staal, 1969: 84.

or learning from, and so on. The basic expression of *apādāna* is Ablative case. The basic semantic relation of the *karman* kāraka (Theme) is 'that which is primarily desired'; its basic expression is Accusative case. The *karaṇa* kāraka (Instrument) is associated with the basic semantic relation of 'the most effective means.' While its basic expression is Instrumental case, some verbs are instead specified for the Genitive case to express the *karaṇa* (see [4] below). Other kārakas include *saṃpradāna* (Indirect Object), *adhikaraṇa* (Locative), *kartṛ* (Agent), and *hetu* (Cause).

Alternations in the expression of arguments are handled with optional rules. For example, the kāraka *karaṇa*, defined as the relation 'with the most effective means' is normally expressed with Instrumental case, as in (4a). But some verbs, such as *yajate* 'sacrifice', are associated with an optional rule specifying Genitive case for *karaṇa*, as in (4b).

(4a)	Paraśunā	vṛkṣaṃ	chinatti.
	axe.INST	tree.ACC	cuts
	'He cuts the tree with an axe.'		
(4b)	Ghṛtasya /	Ghṛtena	yajate.
	butter.INST /	butter.GEN	sacrifice
	'He sacrifices with clarified butter.'		

The more general Instrumental rule acts as a default, applying when the more specialized optional Genitive rule is not selected.

This interplay between alternative mapping rules allows the intermediate level of kārakas to greatly simplify the grammar. For example, a range of (possibly related) semantic relations map onto the *karman* kāraka. This kāraka can be expressed in a range of ways, including compounds formed with the suffix *-aN*, the Accusative case, the 'objective' use of the Genitive case, and so on. Kiparsky and Staal (1969: 110) point out that "If semantic representations were mapped directly into surface structures, without the mediating kārakas, the list of surface structures to which *karman* can correspond ... would have to be enumerated anew for each semantic relation which can underlie a *karman* relation." In short, the kārakas act as important equivalence classes for the statement of linguistic rules and generalizations. The rules for actives and passives, for impersonal passives, for infinitive verbs and nominals, for the use of particular cases, and for the interpretation of unexpressed agents of infinitives and participles are expressed in terms of the kārakas.

Thematic Roles in Modern Generative Grammar

Fillmore's (1968) Case Grammar, and much subsequent work, revived Pāṇini's proposals in a modern setting. A principle objective of Case Grammar was to identify argument positions that may have different realizations in syntax, e.g., the theme of the verb *bake* that is expressed as the object of (1a) and the subject of (2b). Fillmore argued that for many grammatical processes, the reference to purely syntactic relations such as subject and object is insufficient, and must be supplemented or even replaced by a reference to underlying semantic properties (cf. thematic role types), which he called **deep cases** or simply cases.

Fillmore hypothesized "a set of universal, presumably innate, concepts which identify certain types of judgments human beings are capable of making about the events that are going on around them" (Fillmore, 1968: 24). He posited the following preliminary list of cases, noting however that "additional cases will surely be needed" (and indeed Fillmore added more in later works):

(5a) Agent (A), the typically animate perceived instigator of the action
(5b) Instrument (I), inanimate force or object causally involved in the action or state
(5c) Dative (cvD), the animate being affected by the state or action
(5d) Factitive (F), the object or being resulting from the action or state.
(5e) Locative (L), the location or spatial orientation of the state or action
(5f) Objective (O), "the semantically most neutral case ... conceivably the concept should be limited to things which are affected by the action or state"

Fillmore provided linguistic evidence for his deep cases (for consistency they will be referred to below as thematic roles). He argued, for example, that the subjects of (6a) and (6b) have different thematic roles, namely Agent and Instrument, respectively, on the basis of facts in (6c)–(6e), assuming biuniqueness of role assignment (exactly one role per argument Noun Phrase). The unacceptable (6d) represents a failed attempt to assign both Agent and Instrument roles to the bracketed conjoined subject, while in (6e) the Instrument role is assigned to two different dependents.

(6a) John broke the window.
(6b) A hammer broke the window.
(6c) John broke the window (with a hammer).
(6d) *[John and a hammer] broke the window.
(6e) *A hammer broke the window with a chisel.
(6f) The window broke.

For the mapping from deep cases to surface syntactic structure, Fillmore introduced the influential idea of a hierarchy of preference for subject selection. He posited the following rule applying to verbs with

Agentive (A), Instrumental (I), and/or Objective (O) cases: "If there is an A, it becomes the subject; otherwise if there is an I, it becomes the subject; otherwise the subject is O" (Fillmore, 1968: 33). This rule accounts for the alternations in (6) above, assuming that the verb *break* selects O as an obligatory role while optionally selecting A and I. This mapping from semantic roles to their expression in the syntax is sometimes called **linking** or argument selection.

This notion of a universal **thematic hierarchy** relevant to linking has since reappeared in many variants (Jackendoff, 1972; Foley and Van Valin, 1984; Bresnan and Kanerva, 1989; inter alia). A relative (often partial) ordering is imposed on thematic role types and on grammatical relations, as in this simplified system:

(7a) agent > beneficiary > recipient/experiencer > instrument > theme > location
(7b) Subject > Object

Linking between these two hierarchies must respect both orders, so that, for example, in a transitive Agent/Theme verb, the Agent must link to Subject and Theme to Object, and not the other way around (i.e., the linked structure is an order isomorphism). This idea has been influential in several different syntactic frameworks. Wechsler (1995) developed this variety of hierarchical linking scheme within the framework of Head-Driven Phrase Structure Grammar. Lexical Mapping Theory (Bresnan and Kanerva, 1989 and much subsequent work) uses both absolute constraints ('Agents cannot map to objects') and relativistic ones based on a thematic hierarchy.

Pāṇini's theory of kārakas, Fillmore's Case Grammar, and other theories of thematic role types have been criticized (Dowty, 1989, 1991, *inter alia*). One problem is the difficulty of finding reliable diagnostics or definitions for the role types. Semantic criteria tend to lead to a fragmentation into finer and finer subtypes. Another problem is that a single event participant often seems to play more than one role: *John* in *John ran to the store* is arguably both the Agent (since John volitionally carries out the action) and the Theme (since he undergoes a change of location). Similarly, in the event described by *Beth bought the car from Ann for $500*, Beth has three roles: she is simultaneously the Agent, the Recipient (of the car), and the Source (of the money) (Jackendoff, 1990: 59ff). This last problem, at least, was addressed by decomposition theories, to which we turn next.

Decomposition Approaches

In the theories described so far, a verb is associated with an atomic relation (such as **break′**, **eat′**, etc.) and a simple set or list of argument roles. Theories of **lexical decomposition** expand on that model by decomposing word meaning into a structure built from more basic relations such as CAUSE, GO, STAY, and so on. The verbs *buy* and *sell*, for example, can be decomposed into the following thematic structures, where GO_{Poss} represents the transfer of possession (adapted and simplified from Jackendoff, 1990: 191):

(8a) *sell* ('α sold γ to β for δ')

$$cause\left(\alpha, \begin{bmatrix} go_{Poss}(\gamma, [from(\alpha)\ to(\beta)]) \\ go_{Poss}(\delta, [from(\beta)\ to(\alpha)]) \end{bmatrix}\right)$$

(8b) *buy* ('β bought γ from α for δ')

$$cause\left(\beta, \begin{bmatrix} go_{Poss}(\gamma, [from(\alpha)\ to(\beta)]) \\ go_{Poss}(\delta, [from(\beta)\ to(\alpha)]) \end{bmatrix}\right)$$

Variables index the argument positions, allowing a single participant to play multiple roles, as in the following example sentences:

(9a) Ann sold the car to Beth for $500.

$$cause\left(Ann, \begin{bmatrix} go_{Poss}(car, [from(Ann)\ to(Beth)]) \\ go_{Poss}(\$500, [\text{from(Beth) to(Ann)}]) \end{bmatrix}\right)$$

(9b) Beth bought the car from Ann for $500.

$$cause\left(Beth, \begin{bmatrix} go_{Poss}(car, [from(Ann)\ to(Beth)]) \\ go_{Poss}(\$500, [\text{from(Beth) to(Ann)}]) \end{bmatrix}\right)$$

Notice that the structures for *buy* and *sell* in (8) are the same except for the identity of the first argument of CAUSE. This reflects the fact that (9a) and (9b) are paraphrases (or very nearly so), differing only with respect to the primary instigator of the event (Jackendoff, 1990: 191).

The structures in (8)–(9) illustrate a **localist** approach, in which various abstract relations such as possession are analyzed as metaphorical extensions of locative relations (Gruber, 1965; Jackendoff, 1972). Relations such as GO apply across different semantic fields, the most basic being spatial location and movement, where GO encodes literal motion in space. Within the field of possession relations, GO_{Poss} indicates transfer of possession (the semantic field is indicated by the subscript). *see* **Lexical Conceptual Structure** for more on Jackendoff's decomposition theory generally, and the localist hypothesis in particular.

Gruber (1965) hypothesized that all semantic relations are generalizations of spatial and motional relations. Jackendoff (1990: 125ff) argued that this reduction was inadequate and supplemented the localist structure with other relations such as

AFF(ect), a two-place relation between an Actor (the one that affects) and Patient (the one that is affected). Inspired by autosegmental phonology, Jackendoff represented relations on two autonomous tiers, the thematic tier for local relations and their derivatives, and the action tier for the roles Actor and Patient. In another tier-based proposal, Grimshaw (1990) posited a thematic tier that contains thematic roles such as Agent, Experiencer, Goal/Source/Location, and Theme, and an aspectual tier that expresses causation and change of state.

Aspectual Decomposition

An influential decomposition approach to word meaning is presented in Dowty, 1979. Dowty combined insights developed in Generative Semantics (see 'Composing Complex Word Meaning in the Syntax' below) with the intensional logic system in the tradition of Richard Montague. He focused on deriving the aspectual classes of verbs due to Vendler (1957), namely states, activities, accomplishments, and achievements. States (*know, love, be happy*) do not involve change, in contrast to the other three categories, which do. Activity predicates (*run, push a cart*) denote indefinite change of state, while the remaining nonstative classes denote definite changes with an inherent endpoint. Accomplishments (*paint a picture, make a chair*) are complex and extended in time, while achievements (*spot, find, die*) are simple and occur at a point in time.

Dowty (1979) hypothesized that "the different aspectual properties of the various kinds of verbs can be explained by postulating a single homogeneous class of predicates – stative predicates – plus three or four sentential operators and connectives." (Dowty, 1979: 71) The operators and connectives are treated as logical constants, with a standard model-theoretic interpretation for each. Two important operators are CAUSE and BECOME. Accomplishments are defined in terms of the operator CAUSE, which takes two propositions as arguments. As its name suggests, this operator is meant to capture the notion of causation. The BECOME operator takes a single state as its scope, its interpretation fixed so that BECOME(p) is true at time t if $\neg p$ is true just prior to t and p is true just after t. This operator is introduced by accomplishment verbs, and the state p corresponds to the result state of the accomplishment. A third operator, DO, relates volitional agents to the actions they undertake.

Dowty illustrated his system with detailed analyses, including a treatment of the systematic semantic relation between adjectives such as *cool* or *open*, and their cognate inchoative and transitive verbs. For example, the property **cool**′ is the stative predicate expressed by the adjective *cool* (10a). (The logical expressions in (10) are adapted in simplified form from Dowty, 1979: 206–207). The inchoative verb *cool*, as in *The soup cooled*, is translated using **cool**′ in combination with the BECOME operator in (10b). This sentence can be roughly paraphrased as 'The soup became cool.' Dowty's translation of the causative verb *cool*, as in *Marie cooled the soup*, is an expression of the form ϕ CAUSE ψ, where ϕ and ψ are propositions (10c). The causing proposition ϕ involves the agent argument (*Marie*, in the example) and the result ψ is BECOME(**cool**′ (the-soup)).

(10a) adjective *cool* (as in *The soup is cool*):
λy [**cool**′ (y)]

(10b) intransitive verb *cool* (as in *The soup cooled*):
λy [BECOME[**cool**′ (y)]]

(10c) transitive verb *cool* (as in *Marie cooled the soup*):
$\lambda y \lambda x$[[. . .x . . .] CAUSE [BECOME[**cool**′ (y)]]]

Dowty motivated his system with a rich array of linguistic evidence. For example, the existence of the result state expression **cool**′ (y) in the structure in (10b) and (10c) explains the ambiguity of *Marie cooled the soup again*: it presupposes either (a) that Marie cooled the soup at least once before, or (b) that the soup was cool before. (Reading (b) is illustrated by the familiar rhyme, *All the king's horses and all the king's men couldn't put Humpty Dumpty together again*. Dowty (1979: 252) notes that this "is obviously not intended to entail that anyone had put Humpty Dumpty together on an earlier occasion, but merely that Humpty Dumpty had been 'together' once before.") This ambiguity follows if the operator introduced by the adverb *again*, which contributes the presupposition that the situation in its scope obtained previously, can take a scope that is either wider or narrower than that of the BECOME operator.

Unlike Pāṇini, Fillmore, and Jackendoff, Dowty did not apply his theory to the linking between lexical semantics and syntax, such as subject selection. Dowty does not posit rules of the form 'a variable contained within the first argument of CAUSE must be linked to the subject.' Nor would such rules make sense, under Dowty's assumptions. The expressions of intensional logic do not constitute a linguistic level of representation, since various parts of them can effectively be traded in for meaning postulates without affecting the resulting interpretation. Dowty's main hypothesis – that all verb meanings can be reduced to states together with a small set of primitive semantic operations – does not require that there be a unique translation of each linguistic expression into intensional logic, but only that there be at least one translation (Dowty, 1979: 199).

However, other researchers have adopted a reified version of Dowty's logical expressions as a basis for linking theories. Foley and Van Valin (1984), for example, posited logical structures based on Dowty, 1979. A table of universal correspondences maps these positions in logical structure onto the two Macro-Roles Actor and Undergoer, and these in turn are mapped onto the morphosyntax of the sentence.

An interesting variant of such approaches to linking derives linking patterns from the depth of embedding in the logical form (Bierwisch and Schreuder, 1992; Wunderlich, 1997). Bierwisch and Wunderlich represent grammatically relevant aspects of lexical decomposition in a semantic form, as they call it, built from universal operators such as CAUSE and BECOME as above. The arguments of a verb are ranked according to their relative level of embeddedness in the semantic form. Wunderlich (1997) refers to the ranked set of arguments, elaborated with some nonsemantic information, as the thematic structure. For example, in a semantic form similar to (10c) above, the variable *x* would outrank *y*, since *y* is the more deeply embedded (this is a simplification; see Wunderlich, 1997 for details). This ranking determines the mapping to grammatical relations such as subject and object, much as the thematic hierarchy does in the system presented in (7) above, only it is unnecessary to stipulate a hierarchy since the ranking is derived from the semantic form.

Proto-Roles and Macro-Roles

Dowty (1991) proposed a theory of linking based on prototype theory. The idea behind his proto-role approach is that there are really only two thematic-role-like concepts involved in argument selection, and these are 'cluster concepts,' not discretely defined ones. He calls them the Agent Proto-Role and Patient Proto-Role. These are to be the (only) thematic categories on which linking principles are stated. These are the specific properties Dowty (1991: 572) gives:

(11) Contributing properties for the Agent Proto-Role:
a. volitional involvement in the event or state
b. sentience (and/or perception)
c. causing an event or change of state in another participant
d. movement (relative to the position of another participant)
(e. exists independently of the event named by the verb)

(12) Contributing properties for the Patient Proto-Role:
a. undergoes change of state
b. incremental theme
c. causally affected by another participant
d. stationary relative to movement of another participant
(e. does not exist independently of the event, or not at all)

The properties are prototypical: no single property is essential for either role. Instead, Dowty gives the following procedure:

(13) Argument selection principle: in predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object. (Dowty, 1991: 576)

Notice that there is no attempt to find some unifying semantics behind the lists of properties in (11) and (12). Proto-Agent and Proto-Patient are 'cluster concepts' or 'higher-order generalizations about meanings' that need not even be considered as part of the competence grammar. Instead, Dowty suggests that the argument selection principle (13) acts as a default in the acquisition of lexical items.

A number of linguists have borrowed aspects of the proto-role idea into their models of competence grammar (Ackerman and Moore, 1999; Davis, 2001). Davis's (2001) theory of linking between word meaning and syntax uses proto-role properties in a multiple inheritance type hierarchy in the Head-Driven Phrase Structure Grammar framework. Each proto-role property is encoded in the lexicon as a type within a rich hierarchy of types and subtypes. Davis assumes two 'macro-roles' called Actor and Undergoer (following the terminology of Foley and Van Valin, 1984), which are, for Davis, reified versions of Dowty's (1991) Proto-Agent and Proto-Patient cluster concepts, respectively. For example, corresponding to (11c) ('causing an event or change of state in another participant') and (12c) ('causally affected by another participant') is an abstract 'affect' relation with two arguments, Actor and Undergoer. This semantic relation takes its place within a hierarchy of relations of increasing specificity. Particular verbs inherit semantic information from those types, and thereby also inherit the classification of roles into the two macro-roles, which determines the linking to the syntax.

Composing Complex Word Meaning in the Syntax

Complementing the theories of lexical decomposition is the idea that apparently complex word meanings are composed within the combinatorial syntax itself.

This recurring theme has resurfaced in generative syntax under different guises.

An early version of this theme appeared in the 1960s under the rubric of Generative Semantics (Lakoff, 1965; McCawley, 1968). Semantically contentful primes such as CAUSE and BECOME are directly inserted into syntactic deep structure representations of the sentence meaning. For example, the systematic relation between the adjectival, intransitive, and transitive forms, as in (10) above, was derived by positing distinct though related deep structures for the sentences, analogous to the logical expressions for word meaning in (10) (as noted above, Generative Semantics was one inspiration for Dowty's 1979 analysis).

Although Generative Semantics itself died out, vestiges of the syntactic composition approach to word meaning survived, and later returned in full force. It is noteworthy that even Chomsky's (1970) influential article 'Remarks on Nominalization,' which persuasively argued *against* using transformations to capture relations between derivational cognates such as *destroy/destruction*, still posited an abstract CAUSE node in syntax for the derivation of causative variants of verbs (Chomsky, 1970: 24ff; example [12]).

In later variants of transformational grammar such as Government/Binding Theory, Deep Structure (or D-structure, as it came to be called) lost its status as a true semantic representation, but remained a representation of thematic structure (Chomsky, 1981: Chap. 2, Sect. 2.2). The idea was that a particular thematic role of a lexeme must be consistently assigned to the same position in phrase structure. One formulation of this conception was Baker's (1988) Uniformity of Theta Assignment Hypothesis (UTAH, [14]). Baker illustrated with the alternation in (15).

(14) Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure. (Baker, 1988: 46)

(15a) Julia melted the ice cream into mush.
(15b) The ice cream melted into mush.

Since the thematic relationship between *melted* and *the ice cream* is the same in (15a) and (15b), it follows from UTAH that they must be in the same relative positions at D-structure. Specifically, the NP *the ice cream* is the (D-structure) object of the verb in both sentences. Baker posits the following D-structures for (15a) and (15b), respectively:

(16a) $[_{S}$ Julia $[_{VP}$ melted [the ice cream] into mush]].
(16b) $[_{S}$*e* $[_{VP}$ melted [the ice cream] into mush]].

To derive sentence (15b), a transformation moves the NP *the ice cream* into the subject position, where it replaces the empty element marked by *e*. In Government Binding theory, D-structure functioned as a kind of thematic structure for the sentence.

The Generative Semantics idea of building complex word meaning by combining simpler semantic elements within the syntax was revived in the 1990s, but it remains highly controversial. In one influential proposal, Hale and Keyser (1993) derive denominal verbs such as *paint* and *shelve* from a syntactic structure containing the cognate nouns *paint* and *shelf*.

(17a) We painted the house.
(17b) We $[_{V'}$ V1 $[_{VP}$ house $[_{V'}$ V2 $[_{PP}$ P_{with} paint]]]].

(18a) We shelved the books.
(18b) We $[_{V'}$ V1 $[_{VP}$ books $[_{V'}$ V2 $[_{PP}$ P_{on} shelf]]]].

The nominal root *paint* or *shelf* moves to the empty verb position V1, combining en route with the abstract silent preposition shown here as P_{with} (cp. 'provide the house with paint') or P_{on} (cp. 'put books on the shelf'); and with an abstract silent verb in V2.

But the success of that analysis is disputed in a detailed critique by Kiparsky (1997). Kiparsky argued that the derivation of such verbs from nouns is conditioned by conceptual knowledge about the noun, information assumed to be absent from the syntax-like structures posited by Hale and Keyser. Kiparsky noted, first of all, that Hale and Keyser's proposed system fails to prevent the insertion of the noun root into the wrong structure. For example, substituting *paint* for *books* and *house* for *shelf* in (18b) yields a structure that would mean 'cause paint to go on the house' – that is, 'paint the house'. But this wrongly leads to the generation of the unwanted sentence **We housed the paint*. Hence Hale and Keyser do not actually predict whether the denominal verb is named for the location (shelf, etc.) or the locatum (paint, etc). Kiparsky (1997: 482) specifies a simple principle to do just that: "If an action is named after a thing, it involves a canonical use of the thing." It is a canonical use of paint to put it on houses, so the action (to paint) is named after the thing (paint); but it is not a canonical use of houses to put paint on them. This explanation crucially depends upon conceptual information that is associated with the words but absent from the syntactic or semantic form. Thus noun-to-verb conversion is a lexical and not a syntactic process.

In another influential proposal to build word meaning in the syntax, Kratzer (1996) hypothesized that the external arguments (Williams, 1981) – roughly the Agent thematic roles – are not selected by the verb at all. For Kratzer (1996), the verb *buy*

lacks a buyer argument, hence in the sentence *Sue bought the doll*, the subject *Sue* is not an argument of the verb *buy*. Instead the agent role is assigned in the syntax by what is sometimes characterized as an abstract light verb or secondary predicate.

In an actual light verb construction such as *John will do the laundry*, most of the semantic content describing the laundering event is carried by the noun *laundry*, while the light verb *do* merely serves to introduce the subject (*John*), which expresses the agent of that event. Notating the abstract light verb with lowercase *v* (Chomsky, 1995: 315), the underlying syntactic structure of *Sue bought the doll* is shown in (19a). This structure is intuitively analogous to the (somewhat awkward) sentence (19b), provided here for illustrative purposes.

(19a) [Sue [*v* [bought the doll]]]
(19b) [Sue [did [the purchase of the doll]]]
(19c) $\exists$e[buy(the-doll, e) $\wedge$ Agent(Sue, e)]

Kratzer's logical form for the sentence, shown in (19c), is a modification of the event semantics analysis due to Davidson (1967). Davidson argued that an action sentence asserts the existence of an event, indicated by the variable *e*, which is bound by the existential quantifier ($\exists$). Kratzer hypothesized that in composing the semantic form in (19c) from the sentence structure in (19a), the expression **buy**(the-doll, e) comes from the verb *bought* (and its argument, the NP *the doll*), while the expression **Agent**(Sue, e) is provided by *v* (and its argument, the NP *Sue*). Note that this use of the abstract light verb is similar to the use of semantic primes such as CAUSE in the theories that compose word meaning in the syntax. One innovation introduced in this most recent revival of Generative Semantics has been the attempt to assimilate the abstract semantic primes into the system of functional heads in extended X-bar theory.

Kratzer's proposal that agent arguments are not selected by the verb has been widely adopted but remains highly controversial. One challenge for Kratzer is to explain why verbs vary as to whether they can, must, or cannot appear with an agent argument:

(20a) John dissolved the company. / The company dissolved.
(20b) John eliminated the company. / *The company eliminated.
(20c) *John disappeared the rabbit. / The rabbit disappeared.

Even restricting our attention to verbs that select an agent argument, the proposal still encounters problems. Krifka (1999) attacks the idea of representing lexical semantics in syntactic terms by showing that many verbs of causation impose special semantic conditions on the relation between the causing and resulting events. This supposition allows an elegant account of certain observed constraints on the dative alternation (e.g., *Sue threw/pulled the box to Ann; Sue threw/*pulled Ann the box*). But Krifka notes that this account is possible only if those semantic conditions, and hence the causing event itself, are specified in the lexical entry of the verb.

The question of whether word meaning is assembled in the lexicon or the syntax remains controversial.

See also: Argument Structure; Aspect and Aktionsart; Causatives: Semantics; Event-Based Semantics; Formal Semantics; Lexical Conceptual Structure; Lexical Conditions; Lexical Fields; Lexicon: Structure; Meaning Postulates; Panini; Prototype Semantics; Semantic Primitives; Semantics in Role and Reference Grammar; Verbs.

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Thematics

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Thematics is the study of themes and motifs in text and discourse. It deals with textual elements and the inferences and processes underlying their construction and maintenance. Because the elements, inferences, and processes lie at the crossroads of various disciplines, the study of themes must be carried out at the interface of these disciplines, including linguistics, psychology, cognitive science, (art) history, and literary studies. For instance, in literary studies and art history, the nature, occurrence, and development of popular motifs and themes have been documented (Daemmrich and Daemmrich, 1986), the constant elements of theme have been compared to the variable elements in literary text (Zholkovsky, 1984), and historical, social, and cultural aspects of theme have been visited and revisited (Bremond *et al.*, 1995; Sollors, 1993). In text linguistics the textual features that contribute to theme have been analyzed (Emmott, 1997; van Dijk, 1980; van Peer, 1986). In psychology cognitive processes that are active in constructing the theme of the text have been investigated (Gernsbacher, 1994; Graesser *et al.*, 2003), whereas in computational linguistics various attempts have been made to automatically summarize and retrieve themes in text (Jurafsky and Martin, 2000). In sum, thematics has grown to highly interdisciplinary studies of 'aboutness' in text (Louwerse and van Peer, 2002).

Theme and Motifs

Theme refers to what a text or discourse is about, its main idea, its subject or topic. Several other terms are somewhat synonymous to theme, including *topos*, *Stoff* (as in *Stoffgeschichte), figure*, *topic*, *gist*, *upshot*, and *point*. Themes are often related to some human activity, are directly involved in human interests and concerns, or tend to be emotionally charged. Textbook examples of themes are illusion versus reality (*Madame Bovary*; *Hamlet*); marriage, love, and family life (*Anna Karenina*); or a journey of discovery (*Ulysses*). In addition to the meaning of aboutness, theme has sometimes been considered to be related only to the doctrinal content of a text. A clear example concerns fables, where the theme would be the moral of the text.

Related to theme is the notion of motif, the smallest event units in a text (e.g., the hero died, the letter

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arrived). Motifs can be subdivided into bound and free motifs. Bound motifs are essential to the logical-chronological development of a text (generally a story), whereas free motifs are not essential to the story line. Another distinction between motifs is the one between static and dynamic motifs. The former are, for instance, states of the character (whether necessary or not for the story line), whereas the latter are actions (Barthes, 1970; Tomashevsky, 1925/1965).

History of Thematics

The study of theme can be traced back to Plato's *Ion* (ca. 390 B.C.E.), Aristotle's *Poetics* (ca. 335 B.C.E.), and Horace's *Art of Poetry* (ca. 14 B.C.E.) and has received continuous attention throughout the centuries. The term *thematics* was coined in 1925 by Tomashevsky (English translation 1965) in his article 'Thematics.' Tomashevsky claimed that many texts can have one theme, but that one text can also have many themes. In the tradition of Russian Formalism, Tomashevsky tried to isolate and define the formal properties of poetic language and argued that the theme of a text is the sum of the meanings of its elements. More precisely, the themes (or motifs) of the text form the building blocks of texts.

The impetus in thematic research came from folklorists. In a Positivist tradition, they looked for the universality of folktales and identified recurrent patterns. Bédier (1893), for instance, made the distinction between constant and variable components in folktales, where the former form the basis of the story. The constant and variable building blocks of a story resulted in a number of motif indices (e.g., Veselóvsky, 1913) that were very different from those that classified according to the historical relationship stories had to each other (e.g., Aarne, 1910). Aarne's *Types of the Folk-tale* was originally an historical index, but was revised by Thompson using the smaller elements of a story (motifs) that did not imply the historical connection. The result was the influential Aarne–Thompson (1928) index that brought together narrative elements from a wide range of traditional fictional narratives. Later, Thompson's six-volume *Motif-Index of Folk-literature* (1955–1958) classified motifs into smaller classes such as actors (e.g., wicked stepmother), objects (e.g., seven-league-boots), and single incidents (e.g., to die next day).

The Aarne and Thompson classifications proved to be very useful for practical references, but lacked a theoretical basis. Such a basis was provided by Vladimir Propp's *Morphology of the Folktale* (original 1928; English translation 1958), which undoubtedly influenced the interdisciplinary study of themes most. Many of the methodological problems Propp identified directly relate to today's state of thematics. Propp argued, for instance, that classifying texts is problematic because of the methods of investigation and argues that only an interdisciplinary approach can bring solutions. More specifically, Propp claimed that previous classifications with a clear-cut *a priori* division into which the various tales under investigation are classified are problematic. Propp argued that motifs are the primary building blocks of a tale, whereas the plot is a creative unifying act. This means that a set of motifs forms the constants of a tale, to which variables are added. The problem, however, is to decide what these constants are. Instead of using a deductive approach, where the constants are defined before the actual study of the tales has started, Propp compared the plots of a corpus of tales by abstracting each tale's constant elements from the variable ones. These constant elements are what Propp called 'functions,' acts of a character that are important for the course of the action in the text. The advantage of such a method is that the varieties on Aarne and Thompson's paradigmatic plane are reduced by working on a syntagmatic plane. More concretely, many folklorists see a motif such as 'a dragon kidnaps the tsar's daughter' as a basic narrative unit. Propp, on the other hand, argued that this example can be further decomposed into four elements, which can in fact vary. The dragon can be replaced by all kinds of villains, the abduction by all kinds of acts of disappearance, the tsar by any powerful ruler, or the princess by any kind of victim.

Although one could argue that thematics has never lacked interest, in the 1970s and 1980s it lost its momentum somewhat, at least in literary studies. The treatment of themes in a systematic text-centered way and the confusion regarding its terminology (Levin, 1968) resulted in a movement away from thematic criticism in literary studies. Some, however, continued their work in thematics (see following discussion). More recently, the interest in the study of themes has picked up again, primarily because of the interdisciplinary interest in the study of theme (Bremond *et al.*, 1995; Louwerse and van Peer, 2002; Sollors, 1993; Trommler, 1995). Thematics has grown to become an interdisciplinary line of research, with studies on theme in literary studies, art history and music, text linguistics, psychology, and computational linguistics. We will briefly outline some of the leading work in each of these areas, fully acknowledging that by dividing the overview into disciplines we do not do justice to the interdisciplinary nature of thematics.

Text Linguistics

The object of thematics is somewhat different from the notion of theme as distinguished from rheme. In linguistics and psycholinguistics the distinction between theme and rheme (also referred to as given and new, topic and comment) has played an important role. In the 1920s linguists of the Prague School introduced the distinction between theme and rheme, theme being the given information, used by the speaker to either introduce or maintain a particular topic. The rheme is the new information, that is, the expression containing the information the speaker wishes to communicate with respect to the topic at hand. In a similar vein, theme in functional grammar is selected by the speaker to ground what is going to be said, the point of departure (Halliday, 1985). This notion of theme is related to that of theme used in thematics, with the important difference that in thematics, theme refers to the aboutness of text units beyond the sentence (typically paragraph, chapter, text, or several texts).

This last notion of theme became popular in text linguistics with the English translation of Propp's *Morphology of the Folktale* (1958). Around this time various linguists argued for global structures in narrative (Bierwisch, 1965; Harris, 1968), followed by transformational rules for story and text grammars (Van Dijk, 1972, 1980). van Dijk, for instance, proposed that macrorules like addition, selection, deletion, and construction are applied to the textual surface structure. These rules filter the text and keep its gist, the macrostructure. In other words, the macrostructure of a text can guide the reader in determining the theme of the text (*see* **Macrostructure**). In fact, certain linguistic cues and structures can help identify these global structures (Givón, 1993).

Other text linguists have argued that it is not just the presence of these linguistic cues that can create thematic meaning, but also how these cues are used (see Emmott, 1997). Stylisticians generally use the term *foregrounding* when the text draws attention to the linguistic medium because of its unusual use (van Peer, 1986). Repeated use of certain linguistic structures or stylistic figures will not only emphasize the literariness of the text, but also its thematic meaning.

Literary Studies

For a long time the object of thematics was primarily reserved for literary themes, including those in folktales. Although the distinction between thematics in literary studies and in other disciplines is not clear cut, literary studies has clearly had its own thematic tradition. Levin (1968), for instance, pointed out the importance of the textual units in a text, but showed that thematics in the literary tradition has primarily been historically oriented. Elisséef (1949) documented a theme and motif index in *Thousand and One Nights*, whereas Daemmrich and Daemmrich (1986) compared recurrent themes in literature, resulting in a large index of themes and motifs and their occurrences in western literature. Other examples of these indices are Amoia and Knapp (2002) identifying multicultural themes, Brunel (1992) listing mythological themes, Magill (1986) identifying themes in drama, and Zipes (2000) indexing themes in fairy tales.

No doubt in part caused by Formalist and Structuralist approaches becoming influential in the English- and French-speaking world in the seventies (Barthes, 1970; Bremond, 1973; Propp, 1958; Thomashevsky, 1925/1965), a gradual shift toward text-centered approaches can be noticed in the study of themes. At the time when poststructuralism became fashionable in literary studies, Zholkovsky (1984) and Ziolkovski (1983) distanced themselves from these movements and linked thematics back to a prepoststructuralist poetics, showing how Formalism and Structuralism can go hand in hand with thematics, arguing that generic themes in literature come about through the structure of the text. However, whereas in text linguistics and psychology, the attention for textual thematic features in the text increased, thematics in literary studies became marginalized. This changed with the volumes by Bremond *et al.* (1995), Sollors (1993), and Trommler (1995), in part perhaps because these volumes include a variety of approaches in the field of literary studies and (art) history.

Cross-Cultural Psychology

Recently, another dimension of thematics has been added from the field of cross-cultural psychology. Cultural differences and similarities are seen as reflected in different and similar themes that play a dominant role in those cultures. Around such themes patterns of shared beliefs, norms, and values are organized into cultural syndromes (Triandis, 1996). Examples of such syndromes are collectivism, individualism, honor, and tightness. In collectivist cultures, for instance, the self is predominantly defined with reference to others in the social group, whereas individualist cultures define the self in more autonomous terms. It is obvious that the theme of self uses different forms of social space, goal structures, or emotions. Cross-cultural psychologists have developed methods to study and measure the underlying themes of cultural syndromes (Triandis *et al.*, 1990). In order to start developing such a cross-cultural psychology, we need to study the differences between cultures. One way to do this is by looking at the way

in which culturally defined themes construct cultural syndromes.

Psycholinguistics

One of the first thematics studies in psychology investigated the facilitating role of memory for themes (Bransford and Johnson, 1972). When participants were given a rather vague and ambiguous text without a clear theme, recall was inferior compared to the condition where participants were instructed what the text was about. The role of theme in memory was also found with more natural (less vague and ambiguous texts) texts (Anderson and Pichert, 1978).

Several studies have found that text processing involves three processing levels: the surface form (the meaning of the text with its linguistic structure), the propositional representation of the surface form (the meaning of the text), and the situation model (the meaning of the text integrated with the reader's background knowledge) (Kintsch, 1998). The surface level representation decays from memory relatively quickly. The propositional level, which contains the meaningful thematic units primarily derived from the text, decays from memory next. The situation model, which is most likely to contain all relevant thematic information, is retained in memory best (Kintsch *et al.*, 1990). Various text processing theories have been able to predict which parts of the text are remembered best and why (van Dijk and Kintsch, 1983). All studies indicate that theme content decays from memory more slowly than other processing levels (Kintsch *et al.*, 1990).

There is also some thematic research in the field of neuropsychology. Despite the fact that it is hard to determine where the processing of themes takes place in the brain (given that there are so many lower- and higher-level cognitive processes active at the same time) literature suggests that many of the processes involved in retrieving the theme of the text can be located in the right hemisphere (Nichelli *et al.*, 1995).

Computational Linguistics

A line of thematics that is relatively new concerns computational approaches to the study of theme. Although there is no computational model available that plucks out the theme of a text, several models approximate what the text is about. Some models center around the frequency of semantic fields in a text. Examples of such models are PROTAN (PROTocol Analyzer), which creates profiles of the main affective connotations in the text and analyzes relations between the words in the text to determine themes (Hogenraad, 2002), and ALEXIS (Martindale, 1990), using the Regressive Imagery Dictionary to measure thematic primordial content and conceptual thought.

A different direction in computational thematics comes from work that builds onto story grammars (Rumelhart, 1977). Initially these story grammars consisted of rule systems that could account for major events in conventional stories. A typical rule would state that a story consisted of an introduction, climax, and conclusion. This work expanded with the work on scripts (Schank and Abelson, 1977), generic knowledge structures like restaurant scripts that activate typical events in a restaurant, the work on goals of the characters in the text (Wilensky, 1983), and the work on affect in characters in Lehnert's (1981) plot unit analysis. Dyer (1983) developed these theories further by introducing thematic abstraction units (TAUs), knowledge structures for understanding events. TAUs are more abstract than Schank and Abelson's (1977) scripts, in that they incorporate the agents' plans and goals. TAUs would allow to generate a complex knowledge dependency structure of plans, failed plans, and attempted recovery of plans.

More recently, computational models have been developed that identify cohesion relations between events in a text in order to compute the most cohesive, and therefore most salient, thematic events (Louwerse, 2002). A slightly different approach was taken by Kintsch (2002), who used Latent Semantic Analysis to represent events in a text as vectors in a high-dimensional space, allowing to derive a precise mathematical representation of the theme of the text.

Interdisciplinary Studies and Future Directions

Thematics has primarily focused on narrative texts, in part because narratives tend to be more homogeneous and in part because of the background of thematics in literary studies. Looking at the history of thematics, some (Bremond *et al.*, 1995; Sollors, 1993) have claimed that thematics was present and absent at different time periods. The argument should be made, however, that thematics has never disappeared from disciplines such as literary studies, text linguistics, psychology, and computational linguistics. With the current efforts to integrate these various approaches (Louwerse and van Peer, 2002), the study of theme has thereby become even more influential and more intercultural as well as interdisciplinary.

See also: Barthes, Roland (1915–1980); Cognitive Science: Overview; Cohesion and Coherence: Linguistic Approaches; Computational Stylistics; Discourse Processing;

Foregrounding; Identity and Language; Latent Semantic Analysis; Macrostructure; Narrative: Linguistic and Structural Theories; Propp, Vladimir Iakovlevich (1895–1970); Psycholinguistics: Overview; Reading Processes in Adults; Representation in Language and Mind; Stylistics; Text and Text Analysis.

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Theme in Text

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Starting Points

The special status of the opening constituent(s) of sentences in the signaling of discourse organization has long been recognized, particularly within applied studies oriented toward the teaching of writing (see, e.g., Vande Kopple, 1991; Hewings, 2004); and scholars from a variety of backgrounds have investigated the textual implications of placing certain kinds of constituents in initial position (e.g., Thompson, 1985, on purpose clauses; Schiffrin, 1985, on causal sequences; Kies, 1986, on left dislocations). The phenomenon has been most fully theorized within Systemic Functional Grammar under the label of Theme (Halliday, 1967/1968, 1985/1994/2004), and the majority of recent studies of Theme in text operate within this approach. The account given here will therefore mainly draw on the Systemic Functional model.

Identifying Theme

It is useful to begin by providing a brief sketch of how Theme is identified in this model. Halliday (e.g., 1994: 53) views Theme (in English) as comprising everything up to and including the first experiential ('content') constituent of a clause. Anything following the Theme in the clause is termed Rheme. Example 1 illustrates some of the basic categories – the Themes are underlined:

(1) [1] Rover joined our household entirely at random. [2] But the relationship with him was entirely satisfying. [3] When you have a dog, you put in food and attention, [4] and what you get out is unconditional affection and respect. [5] Of course, animal behaviourists see this as no more than pack instinct.

In three of these sentences, the first experiential constituent is simultaneously Subject and Theme. In Halliday's terms, this is 'unmarked Theme': the choice that is made unless there are particular reasons for choosing something other than Subject as Theme. In [1] this constituent comprises the whole of Theme; in [2] the experiential constituent *the relationship with him* is preceded by a textual element, the conjunction *but*; and in [5] the experiential constituent *animal behaviourists* is preceded by an interpersonal element, the disjunct *of course* ([2] and [5] are therefore cases of 'multiple Theme' in Halliday's terms). In [3] the Theme is a 'marked Theme' (i.e., non-Subject Theme), realized by an initial adverbial clause. The Theme of [4] consists of a textual conjunction *and* followed by an embedded clause functioning as Subject in a WH-cleft structure. Halliday calls this latter type a thematic equative, whereas Fawcett and Huang (1995) have coined the term 'enhanced Theme' for this and a range of other Theme types, which appear to lie outside the unmarked/marked distinction.

There are a number of complications in this deceptively simple picture, which particularly affect decisions on where the boundary between Theme and Rheme should be placed. Two complicating factors that are especially relevant to thematic analyses of texts are the status of Subject following a marked Theme, and the presence of grammatical metaphor. A number of analysts (e.g., Enkvist, 1973; Downing, 1991; Davies, 1997) argue that marked Themes perform different textual functions from unmarked Themes, and that therefore, if, as typically happens, the Subject follows immediately after a marked Theme, this also should be included as the unmarked Theme. Thus, in sentence [3] of example 1 above, the Theme would be *When you have a dog, you*.

Grammatical metaphor (Halliday and Matthiessen, 2004: Chapter 10) comes into play, especially in

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Grammatical metaphor (Halliday and Matthiessen, 2004: Chapter 10) comes into play, especially in

relation to interpersonal meanings. These are congruently expressed through choices in interpersonal systems such as modality and Mood, but they may be 'experientialized,' that is, metaphorically expressed as if they were part of the content. Examples 2 to 5 illustrate the difference.

(2) Perhaps a cable show will make for an easier transition into electoral politics.
(3) It is possible that time changes somehow inside a black hole.
(4) Was he any good?
(5) I'd like to ask whether you really read my article.

In 2, the interpersonal modal disjunct *perhaps* is part of a multiple Theme: it contributes to Theme but does not "exhaust the thematic potential of the clause" (Halliday, 1994: 52). In 3, by contrast, the writer's assessment of probability is construed as if being *possible* were an 'external' attribute of the proposition *time changes somehow inside a black hole*. Similarly, in 4, the ordering Finite^Subject signals that this is an interrogative, functioning as a question; whereas in 5 the speech function being performed is made experientially explicit through the projecting (reporting) clause *I'd like to ask* (see Halliday and Matthiessen, 2004: 626, on interpersonal projection). In such cases, there are three main options in identifying Theme. In 3, for example, Halliday (see, e.g., Halliday and Matthiessen, 2004: 98) identifies *it* alone as Theme (which, for convenience, may be described as 'minimal Theme,' shown by double underlining above), with *time* as the separate subsidiary Theme of the embedded clause. Thompson (2004: 152) argues that the experientialized interpersonal meaning *it is possible* functions as a type of enhanced Theme that he calls 'thematized comment'; and a number of other analysts such as Martin (1995: 251) view *it is possible* as an interpersonal element in a multiple Theme and therefore include the following Subject in Theme ('maximal' Theme, with single underlining). Grammatical metaphor involves a recalibration of the relationship between meaning and form, and the multiple analyses therefore reflect different analytical emphases: Theme will be identified differently depending on whether a more semantically-oriented or a more formally oriented perspective is taken. All three options are therefore justifiable, and provide complementary perspectives; but, in order to simplify matters, in the following discussion I will generally work with maximal Theme.

Theme in Text

Unit of Analysis

Three main units of analysis have been used in investigating Theme in text: the clause, the T-unit (an independent clause and any clauses dependent on it – Hunt, 1965), and the orthographic sentence. Example 6 shows the effect of choosing each of these in turn, using a sentence from extract 1 above:

(6a) When you have a dog, you put in food and attention, and what you get out is unconditional affection and respect.
(6b) When you have a dog, you put in food and attention, and what you get out is unconditional affection and respect.
(6c) When you have a dog, you put in food and attention, and what you get out is unconditional affection and respect.

(In 6b, as noted above, some analysts would take *when you have a dog, you* as the first Theme of the T-unit.) There are different grounds for taking each of these options: the clause is the fundamental linguistic context within which the Theme-Rheme structure operates and thus provides the analytical baseline; the choice of the T-unit highlights the fact that the structural dominance of an independent clause reflects informational dominance and therefore Themes at this level signal more visibly the way a text is unfolding; whereas the sentence is clearly salient for writers as it is orthographically marked off (it is, of course, less relevant to most spoken discourse). The options provide complementary perspectives on thematic choices in text: very broadly, a clause-by-clause analysis tends to highlight continuity of topic, whereas analyses based on the T-unit or sentence tend to bring out more strongly stages in the unfolding of the text. This can be seen clearly in the following extract (taken from a longer extract that will form example 8 below). T-unit Themes (which in this case are identical with sentence Themes) are underlined; clause Themes are in italics.

(7) *When MNEs* are exporting into a foreign market, *host country nationals* will handle everything. *As the firm* begins initial manufacture in that country, *the use of expatriate managers and third country nationals* begins to increase. *As the company* moves through the ensuing stages of internationalization, *the nationality mix of the managers in the overseas unit* continues to change to meet the changing demands of the environment.

Table 1 compares the Themes at T-unit and at clause level. The table brings out the fact that the T-unit Themes signal the chronological stages in the internationalization process, whereas this is obscured in the clause Themes. Instead, these establish two alternating threads of continuity: the MNEs (multinational enterprises) and the different kinds of personnel involved in each stage.

Table 1 Comparison of themes at different levels

T-unit/sentence themes	*Clause themes*
When MNEs are exporting into a foreign market,	When MNEs
As the firm begins initial manufacture in that country,	host country nationals As the firm
As the company moves through the ensuing stages of internationalization,	the use of expatriate managers and third country nationals As the company the nationality mix of the managers in the overseas unit

A full account would clearly need to consider all three options, although, for reasons of space, I will work primarily with T-units in this article.

The Functions of Theme in Text

Much of the work on Theme in text within the Systemic Functional tradition draws inspiration from Fries (1981/1983); and it was in this paper that he suggested that thematic choices across a text reflect the text's 'method of development' – a term that has become probably the most widely used gloss on the function of Theme. A number of different ways of visualizing its function have also been proposed: in a later paper (1993: 338) Fries himself describes Theme as providing "a framework for the interpretation of the clause" and as "orient[ing] the receiver to what is about to be communicated," whereas Martin (1992: 436) characterizes Theme as "scaffolding" the rhetorical structure of a text. Matthiessen talks of it as establishing "a local context" for the clause (1995a: 514), and as signaling the current 'logogenetic growth-point' in the instantial system of the text (1995b: 32) – that is, indicating which aspect of the experiential and/or interpersonal meanings in the text is about to be developed.

Approaches to Thematic Analysis

In order to explore the significance of these glosses more fully, it is necessary to examine thematic choices in text from a variety of perspectives. Three main aspects of Theme in text have been explored: thematic progression, Theme type, and thematic content. These are complementary perspectives, and many studies combine two or all of them; but it is convenient to outline each of them in turn.

Thematic progression, or TP (Daneš, 1974; Dubois, 1987) tracks the source of the content in Theme. Daneš identifies three main patterns of progression: constant, in which the content in one Theme connects (through lexical repetition, pronominalization, etc.) to a preceding Theme (usually although not necessarily immediately preceding); simple linear, in which the Theme connects to a preceding Rheme; and derived, in which successive Themes connect to a 'hyper-Theme' that may or may not be explicitly realized in the text. These categories can be illustrated with the following extract, which is deliberately chosen as an instance of a carefully planned text that is strongly oriented toward experiential concerns. It is taken from a university-level Business Studies textbook (reproduced with permission from A. M. Rugman and R. M. Hodgetts, 1995. *International Business: A strategic management approach*. New York: McGraw-Hill. pp. 324–5). T-unit/sentence Themes are underlined and numbers added for ease of reference; bolding is as in the original.

(8) [1] **International human resource management (IHRM)** is the process of selecting, training, developing, and compensating personnel in overseas positions. [2] This chapter will examine each of these activities. [3] Before doing so, however, it is important to understand the general nature of this overall process, which begins with selecting and hiring.

[4] There are three basic sources of personnel talent that MNEs can tap for positions. [5] One is **home country nationals**, who reside abroad but are citizens of the parent country of the multinational. [6] These individuals are typically called **expatriates**. [7] An example is a U.S. manager assigned to head an R&D department in Tokyo for IBM Japan. [8] A second is **host country nationals**, who are local people hired by the MNE. [9] An example is a British manager working for Ford Motor in London. [10] The last is **third country nationals**, who are citizens of countries other than the one in which the MNE is headquartered or the one in which they are assigned to work by the multinational. [11] An example is a French manager working for Mercedes-Benz in the United States.

[12] Staffing patterns may vary depending on the length of time that the MNE has been operating. [13] Many MNEs will initially rely on home country managers to staff their overseas units, gradually putting more host country nationals into management positions as the firm gains experience. [14] Another approach is to use home country nationals in less developed countries and employ host country nationals in more developed regions. [15] This pattern has been found fairly prevalent amongst U.S. and European MNEs. [16] A third pattern is to put a home country manager in charge of a new operation, but once the unit is up and running, turn it over to a host country manager. [17] Figure 12.1 provides an illustration of the types of

Table 2 Thematic Progression in a Planned Text

[1] International human resource management (IHRM) is the process of selecting, training, developing, and compensating personnel in overseas positions.

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[16] A third pattern is to put a home country manager in charge of a new operation, but once the unit is up and running, turn it over to a host country manager.

[17] Figure 12.1 provides an illustration of the types of managers, by nationality mix, required over the stages of internationalization.

[18] When MNEs are exporting into a foreign market, host country nationals will handle everything.

[19] As the firm begins initial manufacture in that country, the use of expatriate managers and third country nationals begins to increase.

[20] As the company moves through the ensuing stages of internationalization, the nationality mix of the managers in the overseas unit continues to change to meet the changing demands of the environment.

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In Table 2, the source of each Theme is shown by arrows: dashed arrows show constant TP; dotted arrows show linear TP; and solid arrows show derived TP.

As can be seen, the text relies mainly on derived TP, with occasional examples of linear TP, and one possible case of constant TP (I have taken *an example* in [7] as connecting to *these individuals* in the preceding Theme, but it could equally well connect to the Rheme of [6] or even [5]). There are a number of 'breaks' (Ventola and Mauranen, 1991, label the TP in such cases as 'unmotivated'): in particular, references to the text (*this chapter*, *Figure 12.1*) appear to stand outside 'normal' TP. In addition, I have shown the Theme of [4] as entering into derived TP, connecting to the Rheme of [3]; but existential *there* has no experiential meaning, and the connection is in fact from Rheme to Rheme. As a number of researchers (e.g., Cloran, 1995) have noted, such connections are relatively common but cannot be accounted for within the original TP model.

However, leaving aside these analytical problems, we can consider what the TP patterns reflect about the text. They highlight the fact that the text has a clear and relatively simple hierarchical organization, with successive aspects of the topic introduced in Rheme and elaborated on in one or more following sentences, with the focus of each stage of the elaboration signaled in Theme position: for example, the *three basic sources* mentioned in [4] are thematically listed in [5] *One*, [8] *A second* and [10] *The last*. The general pattern is thus that new topics are brought into the text in the Rheme of sentences which function as hyper-Themes and then shift into Theme until the next topic is introduced. This picture is made more complex by the fact that the patterns tend to overlap: for example, the Theme of [12] connects to the Rheme of [3], showing that it is a new elaboration of *the general nature of this overall process*; but, because [12] is itself a hyper-Theme, the Rheme sets up the topic of the next stretch of text, the way that staffing patterns *may vary* (to which the Themes of [13], [14] and [16] then connect).

So much for the individual text; but it is also interesting to consider to what extent these findings are more generally applicable. Fries (1981/1983) originally hypothesized that patterns of TP would vary according to genre: for example, narratives might be expected to draw fairly regularly on constant TP to maintain focus on a particular character, whereas argumentation would typically be reflected in linear TP, with each step in the argument involving the thematizing of matter in the preceding Rheme. However, he later (1995a: 319) concluded that, despite some evidence of correlation, the relationship is more complex and may be disrupted by local concerns. Extract 8 might at first sight appear to support the hypothesis that derived TP is associated with exposition, in which different aspects of a topic are elaborated on and exemplified; but this appears to be dependent on incidental factors such as the number of examples given. The relationship between [8] and [9], and between [10] and [11], is also one of elaboration; but as only one example is given in each case, these are categorized as linear TP.

The identification of the source of thematic content in terms of TP is therefore useful in tracking the flow of information through a text; but the ways in which it may correlate with other aspects of textuality remain somewhat unclear. There is also the restriction that 'content' in TP is seen in purely experiential terms, which means that it can be difficult to handle thematized interpersonal meanings: these may appear to represent breaks even though the text is clearly unfolding coherently.

We now turn to the second approach to analysis, Theme type, which focuses on whether Themes are simple or multiple, and whether they are unmarked, marked, or enhanced. The same extract can be used to illustrate this approach. Table 3 shows the Themes arranged by type ('maximal' Themes following marked Theme are in italics).

It is immediately noticeable that there are no textual or interpersonal Themes (except *however* in the maximal Theme analysis of [3]); and, of course, the absence of features is as significant as the presence. There are in fact textual signals, which will be discussed below; but it is clear that the writers are not much concerned to negotiate interpersonal relationships with the reader: the relative statuses are construed as more or less fixed, and the focus is on the transmission of information. This is also reflected in the absence of enhanced Theme (again with the exception of maximal Theme in [3]). Enhanced Themes appear to be associated with greater rhetorical effort (Francis, 1990), and the avoiding of such effort contributes to the authoritative, factual tone of the extract.

Table 3 Theme type in a planned text

Textual/interpersonal theme	*Experiential theme*		
	Marked theme	*Enhanced theme*	*Unmarked theme*
[1]			International human resource management (IHRM)
[2]			This chapter
[3]	Before doing so,	*however, it is important*	
[4]			There
[5]			One
[6]			These individuals
[7]			An example
[8]			A second
[9]			An example
[10]			The last
[11]			An example
[12]			Staffing patterns
[13]			Many MNEs
[14]			Another approach
[15]			This pattern
[16]			A third pattern
[17]			Figure 12.1
[18]	When MNEs are exporting into a foreign market,		*host country nationals*
[19]	As the firm begins initial manufacture in that country,		*the use of expatriate managers and third country nationals*
[20]	As the company moves through the ensuing stages of internationalization,		*the nationality mix of the managers in the overseas unit*

The majority of Themes are unmarked, reflecting the maintenance of focus on aspects of a single main topic. The first marked Theme is in [3]: it 'places' this first main topic by signalling that it is merely a preliminary (albeit an *important* one) to the central topic of the chapter (examining each of the activities listed in [1]), which will follow later. This helps to explain why the Theme of [3] stands out: it functions at a relatively high level to signal the organization of the chapter. It has often been argued (e.g., by Fries, 1995a) that marked Themes are typically associated with changes in the direction of a text: they establish a new local context, in contrast to unmarked Themes that typically reflect continuity of topic. This applies very clearly to [3] – and it is worth noting that the maximal Theme analysis picks up further contextualization in the enhanced Theme, in terms of the writers' evaluation of the information they are about to give: there is noticeable thematic 'turbulence' at this point in the text. The other marked Themes, in [18]–[20], work at a lower level in the textual hierarchy; but they illustrate the same principle as [3] – see discussion of Table 1 above.

There is a good deal of evidence that the different functions of marked and unmarked Themes discussed in relation to this particular extract apply more generally across a range of genres (Downing, 1991; Martin, 1992); and Davies (1997) makes the stronger claim that different genres display different patterns of marked and unmarked Themes. By contrast, Fries (1981/1983) notes that the distinction does not apply to the way in which Themes reflect the method of development in the texts he uses to illustrate his argument: the relevant experiential content appears apparently indiscriminately in both marked and unmarked Themes. As with TP, the picture is therefore more complex than it appears at first.

The final approach to analysis, thematic content, categorizes the type of meanings found in Theme, along various dimensions. Probably the most widely used type of categorization is in terms of the entities that are thematized. This may involve general classes such as concrete vs. abstract, or 'real-world' vs. 'virtual' entities ('virtual' entities are those construed by grammatical metaphor, such as *comparison* or *categorisation*, or by embedded propositions treated as entities – for example, to lose one parent *may be regarded as a misfortune*), or specific sets of classes relating to the topic of the text(s) being analyzed. Gosden (1993), for example, identifies four domains from which Subjects (which he treats as obligatorily thematic) in academic research articles may be

selected: Participant (the writer, other researchers, etc.); Discourse (the text itself); Hypothesized and Objectivized (a somewhat disparate category covering phenomena such as evaluation and abstract concepts); and Real-World (concrete entities). He argues that these are specific to the genre he investigates, and, furthermore, that the distribution of choices from the four domains varies according to the different generic stages of the research article. Berry (1995: 58) draws an important distinction between informational or topic-based Themes and interactional Themes (those which refer to the writer/speaker and reader/hearer), and she discusses the effect of writers choosing different patterns of choices between these two categories.

Table 3 shows that in extract 8 there are no interactional Themes: at the point at which one might most easily have appeared, in [2], the writers opt to foreground their text – *this chapter* – rather than themselves. A number of the informational Themes pick out entities such as *sources* and *patterns* that are semitechnical terms intermediate between 'concrete' and 'abstract.' Concrete (although nonspecific) entities such as *many MNEs* also occur, but not very frequently: the writers are framing the information in terms of generalized concepts, with the concrete entities more typically appearing in Rheme. The usual movement within each T-unit is thus from thematized class to rhematized exponent.

The other significant group of thematized entities relate to the textual organisation. I mentioned above that there are few, if any, textual elements in Theme; but the organization is, in fact, signaled thematically at times, through experientialized forms rather than through textual Adjuncts: rather than *for example*, the writers use *an example [is]*, and rather than *thirdly*, they use *a third pattern [is]*. This means that the organization is construed as inherent in the information: the reader of this textbook is being firmly steered towards assimilating the relationships (mostly elaboration, as noted above) between the chunks of information along with the content itself. This reinforces the tendency to move within the T-unit from concept to realization: the concrete details are consistently presented in the frame of what Thompson (2004: 167) calls the 'conceptual map' of the text. It is certainly no accident that it would be very easy to 'translate' the extract into note form with the categories and relationships taken from the thematic content – Table 4 illustrates this for sentences [4]–[11]. The information to be placed under each heading within the framework is taken from the Rhemes.

This mapping of thematic content onto the framework and of rhematic content onto the 'filling' is typical of planned, expository text (see Fries, 1981/1983, and Thompson, 2004, for similar examples),

Table 4 From theme to notes in a textbook

Three basic sources of personnel talent:	
[5]	source 1:
[7]	e.g.
[8]	source 2:
[9]	e.g.
[10]	source 3:
[11]	e.g.

and illustrates the claim (made with precise caution in Fries, 1995b: 9) that where a text has a clear method of development it will be reflected in the Theme choices, particularly in terms of thematic content. However, as Fries makes clear, not all texts have a simple method of development, and it cannot be expected that the functions of Theme in texts such as 8 will necessarily apply to all texts.

Theme Patterns in Unplanned Text

In order to round out the reasonably clear but partial picture that has emerged so far, therefore, it is necessary to explore Theme in a different text type. The ways in which Theme works in text appear to be influenced by two main intersecting factors: the degree to which the text is planned or unplanned, and the degree to which it is experientially or interpersonally oriented (Matthiessen, 1995b; Martin, 1995). The following outline will, more briefly, revisit the approaches to Theme analysis introduced above, using a text at the other extreme of these clines in order to illustrate some of the differences.

The text (transcribed by Angela Reid) is an extract from 'a television chat show (extract from *Trisha*, June 2001, produced by ITV Anglia Television, reproduced with permission)' dealing with personal problems: the situation of the 'guest' is described and then the audience are invited to put questions and give comments. T is the host, S the guest, and A1-2 are members of the audience. In Table 5, T-unit Themes are underlined, and TP is shown using the same conventions as in Table 2 above.

TP has mainly been used to analyze monologic texts, and Table 5 illustrates some of the difficulties of applying it to dialogue. Some of the gaps could be filled in if elliptical material were somehow reinstated (e.g., [22]–[23]); but the discourse is clearly more loosely structured than extract 8, not least because new speakers may not connect back in any obvious way to what the previous speaker has said. Where TP can be traced, there is generally reliance on constant TP (e.g., [4]–[5]), though often this involves jumping over one or more intermediate T-units either within a turn (e.g., [5]–[7]) or across turns (e.g., [9]–[11]). It also involves allowing links between *I* and *you* in

Table 5 Theme and thematic progression in an unplanned, interpersonally oriented text

T: [1] let me ask you Sally if the fact that he went means that *he* failed your test

S: [2] yes he did

T: [3] yes

A1: [4] I feel that Sally's actually setting *him* up a bit

[5] because the thing that seems to me is that Sally's going out to work

[6] he's unemployed

[7] and she *feels*

[8] he's frittering away his time at home when he should be out there earning money the same as she is

T: [9] is that it

A1: [10] I feel that she's pushing him away

T: [11] thank you but is that *how you feel* Sally

S: [12] I feel as if I'*m the sole earner*

[13] and well it should be equal

[14] and I'm working all day

[15] and he's free to do anything

T: [16] but what about these mood swings throwing things all that sort of thing

S: [17] he *gets me so annoyed*

[18] he doesn't understand where I'm coming from

T: [19] can I ask why Sally

S: [20] I don't trust him

T: [21] you don't trust him

S: [22] no

T: [23] ok

[24] yes

A2: [25] you know you're planning marriage

S: [26] yeah

A2: [27] are you going to base the *marriage* on distrust and paranoia

[28] because it's never going to work

[29] and you're better to part and find partners you can trust

utterances by different speakers (e.g., [20]–[21]), on the grounds that the entity referred to is the same. The predominance of constant TP reflects the broad maintenance of focus on the two main people involved, Sally and her boyfriend: each move forward in the discourse is related not to developing aspects of some overarching topic (as with the derived TP in 8) but to discussing different actions and feelings of these two people. To some extent, this therefore bears out the hypothesis that the patterns of TP may vary with type of expansion and perhaps with genre; but it suggests more strongly that the concept of TP is only sporadically applicable to certain types of discourse (which in itself may, of course, be a distinguishing feature of those discourses).

Table 6 shows the Theme choices in the conversation, laid out as closely as possible to Table 3, to allow easy comparison.

What immediately stands out is the much more extensive use than in extract 8 of multiple and enhanced Theme. The latter are all experientialized interpersonal meanings, and, together with the frequent interpersonal Themes, they construe the conversation as being about negotiation over opinions as much as content. This is unsurprising in human terms, because the situation is inherently face-threatening for Sally: her private life is (with her collaboration, of course) being discussed in public. In addition, this is dialogic discourse, and many of the interpersonal Themes reflect the exchange of turns: for example, 'response' words such as *yes* in [2] and *no* in [22], and the Finite as interpersonal Theme in interrogatives such as [8] (see Halliday and Matthiessen, 2004: 81, for the basis for this analysis). Two of the enhanced Themes ([1] and [19]) in fact construe awareness of both the addressee's needs and the current state of the ongoing discourse: the host enacts her control over the conversation through showing politeness by asking permission (*let me, can I*) and signaling the speech function being performed (*ask you if, ask why*). The relationships between addressers and addressees are much less settled than in the textbook; and the majority of the negotiation over the right to speak, viewpoint, etc. is done in the thematic zone; the Rhemes are where the content is mainly expressed. The framing of the discourse is therefore primarily in terms of interpersonal concerns; and the 'filling' realizes the experiential concerns.

Table 6 Theme type in an unplanned, interpersonally oriented text

Textual theme	*Interpersonal theme*	*Experiential theme*		
		Marked theme	*Enhanced theme*	*Unmarked theme*
[1]			let me ask you Sally if	*the fact that he went*
[2]	yes			
[3]	yes			he
[4]			I feel that	*Sally*
[5] because			the thing that seems to me is that	*Sally*
[6]				he
[7] and				she
[8]	is			that
[9]			I feel that	*she*
[10]	thank you			
[11] but	is			that
[12]			I feel as if	*I*
[13] and well				it
[14] and				I
[15] and				he
[16] but	[what about]			what about
[17]				he
[18]				he
[19]	[*why*]		can I ask	*why*
[20]				I
[21]				you
[22]	no			
[23]	ok			
[24]	yes			
[25]	you know			you
[26]	yeah			
[27]	are			you
[28] because				it
[29] and				you

This is reinforced by the thematic content. If we focus on the unmarked Themes, a number are interactional Themes (Berry, 1995) – e.g., *I* in [14], *you* in [27]; and in this context *she* and *Sally* can be included as at least semi-interactional, as the speaker is directing his comments at Sally via the host. Thus, the interpersonal orientation permeates all parts of the thematic zone. In addition, with the exception of [1], the Themes are very short: they have much less content than the Themes in the textbook. They are also predominantly pronouns, referring either to the people involved or to previous messages (*that* in [8] and [11]). The speaker is not, therefore, using Theme to introduce new topics or to signal new points of departure. The overall effect is that the unmarked Themes do much less of the communicative work than in extract 8; the informational 'weight' is in the interpersonal and enhanced Themes and the Rhemes.

One general way of viewing the differences between Theme patterns in the textbook and conversation extracts is to see them in terms of competition for thematic space between various kinds of experiential and interpersonal concerns. It is in fact predictable that this competition will arise, since, as Matthiessen (1995b) points out, Theme (together with other textual phenomena) functions as an 'enabling resource' for both experiential and interpersonal meanings.

Conclusion

There has only been space in this article to examine Theme in two extracts, but the discussion has been designed to show that concepts such as 'method of development' and 'scaffolding' need to be interpreted rather differently in different types of text, with the degree of planning and the orientation to experiential or interpersonal meanings as the crucial dimensions of difference. Registers that fall somewhere between the two extremes illustrated here along either of these dimensions have been shown (e.g., by Francis, 1990; Fries, 1995a; Davies, 1997) to vary systematically in the way that their thematic choices function. For example, persuasive and argumentative texts such as newspaper opinion columns or academic research articles (especially in 'softer' disciplines) are highly planned but address interpersonal concerns more than a purely expository text such as 8; and this is reflected in the way in which the Themes scaffold the rhetorical unfolding of the text (Martin, 1995; Matthiessen, 1995b). A further complicating factor, which it has not been possible to explore here, is the degree of sophistication aimed for: there is a tendency for more 'unsophisticated' written texts (e.g., textbooks for children) to display relatively simple, clear patterns of thematic choice, whereas greater complexity of argument or exposition can be construed by more complicated interweavings of thematic patterns. The effects of these different factors make it difficult to arrive at a simple description of the function of Theme in text: it is useful, rather, to invoke Wittgenstein's analogy of family resemblance and to see thematic choice as broadly working to provide a textual framework of some kind, but with the type of framework varying according to the register.

See also: Clefting in Spoken Discourse; Focus; Focus Particles; Foregrounding; Genre and Genre Analysis; Iconicity; Spoken Discourse: Word Order; Systemic Theory; Text and Text Analysis; Thematics.

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Thesauruses

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Defining 'Thesaurus'

The term 'thesaurus' has undergone several extensions in meaning over the years, so that today it can cover at least three different senses: (1) 'special word-list' or 'lexicon,' (2) 'semantic dictionary' or 'nomenclator,' and (3) 'terminological database' or 'index.'

The first of these, the traditional and now largely obsolete sense of 'classical lexicon' (regarded as a 'treasury' of words) is associated with early historical or literary dictionary projects, such as Thomas Cooper's *Thesaurus Linguae Romanae et Britannicae* (1565), the *Thesaurus Lingae Latinae* (10 volumes published since 1894; incomplete), the *Trésor de la langue française* (1971–1994) and author concordances such as the *Shakespeare Thesaurus* (Marvin Spevak, 1993). The second and nowadays most central sense of 'semantically organized dictionary' has been gaining ground since the middle of the 19th century, when Peter Mark Roget, a medical doctor whose family had come to Britain from France and who had developed a life-long interest in scientific taxonomies, developed his famous *Thesaurus of English words and phrases* as a conceptually structured word-finder. The third and most recent sense of 'index to the vocabulary' of specific fields is relevant in the study and codification of technical terminology and information retrieval, e.g., Sharon Black's *Thesaurus of subject headings for television* (1989) and Alvin Walker's *Thesaurus of psychological index terms* (8th edn., 1997).

The rest of this article concentrates on the most relevant second meaning, which has been defined as "a linguistically oriented wordbook in which general-language vocabulary is organized from a semantic point of view" (Margaret Rogers, as cited by Dušan Gabrovšek, 1997: 188), designed to give guidance on alternative words for similar concepts. The definitions above already illustrate the problem which thesauruses address: how to explain and express ideas which are couched in words with multiple meanings (such as the polysemous lexeme *thesaurus* itself) by means of semantically related words (such as the partial synonyms *word-list*, *reference book*, *lexicon*, *glossary,* and *index*). Another example of a lexical field that illustrates the nature, development, and roles of the thesaurus is the group of vocabulary items that can communicate the concept of 'comfortable seat for more than one person,' such as *sofa*, *couch, settee*, *divan,* and so on.

The Thesaurus in Dictionary Research

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The Thesaurus in Dictionary Research

The study of thesauruses is still a relatively neglected field, and no single item in the literature on dictionary

research or metalexicography covers all aspects of the subject. The most important authority is the German linguist Werner Hüllen, who convened one of the first conferences on thesaurus lexicography (1994), wrote books on English lexicography and Roget's *Thesaurus* (1999, 2004), and commissioned a special issue of a journal on the theme of thesauruses and other onomasiological dictionaries (Hüllen, 2006). The only other specialist conference on this topic, the 5th NLRI Symposium in Tokyo (Nakano *et al.*, 1997), provided an overview of thesaurus lexicography for Asian languages such as Japanese, Chinese, Korean, and Hindi in comparison with English.

The distinction between 'semasiology' (or sign interpretation) and 'onomasiology' (or name allocation) is often claimed to be relevant, as it can help us understand the essence of thesaurus lexicography. The traditional general monolingual dictionary is semasiological in the sense that it provides an explanation of the meaning(s) of a given word by means of definitions or examples, the direction being from word to meaning – for the purpose of helping native speakers with passive 'decoding' or comprehension of utterances. More specialized onomasiological dictionaries such as thesauruses, on the other hand, start with a given concept or meaning and provide a range of lexical choices for expressing that concept, the direction being from meaning to word – for the purpose of assisting with active 'encoding' or composition of discourse.

There are many different ways of studying the intricacies of thesauruses. The most important of these will be discussed here in terms of six 'perspectives' that have been explored in dictionary research (Hartmann, 2003):

1. Dictionary history
2. Dictionary criticism
3. Dictionary typology
4. Dictionary structure
5. Dictionary use
6. Dictionary IT

The first of these research perspectives is 'dictionary history.' Several aspects of anthropological, cultural, and personal history can be shown to be relevant. Of these, the most important in this context is the so-called genre-specific approach, aimed at finding out how different types of dictionaries have evolved for different purposes.

The onomasiological tradition in lexicography is long-established, but more recently it has been outclassed and overshadowed by semasiology, with thesauruses, synonym dictionaries and even nonlexicographic reference products such as usage guides, crossword puzzle solvers, and plant identification books coming under the universal spell of the alphabet as the most convenient device for arranging the information. Since it became a subject worthy of scholarly attention, dictionary history has thus been primarily the story of A–Z wordbooks, while the topical-semantic approaches have only rarely been explored systematically, e.g., by Igor Burkhanov (1999), who investigated the links between linguistic semantics and dictionary structure under the heading 'ideography,' and Werner Hüllen, whose two monographs summarized what was known about the history of early English dictionaries as thematically arranged pedagogical reference books (Hüllen, 1999) and about the origin and impact of Roget's *Thesaurus* (Hüllen, 2004).

Roget is usually shown as inheriting the tradition of (French) synonym dictionaries and adapting it in a completely new medium, the thematically presented (English) thesaurus, by means of systematically arranged taxonomic clusters, e.g., 'couches and sofas' would be treated within the class 'the home' and the subclass 'furniture'. The technical term 'cumulative' has evolved to characterize such dictionaries, with lists of words as alternatives to the headword, which do not always help even native speakers to know exactly what distinguishes, say, a couch from a 'sofa'. This is in contrast to 'distinctive' works such as Tom McArthur's *Longman Lexicon* (1981), which provides foreign learners with explanatory discriminations, by definition and/or example, for each sense of the words listed: for instance, for the five specific nouns in the subclass 'couches and divans' within the class 'buildings, houses, the home, clothes, belongings, and personal care,' some even with pictorial illustrations, and in some editions with foreign-language equivalents.

Some early synonym dictionaries attempted to discriminate the individual members of such conceptually related groups of words, but more recent products, under the influence of Roget's *Thesaurus*, tend to merely enumerate them. Sometimes, however, the boundary between a semasiological dictionary and an onomasiological thesaurus is deliberately blurred, e.g., in the French tradition by the so-called 'analogical' dictionary (Hausmann, 1990), or in the English tradition by the increasingly popular 'dictionary and thesaurus' hybrid, especially since it has become relatively easy to combine the two genres electronically (see below).

Table 1 shows that Roget's pioneering *Thesaurus* continued well beyond the author's death in 1869. While it was commercially successful and influential, sparking off many imitations both within British and American English and in other languages (see the next section below, on thesauruses in specific languages),

Table 1 The story of Roget's Thesaurus

Year	*British editions (revising editors)*	*American editions (revising editors)*
1852	Peter Mark Roget *Thesaurus* 1	–
1853	Peter Mark Roget *Thesaurus* (2)	Peter Mark Roget *Thesaurus* (2)
1854	–	Barbara Sears *Roget's Thesaurus*
1855	Peter Mark Roget *Thesaurus* (3)	Barbara Sears *Roget's Thesaurus* (3)
1879	John L. Roget *Thesaurus* 2	(John L. Roget) *Roget's Thesaurus*
1912	D.C. Browning *(Everyman's) Thesaurus*	–
1922	–	(John L. Roget) *Roget's International Thes.* I
1936	Samuel R. Roget *Thesaurus* 3	–
1946	–	C.O. Sylvester Mawson *Roget's Intern. Thes.* II
1951	*Roget's Thesaurus* (100th Anniversary edn.)	–
1962	Robert A. Dutch *Roget's Thesaurus* 4	L. Berrey *Roget's International Thesaurus* III
1977	–	Robert L. Chapman *Roget's Intern. Thesaurus* IV
1982	Susan M. Lloyd *Roget's Thesaurus* 5	–
1987	Betty Kirkpatrick *Roget's Thesaurus* 6	–
1992	–	Robert L. Chapman *Roget's Intern. Thesaurus* V
1998	Betty Kirkpatrick *Roget's Thesaurus* 7	–
2001	–	Barbara A. Kipfcr *Roget's Intern. Thesaurus* VI
2002	George Davidson (150th Anniversary edn.)	–

its cumulative pattern has not fully replaced the earlier tradition of distinctive synonym dictionaries, and no single design format dominates the genre today.

In the first few years, the annual reprints (some indicated in parentheses) were called 'editions,' although they were identical impressions. More recent editions, both in the United Kingdom and in the United States, have differed more substantially, with revising editors leaving their individual marks on them, attempting to update the classifications that reflect the various underlying philosophical, religious, and scientific traditions. In general, American editions have tended to 'humanize' the overall word list, by spreading out the top-down arrangement of notional categories (from 'abstract relations,' 'space,' 'matter,' and 'intellect,' to 'volition' and 'affections') and placing greater emphasis on everyday folk concepts (from 'body,' 'feelings,' 'place,' and 'living things' to 'sports,' 'mind,' and 'technology'); they have also introduced more encyclopedic material, made the alphabetic principle more dominating, and provided more distinctive (sometimes definitional) information (Piotrowski, 1994; Burkhanov, 1999).

The question of why it can be relatively difficult to find meaningful links between *sofa*, *settee*, *couch*, and their potential synonyms in thesauruses is part of the concern of 'dictionary criticism,' the second perspective of dictionary research, which in spite of a relatively long tradition is still underdeveloped, especially in the way that one or more dictionaries are reviewed in the popular press or in scholarly journals. Most English-language thesauruses that an average user is likely to consult, provide lists of near-synonyms in no particular or apparent order, without telling those who want to know what exactly the differences are between a *couch*, a *sofa* and a *settee*; how a *loveseat* can bridge the gap between an upholstered armchair for one and a soft seat for more than one; where the borderlines are between a relatively soft *sofa* and a relatively hard *settle*; or a *sofa* for sitting on and a *sofa bed* for sleeping on; and how many different subtypes (e.g., *chesterfield, davenport*, *ottoman*) might be distinguished.

No universally agreed-upon criteria have been established yet for the evaluation of reference works, and this sad fact is particularly true of thesauruses. The few studies that have been attempted have led authorities to diagnose a general crisis among contemporary compilers, publishers, and critics of such works of reference, while at the same time marveling at their continuing high sales figures. Dictionary-buying guides (such as Loughridge, 1990) do provide limited information on existing products, but usually without covering all the issues.

As for the third perspective of relevance here, 'dictionary typology,' the Russian linguist and lexicographer Lev Vladimirovich Shcherba (1941/1995/2003) introduced the term 'ideological' dictionary, in contrast to the 'ordinary' or conventional defining/translating dictionary. This is one of six oppositions by which he set the precedent for many more bipolar distinctions, such as orthographic/ideographic, semasiological/onomasiological, alphabetic/ thematic, word-based lexical/thing-based encyclopedic, definitional/conceptual, syntagmatic/paradigmatic, explanatory/terminological, and so on, that have subsequently characterized the literature on classifying dictionaries. Many authors unfortunately have ignored the significance and complexities of purpose or function. The typology of onomasiologial dictionaries will remain in the doldrums

Table 2 Subtypes of the thesaurus genre

Exemplar	*Year of publication*	*Macrostructure*	*Microstructure*
P. M. Roget comp *Thesaurus of English Words and Phrases*	1852	thematic/alph. index	cumulative
R. Soule comp. *A Dictionary of English Synonymes . . .*	1871	alphabetic	cumulative
R. F. Egan ed. *Merriam-Webster's Dictionary of Synonyms*	1942	alphabetic	distinctive
E. Fluck ed. (J. I. Rodale's) *Synonym Finder*	1961	alphabetic	cumulative/distinctive
C. G. Laird ed. *Webster's New World Thesaurus*	1971	alphabetic	cumulative/distinctive
T. McArthur comp. *Longman Lexicon of Contemporary English*	1981	thematic/alph. index	distinctive
J. Green comp. *The Slang Thesaurus*	1986	thematic/alph. index	cumulative
W. T. McLeod ed. *Collins Dictionary and Thesaurus*	1987	alphabetic	cumulative/distinctive
P. R. Wilkinson comp. *Thesaurus of Trad. English Metaphors*	1992	thematic/alph. index	distinctive
B. A. Kipfer ed. *Roget's 21st Century Thes. in Dictionary Form*	1992	alphabetic	distinctive/definition
D. Summers & M. Rundell eds. *Longman Language Activator*	1993	alphabetic	distinctive/collocational
J. Roberts & C. Kay eds. *Thesaurus of Old English*	1995	thematic/alph. index	cumulative/distinctive
D. Le Fur ed. *Collins/Robert Compreh. Dic & Thes. Fr-En*	2000	alphabetic/bilingual	distinctive/translational
P. Gillard ed. *Cambridge Advanced L. Dictionary (SMART CD)*	2003	alphabetic/electronic	cumulative/distinctive

Table 3 A thesaurus 'family' from one publisher

Title	*Editor*	*Year*	*Subtype*
New Oxford Thesaurus of English	P. Hanks	2000	large A–Z thesaurus
The Oxford Thesaurus. An A–Z Dic. of Synonyms	L. Urdang	1991	large A–Z thesaurus
Concise Oxford Thesaurus	B. Kirkpatrick	1995	medium-size thesaurus
Colour Oxford Thesaurus	M. Nixon	1995	small thesaurus
Oxford Dic., Thesaurus, and Wordpower Guide	M. Waite	2001	large dictionary/thesaurus
Oxford Visual Dictionary	J.-C. Corbeil	1997	4-lang. illustrated thesaurus
Oxford Learner's Wordfinder Dictionary	H. Trappes-Lomax	1997	EFL synonym dictionary
Oxf. Adv. Learners' Dictionary (Genie CD 2001)	S. Wehmeier	2000	(electronic) EFL dictionary
Oxford School Thesaurus	A. Spooner	2002	for pupils aged 9+

until dictionary researchers realize the diversity of existing subtypes or genres, from nomenclators, onomastica, and promptoria, to terminological glossaries, usage guides, and vocabulary builders, together with the manifold educational, technological, social, and other factors that ought to be considered in their classification.

Table 2 illustrates the fact that even within the thesaurus genre there are considerable variations, and several subtypes of print and electronic dictionaries can be distinguished according to whether the organization of the word list (macrostructure) is thematic or alphabetic, and whether the presentation of information inside the entry (microstructure) is distinctive or cumulative, sometimes in combination (see also Table 3 for Oxford University Press products). Some thesauruses can be bilingual; some can be limited to certain social or literary varieties of the language; some can be dedicated to a particular historical period of the language. (For a thesaurus-type treatment of the vocabulary of technical fields, *see* **Terminology and Terminological Databases**.)

The fourth perspective, 'dictionary structure,' might help us explain the often arbitrary and indiscriminate treatment of *sofa* and its synonyms in thesauruses like Roget's and its adaptations in other languages, e.g., in terms of such design features as taxonomic word lists and cumulative entries. There are many other aspects of this structural perspective to be considered, and many of the associated controversies are still unsettled, notably which of the currently available systems of semantic theory might be most suitable, and whether and how all this could be supported by electronic techniques (see the section on interdisciplinary aspects below).

Structurally, the distinction between thematic and alphabetic reference works partly overlaps with that between the cumulative and distinctive styles of presentation. Thus, our lexical field of comfortable seating objects could be treated in terms of semantic categories such as conceptual domains (e.g., 'space'), classes (e.g., 'home'), subclasses (e.g., 'furniture') and notions (e.g., 'cushioned seat'). The categories, classes, notions and concepts are sometimes specified in terms of superordinate/hyperonymous lexemes (such as *sofa*), synonymous/heteronymous lexemes (such as *couch*, *settee*, and *divan*) and subordinate/hyponymous lexemes (such as *leather sofa*, *upholstered sofa*, and *chaise longue*). Antonymy, meronymy, and other sense relations are also often displayed. The

lexemes used for this purpose may or may not be prototypical words, or form part of commonsense folk taxonomies or technical terminological systems. The taxonomic levels are sometimes correlated either with traditional divisions like book, chapter, section, and paragraph, or metalexicographic divisions like macrostructure, mesostructure and microstructure (see Figure 1).

Typically, an alphabetic index is required in order to help the lexicographer to place and the user to find the appropriate entry where the lexical field in question may be treated. Alternatively, an alphabetic, rather than ontological, format may be easier from the point of view of access, but it imposes on the lexicographer an even greater burden of sense discrimination. Figure 1 illustrates this, by reference to the most recent American edition of Roget's *Thesaurus*. Category 229 'Furniture' (between 228 'Abode, Habitat' and 230 'Town, City') is a subclass of Class 3 'Place and Change of Place,' while Category 901 'Support' comes between 900 'Counteraction' and 902 'Impulse, Impact' under Class 14 'The Mind and Ideas.' Note that, the various synonyms for individual pieces of furniture for sitting or lying on are listed, but not distinguished, which would make its use by nonnative speakers very difficult.

The relative advantages and disadvantages of structural features certainly affect the fifth research perspective, 'dictionary use,' and the way in which specific reference needs of the user may (or may not) be met by the activation of required reference skills. Why, where, and how would someone seeking onomasiological information of the type sketched above go about finding it? Unfortunately, not much empirical user research has been done in this area, with Ulrich Püschel (1986: 223) complaining that such dictionaries "cannot at all serve the purposes promised by the authors" (quoted from the English abstract), and Herbert Ernst Wiegand (1994) querying whether and how dictionaries of the cumulative genre can possibly be used to solve 'word-finding' problems. What indeed are these purposes and problems, and how do they differ by the nature, age and expertise of users; e.g., in what ways are the needs of foreign learners different from those of native speakers, and how, in any case, is the average user to know which thesaurus to choose in the first place?

229 FURNITURE
NOUNS **1 furniture,** furnishings, movables, home furnishings, house furnishings, household effects, household goods, office furniture, school furniture, church furniture, library furniture, furnishments [old]; **cabinetmaking,** cabinetwork, cabinetry; **furniture design, furniture style** [see list]; period furniture; **piece of furniture, furniture piece,** chair, couch, sofa, bed, table, desk, cabinet, mirror, clock, screen; **suite, set of furniture,** ensemble, decor [**2 …**]

901 SUPPORT
19 sofa, **bed; couch;** the sack *and* the hay *and* kip *and* doss [nf]; futon; bedstead; **litter, stretcher,** gurney

Figure 1 Two typical thesaurus entries (from *Roget's international thesaurus* 6th edn., 2001).

One important dichotomy that these doubts have added to the debate is that between (passive) decoding and (active) encoding, the former associated with activities like reading comprehension, and the latter with the writing skills required for text composition and translation. As we have seen, decoding correlates with the traditional (semasiological) dictionary for reception, while for encoding activities, a productive (onomasiological) thesaurus is claimed to be more appropriate. A few years ago, a working party of the so-called Thematic Network Project in the Area of Languages (Hartmann, 1999) surveyed the evidence for relatively low dictionary awareness in university institutions throughout the European Union, including the fact that users failed to admit problems in their reference experience, and received little training in school and even less assistance in bookshops and libraries, least of all for onomasiological dictionaries such as thesauruses.

The sixth research perspective we need to explore is 'dictionary IT,' or using the possibilities of the still new computer media to overcome at least some of the above limitations. One such innovation is the design of 'hybrid' products combining features of the dictionary and the thesaurus (Calzolari, 1988). There have also been experiments combining monolingual and interlingual dictionaries ('bilingualized' reference works), or the dictionary and the often pictorially supported encyclopedia. Computer technology has also brought new benefits in terms of the relative ease of online searches for dictionary users and improved access to corpus evidence for lexicographers.

Thus, from his or her work-station anyone can, through the thesaurus built into its word-processing program, check the lexical field of *sofa* via hypernyms or synonyms, such as *furniture*, *seat*, and *settee*; can search, through the Internet, for lists of bibliographical references (e.g., for the literature on 'onomasiological dictionaries') or for relevant websites (e.g., of libraries and publishers); consult online dictionaries and databases such as *WordSearch* or *Visual Thesaurus* which display synonymous relationships (e.g., for lexical fields like the one around *sofa* in the form of word lists or semantic constellation diagrams); and they can even try to find a way into text corpora and semantic databases such as FrameNet, in which a particular word or phrase may be documented in its respective discourse contexts. It is likely that these developments could also bring improvements to the way semantic information will be collected and presented in future.

Thesauruses in Specific Languages

There is no single publication dedicated entirely to the discussion of thesauruses in English, but in terms of production, marketing, and use, English thesauruses can definitely be said to lead the field: for the period between 1900 to 2000, a recent survey (Hartmann, 2006) located 158 relevant titles, not counting electronic products, published largely in Britain and the United States and a small proportion in other countries (see Tables 2 and 3).

There is an exciting and still largely unexplored wealth of types and subtypes of reference works, from the (early) interlingual/thematic to the monolingual/alphabetic, with a very small proportion that are pedagogically oriented and bilingual. There is also a general tendency today to restyle older synonym dictionaries as 'thesauruses' (occasionally other titles appear, especially for American English, e.g., *wordfinder*, *word menu*, *descriptionary*, and *reverse dictionary*), even though that may make them more cumulative. This is a trend which dictionary publishers are trying at the same time to counteract by producing a new generation of dictionary–thesaurus hybrids. All this is of course part of the pressure of commercial competition, often resulting "in a preference for hiring editorial assistants to update existing successful products rather than inviting established authorities to produce something completely original" (Hartmann, 2006).

Table 3 illustrates the whole range of thesaurus-type reference books offered by one important British dictionary publisher.

The following thesaurus subtypes are represented:

1. Pure 'thesauruses' (up to seven issued, from the large/comprehensive, e.g., *New Oxford thesaurus of English*, to the mini);
2. Dictionary–thesaurus hybrids (up to six, again from fairly large, e.g., *Oxford dictionary, thesaurus, and wordpower guide*, to mini);
3. Special-purpose thesauruses for native-speakers (for up to six age levels of school pupils, e.g., *Oxford school thesaurus*, and foreign learners of English, e.g., *Oxford learner's wordfinder dictionary*);
4. Dictionaries of synonyms, idioms, paronyms, and pictorial dictionaries (e.g., the quadrilingual *Oxford visual dictionary*);
5. Electronic products (e.g., the *Oxford advanced learners' dictionary*, recently also available in CD *Genie* format), which allow the user to click-search definitional, collocational, synonym, and other information, even during word-processing and emailing activities).

For other languages, less variety and less information is available. Table 4 is intended to give an impression of the range of thesaurus-type dictionaries in a number of European languages.

The apparent correlation between the number of speakers of these languages and the number of onomasiological reference works produced for them may not be an accident, but a reflection of the willingness of compilers and publishers to meet the demand for such dictionaries. In some of these, Roget's thesaurus approach has been copied and adapted, while in others, the format of the (distinctive) synonym dictionary prevails. Thus, for German, the comprehensive historical survey by Marion Hahn (2002) documents both the distinctive and the cumulative traditions, the latter including Franz Dornseiff's thesaurus *Deutscher Wortschatz nach Sachgruppen*, recently revised in a new edition. The French 'analogical' pattern, an attempt to combine both traditions, has also influenced practices in other Romance languages such as Spanish, while the Russian approach to thesaurus lexicography has affected those in other Slavonic languages such as Polish. The best comparative treatment to this day remains Carla Marello's encyclopedia article (1990) which described thesauruses in several traditions, going back to the very first printed dictionary in Europe, the pragmatically

Table 4 *Onomasiological Dictionaries in Selected European Languages* (Published During 20th Century)

Language	*Number of speakers (in Europe)*	*Onomasiological dictionaries*	*Number of these in thesaurus genre*	*Representative thesauruses (or synonym lexicons)*
English	57 million	158	70+	Roget's *Thesaurus* [see Tables 1, and 2, Figure 1]
Spanish	39 million	218	100+	J. Casares *Diccionario ideológico* 1942/1995
German	96 million	102	30+	F. Dornseiff *Dt. Wortschatz nach Sachgruppen* 1933/2004
Russian	115 million	45	8	J. D. Apresjan *et al. Novyj ob. slovar' sinonimov* . . . 1997
French	55 million	65	10	D. Péchoin *Thesaurus Larousse: des idées aux mots* 1991
Italian	60 million	26	3	N. Tommaseo *Nuovo dizionario dei sinonimi* 1905/1974
Polish	37 million	25	3	S. Skorupka *Slownik wyrazów bliskoznacznych* 1957/2001
Dutch	22 million	19	5	L. Brouwers *Het juiste woord* 1928/1989
Greek	12 million	8	2	T. Vostantzoglou *Antilexikon i onomastikon* 1949/1990

structured, bilingual Venetian–German travel guide *Introito e porta* of 1477.

Outside Europe, the thesaurus has also flourished. In many ancient cultures, particularly in the Middle East and the Far East, thematic–topical dictionary-making is older than alphabetic lexicography, e.g., in the form of the Chinese thesaurus *Erya*, produced in the 3rd century B.C. Building on the tradition of the Sanskrit thesaurus *Amar Kosh*, by the 6th-century scholar Amar Singh, Arvind Kumar (1998) described work on his *Samantar Kosh*, published in 1996, on the basis of a new logical order of the concepts of Modern Hindi. For Modern Arabic, a new thesaurus (*Kanz al-lughah al-arabiyyah* by Hanna Ghalib) was issued (Librairie du Liban) in 2003. For Afrikaans, the *Groot Tesourus van Afrikaans* by L. G. De Stadler was published (Southern Publishers) in 1994. For Japanese, a range of products are available, including the electronic version of the research-oriented *Bunrui Goi Hyou*, first developed in the 1960s at the National Language Research Institute (and also translated into Korean).

Interdisciplinary Aspects

The field of onomasiology lies right between lexicography and linguistics, since it is concerned with the problem of 'meaning' and its treatment in the dictionary, both in terms of intralingual sense relations between vocabulary items within a language, and of interlingual equivalence relations between vocabulary items in two or more languages. It is not surprising, then, that the linguistic disciplines of semantics and lexicology, as well as the whole of lexicography, have claimed this important territory, in order to understand, model, and improve the presentation of sense relations, for the benefit of native speakers and foreign learners. Various theories and models have been proposed for describing such lexical properties (componential analysis, lexical fields, frame semantics, and prototype semantics), and various reference works have tried to codify their essential features (nomenclators, promptoria, usage guides, and vocabulary builders), none with fully satisfactory completeness.

One recurring example is the domain of *seats* (*chair*, *bench*, *couch*, *sofa*, etc.), which has been investigated, decomposed, and tabulated by structural, anthropological, and cognitive linguists (for example, Helmut Gipper, Bernard Pottier, Charles Fillmore, Anna Wierzbicka, and Igor Burkhanov), and referred to by the (meta-)lexicographer Piet van Sterkenburg (1992: 524) as an "evergreen from structuralism." But long before all this tentative modelling in linguistic semantics, lexicographers from Girard to Roget had to cope with the notion of overlapping meanings in their synonym dictionaries and thesauruses. The history of Roget's *Thesaurus* and some of his predecessors, contemporaries, and successors has been documented by Werner Hüllen (2004), but a comparative study of such dictionaries in various languages is still outstanding.

A number of observations can be made on the development and nature of such onomasiological reference works. Most are monolingual, but for the more popular languages, bilingual synonym dictionaries exist, too; there is even a polyglot comparative *Dictionary of selected synonyms in the principal Indo–European languages* by Carl D. Buck (1949), which dealt with the lexical field of 'seats' in terms of one entry, *chair* (within the notion 'Dwelling, House, Furniture,' between *bed* and *table*), listing its equivalents in Greek, Latin, French, English, German, and 20 other languages. However, the comment on those selected says that "not included are words which may denote any kind of 'seat. . . .'"

During the last few years, there has been a convergence of such disciplines as (case) grammar and (frame) semantics, both within 'cognitive' linguistics and in relation to lexicography (and metalexicography), all supported by IT. Thus, the development of WordNet, a psycholinguistically inspired lexicon of semantic associations which specifies synonyms, hypernyms, hyponyms, holonyms, meronyms, and other coordinate terms for most of the more frequent vocabulary items in English, together with FrameNet, another American approach to computer-assisted semantic analysis, have made lexicographers aware of the advantages of corpus linguistics and the potential benefits of displaying semantic networks such as the 'concept lattices' shown in Figure 2.

The synonym cluster associated with the word *couch* is shown here, first as a verb with the meaning 'to formulate,' leading on to at least three possible synonyms (*put*, *frame*, and *cast*), and then as a noun with several distinct meanings, one of which

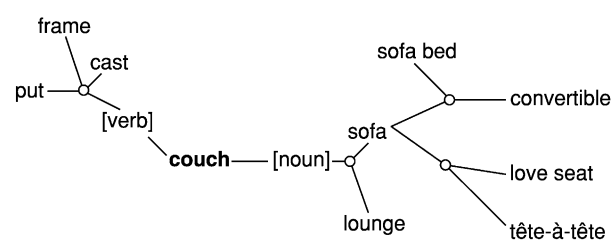

Figure 2 A synonym network (based on the *Visual thesaurus*) www.visualthesaurus.com, published by Plumb Design (1998–2004) as an electronic adaptation of *WordNet*, developed at Princeton University by Miller *et al.* (1990). In the *Visual thesaurus*, the basic meanings indicated graphically by small circles are correlated with definitions which appear in boxes when pointed at by the mouse; they can also be called up and compared with related ones in a marginal column on the right side of the screen.

('upholstered seat for more than one person') leads on to the synonyms *lounge* and *sofa*, and from the latter further to 'upholstered seat for more than one that can be changed into a bed' with two synonyms (*sofa bed* and *convertible*) and to 'small sofa for two' with two more (*love seat* and *tête-à-tête*).

This is one of several modes of presentation that are becoming available in the early 21st century, although it is difficult to keep track of the emerging formats and the terminological classification, qualitative evaluation, and pedagogical integration of these digital reference media. Thus, Yukio Tono (2004) distinguished five types of electronic interface (CD-ROM, Hyperlink, Pop-up mode, Parallel format, and Pocket e-dictionary), but little is known about the advantages and limitations of specific digital and Web-based products. The new generation of CD dictionaries, for example, *Genie*, which is linked to the *Oxford advanced learner's dictionary*, can be used for word searches, text searches, and sound searches in both decoding and encoding contexts. Thus, for the word *couch*, a range of synonyms and other related words will appear, from *armchair* and *chaise longue* to *lounger* and *sofa*, together with definitions and examples. Collocational information is also included, as well as links to illustrations and study pages.

For users with appropriate IT skills, these reference experiences are promising indeed. However, instruction and persistence are often required to exploit them fully on a practical level; ideally the 'new' material needs to be tested against both user practices for their effectiveness and corpus evidence for their reliability (Sierra Martinez, 2000). To verify exactly what denotational and connotational differences there are between words like *couch* and *sofa*, for example, would in turn require more interdisciplinary contacts with such fields as semantics, sociolinguistics, and computational linguistics.

Many other fields of relevance could be mentioned. Some that have been covered here include history and linguistics; others not covered include neurolinguistics (how is vocabulary stored in the brain?), education (how are users, specifically language learners, taught to find and interpret information in thesauruses?), and the various disciplines that have been the subject of encyclopedic or terminological reference works.

See also: Cognitive Linguistics; Componential Analysis; Computers in Lexicography; Corpus Linguistics; English Lexicography; Frame Semantics; Lexical Fields; Lexicography: Overview; Lexicology; Linguistic Terminology; Polysemy and Homonymy; Prototype Semantics; Synonymy; Terminology and Terminological Databases; WordNet(s).

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Thetic–Categorical Distinction

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In the late 19th and early 20th century, there were two major attempts at overcoming the Aristotelian articulation of the clause (or 'judgment') in subject and predicate: one by Gottlob Frege (*see* **Frege, Gottlob (1848–1925)**), who did away with the distinction altogether, and one by Franz von Brentano and Anton Marty, who restricted the traditional subject–predicate articulation to what they called 'categorical judgments,' as opposed to 'thetic judgments,' which do not involve an act of predication about some 'psychological subject' but attribute something to a situation as a whole.

This suggestion was later taken up by the Czech linguist Vilém Mathesius (1929) (*see* **Mathesius, Vilém (1882–1945)**), who saw the sentence as a communicative utterance by which the speaker assumes some active attitude to some fact or group of facts (1983: 124). In declarative sentences, this active attitude is assertion. An assertion can either be the simple presentation of an event or action (like in Czech *byla tma* 'it was dark'; thetic) or a predicative statement about a theme (*and the king had a beautiful daughter*; categorical).

It was not until 1972 that the U.S.-Japanese linguist Sige-Yuki Kuroda rediscovered the Brentano-Marty proposal. He argued that the much discussed difference between the Japanese 'subject' particle *ga* and the 'topic' particle *wa* actually reflected a distinction between two judgment types, viz., the categorical and the thetic. At the time of its publication, however, Kuroda's paper did not have too much impact, as another U.S.-Japanese scholar, the Harvard linguist Susumo Kuno (1972), had just proposed a different explanation of the same phenomenon in terms of information structure: the *ga*-clauses in question were 'neutral descriptions,' which contained all new information, while *wa*-clauses were about some (given or contrasted) topic. This proposal tailed in with a long-standing discussion about 'accented subjects' in English (see Bolinger, 1954; Fuchs, 1980) and similar phenomena.

A number of scholars of Romance languages (such as Vattuone (1975) on Genoese Italian and Ulrich (1985) on Romanian) maintained that the word order verb–subject (VS, in contrast to subject–verb, SV) in these languages codes thetic judgments. (Similar observations have been made for Hungarian, Russian, Bulgarian, and Modern Greek.) This claim was taken up by Hans-Jürgen Sasse in 1987. His point is that the thetic/categorical distinction (which he relates to the sentential communication perspective) is independent of the information-structure phenomena described by Kuno (which Sasse associates with discourse–pragmatic presuppositions). (*see* **Pragmatics: Overview; Discourse, Foucauldian Approach**.)

If thetic judgments were simply 'neutral description' sentences, they would be the appropriate answer to questions (such as '*What happened?*') that do not introduce any discourse-pragmatically presupposed material (*see* **Presupposition; Pragmatic Presupposition**). But while such questions are a valid diagnostic for neutral descriptions (and 'all-new' sentences), they fail as a diagnostic for thetic judgments. In answering, the speaker still has a choice between, for example, VS and SV forms in Italian: he or she can either focus on the situation as a whole and make a statement

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about this, or choose a topic as a predication base and predicate something about this topic. This topic would then be new in the given situation; the resulting sentence is a categorical, all-new sentence.

Grammatical structure can be said to have two core articulations: a semantic articulation as predication and a topicality articulation as judgment. But there is also another, pragmatic articulation, that of given vs. new (Haberland and Nedergaard Thomsen, 1993: 177). Whether the thetic/categorical distinction is grammatically relevant depends on whether a language emphasizes topicality articulation (situational pragmatics) rather than information structure (discourse pragmatics). In other words, the question is whether the available syntactic means are more suited for expressing a thetic/categorical than an information structure-based distinction. So far, the following syntactic phenomena have been suggested as realizing the thetic/categorical distinction:

Noun incorporation:
Boni (Sasse, 1984)

Verb–Subject order:
Genoese Italian (Vattuone, 1975)
Romanian (Ulrich, 1985)
Modern Greek (Sasse, 1987)
Swahili (Sasse, 1987)

Split structures:
French (Ulrich, 1985; Sasse, 1987)

Dummy subjects:
Danish (*der*) (Heltoft, 1993)

Intonation features ('accented subjects'):
English (Sasse, 1987)
German (Sasse, 1984)
Morphological marking:
Japanese: *wa* versus *ga* (Kuroda, 1972; Shibatani, 1991)

Lambrecht (1987, 1994) has proposed a more fine-grained typology of focus that aims at capturing both the phenomena analyzed by the information-structure approach (as outlined by Kuno) and the thetic/categorical approach *à la* Kuroda, Sasse, and others (for a discussion, see Van Valin, 1990). In Lambrecht's approach, thetic judgments are cases of sentence focus.

A very critical discussion of the issue can be found in Wehr (2000).

See also: Discourse; Discourse, Foucauldian Approach; Frege, Gottlob (1848–1925); Mathesius, Vilém (1882–1945); Pragmatics; Pragmatic Presupposition; Pragmatics: Overview; Presupposition.

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Think-Aloud Protocols

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What Is a Think-Aloud Protocol?

Think aloud (TA) is a method of eliciting data about the cognitive and linguistic processes that go on in the translator's mind while translating. Think aloud refers to spontaneous concurrent task-related verbalization during task performance that ideally takes place virtually without prompting. The term 'think aloud' is sometimes also used to refer to retrospective sessions in which the subject is asked to comment on the task after its performance, but in this article the term is confined to concurrent verbalization. Also, 'think aloud' is here confined to solitary thinking aloud and, thus, does not include dialogue protocols, which are transcripts of discussions in joint translation sessions.

In a typical experimental design, a translator is asked to 'think aloud' while carrying out the translation brief, i.e., to verbalize his/her thoughts to the extent that this is possible without hampering task performance. The tape-recorded or videotaped think-aloud session is transcribed into think-aloud protocols (TAPs), which are then subjected to the kind of analysis that is needed to answer the research question at hand. The degree of accuracy and the notations used in the transcription also depend on the aim of the research, but it is advisable to transcribe the material carefully, following, e.g., the standard procedures used in conversation analysis. It is customary to include in the transcription such nonverbal items as the length of pauses, intonation patterns, and paralinguistic phenomena (laughter, sighing, exclamations, cursing, etc.). Careful transcription also makes the protocol accessible for other researchers and improves its usability for a greater variety of research purposes.

The TAPs, together with the translation product itself, constitute the raw data that are generated in a think-aloud session, and they can at best give a glimpse into the translator's mind. Complemented with other data, such as a tape-recorded retrospective interview with the translator or a log of the translator's keyboard activity, TAPs can turn out a valuable source of information that cannot be accessed by any other methodology. Think-aloud data in translation studies have been criticized, e.g., for being fragmentary; for representing the products of cognitive processes instead of the processes themselves, and for the potentially detrimental effects of TA on the processes. For concise reviews of this discussion, see Jääskeläinen (1998: 266–267) and Bernardini (2001). By carefully planning the experimental session, however, some of the imminent problems can be avoided.

How to Set Up an Experimental Session with Think Aloud

The aims of think-aloud experiments vary, but normally the researcher wishes to capture the translation process as intact and authentic as possible. Therefore, the session should be administered in such a way that the translator does not find the experimental situation stressful. A stressful and artificial situation will distort the translator's task performance, and her think-aloud data will not reflect her normal thinking. One way to foster ecological validity is to administer the experimental session in the translator's own office, where she has access to the tools and contacts that she normally uses in her work. It is also recommended that a warming up task should be administered in order to give the subject a chance to try out thinking aloud in advance of the experimental task. Another recommendation is that the task description should be given clearly and unambiguously and that it should also be available in a written format. This is necessary, if the aim is to enable other researchers to replicate the experiment.

An important caveat concerning think aloud is that the subjects in a think-aloud experiment should be encouraged merely to verbalize freely, i.e., to think aloud instead of analyzing, commenting on, or telling the experimenter what they are doing. If the subject falls silent for a long period, the experimenter can give a simple prompt to encourage the subject to carry on thinking aloud, but the subject should not be asked to explain, justify, or report on his or her performance.

For example, if the aim of the research is to find out on what grounds professional translators add explicating items, e.g., adversative connectives (cf. Englund Dimitrova, 2003), in their translations, the researcher probably chooses a source text and a task description in which some items are likely to trigger off such additions. If the expected behavior does not take place, i.e., if the subject does not react to the source text as expected, the experimenter refrains from prompting the subject to comment on the item or phenomenon, even though it is in focus in the research design. Thinking aloud should be spontaneous; otherwise, it is not thinking aloud at all, and this is probably the biggest problem inherent in this method of data elicitation (see 'Constraints and Limitations' section).

In order to find out how the subject reacted to the experimental situation and perhaps to get some

further information that may explain aspects of task performance, it is recommendable to arrange a retrospective interview with the translator right after the experimental session itself. This is a session in which the subject is asked to comment on the session as a whole, and which gives the researcher the opportunity to find out, for example, if the subject felt that he was performing naturally or whether the think-aloud condition was disturbing in some respect. The subject could also be asked to evaluate the quality of his performance in the test and to compare it to his normal level of performance.

Why Investigate Think-aloud Data?

TAPs have been analyzed to investigate, e.g., translators' problem-solving, decision-making, information search, and motivation. Subjects representing varying levels and domains of expertise have been used in order to identify those process features that go together with expert-level performance (e.g., Tirkkonen-Condit, 1996; Jääskeläinen, 1999; Livbjerg and Mees, 2002; Sirén and Hakkarainen, 2002). The effect of the familiarity of the translation assignment on the process was investigated by Laukkanen (1997), the effect of time pressure by Jensen (2000), and the effect of access to dictionaries by Livbjerg and Mees (1999).

The first major research projects based on TAP data (Gerloff, 1986, 1988; Krings, 1986, 1988; Lörscher, 1986) came out virtually simultaneously in the late 1980s. These pioneering studies aimed at identifying the overall features of the translation process; in other words they set out to investigate 'what happened in the translator's head' and to devise methods of analysis to describe what they found.

Transcripts of think-aloud sessions seem very confusing, if the research questions are of such a global nature as they tended to be at first. Below are two excerpts of a think-aloud protocol in which a Finnish translator is dealing with the English expression *vulnerably housed* in an experimental session administered by the present writer herself (for a report of the experiment, see Tirkkonen-Condit, 2002). The original TAP excerpts are accompanied by their translations into English. The figures in brackets indicate the length of pauses in seconds; underlined pauses in brackets stand for those pauses during which typing takes place; (.) stands for a pause shorter than one second; (hh) indicates a sigh with an out-breath; and (( )) for inaudible verbalization. A lengthened end vowel is marked with a double colon.

vulnerably (12) (reading a dictionary entry) vulnerably housed (14) haavoittuva herkkä uhanalainen suojaton (2) hmm (2) entäs tuo housed sitten (( )) (18) house kyllä löytyy (3) onkos tuo nyt oikein (3) on (6) en tiennykään että housella on monia monta merkitystä (6) the club is housed (.) there (.) kerho sijaitsee siellä (.) (( )) (2) hmm (1) vulnerably housed (5) voi räkä tämä on joku sanonta (4) (( )) (moving the microphone) (18) hh (2) siis jotenkinhan tämä liittyy köyhyyteen asunnottomuuteen (25) to house on majoittaa (2) voiskohan tämä olla ettei oo pysyvää asuntoo tai asuinpaikkaa (4) tai sitten mie yhistän nämä kaikki kolme (2) kodittomat ja entiset kodittomat ja (6) taidan tarjota ei pysyvää asuinpaikkaa (3) hh

se on tuo (.) vulnerably housed taas kummittelemassa (1) (( )) (13) irtolainen on varmaan vähän (.) arvoväritteinen (laugh) (6) hh tarjotaan nyt sitten ilman vakituista (.) asuinpaikkaa:: (17) (( )) (2) vaatii jottain lissää tähän

[vulnerably (12) (reading a dictionary entry) vulnerably housed (14) woundable sensitive threatened without shelter (2) hmm (2) what about housed then (( )) (reading a dictionary entry) house is there alright (3) but is this one correct (3) yes it is (6) I did not know that house has several meanings (6) the club is housed (.) there (.) the club is located there (.) (( )) (2) hmm (1) vulnerably housed (5) heck this is some idiom (4) (( )) (moving the microphone) (18) hh (2) so this has something to do with poverty having no place to live (25) to house means to accommodate (2) could this mean that someone does not have permanent dwelling or place were to live (4) or then I will put all the three things together (2) homeless and ex-homeless and (6) I might offer with no permanent place to live (3) hh]

[there's this (.) vulnerably housed haunting me again (1) (( )) (13) a tramp is probably a bit (.) loaded (laugh) (6) hh okay lets just offer without permanent place to live (17) (( )) (2) it needs some padding here]

The above excerpts show that the translator ultimately figured out, with the help of a dictionary, that *vulnerably housed* probably referred to people with no permanent place to live.

The early researchers were wondering, for example, what the unit of analysis should be and on what basis stretches or passages in the ongoing verbalization should be segmented and categorized. Krings (1986) decided to use the translation problem as the unit of analysis. The entity of translation problem was operationalized by establishing a number of unambiguous problem indicators, which included pauses of three seconds or longer, gaps in the translated text, production of multiple translation variants, and expressions of ignorance. Categorization and counting of the problems generated data that enabled the researcher to make intersubject comparisons as well as process versus product comparisons. A similar method was subsequently developed for the categorization and analysis of translational decisions by Tirkkonen-Condit (1991).

In the 1990s, the popularity of think aloud in process-oriented research was reflected in the

contemporary review articles and collective volumes, which focused almost entirely on studies that used TA as the main method of data elicitation. The review article by Kussmaul and Tirkkonen-Condit (1995) on process research carried out in Europe, for example, discussed mainly TA projects, although a couple of studies based on dialogue protocols were also included.

Another feature shared by early process studies is a concern for transferring research findings to translation pedagogy. This is not surprising, as the researchers were themselves teachers of translation in departments of foreign languages or in schools of translation studies, where they had access to voluntary subjects for experiments. Whereas Pamela Gerloff, Hans-Peter Krings, and Wolfgang Lörscher in their pioneering work were primarily focused on identifying the nature of process phenomena, most of the other researchers in the 1980s and early 1990s were already on the lookout for applications. Pedagogical relevance is clearly highlighted in the work of Donald Kiraly, who challenged the didactic routines of a teacher-centered translation class and argued for a constructivist approach to learning and teaching (Kiraly, 1995). Paul Kussmaul with his colleague Hans Hönig also used students' performance as a database, and focused on identifying such strategies for solving translation problems that could be taught to novices in translation (e.g., Hönig, 1988; Kussmaul, 1995). Frank G. Königs deserves to be mentioned among those whose empirical findings from translation students' performance contributed to the theory of the translation process as early as the 1980s (Königs, 1987, 1991). In his 1987 article, he divided the translation process in two blocks, with the Adhoc block standing for automatic processing and the Rest block for conscious processing. The hypothesis of static automated blocks was challenged by Jääskeläinen and Tirkkonen-Condit (1991) by virtue of empirical evidence that showed that automation could also happen during the process, and that seemingly automated solutions could be subjected to conscious treatment.

The special issue of *Meta* on Translation Processes edited by Königs in 1996 reflects the state of the art at the time but also the trends for the years to come. Some papers still aim at capturing the essence of the entire process, while others focus on the strategic dimension (Mondahl and Anker Jensen) or particular aspects of the process (Tirkkonen-Condit and Laukkanen). This collection in the main represents what Jääskeläinen (1999) called first-generation research, in that the contributions, the empirical papers in particular, start from scratch as it were, i.e., the findings from their own small-scale pilot studies, and then go on to sketch hypotheses for future testing.

For obvious reasons, first-generation research dominates the collective volume edited by Candace Séguinot in 1989. Séguinot herself was one of the first scholars who set out to investigate what happened in the minds of real professionals in the translation industry as they carried out their routine tasks. One important observation was that highly experienced professional translators did not necessarily verbalize very much when performing their routine tasks. Processes that call for conscious decision making and problem solving from the novice become automated for the expert and will not surface in the expert's TA unless explicitly prompted. The translator who functioned as subject in Séguinot's (1989) study worked in the Department of the Secretary of State, and for the purposes of the experiment, chose a text from the pool of texts that were due for translation in the English Section. Even though verbalizing was scarce, there were signals in the typing performance that revealed potential decision points and some other reasons for deviating from 'smooth' target language rendering. The most obvious signals of deviations from smooth rendering were pauses and revisions. A comparison of source and target texts, however, yielded perhaps the most interesting findings of the entire study, namely the fact that the professional translator changed the text in several respects while translating it. The target text manifested increased objectivity, improved logic, greater explicitness, greater precision, improved coherence, sustained register, and tendency to brevity (Séguinot, 1989: 25–30). The necessity to improve the text is widely acknowledged by those who translate nonliterary or functional texts (see e.g., Nida, 2002).

The scarcity of verbalization in the professionals' think-aloud protocols may have led Séguinot to question the usefulness of TA as a method of data elicitation altogether (see Séguinot, 1996) and to look for other methods. Thus for another study somewhat later, Séguinot tape-recorded two experienced translators' conversations while these were working as a team to produce translations for publication (Séguinot, 2000). It turned out that the professional translators' dialogues revealed 'managerial' aspects of task performance that would hardly have surfaced in solitary think aloud, let alone leave a trace in the product. A discussion on 'Think Aloud Versus Dialogue Protocols' appears later in this article.

An Overview of the Major Results

One of the main findings in TAP research, and in process research at large, is that it is dangerous to make sweeping generalizations about translation processes. There is wide individual variation in the processes of

novices as well as those of skilled professionals. It has turned out, for example, that professional status does not necessarily guarantee high-quality performance, and conversely, that novices' performance may manifest features of expertise. This finding has important consequences for research that aims at identifying elements of expertise in translation processes. It means that studies of processes must be accompanied by an evaluation of product quality as well.

Another major finding relates to the discussion on automated processing in translation. It had turned out that professional translators, while carrying out their routine assignments in experimental sessions, often fell silent for long stretches of time. This phenomenon in turn was accounted for by the psychological fact that cognitive processes tend to become automatic through repeated practice (e.g., Ericsson and Simon, 1984). This led some researchers to conclude that there was no access to professional processing via think aloud. As other researchers continued getting ample evidence to the contrary, the outcome of the discussion was that the propensity to think aloud depended on the type of assignment. A translation brief that called for the translator to repeat a well established routine did not necessarily trigger off conscious decision-making, let alone problem-solving, and thus virtually no spontaneous verbalization. In contrast, a new kind of translation assignment, a nonroutine task, was found to generate spontaneous thinking aloud.

One observation, however, is probably shared by everybody who has been involved in TA experiments, namely the observation that there are some people for whom the think-aloud condition is so unnatural that it is bound to affect their performance and thus the ecological validity of the results. On the other hand, there are those who recognize thinking aloud, or subvocal verbalization, as their normal condition when carrying out a cognitive task, be it translation, a mathematical puzzle, or figuring out a location on the map. Most people probably fall in between these two extremes. This relates to the constraints and limitations of TA to be discussed in the 'Constraints and Limitations' section of this article.

Although there is great individual variation even among expert-level translators, there are still a number of shared features of expertise that emerge in several studies. An overview of these features is given in Tirkkonen-Condit (1996), and it is summarized in what follows. Here the term 'expertise' is preferred to professionalism, as the focus is on processes that are observed to result in successful performance. Expertise captures the idea that it is not professional status we are interested in but expert-level performance and the processes that account for it.

When the translation process is described in terms of the knowledge base utilized by the translator, expertise is characterized by a highlighted proportion of knowledge inferred from the source text. Whereas novices and nonexperts tend to focus on lexical items and other microlinguistic aspects and to resort to text-external translation aids for information, experts tend to focus on the text itself and to maximize the amount of information to be gleaned from its semantic, pragmatic, and intertextual dimensions. Nonexpert comprehension procedures tend to be locally oriented, while expert comprehension procedures tend to be globally oriented.

A similar local versus global distinction is to be found in the text generation procedures of nonexperts and experts. A feature typical of experts' text generation is that some decisions about the entire target text are made at a relatively early stage of the process. Among such global decisions can be, for example, decisions about the overall style of the emerging target text. If a translator decides, for example, to use an overbearing tone, then she will discard such translation variants that give an impression of compliance or pleasantness. One way of analyzing think-aloud protocols from the point of view of stylistic decisions is to look at the adjectives that the translators use when evaluating potential translation variants or the text that has already been produced. The adjectives reflect the general impressions the translators are aiming at, as well as the impressions they wish to avoid. One translator, for example, expressed desirable qualities with such adjectives as *natural, balanced, lucid, pleasant, elegant, simple,* and undesirable qualities with expressions such as *simplistic, mild, pedantic.*

Experts have also been found to behave according to their global decisions and according to the principles they have adopted, while no similar compatibility between global aims and local decisions has been found in nonexperts' protocols. On the contrary, there is often a conflict between voiced principles and action. Subjects representing nonexpert performance may emphasize the importance of reference material or expert help, but in local decision-making situations end up just using a dictionary in spite of easy access to the Internet, the telephone, or the library. Such incompatibility between principles and local decisions is to be seen in the following TAP excerpt from Laukkanen's (1997) study:

> kuinkas pitkä tää nyt olikaan (1) ei kovin pitkä (1) nyt tää pitäis ensin lukea mutta (.) kaikkien taiteen sääntöjen mukaan (.) mut mä en aio lukea tätä (laughs) (5.0) ku ei näit yleensä jaksa eikä ehdi nii (.) tai sitä lukee sitä mukaa ku tekee et kyl siinä sitte huomaa jos tulee jotain outoo

> [let me see how long was this now (1) not very long (1) now then I should read this through first but (.) according to the rules of the game (.) but I'm not going to read it (laughs) (5) because you normally don't have the energy or the time so (.) or you just read it while doing it so you will see if something strange comes up]

Another feature of expertise is that decision-making effort is concentrated on those problem areas of the task that seem to have the greatest bearing on the outcome. Such crucial areas are, for example, titles and headings as well as pivotal terms, names, or acronyms that get frequently repeated in the text. The distribution of decision-making effort can be investigated by different methodologies developed within the TAP research tradition. One method is to identify all those sections in the protocols in which more than one potential translation variant is voiced for a particular section of the source text (see Krings, 1988). Accumulation of competing translation variants, or multiple variant production, implies a need for a conscious decision, i.e., a choice of just one variant and the rejection of others. In the performance of experts, multiple variant production has been observed to accumulate on those areas that have greatest weight in the entire assignment. Experts invest decision-making effort strategically instead of wasting it on irrelevant details.

Focus on target text generation and monitoring its quality show in the think-aloud protocols of experts also in the distribution of evaluative expressions. It has been shown (Tirkkonen-Condit and Laukkanen, 1996) that the proportion of target text evaluations (of all evaluative expressions identified in the TAPs) grows with the level of expertise. Research with other methodologies support the observation that expertise calls for monitoring skills (e.g., Sirén and Hakkarainen, 2002; Hansen, 2003).

Constraints and Limitations

With the caveat in mind that a TAP can, at best, only give a glimpse into the translator's mind, perhaps the most serious limitation of this method of data elicitation is that it is not applicable to all potential subjects. Some people simply cannot think aloud naturally. If they do not fall silent altogether, they may start giving a retrospective report of what they just did, or a report on what they are going to do next. Instead of thinking aloud by themselves, they talk to an addressee, even if there is no one present in the room. Inability to think aloud is not the only problem relating to suitability as a subject. The think-aloud condition may also be experienced as intrusive or embarrassing, which also endangers the validity of the data. A warming-up task should reveal if a subject feels at home with think aloud. If this is not the case, there is a good reason to give up the experiment or at least to treat the TA data with caution.

The problem of automated processes in the context of translation briefs of a routine type was mentioned earlier in this article. Thus, if the aim is to identify process features that may account for professional and expert-level performance, the experimental task should have elements that require detachment from everyday routines. The translation brief, for instance, that I used in a think-aloud experiment administered in the Helsinki-based translation unit of the European Commission elicited a good amount of thinking aloud from all the eight professional translators who took part in the experiment. Their routine tasks constituted mainly legal EU texts to be translated from English or French into Finnish, whereas the experimental task represented a less specialized field. Its description is given below in the format in which it was presented to the subjects (for details, see Tirkkonen-Condit, 2002):

> The following text appears on the cover page of a weekly publication sold on the street in Britain, called *The Big Issue* (as the text itself explains). In Finland some organizations of the unemployed have had a similar initiative in mind, and one of them has commissioned the English text to be translated into Finnish. The translation is needed as a basis for launching such an initiative in Finland.

In research that aims at optimal psychological and ecological validity, the think-aloud experiment should be administered in such a way that the translator's normal working habits are interfered with as little as possible, even though the translation brief itself deviates from everyday routines. Spontaneity of thinking aloud is the ideal, and prompting should be as unobtrusive as possible. Solicitation of explanations, justifications, descriptions, etc. will affect the spontaneity and authenticity of think-aloud data, which then does not really represent what goes on in the translator's mind, but rather what goes on in the experimenter's mind. A think-aloud session may of course be interrupted by 'normal' addressee-oriented talk, when, for instance, the experimenter and the subject are discussing the location or the functioning of the microphone, but this should not be confused with thinking aloud.

The effect of TA on processing has concerned the researchers themselves as well as their critics. One of the most influential of the latter is Gideon Toury, whom I quote in what follows (see Toury, 1995: 235–237):

> "My concern is rather with the *possible interference of two modes of translation*. Thus what the experiment claims to involve is basically the gradual production of

> a *written* translation of a *written* text. However, the need to verbalize aloud forces the subjects to produce not just *mental,* but *spoken* translation before the required written one; and there is a real possibility that spoken and written translation do not involve the exact same strategies." (Italics as in the original.)

Here Toury seems to assume that subjects in a think-aloud experiment are forced to produce a spoken translation before they type or write down their translation or part of it. This is a gross misunderstanding of how a normal think-aloud experiment is administered. If subjects in fact verbalize stretches of the enfolding target text in advance of typing it, they do it without an instruction to do so. It would be against the rules of think aloud as it were, if the administrator of the experiment asked the translator to translate orally – if the aim is to study processes that go on in the translator's mind while performing a (normal) written translation task. It may be the case that the experimenters that Toury has observed have forced their subjects to verbalize in advance what they are going to type but this kind of request seems very strange and, indeed, is not justified, let alone required, by the method itself. If this were the general practice in think-aloud experiments, then how were we to explain the fact that professional translators tend to fall silent in routine tasks?

Even though some of the criticism addressed at think aloud is obviously misguided, the potential effect of think aloud on the translation process itself should not be dismissed lightly. One hypothesis (see e.g., Toury, 1995: 236–237) is that think aloud may affect the size of the translation unit by making it shorter than it would be in a non-TA condition. This in turn may result in a tendency to translate verbatim. The hypothesis according to which TA tends to shorten translation units has in fact got support from Arnt Lykke Jakobsen's study, in which subjects translated with and without think aloud. In both conditions, their keyboard activity was logged, whereby it was possible also to identify segments of text that were produced between pauses of a certain length (see Jakobsen, 2003). In addition to having a shortening effect on translated segments, TA was also noticed to increase the frequency of revisions and, consequently, also to lengthen the time needed to perform the task at hand.

In the light of the above discussion, it seems justified to expect that TA probably affects the translation process in some way, even if the experiment is conducted carefully and without pressuring the translators to verbalize what they would not spontaneously verbalize while translating in a TA condition. Another project altogether would be to find out whether TA has an effect on the quality of translation. To my knowledge, this has not been done in any of the experiments in which the aim has been to identify the potential effects of TA on the translator's performance. If it is the case that TA has a detrimental effect on translation quality, this should be taken seriously. However, there is no evidence so far that this is the case. On the contrary, many of the professionals that have participated in the experiments carried out by myself and my colleagues have turned out high quality translations in spite of – or perhaps by virtue of – the TA condition.

Think Aloud Versus Dialogue Protocols

One of the proponents of dialogue protocols is Juliane House, who argues for their superiority in eliciting richer data on translators' choices than solitary thinking aloud (see House, 1988, 2000). Paul Kussmaul has also given joint translation tasks to translation students, whose discussions have been recorded and transcribed into dialogue protocols. One of his aims (see Kussmaul, 1991) has been to find out how creativity manifests itself in translation. It seems that pair work can be conducive to creative impulses, as there is also room for joking and carnivalism while carrying out the task as a joint effort. It may also be the case that the experimental condition is more relaxed and less threatening in joint translation, as the responsibility for the outcome is shared. Thus the use of joint translation and dialogue protocols especially for pedagogic purposes seems well justified.

Another well-known argument for the use of dialogue protocols instead of TAPs for data collection is that it is easier for people to talk to others than to themselves. Consequently, there is more material to transcribe and more data to analyze. It should be remembered, however, that the nature of the dialogical data is different, and that dialogue protocols do not represent translation as it happens in most translator's work place. Translators may negotiate the translation brief and other aspects of the assignment with their employers and colleagues, but most of the target text generation normally takes place on a solitary basis. If the aim is to find out process phenomena in solitary translation, dialogue protocols will not serve the purpose. For some research purposes it may be a good idea to combine the two methods: if the researcher is interested in the processes of metaphor translation, for instance, he or she may set up an experiment in which one and the same translation brief is given to a number of solitary translators who perform the task in a TA condition, and to pairs of translators whose discussions are recorded and transcribed into dialogue protocols. Thus, particular instances of metaphoric expressions can be

observed to compare the processes that enfold in solitary versus dialogical conditions.

Think Aloud and Triangulation of Methods

It is important to bear in mind that TAPs do not constitute a research method. They are just one method of eliciting data that is assumed to bear on the processes that go on in the translator's mind while translating. In thinking aloud the verbalization, if any, is fragmentary by nature, as it ideally represents the subject's solitary thinking and is not really meant for the benefit of others. Thus, it is normal that sections of the recording are inaudible, incomprehensible or difficult to interpret. In addition to vocalized elements, however, TAPs contain information on pausing and other nonverbal information that may help in the interpretation of the vocalized sections.

Among the promising new methods of data elicitation that can be used in combination with TAPs, supplementary to TAPs, or independently of TAPs, is the logging of the translator's text generation by means of software such as Translog (see Jakobsen, 1999). The software registers all keyboard activity and has a replay facility that makes it possible to observe the typing process as it enfolds in real time, or speeded up at will. It is interesting to observe, for example, if text generation proceeds smoothly, if it has a certain rhythm, and if the rhythm varies. It has been noticed, for example, that individual translators manifest varying temporal rhythms in their text generation (Jakobsen, 2003).

The raw data from Translog is confined to two items: the final printout of the translation and an accurate register of the typing process in terms of keyboard activity. There is accurate information about the timing of each key stroke, pauses of any size, revisions, misprints, deletions, etc. Quantitative intersubject comparisons of merely this raw data can be revealing, if, for example, we are in search of process features that go together with expert level quality. We might want to ask, for example, how a high-quality translation tends to be generated; is it via abundant revision and abundant waste of keyboard activity, or is it generated smoothly, with little revision and little back and forth movement?

Translog does not provide any information about the translator's thinking, but it can be combined with a retrospective replay session, in which the translator has a chance to comment on her text generation while watching how it appears on the computer screen. As Translog also keeps an accurate log of interim solutions, the translator in the retrospective replay session may still remember why a particular interim solution was discarded and did not end up in the version that was accepted for the final printout.

Translog has at least two advantages over think aloud. From the translator's viewpoint it is less obtrusive, and from the researcher's viewpoint it is less labor-intensive. Thus it enables collection of large quantities of data, assuming that there are enough translators who volunteer as subjects. Registering the eye gaze patterns of translators is another method that could perhaps be increasingly used to glean information of the cognitive processes that account for translational phenomena. Correlating quantitative data from various sources would enable us to test the hypotheses that have been suggested as a result of small-scale research with TA and other labor-intensive data collection methods (e.g., the hypotheses on expert versus nonexpert processes should be tested with large-scale quantitative research). Perhaps in the future it will be possible to set up large-scale projects on translation processes, in which quantitative analyses of data from various sources are carried out. Translogged data and eye-gaze data, for example, might be elicited from a great number of translators representing different levels of expertise, and the data might be correlated and subjected to statistical analyses. This is necessary, if we are to find out if there are indeed shared patterns that single out those translation processes that result in high-quality translation.

Conclusion

Bearing in mind the caveats, constraints, and limitations that accompany the use of TAPs, it can be concluded that, especially in combination with other methods of data collection, the think-aloud method should belong to the tool kit of a researcher who is interested in the workings of a translator's mind. As TAPs have also turned out pedagogically useful, they should belong to the tool kit of a teacher of translation as well.

See also: Psycholinguistic Research Methods; Translation Units; Translation Universals.

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Third Language Acquisition

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Introduction. The Spread of Third Language Acquisition: Sociolinguistic Perspectives

Third language acquisition is a very common phenomenon all over the world and occurs in a large number of diverse sociolinguistic situations. The number of languages spoken in the world nowadays (approximately 6,000) clearly outnumbers the number of countries (approximately 200) in which they are spoken, implying that going beyond second language acquisition is not unusual, and learning a third or a fourth language is natural for many people all over the world. Third language acquisition occurs commonly in bilingual and multilingual contexts, when, due to historical or political reasons, two or more languages overlap in a region, but also occurs commonly among individuals who need to communicate for professional or other reasons.

Third language acquisition is promoted in Europe within established linguistic minority groups (for example, Catalan, Basque, Frisian, or Welsh), whose members, as a matter of ethnic pride and cultural preservation, support learning and using their traditional languages in addition to the national language and languages of wider communication. It is also very common for immigrants to learn a third language. In some cases, immigrants are already bilingual or multilingual before they learn the language of the host country, and in non-English-speaking countries, they may also further their communication skills by learning English at school in the host country. In the United States, Canada, Australia, and New Zealand, immigration is a very common phenomenon. Members of minority communities in these countries speak their own heritage language (for example, Mohawk in Canada or Maori in New Zealand) or the immigrant language (for example, Spanish, Italian, or Chinese) and may learn English in schools (and in the case of children, additional languages) or as part of their assimilation education.

Bilingualism and multilingualism are extremely common in Asia and Africa. In some countries in these regions, many people use a variety of family and tribal languages plus a lingua franca and/or a national language, thus third language acquisition is a very common part of the culture. The teaching of additional languages at school also contributes to multilingualism. For example, speakers of Berber in Morocco learn Arabic, French, and some English at school; in South America, school is often the place where many children acquire a second and a third language. Native speakers of Quechua, Aymara, or Guarani, for example, usually learn Spanish as a second language and English as a third language.

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Third Language Acquisition

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Introduction. The Spread of Third Language Acquisition: Sociolinguistic Perspectives

Third language acquisition is a very common phenomenon all over the world and occurs in a large number of diverse sociolinguistic situations. The number of languages spoken in the world nowadays (approximately 6,000) clearly outnumbers the number of countries (approximately 200) in which they are spoken, implying that going beyond second language acquisition is not unusual, and learning a third or a fourth language is natural for many people all over the world. Third language acquisition occurs commonly in bilingual and multilingual contexts, when, due to historical or political reasons, two or more languages overlap in a region, but also occurs commonly among individuals who need to communicate for professional or other reasons.

Third language acquisition is promoted in Europe within established linguistic minority groups (for example, Catalan, Basque, Frisian, or Welsh), whose members, as a matter of ethnic pride and cultural preservation, support learning and using their traditional languages in addition to the national language and languages of wider communication. It is also very common for immigrants to learn a third language. In some cases, immigrants are already bilingual or multilingual before they learn the language of the host country, and in non-English-speaking countries, they may also further their communication skills by learning English at school in the host country. In the United States, Canada, Australia, and New Zealand, immigration is a very common phenomenon. Members of minority communities in these countries speak their own heritage language (for example, Mohawk in Canada or Maori in New Zealand) or the immigrant language (for example, Spanish, Italian, or Chinese) and may learn English in schools (and in the case of children, additional languages) or as part of their assimilation education.

Bilingualism and multilingualism are extremely common in Asia and Africa. In some countries in these regions, many people use a variety of family and tribal languages plus a lingua franca and/or a national language, thus third language acquisition is a very common part of the culture. The teaching of additional languages at school also contributes to multilingualism. For example, speakers of Berber in Morocco learn Arabic, French, and some English at school; in South America, school is often the place where many children acquire a second and a third language. Native speakers of Quechua, Aymara, or Guarani, for example, usually learn Spanish as a second language and English as a third language.

The role of English as the most important language of wider communication in the world also contributes to its dominance as a third language. The spread of English has been visualized by Kachru (1992) in terms of three circles. The innermost circle includes the countries that are traditionally considered the bases of English, where English is the first language for the majority of the populations (the United Kingdom, the United States, Ireland, Canada, Australia, and New Zealand). (As already noted, however, English is not the only language spoken in these countries and it is learned as a second or third language by members of minority communities.) The next circle outward includes those countries where English is not the first language for the majority of the population, but it is a second or third language that is used at the institutional level, as the result of colonization (India, Nigeria, Philippines, etc.). The expanding outermost circle includes those countries where English has no official status and is taught as a foreign language (Continental Europe, Japan, China, South America, etc.). As can be seen, speakers of English are in contact with speakers of other languages in all three circles, and therefore the third language acquisition of English is not unusual in most places in the world.

Despite third language acquisition being a common phenomenon, research in this field has received very little attention until recently. In the past decade, there has been a growing body of research into third language (L3) acquisition and multilingualism, as is reflected in an increasing number of publications in this area (for instance, Cenoz and Jessner, 2000; Cenoz *et al.*, 2001), in the publication of *The International Journal of Multilingualism*, and in the number of international conferences devoted to research on third language acquisition (held in Innsbruck, 1999; Leeuwarden, 2001; Tralee, 2003; and Fribourgh-Biel, 2005). The research has responded to the need to identify the specific characteristics that distinguish L3 acquisition and multilingualism from second language (L2) acquisition and bilingualism, and has addressed psycholinguistic, sociolinguistic, and educational issues. Research in this area tried to answer questions concerning the influence of bilingualism on L3 acquisition, whether L3 learners mix languages more than L2 learners do, how the first and the second languages affect the acquisition of additional languages, and which specific strategies are used by learners in L3 acquisition.

Differences between Second and Third Language Acquisition

Processes involved in the acquisition of a second or a third language have a lot in common, both theoretically and in terms of research methodologies. In both cases, researchers make theoretical proposals about the way learners process and use languages that are not their first language, and analyze learners' production of the target languages. However, there are important differences in the learning processes. These differences can be basically defined as 'process oriented' and 'product oriented.' Third language acquisition is a more complex phenomenon, compared to second language acquisition, and entails some specific characteristics. Learners, having already faced the task of acquiring a non-native (second) language, have gone through the process of developing learning strategies and metalinguistic awareness. The 'product' resulting from the process of acquiring a second language – that is, communicative competence in the second language – can influence how learners acquire a third language. This effect has been described in studies of the cross-linguistic influence in third language acquisition. The process of acquiring a third language can be considered more complex in terms of research because it involves all of the factors related to second language acquisition, plus additional factors related to the size of the learner's linguistic repertoire and his/her experience as language learner:

> Multilingual acquisition and multilingualism are complex phenomena. They implicate all the factors and processes associated with second language acquisition and bilingualism as well as unique and potentially more complex factors and effects associated with the interactions that are possible among the multiple languages being learned and the processes of learning them. [Cenoz and Genesee, 1998, 16]

The range of situations in which a third language may be acquired is also potentially quite broad. Languages may be acquired either simultaneously (early bilingualism or early trilingualism) or consecutively. A third language may also be acquired following the simultaneous acquisition of two languages, or simultaneously with a second language. These situations could become even more complex if the process of acquiring different languages is interrupted and resumed.

Second language acquisition can take place formally (through instruction), naturally (outside school), or by a combination of instruction and natural acquisition. When several languages are involved, there is more potential for diversity. Ytsma (2001) proposed a typology of trilingual education that includes 46 types and is based on factors such as the linguistic distance between the languages involved, the use of the third language in the sociolinguistic context, or the age of introduction of the third language. For example, the three languages may be typologically related to

each other, as in the case of trilingual programs in Friesland, where English is learned as a third language after Frisian and Dutch, or two of the three languages involved may be typologically related to each other but unrelated to the other, as in the case of immersion programs in Finland involving Finnish, Swedish, and English. Other variables, such as the sociocultural status of the languages, also entail greater diversity when more than two languages are involved. For example, in Luxembourg, the second and third languages used in schools (French and German) are considered more prestigious than the first language. In Quebec, Canada, double-immersion programs (see Genesee, 1998) expose learners who speak English as their first language to French and Hebrew as languages of instruction.

The areas of research that have received the greatest attention when comparing second and third language acquisition are metalinguistic awareness and learning and communicative strategies (for a review, see Cenoz, 2003a). Research on the effects of bilingualism on metalinguistic awareness has associated bilingualism with a higher ability to reflect on language and to manipulate it. Bialystok (2001) observed that bilinguals tend to obtain better results in tasks related to word awareness and in tasks that demand high levels of control of attention. A number of studies have been reported that multilinguals use a wider variety of processing strategies. In a series of comparisons of monolinguals and multilinguals learning artificial linguistic systems (see, for example, Nayak *et al.*, 1990), it was found that multilingual persons demonstrated greater flexibility in switching strategies according to the demand characteristics of the task; for example, they preferred mnemonic strategies for a memory task and linguistic strategies for a rule-discovery task, they were more likely to modify strategies that were not effective in language learning, and they more effectively used implicit learning strategies. Their superiority in these domains was attributed to their experience as language learners.

According to some research studies, bilingual children are more sensitive to the communicative needs of their interlocutors and use more varied communication strategies. This enhanced ability may be related to the fact that bilinguals have to keep their languages separate and have to switch languages according to the needs of different situations.

Third Language Acquisition Research

Though the focus of research on third language acquisition is potentially broad in scope, so far it has been limited to a few specific aspects of language acquisition: the effect of bilingualism on third language acquisition, the acquisition of a third language at different ages, and the cross-linguistic influence from the first and the second languages into the third one.

Effect of Bilingualism on Third Language Acquisition

One of the main areas of interest in third language studies is analysis of the influence of bilingualism on learning another language; this has been achieved by comparing bilingual and monolingual learners during acquisition of a third language. These studies tend to confirm the advantages that bilinguals have over monolinguals in language learning. Studies concerning general aspects of proficiency indicate that bilingualism has a positive effect on L3 acquisition when it takes place in additive contexts and when bilinguals have acquired literacy skills in both of their first two languages. For example, research on the acquisition of French as a third language in Canadian immersion programs indicates that bilingual children score higher on French language tests than do their monolingual counterparts (see Bild and Swain, 1989). Similar results were obtained by Thomas (1988), who compared the scores on French tests of English–Spanish bilinguals to those of English-speaking monolinguals. Research conducted in Catalonia and the Basque Country also confirms these results (for a review, see Cenoz, 2003a).

However, not all research studies report positive effects of bilingualism on L3 acquisition. Some studies comparing the degree of proficiency achieved in the third language by bilingual immigrant students and majority-language students have reported no differences. For example, Sanders and Meijers (1995) and Van Gelderen *et al.* (2003) did not find any advantages associated with the acquisition of English as a third language when they compared monolingual Dutch speakers and bilingual immigrant students who had Turkish or Moroccan Arabic as their first language. These results may be related to the sociolinguistic context in which the research took place, and it is important to bear in mind that L3 acquisition is a complex phenomenon affected by a large number of individual and contextual factors, and bilingualism is one of these factors but not necessarily the most important factor in L3 acquisition.

Research on very specific areas of language proficiency tend to confirm the advantages of bilinguals over monolinguals, but this trend has not been confirmed in all cases (Cenoz, 2003a). Nevertheless, when it comes to very specific aspects of proficiency, the comparability of the results of these studies is severely limited by their diversity regarding the

specific areas of language proficiency tested and their different research methodologies.

Age and Third Language Acquisition

Third language acquisition can take place at different times in life. In the case of early trilingualism, children are exposed to three languages from a very early age. There are several case studies on early trilingualism (see Quay, 2001), but it is difficult to say how widespread early trilingualism is. Most research studies and reports have been written by European and North American parents who are, in most cases, linguists or language teachers and who have decided to follow a specific language policy and speak different languages at home. Early L3 acquisition also occurs naturally as the result of immigration by families to areas where two or more languages are spoken. The many different situations in which early L3 acquisition takes place depend on factors such as the languages used by each of the parents when addressing the child, or used between the parents, and the languages used in education. Other factors are the discourse strategies used by parents or their attitudes toward multilingualism.

There have been very few research studies on early trilingualism, and most have focused on language mixing, because this is the most noticeable characteristic of multilingual production. When considering the relative proportion of language mixing in the child's production of speech, in the case of early trilingualism, most parents and researchers report that children tend to mix their languages at the onset of speech production but that there is separation of the language systems afterward. There is not enough evidence in the case of early trilingualism to support either the 'mixed' or the 'separate' systems hypotheses. Language mixing at the onset of speech production is not necessarily evidence for mixed language systems, because children may produce words in other languages as a strategy when they have a lexical gap. Language mixing may also be related to language mixing by adults; as Nicoladis and Genesee (1997) observed, the parents' language mixing can have an effect on their children's language mixing.

The acquisition of a third language at school is probably a more common event than early trilingualism is. Second and third languages can be taught as school subjects or can be used as languages of instruction, as is the case in immersion programs. Research on the age factor in L2 and L3 acquisition indicates that instruction in foreign languages from an early age, in the school context, does not necessarily mean higher achievement in all cases. When instruction in the third language is limited to a few hours a week, older children make more progress than younger children do, but when instruction is more intensive and the second and third languages are used as languages of instruction, the results can be more positive for early starters (see Genesee, 1998; Cenoz, 2003b).

Cross-Linguistic Influence in Third Language Acquisition

Contextual interactions that occur when learners are exposed to more than one language and particularly the influence of the first and second languages on the third language are primary areas of research in third language acquisition studies. Such research highlights the differences between processes involved in L2 and L3 learning and has important implications for broader theories of language acquisition. Specific areas of investigation include the effects of different factors (such as typological distance, L2 status, proficiency, or time of acquisition) on cross-linguistic influence from L1 and L2 on L3. Speakers borrow more terms from the language that is typologically closer to the target language. For example, Cenoz (2003c) observed that learners used Spanish more often than Basque as the source language of borrowings into English both when Spanish was the first language and when it was the second language.

Another factor that can predict cross-linguistic influence is the so-called foreign language effect, or L2 status (Hammarberg, 2001). Several studies have reported that learners tend to use the L2 or languages other than the L1 as the source language of cross-linguistic influence (Clyne, 1997; Williams and Hammarberg, 1998), but typology seems to be stronger than L2 status when learners choose their source language for borrowing into the third language. Cross-linguistic influence in L2 acquisition has been related to the level of proficiency in the target language; less proficient learners have been reported to transfer more elements from their first language, compared to learners who present higher levels of proficiency (Ringbom, 1987). Even though it has also been suggested that transfer is more likely from the first language than from subsequently learned languages (Ringbom, 1987), such effects seem to be less potent than typological similarity between the languages. Another factor that can potentially affect cross-linguistic influence is 'recency' (see Hammarberg, 2001). It is hypothesized that learners are more likely to borrow from a language they actively use than from other languages they may know but do not use.

Other factors that can determine cross-linguistic influence are related to the specific context in which communication takes place, including the interlocutors, the settings, and the topics of the conversation.

Grosjean (1998) considered that these factors determine if the speaker is in a bilingual or a monolingual mode. The influence of the contextual factors that determine the speaker's mode has been confirmed in some L3 studies. For example, Dewaele (2001) found that the level of formality affects the total number of terms transferred from the L2 in L3 production, and the percentage of mixed utterances was higher in informal situations.

Multilingual Competence and the Multilingual Mind

Acquiring communicative competence involves the acquisition of linguistic, sociolinguistic, discourse, pragmatic, and strategic competence. When several languages are involved, as in third language acquisition, it seems quite unrealistic to expect learners to acquire a native-speaker level of competence with regard to all of the different components. In fact, the traditional idea of competence as related to second language acquisition has been challenged. Grosjean (1992), Cook (1992, 1995), and others proposed that the traditional position on L2 competence, i.e., expecting multilingual and monolingual learners to achieve monolingual native competence, is a 'monolingual view of bilingualism.' As Edwards (1994) pointed out, a perfectly balanced bilingualism or multilingualism is exceptional. Most learners do not achieve native competence in a second or third language, and in some cases both teachers and learners view this as failure in the language acquisition process. This view is derived from the fact that only the norms of native speakers are considered, and that the needs of the learners and the ways that they are going to use the language are disregarded. In comparison to this 'fractional' view of an idealized form of bilingualism, Grosjean (1992) proposed a holistic view. Bilinguals seldom have balanced proficiency because they have developed communicative competencies in two languages according to the specific contexts in which they learn to use them. The language competence of bilinguals should not be regarded as simply the sum of two monolingual competencies, but rather should be judged in conjunction with the users' total linguistic repertoire.

Cook (1992) proposed the notion of 'multicompetence' to designate a unique form of language competence that is not necessarily comparable to that of monolinguals. According to Cook, second language users should not be viewed as imitation monolinguals in a second language, but rather they should be seen to possess unique forms of competence, or competencies, in their own right. Herdina and Jessner (2002) also adopted a holistic view of bilingualism and emphasized the fact that multilingual competence is dynamic rather than static.

Other specific theoretical proposals for multilingual processing have focused on the processing of the lexicon. For example, De Bot (2004) proposed a theoretical model that consists of three stores of information: conceptual features, syntactic procedures and form elements, and a language node that controls the use of the different languages. He concluded that there is no need to develop a specific model for multilingual processing, but rather the goal is to adapt the specific models so as to accommodate for more languages. Indeed, speech production in the different languages a multilingual uses may share most of the general characteristics of speech production in monolinguals and bilinguals, but necessarily presents more complexity and implies some specific characteristics derived from the interaction between different linguistic systems. The processes used in L3 acquisition may be very similar to those used by L2 learners, but, as Clyne pointed out, "the additional language complicates the operations of the processes" (Clyne, 1997: 113).

Contribution of Third Language Acquisition Research to Applied Linguistics

The study of third language acquisition makes an important contribution to research in applied linguistics because the process of acquiring a third language entails some specific characteristics that can help to understand the complex process of language acquisition in general. The diversity of third language acquisition and the interplay of combinatory possibilities in this process give rise to situations that are unique in language acquisition. Third language acquisition research is based on the theories and research methods used in second language acquisition, but can also contribute empirical data and theoretical proposals that are of interest to researchers working in other areas of language acquisition, and to applied linguists in general.

Acquisition of a third language has a great deal in common with second language acquisition (for example, in terms of research methodologies), but there is a need to conduct research specific to multilingualism in order to identify unique characteristics and operations that affect this process. Research that compares second language acquisition to third language acquisition is central in third language acquisition studies in order to identify specific and unique characteristics in the process of third language acquisition.

Another important reason to focus on the specific characteristics of third language acquisition is that research in this area brings together the disciplines

of bilingualism studies and second language acquisition research. These two areas have often ignored one another, the latter concentrating on the processes involved in the acquisition of a second language and the description of the resulting proficiency, and the former often concentrating on the effects of bilingualism on cognitive development. The study of the impact of bilingualism on third language acquisition brings these two traditions together.

See also: Applied Linguistics: Overview and History; Pedagogical Grammars: Second Language.

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Relevant Website

http://www.spz.tu-darmstadt.de/projekt_L3 – Website with information on third language acquisition.

Thomas of Erfurt (fl. 1300)

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Thomas of Erfurt probably obtained the degree of Magister in Paris, where Petrus Heliae had started philosophizing language, i.e., philosophical theorizing about language. Around 1300 he was Magister regens (principal) and rector at St. Severi School and St. Jacob School in Erfurt, Thuringia, Germany.

Owing to his logical studies on language such as *Novi modi significandi* and *Tractatus de modis significandi sive grammatica speculative,* he is regarded as one of the leading writers of the so-called 'Modists' school.' His *Grammatica speculativa* had been considered for a long time to be a work by Duns Scotus until Martin Grabmann (1922) proved it to be Thomas's lucubration. Martin Heidegger's *Habilitationsschrift* (1916) treated in fact Thomas's *Grammatica speculativa*. Thomas's other works include *Fundamentum puerorum*, an elementary grammar book in verse for didactic and mnemonic purposes, as well as commentaries on Porphyrius's *Isagoge* and others.

His definition of grammar has become a long-lived tradition in the history of grammar books in Europe: "*Grammatica est scientia docens nos recte scribere, recte scripta recte intelligere, recte intellecta recte componere, recte composito debito modo pronunciare*." These divisions of grammar came to be called orthographia, etymologia, diasynthetica, and prosodia, respectively, of which the most remarkable division is diasynthetica, i.e., syntax.

In the tradition of Latin grammar books during the Roman Age, syntax had tended to attract little attention. Latin being the native language of the Romans, their grammar books mainly treated accidence, i.e., how words should be inflected. In the Middle Ages, however, those whose native languages were not Latin began to use Latin as a kind of Koine of Western Europe with the result that syntax, i.e., how to make sentences of words without causing confusion, became more and more important. The Latin language of the Middle Ages, i.e., Medieval Latin, was the vehicle of scholasticism, a most delicate hair-splitting kind of thinking and discussing. In that kind of philosophy, syntax must be ruled by exact regulations, and these syntactical rules came to be equated with those of the human mind. This tendency was started in Paris, where Thomas studied, around 1150 by Petrus Heliae. Such philosophizing of language, which began with scholastic commentaries by Dominican monks on Donatus and Priscianus, can be said to have culminated in Thomas's *Grammatica speculativa*, and his contemporaries, such as Siger de Courtrai.

Their belief that there should exist only one *a priori* pure grammar common to all languages was more or less neglected for a long time, but Edmund Husserl (1913) showed that the ideal of *a priori* grammar has a solid claim and a certain extent of applicability. The return to this idea of intrinsic correlation between mind and grammar can be witnessed in Noam Chomsky's popularity after the dominant school of structural linguistics based on 'stimulus and response' lost its luster.

See also: Chomsky, Noam (b. 1928); Heidegger, Martin (1889–1976); Husserl, Edmund (1859–1938); Siger de Courtrai (d. 1341).

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Thomas, John Jacob (ca. 1840–1889)

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Born in Trinidad in 1840, John Jacob Thomas is perhaps best known for his work *The theory and practice of Creole grammar*, a description of the French Creole of his home island that remained the benchmark study of the language until well into the 20th century. The accuracy and thoroughness with which he wrote his book earned him considerable praise during his lifetime, both at home and in Europe. His achievement is all the more remarkable in that he was not a native speaker of French Creole, having studied and acquired it upon assignment as a teacher to an area in which the

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Owing to his logical studies on language such as *Novi modi significandi* and *Tractatus de modis significandi sive grammatica speculative,* he is regarded as one of the leading writers of the so-called 'Modists' school.' His *Grammatica speculativa* had been considered for a long time to be a work by Duns Scotus until Martin Grabmann (1922) proved it to be Thomas's lucubration. Martin Heidegger's *Habilitationsschrift* (1916) treated in fact Thomas's *Grammatica speculativa*. Thomas's other works include *Fundamentum puerorum*, an elementary grammar book in verse for didactic and mnemonic purposes, as well as commentaries on Porphyrius's *Isagoge* and others.

His definition of grammar has become a long-lived tradition in the history of grammar books in Europe: "*Grammatica est scientia docens nos recte scribere, recte scripta recte intelligere, recte intellecta recte componere, recte composito debito modo pronunciare*." These divisions of grammar came to be called orthographia, etymologia, diasynthetica, and prosodia, respectively, of which the most remarkable division is diasynthetica, i.e., syntax.

In the tradition of Latin grammar books during the Roman Age, syntax had tended to attract little attention. Latin being the native language of the Romans, their grammar books mainly treated accidence, i.e., how words should be inflected. In the Middle Ages, however, those whose native languages were not Latin began to use Latin as a kind of Koine of Western Europe with the result that syntax, i.e., how to make sentences of words without causing confusion, became more and more important. The Latin language of the Middle Ages, i.e., Medieval Latin, was the vehicle of scholasticism, a most delicate hair-splitting kind of thinking and discussing. In that kind of philosophy, syntax must be ruled by exact regulations, and these syntactical rules came to be equated with those of the human mind. This tendency was started in Paris, where Thomas studied, around 1150 by Petrus Heliae. Such philosophizing of language, which began with scholastic commentaries by Dominican monks on Donatus and Priscianus, can be said to have culminated in Thomas's *Grammatica speculativa*, and his contemporaries, such as Siger de Courtrai.

Their belief that there should exist only one *a priori* pure grammar common to all languages was more or less neglected for a long time, but Edmund Husserl (1913) showed that the ideal of *a priori* grammar has a solid claim and a certain extent of applicability. The return to this idea of intrinsic correlation between mind and grammar can be witnessed in Noam Chomsky's popularity after the dominant school of structural linguistics based on 'stimulus and response' lost its luster.

See also: Chomsky, Noam (b. 1928); Heidegger, Martin (1889–1976); Husserl, Edmund (1859–1938); Siger de Courtrai (d. 1341).

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Thomas, John Jacob (ca. 1840–1889)

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Born in Trinidad in 1840, John Jacob Thomas is perhaps best known for his work *The theory and practice of Creole grammar*, a description of the French Creole of his home island that remained the benchmark study of the language until well into the 20th century. The accuracy and thoroughness with which he wrote his book earned him considerable praise during his lifetime, both at home and in Europe. His achievement is all the more remarkable in that he was not a native speaker of French Creole, having studied and acquired it upon assignment as a teacher to an area in which the

language served as the predominate means of communication. As a Black male of humble origins, he also garnered lasting admiration for his articulate, erudite response to a prominent White scholar's attack on West Indians of African descent.

Thomas received his education in one of Trinidad's ward schools and at the Woodbrook Normal School in the environs of Port-of-Spain, the island's capital city. In 1860 he was appointed the schoolmaster at Savonetta, a Patois-speaking community, and so set out immediately to learn the language of his students. (A native speaker of English, Thomas also acquired competency in Greek, Latin, French, and Spanish over the course of his lifetime.) In 1866, having scored first on newly established competitive civil service examinations, he was appointed to the office of the Receiver-General, and in 1869 was sent to Cedros as Clerk of the Peace. Thomas spent virtually his entire career in the employ of the Civil Service as an educator in various locations in central and southwestern Trinidad, and even lived and worked as a tutor in St George's, the capital of the island of Grenada, later in life. He also received appointments to the Education Board and to the council of Queen's Collegiate School.

The appearance in 1869 of Thomas's *Theory and practice of Creole grammar* earned him the respect of his contemporaries, including Trinidad's governor, Arthur Gordon, who introduced him to the British writer Charles Kingsley, a visitor to Trinidad in that same year. It was in part because of these connections that Thomas was able to travel to England in 1873, where his book had been widely acclaimed. He was received there as something of a celebrity, and delivered a paper entitled 'On some peculiarities of the Creole language' before the Philological Society of London.

In 1876 Thomas wrote *Froudacity* as a rebuttal to J. A. Froude's *The bow ofUlysses,* which attempted to justify a more stringent form of British colonialism in the islands based on what Froude proposed was the innate inferiority of West Indian Blacks. This work earned Thomas international recognition and established his reputation as a scholar of considerable ability. In the same year, he married Mary Ann Jane Regis in the Roman Catholic cathedral of Port-of-Spain.

Three years later, confined to his bed with rheumatism and partially blind, Thomas resigned his position and spent his convalescence translating from French to English *A history of Trinidad under the Spanish government*. After having largely recovered, Thomas was appointed headmaster of the San Fernando High School in 1883, where he was occasionally forced to defend his appointment against charges that he was not up to the job and was only given it because of his status as a freemason. In characteristically efficient fashion, Thomas drew a distinction between himself, a locally born man who, like his charges, was the product of an humble environment, and the formally educated outsider whose good intentions could not make up for his lack a common background with his students. In 1888, Thomas made the decision to live and work in Grenada, where he was serving as a tutor, just before his departure on a second trip to the United Kingdom. His intent during this journey was to prepare for a second edition of *The theory and practice of Creole grammar,* which would have compared the various creoles of the West Indies and other areas of the world. Although he managed to spend a period of time conducting research in the British Library, his health deteriorated considerably, and he was soon gravely ill. John Jacob Thomas died in London of tuberculosis on September 20, 1889.

Largely self-taught, Thomas holds a prominent place in Creole linguistics for his outstanding original contribution in the form of his book, *The theory and practice of Creole grammar.* He was the first black man, and one of the first linguists, to produce a Creole grammar, and for over 100 years his work was the authoritative description of Trinidadian French Creole. It is worth noting that his work, published in 1869, predates similar ones focusing on the grammars of Guyanese Creole (1872), Martiniquan Creole (1874), and Mauritian Creole (1880) (Gilbert, 1994: 4607). He was at the same time a pan-Africanist who was in many ways a precursor to the prominent figures of the black nationalist movements of the 20th century. His *Froudacity* continues to be praised by prominent scholars of Black Studies, such as Selwyn Cudjoe, who references Thomas's "audacity" in responding to such a prominent White intellectual, and C. L. R. James, who says that Thomas "overwhelmed" Froude (Smith, 2002: xii–xiii). In addition to Thomas's prominence as a linguist and Creolist, the scholar Faith Smith assigns him a place in history as "a late-nineteenth century pan-Africanist precursor of Marcus Garvey, a Caribbean anti-imperialist who is an important nodal point in a tradition stretching from Toussaint L'Ouverture to Fidel Castro, and a worthy competitor of White Victorian Intellectuals" (Smith, 2002: xv).

See also: Pidgins and Creoles: Overview.

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Thompson, Laurence Cassius (b.1926)

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Mr. L. C. Thompson is a descriptivist and comparativist credited with contributions in Vietnamese and Salish (North American Indian). His scholarly career was cut short by stroke-induced aphasia at age 57.

Born on March 11, 1926, in Manchester, New Hampshire, Laurence Thompson spent his youth in New England. He studied French and Spanish at Middlebury College for two years, interrupting his college education to join the U.S. Army in 1945. He then returned to Middlebury and graduated *magna cum laude* in 1949. He pursued graduate studies in Russian language and Slavic linguistics at Yale, where he studied under Bloch (*see* **Bloch, Bernard (1907–1965)**) and Edgerton (*see* **Edgerton, Franklin (1885–1963)**), the latter serving as a role model for Thompson. His entry into the Vietnamese phase of his career was fortuitously prompted by the opportunity to join that fledgling areal program. His two years of field work in Vietnam resulted in the doctoral dissertation 'A grammar of spoken South Vietnamese' (1954). He taught the Vietnamese language at Yale for one year, and then spent two years at the U.S. Army Language School (later called the Defense Language Institute) at the Presidio of Monterey, California, where he supervised instruction in Russian and southeast Asian languages. *A Vietnamese grammar*, published in 1965, remains the standard work in Vietnamese analysis.

The Salish phase of Thompson's career spanned 9 years at the University of Washington (1957–1966) and 17 at the University of Hawaii (1966–1983). The fulfillment of a long-standing interest in American Indian languages, this phase coincided with the private and professional partnership of L. C. Thompson with Maranell Terry Thompson (born on April 1, 1927, in Colorado City, Texas). After their marriage in 1964, the Thompsons dedicated themselves to the documentation of Salish and other native languages of northwest North America. In a partnership in which L. C. Thompson did most of the synchronic and diachronic linguistic analysis and M. T. Thompson oversaw the details of organization and management, the Thompsons surveyed many of the two dozen lanuages of the Salish family, and together wrote grammars and dictionaries of Tillamook, Clallam, and Thompson as well as other linguistic documents. The Thompson team was instrumental in creating research opportunities that led to the preparation of dissertations on Lushootseed, Shuswap, Spokane, Colville (Okanagan), Saanich (Salish, Straits) Thompson (all Salish languages), and comparative Chemakuan (a neighboring family). After L. C. Thompson's aphasia, M. T. Thompson carried on with their work, preparing for publication their grammar and dictionary of Thompson and the ethnolinguistic component of the Thompson ethnobotany.

L.C. Thompson's deepest linguistic concerns centered on world view, as reflected in the characterization of Clallam (1971) as a language in which "the universe is viewed as autonomous and dynamic. Entities-persons and things are part of the general scheme, but are only incidentally responsible for situations which arise," or in his later claim (1976) that the morphemes of Salish languages carry values for "the degree of control that the agent exerts over the action, state, or process." The analog in his personal life was his discovery of his need to be in control, a recognition that M. T. Thompson says caused him hilarity, and that prompted him to dedicate the Thompson grammar to the therapist "without whom," he wrote, "none of this [work] would have been possible."

See also: Bloch, Bernard (1907–1965); Edgerton, Franklin (1885–1963); Salishan Languages; Vietnamese.

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Vilhelm Ludvig Peter Thomsen was born in Copenhagen, but he spent most of his childhood in the northern Jutland town of Randers, where he attended the Latin School. From there he returned to Copenhagen to attend university, and, like his compatriot Otto Jespersen with law and his Norwegian friend Johan Storm with natural sciences, a false start (in Thomsen's case as a student of theology) preceded his linguistic studies. He had a passion and a tremendous capacity for foreign languages, and he took every opportunity he could to learn new languages. His first publication, a comparative study of Hungarian, appeared in 1867. This, together with his doctoral dissertation of 1869 dealing with Finnish, meant that Thomsen was a pioneer in the field of Finno-Ugric philology. In 1869, as was quite typical for serious linguists at this time, he set off on an extended tour of Europe, to hear the languages and to hear the great European scholars of language. He returned home the following year and began working as a school teacher. This career was short-lived, and in 1875 he gained a permanent appointment at the university as extraordinary reader in comparative philology. Two years later he was promoted to an ordinary professorship in the same discipline.

The range of languages and linguistic topics on which Thomsen worked is impressive (see Sandfeld, 1983 for details), but his greatest achievement was the successful interpretation of the Old Turkish Orkhon inscriptions in 1893, which until then had confounded scholars. Turkish became Thomsen's dominant interest during the last decades of his life, but he found time for much else besides, including a history of linguistics (Thomsen, 1902). Despite the volume of his scholarly output Thomsen was also active as an administrator, serving as rektor of the university in 1902, and as president of the Danish Academy of Sciences in 1909.

See also: Finnish; Hungarian; Jespersen, Otto (1860–1943); Storm, Johan (1836–1920); Uralic Languages.

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Thought and Language: Philosophical Aspects

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There is a veritable thicket of philosophical issues waiting to ensnare anyone who reflects on the relation between thought and language. The complexity of this thicket has been further enhanced by the fact that many philosophers have been preoccupied with trying to understand the nature and limits of human thought about the world we inhabit. In fact, philosophical interest in the relation of thought to the world has, to a large extent, motivated philosophical interest in language. For example, consider the proposal that our concepts and the basic structural features of our thoughts reflect the fundamental ontological categories 'out there' in the world. Some philosophers have proposed that by a careful study of language we can obtain a clearer grasp of the structure of thought and therefore a clearer understanding of what the world is like. Others have argued that the last place to look for metaphysical insight is language, thinking it to be a distorting mirror of the world. In addition to these broader metaphysical and epistemological questions – i.e., questions concerning what the world is like and what we can know about it – philosophical interest in language has also been motivated simply by an understandable fascination with the amazing human capacities for thought and language. It has been emphasized time and again that these capacities set human beings apart from the rest of the natural world.

Two of the main philosophical questions that have arisen regarding the relation of language and thought will be discussed here. First, philosophers have questioned the relative priority of thought and language: is thought prior to language (in some important sense to be defined) or vice versa? How one conceives of the relative priority of thought and language can affect how one approaches the second question: language and thought are both characterized by intentionality or 'aboutness'. When we think and speak, we are connecting with things in the world, and thinking and talking about them. Philosophers have sought to understand this aboutness of thought and language.

The Relative Priority of Thought and Language

Is thought prior to language? That is, is language merely a vehicle by means of which we express our thoughts? Some philosophers have argued (or merely assumed) that the capacity for linguistic expression is a capacity that allows us to communicate our thoughts and that we have an antecedent grasp on those thoughts. If so, one wants to understand what makes the structure of the natural languages well suited to expressing our thoughts. Are thoughts structured in a way similar to the languages that we use to express them? Is language a window onto the mind, so to speak?

Some have answered this last question affirmatively, but think that the reason the structure of human languages reflects the structure of human thought is because the capacity for language is **prior** to thought in some important sense. An extreme version of this view has been held by philosophers who are skeptical about the very existence of mental phenomena, such as thought. They point out that our tendency to attribute thoughts to other individuals depends largely on their capacity to use language. They argue that perhaps this linguistic behavior is all there really is to thought, properly so-called. Some have found this position too extreme, but have nonetheless stressed that thought, properly so-called, is not possible without the acquisition of a language and that the idea that language merely serves as the vehicle of thought is misguided. I describe a classic 'Cartesian' view of the primacy of thought over language and briefly sketch a thought-skeptical 'behaviorist' response to it, followed by a more nuanced view that recognizes the existence of thoughts, but argues that language is still prior to thought in an important sense. These issues are very much live ones in current research in linguistics, psychology, and philosophy departments, but to avoid some of the complexity and technical vocabulary of more current discussions, I present more classic loci of the above three positions.

The Cartesian View

The following passages from Descartes (1596–1650) represent commonly held views on thought and the relation between thought and language in the early modern and modern period. First, Descartes exhibits the perennial fascination with thought, and by extension language, as that which distinguishes man from beast. Discussing the possibility of automata constructed to look like and mimic the movements of animals and humans, Descartes writes:

> [I]f any such machines had the organs and outward shape of a monkey or of some other animal that lacks reason, we should have no means of knowing that they did not possess entirely the same nature as these animals; whereas if any such machines bore a resemblance to our

> bodies and imitated our actions as closely as possible for all practical purposes, we should still have two very certain means of recognizing that they were not real men. The first is that they could never use words, or put together other signs, as we do in order to declare our thoughts to others. For we can certainly conceive of a machine so constructed that it utters words, and even utters words which correspond to bodily actions causing a change in its organs (e.g., if you touch it in one spot it asks you what you want of it, if you touch it in another it cries out that you are hurting it, and so on.) But it is not conceivable that such a machine should produce different arrangements of words so as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do. Secondly, even though such machines might do some things as well as we do them, or perhaps even better, they would inevitably fail in others, which would reveal that they were acting not through understanding but only from the disposition of their organs. (Descartes, 1999)

We see several themes in this passage. It is argued that what separates humans from the other animals is the capacity for thought and reason. This capacity underwrites the linguistic capacity of humans, whose linguistic behavior cannot be adequately understood as the predetermined, mechanically generated output response to various external stimuli. To describe the human linguistic capacity in such a mechanical way would be to miss the evident fact that humans, but not automata (or nonhuman animals), understand to a significant degree the external stimuli, are able to reason to an appropriate response, and, on making an utterance, mean what they say. Human language is thus fundamentally rooted in human reason, which is in turn an operation of the human mind. For Descartes, the mind is a distinct substance from the body and its workings cannot be explained by the mechanistic laws that govern bodies. Since nonhuman animals have no minds, they can be described in completely mechanistic terms. How can we know this to be the case? Descartes continues:

> Now in just these two ways we can also know the difference between man and beast. For it is quite remarkable that there are no men so dull-witted or stupid – and this includes even madmen – that they are incapable of arranging various words together and forming an utterance from them in order to make their thoughts understood; whereas there is no other animal, however perfect and well-endowed it may be, that can do the like. This does not happen because they lack the necessary organs, for we see that magpies and parrots can utter words as we do, and yet they cannot speak as we do: *that is, they cannot show that they are thinking what they are saying*. On the other hand, men born deaf and dumb, and thus deprived of speech-organs as much as the beasts or even more so, normally invent their own signs to make themselves understood by those who, being regularly in their company, have the time to learn their language. (Descartes, 1999)

Again, Descartes emphasizes the priority of thought to language when he characterizes language as essentially a vehicle of thought. What makes a string of noises a use of language is that it expresses what the speaker is thinking. Any real use of language requires that there be understanding, not mere parroting of sounds. Humans, but not magpies and parrots, produce words, and string them together into sentences in a certain way in an act intended to convey their thoughts. Mere strings of sounds, even word-like sounds, and sentence-like strings of them are meaningless unless produced with the intention of conveying thoughts. Descartes seems to presuppose that as humans – creatures with both mind and body – we are essentially endowed with the capacity for thought. If we are unable, for whatever reason, to learn or to produce the spoken or written language of our community, we will nonetheless have thoughts that we might wish to convey and will find some means for doing so.

Behaviorism

Some philosophers in the early 20th century questioned the rich ontology of mental phenomena that was taken for granted by Descartes. A particularly influential school of thought was 'behaviorism'. Not all behaviorists questioned the existence of unseen mental phenomena. Some were simply trying to demarcate what they took to be the appropriate data on which to base a science of psychology. Such 'methodological' behaviorists thought that scientific description of human psychology should focus exclusively on intersubjectively observable phenomena – in particular on behavior, including linguistic behavior. Such behaviorists had a proscription for scientific methodology in the field of psychology, but stopped short of metaphysical pronouncements. An 'ontological' behaviorist, on the other hand, is someone who wishes to give an analysis of mental vocabulary in terms of outwardly observable behavior, without reference to any phenomena that have those qualities thought to be characteristic of the 'mental' – e.g., being immaterial, inner, available as a result of immediate awareness or through 'introspection' and 'private' (i.e., inaccessible to someone else). An ontological behaviorist has a metaphysical bias against admitting the very existence of phenomena thus characterized and seeks to explain what mistakes we are making when we apparently make reference to

such phenomena. Behaviorism as a methodological thesis is not necessarily committed to such a strong metaphysical bias. Nonetheless, for all behaviorists there is a strong sense in which language is prior to thought: either mental vocabulary is analyzed in terms of behavior, in particular linguistic behavior, or, in the scientific description of human beings, it is abandoned in favor of description of behavior.

Sellars: Language as a Precondition for Thought

Wilfred Sellars provides a more nuanced view, avoiding a direct confrontation with our rather strong intuitions that there are mental phenomena, while at the same time explaining why language is indeed a necessary precondition for thought and not the other way around. In *Empiricism and the philosophy of mind*, he defends the following revised version of the classical analysis of our common sense conception of thoughts:

> [T]o each of us belongs a stream of episodes, not themselves immediate experiences, to which we have privileged, but by no means infallible, access. These episodes can occur without being 'expressed' by overt verbal behavior, though verbal behavior is – in an important sense – their natural fruition. Again, we can 'hear ourselves think', but the verbal imagery that enables us to do this is no more the thinking itself than is the overt verbal behavior by which it is expressed and communicated to others. . ..Now, it is my purpose to defend such a revised classical analysis of our common-sense conception of thoughts, and in the course of doing so I shall develop distinctions which will later contribute to a resolution, in principle, of the puzzle of *immediate experience*. But before I continue, let me hasten to add that it will turn out that the view I am about to expound could, with equal appropriateness, be represented as a modified form of the view that thoughts are *linguistic episodes*. (Sellars, 1997)

At the same time that Sellars wishes to defend a revised version of the view that there are 'inner' thought episodes, he also wishes to defend a revised version of the view that thoughts are linguistic episodes – the crude form of which is behaviorism. To explain what he means, Sellars introduces a piece of 'anthropological science fiction'. He imagines a stage of 'prehistory' in which humans are limited to using a 'Rylean language' – a language whose fundamental vocabulary is composed of terms for public properties and public objects located in space and enduring through time. It has resources for conjunction, disjunction, negation, and quantification; employs the subjunctive conditional; and allows for other 'looser' logical relations that are typical of ordinary discourse. Sellars asks: Would anything have to be added to the Rylean language to allow speakers of it to recognize and talk about themselves as beings that think (as well as having feelings, sensations, and perceptions)?

First, says Sellars, assume that they also have a way of making 'semantical' statements – i.e., statements about the meanings of the terms in their vocabulary, statements about what has been said by the assertion of a sentence, and a general ability to say that the assertion is true or false. If they have these resources, then they are arguably equipped to talk about thoughts – since thoughts share the same characteristics as bits of language. Just as we can say that when we use the expression 'tiger' we are talking about tigers, we can likewise claim to be thinking about tigers. Sellars proposes that we reverse the classical order of explanation and suppose "that the intentionality of *thoughts* can be traced to the application of semantical categories to overt verbal performances" (Sellars, 1997). Clearly, in order to support this proposal, Sellars must provide an account of the aboutness of linguistic expressions – what connects the term 'Tamela' with the individual, Tamela, whose name it is; what connects the term tiger with the species *Felis tigris*, and by extension with individual tigers; what connects the term 'hard' with that property that nails, concrete, and marble have, but which cotton and rabbit fur lack. Also, Sellars must provide this account without making reference either to a speakers' independent grasp in thought of some thing, kind, or property or to a speaker's intentions to refer to such a thing so grasped. Note that from a discussion of the relative priority of thought and language, we have moved into a discussion of the intentionality of thought and language. Sellars's view that language is prior to thought clearly constrains his explanation of the aboutness of thought and language.

Returning to Sellars's explanation of how speakers might come to talk about inner episodes such as thoughts, recall that Sellars's mythical Rylean language-speakers' capabilities include a description of public objects, properties, and relations and the ability to discuss the semantic properties of words and sentences. At some point, they will notice that their fellows exhibit intelligent behavior even though they are not making any assertions. This will lead them, says Sellars, to develop a theory according to which there are inner episodes that are the beginning of a process that usually, though not always, culminates in overt verbal behavior. The model for these episodes will be overt speech and thus what this rudimentary psychological theory will posit will be 'inner speech'. As it is inner speech, the semantical properties of

outward speech will be applicable to it, and so the Ryleans can talk of the inner episodes as having meaning and as being about various public objects. The term 'thoughts' could be introduced to name these episodes of inner speech. Insofar as the Ryleans had good reason to posit these thoughts (on the basis of observing intelligent behavior that is performed in silence), it can be assumed that they really do exist, with a nature to be further determined as the 'science' develops.

Two questions immediately come to mind about Sellars's account: One, if the overt verbal discourse is supposed on this theory to be the culmination of a process that begins with inner speech, i.e., thought, does this not take us back to the Cartesian view that overt linguistic behavior serves as a vehicle for the expression of thought? Two, if we are explaining the occurrence of overt linguistic behavior as the result of thoughts and we allow ourselves to talk about the semantic properties – the meaning and aboutness – of thoughts, are we not thereby analyzing the semantical properties of overt linguistic behavior in terms of the semantic properties of thought? In response to the first question, Sellars replies that, on the contrary, this theory "is perfectly compatible with the idea that the **ability** *to* **have thoughts** is acquired in the process of acquiring overt speech and that only after overt speech is well established, can 'inner speech' occur without its overt culmination" (Sellars, 1997; boldface added). In response to the second question, he writes, "It must not be forgotten that the semantical characterization of overt verbal episodes is the primary use of semantical terms, and that overt linguistic events as semantically characterized are the model for the inner episodes introduced by the theory" (Sellars, 1997).

Sellars continues with a description of how we come to self-ascribe thoughts. Sellars proposes that a speaker of the Rylean language, S, can be 'trained' on the basis of observing his own behavior, to say of himself that he is thinking 'p', just as a third party might say on the basis of S's behavior that S is thinking 'p'. According to Sellars, speaker S can eventually "be trained to give reasonably reliable self-descriptions, using the language of the theory, without having to observe his [own] overt behavior." With the spread of such reliable self-ascription of thoughts, the Ryleans will begin to talk of the 'privileged access' that each individual has to his or her own thoughts. Now, *prima facie* Sellars's story might seem to be exactly backward: after all, do we not think of thoughts as the sorts of things that we simply reflect on, things we introspect, and things we know the contents of? Is it plausible that speakers learn a language that has evolved with the expressive power to allow third-person ascriptions of thought, and that speakers then, by extrapolation, extend those concepts to themselves, self-ascribing thoughts and eventually becoming authoritative reporters of their own thoughts?

The problem with this type of objection to Sellars's myth is that it misses another key aspect of language, according to some philosophers, its essentially public and social nature. The public and social nature of language has been much emphasized by, e.g., Ludwig Wittgenstein, Paul Grice, and Saul Kripke. Sellars defends his picture by pointing out that it stresses the intersubjectivity of thought and the concepts that are used to describe such inner episodes, while not denying the fact that individuals do have privileged access to their thoughts and do make authoritative self-reports using these concepts. Of our use of concepts such as 'think', 'believe', and 'fear', in self-reporting, Sellars writes:

> [T]he reporting role of these concepts – the fact that each of us has a privileged access to his thoughts – constitutes a dimension of the use of these concepts which is *built on* and *presupposes* this intersubjective status. My myth has shown that the fact that language is essentially an intersubjective achievement, and is learned in intersubjective contexts – a fact rightly stressed in modern psychologies of language, thus by B. F. Skinner and by certain philosophers, e.g., Carnap, Wittgenstein – is compatible with the 'privacy' of inner episodes. It also makes clear that this privacy is not an 'absolute privacy.' For if it recognizes that these concepts have a reporting use in which one is not drawing inferences from behavioral evidence, it nevertheless insists that the fact that overt behavior *is* evidence for these episodes *is built into the very logic of these concepts*... (Sellars, 1997)

A Closer Look at the Relation between Thought and Language

We have seen only a sample of the various complex issues that arise when one considers the relative priority of language and thought. A few more questions might help to puncture the level of generality of the discussion thus far. Suppose with Sellars that mental concepts have "built into their very logic" that they are evidenced by overt behavior. What would this show about the primacy of language over thought? Sellars has told a tale in which thought emerges in individuals in a way that depends on their acquisition of a language. If he is right, then it would seem that he has given us a clear sense in which language is prior to thought. However, this is far from clear due to the sketchiness of Sellars's tale. Work on this topic by Vygotsky and, more recently, Andy Clark has seen the more detailed development of the view that although

we do not think in any particular language, the acquisition of a language provides the necessary scaffolding for thought. Some quite recent work by psychologists such as Elizabeth Spelke and Dedre Gentner also address these and related issues. (See, for example, Vygotsky, 1998, Clark, 2003 and Gentner and Goldin-Meadow, 2003.) Returning to Sellars, many questions remain untouched and suggest a much more complicated picture about the relation between thought and language, including the question of intentionality.

First, we might return to that part of Sellars's myth in which language begins to emerge in a community. Plausibly, the initial steps will involve the introduction of names for particular things, categories of things, properties of things, and relations that they bear to one another. How can this practice emerge if there is not an antecedent awareness on the part of the protolanguage users of individuals as distinct from one another, an antecedent awareness of ways in which things resemble or fail to resemble one another, and so on? That an expression can be introduced **for** some individual, collection of individuals, kind of substance, or property of things would seem to require an antecedent focus on it. This would suggest that the aboutness of linguistic items is not fundamental, but is instead derivative from the aboutness of such a prelinguistic focus of the mind.

Second, setting aside speculation into the origins of language, we can simply focus on individuals who are learning a language. In Sellars's favor, it does seem obvious that learning a language greatly enriches an individual's thought capacities. If I have no language, I am unlikely to have the concepts that would allow me to think: *The recent convictions of crooked CEOs who hold themselves above the law is symptomatic of the public's dissatisfaction with the current economic climate*. Nonetheless, consider the true language novice: Perhaps it is necessary for learning terms such as 'ball' and 'mommy', that a child can already discern in a rudimentary way an object from its surroundings, can distinguish one object from another, can distinguish himself from his mother, and can tell his own feet from toys in his crib. Perhaps some rudimentary conceptual abilities are preconditions for the acquisition of language. These questions are the focus of extensive empirical study and there remains a considerable amount of controversy over the role of language in concept formation and development.

Third, leaving aside the language learner, we can focus on the linguistically competent adult who asserts: *The man in the corner wearing the toupee is Janice's employee*. What makes it the case that this assertion is **about** some particular individual? Is it simply the fact that some man is standing in the corner indicated by the speaker and is the only such man wearing a toupee? In other words, does the definite description used, and the rules of language that govern how definite descriptions are to be used to refer to individuals by means of their properties, determine who is being referred to? Or are the intentions and mental focus of the speaker also important? Suppose there is a man in the corner but that he is not wearing a toupee. He is, nonetheless, the person to whom the speaker intends to refer. Can we make sense of the speaker having such an intention, independently of her use of a certain description? It would seem unintuitive to deny this. If we agree that it makes sense to say that the speaker **intends** to refer to a particular man, regardless of the description she uses, would we say that the speaker nonetheless **fails** to refer to that man, simply because that man does not fit the definite description *the man in the corner wearing the toupee*? In general, do linguistic expressions and the rules that govern them determine their own path to objects in the world or is the referential role of linguistic expressions parasitic on the more primitive aboutness of our thoughts?

All three of the above paragraphs concern the relative priority of thought and language when it comes to explaining the aboutness of our thoughts and of the 'referring expressions' in our language. But all three focus on a different stage in the development, acquisition, and use of language. Thus, not only the questions, but also the considerations that should be brought to bear in answering them will be different. Though this essay provides but a sampling of the variety and complexity of the issues concerning the relation between thought and language, it should help to explain why philosophers, linguists, and psychologists must spend as much time clearly articulating precisely what questions they are concerned with, as they do in looking for answers to them.

See also: Analytic Philosophy; Arnauld, Antoine (1612–1694); Behaviorism: Varieties; Causal Theories of Reference and Meaning; Communication in Grey Parrots; Communication, Understanding, and Interpretation: Philosophical Aspects; Epistemology and Language; Externalism about Content; Grice, Herbert Paul (1913–1988); Intention and Semantics; Kripke, Saul (b. 1940); Representation in Language and Mind.

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Thought Experiments

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Introduction

Contemporary analytic philosophy of mind and language baffles many people, provoking the question: How do philosophers support the claims they make? And many people disapprove of the methods of contemporary linguistic theory, asking: How could these people be content to work with such unreliable data? The source of the reactions in both cases is the same – thought experiments. In contrast to the kind of experiments that are the central tool of science, both philosophers and linguistic theorists are quite happy to base their theories and claims on thought experiments.

A thought experiment is an exercise of the imagination. Specifically, it is imagining a scenario of some kind for some purpose. In contrast to what we might call a hands-on experiment, in which something in the real world is manipulated and observed, in a thought experiment we play around with aspects of a scenario in the imagination. (There is no perfect term to mark the contrast here; 'real experiment' and 'physical experiment' both beg the question. Some people hold that thought experiments **are** real experiments, of a kind, and, if the mind simply **is** material, then thought experiments are also physical experiments, of a kind.)

The kinds of scenarios imagined in philosophy are very different from those in linguistic theory and so is the putative point of the exercise. In philosophy, thought experiments are about complex situations and the point of the exercise is to determine whether the scenario or something contentious in connection with the scenario is possible. (Already here we see a large difference between the objectives of thought experiments and hands-on experiments: Thought experiments aim to reveal what is possible; hand-on experiments aim to reveal what is actually the case.)

In linguistic theory, thought experiments usually concern much smaller matters – strings of words – and the objective is to test intuitions of grammaticality or meaningfulness. The kinds of question asked are: Does this string sound grammatical? Could this string mean such-and-such in the imagined context?'

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What baffles people about philosophers' use of thought experiments is that philosophers seem to believe that imagining some scenario could reveal

things of importance. Surely it takes 'real' experiments to do that. Researchers disapprove of linguists relying on their (smaller) thought experiments because whether a string seems grammatical or meaningful to someone or not seems to be an extremely insecure thread on which to hang anything, let alone something as complex and multitudinously vulnerable as a linguistic theory.

Philosophy and linguistic theory are not the only academic pursuits that make use of thought experiments. Physics, for example, is famous for its thought experiments, Schrodinger's cat and Galileo's tying a smaller and a bigger piece of matter together being two of the best known. Schrodinger argued, against the indeterminacy interpretation of quantum mechanics, that a cat in a box had to be in some determinate state even if we did not know what it was. Galileo argued, against the Aristotelians, that, if a smaller mass falls slower than a bigger one, then if we tie the two together the resultant mass ought to fall both faster and slower than the bigger of its two components by itself.

Sometimes psychological researchers use thought experiments, too. For example, some research into reasoning starts with getting the subject to do a thought experiment. The subject is asked to determine whether more words begin with *r* than end with it, for example, or to determine which of two alternatives is more probable. Presumably, the way in which subjects do this is by imagining something and then using what they have imagined to answer the question.

Big-scenario thought experiments play a larger role in philosophy than anywhere else, however; and small-scenario thought experiments play a larger role in linguistic theory than anywhere else.

Example Thought Experiments

We have already introduced examples of thought experiments from physics and psychology. To illustrate how thought experiments go in linguistics, take the kind of string that Chomsky made famous, for example, *colorless green ideas sleep furiously.* Is the string grammatical? Is it meaningful and, if so, what does it mean?

In philosophy, thought experiments go back to Plato's Myth of the Cave, if not earlier. Well-known recent ones include the Chinese room (Searle), Twin Earth (Putnam), and Mary the color scientist (Jackson).

Searle's Chinese room is the most famous thought experiment in recent history. Someone who knows no Chinese is put in a room. Sheets of paper with shapes on them come in through a slot. The person has an inventory of other shapes and a huge rulebook linking shapes to shapes. For each shape that comes in, she identifies and finds the linked shape(s) and shoves it (or them) out a second slot. Unbeknown to her, the shapes coming in encode questions in Chinese and the shapes going out are answers to these questions. What this is supposed to show, is that what the person who knows no Chinese does in the room, is all that a computer processing symbols by their physically detectable properties could do.

Twin Earth thought experiments go like this. Imagine a person here on Earth, Adam, and his completely identical twin, Twadam, on experientially indistinguishable Twin Earth. Adam and Twadam both use the word *water,* and they use it in situations that are experientially indistinguishable. Yet on Earth what is called *water* is H_2O and on Twin Earth it is XYZ. Does the word *water* as used by Adam and by Twadam have the same meaning? Evidently not. Yet everything in their heads is the same. Hence, in Putnam's memorable phrase, "meanings just ain't in the head" (Putnam, 1975: 227).

The thought experiment about Mary the color scientist goes like this. Mary is a wonderful color scientist. Indeed, she knows absolutely everything there is to know about color experience. Yet she has never seen a color. One day the blinders are removed and she sees color for the first time. It would seem that she would gain a new item of knowledge – what it is like to **experience** color. Hence, experience is not . . . (draw your favorite inference).

What are thought experiments like these meant to do? Indeed, why do serious adults indulge in such activities at all?

What Are Thought Experiments Supposed to Do?

What thought experiments are meant to do is different in each discipline that uses them. In physics, not only is the thought-experimental situation clear but its implications are clear, too, many of them anyway. The latter is notably not true of philosophers' thought experiments. In linguistics and psychology, the thought experiments are done by subjects, not by the researchers, and are meant to generate data, not sort out what is actual or possible with respect to data. Linguistic thought experiments generate data about the rules of syntax and meaning; psychologists' thought experiments generate data about how the mind works. (Brown, 1991, said that they are real experiments done in the mind, not thought experiments at all.) Philosophers' thought experiments do

not generate data and are meant to do something all by themselves.

Philosophers' thought experiments sometimes play a normative role, another thing that is not true elsewhere. Think again of thought experiments in reasoning research. Psychologists aim to find out how their subjects actually reason: what mistakes they make, what produces these mistakes, and so on. When a philosopher runs a thought experiment about reasoning, her interest is different, usually having to do with finding out something about what *good* reasoning consists of.

What people find baffling about philosophers and their thought experiments is that often they care more about possibilities than about what is actually the case. So long as a Chinese room is possible, Searle could not care less whether one had ever existed. The reason is that philosophers want to know what is possible and impossible, not (just) what is actually the case or not. The conclusion that we are meant to take away from the Chinese room experiment, for example, is that consciousness, understanding, and so on not only **are not** but **could not be** the manipulation of symbols by physically detectable properties.

Because thought experiments deal with what we take to be essential and distinctive about some kind of thing, they can reveal what our concepts for that kind of thing mean. Thought experiments cannot give us a final answer about what anything is like (believing the contrary was a key mistake of classical conceptual analysts). But they can give us a first answer – when we talk about consciousness or lexical meaning or . . . or . . . or . . . they can show us what we are talking about at that moment, even though we may revise the concept as we learn more (Jackson, 1998: 30–31; all this is similar to his notion of modest conceptual analysis, 1998: 43).

More particularly, thought experiments can reveal what *we* care about in connection with a concept. What matters to us about representation, for example? Well, one of the things that matters to us is its role in mistakes, in misrepresentation, and so on. For this task, determining what can and cannot be imagined with respect to things of the kind in question is actually **better** than determining what is actually the case with respect to things of that kind. Studying what is actually the case does not isolate what we take to be central to and characteristic of things of that kind. Determining what we can and cannot imagine with respect to things of the kind can do so.

Determining what we currently mean by a term and what matters to us about things of the kind named by the term may seem to be a rather modest contribution to intellectual life. Maybe; but it is also a vital one. Unless researchers are all talking about the same thing and take the same properties to be importantly distinctive of things of the kind, they risk talking past one another.

Philosophers' (and others') thought experiments can also play a role in hypothesis generation and, sometimes, in hypothesis elimination. Generating hypotheses is highly independent of data or any form of direct observation and/or manipulation of the world. Indeed, in hypothesis generation the imagination is the central player.

The hypothesis-generating function of thought experiments shows us one way in which they differ from hands-on experiments. Think of a possibility-space. Hands-on experiments uncover which of the possibilities in that space are actually the case. By contrast, thought experiments do two things. First, as we have seen, they help us forge conceptual tools for identifying and reidentifying items in the possibility-space. (We might call this their conceptual analytic role.) Second, they help us to identify possibilities, to generate ideas, concerning what might be going on in the space we are investigating. They give us new ways of picturing the phenomena under investigation. (We might call this their hypothesis-generating role.)

The idea that philosophers' thought experiments can also play a role in hypothesis elimination is more controversial. Thought experiments in linguistic theory and psychology clearly play this role The same is true of thought experiments in physics: Galileo meant to eliminate an hypothesis of Aristotelian physics, and Schrodinger meant to eliminate an hypothesis in quantum mechanics. How? The story may go like this. When thought experiments sort out a possibility-space, revealing the real possibilities and eliminating the merely putative ones, they also eliminate hypotheses. There is no reason why thought experiments in philosophy cannot play a similar role. However, they seldom are as clear or uncontroversial as thought experiments in other areas.

How thought experiments work is a complicated and controversial topic, but compare them to proofs in mathematics. Mathematical proofs are generally derivational: To justify a proposition, we show that it can be derived from well-accepted axioms using well-accepted rules. Thought experiments are not like this. They display something to us, something that was obscure or masked and that can be made clearer by imagining the indicated situation. (Because the objects and at least most of the relationships thus imagined are recalled from memory, memory based

on earlier experience, note too that thought experiments have an empirical element.)

To sum up, thought experiments are quite different from hands-on experiments. However, they play a role in hands-on experiments, generating concepts with which to do them and hypotheses for them to test. They can also play a role in eliminating hypotheses.

See also: History of Linguistics: Discipline of Linguistics; Linguistics as a Science; Thought and Language: Philosophical Aspects.

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Thumb, Albert (1865–1915)

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Albert Thumb was one of the most important scholars of Greek of his time. Born in Freiburg im Breisgau in 1865, Thumb was a student of Karl Brugmann, who had a major impact on his scholarly career. In 1888 Thumb completed a doctorate in Strassburg, with a dissertation on aspiration in Greek, and then pursued his studies further in Munich and Greece. Thumb eventually returned to Freiburg as a *Privatdozent*, remaining there until 1901, when he accepted a position in Marburg. He left Marburg for Strassburg in 1909, and died in Strassburg in 1915, while holding a professorship of Indo-European linguistics there.

Thumb is best known for his work in Greek. He revised the Greek grammar of his teacher Brugmann (Brugmann, 1913), prepared a substantial handbook of Greek dialectology (Thumb, 1909), and published extensively on various questions of Greek linguistics and philology, including Greek inscriptions, ancient Greek prosody, the development of the Greek pronominal system, and Greek loanwords in Albanian and Armenian. Thumb's most lasting contributions to Greek linguistics lie in his work on Modern Greek. He published a number of books in this area, including two handbooks, the first of which was eventually translated into English (Thumb, 1910, 1912, 1915). Thumb was one of the few Indo-Europeanists of his day equally adept at Modern and Ancient Greek, a fact reflected in his publications. Thumb was also a skilled Indologist; he taught Indological courses in Marburg and also authored a handbook of Sanskrit that became a standard work in the field (Thumb, 1905). Finally, Thumb worked on a number of miscellaneous topics, ranging from the etymology of the Gothic word for 'shirt' to the psychology of language, especially regarding its possible relation to, and uses in, philology. Although many of his shorter works have been forgotten, his outstanding handbooks have made a place for him in Indology and classical studies even today. (See Hatzidakis, 1916 for an evaluation of Thumb's work and Anonymous, 1922 for a listing of his publications.)

See also: Brugmann, Karl (1849–1919); Greek, Ancient; Greek, Modern.

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To sum up, thought experiments are quite different from hands-on experiments. However, they play a role in hands-on experiments, generating concepts with which to do them and hypotheses for them to test. They can also play a role in eliminating hypotheses.

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See also: Brugmann, Karl (1849–1919); Greek, Ancient; Greek, Modern.

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Rudolf Thurneysen, an Indo-Europeanist whose work in linguistics and philology was centered around Celtic and Italic, was born on March 14, 1857 in Basel, Switzerland. For years he stood as one of the most preeminent scholars of Old and Middle Irish language and literature. Beginning in 1875, Thurneysen studied comparative Indo-European (especially Celtic and Romance) philology at the universities of Basel, Leipzig, and Berlin under such luminaries as Jakob Burckhardt, August Leskien, Friedrich Nietzsche, Ernst Windisch, and Heinrich Zimmer. In 1879 Thurneysen earned a doctorate from Leipzig for his dissertation on Latin verbs. He studied further under the likes of Henri Gaidoz at the École des hautes études and the Collège de France in Paris and at Basel before completing a Habilitation at Jena (Germany) in May 1882.

Thurneysen was Privatdozent (external lecturer) of Celtic and Romance Philology at Jena until mid-1884, when he was appointed the equivalent of associate professor in the same fields. From early 1887 through March 1913, Thurneysen was Professor of Comparative Linguistics at Freiburg im Breisgau, the successor to Karl Brugmann – who had left for Leipzig – and from April 1913 until he received emeritus status in September 1923 (at his own request), Thurneysen was Professor of Indo-European Linguistics and head of the linguistics department at Bonn. In 1911 and 1929 Thurneysen offered seminars in Dublin at the School of Irish Learning and the Royal Irish Academy, respectively.

In 1909, Thurneysen introduced his authoritative *Handbuch des Alt-irischen*, later translated into English as *A grammar of Old Irish* and *Old Irish reader* and, in its various forms, still the standard reference work for students of Old Irish after nearly a century. Throughout his life he made significant contributions to the field of linguistics with regard to Germanic, Italic (especially Latin and Romance), and all of the then known Celtic languages. Thurneysen considerably advanced the understanding of early Irish metrics and of stress and the complex verbal system in Old Irish. Thurneysen's Law, which relates to the voicing of certain fricative sounds in Gothic, is attributed to him as well.

Thurneysen also published widely on various topics concerning early Irish literature and often served as a translator and editor of texts in that area. From just before the outset of his retirement in 1923 until mid-1940, Thurneysen served as a collaborating editor of the *Zeitschrift für celtische Philologie*, in which appeared much of his work on the subject of early Irish law that captivated him for the last 20 years or so of his life. He died on August 9, 1940 in Bonn, leaving his wife since 1893, Elisabeth (née) Kriebel, and four daughters, Barbara, Elisabeth, Hedwig, and Marianne.

See also: Breton; Celtic Religion; Cornish; Early Irish Linguistics; Indo–European Languages; Language of Legal Texts; Law and Language: Overview; Legal Language: History; Meter; Ogam; Scots Gaelic; Welsh.

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Tibet: Scripts

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Introduction

Tibetan scripts derive from a late Brahmi script, probably Siddhamatrka, from the Gupta period. There are several styles of Tibetan script proper that were devised by the 8th century and have remained in use until the present day. Traditionally, Tibetan script was considered to have been introduced by Buddhist monks sent to India during the reign of the Tibetan king Srong-btsan sgam-po (reigned 627–650), but the native Bon tradition records a lengthier process, corroborated by early monuments written in Tibetan script that do not mention Buddhism (Beyer, 1992: 40–41; Narkyid, 1983: 207–220). The orthography was reformed and codified early in the 'Second Conversion' to Buddhism of the 10th and 11th centuries; the reformed orthography (referred to as Literary Tibetan) shows little dialectal variation apart from morphosyntactic ones. The major offshoot of Tibetan script is 'Phags-pa script, devised between 1264 and 1269 by the lama 'Phags-pa Blo-gros rgyal-mtshan, head of the Sa-skya-pa sect ('Gray Earth,' named after the head monastery, and colloquially referred to as the 'Flower Hats'), at the behest of the Mongol Great Khan Khubilai to serve as a universal script for the major languages of his empire (Chinese, Mongolian, Tibetan, and Uighur [Uyghur]) and for Sanskrit. Although this script (called 'Phags-pa script,' 'quadrilateral' or 'square script,' or 'new Mongolian script' in various languages) was used in the higher levels of imperial administration, it did no displace any of the rival scripts and after the end of the Yuan dynasty in 1368 was only used ceremonially among the Mongols; as a widely used script it survived only in parts of Tibet (van der Kuijp, 1996: 437).

Principles of Tibetan Script

Tibetan script adapted 25 consonant signs and four vowel signs from Brahmi script; the forms used are identical to those in an inscription from Golapur dated c. 500 (Beyer, 1992: 41). The varieties of Tibetan script differ in the extent to which they write bars at the tops of letters: *dbu can* 'headed' script (the basis for the printed letters familiar in the West) writes horizontal bars as part of the letters; the various styles *of dbu med* 'headless' script lack

Table 1 Tibetan script

Consonants

		Labial		*Dental*		*Palatal*		*Velar*		*Glottal*	
	Asp.	ཕ	p^h	ཐ	t^h			ཁ	k^h	ཧ	
Stops	*Vl.*	པ	p	ཏ	t			ཀ	k		
	Vd.	བ	b	ད	d			ག	g		
	Asp.			ཚ	c^h	ཆ	$\check{c}^h$				
Affricates	*Vl.*			ཙ	c	ཅ	č				
	Vd.			ཛ	dz	ཇ	ǰ				
	Vl.			ས	s	ཤ	š			ཧ	h
Fricatives											
	Vd.			ཟ	z	ཞ	ž				
Nasals		མ	m	ན	n	ཉ	ɲ	ང	ŋ	འ	ʔ[N]
Glides		ཝ	w	ཡ	y						
Liquids				ལ	l	ར[a]	r				

[a] Retroflex in modern dialects.

Vowel signs	ཨ	ཨེ	ཨི	ཨོ	ཨུ
	a	*e*	*i*	*o*	*u*
Formation of superscript and subscript letters	རྐ	ལྐ	སྐ		རྐྱ
	rka	*lka*	*ska*		*rkya*
	ཀྱ	ཀྲ	ཁླ	ཀྭ	སྐྱ
	kya	*kra*	*kla*	*kwa*	*skya*

[a]Retroflex in modern dialects.

them. (Unlike Devanagari, Tibetan script never joins letters with horizontal bars.) As in Devanagari, each consonant sign indicates an inherent *a* unless position or vowel sign indicates otherwise (see Table 1). In addition to the letters borrowed from Brahmi, Tibetan script contains modified forms of the palatal series to write dental affricates; there are also two letters that are often taken to indicate a vowel at the beginning of the syllable, *a-chen (a-čʰen)* 'large *a*' (from Brahmi) and '*a-chung ('a-čʰuŋ)* 'small *a*' (of uncertain origin). The former indicated a syllable-initial glottal stop, while the original value of the latter is disputed: In later dialects it is realized as zero, prenasalization, or a glottal or velar/uvular consonant, depending on environment. Based on Tibeto-Burman comparanda, Matisoff (2003: 116) reconstructed it as a nasalized glottal stop in early Old Tibetan, which is followed here, though this value should not be assumed for Literary Tibetan. In addition, this letter serves three other functions: (1) it serves as a vowel support for the offglide of diphthongs resulting from the diminutive suffix *-u* and (in modern Tibetan) case endings in *-i*; (2) in ambiguous sequences of two consonant signs, '*a-chung* is placed after the second consonant if it is followed by *a*; (3) in transcriptions of Sanskrit, '*a-chung* is written subscript to indicate a long vowel.

However, because Old Tibetan possessed a much richer inventory of consonant clusters than did Sanskrit or contemporary Indic languages, Tibetan script indicated syllable boundaries explicitly by a raised dot *(bar tsheg* 'intermediate dot'), thereby obviating the need for most conjunct letters (which often cross syllable boundaries in Indic orthographies) or the *virama* (used to indicate a syllable-final consonant). The Old Tibetan syllabic nucleus consisted of a vowel (*a*, *e*, *i*, *o*, *u*); diphthongs were rare and occurred only in open syllables. Syllables could have codas of one or two consonants and onsets of up to four consonants. In the coda slot only voiced stops (*b*, *d*, *g*), nasals (*n*, *m*, *ŋ*), liquids (*r*, *l*), and *s* could occur; complex codas consisted of a grave (labial or velar) consonant followed by *s* (and in Old Tibetan by *d*, called *da-drag* 'heavy *d*', which was in complementary distribution with *s* but was lost by the time of Literary Tibetan). Coda consonants are written to the right of the letter supporting the vowel.

All consonants can occur in simple onsets; one consonant can follow and two can precede the simple onset slot (the 'initial'), with co-occurrence restrictions based largely on the value of the initial. In general, Tibetan script indicates more complex onsets by appropriate modifications of the letter for the initial (the 'central position'): letters for consonants in the slots immediately preceding and following the initial are superfixed and subfixed to the central letter (only superscript *r* and subscript *r*, *y*, and *w* are true conjunct letters); consonants in the first onset slot ('prefix consonants,' which seem to have been extrasyllabic) are written to the left of the central letter. That the distinction between initials and prefixed letters was phonologically real is shown by, for example, the regular developments of *g.y* and *gy*: *g.yag* → *yág* ~ *yáà* 'yak' vs. *gyag* → *gyàg* ~ *jàg* 'destroying'. Vowel signs are written either above (*e*, *i*, *o*) or below (*u*) the central letter, including any adscripts. However, the correspondence between onset slot and position in the written syllable was not observed for all onsets of two or three consonants; thus, *r*, *l*, and *w* preceded by other consonants were always written subscript even when they appear to have occupied the initial slot. This mismatch has complicated the rules for deriving the modern pronunciation from the spelling. (Thus, subscript *l* acts as an initial except when subscript to z: *zla-pa* → Lhasa *dàwa* 'moon', cf. *sla-po* → Lh. *lábo* 'thin, weak'.)

The letters *r*, *l*, and *s* can be superscript, and *r*, *y*, and *l* are the major subscript letters. The relatively rare subscript *w* (*wa-zur* 'corner *w*') appears in some words to have reflected a rounding of the preceding consonant that has left no traces in the modern dialects, but in other words seems to have served only to distinguish homophones; it may also occur subscript after subscript *r*. The letters *b*, *d*, *g*, *m*, and '*a-chung* can occur in the leftmost position, though only *b* co-occurs with superscript letters. Each of these letters could co-occur with a limited subset of possible initials, usually natural classes (for example, subscript *y* can only follow velar stops and the labial nasal and stops – dentals followed by *y* had developed into the palatals before the adoption of writing); moreover, not all superscript and subscript letters could co-occur (*r* cannot be both superscript and subscript, for example, and superscript *l* cannot occur with a subscript letter; Beyer, 1992: 68–89). Restrictions on which initials can occur with other onset consonants can be found in most grammars of Literary Tibetan (e.g., Goldstein, 1991: 23–27).

Modern Pronunciation Rules

The rich variety of consonant clusters in Old Tibetan was drastically reduced through massive cluster simplification, leading to the development of tones and a wider range of vowels. Broadly speaking, this process has proceeded furthest in the central Tibetan dialects, which allow no onset clusters and only nasal codas (and *r*, *b* and *g* in many varieties). Because of its international prestige, discussion of developments will be limited to the Lhasa dialect, though other

བྱང་ཆུབ་སེམས་མཆོག་རིན་པོ་ཆེ།། ཨ་སྐྱེས་པ་རྣམས་སྐྱེས་གྱུར་ཅིག།

སྐྱེས་པ་ཉམས་པ་མེད་པར་ཡང་།། གོང་ནས་གོང་དུ་འཕེལ་བར་འོག།

byaŋ-čʰub-sems	mčʰog	rin-po-čʰe \\	ma-skyes-pa-rnams	skyes	
complete.mind[1]	best	jewel	NEG.arise.NOM.PLUR	arise	
gyur-čig \	skyes-pa	ɲams-pa	med-pa.r	yaŋ \\	goŋ-nas
become.IMP	arise.NOM	diminish.NOM	NEG.NOM.DAT	CONJ	above.ABL
goŋ-du	ʔɴpʰel-ba.r	šog \			
above.DAT	increase.NOM.DAT	come			

May the supreme jewel Bodhicittas
That have not arisen, arise and grow;
And may that which has arisen not diminish
But increase more and more.

From Shantideva (Slob-dpon-shi-ba-lha), *Bodhisattvacharyavatara* (*sPyod-'jug, The Bodhisattva's Way of Life*), early 8th century CE. Text and translation provided by Yangbum Gyal.

[1] Tibetan for *Bodhicitta* 'Enlightenment Mind.'

Figure 1 Sample of Tibetan script.

dialects are of greater philological interest (such as Amdo, spoken in northern Qinghai, which is the source for most Tibetan loanwords into Mongolian and other Inner Asian languages).

In general, initials retain their Old Tibetan places of articulation unless followed by the subscripts *r* and *y*; the former has created a series of retroflex stops or (in elegant Lhasa Tibetan) affricates (from labials, dentals, and velars) and the latter palatals (the labials developed into palatal affricates, the velars into palatalized velars or palatal stops). Pre-initial consonants, on the other hand, affected the voicing and manner of initials. Changes in voicing induced by pre-initials interacted with the loss of a three-way distinction in voicing in the obstruents to create a system of high and low tones; in modern central dialects the effects of pre-initial consonants are best described by the resulting tonal categories and voicing (Goldstein, 1991: 3–5, 23–27; Miller, 1956: 6–15). At the other end of the syllable, coda consonants affected the preceding vowel as follows: (1) the dentals *d*, *n*, *s*, and *l* fronted preceding vowels ($u \rightarrow$ *ü*, *o* $\rightarrow$ *ö*, *a* $\rightarrow$ *ɛ*); *b* raised *a* to *ə* and *r* lowered *o* to *ɔ*; (2) vowels were lengthened preceding *l*, *d*, *s*, *n*, *r*, and *g* (unless the variety preserved the last two); (3) vowels before *s*, *d*, and *g* took a low tone to yield falling high and low tones. In final clusters, the final *s* was lost without affecting the rest of the syllable except for minor tonal effects on preceding nasals (Goldstein, 1991: 10–14). The most elegant forms of Lhasa Tibetan retain only nasal codas; other varieties of central Tibetan retain final *b* and, more variably, *g* and *r*. (Beyer, 1992: 27–28).

With cluster simplification there was a concurrent process of lexicalization of earlier collocations as disyllabic words marked by numerous lexically based phonological rules:

1. Pre-initials of the second morpheme were resyllabified as the codas of preceding open syllables if the word was lexicalized before the loss of pre-initials; in this case, '*a-chung* developed into a nasal homorganic with the following consonant. Thus, *rdo-rje* $\rightarrow$ *dor-je* 'thunderbolt, *vajra*; diamond', which was borrowed into Mongolian as *dorji*; similarly, the negative verbal particle *mi* was lexicalized with a following existential verb '*dug* quite early, giving the modern pronunciation *min-dug*. Similarly, codas of first syllables are often preserved in disyllables, but there are many exceptions depending on the looseness and the date the word was lexicalized.
2. The morphemes in lexicalized collocations display tone sandhi.
3. A system of vowel harmony based on the height (high versus nonhigh) of the second vowel has developed.
4. The voicing of some medial obstruents changed (Goldstein, 1991: 27–29).

See Figure 1 for a sample of Tibetan script.

Table 2 ‘Phags-pa script

Consonants

		Labial		*Coronal*		*Palatal*		*Velar*		*Uvular*	
	Asp.		p’		t’				k’		
Stops	*Vl.*		p		t				k		q
	Vd.		b		d				g	[c]	γ
	Asp.			[b]	c’		č’				
Affricates	*Vl.*			[b]	c		č				
	Vd.			[b]	dz		ǰ				
	Vl.		f		s		š				h
Fricatives											
	Vd.	[a]	v/w		z	[b]	ž			[c]	•
Nasals;			m		n		ɲ		ŋ		
Glides			w		y			*Other:*			
								[b]			
Liquids								*Palatization*			
				r	l				k^ya		

[a] Not used in Mongolian words.
[b] Used in Chinese words.
[c] The signs ⟨γ⟩ and ⟨•⟩ probably indicated a voiced uvular stop and fricative in the early 13th century or before; later they lenided to a voiced uvular fricative and zero. (Poppe, 1957: 19–34; van der Kuijp, 1996; 437–441; Miller, 2002: 179–205.)

Vowel

	Initial	*Non-initial*		*Initial*	*Non-initial*
a		—	ä		
e			ö[d]		
i			ü		
o[d]			ɨ		
u					

[d] A vertical medial line is used to link these vowel signs to a following tautosyllabic consonant.

Mongolian diphthongs (non-initial)

	ayi	[e]	eyi		oyi
[e]	ei		ui		üi

[e] Generally *eyi* (*äyi*, occasionally *eyi*) is used in non-final position, *ei* (*äe*) finally. (Chinese diphthongs are written *ay*, etc.)

Conventions for Foreign Words

Special forms of the Tibetan letters are used to transcribe Sanskrit. Retroflexes are written with the mirror image of the corresponding dentals, and certain clusters foreign to Tibetan are written with adfixed letters. Long vowels are indicated by a subscript ‘*a-chung*. Voiced aspirates are written with *h* subscript to the corresponding voiced consonant. Finally, symbols for *visarga*, *anusvara*, *anunasika*, etc., are also used in Tibetan without change. Foreign sounds in other languages are generally transcribed with sequences of Tibetan letters; thus, *f* in English and Chinese loanwords is written as *h* with a subscript *w*. Especially noteworthy are the conventions for writing Turkic front rounded vowels, for they were carried over into ‘Phags-pa script: noninitial rounded vowels were written with subscript *y* (continued by the ‘Phags-pa symbol for *ä*) and the corresponding unrounded vowel (thus, *kyu* indicated *kü*); initially, they were supported by *a-chen*. This system continues the Brahmi system for the noninitials, but modifies that for initials (in which *ä*, *e*, *ö*, and *ü* were written *aya*, *eya*, *oya*, and *uyu* respectively) (Ligeti, 1961: 210–211).

‘Phags-pa Script

In order to create a script that could be used to write all the major languages of the Mongol empire, the ‘Phags-pa lama provided symbols for all the phonemic distinctions in the languages in question, from

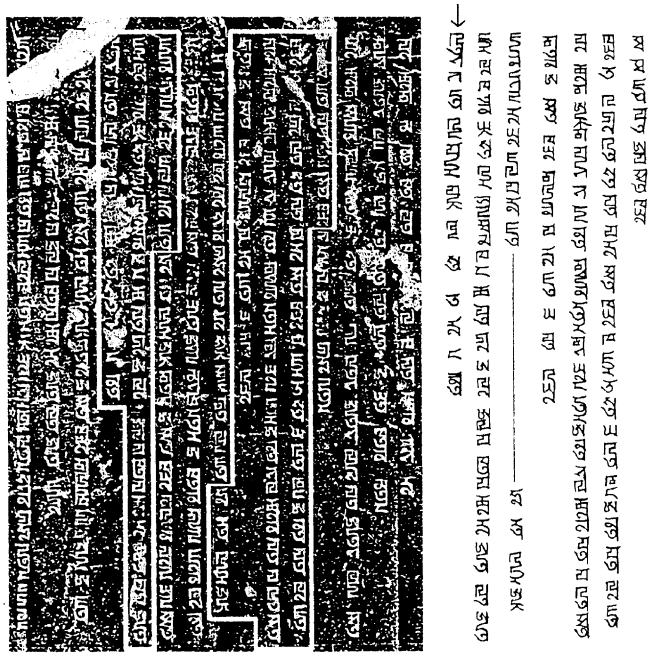

•uä	edu•ä	bär	bö•äsu	urida-nu /	jarliq-un	yosu-•ar	c'aŋ t'amqa-d-ač'a		buši
age	now	TOP	if.it.is.so	early-GEN	edict-GEN	rule-INSTR	[types of taxes].PL.ABL		other

ali[ba]	alba	qubč'iri	ülu	ü/jä-n	deŋri-yi	jalbari-ju …	hiru•är	ö/gu-n
any	corvée	tax	NEG	see-SCV	Heaven-ACC	pray-ICV	benediction	give.SCV

a-t'uqayi	gä•ä-n	bari-ju	yabu-•ayi /	bič'ig	ög-bäe	edä-nu	gwän-dur	geyid-dur
be.HORT	say.SCV	hold.ICV	walk.IP	writing	give.PRF	3p.GEN	temple.DAT	dwelling.DAT

anu	elčin	bu	ba•u-t'u/qayi	u[la]•a	ši•usu	bu	bari-t'uqayi	qajar	usu
3p	messenger	NEG	dismount.HORT	relay.horse	food	NEG	take.HORT	land	water

ya•u	k'ä	anu	buli-ju /	t'at'a-ju	bu	ab-t'uqayi
what	pattern	3p	seize.ICV	extract.ICV	NEG	take.HORT

SCV: Subordinative converb; ICV: Imperfective converb; HORT: Hortative/subjunctive; IP: Imperfect participle

'Now, in that case, in accordance with earlier edicts stating that they [Buddhist, Taoist, Christian, and Muslim clergy] are to pray to Heaven and offer benedictions while not being subject to any corvées or taxes apart from the land and commercial taxes, we have issued a writ to be retained. Messengers are not to stop at their temples and dwellings. They must not take relay horses or provisions. They must not seize or appropriate their lands, waters, or anything else.' (Edict of Mangala, 1276, lines 6-20 of the Mongolian text. Fair copy by author. Chevannes, Plate XIX; Poppe 46-7).

Figure 2 Sample of 'Phags-pa script.

which a given language would be written with a subset of the symbols chosen for the best phonetic fit, which is much the same principle as that of the IPA; thus, while the script can indicate a three-way voicing distinction for stops and affricates, languages such as Mongolian or Uighur would ideally use only two of the series, chosen to best indicate the degree of voicing and aspiration. The script is thus of extreme interest to the historians of these languages, for it provides a broad transcription of the prototypical values of the target phonemes. However, while the script is conventionally dated to between 1264 and 1269, it likely incorporated earlier Tibetan and Brahmi systems for writing other languages; in addition, the native conventions for each script were often followed without regard for allophonic variation or later changes. Thus, the interpretation of 'Phags-pa script for a given language requires some care.

As in Tibetan, 'Phags-pa script is largely alphabetic; consonant signs have inherent *a* in the absence of

another vowel sign. Most of the letters are taken from Tibetan script but the organization of the script derives from Uighur-Mongolian, and the signs for many non-Tibetan sounds follow Brahmi conventions. The script is oriented top to bottom and left to right, with the characters for each syllable joined in a square. Generally the script assumes CV(C) syllable structure; Tibetan words with consonant clusters are written as in Tibetan. Vowel signs follow the first full consonant sign, with special signs for initial vowels (see Table 2).

The approximate phonetic values of most 'Phags-pa signs are clear, but those of the signs herein transcribed • and γ are still debated. The former derives from Tibetan '*a-chung*, whose value at the time the script was devised is unclear, while the latter was used particularly for Middle Mongolian γ, which has generally been lost intervocalically in the modern dialects to yield long vowels. Moreover, their interpretation depends crucially on the extent to which Uighur-Mongolian conventions were followed in 'Phags-pa. The values accepted here must be taken as having been adapted to the phonemic system of the target language, with interference from native orthography. Thus, they are close to the values found from internal reconstruction of early Mongolian as preserved in Uighur-Mongolian script; however, transcriptions of Mongolian in Arabic and Korean scripts vary extensively in the values indicated for these sounds: zero in the Mongolian dictionary of the *Muqaddimat al-Adab* (Poppe, 1927: 22); zero, *g* (rare), or *w* in the Istanbul manuscript of the *Shamil ül-lugha* (Ligeti, 1964: 113–119); zero, *h*, *w*, and *g* in the Leiden manuscript of a Turko-Mongolian lexicon (Poppe, 1927: 1017–1024); and zero between like vowels and γ between unlike vowels in Korean transcriptions of Middle Mongolian (Miller, 2002: 200n40). Besides the fact that these transcriptions postdate the creation of Mongolian script by well over a century, there is probably dialect variation involved. Similarly, • is used for phonemic γ in Old Mandarin, realized variously in different environments (Miller, 2002: 190–196).

Because the most significant texts in 'Phags-pa script are in Chinese or Mongolian, the conventions for these languages are indicated in Table 2. It is important to note that Mongolian is typically written in 'Phags-pa script following the conventions of Uighur-Mongolian script. Thus, vowel harmony is usually indicated by the choice of velar sign, and in other cases is often indicated only in the first syllable (see Figure 2).

See also: Belorussian; Brahui; Mongolic Languages; Tibetan.

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Tibetan

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Geography, Affiliation, and History

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parts of Bhutan, India (Ladakh in Kashmir and parts of Himachal Pradesh), Pakistan (Baltistan), Nepal (Mugu, Dolpo, Mustang, Solu Khumbu), Burma, and the Chinese provinces of Yunnan, Sichuan, Gansu, and Qinghai. Estimates of the number of speakers range from about three to seven million. It is also used as a religious language by Mongols in the Republic of Mongolia, Inner Mongolia (China), and Russia (Buriats and Kalmucks), and by members of some ethnic groups in Nepal, including Newars and Tamangs, and other parts of the Himalayas. It is usually reckoned to be a member of the Tibeto-Burman language group, which, with the Karen and Chinese groups, forms the Sino-Tibetan family, though some scholars have cast doubt on this affiliation, citing parallels with Indo-European.

The Tibetans emerge into history in the 7th century AD. It is from that time also that their alphabetic writing system, based on a model of Indian origin, is alleged to date. The earliest datable example of the language is probably an inscription on a stone pillar in Lhasa dating from about 760 AD. Although originally often used for administrative purposes, since the 10th century Classical Tibetan has been closely associated with Buddhism, having been used to translate a vast range of literature, mostly from Sanskrit. There is also an indigenous literature, which was also almost entirely religious until the mid-20th century. Since that time the nonreligious genres of journalism and other 'nonfiction' have also flourished, and since the late 20th century also novels, short stories and poetry.

The spoken dialects have usually remained unwritten. Poorly recorded from premodern times, they have often developed separately from the written language and from one another. To ease the consequent difficulties of communication, several of the spoken dialects have come to be used as *lingua francas*: Lhasa Tibetan over the Tibetan Autonomous Region and among the exile community; Dzongkha in Bhutan, Leh Ladakhi in Ladakh and Amdo Khake (Amdo) in Qinghai and Kansu. While parallel modern regional written languages have also been developed (see below), the gap between spoken and written forms of the language remains wide.

Grammar

Words

A Tibetan word (phonologically defined) comprises a noun, verb, or adjective constituent, with or without one or more particles. A noun constituent may be polysyllabic, while verb and adjective constituents are all monosyllabic. Many verbs have variant forms ('stems' or 'roots') corresponding to tense/aspect differences. Other parts of speech are invariable, apart from sandhi variation with suffixed or prefixed particles. Particles express noun case categories and adjectival degree, mark the ends of subordinate clauses, and establish verb tense/mood/aspect categories. Most particles are suffixed, though a few negative, dubitative, or interrogative ones are prefixed. There are also many phrasal nouns, verbs, and adjectives comprising two or more words. Particles are subdivided into noun, verb, and adjective, according to which type of word they occur in. A few particles can stand as separate words.

Noun Phrases

The order of elements in the noun phrase is: (1) head (noun), (2) epithet (adjective), (3) deictic (noun), (4) numerator (particle), (5) case marker (genitive, subject-marking, instrumental, dative-locative, ablative, comparative or adverbial particle).

Verb Phrases

In Classical Tibetan, a verb paradigm may have from one to four stems, and sometimes alternative forms for the same stem, e.g., the verb *seize* (shown here in transliterated Tibetan spelling):

present	past	future	imperative
'dzin./zin.	*bzung./zung.*	*gzung.*	*zungs.*

A few verbs have suppletive paradigms with stems drawn from etymologically different verbs.

Modern spoken dialects show a reduction in the number and variety of verb stems; for example in the Lhasa dialect, for most speakers no verb has a separate future stem and many verbs have been reduced to a single stem: the equivalent of either the present or past of the classical language. More than compensating for this reduction has been a great increase in the use of verb particles and auxiliaries to express a complex mix of person, tense, aspect, mood, and evidential and judgmental modality systems. In many dialects there is also an unusual system of what may be termed 'viewpoint' – self-centered vs. other-centered – in which there is concord between the verb phrase and the speaker, who may or may not correspond to one of the arguments of the clause.

Verbs may be divided into two types: verbs of being (also used as auxiliaries) and lexical verbs. Verbs of being participate obligatorily in the grammatical systems of viewpoint and evidential modality. Lexical verbs are of two types, which determine their participation in the systems mentioned: 'intentional,' where the action is under voluntary control, and 'unintentional.' The majority pattern of the lexical verb phrase is: (1) lexical verb stem, (2) linking

particle, (3) polar particle, (4) auxiliary, (5) modal particle.

Past, present and future tenses are established by a combination of verb stem and auxiliary. Similar means are used to distinguish perfect, progressive, and prospective aspect, of which there are several subtypes in each case.

Clauses

Tibetan clauses are of SOV (subject-object-verb) type, with OSV order also possible. As well as the clause-final verb phrase, the clause may contain a subject, an object, and one or more adjuncts, all noun phrases. Subject and object phrases are regularly omitted without being represented by pronouns if they are not 'new.'

The main clause is the last in the sentence. Nonfinal (subordinate) clauses are usually marked by special particles.

Past-tense and often present-tense clauses are syntactically ergative, the subject of a transitive clause being marked with a particle identical in written form to the 'instrumental' noun particle.

Phonology

Modern central, southern, and eastern dialects have well-developed lexical tone, which has been analyzed in various ways, the simplest being as a two-tone system. In the Lhasa dialect the word is the domain of tone, which is manifested mainly as the pitch (high or low) of its first (or only) syllable. These tonal dialects mostly have few word-initial consonants, with few or no consonant clusters at word-initial position. Plosive and affricate initials always maintain a clear differentiation between an aspirated and an unaspirated series, while voicing has tended to disappear from these series as well as from fricative initials. The dialect of Dingri in southern Tibet has 27 word-initial consonants, all of them simple.

In the western dialects of Balti (spoken in northern Pakistan) and Ladakhi, as well as in some northeastern dialects of Gansu and Qinghai, tone is usually less well developed or absent, with a richer variety of word-initial consonant clusters. The northeastern Amdo Khake (Amdo) dialect has 36 simple word-initial consonants and 78 cluster initials. The writing system, whose spellings are full of consonant clusters, would suggest that the dialect it was based on, perhaps a central dialect of the 7th century, may have been pronounced somewhat like these so-called 'archaic' dialects. However, none of the present dialects approaches the complexity of the spelling system in this respect.

The tonal dialects of central and southern Tibet generally also have a system of vowel harmony. In the Lhasa dialect its domain is a pair of adjacent syllables within a word. Many noun, verb, adjective, and particle constituents vary between an open and a close alternant. Most of the nonparticle constituents in question are spelt with one of the vowels *o*, *e*, or *a*: they will be pronounced with a closer vowel alternant when next to a syllable spelt with *i*, *u*, or the combination *ab*. There is little or no evidence of vowel harmony in the script, suggesting that its development, like that of tone, may have accompanied the progressive loss of consonant distinctions. Whereas the 'archaic' or 'cluster' dialects may typically have nine vowels, corresponding to the five of the script, the 'modern' or 'noncluster' harmonic dialects may have about 25 (in both cases, analyzed nonphonemically).

Honorifics

The written language and most of the dialects have a well-developed honorific system, in which lexical choice of verb is determined by the social status of the person acting as its grammatical subject. There is also a 'respectful' system, in which there is concord between choice of verb and direct or indirect object, and the two systems may be combined. Nouns, adjectives, and verb particles are also affected.

Sample Sentence

(Lhasa dialect: transliterated spelling in italics with phonetic rendering below: tones unmarked)

"a.las.	*rang.gis.*
ʔalɛː.	raŋgi
EXCLAMATION	you-ERG SUBJ-MAKING PART

zer.yag.la.
sejala
say-NOMINALIZING PART-DATIVE-LOCATIVE PART

cha.	*bzhag.na/*	*lha.sa'i.*
tɕa	ɕaanə,	ɬɛsɛː
belief	place-if	Lhasa-of

gnam. gzhi.ni.	*dgun.ka.*
nʌmɕɪnɪ	gyŋgə
climate-TOPIC-MARKING PART	winter

dro.po.	*dang.*	*dbyar.ka.*
trɔpo	tã	jaagə
warm-ADJ PART	and	summer

gsil.po.	*yod.pa.'dra/*
siibu	jøːbədra.
cool-ADJ PART	is-seem

'Well! To believe what you say, the climate of Lhasa seems to be warm in winter and cool in summer!'

Recent History

Developments since World War II have led to the political fragmentation of the Tibetan-speaking world and the increasing influence of other languages, particularly Chinese (Mandarin Chinese), English, Urdu, Hindi, and Nepali. However, the same period has also seen the development of Modern Literary Tibetan (in Tibet and among refugees), Written Dzongkha (in Bhutan), and Written Ladakhi (in Kashmir) as written languages, based respectively on Lhasa Tibetan, spoken Dzongkha, and spoken Ladakhi, but influenced by Classical Tibetan. Some other dialects, including Amdo Khake (Amdo), Kham, and Sikkimese have also had written equivalents devised for them. The late 20th century has also witnessed a Tibetan diaspora, which has led to vastly increased interest in the language and culture, centered on a numerically small but culturally active exile community in India and Nepal. Since the late 20th century, there has also been a marked revival of Tibetan in the Republic of Mongolia. Despite the problems experienced by its speakers, Tibetan remains a living, vigorous, and developing language.

See also: Buddhism, Tibetan; China: Language Situation; Ergativity; Evidentiality in Grammar; Harmony; Honorifics; India: Language Situation; Morphological Typology; Nepal: Language Situation; Pakistan: Language Situation; Perfectives, Imperfectives, and Progressives; Tibet: Scripts; Tone: Phonology.

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Tigrinya

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Tigrinya (self-name tɨgrɨŋŋa or tɨgraj), which is spoken in Eritrea and Ethiopia, is the second largest member of the Ethiopian branch of the Semitic family of languages, constituting together with Tigre and the extinct Ge'ez (or Classical Ethiopic) the northern subdivision. Estimates of the number of speakers in both countries vary from 4 to 5 million. Tigrinya is one of the two working languages of Eritrea, where it is the first language of about 50% of the population, and a major national language of Ethiopia. Tigrinya is written in a slightly expanded version of the Ethiopic syllabary, and as a written language has a history only from the latter half of the 19th century, due in great part both to the prestige of Ge'ez as the written language of Christian Ethiopia in the past, as well as to the dominance of its sister language, Amharic, as the language of the Ethiopian court.

Modern Tigrinya shows a considerable degree of dialect variation in the handful of preliminary studies that have been done. The standardization of written Tigrinya took its impetus from the full independence of Eritrea in 1993 and the adoption of Tigrinya as the principal language of the state.

Phonology

Tigrinya has 32 consonant and 7 vowel phonemes. Distinctive are the glottalized consonants and the labialized velars. The velars /k/, /kʷ/, /k'/ and /k'ʷ/ have fricative allophones in postvocalic position including across close juncture between word boundaries: kɐfɐtɐ 'he opened' but jɨxɐffɨt 'he opens', k'orbot 'leather' but ʔɨta x'orbot 'the leather'. As the script has special symbols for these allophones, they will be indicated in the data here. Consonant length is phonemic, except for the glottals and pharyngeals which do not have lengthened counterparts. (See **Table 1** for the consonant chart.)

Ethiopianist convention occasionally employs different symbols from the IPA ones used here; thus, š = ʃ, ž = ʒ, č = tʃ, q = k', ṭ = t', č̣ = tʃ', ǧ = dʒ, ṣ = s', p̱ = p', ñ = ɲ, y = j, k̲ = x, q̲ = x', ḥ = ħ, ' = ʕ, ' = ʔ, ä = ɐ, ə = ɨ. The vowel phonemes of Tigrinya are are /i/, /ɨ/, /u/, /e/, /o/, /ɐ/, and /a/, of which the central vowels /ɐ/, /ɨ/, and /a/ are of particularly frequent occurrence. The mid-central vowel /ɐ/ has a markedly more open allophone in word final position: nɐgɐrɐ = [nɐgɐrɐ̞] 'he spoke', and indeed following a glottal or pharyngeal consonant this is written in the script with the same vowel sign as /e/.

Morphology

Tigrinya, like other Ethiopian Semitic languages, has a complex inflectional morphology, particularly in the verbal system, employing not only prefixes and suffixes but also internal modification of the typical Semitic consonantal root-and-pattern type. Internal modification is also employed in forming many noun plurals from the singular, sometimes in combination

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Table 1 The consonant phonemes of Tigrinya

	Bilabial	*Alveolar/dental*	*Palatal*	*Velar*	*Pharyngeal*	*Glottal*
Plosive/affricate	b p	d t	dʒ tʃ	g k		ʔ
Glottalized						
Plosive/affricate/fricative	p'	t'	tʃ'	k'		
			s'	[x']		
Labialized				g^w k^w		
				k'^{w}		
			[x^w][x'^{w}]			
Fricative	f	z s	ʒ ʃ	[x]	ʕ ħ	h
Nasal	m	n	ɲ			
Lateral		l				
		r				
Approximant	w		j			

with the addition of an affix, in 'broken plural' patterns so typical of other Semitic languages such as Arabic: wɐrħi 'month', ʔawarɨħ 'months', kɐnfɐr 'lip', kɐnafɨr 'lips'. Other noun plurals are formed by suffixes alone: sɐb 'man', sɐbat 'men', g^wasa 'shepherd', g^wasot 'shepherds'. Plural formations are determined lexically and cannot be predicted from the shape of the singular form.

In addition to number, nouns also have the category of gender, with two terms linked with male and female in animate nouns, while inanimates generally fluctuate in gender. Gender is mostly observable only in agreement. Definiteness is also indicated in the noun phrase by means of an article, in origin a remote demonstrative: ʔɨtom kahnat 'the priests', ʔɨta waʕro 'the lioness', ʔɨtu s'ɨbbux' wɐddi 'the good boy'. Case relations are expressed by prepositions. Particularly interesting is the use of nɨ-(nɐ- + DEF) as optional marker of a definite direct object, the same clitic also having the function of indicating an indirect object:

nɐ-tu sɨrnaj jɨ-xɨrkɨriʔ-o
OBJ-DEF *wheat* *3(PL)-grind.*IMPERF.PL-*it*
'they grind the wheat'

ʔɨtu k'ɐʃʃi nɐ-ta sɐbɐjti jɨ-ngɐr
DEF *priest* *to*-DEF *woman* *3*MASC.SING-tell.*JUSSIVE*
'let the priest tell [it] to the woman'

Verbs inflect for voice or valency, tense-mood-aspect (TMA), and person. In addition to the base-stem shapes, which are essentially three in number, there are three prefixed stem derivatives for each of these: tɐ-, which essentially has the function of marking passive-reflexive, ʔa- which generally has the function of marking causative-transitive, and a complex formative comprising ʔa-combined with lengthening of the first radical consonant or -t-(i.e., formative ʔat-) before a glottal or pharyngeal. The meanings of derived stems are in addition often lexically defined. There are also specific TMA stem patterns associated with each of these derivational elements: nɐgɐrɐ 'he spoke', tɐ-nɐgrɐ 'it was spoken', bɐxɐjɐ 'he wept', ʔa-bkɐjɐ 'he made someone weep', las'ɐjɐ 'he shaved himself', ʔa-las'ɐjɐ 'he made someone shave himself', fɐnnɐwɐ 'he sent away', ʔaf-fanɐwɐ 'he accompanied someone on his way', etc.

There are four fundamental TMA forms, conventionally referred to as the Perfect, the Imperfect, the Jussive-Imperative, and the Gerundive. The latter is sometimes also described as a Converb. These are marked both by different stem shapes and by different person markers, with the Imperfect and the Jussive having the same set of person markers (the Imperative marks only gender-number). The tense system is considerably augmented beyond these basic forms by means of auxiliaries and periphrastic constructions.

ʔab ʔasmɐra tɐ-wɐlɐd-ku
in *Asmara* PASS-*bear.*PERF-*1*SING.PERF
'I was born in Asmara'

maj ʔ-a-fɨlliħ
water *1*SING.IMPERF-CAUS-*boil.*IMPERF
'I boil the water'

nɐ-tu gɐnzɐb kɨ-[ɨ]-hɨb-ɐkka ʔɨj-jɐ
OBJ-DEF *money* FUT-*[1*SING.IMPF]-*give.*IMPERF-*you* COP-*1*SING
'I will give you the money'

tɨ-ħɨz-o ʔallo-xa
*2*MS.IMPERF-*catch.*IMPERF-*him* *be.*PRES-*2*SING.MASC[PERF]
'you catch him (now)'

ʔab-zu ʕabij gɐza jɨ-x'ɨmmɐt' nɐbɐr-ɐ
in-this *big* *house* *3*MASC.SING.IMPERF-*live.*IMPERF *be.*PAST-3MS.PERF
'he was living in this big house'

s'ɨbaħ tɐmɐlis-ɐ ʔɨ-xɐwwɨn
tomorrow *return.*GER-1SING.GER *1*SING.IMPERF-*be.*IMPERF
'I may come back tomorrow'

The gerundive is used both as a subordinate verb, marking an anterior event in a sequence, and as a main verb form, expressing the result of an action:

mɨs mɐn mɐs'iʔ-ka
*with who come.*GER-2MASC.SING.GER
'with whom have you come?'

nab-tu gɐza tɐmɐlis-a
into-DEF *house return.*GER-3FEM.SING.GER
tɐx'ɐmmit'-a ʔɨngera
*sit.*GER-3FEM.SING.GER *bread*
hab-ɐtt-o
*give.*PERF-3FEM.SING.PERF-*him*
'she returned to the house, sat down, and gave him some bread'

Syntax

Word order in Tigrinya is generally subject-object-verb (SOV), with subordinate clauses preceding the main clause. Noun phrases are also generally head final with modifiers, including relative clauses, preceding the noun.

ʔɨtu ʔanbɐsa zɨ-x'ɐtɐl-ɐ sɐb bɨ-ħ ak'k'i
DEF *lion* REL-*kill.*PERF-3MASC.SING.PERF *man in-truth*

zɨ-Ø-fɐrɨħ
REL-[3MASC.SING.IMPERF]-*fear.*IMPERF
ʔaj-kon-ɐ-n
NEG-*be.*PERF-3MASC.SING.PERF-NEG
'the man who has killed a lion indeed has nothing to fear'

See also: Afroasiatic Languages; Eritrea: Language Situation; Ethiopia: Language Situation; Semitic Languages.

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Tillamook *See:* Salishan Languages.

Tilly, William (1860–1935)

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William Tilly, an influential figure in the history of language teaching and practical phonetics, was born in Sydney, Australia, on November 29, 1860, the son of a missionary, Charles Tilley. (Tilly later changed his surname from Tilley so as to correspond to German spelling.)

He had a checkered academic career, first studying Pitman's shorthand (then known as phonography) at a 'Mechanics' Institute' in Melbourne, where he obtained a certificate in 1877. After a period as a theology student at Camden College, he spent just one year at Sydney University and then attended the Public Training School for Teachers. He became a schoolteacher, and in 1885 was appointed director of Dubbo Superior Public School, New South Wales.

However, Tilly had become fascinated by foreign languages. In 1890, he gave up his job to go to Germany, which he considered to be the country that led the world in modern language teaching. He studied a variety of linguistic disciplines, first at Giessen and then at Marburg. In 1893, through the agency of Wilhelm Viëtor, he was appointed to a lectureship in English at Marburg University. He there founded Institut Tilly, a private school dedicated to teaching German and other modern languages by what were regarded at the time as daringly

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innovative methods. Tilly subscribed to a radical form of the instructional techniques advocated by the Reform Movement, employing a 'total immersion' approach. He rejected teaching through translation, preferring to expose students to intensive periods of training in the target language; for several weeks on end they were not permitted any opportunity to speak, read, or even hear their mother tongue. Pronunciation was taught through a combination of applied phonetics and strenuous practical articulatory exercises.

Tilly's rigorous approach enjoyed such tremendous success that in 1902 he decided to resign from his university post in order to concentrate on his institute, which he moved to the suburbs of Berlin, first Friedenau and, from 1905 onward, Gross-Lichterfelde. The fame of Institut Tilly and its director spread, with it attracting students from all over the world. Daniel Jones, then an undergraduate reading mathematics at Cambridge, revealed that he was first introduced to phonetics by Tilly in 1900 and thereafter became his lifelong admirer (Collins and Mees, 1999: 12–15).

Tilly continued to teach until 1914, when World War I wrecked his life. After being interned as an alien in Germany for a year, he fled to the United States and for two years was employed in various teaching posts. In 1918 he was appointed Professor of Phonetics at Columbia University, New York, where he soon attracted a body of devoted pupils, many of whom later took up influential academic positions.

Viewed from the present age, Tilly's approach appears curious in that he prescribed a largely British style of pronunciation for his American students; nevertheless he exerted considerable influence on speech training and the teaching of practical phonetics in universities and colleges in the United States. Tilly joined the International Phonetic Association in 1892 and remained a member all his life, being elected to the Council of the IPA in 1900. He is felt to have played a vital role in spreading knowledge of the IPA and its phonetic alphabet not only in Europe but also throughout the United States, especially in the speech departments of American universities.

Tilly produced few publications, and none of real significance. His influence on the development of linguistics appears to have been entirely through the force of his personality and his legendary abilities as a language teacher and practical phonetician. He died in New York in 1935.

See also: International Phonetic Association; Jones, Daniel (1881–1967); Language Teaching Traditions: Second Language; Pitman, Isaac, Sir (1813–1897); Viëtor, Wilhelm (1850–1918).

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Timor Lorosae: Language Situation

J Hajek, University of Melbourne, Melbourne, Australia

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The Republic of Timor Lorosae (or East Timor) achieved full independence on May 22, 2002, after almost 500 years of colonial contact and rule. Under Portuguese control until 1975, it was in turn occupied by Indonesia until 1999. Although only a small nation (est. 998 000 inhabitants), it is notable not only for its difficult political history but also for its linguistic diversity. The estimated number of indigenous languages varies from 15 to 25, and these fall into 2 genetically unrelated groups: Austronesian and so-called Non-Austronesian or Papuan (Trans-New Guinea language family). The best-known East Timorese language is Dili Tetum (or Tetun Dili). It is Austronesian in origin and the principal lingua franca of the nation. It also shows the effects of extensive contact with Portuguese, as can be seen in this following example taken from a local press report (Portuguese loans are in bold):

(1)	iha	**15**	**de**	**Jullu**	loron
	LOC	15	of	July	day
		hahú	**kampanha**	**eleitoral**	nian,
		begin	campaign	electoral	POS
		membru	**gabinete**	sira	nebé
		member	cabinet	3PL	REL

innovative methods. Tilly subscribed to a radical form of the instructional techniques advocated by the Reform Movement, employing a 'total immersion' approach. He rejected teaching through translation, preferring to expose students to intensive periods of training in the target language; for several weeks on end they were not permitted any opportunity to speak, read, or even hear their mother tongue. Pronunciation was taught through a combination of applied phonetics and strenuous practical articulatory exercises.

Tilly's rigorous approach enjoyed such tremendous success that in 1902 he decided to resign from his university post in order to concentrate on his institute, which he moved to the suburbs of Berlin, first Friedenau and, from 1905 onward, Gross-Lichterfelde. The fame of Institut Tilly and its director spread, with it attracting students from all over the world. Daniel Jones, then an undergraduate reading mathematics at Cambridge, revealed that he was first introduced to phonetics by Tilly in 1900 and thereafter became his lifelong admirer (Collins and Mees, 1999: 12–15).

Tilly continued to teach until 1914, when World War I wrecked his life. After being interned as an alien in Germany for a year, he fled to the United States and for two years was employed in various teaching posts. In 1918 he was appointed Professor of Phonetics at Columbia University, New York, where he soon attracted a body of devoted pupils, many of whom later took up influential academic positions.

Viewed from the present age, Tilly's approach appears curious in that he prescribed a largely British style of pronunciation for his American students; nevertheless he exerted considerable influence on speech training and the teaching of practical phonetics in universities and colleges in the United States. Tilly joined the International Phonetic Association in 1892 and remained a member all his life, being elected to the Council of the IPA in 1900. He is felt to have played a vital role in spreading knowledge of the IPA and its phonetic alphabet not only in Europe but also throughout the United States, especially in the speech departments of American universities.

Tilly produced few publications, and none of real significance. His influence on the development of linguistics appears to have been entirely through the force of his personality and his legendary abilities as a language teacher and practical phonetician. He died in New York in 1935.

See also: International Phonetic Association; Jones, Daniel (1881–1967); Language Teaching Traditions: Second Language; Pitman, Isaac, Sir (1813–1897); Viëtor, Wilhelm (1850–1918).

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aktivu	**politikamente**	sei	atu
active	politically	FUT	IRR
suspende	sira	nia	
suspend	3PL	POS	
funsaun	**governamentál**		
function	governmental		

'on the 15th of July, when the electoral campaign begins, those cabinet members who are politically active will have to suspend their government functions.'

Other Austronesian languages include Mambae, Tokodede, and Galoli. Of the Papuan languages, Fataluku, Makalero, and Makasae form a chain in the extreme east, whereas Bunak is spoken much further to the west. Contact within and between the two language families has been extensive over time, with the result that there are many typological similarities. These include shared lexicon, phonological simplification, the presence of no or very little productive morphology, similar tense–aspect–mood systems, very limited argument marking, if any, on verbs, and the absence of a passive construction. On the other hand, the Austronesian languages remain strongly SVO in terms of sentence structure, whereas the Non-Austronesian languages are characteristically SOV.

Language vitality has in most cases proven to be very robust, regardless of the size of the community. Only one language, Makua (or Lovaia), is immediately threatened: today it has only a handful of speakers, with the rest having shifted to Fataluku.

East Timor's new constitution gives coofficial status to Portuguese and Tetum. Development of the latter is well under way, and a standard form, known as 'Official Tetum,' is now recognized. It is essentially Dili Tetum, with some elements drawn from more conservative, rural varieties of Tetum. Indonesian is still widely spoken, but is being phased out of administration and schools, while Portuguese has now been reintroduced to these same sectors, alongside Tetum.

See also: Austronesian Languages: Overview (02123): Indonesia: Language Situation; Papuan Languages; Portuguese; Trans New Guinea Languages.

Language Maps (Appendix 1): Map 85.

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Tinbergen, Niko (1917–1988)

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Niko Tinbergen was one of the founding fathers of the biological study of animal behavior, known as 'ethology,' or currently, as 'behavioral biology.' He received the Nobel Prize in Physiology or Medicine in 1973, together with Konrad Lorenz and Karl von Frisch "for their discoveries concerning organization and elicitation of individual and social behavior patterns." Of the three, Tinbergen is known as the experimentalist. He was a field biologist and keen observer of behavior with the skill to translate observations of animals in their natural habitat into hypotheses about the causation or the adaptive significance of behavior that he tested with simple and elegant experiments.

Tinbergen was born in The Hague The Netherlands. He had one sister and three brothers, one of whom is Jan Tinbergen, recipient of the Nobel Prize in Economics in 1969. Niko was attracted to observing and photographing animals – particularly birds. As an undergraduate student of biology at Leiden University The Netherlands, he often escaped dull lectures to get into the field. In 1930, he began a study focusing on how a solitary wasp, the bee-wolf, used landmarks to find his nest. The 29-page long thesis was finished in a rush (1932) in order to participate in an expedition to Greenland. In 1933, Tinbergen became assistant at the Zoology Department, where he developed a course on animal behavior. He initiated classic laboratory studies on the courtship behavior of sticklebacks, analyzing the interaction of males and females using artificial fish-models. In 1936, Tinbergen met Konrad Lorenz. Their mutual inspiration contributed tremendously to the establishment of ethology as a discipline. Their

aktivu	**politikamente**	sei	atu
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See also: Animal Communication: Overview; Bee Dance; Development of Communication in Animals.

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Tiwi

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Introduction

Tiwi is an Australian Aboriginal language spoken by the Tiwi people, who number about 2000 and live on Bathurst Island and Melville Island (north of Darwin). Over the decades, since the first extensive contact with Europeans early in the 20th century, the Tiwi culture has undergone considerable change; the Tiwi people have changed from a seminomadic, hunter and gatherer way of life to a more settled lifestyle, and now mainly live in four townships on both islands. The Tiwi people are caught between two cultures, traditional and modern; they desire the benefits of European culture but also want to retain their own identity through some of their traditional ways. Although Tiwi people still do some hunting and gathering and maintain some of their traditional ceremonial life, they are now dependent on a money economy and are mostly Roman Catholic in religion. This change is also reflected in what has happened and is still happening in the language.

The language change is so extensive that young people (even people in their forties) no longer speak or even understand much of the traditional language. Not only does the language of the young people contain a number of English words, but the actual structure of the language has changed. These changes are due to a combination of factors over a period of decades. One of the most significant factors was the setting up of a school for both boys and girls in 1914, with English as the language of instruction and literacy. In addition to this, between 1921 and 1973, most girls were brought up from about the age of six in a dormitory, which effectively cut them off from extensive contact with their families and from hearing the Tiwi language spoken in a regular family context.

The verbal repertoire of the Tiwi people can be characterized by at least five codes: Traditional Tiwi, Modern Tiwi (a modified form of Traditional Tiwi), New Tiwi (an anglicized Tiwi), Tiwi–English, and Standard Australian English. These codes, though

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having characteristics that distinguish them from each other, are not discrete, but rather merge into one another along a spectrum. Each code has within it characteristic styles. For instance, within New Tiwi, there is a difference between the more formal style, used in storytelling on tape and in elicited speech, and the less formal style, used in spontaneous speech. Also, the New Tiwi used by children is different from that used by adults. The Tiwi code used by a person is largely dependent on the age of the speaker, but not exclusively so. Though most young people do not command much Traditional Tiwi (with their understanding being greater than their production), older people do appear to command New Tiwi to some extent and usually use it in speaking with younger people. In addition to the diversity of codes, the situation is made more complex by switching between codes, including English.

Traditional Tiwi

In Traditional Tiwi (TT), there are four vowels: a, i, o, u. The consonants are given Table 1, in which the symbols used are the orthographic ones developed when Tiwi became a written language 30 years ago. The prenasalized and labialized stops are interpreted as single consonants on the basis that there are no unambiguous double consonants in Tiwi. The Tiwi syllable pattern is consonant-vowel (CV) or V with no closed syllables.

Tiwi nouns are divided into two classes, masculine and feminine. For humans (and some animals), the distinction is on the basis of natural sex. For non-humans, the distinction is made on other criteria, normally semantic grounds. Plurality is marked only on human nouns, and the distinction between masculine (MASC) and feminine (FEM) is lost in plural (PL) nouns. Adjectives agree with the nouns that they qualify in gender and plurality (when applicable), as shown in the following examples:

(1) arikula-ni tini
big-MASC man
'big men'
arikula-nga tinga
big-FEM woman
'big women'
arikula-pi tiwi
big-PL people
'big people'

Traditional Tiwi is a polysynthetic language, with the inflected verb having an extremely complex structure. It is one of the prefixing languages of northwestern Australia but it has not been found to be directly related to any of them. The verb is able to take a number of affixes (mainly prefixes), indicating subject person, direct or indirect object person, tense, aspect, mood, time of day, and distance in time or space, for example. The nucleus of the verb contains a verb root but may also contain one or more incorporated forms that add some other nominal, stative, or verbal meaning (abbreviations: CONT, continuous; INCL, inclusive; SUBJUNC, subjunctive; EMPH, emphatic; CON, connective; CAUS, causative):

(2) Pi-rri-mini-wujingi-pirni.
they-PAST-me-CONT-hit
'They were hitting me.'

(3) Yinkiti nga-ma-wun-ta-y-akirayi.
food we(INCL)-SUBJUNC-them-EMPH-CON-give
'We should give them food.'

(4) Nganti-ri-ma-rri-pi-y-ajirringi-kitikim-ani warta.
we.PAST.FEM-CON-with-CON-bush
long.thing-CON-crocodile-drag-PAST.HABIT
'We used to drag the crocodile to the bush with the spear still in her.'

(5) Taringini yi-mini-maji-wutu-wirri.
snake he.PAST-me-on-horse-bite.
'A snake bit me while I was on a horse.'

In Traditional Tiwi, there is also a verb phrase, consisting of a free-form verb, which carries the basic

Table 1 Traditional Tiwi consonants

Feature	*Apical*		*Laminal*	*Peripheral*	
	Alveolar	*Postalveolar*	*Dental/Palatal*	*Dorsal*	*Labial*
Stops	t	rt	j	k	p
Prenasalized stops	nt	rnt	nj	nk	mp
Nasals	n	rn	ny	ng	m
Labialized stops				kw	pw
Labialized nasals				ngw	mw
Laterals	l	rl			
Rhotics	rr	r			
Semivowels			y	g[a]	w

[a]The symbol 'g' represents a velar fricative, which seems to behave like a semivowel.

meaning, and an auxiliary verb, which can carry the same inflections as an independent verb. The class of free-form verbs occurring in this type of construction is small and, even in TT, may be expanded by the use of English loan verbs.

(6) Papi awungarra pi-ri-maji-wutuwu-mi.
arrive here they.PAST-CON-on-horse-do
'They arrived here on horses.'

(7) mwarliki nga-ma-wun-ta-m-amigi
bathe we(INCL)-SUBJUNC-them-EMPH-do-CAUS
'we should cause them to bathe'

New Tiwi

The speech of young people incorporates a number of changes to the traditional language, including phonological changes and changes in vocabulary, in noun classification, and in syntax, such as word order. However, the greatest change is in the verbs. New Tiwi (NT) is no longer a polysynthetic language but has become more isolating. Most of the verbal inflection has been lost, with simple verb forms mostly replacing the complex inflected verbs. The NT verb form is based on the TT verb phrase. However, the small class of free-form verbs has been expanded by a greater use of loan verbs from English and, in a few cases, by the use of the singular imperative as a free-form verb. The auxiliary verb may or may not be used, depending on the formality of the occasion. When it is used, there are very few inflections retained, usually only those prefixes marking subject and tense, though even these are often changed in form. The following three examples are comparisons of New Tiwi and Traditional Tiwi:

(8a) NT: Wokapat yi-mi.
walk he.PAST-do
'He walked.'
(8b) TT: Yi-p-angurlimayi.
he.PAST-CON-walk
'He walked.'

(9a) NT: Lukim ngi-ri-mi nginja.
see I-CON-do you.SING
'I saw you.'
(9b) TT: Ngi-rri-min-j-akurluwunyi (nginja).
I-PAST-you(SING)-CON-see (you.SING)
'I saw you.'

(10a) NT: Tamu ji-mi.
sit she.PAST-do
'She sat.'
(10b) TT: Ji-yi-muwu.
she.PAST-CON-sit
'She sat.'

Note: *tamuwu* is the singular imperative form in Traditional Tiwi.

Young people sometimes use the continuous action prefix *wuji-*, but other aspects and moods are given by loanwords from English, such as *stat* 'start,' *tra* 'try,' *jut* or *shut* 'should,' and *ken* 'can.'

(11a) NT: Yoyi a-wuji-ki-mi.
dance he-CONT-CON-do
'He is dancing.'
(11b) TT: Yoyi a-wuji-ngi-mi.
dance he.NONPAST-CONT-CON-do
'He is dancing.'

(12) NT: Jirra tra kirrim ji-mi warra.
she try get she.PAST-do water
'She tried to get some water.'

Since the verbs in NT no longer have the inflections of TT, there is a greater use of nouns and pronouns, to indicate the participants, and dependence on time words or the context, to indicate the tense. In NT, there is also considerable use of other English loanwords. In the speech of young people, particularly children, these may include words such as *pijipiji* for 'fish,' for which there is a traditional Tiwi equivalent. In general, NT can be said to be an 'amalgam' of Tiwi and English – in other words, a 'mixed code,' like a pidgin (or creole) Tiwi. This type of amalgam distinguishes 'mixing' from 'switching' between codes, though it is often hard to tell where mixing ends and switching begins. The following example from a 4-year-old boy shows the mixing in his Tiwi and the switching between his New Tiwi and his Tiwi–English (TE) in the same utterance:

(13) Ya kilim ja. [NT] I kill you, mate. (TE)
I hit you (SING) I hit you mate
'I'll hit you, mate.'

Modern Tiwi

What is normally thought of as Modern Tiwi (MT) is a style, or a range of styles, between Traditional Tiwi and New Tiwi; in general, ModernTiwi is a modified or simplified style of TT. In Modern Tiwi, people use more verbs with TT verb roots than are used in NT, but the verbs do not have the same richness of inflection as in TT. In general, the only affixes retained in the verb are the subject and tense prefixes and others that are not able to be expressed externally in TT, such as some aspect and mood affixes. Other affixes and incorporated forms are normally omitted, particularly those affixes indicating whether an action was done in the morning or evening and the object prefixes. These are either expressed by free-form words or are understood from the context.

(14a) MT: Japinari yi-pirni ngiya.
morning he.PAST-hit me
'He hit me in the morning.'

(14b) TT: (Japinari) yu-watu-mini-pirni.
morning he.PAST-morning-me-hit
'He hit me in the morning.'

Another feature of MT is the loss of distinction between first-person plural inclusive and exclusive subjects, as is also the case in NT.

(15a) TT: Ngimpi-ri-majirripi.
we(EXCL)NONPAST-CON-lie.down
'We (but not you) lie down.'
Nga-ri-majirripi.
we(INCL)-CON-lie.down
'We (including you) lie down.'

(15b) MT: Nga-ri-majirripi.
we.NONPAST-CON-lie.down
'We lie down.'

Conclusion

The present-day language situation among the Tiwi people is very complex; a broad overview cannot begin to describe the differences that there may be among the four townships on Bathurst and Melville islands. Briefly, there are certain domains wherein a particular code is appropriate and may be used exclusively (or almost exclusively). In other situations, more than one code may be used, depending on the speakers and hearers and the formality of the occasion. Traditional Tiwi is used in the traditional ceremonies and songs, in some liturgy in the church, and in some written material. In situations in which non-Tiwi people are involved, such as administrative and work situations, English is mostly used, though the English used by the Tiwis may vary between Standard English and Tiwi–English. English is also used in the homily and in some of the liturgy and songs in church, and in all of the schools, at least in formal education. Modern Tiwi is used in bilingual education in the primary school on Bathurst Island and in some formal situations, when young Tiwi people are involved, such as when giving a formal speech in Tiwi. There is some written material in Modern Tiwi, produced by the schools and by the author (Jennifer Lee) and her Summer Institute of Linguistics colleague, Marie Godfrey (New Tiwi is not generally acceptable in written form). New Tiwi is the common code of young people, though with considerable code switching with English in most situations, depending on the speakers and hearers.

See also: Affixation; Australia: Language Situation; Classifiers and Noun Classes: Semantics; Code Switching and Mixing; Code Switching; Cultural and Social Dimension of Spoken Discourse; Incorporation; Language Change and Cultural Change; Language Change and Language Contact; Morphology in Pidgins and Creoles; Pidgins and Creoles: Overview; Polysynthetic Language: Central Siberian Yupik.

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Born May 23, 1835 in Hirzel (Switzerland), Adolf Tobler studied classical and modern philology in Zurich and Bonn (attending Diez's lectures in 1856–1857). After receiving his Ph.D. at the University of Zurich in 1857, and his Habilitation in Bern in 1867, he became the first professor of Romance philology at the University of Berlin, where he remained until his death on March 18, 1910.

Tobler's research was focused on Gallo–Romance, and to a much lesser extent Italian, philology. His approach was rooted in the careful study and criticism of medieval literary texts, of which he tried to understand the finest details of the vocabulary and the syntax. Tobler stressed the need to place the texts in the cultural and historical setting of their times in order to understand their contents.

Tobler's main linguistic achievements were his extensive dictionary of Old French, published posthumously by his student Erhard Lommatzsch (1886–1975) and, after the latter's death, by a team of Romance scholars, and his fine-grained, very detailed studies of morphosyntactic phenomena in Old French, also sporadically in Modern French. His scattered grammatical analyses, some 100 in total, were gathered in five volumes (Tobler, 1886–1912) from which a solid syntactic theory can be distilled (see de Boer, 1946–1947). These *Vermischte Beiträge*, though primarily concerned with problems of diachronic syntax, had a major impact on the grammaticography of Modern French at the beginning of the 20th century. Tobler's morphosyntactic analyses were closely linked with his lexicographical work on Old French; in fact, he did not draw a boundary between lexical and grammatical phenomena. The lexicographical description of Old French is primarily based on medieval literary texts, and much less so on administrative and scientific texts; in spite of this limitation, the *Altfranzösisches Wörterbuch* (Tobler and Lommatzsch, 1915–) remains an indispensable tool for students of Old French and of the history of the French lexicon, because of its sound philological foundations and its accurate references to textual occurrences.

Tobler also wrote a classic textbook on French versification (1880; later translated into French). Adopting a historical–evolutionist approach, Tobler showed Modern French prosody to be based on medieval metrics.

In his linguistic, literary, and philological writings, Tobler was guided by historicist principles; in the explanation of facts he often appealed to logical and psychological factors. Tobler accorded scientific value only to historical approaches of linguistic and literary phenomena. A typical representative of philological text study, he strongly opposed modernist reforms in foreign language teaching and remained strongly attached to the traditional conception of Romance philology.

See also: Diez, Friedrich (1794–1876); Romance Languages.

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Tocharian

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Tocharian (Tokharian) is the conventional name for two related, extinct Indo–European (IE) languages known from documents found in the oases north of the Taklamakan desert in Xinjiang (Chinese Turkestan). The languages are now generally referred to as Tocharian A (TA) and Tocharian B (TB); the alternatives *Osttocharisch* and *Westtocharisch* (East and West Tocharian) are still used by German scholars; 'Turfanian' and 'Kuchean' are obsolete terms.

Tocharian is known from manuscripts discovered by archaeological missions to Xinjiang in the years preceding World War I, in particular those led by Sir Aurel Stein of the United Kingdom, Albert von le Coq of Germany, and Paul Pelliot of France. In addition to a wealth of Middle Iranian documents, the expeditions brought back others in unknown languages, written in the 'slanting' Brāhmī script of Central Asia. In 1908 the German philologists Emil Sieg and Wilhelm Siegling conclusively identified them as non-Indo–Iranian IE languages, which they labeled 'Indo–Scythian'; they also succeeded in distinguishing TA and TB.

The manuscripts are dated to approximately the sixth to eighth centuries AD, but further chronological precision is difficult. The TA records were discovered in and around Turfan and Qarašahr and are entirely of Buddhist religious content; most are translations or adaptations of Sanskrit originals. TB documents were found across the northern Silk Road from Kuča in the west to Turfan in the east; most are Buddhist in content, but a solitary love poem and a large number of monastery records, as well as caravan passes and cave graffiti, indicate that TB was the vernacular of at least part of the population in these areas in the later first millennium.

TA is remarkably uniform linguistically, and a number of facts indicate that it was no longer spoken at the time of the surviving manuscripts, but served as a sort of liturgical language among speakers of TB and Old Turkic. The TB documents exhibit considerable variation on all levels. On the basis of certain phonological and morphological features, they have been divided into western, central, and eastern dialects, but as vernacular TB sources (e.g., caravan passes or cave graffiti) mostly show 'eastern' characteristics, this division may also reflect chronological and/or sociolinguistic differences. Another source of variation is poetic: many forms in TB verse passages have been adjusted by one syllable to fit the meter; also characteristic is *pudñäkte* 'Buddha' for prose *pañäkte*.

The speakers of Tocharian played an important role in the Buddhist civilization of pre-Islamic eastern Central Asia, but their exact identity remains unknown. The name 'Tocharian' rests mainly on the form *twγry* in an Old Uyghur colophon, but both the reading and the identification have been challenged. It seems certain that the speakers of TA and TB were not the 'Tocharians' of antiquity (Strabon's Τόχαροι; Skt. *Tukhāra-*). Among the figures in the spectacular Buddhist cave paintings of the region are some with red hair and green or blue eyes, and many have speculated that these were the Tocharians; more recently, the discovery of red-haired, 'Western'-looking mummies in the Taklamakan made headlines in the mid-1990s, but once again we cannot be sure which language they spoke. In any case, the speakers of Tocharian (more precisely, TB; see above) began to shift to Turkic in the later first millennium AD; the language was probably extinct by 1000.

Although they differ in numerous respects and certainly were not mutually intelligible, TA and TB were structurally similar, characterized by right-headed constituent phrases, a system of agglutinating nominal case suffixes, and the central role of aspect and tense in verbal morphology. The two had doubtless been diverging for several centuries before the time of our documents, so that their latest reconstructible common ancestor, Proto-Tocharian (PT), must be dated to the last centuries BC.

The variety of Brāhmī script used to write Tocharian lacked symbols for distinctively Tocharian sounds such as labiovelar [k^w] and (in TB) the diphthongs [ew], [ow], [aw], [ay], and contained signs (*akṣara*s) for Sanskrit and Prakrit phonemes absent in the language (e.g., *v, h*, and the voiced, aspirated, and retroflex obstruents; the latter are used almost exclusively in Indo–Aryan borrowings). The most remarkable innovation of the Tocharian writing system is the creation of a series of *Fremdzeichen* ('foreign signs') to represent sequences of consonant + the vowel *ä*, probably a high central [ɨ]; these exist for most, but not all consonants, and are used apparently interchangeably with the normal *akṣara* plus two subscript dots (hence the transcriptions *tä*, *ñä*, etc.). A second vowel (usually *u*) can be combined with a ligature (e.g., *kse* + *u*, transcribed $k_u se$); such 'subscript' *u*'s may denote either a labiovelar or a reduced/syncopated vowel.

Recent research has elucidated most of the principal phonological developments from Proto-Indo–European (PIE) to PT and the two Tocharian languages. The PIE series of voiceless, voiced, and voiced aspirate

stops have famously merged, except that *t, *d^h > PT *t remained distinct from *d > PT *t^s. PIE palatals and velars merged in PT, but labiovelars and sequences of palatal/velar + *w remained distinct. Palatalization before front vowels created new allophones that then became phonemic and gave rise to a number of morphologically conditioned alternations. The vowels underwent many changes, including loss of contrastive length. TB is in general the more phonologically conservative of the two languages, especially the western dialect; in contrast, TA has undergone sweeping changes, principally involving the vowel system.

The noun distinguishes two genders, masculine and feminine, plus a class of nouns of 'alternating' gender that take masculine agreement in the singular and feminine in the plural. Nouns and adjectives contrast for singular, plural, and dual. Nouns inflect for nine cases in each language, but only the three 'primary' cases, nominative, oblique, and genitive, are of PIE date; the remaining 'secondary' case suffixes are agglutinative, added to the oblique of singular and plural alike, and attached only to the last element of a noun phrase (e.g., TA *kuklas yukas oṅkälmās-yo* 'with chariots, horses, and elephants'). Although their functions mostly coincide, few of the suffixes are clearly cognate: cf. comitative TB *-mpa*, TA *-aśśäl*, ablative TB *-meṃ*, TA *-äṣ*. Most nonfeminine nouns have identical forms for nom. and obl. singular, derived from the PIE accusative, but masculine nouns denoting rational beings have secondarily created a distinct oblique in TB *-ṃ*, TA *-(a)ṃ*.

The numerals are of clear IE provenance: TB *wi*, TA m. *wu*, f. *we* '2,' TB m. *trey* ~ *trai*, f. *tarya*, TA m. *tre*, f. *tri* '3,' TB m. *śtwer*, f. *śtwāra*, TA *śtwar* '4,' TB *piś*, TA *päñ* '5,' TB *ṣkas*, TA *ṣäk* '6,' TB *ṣukt*, TA *ṣpät* '7,' TB *okt*, TA *okät* '8,' TB, TA *ñu* '9,' TB *śak*, TA *śäk* '10,' TB *ikäṃ*, TA *wiki* '20.' The prehistory of the personal and demonstrative pronouns contains a number of unsolved problems; noteworthy is the existence of separate masculine and feminine forms for 'I' in TA, m. *näṣ*, f. *ñuk* (vs. TB m./f. *ñäś*, *ñiś*).

The verb exhibits numerous idiosyncratic developments alongside a wealth of interesting and archaic features and has played an increasingly prominent role in the ongoing debate over the reconstruction of the PIE verbal system. The inherited voice distinction of active and mediopassive is robustly preserved. An interesting, if often overemphasized, feature is the widespread suffixation of PT *-skë- ~ *-ṣṣə- (> TB /-ske-/ ~ /-ṣṣə-/ ~ /-s-/; TA *-sa-* ~ *-ṣ-*) to derive transitives to intransitive roots and causatives to many, but not all, transitive roots. Both languages have the same morphological categories of present and imperfect (= nonpast and past of the imperfective stem), subjunctive/future and optative (= nonpast and past of the perfective stem), imperative, and preterite; nonfinite forms include the infinitive, gerundives I and II (denoting respectively obligation and possibility), a verbal noun or 'abstract,' almost always built to gerundive II; and a present and preterite participle. Most inflectional categories and patterns of verbal stem derivation are of PIE date, including reflexes of nasal and stative presents and root and (pre-)sigmatic aorists. Approximately a dozen verbs are suppletive, second only to Old Irish among IE languages. Among numerous unsolved problems are the remarkable paucity of simple thematic presents, and the origin of the Tocharian subjunctive and its relation to the classical PIE subjunctive and perfect.

Nominal compounds are fairly common, as are complex derivatives like TB *raddhi-lak-ä-ṣ(ṣ-äly)-ñeṣṣe* 'of causing to see wonders.' As the Tocharian languages are left-branching, the verb is usually clause-final in prose documents but may be raised for various pragmatic effects; verse texts not surprisingly offer much variation.

Early on, many Indo–Europeanists were struck by the apparent connections between Tocharian and the western IE languages, particularly Celtic and Germanic. Today, however, the emerging consensus holds that Tocharian is not closely related to any other branch of IE but, rather, was the second after Anatolian to diverge from the ancestral speech community.

Little is known of the earliest contacts between Tocharian and other languages. Several strata of Iranian loanwords may be distinguished: the oldest appear to date from the Old Iranian period, followed by a small set whose preforms strongly resemble Ossetic; most recent are loans from neighboring Eastern Middle Iranian languages, particularly Khotanese. A few old Indo–Aryan borrowings go back to the pre-PT period – note TB (prose) *pañäkte*, TA *ptāñkät* 'Buddha' and TA *pñi* 'puṇya', reflecting the change of *u > PT *ə – but the huge number of loanwords from Sanskrit and Prakrit entered the language comparatively recently; some have been (partly) assimilated to Tocharian phonology, but many retain their original orthography and may have belonged only to high religious registers. Certain old loanwords in Chinese appear to come from Tocharian, for example, MidChin. *mjit (or sim.) 'honey' ← PT *m^yətə (cf. TB *mit*). In light of the Tocharians' ultimate linguistic shift to Turkic, it is interesting to note that a few important Turkic words may be of Tocharian origin: cf. TB *okso* 'ox', *kauṃ* (*kom*) 'day, sun' → Proto-Turkic *öküz, *kün.

See also: Buddhism, Japanese; Buddhism, Tibetan; Chinese; Indo–Aryan Languages; Indo–European Languages; Iranian Languages; Sanskrit; Turkic Languages.

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Toda

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Toda is the name of an ethnic group that resides on the Nilagiri mountains (=Nilgiris) in South India (with its major town of Udagamandalam = Ooty = Ootacamund located at 11.24°N and 76.44°E). The lofty Nilagiri mountains (with peaks rising above 2400 m) are the home of five culturally interrelated ethnic communities – Toda, Kota, Kurumba, Irula, and Badaga – all speaking different Dravidian languages. The Todas recognize the mutual relationship and the historical interdependency among these five communities. Though they are known as Todas to outsiders, they call themselves oˑŁ (meaning 'Toda person'), and their language, oˑŁ-poˑš (poˑš 'language'). The Toda language contains different words for each of the five Nilagiri communities. They are oˑŁ (Toda = tōḍa), *kwïˑf* (Kōṭa), *kurb* (Kurumba), *erl* (Iruḷa), and *maˑf* (Baḍaga). Though the Toda language does not have a word or a phrase to denote all these five communities together as one group, it has the word, *pöˑṛ*, which means 'a nonwhite low lander (who does not belong to any of the five Nilagiri communities.)'

See also: Buddhism, Japanese; Buddhism, Tibetan; Chinese; Indo–Aryan Languages; Indo–European Languages; Iranian Languages; Sanskrit; Turkic Languages.

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This term demarcates all the five communities together as a group from the rest of the people of India. A white person (who is expected not to be an Indian) is called *ars*.

Toda language is endangered, with just around 900 speakers, most of whom are bilingual in their mother tongue and in Tamil language, the most dominant language in the area. There is twofold division among the Todas, conventionally called 'moieties' in anthropology. The moieties are *to·r̄θaŝ* and *töwfiŁy*. Except for a few words and phrases, no significant dialectal differences are found between these two moieties.

Phonology

Among the languages of India, Toda possesses a unique and complex inventory of phonemes. It is the sound system of this language that makes it sound 'very foreign' to many non-Todas, making them to imagine wildly that it is because the Todas were originally some exotic people such as Greeks, Persians, and so forth their language contains so many 'foreign' sounds. All of these 'exotic' sounds are derivable historically from a proto-stage through an intricate set of rules.

In addition to the typical five vowels (and their long counterparts) available in most of the Dravidian languages, the Toda vowel inventory contains front rounded vowels, /*ü*, *ö*/, and a back unrounded vowel, /*ï*/. In addition, each of the eight vowel positions has a short and long counterpart. This results in a total of 16 contrasting vowel phonemes viz., *i*, *i·*, *e*, *e·*, *ü*, *ü·*, *ö*, *ö·*, *ï*, *ï·*, *u*, *u·*, *o*, *o·*, *a*, *a·*. The inventory of consonants presents the most complex system known for any Indian language, and some of the consonantal contrasts found in this language are not encountered in any other language in the world. There are four voiceless sibilants contrasting at dental, alveolar, palatal, and retroflex places: /s, ŝ, š, ṣ/. There are three non-sibilant fricatives: /f, θ, x/. By some morphophonemic changes, the voiced counterparts of these fricatives also attain contrastive status. Voiceless and voiced plosives contrast at seven places of articulation. They are labial (p, b), dental (t, d), denti-alveolar (c, ẓ), alveolar (t̲, d̲), palato-alveolar (č, j), retroflex (ṭ, ḍ), and velar (k, g). There are three nasals: /m, n, ṇ/. This is the only known language that has a set of three contrastive trills and four contrastive laterals. The trills are dental /r/, alveolar /r̲/, and retroflex /ṛ/, and the laterals are voiceless alveolar /ɬ/, voiced alveolar /l/, voiceless retroflex /Ł/ and voiced retroflex /ḷ/ (Tables 1 and 2).

Table 1 Vowels

	FU		*FR*		*CR*	*CU*		*BU*		*BR*	
High	i	i·	ü	ü·				ï	ï·	u	u·
Mid	e	e·	ö	ö·						o	o·
Low						a	a·				

Sentences

Toda is an SOV language with syntax very similar to that of other Dravidian languages. The so-called 'extra-subject predication' (Emeneau, 1984: 51) is peculiar to this language; for example,

o·n kïfy köṭ-s-pini
I$_{NOM}$ ear$_{NOM}$ got.destroyed-PAST.SUFFIX-1ST PERSON.SINGULAR
'My ears were ruined'

In a parallel sentence in other Dravidian languages, a dative-subject and the verb in concord with the object are expected.

The reportative/quotative sentences are also different in this language. The subject of the embedded sentence is marked for accusative case; for example,

en-n "pod-či"ïd̲, ka·k öštši/uncsi
I-ACC "will.come.3p" QUOT, crow said.3PERSON/ thought.3PERSON
'The crow said/thought that I would come'

Pronouns and Nouns First- and second-person pronouns are differentiated for number and inclusiveness (inclusion or exclusion of the addressee). There is no differentiation on the basis of sex among the pronouns. The pronouns are: first person singular: *o·n*, exclusive plural *em*, inclusive plural, *om*; second-person singular *ni·*, plural *nïm*; third person *aθ* (and its

Table 2 Consonants

	Labial		*Dental*		*Denti-Alveolar*		*Alveolar*		*Palato-Alveolar*		*Retroflex*		*Velar*	
Stops	p	b	t	d	c	ẓ	t̲	d̲	č	j	ṭ	ḍ	k	g
Nasals		m						n				ṇ		
Fricatives	f	(v)	θ	(δ)	s	(z)	ŝ	(ẑ)	š	(ž)	ṣ	(ẕ)	x	(γ)
Trills				r				r̲				ṛ		
Approximants										y				w
Laterals							ɬ	l			Ł	ḷ		

plural *aθ-aˑm* containing the plural suffix *-aˑm*). Nouns are either simple or derived. Simple nouns are mono-morphemic, and derived nouns contain a suffix; for example, *kurb* 'Kurumba community,' *kurbč* 'a Kurumba female.'

Nouns are inflected for plurality and case by means of suffixes. *-aˑm* is the most common plural suffix (*ïr* 'buffalo,' *ïr-aˑm* 'buffalos'). Some of the case suffixes are accusative *-n*, dative *-k*∼*-g*, locative -ŝ, ablative *-ŝn*, instrumental *-ïṭ*, causal *-ïd*, sociative *-wïṛ*. Some of the postpositions are *pok* 'at the time of,' *taŝ* 'above.' Some case forms are also formed by adding post-positions.

Numerals and Modifiers

Formation of numerals follows the general Dravidian pattern. Numerals 1000, 100, and 1–10 are monomorphemic. They are *wïḏ* '1,' *eˑḍ* '2,' *muˑḏ* '3,' *noˑng* '4,' *üẓ* '5,' *oˑṛ* '6,' *öw* '7,' *öṭ* '8,' *wïnboθ* '9,' *pot* '10,' *noˑṛ* '100,' and *soˑfer* '1000'. The formula for forming decades is 2, 3, and so on, followed by 10 (e.g., *mu-poθ* [3–10] '30'). The formula for series between decades (e.g., 31–39) is the numeral for decade followed by 1–9 (e.g., *mu-poθ-eˑḍ* [3-10-2] 'thirty-two'). Ordinals are derived from the above cardinals by the addition of the suffix *-oˑθ* (e.g., *eˑḍ-ö̱θ* 'second').

As in the case of several other Dravidian languages, it is difficult to demarcate adjectives from nouns. A few descriptive adjectives are *kïṛ/kin* 'small,' *per* 'big,' *poč* 'green.' Similarly, adverbs as a class consists of a very few members. Most of the forms that function as adverbs are inflected nouns or forms derived from verbs. A few clear cases of adverbs are *maxaṛ* 'earliest,' *pïn* 'later, afterwards.'

Oblique Forms

Some nouns, numerals, and so on are converted into oblique forms when some case suffixes are added to them. The most common oblique suffix is *-t*; for example, *meˑṇ* 'tree': *meˑn-t-k* 'to the tree' [*-k* is the dative suffix]; *eˑḍ* 'two': *nïm eˑŁ-k* 'to you both.'

Verbs

The structure of Toda verb is quite complex compared to the rest of Dravidian languages. A verb is either simple (containing only a verbal root) or derived (root+derivative suffix). The most common derivate suffix is a transitive/causative suffix (e.g., *nïl-* 'to stand,' *nïl-c-* 'make to stand'). In a majority of cases, the transitive/causative suffix fuses with the ending of the root, as in *oˑṛ-* 'to become dry,' *oˑṭ-* 'to dry something.' Mediative forms can be derived from a simple or derived base by addition of the suffix *-eṭ*∼*eṭy-*. The mediative form denotes a type of indirect or noncontactual causation; for example, *miy-*∼*mis-* 'to graze (intr),' *miˑc-* ∼ *miˑč-* 'to graze (tr)' occurring in: *ïr-aˑ-n a tïṭ-ȧṛ miˑc* '(Go and) graze (tr.) the buffalos over that hill!'; *mors-fy ïr-k wïḷḷy mad kwïṛt miy-eˑṭ* 'Give some good medicine to the buffalos with foot-and-mouth disease and make them graze!'

Almost all of the Toda verbal bases have two morphophonemic alternants, conventionally called Stem 1 (S1) and Stem 2 (S2). S2 enters into a majority of inflections. Historically it corresponds to the past-tense stem in some of the South Dravidian languages (such as Tamil). S1 is the etymologically underlying form, and the corresponding S2 is derivable by a set of rules from it. For instance, 'to stand' -S1: *nïl-*> S2: *nïḏ-*. In addition, there is a third variety of stem called the 'Desiderative' stem that is peculiar to Toda among the Dravidian languages. The desiderative stem takes some inflectional suffixes.

A verb base alone functions as the singular imperative form; for example, *part* 'You(sg.) pray!.' All other full verbal forms contain a verb base followed by an optional inflection layer for tense/mode. A further optional inflectional layer of Pronominal suffixes (PN) that reflects the pronominal class of the subject terminates the verb. The third-person PN suffix is selected if the subject is any noun (singular or plural) or if it is a third-person pronoun (singular or plural). When the subject is a personal pronoun, the corresponding PN suffix is chosen. The PN layer is very complex in Toda compared with other Dravidian languages. It contains several sets of PN suffixes that are added to different inflections. In the case of some inflections such as Non-Past, just the verb base followed by the appropriate PN suffix without an intervening tense suffix functions as the full verb. Another complexity of the PN suffix layer is the occurrence of two morphophonemic alternants of the same suffix across two sets that are conventionally called Paradigm I and Paradigm II. Paradigm I occurs before a terminating declarative suffix *-i*, and Paradigm II elsewhere.

Examples of a few tenses/modes are listed here (the verb base *tïn-* ∼ *tïḏ-* 'to eat' is followed by one or more of the following suffixes: T = tense/mode suffix, Pn = Person suffix, D = declarative suffix: Past: *tïḏ-s-s-i* [T-Pn-D] 'He/she/it/they ate'; Non-past: *tïḏ-č-i* [Pn-D] 'He/she/it/they will eat'; Negative: *tïn-ïn-i* [Pn-D] 'I did/do/will not eat'; Voluntative: *tïn-g-y* [T-Pn] 'You(sg) may eat'; Tenseless: *tïḏ-en* [T-Pn] 'I eat'; Plural Imperative: *tïn-ŝ* [Pn] 'You (pl.) eat!'; Conditional : *tïḏ-u-fiṛ* [Pn-M] 'If he/she/it eats'; Contemporaneity : *tïḏ-u-k* [Pn-M] 'while we (incl) were eating'; *tïḏ-pok* [T-Pn] 'when (somebody) ate'; Purposive: *tiḏ-pïk* [T-P] 'for the sake of eating.'

A number of verb bases also function as auxiliary verbs (Ax) in producing various modal forms. Some examples are: *kuty-ïs-s-pini* [*kuty*-'to embroider'-Ax-T-Pn] 'I knew how to embroider'; *pod-kïš-ïyi* [*pod*-'to come'-Ax-Pn] 'He could not come'; *noby-pïṭ-s-pini* [*noby*-'to believe'-Ax-T-Pn] 'I believed (him) wrongly,' *tïḏ-kuṛy-s-py* [*tïḏ*-'to eat'-Ax-T-Pn] 'You(sg) have completed eating'; *aˑfoṭ-kwïḏ-ïṭi* [*aˑfoṭ*-'to talk'-Ax -Pn] 'Don't talk to yourself,' *kïs-s-pod-s-si* [*kïs*-'to do' -Ax-T-Pn] 'He went on doing,' *köṭ-s-piˑ-č-či* [*köṭ* 'to be spoiled' -T-Ax-Pn] 'It will get spoiled.'

A set of suffixes derives verbal forms that are used as modifiers; for example, *tïḏ-fy oˑŁ* 'man who ate'; *tïḏ-θ oˑŁ* 'man who ate (more definite)'; *tïḏ-t oˑŁ* 'man who eats'; *tïḏ-p oˑŁ* 'man who can eat'; *tïn-oˑ-fy oˑŁ* 'man did/does not eat.' The suffix *-t* also derives a verbal noun as in: *nöw kïs-t* 'making a song' [*kïy-* ~*kïs-* 'to make, do'].

Vocabulary

Before the Todas came into contact with words from the languages from the plains such as Tamil, Hindi, and English, their borrowed vocabulary must have consisted of a few words from the language of their neighbors such as Badagas. In contemporary Toda language, there are a few words from Badaga (and some Indo-Aryan words borrowed through Badaga), Tamil, Hindi, and English. Because of the elaborate ritual structure, Toda language has developed an intricate system of naming of persons, water buffalos, and places. Like other languages, it has some culture-specific vocabulary—for instance, because of the importance of the water buffalo in the spiritual as well as mundane planes of their lives, we find words with very specific meanings such as: *malf-* 'buffalo gives a side glance before attacking.' The traditional songs (some of them are presently in their twilight stage) contain special words as well as word-formation processes. The most important component of a Toda song is a paired unit called *koṇ* (called song-units by earlier authors). An example of a *koṇ* is: *poṭy-terθ-poṇm # twïˑ-terθ-ïr* [box-having.opened-money # buffalo.pen-having.opened-buffalos] (just open the box and give money or open the buffalo-pen and give buffalos to anybody who asks>) 'to behave very generously.'

See also: Dravidian Languages; India: Language Situation.

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Todo, Akiyaso (b. 1915)

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Tōdō Akiyasu (1915–1985) was born in Mie Prefecture, Japan, and grew up in China, where his father was stationed. He was directly descended from the 17th century Tōdō lords of Ueno, who were friends and patrons of the haiku poet Bashō (1644–1694). After graduating from Tokyo University in 1938, Tōdō joined the Japanese Foreign Service, and was assigned to study Chinese language and culture at an advanced level in Beijing. He was subsequently drafted into the Japanese Army, as a military Chinese language instructor.

After World War II, he became a graduate student of Chinese linguistics and philosophy at Tokyo

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After World War II, he became a graduate student of Chinese linguistics and philosophy at Tokyo

University, where he also taught Chinese language. His mentor in linguistics at Tokyo University was Professor Hattori Shirō, with whom Tōdō co-authored *Chūgen on 'in no kenkyū* a study of 14th-century Chinese phonology, in 1958 (Hattori and Tōdō, 1958). Shortly before that, Tōdō had completed a study of modern Chinese phonology, *Chūgokugo on 'in ron,* published in 1957. In 1960, after completing the 14-year doctoral program in linguistics, Tōdō became the head of the Chinese Literature Faculty of Tokyo University.

In the 1960s, Tōdō shifted his attention from phonology to the history and taxonomy of Chinese characters (*kanji*). Characters were traditionally arranged into 214 groups, with characters in each group sharing the same graphic classifying element. Several hundred phonetic elements also suggested the pronunciation of characters in which they occurred, but over time these elements had undergone so much phonological variation that members of character families sharing them often had quite divergent pronunciations. The 214 classifying elements of characters were also assigned to vague semantic categories, but over time these elements had also lost clear meaning boundaries in many cases. Scholars had traditionally analyzed many characters as combinations of these semantic and phonetic elements, but since these elements had become ill-defined, there were many inconsistencies in such analysis.

Tōdō found that ancient phonetic elements often had corresponding ancient semantic values, and that their graphic representations often suggested the same semantic values. He described these findings in *A study of the lexical origins of Kanji: research on word families in archaic written Chinese* (*Kanji no gogen kenkyū: jōko Kango no tango kazoku no kenkyū*) published in 1963. This was the beginning of Tōdō's lifelong lexemic and lexicological research on Chinese characters, yielding *kanji* dictionaries and other lexico-semantic studies based on this new mode of analysis.

During two years of political turbulence at Tokyo University in the late 1960s, Tōdō went to the campus every day and carried on with his research. After the disorder was quelled in 1970, he resigned his position because he felt overly harsh penalties were imposed on former student protesters. He accepted a teaching post at Waseda University and helped organize a private Chinese language and culture academy in Tokyo, which he headed until his death in 1985. He gave numerous lectures on Chinese language and linguistics on the national public NHK television network, published a number of books on Chinese language and culture, and became a well-known and popular authority on Chinese language and culture among the general public. He also continued to publish lexical and lexicographic studies, culminating in his monumental *Kanji-gen Character Dictionary,* published posthumously in 1988. This work continues to be a leading authoritative *kanji* dictionary, appearing in a series of revised editions up to the present day.

See also: Chinese (Mandarin): Phonology; Hattori, Shiro (1908–1995).

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Tofan *See:* Turkic Languages.

Togo: Language Situation

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Togo was a former French colony and inherited French as the official language. In addition, 34 ethnic languages are spoken by Togo's population of 4.5 million. The country is in the special diglossic situation that characterizes many sub-Saharan African countries: a European language (French) is the official language and functions as the language of formal education and the medium of formal communication, while African languages are limited to a subsidiary role and used in informal domains (e.g., family, market place, in traditional activities, etc.).

Languages of Togo

It is difficult to give the exact number of indigenous languages spoken in Togo because of the well-known problem of distinguishing between dialects and languages. Furthermore, often ethnonyms are equated with glossonyms, although both realities do not always coincide. In the official population census statistics of 1981, we find 34 ethnonyms for a population of 3.9 million people:

> Adele (0.20%), Adja (3.12%), Ahlon (0.18%), Akebu (1.15%), Akposso (2.67%), Ana (Ife) (2.50%), Anlon/Aoulan (Igo) (0.07%), Anyanga (0.20%), Bariba/Tamberma (Be-tammaribe) (0.56%), Bassar (1.76%), Ehoue (0.12%), Ewe (23.19%), Fon (1.00%), Gurma (3.39%), Hausa (0.27%), Kabiye (13.79%), Konkomba (1.41%), Tem (Kotokoli) (5.75%), Kpessi (0.09%), Lamba (3.05%), Losso (4.10%), Ge (Mina) (5.66%), Moba (5.37%), Mossi (0.26%), Nago (Anago) (0.26%), Ngam-Gam (0.95%), Ouatchi (10.30%), Peda-Pla (0.40%), Peul (1.36%), Tchamba (0.97%), Tchokossi (Anufom) (1.18%), Yanga (0.29%), Yoruba (0.19%).

There are other ethnonyms not included in this list. Some small ethnic groups have been tacitly included in bigger groups which seem nowadays to be their natural allies. That is the case with the Adangme in the Ewe area, the Ntribu, located between the Adele and the Ewe, and the Biyobe in the Kabiye area.

With these last three included, Togo has a total of 37 ethnic groups. To be sure, population statistics for a particular ethnic group of cannot always be equated with the number of language speakers, as a given language may be spoken in several communities located in a linguistic continuum; for example Ewe among the communities in the Gbe continuum (i.e., Ewe 23.19%, Ouatchi 10.30%, Ge-Mina 5.66%, Adja 3.12%, etc.), and Kabiye in the Kabiye-Tem continuum (i.e., Kabiye 13.79%, Tem (Kotokoli) 5.75%, Lamba 3.05%, etc.). When one adds factors that favor a language being learned as second language, i.e., socioeconomic factors or a location near minor languages, one could find that more than 42% of the population speak Ewe and over 23% speak Kabiye. It is very difficult to establish with certainty how many people speak which language with what competence, so any statistics must be considered rough estimations. The 1981 census lists only six ethnic groups with over 5% of the population: Ewe 23.19%, Ouatchi 10.30%, Ge-Mina 5.66% (in the Gbe continuum), Kabiye 13.79%, Tem (Kotokoli) 5.75% (in the Kabiye-Tem continuum), and Ben (Moba) 5.37%.

The data help in the case of minor communities, i.e. those that are under 5% of the population, to evaluate the number of native speakers of individual Togolese languages. From 28 communities speaking different languages, 27 are under 5% for each, 25 under 3% for each , 17 under 2% for each. As their languages play a minor role in the communication of Togolese, it is clear that such languages are seldom learnt by other communities. Therefore, we can assume that the data for ethnic groups reflect the relative sizes of the groups of speakers of the minor languages. In percentage of the whole population of the country we find as very low percentages for these groups:

> Adele 0.2%, Ahlon (Igo) 0.18%, Akebu 1.15%, Anyanga 0.56%, Bariba and Temberma 0.56%, Fon 1.00%, Hausa 0.27%, Mosi 0.26%, Ngam-Ngam 0.96%, Fulani 1.36%, Tchamba 0.97%, Tchokossi 1.18%, Yanga 0.29%, Yoruba 0.19%.

All 14 of these linguistically different communities make up together just 9.13% of the Togolese population. When we consider the risk a language can run of becoming extinct because of the small size of its speaker population, we must exclude languages which are spoken by minorities in Togo, but at the same time are languages of wider communication in other countries. Thus Fon, Fulani, Hausa, Yoruba, and Mosi (More) cannot be included. The statistics referred to do not give any information about Dilo (language of Ntribu), Miyobe (language of Biyobe), and Adangme (language of Adangme). Numerically these groups are so small that they cannot even make 0.5% together, which is presumably the reason the national statistics fail to list them.

Another source for establishing the number of speakers of languages in Togo is the SIL Ethnolgue database. Table 1 is based on Ethnologue and gives the percentage of the total population for each Togolese linguistic community.

Table 1 Language speakers as a percentage of Togo's population of 4 397 000 (based on Ethnologue data)

1. Adele: 12 000 (0.26%) <Kwa>
2. Aja-gbe: 114 800 (2.53) <Kwa>
3. Akaselem/Tchamba: 34 300 (0.75%)<Gur>
4. Akebou: 40 700 (0.90%) <Kwa>
5. Akposso: 94 900 (2.10%) <Kwa>
6. Anii/Akpe/Basila: 4100 (0.09%) <Kwa>
7. Anufo/Tchokossi: 41 800 (0.90%) <Kwa>
8. Anyanga: 7200 (0.16%) <Kwa>
9. Bago: 6100 (0.13%) <Gur>
10. Bisa: 3000 (0.06%) <Mande>
11. Delo: 5400 (0.12%) <Gur>
12. Ewe: 861 900 (19.15%) <Kwa>
13. Fon-gbe: 35 500 (0.77%) <Gur>
14. Fulfulde: 48 200 (1.06%) <Atlantic>
15. Gen-gbe: 200 900 (4.46%) <Kwa>
16. Gurmancema: 120 500 (2.67%) <Gur>
17. Hausa: 9600 (0.21%) <Chadic Afroasiatic>
18. Ife: 74 000 (1.55%) <Benue-Congo>
19. Igo/Ahlon: 6300 (0.14%) <Kwa>
20. Kabiye: 700 000 (15.55%) <Gur>
21. Kambole: 20 000 (0.44%) <Benue-Congo>
22. Konkomba: 50 100 (1.11%) <Gur>
23. Kpessi: 3100 (0.068%) <Kwa>
24. Lama/Lamba: 117 400 (2.60%) <Gur>
25. Maxi-gbe: 25 300 (0.56%) <Kwa>
26. Moba/Ben: 189 400 (4.20%) <Gur>
27. Moore: 19 700 (0.43%) <Gur>
28. Nawdm: 145 600 (3.23%) <Gur>
29. Ngamgam: 33 500 (0.74%) <Gur>
30. Ntcham/Basar: 100 000 (2.22%) <Gur>
31. Sola/Miyobe: 1700 (0.037%) <Gur?>
32. Tamberma: 19 800 (0.44%) <Gur>
33. Tem: 204 100 (4.5%) <Gur>
34. Waci-gbe: 365 500 (8.12%) <Kwa>

The high language diversity in Togo is directly related to the geographical shape and position of the country; the dimensions of the country show a certain disproportion, with an east–west dimension of only 50 to 100 km against the south–north axis of 650 km. Linguistic diversity is particularly striking when one moves on the south–north axis. In fact, the country is located in that part of Africa referred to by Dalby (1980: 342) as "a zone of fragmentation" with a high linguistic complexity, stretching out from west to east across the African continent, from Senegal to Ethiopia and East Africa. Togo is a long but narrow band lodged in a linguistic zone where the diversity runs on the south-north axis: Gur languages in the northern part, Kwa languages in the southern part, intermediate languages between the two zones.

Official Language Policy and Language Attitudes

Togo has without any ambiguity an exoglossic language policy. French is the official language and also the only language that is ethnically neutral. Speaking French improves social status and allows international contacts, which are considered highly desirable. The relatively high literacy rate among the young portion of the population, the high prestige of French, and the strong diversity of indigenous linguistic communities combine to give the French language a real chance of becoming a lingua franca that will be accepted by all Togolese.

A language policy supporting indigenous languages in Togo was expressed in the School Reform Act of 1975: Ewe (a Kwa language) and Kabiye (a Gur language), spoken by the two numerically most important ethnic groups, were given the status of national languages. French remains the only official language. Two national languages zones were created: the Ewe zone in the south and the Kabiye zone in the north. The kindergarten was the domain of local maternal languages. Both chosen national languages had to be promoted and taught in schools according to the following schema: In the Ewe-zone, Ewe was to be taught as a subject in primary and secondary schools, and Kabiye as a subject in high schools, while in the Kabiye-zone, Kabiye was to be taught as a subject in primary and secondary schools, and Ewe as a subject in high schools.

Teachers were trained to teach these languages in primary and secondary schools. But the program did not cover all state schools and only few private schools agreed to introduce these languages as subjects. Lébikaza (1998) pointed out that the national languages program failed principally for the following reasons: the parents were not well informed and some of them did not accept that their children's curricula included learning the national languages; private schools were free to not apply the program; the taught languages were just optional subjects; few teachers were trained in these languages; and the program received increasingly less consideration and financial support.

In the government media (radio, television, newspapers) Ewe and Kabiye were used as national languages until 1990. After the National Conference of 1991, Radio Lomé and Radio Kara introduced news broadcasts in almost all African languages spoken in Togo. Kabiye and Ewe are given the most important broadcasting time. The minor languages are treated differently on the two stations. Radio Lomé takes strong minor languages like Miyobe (Sola) (with only 0.037% of the Togolese population), Anyanga, and so on into consideration; Radio Kara does not. Radio Kara uses one language within a linguistic cluster (i.e., Ewe for the Ewe-Waci-Gen cluster, Moba for the Moba-Gurmance cluster); Radio Lomé uses all members of these clusters. In fact Radio Lomé began,

under pressure of the ethnic-linguistic communities, to broadcast in almost all the languages of the country during the National Conference. Every politician was anxious to convince all the communities that they would not be excluded from the ongoing democratization process. The news is presented in Kabiye and Ewe for 30 minutes, three times a day, plus 10 minutes of notices and announcements), every other indigenous language is given five minutes of programming. One might say these are five symbolic minutes, but they provide time enough to let every community know that its language is present in the radio!

Radio Lomé (28 Languages)

Ewe: 1 hour 40 minutes daily
Kabiye: 1 hour 40 minutes daily

2 hours every day (total) for other African languages:

Adele, Aja-gbe, Akaselem/Tchamba, Akebou, Akposso, Anufo/Tchokossi, Anyanga, Ewe, Fon-gbe, Fulfulde, Gen-gbe, Gurmancema, Hausa, Ife (Ana-Ife), Kambole, Konkomba, Lama(Lamba), Miyobe(Sola), Moba(Ben), Moore, Nawdm, Ngangam, Ntcham (Basar), Tamberma, Tem, Waci-gbe.

Radio Kara (14 Languages)

Ewe: 1 hour 40 minutes per day
Kabiye: 1 hour 40 minutes per day

2 hours every day (total) for other African languages:

Akaselem/Tchamba, Akposso, Anufo/Tchokossi, Ewe, Fulfulde, Hausa, Konkomba, Lama(Lamba), Moba(Ben), Nawdm, Ntcham(Basar), Tamberma.

The national television station TVT gives only 15 minutes of news in Kabiye and Ewe daily. Sketches are regularly presented in both languages. No other Togolese language is used on national television. There are several private radio stations and some private television stations; they make use of national languages, mainly Ewe, Gen, Kabiye, and Tem. The use of one or more Togolese languages in these media depends on the objectives of their owners. The government daily newspaper *Togo Presse* is published in French and reserves a half page each to Ewe and Kabiye.

Language policy in Togo is designed by those in power to satisfy the majority of the population, at least emotionally, and to avoid frustrations. Indeed it seems out of question to propose a single national language policy in Togo. A multilingual approach is more suited to the Togolese reality (see Lébikaza, 1998, 2003, for discussion): Togolese languages should be used within their local domains as oral and written mediums and be complementary to French. Even the languages of small ethnic groups have an intensive intra-group use, reinforced sometimes by the existence of an urban center (i.e. Anufo in Mango, Ana-Ife in Atakpame, etc.). Each community in Togo preserves jealously its linguistic and cultural identity even if some of its members also speak other languages for extra-group purposes. The Togolese, more often women and children, learn the languages of the new locality where they settle. That is very important for informal interactions. It is therefore not rare to meet a Togolese who speaks two or more indigenous languages in addition to their own ethnic language. Candidates for a second language are either languages of the largest ethnic groups used in the urban centers, i.e., Ewe and Kabiye, or languages spoken by ethnic groups who are very active in trade and transport, i.e., Tem and Gen-gbe. The latter has an additional advantage in being the most important Togolese language in the capital Lomé.

Endangered Languages

Some 20 languages are spoken by fewer than 1% of the population of Togo. These languages are not necessarily considered endangered simply because of the small number of native speakers. A question arises as to how to determine whether a language is endangered. The number of speakers alone is not a sufficient indicator, and many minor languages are transmitted to younger generations. In many communities, loyalty to the community's language and culture are high, and so younger speakers learn minor languages in addition to the languages of wider communication, as well as French.

See also: Endangered Languages; Ewe; Minorities and Language; Multiculturalism and Language.

Language Maps (Appendix 1): Map 43.

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Tohono O'odham

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In the early 1900s, Juan Dolores, a native O'odham speaker, documented the language with linguist J. Alden Mason (Mathiot, 1991). Dolores published collections of O'odham verbs (Dolores, 1913), noun stems (Dolores, 1923), and nicknames (Dolores, 1936). Mason and Dolores compiled their work into an O'odham grammar. Ken Hale (1959) wrote his dissertation, 'A Papago Grammar,' based on fieldwork with O'odham speakers, and Dean Saxton (1963) published an article on the O'odham phonemic system. Madeline Mathiot (1973) compiled an extensive dictionary with the grammatical usage. Saxton *et al*. (1983) published an English-O'odham/Pima and Pima/O'odham-English dictionary. Zepeda (1984), a native speaker, wrote a pedagogical grammar of Tohono O'odham. Some books portray O'odham songs (Bahr *et al*., 1997; Underhill, 1993). A number of recent articles in O'odham discuss the language from theoretical points of view (Hale, 1983; Hill and Zepeda, 1992; Fitzgerald, 1997, 1998, 2000, 2002; Miyashita, 2002; Truckenbrodt, 1999).

Many loanwords are from Spanish, and some are from other indigenous languages (Miller, 1990; Hill, 1998). Five major dialects are recognized: Totoguañ, Koló:di, Gigimai, Hú:hu'ula, Ko:adk, and Huhuwos (S'óobemakame) (Saxton, 1963; Saxton *et al*., 1983). There are generational and gender variations. Sentential conjunction such as *kuñ* '. . . , and I . . .' and *kup* '. . . , and you . . .' may be shortened to *n* and *p* (Zepeda, 1983). The former is more formal than the latter. Women use inhalation, or

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pulmonic ingressive airstream, in discourse for intimate interactional purposes (Hill and Zepeda, 1999).

The Alvarez-Hale writing system (Alvarez and Hale, 1970) is the official orthography of the Tohono O'odham Nation (Zepeda, 1983). Dictionaries by Mathiot (1973) and Saxton *et al.* (1983) use their own systems and are different from the Alvarez-Hale system (Zepeda, 1983; Miyashita and Moll, 1999).

Zepeda (1983) describes that O'odham exhibits 19 consonants: *b, c (= tʃ), d, ḍ (= ɖ)*, *g*, *h*, *j (= dʒ)*, *k*, *l (= ɭ)*, *m*, *n*, *ñ*, *ŋ*, *p*, *s*, *ṣ (= ʂ)*, *t*, *w*, *y (= j),* and asymmetric five vowels *i*, *e* (= *ɨ*), *u*, *o*, *a* . Although minimal pairs are rarely found, long and short vowels are phonemic (Hale, 1959). For example, *hik* 'navel' vs. *hi:k* 'cut,' *ta:tk* 'feel' vs. *tatk* 'the root of a plant.' There are extra-short (or aspirated, voiceless) vowels marked with a breve [ĭ] in the orthography. An additional example, *toki* 'cotton' vs. *go:kĭ* 'footprint.' Allophonic variations appear in native words. Phonemes *t d n ḍ*, and *ṣ* appear as *c j ñ l*, and *s* before */i/*.

The stress falls on an initial syllable, e.g., *músigo* 'musician.' Prefixes do not bear a stress, e.g., *ha-wápkon* 'them-wash.' Secondary stress appears in polymorphemic words (Fitzgerald, 1997). Some loanwords are noninitially stressed, e.g., *paló:ma* 'dove < Spanish *paloma*.'

Nouns and verbs undergo partial reduplication for plural and/or distributive indications, e.g., *gogs* → *gogogs* 'dog(s).' *him* 'walking sing.' → *hihim* 'walking pl.', etc. Some words do not reduplicate, e.g., *cicwi* 'playing.' (Zepeda, 1984; Hill and Zepeda, 1998). Truncation forms a perfective verb by dropping the last consonant of an imperfective verb, e.g., *o'ohan* 'writing' → *o'oha* 'wrote.' This does not apply to a vowel-final word, e.g., *cicwi* 'playing' → *cicwi* 'played,' *si'i* 'sucking' → *si:* 'sucked.'

Person/number of possessives is indicated by a prefix, except for third person singular, which is a suffix (Zepeda, 1984). Possessed nouns are classified into alienable and inalienable categories. Alienable nouns are analyzed as either they having been previously unowned or as being related to sequential human ownership (Bahr, 1986). As shown in (1) and (2), an alienable noun must have the suffix *-ga*, and an inalienable does not.

(1) ñ-je'e
1.sing.POSS-mother
'my mother'

(2) gogs-ga-j
dog-alienable-3.sing.POSS
'his or her dog'

O'odham is a nonconfigurational language. All six orders (SOV, SVO, OSV, OVS, VSO, and VOS) are possible for a transitive sentence without meaning alteration (Zepeda, 1984; Miyashita *et al.*, 2003). Pragmatic status may correlate the word order (Payne, 1987). Any nonpronominal noun must follow a particle called a *g*-determiner, except when it is sentence-initial. A sentence must have an auxiliary (AUX), which must be in the second position of the sentence as only one restriction regarding the configuration (Zepeda, 1984).

(3) Wakial 'o ceposid g haiwan. (SVO)
cowboy. AUX. branding DET cow.
sing 3.sing sing
'The cowboy is/was branding the cow.'

(4) Ceposid 'o g wakial g haiwan. (VSO)
branding AUX. DET cowboy. DET cow.
3.sing sing sing
'The cowboy is/was branding the cow.'

AUX indicates the subject's person and number, and a verb prefix indicates that of the object. However, as shown in sentences (3) and (4), any third person singular argument has no overt indication regarding the grammatical relation. Although there is no overt case marking, O'odham may be an ergative language because a reduplicated intransitive verb agrees with the plural subject, while a reduplicated transitive verb agrees with the plural object in a sentence (Zepeda, 1983; Miyashita, 2002).

Verbal aspects are distinguished between completed and continued actions (Dolores, 1913; Zepeda, 1983). Tense is divided into future and nonfuture. Imperfective present and past are not grammatically distinguished. Future is marked by a particle *o* with perfective AUX. Future imperfective sentences are formed with the perfective AUX, the imperfective verb, and usually the suffix *-d/-ad* on the verb.

O'odham kin terms show the equilateral system (Saxton *et al.*, 1983). Siblings and cousins are the same, *ṣe:pij*. Parents' siblings have eight distinct terms depending on the gender, age, and lineage. Grandparents have four distinct terms. Great-grandparents have one term, *wi:kol*. Great-great-grandparents have the same term as siblings, *ṣe:pij*. The term for 'child' is distinct depending on the gender of the parent rather than of the child.

See also: United States of America: Language Situation; Uto-Aztecan Languages.

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Tok Pisin

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managers. A form of pidgin English served this purpose. When the labor trade ended in 1905, most of the workers went back to their countries of origin, taking with them knowledge of this Queensland Plantation Pidgin. In these highly multilingual countries, pidgin served the useful internal function of communicating across ethnolinguistic boundaries. Social conditions were thus conducive not just for the retention and spread of the pidgin but also for its stabilization and subsequent creolization.

Today, Tok Pisin is used across Papua New Guinea's social spectrum, known by villagers and government ministers alike. It is the most frequently used language in the House of Assembly, the country's main legislative body, and the constitution recognizes Tok Pisin as one of the national languages of Papua New Guinea. Tok Pisin has become the main language of the migrant proletarian and the first language of the younger generation of town-born children, where it has creolized (i.e., become a creole). Tok Pisin is also one of the few pidgin and creole languages to have undergone considerable standardization because missionaries realized its potential early on as a valuable lingua franca for proselytizing among a linguistically diverse population and began using it for teaching. Most printed material is still religious; the Bible has been translated into Tok Pisin. However, the language is used to some extent in radio and television broadcasting, especially in interviews and news reports. The weekly Tok Pisin newspaper, *Wantok,* has a readership of over 30 000. Until recently, English was the only official language of education in Papua New Guinea despite the fact that few children enter school knowing it. However, education reforms have allowed communities to choose the language to be used in the first 3 years of elementary education, and many have chosen Tok Pisin.

The lexicon of Tok Pisin is mainly English (79%); Tolai (Kuanua), an indigenous language, has contributed 11%, other indigenous languages 6%, German 3%, and Malay 1%; there is also a handful of words from other European languages such as Portuguese/Spanish (e.g., *save* from Portuguese/Spanish *sabir/saber* 'to know/knowledge'). English borrowings provide the most important source of new vocabulary. Even frequently used words such as *kiau* 'egg' from Tolai are increasingly being replaced by or used alongside the English *egg*. Likewise, some of the German vocabulary in the language (e.g., *beten* 'pray'), dating from the period of German colonial rule (1884–1914) of part of the country, is giving way to English. The phonology of individual speakers of Tok Pisin varies from a core system that is shared by all speakers of the language and is similar to that of the indigenous substrate languages to a highly anglicized phonology that makes the most of English consonant and vowel distinctions. Tok Pisin has little morphology, although it has acquired some derivational and inflectional morphology in the course of its expansion. The suffix-*pela* is used to form the plural of the first- and second-person pronouns (e.g., *yu-pela* 'you plural'); it also marks a subset of monosyllabic attributive adjectives, demonstratives, and cardinal numerals (e.g., *dis-pela tu-pela pis* 'these two fish(es)'). Transitive verbs are marked with the suffix-*im*.

em	i	lus-im	dis-pela	ples
3.SING	PRED	leave-TRANS	this-DEM	place/village

'he/she/it left this place/village'

(Here, PRED stands for predicate marker.) Some grammatical distinctions reflect the influence of the substrate indigenous languages; in the personal pronoun system, different pronouns are used for inclusive (i.e., speaker + hearer) and exclusive (i.e., speaker + other(s), not including hearer). Compare *yumi* 'we (inclusive)' with *mipela* 'we (exclusive).'

Full lexemes are often used to express grammatical categories such as case, number, gender, tense, mood, and aspect, which in other languages are expressed by inflectional morphology; these distinctions are, however, not always obligatory. This is especially true for tense, mood, and aspect. The normal way of indicating past time is through use of the unmarked verb form, but *bin* (from English *been*) may be used.

ol	i	bin	adopt-im	liklik	meri
3.PL	PRED	PAST	adopt-TRANS	little	girl

'they adopted a/the little girl'

Sometimes *bin* is used in conjunction with *pinis* (from English *finish*) to mark completed actions in the past as a kind of perfective marker.

tim	bilong	Mormads	i	bin	win-im	pinis
team	of	Mormads	PRED	PAST	win-TRANS	PERF

'the Mormads team has won (the grand netball final)'

The meanings of immediate and remote future, prediction, intention, and irrealis may be expressed by clause-initial or preverbal *bai,* which has almost entirely replaced the earlier form *baimbai* (from English *by and by*). Pronominal subjects tend to take clause-initial *bai*, and noun phrases tend to take preverbal *bai*. Preverbal position is fast becoming the preferred order, although there are regional and stylistic differences.

mi	bai	go
1.SING	FUT	go

'I will go'

Tok Pisin has SVO word order; there is no copula and negation is preverbal (*mi no save* 'I don't know'). There is no inversion for questions.

yu-pela	gat	brus	a?
2-PL	have	tobacco	Q

'do you (plural) have tobacco?'

See also: Morphology in Pidgins and Creoles; Papua New Guinea: Language Situation; Pidgins and Creoles: Overview; Solomon Islands: Language Situation; Vanuatu: Language Situation.

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Tokelau: Language Situation

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Tokelau comprises three atolls situated 500 km north of Samoa. Under New Zealand administration since 1926, it is in UN terms, a "non self-governing territory." It is expected that the people will eventually make an act of political determination and Tokelau will become "self-governing in free association with New Zealand." The language is spoken by approximately 7000 people. About 1500 live in the atolls and over 6000 in New Zealand. In addition there are some Tokelauans living in Australia, Hawaii, and the West Coast of the United States. Little is currently known about language maintenance in those areas.

Tokelauan belongs to the Polynesian branch of the Austronesian language family. Both long-standing and more recent subgrouping theories place it closest to the languages of Samoa and Tuvalu. The phonology follows the typical Polynesian pattern. There are five vowels, /i, e, a, o, u/, which can be short or long. The consonants are /p, t, k, f, h, v, l, m, n, g [=ŋ] /. The orthography is phonemic, except that long vowels are not distinguished by most Tokelauan writers. The macron is used by linguists and in some published Tokelauan material. The grammar has many features in common with other western Polynesian languages, including ergative case marking. Hooper (1996) is a short general description of the language.

Since the introduction of Christianity in the 1860s until 25 to 30 years ago, Samoan was the language of the church and schools, and in most contexts the only written language, resulting in some Samoan influence on the lexicon. Tokelauan oral culture was maintained, and adults were bilingual in Samoan and Tokelauan. In the 1960s an orthography was developed and the schools started to introduce instruction in writing and reading Tokelauan. It is now the language of the church and administration and is used in all contexts in island life. Hooper and Huntsman (1992) give a detailed history of Tokelau language use.

From the early 1960s onward, due to population pressures in the atolls, many Tokelauans migrated to New Zealand. For the second- and third-generation Tokelauan New Zealanders, some of whom are now attending tertiary institutions, language maintenance is problematic. In 1996 53% of Tokelauans in New Zealand were able to hold 'an everyday conversation' in their native language; by 2001 this had declined to 44%. Of that group, 71% were born in Tokelau. The decline is partly a result of the youth of the New Zealand Tokelau population: in 2001 43% were under 15 years of age. Church services continue to use Tokelauan, and there are two licensed Tokelauan early childhood education centers, in the Auckland and Wellington regions. Developments in the area of print culture include the *Tokelau dictionary* (1986); a Catholic missal; a Protestant hymnal; numerous publications by the New Zealand Ministry of Education for use in primary schools, and various items such as legal statutes and civil service reports circulated in photocopied and electronic forms. Bible translation is an ongoing project, and the four Gospels have already been translated and published.

See also: Austronesian Languages: Overview; Language Maintenance and Shift; New Zealand: Language Situation.

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Tokieda, Motoki (1900–1967)

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Motoki Tokieda, one of the most influential, and controversial, scholars in the native tradition of Japanese linguistics, was born in downtown Tokyo on December 6, 1900. Strongly attracted to the Japanese language as a teenager, he had already determined what his life's work would be when he entered Tokyo Imperial University. His graduation thesis, completed in 1924, was a reexamination of the history of Japanese linguistics in the early modern period, with focus on the *Kokugaku* ('national learning') school of thought and the development of their 'consciousness' of language. In 1927, Tokieda was appointed to the Faculty of Law and Literature at Keijo Imperial University, which was established in Seoul, Korea by Imperial Japan in 1924. He was promoted to Professor in 1933. In 1943, two years before the end of World War II, he returned to Japan and succeeded Shinkichi Hashimoto as Professor of Japanese linguistics at Tokyo Imperial University. After his retirement from this position in 1961, he served as Professor at Waseda University in Tokyo. Tokieda died in Tokyo on October 27, 1967.

Tokieda had a great impact on Japanese linguistics with descriptions and analyses of Japanese based on his Process Theory of Language (PTL), which views language as the psychological process of communication. PTL has been and still is a topic of discussion and controversy in Japan, for its own sake as well as for the role it played in Tokieda's attack on Saussure. In his *Kokugogaku genron* ('Fundamentals of Japanese Linguistics') published in 1941, Tokieda contrasted PTL with Saussure's theory of language, severely criticizing the thoughts expressed in *Cours de linguistique générale* (or, perhaps more accurately, in its Japanese translation by Hideo Kobayashi). Tokieda's critique of Saussure invited countercritiques, to many of which Tokieda replied, including the one from the eminent linguist Shirō Hattori, which led to the famous Tokieda–Hattori debate in 1957. Hattori claimed among other things that Tokieda had misunderstood Saussure because he had grasped crucial notions like *une entité psychique* in terms of their Japanese translations, a point that contributed to the unusual expansion of the scope of the discussion – from the validity of PTL to the correctness of Tokieda's and Hattori's interpretations of the *Cours*, and even to the reliability of the Japanese translation. Since scholars outside of Japanese linguistics also participated in this extended debate, Tokieda has come to occupy a unique position among traditional Japanese linguists: he is probably the only one in this tradition who has been widely cited by philosophers and other non-linguists as well as by those linguists who would otherwise not have paid much attention to the traditional school of Japanese linguistics. In the latter school, Tokieda has

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continued to be referred to regarding almost all branches of Japanese linguistics, reflecting his wide-ranging interests and achievements.

See also: Japan: History of Linguistics; Hattori, Shiro (1908–1995); Kobayashi, Hideo (1903–1978); Saussure, Ferdinand (-Mongin) de (1857–1913); Yamada, Yoshio (1873–1958).

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Peter Paul Toma, a linguist researcher for machine translation (MT) and one of the most prominent pioneers of MT, was born on July 10, 1924, in Hungary. In 1945 he became a refugee and arrived in Bavaria, Germany, where his multilingual competency in Hungarian, English, and German enabled him to function as a liaison between the U.S. Third Army and the many Hungarian refugees. In 1952 he immigrated to the United States, and he became a citizen in 1957, a year after he obtained a steady job in physics at the California Institute of Technology. About the same time the Institute received its first computer, a Datatron 205. Toma, among the first to take the computer course, realized immediately the potential for language translation and volunteered to spend night after night at the computer, programming and debugging his first system.

In 1958 Toma joined the Georgetown University MT project (until 1961) and developed the SERNA (*S Russkogo Na Angliskij* 'From Russian to English') system. Subsequently, at Computer Concepts Inc. in Los Angeles, he developed the AUTORAN and TECHNOTRAN systems. While politics and the 1966 ALPAC Report virtually 'killed' MT in the United States, Toma demonstrated his two systems successfully in Germany, mostly at the University of Bonn, from which he received his Ph.D. (1970) in communication and computer science. The high-level European recognition and the fact that he received a grant from the prestigious German Science Foundation moved the U.S. Air Force to support Toma's latest invention at the time, SYSTRAN (System Translation); it has been installed at Wright Patterson Air Force Base since 1969. Two companies developed and marketed SYSTRAN: LATSEC Inc. (for the U.S. government) and World Translation Center Inc. (for outside the government); Toma established each in La Jolla, California, in 1968 and 1975, respectively.

In 1985 Toma sold SYSTRAN to Jean Gachot to be able to finance a high-level Conflict Resolution Symposium in New Zealand, to bring East and West closer together. Since then he has also become an expert in longevity and related sciences, yet his passion for MT has remained unchanged. On August 8, 2003 in Budapest, Toma met his wife Réka, who currently works with him and coordinates the implementation of his latest inventions: the VOXTRAN speech translation system and the Personal Translator (PT). World-renowned scientists, experts, and a trained staff in Budapest are participating in this enterprise with enthusiasm.

See also: Computational Linguistics: History; Machine Translation: History.

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continued to be referred to regarding almost all branches of Japanese linguistics, reflecting his wide-ranging interests and achievements.

See also: Japan: History of Linguistics; Hattori, Shiro (1908–1995); Kobayashi, Hideo (1903–1978); Saussure, Ferdinand (-Mongin) de (1857–1913); Yamada, Yoshio (1873–1958).

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Tone in Connected Discourse

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In connected discourse, lexical tones in a sentence have to be said in quick succession, frequently with no pauses in between. In addition to tone, a sentence also carries many other communicative functions that either use pitch as their primary or secondary carrier or change pitch inadvertently. As a result, the acoustic manifestation of tone, mainly in the form of fundamental frequency (F_0) contours, rarely resembles its underlying form. A clear understanding of tone is therefore impossible without comprehending the effects of these factors on the acoustic form of tone. This article discusses the realization of tone in connected discourse in terms of the interaction between tone and other pitch-modifying factors. The discussion is mainly based on data from Mandarin, for which extensive experimental data have been collected in recent years.

How Are Tones Produced in Succession?

In connected speech in a tone language, adjacent syllables frequently have different tones. One of the most basic issues concerning tone in discourse is how a sequence of tones are articulated in succession. Is the shift from one tone to the next instantaneous or fast enough so that the shifting period is negligible? If the shift is not instantaneous, where does it occur? Is there a time interval specially reserved for the tonal shift? Answers to these questions can be found through systematic comparisons of sentences with different tonal compositions. Figure 1 displays time-normalized F_0 contours of Mandarin five-syllable sentences. In each panel, the tones of all syllables are held constant except those of syllable 2, which alternate across high (H), rising (R), low (L), and falling (F). Several direct observations can be made. First, although the tone of syllable 3 is the same in each panel, the F_0 trajectory varies extensively when the tone of syllable 2 changes. Second, there is nevertheless consistency about the tones in syllable 3. In each panel, the four F_0 curves in the syllable gradually converge to a quasi-linear configuration appropriate for the tone: high-level for H, rising for R, and falling for F, as illustrated by the short straight dashed lines. Assuming that these quasi-linear trajectories resemble some sort of the desired goals for the tones, the approximation of each of them starts roughly from the onset of syllable 3 and ends approximately at the offset of syllable 3, whether the converging configuration is a slope or a horizontal line. These

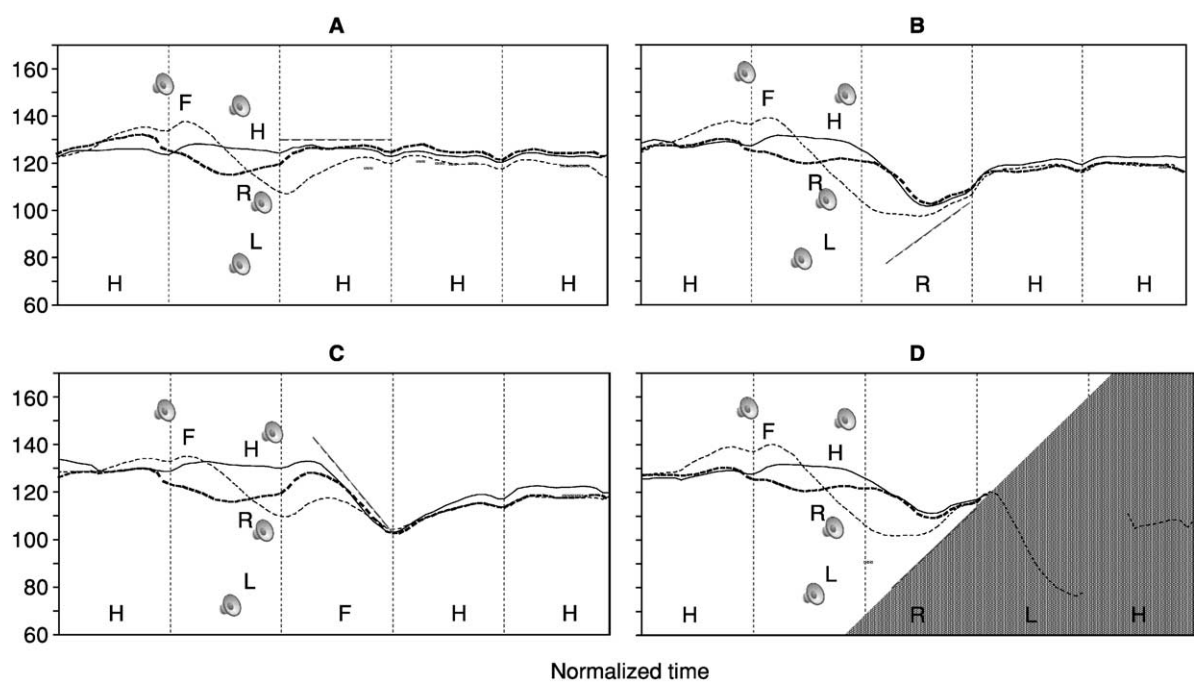

Figure 1 Mean F_0 contours of Mandarin 5-tone sequences in sentence. Each curve is a time-normalized average across 24 repetitions by four male speakers (Xu, 1999). (A–C) H, R, and F (in syllable 3) are preceded by four different tones and followed by H. (D) R in syllable 3 is followed by L. Vertical lines indicate syllable boundaries. The short dashed lines depict hypothetical underlying pitch targets. The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here. With permission from Elsevier Inc.

observations suggest the basic mechanisms of tone implementation in connected speech. First, the transition between adjacent tones is not instantaneous. Rather, it takes a long time. Second, despite this fact, no time intervals are reserved just for the tonal transitions. Instead, the transition toward each tone occurs *in situ* (i.e., during the syllable to which the tone is designated). Third, each transition starts at the beginning of the host syllable and terminates at the end of the syllable. Thus, the F_0 of an entire syllable constitutes a continuous movement toward the ideal pitch pattern of the tone it hosts. In other words, the approximation of the underlying pitch target of a tone is synchronized with its host syllable.

The sluggishness of the shift between adjacent tones is directly related to a basic articulatory constraint – the maximum speed of pitch change. This speed can be expressed with the following linear equations based on data reported in Xu and Sun (2002):

$$t = 89.6 + 8.7d \quad \text{(raising)} \tag{1}$$

$$t = 100.4 + 5.8d \quad \text{(lowering)} \tag{2}$$

where t is the amount of time (ms) it takes to complete the pitch shift, and d is the size of pitch shift in semitone (st). According to Eqs. (1) and (2), it takes approximately 124 ms to either raise or lower pitch by 4 st. As can be seen in Figure 1, the difference between two adjacent tones is often close to or greater than 4 st ($1\ \text{st} = 12 \times \log2\ (F_0/F_{0\text{reference}})$). In connected speech, the duration of a syllable is very short compared to the minimum time needed to make the tonal transitions. In Mandarin, for example, the average syllable duration is approximately 180–215 ms (Duanmu, 1994; Xu, 1999). This means that to make a single pitch shift of 4 st, the greater half of a syllable has to be used just for the transition even at the maximum speed of pitch change. As can be seen in Figure 1, if the tone is R or F, often two pitch movements have to be made within one syllable. According to Eqs. (1) and (2), there is barely enough time for any two pitch movements within a syllable 180–215 ms long. Indeed, in producing these tones the maximum speed of pitch change is frequently approached (Xu and Sun, 2002). In fact, even the maximum speed is often not fast enough. This is evident from the apparent 'undershoot' in syllable 3 in Figure 1: when the tone of syllable 2 ends low, the F_0 peak in F becomes lower, and when the tone of syllable 2 ends high, the F_0 valley in R becomes higher. Furthermore, the location of these F_0 turning points also varies: the greater the F_0 excursion in the early part of the syllable, the later the turning point.

The tonal undershoot and the delay in the syllable-internal turning points further highlight the synchrony between tone and syllable. Without such synchrony in the HLF sequence, the transition toward F could have started earlier, given that L is more easily approached because only a single pitch movement is involved. Apparently, no microadjustment of tonal alignment is made and the synchrony between tone and syllable is maintained, often at the expense of full realization of the tone.

These facts suggest syllable-synchronized sequential (pitch) target approximation as the basic mechanism of tone implementation. A pitch target is an ideal pitch trajectory associated with a tone. A target can be rather simple, as illustrated by the short dashed lines in Figure 1, but still capable of leading to a complex surface F_0 contour due to the target approximation process. It can be a static register such as [high], [low], or [mid], which probably underlies a tone such as H, L, or M. Targets can also be dynamic, such as [rise] and [fall]. For these targets, both the slope and the relative height are part of the articulatory goal. Such targets may underlie tones such as R and F.

A further implication of syllable-synchronized sequential target approximation under the constraint of the maximum speed of pitch change is that if the duration of a syllable in a language is routinely shorter than that needed for two F_0 movements within a syllable, it may become impossible for that syllable to carry contour tones. Indeed, research has revealed a close relation between the occurrence of contour tones and average vowel length (which is closely related to syllable length) in many languages (Duanmu, 1994; Zhang, 2002).

Finally, if the contextual F_0 variation of tone as shown in Figure 1 is viewed in terms of the influence of adjacent tones on each other, there is extensive carryover assimilation but little anticipatory influence. If any, the anticipatory influence is mostly dissimilatory, as can be seen in Figure 1: the F_0 of H in syllable 1 is higher whenever the tone of syllable 2 has a low F_0 point. Such dissimilation has been found in several languages, including Mandarin, Thai, Yoruba, and Igbo. However, its underlying mechanism is unclear.

Dynamic versus Static Targets

A long-standing discussion in tone research concerns whether a tone such as R or F is composed of successive level components so that the underlying composition is actually LH or HL or a single contour component that somewhat resembles the actual F_0 curve. The constraint of the maximum speed of pitch change makes it unlikely that the actual F_0 contour directly corresponds to an underlying

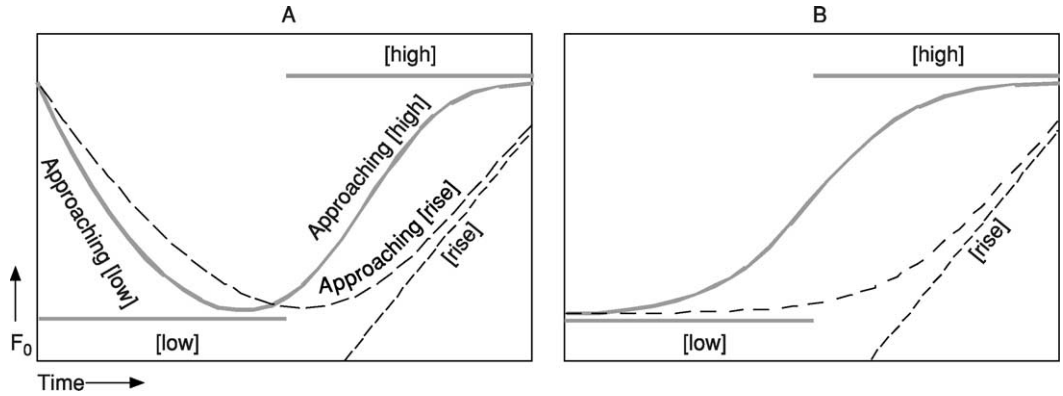

Figure 2 Hypothetical F_0 trajectories (curved lines) that asymptotically approach either two consecutive static targets (solid lines) or a single dynamic target (dashed lines). In (A) the previous tone ends high, whereas in (B) the previous tone ends low. With permission from Elsevier Inc.

configuration. On the other hand, whether or not two separate underlying components are involved can be tested in terms of whether a single target or two successive ones are being implemented. Figure 2 illustrates how such distinction can be made. If a particular tone consists of two elements, as indicated by the low and high level bars in Figure 2A, a clear transition should occur between the two. Thus, a LH combination should result in an F_0 contour like the solid curve in Figure 2A, which approaches the [low] and [high] targets in succession. If, however, the target is unitary but dynamic, like the dashed slanting line in Figure 2A, the resulting contour should have the shape of the dashed curve. If the previous tone happens to end low, then the F_0 contours resulting from two static targets or one dynamic target may look like the solid or dashed curve in Figure 2B, respectively. A further test is that the distinction between consecutive static targets and unitary dynamic target should become even more apparent when (i) the syllable duration is increased and (ii) the tone is emphasized and hence given greater articulatory effort for implementing its target(s).

A case in point is R and F in Mandarin. When spoken at a slow rate, the F_0 contour of R resembles the dashed rather than the solid curves in either Figure 2A or Figure 2B, and the most dynamic portion of the F_0 contour becomes increasingly later as the syllable duration increases. Furthermore, when under focus (i.e., being emphasized), the dynamic portions of R and F in Mandarin occur even later in the syllable, as can be seen in Figure 3, instead of exhibiting clear separation of two static components as do the solid lines in Figure 2.

The evidence thus suggests that tones such as R and F in Mandarin are associated with dynamic [rise] and [fall] as pitch targets. On the other hand, of course, the existence of dynamic tonal targets does not mean that any contour-like tone is underlyingly dynamic. It is also possible for a tone to be composed of two successive pitch targets. For example, the citation form of L in Beijing Mandarin may indeed consist of two components: a [low] followed by either a static [mid] or [mid-high] or a dynamic [rise]. (Further research is needed to determine which is more likely the case.) It is thus an empirical question whether a particular contour-like tone in a language or dialect has underlyingly static or dynamic target(s).

Tonal Variation Due to Change of Underlying Pitch Target

The understanding of the basic mechanisms of producing tones in succession can also help us better identify cases in which the targets themselves are changed. Such changes are often referred to as tone sandhi. The sandhi may be prompted by different triggers, some related to particular tonal contexts and some to morphological or syntactic functions (*see* **Tone: Phonology**). In the case of Mandarin L-sandhi, for example, L becomes very different when followed by another L than when followed by other tones, as can be seen in Figure 4A. Figure 4B shows that the surface form of such L variant is very similar in shape to that of R. Indeed, native listeners cannot distinguish LL from RL (Peng, 2000; Wang and Li, 1967).

What is most striking about this kind of tonal variation is that, as can be seen in Figure 4A, the sandhi L starts to differ very early in its host syllable from the non-sandhi L, and the latter exhibits virtually no sign of anticipating the following tone. This suggests that what happens to L in anticipation of an upcoming L is that its pitch target is changed before execution, and such change does not alter

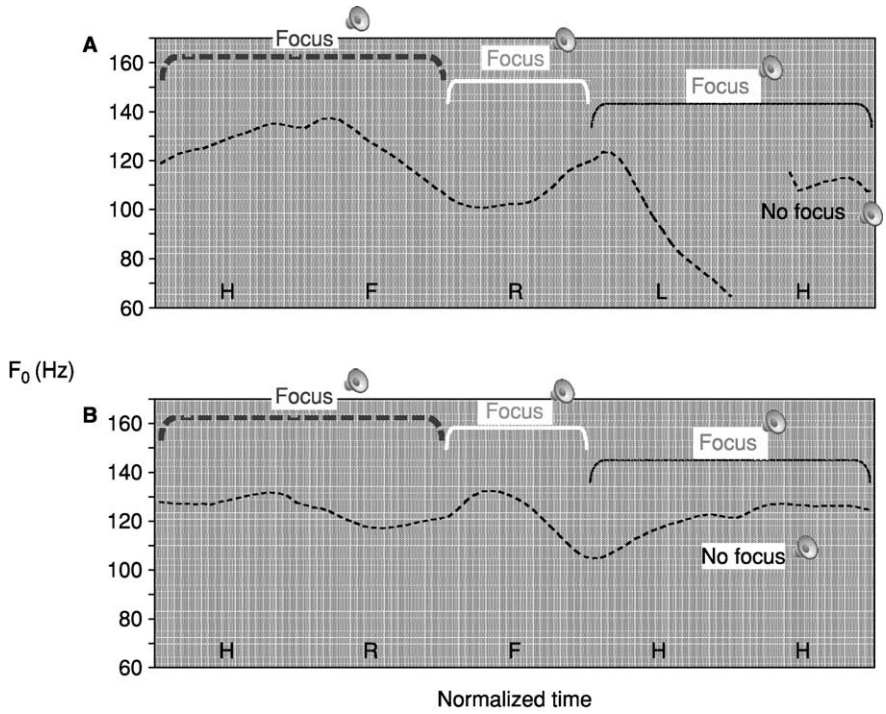

Figure 3 Mean F_0 contours of Mandarin tone sequences HFRLH (A) and HRFHH (B) spoken with focus in different positions. The curves are time-normalized F_0 averaged across 24 repetitions by four male speakers. Data from Xu (1999). The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here. With permission from Elsevier Inc.

the process of syllable-synchronized sequential target approximation. In other words, once assigned, a sequence of pitch targets are just implemented one at a time – each during the time interval of its host syllable. No anticipatory target execution is involved.

Target alternation is not limited to anticipation of an upcoming tone; it can also happen after certain tones. In Yoruba, for example, H is known to become R after L, and L becomes F after H. It is not fully clear, however, whether these are genuine cases of target alternation or cases of carryover assimilation. Further research is needed.

Tonal Variation Related to Aspects of Target Execution

Whereas tones specify the pitch targets (which are subject to alternation, as just discussed) of individual syllables, other aspects of the target approximation process are left unspecified and, hence, available for manipulation to encode other communicative functions. These aspects include articulatory strength, syllable duration, and pitch range. The manipulation of these aspects has strong effects on the surface F_0 contours. In fact, F_0 variations due to some of these effects are often no smaller than those due to the lexical tones.

Tonal Variation Due to Articulatory Strength and Syllable Duration

Articulatory strength determines how quickly a pitch target is approximated, and syllable duration determines how much time is allotted to the approximation process. Other things being equal, therefore, greater strength enables a pitch target to be approached more quickly than weaker strength, and longer syllable duration allows a target to be more fully implemented than shorter duration. Thus, manipulation of strength or duration or both determines the extent to which a lexical tone is realized. Also, such manipulation can be used to encode certain communicative information.

Strength and Duration as Lexical Information In some tone languages, certain morphemes are considered to be phonologically toneless (*see* **Tone: Phonology**); for example, those morphemes in Mandarin that are said to bear the neutral tone. Also, L in Chichewa and M in Yoruba are believed to be unspecified for tonal values. Regarding where the F_0 values of these syllables come from, a popular view is that they are derived through interpolation between adjacent tones. Experimental data suggest, however, that interpolation is an unlikely process. Figure 5 shows Mandarin sentences containing three consecutive neutral tone (N) syllables. In Figure 5A, they are

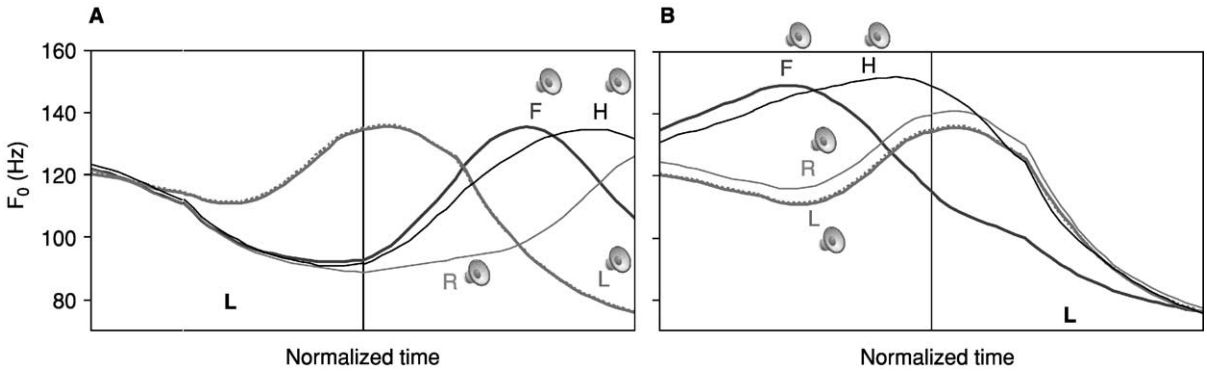

Figure 4 (A) Mean F_0 contours of Mandarin L before (A) and after (B) four different tones. Adapted from Xu (1997). The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here. With permission from Elsevier Inc.

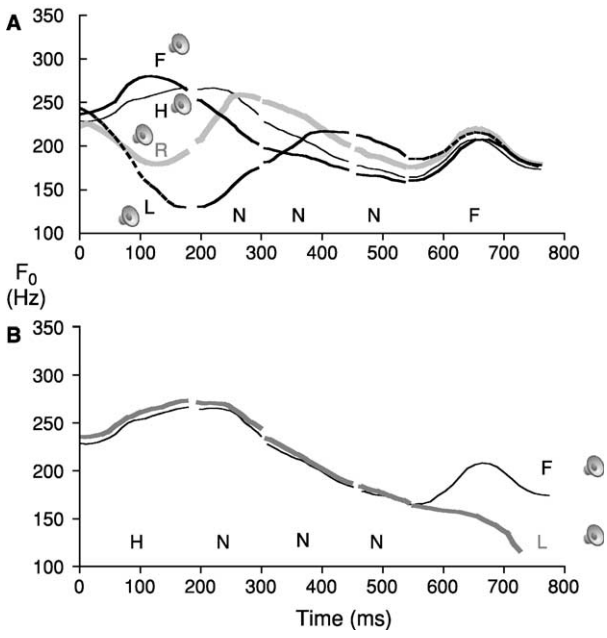

Figure 5 Mandarin sentences containing three consecutive neutral tone (N) syllables. In (A), they are preceded by four different tones. In (B), they are followed by either F or L. Data from Chen and Xu (2002). The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here.

preceded by four different tones and followed by F. In Figure 5B, they are preceded by H but followed by either F or L. In Figure 5A, the F_0 of the neutral tone syllables is substantially affected by the preceding tone. However, the influence gradually reduces as time elapses, and by the end of the third neutral tone, the four F_0 curves have almost converged. In Figure 5B, in contrast, the tone of the last syllable has virtually no influence on the preceding neutral tone. Thus, F_0 of the neutral tone could not have been derived from interpolation between the surrounding tones because the following tone makes no contribution to its F_0. Given that the carryover influence from the preceding tone is similar in nature as that seen in Figure 1, the F_0 convergence over the course of the neutral tone must be in the direction of an underlying pitch target associated with the neutral tone, which is probably a static [mid]. What makes the neutral tone really different from the full tones is likely to be weaker articulatory strength plus shorter syllable duration (approximately 60% of the length of full tone syllables), which would lead to both slower target approximation and greater undershoot.

Regarding how weak the strength can be, there have been suggestions that the level of articulatory effort is zero, and the F_0 movement during the neutral tone is due to relaxation to a rest position under the elastic force of the vocal folds. Note that such elastic force is available only if the vocal folds are stretched beyond their resting length during the production of the full tones. However, the vocal folds are typically much shorter during phonation than during rest (Hollien and Moore, 1960). Thus, whatever pitch target is associated with a neutral tone or its like, it is probably implemented with active muscle forces, although the forces can be quite weak at times.

Strength and Duration as Grouping and Demarcation Information In addition to lexical information, strength may also serve to group syllables into chunks and to group smaller chunks into larger ones. Such grouping is closely related to a hierarchical prosodic structure whose communicative function is not fully clear. What is determined by prosodic structure is the grouping relation among the linear sequence of syllables and words. It has been demonstrated that a syllable's ability to resist tonal coarticulation from adjacent tones is related to its prosodic strength (Shih and Sproat, 1992). Tones on prosodically weak syllables tend to have less extreme tone shapes or greater undershoot.

Figure 6 displays mean F_0 contours of consecutive R and F sequences with varying numbers of syllables

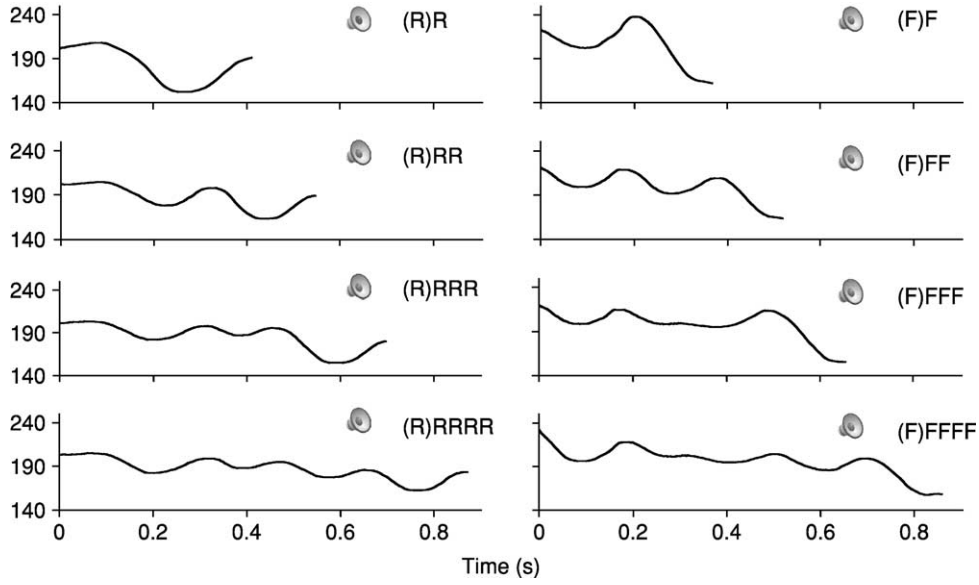

Figure 6 Mean F_0 contours of consecutive R and F sequences with varying numbers of syllables said in the middle of a carrier. The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here.

said in the middle of a carrier. The all-R and all-F sequences impose great pressure on tone production, as discussed previously, and hence would best reveal the strength differences among syllables. As can be seen in Figure 6, as the number of syllables increases, the magnitude of F_0 excursion decreases, which appears to be related to the insufficient increase in syllable duration as the group size becomes larger. Meanwhile, the magnitude reduction differs in various locations. However, in each case it is the first and last syllable in the group that are reduced the least. There thus appears to be an 'edge marking' effect. This line of research is still in its early stage, and much more needs to be learned about how exactly articulatory strength and duration are used by various functions.

Tonal Variation Due to Pitch Range Modification

Pitch range specifies the pitch interval within which each tonal pitch target is implemented. It is definable by two parameters: height and span. The effectiveness of pitch range manipulation has to do with the fact that the entire exploitable pitch range of human speakers is quite large, approximately 2 octaves in total (Fairbanks, 1959). This is more than twice as much as the range needed for lexical tones. Thus, even in a tone language there is room left in the pitch range for things other than lexical tones. From the perspective of the target approximation process, pitch range manipulation can be achieved by shifting the height of a pitch target without changing anything else about it. Pitch range manipulation has been put to use by languages for encoding functions such as focus, sentence type, and new topic (topic shift/turn-taking).

Focus Focus is a pragmatically motivated emphasis. For example, when the sentence 'John talked to Jane' is said in response to the question 'Who talked to Jane?' the word 'John' is naturally emphasized, hence 'focused.' In certain circumstances, speech sounds as small as a single segment can be put under focus (van Heuven, 1994). At the same time, focus is a global function. That is, with focus the speaker tries to indicate that a particular component of the utterance is highlighted against all other components. This is done by an asymmetrical pitch range manipulation about the focused item, as can be seen in Figure 7 as well as Figure 3. Specifically, a narrow focus is manifested through a tri-zone pitch range control: the pitch range of focused region is expanded, that of the postfocus region suppressed, and that of the prefocused region left largely the same as in utterances without narrow focus. Expansion means the pitch range is widened instead of only raised. The widening is the most obvious in Figure 3A, in which the low point of R becomes lower under focus. Tri-zone pitch range control by focus is quite widespread among languages, both tonal and nontonal, although it is not clear whether it is truly universal.

An interesting consequence of the tri-zone pitch range control is that a final focus (i.e., focus on the last word of a sentence) is not implemented effectively. This is clearly seen in both Figure 3 and Figure 7. As a result, final focus is also perceptually not well separated from no narrow focus.

Presumably, the on-focus pitch range expansion is conditioned by postfocus pitch range suppression: if the latter is not implementable (for there is no postfocus component), the former cannot be effectively implemented either.

Sentence Type: Statement versus Question Pitch range can be further modified by a function that may be referred to as sentence type. This function distinguishes question from statement and possibly also from continuation. A question is known to have an overall rising intonation, although it is also known that not all syntactic questions have a rising intonation. Although the F_0 difference between question and statement is the most obvious at the end of the sentence, more global patterns are also involved. In particular, the onset of the F_0 raising by question is conditioned by focus. Figure 8 shows mean F_0 contours of Mandarin question versus statement in sentences consisting of only H. In Figure 8a, either focus is on the sentence initial word or there is no narrow focus (neutral focus). In Figure 8b, focus is either sentence medial or sentence final. It is apparent that the divergence between statement and question starts from the focused word rather than from the beginning of the sentence or occurring only in the final word of the sentence.

The F_0 patterns in Figure 8 thus demonstrate that question intonation consists mainly of pitch range adjustments, and the adjustments are likely to be nonlinear over time, with greater increase toward the end of the question. The nonlinearity may explain why the final raising is typically much more prominent than in earlier regions. Similar to the nonlinear

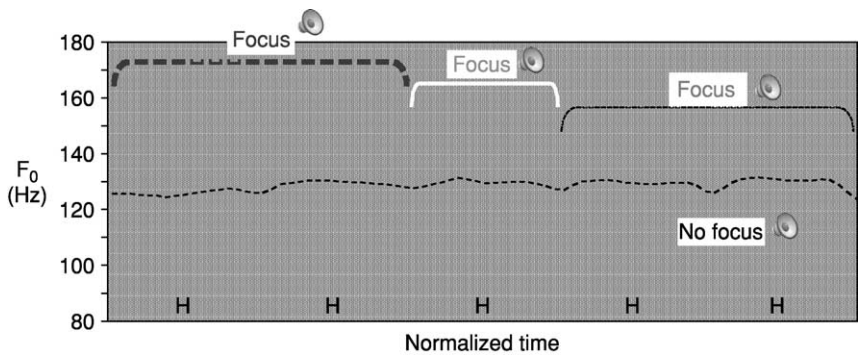

Figure 7 Pitch range variations in Mandarin due to focus in different positions. The curves are time-normalized F_0 averaged across 24 repetitions by four speakers. Data from Xu (1999). The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here. With permission from Elsevier Inc.

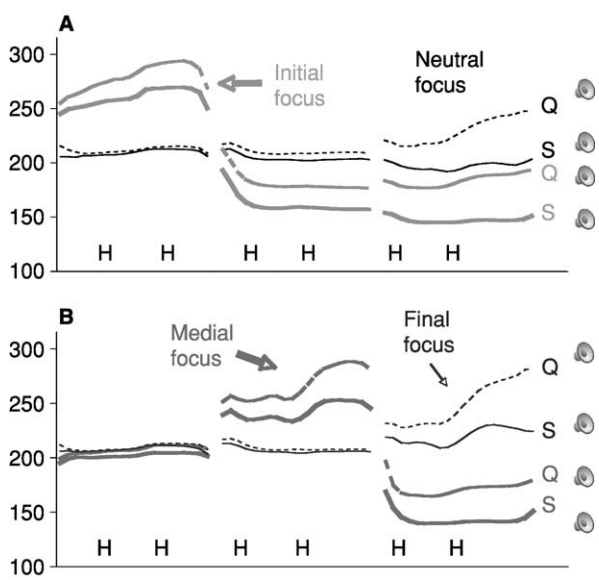

Figure 8 Mean F_0 contours of Mandarin question versus statement in sentences consisting of only H tones. In (A), either focus is on the sentence initial word or there is no narrow focus. In (B), focus is either sentence medial or sentence final. Data from Liu and Xu (2004). The audios are samples of individual sentences. Their F_0 curves may not precisely match those shown here.

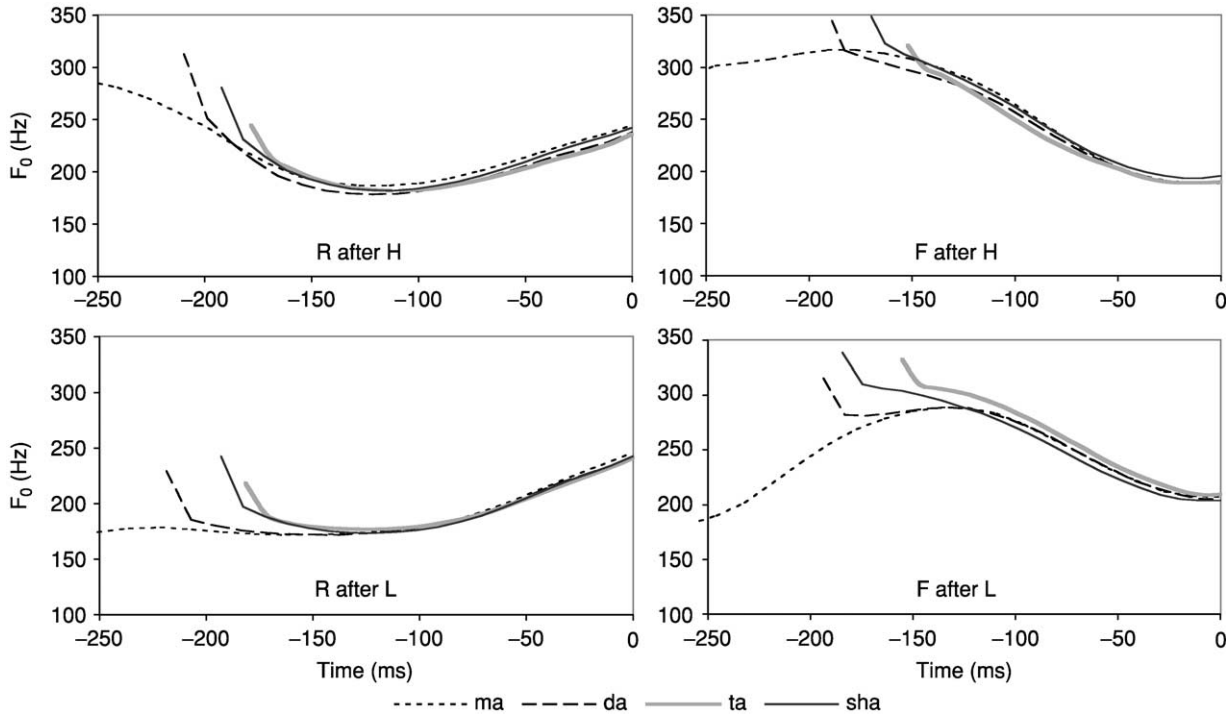

Figure 9 Effects of voiceless consonants on the F_0 contours of Mandarin R and F produced after H and L. Each curve is an average across five repetitions, two carrier sentences, and seven female speakers. All curves are aligned to the syllable offset. Data from Xu *et al.* (2003).

F_0 raising in questions, the gradual F_0 lowering in statements is also likely nonlinear, with greater decrease toward the end of the statement.

New Topic (Topic Shift/Turn-Taking) Pitch range can be further modified by a function that affects the beginning of a sentence more than the end of the sentence. When a sentence is the very first in a conversational turn or a read paragraph, its onset F_0 can be extensively raised, sometimes by as much as an octave (Umeda, 1982). Although the details are not quite clear, this function also seems to affect the pitch range of a sentence nonlinearly, with a large F_0 raise near the beginning of the sentence and an F_0 descent afterwards that is fast at first but slows down later. The high initial F_0, often accompanied by increased intensity, probably helps to draw listeners' attention. As such, the function probably serves as a beginning signal for a new topic or a conversational turn.

The Effects of Pitch Range Manipulations Combined We have seen that although the local F_0 contours of individual syllables are mostly determined by the underlying pitch targets and their manner of implementation as related to articulatory strength and syllable duration, the relative height of the tones can still be extensively modified by focus, sentence type, and new topic. Note also that these functions, with the only exception of question intonation, all tilt F_0 downward toward the end of the sentence. Such tilting is in the same direction as the frequently reported tonal phenomenon known as downdrift. Thus, future research is needed to determine if downdrift is in any way related to these functions.

Inadvertent F_0 Variation

Inadvertent F_0 variation refers to F_0 changes caused by functions whose primary target of control is not F_0. Two types of inadvertent F_0 variations have been widely reported: vowel intrinsic F_0 and perturbation of F_0 by consonant. As their names indicate, the primary target of control is the articulation of the vowel or consonant rather than F_0 *per se*. Nevertheless, F_0 is inadvertently affected by the articulatory maneuvers involved.

Intrinsic F_0 of Vowel

Intrinsic vowel F_0 refers to the phenomenon that, other things being equal, different vowels are produced with different F_0 values. Such variation is mostly related to vowel height: the higher the vowel, the higher the F_0. The intrinsic F_0 difference is in the range of 1.65 st or 15 Hz (Whalen and Levitt, 1995). Intrinsic F_0 has been found in both tone and nontone languages. Being small in magnitude, it does not usually affect either the local or the global F_0 patterns in a significant way. There is also evidence that its

magnitude becomes smaller in connected speech (Ladd and Silverman, 1984). Nevertheless, with regard to systematic analysis of any effect on F_0 by other factors, intrinsic F_0 has to be taken into consideration.

Consonant Perturbation of F_0

A nonsonorant consonant perturbs F_0 in two ways. First, it interrupts the otherwise continuous F_0 flow. Second, it either raises or lowers the F_0 of the adjacent vowels. Although the F_0 raising and lowering have been widely known, the effect of F_0 interruption is often not carefully considered. In general, it has been taken for granted that because of the F_0 interruption, consonants are not part of the tone-bearing unit. Recent research, however, has found evidence that the voicing interruption does not really disrupt the pitch target approximation process as seen in Figure 1. Figure 9 displays the mean F_0 contours of Mandarin syllables /ma/, /da/, /ta/, and /sha/ spoken with R and F. Compared to the F_0 contours in /ma/, in which the transition toward the tonal target is visible, the F_0 curves in syllables with the voiceless consonants start late and have various amounts of local perturbations at the voice onset. Nonetheless, if these local effects are put aside, the F_0 curves in /da/, /ta/, and /sha/ look very similar to those of /ma/. Hence, by the time the apparent local effects are over, F_0 is already quite low in R but quite high in F. Therefore, the process of syllable-synchronized sequential target approximation remains the same whether or not voicing continues through the consonant. Thus, the effect of voiceless consonants is only to introduce rather local perturbations without changing the basic mechanism of tone production.

See also: Chinese (Mandarin): Phonology; Coarticulation; Intonation and Syntax; Intonation; Phonology–Phonetics Interface; Prosodic Aspects of Speech and Language; Prosodic Cues of Discourse Units; Speech Production; Speech Synthesis: Prosody; Tone: Neurophonetics; Tone: Phonology.

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Tone: Neurophonetics

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Introduction

The notion of speech prosody dates back to Monrad-Krohn's (1947) case study of a woman who was unable to produce the phonemic tone contrasts in her native Norwegian dialect, even though she retained considerable musical ability. Languages that exploit phonologically relevant variations in pitch at the syllable level are called tone languages (for review of the phonetics of tone languages, see Gandour (1994)). Tone languages are especially advantageous for exploring how speech prosody is mapped in the human brain. The focus here is on three major sources of evidence relevant to the neural substrates underlying tonal processing: dichotic listening studies, to assess hemispheric laterality effects; lesion-deficit studies, to assess tonal deficits in production or perception by unilateral brain-damaged adults; and functional neuroimaging studies, to assess normal adult tonal processing brain activity in the two brain hemispheres. Dichotic listening studies tell us which hemisphere predominates for a given function, lesion-deficit studies tell us what areas within a hemisphere are necessary for normal functioning, and brain imaging studies tell us what areas in either the left hemisphere (LH) or the right hemisphere (RH) participate in that function. From a historical perspective, the dichotic listening paradigm goes back about 40 years, lesion-deficit analysis has been used for almost 150 years, and functional neuroimaging has emerged within the past 20 years. This new analytical neuroimagery tool permits us to investigate in both hemispheres, the large-scale, widely distributed neural networks that underlie tonal processing in the normal functioning human brain.

Dichotic Listening

With the dichotic listening technique, two different auditory stimuli are presented at the same time, one in each ear (Hugdahl, 1999). Dichotic presentation of verbal auditory stimuli typically yields a right ear advantage (REA) when participants are requested to report what they hear on each trial. The standard explanation for the REA is that the contralateral auditory pathways suppress the ipsilateral pathways at the level of the brain stem, thus favoring the right ear input to the language-dominant LH. Information from the left ear has to be transferred across the corpus callosum in order to be processed in the LH. This transfer attenuates the available information, in addition to increasing the time it takes for the left ear signal to reach the language centers in the LH.

The RH, on the other hand, appears to be better at processing music and pitch contours in nonlanguage contexts (Zatorre *et al.*, 2002). This raises the question of how pitch contours are processed in the human brain when they signal differences in meaning at the lexical level. Tone languages provide a window for investigating hemispheric specialization of pitch processing in language vs. nonlanguage domains. By comparing dichotic perception of identical pitch contours in speech and nonspeech contexts, we are able to determine whether hemispheric specialization is driven primarily by complex physical cues or by domain-specific phonological functions.

The seminal dichotic perception studies of lexical tone focused on Thai (Van Lancker, 1980). Speakers of a nontone language (English), musically untrained and musically trained, served as control groups. Ear preferences were compared for three sets of stimuli: stimulus (1), a minimal set of Thai words distinguished by tone; stimulus (2), a minimal set of Thai words distinguished by initial consonant; and stimulus (3), a minimal set of hums distinguished by pitch changes homologous to stimulus (1). The Thai group showed a significant REA for both the tone words (stimulus (1)) and the consonant words (stimulus (2)), but no ear advantage for hums (stimulus (3)). English listeners, regardless of musical training, showed a REA for the consonant words of stimulus (2) only. Taken together, these findings suggest that pitch perception is lateralized to the LH when pitch variations

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signal language-specific functions. No ear advantage is observed for tone words in either the musically untrained or the musically trained English group, because pitch patterns are not exploited at the syllable level in English. It is unlikely that the REA for Thai tones can be attributed simply to greater familiarity with pitch contrasts, since the musically trained English group failed to show a right ear advantage for tone words. A right ear advantage for consonant words is observed in both Thai and English groups, because initial consonants are contrastive in both languages. The hums yielded no significant ear effects regardless of language experience, because they were not linguistically significant.

A left hemisphere superiority for dichotic perception of lexical tone has also been demonstrated in Mandarin Chinese (Wang *et al.*, 2001, and references therein). Stimuli consisted of four quadruplets of Mandarin words distinguished minimally by tone. Musically untrained English listeners served as the control group. A REA for the tone words was observed in the Mandarin group only. No ear advantage was found for the nontone language listeners. Dichotic perception of the two Norwegian pitch accents similarly reveals a LH advantage for Norwegian words differing only in tone. These findings combined reinforce the view that lateralization of pitch processing varies, depending on language experience. Hemispheric specialization appears to be based on language functions instead of physical parameters.

All of the aforementioned studies of dichotic perception of tone used real words as stimuli. Thus, it may be the case that these findings on prelexical processing of tone are confounded with lexical processing (Wong, 2002).

Lesion Deficits

Traditional models of language and the brain have presumed that certain functions are localized in specific areas of the brain. Most of this information has been drawn from studies of left-brain-damaged patients who have suffered strokes due to blockage of blood flow to the brain. Damage in specific areas may be responsible for specific language deficits, or aphasias (for review of aphasic syndromes, see Dronkers *et al.* (2000)). The LH is also dominant for language functions in native speakers of tone languages, as in nontone languages (Gandour, 1998a; Packard, 2005). All current information on tonal breakdown comes from aphasics who are native speakers of tone languages spoken in the Far East. No information is available in the extant literature on aphasics who are native speakers of tone languages in other parts of the world, especially Africa and Central America. The African and Central American languages are typologically different from those in Asia with respect to tonal inventories and rule systems, and represent a gap in our knowledge of the neurophonetics of tone.

Relevant to tonal processing, it is well known that the RH plays a critical role in pitch production and perception (Zatorre *et al.*, 2002). Since pitch is the primary auditory correlate of lexical tone, it is of theoretical interest to explore the nature of tonal breakdown after unilateral brain damage. If hemispheric specialization is driven primarily by acoustic cues regardless of function, then we expect to observe tonal disturbances subsequent to RH lesions. On the other hand, if hemispheric specialization is driven primarily by language function, then we expect to observe tonal deficits subsequent to LH lesions.

Production

Tones, like consonants and vowels, may be disrupted subsequent to LH damage (Baum and Pell, 1999; Gandour, 1987, 1998a; see Wong, 2002). The bulk of the research has focused on tonal production in isolated monosyllabic words (Mandarin Chinese, Cantonese, and Thai). Variability in the magnitude of tonal deficits appears to be related primarily to aphasia severity. The more severe the aphasic impairment, the more difficulty the patient experiences in producing tones. Although the extent of disruption varies in LH patients depending on severity level, tonal production appears not to be impaired following unilateral lesions to the RH. Pitch accent contrasts in Norwegian are also more perturbed in LH-damaged patients than in RH-damaged patients.

The magnitude of tonal disruption (or preservation) relative to consonants and vowels may serve as an index of segmental vs. suprasegmental autonomy in speech production. In Mandarin Chinese, both tones and consonants appear to be equally vulnerable in LH-damaged patients with nonfluent aphasia. Its tones, however, are observed to be more vulnerable to disruption than vowels are (Liang and Heuven, 2003). In Thai, tones produced by a Broca's aphasic are preserved, in contrast to a severe impairment in producing consonants. Sequences of phonemic approximations (SPAs) to a single target word on a picture-naming task may yield data crucially relevant to the issue of autonomous representations in speech planning (Gandour *et al.*, 1994). SPAs exhibit a general tendency of steady progression toward the target, which supports the notion that conduction aphasics suffer from a general deficit in phonological encoding. In the study by Gandour *et al.* (1994), in the

course of the participant's SPAs, tonal information was accessed earlier than was information for consonants or vowels. Within the participant's SPAs, tonal information was more stable than segmental across successive approximations. Such findings are compatible with the view that phonological information about a word is not accessed as an indivisible whole, but rather in parts, and, furthermore, that these parts or tiers become available in stages in generating the phonological plan of a word (see Liang and Heuven, 2003).

There is some evidence for selective deficits in the production of particular types of tonal contours. For example, the third tone in Mandarin Chinese, which exhibits a bidirectional, falling–rising contour, is especially vulnerable to disruption. In a study of tones produced by LH-damaged nonfluent patients, the third tone accounts for over half of the tonal confusions. However, in Cantonese, production errors by LH-damaged patients have been reported to be evenly distributed across the six tones, level and contour alike. In productions of citation forms of Thai tones by LH-damaged patients, almost all tonal substitutions result in a mid, low, or falling tone. Of the five Thai tones, the mid, low, and falling tones are characterized primarily by a falling F_0 trajectory throughout their duration, whereas the high and rising tones are not. These findings are compatible with the notion that tones exhibiting a falling F_0 contour are articulatorily less complex than others.

In a case study by Liang and Heuven (2004), the four Mandarin Chinese tones were not all equally vulnerable to disruption when produced in isolated monosyllabic words by a Broca's aphasia patient. Perceptual evaluation of the patient's tonal productions indicated that the high level tone was preserved, whereas the other three tones (high rising, low falling rising, and high falling) were severely impaired. This finding suggests that tones that exhibit dynamic F_0 contours are more difficult to produce than are those that do not. Moreover, the patient's vowels were spared relative to tones. Because vowels and tones are coterminous in production, these findings point to some degree of autonomy between segmental and suprasegmental aspects of speech production. The most salient characteristic across the four tones is their sharp, falling F_0 contour over the last 50% of their duration. The prevalence of falling contours has also been observed in a Thai Broca's aphasia patient (Figure 1). These findings are consistent with the notion that falling tones are easier to produce than rising tones are.

In nontone languages, aphasic speakers exhibit a narrowing of the F_0 range, especially in longer sentences. This inability to maintain a sufficiently wide

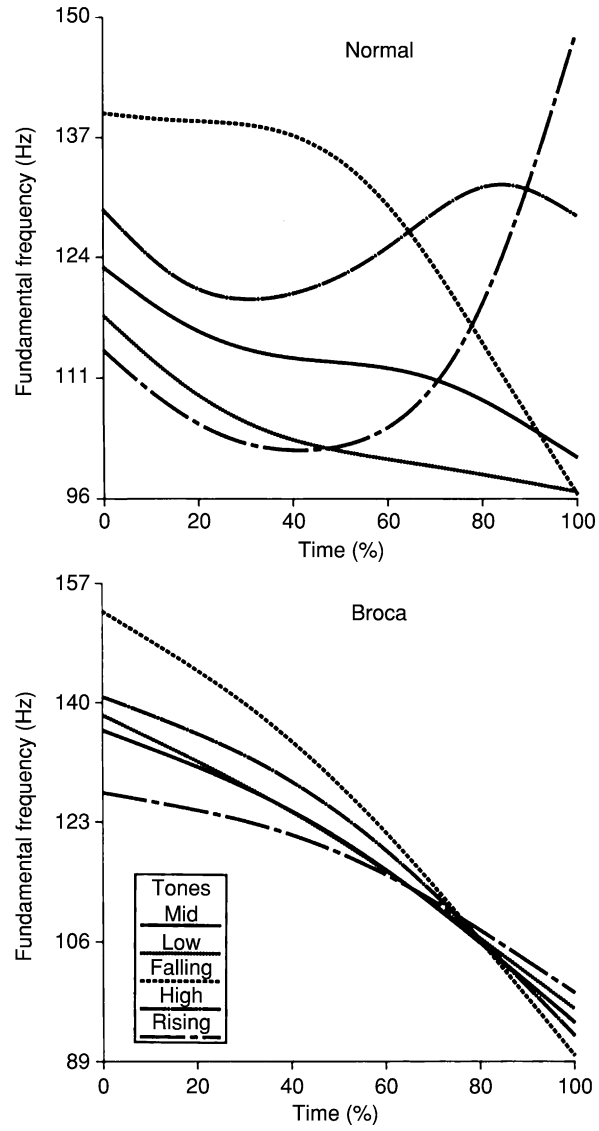

Figure 1 Average F_0 contours (Hz) of Thai tones normalized for time on a percent scale, as produced in isolated monosyllables by a normal adult (top) and by a patient with Broca's aphasia (bottom). In severe cases of aphasia in Thai-speaking patients, the only tone to be spared is the falling tone. Of the five Thai tones, it is the most resistant to disruption. Data adapted from Gandour J, Ponglorpisit S & Dardarananda R. (1992), 'Tonal disturbances in Thai after brain damage.' *Journal of Neurolinguistics 7*, 133–145, with permission.

F_0 range has been offered as an explanation for the prosodic disturbance, but this explanation cannot account for aphasic speakers of tone languages. For example, the opposite effect is seen in Thai aphasic speakers. Not only is there no compression of the F_0 range, but the tone space in LH-damaged patients actually reveals a wider than normal range. Therefore, it is unlikely that the difficulty aphasic speakers have in producing tonal contrasts, at least for tones in isolated words, can be attributed to a narrowing of the F_0 range.

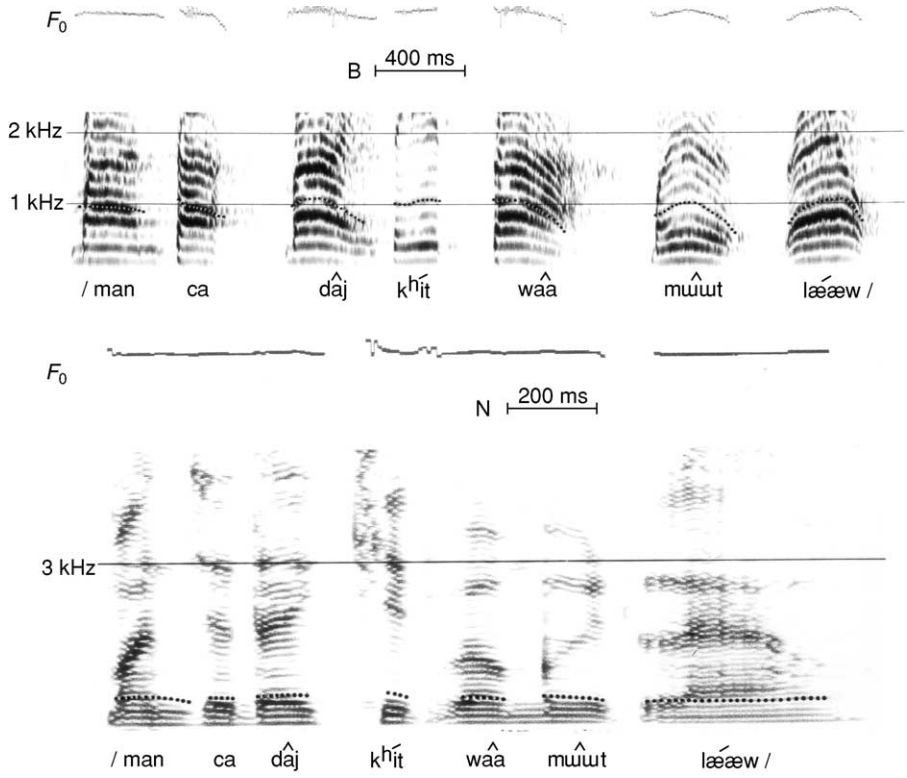

Figure 2 The F_0 contours of a Thai sentence (*This would make him think that it was dark*) produced by a Thai-speaking Broca's (B) aphasia patient (top) and a normal adult speaker (bottom). The sequence of tones is mid, mid, falling, high, falling, falling, high. A dotted line is drawn through the fifth harmonic in the narrowband spectrograms (4-kHz frequency range; 75-Hz analysis filter). The speaking rate and rhythm of the Broca's aphasia patient were markedly impaired (she produced speech on a syllable-by-syllable basis). Deviant timing notwithstanding, she had no difficulty in producing Thai tones in connected speech. In comparison to the normal speaker, the patient's F_0 contours resemble more closely those that occur in isolated monosyllables. The effects of tonal coarticulation and sentence intonation are minimized in the patient's speech due to her inability to control F_0 over a temporal domain larger than a single syllable. Reprinted from Gandour J, Holasuit Petty S & Dardarananda R (1989). 'Dysprosody in Broca's aphasia: a case study.' *Brain and Language 37*, 232–257, with permission.

Rather than attribute the disruption of intonation contours in nontone languages to a malfunction in F_0 mechanisms, it seems more likely that F_0 disturbances in connected speech may be secondary to an underlying timing disorder. Indeed, a case study of a Thai Broca's aphasia patient clearly showed that F_0 contours of the five Thai tones were preserved in sentence-level discourse, despite the fact that the patient's timing was aberrant (Figure 2). Deviant timing at the sentence level necessarily disrupts F_0 contours associated with intonation, but not tone. This suggests that tonal contours may be less disrupted than intonation is because of the smaller temporal domain over which they extend.

To investigate production of tones at the intersyllabic level, tonal coarticulation was investigated in Thai aphasic patients (Gandour *et al.*, 1996). Coarticulation refers to the phenomenon whereby a given speech sound is altered in its phonetic manifestation, depending on influences from adjacent sounds. In tones, coarticulatory effects occur in much the same way as in consonants and vowels. Anticipatory and perseverative coarticulation, respectively, involve one speech sound being influenced by subsequent and preceding sounds. All 25 possible sequences of two tones from the set of five Thai tones were embedded in a carrier sentence. Anticipatory and perseverative tonal coarticulation were markedly reduced in left-fluent aphasic patients, were totally absent in left-nonfluent aphasic patients, but were reasonably well preserved in RH-damaged patients. The disparity in performance between LH- and RH-damaged patients supports the notion that tonal coarticulation is predominantly a LH function.

At the sentence level, the question arises whether lexical tones preserve their identity under the influence of intonation. A common phenomenon in most languages is a gradual lowering of F_0 during the course of an utterance, i.e., declination. A breakdown in intonation is expected, especially in nonfluent aphasic patients, because of the length of the utterances over which declination spans. To test the

interaction between tone and intonation, Thai sentences were constructed with three stressed keywords in sentence-initial, -medial, and -final positions (Gandour *et al.*, 1997). For both normal and brain-damaged speakers, results indicated that the average F_0 of tones in sentence-final position was significantly lower in F_0 than in either sentence-initial or -medial position. Contrary to expectation, no differences in task performance could be attributed to either the LH or RH. Perhaps Thai sentence intonation is manifested primarily as a final lowering effect, instead of declination. In this experiment, brain-damaged patients had to implement this lowering effect over only the small, final portion of the sentence. It is also well known that stressed syllables are less vulnerable to disruption than unstressed syllables are. The degree to which brain-damaged patients suffer prosodic deficits reflects, in part, an interaction between stress and utterance length.

Perception

Tonal breakdown in perception reveals that the LH is dominant for the perception of lexical tones in Mandarin Chinese, Cantonese, Thai, and Toisanese (Baum and Pell, 1999; Gandour, 1998a,b). Those tones that are most susceptible to perceptual confusion are precisely those that are phonetically similar in height and shape to others in the tone space. For example, the mid and low tones are vulnerable to confusion in Thai and the high rising (tone 2) and low falling rising (tone 3) tones are vulnerable to confusion in Mandarin Chinese. The LH also emerges as the dominant hemisphere for the perception of Norwegian pitch accent distinctions. Although some caution is in order due to methodological concerns (Wong, 2002), the extant data on tonal deficits clearly implicate the LH.

Functional Neuroimaging

Functional neuroimaging refers to methods that are currently available for the noninvasive measurement of brain activity in humans (for review of functional neuroimaging methods in cognitive neuroscience, see Rugg (1999)). The role neuroimaging plays in cognitive neuroscience is to allow identification of functional-level elementary operations that support cognitive processing (e.g., language) and determination of how these operations are instantiated in the human brain (Binder and Price, 2001). Modern functional brain imaging techniques include, among others, positron emission tomography (PET), functional magnetic resonance imaging (fMRI), and magnetoencephalography (MEG) (see Rugg, 1999, and references therein). These brain imaging methods complement the lesion-deficit approach. Most importantly, they provide a window for viewing neural activity underlying cognitive processing in both hemispheres *in vivo* in neurologically intact subjects. In regard to speech prosody, an overwhelming majority of the brain imaging experiments to date have focused on the underlying basis for hemispheric asymmetry in speech perception (Baum and Pell, 1999; Dogil *et al.*, 2002; Gandour, 2005; Wong, 2002).

Tone

In studies of pitch processing, a fundamental question is whether shared neural mechanisms at higher cortical levels are engaged for pitch perception of linguistic and nonlinguistic auditory stimuli. PET was used to compare pitch processing in native speakers of two tone languages, Chinese and Thai, and in speakers of English, a nontone language (Gandour *et al.*, 2000). Participants were asked to perform focused-attention, speeded-response, auditory discrimination judgments of tone and pitch vs. a passive silent baseline. In the tone condition, they judged pitch patterns of Thai tones; in the pitch condition, they judged homologous pitch patterns in nonspeech stimuli. When comparing the tone to the pitch task, only the Thai group showed significant activation in left posterior inferior frontal regions. These differential patterns of brain activation across language groups and tasks support the view that pitch patterns are processed at higher cortical levels in a top-down manner according to their linguistic function in a particular language.

A LH specialization for tonal processing is also observed in native speakers of Mandarin Chinese when they are asked to make discrimination judgments of Chinese tones and of homologous pitch patterns in low-pass-filtered versions of the same stimuli (Gandour, 2005, and references therein). Chinese listeners extracted tonal information associated with the Chinese tones via left inferior frontal regions in both speech and nonspeech stimuli (**Figure 3**). The tone task required judgments of Chinese pseudowords; the pitch task required judgments of nonwords. Chinese listeners apparently respond to tonal phonemes at the prelexical stage of processing in both tasks, as evidenced by the absence of any significant increases in regional blood flow on the tone task relative to pitch. Conversely, English listeners exhibited activation in homologous areas of the RH. Pitch processing is lateralized to the LH only when the pitch patterns are phonologically significant to the listener; otherwise, processing is lateralized to the RH. A similar leftward asymmetry was observed in the Chinese group when judging Chinese

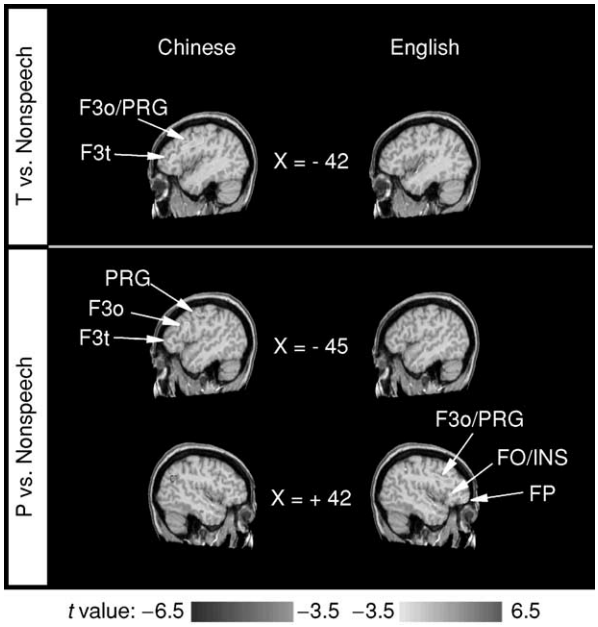

Figure 3 Averaged positron emission tomography (PET) activation maps of Mandarin Chinese (left) and English (right) listeners for the tone (top panel) and pitch (bottom panel) tasks, superimposed on anatomic images transformed to a standard stereotaxic space (T, tone; P, pitch; F3o, inferior frontal gyrus/pars opercularis; PRG, precentral gyrus/premotor cortex; F3t, inferior frontal gyrus/pars triangularis; FO, frontal operculum; INS, insula; FP, frontal pole). Activation foci are observed in the left inferior frontal gyrus of Chinese listeners in both the tone and pitch tasks relative to passive listening. In the pitch task, activation patterns in the left and right frontal lobes are complementary between language groups. Data adapted from Hsieh L, Gandour J, Wong D & Hutchins G (2001). 'Functional heterogeneity of inferior frontal gyrus is shaped by linguistic experience.' *Brain and Language 76*, 227–252, with permission.

consonants and vowels. It appears that LH mechanisms mediate processing of linguistic information irrespective of acoustic cues or type of phonological unit, segmental or suprasegmental.

Whether a particular auditory/acoustic cue serves a phonological function in a listener's native language dictates laterality. No activation occurs in left frontal regions for English listeners on either the tone or pitch task because they judge auditory features of Chinese tones that are not phonologically significant in the English language. Similarly, when judging Thai tones, Chinese listeners fail to show activation of LH regions (Gandour *et al.*, 2000, 2002).

Tone vs. Vowel Length

Whereas some studies support speech-specific circuits, others suggest that lateralization is dictated by relative computational demands of complex auditory signals in the spectral or time domains. To examine how the brain processes linguistically relevant spectral and temporal information, fMRI was used to investigate Thai speech, a language in which spectral processing, associated with lexical tones, and temporal processing, associated with vowel length, can be differentiated (Gandour *et al.*, 2002). Thai and Chinese participants were asked to perform discrimination judgments of pitch and timing patterns presented in the same auditory stimuli in two different contexts: linguistic (Thai speech) and nonlinguistic (nonspeech hums). In the speech condition, tasks required judging Thai tones (T) and vowel length (VL); in the nonspeech condition, tasks required judging homologous pitch contours (P), and duration patterns (D). A remaining task required listening passively to nonspeech hums (L). Only the Thai group showed activation in the left inferior prefrontal cortex in speech minus nonspeech contrasts for spectral (T vs. P) and temporal (VL vs. D) cues (Figure 4). Thai and Chinese groups, however, exhibited similar frontoparietal activation patterns in nonspeech hums minus passive listening contrasts for spectral (P vs. L) and temporal (D vs. L) cues. Regardless of the neural mechanisms underlying low-level auditory processing, these findings clearly indicate that hemispheric specialization is sensitive to language-specific factors. The type of acoustic cue underlying a phonological contrast is not as important as whether a particular cue serves a phonological function. Like Thai, the Chinese language exploits variations in F_0 to signal tonal contrasts. Unlike Thai, temporal variations in vowels are not exploited phonologically. Despite experience with lexically contrastive F_0 contours, the Chinese group still failed to show LH lateralization for Thai tones.

Tone vs. Onset/Rhyme

The optimal test for phonetic extraction requires that nonminimal pairs (e.g., *beep* vs. *doom*) be compared directly to minimal pairs (e.g., *bag* vs. *gag*). In nonminimal pairs, subjects must separate the individual phonetic units from the whole syllable in order to make a same/different judgment. In minimal pairs, subjects do not necessarily need to tease apart the phonetic units or even to be able to classify the paired stimuli into linguistic categories. A crosslinguistic fMRI study (Gandour, 2005) was conducted to investigate neural mechanisms involved in extraction of Chinese consonants (onsets), rhymes, and tones from minimal and nonminimal pairs. Chinese and English subjects performed discrimination judgments of targeted subsyllabic units. Direct between-group comparisons of consonants, rhymes, and tones in both minimal and nonminimal pairs, segmental and suprasegmental alike, revealed increased activation

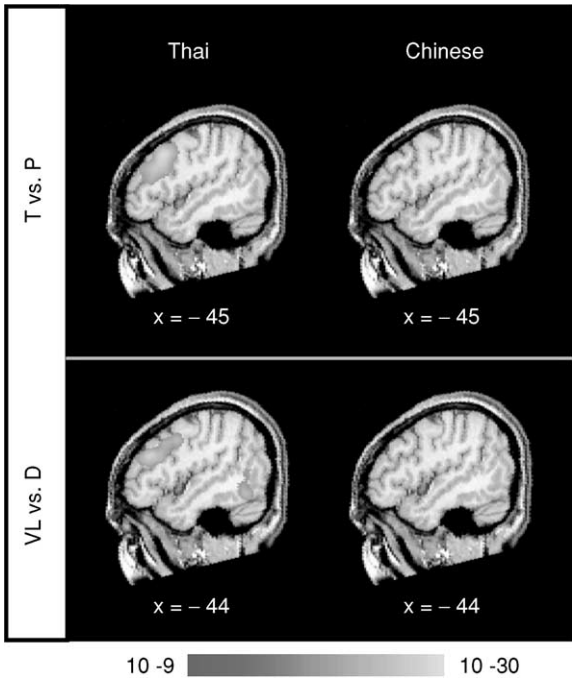

Figure 4 Averaged functional magnetic resonance imaging (fMRI) activation maps for the groups of native Thai and Chinese speakers, showing crosslinguistic differences in brain activation for the spectral contrast between Thai tones (T) and pitch (P) (top panel) and the temporal contrast between Thai vowel length (VL) and duration (D) (bottom panel). Each panel shows a left sagittal section through stereotaxic space of activation maps, superimposed onto a representative brain anatomy. Left-sided activation foci in frontal and temporo-occipital regions occur in the Thai group only. Student's *t*-statistic values are represented by a color scheme whereby the significance levels increase from red to yellow. Reprinted from Gandour J, Wong D, Lowe M, Dzemidzic M, Satthamnuwong N, Tong Y, *et al.* (2002). 'A cross-linguistic FMRI study of spectral and temporal cues underlying phonological processing.' *Journal of Cognitive Neuroscience 14*(*7*), 1076–1087.

for the Chinese group in a widely distributed network in frontal, parietal, and temporal regions of the LH. Within-group comparisons of nonminimal and minimal pairs showed that frontal and parietal activity varies for each subsyllabic component. In the frontal lobe, for example, the Chinese group showed bilateral activation of the anterior middle frontal gyrus (MFG) for rhymes and tones only. Rhymes induced greater activation in the left posterior MFG for the Chinese group when compared to consonants and tones in nonminimal pairs (Figure 5). The activation of this network in processing nonminimal pairs shows that phonetic segmentation varies as a function of the subsyllabic unit in relation to both task demands (e.g., attention, memory) and syllable structure. The fact that the rhyme elicits greater activation in the left posterior MFG than either consonant or tone does indicates that not all units are treated alike in terms of phonetic segmentation.

Tone vs. Syllable

In an attempt to isolate mediational components that may be involved in phonetic extraction, an fMRI experiment was conducted on Mandarin Chinese tones to compare tonal matching to a control condition in which whole syllables are matched to one another (Gandour, 2005). In both conditions, auditory stimuli and task procedures were kept constant. It is thus possible to segregate the extraction of subsyllabic units from whole syllables, mediated by selective attention, which is guided either to a subpart of the syllable or to the whole syllable. Results showed a left-sided frontoparietal attention network, including a dorsolateral region of posterior prefrontal cortex in the vicinity of the junction of the precentral and inferior frontal sulci (PCS/IFS), a medial frontal presupplementary motor area (pre-SMA), and regions within the superior parietal lobule (SPL) (Figure 6). This network, in full or in part, has been observed in other studies that cut across sensory modalities, linguistic categories, and other domains. The pre-SMA retrieves a memory scheme for initiating preparation prior to each processing step in the task; the PCS/IFS junction area encodes the perceived signal, stores it for immediate matching, and transfers the matched code to the neighboring motor area for a response; the SPL marks and maintains the engagement of the activity in the PCS/IFS area so that the to-be-matched target and probe can be properly paired. In the language domain, these mediational processes make it possible for a listener to extract linguistically significant parameters in his/her native language.

Tone vs. Intonation

Speech prosody is processed in neither a single region nor in a specific hemisphere, but engages multiple areas comprising a large-scale spatially distributed network in both hemispheres. Evidence supporting a RH role in the perception of prosodic units at phrase- and sentence-level structures has been wide-ranging (Baum and Pell, 1999). Equally compelling has been evidence supporting involvement of the LH in the perception of prosodic units at syllable- or word-level structures. A key question is whether the observed laterality effects in tone perception are due to level of linguistic representation or to size of temporal domain, or to both. Chinese tones are manifested at the syllable level and intonation is manifested at the sentence level. When asked to compare lexical tones in three-syllable sentence pairs, Chinese listeners show frontoparietal activation in the LH (Gandour, 2005). Bilateral frontoparietal activity is observed when they are asked to compare intonation in the same sentences. In a direct comparison of tone and

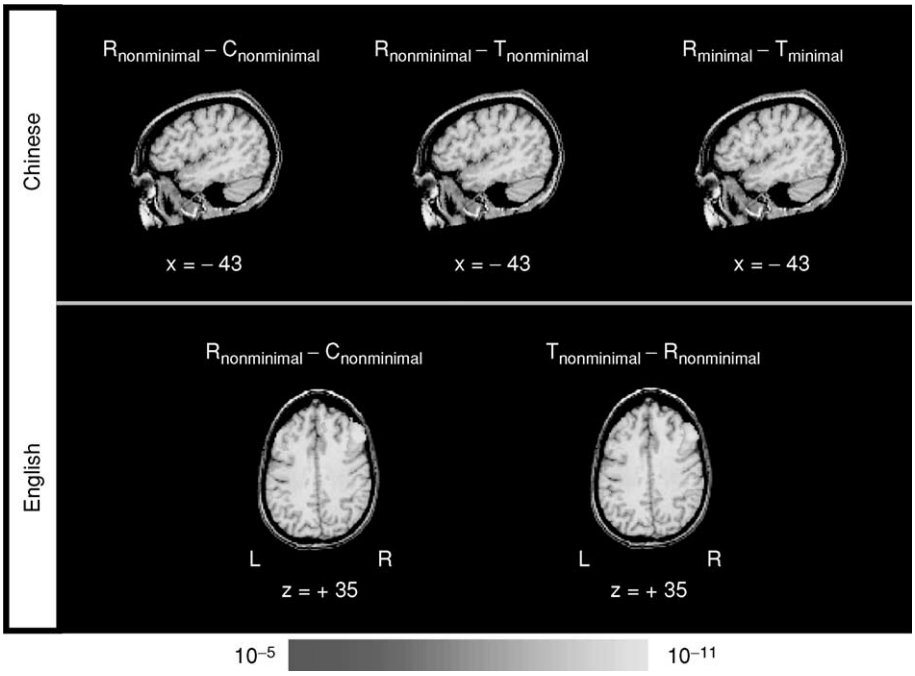

Figure 5 Averaged functional magnetic resonance imaging (fMRI) activation maps obtained from comparison of consonant vs. rhyme vs. tone tasks by nonminimal and minimal pair conditions within the Chinese (upper panel) and English (lower panel) language groups (C, consonant; R, rhyme; T, tone; L, left hemisphere; R, right hemisphere). The Chinese group shows a common focus of activation in the left posterior middle frontal gyrus in comparisons of $R_{nonminimal}$ minus $C_{nonminimal}$, $R_{nonminimal}$ minus $T_{nonminimal}$, and $R_{minimal}$ minus $T_{minimal}$. The English group, on the other hand, shows activation of the posterior middle frontal gyrus and inferior parietal lobule bilaterally in comparisons of $T_{nonminimal}$ minus $C_{nonminimal}$ and $T_{nonminimal}$ minus $R_{nonminimal}$. Reprinted from Gandour J, Xu Y, Wong D, Dzemidzic M, Lowe M, Li X, *et al.* (2003). 'Neural correlates of segmental and tonal information in speech perception.' *Human Brain Mapping 20*(*4*), 185–200.

intonation, the latter is found to engage only RH mechanisms in frontotemporal regions.

In an fMRI study (Gandour *et al.*, 2004), brain activity was elicited by selective attention to Chinese intonation and tone presented in three-syllable and one-syllable sentence pairs. The Chinese group exhibited greater activity than the English group did in a left inferior parietal region, across tasks. Only the Chinese group exhibited a leftward asymmetry in inferior parietal and posterior superior temporal, anterior temporal, and frontopolar regions. Both language groups shared a rightward asymmetry in the midportions of the superior temporal sulcus and MFG, irrespective of prosodic unit or temporal interval.

These crosslanguage differences in laterality of particular brain regions are hypothesized to depend on a listener's implicit knowledge of the relation between external stimulus features (acoustic/auditory) and internal conceptual representations (linguistic/prosodic). All regions in the frontal, temporal, and parietal lobes that are lateralized to the LH in response to all tasks or subsets of tasks are found in the Chinese group only (Figure 7). Conversely, the two regions in the temporal and frontal lobes that are lateralized to the RH are found in both language groups. LH laterality reflects higher order processing of internal representations of Chinese tone and intonation, whereas RH laterality reflects lower order processing of complex auditory stimuli (see Valaki *et al.*, 2004). These findings cannot be explained by a model that claims that segmental, lexical (e.g., tone), and syntactic information is processed in the LH and that suprasegmental sentence-level information (e.g., intonation) is processed in the RH (Friederici and Alter, 2004). Rather, they most likely reflect task demands related to retrieval of internal representations associated with tone and intonation.

Tone Perception by Nonnative Speakers

Evidence from the behavioral, neuropsychological, and functional neuroimaging literature consistently points to the lack of LH dominance in the processing of lexical tone by English speakers who have had no prior experience with a tone language. The question arises as to what the effects on brain processing are for nonnative speakers learning a tone-based second language (L2). Cortical modification resulting from L2 acquisition of Mandarin Chinese tones was investigated using fMRI to compare cortical activation

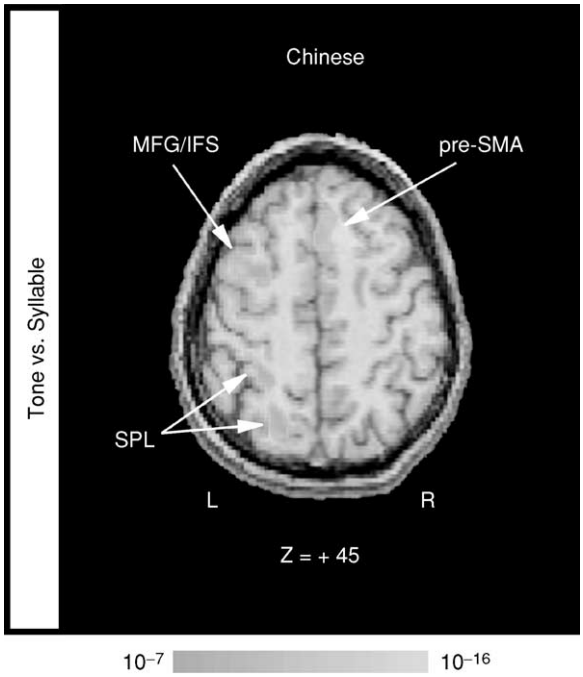

Figure 6 Averaged functional magnetic resonance imaging (fMRI) activation map obtained from a direct comparison of tone vs. syllable discrimination judgments for a group of 12 native speakers of Chinese (IFS, inferior frontal sulcus; SMA, supplementary motor area; SPL, superior parietal lobule). This horizontal section shows brain activity in dorsal aspects of the left frontal and parietal lobes. Data adapted from Li X, Gandour J, Talavage T, Wong D, Dzemidzic M, Lowe M, *et al.* (2003). 'Selective attention to lexical tones recruits left dorsal frontoparietal network.' *NeuroReport 14*(*17*), 2263–2266.

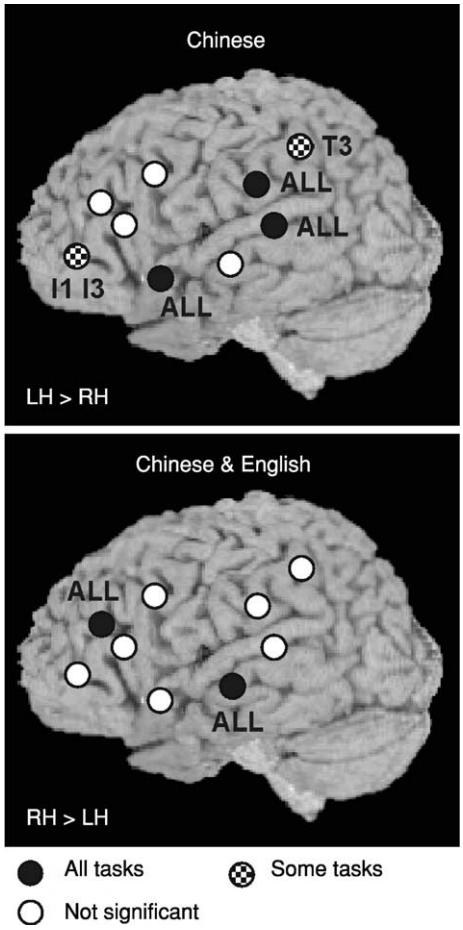

Figure 7 Laterality effects for regions of interest (ROIs) in the Chinese group only, and in both Chinese and English groups, rendered on a three-dimensional left hemisphere (LH) template for common reference. In the Chinese group (top panel), the inferior parietal lobule (IPL), anterior superior temporal gyrus (aSTG), and posterior superior temporal gyrus (pSTG) are left-lateralized (LH > RH) across tasks; the anterior middle frontal gyrus (aMFG) (I1, I3) and inferior parietal sulcus (IPS) (T3) are left-lateralized for specific tasks. In both groups (bottom panel), the mid middle frontal gyrus (mMFG) and mid superior temporal sulcus (mSTS) are right-lateralized (RH > LH) across tasks (bottom right panel). Other ROIs do not show laterality effects. No region of interest elicited either a rightward asymmetry for the Chinese group only, or a leftward asymmetry for both Chinese and English groups. Reprinted from Gandour J, Tong Y, Wong D, Talavage T, Dzemidzic M, Xu Y, *et al.* (2004). 'Hemispheric roles in the perception of speech prosody.' *Neuroimage 23*, 344–357, with permission.

during a tone identification task before and after a 2-week training procedure for adult English-speaking beginning learners (for review of Mandarin Chinese tone processing by second-language learners, see Wang *et al.* (2005)). Cortical effects of learning Chinese tones were associated with increased activation in the left posterior superior temporal gyrus (STG), recruitment of additional cortical volume within adjacent regions of the left STG, and recruitment of additional cortical volume within the right inferior frontal gyrus. These early cortical effects of learning lexical tones involve both the expansion of preexisting language-related areas and the recruitment of additional cortical regions specialized for functions required by the second language.

Conclusions

Lexical tones are better thought of as emerging from a mosaic of multiple local asymmetries, whereby different regions are differentially weighted in laterality, depending on cognitive domain, sensory modality, and task-related features. Hypotheses that are function-based or parameter-based capture only part of the phenomenon (see Dogil *et al.* (2002) and Friederici and Alter (2004); for competing hypotheses on speech prosody and the brain, see Ivry and Robertson (1998) and Zatorre *et al.* (2002)). The view here is that lexical tones, or intonation, for that matter, are lateralized to neither the LH nor the RH exclusively (Gandour *et al.*, 2004).

A viable, neurobiological model of speech prosody must allow for dynamic interactions between the two

hemispheres via the corpus callosum. Whereas the RH is engaged in pitch processing of complex auditory signals, including pitch variations associated with various aspects of speech prosody, the LH appears to be recruited to process categorical information to support phonological processing, as well as syntactic and semantic processing (see Friederici and Alter, 2004). Neuroimaging data point to functional segregation of frontal, temporal, and parietal regions, as well as to their functional integration as part of widely distributed cortical networks (for conceptual frameworks that have been proposed to underlie the neuroanatomical and functional organization of speech perception, see Hickok and Poeppel (2004) and Scott and Wise (2004)). For example, LH networks in the temporal lobe that are sensitive to phonologically relevant parameters from the auditory signal are located in anterior and posterior, as opposed to central, regions of the STG/STS (Gandour *et al.*, 2004). The anterior region appears to be part of an auditory–semantic processing stream and the posterior region appears to be part of an auditory–motor processing stream. Both processing streams, in turn, project to convergence areas in the frontal lobe. Such perspectives are essential for future advances in our understanding of the neural bases of speech prosody.

See also: Phonetics, Acoustic; Evolution of Phonetics and Phonology; Psycholinguistics: History.

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Tone: Phonology

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A tone language is a language in which the pitch of the voice can change the meaning of the word. In Cantonese (Chinese, Yue), for example, [yau] has six meanings depending on its tone:

(1) *[yau] in Cantonese*

high level	'worry'	high rising	'paint' (N)
mid level	'thin'	low level	'again'
very low level	'oil'	low rising	'have'

This is distinct from intonation, in which pitch changes may signal sentence-level meanings such as questions or surprise. All languages seem to use pitch intonationally, but only some 60–70% are like Cantonese in using it lexically. This includes most of the languages of sub-Saharan Africa, east and southeast Asia, and Central America; many in North and South America and the Pacific; and even a number of languages of Western Europe, such as Swedish and some varieties of Dutch. The only continent which seems to have no tone languages is Australia.

Tone languages may distinguish at least four different pitch levels, as in the West African language Mambila and the Mexican language Mazateco, and some contrast five levels, such as Dan (West Africa), Miao-Yao (Southeast Asia), and Trique (Mexico). They may also distinguish between level tones, rising tones, falling tones, and more complex rise-falls or fall-rises. Cantonese, for example, has four levels (one of which falls slightly) and two rises. Two contours of the same shape seem to be the maximum, although there are rare reports of three, for example Chatino (Mexico).

Pitch is controlled by the larynx in ways that are not fully understood, but that include varying the tension of the vocal folds and the height of the larynx. These laryngeal mechanisms also play a role in voicing, glottalization, and aspiration, and this fact underlies the historical origins of tone. Typically, a contrast between voiced and voiceless syllable-initial consonants gave rise to a contrast between lower and higher tones on the following vowel. Glottal stops and [h] at the end of the syllable gave rise to rising and falling tones respectively on the preceding vowel. This process is known as tonogenesis, and is well documented and understood, particularly in the languages of east and southeast Asia. See Hombert *et al.* (1979) for an excellent review.

The main acoustic correlate of tone is the fundamental frequency of the speech signal, known as $F_{Ø}$. This is the rate of vibration of the vocal folds, and ranges from a low of around 80 cycles per second for the lowest speaking pitch of a male voice, to a high of around 400 cycles per second for the highest speaking pitch of a female voice. As a result, the high tone of male may have an $F_{Ø}$ that is lower than the low tone of a female or a child.

The actual pitch of a tone may depend on its context. A striking example is the phenomenon known as 'downstep.' In many languages with a high (H) vs. low (L) tone contrast, high tones are pronounced lower in pitch after a low tone than they are after another high. This gives the illusion of a third tone with a mid pitch, but it is entirely predictable from the context. The process repeats, so each subsequent

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very low level	'oil'	low rising	'have'

This is distinct from intonation, in which pitch changes may signal sentence-level meanings such as questions or surprise. All languages seem to use pitch intonationally, but only some 60–70% are like Cantonese in using it lexically. This includes most of the languages of sub-Saharan Africa, east and southeast Asia, and Central America; many in North and South America and the Pacific; and even a number of languages of Western Europe, such as Swedish and some varieties of Dutch. The only continent which seems to have no tone languages is Australia.

Tone languages may distinguish at least four different pitch levels, as in the West African language Mambila and the Mexican language Mazateco, and some contrast five levels, such as Dan (West Africa), Miao-Yao (Southeast Asia), and Trique (Mexico). They may also distinguish between level tones, rising tones, falling tones, and more complex rise-falls or fall-rises. Cantonese, for example, has four levels (one of which falls slightly) and two rises. Two contours of the same shape seem to be the maximum, although there are rare reports of three, for example Chatino (Mexico).

Pitch is controlled by the larynx in ways that are not fully understood, but that include varying the tension of the vocal folds and the height of the larynx. These laryngeal mechanisms also play a role in voicing, glottalization, and aspiration, and this fact underlies the historical origins of tone. Typically, a contrast between voiced and voiceless syllable-initial consonants gave rise to a contrast between lower and higher tones on the following vowel. Glottal stops and [h] at the end of the syllable gave rise to rising and falling tones respectively on the preceding vowel. This process is known as tonogenesis, and is well documented and understood, particularly in the languages of east and southeast Asia. See Hombert *et al.* (1979) for an excellent review.

The main acoustic correlate of tone is the fundamental frequency of the speech signal, known as $F_{Ø}$. This is the rate of vibration of the vocal folds, and ranges from a low of around 80 cycles per second for the lowest speaking pitch of a male voice, to a high of around 400 cycles per second for the highest speaking pitch of a female voice. As a result, the high tone of male may have an $F_{Ø}$ that is lower than the low tone of a female or a child.

The actual pitch of a tone may depend on its context. A striking example is the phenomenon known as 'downstep.' In many languages with a high (H) vs. low (L) tone contrast, high tones are pronounced lower in pitch after a low tone than they are after another high. This gives the illusion of a third tone with a mid pitch, but it is entirely predictable from the context. The process repeats, so each subsequent

H after a L is lower still. In Shona, a Bantu language, an underlying LHLHLHLH sequence is pronounced with each H lower than the last.

Phonologists working on tone have made two striking claims. First, contour tones are not indivisible units characterized by features such as [+rising] or [+falling], but instead are composed of sequences of level tones. A rise is a LH sequence, and a fall is a HL sequence, pronounced on a single syllable. Second, tones have a high degree of independence from the segments on which they are pronounced, very much like the melody of a song is separate from the lyrics. As a result they show a number of unusual behaviors: mobility, stability, one-to-many mapping, many-to-one mapping, toneless syllables, and floating tones.

Mobility is the ability of a tone to move a long distance from its point of origin. For example, in the Bantu language Chizigula (Kenstowicz and Kisseberth, 1990) some verbs such as /lo̱mbez/ have underlying H tones, shown by the underlined syllable, and every form of the verb is pronounced with one high-toned syllable. However, the tone does not necessarily show up on the verb root, but instead on the penultimate syllable of the suffixed verb, as can be seen in the right-hand column below. In contrast, the left-hand column shows a verb with no high tone, in which no syllable has high surface pitch. Here and henceforth, an acute accent denotes H tone, and a grave accent or no accent L tone.

(2)	*Toneless verbs:*		*H-tone verbs:*	
	ku-damany-a	'to do'	ku-lo̱mbéz-a	'to request'
	ku-damany-iz-a	'to do for'	ku-lo̱mbez-éz-a	'to request for'
	ku-damany-iz-an-a	'to do for e.o.'	ku lo̱mbez-ez-án-a	'to request for e.o.'

Stability is the resistance of tones to deletion or movement, even when the vowels on which they originate are deleted or moved. In Thai, a language game exchanges portions of two syllables. However, the tones stay behind, so that the tonal melody is unaffected. In the example below, the /H/ from /en/ stays behind on the first syllable, and surfaces on [am]. /en/ on the other hand surfaces with the /M/ that originated on /am/. A horizontal macron shows mid tone.

(3) tén rām → tám rēn 'dance' (Melody: H M)

One-to-many and many-to-one refer to the mappings between tones and syllables. In a one-to-many mapping, one tone spreads out over several syllables to form a tonal plateau. In Chiquihuitla Mazatec (Mexico; Jamieson, 1977) we see unbounded spread of high tones. In this example, the last tone of the first morpheme spreads rightwards, obliterating all other tones except the last:

(4) kihMH -nkaM -muMsuML → kihMH nkaH muHsuHL
went again hired worker

In a many-to-one mapping, two or more tones are pronounced on single syllable. In Siane nouns (Papua New Guinea; James, 1994), contours are formed only when excess tones have nowhere else to go. A monosyllabic noun with two underlying tones LH shows up with only the L tone on the noun root, and the H tone on any suffix. Only if there is no suffix do the two tones surface on the noun itself, forming a rising contour shown by the hacek accent.

(5)	/yoLH/	yo + te	→	yòLtéH	'fire, 1sg.poss'
		yo	→	yǒLH	'fire'

Finally, even in tone languages, some syllables may be underlyingly toneless, and take their phonetic pitch entirely from the surrounding tones. This is also a common outcome for unstressed syllables which may lose any underlying tones. Conversely, some tones may not have underlying segmental hosts. These 'floating tones' manifest their presence only when they attach to a neighboring tone. In Cantonese, for example, there is a suffix that consists solely of a H tone (Yip, 2002). When this attaches to the final syllable of a word, it creates a new tone that starts at the starting pitch of the original syllable, and ends high. Thus the low-toned /yipL/ becomes rising [LH], but the originally high falling /paiHL/ becomes high level [HH], squeezing out the L of the original fall. Such floating tones may exert influence on other tones even when they are not themselves pronounced. In many Bantu languages, floating L tones may cause 'non-automatic' downstep of a following H.

These properties of tone have given rise to a theory known as 'autosegmental phonology' (Goldsmith, 1976), in which tone is represented on a separate tier from the segments and linked to them by association lines. Under this approach, the two diagrams below show first a tonal plateau like the one created by spreading H tone in Mazateco above, and then a contour tone like the one created in Cantonese affixation:

(6) *Tonal plateau* *Contour tone*

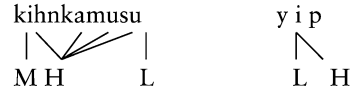

The richness of these tonal patterns is constrained in a variety of ways. Contour tones, particularly rises, are often found only on final syllables or long vowels. High tones may be attracted to prominent or stressed positions. Languages may avoid sequences of two syllables with identical tones, so that two adjacent H-toned morphemes may dissimilate, with one becoming L or deleting. In Bantu, this well-known

process is called Meeussen's Rule, but it is understood as an instance of a very general phonological phenomenon applicable well beyond tonal phonology, dubbed the Obligatory Contour Principle, or OCP (Leben, 1973).

Although lexical tone may distinguish one word from another, it is also used for grammatical purposes. In many Bantu languages it signals tense and aspect distinctions, so that in the N. Karanga dialect of Shona (Odden, 1981) [..biki-is-a] means '*make cook*' but [..bik-ī́s-a], with a H tone on the second syllable, means '*didn't make cook*'. Tonal morphemes are common. In Yoruba (Akinlabi and Lieberman, 2000), subject noun phrases are marked by a H tone suffix, as in the first word in these sentences:

(7) L + H → LH bàtà já → bàtǎ já 'The shoe got cut'

(8) H + H → H Délé lɔ → Délé lɔ 'Dele went'

Tone interacts with the morpho syntax in other ways. Tones may change in a context that is partly defined by the syntax. In the Min dialects of Chinese (Chen, 2000), every tone has two variants. One is found phrase-finally, and the other is found elsewhere. The phrasing is determined largely by the syntax. The tonal changes are unusual, in that each tone changes to another one, creating a circular chainshift.

(9) *Taiwanese tonal changes: Min tone circle*

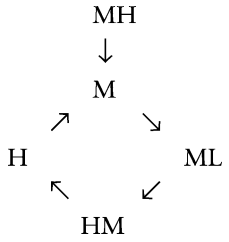

Although the summary so far may make tone seem very different from other properties of sounds, this is misleading. Many of the behaviors first noticed in tone have their counterparts in other areas of phonology. Tonal spreading has its analogues in vowel harmony and nasal harmony. Stability of tones under deletion has an analogue in the retention of nasality on a neighboring vowel after loss of a coda nasal. Contour tones, in some ways, resemble affricate consonants, in that both change a feature (tone or continuancy) midway through a segment. Loss of tones on unstressed syllables looks very similar to the reduction of unstressed vowels to schwa.

Can one discern subtypes of tonal systems as one looks across languages, and do these coincide with particular language families or geographical areas? Up to a point, the answer is 'yes,' but more careful scrutiny shows that 'Asian-type' tone languages are found in Africa, and vice versa. Further, the differences are more illusory than real. Traditionally, we think of African tonal languages as having (1) small tonal inventories, often just H versus L (2) few contour tones, and only on final syllables (3) very mobile tones (4) few tones per word. Asian tone languages, on the other hand, are usually said to have (1) large tonal inventories, with several levels and various contours (2) contour tones occurring prolifically and freely on any syllable (3) tones largely remaining in their underlying position (4) lots of tones per word. All of these generalizations turn out to have copious exceptions. For example, the West African Kru language Grebo (Liberian Grebo) (Newman, 1986) has four level tones and two different rising tones, and the rising tones are not restricted to final position. Conversely, Lhasa Tibetan, under some assumptions, (Duanmu, 1992), has only a H and a LH tone, and the LH only surfaces as a rise on final syllables. Elsewhere, the H moves off its original syllable onto the next syllable, exactly as in the African language Mende, or the New Guinea language Siane. Duanmu (2000) pointed out that many of the differences in tonal behavior follow from other facts about the languages in question. If a language has no heavy syllables, then it is less likely to have contour tones. Bantu languages, for example, often have a strict CV syllable structure, whereas Mandarin Chinese has CVV and CVC syllables. If a language has a rich affixing morphology, as in Bantu, then tones are likely to be more mobile; however, Chinese languages have few affixes, preferring to form new words through compounding.

One subtype of tonal languages is an accentual language, like Japanese or Lithuanian. Many phonologists would now argue that accent is represented as tone, but tone that is linked to a particular syllable and does not move around. Such languages have small tonal inventories (often only one) and each word has few tones (again, usually only one) (*see* **Accent**).

See also: Accent; Autosegmental Phonology; Chinese (Mandarin): Phonology; Kimatuumbi: Phonology; Tone: Neurophonetics.

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Tonga: Language Situation

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Tonga a constitutional monarchy, at which time he emancipated the serfs, he promulgated a new code of law, and limited the power of the chiefs. Tonga became a British protected state under a Treaty of Friendship in 1900, when European settlers and rival Tongan chiefs tried to oust the second king. The Treaty of Friendship and protected state status ended in 1970 under arrangements established prior to her death by the third monarch, Queen Salote. Tonga joined the Commonwealth of Nations in 1970 and the United Nations in 1999. The official languages of the Kingdom of Tonga are English and Tongan. The latter is a Polynesian language closely related to Niue. There are slight dialect differences from north to south. The ethnic group is predominantly monolingual in Tongan. A minority of islanders speak Niuafo'ou, which is probably a dialect of East Uvean (Wallisian). Most Niuafo'ou speakers are bilingual in Tongan. Another language, now extinct, is known from a few words collected by Westerners in the 17th century to have been in use on Tonga; Niuatoputapu disappeared before the 19th century and the ethnic group now speaks Tongan.

See also: Austronesian Languages: Overview.

Language Maps (Appendix 1): Map 174.

Tooke, John Horne (1736–1812)

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Tooke, born *John Horne* on June 25, 1736 in Westminster, was a cleric, political agitator and amateur philologist famous for writing *The diversions of Purley*, published in two volumes in 1786 and 1805. To honor his friend and patron, William Tooke, Horne added the name Tooke to his own in 1782, and he included Purley, Tooke's estate where Horne lived free of charge while writing the first volume of this large work, in its title. Horne Tooke was ordained in 1760, but his true interests lay in politics and the law. He was active in several organizations seeking constitutional reform, even founding the Constitutional Society around 1770. Such involvement landed him in prison in 1778, convicted of seditious libel for supporting the American colonists, and got him accused of treason in 1794, though he was acquitted. He eventually retired to Wimbledon where he died on March 18, 1812.

Tooke's imprisonment in 1778 first afforded him time to pursue a long-standing interest in language. He wrote *A letter to John Dunning, Esq.*, a 72-page linguistic analysis of the precedent that had been quoted against him, focusing particularly on the semantics and grammar of conjunctions and prepositions. He claimed to be the victim of "two prepositions and a conjunction."

This letter was later incorporated into the much longer *Epea pteroenta* or *The diversions of Purley*, which was written in the form of conversations involving himself, William Tooke, and Richard Beadon (Vol. 1) and himself and Sir Francis Burdett (Vol. 2). A third volume was planned for which Tooke even received some payments, but he burned it before his death.

The Greek title, *Epea pteroenta* ('winged words'), relates to the central notion of abbreviation in Tooke's theory of language. Starting with Locke's materialist philosophy (*see* **Locke, John (1632–1704)**), Tooke held that all ideas (and words) originally come from simple sensations, but complex ideas arise when one word is used to represent a series of sensations, and such words are 'abbreviations,' which are necessary to enable efficient communication. Tooke then used etymologies to reveal the 'true' meanings of words, the sensations from which they were derived (e.g., 'through' comes from 'door'). This was opposed to the grammars of Harris and Monboddo (*see* **Harris, James (1709–1780)** and **Burnett, James, Monboddo, Lord (1714–1799)**).

Tooke's political and linguistic ideas worked together. *The diversions of Purley* was essentially an attempt to undermine the idea that certain realms of discourse, such as politics and law, were only accessible to upper classes by showing the simple roots of ideas in experiences and etymologies that are universally accessible.

The impact of Tooke's *The diversions of Purley* was profound, influencing Coleridge and James Mill, among others, but it was quickly outmoded, though only reluctantly discarded in the English popular imagination, by developments in comparative philology in Germany.

See also: Burnett, James, Monboddo, Lord (1714–1799); English, Early Modern; Harris, James (1709–1780); Locke, John (1632–1704).

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Tooke's imprisonment in 1778 first afforded him time to pursue a long-standing interest in language. He wrote *A letter to John Dunning, Esq.*, a 72-page linguistic analysis of the precedent that had been quoted against him, focusing particularly on the semantics and grammar of conjunctions and prepositions. He claimed to be the victim of "two prepositions and a conjunction."

This letter was later incorporated into the much longer *Epea pteroenta* or *The diversions of Purley*, which was written in the form of conversations involving himself, William Tooke, and Richard Beadon (Vol. 1) and himself and Sir Francis Burdett (Vol. 2). A third volume was planned for which Tooke even received some payments, but he burned it before his death.

The Greek title, *Epea pteroenta* ('winged words'), relates to the central notion of abbreviation in Tooke's theory of language. Starting with Locke's materialist philosophy (*see* **Locke, John (1632–1704)**), Tooke held that all ideas (and words) originally come from simple sensations, but complex ideas arise when one word is used to represent a series of sensations, and such words are 'abbreviations,' which are necessary to enable efficient communication. Tooke then used etymologies to reveal the 'true' meanings of words, the sensations from which they were derived (e.g., 'through' comes from 'door'). This was opposed to the grammars of Harris and Monboddo (*see* **Harris, James (1709–1780)** and **Burnett, James, Monboddo, Lord (1714–1799)**).

Tooke's political and linguistic ideas worked together. *The diversions of Purley* was essentially an attempt to undermine the idea that certain realms of discourse, such as politics and law, were only accessible to upper classes by showing the simple roots of ideas in experiences and etymologies that are universally accessible.

The impact of Tooke's *The diversions of Purley* was profound, influencing Coleridge and James Mill, among others, but it was quickly outmoded, though only reluctantly discarded in the English popular imagination, by developments in comparative philology in Germany.

See also: Burnett, James, Monboddo, Lord (1714–1799); English, Early Modern; Harris, James (1709–1780); Locke, John (1632–1704).

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Topic and Comment

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Definitional Problems and History of the Terms

There are few terms and concepts in linguistics as problematic as Topic and Comment; few have had such a wide range of different applications that affect such fields as grammar, typology, pragmatics, and sociolinguistics. Moreover, few terms and concepts are relevant in so many different areas of application, from language instruction to professional writing (journalistic, official, legal, and political language) and from automatic text analysis to artificial intelligence. In fact, this pair of terms covers a wide range of far-reaching phenomena and properties that are found at the very center of the functioning of the linguistic system, such as referentiality, predication, the utterance-act, and information structure. The fact that definitions (and applications) were developed in different scientific spheres means that they have focused to a varying degree on these different aspects, which has at times prevented a clear view of all the problems and all the results. In addition, the general phenomena referred to above belong not only to a primarily philosophical but also to an empirical dimension, and we are still uncertain how we can reconcile these different dimensions; it is difficult to give definitive answers using individual models.

Although there are points of convergence and a level of continuity among the definitions, differences remain because their origins lie in different traditions, and the concepts have been adapted by changing scientific and cultural contexts. Attempting to superimpose terms belonging to different fields and periods is therefore problematic. The definition of Topic as 'what is being talked about' and Comment as 'what is being said about what is being talked about,' which is characteristic of American Structuralism (see Sapir, 1921; Hockett, 1958), is based on the axiom that these two parts are present in every declarative utterance. This is expressed in regulative terms by Lambrecht (1987: 254): "Do not introduce a referent and talk about it at the same time." He affirmed that the relation Topic-of "expresses the pragmatic relation of aboutness that holds between a referent and a proposition with respect to a particular discourse" (Lambrecht, 1994: 127). For an element to be able to assume the Topic function, it has to be referential. Moreover, the relation 'Topic of' is defined in entirely semantic terms: "A referent is interpreted as a topic of a proposition if in a given discourse the proposition is construed as being about this referent, i.e. as expressing information which is relevant to and which increases the addressee's knowledge of the referent" (Lambrecht, 1994: 127 and 131).

This type of definition and the axiom referred to above have their origins in a philosophical tradition that includes the whole history of Western thought. Although terms found in classical thought require accurate philological investigation and are not easily paired up with modern terms, one can argue that the splitting of an expression (*logos*) into "two inseparable semantic and referential functions" – *onoma* and *rhema* – was established by Plato and then taken up again by Aristotle (see Lyons, 1968; Lallot, 1988; Spina, 2002). Furthermore, linking referentiality to the utterance-act has an ancient provenance. The *onoma* signals actors and experiencers, whereas the *rheme* signals actions and events. Sometimes, the *onoma* is represented as content, and the *rheme* is represented as typically having an enunciative function (Spina, 2002; for an overview of the whole tradition, see Sandmann, 1979).

An underlying opposition has also been suggested for the notions of Theme and Rheme, as is found in European functional linguistics and text linguistics (*see* **Halliday, Michael A. K. (b. 1925)**; **Prague School**). In these fields, the pair is defined according

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to functional principles that are based on the speaker's needs and communicative aims. Mathesius (1983: 102) maintained, "Every bipartite utterance is composed of two components, the first of which expresses something relatively new and contains what is asserted by the sentence... The second part of the sentence contains the basis of the utterance or theme, the psychological subject according to earlier terminology, i.e. things relatively familiar or most readily available to the speaker as the starting point." The order assigned here to the first and second parts invokes a hierarchy of importance, not some linear property of the syntagmatic structure. However, the linearization of Theme and Rheme is an area that has been investigated widely by Mathesius and other Prague School theorists (see Mathesius, 1924, 1939, 1941–1942; Daneš, 1985; Sgall *et al.,* 1986; Firbas, 1992).

The categories described by the Prague School are classical tools in discourse analysis that have precedents in philosophical thought concerning textual hermeneutics (see Schleiermacher, 1988). In actual fact, no textual analysis is possible without assuming a hierarchy of informative importance for parts of the texts with respect to the speaker or to the interlocutor. However, the Prague School and North American definitions are not as rigidly separated as one might think. Mathesius (1939: 174), for example, assimilated "that which is known in a given situation" to the "utterance's starting point ... from where the speaker begins," defining the utterance's nucleus as "that which the speaker asserts with respect to the starting point ... or taking it into consideration."

However, no matter how many early versions of these concepts and terms can be found, in modern linguistics, the Topic-Comment and Theme-Rheme pairs must be understood within the scientific traditions in which they were developed and in which they continue to be used (with some subsequent modifications). Even allowing for the differences between the North American and European scientific environment, both use linguistic concepts that have been influenced by schools of pragmatism. These trends have left their mark in various ways on functional approaches of the 20th century and, in certain respects, also on some fields of North American structuralism. In fact, the definition of both of these pairs assumes that the functioning of the utterance-act or of the discourse/text is a key criterion. All 20th-century models are based on the notion of functioning (the First and Second Prague Schools, Halliday, and Chafe), but the biases of each favor either the pragmatic or the semantic dimension. In the Prague tradition, the Theme and the Rheme are considered to be the units of the actual articulation of the sentence (Functional Sentence Perspective). This concerns "the way in which the sentence is inserted into the real context from which it comes" (Mathesius, 1939: 174). Indeed, "it is only the moment of actuality that creates a sentence from the words" (Mathesius, 1924: 171).

Topic and Comment, Subject and Predicate

Lack of Alignment between Pragmatic Functions and Semantic and Grammatical Functions

In many approaches, a correspondence (if not an exact correlation) is assumed between Topic-Comment and Subject-Predicate (see Sapir, 1921; Strawson, 1974; Lambrecht, 1994). In developing a "Relevance Principle," Strawson (1974: 97) observed, "Statements or the pieces of discourse to which they belong have subjects, not only in the relatively precise sense of logic and grammar, but in a vaguer sense with which [one] shall associate the words 'topic' and 'about.'" Moreover, he noted that "stating is not a gratuitous and random human activity. We do not, except in social desperation, direct isolated and unconnected pieces of information at each other, but on the contrary intend in general to give or add information about what is a matter of standing current interest or concern" (Strawson, 1974: 97; cf. also Lambrecht, 1994).

Yet, the association of Topic-Comment and Subject-Predicate is problematic, because alongside the obvious similarities, there are also considerable differences. The first similarity lies in the actual nature of the relationship between the two parts. The question of whether the Subject is dependent on the Verb (Predicate) or whether the Predicate is dependent on the Subject has been discussed at length, and valid reasons have been proposed to support both theories (see Matthews, 1981; Graffi, 2001). However, it seems plausible to think that in each case both of the parts are necessary for the larger construction that they form (enunciation for T-C and phrase for S-P) and that they correspond and are mutually dependent (for more information on this model of interdependence or 'solidarity,' see Martinet, 1965 and 1985). There can be no Predicate without a Subject, and there can be no Subject without a Predicate; Predicate and Object, in contrast, are not linked by this kind of reciprocal relation. A second aspect that the two pairs of functions have in common concerns the canonical (or prototypical) semantico-pragmatic properties of each of the two parts: one carries reference, and the other carries the utterance-act/predication (for a philosophical account, cf. Strawson, 1974).

The differences are no less significant. Topic-Comment (T-C) or Theme-Rheme (T-R) is a representation that is anchored not at the syntactic level, but rather at a more general dimension defined as rhetorical-pragmatic (see below). In fact, it seems necessary to bring back into focus the traditional distinction among 'utterance,' 'proposition,' and 'sentence' as constructions that belong to three different dimensions; namely, the pragmatic, semantic, and syntactic. The T-C (or T-R) pair is concerned with the level of the utterance-act, and it constitutes its basic articulation. Its terms therefore need to be kept distinct from both Predicate-Arguments and Subject-Predicate, whatever similarities might exist between them. The utterance-act is defined by the speaker's communicative intention or, in other terms, by his or her desire to mean something. This type of component is not included in either the syntactic configuration or in the propositional scheme. A simple utterance such as:

(1) John loves the sea

is not represented fully by either the phrase structure of traditional constituent analysis (or any more recent version of generative grammar):

(2) [S[NP *John*] [VP[V *loves*] [NP[Det *the*] [NP *sea*]]]]

nor by the propositional scheme:

(3) p (a, b), where p = 'to love', a = 'John', b = 'sea'

but by a more complex structure that can be informally expressed as follows:

(4) as for John, I am telling you that John loves the sea

The representation in (4) demonstrates that the syntactic configuration and the propositional scheme can only be considered subparts of the whole utterance. In particular, the p component of (3) forms a lower-level predicate, the semantic representation of which is defined by three properties: bivalency, the inherent lexico-semantic features of 'to love', and the capacity to combine with arguments that have specific semantic features. In contrast, the fact that an utterance like (1) has a pragmatic representation in which a declarative statement appears does not concern the propositional predicate: It is not something that is included in the properties of the predicate 'to love,' and neither is it part of its relations with the arguments 'John' and 'sea.' The declarative statement 'I am telling' must be represented as a predicate of a higher level. The differences between the representations of the syntactic structure (2), the proposition (3), and the utterance-act (4) can be expressed in relation to the well-known distinction between 'mood' (*modus*) and the statement's content structure (*dictum*; see Bally, 1944; Graffi, 2001). The constituent that has predicative function in a sentence configuration and the predicate of the logical-semantic scheme are part of the statement's content structure. The higher predicate 'I am telling' is the mood of the utterance-act. It is not necessarily realized by phrase structure or by any other kind of segmental shape; in many languages in fact, it is normally realized by intonation. Yet, in order for an utterance-act to be formed, it must be present in any case.

Based on this schema, one can say that the division of Topic and Comment constitutes the basic structure of representations like (4). The relationship between T and C is defined by a predication at a higher level than that belonging to the predicate 'to love.' This kind of predication can be represented by the illocutionary force of statement. The Topic function does not coincide with the Subject any more than the Comment does with the Predicate. Topic and Comment belong to an organizational level that is logically higher, and their relation is determined by the declarative mood.

Significant proof of this theory is found in a well-known empirical feature that distinguishes subordinate clauses from main clauses. Only the latter can have a Topic-Comment articulation, whereas the former do not. In fact, the illocutionary force of statement is a fundamental part of the representation of main declarative clauses, whereas subordinate clauses have only the statement's content structure in their representations. The fact that, in some approaches, like the Second Prague School (see Svoboda, 1968; Firbas, 1992), subordinate clauses have been divided into Theme and Rheme illustrates a further aspect of the conceptual difference between the two pairs of terms.

Representations like (4) can account not only for utterances like (1), where the statement's content structure is made up of a Subject – (transitive) Predicate structure but also utterances where the statement's content structure has Subject – (intransitive) Predicate structure, as in (5) with the corresponding representation of the utterance-act (6):

(5) John is coming

(6) as for John, I am telling you that John is coming

Yet, not all utterances with single-arguments in the statement's content structure have a representation like (6). So-called presentative or thetic utterances like (7):

(7) JOHN is coming

that are marked in English by a focal accent on John and in other languages by the order VS do not easily conform to the Topic-Comment split. According to a line of thought that has gained wide consensus, utterances like (7) lack the Topic-Comment articulation and the Theme-Rheme split. They can be analyzed according to two different interpretations, depending on the context. In one, *John* is in Focus (in this case, the utterance has the pragmatic presupposition that someone will come), and in the other, the whole statement's content structure is in Focus (in this case, the pragmatic presupposition can be expressed by the question "what's happening?"). In the latter interpretation, single-component structures like (7) are opposed to bipartite T-C or T-R structures. This tradition of linguistic thought was influenced by the distinction made by Kant between *a priori* 'analytic' judgments and *a posteriori* 'synthetic' judgments, which are typically bipartite, and existential judgements that have no predicate. Marty reinterpreted the Kantian distinction by opposing "categorical" judgments that are bipartite and "thetic" judgements that are simple, having only one member (see Ulrich, 1985).

In this respect, there is an interesting difference between some Topic-Comment models that are in wide use today and the Theme-Rheme models from the Prague School. According to the first type, Topic is absent because this type of function needs to be realized by a constituent that has a high position in the referentiality hierarchy; canonically, this would be a NP. According to the second type, in contrast, the bipartite articulation is legitimate if (7) is interpreted as having only *John* in Focus: The verb 'to come' would be the Theme, and *John* would be the Rheme.

However, these analyses are problematic. The two interpretations of (7) could correspond to the representations of the utterance-act (8) and (9):

(8) I'm saying that the person who is coming is John

(9) I'm saying that what is happening is that John is coming

Yet, such representations can be considered, respectively, equivalent to the following:

(10) As for who is coming, I'm saying that the person who is coming is John

(11) As for what is happening, I'm saying that what is happening is that John is coming

The fact that the Topics of utterances like (7) are not realized in the linguistic structure does not prevent the analysis of the utterance-act from containing representations that make them explicit; the utterance-act also includes elements that are not verbally expressed but present in the context. This has at least two implications: (1) the distinction between elements that carry reference and elements that carry the predication, at the pragmatic level, might be more complicated than is often thought, and (2) the T-C and T-R models can be transcoded.

It becomes particularly obvious that we need representations of the utterance that are not limited to the canonical forms of configurational and propositional representation when we look at utterances whose syntactic structure contains constituents that do not have traditional Grammatical Functions. Utterances with various types of left dislocation and hanging topics, like (12), (13), and (14)

(12) John, I saw him yesterday

(13) John, I lent him the book

(14) John, his house is a complete mess

do not have identical functions: The Subject and Object (either direct or indirect) functions evidently belong to a level of representation different from that at which the Topic function is found. This question has recently been tackled in the so-called discourse configurational models of generative grammar (cf. Kiss, 1995). These models define two discourse semantic functions, Topic and Focus, the first "serving to foreground a specific individual that something will be predicated about" and the second "expressing identification" (Kiss, 1995: 6). Although this may seem a major departure from traditional generative models, which define the Topic function in purely configurational terms, the main orientation still remains on the study of how the two discourse functions are expressed through a structural (i.e., configurational) relation. In other terms, the discourse configurational models only account for the structural projections of a Function that itself belongs to another level of representation.

What has been said so far allows further consideration of the parallels between the Subject-Predicate and the Topic-Comment functions. The former defines the sentence and the latter the utterance. Both relations are crucial for functioning, at different levels. Through them, what were simple groups of elements become meaningful units at the sentence-level and carry indexical values at the utterance-level. It is at the latter level that they properly become communicative units.

Structural Implications of the Differences among Pragmatic, Semantic, and Grammatical Functions

The pragmatic and semantic differences discussed here have significant consequences for the structural level. They also involve different formal properties. In

languages in which the Subject function is morphologically encoded (this is realized by the relevant Noun Phrases and/or by the heads of Verb phrases of which they are made), such encoding does not necessarily match the structural projection of the Topic function. For example, if the linguistic system has Case marking on the Subject, this might not be required for the Topic, or it could be realized by Case marking that is not the same as the Subject's marking. Similarly, if a language has agreement between Subject and Verb, the same might not apply to the constituents that realize the Topic and Comment functions. In general, the range of types of constituents that can have the Topic function (or the Comment function) is larger than the range of types of constituents that can have the Subject or Predicate functions.

Another group of structural properties that distinguish Subjects from Topics concerns the movement properties of the relative constituents within the sentence. In certain models, the Topic function is determined by linearity. It is associated with the first or one of the first positions of the proper domain of the sentence or with an extra-sentential position to the left of the proper domain (see Graffi, 1994; Dik, 1997). The movement of the Topic constituent to another position in the sentence, in particular toward final or extra-sentential positions to the right of the proper domain (the Tail), generally leads to the constituent losing the Topic (or Theme) function. Nevertheless, the fact that there is a significant statistical correspondence across the world's languages between the basic Subject position and the Topic function appearing in the initial position (see Comrie, 1981; Tomlin, 1986) cannot be taken as conclusive proof that Subjects and Topics should be considered to be structurally equivalent. In fact, in many languages the range of grammatical functions whose constituents can occupy the initial positions of the proper domain of the sentence is not limited to the Subject function alone. One need only think of relatively common processes, such as left dislocation of direct or indirect Objects.

Finally, there are also substantial differences in the referential endophoric properties. In many languages, the grammatical Subject constituents have control properties over anaphors that the Topic constituents do not have. All the structural differences mentioned so far have implications for both typology (cf. the Topic-prominent vs. Subject-prominent language dichotomy presented by Li and Thompson, 1976 and widely used in typology) and Universal Grammar (see the important study of Keenan, 1976).

To sum up, the set of the structural properties defined by T-C, T-R and the set of structural properties defined by Subject-Predicate intersect, but do not wholly overlap. In particular, the set of constructions that realize T-C functions is larger than the set of constructions that realize the syntactic functions Subject-Predicate.

Similarities and Differences among Various Models

The concept of Topic as an element that limits or restricts the field of the predication (Chafe, 1987) is based on structural properties (for example, the fact that the Topic needs to precede the predicate) and lexico-semantic properties (specifically, contiguity and isotopy). The definition of Theme as the 'Base' or starting point of the utterance (Mathesius), or the part that conveys the lowest level of Communicative Dynamism (Firbas, Svoboda), depends on linear principles of functioning that are to some extent independent from the grammatical organization. To a certain extent, one can say the same for the GIVEN-NEW and for the KNOWN-UNKNOWN parameters, all of which are used widely in text linguistics. These parameters are based on the lexico-semantic and compositional properties of units in relation to larger sections of text; however, they also constitute pragmatic categories related to the functioning of the utterance-act. Similar observations can be applied to the notion of 'Focus' in Tagmemics (see Pike, 1982) and the recent versions of the Focus function (see Rebuschi and Tuller, 1999 and (*see* **Focus**), which show similarities to the notions of Comment and Rheme. This is also the case for the definitions of Topic either as the center of attention (see Chafe, 1976) or as a most accessible element (see Givón, 1985; Chafe, 1994) that are based on cognitive properties.

In many models, two different pragmatic and semantic approaches are merged: one according to which the meaning and information of units depend on their referential indexes, determined by the context, and the other according to which the meaning and information of an utterance depend on the 'functioning,' or to be more precise, on the actual dynamics with which the speakers plan and perform the discourse in relation to the listeners. It is generally the case that in all the models the relationship between meaning and information remains an open question (but see the interesting proposals presented by Bar-Hillel and Carnap, 1964; Harris, 1991). However, the centrality assigned to indexical coordinates to a greater or lesser extent (see Bar-Hillel, 1954, 1970) is a criterion that appears to have been employed in a more general way than the concept of 'functioning,' albeit at different levels of theoretical development. This kind of characteristic in fact can be

used as a distinctive criterion to determine the degree of pragmatic orientation of a model. Another criterion for pragmatic orientation concerns the speaker-listener dimension: Base, GIVEN, NEW, Focus, accessible element, and center of attention are all categories related to the speaker and the listener.

However, a question emerges that has so far remained unanswered: whether the categories defined according to the speaker are the same as those defined according to the listener. The fact is that the two types of categories do not necessarily coincide: what is Topic for the speaker might not be for the listener and vice versa. In fact, an important difference among the functional models concerns the bias toward production or comprehension of the utterance/text. If concepts like GIVEN and NEW or the hierarchy of communicative dynamism seem to be ambivalent, 'Base' perhaps displays a bias toward production and 'the most accessible element' is biased toward comprehension. The bias often remains implicit, but has important consequences for the modeling itself.

Topic-Comment Articulation and Spoken Discourse

Two questions often discussed concern the hypotheses that the Topic-Comment articulation is characteristic of spoken discourse and that it has a more basic character than the Subject-Predicate articulation. Indeed, several psycholinguistic studies seem to show that in the process of language acquisition the structures that have the grammatical properties of Subject-Predicate appear after the structures that are grammatically heterogeneous and that are reducible to the general Topic-Comment articulation (cf. MacWhinney and Bates, 1978 and, for second language acquisition, Klein and Perdue, 1992). There is no question that analyses of oral corpora of languages that have grammatically articulated Subject and Predicate show numerous structures that do not conform to patterns in which the Topic is a Subject NP and the Comment is a canonical VP. Yet, the two hypotheses proposed are difficult to test empirically. One reason is that phenomena with very diverse structural characteristics are often grouped together under the label of T-C, which means that results obtained across a variety of research areas are incompatible.

Statistical calculations have been done on a range of languages through corpora in an attempt to determine the occurrence rate of structures that are traditionally considered to be examples of the T-C split, such as hanging topics, left dislocations, etc. However, it is questionable whether the results obtained in this way can definitively prove the prevalence of such structures in spoken discourse because of the great variety of linguistic and extra-linguistic conditions that can apply to both spoken texts and written texts. To sum up, without excluding the fact that certain structures like (13) and (14) are in reality characteristic of unplanned spoken discourse, in general the hypotheses discussed may have methodological rather than theoretical value. In the analysis of spoken discourse, categories, such as Topic-Comment or Theme-Rheme, may prove to be more useful than purely syntactic categories.

Cognitive, Interactional, and Textual Dimensions

The representation of Topic and Comment in cognitive terms, common in some North American functional schools, has important precedents in the history of linguistic thought. During the second half of the 19th century, a lively debate emerged about the notion of Subject and Predicate, in which the grammatical categories were defined psychologically by some scholars (see Graffi, 2001). Paul (1920: 87) defined the Psychological Subject as "the first retrievable complex of psychological representations in the consciousness of the speaking and thinking being" and the Psychological Predicate as "the second [complex of psychological representations] that is connected to the first." Although he acknowledged that the grammatical Subject and Predicate do not always correspond to the psychological Subject and Predicate, Paul nevertheless believed that "the grammatical relations are based on the psychological relations" (1920: 111). Interest in the psychological dimension has always been present in linguistics, in particular in certain functional schools. However, in the Prague School, psychology was considered to be a discipline entirely auxiliary to linguistics (Mathesius, 1924).

In North American functional studies, topics have been defined at sentence-level (the micro-level) as constituents that have referential features or rather as 'participants' in the semantic scheme (see Foley and Van Valin, 1984; Givón, 1985; Chafe, 1994; Lambrecht, 1994). This definition has often been used in linguistic typology, particularly after Comrie (1981; see Premper, 2001). Discourse topics have been defined as "aggregate[s] of coherently related events, states, and referents that are held together in some form in the speaker's semi-active consciousness" (Chafe, 1994: 121). Givón (1985) believed that the definition of Topic as an atomistic, singular, and discrete unit at the sentence-level (the so-called micro-topic) should be replaced by a model that represents a plurality of sentence topics and the permanence or continuity of these text participants. In each case, these studies were based on a semantic assumption about the

representation of ideas; namely, that events and states and the referents that participate in them make up the basic cognitive network of the speakers and the listeners (see Givón, 1985; Chafe, 1994). This model has an equivalent in the so-called ontologies in use today in artificial intelligence. The analyses of Topic continuity can in fact have numerous applications in this sector and also in computational linguistics.

Topic and Comment: Between Reference and Relationship

The property traditionally ascribed to the Topic function – namely, its capacity to contain elements that carry reference – is neither a necessary nor a sufficient condition for topicality. The fact that Topic has recently been reinterpreted in relation to a referential hierarchy of access to the function (Topics tend to be elements high up on the hierarchy of referentiality) shows that it is not a necessary condition. For example, there are adjectives or verb forms with no finite marking that can perform the Topic function in many languages. Moreover, not all referential elements are Topics. Referentiality simply defines a relation between an element and an exophoric context (that is to say, extra-linguistic) or an endophoric context (that is to say, intratextual). In contrast, topicality is a purely textual function, linked to the flow of information in the text: For an element to be a Topic, it must be part of an informative progression where something is being said about it or, more precisely, more information is being added about it. In other words, for an element to be a Topic, it must be true that other information will be added about it. As has been said, the models of textual Topic-continuity rely on referential characteristics, whereas sentence-oriented models are based on the relational characteristics of Topic and Comment. In the latter, the similarity with the syntactic functions of Subject and Predicate – also inherently relational – is therefore emphasized.

See also: Clefting in Spoken Discourse; Detachment Constructions; Focus; Halliday, Michael A. K. (b. 1925); Information Structure in Spoken Discourse; Intonation and Syntax; Prague School; Referential Relations in Spoken Discourse; Spoken Discourse: Word Order; Understanding Spoken Discourse.

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Topic Chaining Constructions

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When people speak, they do so within a context that includes previous speech, of themselves, of other interlocutors, and even of long-dead ancestors, in clichés, proverbs, or even fables. This context of speaking, together with wider sociocultural knowledge, is the background against which people construct and interpret the meaning and relevance of new utterances so that the utterances cohere to make up an intelligible discourse. A discourse is not merely a set of sentences randomly strung together but is, rather, a structural series, the development of which constitutes a coherent whole and is recognized as such by speakers of a language. Some of the crucial principles that guide this process of structuring discourse are those concerning informativeness. Following Levinson (2000), we can define the information content of an utterance in terms of the number of possible states of affairs it effectively rules out. So, in giving instructions to a waiter in a crowded restaurant, it is likely that *bring this to the table of the middle-aged bald men* is more informative than *bring this to the table with men* because it effectively rules out more tables for the waiter. But there is clearly a limit to the level of explicitness desirable in order to achieve informativeness. For example, more and more restricting details could be added, for example, *bring this to the table with the middle-aged bald men, all of whom are drunk and are having a bucks' night for the one in the red jacket*, and so on, but this quickly runs afoul of practical economic limits on utterance size. To optimize the efficacy of both informativeness and economy, speakers of natural languages employ a set of heuristics for the production and interpretation of utterances in discourse (Grice, 1989; Horn, 1989; Levinson, 2000), two in particular being relevant here: (1) if something is stereotypical or expected, express it simply; and conversely, (2) if something is expressed in a more complex, unusual, or marked way, the stereotypical or usual interpretation should be avoided. These principles ride the razor's edge between informativeness and economy, in that things taken for granted in terms of the effective

Abstract:

This article presents an overview of the problems and methods relating to the definition of Topic and Comment. Special attention is devoted to the relationship of Topic-Comment to Subject-Predicate and Predicate-Arguments. It is argued that Topic and Comment belong to a level of representation that is logically higher than that of Subject-Predicate and Predicate-Arguments and that their interdependent relation is determined by Mood.

Biography:

Rosanna Sornicola is Professor of General Linguistics at the Department of Modern Philology of the University of Naples Federico II, where she is also the Director of the European Master's Degree in Linguistics. She graduated in Linguistics and Modern Philology at the University of Naples in 1975. She was Visiting Fellow at Wolfson College (Cambridge) in 1983 and 1987, Visiting Researcher at the Department of Linguistics of the University of California (at Berkeley) (1985), and Visiting Researcher at the Department of Italian of the University of California (at Los Angeles) (1988). She is a member of Wolfson College of the University of Cambridge. She was Visiting Professor at the University of California at Los Angeles (1990), Manchester University (1990), Girona (1996), and Gand (1999), and has lectured in many other European universities.

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She is member of the scientific board of the reviews *Cahiers de linguistique romane, Lingue e Linguaggi*, and *Revue de linguistique romane*, and is coeditor of the journal *Bollettino Linguistico Campano*. She has been member of the Executive Committee of the International Society for Historical Linguistics, of the Scientific Bureau of the Societé internationale de linguistique et philologie romanes, and since 1999 has served as President of the Società di Linguistica Italiana.

Her research interests concern phonetic, phonology, syntax, and pragmatics of spoken language, the relationship between spoken and written discourse, Italian and Romance sociolinguistics and dialectology, synchronic and diachronic typology, and history of linguistics (especially the history of European functionalism).

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Keywords:
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Hanging topic
Illocutionary force
Information structure
Left dislocations
Main clause

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When people speak, they do so within a context that includes previous speech, of themselves, of other interlocutors, and even of long-dead ancestors, in clichés, proverbs, or even fables. This context of speaking, together with wider sociocultural knowledge, is the background against which people construct and interpret the meaning and relevance of new utterances so that the utterances cohere to make up an intelligible discourse. A discourse is not merely a set of sentences randomly strung together but is, rather, a structural series, the development of which constitutes a coherent whole and is recognized as such by speakers of a language. Some of the crucial principles that guide this process of structuring discourse are those concerning informativeness. Following Levinson (2000), we can define the information content of an utterance in terms of the number of possible states of affairs it effectively rules out. So, in giving instructions to a waiter in a crowded restaurant, it is likely that *bring this to the table of the middle-aged bald men* is more informative than *bring this to the table with men* because it effectively rules out more tables for the waiter. But there is clearly a limit to the level of explicitness desirable in order to achieve informativeness. For example, more and more restricting details could be added, for example, *bring this to the table with the middle-aged bald men, all of whom are drunk and are having a bucks' night for the one in the red jacket*, and so on, but this quickly runs afoul of practical economic limits on utterance size. To optimize the efficacy of both informativeness and economy, speakers of natural languages employ a set of heuristics for the production and interpretation of utterances in discourse (Grice, 1989; Horn, 1989; Levinson, 2000), two in particular being relevant here: (1) if something is stereotypical or expected, express it simply; and conversely, (2) if something is expressed in a more complex, unusual, or marked way, the stereotypical or usual interpretation should be avoided. These principles ride the razor's edge between informativeness and economy, in that things taken for granted in terms of the effective

informativeness of the utterance tend toward attenuated expression, whereas those that cannot favor a fuller enunciation.

These principles ground what is typically called the information structure of a sentence (Lambrecht, 1994; King, 1995; Kiss, 1995) and its articulation in terms of the notions of topic and focus. Lambrecht (1994: 131) defined topic as the entity an utterance is about. Topics are typically already presupposed, established in the discourse context (or pragmatically accessible, in Lambrecht's terms) and in this are in marked contrast to focus, the asserted component of the utterance (Lambrecht, 1994: 213). In terms of the grounding heuristics, topical constituents, as presupposed/established, tend toward attenuated formal realizations, whereas focused constituents, as the main asserted point of the utterance and hence typically unexpected or noteworthy, favor fuller formal realizations. Bresnan (2001), building on Givón (1976, 1983) builds a hierarchy of NP types, starting with the most attenuated realizations, zero (i.e., no overt phonemic form), through affixes, clitics, free pronouns, and up to full noun-headed NPs, and links these through harmonic alignment (Aissen, 2001) with the notions of topic and focus, so that the more attenuated NP types are likely to be topics and the fuller ones are likely to be focus.

Clearly, the most attenuated realization, zero, has the strongest claim on topic status; the simplest possible expression is interpreted as the most presupposed, identifiable referent. Languages exhibit a phenomenon called topic chaining (Li and Thompson, 1979), in which a topic is established as a full NP in the first clause in a discourse unit, and this then functions as the referent for the topics in the succeeding clauses, with attenuated realizations as zero or pronominals. Zero is obviously the most extreme realization and potentially presents a problem of recoverability: if there is no overt trace of the topic in the clause, how can we clearly identify its function? Some languages, such as Chinese (Mandarin Chinese) or Watam of New Guinea, are quite free in their use of zero realization; NPs in a range of syntactic functions can be realized by zero if they are highly accessible topics. This often results in potential syntactic ambiguity in the delineation of syntactic functions in a clause, especially if multiple zero realization of topical NPs is permitted in a single clause, as in Watam, although this problem is typically resolved by contextual cues. Other languages are more restricted; English, for instance, allows zero realization only for subject NPs (Figure 1). Note that, due to the syntactic restriction, there is no ambiguity here. Note further that utterances in languages with such restrictions are actually more informative (in the sense previously defined) than those without, in that they formally rule out more possible states of affairs.

Languages with restrictions on the type of syntactic functions that can be realized by zero anaphora often have voice systems. Voice systems permute the syntactic structure of the clause so that a choice of syntactic functions can be accessible to the privileged syntactic constituent that is the target for zero realization, called the pivot. The pivot notion then represents a syntacticization of the notion of topic. It is the unmarked slot for topics, and, because zero realization is restricted to highly accessible topics, this is only possible in the pivot function. Voice systems then allow topics of an array of syntactic functions to be accessible to the pivot function and hence have the option of zero realization.

Languages can be classified into three types in terms of their pivot choices and voice systems. English illustrates the most common and familiar type. In this case, the basic unmarked choice for the pivot of a transitive verb is the actor participant, and clauses with such an unmarked and expected choice are in the neutral active voice. If the undergoer of a transitive verb is the topic of a clause and target for zero realization, then an alternative clause structure, the passive voice, is employed, making the undergoer the pivot and demoting the actor to a peripheral adjunct position, as in the following active-passive pair:

(1a) the boy hit the ball
(1b) the ball was hit by the boy

In languages of the English type, a wide range of constructions that require pivots as the target of zero realization of highly presupposed topics employ passives when the pivot is the undergoer of a transitive clause (Figure 2).

The second type is exemplified by ergative languages (Figure 3B) like the Mayan language Mam (England, 1988) or the Australian language Dyirbal (Dixon, 1972). In these languages the unmarked pivot choice is the undergoer participant of a transitive verb, the opposite of English (Figure 3A). The undergoer as the pivot is then the target of zero realization in unmarked utterances, as in Dyirbal (Figure 4).

If the actor is highly topical and the target of zero realization, it cannot simply be elided. Rather,

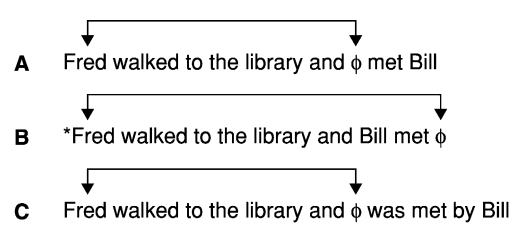

Figure 1 English zero realization for subject NPs.

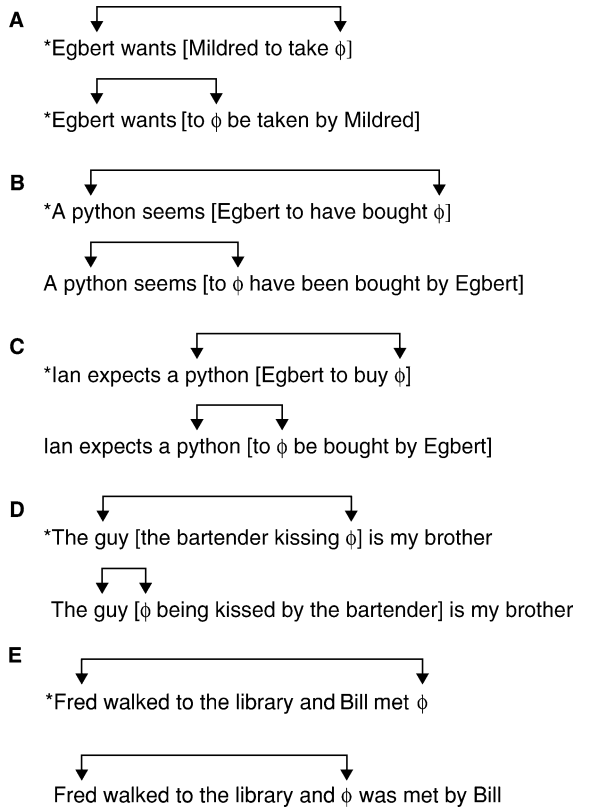

Figure 2 In English, constructions that require pivots as the target of zero realization of highly presupposed topics employ passives when the pivot is the undergoer of a transitive clause.

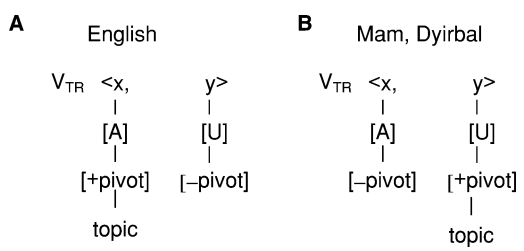

Figure 3 (A) English vs. (B) Mam and Dyribal (ergative languages), in which the unmarked pivot choice is the undergoer participant of a transitive verb.

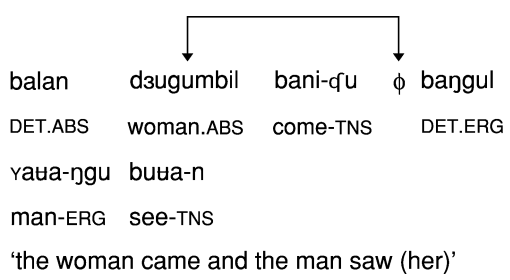

Figure 4 In Dyirbal, the undergoer as the pivot is then the target of zero realization in unmarked utterances.

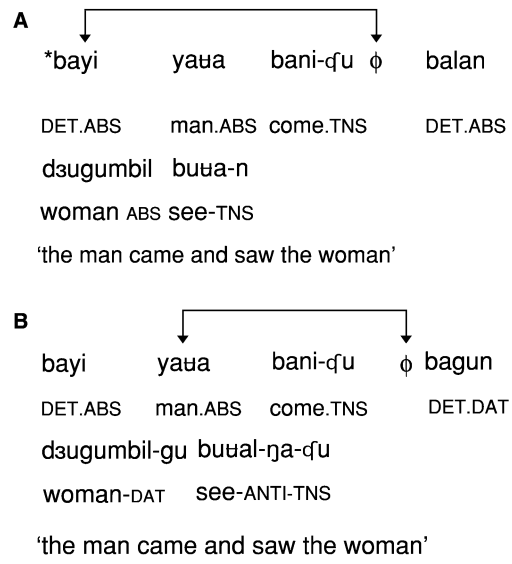

Figure 5 The antipassive, the mirror image of the passive puts the undergoer in a peripheral adjunct position (dative case in Dyirbal); the actor becomes accessible to zero realization.

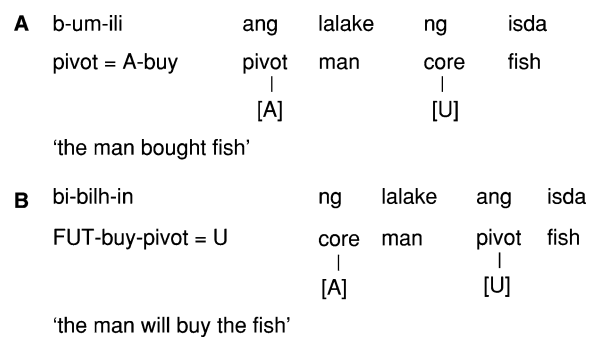

Figure 6 In Tagalog, there is no strong preference for either the actor or the undergoer to be the pivot of the clause; either can be according to wider syntactic or textual constraints.

a construction called the antipassive, the mirror image of the passive, is required, which puts the undergoer in a peripheral adjunct position (in the dative case in Dyirbal) and the actor becomes accessible to zero realization (Figure 5). Ellipsis across conjoined clauses is restricted to pivot NPs. The sentence in Figure 4 is grammatical because it is the undergoer participant of the transitive verb *βʊʃαλ-* 'see,' the pivot choice, which is elided (note that, as expected, the literal English translation of the sentence in Figure 4 is ungrammatical because of the opposite choice for the pivot: **the woman came and the man saw ϕ*). The sentence in Figure 5A is ungrammatical because the actor has been elided: actors are not the pivot choices of transitive verbs in Dyirbal and are therefore not targeted for zero realization (the English translation is perfectly grammatical, as we would predict). In order to communicate the meaning

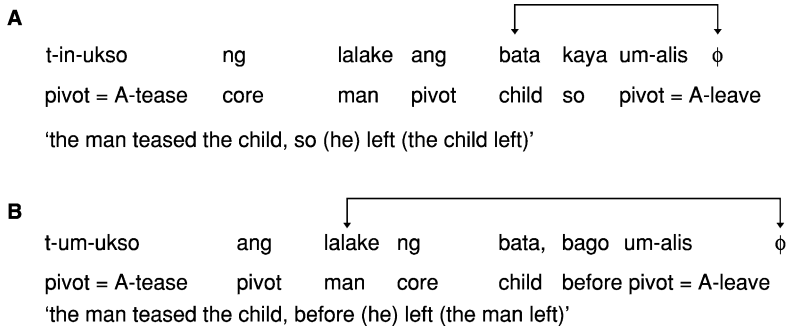

Figure 7 In Tagalog, the semantic role of the controlling pivot of the first clause may be (A) actor or (B) undergoer.

of Figure 5A grammatically in Dyirbal, an antipassive construction must be used, as in Figure 5B. This places the actor in the pivot function, and it is therefore a proper target for ellipsis.

The final type of voice system is widespread in Western Austronesian languages and is here exemplified by Tagalog. These are symmetrical pivot languages in which there is no strong preference for either the actor or the undergoer to be the pivot of the clause; either can be according to wider syntactic or textual constraints. In Tagalog, core subcategorized arguments are marked with the preposition *ng* and adjuncts with *sa*. The pivot has the preposition *ang* and the verb takes a series of affixes to indicate the actor or undergoer semantic function of the pivot (Figure 6). Note that either the actor or undergoer participant can be the pivot, the choice being signaled by different affixation to the verb: the infix *-um* -for actor = pivot and the suffix *-in* for undergoer = pivot. Note further that regardless of which participant becomes the pivot, the other argument remains core and marked by *ng*.

This is in marked contrast to asymmetrical languages such as English and Dyirbal in which marked constructions such as passive or antipassive must be used when anything other than the normal pivot choice is made, forcing the recasting of the clause, with the erstwhile pivot appearing as a peripheral adjunct NP or disappearing from the clause entirely. Clearly, languages such as English and Dyirbal are asymmetrical; one participant type is strongly favored to be the pivot and, if it fails to assume this function, it ceases to be core subcategorized. This is not the case in symmetrical languages such as Tagalog in which either choice is possible, with no major disruption to clause structure regardless of which is chosen.

Tagalog pivots have many of the same properties we have come to expect of them from English and Dyirbal (Figure 7). The topic is established as an overt pivot NP in the first clause and then is targeted for zero realization in the second clause of both examples. The pivot of the second clause is obligatorily realized as zero if it is coreferential with the pivot of the first clause. Note that the semantic role of the controlling pivot of the first clause is irrelevant; it may be the actor (Figure 7A) or the undergoer (Figure 7B), but it must be the pivot. The example in Figure 7A cannot be construed with a meaning that it was the man who left; that is, only the pivot is the possible antecedent of the zero anaphora in the second clause.

See also: Coordination; Serial Verb Constructions; Thematic Structure; Topic and Comment.

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Vladimir Nikolaevich Toporov is a Russian philologist, linguist, and specialist in Indo-European linguistics, semiotics and history of culture. His research covers topics in Slavic, Baltic, Indo-European, and Russian linguistics as well as general linguistics, poetics, folklore, mythology, and culturology. Toporov was one of the pioneers of semiotic research in the USSR. His semiotic views were formed in the course of his occupation with linguistics of Slavic and other Indo-European languages. Toporov was a permanent member of Tartu semiotic school and a contributor of all issues of *Papers on Sign Systems*. Among the works written by him are structural descriptions of Sanskrit and Pali grammar, a few studies on Hittite texts, an etymological dictionary of Old Prussian, and numerous etymological papers. Toporov's Ph.D. dissertation was devoted to the expression of locativity in Slavic and Baltic languages; in 1989 he was conferred a doctoral degree (doctor habilis) *honoris causa* for the total of his published works.

Born in Moscow (Russia) on August 8, 1928, Toporov is married to Tatjana Ja Elizarenkova, a specialist in Indic culture and languages, and a translator of Rig-Veda into Russian. His two daughters are philologists: Tatjana V. Toporova, an author of three books, is a specialist in old Germanic languages; Anna V. Toporova deals with Romance languages. Toporov works at the Institute for Slavistics (Russian Academy of Sciences), where he has been a member since 1990. His research was marked with a number of prestigious awards, including the National Award of USSR, the Alexander Solzhenitsyn Award, and the Andrej Belyj prize.

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mythological beliefs related to mushrooms, ladybird, beaver, bee, and on other religious faiths going back to Slavic paganism and Indo-European poetics (a summarizing work was Toporov and Ivanov, 1974). In several publications Toporov analyzed the structure of riddles and charms.

Since the 1960s, Toporov has published numerous works on Russian writers and poets of the 19th to 20th centuries and the poetics of their œuvre. Among this set of his works are studies on Pushkin and his predecessors (Zhukovsky, Batjushkov and Karamzin), on akmeists' poetry (with T. V. Tsivjan), and on intertextual connections between Russian and European writers (Pushkin and Goldsmith, akmeists, and Gérard de Nerval).

Topics in Old Indic classical literature have been addressed in Toporov's writing as well, for instance his 1998 book on Sudraka's *Mrcchakatika* (The little clay cart; Toporov, 1998a), his study of dialogue structure of Sophocles's *Oedipus Rex,* and his study of the plot in Vergil's *Aeneid* ('Aeneas: the man of his destiny').

Some of Toporov's works are devoted to the reconstruction of Proto-Slavic text (1998b), and the reconstruction of the earliest historical situation in Kiev (beginning of the 10th century), based on the letter from the genizah of Cairo synagogue.

Two characteristics of Toporov as an etymologist are, first, his attention to textual reconstruction (namely, the reconstruction of a sign system in general) and its possible fragments and variants; secondly, Toporov admits the possibility of multiple etymologies, whereby several stages of a word's semantic development and possible contexts can be reconstructed. Following the ideas of Benveniste, Toporov lays special emphasis on the coincidence in semantics between different traditions.

See also: Balto-Slavic Languages; Hittite; Indo–European Languages; Indo–Iranian; Jakobson, Roman (1896–1982); Ket; Mel'uk, Igor Aleksandrovic (b.1932); Pali; Russian; Sanskrit; Slavic Languages.

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Torricelli Languages

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The approximately 50 languages of the Torricelli are spoken in north Papua New Guinea. The family extends from the eastern Bewani mountains in Sandaun Province; through the Torricelli ranges to Maprik, where Ndu speaking villages reach through to the north coast; and continuing east of Wewak in Sepik Province in the Marienberg ranges and ground south of the Murik lakes, with a final outpost at Bogia in Madang province. The languages are remarkable for non-Austronesian languages in New Guinea for having a basic SVO word order, whereas the norm is SOV. They have been grouped into seven subgroups, whose internal constituency appears to be valid, although the seven-way division still awaits proof. The membership of the family as a whole appears to be accurate.

There are typically no phonetically unusual segments in Torricelli languages, and, although stress is frequently contrastive, reports of tonal differences are rare. The languages near Nuku share with the adjacent Ndu languages the presence of creaky or glottalized vowels, ranging from just one (/a/) to contrasts present on the whole vowel inventory. The vowel inventories tend to be large, with seven or eight vowels being not uncommon in the western languages (a typical inventory is /i e ɛ a ɔ o u ʉ/) and five or six vowels being more common in the east. The loss of velar segments in some western languages has led to the unusual case of languages without velar contrasts at all. Voicing contrasts are usually associated with prenasalization.

There is significant diversity within the family, and the Torricelli languages are also significantly different from most other languages of New Guinea. Although they all show SVO order, typically with prefixal agreement for the subject and suffixal agreement for the object and lacking case marking on (core) nominals – all features that are unusual in New Guinea – other details of their morphological and syntactic structure show considerable diversity. In the eastern languages, such as Monumbo and Arapesh (Bukiyip, also known as Muhiang), multiple class systems with extensive concord are found, whereas in the west only remnant traces of noun classification can be found in the synchronically irregular plural endings of One and Olo.

For example, in Bukiyip 'stone' is *utom* (SING) *utabal* (PL), showing the *-m* and *-bal* suffixes typical of class 5 nouns (compare this with a class 2 noun, such as 'village' *wa-bél* SING, *wa-lúb* PL). Adjectives show similar suffixes, agreeing in class and number with their noun, and verbs have cognate prefixes:

yopi-**mi** uto-**m** **m**-a-pwe agnú
'(the) good stone is there'

yopi-**bili** wa-**bél** **bl**-a-pwe agnú
'(the) good village is there'

In the western Torricelli language One, 'stone' is *toma* (SING) *tomu* (PL), showing an *-a* versus *-u* pattern, just as in 'flower' *sula* (SING), *sulu* (PL), indicating that, although it is a minority pattern, the alternations in 'stone' are regular. The word for 'village' *wapli* can be singular or plural, with the common *-li* plural suffix, but *wap* is only singular (this form is commonly found in compounds, such as *wap oi* 'village grounds, area'). Concord on other words is not as strong, however:

upo toma w-ae nu
'the good stone is there'

This sentence shows no agreement on *upo* 'good,' and only the general second/third-person singular *w-* on the verb 'sit, be at.' The same forms as are found in:

upo wapli w-ae nu
'the good village is there'

A few adjectives do show alternations:

plola toma w-ae nu
'the short stone is there'

plolu tomu n-ai n-e nu
'the short stones are there'

with variation for number (the verb 'sit' has irregular singular and plural forms). Different noun classes, however, do not show different agreement patterns. Using the same inflecting adjective, *plola*, with a different noun shows the same inflectional pattern:

plola wap w-ae nu
'the short village is there'

plolu wapli n-ai n-e nu
'the short villages are there'

There are also no differences in verbal morphology. Another striking aspect of the NP in One involves the lack of a fixed word order: Gen N as well as N Gen, Dem N as well as N Dem, and Adj N as well as N Adj are found, with only relative clauses being restricted to postnominal position.

Like most languages of New Guinea, there is no evidence of a voice system operating in any of the Torricelli languages, but applicatives are almost universal in the Torricelli languages, being found in at least fossilized form even on the more isolating

members of the family. In some languages the applicative and the verb 'give' show close similarities (One: *-ne* APPL and *an(e)* 'give'), whereas in other languages the two morphemes bear no obvious resemblance to each other (Olo: *-f(i)* APPL, *wa* 'give'; Arapesh *-'ma* APPL, *se'* 'give'). There does not seem to be a single historical source for the various applicatives attested in different branches of the family. An applicative is often required lexically by low-transitive verbs. One has *y-upa-**ne*** 'follow,' with a lexicalized applicative, for instance.

Serial verbs are a regular feature of Torricelli languages, although clause chaining is not. One, the westernmost Torricelli language has an unusual syntactic parameter setting whereby word order within the NP is free but the position of NPs and PPs within the clause is rigidly fixed, implying that there is configurationality at the clause level but not at the phrase level.

Over the years, there have been various suggestions concerning the history of the Torricelli languages. Authors have suggested a relationship with the Asli languages of Malaysia and with the East Bird's Head languages of western New Guinea. None of these claims has yet stood up to any serious investigation. The SVO order of the Torricelli languages, unusual in New Guinea, has been attributed to Austronesian contact (as has also been proposed for the similarly SVO languages of the Bird's Head), but it could just as easily be innate. The Torricelli languages are, indeed, not highlands languages, and there is no reason to suppose that SVO is not the original Torricelli order.

See also: Papua New Guinea: Language Situation; Papuan Languages.

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Totonacan Languages

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The Totonacan languages are spoken in central Mexico in a region that includes parts of three states: southern Hidalgo, northern Puebla, and northwestern Veracruz (see Figures 1 and 2). Although proposals have sometimes been made to relate the Totonacan languages to Mayan, Mixe-Zoquean, and other languages in Mesoamerica (McQuown, 1942), these relationships have never been demonstrated. Today, the Totonacan language family is generally regarded as an 'isolate' in the classification of Mesoamerican languages (Suárez, 1983; Campbell, 1997). It is thought that speakers of these languages settled near the Gulf Coast around 800 A.D. Their original homeland is unknown; however, based on ethnohistorical sources and loanwords found in other Mesoamerican languages, it has been proposed that Totonacs may have founded Teotihuacan and moved to their current location following its collapse (Justeson *et al.*, 1985).

Totonacan Language Family

The Totonacan language family is made up of two branches: Totonac, consisting of four languages, with roughly 220 736 speakers, and Tepehua, consisting of three languages, with approximately 8252 speakers (INEGI–XII Censo General, 2000). Although the Totonac and Tepehua languages are mutually unintelligible today, they share a great deal of vocabulary and exhibit many structural similarities. These similarities indicate that the languages developed, historically, from a common ancestor, Proto-Totonacan. Figure 3 provides a simplified representation of the relationships of the various languages. As linguistic investigation proceeds, further groupings and subgroupings within the family will undoubtedly emerge.

As illustrated in Figure 3, the Totonac branch consists of four languages, referred to here as Misantla, Papantla, Sierra, and Northern:

Misantla Totonac, the southernmost variety, is spoken between the cities of Xalapa and Misantla in Veracruz. Towns where speakers may still be found include Yecuatla (192 speakers), San Marcos Atexquilapan (13), Landero y Coss (61), Chiconquiaco (56), and Jilotepec (11) (INEGI–XII Censo General, 2000). Misantla Totonac is moribund, with few native speakers remaining, all over the age of 45. The largest concentration of speakers is found in Yecuatla, but their number is dwindling rapidly. According to the Mexican Census, 486 individuals spoke Totonac in Yecuatla in 1980; in 2000, only

Figure 1 Mexico (adapted from a map drawn by Ashley Withers).

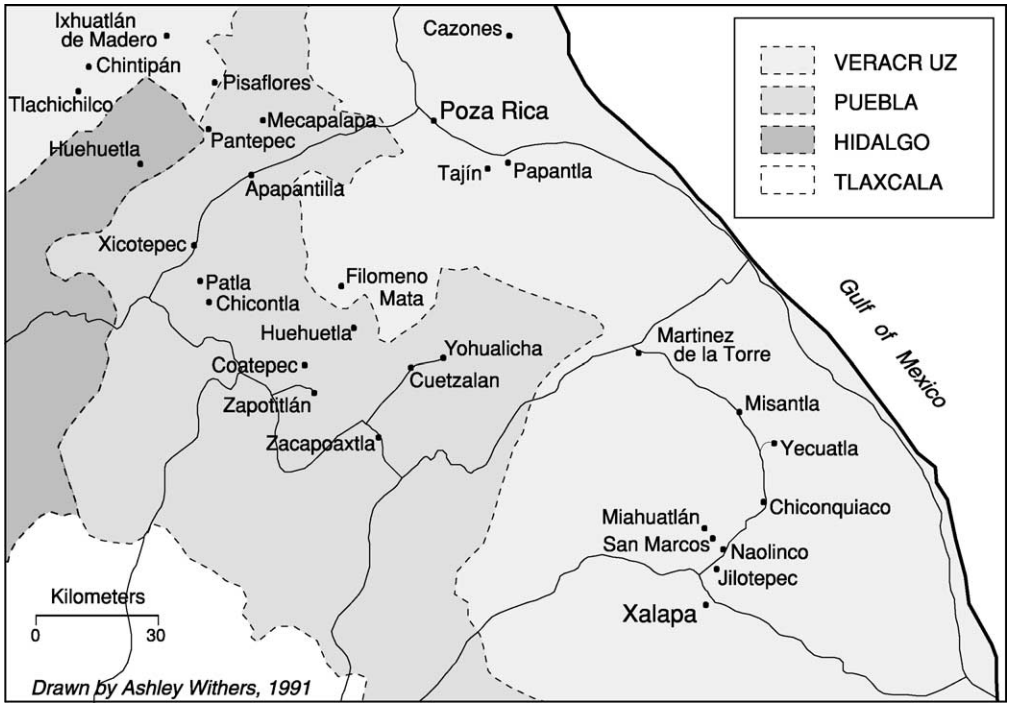

Figure 2 Totonacan language area (adapted from a map drawn by Ashley Withers).

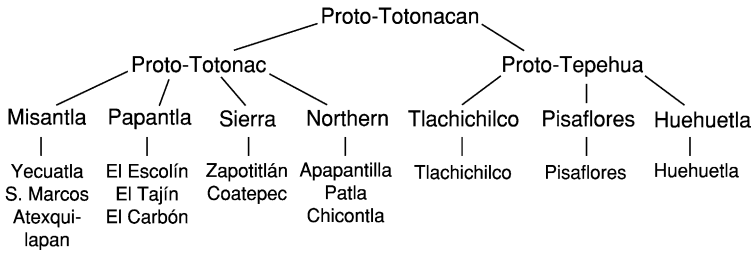

Figure 3 Totonacan language family.

192 speakers remained (INEGI–Censo General, 1980, 2000). Data on Misantla Totonac come from Yecuatla and San Marcos Atexquilapan (MacKay, 1994, 1999; MacKay and Trechsel, 2003, in press).

Papantla Totonac is spoken by roughly 36 000 individuals in and around the city of Papantla, Veracruz. Children are still learning Papantla Totonac, but the language is being used less frequently within the communities. Data on Papantla Totonac come from El Escolín (Aschmann, 1973), Cerro del Carbón (Levy, 1987, 1990), and El Tajín (García Ramos, 2000).

Sierra Totonac is spoken by more than 100 000 people in the Sierra Norte de Puebla and nearby towns in Veracruz. The exact limits of Sierra Totonac and Northern Totonac are still being determined. Children continue to learn Sierra Totonac as their native language, and it is the main language used in many communities. Data on Sierra Totonac come from Zapotitlán de Méndez, Puebla (Aschmann and Wonderly, 1952; Aschmann, 1962), and Coatepec, Puebla (McQuown, 1990).

Northern Totonac is spoken by roughly 10 000 people in the region surrounding Xicotepec de Juárez, Puebla. It is unclear how many children are learning Northern Totonac; most speakers appear to be middle aged or older. Data on Northern Totonac come from Apapantilla, Puebla (Reid *et al.*, 1968; Reid and Bishop, 1974; Reid, 1991) and Patla and Chicontla, Puebla (Beck, 2004). Beck refers to the variety of Northern Totonac spoken in the latter two communities as Upper Necaxa Totonac.

The Tepehua branch of Totonacan consists of three languages, identified here as Tlachichilco, Pisaflores, and Huehuetla.

Tlachichilco Tepehua is spoken in Tlachichilco, Veracruz, and in the surrounding communities of Chintipán, Tierra Colorada, and Tecomajapa.

	Labial	Alveolar	Alveo-palatal	Palatal	Velar	Uvular	Glottal
Plosive	p	t			k	q	ʔ
Affricate		ts, tɬ[a]	tʃ				
Nasal	m	n					
Fricative		s, ɬ	ʃ				h
Approximant	w			y			
Lateral approximant		l					

[a] tɬ is found only in Sierra Totonac, Northern Totonac and Papantla Totonac.

Figure 4 Totonacan consonants.

According to the 2000 census, there are approximately 2463 speakers in these communities, many of whom are middle aged or older (Watters, 1988: 5). James K. Watters is the only linguist to have conducted research on Tlachichilco Tepehua. His publications include discussions of morphosyntax (1988), phonology (1987), verbal semantics (1996), and second-person laryngealization (1994). Although there is as yet no published lexicon or descriptive grammar of Tlachichilco Tepehua, it is the best documented of all the Tepehua languages.

Pisaflores Tepehua is spoken by roughly 2786 individuals in and around Pisaflores, Veracruz. Tepehua is the main language of this community and children are still learning it as their native language. Carolyn J. MacKay and Frank R. Trechsel have been conducting linguistic research in Pisaflores since 1997 and are working on a description of Pisaflores Tepehua.

Huehuetla Tepehua is spoken in and around the towns of Huehuetla, Hidalgo, and Mecapalapa, Puebla. There are approximately 1649 speakers of Huehuetla Tepehua, all of whom are at least middle aged. Publications on the language include a short sketch of sentence structure, a description of Tepehua numerals, and a preliminary description of verb inflection (Herzog, 1974). The Liga Bíblica Mundial del Hogar published the New Testament in Huehuetla Tepehua in 1976.

Totonacan Phonology

Totonacan languages exhibit three vowels, */a/*, */i/*, */u/*, and a length distinction, contrasting short and long vowels. Some languages, like Northern Totonac, have also developed phonemic */e/* and */o/* (Beck, 2004). Plain and laryngealized variants of both short and long vowels exist in all Totonacan languages. Whether this distinction is contrastive or predictable has not yet been determined for all varieties. However, all Totonacan languages employ laryngealization to mark second-person subjects.

(1) Misantla Totonac (MacKay, 1999: 156, 157)
[wíʃ kat̪sḭ́ḭ] 'you know X'
/wi̱ʃ kat̪sii/
[ʔṵ́t kat̪síi] 's/he knows X'
/ut kat̪sii/
[kin̪á̰n ká̰a̰yáa] 'we cut X'
/kin̪an ka̰a̰-yaa-wa/
[wi̱ʃín ká̰a̰yá̰a̰tat] 'y'all cut X'
/wi̱ʃin ka̰a̰-yaa-tat/

Figure 4 presents the consonants that are found in almost all Totonacan languages. In most Totonacan languages, glottal stop is contrastive only in word-final position. However, in Upper Necaxa Totonac, Pisaflores Tepehua, and Huehuetla Tepehua, /ʔ/ has replaced */q/* and therefore occurs in other positions as well.

Consonant alternations to mark degrees of size, force, and intensity have been described in Totonacan. This sound symbolism typically involves the sets of sounds s/ʃ/ɬ, k/q, and ts/tʃ with ɬ, q, and tʃ being the most intense (Bishop, 1984; Levy, 1987; MacKay, 1999; Beck, 2004).

(2) Misantla Totonac (MacKay, 1999: 114)
[tsṵtsṵ́] /tsũtsũ/ 's/he smokes'
[tʃṵ̃tʃṵ́] /tʃũtʃũ/ 's/he sucks'

(3) Papantla Totonac (Levy, 1987: 115)
sukũ 'small hole'
ɬukũ 'medium-sized hole'
ɬuqũ 'large hole'

Totonacan Morphology

Totonacan languages exploit a very complex and productive morphology, characterized by a large number of affixes, both prefixes and suffixes, that do most of the work of the grammar. Verbs and nominals are the major word classes.

Nominals

In some languages (e.g., Misantla Totonac and Sierra Totonac), adjectives and nouns do not differ in their inflectional morphology. In others, however (e.g., Papantla Totonac and Upper Necaxa Totonac), nouns and adjectives are distinct. Nominal inflectional morphology is relatively simple. Nominals are optionally marked for plurality, and in possessive constructions are also marked for person (and sometimes number) of possessors.

(4) Misantla Totonac (MacKay, 1999: 349)

[kíɲtʃík]	1POSS-house	'my house'
/kin-tʃik/		
[kíɲtʃikḭ́n]	1POSS-house-PL	'my houses'
/kin-tʃik-VVn/		
[kíɲtʃikã̰n]	1POSS-house-POSS.PL	'our house'
/kin-tʃik-kan̰/		
[kíɲtʃikḭ́ɲkã̰n]	1POSS-house-PL-POSS.PL	'our houses'
/kin-tʃik-VVn-kan̰/		

Numerals

The Totonacan numerical system, like many others in Mesoamerica, is vigesimal. In many of the Totonacan languages, the numerical system is being replaced by the Spanish one.

(5) Misantla Totonac (MacKay, 1999: 393, 394)

[puʃúmpuʃúmpuʃún]	'sixty (20 + 20 + 20)'
/puʃum-puʃum-puʃum/	
[tutún puʃún]	'sixty (3 × 20)'
/tutun puʃum/	

Body Part Prefixes

Body Part Prefixes occur on both nominal and verb stems, but are most productive on verbs. They usually denote either the body part affected by the action of the verb or a spatial relationship ('in front of,' 'behind,' 'beside,' 'above,' etc.).

(6) Misantla Totonac (MacKay, 1999: 230)
[míntaqa̰qa̰nṵ̰ut]
/min-ta-qa̰qa̰-nṵṵ-Vt/
2POSS-INCHOATIVE-ear rel.-inside-NOM
'your earring'

Verbal Inflection

Totonacan verbal morphology is characterized by a layering of derivational and inflectional affixes. Verbs may be inherently stative, intransitive, transitive, and, in some languages, ditransitive. In all languages, the verbal inflectional system distinguishes two aspectual categories (perfective and imperfective); two tense categories (past and nonpast); and two mood categories (realis and irrealis). In many, but not all, Totonacan languages, the inflectional system also marks categories of future tense and/or perfect aspect. The exact distribution of these latter categories in the family has yet to be determined.

In addition, in all Totonacan languages, verbal inflectional affixes mark categories of person and number of both subjects and objects. For the most part, inflectional affixes are transparent in the sense that they can be easily isolated and their semantic contribution is clear. In transitive sentences involving two nonthird-person arguments, however, certain contrasts are neutralized. In all languages except Sierra Totonac, combinations of a second-person subject and a first-person object, where either or both are plural, are expressed by means of reciprocal verbs with first person inclusive plural subjects. Sentences like the following, from Pisaflores Tepehua, are systematically ambiguous:

(7) Pisaflores Tepehua (MacKay and Trechsel, 2003: 295)
[kiláalá?tsi̱naaw]
/kin-laa-la?tsi̱n-yaa-wi/
1OBJ = RECIP-see.X-IMPERF-1SUBJ.PL
'You (sg.) see us,' 'You (pl.) see me,' 'You (pl.) see us'

A similar ambiguity emerges in sentences in which a first person subject acts on a second person object and, again, one or both are plural. In the Tepehua languages, these combinations are expressed by means of reciprocal verbs with first person exclusive plural subjects. The example in (8) is four-ways ambiguous:

(8) Pisaflores Tepehua (MacKay and Trechsel, 2003: 297)
[?i̱kláalá?tsĩnáaw]
/ik-laa-la?tsi̱n-yaa-wi/
1SUBJ-RECIP-see.X-IMPERF-1SUBJ.PL
'I see you (pl.),' 'We see you (sg.),' 'We see you (pl.),' 'We (excl.) see each other'

In contrast, the Totonac languages, with the exception of Sierra Totonac, use reciprocal verbs in 2SUBJ > 1OBJ contexts, but not in 1SUBJ > 2OBJ contexts. Nevertheless, all Totonac languages employ a single verb form to express combinations of first person subject and second person object where one or both are plural. Ambiguities of the sort illustrated in (7) and (8) are pervasive throughout the family.

Verbal Derivation

Totonacan languages exhibit a rich inventory of derivational affixes that affect the valence of both

transitive and instransitive verbs. The most productive are a causative affix, /maa-/ 'CAUS,' and several applicative affixes that license arguments interpreted as beneficiary, recipient/goal, instrumental, comitative, and others. In many languages, applicative affixes are the only means available for expressing arguments with these semantic roles.

(9) Misantla Totonac (MacKay, 1999: 274)
[ʔi̯klíilaq̯ɛnáan
/ik-lii-laq̯an-yaa-na
1SUBJ-INST-see X-IMPERF-2OBJ
kílíiláqtʃaqáatáayat]
kin-lii-laq = tʃaqaa-taaya-Vt/
1POSS-INST-eye rel.-upright-NOM
'I see you with my glasses'

On transitive verbs, causative and applicative affixes yield ditransitive verbs with two nonoblique objects. There is variation within the family concerning the treatment of these objects. At one extreme are languages like Misantla Totonac in which either or both of the objects may control overt object agreement. Sentences like (10) are systematically ambiguous in this language:

(10) Misantla Totonac (MacKay, 1999: 190)
[ʔi̯kláamakaʔi̯ʃki̯
/ik-laa-maka-i̯ʃki̯-wa
1SUBJ-3OBJ.PL-hand rel.-give X to Y-1SUBJ.PL
hɔ̃nlíbru]
hun-libru/
DET-book
'we handed them the book,' 'we handed him/her the books'

At the other extreme are languages like Papantla Totonac (Levy, 2000) in which only one of the two objects may control agreement.

(11) Papantla Totonac (Levy, 2000: 5)

ka:-ma:xi':-lh	lakcumaján	kin-qa'wasa
OBJ.PL-give-PFV	girls	1POSS-son

'I gave my son to the girls' / *'I gave the girls to my son'

Between these extremes are several intermediate types in which possibilities of double object marking are constrained by person and number features of the objects.

Totonacan Syntax

Word order in Totonacan languages is extremely flexible and almost any order is acceptable. In unmarked cases, word order is verb initial, and frequently VSO. Subjects may precede the verb for pragmatic effects associated with focus or topicalization.

Coordination and subordination are not explicitly marked and verbs in both clauses exhibit finite verbal morphology.

(12) Misantla Totonac (MacKay and Trechsel, in press)

[lakaa	ʔi̯knízpáa	hɔ̃n	tʃi̯ʃkúʔ
/lakaa	ik-nispaa	hun	tʃi̯ʃkuʔ
NEG	1SUBJ-know.X	DET	man

hɔ̃n	tiyúut	lą̨ąt̨at]
hun	tiyuut	laa-min(t̨an)-ti/
DET	who	COM-come-2PERF

'I don't know the man you came with.'

See also: Mexico: Language Situation.

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Tovar, Antonio (1911–1985)

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Acquainted with Basque and Valencian from early childhood on, Tovar was to develop wide-ranging linguistic interests. He studied in El Escorial, Valladolid (his native town), Madrid, Paris, and Berlin, taking degrees in law, history, archaeology, and classics. In 1941, he obtained his Ph.D. in Madrid. From 1942 until 1963, he held the chair of Latin in Salamanca, where he was *rector magnificus* from 1951 until 1956 (during 1948–1949, he taught at the University of Buenos Aires). In his youth an adherent of the *Falange*, Tovar had gradually distanced himself from the Franco regime. He was removed from his rectorship and from his chair in Salamanca, and he left Spain. He subsequently held university positions in Tucumán (1958–1959), Urbana-Champaign (1960–1961, 1963–1967), and Tübingen (1967–1979). After the political changes in Spain in the mid-1970s, he returned to his home country. He died in Madrid on December 14, 1985. Tovar was a member of the *Real Academia de la Lengua Española*, and he held honorary degrees from various universities.

Tovar's scientific output is exceptionally rich and variegated. As a classicist, he contributed to the historical grammar of Latin, to Greek history and archaeology, to the study of Plato, to epigraphy, etc. From Latin and Greek, he was led into the field of Indo-European comparative linguistics. He wrote on problems in the history (especially the history of the lexicon) of Celtic, Germanic, Slavic, and Italic. In 1977, he published a study on Krahe's theory of old-Indo-European river names. He also made significant contributions to the Romance field. In his study of lenition phenomena in Western Romance, he attributed voicing of single intervocalic stops to the (pre-)

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Celtic substratum. As a student of M. Gómez Moreno, Tovar also engaged in the study of the ancient, pre-Indo-European languages of the Iberian peninsula (and their later developments, e.g., into Celtiberian, the scientific study of which was initiated by Tovar in 1946) and in the study of Basque, to which he applied M. Swadesh's technique of lexicostatistics or glottochronology (yielding the controversial result of a closer affinity of Basque to the Berber languages than to Caucasian). Tovar's stay in South America resulted in a number of Americanist publications, the most important of which is the catalogue of South American Indian languages (1984), which contains useful bibliographical and typological information. Tovar also conducted fieldwork on South American languages, and he encouraged the study of pre-Columbian languages because of their relevance for a comprehensive approach to Hispanic culture.

A universal mind, Tovar also wrote on modern literature and music, and he participated in discussions concerning educational reform and the role of universities in the modern world.

See also: Basque; Swadesh, Morris (1909–1967).

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Traditional Grammar

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The term 'traditional school grammar' was used by Fries in 1952 to distinguish grammar as commonly taught in the grade schools of the day from scientific linguistics. In this sense, 'traditional grammar' refers to the practical discipline that entered the educational tradition of the Western world as the first of the 'seven liberal arts,' a curriculum that has been traced to Plato's academy. An early Platonist, Crantor (4th century B.C.), is quoted as saying that students were not admitted there without having completed an *enkuklios paideia* or 'rounded education,' which consisted of grammar, rhetoric, logic, arithmetic, geometry, harmony, and astronomy (Stobaeus, 2.31.27; cp. 2.31.22, 28, 11, and Diogenes Laertius, 4.10). The Romans imitated this basic curriculum, introducing the term *artes liberales* or 'liberal arts' (Seneca, *Epistles* 88.23). Martianus Capella's *Marriage of Philology and Mercury*, a popular, allegorical work, perpetuated the prestige of the seven liberal arts during the Middle Ages.

Capella called the liberal arts 'divine bridesmaids,' exalted in one sense and humble in another: they were exalted because they were anchored in the innate, god-like capacities of the human mind and thus mastered as much by introspection as by empirical observation; humble, because they represented rudimentary abilities subservient to advanced studies. Grammar's position as the first of the liberal arts reflected the assumption that the ground rules of language are the first thing that an aspiring scholar in any field should master.

Aristotle distinguished between scientific and practical disciplines. A geometer views right angles in a scientific way; a carpenter, in a practical one (*Nichomachean ethics 1098a*). Traditional grammar is a practical discipline in the Aristotelian sense. At its heart is a rugged taxonomy of words: classifications that do not aspire to scientific exactitude but are useful in mastering languages. Aristotelian himself lay the foundation in *On interpretation (16a)* where he notes that a proposition, whose distinguishing characteristic is its association with truth or falsehood requires the union of a noun or verb. Herein lies the nucleus of traditional grammar, the insight that all complete sentences consist structurally of the union of a subject and a predicate.

The next step was taken by Dionysius Thrax, a Hellenistic scholar who studied at the library of Alexandria in the 2nd century B.C. and later taught grammar and literature on Rhodes. There he published

Celtic substratum. As a student of M. Gómez Moreno, Tovar also engaged in the study of the ancient, pre-Indo-European languages of the Iberian peninsula (and their later developments, e.g., into Celtiberian, the scientific study of which was initiated by Tovar in 1946) and in the study of Basque, to which he applied M. Swadesh's technique of lexicostatistics or glottochronology (yielding the controversial result of a closer affinity of Basque to the Berber languages than to Caucasian). Tovar's stay in South America resulted in a number of Americanist publications, the most important of which is the catalogue of South American Indian languages (1984), which contains useful bibliographical and typological information. Tovar also conducted fieldwork on South American languages, and he encouraged the study of pre-Columbian languages because of their relevance for a comprehensive approach to Hispanic culture.

A universal mind, Tovar also wrote on modern literature and music, and he participated in discussions concerning educational reform and the role of universities in the modern world.

See also: Basque; Swadesh, Morris (1909–1967).

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treatises on language and literature. Of these, just one very brief one survives, *Techne Grammatikê* (The grammatical art). Despite its brevity, Dionysius' *Technê* was immensely influential in its classification of words into eight parts of speech. Before its appearance, the classification of most words was up in the air. Aristotle spoke of nouns, verbs, and everything else; more detailed systems were proposed without catching on. Dionysius' swept away the competition.

In its surviving form, Dionysius's work consists of 20 brief chapters, most no more than one brief paragraph in length. The first 10 chapters deal with the phonetic values of the letters of the Greek alphabet. Chapter 11 introduces the notion of the sentence and the parts of speech: "a sentence (logos) is an arrangement of words expressing a thought complete in itself (*dianoian autotelê*). There are eight parts of speech: noun, verb, participle, article, pronoun, preposition, adverb, conjunction." (Dionysius viewed adjectives as a subspecies of noun and participles as distinct from verbs.) The remaining chapters of his book give examples of each part of speech in order with some further subdivisions, e.g., the distinction between common and proper nouns.

Dionysius' doctrine of the eight parts of speech was adopted by Roman grammarians, especially Aelius Donatus, who flourished in Rome around 350 B.C. His pupils included St. Jerome, famous for translating the Bible into Latin. Donatus published literary commentaries, of which excerpts survive, and a two-part Latin grammar. The second part consists of a brief definition of the parts of speech in the form of a catechism:

> What are (the parts of speech)?
> Noun, pronoun, verb, adverb, participle, conjunction, preposition, interjection.
> What is a noun?
> A part of speech with a case ending and signifying a person or thing specifically or generically.

As this excerpt shows, articles, which Latin lacks, have been dropped and interjections have been raised in status from subspecies of adverb to their own part of speech. The only major difference between Donatus' list and modern ones is that the he continues to put nouns and adjectives into the same group while leaving participles in a separate category.

In the 5th century A.D. Priscian produced a much longer grammar, illustrating Donatus' definitions with extensive quotations from Greek and Latin literature. In the early Middle Ages, the study of Donatus and Priscian was synonymous with the study of grammar and early education in general.

Judging by some polemical writings of the day, the study of grammar declined in the High Middle Ages with the development of great European universities led by Paris. Aristotelian logic and its use in public disputations acquired great prestige, while the study of classical authors and the mastery of grammar that it required were neglected. In 1215, classical literature was completely absent from Paris's liberal arts curriculum, which was devoted entirely to logic. (Bursill-Hall, 1971: 24). The best known critic of this trend was John of Salisbury, a British scholar educated at Paris and elsewhere. He laments that at Paris the neglect of grammar produced "men who profess all the arts, liberal and mechanical, but who are ignorant of the very first one, without which it is futile to go on to attempt the others" (John of Salisbury, 1955: I.24, 71). In a similar vein, Henri d'Andeli composed a comical allegory, 'The Battle of the Seven Arts' in 1259. In it, Logic with its stronghold in Paris vanquishes grammar, but Andeli predicts that grammar will eventually be vindicated. "In every science," he concludes, "the 'master' who has not mastered the parts of speech is a mere child."

The restoration of grammar occurred as part of the humanist movement beginning in the 14th century. As Kristeller has made clear, the impact of Petrarch and the other 'humanists' was to restore prestige to the study of literary classics. An essential aspect of their program was the revitalization in primary education of the study of grammar. The grammar that dominated the schools in the 13th century was Alexander's *Doctrinale*. A lengthy work, written in metrical Latin in order to be memorized, its principal purpose was the acquisition of a large technical vocabulary, including Greek and Hebrew loan words, to assist students in disputations. In modern terms, it was aimed at acquiring proficiency in Latin through immersion.

As the humanist movement spread north from Italy, its exponents undertook the task of writing new Latin grammars. These were expositions of the parts of speech in Latin along the lines laid down by Donatus. An innovative feature of the humanist grammars was that they contained explanations and illustrations of grammar in the vernacular languages of the students for whom they were designed. Previously, it had been widely assumed that only classical languages had grammars. Hence though the primary goal of humanist grammars was to enable students to read and write correct, classical Latin, an unintended benefit was that the students gained a grammatical understanding of their mother tongues.

Erasmus was the person most responsible for bringing the humanist movement to England. One of Erasmus' British friends was John Colet, who endowed and re-established one of London's leading cathedral schools, St. Paul's, in 1509. Under his direction, St. Paul's became the first of the Renaissance

grammar schools in England, with a focus on the study of grammar and classical literature. Colet appointed William Lily as the first high master of St. Paul's. Among Lily's responsibilities was the compilation of a grammar to be used by his students. He composed a short work on the eight parts of speech, which was amended by Erasmus and published throughout Europe under the latter's name. Like all humanist grammars, Lily's explained Latin's parts of speech in terms of English, thus giving students incidental insights into their own language. In the 1540s, Lily's treatise on the parts of speech was combined with a work on morphology by Colet and published with a decree by Henry VIII prescribing its exclusive use in all British schools. Humanist reforms in British education bore fruit in the literary productions of the 16th and 17th centuries, including those of William Shakespeare, who like generations of British schoolboys was raised on Lily's grammar. Shakespeare is thought to have been an indifferent student of Latin, but in the judgment of Samuel Johnson, "he had Latin enough to grammaticize his English" (Baldwin, 1944: ii.668).

Traditional grammar, as epitomized by Lily, continued to be a major focus in English-speaking grade schools for at least three centuries after Shakespeare's time. Emphasis on it increased in the late 18th century and early 19th when the publication of authoritative dictionaries by Samuel Johnson and Noah Webster ignited interest in 'correct' or standard English, and the same period witnessed the first spate of books on proper grammar. In England, the most influential was Bishop Robert Lowth's *Short introduction to English grammar*, which went through 22 editions between its initial publication in 1762 and 1800. In the same period, a million copies of Lindley Murray's adaption of Lowth's work, *English grammar*, were sold in America. The prescriptions found in Lowth and Murray were based on the usage of the respected English authors. Their terminology and categories were adapted from classical Latin. It was in this period that English grammar began to be studied for its own sake.

It was also in the 18th century that Donatus' list of the parts of speech received its last major revision. In 1761, Priestley published an introduction to grammar in which he separated nouns and adjectives into separate categories while reclassing participles as forms of verbs. His classification has remained dominant.

Dionysius	*Donatus*	*Priestly*
Nouns (incl. Adjectives)	Nouns (incl.) Adjectives	Nouns
Verbs	Verbs	Verbs (incl. Participles)
Participles	Participles	******
Articles	******	Adjectives (incl. Articles)
Pronouns	Pronouns	Pronouns
Prepositions	Prepositions	Prepositions
Adverbs (incl. Interjections)	Adverbs	Adverbs
Conjunctions	Conjunctions	Conjunctions
******	Interjections	Interjections

Questions about the educational value of traditional grammar were raised by progressive educators early in the 20th century. At this time, educators were reconsidering the goals of education because of large numbers of grade-school and high-school students who were not destined to enter college. Since such students had no need or desire to read Latin and became fluent speakers of their mother tongues without formal instruction in grammar, progressives urged that the subject could be eliminated or greatly reduced in importance.

Skepticism about the educational value of grammar gained further ground later in the 20th century with the growth of interest in scientific linguists, according to whom, as descriptive scientists, there are no better or worse ways to speak, simply various dialects, all of which are governed by complex, largely subconscious rules. The 'prescriptivism' of 18th-century grammarians has often been criticized by modern linguists. In 1952, Fries equated 'traditional school grammar' with the practice of bleeding in medicine and urged educators to abandon it. His criticism was based on its prescriptivist tendencies and his belief that the traditional definition of the sentence and parts of speech were not scientifically valid. His position was endorsed in the United States by the National Council of Teachers of English in 1963. This led to reduced emphasis on grammar in American schools. Similar tendencies were at work in the United Kingdom.

In the 1990s, concern about students' verbal abilities in both countries led traditionalists to advocate a return to traditional grammar in education. In 1998, Britain's New Labour government made grammatical analysis the central point of its National Literacy Strategy, an integrated syllabus for teaching reading and writing in England's primary schools. In the United States, new academic standards adopted on a state-by-state basis typically mandated more attention to grammar. In neither country have the issues separating the traditional grammar's opponents and advocates been settled. The argument for traditional grammar is that it provides a structure that facilitates student achievement in reading, writing, and the study of foreign language. Opponents argue that its definitions are outmoded and that it fosters a prescriptivist attitude toward language that is unfounded and counterproductive.

See also: Description and Prescription; Post-Bloomfieldians.

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Traditions in Animals

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More than 50 years ago, James Fisher and Robert Hinde (1949) documented the spread of a tradition of milk-bottle opening among British birds. Shortly thereafter, Satsue Mito discovered that several members of a troop of macaques living on Koshima Island in southern Japan would take dirt-covered sweet potatoes to a nearby stream and wash the dirt from them (Kawai, 1965). Geographical dialects in the songs of birds (*see* **Dialects in Birdsongs**) have long been a subject of discussion by ornithologists (Armstrong, 1963), and idiosyncratic feeding behaviors in various populations of Norway rats have been reported for many decades (for a review, see Galef, 2003b). Such observations provided the first evidence that members of a single species living in different areas exhibit differences in their behavioral repertoires that are not readily explained in terms of differences in either their genotypes or their ecological circumstances. The evidence, fragmentary though it was, led to a resurgence of interest in laboratory studies of the behavioral processes supporting social learning in animals as well as extraordinary efforts to describe differences in the behavior of geographically distinct populations of free-living primates.

Evidence from the field of differences in the behavior of geographically distinct populations within a species is now overwhelming not only in the great apes and other mammals, but in fish and birds as well (e.g., Box and Gibson, 1999; Fragaszy and Perry, 2003). For example, chimpanzees at Gombe National Park in east Africa hold a long stick in one hand and use the other to wipe ants from the probe and transfer the ants to their mouths. Chimps living in the Tai Forest in west Africa use a short stick to collect ants and their mouths to remove ants from the stick (McGrew, 1992; Whiten *et al.*, 1999). Studies of orangutan populations scattered across Southeast Asia have revealed similar differences in behavior

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among geographically distinct populations (Van Schaik *et al*., 2003). Important articles have appeared in the scientific literature using the term 'culture' to describe the local-specific behavioral repertoires of populations of chimpanzees and orangutans (Whiten *et al*., 1999; Van Schaik *et al*., 2003), suggesting fundamental similarities in the traditions of humans and great apes.

There is disagreement as to the appropriateness of such a usage. Some argue that although human culture and animal traditions share certain features, until we have a better understanding of how behavior is transmitted in both animals and humans, it is premature to assume that they are equivalent (Galef, 1992). Others feel that the specific mechanisms involved in the diffusion of behaviors through populations can be ignored when discussing traditions or culture because the evolutionary consequence of social learning, however it occurs, is always the same: behavior is transmitted (de Waal and Tyack, 2003).

From the perspective of those interested in language and linguistics, the differences between the traditions of animals and those of humans appear profound indeed. Although there has been relatively little study of the way in which humans acquire traditional patterns of behavior, many aspects of human culture, especially those involving the acquisition of complex skills, appear to depend on language, on teaching, and on imitation for their propagation.

Although apes have the capacity to manipulate a symbolic system invented and given to them by humans and to communicate with it (*see* **Cognitive Basis for Language Evolution in Non-human Primates**), there is no evidence that free-living apes communicate in a similar way. Anecdotal reports suggest that chimpanzees may engage in activities that can be interpreted as deliberate tuition of their young. However, teaching, as we know it in humans, appears to play a limited role, if any, in the development of the behavioral repertoires of apes. Chimpanzees and orangutans probably can imitate to some extent, but the contribution of imitation of others to the development of behavior of free-living animals is not known. If even our closest phylogenetic relatives rarely transmit behavior as we do, how is the existence of traditions in animals to be understood?

Like humans, nonhuman animals provide conspecifics with whom they share an environment with information useful in determining which of many possible behaviors is likely to be successful. In some cases, the traditions of animals are shaped and maintained by signals (behaviors evolved for the purpose of communication) emitted by one animal that influence the behavior of another. For example, male cowbirds from different geographical areas sing different variants of male-cowbird song, and these 'song dialects' are maintained by differences in the response of females from different areas to the songs that males produce. Although male cowbirds normally sing all of the various songs in their repertoires without repetition, after a female cowbird gives a wing stroke display in response to a male's song, he repeats that song several times in succession. During the breeding season, males tend to produce songs that previously caused females to give wing stroke displays and thus increase their access to females (West and King, 1988). Other contributors to this encyclopedia have discussed, either in detail or in passing (*see* **Animal Communication: Overview**; **Animal Communication: Vocal Learning**; **Cognitive Basis for Language Evolution in Non-human Primates**; **Communication in Marine Mammals**; **Dialects in Birdsongs**), traditions that similarly involve signals shaped by natural selection for the purpose of communication. I focus here on 'communications' between animals that do not involve signals that evolved for communicative purposes. Animals can learn from others not because those others actively provide information, but because stimuli that others emit as byproducts of activities necessary for their own maintenance incidentally direct the behavior of recipients in profitable directions (e.g., King, 1994). For example, the rasping sounds that an agouti makes as it gnaws on a nut carry for many tens of meters through the forests of Central America, attracting both other agouti and the occasional predator to a promising feeding site. A vulture descending to feed from a carcass lying on the Serengeti Plain attracts both others of its kind and competing species to a recent kill. It does not seem reasonable to suppose that, in such cases, individuals that have discovered a food source emit signals to announce their finds. Still, the feeding behavior of one agouti or vulture provides an unambiguous cue to those sufficiently alert to detect and exploit it.

Sometimes the behavior of one animal results in residual changes in the environment that affect the behavior of conspecifics. As a Norway rat moves about its home range, it creates paths through the undergrowth that influence the behavior of those that come after. As it feeds, it deposits residual olfactory cues in the saliva it leaves on its food and in the feces it voids in the location where it eats. Such residual signs are attractive to other rats and strongly bias their choice of feeding site (Galef, 2003b).

Sometimes, the effects of environmental modification of the behavioral development of others are quite sophisticated. For example, the pine forests of Israel are inhabited by colonies of roof rats that live on a diet of pine seeds and water. Laboratory observation

of roof rats captured either in pine forest or elsewhere in Israel reveals that although all of the former animals are able to extract pine seeds from cones in a way that provides more energy than it consumes, few rats captured outside the pine forest can do so. The efficient method of harvesting pine seeds takes advantage of the architecture of cones and involves starting at the base of a cone and removing, in succession, the spiral of scales that run from the base of a cone to its apex. Regardless of genetic background, rat pups reared by dams that open pinecones in their presence usually develop the efficient technique, whereas few pups reared by dams not given access to pinecones do so. Experience of young rats in completing the removal of scales from cones started in the right way by an adult rat (or by a human stripping scales from the base of a cone in imitation of a proficient adult) allowed most of them to acquire the efficient technique (Terkel, 1995). Clearly, socially produced residual changes in the environment provide the necessary substrate for diffusion of behavior through rat populations.

In discussion of the development of behavioral traditions in members of our own species, the role of information acquired as a result of observation of the activities of others as they go about behaviors necessary for self-maintenance is easily overlooked. We talk, we teach, we confer, we advertise. It is easy to forget that we also act and that our activities provide useful, often unambiguous messages for others, modeling behaviors that are likely to be rewarded in a shared environment. Extraction of information from the life-sustaining activities of others and the residues such activities leave in the environment, rather than from signals that have an explicitly communicative function, can prove useful, even for humans.

There has been considerable discussion among behavioral ecologists as to whether signals passing from one animal to another provide a recipient with honest information or are designed to manipulate the behavior of a signal recipient to the sender's advantage (*see* **Animal Communication: Deception and Honest Signaling**). Information extracted from observation of the life-sustaining activities of others is less likely to misinform than information extracted from signals evolved for communicative purposes. No animals other than humans, and perhaps chimpanzees, have been shown to modify behaviors involved in their own maintenance so as to mislead others. Consequently, information extracted from signs and cues emitted by others, rather than information extracted from signals that evolved for purposes of communication, is likely to be particularly useful.

Information extracted from the behavior of others can both introduce novelty into behavioral repertoires and lead to homogeneity in the behavior of members of a population (Galef, 2003a). However, like other elements in the behavioral repertoires of individuals, behaviors acquired by extracting information from signs or cues produced by others are rewarded or punished during subsequent interaction with the physical and social environments. Consequently, socially acquired behaviors will increase or decrease in frequency of expression in a population as a function of their costs and benefits relative to alternative behaviors in the repertoires of population members. There is no reason to believe that there is anything special about behaviors that are acquired socially. Like behaviors acquired as the result of individual experience, continued expression of a socially learned behavior depends on the reward it produces relative to alternative related behaviors in an individual's repertoire. Still, information extracted from others as they go about the mundane tasks necessary for self-maintenance, like the signals that other contributors to this encyclopedia discuss, can bias the development of behavioral repertoires of nonverbal species (Boyd and Richerson, 1985).

See also: Alarm Calls; Animal Communication: Deception and Honest Signaling; Animal Communication Networks; Animal Communication: Overview; Animal Communication: Parent–Offspring; Animal Communication: Vocal Learning; Apes: Gesture Communication; Bee Dance; Birdsong; Cognitive Basis for Language Evolution in Non-human Primates; Communication in Grey Parrots; Communication in Marine Mammals; Development of Communication in Animals; Dialects in Birdsongs; Individual Recognition in Animal Species; Non-human Primate Communication.

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Trager, George L. (1906–1992)

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Trager was born on March 22, 1906 in Newark, NJ, and died on August 31, 1992 in Pasadena, CA. He is well-known for his contributions to structural linguistics, phonetics, American Indian languages, Romance philology, and Slavic and Germanic linguistics.

The young Trager, whose parents emigrated from Russia via Germany, grew up speaking Russian and German at home, and English in his Newark neighborhood and in school. An excellent student in the public schools of Newark, he was awarded a full state scholarship to attend Rutgers University in 1922. Although his first declared major was chemistry, he graduated in 1926 with a B. Litt. in Romance languages. He received both his A.M. (1929) and Ph.D. (1932) in Romance Philology from Columbia University. His dissertation (Trager, 1932) was supervised by H. R. Muller, with L. H. Gray serving on his committee. Although his forte was in Romance, he was also competent in Slavic (see Trager, 1933, 1942). Two classic studies deal with French morphology (Trager, 1944, 1955), a particular strength of his, and he taught French at Brown University and Columbia University.

Trager was a Research Associate of the International Auxiliary Language Association from 1931–1934. He taught every foreign language offered at Adams State College in Alamosa, CO, from 1934–1936. It was during this period that he began his lifelong fieldwork on Taos, a Tanoan language spoken about 100 miles from Alamosa. He was a postdoctoral scholar at Yale University from 1936–1938, and a research fellow there from 1936–1941. He was Lecturer in Phonetics for 1937–1938 (see Trager and Bloch, 1940; Trager, 1950a, 1964, e.g., for his special expertise in that subject). He later served there as Assistant Professor of Slavic Languages (1942–44). During the Yale years, he came in contact with numerous superstars of the structuralist era: E. Sapir, M. Swadesh, C. Osgood, F. Edgerton, E. H. Sturtevant, M. B. Emeneau, C. F. Hockett, B. L. Whorf, and also L. Bloomfield. He collaborated with Whorf, B. Bloch, and with others (e.g., H. L. Smith, Jr.) in a long and distinguished career.

Trager was Chief Linguistics Secretary for the U.S. Board of Geographical Names from 1944–1946. He then was Professor of Linguistics at the University of Oklahoma, Norman, from 1946–1948, followed by a stint as Professor of Linguistics at the Foreign Service Institute from 1948–1953. He also served as Director of Linguistic Research at the Institute of Languages and Linguistics, Georgetown University from 1950–1953, and was Visiting Professor there for 1954–1955. After Georgetown, he became the Assistant Director of the Human Relations Area Files, Washington Bureau, American University, for 1955–1956. He became Professor of Anthropology and Linguistics, University of Buffalo, 1956–1957, and

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Chair of Modern Languages, 1956–58. Moving to Dallas, he became Professor of Anthropology at Southern Methodist University from 1967–1971, becoming Emeritus in 1971. After retiring in Dallas, he secured another position at Northern Illinois University, De Kalb, in 1971 as Professor of Anthropology.

Trager's accomplishments include the following: Ford Foundation Visiting Lecturer, School of Applied Linguistics, University of Edinburgh, 1969; Guggenheim Fellow, 1941–1942, for the study of Slovene immigrants in PA; National Science Foundation (NSF) Research Grantee, Taos Pueblo, NM, 1959–1960; Fellow, Center for Advanced Study in the Behavioral Sciences, Stanford, CA, 1962–1963; NSF Research Grantee, 1964–1967; Fellow, American Anthropological Association; Fellow, American Academy of Arts and Sciences; President, Linguistic Society of America, 1960. Trager (1963) was his Presidential address, which B. Bloch, as editor of *Language*, refused to publish, presumably for its lack of scholarly content.

During his vibrant years in the 1940s, Trager was well-known for cofounding (along with C. F. Hockett) an informal linguistics journal, *Studies in Linguistics*. Trager was editor; M. Joos was the publisher until 1947. Thereafter, the whole enterprise rested on Trager's shoulders. Many of Trager's works were published in this series (e.g., 1949, 1958, 1963). *Studies in Linguistics* ended publication with Vol. 25 (1975), and Fickett (1975) was its last *Occasional Paper*.

Trager's fame as a structuralist rests primarily on his collaborative efforts: Trager and Bloch (1940), Trager and Bloch (1942), Trager and Rice (1950), Trager and Smith (1951), and Trager and Hall (1953). The phonetic chart of Trager and Bloch (1942: 22), more detailed than the standard IPA chart, became legendary for its completeness. Trager and Smith (1951) presented many classical statements on complex nuclei, internal open and terminal juncture, superfixes, intonation patterns, and metalinguistics. Trager and Harben (1958) demonstrated Trager's expertise in North American Indian linguistics.

Trager's (1972) textbook appeared in the Chandler Publications series in Anthropology and Sociology edited by L. Broom. The nine-chapter volume was unusual for its time and probably is also unusual today in that it devoted considerable space to grammatology – a special interest of his for a long time (1972; 179–310). Here, he made the bold pronouncement that "the ANTHROPOLOGY of spelling reform is as yet an almost completely unexplored field" (1972: 310). It should be noted that Trager considered the Semitic alphabets to be real alphabets – not syllabaries or the like, with the exception of Ethiopic (1972: 268–275).

Trager (1971) contains an annotated bibliography of Trager's publications through 1970, while Smith (1972) was the Trager *festschrift*. Manaster-Ramer (1994) called attention to the fact that Trager's publications on French (especially 1944 and 1955) were among the earliest arguing for abstractness in phonology. Manaster-Ramer (1994) also noted that Trager's analysis of ergativity in Taos "elegantly account[s] for the formal identity of intransitive subjects with objects." Of interest to the history of linguistics, mention should be made of Hockett (1993), which presented many important details on Trager's life and oeuvre, also touching on his personal (and often tragic) circumstances and relationships with other linguists.

See also: Bloch, Bernard (1907–1965); Hockett, Charles Francis (1916–2000); Linguistics as a University Subject: Early History, in America; Phoneme; Post-Bloomfieldians; Smith, Henry Lee (1913–1972).

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Trans New Guinea Languages

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The Trans New Guinea Family

Comprising upward of 400 languages, Trans New Guinea (TNG) is the third largest family in the world in number of languages, behind Austronesian and Niger-Congo and ahead of Indo-European. TNG is the predominant family on the large island of New Guinea, a region of spectacular linguistic diversity that contains some 18 families that are not demonstrably related (*see* **Papuan Languages** and **Austronesian Languages: Overview**). TNG languages are spoken continuously along the 2000-km mountain chain that runs along the center of New Guinea as far west as the Bird's Head, and they also are used in several parts of the lowlands. At least a dozen TNG languages are also present on Timor, Alor, and Pantar Islands in East Nusantara.

About 3 million people speak TNG languages. Yet, most of the languages have fewer than 5000 speakers. Their small size reflects the difficult terrain of New Guinea in combination with extreme political fragmentation; peoples were traditionally subsistence farmers or foragers, and until colonial times political groups seldom exceeded a few hundred people. The largest TNG language communities are Enga (about 200 000) and Medlpa (Melpa; 150 000) in the highlands of Papua New Guinea, and Western Dani (150 000) and Lower Grand Valley Dani (130 000) in the highlands of West Papua (Irian Jaya).

Until the late 19th century, the TNG languages of New Guinea were completely unknown to linguists, and most remained unrecorded until after World War II. Since then, linguists from various parts of the world have done descriptive and comparative work on TNG languages. Although most are still only documented (at best) by grammatical sketches and word lists, there are quite detailed published grammatical descriptions of perhaps 50 to 70 TNG languages. Reasonably good dictionaries exist for about 20 TNG languages. Excellent introductory overviews are given in Foley (1986, 2000). The atlas of Wurm and Hattori (1981–83) contains detailed maps, and Carrington's work (1996) is a near-exhaustive bibliography. Languages for which there are good grammars include Korafe of the Binandere group (Farr, 1999), Grand Valley Dani (Bromley, 1981), Hua (a dialect of Yagaria) of the Gorokan group (Haiman, 1980), and Eipo (Eipomek) of the Mek group (Heeschen, 1998).

History of the Trans New Guinea Hypothesis

The hypothesis that there is a large TNG family was proposed about 1970 by linguists at the Australian National University, mainly on the basis of typological resemblances and a handful of widespread putative cognates (McElhanon and Voorhoeve, 1970: Wurm, 1975). However, critics argued that the hypothesis was based on unreliable methods and that the evidence was unconvincing. Percentages of resemblant basic vocabulary forms shared by languages belonging to distant branches of TNG are very low, in the range of 3–7%, and in a region where there has been extensive lexical diffusion for millennia, this level of agreement could be due to borrowing and chance. Recently, linguists have applied more classical comparative methods and have found evidence that strongly supports a modified version of the TNG hypothesis (Pawley, 1995: Ross, 1995; Pawley, 1998, 2001, in press; Ross, in press).

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Table 1 Proto TNG free pronouns

	1st person	*2nd person*	*3rd person*
sing.	na	ŋga	[y]a, ua
pl. (i-agrade)	ni	ŋgi, ki	i
(u-grade)	nu		
pl.	nja		

Table 2 Some cognate sets of the Trans New Guinea family

	'breast'	*'eat'*	*'louse'*	*'name'*
Proto TNG	*amu	*na-	*niman	*imbi
Asmat (Irian Jaya)		na-		yipi
Kiwai (SW coast, PNG)	amo		nimo	
Kewa (W. Highlands, PNG)		na-		ibi
Kuman (C. Highlands, PNG)	aemu		numan	
Kube (Morobe, PNG)	namu	ne-	imiŋ	
Katiati (Madang Province, PNG)	ama		ñima	nimbi
Aomie (Central Province, PNG)	ame		ume	ihe

The main grounds for considering TNG to be a language family are (1) systematic form-meaning correspondences in the independent personal pronouns, permitting reconstruction of virtually a complete paradigm (Table 1); (2) some 200 putative cognate sets (nearly from 'basic vocabulary') being represented in two or more major subgroups (Table 2); (3) a body of regular sound correspondences for a small sample of languages belonging to eight different subgroups, which has allowed a good part of the Proto TNG sound system to be reconstructed (Table 3); and (4) resemblances in certain other grammatical paradigms, chiefly the form of verbal suffixes marking person-number of subject. In addition, the distribution of certain striking structural features, such as switch-reference morphology on verbs, has been shown to correlate rather closely with the distribution of TNG languages.

TNG seems to have had a simple syllable structure, with syllables of the shape (C)V and (word-finally) CVC.

Subgroups of Trans New Guinea

More than 30 subgroups are recognized that have not been assigned to any larger grouping within Trans New Guinea. Much of the evidence for these groups is based on innovations in the personal pronouns (Ross, in press). The following is a selection of the more important subgroups.

Madang (Madang-Adelbert Range) is by far the largest well-defined subgroup of TNG, with about

Table 3 Proto TNG segmental phonemes (Minimal set)

	Bilabial	*Apical*	*Palatal*	*Velar*
Consonants				
oral obstruents	p	t s		k
prenasalized obstruents	mb	nd	nj	ŋg
nasals	m	n		ŋ
lateral		l		
glide	w		y	
Vowels	front	central	back	
high	i		u	
mid	e		o	
low		a		

100 members (*see* **Madang Languages**). It occupies the central two-thirds of Madang Province from the coast to the Bismark and Schrader Ranges. Huon-Finisterre contains about 70 languages spoken on the Huon Peninsula and in the Finisterre and Saruwagi Ranges in Morobe and Madang Provinces. Chimbu-Wahgi (Chimbu) is centered east and south of Mt. Hagen, in the Wahgi, Nebilyer, and Kaugel Valleys and extends north of the Sepik-Wahgi Divide into the Jimi Valley. It contains perhaps 12 languages, although the situation is complicated by extensive dialect chaining. The best-known members are probably Kuman (Chimbu), Middle Wahgi, Sinasina, and Medlpa (Melpa). Engan is a well-defined group consisting of several languages spoken over a wide area to the west of Mt. Hagen. There is a northern subgroup that includes Enga, Ipili, Iniai (Bisorio), and Lembena and a southern subgroup that includes Sau (Samberigi), Huli, Mendi (Angal), and Kewa.

The Kainantu and Goroka groups occupy contiguous parts of Eastern Highlands Province. Each consists of a half a dozen or so languages, some with diverse dialects. Together they probably form a single higher-order larger subgroup, Kainantu-Goroka. The Angan group of about 12 languages occupies considerable areas of Morobe and Guilf Provinces and extends into the Eastern Highlands province. Southeast New Guinea contains the Dagan, Mailuan, Yareba, Manubaran, Kwalean, and Koiari groups, which all replace Proto TNG **ŋgi* '2 PL' by **ya*, as well as the Binandere and Goilalan groups.

The Ok group comprises about about 10 languages spoken in the central ranges around the West Papua-Papua New Guinea border, including the Star Mountains, and the Thurnwald and Victor Emmanual Ranges. The Awyu-Dumut and Asmat-Kamoro groups occupy the lowlands to the southwest of this area, in West Papua. The Dani languages spoken in and around the Baliem Valley and the Wissel Lakes languages seem to belong together in a Western New Guinea group. The West Bomberai and Timor-Alor-Pantar groups

share two probable innovations in pronouns, which suggests that together they may form a West Trans New Guinea group (Figure 1).

Where and When was Proto TNG Spoken?

The largest concentration of established high-order subgroups of TNG lies in the central highlands of Papua New Guinea between the Strickland River and Eastern Highlands. It is safe to say that this was a very early area of TNG expansion and that initial dispersal was mainly along the central cordillera. If we take conventional estimates for the breakup of Indo-European (at least 6000 years ago) and Austronesian (about 5000 years ago) as yardsticks, a date of between 8000 and 12 000 years ago for the breakup of TNG is reasonable, given that lexicostatistical diversity within TNG is far greater than in either Indo-European or Austronesian. It is noteworthy that dates of about 10 000 years ago have been established for early agriculture, probably based on taro and bananas, in the Upper Wahgi Valley (Denham *et al.*, 2003). It may have been their use of agriculture that enabled speakers of TNG languages to establish permanent settlements along the central highlands of New Guinea as the climate warmed after the last Ice Age.

Structural Characteristics of TNG Languages

Phonology

Many TNG languages have sound systems similar to that posited for Proto TNG, with syllables of the shape (C)V and (word-finally) CVC, five vowels, and series of nasals, oral, and pre-nasalized (or voiceless and voiced) obstruents with contrasts at bilabial, apical, and velar (and sometimes palatal) positions. A number of languages in the central highlands have a contrast between dental, alveo-palatal, and velar laterals, or between resonant and fricative palatals. [t] and [r] are often allophones of the same phoneme. Many TNG languages have word tone or pitch accent (Donohue, 1997).

Grammar and Semantics

The preferred order of constituents in verbal clauses is SOV, but OVS often occurs as a marked structure. Adpositions follow the verb, whereas determiners and possessors follow the noun. Case marking is generally absent or little developed. Most languages organize pronominal affixes to show a nominative-accusative (or dative) contrast. No language is known to have a full ergative-absolutive alignment for verb pronominals.

Generally, a verb root cannot be used as a noun without derivational morphology or vice versa. In some languages verb roots are a small closed class, with between 50 and 150 members. The densest concentration of such languages seems to be in the Chimbu-Wahgi and Kalam-Kobon subgroups. Common nouns are an open class with many subclasses. Minor classes include adjectives, adverbs, and (see below) verbal adjuncts.

TNG languages typically have fairly simple systems of independent pronouns, in some cases distinguishing three persons but with no number contrasts. More complex pronoun systems are constructed by adding number markers for dual and plural. However, there is often a discrepancy between the kinds of distinctions made in independent pronouns and in verbal affixes. For example, Kuman of the Chimbu-Wahgi family has only four independent pronouns – first person singular, first person plural, second person, and third person – but in verbal morphology Kuman makes nine contrasts for the subject: three persons each with singular, dual, and plural.

Morphology is chiefly suffixal. In most languages, nouns carry little morphology. Kinship terms and sometimes part terms often require affixed possessive pronouns. A few languages mark gender contrasts. A good many TNG languages use existential verbs, such as 'stand', 'sit', 'lie' and sometimes, other verbs like 'hang', 'carry' and 'come', as quasi-classifiers of nouns (Lang, 1975), with nouns selecting a verb according to their shape, posture, size, and composition. However, the choice of verb has some flexibility relative to the situation of the referent. Nouns are usually not inflected for number. Certain generic categories are typically expressed by N + N (and occasionally N + N + N) compounds denoting the most salient members of a class (e.g., often 'people' is 'woman-man', 'children' is 'girl-boy', and 'ancestors' is 'grandmother-grandfather'.

Most TNG languages distinguish two types of inflected verb, often called 'final' and 'medial.' Final verbs head the final clause in a sentence and carry suffixes marking absolute tense-aspect-mood and person-number of subject. Medial verbs head nonfinal coordinate-dependent clauses and carry suffixes marking (1) whether the event denoted by the medial verb occurs prior to or simultaneous with that of the final verb and (2) 'switch reference' (i.e., whether that verb has the same subject or topic as the next clause; Roberts (1997) surveys the several kinds of switch-reference systems.) In many languages, transitive verbs also carry a pronominal prefix or proclitic marking object agreement. Some languages have

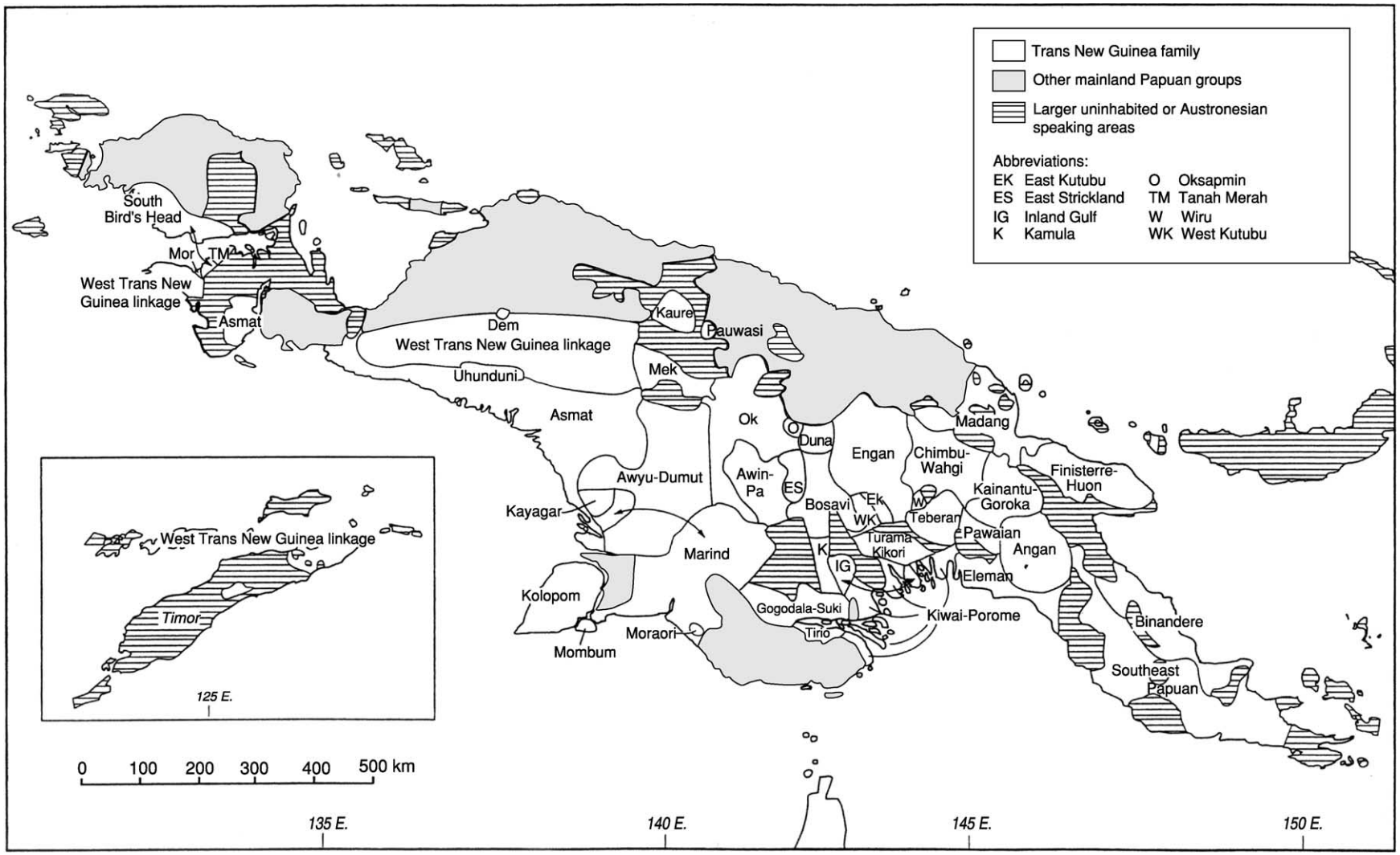

Figure 1 Location of the main subgroups of the Trans New Guinea family.

causative and applicative affixes that add arguments to the verb. Several Highlands subgroups carry evidential suffixes, indicating whether the clause denotes an event witnessed by the speaker or based on hearsay. In constructions denoting uncontrolled bodily and mental processes (e.g., sweating, sneezing, bleeding, feeling sick), the experiencer is often marked by an object/dative pronoun and is the direct object. A noun denoting the bodily condition is, arguably, the subject or else there is no referential subject. There are usually clauses with nominal predicates denoting class membership and identifying relationships.

All TNG languages make extensive use of at least one of two types of complex (multi-headed) predicates to augment their stock of verbs. First, in verbal adjunct constructions, an inflected verb, usually carrying a rather general meaning, such as 'make', 'hit' or 'go', occurs in partnership with a noninflecting base (the verbal adjunct), which carries a more specific meaning. Verbal adjuncts partner just a small set of verbs. For example, Kalam has a single verb of sound making and speaking, *ag-*, but has some 30 verbal adjuncts that denote particular kinds of sounds and occur only with *ag-*. Second, in serial verb constructions, two or more bare verb roots occur in sequence to express a tightly integrated sequence of subevents; for example, Kalam: *d ap* (get come) 'bring', *d am* (get go) 'take', *am d ap* (go get come) 'fetch', *d nŋ* (touch perceive) 'feel', *ñb nŋ* (eat perceive) 'taste'. Many languages have a looser type of serial verb construction – narrative serialization – which allows a streamlined, formulaic representation of episodes in which the same actor performs a familiar sequence of actions; for example, Kalam: *am alŋaw-kab tk d ap ad ñb-* (go pandanus-nut gather get come cook eat) 'gather and eat pandanus nuts'.

Generally, little use is made of conjunctions to show sequential, conditional, and causal relations. Speakers commonly use long chains of clauses headed by medial verbs to report a sequence of past events that make up a single complex episode. In narratives, paragraph-like boundaries are frequently marked by head-tail linkage, in which the last clause of the previous sentence is repeated, to begin a new sentence.

See also: Austronesian Languages: Overview; Madang Languages; Papuan Languages.

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Transformational Grammar: Evolution

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Transformational grammar was developed in the mid 1950s by Noam Chomsky. Over the next two decades it became the dominant paradigm in syntactic theory and description and its descendant, government binding theory is still one of the most influential current theories. Transformational grammar forms a wide-ranging theory, whose central tenets are the use of hypothetico-deductive methodology to construct formal models of certain aspects of human linguistic capabilities. Such models are called 'grammars' in the theory and are taken to be an encoding, in some form, of the native speaker's linguistic knowledge (or 'competence'). Much of the work of transformational grammar has consisted of constructing models of (fragments of) individual languages, but equally important has been the task of exploring and defining the properties which are required by such grammars to provide accurate and revealing accounts of the linguistic data under consideration. Such general properties are taken to form the content of 'linguistic theory' (also termed 'universal grammar') and therefore do not need to be stated in individual linguistic descriptions. While a grammar for an individual language is a representation of the linguistic knowledge of the native speaker of that language, linguistic theory represents the properties (possibly very abstract in nature) which constrain all languages and thus defines the notion 'possible human language.' The content of universal grammar is taken to be a characterization of the human language acquisition device – those antecedent conditions that make language acquisition possible and which constrain the learning space available to the child acquiring a native language. Transformational grammar has undergone significant evolution since its initial development and one of the slightly ironic consequences of the pursuit of the goals listed above is that transformations themselves have come increasingly to play a less and less significant role in the theory. This article traces that development.

Early Transformational Grammar

Transformations, from which the theory derives its name, were developed during the 1950s by Zellig Harris and Noam Chomsky. The central idea underlying the concept of transformation was that of capturing systematic relationships between different syntactic representations. However, because of fundamental differences in the metalinguistic goals of Harris and Chomsky, the role played by transformations in the work of the two and the consequences of their introduction also were radically different.

Harris on Transformations

For Harris, transformations offered a way of allowing structural linguistics to transcend the limits of the sentence and offer a method of approaching discourse-level structures. For Harris, transformations are a device that extends the descriptive linguistic techniques of segmentation and classification to texts larger than a single sentence. They allow the linguist to establish equivalences between sequences of words in a text which would otherwise resist analysis. For example, suppose that a text contains the sentences:

(1) He played the cello.

(2) The cello was played by Casals.

but no sentences of the form:

(3) Casals played the cello.

(4) The cello was played by him.

In other words, there are no environments which show that *Casals* and *he/him* are grammatically equivalent (i.e., belong to the same grammatical category).

If, however, the text contains active/passive sentence pairs:

(5) He plays the guitar.

(6) The guitar was played by him.

an equivalence can be established between the two sentence types, as follows:

(7) $N_x V N_y \leftrightarrow N_y$ *was Ved by* N_x

Assuming that *He*, *him*, *Casals*, and *the guitar* belong to the category *N*, and that *played* is a member of the category *V*, (7) captures the relationship between the two; and between all other pairs of sentences possessing the same structure. With the equivalence given in (7) above, 'we can show that all the environments of *Casals* are equivalent to all those of *he*; and this in turn can make other equivalences discoverable textually' (Harris 1952: 129).

Chomsky on Transformations

For Chomsky, on the other hand, transformations formed part of a program directed at characterizing

the nature and properties of the human language faculty. Chomsky states:

> The development of these ideas that I would like to report on briefly, however, follows a somewhat different course. It begins by questioning the adequacy of a certain view of the nature of linguistic theory that has dominated much recent work, and it attempts to reformulate the goals of linguistic theory in such a way that questions of a rather different nature are raised. And finally, it attempts to show that the concept of grammatical transformation, in something like Harris' sense, but with certain differences, is essential to answering these questions (Chomsky, 1964b: 212).

One major difference between Chomsky's and Harris's applications of transformations was the nature of the representations between which a transformational mapping held. For Harris, the kinds of relationships captured by transformations were essentially those which in terminology developed later were called 'surface structure' relationships (Chomsky 1965a). That is to say, the mappings defined by transformations were limited to those which could be expressed in terms of the categories and linear order of the actually occurring words/morphemes in a sentence. For Chomsky, no such restriction was applicable. This is apparent in one of Chomsky's earliest and most well-known transformational analyses: that of the English auxiliary system. The abstractness permitted by Chomsky's conception of transformations allowed him to propose an elegant and simple analysis of the auxiliary system which, in the words of Newmeyer (1980: 24), "[...] probably did more to win supporters for Chomsky than all of his metatheoretical statements about discovery and evaluation procedures." In *Syntactic structures*, the book in which transformational grammar first became accessible to the linguistic community, Chomsky states:

> The study of these 'auxiliary verbs' turns out to be quite crucial in the development of English grammar. We shall see that their behaviour is very regular and quite simply describable when observed from a point of view that is quite different to that developed above. Though it appears to be quite complex if we attempt to incorporate these phrases directly into a [S, F] grammar [i.e., a phrase structure grammar] (Chomsky 1957: 38).

and proposes the following phrase structure rules:

(i) $Verb \rightarrow Aux \rightarrow V$ [28]
(ii) $V \rightarrow hit, take, walk, read, etc.$
(iii) $Aux \rightarrow C\ (M)\ (have + en)\ (be + ing)\ (be + en)$
(iv) $M \rightarrow will, can, may, shall, must$

$$\text{(i)}\ C \rightarrow \begin{Bmatrix} S \text{ in the context } NP_{sing\bar{a}} \\ \emptyset \text{ in the context } NP_{pl\bar{a}} \\ past[29] \end{Bmatrix}$$

Rule [28iii] states that an *Aux* phrase must contain as its initial element the tense/agreement morpheme *C*, and that this initial element can be followed by zero or more of *M*, *have* + *en*, *be* + *ing*, *be* + *en* in that order. *M* can then take any of the forms in [28iv]. Chomsky (1975: 232–33) observes, however, that:

> the sequence of morphemes which results from an application of [28] is not in the correct order. Thus to complete the statement we give the following rule [which later became known as 'affix hopping']:
>
> (ii) Let *Af* stand for any of the affixes *past*, *S*, *Φ*, *en*, *ing*. [29]
> Let *v* stand for any *M* or *V*, or *have* or *be* (i.e., for any nonaffix in the phrase *Verb*).
> Then:
> $Af + v \rightarrow v + Af\ \#$
> where # is interpreted as word boundary.
>
> (iii) Replace + by # except in the context $v \rightarrow Af$.
> Insert # initially and finally.

When the items *S*, *have* + *en* and *be* + *ing* in rule [28iii] are selected to give the string:

(8) $the + man + S + have + en + be + ing + read + the + book$

and rule [29ii] is applied three times (first to *C* + *have*, then to *en* + *be*, and finally to *ing* + *read*), followed by the application of rule [29iii], the following is derived:

(9) $the\ \#\ man\ \#\ have + S\ \#\ be + en\ \#\ read + ing\ \#\ the\ \#\ book$

Chomsky's analysis thus depends upon an abstract structure in which the affixes of the auxiliary system do not appear in their 'surface' order. The question of what kind of syntactic representations could legitimately constitute the input and output of a transformation came to be one of the most significant issues in the development of transformational theory.

In Chomsky's interpretation of the notion, a transformation is a mapping which converts a sentence (= a string of words) with an associated constituent structure analysis (= a 'phrase marker'), defined by a set of phrase-structure rules, into a new sentence with a 'derived constituent structure.' A transformation consists of a 'structural analysis' (often also called a 'structural description,' and abbreviated to *SD*), which specifies the sequence of categories into which a phrase marker must be analyzable for the transformation to apply to it, and a 'structural change,' which specifies the changes effected on the input phrase marker by the transformation. For example, the passive transformation is given by Chomsky (1957: 112) in the following form:

(10) Structural analysis:
$NP - Aux - V - NP$
Structural change:
$X_1 - X_2 - X_3 - X_4 \rightarrow X_4 - X_2 + be + en - X_3 - by + X_1$

(An alternative notation, which merges the structural analysis and structural change into a single statement of the form:

$NP_1 - Aux - V - NP_2$
$\rightarrow NP_2 - Aux + be + en - V - by + NP_1$

was also commonly used in later transformational work.)

The structural analysis specifies that for the transformation to apply to a string, the phrase marker associated with that string must be analyzable into a sequence of $NP - Aux - V - NP$. In the structural change, the variables $X_1 - X_4$ identify the four categories listed in the structural analysis and the string to the right of the arrow defines the mapping effected by the transformation: the relative positions of the two NPs are interchanged, the morpheme *by* is adjoined to the left of X_1 in its new position and the morphemes *be* and *en* are adjoined to the left of X_2 (= *Aux*). Each transformation is thus the composition of a number of more elementary operations, which include deletion, substitution of one element for another, adjunction, and permutation. For example, Chomsky (1965b: 120) specifies the operation of the passive transformation in terms of the following 'elementary transformation,' which details the operations performed by the rule:

(11) $tp(Y_1; Y_1, \ldots, Y_4) = Y_4$
[substitute Y_4 for Y_1]
$tp(Y_1, Y_2; Y_2, Y_3, Y_4) = Y_2$^be^en
[adjoin *be* and *en* t the right of Y_2]
$tp(Y_1, Y_2, Y_3; Y_3, Y_4) = Y_3$
[leave Y_3 unchanged (identity)]
$tp(Y_1, Y_2, Y_3, Y_4; Y_4) = be\hat{}Y_1$
[adjoin *be* to left of Y_1]
$tp(Y_1, \ldots, Y_n; Y_n, \ldots, Y_r) = Y_n$ for all $n \leq r \neq 4$
[identity]

This notation identifies each term in the structural description of the transformation by successively splitting the structural description into two substrings (indicated in 11 by the semicolon), one of which terminates with that item and the other of which begins with it. For each such item, the elementary transformation specifies what operation is performed on it.

As stated above, Chomsky's motivation for the introduction of transformations was radically different to that of Harris. Chomsky had established a hierarchy of language types, which could be used to model the properties of human languages. Each of the languages on the Chomsky hierarchy is defined in terms of the possible sequences of symbols it admits. Chomsky presented a proof that English possesses properties which mean that it cannot be analyzed in terms of the most restricted type of language on the hierarchy: 'finite state languages.' He also argued that any attempt to describe the syntactic properties of English in terms of the kind of devices available for characterizing the next weakest language type on the hierarchy ('phrase structure languages') leads to the loss of generalizations and greater complexity. The simple and elegant analysis of the English auxiliary system or of the passive outlined above, for instance, which require the capacity to rearrange the order of elements in a string cannot be accomplished within the limits of these more restricted grammatical systems. Chomsky concludes (1957: 44) 'By further study of the limitations of phrase structure grammars with respect to English we can show quite conclusively that these grammars will be so hoplessly complex that they will be without interest unless we incorporate such rules [i.e., transformations].' (It is, however, important to note that Chomsky did not *prove* that English could not be analyzed by phrase structure grammars at all. Rather, he argued that any such analysis would be unacceptably complex and unrevealing. Indeed, later developments in phrase structure grammars in the 1980s demonstrated that even this assertion is too strong.)

A grammar for Chomsky is a device which defines the language under investigation via a system of rules. In the earliest stages of transformational grammar (e.g., *Syntactic structures*), the grammar consisted of three sets of rules:

(12) Phrase structure rules
Transformations
Morphophonemic rules

As seen above, the phrase structure rules defined the constituent structures which form the input to the transformational component. The morphophonemic rules are responsible for ensuring, for example, that *take* + *en* is realized as *took*.

Subtypes of Transformations

Transformations in the early period fell into two categories, 'singulary' transformations, whose domain consisted of a single sentence, and 'generalized' (or 'double-based') transformations, with a structural description containing reference to more than one sentence. All the examples mentioned so far have been of singulary transformations. An example of a generalized transformation is the rule for coordination (Chomsky 1957: 113):

(13) Structural analysis: of S_1: $Z - X - W$
of S_2: $Z - X - W$
where X is a minimal element (e.g., *NP*, *VP*, etc.)
and Z, W are segments of terminal strings.
Structural change:
$(X_1 - X_2 - X_3; X_4 - X_5 - X_6) \rightarrow (X_1 - X_2 + and + X_5 - X_6)$

For example:

(Yesterday – John – left home; Yesterday – Sam – left home)
→ (Yesterday – John + and + Sam – left home),
where *John* and *Sam* are both instances of NP.

A further major class of generalized transformations were those that embedded one sentence in another. Chomsky (1964b) lists 19 such transformations, of which the following are representative examples:

(14) Nominalization
Structural analysis: S_1: T, $it + \varphi$, VP
S_2: NP, C, VP_1
Structural change:
$X_4 + S$ or φ replaces X_1; $ing + X_6$ replaces X_2

For example:

$$\begin{Bmatrix} \text{T} & -\text{it} + \text{C} & -\text{be} + \text{a} + \text{great} + \text{surprise} \\ X1 & X2 & X3 \\ \text{John} & -\text{C} & -\text{prove} + \text{the} + \text{theorem} \\ X4 & X5 & X6 \end{Bmatrix}$$

→ John + S – ing + prove + the + theorem – C – be + a + great + surprise

giving 'John's proving the theorem was/is a great surprise.'

(15) Complement
Structural analysis: S_1: X, V_T, *Comp*, *NP*
S_2: *NP*, *Aux*, *be*, *Pred*
Condition: X_2 is a member of the class of verbs containing *consider*, *believe*, ...
Structural change: X_5 replaces X_4; X_8 replaces X_3

For example:

$$\begin{Bmatrix} \text{They} + \text{C} & -\text{consider} & -\text{Comp} & -\text{the} + \text{assistant} \\ X1 & X2 & X3 & X4 \\ \text{the} + \text{assistant} & -\text{C} & -\text{be} & -\text{qualified} \\ X5 & X6 & X7 & X8 \end{Bmatrix}$$

→ They + C – consider – qualified – the + assistant

Following the application of an obligatory transformation which permutes the last two factors in the derived phrase marker, this gives *They consider the assistant qualified*.

This class of generalized transformation exemplified by (15) formed the locus of recursion in early transformational grammar, and was thus the mechanism by which grammars make available an infinite set of sentences from finite resources.

Rule Ordering

Transformations, in principle, could be ordered arbitrarily relative to one another (i.e., they were extrinsically, rather than intrinsically ordered). For example, the derivation of an interrogative sentence such as *Did John eat an apple* involved the application of the (optional) question–formation transformation:

(16) Structural analysis : $\begin{Bmatrix} NP - C - V \ldots \\ NP - C + M - \ldots \\ NP - C + have - \ldots \\ NP - C + be - \ldots \end{Bmatrix}$

Structural change: $X_1 - X_2 - X_3 \rightarrow X_2 - X_1 - X_3$

In other words, the tense formative C moves to the front of the sentence. The resulting derived P-marker requires the obligatory application of the word-boundary transformation [29iii] and the *do*-insertion transformation:

(17) *do*-insertion
Structural analysis: $\# - Af$
Structural change: $X_1 - X_2 \rightarrow X_1 - do + X_2$

(Adjoin the word *do* to the left of any affix immediately preceded by a word boundary.)

The successive stages of the derivation would look like this:

Phrase structure:	John – C – eat – the apple
Question-formation:	C – John – eat – the apple
Word-boundary:	#C#John#eat# the apple
Do-insertion:	#do + C#John#eat# the apple

($do + C$ is then converted to *did* by a morphophonological rule).

In order to correctly derive the sentence *Who ate the apple*, it was necessary to stipulate that T_w, the rule which moves an interrogative element such as *who* to sentence initial position, must apply *after* the question-formation transformation:

Phrase structure rules:	John – C – eat – the apple
Question–formation:	C – John – eat – the apple
T_w:	Who – C – eat – the apple
Word-boundary:	#Who#C eat# the apple

Do-insertion cannot apply to this structure, so affix hopping [29ii] applies obligatorily instead:

Affix Hopping: #Who# eat + C# the apple

Applying the two transformations in the reverse order would have the following effect:

Phrase structure rules:	John – C – eat – the apple
T_w:	Who – C – eat – the apple
Question-formation:	C – who – eat – the apple
Word-boundary:	#C # who# eat# the apple
Do-insertion:	#do + C# who# eat# the apple

This would give the ungrammatical **Did/does who eat the apple*. The only way in this analysis to avoid the generation of this ungrammatical string is to stipulate the ordering which gives the correct results.

In addition, a stipulation was required as to whether the application of a given transformation was either obligatory or optional. In the examples given above, the passive transformation is an instance of an optional rule, 'affix hopping,' [29ii] an instance of an obligatory rule – it must apply to any structure which meets the terms of its structural analysis. A sentence that is generated solely by the application of obligatory rules was termed a 'kernel' sentence. These corresponded to the class of simple, active, declarative sentences. Associated with the transformational derivation of each sentence was a representation called a 'T-marker,' which recorded which transformations had applied and in which order.

Transformations and Mental Processes

Although transformational grammar is intended as a model of the linguistic knowledge of the native speaker, it was not Chomsky's claim that the components of the theory were a model of the way the construction or comprehension of linguistic utterances is computed in the brain. Nonetheless, a number of experiments carried out in the 1950s and 1960s seemed to show that the transformational grammars developed for English during the early period did indeed make accurate predictions if taken as models of mental processing. In brief, these experiments seemed to show that there was a correlation between the number of transformations involved in the derivation of a sentence and the processing complexity associated with the sentence, measured in terms of some behavioral index such as response time – the greater the number of transformations involved, the greater the processing difficulty. For example, passive sentences take longer to process than their active counterparts and negative sentences take longer to process than their affirmative counterparts.

However, subsequent studies and a more mature assessment of the results of these experiments have shown that those experiments which seemed to show a positive correlation between transformational complexity and processing load did so because of a failure to control for other variables. It is well attested that processing load increases with sentence length. In the case of passive sentences, for example, *Albert was eaten by a lion* is two words longer than *A lion ate Albert*. Once such factors as this were controlled for, it became apparent that the derivational complexity hypothesis could not be maintained. It is universally agreed that the relationship between the form of a transformational grammar and the manner in which it is implemented in the brain is much more abstract and indirect than these early experiments suggested. It is therefore important to note that when linguists talk of a grammar 'generating' a set of sentences, there is no implication in the use of the term that the grammar is a model of human sentence production (see Carroll and Bever 1976).

The 'Standard Theory'

As Chomsky comments (1975: 23), "The theory of transformations developed in *The Logical Structure of Linguistic Theory* was far too unrestricted. It seems that there are much narrower conditions that determine the applicability of transformations and the kinds of mapping they can perform." The subsequent development of transformational grammar can be seen as a progressive transfer of many of the functions originally assigned to transformations to other components of the grammar.

There are five major areas in which this pattern of development can be seen:

1. Rule interaction;
2. Recursion;
3. Derived constituent structure;
4. The relationship of syntax to semantic interpretation;
5. The degree of abstractness permitted for underlying representations.

Rule interaction had presented a problem in the early theory of transformations because it was not clear what kind of ordering relationships could exist between singulary and generalized transformations. It was not clear whether, for example, singulary transformations could apply to an incomplete sentence structure *before* a generalized transformation embedded material in it. Various suggestions were made concerning the 'traffic rule' problem, but the most significant contribution was that of Fillmore (1963) who observed that it did not appear that there were any cases in which a singulary transformation had to apply to a structure before a generalized transformation embedded material in it. Second, it did not appear that it was necessary in practice to stipulate any ordering between generalized transformations, and third, there were attested cases where a singulary

transformation could apply to a sentence before it was embedded in a larger structure (passive, for example, in sentences such as *The director believed the keeper to have been eaten by one of the lions*). Fillmore's conclusion from these facts was that singulary transformations should apply first to (what would be) the most deeply embedded sentence. This sentence would then be embedded in the matrix sentence by a generalized transformation. This sentence would then become the domain of the singulary transformations again, and the process would be repeated as often as necessary.

Since transformations are mappings from phrase markers to phrase markers, it is essential that there be some well-defined way of specifying the constituent structure that results from the application of a transformation. The passive, for example, requires that the word *by* be adjoined to the left of the NP which has been moved into final position. It is clear that the resulting constituent should be a prepositional phrase, and that *by* itself should be a preposition. This information is not derivable, however, from the version of the transformation given above. Some linguists resolved this issue by specifying the details of the derived constituent structure in the structural change of the transformation itself:

(18) $NP_1 - Aux - V - NP_2 \rightarrow NP_2 - Aux + be + en - V - [_{PP}[_P\ by] + NP_1]$

This increasingly came to be considered an undesirable enrichment of the theory and alternatives were sought.

The problem of derived constituent structure also arose in the context of the application of generalized transformations. As can be seen from the complement example above (15), the transformation not only embeds material from one clause into another, but also deletes the subject of the embedded clause. The question then arises as to what the category of the embedded constituent is. The idea rapidly developed (Katz and Postal 1964) that clauses into which a sentence was to be embedded should contain a 'dummy' node, defined by the phrase structure component of the grammar, which would provide a host (and a category) for the embedded material.

These issues were addressed in the 'standard theory,' the name given to the revised version of transformational grammar developed by Chomsky in his book *Aspects of the theory of syntax* (1965a).

Rule Interaction: the Transformational Cycle

In *Aspects* the issues listed above received a radical answer, which reduced the role which transformations played in the theory. Most dramatically, the class of generalized transformations was eliminated entirely and their role as the locus of recursion was allocated to the phrase structure component. The issue of rule interaction was resolved by combining Fillmore's proposals with this innovation. Their joint effect is to require that transformations apply first to the most deeply embedded sentential structure, and, only when all possibilities have been exhausted, is the next 'higher' sentential level considered as a transformational domain. Graphically, the situation is illustrated in the schematic tree in Figure 1.

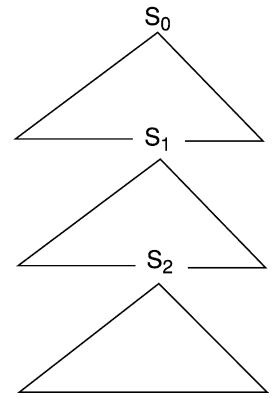

Figure 1

All transformations apply first to S_2, then to S_1, and only then to S_0. This principle of transformational rule application is known as the ('transformational') cycle.

By way of specific illustration, take the analyses of complementation by Rosenbaum (1967) whose thesis has proved a reference point for most subsequent work. Rosenbaum's work is concerned with the analysis of sentences such as the following:

(19) Sam prefers to stay here.

(20) I believe Bill to have been convinced by John.

(21) John is believed by me to have convinced Bill.

Each of these sentences would earlier have involved a generalized transformation. In the *Aspects* framework, the structures underlying them are provided by the following phrase structure rule:

(22) VP → V (NP) S

This rule preempts the role of generalized transformations by introducing the symbol S on its right-hand side. The structure associated with (19) by Rosenbaum's phrase structure rules (suppressing some details) is given in Figure 2.

On the lowest cyclic domain (the structure dominated by S_1) no rules apply. When the next highest cyclic domain (S_0) is reached, a 'complementizer placement' transformation is responsible for transforming this basic structure into:

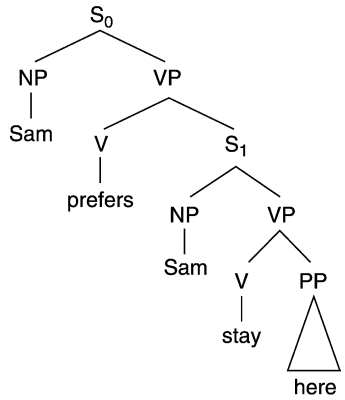

Figure 2

Second Cycle: Sam prefers [for Sam [$_{VP}$ to stay here]]

This structure meets the structural description of what Rosenbam termed the 'identity erasure transformation' (now generally known as 'equi NP deletion,' or simply 'Equi'):

(23) Equi NP Deletion
Structural Description:

W	(NP)	X	+D	NP	Y	(NP)	Z
1	2	3	4	5	6	7	8

(Where + D identifies the complementizer *for – to*.)
Structural Change: 5 is erased (deleted) by 2

The effect of the application of this rule on *Sam prefers* [*for Sam* [$_{VP}$ *to stay here*]] is to delete the second occurrence of the NP *Sam*:

Second Cycle: Sam prefers [for [$_{VP}$ to stay here]]

which finally gives *Sam prefers* [$_{VP}$ *to stay here*]], through the application of a rule of 'complementizer deletion.'

For (20) and (21), Rosenbaum's analysis would provide the derivations in (20a) and (21a). (Note the use of the substructure [$_{MAN}$ by + P] in these derivations to provide a trigger for the passive transformation and a landing-site for the NP moved from subject position by the passive.)

(20a) *First Cycle*: I believe [$_{NP}$ it [$_{S}$ [$_{NP}$ John] [$_{VP}$ have + en convince Bill] [$_{MAN}$ by + P]]]]

Passive: I believe [$_{NP}$ it [$_{S}$ [$_{NP}$ Bill] [$_{VP}$ have + en *be + en* convince [$_{MAN}$ by + *John*]]]]

Affix Hopping: I believe [$_{NP}$ it [$_{S}$ [$_{NP}$ Bill] [$_{VP}$ have *be + en convince + en*] [$_{MAN}$ by + John]]]]

Second Cycle:

Complementizer Placement: I believe [$_{NP}$ it [$_{S}$ *for* [$_{NP}$ Bill] [$_{VP}$ *to* have be + en convince + en] [$_{MAN}$ by + John]]]]

Extraposition: I believe [$_{NP}$ it] [$_{S}$ for [$_{NP}$ Bill] [$_{VP}$ to have be + en convince + en] [$_{MAN}$ by + John]]]

Raising to object: I believe [$_{NP}$ *Bill*] [$_{S}$ for [$_{VP}$ to have be + en convince + en] [$_{MAN}$ by + John]]]

Complementizer Deletion: I believe [$_{NP}$ Bill] [$_{S}$ [$_{VP}$ to have be + en convince + en] [$_{MAN}$ by + John]]]

Post Cycle:

Morphophonemic Rules: I believe [$_{NP}$ Bill] [$_{S}$ [$_{VP}$ to have *been convinced*] [$_{MAN}$ by + John]]]

('Extraposition' is a transformation that takes a structure of the form [$_{NP}$ it S] and moves the S rightwards out of the NP.)

(21a) *First Cycle*: I believe [$_{NP}$ it [$_{S}$ [$_{NP}$ John] [$_{NP}$ have + en convince Bill]]] [$_{MAN}$ by + P]

Affix Hopping: I believe [$_{NP}$ it [$_{S}$ [$_{NP}$ John] [$_{VP}$ have *convince + en* Bill]]] [$_{MAN}$ by + P]

Second Cycle:

Complementizer Placement: I believe [$_{NP}$ it [$_{S}$ *for* [$_{NP}$ John] [$_{VP}$ *to* have convince + en Bill]]] [$_{MAN}$ by + P]

Passive: [$_{NP}$ it [$_{S}$ for [$_{NP}$ John] [$_{VP}$ to have convince + en Bill]]] *be + en* believe [$_{MAN}$ by + I]

Extraposition: it be + en believe [$_{MAN}$ by + I] [$_{S}$ for [$_{NP}$ John] [$_{VP}$ to have convince + en Bill]]]

Raising: *John* be + en believe [$_{MAN}$ by + I] [$_{S}$ for [$_{VP}$ to have convince + en Bill]]]

Affix Hopping: John be *believe + en* [$_{MAN}$ by + I] [$_{S}$ for [$_{VP}$ to have convince + en Bill]]]

Complementizer Deletion: John be believe + en [$_{MAN}$ by + I] [$_{S}$ [$_{VP}$ to have convince + en Bill]]]

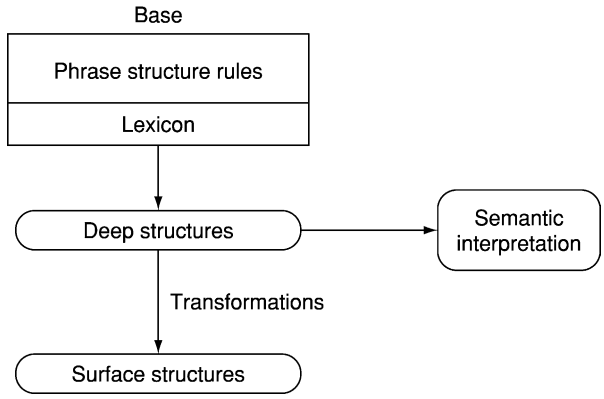

Figure 3

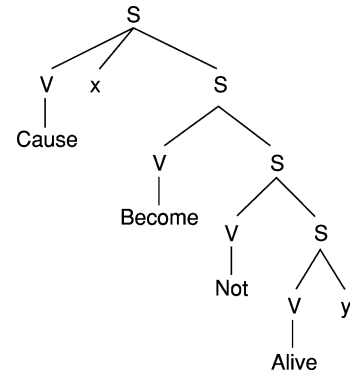

Figure 4

Post Cycle:
Morphophonemic Rules: John is *believed* [$_{MAN}$ by + *me*] [$_{S}$ [$_{VP}$ to have *convinced* Bill]]]

In (20a) the passive transformation applies on the first cycle (inside the subordinate clause), whereas in (21a) it applies on the second cycle (in the main clause). In both derivations affix hopping applies twice, once on the first cycle and once on the second. Both these sentences also exemplify the rule of raising (called 'pronoun replacement' by Rosenbaum), which moves the subject of a nonfinite subordinate clause (here *John*) into the next higher clause on the second cycle. The existence of this rule was to become a major issue in the subsequent development of transformational grammar.

The Organization of the Grammar

With the adoption of the transformational cycle, many of the problems of rule interaction were satisfactorily resolved and, by the time of the publication of *Aspects of the theory of syntax*, the organization of the grammar took the following form (shown in Figure 3).

The 'lexicon' (formerly part of the phrase structure component) and Phrase Structure Rules were split into separate subcomponents of the 'base component' of the grammar and jointly determined a level of syntactic representation called 'deep structure.' This, on the one hand, provided the input to rules of semantic interpretation and, on the other, the input to the transformational component of the grammar, which mapped deep structure representations on to surface structure representations in the manner illustrated in (20a) and (21a) above.

Generative Semantics

The proposal that deep structure formed the level at which both lexical insertion and semantic interpretation took place came under strong challenge during the late 1960s. The branch of transformational grammar which became known as generative semantics argued that this conception of the organization of the grammar led to a loss of generalizations, a situation which could be remedied if underlying representations were allowed to be more abstract than Chomsky's deep structures. This aspect of generative semantics was driven by the Katz–Postal hypothesis (Katz and Postal 1964) concerning the relationship between syntax and semantics. This proposed that all the information necessary for semantic interpretation is represented in the underlying structure of a sentence. Corollaries of this proposal are that synonymous sentences have a single underlying structure and that ambiguous sentences have more than one underlying structure. It also implies that transformations do not change semantic interpretation.

For many sentence pairs, such as actives and passives, this proposal seems eminently reasonable. The assumption that *John saw Bill* and *Bill was seen by John* have the same deep structure and acquire their different surface forms through the application of transformations provides a basis for accounting for the fact that the two sentences have the same truth conditions. However, this logic, when applied to *Bill is dead* and *Bill is not alive* leads to the conclusion that they too must share a single underlying structure. In this case, however, such an identity in underlying structure must exist *before* lexical insertion, contradicting Chomsky's hypothesis about deep structure. This led McCawley (1968) to propose that the underlying structure of a sentence of the form *x killed y* should receive the analysis in Figure 4 (note that McCawley is assuming here that in its underlying structure English is verb-initial; see McCawley 1970 for details).

By the repeated cyclic application of an optional transformation of 'predicate raising,' the verbs in this structure could be adjoined to one another to give the structure in Figure 5.

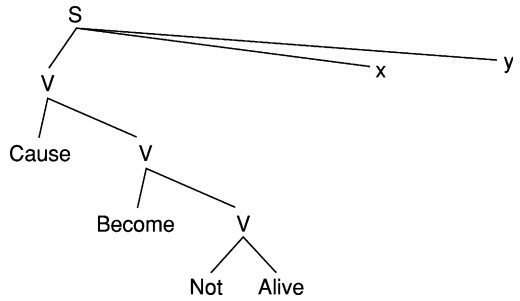

Figure 5

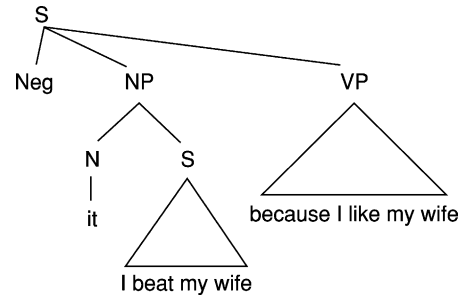

Figure 7

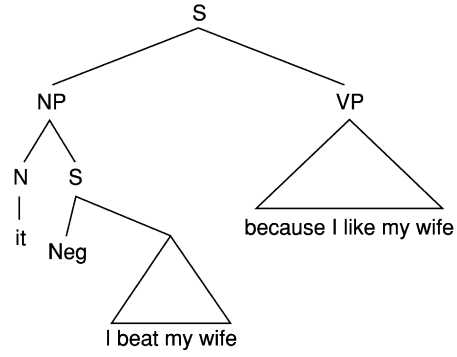

Figure 6

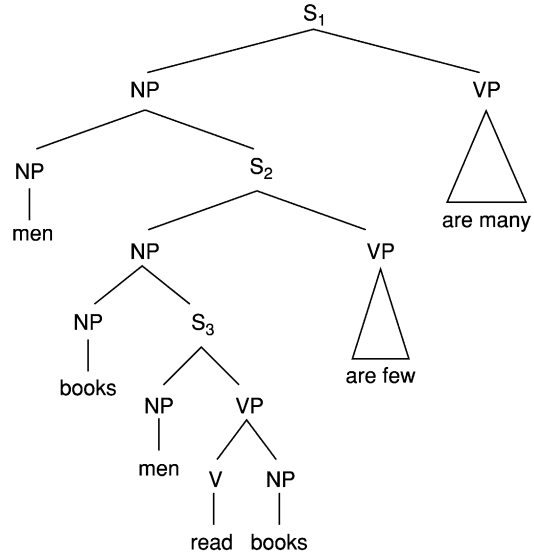

Figure 8

McCawley proposed that 'if lexical insertion did not apply until after that transformation, then the "dictionary entry" for *kill* could be expressed as a transformation which replaces the subtree at the left [of the above tree] by *kill*' (McCawley 1968: 73). If lexical insertion is constrained to apply before all transformations, as in the *Aspects* approach, the semantic relationship between *x killed y* and *x caused y to become not alive* could not be expressed using transformations.

As an example of ambiguity prompting the postulation of different underlying structures, where purely syntactic evidence might not warrant them, take Lakoff's (1970) argument that the ambiguity of the sentence (24), with its two paraphrases (25) and (26):

(24) I don't beat my wife because I like her.

(25) It is because I like her that I don't beat my wife.

(26) It is not because I like her that I beat my wife.

could be accounted for by the assumption that the two readings correspond to different underlying structures. For (25), Lakoff proposed the structure in Figure 6.

For (26), he proposed the structure in Figure 7.

Transformations called 'it-deletion' and 'neg lowering' apply to these structures to give (24).

A further modification of standard transformational grammar made within generative semantics concerned the nature of the relationship which held between the various levels of a derivation. In standard transformational grammar, transformations are in effect relations between adjacent stages in a derivation. There was no possibility of a transformational 'looking forward' to a future stage in the derivation, for example. Generative semanticists, on the other hand, argued that such extensions were necessary. Lakoff (1971) observed that sentences like *Many men read few books* and *Few books are read by many men* seem to differ in their interpretations. The first is paraphrasable as *There are many men who read few books* and the second as *There are few books that are read by many men*. Lakoff proposed that these two interpretations are derived from different underlying structures. The first has the underlying structure in Figure 8, the second that in Figure 9.

The surface structures are derived by a transformation of 'quantifier lowering.' A problem remains, however, in ensuring that structure in Figure 8 must

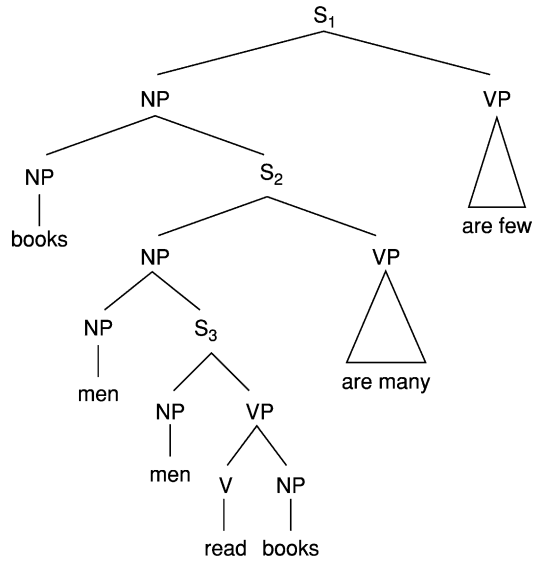

Figure 9

undergo passive and the structure in Figure 9 must not. Lakoff's solution was to propose that passive and quantifier lowering could freely apply to both structures, but that a 'global derivational constraint' checked the relationship between the underlying and surface forms, requiring that the quantifier which was highest in underlying structure must be the leftmost one in surface structure. Global constraints allow the application of a transformation to have access to any level of representation in the derivation, not merely the information coded in its structural description and structural change.

In essence, what generative semantics did was to pursue the use of transformations to express linguistic regularities and subregularities to its logical conclusion. It assumed that transformations were the *only* way that such regularities should be captured, incorporating into syntactic description phenomena from semantics, pragmatics, and even social interaction. Ultimately, however, this central tenet of generative semantics was rejected by the majority of linguists working in the transformational framework. (A more comprehensive discussion of generative semantics and the factors both linguistic and nonlinguistic involved in its rise and fall can be found in Newmeyer 1980: ch. 4 and 5.)

The Extended Standard Theory

Subsequent developments in transformational grammar were motivated by a desire to constrain the expressive power of the transformational component. These took two forms. One was to seek to impose restrictions on transformations themselves, with the goal of limiting their expressive power; the other was to reallocate the responsibility for certain classes of phenomena to other components of the grammar, in particular the lexicon, the phrase structure component, and the semantic component. The name given to the version of the theory incorporating these revisions, which developed during the 1970s, was the 'extended standard theory.'

The work of Peters and Ritchie (1973) too undoubtedly encouraged a climate in which constraining the power of transformations was seen as desirable. They provided a proof that transformational grammars of the *Aspects* type had the weak generative capacity of the most powerful device on the Chomsky hierarchy, unrestricted rewriting systems (Turing machines). This meant that human languages, as characterizable by transformational grammars, had no particular properties other than that they could be generated by some set of well-defined rules. *Aspects*-style transformational grammar did not place any interesting constraints on the class of possible human languages. In terms of language acquisition, this implies that the formal properties of transformational grammars provided no interesting restrictions on the search space accessible to the learner. There was undoubted merit, in the light of these results, in any program which sought to constrain the power of existing transformational grammars.

The Lexicalist Hypothesis

'Nominalization,' referred to above, had been one of the earliest transformational rules proposed (see Lees 1966). Yet in 'Remarks on nominalization,' Chomsky (1970) developed the argument that at least some nominals which had previously been assumed to be transformationally derived were in fact simply basic lexical entries. His argument had two prongs. First, he demonstrated that the basis for the purported generalization was unsound and, second, that there were alternative ways of capturing the generalizations which remained.

In arguing against a transformational analysis of nominalization, Chomsky noted that what he termed 'derived nominals' (such as *refusal*, *easiness*, *revolution*, *belief*) do not occur in structures which are themselves derived by transformations. (The term 'derived nominal' does not imply any transformational derivation. Rather, the term is an allusion to the fact that such nominals form part of the derivational morphology of English.) So the sentences on the right of the arrows in (27) and (29) below are well-formed, but their corresponding derived nominals in (28) and (30) are not:

(27) To please John is easy ⇒ John is easy to please

(28) *John's easiness to please

(29) For John to win the prize is certain ⇒ John is certain to win the prize

(30) *John's certainty to win the prize

Furthermore, the semantic relationship which holds between a derived nominal and the item it is supposed to be derived from is frequently idiosyncratic. *John's deeds*, for example, are not the same as *things which John did*, nor is *John's ignorance* the same as *what John ignores*. In the common situation where there is no verb or adjective corresponding to a derived nominal (such as '*book*,' '*poem*'), the proponent of a transformational analysis is forced to postulate abstract underlying verbs such as *poetize* and to formulate mechanisms to ensure that these nonexistent items do not show up in surface structures (see, for example, Lakoff 1970).

To capture the regularities that do occur, such as *John refused to leave/John's refusal to leave*, *The enemy destroyed the city/The enemy's destruction of the city* and *The city was destroyed by the enemy/The city's destruction by the enemy*, Chomsky proposed first that in cases where there exists a verb/derived nominal pair, the lexical entry should be neutral with respect to grammatical category, but should specify what complements the pair require. In addition, he proposed an extension of the theory of phrase structure, known as 'X-bar theory,' to allow generalizations to be made across different linguistic categories.

For example, sentences and NPs have a similar internal structure (cf. Chomsky, 1970: 211). In (31) *the theorem* is the direct object of the noun *proof* and *John* is its subject. (This structure also requires the later insertion of the preposition *of*.)

(31)

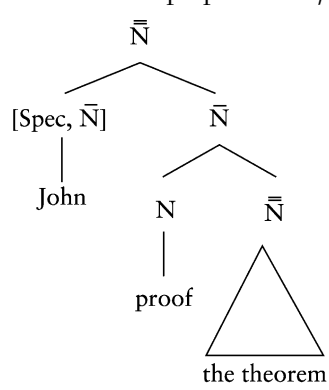

In the corresponding sentence, *the theorem* and *John* hold exactly the same grammatical relations to the verb *prove*.

(32)

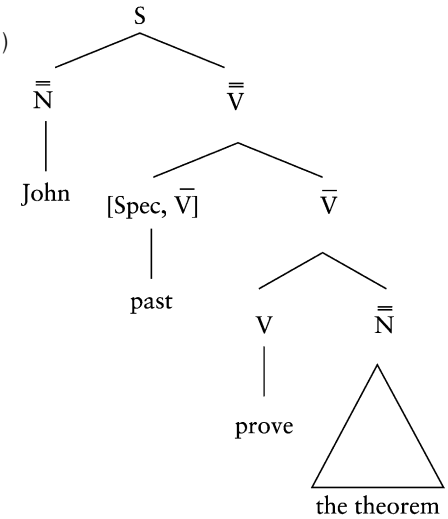

Chomsky also proposed that cyclic transformations such as passive could apply not only within sentences, but also within NPs, and proposed factoring the passive transformation into two subrules: 'NP-preposing' and 'agent-postposing.' The derivation of *The city's destruction by the enemy* would look like this (with various details omitted):

(33)

	The enemy('s) destruction the city by Δ
Agent-postposing	The destruction (of) the city by the enemy
NP-preposing	The city('s) destruction by the enemy

Note that the intermediate stage, resulting from agent-postposing, is also grammatical, provided that the NP's subject position is filled by a determiner. Exactly the same transformations apply in the case of the sentential passive *The city was destroyed by the enemy*, with the additional proviso that, for independent reasons, NP-preposing is obligatory.

Chomsky's argument, then, was that the generalizations captured by the nominalization transformation were spurious and, to the extent that genuine generalizations exist (such as the existence of active/passive pairs of nominalizations) there are alternative analyses available. The upshot of this was the proposal that transformations cannot change the syntactic category of an item. Thus, the rule of nominalization, as posited in early transformational grammar is not a possible transformation. This proposal was termed the 'lexicalist hypothesis,' because it assumes that any relationship of a crosscategorical kind is represented in the lexicon, and not by a transformational relationship.

Interpretive Semantics

The lexicalist hypothesis removes from the transformational component the power to alter syntactic categories and hence results in the reallocation of one class of linguistic phenomena to another component of the grammar. This is a tendency that is seen to be repeated with respect to other linguistic phenomena as the theory develops.

From the early days of transformational grammar, it had been assumed that the relationship that exists between an anaphoric pronoun and its antecedent, in sentences such as (34), where *Alice* and *she* can be interpreted as referring to the same individual, was to be captured by a transformation:

(34) Alice said that she should go.

The standard analysis of anaphoric pronouns (Lees and Klima 1969) assumed that they were derived from an underlying structure containing two identical occurrences of an NP. One of the NPs would be obligatorily converted into a pronoun by the pronominalization transformation:

(35) Pronominalization
$X - NP_1 - Y - NP_2Z \rightarrow X - NP - Y - NP_2[+Pro]Z$

where $NP_1 = NP_2$ [and various conditions on the topological relations between the two NPs were satisfied].

Jacendoff (1972) argued instead for a treatment of pronominal anaphora which relied on rules of semantic interpretation (an 'interpretive' approach to pronominalization). Jackendoff pointed out that the condition requiring identity between the two NPs (which must include not only syntactic identity but also identity of reference) is unexpected given that coreference is not generally a condition on the application of transformations; no movement rule, for example, is constrained to apply only to coreferential NPs.

Jackendoff's proposal assumed that anaphoric pronouns were base-generated in underlying structure and that rules of semantic interpretation established the necessary connection between them and their antecedents; no transformation of any kind was involved. This approach had a number of empirical consequences. It provided the basis for a solution to the problem that, in sentences containing quantified NPs such as *every runner*, the transformational treatment of prominalization predicts incorrectly that *Every runner expects that she will win* should have the interpretation associated with *Every runner expects that every runner will win*.

Furthermore, there are cases of anaphora which do not involve pronouns. Such sentences as *I wanted to help Harry, but the fool wouldn't let me* allow a coreferential interpretation of *Harry* and *the fool*. In addition, the conditions on the configurations in which anaphora is possible are shared by pronominal anaphors and by 'epithets' like *the fool*. For example, neither permit an anaphoric interpretation in sentences like the following *He/the fool said Harry would leave*. It is implausible to envisage a transformation giving rise to epithets, but no problems arise in principle in assuming that epithets are assigned interpretations by the same semantic rules that interpret pronouns. Note also that Jackendoff's proposal is consonant with the lexicalist hypothesis in not allowing a transformation to radically alter the morphological shape of lexical material.

The net conclusion of these and other arguments is that pronominalization is not a transformation and that the phenomenon of pronominal anaphora falls within the domain of the semantic component of the grammar.

Similar arguments apply to two other long-established transformational analyses; those of reflexivization and equi-NP deletion. Reflexivization was assumed to work in complementary distribution with pronominalization; roughly, where the latter applied to identical NPs which were separated by a clause boundary, the former applied to identical NPs in the same clause. Thus, *Mary was proud of Mary* would give *Mary was proud of herself*. Note, however, that when a quantified NP is involved, the result is the same as in the case of pronominalization; *Every runner is proud of herself* does not have the same interpretation as *Every runner is proud of every runner*. Equi-NP deletion, which derives *Mary wanted to win* from *Mary wanted Mary to win* exhibits the same phenomenon; *Every runner wanted to win* does not have the same interpretation as *Every runner wanted every runner to win*. As a consequence, proponents of the interpretive semantics position argued that neither reflexives nor the control phenomena handled by equi-NP deletion were the responsibility of the transformational component. Instead, reflexive pronouns should be basegenerated and interpreted by the semantic component. For 'equi' sentences it was proposed that the subject position of the nonfinite subordinate clause was filled by a basegenerated phonologically empty pronominal (PRO), also interpreted by the semantic component.

The result of these proposals was the removal from the transformational component of responsibility for a whole class of linguistic phenomena – those involving coreference – resulting in a more constrained theory of transformations and a superior account of the empirical data.

Constraints on Movement Rules

Structure Preservation The lexicalist hypothesis and interpretive semantics reduced the range of phenomena to be accounted for by the transformational component. For those transformations that remained, a major goal of the extended standard theory was to remove from the theory the capacity for individual transformational rules to contain detailed specifications of the conditions of their application, and to replace them with general conditions applying to all transformations, or to whole classes of transformations. This goal may be summarized as that of restricting the expressive power of transformations.

It was noted above that the precise manner in which the derived constituent structure resulting from the application of a transformation was determined was unclear and that various *ad hoc* measures were adopted, such as stipulating derived constituent structure in the structural change of the rule or introducing 'dummy' elements to act as the landing site of a moved constituent. This issue received a more highly-motivated solution in proposals by Emonds (1976). Emonds established three different classes of movement transformations:

(36) Root transformations
Those that crucially involved the root (roughly speaking the topmost) S node, and hence do not apply in subordinate clauses. Examples include Subject–Auxilliary Inversion (*Isn't it cold today*), Directional Adverb Preposing (*Down the street rolled the baby carriage*) and Topicalization (*Our daughters we are proud of*).

(37) Local transformations
Those that involve the reordering of two adjacent constituents, one of which is phrasal and the other nonphrasal. An example is Particle Movement (cf. *She picked up the book* and *She picked the book up*).

(38) Structure Preserving Transformations
Those that involve the replacement of a node by one of the same syntactic category. Examples include Passive, Raising, There-insertion (*A book is on the table* ⇒ *There is a book on the table*) and Dative Movement (*gave a ticket to John* ⇒ *gave John a ticket*).

The phenomena handled by root and local transformations have been subject to reanalysis more recently, but the essence of the structure preserving hypothesis has been accepted by all subsequent work.

Emonds argued, like Chomsky, that the passive transformation is in fact a composition of two separate rules: one that postposes the agent NP into the position of *by*-phrase object; and one that preposes the object NP into the vacant subject NP position. This requires that the derivation of *Germany was defeated by Russia* looks like this:

(39)

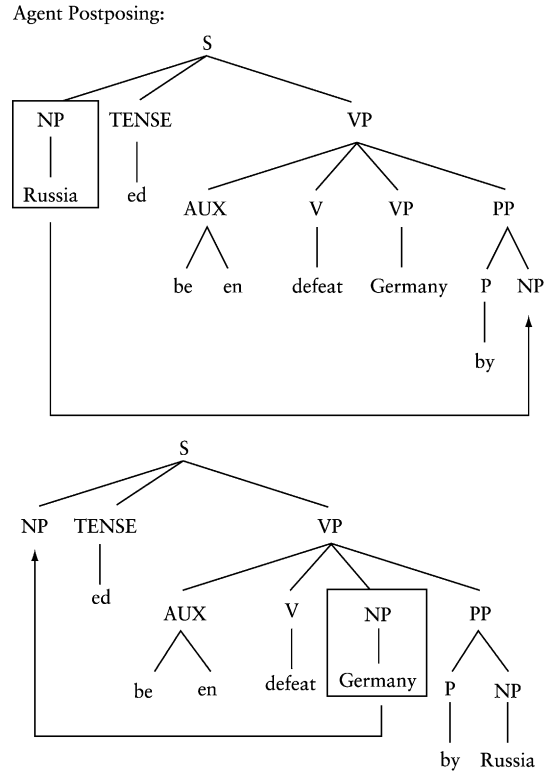

The structure-preserving hypothesis requires that the *by*-phrase be present in deep structure and that the NP within it be lexically empty (note that this implies that lexical insertion need not take place at deep structure). This analysis accounts for the fact that the passive *by*-phrase is like any other PP with respect to its internal structure and transformational behaviour.

Emonds points out that the fact that PPs under VP are generally optional in English, when combined with the structure-preserving analysis of passive, accounts automatically for the existence of agentless passives (*Germany was defeated*), in contrast to early analyses which had postulated a rule of by-phrase deletion.

Emonds's proposals constituted a step in the direction of removing from the structural description and structural change of a transformation the necessity, or even the possibility, of specifying where a constituent could be moved to; e.g., if the structure involved is not a root S and the transformation does not involve two adjacent constituents, the only possibility is for the moved constituent to move to a location in which the phrase structure rules permit a constituent of that type to be generated.

Blind Application of Transformations The 1970s saw major steps toward the goal of replacing conditions on specific transformations with general conditions which, instead of forming part of individual grammars, were a component of universal grammar. Chomsky (1973) noted that, if the structural description of the passive transformation in English were taken to be essentially:

(41) X, NP, V, NP, Y

with no reference to conditions requiring the two NPs to be members of the same clause (as had been standardly assumed), the transformation would apply to the deep structure analysis of a sentence like *I believe the dog to be hungry*, namely [$_s$ *I believe* [$_s$ [$_{NP}$ *the dog*] [$_{VP}$ *to be hungry*]] without the necessity for raising to move the NP *the dog* into the higher clause. Without any restriction on its operation, passive (and other transformations) would apply 'blindly' to any structural configuration meeting the structural description. Viewed in this way there is no problem in accounting for sentences such as *The dog is believed to be hungry by me*. Instead, there is a question as to why passive does not apply to *I believe the dog is hungry* to give **The dog is believed is hungry by me*. Chomsky's conclusion was that the failure of the passive to apply to the latter sentence is to be attributed to a general condition on transformational rules to the effect that no item may be extracted from a tensed (finite) clause. This constraint is phrased as follows:

(42) The Tensed-S Condition (TSC)
No rule can involve *X, Y* in the structure
... *X* ... [α ... *Y* ...] ... [where *a* is a tensed sentence]

Chomsky's discussion of reciprocals (*each other*) illustrates the application of the TSC. Following Dougherty (1970), he assumes that *each* in sentences such as (43):

(43) The men hated each other.

originates in deep structure as part of the subject NP as in (44):

(44) The men each hated the others.

and is moved out of it by a transformation ('each' movement) to give the structure in (43). The TSC explains why this movement is not possible in sentences like *The men each expected* [$_s$ *the others would win*] to give **The men expected* [$_s$ *each other would win*], and why movement of *each* is possible in the nonfinite counterpart *The men each expected* [$_s$ *the others to win*], giving *The men expected* [$_s$ *each other to win*].

However, given the grammaticality of *The men expected* [$_s$ *to shoot each other*], in which *each* appears in the object NP of the lower clause, the TSC does not account for the ungrammaticality of **The men expected* [$_s$ *the soldier to shoot each other*]. To account for this paradigm, Chomsky proposed the specified subject condition:

(45) Specified Subject Condition (SSC)
No rule can involve *X, Y* in the structure
... *X* ... [α ... *Z* ... – *WYV** ...]...

where Z is the subject of *WYV* in α, α is a cyclic node (NP or S) and α contains a subject distinct from *Z* and not controlled by *X*.

'Control' is the relationship which holds between PRO and its antecedent in 'Equi' constructions, or between a 'trace' (see below) and its antecedent. Any subject meeting the additional criterion in (45) is a 'specified subject.'

(46) We promised Bill [$_s$ PRO to kill each other].

and:

(47) *We persuaded Bill [$_s$ PRO to kill each other].

In (46) *each* originates in the deep structure as part of the NP containing *we*, which is the controller of PRO and moves into the subordinate sentence by 'each movement' (cf. 44 above); whereas in (47) the controller of PRO is the NP *Bill* which does not contain *each* at any level of representation. PRO in (47) is therefore a specified subject. Note that any phonologically realized NP (such as *the soldier* in (45)) is a specified subject, and also blocks the application of 'each' movement.

Under standard assumptions, there was an immediate counter-example to these conditions: the rule of *wh*-movement (so called because it moves phrases which contain the class of interrogatives and relatives that begin with the letters 'wh,' such as *who*, *which*, and *what* – as well as various others not fitting this description, such as *how*). *Wh*-movement is the rule responsible for deriving sentences such as:

(48) Who did John kill?

Since *kill* is a transitive verb, it is expected to have a direct object, yet no NP follows the verb in (48). The reason for this is that the requirement for an object NP is satisfied at deep structure, and the NP concerned, *who*, is moved to its surface structure position by a transformation.

In contrast to the transformations discussed so far, *wh*- movement has the property of being 'unbounded.' That is to say, that there seems to be no principled limit on the amount of material that can intervene between the deep structure position of the *wh*-item

and its surface structure position, as the following examples illustrate (the underscore marks the position from which *who* has moved):

(49) Who does Max think John killed_____?

(50) Who did Sam say Max thinks John killed_____?

Note that in these examples the clause which contains the extraction site of *who* is a finite one and, in addition, contains a specified subject (*John*). According to the TSC and SSC these sentences should not be possible.

Chomsky's solution to this problem was the radical proposal that, contrary to appearances, *wh*-movement is a cyclic rule. He adopted a proposal made by Bresnan (1970) that *wh*-movement involves moving the *wh*-phrase into the complementizer position of a clause – roughly speaking, the clause-initial position occupied by *that* or *whether*. This position, known as COMP, has the status of an 'escape hatch' for movement; movement to or from the COMP position does not violate the TSC or SSC.

The derivation of (50) would thus proceed as in (51):

(51) $[_{s'}$who$[_{s}$ did Sam say $[_{s'}$ COMP $[_{s}$ Max thinks $[_{s'}$ COMP $[_{s}$ John killed ___]]]]]]

To enforce the cyclic application of *wh*-movement (and prevent the movement of *who* in (51) from its deep to surface structure positions in one fell swoop), Chomsky proposed a further condition on movement rules: 'subjacency.' A node *X* is 'subjacent' to another node *Y* only if *Y* is higher in the tree than *X* and there is at most one cyclic node that dominates *X* and does not dominate *Y*. This is illustrated diagrammatically below, where α is a cyclic node (that is, NP or S):

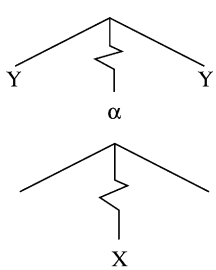

The subjacency condition requires that no movement can take place from *X* to *Y* unless *X* is subjacent to *Y*. Checking (51) will confirm that the combination of COMP as the landing-site for *wh*-movement and subjacency precludes any other derivation than the one indicated.

Subjacency also provides an account for a class of phenomena known, since Ross (1967), as 'islands.' Despite the apparent unboundedness of *wh*-movement, it had been known for some time that there are constructions out of which *wh*-movement is prevented for some reason from moving *wh*-items. Chomsky (1964a) had observed that while the sentence *John kept the car in the garage* is ambiguous (meaning either that the car in the garage was kept by John, or that the car was kept in the garage by John), the sentence *Which car did John keep in the garage* is not, having only the latter reading. The nonexistent reading is the one in which the NP *the garage* is contained within the larger NP *the car in the garage*. Chomsky had proposed that in a situation like this, where a transformation might in principle apply to either of two NPs, in fact it must apply only to the larger one. This proposed constraint he termed the 'A-over-A principle.'

Ross (1967) gave a detailed investigation of a wide range of situations in which the application of unbounded movement rules was blocked. Ross pointed out that the A-over-A principle proved too strong in certain cases and identified the defining characteristics of the phenomenon as a set of structural configurations which he termed 'islands,' and proposed a corresponding set of 'island constraints' to restrict the application of unbounded movement rules:

(52) Complex NP Constraint (CNPC)
No item may be moved out of a complex NP by transformation, where a 'complex NP' is a structure of the following form.
Example:

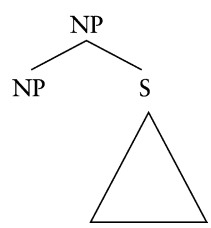

Max met a man that sells books/what
*What did Max meet $[_{NP}$ $[_{NP}$ a man$]$ $[_{S}$ that sells ___]]

(53) Sentential Subject Constraint
No item may be moved out of a sentential subject by a transformation.
Example:
That John gave the book to Max/who surprised Sam
*who did $[_{NP}$ $[_{S}$ that John gave the book to _]] surprise Sam

(54) Coordinate Structure Constraint (CSC)
No conjunct in a coordinate structure may be moved, nor may any item in a conjunct be moved out of that conjunct.

Example:

Max spoke to Sam/who and Fred
*Who did Max speak to [$_{NP}$ – and Fred]

(55) Left Branch Condition
No NP on the left branch of another NP may be moved out of that NP.
Example:

You read Fred's/whose book
*Whose did you read [$_{NP}$ – book]

The subjacency principle serves to provide a unified account of all these island phenomena except the coordinate structure constraint. Note that in all other cases but coordinate structures, the movement involves a violation of subjacency. To illustrate with the last example, in **Whose* [$_s$ *did you read* [$_{NP}$— *book*]] two cyclic nodes, S and NP, intervene between *whose* and the extraction site.

Chomsky also proposed that subjacency would account for the prohibition on moving two (or more) *wh*-phrases out of the same clause (the *wh*-island constraint), as in **What* [$_s$ *do you wonder* [*who* [$_s$— *saw*—]]. On the assumption that, once the COMP node of the lower clause is occupied by *who*, it is no longer a possible landing-site for *what*, the only route to the topmost COMP will involve crossing two S nodes – a subjacency violation.

Trace Theory

The developments outlined in the preceding sections resulted in a situation where the substantive content of transformations had been severely reduced. Lexicalism had removed many linguistic phenomena from the domain of the transformational component, as had the reanalysis of phenomena involving coreference; structure preservation reduced the need to specify details in the structural descriptions of transformations, and subjacency limited the domain of application of transformations.

Chomsky (1973) had introduced the idea that movement of an NP left behind a 'trace' of itself. He developed this idea further (Chomsky 1976). He proposed that all movement transformations leave behind an phonetically empty copy (a 'trace') bound by the moved constituent and inheriting all its relevant properties. He points out the pattern of reciprocal interpretation (now effected by an interpretive rule, rather than the transformation of 'each' movement) supports the postulation of such an empty category in sentences involving raising to subject. There is a parallel between (56) and (57), where reciprocal interpretation in (57) allows *each other* and *the men* to be construed together, just as if they were in the same clause, as in (56):

(56) The men like each other.

(57) The men seem to John [*t* to like each other].

There is a similar parallel between (58) and (59), where reciprocal interpretation is blocked by the SSC. This insight is captured explicitly by the occurrence of a trace of NP preposing in (57) which participates in the interpretation of *each other* and one in (59) which forms a specified subject since it is bound by the singular moved NP *John*, blocking reciprocal interpretation with *men* just as the overt occurrence of *John* does in (58):

(58) The men want [John to like each other].

(59) John seems to the men [*t* to like each other].

Lasnik (1977) drew a parallel between the relationship which exists between traces and their binders and that which exists between PRO and its controller and between a reciprocal and its antecedent: always the binder must precede or asymmetrically 'command' the trace. (A commands B if the first S node that dominates A also dominates B.) This means that movement must always be leftward or to a higher position in a tree. Hence, raising is a possible movement rule, but its inverse, 'lowering,' would not be. Similarly, *wh*-movement must always be to a higher COMP node and never to a lower one.

With these developments, Chomsky proposed a constraint on transformations to the effect that the only categories that may be explicitly mentioned in a structural description are those that are changed (i.e., moved, deleted etc.) by the rule. He also suggests that a further step can be taken in the light of the structure preserving hypothesis, which entails that, for example, an NP can only be moved into another NP position. 'Thus the rules in question [e.g., passive] reduce to the following formulation: move NP' (Chomsky, 1976: 313).

All other details of the operations carried out by the rule are determind by general principles. The landing site being determined by a combination of the structure preserving hypothesis, subjacency, and Lasnik's condition.

This move was accompanied by a reinterpretation of the status of conditions like the TSC and the SSC, which ultmately spells the end of transformation grammar as such and its evolution into government-binding theory. At their inception, these conditions were construed as constraints on rules, blocking their application. Chomsky now proposed construing them

as conditions on surface structure wellformedness. That is to say, 'move NP' can apply freely, but the resulting representations must satisfy the TSC and the SSC. To take a specific example, *John seems* [*t to like Bill*] is the result of move NP and the trace is bound by an NP (*John*) as required by Lasnik's proposal. In **John seems* [*Bill to like* t], although NP movement has applied, the resulting configuration violates the SSC, on the assumption that the relationship between an NP and its trace is just like the one that holds between a reciprocal and its antecedent. The trace does not stand in the appropriate relationship to *John*, any more than *each other* does to *they* in **They expect* [*Bill to like each other*].

In 'On binding' Chomsky (1980) took this development a stage further and proposed that the SSC (renamed the 'opacity condition') and the TSC (renamed first the 'propositional island condition,' or PIC, and then the 'nominative island condition,' or NIC) should be reinterpreted as constraints on the occurrence of anaphors alone, rather than as relations between anaphors and their antecedents. The opacity condition took the form 'if α is an anaphor in the domain of the subject of β, β minimal, then α cannot be free in β, β = NP or S′. The nominative island condition took the form: A nominative anaphor cannot be free in S′. 'In the domain of' means 'c-commanded by,' where A c-commands B if the first branching node which dominates A also dominates B (a revision of Lasnik's 'precede or command'). 'Free' means not coindexed with a c-commanding antecedent. Nominative case is assigned only to the subjects of finite clauses.

To take up the analysis of *each other* to exemplify the revised framework, Chomsky suggests that all that need now be said about the distribution of *each other* is that it is a reciprocal. From this, within an appropriately articulated theory of grammar, will follow the requirement that it be bound by a plural antecedent within the same S′ or NP, if it is not itself a subject, so that (60) is grammatical with *each other* bound by *the students* within the minimal S′:

(60) John expected [$_{S'}$ the students to like each other].

(61), however, is ill-formed, because *each other* has no acceptable antecedent within S′:

(61) *The students expected [$_{S'}$ John to like each other].

(62) is ill-formed because the lower clause is finite. Its subject *each other* is therefore nominative and, according to the NIC, must be bound in S′. But, in this structure there is no possible c-commanding binder within S′, so the sentence is defined as ungrammatical:

(62) *The students expected [$_{S'}$ to each other would to like John].

Earlier, Chomsky (1977) had argued that what had been considered a range of different transformations should all be interpreted as expressions of *wh*-movement. These included not only *wh*-questions and relative clauses, but also topicalization (63a) (and its associated analysis in 63b), *Tough*-movement (64a) and (64b), comparatives and cleft sentences, although most of these do not occur with overt *wh*-phrases in them:

(63a) This book, I asked Bill to get his students to read.
(63b) [$_{S''}$[$_{TOP}$ This book] [$_{S'}$[$_{COMP}$ what] I asked Bill to get his students to read t]].

(64a) John is easy for us to please.
(64b) John is easy for us [$_{S'}$[who for] PRO to please t]].

(65a) John is taller than Mary is.
(65b) John is taller than [$_{S'}$[what] Mary is *t*]].

Chomsky's argument was founded on the claim that all these constructions exhibit the defining characteristics of *wh*-movement:

(66) a. it leaves a gap;
b. there is an apparent violation of subjacency, PIC and SSC;
c. it observes the complex NP constraint;
d. it observes *wh*-island constraints.

For example, the comparative in (67) and the *wh*-question (68) both demonstrate a violation of the complex NP constraint, while the comparative in (69) and the *wh*-question (70) both demonstrate parallel violations of the *wh*-island constraint:

(67) *Mary is taller than (what) Bill believes [$_{NP}$ the claim that she is –].

(68) *Who does Bill believe [$_{NP}$ the claim that she met –].

(69) *Mary is taller than (what) [I wonder [whether she used to be –]].

(70) *Who [does Bill wonder [whether she met –]].

The set of transformational movement rules was now reduced to two: 'move NP' and 'move *wh*' and in *On binding* Chomsky proposed that it could be reduced still further to 'move α,' where α is some category of the grammar. Move α will apply freely, but the resulting structures must satisfy the relevant constraints.

Transformational grammar, as it had been envisaged originally, was about to evolve into a theory in which transformations themselves played a relatively minor

role. The task of specifying the operations which transformations were entitled to perform was to be replaced by the task of specifying well-formedness conditions on the representations which resulted from the operation of transformations and other kinds of rules. The only constraint specific to transformations was, and remains, subjacency.

Transformational grammar constituted a major breakthrough in the investigation of the syntax of human languages and spawned an unprecedented amount of research, providing many new insights into language and its structure. It has been a topic of controversy since its inception, and a variety of alternatives now exist which challenge the very bases of transformational theory; but it is fair to say that many of them have developed in response to positions articulated within transformational grammar and it is doubtful that they would have come about without the stimulus and insights provided by transformational grammar. It is certainly true that our understanding of human language would be much impoverished had it not existed.

See also: Chomsky, Noam (b. 1928); Constituent Structure; Generative Semantics; 20th Century Linguistics: Overview of Trends; Principles and Parameters Framework of Generative Grammar; Relations and Functions; Rules and Principles.

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Transitivity: Stylistics Approaches

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Introduction to Halliday's Notion of Transitivity

In stylistic analysis, 'transitivity' is used most often in the Hallidayan sense. The following is a simplified account of this aspect of Halliday's grammar (*see* **Systemic Theory**, Halliday and Matthiessen, 2004 and Thompson, 1996 for a more complete one). Transitivity refers to the linguistic system used to create experiential or ideational meaning, which is concerned with how entities and actions in a situation are coded in the language.

Processes, Participants, and Circumstantials

Although events and situations could be categorized in an infinite number of ways, the transitivity system divides them into six process types: material, behavioral, mental, verbal, relational, and existential. Processes are represented in a clause by the verbal group. Each process is connected with various participants, and any process can be accompanied by one or more circumstantials. Participants are inherent in a process; it is difficult or impossible to conceive of the situation or event coded by the process as being complete without at least one participant. Circumstantials, on the other hand, almost always express optional information. Although processes are categorized semantically, their semantic differences are reflected in grammatical patterns. Participants are coded as noun phrases, generally subjects, direct objects, or indirect objects, while circumstantials are usually expressed as prepositional phrases.

In material processes, "things happen, and people or other actors do things, or make them happen." (Halliday and Matthiessen, 2004: 170) Examples of verbs that encode material processes include *build*, *break*, *rub*, *deliver*, *shrivel*, *flatten*, and *meet*. The 'doers' in two-participant material processes are Agents and those in one-participant processes are Mediums. These roles are generally coded as subjects. Material processes often involve one or more other major participants, which differ in terms of the extent to which they are affected by the action. Goals, which are usually coded as direct objects, are the most affected. Recipients, usually coded as indirect objects, are generally less affected. Scopes are only marginally participants in the process; either they are not very affected, or they are not concrete entities at all, but are nominalizations of the process itself. Following are examples of these participant types:

(1) Peter repaired **the car.** (Goal)

(2) Catherine gave some books to **her students.** (Recipient)

(3) Walter crossed **the ocean.** (Scope, unaffected concrete entity)

(4) Mary sang **a song.** (Scope, nominalization of the process)

Mental processes are concerned with how we perceive the world or represent it to ourselves. Typical mental process verbs include *believe*, *know*, *see*, *want*, *like*, *frighten*, *doubt*, *remember*, or *regret*. These processes are prototypically states rather than actions. Mental processes involve two types of participants. The Senser is the conscious, usually human, entity that is in the state described. The Phenomenon is the entity, concrete or abstract, that is inducing the state. So, for example, in the sentence:

(5) Peter likes traveling.

Peter refers to the Senser and *traveling* to the Phenomenon. The range of entities that can be Phenomena is almost limitless. One grammatical result of this range is that Phenomena can be coded not only as noun phrases, but as subordinate clauses, as in:

(6) Peter likes to go to Europe with his wife.

Behavioral processes, represented by verbs like *worry*, *ponder*, *plan*, *sneeze*, *cough*, and *crouch*, fall into two subclasses, cognitive and physical. The cognitive ones are like mental processes, except that they are more eventlike; they usually refer to situations that are temporally bounded, as in:

(7) The cat dreamed about mice last night.

and/or to actions that are intentional, as in:

(8) Mary was thinking about writing a novel.

The physical behavioral processes are similar to material processes, except that they don't affect anyone other than the entity doing them, as in:

(9) Peter was sitting down.

and/or they are involuntary, as in:

(10) The baby laughed at her aunt's funny noises.

Behavioral processes have one main participant, the Behaver, the one performing the activity. Sometimes the process itself is "dressed up as if it was a participant" (Halliday and Matthiessen, 2004: 251), as in:

(11) He gave a great yawn.

in which case the participant role of the *yawn* is Behavior.

Relational processes are concerned with how we identify and classify entities. As such, like mental processes, they are prototypically states. Examples of verbs encoding relational processes include *be*, *remain*, *seem*, *exemplify*, and *have*. Relational processes are used for many related but distinguishable functions, including identifying, as in:

(12) That woman is a professor.

assigning an attribute, as in:

(13) That dog seems worried.

establishing possession, as in:

(14) Elizabeth has two cats.

or specifying any of a wide range of circumstantial types of information such as spatial or temporal location, content, or origin, as in:

(15) Boise is in Idaho.

(16) The meeting is at ten o'clock.

(17) The dress is (of) silk.

(18) The book is by Roberta Gellis.

For stylistic purposes, the several participants in relational processes can be combined into two, Identified and Identifier. The Identified is the entity about which information is provided and the Identifier is the information itself. Thus, in:

(19) The woman is a doctor.

the woman refers to the Identified and *a doctor* refers to the Identifier.

Verbal processes are those involving symbolically coded information being transferred between people. While the most prototypical verbal processes are those in which a person is actually saying something, any activity in which information is coded into language by a human being to be conveyed to another human being is considered verbal, as in sentences like:

(20) The report argues for more funds for education.

Examples of verbal process verbs are *speak*, *announce*, *promise*, and *ask*. The participants in verbal processes are the Sayer, the Receiver, the Verbiage, and the Target. The Sayer is the immediate conveyor of the message, which may be a person, but can also be the medium of the message itself, if a speaker is not present. So, in:

(21) The letter describes Peter as a wonderful person.

the letter is the Sayer. The Receiver is the audience; in:

(22) Susan told Jeff to sort the mail.

Susan is the Sayer and *Jeff* is the Receiver. The message itself is the Verbiage; *to sort the mail* is the Verbiage in (22). The Target is the entity that the verbiage refers to; in (21) above, *Peter* is the Target.

Existential processes involve something existing, as in:

(23) There are many short-sighted people.

The most common verb representing existential processes is *be*, but others include *exist*, *remain*, and *ensue*. Existential processes have only one participant, the entity that exists, which is the Existent. In (23) above, the *many short-sighted people* represent the Existent.

Lexicogrammatical Metaphor

In all of the above, it is assumed that there is an obvious one-to-one correspondence between the process, which exists outside of language, and the way it is linguistically coded. That is, processes will be realized by verbs and participants by nouns, and any given process will always be realized with a verb whose default meaning matches it. Neither of these is always the case. It is certainly possible for the default meanings of the words and the grammatical structure to be completely congruent with the actual event, as in:

(24) George destroyed the vase with a hammer.

However, it is equally possible to have encodings that are quite incongruent with the event, as would be the case if the situation just described were encoded as:

(25) There was a disintegration of the vase.

There is a continuum of encodings, with a range of possibilities between very congruent and very incongruent. For the event described above, the sentences:

(26) The hammer smashed into the vase.

(27) The vase disintegrated due to George's actions.

represent intermediate encodings. Any encodings that are not completely congruent are examples of lexicogrammatical metaphor. (Taverniers, 2003: 8)

Stylistic Applications of Halliday's Model of Transitivity

Point of View

There are a number of stylistic devices that contribute to creating point of view or focalization (Simpson, 1993; Toolan, 2001). One of the most straightforward involves the use of mental and cognitive behavioral processes. The Phenomenon in mental processes is usually accessible only to the Senser; for example, in:

(28) Sharon thought that she had wonderful parents.

the subordinate clause expresses information only known to Sharon. Likewise, many cognitive behavioral processes, such as dreaming or listening, are not readily observable from the outside, so only the Behaver will know they are engaged in that activity. Thus, for either type of process, the person involved will be the focalizer in that section of text, the person whose point of view is being represented. Transitivity choices also affect point of view in more subtle ways because they change the way different characters are viewed by themselves or by the reader, especially in terms of relative power or responsibility. This aspect of point of view will be discussed in more detail below.

Text Subworlds

There has been increasing interest in the role played by text subworlds (*see* **Text World Theory** and Werth, 1999) or mental spaces (*see* **Possible Worlds: Stylistic Applications** and Fauconnier, 1994) in a reader's comprehension of point of view and other aspects of a text (Stockwell, 2002: Ch. 7 & 10; Gavins, 2003; Semino, 2003). While subworlds can be set up by a variety of stylistic devices, among the most common are mental or verbal processes. These processes have in common that they can act as 'space-builders' (Fauconnier, 1994), creating subworlds containing the information introduced by the process. So, for example, in:

(29) Peter dreamed that a steamboat was being washed over the pier by the storm.

the verb *dreamed* creates a subworld containing the event involving the *steamboat*, *the pier*, and *the storm*. Likewise, in:

(30) Marion said, "I worked my way across the Atlantic on a tramp steamer."

the verb *said* creates a subworld containing the event involving *Marion*, *the Atlantic*, and the *steamer*. While the situations introduced into a subworld in these cases are described by a single subordinate clause, it is possible for a sentence containing a space-building verb to be followed by a paragraph, chapter, or even an entire work referring to a subworld; Coleridge's *Rime of the ancient mariner* (1798/1994) is a well-known example of this. So, (29) and (30) above could be followed by a virtually unlimited amount of text with additional information about the occurrences in the dream or verbal subworlds already established.

Coding Power and Responsibility

The aspect of transitivity that probably has the greatest potential utility in stylistic analyses has to do with what the choices of different processes and participants reveal about power relationships and assignment of responsibility for actions. In general, participants have significantly different degrees of power depending on how eventlike the process is in which they are involved. In a prototypical event, an Agent acting on their own intentionally causes a permanent change of state in a Goal, as in:

(31) The sculptor carved the marble.

In this case, the Agent will be represented as extremely powerful, especially in relation to the Goal, which will be represented as extremely low in power. As the process becomes less and less eventlike, there is less power involved, and it is more equally divided between the participants, as in:

(32) Katie touched the cat.

In addition, participants that are less directly connected to the event, such as Recipients and Circumstantials, neither have power themselves nor affect the power of other, more central entities, like *Elizabeth* and *the den* in:

(33) Katie gave Elizabeth a book in the den.

Among participants, the Existent and the Identified in existential and relational processes are the least powerful or active. The Senser and Behaver in mental and behavioral processes are more active, in that they are doing something, but they are still not particularly powerful, because generally their actions do not directly affect anyone or anything else. This situation changes somewhat if these participants are engaged in planning future actions. For example, if a heroine in a popular romance makes plans to exact revenge or to escape, she will appear more active and powerful than if she is simply fearing for her life or the hero's. This appearance is especially true if she carries out at least some of those plans later. The actions in verbal processes may also confer some power on the Sayer if the Verbiage causes a permanent change in someone else, as in an order for an execution, but often verbal activities have no permanent effect on others, making Sayers, like Sensers and Behavers, relatively low in power.

Material processes are the most eventlike as a class, but there is still a lot of variety within the category, resulting in differing degrees of power assigned to the participants. So, for example, if a character in a novel participates mostly as the Medium in a material process, they will be active but not particularly powerful, since no other entity is involved. And even in processes with two participants, the degree of the Agent's perceived power will be greater if the process involves a Goal than if it has the less-affected Scope, and if

there is a Goal, the Agent's power will be greater if the Goal undergoes a change of state rather than just a change of location. Thus, the subject's power increases from sentence (34) to (37), as the events described become more and more eventlike:

(34) The soldier went out on maneuvers. (Medium-only process)

(35) The soldier crossed the field. (Agent-Scope process)

(36) The soldier took the prisoner to the cell. (Agent-Goal process involving change in location of the Goal)

(37) The soldier shot the prisoner. (Agent-Goal process involving change in state of the Goal)

While it is possible to represent different participants as more or less powerful simply by choosing different types of processes for them to participate in, adding lexicogrammatical metaphor allows the author to create more complex stylistic effects by 'upgrading' or 'downgrading' processes. Researchers (Taverniers, 2003) have pointed out that grammatical metaphor, like lexical metaphor, requires that the reader understand both the literal and the metaphorical event codings to be able to comprehend the text. Thus, if a process at one point on the event continuum is upgraded by being metaphorically coded as one that is at a higher point, or downgraded by being coded as one at a lower point, having to process the literal meaning as well as the metaphorical one will make the situation described seem either more or less eventlike, with corresponding changes in the perceived power of the participants. This shift can be done merely by choosing a different verb within the same process type. For example, a material process involving change of state, as in:

(38) The assassin killed the president with a crossbow.

can be incongruently coded as a process involving change of location:

(39) The arrow traveled 15 feet before passing through the chest.

Compare this sentence with the syntactically parallel but congruent coding for a change of location:

(40) The car traveled 15 miles before passing through Rockville.

The metaphorical encoding in (39) not only makes the situation less eventlike by coding it as a change of location rather than a change of state, but it is now coded as a process with a Medium and Circumstantials only; the people involved, who would be the natural Agent and Goal, are either completely absent or referred to only indirectly. In general, any metaphorical encoding that recodes Goals as less affected participants or Circumstantials will decrease the perceived power of the natural Agent, and any encoding that codes less central entities as Goals will increase the perceived power of the entity coded as Agent.

A more drastic metaphorical change involves coding one type of process as another. For example, compare the congruent coding in:

(41) Elizabeth thought about her lovely granddaughter.

in which the situation is represented as a one-participant behavioral process, thus assigning no power to the participant, with that in:

(42) Thoughts of her lovely granddaughter engulfed Elizabeth.

in which the situation is coded as a two-participant material process with the *thoughts* in the position of Agent, and *Elizabeth* as a Goal, thus upgrading the power of the thoughts as well as process as a whole, and downgrading Elizabeth's power within the process. A classic example of use of lexicogrammatical metaphor to affect perceptions of power is William Golding's novel *The Inheritors* (1963), which portrays the worldview of the Neanderthals as one in which causation is almost never assigned to a person as a whole; instead, either a person's body parts, or inanimate objects, play the role of Agent or Medium (see Halliday, 1981 and Hoover, 1998 for transitivity analyses of this novel, and Short, 1976; Kennedy, 1982; and Simpson, 1993 for relevant transitivity analyses of other works.)

Power and responsibility are closely tied together, so any stylistic choice that changes perceived power will also change perceived responsibility. In fictional texts, the author can simply have characters participate in highly eventlike processes in order to represent them as having or lacking responsibility, increasing the effects by using lexicogrammatical metaphor if they choose. In reporting real events, authors are more likely to attempt to change the perception of responsibility by using metaphor, rather than changing the events themselves. The effects of using incongruent coding are especially noticeable when there is a great deal of responsibility involved, as is the case in highly eventlike situations. For example, the situation congruently coded in:

(43) The army bombed the city and killed many civilians.

involves two permanent change-of-state material processes represented as main verbs, and clearly assigns both the power and the responsibility for the events to *the army*. However, the coding can be downgraded significantly, as in the incongruent sentence:

(44) The city's bombardment and the resultant loss of life were necessary for national security.

in which the main process, expressed by *were*, is relational. This coding not only transforms material events involving catastrophic changes of state in the Goals into a static situation, but it allows the participants who are the natural Agents to be removed from the sentence altogether.

Basic Narrative Structure

Basic narrative structure has been discussed by a number of researchers (*see* **Narrative: Cognitive Approaches** and Toolan, 2001: Ch. 6 for a summary.) While there are significant differences in opinion about the extent to which there is a basic structure common to all narratives, certain components appear in many analyses. These include orientation, complicating action, resolution, and evaluation. Because they serve different functions, these components have noticeably different distributions of processes (Halliday and Matthiessen, 2004: 174). The orientation, also called the setting, introduces characters and locates the narrative in a particular time and place. As a result, existential and relational processes, often accompanied by a high number of Circumstantials, will predominate. The complicating action and the resolution contain the main events in the narrative, delineating the cause-effect chain that holds the story together. These sections will therefore generally be dominated by material clauses, although as Toolan (2001: 153) points out, verbal processes may be part of the cause-effect chain as well.

The evaluation component of a story is more complex and often harder to separate out than the other parts of a narrative. Evaluation includes

> all the means used to establish and sustain the point, the contextual significance and tellability, or reportability, of a story. It may take many forms and appear at almost any point in the telling . . . (Toolan, 2001: 151).

At least in external evaluation, which appears in clauses separate from those coding the complicating actions and resolution, there will generally be a predominance of relational and verbal processes, as the author either has the narrator evaluate the situation, as in:

(45) It was an amazing experience.

or places the evaluative clauses in the mouth of a character, as in:

(46) Elizabeth said, "I've never had something so amazing happen to me."

While these components are easiest to identify in simple oral narratives, many of the same patterns are also recognizable in longer, more complex texts. For example, sections where the narrative departs from the main cause-effect chain will often show a concomitant shift from predominantly material to nonmaterial processes. In descriptive sections, as in orientation sections, existential and relational processes will predominate. A section in which a character remembers the past, muses over the present, or considers the future, will probably contain a number of mental processes, building often quite complex textual subworlds.

Genre Analysis

Just as different components of a basic narrative show different process patterns, so do different genres to varying degrees (*see* **Genre and Genre Analysis**). First, there is a basic difference in patterns between narrative and expository/argumentative texts, in that, unlike narratives, expository texts will have a significantly greater proportion of relational to other processes. Moreover, scientific writing in particular and writing in an academic register in general show an extremely large number of instances of a particular type of lexicogrammatical metaphor that construes entire events as entities that act as participants in relational processes (Halliday, 1988). Thus, rather than saying:

(47) I put 40 mice in an enclosure suitable for 5 and after a week, they were constantly fighting with each other.

an author will use nominalization metaphors, as in:

(48) Overcrowding of the rodents was correlated with heightened aggression.

Within fiction, subgenres often show different patterns of processes. For example, romance fiction generally has a significantly higher percentage of verbal, behavioral, and mental processes than do action books such as westerns and spy or crime thrillers (Nash, 1990). Use of these types of processes, along with material processes involving movement, serves to make heroines appear active without being powerful (Nash, 1990; Ryder, 1999). This appearance is accomplished by coding the heroine as the subject in a main clause, generally a fairly powerful position, while making the process in which she participates active but not very eventlike. Use of lexicogrammatical metaphor to code normally one-participant processes as transitive verbs also allows

the heroine to look more powerful as well, by turning Circumstantials into Scopes or Behaviors:

> (49) Delia paced the room, occasionally giving an impatient sigh. She picked up the letter, unfolded it, read it for at least the tenth time, then folded it again and put it back on the mantel.

In the first sentence in (49), two inherently intransitive processes, pacing and sighing, have been upgraded by making them transitive and adding a Goal and a Behavior, and the second sentence contains a string of transitive processes, but none of them creates a change in state of the Goal.

Mysteries also generally contain a relatively high percentage of verbal, mental, and cognitive behavioral processes, but these processes serve a somewhat different purpose in this genre than they do in romance. The author must provide the reader with all the information necessary to resolve the mystery without making the information so obvious that there is no puzzle to solve. One of the easiest ways to accomplish this negotiation is to provide the reader with a variety of subworlds set up by verbal processes, containing conflicting versions of the facts provided to the detective by the various witnesses and suspects. In addition, the detective as well as other characters are represented as considering various solutions to the mystery, which are coded as subworlds created by mental processes. (See Simpson, 1993; Stockwell, 2000; and Ryder, 2003 for process analyses of various other fiction subgenres.)

Critical Discourse Analysis and Feminist Stylistics

Critical discourse analysis and feminist stylistics both examine how stylistic choices in a text construct unequal positions for different social groups, and how the representation of disempowered groups can be analyzed and altered to redress the inequality. Critical discourse analysis (CDA) has a number of strands, but most CDA researchers agree that discourse, both spoken and written, helps produce and sustain, but also transform, unequal power relationships (*see* **Critical Discourse Analysis**). This primary concern with power and its representation makes transitivity analysis a particularly attractive analytical tool. CDA has been applied to a wide variety of texts, concentrating on those in the public sphere (Trew, 1979). In all cases studied, an analysis of the types of processes, participants, and lexicogrammatical metaphors found in the text reveals that certain groups are coded as having more power or responsibility than others, even when casual readers, or the writers themselves, may not have realized that the text contained such consistent patterns.

> Researchers in feminist stylistics attempt not only to describe sexism in a text, but also to analyze the way that point of view, agency, metaphor, or transitivity are unexpectedly closely related to matters of gender (Mills, 1995: 1).

(*see* **Stylistics, Feminist**). Like CDA, feminist stylistics studies include analyses of a wide variety of texts, but there is a central concern with media and advertising representations of women (Clark, 1992), and the representation of female characters in romance novels (Christian-Smith, 1989; Ryder, 1999; Wareing, 1994). As in CDA studies, these analyses generally show that consciously or not, those supporting the present power structure choose patterns of processes and participants that consistently code women as generally passive and powerless on the one hand, but on the other hand, as responsible for many of the crimes in which they are victims. This picture is complicated by studies showing that in some texts written by women, the authors have found ways to 'have their cake and eat it, too,' that is, to appear to be obedient to the dominant group's rules while still defining themselves in opposition to them (Mills, 1997), or have shown women as powerless as a form of protest (Burton, 1982).

Cautionary Note

Several authors have argued that stylistic effects cannot simply be 'read off' transitivity patterns in a text, because the same patterns seem to have quite different results in different texts (Fish, 1981). However, as Simpson (1993: Ch. 4) has pointed out, combining information about the general effects of certain transitivity patterns with the specific context of an individual text does in fact produce insightful analyses. Simpson compares passages from *The Inheritors* (1963) and *Pincher Martin* (2002), both by William Golding and both exhibiting strikingly similar transitivity choices that represent characters as powerless. Simpson points out that, while the personalities of the characters in the two passages are quite different, the similarity in transitivity choices still makes sense, since both characters lack power even though in one case, it is because of lower innate intelligence, and in the other, it is because the character is drowning. Simpson concludes that "isolating an interpretive 'lowest common denominator' in this way . . . high-highlights the fact that both texts, despite markedly divergent story lines, are at one level of analysis, stylistically very similar" (Simpson, 1993: 113).

See also: Critical Discourse Analysis; Genre and Genre Analysis; Narrative: Cognitive Approaches; Possible

Worlds: Stylistic Applications; Stylistics, Feminist; Systemic Theory; Text World Theory.

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such as subtitling, dubbing, voice-over, and website translation, which will undoubtedly open rich avenues for interdisciplinary research.

See also: Bible; Qur'an.

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Translation and Genre: Drama

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While drama translation for the page has much in common with translation in other literary genres, transferring a play from one language into another for performance on stage presents the translator with problems of a different order. Unlike the reader of a play, a theatre audience is not in a position to consult footnotes or encyclopedias containing information about unfamiliar cultural concepts and social situations. With the exception of explanatory comments provided in performance programs, audiences are left

to fend for themselves when confronted with unknown, often bewildering information. Also of importance is the notion of performability, the ease with which director and actors can make a play come to life, an outcome crucially dependent on the use of spoken rather than written language. Often an indicator of class, education and geographical origin, the language of the different characters in a play is uniquely defined by their idiolect, sociolect and dialect, which often do not travel easily in translation. In addition to other linguistic obstacles, there is also the potential problem of the kind or genre of the play to be translated. A play originally conceived as expressionist or symbolist, does not normally benefit from a naturalist approach to the dialogue in translation. Finally, there is the question of direction of translation; global awareness of Anglo-American language and culture greatly facilitates translation out of English, leaving the translator of plays originating in other languages wrestling with problems of a different nature, often resulting in the need for re-writes, versions and adaptations in English translation.

Foreignizing vs. Domesticating

When transferring a play from one language into another, two contrasting approaches may be recognized: the playwright may be left in peace as much as possible and the audience sent abroad or the audience may lean back in comfort while the playwright is brought closer (Lefevere, 1977: 74). In short, the translator may opt for a *foreignizing* or *domesticating* approach (Venuti, 1995). While the former entails retaining alien allusions and references, the latter strives to neutralize culture-specific elements and may even relocate the play to the country of the target language in order to facilitate audience understanding of a play. An example of this strategy is David Johnston's translation of *Luces de bohemia, Lights of Bohemia*, Ramón Valle-Inclán's play set in the Madrid of 1918/1919, proliferating in social, cultural and literary Spanish references. In order to make his version more easily accessible to an English audience, the setting of the play was moved from the post-Bolshevik disturbances of Madrid and relocated to Dublin just before the Easter Rising (Johnston, 2000). Relocation is also the strategy employed in the creation of the English version of *Natale in casa Cupiello*, *Christmas at the Cupiellos*, by Italian playwright Eduardo de Filippo as a solution to the problem of transferring the Neopolitan playwright's dialect in translation. Retitled *Ducking out,* this close study of family life was moved to Yorkshire, home ground of the adaptor, British playwright Mike Stott.

Familiarity with the Target Language and Culture

The risk of an English audience failing to understand references to cultural concepts and social situations is, however, less likely to be of concern in the translation of French plays. Close historical links and geographical proximity between France and the UK as well as French being the first foreign language taught at English schools have created a situation allowing playwright and translator Neill Bartlett to comment on his translation of Jean Genet's use of puns in his play *Splendid's* that "[a]ny reader who thinks my choice too bold should consult the French text in order to trace the originals of my puns" (Bartlett, 1995: xvi). Of equal help to the translator is the preponderance of French loanwords in English, making it possible for instance to retain the title of Jean Cocteau's 1937 play *Les parents terribles* for performance in London while a greater distance to the play's country of origin necessitated a change to *Indiscretions* when transferred to New York. Still, on other occasions, the translator may be less inclined to greet the presence of French loanwords in English with enthusiasm. While Anglo-Saxon words and expressions belong to the register of everyday usage, French terms in English are often associated with a more elevated style of discourse. Whereas a play such as *Messe solennelle pour une pleine lune d' été, Solemn mass for a full moon in summer,* by Quebec playwright Michael Tremblay contains words that belong naturally to a French vernacular idiom such as *apathie, violence, insensibilité*, English cognates such as "apathy, violence and insensibility" fit less comfortably into non-standard language while proving difficult to replace by Anglo-Saxon equivalents (Bowman, 2000). However, this problem in translation is compensated for by the retention of French place names and characters addressing each other as 'Madame' or 'Monsieur,' thus allowing French plays to remain foreign in the sure knowledge that for an English theatre audience, 'the other' is not alien to the point of causing consternation.

Confronted with the work of playwrights writing in other less well-known languages, audience response may be different. Retaining the Russian form of address, including the use of patronymics in respectful conversation, not only places a burden on the memory of English actors but also on the audience, drawing early critical complaints that Anton Chekhov's plays inevitably entailed a stage "inscrutably occupied by Mishka Vaselenovitch Klooglosevtloff, a retired professor . . . and a very puzzling assortment of Pishkins, Boraptakins, Sergius Vodkaroffs, Abrezkoffvitchs and Olthidors . . ." (Senelick, 1987: 292).

Spoken Language and Dialects

Full awareness that drama requires the spoken mode to be matched in translation is relatively recent. Before naturalism reached the stage in the form of the modern drama, the way ordinary people speak was of little interest as it was not considered appropriate language to be used on stage. When, in 1914, *Pygmalion* first opened at His Majesty's Theatre in London, critics did not take kindly to the use of expressions such as "not bloody likely." George Bernard Shaw had met the linguist Henry Sweet, with whom Professor Henry Higgins of *Pygmalion* and subsequently *My fair lady* shares many characteristics in the early 1880s and was well aware of the way in English dialect and sociolect interact to make language an indicator of class and education. In translation, however, both contrive to make full appreciation of the original far from easy. An example of the problems in the translation of plays written in dialect is provided by the work of Gerhart Hauptmann. Written in 1892, *Die Weber, The weavers*, based on a real-life uprising of a group of hand-loom weavers in the 1840s, established the German naturalist writer as a leading European playwright and, in 1912, earned him the Nobel Prize for Literature. Written in Silesian dialect, making an authentic match of the original in translation into standard English difficult to achieve, more recently the spirit of Hauptmann's play has been captured in a Scots dialect version by Bill Findlay where the numerous linguistic options in German have found their counterpart in the number of flexible linguistic choices available in Scots such as urban vs. rural, regional vs. standardized, historic vs. contemporary (Findlay, 1998). Also translated into non-standard English for performance in translation from Russian is the work of Anton Chekhov. In an attempt to avoid associations of the Home Counties to be evoked by a translation into Standard English, Irish playwright and adaptor Thomas Kilroy relocated *The seagull* to Ireland, which enabled him to use Hiberno-English for the translation, a variety of English different in grammar and syntax from the speech of mainland England.

Grammar and Syntax-Linked Problems

Other linguistic obstacles facing the translator of drama is the problem presented by "untranslatable" words and expressions, a situation made particularly difficult if the term or expression is used thematically throughout a play. If, for instance, an innovative phrase or expression draws on language-specific syntax and grammar, absence of equivalence may necessitate the use of paraphrasing. Characteristic of Ibsen's creative use of Norwegian is his style of compound formation whereby new, transparent nouns and adjectives are created by combining already familiar words into novel concepts. A well-known example is *lysrædd*, literally meaning 'lightfrightened,' used by Ibsen in *Ghosts* in order to describe a household where a carefully constructed web of lies keeps in the dark everything that does not stand up to closer scrutiny. Similarly the Swedish dramatist August Strindberg, whose fast-paced action is often achieved through the creation of compounds such as *sjalpåtagning,* literally 'shawl-putting-on,' which as "helping her on with her shawl" inevitably loses in immediacy, economy and humor in English translation (Sandbach, 1985: 30–33). The process of compound formation allowed by the grammars of Norwegian and Swedish is paralleled in German while less easily matched in English, not characteristically Germanic in a number of syntactic and grammatical respects.

In translation between German and English, there is yet another related problem presented by the use of prefixes and suffixes in the two languages. Bertolt Brecht's well-known dramatic principle of *Verfremdung* (making unfamiliar) or V- effect is not only an intriguing theatrical strategy but also a term, far from easy to translate into English. While the prefix ver- travels with ease between other Germanic languages as does the suffix -ung, in English Brecht's proposed process of making something seem less familiar is often rendered through the French loan "alienation" leaving open the possibility of an interpretation involving negative connotations.

Nor is drama translation between Romance languages and English altogether free from grammar and syntax-linked problems. While a language such as Italian allows pronominal subjects to be omitted, English does not, at times resulting in wordier constructions in translation. At the beginning of Luigi Pirandello's play *La vita che ti diedi*, *The life that I gave you*, Donn'Anna's only son lies dead; here key words such as *vita* 'life' and *morte* 'death' along with their derived forms are juxtaposed. Act II concludes with one word from Donn'Anna: *vive*. In English translation, this single key word becomes three; 'he is alive,' reducing the succinct impact of one single word at a crucially theatrical moment of the play (Anderman, 2005). Not infrequently, the problem in Pirandello translation starts as early as the title of the play (Bassnett-McGuire, 1983). For instance, while *Cosi è (se vi pare)* contains a light, jocular note, this could hardly be said about the English titles under

which the play is often known: *Right you are (if you think so)* or *It is so (if you think so)*.

Genre and Kind of Drama

In the case of Pirandello's countryman Dario Fo, 1997 Nobel Prize laureate, problems in translation are closely linked to genre. Writing in the tradition of *commedia dell'arte*, a hard-hitting while entertaining form of political satire, a Fo play such as *Accidental death of an anarchist* has often emerged in English as a farce but with its emphasis on the play's humorous aspects, part of its bite lost in translation. As the tradition in which Dario Fo writes may become blurred, so too is often the style in English translation of the plays by Federico García Lorca. It is not always remembered that a play such as *Yerma* is as much a poem as it is a play and that a translation that may be right for naturalistic intensity will not necessarily do justice to the original language of the work of the Spanish poet and dramatist.

Direction of Translation

Translation of English and American plays into other languages on the other hand poses considerably fewer problems than translation in the opposite direction. The position of English as a global language and, in addition, the virtual hegemony of the Anglo-American literary tradition, normally ensures relatively faithful renderings of the source text with less need for adjustment to facilitate comprehension in the translation of plays written in English. The impact of this lack of equivalence that manifests itself in translation has been given a theoretical explanation by the Israeli scholar Itamar Even-Zohar who views a given culture as a 'polysystem' or system of systems. In the dialogue between these systems, an imbalance prevails in the power relations that hold between them: at a given time in history, a particular system is likely to be stronger than another one (Even-Zohar, 1990). For many centuries, center position in the world of theatre was held by French playwrights which, for the first stage production of *Hamlet* at the Comédie Française, led the translator Jean-François Ducis to feel entitled to domesticate Shakespeare's play in order to meet the neo-classicist demands for unity of time, place and action. As a result, in translation into French, Hamlet never leaves Elsinor where the action takes place during an uninterrupted period of 24 hours with all subplots removed, including the death of Ophelia (Heylen, 1993: 26–44). And the period 1850–1870, the French influence on cultural life in Britain at its peak, saw English playwrights put a Parisian success on the London stage in various degrees of adaptation, spawning not only one but sometimes several English versions of the original (Hale, 2000).

In the early 21st century, French literary supremacy has given way to Anglo-American hegemony, with accompanying norms dictating the translation of drama. This situation notwithstanding, the European canon is increasingly finding its way onto English-speaking stages in translation, versions, and adaptations. With the growth of globalization, in time to come there might even be a chance for drama from beyond Europe to emerge fully, bringing with it a different set of linguistic problems, in turn requiring new solutions in translation.

See also: Corpora in Studies of Variation; Corpora of Spoken Discourse; Dialect Representations in Texts; Drama: Stylistic Aspects; Particles in Spoken Discourse; Shaw, George Bernard (1856–1950); Sociolect/Social Class; Sweet, Henry (1845–1912).

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Translation and Genre: Literary

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To put it plainly, 'genre' means a kind or type of rhetoric. Furthermore, the term can be applied to any stylistically consistent utterance, whether oral or written, literary or non-literary. Major literary genres are drama, poetry, fiction, and essay. Each major genre has many a subgenre like tragedy, sonnet, tale, or sermon. As a term, genre, derived from *genus* (any class of things that can be divided into subclasses), comes to translation studies via literary history and criticism and by extension to translation criticism and practice. It is the umbrella term, favored by literary tradition. Thus, translation criticism and practice, where humanistic literary studies are uppermost, tend to refer to genres. On the other hand, very similar strategies of discourse analysis, when emanating from linguistics, are termed text types. It should be born in mind that the differences between genre and text type, if any, are subtle and probably immaterial.

Veritably every philosopher who takes up language has at least an implicit theory of genre, and every major literary critic or historian usually has an explicit theory of genre. However, in the second half of the 20th century, the undisputed giants of genre criticism have been Mikhail Mikhailovich Bakhtin (1896–1975), Georg Lukacs (1885–1971), and Northrup Frye (1912–1991). By and large, students pursuing genre will find more open discussion in the period norms of Structuralism and Modernism, which were the prevailing fashions down through the years immediately following World War II, than in Poststructuralism and Postmodernism, which have dominated the past quarter century. Oversimplified, Structuralists and Modernists such as Claude Lévi-Strauss and T. S. Eliot tend to show the patterns underlying detail and hence support the classifications of literary genres. Poststructuralists and Postmodernists like Michel Foucault and Edward Said point out the distortions caused by zealously applied taxonomies. Translation theorists move with cultural history and keep their own perspectives attuned. Eugene Nida (1912–) and André Lefevere (1947–1997) have been conspicuous examples of theorists who integrate the contributions of successive critical strategies. Literary translation follows literary fashions and usually precedes translation theory, so the taxonomy comes after the example. In translation practice, the usefulness of genre as an initial identifying text marker is obvious. The rhetorical conventions inscribed in a genre both compose a tradition and present a guide. Thus, if translators identify the genre at the outset of a translation project, they will have the support of the tradition and, probably also, many available models to follow or flout.

Yet, while such verbalizing activities as storytelling, song-making, play-acting, reporting, and sermonizing may be found both throughout the world and throughout recorded history, literary genres do not cross linguistic and cultural boundaries totally unchanged. This disparity is one of the challenges of literary translation. Even when the chief countries of use have had long and close cultural connections, like England and France, the modes of writing and expectations of readers regarding genres may be slightly different. The differences are especially notable when cultural contacts are relatively recent and/or when language structures are acutely different, like English and Japanese. In such cases, accommodating genres may be even more challenging and transfer conventions more unstable. If to those issues is added the influence of cultural imperialism and postcolonial resistance, the translator's task may be more problematic still.

Let us look first at genres from sites of extended cultural contact. Countries with Western European cultures have developed transfer conventions, and this development means that readers of the first text (popularly called the 'original') read – or assume – the genre label and consequently expect certain features. French publishers, for example, will sometimes use the genre label as a veritable subtitle. They may do so even, perhaps especially, when the text is nontraditional. For example, with experimental fictions like Marguerite Duras, *Emily L. roman* ('Emily L. novel') or Samuel Beckett, *Comment c'est, roman* ('How It Is, novel') the genre subtitle probably elicits a certain kind of reading. Translators must take on the assumptions of the first-language readers and use the tools of literary analysis they have learned from their reading of both the source and target literary traditions. Translators usually operate intuitively at this stage of the project. That is, for example, if they already know they are dealing with a novel, they begin looking for tone, diction, hidden meanings, basic mythoi, etc.

At this point, translators must make a preliminary decision on how to use genre conventions. For example, in translating Baudelaire's *Les Fleurs du Mal*

(1857, 'Flowers of Evil'), which uses the hexameter, Stefan George had to condense when he decided to use iambic pentameter for *Die Blumen des Bösen* (1891). In this *tour de force*, he successfully approximated Baudelaire's rhyming also. The ultimate English translation of Baudelaire's *Fleurs* still seems elusive, although many talented poets have had partial success. Not only has condensation been a challenge, but rhyming, in and out of critical favor, has taken a toll on Baudelaire in English. With rhyme, there is the risk of forced semantic skewing or padded lines; without rhyme, there is often a refracted loss of melody.

Some subgenres are so specialized and so tied to the national tradition that gave rise to it that they are frequently referred to by the same word in a variety of languages. The Italian *novella* is such an instance, passing into English and German dictionaries as a relatively long fictional narrative, usually under 200 pages, frequently with a first-person narrator. The subgenre 'novelette' is presumably equivalent, but without such specific rhetorical features. The concept of genre, however, in these closely related cultures does not require great feats of imitation. Sometimes, the patronage system of the target culture will want a translation that fits seamlessly into the target literature, like John E. Wood's 1997 retranslation of Thomas Mann's encyclopedic *Doktor Faustus* (1947), in itself a compendium of a variety of medieval and modern German subgenres. (H. T. Lowe-Porter, in the first translation of 1948, had made a heroic effort in this respect also.) At other times, the patronage system decides to accommodate a boisterous genre that stands out from the norm like Gregory Rabassa's replication in Gabriel García Márquez's *Cien años de soledad* ('One hundred years of solitude,' 1967). Indeed, it is tempting to say that if Beckett's longer pieces of fiction had not been labeled 'novels,' readers might not have recognized them as such.

For examples of genre transfers between two markedly different languages and cultures, we can turn to the *haiku* and the *noh*. Here translators are really forced to adapt or simply incorporate an inspiration.

The haiku is an unrhymed Japanese poem where the three lines contain 5, 7, and 5 syllables; it has a close relationship to nature. The noh is a classic Japanese dance-drama with a plot relying on heroic narratives. The haiku has been successfully approximated by Western poets since the turn of the 20th century. It has become a recognized form of a very elliptical, imagistic poem with an elusive voice. The voice is elusive because it does not address the reader directly as in an epic poem; its voices are not played out in front of an audience as in a drama; and it is not overheard as in a lyric. A haiku's imagery is simply stated, thus making it a form that fills a niche in the Western prosodic repertory.

Western drama has not made room for the noh, even though it was chosen by Nobel Laureate W. B. Yeats as a poetic theater model for his own dramatization of heroes in Irish mythology. Possibly this lack of acceptance is because the noh is a **dance**-drama. The texts of noh plays represent only a fraction of the implicit play, which to be translated, really must be performed. Yet it remains a generic model for dramatists who want a highly stylized piece for audiences willing to take a play into their minds and forego watching action with which they can identify. As for any noh fad, there have been many dramatic subgenres that undermine the well-made play, codified by Aristotle and recurring throughout Western literature whenever a tight structure is in fashion, but it would be difficult to prove that the variations of Expressionism, Surrealism, Absurdism, etc., show more than coincidental similarities.

Tight structure, as would be found in French Neo-Classicists like Corneille, Racine, or Moliere or Naturalists like Ibsen, should be a reminder that great writers of genius can create a subgenre of their own. Shakespeare would be an example of a playwright with deceptively loose genres. Although he wrote comedies, tragedies, histories, and many permutations and combinations, if 'Shakespearean' is applied to another playwright's drama, the reader or spectator prepares for a play that overflows conventional expectations of plot, characterization, and scope, where the language does more than advance the momentum. It calls attention to itself by its transcendence of ordinary discourse. Critics are prompt to coin subgenres for the highly original rhetoricians; Calvino, Faulkner, Joyce, Kafka, and Proust immediately come to mind.

Indeed, as a word, genre is multipurpose and elastic. When Proust's Charles Swann exclaims in the last line of *Un Amour de Swann* ('Swann in love') that he wasted years of his life for a woman who wasn't even his *genre!* (his 'type'), he indicates not only the slippery semantic ground of this term, but also the unstable domain in which it is a convenient catch-all.

See also: ; Abduction; Eco, Umberto: Theory of the Sign; Fictional Discourse: Philosophical Aspects; Figurative Language: Semiotics; Genres in Political Discourse; Language: Semiotics; Literary Theory and Stylistics; Metaphor: Psychological Aspects; Metaphor: Stylistic Approaches; Normativity; Poetry: Stylistic Aspects;

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Translation and Genre: Sacred Texts

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The translation of sacred texts is a particularly sensitive task. Sacred texts, or holy texts, have traditionally been considered to embody core values of particular cultures, guiding beliefs and behavior and influencing not only the lives of isolated individuals but also of large numbers of people, shaping the history of entire nations and continents, redrawing boundaries of states, and influencing cultural production in a number of interesting ways. Sacred texts such as the Bible and the Qur'an are considered by believers to be inspired by the Divinity; the Qur'an, for instance, is thought to contain, verbatim, the word of God revealed to the prophet Muhammad by the Angel Gabriel. This inevitably has important implications both for the legitimacy and acceptability of translations and for the methods of translation that should be used. More passionately than in the case of any other texts, the very right to exist is denied to translations of some sacred texts, and where translations are considered possible or even desirable, they are scrutinized with the greatest care by members of the hierarchical structure of the institution supporting each religion to ensure that no deliberate or nondeliberate distortion of the divine message has taken place. The first issue we need to address, then, is the very translatability of sacred texts and the legitimacy of translations.

The Translatability of Sacred Texts

Is the holy translatable? In order to answer this question, which has been at the center of theological debate for centuries, we would need to be able to define the holy – is it something that exists independent from our judgment of it, or is the aura of holiness the result of a consensus of a number of people who have adopted the view that a particular text is the word of God and hence is sacred? Then, we would need to establish whether the Divinity who is believed to have originated the sacred text encourages or forbids translation, and here we again find ourselves in the realm of theological controversy. Finally, we need to define translation, and this is a notoriously difficult task. All these questions may receive different answers depending on the religious tradition we subscribe to or the decision not to belong to any and, last but not least, on the theory of translation we adopt.

The biblical story of the tower of Babel has long fascinated translation scholars in the west (see Steiner, 1998; Derrida, 2002) and has been interpreted as a myth of the origin of translation, also giving rise to speculation about the relationship between translation and the holy. According to the Book of Genesis 11:1–9, all the people on earth originally spoke the same language. They decided to build a city with a great tower, so tall that its top should reach the heavens, but God confounded this activity by making them speak different languages. Because they could no longer understand each other, the people stopped building and scattered over the face of the earth. According to Derrida's reading, the fact that God destroyed both the tower and the original linguistic unity imposes and at the same time forbids translation. Translation is necessary if people are to be able to understand each other, and the translator's job is to remedy the scattering of tongues at Babel. But at the same time, by working toward the restoration of communication that God felt it necessary to destroy, the translator may in fact be working against God.

What is quite certain is that translation, including translation of sacred texts, does take place, even though many people do not always realize that the texts they are using have undergone at least one if not several translation processes. For example, the Jewish Torah, the equivalent of what Christians call the Old Testament, was translated from Hebrew into Greek in the third century B.C. (the famous *Septuagint*), from Greek into Latin (St. Jerome's influential *Vulgate*), and from Latin into a number of vernaculars. Buddhist texts were translated from Sanskrit and Pāli to Tibetan, Chinese, and Japanese and then into other Asian and European languages.

Given that translation attempts to restate a message in a new linguistic and cultural medium, it involves the recognition and at the same time the relativization of the importance and worth of each medium and the belief that the spirit and the letter are not inseparable. Christianity, for example, has embraced translation as a fundamental way of spreading its message across the world; according to Nida (1998: 23) at least one book of the Christian Scriptures has been translated into 2009 languages and dialects, spoken by at least 97% of the world's population. This Christian tradition of translation may be linked to the event of the Pentecost, when, filled with the Holy Spirit, the apostles addressed the crowd in a variety of languages, not just in Hebrew or Aramaic. Support for translation is also to be found in the New Testament in the letters of St. Paul. In the first letter to the Corinthians 14:13, St. Paul urged those who speak in an unknown tongue to pray that they may

also interpret. According to Toker (2005), the Pauline view is that the spirit, the Truth, is not tied to the sounds and words in which it finds its expression, but that it can be expressed in different words and in different tongues.

Other religions, however, resist translation, thus effectively claiming sacred status for the language in which they have their text. Thus, the *Megillath Ta'anith,* or *Scroll of Fasting* (also known as the *List of Festivals*), a first- or second-century A.D. writing, records the Judaic belief that three days of total darkness fell on the world when the Torah (or the Jewish Law) was translated from Hebrew into Greek. Furthermore, Steiner (1998: 63) shows that, according to the Talmud (a collection of Jewish oral tradition interpreting the Torah), the omission or the addition of one single letter of the Law might mean the destruction of the entire world. If we take this literally, the fact that translation involves altering completely the form or the letter of the text inevitably means that the Torah is untranslatable or, at the very least, that terrible consequences may be expected should anyone dare to undertake its translation.

Another sacred text that is considered by believers to be untranslatable is the Qur'an. To this day an influential school of thought subscribes to the view that any existing translations of it are illegitimate. One of the reasons cited in support of this opinion is the fact that, linguistically, the Qur'an is the masterpiece of the Arabic language and is considered to be of miraculous beauty; some scholars actually suggest that "the triumph of Islam was the triumph of a language, more particularly of a book" (Hitti, 1970: 91). Another argument in favor of the absolute untranslatability of the Qur'an is found in *aya* number 2 of the *sura* of Yusuf, which says that the holy book was sent down as an Arabic Qur'an. But even if the Qur'an were to be translated, how could a human translator cope with a text authored by God, a text whose very sounds originated in heaven? Because of all these reasons we find titles such as *The Meanings of the Glorious Qur'an* or *The Message of the Qur'an,* and not simply *The Qur'an,* as titles for translations. This implies not only a view of translations as inferior reproductions of an inimitable original, but also a view of translation as interpretation (see further below).

The belief in the superior, or even sacred, status of the language of a holy text is apparent even in religious traditions that do allow translation, such as Christianity. It has been the case that once the Bible was translated into a particular language, the translation itself was attributed a status virtually equal to that of the source text itself, and further retranslations were banned because they were believed to distort the word of God. Moreover, some of these translations acted as source texts for further translations into other languages; an example of this is St. Jerome's Latin *Vulgate*. In fact, in western Europe in the Middle Ages only three languages were considered suitable for religious expression: Hebrew, Greek, and Latin, and the liturgy in the Roman Catholic Church was performed in Latin. In the end a compromise was reached, and even though the Bible and the liturgy could only be read or recited in Latin, the use of vernacular for preaching was permitted. This compromise was taken a step further during the Reformation, when the Bible itself started being translated into vernaculars. As far as eastern Christianity is concerned, the Orthodox Church of Greece still uses the original text of St. John Chrysostomos' liturgy, which dates back to the fourth century A.D. and uses a language that is hardly accessible to speakers of Modern Greek. This situation is similar to that of the Old Church Slavonic text used by the Orthodox Churches of Russia, Serbia, and other Slavic countries; there is resistance to translating the liturgy into modern-day language, even though the Old Slavonic text is not an original but is in fact a translation from Greek. It appears that the form and content of a message are frequently perceived to be inseparable in the case of sensitive texts and that the power of tradition can be greater than the drive to adapt to contemporary linguistic realities.

Translating a sacred text must start from the premise that the same message *can* be conveyed in a different linguistic form, and this involves an optimistic view of translation or, perhaps, a deeply held conviction that even though imperfect, translation is necessary. But the fact that there are multiple translations into the same language of a sacred text such as the Bible suggests that there are more ways than one of approaching the task of translation; it also raises questions about which translated version is the correct one. Even though the differences between versions may seem relatively small to the uninitiated, some of them have caused huge doctrinal controversies. The institutions and people who accused translators of malicious distortion of the word of God and on a few occasions burned them at the stake acted in the name of their conviction that one translation was correct and another one wrong, but given the nature of the translational act, it is less than obvious how one can ever be so sure. According to Steiner (1998), translation, just as any other act of communication, involves interpretation, and more often than not, there are several possible interpretations. Although linguistic analysis and contextualization of the message can help eliminate some of these interpretations, it may still be necessary to choose

between those that remain. In a sense, then, by having to decide in favor of one of several possible alternatives, translation inevitably limits the meaning potential of a text, though at the same time it may open up a number of other associations. If, from a strictly linguistic point of view, there can be several translations or interpretations of a text, it is obvious that issues outside the text itself will be the ones to decide which interpretation is considered correct and/or acceptable.

The pressures on translators of holy texts are great, and they come from various quarters. Small wonder that this should be so, given that these translators work with texts "having a long history and involving the deep personal attachment of many people and the vast, vested interest of numerous institutions" (Nida, 1964: 26). Translators are not free to do what they like, because context and tradition tend to dictate the extent to which receivers will accept a particular translation as faithful, accurate, or effective (Nida, 1964: 179). To take this a step further, according to Shackle (2005) it is precisely context, rather than the content, of a text that makes the holy difficult to translate or even untranslatable; resistance to translation may actually be due to control of interpretation rather than to inherent textual untranslatability.

In 1529 Sir Thomas More, English humanist, writer, chancellor to King Henry VIII, and a devout Catholic, wrote his *Dialogue Concerning Heresies* and in 1532 the *Confutation of Tyndale's Answer.* Tyndale was the first person after the invention of printing to take steps toward translating and publishing the Bible in English; his vernacular translation was burned on the grounds that it promoted heretical ideas. Among the things that More objected to in Tyndale's translation are the renderings of a number of key words such as *senior* instead of *priest, congregation* for *Church,* and *love* for *charity.* According to More, Tyndale used *senior* or *elder* and not *priest* in order to promote the (Lutheran) view that priesthood is not a sacrament, as was believed in the Catholic church, but simply the office of a layperson appointed to preach. As for *congregation,* More's objection was that although the Church is indeed a congregation, not every congregation is the Church, and consequently people should not be misled into believing that all congregations are legitimate. Finally, according to More, charity always involves love, but love does not always involve charity. As explained in Long (2001: 143), in Latin there are two words for *love*: *amor* for physical, worldly love, and *caritas* for holy love, and even though in English the word *love* covers both meanings, *charity* was preferred because it was a closer derivative of *caritas* but also because it did away with any possible connotations of a physical type of love. In the Catholic Church, chastity was praised as a virtue and almost a prerequisite for holiness. Numerous other examples can be adduced to show how translational choices can give rise to doctrinal controversy. Perhaps one of the most famous examples is Martin Luther's German translation of the Bible, a crucial event in the history of western Christianity and a landmark of the Reformation. The particular way in which Luther rendered the verse in Romans 3:28, by adding the word *allein* (*only*), supported the doctrine of justification by faith alone (*sola fide*), which was different from the Catholic doctrine of salvation by faith and good deeds. To this day this is a major dogmatic difference between the Catholic Church and the Protestant Church.

To conclude, choices in translation, even when justifiable by linguistic analysis and by exegesis, can be extremely threatening to an established interpretation. And since translation is such a powerful means of challenging the accepted meanings of a holy text, it has been used time and again to bring about and justify change. Institutional control over interpretation is praised by some as a safeguard against error and is condemned by others as a restrictive, self-proclaimed monopoly on Truth. As explained in Long (2005: 3), the scattering of tongues at Babel obliges us to find a way of dealing with the multiplicity of interpretations either by fearing that they obscure God's message and lead us to chaos or by welcoming them as useful aids toward a multifaceted comprehension of the Divine. One can only hope that rather than producing confusion, the multiple translations of God's text(s) may actually be beneficial; after all, St. Augustine does say that "in fact, this diversity has helped rather than impeded understanding, if readers would only be discerning" (Gavigan, 1966: 74).

Main Issues and Strategies in Translating Sacred Texts

Not all religious texts have the same central status within a given tradition. For example, in addition to the holy book, the Qur'an, another source of authority underpinning Muslim life is to be found in the *hadith*, the sayings of the prophet Muhammad as remembered by those around him and written down after his death. The restrictions with respect to translation that apply to the Qur'an do not apply to the *hadith*; the *hadith* may be translated and quoted in translation because they are authored by a human and can therefore be translated by a human, whereas the Qur'an is believed to be authored by God.

In eastern Orthodox Christianity there are two major sources of authority: the Bible and the Tradition of the Church. The Tradition comprises a large body

of writings, some of which date back to the very beginnings of Christianity, oral teachings and customs, liturgical texts, stories about the lives of the saints, as well as core doctrine agreed on during the seven Ecumenical Councils that took place between the fourth and the seventh centuries A.D. The writings of the early church fathers such as St. Basil, St. John Chrysostomos or Golden Mouth, St. Athanasius and many others, have already been translated into a number of languages and so have collections of sayings from, and stories about, the lives of the fathers from the desert, founders of monasticism. In a sense, the Tradition is the very memory of the Church, a living repository that grows all the time because new experiences are constantly added to it, and translation is an ongoing activity. The status of some of these texts is difficult to overestimate: apart from guidance on doctrine, they offer detailed, practical advice on worship and everyday life. However, no single one of them is as important as the Bible, and this means less pressure on translators. Having said this, translation is not always an easy task because a good knowledge of the Bible and of the Tradition is usually required if one is to be able to translate these texts. And no translation is published without the approval of the hierarchy of the Church. Major undertakings such as retranslations of the Bible carry, on their first page, the approval of the Patriarch of the country; translations of other writings may also be published with the approval of a bishop.

The translation of a sacred text into a given language is influenced in a number of ways by previous translations of that or other texts belonging to the same religious tradition. If there has been previous translation activity, there might already be an established religious terminology and style. This can ease the translator's task considerably, but at the same time it may impose a number of restrictions in terms of what receivers are prepared to consider an acceptable translation. The reaction of the receivers is inevitably linked to their background, previous awareness of religious tradition, and the expectations they bring to their reading of the translated text (the issue of taking different audience groups into account when translating religious texts is discussed later).

It is interesting to notice that the holy text(s) of a culture may have marginal significance in another culture or may even be completely unknown, except perhaps to a number of converts, immigrants, or scholars. This is the case in Western Europe of the Orthodox liturgy of St. John Chrysostomos or of the Hindu holy book Baghavad-Gītā. Translating into a culture that already has its own religious tradition, and into a language whose religious vocabulary has developed in order to respond to the needs of the already existing religion, can be a challenging task. This is not least because the religious terminology that is required may either be unavailable, or, should translation equivalents exist, on closer scrutiny they are found to be loaded with semantic associations that are specific to the already established religion. For example, the English translators of the 1954 volume *Early Fathers from the Philokalia* (a collection of Christian patristic texts) discuss in their preface the example of the terms *theology* and *theologian*. They point out that in the Orthodox Church *theology* does not refer to systematic theoretical knowledge about God, which is the meaning generally accepted in Western Christianity. Rather, it refers to a gift of the Holy Spirit, the gift of speaking about God "with deep insight and with powerful and winning words" (Kadloubovsky and Palmer, 1954: 17). It is bestowed only on those who have attained wisdom and contemplation, and in the Orthodox Church the title of *theologos* is only given to three writers: St. John the Evangelist, St. Gregory of Naziansus, and St. Symeon the New Theologian.

In his discussion of cultural untranslatability of the Qur'an, Abdul-Raof (2005) explains that Arabic words such as *jannah* (paradise), *naar* (hell fire), or *haj* (pilgrimage), which appear to be easy to translate into English, relay different mental images and expectations than their English equivalents, which are rooted in the Christian religious tradition. The very word for God, *Allah*, evokes a number of associations that are specific to Islam, such as the ninety-nine attributes mentioned in the Qur'an, whereas the English word *God* is linked to the Christian dogma of the Holy Trinity (God as Father, Son, and Holy Spirit), a view that Islam does not share. Writing about a totally different religious tradition, Foiera (2005) notices that Buddhist texts translated into Italian, a culture and language heavily influenced by Christianity, are bound to be misunderstood because specific Buddhist concepts and practices are reconfigured by western audiences to correspond to preexisting Christian ideas such as the binary distinction between good and evil and the existence of an almighty God.

Because of the status of holy texts within given cultures and the importance attributed to the smallest textual detail, translation strategies have traditionally been source-text oriented, sometimes to the extent of attempting to achieve word-for-word equivalence. Even translators who advocate the merits of other translation strategies are cautious when it comes to translating a sacred text. Thus, in his 'Letter to Pammachius,' St. Jerome, translator of the Latin *Vulgate*, explains that a literal translation obscures

the meaning and admits that he prefers sense-for-sense translation to word-for-word translation, "*except in the case of the scriptures in which even the order of the words is a mystery*" (Lefevere, 1992: 47, my emphasis). Luther's German translation of the Bible was based on a more target-oriented approach to translating the holy text. As Luther himself explains in his 1530 'Open Letter on Translating,' his aim was to make the Bible accessible to common people by avoiding obscure expressions translated literally from another language and by using fluent German instead. However, Luther himself, as well as other translators of the Reformation era, did on occasion sacrifice this principle of intelligibility and reverted to literalism where essential theological aspects were concerned (Kirk, 2005: 90).

In the twentieth century, Bible translation took a significant step toward a view that translation should, above all, be communicative. According to this approach, which has become particularly influential not only in the area of Bible translation but also in the translation of texts other than the religious, the aim of translation is to communicate to a new audience, in a different language and cultural context, the same message that the author(s) of the source text intended to communicate to their original audience (see Nida, 1964; Nida and Taber, 1969; de Waard and Nida, 1986). In other words, translators should not aim for formal equivalence, but for dynamic (also known as functional) equivalence (i.e., equivalence of effect or response). For example, in John 6:24 "to give glory to God" actually means "to swear to tell the truth" (Nida, 1998: 24), and translators should opt for the rendering that makes it likelier that the average reader for whom a translation is intended will understand it correctly (Nida and Taber, 1969: 1). This method of translating involves a significant effort of interpretation on the part of the translator and presupposes that the translator is able to decide, based on scholarly evidence, what the correct meaning of the text really is. Communicative translation is inevitably based on a number of (warranted or unwarranted) assumptions about the response of the original audience as well as the likely response of those for whom the translation is intended.

Linked to the issue of formal versus dynamic equivalence as translation strategies is the issue of foreignization versus domestication in translation. A foreignizing approach involves moving the reader toward the original author, whereas a domesticating approach moves the author toward the reader. Domestication in particular has been criticized for attempting to turn a cultural 'other' into 'the same,' for reinforcing stereotypes, and in general for being an undemocratic form of cross-cultural communication (Venuti, 1995, 1998). According to Kirk (2005: 94), dynamic equivalence, as formulated by Nida, finds a valid middle way between the two strategies by rejecting domestication of the cultural background while encouraging linguistic domestication, though it is not always easy to make distinctions between the purely cultural and the purely linguistic aspects of a text.

The issue of style is very important when it comes to translating or retranslating a holy text, and one of the aspects usually discussed in relation to it is archaization versus modernization. Some people insist on having translations that sound ancient or even strange and unearthly because they feel these are more appropriate in view of the supernatural character of the message, whereas easy-to-understand renderings in modern idiom are considered to be less respectful of the text (Nida, 1997: 193–194). Also, there is a tendency in translation to use a higher register than the one in the source text; this is probably because of the perception that literary language fits the divine message better than a colloquial style. Those who disagree with this view consider that contemporary language is entirely appropriate as a means of conveying a spiritual message, and that believers should not prefer the emotional security of traditional religious style to the pursuit of a better understanding of the message itself (for a discussion of archaizing and modernizing strategies in English translations of the Orthodox liturgy of St. John Chrysostomos, see Şerban, 2005). Last but not least, no contemporary (re)translation of a sacred text can avoid taking one stand or another on the issue of gender-inclusive language.

Translation strategy will ultimately depend on a variety of textual and extratextual factors that include, but are not restricted to: reasons for (re)translating; aims to be achieved; the identity and background of the translator(s); assumptions about the targeted audience; pressures from tradition, commissioner, and audience; considerations of historical, social, and political background; and many other factors. Some translations are done to spread a message and others to refute it, such as, for instance, Robert of Chester's 1143 Latin translation of the Qur'an (Mustapha, 1998: 203). Other translations are done out of intellectual curiosity and the desire to make an exotic religion or way of life known to audiences at home; this has sometimes been a byproduct of colonialism and at the same time a means of reinforcing colonial relations. Some translators work on their own and others in teams; some are spiritual leaders in their respective tradition, and others are

scholars who have an academic interest in the religion whose texts they translate. At times retranslation work is motivated by the desire to improve the text as a result of contemporary scholarly advances in archaeology, textual criticism, or linguistics, whereas other retranslations aim to achieve a differentiated targeting of various audience groups.

It is now increasingly recognized that different audiences are best suited by different translation strategies; for example, editions prepared for teenagers, newly literate adults, or immigrants who are just learning the language of their new country may not be appropriate for highly educated audiences and the other way round. According to de Waard and Nida (1986), "all of these varieties of translating and adapting [e.g., formal equivalence, dynamic equivalence] have a certain legitimacy for particular audiences and special circumstances" (de Waard and Nida, 1986: 42, my addition). Thus, a more accessible level of language is called for if the translation targets children or the educationally disadvantaged, whereas a scholarly readership may prefer a more literal rendering accompanied by a critical apparatus in the form of preface, footnotes, dictionary of unusual words, index, and maps.

Needless to say, translators ideally have to work on reliable manuscripts, but even so, they may be confronted with errors. For example, in Mark 1:4 the Greek manuscript reads "as it says in Isaiah" but the words are actually from Malachi (Nida, 1998: 25). Kadloubovsky and Palmer (1954), the English translators of the *Philokalia*, reported being aware that some bibliographical details in the manuscript and some attributions of authorship (e.g., between the monk Evagrius and St. Nilus of Sinai) are questionable according to modern scholarship; however, they did not consider themselves to have the authority to make final pronouncements on these matters and decided to translate things as they are in the Russian version that they used as a source text.

When it comes to translations of holy texts, the question of *what* is translated can be just as important as that of *how* it is translated. Thus, Crosby (2005) argued that the nature of westerners' interest in Buddhism from the 19th century onward has had a major impact on the types of texts selected for translation into western languages; translations emphasize certain dimensions of Buddhism, such as the rational-scientific side, to the detriment of other aspects, such as ritual, daily practices, and ecclesiastical hierarchies. This has led to a view of Buddhism that is divorced from living Buddhism practiced by Buddhists.

Many important statements about translation have been developed as a result of work on sacred texts, and those that are best known in the west have come from translators and researchers of Christian texts, especially the Bible. This does not mean that statements on translation based on the experience of translating texts from other religious traditions and between languages other than western do not exist; it is just that scholarship is more compartmentalized than we would like to think it is, and access to the experience of other cultures is less than straightforward. Also, it is interesting to notice that not all cultures and religions place the same emphasis on written holy texts as the Judeo-Christian and Muslim traditions, and that for some religions oral modes of transmission may be just as important as writing.

It would be difficult to overestimate the impact that translating sacred texts has had, for better or for worse, on the world as we know it. Translators of holy texts have contributed to the spread of new ideas and ways of life; they have invented alphabets such as the Armenian and the Glagolitic and contributed to the rise of vernaculars and to the birth of national literatures. Directly or indirectly, their work has influenced numerous forms of cultural production besides literature, such as music, painting, and architecture (for a detailed overview of the role of translators through history, see Deslile and Woodsworth, 1995). The single most important factor in shaping 2000 years of European civilization and American civilization for the last few centuries has been the Judeo-Christian heritage; other religious traditions have had a similar impact in other parts of the world. On the negative side, in association with colonialism and other forms of unequal power relations, religious translation has worked toward the forceful imposition of new systems of values, sometimes to the extent of virtually wiping out preexisting civilizations.

In today's world, travel, access to the powerful new media, and intensified cross-cultural interaction linked to economic globalization have made it almost impossible to totally ignore the existence of other religions. This state of affairs creates interesting challenges for translators of holy texts and for translation scholars, who are suddenly faced with a different dynamics of cross-cultural communication than used to be the case in the not-too-distant past and with a different type of audience, who has access to a wealth of (sometimes conflicting) information. In addition to the old way of reaching audiences via printed books, religious messages can now be conveyed using the Internet and a variety of television programs such as feature films, cartoons, documentaries, televised sermons, and even advertisements. Consequently, the area of religious translation has recently broadened to include forms of multimedia adaptation

such as subtitling, dubbing, voice-over, and website translation, which will undoubtedly open rich avenues for interdisciplinary research.

See also: Bible; Qur'an.

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Translation and Genre: Drama

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While drama translation for the page has much in common with translation in other literary genres, transferring a play from one language into another for performance on stage presents the translator with problems of a different order. Unlike the reader of a play, a theatre audience is not in a position to consult footnotes or encyclopedias containing information about unfamiliar cultural concepts and social situations. With the exception of explanatory comments provided in performance programs, audiences are left

Translation Memories

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Translation memory (TM) systems, the most widely used toolkits in the localization of digital information, enable the translation and cultural adaptation of electronic content (e-content) for local markets. The idea behind TM systems is to store in a computer system the original e-content and the translation that has been produced by human translators; the stored translated version of the source document has been broken down into manageable units, generally one sentence long. Over time, enormous collections of sentences and their corresponding translations are built up in the systems. TM systems allow translators to recycle the stored translated segments by automatically proposing a relevant translation from the memory, either as a complete ('exact match') or as a partial ('fuzzy match') solution, whenever the same or similar sentences reoccur in the translation process. This increases a translator's productivity and helps ensure that terminology and expressions are consistently used across translations. Thus, TM systems facilitate and speed up the translation of an ever-increasing number of specialized texts.

Components of TM Systems

Apart from the 'memory,' or translation archive, as its core element, a typical TM system consists of an array of tools and functionalities to assist the human translator (see Figure 1). The system usually includes the following tools:

- A multilingual editor for reading source texts and writing translations in all relevant file formats of different word-processing programs, desktop publishing (DTP) systems, etc., protecting the layout tags of these formats against accidentally being deleted or overwritten.
- A terminology management program for maintaining termbases to store, retrieve, and update subject-, customer-, and project-specific terminology.
- An automatic term-recognition feature for automatically looking up in the termbase all terms that occur in the source text segment on which the translator is currently working.
- A concordance tool allowing users to retrieve all instances of a specific search string (single words, word groups, phrases, etc.) from a TM and to view these occurrences in their immediate context.
- A statistics feature providing a rough overview of the amount of text that can be reused from a TM for translating a new source document.
- An alignment tool to create TM databases from previously translated documents that are available only as separate source and target text files, by comparing a source text and its translation, matching the corresponding segments, and binding them together as units in a TM.

In addition, a few TM systems offer terminology extraction as an optional or an integrated feature to assist in populating termbases and in setting up the terminology for an e-content localization project by extracting mono- or bilingual lists of potential terms from a selection of electronic (source and/or target) texts. Increasingly, TM suites also include support for machine translation (MT), either by offering interfaces with MT systems or even by integrating their own MT component. Finally, some kind of project management (PM) support is built into most TM systems. These PM features may support the following functions:

- File handling and management (specification of all source language files, project-relevant termbases and TM databases, and assistance in defining folder structures).
- Management of client and translator data (addresses, contact persons, translators' skills, equipment, availability, etc.).
- Workflow management (deadlines, project progress, etc.).

The History of TM Systems

The basic idea of computer-assisted reuse of human translations can be traced back to the 1960s, when the European Coal and Steel Community (ECSC) developed and used a computer system to retrieve terms and their contexts from stored human translations by identifying those sentences with lexical items that most closely matched the lexical items of a sentence to be translated (Automatic Language Processing Advisory Committee, 1966: 27). A much broader reuse of existing machine-readable human translations with a clear focus on facilitating and accelerating revision processing, by identifying unchanged passages, was envisaged in a model developed by the translation service of the German Federal Army in the early 1970s (Krollmann, 1971). The notion of automatically retrieving 'exact matches' was first implemented in the early 1980s by ALPS, Inc. in a simple tool called 'repetitions processing,' as part of

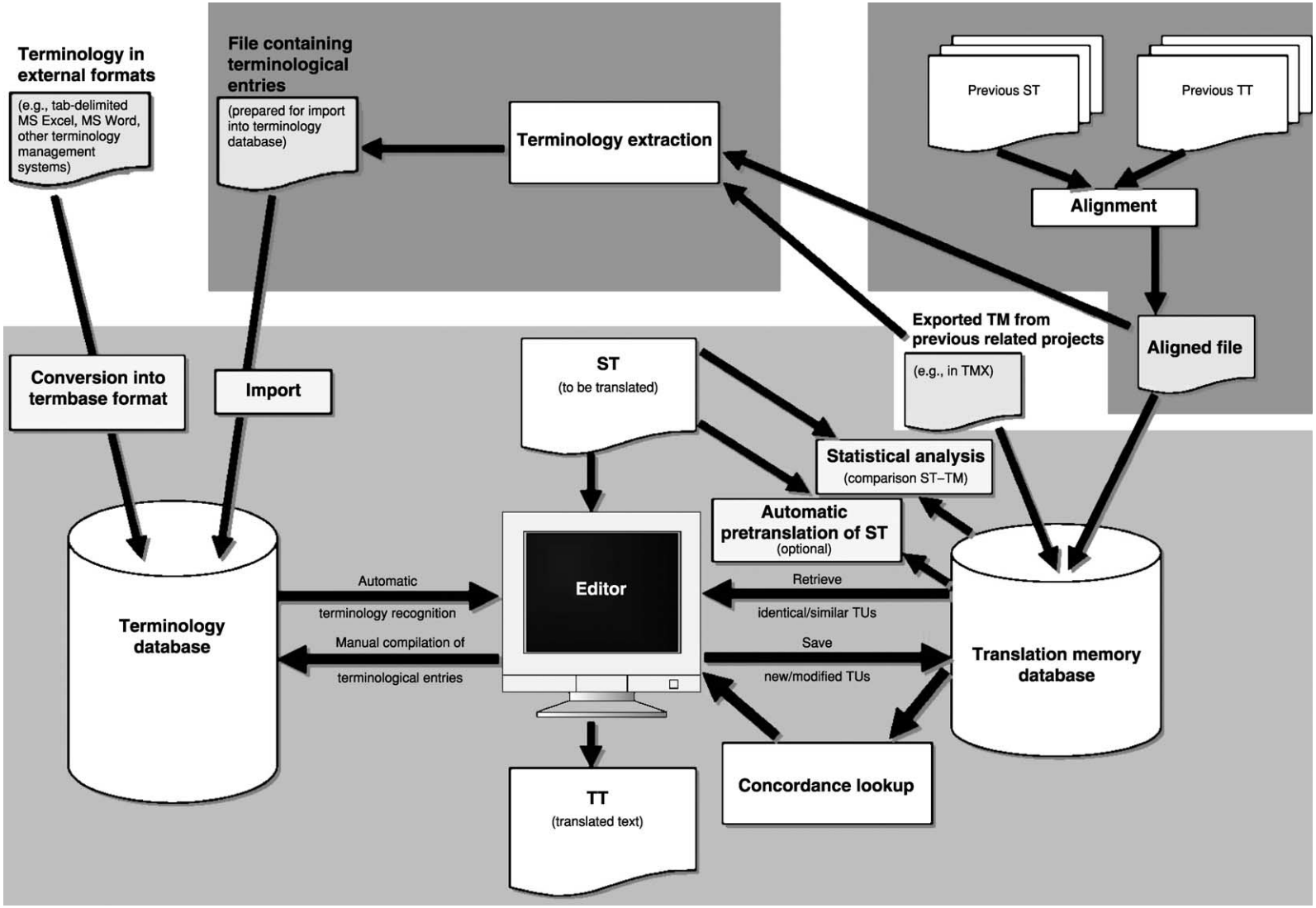

Figure 1 Components and processes in a translation memory (TM) system (excluding project management and machine translation functionalities): ST, source text document; TT, target text document; TU, translation unit; TMX, Translation Memory eXchange format. Components and processes involved in the core translation process are shaded in light gray; optional preparatory components and processes are shaded in dark gray.

the company's commercial MT system. The reuse of similar sentences (fuzzy matching) was first suggested in the late 1970s in a paper by the European Economic Community (now called the European Union) translator Peter Arthern (1979), but commercial TM systems did not appear on the market until the early 1990s.

Types of TM Systems

In most systems available on the market, the TM is a database. Each record in a TM database contains a translation unit (TU) consisting of a pair of source and target text segments. In addition to the TU, there may be further information on the creation and modification dates, the person who created or modified the entry, the project(s) or customer(s) the TU is used for, etc.

Some TM systems do not make use of the database approach but store entire source and target text pairs in their proprietary formats as reference material for future reuse in related translation projects. While TM databases constitute an amalgamation of translation units that isolates each segment from its context, the reference text approach makes it easier to take context into account during the matching process. On the other hand, this approach is rather static, i.e., it is not possible immediately to reuse TUs that have just been created. Therefore, systems based on the reference text approach also create a so-called temporary fuzzy index, which is a kind of temporary database providing access to recently created TUs as well as fuzzy-match functionality.

Creation of a TM

Basically, there are three ways of feeding a TM: (1) while translating – when translating a text using a TM database, each segment from the source text will be automatically stored in the database along with its translation; (2) by importing another TM database – this can either be a TM created with the same TM system or with a TM available in the Translation Memory eXchange format (TMX), which is supported by all commercial systems; and (3) by aligning existing translations and their original texts – with the help of an alignment tool, it is possible to create TM databases from the source and target text files of previous translation projects.

TM Systems and Machine Translation

Translation memory technology is not to be confused with machine translation. Whereas MT systems translate without human intervention, TM systems provide features and tools to store and retrieve segments translated by a human translator. Despite this essential distinction between TM and MT, TM technology shares certain features with what is called 'example-based MT' (EBMT), an approach first suggested in Japan in the early 1980s (Nagao, 1984). Both TM and EBMT try to retrieve 'best matches' for the sentences of the text to be translated, from a bilingual text archive or database containing sentence-level alignments of existing translations and their original texts. Yet, there are fundamental differences between the purposes of EBMT and TM systems. A TM is mainly an information retrieval system that leaves decisions about whether and how to reuse and adjust the retrieved results – and thus the actual translation task – to the human translator. EBMT aims at producing translations by automatically selecting suitable fragments from the source language side of the retrieved TUs and building the translation from the corresponding elements of the target language side. Due to the complexity of this recombination task, not every TU contained in a translation archive is equally suited for reuse in TM systems and EBMT environments.

For good reason, MT has so far been used very little in high-quality e-content localization. MT is suited for only a very limited range of text types, and source texts have to be carefully tailored to the capabilities and restrictions of an MT system to minimize the amount of time and effort needed for postediting. Nevertheless, TM suites increasingly offer support for MT. Basically, there are two possible ways of combining MT and TM. The first way is batch processing (usually during project preparation). In a batch scenario, all segments of the source text that do not produce an exact match or a high percentage of fuzzy matches when being compared with the TM database may be exported for processing by MT. After the unknown segments have been translated by the MT application, the new translation units can be merged into the TM database. When the translator works on the text, the units generated by the MT system will be presented as candidate translations, possibly with a predefined matching penalty. The second way of combining MT and TM is interactive processing (during the proper translation stage). In an interactive scenario, translators can invoke the MT system each time there is no match with the TM database. If the result from the MT system proves helpful, it can be edited as necessary. The resulting translation unit will then be stored in the TM database for future reuse.

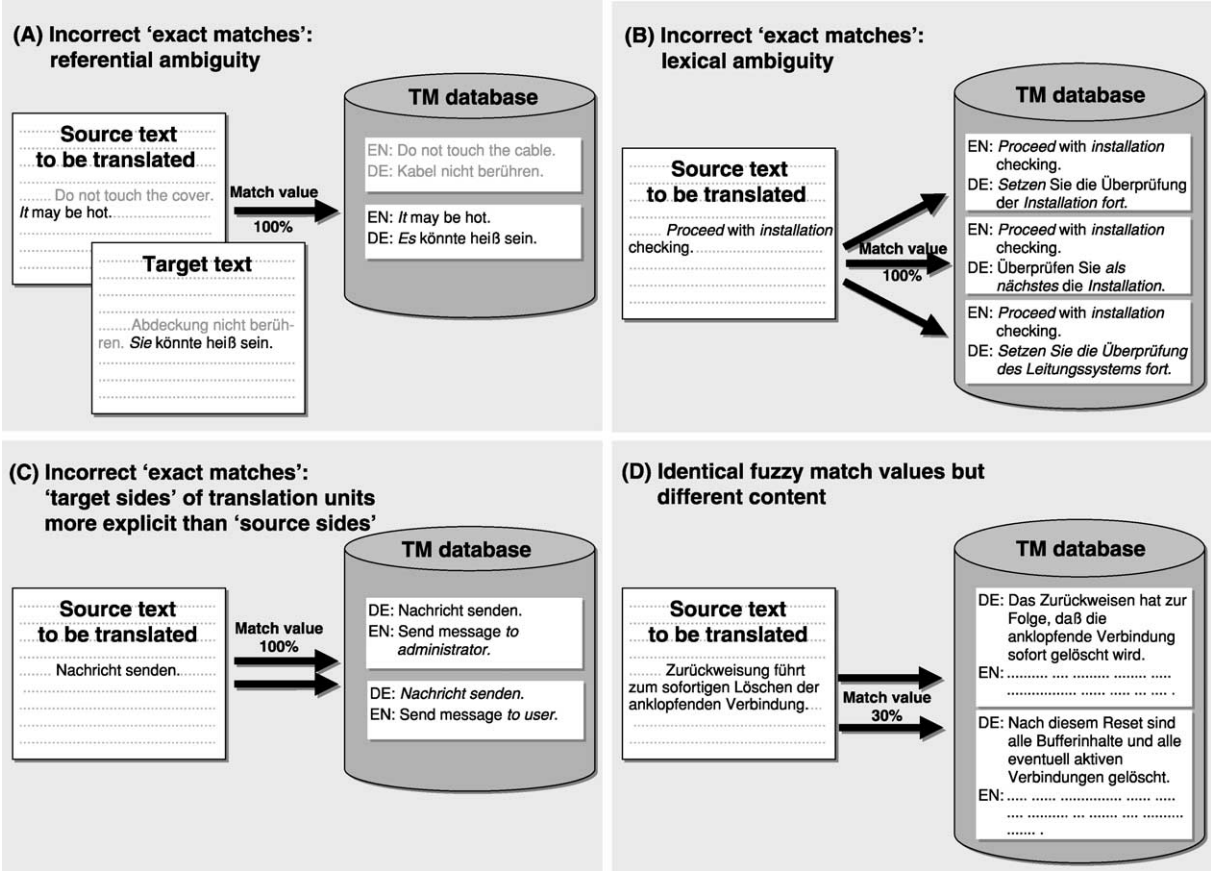

Figure 2 Examples in English (EN) and German (DE), demonstrating shortcomings of fuzzy match algorithms.

Advantages and Limitations of TM Usage

The advantages of using TM systems are fairly obvious: they increase the translator's productivity and enhance translation quality by ensuring that terminology and expressions are used consistently within and across translations. Users in industry and international organizations report a 25–60% rise in productivity. Yet, it must be stated that the use of TM systems may also have negative effects on translation quality. One of the major disadvantages of TM systems is that they usually operate at sentence level. Thus, there is a serious danger that the translator will focus too much on isolated sentences, possibly disregarding the contexts in which the sentences are embedded. Moreover, the matching algorithms of TM systems are based on very simple formal criteria, such as the similarity of character strings. Therefore, the human translator's notion of the degree of similarity between a segment to be translated and a segment retrieved from the database may differ considerably from the degree of similarity calculated by the TM system. This may lead to situations wherein exact matches yield wrong translations, or one translation of a fuzzy match requires little or no adjustment but another fuzzy match with the same similarity value is not useful at all (see Figure 2) (for a discussion on the aspects of evaluating the retrieval mechanisms of TM systems, see Expert Advisory Group on Language Engineering Standards (1996), Whyman and Somers (1999), and Reinke (2000a, 2004).

Despite the drawbacks, it should be noted that TM systems generally integrate into the translation workflow comparatively smoothly. As opposed to MT, they leave human translators in control of the actual translation process, while relieving them from routine work and maintaining translation as a creative act whenever the linguistic resourcefulness of a human being is required.

See also: Concordances; Localization; Machine-Aided Translation: Methods.

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Translation of Scientific and Medical Texts

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All types of knowledge, particularly in written form, are culturally mobile. They are capable of being transferred to new settings, absorbed by different peoples, even those of widely differing background and outlook. Translation is the linguistic process that makes this possible, whether for Homer's *Iliad* or Newton's *Principia Mathematica*. Translation is the act that renders knowledge, whether literary or scientific, a mobile form of culture. Such mobility, in turn, is what gives human understanding a deep and lasting influence beyond the borders of its original setting.

Discussions related to the theory, practice, and history of translation have tended to focus on literary and holy texts. Yet translation has been a central determinant in the history of scientific knowledge as well, therefore a crucial element in its intellectual history, and continues to be so today. Indeed, modern science and medicine would be inconceivable without the contributing elements of Greek, Hindu, and early Islamic thought, which came to Europe through several major episodes of translation. Today, moreover, the works of Newton, who wrote in Latin, Pasteur (French), and Einstein (German) are found in every major language of the world, and important scientific and medical papers, books, reports, procedures, and much more are made available to all nations through the effort of translators.

Despite such importance, science and medical translation has been a topic of only sporadic scholarly study. The so-called 'invisibility' of the literary translator, whose labor and worth tend to be ignored in favor of the original author, doubly applies to the scientific translator, who has been neglected

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even by the field of translation studies, with a few important exceptions. These exceptions – for example, concerning the transmission of ancient Greek and medieval Islamic science – reveal an interesting truth: no less than with literary works, translators of science and medicine have often imposed new elements upon the texts they have rendered, enriching and expanding them by adaptation to new cultural contexts. Just as the world has benefited greatly from the translation of scientific and medical knowledge into many languages, so has this knowledge been advanced by translation in turn.

The Translation of Scientific Works: Assumptions and Realities

There are several widely held assumptions about the linguistic transfer of scientific texts. One holds that science translation is literal, mechanical work, since it deals only with informational content embodied in terms that have exact equivalents in every language. Thus, a complete one-to-one correspondence exists: word-for-word translation is not only possible, but necessary. Such assumptions grow from the fundamental idea that scientific language constitutes a universal form of human discourse. It follows from this that any transfer among languages merely involves the production of duplicates.

These ideas are disproved by several realities. First, linguistic universality implies a fixed and final, ahistorical discourse. Yet, scientific speech has changed profoundly over time, even during the past century, not only in vocabulary, but in grammar and in many rhetorical elements (techniques of persuasion). Prior to the late 19th century, the written style of physics, astronomy, chemistry, and medicine shared many ingredients with literary and philosophical expression, common to educated discourse as a whole. Galileo's *Sidereus nuncios* or Darwin's *Origin of Species* were composed according to the general standards for elegance of their era (late Renaissance Latin, Victorian prose). Thus, translation of scientific literature can involve many of the identical challenges claimed for works in the humanities.

Close analysis also reveals that the subsequent evolution of technical discourse toward a more instrumental style has not occurred uniformly across languages, but instead has been quite variable. It is instructive to consider an example, from a published abstract in geology:

> En effet, quel que soit le site initial des séries les plus compétentes, celles-ci ont finalement tendance à occuper une position structurale haute en fin de déformation (Turki *et al.*, 1988: 399).
>
> [Published version in English] Therefore, despite the initial configuration, the most competent strata will reach the highest structural position at the end of deformation.

The more literary character of the French compared with the English version is clear. Results of professional translation today, like the above, indicate that one-to-one correspondence in scientific translation does not exist. A more accurate rendering of the original French (Therefore, whatever the initial setting of the most competent strata, these have a tendency, finally, to occupy a high structural position at the end of deformation.) would not likely be considered proper scientific style in English. In addition, the experience of machine translation has shown that word-for-word renditions utterly fail to yield a publishable result and are often, in whole or part, incomprehensible.

Comparative linguistics, meanwhile, argues that languages inevitably evolve out of specific cultural circumstances and are never pure replicas of one another. This applies to professional discourses, too, which are more than terminology alone. At base, a physics paper in German cannot be perfectly copied into Chinese or Russian for the same fundamental reasons that this cannot be done for novels: differences in grammar, syntax, usage, etc. Interpretation is always involved in translation, and this includes scientific material. The scope of such interpretation has changed over time, for several reasons. One reason relates to the evolving character of scientific discourse itself, which, as noted, was quite diverse for most of its history.

Another central factor is the wide range of standards – or lack thereof – used in translation generally during premodern times. The common idea that translators have always chosen between a 'literal' and a 'free' approach – an idea, it should be said, that comes from the writings of translators themselves – is far too simplistic to describe what actually occurred. Certainly, translators were often free to do as they saw fit, there being no official rules for correctness and seldom any means of accountability. This freedom allowed for relatively literal equivalents, to be sure, but also for a wide range of methods, both written and oral, by individuals, partners, even groups. In ancient and medieval translations, it is typical to find that original material has been deleted, added to, edited, reorganized, and very often, when the source was difficult to understand, unintentionally corrupted. In some cases, for example Ptolemy's *Syntaxis Mathematica*, the text was divided up into chapters and sections, figures were changed or added, and even a new title given (*Almagest*). As a result, individual texts tended to

undergo a degree of cultural-linguistic adaptation, or nativization, to each new setting. This could affect the more technical content peripherally or in a more substantive fashion. Either way, during the great majority of history, translators understood their work as involving the creation of new originals.

Role of Translation in the History of Science

No original scientific, medical, or mathematical text from classical antiquity has survived to the present. The oldest versions date from around the 8th century and afterward; thus, for authors such as Euclid, Archimedes, Galen, and Aristotle, more than 600 years removed. What exists, therefore, are copies of copies, and, in many cases, copies of translations of translations (for Galen's medical works, Latin versions of Arabic translations of Greek and Syriac copies). This is also true for many works of Islamic, Hindu, and Chinese science, particularly before the era of print. The importance for the history of science is considerable. Prior to the advent of modern experimental work and the rise of the technical journal in the 17th and 18th centuries, this history was largely a tale of books and their influence. Major periods of advancement often came as a result of expanding the written foundations of science, mainly through the incorporation of new texts from outside.

Modern science had its most immediate beginnings in Europe, mainly in the later 16th and the 17th centuries. However, the intellectual seeds from which 'natural philosophy' grew were planted much earlier, in the late medieval period, when the greater part of a massive body of scientific knowledge and philosophy was decanted into Latin. This material had a number of cultural and historical sources: Late Classical and Hellenistic Greek thought; Nestorian scholarship of the Near East; Hindu mathematics and astronomy; Islamic science of 9th–12th centuries. The material brought into Europe, mainly from Arabic and, to a lesser extent, Greek, combined ingredients from all these sources and proved enormously rich, nutritive. It was at this time that the basic texts of mathematical astronomy (Ptolemy, al-Tusi), geometry (Euclid), algebra (al-Kwarizmi), optics (al-Hazen), mechanics (Archimedes), medicine (Ibn Sina, Galen), and a dozen other fields, as well as Arabic numerals, the sine function, and the zero (all of Hindu origin) entered Europe. Men such as Adelard of Bath, Gerard of Cremona, and William of Moerbeke gained no small fame at the time for the many translations they produced.

Their effort, however, was possible because it drew directly upon the fruits of a similar episode several centuries older. In fact, it was the great Arabic translators – Hunayn ibn Ishaq above all, but many others, such as Thabit ibn Qurra – who had collected and rendered scientific texts from all parts of the Near East and beyond, and who drew on works in Syriac, Greek, Pahlavi, and Sanskrit for this purpose. The great flowering of intellectual life in early Islam, by which the Near East arguably became the most advanced, enlightened region on Earth, was deeply dependent upon the incorporation of this diverse knowledge through translation.

In more recent times, translation has been the basis for the initiation of a modern scientific culture in non-Western nations. In Japan, for example, nearly all early scientists (late 18th and early 19th century) were translators first: their work involved increasing the number of scientific texts for study, adapting these works to Japanese uses, and attempting to further the knowledge gained thereby. This could mean certain adaptations, reflective of the cultural-historical moment, such as the rendering of the 'survival of the fittest' concept as 'victory of the superior over the inferior' in a late 19th century, militarizing Japan. Ironic consequences could also occur, for instance related to the refusal or inability to translate important works. Jesuit missionaries of the 17th century, notably Matteo Ricci, introduced western astronomy to China, yet, due to dictates of the Counter-Reformation, were forbidden to profess the heliocentric system. Thus, when the Chinese eventually encountered this system later on, in the translated works of Galileo, Kepler, and Newton, they rejected it in favor of a pre-Copernican universe.

In today's world, translators of scientific and medical material are commonly employed by governments, universities, research institutes, corporations, foundations, journals, and other important institutions throughout the world. The influence of such translators on the present development of science is therefore no less profound, historically speaking, than in the past.

Cultural Importance

It follows from the above that the translation of scientific and medical works has been an important element in the modernization of societies. Technical know-how, rendered into native languages, has provided different cultures with potent intellectual ingredients for material advancement. This is a broad statement and suggests many questions about the exact role translation has played with regard to the introduction of modern mathematics, theoretical and applied, medicine and medical technology, military techniques and technology, and scientific research in general.

On the linguistic side, it is clear that science and medical translators have greatly expanded all the major languages of the world. In former centuries, these translators have often been involved in the creation of new vocabularies. On the other hand, it is estimated that scientific terms comprise well over half of all English words – this language now being the dominant world discourse for science and medicine – suggesting that the same is true or will soon be true for other tongues as well. While it is true that most scientific and medical literature is published in English today, researchers still employ their native languages to communicate among themselves and to perform experimental work. As a result, the writing of publishable articles in English involves an effort of translation, one with distinct cultural dimensions. The future of science, practically and culturally, therefore appears deeply bound up with the phenomenon of translation.

In sum, the task of the scientific translator, no less than his or her literary relative, has been to create new texts, to multiply sources into new languages, thereby to produce new originals that can be studied, taught, absorbed, and that therefore become fertile cultural material. Over time, translation has made of science a great library, ever more enriched, accessible, and expanding.

See also: Approaches to Translation, Linguistic; Cultural Evolution of Language; English in the Present Day (since ca. 1900); Hermeneutics; Jargon; Language Change and Cultural Change; Language Change and Language Contact; Languages for Specific Purposes; Languages of Wider Communication; Linguistic Influence; Localization; Machine Translation: Overview; Medical Communication: Linguas Francas; Medical Discourse: Sociohistorical Construction; Philosophy of Science and Linguistics; Translation and Genre: Literary; Translation: Profession; Translational Equivalence; Universal Language Schemes in the 17th Century.

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Translation: History

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The Classical Period

Jewish Translation

Translation was a constant of ancient civilizations – there are bilingual inscriptions from Assyria and Mesopotamia (3000 B.C.) and the Rosetta stone from Egypt (196 B.C.). Most of these translations dealt with administrative and commercial matters. The Jewish translators of the Old Testament were based in Alexandria, then one of the most important Greek-speaking cities in the Mediterranean. By 200 B.C. they were facing a dilemma. On the one hand, most Jews living outside Palestine could not understand Hebrew well enough to read the Scriptures. On the other, translation of the Scriptures was tampering with the Word of God. Both Jewish theology and Neoplatonist philosophy agreed that the Divine Word illuminated the human soul and mind and that names directly reflected natures. One could avoid negating the creative power of the Scriptures only by strict word-for-word translation. The Greek version of the Hebrew Scriptures, the Septuagint, was complete by about 150 B.C. The persistent legend that the 70 translators were left in solitary confinement each with a Hebrew text and in 70 days each produced identical texts shows that literal translation was accorded mystical value.

Roman Translation

In ancient Rome, translation was always done from Greek texts, normally as a rhetorical or creative task. Roman thought on the craft was summed up by the 1st-century rhetorician Quintilian, who repeated the ideas of Cicero and Horace, seeing translation as 'rivalry' of the original author. The one dissenting voice was the philosopher Seneca the Younger, who demanded that if truth was to be kept, translation should be strictly literal.

In about 250 B.C., Livius Andrónicus, a Greek slave captured at Tarentum in southern Italy in 272 B.C. produced a Latin version of the *Odyssey* that was still being used as a textbook in Roman schools a couple of centuries later. In the meantime, soldiers and other administrators were coming back to Rome with a taste for Greek amusements, particularly theater. Enterprising writers supplied the need by free translation and even adaptation from Greek dramatists. The two most famous of these Roman dramatists of the generation after Livius Andronicus, Plautus (d. 184 B.C.) and Terence (190–159 B.C.), were regarded as authorities on translation until the end of the western Roman Empire.

The greatest age of Roman literary translation lasted from the 1st century B.C. to the middle of the 1st century A.D. The Roman Golden Age set the custom, which lasted until well into the 20th century, of treating translation as a literary apprenticeship and constant exercise. Most of the extant poets had some translation in their corpus; for example, Cicero's major contribution was to create scientific terminology through his versions of Greek philosophy. Translation remained common in the centuries following, one notable translator being the philosopher Apuleius (120–155), the author of *The golden ass*.

The importance of literary translation has obscured the immense amount of Roman technical and scientific translation. There was a small corpus of medical translators whose adherence to the originals by Hippocrates, Galen, and some minor Greek medical writers was typical of technical work in all ages. Drawing on the talent at his disposal, the Emperor Augustus set up a translation office as part of the imperial household to assist in administering the Empire. Its most prominent piece of work is the *Monumentum*

Conclusion

Looking back at attitudes in the 1970s and 1980s, translators were insular and considered any criticism (albeit constructive) as an affront to their competence as a translator. The concept of planned continuing personal development had not been considered. Technology has changed almost beyond recognition, as has the way in which most translators work. Although I am heartened by the way in which the profession is developing, translators need to realize their true worth and promote themselves as professionals if they are to receive just rewards for their labors.

See also: Conference Interpreting.

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Translation Units

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The Unit of the Translation Product

The definition and identification of the unit of translation depends on whether the translation product or the translation process is being considered. When the translation product is at issue, translation units are pairs of source and target text segments (*see* **Translation Memories**); these segments can be identified as source and translation by mapping the units of the target text onto the units of the source text (Toury, 1986). Studies that have compared translation and source text pairs produced by novice translators with pairs produced by experienced translators show that the units formed in novice-translator pairs are smaller in extent and generally are of a lower linguistic rank (word, phrase) than are those (clause, sentence) formed in pairs produced by experienced translators.

The Unit of the Translating Process

When the process of translating is at issue, the translation unit is understood to be that stretch of the source text that the translator keeps in mind at any one time, in order to produce translation equivalents in the text he or she is creating (Lörscher, 1991). These units can be identified during 'talk aloud protocol' studies (TAPs) (*see* **Think-Aloud Protocols**), and, like the product-oriented studies, TAPs suggest that whereas learner translators tend to view a word or a phrase as the unit of translation, more experienced translators focus on larger stretches of text as translation units. Note in this connection that some research suggests that the verbalization process of TAP studies has a shortening effect on translation units.

Translation Units and Translation Equivalents

Translation units (however understood) cannot be identified with translation equivalents, for two reasons. First, the former regularly determine the latter; second, whereas translation equivalents, being formal, may be fairly fixed for some expressions, translation units, in the cognitive sense of units of attention, tend to vary according to the translator's personal past history and general mental capacities. Consider the potential text segments 'six' and 'feet' cooccurring in the uninterrupted sequence, *six feet*. The translation equivalent for the two-word sequence will tend to vary depending on the cotext in the sentence; in this case, the choices may be between the body-part sense of 'feet' and the unit of measurement. Thus, before an equivalent can be selected, it is necessary to consider at least the stretch of cotext that explains which sense is meant, and that stretch will then be the translation unit. Potential units in the example here might be 'all of its six feet' in a sentence such as *The monster put socks on all of its six feet*, and 'six feet tall' in *Jack is six feet tall*. If the unit initially identified as instrumental in determining where equivalence is to be established and what it is to be were in fact 'six feet tall,' then, as far as a translator *in medias res* is concerned, it may be necessary to break this unit down into two smaller units, namely, 'feet' and 'six,' so that a measurement

equivalent of feet (say, centimeters) could be multiplied by six to arrive at the correct metrical expression of the height. However, the translator may have come across this height indication often enough before to remember the metrical equivalent, in which case 'six feet' will not need to be broken down into subunits.

See also: Think-Aloud Protocols; Translation Memories.

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Translation Universals

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Introduction

The search for translation universals began in the early 1990s, with roots in translation studies and corpus linguistics. In translation studies, the fundamental influence came from descriptive translation studies, which shifted the focus in translation research from the relationship between source and target texts to translations themselves.

The second major impetus came from outside translation studies: the extension of large electronic corpora to translations provided a chance of seeing large-scale patterning in translated language. Earlier, contrastive linguistics had begun to employ corpus data based on translations, but its priority lay in comparing the source and target languages.

It was Mona Baker's seminal paper in 1993 which brought together the traditions of descriptive translation studies and corpus linguistics (Baker, 1993). She suggested that this combination made it possible to investigate those linguistic features which typically occur in translations rather than nontranslated texts, and which are not dependent on the specific language pairs involved. Baker defined translation universals as

> ... universal features of translation, that is features which typically occur in translated texts rather than original utterances and which are not the result of interference from specific linguistic systems. (Baker, 1993: 243)

Baker saw in electronic corpora a useful testing ground for hypotheses concerning universals that had been put forward by other scholars, mainly on the basis of small-scale studies. The assumptions or hypotheses included features such as a tendency towards explicitation, disambiguation, and simplification, growing grammatical conventionality and a tendency to overrepresent typical features of the target language, as well as the tendency to reduce or remove repetitions. Following the publication of Baker's article, the idea of linguistic translation universals has found a place at the center of discussion in translation studies, and empirical studies have begun to proliferate.

Corpus data is so different from the kind of evidence that scholars in language-related disciplines were traditionally used to that it has surprised linguists, lexicographers, and translation scholars. The number of instances it yields of repeated items and patterns transcends our intuition about language. Different kinds of corpora have been used to study translations, but the terminology concerning corpus types is somewhat unstable. Nevertheless, three types can be distinguished: a 'parallel corpus' consists of texts and their translations; a 'comparable corpus' consists of matched subcorpora compiled on similar principles in one language, with one subcorpus of translations, and the other of comparable texts written originally in the same language; a 'bilingual corpus' is an umbrella term for any corpora involving two languages.

For patterns and distributions in translated language, we are still in the early stages of discovery. Although more recent findings have thrown light on early hypotheses, they also reveal a more complex picture of the phenomena and processes involved. Also, some hypotheses seem to concern the relationship of sources and their translations, while others have been concerned with translated and nontranslated texts, but these have not always been kept apart. Many hypotheses have process-related names, like 'simplification' and 'explicitation' even if they do not

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refer to differences between source texts and their translations.

The idea that translation studies ought to search for general laws and regularities is not new. Gideon Toury proposed this as a fundamental task of descriptive translation studies at the beginning of the 1980s (and again in 1995). Similar suggestions have been made since: for example, Andrew Chesterman envisaged translation studies as a rigorously scientific pursuit, seeking generalizations like any other science.

Theoretical modeling of the nature of translated language has included conceptualizations of translation as constituting a language form of its own, which is not reducible to either the source or the target. Notions of this kind have been put forward in terms of translations as 'hybrid language,' or as a 'third code.' Although some suggestions about laws of translation imply a broader view of universals than linguistic – cognitive processes for example – the main focus of the research has so far been on linguistic features.

The Concept of Translation Universals

Since the idea of universals was introduced, many scholars in translation studies have hastened to dispute the validity of the concept, while agreeing that it is nevertheless very interesting. As one consequence, alternative terms and concepts have abounded; 'laws' and 'tendencies' have appeared more acceptable to many than 'universals.' The disputes reflect different understandings of the term 'universal,' but there seems to be more conceptual than terminological unity in the field.

One of the most influential scholars advocating the search for general laws of translation is Toury, who avoids the term 'universals.' He proposes (1995) some general laws ("the law of growing standardization," "the law of interference"), which have subsequently been taken up by other scholars for further empirical validation. Recently he has characterized such laws as probabilistic propositions or conditioned regularities. In his view, the chief value of such laws lies in their explanatory power.

On similar lines, Chesterman argues that the quest for generalities which characterizes all science should also be one of the prime tasks of translation studies. Seeing universals as one route to high-level generalizations, he distinguishes (2004) two types of universals: one relates to the process from the source to the target text (what he called 'S-universals'), the other, 'T-universals,' compares translations to other target language texts. Chesterman's distinction clarifies discussion, but empirical research does not seem to divide the field up equally clearly. The S-type has been studied less with large databases than the T-type, although it can fruitfully be investigated with parallel corpora.

One of the strongest objections to the search for universal laws has come from translation history: for instance Tymoczko (1998) maintains that the very idea of making claims about universals in translation is inconceivable since we have no way of capturing translations from all times and all languages. This can be countered by observing that we need not have access to all translations that have ever existed to be able to posit general laws – for any field of research, access to data is limited, but pursuing generalities is based on the data we have. Nevertheless, the status of translations relative to spontaneous texts in a given language can have changed radically: translations have often preceded domestic texts, provided models for new genres, and generated linguistic innovations, and the borderlines between translations, adaptations, and texts otherwise heavily influenced by foreign sources tend to remain indeterminate.

Considerations of this kind impose limitations on the claims made about translation universals, but fuzzy categories and boundaries are typical rather than exceptional for many objects of study in the humanities and social sciences. In any case, translation studies rest on the idea that translations exist, and are sufficiently identifiable to warrant research.

In linguistics, universals have been investigated and debated for many decades. It has become generally accepted that a fruitful study of language universals needs to take into account different kinds of general tendencies insofar as they are shared by a large number of languages, not only 'absolute' universals. As Greenberg *et al.* put it in their classic 'Memorandum concerning language universals': "Language universals are by their very nature summary statements about characteristics or tendencies shared by all human speakers." (Greenberg *et al.*, 1966: xv) A similar extended view, which includes tendencies, seems also appropriate to translation studies. Moreover, the distinction in linguistics between universals which can be traced back to general human cognitive capacities and those which relate linguistic structures and the functional uses of languages appear equally relevant to translation universals.

The term 'universals' does not, then, necessarily refer only to absolute laws which are true without exceptions. Rather, most of the suggested universal features are general or law-like tendencies, or high probabilities of occurrence. Because the empirical study of translation universals is relatively new, the hypotheses have tended to be very general, even

vague, of the type 'all translations are X,' or 'all translations have a tendency to Y.' Few more specific hypotheses have been presented yet, but the empirical work so far seems to suggest that the reality of translations is likely to be more complex, and have more determinants than the first generation of hypotheses would suggest.

Hypotheses Concerning Translation Universals

Hypotheses on universals presented by various translation scholars at different times and in different places were first gathered by Baker. These hypotheses were often based on small-scale studies of language pairs. They overlap in part, and some have established themselves better than others. Below, the three most firmly established hypotheses are briefly presented and discussed, followed by three more recent ones. It must be kept in mind that the first hypotheses originated in possibly incomparable circumstances and on the basis of small and specific data; before large-scale empirical data was available, it was difficult to focus predictions precisely.

The most established and extensively studied hypotheses are 'explicitation,' 'simplification,' and 'conventionalization.' Three newer hypotheses have grown out of large-scale observations in corpus research in the early 2000s: 'underrepresentation of unique target language items,' 'source language interference,' and 'untypical collocations.'

Explicitation

The most widely accepted hypothesis, which tends to receive support but relatively little counterevidence is one which predicts that translations are more explicit than source texts, in other words that the translation process tends to add information and linguistic material. Explicitation has mostly been studied as an S-universal, but increasingly also as a T-universal.

Blum-Kulka (1986) noticed that translations contained more redundancy and explicit cohesion than their source texts, and called this tendency 'explicitation.' Since then, a number of studies have found support for explicitation at different levels of language. Baker (1996) observed that translations tend to contain more explanatory lexis (such as *cause, due to, lead to*) and connectors, more syntactic repetition, and more textual extensions such as parentheses, dashes, footnotes, and paraphrases of metaphors. Olohan and Baker (2000) observed a related tendency to use rather than omit an optional relative pronoun in reporting clauses (*he said that it's all right* rather than *he said it's all right*). Johansson (1998) noticed that translations between English and Norwegian (Norwegian, Bokmaal) in either direction were longer in terms of number of words than their originals. Culture-specific phenomena also tend to be replaced by better-known hyperonyms (*shilling – coin*), or explanatory paraphrases. Some findings suggest genre-related differences: the finding that the number of connectors in academic texts increases in translation has not been confirmed for the genre of children's literature. Occasional findings seem to speak against increased explicitness: Puurtinen (1995) found more nonfinite clauses in translated children's literature than in nontranslated literary texts for children. However, this was not confirmed by Eskola (2002), who discovered that clause type and source language influenced the choices of finite vs. nonfinite structures.

Explicitation has thus been observed in different aspects of language – syntax, lexis, and text, as well as culture-specific concepts, but there seem to be more constraints in operation than merely the fact that a text has been translated – the level of language investigated, the genre of the text, as well as temporal or cultural distance between source and target are likely to affect the level and kind of explicitness in translations.

Simplification

In contrast to explicitation, the hypothesis of simplification has given rise to much controversy and conflicting results. One problem is the definition of simplification, which has turned out to be difficult to agree on. Inherent problems are involved in that simplification at one level may lead to increased complexity at another. So, for example, simplifying sentence structures by converting sentences to simple main clauses with few subordinate clauses may lead to greater complexity at text level, reducing its coherent flow, and making it seem fragmented and hard to follow. Similar conflicting processes have been found in second language users, who appear to compensate for their simplification of target language morphology by employing periphrastic syntactic means instead. Moreover, simplification has been postulated for both S- and T-type hypotheses, which may have caused some of the confusion, since scholars have meant different things by it, perhaps not always being aware of this.

As a process term, 'simplification' is more appropriate in referring to shifts from the source to the target text than to differences between translated and nontranslated texts, but it has also been applied to the latter setting. Some suggested simplifications, such as the tendency to shorten sentences, seem to depend on individual translators' preferences, and not to qualify as universal.

The characteristics interpreted as manifestations of simplification have included above all lexical simplification, which Laviosa-Braithwaite (1996) found in her influential research on lexis in translated language. Laviosa-Braithwaite's study was the first large-scale investigation with the explicit objective of testing hypotheses about translation universals. Her corpus was of the comparable type, comprising original English newspaper texts and corresponding translations from several source languages. Her findings indicated that translations had a lower type-token ratio, a lower lexical density, and a proportional overrepresentation of the most frequent lexis. Yet lexical simplification has not always been confirmed: for example Jantunen (2001) found no support for it. Methodological differences may play a role, since Laviosa-Braithwaite compared overall word frequencies, whereas Jantunen looked into a selection of individual items in greater detail. Detailed analyses tend to show that the behavior of different items is not identical, and therefore other factors need to be considered in addition to an overall tendency. The increased complexity of the hypotheses needed for the next stage of universals research is also apparent from investigations of syntax and connectors: particular structures or items manifest patterning which may be interpreted as increased simplicity; others do not.

Conventionalization

Another common observation concerning translations is their general tendency towards conventionality, sometimes called 'normalization.' This tendency relates to a general conservatism said to characterize translations – a tendency to avoid the margins, to remain within established mainstream usage. Conventionalization has been viewed both as an S- and a T-type hypothesis, which, as pointed out above, may lead scholars to talk at cross-purposes. Conventionalization was conceptualized earlier by Gideon Toury, who talked about "the law of growing standardization." (Toury, 1995) By this Toury meant what he termed the tendency of translations to replace textemes with repertoremes (1995: 268), that is, the tendency of translations to modify the textual relations in the source text in favor of more habitual options in the target language linguistic repertoire. The conventionalization hypothesis bears some affinity to the simplification hypothesis: both quote the great lexical frequencies of frequent items as evidence in support of their claims.

Empirical work has reported that translations favor unmarked grammar, clichés, and typical, common lexis instead of the unusual or the unique; replace standard language for dialect; and normalize punctuation and exaggerate target language features. A further source of evidence has been found in the greater proportions of n-grams, or recurrent multiword clusters, in translational data as compared to spontaneous texts. Kenny's (1996) corpus-based study on conventionalization focused on 'hapax legomena' (i.e., words which only occur once in a given database), finding evidence to support the hypothesis, but on account of the considerable variation among individual translators (and even in one translator's strategies in different contexts), she concluded that the tendency to avoid hapaxes in translations more than in originals is not likely to be a universal.

Opposite tendencies have also been reported: Toury referred generally to "the well-documented fact that in translations, linguistic forms and structures often occur which are rarely, or perhaps even never encountered in utterances originally composed in the target language" (1995: 208). Mauranen reported untypical collocations in translations, and Jantunen found translations to have greater variety among the collocates of frequent intensifiers. Altogether, the tendency of translations to favor conventional, middle-of-the-road language has not been demonstrated, and anecdotal evidence of linguistic oddity in translations is common.

Underrepresentation of Unique Target Language Elements

Tirkkonen-Condit (2004) puts forward a hypothesis that linguistic features which tend to be unique to the target language, or in any case do not occur in the source language, are proportionally underrepresented in translations. Such unique features are also sometimes referred to as 'untranslatables.' This directly contradicts the earlier hypothesis that features specific to the target language get overrepresented in translations.

Tirkkonen-Condit's research on Finnish (Standard Finnish) clitics and verbs of sufficiency strongly supports her hypothesis, showing that these elements occurs more rarely in translations. Her suggested explanation is that these items are missing from a translator's bilingual 'mental dictionary,' because they have no counterpart in the source language, which would make up the other half of the entry, as it were. Therefore, they have a slighter chance to be chosen for the target text than they would have if the text was written directly in the target language. Tirkkonen-Condit thus presents this as a T-universal. Nevertheless, her explanation reaches out towards the cognitive domain, bringing in a process angle on the observations that originated in studying the linguistic product.

Supporting evidence for the hypothesis has also come from the realm of syntax, where Eskola (2002) noticed that certain target-language nonfinite constructions were underrepresented in translations when the source language did not possess a directly corresponding structure. Further lexicogrammatical support has also come from the rare use of the Finnish 'zero person' in translations, although it is highly characteristic of Finnish spontaneous usage. This evidence comes from both comparable and parallel corpora (Mauranen and Tiittula, 2005).

Support for this hypothesis has hitherto been strong, but although the studies have involved more than one source language, they have mostly had Finnish as the target language. An earlier study by Gellerstam (1996) on Swedish was nevertheless in accordance with it: a few Swedish discourse particles were underrepresented in translations from English, where they had no direct counterpart. In all, the hypothesis seems promising, but requires further research in a wider variety of target languages.

Source Language Interference

At first sight, it would seem that there is nothing new in the hypothesis that the source language causes interference in translations. This appears to be the first commonsense explanation that comes to mind when people uninitiated in translation studies seek an explanation for translational oddities. However, interference has been problematic in the study of universals, since Baker's (1993) initial definition seems to exclude interference completely. The idea that interference is a general law of translation was nevertheless included in Toury's (1995) "law of interference," and later other scholars postulated this as a possible universal, for example, Laviosa-Braithwaite (1996), Eskola (2002), and Mauranen (2004).

Eskola's (2002) research on nonfinite constructions compares translations from Russian and English and discovers that Finnish translations tends to overrepresent those structures which have a straightforward counterpart in the source language. The interference hypothesis has also been supported in lexical studies. Both Jantunen (2004b) and Mauranen (2004) use subcorpora with 10 source languages as well as subcorpora with a single source language. Single-source translations differ from those representing a variety of source languages. While differences in translations from individual source languages seem to support the interference hypothesis, translations on the whole are closer to each other than to target language originals. This seems to indicate that although interference exerts a strong influence, it does not entirely explain the specificity of translations.

Corpus-based studies supporting the universal of interference have used a research design for T-universals. Yet their conclusions invoke the source language, which suggests that while the distinction between S- and T-universals adds to conceptual clarity, it gets blurred in actual translations.

Untypical Collocations

This hypothesis, suggested by Mauranen (2000), relates to earlier findings indicating that distributions of language items in translations are different from their distributions in spontaneous text in the same language. These observations are of the T-type, all based on large comparable corpora.

Laviosa-Braithwaite (1996) investigated individual word forms and found that the most frequent words were proportionally overrepresented in translations. The untypical frequencies Gellerstam (1996) found comparing translated and original Swedish concerned different kinds of linguistic items; for example, nominal headwords were more frequent in translations into Swedish than in original Swedish texts, whereas Swedish attitudinal particles were less frequent; certain reporting verbs were differently distributed. Mauranen (2000) studied item combinations, both 'collocations' (the tendency of words to co-occur more frequently than could be expected by chance) and 'colligations' (the habitual combination of a lexical item with a grammatical category). According to her results, translations favor combinations which are possible in the target language system, but rare or absent from actual texts. Conversely, translations often have few or no instances of combinations that are frequent in target language texts. These findings do not necessarily contradict those indicating that frequent items are even more frequent in translations; individual items in the combinations may be frequent, even if their co-occurrence is unusual.

This hypothesis is in accordance with Kenny's (1999) results on collocational differences in hapaxes, and has found some, although not unequivocal support in Jantunen's (2001) investigation of near-synonymous intensifiers and their combinatory tendencies: he found both under- and overrepresentation of collocations, colligations, and cluster sequences of several words in translations. Variation was item-specific.

Colligations straddle lexis and grammar. Jantunen's study was concerned with highly frequent intensifiers, which can be regarded as partly grammaticalized and be placed on a continuum between grammar and lexis. Another combinatorial observation is that fixed word sequences are more common in translations. Altogether, combinations deserve more

attention since they may resolve some contradictory findings.

Approaches to the Study of Translation Universals

The chief value of research on universals lies in deepening our understanding of translation, and contributing to translation theory. No single research method can be regarded as the sole or best means of approaching universal properties of translations. In the discussion hitherto, three broad strands can be discerned: linguistic, cognitive, and social. The first two relate to the well-established categories of translation product and translation process. The third draws on sociocultural research, which has often been hostile to general laws, but may conceivably contribute to interesting generalizations.

The Linguistic Approach

Most research into translation universals has been linguistically oriented. The systematic research on translation universals originated in corpus studies, although developments in translation theory constituted important prerequisites.

Corpus methods are well suited for the discovery of large-scale linguistic tendencies, and they can therefore reasonably be expected to continue to play a major role in universals research. Corpora have benefited research on parallel texts by providing a much larger number of examples that can be retrieved simultaneously for scrutiny than was possible earlier. Large numbers help us get away from individual translators' idiosyncrasies, and enable an overview of what is typical as well as the extent of variation and the detection of the unique.

A more radical departure from tradition has been the development of comparable translation corpora. By excluding access to source texts, they force scholars to focus their attention on the target text and the target language. These databases have also enabled comparisons between translations from different sources and one target language. Similarities between translations from different sources, which set them apart from target language originals, provide good candidates for several universals; conversely, features typical only of a single source language are likely to be caused by interference. It is important to include a variety of source languages in comparable corpora, so as to distinguish that which is shared by all translations, and equally important to compare findings in different target languages to exclude that which is language-pair specific.

The Cognitive Approach

The cognitive approach (see, e.g., Jääskeläinen, 1999; Alves (ed.), 2003) has remained largely at the level of theoretical discussion, but it has also featured in empirical research as a model for explaining the characteristics of translated texts. The translator's cognitive processes are seen as the mediating element which accounts for the shifts that are linguistically manifest. This seems a major direction where explanation is sought for large-scale observations in corpus-based studies. While some scholars make explicit reference to cognitive concepts like the translator's bilingual mental dictionary, others have remained at more commonsense levels of process description, talking about translators' tendencies to translate word for word, or to translate that which is stimulated by the source text. Statements of the latter kind point to a need for modeling linguistic findings about translation also in process terms.

The Social Approach

The social approach has mainly taken a critical stance in relation to translation universals (see, Tymoczko, 1998; Paloposki, 2002). Sociohistorical views tend to emphasize the particular over the general, and this research has problematized simple notions of translation. Historical examples show that source texts may have undergone such major transformations that any attempt at direct linguistic comparison is ruled out, and cases where it may be difficult to identify a source language, let alone a source text, are known even in the contemporary world, for example in the E.U. Translations have played a major role in bringing new genres and text types into cultures, which implies that domestic counterparts to translations cannot always be found even in well-established national writing cultures. Basically, the comparative study of translations with either their sources or matching texts written in the target language assumes a distinguishable source and its translated counterpart, which in certain respects is a simplification.

Social constraints may weaken the comparability of texts even if source texts and their translations are identifiable without problems: translations are not distributed evenly across the genres of the target culture, nor is their social status homogeneous. An important factor is what Toury (1995) called "preliminary norms," that is, the translation policies which determine things like the selection of texts for translation. For a given language pair, more tends to get translated in one direction than the other. In addition, translations in one direction are likely to be differently biased for social determinants like prestige, or date of original. The ensuing dilemma is that

the comparability of texts conflicts with the objective of reflecting prevailing preliminary norms, although an ambitious corpus would wish to incorporate both criteria.

These facts limit any unproblematic comparability and remind us of likely sources of systematic bias in large databases. However, while the constraints must be kept in mind, they do not invalidate the search for generality, since ideally homogeneous databases can hardly be compiled with real language and real translations. A search for generality cannot assume homogeneity of the research object; rather, it consists in search for the shared within the variation.

Conclusion

The quest for universals is by its nature international and collaborative. It is vital to combine findings from a wide variety of languages and language pairs, both typologically distant and close.

It is also necessary to involve all levels of language. Both lexis and grammar have been investigated, with their overlapping areas to an extent, but textual phenomena have been comparatively neglected. Moreover, both process and product need to be covered, which implies taking on board a variety of research methods. Even though corpora provide a unique opportunity to observe large-scale phenomena, establishing universals of cognitive processes requires psycholinguistic means. The implications of sociocultural research are also important in informing linguistic and cognitive studies of the wider contexts that shape translations.

So far most empirical investigation into translation universals has focused on linguistic characteristics, while theoretical discussion has concerned the plausibility, kinds, and possible determinants of universal tendencies. The field is still young, and it is to be expected that the evidence which is accumulating from empirical studies will open many new questions.

See also: Corpus Linguistics.

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Translational Equivalence

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Introduction

The concept of equivalence can be identified as one of the most contentious, and thus potentially most significant, concepts in the study of translation. Debates have centered on how the concept is to be interpreted, the domain of its application, and the extent to which it is even useful in the study of translation.

In understanding the controversy, it is helpful to keep in mind the basic components of the concept of equivalence. 'Equivalence' is defined as the state of being 'equivalent,' which, in turn, is defined in the *Collins English dictionary* (1986: 516) as being, among other things:

1. equal or interchangeable in value, quantity, significance, etc., or
2. having the same or similar effect or meaning.

As suggested by these two main entries, the concept includes three key elements: two entities between which a relationship holds, a relationship (of equality, interchangeability, sameness, similarity), and a quality or feature according to which the relationship between the two elements is defined (e.g., value, quantity, significance, effect, meaning, etc.). As we shall see, various elements of this notion will be more or less in focus in the evolving debates. However, there has been no disagreement on the basic content of the notion.

The following presentation includes a brief historical overview of the development of the equivalence concept in translation studies. Next, two complementary views of this historical development are presented. In the final section, the *status quo* will be briefly sketched.

A Brief Historical Overview

Chesterman (1998: 16–27) provides an insightful chronology of the debate on equivalence in translation studies. In his account, Chesterman describes three distinct stages in the historical development. These three stages coincide in large part with the key stages discussed in Pym (1995) and Halverson (1997). In the following, Chesterman's outline will serve as the starting point, and the contributions of the latter two will be addressed in the section on the development in context.

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Translation: History

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The Classical Period

Jewish Translation

Translation was a constant of ancient civilizations – there are bilingual inscriptions from Assyria and Mesopotamia (3000 B.C.) and the Rosetta stone from Egypt (196 B.C.). Most of these translations dealt with administrative and commercial matters. The Jewish translators of the Old Testament were based in Alexandria, then one of the most important Greek-speaking cities in the Mediterranean. By 200 B.C. they were facing a dilemma. On the one hand, most Jews living outside Palestine could not understand Hebrew well enough to read the Scriptures. On the other, translation of the Scriptures was tampering with the Word of God. Both Jewish theology and Neoplatonist philosophy agreed that the Divine Word illuminated the human soul and mind and that names directly reflected natures. One could avoid negating the creative power of the Scriptures only by strict word-for-word translation. The Greek version of the Hebrew Scriptures, the Septuagint, was complete by about 150 B.C. The persistent legend that the 70 translators were left in solitary confinement each with a Hebrew text and in 70 days each produced identical texts shows that literal translation was accorded mystical value.

Roman Translation

In ancient Rome, translation was always done from Greek texts, normally as a rhetorical or creative task. Roman thought on the craft was summed up by the 1st-century rhetorician Quintilian, who repeated the ideas of Cicero and Horace, seeing translation as 'rivalry' of the original author. The one dissenting voice was the philosopher Seneca the Younger, who demanded that if truth was to be kept, translation should be strictly literal.

In about 250 B.C., Livius Andrónicus, a Greek slave captured at Tarentum in southern Italy in 272 B.C. produced a Latin version of the *Odyssey* that was still being used as a textbook in Roman schools a couple of centuries later. In the meantime, soldiers and other administrators were coming back to Rome with a taste for Greek amusements, particularly theater. Enterprising writers supplied the need by free translation and even adaptation from Greek dramatists. The two most famous of these Roman dramatists of the generation after Livius Andronicus, Plautus (d. 184 B.C.) and Terence (190–159 B.C.), were regarded as authorities on translation until the end of the western Roman Empire.

The greatest age of Roman literary translation lasted from the 1st century B.C. to the middle of the 1st century A.D. The Roman Golden Age set the custom, which lasted until well into the 20th century, of treating translation as a literary apprenticeship and constant exercise. Most of the extant poets had some translation in their corpus; for example, Cicero's major contribution was to create scientific terminology through his versions of Greek philosophy. Translation remained common in the centuries following, one notable translator being the philosopher Apuleius (120–155), the author of *The golden ass*.

The importance of literary translation has obscured the immense amount of Roman technical and scientific translation. There was a small corpus of medical translators whose adherence to the originals by Hippocrates, Galen, and some minor Greek medical writers was typical of technical work in all ages. Drawing on the talent at his disposal, the Emperor Augustus set up a translation office as part of the imperial household to assist in administering the Empire. Its most prominent piece of work is the *Monumentum*

ancyranum, Emperor Augustus's own statement of his achievements, translated as a blatant piece of propaganda. This translation office remained active until after the fall of Rome in the 5th century.

Christian Translation

Christian translation, from Greek into Latin (except for Ulfila's 4th-century Gothic version of the Bible) began in the 2nd century A.D. with the *Shepherd of Hermas* and parts of the Bible. The Jewish Platonist ideas on the relationship between language and the divine flourished in their assiduously literal style. Translation of Greek Christian liturgies for Latin speakers began soon after. The Christian tradition culminated in the work of St Jerome (348–420), famous for his Latin version of the Bible, the Vulgate (383–406) and for a huge number of miscellaneous translations covering Church administration, monastic rules, and theology. However, he was only one of a very skilled band of translators that included his former friend Rufinus (345–410), the philosopher Marius Mercator (ca. 400–450), and a large number of anonymous churchmen.

Roman translation came to an end with Boethius (480–524). He had meant to stave off the tide of barbarism attendant on the collapse of the Roman Empire by producing Latin versions of the complete corpus of Plato and Aristotle but was executed for treason in 524 with only a small part of the work done. His versions revert, to the stricted type of translation thought proper by Biblical translators. His preface to Porphyry's *Isagoge*, which castigates elegance as inimical to 'truth,' may owe as much to Seneca as to the Judeo–Christian tradition.

The Middle Ages

Translation from Greek to Latin

Although Jerome was revered and quoted right through the Middle Ages and the Renaissance as the main model for translation, the medieval tone was set by Boethius. His methods were followed by Cassiodorus (ca. 490–583). Between 550 and 560, Cassiodorus assembled a stable of translators in a monastery in Calabria, called the Vivarium, dedicated to preserving classical culture. He, like Boethius, had the ambition to translate the whole of Greek philosophy and theology into Latin. Though he did not succeed in this aim, he put translation on a sound administrative footing that kept cultural lines open with the Greek East. From the 6th until the 16th centuries there was a flourishing traffic of religious translations between East and West.

Among the most significant translation centers were the schools of the Muslim world at Baghdad, Seville, Toledo, and Cordova, where Greek philosophy and science were translated into Arabic. From the 10th to the early 12th centuries, these centers, in particular Toledo, played host to a number of Christian philosophers who translated Arab texts into Latin and brought back to the West Greek texts that had been lost. Another important center for this work was the Kingdom of the Two Sicilies, where scientific, diplomatic, and religious translators worked between Latin, Arab, and Greek. But even there can be found flashes of the ancient rhetorical theories of translation. Henricus Aristippus, Archdeacon of Catania (fl. 1100–1170), supported illuminist arguments for literal translation by quoting Horace's *Ars poetica* 361–362, which compared poetry to a picture that is different according to the angle from which you view it. Between the 9th and 16th centuries, there were Latin communities in Constantinople and Greek ones in the West that kept up a steady flow of translation between Latin and Greek in an effort to heal the breach between Eastern and Western Christianity.

The 13th-century controversy at the University of Paris over translating Greek philosophers from Arabic versions caused a fierce discussion of translation. Roger Bacon, arguing from lexical and terminological evidence, condemned it out of hand in his *Opus tertium*, while other philosophers, notably Thomas Aquinas, speculated on the nature of translation, seeing it almost as a barter transaction in which fair value must be paid. After attempts to condemn Aristotle as corrupt and corrupting, his works were retranslated from the Greek texts to rid them of Arab accretions. The greatest of these translators were William of Moerbeke (1215–1286), a Dominican friar, and Robert Grosseteste (1168–1253), Bishop of Lincoln.

Toward the Vernaculars

St Cyril and St Methodius (early 9th century) Christianized the Slavs and translated the Greek liturgy and Bible into Slavonic. In England the first Bible translation was the verse rendering of Caedmon (7th century). A century and a half later, Alfred the Great (848–899) ordered Pope Gregory the Great's *Pastoral care* and other important ecclesiastical documents to be translated into Anglo-Saxon to counteract a certain laxness in the English church. In Germany, the English missionary St Boniface (673–754) produced one of the early versions of the Scriptures. During the 8th century, there was much legal translation between the vernaculars and Latin as new codes were evolved from Roman Law.

After the Christian conquest of Spain, the kings, particularly Alfonso el Sabio, commissioned technical

translations from Arab and Latin into the vernacular. By the 14th century, there existed a full corpus of medical works in Spanish and Catalan. In France, Charles V founded a similar cultural center in his court. His translators included men of letters, administrators, and scientists. The most important was Nicole Oresme (1320–1382), reputed to be the first to translate Aristotle into a vernacular language. London, too, was an important center of royal patronage, and gained dramatically in importance after William Caxton (1422–1491), a skilled translator, set up his printing press.

Literary translation into vernacular languages, either from Latin or from other vernaculars, began around the 10th century. The first translations of classical rhetoric date from this period – vernacular writers saw such translation in the same light as Livius Andronicus had seen it 1200 years before: it was a way of bringing the language to maturity. For the general public, there were versions of Ovid and Virgil, very often taken from medieval Latin reworkings. Epic poetry, like the *Chanson de Roland*, was also translated widely, so most of this great medieval epic exists in a large number of dialects and languages. Much of the really important translation was in the hands of the troubadours, who translated very freely between the vernacular languages, often extempore and as part of a performance.

The laity benefited from translation of popular devotional books, much of it anonymous. Boethius's *Consolation of philosophy* was very popular, and was normally taken from a French version, for example, Chaucer's translation. Many countries produced versions of the epistles and gospels used at Mass, and it seems that these were often read while the celebrant read the Latin.

Whereas a technical translation remains very close to its original, literary translation is extremely free. The first attempts to apply linguistics to translation seem to be the orthodox attacks on the 14th-century Lollard Bibles: the claim was that translation from Latin to the vernaculars was impossible because of lack of formal identity between language resources. The Lollard reply turned on functional arguments – if one could do the same or similar things in English (i.e., construct sentences, show the line of argument) one did not need formal identity.

Renaissance and Humanism

Philosophy and Science

As the Turks were increasing the pressure on the Byzantine Empire in the 14th century, Greek scholars began moving west. Once established, they made their living by setting up schools. Major schools were set up at Florence and Venice, both powerful trading republics with ruling families interested in scholarship, by Manuel Chrysoloras (1355–1415) and Constantine Lascaris (fl. 1450–1490), who soon distinguished themselves as translators from Greek into Latin and put translation at the center of the educated person's skills. Among their pupils were Marsilio Ficino (1433–1499), who translated Plato into Latin, and Aeneas Silvius Piccolomini (1405–1464), later Pope Pius II. In these schools, translation reverted to the manner and principles of the classical rhetoricians and thus dethroned the translation model of Boethius. An early pupil of the Florentine schools, Leonardo Bruni Aretino (1369–1444), translated Aristotle into Latin (ca. 1420) and wrote a rather pugnacious preface on the necessity of translating works in a style consonant with their elegance.

Because the basic training of a scientist was classical and philological, noted translators like Thomas Linacre (1465–1524), Professor of Medicine at Oxford, and Janus Cornarius (1500–1588), first Dean of Medicine at Jena, scoured European libraries for Greek medical and scientific manuscripts, edited them, and translated them into Latin. By 1600 practically every important Greek work on science and philosophy had its humanist Latin version for use in the medical schools, and in many cases a vernacular version as well. Alongside these were translations from texts on alchemy, both works ascribed to the 13th-century scholastics like Roger Bacon and Albert the Great and books by later alchemists, like Basil Valentine and Nicholas of Cusa. Contemporary alchemists like P. A. Paracelsus (1493–1541), who wrote in their own languages (in the case of Paracelsus, German), were translated into Latin and from there into the local vernaculars. Gerhard Dorn (fl. 1570–1590) was the most prominent Latin translator of alchemy.

Religion

Sixteenth-century humanism was essentially religious, and translators were essential to Reformation and Counter-Reformation. They treated religious material no differently from other writings, assessing the worth of manuscripts, interpreting readings against parallel texts, etc. Translators first sought to produce Latin Bibles of humanist standard, and there were a large number of them. The most influential was the Greek–Latin New Testament (1523) of Desiderius Erasmus (ca. 1466–1536), the *textus receptus*, which studiously tried to be doctrinally neutral. But other Latin translators, like Théodore de Bèze (1519–1605) and Sebastian Castalio (1515–1563), produced

Bibles in fairly classical Latin, but with strong doctrinal leanings.

Of the vernacular Bibles, Luther's (1534) was preeminent. Other German versions were produced by reformers in Switzerland. Luther influenced the Dutch version of 1537, the Swedish of 1541, and the Danish of 1550. Other important Protestant Bibles were the 1641 Italian version by the Calvinist Giovanni Diodati (1576–1649), which he himself turned into French in 1644, and the French Bibles of Jacques Lefevre d'Etaples (1455–1537) and Pierre Olivétan (d. 1538), and de Bèze's 'Geneva Bible,' which came out in 1528, 1535, and 1556, respectively. In Spain the first complete version of Scripture was published in 1569 by Cassiodoro de Reina (1520–1594), a follower of Jean Calvin's, and in Italy the first complete Bible was by Antonio Brucioli (ca. 1495–1566) in 1532. In England there was a long progression from the Tyndale Bible of 1526–1530 to the Authorized Version of 1611, which is an excellent example of teamwork. The work was divided among six 'companies,' which included theologians as well as experts in classical languages.

Catholic countries tended to lag in Biblical translation. Spain continued the medieval custom of translating the epistles and gospels used at Mass. France often readapted Protestant or doubtful Bibles; for example, the Catholic Bible de Louvain (1550) was Lefevre d'Etaples's edition brought up to date. Likewise in Germany: Hieronymus Emser's version (1523) tried to 'correct' those parts of Luther's Bible already circulating. In 1548 Nicolaus van Winghe produced a Dutch Catholic Bible that remained standard until 1926. In England the Douay–Rheims version, translated from the Vulgate, appeared in 1588 as an emergency measure to counter Protestant accusations, partially justified, that the Catholics were afraid of the Bible. Most of the Protestant Bibles were taken from the original Hebrew and Greek, the only major exception being Miles Coverdale's (1535), taken from the Vulgate. Until Ronald Knox's Bible in 1949, Catholic Bibles were almost exclusively taken from the Vulgate.

Developing vernacular liturgies was essential to the Reformation. Partial translations of the Catholic liturgy already existed in the 'Primers.' In England the Book of Common Prayer (1549) rose out of English versions from the 'Primers' and translations from the Sarum Missal and Breviary. The translation committee was headed by Thomas Cranmer (1489–1566), Archbishop of Canterbury. For the next 200 years, the Book of Common Prayer was translated into other European languages to serve Anglicans living overseas and missionary congregations. Other Reformers who created similar works of liturgical adaptation mixed with translation were Martin Luther and Jean Calvin (1509–1556). As the Reformation spread, there were translations of Luther's liturgy into Scandinavian languages, which were adopted for the normal worship. Translators also entered with gusto into religious controversy. Luther's and Calvin's polemical works were translated into most European languages, and rebuttals, both Catholic and Protestant, were translated and circulated just as vigorously. Luther's works were translated into English by Richard Taverner (1505–1575), who was responsible for Taverner's Bible (1539); and Thomas Norton (1532–1584), a noted scourge of both Catholics and Lutherans, translated Calvin's *Les Institutions de la Religion Chrestienne*, which Calvin himself had translated into French from his own Latin version. There was also some translation of Jewish prayer books and synagogue liturgies into vernacular languages, but as yet no Biblical work.

Literary and Educational Translation

The rise of the vernaculars as standard languages slowly shifted the focus of translation toward literature. However, what could be termed a 'modern language' changed subtly. The standard languages of political and cultural centers – English, French, Spanish, and Italian – moved in to replace those like Catalan and Provençal, which were losing ground. In the recognized languages, literary translation brought to fruition what the Romans from the preclassical dramatists to Jerome had to teach. The Italians were in the forefront, one of the most important names being Petrarch (1304–1374). The humanist printing presses, like those of Aldus Manutius (1455–1515), himself a fine translator, and Frobenius in Antwerp, commissioned vernacular translations and sold them widely.

In the rest of Europe, literary translation arrived late in the 16th century, though there were some earlier pioneers like Gavin Douglas (1474–1522), Bishop of Dunkeld, whose Scots version of Virgil's *Aeneid* is particularly interesting. The major inspiration was classical, within an Italian cultural dominance, although Jean Baudoin (1564–1650), Lecteur to Marguerite of Navarre, translated a number of English books, including Sir Philip Sydney's *Arcadia*, into French. Poetry predominated, but by 1600 works of most of the common Latin and Greek prose writers had been translated into modern languages. In France, among the important translators were the group of poets centered around Pierre Ronsard (1524–1585), known as the *Pléiade*, whose interest lay in the latest from Italy as well as Greek and Latin literature; and Jacques Amyot (1513–1593), whose French version of Plutarch's *Lives* was translated into

English by Sir Thomas North (a. 1535–a. 1601). In England, Henry Howard, the Earl of Surrey (1517–1547), was known for his translations of Petrarch and the classics, and, the most famous of all, George Chapman (1559–1634), for his Homer. In Spain the Franciscan poet Fray Luis de Leon (1520–1591) was also renowned for his translations from classical literature.

Though the center of their intellectual world was in the classics, the humanists saw popular education as a priority. Educational works by Erasmus (particularly the *Colloquia*) and Luis Vivès were widely translated. One of the most characteristic manifestations of this interest was concern for the education of the 'Prince,' that idealized Renaissance figure who embodied all possible human virtues. The tone was set by works such as *Doctrinall of princes* (1533), translated by Sir Thomas Elyot (1490–1546) from the Greek of Isocrates, and the versions of Castiglione's *Il cortegiano* by Thomas Hoby (1424–1585; English), Juan Boscan (d. 1542; Spanish), and Bartholomew Clerke (1537–1590; Latin). Machiavelli's work was translated but feared, and the English version of *Il principe* by Sir Thomas Bedingfield (d. 1613) was unfavorably noticed by Queen Elizabeth I and remained in manuscript until after 1960.

The Age of Reason

Literary Translation

During the 17th and 18th centuries, literary translation was dominated by French models, the notorious *belles infidèles*, which judged a translation according to contemporary norms of taste. In France the salon, in Britain the coffeehouse, and everywhere in Europe the learned society were essential to the development of translation at this time. The influence of the Royal Society and the Académie Française were seconded by periodicals like the *Gentleman's Magazine* and *L'année littéraire*. In France the dominant figure was Nicholas Perrot d'Ablancourt (1600–1643), whose ruling principle was to "remove everything that could wound our sensibilities." The same principle was followed by Anne Dacier (1651–1720) in her Homer, which is a classic of the style. The dominant figure in Britain was John Dryden, who took his famous typology of 'metaphrase,' 'paraphrase,' and 'imitation' from French practice. He opted for paraphrase as ideal, but in practice his poetic translation leaned more toward 'imitation.' German translators, like Bodmer (1698–1783), Breitinger (1701–1776), and Gottsched (1700–1776), followed the same line.

Though classical works were still the staple of the literary translator, there was also work from modern languages, much of it for recreational reading. This work included Latin version of contemporary poets, the version of *Paradise lost* by William Hogg adding to John Milton's international reputation. From the end of the 17th century, translators begin to demand authenticity and close translation. T. R. Steiner traced this change to the influence of Pierre-Daniel Huet (1630–1721), who championed literal translation. Among English translators affected by him were Sir Edward Sherburne (1616–1702). The new manner became standard later in the 18th century, as in the translations ascribed to Tobias Smollett (1721–1771) in England and taught in France by Charles Batteux (1713–1780), a noted translator from Latin and Greek; in Spain, in Antonio Capmany Suris y Montpalau (1742–1813), who translated from French; and in Russia, in Vasily Trediskovsky (1703–1779), who worked from classical languages. The 18th century was discussed at length in Tytler's 1791 *Essay on translation*. But the old manner persisted – L'Abbé Prévost, one of the few who kept away from classical translation and specialized in translation from English, published a version of Richardson's *Clarissa Harlowe* that followed *les belles infidèles* to the point of wounding the author. And Jacques Delille (1783–1813) was still translating like this during the French Revolution.

Religious Translation

The Dutch Protestants produced their standard Statenbijbel in 1637. Luther's German Bible was kept constantly up to date, and the Douay–Rheims Bible was updated by Bishop Richard Challoner (1691–1781) in 1763. Martini, the Bishop of Florence, translated the Bible into Italian between 1769 and 1781, and the official Spanish version of 1793 was also from the Vulgate. If attempts like the Bible of Lemaistre de Saci (1613–1684), taken from the Vulgate, are set aside, in France translation was merely an incidental part of Biblical scholarship. This gathered pace during the 18th century with the work of Richard Simon (1638–1712), the author of a huge Biblical encyclopedia, and Charles Houbigant (1686–1783), whose Latin version of the Hebrew Old Testament has an important preface on translation. This work came into its own in Britain at the end of the 18th century among those who were trying to replace the Authorized Version. The greatest translator of the period was George Campbell (1719–1796), principal of Marischal College in Aberdeen; his Four Gospels (1789) was meant to be an ecumenical version. At the beginning of the 19th century, it was frequently published with the epistles by James MacKnight (1721–1800) and the books of Acts and Revelation by Philip Doddridge (1739–1786). Campbell's

work is notable for its voluminous notes and introduction, which was a summing up of 18th-century thought on translation in general.

Strangely enough, French Catholicism provided Protestant Europe with much devotional literature, Fénélon, the Archbishop of Cambrai, being a popular author. As Catholicism became more sure of itself, there was a great deal of translation into vernaculars of traditional devotional literature, like *The imitation of Christ*, ascribed to Thomas à Kempis (ca. 1379–1471) – even in England after the break with Rome. There was a fair amount of polemical translation as well, the most virulent occasioned by the 1643 quarrel between Port-Royal (*see* **Port-Royal Tradition of Grammar**) and the Jesuits, and centering around Pascal's *Lettres provinciales*, though the fallout from the Reformation kept translators going for the whole century. Translators tried to temper the acrimony by translating works on religious tolerance, like the religious writings of the great Dutch jurist Hugo Grotius.

Technical Translation

At the beginning of the 17th century, three scientific paradigms were fighting for supremacy, and for the warring scientists translation was a professional responsibility. First there was the scientific paradigm, of which Thomas Linacre, the founder of the Royal College of Physicians, was typical; the second was the alchemist paradigm; and the third was the new philosophy of science taught by Francis Bacon and René Descartes. There was still a little translation from classical writers, but the humanist versions remained standard.

Not only were the latest medical sources translated, but also the works of medievals with a reputation, like Albertus Magnus, Roger Bacon, and Ramon Lull. Alchemists and surgeons often wrote in their own languages. The most famous of these authors, Paracelsus and Glauber, were still translated into Latin for international consumption. In Britain in particular, both vernacular and Latin translation had its political side, as is quite clear from noted Puritan apothecaries like Nicholas Culpeper (1616–1654) and from Royalist translators like Elias Ashmole (1617–1692). The fight continued all over Europe until about 1680.

Between 1660 and 1700, there was a staggering amount of translation of the writings of Bacon, Descartes, and, at the end of the century, Isaac Newton. This was a time when scientists were beginning to write in their native languages, with consequent difficulties for readers in other countries. Robert Boyle and Isaac Newton commissioned their own Latin translations, and sat on the translators' shoulders. Descartes was well served by his French translator, le Duc de Luynes, and badly by the Dutch mathematician Frans van Schooten (1615–1660). In the rare cases where scientists were incapable of writing Latin (e.g., A. van Leeuwenhoek), they found anonymous Latin translators. Scientific translation was largely in the hands of the medical profession, encouraged by publication subsidies. The demand was so high that entrepreneurs made use of unemployed university graduates as translators, usually without acknowledging their help. The peak of this activity was in the period 1700–1745 and coincided with the general acceptance of the scientific ideas of Descartes and Newton. Indeed, it is doubtful that Linnaeus, the famous biologist, Albrecht von Haller, the founder of physiology, or T. O. Bergman, the noted Swedish chemist, would have had the effect they did if they had not written in Latin and been translated into the vernaculars.

By the early 18th century, vernacular work on medicine was usually translated directly into modern languages. By the late 18th century, the center of scientific translation in Britain was moving north to the scientific communities of the Midlands and Scotland, who were in contact with France, Germany, and Sweden. In France the center was still Paris, where Louis-Bernard Guyton de Morveau (1737–1816) was particularly active in both translation and research. Creative physicians like William Lewis (1714–1781) of Edinburgh, de Rusieux of Paris, and J. H. Ziegler of Germany were translators and were translated.

The 17th century had produced a lot of 'gentlemanly' translation, on gardening, building, and architecture, much of it from French and Italian sources; for example, the translations by John Evelyn (1620–1706), on gardening and art, and translations of important Italian architects like Giacomo da Vignola and Andrea Palladio. The 18th century, too, was also marked by the translation of applied science, much of it from French, Swedish, and German. A good part of it dealt with agriculture – the concentration of population in the new towns demanded intensive agriculture if the people were to be fed. There was also much on the manufacture and use of weapons, the French being in the forefront. Navigation and traditional crafts like dyeing also benefited from translators. However, the most radical changes came in pharmacy, which followed the 'new chemistry' so closely that its practice was reformed.

Education was an important issue, and authors translated into most European languages, including Latin, ranged from Jan Amos Comenius to John Locke. Much translation of history, education, and the like was commissioned for political purposes. In Britain, Cromwell's Parliament commissioned legal

and historical translation in an effort to legitimize the regime. On his return to power (1660), Charles II used translators like Dryden to translate political, if not polemical, works in support of the Royalist cause. In the following century, Adam Smith's *The wealth of nations* was translated into Spanish for the financial guidance of the government (1794), and in France there were at least four translations of Smith's work between 1793 and 1815, each coinciding with a change of regime, T. R. Malthus's work on population was also translated. As usual, a good deal of this translation was anonymous, and done to meet specific scientific needs.

The 19th Century

Romanticism and Literature

It was not until the rise of Romanticism that 'translation' became popularly identified with literary translation. The precursor of the movement, Johann Gottfried von Herder (1744–1803), left to it a thoroughgoing Platonism that saw man and his society as creatures of the language spoken. For Herder, translators were the 'morning star' of a literature, because they introduced a literature to the great things in other literatures. His own contribution to German was a collection of translations from European poetry, the *Volkslieder* (1778–1779), which imitated the original meters as the appropriate dress for the verse. Classical meters were acclimatized in German by Friedrich Klopstock (1724–1803); English experimentations, even by the poet Tennyson, were never successful.

Herder's view of translation as a hermeneutics of text was refined by Friedrich Daniel Ernst Schleiermacher (1768–1834). Romantic translators took on two interlinked tasks: the first was penetration to 'pure speech,' supposed by Friedrich Hölderlin (1770–1843) to underlie all languages; the second was to present author and text unadorned to the reading public in the second language. Hence, the famous classification by Johann Wolfgang von Goethe (1748–1832): literal, 'parody,' and interlinearversion. The first was word for word, and to be used if no other was possible; in 'parody' translation, the translator imposed himself and his society on the original; and the interlinearversion was the penetration to the very essence of the original.

All of these theorists were practical translators as well, Hölderlin and Schleiermacher translating from Greek poetry, and Goethe and Wilhelm von Humboldt from both modern and ancient languages. In France, Goethe's ideas were taken up by Madame de Stael, whose *Esprit des traductions* (1816) is one of the seminal statements of Romantic ideology. Such ideas were also illustrated by the version of *Paradise lost* (1836) by René de Chateaubriand, who boasted that he had kept both the virtues and faults of the original. On a more pedestrian level, Amadée Pichot (1795–1877) publicized English literature with assiduous but extremely literal translations of contemporary writers. In Britain, after a much-reviled translation of *The sorrows of young Werther* from a French version, Goethe's most prominent publicist was Thomas Carlyle (1795–1881); in America, Bayard Taylor (1825–1878); and in Italy, Michele Leone di Parma (1776–1858). But Goethe's ideas had special impact in Russia and other parts of Eastern Europe, where translation still had the creative status it had enjoyed in the Western Renaissance. Romantic poets, English, German, and French, were translated by Zhukovsky (1783–1852). Dickens was a favorite subject: both his French translator, Pichot, and his Russian, Vvedensky (1813–1855), wrote to him. Shakespeare was another favorite, the German Tieck-Schlegel version being almost a national monument, unmatched by any other version. Romanticism also occasioned the midcentury vogue of Eastern literature. Eastern languages were taken up in France by Emile-Louis Burnouf (1821–1907), and in Germany by the Romantics, in particular von Humboldt. The most famous English translation of Eastern poetry is probably *The Rubaiyat of Omar Khayyam*, (1859) from the Persian by Edward Fitzgerald (1809–1883).

The crux of the Romantic legacy was the nature of authenticity. It was given public airing in the famous quarrel between Matthew Arnold (1822–1888) and F. W. Newman (1805–1897) over translating Homer. Newman believed that the archaic and antique in Homer should be presented to the reader of English by conscious archaism, while Arnold insisted on presenting Homer as poetry that conformed to the contemporary experience of poetry. Probably the greatest of Newman's partisans were John Conington (1825–1869), Professor of Latin at Oxford, and Sir Richard Jebb (1841–1905) of Cambridge. Robert Browning's *Agamemnon* (1877) is an excellent example of the Newman style, and his preface recalls that of Chateaubriand to Milton's *Paradise lost*. Arnold's approach culminated in the translations of Dante and his circle by Dante Gabriel Rossetti (1828–1882). His cardinal principle was that 'a good poem should not be turned into a bad.' In other countries, particularly France, translation showed much influence of contemporary literary movements. Charles Baudelaire (1821–1867) changed Poe from a very good second-rate American writer into a first-class French one, and Leconte de Lisle (1818–1894), a true Parnassian, went back to the classics. In Germany the development of literary translation followed much the

same lines as in England, with conflict between the antiquarian and the authentic in the Romantic sensibility.

Romantic ideas on translation also had their political side. The subject peoples of the Austro–Hungarian Empire, particularly in what became Czechoslovakia, were strongly influenced by the nationalism inherent in Romanticism and plotted revolution. Elsewhere, for example, in Canada, where English and French were in close contact, Romantic ideas on the teaching role of the translator affected the problems of preserving the identity of the minority and interpreting the two cultural groups to each other, and the French minority had to decide whether to absorb material from the dominant culture or to stand aloof. The Canadian situation is interesting for the critical role played by newspapers in fostering translation between the two languages, especially by serializing translated novels.

There was also some translation of libretti; this practice continued into the 20th century. Gilbert and Sullivan operas were presented in German in Germany, and French and Viennese operettas (e.g., the Strauss family and Offenbach) in London in English. There was also some translation of French, Italian, and German operas into other European languages, though nowhere near the 20th-century scale of such translation. German *lieder* and the French art songs were also translated, often very badly, for the drawing room soprano and tenor.

Religious Translation

The issue of updating the Bible did not go away. In 1836 a Catholic historian, Dr. John Lingard (1771–1851), published a Bible with the New Testament translated from the Greek. Among Protestant efforts was the modernized King James Bible (1833) produced by the American lexicographer Noah Webster. During the 1850s pressure began to mount in England for a revision of the Authorized Version, if not a completely new translation, for Biblical scholarship had advanced considerably. In 1870 the Convocation of the Anglican Province of Canterbury set up a committee to revise the Authorized Version. Other Protestant churches joined in. In 1881 the English New Testament was published, and in 1885 the whole Bible (the Revised Version). The American Bible Union (ABU) had been established in 1864 and sent observers to keep an eye on what the English Anglicans were doing. The American Standard Version was published in 1901.

Spain was still nervous of Bible translation; however, the British and Foreign Bible Society was happily supplying Protestant versions of the Bible in European languages – for example, a revision of Valera's 1625 Spanish version was reprinted many times between 1806 and 1817, and a Catalan New Testament was produced by J. M. Prat (1832). At the end of the 19th century, l'Abbé Augustin Crampon (1826–1894) produced what was to become the standard French Catholic Bible of the early 20th century. For French Protestants, the most important Bible was the version of Louis Ségond (1810–1885), whose Old Testament came out in 1874; the New Testament followed in 1880.

The Jews were once again facing the ancient problem: a religiously vital social group that could read but not understand the sacred books. In America, Rabbi Isaac Leeser (1806–1868) published his English version of the Old Testament in the Masoretic text in 1853. The Jewish Publication Society, founded in 1892, produced an official Jewish version in English in 1901. Other Jewish communities followed suit.

The Oxford Movement in the Anglican Church sought to prove its essential Catholicism by returning as far as possible to early Christian practices. There was much interest in the Fathers of the Church, in both doctrine and hymnody. The movement's search for ancient Christian hymns began with the Roman Breviary, then passed to the Paris Breviary, and finally to pre-Reformation rites like the Sarum (from Salisbury) and the York. The leading translator was John Mason Neale (1818–1866), whose hymn versions took into account the traditional melodies of medieval Service books. Most of his work appeared in *Hymns ancient and modern* (1861), edited by Reverend Sir H. W. Baker (1821–1877). Another important contributor to this famous hymnbook was Catherine Winkworth (1827–1878), an early feminist, whose speciality was translation from German, and particularly the Lutheran hymns.

Technical Translation

Technical translation in the 19th century did not benefit at all from the Romantic revolution; indeed, its practice had continued in the same manner since the early 17th century. The work of Michael Faraday, J. J. Berzelius, the Swedish chemist, and other scientific pioneers was widely translated. The quantity of translations increased as the century went on, though now the scientist was no longer his own translator. In the humanities, by contrast, the task of translation was still regarded as the professional responsibility of contemporary philosophers and social scientists.

Less is known of the translation that went on in the bureaucracies of the Ottoman, Austro–Hungarian, or Russian empires than of the work carried out in the empires outside Europe. European colonial expansion gathered pace during the 19th

century. Training local people as interpreters was the first step; colonists then learned the native languages. Soon colonial administrators benefited from a loosely organized translation profession. In most places a system of professional certification slowly developed. For example, in the previous century Sir William Jones (1746–1794), though most famous for demonstrating that Sanskrit was an Indo–European language, was an assiduous translator from Eastern languages, specializing in law. His ideas had considerable influence on later British colonial policy.

Tensions between French and English, and English and Spanish, antedated British expansion in North America. The resulting warfare occasioned a fair amount of translation. Bilingual officers worked as volunteer translators between English and French or Spanish. Apart from this, there is very little on record of anything beyond *ad hoc* translation before the British takeover of Canada in 1759, the Louisiana Purchase of 1803, and American expansion into the Spanish territories that now make up parts of Florida, Texas, and California. The press played a very important role. It was to it that the various Canadian governments (and also the government of Louisiana) later turned when they needed translators.

Missionary Translation

During the 18th century, European expansion into the New World revived ancient problems entailed in translating between sophisticated and unsophisticated languages. Little is known of how early Christian missionaries, like St Boniface (d. 755), had faced the problems of creating literacy before being able to translate the Bible into languages previously unwritten. Until the 16th century it was trade, not colonization, that usually went with the missionary. A new pattern developed in the Americas, where in the British, French, Spanish, and Portuguese dominions, missionary and colonist often arrived together, and at times cooperated. The practice of the New England and the Jesuit missionaries with Amerindian languages was typical: translation of the Bible and the introduction of Christian worship – for example, by Thomas Mayhew (d. 1657) and John Eliot (d. 1690) – were preceded by and prepared for the production of grammars and lexicons; literacy as well as conversion was an objective.

Missionary translation was first given direction by the formation of the Congregatio pro Propaganda Fide in Rome in 1662. There are reports of translations of the Bible into Eastern languages mainly from Catholics like St Francis Xavier (1506–1552), and the Congregation has continued active translation. On the Protestant side, the Society for the Propagation of Christian Knowledge (1698), the Society for the Propagation of the Gospel in Foreign Parts (1701), and the Moravian Brotherhood (founded 1722) took a vital part in Bible translation into non-Indo–European languages. Perhaps the most important development was the foundation of the interdenominational British and Foreign Bible Society in 1804, which had as its sole aim the production and distribution of vernacular scriptures all over the world, including England and Wales. Early in the 19th century, the Church Missionary Society of the Anglican Church entered into an agreement about cooperation. Parallel Bible societies were founded in Scotland and the United States. In many parts of the world, Catholic and Protestant Bibles were in competition. There are extensive records of Protestant liturgical translation into the languages of the mission fields: the Tamil translation of the Lutheran liturgy published in Ceylon in 1781 is far from unusual. Indeed, Anglican translation of the *Book of Common Prayer* into the languages of the Indian subcontinent helped lay the foundations for the development of eastern forms of Christianity. During the 19th century, most of the vernacular Scriptures published by these bodies were translated in the field, often with the help of native speakers.

In the United States in particular, linguists began to take a large hand in Bible translation in the mid-20th century. After World War II, American Bible Societies merged into the United Bible Societies (UBS), with its own periodical, *The Bible translator.* On the evangelical side, the work of UBS was grouped around the Summer Institute of Linguistics, also known as the 'Wycliffe Bible Translators.' One of its leaders was Eugene Nida, whose work on the theory of translation focused specifically on the Bible. The linguistics of the mid-20th century, with its strong anthropological bias, suited this work.

The Qu'rān was also translated early into European languages. There is a 'curiosity-oriented' translation into Latin, dating from the 12th century, ascribed to Robertus Ketenensis and Hermannus Dalmata. This was republished in 1543 by Theodore Bibliander (1504–1564). There are also a few 16th-century Latin versions of the Qu'rān for the information of Christian missionaries. It was a popular book among European translators during the 19th century, versions having been made in all the important European languages. Because Muslims have the same attitude to the Word of God as Jews, translation of the Qu'rān for religious purposes is suspect. Nevertheless, a number of modern translations into European languages have been tolerated by the authorities for use by European Muslims. The Western interest in Eastern

religions has also occasioned much translation and commentary on the Hindu scriptures.

The 20th Century

Religious Translation

Christian The dominant motivation was the increasingly urgent need to replace the great European language translations of the past by up-to-date versions. This coincided with two contradictory movements – the centripetal force of ecumenism, which increased pressures toward a Bible common to all Christian churches, and the centrifugal forces created by new types of Christian and Jewish fundamentalism. In English there are a huge number of Bibles, the best known early 20th-century ones being The New Testament: A New Translation by James Moffat in 1913, with the Old Testament following in 1924, and The New Testament: An American Translation by Edgar J. Goodspeed (1923). In 1913 a version of the Old Testament by Powis Smith and others was published with Goodspeed's, the whole being known as The Bible: an American translation.

Among 'official versions' in English, the most notable Protestant versions are the American Revized Standard Version (1952) from the International Council for Religious Education, and the British New English Bible (1961), which was initiated by the Church of Scotland but which eventually became a joint effort by most of the mainstream Protestant denominations. Later on, a printing of the New English Bible was authorized by the Catholic Church. The Catholic church first published the Westminster Bible (1913); Monsignor Ronald Knox's version was published in its entirety in 1949 but was superseded by the Jerusalem Bible in 1966. The Knox is the last important version from the Vulgate, and it was done with a close eye on the Greek and the Hebrew texts.

Other important modern Bibles are the Spanish versions by Nalcar-Colunga (1944) and Bover-Cantera (1957). The Catalan version, from the Benedictine Monastery at Montserrat, began publication in 1926, but the work was suspended between 1936 and 1950 by the anti-Catalan policies of the Franco government.

The Roman Catholic and various Orthodox churches produced bilingual service books. Liturgical reforms instituted by Pope Pius X (1903–1914) encouraged the production of a very large number of missals of various states of completeness for the laity. There were also a few translations of the Divine Office for the laity and certain religious communities. One of the most interesting of these is *Byzantine daily worship* (1969), translated from the Greek *Horologion* (Breviary), and the ancient liturgy of St John Chrysostom for the Greek Uniate community worldwide. The Anglican Church continued translating the Book of Common Prayer into the languages of the British Empire and Commonwealth. After Vatican II (1962–1965), national commissions were set up throughout the Catholic world to organize the translation of the entire Roman Catholic liturgy into the vernaculars. For international languages like English, French, and German, there were international commissions that came to agreement on language standards and other matters. In the name of ecumenism, the various churches cooperated in versions of common texts like the Creeds and the Gloria in excelsis Deo.

Jewish The most notable Jewish Bible translators, mainly because of their very telling and coherent arguments for literal translation, were the philosopher–theologian Martin Buber (1878–1965) and Franz Rosenzweig (1886–1929), whose German Bible, with a preface, was published 1926–1938. Their principles were taken up by Henri Meschonnic (1932) in France, and applied to secular translation as well. Jewish bilingual versions of the synagogue liturgies and private prayers go back a considerable time, at least to the 16th century. However, as Reform Jews began to worship in the local vernaculars, unilingual service books were produced from the middle of the 20th century onward. Among the Jewish Bibles in English, The Holy Scriptures by the Jewish Publication Society was published in 1917.

Probably the best of the modern versions is the French Bible de Jérusalem (1948–1954) from the Ecole biblique de Jérusalem. The English Jerusalem Bible (1966) came from the same team, and they also produced a Spanish translation (1987).

Technical Translation

The 20th century saw the rise of the translating profession, centered on technical work. The trigger seems to have been the founding of the League of Nations in 1918. By that time, many governments had translation offices for administrative purposes. After World War II, these expanded quickly, following the postwar political and trade patterns. Private firms began to follow the lead of governments and created their own translation sections to translate everything from technical reports and instruction manuals to publicity. It was only a matter of time before freelance translators began organizing themselves as commercial operations and into societies like FIT (la Fédération Internationale des Traducteurs). Specialized training

is a 20th-century phenomenon, and it gained pace in the 1960s with courses being established in universities and specialized schools. There continued to be a lot of in-house translator training, one of the finest translation schools in the world being run by the electronics firm Philips, in the Netherlands.

There has been a growing body of theory of technical translation, with some attempt to relate it to the mainstream literary and religious work. One obvious result has been the creation of specialities like terminologist and documentalist. The great expansion of translation in the first half of the 20th century occasioned experimentation in machine translation (MT), which stemmed from a memo from an American founder of the field, Warren Weaver, in 1947 on applying code-breaking techniques to languages. Results have proved limited. Its most useful spinoff has been the development of automated dictionaries.

Literary Translation

At the beginning of the 20th century, literary translation remained what it had traditionally been, a searching apprenticeship for the creative writer. Nineteenth-century manners of translation spilled over into the first half of the 20th with the vaguely Swinburnesque manner of the translations from Greek by Gilbert Murray (1866–1957), and the versions of modern and classical literature from Valéry Larbaud (1881–1957), Paul Valéry (1871–1945), André Gide (1928–1945), and the English version of Proust by Scott Moncrieff. In Germany figures like Ulrich von Wilamovitz-Moellendorf (1848–1931) carried the Romantic tradition to its limits. Reaction against the tradition started at the beginning of the century, with Rudolf Borchardt (1877–1945), and continued in Symbolists like Walter Benjamin (1892–1940). In Slavic Europe, translation has remained an activity central to the work of creative writers without excluding specialist translators of literature.

The decisive break in the tradition came with Symbolist writers and writers under Symbolist influence like Ezra Pound (1888–1972), Yves Bonnefoy (b. 1923), the Russian Balmont (1867–1943), and the German Walter Benjamin, who developed the Romantic idea of the language shape having its own meaning. Attitudes and practice range from Benjamin's attempts to get rid of meaning altogether to Pound and Henri Meschonnic, who successfully walked the tightrope between sound and sense, with some striking results. Bonnefoy, in particular, came very close to some of the 20th-century theorizing on the linguistic element in translation in his Shakespeare translations.

Under the pressure of changes in education, translation from classical languages diversified; beside translations for the reader's recreation grew up translations to help students – for example, in English-speaking countries the Loeb editions from Harvard University Press, and in French the Editions Budé. Translation began to acquire its own impressarios. One of the most important was Betty Radice (1912–1985), a classical scholar and excellent translator in her own right, who was editor of the Penguin Classics series.

It is in the translation of modern languages that there has been the most change. Theater has taken the interest of many translators, even if at times they chafe against what producers do to their texts. Translation of libretti has continued, some of it anonymous, and opera has attracted people of the caliber of W. H. Auden (1907–1973). As had happened during the Middle Ages, hitherto unimportant languages and literatures have gained worldwide recognition through translation. Eastern European work has become influential, and smaller European countries important, as they appreciate that translation provides access to a greater audience for their literatures. Indeed, at times translation into the languages of non-Communist Europe was the only way in which dissident writers like Milan Kundera in Czechoslovakia and Alexander Solzhenitsyn in the former Soviet Union could be published at all. As well, former European colonies developed their own distinctive literary voices; they attracted the notice of translators and produced translators themselves – for example, Octavio Paz from Mexico. The number of translators from the former European colonies in Africa and Asia has been growing. Many bilingual countries have attempted to foster literary translation for the sake of national cohesion. Canada, for instance, subsidizes translation of Canadian French writers into English and vice versa. At times, translation has been used as it was in 19th-century Europe, as a nationalist rallying point, in Quebec, Scotland, and Wales.

Interest has grown in hitherto unconsidered literatures. Many classical translators – for instance, Peter Green – have taken up translation of modern Greek literature. There has also been increased interest in Eastern literatures by translators like I. A. Richards and Achilles Fang. The 20th-century literary prizes have had an important influence on the extent of translation: Nobel Prize winners like Patrick White, the Australian, and Alexander Solzhenitsyn, himself a fine translator, have been translated worldwide.

New areas of translation have developed, including popular fiction for the mass market (e.g., the works of detective writers Georges Simenon and Agatha Christie) and film dubbing, which reconciles the

sense of what is said with the observable features of lip and face movement.

Theories of translation have followed changes in linguistic and literary theory. Symbolist theories of literature have been most prominent in the translation theories of people like Ezra Pound and Yves Bonnefoy. In Eastern Europe, translation theory has been of vital interest – for example, the Prague School, whose linguistic theories did not prevent them from producing extremely perceptive work on poetics and translation. Linguistic theories of translation have been a feature of the 20th century, though usually in complete isolation from the more traditional literary stream. In the English-speaking world, American structuralism gave rise to the theories and practice of the Summer Institute of Linguistics, typified by the work of Eugene Nida; and English translation theory has risen out of the work of J. R. Firth and M. A. K. Halliday. In the French-speaking world, a contrastive linguistics applied to translation was developed from the Geneva School, chiefly from the theories of Charles Bally. Its first manifestation was the stylistique *comparée* of Malblanc, and Vinay and Darbelnet; it was further developed by reference to the theories of Gustave Guillaume and Culioli's theories on enunciation. Like the linguistics of Prague, contrastive linguistics takes account of discourse phenomena. The end of the 1980s saw some attempt to combine both linguistic and literary theories of translation by absorbing the idea of linguistic transfer into a concept of translation as a communicative act whose source and target texts are embedded in differing cultural matrices.

See also: Ascham, Roger (1515–1568); Bible Translation into Lesser-Known Languages; Caxton, William (c. 1415-1491); Functional Discourse Grammar; Interpretation: Theory; Machine Translation: History; Machine Translation: Interlingual Methods; Machine Translation: Overview; Machine-Aided Translation: Methods; Mounin, Georges (1910–1993); Nida, Eugene Albert (b. 1914); Port-Royal Tradition of Grammar; Prague School; Summer Institute of Linguistics; Translational Equivalence; Tyndale, William (1494–1536).

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Translation: Pedagogy

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Introduction: From Pedagogical Translation to Translation Pedagogy

Two rather different educational settings are likely to come to mind if we think of translation pedagogy. In foreign language classes in many parts of the world, pedagogical translation into the mother tongue has traditionally been used to practice and demonstrate comprehension of foreign language structures and lexical items, whereas inverse translation activities, in which students produce texts in a foreign language on the basis of a native-language original, are geared toward having learners practice and demonstrate their ability to actively use those structures in linguistic production. Translation as a pedagogical tool has moved in and out of fashion as a teaching and testing technique in foreign language classrooms for many decades, and the debate for and against this practice still rages today.

There is an essential difference between this type of pedagogical translation, however, and the variety in which professional translators are engaged. In the former, there is no real linguistic gap to be bridged, no target reader who needs the translated text in order to comprehend a message in a language she or he does not understand; there is no client and there is no real communicative situation. This kind of translational activity might perhaps best be seen as a type of transcoding, where the translator essentially manipulates contrasting structures in two languages.

The consensus view in translation studies today is that professional translation, on the other hand, is a complex cognitive, social, and often technical process of interlingual and intercultural communication. In this article, the approaches, strategies and techniques for helping future nonliterary translators to acquire the necessary professional language mediation skills to accomplish such communicative tasks for professional purposes comprise translation pedagogy.

The Setting for Learning: Translator Education Programs

Although on-the-job learning and lifelong learning are key features of a translator's education today, translators of pragmatic (e.g., nonliterary) texts around the world often receive their initial training in university-level programs (both undergraduate and graduate). Pym and Caminade (1995) estimated that there were close to 300 such programs, and the number is still rising. In Europe, most of the first university programs for the training of translators were established in German-speaking countries. The University of Heidelberg set up the very first one in 1930. This was followed by programs in Geneva (1941), Vienna (1943), Graz (1946), and Innsbrück (1946) – all of them notably subsumed within philology departments (Snell-Hornby, 1998: 31). The interpreting school in Germersheim (later to become the interpreting and translation faculty of the University of Mainz) was founded by the French occupational forces in 1947, and the Saarbrücken program was started in 1948. Similar institutions were founded throughout Western Europe within a short period, including schools in Antwerp, Brussels, Mons, Copenhagen, Aarhus, and Triest. Then in 1957, the Ecole Supérieure d'Interprètes et de Traducteurs (ESIT) and the Institut Supérieur d'Interprétation et de Traduction (ISIT) were established in Paris.

Following a series of meetings between representatives of the translator training schools in Geneva, Heidelberg, Paris, Germersheim, Saarbrücken, and Triest, the *Conférence Internationale Permanente d'Instituts Universitaires de Traducteurs et d'Interprètes* (CIUTI) was founded. In 1995, this international association of translator education institutions had 21 members. CIUTI both acknowledges the status of its members and contributes to their standing and prestige in the translation world. And yet, as Snell-Hornby points out, it is particularly the older institutions (which were formed as appendages to philology departments) that still suffer from their second-class status, essentially as language schools where translation competence was long equated essentially with foreign language competence (Snell-Hornby, 1998: 32).

This brings us back to translation pedagogy: when translation is understood essentially as a type of foreign language competence, it is hard to justify the need for a special pedagogy of translation. Hence, there have to date been few concerted attempts to develop systematic approaches to translation pedagogy. This is reflected in the fact that, despite the existence of nearly 300 translator education institutions around the world, there are still no degree programs for the training of translator educators. Attempts by CIUTI to develop translation pedagogy in conjunction with other international institutions have yet to bear fruit. Without suitable institutional settings for the systematic development of pedagogical approaches, strategies, and techniques, paradigms for translation pedagogy have been slow to emerge.

There are signs, however, that an awareness of the extreme importance of language mediation in today's global village is helping to bring about change for the better in this regard. The popularity of the summer courses in translation teaching at the Monterey Institute of International Studies, the Universities of Tarragona and Rennes (Gabr, 2001), and most recently the University of Vic reflects the interest on the part of practicing and prospective translation teachers in learning about and contributing to the advancement of translation pedagogy.

Partly as a result of the long-standing dependency of the major translator education programs on philology departments, the focus of attention in the early translator training programs was initially placed on translation competence – the ability to produce a text in one language on the basis of a text written in another language, with literary and cultural studies playing a separate and superordinate role in the educational process. Over the past decade or more, a shift has been gathering momentum in the direction of developing translator competence – that is, the superset of skills that translators can be expected to need in professional life today, including: linguistic but also interpersonal, (inter)cultural, technical, subject-matter, entrepreneurial, and research subcompetences.

The Emergence of Translation Pedagogy – Toward the Development of Translator Competence

Until translation studies began to take an interest in translation as a communicative process, there was essentially no difference between the pedagogical translation activities known to foreign language learners the world over and translation pedagogy as applied in the classroom for the training of professional translators. Aptly described back in 1977 by Ladmiral as a *"performance magistrale"* (instructional performance), the standard procedure was to have students translate a text at home, bring their faulty versions to class, and have them dissected by the teacher sentence by sentence, with different students offering sentences taken from their respective translations for review.

From this very limited pedagogical basis, translation pedagogy as a subfield of translation studies has begun to evolve over the past decade into a varied and complex subfield of translation studies. There are three major reasons for this trend: (1) advances in translation theory, (2) the application of findings from educational research to the teaching of professional translation skills, and (3) the advent of the personal computer and related technologies as essential tools for professional translators.

Advances in Translation Theory

For some of the most influential translation theorists in the 20th century (such as Georges Mounin; Wolfram Wilss, at least in his earlier works; and John Catford), translation was essentially a type of linguistic process based on principles of contrastive linguistics for two languages. As translation theory evolved, however, the consensus view expanded to include cultural, interpretive, interpersonal, cognitive, and even technical factors as well. With the advent of the functionalist approach in translation theory, with major proponents such as Katharina Reiss, Hans Vermeer, Christiane Nord, Hans Hönig, and Paul Kussmaul, the function or purpose of translated texts as communicative tools moved into the center of attention, where it remains today.

Although this article lacks space to even outline the great variety of factors that have been investigated to date, it is fair to say that translation studies as a field has moved radically in the direction of embracing an integrative approach to translation that sees itself as a multidiscipline with virtually no aspect of the communicative process being outside its scope of reference. Perhaps one of the most overriding shifts in translation theory has been from the static to the dynamic: from seeing the translation process as one of establishing equivalence between original and translated texts to seeing it instead as one of cognitive, social, and communicative action. Results of think-aloud studies on the mental processes involved in translation, focusing primarily on the interplay between intuitions and strategies, suggest that mental process research can be a fruitful source of knowledge about how experts and novices translate differently. Such research may well make valuable contributions to translation pedagogy in the future, for example in specifying a role for strategy and creativity training.

In any event, against the backdrop of the modern understanding of translation, translation pedagogy can no longer be reduced to a simplistic *performance magistrale,* where a teacher can be expected to transmit the knowledge necessary to achieve linguistic equivalence. As in all other domains of human activity, the skills and knowledge needed to act need to be developed through the authentic practice of that professional domain. Partly as a result of the equivalence-to-action shift in translation theory, there is an ever-increasing awareness that translation students must be actively engaged in the development of individually adapted skills for dealing with the

myriad unforeseeable combinations of factors that they will face in their professional work.

The Application of Findings from Educational Research to the Teaching of Translation

Dramatic changes are beginning to take place in the domain of translation pedagogy as the result of educational research in general and foreign language education research in particular. Although the philological orientation of the early translator education programs may well have inhibited the transfer of educational research findings to translation pedagogy, the increased awareness of the multidisciplinary nature of translation and also the increased involvement in translator education of scholars with experience in other pedagogical domains are breathing fresh life into stifling chalk-and-talk translation classrooms (Colina, 2003; González Davies, 2003, 2004; Kiraly, 1995, 2000; Malmkjær, 1998).

Two increasingly popular pedagogical approaches reflect the increasing application of educational research findings to translation pedagogy. The first is objectives-based instruction, with its special emphasis on the specification of the aims of instruction, the sequencing of tasks and authentic classroom activities (Delisle, 1984; González Davies, 2003, 2004; Hurtado Albir, 1999; Nunan, 1993). Instead of the mere distribution of knowledge, the objectives-based classroom favors the negotiation of knowledge between students and between students and teachers. Instead of random text selection at the whim of the teacher, this approach emphasizes the consistent use of carefully structured syllabi with stated aims and objectives that take into account specific stages of learning.

The other innovative approach is based on constructivism, a family of educational philosophies that has already been applied to a wide variety of educational domains and that is based on the concept that learners essentially construct their own understandings of the world, rather than ingesting ready-made understandings from others, such as teachers. An interpretation and potential applications of a social constructivist approach to translation pedagogy, based on the Vygotskian view that the mental construction process is essentially a social one, are outlined in Kiraly (2000). In a social-constructivist classroom, students construct knowledge and skills through group interaction. Although the earliest stages in the educational process may closely resemble transmissionist teaching, the teacher gradually proceeds to 'scaffold' the instructional process, transferring considerable responsibility for learning to the learners themselves. Starting with consciousness-raising activities, instruction proceeds to simulated small-project work and then authentic projects carried out by the students collaboratively but quite independently of the teacher, who may serve as a resource person and project coordinator. This process is intended to promote students' initiation into the professional world (Kiraly, 1995, 2000; Little, 1991).

Perhaps the most striking change in classrooms from the application of both the objective-based and the social-constructivist approach is the shift toward student-centered learning. Although the chalk-and-talk transmissionist approach may still be the rule in many translator education centers, what might be called cooperative or collaborative approaches involving extensive group work and a systematic transfer of control from the teacher to the learners in the educational process are becoming increasingly popular. Many teachers are seeing their role gradually evolve from that of lecturer to include that of facilitator, advisor, and resource person, from being a 'sage on the stage' to a 'guide on the side.' As for classroom activities and procedures, both of these approaches combine real-life and pedagogical activities, task- and project-based teaching, and portfolios for assessment purposes (González Davies, 2003, 2004; Hurtado Albir, 1999).

Technology and Translation Pedagogy

Some of the most significant changes in the translator's profession over the past 30 years have been the advent of computer-based tools, the impact of globalization, and high-speed, worldwide communications. Whereas translators in the early 1980s were still typing their translations into typewriters and mailing them or delivering them to clients, most translators now work with up-to-date personal computers and transmit their texts almost instantly around the globe. No longer restricted to print dictionaries and texts for reference materials, translators today work extensively with search engines, parallel texts, and glossaries that can be updated at will. They not only process basic texts, but must also work with spreadsheets, desktop-publishing programs, and terminology management programs. Media translation has become increasingly computerized, and software localization comprises an entire subdomain of professional translation. Complex translation memory systems are increasingly becoming the order of the day for translators in many parts of the world (Austermühl, 2001).

A related shift in translator education has been away from an emphasis on general translation skills toward those specifically needed for the translation of specialized or technical texts. With economic globalization and the advent of software and Internet localization, translator trainees are

increasingly in need of research skills, technical knowledge and competence in the use of translation technologies including translation memories and terminology management programs. The curricula of translator education programs have adapted to keep pace with changes on the market, and pedagogical approaches specifically for the training of technical translation skills are starting to emerge as well (Gonzalez Davies, 2003).

The advent of modern electronic tools has not only increased the pace of the translation process, it has also expanded the range of tasks that the translator can be expected to fulfill as well as their professional opportunities. In addition, technological advances and the global village phenomenon have contributed to the crumbling of barriers in international communications and the global marketplace. This in turn has led to an increased awareness of cultural and textual differences as well as of the implications of these advances for the translator's work. Finally, as Kaiser-Cooke (2003) has clearly demonstrated, we have reached a stage in the history of translation studies where translation theory, pedagogy, and practice can inform each other.

The rapid pace of change in the translation profession is certainly having a major impact on translation studies curricula and also on pedagogy to an increasing degree. Perhaps more than for translation skills *per se,* it is self-evident that learners need hands-on experience to develop skill at manipulating the electronic tools that are vital to the profession today. Instructors in the area of computer-aided translation are often experienced translators themselves and see the necessity for practice-oriented work to develop computer proficiency. Although computerized classrooms still lend themselves to transmissionist instruction, with a single computer and LCD display that can allow the teacher to remain in the focus of attention, of especial interest in the future will be efforts to turn the computer-based learning environment into a collaborative learning environment (Kiraly, 2000: 123–139; González Davies, 2004). Thanks to the low cost and ready availability of high-speed digital communications, distance learning and blended learning are also beginning to expand pedagogical options in translation pedagogy (Pym, 2002).

Conclusion

In theory, translation pedagogy has already come a long way from its early exclusive reliance on the lecture format to transfer translation competence from teachers to students. Although in practice the transition process is slow, the writing is on the wall. Translation studies has established itself as an independent, yet multidisciplinary field of study. The 300 translator education programs now need to devote increased attention to the numerous albeit piecemeal attempts to make the development of translation-related skills a process of increasing linguistic, technical, and social competence and professionalism. As the title of a recent volume of articles on translation pedagogy reflects, translation pedagogy needs to open the door to the ivory tower (Baer and Koby, 2004). It needs to begin communicating with professional translators on the market as well as researchers and scholars in other fields, and it needs to investigate teaching approaches and techniques to determine the role that state-of-the-art pedagogy can contribute to a field of human endeavor that is both ancient and at the cutting edge of intercultural and interpersonal interaction.

See also: Communities of Practice; Constructivism; Functional Approaches to Translation: Skopos Theory; Translation: Profession.

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Translation: Pragmatics

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Introduction

Pragmatics has become increasingly important in the study of translation. This is the result of a number of shifts in the way translation itself has been approached. This includes, first, the fact that we have begun to look at translation more and more as just another type of language use, indistinct from other ordinary language uses (apart from the fact that it involves two languages). Second, this shift has made it possible to consider translation as falling under the remit of verbal communication, thereby allowing us to study it within pragmatics. Finally, new developments in pragmatics have enabled us to unify the study of all types of language use, including translation, under a single pragmatic theory, thus allowing us both to simplify the study of translation and to bring it closer within the sphere of verbal communication. The end result of these shifts has been that translation now is seen as just one more instance of verbal communication and consequently, as being subject to the same principles of verbal communication that govern all utterance interpretation (both intra- and interlinguistically). (*see* **Intercultural Pragmatics and Communication**.)

The shifts in the overall approach to translation have only taken place very gradually over the last 20 years or so and in the context of an unsystematic and fragmented study of translation. This entry reviews these changes and discusses how pragmatics has come to solve earlier problems and to play an increasingly central role in the discipline. (*see* **Pragmatics: Overview**.)

The article is organized as follows. First, the gradual shift toward pragmatics within translation is discussed briefly. Then, some of the current key pragmatic concepts, as applied to translation, are introduced. Finally, the results are discussed, and some conclusions are drawn.

A Brief Overview of Approaches to Translation

The study of translation has traditionally been approached from two different points of view: one is non-theoretical, the other more theoretically oriented (for an introduction to translation studies, see, e.g., Munday, 2001).

The non-theoretical approaches to translation maintain that translation is not primarily an act of communication, but rather an art, an intuitive endeavor, and that as such is not amenable to scientific treatment. This is the stance taken by a scholar such as Steiner, who argues that in translation "what we are dealing with is not a science, but an art" (1975: 295). Similarly, Newmark (1988: 19) argues, "[i]n fact translation theory is neither a theory nor a science, but the body of knowledge that we have and have still to have about the process of translating." These non-theoretical approaches have been very influential in the study of translation, in that many scholars have seen their role as restricted to the production of lists of recommendations that could guide translators in their work. However, it has been generally acknowledged that one of the main problems with this type of approach is its inherent limitation as regards scientific enquiry and as to the type and degree of explanation achievable. In other words, from this point of view, at most we are likely to achieve a set of observations about

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The non-theoretical approaches to translation maintain that translation is not primarily an act of communication, but rather an art, an intuitive endeavor, and that as such is not amenable to scientific treatment. This is the stance taken by a scholar such as Steiner, who argues that in translation "what we are dealing with is not a science, but an art" (1975: 295). Similarly, Newmark (1988: 19) argues, "[i]n fact translation theory is neither a theory nor a science, but the body of knowledge that we have and have still to have about the process of translating." These non-theoretical approaches have been very influential in the study of translation, in that many scholars have seen their role as restricted to the production of lists of recommendations that could guide translators in their work. However, it has been generally acknowledged that one of the main problems with this type of approach is its inherent limitation as regards scientific enquiry and as to the type and degree of explanation achievable. In other words, from this point of view, at most we are likely to achieve a set of observations about

translation; there will not be any systematic development of an underlying theory that would allow us fully to explain the phenomena involved in translation. Inevitably, as communication plays no central role in these non-theoretical approaches, the contribution of pragmatics is limited.

The more theoretically oriented approaches to translation have attempted to solve the inherent limitations of non-theoretical accounts. Broadly speaking, two types of approach can be identified: the first type is multidisciplinary and the second equivalence-based. The multidisciplinary approaches have tried to consider the various influences that can be observed in translation, with a view toward shedding some light on the processes involved. They have attempted to do this by exploring the impact on translation of diverse disciplines such as linguistics, literature, cultural studies, anthropology, etc. Multidisciplinary approaches have been influential in opening up the study of translation to many disciplines and in enabling researchers to explore a wide range of influences on the process of translation. However, one of the main problems with this type of approach has been the lack of a coherent and systematic account, giving rise instead to a highly fragmented study of the discipline and to inevitable limitations in the development of a unified theory of translation. Within this type of approach, the role of pragmatics has, at best, been one among many contributions to the field; pragmatics has not played any systematic or central part in its development.

The first major approach that allowed us to develop a more systematic and coherent account of translation was one based on the notion of equivalence (for an introduction, see Baker, 1992). This approach is part of an array of theories that are ultimately based on a structuralist view of translation and on the code model approach to communication (for an introduction to some of these theories, see Munday, 2003). The equivalence-based approach involves an important theoretical shift in that it is one of the first major attempts not only to develop a systematic and explanatory account of translation, but also to include explicitly the role of pragmatics in translation (in particular, Gricean pragmatics). (*see* **Grice, Herbert Paul (1913–1988); Pragmatics: Overview**.) Equivalence, in the context of translating, implies that the aim of a translation is to produce a target language text which is equivalent to the original language text. This represents an improvement on earlier approaches in that here there is a purpose and a guiding principle in the production of translations, as well as an explanation for the choices made by a translator, both in the process of translation and in the production of target texts.

The equivalence approach to translation has also been influential in that it has enabled practitioners to apply more consistent criteria to the study, practice, and evaluation of translations. From a pragmatic point of view, it has made it possible to include equivalence features at the pragmatic level (such as reference, coherence, implicatures, pragmatic maxims, etc.). (*see* **Cohesion and Coherence: Linguistic Approaches; Maxims and Flouting; Implicature**.)

Even so, the equivalence approach, systematic as it may seem, lacks definitional precision. Baker herself, whose entire 1992 book is based on the notion of equivalence, acknowledges the shortcomings of this concept: "equivalence is adopted [...] for the sake of convenience – because most translators are used to it rather than because it has any theoretical status." (Baker, 1992: 5–6). The approach has also been shown to face other serious problems (see Gutt, 2000: Chap. 1), particularly as a result of the insights gained in current studies in pragmatics and human communication. What these problems have in common is the insight that equivalence is at best a descriptive concept, not an explanatory one, and that it ultimately relies on other concepts that are external to its definition (i.e., equivalence is not a sufficient criterion in and by itself). So how can these problems be addressed?

Translation, Communication, and Pragmatics

A suggested solution to the problems mentioned above places the study and practice of translation more firmly within verbal communication and pragmatics (thus making it more amenable to scientific study). As Hatim and Mason (1997: vii) state, "we look at all kinds of translating as essentially *acts of communication* in the same sense as that which applies to other kinds of verbal interaction" (my italics). Gutt (2000: 23) argues along the same lines: "Translation is indeed best handled as a matter of communication." He similarly argues that "issues of translation are at heart issues of communication" (Gutt, 2000: 198). This line of enquiry, which sees translation as an instance of verbal communication, is the main link between pragmatics and translation in current research on the subject.

The chief proponent of a consistent and systematic application of pragmatics to translation has been Gutt (2000), who has applied one of the main current pragmatic theories, viz., Relevance Theory, to the subject (for an introduction to Relevance Theory, see Blakemore, 1992; Sperber and Wilson, 1995). (*see* **Relevance Theory**.) Relevance Theory allows us to approach the study of translation as an act of

communication, in a systematic and explanatory fashion. A number of key assumptions make this possible. As Blakemore (1992: 39) argues, "[t]he search for relevance is something that constrains all communication, verbal and non-verbal." (Gutt, 2000: 198) goes further and maintains that "the principles, rules and guidelines of translation are applications of the principle of relevance." He further claims that "given the general framework of relevance theory, no special, additional concepts or theoretical tools are needed to accommodate translation" (Gutt, 2000: 237). The latter claim has profound and far-reaching implications for translation, as it amounts to saying that there is no need for a theory of translation as such. Instead, translation is seen as just one more instance of verbal communication, with the particularity that it involves two languages. Thus, from this point of view, translation can be studied fully within pragmatics (which thereby becomes its proper theoretical domain).

There are a number of advantages of this approach over earlier ones. First, there is no need to construct extra theoretical machinery to account for translation. Second, all the separate and diverging claims that have been made about translation can be seen as natural applications of the principle of relevance and, therefore, can be unified under a single explanatory theory (rather than being isolated claims without internal theoretical foundation or coherence). (*see* **Communicative Principle and Communication**.) Third, translation can benefit directly from advances made in our understanding of verbal communication, pragmatics, and cognition (which contrasts with the earlier situation, when translation was treated as an isolated discipline and had to borrow concepts from widely diverging areas of research, something that resulted in the absence of a unified account). Finally, in contrast with, e.g., equivalence approaches, an approach based on Relevance Theory provides explicit definitions for its theoretical framework, which is intended to be universal in its application and univocal in its search for intended interpretations of texts/discourses.

For a translation theory based on the notion of relevance, the challenge has been to spell out the implications for translation of all of the above claims as well as of the specific theoretical claims made within Relevance Theory proper. So far, two areas of research have been developed in this respect: one at the macro level and the other at the micro level. By far the biggest contribution in this endeavor has been achieved at the macro level (see, in particular, Gutt, 2000); here the driving interest has been the theoretical characterization of translation as an instance of verbal communication to be studied within pragmatic theory. In this respect, Gutt (2000) argues that the key notion in any account of translation is that of resemblance, both interpretive and non-interpretive. He claims that for a target text or discourse to be a translation, it has to enter into a relationship of resemblance with the original text/discourse (in which resemblance is defined as the extent to which two representations share properties such as semantic content, linguistic features, sounds, etc.). In particular, the main focus of research has been interpretive resemblance, which focuses on the resemblance of content between original and target texts (i.e., the extent to which they share analytic and synthetic implications). For a translation to be successfully communicated, so it is claimed, it must (interpretively) resemble the original in an optimally relevant way. More recently, researchers such as Almazán García (2001) have argued that the notion of interpretive resemblance must be substituted by that of meta-representation in order to cover all possible cases of translation. However, as matters stand, there does not seem to be enough evidence to suggest that the notion of resemblance should be unable to by itself account for all translation cases (cf. Gutt, 2000: 198).

There are a number of advantages in characterizing translation as interlinguistic resemblance within the approach provided by Relevance Theory. For example, such a characterization allows us to understand why some translations are more direct than others (e.g., when issues of close resemblance are relevant, as in literary translation); or why it is sometimes necessary to include background information in the target text (e.g., when contextual assumptions would not otherwise be available to trigger the intended contextual effects, as in translation across very different cultures). Thus, research at this macro level has been fundamental to the application of pragmatic theory to translation; it also has made its application possible at the micro-level.

At this level, the prevailing interest has been to explore in more detail the processes and products that result from seeing translation as an act of communication (see, e.g., Rosales Sequeiros, 2002). Here, a key assumption is that the translator is not only a receptor of the original text but also a communicator of the target text. This presents us with a double role for the translator in communication, which (together with the gaps that necessarily exist between what is encoded and what is communicated in linguistic communication) gives rise to an array of textual and communicative effects in translation (e.g., discrepancies between original and target texts). These effects can be seen at all pragmatic levels, including the word/concept level, the referential level, the propositional

level, and the level of implicature, among others. In all these cases, we find that translations often differ from the original texts as a result of the communicative processes experienced by the translator during the interpretation of the original text and the rendering of his/her interpretation in the target text. In these cases, we find that pragmatic theory allows us to explain the discrepancies found between the two texts and, in turn, helps us in our evaluation and acceptability judgments of target texts. This insight also allows us to understand and unify, within a single theory, a wide range of translation discrepancies. For example, it allows us to determine when direct translations are not possible (e.g., when the linguistic structures of the two languages are not capable of the same degree of explicitness); or why certain discrepancies recur in translation (e.g., when the translator renders into the target language not what is encoded in the original text but, rather, what is communicated). In general, research at the micro level allows us to understand and predict the potential problems faced by translators in the process of translation, and thus alert practitioners to possible solutions.

Conclusion

Seeing translation as an instance of language use, and consequently studying it within the framework of verbal communication and pragmatics, has resulted in pragmatics playing an increasingly important and central role in the study of translation. This shift, as well as other current developments within pragmatic theory, has enabled us to unify the study of translation within a single theoretical approach, viz., that of Relevance Theory.

Relevance Theory allows us to simplify the study of translation both by doing away with the need for a separate theory of translation and by allowing us, instead, to indistinctly apply the same concepts used in other types of language use to translation. Translation is specific only inasmuch as it involves two languages and inasmuch as the target text is purported to resemble the original text. These contextual assumptions play the same role in the interpretation process as does any other contextual assumption. All the other observable and cognitive processes involved in translation can be explained and accounted for by pragmatic principles and processes covered within Relevance Theory.

Within the relevance-theoretic approach, research on translation has focused on two main areas. On the one hand, there has been an interest at the macro-level in characterizing translation as a communicative event involving interlinguistic resemblance between two texts or discourses. On the other hand, there has been an interest at the micro level in understanding the cognitive and communicative processes experienced by translators as receptors and communicators, and the effects these processes have on the products of translation.

Future pragmatic research on translation is likely to continue to focus on the two levels indicated above, as it attempts both to specify the communicative nature of translation more precisely and to understand the changes in target texts and discourses caused by the communicative process of translation.

See also: Cohesion and Coherence: Linguistic Approaches; Communicative Principle and Communication; Implicature; Intercultural Pragmatics and Communication; Maxims and Flouting; Pragmatic Acts; Pragmatics: Overview; Reference: Stylistic Aspects; Relevance Theory.

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Translation: Profession

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Present Status

The translation profession is undergoing significant change and is becoming increasingly structured with more and more students attending undergraduate and postgraduate translation courses at universities. People who have trained in other professions are retraining as translators partly to specialize and partly to make a career move as a way of finding enhanced career satisfaction. A significant proportion of translators work as freelancers and therefore have the opportunity to wrap their careers around their own lifestyles and family commitments. Few professions offer this level of flexibility and independence.

Although the professions of translator and interpreter are significantly different, you can hear interpreters being called translators in news reports from around the world. Many people work as translators and interpreters since both have common skills. In simplistic terms, a translator produces a written text in what is referred to as a target language that is a true and faithful rendering of a text supplied in a source language. Interpreters provide verbal translation into and from source and target languages.

It is usual practice for a translator to work into his or her target language, and professional ethics recommend that this should be the translator's mother tongue or language of habitual use, as it is sometimes called. However, circumstances often mean that this is not possible. I have taught on short courses for translators who work under extraordinary conditions in conflict areas or in government offices where they are required to translate into several target languages purely because of the extreme demands of their circumstances or the highly confidential nature of their work.

Translators have the luxury of being able to consider and revise their work, usually several times, before submitting it to their client. Translators can take a break when they feel like it – subject to the urgency of work, of course. There is physical evidence of the translator's work in most cases. Interpreters, on the other hand, have but a single stab at translation, and their output is verbal with little opportunity for revision. Physical evidence is provided only if their work is recorded or a third person produces a written report of the same.

It is easy to blame the translator for other people's errors. "Lost in translation" is an easy excuse, and the quality of the source material and information provided by the client usually has a far greater impact on the quality of the output than the work of the translator. The translator is often given scant regard in management literature. Just to give an example, the bold statement, *"Translation errors are the cause of the greatest number and variety of blunders in international business"* is the opening line of the chapter on translation in a book on blunders in international business (Ricks, 1993: 77). This gives no indication of the quality of the source material, the way in which the translator is selected, or the constraints he or she works under, all of which have a significant effect on the quality of the end result.

At present translation is an unregulated profession since anybody can call themselves a translator without having formal and recognized qualifications. Translation is often a cost-led business where price may determine the quality of the output. This state of affairs will continue until the translation profession is taken seriously and people who are engaged to do translation work have appropriately recognized qualifications. Culture plays a part, and the status of

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At present translation is an unregulated profession since anybody can call themselves a translator without having formal and recognized qualifications. Translation is often a cost-led business where price may determine the quality of the output. This state of affairs will continue until the translation profession is taken seriously and people who are engaged to do translation work have appropriately recognized qualifications. Culture plays a part, and the status of

the translator depends on achievement-oriented and ascription-oriented cultures. In Western society, the translator is supposed to be a neutral black box serving the interest of modern language comprehension, whereas in Japan, for example, the translator is an interpreter not simply of language but also of gesture, meaning and context (Trompenaars and Hampden-Turner, 2002: 110).

Stakeholders in the Profession

It is heartening to recognize that, over the last 20 years or so, clients' attitudes toward translators and the profession have changed. There is a growing acceptance, at least among more enlightened clients, that the translator is a professional and not just an anonymous black box impersonally churning out texts in a target language. Table 1 identifies some of the stakeholders in translation and their impact on the profession and the quality of its work.

Continuous Personal Development

The translator becomes quite erudite by virtue of having to read word for word and fully comprehend the material he or she translates. Although this is educational to a degree, there is no substitute for sound subject knowledge. Continuous personal development is now a reality in the translation profession, but how is this achieved? The advent of the World Wide Web makes researching subjects for translation more accessible. The only caution is that information gained from this source may not necessarily be validated. So what other options are available?

Finding Good Mentors

I became a translator by circumstance rather than design and the fact that I had a technical background. I was living in Sweden at the time and had received what might be termed a science-based education.

Table 1 Stakeholders in translation

Stakeholder	*Impact on the profession*
The translator	The translator has a responsibility to his or hers clients and to the profession as a whole. Only by being completely professional and regulated can the translator and the profession gain the recognition and status they deserve.
The client/end user	The client/end user is often quite unaware of the true demands of the profession and holds a stereotypical view of how the translator works. The layperson invariably imagines that the translator translates into 'foreign' languages and has little idea of the skills required to be a translator. Thus the translator and the profession have the daunting task of educating clients, raising awareness, and dispelling stereotypical views.
Translation agencies	Serious translation agencies now employ project managers, who are linguistically skilled and, in many cases, will have completed translation studies at a university. This represents a change from the time when translation project management was purely an administrative exercise that provided little added value from a translation aspect.
Public bodies	The European community and the United Nations are among the organizations that hold translation competitions for translators. Each demands a degree either in languages or a specialized field as well as ''*a perfect mastery of their mother tongue*'' (European Community) or ''*a perfect command of English and an excellent knowledge of French and one of the other official languages of the United Nations*'' (United Nations) (Samuelsson-Brown, 2004:20). Although this might be considered overkill for the profession, as a whole it sets a good benchmark.
Education providers	The number of universities that teach translation and translation studies has grown. These offer a range of options that can help would-be translators identify their potential specialist interests. Those who follow postgraduate studies have the opportunity to compile a translation dossier under the guidance of experienced practitioners. This provides evidence of their skills and facilitates entry into the profession by helping surmount one of the most difficult hurdles when starting out – ''How can I get work if I have no experience but how can I gain experience if I cannot get work?''
Professional organizations for translators	No professional organization can survive without serving the best interests of its members and, consequentially, enhancing the status of its members in the public eye. In the United Kingdom the Institute of Linguists and the Institute of Translation and Interpreting have become aware of the need for and support the concept of continuing personal development. This can only enhance the status of the profession and emulate the practice already implemented by other professions, such as doctors, accountants, and solicitors. The Institute of Translation and Interpreting has a mentoring program where fledgling translators can seek the advice of more senior and experienced members. This is managed through having an e-mail forum and mentees being set personal development assignments for discussion with other mentees and experienced mentors. In 2004, the Institute of Linguists sought chartered status for its members and the profession. This is an important step on the way to regulating the profession and thus enhancing its status.

Moving into translation seemed a natural progression. As a staff translator/technical editor, I was fortunate at the time to be working with a group of specialists that included technical writers who were experts in their own particular fields. They were able to act as guides and mentors in terms of subject knowledge. As a naïve, fledgling, and perhaps ignorant translator, I felt undaunted by the texts offered to me for translation. As I became more experienced, I accepted that I have limitations – difficult to accept when trying to build a reputation.

Translator organizations such as the Institute of Translation and Interpreting run short courses and seminars on specific subjects as well as a program in which experienced members act as a mentoring group.

Further Education

Attending further education on a full-time basis is not always practical or affordable. Distance learning is a viable option and allows the translator to further his or her education while still working and earning a living. Distance learning has developed significantly over the last 30 years through organizations such as the Open University. Though this demands considerable discipline in managing the time required to study, my personal experience of this type of continuing personal development is nothing but positive. It also offers networking and marketing opportunities through meeting other mature students who are already established in their own careers. This is positive since many translators, and freelancers in particular, live a hermit-like existence and do not mingle with the 'outside world' enough.

The concept of continuing personal development is in itself a development and evolves from attending discrete courses to encompassing planned development rather than reacting to needs at a particular time.

Quality Control

This subject is a minefield since translation is intellectual output based on individual interpretation and style – the latter is also the greatest source of dispute. There is no formal requirement for translators to have an accredited quality management system such as ISO 9001:2000. It can be argued that such accreditation applies only to the administrative and management procedures related to the production and delivery of a translation and not to the translation process itself. This is true to a degree, but this latest version of the standard is more client-oriented, and the self-analysis the standard demands is a useful discipline.

The act of writing procedures to analyze product realization and deal with client complaints, for example, raises awareness of quality management and professional responsibilities toward the client. Part of my own quality control is to grade the quality of source material submitted for translation and provide constructive feedback to clients (with the appropriate level of sensitivity) in an attempt to ensure that the texts I am asked to translate do not contain mistakes that can be misinterpreted or perpetuated in the translation.

Admittedly, the compilation of a quality manual takes time, and maintaining accreditation costs money. Documenting a quality management system does have a number of benefits. For example:

- Formal accreditation according to ISO 9001:2000, or having a documented quality management system, may be a requirement when being considered for certain translation assignments.
- Being accredited can provide a competitive advantage.
- Analysis of what could diminish quality of the end product raises awareness and, consequently, goes a long way to pre-empting problems.

Unless stated otherwise by the client, the normal assumption is that the translation is being made for information purposes. Quality objectives determined by the intended use of the translation and general objectives are illustrated in Table 2. These are provided for guidance only.

Table 2 Quality control objectives

Quality control objectives	*Intended use of the translation*			
	Information only	*General publication*	*Legal*	*Certified translation*
To provide the appropriate linguistic skills and experience	✓	✓	✓	✓
To provide an accurate and complete translation	✓	✓	✓	✓
To deliver on or before the agreed delivery date and time	✓	✓	✓	✓
To deliver work in the software format prescribed by the client	✓	✓	✓	
To adhere to the style and layout prescribed by the client		✓	✓	✓
To use terminology appropriate for the intended use	✓	✓	✓	✓

Conclusion

Looking back at attitudes in the 1970s and 1980s, translators were insular and considered any criticism (albeit constructive) as an affront to their competence as a translator. The concept of planned continuing personal development had not been considered. Technology has changed almost beyond recognition, as has the way in which most translators work. Although I am heartened by the way in which the profession is developing, translators need to realize their true worth and promote themselves as professionals if they are to receive just rewards for their labors.

See also: Conference Interpreting.

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Translation Units

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The Unit of the Translation Product

The definition and identification of the unit of translation depends on whether the translation product or the translation process is being considered. When the translation product is at issue, translation units are pairs of source and target text segments (*see* **Translation Memories**); these segments can be identified as source and translation by mapping the units of the target text onto the units of the source text (Toury, 1986). Studies that have compared translation and source text pairs produced by novice translators with pairs produced by experienced translators show that the units formed in novice-translator pairs are smaller in extent and generally are of a lower linguistic rank (word, phrase) than are those (clause, sentence) formed in pairs produced by experienced translators.

The Unit of the Translating Process

When the process of translating is at issue, the translation unit is understood to be that stretch of the source text that the translator keeps in mind at any one time, in order to produce translation equivalents in the text he or she is creating (Lörscher, 1991). These units can be identified during 'talk aloud protocol' studies (TAPs) (*see* **Think-Aloud Protocols**), and, like the product-oriented studies, TAPs suggest that whereas learner translators tend to view a word or a phrase as the unit of translation, more experienced translators focus on larger stretches of text as translation units. Note in this connection that some research suggests that the verbalization process of TAP studies has a shortening effect on translation units.

Translation Units and Translation Equivalents

Translation units (however understood) cannot be identified with translation equivalents, for two reasons. First, the former regularly determine the latter; second, whereas translation equivalents, being formal, may be fairly fixed for some expressions, translation units, in the cognitive sense of units of attention, tend to vary according to the translator's personal past history and general mental capacities. Consider the potential text segments 'six' and 'feet' cooccurring in the uninterrupted sequence, *six feet*. The translation equivalent for the two-word sequence will tend to vary depending on the cotext in the sentence; in this case, the choices may be between the body-part sense of 'feet' and the unit of measurement. Thus, before an equivalent can be selected, it is necessary to consider at least the stretch of cotext that explains which sense is meant, and that stretch will then be the translation unit. Potential units in the example here might be 'all of its six feet' in a sentence such as *The monster put socks on all of its six feet*, and 'six feet tall' in *Jack is six feet tall*. If the unit initially identified as instrumental in determining where equivalence is to be established and what it is to be were in fact 'six feet tall,' then, as far as a translator *in medias res* is concerned, it may be necessary to break this unit down into two smaller units, namely, 'feet' and 'six,' so that a measurement

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Translational Equivalence

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Introduction

The concept of equivalence can be identified as one of the most contentious, and thus potentially most significant, concepts in the study of translation. Debates have centered on how the concept is to be interpreted, the domain of its application, and the extent to which it is even useful in the study of translation.

In understanding the controversy, it is helpful to keep in mind the basic components of the concept of equivalence. 'Equivalence' is defined as the state of being 'equivalent,' which, in turn, is defined in the *Collins English dictionary* (1986: 516) as being, among other things:

1. equal or interchangeable in value, quantity, significance, etc., or
2. having the same or similar effect or meaning.

As suggested by these two main entries, the concept includes three key elements: two entities between which a relationship holds, a relationship (of equality, interchangeability, sameness, similarity), and a quality or feature according to which the relationship between the two elements is defined (e.g., value, quantity, significance, effect, meaning, etc.). As we shall see, various elements of this notion will be more or less in focus in the evolving debates. However, there has been no disagreement on the basic content of the notion.

The following presentation includes a brief historical overview of the development of the equivalence concept in translation studies. Next, two complementary views of this historical development are presented. In the final section, the *status quo* will be briefly sketched.

A Brief Historical Overview

Chesterman (1998: 16–27) provides an insightful chronology of the debate on equivalence in translation studies. In his account, Chesterman describes three distinct stages in the historical development. These three stages coincide in large part with the key stages discussed in Pym (1995) and Halverson (1997). In the following, Chesterman's outline will serve as the starting point, and the contributions of the latter two will be addressed in the section on the development in context.

Chesterman distinguishes between the 'equative view,' 'the taxonomic view,' and 'the relativist view' of equivalence, in chronological order. The oldest, the equative view, "is based on the original mathematical definition of equivalence, denoting a reversible relation: A is B and B is A" (1998: 18). This view has been linked to the earliest known (more specifically Western) writings on translation, and "appears to have been heavily influenced by the uses to which translation was put at the time, and other more general beliefs of the scholars who thought about these matters" (ibid.). The claim is that, in the Western tradition at least, the primary concern and problem of translation scholars was the translation of the Bible. Concurrent beliefs in the inviolate nature of the particular meaning of this particular text ('the Word of God') and in the separability of form and meaning led to a theory of translation in which meaning was believed to be identical in source and target texts. Equivalence of source and target was, in this view, a unitary notion. There was only one kind of relationship that could pertain between a translation and its source: identity of meaning (the relationship is identity and the feature compared is meaning).

The second stage, represented by the taxonomic view in Chesterman's terms, is one of more recent significance. In brief, the main development signaled by this view was that equivalence is not a unitary notion, but a multiple one; in other words, there is not one kind of equivalence, but many. According to Chesterman (1998: 21), the earliest signs of this view are visible even in Jerome. However, the main elaboration of this view came with the emergence of translation studies as an independent academic discipline, a development which started in the 1960s.

Several scholars have elaborated types of equivalence, though not all have achieved the same theoretical status. One of the first, and most influential, is Nida's (1964) distinction between 'formal' and 'dynamic' equivalence. Nida discusses the two types as 'two basic orientations in translating.' The first, formal equivalence, is described as follows:

> Formal equivalence focuses attention on the message itself, in both form and content. In such a translation one is concerned with such correspondences as poetry to poetry, sentence to sentence, and concept to concept (1964: 159).

In a translation oriented toward dynamic equivalence, on the other hand,

> . . . one is not so concerned with matching the receptor-language message with the source-language message, but with the dynamic relationship, that the relationship between receptor and message should be substantially the same as that which existed between the original receptors and the message (ibid.).

Nida's approach maintains a focus on a sameness relationship between source text and target text, and in this respect maintains two of the three key components of the equivalence concept as it was previously known. What changes the debate is the introduction of text-external factors. His distinction between formal and dynamic equivalence establishes a new feature upon which to base a sameness relationship: the idea of receptor effect. Here the grounds for establishing sameness are located outside the texts themselves, with respect to both their formal and semantic characteristics. The focus is shifted toward their reception.

One of Nida's contemporaries, J. C. Catford, is also concerned with source text (ST)-target text (TT) correspondences and relationships. Catford distinguishes first between 'formal correspondence' and 'translation equivalence,' and in the case of the latter, he makes a further distinction between "translation equivalence as an empirical phenomenon" and "the underlying conditions, or justification, of translation equivalence" (1965: 27). For the purposes of this brief overview, it is important that we note the ways in which source and target language correspondences (formal) differ from ST-TT ones (textual). According to Catford:

> A textual equivalent is any TL text or portion of text which is observed on a particular occasion, by methods described below, to be the equivalent of a given SL text or portion of text. A formal correspondent, on the other hand, is any TL category (unit, class, structure, element of structure, etc.), which can be said to occupy, as nearly as possible, the 'same' place in the 'economy' of the TL as the given SL category occupies in the SL (1965: 27).

Catford (1965: 49) requires further that any given TL item meet certain conditions if it is to be considered a translation equivalent of a given SL item. He claims that, "The SL and TL items rarely have 'the same meaning' in the linguistic sense; but they can function in the same situation." He elaborates on situational sameness by saying that it is established on the basis of overlapping contextual or 'situational features,' analogous to the distinctive features of phonology. For the purposes of our historical overview, it is important to note that Catford too claims a central role for translation equivalence. His project incorporates a sameness relationship between ST and TT elements, and the basis for sameness is 'features of situational substance.'

A third taxonomic approach is represented by Newmark (1982, 1988). His contribution to the equivalence debate also consists of a distinction between two basic translation 'methods': 'semantic' and

'communicative' translation (1988: 45ff.). These two represent the middle ground on a continuum from SL emphasis to TL emphasis, and the main difference between the two lies in the basis for the 'sameness' relationship. According to Newmark:

> Communicative translation attempts to produce on its readers an effect as close as possible to that obtained on the readers of the original. Semantic translation attempts to render, as closely as the semantic and syntactic structures of the second language allow, the exact contextual meaning of the original (1982: 39).

The focus in communicative translation is, like in Nida, on sameness of 'effect.' In Newmark's semantic translation, the focus is on sameness of 'contextual meaning.' In fact, Newmark's account contains far more detail and more subtle distinctions than this brief presentation allows. But for the purpose at hand, what is vital is the position of Newmark, like Catford and Nida, within the taxonomic tradition in which translation equivalence is considered primary and the objective of translation scholars is to elucidate the grounds on which sameness of ST/TT elements may be established.

A more recent and more elaborated view of translation equivalence is presented in Koller (1995, 2001). Koller argues that an account of translational relationships must take into account five 'equivalence frameworks': extralinguistic content, connotations, text and language norms, the receiver, and certain formal-aesthetic features of the SL text (1995: 197–198; 2001: 214ff.). These five frameworks are then linked to five types of translation equivalence: denotative, connotative, text-normative, pragmatic, and formal, respectively. This is an elaboration of earlier views, in that particular care is given to features of the communicative situation, and it becomes possible to situate the idea of the 'intended effect' in a broader linguistic framework. In terms of the development of the equivalence concept in translation studies, Koller's approach represents expansion, or elaboration, along the feature/characteristic axis. Otherwise, it is fundamentally the same as the other taxonomic views, in that there is a sameness relationship between two texts or text-elements.

The authors mentioned here all share the view that equivalence is central to any description or explanation of translational phenomena. More specifically, they see this notion as one of the defining characteristics of translated texts. In other words, the taxonomies of equivalence types represent criteria for the identification of texts as translations and, in some cases, as good or bad translations.

Chesterman (1998: 24ff.) refers to the third phase in the history of 'equivalence' in translation studies as the 'relativist view.' The emergence of this view is in many ways a much more radical development than the transition from a unitary 'meaning identity' to a richer taxonomic account of sameness. The views within this third stage vary from a complete rejection of the equivalence concept to a radical rethinking of it. For some scholars, the idea of equivalence in translation is philosophically untenable, given the instability of meaning (for an overview see Gentzler, 1993: 144–180). For others, the impetus for rejecting the notion is less philosophically motivated. Following a review of the uses of the concept in translation studies, Snell-Hornby (1988: 13–22) concludes that:

> . . . equivalence is unsuitable as a basic concept in translation theory: the term *equivalence,* apart from being imprecise and ill-defined (even after a heated debate of over twenty years) presents an illusion of symmetry between languages which hardly exists beyond the level of vague approximations and which distorts the basic problems of translation. (1988: 22)

In Snell-Hornby's view, the proliferation of equivalence types (taxonomies) and the loosening of the 'identity' or 'sameness' relationship is indicative of a problem with the concept itself, which leads her to advise against its use.

For other scholars, the focus on ST-TT relationships represented by the taxonomic approach has been maintained, but relativized. The key figure in this movement is Toury, who argues that translations must be identified, not on the basis of predefined relationships, but on the basis of status as such in a target culture (1980, 1995). In other words, 'assumed translations,' those accepted as such by a target culture, are to serve as the sources of information about translational relationships, which are thus empirically grounded and culturally/temporally situated. The crucial step here is that the nature of the translation relationship is no longer predefined; it is empirically derived. Consequently, defining ways in which ST and TT might be the same (types of equivalence) is moot, and the job of the translation scholar becomes to describe the actual relationships found. In terms of the general definition of equivalence that we started out with, we are now left with no specification of the nature of the relationship or the features along which it may be established; the constant is that there is some relationship (Toury's relationship postulate) involving some 'shared features' (Toury's transfer postulate) between the assumed translation and a source text (Toury's source postulate). Thus, what remains is the skeletal definition we started out with: the two entities, a relationship of sharing, and something shared (some feature or features). Within descriptive translation studies, all aspects of the translation relationship

are subject to empirical investigation; nothing is set *a priori*.

The Development in Context

Pym (1995) and Halverson (1997) present two different and complementary accounts of the historical development sketched above, more specifically, the movement from what Chesterman refers to as 'the taxonomic' to 'the relativist' view. In both accounts, the emergence of the taxonomic view in the 1960s and 70s and its rejection by various scholars in the 1980s and 1990s are placed in broader contexts, first in terms of institutional concerns (Pym) and then in terms of philosophical ones (Halverson).

Pym's (1995) account of the rise and fall of the equivalence concept in translation studies was based on an analysis of the sociological/political atmosphere in which translation studies emerged. In his view, for the early scholars (1960s and 1970s) the concept functioned as 'a piece of scientific capital' (1995: 159), which served one major overarching purpose: it gave translation studies scientific legitimacy. According to Pym, "It provided the foundation for research programmes supposedly useful for both machine-translation research and translator training .... the equivalence paradigm enjoyed a degree of success in advancing the cause of moderately independent research programmes and translator-training institutes." (ibid.) According to Pym, the cultural and academic climates of the time were conducive to this development.

Pym also discusses the reversal in the concept's fortunes represented by the relativist approaches. In his account, the historical-descriptive approach represented by Toury, and the philosophically similar scopos theory (Vermeer, 1989), also have clear scientific ambitions; it is just that the equivalence concept was not assigned the pivotal status it had held earlier (Pym, 1995: 160). For both of these theorists, the relationships between source and target texts can be many, and they can only be described after the fact. In other words, translational relationships (whatever they are) are situated in time and space and may show variation across either or both.

Halverson (1997) also addresses the same development, from Chesterman's taxonomic to relativist views of the equivalence concept. Her argument is that this development mirrors contemporary developments in ideas of scientific change and truth. The key change here is from the positivist belief in objectively verifiable truths and science as knowledge accretion to the relativist account of scientific change as historically and socially contingent. Halverson argues that the equivalence concept developed along the same lines; the taxonomic view was based on an objectivist philosophy of science, and the relativist reversal represented a movement toward historically situated contingency. By this account, translation scholars changed as the intellectual climate elsewhere changed.

Status Quo

In his paper, Pym presents evidence of what he calls, "a minority return to equivalence" (1995: 167). He counts himself as one of the "few isolated voices" (1995: 171) calling for a "recupera[tion]" (ibid.) of the equivalence concept. The current situation nearly 10 years after Pym wrote his article is, indeed, one in which several writers argue for a return to the focus on ST-TT relationships and a revitalization of the equivalence concept, broadly defined.

An important work in this connection is Koller's 1995 article, in which he outlines the limitations of the concept of equivalence and neatly demonstrates the gradations of sameness/similarity that pertain between ST-TT pairs. His starting point is the need for a remedy to relativist approaches to defining translation studies' object of study. This article identifies two key features of the current situation: the need for a means to agree on our object of study, and the failure of the equivalence concept to serve that need.

Pym (1995: 165) describes the work of writers such as Gutt (1991), Neubert (1994), and Stecconi (1994) as sharing an interest in "objectifying the subjective" view that equivalence holds an important position in the study of translation. By Pym's account, all of these writers share a concern with creating a framework for a principled investigation of translation, which necessarily involves agreeing on a means of identifying the object of study. For these writers, an appropriate starting point is a revised version of the equivalence concept.

Halverson (1999) takes a similar view with regard to the issue of translation studies' object of study. Her argument is that the concept of 'translation' must be viewed as a prototype concept. From such a perspective, a culturally situated concept/category, with more or less central members, may be related to corresponding categories in other languages/cultures. Halverson (1998, 2002) demonstrates that, at least for some languages, equivalence/sameness/similarity is a vital part of the conceptual content of 'translation.' Thus, the concept, in a graded form, is necessary for translation studies.

The paths forward from the common starting point shared by these authors are less well established; much remains open. In conclusion, one might describe the *status quo* as follows: at present, the equivalence concept is still closely associated with the taxonomic

(objectivist) manifestations of the 1960s–1970s and is, consequently, rejected by many. The emerging interest in a resuscitation founded in different philosophies and/or theories of language is still in the early stages. However, translation studies may be witnessing the beginning of a move away from polarization toward integration on this particular issue.

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Translational Stylistics

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Introduction

The term 'translational stylistics' was first used by Malmkjær (1994) in the context of a discussion about teaching translation. Nord (1992: 46–47) had earlier distinguished between generalizable and text-specific translation problems that trainee translators might face, suggesting that text-specific problems should be avoided in the early stages of translator training because they allow for less transferability of learning, compared to generalizable translation problems. Students, according to Nord (1992: 47), should "feel free to try out their own creative ways of solving translation problems" only once they have learned "the basic rules of the 'craft.'" Malmkjær (1994: 62) suggested that trainee translators also need to know when the basic rules of the craft need to be followed and when it is better to abandon them and give way to creativity, and that exercises in translational stylistics can sensitize students to the kinds of considerations that are helpful in guiding such decisions. This point was illustrated with reference to the norm that Toury (1991: 188) had referred to as "one of the most persistent, unbending norms in translation in all languages studied so far," namely, the norm that appears to lead to a general tendency to avoid repetition in translations. It is likely that trainee translators internalize this norm during their training period – in any case, given the persistence of the norm, it is clear that translators internalize it at some point in time. However, because repetition is sometimes (perhaps even frequently) used by authors to highlight certain concepts and notions that are important, it may often be

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desirable to re-present repetition in translation; the question facing translators with respect to repetition is when (under which circumstances) to re-present source text-situated repetition in a translation.

A comparison of Hans Christian Andersen's story (1835) *Prindsessen paa Ærten* (*The princess on the pea*) (Dal, 1963: 41–42) and a selection of translations of it into English illuminates the importance of recognizing intended repetitions in a source text. The source text of Andersen's story consists of 347 words, in which a form of the lexeme PRINDSESSE (PRINCESS) occurs 12 times. In the translations, this lexeme is typically re-presented using the lexeme PRINCESS. However, in the source text, PRINDSESSE is modified four times with the lexeme RIGTIG and three times with the lexeme VIRKELIG (VIRKELIG does not occur anywhere else in the story, whereas RIGTIG is also used also to modify the lexeme HISTORIE (STORY) in the last sentence). In a selection of translations of Andersen's text, his patterns of modification have not been re-presented; instead, the tendency is to vary more widely the adjectives used to modify the lexeme PRINCESS, and no adjective used to modify PRINCESS is also used to modify STORY. Therefore, readers of the translations tend not to face the questions raised by the patterns in the source text – about what characteristic the princess may share with a 'story' (in that they are both modified by RIGTIG) and whether Andersen uses the two near-synonyms, RIGTIG and VIRKELIG, interchangeably or to draw a qualitative distinction. Malmkjær argued that the source text patterns facilitate and support a reading of the story as a quest for a genuine (VIRKELIG) princess, as opposed to a woman who just looks like a stereotypical (RIGTIG) princess, by a prince who is uncertain about how to judge the princesses he meets on the genuineness-of-appearances parameter, and that this reading is further supported by a search for patterns of use of the same adjectives in Andersen's wider story opus. In fact, a broader search of Andersen's work shows a clear tendency to use RIGTIG to modify nouns standing for stereotypical examples of a kind, and to use VIRKELIG to modify nouns standing for the genuine article. Three text selections provide examples of this. Example (1) is from Andersen's *Nissen hos Spækhøkeren* (*The sprite at the charcuterie*) (1853):

(1) Der var en **rigtig** student, han
there was a **x** student he
boede paa Qvisten og
lived on attic-DEF and
ejede ingenting; der var en
owned nothing there was a
There was a . . . student, he lived in the
attic and owned nothing; there was a . . .
rigtig Spækhøker, han boede i
x charcuterier he lived in
stuen og eiede hele Huset.
ground and owned whole house-
floor-DEF DEF
. . . charcuterier, he lived on the ground floor and
owned the entire building.

Example (2) is from Andersen's *Svinedrengen* (*The swineboy*) (1842):

(2) 'Fy Papa!' sagde hun, 'den er
fie papa said she it is
ikke kunstig, den er **virkelig**!'
not artificial it is **x**
'Fie Papa!' she said, 'it is not artificial, it is . . . !'

Example (3) is from Andersen's *Nattergalen* (*The nightingale*) (1844):

(3) Den **virkelige** Nattergal sang paa
the **x** nightingale sang on
siin Maneer, og Kunstfuglen
its manner and artbird-DEF
gik paa Valser.
went on cylinders
The . . . nightingale sang in its own way, and
the artificial bird used cylinders.

Again, many translations do not reproduce such pattern of use, and Malmkjær (1994) argued that when trainee translators are helped to see the patterns in the original, compared with the lack of them in many translations, they will understand that an important dimension of the original story, along with an opportunity to arrive at a particular reading of it, may be lost to readers of the translation if the patterns of repetition are not re-presented in the translation (see also Malmkjær, 1995, 2003a).

Developing the Notion of Translational Stylistics

The early work in translational stylistics assumed unawareness on the part of translators, concerning certain patterns in the source texts. In later work, Malmkjær (2003b, 2004) defines translational stylistics as a text-focused search for answers to the question why, given a certain source text or set of source texts, a translation of the text (or of the set of texts) had been shaped by a translator in a particular way. This approach to translational stylistics assumes deliberate shaping of translations by translators to particular ends.

Emphasis on the source text distinguishes translational stylistics from approaches that concentrate on translators' styles as such, paying only secondary attention is given to the influence on their linguistic

choices exerted by aspects of the source text (see, for example, Baker, 2000). Emphasis on the source text also distinguishes translational stylistics from the interest expressed by Hermans (1996) in instances in which translators reveal themselves in their translations through paratextual material, such as translator's notes (Hermans, 1996: 27), or through textual choices that are likely to remind readers that they are reading a translation – for example, when character-motivated proper names in literature are translated literally into the language of the translation (e.g., in Dutch to English, Parson 'Wawalaar' becomes Parson 'Blatherer') (Hermans, 1996: 35), so that incongruity with the context is created: an obviously Dutch character bears an English name. Translational stylistics, however, does not distance itself from the wider aims of such approaches – in Baker's case, to point to the creative nature of translating (Baker, 2000: 262), and in Hermans's case, to incorporate into any model of translated narrative "the Translator as constantly coproducing the discourse" (Hermans, 1996: 43). Indeed, these aims are highlighted in studies in translational stylistics, which focus on translators' quests to minimize the potential to offend the religious and other sensibilities of an intended readership (Malmkjær, 2003b, 2004), or to contribute to the self-assertion of a nation (Millan-Varela, 1997a,b), or to reinterpret a classic for a new cultural context (Ben-Ari, 2002). If the arguments for such quests are supported by paratextual material such as that noted by Kovala (1996), so much the better; in fact, it is important that studies in translational stylistics draw on whatever historical, sociological, and biographical materials are available and relevant to the periods, places, languages, works, authors, and/or translators on which they concentrate.

The Argument for Translational Stylistics

Malmkjær (2004) suggests that studies in stylistics may be primarily oriented toward the text, the reader, or the writer, and that although studies oriented toward the text or toward the reader can be carried out on translations without regard to their source texts, writer-oriented stylistic studies of translations need to take account of relationships between translations and their sources:

> It is possible to analyse the style of any text, and it is possible to make claims about how any text elicits responses in the reading mind, irrespective of the text's manner of coming into being. In contrast, it is not possible through stylistic analysis of a translation alone to provide a satisfactory answer to the question *why* the translation has been made to mean as it does [Malmkjær, 2004: 16].

To find an answer to this question, it is necessary to take into consideration relationships that obtain between the translated text and its source; in fact, "unless this relationship is taken into consideration, many textual features of potential interest are unlikely to come to the notice of the analyst" (Malmkjær, 2004: 16). Consider the following extract from Henry William Dulcken's translation (1864) of Hans Christian Andersen's story, *Engelen* (*The angel*) (see Malmkjær, 2003b: 52–54):

> And the child opened his eyes and looked into the glorious happy face of the angel; and at the same moment they entered the regions where there is peace and joy. And the Father pressed the dead child to his bosom, and then it received wings like the angel, and flew hand in hand with him. And the Almighty pressed all the flowers to his heart, but he kissed the dry withered field flower, and it received a voice and sang with all the angels hovering around.

In the passage, an angel has come to collect a dead child together with the possession most dear to it while it lived, to take both to God. The possession is a field flower grown in a pot in the sick child's window, which brought the child happiness, but which was later discarded and left to wither. The passage recounts what happens next. There is nothing particularly remarkable about the passage; however, there are some remarkable relationships between it and its source, which reads as follows:

> Og Barnet aabnede ganske sine Øine og saae ind i Engelens deilige, glade Ansigt, og i samme Øieblik vare de i Guds Himmel, hvor der var Glæde og Lyksalighed. Og Gud trykkede det døde Barn til sit Hjerte, og da fik det Vinger som den anden Engel og fløi Haand i Haand med ham; og Gud trykkede alle Blomsterne til sit Hjerte, men den fattige, visne Markblomst kyssede han, og den fik Stemme og sang med alle Englene, der svævede om Gud [Hans Christian Andersen, *Engelen*].

If we set a gloss (G) of this source against Dulcken's translation (D), it becomes clear that the translation departs subtly from the original:

> G: And the child opened completely its eyes and looked into the angel's lovely
> D: And the child opened his eyes and looked into the glorious
>
> G: happy face, and at the same moment were they in God's heaven, where there
> D: happy face of the angel; and at the same moment they entered the regions where there
>
> G: was joy and bliss. And God pressed the dead child to his heart, and then
> D: is peace and joy. And the Father pressed the dead child to his bosom, and then

G: got it wings like the other angel and flew hand in hand with him; and God
D: it received wings like the angel, and flew hand in hand with him. And the Almighty

G: pressed all the flowers to his heart, but the poor, withered field flower kissed he,
D: pressed all the flowers to his heart, but he kissed the dry withered field flower,
G: and it got voice and sang with all the angels, that floated around God . . .
D: and it received a voice and sang with all the angels hovering around –

Where Andersen has a change of state from not being in Heaven to being in it, *og i samme Øieblik* ***vare*** *de i Guds Himmel* 'and at the same moment they **were** in God's heaven,' Dulcken has a change of position, an entering: 'and at the same moment they **entered** the regions where there is peace and joy.' In the source text, the change of state is simultaneous with the child opening its eyes **completely**. This is the third step in a process that begins earlier in the story when the child hears 'as if in a dream' the angel's story and continues when the angel kisses the child and 'the little one half opened its eyes.' Dulcken reproduces these two steps, but because he does not translate *ganske* 'completely,' the child's final, full vision of the angel is less clearly connected to the two previous stages on its path to 'visionariness,' the last stage coinciding with a metamorphosis of place. The translation presents an opening of the eyes that coincides with entering one region from another, separate region. Once in this region, Andersen's child has wings 'like the **other** angel,' suggesting that the child belongs to the same category of being as the angel; the angel in the translation remains unique: 'the angel.' In the source text, the child becomes winged and the flower becomes voiced. The Danish verb *at få*, although it can mean to be given something, can also mean to become the kind of person who has something, as in *Vi har fået hus* 'we have become house owners.' In contrast, Dulcken's child **receives** wings and the flower **receives** a voice. Dulcken's almighty is a benevolent God who bestows things, whereas Andersen's almighty is a transforming, overtly loving God.

Against the background of a wider study of Andersen's lexis, compared to Dulcken's, Malmkjær (2003b, 2004) links translation choices of this kind with a desire on the translator's part to create distance between the secular and the divine. In the passage quoted, there is a greater sense of physical distance between Heaven and Earth in the translation than there is in the source, because the translation has the characters entering from one sphere into another; there is greater metaphorical distance between the two spheres insofar as the child and the angel remain creatures of different types in the translation, and there is greater linguistic distance between the two regions insofar as the translation avoids naming the deity, using 'the regions where there is peace and joy' for 'God's heaven,' and using 'the Father,' 'the Almighty,' and '0' for 'God.' It is obvious that none of this would be so clearly noticeable in the translation alone as it is when the translation is compared with its source text. Dulcken's desire for distance is further linked to sociohistorical differences between attitudes to religion in Victorian Britain and in Andersen's Denmark.

Additional Examples of Studies in Translational Stylistics

Millán-Varela (1997b) shows how Otero Pedrayo used his translation (1926) into Galician of fragments of Joyce's *Ulysses* to promote Galician language and culture: "Otero the translator does not choose the expected literal translation which would have coincided in form both with the Latin forms of the ST and the Spanish language. Instead, he opts for an alternative solution: translate the meaning into 'pure' Galician forms" (Millán-Varela, 1997b: 288). For example, the purely Galician forms *xantar* 'diet' and *calzós* 'trousers' were chosen in preference to forms that Galician shares with Spanish, *dieta* and *pantalón*, even though the Galician choices carry with them nuances of meaning present in neither the source text nor in the potential Spanish/Galician equivalents: for example, *xantar* refers only to lunchtime and *calzós* makes reference to a traditional type of garment that used to be worn instead of trousers (Millán-Varela, 1997b: 288).

In a comparative study of eight translations into Hebrew of Lew Wallace's *Ben-Hur: a tale of the Christ* (1880), Ben-Ari (2002) shows how the translators respond to a long tradition of manipulating non-Jewish, especially Christian, material in translations into Hebrew (2002: 265):

> For generations, the existence of Christian elements in literary texts was regarded as problematic . . . and called for some kind of 'approach' or 'treatment', censoring the very translation of a text or interfering in various ways and degrees in the straightforwardness of operational stages of the translation.
>
> The reasons are so manifold it would be presumptuous to attempt to analyze them within the framework of translation norms, unless the larger context of the Judaism–Christianity dichotomy into account. More than in any other discussion of norms, the intertwined elements at work here exemplify the complexity of the issues involved in cultural interference and cultural research.

Ben-Ari shows how, in the translations into Hebrew, Ben-Hur who in the original text begins life as a Jew

but converts to Christianity, is converted back to the Jewish faith, and how the novel's model of Christianity is converted into a 'Jews against Romans' model (Ben-Ari, 2002: 272). This is done partly by the elimination or alteration of Christian elements – very obviously, for example, in the conversion of the subtitle, *A tale of the Christ*, into *Sipur histori mi-yme ha-bayit ha-sheni* 'A historical tale from the period of the Second Temple' (Ben-Ari, 2002: 277), and in the omission, from all but two translations, of Book First of the original, which deals with the birth of Christ (2002: 283). Smaller scale linguistic filters include, for example, the omission of the name of the village of Nazareth, which becomes 'a village in Galilee' (2002: 287), and the provision of chapter headings instead of the original text's numbering system. Ben-Ari (2002: 292) specifically mentions the chapter heading, 'A Jew and a Roman'.

See also: Stylistics.

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Elisabeth Closs Traugott is a Professor Emeritus of Linguistics and English at Stanford University in California. She began her undergraduate studies at Oxford University in 1957 and completed her graduate studies at the English department of the University of California at Berkeley in 1964. She held an assistant professorship in the Department of English at Berkeley from 1964 to 1970. In 1970 she became an Associate Professor of Linguistics and English at Stanford and has held full professorship at the same school since 1977. Traugott has also been a Fellow at the Center for Advanced Study in the Behavioral Sciences, and a Guggenheim Fellow.

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Her other research contributions focus on language change, particularly grammaticalization, lexicalization of conversational inferences, and subjectification; clause combining, particularly conditionals, concessives, and causal clauses. Some of her important articles in these areas include '*And* and *But* connectives in English' (*Studies in language*, 1986), 'On the rise of epistemic meanings in English: an example of subjectification in semantic change' (*Language*, 1989). With respect to clause combining, the investigation of the historical paths of English connectives *and* and *but* shows that there is a strong tendency for spatial and temporal meanings to give rise to logical connective meanings. In regard to the subjectification process in semantic change, it is demonstrated that "meanings tend to become increasingly situated in the speaker's subjective belief state or attitude towards the proposition." The semantic changes of modal auxiliaries (e.g., *must*), assertive speech act verbs, and modal adverbs show that epistemics develop from more root, deontic, and concrete meanings to more strongly subject epistemicity.

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See also: Grammaticalization.

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Treebanks and Tagsets

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Introduction

Treebanks, by definition, are series of trees that arise from parsing a textual form of a sentence (as it appears on a printed page or in an electronic article, or that is a transcribed spoken utterance). Parsing of a sentence is an intermediate step on the way from a surface expression (written or spoken) to a formal sentence understanding representation. It is believed that parsing is a crucial step on that way, being the first one (after tokenization or acoustic processing, phonological, morphological, and other 'low-level' procedures) that assigns a structure to the analyzed utterance. Treebanks thus capture the result of such parsing of many utterances (typically, a continuous series of sentences and documents originally collected in an electronic corpus).

Treebanks are created (annotated) manually, by linguists (or by non-linguists with some linguistic training and under supervision by linguists), who also prepare and gradually refine the treebank annotation guidelines. The typical size of a treebank is hundreds of thousands to one or two million word tokens (tens to hundreds of thousands of utterances).

The purpose of treebanks is essentially twofold. First, they serve as an exact, explicit formal description of language structure under a given theory or formalism for further linguistic research (whether structural, lexical, or any other). Second, they can be used for automatic training of parsers – by machine learning, probabilistic, statistical, or other data-driven algorithms to derive features, rules, or other formal mechanisms (possibly with probabilities, weights, or scores) that can be then used to automatically replicate on some other, previously unseen data, the process of parsing that leads to the original treebank. Using such a trained parser, a much larger

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treebank can be constructed automatically, even though only the best automatic parsers achieve less than 10% errors (for a discussion of error rate, see the section 'Using Treebanks: Searching and Parsing' in this article). Although automatically parsed treebanks can serve well for linguistic research that can tolerate the parsing output noise, they cannot be relied upon by further automatic processing as can the original, manually annotated treebanks, and they can be used (with caution) only for certain specific purposes.

Manual treebank annotation is a lengthy, expensive process (both in terms of human resources and actual money spent during the process). It is expected that treebanks will be reused for many projects for both of the aforementioned purposes; they are typically published for worldwide distribution by one of the leading publishers of electronic language resources, the Linguistic Data Consortium (Philadelphia, PA, USA) or ELRA/ELDA (Paris, France).

Types of Treebanks

Known treebanks can be classified into two groups according to the underlying view of the linguistic theory used:

- parse-tree (constituent, phrase-structure) treebanks, and
- dependency treebanks

Parse-tree treebanks can be almost, without change, viewed as derivation trees of some context-free grammar (CFG), with the original theory of phrase-structure grammars (PSG) being closest in its formulation. Dependency treebanks are typically close to the functional view, such as the Functional Generative Description Theory or the Meaning-Text Theory.

Parse-Tree Treebanks

A context-free grammar backbone is behind all such treebanks. Each node has in principle only a single label. The root of the tree (typically denoted S, for 'Sentence', or 'Start symbol' in CFG terminology) is typically split to two or more subtrees with other phrase labels (such as NP for noun phrase, VP for verb phrase, etc.; these are called non-terminal symbols in CFG terminology). Recursively, the subtrees are split further and further, until a terminal node (a node with no descendants) is reached; the terminal nodes correspond to the surface form of words in the analyzed sentence. The nodes just above the terminal nodes are called pre-terminals; they are labeled not by phrase labels, but by the POS (part-of-speech) tags assigned to the words at the terminal nodes below them. The number of nodes in a parse-tree treebank (if pre-terminal nodes are used) is thus between twice and three times the number of tokens in the analyzed sentence, or even more if some non-branching non-terminals are employed in the tree. An example of a tagset used for a parse-tree treebank follows.

```
(S (NP Industrial production)
   (VP increased
       (PP by
           (NP 0.8 percent))
       (PP in
           (NP December))))
```

Figure 1 Example parse tree with phrase labels *(Industrial production increased by 0.8 percent in December).*

S (Sentence)
NP (Noun Phrase)
VP (Verb Phrase)
AUXV (Auxiliary Verb)
ADJP (Adjectival Phrase)
ADVP (Adverbial Phrase)
PP (Prepositional Phrase)
SBAR (Relative Clause, Subordinate Clause)
FRAG (Fragment)
PRN (Parenthetical)
CONJP (Multi-word Conjunction)
UCP (Unlike Coordinated Phrase)

Figure 1 shows an example of an annotated parse-tree.

Dependency Treebanks

In dependency treebanks, no non-terminal or phrase-marking labels are used. Instead, nodes in the dependency tree are labeled by complex labels (attribute-value pairs). There are at least three of them at each node: the word (in its surface form) itself, its POS tag, and some sort of a functional label. The edges of the tree denote dependency: from the root to the leaves, the 'upper' node of an edge is called the 'governor' and the lower one is called the 'dependent.' Even though the direction of the dependency is sometimes theory-dependent, verbs typically govern its complementations (arguments and adjunct), nouns their attributes and other modifiers, conjunctions the subordinate clauses they precede, prepositions the head noun of the phrase they belong to, etc. The number of nodes in a dependency treebank is thus equal to the number of tokens in the analyzed sentence.

A possible list of dependency functional labels in such a treebank follows.

Pred (Predicate)
Sb (Subject)
Obj (Object)

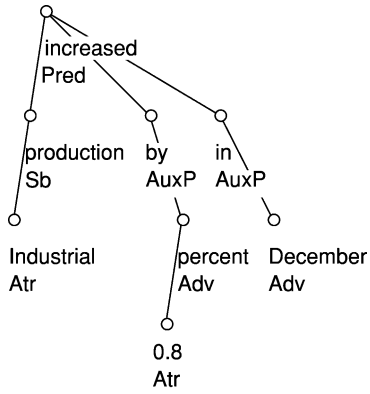

Figure 2 Example surface-syntactic dependency tree *(Industrial production increased by 0.8 percent in December).*

Adv (Adverbial (all types))
Pnom (Nominal part of a predicate)
Atr (Attribute)
AuxV (Auxiliary verb (to_be))
AuxP (Preposition)
AuxC (Subordinate conjunction)
AuxZ (Intensifier)
AuxG (Graphical symbol)
AuxR (Reflexive particle)
Coord (Coordination)

Figure 2 shows their usage in a partially annotated syntactic dependency tree.

Type Difference

Treebank types are, after all, not as different as they might seem from their description. Parse-tree treebanks can be converted into dependency treebanks if heads (governing nodes in the resulting converted dependency tree) are determined for every non-terminal in the corpus, which might be a very non-trivial task if they are not manually annotated. Dependency treebanks can be converted into parse-tree treebanks under two basic conditions: first, a strategy has to be determined for whether the resulting trees should be primarily deep or wide (or something in between, based on the language, style of annotation, purpose of conversion, etc.), and second, a procedure for naming the newly created non-terminal nodes must be devised that can use only the existing dependency type labels. Moreover, if the dependency trees are not projective, additional considerations must be taken into account.

While the parse-tree style of annotation can be (almost) directly used for training automatic parsers, the dependency trees are believed to have the advantage of being closer to semantic interpretation of the sentence and therefore more suitable for further (deeper) analysis.

The Complexity and Depth of Annotation: From Syntax to Semantics and Beyond

The basic types of treebanks already described are also referred to as (surface) 'syntactic treebanks.' Various schemes have been designed to 'deepen' the annotation towards a (syntactico-)semantic, pragmatic, content or 'logical' annotation. For example, the predicate-argument structure of verbal or nominal clauses is annotated (similarly in treebanks based on other theories, valency structure of verbs and some nouns and adjectives can be annotated), function words (and/or inflection for languages that use it extensively) can be generalized and formalized into a detailed set of node function labels, and various grammatical functions can be reflected in an enriched set of node labels. More structure that complements the basic tree structure of the sentence analysis representation is introduced for anaphora links (and co-reference in general), and the information and discourse structure of the sentence is annotated as well. These various schemes always contain links back to the basic syntactic annotation or are directly embedded in it in order to facilitate automatic learning of the process of 'deepening' the sentence analysis (and vice versa). Examples of functional (dependency) labels follow.

PRED (Predicate)
ACT (Actor)
PAT (Patient (2nd verbal argument))
ADDR (Addressee)
EFF (Effect)
BEN (Benefactor)
LOC (Location)
TWHEN (Time-when)
THO (Time-how often)
AIM (Aim)
CAUS (Cause)
RSTR (Restrictive Attribute)
DIFF (Difference)
DISJ (Disjunctive coordination)
RHEM (Rhematizer)

Figure 3 shows an example of a deep syntactico-semantic annotation.

Lexicons and Treebanks

Treebanks are sometimes accompanied by lexicons that contain the context-independent information about lexical behavior of words at the given level of annotation. For inflectionally rich or agglutinative languages, a morphological dictionary is often provided that lists many more words than can be found in the annotated treebank, facilitating processing of

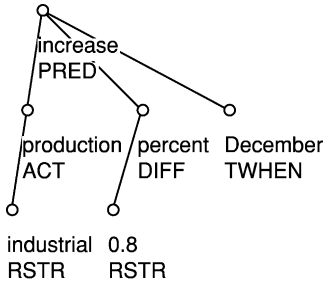

Figure 3 Example deep syntactic (functional) sentence representation *(Industrial production increased by 0.8 percent in December).*

general texts. For deeply (semantically) annotated corpora, a 'valency' lexicon or a 'PropBank' lexicon (both essentially listing possible arguments of words of various parts of speech, in a theory/annotation dependent way) accompany such a corpus, often with links between the lexicon entry occurrences in the corpus and the lexicon entries themselves, for easy reference.

Parallel Treebanks

For multilingual applications, most notably for machine translation, parallel treebanks provide an advantage to ordinary parallel corpora in that they can be used for inducing reliable structural correspondence between the languages in question. It is believed that structural differences between languages, especially at the semantic level, are much smaller than the differences observed at the word level (such as different word order, use of function words vs. inflection in the other language, etc.). Very few parallel treebanks exist today, but some are under construction.

The Process of Treebank Annotation

Manual annotation of a million-word (or bigger) treebank is a complex task that includes several stages and a varying size of the annotation team. The annotation guidelines have to be written first (even though they are necessarily being modified and extended during the process). Data has to be selected and technologically prepared for annotation, and annotation software has to be acquired or created. Decisions have to be made about how much automatic pre-annotation is desirable given the main goals of the annotation project and the time and budget constraints; one has to be cautious here because the team members may be influenced by the pre-annotation. Annotators have to be chosen and trained, and their ability to follow the guidelines, work effectively, and focus for many hours (which is often unrelated to their education or age) has to be assessed before the final selection is made.

During the process of annotation, inter-annotator agreement has to be measured and problems must be solved quickly by modifying the guidelines and/or retraining the annotators. Software has to be maintained and enhanced during the process of annotation to make the process more efficient and less error-prone. If the teams of annotators are specialized (to annotate only a subset of the node labels, for example) and work in parallel on the same data, extreme care has to be taken when merging the annotation into a single final corpus. Access to dictionaries and the annotated corpus (if the annotation is performed onsite and/or online, with direct access to the actual data) must be controlled in order to avoid simultaneous changes, much as in large online databases. When the annotation is finished, it has to be extensively checked at various levels (low-level markup, consistency with the final version of the guidelines, consistency between the groups of annotators; consistency inside the data, if possible; link targets for additional superimposed structure; etc.).

Last, the result must be prepared for publication with full documentation, examples of use, viewing and processing software for general use, pointers to papers and articles about the underlying theory, current use, or other aspects of annotation, pointers to similar or complementary projects, etc.

Typically, the annotation itself as performed by the annotators forms only 15 to 30% of the total effort. The cost of producing a syntactic treebank of a reasonable size is about $1 per annotated word, and can triple (or worse) if some form of a complex, 'deep' semantic annotation is used.

Existing Treebanks: a Short Survey

The first and most used treebank of all time is the Penn Treebank (Marcus *et al.*, 1993). It is of the parse-tree type and contains 1.3 million annotated words (English articles from the Wall Street Journal from the end of the 1980s and beginning of the 1990s.) The treebank has been enhanced since its first publication (e.g., the set of non-terminal labels has been extended to contain functional information as well). Recently, predicate-argument annotation has been superimposed on the Penn Treebank, based on the PropBank (Kingsbury and Palmer, 2002) and NomBank (Meyers *et al.*, 2004) projects.

The Czech-language Prague Dependency Treebank project (Hajič *et al.*, 2001) uses the dependency-type of annotation (based on the Functional Generative Description theory (Sgall *et al.*, 1986)), and consists of two treebanks whose nodes are linked together:

one contains the annotation of the morphological and surface syntactic structure of Czech, and the other one (on the same data) contains the 'deep' complex annotation of valency, detailed dependency and grammatical functions (a total of 16 node labels), co-reference, and information structure of the sentence.

The German TIGER (Brants *et al.*, 2002) corpus (an extension of an earlier and smaller Negra corpus) contains a mixture of both types of annotation (parse-tree and functional/dependency). On top of the usual non-terminals used for denoting the underlying parse-trees, a wide-coverage LFG grammar formalism has been used for the functional style of annotation. Verb subcategorization is also used as part of the annotation. The corpus has been prepared semi-automatically; however, this corpus is considered a manually annotated one because of the amount of manual work and checking that went into its creation.

There are other treebanks being used and/or created, such as for the Arabic, Bulgarian, Chinese, Danish, Dutch, Hungarian, Italian, Slovak, Slovenian, Swedish, Turkish, and other languages. These treebanks are typically smaller in size, and they are modeled after one of the basic types; sometimes (for example, the Arabic one) they are using (almost) the same sets of labels as the Penn or the Prague Dependency Treebanks. The largest spoken language treebank is the English Switchboard corpus (Godfrey *et al.*, 1992); however, it has been parsed automatically (not manually) by one of the statistical parsers trained on the Penn Treebank.

Using Treebanks: Searching and Parsing

Linguists are interested in searching treebanks, which is a much more complex task than searching an ordinary (linearly ordered) corpus, both from a mathematical and an end-user point of view. Instead of – or in addition to – formulating corpus queries in terms of distance between words, syntactic relations are the core of the queries. For example, one might search for all clauses in which two direct objects are used, regardless of the verb that heads such a phrase. In the case of deeper annotation, one might formulate even more complex queries, such as finding all instances of personal pronouns that refer outside a clause boundary (and perhaps to express their count as the percentage of all personal pronouns used in the corpus). Currently, very few general-purpose tree search systems exist. A rudimentary search system is called `tgrep`, a tree search system operating on principles similar to those of the file-searching `grep` utility (and suitable especially for the Penn Treebank), but without a graphical user interface. TIGERSearch, a tool to search corpora following the TIGER treebank style of annotation, does contain such an interface, as does the Netgraph system that accompanies some of the treebanks published by the Linguistic Data Consortium. Other systems are currently being developed, usually to accompany treebanks developed by various research groups.

The Computational Linguistics community sees the main purpose of treebanks in automatically training parsers. The manually annotated data is fed into a system that automatically derives features or rules and/or their weights or probabilities from the manual annotation and stores them as a parsing 'model'. Once trained, such parsing model used with appropriate parsing software can automatically replicate the manual annotation on new texts and thus be eventually made part of natural language processing applications. Good parsers, however, do not have to necessarily be trained automatically (before the advent of treebanks, it was not even possible to do so). The logical question then arises when comparing parsers of any kind – which of them is better? Again, treebanks provide the answer: parser output can be compared to the manually annotated data (obviously, it is different than that used for training a data-driven parser) and numerically evaluated. The error function used depends on the type of treebank. In the case of parse-tree treebanks, the measure concerns the number of 'crossing brackets (and their labels)', i.e., roughly speaking, the number of subtrees whose spans do not match that of the manually annotated sentence. For dependency treebanks, the measure is even simpler – every node that is not correctly attached to its 'true' (i.e., manually annotated) governor, or has the wrong label, counts as an error.

Summary

Treebanks, since the publication of the first one, the Penn Treebank, have been the source of a true revolution in Computational Linguistics, especially in the area of parsing natural language sentences. With limited research resources and the apparent high cost of building treebanks, we cannot currently hope for substantially larger manually annotated treebanks – despite the desperate need for them; further research is needed to discover ways of annotating more textual and spoken data with the reliability attainable by humans but using much more efficient methods.

See also: Anaphora and Coreference Resolution, Statistical; Computational Lexicons and Dictionaries; Corpora; Corpus Linguistics; Dependency Grammar; Language

Processing: Statistical Methods; Mark-up Languages: Text; Parsing: Statistical Methods; Part-of-Speech Tagging.

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Trier, Jost (1894–1970)

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Jost Trier, the son of a medical doctor, was born in Schlitz. He studied German and Roman languages as well as comparative linguistics in Freiburg, Basel, Berlin, and Marburg. He received a professorship in German philology in 1932 at the *Westfälische Wilhelms-Universität*, Münster, where he became *Rektor* in 1956–1957 and *Prorektor* the following year. He became a member of the *Akademie der Wissenschaften* in Göttingen (1939) and was made *Ehrenmitglied* of the *Deutscher Germanistenverband* (1962) and of the *Institut für Deutsche Sprache* (1969). He was awarded the Konrad-Duden Prize (city of Mannheim, 1968), for having honored the German language with his work. Trier died in Bad Salzuflen in 1970, and his letters, manuscripts, and personal documents are stored at the University of Münster.

Trier, inspired by Saussure and influenced by Humboldt, developed, after Weisgerber's research, the lexical field method as applied to German etymology. His work *Der deutsche Wortschatz im Sinnbezirk des Verstandes. Die Geschichte eines sprachlichen Feldes* (1931), was the foundation for research in field semantics. He was an innovator in adopting a structuralist approach to studies of word meaning. He used each lexical item according to its semantic relations with the other items, to consider individual words and to group into lexical fields. As his interest was studying the whole system more than individual words, such an analysis was meant to cover the whole vocabulary: based on this, Trier chose small conceptual areas of vocabulary for his 'mosaic model'; for instance, the abstract notions of 'knowledge' in medieval German – *wîsheit*, *kunst,* and *list* – the former being a superordinate, the latter ones hyponyms, and, by the end of the 13th century, the structure of the field changed; *wîsheit* was no longer a generic, *list* had left the group, and *wizzen* had entered it.

The semantic field analysis shows that a conceptual region may change according to different languages or to successive states of a language. Trier's theory was criticized for considering vocabulary as a single

Processing: Statistical Methods; Mark-up Languages: Text; Parsing: Statistical Methods; Part-of-Speech Tagging.

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See also: Humboldt, Wilhelm von (1767–1835); Lexical Fields; Lexicon: Structure; Saussure, Ferdinand (-Mongin) de (1857–1913).

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Trinidad and Tobago: Language Situation

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Geographical Location

Trinidad and Tobago is the most southerly nation in the Eastern Caribbean region, lying immediately north of the South American continent, near Venezuela.

Historical Overview: Language Shift and Development

As a twin island state it arguably represents a single speech community, although its language history and present linguistic status remain partially distinct. Although Trinidad went through periods of Spanish (1498–1797) and English rule (1802–1963), the French had a powerful influence because they were encouraged to settle the island by the Spanish from 1783. Additionally, the island was inhabited from the mid-19th century by indentured laborers from India, who came between 1849 and 1917; the Indian language that won out among them was Bhojpuri (cf. Mohan and Zador, 1986), a language variety of northwest India that is only today disappearing as a native language. During the 19th century 2500 Chinese (1853–1886), some Syrians and Lebanese, and 1298 Portuguese speakers from Madeira (Ferreira, 1994, 1999), all came to Trinidad, as well as freed slaves. Tobago had a more exclusively English influence despite many European skirmishes.

In both territories creole languages were established immediately following the importation of large numbers of African slaves. In Trinidad, slaves came mainly from other parts of the Caribbean, whereas in Tobago more came directly from Africa, as well as from elsewhere in the Caribbean. In Tobago, the plantation continued to be the focal point of people's lives, after emancipation in 1838, whereas in Trinidad, Afro-Trinidadians moved to the towns, and the plantations had to be worked by indentured laborers.

There are lexical influences (cf. Allsopp, 1996) from all the languages mentioned, as well as from the original Amerindian languages, both Carib and Arawakan, whom the Spanish decimated (cf. Baksh-Soodeen, 1995). Throughout the 19th century linguistic duality is attested between French and English-lexicon creoles: people gradually became bilingual in French and English creoles but hid the latter, feigning incomprehension of their ruling class (cf. Winer, 1984). A basilectal French creole is attested for Trinidad but there appears to have been no basilectal English creole therein; rather, there was a crossover from French-lexicon basilect to English-lexicon mesolect, which spanned a transition period from the late 19th to the early 20th centuries. There are influences from the French creole still present in modern Trinidadian speech.

Tobago, however, has retained an English-lexicon basilect down to the present. Not only did it have a more consistently British history, but it also retained a rural economy, based on agriculture and a village-based social life, such that the oldest variety of language was retained intact. Old people in Tobago tend to regard the mesolect as a Trinidadian intrusion and a corrupt mixed language variety, whereas for the younger generation, the mesolect has become their chief variety of identification. Increased contact with

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Trinidad helped to spread the variety, but it also developed within Tobago, as the education system encompassed more and more of the 20th-century population.

Present-Day Language Situation

The Language Complex

Today, the Standard and the mesolectal Creole variety are shared by the two islands, but the basilect is exclusive to Tobago. When collecting data in the 1990s we found that the basilect is still being acquired by some young rural-based Tobagonians as their first home variety (James and Youssef, 2002). Each language variety has its own social-psychological value such that a necessary continuous shift away from the Creole and toward Standard is not envisaged, but is a potential stabilization of the contact varieties. Although the Creole is the language of humor, solidarity, emotion, and national identification, the standard is the language of education, government, and the professions. The recognition of the Creole as a language in its own right in 1975, has led to the mesolect's much wider usage in all spheres, however, and ordered code-mixing has become normative in many contexts including the classroom.

The language varieties of Trinidad have been described from a sociolinguistic perspective by Winford (1972) and with concern for the rootedness of Trinidadian in the French Creole past by Solomon (1993). The language varieties of Tobago have been recently described (James and Youssef, 2002), since it was recognized that the two islands have been lumped together as one without concern for the separate language status of Tobago. The language acquisition duality has been investigated (Youssef, 1990), and Youssef (1996) explicates the communicative competence of adult speakers. Descriptions of the grammatical and phonological systems of the twin-island state are shortly to appear (James and Youssef, 2004; Youssef and James, 2003).

As an exemplifying subset, the verb system has three types of structure: main verb structure (e.g., *She eat she food*), copula structure (e.g., *She de a yard*), and copula-less structures (e.g., *She sick*) within which adjectives in the English system function as verbs in the creole one. All three subsystems are modified by preverbal tense, aspect, and mood (TAM) markers and a single aspect suffix *-in(g)*. These markers exhibit consistent discourse functions, denoting background or foreground focus, and different kinds of mood (For further detail see Chapter 5 of James and Youssef, 2003).

In a recent analysis of Caribbean Creole markers and their labels, Youssef (2002) synthesized past analyses (e.g., Bickerton, 1975; Solomon, 1993; Winford, 1993) of the oppositional systems of labeling, deducing a comprehensive perfective label in the zero marker, ranged in opposition to imperfective marking in *bin, bina* and *a* (basilectal) and in *did, was + -in* and *-in* (mesolectal). There is no fit with the English tense-aspect-modality system for any single marker, and this situation makes acquisition of the latter problematic for creole speakers who assume synonymity of systems.

Speaker Range and Competence

Speakers in both islands command, either wholly or partially, two or three language varieties, which they use separately or mix systematically. Code mixing is the unmarked norm, and individuals cannot readily 'unmix' in some cases. Children vary their speech stylistically from the very start of language acquisition, and three-year-olds balance among their codes according to situation, setting, and addressee. The term varilingualism was coined to describe this overall competence (Youssef, 1990, 1991, 1996), because the capacity to mix varieties is built into the development of grammatical competence from the earliest stage. The situation is not unlike that of some Hispanic speakers growing up in the United States where English and Spanish are mixed in some contexts (cf. Field, 1994; Zentella, 1997), but censure is less locally, due to the common Anglophone lexical base.

Current Influences and Cultural Forms: A Multicultural Entity

Today there are strong influences on local language from both the United States and Jamaica, sources of cultural influence through the media. Large diasporic communities of Trinbagonians can be found in New York, Miami, and London, where they integrate and adopt local accents more readily than Jamaicans, Barbadians, and others. This matter of language identity in the diaspora awaits critical research, however.

Internally Trinidad and Tobago has indigenously evolved cultural forms including chutney, an Indian calypso-influenced song and dance form, as well as the more well known calypso, institutionalized especially in Carnival, a complex and brilliant visual and musical arts extravaganza. Steel band music is an integral part of this celebration as well as independently having won world acclaim. Art forms are mentioned because there is a continuity between the linguistic and cultural diversities of the Trinbagonian people as expressive outworkings of a multicultural entity, unrivaled elsewhere in the Caribbean. The various musical forms may all be accessed via the website Fetenet.com, which simultaneously exposes

interested readers to the language of the territory described.

See also: Code Switching and Mixing; Pidgins and Creoles: Overview.

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Trnka, Bohumil (1895–1984)

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Bohumil Trnka was born near the Czechoslovakian town Humpolec on June 3, 1895. He died in Prague in 1984. At an early age he established himself as an authority on the English language and he remained in that field throughout his scholarly career, from 1925 as Professor of English language and older English literature at Charles University, Prague, followed by two decades of active retirement in which he was a well-known figure in European linguistics.

Among Trnka's major works within the field of English studies are a monograph on the historical syntax of the English verb (Trnka, 1930) and another monograph on Modern English phonology (Trnka, 1935). The latter work was a pioneering accomplishment; it was in fact the first such treatise to appear, and it was followed by other such prewar works within the Praguean trend (e.g., a monograph on Danish phonology by André Martinet, 1937).

In his breadth of study in the field of English studies and general linguistics Trnka was rather reminiscent of Otto Jespersen. Throughout his active scholarly life Trnka published on a wide variety of subjects within descriptive English grammar and phonology, notably on word classes and on word formation (an area in which Jespersen had not arrived at a fully satisfactory approach). Trnka developed a theory of word classes in English according to which nouns and verbs were constituted morphologically – by the inflectional categories associated with them. In his last work (Trnka, 1990) he delved into the relationship between language and society, like Jespersen and Sommerfelt before him.

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Along with his position in English studies, Trnka was engaged in general linguistics, being one of the founders of the Prague school. He contributed substantially to the exploration of the notion of **contrast** at all levels of language structure, and thus worked along similar lines as Trubetzkoy and Jakobson in the prewar period, though his contribution has probably been somewhat overlooked in comparison to those of his two colleagues. Unlike them, however, he became a major force in the revival of the Prague school after World War II, with its emphasis on functionalism. He then went into the study of lexical meaning, a topic that was not otherwise much cultivated by structural linguists. In Trnka's view, a language system contains a finite (though high) number of lexical slots – 'empty squares' – each of which can be charged with meaning and thus can be studied at a meaning level. This approach to semantics is somewhat akin to but also interestingly different from that of Hjelmslev, who more or less at the same time had presented his own, much-debated ideas about content form and content substance.

Trnka was among the few early structuralists who, like Twaddell in the Bloomfield school, widened the scope of modern general linguistics so as to include language diachrony. Within historical phonology he wrote on Indo–European and Proto–Germanic phonology, including an analysis of the structural properties of Runic writing, and he addressed the great vowel shift in English.

See also: Jakobson, Roman (1896–1982); Jespersen, Otto (1860–1943); Martinet, André (1908–1999); Phonology: Overview; Prague School; Sommerfelt, Alf (1892–1965); Trubetskoy, Nikolai Sergeievich, Prince (1890–1938).

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Trubetzkoy, Nikolai Sergeievich, Prince (1890–1938)

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Nikolai Sergeiievich Trubetzkoy, a Russian philologist, was born in Moscow in 1890 of a noble family. His father, Prince Sergei Trubetzkoy, was a professor of philosophy and rector of the University of Moscow. After graduating from Moscow University, where he read Sanskrit and philology, Nikolai Trubetzkoy pursued his Ph.D. in Sanskrit and historical linguistics at Leipzig University. His teachers were Neogrammarians, and he came to meet other fellow students, such as L. Bloomfield and L Tesnière. Subsequently, he taught at Moscow University (1915–1917), Rostov (1918–1919), and Sofia, Bulgaria (1920–1922). He was forced to flee Russia at the time of the October Revolution. From 1923 on, he was a professor of Slavic philology at the University of Vienna. He died in Vienna in 1938.

As a Russian philologist, and in tandem with intellectual climate in the old Russian empire of the early 1920s, Trubetzkoy based much of his work on the heritage of language studies, linguistics, and philology in the old Russian empire that evolved especially in the second half of the 19th century. There was a substantive migration of concepts and amassed data to the Prague Linguistic Circle and European centers before they crossed the Atlantic with Jakobson and others. After the demise of the Soviet Union, access to materials and archives was greatly facilitated, which has allowed broader research.

Trubetzkoy began his writings about folk poetry and myth within the spirit of the time. For example, in 1905, he wrote about a Finnish song, 'Kulto neito,' representing pagan customs; in 1906, he wrote on the mythical character Zolotaia Baba ('Golden Woman'); in 1908, he focused on the parallels of the myth of the origin of stone/earth between the Caucasian and Phyrgian peoples. The history of mythical thinking and mythology was a common pursuit in both western and eastern Europe throughout the 19th century.

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He also wrote about the collection of linguistic and cultural information on the many tribes and

people of the Caucasus. This work was a part of a tradition of a series of archeological and geographic expeditions that became a common activity by the second half of the 19th century in the Old Russian Empire and continued into the 20th century. In 1930, in his 'Nordkaukasische Wortgleichungen,' Trubetzkoy set out sound correspondences between the east and west Caucasian languages with a historical description of their consonant systems.

Trubetzkoy had an equally keen interest in issues of sociology and the politics of language, nationalism, and national identity. He wrote a number of articles on these topics and was one of the main ideological figures of Eurasianism, a political ideological movement of Russian émigrés in the 1920s and 1930s. The movement was based on the principle that the territories of the Russian empire in eastern Europe and northern Asia constitute a geographic, cultural, and political unit that is neither Europe nor Asia. The followers of this movement were antagonistic to Western values and European culture and had a messianic stance. The movement opposed self-determination for the peoples of the Russian empire and regarded their cultures and languages as part of the Russian collective or common tradition. Trubetzkoy was concerned with and wrote about Russian self-awareness and national identity. Eurasianism influenced his works in philology and linguistics.

In 1928, Professor V. Mathesius invited Trubetzkoy to become a member of the Prague Linguistic Circle (founded in 1926), where he met R. Jakobson (1896–1982) again. R. Jakobson regarded Troubetzkoy as his mentor, and they became good friends. Jakobson spoke about this many times. Trubetzkoy became an active member of the Prague Linguistic Circle, along with V. Mathesius, R. Jakobson, S. Karchevskii, and Jan Murařosvký, among others. The correspondence between Trubetzkoy and Jabokson (Jakobson, 1975) offers a personal perspective of their interactions during this period.

It is claimed that Trubetzkoy formally introduced some basic concepts, including markedness and invariance, that later became common currency in 20th-century linguistics. Indeed, Trubetzkoy and others in the Prague Linguistic Circle had had contact with O. O. Potebnja's (1835–1891) theory and philosophy of language, which contains these concepts.

Trubetzkoy's ideas on phonology, morphology, and linguistic geography were developed from the period of the Prague Linguistic Circle. He published *Zur allgemeinen Theorie der phonologischen Vokalsysteme* in 1929, and articles followed on the phonological system, on phonology and linguistic geography in 1931, and on the state of phonology in 1933. His 1936 essay concentrated on the theory of phonological oppositions.

The posthumous publication of his *Grundzüge der Phonologie* in 1939 (translated into English in 1969; it contains his autobiographical notes and a bibliography) is considered to be an account of the main beliefs of the Prague Linguistic Circle. It was not completed during his lifetime. Trubetzkoy put forward the idea that phonemes or phonological units are abstract: Any sound, e.g., 'p,' may have many varieties in a speech community, yet is perceived and treated as the same sound. If the change of the sound produces a contrast or opposition (r/m in 'rat' and 'mat'), a different word with different meaning results, and the phoneme has a contrastive function. Trubetzkoy produced a classification system for all phonemes, describing their features by comparing some 200 phonological systems in his search for a system of relationships and universals. This is usually regarded as the basis for the subsequent refinement of the concept of distinctive features later developed by R. Jakobson. In this work, Trubetzkoy also considered the possibility of the creation of a phonetic system for an artificial language.

He advocated the existence of a 'common Russian' literary language encompassing other Slavic languages. He lectured and wrote on the historical and contemporary Slavic languages and literatures as a professor of philology. He confused Old Ukrainian with Middle Russian literature, particularly in his lectures in the 1920s.

Trubetzkoy wrote and lectured on other aspects of language and literature. He used the term 'morphophonology' in his treatment of morphology and grammatical categories and functions of language. His influence in structural linguistics as developed in the 20th century is a relevant component in the history of ideas in linguistics and literary studies.

See also: Bloomfield, Leonard (1887–1949); Caucasian Languages; Jakobson, Roman (1896–1982); Mathesius, Vilém (1882–1945); Phonology: Overview; Potebnja, Alexander (1835–1891); Prague School; Slavic Languages; Tesniere, Lucien Valerius (1893–1954).

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Truth Conditional Semantics and Meaning

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From the early 20th century, beginning with the revolutions in logic begun by the German mathematician Gotlob Frege and the English philosopher Bertrand Russell, until the present, philosophers have speculated about the notion of meaning. A variety of such notions are in general use: natural meaning, as in 'smoke means fire' or 'those spots mean measles'; conventional meaning, as in 'a red traffic light means stop' or 'a skull and crossbones means danger'; intentional meaning, as in 'John means well,' or 'Frank means business.' Philosophical semanticists are preoccupied with a different notion of meaning, however: Linguistic meaning is involved in the utterances of 'the words "bachelor" and "unmarried man" are synonymous (have the same meaning)'; 'the word "bank" is ambiguous (has several meanings)'; 'the string of words 'colorless green ideas sleep furiously' is anomalous (has no meaning whatsoever)'; 'the sentence "All bachelors are unmarried" is analytic (true in virtue of its meaning alone)'; and more directly, 'what "La neve e' bianca" means is that snow is white.'

One problem surrounding linguistic meaning concerns its dual roles. The meaning of a word reaches out, as it were, into the world, but also retains an inwards relation to other words. The meaning of 'tomato' is related both to the world – tomatoes – and to other words it combines with, as in, 'Tomatoes are a fruit'; 'Are tomatoes a fruit?' 'Get me a tomato!' Whatever else meaning involves, these two diverse roles are essential. For if one knows the meaning of 'tomato,' one grasps how it applies to the world and also how to employ it in indefinitely many sentences – a phenomenon labeled the productivity (or creativity) of language.

Compositionality is invariably invoked to explain productivity: the meaning of a complex linguistic expression is a function of the meanings of its parts. Differences in meaning between 'A tomato is better than an apple' and 'An apple is better than a tomato'

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Truth Conditional Semantics and Meaning

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One problem surrounding linguistic meaning concerns its dual roles. The meaning of a word reaches out, as it were, into the world, but also retains an inwards relation to other words. The meaning of 'tomato' is related both to the world – tomatoes – and to other words it combines with, as in, 'Tomatoes are a fruit'; 'Are tomatoes a fruit?' 'Get me a tomato!' Whatever else meaning involves, these two diverse roles are essential. For if one knows the meaning of 'tomato,' one grasps how it applies to the world and also how to employ it in indefinitely many sentences – a phenomenon labeled the productivity (or creativity) of language.

Compositionality is invariably invoked to explain productivity: the meaning of a complex linguistic expression is a function of the meanings of its parts. Differences in meaning between 'A tomato is better than an apple' and 'An apple is better than a tomato'

are due solely to the manner in which the sentences are composed. In this regard linguistic meaning differs from other sorts of meaning. A red skull and crossbones doesn't mean *stop danger*; smoky spots don't signify *enflamed measles*; if John both means well and means business it doesn't follow he means good business.

Finite beings never have entertained nor will entertain or use more than finitely many sentences, but just as 'A tomato is better than an apple' and 'An apple is better than an orange' are sentences, so too is 'A tomato is better than an apple and an apple is better than an orange'; and just as 'The apple is rotten' is a sentence, so too is 'The apple that fell on the man is rotten,' 'The apple that fell on the man who sat under a tree is rotten,' and so on with no obvious end. Because our language includes devices of grammatical conjunction and relative clause construction, we are able to form new sentences from old ones. Whatever meanings are, they must fit together in accordance with the compositionality principle. The project becomes to settle on basic word meaning and to let sentence meaning be composed from simpler components.

Philosophers have tended to fix on one of the two main aspects of meaning to the detriment of other. A theory of meaning – a semantic theory – must explain how a word can perform both of its functions. So, for example, John Locke, the 17th century empiricist, concentrated on the inner aspects of meaning. For him meaning is mental; we use language to encode thought. Successful communication involves correctly decoding words heard into their corresponding associated ideas. So construed, the meaning of an expression is the idea associated with it in the mind of anyone who knows and understands the expression.

But focusing on inner aspects of meaning raises some issues. Suppose your idea of grass is associated in your mind with your idea of warm weather; would it follow that 'grass' has the idea of warm weather as part of its meaning, at least for you? This focus also ignores the public nature of meaning. We learn the meaning of words from others, and once conversant, we can determine whether others successfully understand us. If meaning is an associated idea, how does anyone learn it? Then there is the matter of compositionality. Suppose a speaker associates with the complex expression 'brown cow' the idea of fear; he is not, however, fearful of cows or brown things *per se*, only the brown cows. On an ideational semantics, the meaning of 'brown cow' is not predictable from the meanings of its parts.

In an effort to render meaning public, B. F. Skinner hypothesized that the correct semantics for a natural language is behavioristic: the meaning of an expression is the stimulus that evokes it or the response it evokes, or a combination of both, at the time it is uttered. The meaning of 'Fire!' might be as it were to run. But a fireman, or a pyromaniac, or an audience of a known liar or a play doesn't run when she hears 'Fire!' Does it seem plausible that such individuals mean something different by 'Fire!' than those who run do? Then too there is the persistent worry over compositionality. Suppose a speaker recoils when he hears 'brown cow' but not when he hears 'brown' or 'cow' alone. The terms' meaning then would be undetermined by the meanings of its parts. How then does a speaker learn its meaning and the meaning of indefinitely many other expressions that can host it?

Bertrand Russell, following J. S. Mill, pursued the intuition that linguistic items are signs of something other than themselves. He suggested that the meaning of an expression is what that expression applies to, thus removing meaning from the minds and bodies of its users and placing it squarely in the world. On a referential semantics, all that one learns when one learns the meaning of 'tomato' is that it applies to tomatoes, and to nothing else. The semantics is compositional: if 'red' applies to anything red and 'tomato' applies to any tomato, 'red tomato' applies to red tomatoes.

But what about words that apply to nothing, like the term 'unicorn'? What about the serious problem first pointed out by Frege, that two expressions may have the same referent without having the same meaning? For example, 'Samuel Clemens' and 'Mark Twain' name the same author, but they aren't synonyms. As Frege noted, one could believe that Mark Twain wrote *Tom Sawyer* yet disbelieve Samuel Clemens did, without being irrational. Some authors, e.g., J. S. Mill and S. Kripke, conclude that proper names lack meaning. After all, if one does not know the referent of a name, one does not reach for a dictionary but rather an encyclopedia. But the problem persists even for common nouns – paradigmatic meaningful expressions. The descriptions 'the 41st president' and 'the husband of Hillary Clinton' apply to the same person but are not synonymous. One can understand both without recognizing that they apply to the same individual. But if meaning is what one learns when one learns an expression and if meaning is reference, then we have a problem.

In the seminal semantic theory of Frege, inner and outer aspects of meaning are inextricably bound. Frege associates with each expression a referent. The referents of these parts contribute systematically to the truth or falsehood of sentences in which they occur. Thus the truth or falsehood of 'The 41st president is a Democrat' is determined by the referents of

its individual words and the way they are put together. Its overall significance is fixed by what the parts of the sentence 'stand for' in the world and by relations between those parts. It follows that if a word is replaced in a sentence with another having the same referent, its truth or falsehood will not change. So the outer condition is secured. But now worries about the inner aspects of meaning arise. If you believe that the 41st president is a Democrat, it doesn't follow you will believe that the husband of Hillary Clinton is one. So 'You believe that the 41st president is a Democrat' will be true, while 'You believe that the husband of Hillary Clinton is a Democrat' will be false. If meaning determines truth or falsity, meaning must involve more than reference.

Frege accounts for this problem with senses. The sense of an expression is, intuitively, not what is referred to by an expression but the way in which it is referred to. Each sense determines one reference, but to one reference there may correspond many senses. Central to his view is that senses are abstract objects and not ideas in people's minds as per Locke. The two belief sentences above can disagree in truth value because, although both are about Bill Clinton, they pick him out in distinct ways.

Frege doesn't address how we explain the reference of words. A natural albeit vague answer is in terms of the psychological capacities of users of a language: words mean what they do because of what speakers do with them. An example of this semantics is the logical positivism of the Vienna Circle in the 1920s and 1930s, according to which the meaning of a sentence is given by an account of what it would take to verify it.

The basic idea behind verificationism is that meaning must be a result of links between language and experience: some sentences have meaning because they are definable in terms of other sentences, but ultimately basic sentences, the observation sentences, have their meaning because of their direct connection with experience (in this case being reports of it rather than copies). The connections between the world and language come down to a connection between observation sentences, on the one hand, and experience, on the other. Speakers, then, refer to whatever objects they would identify as the referents, whether by description or by recognition. Although the circumstances under which 'triangular' and 'trilateral' apply are the same, speakers go about *verifying* those applications in different ways. This suggests that the meaning of an expression is determined by the verifiability of sentences containing it.

The case against verificationism was most ardently pressed by W. V. Quine in the 1950s. He followed the verificationists in linking meaning to experience, but he argued that experience relates not to individual sentences but to whole theories. Since meaning must be empirically available, Quine poses the question: What empirical evidence determines what certain utterances mean? He contends that the only acceptable evidence is behavioral, based on the demands of the publicity of meaning, and therefore shuns Fregean senses. But behavioral evidence cannot, he argues, determine whether a person's words mean one thing or another; alternative incompatible 'translations' of the evidence are always available. And so Quine infers his famous doctrine that translation is indeterminate: no facts determine what words mean, i.e., there are no meanings.

Confronted with the skepticism about meaning produced by the indeterminacy of translation (and the later Wittgenstein's work as well), Donald Davidson in the 1960s and 1970s made a significant effort to resuscitate meaning. Sharing Quine's sympathies with an outer criterion, Davidson attempted to account for meaning not in terms of behavior but on the basis of truth, which by then had come to seem more logically tractable than meaning due to the formal work of the Polish logician Alfred Tarski. In the 1930s Tarski defined truth for formal languages in terms of the relation of satisfaction holding between the parts of sentences and sequences of objects. Truth is thereby determined systematically by the satisfaction of sentential parts; Tarski could show how to formally derive, from axioms and rules, semantic theorems that specify conditions under which any sentence of the language is true.

Frege and Davidson agree about compositionality being non-negotiable, but Davidson spurns the troublesome notion of sense and instead employs a Tarskian theory of truth to 'serve' as a theory of meaning. In outline, his idea is that a semantic theory for a language should entail for any sentence a theorem that 'gives its meaning' while respecting compositionality. But how can we devise a semantics with these consequences? Davidson's insight was to replace 'means that' in a sentence like '"La neve e' bianca" means that snow is white' with 'is true if and only if.' Tarski had already shown how to prove such theorems. By exploiting Tarski's theory of truth as a semantic theory, Davidson rendered substantive the rough but venerable idea that to give the meaning of a sentence is to give its truth conditions.

But how can a truth conditional semantics explain away the phenomena for which Frege invoked senses in order to explain in the first place? The sentences 'The 41st president is a Democrat' and 'The husband of Hillary Clinton is a Democrat' share truth conditions; both are true just in case Bill Clinton is a Democrat. But they don't mean the same. In response, Davidson suggested that in order to devise an

adequate truth theory for any given speaker who uses these sentences, we must apply the constraints of radical interpretation, particularly, the 'principle of charity' – assume that on the whole speakers are truthful. Interpretation proceeds as follows: collect sentences a speaker 'holds true,' and devise a truth theory with theorems specifying the circumstances under which these sentences were held true as a consequence. According to Davidson, any such theory will prove a sentence like '"The 41st president is a Democrat" is true if and only if the 41st president is a Democrat,' but not '"The 41st president is a Democrat" is true if and only if the husband of Hillary Clinton is a Democrat', thus solving Frege's problem.

Most semanticists in the 1980s and 1990s doubted whether a truth theory could specify the meaning of any given sentence. Many recommended adding to a truth conditional approach a conceptual role (also cognitive role, computational role, and inferential role) semantics. To understand how and why, consider the following thought experiment: suppose each of two otherwise psychologically indistinguishable speakers says, 'I am 30 years old.' The references of their utterances of 'I' differ. This shows that if the meaning of 'I' is what each speaker who uses the word grasps, then meaning does not determine reference. For if meaning determines reference, then these speakers do not grasp the same meaning and therefore they must assign distinct meanings to 'I.'

Hilary Putnam and David Kaplan independently explain this phenomenon by distinguishing the character (or stereotype) of an expression from its referent in a context of use. The character of 'I' maps any context of use onto its user. This character is grasped by anyone who understands the sentence. The utterance's content is its truth condition. When each speaker says, 'I am 30 years old,' what they know may be the same – they have the same understanding – but what each says has different truth conditions.

So far two expressions can share the same character (or stereotype or whatever corresponds to what we know in virtue of which we understand) and yet these expressions can differ in reference and truth conditions, since, as we saw above, conversely, sentences with the same truth conditions, our Bill Clinton sentences, can differ on the understanding component of meaning. What are we to make of someone who understands both sentences, yet asserts the first while denying the second? We know Frege's solution appeals to senses, and we touched upon Davidson's effort with radical interpretation. The conceptual role semanticist argues, instead, that these two descriptions have distinct computational roles for the speaker.

In sum, there are two distinct ways of semantically individuating a speaker's words: according to truth conditions **and** according to computational roles. According to the way of truth conditions, the speaker believes that Bill Clinton is a Democrat and also believes he is not a Democrat. But his rationality is not impugned, since truth conditions do not exhaust understanding. According to computational role, the corresponding beliefs expressed by utterances of these sentences are distinct, since the descriptions have distinct computational roles. When his beliefs are individuated in terms of computational roles, he does not have contradictory beliefs.

While the idea of a conceptual role for an expression has been around in philosophy for some time, what they are and what form a theory of conceptual role is supposed to take is much less clear than the form of a truth theory. For conceptual role semantics to explain how your word 'tomato' and mine can be synonymous, our words must share conceptual roles, but this is extremely unlikely. As long as there is the slightest difference between us with respect to inferences we are prepared to draw from our word 'tomato,' their conceptual roles differ. But then it is difficult to see how sense could be made of communication. If we assign different meanings to 'tomato' because our conceptual rules are distinct, there is nothing in common to be communicated. If we assign the same meaning (and so, assign the same conceptual roles), there is no need for communication. Compositionality is no easier to understand with conceptual rolesemantics: the inferential roles of complexes need not be determined by the inferential roles of its components – take 'brown cow' again.

For Davidson, belief and meaning are interdependent. One of the lessons he draws is that nothing can genuinely have beliefs unless it also has a public language. Many philosophers have recoiled, both because they think it is undeniable that certain nonlinguistic creatures – such as dogs and apes – have beliefs, and because they hope meaning can be explained in terms of beliefs and other mental states. One such influential semantics is H. P. Grice's, who suggested that the meanings of sentences can be reduced to a speaker's intention to induce a belief in the hearer by means of their mutual recognition of that intention.

Grice's analysis of meaning consists of various parts. It begins with a notion of speaker meaning: A speaker S means something by an utterance if and only if S intends the utterance to produce an effect in an audience A by means of A's recognition of this intention. So, e.g., I discover a person so constituted that, when I tell him that whenever I groan in a certain way I wanted him to wink; thereafter, whenever he recognizes the groan (and with it my intention), he winks. Grice's underlying idea is that I did something

('made a groan') with intentions. First, I intended to produce the utterance (the groan); second, I intended my audience to recognize the utterance; third, I intended that they should recognize my intention to produce the utterance; and fourth, I intended that they should recognize that I intended them to form some new belief (or do some action, etc.). In these circumstances, according to Grice, my groan means to wink. The place of conventional meaning in Grice's conception of language appears to be that it constitutes a feature of words that speakers might exploit in realizing the intentions referred to in the analysis of speakers' meaning.

Although Grice's program is not as popular as it once was, the general idea of reducing meaning to the psychological states of speakers is now widely accepted (*contra* Quine, Davidson, Wittgenstein, and their followers). In this sense Griceans have returned to the 17th century's emphasis on inner over outer aspects of meaning. How much, in the end, semantic properties can be attributed to features of the human mind remains a deep problem for continued study.

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Truth: Primary Bearers

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Introduction

What are the kinds of thing that are capable of being true or false – of bearing a truth-value? This issue in metaphysics connects with central issues in the philosophy of language. As noted in Haack (1978: 79), it has been regarded as bearing on such topics as the semantic paradoxes, the motivation for many-valued logics, and the viability of Russell's theory of descriptions.

To judge by our loose talk, various kinds of thing are capable of bearing truth-value. The obvious candidates are sentences, statements, propositions, and beliefs. Suppose Sally asserts the English sentence (1):

(1) George W. Bush was president of the United States in 2003.

We might describe her as having made a true statement, as having (assertorically) uttered a true sentence, as having expressed a true proposition, or as having given voice to a true belief. But supposing that we regard truth and falsity as properties, might it not be the case that 'in the final analysis' only one candidate has these properties nonderivatively?

Consider for example the hypothesis that the truth or falsity of a belief derives from the truth or falsity of the proposition that is believed. This hypothesis can be supported by appeal to the standard analysis of the propositional attitudes. On this analysis, what is shared by, for example, the belief that Jones is in Manhattan and the desire that Jones is in Manhattan is the propositional content *that Jones is in Manhattan*. Now, if the truth of a belief derives from the truth of the proposition believed, we have a natural explanation of the phenomenon whereby the same state of affairs – in this case, Jones's presence in Manhattan – bears equally on the truth of the belief as on the satisfaction of the desire. The explanation would be that the semantic evaluation of the attitudes – their evaluation along the dimensions of truth, or satisfaction, or what have you – is in the first instance an evaluation of their propositional contents. In this way we see how we might support the hypothesis that beliefs have their truth-values derivatively.

The hypothesis that there is a primary bearer of truth-value is the hypothesis that one type of entity bears its truth-value nonderivatively. Which of the three remaining candidates – sentence, proposition, statement – fits this job description?

('made a groan') with intentions. First, I intended to produce the utterance (the groan); second, I intended my audience to recognize the utterance; third, I intended that they should recognize my intention to produce the utterance; and fourth, I intended that they should recognize that I intended them to form some new belief (or do some action, etc.). In these circumstances, according to Grice, my groan means to wink. The place of conventional meaning in Grice's conception of language appears to be that it constitutes a feature of words that speakers might exploit in realizing the intentions referred to in the analysis of speakers' meaning.

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The Case for the Sentence as the Primary Bearer of Truth-Value

Consider first the sentence. One reason for regarding sentences as the primary truth bearers has to do with a traditional understanding of the aim and scope of logic. Logic is traditionally taken to be (or include) the study of the entailment relation, where a set of sentences of a language *L* entails a sentence *S* of *L* iff *S* is true on every interpretation on which all of the members of are true. Since this talk of 'truth on an interpretation' applies to sentences (well-formed formulas), it can be argued that logic itself gives us a motive to treat (atomic) sentences as having their truth nonderivatively (*see* **Logical Consequence**).

A second consideration in support of the sentence is that certain theories of truth seem to require, or at least to work best with, sentences as the primary bearers of truth. Consider for example those theories on which truth is a relation of correspondence between the facts and the truth bearers (whatever they are). Such theories typically require that candidate truth bearers have a structure that mirrors that of the facts; and it is arguable that sentences are the most apt candidate here (see e.g., Wittgenstein, 1922). So, too, Tarski's (1944, 1956) semantic theory of truth defines truth in terms of satisfaction, and goes on to characterize satisfaction in a way that makes use of various quasilinguistic distinctions, including that between names and predicates. This, too, appears to call for sentences as the primary bearers of truth.

It is worth noting, though, that neither of the foregoing arguments from the theory of truth is decisive in establishing the sentence as the primary bearer of truth. For example, on at least some conceptions of propositions, propositions can play the roles required by either of the above theories of truth. (For example, the argument from the correspondence theory of truth could be taken to rule out propositions only insofar as these are taken to be unstructured entities: sets of possible worlds, for example.) In addition, there are those theorists who, though rejecting both the sentence and the proposition as the primary bearer of truth, nevertheless endorse Tarski's semantic theory of truth: one thinks here of Davidson's (1967) attempt to square Tarski's theory with a view on which the statement is the primary bearer of truth.

Context and the Question of Truth Bearers

The sentence proposal is not without its share of difficulties. These can be seen when we turn attention from the formal languages typically studied in logic to natural languages. The main problem concerns context sensitivity. A sentence such as (2) is true or false according to who used it, and when.

(2) I am tired

So if sentences are the primary bearers of truth, we face a dilemma. Suppose that sentences which (like [2]) contain a context-sensitive component bear a truth-value. Then such sentences will have to be treated as having a truth-value that changes over time, according to the context of use. But the idea of a truth bearer that changes its truth-value over time is incompatible with the prevalent view (found in Frege, 1918 and elsewhere) that truth bearers have their truth-value timelessly. Suppose then that sentences like (2) do not bear a truth-value. To retain the sentence-as-primary-truth-bearer view, sentences must be found that do bear a truth-value. One natural suggestion comes in the form of Quine's (1960) 'eternal sentences': the truth bearers are those sentences whose truth-value is unaffected by any change of context. But, given other plausible assumptions, the 'eternal sentence' view has the revisionary implications, first, that the vast majority of sentences of everyday discourse fail to have a truth-value, and second (and as a result), that most speakers will have a hard time formulating truth-value-bearing sentences.

Presented with this dilemma, the defender of the sentence might think to advert to the distinction between sentence types and tokens. Then the phenomenon of context sensitivity might be taken to establish that it is not sentence types, but rather sentence tokens, that we evaluate for truth. For instance, Mary's utterance of (2) at noon, and her utterance of (2) at midnight, will present type-identical but token-distinct sentences – in which case we can treat the two sentence tokens as differing in truth-value, while allowing that each token has its truth-value timelessly. (If Mary was tired at midnight of the night of her midnight utterance of [2], then it is **always true** that she was tired then, and her midnight token of [2] is timelessly true.) But it is unclear whether the appeal to the type/token distinction provides a solid defense of the sententialist view of truth bearers. For one thing, it is natural to think that logic deals with sentence types rather than tokens, in which case the sentence token proposal is in tension with the logic-based motivation for the sentence view. For another, it is unclear whether the appeal to the type/token distinction gives us a reason to prefer the sentence token, as opposed to the statement or the proposition, as the primary bearer of truth. Indeed, it is plausible to suppose that the core lesson of context sensitivity is that it is not sentences themselves (whether construed as types or tokens), but what is expressed by the use

of a sentence on a given occasion, that is evaluated for truth.

This understanding of the lesson of context sensitivity has motivated many to look beyond the sentence. Some endorse the proposition, conceived as what is yielded by a semantic evaluation of utterances, as the primary truth bearer. Others, hesitant to endorse propositions given their abstractness and/or the difficulties involved in formulating their individuation conditions, have opted instead for the statement as the primary truth bearer. Since any utterances of e.g., (2) by distinct speakers, as well as any sufficiently temporally distinct utterances of (2) (even by the same speaker), express different statements, treating the statement as the primary truth bearer provides a natural accommodation of context sensitivity. But the relative superiority of the statement to the proposition depends on the controversial claim that statement individuation will be less problematic than, and in any case independent of, proposition individuation.

Ramifications of the Debate about Truth Bearers

As noted at the outset, the dispute over the primary bearer of truth-value bears on various issues in philosophical logic, the philosophy of logic, and the philosophy of language.

Consider for example the class of paradoxes which are often characterized as the 'semantic' paradoxes. The paradigmatic example is the so-called liar paradox, involving a sentence such as the following:

(L) This sentence is false

(For ease of exposition I will speak of sentences, rather than of types or tokens; but the point can be made either way.) If sentences are the primary bearers of truth, we might expect that (L) must be ascribed a truth-value. (This depends on the additional assumption that if sentences are the primary bearers of truth then all sentences must bear a truth-value.) But of course (L) is paradoxical: if it is false then it is true, and if it is true then it is false. Proponents of the sentence-as-primary-vehicle-of-truth view might well take the lesson of the liar to be that we need a logic that permits of more than two truth-values: the third value could be neither true nor false. Alternatively, the lesson of the liar might be that we should reject the claim that it is sentences, as opposed to statements or propositions, that are the primary bearers of truth: the claim would then be that an utterance of (L) does not express a proposition or make a statement. (Admittedly, both reactions ought to be assessed in terms of the acceptability of their implications, as well as their adequacy as an account of the semantic paradoxes more generally.)

The issue of truth bearers is also relevant to the viability of Russell's theory of descriptions. On the assumption that semantic evaluation is the evaluation of sentences, Russell concluded that sentences containing a definite description – for example, sentences of the form 'The *F* is *G*' – ought to be analyzed as implicitly quantificational, in the manner of 'There is something, *x*, that is *F* and *G*, and anything that is *F* is identical to *x*.' One of the advantages of this analysis is that it can preserve the meaningfulness and truth evaluability of such sentences even if there is no single thing that is *F*. But Strawson (1950) regarded Russell's proposed analysis as plainly artificial: among other things, it requires us to suppose that the grammatical subject of the sentence ('The *F*') is not its logical subject (which, on Russell's analysis, would be the predicates or propositional functions '*x* is *F*' and '*x* is *G*'). On Strawson's diagnosis, Russell was led to such a plainly artificial analysis by his assumption that semantic evaluation is the evaluation of sentences. Strawson rejected this assumption in favor of the view that semantic evaluation is the evaluation of statements; and having done so, he urged that we do not conflate the issue of truth evaluability (a feature of statements) with the issue of meaningfulness (a feature of words and sentences). Thus, on Strawson's analysis, utterances of sentences of the form 'The *F* is *G*' fail to express a statement (and so fail to be truth evaluable) if there is nothing in the relevant context that is uniquely *F*; but even so the sentence uttered would not thereby cease to be meaningful, since meaningfulness is a matter of the rules for the proper use of expressions. In this way we see that issues pertaining to the primary bearer of truth-value have implications for the viability of Russell's theory of descriptions.

The Scope of the Issue

The debate regarding the primary bearers of truth is itself typically presented in connection with the doctrine that truth is a relation (or a property). As it has been formulated here, the issue concerns which entity bears truth-value nonderivatively, and this can seem to be the same as the question regarding which entity nonderivatively possesses the property of truth. One might wonder, then, whether the debate might be dissolved by following so-called minimalist or deflationary views of truth, according to which truth is not a relation or a property. But as noted in Haack (1978: 83–84), there are questions in the vicinity of the 'primary bearer' debate which survive the repudiation of truth as a property or relation. The key issue concerns

the application of formal logic to natural language. Consider the familiar *modus ponens* inference rule:

$$\begin{array}{l} p \\ \underline{p \rightarrow q} \\ q \end{array}$$

To apply *modus ponens*, we must find acceptable values for p and q. But when considering what counts as an acceptable value, we are forced to confront issues of sentential context sensitivity again. To wit: the inference from "I am tired now" and "If I am tired now, I should go to bed now" to "I should go to bed now," though valid if we keep fixed the time and speaker, equivocates (and so is invalid) if the speaker or time changes from one premise to the next. This has nothing to do with whether one regards truth as a relation; but it does appear to raise most, if not all, of the issues brought up by the primary-bearer debate.

See also: Logical Consequence; Paradoxes, Semantic; Truth: Theories of in Philosophy.

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Truth: Theories of in Philosophy

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Traditional Theories

'What is truth?' is a question often deemed to be so perplexing as to be unanswerable. Yet understanding truth is clearly important, as the concept seems to sit at the center of many debates, including those over the nature of knowledge, meaning, and logic. Theories of truth are divided over two basic questions: Does truth have a nature? And, if so, what sort of nature does it have? Traditional theories answer 'yes' to the first question and so attempt to give an answer to the second; deflationary theories deny that truth has a nature that needs a deep explanation. We'll canvass traditional and deflationary theories in turn.

The oldest theory of truth is arguably the correspondence theory of truth. The basic idea, which may have originated from Aristotle, is that true propositions correspond to the facts. Taken just by itself, this idea is a truism; correspondence theorists add flesh to its bones by spelling out the nature of 'correspondence' and 'facts' in different ways.

In the early 20th century, for example, Wittgenstein (1922) and Russell (1906) developed a version of the correspondence theory of truth according to which propositions were true in virtue of sharing a common structure with the facts. According to this view, the concepts that compose simple propositions like the *cat is on the mat* exhibit a certain form; and objects (cats, mats) and relations (*being on*) compose basic facts that also exhibit a logical form or configuration. Thus a proposition 'corresponds' to a fact just when they share the same form or structure (see **Figure 1**).

Although this sort of view seems to explain the truth of simple propositions about cats and mats well enough, it faces problems with other sorts of facts. Consider the true proposition that there are no unicorns. Is there a negative fact which makes this proposition true? It is unclear whether there are any such facts. In response to these sorts of worries, some philosophers, following Tarski (1943) have attempted to cash out the correspondence intuition

the application of formal logic to natural language. Consider the familiar *modus ponens* inference rule:

$$\frac{p \quad p \rightarrow q}{q}$$

To apply *modus ponens*, we must find acceptable values for p and q. But when considering what counts as an acceptable value, we are forced to confront issues of sentential context sensitivity again. To wit: the inference from "I am tired now" and "If I am tired now, I should go to bed now" to "I should go to bed now," though valid if we keep fixed the time and speaker, equivocates (and so is invalid) if the speaker or time changes from one premise to the next. This has nothing to do with whether one regards truth as a relation; but it does appear to raise most, if not all, of the issues brought up by the primary-bearer debate.

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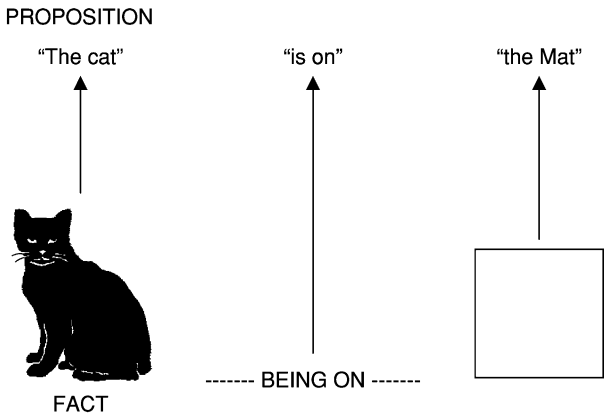

Figure 1 Proposition corresponding to a fact.

in a way that avoids commitment to facts, negative or otherwise, by arguing that propositions are true in virtue of the reference of their parts to objects and properties. The success of this strategy, however, rests on whether a satisfactory account of reference can be given.

Many philosophers also have found fault with the correspondence theory because of worries that it leads to skepticism. According to these philosophers, it is difficult to understand how we could ever "step outside" all language and thought in order to check and see whether our propositions really correspond to the facts. Partly because of these misgivings, philosophers in the 19th century developed the coherence theory of truth (Bradley, 1893). According to the coherence theory, a proposition is true just when it is a member of a coherent system. Thus propositions aren't true on this view because of their relation to the mind-independent facts but because of their relation to each other. One benefit of this view is that it seems to provide an answer to skepticism. For as long as a proposition 'hangs together' with other propositions in the sense defined by the theory, it is true. We don't have to encounter the naked facts 'in themselves' to know what is true and what is false.

Coherence theories, however, have seemed overly permissive to many philosophers. As Russell (1906) famously pointed out, such views imply that any group of propositions – even ones that are obviously false – are true as long as they are mutually coherent. They therefore seem to make too many propositions true.

A third theory of truth was developed by the pragmatist William James (1909) following earlier work by Charles Peirce. According to James's pragmatist theory, a proposition isn't true because it copies or coheres with anything. For the pragmatists, propositions are tools, and good tools do good work. Thus, on this theory, a proposition is true just when it is practically justified. A proposition is practically justified in turn when it is useful for achieving our goals over the long run.

The pragmatist theory, however, seems to face an uncomfortable dilemma when asked to explain what makes a proposition useful. If what makes propositions useful is up to us, then again any old claim might turn out to be true. By contrast, if it isn't up to us, then it seems we must abandon pragmatism. Consider the proposition that my brakes are working in my car. Believing this guides me in making future useful predictions (if I press the brakes the car will stop). But presumably it is only useful for me to believe that the brakes are working if it is really true that they *are* working. But this is not something the pragmatist can say, since we just invoked truth to explain usefulness instead of the other way around.

Deflationary Theories

Deflationary theories of truth are so called because they deflate the pretensions of traditional theories which attempt to define the underlying nature of truth. Deflationists take the fundamental fact about truth to be

(T) The proposition that p is true if and only if p.

The basic idea is that this schematic principle (more or less, depending on the variety of deflationism involved) explains all there is to explain about truth.

Most deflationary views have two aspects. The first and arguably most central is the metaphysical thesis already mentioned that truth has no underlying nature. This is often put by saying that there is no property, or at least no substantive property, shared by all and only true propositions. Deflationists typically argue for this claim by trying to show that, contra the tradition, we needn't appeal to anything other than (T) to explain truth's involvement in knowledge, meaning and logic. The second aspect of any deflationary theory is a semantic thesis about the role, if any, the word "true" plays in our language.

The simplest form of deflationism is the redundancy theory of truth, and stems from work by Frege and possibly Ramsey (1927). On this account, we need no separate semantic explanation of truth, for 'it is true that p' is just another way to say 'p.' To say that it is true that roses are red, for example, is really just to say in different words that roses are red. Thus, we only *appear* to ascribe a property to a sentence or proposition when we say that it is true; we are in reality ascribing nothing as ascriptions of truth are simply superfluous or redundant; they add nothing to the content of what has already been said.

The redundancy theory faces two crippling problems. First, there are counterexamples to its central claim. Consider, to take just one example, the proposition that

(S) Everything that Socrates said is true.

Clearly, the claim that *Everything Socrates said is true* is not equivalent to the fragment that *Everything Socrates said*. Accordingly, all ascriptions of truth are not redundant as the theory demands.

The second problem for the redundancy theory and other early forms of deflationism concerns whether and how we generalize over schema (T) in order to offer a suitable definition of truth. Redundancy theorists had a problem offering such a definition because using ordinary objectual quantification, it is hard to see how one could convert (T) into a suitable explicit definition. The natural suggestion 'For any proposition p, the proposition that p is true if and only if p' isn't, strictly speaking, well formed, because 'p' is being used as two different types of variables. Where it appears as a conjunct by itself, on the right-hand side of (T), it is used as a proposition; but, on the left-hand side, it has the character of a name being completed by a predicate.

Contemporary deflationists have made numerous suggestions as to how to deal with these two problems. Like the redundancy theory, the minimal theory (Horwich, 1998) holds that (T) is the most fundamental fact about truth. But, unlike the redundancy theorist, minimalists believe that 'the proposition that snow is white is true' and 'snow is white' are only necessarily equivalent, not synonymous. Moreover, they can acknowledge that truth is property. It is just not a substantive or natural property that needs any sort of *metaphysical* explanation. Minimalists also reject the need for an explicit definition of truth. They argue that truth is instead implicitly defined by all the instances of (T), and that our grasp of the concept consists in our disposition to accept these instances. Finally, following Quine, minimalists hold that our concept of truth does serve an important purpose. Without it, rather than asserting (S) above, we would face the impossible task of expressing an indefinitely long conjunction, namely:

If Socrates said roses are red, then roses are red, if Socrates said violets are blue then violets are blue . . .

But with (T) in hand, we may say instead that for every object x, such that x = what Socrates said, then x is true. The minimalist concludes that the sole function of the concept of truth is to allow us to generalize over open-ended strings of claims like this.

One issue dividing contemporary deflationists concerns the proper bearers of truth. Disquotationalists (e.g., Quine, 1990) are skeptical about the existence of propositions and take sentences or even utterances, to bear truth. Hence, they take as their central principle not (T) but the disquotation schema

(D): "S" is true if and only if s.

So-called pure disquotationalists, following Field (2001), go even farther. They take the concept of truth to apply only to sentences that we understand. Other philosophers have objected that this is too stringent, as it seems that we can apply the concept to sentences we can't understand, as when I say that most of what Socrates said was true, even though I don't understand ancient Greek.

A pressing problem for any form of deflationism, first raised by Dummett (1978), is how to account for the normative role truth plays in thought and language. It is a truism that in asserting propositions and forming beliefs, we aim at the truth. That is:

(TN) Other things being equal, we ought to believe what is true.

But it is difficult to see how (TN), which deals with what ought to be the case, can be deduced from (T), which deals only with what is the case. Deflationists typically reply that (TN) is simply another example of the generalizing function of truth. That is, (TN) is simply short for a long conjunction of individual norms of the form:

(B) Other things being equal, we ought to believe p when p.

And (TN) can be deduced from (T) along with (B). The issue remains unclear, however. For the deflationist now faces the difficult task of explaining why we should accept all instances of (B) without invoking the fact she set out to explain: that it is good to believe what is true, that is, (T).

Alternative Theories

Recently, several different theories of truth have sprung up as alternatives to both traditional and deflationary views of truth. The identity theory (Dodd, 2000) holds that true propositions do not correspond to the facts but are rather strictly identical to facts. Primitivism (Davidson, 1990) holds that truth is a primitive, indefinable property that we cannot explain in simpler terms that don't already presuppose it. Finally, alethic pluralism (Wright, 1992; Lynch, 2004) holds that truth may come in more than one form, in that propositions in different domains might be true in different ways. Thus, propositions

about the physical world around us may be true by corresponding to the facts, whereas those about morality may be true in virtue of their coherence with other propositions. Thus, the pluralist rejects traditional theories in so far as they try to say that all propositions are true in a single way. But, unlike the deflationist, they hold that there are more facts about truth than (T). The main problem with such theories, however, is to spell out exactly what is in common between all these ways of being true; that is, to say what makes them all 'ways of being true.'

See also: Deflationism; Metaphysics, Substitution *Salva Veritate* and the Slingshot Argument; Propositions; Quantifiers: Semantics; Realism and Antirealism; Relativism; Representation in Language and Mind; Russell, Bertrand (1872–1970); Tarski, Alfred (1902–1983); Truth: Primary Bearers.

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Tsamosan *See:* Salishan Languages.

Tucanoan Languages

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Overview

Classification

The Tucanoan languages of Colombia, Peru, Ecuador, and Brazil fall into two major groupings: Western Tucanoan (WT) and Eastern Tucanoan (ET). In the Eastern area, there are two languages that are very different from the other languages: Cubeo (Cub.) and Retuarã/Tanimuca (Tanimuca-Retuarã; Ret.). Waltz and Wheeler (1972: 128–129), recognizing this difference, chose to put Cub. in a category by itself, calling it 'Middle Tucanoan.' (In other publications, the term 'Central Tucanoan' is used, but is obviously not intended as a geographic term as Cub. is on the northern edge of the other ET languages.) Waltz and Wheeler, in their Proto-Tucanoan studies, referring to

about the physical world around us may be true by corresponding to the facts, whereas those about morality may be true in virtue of their coherence with other propositions. Thus, the pluralist rejects traditional theories in so far as they try to say that all propositions are true in a single way. But, unlike the deflationist, they hold that there are more facts about truth than (T). The main problem with such theories, however, is to spell out exactly what is in common between all these ways of being true; that is, to say what makes them all 'ways of being true.'

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Overview

Classification

The Tucanoan languages of Colombia, Peru, Ecuador, and Brazil fall into two major groupings: Western Tucanoan (WT) and Eastern Tucanoan (ET). In the Eastern area, there are two languages that are very different from the other languages: Cubeo (Cub.) and Retuarã/Tanimuca (Tanimuca-Retuarã; Ret.). Waltz and Wheeler (1972: 128–129), recognizing this difference, chose to put Cub. in a category by itself, calling it 'Middle Tucanoan.' (In other publications, the term 'Central Tucanoan' is used, but is obviously not intended as a geographic term as Cub. is on the northern edge of the other ET languages.) Waltz and Wheeler, in their Proto-Tucanoan studies, referring to

the differences between Cub. and the other ET languages, said, "The data indicates a possible break between Cub. and Western Tucanoan some time later than that between the Eastern Tucanoan groups and Western Tucanoan." (1972: 128). Ret., which is spoken south of the main ET area, was not included in the study by Waltz and Wheeler. Strom commented (1992: 1) that there appears to have been considerable influence from the Yucuna language on Ret. Ramirez (1997: 17) classified Ret. as ET, but puts it in a subcategory of its own. Malone (1986: Sect. 9.1) said: "Cubeo and Retuarã group closest to each other, which is shown by innovations for the protoconsonants *b (in the environment $__V_1CV_2$, where C is bilabial [bil]), *s, *w, *y. Cub. tends to have more innovations in common with WT languages (*b/$__V_1C_{+bil}V_2$, *d/__i, __Vs, *y/__Vd), but also has some in common with ET languages (*d, *w); Ret. tends to have more innovations in common with ET languages (*d, *w), but also has some in common with WT languages (*b/$__V_1C_{+bil}V_2$, *d/__Vs). I consider these two languages to be Middle Tucanoan."

In Table 1, linguistically similar languages are grouped together, based on their development from Proto-Tucanoan (Malone, 1986: Sect. 9.1 & 9.2, and I have added Pisamira [Pis.] to her data). Barasano (Barasana) and Taiwano are listed as one (Bar.), as the only major difference between the two is in pitch-stress (Jones and Jones, 1991: 2). Retuarã and Tanimuca are listed as one, (Ret.), as they differ mainly in a few lexical items (Strom, 1992: 1). Population figures for Pis. are taken from González (2000: 374), for Wanano (Guanano; Wan.) are from Stenzel (2004: 23), and for Yurutí (Yuruti; Yur.) are from Kinch (personal communication). The rest of the population figures are taken from the Ethnologue.

Table 1 The Tucanoan language family and population figures

Languages and groupings	*Population figure*	*Abbreviations*
EASTERN TUCANOAN Group #1		
Wanano	1560	Wan.
Piratapuyo	1070	Pir.
Tucano	5000	Tuc.
Pisamira	46	Pis.
Tuyuca	815	Tuy.
Yurutí	850	Yur.
Waimajã/Bará	700	Wai./Bar.
Carapana	650	Car.
Tatuyo	350	Tat.
EASTERN TUCANOAN Group #2		
Siriano	310	Sir.
Desano	1760	Des.
Macuna	550	Mac.
Barasano/Taiwano	350	Bas.
MIDDLE TUCANOAN		
Cubeo	6150	Cub.
Retuarã/Tanimuca	300	Ret.
WESTERN TUCANOAN		
Koreguaje	2000	Kor.
Secoya	435	Sec.
Siona	300	Sio.
Orejón	300	Ore.

The last three in the list of ET languages in Group #1 (from Table 1), demonstrate a borrowing from Arawakan languages in the inclusion of a ubiquitous prefix *ka-*, which does not occur in the other Tucanoan languages. See Metzger (1998). Many other well-established borrowings are apparent in the languages, especially from Geral (Nhengatu) and Portuguese. More recent borrowings from Spanish and/or Portuguese, are freely incorporated into the languages and suffixed with the appropriate Tucanoan suffixes.

Location

The Tucanoan languages are spoken in the border regions of Colombia with Brazil, Peru, and Ecuador. The ET languages and Cub. are spoken in the state of Vaupés in Colombia and the state of Amazonas of Brazil. Ret. is spoken in the state of Amazonas in Colombia. See Figure 1. The WT languages are spoken to the west and southwest of the ET languages. Koreguaje (Kor.) is found in the states of Caquetá and Putumayo in Colombia, Secoya (Sec.) near the Putumayo River in Ecuador and Peru, Siona (Sio.) on both sides of the Putumayo River in Colombia and Ecuador, and Orejón (Ore.) south of the Putumayo River in Peru. See Figure 2.

Interrelationship

The ET people mainly define themselves by their language, which is the language of their father. Thus, a Tuyuca (Tuy.) woman, for example, might marry a Siriano (Sir.) man. Each would continue to speak his or her own language. The children learn their mother's language first, and later on switch to speak their father's language. The men in a Sir. village might marry women from different language groups, with the result that the children in the village grow up hearing from two to six languages. For a succinct analysis of the relationships between the different ET groups, see Aikhenvald (2002: 17–28). The Western and Middle Tucanoan groups are permitted, within specific kinship guidelines, to marry those who speak their own language. The Eastern and Middle Tucanoan language groups all share basically the same culture and belief systems, which differ in significant ways from the Western groups.

Figure 1 Eastern and Middle Tucanoan languages with approximate locations.

Language Features

Some of the more interesting features of the Tucanoan languages are the small number of consonants, nasalization and nasal spreading, the system of numerical classifiers, and the use of evidential suffixes on the verb. These, as well as other features, will be discussed below.

Phonological Characterestics

Vowels

The Tucanoan languages, with the exception of Ret., have the vowel inventory as seen in Table 2. Ret. has a five vowel system, lacking the /ɨ/ of the other Tucanoan languages. In all of the Tucanoan

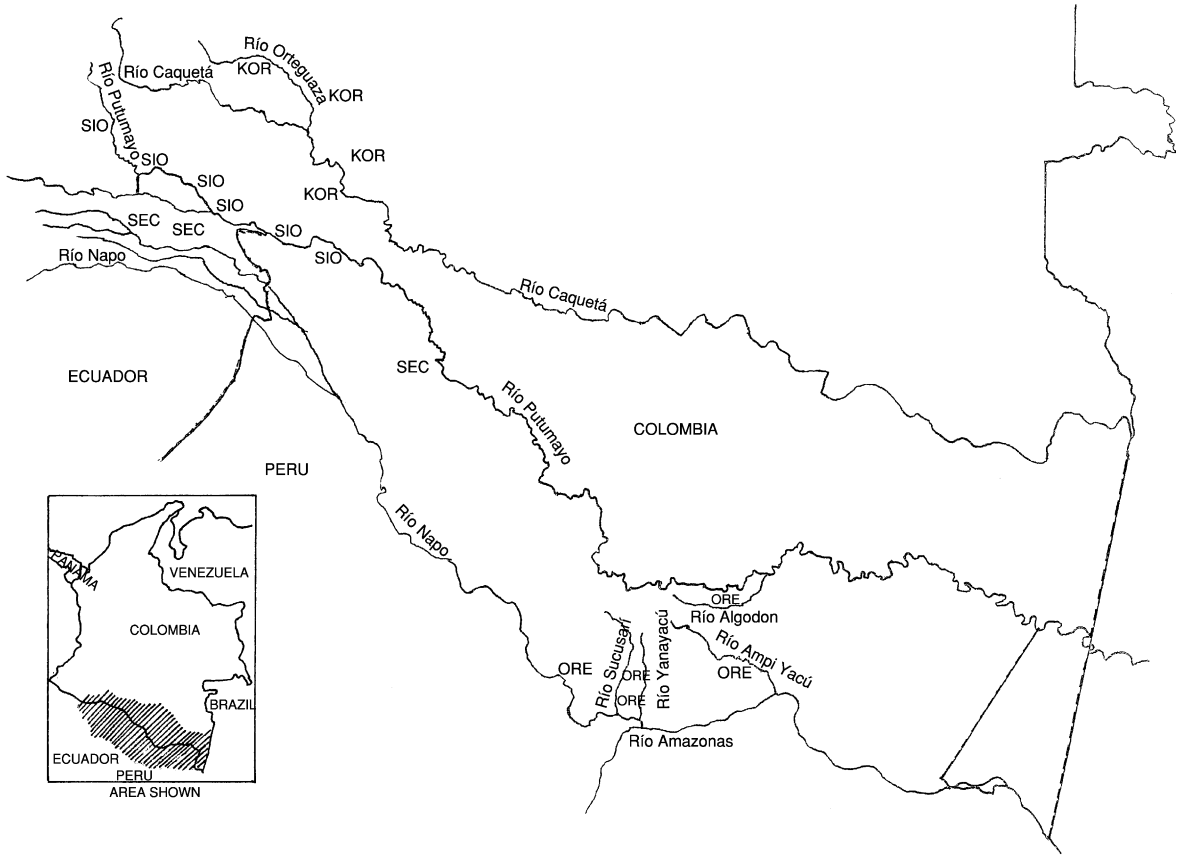

Figure 2 Western Tucanoan languages with approximate locations.

languages there are oral vowels in oral syllables and nasal vowels in nasal syllables. The following examples illustrate the six vowel contrasts:

Tuy. (my field data):

(1) /baˈa/ 'disposable basket'
/beˈe/ 'to split'
/biˈi/ 'to be similar'
/boˈo/ 'to desire'
/buˈu/ '*tucunaré* fish'
/bɨˈɨ/ 'pirana'

The following examples illustrate the oral–nasal contrasts:

Bas. (Jones and Jones, 1991: 9; personal communication):

(2)	a/ã	wa/wã	'to go'/'to illuminate'
	e/ẽ	eho/ẽhõ	'type of jungle nut'/'cold (illness)'
	i/ĩ	i/ĩ	'that (in sight)'/3SING.MASC (PRONOUN)
	o/õ	oha/õhã	'to enter woods'/'to untie'
	u/ũ	udi/ũdĩ	'to inhale'/'be similar to'
	ɨ/ɨ̃	ɨhɨ/ɨ̃hɨ̃	'hereditary chief of a sib'/'to burn (fire)'

The vowel /ɨ/ is a high central unrounded vowel, which is realized phonetically as a back unrounded vowel in certain environments in Carapana (Car.) and Tatuyo (Tat.) (Gómez-Imbert, 2000: 326 and Barnes field data).

Vowel Sequences Sequences of two contiguous vowels within a morpheme reveal interesting patterns of symmetry. See the description of Sir. (Nagler and Brandrup 1979: 120–122), and also of Pis. (González 2000: 380–381), in which she explained that /i/ and /ɨ/ may precede low vowels in the sequences iV and ɨV; /u/ may precede the three vowels farthest from itself; /e/ and /o/ may precede other low vowels; and /a/ may precede all three high vowels.

Consonants

The inventory of consonants in the majority of the Tucanoan languages, charted according to their phonemic characteristics, is shown in Table 3.

For a functional analysis of the consonants in four of the ET languages, see Gómez-Imbert (2000: 327–328).

In the ET and Middle Tucanoan languages, the voiced consonants and /h/ have nasal variants in nasal morphemes.

All 12 of the consonants in Table 3 are found in Desano (Des.) and Pir. The following languages have

Table 2 Vowel inventory

Type	*Front*	*Central*	*Back*
High	*i*	*ɨ*	*u*
Low	*e*	*a*	*o*

Table 3 Consonant inventory

	Bilabial	*Alveolar*	*Palatal*	*Velar*	*Glottal*
Voiceless stops	*p*	*t*		*k*	*ʔ*
Voiced stops	*b*	*d*		*g*	
Voiced flap		*r*			
Voiceless sibilant		*s*			
Voiceless semivowels			*h*		
Voiced semivowels	*w*		*j*		

all but /ʔ/: Car., Pis., Sir., Tuy., and Yur. The voiceless affricate /tʃ/ is used in Pis. rather than the voiceless sibilant /s/. Waimajã/Bará (Waimaha; Wai.) and Tat. lack both /ʔ/ and /s/. Bas. and Macuna (Mac.) lack /ʔ/ and /p/.

Cub. lacks /ʔ/ as well as /g/, and has the voiceless affricate /tʃ/ rather than /s/. Ret. lacks /j/ and /g/, but has the palatal stop /dj/.

The speakers of languages that lack /p/ or /s/ employ those consonants both in loanwords and when speaking other Tucanoan languages.

Two Western Tucanoan languages, Kor. and Sio., have 24 and 18 consonants respectively. Kor. has no voiced stops, but rather has bilabial and alveolar nasals at those points of articulation, and has /ɲ/ rather than /j/. It includes /w̥/ in addition to /w/, three voiceless aspirated stops, two voiceless nasals, the voiced affricate /dʒ/, and six labialized consonants. Of the typical 12 Tucanoan phonemes, Sio. lacks /r/, but includes a 'soft' voiceless fricative written as /z/, plus the two nasals /m, n/, the voiceless affricate /tʃ/, and three labialized consonants /k^w, g^w, h^w/.

Sec., as with Sio., lacks /r/, but has the same 'soft' voiceless fricative written as /z/, plus /k^w/ rather than /g/, and /m/ rather than /b/, totaling 12.

Ore. lacks /w/ and /r/ ([r] is an allophone of /d/), and includes the voiceless affricate /tʃ/. (Adequate information on Ore. is lacking.)

Two ET languages, Tucano (Tuc) and Wan., have 15 and 16 consonants respectively. Wan., in addition to the typical 12 Tucanoan phonemes, includes the voiceless affricate /tʃ/ and three voiceless aspirated stops. For a description of the development of these additional consonants in present-day Wan. from Proto-Tucanoan, see Waltz 2002. In 1967, West and Welch analyzed Tuc. as having the 12 consonants in Table 3. In 2000, having observed a definite change in pronunciation from, and language attitude toward, what was /CV_1hV_1/ to /ChV_1/ (where C is a voiceless stop), they included voiceless aspirated stops in their analysis, bringing the total of Tuc. consonants to 15. Welch and West (personal communication) analyze the phonetic realization [ChV] as /ChV/, for example: /-kho/ 'large, FEM,' whereas Ramirez recognized only /CV_1hV_1/: /-koho/ 'large' (1997: 216). Ramirez also analyzed /r/ as an allophone of /d/, which results in his defining a total of 11 consonant phonemes for Tuc. (1997: 25). It is to be noted that West and Welch have studied Tuc. in Colombia, and Ramirez in Brazil. The distance between the two locations of study is so great, and contact between the two groups is so rare, that it is not surprising that there are some differences.

Syllable Patterns

The Middle and ET languages have one basic syllable pattern: (C)V. In Des., Piratapuyo (Pir.), Tuc., and Ret. there is an additional syllable pattern, one in which the syllable is closed with a glottal stop: (C)Vʔ. In all of the languages, (C)VV has been analyzed as two syllables: (C)V.V, except that Ramirez analyzed (C)VV as a bimoraic syllable (1997: 53–56). The WT languages have monosyllabic two-vowel clusters, and a syllable can be closed with a glottal stop in Kor., Sec., and Sio.

There is evidence in Pir., Tuc., and Tuy. that an unstressed vowel between consonants /s/ and /t/ is dropping out, creating the consonant cluster /st/.

Pir. (Klumpp and Klumpp, 1973: 116; Waltz, personal communication):

(3) /biásitu/ [biástu] 'pot for hot pepper'

Tuc. (Welch and West, personal communication):

(4) /baʔa-sɨté/ [baʔasté] 'eat and scatter (food)'

Tuy. (my field data):

(5) /ˈpaasɨti/ [páasti] 'to be tired/bored'

Suprasegmentals

The suprasegmentals in the Tucanoan languages are nasalization and tone or stress that is accompanied by high pitch.

Nasalization and Nasal Assimilation In all of the ET languages, nasalization is a feature of the morpheme. Root morphemes are either oral or nasal. Suffixes are either specified as oral or nasal, or they are unspecified for nasalization. Those that are unspecified

are oral following an oral morpheme, and nasal following a nasal morpheme. In all of the Tucanoan languages, nasal spreading is progressive, spreading from left to right. In the following example from Des., /-re/ 'specifier' is unspecified for nasalization:

Des. (Miller, 1999: 14):

(6) /igo-re/ [igoɾe] 'to her'
/bãrĩ-re/ [mãɾĩɾẽ] 'to us'

In the Middle Tucanoan language Cub., as in the ET languages, nasalization is a feature of the morpheme, but the nasal spreading rule is different. In Cub., nasality spreads through any suffix that begins with /b, d, j/. In Ret., nasal spreading is blocked by obstruents, and present analysis has indicated that it occurs within the metrical foot (Strom, personal communication).

In the WT languages, nasalization is a feature of the syllable and spreads through all suffixes that begin with /w, j, h, ʔ/. In addition, nasalization spreads through /dʒ/ in Kor. and through /h^{w}/ in Sio. (Information is lacking on Ore.)

Regressive nasal spreading, where it occurs, is very limited. In the WT languages, it spreads from a morpheme consisting of a single nasal vowel to the preceding suffix. In the ET languages, regressive nasal spreading takes place in Des. (Miller, 1999: 14–15), Sir. (Criswell and Brandrup, 2000: 399), and Bas. (Jones and Jones, 1991: 15–16), affecting a limited set of specific, single-syllable suffixes. The regressive spreading never goes beyond one syllable. In the Middle Tucanoan language Ret., regressive nasal spreading affects only the first-person singular morpheme, which is prefixed to the verb root (Strom, 1992: 20). To illustrate regressive nasal spreading, note what happens to the suffix /-bi/ 'negative' in the following examples:

Des. (Miller, 1999: 14):

(7) wẽhẽ-bĩ-rã
kill-NEG-PL.ANIM
'the ones who don't kill'

(8) wẽhẽ-bi-gɨ
kill-NEG-*sing*.MASC
'the one who doesn't kill'

Accent and Tone Of the 19 Tucanoan languages, 11 have tonal systems with high and low tone contrasting in identical or analogous environments. In Car., Tat., Mac., and Wai. (though perhaps not in Bar.), all four combinations of high and low on two syllable roots occur.

In Des., Tuy., and Yur., there is one accented syllable per phonological word, and it is associated with high pitch. Sec. and Sio. have a pattern of accent on alternate suffixes. Ret. has a system of multiple stress with rules that require epenthesized suffixes and stress shifts (Strom, 1992: 13–19).

Accent is a property of the morpheme in the following ET languages:

- Bas. (Gómez-Imbert and Kenstowicz, 2000: 421)
- Des. (Miller, 1999: 15)
- Ret. (Strom, personal communication)
- Sir. (Criswell and Brandrup, 2000: 398)
- Tuc. (Ramirez, 1997: 68)
- Tuy. (Barnes, 1996: 31)
- Yur. (Kinch, personal communication)

The literature indicates that accent is probably a property of the morpheme also in:

- Cub. (Morse and Maxwell, 1999: 11–12)
- Mac. (Gómez-Imbert, 2000: 331)
- Pis. (González, 2000: 382).

Grammatical Characteristics

Sentence

The sentence in Tucanoan languages obligatorily demands a verb. Sentence fragments are used, but they occur, for example, as abbreviated answers to questions, responses using question words, etc.

Word Order In the majority of the Tucanoan languages, the usual word order in declarative clauses is (S)(O)V, with variations according to discourse constraints. In Car., the preferred word order is (O)(S)V. Bas. exhibits the basic order OVS. Cub. also has (O)VS, but SV(O) occurs as frequently. Kor. is the only language that has a preferred word order in which the verb is initial: V(S)(O), although other word orders also occur. The pattern OV occurs in all the Tucanoan languages, and the languages exhibit other typical features of OV languages.

Case Markers Nouns in the role of grammatical subject are unmarked, and there are rules for when the complements are marked. In Ret., both an animate subject and an animate object may have the same marker /-re ~-te/. Where there could be confusion, it is avoided by word order: The subject precedes the object.

Ret. (Strom, 1992: 114):

(9) ernesto-te alvaro-te hedjobaa-rape
Ernest-HUM *Alvaro*-HUM *help*-PAST
'Ernest helped Alvaro'

Although the Tucanoan languages are almost exclusively suffixing languages, Car. and Tat. allow the complement, if it is a pronoun, to be prefixed to the

verb, and Ret. has a neuter complement pronoun that only occurs as a prefix. In the rest of the Tucanoan languages, if the complement-pronoun needs to be expressed, it occurs in a separate word along with the complement/specificity suffix (REC = recent past; EV = evidential; NON3 = nonthird person – evidentiality and nonthird person are concepts discussed later in this article).

Car. (Gómez-Imbert, 2000: 332):

(10) kɨ-ĩjã́-à-bõ
3sing.MASC-see-REC-EV:PAST.VISUAL.3sing.FEM
'she saw him'

Sir. ('Brandrup, personal communication):

(11) sĩ́-bĩ
give-EV:PAST.VISUAL.3sing.MASC
'he gave (it) (to me)'

(12) igó-re weré-bɨ
3sing.FEM-SPEC tell-EV:PAST.VISUAL.NON3
'I told (that) to her'

The specificity suffix, which marks significant participants and props in the discourse, does not always occur with nonpronominal direct objects. Noun incorporation is evident where the object precedes the verb root and is phonologically part of the verb word.

Des. (Miller, 1999: 109):

(13) diu-pi
egg-place.on.ground
'lay an egg'

Other nounverb combinations function as noun incorporation. Alternatively the noun may function as an independent complement (BEN = benefactive).

Tat. (Gómez-Imbert, 2000: 334):

(14) jɨ-pátu-kẽdõ̃õ-boha-ja /kẽdõ̃õ-ja pátu-re
1sing-coca-prepare-BEN-IMP /prepare-IMP coca-SPEC
'prepare coca for me' /'prepare the coca'

When it is clear from the context that the noun is the complement, it is not marked as such, as in the case of 'pigs' in the following example (ANIM = animate, a concept discussed in this article).

Tuy. (Barnes, unpublished text #157):

(15) ape-'bɨreko 'tuakũbũ-adacu,
other.day arrive.near.goal-FUT.1,2PL pig-PL
je'se-a ja'a-adara hĩ'ĩ-ra
eat-AFFIRM.1,2PL say-PL.ANIM
'the next day we will arrive near (the town) in order to eat pigs'

With few exceptions, indirect objects, experiencers, and benefactors are always marked with the complement/specificity marker (SEP = separation, i.e., uncertain; D = dimension).

Mac. (Smothermon and Smothermon, 1995: 72):

(16) pauru-re ĩo-gɨ
Pablo-SPEC show-sing.MASC
j-a jɨ
AUXILIARY.VERB-PRES 1sing
'I am showing (it) to Pablo'

Sio. (Wheeler, 2000: 187):

(17) jɨ'ʔɨ dɨ̃'hõ-de gõ'ʔã haʔ'si-gɨ-jã
1sing wife-SPEC bones hurt-certainty-SEP
'my wife's bones hurt' (lit. 'bones hurt my wife')

Des. (Miller, 1999: 144):

(18) jɨ-re suʔri
1sing-SPEC clothes
ãsũ-basa-ra-jẽ sãjã-bɨ
buy-BEN-NOM-CLASS: 2D.flexible put.on-EV:PAST.VISUAL.NON3
'I put on the dress (cloth) that was bought for me'

A separate set of suffixes identify location, time, instrument, and accompaniment (ACC).

Pis. (González, 2000: 387):

(19) wetʃe-pɨ
field-LOCATIVE
'in the field'

(20) jãbĩ-pɨ
night-LOCATIVE
'at night'

(21) wãbõ-bẽdã
hand-INSTR
'by hand'

(22) kɨ̃-bai-bẽdã
3sing.MASC-younger.brother-ACCOM
'with his younger brother'

Nouns

Nouns in Tucanoan languages may be divided into two basic categories: animate and inanimate. These two categories take different plural suffixes. Within the animate category, human and nonhuman categories also take different plurals. Most ET nonhuman animate nouns are inherently singular and take a plural suffix. Nouns that refer to animals, insects, or fish that generally are found in groups are inherently plural and take a singularizing suffix.

Sir. (Criswell and Brandrup, 2000: 408):

(23) diá diá-rí
river river-PL.INAN
'river' 'rivers'

Sir. (Criswell and Brandrup, 2000: 405):

(24) bãhĩ-gɨ̃ bãhĩ-rã
*child-sing.*MASC *child-*PL.ANIM
'boy' 'children'

(25) pãbũ pãbũ-ã̃
armadillo *armadillo-*PL.ANIM
'armadillo' 'armadillos'

(26) burúá burúá-bɨ̃
termites *termites-*SINGULARIZER
'termites' 'a termite'

WT animate nouns have three categories: general, singular (with a singular suffix that is either masculine or feminine) and plural (with a plural suffix).

Sio. (Wheeler, 2000: 185):

(27) 'zĩ 'zĩgɨ 'zĩgo 'zĩkʷa
'child' 'boy' 'girl' 'children'

Classifiers The Tucanoan languages all have a small set of animate classifiers and, in most of the languages, a larger set of inanimate classifiers.

Animate classifiers, which also function as animate nominalizers, include masculine singular, feminine singular, and plural. Most of the languages have past, present, and future forms for the animate nominalizers as is shown in Table 4 for Sir.

Sir. (Criswell and Brandrup, 2000: 408):

(28) buué-gɨ
*study-sing.*MASC
'he who studies'

(29) buué-dii-gɨ
*study-*PERFECTIVE*-sing.*MASC
'he who studied'

(30) buué-bu-gɨ
*study-*POTENTIAL*-sing.*MASC
'he who will study'

Typically each ET language has over 100 inanimate classifiers, plus many nouns that may also function as classifiers. Ramirez (1997: 109) says that Tuc. has only six classifier suffixes, which he calls "shape suffixes" (plus some 400 'dependent nouns'). The 'shape suffixes' that both West and Welch (2000: 428 and personal communication) and Ramirez have identified are a small set of classifiers that do not require a nominalizer between the verb root and the 'shape suffix,' as do the many Tuc. suffixes that correspond to classifiers found in other ET languages.

Table 4 Animate classifiers in Siriano (Criswell and Brandrup, 2000: 408)

Tense	*Singular, Masculine*	*Singular, Feminine*	*Plural*
Present	*-gɨ*	*-go*	*-rã*
Past	*-dii-gɨ*	*-dee-go*	*-dẽẽ-rã*
Future	*-bu-gɨ*	*-bu-go*	*-bũ-rã*

Inanimate classifiers in Tucanoan languages typically are suffixes that categorize the object(s) referred to in terms of some salient characteristic, such as shape or arrangement. For a complete description of Tuy. classifiers see Barnes (1990). Tucanoan classifiers have been variously described as noun classifiers or numeral classifiers. In the ET languages, they are suffixed to numerals, demonstratives, quantifiers, genitives, nouns, and to either nominalized verbs and/or descriptive adjectives, or, in the case of the WT languages, directly to these roots as nominalizers.

Des. (Miller, 1999: 37, 5, 45, 125, 38, 40):

(31) juhu-koaru
*one-*CLASS*:gourd*
'one gourd'

(32) iri-ru
*this-*CLASS*:oblong*
'this airplane'

(33) baha-bĩhĩ-ri
*a.lot-*CLASS*:thin.plane-*PL.INAN
'many knives'

(34) bɨ̃-ja-ru
*2sing-*GEN-CLASS*:oblong*
'your boat'

(35) jukɨ-kawe
*tree-*CLASS*:bent*
'crooked tree'

(36) oʔa-ri-boga
*sweep-*NOM-CLASS*:bundle*
'broom'

When classifiers are suffixed to nouns, they are in a relationship of General-specific, as in the following examples, where /dẽĩ/ is the 'miritı́' palm.

Cub. (Ferguson *et al.*, 2000: 361):

(37) dẽĩ-jɨ̃ 'palm tree'
dẽĩ-rɨ 'palm fruit'
dẽĩ-kũ 'cluster of palm fruit'
dẽĩ-jabe 'seed of the palm fruit'
dẽĩ-joka 'palm leaf'

The WT languages have from 17 (Sec.) to 30 (Kor.) classifiers. These classifiers are suffixed to nouns, as in the Cub. examples above, and to verbs and adjectives as nominalizers. They are sometimes found suffixed to numerals and demonstrative adjectives.

The more than 29 Ret. classifiers are suffixed to nouns, numerals, nominalized verbs and descriptive adjectives, and optionally to demonstrative adjectives.

Noun Modifiers Noun modifiers in Tucanoan languages may be divided into two major groups: limiting adjectives and nominalized adjectival verbs.

Limiting adjectives, which are numerals, genitives, demonstratives (anaphoric or exophoric), and quantifiers, are either separate words or roots that require suffixes.

Mac. (Smothermon and Smothermon, 1995: 39–40):

(38) hɨa-hibɨ
two-CLASS:*basket*
'two baskets'

(39) hɨ̃gɨ ĩ ja-gɨ
hammock *3sing*.MASC GEN-CLASS:*hammock*
'his hammock'

Yur. (Kinch and Kinch, 2000: 477):

(40) ai-wi
that(EXOPHORIC)-CLASS:*building*
'that house'

Des. (Miller, 1999: 45):

(41) baha-bẽ-rã
a.lot-NEG-PL.ANIM
'a few (people)'

Nominalized adjectival verbs take the place of descriptive adjectives in the traditional sense of the term. Stative verbs, such as 'to be red' and 'to be big,' do not always take the full range of verb suffixes, and yet they are used as verbs, as can be seen in the following example.

Tuy. (Barnes, unpublished text #82):

(42) 'jaa dia'poa baji'ro
*1*GEN *face* *very*
jĩ'ĩ-a
be.black-EV:PRES.VISUAL.NON3
'my face is really dark (from the sun)'

Nominalized adjectival verbs may serve as full constituents of the sentence, i.e., the noun that is being modified will not appear in the sentence if the referent is already clear. When the referent is an animate noun, an animate classifier is suffixed directly to the verb and functions as a nominalizer. In the case of an inanimate referent, some of the languages require that a nominalizer be suffixed to the verb before the classifier.

Wan. (Waltz and Waltz, 2000: 460):

(43) jã́-ĩdã
be.bad-CLASS:PL.ANIM
'bad people'

Bas. (Jones and Jones, 1991: 63):

(44) sũã-ri-hãĩ joa-ri-hãĩ
be.red-NOM-CLASS:2D *be.long*-NOM-CLASS:2D
ãbõ-a-ha jɨ
want-PRES-NON3 *1sing*
'I want a long red piece of cloth'

Cub. has a small class of descriptive adjectives, which function neither as nouns nor as verbs. Among these are: *big, small, old, dry,* and *curly* (Morse and Maxwell, 1999: 124). Des., Sir., and Tuc. each list a small number of adjectives, among which are: *big* and *small* (Miller, 1999: 51; Criswell and Brandrup, 2000: 410; Welch, personal communication). Sec. and Sio. also each have a small class of descriptive adjective roots, including *big* and *small*, and derive the rest of their descriptive words from other grammatical forms (Johnson and Levinsohn, 1990: 37–38; Wheeler, 1987: 116–117). In Ret., words that are traditionally thought of as descriptive adjectives function almost exactly like nouns, and thus are listed as nouns (Strom, 1992: 23–26). The rest of the Tucanoan languages derive descriptive words by nominalizing verb roots and/or suffixing gender/number or classifier suffixes. In many, but not all, cases, these function much as do relative clauses in other languages.

Cub. (Morse and Maxwell, 1999: 86):

(45) xidoxa-RI-xãrãwɨ
be.scary-NOM-CLASS:day
'a scary day'

Personal Pronouns All of the Tucanoan languages have the same system for personal pronouns. In the singular, there are four forms: first person, second person, third-person masculine and third-person feminine. In the plural, there are also four forms: first-person exclusive, first-person inclusive, second person, and third person.

Tat. exhibits a typical set as shown in Table 5.

Demonstrative Adjectives The Tucanoan languages are split as to whether they make a distinction

Table 5 Personal pronouns in Tatuyo (Gómez-Imbert, 2000: 341)

	Person	*Singular*	*Plural*
	exclusive		*hãã*
1		*jɨ̃ɨ*	
	inclusive		*bãdĩ*
2		*bɨ̃ɨ̃*	*bɨ̃hã́ã*
	masculine	*kɨ̃ɨ̃*	
3			*dã́ã*
	feminine	*kõõ*	

between singular and plural in the demonstrative adjectives for inanimate referents. Cub., for example, does not make the distinction: /i-/ means both 'this' and 'these'; /ãdĩ-/ means both 'that' and 'those.' The anaphoric pronoun /di-/ means both 'that' and 'those' (Morse and Maxwell, 1999: 96). Pluralization is indicated only on the classifier or noun that follows the demonstrative adjective. Tuy. does make the distinction as shown in Table 6, and thus number is indicated on both the demonstrative adjective and the classifier or noun which follows it.

Tuy. (my field data):

(46) ati-do'to
*'this-*CLASS*:large.bundle*
'this large bundle (of firewood, cane, etc.)'

(47) ate-do'to-ri
*this.*PL-CLASS*:large.bundle-*PL.INAN
'these large bundles (of firewood, cane, etc.)'

Verbs

Independent verbs in Tucanoan languages are minimally comprised of a verb root and an evidential suffix, or an imperative, interrogative, or future suffix. In Tat. and Car., the verb root may be prefixed by a pronoun, and, to a lesser extent, the same is true for Bas. and Wai. Mood is indicated by suffixes that occur between the verb root and the evidential suffix, and may include negative, contraexpectation, desiderative, and irrealis suffixes. Some aspects are also indicated by verb suffixes that occur between the verb root and the evidential suffix, and indicate, for example, the habitual, durative, completive, and iterative aspects. Other aspects are indicated by auxiliary verb phrases.

Auxiliary Verbs The most common use of an auxiliary verb is in expressions of the progressive aspect. The main verb is nominalized, and the auxiliary verb is suffixed by dependent or independent verb suffixes, including whatever aspect or mood suffixes may be appropriate to the situation.

Table 6 Demonstrative pronouns in Tuyuca (Barnes and Malone, 2000: 446)

Pronoun	*Singular*	*Plural/Noncountable*
Exophoric		
'this'	*ati-*	*ate*
'that'	*ii-*	*iye*
Anaphoric		
'that'	*tii-*	*tee*

Tuy. (my field data):

(48) 'waa-gɨ tii-'bĩ-wi
*go-*NOM*:sing.*MASC *do-*CONTRAEXPECTATION-EV:PAST.VISUAL*.sing.*MASC
'He was going, but . . .'

Compound Verb Roots Compounding of verb roots is rare in the WT languages and Cub., but common in Ret. and the ET languages, where up to four verb roots can be combined in one phonological word. See Gómez-Imbert (1988) for an explanation of three different types of compounding that typically take place.

Tat. (Gómez-Imbert, 1988: 107):

(49) yã̄ã̄-róka-kũ̄bũ̄-ehá
fall-strike-lie.immobile-arrive
'to fall, arriving at and striking (the ground), and being immobile'

Evidentiality Evidentiality is an obligatory feature of the independent verb word in the ET languages, as well as in Cub., Sio., and Sec. It is indicated by optional verb suffixes in Ret., and is indicated by means of auxiliary verbs in Kor.

Evidential suffixes in the ET languages carry information about present and past tenses, and subject, including person, number, and gender. The function of the evidential suffixes appears to vary somewhat between the languages, indicating one of the following:

1. How the speaker obtained the information: Bar. and Wai. (my field data); Bas., Car., Mac., and Tat. (Gómez-Imbert, 2000: 340); Des. (Miller, 1999: 64); Sir. (Criswell and Brandrup, 2000: 400); Tuy. (Barnes and Malone, 2000: 441); Yur. (Kinch and Kinch, 2000: 479),
2. The speaker's degree of knowledge of the situation: Tuc., according to Ramirez (1997: 121), or
3. the point of view of the speaker: Wan. (Waltz and Waltz, 2000: 456); Tuc., according to Welch and West (2000: 424).

Evidential suffixes in the Middle Tucanoan language Cub. and in the WT languages Sio. and Sec. convey tense and person information as in the ET languages, but they indicate the degree of certainty about the information rather than how the speaker obtained the information (Ferguson *et al.*, 2000: 363; Wheeler, 2000: 189; Johnson and Levinsohn, 1990: 66–70). There is no information available on Ore.

Ret.'s evidential system consists of three optional verb suffixes. The first is /-ko-/, by which the

Table 7 Evidentials in Siriano (Criswell and Brandrup, 2000: 400)

Tense		*Visual*	*Apparent*	*Secondhand*	*Assumed*
Past	NON3	*-bɨ*	*-jo*	*-juro*	*-kujo*
	3sing.MASC	*-bĩ*	*-jũbĩ*	*-jupɨ*	*-kũjũbĩ*
	3sing.FEM	*-bõ*	*-jũbõ*	*-jupo*	*-kũjũbõ*
	3PL	*-bã*	*-jũbã*	*-jũrã*	*-kũjũbã*
Present	NON3	*-a*	-	-	*-koa*
	3sing.MASC	*-bĩ*	-	-	*-kũbĩ*
	3sing.FEM	*-bõ*	-	-	*-kũbõ*
	3PL	*-bã*	-	-	*-kũbã*

speaker tells something that he knows is a fact because he has heard something take place, although he has not seen it. The second is /-rihi-/, by which the speaker indicates that he is stating an assumption. The third is /-re/, by which the speakers conveys that the information is secondhand (Strom, 1992: 90–91).

Kor. employs auxiliary verbs to indicate evidentiality. One indicates secondhand information and the other indicates a supposition on the part of the speaker (Cook and Criswell, 1993: 86–87).

Wan. (Waltz and Waltz, 2000: 457) and Des. (Miller, 1999: 67–68) use an auxiliary verb phrase for the 'apparent' evidential, which is equivalent in function to the apparent evidential suffix in Tuy. The cognate verb phrase in Tuy. is distinct from the apparent evidential; the auxiliary verb bears the witnessed evidential suffix, and indicates that the speaker visually observed the end result of an action or state. (See Barnes, 1984: 264). Thus, by looking into the empty house he says, 'They left,' literally saying, 'I see that they are ones who have left.' Tuy. also has a single-syllable evidential suffix that indicates 'apparent' actions or states that the speaker deduces from evidence. That single-syllable suffix would be used, for example, when concluding that a piece of fruit was **apparently** in the state of being ripe, or it would not have fallen off the tree on its own. In the text where the following example occurs, the speaker heard the fruit fall, but never saw it.

Tuy. (Barnes, unpublished text #137):

(50) yĩĩ-'ri-ga dĩ'ĩ-bĩ-a-ju
ripen-NOM-CLASS:3D *be*-CONTRAEXPECTATION-REC-EV:PAST.APPARENT.NON3
'apparently the fruit was ripe'

Malone has concluded that the apparent evidential in Tuy. developed as the Tuy. speakers moved from expressing speaker distance in time and space to emphasizing how the speaker obtained his information (Malone, 1988: 138).

Table 7 illustrates a typical Tucanoan evidential system.

As is typical of most of the ET languages, person markers distinguish between third person and non-third persons. In Table 7, NON3 includes first and second persons singular and plural, plus inanimate.

Note that two of the eight paradigms in Table 7 are totally incomplete. The present tense in Sir. only distinguishes between the visual and assumed evidentials. The largest and most complete set of paradigms described in the literature on ET languages is found in Tuy., where 8 of 10 paradigms are complete (Barnes, 1984: 258). One of the incomplete paradigms is missing only the NON3 suffix. The totally empty paradigm is the present secondhand slot where one would not expect a paradigm, since secondhand information is always reported as past. Note the use of present and past in the following examples:

Tuy. (my field data):

(51) Bar'ia a'ti-jo
Maria come-EV:PRES.VISUAL.*3sing*.FEM
'Maria is coming' (reported by a person outside the house who sees Maria coming)

(52) a'ti-a-jigo
come-REC-EV: PAST.SECONDHAND.*3sing*.FEM
'she is coming' (lit. 'I was told that she was coming'), (reported by a person inside the house who has not seen Maria, but who heard the other say that she is coming)

Two features of evidentiality that occur in all of the Tucanoan languages are (1) firsthand knowledge of the state or event and (2) secondhand knowledge, indicating that the only information the speaker has about what he relates is that which came from someone else. All other features such as direct or indirect evidence, and tangible or intangible evidence, or, in the WT languages: degree of certainty, can be subdivisions of point (1).

Future The WT languages express the future by means of the potential aspect. The Middle and ET languages express the future in modal terms. For example, Bas. uses one of three moods to indicate the future: avoidance, conjecture, and intention

Table 8 Probable and indefinite future suffixes in Yurutí (Kinch and Kinch, 2000: 480, and personal communication)

Person	*Probable future*	*Indefinite future*
1,2 sing.MASC	*-gɨaku*	*-gɨga*
1,2 sing.FEM	*-goaku*	*-goga*
1,2PL	*-roaku*	*-raga*
3sing.MASC	*-gɨaki*	*-gɨagawi*
3sing.FEM	*-goakugo*	*-goagago*
3PL	*-rakua*	*-ragawa* ∼ *-roagawa*
Inanimate	*-roaku*	*-roga*

(Jones and Jones, 1991: 88–92). The rest of the Tucanoan languages have from one to three sets of future endings, composed of two to three morphemes each, which together convey probability, supposition, or definite intention. A study of Table 8 reveals how more than one morpheme is typically used in the formation of the future tenses.

Yur. (Kinch and Kinch, 2000: 480):

(53) bẽ'dãbẽ-pɨ 'waa-gɨaki
*tomorrow-*LOCATIVE *go-*FUT.PROBABLE
'he will go tomorrow'

(54) ati-jã'bĩka jo'sa-gɨagawi 'kɨ̃ɨ̃
this-afternoon *hang.in.hammock-*FUT.INDEFINITE *3sing.*MASC
'probably he will rest in his hammock this afternoon'

See also: Arawak Languages; Brazil: Language Situation; Classifiers and Noun Classes: Semantics; Colombia: Language Situation; Ecuador: Language Situation; Evidentiality in Grammar; Peru: Language Situation; Tense, Mood, Aspect: Overview.

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Tucker, Archibald Norman (1904–1980)

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Archibald Norman Tucker, phonetician and Africanist, was born in Cape Town and studied at the university there. After postgraduate work in Daniel Jones's Department of Phonetics at University College, London., he took his Ph.D. there in 1929, and was then engaged by the Education Department of the Sudan government to collect and analyze material on the indigenous languages of that country. In 1932 he was appointed to the Department of Phonetics and Linguistics at the then London School of Oriental Studies, and in 1951 became Professor of East African languages at what had now become the School of Oriental and African Studies. He retired in 1971, though for some years after that could still be seen working in an office he had retained at the School. He died in Camden, London.

Tucker's range of language interests was enormous, covering virtually the whole of the eastern half of the African continent, from the Sotho-Nguni group of languages in the south to the languages of western Sudan. His early work experience had brought him to one of the few areas of Africa where three of the four African language phyla could be experienced and material collected. Moreover, his training as a phonetician lent authority to his phonetic records and observations; his paper on distinctive voice quality in some of the 'Nilotic' languages is among the first to draw attention to this feature. These circumstances made it natural for him to take an interest in language classification, his earliest essay on which appeared in 1940, to be followed by two others produced in collaboration with his SOAS colleague Margaret Bryan. These have been described by a present-day expert (Bender, 2000) as "a great landmark in Nilo-Saharan studies," though both the classificatory groupings and the nomenclature employed have in more recent times been to some degree superseded. In addition to this, Tucker's phonological analyses may be thought to lose something through his steady adherence to the phonemic principles of his early training. His prosodic treatment of part of Luganda phonology is one interesting exception.

His academic interests extended, within African linguistics, to matters of orthography, including tone marking, and, beyond linguistics, to folklore and anthropology, as instanced by his extensive collection of materials on the marriage customs and rites of the Luo people.

See also: Luganda; Nilo-Saharan Languages.

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Tukanoan *See:* Tucanoan Languages.

Tungusic Languages

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Location and Composition of the Tungusic Language Family: Sociolinguistic Data

Tungusic languages (former name: Manchu–Tungusic) are spoken in a wide territory that includes Central and East Siberia and northeast China (Manchuria). One language, Sibe (Xibe), is located in the Xinjiang province of China. There are 12 modern Tungusic languages (see Table 1).

There are also two languages attested diachronically: Jurchen, represented by some inscriptions and dictionaries (12th–15th centuries C.E.), and Manchu, the state language of the Qing empire in China (1644–1911 C.E.) that has an abundant corpus of various written texts (16th to the early 20th century C.E.), most of them translations from Chinese. For all practical purposes, Manchu can be considered an archaic dialect of Jurchen, although the two languages employ different writing systems. Jurchen used a cumbersome indigenous (inspired by Chinese and Khitan writing systems) script that included both semantographic and syllabic signs. Manchu, on the other hand, uses the modified version of the Mongolian alphabet. Classical Manchu is still used in private correspondence by Heilongjiang Manchu, Solon, and Dagur Mongolians.

All surviving Tungusic languages are endangered to a greater or lesser extent; some of them are on the brink of extinction. The only languages spoken in China that have a written form are (1) Heilonjiang Manchu, whose speakers use essentially Classical Manchu, and (2) Sibe, whose speakers use a modified version of Classical Manchu that includes certain Sibe colloquialisms, because Sibe is historically a dialect of Manchu. During the Soviet period, literary forms were created for almost all Tungusic languages spoken in Russia, but most of them turned out to be short-lived. Even those languages that still have literary forms (Ewenki, Ewen, and Nanai) have a rather narrow application.

Internal Classification

There have been several conflicting attempts to classify Tungusic languages, but the most convincing is the recent attempt by Stefan Georg (2004), in which he proposed two basic groups: Northern (Ewenki, Ewen, Solon, Neghidal, Udehe, and Oroch) and Southern (Nanai, Ulcha, Uilta, both Classical and Modern Manchu, Sibe, and Jurchen). Within the Northern group, the following three subgroups should be distinguished: Ewen, Ewenki–Solon–Neghidal, and

Table 1 Modern Tungusic languages

	Names appearing in Ethnologue	*Frequently used alternative names*	*Number of native speakers*[a]
Ewenki	Evenki	Elunchun	11 360
Ewen	Even	Lamut	7463
Solon	Evenki	Ewenke	17 000
Neghidal	Negidal		170
Kili	Kili	Kur-Urmi, Hezhen	40
Udehe		Udige	526
Oroch	Oroch		169
Nanai		Goldi	5292
Ulcha	Ulcha	Olcha	986
Uilta		Orok	89
Heilongjiang Manchu	Manchu		70
Sibe	Xibe	Xibo	26 760

[a]Estimates of native speakers based on Soviet census of 1989 and Chinese census of 1990.

the intermediate subgroup including Udehe and Oroch. The languages of the intermediate subgroup are basically the Northern Tungusic languages that were strongly influenced by the Southern Tungusic languages. The Kili language that was traditionally considered a dialect of Nanai also likely belongs to the Northern group (Doerfer, 1978a). There are two subgroups within the Southern group: the Nani subgroup, including Nanai, Ulcha, and Uilta; and the Manchu subgroup, which included Manchu (both Classical and Modern), Sibe, and Jurchen.

Wider Genetic Affiliation

There is a widespread belief that Tungusic languages are distantly related to Mongolic, Turkic, Korean, and Japonic languages, forming with them the Altaic family. However, this controversial relationship has never been demonstrated satisfactorily. It is most likely that numerous parallels between the Tungusic and other Altaic languages represent traces of centuries- or even millennia-long contacts.

Structure

All Tungusic languages are agglutinative (with some elements of fusion) languages with SOV word order, although Ewen in some cases has shifts to SVO order, apparently under a strong Russian influence. Thus, there is only suffixation and no prefixation. Almost all languages have a rich morphology, with a somewhat reduced version of it in the Manchu subgroup.

Phonology

Tables 2 and 3 show the vowels and consonants for the Podkamennaia Tunguska subdialect of the Southern Ewenki dialect, which is used as the basis of the modern literary language. Both vocalic and consonantal systems are representative of the whole family, although, of course, certain expansions and/or reductions can be observed in individual languages. Syllabic structure is V, VC, CV, and CVC. Stress is probably dynamic, although further research is necessary. All languages have vowel harmony.

All vowels can be either short or long except **e** (< diphthong *ia), which is always long. Vowel length is phonemic (cf. Ewenki *bu-* 'to die,' *bū-* 'to give'; *tūkala* 'name of a plant,' *tukala* 'earth, ground').

Table 2 Vowels in Tungusic languages

	Front	*Central*	*Back*
High	i,ī		u, ū
Mid	ē	ə, ə̄	o, ō
Low	a, ā		

Morphology

Overall, the Northern Tungusic languages have a richer morphology than the Southern Tungusic languages. Nouns in most Tungusic languages have categories of number, case, and possession, although possession is not present in the Manchu subgroup. The number of cases varies from 6 in Manchu to 13 in Ewen. There is a certain allomorphism in case suffixes, depending on the last consonant of a nominal stem and vowel harmony. Table 4 shows an Ewenki paradigm that includes 11 cases for the words *bira* 'river,' *dət* 'tundra,' and *oron* 'reindeer.'

Some Tungusic languages differentiate between alienable and inalienable possession (cf. Ewenki *dili-B* head-1PERS.sing.POSS 'my head' and *dili-ŋi-β* head-ALIEN-1PERS.sing.POSS 'head of an animal that I killed and have in my possession,' where alienable possession is indicated by the special affix -*ŋi*-). There is also a distinction between exclusive and inclusive first person plural pronouns (cf. Manchu *be* 'we without you' and *muse* 'we including you,' 'I and you').

In some languages, adjectives agree with the modified noun in number and case, as for example in Ewenki: ərū-l-dū bira-l-dū bad-PL-DAT.LOC river-PL-DAT.LOC 'in bad rivers'; adjectives stay uninflected in other languages, as in Nanai: *dāi xoton-sal-ƒiaƒi* big city-PL-EL 'from big cities.'

The verbal morphology is very complex. All languages differentiate between nonfinite and finite verbal forms. Verbs have the following categories: voice, aspect, mood, tense, person, and number. There are six moods, six voices, and ten different aspects in

Table 3 Consonants in Tungusic languages

	Bilabial		*Dental*		*Palatal*		*Velar*		*Glottal*
Plosive	p	b	t	d	c	ƒ	k	g	
Nasal		m		n		ɲ		ŋ	
Trill				r					
Fricative		β	s						h
Approximant						j			
Lateral approximant				l					

Table 4 Morphology in Tungusic languages

	Vowel stem	*Plosive stem*	*Nasal stem*
Nominative	bira	dət	oron
Accusative	bira-*β*a	dət-pe	oron-mo
Indefinite accusative	bira-ja	dət-je	oron-o
Dative–locative	bira-dū	dət-tū	oron-dū
Allative	bira-tki	dət-tiki	oron-tiki
Illative	bira-lā	dət-[tu]lə	oron-dulā
Prolative	bira-lī	dət-[tu]lī	oron-dulī
Allative–locative	bira-kla	dət-iklə	oron-ikla
Elative	bira-duk	dət-tuk	oron-duk
Ablative	bira-git	dət-kit	oron-ŋit
Instrumental	bira-t	dət-it	oron-di

Ewenki. The typical order of affixes in a verbal form is root-VOICE-ASPECT-MOOD-TENSE-PERSON/NUMBER (e.g., Ewenki *ana-wkān-ɟə-cā-n* push-CAUS-IMPERF-PAST-3PERS.sing 'she was making [him] to push'). In most Tungusic languages, there is a special negative verb (e.g., Ewenki *baka-ra-n* find-AOR.PART-3PERS.sing 'he found,' *ə-cā-n baka-ra* NEG.V-PAST-3PERS.sing find-AOR.PART 'he did not find,' *baka-ɟaŋā-n* find-FUT-3PERS.sing 'he will find,' *ə-ɟəŋā-n baka-ra* NEG.V-FUT-3PERS.sing find-AOR.PART 'he will not find').

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Tunisia: Language Situation

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Although Tunisia is an Arab, African, and Mediterranean country that has long served as the crossroads between East and West, it possesses a level of linguistic and cultural homogeneity found in few other countries around the world. Tunisia has a population of approximately 10 million and literacy rate of 74%, and over 99% of Tunisians speak Arabic (Arabic, Tunisian Spoken). As with other Arab countries, diglossia exists in which Arabic is divided into 'higher' varieties (composed of Classical Arabic and Modern Standard Arabic) and 'lower' colloquial varieties, which themselves are represented by local dialects.

Classical Arabic is used in reciting the Koran while Modern Standard Arabic is employed in academic

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Classical Arabic is used in reciting the Koran while Modern Standard Arabic is employed in academic

lectures, literature, and political speeches. Modern Standard Arabic (MSA) is more commonly employed yet less formal than Classical Arabic. Tunisian Arabic, sharing features with Maghrebi Arabic also spoken in Morocco, Algeria, and Libya, forms with MSA a diglossia and occupies a lower standard than both Classical Arabic and MSA. Educated Arabic is another linguistic variety developing from the competition between Tunisian Arabic and MSA. Finally, French Arabic represents a mixture of French and Arabic.

Tunisian Berber speakers account for less than 1% of the population. Berbers are found in six small villages in the south of Tunisia: Chenini, Douiret, Guellala, Tamezret, Taoujout, and Zrawa. Berbers also continue to migrate back and forth between their villages and larger cities in Tunisia and France. Unlike the Berber varieties in Morocco and Algeria, Tunisian Berber is facing obsolescence because of widespread Arabic and French bilingualism as well as its relegation to use only among family and friends.

French, of course, remains the second language of Tunisia due to the establishment of the country as a French protectorate from 1912 to 1956 and the continued political, economic, and cultural ties that have existed since independence. While the curriculum in basic education has been Arabized, French is taught from the third year. In secondary school, French is the language of math and science instruction, while Modern Standard Arabic is used to teach the humanities. In practice, varieties of Arabic reflecting the diglossic continuum and French are commonly used in Tunisian education. While Arabization is continuing in government ministries and educational institutions, French also remains firmly established.

Other languages in Tunisia include English, German, and Italian. For the foreseeable future French will remain the dominant second language; however, there is an ongoing struggle between the spread of English and the continued use of French in Tunisia. The argument put forward by certain educators, journalists, and businesspeople in Tunisia and elsewhere in the Maghreb is that while French provides a window to the outside world, English opens a larger door. Discussion concerning modernization and privatization often leads to questions about language policy and planning decisions. German and Italian are additional languages commonly taught and used in Tunisia because of trade and tourism.

While Arabization will carry on within domains of Tunisian society, socio-economic cooperation with European Union countries indicates that Tunisia will continue to encourage multilingualism as a tool for development.

See also: Arabic; Berber.

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Tupian Languages

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The Tupí family is one of the largest families of languages of South America. It contains 10 branches, with a variety of languages in each branch. The first comprehensive classification of the Tupian languages was by Rodrigues (1964), and further improvements of his classification were made by Cabral (1996, 1997), Gabas (2000), Rodrigues and Cabral (2002), Rodrigues and Dietrich (1997), and Rodrigues (1966, 1980, 1985a, 1997). It is generally accepted that the point of origin of Tupian groups is the state of Rondônia, in the northwest part of Brazil. Rondônia is still the homeland of five Tupian branches – Arikém, Mondé, Puruborá, Ramaráma, and Tuparí – and of a few dialects (Amondawa, Karipuna, and Uru-eu-wau-wau) of the Kawahíb cluster of the Tupí-Guaraní branch.

Nine branches of the Tupí family are shown in **Table 1**, together with the languages that belong to each branch. Classification of the tenth branch of the Tupí family, Tupí-Guaraní, is shown separately, in **Table 2**, because of its complexity; the Tupí-Guaraní branch has the largest number of languages of the Tupí family (almost 50 languages, arranged in several subgroupings), and several of its members are spoken in countries other than Brazil. In **Table 1**, languages on the same line separated by a slash correspond to dialects of the same language; languages within parentheses correspond to alternate names for that

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Table 1 Classification of nine branches of the Tupi family

Branch	*Language*	*Population*
Awetí	Awetí	100
Arikém	Arikém	Extinct
	Karitiána	170
Jurúna	Jurúna	210
	Xipáya	15 (two speakers)
Mawé	Mawé (or Sateré)	5800
Mondé	Aruá/Cinta-Larga/Gavião/Zoró	36/640/360/250
	Mondé (Salamãy)	3 (semi-speakers)
	Suruí	580
Mundurukú	Mundurukú	3000
	Kuruáya	10
Puruborá	Puruborá	20 (two semi-speakers)
Ramaráma	Karo (Arara)	170
Tuparí	Ayurú	40
	Akuntsu	7
	Makuráp	130
	Mekéns (Sakirabiat)	70
	Tuparí	200

language. In Table 2, language clusters are indicated by italics. These correspond roughly to dialects of the same language. The population numbers given in both tables, except where indicated, correspond to the actual number of speakers of the language.

Of the 10 branches of the Tupí family, the Tupí-Guaraní branch is the one mostly studied. Languages of this branch have a higher degree of lexical and morphological similarities to each other when compared to languages of other branches. Internal classification of the Tupí family is currently in the early stages, but what is known about languages outside the Tupí-Guaraní branch allows a few generalizations to be made about Tupian languages as a whole. Larger genetic relations between Proto-Tupí and other families of languages, especially Macro-Jê and Karíb, have been proposed by Greenberg (1987) and Rodrigues (1985b, 1999, 2000) (*see* **Macro-Jê; Cariban Languages**).

General Properties of Tupian Languages

From the point of view of phonetics and phonology, Tupian languages do not have intricate consonantal and/or vocalic systems. Rodrigues (1999: 112) has reported that consonant systems across the family vary from 10 to 19, and Rodrigues and Dietrich (1997) proposed that Proto-Tupí has a six-vowel system. It is common that languages of various branches have a phonological distinction between short and long vowels (cf., Jurúna and Xipáya, of the Jurúna branch; Mundurukú, of the Mundurukú branch; possibly all languages of the Tuparí branch; all languages of the Mondé branch; and Karitiána, of the Arikém branch). Furthermore, nearly half of the Tupian branches have languages with either a true tone system (the Mundurukú and Mondé branches and possibly the Tuparí and Jurúna branches) or a pitch-accent system (Arikém and Ramaráma branches). Stress in Tupian languages is predictable, occurring generally in the last syllable of words. Tupian languages also have a syllable structure that typically does not allow consonant codas word-internally, with the exception of the glottal stop and the glottal fricative. Thus, patterns of consonant-vowel-consonant (CVC) and vowel-consonant (VC) occur exclusively word-finally.

From the point of view of morphology, Tupian languages are agglutinative and isolating. Only a few linguistic categories are marked by affixes – for instance, pronominal prefixes, two or three valence-changing prefixes (causative, comitative causative, and detransitivizer or passivizer), modal markers (usually indicative and gerund), and diminutive/augmentative markers. Categories such as number, gender, tense, and aspect are syntactically marked by particles.

Word classes are well established and easily distinguishable from each other on morphological and/or syntactic/semantic bases. Typical word classes are nouns (including pronouns), verbs (transitive, intransitive and, sometimes, uninflected verbs), postpositions, and particles. Adjectives occur in only a few branches (Arikém, Ramaráma, and Mondé). In all other branches, a descriptive verb fulfills the function of 'attributes' and 'properties.' Core cases, with the possible exception of Tupí-Guaranian languages, are not morphologically marked. Oblique case marking is conveyed by postpositions, in postpositional phrases. Usually, four or five cases are marked (ablative, allative, dative, instrumental, locative), although languages such as Karo have a larger system; Karo has 12 different postpositions that are used to mark the ablative, abessive, adessive, allative, comitative, dative, dispersive, inessive, instrumental, locative, similative, and circumjective cases.

Nouns, with the exception of those for elements of nature, are categorized as either alienable or inalienable. Alienable nouns generally designate manufactured items, kinship terms, animals, and plants, and occur freely in noun phrases. Inalienable nouns include mostly body parts (and, in some languages, kinship terms), and must occur preceded either by a free noun or a personal prefix (or, in some languages, such as Karo, a personal clitic). The occurrence of positional demonstratives, which mark the lying, standing, sitting, and hanging position of the head noun, is common in Tupian languages. Positional

Table 2 Classification of the Tupí-Guaraní branch[a]

Subgroup	*Language and clusters*[b]	*Country*	*Population*
I	Ancient Guarani	Brazil	Extinct
	Chiriguano (Avá)	Argentina/Bolivia/Paraguay	15 000/35 000/2000
	Izoceño	Bolivia	15 000
	Guayakí	Paraguay	850
	Kaiwá	Argentina/Brazil/Paraguay	500/9000/10 000
	Mbyá	Argentina/Brazil	1000/2000
	Nhandéva	Brazil	4900
	Paraguayan Guaraní	Paraguay and border areas of Argentina and Brazil	4 000 000
	Xetá	Brazil	3
II	Guarayu	Bolivia	5000
	Sirionó	Bolivia	650
	Jorá	Bolivia	5–10
III	Lingua Geral Paulista	Brazil	Extinct
	Nheengatu	Brazil	3000
	Tupí	Brazil	Extinct
	Tupinambá	Brazil	Extinct
IV	Avá (Canoeiro)	Brazil	100
	Asuriní of Tocantins	Brazil	200
	Guajajára	Brazil	10 000
	Parakanã	Brazil	350
	Suruí of Tocantins	Brazil	150
	Tapirapé	Brazil	200–350
	Tembé	Brazil	100–200
	Turiwára	Brazil	Extinct
V	Anambé of Cairarí	Brazil	20
	Araweté	Brazil	80
	Ararandewára-Amanajé	Brazil	200 (extinct)
	Asuriní of Xingú	Brazil	65
		Brazil	70
VI	Apiaká	Brazil	?
	Kawahíb cluster		
	Amondawa	Brazil	50
	Karipuna	Brazil	12–15
	Juma	Brazil	9
	Tenharim	Brazil	260
	Uru-eu-wau-wau	Brazil	100
	Kayabí	Brazil	800
	Parintintin	Brazil	130
VII	Kamayurá	Brazil	270
VIII	North of the Amazon		
	Emerillon	French Guiana	200
	Wayampí (Oyampí)	Brazil/French Guiana	500/650
	Zo'é	Brazil	140
	South of the Amazon		
	Guajá	Brazil	350
	Aurê and Aurá	Brazil	2
	Urubú-Kaapor	Brazil	500

[a]Data from Rodrigues and Cabral (2002).
[b]Names in italics indicate language clusters.

demonstratives are found in Mekéns, Karitiána, Mawé, and Mundurukú.

There is a remarkable class of words called 'ideophones' in many Tupian languages. Although their properties are not yet totally understood and/or described, roughly, ideophones have similarities to intransitive verbs, but their phonological, morphological, syntactic, and discourse behaviors are rather different. Ideophones are found in Karo (Ramaráma), Karitiána (Arikém), Mundurukú (Mundurukú), Xipáya (Jurúna), and Kamayurá (Tupí-Guaraní). Languages of the Awetí, Mawé, Mondé, and Tuparí branches do not have ideophones, but rather have a class of uninflected verbs.

Syntactic characteristics of Tupian languages include a basic subject-object-verb (SOV) order of clause constituents, with fronting of S or O being used as a syntactic device for emphasis or contrast. The occurrence of clause-chaining constructions, whereby a clause is structured of one main verb in the finite form plus one or more chained verbs in nonfinite or unmarked form, is common and is sometimes erroneously interpreted as serial verb constructions (Jensen, 1990). Typically, coreferential intransitive subjects receive special markings in chained clauses (although this does not characterize a switch-reference system), and transitive subjects are absent (zero-anaphora).

Evidentiality is also a widespread phenomenon in all branches of the Tupí family. Unfortunately, this is not yet fully understood and described, with the exception of Karo (Gabas, 1999) and Kamayurá (Seki, 2000). In Karo, the 11 evidentials are grouped in two categories. One grouping refers to the attitude of the speaker toward the proposition conveyed, and the other refers to the source of information. For Kamayurá, Seki (2000: 104) has described the existence of 'interjective particles' that are used to report to the attitude of the speaker toward the information conveyed. Although Seki does not explicitly analyze these particles as being evidentials, they can easily be interpreted as such.

Tupian languages also have systems of noun classification. In two branches, Mundurukú and Karo, a robust classifier system occurs. In Mundurukú, approximately 50 classifiers occur associated with the preceding noun according to their shape. Classifiers in Mundurukú also occur in concordance with other elements in the noun phrase. In Karo, a set of 11 classifiers occurs, relating to the shape (7), arrangement (2), and gender (1) of the preceding noun (the meaning of the 11th classifier remains unknown). Classifiers in Karo also occur, obligatorily, after an adjective, in concordance. Although languages of other branches do not have classifier systems per se, cognates of classifiers in Karo and Mundurukú occur lexicalized in many words throughout the family, usually the classifier for round objects, *ʔaʔ*; the classifier for concave/convex objects, *ka* or *kap*; and the classifier for flat objects, *peʔ*. This suggests that a system of noun classification already existed in the protolanguage, Proto-Tupí.

See also: Adjectives; Adpositions; Brazil: Language Situation; Cariban Languages; Converbs; Demonstratives; Evidentiality in Grammar; Guarani; Ideophones; Imperatives; Macro-Jê; Mood and Modality in Grammar; Nouns; Passives and Impersonals; Serial Verb Constructions; Word Classes/Parts of Speech: Overview.

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Turgot, Anne Robert Jacques (1727–1781)

D Droixhe

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Born in Paris in 1727, the future *Intendant* of Limousin (1761–1774) and General Controller of Finances (1774–1776) started to discuss the fashionable question of language under the influence of Condillac (1746; *see* **Condillac, Etienne Bonnot de (1714–1780)**) and Maupertuis (1748). His commentary on the latter's *Réflexions philosophiques sur l'origine des langues et la signification des mots* was opposed, in a pre-Rousseauist way, to the idea of the invention of language by primitive reasoning like a 'philosopher.' Words evolve dynamically from metaphors to a sort of *tablature*, 'a methodical disposition of signs' which allows thinking. In the metaphors are culturally printed the various perceptions of the world; so, Turgot rejected at the same time the Cartesian primacy of ideas and the growing tendency to explain the diversity of languages by climate or national psychology. A decisive effort was made to establish the linguistic field as an object in itself.

Planning a study *On the formation of languages and general grammar*, of which some fragments are preserved, Turgot quickly shifted from genetic interrogation to 'semantic history' or 'experimental metaphysics.' He was asked to write the article *Etymologie* for Diderot's *Encyclopédie* (1756; *see* **Diderot, Denis (1713–1784)**), his main contribution to modern linguistics, which belongs to the same scientific movement as Sarmiento's *Elementos etimológicaos* (1758–1766) or Tetens's *Über die Grundsätze und den Nutzen der Etymologie* (1765–1766).

Turgot applied to this subject the Leibnizian law of continuity, with tendencies towards the principles of immediacy and proximity. An etymology must take into account the internal relationships of a given language, before it refers to exotic roots. Then, it has to reconstruct a 'chain of alterations' offering 'a succession of facts known directly or proved by credible inductions.' These alterations are not universal, but fundamentally particular and open to the most unexpected developments. 'Every language, and in every language every dialect, every nation, every century, constantly changes some letters into other letters, and resists other changes which are just as constantly adopted by neighbors.' Rask (*see* **Rask, Rasmus Kristian (1787–1832)**) recognized Turgot's epistemological innovation.

The effect of the latter in comparativism was limited by the perturbing principle of contact and borrowing, to which some lexical correspondences were readily attributed by Turgot. The prevailing concept of 'commerce' was probably not extraneous to this option, as the bourgeois ideology of the 'added value' must have influenced his insistence on the transformation of reality by words and on their poeticity.

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Between Vico and Herder (*see* **Herder, Johann Gottfried (1744–1803)**), announcing the German creativity of sign (Tetens's *Bildendes Dichtungsvermögen*), Turgot invented and spontaneously articulated several features of a change leading to romanticism.

See also: Condillac, Etienne Bonnot de (1714–1780); Diderot, Denis (1713–1784); Herder, Johann Gottfried (1744–1803); Rask, Rasmus Kristian (1787–1832).

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Turing Test

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Introduction

'The Turing Test' is the name given to any of several variations of an experiment proposed by the mathematician and computer scientist Alan M. Turing in his essay, 'Computing machinery and intelligence,' which appeared in the philosophy journal *Mind* in 1950. The Test, briefly put, is for an interrogator to decide whether a participant in a natural-language conversation is a human or a computer. The participant passes the test to the extent that it convinces the interrogator that it is human (even if it is really a computer). (For simplicity, I will usually call the one (or two) participant(s) in a Turing Test other than the interrogator *the participant*. In different versions of the Test, the participant(s) might be a male and/or female human, a computer, or perhaps some other candidate for the ascription of *intelligence*.)

The experiment, a version of a parlor game that Turing called *the imitation game*, was designed to help answer the question 'Can machines think?' by replacing that informal question (containing the vague terms *machines* and *think*) by a more precise question: Can a computer 'pass' a Turing Test? Thus, the vague terms *machines* and *think* are replaced by, respectively, the more precise notions of a digital computer (or a Turing machine) and the more precise – or at least behaviorally determinable – notion of passing the Test. (This strategy – replacing a vague, informal question that is difficult to answer with a more precise question that is easier to answer – is similar to the strategy that Turing (1936) adopted in giving his extremely influential answer to the question of what 'computable' means.)

The Imitation Game

The original 'imitation game' consists of three players: a man, a woman, and an interrogator, each in a separate room, communicating only via teletype (or what today would be considered an 'instant messaging' interface), such that none of the players can see or hear the others, thus limiting their interactions to typed (i.e., written) linguistic communication. We will consider the extent to which this is a limitation later on. The woman's task is to convince the interrogator that she is the woman; the man's task is to **imitate** a woman so as to convince the interrogator that he **is** the woman; and the interrogator's task is to determine who is which. The man wins the imitation game (i.e., 'passes' the imitation-game 'test') if he succeeds in convincing the interrogator (e.g., perhaps by deception) that he is the woman; thus, the woman succeeds (as does the interrogator) to the extent that

Between Vico and Herder (*see* **Herder, Johann Gottfried (1744–1803)**), announcing the German creativity of sign (Tetens's *Bildendes Dichtungsvermögen*), Turgot invented and spontaneously articulated several features of a change leading to romanticism.

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the man fails. This version of the imitation game seems to be computationally solvable: a computational study has suggested that it is possible to identify stylistically whether the author of a given text is male or female (see Argamon *et al.,* 2003) for a computational investigation of this.

The Turing Test and Its Variations

Several versions of the Turing Test may be found in Turing's essay and in subsequent literature. Turing's first version merely replaces the man in the imitation game by a computer. If the interrogator fails as often as he or she did with the imitation game, then the computer is said to have 'passed the Turing Test'. But does this mean that the computer passes the Test if it is able to convince the interrogator that it is a man who, in turn, is trying to convince the interrogator that he is the woman?

It is reasonably clear from Turing's essay that he had in mind something less convoluted. Thus, the second version of the Test replaces the man by a computer and the woman by another **man**, and so the computer's task is to convince the interrogator that it is a man (see Colby *et al.,* 1972: 202 and Shieber, 2004: 100–104 for further discussion of the gender issue).

A more gender-neutral version replaces the man by a computer and the woman by a **human** (of either sex). The computer passes this version of the Test if it convinces the interrogator that it is the human.

In modern versions of the Test, this is simplified even more, by having an interrogator and only one participant: either a computer or a human. Again, the computer 'passes' this Test if it convinces the interrogator that he or she is interacting with a human. Turing (1950) alludes to this version as a *viva voce*, i.e., an oral examination; a subject passes an oral exam by convincing the examiner that he or she 'understands' the material that he or she is being tested on.

Another variation (Stuart C. Shapiro, personal communication) depends on whether the interrogator **knows** that there is a possibility that the participant is a computer or whether the interrogator is merely being asked to judge whether the participant is intelligent (or as intelligent as a normal person).

Turing (1950: 441) also mentions a version of the Test in which the interrogator must distinguish between a digital computer and a discrete-state machine. Other variations are described later on.

Passing the Test

As a standard for deciding whether a participant has passed the Test, Turing (1950: 442) proposed that "an average interrogator will not have more than 70 per cent. [*sic*] chance of making the right identification after five minutes of questioning." Some researchers have complained that this sets the standard too low, but the actual statistical standard to be applied could easily be varied (e.g., 70% increased to 95%, 5 minutes increased to several months, etc.). Turing's prediction was "that at the end of the century [i.e., by 2000], the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted" (Turing, 1950: 442). (We will examine these two standards later in this essay. At the end of the century, in fact, several anthologies considered the status of Turing's prediction: Akman and Blackburn, 2000; Moor, 2000–2001; Moor, 2003; Shieber, 2004.)

The Turing Test has been likened to two, more familiar situations:

1. The two-entity version (interrogator and participant) is like the situation in which a human corresponds with a pen pal (Harnad, 1989). In real life, the human would be unlikely to doubt that the pen pal was a human. One point of the Turing test is that if the pen pal were, in fact, a computer, still the human would not question its humanity (i.e., its human level of intelligence or its human ability to think).
2. As Stuart Shieber (2004) points out, the interrogator's task is like that of someone determining whether something is 1 m long by comparing it with a standard meter; both items share the same length. Here, the interrogator is determining whether something has a certain feature (namely, a human level of intelligence) by seeing if it shares that feature with (i.e., if it can be measured against) another entity, which, by hypothesis, is a 'standard' for having that feature. And, in the case of the Turing Test, the standard is written linguistic communication (Shieber's term is 'verbal behavior').

Experiments with Real Turing-like Tests

Two early AI (artificial intelligence) programs in the areas of natural-language processing and cognitive modeling are often mentioned in connection with the Turing Test. Joseph Weizenbaum's (1966, 1967) computer program Eliza appears to converse in more or less fluent English with its user, apparently simulating a Rogerian psycho-therapist. Many anecdotes of people being fooled into thinking that they were conversing with a real human suggest that Eliza has passed a Turing-like Test. Yet Eliza's natural-language-processing techniques are mere pattern

matching using little or no grammatical knowledge (e.g., swapping pronouns such as you and me in certain patterns) – i.e., the techniques are not cognitive. Hence, Weizenbaum has claimed that Eliza is a counterexample to the Turing Test. But this has not been subject to controlled experiments.

On the other hand, Kenneth Mark Colby's computer program Parry is an Eliza-inspired program that, using more sophisticated natural-language-processing techniques than Eliza, simulates a paranoid patient. Parry has been the subject of controlled Turing-Test-like experiments (Colby *et al.,* 1972; Colby, 1981), and Colby, at least, claims that it has passed the Turing Test, having convinced human psychotherapist judges that they were conversing with a human paranoid patient. On the other hand, that is all that Parry can discuss, and so it is not clear that the sort of test that it passes is a full-fledged Turing Test.

The Loebner Prize Competition, held annually since 1991, is a Turing-like test that has offered a monetary award "for the first computer whose responses were indistinguishable from a human's. Each year an annual prize of $2000 and a bronze medal is awarded to the most human computer. The winner of the annual contest is the best entry relative to other entries that year, irrespective of how good it is in an absolute sense" (Loebner, 2003). Most of the winners have been elaborate Eliza-like programs (sometimes called *chatterbots*). However, one notable exception was David Levy's CONVERSE program (Batacharia *et al.,* 1999), which won the Loebner Prize in 1997, and which was developed by a team including at least one well-known researcher in computational linguistics (Yorick Wilks). The Loebner Competition has been critically analyzed by the computational linguist Stuart Shieber, who has argued that the Competition, unlike other competitions for professional computational linguists (e.g., the Message Understanding Conferences and the Text Retrieval Conferences), has not fostered research and development, but merely encouraged unintelligent, Eliza-like chatterbot programs whose sole goal is to fool the judges (Shieber, 1994a, 1994b; for Loebner's reply, see Loebner, 1994).

Turning the tables, some projects have used computers as 'interrogators' in a Turing-like test to unmask computer programs that attempt to convince other computer programs that they are human and hence entitled, say, to e-mail accounts. However, these tests are not based on natural-language understanding or even verbal behavior; they usually involve visual images containing distorted words that only humans can read (Ahn *et al.,* 2004). One formal investigation that replaces the interrogator with a Turing machine claims to show that no computer can be a perfect interrogator in the standard Turing Test (Sato and Ikegami, 2004). And there have been other investigations of the formal, logical, and computational structure of the Turing Test (e.g., Bradford and Wollowski, 1994; Shieber, 2005).

What Must a Computer Be Able to Do in Order to Pass the Turing Test?

A significant feature of the Test is the central role of language. To pass the Test, a participant must be able to communicate in the written natural language of the interrogator to such an extent that the interrogator cannot distinguish its linguistic behavior from that of a human using that language. (To simplify matters, we will assume that all participants speak that language equally well.)

This feature echoes a historical antecedent to the Turing Test: in his *Discourse on method* (1637: Part V), the philosopher René Descartes argued that there was a test that could show that a machine that looked and behaved like a human was not a real human, namely, that even if it could use language in certain appropriate, responsive ways (e.g., to "ask what we wish to say to it" if "touched in a particular part," or to "exclaim that it is being hurt" if touched somewhere else), it could not "arrange its speech . . . in order to reply appropriately to everything that may be said in its presence" (Descartes, 1637/1970: 116). There are two issues to consider: (1) Is linguistic ability a reasonable replacement for the informal notions of 'thinking' or 'intelligence'? (2) Must the test be limited to linguistic ability?

Is Written Linguistic Behavior a Reasonable Replacement for 'Cognition'?

'Thinking' is a vague term, and 'intelligence' is not necessarily, or even probably, intended in the sense of the IQ-test notion of intelligence, but merely as a convenient synonym for 'cognition'. Therefore, we will use the latter term, which is less controversial.

To approach an answer to the question of whether written linguistic behavior can replace 'cognition', we can look at what Turing thought the computer might have to be able to do. In his examples of the computer's behavior and in his replies to a series of potential objections, Turing suggests that the computer might have to do the following (kinds of) things:

- Answer questions about its physical appearance and abilities.
- Answer questions about its personality and experiences.
- Write and discuss a poem on a given topic.

- Do arithmetic.
- Solve chess problems.
- Have access to, and be able to use, commonsense information about the seasons, Christmas, familiar fictional characters, etc. (This is sometimes called world knowledge.)
- Learn.

For Turing, the last of these was the most important. Presumably, this learning would have to come from reading, not from doing, although Turing also suggests that the machine might have other "experience[s], not to be described as education." In any case, Turing seems to have been willing to restrict the Test-passing capabilities of the machine to "all purely intellectual fields," which, presumably, manifest themselves through language.

Insofar as ordinary cognition is surely involved in these sorts of activities, being able to do them does seem to be a reasonable test of human-level cognition. Surely, if a machine could do such things, an interrogator would be justified in being unable to distinguish between it and a human who could do them equally well. Hence (perhaps), the interrogator would be justified in concluding that the participant had cognition. Turing, however, does not say that the interrogator needs to draw the conclusion that the participant really has cognition (i.e., really can do these things); perhaps this is why he wrote that "the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted."

Thus, a computer must have at least the following two capacities to pass a Turing Test: (1) the ability to understand and generate natural language; (2) lots of world knowledge. Let us consider each of these.

Understanding Natural Language What counts as 'understanding' (including generating) natural language? Turing apparently thought that it simply meant behaving in such a way that the interrogator **believes** that the participant understands the language, i.e., that the interrogator **attributes** natural-language understanding to the participant (cf. Dennett's (1968) "intentional stance"). Cognitivists hold that it means something more than mere behavior. Perhaps any entity that exhibits such behavior must have the further capacity to be able to parse linguistic input, construct a (mental) representation of it, integrate or assimilate it into 'background knowledge', determine an appropriate linguistic response, and formulate and express that response in a grammatical utterance. Or **understanding** natural language might mean something even more than certain behavior together with this natural-language-**processing** capacity: Perhaps the entity must have "intrinsic intentionality" or consciousness (Searle, 1980).

World Knowledge Understanding natural language is probably not something that can be done merely on the basis of linguistic knowledge (e.g., knowledge of a grammar and lexicon). It probably requires much world knowledge – not only semantic and pragmatic knowledge, but also something like what the educational reformer E. D. Hirsch (1987) calls 'cultural literacy' or what the AI researcher Douglas B. Lenat (1995) calls 'commonsense knowledge', i.e., lots of facts about the world, and perhaps also some specialized domain knowledge (e.g., knowledge of how to play chess).

The computational linguist Terry Winograd argued for the claim that natural-language understanding requires such knowledge: consider these two sentences, which differ in only one word: (a) "The city councilors refused the demonstrators a permit because they advocated violence" and (b) "The city councilors refused the demonstrators a permit because they feared violence." Arguably, it is 'world knowledge' or 'commonsense knowledge' about the roles of city councilors and demonstrators, as well as semantic knowledge about the meanings of the words *advocated* and *feared*, that aids in determining that the word *they* refers to the demonstrators in (a) but to the city councilors in (b).

Moreover, someone reading *The Diary of Anne Frank* who does not understand the word *Gestapo* might be told that it was Hitler's secret police, but if the reader does not know who Hitler was, this will not be of much help. The reader needs to know that Hitler was the Nazi dictator of Germany during World War II, who the Nazis were, where Germany is, what World War II was, etc.

Is Written Linguistic Communication a Limitation?

Must the test be limited to linguistic behavior? After all, cognition in general is usually taken to consist of more than just linguistic ability; e.g., it includes learning, perception, reasoning, memory, planning (and acting on those plans), etc. In the original imitation game, the restriction to linguistic interrogation eliminated the need to deal with the physical make-up of the participants. Limiting the interrogation to linguistic communication does not seem debilitating: surely the sorts of conversations that Turing suggested cover a wide range of intellectual activities – enough to convince an interrogator of the

participant's cognition (or, more precisely, the participant's cognitive-behavioral indistinguishability from a human).

Linguistic ability by itself is surely a mark of cognition. Moreover, it may be that linguistic ability is the essential core of the kind of cognition that is in question, in the sense that any entity that had such linguistic ability is highly likely to have – or require – most other kinds of cognition (Rapaport, 1988; Harnad, 1989; Rey, 2002). Not only does natural-language understanding require world knowledge, but it is arguably the case that natural-language understanding is 'AI-complete'; i.e., 'solving' the natural-language-understanding problem may require solving all other problems in AI (artificial intelligence). If so, then, insofar as passing the Turing Test requires natural-language understanding, it would be a sufficient condition of cognition. In any case, the psychologist Stevan Harnad (1989) has proposed a Total Turing Test variation that extends the Test to allow for demonstrations of perception, action, and other sorts of non-linguistic cognition (or cognitive indistinguishability from humans).

If passing the Turing Test requires, not merely the ability to fool or (statistically) convince an interrogator that he or she is conversing with a human (or at least with an entity with human-level cognition), but actual, human-level linguistic abilities, then what kinds of abilities are required? Research in AI and computational linguistics since the mid-1950s suggests that any natural-language understander – including a Turing-Test-passing program – must be able (at least) to:

1. take coherent discourse (as opposed to isolated sentences) as input
2. understand ungrammatical input
3. make inferences and revise beliefs
4. make plans (for speech acts, to ask and answer questions, and to initiate conversation)
5. understand plans (including the speech acts of all interlocutors in the conversation)
6. construct user models (i.e., 'theories of mind', or psychological theories, of all interlocutors)
7. learn about the world and about language, and do this in part via a natural-language interaction
8. have background (or 'world', or 'commonsense') knowledge
9. remember what it heard, learned, inferred, and revised.

Arguably, any entity having these abilities could be said to be able to understand language or, more generally, to be cognitive, or to think. The open research question is whether **computational** theories of these cognitive abilities can be developed.

What Does Passing the Turing Test Mean?

Does Passing the Turing Test Demonstrate Real Cognition or Only the Appearance of Cognition?

Is a machine that **appears** to understand natural language or to have cognition **really** understanding natural language; does it really have cognition? Perhaps the early-to-mid-20th-century behavioral bias made it seem reasonable to Turing that his test answers this question in the only way possible. But the modern late-20th-to-early-21st-century cognitive bias has kept the question open.

One position is that if the output of the machine is not produced by 'the same' methods that humans use, then although its external behavior might be similar to a human's, its internal mechanism is not and, hence, it is not really doing them. Another position is that anything that is capable of these complex sorts of linguistic behavior is indeed communicating in language (at least, no less than a human is) and not merely appearing to, no matter what internal mechanism produces the output. That is, it is not merely simulating the use of language; rather, at least in the case of language use (and other cognitive phenomena), this sort of simulation **is** the real thing (Rapaport, 1988).

Another line of argument, however, suggests that even in the case in which it is felt that the appearance is not reality, it is near enough so as not to matter. Some support for this is given by Turing's statement "that at the end of the century **the use of words** and **general educated opinion** will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted." One way that this might come about is if "the use of words" were to change, e.g., the meaning of *think* might be extended metaphorically to cover both machines and humans. Enlarging the scope of meaning of a word is something that has happened many times before: "To fly" was once something that only birds and bats were said to do; now, airplanes, helicopters, space shuttles, and their human riders are all said to fly. A 'computer' was once a **human** whose job was to carry out complex or lengthy mathematical calculations; now, it is a **machine** that does what those humans once did. Such semantic enlargements can come about by metaphorical extension: perhaps planes do not literally fly (in the bird-sense), just as philosophers do not literally shoot down an opponent's argument, but we eventually come to apply the metaphor so often that it becomes an unquestioningly acceptable – even unavoidable – predication.

In addition to "the use of words" changing, it is also possible for "general educated opinion" about the nature of cognition to change, perhaps as a result

of progress in AI, philosophical analysis, or psychological research, e.g., the meaning of the word *think* might be abstracted to an essence that allows it to be predicated of both AI-programmed computers and humans (not to mention other animals). Our current theoretical understanding of heavier-than-air flight encompasses both bird flight and airplane flight. And our current theoretical understanding of computation – due, in fact, to Turing (1936) – has its foundation in an analysis of what human computers do. Extending this idea, progress in AI and cognitive science could cause us to have a better understanding of cognition in such a way that the new understanding applies to both humans and machines.

Is Passing the Turing Test a Sufficient Demonstration of Cognition?

In what sense does passing the Turing Test **replace** the vague notion of 'thinking'? Logically, there are two possibilities: it is a necessary condition, or it is a sufficient condition (or both). To say that passing the Turing Test is a **necessary** condition of 'thinking' is to mean that if something thinks, then it can pass the Turing Test. It might, of course, be the case that something can think but fails the Test, perhaps because the interrogator is not up to par or because the thinking agent simply is having an 'off day'. But, presumably, under normal circumstances, a real cognitive agent that takes the Test will pass it.

More controversial is the proposition that passing the Turing Test is a **sufficient** condition of 'thinking'. To say this is to mean that if something passes the Test, then it 'thinks'. Several objections to the Turing Test take the form of showing that it is not a sufficient condition for thinking.

The 'Aunt Bertha' Table-Lookup Objection One, due to the philosopher Ned Block (1981), considers a computer program that stores a finite, but extremely large, number of possible conversations – all the one-hour conversations that the programmer's 'Aunt Bertha' might possibly have during her entire life, on any subject whatever. Such a program would, presumably, pass the Test, yet would not normally be considered to 'think'. The point is that the methods whereby the responses are produced are behaviorally, but not psychologically, plausible. Thus, we have a case of something that passes the Test but does not think, which is a counterexample to the test's sufficiency. Thinking, according to this objection, is not merely a matter of behavior, but also a matter of how that behavior is produced, and certain ways of producing it are not suitably cognitive (such as memorizing a large lookup table), whereas certain others might be (such as requiring reasoning; cf. Shannon and McCarthy, 1956).

One possible response is to deny the possibility of such a 'pre-compiled' lookup table (e.g., such a system could not learn new words). To this objection it can be replied that there is only a finite (albeit astronomically large) number of possible words, all of which could be pre-compiled. On behalf of the Test, another response to Block's objection is to admit this, but to point out that the Test still provides considerable evidence supportive of a claim to cognition and, in the absence of any ability to know how the cognitive behavior was produced (as in the pen pal case), that might be all the evidence one could possibly have.

The Chinese-Room Objection Perhaps the most well-known objection to the Test's sufficiency is the philosopher John Searle's (1980) Chinese-Room Argument. Here, a human who knows no Chinese is placed in a room with an instruction book that tells him how to manipulate certain symbols that are input to him in the room, and then how to output other symbols on the basis of these manipulations. The interrogator is a native speaker of Chinese who inputs questions written in Chinese characters and reads the output from the room. By hypothesis, the interrogator judges that the entity with which he is fluently conversing understands Chinese, whereas, again by hypothesis, the human in the room in fact knows no Chinese and is merely manipulating marks that are 'meaningless' to him. Thus, we seem to have a case in which something does not have a certain sort of cognition (in this case, understanding natural language) yet passes the Turing Test (and, moreover, via 'reasoning' as opposed to 'memorization').

One response to Searle's proposed counterexample is to object that the solo human is not the Test-taker; rather, the Test is being taken – and passed – by the system consisting of the human combined with the instruction book, and it is possible that that **system** does understand Chinese even though its **parts** do not. In any case, denying that the **system** understands Chinese is not the same as denying that the **human** in the room understands Chinese.

This 'systems reply' is often supplemented by a 'robot reply', a version of the Total Turing Test in which the participant memorizes the instruction book and is endowed with other kinds of cognition, such as those involving sensors (e.g., perception) and effectors (e.g., acting). Finally, as in the AI-complete situation, perhaps a suitably rich sort of symbol manipulation (combining linguistically derived concepts with perceptually derived concepts) could provide the

apparently missing semantic component (Rapaport, 2000).

Is Cognition Subjective? Both Block's and Searle's objections also raise the issue of whether cognition (or natural-language understanding) is a subjective phenomenon: a participant passes a Turing Test **with respect to a given interrogator.** Thus, a given lookup table might not work for a given interrogator, and different interrogators might disagree on whether a participant in a Chinese Room demonstrates understanding.

Is Cognitive Behavior Really Cognition?

A participant will either pass the Turing Test or not. If **no** computer ever passes it – that is, if only humans (or other entities independently judged to be capable of cognition, such as extraterrestrials) pass it – then the Test succeeds in the sense that it offers a (behavioral) mark of (human) cognition. If, on the other hand, a computer **does** pass it, that could be for two reasons: either it is **really** cognitive (and able to **convince** the interrogator of this), or else it is not but only **appears** to be.

One way of phrasing the fundamental problem posed by the Turing Test is whether mere cognitive behavior **is** real cognition. There are three possibilities: (1) Real cognition might be 'mere' input-output behavior (statistical correlation). (2) Or real cognition might be input-output behavior **plus** any intervening process (including the 'Aunt Bertha' kinds of table-lookup processes or Eliza-like natural-language-processing tricks). (3) Or real cognition might be input-output behavior with an intervening process **of a 'cognitive' kind**, such as a reasoning process, a symbolic computational process, a connectionist computational process, or a 'dynamic systems' process, implementing some psychological theory.

The Turing Test does not seem to distinguish among these three possibilities. Should it, i.e., is it only external behavior that counts as cognition, or is the internal process (if any) important, too (as Shannon and McCarthy, 1956 suggested)? Consider a 'magical' natural-language-processing machine: a pure input-output machine that takes natural language input (from the interrogator) and 'magically' yields (appropriate) natural-language output (i.e., a 'function machine' with no internal processes). Suppose this magical machine passes a Turing Test. Is it cognitive? Turing might have argued that it was, even though we could not know why or how it managed to understand natural language (after all, it's magic!). On the other hand, although we know that our brain is a non-magical natural-language processor, we are not yet at the stage where we can say with certainty that we know why or how **it** manages to understand natural language.

Thus, the fundamental problem of the Turing Test is the classic problem of intension vs. extension: Is the **way** in which a result is obtained or an act is performed (i.e., the result or act viewed intensionally) more important than the **result** itself (i.e., the result or act viewed extensionally)? From the perspective of linguistics, is the ability to respond to stimuli with 'fluent' verbal behavior that is indistinguishable from 'normal' human verbal behavior different from a 'deeper', 'cognitive' ability of 'understanding language'? (This is nearly the debate between B. F. Skinner's theory of verbal behavior and Noam Chomsky's theories of grammar.)

Thus, there are two possibilities as to why a participant might pass a Turing Test: its cognitive behavior is (merely) extensionally equivalent to (real, human) cognition, or its cognitive behavior is (also) intensionally equivalent to real (human) cognition. Should the first possibility vitiate the Test? Suppose that the interrogator (an external observer) takes the 'intentional stance' and ascribes cognition to the participant. It does not follow that the participant is **not** really (intensionally) cognitive. After all, one reason that ascribing an internal, intensional cognitive state or process might be the best explanation for an entity's behavior is that the entity really produced its behavior via that process.

Consider the Aunt Bertha memorization machine. Suppose that the table lookups can be done in real time. We seem to be faced with two choices: assert that it is a counterexample to the Turing Test or accept that the Aunt Bertha machine really is cognitive (and not merely **behaving** cognitively). On the side of real cognition, we could argue that the Aunt Bertha machine would not work – that only a real cognitive agent could pass the Turing Test. The Chinese-Room Argument would **not** be a counterexample in this case, because the Chinese-Room system consisting of the human together with the instruction book might only pass if the instruction book were AI-complete, containing a full computational cognitive theory. To assert that it could not contain such a theory is to go beyond the empirical evidence, especially because we do not have that evidence yet.

Or, also on the side of real cognition, we could bite the bullet and say that the Aunt Bertha machine **is** cognitive **despite** being a mere lookup table, i.e., that appropriate lookup tables are just one way of being cognitive (cf. Putnam's (1960) Turing-machine

lookup-table analogy to the human mind). In other words, the **appearance** of cognition **is** real cognition; i.e., the external ascription of cognition is all that matters (as in the pen pal case). Arguably, our ordinary notion of 'understanding' applies to an omniscient deity that would never have to draw inferences or in any way 'process' information. Thus, if table lookup is not cognition, then such omniscience would not be cognitive, which seems to violate our pre-theoretical intuitions.

Consider an analogy: a Turing Test for seeing. Under what conditions would it be fair to say that an external observer can determine whether an entity sees? Is mere 'seeing behavior' enough?, e.g., is it enough that the entity reacts appropriately to visual stimuli whether or not it has any internal representation of them? Plants not only respond tropistically to light, but there is even some evidence that they can sense the presence of distal stimuli by means of light reflection. So, do plants see? Probably not, in the sense that they probably have no internal representation of the external stimuli – but can that be determined behaviorally? Consider 'blindsight': there is evidence that some blind humans can respond appropriately to visual stimuli. Do they see (despite their protestations that they cannot)? This case is especially puzzling, because it is conceivable that such blindsighted humans have internal representations that they use in processing the external stimuli, yet they are not aware of them.

Conclusion

Turing hoped that his Test would replace the question, 'Can machines think?' It has not – in large part because of disagreement over whether it is an appropriate replacement. Any formal idea that is proposed to replace an informal one is bound to suffer from this problem, for the formal idea will always include some feature that the informal one appears to exclude, and vice versa. In the case of the Turing Test, this has given rise to the debate over its sufficiency for thinking and for cognition in general. Nevertheless, more than 50 years after its appearance, the Turing Test continues to help focus debate on issues concerning the relation of cognition to computation.

See also: Chomsky, Noam (b. 1928); Descartes, René (1596–1650); Natural Language Processing: Overview; Natural Language Processing: System Evaluation; Natural Language Understanding, Automatic; Putnam, Hilary (b. 1926); Text Retrieval Conference and Message Understanding Conference; Turing, Alan Mathison (1912–1954).

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Turing, Alan Mathison (1912–1954)

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Alan Turing (1912–1954), one of the most important logicians and mathematicians of the 20th century, developed the basic theory for computer science and participated in the breaking of the German secret codes during World War II. Turing's contributions to linguistics usually go unnoticed. As an abstract thinker, his achievements crossed disciplinary boundaries.

In 1937, Turing published a paper usually referred to by its shortened title, 'Computable numbers,' in which he described what is now known as a Turing machine. A Turing machine is an abstract machine that executes a program (a set of instructions) one step at a time. In theory, a universal Turing machine can compute anything that is computable. The Turing machine is the abstract basis for modern digital computers.

In 1950, he published another important paper, 'Computing machinery and intelligence,' which raised the question of whether a machine, specifically a digital computer, could think. The paper described what has come to be known as the 'Turing test,' in which an interrogator questions a hidden human and computer. All questions and answers are communicated by typewritten message. The interrogator's job is to distinguish between the computer and the human solely on the basis of the answers. One player tries to deceive the interrogator; the other player tries to help the interrogator. Turing's argument was that if the computer successfully played what he called the 'Imitation Game,' it could be said to think, since it effectively mimicked a human being.

A grammar may be considered a Turing machine. Generative grammar is claimed to be a method of generating 'correct' and only 'correct' sentences in a language. The Turing test is a test of intelligence that equates intelligence with language use. While Turing held out high hopes for successfully programming a computer to pass his test (Turing test contests have been held, and at least one computer is claimed to have passed), no one has yet shown that language use is computable in the mathematical sense. Turing showed that if intelligence equates with some level of language use, language use cannot be limited to grammar. Taking his two great accomplishments together, we can say that even if grammar is shown to be a universal Turing machine, simply creating 'correct' sentences in a language is insufficient to pass the Turing test. Turing's achievements question whether the focus of linguistics should be restricted to grammar.

An interesting development in Turing's thoughts occurred between his two great papers. A Turing machine is very simple and has the ability only to react. In the last section of his 1950 paper, Turing no longer talked about a machine that is programmed but about one that learns, perhaps by a mechanism akin to natural selection. In between his papers, Turing helped to create Britain's first computer and had daily experience with it. Turing's theoretical computers responded to conversations, not equations.

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Turing, Alan Mathison (1912–1954)

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Alan Turing (1912–1954), one of the most important logicians and mathematicians of the 20th century, developed the basic theory for computer science and participated in the breaking of the German secret codes during World War II. Turing's contributions to linguistics usually go unnoticed. As an abstract thinker, his achievements crossed disciplinary boundaries.

In 1937, Turing published a paper usually referred to by its shortened title, 'Computable numbers,' in which he described what is now known as a Turing machine. A Turing machine is an abstract machine that executes a program (a set of instructions) one step at a time. In theory, a universal Turing machine can compute anything that is computable. The Turing machine is the abstract basis for modern digital computers.

In 1950, he published another important paper, 'Computing machinery and intelligence,' which raised the question of whether a machine, specifically a digital computer, could think. The paper described what has come to be known as the 'Turing test,' in which an interrogator questions a hidden human and computer. All questions and answers are communicated by typewritten message. The interrogator's job is to distinguish between the computer and the human solely on the basis of the answers. One player tries to deceive the interrogator; the other player tries to help the interrogator. Turing's argument was that if the computer successfully played what he called the 'Imitation Game,' it could be said to think, since it effectively mimicked a human being.

A grammar may be considered a Turing machine. Generative grammar is claimed to be a method of generating 'correct' and only 'correct' sentences in a language. The Turing test is a test of intelligence that equates intelligence with language use. While Turing held out high hopes for successfully programming a computer to pass his test (Turing test contests have been held, and at least one computer is claimed to have passed), no one has yet shown that language use is computable in the mathematical sense. Turing showed that if intelligence equates with some level of language use, language use cannot be limited to grammar. Taking his two great accomplishments together, we can say that even if grammar is shown to be a universal Turing machine, simply creating 'correct' sentences in a language is insufficient to pass the Turing test. Turing's achievements question whether the focus of linguistics should be restricted to grammar.

An interesting development in Turing's thoughts occurred between his two great papers. A Turing machine is very simple and has the ability only to react. In the last section of his 1950 paper, Turing no longer talked about a machine that is programmed but about one that learns, perhaps by a mechanism akin to natural selection. In between his papers, Turing helped to create Britain's first computer and had daily experience with it. Turing's theoretical computers responded to conversations, not equations.

See also: Turing Test.

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Turkey: Language Situation

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The official language of the Republic of Turkey is Turkish (Altaic/Turkic/Southwestern). It is estimated to be the first language of 80–85% of the population of 70 million people and to be spoken by native or near-native fluency by the majority of the rest of the population.

In the rest of this article, the figures given for the number of speakers of each language reflect rough estimates of first language users including bilinguals and are based on Andrews (1989), Grimes (2000), Şener (2004), and personal communication. For most of the languages with less than 30 000 speakers, the population is over 50 years of age.

Next to Turkish, the language with the largest number of speakers is Kurmanji (Indo-European/Western Indo-Iranian; 10–12 million people) followed by Zaza (Zaza-Gorani; Indo-European; 1 million people), Arabic (Afroasiatic; 1 million people), and Azerbaijani (Altaic; 500 000 people).

There are native speakers of a few dozen other languages in Turkey. These languages are spoken by the various Muslim, Christian, and Jewish communities that Turkey inherited from the Ottoman Empire in 1923 (Turks, Greeks, Armenians, Jews, Kurds, Gypsies, Tatars, Turkomans, Azerbaijanis, Albanians, Arabs, Aramaens, Muslims from the Caucasus and the Balkans, and others). More recently, immigrants, asylum seekers, and refugees from Iraq, Iran, Afghanistan, the central Asian Turkic countries, east Africa, and Nigeria have been coming into Turkey. There are no official figures for the numbers of speakers of these languages, as language use has not been surveyed in censuses since 1965.

Language has been the centerpiece of nation-building programs since the end of the 19th century. Turkish was proclaimed as the official language of the Ottoman Empire in the constitution of 1876 and became part of the curriculum in all schools in 1894 (Sadoğlu, 2003). The unofficial but sanctioned multilingualism (in schools and in the press) of the Ottoman period gradually gave way to the promotion of Turkish and reached a climax after the Republic was formed. In the 1930s, campaigns were launched to create a unified national identity through the usage of Turkish, which, at times, took the form of coercion (Çağaptay, 2002). The present constitution (1981, articles 3/1 and 42) designates Turkish as the "language of the Turkish State" and the only language that can be taught as the "mother tongue," except for those covered under international treaties, such as the Lausanne Treaty, 1923, articles 40–41, which in practice applies only to Armenian (Indo-European; 50 000 people) and Greek (Indo-European; a few thousand people). These languages, as well as Ladino (Indo-European, Judeo-Spanish; unknown number of speakers and designated as seriously endangered by the *UNESCO red book on endangered languages*), are also used in the print media.

Although the Lausanne Treaty of 1923 grants every Turkish citizen the freedom to use his or her language in the press and in open meetings (article 39/4; Aydın, 2002), this freedom has been put into practice only very recently; formerly, such language usage would often result in prosecution. In June, 2004, the Turkish Radio and Television Corporation started broadcasting half-hour programs in Kurmanji, Zaza, Circassian/Adyghe (Caucasian, 50 000 speakers), Bosnian (Indo-European; 20 000 speakers), and Arabic. Some broadcasts in Turkish are accompanied by signed Turkish, which is distinct from Turkish Sign Language (unknown number of users) that is used natively by members of the deaf community. Oralism has been the medium in schools for the deaf since the implementation of a 1953 regulation of the Ministry of National Education.

Also spoken are the following languages:

- *Turkic* (Altaic): Uzbek (a few thousand speakers), Turkmen, Uyghur, Kumyk (a few hundred speakers), Tatar, Karachay-Balkar (unknown number of speakers), and these languages designated as

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- *Languages spoken by recent immigrants, refugees, and asylum seekers*: Afroasiatic languages: Amharic, Somali, and Tigrigna; Niger-Congo: Lingala, Swahili, and various languages spoken in Nigeria; Indo-European: Russian and Farsi; and Altaic: Kazakh and Kirghiz (hundreds of thousands of speakers)
- *Foreign languages taught in secondary schools*: English, French, German, and Italian

See also: Arabic; Armenian; Azerbaijanian; Caucasian Languages; Endangered Languages; Greek, Modern; Kurdish; Sign Language: Interpreting; Turkic Languages; Turkish.

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Turkic Languages

L Johanson, Universität Mainz, Mainz, Germany

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Development and Classification

The Turkic language family was first attested in 8th century inscriptions. Turkic-speaking groups first appeared in the Inner Eurasian steppes, from where they moved to Central Asia, Eastern Europe, the Middle East, Siberia, etc. Because of their high mobility, Turkic expanded over a huge area.

The Proto-Turkic network of varieties was dissolved by an early split of Oghur or Bulgar Turkic. Its modern representative, Chuvash, a descendant of Volga Bulgar, differs from Common Turkic by specific phonetic representations, e.g., *r* and *l* instead of *z* and *š* in words such as *śĕr* 'hundred' and *śul* 'year' (Turkish *yüz* 'hundred,' *yaş* 'age'). A second split is represented by Khalaj, which retains a reflex of Proto-Turkic **p-* as *h-*, e.g., *hadaq* 'foot.' Dialect splitting has led to further differentiation of Common Turkic. There is no mutual intelligibility throughout the family today. The following division combines the current areal distribution with genealogical and typological features.

1. The Southwestern or Oghuz branch contains a western subgroup comprising Turkish, Gagauz, and Azerbaijanian (Azerbaijani, Northern and Azerbaijani, Southern), a southern subgroup comprising dialects of southern Iran and Afghanistan, and an eastern subgroup comprising Turkmen and Khorasan Turkic.
2. The Northwestern or Kipchak branch has a western subgroup comprising Kumyk, Karachay-Balkar, Crimean Tatar, and Karaim, a northern subgroup comprising Tatar and Bashkir, and a southern subgroup comprising Kazakh, Karakalpak, Kipchak Uzbek, Nogai, and Kirghiz (of different origin, but strongly influenced by Kazakh).
3. The Southeastern or Uyghur-Karluk branch has a western Uzbek subgroup and and eastern Uyghur subgroup.

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3. The Southeastern or Uyghur-Karluk branch has a western Uzbek subgroup and and eastern Uyghur subgroup.

4. The Northeastern or Siberian branch has a southern heterogeneous subgroup comprising Sayan Turkic (Tuvan, Tofan), Abakan (Yenisei) Turkic (Khakas, Shor), Chulym Turkic, Altai Turkic (Altai, Northern and Southern), and a northern subgroup comprising Yakut (Sakha) and Dolgan.
5. Chuvash is geographically situated in the northwestern area (Volga region).
6. Khalaj is geographically situated in the southwestern area (central Iran).

Deviant languages in China are Salar, of Oghuz origin, Yellow Uyghur (Yugur, West) and Fu-yü (Manchuria), both of south Siberian origin.

One traditional classificatory criterion is the final consonant of the word for 'nine.' Its representation as *r* in Chuvash *tăxxăr* separates Oghur from Common Turkic (Turkish *dokuz*). The intervocalic consonant in the word for 'foot' divides most Northeastern languages, Chuvash, Khalaj, etc. from the rest, which exihibits *-y-* (Turkish *ayak*), e.g., Tuvan *adaq*, Khakas *azax*, Chuvash *ura*. Oghuz Turkic differs from the rest by loss of suffix-initial velars, e.g., *qal-an* [remain-PART] instead of *qal-γan* [remain-PART] 'remaining.' Final *-G* is devoiced in the Southeast (Uyghur *taγ-liq* [mountain-DER] 'mountainous'), preserved in southern Siberia (Tuvan *daγ-lïγ* [mountain-DER]), and lost elsewhere (Turkish *dağ-lı* [mountain-DER]).

Most older linguistic stages are insufficently known. Written sources, where available, provide no direct information on spoken varieties. Early Oghuz and Bulgar (East Europe, 6th–7th centuries) are unknown. There are no texts in the language of the Khazars (7th–10th centuries). Pecheneg and Kuman, predecessors of West Kipchak, are only known from loanwords, titles, and names.

Written Varieties

Turkic literary varieties have emerged in various cultural centers. Many older Turkic empires, however, used foreign languages for administration (Sogdian, Persian). Muslim Turks often used Persian for poetry, and Arabic for religious and scientific writing. Russian has played an important role for many groups. The following main stages of written Turkic may be distinguished.

1. An older pre-Islamic East Old Turkic period (8th century–), is represented in inscriptions, manuscripts, and block prints. East Old Turkic proper is documented in stone inscriptions (Orkhon Valley), which celebrate the rulers of the Second Eastern Türk Empire, in other inscriptions found in Mongolia and the Yenisei and Talas valleys, and also in a few manuscripts. The Old Kirghiz inscriptions are of this type. Old Uyghur is first recorded in the period of Uyghur rule over the Eastern Empire. Early Old Uyghur is attested in runiform inscriptions and manuscripts. From the 10th century on, Old Uyghur became the medium of a flourishing literary culture in the Tienshan-Tarim area, attested in texts of Buddhist, Manichaean, and Nestorian content.
2. A middle Turkic period comprises various early Islamic varieties.

   The first East Turkic written language, Karakhanid (11th century–), developed in Kashgar, is close to Old Uyghur but lexically influenced by Arabic and Persian. Maḥmūd of Kashgar provides information (1073) on Karakhanid and other contemporary Turkic varieties.

   Khorezmian Turkic, used in the 13th–14th centuries in the Golden Horde and Mamluk Egypt, is based on the older languages but contains Oghuz and Kipchak elements.

   This tradition is continued in Chaghatay (15th century–). Early Chaghatay contains regional elements of the Timurid area. Later, Chaghatay became the dominant written language of Central Asia, eventually conquering an immense area of validity and developing regional varieties.

   The first West Turkic written language is Volga Bulgar, insufficiently known from epitaphs of the 13th and 14th centuries. Information on early Kipchak Turkic is given in the Codex Cumanicus, compiled by Christians, and in dictionaries and grammars written in Mamluk Egypt and Syria.

   Oghuz Turkic is first represented by Old Anatolian Turkish (13th century–), which was a subordinate written medium until the end of Seljuk rule. Old Ottoman is the initial stage of Ottoman, which begins with the foundation of the Ottoman Empire in 1307. In Azerbaijan a literary language developed from the 15th century on.
3. A premodern period (16th century–) begins with the development of regionally influenced written languages. Middle and Late Ottoman became the leading written language with an abundantly rich literature. Chaghatay continued to play a major role and remained the literary language of all non-Oghuz Muslim Turks until a century ago.
4. A modern period begins in the second half of the 19th century with the formation of regional written languages. The political division of the Turkic-speaking world in the 20th century and the language policies pursued in the Soviet Union, Turkey, China, and Iran had dramatic effects that increasingly obstructed transregional linguistic contacts. A dozen 'national' languages with a narrow radius of validity emerged. In Turkey,

Ottoman was replaced by modern Turkish. The social importance of many Turkic languages was very limited. After the recent political developments, their significance is rapidly increasing, but the varieties spoken in Iran, Afghanistan, Iraq, etc., still have poor possibilities to develop.

Various scripts and script systems have been applied to Turkic. A specific runiform script was created for Old East Turkic. Most Old Uyghur texts are written in Uyghur script, originating in the Near East and later taken over by Mongols and Manchus. It is similar to the Sogdian script, which is also used in Buddhist texts. A few Buddhist manuscripts are written in Brahmi script, Manichaean texts in Manichaean script, and Nestorian texts in Syriac script. Arabic script was used for the languages of the Islamic era (still used in China for Uyghur and Kazakh). A unified Roman-based script was introduced for several languages in the early Soviet period, but later replaced by different Cyrillic-based scripts. A Roman-based alphabet was introduced in Turkey in 1923. Most of the newly established Turkic republics have introduced or are introducing Roman-based scripts.

Contacts

The massive displacements of Turkic-speaking groups throughout their history have led to various phenomena induced by contacts with Iranian, Slavic, Mongolic, Uralic, etc. Speakers of Turkic have copied lexical, phonetic, morphological, and syntactic elements, whereas non-Turkic (e.g., Iranian, Greek, Finno-Ugric, Samoyedic, Yeniseian, Tungusic) groups shifting to Turkic have exerted substrate influence by copying native elements into their new varieties. Languages such as Chuvash, Yakut, Salar, Yellow Uyghur, Khalaj, Karaim, and Fu-yü have long developed in isolation from their relatives, preserving old features and acquiring new ones in their environments. Long and intense interaction with Iranian in Central Asia, Iran, Afghanistan, etc., has led to profound convergence phenomena. Massive foreign influence has sometimes caused considerable typological deviations, e.g., drastic structural changes in Karaim and Gagauz under Slavic impact.

Most written languages have been strongly influenced by Persian and Arabic. In Chaghatay (Chagatai) and Ottoman, lexical borrowing contributed to a remarkable richness of the vocabularies, whereas grammar was much less affected. The overload of Persian and Arabic in Ottoman led to strong puristic efforts in the 20th century to create a so-called Pure Turkish.

Internal convergence processes have resulted in leveling of languages of the central area. Several Turkic koinés have been used as transregional codes for trade and intergroup communication, e.g., Azerbaijanian in Iran and the Caucasus region.

Linguistic Features

Despite their huge area of distribution, Turkic languages share essential phonological, morphological, and syntactic features.

They have a synthetic word structure with numerous highly applicable derivational and grammatical suffixes, and a juxtaposing technique with clear-cut morpheme boundaries and predictable allomorphs. These agglutinative principles yield considerable morphological regularity and transparency. Exceptions include traces of vowel gradation in the pronominal declination, e.g., Turkish *ben* 'I,' *ban-a* [I-DAT] 'to me.' The agglutinative structure is partly deranged in languages of the northeast and southeast. Some languages, e.g., Uzbek, even display borrowed prefixes.

The syllable contains minimally a vowel with maximally one preceding and one subsequent consonant. Vowel hiatus and consonant clusters are avoided.

Most languages exhibit eight short vowel phonemes, *a*, *ï*, *o*, *u*, *e*, *i*, *ö*, *ü*, classified according to the features front vs. back, unrounded vs. rounded, and high vs. low. Proto-Turkic long vowel phonemes are preserved in Turkmen, Yakut, and Khalaj. Iranian and Slavic phonetic influence has sometimes affected the front vs. back distinctions. Tatar, Bashkir, Chuvash, and Uyghur exhibit systematic vowel shifts. Chuvash, Gagauz, Karaim, etc., have developed palatalized consonants, e.g., Karaim *ḿeń* 'I'. Tuvan and Tofan exhibit a glottal element signaling strong obstruents, e.g., *aʔt* 'horse' vs. *at* 'name.'

The most general sound harmony phenomenon is an intrasyllabic front vs. back assimilation. An intersyllabic front vs. back harmony causes neutralization of the front vs. back distinction under the influence of the preceding syllable. If applied consistently, it excludes back and front syllables in a word, e.g., Turkish *ev-ler-im-e* [house-PL-POSS.1.SG-DAT] 'to my houses,' *at-lar-ım-a* [horse-PL-POSS.1.SG-DAT] 'to my horses.' Some languages only display this kind of harmony, whereas others also apply a rounded vs. unrounded harmony, neutralization of the distinction rounded vs. unrounded in high suffix vowels, e.g., Turkish *el-im* [hand-POSS.1.SG] 'my hand,' *gül-üm* [rose-POSS.1.SG] 'my rose.' Languages such as Yakut and Kirghiz apply this harmony to low-vowel suffixes as well, e.g., *börö-lör* [wolf-PL] 'wolves.' There are numerous exceptions to harmony rules in loanwords. Further allomorphs are created by various consonant assimilations.

The rules of word accent vary. A high pitch accent, interacting with a dynamic stress accent, mostly falls on the last accentable syllable of native words.

The morphological structure has remained relatively stable through the centuries. The main word classes are nominals (nouns, adjectives, pronouns, numerals) and verbals. The primary stems can be used as free forms, e.g., *at* 'horse,' *at!* 'throw!.' From verbal and nominal stems, which are sharply distinguished, expanded stems are formed. Nominals take plural, possessive, case, and specific derivational suffixes. Grammatical gender is not marked. The verbal morphology comprises markers of actionality, voice, possibility, negation, aspect, mood, evidentiality, tense, person, interrogation, etc. Voice is expressed by passive, reflexive-middle, causative, and cooperative-reciprocal suffixes. The order and combinability of suffixes is basically common to all Turkic languages.

Constructions with postposed auxiliary verbs (postverbs) express actional modifications. A few constructions have developed into aspect-tense categories, e.g., Turkish *gel-iyor* [come-PRES] 'comes' < **gel-e yorï-r* [come-CONV run-AOR] ('runs coming'). Possibility markers are formed with auxiliary verbs such as *bil-* 'to know' and *al-* 'to take,' e.g., Kirghiz *ber-e al-*[give-CONV AUX.POTEN] 'to be able to give.'

Turkic languages share many syntactic characteristics. With respect to relational typology, they adhere to the nominative-accusative pattern. They have a head-final constituent order, with dependents preceding their heads. The unmarked order of clause constituents is subject + object + predicate (SOV). Adjectival, genitival, and participial attributes precede the head of the nominal phrase. Postpositions are used instead of prepositions. There is no agreement in number or case between dependents and heads. The focus position is in front of the predicate core. The unmarked constituent order is often deviated from for discourse-pragmatic reasons. Contact-induced word order changes are common, e.g., in Gagauz, which has become an SVO language.

Preposed subordinate clauses are based on verbal nouns, participles, and converbs. The use of postposed subordinative patterns with conjunctions are typical effects of Iranian and Slavic influence. Most languages possess conjunctions, even coordinative ones meaning 'and,' 'or,' and 'but' of Persian, Arabic, or Russian origin.

Turkic lacks definite articles. The indefinite article is formally identical with the numeral 'one' Genitival attributes, expressing a possessor, stand in the genitive, whereas their head, indicating a possessed entity, carries a possessive suffix, e.g., Turkish *at-ın baş-ı* [horse-GEN head-POSS.3.SG] 'the head of the horse.' The dominant type of nominal compounds follows the pattern noun + noun + possessive suffix, e.g., Turkish *el çanta-sı* [hand bag-POSS.3.SG] 'handbag.'

All Turkic varieties exhibit numerous loanwords. Arabic and Persian loans are frequent in all Islamic-Turkic languages. The Iranian influence is strong in Uyghur, Uzbek, and varieties of Iran and Afghanistan. Many languages have been subject to considerable Mongolic and Slavic influence. Loans and calques from European languages have become increasingly important. The Turkic languages spoken in China exhibit old and recent loans from Chinese.

See also: Afghanistan: Language Situation; Arabic; Azerbaijan: Language Situation; China: Language Situation; Chinese; Iran: Language Situation; Iranian Languages; Russian Federation: Language Situation; Slavic Languages; Turkey: Language Situation; Uralic Languages; Uzbek.

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Turkish

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Turkish (natively *Türkçe*), the official language of the Republic of Turkey, is spoken by a large proportion of the Turkish population. There are also Turkish speakers in the Balkans, particularly in Greece, Bulgaria, and the former Yugoslavia, although there has been extensive population inflow from those countries into Turkey, and there is a substantial minority of Turkish speakers in Cyprus. There are Turkish-influenced Turkic dialects in Iraq in the region of Kirkuk, where the speakers are called

Oghuz Turkic
Old Anatolian Turkish
Old Uyghur
Ottoman Turkish
Pecheneg
Sakha
Salar
Samoyedic
Sayan Turkic
Shor
Slavic
Sogdian
Tofan
Tungusic
Turkic languages
Tuvan
Uralic
Uyghur-Karluk
Volga Bulgar
Yakut
Yellow Uyghur
Yenisei Turkic
Yeniseian

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Turkmen or Turkomans. The *Ethnologue* entry for Turkish gives a population of roughly 46 million speakers in Turkey, and 61 million in all countries.

Turkish belongs to the southwestern, or Oghuz (*Oğuz*), group of Turkic languages. This group also includes Azerbaijani, spoken in Azerbaijan and in adjacent areas of Iran; Qashqay and related dialects, spoken in the Zagros mountain area of Iran; Türkmen, spoken in Turkmenistan; and Gagauz, spoken in Bulgaria, in Romania, and principally in Moldova, although there has been substantial migration from Moldova to Turkey. Central Asian Turkic languages include the national languages of Kazakhstan, Uzbekistan, and Kyrghyzstan, and a number of others. Turkic, in turn, belongs to the Altaic family of languages, which also includes the Mongol and Manchu-Tunguz language families. Though this relationship has recently been called into question, it was proved convincingly by Poppe more than a generation ago (Poppe, 1960). Wider affinities of the Altaic family have been suggested for Korean, and even for Japanese.

Turkish scholars divide the history of the Turkish language into three periods: (1) Old Anatolian Turkish (*Eski Anadolu Türkçesi*), comprising texts dating from the earliest arrival of Turkic speakers in Anatolia, through the Seljuk period to the formation of the Ottoman Empire; (2) Ottoman (*Osmanlıca*), the language of the Ottoman Empire, heavily influenced by Arabic and Persian; and (3) Modern Turkish (*Yeni Türkçe*), dating from the overthrow of the Ottoman Empire and from the Turkish language reform movement of the 1920s and 1930s. The Turkish language reform movement was launched by Atatürk as part of his overall plan to distance Turkey from Middle Eastern, specifically Arabic and Persian, influences, in favor of European influence. This movement in the language area included most noticeably the replacement of the Arabic writing system with a Latin alphabet in 1928, and a drive to replace Arabic and Persian vocabulary, once pervasive in Ottoman texts, with vocabulary drawn or constructed from Turkish sources, or Turkish-looking inventions. The drive to cleanse the lexicon has waxed and waned over the interim and has acquired political correlates: writers on the left tend to use neologisms; those on the right use a more traditional vocabulary. There has been no corresponding attempt to rid the lexicon of European or English terminology (for more on the language reform movement, see Lewis (1999)). In 1997, a committee of the American Association of Teachers of Turkic Languages attempted to create a standardized English terminology for Turkish, which is used here.

Phonology

Phonemes

Consonants The International Phonetic Association (IPA) representations of the Turkish consonant system are shown in Table 1. Turkish uses 21 letters for consonants: b c ç d f g ğ h j k l m n p r s ş t v y z. These represent the expected sounds, except as follows:

Letter	Sound
c	[dʒ]
ç	[tʃ]
j	[ʒ]
ş	[ʃ]

In the following discussions, [tʃ] and [dʒ] will henceforth be written /č/ and /ǰ/, since they function in all phonological respects as members of the natural class of stops, not as clusters. The letters *k g l* each stand for two sounds: a plain velar or lateral [k g l] and a front velar or palatal [c ɟ ʎ]. In words of Turkish origin, the front velar variant occurs with front vowels and the plain velar occurs with back vowels. In words of Arabic origin, however, /c ɟ ʎ/ can occur with back vowels, giving rise to pairs and thus distinctive contrasts, as in *kar* 'snow' [kɑr] and *kâr* 'profit' [cɑr].

The letter *ğ*, or *yumuşak ge* 'soft g', has no consonantal sound. It normally represents an historical or underlying /g/ that has been deleted; in some Anatolian dialects, it survives as a voiced fricative [ɣ]. Most commonly, *ğ* lengthens the preceding vowel in syllable-final (coda) position, and represents nothing between vowels, as in *dağ* 'mountain' [dɑː] and *dağa* 'mountain (dat)' [dɑɑ].

Vowels Turkish vowels are traditionally represented in a 'cube' shape, consisting of all possible values of the features, front/back, high/low, and rounded/unrounded, as in Figure 1. Each vowel can occur long, from the deletion of *ğ*, and the vowels /e i a u/ can occur long in Arabic loanwords, giving a total of 16 vowel phonemes. The vowel letters are for the most part self-explanatory, except for *ı*, an undotted

Table 1 International Phonetic Association symbols for Turkish consonants

Labial	*Dental*	*Palatal*	*Front velar*	*Velar*	*Glottal*
p	t	tʃ	c	k	
b	d	dʒ	ɟ	g	
f	s	ʃ			h
v	z	ʒ			
m	n				
	l	ʎ			
	r	ʎ			

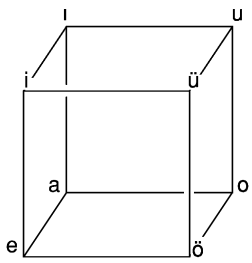

Figure 1 Turkish vowels. Front vowels are represented at the front of the cube, high vowels are at the top, and rounded vowels are to the right. Reproduced with permission from MIT Press.

Table 2 Turkish vowel harmony

Stem	*Gloss*	*Dative*	*Objective*
bal	'honey'	*bala*	*balı*
kıl	'hair'	*kıla*	*kılı*
ok	'arrow'	*oka*	*oku*
buz	'ice'	*buza*	*buzu*
ev	'house'	*eve*	*evi*
il	'province'	*ile*	*ili*
göl	'lake'	*göle*	*gölü*
gül	'rose'	*güle*	*gülü*

'i,' which is a high back unrounded vowel, IPA [ɯ]. All Turkish vowels are phonetically lax, except sometimes before *y* or *ğ*, thus *a e i ı o ö u ü* sound like [ɑ ɛ ɪ ɯ ɔ œ ʊ ʏ]. Because the difference between *ı* and *i* is distinctive, it must be maintained for capitals also, i.e., *I* and *İ*.

Stress Stress in Turkish consists of higher pitch, rather than greater loudness on the accented syllable. Stress is normally on the last syllable of the word; as affixes are added, stress moves rightward:

(1) él 'hand'
ellér 'hands'
ellerím 'my hands'

There are a number of exceptions to final stress. Some words have inherent nonfinal stress, and in these cases stress does not move with the addition of affixes. Inherently stressed words include most loans, which have their own rule for accent; in such cases, the accent may fall on a syllable other than that which is stressed in the source language, as in *sinéma* 'cinema' and *Kenédi* 'Kennedy'. Some affixes are prestressing; stress then falls on the preceding syllable and remains there as additional affixes are added. The rules for stress and much else in Turkish phonology are extensively worked out in Demircan (2001).

Phonological Rules

Turkish being an agglutinating language, suffixes are added to stems in such a manner that segmentation is relatively easy. However, a number of changes take place in both stems and suffixes when this happens.

Vowel Harmony Vowel harmony involves the two features front/back and rounded/unrounded. It is a syllable-to-syllable process by which each vowel conditions the following vowel, according to the following rules:

1. Any of the vowels can occur in the first syllable of a word.
2. A noninitial vowel assimilates to the previous vowel in frontness.
3. A noninitial high vowel assimilates to the previous vowel in rounding. A noninitial low vowel is unrounded. Thus /o ö/ do not appear in harmonic suffixes.

The process is illustrated in Table 2, which shows how the stem, dative (suffix *-yA*), and objective (suffix *-yI*) case forms of a set of nouns are used (in morphophonemic transcription, the symbol *A* represents the alternation between /a/ and /e/, and the symbol *I* represents the alternation /i ı u ü/). A few native words and very many foreign words are nonharmonic, such as *kardeş* 'brother', *otel* 'hotel', and *sigorta* 'insurance'. This has led some scholars to claim that vowel harmony no longer holds for stems (Clements and Sezer, 1982). In the case of a nonharmonic word, suffixes are controlled by the last syllable, as in *asansör* 'elevator' (plural *asansörler*) and *kredikart* 'credit card' (plural *kredikartlar*).

Other Phonological Rules Beyond vowel harmony, stems and suffixes have a highly changeable nature. Suffix-initial voiced stops devoice after a stem ending in an unvoiced consonant. Many suffixes have different postconsonantal and postvocalic forms. Stems also undergo a number of rules designed to maintain canonical syllable structure, particularly in closed syllables. Among the rules applying to syllables are final devoicing, epenthesis, degemination, and vowel shortening. There are many details concerning these rules, but as an extreme example, the verbal noun suffix best written as *-DIg* has 16 forms:

-dik/dık/duk/dük/tik/tık/tuk/tük/diğ/dığ/duğ/düğ/tiğ/tığ/tuğ/tüğ

Morphology

Turkish is an agglutinating language in which suffixes, in some cases a large number of them (the

lists of suffixes in the following sections are not exhaustive), are added fairly transparently to stems:

(2)

ev	'house'
evler	'houses'
evlerim	'my houses'
evlerimiz	'our houses'
evlerimizde	'in our houses'
evlerimizdeki	'which is in our houses'

The Noun Paradigm

Noun stems may have the following inflectional suffixes, in order:

1. Plural *-lAr* (as in *baba* 'father', *babalar* 'fathers' and *deve* 'camel', *develer* camels).
2. Possessive (possessed agreement).
3. Case (as in *oda* 'room').

(3)

Nominative:	oda
Genitive (-(n)In):	odanın
Dative (-yA):	odaya
Objective (-yI):	odayı
Locative (-DA):	odada
Ablative (-DAn):	odadan
Instrumental/comitative (-y-lA):	odayla

The Verb Paradigm

Starting with the verb root, a number of derivational suffixes can be added to build up the verb stem. These include reflexive, reciprocal, causative, passive, impossibility, negative, and abilitative forms. At this point, from the verb stem, it is possible to go in a number of directions. For a finite ('tensed') verb, the next step is a tense suffix, followed normally by a personal ending:

(4)

General present:	gelirim	'I come', 'I'll come'
Progressive:	geliyorum	'I am coming'
(Definite) past:	geldim	'I came'
Unwitnessed past:	gelmişim	'I (supposedly) came
Future:	geleceğim	'I will come'
Necessitative:	gelmeliyim	'I ought to come'
Optative:	geleyim	'let me come'
Conditional:	gelsem	'if I come'

There is also a wide range of nonfinite suffixes possible at this point for the formation of subordinate clauses. These include verbal nouns or nominalizations, participles, and adverbial clause suffixes (traditional 'converbs').

Auxiliary Suffixes

Finally, there is a group of suffixes that can be categorized under the heading of 'auxiliary'. They can be added both to verbal and nonverbal predicates, hence a separate auxiliary category. They include most prominently the personal endings, but also some morphemes that can be called 'aspects', although they are not all aspects any more than the tenses are all tenses (abbreviations: SG, singular; PROG, progressive):

(5) Yorgun -du -m.
tired -PAST –1SG
'I was tired'.

(6) Gel -iyor -du -m.
come -PROG -PAST -1SG
'I was coming'.

The aspects are past *-y-DI*, dubitative *-y-mIş*, and conditional *-y-sA*. Furthermore, there is an adverbial aspect *-y-ken*. These look very similar to some tenses, i.e., definite past *-DI*, unwitnessed past *-mIş*, and conditional *–sA*, but they differ in morphology, meaning, and prosody (all auxiliary suffixes are prestressing).

The inferential/quotative, sometimes called dubitative (DUB), *-y-mIş*, deserves special discussion. This aspect, and to some extent the corresponding tense, *-mIş*, are used when the speaker wishes to be disassociated from the truth of the utterance – for example, when the speaker has information that has only been heard or recently found out (VB, verb):

(7) Sen tembel -miş -sin.
you lazy -DUB -2SG
'They say you are lazy'.

(8) Geçen sene hasta -lan-mış-sın.
past year sick -VB-DUB–2SG
'(I heard) you got sick last year'.

The dubitative can also be used for statements for which the speaker does have personal knowledge of the fact, but is expressing something unexpected or surprising – for example, after trying a food that the speaker had expected to dislike:

(9) Bu yemek iyi -miş!
this food good -DUB
'This food is good!'

Syntax

Unmarked (normal) word order is subject-object-verb, as shown in the following example (OBJ, objective; DAT, dative):

(10) Hasan mektub -u
Hasan letter -OBJ
Ayşe-ye gönder -di.
Ayşe-DAT send -PAST
'Hasan sent the letter to Ayşe'.

However, this is complicated by the fact that Turkish has pragmatically conditioned word order, by which the information status of noun phrases, rather than

their grammatical function, determines their placement in the sentence. Many of the basic principles were worked out by Erguvanlı (1984). The topic is sentence initial; thus, any of the terms of Example (10) could be initial, depending on whether Hasan, the letter, or Ayşe is the topic. New information comes in the preverbal position, thus any of the terms of Example (10), if indefinite, would move preverbally:

(11) Mektub-u Ayşe-ye bir
letter-OBJ Ayşe-DAT a
arkadaş gönder-di.
friend send-PAST
'A friend sent the letter to Ayse'.

In fact, preverbal position is focus position; thus, *wh*-words are found here, as well as words questioned contrastively, the focused words in the answers to *wh*-questions, or any focused argument. Though the canonical sentence pattern for English might be written as subject-verb-object-X, where X is everything else, the pattern for Turkish would be topic-X-focus verb, and is thus determined by pragmatic rather than by grammatical conditions. Furthermore, sentences are not necessarily verb final. Backgrounded or unstressed information can move to the right of the verb, producing what is traditionally called a *devrik cümle* (*tümce*), or 'inverted sentence' (NEG, negative; PL, plural):

(12) Ver-me çocuğ-a kibrit-ler-i.
give-NEG child-DAT match-PL-OBJ
'Don't give the child the matches'.

The focus in Example (12) is 'don't give,' and the child and the matches will have been previously mentioned or are clear in the context, i.e., are 'given' in the sense of functional syntax.

Turkish is a left-branching and head-final language in which nouns follow adjectives (Example (13)), possessives (Example (14)), and relative clauses (Example (15)); postpositions follow noun phrases (Example (16)), and verbs follow direct objects, even subordinate clauses (Example (17)) (GEN, genitive; POSS, possessive; LOC, locative; PART, participle; ABL, ablative; VN, verbal noun; FUT, future):

(13) çok küçük bir çocuk.
very small a child
'A very small child'.

(14) Enver-in şapka-sı.
Enver-GEN hat-POSS
'Enver's hat'.

(15) Köşe-de otur-an kız.
corner-LOC sit-PART girl
'The girl who is sitting in the corner'.

(16) Bu haber-den dolayı.
this news-ABL because
'Because of this news'.

(17) Hasan-ın yarın
Hasan-GEN tomorrow
gel-eceğ-in-i duy-du–m.
come-VN.FUT–3SG-OBJ hear-PAST–1SG
'I heard that Hasan will come tomorrow'.

Notice from Example (17) that Turkish is a pro-drop language ('pronoun dropping'; i.e., subject pronouns normally are not used, as in Latin or Spanish). Overt pronouns appear in cases of focus or contrast, including topic change. Because relative clauses precede head nouns, and direct objects (including noun complement clauses) precede the main verb, Turkish sentences sometimes give the impression of having the reverse word order from English. English speakers reading Turkish sometimes find it easier to start at the end of a sentence and read toward the front, and Turkish speakers report that they do the same in reading English.

See also: Altaic Languages; Turkey: Language Situation; Turkic Languages; Turkish Lexicography.

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Turkish Lexicography

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The earliest known lexicon of Turkic languages is the *Diwan lûgat at-Turk* (Compendium of Turkic dialects), which was compiled by Mahmud al-Kashgari in the 11th century. According to its author, the *Diwan* was prepared in Baghdad between 1072 and 1074 and presented to an Abbasid caliph. The *Diwan* is an encyclopedic Turkish-Arabic lexicon aimed at teaching Turkish to Arabs and contains approximately 7500 headwords, accompanied by rich information on Turkish ethnography, history, and literature. The entries are ordered not alphabetically but according to three-letter Arabic roots and provide usage examples taken from elegies and proverbs.

An important lexicon of 18th-century Ottoman Turkish is Francisci a Mesgnien Meninski's four-volume *Lexicon Turcico-Arabico-Persicum* (Turkish-Arabic-Persian lexicon), which was published in Vienna in 1780. Each entry begins with the orthographic form in the Arabic alphabet, followed by a transcription in the Latin alphabet and a field indicating whether the word is of Turkish, Arabic, or Persian origin. The Latin transcription provides valuable information on 18th-century pronunciation, since it distinguishes between the Turkish round vowels [o], [œ], [u], and [y]. In lexicons using the Arabic script, these vowels are all represented by the Arabic letter و which makes it impossible to arrive at the correct pronunciation from the orthographic form.

Statesman and author Ahmed Vefik Pasha's *Lehçe-i Osmanî* (The Ottoman dialect) is a two-volume dictionary of 19th-century Ottoman Turkish published in 1888. Vefik Pasha was an early proponent of Turkish nationalism and the 'purification' of the Turkish language, and the *Lehçe-i Osmanî* reflects this political orientation. According to Vefik Pasha, Ottoman Turkish was not a separate language but only a dialect that had been invaded by Arabic and Persian elements – and later by the languages of Europe, particularly French – which should be removed from the language. In keeping with this idea, which would become a major issue in Turkish lexicography in the 20th century, Vefik Pasha dedicated the first volume of his dictionary exclusively to words of Turkish origin, while the second volume contained frequently used foreign words.

Another major general dictionary of Ottoman Turkish, *Kamus-ı Türkî*, was published by author and lexicographer Shemseddin Sami Bey in Istanbul in 1901. The *Kamus* is an alphabetically ordered general dictionary containing a substantial number of multi word entries, parts-of-speech information, subject domain information, and etymologies for Arabic, Persian, and French loanwords. Unlike Ahmed Vefik Pasha's *Lehçe-i Osmanî*, the *Kamus-ı Türkî* is a descriptive work that presents words of Turkish, Arabic, Persian, and French origin side by side.

An extremely influential English-Turkish dictionary is *A lexicon, English and Turkish* . . published by Sir James W. Redhouse in 1861 (Figure 1). The bilingual general dictionary contains 93 000 English headwords and their pronunciation, followed by their Turkish equivalents and definitions in Arabic script. Redhouse also published a Turkish-English dictionary entitled *Kitab-ı Maani-i Lehçe* (A Turkish and English lexicon) in 1890. These two original works

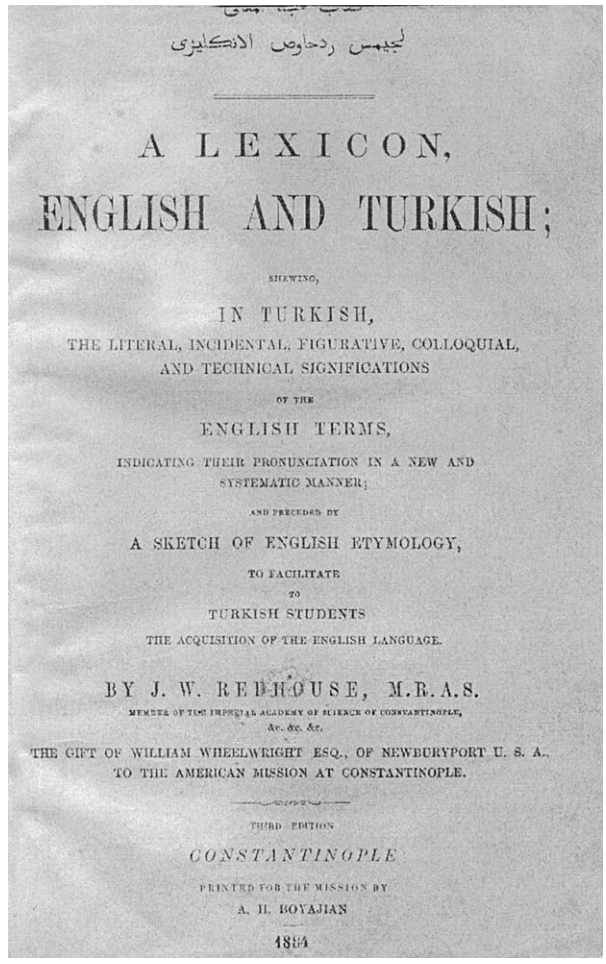

A LEXICON,

ENGLISH AND TURKISH;

SHEWING,

IN TURKISH,

THE LITERAL, INCIDENTAL, FIGURATIVE, COLLOQUIAL, AND TECHNICAL SIGNIFICATIONS

OF THE

ENGLISH TERMS,

INDICATING THEIR PRONUNCIATION IN A NEW AND SYSTEMATIC MANNER;

AND PRECEDED BY

A SKETCH OF ENGLISH ETYMOLOGY,

TO FACILITATE

TO

TURKISH STUDENTS

THE ACQUISITION OF THE ENGLISH LANGUAGE.

BY J. W. REDHOUSE, M.R.A.S.

MEMBER OF THE IMPERIAL ACADEMY OF SCIENCE OF CONSTANTINOPLE, &c. &c. &c.

THE GIFT OF WILLIAM WHEELWRIGHT ESQ., OF NEWBURYPORT U. S. A. TO THE AMERICAN MISSION AT CONSTANTINOPLE.

THIRD EDITION

CONSTANTINOPLE

PRINTED FOR THE MISSION BY

A. H. BOYAJIAN

1884

Figure 1 First page of "*A Lexicon, English and Turkish* . . ." compiled by Sir J. W. Redhouse and printed in Constantinople (Istanbul) by A. H. Boyajian in 1884.

have been transcribed, extended, and modified several times and are still in print today.

With the shift from the Arabic alphabet to the Latin alphabet in 1928, dictionaries that had been published in the Arabic alphabet over the centuries gradually became inaccessible to the public at large. The alphabet change coincided with the new Republic's nationalistic campaign to 'purify' the language. The Turkish Language Association (TDK) was established in 1932, and the monolingual Turkish dictionary compiled by this institution is still the most influential general dictionary of the Turkish that is spoken and written in modern Turkey.

The first edition of TDK's *Türkçe Sözlük* (Turkish dictionary), published in 1945, contains a considerable number of newly coined words and revived old Turkish words aimed at expelling Arabic, Persian, Latin, and Greek elements from the lexicon. The dictionary was considerably expanded and modified in successive editions. Newly coined or revived words that had obviously failed to gain public support were removed from the dictionary in later editions. The eighth (and most recent) edition, printed in 1988, is also available online.

The history of TDK's *Türkçe Sözlük* is full of political struggles that manifested themselves in the form of questions as to whether or not words of foreign origin should be included, how far the dictionary's compilers should go with coining new terms, what kind of standard spelling should be adopted, and whether or not usage examples from authors not favored by the state should be included. The debate around the 'purification' campaign was so intense that literary historian and linguist Faruk K. Timurtaş felt obliged to publish a small handbook in 1979, entitled *Uydurma Olan ve Olmayan Yeni Kelimeler Sözlüğü* (Dictionary of new words, fabricated and non-fabricated). Whatever the merits of this heated debate may be, hundreds of words and various roots and suffixes coined or revived by the TDK have now become a standard part of Turkish.

An important lexical resource is the 12-volume *Derleme Sözlüğü* (Compilation of Turkish words), compiled by the TDK between 1932 and 1982. This is an extensive survey of words used within the territory of the Republic of Turkey and is based on a collection of 600 000 index cards sent in by almost one thousand volunteers from all over the country, including the most remote villages. The *Derleme Sözlüğü* is a major dialectological repository of 20th-century Anatolian Turkish and provides valuable information on the history, phonology, and morphology of the language.

Another reference source published by the TDK is the *Tarama Sözlüğü* (Survey of Turkish texts), prepared between 1935 and 1977 by experts in Ottoman Turkish. The *Tarama Sözlüğü* is a survey of words found in more than 200 manuscripts and printed works written in Turkish between the 13th and 19th centuries. The work was later expanded and published in eight volumes (1963–1977). An abbreviated, single-volume version was published in 1983.

The TDK also published a two-volume English-Turkish dictionary in 1999. The dictionary, compiled by Hamit Atalay, contains 180 000 English entries with parts-of-speech information, Turkish translations, Turkish definitions, fine sense distinctions, usage examples, synonyms, and antonyms.

The rapid rate of language change in 20th-century Turkey gained further momentum beginning in the 1950s, which gave rise to the need for Ottoman Turkish/modern Turkish dictionaries. A reputable and large-scale example of this kind is Ferit Devellioğlu's *Osmanlıca-Türkçe Ansiklopedik Lûgat* (Ottoman-Turkish encyclopedic dictionary) (1962), which contains 60,000 entries together with Arabic and Latin transcriptions, parts-of-speech information, and etymologies. The three-volume *Osmanlı Tarih Deyimleri ve Terimleri Sözlüğü* (Dictionary of Ottoman historical terms), published by the Turkish Ministry of National Education in 1983, is an encyclopedic dictionary compiled by Mehmet Zeki Pakalın that is a rich repository of the linguistic and cultural heritage of the Ottoman Empire.

Pars Tuğlacı (b. 1933), a Turkish citizen of Armenian origin, is a major lexicographer of Turkish who has compiled a wide variety of lexicons. His 10-volume *Okyanus* encyclopedic dictionary (1971–1974) is the largest lexicon of Turkish prepared by a single individual. It contains usage examples, parts-of-speech information, word origins, color illustrations, and English and French translations for approximately 200 000 lexical items, including a substantial number of multiword expressions. Tuğlacı has also published an English-Turkish medical dictionary, a dictionary of economic and legal terms, a French-Turkish dictionary, a dictionary of English idioms, and a collection of synonyms and antonyms in Turkish.

In the 20th century, special subject dictionaries were mainly compiled by individuals who were not necessarily lexicographers. Common problems with these resources include the almost total absence of teamwork, lack of a scientific system for word list preparation, inconsistent spelling practices and definitions, mistakes carried over from earlier sources, deviations from descriptive principles reflecting the political orientation of the author, low print runs, and inadequate promotion. Notable exceptions are the *Türk Hukuk Lûgati* (Turkish law dictionary), prepared by the *Türk Hukuk Cemiyeti* (Turkish Law

Association) (1943); the two-volume English-Turkish-English *Hukuk Sözlüğü* (Law dictionary) by Mustafa Ovacık (1964); *Açıklamalı Tıp Terimleri Sözlüğü* (English-Turkish explanatory dictionary of medical terms) by Utkan Kocatürk (2000); *İngilizce-Türkçe Reklam Terimleri ve Kavramları Sözlüğü* (English-Turkish dictionary of advertising terms) by Tanses Gülsoy (1999); and *İngilizce-Türkçe Ansiklopedik Bilişim Sözlüğü* (English-Turkish encyclopedic dictionary of IT terms) (2002).

With the advent of personal computers and the Internet, a limited number of online glossaries emerged starting in the late 1990s. Current resources are mere transfers of existing printed resources, or worse, compilations from various unknown sources. Zargan is the publisher of a major online Turkish-English-Turkish terminology bank containing 435 000 entries, with special emphasis on business terms.

Ongoing lexicography projects using computer technology focus on online collaboration possibilities, error-reporting systems, automatic detection and sorting of missing entries based on user queries and corpus data, cross-linking of online resources, the integration of online lexical resources into word processors, and the development of intelligent search algorithms using spelling correction systems and morphological analyzers, the latter being an absolute necessity for an agglutinating language like Turkish.

Recent academic projects include Sabancı University's Turkish WordNet, which contains 13 000 concepts, and Berkeley University's Turkish Electronic Living Lexicon, which is a database of 30 000 Turkish words, representing both print dictionaries and actual speaker knowledge. The latter includes orthographic representations, phonemic transcriptions, morphological roots, and etymologies. Another center of academic activity on the Turkish language is the Middle East Technical University in Ankara, whose Informatics Institute has published a treebank and a balanced corpus for lexical studies in Turkish.

See also: Academies: Dictionaries and Standards; Altaic Languages; Bilingual Lexicography; Computers in Lexicography; Corpora; Corpus Lexicography; Language Change, Intentional; Language Planning and Policy: Models; Lexicography: Overview; Nationalism and Linguistics; Politics and Language: Overview; Terminology, Term Banks and Termbases for Translation; Treebanks and Tagsets; Turkey: Language Situation; Turkic Languages; Turkish; WordNet(s).

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http://www.zargan.com – Zargan Online Terminology Bank.

Turkmen

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Location and Speakers

Turkmen (*türkmen dili, türkmenče*) belongs to the southwestern or Oghuz branch of the Turkic language family, which also includes Turkish. It is mainly spoken in Turkmenistan (*Türkmenistan döwleti*), which is located in the Transcaspian region and whose capital is Ashgabat. Turkmenistan borders on Iran and Afghanistan in the south, Uzbekistan in the east, and Kazakhstan in the north. The area of distribution of Turkmen extends from the southeastern shore of the Caspian Sea to the Kazakh-speaking area in the north, the Karakalpak-speaking area in the northeast, the Uzbek-speaking area in the east, beyond the Amudarya River, and the Persian (Farsi, Western) and Khorasan Oghuz (Khorasani Turkish) areas in the south, beyond the borders to Afghanistan and Iran. Though Turkmens make up 85% of the 4.8 million inhabitants, only 72% speak Turkmen. The other main languages are Russian (12%) and Uzbek (9%). Turkmen-speaking groups also live in the Russian Federation, Kazakhstan, Tajikistan, China, etc. The total number of speakers amounts to nearly 5 million.

The designation 'Turkmen' is not unequivocal. Older Oghuz varieties spoken in Khorezm, Khorasan, Azerbaijan, Anatolia, and other regions in the Near East were referred to as 'Turkmen.' Several nomadic groups in Anatolia, Iraq, etc. are still called 'Turkmen' without being Turkmen in a linguistic sense.

Since the mid-1990s, language policy aims at consolidating Turkmen as the state language and to remove the Russian dominance. Turkmen is gaining more social functions. The 1992 constitution defines it as the "official language of inter-ethnic communication." Geographic names and administrative terms have been changed from Russian to Turkmen. In practice, however, Russian has maintained its importance in most spheres of public communication.

Origin and History

The Turkmens go back to the Turkic-speaking Oghuz confederation of tribes, whose Inner Asian steppe empire collapsed in 744. Certain Oghuz groups migrated into the region between the Syrdarya and Ural rivers. By the late 10th century, the Seljuk dynasty was founded, and an autonomous state was established on the lower Syrdarya. The Seljuks left this region in the middle of the 11th century and migrated westwards. Their modern descendants are the Turks of Khorasan, Azerbaijan, and Turkey. The speakers of Turkmen are mainly descendants of non-Seljuk groups that did not take part in these migrations.

During the Mongol conquests in the 13th century, the remaining Oghuz tribes were pushed into the Karakum desert and the region east of the Caspian Sea. From the 16th century on, Turkmen groups migrated to Khorezm, to the southern part of today's Turkmenistan, and to Khorasan, absorbing local Turkic and Iranian elements. The major migrations of the Salïr, Ersarï, Sarïq and Teke tribes took place in the 17th century. In the 18th century, the Turkmens conquered the whole core area that they inhabit today.

Most tribes were subsequently divided and controlled by the Uzbek khanates of Khiwa and Bukhara, while the Persian shahs tried to subdue the southern tribes. The dependence of Khiwa and Persia came to an end after the mid-19th century. Some decades later, Russia annexed the Turkmen territory, which caused many Turkmen groups to emigrate to Afghanistan and Iran. The Turkmen area was first administered as the Trans-Caspian district in the Governorate of Turkistan. In 1924, Turkmenistan was proclaimed a Socialist Soviet Republic.

In connection with the dissolution of the Soviet Union, Turkmenistan declared its sovereignty in 1990, achieved its independence in 1991 (after a popular referendum), and adopted its new constitution in 1992.

Related Languages and Language Contacts

The closest relative of Turkmen is Khorasan Turkic (Khorasani), spoken in northeastern Iran and Khorazm, a distinct language with which it constitutes the eastern subbranch of Oghuz. Azerbaijanian (Azerbaijani) and Turkish represent the western subbranch. The specific features of Turkmen are partly archaic and partly innovative, due to language contact. Within the Turkic family, Khorasan Turkic, Uzbek, and Karakalpak are the most important contact languages. Turkmen has had intensive contacts with Persian and, during the last century, with Russian.

The Written Language

Old Turkmen is not clearly documented in written sources. The oldest records of 'Turkmen' relate to Oghuz varieties in general. Oghuz texts of the following centuries do not exhibit any specific Turkmen features. A written Turkmen literature began in the 18th century, but the language used is a variety of the

classical Chaghatay (Chagatai) language. A Turkmen standard language was created in the Soviet era and formed mainly from 1928 on. It was based on the Teke dialect as spoken in the Ashgabat region.

Arabic script was used in the first period. Two script reforms, in 1922 and 1925, aimed at reflecting spoken features more adequately. A Roman-based alphabet that reflected most of these features rather accurately was in use from 1928 to 1940. A variant of the Cyrillic alphabet was adopted in 1939–1940. Since the early 1990s, there has been a transition to a Roman-based script again. In 1993, the final version of a Roman-based alphabet was adopted to replace the Cyrillic one. It has several unique letters that distinguish it from Turkey's alphabet and the newly adopted alphabets of other Turkic republics.

Distinctive Features

Turkmen exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation, e.g., *A* = *a/e*, *I* = *ï/i*. Segments in round brackets only occur after consonant final stems. Hyphens are used here to indicate morpheme boundaries.

Phonology

Turkmen has, like Yakut and Khalaj, preserved Proto-Turkic long vowels in a consistent way, e.g., *a:t* 'name' < *a:t* (but at 'horse' < *at*), *dö:rt* 'four' vs. Turkish *dört* < *tö:rt*. The orthography does not normally mark vowel length, but *ü*: in words of Turkic origin is expressed by *üy*, e.g., *süyt* for [θü:t] 'milk'. Proto-Turkic *e:* is mostly represented by Turkmen *i*, which mostly corresponds to Azerbaijanian *e*, e.g., *gi:č* 'late' (Azerbaijanian *geč*, Turkish *geç*).

A striking feature of Turkmen pronunciation is the presence of the interdental fricatives *θ* and *δ*, which correspond to *s* and *z* in other Turkic languages, e.g., *θiδ* 'you' (Turkish *siz*).

As in Azerbaijanian, the word-initial back velar *ġ*- corresponds to *q*- in other Turkic languages, e.g., *ġï:δ* 'girl' (Azerbaijanian *ġïz*, Turkish *kız*). Initial *b*- is preserved in *ber*- 'to give', *ba:r* 'existing', *bar*- 'to go' and *bol*- 'to become' (Turkish *ver*-, *var*, *var*-, *ol*-). The bilabial fricative *β* is used instead of labiodental *v*, e.g., *a:β* 'hunt' (Turkish *av*). It appears as the glide *w* between two vowels or between a liquid and a vowel. The bilabial fricative *f* is frequently replaced by the stop *p* in loans, e.g., *pikir* 'thought' (Turkish *fikir*).

Suffix vowels mostly assimilate to the quality of the preceding vowel. Turkmen displays both front vs. back harmony and rounded vs. unrounded harmony. The latter also includes suffixes with low vowels, e.g., *toy-do* [feast-LOC] 'at the feast' vs. *öy-dö* [house-LOC] 'in the house'. Long *a:* and *e:* are not rounded; there are also other exceptions. Though the orthography represents the vowels of rather closely, rounding harmony is not consistently represented. Rounding is only expressed in high vowels and not beyond the second syllable. The tendency towards rounded low suffix vowels is also observed in languages such as Kirghiz, Altay Turkic (Altai), and Yakut.

Numerous consonant assimilations are observed, e.g., *men-ne* [I-LOC] 'in me', *ġïδ-δan* [girl-ABL] 'from the girl', *yol-loš* [way-DER] 'comrade' (Turkish *ben-de* [I-LOC], *kiz-dan* [girl-ABL], *yol-daş* [way-DER]). They are mostly not reflected in the orthography.

In copies of loanwords, nonpermissible consonant clusters are dissolved by means of prothetic or epenthetic vowels, e.g., *uθθul* 'chair' < Russian *stul*, *pikir* 'thought' < Arabic *fikr*. In recent loanwords from Russian, these vowels are not reflected orthographically.

Grammar

The comparative degree of adjectives is formed with *-rA:K*, e.g., *kičire:k* [small-COMP] 'smaller, rather small' (*kiči* 'small'). The demonstrative pronouns *bu:*, *šu:*, *ol* and *šo[l]* form a fourfold deictic system, expressing various degrees of distance (Turkish *bu*, *o* and *şu*).

The old present tense, mostly called 'indefinite future,' is formed with *-Ar*, e.g., *bil-er* [know-AOR] 'will know' (Turkish *bil-ir* [know-AOR]), *oqa:-r* [read-AOR] 'will read' (Turkish *oku-r* [read-AOR]). The negative marker is *-mAδ* in the third person, and *-mAr* in the other persons, e.g., *gel-mer-in* [come-NEG.AOR-1.SG] 'I will not come' (Turkish *gel-me-m* [come-NEG.AOR-1.SG], Azerbaijanian *gel-mer-em* [come-NEG.AOR-1.SG]). A more focused present tense is formed with *-yA:r*, often contracted to *-yA*, e.g., *bil-ye:r* [know-PRES.3.SG] 'knows', *oqa-ya:r* [read-PRES.3.SG] 'reads, is reading'. A few verbs exhibit contracted forms without this marker: *du:r* [stand-PRES.3.SG] 'is standing', *otï:r* [sit-PRES.3.SG] 'is sitting', *yatï:r* [lie-PRES.3.SG] 'is lying'. These forms can be used with a converb marker to express a continuous present, e.g., *oqa:-p otï:r* [read-CONV AUX-PRES.3.SG] 'is reading'.

The second-person imperatives include an unmarked singular, e.g., *gel* [come.IMP.2.SG] 'come!', a form

expressing insistence, e.g., *gel-gin* [come-IMP.2.SG], a plural form, e.g., *gel-iŋ* [come.IMP.2.PL], and intensifying forms, e.g., *gel-θen-e* [come-IMP.2.SG] (singular) and *gel-θe-ŋiδ-lä:ŋ* [come-IMP.2.PL] (plural). The first-person plural has a special form that only refers to the speaker and the addressee, e.g., *gel-eli-ŋ* [come-IMP.1.PL] 'let us come', *gel-eli* [come-IMP.1.INCL] 'let us come (you and me)'.

The future marker *-ǰAK* and the intentional marker *-mAK-čI* lack personal markers, e.g., *men gel-ǰek* [I come-FUT] 'I will come' (Turkish *gel-eceğ-im* [come-FUT.1.SG]), *men yaδ-maq-či* [I write-INTENT] 'I intend to write'.

Turkmen has a postterminal ('past') participle marker *-An* and an intraterminal ('present') participle marker *-yA:n*, e.g., *bil-en* [know-POSTTERMINAL.PART] 'having known', *bil-ye:n* [know-INTRATERMINAL.PART] 'knowing'. A categorical negation is formed with the participle in *-An* + possessive suffix + *yo:q* 'non-existing', e.g., *al-amo:q* (<*al-an-ïm yo:q*) [take-POSTTERMINAL.PART-POSS.1.SG not-existing] 'I did/do not take at all'. There is a postterminal converb marker *-(I)p*, e.g., *oyno-p* [play-POSTTERMINAL.CONV] 'having played'. The corresponding marker of Turkish and Azerbaijanian displays the uncontracted form *-(y)Ip/-(y)Ib*, e.g., Turkish *oyna-yip* [play-POSTTERMINAL.CONV].

Among the evidential markers, the inflectional suffix *-(I)p-dIr*, negated *-mAn-dIr*, forms an evidential (indirective) past, e.g., *gel-ip-dir* [come-POSTTERMINAL.CONV-EV.3.SG] 'has evidently come'. The copula particle *eken* combines with various participles, e.g., *gel-en eken* [come-POSTTERMINAL. PART EV.PARTICLE] 'has obviously arrived'. The copula particle *-mIš* suggests second-hand information, e.g., *gel-ip-miš-in* [come-POSTTERMINAL. CONV-EV.3SG] 'has reportedly come'. A presumptive intraterminal (present, imperfect) is formed with *-yA:n-dIr*, a presumptive postterminal (perfect) with *-A:n-dIr*, e.g., *bar-ya:n-nïr* [go-INTRATERMINAL. PART-PRESUMP.3.SG] 'is probably going', *bar-an -nïr* [go-POSTTERMINAL.PART-PRESUMP.3.SG] 'has probably gone'.

A number of postverb constructions with converbs plus auxiliary verbs, *ġoy-* 'to put', *git-* 'to go away', *čïq-* 'to go out', *dur-* 'stand', *otur-* 'sit', *yör-* 'move', etc., express modifications of the manner in which the action denoted by the lexical verb is carried out.

Lexicon

The Turkmen vocabulary is basically of southwestern Turkic origin, though it also contains words typical of the Northwestern and Southeastern branches of Turkic. There are synonyms representing Oghuz and non-Oghuz types, e.g., *ġapï* and *išik* 'door', *dodaq* and *erin* 'lip'. The vocabulary contains numerous words of Arabic and Persian origin, borrowed from Persian and representing the traditional sphere of Islamic civilization, e.g., *xat* 'letter', *ïnθa:n* 'human being', *ša:t* 'glad', *gül* 'flower', *ireŋk* 'color'. The Turkmen conjunctions are mainly of Arabo-Persian origin, e.g., *we* 'and', *emma:* 'but'. Words of Russian origin, borrowed from the 19th century on, represent phenomena of modern life, e.g., *poθyolok* 'settlement', *ġaδyet* 'newspaper', *fe:rma* 'farm'. The vocabulary contains many recent internationalisms borrowed via Russian.

Dialects

Turkmen dialects and subdialects are referred to by the names of tribes and clans. One main dialect group comprises the Teke, Yomud, Sarïq, Salïr, Gökleng and Ersari dialects, which are rather close to Standard Turkmen. The Teke dialect, occupying the central area, has two subdialects, Marï and Akhal, the latter spoken in the Ashgabat region. The Yomud dialect is spoken on the southeast shore of the Caspian Sea and in the northern part of Turkmenistan. Ersarï dialects are spoken in the eastern part of the country. The second main dialect group is found in the regions on and beyond the borders to Iran and Uzbekistan. These dialects are more distant from Standard Turkmen, lacking, for example, the interdental pronunciation of the sibilants *s* and *z*.

An isolated variety of Turkmen is Türkpen (Russian Trukhmen), spoken by small groups (ca. 12 000) on the lower Kuma River in the Stavropol region of Northern Caucasus. Türkpen is strongly influenced by Noghay (Nogai). Its speakers are descended from Turkmen tribes that migrated here in the 18th century from the Mangyshlak region east of the Caspian Sea. Salar, spoken in western China, seems to go back to an early Turkmen variety.

See also: Afghanistan: Language Situation; Altaic Languages; Azerbaijanian; China: Language Situation; Iran: Language Situation; Kazakhstan: Language Situation; Persian, Modern; Russian; Turkic Languages; Turkish; Turkmenistan: Language Situation; Uzbek; Yakut.

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Turkmenistan: Language Situation

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Languages

The Republic of Turkmenistan, located in the Transcaspian region between the Caspian Sea and the Amudarya River, borders on Iran and Afghanistan in the south, Uzbekistan in the east, and Kazakhstan in the north. Four-fifths of the country consist of deserts, with the Kara-Kum desert dominating the central area. The majority of the population live in a long, narrow zone on the northern slopes of the Köpetdagh and along the Amudarya River.

Turkmenistan was annexed by Russia between 1865 and 1885, was proclaimed a Socialist Soviet Republic in 1924, and achieved its independence from the Soviet Union in 1991.

The population of Turkmenistan numbers more than 4.8 million, of which about 85% are Turkmen. No other titular nation in the Turkic republics of Central Asia reaches this high share of the total population. The rest consists of Uzbeks (5%), Russians (4%), Kazakhs, Tatars, Ukrainians, Azerbaijanians, Armenians, etc. The capital Ashgabat and some other cities have a high proportion of non-Turkmen inhabitants. The majority of the Uzbek-speaking groups live along the Amudarya River. The Kazakh-speaking area is located in the northern part of the republic. Khorasan Turkic is spoken in the southern region bordering northern Iran. Turkmen-speaking groups also live in Iran, Afghanistan, Kazakhstan, Uzbekistan, the Russian Federation, Kazakhstan, Tajikistan, China, etc. The annexation of the Turkmen territory by Russia at the end of the 19th century as well as the events of the Civil War and later socioeconomic reforms caused sizeable Turkmen groups to emigrate to Afghanistan and Iran.

The official national language of Turkmenistan is Turkmen, spoken by about 72% of the population. Russian is still spoken by 12%.

Language Policy

When Soviet Central Asia was divided into union republics in 1924, the Transcaspian District and the Turkmen Oblast of the Turkestan Autonomous Soviet Socialist Republic were transformed into the Turkmen Soviet Socialist Republic. In the following period, significant numbers of Russians and other non-Turkmens migrated to the urban areas of the republic. Standard Turkmen, based on the dialect spoken in the region around Ashgabat, was formed during the Soviet period. Education and literacy, mainly in Russian, but also in Turkmen, were strongly promoted.

In the post-Soviet period, efforts to preserve, protect, and promote Turkmen have been successful. The social functions of the language have been broadened, and its status as the state language has been consolidated. Russian was replaced as official language in the 1992 constitution, which defined Turkmen as the official language of interethnic communication. In 1993, English was given the status of a second official language. Though the language policy has been aiming at limiting the influence of Russian, this language has maintained much of its importance in official and public communication.

Turkmen has been written with Arabic script, a Roman-based alphabet, and a Cyrillic-based alphabet. In 1993, the final version of a Roman-based alphabet was adopted to replace the Cyrillic one, but the transition to this script system has been slow. Turkmenistan still applies a dual system with Cyrillic- and Roman-based scripts appearing side by side.

See also: Afghanistan: Language Situation; Iran: Language Situation.

Language Maps (Appendix 1): Map 128.

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Turks and Caicos Islands: Language Situation

Editorial Team

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The Turks and Caicos Islands are two island groups in the North Atlantic Ocean, a southeastern continuation of the Bahamas. The archipelago includes more than 30 small islands, of which only eight are inhabited.

The first known inhabitants here were Taíno Indians, who were killed and forced into slavery by European settlers in the 16th century. Ownership of the territory was disputed between the French, Spanish, and British, which ended with the eventual victory of the British, although the French also ruled for some period in later history. The islands remained without a permanent population until 1678, when people arrived from Bermuda and settled there, trading in salt. Later settlers established cotton plantations, using the labor of slaves. The archipelago became part of the Bahamas in 1799 and then became self-governing in 1848. In 1872 it was annexed to Jamaica, where it remained until 1962, when it was linked to the Bahamas. In 1973 it became an overseas territory of the United Kingdom.

The population (19 956, July 2004 estimate) is mostly of African origin (90%), descended from the slaves who were brought in the 18th century. In addition, there is a mixed European and American minority (10%). Recent years have seen the rise of the number of immigrants from Haiti and the Dominican Republic.

The official language is English. At least half of the population speaks Turks and Caicos Creole English, a creole closely related to Bahamas Creole English.

See also: Bahamas: Language Situation; Pidgins and Creoles: Overview.

Turner, Lorenzo Dow (1895–1972)

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Turner's greatest contribution was to rebut the assumption that there were no African retentions in the New World, using thousands of examples from all aspects of language. Turner's (1949) book paved the way for later studies in both creoles and in African American Vernacular English.

See also: Armstrong, Lilias Eveline (1882–1937); Dialect Atlases; English, African American Vernacular; Gullah; Jones, Daniel (1881–1967); Kurath, Hans (1891–1992); Pidgins and Creoles: Overview; Sapir, Edward (1884–1939); Ward, Ida Caroline (1880–1950).

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Turner, Ralph Lilley, Sir (1888–1983)

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Sir Ralph Lilley Turner (IES KB MC FBA) was serving as an officer in the Gurkha Rifles during the Palestine Campaign of 1917–1918 when he conceived the plan that was to lead to *A comparative and etymological dictionary of the Nepali language* (Turner, 1931) and to *A comparative dictionary of the Indo-Aryan languages* (Turner, 1966, 1969, 1971, 1985).

Turner was born on October 5, 1888. He was introduced to Sanskrit while still at school, studied Classics and Sanskrit with comparative philology at Cambridge, and in 1913 was appointed to teach Sanskrit in Queen's College, Benares. He was, in 1920, deputed to Benares Hindu University as a professor of Indian linguistics and, in 1922, elected to the chair of Sanskrit in London University at its new School of Oriental Studies. Thus he not only influenced and worked with the rising generation of Indian historical linguists, such as S. K. Chatterji, S. M. Katre,

additional training from the Linguistic Institutes of 1931 and 1934. Realizing the importance of the African substrate in these languages, he spent 1936 to 1937 at the University of London, studying phonetics with Daniel Jones and Lilias Armstrong, and at the School of Oriental and African Studies, studying West African languages with Ida Ward. Not long after a research fellowship at Yale, where he studied under Edward Sapir, Turner began publishing his previous studies on Africanisms in Gullah. In part because he was African–American, Turner was able to win the trust of his linguistic consultants and was able to describe a more vernacular form of Gullah than his white colleagues could.

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T. N. Dave, Baburam Saksena, etc., but was also eventually in touch with G. A. Grierson, D. L. R. Lorimer, and G. Morgenstierne, who were collecting and evaluating data from the languages of the western Himalaya and Hindu Kush.

Turner's studies of Gujarati, Sindhi, Nepali, and Gypsy Romani from 1915 to 1930 followed immediately upon the Frenchman Jules Bloch's similarly pioneering study of the evolution of Marathi. Here Turner set himself to introduce into the study of Indo-Aryan languages the Neogrammarian concept of linguistic regularity, together with a proper understanding of the phonology of accent. He was the first to give a satisfactory account of the nature and origin of Sindhi recursive consonants, and to demonstrate that the affiliations of Romani lie with Hindi, etc., rather than with the more peripheral Indo-Aryan languages.

His Nepali dictionary of 1931, listing Old, Middle, and New Indo-Aryan cognates for every word registered, became for 35 years the most indispensable and most often quoted research tool in Indian linguistic science, until superseded by his magnificent *A comparative dictionary of the Indo-Aryan languages*. Inspired by Meyer-Lübke's dictionary of the Romance languages, and originally conceived as an integral part of Grierson's *Linguistic survey of India* on which it was ultimately based, the Indo-Aryan dictionary of 1966 (in fascicles from 1962) comprised some 140,000 words arranged under nearly 15,000 Old Indo-Aryan headwords, attested in Sanskrit or provisionally reconstructed. Its timing meant that it could interact fruitfully with the compilation of Burrow and Emeneau's *Dravidian etymological dictionary* and M. Mayrhofer's *Etymologisches Wörterbuch des Altindoarischen*. Its *Phonetic analysis* (Turner, 1971) introduced into Indian lexicography the use of computer analysis. Based on the *Indexes* prepared by his wife Dorothy (Turner, 1969), that volume enabled the user to examine all words which contain a particular sound or group of sounds in any given phonetic environment. Thus the publication was completed in Turner's 83rd year, and a further volume of his *Addenda and corrigenda* (Turner, 1985) appeared posthumously.

Raw material for the Indo-Aryan dictionary had been amassed by 1937, but then Turner accepted appointment as director of the School of Oriental Studies, which, at his instigation, soon became the School of Oriental and African Studies. As the school struggled to meet the need for language training during the war, Turner's sustained campaigning led, in 1946, to a Commission of Enquiry Report that provided for the expansion and development of Oriental and African studies in London and other British universities, thus securing their future for some generations to come. On his retirement in 1957, he was at last able to edit the dictionary, and to resume a series of articles dealing with outstanding problems of historical phonology, of which the last appeared in 1982, in Turner's 94th year. He died on April 23, 1983.

See also: Bloch, Jules (1880–1953); Chatterji, Suniti Kumar (1890–1977); Grierson, George Abraham, Sir (1851–1941); Katre, Sumitra Mangesh (1906–1998); Indo–Aryan Languages; Iranian Languages; Mayrhofer, Manfred (b. 1926); Meyer-Lübke, Wilhelm (1861–1936); Nepali.

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Tuvalu: Language Situation

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Tuvalu is an island nation located in the Pacific Ocean midway between Hawaii and Australia. Its name means 'Eight Standing Together' in Tuvaluan. With the exception of tiny Vatican City, it is the independent nation with the fewest inhabitants. Due to their low elevation (5 m maximum), the islands that make up this nation are threatened by any future sea level rise. The population may evacuate during the next decades to New Zealand, or Niue, a small Pacific island (independent but associated with New Zealand) that is not threatened by sea level rise, but does have decreasing population. According to the evidence of linguists, the settlement of the country goes back about 2 000 years. It is generally believed that the earlier ancestors came mostly from Samoa, possibly by way of Tokelau, while others came from Tonga and Uvea (Wallis Island). These settlers were all Polynesians with the exception of those on Nui, where many people are descendants of Micronesians from Kiribati. Formerly called the Ellice Islands, Tuvalu came under British jurisdiction in 1877 and was made part of the British Protectorate (and later colony) of the Gilbert and Ellice Islands in 1892. Tuvalu achieved full independence in 1978 and it is now a special member of the Commonwealth. The official languages of Tuvalu are Tuvaluan, a Polynesian language that is spoken by virtually everybody, and English, which is, however, not in daily use. Kiribati is a national language. There are three distinct linguistic areas in Tuvalu. The first area contains the islands of Nanumea, Niutao, and Nanumaga, where the northern variety of Tuvalu is spoken. The second linguistic group comprises the islands of Vaitupu, Nukufetau, Funafuti, and Nukulaelae, where the southern variety of Tuvalu is spoken. The third is the island of Nui, where some of the inhabitants speak a language that is fundamentally derived from I-Kiribati, a Micronesian language.

See also: Austronesian Languages: Overview.

Tuvan *See:* Turkic Languages.

Twaddell, William Freeman (1906–1982)

J Rischel, Mahidol University, Thailand

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William Freeman Twaddell was born in Rye, New York on March 22, 1906, and he died in Providence, Rhode Island on March 1st, 1982. Twaddell studied German philology and earned his Ph.D. from Harvard in 1930. In 1937 he became Professor of German and chair of the German Department at the University of Wisconsin; in 1946, he received a similar post at Brown University. With his outstanding competence in general linguistics, however, he soon shifted to that field. He remained chairman of the newly established linguistics department of Brown University until his retirement in 1971. In 1953 he was president of the Linguistic Society of America, and, over the years, he became involved in numerous academic tasks, such as consultant to projects.

Twaddell's early career coincided with the upsurge of structural linguistics in the United States; he stands out as one of the most interesting scholars associated with 'Bloomfieldian' linguistics. His essay *On defining the phoneme* (1935) is generally hailed as a landmark within pregenerative phonological theory, although it did not influence the subsequent development of American structuralism as much as one might have expected. Twaddell exhibits a total independence of mind, taking issue both with Sapir's mentalism and Bloomfield's physicalism and ending up with a notion of the phoneme as 'an abstractional, fictitious unit' (thus endorsing the approach that has been dubbed 'hocus-pocus linguistics,' as against theories making a claim to reality: so-called 'God's truth linguistics'). To Twaddell, the real phonemes (or 'microphonemes') are the position-bound units that enter paradigmatic contrasts, i.e., the members of minimal

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sets. Accordingly, if one uses the term phoneme in the conventional sense (the 'macrophoneme,' in Twaddell's terminology), one is referring to a fictitious class consisting of phonetically more or less similar members from different contrastive sets.

In retrospect it is clear that Twaddell's approach distances itself from the post-Bloomfieldian concept of the phoneme as a sound unit defined by distributional properties. Its anchoring in paradigmatic contrast was, on the other hand, shared by certain other versions of structuralism that were then in the making, particularly the Hjelmslevian trend.

As a philologist working on early German, Twaddell made a seminal contribution to the theoretical basis of historical linguistics by demonstrating how various major sound shifts can be understood as changes in the phonological pattern. He thus stands out as one of those who managed to establish a fruitful connection between traditional philology and structuralism.

Twaddell made significant contributions outside phonology proper. *The English verb auxiliaries* (1960) stands out as one of the highlights of descriptive English grammar from before the era when generative grammar became dominant.

Finally, it deserves mention that after moving to Brown University, Twaddell contributed substantially to the development of foreign language teaching in the United States. He worked out several textbooks dealing with the German language and introduced the use of the computer in handling text material. Nelson Francis, one of the scholars behind the *Brown standard corpus of present-day English* has explicitly acknowledged that it was inspired by Twaddell's computer-supported approach.

See also: Bloomfield, Leonard (1887–1949); Copenhagen School; Corpus Linguistics; Phoneme.

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Twardowski, Kazimierz (1866–1938)

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Kazimierz Twardowski was born on September 20, 1866 in Vienna. From 1866 to 1889, Twardowski studied philosophy in Vienna under Franz Brentano. In 1881 he earned his Ph.D. and, in 1894, *venia legendi* from the same University. He lectured on logics in Vienna, and worked for a short time for a Vienna insurance company. In 1895 he received the philosophy professorship at the University of Lvov, and from 1914 to 1917, he was the rector of the University of Lvov. He was also awarded the *doctor honoris causa* title by the University of Warsaw and the University of Poznań.

As the eminent professor of philosophy, Twardowski actively worked as a scholar, lecturer, and organizer. He supervised the seminar studies of many philosophers (e.g., Kazimierz Ajdukiewicz, Tadeusz Kotarbiński, Władysław Tatarkiewicz, Roman Ingarden), and also other scholars, e.g., Juliusz Kleiner (literary historian), Jerzy Kuryłowicz (linguist), Stanisław Łempicki (culture historian), and Stefan Baley (psychologist).

Twardowski's main concern was to establish a modern philosophy in Poland. He claimed that such a philosophy must not be unidirectional and so became a propagator of French and English philosophical traditions and achievements and began to develop an organizing frame for the Polish philosophy. In 1904 he established in Lvov the Polish Philosophical Society, and in 1911 realized one of his great ambitions, issuing the periodical *Ruch Filozoficzny*, which informed readers of both international philosophical issues, as well as those at home in Poland. Twardowski is also known as a promoter of the teaching of philosophy in secondary schools in the form of open lectures.

Twardowski advocated the use of scientific methods in philosophy and wanted to investigate scientific problems. At the same time, he rejected all the methods that might involve subjective opinions and, similarly to Brentano, opposed analyzing issues connected

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Twardowski advocated the use of scientific methods in philosophy and wanted to investigate scientific problems. At the same time, he rejected all the methods that might involve subjective opinions and, similarly to Brentano, opposed analyzing issues connected

with one's viewpoint. He claimed that philosophy is the theory of science, the subject of which is the study of human cognition. Thus, he supplemented his researches with psychological evidence and data now referred to as semantic. Twardowski divided the cognitive psychical phenomena into **representations** and **statements**; the former into **images** and **conceptions**. According to this distinction, representation is not an element of a statement, but a necessary condition of it (idiogenetic theory of statements). For example, the conception of a rectangle consists of an image of some plain geometric figure that the agent complements with another two characteristics: rectangular and equilateral.

Apart from investigating purely scientific problems, Twardowski cultivated a rule of clear speaking according to his saying, 'the one who speaks unclearly, thinks unclearly,' in which he always called for proofs of every statement and avoided speculations. Later, his students formed the Warsaw-Lvov School of Philosophy, and, since they followed Twardowski's ideas, it was a school of analytic philosophy. Twardowski died on February 12, 1938 in Lvov.

See also: Kotarbinski, Tadeusz (1912–1998); Kuryowicz, Jerzy (1895–1978).

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20th-Century Linguistics: Overview of Trends

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Introduction

Two theoretical trends can be considered as hallmarks of 20th-century linguistics: structural linguistics and generative grammar. They almost equally divide this epoch: structural linguistics (or, shortly, structuralism) flourished between the 1910s and the 1950s, generative grammar from the 1950s. Structuralism was not a unitary theory, but rather a galaxy of schools sharing some principles; furthermore, some important differences distinguish European structuralist schools from the American one. Generative grammar, instead, originated as a unitary theory, which subsequently divided into different schools and which stimulated several alternatives from scholars not accepting it.

Both structural linguistics and generative grammar also had an impact outside linguistics: between the 1950s and 1970s (especially in France), the former became the model for all humanities, hence a 'structural' anthropology, a 'structural' sociology, etc., were developed. Generative grammar, in its turn, was seen as one of the initial steps of the so-called cognitive revolution. Neither of these extensions was free of problems: in many cases, concepts of structural linguistics were applied to other fields with some illegitimate modifications, and the debate on what 'cognitive' really means has not yet come to a solution. All this, however, does not lessen the outstanding role of both structuralism and generative grammar within 20th-century linguistics and within 20th-century thought in general. This article will therefore focus almost exclusively on these two theoretical trends: even sociolinguistics will be dealt with rather as an alternative to generative grammar rather

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Two-Dimensional Semantics

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When we ask whether a sentence is true or false, we are always asking with respect to a particular world. We are typically concerned about a sentence's truth value in the actual world, but we sometimes consider its truth value in other possible worlds as well. Thus the evaluation of any sentence is world-dependent in the sense that whether it is true (in a world) depends on the facts about that world. Context-sensitive sentences are also world-dependent in another quite different sense – what they mean depends on facts about the context, or world, in which they are used. For instance, *it's cold here* uttered in Pakistan means that it is cold in Pakistan, and when uttered in New Jersey means that it is cold in New Jersey. Two-dimensional semantics uses a formal apparatus from two-dimensional modal logic to characterize these two kinds of world-dependence. The two-dimensional framework has been applied to a variety of problems in semantics (indexicals and demonstratives and their interaction with modal operators), pragmatics (presupposition), and philosophy (accounts of the *a priori/a posteriori* distinction and the psychological/functional roles of thought). All of these applications depend on various assumptions, which are not implicit in two-dimensional modal logic, and many of which are controversial.

Modal logic allows that expressions may have different extensions in different possible worlds. For instance, it allows that the objects that satisfy a predicate in one world may differ from those that satisfy it in another. In one-dimensional modal logic, the rule that determines each expression's extension in every world, called its intension, is represented as a function from possible worlds into extensions. The intension of a predicate F, for instance, is a function that takes a possible world onto the set of individuals that satisfy F in that world, and the intension of a singular term t is a function taking possible worlds to single individuals. Two-dimensional modal logic allows that a single expression may be associated with different one-dimensional intensions in different contexts, or worlds, of use. So it associates a two-dimensional intension with each expression, which is a function from possible worlds to one-dimensional intensions, or equivalently a function from ordered pairs of possible worlds into extensions (see Segerberg, 1973; Aqvist, 1973; van Fraassen, 1977 for expositions of a two-dimensional modal semantics for formal languages).

Since a two-dimensional intension takes pairs of possible worlds onto extensions, it has the resources to represent the two different kinds of world-dependence mentioned above. One of the worlds supplies the contextual elements needed to interpret context-sensitive expressions, and the other world supplies the context of evaluation. I will call the entity that plays the former role the world of occurrence, and the entity that plays the latter role the world of evaluation, although no terminology is standard.

Two-dimensional intensions can be represented in a matrix such as Figure 1, which gives a two-dimensional intension for a single expression, s. In the leftmost column of Figure 1, w^1, w^2, and w^3 represent possible worlds considered as worlds of occurrence. In the top row, these same three worlds are considered as worlds of evaluation. Suppose that s is the sentence *I am in San Francisco*. In w^1, Ann is the speaker of this sentence and Ann is in San Francisco. She is also in San Francisco in w^3, but not in w^2. In w^2, Beth is the speaker, but she is in London in all three worlds. In w^3, Carl is the speaker, and Carl is in San Francisco in all three worlds. The cells of this matrix are filled in with truth values, since this is the appropriate extension for sentences. The row corresponding to w^1 tells us the truth value, in w^1, w^2, and w^3, of the sentence s, considered as occurring in w^1. In w^1, Ann utters this sentence, so it is true just in the case where Ann is in San Francisco. Accordingly, this occurrence is true in w^1 and w^3, but false in w^2, as the matrix indicates. Similarly, the row

s	w^1	w^2	w^3
w^1	T	F	T
w^2	F	F	F
w^3	T	T	T

Figure 1 Two-dimensional matrix.

corresponding to w^2 tells us the truth value in these three worlds of the sentence *s*, now considered as occurring in w^2. Since Beth, not Ann, utters *s* in w^2, this occurrence is true just in the case where Beth is in San Francisco. Since she is in London in all three worlds, the matrix contains an F in every cell in this row. The third row of the matrix tells us that the sentence *s*, considered as occurring in w^3, is true in all three worlds. Since Carl is the speaker in w^3, and he is in San Francisco in all three worlds, the row contains a T in every cell.

The matrix in Figure 1 only contains three possible worlds. But it is in principle possible to construct more comprehensive matrices, which contain many or all possible worlds. When the associated expression is a sentence, these more comprehensive matrices determine a number of propositions of theoretical interest. First, each row in such a matrix specifies a set of worlds in which the sentence *s* expresses a truth when it occurs in the world of that row. When the row in question is that corresponding to the actual world, the proposition it determines is the proposition *s* expresses. Another proposition of some theoretical interest is the set of worlds *w* in which the occurrence of *s* in *w* expresses a truth in *w*. If the matrix is constructed so that worlds w–w^n are arranged in numerical order on the top row and down the leftmost column, this proposition will be the diagonal of the matrix.

Applications

Different philosophers have modified this basic application of the two-dimensional framework in different ways for different purposes in semantics, pragmatics, philosophy of mind and language, and epistemology. Some philosophers follow the model of two-dimensional modal logic and offer a two-dimensional semantics for expressions (Kaplan, 1989). Others apply the two-dimensional apparatus to utterances (Stalnaker, 1978), or thoughts (Chalmers, 1996; Jackson, 1998) instead of or in addition to expressions themselves. Philosophers have also interpreted what I have called the world of occurrence and world of evaluation in different ways. Some construe both as possible worlds (Stalnaker, 1978). For others, they are ordered n-tuples of contextually supplied elements (Kaplan, 1989) or maximal epistemic possibilities (Chalmers, 2004). Some philosophers think that the worlds of evaluation and worlds of occurrence are the same type of entity, and for others, different kinds of entities play the roles of worlds of utterance and worlds of evaluation within the same application of the two-dimensional framework (Kaplan, 1989; Chalmers, 1996, 2004).

David Kaplan has used the two-dimensional framework to provide a semantics for indexical and demonstrative pronouns. For Kaplan, indexicals and demonstratives are associated with characters, which are rules that determine their contents in different contexts of use. For instance, the character of *I* is the rule that says that an occurrence of *I* in a world of occurrence *w* refers to the speaker of that world of occurrence, and this individual is the content of this occurrence of *I*. Kaplan identifies worlds of occurrence (which he calls contexts of use) and worlds of evaluation (which he calls circumstances of evaluation) as ordered n-tuples of a speaker, time, location, and world.

Robert Stalnaker has suggested that the two-dimensional framework can explain how utterances acquire pragmatic effects. A pragmatic effect of an utterance is something that the utterance conveys beyond its semantic content, and which is determined both by the sentence uttered and the conversational context in which the utterance takes place. The conversational context supplies what Stalnaker calls a context set, which contains all beliefs and assumptions mutually held by all parties to the conversation, and against which the utterance is interpreted. Stalnaker proposes that we construct a two-dimensional matrix for a specific utterance and include in the matrix all and only those worlds in the context set. Typically, an utterance will express the same proposition in every world in the context set, because this set includes information about what the expressions in the utterance mean, how context-sensitive terms are to be interpreted, and which objects they refer to. However, in some cases the context set will not include all of this information, so that the utterance will express different propositions in different worlds. For instance, consider an utterance of *I am Bill Clinton*. This utterance either expresses or a necessarily true proposition, if the speaker is in fact Bill Clinton, or a necessarily false proposition otherwise. In neither case would the literal content of this utterance serve the typical purpose of ruling out some possibilities that the preceding parts of the conversation had left open. Yet the utterance can serve this typical purpose if some participants in the conversation do not already know who the speaker is. In such cases, the context set for the conversation will include worlds in which the speaker is Bill Clinton, and worlds in which he is someone else. Thus the speaker's utterance of *I am Bill Clinton* expresses different propositions in different worlds in the context set. Which of these is the one the utterance conveys? Stalnaker suggests that it may be the diagonal of the two-dimensional matrix associated with this

utterance. This is the contingent proposition that the speaker of a particular utterance is Bill Clinton, and this is intuitively the information conveyed by this utterance.

Stalnaker and Kaplan, among other philosophers, have also suggested that the two-dimensional framework does some strictly philosophical work. First, it appears to offer some account of the special epistemic properties of sentences like (1) (Kaplan, 1989; Stalnaker, 1978; but see Stalnaker, 2004).

(1) *I am here now.*

Uses of (1) express contingent truths, but (1) expresses a truth in every world of use. So (1) is in a certain sense an *a priori* truth – one need not know anything about the world of use to know that (1) expresses a truth in it. Although the different propositions it expresses in different worlds are all contingent, the diagonal of the two-dimensional matrix it determines will be necessary.

Martin Davies and Lloyd Humberstone have also applied the two-dimensional framework to a similar end, to explain a distinction between superficial and deep contingency earlier introduced by Gareth Evans. (Davies and Humberstone, 1980; Evans, 1979). Evans claimed that a sentence *s* is superficially contingent if and only if there exists a world *w* such that it is not the case that *s* is true in *w*, and *s* is deeply contingent if its truth depends on a contingent feature of the actual world. Typically, deep and superficial necessity coincide, but Evans argues that they need not always do so. Evans introduced this distinction to criticize Saul Kripke's claim that some propositions, such as (2) are both contingent and *a priori*.

(2) *The standard meter stick in Paris is one meter long.*

(2) is contingent because that very stick might have been less than one meter, but *a priori* because one can know (2) without appeal to experience. Evans argued that in all putative cases of the contingent *a priori*, the two notions of contingency come apart, and all such cases are merely superficially contingent. Davies and Humberstone apply Evans's basic distinction to necessity rather than contingency, and claim that a statement *s* is deeply necessary if and only if the diagonal of the two-dimensional matrix for *s* contains every possible world, and it is superficially necessary if and only if the horizontal of the matrix for the row corresponding to the actual world contains every possible world. They do not attempt to use the two-dimensional framework to characterize *a priority* directly, though they do note that they know of no examples of *a priori* truths that are not deeply necessary. Since they also acknowledge some examples of deeply necessary *a posteriori* truth, they do not identify deep necessity, in their sense, with *a priority*.

David Chalmers and Frank Jackson have made the more ambitious identification of necessity on the diagonal with *a priority* (Chalmers, 1996; Jackson, 1998). Jackson in particular has suggested that there is only one notion of necessity and that the deep necessity Davies and Humberstone have defined is really *a priority* in disguise. For Chalmers and Jackson, thoughts as well as sentences have two-dimensional intensions, which they understand as functions from ordered pairs of centered worlds and uncentered worlds to truth values. A centered world is just a possible world with an individual and a time marked as its center. This two-dimensional intension determines both a primary and a secondary intension. The primary intension of a thought or sentence token *t* is a set of centered worlds *w* in which *t*, considered as occurring in *w*, is true in *w*, and would be found along the diagonal of a two-dimensional matrix. Its secondary intension is a set of uncentered worlds *w* in which *t*, considered as occurring in the actual world, is true in *w*, and would be found along the horizontal row associated with the actual world in a two-dimensional matrix. Chalmers and Jackson argue that primary intensions provide the following robust characterization of *a priori* knowledge: a thought is *a priori* if and only if its primary intension is necessary, that is, it contains every centered world (Jackson, 1998; Chalmers, 2004). Critics have attacked their view for what they see to be its revival of descriptivism about reference and its commitment to internalism about content (Soames, 2005; Byrne and Pryor, forthcoming; Stalnaker, 2004). Although Chalmers and Jackson embrace internalism about thought content, they deny that their application of two-dimensional semantics commits them to descriptivism.

See also: Analytic/Synthetic, Necessary/Contingent, and *a priori/a posteriori*; Character versus Content; Dthat; *A Priori* Knowledge: Linguistic Aspects; Modal Logic; Operators in Semantics and Typed Logics; Possible Worlds: Philosophical Theories; Temporal Logic.

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Tyndale, William (1494–1536)

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William Tyndale – English humanist, biblical translator, martyr – was born near the border of Wales, probably in Gloucestershire, in 1494 or 1495. He grew up in Oxford where, in 1515, he graduated from Oxford University. Later he moved to Cambridge where he met Erasmus, the theologian who influenced young Tyndale. In 1521, he was ordained into the priesthood, and in the same year, he became a chaplain in the house of Sir John Walsh.

Tyndale, who tried to make the first English translation of *Enchiridion*, devoted himself to the study of the Scriptures, which was viewed as an open commitment to the doctrines of the Reformation. As a consequence, he was summoned before the chancellor of the diocese of Worcester who charged him with heresy. As an avid adherent to reforming the Church, Tyndale became obsessed with the idea of addressing the English translation of the Bible to simple people, writing it in the common English language. To spread his views, Tyndale traveled from town to town, presenting his ideas to the common people of England. The church authorities were most displeased with Tyndale's inspirations and persecuted him. Finally, in 1524, Tyndale left England under a false name.

In the same year he met Martin Luther at Wittenberg, where he consulted him on the Bible translations. The first English translation of the New Testament was completed in August, 1525. Tyndale was indeed a gifted scholar and a translator. He knew Greek, Hebrew, and seven other languages. Tyndale's Old and New Testament were actually the first English translations of the Scriptures directly from the Greek and Hebrew languages. The printing began at Cologne in the summer of 1525 and was completed at Worms.

In the following year, some copies of Tyndale's translation of the New Testament were smuggled into England, where they began to circulate among the common folk. Tyndale already had powerful enemies in England, as well as on the Continent. In Antwerp he had theological arguments with Sir Thomas More, a fervent opponent of Luther's Reformation. The Church authorities acted immediately, and, in the end, Tyndale was betrayed by one of his own students (Henry Phillips). Captured and arrested in 1535, he was tried for heresy and treason and was hung and burned at the stake. He died a martyr's death on October 6, 1536 in Vilvorde in Belgium.

The first complete English translation of the Holy Bible was published on the Continent in 1535. With the decree of King Henry VIII, the first Tyndale translation of the New Testament was officially printed in England in 1536. Tyndale laid the foundation for further English translations of the Bible. The fully authorized and

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official version of the English Bible, known as the King James Version (KJV), was first published in 1611. Tyndale's revolutionary translation of the Bible into an early form of Modern English promoted, to a certain degree, Gutenberg's invention of the printing press. Tyndale could be perhaps the greatest English linguist and defender of the English language of all time, for his universal ideas did not die with him.

See also: Bible; Bible, English; English, Middle English; English, Early Modern; Luther, Martin (1483–1546).

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Type versus Token

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The Distinction

The distinction between a 'type' of thing and a 'token' of that type of thing, first described in those terms by C. S. Peirce, is an ontological one, akin to the universal/particular distinction (but arguably different from it; see below). Peirce pointed out that English, unlike German, has only one definite article, the word 'the'; this is the word type. Yet pick up any book in English and quite a few words on a particular page are apt to be 'the's; these are word tokens. Word tokens are concrete; they are spatiotemporal particulars such as inscriptions composed of ink, raised dots, light pixels, or utterances of phonetic sounds, or smoke signals, dots and dashes, etc. (Although not every sequence of three dots followed by three dashes followed by three dots, e.g., is a token of the Morse code distress signal; it may need to have been produced with a certain intention and in accordance with certain conventions. *see* **Speech Acts**.) Each token has a unique spatiotemporal location, unlike a type, which is arguably an abstract object and does not.

In other words, the word 'word' is ambiguous. When we read that there are one million words in the *O.E.D.*, that Shakespeare's vocabulary consisted of 30 000 words, or that a two-year old should be able to say 20 words, we are to count word **types**. If the printer warns us to replace the ink cartridge every 100 000 words, we are to count word **tokens**. Different counting procedures point to different criteria of identity associated with the word 'word.' The same may be said of letters, phonemes, sentences, and most other linguistic items. There are only 26 letters in the English alphabet, yet there are more than 26 letters in (your concrete token of) this sentence. The former are types, the latter tokens. There are 44 phonemes in English, yet millions of phonemes uttered every day. The numbers reverse when it comes to sentences, for linguists assure us that there are many more, perhaps infinitely many more, sentence types than token sentences produced. The type-token distinction explains and is motivated by such considerations. It helps us to avoid fallacious inferences such as that if Shakespeare knew 30 000 words, then the total number of words in my copy of Shakespeare's plays cannot exceed 30 000. (For more about words types, see Wetzel (2000).)

Its Usefulness

The type-token distinction is important to other branches of philosophy besides philosophy of language and logic. In philosophy of mind, it yields two significantly different versions of the identity theory: one identifies types of mental events with types of physical events (suggesting that the best way to understand mental activity is through neurology); the other merely says that every mental event is some physical event or other (but not necessarily a biological physical event, leaving the door open to an understanding of mental activity in terms of, say, programming) (see Block, 1980). In aesthetics, it is customary to distinguish works of art such as Mozart's Prague symphony (a type) from its many actual performances (tokens) (and also from its many interpretations, recordings, playings of recording, etc.) (see Wollheim, 1968; Wolterstorff, 1975). In ethics, actions are said to be right/wrong, but there is a dispute as to whether there are general principles that prescribe which types of actions are right/wrong or no general principles and only action tokens that are right/wrong.

Outside of philosophy, type talk is ubiquitous. That is, in scientific and everyday discourse we often speak

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Outside of philosophy, type talk is ubiquitous. That is, in scientific and everyday discourse we often speak

in ways that apparently refer to types. When, for example, we read that the mountain lion disappeared from Iowa in 1867, but now is making a comeback there in the suburbs, we know no particular cat disappeared; rather, a type of cat, a species, did so. Similarly, to say the ivory-billed woodpecker is extinct, or that the banded bog skimmer is rare is not to be referring to one particular organism. The first gene that scientists found linked to an ordinary human personality trait (novelty seeking) is obviously a type of gene. These are examples of sentences where a **singular term** apparently refers to a type. But we also **quantify** over types with great regularity, as when a study claims that of 20 481 species examined, two-thirds were secure, 7% were critically imperiled, and 15% were vulnerable. Often we do both, as when it was claimed (in the 60s) that there are 30 particles, yet all but the electron, neutrino, photon, graviton, and proton are unstable. As with art (above), so with artifacts: when we read that the personal computer is more than 30 years old and is only now beginning to reveal its true potential, we do not think there is a particular dusty 30-year-old PC that is somehow improving. The chess move, we are told, of accepting the Queen's Gambit with 2...dc has been known since 1512, but Black must be careful in this opening – the pawn snatch is too risky. For a comprehensive treatment of reference to the many sorts of abstract objects we make in discourse, see Asher (1993).

Universals

The type-token distinction is akin to the universal-particular distinction, but there is some question as to whether types ought to be classified with the classic property examples of universals such as *being white*. If the hallmark of a universal is a capacity to have more than one instance, then types are universals. Types are generally also said to be abstract, just as universals are often said to be, in contrast to their tokens, which are concrete. However, if the hallmark of a universal is to answer to a predicate or open sentence the way *being white* answers to 'is white,' then types do not resemble universals, as they answer to singular terms (and quantifiers). This is amply illustrated in the preceding paragraph. That is to say, types seem to be *objects*, like numbers and sets, rather than properties or concepts; it's just that they are not particular concrete objects. If, then, we follow Frege (1977) in classifying all objects as complete and saturated and referred to by singular terms, and all properties as incomplete and unsaturated and referred to by predicates, then types would not fall into the same category as the classic examples of universals such as *being white*.

A Related Distinction

The type-token distinction may seem to license or encourage the following fallacious inference: This encyclopedia entry consists of (about) 2,000 words. Word types, or word tokens? It can't be word types, since my editor assures me that each and every 'the' counts as another word. Therefore it consists of (about) 2,000 word tokens. But then the encyclopedia entry itself would be a token – which it is not. (It is not the one in the Library of Congress in Washington, for example, as opposed to the one in the Bibliothèque Nationale in Paris.) The entry itself has many tokens, but is itself a type. As Simons (1982) points out, since it is abstract, it cannot be composed of concrete word tokens. So what are we counting when we count 2000 words? **Occurrences** of word types (see Wetzel (1993), for an account). That is to say, the word 'the' occurs quite a few times in this encyclopedia entry. The letter 'x' occurs three times in the formula '$(\exists x)$ (Gx & Hx)'. Now this may seem impossible; how can one and the same thing occur more than once in something without there being two tokens of it? See Armstrong (1986) and Lewis (1986a), (1986b) for a debate on this point, and Wetzel (2006) for a rebuttal of Lewis. However, consider a sequence. The number 1 – the very same number – occurs several times in the sequence $<0,1,0,1,0,1>$. Even a concrete object can occur more than once. The same person occurs more than once in the sequence of New Jersey million dollar lottery winners, remarkably enough. The moral is that not every occurrence of a type is a token of it.

Do Types Exist?

Obviously, if types are universals then whether they exist is a matter of debate – a debate that goes back at least to Plato. Modern Platonists say they exist as transcendent abstract objects with no space-time location; see Bromberger (1989), Hale (1990), Katz (1981), and Wetzel (2002). Aristotelian realists say they exist as repeatable objects with numerous space-time locations; see Armstrong (1978), Wollheim (1968), and perhaps Zemach (1992) – although he calls himself a nominalist. Nominalists say they don't exist; see Goodman and Quine (1947), Quine (1953), Goodman (1977), and Bromberger (1992). With respect to universals, there is a third position, conceptualism, which tries to make do with mental objects such as ideas, or representations, in lieu of abstract ones, but since ideas also come in types and tokens, conceptualism only postpones the question – although see Sźabo (1999). Some nominalists believe that if types are abstract objects, then, as is true for

all abstract objects, we cannot have knowledge of them, because we cannot causally interact with them. Others take issue with a traditional argument for universals, according to which a red sunset and a red rose have something in common, and this something can only be the property of *being red*, so properties exist. Quine (1953), for example, objects that 'the rose is red because the rose partakes of redness' is uninformative – we are no better off in terms of explanatory power with such extra objects as *redness* than we are without them; perhaps a rose's being red and a sunset's being red are just brute facts.

Since Quine's attack on the traditional argument convinced many that that argument fails, the debate has shifted away from predicates. A realist nowadays is better off pointing to the fact, evidenced in the first four paragraphs above, that we talk as if there are types (even without appealing to predicates). That is, we frequently use singular terms for types, and we quantify over types in our theories. Quine (1953) has rightly stressed that we are ontologically committed to that over which we quantify. (For these reasons, although he rejected *redness,* Quine (1987: 217) held that expression types such as the word 'red' exist.) As we saw, Frege emphasized that singular term usage is in indicator of **objecthood**. Since at least on the face of it we are committed to types in many fields of inquiry, it is incumbent upon the nominalist to 'analyze them away.' (Or to maintain that all theories that appear to refer to types are false – but this is a radical approach, as it comprises nearly all theories.)

The usual nominalist approach is to maintain that the surface grammar of type talk is misleading, that talk of types is just a harmless way of talking about tokens (see Bromberger, 1992). To say 'the horse is a mammal' is just to say 'all horses are mammals,' for example. The idea is to 'analyze away' apparent references to types by offering translations that are apparently type-free and otherwise nominalistically acceptable (see Goodman and Quine (1947) and Goodman (1977) for optimism). The problem is how to do this for each and every type reference (see Wetzel (2000) for pessimism). Sometimes the translation is obvious as with the horse example, where the predicate 'is a mammal' is true of the type and true of all the tokens too. But not all predicates are so cooperative. The grizzly bear is ferocious, but not every grizzly is ferocious. The word 'Gluck' is guttural, but its token inscriptions are not. For that matter, the written tokens have nothing observable in common with spoken tokens (if there is no type). Collective properties pose even more of a challenge. 'The ivory-billed woodpecker is extinct' is perhaps approximately equivalent to 'there are no more ivory-billed woodpeckers, although there used to be interbreeding populations of them,' which is arguably nominalistic. But it is very difficult to find a nominalistic paraphrase for 'Old Glory had 28 stars in 1846 but now has 50.' And it is nigh-on impossible to find a paraphrase for the claim mentioned above, that 'Of 20 481 species examined, two-thirds were secure, 7% were critically imperiled, and 15% were vulnerable.'

But the clincher for this nominalistic proposal (that all type-talk can be analyzed away in favor of talk of tokens) is that it presupposes that all types have tokens. Whether all types have tokens is a matter of some debate. Peirce, for example claimed it, but Chomsky (1957) denied it. It would violate laws of syntax that together have the consequence that there are more sentences than have been or will be instantiated.

See also: Grammar; Lexicography: Overview; Linguistic Reality; Phonology: Overview; Speech Acts.

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Typography

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Typography is the art of formalizing written text for replication. In some significant respects, therefore, typography is to writing as writing is to speech: a way of picking and drying the flowers of language that would otherwise be all too quickly gone. Like writing, however, typography has led to the cultivation of new varieties of language – often unspoken and sometimes unspeakable – which are exclusively intended for preservation in visible form. In theory, instances of language are chosen for preservation – first in writing, then in type – on the basis of their merits. In practice, much language is typographically preserved because that is the only form in which it was ever intended to function.

'Type' is from Greek τύπος, a casting or impression, from τύπτειν, to strike or beat. 'Typography' originally meant to copy out (γράφειν) a text mechanically, using sculpted, cast replicas of handwritten letters. When the term 'typographia' was coined, in Italy toward the end of the 15th century, the reigning method of text printing was letterpress, a three-dimensional process giving a subtly three-dimensional result. Since the mid 20th century, however, most printing has been two-dimensional. 'Type' to the typographer now means reusable, prefabricated letters in any functional medium (from three-dimensional metal to zero-dimensional digital information) and the mostly two-dimensional printed traces that they leave.

Typography embraces the creation of these letters and preparation of their context as well as their actual use. One of its major subdivisions, therefore, is type design: the shaping of individual letterforms, their companion diacritics, punctuation, numerals, and other symbols, and the arrangement of these glyphs into working sets, called fonts. The rest of the field – covered by the French terms *mise en texte* and *mise en page* – involves the selection of type, paper, and ink; the typographic styling of written texts (which comes down in large part to decisions about headings, textual subdivisions, and style of punctuation); the design and organization of empty pages (determining folds, trimming, and binding); and the translation of text into visible patterns and structures with which those empty pages may be filled.

The craft has long been known as 'the black art,' as if ink were the key to it all, but one of the working principles of typography, as of calligraphy and painting, is that the negative space matters no less than the positive. Typographers therefore concern themselves with the sizes and shapes of the spaces (known as counters) inside letters, the spaces between letters and words, the spaces between lines (known as leading), and with the margins surrounding the textblock, as much as with the ink-bearing areas themselves. (See **Figures 1** and **2**.)

Type is normally measured by body size – the height of the real or imaginary block on which the ink-bearing image of the letter is or could be cast. But the size of this type body alone tells us little about the trace it will leave on the page. The typographer will be more concerned with other factors, most of which can be

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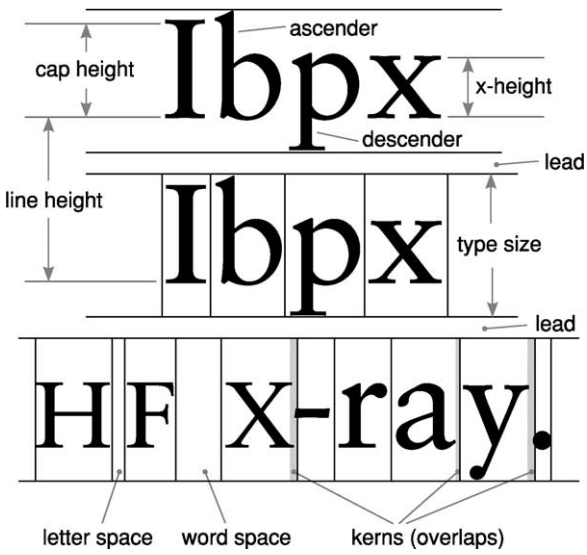

Figure 1 The measurement of type. *Type size* or *body size* is the height of the face of the block on which the letter is carried – or *would be carried* if it were cast as metal type. *Line height* (also known as *leading*) equals *type size* plus *lead*, but it is customarily measured from baseline to baseline. The *cap height* may or may not match the height of the ascenders. Letterspacing *increases* space between letters; kerning *decreases* it. With metal type, letterspacing is easy but kerning is more difficult. With digital type, both are equally easy.

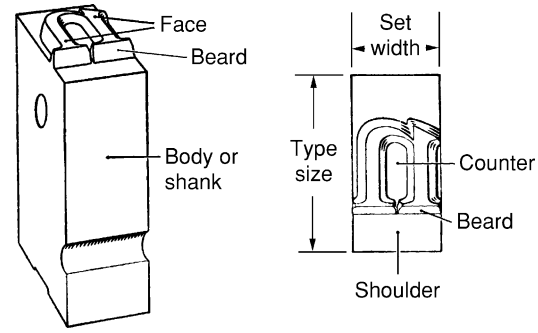

Figure 2 A piece of foundry type. (After Chappell & Bringhurst, 1999.)

expressed in terms of relative proportions. These factors include (1) the relative darkness or lightness and wideness or narrowness of the letters, (2) the degree of internal contrast (relation of thin strokes to thick strokes), (3) the implicit axis of the letters (i.e., the implied rotational posture of the writing hand), (4) the presence or absence and relative prominence of the serifs, (5) the crispness or bluntness of serifs or stroke ends, (6) the aperture (relative openness of semi-enclosed forms such as c, e, and s), (7) the relative size of upper and lower case (in typographic terms, the relation of cap-height to x-height and height of ascenders), (8) the internal proportions of the lower case (relations of x-height to ascender and descender), (9) the tightness of the set (which is to say, the amount of space, on average, between letters), (10) in digital type, the quality of the kerning table (a built-in set of instructions for tightening or loosening the spacing of selected pairs of glyphs), (11) the average size of the spaces between words in relation to the darkness of the face and the fit of contiguous letters, (12) the relation of type size to line-length or measure (often expressed in the average number of characters per line), (13) the relation of cap-height and x-height to interlinear space, (14) the inherent proportions of the textblock (relation of height to width), (15) the relation of the textblock to the page (in other words, the proportions of the margins to each other and to the textblock), and not least (16) the historical and social connotations of the typeface.

As this list may suggest, typographers tend to focus their attention on the letter and the page, where writers are apt to concentrate on the lexeme and the sentence, and speakers on the morpheme, phrase, and clause. This is a sign that typographers may in fact lose sight of language in the very act of translating it into a durable visual form. Yet typography is a natural outgrowth of writing. It is a bridge between visual art and textual editing, and, together with writing and editing, part of a bridge between the things that humans say and the tangible traces they leave behind.

In some aspects of their work, however, typographers do indeed push writing past the realm of language, into the realm of iconic visual symbols. Commercial logotypes exemplify this kind of supra- or sub-linguistic typography.

None of the subtleties of concern to a typographer is openly expressed in a conventional type specification, which usually consists of a name and three numbers. For example: Palatino roman 9/11 × 16. Even this description, though straightforward and precise, gives varying results depending on where the fonts originate and which system of measurement is employed. 'Palatino roman' is the name of a type, designed by Hermann Zapf in 1946, but it has been legitimately made in several different versions and illegitimately copied by many different firms. Professional typographers are also prone to edit their digital fonts, introducing further small refinements. Thus not all incarnations of Palatino roman are identical. As for the numbers: in most of the Anglo-American world, 9/11 × 16 means type in the 9-point body size, set with 2 points additional leading ($9 + 2 = 11$ points vertical distance from baseline to baseline), on a horizontal measure (line length) of 16 picas. A pica is, in metal type, 0.16608 inch (4.21844 mm) or, in digital type, exactly one sixth of an inch (4.23334 mm), and there are 12 points in a pica. In much of Europe,

however, the units employed are the cicero and its subdivision, the Didot point. These are roughly 7% larger than the pica and Anglo-American point. Depending on the measurement system used, therefore, there may be 72.25, exactly 72, or only 67.4 points per inch.

Early experiments with cutting and casting movable type in Asia involved ceramic, wood, and bronze. From the earliest days of printing in Europe through the end of the 19th century, alloys of lead were preferred. In the traditional method, each letter is cut actual size in reverse orientation on the end of a steel punch. Once the desired forms are achieved, each punch is hardened and driven into a block of brass to produce a matrix. This is fitted into a mold, and letters are cast directly from it in type metal. The alloy employed is, as a rule, 70% to 80% lead, 15% to 30% antimony, 5% to 10% tin, and 0% to 2% copper.

Linotype, Monotype and other patented hot-metal typesetting machines were extensively employed during the first two-thirds of the 20th century. The alloy used with these devices is generally higher in lead, free of copper, lower in tin and antimony, and therefore quicker to melt (and thus less durable) than foundry metal.

With the introduction of scalable digital type in the early 1980s, fonts rapidly returned to the form of disembodied information – just as immaterial, invisible, and weightless as they were in the days of the scribes but more profuse and more invariantly formed.

Type grows out of writing, and the world of the typographer grows directly out of the manuscript tradition. In the scribal cultures of Asia and Europe, librarians preserved not only texts but also the scripts in which they were written. Particular kinds of letterforms came to be associated with certain locations and languages, with certain kinds of literature, and then with certain scribal contexts and conventions. Roman capitals and uncials, for example, were retained for use in titles, initials, and headings long after they had ceased to be preferred for running text, and in multilingual manuscripts, different scripts were commonly employed for sacred and secular matter, or for Germanic and Romance languages, as they were for Latin and Greek. Professional scribes mastered not one hand or style of script but several, which they did not mix at random. In the scribal world, therefore, centuries before printing type was invented, letterforms had in effect been organized into fonts, stored in the hands and minds of experienced scribes and employed in accord with established conventions. 'Writing' was thereby formalized into 'typography' in a conceptual sense long before the first printing type was cut or printing machinery constructed. When movable type was initially adopted – in 11th-century China, 13th-century Korea, and 15th-century Europe – the aesthetic principles of typography were already well established. Only the technical problems remained to be solved.

The results were noticeably different when printing was introduced, often with missionary zeal, to oral cultures in Africa, the Americas, and Oceania. In the absence of any indigenous scribal tradition, typographical judgment is necessarily either arbitrary or alien and imposed. The Sequoyah syllabary used for Cherokee; the Evans syllabary used for Cree, Ojibwa, and Inuktitut; and the Pollard syllabary used for Western Hmong and some of its sister languages are examples of conscious creations which rapidly spread through their target communities. Each, however, was introduced into a scribal vacuum. Though each of these scripts remains in use and has been rendered typographically, an indigenous typographic aesthetic is still difficult to discern.

Wherever lasting scribal or typographic traditions have evolved, writing systems have been subject to the same social forces that affect the other arts and crafts. This means that scribal and typographic styles are prone to exhibit the same kinds of regional and historical variation found in architecture, literature, painting, and music. A taxonomy or history that fits these other arts is therefore apt to fit the corresponding typographic or manuscript tradition. Chinese script and print have changed, like Chinese architecture and painting, from the Sòng to the Míng and Qing dynasties and the postimperial era. European letterforms and page designs are easily identified as products of the Renaissance, Mannerist, Baroque, or Neoclassical period (Figure 3). Arabic, Greek, and Indic scripts likewise vary from age to age according to the Arabic, Greek, and Indic cultural calendars.

Figure 3 Renaissance, Baroque, Neoclassical and Romantic roman letterforms. Renaissance roman forms have a consistently *humanist axis*; Baroque forms have a *variable* axis which is still predominantly humanist; Neoclassical forms have a *rationalist axis*, and Romantic forms an exaggerated or dramatized rationalist axis. (Axis is defined as the orientation of the nib used to write the letters – or the nib that *would be used* to write them, if they were handwritten.) Renaissance, Baroque and Neoclassical letterforms all modulate gradually from thick to thin, while Romantic letterforms modulate more abruptly. (After Chappell & Bringhurst, 1999.)

Yet typefounding and printing have the power to separate scripts from their native places, just as they separate texts from their native times. Greek type was cut, and Greek books were printed, in Italy, France, Spain, England, and the Netherlands for 300 years before any printing was done in Greece itself. Arabic type was also cut and used in Western Europe long before it was made in the Middle East. The history of Greek and Arabic script and type has therefore been tied to the Western European cultural calendar for several centuries, while the history of Greek and Arabic literature, music, and architecture has not.

In Europe and its colonies, the Romantic age coincided with a rapid increase in the level of public literacy. Public consciousness of the historical mutability of letters also rose to an unprecedented level. In these conditions – when 'modern' was synonymous with 'romantic' – a simplified and popular historical taxonomy arose. Renaissance and Baroque letterforms came to be known as 'old-style'; neoclassical letterforms were called 'transitional'; and romantic letterforms were called 'modern.' Though it is thoroughly outdated, this crude and casual taxonomy remains in widespread use for the Latin alphabet.

A more basic taxonomic distinction – applicable to writing systems generally, not just to the Latin alphabet – is based on a single, simple test: do the glyphs have serifs or do they not? If yes, the type is serifed; if not, it is called unserifed or sanserif. (Professional typographers abbreviate these terms to 'serif' and 'sans.') From the perspective of European romantic taxonomy, sanserif type is 'postmodern,' – i.e., it is postromantic. In fact, however, the vast majority of writing systems are sanserif in their archaic incarnations. (This is true for Chinese, Greek, Latin, Hebrew, Arabic, and Korean script, among others.) Wherever artists are attracted to the archaic (as they were in Táng China, Renaissance Italy, and early modern Europe), sanserif letterforms are likely to be revived, at least for limited purposes. Only in the modern age, however, have sanserif forms become a typographic staple, widely used for printing text.

See also: Calligraphy, Western, Modern; Printing and Typewriting.

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Ubriatova, Elizaveta Ivanovna (1907–1990)

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Elizaveta Ivanovna Ubriatova (Ubriatova) was born in Irkutsk (the Russian Federation) in 1907 and died in Novosibirsk in 1990. She was a Russian turcologist whose linguistic work should be seen in the broad context of Siberian Turkic languages. Ubriatova's most substantial contributions to scholarship were her books and papers devoted to the dialectology, syntax, history, phonetics, and so on of the Yakut (Sakha) language as well as problems involved in the co-existence of Turkic with noncognate languages in the vast territories of Siberia.

Ubriatova was educated at the University of Irkutsk, and a year after her graduation from the university she was offered the position of a teacher at a primary school in Taimyr (the Taimyr national region), beyond the polar circle. In a short period of time, Ubriatova became acquainted with the Dolgan language and the life of its bearers and developed an interest in Siberian Turkic languages. To master them, Ubriatova took up postgraduate courses at the Institute of Peoples of the North in Leningrad (present St. Petersburg). Under the guidance of Academician Malov, she received an M.A. for her thesis entitled 'The language of the Norilsk Dolgan' in 1940 and a Ph.D. for her thesis 'Complex subordinate sentences in the Yakut (Sakha) language' in 1950. In Ubriatova (1950), younger scholars found both a thorough theoretical orientation and a manual of analytical procedures for all kinds of complex subordinate sentences.

In comparative linguistics she was a strong defender of three periods in the interaction of the Yakut language with a series of other languages: (1) the period of the Yakut language formation with all specific features of its grammatical structure: during a long period, some ancient people who spoke a language of Orkhon inscriptions lived side by side with groups of people who spoke Mongolian and Tungusic (Tungus); (2) the time when Mongolian and Tungusic groups switched to Turkic: at the end of this period, two dialects of Yakut (one retaining the unstressed *o* and another retaining the unstressed *a*) took shape; (3) the period of the Yakut language spreading beyond the boundaries of the territory between the Aldan and the Lena. Central to Ubriatova's thinking was the idea of similarity between Tofa (Karagas) and Tuvan (Tuvin), on the one hand, and Written Old Uyghur, on the other.

She was the first to point to Old Uyghur, from which attested grammatical features in the Turkic languages of South Siberia could be derived. The character of verb-forms occurring in Siberian Turkic languages made Ubriatova infer that there were three sources from which Turkic languages of Siberia had originated. The traces of Old Turkic languages – Orkhon-Turkic, Old Uyghur, and Kirghiz – occur in modern Turkic languages to a varied degree and may be assigned to different periods of time. The traces of later interaction overlap the earlier ones. One may assume that at first the Oghuz-Orkhon language was spread in the territory and a little later or simultaneously Old Uyghur began to extend its position and interact with the cognate Oghuz-Orkhon language.

As the character of verb-system in all modern Turkic languages in Siberia permits treating them as Kipchak, and as modern Kirghiz belongs to the same group, Ubriatova arrived at the conclusion that the source of Siberian Turkic languages' Kipchakization was Old Kirghiz.

Ubriatova received many honors, including the title of Honored Scientist of the Sakha Republic, Order of the Red Banner, two Badges of Honor and four medals. She has many disciples and followers where Turkic languages are studied and spoken.

See also: Turkic Languages.

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Ueda, Kazutoshi (1867–1937)

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Kazutoshi Ueda, founder of the modern scientific study of Japanese, was born in Tokyo on January 7, 1867. In 1885 he enrolled in the Department of Japanese and Chinese Literature, Faculty of Letters, Tokyo Imperial University. There he was initiated into the study of the Japanese language by Basil Hall Chamberlain and decided to devote his life to the subject. In 1890 Ueda was sent to Germany to study Indo-European linguistics. He studied first in Berlin and then in Leipzig under such leading linguists of the time as Georg von der Gabelentz and Karl Brugmann. On his return to Japan in 1894, Ueda was appointed professor of linguistics at Tokyo Imperial University, where he lectured on linguistics as he had absorbed it in Germany as well as on the history of Japanese indigenous efforts at linguistic studies (*kokugaku*). In 1899 he was awarded a D.Litt. In 1905 he was appointed to the chair of Japanese language, in which position he remained until his retirement in 1927. Outside the university, Ueda served as director of various bureaus of the Ministry of Education. He died in Tokyo on October 26, 1937.

Ueda's achievements can be divided into three areas: his own contributions to the scientific study of the Japanese language, his fostering of many disciples, and his activities for the cause of improving and standardizing Japanese. First, Ueda applied the methods of Indo-European linguistics to the study of Japanese. He demonstrated that modern Japanese *h* comes from *p* by way of *f* (e.g., *haha* 'mother' < *fafa* < *papa*), thereby laying the foundations of historical Japanese phonology. Second, Ueda produced many competent disciples. In the latter half of the 19th century, which marked the beginnings of modern Japan, his position as Professor of Japanese Language at Tokyo Imperial University meant that he was charged with the pioneering mission to foster young able scholars and to put them in the right places for the future development of the discipline. Among his pupils were Katsuji Fujioka (linguistics), Izuru Shinmura (philology), Kanji Matsui (lexicography), and Kyosuke Kindaichi (Ainu language). Third, Ueda engaged himself in various efforts outside the university to reform and standardize the Japanese language. He gave many lectures and published various articles for the purpose of improving the national language. He also helped the Ministry of Education to found the Committee for Investigating the Japanese Language. He himself became a member of the committee and contributed to the establishment of a standard Japanese and to the reform of the writing system.

See also: Brugmann, Karl (1849–1919); Chamberlain, Basil Hall (1850–1935); Fujioka, Katsuji (1872–1935); Gabelentz, H. Georg Conon von der (1840–1893); Kindaichi, Kyosuke (1882–1971); Shinmura, Izuru (1876–1967).

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Kazutoshi Ueda, founder of the modern scientific study of Japanese, was born in Tokyo on January 7, 1867. In 1885 he enrolled in the Department of Japanese and Chinese Literature, Faculty of Letters, Tokyo Imperial University. There he was initiated into the study of the Japanese language by Basil Hall Chamberlain and decided to devote his life to the subject. In 1890 Ueda was sent to Germany to study Indo-European linguistics. He studied first in Berlin and then in Leipzig under such leading linguists of the time as Georg von der Gabelentz and Karl Brugmann. On his return to Japan in 1894, Ueda was appointed professor of linguistics at Tokyo Imperial University, where he lectured on linguistics as he had absorbed it in Germany as well as on the history of Japanese indigenous efforts at linguistic studies (*kokugaku*). In 1899 he was awarded a D.Litt. In 1905 he was appointed to the chair of Japanese language, in which position he remained until his retirement in 1927. Outside the university, Ueda served as director of various bureaus of the Ministry of Education. He died in Tokyo on October 26, 1937.

Ueda's achievements can be divided into three areas: his own contributions to the scientific study of the Japanese language, his fostering of many disciples, and his activities for the cause of improving and standardizing Japanese. First, Ueda applied the methods of Indo-European linguistics to the study of Japanese. He demonstrated that modern Japanese *h* comes from *p* by way of *f* (e.g., *haha* 'mother' < *fafa* < *papa*), thereby laying the foundations of historical Japanese phonology. Second, Ueda produced many competent disciples. In the latter half of the 19th century, which marked the beginnings of modern Japan, his position as Professor of Japanese Language at Tokyo Imperial University meant that he was charged with the pioneering mission to foster young able scholars and to put them in the right places for the future development of the discipline. Among his pupils were Katsuji Fujioka (linguistics), Izuru Shinmura (philology), Kanji Matsui (lexicography), and Kyosuke Kindaichi (Ainu language). Third, Ueda engaged himself in various efforts outside the university to reform and standardize the Japanese language. He gave many lectures and published various articles for the purpose of improving the national language. He also helped the Ministry of Education to found the Committee for Investigating the Japanese Language. He himself became a member of the committee and contributed to the establishment of a standard Japanese and to the reform of the writing system.

See also: Brugmann, Karl (1849–1919); Chamberlain, Basil Hall (1850–1935); Fujioka, Katsuji (1872–1935); Gabelentz, H. Georg Conon von der (1840–1893); Kindaichi, Kyosuke (1882–1971); Shinmura, Izuru (1876–1967).

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Uganda: Language Situation

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Multilingualism is pervasive in Uganda. Ethnologue (2003) identifies 45 languages, including two extinct ones. No single language is dominant.

The Languages of Uganda

The indigenous languages show considerable genetic diversity. The Bantu subfamily of Niger-Congo has the largest number of languages and the most speakers. (Figures are vaguely indicative of the true picture. Numbers of speakers are from the 1991 census, and percentages are from Ladefoged *et al.*, 1971.) It includes Luganda (Ganda), with 3 015 980 and accounting for a little more than 16% of the population, plus an additional 1 million second language speakers. Another important language is Runyakitara (Nyankore, Runyoro, Rutooro, Rukiga and Runyankole), which represents about 25% of the country's population (cf. Ladefoged *et al.*, 1971; Byakutaga and Musinguzi, 2000).

Nilo-Saharan languages are spoken in the north and of the east of the country. The largest group is Western Nilotic, which includes Lango (977 680 speakers) and Acholi (746 796 speakers). There are also several Eastern Nilotic languages, the largest of which is Teso (999 537 speakers). Central Sudanic languages (e.g., Lugbara and Madi [Ma'di]) are spoken by about 6% of the population in the extreme northwest. The only Southern Nilotic language in Uganda is Kupsabiny, spoken by just 0.6% of the population.

Many small languages are endangered (e.g., Kuliak [Ik] and Rugungu [Gungu]); two are extinct namely, Lusinga (Singa) and Nyangi (Nyang'i).

The Indo-European languages English, Gujarati, and Hindi are also spoken in the country.

Language Policy

The 1995 Uganda Constitution allows the use of indigenous languages in any domain of public life. However, since no significant resources have been committed to modernizing them, this declaration remains a vain ambition. English, whose introduction was due to the colonization of the country, remains the official language. It is the language of today's elite: it is the language of political and social exclusion (e.g., parliamentary candidates must be proficient in English). But, for the rest of the population, it is also the language of aspiration, of modernization.

Voeglin and Voeglin (1977) estimated that there were 1 million speakers of English as a second language; the figure must be higher now. Most citizens have a rudimentary command of the language.

Current policy as outlined in the 1992 White Paper on Education is designed to entrench the status quo since it:

- recognizes English as the sole medium of education in urban primary schools
- restricts the use of vernacular languages as a medium of instruction to the first four years of school in rural districts and requires a switch to English from the fifth year
- makes English the only medium of instruction in all secondary schools.

The White Paper also makes both English and Kiswahili (Swahili) compulsory subjects in secondary schools. Despite this mandate, the position of English remains unassailable. In reality, the teaching of English is compulsory and enforced, whereas the teaching of Kiswahili remains optional, and take up is minimal. There have been some positive developments in recent years. Use of Ugandan languages in the media has increased with the explosive growth in the number of FM radio stations. Just as importantly, Uganda Sign Language (Ugandan Sign Language) was given a boost when it was officially recognized in the 1995 constitution.

See also: Bantu Languages; Language Education Policies in Africa; Language Policy in Multilingual Educational Contexts; Luganda; Niger-Congo Languages; Nilo-Saharan Languages; Southern Bantu Languages; Swahili.

Language Maps (Appendix 1): Map 44.

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Ugaritic

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The Ugaritic language was rediscovered after a 3000-year gap, when, in spring of 1928, a farmer discovered a tomb at Minet el-Beida, on the Mediterranean, in what is now Syria, about 12 km from modern Latakia and a few hundred yards away from a large tell called Ras Shamra, 'Cape Fennel.' In 1929, the French began excavating what turned out to be a large necropolis. They soon moved on to the nearby tell of Ras Shamra, and in May of that year the first Ugaritic cuneiform clay tablets were found. After the first tablets were published in 1930, it was clear that the repertoire of signs was small (only 30), and so the writing system was assumed to be alphabetic and without vowels. Within months, the language was essentially deciphered. The identification of the site with ancient Ugarit was confirmed in the early 1930s with the discovery of a tablet that mentioned Niqmaddu, king of Ugarit.

Ugaritic is one branch of the Northwest Semitic languages, along with the Canaanite languages, the several forms of Aramaic, and other less well-documented languages. It is written in a cuneiform alphabet on clay tablets. Because the acrophonic linear alphabet predates the Ugaritic alphabet by several centuries, Ugaritic cuneiform was probably devised to adapt the idea of the alphabet to the medium of clay and stylus. Our earliest abecedaries, which are texts that list the letters of an alphabet written in a standard order, come from Ugarit, and they exhibit both the usual West Semitic order and, strikingly, the South Semitic order in a very few texts. Why abecedaries in this South Semitic order were present at Ugarit is so far unknown.

Ugaritic exhibits individual signs for 27 consonants of the West Semitic languages, plus three extra signs. There are two extra 'aleph signs, plus one for a sibilant that is used for loanwords. The three 'aleph signs are transcribed 'a, 'i, and 'u: 'a is used when an 'aleph in a word is followed by the vowel /a/, 'i is used when 'aleph is followed by /i/ or /e/ (<*ay), and 'u is used when 'aleph is followed by /u/ or /o/ (<*aw). A syllable-closing 'aleph is marked by 'i. These three signs have been very helpful in determining the vocalization of Ugaritic words, as have syllabaries that include Ugaritic words spelled out in Akkadian cuneiform, which is syllabic and so includes vowels. The Ugaritic consonants, given in the indigenous alphabet order, are ,' b, g, ḫ, d, h, w, z, ḥ, ṭ, y, k, š, l, m, ḏ, n, ẓ, s, ı, p, ṣ, q, r, ṯ, ġ, t (plus, as was noted above, two extra ' signs and a sibilant sign used for loanwords). The vowels reconstructed for Ugaritic are a, i, u, ā, ī, ū, o (<*aw), and e (<*ay). This cuneiform alphabet also exists in a shorter form of 22 signs, indicating that where this shorter alphabet is used, several mergers of consonants have taken place. A few tablets written in this shorter alphabet come from the site of Ugarit, but many were found farther south, at Sarepta and Kamid el-Loz in Lebanon, and at Taanach, Mt. Tabor, and Beth Shemesh in Israel.

The city-state of Ugarit was an important port, with its position on the Mediterranean and its proximity to Cyprus on the west, and its access to inland routes to the north and east. There are writings found at Ugarit in several different languages: besides Ugaritic, there are texts in Akkadian (the lingua franca of the time), Sumerian, Hittite (both syllabic cuneiform and hieroglyphic), Egyptian, Hurrian, and Cypro-Minoan. Texts found at the sites of Mari, Alalakh, and Amarna, among others, mention the city-state. The Ugaritic texts cover a short period of time, probably late 14th to early 12th century B.C. Excavation continues, but as of this writing, approximately 50 poetic texts and 1500 prose texts have been found at Ras Shamra and at neighboring Ras Ibn Hani. The poetic texts are mythological; the prose texts are ritual and other cultic texts, administrative documents, letters, omens, medical texts, and school exercises. The poetic mythological texts are characterized by parallelism, as in these couplets from the Baal myth:

> Sea sends messengers/Judge River, a delegation;
> Message of Sea, your master/your lord, Judge River.

Like other West Semitic languages, Ugaritic has prefix- and suffix-conjugation verbs, *yaqtulu/qatala*, but there are in addition two more prefix-conjugations: *yaqtul* and *yaqtula*. The prefix-conjugation *yaqtul* serves as both a jussive, or indirect imperative, and as a preterit. The prefix-conjugation *yaqtula* is less well understood, but appears to serve as a volitive form; it also, however, seems to occur in subordinate (especially purpose) clauses. The verb stems that are extant in Ugaritic are G, Gt, D, tD, N, Š (a causative), Št (reflexive of the causative).

Nominals in Ugaritic have masculine and feminine gender and singular, dual, and plural number. There are three cases in the singular – nominative, genitive, and accusative; the plural is diptotic – nominative and oblique. Nouns occur in both absolute (unbound) and bound states. The bound state is used for initial members of genitive chains called construct chains (*see* **Semitic Languages**) and for nouns before

pronominal possessive suffixes. There is no marked definite article in Ugaritic. There is evidence for -a- insertion in the plurals of nouns of the shape $C_1vC_2C_3$-: the (nominative) plural is $C_1vC_2aC_3$ūma. For example, 'king' (nominative) is *malku*, and 'kings' is *malakūma* (we can compare Biblical Hebrew *mélek*, plural *məlākîm*).

See also: Mesopotamian Cuneiform Script; Semitic Languages; Writing Materials.

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Ukraine: Language Situation

Editorial Team

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A major European power in the early middle ages, Ukraine had been part of the Polish–Lithuanian empire, of Czarist Russia, and after a short spell of independence, of the USSR until it became independent again in 1991. Ukraine is situated between Russia in the east and northeast; Belarus in the north; Poland, Slovakia, and Hungary in the west; and Romania and Moldova in the southwest. In the south, Ukraine has access to the Black Sea. The Crimean peninsula is an autonomous part of Ukraine.

Ukraine has a population of over 47 million people. The national and official language is Ukrainian, which is spoken by the majority (about 70%) of Ukrainians. Russian is the largest minority language, spoken by approximately 11 million first-language speakers, mainly in the industrialized east of the country and in urban centers, as well as by bilingual speakers. In addition to Ukrainian and Russian, Ukraine is home to a large number of languages, including communities of speakers of languages also spoken in neighboring countries, as well as small communities whose languages can be viewed as endangered. Among the larger communities are speakers of Polish (1 151 000), Belarusan (444 000), Romanian (250 000), Bulgarian (234 000), and Hungarian (187 000) in the west of the country. Languages of Ukraine that are not spoken as major languages in neighboring countries include Eastern Yiddish (634 000), Crimean Turkish (200 000), Jakati (156 000; spoken by the Jats, or 'gypsies,' of Afghanistan), Tatar (90 542), the Roma languages Carpathian and Vlax Romani, and Rusyn. The two Turkic languages, Urum, spoken in 10 villages in the Donetsk Oblast in southeastern Ukraine, and Karaim, spoken on the Crimean Peninsula, are endangered. The Crimean Peninsula was also the home of the last speakers of Gothic, which survived there until the 18th century.

See also: Multilingualism: Pragmatic Aspects; Ukrainian.

Language Maps (Appendix 1): Map 144.

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See also: Mesopotamian Cuneiform Script; Semitic Languages; Writing Materials.

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See also: Multilingualism: Pragmatic Aspects; Ukrainian.

Language Maps (Appendix 1): Map 144.

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Ukrainian

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Ukrainian, with some 36 million speakers in the Ukrainian Republic, forms with Russian and Belorussian the East Slavic branch of the Slavic language family. The standard language, which is written in the Cyrillic alphabet, has its roots in the 19th century – no enduring literary tradition had been able to form before this time – and is based on the relatively recent and uniform southeastern dialect. Since the late 19th century, the West Ukrainian (Galician) speech of L'viv has also played a role in the formation of the national standard.

Among the vocalic features that distinguish Ukrainian from the rest of East Slavic are the preservation of *o* in unstressed syllables: *vodá* /vodȧ/ 'water' (Rus., BR /vadȧ/), and the merger of East Slavic (ESl.) *i* with *y* to give a central-front mid vowel (represented in transliteration by *y*): *synij* 'blue,' like *syn* 'son' (Rus. *sinij* : *syn*). A new *i* developed in turn from ESl. *$\bar{e}$: *lis* /lʲis/ 'woods' (Rus., BR /lʲis/) and from *e* and *o* in a secondarily closed syllable: *šist'* 'six' (gen. *šestý*), *nis* 'nose' (gen. *nósa*). *e* > *o* after hushers and *j*: *čotýry* 'four,' *johó* 'his' (Rus. *četýre*, *jegó*), but *téplyj* 'warm' (Rus. *tëplyj* /tʲȯ-).

In contrast to Russian and Belorussian, Ukrainian consonants are not palatalized before *e* or *y* (the merger of ESl. *i* and *y*): *nestý* 'to carry' (Rus. *nestí* [-tʲi]), but there is palatalization before the new *i* representing ESl. *$\bar{e}$, *e*, *o*: *díty* [dʲi-] 'children' (Rus. *déti*), *nis* -nʲi-] 'nose' (Rus. *nos*). Stem-final *c* is typically palatalized: *kinec'* [-tsʲ] 'end,' gen. *kincjá* (Rus. *konéc, koncá*); final labials lose palatalization: *hólub* 'dove' (Rus. *gólub'*). Common Slavic /g/ has become /h/. Like Belorussian, Ukrainian has *w* (written *v*) corresponding to Russian *v* in a closed syllable: *právda* [prȧwda] 'truth,' and in some cases (including the masculine past tense marker) to *l*: *vovk* [vowk] 'wolf' (Rus. *volk*), *buv* [buw] 'was, masc.' (fem. *bulá*). Unlike other East Slavic languages, there is no regressive devoicing of voiced consonants: *kázka* 'tale' (with *z* preserved), or final devoicing: *did* 'grandfather' (with final *d*).

In addition to the six nominal case forms of Russian and Belorussian, Ukrainian has a regular vocative (*sýnu* 'son!,' nom. *syn*). As in Belorussian, there is an alternation of velar and dental stems in certain case forms: nom. *rik* 'year,' loc. *róci*; nom. *rih* 'corner,' loc. *rózi*. The verb has two regular conjugation patterns, illustrated by *nestý* 'to carry' (I) and *xodýty* 'to walk, go' (II): 1SG *nesú*, *xodžú*, 2SG *neséš*, *xódyš*, 3SG *nesé*, *xódyt'*, 1PL *nesemó*, *xódym*, 2PL *neseté*, *xódyte*, 3PL *nesút'*, *xódjat'* (like Belorussian, but unlike Russian, the 3rd person ending is palatalized). Unlike Russian or Belorussian, there is no alternation of velar and palatal stems in Ist conjugation verbs, the palatal stem having been generalized: *mohtý* 'to be able': *móžu*, *móžeš* (BR *mahú*, *móžaš*).

Lexically, Ukrainian lacks the Church Slavicisms characteristic of Russian (Ukr. *skoročú* 'shorten.1SG PF,' with ESl. *s-*, *oro*, *č*; cf. Rus. *sokraščú*, with ChSl. *so-*, *ra*, and *šč*), but shows a large number of borrowings from Polish: *cikávyj* 'interesting' (Pol. *ciekawy*, but Rus. *interésnyj*), *raxúnok* 'bill, account' (Pol. *rachunek*, but Rus. *sčët*), *otrymáty* 'to receive' (Pol. *otrzymać*, but Rus. *polučít'*).

See also: Belorussian; Russian; Slavic Languages; Ukraine: Language Situation.

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Uldall, Hans-Jørgen (1907–1957)

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Hans-Jørgen Uldall is most widely known for his *Outline of glossematics*, which was finally published only two months before his premature death. Born in Silkeborg, Denmark, the son of a doctor, he began studies at the University of Copenhagen in 1924 as a medical student, but soon changed to English and quickly drew the attention of his professor – Otto Jespersen. After studying under Daniel Jones in 1927, and achieving a native command of English, he was invited, in 1929, to teach at the University of Capetown as deputy for D. M. Beach. A teaching stint followed at the School of Oriental and African Studies (SOAS) for most of 1930. Then, on Jespersen's recommendation, in 1931 he went to California to carry out fieldwork for Franz Boas. He studied Southern Maidu in 1931 and in the summer of 1932. During his time in the United States, he studied anthropology under Boas at Columbia University and registered as an M.A. student there, although he never submitted his thesis. After some initial publication based on Jones's phoneme theory, he hesitated to complete his Maidu publication because he felt the need for a revised theoretical base.

In 1932, Uldall returned to Denmark and remained there until 1939. Jobs were hard to find, and Uldall had not completed his Danish degree. He had various temporary posts, initially associated with his old professor, Jespersen. He considered going abroad but his wife became ill with tuberculosis and died in 1937. Uldall was also kept in Denmark through his association with Hjelmslev, whom he had met shortly after returning, through the Linguistic Circle of Copenhagen. A phonology of Danish was planned under the Prague model but never completed. The work, involving Hjelmselv, Uldall, and Paul Lier, led to the development of a new theory that they called *glossematics* (q.v.). They planned various publications, but modifications to the theory delayed publication. In 1937 they agreed on the basic model and hoped to finish two publications on phonematics and Danish phonology. However, in 1939, Uldall felt obliged to take a post with the British Council in Athens, although he still intended to spend a significant part of the year in Denmark.

His intent was to go to Athens, but wartime circumstances prevented it. He found himself in Egypt instead, with his new bride, Elizabeth Anderson. They taught for the British Council in Cairo, Tel Aviv, Baghdad, and Alexandria. Throughout the war, Uldall was completely cut off from Hjelmslev. Their attempts to reestablish their working relationship of the late 1930s failed, interrupted by Uldall's further work for the British Council, and then for Tucuman University in Argentina, as well as work in Edinburgh (where Elizabeth, his wife, was appointed to the University in 1949). Even most of a year spent in Denmark (1931–1932) failed to further collaboration between the two, not least because their views had diverged. Hjelmslev felt unable to sign off on the proposed publication by Uldall, which was critical to his career. The publication appeared only two months before his death in Lagos, where he was a senior lecturer at the University of Ibadan.

See also: Boas, Franz (1858–1942); Glossematics; Hjelmslev, Louis Trolle (1899–1965); Jespersen, Otto (1860–1943); Jones, Daniel (1881–1967).

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Ulfilas (Ulfila, Wulfila, Urphilas) (ca. 311–382)

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Ulfilas was born ca. 311, probably in Gothia, north of the Danube but not part of the Roman empire, in what is now Rumania. His forebears were among a group of Roman prisoners abducted from Cappadocia (southern Turkey) by Goths in about 250. Nothing is known about his early life. Before the age of 30, however, he had acquired the position of *lector* (i.e., reader) in the Church. He was ordained Bishop to Gothia, probably in 341 in Constantinople – the evidence for the dating is debatable. The persecution of Christians some seven years later, in 347–348, forced him and others to flee southward from their home in Gothia to the comparative safety of the Roman province of Moesia. Thereafter his headquarters were located in what is now Bulgaria, about 200 km east–northeast of Sofia, in Turnovo.

Ulfilas espoused an Arian form of Christianity, believing that Christ was 'like' God, not 'of the same essence' as Him: the Homoean doctrine. Ulfilas and his fellow Christians in Moesia suffered no hardships from the Roman emperors because of their faith, until a few years before Ulfilas' death when the emperor Theodosius I (347–395) instituted political and property changes among the Arians, which saw Arianism decline in favor of Catholicism. Ulfilas was summoned to meet Theodosius in Constantinople – the exact reasons for which are unclear. He subsequently died there, in either 382 or 383.

The sources for his life are comparatively limited, and are to be found in the works of eight early medieval historians from the 5th to the 9th centuries. Of these, the two most informative are by Auxentius of Durostorum (i.e., Silistra, about 100 km southeast of Bucharest), and Philostorgius. Auxentius (fl. ca. 400) was a pupil, and also the foster son, of Ulfilas, and his *Epistola de fide, vita, et obitu Ulfilae* describes in some detail the main features of Ulfilas' life, especially his religious opinions. It makes no mention, however, of his translation of the Bible into Gothic. Philostorgius (368–ca. 433) stated that Ulfilas "was the inventor for [the Goths] of their own letters, and translated all the Scriptures into their language – with the exception ... of [the Books of] Kings. This was because the books contain the history of wars, while the Gothic people, being lovers of war, were in need of something to restrain their passion for fighting rather than to incite them to it" (Heather and Matthews, 1991: 144). The 6th-century Gothic historian Jordanes noted that Ulfilas "is said also to have taught them how to write" (idem); Isidor of Seville (ca. 570–636) merely repeated the assertion that Ulfilas invented the Gothic alphabet and translated the Old and New Testaments, as did Wala(h)frid Strabo (c. 809–849) more than two centuries later (Streitberg, 1908: xxiv–xxv). The comments on Ulfilas by Socrates Scholasticus (5th century), Sozomen (5th century), and Theodoret (ca. 393–ca. 458) add nothing further to our understanding of his role as translator. Ulfilas is reputed to have been a fine preacher; he also wrote a series of tracts and commentaries/translations on Arian matters in Greek, Latin, and Gothic, none of which have survived.

Ulfilas is important in the history of the development of Christianity in southeastern Europe, especially in the formulation of Christian doctrines and the maintenance of Arianism. From a specifically linguistic viewpoint, his translation of the Bible, parts of which have been preserved (*see* **Gothic**), provided scholars of the early Germanic languages with a major source of crucially significant textual materials.

See also: Bible; Gothic.

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Ullendorff, Edward (b. 1920)

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Edward Ullendorff (b. Zürich 1920) is one of the leading British figures in Ethiopian studies during the second half of the 20th century. After studying at the Hebrew University, Jerusalem, in the-then Palestine, and following various positions with the British Administration, first in Eritrea and Ethiopia between 1942 and 1946, and briefly in the Palestine Mandatary Government between 1947 and 1948, Ullendorff began his academic career in Oxford, where he tutored Colonial Service cadets in Arabic. Then, in 1950, he was appointed Lecturer in Semitic Languages at the University of St Andrews. His experience in Eritrea and Ethiopia allowed him to develop what was to become his main field of study throughout his academic career, the Semitic languages of Ethiopia. Much of Ullendorff's published work in this field focuses more on what may be called the philological rather than the linguistic, the first of his major books being *The Semitic languages of Ethiopia: a comparative phonology* (1955), which is the published version of his doctoral dissertation. During the years before 1959, when he moved to the University of Manchester to take up the Chair in Semitic Languages and Literatures, he also wrote and reviewed on other areas of Semitic studies, ranging from Hebrew and Aramaic to South Arabian, as well as the field of Ethiopian studies. Reviewing academic books has always been one of the most active areas of Ullendorff's writing; indeed, his bibliography reveals over 300 reviews in more than 60 years of publications. In Manchester, he continued to work equally on Ethiopian matters as well as on wider Semitic themes, especially Biblical and Ugaritic studies, to which he has returned on various occasions throughout his career. It is also indicative of his wide-ranging scholarship that he has never confined himself to 'languages and literatures' in the strictest sense. Thus, in 1960, there appeared the first edition of his book *The Ethiopians: an introduction to country and people,* a highly readable and informative book that has seen several reprints and four editions, the latest published in 1998 in Kingston, Jamaica. Possibly his most outstanding book-length publication, *Ethiopia and the Bible – the Schweich lectures of the British Academy* (1968), is eloquent testimony to the philology-based range of his scholarship, covering as it does a broad canvas of textual sources in Semitic languages.

In 1964, Ullendorff moved to the School of Oriental and African Studies to take up the Chair in Ethiopian Studies that had been specially created for him. This was the first Chair in Ethiopian Studies anywhere in the world. Ullendorff remained as Professor of Ethiopian Studies until 1979, when he exchanged that position for the Chair in Semitic Languages. On his retirement in 1982, the University of London conferred upon him Emeritus status in terms of 'Semitic Languages and Ethiopian Studies,' thus giving recognition to both of the chairs that he had held. During his time in London, the study and teaching of Ethiopian languages was begun on a regular basis, greatly aided by his *An Amharic chrestomathy* (1965), which was followed some years later by a similar volume, *A Tigrinya* (*Təgrəňňa*) chrestomathy (1985). Also notable is his translation from Amharic of the first volume of Emperor Haile Sellassie I's autobiography (1976).

In 1988 he published an account of his early adult years, *The two Zions: reminiscences of Jerusalem and Ethiopia*, and in 1989 he was honored with a dedicated volume of the *Journal of Semitic Studies*, which contains a comprehensive bibliography of his writings up to that point (Hopkins, 1989).

See also: Amharic; Ethiopian Semitic Languages; Semitic Languages; Tigrinya; Ugaritic.

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Stephen Ullmann was born in 1914 in Budapest, where he attended university, obtaining a doctorate in 1936. In England, during World War II, he worked for the BBC and never returned to Hungary. His first university appointment was to the University of Glasgow, from 1946–1953, then to the chair of Roman philology at Leeds, and finally chair of Roman languages at Oxford, until his death in 1976. He was a director of the philological journal *Archivum Linguisticum* (1949–1962) and president of the Philological Society (1970–1974).

In the two fields of semantics and of stylistics, which he did not define as separate areas of linguistics, Ullmann played an important role by introducing to English-speaking universities the research of the French, such as Alfred Darmesteter's *La vie des mots étudiés dans leur signification* (1887), Michel Bréal's *Essai de sémantique* (1897), and especially Ferdinand de Saussure's contributions (*Cours de linguistique générale*, 1916), characterizing the distinction between diachrony and synchrony as a "Copernican revolution" – Ullmann also introduced the main studies of German and other European scholars who had influenced him during his formative years (e.g., Jost Trier, *Der deutsche Wortschatz im Sinnbezirk des Verstandes*, 1931; Gombocz and Weisberger, *Muttersprache und Geistesbildung*, 1929). As well, his Germanic studies in philology and in philosophy were extensive (*see* **Bühler, Karl (1879–1963); Husserl, Edmund (1859–1938)**).

The principles of semantics: a linguistic approach to meaning, an erudite synthesis packed with notes and references, was, when published in 1951, welcomed by the main researchers in the field, such as John Lyons and Pierre Guiraud. Here, for the first time, the common denominator of different problematics is studied and is revealed as organizing conjointly the areas of descriptive, historical, and general semantics.

His *Précis de sémantique française* (1952), although more ambitious, was less convincing. Its aim was to delineate the dominant semantic traits of a specific language, but the book seems to contain a number of common opinions about the French vocabulary, such as: the French word is essentially abstract, it is altogether polysemous and comprises many homonyms, Latinate words constitute a state within a state, and the French word's semantic autonomy is relatively weak – more than the word in other languages, the French word needs to be within a context to be understood.

See also: Bühler, Karl (1879–1963); Bréal, Michel Jules Alfred (1832–1915); Husserl, Edmund (1859–1938); Lyons, John, Sir (b. 1932); Saussure, Ferdinand (-Mongin) de (1857–1913); Stylistics; Trier, Jost (1894–1970).

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Ulwa *See:* Misumalpan.

Unaccusativity

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The core observation leading to the unaccusative hypothesis is that intransitive verbs exhibit two different syntactic patterns and that in one of them, the subject has important characteristics in common with the object of a transitive verb. The verbs whose subjects have object-like behavior are called unaccusative, and the other intransitive verbs are unergative. (During the 1980s there was an attempt within government binding theory to call unaccusatives ergatives.) The coinage, attributed to Geoff Pullum, is introduced in David Perlmutter's seminal paper (1978) 'Impersonal passives and the unaccusative hypothesis.' That paper can be considered the starting point of much research over the past 25 years, but there is earlier work drawing attention to object-like properties of intransitive subjects. Perlmutter (1978) himself mentioned Sapir (1917). Hall (1965) and Chvany (1975) pointed out that some clauses seem to lack deep subjects in English and Russian, respectively, and Napoli (1973) hypothesized underlying objects that advance to subjects for Italian verbs. Other early sources are documented in Pullum (1988).

The unaccusative hypothesis has led to three major areas of investigation:

- the determination of (language-specific) diagnostics distinguishing unaccusative from unergative verbs
- the semantic correlates to the syntactic distinction
- the theory-specific formulations of the hypothesis and attempts to explain it.

In what follows I will use terms like 'underlying' or 'deep' objects to refer to the subjects of unaccusative verbs. This doesn't express a commitment to the idea that the only possible analysis of such a subject requires the postulation of an underlying object. In a later section, I observe that some frameworks accommodate the unaccusative hypothesis without such an assumption.

Diagnostics for Unaccusativity

Unaccusativity has been studied in a great variety of languages, and many different diagnostics have been proposed. I will limit myself to those that are syntactic in nature and apply in simple clauses. I will also ignore the attempts to extend unaccusative analyses to adjectives, and I will concentrate on the diagnostics for Germanic, Romance, and Slavic languages, assuming they are the most accessible. But the interested reader can find comparable discussions of, for example, Acehnese (Aceh), Basque, Choctaw, Georgian, Greek, Hebrew, Japanese, Lithuanian, Sanskrit, Saramaccan, and Turkish.

Impersonal Passive

The phenomenon that Perlmutter (1978) discussed in detail is the impersonal passive.

The construction is illustrated for Dutch in (1)

(1) er wordt hier door de jonge lui veel gedanst
it is here by the young people a-lot danced
'the young people dance a lot here' (Perlmutter, 1978: 168)

This corresponds to the active in (2).

(2) de jonge lui dansen hier veel
'the young people dance here a-lot'

It is possible with some verbs, claimed to be unergative verbs, and not with others, claimed to be unaccusative. An ungrammatical example is given in (3).

(3) er werd door vele kinderen in de rook gestikt
it was by the children in the smoke suffocated
'many children suffocated in the smoke' (Perlmutter, 1978: 170)

Example (3) corresponds to the active in (4).

(4) vele kinderen zijn in de rook gestikt
many children are in the smoke suffocated
'many children are suffocated in the smoke' (Perlmutter, 1978: 170)

It is the unaccusative phenomenon of choice in the theoretical context of relational grammar that frames Perlmutter's discussion because two of the claims of relational grammar are that there is only one promotion from object to subject per clause and that passive cannot involve spontaneous demotion. Impersonal passive is not possible with unaccusatives because, by the unaccusative hypothesis, their active subject is the result of an advancement from object to subject, and only one such advancement is possible. Impersonal passive has been discussed as an unaccusative diagnostic in, *inter alia*, Dutch (e.g., Perlmutter, 1978; Hoekstra, 1984; Zaenen, 1988, 1993), German (German, Standard) (e.g., Shannon, 1987; Grewendorf, 1989), and Turkish (e.g., Perlmutter, 1978). Not all these discussions agree on the relevance of the diagnostic (see discussion below).

Note that the references given here and in the rest of this article pertain only to discussions of the phenomena that refer to unaccusativity. They are meant only to point the interested reader in the right direction.

Auxiliary Selection

Early work on unaccusativity, with the contributions of Rosen (1981) and Burzio (1981), focused on Italian. One of the diagnostics they discussed is auxiliary selection (first examined in Perlmutter, 1989, the published version of a paper drafted more than ten years earlier). The contrast can be illustrated by (5) and (6) (from Rosen, 1984: 44):

(5) Mario ha esagerato
Mario has exaggerated
Mario exaggerated

(6) la pressione è aumentata
the pressure is increased
'the pressure increased'

The diagnostic is deemed to be relevant because in Italian the auxiliary for the passive voice is also *essere* (to be). So again a generalization can be made: *essere* signals that an advancement from object to subject has taken place. The diagnostic has been discussed for several Germanic and Romance languages. We cite, *inter alia*, Dutch (Hoekstra, 1984; Everaert, 1986; Zaenen, 1988, 1993), French (Legendre, 1989), German (Grewendorf, 1989), and Italian (also Rosen, 1984; Burzio, 1986; Van Valin, 1990; Sorace, 2004; Legendre and Sorace, 2004).

Ne-Cliticization

Another Italian diagnostic that has been discussed extensively in the literature is *ne*-cliticization, exemplified in the contrast between (7) and (8) (from Bentley, 2004).

(7) ne arrivano molti
NE *arrive*-PL *many*-PL
'many of them arrived'

(8) *ne studiano molti.
NE *study*-PL *many*-PL
'many of them study'

The situation is a bit more complex than with the two previous diagnostics because sentences such as (7) are grammatical only when the subject follows the verb. The version in (9) is not acceptable (Burzio, 1986: 21):

(9) *molti ne arrivanono
many NE *arrive*-FUT-PL
'many of them will arrive'

Only a postverbal subject can float *ne*-clitics. And, as we would of course expect, so can objects, as illustrated in (10) (from Rosen, 1984: 49).

(10) ne ho visti tre
NE *have-1*SG *seen three*
'I saw three of them'

Levin and Rappaport Hovav (1995) saw *ne*-cliticization as a manifestation of surface unaccusativity because the argument of the intransitive verb actually occurs in object position and there is no direct appeal to the underlying status of the argument, as there is with auxiliary selection and passivization.

Ne-cliticization as such is obviously restricted to Italian. Some attempts have been made to extend the analysis to clitic phenomena in other languages, mainly in Romance. Relevant studies for Italian are Rosen (1981), Burzio (1981, 1986), Belletti (1988), Van Valin (1990), and Bentley (2004).

Participial Constructions

Some intransitive verbs can appear in the participial absolute construction in Italian, and others cannot, as illustrated in the following examples (adapted from Rosen, 1984).

(11) arrivati i Frabiani scoppiarono gli applausi
arrived the Frabians exploded the applause
'after the Frabians arrived, the applause exploded'

(12) *resistiti i Frabiani scoppiarono gli applausi
stood-firm the Frabians exploded the applause
'after the Frabians stood firm, the applause exploded'

Again, verbs such as *arrivare* (to arrive) pattern with objects here.

This diagnostic has been discussed for other Romance languages; for French, see Legendre (1989) and Legendre and Sorace (2004). It is one of the participial distinctions that are conditioned by the unergative/unaccusative distinction.

Another is the adjectival perfect participle in Germanic, illustrated by the following contrast:

(13) the fallen leaf

(14) *the laughed boy

Again (13) exhibits the same behavior as subjects of passivized transitive verbs (*the painted house*). This diagnostic was proposed for Dutch by Hoekstra (1984). Across languages, it seems to be one of the diagnostics that is deemed the most reliable.

Resultatives

A more subtle manifestation of unaccusativity can be seen in the following contrasts (from Levin and Rappaport Hovav, 1995: 39, 35, 63).

(15) the river froze solid

(16) *Dora shouted hoarse

(17) Dora shouted herself hoarse

(18) Terry wiped the table clean

This construction is considered to be the diagnostic par excellence for unaccusativity in English by Levin and Rappaport Hovav (1995), who discussed it extensively. I refer to them for references about the resultative construction in general. With respect to unaccusativity, the fact to notice is that a resultative can be predicated of an object, as in (18), and of subjects that under the unaccusative hypothesis would be considered to be underlying objects, as in (15), but not of subjects like (16) except when a reflexive is added, as in (17).

Genitive of Negation

Subjects of unaccusatives in Russian can receive genitive case under negation, as do objects, and in contradistinction to the subjects of unergatives, as illustrated in the following contrasts.

(19) otveta ne prišlo
answer-GEN NEG came
'no answer came' (Originally from Babby, 1980; cited in Harves, 2002: 34)

(20) Anna ne kupila knig
Anna NEG bought books-GEN
'Anna didn't buy books' (Harves, 2002: 34)

(21) *ni odnoj devuški ne pelo
not single girl-GEN NEG sang
'not a single girl sang' (Harves, 2002: 34)

This contrast was first mentioned in the context of unaccusativity in Pesetsky (1982). For a recent discussion, see Harves (2002). Note that the verbs in this construction do not agree with the genitive; they are in an impersonal form, and not all analyses assume that all genitive arguments of intransitives are to be analyzed as surface subjects.

Po-Phrases in Russian

Po-phrases in Russian are used to indicate distributivity. They are felicitous with unaccusative subjects and with objects but not with unergative subjects, as illustrated below.

(22) ja dal mal'čikam po jabloku
I gave boys-DAT PO apple-DAT
'I gave the boys an apple each'

(23) po jabloku upalo s každogo dereva
PO apple-DAT fell from each tree
'an apple fell from each tree'

(24) *v každoj kvartire smejalos' po mal'ciku
in each apartment laughed PO boy-DAT
'a boy laughed in each apartment' (examples cited in Harves, 2002: 35)

This was also first observed in Pesetsky (1982). Again the verbs in this construction are impersonal (they don't agree with the hypothesized subject). Recent discussions can be found in Harves (2002) and Schoorlemmer (1995). A similar potential diagnostic is discussed for Spanish in Bosque (1992).

Na-/Pere-/Po-Prefixation in Russian

According to Schoorlemmer (1995) and others, prefixation with *na* ('to V a lot') or *pere/po* ('to V all') leads to quantification of the object with transitive verbs and of the subject with unaccusative intransitives. It is ungrammatical with unergatives.

(25) diti *na*kupili *mnogo* knig
children bought many books-GEN
'the children bought a lot of books'

(26) *mnogo* travy *na*roslo v parke
much grass-GEN grew in park
'a lot of grass grew in the park'

(27) **mnogo* detej *na*igralo v parke
many children-GEN played in park
'many children played in the park' (examples cited in Harves, 2002: 104–105)

Positional Phenomena

A number of diagnostics have been proposed in which the underlying object shows up in object position on the surface and the subject position is filled either with another argument or a dummy (such as *there*) or left unfilled. Depending on the analysis, the underlying object can be claimed to be the surface object, and a dummy, overt or not, or another constituent can be postulated to be the subject, or when the theory allows it, the construction can be treated as subjectless.

Inversion in Romance

In Italian, inversion constructions are the ones that allow *ne*-cliticization (see above). Their postverbal argument is analyzed as a subject in object position (Belletti, 1988; Rosen, 1981).

Unaccusative Inversion

Marandin (1999) singled out one type of French inversion construction as being an unaccusative construction because the postverbal element has several

object-like properties. The construction is illustrated in (28). It should be distinguished from the better-studied stylistic inversion, in which the argument does not have these object-like properties.

(28) je voudrais qu'en vienne au moins un autre
I would like that EN *come at least one other*
'I would like at least one other one to come'
(Marandin, 1999: 7)

Among the objectlike properties of the postverbal argument are *en*-clitics, nonoccurrence with an(other) object, and the restriction of the construction to non-agentive verbs. The author assumes that the postverbal argument is a surface object. See also Legendre and Sorace (2004) for discussion.

Locative Inversion

The construction is exemplified in English in sentences such as

(29) In the distance appeared the towers and spires of a town which greatly resembled Oxford (from Bromfield, L., *The farm*, cited in Levin and Rappaport Hovav, 1995).

It is discussed *inter alia* in Levin (1987), Bresnan (1984), and Levin and Rappaport Havav (1995). Again, the postverbal argument can be analyzed as a surface subject or a surface object. Similar constructions have been discussed as unaccusative in Spanish and Russian, for example.

Inversion with Psych-Verbs

In several languages we find a class of psychological and related predicates with two nominal arguments, one of which is clearly nominative and one which is, as far as one can tell, not accusative. The word order with these verbs tends to be more flexible than with other two-argument verbs. For instance, in Dutch we find the following possibilities.

(30) ...dat de teugels *hem* zijn ontglipt
...that the bridles him are slipped
'...that the bridles have slipped from his hands'

(31) ... dat *hem* de teugels ontglipt zijn (Everaert, 1986: 114)

This second word order is not possible with other predicates, as illustrated in (32–33)

(32) ??...dat *ons* de kinderen hebben geërgerd
...that us the children have annoyed
'...that the children have annoyed us'

(33) ...dat de kinderen *ons* hebben geërgerd.

These word order facts are discussed in, for example, Everaert (1986) as possible diagnostics for unaccusativity. For Italian experiencer verbs and their relevance to unaccusativity, see Perlmutter (1983) and many others.

First Conjunct Agreement in Inversion in Russian

When a conjoint nominative subject is in postverbal position in Russian, the verb can show singular agreement with the first conjoint. It has been claimed (Harvis, 2002) that this is possible only with unaccusative verbs.

(34) k beregu bežal Kolja I Vanja
*towards shore ran-*MASC-SG *Kolya and Vanya*
'Kolya and Vanya ran to the shore' (cited in Harvis, 2002: 37)

(35) *na večěre igral Andrej I Kolja
*at the party played-*MASC-SG *Andrej and Kolya*
'Andrej and Kolya played at the party' (cited in Harvis, 2002: 38)

Extraction Phenomena

The potential influence of the unaccusative-unergative distinction on *wh*-type constructions has not been discussed extensively except in Grewendorf (1989), who drew attention to several types of extraction asymmetries that seem to be influenced by the distinction in German. I illustrate two of them: *was-für* split and partial VP fronting.

Was-Für Split

While the example in (36) is ungrammatical, the sentence in (37) is acceptable.

(36) *was haben für Leute gearbeitet?
what have for people worked
'what kind of people have worked?'

(37) was sind für Leute angekommen?
what are for people arrived
'what kind of people have arrived?'
(Grewendorf, 1989: 30)

It was already observed for the Dutch equivalent of the construction (see, e.g., Everaert, 1986) that this kind of split (*wat voor* in Dutch) is in general acceptable with direct objects and unaccusatives. Grewendorf (1989) extended the analysis to German but noted that there is speaker variation and that the grammaticality of the result depends on the position of the nominative argument: only when it is in 'object position' is the split extraction allowed, as illustrated with the following contrast.

(38) was sind dem Lehrer für Fehler aufgefallen?
what are the teacher-DAT for mistakes been-striking
*was sind für Fehler dem Lehrer aufgefallen?
what are for mistakes the teacher-DAT been-striking
'what kind of mistake has the teacher noticed?'

Was-für split is thus a positional phenomenon like *ne*-cliticization in Italian.

Partial VP-Fronting

The term 'partial VP-fronting' refers to the fronting of a participle or an infinitive with some of its non-subject arguments. In some cases, however, German also allows the fronting of a nominative argument together with the participle, as illustrated in (39).

(39) eine Concorde gelandet is gestern in München-Riem
a Concorde landed is yesterday in Munich-Riem
'a Concorde landed yesterday in Munich-Riem'
(Grewendorff, 1989)

This has been claimed to be limited to unaccusative verbs and indefinite arguments, but the conditions on this construction are far from clear.

Other extraction phenomena discussed by Grewendorf (1989) are extractions out of NP subjects and out of subject sentences, and discontinuous phrases of the following kind:

(40) weine haben dem Hans auch billige geschmeckt
wines-NOM have the John-DAT also cheap tasted
'John enjoyed also cheap wines'

The Status of Reflexive Constructions

For languages in which it can be argued that reflexivization is a kind of intransitivization and that the reflexive is not an argument but a morphological marker, it has often also been argued that reflexive clauses are unaccusative clauses (see, e.g., Marantz, 1984). This type of analysis remains very controversial.

As said above I will not discuss morphological or biclausal diagnostics. The most prevalent of the morphological ones is *-er* suffixation, which has been studied for English in Levin and Rappaport Hovav (1995) and earlier work and for Dutch in Hoekstra (1984).

Complex clause arguments are mainly discussed for French in Legendre (1989), who gives the behavior of embedded infinitives under *croire* and *laisser* as diagnostics as well as object raising ('easy to please' constructions). The behavior of infinitives under *lassen* has also been discussed for German (Grewendorf, 1989).

Language-Internal Mismatches

The previous sections show that there is a wealth of evidence for the conclusion that not all intransitive verbs are created equal. For all these differences to be reflexes of nothing but the unaccusative–unergative distinction, however, it should be the case that, if there are several tests within one language, they pick out the same verbs, or at least the same verb meanings. From the beginning on, there have been doubts about this. Levin (1987) discussed mismatches with respect to unaccusative tests in Dutch and English. Similar observations have been made for German (Kathol, 1991) and for Italian (Bentley, 2004). These mismatches point to the need for other factors to be taken into account, to supplement or replace the unaccusative hypothesis. This has led to investigations of the semantic factors that underlie the unaccusative–unergative distinction.

Semantic Correlates

Perlmutter (1978) already observed that the syntactic distinction opposing unergative and unaccusative intransitives correlated with semantic distinctions. The unergatives that his impersonal passive test picks out tend to describe volitional acts and some involuntary bodily processes whereas the unaccusatives are verbs with a semantic patient as argument, as well as verbs of existing and happening, nonvoluntary emission of stimuli, aspectual predicates, and duratives.

The existence of these correlates has led to attempts to reduce the distinction to a matter of semantic classes. For instance for Dutch, Zaenen (1988) argued that there are two semantic distinctions at work, (a) the aspectual opposition between telic and atelic predicates, which conditions auxiliary selection and past participle behavior, and (b) the volitional one, which conditions the possibility of forming impersonal passives. For Italian, Van Valin (1990) claimed that auxiliary selection depends on the presence of a state predicate in a Dowty decomposition of the meaning of predicates. Rosen (1984) argued against the attempts to reduce the unaccusative–unergative distinction to semantics both across languages (the 'universal alignment hypothesis' of Perlmutter and Postal) and language internally (her 'little alignment hypothesis'). The universal alignment hypothesis states that there are principles of universal grammar that predict the initial relations borne by each argument on the basis of the meaning of the predicates. Rosen argued against it by pointing out apparent counterexamples, but for several of her examples it is not clear that verbs that she considered to have the same meaning

are indeed completely synonymous. Verbs that are translations of each other can in fact belong to different aspectual classes. The little alignment hypothesis assumes only consistency of the mapping between meaning and initial grammatical function within each language. Here again, it is not clear that Rosen kept the meaning constant in her contrasts. In fact, in certain cases she compared transitives and intransitives that have a different mapping from argument structure to grammatical function, as illustrated in the following example:

(41) Bertini ha calato il sipario
'Bertini has lowered the curtain'

(42) il sipario è calato
the curtain is fallen
'the curtain fell'

It is clear that the relation between the two subcategorization frames and the semantic roles associated with the arguments in this example lends itself very easily to an analysis that preserves the little alignment hypothesis. In general Rosen's observations do not warrant her conclusions. As discussed in Grimshaw (1987), the relation between the various diagnostics and the distinction itself might not be completely straightforward.

Initial attempts to isolate semantic correlates for unaccusativity, however, have also come under attack. For Dutch, for instance, Hoekstra (1999) claimed there is no satisfying semantic criterion.

The most sophisticated attempt to date to reconcile the observations about semantic correlates, mismatches, and the object-like behavior of some intransitive subjects that is the basis of the unaccusativity hypothesis is that of Levin and Rappaport Hovav (1995), who eliminated what they call surface unaccusativity, mainly positional phenomena, from the picture and proposed four partially ordered mapping rules to account for the semantic classes that correlate with the unaccusative–unergative distinction. They hypothesized that

- arguments undergoing directed change map onto underlying objects, as well as
- arguments whose existence is asserted or denied, whereas
- arguments that denote immediate causes map unto underlying subjects. Finally
- a default rule maps other arguments to objects.

The problem with their account is that notions such as 'directed change' and 'immediate cause' are not given an operational definition apart from unaccusativity, which makes the proposal rather circular.

The observation that unaccusative verbs in different languages tend to be similar but different has led to another type of theorizing, represented by the work of Sorace and Legendre. Sorace (e.g., in Sorace, 2004) proposed gradient hierarchies based on aspectual parameters, predicting that the closer a verb is to expressing a 'telic dynamic' change, the more likely it is to be unaccusative, whereas when it expresses an 'atelic nondynamic activity,' it will be unergative. Different languages and different constructions have different cutoff points on this hierarchy for verbs that exhibit syntactic unaccusativity. This is further formalized in optimality theory in Legendre and Sorace (2004). This proposal too has the problem of appealing to ill-defined semantic notions.

Theory-Specific Formulations of the Hypothesis

While there has been much discussion about what motivates the unaccusative–unergative distinction, it has not been difficult for any syntactic framework to accommodate it if so desired.

In multistratal theories such as relational grammar and government binding theory, the unaccusative subject is treated as an underlying object. In relational grammar this means that it is a two in the initial stratum and a one in a later one, the final one (if no dummy insertion has occurred and the predicate is not in a raising construction). In government binding theory, the unaccusative subject is hypothesized to have originated within the VP, it is an internal argument just like any other object, and it is moved to the external argument position (the subject position) (Burzio, 1981, 1986). In both these theories, we need a principle to make sure that this movement happens. In both cases it is a requirement that all clauses have a subject, supplemented in government binding theory by Burzio's generalization that verbs lacking an external argument can't assign accusative case. In late government binding theory approaches and in the minimalist framework, all arguments tend to originate in a VP internal position; hence unergatives and unaccusatives need to be distinguished in a different way. Given the number of different projections available, this has not proven to be a problem (see, e.g., Alexiadou *et al.*, 2004: 14 for a proposal). In these recent approaches, several projections are available, and different semantic phenomena can be linked to those, allowing for the representation of more fine-grained distinctions than just the unaccusative–unergative opposition.

In monostratal theories, the unaccusative–unergative distinction is represented as a difference

on the level of argument structure. In lexical functional grammar, the analysis was first proposed in Levin (1987). It is further developed in Bresnan and Zaenen (1990) and Zaenen (1993). The main idea is that an unaccusative argument is classified as −r (nonrestrictive), the same way as canonical objects. This allows it to be realized as a subject or an object, and assuming a principle that will force it to become a subject when there is no other subject candidate, it will surface as such in passives and unaccusatives. In head-driven phrase structure grammar, the original proposal (Kathol, 1991) was simply to add an attribute ERG to the lexical entries of unaccusative subjects and canonical objects. This attribute would be deployed in lexical roles and either allow or block their application; for example, in the passive rule, it would regulate what could become the subject of a passive. In later versions of the theory, the head-driven-phrase-structure-grammar version of argument structure and roles assignment is exploited. For instance, Blevins (2003) proposed a stem representation in which unergative arguments have a SUBJ and an argument structure (ARG-S) attribute with the same value, whereas unaccusatives only have an ARG-S attribute. On the word level, the representation for both contains a SUBJ attribute, and a lexical mapping constraint ensures that the highest value of the ARG-S is also that of the SUBJ.

Other theories deny the relevance of the unaccusative–unergative distinction and try to develop purely semantic approaches to the so-called unaccusative phenomena. This is, for instance, the direction chosen in role and reference grammar (Van Valin, 1990). However, as Levin and Rappaport Hovav pointed out, to explain fake reflexives in resultatives, Van Valin would have had to appeal to some syntactic generalization (Levin and Rappaport Hovav, 1995: 71).

Of course, representing the unaccuative–unergative distinction is not explaining it. Most attempts at explanation tend to be more or less disguised stipulations, and a discussion of them would require more detail about the various linguistic theories than is possible here. I refer interested readers to the literature in the theory of their choice. Whether an ultimately satisfactory explanation will maintain a unified unaccusative–unergative opposition or split up all the phenomena that have been studied as part of the opposition and explain them in different ways, only the future can tell.

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Underspecification

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Underspecification in phonology is the partial description of lexical entries, intermediate forms (phonological underspecification) or surface forms (phonetic underspecification). Motivations for underspecification range from language-particular descriptive necessity to the desire to capture universal phonological generalizations.

Underspecification is a relative notion, defined by the absence of specification in any given form for features or metrical structures that play an active role in the language. Phonological underspecification is the situation in which a segment lacks a value in underlying or intermediate representation for a feature that it is specified for on the surface. Underspecification is often used, for example, in the lexical representation of harmonic affix vowels like those of the Turkish plural suffix (*-ler* ~ *-lar*), whose specification for [back] is completely predictable from the stem that the affix attaches to (*ev-ler* 'house-pl', *at-lar* 'horse-pl'); there is no evidence that the suffix vowel has any intrinsic [back] specification of its own to lexically store. Phonetic underspecification is the situation in which a segment lacks a phonological feature value, and therefore a phonetic target, for some dimension that other similar segments in the language can be specified for. This is invoked especially frequently for tone in languages where only a relatively few syllables in a word have a clear phonetic tonal target and the others assimilate gradiently to the pitch of nearby targets; for example to describe English intonation, Liberman and Pierrehumbert (1984: 218) use H[igh] for high pitch targets and L[ow] for low ones in sentences such as *Is it five?*, which has an L associated with *Is* and an H associated with *five*; the pitch contour of the middle word, *it*, is simply the transition between L and H, with no tonal target of its own.

Generally, a given token of a segment is considered underspecified with respect to a binary-valued feature only if it is legal generally for segments of that type to bear the feature in question; thus, for example, vowels are not normally considered underspecified for features that only consonants can bear (e.g.,

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[strident]), and vice versa. Most discussions of underspecification in the literature are confined to segmental or tonal features.

Surface (Phonetic) Underspecification: Gradient Interpolation

Surface underspecification is used to capture the phonetic contrast between segments that are associated with a target for some articulatory dimension and those that are not. The former show consistent behavior along the dimension in question; the latter are fully characterized through coarticulation with, or interpolation between, the phonetic targets associated with segments to either side. A case of tonal interpolation in a pitch-accent language is discussed by Pierrehumbert and Beckman (1988), who distinguish vowels that have High or Low tonal targets in Japanese from tonally underspecified vowels. The pitch of a tonally underspecified vowel is predicted from its location on the transitional curve connecting the pitches of the tonal targets on either side. Similar interpolation in the segmental domain is discussed by Keating (e.g., Keating, 1988), who shows that in terms of tongue shape features, /h/ coarticulates fully in with the segments on either side, rather than establishing any place of articulation targets of its own. Cohn (1990) found parallels in the nasal dimension in many languages, arguing against surface specification of [nasal] or [oral] for segments whose nasal airflow is best described as a steady, gradual transition from the degree of nasal airflow found in the fully specified segments to either side, whatever they might be.

Uses of Phonological Underspecification

Even for segments that are fully specified on the surface and have clear phonetic targets for particular features, there are arguments for underspecification at underlying or intermediate representation. A variety of arguments have been put forward for underspecification, not all of them mutually consistent.

Economy Metric

The first general use of underspecification in the generative literature was in service of lexical economy. Chomsky and Halle (1968) proposed an evaluation metric based on feature-counting that favors forms whose underlying featural description is minimal; thus, for example, the underlying representation of a form whose phonetic realization is [sæt] might be missing the [-voice] specification for [s] and [t], the [-back] specification for [æ], and so forth; these would be supplied, possibly immediately, by the phonological rules of the grammar. Lexical economy has largely fallen out of favor as the motivation for underspecification, however, yielding to approaches that use underspecification to capture patterns of phonological behavior either cross-linguistically or in a particular language.

Capturing Markedness

In the early 1980s underspecification was adopted as a means of capturing cross-linguistic generalizations about markedness. Marked feature values are more restricted in their distribution and tend to be more involved in triggering phonological alternations. Operating on the strong assumption, building on earlier work from the Prague school of linguistics, that for every binary-valued feature, in any given context, there is one marked and one unmarked value, Kiparsky (e.g., 1982) and Archangeli (e.g., 1984) developed the theory of Radical Underspecification in which the universally unmarked value of any given feature value is automatically underspecified in the lexicon of every language. For vowels, [+high] is unmarked and therefore underspecified; for obstruents, [-cont] is unmarked and therefore underspecified, and so forth. As a result of underspecification, phonological rules can refer to and manipulate only marked feature values during the stage of the derivation when underspecification is in force, accounting for the greater relative activity of marked feature values and for the greater tendency of segments with unmarked feature values to assimilate to other, more marked segments (thus, for example, coronal consonants, whose place of articulation is considered unmarked relative to labials, palatals, and velars, are the most likely of all consonants to assimilate in place to a neighboring consonant; underspecifying them for place permits the researcher to formally model this asymmetry). In Radical Underspecification Theory, underspecified values are filled in at a late stage of the derivation, at which point the behavioral asymmetry between marked and unmarked feature values disappears.

Radical Underspecification Theory can be modified to capture language-particular markedness as well as universal markedness by taking context into account. The value that may be unmarked for a given feature in general – e.g., [-voice], for obstruents – may be the marked value in a specific context – e.g., postnasally, for obstruents.

The universality of Radical Underspecification has been challenged by observations that markedness itself is not completely universal; what qualifies as the unmarked, or default, vowel or consonant can vary across languages. The use of underspecification

to capture unmarkedness in general has also been challenged by arguments initiated by Steriade (1995) and furthered in Optimality Theory (Prince and Smolensky, 1993), that grammatical constraints, rather than differentially specified representations, are the best means of handling markedness effects. For example, Pulleyblank (in press) argued that the special status of /i/ in Yoruba, which in a 1988 paper he attributed to unmarkedness and total featural underspecification, is better captured through grammatical constraints and does not require full specification of /i/. Pulleyblank argued that underspecification of /i/ is not just superfluous but actually interferes with the proper analysis of Yoruba phonology, citing several phonological patterns (e.g., /r/ deletion between identical vowels) that must specifically refer to the features of /i/. Such patterns are incompatible with underspecification. A recent comprehensive discussion of markedness in Optimality Theory is presented in DeLacy (2002).

Predicting Contrast

Not only are universally unmarked feature values relatively inactive, relative to universally marked features; features that are not contrastive in a particular environment within a language have also been claimed to play less of a role in conditioning or triggering alternations. Contrastive underspecification theory, developed by Mester and Itô (1989), uses underspecification to capture behavioral differences between contrastive and redundant features. According to Contrastive Underspecification Theory, feature values are fully specified on all segments of a type for which a given feature is contrastive and underspecified on segments in a class within which the feature is not contrastive. Thus, for example, [voice] would be specified on all obstruents in Japanese, which distinguishes [t] and [d], but not on sonorants, which are uniformly voiced; Mester and Itô utilize contrastive underspecification for voice to account for why Rendaku compound voicing in Japanese (*ori* + *kami* → *origami*) is impeded by contrastive obstruent voicing in the second member of the compound (e.g., *kami* + *kaze* → *kamikaze, not *kamigaze*) but not (redundant) sonorant voicing, as in *origami* (not **orikami)*. Mester and Itô proposed a ban on multiple specifications of [+voice] in the second member of the compound; *-gaze,* with voiced [g] and [z], would violate this ban, but *-gami* would not, on the view that the redundant voicing on [m] is not phonologically represented.

As with Radical Underspecification, Contrastive Underspecification has met with empirical and theoretical challenges. In Japanese, for example, other language evidence suggests that sonorants must be specified for [voice] in the lexical representation. And the nonrepresentational methods of differentiating contrastive and redundant feature values made available in Optimality Theory have reduced or eliminated appeals to contrastive underspecification.

Archiphonemic Underspecification

The use of underspecification which has been the most resilient to empirical and theoretical challenge, is in the description of highly language-specific patterns, of two related kinds: (a) the featural content of a segment is completely predictable from context, with no evidence bearing on its lexical featural specification, if any, and (b) there is a three-way contrast among segments, such that some are clearly specified for one value of a binary-valued feature, others are clearly specified for the opposite value of that feature, and the others oscillate between the two values, according to context. In Turkish, for example, most suffix vowels are harmonic; their values for [back] and [round] are always predictable from context. Assigning these vowels a lexical value of their own would be purely arbitrary, and most descriptions of Turkish in the literature opt not to do this. This use of underspecification is conceptually equivalent to the structuralist 'archiphoneme.' Turkish also has nonharmonic suffix vowels: some are always front (e.g., *-ken* 'while doing/being,' as in *çocuk-ken* 'while a child'), and others are always back (e.g., the second vowel in the progressive suffix *-Iyor*, as in *gel-iyor* 'is coming.' Archiphonemic underspecification has largely flown under the radar of universalist theories of underspecification, such as Radical or Contrastive Underspecification, to the point that rejections of the latter theories were voiced as rejections of underspecification of any kind (Steriade, 1995). However, recognition of the need for archiphonemic underspecification has been growing again in recent literature (Inkelas, 1995; Reiss, 2003).

See also: Distinctive Features; Generative Phonology.

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Understanding Spoken Discourse

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Introduction: the Contextual Specificity of Spoken Interaction

To characterize spoken discourse requires us to specify the very different contexts of utterance which occur in the production and reception of spoken and written discourse. These configurations largely explain the rather different properties of spoken and written discourse, even allowing for equivalence of register and formality: see the well-documented account of crosslanguage spoken syntax and discourse in Miller and Weinert (1998).

Speech prototypically involves face-to-face interaction between two or more participants who share a spatiotemporal environment. This, together with a common cultural and personal background in the case of conversationalists who know each other well, provides a rich contextual common ground, allowing the speaker to avoid having to verbalize a number of aspects of his or her message. At the same time this common ground enables the discourse participants to rely to a large extent on nonverbal signaling, in tandem with and even, on occasion, in place of, the verbal textualization of a given utterance. Planning time, as well as 'understanding' time, is naturally minimal and at a premium – and a great many features of spontaneous speech flow from this key factor. Moreover, both speech and writing are normally designed by the user so as to be readily understood by the addressee (cf. the notion of 'recipient design'). Indeed, according to Clark (1996) and other linguists, conversation and communication in general is a fundamentally joint activity, involving the active participation of the interlocutors and the coordination of their actions (verbal as well as nonverbal).

What I have just (very briefly) characterized is of course the prototypical instance of spoken interaction. There are obviously other less prototypical types of spoken discourse: for example, speaking on the telephone, where the participants share a time frame (adjusting for time zone differences when the call is international) but not a spatial one, where only two participants are involved, and where the communication is 'ear to ear' rather than face to face (no nonvocal gestures or visual percepts are possible): see Drummond and Hopper (1991) for a discussion of miscommunication over the telephone; and speaking in a formal situation (a speech, lecture, and so forth) in front of a group of people in circumstances where convention does not normally allow for verbal exchange and interaction.

In written discourse, on the other hand, there is by definition no common spatiotemporal ground between the writer and his or her reader(s). Since this is the case, and since inevitably there will be little or no opportunity to use nonverbal signals, the text used will need to be relatively explicit – since the textual input is confined to the verbal content, in conjunction with punctuation and various graphic devices. The much greater availability, in principle,

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of planning time allows the writer to review and to amend his or her written production.

The Context of Spoken Discourse, the Distinction between *Text* and *Discourse*, and their Roles in Understanding

It is useful in analyzing spoken (as well as written) discourse understanding to draw a three-way distinction between the dimensions of *text*, *discourse*, and *context*. Definitions which I find helpful are given below (see Cornish, 1999: §2.3 and 2003: §2 for further development and illustration of the 'text'/'discourse' distinction, and its importance for anaphora; also Edmondson, 1981: 4; Seidlhofer and Widdowson, 1999; and Werth, 1999: ch. 5 in connection with the notion 'context,' on 'Common Ground' within his 'Text Worlds' framework):

> *Text, discourse and context*
>
> *Text*: the connected sequence of verbal signs and nonverbal signals in terms of which discourse is coconstructed by the participants in the act of communication.
>
> *Discourse*: the hierarchically structured, situated sequence of indexical, propositional, utterance and illocutionary acts carried out in pursuance of some communicative goal, as integrated within a given context.
>
> The *context* is subject to an ongoing process of construction and revision as the discourse unfolds. It is through the invocation of a relevant context (which is partly determined by the nature of the cotext at issue, as well as by its genre) that the hearer or reader is able to convert the connected sequence of textual cues that is *text* into *discourse*. (Extract [slightly amended with permission from Mouton de Gruyter] from Cornish, 2003: 3.)

The text is the perceptible record of at least one utterance act (whether realized in terms of a verbal, linguistic trace or of a nonverbal trace – which may be gestural, sensory-perceptual or prosodic). See especially Clark (1996), chapter 6, on nonverbal signals and their different kinds of function in discourse. Clark draws a highly relevant distinction between two simultaneously functioning textual 'tracks' which operate in spoken discourse: a primary track, where the 'official business' of the transaction at hand is conducted; and a secondary 'metadiscursive' or discourse management track, where participants make explicit the purposes and functions of the preceding and ongoing talk. The functions of either track may be realized via verbal and nonverbal signals (whether in tandem or individually). We shall be looking at examples of this dual-track structure in operation shortly.

The notion of *text* is close to what Gumperz (1992: 234) calls "contextualization cues." The discourse partners make use of this record (a dual-track one, according to Clark, 1996), in conjunction with their invocation of a relevant *context* in cognitive terms, in order to create discourse.

Discourse, on the other hand, refers to the hierarchically structured, mentally represented product of the sequences of utterance, propositional, illocutionary, and indexical acts which the participants are carrying out as the communication takes place. Such sequences have as their *raison d'être* the accomplishment of some particular overall communicative goal (see Parisi and Castelfranchi, 1977).

The crucial point about this distinction is that discourse is a (re)constructive, and therefore highly probabilistic, enterprise: from the addressee's perspective, it is by no means a question of simply directly **decoding** the text in order to arrive at the fully fledged message originally intended by the addressor. Indeed, the addressee actively contributes both to the text and to the discourse via his or her phatic signals, indications of (mis)understanding, and other reactions to the speaker's moves. Meaning does not lie 'in' the text; it has to be constructed by the addressee (and the speaker!) via the text and an appropriate context (cf. Coupland *et al.*, 1991: 5). In any case, the text is often, if not always, both incomplete and indeterminate in relation to the discourse which may be derived from it in conjunction with a context.

Some Aspects of Understanding Spoken Discourse

Inferring Propositional Content and Illocutionary Force

In what follows, I shall be examining instances of (mis)understanding which occur, and are manifest, **within** conversations. So it is the monitoring by the discourse participants themselves of the discourse being co-constructed that is at issue here. I am adopting the principle that it is when misunderstandings, disagreements, or disruptions generally are manifest in the textual record of a conversation that the way in which discourse normally operates may be seen most clearly (cf. Coupland *et al.*, 1991). Let us analyze an initial occurrence of such a phenomenon. Here is a segment from the BBC Radio 4 cultural discussion program *Start the Week*. The previous speaker (Caroline Quinn) has been arguing that the alienation of black people in the United States is not due to a single factor, but has a variety of causes; that the situation is improving for all racial groups in the United States, and that differences in degrees of

integration into U.S. society are in part due to differences in the 'cultural inheritance' which each group brings with it. Homi Bhabha is then given the floor (for a second time) by the presenter, Melvyn Bragg. Notational symbols used here are as follows: – : pause; — : double pause; upper-case letters: strongly accented syllable; [...]: simultaneous speech; = : latching; (a): elision of 'a'; .hhh = sharp intake of breath. See Cameron (2001), chapter 3 and Schiffrin (1994), Appendix 2 for details of spoken discourse transcription.

> HB: Kate Kate – Caroline – you know I'm SURE you didn't mean it but sometimes – cultural inheritance shades off into biological inheritance – in in the States you know people say .hhh – Blacks are in some – inherent way – inferior – an' there's a lot of – a lot of a lot of stuff going around now of course – American Blacks came as slaves it's not what they brought with them it was what they were not – Able to bring with them they were [snatched – no but – —]
> CQ: [it's no – it's nobody's fault] =
> Idem: = no I'm not saying it's anybody's fault – but I'm just saying you know that that's the brute – historical – FACT . . .

In track 1 here, Caroline Quinn asserts that the fact that black slaves were forced to sail to America without taking any of their possessions with them was not **their** fault (this is the proposition actually intended to be conveyed by the speaker here). It is no doubt the extreme sensitivity of the issue (racism towards Blacks) that has motivated the use of the indefinite negative with wide scope, *nobody*, here. (This is also the motivation for HB's intake of breath in line 4, just before his presentation of the [racist] view of Blacks in the United States.) And in track 2, the same speaker is rejecting what she sees as Homi Bhabha's illocutionary stance in the extract – justifying and even seeming to condone the fact that black people in the United States are still not considered as 'real' Americans. Bhabha's response (in track 2) is to assert that this is not **his** view (notice his repetition of the verb *say* in "I'm (not) saying . . . "), but that the source of the way black Americans are viewed today is an objective, historical fact; and in doing so, he is clearly rejecting Caroline Quinn's implied interpretation of his illocutionary stance in his first turn.

Inferring Intended Interactional Moves and Acts

Occasionally, speakers and their addressee(s) disengage themselves from the discourse which they are creating, to establish metadiscursively what the relation is between their adjacent moves. This occurs in the 'second' track, then, in Clark's (1996) terms. When this happens, we get an explicit view of how the discourse participants are interpreting each other's utterances (see also Cameron, 2001: 116). An example occurred during a discussion about the Devil in another edition of *Start the Week* (April 22, 1996). Here, Melvyn Bragg (MB) is picking up on Peter Stanford's characterization of the use of 'the Devil' by the medieval Church as a means of social control:

> MB: yes – the interesting thing is that was it already coercive an' repressive – or did it actually call out something that's in people anyway – I mean the way you put it is that this is an authorit this is a Church behaving as the Church behaved in many many diff(e)rent ways – in great ways an' in wicked ways – but this is a Church behaving in a very authoriTArian way – in saying "you will follow us – or we will er – we will – get you and we've got the man to get you – he's called 'the Devil' " – but – isn't there something else there – isn't it a rec(og)nition of what's part of human nature and it was a BRILLiant metaphor – just as Christianity is full of brilliant metaphors as to what human nature is about so – .hhh it's more positive in a way than [what you're saying]
> PS: [well – well] it wouldn't have worked would it – un un unless they were actually tapping into something that people wanted to believe – and if you think about it =
> MB: = so you're agreeing =
> PS: = I'm agreeing – but if you think about the – concept of evil . . .

Melvyn Bragg, in his first turn, is objecting to what he sees as a one-sided view of the status of the Devil in the medieval Church, according to Peter Stanford's earlier characterization: he is taking the view that, rather than 'imposing' the Devil on believers in an authoritarian manner, the medieval Church more intelligently used the Devil as a metaphor for something that it recognized as already being part of human nature. Given that it is the former view which Bragg understands Stanford to be adopting, he clearly expects him to disagree with his objection. Yet Stanford's response is in conformity with this 'objection,' so it cannot count as a 'disagreement.' As soon as Bragg realizes this, he interrupts Stanford's response and asks him (via a declarative request) for confirmation of this interpretation. Stanford then immediately gives it by repeating the 'agreement' statement, then moves straight on to a development of the main point he had begun making at the point of interruption. This is achieved via a repetition of the actual words of his preceding final utterance (with the conjunction *and* replaced by the adversative *but*): . . . *and if you think about it* . . . . This is clear evidence of the 'two-track' structure of textual development, as argued by Clark (1996), since the final conjunct of the

preinterrupted segment by Peter Stanford is repeated virtually verbatim immediately after the interruption. This indicates that the primary, 'official business' track has not in fact been interrupted, but that it is the secondary, metadiscursive one which contained the interruption.

Conclusion

As Clark (1996) in particular emphasizes throughout his book, discourse is a joint endeavor, not the individual responsibility of the speaker, where the addressee has a merely passive role in decoding his or her utterances. The textual record (verbal content of the utterances as well as meaningful gestures, prosody, and phatic and other vocalizations) underdetermines the discourse which the participants are jointly constructing as the text unfolds in a particular context. The discourse constructed at any given point in this unfolding is a tentative, probabilistic affair, and not only is it subject to continual modification in terms of updating as each new utterance is encountered, but the immediately preceding discourse at a given point may also be revised and reconstructed retroactively, as a function of a subsequent discourse act or move. This may occur when a participant, encountering another's reaction to what he or she is attempting to say, realizes the latter has misunderstood his or her propositional content or illocutionary stance or the nature of his or her move (see the *Start the Week* examples above). In triggering this process of updating, revision and (re)negotiation, discourse particles, vocal and visual gestures, pausing and prosody generally, all take on a crucial significance. The dual-track structure of textualization suggested by Clark (1996) makes possible this parallel management of the discharge of 'official discourse business' (track 1) on the one hand, and the signaling of discourse organization (track 2) on the other.

See also: Cohesion and Coherence: Linguistic Approaches; Context and Common Ground; Context, Communicative; Conversation Analysis; Dialogue and Interaction; Discourse Management; Discourse Processing; Hesitation Phenomena and Pauses; Mood, Clause Types, and Illocutionary Force; Nonverbal Communication; Pauses and Hesitations: Psycholinguistic Approach; Planning Strategies and Production of Spoken Discourse; Speech Acts; Spoken Discourse: Types.

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Unification, Classical and Default

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Writing a context-free grammar for a (fragment of) natural language can be a rather tedious and linguistically nongratifying job. Some phenomena, such as agreement, are hard to describe using the standard machinery of context-free grammar. Other phenomena, such as the grammar of *wh*-movement, may even seem impossible to implement.

A related problem comes from the development of (wide-coverage) lexica for formal or computational grammars. Grammars for natural language tend to make quite detailed assumptions about the information available in lexical entries. While for theoretical purposes it may suffice to specify which type of information one considers to be lexical, a lexicon that needs to be used in practical applications actually has to provide this information, usually for a large number of lexical items. Although the amount of information that has to be present in individual lexical items can be substantial, the differences between large groups of lexical items are often small and predictable. This suggests that lexica for computational grammars can and should employ mechanisms that ensure that information can be shared among lexical items.

For these reasons, the use of feature-based grammar formalisms, which employ unification as the sole mode for sharing and checking information, has become widespread, both in theoretical linguistics and in computational linguistics. Unification grammar allows for concise descriptions of agreement and other phenomena, including constructions that are beyond the descriptive power of context-free grammar. Lexical items can be associated with information-rich feature structures. Commonalities between these structures can be expressed using inheritance.

Linguists have always felt the need to use indices, variables, and features in their theoretical frameworks. Unification grammar provides the formal underpinning for these notational devices, which are often presented as straightforward extensions of context-free grammar. Unification is also the cornerstone of a family of linguistic theories, such as lexical functional grammar (Bresnan, 1982), generalized phrase structure grammar (GPSG; Gazdar *et al*., 1985), and head-driven phrase structure grammar (HPSG; Pollard and Sag, 1994) and has been applied fruitfully to categorial grammar and tree-adjoining grammar. What all these frameworks have in common is that they encode linguistic knowledge (rules, principles, lexical entries, etc.) in the form of feature structures and that unification is used as the operation to combine information. Unification can be implemented efficiently, and most parsing algorithms for context-free grammar can be extended easily to unification-based grammars. Unification-based grammars are therefore popular in natural language processing, especially in work that emphasizes linguistic aspects.

Basic Notions

Feature structures, as shown in Figure 1, consist of features and values. Values can be either atoms or feature structures themselves. The feature structure in Figure 1A contains a feature CAT, whose value is the atom *np*, and a feature AGR, whose value is a feature structure specifying values for NUM and PER. The path ⟨AGR PER⟩ refers to the value of the feature PER within the feature structure that is the value of AGR. The value of ⟨AGR PER⟩ in the feature structure in Figure 1A is the atom *1st*. Feature structures may also contain reentrancies, stating that the value of two or more features is shared. This is usually indicated by prefixing the shared values with a boxed integer. The actual value of the reentrant features is mentioned only once. The feature structure in Figure 1B contains a reentrancy for ⟨SUBJ⟩ and ⟨COMPL SUBJ⟩. The value of both paths is the atom *kim*.

Feature structures may be partially ordered according to the amount of information they contain. If feature structure A is more general than B, that is, if all the information in A is also present in B, then A subsumes B.

Definition 1 *Feature structure A* **subsumes** *feature structure B if and only if (iff)*

- *For every feature F in A,*
  – if the value of F in A is atomic, the value of F in A and B is identical,
  – if the value of F in A is a feature structure, the value of F in A subsumes the value of F in B.
- *Every reentrancy in A is also present in B.*

$$\textbf{A}\quad \begin{bmatrix} \text{CAT} & np \\ \text{AGR} & \begin{bmatrix} \text{NUM} & pl \\ \text{PER} & 1st \end{bmatrix} \end{bmatrix} \qquad \textbf{B}\quad \begin{bmatrix} \text{SUBJ} & \boxed{1}\ kim \\ \text{COMPL} & \begin{bmatrix} \text{SUBJ} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

Figure 1 Feature structures (A) containing a feature with another feature structure as value and (B) containing a reentrancy.

Unification is the operation that merges two feature structures into a single feature structure containing all the information encoded in the two input structures and nothing more. If the two input structures contain conflicting information, unification fails. Unification is defined in terms of subsumption:

Definition 2 *The* **unification** *of feature structures A and B is the most general feature structure that is subsumed by both A and B, if such a feature structure exists.*

Unification-Based Grammar

A unification-based grammar consists of a lexicon, in which each word is associated with one or more feature structures, and grammar rules, also defined in terms of feature structures. In the simplest case, grammar rules are comparable to those of context-free grammar in the sense that they consist of a mother and an ordered list of (zero or more) daughters. That is, the rule in Figure 2 will allow for the derivation of a constituent of category S (i.e., with feature structure [CAT *s*]) only if there is a constituent that is unifiable with the first feature structure on the right-hand side of the arrow, followed by a constituent that is unifiable with the second feature structure on the right-hand side. The reentrancy for the feature AGR between the two daughters requires that the whole rule must in fact be understood as expressing a single feature structure. This is shown in Figure 2B. Note that the list of daughters is expressed as a (recursive) feature structure, in which FIRST is used to denote the value of the first element of a list and REST to denote the value of the tail of a list.

Unification-based grammars are often referred to as constraint-based grammars. A grammar defines the feature structures that are associated with lexical items and grammar rules. In doing so, the grammar has to use a language for describing feature structures. Following Kasper and Rounds (1986) and others, a language for feature structures can be given a semantics by specifying which feature structures satisfy a given description. Descriptions can also be seen as imposing constraints on the feature structures that satisfy them. For this reason, unification-based formalisms are often referred to as 'constraint-based grammar formalisms.' In the simplest feature description languages, one can describe a feature structure only as a conjunction of statements that specify an atomic value for a path or a reentrancy between paths. In such languages, there is always a unique feature structure satisfying a description that subsumes all other features structures satisfying the description. More powerful languages allow for disjunction and negation; that is, one may state that the value of CASE is *nom* or *acc* or *not gen*. Languages that are even more powerful allow the use of quantification and relations. In such languages, one may state that all elements in a listlike feature structure have to meet a certain requirement, or one may define the value of a feature as the append of two listlike feature structures. In these more powerful languages, there is no longer a unique most general feature structure satisfying a constraint, which may pose considerable challenges for implementation.

A

$$\begin{bmatrix}\text{CAT} & s\end{bmatrix} \rightarrow \begin{bmatrix}\text{CAT} & np \\ \text{AGR} & \boxed{1}\end{bmatrix}\begin{bmatrix}\text{CAT} & vp \\ \text{AGR} & \boxed{1}\end{bmatrix}$$

B

$$\begin{bmatrix}\text{MOTHER} & \begin{bmatrix}\text{CAT} & s\end{bmatrix} \\ \text{DAUGHTERS} & \begin{bmatrix}\text{FIRST} & \begin{bmatrix}\text{CAT} & np \\ \text{AGR} & \boxed{1}\end{bmatrix} \\ \text{REST} & \begin{bmatrix}\text{FIRST} & \begin{bmatrix}\text{CAT} & vp \\ \text{AGR} & \boxed{1}\end{bmatrix} \\ \text{REST} & nil\end{bmatrix}\end{bmatrix}\end{bmatrix}$$

Figure 2 Rules in a unification-based extension of context-free grammar can be interpreted as feature structures, consisting of a mother and a list of daughters.

Agreement as Unification

The advantages of using unification in grammar can be demonstrated easily with an example based on agreement. Dutch nouns have either neuter or non-neuter gender. The definite determiners *het* and *de* select for neuter and non-neuter nouns, respectively. The indefinite determiner *een* may be used with both neuter and non-neuter nouns. Prenominal adjectives are normally inflected, but an uninflected adjective occurs when the adjective modifies a (singular) neuter noun and the NP as a whole is indefinite (i.e., introduced by *een*):

(1a)	de	oude	kerk
	the	old	*church*(NNEUT)
(1b)	het	oude	huis
	the	*old*	*house*(NEUT)
(1c)	een	oude	kerk
	an	*old*	*church*
(1d)	een	oud	huis
	an	*old*	*house*

This agreement pattern is captured by the grammar fragment in Figure 3. Agreement is expressed by the feature AGR, which contains a feature GEN, used to capture the gender distinction, and DEF, used to distinguish between definite and indefinite NPs.

The determiner, adjective, and noun all may impose constraints on AGR. Unifying the value for AGR between noun and adjective and between the projection of a noun and the determiner enforces a requirement that agreement information contributed by all elements must be compatible. The fragment can be extended easily to take plurals into account.

It should be noted that the unification-based account of this phenomenon has several advantages over an account using only the standard machinery of context-free grammar. As there are four possible combinations of gender and definiteness values, a context-free grammar with atomic category symbols only would have to provide four variants for the two rules in Figure 3A and also two lexical entries for the indefinite determiner *een* (which combines with both neuter and non-neuter nouns). (Below, a technique is mentioned that allows the two lexical entries for *oude* to be reduced to one.) Note also that (undirectional) unification of information is essential in this case. An account based on upward or downward percolation of feature-values would have to ensure that information from the determiner can be passed on to the sister labeled [CAT *n*] and that information from the head noun can be passed on to the mother node as well as the sister labeled [CAT *a*]. A unification-based account can deal with this situation by simply assuming across-the-board sharing of the relevant morphosyntactic information.

Typed Feature Structures

It is customary to impose restrictions on the values that a given feature may take on. For instance, the value of CASE for a given grammar can be restricted to *nom*, *acc*, *dat*, or *gen*, while the value of NUM can be restricted to *pl* or *sg*. Similarly, one might want to impose constraints on which combinations of features can co-occur. For instance, the value of AGR could be restricted to feature structures which may contain the features PER and NUM but not CAT or SUBJ.

Typed feature structures make it possible to express such constraints. A typed feature structure is well formed only if it is in accordance with a type signature.

Definition 3 *A* **type signature** *consists of:*

- *A finite set of types,*
- *A partial order on types,*
- *Appropriateness conditions, specifying*
  - *the features that are appropriate for a given type,*
  - *the type of the values that each feature may take on.*

Figure 4 contains a fragment of a type signature. It defines the types *verb* and *noun* as subtypes of *sign*. For *sign* the attribute AGR is appropriate, and its value has to be of type *agr*. For nouns, an additional feature CASE is appropriate, and its value has to be of type

A

$$\begin{bmatrix}\text{CAT} & np\\ \text{AGR} & \boxed{1}\end{bmatrix} \rightarrow \begin{bmatrix}\text{CAT} & det\\ \text{AGR} & \boxed{1}\end{bmatrix}\begin{bmatrix}\text{CAT} & n\\ \text{AGR} & \boxed{1}\end{bmatrix}$$

$$\begin{bmatrix}\text{CAT} & n\\ \text{AGR} & \boxed{1}\end{bmatrix} \rightarrow \begin{bmatrix}\text{CAT} & a\\ \text{AGR} & \boxed{1}\end{bmatrix}\begin{bmatrix}\text{CAT} & n\\ \text{AGR} & \boxed{1}\end{bmatrix}$$

B

$$\text{de} \mapsto \begin{bmatrix}\text{CAT} & det\\ \text{AGR} & \begin{bmatrix}\text{DEF} & +\\ \text{GEN} & nneut\end{bmatrix}\end{bmatrix} \qquad \text{oude} \mapsto \begin{bmatrix}\text{CAT} & a\\ \text{AGR} & \begin{bmatrix}\text{GEN} & nneut\end{bmatrix}\end{bmatrix}$$

$$\text{het} \mapsto \begin{bmatrix}\text{CAT} & det\\ \text{AGR} & \begin{bmatrix}\text{DEF} & +\\ \text{GEN} & neut\end{bmatrix}\end{bmatrix} \qquad \text{oude} \mapsto \begin{bmatrix}\text{CAT} & a\\ \text{AGR} & \begin{bmatrix}\text{DEF} & +\\ \text{GEN} & neut\end{bmatrix}\end{bmatrix}$$

$$\text{een} \mapsto \begin{bmatrix}\text{CAT} & det\\ \text{AGR} & \begin{bmatrix}\text{DEF} & -\end{bmatrix}\end{bmatrix} \qquad \text{oud} \mapsto \begin{bmatrix}\text{CAT} & a\\ \text{AGR} & \begin{bmatrix}\text{DEF} & -\\ \text{GEN} & neut\end{bmatrix}\end{bmatrix}$$

$$\text{huis} \mapsto \begin{bmatrix}\text{CAT} & n\\ \text{AGR} & \begin{bmatrix}\text{GEN} & neut\end{bmatrix}\end{bmatrix} \qquad \text{kerk} \mapsto \begin{bmatrix}\text{CAT} & n\\ \text{AGR} & \begin{bmatrix}\text{GEN} & nneut\end{bmatrix}\end{bmatrix}$$

Figure 3 Rules and lexical entries for internal agreement of Dutch singular *nps*.

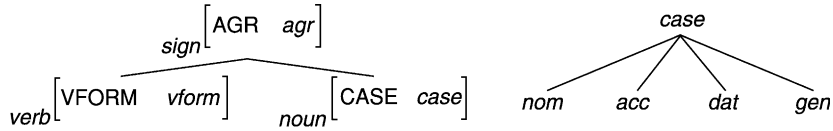

Figure 4 Fragment of a signature for a grammar with typed feature structures.

case. The subtypes of *case* are given as well. Note that no features are appropriate for *case* and its subtypes.

The definition of subsumption for typed feature structures takes type subsumption into account:

Definition 4 *A typed feature structure A* **subsumes** *a typed-feature structure B iff*

- *The type of A subsumes the type of B,*
- *For every feature F in A it is the case that the value of F subsumes the value of F in B,*
- *Every reentrancy present in A is also present in B.*

Note that, as all atomic values are types, the distinction between complex and atomic values is no longer relevant. The unification of two typed feature structures is the most general typed feature structure subsumed by both feature structures, if such a structure exists.

The use of types can make it easier to grasp a grammar. In implementations, types can be used to facilitate grammar maintenance (for instance by detecting errors at compile time) and to improve processing speed. Finally, types can be used to express generalizations that may be hard to express in an untyped system.

For instance, to capture the agreement in Dutch singular NPs described in the previous section, one might eliminate the features GEN and DEF and instead use the type hierarchy in Figure 5 as potential values for a feature AGR. The most specific types in the hierarchy express combinations of the value for definiteness and gender. The definite determiners *de* and *het* would be [AGR *neut-def*] and [AGR *nneut-def*], respectively. The intermediate types express a value for either definiteness or gender. The indefinite determiner is specified as [AGR *indef*], for instance, while nouns are [AGR *neut*] or [AGR *nneut*]. The type *nneut-or-def*, finally, is added in order to be able to describe the agreement properties of an inflected adjective (*oude*). An uninflected adjective would be [AGR *neut-indef*]. Note that by providing a single lexical entry for inflected adjectives, the use of types captures a generalization that is missed in the untyped fragment in Figure 3.

Inheritance and Default Unification

Unification-based formalisms use unification to combine feature structures encoding linguistic properties. Unification is a monotonic operation in the sense that it combines information and can never change or remove feature values. Monotonicity is in general a property to be appreciated: it supports declarative interpretations and implementations of grammar formalisms. Certain linguistic phenomena, however, are more easily described using default mechanisms of various sorts. This holds for lexical information in particular, but defaults have also been used in syntax.

Unification-based frameworks tend to organize the lexicon using some form of inheritance. All verbs have certain properties in common (i.e., they are of category *verb*, they may combine with a subject and zero or more complements, etc.), and these properties should preferably be stated only once. The idea of inheritance is to define a class or type (i.e., *verbal-lexeme*) that states that any element in this class has to be of category *verb*, etc. A lexical item that is defined to be of class *verbal-lexeme* inherits all the properties defined for this class. Classes may inherit from more general classes. Thus, one might define a class *transitive-verb* that inherits from *verbal-lexeme*. A snapshot of a hypothetical lexical hierarchy is given in Figure 6. Note that classes are similar to types in the sense that they are both partially ordered and impose constraints on feature structures. The distinction between types and classes is therefore often conflated.

The *verbal-lexeme* class in Figure 6 states that a verb may combine with a subject whose NFORM is *norm*. This statement will rule out sentences in which a verb combines with expletives such as *there* or *it*. While the statement is true for the majority of verbs, an intransitive verb such as *rain* is exceptional in that it selects for expletive *it*. If inheritance is a default mechanism, one can define *rains* as inheriting from *intransitive-verb* with the exception of the value for NORM, which is explicitly assigned the value *it* in the lexical entry of *rain*. Similarly, there are verbs that take a clausal subject or object. Such verbs can share certain properties with either intransitive or transitive

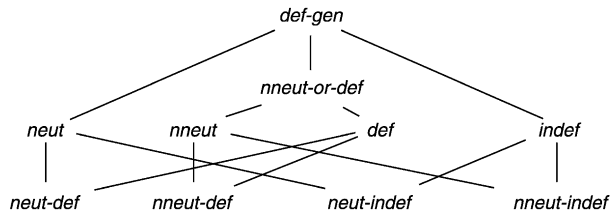

Figure 5 Type signature for agreement in Dutch NPs.

verbs. Thus, one might consider classifying them as either intransitive or transitive, but one must ensure at the same time that the value of ⟨SUBJ CAT⟩ or ⟨COMPS FIRST CAT⟩ is *s* instead of *np*.

It should be noticed that the feature structures in Figure 6 are artificially simple. Thus, while it may seem that in this case one could easily come up with an alternative hierarchy that is strictly monotonic, doing so will in general be harder for realistic examples. In that case, any attempt to encode a lexical hierarchy monotonically may lead to considerable reduplication of information.

The use of inheritance to capture generalizations is not restricted to the lexicon. HPSG, for instance, was originally seen as a theory that put strong emphasis on the lexicon while minimizing the number of phrase structure schemata. In more recent versions of this theory (Sag, 1997; Ginzburg and Sag, 2000), however, a substantial number of construction-specific phrase structure schemata are being used. Generalizations over various schemata are captured by means of inheritance.

A somewhat different reason for considering default mechanisms in syntax comes from observations concerning feature percolation. An important generalization about phrase structure rules is that the syntactic properties of a phrase are to a large extent determined by the syntactic properties of the head of that phrase. Authors differ, however, on whether this generalization is only a default (i.e., it holds for most syntactic properties and in most syntactic constructions, but exceptions exist) or a requirement that can be imposed without exception on a certain class of syntactic properties. In GPSG, for instance, the head-feature convention states that head features are identical on mother and head daughter unless there is information in the rule that contradicts this. Head features typically express morphosyntactic properties, such as agreement, case, verb form, etc. The head-feature principle of HPSG as formulated by Pollard and Sag (1994) states that the head features of the mother and head daughter in a rule are reentrant. This principle excludes any possibility of exceptions.

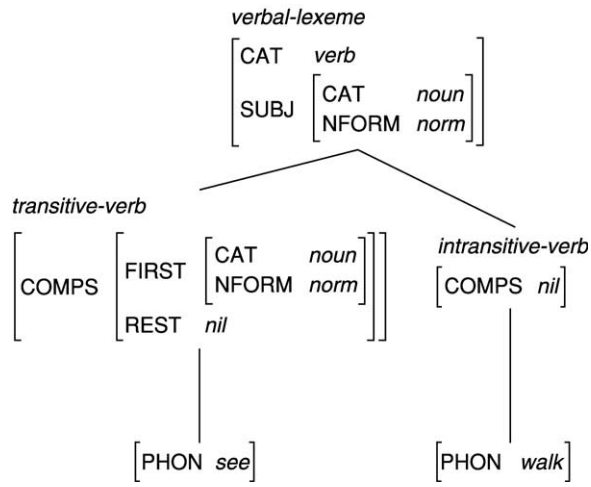

Figure 6 Fragment of a verbal lexical hierarchy.

The generalized head feature principle of Ginzburg and Sag (2000), finally, is again a default principle. Furthermore, it is no longer restricted to morphosyntactic information but applies to all syntactic and semantic information.

One might try to come up with specific operations on feature structures to implement the effects of default inheritance or the default interpretation of a head feature principle. It seems, however, that a more general solution can be found by extending the unification-based formalism with a nonmonotonic notion of unification. The specific mechanisms discussed above can ideally all be defined in terms of this general operation. Various proposals for a general default unification operation have been put forward. Bouma (1992) and Carpenter (1992b) both propose operations that nonmonotonically combine a feature structure D (contributing the default information) with a feature structure S (contributing strict information) in such a way that all information from S is preserved, as well as the information from D that is consistent with S. In terms of subsumption, one might define the default unification of D and S as the unification of D′ with S, where D′ is the maximally specific feature structure subsuming D and unifiable with S. Figure 7A illustrates default unification for a simple case not involving reentrancies, where we use $\sqcup!$ to denote the default unification operation.

Default unification of feature structures that do contain reentrancies is harder to define. Part of the problem is that there may be more than one way to generalize D to a feature structure D′ compatible with S. This is illustrated in Figure 7B. D in this case might be generalized in two different ways (i.e., by

$$\textbf{A}\quad D = \begin{bmatrix} \text{CASE} & \textit{nom} \\ \text{NFORM} & \textit{norm} \end{bmatrix} \qquad S = \begin{bmatrix} \text{NFORM} & \textit{it} \end{bmatrix}$$

$$D \sqcup\!! \, S = \begin{bmatrix} \text{CASE} & \textit{nom} \\ \text{NFORM} & \textit{it} \end{bmatrix}$$

$$\textbf{B}\quad D = \begin{bmatrix} \text{HEAD} & \boxed{1}\begin{bmatrix} \text{COMPL} & - \end{bmatrix} \\ \text{HD-DGHTR} & \begin{bmatrix} \text{HEAD} & \boxed{1} \end{bmatrix} \end{bmatrix} \qquad S = \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{COMPL} & + \end{bmatrix} \end{bmatrix}$$

$$\textbf{C}\quad D \sqcup\!! \, S = \begin{bmatrix} \text{HEAD} & \boxed{1}\begin{bmatrix} \text{COMPL} & + \end{bmatrix} \\ \text{HD-DGHTR} & \begin{bmatrix} \text{HEAD} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

$$\textbf{D}\quad D \sqcup\!! \, S = \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{COMPL} & + \end{bmatrix} \\ \text{HD-DGHTR} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{COMPL} & - \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Figure 7 Default unification examples.

removing [COMPL −] or by removing the reentrancy), leading to the result in Figure 7C and 7D, respectively. Carpenter's 'credulous default unification' (1992b) defines the result of default unification in such cases as a disjunction of possibilities. His 'skeptical default unification' defines the result as the maximal feature structure subsuming all the disjuncts obtained by 'credulous default unification.' Bouma's (1992) default unification does define D′ as the maximal specific generalization of D that does not contain paths with an atomic value or reentrant paths that are mentioned in S. In general, this suppresses more information from D than would be required by the consistency requirement. On the other hand, it does allow one to suppress information (i.e., to generalize a feature structure) by means of default unification. One application is the definition of auxiliary verbs in theories like HPSG. Auxiliaries may combine with any type of subject (i.e., normal and expletive NPs as well as sentential subjects) as long as they do so in accordance with the selection requirements of the main verb heading the VP selected by the auxiliary. This dependency is expressed by the provision of strict information that the value of SUBJ is reentrant with the SUBJ value of the VP-complement. Furthermore, the normal, default value for SUBJ is suppressed.

Following earlier work by Young and Rounds (1993), Lascarides *et al.* (1996) and Lascarides and Copestake (1999) developed a notion of default unification for typed feature structures. It differs from other proposals in that it assumes that certain feature values are explicitly marked as default values. Default unification of two feature structures may never lead to conflicts in the nondefault values and, for features with a default value, preserves the value provided by the feature structure with the most specific type.

Default unification is usually seen as a means to streamline the definition of grammars. It allows one to express generalizations over classes of lexical items or grammar rules, and at the same time it does not exclude the possibility of exceptions to these generalizations. The interaction between default and strict information in grammar definitions can be computed off-line. That is, once a definition is complete, all information associated with a lexical item or phrase structure rule can be computed. During processing, however, the distinction between default and strict information is no longer relevant, and only monotonic unification is used. The proposal by Lascarides and Copestake (1999) is more radical in that it assumes that the interaction between default and strict information is not necessarily restricted to the definitional stage but may be preserved during processing.

Open Problems and Alternatives

Unification-based grammars, and especially unification-based approaches to morphosyntactic phenomena, have impressive empirical coverage. This is not to say that there are no open problems, however. Ingria (1990) argued that a typical unification-based account of agreement and case assignment makes the wrong prediction in cases such as (2).

(2a)	*sie	findet	und	hilft
	she	*finds*(ACC)	*and*	*helps*(DAT)
		Männer/	Männern	
		men(ACC)	*men*(DAT)	
(2b)	er	findet	und	hilft
	he	*finds*(ACC)	*and*	*helps*(DAT)
		Frauen		
		women		
		(DAT/ACC)		

The ungrammaticality of example (2a) suggests that the case of the direct object must be compatible with the case requirements of both coordinated verbs. A unification-based account would predict this by simply unifying the case values of both verbs with that of the direct object. The grammaticality of (2b) suggests that this cannot be the full story, however. If the direct object neutralizes the distinction between ACC and DAT, the sentence is grammatical. This suggests that the relation between the case requirements of the verbs and the case value of the object should not be modeled in terms of unification.

Coordination of unlike categories, as in (3), poses another challenge for unification-based approaches.

(3) Kim became wealthy and a Republican

Coordination of an AP and an NP is allowed only if the result is selected by a head that may combine with either an AP or an NP. Bayer (1996) argued that unification-based accounts of this phenomenon make the wrong predictions in a number of cases and argues for an account based on the proof system of Lambek categorial grammar. Johnson (1999) argued for a reformulation of lexical functional grammar that is similar in spirit to the proposal of Bayer.

Conclusion

Unification-based approaches to syntax have given rise to a family of linguistic frameworks that combine formal and descriptive precision and have served as the basis of various large-scale grammar implementation efforts.

Unification-based approaches to phonology and morphology have been developed as well (see Bird, 1995 and Riehemann, 1998). The use of unification in semantics was initially seen as more problematic (Moore, 1989), but the recent interest in formalisms for underspecified semantics (starting with Reyle, 1993 and Alshawi and Crouch, 1992) is heavily influenced by techniques from unification-based grammar.

More recently, computational linguistics has started to investigate combinations of unification-based grammars with stochastic models (Abney, 1997; Geman and Johnson, 2002). Such models typically use frequencies derived from large (annotated or unannotated) corpora to estimate probabilities for parses produced by a (wide-coverage) unification-based grammar.

See also: Computational Lexicons and Dictionaries; Coordination; Declarative Models of Syntax; Head Feature Principle and Feature Distribution Constraints; Head-Driven Phrase Structure Grammar; Symbolic Computational Linguistics: Overview; Syntactic Features and Feature Structures; Unification: Computational Issues.

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Unification: Computational Issues

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Motivation

Early attempts to formally describe the structure of natural languages (Chomsky, 1956) resulted in the development of formal grammars, of which context-free grammars (CFGs) are a notable example. Context-free grammars, however, have been found inadequate for this purpose, not only because some natural languages are, apparently, beyond the expressive power of CFGs (Shieber, 1985; Manaster-Ramer, 1987), but also because CFGs do not provide sufficiently succinct descriptions of the phenomena linguists are usually interested in. The main drawback of CFGs (and other phrase-structure formalisms, including early incarnations of tree-adjoining grammars (Joshi *et al.*, 1975)) in this respect is that the symbols they manipulate are 'atomic,' with no inherent structure, whereas the linguistic entities that have to be modeled by them are inherently structured. For example, words have properties such as number, gender, tense or root; phrases are categorized and subcategorized; phonemes are described as sets of features; etc.

A natural way of extending phrase-structure grammars to rectify this problem is by incorporating 'properties' of symbols into the grammar, further specifying the crude categorial information. This is achieved by replacing the atomic symbols of CFGs by 'feature structures,' which provide a natural representation for the kind of linguistic information grammars specify. In this view, the lexicon associates with each word a set of feature structures, rather than a set of atomic terminal symbols, and grammar rules are defined over feature structures, rather than over atomic nonterminal symbols. With this extension, rule application has to be amended, too, and comparing two symbols cannot be simply reduced to identity checking, as is the case in CFGs. Rather, an information comparison and combination operation, 'unification,' is used to decide whether a rule can be applied to some form. This article defines feature structures (the second section), unification (the third section) and unification grammars (the fourth section) from a computational point of view. For a more linguistically oriented discussion of unification and default unification, refer to Bouma (**Unification, Classical and Default**).

The move from CFGs to unification grammars provides an additional dimension for linguistic generalizations. It facilitates the expression of linguistic constraints by means of a single rule, instead of a collection of 'similar' rules. More significantly, it also results in a dramatic increase in expressive power: the set of languages that can be defined by unification grammars is much larger than the set of context-free languages; in terms of the Chomsky (1956) hierarchy of languages, this is the set of recursively enumerable (type-0) languages. Consequently, computational processing of unification grammars is significantly less efficient than processing with CFGs. Some of these issues are discussed in the last section.

Feature Structures

Attribute-Value Matrices

Feature structures are graphically represented using a notation known as attribute-value matrices (AVMs). Such matrices list, within square brackets, a set of features, along with their values. Each 'row' in an AVM is a pair $\text{F} : v$, denoting that the feature F has the value v; the value can either be atomic or complex, in the form of another AVM. In addition, certain values can be associated with variables, which serve

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as pointers to the values. Variables are denoted by numeric indices enclosed in a square. These notions are further elaborated in this section.

An AVM is a syntactic object, which can be either atomic or a complex. Each AVM is associated with a variable, the idea being that two occurrences of the same variable denote one and the same value. An atomic feature structure is a variable, associated with an 'atom,' drawn from a fixed set ATOMS; these will usually be nonstructured linguistic notions such as singular, plural or accusative. A complex feature structure is a variable, associated with a finite, possibly empty set of pairs, where each pair consists of a feature and a value. Features are drawn from a fixed (per grammar), predefined set FEATS; values are, recursively, AVMs themselves. Thus, FEATS and ATOMS, as well as the (infinite) set of variables, are parameters for the collection of AVMs, and are referred to as the 'signature' over which feature structures are defined.

(1) In the following AVM, the set of variables includes $\boxed{3}$,$\boxed{5}$,$\boxed{6}$ and $\boxed{8}$. FEATS = {AGR, NUM, PERS} and ATOMS = {*pl, third*}.

$$\boxed{3}\begin{bmatrix}\text{AGR}: & \boxed{5}\begin{bmatrix}\text{NUM}: & \boxed{6}pl\\ \text{PERS}: & \boxed{8}third\end{bmatrix}\end{bmatrix}$$

Meta-variables F, G, H are used to range over FEATS and *A, B, C* to range over feature structures. If

$$A = \boxed{i_0}\begin{bmatrix}F_1: & \boxed{i_1}A_1\\ \vdots & \vdots\\ F_n: & \boxed{i_n}A_n\end{bmatrix}$$

is a complex feature structure then the 'domain' of A is $dom(A) = \{F_i \mid 1 \leq i \leq n\}$. When A is atomic, $dom(A)$ is undefined. A special case of a feature structure is the empty one, denoted [ ], whose domain is the empty set of features. Note that, $|dom(A)| = n$. That is, for every $1 \leq i, j \leq n$ such that $i \neq j$, $F_i \neq F_j$. This uniqueness of value assignment by A to each F_i (known also as the 'functional' character of feature structures) is very essential. In particular, the order of the 'rows' in an AVM is not important, and any permutation of this order will result in an identical AVM. The 'value' of a feature F_i in A is $val(A, F_i) = A_i$. If $F \notin dom(A)$ then $val(A, F)$ is undefined.

Since variables are used to denote value sharing, there is not much sense in associating the same variable with two different values. Therefore, an AVM is well formed if for every variable occurring in it, all its occurrences are associated with the same value.

(2) The following AVM, A, is well formed since both occurrences of $\boxed{1}$ are associated with the same value, *a*. B is not well formed due to the two incompatible assignments of $\boxed{1}$; C is not well formed because the values associated with $\boxed{1}$ are different:

$$A = \boxed{3}\begin{bmatrix}\text{F}: & \boxed{1}a\\ \text{G}: & \boxed{2}\begin{bmatrix}\text{H}: & \boxed{1}a\end{bmatrix}\end{bmatrix},\ B = \boxed{4}\begin{bmatrix}\text{F}: & \boxed{1}\begin{bmatrix}\text{H}: & \boxed{2}a\end{bmatrix}\\ \text{G}: & \boxed{1}b\end{bmatrix},$$

$$C = \boxed{3}\begin{bmatrix}\text{F}: & \boxed{1}\begin{bmatrix}\text{H}: & \boxed{4}a\end{bmatrix}\\ \text{G}: & \boxed{1}\begin{bmatrix}\text{K}: & \boxed{5}b\end{bmatrix}\end{bmatrix}$$

In the sequel, all AVMs are assumed to be well formed. Furthermore, since multiple occurrences of the same variable are always associated with the same values, only one instance of this value is explicated, leaving the other occurrences of the same variable unspecified. As another convention, whenever a variable is associated with the empty AVM, the AVM itself is omitted and only the variable is specified. Finally, if a variable occurs only once in an AVM, it is usually not depicted (as it carries no additional information).

(3) Consider the following feature structure, A:

$$\begin{bmatrix}\text{F}: & \boxed{3}a\\ \text{G}: & \boxed{4}\begin{bmatrix}\text{H}: & \boxed{3}a\end{bmatrix}\\ \text{H}: & \boxed{2}[\,]\end{bmatrix}$$

Notice that it is well formed, since the only variable occurring more than once ($\boxed{3}$) is associated with the same value (*a*) in both its occurrences. Therefore, one occurrence of the value can be left explicit, yielding:

$$\begin{bmatrix}\text{F}: & \boxed{3}\\ \text{G}: & \boxed{4}\begin{bmatrix}\text{H}: & \boxed{3}a\end{bmatrix}\\ \text{H}: & \boxed{2}[\,]\end{bmatrix}$$

Next, the tag $\boxed{2}$ is associated with the empty feature structure, which can be omitted:

$$\begin{bmatrix}\text{F}: & \boxed{3}\\ \text{G}: & \boxed{4}\begin{bmatrix}\text{H}: & \boxed{3}a\end{bmatrix}\\ \text{H}: & \boxed{2}[\,]\end{bmatrix}$$

Finally, the tag $\boxed{4}$ occurs only once, so it can be omitted:

$$\begin{bmatrix} \text{F}: & \boxed{3} \\ \text{G}: & \begin{bmatrix} \text{H}: & \boxed{3}a \end{bmatrix} \\ \text{H}: & \boxed{2} \end{bmatrix}$$

A 'path' is a (possibly empty) sequence of features that can be used to pick a value in a feature structure. Angular brackets '$\langle \ldots \rangle$' are used to depict paths explicitly. For example, in the AVM A of example (3), the single feature $\langle$F$\rangle$ constitutes a path; and so does the sequence $\langle$G,H$\rangle$, since $\langle$G$\rangle$ can be used to pick the value $\begin{bmatrix} \text{H}: & \boxed{3}a \end{bmatrix}$ (because $val(A, \text{G}) = \begin{bmatrix} \text{H}: & \boxed{3}a \end{bmatrix}$). In more complex AVMs, with deeper levels of embedding, longer paths can be used recursively to reach more deeply nested features. The set of all the paths of A is denoted $\Pi(A)$.

The notion of values is extended from features to paths: $val(A, \pi)$ is the value obtained by following the path π in A; this value (if defined) is again a feature structure. If A_i is the value of some path π in A then A_i is said to be a *sub-AVM* of A. The empty path is denoted ε, and $val(A, \varepsilon) = A$ for every feature structure A.

(4) Let $A = \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & pl \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix}$

Then $dom(A) = \{\text{AGR}\}$, and

$$val(\text{A}, \text{AGR}) = \begin{bmatrix} \text{NUM}: & pl \\ \text{PERS}: & third \end{bmatrix}$$

The paths of A are $\prod(A) = \{\varepsilon, \langle\text{AGR}\rangle, \langle\text{AGR, NUM}\rangle, \langle\text{AGR, PERS}\rangle\}$. The values of these paths are: $val(A, \varepsilon) = A$, $val(A, \langle\text{AGR,NUM}\rangle) = pl$, $val(A, \langle\text{AGR,PERS}\rangle) = third$. Since there is no path $\langle\text{NUM,AGR}\rangle$ in A, $val(A, \langle\text{NUM,AGR}\rangle)$ is undefined.

When two paths in an AVM lead to sub-AVMs that are associated with the same variable, the paths are said to be reentrant; reentrancy in some feature structure A is denoted by the symbol '$\underset{\sim}{A}$.' For example, in the feature structure

$$A_3 = \begin{bmatrix} \text{SUBJ}: & \begin{bmatrix} \text{AGR}: & \boxed{1}\begin{bmatrix} \text{NUM}: & plural \end{bmatrix} \end{bmatrix} \\ \text{OBJ}: & \begin{bmatrix} \text{AGR}: & \boxed{1} \end{bmatrix} \end{bmatrix}$$

the paths $\langle$SUBJ, AGR$\rangle$ and $\langle$OBJ, AGR$\rangle$ are reentrant, that is, $\langle$SUBJ, AGR$\rangle$ $\underset{\sim}{A}$ $\langle$OBJ, AGR$\rangle$. The distinction between 'being the same entity,' or being identical, and being 'similar but distinct' entities, is referred to in the literature as the distinction between 'token identity' and 'type identity,' respectively.

(5) Consider the following feature structure:

$$A = \begin{bmatrix} \text{SUBJ}: & \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \\ \text{OBJ}: & \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

In A, the features SUBJ and OBJ have equal, but not token-identical, values. In contrast, consider the following AVM:

$$B = \begin{bmatrix} \text{SUBJ}: & \boxed{4}\begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \\ \text{OBJ}: & \boxed{4} \end{bmatrix}$$

In B, the values of SUBJ and OBJ are not only type-identical, they are also token-identical; in effect, there is only one and the same value shared by both features in B. The two features simply 'point' to this one value, in much the same way as pointers in programming languages might be set to refer to the same location in memory.

An important consequence of token identity is the following: if the value of one of two features having a shared value is modified, this modification is immediately 'sensed' by the other feature and its value also changes to the same new value. This is demonstrated in example (6).

(6) Consider again the following feature structures:

$$A = \begin{bmatrix} \text{SUBJ}: & \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \\ \text{OBJ}: & \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

$$B = \begin{bmatrix} \text{SUBJ}: & \boxed{4}\begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \\ \text{OBJ}: & \boxed{4} \end{bmatrix}$$

Observe that $val(A, \text{SUBJ}) = val(A, \text{OBJ})$ and $val(B, \text{SUBJ}) = val(B, \text{OBJ})$. However, while $val(B, \text{SUBJ})$ and

val(*B*, OBJ) are token-identical, this is not the case for *A: val*(*A*, SUBJ) and *val*(*A*, OBJ) are only type-identical. Suppose that by some action (as shown below), a feature CASE with the value nom is added to the value of SUBJ in both *A* and *B*. The outcome of such an operation has different effects on the two feature structures. In *A*, it will result in:

$$A' = \begin{bmatrix} \text{SUBJ}: & \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \\ \text{CASE}: & nom \end{bmatrix} \\ \text{OBJ}: & \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & pl \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

In particular, note that *val*(*A*', SUBJ) $\neq$ *val*(*A*', OBJ). However, in *B* the effect would be:

$$B' = \begin{bmatrix} \text{SUBJ}: & \boxed{4} \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \\ \text{CASE}: & nom \end{bmatrix} \\ \text{OBJ}: & \boxed{4} \end{bmatrix}$$

Here, *val*(*B*', SUBJ) and *val*(*B*', OBJ) are token-identical, implying *val*(*B*', SUBJ) = *val*(*B*', OBJ). Since the values are token identical, the operation has affect over the two reentrant features.

Unification-based theories of language make extensive use of reentrancy to encode grammatical relations. In fact, it is instructive to think of re-entrancies as the unification equivalent of 'movement' in generative linguistics. Feature structures can be arbitrarily complex, and by sharing a single value between two distinct paths, a theory can express the notion of this value being 'moved' from the end of one path to the end of another. However, there is no notion of direction for such movement: the shared value is the common value of both paths, symmetrically.

A special case of reentrancy is 'cyclicity': an AVM can contain a path whose value is the AVM itself. In other words, an AVM can be reentrant with a substructure of itself:

$$A = \begin{bmatrix} \text{F}: & \boxed{2} \begin{bmatrix} \text{G}: & a \\ \text{H}: & \boxed{2} \end{bmatrix} \end{bmatrix}$$

Notice that, in the face of cycles there is no way to fully depict (in some finite way) an AVM, unless the convention of omitting multiple occurrences of shared values is adopted (as above).

Feature Graphs

AVMs are the common representation of feature structures in the linguistic literature. To model AVMs computationally, a graph representation, called 'feature graphs,' is used. Feature graphs are defined over a signature consisting of fixed, nonempty, finite, disjoint sets FEATS of features and ATOMS of atoms, as before.

A feature graph $A = \langle Q_A, \bar{q}_A, \delta_A, \theta_A \rangle$ is a finite, directed, connected, labeled graph consisting of a finite, nonempty set of nodes Q_A (such that $Q_A \cap \text{FEATS} = Q_A \cap \text{ATOMS} = \emptyset$), a root $\bar{q}_A \in Q_A$, a partial function $\delta_A : Q_A \times \text{FEATS} \rightarrow Q_A$ specifying the arcs such that every node $q \in Q_A$ is accessible from $\bar{q}_A$, and a partial function, marking some of the sinks: $\theta_A : Q_S \rightarrow \text{ATOMS}$, where $Q_S = \{q \in Q_A \mid \delta_A\ (q, \text{F})$ is undefined for every $\text{F}\}$. The arcs of a feature graph are thus labeled by features. The root is a designated node from which all other nodes are accessible (through δ); note that nothing prevents the root from having incoming arcs. Sink nodes (nodes with no outgoing edges) can be marked by an atom, but can also be unmarked.

How are the graphs defined above related to the AVMs presented in the previous section? Informally, atomic AVMs are modeled by single nodes, labeled by the atom, with no outgoing arcs. Empty AVMs are modeled by a graph having just one node, bearing no label and having no outgoing features. Complex AVMs denote graphs whose nodes, including the root, may have outgoing arcs, where the arcs' labels correspond to features. The following example depicts both the AVM and the graph representations of feature graphs, where the root is depicted as a gray-colored node.

(7) Consider the AVM A of example (4), repeated here for convenience. A is modeled by the following graph:

$$\begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & pl \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix}$$

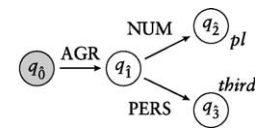

The graph displayed above is $\langle Q, \bar{q}, \delta, \theta \rangle$, *where* $Q = \{q_0, q_1, q_2, q_3\}$, $\bar{q} = q_0$, $\delta(q_0, \text{AGR}) = q_1$, $\delta(q_1, \text{NUM}) = q_2$, $\delta(q_1, \text{PERS}) = q_3$, $Q_S = \{q_2, q_3\}$, $\theta(q_2) = pl$, $\theta\ (q_3) = third$.

In the following graph, the values of the features NUM and PERS are unspecified. This is reflected in the graph by having the leaves q_2 and q_3 bear no marking; in other words, the marking function θ is undefined for the two sinks in its domain.

$$\begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & [\,] \\ \text{PERS}: & [\,] \end{bmatrix} \end{bmatrix}$$

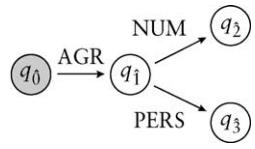

The graph displayed above is $\langle Q, \bar{q}, \delta, \theta \rangle$, *where* $Q = \{q_0, q_1, q_2, q_3\}$, $\bar{q} = q_0$, $\delta(q_0, \text{AGR}) = q_1$, $\delta(q_1, \text{NUM}) = q_2$, $\delta(q_1, \text{PERS}) = q_3$, $Q_S = \{q_2, q_3\}$, and θ is undefined for its entire domain.

Feature Structures

Since feature graphs are simply a special case of directed, labeled graphs, the well-defined notion of graph 'isomorphism' can be adapted to feature graphs. Informally, two graphs are isomorphic when they have the same structure; the identities of their nodes may differ without affecting the structure. In the case of feature graphs, the labels of sink nodes are also required to be identical in order for two graphs to be considered isomorphic.

Two feature graphs $A = \langle Q_A, \bar{q}_A, \delta_A, \theta_A \rangle$ and $B = \langle Q_B, \bar{q}_B, \delta_B, \theta_B \rangle$ are isomorphic, denoted $A \sim B$, iff there exists a one-to-one mapping $i : Q_A \rightarrow Q_B$, called an isomorphism, such that:

- $i(\bar{q}_A) = \bar{q}_B$;
- for all $q_1, q_2 \in Q_A$ and $f \in \text{FEATS}$, $\delta_A\ (q_1, f) = q_2$ iff $\delta_B\ (i(q_1), f) = i(q_2)$; and
- for all $q \in Q_A$, $\theta_A(q) = \theta_B(i(q))$ (either both are undefined, or both are defined and equal).

Given a feature graph A, a feature structure $\hat{A}$ is the equivalence class of all the feature graphs that are isomorphic to A: $[A]\sim$.

The definition of feature structures as equivalence classes of isomorphic feature graphs calls for a natural lifting of some properties of feature graphs to feature structures. This can be naturally achieved since if $\hat{A}$ is a feature structure and $A \in \hat{A}$, $B \in \hat{A}$ are two isomorphic feature graphs in $\hat{A}$, then

- $\Pi(A) = \Pi(B)$
- for each $\pi \in \Pi(A)$, $val(A, \pi) \sim val(B, \pi)$
- for each $\pi_1, \pi_2 \in \Pi(A)$, $\pi_1 \underset{A}{\leftrightsquigarrow} \pi_2$ iff $\pi_1 \underset{B}{\leftrightsquigarrow} \pi_2$ (and, therefore, A is reentrant/cyclic iff B is reentrant/cyclic).

This facilitates a view of feature structures as graphs, abstracting over the identities of the nodes. Such concepts are sometimes known as 'abstract feature structures' in the literature.

The terms 'AVM' and 'feature structure' are used interchangeably in the rest of this article. Feature structures are reminiscent of first-order terms (FOTs), familiar from logic and in particular logic programming. There are, however, significant differences. First and foremost, FOTs are essentially trees, with possibly shared leaves, whereas feature structures allow reentrancies to occur in every level of the structure. Feature structures can be cyclic, in contrast to (ordinary) FOTs. FOTs use positional encoding of argument structures, with no features. Finally, two FOTs are unifiable only if they have the same functor and the same arity, while two feature structures might be unifiable even if they have different numbers of features, see 'Subsumption and Unification.' The relationships between feature structures and first-order terms is investigated by Penn (2000). A mathematical characterization of feature structures and a discussion of their properties can be found in, e.g., Johnson (1988) or Shieber (1992).

Typed Feature Structures

An additional dimension through which linguistic generalizations can be expressed is obtained by introducing 'typing' to feature structures. The motivation for typing stems from the observation that certain features are more appropriate to some feature structures than to others. For example, consider the two AVMs below:

$$A = \begin{bmatrix} \text{CAT}: & v \\ \text{SUBCAT}: & elist \\ \text{AGR}: & \begin{bmatrix} \text{NUM}: & pl \\ \text{PERS}: & 3rd \end{bmatrix} \end{bmatrix}, \qquad B = \begin{bmatrix} \text{NUM}: & pl \\ \text{PERS}: & 3rd \end{bmatrix}$$

In neither of these structures is the feature GENDER defined, but this feature is certainly more appropriate for B than for the top level of A (although adding it to the AVM that is the value of AGR in A **is** natural). Informally, one would like to claim that the feature GENDER is appropriate for feature structures that model agreement properties (such as B or $val(A, \text{AGR})$ above), but not for feature structures that model signs (such as A). This is not a mathematical claim; it is a claim concerning the intended interpretation of feature structures. To formalize this notion, feature structures are classified, and the names of classes are called types (sometimes referred to as 'sorts'). When each feature structure is associated with a certain type, it becomes possible to define what features are appropriate for a given type, t; these features will be appropriate for every feature structure of type t. For example, the feature structure A above can be assigned the type *sign*, as it represents a linguistic sign; whereas the feature structure B can be assigned the type *agr*, to indicate the fact that it is a collection of agreement features. Now the feature GENDER could be defined as appropriate for the type *agr* but not for the type *sign*.

The move to typed feature structures necessitates an extension of the signature over which feature structures are defined: in addition to the set FEATS of features, a (finite) set TYPES of types is required. Incidentally, the introduction of types renders the set of atoms, ATOMS, redundant, as atoms can be represented using types.

Once types and feature appropriateness are introduced, it is possible to extend their use: it should be clear that for different features, different types of values are appropriate. For example, the feature AGR must be restricted to bear only values of the type *agr*; whereas for the feature GENDER, for example, such values must not be appropriate. Furthermore, a typed system can include a mechanism for **forcing** the occurrence of a certain feature in a TFS, not just for **allowing** it.

As mentioned above, types can be viewed as naming classes of feature structures; a natural outcome of this view is the imposing of 'order' on types, to reflect the natural set inclusion order on sets of feature structures (of those types). It is possible to extend appropriateness to respect this order, such that if a feature is appropriate for a type, it is also appropriate for all its subtypes.

A typed system allows the grammar designer to impose restrictions on feature structures that reflect real-world or linguistic constraints. It enables better generalizations to be stipulated as it gives the grammar writer an additional dimension in which to state such generalizations: linguistic constraints can be defined in terms of types rather than in terms of features. For example, most of the 'rules' of the linguistic theory HPSG are stipulated as constraints on types: if a feature structure is of a certain type, then certain constraints must hold.

While the use of types in linguistic theories is primarily motivated by linguistic considerations, there are several additional, mathematical and computational, advantages to their use. The incorporation of types into programming languages has become the standard. Types provide means for several compile-time and run-time errors to be detected. They allow – in particular when combined with appropriateness – for several optimizations in implementations of feature structure-based formalisms, resulting in more efficient processing. Finally, as in programming languages, the use of types aids in grammar organization and modularization. For simplicity, however, the rest of this article discusses untyped feature structures only.

Linguistic motivation for the use of typed AVMs is first given by Aït-Kaci (1984), who also provides mathematical and computational motivation for using types. This work influenced the development of the linguistic theory Head-Drive Phrase-Structure grammars (HPSG) (Pollard and Sag, 1987, 1994), which remains the main theory that employs TFSs. TFSs are directly defined also by Moshier (1988), and a view of TFSs as a generalization of first-order terms is presented in Carpenter (1991). A logical formulation of TFSs, starting in the basic notions and ending in a complete characterization of TFS-based grammars and their languages, is given by Carpenter (1992). Wintner and Sarkar (2002) show how typing can be beneficial even for systems that employ untyped feature structures.

Subsumption and Unification

Subsumption

Feature structures are used to represent linguistic information, and the amount of information stored within different feature structures can be compared, thus inducing a natural (partial) order on the structures. This relation is called 'subsumption' and is denoted '$\sqsubseteq$.' If A and B are feature structures over the same signature, then A *subsumes* B ($A \sqsubseteq B$; also, A is more general than B, and B is *subsumed by*, or is more specific than, A) if the following conditions hold:

1. if A is an atomic AVM then B is an atomic AVM with the same atom;
2. for every $\text{F} \in \text{FEATS}$, if $\text{F} \in dom(A)$ then $\text{F} \in dom(B)$, and $val(A, \text{F})$ subsumes $val(B, \text{F})$; and
3. if two paths are reentrant in A, they are also reentrant in B: if $\pi_1 \underset{\leftrightsquigarrow}{A} \pi_2$ then $\pi_1 \underset{\leftrightsquigarrow}{B} \pi_2$.

The second condition of the definition is recursive; the recursion ends when an empty value or an atomic value is encountered. Note, the direction of the ordering: greater structures are more specific, i.e., contain more information. This extra information can be manifested as additional features having a defined value, or more specific values for an existing feature, or more reentrancies.

(8) The empty feature structure, [ ], is the most general feature structure, subsuming all others, including atoms (as it encodes no information at all). Since it contains no features (and, hence, no paths), it satisfies the conditions of the subsumption definition vacuously. In particular, it subsumes a feature structure that determines the value of the NUM feature to be *sg*:

$$[\,] \sqsubseteq \begin{bmatrix} \text{NUM}: & sg \end{bmatrix}$$

In the same way,

$$\begin{bmatrix} \text{NUM}: & [\,] \end{bmatrix} \sqsubseteq \begin{bmatrix} \text{NUM}: & sg \end{bmatrix}$$

since the empty feature structure subsumes the atomic feature structure *sg*.

Adding more information, say, about the PERSON feature, results in a more specific feature structure:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \sqsubseteq \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix}$$

Another way to add information is through reentrancies:

$$\begin{bmatrix} \text{NUM1}: & sg \\ \text{NUM2}: & sg \end{bmatrix} \sqsubseteq \begin{bmatrix} \text{NUM1}: & \boxed{1}sg \\ \text{NUM2}: & \boxed{1} \end{bmatrix}$$

Subsumption is a partial relation: not every pair of feature structures is comparable. For example, it is impossible to say which of the following feature structures encodes more information:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \begin{matrix} \not\sqsubseteq \\ \not\sqsupseteq \end{matrix} \begin{bmatrix} \text{NUM}: & pl \end{bmatrix}$$

A different case of incomparability is caused by the existence of different features in the two structures. Since each of the AVMs in the following example has a feature that is not defined in the other, none is more specific than the other:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \begin{matrix} \not\sqsubseteq \\ \not\sqsupseteq \end{matrix} \begin{bmatrix} \text{PERS}: & third \end{bmatrix}$$

While subsumption informally encodes an order of information content among AVMs, sometimes the informal notion can be misleading. For example, the following two AVMs informally encode the same information, pertaining to the agreement features of some entity; formally, however, neither subsumes the other.

$$\begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \begin{matrix} \not\sqsubseteq \\ \not\sqsupseteq \end{matrix} \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix}$$

Subsumption has the following properties:

- Least element: the empty feature structure subsumes every feature structure: for every feature structure A, $[\,] \sqsubseteq A$.
- Reflexivity: for every feature structure A, $A \sqsubseteq A$.
- Transitivity: If $A \sqsubseteq B$ and $B \sqsubseteq C$ than $A \sqsubseteq C$.
- Antisymmetry: If $A \sqsubseteq B$ and $B \sqsubseteq A$ then $A = B$.

Since subsumption is a partial, reflexive, transitive, and antisymmetric relation, it is a partial order.

It is possible to define subsumption directly in terms of feature graphs. Let $A_1 = \langle Q_1, \bar{q}_1, \delta_1, \theta_1 \rangle$ and $A_2 = \langle Q_2, \bar{q}_2, \delta_2, \theta_2 \rangle$ be two feature graphs. A_1 subsumes A_2 (denoted by $A_1 \sqsubseteq A_2$) iff there exists a total function $h : Q_1 \rightarrow Q_2$, called a subsumption morphism, such that:

- $h(\bar{q}1) = \bar{q}_2$
- for every $q \in Q_1$ and for every F such that $\delta_1(q, \text{F})$ is defined, $h(\delta_1(q, \text{F})) = \delta_2(h(q), \text{F})$
- for every $q \in Q_1$, if $\theta_1(q)$ is defined then $\theta_1(q) = \theta_2(h(q))$

The morphism h associates with every node in Q_1 a node in Q_2; if an arc labeled F connects q with q', then such an arc connects $h(q)$ with $h(q')$. In other words, δ and h 'commute.' In addition, if a node $q \in Q_1$ is marked by an atom, then its image $h(q)$ must be marked by the same atom (recall that only sinks can be thus marked). Note that, if a sink in Q_1 is **not** marked, there is no constraint on its image (in particular, it can be a nonsink).

Unification

Motivated by the view of feature structures as representing information, it is useful to have an operation that combines, whenever possible, the information that is encoded in two feature structures. The unification operation, denoted '$\sqcup$,' is defined over pairs of feature structures, and yields the most general feature structure that is more specific than both operands, if one exists: $A = B \sqcup C$ if and only if A is the most general feature structure such that $B \sqsubseteq A$ and $C \sqsubseteq A$. If such a structure exists, the unification succeeds, and the two arguments are said to be unifiable (or consistent). If none exists, the unification fails, and the operands are said to be inconsistent (denoted $B \sqcup C = \top$). In terms of the subsumption ordering, nonfailing unification returns the least upper bound (*lub*) of its arguments. Example (9) sheds light on different aspects of the unification operation.

(9) Unification combines consistent information:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \sqcup \begin{bmatrix} \text{PERS}: & third \end{bmatrix} = \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix}$$

Different atoms are inconsistent:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \sqcup \begin{bmatrix} \text{NUM}: & pl \end{bmatrix} = \top$$

Atoms and nonatoms are inconsistent:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \sqcup pl = \top$$

Unification is absorbing:

$$\begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \sqcup \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} = \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix}$$

Empty feature structures are identity elements:

$$[] \sqcup \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \end{bmatrix} = \begin{bmatrix} \text{AGR}: & \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \end{bmatrix}$$

Reentrancy causes two consistent values to coincide:

$$\begin{bmatrix} \text{F}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \\ \text{G}: & \end{bmatrix} \sqcup \begin{bmatrix} \text{F}: & \boxed{1} \\ \text{G}: & \boxed{1} \end{bmatrix} \quad \begin{bmatrix} \text{F}: & \boxed{1} \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \\ \text{G}: & \boxed{1} \end{bmatrix}$$

Unification acts differently depending on whether the values are equal:

$$\begin{bmatrix} \text{F}: & \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \\ \text{G}: & \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \end{bmatrix} \sqcup \begin{bmatrix} \text{F}: & \begin{bmatrix} \text{PERS}: & third \end{bmatrix} \end{bmatrix} = \begin{bmatrix} \text{F}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \\ \text{G}: & \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \end{bmatrix}$$

. . . or identical:

$$\begin{bmatrix} \text{F}: & \boxed{1} \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \\ \text{G}: & \boxed{1} \end{bmatrix} \sqcup \begin{bmatrix} \text{F}: & \begin{bmatrix} \text{PERS}: & third \end{bmatrix} \end{bmatrix} = \begin{bmatrix} \text{F}: & \boxed{1} \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \\ \text{G}: & \boxed{1} \end{bmatrix}$$

One of the properties of unification is that it binds variables together. When two feature structures are unified, and each of them is associated with some variable, then the two variables are said to be bound to each other, which means that they both share one and the same value (the result of the unification). For all practical purposes, this is equivalent to there being only a single variable. However, the scope of the variables must be taken into account: all other occurrences of the same variables in this scope are effected. As an example, consider the following two feature structures A and B:

$$A = \begin{bmatrix} \text{F}: & \boxed{1} \begin{bmatrix} \text{NUM}: & sg \end{bmatrix} \end{bmatrix} \qquad B = \begin{bmatrix} \text{F}: & \boxed{2} \begin{bmatrix} \text{PERS}: & third \end{bmatrix} \end{bmatrix}$$

When unifying A and B, the result obtained is:

$$A \sqcup B = \begin{bmatrix} \text{F}: & \boxed{1}\boxed{2} \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix}$$

Of course, since the variables $\boxed{1}$ and $\boxed{2}$ occur nowhere else, they can be simply omitted and the result is equal to:

$$A \sqcup B = \begin{bmatrix} \text{F}: & \begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix} \end{bmatrix}$$

However, had either $\boxed{1}$ or occurred elsewhere (for example, as the value of some feature G in A), their values would have been modified as a result of the unification. Consider the following example:

$$\begin{bmatrix} \text{F}: & \boxed{1} \begin{bmatrix} \text{NUM}: sg \end{bmatrix} \\ \text{G}: & \boxed{1} \end{bmatrix} \sqcup \begin{bmatrix} \text{F}: & \boxed{2} \begin{bmatrix} \text{PERS}: third \end{bmatrix} \end{bmatrix} = \begin{bmatrix} \text{F}: & \boxed{3} \begin{bmatrix} \text{NUM}: sg \\ \text{PERS}: third \end{bmatrix} \\ \text{G}: & \boxed{3} \end{bmatrix}$$

The (recursive) unification of the values of the feature F in both operands causes the variables $\boxed{1}$ and $\boxed{2}$ to be bound to each other. The AVMs these variables are associated with are unified, yielding the following AVM:

$$\begin{bmatrix} \text{NUM}: & sg \\ \text{PERS}: & third \end{bmatrix}$$

Then, a fresh variable can be associated with the above AVM in the result.

Properties of unification include:

- Idempotency: $A \sqcup A = A$
- Commutativity: $A \sqcup B = B \sqcup A$
- Associativity: $A \sqcup (B \sqcup C) = (A \sqcup B) \sqcup C$
- Absorption: If $A \sqsubseteq B$ then $A \sqcup B = B$
- Monotonicity: If $A \sqsubseteq B$ then for every C, $A \sqcup C \sqsubseteq B \sqcup C$ (if both exist).

The unification operation was originally defined for first-order terms by Robinson (1965). A variety of algorithms for term unification have since been presented, among which the most popular is that of Martelli and Montanari (1982), extended to cyclic terms by Jaffar (1984). The origin of graph unification can be attributed to Kay (1985), while the general unification algorithms were adapted for feature structures by Aït-Kaci (1984) and Moshier (1988). There is an important difference between the FOT unification and feature structure unification: an FOT is said to be 'ground' if no further unifications can change its value. There is no real equivalent to the concept of groundness for nonatomic feature structures, since unifications can **always** add new features to a structure (unless it is atomic). Another important

difference between FOTs and feature structures has to do with the result of the unification operation. For FOTs, unification results in a substitution, which when applied to both unificands, yields the same FOT. In feature structures, however, unification returns a new feature structure – as if the substitution has already been applied to one of the unificands. In fact, there is no clear analog to the notion of substitution in the domain of feature structures.

Unification Grammars

AVMs were introduced above as a means of extending atomic symbols (such as terminal and nonterminal symbols of a context-free grammar) with structural (linguistic) information. In the same vein, it is possible to extend AVMs to sequences thereof, called *multi-AVMs* below, thereby defining an equivalent of phrase-structure rules over feature structures. *Multi-AVMs* were used implicitly in many implementations of unification-based grammars, but their formal definition (Sikkel, 1997), as well as a discussion of their mathematical properties (Wintner and Francez, 1995; Wintner, 1997), was done much later.

Multi-AVMs can be viewed as sequences of AVMs, with the important observation that some substructures can be shared among two or more AVMs. In other words, the scope of variables is extended from a single AVM to a *multi-AVM*: the same variable can be associated with two substructures of different AVMs. An immediate consequence is that if some substructure of an element on a *multi-AVM* (that is, a substructure of some AVM in it) is modified, this modification might effect other AVMs in the same 'sequence.' The *length* of a *multi-AVM* is the number of its elements. Meta-variables σ, ρ range over *multi-AVMs*.

(10) Following is a *multi-AVM* of length 3:

$$\begin{bmatrix} \text{CAT}: & np \\ \text{AGR}: & \boxed{1} \end{bmatrix} \begin{bmatrix} \text{CAT}: & d \\ \text{AGR}: & \boxed{1} \end{bmatrix} \begin{bmatrix} \text{CAT}: & n \\ \text{AGR}: & \boxed{1} \end{bmatrix}$$

In this example, the feature CAT is used for encoding the category of a constituent. Its values, drawn from the set ATOMS, correspond to the familiar nonterminal symbols of CFGs. The feature AGR encodes a bundle of agreement features, whichever features the determiner and the noun must agree on. The (single) value of the three AGR features is shared among the determiner, the noun, and the noun phrase.

In a unification grammar, rules are expressed as *multi-AVMs*. The *multi-AVM* of example (10) can be viewed as a rule that forms noun phrases by combining a determiner with a noun, imposing agreement between the two daughters. Furthermore, the concept of derivation and, subsequently, language of unification grammars is defined in terms of *multi-AVMs*. As shown below, derivations are manipulations of *multi-AVMs*, *forms*, obtained by successively applying grammar rules.

Note the interpretation of agreement emerging from example (10). Agreement is viewed as a bundle of features that are constrained in two (or more) independent ways, which have to be mutually compatible. Thus, the object that is the value of $\boxed{1}$ in the above example is constrained independently by the '*D*-subtree' and the '*N*-subtree,' and the rule imposes identical resulting values. This view should be contrasted with another, more 'directional,' view of agreement, according to which there is one phrase that determines the value of the bundle of features in question, while a second phrase accommodates these values. The undirectional view of agreement is a typical view of unification-based grammar formalisms, which have a constraint satisfaction view in general, in which undirectionality is inherent. In contrast, transformation-based linguistic theories employ an essential concept of movement that is inherently directional.

The notion of subsumption can be naturally extended from AVMs to *multi-AVMs*: if σ and ρ are two *multi-AVMs* of the same length, n, then $\sigma \sqsubseteq \rho$ if the following conditions hold:

1. every element of σ subsumes the corresponding element of ρ; and
2. if two paths are reentrant in σ, they are also reentrant in ρ.

Note that the second condition refers to reentrancies that possibly relate paths originating in different elements of each *multi-AVM*.

(11) Let σ be the *multi-AVM*:

$$\begin{bmatrix} \text{F}: & \begin{bmatrix} \text{G}: & a \\ \text{H}: & \boxed{1} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \text{G}: & c \end{bmatrix} \begin{bmatrix} \text{F}: & \begin{bmatrix} \text{H}: & v \\ \text{G}: & \boxed{1}d \end{bmatrix} \\ \text{H}: & a \end{bmatrix}$$

and ρ be:

$$\begin{bmatrix} \text{F}: & \begin{bmatrix} \text{G}: & a \\ \text{H}: & d \end{bmatrix} \end{bmatrix} \begin{bmatrix} \text{G}: & c \end{bmatrix} \begin{bmatrix} \text{F}: & \begin{bmatrix} \text{H}: & b \\ \text{G}: & d \end{bmatrix} \\ \text{H}: & a \end{bmatrix}$$

Then σ does not subsume ρ, but $\rho \sqsubseteq \sigma$. This is because of the reentrancy between the values $val(\sigma, 1, \langle F,H \rangle)$ and $val(\sigma,3,\langle F,G \rangle)$; This constraint does not occur in ρ, contributing to ρ's being more general (less specific).

In the same way, the notion of unification can be extended to *multi-AVMs* (of the same length): ρ is the unification of σ_1 and σ_2 (denoted $\rho = \sigma_1 \sqcup \sigma_2$) if σ_1, σ_2, and ρ are of the same length, and ρ is the most general *multi-AVM* that is more specific than both σ_1 and σ_2.

A different unification operation on *multi-AVMs*, *unification in context*, unifies an element of one *multi-AVM* with an element of the other, resulting in possible modifications to both operands. Informally, the two AVMs (associated with the head of some rule and with the selected element in some form) are unified in their respective contexts: the body of the rule and the entire form. When some variable $\boxed{1}$ in the form is unified with some variable $\boxed{2}$ in the rule, all occurrences $\boxed{1}$ of in the form and of $\boxed{2}$ in the rule are modified: they are all set to the unified value. Note, however, that while the rule can be affected by the unification operation, it is only an instance of the rule that is used for each derivation step; derivation cannot alter the grammar itself.

A unification grammar consists of a set of rules, each of which is a *multi-AVM*; a lexicon, which associates a set of AVMs with each word; and a start symbol, which is an AVM. Rules are applied successively on forms, which are themselves *multi-AVMs*, starting with the form that consists of the start symbol only. *Derivation* is a binary relation over forms. Let σ be a form and ρ a grammar rule; application of ρ to σ consists of the following steps:

- Matching the rule's head with some element of the form, the *selected element*;
- Replacing the selected element in the form with the body of the rule, producing a new form.

This process is more involved than CFG derivation due to the presence of feature structures. Matching consists of unifying the head of the rule with the selected element; the rule is only applicable to the form if the unification does not fail. Due to possible reentrancies among elements of the form or the rule, the replacement operation requires unification in context of the head of the rule and the selected element. The replacement operation inserts the modified rule body into the modified form, replacing the selected element of the form. The full derivation relation is, as usual, the reflexive-transitive closure of rule application. A form is *sentential* if it is derivable from the start symbol.

(12) Consider the form

$$\sigma = \begin{bmatrix} \text{CAT} : np \\ \text{AGR} : \boxed{1} \end{bmatrix} \begin{bmatrix} \text{CAT} : np \\ \text{AGR} : \boxed{1} \end{bmatrix}$$

and the rule

$$\rho = \begin{bmatrix} \text{CAT} : np \\ \text{AGR} : \boxed{2} \end{bmatrix} \rightarrow \begin{bmatrix} \text{CAT} : v \\ \text{AGR} : \boxed{2} \end{bmatrix} \begin{bmatrix} \text{CAT} : np \\ \text{AGR} : \boxed{3} \end{bmatrix}$$

The unification in the context of the rule's head with the second element of σ succeeds, and identifies the values $\boxed{2}$ of (occurring in the head of the rule) and $\boxed{1}$ (occurring in the selected element of σ). The rule's body can then replace the selected element, resulting in a new sentential form:

$$\begin{bmatrix} \text{CAT} : np \\ \text{AGR} : \boxed{1} \end{bmatrix} \begin{bmatrix} \text{CAT} : v \\ \text{AGR} : \boxed{1} \end{bmatrix} \begin{bmatrix} \text{CAT} : np \\ \text{AGR} : \boxed{3} \end{bmatrix}$$

Similarly, the concept of derivation trees can be naturally extended to unification grammars. Example (13) depicts such a tree, where the scope of variable is extended to the entire tree.

(13) An example derivation tree:

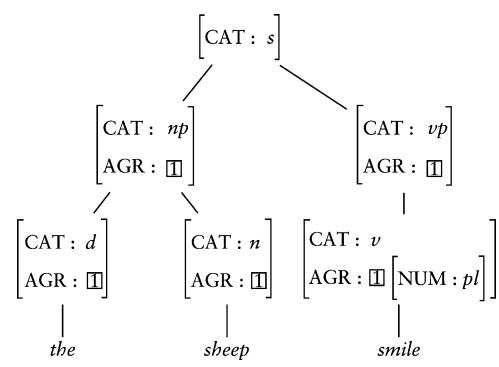

To determine whether a sequence of words, $w = a_1 \cdots a_n$, is in the language of a grammar G, $L(G)$, consider a derivation in G whose first form consists of the start symbol (a feature structure, viewed as a form of length 1), and whose last form is σ'. Let σ be a form obtained by concatenating $A_1, \ldots, A_n$, where each A_i is a lexical entry of the word a_i. Of course, the length of σ is required to be exactly n (the length of w). Notice that, as words can be ambiguous, there can be more than one member in the lexical entry of a word; the definition only requires that one such AVM is selected for each word. $w \in L(G)$ if and only if σ' is a *multi-AVM* that is unifiable with σ: $\sigma \sqcup \sigma'$ does not

fail. The reason for taking σ' rather than σ in the definition has to do with the properties of unification. A derivation might end with an underspecified *multi-AVM*, where additional information has to be gathered from the lexicon; but the reentrancies in the final form of the derivation must be respected: arbitrary instantiations for the variables in this final form cannot be permitted. Rather, if a variable is instantiated to some value (by one lexical entry), all other occurrences of the same variable must be consistent with that value. The current definition takes care of this requirement.

The extension of CFGs by adding features to lexical items and grammar categories dates back to the 1970s (Kay, 1979) and was incorporated into various linguistic theories, starting with functional grammars, later called unification grammars and then functional-unification grammars (Kay, 1983) and lexical-functional grammars (LFG) (Kaplan and Bresnan, 1982; Dalrymple *et al.*, 1995). Later, it was the underlying formalism for Generalized Phrase-Structure Grammars (GPSG) (Gazdar *et al.*, 1985). The best introductory text with an informal, elementary discussion of feature structures is Shieber (1986). In addition to giving a rather informal characterization of feature structures, subsumption and unification, Shieber (1986) defines the simplest unification-based grammatical formalism, PATR (Shieber *et al.*, 1983), and demonstrates how it can be used to encode grammars in different linguistic theories. A linguistically motivated comparative survey of three theories, namely Government and Binding, GPSG, and LFG is given in Sells (1988). Nonrecursive feature structures were added to the tree-adjoining grammar (TAG) formalism (Joshi *et al.*, 1975) by Vijay-Shanker and Joshi (1991), and to some variants of categorial grammars by Uszkoreit (1986) and Zeevat *et al.* (1987). A clear introduction to contemporary phrase structure grammars, with an extensive description of both GPSG and HPSG, including their handling of various linguistic phenomena, is found in Borsley (1996). A more recent exposition of syntactic theory in terms of (typed) unification grammars is found in Sag and Wasow (1999).

Parsing with Unification Grammars

Unification grammars not only provide better linguistic generalizations than CFGs, they actually define a completely different class of languages. While CFGs are limited to defining context-free languages, unification grammars can generate the entire class of recursively enumerable languages, or in other words, can simulate the operation of a Turing machine. In this respect, unification grammars are very similar to programming languages.

The extended expressive power is a double-edged sword. It provides the grammar designer with extremely powerful means for expressing linguistic phenomena; but it is also equally easy to design grammars that never terminate: the computational process of *parsing*, whose aim is to produce all the grammatical structures that a grammar induces on a given sentence, is not guaranteed to terminate for all grammars.

Parsing with unification grammars was developed along with the increased popularity of these grammars at the beginning of the 1980s. A large variety of parsing algorithms have been adapted to unification grammars (Tomita, 1991; Bouma and van Noord, 1993; Sikkel, 1997). Pereira and Warren (1983) define parsing as a special case of logical deducation, and show how definite clause grammars in particular and other unification formalisms in general can be parsed using the Earley deduction proof procedure. The paradigm of parsing as deduction was later extended to many parsing strategies and a variety of grammar formalisms by Shieber *et al.* (1995).

However, it was immediately observed that general unification grammars are Turing-equivalent; this is first mentioned by Kaplan and Bresnan (1982) and is formally proven by Johnson (1988) and Shieber (1992). The main reason is that with unification grammars, ε-rules (rules whose body is empty) and unit-rules (whose body consists of a single element) cannot be removed from the grammar, as is the case with context-free grammars. This leads to derivations in which an unbounded amount of material is generated without expanding the frontier word. To rule out offensive grammars, Pereira and Warren (1983) define the concept of off-line parsability for definite clause grammars, having been introduced (unnamed) by Kaplan and Bresnan (1982) for LFG grammars. Several alternative definitions for this concept are available in the literature, each capturing slightly different properties of the constraint on grammars; a thorough survey is provided by Jaeger *et al.* (2005).

In spite of their inherent computational complexity, unification grammars have become widespread in computational linguistics due to their appealing expressivity and ability to provide detailed accounts of a wide variety of linguistic phenomena, from phonology and morphology to syntax and semantics. Several computational frameworks provide the grammar designer with environments for grammar development; among the most common are LKB (Copestake, 1999) and ALE (Carpenter and Penn, 1999). These systems have been successfully used for developing

large-scale, linguistically motivated grammars of a variety of natural languages.

See also: Unification, Classical and Default.

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United Arab Emirates: Language Situation

Editorial Team

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The United Arab Emirates (UAE) were formed by seven Persian Gulf states – Abu Dhabi, Dubai, Ajman, Fujairah, Ras al Khaimah, Sharjah, and Umm al Qaiwain – after independence from Britain in the early 1970s. The main source of income of the UAE is from oil production, and the economic success resulting from this, as well as a highly developed infrastructure and the comparatively liberal political climate, has attracted a large community of foreign nationals to the UAE, accounting for more than half of the population.

The official language of the UAE is Arabic. As in other parts of the Arabic-speaking world, the language situation in the UAE is characterized by diglossia: the non-native Modern Standard Arabic (Arabic, Standard) is used in writing and in speech for official, public, or formal situations, while colloquial Gulf Arabic (Arabic, Gulf Spoken) is the first language of (UAE nationals) native speakers of Arabic and is used in everyday speech. Arabic is used in all spheres of life, in government, business, the media, and education. Adult literacy in 2002 was 77.3%, and youth literacy (ages 15–24) was 91.4%. English is the main foreign language taught in public education and is used as language of instruction for teaching some subjects in tertiary education.

The population of the UAE is 2.9 million (2002 estimate), of which more than half are non-nationals. The largest group of foreign residents in the UAE are from South Asia, followed by migrants from Iran, other Arab countries, South East Asia, and Europe and East Asia. Languages spoken by more than 100 000 speakers (est.) in the UAE include Malayalam, Balochi (Balochi, Southern), Pashto (Pashto, Northern), Egyptian Arabic (Arabic, Egyptian Spoken), and Somali. Bengali, Telugu, Persian (Farsi, Western), Tagalog, and Omani Arabic (Arabic, Omani Spoken) are spoken by more than 50 000 speakers (est.) in the UAE (Grimes, 2004). No estimates are available for the number of speakers of Hindi, Urdu, Gujarati, or Panjabi. In addition, numerous smaller language communities, including speakers of Thai and Swahili, exist.

Language use of the media in the UAE reflect the multilingual situation; in addition to Arabic language print media and several TV and radio stations, a number of radio stations broadcast in English, Hindi, Urdu, and Malayalam.

See also: Arabic.

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United Arab Emirates: Language Situation

Editorial Team

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United Kingdom: Language Situation

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This article is concerned with the remarkably rich and complex linguistic situation in England, Northern Ireland, and Scotland. These three countries together with Wales comprise the United Kingdom of Great Britain and Northern Ireland. Separate articles deal with Wales (*see* **Wales: Language Situation**), the Channel Islands (*see* **Channel Islands: Language Situation**), and the Isle of Man (*see* **Isle of Man: Language Situation**).

The CIA World Factbook (2004) estimated that the population of the United Kingdom was 60 270 708 in 2004. English is the official language of the United Kingdom and the first language of the large majority of the population. There are no reliable data on the number of people whose first language is not English. According to the CIA Factbook (2004), the population comprises the following 'ethnic groups': English 81.5%, Scottish 9.6%, Irish 2.4%, Welsh 1.9%, Ulster 1.8%, and West Indian, Indian, Pakistani, and other 2.8%. In 2001, the Department for Education and Skills declared that at least 3 million people living in the United Kingdom were born in countries where English is not the national language.

There is great linguistic diversity in the United Kingdom (see Trudgill, 1984). The native languages are themselves varied – English and Scots are Germanic languages, and Welsh, Gaelic, Irish, and Cornish are Celtic languages – and the large number of other languages are the result of substantial immigration into the United Kingdom over many centuries from former European colonies, from Europe, and from much of the rest of the world. Some, like the Romani communities, are long established, but the majority have entered since the 1940s either as political refugees or as migrant labor (see Stubbs, 1985). Unfortunately, the national population census does not ask a question about language. The census team did, however, need to decide which languages the census forms and information leaflets needed to be translated into, and after consultation, the forms were translated into the following 24 languages (in alphabetical order): Albanian/Kosovan, Arabic, Bengali, Chinese (Cantonese), Croatian, Farsi, Persian, French, German, Greek, Gujerati (Gujarati), 'Hindi, Italian, Japanese, Polish, Portuguese, Punjabi (Panjabi), Russian, Serbian, Somali, Spanish, Swahili, Turkish, Urdu, and Vietnamese.

England

English is, by a very long way, the dominant language of the British Isles. Most of the population are native speakers, and almost all of those who are not have English as a second language. Other articles deal with the history of English, with English varieties and dialects, and with the dispersion of English through the world. This short section concentrates on the 'other' languages of England.

As noted above, there is no systematic enumeration of these other languages, but some idea of their diversity can be gained from Baker and Eversley (2000). They reported on a survey of the languages claimed to be spoken by London schoolchildren. They estimated that London schoolchildren speak over 300 different languages and that 30% of all London school children speak a language other than English at home. The 'top 40' languages are English, Bengali & Sylheti, Panjabi, Gujarati, Hindi/Urdu, Turkish, Arabic, English-based Creoles, Yoruba, Somali, Cantonese, Greek, Akan, Portuguese, French, Spanish, Tamil, Farsi, Italian, Vietnamese, Igbo, French-based Creoles, Tagalog, Kurdish, Polish, Swahili, Lingala, Albanian, Luganda (Ganda), Ga, Tigrinya (Tigrigna), German, Japanese, Serbian/Croatian, Russian, Hebrew, Korean, Pashto, Amharic, and Sinhala.

The linguistic diversity of London is probably replicated to a greater or lesser extent elsewhere in the United Kingdom, especially in urban areas, though with a different proportional distribution of languages reflecting different settlement patterns in different regions.

In Cornwall a small number of people speak, read, or understand Cornish, a Brythonic Celtic language (*see* **Cornish**). The United Kingdom has a long-established community of Romani speakers (*see* **Romani**). There are also speakers of Jewish English, Yinglish (*see* **Jewish Languages**).

The main languages taught in school are French, German, Spanish, and Italian. A dozen other languages, including some of the 'minority' languages listed above, are taught as part of the school curriculum in various parts of the country, reflecting local community demand. Many minority and community languages are also taught outside the school curriculum either by local authorities or by community groups. The language of the national media – visual, spoken, and written – is predominantly English, though there are numerous newspapers and other media in a wide range of other languages.

Northern Ireland

The population of Northern Ireland was estimated in 2002 at 1 696 641 (McKernan, 2004). English is the official language in public domains. The local dialects can be categorized as 'more English' or 'more Scots,' depending on the way in which English was imported into Ireland (see Harris, 1984). The more northerly dialects, spoken in parts of Antrim, Down, and Derry and sometimes referred to as 'Scotch-Irish,' reflect settlement from Scotland in the 17th century and are related to Lowland Scots. In 1999, Foras na Gaeilge and Tha Boord o Ulstèr-Scotch were created to promote the language. The dialects of Tyrone, Armagh, Down, and parts of Derry form 'Mid Ulster English' or 'Hiberno-English,' derive from settlement from England, and have more in common with English dialects. Hiberno-English is the dominant variety in Ulster and is spoken in Belfast. Native Irish died out around 1970; since the 1990s, there has been a growing Irish revival movement, and in the 2001 census, 10.35% of the population claimed to have some knowledge of Irish (i.e., could read, write, or speak Irish).

The European Charter for Regional or Minority Languages was signed in 2000 by the U.K. government with regard to Irish and Ulster Scots in Northern Ireland. It ratified the charter in the following year, acknowledging that provisions were in place to promote and develop Irish and Ulster Scots in Northern Ireland. Despite that ratification, Ulster Scots has been denied equal status with Irish. English is the dominant language of education, though in 1995–1996, 3% of primary school students were taught in the Irish medium. As in England, the main foreign languages taught in secondary schools are French, German, Spanish, and Italian. English is the dominant language of the media.

Scotland

The population of Scotland was recorded in the 2001 census as 5 062 011. English is the official language in public domains. In speech, a 'Scottish accent' of English is characterized most noticeably by rhoticity and by a loss of the vowel length distinctions found in most accents of southern England. There are also pervasive differences in vocabulary and idiom, as well as some small syntactic differences. 'Scottish English' exists in a continuum with the dialects known collectively as Scots: 'Lowland Scots' in the border regions and 'Doric' in the northeast. The most conservative dialects are to be found in the northeast and in the Northern Isles (see Aitken, 1984; Bergs, 2001). In the cities, notably in Glasgow, there is a lively working-class demotic form of speech (see Macafee, 1983). Many speakers switch among English, Scottish English, and Scots, depending on the situation. Scots is not officially recognized by the U.K. government, but the Scottish Executive's National Cultural Strategy contains a section promoting Scotland's languages, and there are vigorous and long-standing institutions that support and promote Scots. The General Register office (Scotland) has estimated that 30% of the population are Scots speakers. Scots is also vividly alive as a literary language supported by numerous independent publishing houses situated within the country (*see* **Scots**).

Gaelic, which suffered a catastrophic decline continuing into the early part of the last century, is being reinvigorated. The 2001 census recorded 1.9% of the population as speaking, reading, or understanding Gaelic; the language is particularly strong in the Western Isles where the census recorded that 71.6% of the population speak Gaelic. Gaelic is taught in universities, and a small but increasing number of primary schools offer Gaelic medium education. The BBC and independent TV stations offer Gaelic on TV and the radio. Gaelic is recognized as a minority language by the European Union (*see* **Scots Gaelic**).

The European Charter for Regional or Minority Languages was signed in 2000 by the U.K. government with regard to Gaelic and Scots in Scotland. As with Ulster Scots, the government ratified the charter, but Scots was denied equal status with Gaelic.

In Scotland, there are also several well-established immigrant communities, the largest from the Indian subcontinent and South Asia. There are also long-standing immigrant communities from Europe (e.g., Polish and Ukrainian).

Wales

The 2003 population estimate was that 2 938 000 people reside in Wales. Most of the south of the country is totally anglicized, but there are substantial Welsh-speaking areas in the north and west (*see* **Welsh**). The 2001 census recorded that 16% of the population claimed to understand, speak, read, and write Welsh – that is, have the full range of skills (but without any indication of the level of ability or usage) – whereas 20.5% claimed to speak at least some Welsh (up from 18.5% in 1991). Few people are monolingual in Welsh. The highest proportion of Welsh speakers is found in Gwynedd in the north of the country where Welsh is a first language for a segment of the population. The lowest proportion is in Monmouthshire in the south.

Support for the language grew during the second half of the 20th century, along with the rise of nationalist political organizations, such as the political party Plaid Cymru, Cymdeithas yr Iaith Gymraeg (the Welsh Language Society), and the establishment of the Welsh Assembly. The Welsh Language Act of 1993 established a Welsh Language Board charged with 'promoting and facilitating' the use of Welsh. The language has greatly increased in prominence since the creation of the television channel S4C in November 1982, which broadcasts exclusively in Welsh during peak viewing hours, as does the BBC. Local government uses Welsh as an official language, public bodies issue official literature and publicity in Welsh versions, and all road signs in Wales are in English and Welsh, including the Welsh versions of place names. It is the ambition of the Welsh Assembly 'to create a truly bilingual Wales.' The U.K. government has ratified the European Charter for Minority or Regional Languages with regard to Welsh. The percentage of primary schools where Welsh is the sole or main medium of instruction rose from 14% in 1990 to 18% in 2000. In the more Welsh areas (notably Gwynedd and Dyfed), secondary school education is bilingual, and, since 1999, all secondary schools in Wales are obliged to offer the teaching of Welsh as a second language to all students under 16. The increase in Welsh language provision in education has greatly affected the number of Welsh speakers in the younger age groups, and over the last decade, there has been a substantial effort to promote and sustain the language across the whole spectrum of Welsh life, including education, lifelong learning, community regeneration, the arts, health care, business and enterprise, tourism, housing, and social care.

See also: Channel Islands: Language Situation; Cornish; Dialects: Early European Studies; English in the Present Day (since ca. 1900); Isle of Man: Language Situation; Jewish Languages; Romani; Scots Gaelic; Scots; Wales: Language Situation; Welsh.

Language Maps (Appendix 1): Map 139.

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United States of America: Language Situation

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The linguistic landscape of the United States, though dominated by English, encompasses an unusual diversity of indigenous and immigrant languages. No federal law currently grants English the status of official language, but it is used for virtually all official and institutional functions. Americans tend to be relatively monolingual in English (82% in 2000, **Figure 1**), and Spanish (11%, **Figure 1**) and other languages (7%, **Figure 2**) have a minority status in terms of size of speech community and institutional support (**Figure 2**).

American English

Regional and Social Varieties

English was first established in America by permanent settlers in Jamestown, Virginia, in 1607. By 1780, the number of people of European and African origin had increased to 2.8 million but more than 20% of European Americans were still from non-English-speaking communities, predominantly German, Dutch, Swedish, Irish, and French. This heterogeneity influenced the lexical stock of American English (e.g., *bayou, caribou, prairie* (French); *cookie, waffle* (Dutch); *noodle, snorkel* (German); *corral, ranch* (Spanish)) as well as its regional dialect features; Minnesota English, for instance, bears traces of

Support for the language grew during the second half of the 20th century, along with the rise of nationalist political organizations, such as the political party Plaid Cymru, Cymdeithas yr Iaith Gymraeg (the Welsh Language Society), and the establishment of the Welsh Assembly. The Welsh Language Act of 1993 established a Welsh Language Board charged with 'promoting and facilitating' the use of Welsh. The language has greatly increased in prominence since the creation of the television channel S4C in November 1982, which broadcasts exclusively in Welsh during peak viewing hours, as does the BBC. Local government uses Welsh as an official language, public bodies issue official literature and publicity in Welsh versions, and all road signs in Wales are in English and Welsh, including the Welsh versions of place names. It is the ambition of the Welsh Assembly 'to create a truly bilingual Wales.' The U.K. government has ratified the European Charter for Minority or Regional Languages with regard to Welsh. The percentage of primary schools where Welsh is the sole or main medium of instruction rose from 14% in 1990 to 18% in 2000. In the more Welsh areas (notably Gwynedd and Dyfed), secondary school education is bilingual, and, since 1999, all secondary schools in Wales are obliged to offer the teaching of Welsh as a second language to all students under 16. The increase in Welsh language provision in education has greatly affected the number of Welsh speakers in the younger age groups, and over the last decade, there has been a substantial effort to promote and sustain the language across the whole spectrum of Welsh life, including education, lifelong learning, community regeneration, the arts, health care, business and enterprise, tourism, housing, and social care.

See also: Channel Islands: Language Situation; Cornish; Dialects: Early European Studies; English in the Present Day (since ca. 1900); Isle of Man: Language Situation; Jewish Languages; Romani; Scots Gaelic; Scots; Wales: Language Situation; Welsh.

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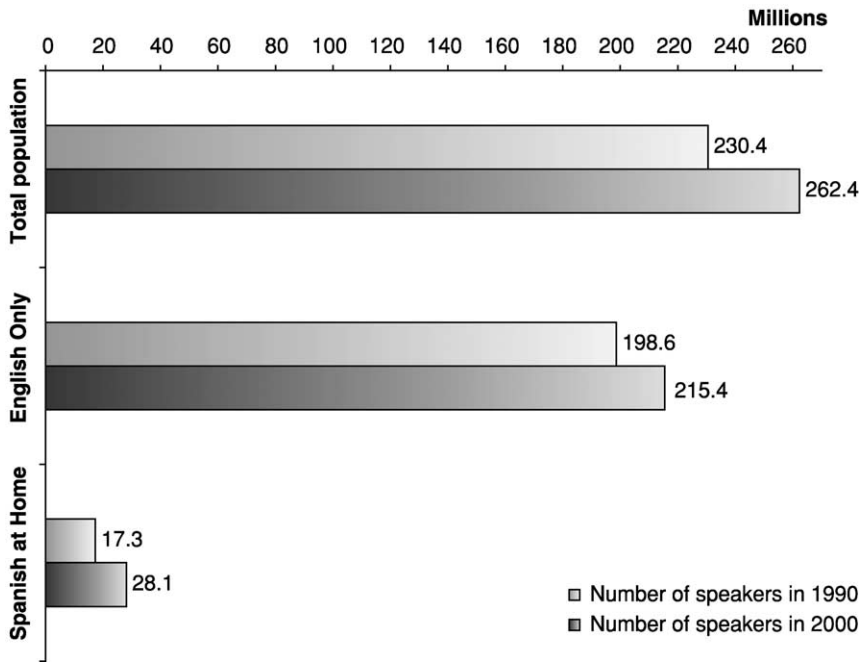

Figure 1 Use of English and Spanish relative to total population in 1999 and 2000 (population 5 years and over). Source: Data from U.S. Bureau of the Census (2003).

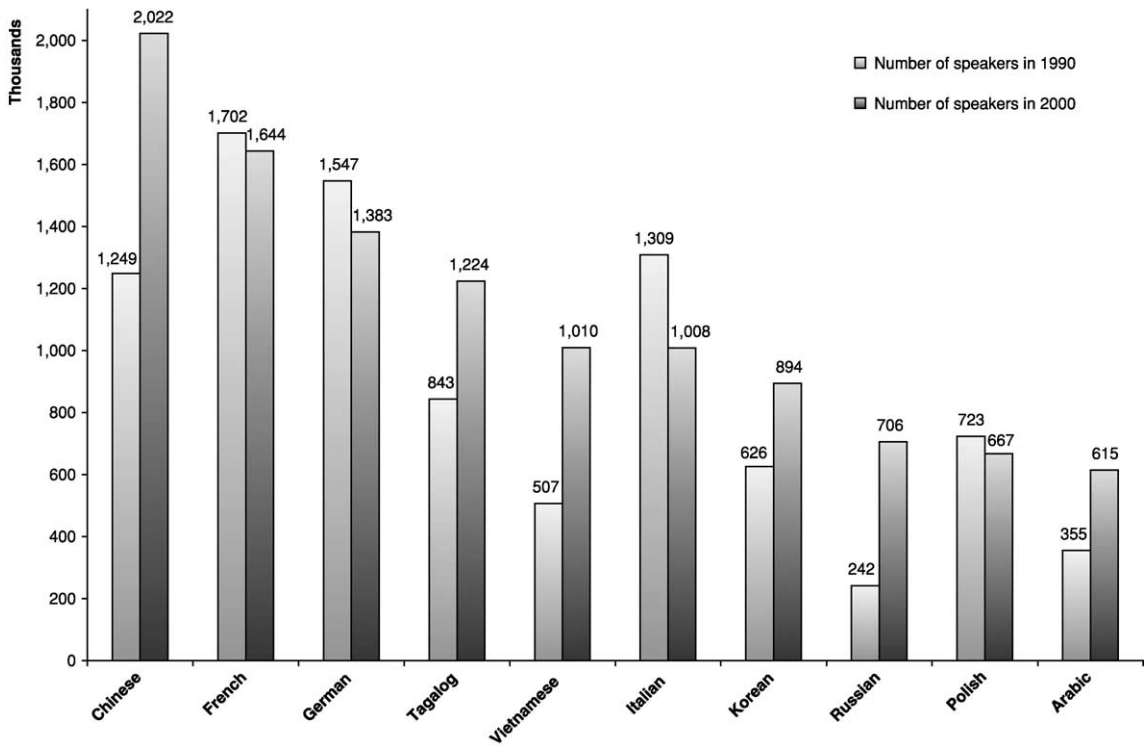

Figure 2 Ten Languages most frequently spoken at home other than English and Spanish in 1999 and 2000 (population 5 years and over). Source: Data from U.S. Bureau of the Census (2003).

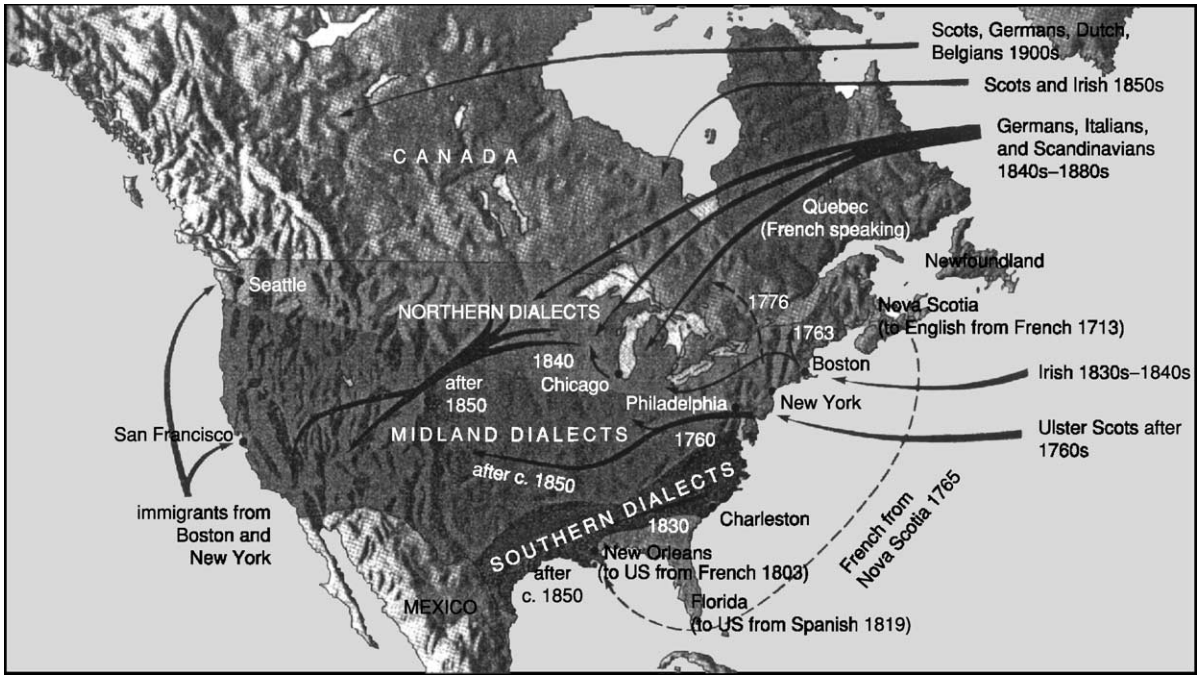

Figure 3 European settlement of North America since the mid-eighteenth century. Source: Reproduced from Graddol, Leith, and Swann (1996: 199).

Swedish phonology and syntax. German (German, Standard) once had a substantial presence, but native use is now primarily limited to the dialect of German known as Pennsylvania Dutch.

Standard American English is distinctive in its phonology (rhoticity, except in parts of the South and the Northeast; greater use of /æ/, e.g., *fast, can't*; intervocalic flapping of /t/, e.g., *butter, writer*; widespread leveling of the vowel distinction in *caught* and *cot,* except in the Northeast), syntax (simple past in perfect contexts, e.g., *Did you see that film yet?;* use of *gotten*), lexicon (*sidewalk, carpark, elevator, schmuck*), and spelling (*center, neighbor, analyze;* Noah Webster's *American Dictionary of the English Language* [1828] introduced many revisions). Early linguistic atlases (Kurath, 1949) used isoglosses of lexical variants such as *pail/bucket* to identify three primary English dialect divisions in the United States – South, North and, to a lesser extent, Midland – within which further minor dialect divisions occur. More recent studies of contemporary dialectal phonological systems continue to reflect these divisions; new dialects are now also beginning to coalesce in more recently settled parts of the West.

Early English-speaking settlers arrived from distinct dialect regions of England and as the frontier later shifted westward, their distinct speech patterns spread along conduits of travel (see Figure 3). While certain features of American English have been argued to originate in the dialects of Early Modern English that first came to America (e.g., rhoticity; use of /æ/; *gotten*; *mad* 'angry'; *fall* 'autumn'), most dialect distinctions were rapidly leveled through early admixture in settlements. The distinctive features of present-day American English dialects therefore tend to derive more from ongoing language change than from early British English.

Pioneering work by William Labov and other sociolinguists, beginning in the 1960s, has demonstrated that social groupings are also a key factor in American dialects. For instance, the Northern Cities Vowel shift – a series of shifts in pronunciation in the area encompassing Detroit, Chicago, Buffalo, and Cleveland – results in certain linguistic features that function as social markers of class, ethnicity, age, and gender, and the associated prestige or stigma of such markers effects dialect change. This research has also indicated that despite the influence of media certain dialect boundaries, e.g., the North–South division, are strengthening in some respects.

African-American English

The variety spoken by many African Americans bears several defining linguistic features in its phonology (word-final consonant cluster simplification, e.g., *told, best;* use of /t, d, f, v/ for /θ, ð/, e.g., in *these,*

with, thumb, bath), syntax (invariant *be* for habitual meaning; nonstandard auxiliary use of *been* and *done*; null copula, e.g., *He workin'*; negative inversion and multiple negation, e.g., *Ain't nobody told me nothing.*), lexicon, and styles of discourse (e.g., toasting, signifying, playing the dozens). Research has shown these features to be systematic and rule-governed, as in all dialects. British English and Creoles have both been proposed as possible origins.

In 1996, the linguistic status of African-American English came under public scrutiny as the Oakland School Board in California passed a resolution declaring a social and educational need to recognize that what they termed Ebonics was the primary language of many students in the county. Although the Linguistic Society of America passed a resolution affirming the importance of recognizing African-American Vernacular English as a systematic dialect, the intensity of the public debate surrounding the school board's resolution led to its ultimate dissolution. The controversy unmasked deeply opposed popular views on the cultural status of vernacular dialects.

The Debate over Bilingualism

Early supporters of installing English as the official language of the United States included Benjamin Franklin and Noah Webster, and the English-Only movement continues this effort. As of 2004, 23 states have adopted Official English laws. However, many English-Only claims, e.g., immigrant resistance to learning English and detrimental effects of bilingualism, have been discredited: research finds consistently high rates of language shift to English among immigrants (see Figure 4), and the popular belief during the first half of the 20th century that bilingualism was detrimental to intellectual development has received no empirical support. In 1968, the Title VII Bilingual Education Act allocated federal funds to children with special linguistic needs. The Official English movement resists measures of this sort, while the English Plus movement, advocating a more bilingual model for the United States, supports them.

Spanish in the United States

The arrival of Spanish in the United States predates that of English, and its development in the Southwest and the Northeast has followed distinct historical and demographic patterns.

Spanish colonization began in Florida with Juan Ponce de Léon's visit in 1513, and spread soon after to Louisiana and the Southwest, where it was administered by the Spanish Viceroyalty, with colonial Spanish remaining the local prestige language for almost two centuries. After the Mexican-American war, almost half of Mexico was ceded to the United States in 1848, including all of present-day California,

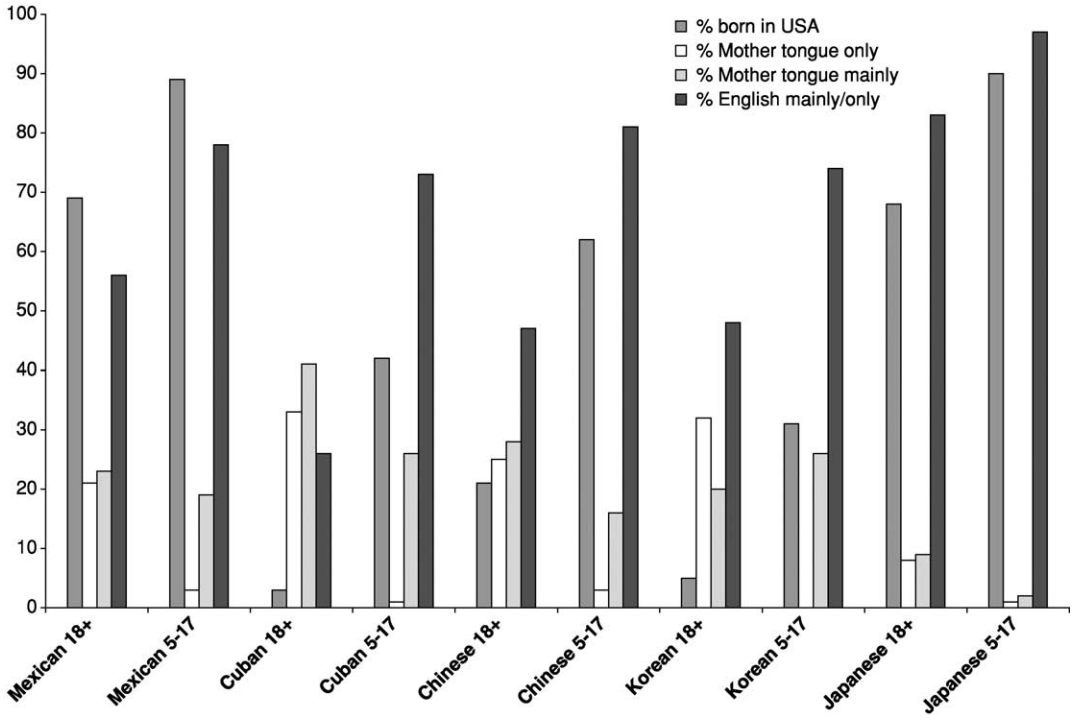

Figure 4 Language use and nativeness across generations among selected immigrant groups. Source: Data from López (1982) as discussed by R. Bayley in Finegan and Rickford (2004: 274).

Nevada, and Utah and parts of Texas, New Mexico, Colorado, Arizona, and Wyoming. Sustained Mexican migration has continually reinforced the Spanish-speaking population of many of these states. The Southwestern states are now home to just under half of the Spanish-speaking population in the United States. Sometimes termed Chicano Spanish, the Southwestern variety bears characteristics of Mexican Spanish and American English. English influence can be seen in lexical innovations (e.g., *libreria* (not *biblioteca*) 'library'; *parientes* (not *padres*) 'parents'; *puchar* 'to push'; *fensa* 'fence'; *cama king* 'king-size bed'); English-based phonology (e.g., *moven* for *mueven*, 'they move') and syntax (phrasal constructions in place of complex morphology) are also common.

Spanish in the Northeast primarily originates from Puerto Rico, the Dominican Republic, Cuba, and Colombia. In 1898, after the Spanish-American war, Puerto Rico became a territory of the United States and was the first major source of Spanish-speaking immigration to the East Coast. The majority of other immigrants arrived later; Cuban refugee migration, for instance, rose dramatically after the 1959 coup. While some phonological traits of these varieties are shared, such as deletion or aspiration of syllable-final /s/, other regional distinctions may persist: e.g., dropping of syllable-final /l/ and /r/ (Cuban) and raspy velar /r/ (Puerto Rican). As colonial Spanish developed first in the Caribbean, the Northeastern United States varieties have brought many Native American, African, and Creole loans into American English, e.g., *canoe* (Native American), *banana* (African), *bodega* (Caribbean Spanish).

Due to extensive language shift to English, a continuum of societal bilingualism has emerged in Hispanic communities, ranging from fluency in Spanish to symbolic use of Spanish by English-dominant bilinguals. Alongside the influence of English on Spanish structure, this bilingualism has given rise, particularly among English-dominant bilinguals in the younger generation, to 'Spanglish,' a hybrid style consisting of proficient and sustained code-switching between Spanish and English. Chicano English, by contrast, is a variety of English with Spanish influence.

Indigenous Languages

Native American Languages

The languages indigenous to America have undergone extensive decimation through contact with sociopolitically empowered colonial languages. Legislation punishing instruction or use of native languages and mandating English as the exclusive language of instruction was enforced in Indian reservations from the 19th century. Estimates place the number of native languages at the time of European contact at 300–600; the current figure stands at approximately 175, of which fewer than 20 are being acquired by children and are thus potentially sustainable. Over 70% of contemporary Native American languages face imminent extinction. A revitalization movement ultimately led to the Native American Languages Act of 1992, calling for federal policy to support the cultural vitality of Native American languages and authorizing funds for their maintenance.

American Creoles

New creole languages have developed indigenously in South Carolina, Hawaii, and Louisiana. In South Carolina, a creole called Gullah or Geechee (Sea Island Creole English) began to develop in 1715 when importation of African slaves, speaking different African languages natively, increased sharply in that area. Grammatical features of the variety include: pronouns such as *ee*, *um*, *shum*, *una*; *duh* or *does be* for habitual marking; *done* to mark completed actions; null copula, null possessive, and null simple past tense. Gullah has declined in recent decades, surviving in a few coastal enclaves. As it is relegated to the home, children may speak it natively but rapidly become bilingual.

Hawaiian Creole (Hawai'i Creole English), sometimes referred to as Pidgin, began to emerge between 1790 and 1820 through contact between native Hawaiians and Europeans; this development preceded a rise in Chinese, Portuguese, and Japanese arrivals between 1860–1900, followed by further influence from Filipino (Tagalog) and American English. These waves of contact resulted in a heterogeneous developmental process, particularly via informal and covert interaction among young speakers having English forcibly imposed on them in schools. Hawaiian Creole is characterized, among other things, by innovations in syntax (e.g., aspect marking: *stei* for progressive, *wen* for past) and in the lexicon, e.g., *pau* 'finished' (Hawaiian), *obake* 'ghost' (Japanese). Despite controversy over its societal and institutional role – only English and Hawaiian are official state languages – Hawaiian Creole is spoken and positively valued by a substantial community.

Louisiana Creole (Louisiana Creole French) is sometimes described as originally one of three French-based languages in Louisiana, alongside Cajun French (French, Cajun), brought by Acadians expelled from Nova Scotia in the 18th century, and Colonial French, an extinct variety once used by French colonizers. An alternative view treats the language situation as comprising a continuum ranging from more French to more

Creole usage. The Creole arose out of contact between African slaves and French colonizers during the period of 1699 and 1750; today, due to the greater social status of English and Standard French, all Louisiana Creole speakers speak another language outside their private domains.

American Sign Language

American Sign Language (ASL) is a natural, visual-spatial language not based on American English. In 1817, the first American school for the Deaf was established, and the resulting convergence of several varieties gave rise to an expanded contact variety. By the late 19th century, an oralist movement led to the banning of signing, a situation that persisted until the 1970s. ASL use nevertheless continued throughout, sometimes covertly, and ASL is now used by 0.5–2 million people, with considerable regional and social variation.

Minority Immigrant Languages

Commonly spoken immigrant languages in the United States other than English and Spanish are listed in Figure 2, which shows immigration-driven reversals in language use during the 1990s: a dramatic increase in the use of Russian (192%), Vietnamese (99%), Arabic (74%), Chinese (62%) and Spanish (57%) contrasts with the decline in the use of several European languages.

European languages have been replenished by immigration since the earliest arrivals in the 15th century. The first large-scale migration of unskilled Asian laborers occurred in the mid–19th century. Chinese, Japanese, and Korean enclaves formed, while South Asian and Filipino immigrants, fewer in number of largely male, did not form self-sufficient communities as early. The second wave of Asian immigration, when quotas were extended after 1965, included refugees from Cambodia, Vietnam, and Laos as well as descendants of earlier immigrants, often more educated and economically secure than their predecessors. The majority of early Arab American immigrants were Christian; subsequent to the 1950s, there has been a rise in Muslim Arab immigration, although this group remains a minority. The major varieties of Arabic represented are Lebanese and Syrian (Arabic, North Levantine Spoken), Palestinian (Arabic, South Levantine Spoken), Egyptian (Arabic, Egyptian Spoken), and Iraqi (Arabic, Mesopotamian Spoken).

Among speakers of minority immigrant languages, or 'heritage languages,' fluency declines sharply across generations, transitioning to monolingualism within two to three generations. In particular, attrition of fluency in selected registers, shift from balanced to asymmetrical bilingualism, and decline in biliteracy across generations is widespread, largely due to institutionalized monolingualism in schools. López's (1982) findings, shown in Figure 4, reflect a close correspondence between the nativeness of a generation in the United States and its tendency to be English-dominant. Nevertheless, language loyalty tends to be strong across generations; in particular, Figure 4 shows a lower rate of loss of Spanish among Mexican Americans as compared to some Asian languages. Language schools, ethnically-defined neighborhoods, and religious and cultural associations serve to maintain languages among first and second generation immigrants; third generation immigrants are generally English speakers but often show renewed, albeit often nonnative, interest in their heritage languages.

See also: Algonquian and Ritwan Languages; American Lexicography; Applied Linguistics in North America; Bilingual Education; Code Switching and Mixing; Dialect Atlases; English, African American Vernacular; Eskimo-Aleut; Hokan Languages; Hopi; Language Education Policies in North America; Language Loyalty; Language Maintenance and Shift; Muskogean Languages; Nahuatl; Pidgins and Creoles: Overview; Salishan Languages; Sign Language: Interpreting; Sign Language: Variation; Siouan Languages; Standardization; Variation and Language: Overview.

Language Maps (Appendix 1): Maps 69–75.

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Universal Language Schemes in the 17th Century

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In the mid-17th century there was widespread and intense interest in the prospect of creating a universal language based on strict philosophical principles. Such projects had a multiplicity of philosophical, theological, and pedagogical aims, ranging from the development of an instrument for establishing universal peace to the creation of a remedy for the 'curse of Babel' (i.e., the diversity of languages). Other more practical functions that such a language might serve included shorthand, cryptography, Bible translation, promotion of commerce, and improvement of education. The prospect of a universal language thus serves as a focal point for quite diverse linguistic concerns, and indeed there are few contemporary preoccupations concerning the unity and diversity of languages that are not directly or indirectly linked to it. This makes the schemes themselves of central importance to the historian of ideas as a unique window into to the 17th-century intellectual landscape. But the very diversity of the preoccupations that are thus brought together means that there is always a danger for the modern reader of oversimplifying the multidimensional historical background.

How the Schemes Worked

It was in England that the theoretical possibility of a universal language was pursued most as a practical challenge, and this makes a survey of the various English entrepreneurs a convenient introduction to how such schemes worked. In fact, the schemes ranged from the quite simple to the very elaborate, and it is useful to follow through a logical progression, using contemporary terminology: from a 'shorthand,' to a 'universal character,' to a 'real character,' to a 'philosophical language.' (Note that the 17th-century term 'character' here means a system of notation, or a writing system.)

Visitors to England in the 17th century were struck by the widespread use of shorthand, known at the time as 'brachygraphy' (i.e., 'short writing'). There were many systems of shorthand available, and they were used for purposes ranging from the transcription of sermons by the congregation to the writing of diaries. Private shorthand systems could also be used as secret codes, and their use for cryptographical purposes was given an extra boost by the turmoil of the civil war in the 1640s. With regard to their structural properties, most shorthand systems used a combination of alphabetic and logographic principles, where an alphabetical sign represented some phonetic element of a word, whereas a logograph represented the meaning of a word by means of a single nonphonetic sign: thus the three letters *s, i,* and *x* gave an alphabetical representation of the component sounds of the

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English word *six,* while the single logograph *6* represented the meaning of this word as a whole. In functional terms, this had the crucial consequence that while alphabetic systems were intrinsically language specific, a purely logographic script would also function as a universal character: a text in English that was transcribed using a logographic universal character could be back-translated not just into English but into French or any other arbitrary language (e.g., *6* translates as Welsh *chwech* as well as English *six*).

The first publications to present themselves as a 'universal character' were simple in the extreme. Cave Beck's scheme was little more than an English word list with a number assigned to each entry (plus a small number of grammatical particles); a parallel French word list had corresponding numbers to link translation equivalents (Beck, 1657). But contemporaries were quick to see the potential applications of such universal scripts in the context of scientific, diplomatic, and missionary activities. Texts, biblical or other, would not need to be translated multiple times; all that needed to be supplied was single translations into the universal character, along with a set of language-specific manuals by which they could be back-translated. Furthermore, a universal character that was **also** a shorthand would, of course, be doubly efficient.

The next stage was to transform the universal character into a 'real character' by constructing logographs not on a purely arbitrary basis (as with Beck). It was recognized that there were already scientific contexts where the limited use of such signs was internationally established: for example, the use of icons to represent the planets in astronomy and the various chemical elements in alchemy and medicine. All that was needed, in principle, was to extend such sorts of usage to the language as a whole. The development of these schemes is extremely interesting from a linguistic point of view, since their architectural principles are in effect hypotheses about the semantic structure of grammar and lexicon. Thus, in a pilot scheme devised by Francis Lodwyck, a radical symbol was assigned to the general concept *drink*, with modifying diacritics to distinguish the cluster of related items such as *drinker* AGENT, *drink* OBJECT, *drinking place* LOCATION, and so on (Lodwyck, 1652; ed. Salmon, 1972). Since the diacritics themselves recur with other radicals (for example, with *write* to yield the set *writer, thing written, writing place,* etc.). The principal idea was that in such a scheme the signs would not stand for words (in a language-specific sense) but would stand directly for things – hence the term 'real character' (cf. Latin *res* 'thing'). Furthermore, if properly constructed, the semantic makeup of such a sign would be transparent: in general, a simple notion would always be represented by a simple sign and a complex notion by a complex sign; and more particularly, a sign representing an agent would always contain the diacritic meaning *agent*, and vice versa.

A real character is by definition a system of writing. It could be turned into a full 'philosophical language' by assigning regular phonetic values to the rationally constructed signs. (Note that in 17th-century usage, the term 'philosophical' covered much that today would be called 'scientific.') A language developed along these lines would be fully adapted for scientific uses and, in a Judeo-Christian context, would amount to a reconstruction of the original language of Adam (with which it would be fully isomorphic, if it could not be identical). In short, it would be a 'perfect' language in the long-standing utopian sense (cf. Eco, 1995); and indeed, there seemed to be no reason in principle why it should not continue to function as a shorthand system, along with all its other advantages. However, the two authors who published a fully worked-out scheme, which they presented as a philosophical language (Dalgarno and Wilkins), took great pains to emphasize that their inventions were not specimens of perfect languages, and Dalgarno even explained at length why a language could not possibly be perfect in all respects.

Problems of Implementation

In a 17th-century English context, the purely philosophical appeal of a utopian language was amplified by larger sociopolitical resonances. It was intimately associated with missionary and imperialistic objectives; it was prominent in debates about the development of algebraic and taxonomic notations requisite in science and technology; and it carried strong millennial overtones that were themselves linked to the political upheavals of the civil war. However, while from a distance all these strands seem to run in the same direction toward a single linguistic objective, what in fact happened was that the technical problems that arose in the practical implementation of a philosophical language caused the skein to unravel. It turned out that not all the objectives were mutually compatible.

George Dalgarno (c. 1616–1687) seems to have been the first to spot that the objectives of a real character were not just incompatible with those of a shorthand system but were diametrically opposed to them. While the purpose of the latter was to abbreviate complex signs into simpler compendia, the aim of the former was precisely to ensure that signs that were semantically complex were transparently expanded to their fullest extent. One system of transcription cannot serve both

purposes. Furthermore, Dalgarno perceived that the results of logical analysis, which strictly speaking should be the foundation of what he considered a truly philosophical language, were in practice not usable as such. For supposing that concepts could be completely broken down into their basic constituents, and that expressions could be formed reflecting this analysis, the result would clash both with the cognitive habits and capacities of language users and with efficiency constraints on the length of expressions. In other words, a sign that properly and completely represented the complex concept it designated would often – far from being transparent – be both incomprehensible and unworkably long.

Other difficulties were to arise when it came to arriving at a consensus as regarded the philosophical principles on which the language was to be based. It had been conceived by many of those involved that the universal language scheme would perforce need to be a collective enterprise. George Dalgarno had at first worked together with Seth Ward and John Wallis on this basis, and he later collaborated closely with John Wilkins (1614–1672). But opinions on the method for constructing the lexicon of the philosophical language widened into a fundamental "breach of judgment," and not one but two schemes were to appear in print. In Wilkins's opinion, the number of radical words, on which modifiers such as those indicating AGENT were to be applied, should be several thousands. In addition, each of these radical words should be connected with a definite place in a comprehensive classification, so that the form of each word would indicate what sort of thing it referred to. In Dalgarno's opinion, Wilkins's method suffered from the attempt to force two incompatible goals – scientific classification and the creation of a practicable language – into a single design. Dalgarno insisted that the number of radical words should be much smaller, so that the language would be more flexible in enabling its users to form complex signs for logically complex things, for this flexibility remained his guiding principle in spite of his belief that it could not be completely carried through. Wilkins, in the preface to his *Essay towards a real character and a philosophical language* (1668; **Figure 1**), made only a passing and anonymous reference to his initial work with Dalgarno, whose *Ars Signorum* had appeared in 1661 (**Figure 2**).

Wilkins' *Essay* was published with the imprimatur of the recently founded Royal Society and was itself a collaborative work, having received input for the elaborate classification schemes it contained from various quarters, notably from John Ray and Francis Willoughby on natural history. After Wilkins' death in 1672, a committee of the Society was set up to look into ways in which the scheme might be improved and put into practice, and there was extensive correspondence within a circle that included Andrew Paschall, John Aubrey, Francis Lodwyck, Robert Hooke, and others. But the discussions were inconclusive, and by the 1680s it was apparent that the whole enterprise had run out of steam.

Questions of Motivation and Objective

Although the heyday of the 17th-century search for a universal language was thus comparatively short-lived, it was a pan-European rather than a narrowly British phenomenon. What emerges from a consideration of the larger context is the variety of the motivations that were involved. Thus, for example, the schemes that were developed in England appear to be by and large intrinsically linked with Protestant missionary objectives; it is emblematic that the frontispiece to Beck's real character should depict figures representing Asia, Africa, and America seated at a table and hearkening (as one might expect in such a context) to the words of a European. But not all those involved in Protestant Bible translation were persuaded of the viability of a universal language for these purposes; Robert Boyle, a leading promoter of missionary activities, was keen to inform himself of their progress, but remained profoundly skeptical. Neither, on the other hand, were universal language schemes a uniquely Protestant preoccupation, since similar schemes were developed and promoted by Jesuit scholars such as Athanasius Kircher and others.

Several of the major intellectual figures of the 17th century whose names are associated with universal language did not themselves produce practical schemes but issued programmatic calls that were taken up and elaborated by others. But although it is tempting to group these calls together as representing variants of a single agenda, they each need to be assessed carefully in the context of the larger philosophical program, and it often emerges that what was intended by a 'philosophical language' for one thinker was quite different from, and sometimes incompatible with, that of the next. Thus, the objectives outlined by Francis Bacon were couched in a scientific framework, which was radically different from that of the religious and pansophic reformer Jan Amos Comenius (Komensky), although Dalgarno linked the two names as mentors in the advertisements for his scheme (Dalgarno, 1657). And what Comenius understood by 'universal harmony,' which a universal language should promote, was fundamentally different from the meaning of the rubric of 'harmonie universelle' in the context of which Marin Mersenne made his own call for a

CHAP. II.

Instances of this Real Character in the Lords Prayer and the Creed.

FOr the better explaining of what hath been before delivered concerning a Real Character, it will be neceſſary to give ſome Example and Inſtance of it, which I ſhall do in the *Lords Prayer* and the *Creed*: Firſt ſetting each of them down after ſuch a manner as they are ordinarily to be written. Then the Characters at a greater diſtance from one another, for the more convenient figuring and inter lining of them. And laſtly, a Particular Explication of each Character out of the Philoſphical Tables, with a Verbal Interpretation of them in the Margin.

The Lords Prayer.

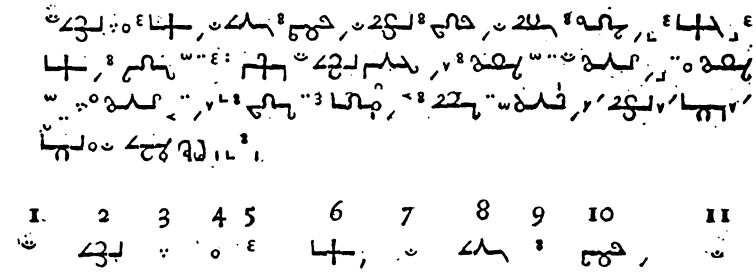

1 2 3 4 5 6 7 8 9 10 11
Our Parent who art in Heaven, Thy Name be Hallowed, Thy
12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Kingdome come, Thy Will be done, ſo in Earth as in Heaven, Give
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
to us on this day our bread expedient and forgive us our treſpaſſes as
44 45 46 47 48 49 50 51 52 53 54 55 56 57 58
we forgive them who treſpaſs againſt us, and lead us not into
59 60 61 62 63 64 65 66 67 68 69 70
temptation, but deliver us from evil, for the Kingdome and the
71 72 73 74 75 76 77 78 79 80.
Power and the Glory is thine, for ever and ever, Amen. So be it.

Eee2 1. (1).

Figure 1 A sample of John Wilkins' 'real character,' 1668.

philosophical language. A more skeptical position on the possibility of a philosophical language was taken by René Descartes. Toward the end of the century, a number of the ideas that were in circulation were picked up and redeployed by Gottfried Wilhelm Leibniz.

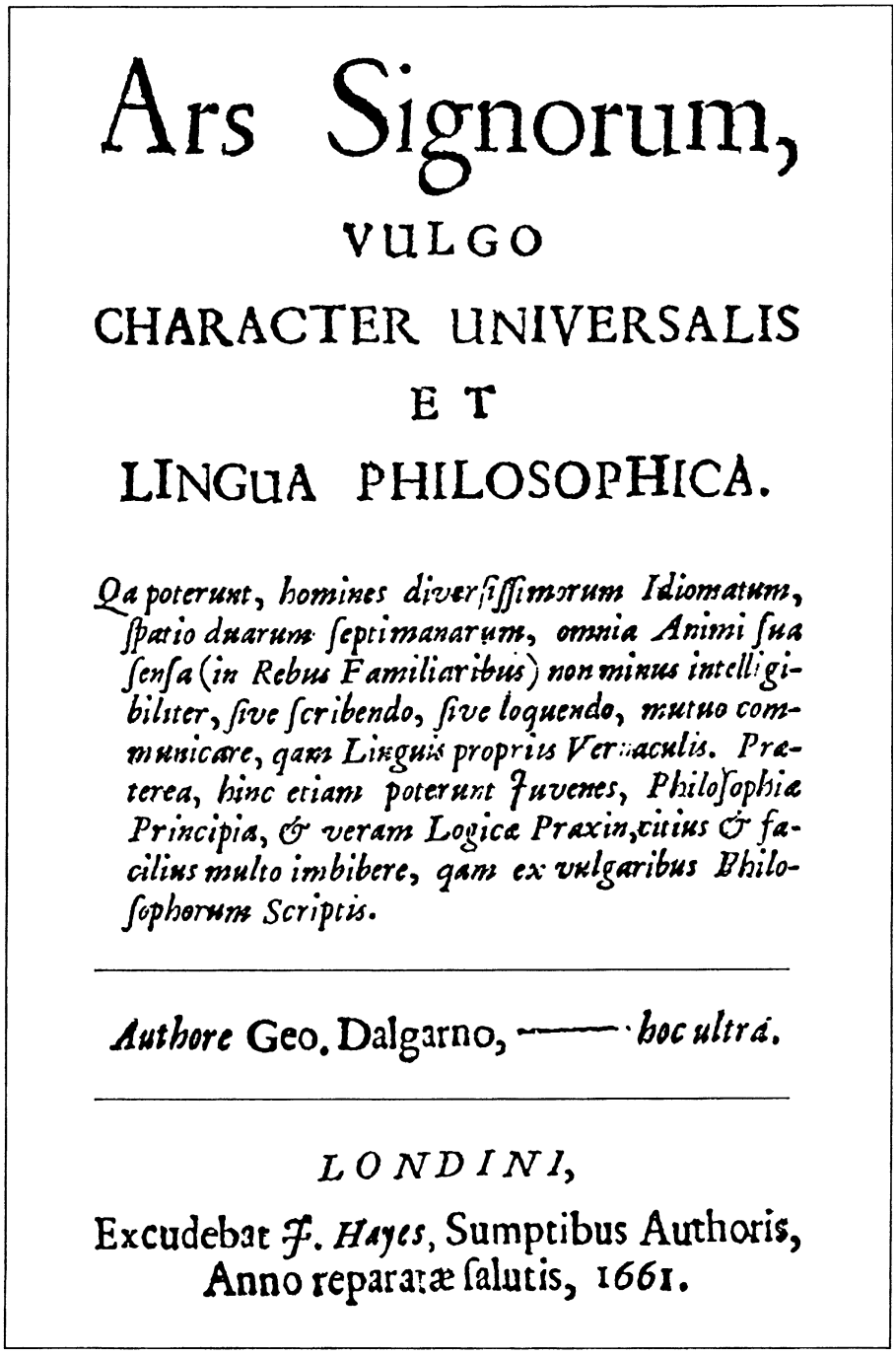

Ars Signorum,

VULGO

CHARACTER UNIVERSALIS

ET

LINGUA PHILOSOPHICA.

Qa poterunt, homines diverſiſſimorum Idiomatum, ſpatio duarum ſeptimanarum, omnia Animi ſua ſenſa (in Rebus Familiaribus) non minus intelligibiliter, ſive ſcribendo, ſive loquendo, mutuo communicare, qam Linguis proprius Vernaculis. Praeterea, hinc etiam poterunt Juvenes, Philoſophiae Principia, & veram Logicae Praxin, citius & facilius multo imbibere, qam ex vulgaribus Philoſophorum Scriptis.

Authore Geo. Dalgarno, —— *hoc ultrà.*

LONDINI,

Excudebat *J. Hayes*, Sumptibus Authoris,
Anno reparatæ ſalutis, 1661.

Figure 2 George Dalgarno's universal language scheme of 1661.

Universal Language and Language Diversity

The above considerations show that discussions of a universal language in the 17th century were central to speculation about language of all sorts, not just about mathematical and logical notation for restricted scientific purposes, nor about simple equivalents to Esperanto. It is thus in the context of universal language schemes that one can find informed and perceptive contemporary discussion of language diversity and language change (for example, in the prefatory matter to Wilkins' *Essay*), and some interesting precursors of language typology in the modern sense.

A final note may serve to highlight both the difficulties and the interest of 17th-century universal

language schemes for the modern reader. In a modern context, the term 'natural language' contrasts with 'artificial language.' In a 17th-century context, a 'natural' language was one that was in conformity with nature, as was the (supposed) original Adamic language. A constructed philosophical language would thus be both artificial and also 'natural' in this sense. What corresponds to the modern concept of 'natural language' would, in a 17th-century context, be an 'instituted language' (i.e., a conventional one). It is of interest that the outcome of the exploration of universal language schemes was often a better understanding of 'instituted languages.' Thus, for example, Dalgarno's recognition that a 'universal character' cannot at the same time be both a shorthand system and a real character led him to the perceptive conclusion that instituted languages, such as English and French, are in effect shorthand systems, i.e., that their simplex words may express ideas that are semantically complex.

A broad history of the quest for a perfect language can be found in Eco (1995; but see the cautionary review by Cram and Maat, 2002). There is a rich bibliography of works available for the reader who is interested in the structural details of individuals schemes, ranging from the early study by Couturat and Leau (1903) to recent works that give access to the primary texts (e.g., Cram and Maat, 2001; Maat, 2004). For studies of the intellectual context of the English schemes, see Salmon (1972), Knowlson (1975), Slaughter (1982), and Lewis (2003). On the lexicological aspects of Wilkins' scheme, see Dolezal (1985), and see Subbiondo (1992) for a collection of studies of Wilkins' *Essay*.

See also: Artificial Languages; Esperanto.

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Uralic Languages

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The 'Uralic' languages derive their name from the Ural Mountains, the assumed homeland of the hypothetical proto-Uralic population that, according to the conventional theory, spanned out into Hungary and across a wide portion of the northern Eurasiatic area, from Norway to Western Siberia (see Figure 1).

Distribution

Of the 22 million speakers of Uralic languages, about 2 million are minority speakers in Russia. The total number of speakers is decreasing; some languages are endangered and others are now extinct. The Uralic language family can be divided into eight language subgroups:

1. Saami (formerly Lapp; 34 000 speakers); about 10 dialectal varieties are spoken in the region between Sweden and the Kola Peninsula in Russia.
2. Finnic (formerly Balto-Finnic), comprising Votic (about 50 speakers, Russia), Ingrian (400 speakers, Russia), Karelian (40 000 speakers, Finland and Russia), Lude (5000 speakers, Russia), Olonetsian (30 000 speakers, Finland and Russia), Veps (6000 speakers, Russia), Livonian (about 10 speakers, Latvia), Finnish (also called Suomi; about 5 500 000 speakers), and Estonian (about 1 000 000 speakers), including the Estonian ethnic/dialectal variety Vôru-Seto (50 000 speakers) in Estonia and Russia.
3. Mordvin (Mordva; 615 000 speakers, Russia), comprising two ethnic/dialectal varieties, Erzya (about 67%) and Moksha (about 33%).
4. Mari (formerly Cheremis; 488 000 speakers, Russia), comprising two dialectal varieties, Hill (Western) Mari (about 10%) and Meadow (Eastern) Mari (about 90%).
5. Permic, or Permian (Russia), comprising Udmurt (formerly Votyak; 464 000 speakers) and Komi, consisting of three ethnic/dialectal varieties, Komi-Zyrian (217 000 speakers), Komi-Permyak

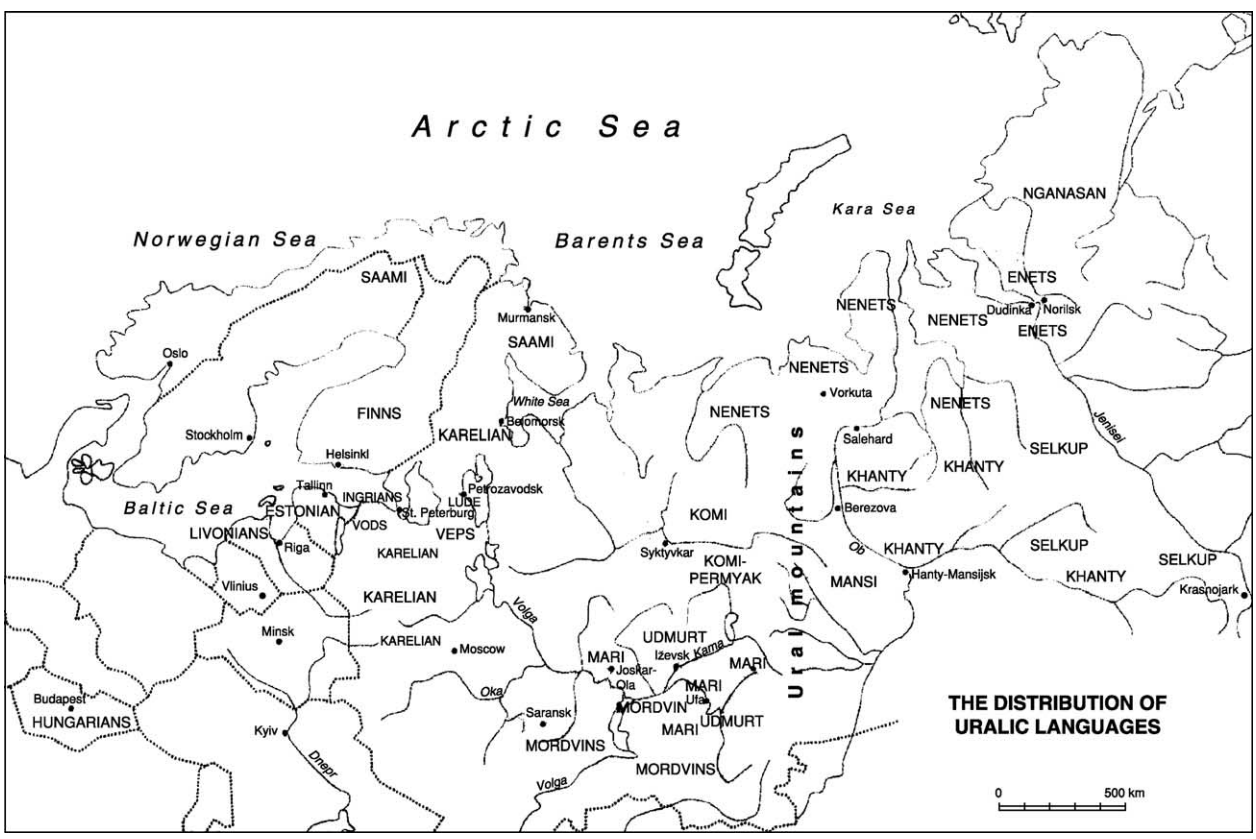

Figure 1 The Uralic languages are spoken by 22 million people. The majority consist of the Finns, Hungarians, and Estonians, living in their nation-states; some 2 million speakers are among the ethnic minorites of Russia. Reproduced with permission from Suihkonen P (2000), *Ugriculture 2000: contemporary art of the Fenno-Ugrian peoples.* Helsinki: Gallen-Kellela Museum.

(94 000 speakers), and Yaz'va-Komi (about 200 speakers).
6. Ob-Ugric (Ob-Ugrian), comprising Mansi (formerly Vogul; 3000 speakers) and Khanty (formerly Ostyak; 14 000 speakers), scattered along the Ob' and lower-Irtysh rivers and tributaries.
7. Hungarian (Magyar; 14 million speakers), including the ethnic/dialectal variety Csángó (100 000 speakers, Romania).
8. Samoyed (Samoyedic), comprising seven closely related languages spoken in West Siberia, i.e., Nenets (formerly Yurak; 32 000 speakers), Enets (formerly Yenisey-Samoyed; about 200 speakers), Nganasan (formerly Tavgy; 1000 speakers), Selkup (formerly Ostyak-Samoyed; 2000 speakers), and three extinct languages, Yurats, Kamas (Kamassian), and Mator (Motor).

Hungarian and Ob-Ugric are conventionally grouped together to form the 'Ugric' subgroup, but the languages are acknowledged to be radically different in phonology, syntax, and vocabulary, and accordingly this group has not been reconstructed from the primary evidence. Several minority languages, including Veps, Mordvin, Mari, Udmurt, Komi, and Ob-Ugric, enjoy official status in their national administrative regions. Despite attempts to revitalize some endangered languages through cultural/educational/political activities and associations (e.g., 'Saami Language Nests' and 'To Save Yugra'), there remains strong pressure to assimilate into the majority languages (Suihkonen, 2002).

Phonology

Most Uralic languages display vowel harmony and consonant gradation, although there are substantial differences in implementation. These features are shared by nearby language groups, including Altaic and Yukaghir. Several Uralic languages also display quantitative vowel and consonant opposition.

Vowel Harmony

Palatovelar vowel harmony, in which the vowels of a word unit, including suffixes, enclitics, etc., are either all back or all front, is found in Finnic (not Estonian and Livonian), Mordvin, Western Mari, some Khanty and Mansi dialects, Hungarian, and Nganasan. Compare Hungarian *kert-be* 'garden-into', *kert-em-be* 'garden-my-into' and *konyhá-ba* 'kitchen-into', *konyhá-m-ba* 'kitchen-my-into'. Labial harmony occurs in Hungarian and Eastern Mari.

Consonant Gradation

Abondolo (1994: 4855) found that most Finnic and Saami languages/dialects display "alternation of strong vs. weak consonant(ism) word-medially in open vs. closed syllables." For example, in comparing Finnish *kirkko* 'church' vs. *kirko-ssa* 'church-INESS' (INESS = inessive) and *papu* 'bean' vs. *pavu-t* 'bean-PL', the first sound of each pair, the strong grade, appears word medially in an open syllable, whereas the second sound, the weak grade, appears word medially in a syllable closed by a suffix. The Samoyed languages display a different, less homogeneous type of gradation. For example, Nganasan presents a complex co-occurrence of various mechanisms, including glottal stop alternation, truncation, syllabic and rhythmic gradation, vowel harmony, and accommodation. In some languages, within specific contexts and/or stems, the original phonetic conditioning factor for gradation has been eroded by subsequent changes; therefore, several inflectional forms can now be distinguished through grade alternation only ('fusion'). Compare the nominative (NOM), genitive (GEN), and partitive (PARTIT) in Finnish *jalka-Ø* 'foot-NOM', *jala-n* 'foot-GEN', and *jalka-a* 'foot-PARTIT' with correspondent Estonian *jala-Ø* (genitive, weak grade) and *jalga-Ø* (partitive, strong grade), in which the alternation is no longer productive.

Vocalism

The smallest vowel inventory (five vowels) is found in Erzya Mordvin; the richest inventory is found in Vakh Khanty, which has 11 full and 2 reduced, front and back (round and unround) vowels. There are diphthongs in Finnic, Saami, some dialects of Mansi, and Nganasan. In several languages, some vowels occur less frequently when not in the first syllable. Most languages (not Erzya Mordvin and most of Permian) present (some sort of) quantitative vowel opposition between two (e.g., Finnish) or three (e.g., Estonian) vowel lengths, to denote different meanings.

Consonantism

Consonantism varies considerably. Finnish has one of the smallest inventories, with 11 consonants, the obstruents being limited to the unvoiced *p, t, k*. Eastern Enontekiö (North Saami dialect) has 31 consonants; the total inventory includes voiced stops, unvoiced nasals, fricatives, affricates, palatal (or palatalized alveolar/dental) series, glides, and laryngeal and glottal stops. Several languages present quantitative consonant opposition between two-way (e.g., Finnish) or three-way (e.g., Estonian and partly Saami) opposition, to denote different meanings. Unlike the other Uralic languages, Hungarian, Permic, and (to a lesser extent) Saami display opposition of voice – for example, voiced *b* and unvoiced *p* denote different meanings.

Word Stress

The stress position varies from language to language, the governing rules often being complex or conditioned by morphophonology or phonotactics. For example, stress is fixed on the first syllable in Finnish, Hungarian, and some Khanty dialects; it is free in Erzya Mordvin, and it falls generally on the last syllable in Udmurt and on the penultimate vowel/vowel sequence in Nganasan. In Nenets, stress position varies depending on morphophonological/syllabic structure. Stress is nondistinctive, except in Udmurt in certain forms.

Morphology

The Uralic languages share -Ø subject marking and a tendency for agglutination, suffixation, absence of copula, and richness of derivational morphology (Abondolo, 1998). These properties are also shared with Altaic. Grammatical, functional, and temporal/aspectual categories are generally language specific, with evidence from historical documents and language examination indicating relatively recent formation. Fusion (see the preceding discussion of consonant gradation) also occurs in varying degrees in several languages, including Estonian, Saami, and Hungarian.

Case Suffixes

The number of case suffixes varies from two (lative and locative) in Northern Khanty to 24 in Komi-Zyrian. In languages with rich suffixation, the majority of suffixes are local suffixes expressing three-way spatial opposition, as in stasis vs. movement ('to' and 'from'). This may be enriched by other suffixes indicating internal vs. external notions in Finnic and Permic. In Hungarian, the additional notion of vicinity is also encoded, as in *ház-ban* 'house-in (side)', *ház-ba* 'house(inside)-into', and *ház-ból* 'house(inside)-from'; *asztal-on* 'table-on', *asztal-ra* 'table(surface-of)-onto', and *asztal-ról* 'table(surface-of)-from'; and *szobor-nál* 'statue-in(the vicinity of)', *szobor-hoz* 'statue(the-vicinity-of)-toward', and *szobor-tól* 'statue(the-vicinity-of)-from'. In Komi-Zyrian and Selkup, the case suffixes also encode animacy.

Plural Markers

Plural markers also vary across the languages, some having a different marker for oblique and/or possessive forms. In Finnish, compare *talo-t* 'house-PL' and *talo-i-ssa* 'house-PL-INESS, in (the) houses'; in Hungarian, compare *birká-k* 'sheep-PL' and *birká-i-m* 'sheep-PL-POSS, my sheep'. The most common plural suffixes are *-t*, *-n*, and *-l*. Saami, Ob-Ugric, and Samoyed have dual suffixes.

Gender and Definiteness

As in Altaic languages, Uralic languages make no gender distinction (except in some nominal derivations), and there are no articles (except in Modern Hungarian); pragmatic and referential notions are typically expressed through the morphological and morphosyntactic apparatus. Mordvin distinguishes indefinite and definite forms of the noun.

Verbs

Verbs are inflected for person, number, tense/aspect, and mood. Typically, there is at least a distinction between present (unmarked) and past tense (marked) and between indicative, imperative, and conditional (except in Mansi). Some languages (e.g., Estonian, Udmurt, and Selkup) also encode the category of evidentiality as mood and/or tense. Reflexivity and causativity are mostly expressed through verbal derivation.

Negation is mostly (although not in Estonian, Hungarian, Ob-Ugric, and Selkup) expressed by an auxiliary (AUX) negation verb, regularly inflected, followed by the main verb, as in the following examples in Finnish:

(1) e-**n** mene
AUX–1SING.PRES go
'I do not go'.

(2) e-**t** mene
AUX–2SING.PRES go
'You do not go'.

Aspect is expressed by various means, including coverbal adverbs, auxiliary verbs, or appropriate marking for the direct object. Compare the different object marking in Finnish:

(3) lue-n artikkeli-**a**
read-I article-PARTIT
'I am reading a/the article'.

(4) lue-n artikkeli-**n**
read-I article-ACC
'I will read the article (completely)'.

Syntax

In the Uralic languages, word order, diathesis, number agreement in noun phrases, and subordinate sentence implementations are generally language specific. In common with Altaic languages, Uralic languages share the following tendencies: postpositions, modifier(s) preceding the modified element within noun phrases, marking as singular all nouns preceded

by any numeral, and expression of subordination through nominalized/nonfinite verbal phrases (Finnish and Hungarian have recently developed subordination through conjunctions).

Basic Word Order

Saami, Finnish, Estonian, Komi, and Hungarian present as subject-verb-object (SVO); Udmurt, Ob-Ugric, and Samoyed present as subject-object-verb (SOV); Mari has a flexible order. Pragmatic/logic/stylistic functions usually play a role in determining word order.

Main Verb Phrases

Verbal phrases may be elaborated in various ways. Ob-Ugric has a passive (personal) voice – e.g., the agent is marked in Khanty by locative. Finnish uses an impersonal passive, and the agent is unspecified. In some languages, extra conjugations encode information about the object, such as number, definiteness, topicality, and referentiality. Hungarian adds one objective/definite (DEF) conjugation to the normal subjective/indefinite (INDEF) conjugation (ACC, accusative):

(5) olvaso-**k**
read–1SING.INDEF
'I read (something)'.

(6) olvaso-**m**
read–1SING.DEF
'I read it'.

(7) olvaso-m a könyv-et
read–1SING.DEF the book-ACC
'I read the book'.

Ob-Ugric adds three objective conjugations, for singular, dual, and plural objects. Nenets, Enets, and Nganasan have five conjugations: one subjective, three objective (as Ob-Ugric), and one objectless/reflexive. The markers differ.

Subordinate Sentences

There are several types of nonfinite (participial, infinitival, and gerundive) verbal phrases. Typically, the verb takes the relevant nonfinite morpheme, and then may be inflected with enclitics, and case, number, possessive, and passive suffixes. Compare Finnish, in which *-ä* (∼ *-a*) and *-ma* (∼ *-mä*) are infinitive morphemes (TRANSLV, translative; EL, elative):

(8) syö-mme elä-ä-kse-mme
eat–1PL live-INF-TRANSLV–1PL
'We eat to live'.

(9) Pekka on koto-na leikki-mä-ssä
Pekka is home-at play-INF-INESS
'Pekka is at home playing'.

(10) Pekka tuli puutarha-sta ä-stä
Pekka came garden-from play-INF-EL
'Pekka came from the garden from playing/ where he was playing'.

Objects

Marking of the direct object is varied and complex, often depending on pragmatic/aspectual factors (as in Examples (3) and (4)), or on the type of sentence the object is in – for example, Hungarian has *-t*, Khanty and Sosva Mansi have -Ø, Eastern Mari and some Samoyed languages have *-m*, Finnish has *-n* or partitive for singular and -Ø or partitive for plural objects, and Udmurt has -Ø for indefinite and accusative for definite objects. Number agreement occurs between subject and predicate. Within the noun phrase, agreement in number and case suffixes occurs in some languages and to various degrees of completeness, being fully developed in Finnish.

Uralic Languages as a Family

The results of recent archaeological, genetic, and anthropological research are inconsistent with the predictions of the Uralic theory, and the significance of the linguistic evidence on which the conventional theory is based has been called into question: for example, there is no reconstruction of the key Ugric node based on the primary evidence, and the common linguistic tendencies appear to be shared with other language groups, such as Altaic. Alternative models have been proposed (see Künnap, 2000; Marácz, 2004; Marcantonio, 2002; Wiik, 2002).

See also: Altaic Languages; Endangered Languages; Estonia: Language Situation; Finland: Language Situation; Finnish; Hungarian; Hungary: Language Situation; Minorities and Language; Norway: Language Situation; Saami; Sweden: Language Situation; Yukaghir.

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Relevant Websites

http://www.helsinki.fi – Helsinki home page, with links to a classification by Tapani Salminen of the Uralic (Finno-Ugrian) languages.
http://www.suri.ee – Website on the history of the Finno-Ugric peoples.

Urdu

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Urdu is the literary, cultural, and religious language of Muslims in India, Pakistan, Bangladesh, and other parts of the world including the United States, the United Kingdom, Germany, and Sweden. The number of Urdu speakers in census data may be under- or overestimated for social and political reasons. However, it is estimated that Urdu is spoken by 54 million worldwide, out of which 43 million speakers are found in India. In addition to being the national language of Pakistan, Urdu is one of the Schedule VIII languages of the Indian democracy, the state official language of Jammu and Kashmir, and the second official language of UP, Bihar, and Andhra Pradesh in India. It is recognized that Urdu, Hindi, and Hindustani share a common grammatical system. Urdu in its colloquial form may therefore be considered the lingua franca of one of the largest speech communities in the world. Urdu is regarded as a pluricentric language that shows different linguistic features.

Origin and Development

Historically, Urdu has developed in a language contact situation over a long period from 1100 A.D. or earlier. After the Muslim invasion of India, it emerged as a speech variety in communication among Muslim rulers, traders, mystics, and the local population. The early form of Urdu developed out of the literary language Sauraseni Apabraṃsa, which was in a state of transition and developing as a New Indo-Aryan language. It had a wide dialect base that included Braj Bhasha, Haryanvi or Bangaru, eastern Panjabi, and other dialects spoken in the region surrounding Delhi. Khaṛi Boli was present as one of the elements in the formative period of Urdu and it gradually became stronger with its development. By 1800, Khaṛi Boli could be considered as the basic source of Urdu. During the period of development, from 1100 to 1800 A.D., Urdu was known by several different names, including Hindwi, Dehalvi, Hindustani, Zaban-e-Urdu, Dakhini or Old Urdu, and Rekhta. The first use of the language name Urdu was made in a couplet in 1776 by the poet Mashafi (1750–1824). However, the use of Urdu, referring to camp, court, or city (Zaban-e-Urdu or Zaban-e-Urdu-e-Shahi or Zaban-e-Urdu-e-Mualla), had been in use from 1560.

Specimens of Hindwi in the early formative period are found scattered in the Nath Panthi literature, early Sufis of North India, Amir Khusro, Nanak, Kabir, Baba Farid, and other poets. Amir Khusro (1236–1324) shows a distinct earlier form of Urdu, or Hindwi as he calls it. However, there is no evidence that the language was in continuous use from 1200 to 1650 except *Bikat Kahani* by Afzal, which appeared 300 years after Amir Khusro's writings. It is therefore not possible to reconstruct a continuous history of the development of Urdu (Chatterji, 1960; Khan, 1958). Insha Allah Khan Insha's *Darya-e-Latafat* ('The river of elegance,' 1807) presents an early linguistic study of the dialects of Delhi and Lucknow.

The emergent variety Hindwi traveled in the south with the Muslim rulers of the Delhi Sultanate (1211–1504) along with the Muslim armies, traders, Sufis, preachers, and other people. It flourished as a literary language in the Decean kingdoms of Golkunda and Bijapur. It was popularly known as Dakhini or Hindwi or Dehalvi. Dakhini has been claimed as

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Dakhini Hindi, Dakhini Urdu, or Old Urdu. It shows some linguistic features that are characteristic of its contact with local languages of the South. However, the origin and development of Dakhini has been traced to Haryanvi, Panjabi, Braj Bhasha, and Khaṛi Boli.

During the Mughal period, Persian was the official language of the court. The elite and noblemen spoke and wrote Persian. The Mughal emperors from Akbar onward spoke an early form of Hindustani at home (Chatterji, 1960). Both the Hindus and the Mughal rulers accepted Braj Bhasha as a literary language. Akbar's courtier, Khan Khanan Rahim, wrote in Braj Bhasha, and even Akbar attempted to write some verses in it. Hindustani or Khari Boli did not develop as a literary language in the north until Wali from Aurangabad arrived in Delhi at the end of the 17th century. Wali demonstrated that Hindustani with a scattering of Persian words could be used to write great poetry. The language used by Wali is known as Rekhta, which means 'scattered,' and implies that Hindustani or Urdu had not been 'Persianized.' The Delhi school of poetry came into existence around Wali during 1700–1720.

By the end of the 18th century and the beginning of the 19th, Urdu, in its modern form, had taken deep roots. Several factors contributed to the emergence of Urdu in its distinct modern form. First, the Dakhini literature was written in the Perso–Arabic script, which had "fixed the orientation of the language" (Chatterji, 1960). Wali and subsequent poets and writers readily adopted the Perso–Arabic script. It became a symbol of linguistic and cultural identity. Second, conscious efforts were made by stalwarts such as Khan Arzu (1689–1756), Shah Hatim (1699–1781), and Mazhar Janejanan (1700–1781) to weed out the Braj Bhasha or indigenous words from Rekhta and incorporate Arabic and Persian words in it during the middle of the 18th century. The extreme Persianization of Urdu became characteristic of the Lucknow school of poetry, whereas the Delhi school developed its own standard form of Urdu. Third, the use of subjunctive constructions, the continuous tenses with 'raha,' the ergative construction with the postposition 'ne,' and the formation of the present tense with imperfect participles became stable and characteristic. Finally, prose began to be written in the emergent Khaṛi Boli by the end of the 18th century. The establishment of Fort William College at the beginning of the 19th century encouraged the development of two styles of prose that paved the way for the emergence of Hindi and Urdu as distinct standard varieties. The two important earliest works in Urdu prose are the *Bagh-o-Bahar* of Mir Amman (1804) and the *Khirad Afroz* of Hafizuddin Ahmed (1803–1815).

Urdu Language: Identity and Conflict

The 19th century may be considered to be the century of consolidation, expansion, and growth of Urdu language identity and literature, on the one hand, and the spread of Urdu and sociopolitical mobilization, on the other. Several mutually interactive forces played a catalytic role in this regard. A synoptic view of some of these factors reflects this. First, after the early prose produced at Fort William College, Urdu literature developed rapidly. All genres of literature, including novel, short story, drama, different forms of prose, and journalistic forms developed and made distinctive achievements. Urdu poets throughout the 19th century flourished, and Urdu entered the modern period with Hali (1837–1914) and Akbar Allahabadi (1846–1921) as well as many others. Muhammad Hussain Azad (1830–1910), in *Ab-e hayat* (1880), provided the first systematic account of the achievements of Urdu poetry, constructing a literary history, a canon, and the theory of poetry. Second, the establishment of several educational institutions, including Delhi College, Anjuman-e-Punjab, and Mohammedan Anglo–Oriental College, played multiple roles in enriching Urdu literature with translations from English as well as original writings in different disciplines. This trend spread the use of Urdu language and literature and contributed to the development of linguistic, literary, and cultural identity. Third, Urdu language and literature gained in momentum when it replaced Persian in 1837. It was used as an official court language along with English in the British-ruled provinces in North India. It gave rise to what is popularly known as the Hindi movement. Between 1868 and 1900, the Hindus of the northwestern provinces fought against Urdu through pamphlets and memoranda. They argued that the Perso–Arabic script was alien to India, that it was unintelligible to common people, and that Hindi written in the Devanagari should be made an official language. As a result of the agitation, in 1881 Hindi replaced Urdu in Devanagari script as the official language of the neighboring province of Bihar. This paved the way for the hardening of cultural-communal attitudes among the speakers of Urdu and Hindi, the divergence of Hindi and Urdu, and the formation of different linguistic identities. This can be seen in the exclusion of Hindu poets and the Hindu community in constructing the history of Urdu literature, on the one hand, and the switching of Hindu writers from Urdu to Hindi on the other (Faruqi, 2001). Prem Chand's switch from Urdu to Hindi was not merely an individual, personal choice but also was intricately involved with interrelated linguistic, political, and economic developments. This

process reached its culmination with the complete identification of Urdu with Muslims in the second quarter of the 20th century.

The conflict between Urdu and Hindi was aggravated by the end of the 19th century and in the second quarter of the 20th century. Two factors played a significant role in this process. First, this period saw the development of voluntary language associations such as Nagari Pracharini Sabha, formed in 1893, Hindi Sahitya Sammelan, founded in 1910, and Anjuman-Taraqqi-e-Urdu, formed in 1903. These associations promoted the cause of Hindi and Urdu, divided the loyalties of Hindi–Urdu speakers and writers, strengthened the linguistic divisions, and consolidated separate identities. Second, the Hindi–Urdu conflict and identities were reinforced by the development of both Hindu and Muslim revivalism and communal antagonism in the context of the Western culture, on the one hand, and the growth of the independence movement, on the other. As a consequence, the political mobilization of the masses contributed to the congruence of symbols of linguistic, cultural, and linguistic identities with the process of nationalism and nation formation. Das Gupta (1971: 57) points out that the identification of nationalism, linguistic, and religions solidarity was "more integral and pervasive" in the case of Muslims as compared to that of the Hindus. Ultimately, the partition of India led to the development of Urdu language and literature in India and Pakistan along different lines. This resulted in two linguistic and literary consequences. First, both the Hindi and Urdu speakers gave up Hindustani on ideological grounds. Although Hindi speakers identified Hindustani with Urdu, the Urdu speakers considered it another form of Hindi. Second, both the Hindi and Urdu speakers lost sensitivity and ability to appreciate the literature in a language other than their own.

Linguistic Description

It is generally recognized that Hindi and Urdu share a common grammatical system. They differ mainly in their writing systems, in their lexicon borrowed from Sanskrit or Persian and Arabic resources, and the minor aspects of syntax. Thus, at the phonological level, Urdu has a subset of phonemes (f x š z ž γ q) because of Perso–Arabic words, whereas Hindi has acquired ṇ ṇ š ṣ from Sanskrit words. Kelkar (1968: 80) points out that "it is highly unlikely that H ṣ ṇ i on the one hand, U q ʔ z x on the other will coexist in the same idiolect." Similarly, Urdu has acquired some other distinctive phonological features. Khan (1978: 10–11) points out that Urdu speakers invariably break up consonant clusters in VCC structure in words of Sanskrit origin, but they pronounce the structure correctly in the Persian and Arabic words. This is partly because of cultural influence of Perso-Arabic vocabulary, and partly because of the educational background of speakers. This refers to the phenomenon of *Schwa* deletion having a wider scope in phonological analysis. Narang and Becker (1971) show that a group of derived nouns and adjectives of Perso–Arabic origin represent an exception to the *Schwa* deletion rule. In short, the distinctive phonological features of Urdu are mainly due to Perso-Arabic words. However, it is generally not specified whether these features are characteristic of written or spoken style or both, or educated or uneducated speakers of Urdu.

The issue of lexical borrowing raises different problems at the lexical or semantic level. Borrowed words may be considered in terms of word classes such as nouns, adjectives, adverbs, compound verb formatives, and so on. For instance, Hindi and Urdu show a clear difference in compound verbs consisting of noun + verb or adjective + verb sequences such as U šurū karnā, istēmāl karnā and H ārambh karnā and prayōg karnā. It is essential to highlight some important issues that are not discussed in the analysis of lexical differences between Hindi and Urdu. First, the studies of distinctive lexicon are based on restricted data as evident from Mobbs (1981) and van Olphen (1989). The implications of the nature and scope of lexical differences between Urdu and Hindi can be understood only on the basis of a large representative sample of both spoken and written varieties belonging to different forms of literature. The corpus of three million words, each in Urdu and Hindi, available with the Central Institute of Indian Languages, Mysore, offers challenging opportunities for a wide range of linguistic studies. Second, it is necessary to recognize that the choice of a word of Persian or Arabic origin does not necessarily imply a choice in favor of Urdu. Similarly, the use of words of Sanskrit origin does not imply Hindi. In other words, both Perso–Arabic and Sanskrit words may have been assimilated and become part of the primary system of Hindustani and thus constitute an integral feature of both Hindi and Urdu. Finally, it is essential to move beyond individual lexical items and bring out the implications of borrowed words in collocations and in reflecting different cultural meanings, values, and history. In other words, it is essential to explore to what extent different sets of Perso–Arabic or Sanskrit vocabulary individually as well as in different collocations contribute to the construction of different conceptualization of entities, events, and situations, and different worldview, at the semantic level. Prem Chand's switch from Urdu to Hindi clearly shows how he found Sanskrit vocabulary congenial to the

themes of his works and the sociocultural worldview related with them (Trivedi, 1989).

The borrowing of Perso–Arabic words in Urdu creates characteristic linguistic features at the grammatical level. This can be seen in a number of word-forming suffixes and prefixes. The process of compound formation in Persian has contributed to productivity of compounds in Urdu. Similarly, the process of word formation in Urdu depends a great deal on Arabic resources. This is particularly evident in the various derived verbs with their associated participles and verbal nouns along with their word forming affixes and vowel patterns added to the root. In other words, the productive process of word formation characteristic of Urdu at the grammatical level shows a deep impact of Perso–Arabic resources. Similarly, the distinctive grammatical features of Urdu can be seen in the use of some prepositions, negative particles, formation of noun duals, or plurals in the case of some nouns that are a result of Perso–Arabic influence. The grammatical analysis of Urdu cannot ignore these linguistic devices, as they are extremely productive and provide a distinctive character. However, a number of issues remain to be explored. First, it is essential to explore how deeply these linguistic devices have influenced the structure of Urdu. It will be useful to study whether these features are particularly typical of literary or administrative language, or newspaper texts, or they are also found in everyday Urdu use. Second, it would be relevant to explore the extent to which these linguistic devices support the process of divergence of Urdu from the colloquial Hindustani grammatical system. In this respect, van Olphen (1989) points out that "it is convergence that threatens Urdu in India." By contrast, Hasnain (1995) shows in a small-scale empirical study of Urdu used in mass media and education that innovations in language based on Perso–Arabic resources of word formation have implications for comprehension or intelligibility of language use. In short, whereas language innovations based on Perso–Arabic resources may contribute to divergence of Urdu from the Hindustani grammatical system, the pressure of comprehensibility may check the trend of divergence. The consequences of the dynamics of convergence and divergence will become clear only in the long run.

Codification and Standardization

Language planning agencies and organizations played a significant role in the development and standardization of Urdu. Anjuman Taraqq-e-Hind, established in 1903, has been in the forefront in the development and promotion of Urdu. After the partition of India, the reorganized organization was less militant and more concerned with the promotion and popularization of Urdu among the people. It has 10 branches in different states and eminent leaders, such as Kazi Abdul Gaffar and Zakir Hussain, have played an important role in its growth. It has made a significant contribution for the recognition of Urdu as a second official language in UP and Bihar and for the extension of its use in schools, colleges, and in radio communication. It has been engaged in the organization of celebration of Ghalib (1797–1869), Iqbal (1878–1938), and Prem Chand (1880–1936) days to popularize Urdu and Urdu conventions involving educational, literary, social, cultural, and political societies (Brass, 1975). Another organization, the Deeni Talimi Council, has focused its attention on the contents of textbooks. It works for the preservation of Muslim cultural values and basic tenets of Islam. Jamia Milia Islamia, established in 1920, has become one of the important educational and academic institutions concerned with Urdu education and academic research. The University Grants Commission recognizes it as a 'central university.' It not only gained prestige and respectability in Urdu education and studies but also played a constructive role in support of Urdu by influencing the language policy of the Union Government (Das Gupta, 1970).

In addition to the nongovernmental organizations, the central and state governments have made a significant contribution to the development and standardization of Urdu. The Bureau for the Promotion of Urdu, established by the Government of India in 1969, has done extensive work on the codification and standardization of Urdu. It has produced 100 000 Urdu technical terms for various disciplines of natural sciences, social sciences, and art, published more than 600 books on academic subjects, and compiled Urdu–Urdu and English–Urdu dictionaries, and Urdu encyclopedias. In UP, Bihar, Madhya Pradesh, Maharashtra, and other states, Urdu academies have been working on translation of books from English, publication of standard literary and scholarly works, university level textbooks, and the promotion of Urdu through seminars and conferences. Similar work on the codification and standardization of Urdu has been going on in Pakistan. The evaluation of the extensive work on development, codification, and standardization of Urdu needs to be studied, focusing on the impact of this on language change and development of pluricentric norms in the two countries. This is also relevant from the point of view of divergence of standard Urdu from the colloquial norm and its implications for comprehension by educated speakers of Urdu.

Although the codification and standardization work by both the government and nongovernmental organizations is essential and significant, it is also important to recognize the contribution of the individuals as creative writers, researchers, scholars, educationalists, linguists, and teachers who play a critical role in the stabilization and cultivation of the standard language. It is not possible to mention all the names of Urdu specialists who have made a substantive contribution to research and development of Urdu. It may, however, be mentioned that several eminent scholars and researchers on Urdu have been recognized for their seminal contribution in various fields of studies on Urdu including Urdu script and spelling reform, lexicography, standardization of pronunciation and vocabulary, historiography of Urdu language and literature, and linguistic analysis and description.

Urdu Literature

Literature has been one of the most significant sources of language development and standardization in the case of many developed languages of the world. The history of Urdu shows parallel development of both literature as well as language. Just as Urdu language was formed in communication and social interaction between two cultures in the situation of language contact, Urdu literature shows fusion of two literary and cultural traditions. The Perso–Arabic elements in Urdu language do not merely constitute a superimposed structure but also form an integral aspect of language identity and its literary tradition. They have a rich semantic potential expressive of Islamic tradition and cultural worldview. Similarly, Urdu literature shows a synthesis between Islamic and Indian cultural traditions at literary, aesthetic, and philosophical levels. Narang (1991) maintains that although Urdu literature has been deeply influenced by Persian literature and rich Iranian and Islamic tradition, it has imbibed Indian cultural influences and has emerged as an expression of the composite culture of India. This is evident from the development of various forms and genres of literature during the last 300 years.

Medieval Urdu poetry shows profound influence of Persian literary tradition in its various forms, imagery, and figures of speech, as well as themes and background. The *ghazal* in the medieval poetry has "no local color," lacks personal touches, and appears to have largely a "museum" quality (Sadiq, 1984). However, in the process of development of Urdu literature over the next two centauries, *ghazal* grew beyond erotic themes. Sadiq (1984: 19) points out that "nothing seems to be alien to its genius and it has readily accommodated ethics, metaphysics, philosophy, mysticism, satire, politics, side by side love, which still continues to be its favourite theme." The semiotic analysis of *ghazals* of Ghalib, Iqbal, Faiz, and Firaq Gorakhpuri (1896–1982) brings out the rich potential of the genre of *ghazal*. The same is true of other genres such as *Masnavi*, *Marsiya*, *Qasida*, and so on. *Masnavis* of Mir Hasan (1727–1786) are soaked with Indian imagery (Sadiq, 1984: 16). Srivastava (1992) shows that *Masnawi* as a poetic form has assimilated in its content Puranic legends, Indian folktales, semihistorical events of Indian soil, and so on in the process of its endogenous growth. The popular love lyric *Qawwali* was not only exclusively developed in India but also became an integral part of the secular North Indian music gaining in popularity, as did its indigenous counterparts such as Hindu Kirtan or Bhajan (Narang, 1991). Mushaira (poetic symposia) has become a popular literary convention in India, Pakistan, and other parts of the world.

The modern Urdu literature has many great achievements to its credit. The individual achievements of great poets, writers, and men of letters are difficult to enumerate. However, it would be adequate to mention a few points that are characteristic of the vitality of Urdu literature. First, the development of Urdu literature has kept pace with the trends and tendencies of the time and produced poets and writers belonging to different traditions, movements, and ideologies. Similar to literary traditions in other major Indian languages, it represents a great deal of involvement, sensitivity, and an awareness of contemporary social reality. For instance, the progressive story writers in Urdu, Rajendra Singh Bedi, Manto (1913–1955), Krishan Chander (1914–1977), and Ismat Chugtai (1915–1991), give expression to economic inequality, social exploitation, and male chauvinism as do their counterparts in Hindi. Quarratul-ain-Haider (b. 1928) and Ismat Chugtai in Urdu focus on Indian women and their consciousness as do Manu Bhandari and Krishna Sobti in Hindi. The Sahitya Akademi award to Ismat Chugtai and the Jnanpeeth award to Quarraul-ain-Haider have gained recognition for Urdu literature at the national level.

Second, Urdu literature is not merely restricted to poetry or fiction. It encompasses a wide range of literary criticism, folk literature, children's literature, and scientific literature. In terms of total literary output, Urdu does not lag behind several major Indian languages.

Finally, it is worth emphasizing that several Urdu poets and writers have carried forward the tradition of the synthesis of the Islamic and the Indian cultures.

In this context, Salahuddin Pervez has achieved a great distinction in his novel *Identity Card* for giving expression to the spirit of Islamic thought and its interaction with the Indian spiritual–cultural system and transforming it into a powerful universal humanistic Indo-Islamic ethos. There is a distinct progress in sincere appreciation and creative assimilation of Buddhist thought and its cultural tradition. Both poets and fiction writers discover a rich potential of myths, jataka tales, and Buddhist philosophy. Quarratul-ain-Haider in her masterpiece *Aag Ka Darya* ('The river of fire') makes an imaginative representation of Vedic and Buddhist elements in the spiritual saga of man. Khalilur Rahman Aazmi (d. 1978), one of the pioneers of the new movement in Urdu poetry, presents Gautam as a symbol of perfection. Similarly, Yusuf Zafar, a leading figure of New Poetry in Pakistan, portrays Buddha as an embodiment of love and compassion and a landmark in the spiritual history of mankind.

In short, Urdu literature shows a genuine creative assimilation of the ancient Indian cultural tradition and philosophy in the context of the contemporary problems of mankind in modern age. The standardization and elaboration of the Urdu language shows not only its communicative dynamics and expressive potential but also the loyalty and identity of its speakers. Thus, the Urdu language and literature have gained recognition because of their vitality and achievements and spread at the international level.

See also: Bangladesh: Language Situation; Hindi; Hindustani; India: Language Situation; Indo–Aryan Languages; Pakistan: Language Situation.

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Uruguay: Language Situation

P A Odber de Baubeta

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The national language of Uruguay and the language of most of its population (estimated at 3 094 000 in 1990) is Spanish, but a Spanish that when spoken may differ quite widely from the standard Castilian of the Iberian Peninsula. Within Uruguay the Department of Rocha is something of an exception, in that Spanish spoken there is the closest to that of the Peninsula, a fact that is accounted for by the Castilian origin of its settlers and its relative isolation from the capital.

The areas in which Uruguayan Spanish differs from standard Castilian include phonology (the pronunciation of-*ll*-in the same way as *y*) and syntax (e.g., the use of the *voseo americano* – the widespread use of *vos* instead of the standard second person singular *tú*, with a modified set of verb endings). The more salient differences, however, are in lexis. A subcategorization of the vocabulary items involved includes the following (some of which are shared by other Latin American varieties of Spanish):

a. Amerindian words. Many Guaraní Indian words are found in the vocabulary of Uruguay in the lexical fields of local flora and fauna: for example, *caraguatá* 'kind of thistle', *ñandú* 'rhea bird'.
b. Archaisms. Some words that are considered archaic in Spain are still current in Uruguay and elsewhere in Latin America: for example, *pollera* 'skirt'.
c. Africanisms. These are found in Uruguayan Spanish because of the slave trade (the first cargo of black slaves arrived in Montevideo in 1756 and slavery in Uruguay was abolished in 1842) and because of Uruguay's proximity to Brazil. Examples are *malambo* 'dance', *macú* 'big drum'.
d. *Lunfardo*. *Lunfardo*, which has been compared with Spanish *caló*, French *argot*, and English *thieves' cant*, was originally the coded language of a very clearly delineated socioprofessional class, those who frequented bars and brothels, and who spent time in prison. It includes such words as *cana* 'prison' and *yeta* 'bad luck'. Based on Spanish, it drew on the language of different immigrant groups (Neapolitans, Genoese), the language used by sailors and dockworkers, and the language of criminals. In certain contexts it may be classified as a kind of professional jargon; see, for instance, the number of different *lunfardo* words used by pickpockets: for example, *grillo* 'side pocket of trousers', *sotal* 'inside pocket of jacket'. *Lunfardo* spread throughout society and became part of popular speech, both rural and urban. It is a major element in the lyrics of the immensely popular tango, which has also caused its dissemination.

In the region where Uruguay borders on Brazil the linguistic situation is considerably influenced by the presence of Portuguese. There are different degrees of penetration, ranging from virtual bilingualism in the towns that stand on the frontier to the existence of several frontier dialects (*brasilero, carimbão, basaño, portuñol*). These may have a Portuguese or a Spanish base; verbs from one language may be conjugated according to the rules of the other; and words may have a Spanish root and a Portuguese ending or vice versa. These dialects are sometimes unintelligible to both Uruguayans and Brazilians.

In schools in Uruguay the most widely taught foreign language is English, partly because many Uruguayans emigrate to English-speaking countries (United States, Australia), but French is also taught. The literacy rate in 1990 for people over 10 years of age was approximately 95%.

See also: Spanish.

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See also: Spanish.

Use Theories of Meaning

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Traditional theories of meaning of the kind proposed by Frege, Russell, and the early Wittgenstein take to heart the idea that language is a system of symbols whose essential role is to **state** or to **represent** the goings on of the world and the mind. From the point of view of a traditional, or representationalist, approach to meaning, the fundamental area of inquiry about language and its significance has to do with the connection between linguistic items and the things they stand for or represent, things or facts. That is why two of the main focal points of traditional theories of meaning are the theory of reference – the exploration of the bond that ties expressions in a language to things in the world – and the theory of propositions – the discussion of the form and the constitution of what is expressed by utterances of sentences and their role in the determination of truth or falsity. So-called use theories of meaning can be best seen as reactions to the fundamental tenets of traditional theories: whereas traditional theories focus on what language represents and how it represents it, use theories search for the key to meaning in actual usage and linguistic practice.

The first strong appeal to use in the theory of meaning appeared in print in 1950, in P. F. Strawson's article 'On Referring.' Strawson's article is meant to be primarily a critical response to the analysis of sentences containing definite descriptions proposed by Bertrand Russell in his seminal paper 'On Denoting.' The merits or demerits of Strawson's specific objections to Russell's theory of descriptions will not be addressed here. The important point for our purposes is rather the positive outlook on meaning that Strawson's remarks suggest. In criticizing Russell, Strawson (1971: 9) contends that "to talk about the meaning of an expression or sentence [is to talk about] the rules, habits, conventions governing its correct use, on all occasions to refer or to assert". Although rather programmatic in character, Strawson's remarks point towards a conception of the significance of linguistic expressions that departs radically from the Frege–Russell–early Wittgenstein approach for, according to Strawson, neither the things that terms stand for, as Russell and Wittgenstein would have it, nor the conceptual material associated with expressions – the sense – that in turn determines what those expressions stand for, as Frege would have it, constitute appropriate answers to the question 'What is the meaning of X?' On the contrary: "to give the meaning of an expression is to give general directions for its use" (Strawson, 1971: 9).

Traditional theories of meaning, with their emphasis on reference and propositions, leave out of the realm of semantic inquiry a host of expressions whose significance cannot be doubted. For what does 'hello' refer to? What proposition do we express, what fragment of the world do we represent, when we say 'hello'? If we do express a proposition, under which conditions is it true or false? Unlike traditional theories, use theories of meaning would explain the meaning of 'hello' and similar expressions by appeal to the rules and conventions that indicate their appropriate use. But it is not only expressions such as 'hello,' 'ouch,' or 'pardon' that, according to use theorists, are left behind by traditional approaches. J. L. Austin argued that this is so for a class of sentences, which he characterized as 'performative,' that look grammatically like any other subject-predicate or subject-verb-object sentence that we use to represent a fragment of the world, such as 'It is raining' or 'The train is late.' We use the latter to tell the way things are and consequently when we utter them we say something true or something false. Performative utterances, on the other hand, do not state or represent the way things are. When we utter a performative, Austin argues, we certainly say something significant, yet it is neither true nor false. The uses of sentences that Austin is thinking of are utterances of, for instance, 'I name this ship *Queen Elizabeth*,' 'I do [take this man to be my husband],' 'I promise to be at the party,' 'I apologize.' According to Austin what all these sentences have in common is that by uttering one of them we do not report or describe a state of affairs, an event or an action. Uttering one of those sentences is actually **performing** an action. Uttering a performative is a speech act. By saying 'I do,' as Austin (1961: 235) puts it, "I am not reporting on a marriage, I am indulging in it". Because utterances of performatives do not function like statements, the question of truth or falsity does not arise with regard to them. However, there are, Austin points out, ways in which performatives can succeed or fail. For instance, if the utterer does not have the authority to give a name to a ship, her utterance of 'I name this ship *Queen Elizabeth*' does not succeed in performing the intended action. For an utterance of a performative to be satisfactory some felicity conditions must be in place.

It is tempting to think that Austin is highlighting a phenomenon circumscribed to a well-delimited class

of utterances, and that for the vast majority of natural language sentences the traditional representational picture applies smoothly. That is not so: what Austin is proposing is not just a specific treatment of a peculiar phenomenon but rather a different conception of meaningfulness. On Austin's view, statements, as much as performatives, are essentially speech acts and are therefore subject to similar conditions of adequacy and success. Suppose we utter a statement such as 'John's children are all very polite' and John has no children. According to Austin, the situation as regards that statement parallels a performative utterance such as 'I promise I will sell you this piece of land' when the piece of land in question does not exist. In the latter case we would say that the sale is void; and in the former case we should say that the statement is void also. Both performatives and statements are subject to the question 'Is it in order?' If the answer is negative, the performance fails. And if the answer is positive, then both performatives and statements are subject to further questions of felicity. Those questions may take different forms depending on the type of speech act: if it is a warning, the question is whether it was justified; if it is a piece of advice, the question is whether it was sound; if it is a statement, the question is whether it was true; in every case, although in different forms, those questions "can only be decided by considering how the content ... is related in some way to fact ... we do require to assess at least a great many performative utterances in a general dimension of correspondence with fact" (Austin, 1961: 250). In this way Austin (1961: 251) takes statements "off their pedestal" and offers a uniform picture of meaning that appeals essentially to our usage of expressions to do things.

Among use theorists we cannot forget Ludwig Wittgenstein, the coiner of the motto 'meaning is use.' In the first part of the *Philosophical Investigations*, completed in 1945 although not published until 1953, Wittgenstein reacts strongly against the traditional conception of meaning. In fact, Wittgenstein is reacting against his own earlier views presented in the *Tractatus Logico-Philosophicus*. Wittgenstein's account of meaning in the *Tractatus*, with its characterization of the proposition as a picture of a fragment of the world, is the paramount example of a traditional representationalist approach. In the *Investigations*, by contrast, Wittgenstein rejects the explanatory project of Frege and Russell: neither the Fregean senses that are supposed to determine the objects expressions refer to, nor the things that on Russell's (and the *Tractatus*'s) approach are directly and conventionally associated with signs, give life and significance to language: only its use gives meaning to a sign.

To understand the kind of practice we engage in when we use a language as members of a speakers' community, Wittgenstein appeals to the metaphor of playing a game. For Wittgenstein, learning a language, like playing tennis, consists in becoming competent at a rule-governed practice. It does not consist in explicitly learning the rules, having them, so to speak, written in one's mind; being able to play tennis, or being able to speak and understand a language consists in being proficient at doing something according to the rules.

Different use-oriented approaches to meaning criticize the traditionalist stance for disregarding the fact that language is a tool that we use to do things, that speaking and understanding a language is a matter of engaging in a practice, and that, consequently, the key to meaning is to be found in the way language users employ language. But how radical the departure from the traditional stance is depends on how the motto 'meaning is use' is interpreted. On the one hand it may be interpreted as a claim about what gives expressions the meaning they have. The appeal to use is then a reminder that languages are social institutions and that it is by virtue of usage that expressions are connected to their meanings. From this point of view, it is not inappropriate to say, for instance, that by virtue of its use, the word 'dog' means a certain concept or that its meaning consists in naming a species. So interpreted, the claim that meaning is use is fundamentally presemantic, it is not a claim about what constitutes the meaning of expressions. So conceived, use theories of meaning are not opposed in essence to traditional theories, although by stressing the meaning-conferring role of use they expand the horizons of the traditional stance, for they make room in semantic theory for expressions whose meaning cannot be cashed out in terms of what and how they represent objects or states of affairs, and they do not disregard aspects of meaning that are not truth conditional.

A more radical way of interpreting the claim that meaning is use is as a semantic claim, i.e., a claim about what constitutes the meaning of linguistic expressions. From this point of view there is nothing over and above the way an expression is used that can qualify as its meaning. Use is not just what makes an expression have a meaning: it is **all there is** to meaning. Some varieties of deflationism take this stance. Thus, for instance, in Horwich (1998: 6) we read: "The meaning property of a word reduces [to] ... the property that every use of the word is explained in terms of the fact that we accept certain specified sentences containing it."

The radical interpretation of the claim that meaning is use faces a number of objections. Here I will

focus on only two general challenges (for discussion, see Horwich, 1998). First, it may be argued that the idea that use determines the meaning of an expression puts the cart before the horse. Intuitively there is a distinction to be drawn between correct or incorrect usage. No matter how pervasive the use of 'irregardless' is, it is an incorrect expression. The very idea of incorrect, but extended, use seems to entail that it is because expressions do have a meaning, over and above the way in which they are used, that we can talk about correct or incorrect usage. Meaning determines (correct) use and not vice versa, so it seems that the claim that meaning is constituted by use has difficulties accounting for the normative aspect of meaning.

Second, the idea that all there is to the meaning of an expression is its use does not leave room for what appears to be a legitimate possibility: a speaker may be competent in the use of an expression, she may know the situations in which it is appropriate to use it and how to react to uses of it, and yet she may not know the meaning of the expression in question. The possibility is, in fact, less far fetched than it appears. Consider the case of Helen Keller: blind and deaf from an early age, she explains in her autobiography how she and her family had developed a rather good system of symbols to communicate their needs and wishes: when she wanted bread, she made a sign, when she wanted ice cream, she made another sign. Her mother had ways to tell Helen what she needed, and Helen would go and get it for her: Helen had mastered the use of a system of symbols. Nevertheless, when she was seven her teacher, Miss Sullivan, once spelled on Helen's hand the sign for water while Helen felt water with her other hand, and that was the moment that she describes as "learning the key to all language." What could she possibly have discovered that she didn't know before? It surely was not how to use the sign 'water' but rather, and quite simply, that 'water' stands for water. Now, it may be argued that learning that 'water' can be used to refer to water is indeed learning something new about the use of 'water.' But then it would appear that even from the point of view of use theories of meaning we need to be sensitive to the fact that expressions represent things and that it is the relation between words and things that makes it possible for us to talk about the world.

See also: Austin, John Langshaw (1911–1960); Deflationism; Normativity; Performative Clauses; Strawson, Peter Frederick (b. 1919); Speech Acts; Wittgenstein, Ludwig Josef Johann (1889–1951).

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Use versus Mention

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Generally, the distinction between using something and mentioning it is completely straightforward. For instance, there is all the difference in the world between mentioning, or talking about, a lawn mower, and using it to mow the lawn. Yet the distinction can engender some confusion when it comes to mental and linguistic representations, and this is what philosophers and linguists have in mind when they talk about the use/mention distinction. The distinction between mentioning a word, picture, or mental representation, and using it to communicate or entertain a thought is best illustrated by example. Sentence (1) uses the word 'Boston,' and sentence (2) mentions it.

(1) Fred is from Boston.
(2) 'Boston' has two syllables.

Philosophers customarily put a word (or complex expression) inside quotation marks, to form its 'quote

focus on only two general challenges (for discussion, see Horwich, 1998). First, it may be argued that the idea that use determines the meaning of an expression puts the cart before the horse. Intuitively there is a distinction to be drawn between correct or incorrect usage. No matter how pervasive the use of 'irregardless' is, it is an incorrect expression. The very idea of incorrect, but extended, use seems to entail that it is because expressions do have a meaning, over and above the way in which they are used, that we can talk about correct or incorrect usage. Meaning determines (correct) use and not vice versa, so it seems that the claim that meaning is constituted by use has difficulties accounting for the normative aspect of meaning.

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(1) Fred is from Boston.
(2) 'Boston' has two syllables.

Philosophers customarily put a word (or complex expression) inside quotation marks, to form its 'quote

name,' if they want to mention it instead of using it, as in (2). Linguists, in contrast, typically use italics, labeled bracketing trees, or a phonetic alphabet to mention an expression, as in (3a–c).

(3a) *Boston* has two syllables.
(3b) [$_{NP}$ Boston] has two syllables.
(3c) bɐs tən has two syllables.

An advantage of the philosopher's convention is that we may easily form the quote name of a quote name simply by enclosing the quote name itself in quotation marks, as in (4):

(4) '"Boston"' is the name of a word, not a city.

We can also mention an expression without using any of these devices, as in (5) and (6).

(5) The first line of Gray's Elegy states a proposition.
(6) Samuel Clemens's pen name is derived from a riverboat driver's call.

Example (5) uses an expression, 'the first line of Gray's Elegy,' to mention the linguistic expression it denotes, namely, 'The curfew tolls the knell of parting day.' Similarly in (6), the expression 'Samuel Clemens's pen name' is used to mention another linguistic expression, namely 'Mark Twain.'

When we talk more systematically about a particular language, as we do in describing its syntax or semantics, we observe the related distinction between object language and metalanguage. The object language is the language under discussion, and the metalanguage is the language we use to talk about the object language. In some cases, the object language and the metalanguage are different languages, as in (7), but the object language and the metalanguage can be the very same, as in (8).

(7) 'Le chien est sur la chaise' is true if and only if the dog is on the chair.
(8) 'The dog is on the chair' is true if and only if the dog is on the chair.

Sentences (7) and (8) mention sentences of the object language (enclosed within quotation marks). The metalanguage, in both cases English, is the language used to state the truth condition of sentences in the object language.

Sentences that mention themselves, such as (9), can give rise to paradox.

(9) This sentence is false.

Sentence (9) appears to have the paradoxical property of expressing a truth if and only if it expresses a falsehood. Many sentences that mention themselves are innocent in this respect, such as (10):

(10) This sentence contains five words.

The paradox only arises for sentences that self-ascribe semantic properties such as truth or falsehood. A central project of a theory of truth is to resolve this paradox.

So far, the use/mention distinction seems easy to keep straight: How could someone confuse the name 'Boston' with the New England city itself? Yet philosophers sometimes charge one another with confusing use and mention of linguistic expressions. Such confusion typically results in mere obscurity, as it does in this passage from Leibniz, as translated by C. I. Lewis.

> Two terms are the same if one can be substituted for the other without altering the truth of any statement. If we have A and B and A enters into some true proposition, and the substitution of B for A wherever it appears, results in a new proposition which is likewise true, and if this can be done for every such proposition, then A and B are said to be the same; and conversely, if A and B are the same, then they can be substituted for one another as I have said (Lewis, 1960: 291).

Richard Cartwright has suggested that the apparent use/mention confusion here makes it difficult to see exactly what Leibniz intended to say in this passage (Cartwright, 1971: 119). Perhaps Leibniz meant that A and B are the same if and only if **their names** can be intersubstituted into any statement without altering the truth value of the proposition that the statement expresses. If this was what he meant, then in some places he should have **mentioned** the names of A and B rather than **using** them, as he in fact did.

In other cases, however, use/mention confusions may ground substantive philosophical mistakes. One such mistake is the familiar confusion of objects with our ideas of them. This mistake arises particularly for philosophically problematic entities such as the number three and Beethoven's Ninth Symphony. It is obvious that they are not concrete objects, but less obvious what else they could be. Since we clearly have ideas of these objects, some have suggested that we identify the objects themselves with our ideas of them. Cursory reflection reveals that this suggestion cannot be correct, since these entities have properties that ideas could not have. Ideas, for instance, cannot be the cube root of 27 or played frequently by the Berlin Philharmonic. Plausibly, what lies behind this suggestion that objects like these are really ideas in our heads is a confusion of our mental representations of these objects with the objects themselves. Like the confusion of the word 'Boston' with the

city of Boston, this is a straightforward confusion of use with mention.

See also: Limits of Language; Metalanguage versus Object Language; Truth: Theories of in Philosophy.

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Petr Karlovich Uslar was born September 1, 1816 in Kurovo, near Tver', Russia. Uslar was a baron, a linguist, an ethnographer, and a pioneering researcher of Northern Caucasian languages. He was Corresponding Member of the Russian Academy of Science in the Historical–Philological Department (1868). Having received the education of a military engineer (1836), Uslar began his military service in the Caucasus. He became a member of the Caucasian Department of the Imperial Russian Geographical Society (1851) and was directed to compose a work about the history of the Caucasus (1858). Uslar began to study the Caucasian languages, believing them to be a significant source of information about Caucasian history.

Studying languages through communication and interaction with native speakers, Uslar became one of the founders of the field of linguistics in Russia. Having devised his own methods of descriptive language analysis, Uslar gave detailed descriptions of Abkhaz, Avar, Chechen, Dargwa, Lak, Lezgi, Svan, Tabassaran, Ubykh, and other Caucasian languages. In a period of linguistic history when there was a lack of generally accepted linguistic terminology and a shortage of investigations of the non-Indo-European languages, Uslar's works presented a rather clear and objective structure of the described languages. Acknowledging the advantages of the Georgian alphabet, Uslar created an alphabet for many Caucasian languages on the basis of the Russian alphabet. He was motivated in his choice by the existence of close and steady interconnections between the Russian nation and communities of the Caucasus. The phoneme systems of the Caucasian languages given by Uslar were precise (with the exception of the Tabassaran phoneme system) and corresponded to the standards of modern phonology even though the notion of 'phoneme' did not exist at that time. Uslar was also one of the creators of the concept of 'passiveness of ergative constructions,' according to which a transitive verb in an ergative construction was equivalent to a verb in the passive voice. Uslar's theory was not without error, because he identified ergative and instrumental constructions and considered a specific construction of Caucasian languages to be a type of an Indo-European construction.

Uslar was also concerned with problems of education, literacy, and the history of the Caucasian people. Thus, he helped to introduce new methods of teaching reading and writing in schools. Uslar stressed that it was essential and much easier for Caucasian people to learn reading and writing (using the Russian alphabet) in their native language first and only after that to begin the study of Russian grammar.

After Uslar's death, all his grammar books (with the exception of the unfinished Tabassaran grammar book, which was first published more than 100 years after his death) were published in the series *Etnografiia Kavkaza: Iazykoznaniie* as *Abxazskii iazyk* (1887–1896), *Chechenskii iazyk* (1888), *Avarskii iazyk* (1889), *Lakskii iazyk* (1890), *Xiurkilinskii iazyk* (1892), and *Kiurinskii iazyk* (1896). Some of the monographs were supplied with articles and letters written by Uslar. All of these works were enriched with samples of folklore, proverbs, sayings, fairy tales, and fables. Each one also had a short introduction into the culture, geography, and history of a given language and a dictionary of a given language in translation from and into Russian.

See also: Caucasian Languages.

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See also: Caucasian Languages.

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Uto-Aztecan Languages

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Uto-Aztecan is a large family of indigenous languages whose descendants are distributed from Oregon in the north to El Salvador in the south, with the heaviest concentrations of contemporary speakers in northern and central Mexico. Today over 45 extant and extinct languages are recognized as part of the family, with some of the extant languages represented by 50 or fewer speakers and others by well over 100 000 (Campbell, 1997; Ethnologue, 2004). In times past, speakers of these languages included peoples displaying the full range of socioeconomic adaptations, from small extended families who lived by hunting and gathering to clans of small village farmers to intensive agriculturalists organized into vast empires. Today, in many communities in the United States, public education and culture change have reduced the number of speakers to dangerously low levels, and language extinction appears inevitable. For others, concerted efforts at language salvage and revitalization that are currently underway may prolong or actually reverse the decline. For several of the more remote and robust languages of Mexico the picture is brighter and there appears to be less danger of significant language loss in the immediate future.

The languages within the Uto-Aztecan family are divided into three more or less contiguous geographic clusters across their broad range. The names for each cluster and views as to their internal relationships have changed through time and are still subject to some debate. The units are generally referred to as (1) Shoshonean or Northern Uto-Aztecan, which includes several branches and languages concentrated in the Great Basin and southern California in the United States; (2) Sonoran, which includes the languages of southern Arizona in the United States and of Sonora, Chihuahua, and Durango in northwest Mexico; and (3) Aztecan or Nahuatl, with languages widespread in central Mexico and outliers in El Salvador. The Sonoran and Aztecan languages are often subsumed under the term Southern Uto-Aztecan, either as a geographic reference to contrast them with the languages of the north or in recognition of a genetic relationship. The languages within each of the clusters and the branches with which they are affiliated are given in **Table 1**.

Records and studies of Uto-Aztecan languages extend back to the time of the Spanish conquest of Mexico with the compilations of Fray Bernardo de Sahagun from 1540 to 1560 on Classical Aztec or Nahuatl, as well as by other early pioneers. Documentation of most of the northern languages did not begin until exploration and colonization of the western United States in the first decades of the 19th century. As explorers, military expeditions, traders, and missionaries began to compile vocabularies of western U.S. and northern Mexican languages, the work on genetic classifications of them began in earnest. Initial compilations by Albert Gallatin in the 1830s and 1840s, Johann Carl Buschmann in the 1850s, and Albert Gatschet in the 1870s, among others, led to the inclusion in the family of most of the languages and branches recognized at present. Most controversial was the linking of Nahuatl to the Sonoran and ultimately Shoshonean languages,

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Uto-Aztecan Languages

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Table 1 Uto-Aztecan languages

Northern Uto-Aztecan
Numic:
Western [2 languages = Mono (Monache, Owens Valley Paiute) and Northern Paiute (including Bannock)]
Central [3 languages = Panamint (Timbisha), Shoshone (Western, Northern, Eastern, Gosiute) and Comanache]
Southern [2 languages = Kawaiisu and Ute (Northern and Southern Ute, Southern Paiute, Chemehuevi)]
Takic:
Serrano-Gabrieliño [3 languages = Serrano (Vanyume), Kitanemuk, *Gabrieliño (Fernandeño)
Cupan [3 languages = Cahuilla, Cupeño, Luiseño (Juaneño)]
*Tataviam (?)
Tubatulabal
Hopi
Southern Uto-Aztecan
Tepiman:
Upper Piman [1 language = (Pima, Tohono O'odham, Nevome)]
Lower Piman [1 language = (Mountain, Yepachi, Yecora-Maycoba)]
Northern Tepehuan
Southern Tepehuan [1–3 languages = (Southern Tepehuan, Tepecano)]
Taracahitan:
Tarahumaran [2–7 languages = Tarahumara (Western, Northern, Central, Southern, Ariseachi, Summit) and Guarijio (Upland, Lowland)]
Opatan [2 languages = Opata and Eudeve]
Cahitan [1–2 languages = Yaqui and Mayo]
Corachol:
Cora [1–2 languages (Cora, Santa Teresa Cora)]
Huichol
Aztecan:
*Pochutla
General Aztec (4–28 languages/dialects = Pipil, Nahuatl (Mexicano, Aztec, Tetelcingo, Zacapoaxtla, etc.)

After Campbell, 1997; Goddard, 1996; Ethnologue, 2004; does not include all extinct* languages.

proposed by Bushmann and accepted by Gatschet in 1878, but rejected by John Wesley Powell in his classification of 1891. Daniel Brinton in his classification the same year accepted the linkage and is credited with naming the family, choosing a northern language (Ute) and a southern one (Aztec) to represent the unity (Goddard, 1996; Lamb, 1964). However, not until Edward Sapir (1913–1914) provided the first systematic study of sound correspondences and lexical reconstructions within the family by comparing Southern Paiute with Nahuatl was the overall relationship considered to be demonstrated. Since that time, work has concentrated on better understanding internal and external relationships for the family, and on the basic description and documentation of the individual languages (Goddard, 1996; Lamb, 1964).

A link between the Uto-Aztecan language family and the Tanoan languages of the U.S. Southwest and thus ultimately to Kiowa of the U.S. Plains was first suggested by Sapir in his 1929 macro-classification of North American Indian languages. This grouping was referred to by him as Aztec-Tanoan, and later given the position of a phylum or superstock. Benjamin Lee Whorf and George Traeger provided sound correspondences and reconstructions to show the Tanoan linkage, although they initially rejected the inclusion of Kiowa. The Kiowa-Tanoan linkage was confirmed in the late 1950s and early 1960s (Goddard, 1996: 313, 317), but the Aztec-Tanoan combination has not fared as well. Suggestions of this and yet more remote relationships for Uto-Aztecan languages, all of which appear doubtful, are reviewed by Campbell (1997).

The internal relationships of some of the Uto-Aztecan branches and sub-branches are still debated. The combinations of languages that make up the northernmost branch, Numic, found in the Great Basin of the United States, are solid. Two languages, Hopi of northern Arizona and Tubatulabal (Tübatulabal) of southern Sierran California, are understood to be independent branches. Early extinctions and thus lack of data for some of the languages of the Takic branch of southern California make internal relationships difficult to determine with certainty, particularly the position of Garbrialiño and Tataviam (Campbell, 1997: 135). Powell and A. L. Kroeber suggested that these four branches were related to each other by more than geography, and referred to them all as Shoshonean (Lamb, 1964). Miller (1983, 1984), based on a review of cognate sets and comparisons of sound systems, rejected this relationship as genetic, preferring to view the four as independent branches of the family. Others accept the unity of these four

branches, citing shared innovations in the sound systems and aspects of morphology as evidence (Goddard, 1996; Campbell, 1997; Heath, 1977, 1985; Manaster Ramer, 1992).

Internal diversity within the remaining branches of the family is also debated, with some arguing for and others against various subgroupings. Again, the problem of language extinctions and thus lack of data enters into the discussion (see Campbell, 1997: 133–135 for details), with Miller (1983) remarking that relationships make the family resemble less a tree than a vine that has been severely pruned! Names for the remaining branches also differ, but there is general agreement on Tepiman (Pimic), Taracahitan (Taracahitic), Corachol (Cora-Huichol), and Aztecan (Goddard, 1996; Campbell, 1997). The position of a fifth branch, Tubar, is likewise debated, with some placing it within Taracahitan (Kaufman, 1974). Some keep Tarahumara and Cahitan as independent branches (Ethnologue, 2004), and others include these with the first three named as a genetic subunit called Sonoran. Sonoran has a long history going back to Buschmann, with the most recent evidence being presented by Hale (1964). The unity of Southern Uto-Aztecan, including Sonoran and Aztecan, is less controversial than the proposal for Northern Uto-Atecan (Campbell, 1997; Goddard, 1996; Heath, 1977, 1985; Manaster Ramer, 1992; Miller, 1983, 1984), although there is still some argument over the position of Aztecan as either having independent status within that unit or being more closely related to Corachol (Campbell and Langacker, 1978).

Most of the languages of Uto-Aztecan, with the exception of those that went extinct early, have been reasonably well studied, beginning with the work on Southern Paiute grammar, texts, and a dictionary by Sapir in 1910 (Sapir, 1930–1931). Most recent in a long line of descriptive works is the publication of the massive *Hopi dictionary* (Hill *et al.*, 1998), representing the largest compilation to date for a Native American language. In between, sufficient descriptive works have been published by numerous authors to provide the data for reconstruction of the basic sound system of the proto-language, as well as an outline of some of its grammatical features, and a partial lexicon.

The Proto-Uto-Aztecan sound system is considered by most to contain a single series of voiceless stops (p, t, c, k, k^w, ʔ), -s, h, two nasals [m, n (or ŋ)], a lateral (l), plus w, y, and possibly r, along with a five vowel system (i, a, ɨ, o, u) plus vowel length (following Campbell, 1997). There is some disagreement as to the identity and directionality of the n, ŋŋ, and l: **n > *ŋ and **l > *n, particularly in selected environments in Northern Uto-Aztecan, or **ŋ > *n and **n > * l in selected environments in Southern Uto-Aztecan (see Campbell, 1997: 136–137) for discussion). The status of **r is likewise not clear, with some suggesting that it is one reflex of **t (Campbell, 1997: 137). Additional work with the cognate sets initially compiled by Miller (1967, 1988) may clarify the matter. The basic sound system has come down to the daughter languages with various alternations, with not all paths particularly clear.

Work on comparative grammar dates to the 1960s and 1970s (Heath, 1978; Langacker, 1977; Steele, 1979; Voegelin, Voegelin and Hale, 1962). Based on these studies, the proto-language is considered to have had several features, including an 'absolutive' noun suffix, used to mark a noun that is neither possessed nor carries another postposition; an auxiliary that contained a complex of modal, pronominal, and tense elements; and various pronomial elements on the verb that marked a reflexive object (Steele, 1979: 444–448). The proto-language is also considered to be a verb final language, with a much richer verb morphology than noun morphology.

The broad distribution of Uto-Aztecan languages has spurred several investigations into the linguistic prehistory of the family, with archaeologists, anthropologists, and linguists making contributions through the years. Comparative lexical work has suggested homelands for Proto-Uto-Aztecan in various locations within its present range, and various features, including agriculture, for its earliest speakers (Fowler, 1983; Hill, 2001, 2003). The language family has thus been fertile ground for testing many hypotheses from historical and theoretical linguistics to anthropological concerns. Today, the expertise of many Uto-Aztecan specialists, especially in the United States, is also being given to Native communities in partnerships addressing language salvage and revitalization in order to preserve these significant languages for speakers in the future.

See also: Cupeño; El Salvador: Language Situation; Hopi; Mexico: Language Situation; Nahuatl; Tohono O'odham; United States of America: Language Situation.

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Uyghur

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Location and Speakers

Uyghur (uyɣur tili, uyɣurča), formerly called Eastern Turki, is spoken in the Chinese Xinjiang Autonomous Region (Eastern Turkistan). It belongs to the Southeastern (Uyghur, Uyghur-Karluk, or Chaghatay) branch of the Turkic language family.

At least 10 million native speakers of Uyghur live in Xinjiang. This region borders Kirghizstan and Tajikistan in the west; Kazakhstan in the northwest; Mongolia in the north and northeast; the Russian Federation in the north; Afghanistan, Jammu, and Kashmir in the southwest; Tibet in the southeast; and the Chinese provinces Gansu and Qinghai in the east. Other languages spoken in Xinjiang include Chinese, Kazakh, and Kirghiz. The speakers of Uyghur predominantly live in the oases north of the Tarim river, on the southern slopes of Tienshan, and on the northern slopes of Kunlun in the southern Taklamakan desert up to the region west of the Lop desert. About half a million speakers of Uyghur live in eastern Kazakhstan, Kyrgyzstan,

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Uzbekistan, Tajikistan, Turkmenistan, Afghanistan, and Mongolia.

The status of Uyghur in Xinjiang is stable. Official documents are issued in both Uyghur and Chinese. Though education in Uyghur is possible up to the university level, Chinese, the dominant language, is necessary for higher education. The Uyghurs make strong efforts to maintain and cultivate their language. In Kazakhstan, a few Uyghur schools exist, and there is a certain publishing activity in Uyghur.

Origin and History

The Old Uyghurs, living near the Selenga River on the territory of today's Mongolia, were vassals of the eastern Türk confederation. They defeated the Türk in 744 and created an empire that extended from Lake Baikal to the Altay Mountains. From here, they expanded their realm to Gansu in the east, and incorporated the Tarim basin and the Ferghana valley. The Uyghurs entertained close contacts with China, adopted Manicheanism, and acted as the religion's protective power.

In 840, the Uyghurs were defeated by the Kirghiz, another Turkic-speaking tribal confederation. Most Uyghurs and many of their subjects fled southward. One group settled in the Ordos region of northern China and assimilated with Chinese and Mongols. The Uyghurs who settled in the Gansu corridor of western China, establishing contact with Tibetans and Mongols, are the ancestors of today's Yellow Uyghurs. The largest group fled to the Tarim basin. In Turfan, the southwesternmost possession of their steppe empire, the Uyghurs established the kingdom of Kocho, which expanded rapidly over large parts of the Tarim basin. It existed until the Mongol invasion in the 13th century, and as a semiautonomous state for some time afterwards. A rich sedentary culture emerged, in which the Uyghur language was used for a comprehensive literary production.

Various Turkic groups had settled in this region from the 6th century on, particularly in the colonies of the Türk empire. The western Tarim basin was predominantly populated by Karluks. Large parts of the area had thus been Turkicized long before the Uyghurs settled here. The Turkic-speaking groups eventually absorbed the indigenous non-Turkic population of Indo-European origin, i.e., speakers of Soghdian (Sogdian) and Tokharian. The southern oases north of Kunlun were mostly populated by Saka speakers. Their region, which had its center in Khotan, essentially remained untouched by Turkicization up to the Mongol period.

The Old Uyghur culture was finally extinguished through the advancement of Islam. The first Islamic Turkic state in the east, the Karakhanid empire, was established in the 10th century, with Kashgar developing into the leading Islamic center in the east. Later on, the oasis states of the Tarim basin were controlled by Karakitay, Mongols, Junggars, and various local rulers. In the 20th century, Eastern Turkistan became a bone of contention in conflicts between Russia, China, and Britain.

Related Languages and Language Contacts

Uyghur is closely related to Uzbek. Modern Uyghur partly goes back to Old Uyghur, which is close to the language of the Orkhon inscriptions of the Türk dynasty. It is not a direct continuation of Old Uyghur, but differs considerably from it as a result of interaction with Indo-European varieties such as Soghdian and Tokharian, and other Turkic varieties. The Turkic varieties of Eastern Turkistan, a major crossroad of Central Asia, have been in contact with numerous other languages. A strong substratum influence has been exerted by speakers of Indo-European shifting to Turkic. Uyghurs had early contacts with Mongols, and later contacts with Kirghiz and Kazakhs. Elements of Persian and Arabic origin were spread by merchants and religious teachers along the Silk Road. Contacts with Russian began in the early 20th century. The long contacts with Chinese have been particularly important. The presence of Chinese speakers in Xinjiang has increased considerably since the 1950s.

The Written Language

Old Uyghur was a highly developed literary language, attested by rich historical materials, mostly of a religious – predominantly Buddhist, but also Manichaean and Nestorian Christian – nature. A rich treasure of Old Uyghur documents, written in various scripts, has been preserved, the last ones dating back to the 15th century. In the Islamic era, Eastern Turkistan was the birthplace of the literary language known as Karakhanid ('Khakani' Turkic), created in the 11th century in Kashgar, the cultural center of the Karakhanid state. Kashgar also became the basis of the eastern variety of the transregional literary language Chaghatay, which developed from the 15th century on in the Timurid realm. Modern written Uyghur is the last stage in this literary tradition.

In 1922, an assembly in Tashkent decided to adopt the historical term 'Uyghur' for speakers of Eastern Turki in Russian Turkistan. The designation was officially accepted in Xinjiang in 1934. Standard Uyghur, the official local language of Xinjiang, was originally

based on varieties spoken in the Ili region, mainly on Soviet territory. The basis of the current standard language are the dialects of Ghulja and Ürümchi. Since 1954, the Language and Script Work Committee (Til-yėziq xizmiti komiteti) is responsible for its norms. The current standard pronunciation was determined in 1987 and slightly revised in 1997.

Modern Uyghur was first written with Arabic script. A Cyrillic script was introduced in 1957 but soon replaced by the Roman-based 'new script' (*yėngi yėziq*), based on the Chinese pinyin system. Since this experiment was unsuccessful, the Arabic-based 'old script' (*kona yėziq*) was revived in 1983. The return to it has made written communication with other Turkic-speaking groups more difficult. For Uyghur varieties of the Soviet Union, Arabic script was used up to 1930, then a Roman-based alphabet was used, and, from 1947 on, a Cyrillic script, which is still used in Kazakhstan, Kyrgyzstan, and Uzbekistan.

Distinctive Features

Uyghur exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation, e.g., *A* = *a/e*, *G* = *ɣ/g*, *K* = *q/k*. Segment within round brackets occur after consonant-final stems only. Hyphens are used here to indicate morpheme boundaries.

Phonology

Uyghur displays many features that are lacking or uncommon in other Turkic languages. The back vowel *ï* is missing in many environments where it is normally found in Turkic, e.g., *yil* 'year.' It is present in the neighborhood of back velars, e.g., *qïz* 'girl' (written *qiz*). The Arabic-based script does not distinguish the vowels *i* and *ï*, though it otherwise provides diacritic signs to designate vowels in an unambiguous way. The typical Turkic frontness-backness and rounded-unrounded harmony is preserved. The latter is relatively weak, many suffixes lacking variants with rounded vowels.

Certain vowel changes and phonological irregularities, in particular regressive assimilations, can be interpreted as Indo-European substratum phenomena. Unaccented nonhigh vowels are raised in open syllables, i.e., *a*, *e*, *ė* > *i*, *o* > *u*, *ö* > *ü*, e.g., *bali-lar* 'children' (*bala* 'child'), *yürüg-üm* [heart-POSS.1.SG] 'my heart' (*yürek* 'heart'). Words of Arabic and Persian origin are not subject to this rule. Two rules of regressive assimilation may be due to contact with Iranian. First, *a* and *e* in open first syllables are raised to *ė* under the influence of *i* or *ï* of the following syllable, e.g., *ėt-im* [horse-POSS.1.SG] 'my horse' (*at* 'horse') or 'my meat' (*et* 'meat'). Second, *a* and *e* in open first syllables are rounded under the influence of *u* or *ü* in the following syllable, e.g., *tömür* 'iron' < *temür*.

Finally *-G* is preserved in monosyllabic words, e.g., *taɣ* 'mountain,' but it is mostly changed to *-K* in nonfirst syllables, e.g., *taɣ-lïq* [mountain-DER] 'mountainous.' Initial *ž-* occurring before high vowels corresponds to *y-* in many other Turkic languages, e.g., *yil* 'year' (Turkish *yıl*). The consonants *r* and *l* are often deleted, particularly before obstruents, e.g., *qa[r]* 'snow,' *qa[r]ga* 'crow,' *bo[l]sa* [be(come)-COND.3.SG] 'if it is.' Loanwords are restructured according to native phonotactical rules. Thus, *f* is mostly replaced by *p*, e.g., *pikir* 'idea' (<*fikr*). Nonpermissible consonant clusters are broken up by means of epenthetic/prothetic vowels or consonant deletion, e.g., *xalïq* 'people' (<*xalq*), *iradiyo* 'radio,' *dos* 'friend' (< *dost*).

Grammar

The ablative suffix is *-Din*, as in Old Uyghur, whereas most Turkic languages exhibit *-Dan*, e.g., *öy-din* [house-ABL] 'from the house.' Uyghur has lost, as Chaghatay already had, the 'pronominal *n*,' which occurs, in most Turkic languages, in third person possessive suffixes before case suffixes, e.g., *öy-i-ge* [house-POSS.3.SG-DAT] 'to her/his house' (cf. Turkish *ev-in-e* [house-POSS.3.SG-DAT]). The polite form of the second person plural pronoun is *si-ler* [you-PL]. There is a general present tense marker going back to **-a tur-ur* (converb suffix + 'stands'), e.g., *oqu-y-du* [read-CONV-3.SG] 'reads, will read,' and a more focal present marker going back to **-p yat-a tur-ur* (converb + 'lie' + converb + 'stands'), e.g., *oqu-wati-du* [read-FOCAL.PRES-3.SG] 'is reading.' Evidentiality is expressed with the copulas *ėken/ėmiš* and the past suffix *-(i)p-tu*. The marker *-gan-di* expresses presumption. More than 20 auxiliary verbs are used in postverb constructions to express manner of action.

Lexicon

Uyghur displays numerous words of Arabic and Persian origin. Many words for abstract concepts are inherited from the Karakhanid-Chaghatay literary tradition. Though this influence has now decreased, one-fifth of the vocabulary is still of Arabic-Persian origin. A large part of the modern technical and administrative vocabulary has been copied from

Russian. The lexical influence of Chinese has become increasingly stronger, and many Chinese neologisms have been copied. In the 1960s, the use of Chinese scientific terminology was obligatory. There is now a tendency to replace Chinese words with products of Turkic word formation, loan translations, and internationalisms copied from Russian.

Dialects

The classification of Uyghur dialects is still controversial. A northern group includes dialects spoken north and east of the Tienshan mountains and immediately south of them. It comprises the westernmost dialects of Kashgar and Yarkent, the more central dialects of Aqsu and Kucha, and the eastern dialects of Turfan and Qumul. The Kashgar-Yarkent dialect is strongly influenced by varieties of Western Turkistan. The Turfan dialect is of special interest, since it seems to stand in a direct historic relationship with Old Uyghur. A particular variety is Taranchi, spoken in the Ili valley by groups that emigrated from Eastern Turkistan at the end of the 18th century. This dialect, which is close to Uzbek, served as the basis of written Uyghur in Russian Turkistan. It is still spoken by Uyghurs in Kazakhstan, Kyrgyzstan, Uzbekistan, etc. A southern group comprises the Khotan dialects. A third group consists of the now nearly extinct Lopnur dialect, which was spoken the eastern Tarim basin and displayed Kirghiz and Mongolian influences. The Khoton (or Busurman 'Muslim') dialect is spoken in the region between the lakes Ubsu-nur and Chirgis-Nur in western Mongolia. The Eynu variety, spoken at various places in southwestern Xinjiang, combines an Uyghur morphosyntax with a special vocabulary of non-Turkic – partly Iranian and partly unknown – origin. Its speakers, all adult men, use it as a secret language to make their conversations unintelligible to outsiders. Salar and Yellow Uyghur were formerly considered dialects of Uyghur. Salar is of Oghuz Turkic origin, whereas Yellow Uyghur is the continuation of an Old Uyghur dialect.

See also: Altaic Languages; Kazakh; Kirghiz; Turkic Languages.

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Uzbek

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Location and Speakers

Uzbek (*ozbek tili*, *ozbekcha*) belongs, like modern Uyghur, to the southeastern (Uyghur, Uyghur-Karluk, or Chaghatay) branch of the Turkic language family. It is spoken in various dialects in Western Turkistan, primarily in the Republic of Uzbekistan (*Ozbekiston Respublikasi*), which occupies the major part of Transoxiana and has common borders with Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan. The Uzbek-speaking areas are concentrated in the the lower Zerafshan and upper Syrdarya valleys and in the Ferghana valley, west and northwest of western Tienshan. Though the Uzbeks make up 80% of the population of the republic, Uzbek is spoken by less than 75%, i.e., about 19.8 million people. Other languages of Uzbekistan include Russian and Tajik. The latter is mainly spoken in the oases of Bukhara and Samarkand and in the Ferghana valley. Russian is mainly spoken in the capital,

Russian. The lexical influence of Chinese has become increasingly stronger, and many Chinese neologisms have been copied. In the 1960s, the use of Chinese scientific terminology was obligatory. There is now a tendency to replace Chinese words with products of Turkic word formation, loan translations, and internationalisms copied from Russian.

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Tashkent. Karakalpakistan, which comprises the northwestern part of Uzbekistan, is an autonomous republic with a special status and a language of the Kazakh type. Karakalpaks make up 2% of the population. Many Karakalpaks use Uzbek as a second language. Uzbek is also spoken in parts of Tajikistan (1.2 million speakers), northern Afghanistan (1.5 million), Kyrgyzstan (600 000), Kazakhstan (350 000), Turkmenistan (360 000), and China (Xinjiang) (15 000). The total number of speakers amounts to about 24 million people.

Uzbek–Russian bilingualism is widespread in Uzbekistan, and Russian has a strong position. Uzbek is, however, one of the most firmly established Turkic languages, the second after Turkish in terms of cultural importance. It has been subject to systematic language planning and cultivation. Post-Soviet Uzbek is in a transitional period of dynamic developments. In general, the status of the Russian language has declined. In the first post-Soviet years, Russian was still defined as the medium of 'crossnational communication' in Uzbekistan. Later, it lost this role and its status as a compulsory subject in Uzbek education. However, the goal of enforcing obligatory use of the indigenous languages in public functions within a few years' time has proved unrealistic.

Origin and History

The historical background of the current linguistic situation is highly complex. In what is now Uzbekistan, varieties of southeastern Turkic have been spoken for a millennium, both by nomadic groups and by a sedentary population in close contact with Iranian-speaking groups. An intensive Iranian–Turkic bilingualism developed in Transoxiana and Ferghana. Sizeable Iranian-speaking groups eventually shifted to Turkic. The Uzbek conquest brought in a different element (the original Uzbeks spoke a Kipchak language of the Kazakh type). After the fall of the Golden Horde, the Uzbeks left the Kipchak territory in the Ponto-Caspian area, seized the power in Transoxiana in about 1500, overthrew the Chaghatay empire, and established the khanates of Khiva and Bukhara. The language of these politically dominant groups was gradually absorbed by varieties of southeastern Turkic ('de-Kipchakization'). Different degrees of maintenance of Kipchak elements and of Iranicization mirror the transition from nomadic to sedentary life. Modern Uzbek is based on the language of the old sedentary Turkic population but displays a few Kipchak features. The original Kipchak varieties have gradually vanished with the abandonment of the nomadic lifestyle. Some remnants of them are found in northern and northwestern Uzbekistan. Russia conquered Uzbekistan in the late 19th century. In the 1920s, Soviet Turkistan was split into a number of socialist republics, and an Uzbek republic was set up in 1924.

Related Languages and Language Contacts

Uzbek is most closely related to modern Uyghur, with which it shares important features. The oldest Turkic population of the area had close relations to speakers of Iranian. The predecessor of Uzbek was strongly influenced by Sogdian and, after the Muslim conquest, New Persian. Long-standing intensive contacts with East Persian have led to copying of numerous features in phonology, morphology, vocabulary, and syntax. There are many striking structural similarities between Uzbek and Tajik. These influences, along with later Kipchak Turkic and Russian influences, have given Uzbek a highly composite character. Uzbek–Tajik bilingualism is still alive in some areas, e.g., in and around Samarkand and Bukhara. An increasing Uzbek influence on Tajik may be observed. Kirghiz–Uzbek bilingualism is found in Kirghiz towns bordering on the Uzbek Ferghana valley.

The Written Language

Persian was for a long time the prestigious language of administration and higher culture in Transoxiana. Its importance later decreased in favor of Chaghatay, the Persian-influenced literary language of the Chaghatay empire cultivated in Samarkand, Bukhara, Tashkent, Ferghana, and other centers. From the 18th century on, Chaghatay developed further through successive modernization and adaptation to regional spoken varieties. The 'Sart' literary language, used until 1920, consisted of Chaghatay with certain modern regional elements. After the Russian conquest of the region, Uzbek was established as the standard language. It was first based on northern dialects, and later, after 1937, on the southern dialects of Tashkent and Ferghana. Modern standard Uzbek is the common 'roof' of highly different varieties.

Uzbek was first, as Chaghatay, written in Arabic script. A Roman-based script was introduced in 1929 and revised in 1934. In 1937, the orthography was simplified. Due to this reform, Uzbek texts became less easily intelligible to readers in neighboring Turkic areas. The old role of Uzbek as a transregional language was thus drastically restricted. A Cyrillic-based script was introduced in 1940 and 1941 and was later modified. The transition to a Roman-based alphabet was enacted by law in 1993. The new script system

was revised in 1995. It is based on the American Standard Code for Information Interchange (ASCII) and dispenses with diacritic signs. The new system preserves the principles of the Cyrillic-based system. It essentially represents a transliteration of the Cyrillic spelling and is thus very different from the Roman-based system of the 1930s.

Distinctive Features

Uzbek exhibits most linguistic features typical of the Turkic family (*see* **Turkic Languages**). It is an agglutinative language with suffixing morphology, sound harmony, and a head-final constituent order. In the following discussions, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation, e.g., A = a/e, G = γ/g, K = q/k. Hyphens are used to indicate morpheme boundaries.

Phonology

The phonetic realizations of the vowels vary greatly. The standard orthography is very vague about the actual pronunciation. With the revision of the Roman-based script in 1934, the vowel signs were reduced to six. When, in 1937, the strongly Iranicized Tashkent dialect was chosen as the norm for the standard language, the signs for *ö*, *ü*, and *ï* disappeared, and the front vowel *æ* was written with the letter 'a.' These principles have been maintained in the new Roman-based system. Modern spelling thus applies a system of six vowel signs, identical with the system used for Tajik. It does not reflect the fact that the distinctions between back and front vowels have been largely preserved.

Standard Uzbek is claimed to have, as a result of Iranian influence, the six vowel phonemes *a*, *e*, *å*, *i*, *o*, and *u*. This analysis is mirrored in the orthography. The sign 'a' stands for a front *æ*, but also for a backed 'a' when adjacent to back-velar or uvular consonants. The higher vowel *e* occurs in first syllables, e.g., *er* 'husband' and *keræk* 'necessary.' A labialized *å* occurs in first syllables, e.g., *ålti* 'six' and *åra* 'interval,' confusingly enough written with the letter 'o.' Similarly, the letter 'i' stands for a front *i*, but also for a backed *ï* when adjacent to back-velar or uvular consonants, e.g., *yaxšï* 'good.' High, unrounded vowels are often reduced or lost in closed syllables before certain consonants, e.g., [b^{i}r] 'one.' The vowels *ȯ* and *u̇* (with a somewhat retracted pronunciation) occur instead of Common Turkic *ö* and *ü*, e.g., *ȯlik* 'dead' and *tu̇n* 'night.' The distinctions *o* vs. *ȯ* and *u* vs. *u̇* are not reflected in the script. Thus, pairs such as *bol-* 'become' vs. *bȯl-* 'divide' and *uč* 'end' vs. *u̇č* 'three' are homographic in modern spelling.

Due to Iranian influence, the manifestations of sound harmony are less straightforward than in most other Turkic languages. There are disturbances of the vowel harmony in most urban dialects, whereas the northern dialects have preserved vowel harmony. Suffixes are very often invariable and their vowels are not assimilating to the frontness–backness or the roundedness–unroundedness of the preceding vowel.

The notation of consonants in the new orthography follows the principles of the Cyrillic-based script. For example, 'ch' represents *č*, 'sh' represents *š*, and 'j' represents *ǰ*. The back velars *q* and *γ* are represented by *q* and *g'*; the front velars *k* and *g* are represented by 'k' and 'g'. As in Uyghur, final *-G* has mostly changed to *-K* in nonfirst-syllable positions, e.g., *sariq* 'yellow' and *tirik* 'alive' (cf. Turkish *sarı* and *diri*).

The realizations of suffixes are highly regular. Uzbek displays less consonant assimilations of suffix-initial *n*, *d*, and *l* than most neighboring languages do. The standard spelling is basically morphological and normally does not indicate vowel harmony or consonant assimilations. In loanwords, high epenthetic vowels are inserted to dissolve nonpermissible consonant clusters, e.g., *fik^{i}r* 'thought' (written *fikr*). However, elements of Russian, Arabic, and Persian origin usually reflect the original forms as written in Cyrillic and Arabic script. Assimilations and other adaptations are thus obscured, e.g., *nisbat* 'relation' for [*nispæt*].

Grammar

Uzbek lacks the 'pronominal n' in the declension of nouns with third-person possessive suffixes, e.g., *qol-i-da* [hand-POSS.3.SG-LOC] 'in his/her hand' (Turkish *kol-un-da* [hand-POSS.3.SG-LOC]). The genitive suffix *-niŋ* is mostly pronounced as *-ni*, thus coinciding with the accusative suffix. Like Uyghur, Uzbek has abandoned the old pronominal flexion in favor of nominal flexion, e.g., *sen-gæ* [you-DAT] 'to you' (Turkish *sana* [you-DAT]). The demonstrative pronouns constitute a four-place system with *bu* 'this,' *šu* 'this (in view),' *oša* 'this (in view, more distant),' and *u* 'that.' Lower numerals can assume the suffix *-tæ*, e.g., *ikki-tæ* 'two (pieces).' The suffixes *-åw* and *-ælæ* form collective numerals, e.g., *ikk-åw* 'the two' and *ikk-ælæ-si* [two-COLL-POSS.3.SG] 'both of them.'

The general present-tense marker goes back to converb suffix + 'stands,' e.g., *kel-æ-di* [come-PRES-3.SG] 'comes, will come.' More focal present markers include *-(æ)yæp* and *-(æ)yåtir*, going back to constructions with *yåt-* 'to lie,' e.g., *yåz-yæp-ti* [write-FOCAL.PRES-3.SG] 'is writing (just now)' and *kel-æ-yåtir* [come-FOCAL.PRES-3.SG] 'is coming.' Other focal forms with various nuances can be formed with auxiliary verbs meaning 'to stand,' 'to sit,' or 'to

move,' e.g., *yåz-ib turib-mæn* [write-FOCAL.PRES-1.SG] 'I am writing.' Evidentiality is expressed by the indirective past marker *-(i)bdi* and the indirective copula particles *ekæn/emiš*, e.g., *ayt-ib-di* [say-EV-3.SG] 'obviously said,' *unut-ib-mæn* [forget-EV-1.SG] 'I have obviously forgotten,' and *kæsæl ekæn* [ill COP.EV] 'is obviously ill.' The interrogative forms *-mi-kæn* and *mi-kin* express doubt, e.g., *kel-gæn-mikan?* [come-POSTTERMINAL.PAST INTERROG] 'has (s)he really come?' The postterminal ('past') marker *-gæn* is used as participle and as a finite form, as in most other Turkic languages, corresponding functionally to Turkish *-mIş*, *-(y)An*, and *-DIK*. There is also an intraterminal ('present') participle in *-digæn*. Postverb constructions with converb forms of the lexical verbs plus auxiliary verbs are used to express semantic modifications, including manner of action, e.g. *-æ ber-* 'to do continuously, to keep doing.' The Persian impact on Uzbek syntax is considerable.

Lexicon

The Uzbek vocabulary contains many loans of Arabic–Persian origin, mostly copied from Persian and inherited from the old literary language, Chaghatay. The strong Iranian influence on Uzbek has led to borrowing of word-formation affixes, even prefixes, e.g., *nå-toγri* 'untrue' (*nå-* 'non-' copied from Persian plus Turkic *toγri* 'right, true'). Female gender is expressed in some nouns borrowed from Arabic and Russian, e.g., *šåir-a* [poet-FEM] 'poetess' (*šåir* 'poet') and *student-ka* [student-FEM] 'female student' (*student* 'student'). Most conjunctions are of Arabic–Persian origin.

Dialects

The dialects exhibit different degrees of Iranicization. The northern dialects, spoken in southern Kazakhstan, north of Tashkent, show little Iranian influence. Southern Uzbek includes the dominant urban dialects of Tashkent, Bukhara, Samarkand, etc., which go back to varieties of the settled populations. They have been heavily influenced by East Persian in their vowel system, for example. Moderately Iranicized dialects are spoken east of Tashkent, in the Ferghana valley, representing a successive transition to Uyghur. The rural dialects of the Kipchak type are Kazakh dialects. Oghuz Turkic dialects, improperly called Oghuz Uzbek, are spoken in Khorezm and adjacent areas. Related dialects are also spoken in southern Uzbekistan and in southern Kazakhstan.

See also: Altaic Languages; Turkic Languages; Uyghur; Uzbekistan: Language Situation.

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Relevant Website

http://www.turkiclanguages.com – Website with many Turkish language resources.

Uzbekistan: Language Situation

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The landlocked Central Asian republic of Uzbekistan shares borders with Kazakhstan on the west and north, with Kyrgyzstan and Tajikistan on the east, and with Afghanistan and Turkmenistan on the south. With about 26 million inhabitants, it is the most populous country of the region. The main language of Uzbekistan is Uzbek (Uzbek, Northern), spoken by about three-quarters of the population, followed by Russian (about 14%), Tajik Tajiki (4%), and several other languages spoken in

move,' e.g., *yåz-ib turib-mæn* [write-FOCAL.PRES-1.SG] 'I am writing.' Evidentiality is expressed by the indirective past marker *-(i)bdi* and the indirective copula particles *ekæn/emiš*, e.g., *ayt-ib-di* [say-EV-3.SG] 'obviously said,' *unut-ib-mæn* [forget-EV-1.SG] 'I have obviously forgotten,' and *kæsæl ekæn* [ill COP.EV] 'is obviously ill.' The interrogative forms *-mi-kæn* and *mi-kin* express doubt, e.g., *kel-gæn-mikan?* [come-POSTTERMINAL.PAST INTERROG] 'has (s)he really come?' The postterminal ('past') marker *-gæn* is used as participle and as a finite form, as in most other Turkic languages, corresponding functionally to Turkish *-mIş*, *-(y)An*, and *-DIK*. There is also an intraterminal ('present') participle in *-digæn*. Postverb constructions with converb forms of the lexical verbs plus auxiliary verbs are used to express semantic modifications, including manner of action, e.g. *-æ ber-* 'to do continuously, to keep doing.' The Persian impact on Uzbek syntax is considerable.

Lexicon

The Uzbek vocabulary contains many loans of Arabic–Persian origin, mostly copied from Persian and inherited from the old literary language, Chaghatay. The strong Iranian influence on Uzbek has led to borrowing of word-formation affixes, even prefixes, e.g., *nå-toγri* 'untrue' (*nå-* 'non-' copied from Persian plus Turkic *toγri* 'right, true'). Female gender is expressed in some nouns borrowed from Arabic and Russian, e.g., *šåir-a* [poet-FEM] 'poetess' (*šåir* 'poet') and *student-ka* [student-FEM] 'female student' (*student* 'student'). Most conjunctions are of Arabic–Persian origin.

Dialects

The dialects exhibit different degrees of Iranicization. The northern dialects, spoken in southern Kazakhstan, north of Tashkent, show little Iranian influence. Southern Uzbek includes the dominant urban dialects of Tashkent, Bukhara, Samarkand, etc., which go back to varieties of the settled populations. They have been heavily influenced by East Persian in their vowel system, for example. Moderately Iranicized dialects are spoken east of Tashkent, in the Ferghana valley, representing a successive transition to Uyghur. The rural dialects of the Kipchak type are Kazakh dialects. Oghuz Turkic dialects, improperly called Oghuz Uzbek, are spoken in Khorezm and adjacent areas. Related dialects are also spoken in southern Uzbekistan and in southern Kazakhstan.

See also: Altaic Languages; Turkic Languages; Uyghur; Uzbekistan: Language Situation.

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Relevant Website

http://www.turkiclanguages.com – Website with many Turkish language resources.

Uzbekistan: Language Situation

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The landlocked Central Asian republic of Uzbekistan shares borders with Kazakhstan on the west and north, with Kyrgyzstan and Tajikistan on the east, and with Afghanistan and Turkmenistan on the south. With about 26 million inhabitants, it is the most populous country of the region. The main language of Uzbekistan is Uzbek (Uzbek, Northern), spoken by about three-quarters of the population, followed by Russian (about 14%), Tajik Tajiki (4%), and several other languages spoken in

neighboring countries, such as Turkmen, Kazakh, and Kirghiz. After having been part of the Soviet Union, Uzbekistan became independent in 1991. As in many Central Asian countries, language policy became important after independence. In particular, Uzbekistan introduced a spelling reform: a Latin-based orthography for Uzbek.

Changes in alphabet are political endeavors that proceed in concert with the creation of linguistic identity. Such has been the case with Uzbekistan and the surrounding countries of Central Asia, whose scripts have undergone changes from Arabic (1923–1929) to Latin (1929–1940) to Cyrillic (1940). Lenin favored Latin because he associated it with modernity; Stalin favored Cyrillic for its ability to unify the Soviet Union. Since independence, however, Uzbekistan has sought to assert its legitimacy of nationhood. One step in this process was September 1993 legislation that dictated a transition of the alphabet used in Uzbekistan from Cyrillic to Latin letters. Although change has been implemented incrementally in the schools, the change was, in theory, to be fully implemented by 2005.

The rationale behind an Uzbek change in alphabet relates to an assertion of national identity along linguistic lines that separate Uzbeks from non-Uzbeks. A Latin alphabet marked a clear distinction from Russia and, at the time of initiation, hinted at a desire for closer relations with Western countries and with Turkey. Economically, arguments for Latin included its being the alphabet of computers and the global economy. In terms of security, a shift to Latin rather than Arabic script (which was discussed as a possible option) afforded some distance from the Arabic-speaking Islamic-extremist threats to the country. And perhaps most significantly, Latinized Uzbek emphasized the geopolitical borders of Uzbekistan, distinguishing it from Kyrgyzstan and Kazakhstan, which use Cyrillic script; Afghanistan, which uses Arabic script; and Tajikistan, which uses both Cyrillic and Arabic letters. (Turkmenistan also adopted a Latin alphabet but remains politically isolated because of the policies of its government.)

In addition to the visual barriers the Latinization of Uzbek creates with its neighbors, it also cuts off future generations from access to the written history of the Uzbek SSR, which used Cyrillic. (This situation has parallels, of course, with Kemalist reforms in Turkey.) Eventually, a history of Uzbekistan will be rewritten in the Latin alphabet, according to 'official' designs, and over time, people will become separated from the written language of those before them.

Uzbeks living outside Uzbekistan, in countries where Latinized Uzbek is not learned, risk losing access to the modern print literature of their homeland. Uzbeks living in Kyrgyzstan, for example, still learn Uzbek in Cyrillic and have difficulty obtaining textbooks because they do not use the Latinized Uzbek schoolbooks.

The printed word gives a fair amount of legitimacy to a nation, and the development of the vernacular is an integral part of nationalism. While alphabet changes do not isolate or prevent groups from verbal communication, such changes do present significant barriers to written communication. These barriers to written communication in turn become barriers to a community's collective memory in addition to impeding the transmission of knowledge and the development of thought to the extent that it is done through a written medium.

Already, Uzbek children have worked their way through the school system learning the Latin script and, unless they study Russian, do not learn the Cyrillic alphabet. Elderly Uzbeks have expressed dissatisfaction with the change in alphabets but often relinquish any protest to their fate of aging. In Uzbekistan today, one sees an increasing amount of Latin script in public places, although many public signs – such as those announcing theater performances or public events – remain in Cyrillic.

See also: Identity in Sociocultural Anthropology and Language; Spelling Reform.

Language Maps (Appendix 1): Map 128.

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V

Vachek, Josef (1909–1996)

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Josef Vachek was born in Prague on March 1, 1909 and died on March 31, 1996. He was one of the most prominent members of the second generation of the Prague School members and one of the most distinguished scholars of English from Czechoslovakia. He studied English and Slavic languages at Charles University in Prague from 1927 to 1932; among his teachers were Vilém Mathesius (1882–1945), Bohumil Trnka (1895–1984), and Miloš Weingart (1890–1939). He became secretary of the Prague Linguistic Circle (PLC) while he was still a student. A draft of his study 'On the phonological interpretation of diphthongs with special consideration of English' was first presented at one of the meetings of the PLC in early 1931 and later turned into a doctoral dissertation, which was submitted in 1932 and subsequently published in German (*Příspěvky k dějinám řeči a literatury anglické* [*Prague Studies in English*] *4,* 1933, 89–172). From 1932 to 1945 he served as teacher of English and Czech at Czechoslovak Commercial College (Československá akademie obchodní) and for the English Grammar School of Prague. In addition, he taught English at Charles University from May 1945 onward. In December 1945 he submitted his Habilitation 'Universal negation in English and Czech' ('Obecný zápor v angličtině a v češtině,' *Příspěvky k dějinám řeči a literatury anglické* [*Prague Studies in English*] *6,* 1947) and became professor at the University of Brno (1947–1961). From 1961 to 1971 he worked for the Institute of Czech (Ústav pro jazyk český) at the Czechoslovak Academy of Sciences in Prague. He was visiting professor at Indiana University in Bloomington (1964) and at Leiden University (1968–69). Beginning in 1971, he held professorships at Comenius University and 17th November University, both in Bratislava. Although he officially retired at the end of February 1976, he continued to work as an external member of staff at the University of Prešov (March 1976–June 1980). Vachek's academic as well as personal memoirs are collected in his 1994 booklet *Vzpomínky českého anglisty* (Reminiscences of a Czech Anglicist), which is at the same time an overview of linguistics, in particular English linguistics, in Czechoslovakia since Vilém Mathesius and the foundation of the Prague Linguistic Circle. To Vachek's pupils belong Jan Firbas, Aleš Svoboda, Josef Hladký, and Libuše Dušková.

His main areas of interest were synchronic and diachronic phonology, syntax, and sociolinguistics, to all of which he frequently applied a contrastive approach, as can be seen in particular from his structural comparison of English and Czech. In phonology he devoted most of his attention to the study of present-day English and Czech, but also to the historical development of their phonological systems. Connected with this was Vachek's research on graphemics and orthography. In syntax he dealt with the structure of universal negation as well as analytical tendencies in present-day English. Another focus in his work was the analysis of the dichotomy between spoken and written language: Although the norm of written language is deduced from that of spoken language, the norm of written language is regarded as neither functionally nor structurally subordinate to the other one; rather, both norms complement one another. He also emphasized that the relation between the spoken and written norms of a language may change considerably in the course of time, and that different languages may exhibit different trends of development in this respect. Finally, Vachek's pedagogical mastery is proven by the fact that during his time as a high-school teacher he produced a number of teaching manuals of Czech and English; for the purposes of academic instruction in English he wrote several university textbooks.

One of Vachek's achievements is to have promoted the ideas of the Prague School by editing readers with translations of seminal articles formerly available only in Czech. He also issued other useful tools for a better understanding of the approach of the Prague School, such as a dictionary, originally published in French in 1960, but now also available in an

updated English translation with supplementary texts (2003).

See also: Czech Republic: Language Situation; Diachronic Morphological Typology; Diphthongs; English in the Present Day (since ca. 1900); English, Later Modern (ca. 1700–1900); Functionalist Theories of Language; Havranek, Bohuslav (1893–1978); Language Change and Cultural Change; Mathesius, Vilém (1882–1945); Morphological Typology; Morphology: Overview; Negation; Phonetics: Overview; Phonology: Overview; Prague School; Prague School; Slavic Languages; Slovakia: Language Situation; Trnka, Bohumil (1895–1984); United Kingdom: Language Situation.

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Vagueness

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Vagueness is the name of a particular kind of uncertainty about the applicability of a predicate. The standard example of a vague predicate is the class of gradable adjectives, including *tall*. If Bill is not quite tall enough to be clearly tall, and not quite short enough to be clearly not tall, then he is a borderline case. The reluctance we feel to assert either that Bill is tall or that Bill is not tall is due to the vagueness inherent in the meaning of the word *tall*.

The Sorities Paradox (Paradox of the Heap)

The tension between small changes and big consequences gives rise to the Sorities Paradox, sometimes known as the Paradox of the Heap (Kamp, 1981; Williamson, 1994). The paradox consists of two main premises. Base premise: Clearly, 1 grain of sand does not qualify as a heap. Inductive premise: Adding a single grain of sand is never sufficient to turn a collection of sand grains that is not a heap into one that is a heap. If we accept both of these premises, then it follows that no matter how many grains of

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sand are added to the first grain, the result will never be a heap. Yet eventually, if we add enough sand, there will come a point at which there is a heap, and we have arrived at a paradox. There are many variations. Raffman (1994) imagines a progression of color chips arranged in order from clearly red to clearly yellow. Each color chip in the sequence differs in hue from the next by an amount that is significantly less than the just-perceptible-difference for normal humans under normal circumstances. If so, then by construction, no normal human perceiver can distinguish the hues of any adjacent pair of color chips, which establishes the relevant inductive premise. Yet if the sequence is extended far enough, the endpoints will clearly be in different color categories. This form of the paradox allows consideration of the difference between being red (a question of fact) and seeming red (a question of perception).

Vagueness Is (Almost) Ubiquitous

Much of the research on vagueness studies gradable adjectives such as *tall*, *red*, or *fun*. An adjective is gradable if it undergoes comparative formation *(taller, redder, more fun)* and superlative formation *(tallest, reddest, most fun)*. In any case, vagueness is by no means limited to gradable adjectives. Even among (arguably) nongradable adjectives such as *circular* or *level* (**?more circular*, *?most level*), whether something is sufficiently circular to qualify as circular is a matter of degree, and it takes only a slight effort to coerce a nongradable adjective into a grading context (most famously, *pregnant*, as in *She is more pregnant than I am*, meaning closer to term).

Members of other lexical categories besides adjectives can be vague. Nouns, for instance: whether an object counts as a chair depends on the degree to which it resembles or functions as a chair. Kamp and Partee (1995) discuss connections between psychological research on categorization, prototypicality, concept formation, and linguistic compositionality issues in noun–noun compound formations such as *male nurse, striped apple,* or *stone lion*.

Verbs are equally susceptible to vagueness. Just how tuneless can a vocalization be and still count as singing? Similarly for prepositions (how far exactly do you have to tilt your head before your left eye is below your nose?) and adverbs. In general, any grammatical element whose contribution to truth conditions requires perception, categorization, or judgment of gradient contingent facts – including tense, aspect, and plurality – suffers from an incurable susceptibility to vague uncertainty. In fact, vagueness is so pervasive that it is worth remarking that there are some concepts that have no vagueness whatsoever, such as the mathematical concepts expressed by the noun *integer* or the adjective *prime*. Because a positive integer is prime if and only if it has exactly two distinct factors, any uncertainty concerning whether a number is prime can only come from uncertainty as to what its factors are. Nor is there any relevant sorities series for which any competent and alert speaker would agree to the inductive premise.

A number of linguistic phenomena resemble vagueness in certain ways, including tolerance for small deviations and uncertain applicability, but arguably are distinct from vagueness. For instance, it is unclear how many kinds of birds must be capable of flight in order to justify the claim, *Birds fly,* and it is similarly unclear how strongly disposed to smoke John must be in order to justify the claim, *John smokes*. In these uses, *birds* names a natural kind, and *John smokes* is a characterizing sentence, both of which are usually treated as types of genericity.

In addition, we can say that *Mary arrived at 3 P.M.* even if Mary arrived shortly before or after the stroke of 3. Likewise, we can say that *everyone in the town was asleep* even if a small number of people were awake. Lasersohn (1999) suggested that these are instances of speaking loosely for the sake of pragmatic convenience and argues that they behave differently than genuine vagueness.

Finally, although the prototypical vague predicates are gradable adjectives, Kennedy and McNally (in press) argue that a subtype of gradable adjectives that they call absolute adjectives, including *empty* or *awake*, do not have a context-dependent standard of comparison and therefore are not vague.

Vagueness is often contagious, in the sense that complex expressions built up from vague predicates are often themselves vague as a result. For instance, if *tall* is vague, then the complex predicates *become tall*, *appear tall, meet a tall person*, etc. will also be vague.

Comparatives, Superlatives, Measure Phrases

Interestingly, vagueness is not always contagious. For comparative constructions such as *Bill is taller than Sue*, or *Bill is 5 centimeters taller than Sue*; for superlatives such as *Bill is the tallest person in the room*; and for measure phrases such as *Bill is two meters tall*, there is no entailment that Bill is tall, and there is no vagueness. Because in most languages the comparatives and superlatives are formed by adding suffixes such as *–er* or by means of other independent formatives, there must be some way of incorporating the vague meaning of *tall* into a more complex meanings that exhibit no vagueness. Von Stechow (1984), Klein (1991), and Kennedy (1999) surveyed and

critiqued linguistic theories of comparatives that provide explanations for these facts (*see* **Comparatives: Semantics**).

Vagueness in Context

The evaluation of vague predicates is both context-dependent and context-changing. The context-dependence of vague predicates consists in at least three related but distinguishable factors: reliance on a contextual standard (threshold), reference to a comparison class, and dependence on conversational and other purposes. Reliance on a contextual standard is typical of gradable adjectives. We can say that Bill will count as tall just in case Bill is tall at least to degree d, where d is a threshold for tallness provided by the context. At this point we are setting aside whether the threshold can ever be known precisely or with certainty and considering instead what determines whether the tallness cutoff falls closer to 150 centimeters, 160 centimeters, etc.

For gradable adjectives at least, one important factor affecting the location of the threshold is the set of objects with respect to which the property in question is being judged, the relevant comparison class. What counts as a tall basketball player is different than what counts as a tall kindergarten student, which differs again from what counts as a tall mushroom. A straightforward way of capturing dependence on comparison class is to relativize the denotation of a vague predicate to a class of objects. One argument in favor of this approach is that (for some vague predicates in some situations) the comparison class can optionally be overtly specified with a *for* phrase, as in *He's tall for a basketball player*. When the comparison class argument is not overtly specified, it presumably receives its value from context. As Graff (2000) noted, when comparison classes appear overtly, they must be natural kinds. We can say that someone is tall for a basketball player, because basketball players form a natural kind, but we cannot say that someone is tall for a person in this room, because people do not normally constitute a natural kind by virtue of occupying a particular room. Nevertheless, the objects in a room can affect the location of a vague threshold. For instance, I can tell you, 'Hand me the big book' in a situation in which one book is larger than the others on my desk. Yet I might be unwilling to describe the very same book as big after a number of even larger books have been placed on my desk. Vague predicates not only depend on context for their applicability, but their use also affects the context with respect to which subsequent uses of vague predicates get evaluated. In fact, vague predicates may sometimes be primarily or entirely used to negotiate a suitable standard (Kyburg and Morreau, 2000; Barker, 2002). For instance, if I tell you that Bill is tall, you may come to know something new about Bill. That is a typical descriptive use. But if Bill's height is well known (perhaps he is standing in plain sight), then I can assert that Bill is tall as a way of informing you of what counts as tall in our community (i.e., that henceforth in our discussion that the relevant standard for tallness is less than Bill's maximal degree of height).

Vagueness versus Ambiguity

The difference in applicability of a vague predicate due to context is generally not considered as a type of lexical ambiguity. One argument supporting this claim presented in Zwicky and Sadock (1975) comes from the interaction of lexical ambiguity with VP ellipsis: if we say *Ann went to the bank and Bill did too*, then either Ann and Bill both went to a river, or they both went to a financial institution. The idea is that the meaning of the elided VP is determined after the ambiguity of lexical items such as *bank* has been resolved. Even words with semantically related but distinct senses count as ambiguous by this test: it is odd to say *Bill waved, and the flag did too*, because people wave a greeting in a sense that is distinct from a flag waving in the wind. But there is no difficulty inserting a vague predicate into a VP ellipsis antecedent even if the subjects correspond to different comparison classes. Thus it is fine to say *Bill is tall, and his six-year-old daughter is too*, even though the standard for tallness is quite different for adults versus kindergarten-age children.

Logical Behavior

Constructions involving vague predicates and especially scalar adjectives obey a number of logical rules that constrain what an adequate theory must explain. For instance, any theory should guarantee that if Bill is tall, then it certainly isn't the case that Bill is not tall. Furthermore, if the theory in question recognizes the existence of borderline cases, it must guarantee that Bill cannot simultaneously be tall and also borderline tall.

Particularly important from the point of view of theories of vagueness is the claim that vague predicates obey the law of the excluded middle, which says that a sentence like *Bill is tall or Bill is not tall* is valid (always true). Even if Bill is a borderline case, and we therefore do not know whether Bill is tall or not tall, many people judge that we nevertheless know that it must be the case that Bill is either tall or not tall.

Vagueness as Ignorance

We have seen that when asked to apply a vague predicate to a borderline case, people experience uncertainty. Williamson diagnosed this condition as ignorance: there is a fact of the matter, we just don't know which judgment is the fact. If so, then the statement *Bill is tall* is either true or false, even if sometimes we don't know which. One way of interpreting this situation is that we have only partial understanding of the meaning of a vague predicate like *tall*, and that our knowledge of its meaning remains incomplete with respect to borderline cases. This approach has the virtue of keeping intact the theorems of classical logic, including the law of the excluded middle.

Fuzzy Logic (Multivalued Logic)

A different, perennially popular strategy holds that truth itself a scalar concept: sentences are true to some degree. If tautologies are true to degree 1, and contradictions are true to degree 0, then contingent propositions may be true to any degree corresponding to a real number between 0 and 1. For instance, the claim that Bill is tall might be true to degree .76. Such theories often do not guarantee the law of the excluded middle.

Supervaluation

Van Fraassen (1966) originally proposed truth value gaps to handle presupposition failure: sentences (such as *The King of France is bald* (*see* **Presupposition**) whose presuppositions are not satisfied simply fail to have a truth value, in which case there is a truth value gap. Kamp (1975), Fine (1975), and others applied the technique of truth value gaps to vagueness. Fine in particular proposed to account for the logical behavior of vague predicates by making a distinction between truth and 'supertruth' by using valuations and supervaluations. A valuation associates each predicate with a partial function that maps the set of individuals onto a positive extension, a negative extension, or neither (this last corresponds to borderline cases). Then a valuation maps a sentence like *Bill is tall* onto true just in case Bill is in the positive extension of *tall*; it maps the sentence onto false just in case Bill is in the negative extension of *tall*; and otherwise the sentence fails to have a truth value.

The excluded-middle sentence *Bill is tall or Bill is not tall* fails to have a truth value for any valuation for which Bill is tall fails to have a truth value. But sentences can be supertrue: if every way of making a valuation more precise by dividing up the borderline cases between the positive extensions and the negative extensions results in a fully precise valuation in which the sentence comes out true, then that sentence is supertrue. For instance, no matter how we divide up the set of individuals between tall and not tall, in a fully precise valuation Bill will have to either be tall or not tall. Either way, the disjunction *Bill is tall or Bill isn't tall* will be true, so the sentence is supertrue. Though supervaluation improves on (most implementations of) multivalued logic with respect to explaining the logical behavior of vague predicates, it has two main vulnerabilities: the Sorities Paradox, and higher-order vagueness.

In a supervaluation theory, it will normally be supertrue that one grain of sand is not a heap, and supertrue that a collection of 50 million grains is a heap. The explanation for why the inductive premise seems so appealing is that for any valuation that fails to be fully precise, i.e., that classifies even one element in the sorities series as a borderline case, the inductive premise comes out true. The reason is that there is no position in the sorities series where one element is in the negative extension of a predicate and the next element is in the positive extension, because there will always be a buffer of borderline cases intervening.

However, in every fully precise valuation, there will be no borderline cases (by construction). Therefore, for every precise valuation, there will always be some number n such that n grains of sand is not a heap, but $n+1$ grains of sand is a heap. This means that the following sentence is supertrue: *There is a number n of grains of sand such that n grains of sand is not a heap, but n + 1 grains of sand is a heap*. This intuitively seems to contradict the inductive premise of the Sorities Paradox, which is one reason why some people remain unsatisfied with supervaluationism.

Higher-Order Vagueness

Fine's original supervaluation theory recognizes three crisp possibilities: a vague predicate clearly applies, it clearly fails to apply, or it clearly neither applies nor fails to apply. But just as there can be uncertainty about precisely where the border between tall and not tall falls, there can be second-order uncertainty about the boundary between clearly tall and borderline tall: is Bill clearly clearly tall, or only sort of clearly tall?

Fine (1975) and Williamson (1994, 1999) consider elaborating supervaluation theories to handle a *definitely* operator. Williamson adds a modal notion of accessibility over the class of precise valuations, so that *Bill is definitely tall* comes out as true at a world

just in case *Bill is tall* is true in that world under every precise valuation accessible from that world. As long as the accessibility relation *R* is not both transitive and symmetric, *definitely definitely p* can receive a value different from *definitely p*, and we have higher orders of vagueness as desired. The problem then becomes finding and justifying a suitable choice for the accessibility relation *R*.

See also: Comparatives: Semantics; Multivalued Logics; Polysemy and Homonymy; Presupposition.

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Vagueness: Philosophical Aspects

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Hallmarks of Vagueness

Much of language is vague, including expressions such as 'heap,' 'bald,' 'red,' 'child,' and 'hungry.' Although the exact criteria of vagueness are controversial, we can say that, at least in general, vague predicates have borderline cases and seem to lack sharp boundaries and well-defined extensions. A dieting man, Don, may at times be a borderline case of 'thin' – it is unclear whether or not he is thin. And the apparent lack of sharp boundaries to the predicate is exhibited in the fact that there does not appear to be a sudden instant during his successful diet at which Don becomes thin. Though we frequently call assertions vague if they don't supply us with enough information (e.g., 'I'll visit next week'), this is a different sense of 'vague' from that at issue here.

Vague predicates give rise to sorites paradoxes, of which the most famous is the paradox of the heap. If you have a heap of sand, and you remove a single grain, then the result will still be a heap. But then, suppose we take a heap of sand and remove grains one by one; repeated applications of that principle imply absurdly that the solitary last grain is a heap. The vagueness of other predicates accounts for the plausibility of comparable principles that can figure in sorites paradoxes, such as 'if someone is a child at time t, then she/he is a child 10 minutes later' or 'if someone of height h is tall, then so is someone one-hundredth of an inch shorter.'

Typical vague predicates also exhibit what is known as 'higher-order vagueness.' Not only does 'tall' have borderline cases at heights between the definitely tall and the definitely not-tall, but the set of such borderline cases does not seem to have sharp boundaries either. Just as it is not plausible to think there is a precise instant at which Don becomes thin, there seems

just in case *Bill is tall* is true in that world under every precise valuation accessible from that world. As long as the accessibility relation *R* is not both transitive and symmetric, *definitely definitely p* can receive a value different from *definitely p*, and we have higher orders of vagueness as desired. The problem then becomes finding and justifying a suitable choice for the accessibility relation *R*.

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to be no precise instant at which Don becomes borderline thin, or one at which he ceases to be borderline thin and becomes definitely thin. Perhaps, then, the borderline cases of 'thin' themselves have borderline cases – borderline borderline cases of 'thin.' And, moreover, those borderline borderline cases do not seem to be sharply bounded either, suggesting a hierarchy of borderline cases corresponding to the apparent lack of sharp boundaries at all levels.

Finally, note that other elements of language besides predicates are also vague: consider, for example, 'hurries,' 'quickly,' 'many,' 'very' and 'the nicest man.' Analogues of the central hallmarks of vagueness could be described in relation to these kinds of expressions.

Three Philosophical Debates About Vagueness

First, is vagueness eliminable? Many have thought not. Vague predicates seem to be an unavoidable presence in our language. As Russell (1923) argues, the application of, say, 'red' is based on unaided sense perception, and so it surely cannot be applicable to only one of an indiscriminable pair. But this thought is enough to generate a sorites paradox by considering something that changes from red to yellow through a series of changes too small for us to detect. Similarly, it can be important to have a word, like 'tall,' to pick out a vague range of a measurable quantity, like height. The applicability of other useful vague predicates can depend on several dimensions of variation – whether someone counts as 'big' can depend on both their height and their weight – or it can depend on a range of dimensions that is itself not well-defined – such as 'nice' applied to people.

Second, is there ontological vagueness? It is controversial whether it is only language and thought that can properly be called vague, or whether there can be vague objects or other vague entities. Russell thought that only representations could be vague, and Evans (1978) has argued that the idea of vague objects is not coherent, but other philosophers have attempted to make sense of the idea. This issue of metaphysical vagueness is often tackled independently of the attempt to give a theory of linguistic vagueness, with which we are concerned here.

Third, does vagueness have implications for logic? Many have thought that vagueness poses a challenge to classical logic. If Don is a borderline case of thinness, it is tempting to maintain that 'Don is thin' is neither true nor false, which is incompatible with the principle of bivalence. And the apparent lack of sharp boundaries to vague predicates is in tension with the well-defined extensions required for classical logic.

Philosophical Theories of Vagueness

A theory of vagueness faces the task of solving the sorites paradox and determining the logic and semantics of vague language.

One approach is to reject classical logic, acknowledging that borderline case predications are neither true nor false, and specifying that they have some intermediate truth-value. For example, we could adopt a three-valued logic and explain the apparent lack of sharp boundaries between the Fs and the non-Fs in terms of the range of cases between these two poles (see Tye, 1994). Or we could recognize a full range of intermediate truth-values corresponding to degrees of truth: in the region of transition from not-thin to thin, Don may count as thin to different degrees, gradually increasing from the minimum, 0, to the maximum, 1. This kind of degree theory calls for an infinite-valued logic (see Machina, 1976; for a non-standard degree theory, see Edgington, 1997).

One common objection to this kind of approach is that it merely replaces classical logic's sharp boundary between truth and falsity with other sharp boundaries between adjacent members of the new set of truth-values. So, for example, according to a three-valued logic, there will be a first instant at which Don ceases to be falsely called thin becomes borderline thin, and with a degree theory, there will similarly be a first instant at which he is thin to some degree greater than 0. Intuitively, there are no such sharp boundaries either. One way of putting the worry is that these views of vagueness cannot accommodate higher-order vagueness. Some theorists, however, (e.g., Tye) have attempted to defend a many-valued theory that is not committed to sharp transitions by appealing to the vagueness of the metalanguage in which the theory is formulated.

An alternative approach to vagueness involves accepting sharp boundaries at the first level and embracing classical logic. This epistemic view maintains that borderline case predications are either true or false – we just do not know which (see Williamson, 1994). Similarly, there is a particular instant at which Don becomes thin – we just do not know when it is. This solves the sorites paradox by denying its main premise, that is, the principle that taking a grain away from a heap will leave you with a heap. Classical logic is preserved in its entirety. The apparent lack of sharp boundaries is merely apparent, and vagueness is a matter of ignorance. Williamson (1994) has defended such a theory and provided a detailed explanation of why we are ignorant by appealing to the idea of a margin for error. If I know that someone of height h is tall, then someone of height h − e is tall, where e is less than the margin required for my belief to be

reliable. It follows that I can't know that someone slightly above the boundary is tall nor, by a parallel principle, can I know that someone slightly below it is not tall; so I can't know that the boundary falls between these two close points.

The supervaluationist theory of vagueness takes a different approach to the semantics of vague language while preserving the theorems and inferences of classical logic (see Fine, 1975; Keefe, 2000). According to this theory, 'Don is thin' is true (false) if and only if it is true (false) on all ways of making it precise, i.e., with all reasonable ways of drawing the boundary to 'thin.' If Don is borderline thin, that sentence is true on some of those ways and false on others, so it is neither true nor false. Before his diet, however, Don was definitely not thin, and it counted as false that he is thin according to supervaluationism, because any boundary that ruled him as thin at that time is not an acceptable way to make 'thin' precise. To see how the law of excluded middle still holds, despite the failure of bivalence, consider the instance 'either Don is thin or he isn't' in the case where he is borderline thin. On every way of making 'thin' precise, that disjunction comes out true, even though on some of those ways it is the first disjunct that is true, and on others it is the second disjunct. The main premise of the sorites paradox comes out false, on the other hand: on every way of drawing the boundary to 'heap,' there is some grain the removal of which turns a heap into a non-heap. But 'heap' is nonetheless not sharply bounded, because there is no particular grain whose removal marks the boundary to 'heap'; different grains mark the boundary for different ways of making 'heap' precise.

Other solutions to the sorites paradox have been proposed in addition to those embedded in the influential theories just sketched. Contextualist accounts appeal to changes in context between the assessments of different predications along a sorites series (see, e.g., Graff, 2000). Now, vague terms are typically context-dependent; whether someone counts as thin or something counts as a heap can depend on the context in which it is considered. But vagueness does not straightforwardly reduce to context-dependence, because if we fix the context, a vague term will still have borderline cases and be susceptible to a sorites paradox. Nonetheless, the contextualist approach attempts to close the gap between these phenomena with a complex and subtle treatment of context-change.

The nihilist response to the sorites paradox is one of the few that does not involve denying its main premise (see Unger, 1979). The meaning of 'heap' dictates that a heap will always survive the removal of a single grain, but the paradoxical argument does not take hold because there are no heaps. Run the case by adding grains one at a time to a single grain (adding a single grain to something that isn't a heap doesn't create a heap) and you have a sound argument with a true conclusion. This nihilist position thus renders our vague predicates empty; there are no tall people, thin people, or red things either.

To summarize, vague predicates typically have borderline cases, apparently lack sharp boundaries, and are susceptible to sorites paradoxes. For example 'is a ripe fruit' has borderline cases – a banana that is not definitely ripe and not definitely not ripe – and there is not typically a sharp point at which a fruit becomes ripe. And we can construct a sorites paradox with the notion using a premise such as 'if a fruit is not ripe at some instant, then it is not ripe one second later.' Vagueness, recall, is not merely an eliminable defect of our language; no precise replacement for 'ripe' would be usable in practice. And it poses a challenge to principles of classical logic, increasing the urgency of providing a theory of vagueness. Theories adopting a multi-valued logic will assign some intermediate truth-value between truth and falsity to the statement that our borderline-ripe banana is ripe. An epistemicist theory will maintain that such a statement is either true or false, but we just don't know which. And the supervaluationist will claim that it is neither true nor false, because it is true on some ways of making 'ripe' precise and false on others. Each of these views solves the sorites paradox by denying that the main premise is completely true, though no matter what they do to explain this, it is hard to dismiss the intuitiveness of a premise like 'if a fruit is not ripe at some instant, then it is not ripe one second later.'

See also: Vagueness.

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Valency Grammar

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The Basic Idea of Valency

Valency (also known as valence, especially in the United States) is the name given in various syntactic theories (such as valency grammar, dependency grammar, word grammar, and some kinds of functional grammar) to a particular kind of dependency property exhibited by many lexical items. This kind of lexicosyntactic property involves the relationship between, on the one hand, the different subclasses of a word-class (such as verb) and, on the other, the different structural environments required by those subclasses, these environments varying both in the number and in the types of element. Valency is thus to be seen as the capacity a verb (or noun, etc.) has for combining with particular patterns of other sentence constituents, in a similar way to that in which the valency of a chemical element is its capacity for combining with a fixed number of atoms of another element (for example, one in the case of monovalent hydrogen or sodium, two in the case of bivalent oxygen or calcium, etc.). Such information is vital for language learners but was never adequately presented in traditional grammars and dictionaries.

The concept of valency is most easily illustrated with reference to verbs. Most languages have a category that roughly corresponds to or embraces the English category of verbs. Examples from English will be given here, although, where appropriate, examples from French, German and other languages will be considered.

All English verbs share syntactic and inflectional features of a very basic kind (such as their range of tensed and untensed forms, and their modification with time adverbials), but they differ radically in their requirements for accompanying noun phrases and/or prepositional phrases (with functions such as subject, object, prepositional object, etc.) that they require and/or permit.

The English verbs *stumble, jolt,* and *thrust* typically occur in distinctive environments, as in sentences like *Alfred stumbled, Alfred jolted the door,* and *Alfred thrust the key into the lock*. Putting one of these verbs into the distinctive syntactic context of one of the others gives an ungrammatical sequence like **Alfred stumbled the door* or **Alfred jolted the key into the lock*. Such restrictions mean that verbs need to be subclassified according to their syntactic potential, a fact recognized by traditional grammar in the (inadequate) division into transitive and intransitive verbs, and in modern linguistics by concepts like 'subcategorization properties,' 'syntactic frame,' or 'argument structure.' The special contribution of valency grammarians to the study of this type of subselection has been a thorough investigation of just how much is determined by the individual verb (or noun, etc.), and of how different potentials of the same verb (e.g., *Alfred pushed/ – pushed the key/ – pushed the key into the lock*) are related.

Different Conceptions of Valency

The invention of the notion of 'valency' (French *valence,* German *Valenz,* Dutch *valentie*) is often credited to Lucien Tesnière, whose *Esquisse d'une syntaxe structurale* appeared in 1953, but whose main work, *Élements de syntaxe structurale* was only published posthumously in 1959. The notion had, however, been clearly expounded by A. W. de Groot in his Dutch work, *Structurele svntaxis* (1949), and is even hinted at by Karl Bühler in an oft-quoted remark from his *Sprachtheorie* (1934), to the effect that "…words of a particular word-class open up around them one or several 'empty places', which

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Valency Grammar

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The Basic Idea of Valency

Valency (also known as valence, especially in the United States) is the name given in various syntactic theories (such as valency grammar, dependency grammar, word grammar, and some kinds of functional grammar) to a particular kind of dependency property exhibited by many lexical items. This kind of lexicosyntactic property involves the relationship between, on the one hand, the different subclasses of a word-class (such as verb) and, on the other, the different structural environments required by those subclasses, these environments varying both in the number and in the types of element. Valency is thus to be seen as the capacity a verb (or noun, etc.) has for combining with particular patterns of other sentence constituents, in a similar way to that in which the valency of a chemical element is its capacity for combining with a fixed number of atoms of another element (for example, one in the case of monovalent hydrogen or sodium, two in the case of bivalent oxygen or calcium, etc.). Such information is vital for language learners but was never adequately presented in traditional grammars and dictionaries.

The concept of valency is most easily illustrated with reference to verbs. Most languages have a category that roughly corresponds to or embraces the English category of verbs. Examples from English will be given here, although, where appropriate, examples from French, German and other languages will be considered.

All English verbs share syntactic and inflectional features of a very basic kind (such as their range of tensed and untensed forms, and their modification with time adverbials), but they differ radically in their requirements for accompanying noun phrases and/or prepositional phrases (with functions such as subject, object, prepositional object, etc.) that they require and/or permit.

The English verbs *stumble, jolt,* and *thrust* typically occur in distinctive environments, as in sentences like *Alfred stumbled, Alfred jolted the door,* and *Alfred thrust the key into the lock*. Putting one of these verbs into the distinctive syntactic context of one of the others gives an ungrammatical sequence like **Alfred stumbled the door* or **Alfred jolted the key into the lock*. Such restrictions mean that verbs need to be subclassified according to their syntactic potential, a fact recognized by traditional grammar in the (inadequate) division into transitive and intransitive verbs, and in modern linguistics by concepts like 'subcategorization properties,' 'syntactic frame,' or 'argument structure.' The special contribution of valency grammarians to the study of this type of subselection has been a thorough investigation of just how much is determined by the individual verb (or noun, etc.), and of how different potentials of the same verb (e.g., *Alfred pushed/ – pushed the key/ – pushed the key into the lock*) are related.

Different Conceptions of Valency

The invention of the notion of 'valency' (French *valence,* German *Valenz,* Dutch *valentie*) is often credited to Lucien Tesnière, whose *Esquisse d'une syntaxe structurale* appeared in 1953, but whose main work, *Élements de syntaxe structurale* was only published posthumously in 1959. The notion had, however, been clearly expounded by A. W. de Groot in his Dutch work, *Structurele svntaxis* (1949), and is even hinted at by Karl Bühler in an oft-quoted remark from his *Sprachtheorie* (1934), to the effect that "…words of a particular word-class open up around them one or several 'empty places', which

have to be filled by words of certain other word-classes" (1934: 173).

It is nevertheless preeminently Tesnière's notion of valency that has been studied and developed in continental Europe, especially Germany, since the 1960s. On the one hand, valency has been integrated with 'dependency theory' by such scholars as J. Ballweg, U. Engel, B. Engelen, H-J. Heringer, J. Kunze, H. Schumacher, and H. Vater; on the other, it has been applied to the detailed description of, most notably, German by G. Helbig and the Leipzig school, but also of English (D. J. Allerton, R. Emons, and T. Herbst), and French (W. Busse and J.-P. Duhost). (For a historical survey up to the mid-1970s, see Korhonen, 1977.) The following review of the problems of valency theory will take Tesnière's proposals as a starting point.

Tesnière's Approach

Valency can be incorporated into a functional type of constituency grammar (involving relationships between the subcategorization of neighboring constituents), but for Tesnière, it was one aspect of dependency grammar. His semantically based syntax was concerned with establishing the hierarchy of word 'connexions' within a sentence, which make up the what he termed the 'structural order' of words (as opposed to their linear order). The structural order of each sentence is given in terms of a 'stemma,' a two-dimensional display, in which the top-to-bottom dimension represents a series of relationships between 'governors' (or 'heads,' French *régissants*) above and 'dependents' (French *subordonnés*) below. Typically in a 'governor-dependent relationship,' the governor may occur without the dependent but not vice versa, and the governor provides the central semantic element, whereas the dependent only represents a modification of this element.

A consideration of the partial structural stemma of (A) in **Figure 1** enables us to appreciate a number of points about Tesnière's approach: a first point is that the governor-dependent relationship can operate at different levels (with *old* acting as dependent of *the grammarian*, but as governor of *very*); a second point is that one governor (like *the grammarian*) can have more than one dependent (*old* and *French* in this case), but not vice versa; finally, a 'semantically empty' word like *the* can combine with a 'full' word like *grammarian* to form a single 'nucleus' (marked with a 'circle'), that is, a single point on the stemma. Each governor is said to act as a 'node' (French *noeud*) for all of its direct and indirect dependents, so that *the grammarian* acts as a node for the whole of the stemma of (A) in **Figure 1**.

In a typical sentence, like that of (B) in **Figure 1**, Tesnière saw the main verb as the 'central node' (*noeud des noeuds*). The verb achieves this central role through its high position in the hierarchy of connexions but also through its ability to determine the number and variety of its dependents. But the question of how many dependents a verb has is no simple matter. In fact, Tesnière distinguished two types of dependent for verbs, to which he gives the labels 'actants' and 'circonstants.' From a semantic point of view, the 'actants' represent the participants, while the 'circonstants' represent the setting and incidental details of the process or state expressed by the verb, the whole sentence portraying a minidrama. In the example of (B) in **Figure 1**, where *offered* represents the process, *Alfred, (that) Bible,* and *to Charles* would be 'actants,' while *repeatedly, in Strasbourg,* and *on Tuesday* would be 'circonstants.'

An Essential Distinction: 'Actants' versus 'Circonstants'

Everything so far noted about Tesnière's views has been a matter of general dependency theory, but the distinction between 'actants' and 'circonstants' is distinctively the preserve of valency theory. 'Actants' belong to the valency of individual verb types, whereas 'circonstants' are in principle potential dependents in any sentence, regardless of the verb. Thus the constellation of 'actants' represented in (B) in **Figure 1** is characteristic of one subclass of English verbs that includes not only *offer* but also *give, lend, refuse, sell, send,* and a couple of dozen others.

In (B), *Alfred, that Bible,* and *to Charles* would be termed by Tesnière first, second, and third 'actant' respectively, and these terms correspond to what in English grammar are normally called subject, (direct) object, and indirect object respectively. These are the only elements that Tesnière recognized as 'actants' in active sentences. This choice is unfortunate, because many prepositional phrases are equally essential to the verb, such as the prepositional object *on Barbara* in *Alice relied on Barbara*, and even purely adverbial phrases are required by certain verbs, such as *live (at home,* etc.), *last (for two hours,* etc.), or *thrust,* which, as noted earlier, needs both an object and a specification of place.

The subclass of verbs that includes *offer, give,* etc. is described as 'trivalent,' because its members require three 'actants'; the same could be said of the subclass of *thrust, put,* etc., although Tesnière did not recognize this. Ordinary transitive verbs like *jolt* or *like, kill,* etc., which merely require a subject and a direct object, are termed 'bivalent' (or 'divalent'); and the same applies to copular verbs like *be, seem*, or

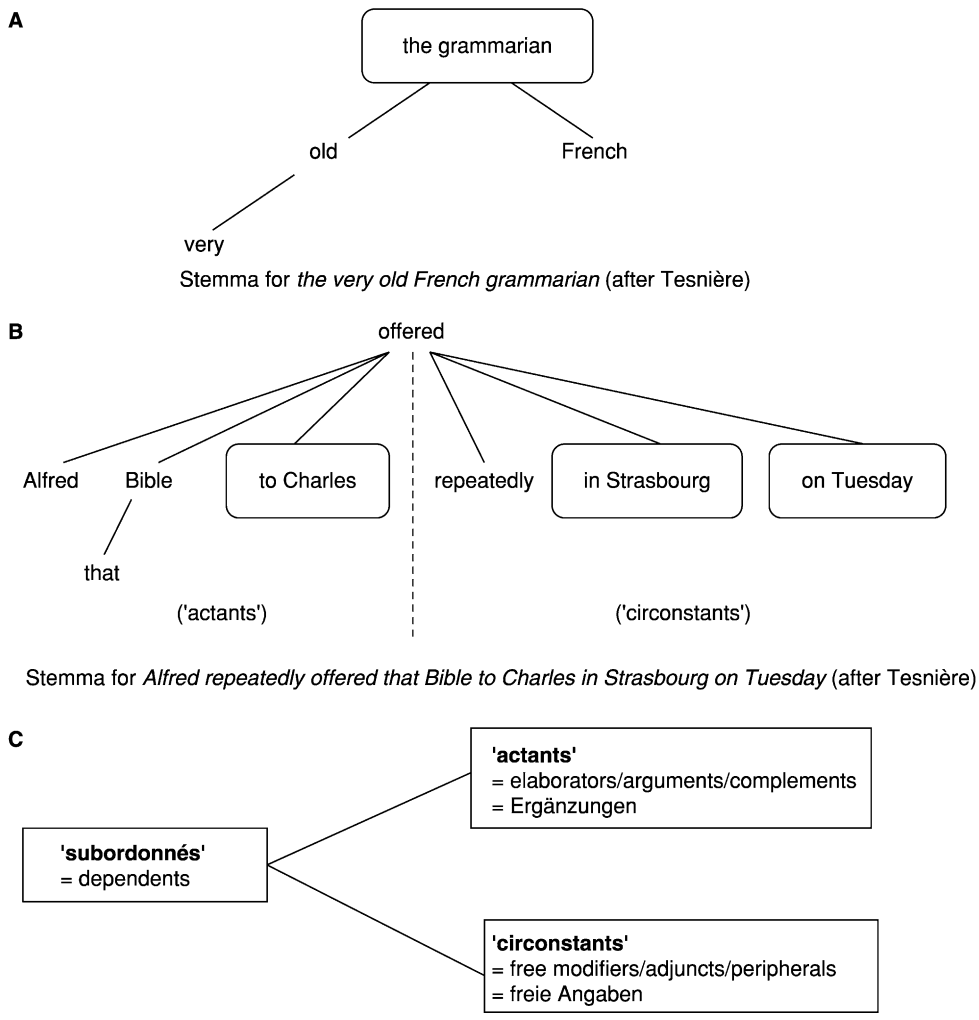

Figure 1 Stemmas and kinds of dependent.

become that take an adjectival or nominal predicative (complement) such as *beautiful* or *a beauty*. Finally, ordinary intransitive verbs like *stumble* or *deteriorate, sneeze*, etc. are described as 'monovalent'. (For 'zero-valent' (or, to use Tesnière's term, 'avalent') verbs, see the section 'Levels of Analysis').

By contrast with 'actants,' the adverbials of (b) are not relevant to valency classification. Thus *repeatedly,* an adverbial of frequency, *in Strasbourg,* a positional adverbial of place, and *on Tuesday,* a punctual adverbial of time, could all just as well have occurred with the different verb subclasses represented by *stumble, jolt,* and *thrust,* in fact, with any verb at all. Tesnière (1966: 125) mistakenly insisted that such adverbials are unlimited in number (by contrast with the fixed number of 'actants'), but the essential point is their universality, their freedom to occur in any sentence.

Through the history of valency theory and grammatical theories such as transformational grammar (cf. Baker, 1989: 266–267) and systemic grammar (cf. Halliday on 'participant roles and circumstantial roles'), various technical terms have been used to refer to the distinction between these two kinds of dependent of a governor (or head). These are listed in (C) in Figure 1. For clarity's sake, the terms 'verb elaborator' and 'free modifier' will henceforth be used for the post-Tesnièrian equivalents of 'actant' and 'circonstant.' (The term 'complement' has frequently been used in the sense of elaborator, but it has the disadvantage that for traditional grammarians and many modern ones, it has a quite different meaning and may exclude the subject, which the terms elaborator and 'actant' never do. The more modern term 'argument' is unfortunate for a different reason: to the uninitiated, it suggests a whole sentence or clause rather than the sentence constituent that it is.)

Whatever the terminology, there is a consensus about the need for a distinction between elaborators

and free modifiers, but there are certain problems associated with it. Clearly Tesnière oversimplified matters by insisting that, in principle, elaborators (i.e., 'actants') were essentially nominal in form and semantically necessary to the verb, while free modifiers (i.e., 'circonstants') were adverbial in form (comprising adverbs and prepositional phrases) and semantically not required by the verb. German valency theorists, such as Helbig, Heringer, and Herbst, have proposed tests for distinguishing the two kinds of dependent. Helbig, for instance, suggested that in sentences like the following:

(1) Alice ate the sandwich in the train.

(2) Alice put the sandwich in the fridge.

the status of the adverbial phrases differs partly because *in the train* is omissible while *in the fridge* is not, but also because the first phrase, though not the second, has regularly corresponding sentences of the form:

(3) Alice was in the train when she ate the sandwich.

(4) What Alice did in the train was $\left\{\begin{array}{l}\text{(to) eat}\\ \text{she ate}\end{array}\right\}$ the sandwich.

These correspondences to related sentences seem to indicate that *in the train* in (1) is a free modifier or 'adjunct,' whereas *in the fridge* in (2), though an adverbial, is a verb elaborator, just like the earlier examples of obligatory adverbials with the verbs *live, last,* and *thrust*.

All obligatory elements are therefore verb elaborators, but this does not mean that all optional elements are free modifiers. Even Tesnière only suggested that elaborators ('actants') are "often indispensable to complete the sense of the verb" (1966: 128). Helbig therefore proposed a three-way division into obligatory elaborators, optional elaborators, and free modifiers (*obligatorische Ergänzungen*, *fakultative Ergänzungen*, *freie Angaben*). The following examples suggest the need for an even more subtle analysis:

(5) Alfred was praising the play.

(6) Alfred was watching [the play].

(7) Alfred was reading (the play).

(8) Alfred was idling.

The first three have *the play* as the object of the verb and therefore as a potential part of its valency, but it is only in the first sentence that the object is obligatory. In both the second and the third sentences, *the play* may be omitted, but under different conditions: whereas in (6) the objectless version of the sentence always requires the listener to identify the thing watched from what is evident in the context, in (7) the objectless sentence leaves the thing read totally open as a matter of no immediate interest (cf. Allerton, 1982: 68–70). Thus while the optional object is clearly part of the valency of *watch* in all its uses, the verb *read* appears to have two different valencies, only one of them involving an object. In (8), finally, no object is possible with the unequivocally intransitive verb *idle;* an object can therefore be no part of its valency. This truism suggests a useful general test: if an element, such as an object noun phrase, can only be added to certain verbs and not to others, then it participates in verb valency, in contrast to, say, a time adverbial like *yesterday* or *today,* which can be freely added to any sentence (given an appropriate tense form). The test of insertion, rather than that of omission, is therefore most useful for distinguishing elaborators from free modifiers.

The Diversity of Elaborators

Further tests are required for deciding what kinds of elaborator need to be distinguished. A substitution test, for instance, is useful in assessing combinations of verb and prepositional phrase. All the prepositional phrases in the following sentences are omissible elaborators, and yet they do not all have the same status:

(9) Alice listened to the big waves.

(10) Alice concentrated on the big waves.

(11) Alice swam to the big waves.

(12) Alice floated on the big waves.

A consideration of the first two sentences, (9) and (10), shows not only that the preposition is selected by the verb, but even that no other preposition is possible without a change in the nature of the combination; the prepositional phrase is therefore some kind of prepositional object (a category not allowed for by Tesnière but standard in German valency grammar). The prepositional phrases in (11) and (12), however, are not prepositional objects, as various tests show: the preposition can be replaced with a range of other prepositions to give a series of regular semantic contrasts (*to* → *into, towards, under,* etc.; *on* → *over, near, behind,* etc.); unlike the prepositional phrases of (9) and (10), those of (11) and (12) demonstrate their place-adverbial nature through their capacity for being preceded by particles like *right* or *back*; finally, whereas the phrases of (9) and (10) show their partly nominal nature through their elicitation with a *What* + preposition question, those of (11) and (12) are typically elicited with the

Where (... to) question typical of place adverbials of location and destination respectively.

These and similar criteria have been referred to by valency grammarians as establishing the various possible elaborators of verbs. It has become clear that these elaborators include not only noun phrases but also prepositional phrases and adverbs. They also include adjective phrases, as in the first two ((13a) and (13b)) of the following sentences:

(13a) Alfred seemed rather stupid.
(13b) Alfred remained fit.

(14a) Alfred seemed a fool.
(14b) Alfred remained an athlete.

(15) Alfred insulted an athlete.

The first two pairs of these sentences, i.e., (13a)/(13b) and (14a)/(14b), illustrate the pattern of a verb with what is in traditional grammar called a complement but in most modern works is referred to as a 'predicative' (following Jespersen). Most typically, this pattern contains an adjective phrase, as in (13), but where it is a noun phrase, as in (14), the noun phrase may generally be replaced with an adjective phrase (hence the alternative label 'predicate nominal/adjectival'). One way in which predicatives differ from objects is in their nonacceptance of 'clefting,' with the result that, comparing (14) with (15), we find that **It was an athlete that he remained* is not a possible sentence, while *It was an athlete that he insulted* is perfectly natural.

Noun phrases and adjective phrases are the two universally described kinds of predicative, but there is a third kind, in the form of a prepositional phrase, as in (16):

(16a) Alfred seemed in a funny mood.
(16b) Alfred remained in good health.

The prepositional phrases *in a funny mood* and *in good health* in these sentences have a similar function to the adjectival phrases *rather stupid* and *fit* in (13a)/(13b); it seems only reasonable then to recognize them as prepositional predicatives, alongside nominal and adjectival ones. In such prepositional phrases, the preposition has a weak semantic contribution to make and is selected by the noun (cf. *under a misapprehension, on top form*).

Returning to noun phrase predicatives, we see that they can be formally identical to noun phrase objects. Clearly predicatives and objects are noun phrases with rather different functions, and it can be argued that function is a vital ingredient in the specification of elaborators, particularly in a noncase language like English. In addition to the 'clefting' test just mentioned, 'passivization' of a sentence, in particular, the moving of an active object to subject position in the corresponding passive clause (e.g., changing (15) above to *An athlete was insulted by Alfred*), can play a part in evaluating such functions. It is worth noting, however, that not all the noun phrases traditionally classed as objects pass this test, and if this is taken to be the hallmark of objecthood, some will need to be thought of as pseudo-objects or 'objoids.' In a language like German, on the other hand, it might be sufficient to define elaborators with such labels as accusative object, dative object, prepositional object, etc. and regard the predicative as a nominative kind of object, since passivization is not limited to sentences with any one kind of object (though, admittedly, only the accusative object can become the passive subject).

One final type of elaborator needs to considered. As a variation of (11), we might cite (17), which differs only in having its adverbial (elaborator) in the shape of a single word adverb instead of a prepositional phrase. It needs to be contrasted with (18), in which the single word adverb has a rather different function:

(17) Alice swam out.

(18) Alice turned out.

Whereas the normal adverbial elaborator *out* in (17) participates in normal semantic contrasts like *swam out* versus *swam in* versus *swam across*, and can be compared with the fuller form *swam out of the lagoon*, the *out* of (18) has a quite different status. The contrast between *turn out* ('appear on duty') and *turn in* ('go to bed') is not the normal one between *in* and *out*, and the combination *turn across* is virtually nonoccurrent. Combinations like *turn out* (or *turn in*) are not normal sequences of verb and adverbial elaborator but tight collocations of the type usually referred to as 'phrasal verbs,' and in these collocations, the adverb has a strong limiting effect on the meaning of the verb, so that *turn*, for instance, has to be understood in a special new sense. Such adverbs (and it is only a question of single-word adverbs) can be described as limiter adverbs.

One view of the total range of English verb elaborators other than the subject is given for bivalent verbs in Figure 2. After each elaborator, a suggested abbreviatory symbol is given in parenthesis.

The Special Status of Subjects

The range of English verb elaborators displayed in Figure 2 expressly excludes the subject. But, as noted above, valency grammarians differ from other grammarians in seeing the subject not as standing apart from the predicate or verb phrase but rather as

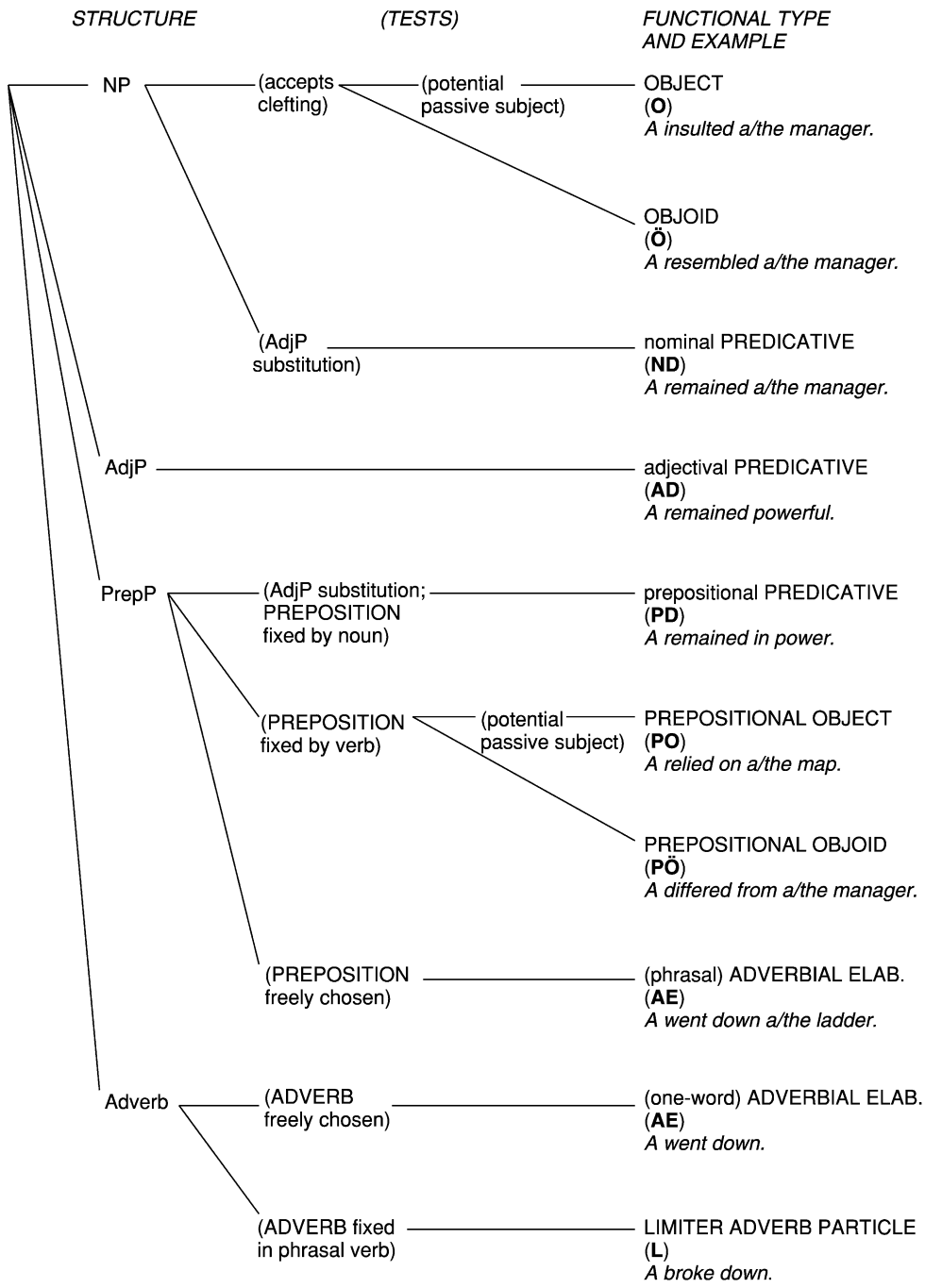

Figure 2 Nonclause elaborators of English bivalent verbs, excluding the subject (**S**).

standing alongside the object as an elaborator. As Tesnière put it (1966: 109), "*... du point de vue structural... le sujet est un complément comme les autres*"; but this statement is something of an oversimplification.

The subject has a special place as regards inflectional morphology. In languages that have grammatical case, there is frequently a case such as the nominative that is selected for active subjects regardless of the lexical verb used, whereas verbs may govern objects in at least two different cases (as in German or Russian). As for the verb's own inflections, these commonly agree with the number, person, etc. of the subject but not the object, whereas the reverse never obtains. Languages with an ergative/absolutive case system, like Basque, are slightly different in these two respects.

In terms of syntactic form, subjects have greater positional prominence in the sense that, in the absence of a specially marked theme, the subject occurs typically as the first noun phrase in the

sentence – a feature shared by SOV, SVO, and VSO languages, that is, well over 90 percent of the world's languages. As regards syntactic dependence for occurrence, the subject normally has a higher priority than the object, in the sense that with all verbs, or (depending on the language) the vast majority of them, a subject is obligatory, while an object is only required by a proportion of verbs (i.e., by transitive ones). It is of course true that many languages – so-called pro-drop languages like Spanish, Italian, or Japanese – allow the subject to be omitted when it is identifiable from the linguistic or situational context (e.g., Spanish *vino* 'he/she/it came'). But these languages further allow the objects of many verbs to be omitted with no requirement of contextual recoverability (just like English *read,* discussed above, cf. Spanish *leyó* 'he/she/it read (something)'); and of course purely intransitive verbs (like Spanish *venir* 'come') reject objects altogether.

Finally, the subject (but not the object) has a textual role in being the typical sentential theme, one often carried forward from previous sentences, and is often phonologically marked as such (in English, for instance, often through a separate intonation unit). On the whole, then, subjects stand apart from other verb elaborators and need to be accorded a special status *vis-à-vis* the verb; but they are elaborators nonetheless.

Levels of Analysis

The above discussion of subjects and objects partly presupposes a clear definition of these categories. But this issue is a complex one, in which much hinges on the relationship between transitive active sentences and passive sentences as well as sentences with other formats. Consider a pair of sentences like:

(19) Alice attacked Barbara.

(20) Barbara was attacked by Alice.

According to most criteria (position, agreement, obligatoriness, for instance), *Alice* is the subject of (19), whereas *Barbara* is the subject of (20) despite the virtual synonymy of the two sentences. Tesnière accepted such an analysis but noted that the subject of the passive, *Barbara,* has the same semantic role ('patient' or 'sufferer' of the verbal action) as the object of the active sentence; whereas the subject of the active sentence, *Alice,* has the same semantic role ('agent') as the passive agentive phrase, *by Alice,* which he termed 'counter-subject' (French *contre-sujet*). What Tesnière failed to note is that these semantic roles are not valid for all active and passive subjects, objects, and counter-subjects; rather, it is a matter of the semantic valency requirements of individual verbs, as exemplified by the similar correspondences observable in the following sentences:

(21) Alice liked Barbara.

(22) Barbara was liked by Alice.

(23) Alice pleased Barbara.

(24) Barbara was pleased by Alice.

Thus, while in the first two sentences, (21) and (22), with *liked,* the active object and the passive subject, *Barbara,* agree in being the causer or stimulus of the emotion described by the verb, in the last two sentences, (23) and (24), with *pleased*, it is the active subject and passive 'counter-subject' (termed 'perject' in Allerton, 1982), *(by) Alice*, that have this kind of role. There is a similar exchange of syntactic functions between the *liked* sentences and the *pleased* sentences for the other semantic role of 'mental experiencer.' So while precise semantic roles are determined by the meaning of individual verbs (cf. also *defeat* and *lose (to)*), there is, given sentences containing any particular verb, a crucial correspondence between the syntactic functions of the active and the passive format of related sentences, and therefore a need to recognize a level of analysis independent of and intermediate between superficial subjects and objects on the one hand and purely semantic roles on the other. This recognition is of the valency level of deep or underlying subjects and objects.

A further reason for recognizing this underlying valency level of description is the behavior of certain meteorological verbs, as exemplified by English *It was raining,* French *Il pleuvait,* and Spanish *Llovía*. In Spanish (and other pro-drop languages), it is impossible to have a subject with such verbs in their normal use, and the verb *llover* can be said to be zero-valent (or 'avalent,' to use Tesnière's term). In English and French, the words *it* and *il* respectively fulfill the requirements discussed above to qualify as superficial subjects; but such a subject has no clear semantic role and is not replaceable (by such a phrase as *the weather*), and it seems that it may simply be part of the required surface structure for English and French sentences without corresponding to a true valency subject. For the corresponding German form *Es regnet*, the situation appears to be slightly different, because sentences without a (nominative) subject do occur, e.g., *Mich friert* 'Me is freezing = I am freezing,' *Mir ist kalt* 'To-me is cold = I am cold,' *Mir wurde geholfen* 'To-me was helped = I was helped'). (N.B. The initial pronoun in these sentences is the theme but not the subject.) It could therefore be argued that, since this empty German *es* is not required by any

	Valency gap	*Valency subject*	*Valency object*
Sentence with:			
Zero-valent verb (e.g. *rain*)	SURFACE SUBJECT	—	—
Monovalent verb (e.g.*stumble*)	—	SURFACE SUBJECT	—
Divalent verb (e.g.. *jolt*)			
— active	—	SURFACE SUBJECT	SURFACE OBJECT
— passive	—	PERJECT*	SURFACE SUBJECT

* = Tesnière's 'contre-sujet,' often referred to simply as 'agent phrase,' although this is often semantically inappopriate.

Figure 3 Correlation of English valency and surface functions.

general rule of sentence structure but is demanded by such meteorological verbs, it is a required (though empty) elaborator.

A summary of the relationships between valency functions and surface form in English meteorological sentences, ordinary intransitive, and transitive sentences. both active and passive, is given in Figure 3.

Trivalent verbs of the indirect object type discussed (like *offer* and *give),* also appear in two virtually synonymous formats in English, as exemplified by:

(25) Alfred handed that Bible to Charles.

(26) Alfred handed Charles that Bible.

These two formats can be regarded as variant realizations of the same valency pattern, with the indirect object appearing either after the object and with a preposition (as in (25)) or before it and without a preposition (as in (26)). Each version gives rise to a different passive sentence (*That Bible was handed . . ./ Charles was handed . . .*).

Different Links between Elaborators and Semantic Roles

Rather different in its valency implications is the kind of obligatorily reflexive verb exemplified by *absent oneself* in (27), compared with the incidentally reflexive verb of (28):

(27) Alice absented herself from the meeting.

(28) Alice criticized herself at the meeting.

Since a nonreflexive object is impossible with the verb *absent,* the *herself* of (27) is an empty elaborator that cannot be said to express an independent semantic role beyond that of the subject, which in this case can be described as agent. In (28), on the other hand, *herself* has the role of patient (or affected entity), with the subject again having the role of agent. But in both cases, the reflexive pronoun fulfills the valency function of object, a (prepositionless) noun phrase immediately following the lexical verb, so that both verbs can be regarded as bivalent.

This view of the valency of reflexive verbs differs from that of Tesnière, who saw reflexive verbs as manifestations of a different kind of verbal voice, the so-called recessive (French *récessif),* which reduced the valency of a verb by one, so that bivalent verbs like *lever* 'raise,' or *ouvrir* 'open (transitive)' become monovalent when reflexive *(se lever* 'rise, stand up,' *s'ouvrir* 'open (intransitive)'). Although this view is an interesting one, it is something of an oversimplification.

In fact, reflexive verbs in French (and many other languages, including German), seem to have at least four possible different kinds of status. A first group of verbs, like *se laver* 'wash oneself' or *se critiquer* 'criticize oneself' are ordinary transitive verbs that can have a reflexive object as an alternative to a normal one, but the reflexive one has no special significance for verb valency. A second group of verbs, like *s'absenter* 'absent oneself' or *se souvenir (de)* 'remember,' do not have a nonreflexive use, and thus the reflexive pronoun is an empty elaborator, even though an essential one, rather similar to the *es* of German *Es regnet* (discussed in the section Levels of Analysis). Thirdly, there are verbs like *douter/ se douter* 'doubt/imagine, suspect' or *résoudre/se résoudre (à)* 'solve/decide,' which have both a nonreflexive and a reflexive use, but where the semantic difference is too great for them to be simply counted as the same verb; in fact, reflexivization is used almost like a device of word-formation for producing a new lexical item, one that has to count as a compulsorily reflexive verb. Finally, there are verbs like *ouvrir* and *vendre,* for which the reflexive pattern is used to convey the idea that the subject is semantically the

patient (and hence also object), and that there is no explicit agent, which is why the patient has to fill the subject position too, as in *La porte s'ouvre* 'The door opens (itself).' This reflexive use truly is a way of coping with a reduced number of semantic roles and gives rise to 'polyvalency,' that is, a verb displaying an equivalent meaning in two quite different grammatical uses.

Tesnière also recognized syntactic devices for increasing the valency of verbs, such as French causative constructions with *faire*. English causative constructions with *have, make, cause,* etc. preserve subject and object functions in the embedded infinitive clause of sentences like those of (29) and (30) below, so that *Alfred* remains the subject and *Balzac* the object of the verb *(to) read,* just as they would have been in a full sentence with the same content *(Alfred reads Balzac,* for instance):

(29) John had Alfred read Balzac.

(30) John caused Alfred to read Balzac.

In French, on the other hand, *faire* seems to combine with infinitives to form complex verbs like *faire mourir* 'have . . . die,' *faire apprendre* 'have . . . learn,' and *faire donner* 'have . . . give' to give sentences like the following (adapted from Tesnière), in which *Jean* is introduced as the causer or instigator and as subject of the whole *faire* + verb complex, displacing *Alfred* from subject position:

(31) Jean fait mourir Alfred.
(cf. Alfred meurt.)

(32) Jean fait apprendre le bulgare à Alfred.
(cf. Alfred apprend le bulgare.)

(33) Jean fait donner la Bible à Charles par Alfred.
(cf. Alfred donne la Bible à Charles.)

As Tesnière pointed out (1966: 260–262), French requires that the displaced subject should occupy the next available place down the hierarchy, starting with the object (= second actant) as in (31), going on to the indirect/ prepositional object (= tierce actant) as in (32), and going on as far as the agent phrase (= quatrième actant) as in (33).

Other languages have different ways of dealing with the valency of causative relationships. One possibility is to allow polyvalency in such a way that the same verb may be used intransitively and transitively in a causative sense without change of form, as with the many so-called ergative verbs of English, which typically refer to a change of state or position. Verbs such as *break, cook, open, boil,* and *sink* have a monovalent use as in (34) below, beside a bivalent one with a causative meaning as in (35):

(34) The glass broke.

(35) John broke the glass.

With such verbs, the subject of the intransitive pattern and the object of the transitive pattern have the same semantic role of 'patient affected,' while the transitive subject has the role of 'agent.'

An alternative way of dealing with different constellations of elaborators with semantic roles is by marking the particular valency pattern by means of derivational morphology, i.e., having a related verb derived with an affix to create a verb of different valency: the German prefix *be-,* for instance, often has the effect of converting an intransitive verb into a transitive one, as in the pairs *arbeiten/bearbeiten* 'work/work on, process' and *enden/beenden* '(come to an) end/(bring to an) end, complete'. Swahili has a range of suffixes that work in a similar way:

-w(a)	dynamic passive	e.g., *-vunjwa* 'be(come) broken'
-ík(a)/-ek(a)	stative passive	e.g., *-vunjika* 'be/ remain broken'
-an(a)	reciprocal	e.g., *-pendana* 'see each other'
-i(a)/-e(a)	applicative	e.g., *-letea* 'bring to (someone)'
-sh(a)/-z(a)/-ny(a)	causative	e.g., *-angusha* 'make fall = drop'

All of these Swahili suffixes give rise to sets of related verbs with different constellations of elaborators with semantic roles, but these constellations are of different kinds. The applicative and the dynamic passive (like the English passive) reassign elaborators: the object in the applicative corresponds to a normal preposition phrase; the subject in the dynamic passive corresponds to a normal object. The stative passive involves reassignment of the object to subject position but loss of the original subject. The reciprocal reduces bivalent subject-object structure to a simple monovalent one. The causative and the applicative increase the valency: the causative includes a new 'instigator' subject, downgrading the normal subject to object, while the applicative introduces a new 'indirect patient' as object, downgrading the normal object to a kind of secondary object.

Patterns Involving a Transcategorial Quasitransformational Relationship

Apart from the regular, transformational relationships that we find between active and passive structures or

in other cases of polyvalency, there are some more distant and less regular cases of valency pattern relationships that need to considered. These are cases in which not simply the elaborators of the verb are reconfigured in some way, but ones in which the verb itself is involved in the restructuring. Unlike active-passive and similar regular transformational relationships, these partly irregular relationships are like word-formation patterns in their partial unpredictability, so that it would be reasonable to refer to them as 'quasitransformational' patterns of correspondence.

Consider the following examples:

(36) Alfred greatly enjoyed the music.

(37) Alice really loved Mozart.

(38) Alfred derived great enjoyment from the music.

(39) Alice really was in love with Mozart.

The sentences of (36) and (37) are simple bivalent structures with subject and object as verb elaborators, whereas their quasi-synonymous kindred sentences, (38) and (39) respectively, involve a different pattern. In this more complex structure, a semantically lightweight verb is used, pushing the verb's meaning into an elaborator position, object position in the case of (38) and noun phrase within a prepositional predicative in (39). Although the valency of the simplex verbs *enjoy* and *love* is identical (i.e., they are both bivalent, with a 'mental processor' subject and a 'mental focus' object), the corresponding nouns (*enjoyment* and *love*) participate in quite different patterns and are anything but interchangeable. In Allerton (2002), sentences like those of (38) and (39) are said to involve 'stretched verb constructions,' and the relationship of their structure to that of their kindred simpler 'unstretched' structure is represented by marking the functions of their elaborators with the capital letters used already (**S, O,** etc.) and by attaching to every descriptive category an oblique stroke (or 'slash') followed by a lowercase letter indicating the corresponding element in the equivalent 'unstretched' structure. Elements that have no correlate in the simple verb structure are labeled as . . . **/ø**. Sentences (38) and (39) could be represented at a valency level as (38x) and (39x) respectively:

(38x) Alfred derived great enjoyment from the music.
S/s + V/ø + O/v + PÖ/o

(39x) Alice really was in love with Mozart.
S/s + V/ø + PD/v + PÖ/o

The collocation *derive enjoyment from* has a meaning that is not essentially different from *enjoy*, so that semantically such correspondences obtain. But grammatically, even at the deeper valency level, *derive* is a verb and *enjoyment* is a noun. Such quasi-transformational relationships between 'kindred' constructions are therefore semantic in nature but need to be recognized as involving a grammatical correspondence that is transcategorial. The existence of stretched verb constructions gives the speaker a wide choice between different verbal construction types to express broadly the same meaning, as the further examples of (40) show.

Each of the options given in (40a)–(40f) represents a different grammatical structure, with a different relationship to the underlying sentence (40), which has the action expressed by a verb. Compared with the simplex structure of (40), the eventuality type named by the verb has been 'moved' into a verb elaborator position (predicative or prepositional objoid or object) and there have been reallocations of the verb elaborators themselves. In the structure of (40b), a 'former' object has been downgraded to the position of a prepositional phrase qualifier (**PQ**) of a verb elaborator, which in this case is a nominal predicative (**ND**):

(40) The child helped the teacher.
S + V + O

(40a) The child was helpful to the teacher.
S/s + V/ø + AD/v + PÖ/o

(40b) The child was a helper of the teacher.
S/s + V/ø + ND/v < PQ/o>
(where the **ND** is agent-oriented)

(40c) The child was a help to the teacher.
S/s + V/ø + ND/v + PÖ/o
(where the **ND** is process-oriented)

(40d) The child was of help to the teacher.
S/s + V/ø + PD/v + PÖ/o

(40e) The child came to the help of the teacher.
S/s + V/ø + PÖ/v + PÖ/o

(40f) The child gave help to the teacher.
S/s + V/ø + O/v + IO/o

What all stretched verb constructions share is the way the process of helping is signaled by an adjective or noun rather than the verb. The verb in such constructions has been variously described as a light or thin verb, or as a support verb, because its semantic contribution is so weak. In English stretched verb constructions with a copular verb, the standard verb is of course *be*, but otherwise, the verb seems to have been selected from a limited list of possibilities: intransitive patterns like (40e) have *come, go, put, meet,* and *provide* or some such similar verb, while in transitive ones like (40f) the most common verb is

make, with *carry out, feel, get, give, have, provide, receive, suffer* and *take* also being frequent.

Adjective and Noun Valency

Although Tesnière confined valency to verbs, it has been naturally extended to adjectives and nouns by later valency grammarians. Predicative adjectives combine with copular verbs to form a unit that has many features in common with verbs, including similar valency requirements, for instance, *be afraid (of)* can be compared with *fear.* Admittedly the adjective (phrase) *afraid (of)* can be regarded as an elaborator of the verb *be;* and it is true that predicative adjective phrases occur with various verbs other than *be,* such as *become, remain, seem* (not to mention the trivalent *make (someone/something …)*, *keep (someone/something …)*, etc.), and thus involve a second order valency. On the other hand, the adjective's valency extends beyond what is normally termed adjective complementation, as in *afraid of the dark,* to cover the subject of its companion verb. An adjective like *afraid,* for instance, requires an animate subject with the role of experiencer. Other predicative adjectives have requirements that link subjects with other elaborators, as the following examples demonstrate:

(41) Alfred is similar to Alice.

(42) Alice and Alfred are similar (to each other).

(43) [Alice is mad about cars.] Alfred is similar.

Clearly *similar (to)* implies two entities, but these can be referred to in three different patterns: in (41), one entity is the subject and the other occurs as a (following) elaborator of the adjective; in the (42) pattern, which involves a reciprocal meaning, the subject must be plural, and the adjective's elaborator is freely omissible; in the (43) pattern, finally, the elaboration of the adjective has to be supplied from the context (just like the object of the verb *watch,* discussed in the section An Essential Distinction: 'Actants' versus 'Circonstans'). The elaboration patterns of such adjectives thus cannot be adequately described without reference to the subject.

Most English adjective elaborators are like verb elaborators in that they follow the word they elaborate. There is, however, one important difference: while the majority of verb objects have no preposition in English, virtually all adjectives do require a preposition before their complement (the one clear exception being *worth).* As in the case of prepositional verbs, the adjectives each select a particular preposition, in an often arbitrary way, for example, *keen on, eager for, dependent on, independent of, free of/from.* Sometimes the adjective's choice of preposition agrees with that of a corresponding verb, sometimes the verb has a different preposition, or no preposition at all:

(44) Alice was hopeful of success.
(cf. Alice hoped for success.)

(45) Alice was hungry for power.
(cf. Alice hungered for power.)

(46) Alice was desirous of wealth.
(cf. Alice desired wealth.)

Adjectives with more than one elaborator are relatively rare but can be found, for example, *responsible to (someone) for (something).*

In case languages, some elaborators of adjectives occur without a preposition, but instead, they occur in a particular case form required by the adjective. In German, this case is most commonly the dative, and such elaborators most commonly precede the adjective, as in (47) below; on the other hand, *anders* 'different', is complemented with the case-neutral subordinator *als,* which follows, as in (48):

(47) Alfred ist seinem Bruder sehr ähnlich.
(cf. Alfred is very similar to his brother.)

(48) Alfred ist ganz anders als sein Bruder.
(cf. Alfred is quite different to/from his brother.)

(Note that *sehr* 'very' and *ganz* 'quite' are free modifiers and thus strictly outside adjective valency; the preference for the one or the other in these cases is determined semantically rather than lexicogrammatically.)

Noun valency is comparable with adjective valency, particularly for nouns derived from adjectives, though the selection of prepositions in noun complements, too, only partly corresponds to that in related words (i.e., adjectives and verbs), as illustrated by these examples:

(49) Alice's dependence on her parents (was obvious).
(cf. Alice was dependent on her parents.
Alice depended on her parents.)

(50) Alfred's pride in the project (was obvious).
(cf. Alfred was proud of the project.
Alfred prided himself on the project.)

Noun valency therefore also needs to be specified independently. It even has special features of its own. In the first place, there are many nouns without a corresponding verb or adjective that take a complement, for example, *daughter (of…), president (of…), headquarters (of…), advantage (of…), appetite (for…).* A second point made clear by the above examples is that of the English *of,* which often counts as the equivalent of a genitive case in case languages,

is the favored preposition; thus an *of* noun complement often corresponds to the simple object of a transitive verb (without a preposition), for example, *bombardment/defence/siege of the castle* (cf. *bombard/defend/besiege the castle)*, although even here there are exceptions, such as *attack on the castle*. The most striking feature of noun valency, however, is the fact that the item corresponding to the subject of a verb, particularly of a transitive one, can appear in a language like English as a possessive determiner (i.e., in place of an article), as an alternative to its occurrence as a prepositional complement, as the following examples show.

(51) a/the defeat, a/the collapse [simple *determiner* + NOUN]

(52) Alfred's collapse, the collapse of Alfred, *the collapse by Alfred.

(53) Bernard's defeat (?by Alfred), the defeat of Bernard by Alfred,
Alfred's defeat of Bernard, *the defeat of Alfred of Bernard

Although complex interrelationships are involved in the above, and borderlines are not always clear, it can be said that *by* complements normally correspond to transitive subjects, possessives to transitive or intransitive subjects (and occasionally objects), and *of* phrases to intransitive subjects or to objects. Furthermore, two complements of the same kind are not allowed.

Embedded Clauses as Part of Valency

Many verbs, adjectives, and nouns, besides their normal valency patterns involving phrases (whether nominal, prepositional, or adjectival) also allow complementation with finite or nonfinite clauses. Alongside phrasal complementation like *Alice wanted a holiday* or *Alice realized her mistake,* verbs like *want, anticipate,* or *realize* also permit clausal complementation as in (54), (55), and (56) respectively:

(54a) Alice wanted to go to Switzerland.
(54b) Alice wanted Angela to go to Switzerland.

(55a) Alice anticipated going to Switzerland.
(55b) Alice anticipated Angela('s) going to Switzerland.

(56a) Alice realized that she had made an error.
(56b) Alice realized how she had gone wrong.

It is part of the valency of the verb *want*, as shown by (54), that it can occur with an elaborator in the form of an infinitive clause (54a), with the further possibility (54b) of specifying a different subject (here *Angela)* for this infinitive. The verb *anticipate*, on the other hand, though impossible with the infinitive, is natural with a gerund construction, as in (55a), and it may have a different subject specified either with a plain noun phrase (*Angela*) in informal English or with a possessive noun phrase (*Angela's*) in formal English. The verb *realize* is impossible with both infinitive and gerund but does occur with a finite clause, either declarative as in (56a) or interrogative as in (56b), although some verbs prefer either the one or the other (e.g., *admit*; *enquire*). Both nonfinite and finite clausal complementation can be regarded as cases of 'embedding,' that is, downgrading of a sentential structure to play a lower level role as a verb elaborator. Some verbs are restricted to clausal complementation: the verb *condescend,* for instance, always requires a following infinitive.

Verbs need to be lexically specified for the types of clausal elaborator they accept, and this requirement involves a number of factors. A first point is the possible verb-form in the embedded clause, i.e., whether it is an infinitive, a gerund, or a finite verb, allowing for the fact that some verbs permit two, or even (as in the case of the verb *intend*) all three of these verb forms. A second consideration is the question of a subject for this verb in the elaborator clause. Finite clauses always have an overt subject, but in a nonfinite clause, a subject may be required, permitted, or impossible, cf.

1. impossible subject, e.g., *Alfred offered (*me) to open the meeting.*
2. permitted subject, e.g., *Alfred intended (me) to open the meeting.*
3. required subject, e.g., *Alfred caused me to open the meeting.*

Nonfinite clauses without an overt subject are understood to have the same subject as the preceding verb.

A noun phrase preceding an infinitive or gerund clause elaborator may therefore be the subject of the verb, but it does not have to be. In fact, there are three possibilities for a noun phrase intervening between the main verb and an elaborator infinitive:

1. the (indirect) object of the first verb, with no connection with the second verb, e.g., *Alice promised me to open the meeting.* (This construction in English seems to be limited to the verbs *promise* and, in one particular use, *ask*.)
2. the object of the first verb and simultaneously the subject of the second verb, e.g., *Mary persuaded me to open the meeting.* (Cf. the impossibility of **Mary persuaded the meeting to be opened by me.*)
3. the subject of the second verb, with no relation to the first verb, e.g., *Mary wanted me to open the*

meeting. (Cf. the virtually synonymous passivized *Mary wanted the meeting to be opened by me*.)

A further complication involves the precise status of the subject of the finite verb. Consider the examples:

(57) Alfred hoped to entertain the audience.

(58) Alfred happened to entertain the audience.

Sentence (57) is similar to (54a), but (58) is rather different in that, although apparently the subject of the verb *happen* is simply *Alfred*, it seems semantically more appropriate to identify the subject as the whole discontinuous infinitive clause *Alfred … to entertain the audience* (cf. the sentence *It happened that Alfred entertained the audience*). It is often suggested, for instance, by Huddleston and Pullum (2002: 1194–1198), that such sentences should be described as having a 'raised' subject, in the sense that the noun phrase *Alfred* has apparently been extracted out of its position of subject of the nonfinite verb *entertain* and superficially promoted to the level of subject of the main clause verb *happen*. One problem with this analysis is that it seems to assume that the embedded clause *Alfred to entertain the audience* would naturally occur in a position after the main verb *happen*, which is not the typical position for the subject. Another approach is to regard (58) as involving a kind of compound verb *happen to entertain*, in which *entertain* is the semantic head, but *happen* is the syntactic main verb.

Something similar is found in the following:

(59) It seems/seemed that the pianist entertained the audience.

On the face of it, such a sentence looks like a case of extraposition, i.e., a structure formed when a clausal subject is replaced by *it* and postponed till the end of the sentence (as in *It annoyed me that he left early*). But an 'unextraposed' version of this sentence is ungrammatical:

(59x) *That the pianist entertained the audience seemed.

Sentences like (59) may therefore have to be regarded as an additional sentence pattern, requiring an empty *it* subject and an obligatory *that*-clause. After all, empty *it*-subjects of a different kind are required anyway for meteorological verbs like *rain* (see the section 'Levels of Analysis').

Finally, all the above points concerning verbs with embedded clauses as elaborators apply equally to adjective and noun complementation, as these phrases show:

able to speak French, capable of speaking French, confident that she could speak French; a tendency to speak French, a habit of speaking French, the fact that she spoke French.

The Limits of Valency

Verbs, adjectives, and nouns are the three major lexical word classes for which the concept of valency is clearly appropriate and for which detailed language studies have been made and preliminary dictionaries compiled. An important issue is whether the concept be extended further, beyond the occasional adverb directly derived from an adjective and copying its valency (e.g., *independently of Alfred)*. Transformational grammarians have suggested grouping together spatiotemporal adverbs and prepositions respectively as intransitive and transitive particles (or 'prepositions' in a new sense), transitive ones involving complementation with noun phrases and prepositional phrases. This insight could be applied to valency to give a classification something like the following particles (or 'prepositions' in a broader sense):

1. *zero-valent:* nearby, home; soon, previously
2. *monovalent* (obligatory simple object): at, to, from, towards; during
3. *monovalent* (omissible simple object): in, above, off; after, before
4. *monovalent* (omissible prepositional object): out (of), in front (of)
5. *bivalent:* between (… and …)

But there are problems with such an analysis: for instance, whether the situated entity (the subject or object of the sentence) should be included as a further elaborator, thus increasing all the above valencies by one; whether *out of* (or *away from*) really contains two words of the same word class particle/'preposition' (albeit of different subclasses); whether *above* and *out* (etc.), in their unaccompanied uses always imply an omitted object.

Although the application of valency grammar can thus be extended, it is not really intended to account for the whole of a syntactic system, any more than Fillmore's 'case grammar' (*see* **Case Grammar**). Valency is a matter of the subcategorization of lexical categories, and therefore in a strict sense would exclude:

1. coordinate structures, which are treated separately both by Tesnière (under the heading of the French term *jonction*)and by Hudson in his *Word grammar* (where they are basic and not derived from word-word relations)

2. grammatical 'specifiers,' such as auxiliaries and (nonpossessive) determiners, which although treated as dependents (or even governors) by many dependency grammarians, were regarded by Tesnière as involving a different relationship to main verbs and nouns respectively – a view still valid today
3. 'subordinators' in Tesnière's interpretation, which embraced prepositions and subordinating conjunctions, these being for him convertors (French *translatifs),* of noun phrases or clauses to adverbial or adnominal function, e.g., adverbial *(Alfred arrived) before the concert/before I arrived;* adnominal *(Alfred liked the book) in the window/which he'd seen in the window)* – again a theoretically tenable position.

Valency can thus evidently be included in a dependency grammar; for Engel (1977: 116), in fact, valency is simply a matter of dependency on subclasses. Equally valency can be incorporated into a functional grammar or a functionally enriched constituency grammar, albeit under a different rubric. Furthermore, valency characteristics have, in recent years, increasingly been incorporated into dictionary entries, and improved specialist valency dictionaries are being prepared (for instance, the Augsburg project for English, initiated by T. Herbst and D. Heath). For a number of years now, too, language departments of the University of Ghent have collaborated in the Contragram Group, which is currently compiling a contrastive valency dictionary. Similar projects have also been at work in China, Denmark, Japan, Korea, and Spain, just to mention some found on an Internet search. Abel *et al.* (2003) discussed the issues involved in specifying verb valency in an electronic learner's dictionary. Such ongoing work makes it clear that, despite any theoretical differences within valency theory or beyond it, its concepts are as valid as ever today. Valency relationships must find a place in every complete grammatical description.

See also: Case Grammar; Construction Grammar; Dependency Grammar; Functional Discourse Grammar; Systemic Theory; Word Grammar.

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Valkhoff, Marius François (1905–1980)

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Marius Valkhoff, born in Zwolle, the Netherlands, in 1905, was the son of Pieter Valkhoff, a professor of French language and literature at the university of Utrecht. He studied Romance language and literature in Amsterdam, studied Italian in Florence, sojourned in Paris (1927), and studied the Rumanian (Romanian) language at Cluj, Rumania. As a student he was most interested in avant-garde movies and was a cofounder of the Dutch *Filmliga* ('movies league'). In 1931, he defended his Ph.D. thesis, entitled 'Les mots français d'origine neérlandaise,' at the University of Amsterdam. The same year saw him appointed as an acting professor of French and Italian at Stellenbosch University in South Africa, where among other things he learned how to play golf. In 1932, he was admitted as a 'privaatdocent' (external unsalaried lecturer) in Rumanian language and literature at his alma mater, opening his courses by giving a public lecture on 'Latin, Romance, Rumanian'; he thus introduced the scientific study of Rumanian in the Netherlands. One year later he was appointed to a special chair of Romance linguistics as the successor to J. J. Salverda de Grave; his inaugural lecture dealt with "argot and thieves' slang." In 1938, he was appointed full professor at the same university. From 1951, he was a professor of French and head of the Department of Romance Studies at the University of Witwatersrand, South Africa. He was the cofounder of the Ernest Oppenheimer Institute of Portuguese Studies and reintroduced the study of Portuguese into the university curriculum. Having retired in 1975, he moved on to Sauve in Languedoc, France; he died in Paris in 1980.

Valkhoff was a prolific author who published on a great variety of subjects, including theology and parapsychology (*On the edge and beyond: three essays on parapsychology*, 1957). In the early 1960s he became fascinated by creolistics. Specializing in this field of research, in the line of the great Romance scholar Schuchardt (*see* **Schuchardt, Hugo (1842–1927)**), he visited the Cape Verde Islands and the isles in the Gulf of Guinea, where creolized Portuguese was still in use. The results of his on-site research, in particular on Sao-Thomé, can be found in the various studies he published on Portuguese creoles and Afrikaans.

Studies in Portuguese and Creole, with special reference to South Africa (1966) and *New light on Afrikaans and Malayo–Portuguese* (1972) stand out as his most important works.

His 1966 book aimed at the vindication and elaboration of Hesseling's (*see* **Hesseling, Dirk Christiaan (1859–1941)**) views on the historical development of the Afrikaans language, views that had been much debated in South Africa in the first decades of the 20th century. According to Valkhoff, it was not Malay, as Hesseling had assumed, but a creolized Portuguese that was the lingua franca spoken at Cape of Good Hope when the first Dutchmen landed there in the 17th century. He claimed that the process of creolization, which was prompted by the 'linguistic encounter' of Dutch and this lingua franca, came up among the nonwhite inhabitants at the Cape. Carefully distinguishing, unlike Hesseling, between various varieties of Creole, Valkhoff also took into account "the possible influence of Khoi" (Gilbert, 1994). As creolization did not make further progress, Afrikaans did not become a true creole language; it can rightly claim the rank of a standard language. To be sure, just like Hesseling, 'the unbiased scholar,' Valkhoff held Afrikaans in high esteem.

In the days of apartheid, most of Afrikaans scholarship was not amused being told by a Hesseling redivivus (cf. Raidt, 1994 on the "new topicality of an ancient controversy") that Afrikaans might be a 'mixed' language. In addition to that, Valkhoff accused his fellow linguists in no uncertain terms of 'diachronic purism,' 'albocentrism,' and 'compartimentage.' As Roberge (1990: 133) explains, Valkhoff was of the opinion that Afrikaner scholars "had imputed their ideal of racial purity into history and linguistics." Understandably, the creolization model did not attract them very much, wishing to "see their language white and pure like their race," as Valkhoff himself put it. Secondly, Afrikaner scholars appeared to him to have confined themselves to the study of the language of the *blankes*. As to 'compartimentage,' Valkhoff was of the opinion that his colleagues had dealt with the Dutch of Europeans, Khoikhoi, and slaves as separate phenomena. All in all, Valkhoff's studies provoked a bitter and lengthy debate. It is true to say that the Romance scholar Valkhoff showed a lack of acquaintance with Germanic studies, in particular with the development of the Dutch language (Zaalberg, 1970), and the same has been argued with regard to his knowledge of Afrikaans (Raidt, 1994: 36). As one of his critics (Lubbe, 1974) put it, Valkhoff has ensured that his name will always be mentioned when the problems surrounding the origin of Afrikaans are discussed. Be this as it may, his works have stimulated the discussion concerning the question of what counts as a creole language.

See also: Afrikaans; Hesseling, Dirk Christiaan (1859–1941); Pidgins and Creoles: Overview; Portuguese; Schuchardt, Hugo (1842–1927).

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Van Name, Addison (1835–1922)

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Addison Van Name's contribution to linguistics was pioneering and historically significant, but his most important legacy may not have been in linguistics. During the latter half of the 19th century, Van Name transformed the Yale library into one of the great reference libraries of the world in terms of both its organization and its acquisitions. He brought the same skills of organization and thoroughness to his work in linguistics, which, although limited, was prescient and insightful.

Van Name published on the linguistics and literatures of such diverse languages as Arabic, Japanese, and Chinese, but his contribution to modern linguistics was most important in terms of a relatively short treatise he published on several creole languages spoken in the Caribbean (Van Name, 1869–1870). Van Name was one of the earliest to recognize that creoles were qualitatively different from other languages, a distinct type, and in this article he anticipated much in the current debates on the origin and nature of creole languages.

Van Name was born to a farming family with lumber and shipping interests in Chenango, New York, on November 15, 1835. He studied at the Binghamton Academy and Phillips Andover Academy before enrolling in Yale College in 1854, where he graduated as valedictorian four years later. Studying philology (the precursor of modern linguistics), Van Name did particularly well in Hebrew. Josiah Willard Gibbs, Sr., professor of sacred languages, remarked his success and often invited him to his campus home, where Van Name became friends with his son Josiah Willard Gibbs, Jr., who pursued an academic career as a theoretical physicist. Van Name's association with Yale and closeness to the Gibbs family continued throughout his life.

After several years of travel and study in Europe, Van Name returned to Yale, first as a tutor and then as an instructor in Hebrew at the Divinity School. He switched to the position of librarian of Yale College in 1865, which he held until his retirement in 1904. In 1867, Van Name married Julia Gibbs, the daughter of his teacher Gibbs *père* and the sister of his good friend Gibbs *fils*. His close bonds to the Gibbs family were underscored when the newlyweds moved into the Gibbs household and raised their three children there. It was perhaps because of this very settled domestic scene that Van Name was able to contribute to linguistics, despite his prodigious contributions to the building of the library at Yale.

In the standard reference on pidgin and creole languages (Holm, 1988, 1989), Holm quotes approvingly an evaluation of Van Name's 1869–1870 'Contributions to creole grammar' as representing the beginning of the scientific study of creole languages (Stolz, 1986: 14). Although not terribly expansive on the theoretical side, the study clearly anticipates the central issues in creole studies and adopts a

See also: Afrikaans; Hesseling, Dirk Christiaan (1859–1941); Pidgins and Creoles: Overview; Portuguese; Schuchardt, Hugo (1842–1927).

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refreshingly modern perspective for the period in which he was writing.

Van Name's study is based primarily on written works and primarily on French creoles: "The survey includes five dialects of the French Creole and the Spanish, to which I have added for the sake of comparison brief notices of the Dutch Creole, and the Negro English of Surinam" (Van Name, 1869–1870: 126). He also benefited from the knowledge of several 'native' speakers to supplement these written works. The study is first of all important in adopting a **comparative** approach and generalizing about creoles *vis-à-vis* each other. He was the first to note similarities across creoles in terms of their phonology, morphosyntax, and even lexicon.

Previous studies and many subsequent ones based themselves on comparisons between a creole and its (European) lexifier language, i.e., the language that provided the creole's vocabulary. These latter studies usually took the position that the creole was a debased form of the lexifier, a position Van Name explicitly rejected.

Van Name looked forward to variationist approaches in recognizing the patterned variation present in creoles and its source, again providing a refreshing counterpart to the generally negative evaluation of creoles:

> . . . the [continued] contact with French, which has never entirely ceased, has been a disturbing influence and a source of corruption, for the standard of Creole purity is to be sought at the furthest remove from the French, where the Creole tendencies are the most developed.

Here Van Name anticipates the notion of the creole continuum and polylectal grammars found in the creolist literature of the 1970s.

Coupled with these insights was Van Name's perspective on seeing creoles as **creative** adaptations with limited resources: "we find, if not many new formations, numerous instances of old material put to new uses" (Van Name, 1869–1870:123). Van Name further recognized that the originators of a creole were typically adults whose ears and tongues had already accustomed themselves to another language under unusual sociohistorical circumstances.

Another way in which Van Name's contribution was important was in recognizing that the processes involved in creole formation are common elsewhere in language change. In a relatively modern way he saw the birth of a creole as telescoping the processes that affect all languages: "here two or three generations have sufficed for a complete transformation" (Van Name, 1869–1870: 123).

Van Name was also right in stating that creoles were not a simple mix of an African and a European language: "It is scarcely necessary to remark that these languages are not of mixed blood, half African and half European, for languages do not mingle so readily as races" (Van Name, 1869–1870:123). His study is also important in remarking the African contribution to creoles, although he saw it as being rather limited, i.e., to the phonology. A weakness that is also found even in more recent work proceeds from an ignorance of African languages (he calls them collectively "African," as if African languages constituted some monolithic entity). Nonetheless, it is the regret of later linguists that Van Name had to spend so much time building the Yale library, for surely his continued focus on creole languages and linguistics in general would have benefited the field.

See also: Pidgins and Creoles: Overview.

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Vanuatu: Language Situation

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Vanuatu is a Melanesian micro-state in the southwest Pacific, renowned for its high density of small vernacular languages and complex sociolinguistic situation. The country's colonial history as a jointly-administered British and French condominium until independence in 1980 shaped the modern language environment. English and French are both official languages, and there is a dual stream anglophone and francophone education system. Another colonial legacy is the pervasive presence of Bislama, an English-lexifier contact language given special constitutional status as both the sole national language and a third official language. Vanuatu is a least developed country of only 200 000 inhabitants, and this configuration of administrative languages adds both color and cost to its governance.

Further complexity arises from the vernacular language situation, truly exceptional in world terms. The most recent survey (Lynch and Crowley, 2001) details 98 distinct vernaculars, 81 of which are still actively spoken, while 17 are moribund. Thirteen languages have over 5000 speakers, giving the other 85 an average size of 1000 speakers. Most vernaculars (75%) are not well known to the linguistic community, appearing in the literature with a short word-list or less.

Vanuatu's extreme linguistic speciation is regarded as a national treasure, 'cherished' in the constitution. It arose from pre-contact settlement patterns whereby small clans were dispersed over rugged terrain and divided by rough seas. The resulting complex of subgroups and dialect chains is still being unraveled. In post-contact times, introduced diseases, genocidal acts, and the labor trade led to severe depopulation, social dislocation, and linguistic decline and extinction. The vernaculars are Oceanic (Austronesian family) languages probably descended from a single ancestral language that arrived about 3500 years ago as so-called Lapita people expanded southeast into the Pacific from Papua New Guinea through the Solomon Islands. Later, founder communities spread from Vanuatu to Fiji and Polynesia, to New Caledonia, and possibly to Micronesia.

Multilingual repertoires are the norm, and language issues are prominent in national life. The relative influence of French and English is a political concern, and suggestions that French might be waning are countered with appeals to misunderstood language equity provisions in the constitution. The judicial system has operated in English since independence, but there are plans to transform it into a dual-language operation. Significant language planning matters include the need for standardization and intellectualization of previously maligned Bislama as it rapidly creolizes in urban settings, and also the protection and development of vernacular languages in the face of potential widespread endangerment through shift to Bislama. A recent Education Master Plan requires that the first 3 years of basic education be conducted in the vernacular, but difficulties in developing orthographies and materials is hampering implementation, although some successful vernacular literacy projects are run by non-state actors. From 2003, an officially recognized and broadly representative National Language Committee has been advising in all language-related areas, but will always be challenged by a conundrum of competing aspirations: the desire for vernacular vitality as a source of Melanesian identity, the demand for development of Bislama as the national language, and the dictate that English and/or French proficiencies attain levels required for international interaction.

See also: Austronesian Languages: Overview; Language Planning and Policy: Models; Multilingualism: Pragmatic Aspects; Pidgins and Creoles: Overview.

Language Maps (Appendix 1): Maps 175, 176.

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Variability in Japanese (Discourse)

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The characterization of Japan as a homogeneous society is a common cultural stereotype. In reality, considerable diversity exists in its ethnic, social, and linguistic makeup. Linguistically, although Japanese is the dominant language, speakers of minority languages cannot be ignored. Minority groups in Japan (as of 2001) include approximately 600 000 resident Koreans and 1.3 million foreign workers and their children from the Philippines, China, Brazil, Peru, Thailand, and other countries (Sugimoto, 2003). Many of them are bilingual. Many Japanese nationals are also bilingual, including returnees from abroad. Although Japan's language policy has been based on a monolingual assimilationist ideology (Noguchi and Fotos, 2001), the country is becoming increasingly multilingual as it seeks to adapt to globalization.

Within the Japanese language itself, extensive diversity also exists across regions, individuals, and contexts. This diversity has been the major focus of study in Japanese sociolinguistics, although scholars vary in their approaches. Many studies employ a social/situational factors approach, often based on quantitative correlational analyses; they may imply that social factors directly affect the language choice, that language choice is a straightforward reflection of the social context. On the other hand, many recent studies adopt a social constructionist approach, regarding the speaker's choice of linguistic forms as a strategy for constructing social identity and social relations. Methodologically, the majority of the studies that employ a social factors approach rely on the data drawn from self-report surveys, but some Labovian sociolinguistic variation studies are available that analyze natural speech data. With a few exceptions, studies that rely on self-report surveys tend to equate what speakers say about their language use with their actual language use without critically discussing the potential difference between the two. On the other hand, studies that take a social constructionist approach usually examine data drawn from natural speech, employing a discourse or conversation analytic method.

Regional Variation and Standardization

Dialect Divisions

Japan, a mountainous island country, is rife with dialectal variations. These variations can sometimes be so large that mutual intelligibility may be hindered. The nature of this regional variability has been extensively investigated in Japanese dialectology. Largely based on the data from self-report surveys and interviews, a number of major dialect divisions have been proposed. One major undisputed division lies between the Ryukyuan dialects and the mainland dialects, with each group being further divided into smaller dialect areas. Significant differences between the two major groups have been observed in phonological, grammatical, and lexical features, including the vowel systems (i.e., three short vowels *a, i, u* in the Shuri variety of the former = Ryukyu vs. five short vowels *a, i, u, e, o* in most varieties of the latter = mainland); the consonantal systems (e.g., glottalized phonemic initial consonants in some varieties of the former but not in the latter); inflections of verbs and adjectives (e.g., distinction between the conclusive form and the attributive form of verbs and adjectives in the former but not in most varieties of the latter); and lexical items (e.g., *wan* vs. *watashi* 'I').

The mainland dialects are sometimes further divided into three areas: eastern Japan, western Japan, and Kyushu. However, another classification recognizes only two areas in the mainland: eastern Japan and western Japan (Kyushu being included in the latter), based on the existence of a major division, or

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a bundle of isoglosses, between the two along the Japan Alps that runs through the central region of the mainland. The well-known linguistic differences between eastern and western Japan include phonological differences (e.g., pitch-accent patterns), morphosyntactic features (e.g., imperative verb forms *-ro* vs. *-i/-yo*; copulas *da* vs. *ja/ya*), and lexical items (e.g., *iru* vs. *oru* 'exist'; *shoppai* vs. *karai* 'salty').

The major dialect divisions just discussed are based on the differences in overall linguistic aspects, including phonology, grammar, and lexicon. Other divisions have also been proposed based on a particular aspect, such as accentual systems, segmental features, or lexical items. For example, five groups are generally recognized on the basis of accentual systems: Kyoto-Osaka (with a four-way contrast in three-mora phrases), Tokyo (with a three-way contrast), Kagoshima-Nagasaki (with a two-way contrast), Miyakonojo (one-pattern), and part of Tohoku/Kyushu (accentless) (see Kokugo-gakkai, 1973; Sanada, 2002; Shibatani, 1990 for delineations of Japanese dialects).

Standardization and Code Switching/Style Shifting

The traditional classification of regional dialects outlined may suggest that the boundaries between different dialects are clear-cut and undisputed. However, in reality, the differences are on a continuum, both synchronically and diachronically. A particularly important issue to consider in this respect is the rapid advancement of standardization of Japanese. Due to a variety of factors associated with the nation's modernization since the Meiji Restoration in 1867 (e.g., the government language policy, which promoted Standard Japanese, or the speech of "the educated Tokyoites," particularly up until the end of World War II, and the development of mass communication and transportation system) language standardization has been steadily advancing in modern Japan, reducing regional differences (e.g., Kobayashi *et al.*, 1996; Chapter 10 in Kunihiro *et al.*, 1999; Sanada, 2002). Consequently, even in the same area there is wide interspeaker (especially intergenerational) and intraspeaker variation in the use of the regional dialect (see following). In other words, the linguistic composition of regional Japan is much more complex than the regional dialects delineated in traditional dialectology, which tends to represent older linguistic forms.

Most of the studies that report the advancement of standardization are based on apparent-time studies. For example, a number of apparent-time studies indicate that younger generations use certain lexical items and honorific morphemes in Standard Japanese more frequently than older generations (Inoue, 1989; Kobayashi *et al.*, 1996; Sanada, 2001, 2002). Real-time studies are rare in Japanese sociolinguistics (as well as in sociolinguistics in general). One notable real-time study, however, was conducted by the National Language Research Institute, which carried out dialect surveys in Tsuruoka, a small city in northern Japan, at 20-year intervals in 1950 (with 577 informants), 1971 (with 564 informants), and 1991 (with 719 informants). Yoneda (1997) reported the results concerning two phonological aspects: segmental features (e.g., labialization of *k*, voicing of intervocalic consonants in Tsuruoka) and accentual patterns (e.g., LH, as in *nego* 'cat', in Tsuruoka vs. HL, as in *neko*, in Standard Japanese). They show that standardization has been proceeding steadily in both phonological aspects, especially in the segmental features, which were found to be completely standardized in the younger age groups during the 1991 assessment (see also Chapters 11 and 20 in Kunihiro *et al.*, 1999). Note, however, that since these findings are based on interview data, the degree of standardization, especially in informal speech, may not be as high as these results indicate.

Although it is evident that the standardization of Japanese has been advancing steadily, its effects may vary depending on the dialect (Sanada, 2002). For example, the Kansai dialect is often said to have the greatest vitality because of the large number of speakers and their pride in their dialect (Inoue, 1989). It has also been claimed that despite the advancement of standardization, regional varieties have not lost their vitality, based on the following two kinds of phenomena. One is the fact that the so-called *shin-hoogen,* new dialect forms – forms that are not standard and used by younger generations more frequently than older generations (e.g., the morpheme *-be* "isn't it?" in eastern Japan, the negative past tense form of a verb *-n katta* in western Japan) – have been constantly emerging in regional dialects, indicating that the direction of language change is not uniquely toward standardization (Inoue, 1989, 1998); instead, more complex processes of dialect leveling are taking place. In addition, many speakers are now said to be bidialectal and use regional and Standard Japanese differentially, depending on the context. Further, it has been claimed that speakers also use a *neo-hoogen,* neo-dialect, a variety in between those two varieties (e.g., Kobayashi *et al.*, 1996; Sanada, 2001, 2002). Although these studies are mostly based on self-report surveys or informal observations, some of the recent studies have begun to analyze actual conversations. Okamoto (2004), for example, demonstrates that speakers do not code-switch between two or three varieties as distinct linguistic systems, and that the use of regional and standard variant forms is a matter of degree created strategically by the complex admixture of (phonological, morphological, and lexical)

variants inter- and intrasententially. Whether or not it is considered a matter of degree, the differential use of regional and Standard Japanese is generally viewed as involving a style shift according to the formality of the situation. In other words, regional dialects are no longer simply linguistic systems associated with different geographical areas but they also function as an index of a speech style concerning formality.

Social Identity and Interspeaker Variation

Variation in Japanese linguistic practice may also concern the speaker's social identity as it relates to gender, age, class, and other attributes. This variation has been another major focus of investigation in Japanese sociolinguistics.

Gender

Until recently, research on Japanese language and gender, a widely studied topic, has focused on the description of gender differences in speech patterns. Based on the assumption that Japanese men and women use distinct 'languages,' or 'men's language' and 'women's language', the differences between the two have been characterized in terms of both general stylistic characteristics, such as polite, gentle, and empathetic, and specific linguistic forms (usually in Standard Japanese), such as self-reference terms (e.g., feminine form *atashi*; masculine forms *boku* and *ore*), address terms (e.g., masculine forms *omae, kimi*), sentence-final particles (e.g., feminine forms *kashira* and *wa*; masculine forms *zo* and *ze*), honorifics, and pitch levels (e.g., Ide and Yoshida, 1999; Ogino *et al.*, 1985; Shibatani, 1990). With a few exceptions, these studies are largely based on researchers' casual observations or self-report surveys and are more likely to represent normative usage than actual speech practices. Further, they essentially employ a social factors approach, assuming that the use of gendered language is a straightforward reflection of the speaker's gender.

In recent years, however, researchers have begun to examine real speech data closely, while at the same time examining the historical process of the societal norm construction for women's speech and its implications (e.g., Nakamura, 2001; Okamoto and Shibamoto Smith, 2004). In general, these studies demonstrate that although the norms may serve as constraints on women's speech, Japanese women (and men) do not necessarily conform to them and that there is wide variation related to the speaker's social background, the speech context, and the speaker's language ideology (e.g., Gendai Nihongo Kenkyukai, 1999, 2002; Okamoto and Shibamoto Smith, 2004). As in the recent gender and language research on English and other languages, the findings of these Japanese studies show that women (and men) do not form a homogeneous speech group, and that gender cannot be treated as a variable that determines one's speech independently of other social variables such as age, class, and sexuality.

One aspect of the intragender variability concerns age differences. It has been reported that (among female speakers of Standard Japanese) younger women tend to use stereotypically feminine forms less frequently than older generations, although even the latter's use of such forms is not particularly pervasive (see following). Moreover, variation has been observed even within the same age group. Miyazaki's (2004) ethnographic study of the speech of junior high school students, for example, shows that not all the girls in the same year use stereotypically feminine self-reference terms, and that girls that belong to a nonconformist group use most untraditional terms (i.e., the stereotypically masculine terms *ore* and *boku*). Another aspect of the intragender variability concerns occupation or social class. For example, Gendai Nihongo Kenkyukai (1999) reports that analyses of women's speech at 19 workplaces show that women used gender-neutral sentence-final forms most frequently, that they hardly used stereotypically feminine sentence-final forms and self-reference terms (*watakushi* and *atashi*), and that they often did not use (expected) honorifics.

As indicated by the preceding discussion, the main focus of Japanese language and gender research has centered on women's speech. Only recently has attention begun to be paid to the variability in men's speech. Gendai Nihongo Kenkyukai (2002), for example, reports that men observed in 21 workplaces hardly used stereotypically masculine sentence-final particles (e.g., *zo* and *ze*), while using honorifics frequently, and also that there is wide variation within men's speech, as illustrated by the use of masculine terms *boku* and *ore*, the former being used frequently at universities and schools and not at other workplaces (e.g., companies), where *ore* is used much more commonly (see also Miyazaki, 2004).

The relation of language, gender, and sexual orientation is another area that has recently begun to receive researchers' attention. Several studies show how gays and lesbians use or disuse gendered speech styles strategically to construct their identity in their struggle with hegemonic heterosexual gender norms (Maree, 2002; Chapters 5, 6, and 11 Okamoto and Shibamoto Smith, 2004). One other important topic that is beginning to gain attention is gender in regional dialects, whereas previous studies have concentrated on Standard Japanese. It has been noted that gender differences in speech are relatively small in regional dialects.

For example, in northern regions some women use the 'masculine' *ore* regularly. Only a few studies have started investigating if and how gender is relevant to speakers of regional dialects.

Although the wide within-gender variability has been demonstrated by recent research, it does not mean that gender *per se* is irrelevant. Studies that compare real speech patterns of women and men report gender differences in the use of certain linguistic forms (e.g., the use of *boku* and *ore* is not common among adult [heterosexual] women) suggesting that speakers are constrained by the gender norms (Gendai Nihongo Kenkyukai, 1999, 2002). Researchers have therefore begun to consider how and why speakers choose their speech styles vis-à-vis their conceptions of language and gender norms.

Age

Age difference also affects Japanese language practice. Linguistic features that have been studied in relation to age include accentual patterns, morphological features (e.g., verb inflections, honorifics, sentence-final particles), and lexical items (e.g., *shin-hoogen* 'new dialect forms', and slang). Many of these studies investigate the phenomena that involve change in progress, although they are generally apparent-time studies. There are also studies of variation related to age grading.

As noted earlier, age difference has been widely investigated with regard to the standardization of Japanese; it has been observed in many regions of Japan that Standard variants as opposed to regional variants as well as *shin-hoogen* 'new dialect' forms are used more frequently by younger generations than older generations. Studies also have observed age differences with regard to some features of Tokyo Japanese, in which younger speakers use innovative forms more frequently than older speakers (Hibiya, 1995; Inoue, 1989, 1998; Matsuda, 1993). Most of these studies interpret the age difference in their apparent-time data as a reflection of the change in progress in real time and explain the change in terms of both language internal and external factors. For example, analyzing the distribution of the denasalization of the velar nasal in the natural speech data drawn from Labovian sociolinguistic interviews involving 62 speakers in Nezu, Tokyo, Hibiya (1995) found that younger speakers used the innovative form [g] (instead of [ŋ]) much more frequently than older speakers, and further that other social factors (e.g., place of birth in Tokyo) as well as language internal factors (e.g., morpheme boundary) also affected the distribution. Matsuda (1993), another variation study, examined natural speech data with regard to the use of the simplified verb potential form *-reru* rather than *-raresu* in Tokyo Japanese; he found an age stratification in the use of this variable and explained the change in terms of a number of language internal factors (e.g., length of the stem) and external factors (e.g., gender).

Variability may also involve age grading. As mentioned earlier, younger women have been found to use stereotypically feminine forms less frequently than older women. This finding, based on apparent-time data, does not necessarily mean that Japanese women's speech has been defeminized over time. It may also be a reflection of age grading within each speaker – an issue that cannot be resolved in the absence of real-time studies. With regard to age grading, some researchers have also examined the so-called *wakamono-go* youth language, or in-group expressions/slang. These expressions are profuse and constantly being renewed. Based on a survey of college students, Yonekawa (1998) discussed the word formation process of these new expressions as well as their functions (e.g., to index group solidarity, to enjoy word play; see also Chapter 19 in Kobayashi *et al.*, 1996). Age grading has also been investigated in relation to language socialization of Japanese children. Studies have examined how children learn to use a variety of linguistic features that are indexical of sociopragmatic meanings (e.g., directives, honorifics, back channels). The acquisition of honorifics, for example, has been discussed by several studies, which indicate that compared to the use of referent honorifics, that of addressee honorifics is learned much earlier, that is, by the age of three (e.g., Fukuda, in press).

Social Class

Social class may also affect Japanese language practice. In Japanese sociolinguistics the notion of class has generally been used rather informally in relation to more specific variables, such as occupation, place of residence, or education (but cf. Chapter 8 in Kunihiro *et al.*, 1999). Thus, for example, it is said that the use of honorifics is related to social class based on the findings such as follows: surveys conducted in northern Japan in the 1970s indicate that the higher the speaker's education, the greater the use of honorifics; the office workers living in cities use honorifics more than farmers and fishermen living villages (Inoue, 1989). Differences in speech patterns have also been observed between the Yamanote 'the hillside' and Shitamachi 'the downtown' areas in Tokyo, which many perceive as a class difference. For example, speakers from Yamanote use the [g] variant of the velar nasal more frequently than those from Shitamashi (Hibiya, 1995; see also Chapters 6 and 7 in Kunihiro *et al.*, 1999 for honorific use in the two areas). Further, some studies examine the correlation

between a linguistic variable and speaker's occupation (or place of residence or education) without explicitly regarding it as a class difference. Gendai Nihongo Kenkyukai (2002), for example, found that the use of certain linguistic features varied depending on the type of workplace; for example, an office of a music band used formal expressions (honorifics and formal address terms) infrequently, compared to other offices and schools (see also the earlier discussion of the masculine self-reference pronouns *ore* and *boku*).

In sum, studies have shown that although a variety of social variables, such as gender, age, and class, affect choice of linguistic forms, they usually interact with each other and jointly influence the choice rather than as independent variables. Note also that most of the studies have employed a social factors approach, whereas some recent studies (particularly in the area of language and gender) have adopted a social constructionist approach.

Conversational Context and Intraspeaker Variation

There is also wide intraspeaker variation in Japanese. That is, speakers change their speech style according to the features of the context, including the interpersonal relationship between the speaker and the addressee or referent, setting, speech act type, and genre. Many linguistic features can affect a particular speech style, such as honorifics, address and reference terms, lexical items, (in)direct speech, discourse markers, and Standard/regional Japanese. These features are often discussed as involving politeness and/or formality. For example, as discussed earlier, speakers use Standard and regional Japanese (in differing proportions), depending on the situation, to bring about different styles that primarily concern formality.

Honorifics

The complex honorific system, one of the most important sociolinguistic features of Japanese, has attracted great interest of scholars in Japanese traditional grammar, sociolinguistics, and discourse analysis. Most of the earlier studies rely on examples of honorifics used in isolated (and usually constructed) sentences and explain the usage based on a social/situational factors approach. Many recent studies, on the other hand, analyze the use of honorifics in actual conversations, often regarding it as a strategy.

Although the details differ, in traditional grammar, honorifics are commonly classified into two major categories: addressee honorifics (e.g., AHON in examples (1), (2), and (3)) and referent honorifics, the latter being further subdivided into subject honorifics (e.g., SHON in example (2)) and non-subject honorifics (e.g., NSHON in example (3)).

(1) ashita wa yasumi des–u.
tomorrow TOP *holiday* is.AHON-PRES
'Tomorrow is a holiday.'

(2) shachoo wa moo sore o
President TOP *already* *that* OBJ
o-yom-ini nar-imash-ita.
SHON-*read*-SHON-AHON-PAST
'The President read it already.'

(3) watashi wa sensei ni sore o
I TOP *teacher* *to* *that* OBJ
o-kaesh–ish-imash-ita.
NSHON-*return*-NSHON-AHON-PAST
'I returned that to the teacher.'

The usage of these different types of honorifics is then characterized in terms of contextual features, especially interpersonal distance. Although insightful, these characterizations are usually given without empirical data. In general, both addressee and referent honorifics are said to be used to show deference/politeness to the relevant individual (i.e., the addressee or referent), who is perceived to be distant (because of the status difference and lack of intimacy) from the speaker. Although interpersonal distance is considered most important, other factors (e.g., formality of setting, type of genre, topic, means of communication, gender) are also noted as relevant (e.g., Kikuchi, 1994; Shibatani, 1990). Most of these studies assume that honorific usage is governed by contextual factors, which tends to yield a prescriptive characterization, but some grammarians recognize strategic uses of honorifics, for example, to express a class status, to convey sarcasm (e.g., Kikuchi, 1994).

Honorific usage has also been investigated by Japanese sociolinguists. Again, many of these studies are correlational and based on large-scale self-report surveys, asking what sentences a speaker would use in different hypothetical situations (e.g., Hill *et al.*, 1986; Ogino *et al.*, 1985). They employ basically a social/situational factors approach, linking social variables (e.g., interpersonal distance, gender) straightforwardly to honorific use. Further, a number of these studies discuss honorifics as a device for expressing politeness, emphasizing that Japanese politeness is based on rigorous situation-based and socially agreed-upon rules, unlike languages such as English, where the expression of politeness is largely a matter of a speaker's strategy. Thus, once a certain situation is recognized, use of honorifics or other formal expressions is obligatory (see, for example, Hill *et al.*, 1986; Ide and Yoshida, 1999). Although

they recognize some strategic uses that deviate from the rules, these studies tend to be prescriptive, largely because self-report surveys are likely to elicit speakers' beliefs about how one should talk in certain situations.

Many recent studies, on the other hand, analyze the use of honorifics in actual discourse. These studies demonstrate the complexity and variability in honorific use that cannot be fully accounted for in terms of the situation-based normative rules (e.g., Cook, 1998; Chapter 4 in Gendai Nihongo Kenkyukai, 1999; Usami, 2002; Chapters 2, 10, and 13 in Okamoto and Shibamoto Smith, 2004). A number of studies show that a speaker often uses both addressee honorifics and plain (or nonhonorific) forms in the same conversation for a variety of reasons, including attempts to effectively carry out a particular speech act (e.g., greeting, making a request, scolding, sarcasm) or activity (e.g., classroom presentation, playing a game), to express emotions (e.g., anger, empathy), to define or change the relational context (e.g., distancing), and to present one's persona in a particular light (e.g., well mannered). For example, in a conversation between family members, plain forms are normally used, but honorifics may sometimes be used when making a request, announcement, scolding, and so on. Teachers in the classroom switch between honorific and plain forms, depending on the activity type (e.g., lecture to the whole class or individual interaction). Further, it has also been noted that speakers may not necessarily use honorifics in the same way in like circumstances because of differences in the attitudes toward the use of honorifics. These studies generally view the use of honorifics as a strategy based on the speaker's assessment of the specific context vis-à-vis the normative usage. Some studies (e.g., Usami, 2002) also attempt to account for Japanese honorific usage within the framework of universal theory of (discourse) politeness rather than regarding it as culturally specific.

Address and Reference Terms

The use of address terms also involves style shifting. Traditionally, it has been said that one uses last name + title, last name or kinship term + the polite suffix *-san*, or title for a person to whom one is expected to show respect, whereas one uses first name + the informal suffix *-chan/kun*, first name, or second-person pronoun (e.g., *anata, omae*) for an equal- or lower-status person (Ide and Yoshida, 1999). Some studies have examined the use of address terms in actual conversations. For example, Gendai-Nihongo Kenkyuukai (2002, Chapter 7) reports that the use of address terms in the 40 workplaces observed tends to conform to the common characterization summarized earlier, but at the same time there are many situational and individual variations, indicating that the choice is quite flexible. For example, speakers in some offices (e.g., a design office, a music office) used much more casual forms of address (e.g., first name only, the pronoun *omae*, last/first name + *chan*, nickname) even during business meetings, as compared to other workplaces. The same study also notes that the same speaker in the same workplace may use different address terms for the same individual in different situations, for example, a meeting or a lunch time (see also Chapters 8 and 16 in Kunihiro *et al.*, 1999 for diverse uses of address terms in a family).

Japanese also has many self-reference terms, including a number of first-person pronouns (e.g., *watakushi, watashi, atashi, boku, ore*). They are commonly associated with formality and gender. Studies based on observations of actual conversations have found that speakers may use different self-reference terms depending on the situation. Miyazaki (2004), for instance, found that boys may shift between *boku* and *ore,* depending on the interlocutor's gender and relative power. It has also been observed that gays and lesbians may shift between normative and nonnormative usage of self-referencing, depending on the interlocutor, speech act, and emotion (Chapters 5 and 11 in Okamoto and Shibamoto Smith, 2004). Gendai Nihongo Kenkyuukai (1999, 2002) also reports wide variation in the use of self-reference terms.

Genres and Speech Acts

As indicated in the preceding discussion, in addition to interpersonal relationships, genres and speech act types are important situational factors that affect speech style choice. There have been studies focused on particular genres (e.g., business meetings, debates, cooking classes, university faculty meetings, telephone conversations). Working within the framework of discourse or conversation analytic research, these studies closely examine natural speech data with regard to the use of specific linguistic features (e.g., honorifics, indirect speech, discourse markers, repetitions, sentence connectives) and strategies (e.g., be (in)direct, veil opposition) used in particular genres. Many of these studies also discuss specific speech acts (e.g., criticism, instruction, refusal, complaint), since genres are often closely related to speech acts. In particular, expressions of conflicts (e.g., disagreement, complaint) have been well studied. Despite the common cultural stereotype of Japanese as uniquely harmonious, studies have found that Japanese do express conflicts and that their expressions depend on the situational factors, including the type of genre, the relationship between the participants, and the participants' goals. For example, conflicts may be

expressed directly in televised political debates, but not in academic debates; lower-status persons may use more indirect speech than higher-status persons (e.g., Szatrowski, 2004).

Many of these studies also compare Japanese and English discourse. Mayes (2003), for example, analyzed Japanese and American cooking classes and found that compared to the American teachers, the Japanese teachers were much more formal (using honorifics) and focused only on task-oriented content, which contributed to the construction of a professional relationship between them and their students. Yotsukura (2003) examined a large corpus of Japanese business transactional telephone conversations, comparing them with English data, and found that Japanese speakers use more empathetic and indirect methods of communication in presenting problems. Many of these cross-linguistic studies resort to Japanese cultural concepts (e.g., *wa* 'harmony', *omoiyari* 'emphathy', *kikubari* 'consideration') to explain their findings, but recent studies (e.g. Mayes, 2003; Yotsukura, 2003) are increasingly more cautious about treating such cultural concepts, or ideologies, as having overarching causal effects on Japanese communication styles and attempt to seek explanations in situation-specific variables, including genres and speech acts.

See also: Accent; Age: Apparent Time and Real Time; Code Switching; Discourse Markers; Gender and Language; Gender; Japanese; Panel Studies and Language Variation; Politeness Strategies as Linguistic Variables; Prestige, Overt and Covert; Social Class and Status; Speech Acts; Style and Style Shifting; Variation and Language: Overview.

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Variation and Formal Theories of Language: HPSG

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Introduction

Variationist sociolinguistics in the Labovian tradition has found that apparently 'free' variation in linguistic form is actually systematically constrained by both linguistic and extralinguistic factors. That is, when a linguistic system presents multiple ways of saying the 'same' thing (different realizations of the same underlying form, presence or absence of inflectional morphology, alternative syntactic constructions), speakers' production of the alternating forms is not random, but rather correlated with both linguistic ('internal') and social ('external') factors (see Labov, 1994, 2001). The linguistic factors include aspects of all levels of linguistic structure (depending to some extent on the nature of the sociolinguistic variable in question), from phonetic context to syntactic constructions. The social factors include characteristics of speakers, relationships between interlocutors, and characteristics of social situations. Thus, sociolinguistic variation can be broadly construed to include patterns of use of honorific markers, the patterning of linguistic forms across registers or situationally based speech styles, and the choice among varying ways to encode particular speech acts.

The existence of patterns within variation across all levels of linguistic structure begs the question of how these patterns can be accommodated in models of linguistic structure. This article discusses how this problem can be approached from one particular theory of grammar, namely Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag, 1994). HPSG conceptualizes language as a system of Saussurean signs. That is, words, phrases, and clauses are all pairings of form and meaning. A grammar of a language is a system of constraints on which signs are admissible, in general and as stand-alone utterances. These constraints are associated with linguistic types, which are in turn organized into a type hierarchy. HPSG signs are associated with four types of information: phonological, syntactic, semantic and pragmatic.

Taking the 'meaning' side of the form-meaning pairing as including pragmatic information as well as semantic information opens the door to modeling the relationship between linguistic form and social meaning (Eckert, 2000; Bender, 2001). In fact, Pollard and Sag (1994) discuss Korean honorifics as well as German polite plurals and model what has been called 'social meaning' as constraints within the 'CONTEXT' field. For example, a Korean noun bearing the honorific suffix *-nim* would be associated with the information that the speaker owes honor to the referent of that noun. To represent this information, the CONTEXT field contains a collection of contextual indices representing information about the speaker, addressee, spatiotemporal location, etc., and a collection of relations such as 'owe-honor' that refer to those indices. (See also Siegel, 2000, and Fukushima, 2002, for related treatments of Japanese honorifics and social role terms.) Paolillo (2000) provides a more elaborated model of registers in Sinhala.

Meanwhile, recent work in variationist sociolinguistics (developing themes introduced in Labov, 1963, and Weinreich *et al.*, 1968) has elaborated the idea that much intra- and inter-speaker variation is the result of speakers creating linguistic (and therefore social) styles out of linguistic alternatives imbued with social meaning (Eckert and McConnell-Ginet, 1992; Eckert, 2000; Irvine and Gal, 2000; Coupland, 2001). 'Social meaning', in this context, is the potential that a particular linguistic form or pattern of linguistic forms has to be used for presenting the speaker's identity, affective state or attitudes, or constructing the speech situation or relationship between the interlocutors as being of a certain type. Linguistic forms bearing social meanings are often integrally involved in the creation (and maintenance) of social

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Variation and Formal Theories of Language: HPSG

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Introduction

Variationist sociolinguistics in the Labovian tradition has found that apparently 'free' variation in linguistic form is actually systematically constrained by both linguistic and extralinguistic factors. That is, when a linguistic system presents multiple ways of saying the 'same' thing (different realizations of the same underlying form, presence or absence of inflectional morphology, alternative syntactic constructions), speakers' production of the alternating forms is not random, but rather correlated with both linguistic ('internal') and social ('external') factors (see Labov, 1994, 2001). The linguistic factors include aspects of all levels of linguistic structure (depending to some extent on the nature of the sociolinguistic variable in question), from phonetic context to syntactic constructions. The social factors include characteristics of speakers, relationships between interlocutors, and characteristics of social situations. Thus, sociolinguistic variation can be broadly construed to include patterns of use of honorific markers, the patterning of linguistic forms across registers or situationally based speech styles, and the choice among varying ways to encode particular speech acts.

The existence of patterns within variation across all levels of linguistic structure begs the question of how these patterns can be accommodated in models of linguistic structure. This article discusses how this problem can be approached from one particular theory of grammar, namely Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag, 1994). HPSG conceptualizes language as a system of Saussurean signs. That is, words, phrases, and clauses are all pairings of form and meaning. A grammar of a language is a system of constraints on which signs are admissible, in general and as stand-alone utterances. These constraints are associated with linguistic types, which are in turn organized into a type hierarchy. HPSG signs are associated with four types of information: phonological, syntactic, semantic and pragmatic.

Taking the 'meaning' side of the form-meaning pairing as including pragmatic information as well as semantic information opens the door to modeling the relationship between linguistic form and social meaning (Eckert, 2000; Bender, 2001). In fact, Pollard and Sag (1994) discuss Korean honorifics as well as German polite plurals and model what has been called 'social meaning' as constraints within the 'CONTEXT' field. For example, a Korean noun bearing the honorific suffix *-nim* would be associated with the information that the speaker owes honor to the referent of that noun. To represent this information, the CONTEXT field contains a collection of contextual indices representing information about the speaker, addressee, spatiotemporal location, etc., and a collection of relations such as 'owe-honor' that refer to those indices. (See also Siegel, 2000, and Fukushima, 2002, for related treatments of Japanese honorifics and social role terms.) Paolillo (2000) provides a more elaborated model of registers in Sinhala.

Meanwhile, recent work in variationist sociolinguistics (developing themes introduced in Labov, 1963, and Weinreich *et al.*, 1968) has elaborated the idea that much intra- and inter-speaker variation is the result of speakers creating linguistic (and therefore social) styles out of linguistic alternatives imbued with social meaning (Eckert and McConnell-Ginet, 1992; Eckert, 2000; Irvine and Gal, 2000; Coupland, 2001). 'Social meaning', in this context, is the potential that a particular linguistic form or pattern of linguistic forms has to be used for presenting the speaker's identity, affective state or attitudes, or constructing the speech situation or relationship between the interlocutors as being of a certain type. Linguistic forms bearing social meanings are often integrally involved in the creation (and maintenance) of social

categories, and especially in the elaboration of those categories. For example, gender categories in any given community are elaborated as bundles of properties ('men are strong,' 'women are sensitive,' etc), and linguistic forms are often associated with these sorts of properties (cf. Ochs, 1992).

Why HPSG is Well-Suited to Modeling Variation

Sociolinguistic variation is usually seen as a matter of linguistic performance, but if it is indeed motivated by the social meanings of the variants, it must be supported by a kind of ever-evolving linguistic competence, linking the forms to their social meanings. The question of whether information pertaining to social meanings as well as relative frequencies of occurrence should be part of grammatical competence remains controversial. However, if this kind of information is to be represented within a model of grammatical competence, HPSG is well suited to do so, for several reasons:

As noted above, the social meaning of variant forms can be associated with those forms through lexical or phrasal signs. For example, Paolillo (2000) finds subject-verb agreement only in 'Literary' registers of Sinhala. Paolillo proposes that the linguistic forms associated with the registers in this diglossic situation carry social meanings pertaining to the speaker's attitude toward the message. The agreeing verb forms thus carry a social meaning of 'edited,' whereas the non-agreeing verb forms carry a social meaning of 'interactive.' (These meanings undoubtedly participate in a rich system of categories of social situations and categories of participants in those situations, and take their substance from that interaction.) These attitudes are coded in the formalization as information inside a feature called 'BACKGROUND' within the 'CONTEXT' part of the sign. Thus, all agreeing verbs in Sinhala would have lexical entries including the information shown in Figure 1. These constraints indicate that the verb agrees with its subject, and that it conveys an 'edited' attitude toward the message. (The boxed numbers in this notation indicate identity between the values of two features.)

Nothing in the theory of HPSG precludes there being alternate ways of saying the same thing, that is, there are no cross-derivational constraints putting alternative linguistic forms into direct competition. On the one hand, this means that there are no situations in which one form categorically blocks another. (Note, however, that direct competition can be compatible with surface variation, if the competition is taken to be stochastic; see Anttila, 1997; Reynolds and Nagy, 1994.) This allows HPSG theories of

$$\begin{bmatrix} \text{SYNTAX} & \begin{bmatrix} \text{SUBJECT} & \langle \text{NP} \begin{bmatrix} \text{AGREEMENT} & \boxed{1} \end{bmatrix} \rangle \\ \text{AGREEMENT} & \boxed{1} \end{bmatrix} \\ \text{SEMANTICS} & \boxed{2} \\ \text{CONTEXT} & \begin{bmatrix} \text{SPEAKER} & \boxed{3} \\ \text{BACKGROUND} & \langle \begin{bmatrix} \text{ATTITUDE} & \textit{edited} \\ \text{EVALUATOR} & \boxed{3} \\ \text{MESSAGE} & \boxed{2} \end{bmatrix} \rangle \end{bmatrix} \end{bmatrix}$$

Figure 1 Constraints on agreeing verbs, establishing agreement with the subject and 'edited' attitude (adapted from example (16) of Paolillo, 2000: 245, reprinted with the permission of Cambridge University Press).

sociolinguistic variation to model that variation as arising from a single integrated linguistic competence (or grammar). On the other hand, the lack of cross-derivational constraints leads to a view of variation in which forms do not have to be in competition in order to be socially meaningful. The grammar will include forms associated with different social meanings. Some of these forms will be in competition to the extent that they can be used to express the same propositional content (for example, agreeing and nonagreeing forms of the same verb). Other socially marked forms (e.g., taboo words) may not have unmarked or other-marked alternatives. Thus, sociolinguistic variables narrowly defined as alternate ways of saying the same thing (Lavandera, 1978) are but a special case of socially meaningful linguistic forms.

HPSG takes advantage of type hierarchies in order to capture both fine-grained details of linguistic signs and generalizations at varying degrees of granularity across those signs. The type hierarchy is a multiple inheritance hierarchy, allowing for the statement of cross-cutting generalizations. For example, the type hierarchy for Sinhala might include the information shown in Figure 2. In one dimension are types bearing contextual constraints (e.g., 'this sign conveys the attitude "edited"'). In another dimension are types bearing grammatical constraints (e.g., 'all verbs take subjects'). These dimensions are cross-classified, and particular lexical entries or grammatical constructions would be instances of the cross-classified types. In this way, the theory is designed to 'scale up' so that additional detailed information (such as social meanings or alternative forms) can be added to a grammar without overwhelming or invalidating what is already there. Furthermore, the type hierarchy opens up interesting questions about the nature

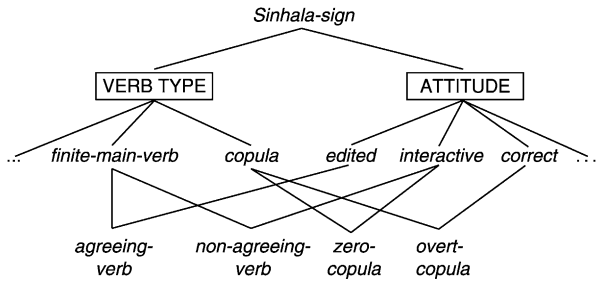

Figure 2 Sample multiple inheritance hierarchy illustrating how the constraints allowing a linguistic form to convey a particular attitude can be stated once and inherited by different forms.

of sociolinguistic variables: in this kind of syntactic analysis, some potentially alternating forms are grouped together under a mutual supertype, whereas others may be further separated in the hierarchy. Is social meaning more likely to attach to pairs or sets of variants which are closely related (such as a set of verb forms), or is the syntactic classification of forms irrelevant to their social classification?

Finally, HPSG, a theory of linguistic competence, has been designed to be 'performance plausible,' taking results of psycholinguistic research on processing as motivation for surface-orientation, a constraint-based architecture and strong lexicalism (Sag *et al.*, 2003: Ch. 9). Thus, HPSG as a theory of linguistic competence can be a component of a theory of linguistic performance, including variability. One example of this integration might be found in the modeling of frequency of occurrence via probabilistic information associated with signs. Jurafsky (1996) proposes using a probability-enhanced construction grammar to model psycholinguistic effects in lexical and constructional access and disambiguation (including garden path effects). In a similar fashion, one could associate probability information with sociolinguistic variants to model their frequency of occurrence and the effect of internal (grammatical) constraints on their frequency of occurrence and on their interpretation. This idea is extended in the next section.

Some Proposed Models

Social Meaning and Noncategorical Constraints

Recent work (Bender, 2001; Bender, 2005) has suggested that so-called internal or noncategorical grammatical constraints on particular variants interact with so-called external constraints or the social meaning of linguistic variables. In particular, Bender finds preliminary evidence (through a matched-guise experiment) suggesting that listeners evaluate the same linguistic variant (copula absence or presence in African American Vernacular English (AAVE)) differently depending on the grammatical context. AAVE copula absence has been found across communities to be sensitive to a number of non-categorical grammatical constraints, including the part of speech of the predicate (Rickford, 1998). In Bender's study, AAVE speakers and other African Americans rated copula presence in a disfavoring environment (before an *-ing* form VP) more extremely in response to questions such as 'How well educated does this person sound?' than copula presence in a favoring environment (before an NP).

This effect could be modeled within HPSG by associating a social meaning (e.g., the full richness of what is means to sound 'educated') with the representation of the overt copula, as well as a probability of occurrence which is dependent on the various factors which have been shown to affect its frequency, including the part of speech of its complement. Presumably, speakers choose to use signs when they match a social meaning they wish to convey. The less likely the sign, however, the more strongly a speaker must wish to express that social meaning in order to choose it. Knowing this, listeners will take the sign to be more socially meaningful to the extent that it was unlikely.

Default Speech Act Interpretations of Linguistic Formulae

Terkourafi and Villavicencio (2003) investigate the relationship between interrogative form and a variety of speech acts (requests for action, requests for information, and offers) in Cypriot Greek. They find that in the presence of particular constellations of social information (age, gender, and social class of speaker and addressee, relationship of interlocutors, etc.) certain forms tend to get used to express particular speech acts. They propose to capture this relationship by making use of persistent defaults associated with the forms. For example, in the context of a customer addressing a salesperson, when both are working class, the form *eʃi NP?* ('Are there NP?') is most likely to express an opening request. Terkourafi and Villavicencio propose to encode this by creating a representation for the phrasal sign that includes both the contextual information and the defeasible constraint that the illocutionary force is a request. Because this is a persistent default, it can be overridden if the actual pragmatic information in context indicates otherwise.

Future Directions

Work on sociolinguistic variation in HPSG is only just beginning, and there remain several open questions. One avenue which has yet to be pursued is whether a uniform model of (morpho-)syntactic and phonological variation is possible. If phonological variables can

be associated with social meaning (as they certainly appear to be – cf. Eckert, 2000), can they be analyzed as signs in the HPSG sense? Can these signs be integrated into the same model of grammar outlined here? Do the same kinds of social meanings attach to phonological as well as syntactic variables? How do syntactic and phonological variables interact?

A further, and perhaps more immediate, question pertains to the compositionality of social meanings. In HPSG, the propositional semantics of a sentence is built up compositionally by collecting the semantic contributions of all of the words plus any semantic contributions of the constructions used to put them together. As a starting point, one could hypothesize that social meanings are treated similarly. If different words or constructions contribute contradictory social meanings to the same sentence, these meanings would merely be collected up, and the resolution of their net effect left to an interpretation component. Further research is needed, however, into the nature of such an interpretation component, and whether the combined effect of social meanings attached to linguistic forms is at all dependent on the grammatical relationships between those forms.

See also: Head-Driven Phrase Structure Grammar; Style and Style Shifting; Syntactic Variation.

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Variation and Formal Theories of Syntax, Chomskyan

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Variable Rule/Linguistic Variable

In the 1960s both sociolinguistic and formal syntax models contained formal rules that could be applied obligatorily or optionally. Formal rules in the earliest Chomskyan transformational model were transformations that connected deep structures with surface structures on the basis of rewrite rules. Optional rules, for example, derived passive, negative, or question sentences from declarative sentences. Labov introduced the concept of variable rule as an extension of this optional rule to include social and stylistic, i.e., external dimensions of language use along with linguistic, i.e., internal dimensions. There is some confusion about the notion of the variable rule since in the earliest literature it refers to both a theoretical model of how to analyze and account for language variation as well as to a method of statistical analysis (Cedergren and Sankoff, 1974). However, both paradigms soon followed their own avenues: the successive transformational models assumed the existence of categorical rules only while variationist sociolinguistics has maintained the notion of the optional rule. The two perspectives on the nature of formal rules reflect deep-seated differences between the two models. The variationist ideas are that the output of a linguistic rule can be probabilistic rather than discrete, and that a linguistic constraint can have a quantitative rather than deterministic effect on the outcome of the process. Formal syntax, however, postulates a blind, deterministic application of a series of procedures given a certain starting point (Chomsky, 1995).

Labov has modified the generative model with the variable rule as a means to accommodate interspeaker and intraspeaker variation. The variationist sociolinguistic practice that has evolved from studies of language variation and change since then takes the principle of accountability as basic (cf, Sankoff, 1990: 296). This principle states that the variants belonging to the same syntactic variable must be specified by the total number of occurrences and the potential occurrences or nonoccurrences in the variable environment, i.e., it ranges between 0% and 100%. It guarantees that the entire range of variability present in the data will be dealt with. The principle of accountability inevitably follows the synonymy principle. This principle is the prerequisite for variants to be assigned to the same linguistic variable: only syntactic variants that are equivocal with regard to referential meaning, i.e., variants that are 'alternate ways of saying "the same" thing,' belong to the same variable. In practice, the assignment of meaning or function of syntactic variants is considered as problematic (Lavandera, 1978).

The indeterminacy of synonymy/functional equivalence is considered not so problematic when examining the phenomenon of verbal agreement, which is present in many vernacular dialects of English all around the world (cf. King, 1994 for French varieties in Canada), as illustrated in (1):

(1a) We parch it (cf. Poplack and Tagliamonte, z1989: 49)

(1b) We parch**es** the coffee

and copula variability, as in African-American Vernacular English (AAVE) (Rickford *et al.*, 1991) or creole varieties, illustrated in (2):

(2a) I **am** just telling the boys (cf. Weldon, 2003:43)

(2b) I'**m** gonna get me a blue tag

(2c) I feel like I Ø fourteen

The examples above illustrate that two or more forms of functional category such as number agreement in (1) and tense in (2) are considered to belong to one linguistic variable. Other linguistic variables that can be found in variationist sociolinguistic practice over the last fifteen years in journals such as *Language Variation and Change* and *Journal of Sociolinguistics* include, for example, null versus overt subjects in varieties of Spanish (Cameron, 1993) and Bislama (Meyerhoff, 2000), particles in Japanese (Takano, 1998) and Mandarin Chinese (Shi, 1989), null versus overt objects in Hungarian (Kontra, 2001), double objects in Dutch (Cornips, 1998), relativization strategies in English varieties and AAVE (Tottie and Rey, 1997), and negation in Scots English (Smith, 2001).

Furthermore, these studies examine nonstandard rather than standard varieties and they may differ considerably in the frequency of the tokens collected, which may range from 29 (Cornips, 1998) to 6809 (Tagliamonte, 1998). It appears that both a low and high frequency of (morpho)syntactic variables may reveal significant correlations between the use of linguistic variants and social dimensions in the speech community.

Structural Representation of the Syntactic Variants

In addition to the synonymy principle, the notion of the linguistic variable as a structural unit was also based on the assumption that the variants have an identical underlying structure or representation, which is subject to variable surface realizations (Winford, 1996: 177). So the alternation between active and passive examples was considered to be instances of different surface manifestations of the same underlying or deep structure. Santorini (1993) and Pintzuk (1995) are examples of studies within the government and binding framework where it was argued that different word orders such as SOV and VSO are derived by movement. However, in later generative models, the idea of a derivational model was abandoned in favor of a configurational model (most recently Minimalism), in which a single representation is subject to various constraints. An example is the study of Meechan and Foley (1994), where variable verbal number agreement in existentials was analyzed as a reflection of different configurational positions of the postverbal NP (a second example is Meyerhoff, 2000).

As a consequence, the original notion of the linguistic variable as a structural unit such that syntactic variants are different surface realizations of an underlying structure has been lost too. The consequences are that the syntactic variable as a structural unit has to be defined again depending on the particular model of syntax one employs. Other studies that can be mentioned in the older principles and parameters framework are Henry (1995) and Cornips (1998), where variants constituting the linguistic variable were brought about by different properties of functional categories. Since the consecutive models in generative grammar follow each other at rather high speed, different makeups of the structural unit can be detected in recent decades.

An Overall Theory of Grammar and the Locus of Variability

Many researchers claim that a bridge between variation and theory remains possible; that is, it is assumed that there exists a fairly direct connection between grammar and language usage. The organization of the grammar may be reflected in the patterns of usage (Taylor, 1994) or quantitative results may lend strong support to structural analysis (Pintzuk, 1995). Or, to put it differently, through the use of variationist methodology and knowledge about the factors contributing to syntactic variation, one catches "a glimpse of grammatical structure" (Meechan and Foley, 1994: 82). Wilson and Henry (1998: 8) phrased the advantages of an overall theory of grammar including variation and formal theory as follows: "We may be able better to understand language variation and change as they are driven by social factors but constrained (at one level) by the nature of possible grammars." One problematic issue in this socially realistic account is how to account for the fact that individual speakers can use several variants of the syntactic variable when maintaining the same style level. This issue is related to the questions within the successive generative models about the locus of syntactic variation, and its restrictions and predictions. In the literature, two alternative approaches to this 'choice' have been suggested (Muysken, 2005). Either the 'choice' is put outside the grammatical mechanisms (Kroch, 1989; Adger and Smith, 2005), or it is put inside the grammar by re-introducing optional rules (Wilson and Henry, 1998; Henry, 2002). The first option was advocated by Kroch and his associates, who claimed that grammar is a blind, autonomous system and the notion of 'choice' (optionality, variability) is not part of it. Instead, the individual speaker revealing variability has separate or competing grammars. Adger and Smith (2005) also argued that the notion of 'choice' cannot be accounted for within the autonomous grammar. In contrast with Kroch's vision, this does not imply that individual speakers "have different grammars, *per se*, but rather a range of lexical items open to them, some of which will have syntactic effects." In their analysis, the notion of 'choice' concerned the level that serves as the input for the autonomous grammatical system. However, Henry (1995) argued that individual grammars include variability and, consequently, the speaker has a real choice in terms of syntactic operations, for instance, optional verb movement. However, all agreed that an analysis of language use (quantitative analysis, intra- and interspeaker variation) in addition to formal theory, i.e., the study of both internal and external constraints, has the potential not only to assess but also to refine theoretical conceptions of linguistic structure.

See also: Binding Theory; Chomsky, Noam (b. 1928); Constant Rate Hypothesis; Copula Variation; Functional Categories; Labov, William (b. 1927); Microparametric Variation; Principles and Parameters Framework of Generative Grammar; Syntactic Constructions; Syntactic Variables and Variable-free Syntax; Syntactic Variation; Weinreich, Uriel (1926–1967); X-Bar Theory.

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Variation and Language: Overview

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The Locus of Variation

If structure is at the heart of language, then variation defines its soul. As Sapir (1921: 147) put it, "Everyone knows that language is variable." Furthermore, variation allows us to differentiate individuals, groups, communities, states, and nations. Notwithstanding the pervasive nature of variability in language, it often has been disregarded or dismissed as tangential to the description of structural patterning and irrelevant to the study of linguistic competence. In fact, it was not until the advent of sociolinguistics a half century ago that the admission of language variation became more than a footnote to linguistic description. The study of language variation is now one of the most rapidly expanding subfields of linguistics with a well-established cohort of researchers, regular conferences, and scholarly journals, but its status is still somewhat marginal within theoretical linguistics, notwithstanding the insistence of William Labov that the study of language variation is central to the solution of fundamental problems in linguistic theory (e.g., Labov, 1966, 2001).

Variability is everywhere in language, from the unique details in each production of a sound or sign to the auditory or visual processing of the linguistic signal. In fact, one of the amazing facts about human communication is the demonstrated ability to normalize the inherent variation within every spoken or signed message in processing the linguistic signal. Although language variation is persistent and pervasive, it is not all equally interesting, even to those who focus on the systematic nature of language variation, so-called language variationists. For example, there is considerable variation in speech or sign production related to the physical make-up of an individual speaker or signer – differences in vocal tract size in spoken language or differences in the size of the hands and body used in signing – that is of interest to those who study language normalization, but this is not generally the focus of systematic language variation studies. Similarly, the relative fluency of production related to idiosyncratic behavior is not of concern to those interested in language variation, although the dichotomy between meaningful social differences and socially insignificant personal differences is not always clear-cut. Generally speaking, interest in language variation focuses on differences that have some social significance in terms of group behavior rather than personal idiosyncrasies, although socially meaningful aspects of individual speaker performance are of interest to those interested in language variation.

The empirical reality is that the boundaries of significant and insignificant language variation are often gradient and obscure rather than discrete and transparent. There is, for example, a fine line between consequential and inconsequential fluctuation in the vowel formants of repeated productions of a given vowel in a constant phonetic context. Some variability in each vowel production is expected, but a larger envelope of fluctuation in the formants might be indicative of a significant vowel change in progress. Determining significance for an envelope of vowel formants, however, can only be arrived at through a series of exploratory procedures that takes into account individual speaker traits, social group norms, the production of other vowels in the system, and so forth. Obviously, the empirical boundaries of investigation for language variation studies are not as straightforward as they may appear in descriptions of systematic variability found in the research literature and often involve preliminary decisions about what to include and what to exclude in the study of orderly variation.

In traditional linguistic description the notion of variation within structural units has often been acknowledged under labels such as 'free fluctuation,' 'optional rules,' and 'free variants.' Although long recognized, this variability has nonetheless been considered to be "an area of little importance" (Crystal, 2003: 189), a kind of garbage heap for variants that could not be predicted invariably within the categorical framework assumed under most models of linguistic description. But in keeping with the adage that "one person's garbage is another person's treasure," the examination of such variation has become the cornerstone of sociolinguistics, with several professional journals dealing regularly with issues of language variation, including one dedicated exclusively to this issue (*Language Variation and Change*), and prominent sociolinguistics conferences that routinely feature presentations on language variation. This includes perhaps the most influential sociolinguistics conference in the world, the annual conference New Ways of Analyzing Variation (NWAV), now well into its third decade of continuous growth.

The Linguistic Variable

An essential construct in the study of linguistic variation is the linguistic variable, a structural unit that includes a set of fluctuating variants showing meaningful co-variation with an independent set of variables.

The linguistic variable was explicitly set forth in early variation studies by William Labov (1966), the acknowledged founder of the field of language variation studies, although this construct was certainly implicit in work previous to that point. On one level, the relationship of the variable to its variants may be likened to that of the classic emic-etic relationship in linguistic description, such as that between a morpheme and its allomorphs or a phoneme and its allophones; however, as we shall see, it is hardly confined by such structural relationships and boundaries. The unit is an abstraction because linguistic variables have no concrete reality apart from the particular variants through which they are realized.

Operationally, the linguistic variable has been used to encompass a wide range of fluctuating variants. The set may be a structural type, such as grammatical category (e.g., a tense category, possessive category), a phoneme (e.g., the phoneme /θ/ or the phoneme /ŋ/ in English), or a natural class of items in a specific linguistic context (e.g., coronal stops in syllable-coda position). It also may be defined in terms of the application of a general process, such as the use of a particular type of contraction (e.g., English variation between *She has not* vs. *She hasn't* vs. *She's not*) or in terms of a syntactic relationship, such as concord (e.g., negative concord in English as in *He didn't do anything about any problem* vs. *He didn't do nothing about no problem*) or phrasal constituency (e.g., head-initial vs. head-final phrases). Variants are usually established apart from theoretical models of language description and may, for all intents and purposes, be accommodated within any syntactic model (e.g., Principles and Parameters, Minimalism, Head-Driven Phrase Structure Grammar, Lexical Functional Grammar, and Construction Grammar) or phonological model (e.g., Generative Phonology, Lexical Phonology, Optimality Theory, Exemplar Theory), although there are significant implications for how such variation may be accommodated within a particular model of language. Finally, the linguistic variable may be defined as a simple lexical choice (e.g. *soda*, *pop*, *tonic*, or *co(ca)-cola* for a carbonated drink in various regions of the United States) or even in terms of a speech act (e.g. alternatives for a expressing a 'directive' or a 'compliment').

As noted, the linguistic variable can cover a full range of linguistic units and relationships. By the same token, the relationship of the variants to each other is not necessarily limited by the fundamental typology operative in linguistic analysis and description. For example, a given phonological variable may encompass allophonic fluctuation within a given phoneme, different phonemes, or combine allophonic and phonemically distinct variants within a unitary variable. Thus, the pronunciation of the vowel of English words like *coffee* or *caught* may involve variants that range from different phonetic productions within the same phonemic vowel (e.g., [kaofi] vs. [koəfi]) to a phonemic merger with another phonemic unit (e.g., the vowel of *caught* and *cot* are both pronounced as [*a*]). In this case, the variants appear to be united by the fact that they exist within a single lexical item. Furthermore, in some applications of the linguistic variable, variants may involve competing systems or grammars (Kroch, 1989) so that variation cannot even be considered inherent within a unitary system. Under this interpretation, typological correspondence or equivalency in the competing systems is the apparent basis for including different variants in a linguistic variable.

The notion of the linguistic variable has been applied to a full range of levels within language, although not without some argument about its appropriate application. Phonological and morphosyntactic variation have tended to dominate language variation research in synchronic and apparent time studies while syntactic variation has been a significant locus of investigation in diachronic studies. For synchronic and apparent time studies, which have tended to use natural conversational interviews as their primary databases, there is both a practical and theoretical explanation for the focus on phonology and morphosyntax. In natural conversation, syntactic phenomena simply do not occur at sufficient frequency levels for meaningful quantitative analyses of systematic variability, the procedural underpinning for variation studies. But there also have been theoretical concerns about the application of variation studies beyond phonology related to the assumption of 'semantic equivalency,' that is, the notion that there is no change in referential meaning based on the selection of one variant or another (Lavandera, 1978). Although it may safely be assumed that the variant pronunciations of unstressed *–ing* in the English word *running* as a final velar [ŋ] or coronal nasal [n] have the same denotational referent, questions about semantic equivalency have arisen in examining variation on other levels. For example, it may be argued that there are subtle meaning differences in the Montreal French use of variants *être* and *avoir* in different contexts (Sankoff and Thibault, 1977). Similarly, it may be questioned whether the difference between the 'active,' '*be* passive,' and '*get* passive' in English (e.g., *They broke into the store* vs. *The store was broken into* vs. *The store got broken into*) are authentic alternatives for "saying the same thing" (Weiner and Labov, 1983). Lavandera (1978) has suggested that the condition of strict semantic equivalency need not be applied rigorously so that the linguistic

variable could be used in study language variation beyond phonology, a guideline now generally adopted in studies of syntactic variables.

The focus on syntax in diachronic studies of language variation is, to a large extent, a product of the kinds of available texts for investigation. Historical documents tend to be more reliable for examining grammatical than phonetic and phonological variation. Furthermore, the increasing accessibility of mega-corpora with automated search capabilities for historical texts has made the investigation of syntactic variability much more accessible to variation researchers.

Although there are lingering questions about the precise structural status of the linguistic variable, it remains a primitive construct in the study of language variation. Most of the lingering questions and qualifications have to do with its precise status as a structural unit and its possible relationship to a grammar of language rather than its usefulness as convenient heuristic in the investigation of language variation. Whether or not it is explicitly recognized, the linguistic variable remains at the procedural foundation of variation analysis, because one must assume that the analyst can delimit a unified, exclusive set of fluctuating language variants that shows meaningful patterns of co-variation with an independent set of variables. Although sensitive to traditional structural categories and relationships in language, the linguistic variable is not necessarily beholden to them, and there are clearly cases where the imposition of a traditional linguistic boundary may actually detract from rather than enhance the understanding of language variation in its social context (Wolfram, 1993). Such considerations may be one of the reasons why it might be argued that the linguistic variable is a uniquely sociolinguistic construct that conveniently – if not always comfortably – covers the locus of co-variation between linguistic variants and other variables that include social, historical, psychological, and linguistic factors.

Systematic Variability

As noted, the significance of the linguistic variable lies in its co-variation with other factors, or independent variables. These factors do not typically correlate with the categorical use of a variant but with the relative frequency of variant occurrence. For example, in most varieties of English, there is fluctuation in the production of the final segment of words such as *swimming* and *walking* with a coronal nasal [n] vs. a velar nasal [ŋ], commonly represented in spelling as *–in'* vs. *–ing*, respectively. Studies of the fluctuation between these variants over a half century now (e.g., Fischer, 1958; Shuy, Wolfram, and Riley, 1967; Kiesling, 1996) have shown that the relative frequency of the *-in'* variant correlates with various types of social, psychological, and linguistic factors. For example, Fischer (1958) showed that boys tended to use more *-in'* than girls and that differences also related to speaker personality type (aggressive vs. cooperative) and mood (tense vs. relaxed); Shuy *et al.* (1967) showed that *–in'* was more frequently used by lower status groups than higher status ones, and Kiesling (1996) showed that a group of fraternity men used *-in'* more frequently to project different types of masculine images during fraternity meetings associated with relations of power and solidarity. At the same time, studies have shown that there is variation in the use of the *–in'* variation based on the lexical category of the word, as verbs are more likely to occur with *in'* than nouns (Fischer, 1958). In all of these cases, the difference in *-in'* usage is a matter of relative frequency rather than categorical predictability – a tendency in which variants have a greater or lesser likelihood of occurring under certain conditions.

Factors that correlate with higher and lower frequency levels of a given variant are referred to as constraints on variability, in which the term 'constraint' is used to refer to a factor that systematically correlates with increased likelihood that a given variant will occur. This use is somewhat different from how the term is used in theoretical linguistics, where constraint is used to refer to a condition that characterizes a universal principle of language or a condition that restricts a language-specific rule. Factors that correlate with the increased frequency of a variant are said to favor the occurrence of a variant, whereas those that correlate with reduced frequency disfavor or inhibit the occurrence of the variant.

Independent variables that co-vary with systematic differences in the relative frequency of a variant are of two primary types, structural linguistic factors related to the linguistic system itself, so-called internal constraints, and social or sociopsychological factors of various types that exist apart from the linguistic system, so-called external constraints. Independent linguistic constraints seem to align closely with traditional types of structural units considered relevant in linguistic description. Thus, for systematic phonological variation, the feature composition of the variant (e.g., voicing, sonorancy), phonetic environment (e.g., preceding and following segments, stress patterns), hierarchical status (e.g., syllable position), and grammatical status (e.g., type of morpheme) may be factors that constrain variability. There also may be other factors, such as the lexical condition that high-frequency words favor a variable process over low-frequency words (Myers and Guy, 1997). For

morphological and syntactic variables, lexical category (e.g., noun vs. verb), phrasal composition (e.g., NP vs. VP, heavy vs. light phrases), co-occurrence relations (e.g., concord, phrasal complements), embedding (matrix vs. embedded clause), and adjacency conditions (proximate vs. distal) may be relevant factors affecting the relative usage of fluctuating variants. These are, of course, the kinds of factors considered in traditional qualitative syntactic descriptions. As with phonological variables, this typology may be extended somewhat, so that factors such as the serialization of structures in a narrative sequence, for example, may affect variability along with the reified, sentence-level grammatical categories and constituents generally recognized in syntactic description.

The types of external variables that correlate with the relative frequency of fluctuating variants may include traditional demographic variables (e.g., age, social class, region), constructed social groupings and practices of various types (e.g., communities of practice, social networks), interactional dynamics (e.g., power relations, solidarity), and even personal presentation styles and registers (e.g., performance, mimicking). Although there seems to be somewhat of a disjunction between systemically based linguistic factors and a broadly ranging array of social and psychological factors, most studies of systematic variation include both independent linguistic and social factors within the same description of linguistic variability. Furthermore, one of the principles that has guided variation analysis over the past few decades is the "principle of multiple causes" (Bailey, 2002: 118), which holds that no single contextual factor can satisfactorily describe the variability observed in natural language. Thus, linguistic factors such as structural composition and linguistic environment may combine with a set of social factors such as age, status, situational context, and so forth in the description of systematic variability.

Although an assortment of linguistic and social variables need to be considered in accounting for systematic variability, not all are of equal magnitude in their orderly effect on the occurrence of variants. To sort out the relative influence of different constraints on variability, variationists often use a type of multivariate regression analysis model designed by the mathematician and linguist, David Sankoff, known as VARBRUL (Cedergren and Sankoff, 1974). Although a variety of commercially available multivariate regression analyses might be applied to determine the significance of various factors on the co-variation of linguistics variants, VARBRUL was designed specifically to handle the kinds of data found in language variation, where not all of the logical cross-products may be manifested and there is often quite unequal distribution of tokens in different cross-product cells in the sample.

Table 1 Illustration of results of VARBRUL analysis (from Mallinson and Wolfram, 2002)

VARBRUL Results
Input probability = .29
Ethnicity
African Americans = .65; European Americans = .33
Grammatical Status
Monomorphemic = .56; bimorphemic = .39
Following Environment
consonant = .80; pause = .37; vowel = .24
Total Chi square = 3.085 Chi square per cell = .257

VARBRUL is a probabilistic-based statistical procedure that shows the relative contributions of various factor groups to the overall variability of items. The weighting values range from 0 to 1 so that a value of greater than 0.5 in a binomial application indicates that the factor being considered has a favoring effect on the occurrence of the variant, whereas a value of less than 0.5 indicates a disfavoring effect; in a trinomial application, a value of more than 0.33 would indicate a favoring effect and a value less than 0.33 would be a disfavoring effect. The higher the VARBRUL weighting is, the stronger the effect of the factor is in accounting for the variability. Both Microsoft and MacIntosh versions of this program are readily available and commonly used by researchers in language variation studies. In Table 1, taken from Mallinson and Wolfram (2002), results from a VARBRUL analysis of the incidence of syllable-coda, stop-final cluster reduction in a remote Appalachian region of North Carolina (USA) are presented, following a conventional procedure for reporting such data. In this binomial analysis based on the application or nonapplication of cluster reduction, the input probability represents the overall application mean of cluster reduction apart from the constraining effects. Two independent linguistic variables, or factor groups, are considered in this simplified presentation, the morphemic status of the cluster (e.g. monomophemic as in *guest* or *mist* vs. bimorphemic as in *guessed* or *missed*) and the following phonetic environment (e.g. consonant as in *guest parking*, vowel as in *guest appearance*, and pause as in *guest* //), and one social factor, ethnic group membership (European American vs. African American). The total Chi square and the Chi square score per cell (i.e., preconsonantal, monomophemic, African American/prevocalic, bimorphemic, European American/etc.) indicate the goodness of fit for the quantitative data.

The data indicate that a following consonant (.84) strongly favors cluster reduction over a following pause (.37) and vowel (.24), and that cluster reduction is favored for monomorphemic (.56) over bimorphemic (.39) clusters. Alhough both following phonetic environment and morphemic status are significant constraints on variability in this study, the following phonetic environment is a stronger constraint than the morphemic status of the cluster. The analysis also reveals that ethnic group membership is a strong social effect on variability, with African Americans (.65) favoring cluster reduction over European Americans (.35).

Although VARBRUL has become the regular statistical program for determining the systematic effect of various constraints on variability, it is not without limitations. Some of these are a product of the procedural assumptions, but some arise from deeper questions about the nature of variation itself. For example, one of the assumptions of VARBRUL is the independence of factor groups, for example, the assumption that the effect of following phonetic environment operates independently from the morphemic status of the cluster. As Sigley (2003) points out, however, both linguistic and social factors are often interactive. With respect to social factors, for example, ethnic group membership may work in tandem with the social factors of age and social class rather than operate independently; similarly, for linguistic factors a suprasegmental effect such as stress may interact with a segmental effect related to the following or preceding phonetic environment. The assumption of independence in effects is therefore questionable, leading to the development of more refined statistical procedures to tease out these interaction effects (Sigley, 2003). There also are lingering questions about how such linguistic and social constraints might be represented in a grammar that includes systematic variability.

Another issue raised by procedures such as VARBRUL relates to group and individual variation. VABRUL analyses are typically based on aggregate data, that is, pooled data for a designated group of speakers without reference to an individual speaker. This procedure obscures variation patterns for individuals, raising the issue of whether or not we can assume that the individual and the group are the same with respect to systematic variation – a kind of homogeneity assumption. Empirical investigations of individual speakers in relation to group norms show that there is impressive regularity from speaker to speaker with respect to the constraint effects on variation, once a reasonable number of tokens are extracted from individual speakers. This leads Guy (1980: 12) to conclude that group norms "recapitulate the generally uniform norms of individuals." Some of the replicability of constraint effects for individual speakers may, however, be due to systemic principles inherent within language itself. It makes phonetic sense, for example, that syllable-coda cluster reduction would be much more likely take place when the following segment is a consonant as opposed to a vowel, given the phonetic complexity of consonant sequencing without intervening vowels. Other constraints, however, seem language specific, such as the relationship between a following pause and following vowel in their effect on variability (Labov, 1994). Although there is sometimes an impressive replicability in terms of constraint effects from speaker to speaker, there may be considerable variation in the overall levels of variation for individual speakers, and some differences in relationships between constraint effects for individual speakers within a group.

Detailed studies of groups and individuals show that one cannot assume that they are always the same with respect to variation, and that there may be considerable variability among speakers within a relatively homogeneous social group. In fact, Dorian (1994) suggests that there is a kind of "personal-pattern variation" that does not co-vary with external social factors. Speakers are both individuals with idiosyncratic life histories as well as affiliated members of a complex array of social groups, making it impossible to explain away all individual-based variation in terms of group norms.

Variation and Language Change

One of the most fruitful areas for the application of language variation analysis is language change, given the fact that change necessarily involves variation. Speakers do not go to bed one night using a particular form only to wake up the next morning to find the form categorically replaced by another one. Variation exists whether the change involves a gradual, imperceptible shift in the phonetic value of a vowel within a continuum of phonetic space or is an abrupt, readily transparent change involving a major syntactic realignment of phrasal constituents. In the progression of language change, there is a transitional period of co-variation between old and new variants. Although all change seems to involve variation, this does not mean that all variation necessarily implies change. Some variation may be stable, a product of internal systemic and natural performance phenomena rather a reflection of dynamic directionality. Sorting out dynamic and stable variation is, however, not always obvious, and can not necessarily be determined *a priori*. In most cases, decisions about transitional and stable variation can be made only after examining

Table 2 Variation model of change following Bailey (1973)

Stage of change	*E_1*	*E_2*
Categorical status, before undergoing change	A	A
Early stage, begins variability in restricted environment	A/B	A
Change in full progress, greater use of new variant in E1 where change first initiated	A/B	A/B
Change progresses towards completion with categorically of new variant first in E1 where change initiated	B	A/B
Completed change, new variant categorical	B	B

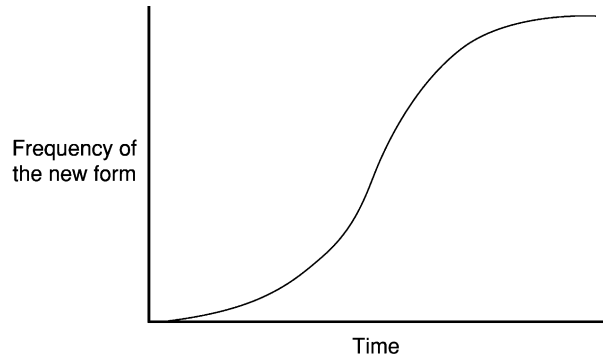

Figure 1 Model of *S* curve in language change.

patterns of variation across time and by considering underlying psycholinguistic and sociolinguistic principles that might help determine the difference.

Although the variability inherent in change has sometimes been ignored in historical linguistics under the traditional assumption that language change could not be directly observed, the empirical analysis of language change at different points in real time and in 'apparent time' (i.e., the assumption that differences across different generations of speakers at a given point in time will mirror actual diachronic change) indicates that the variable transition of variants proceeds in an orderly fashion over time and space.

Various models have been proposed for capturing the systematic heterogeneity associated with change. One of the earlier models (Bailey, 1973) proposed that change started variably in a limited, natural linguistic environment and then spread from that point to other environments. Furthermore, this model assumed that that variable change in the earliest environment would ideally show greater variability than changes in other environments where the change started later, so that relationships of 'more' and 'less' with respect to new forms might reflect chronological relations of 'earlier' and 'later.' This relationship can be illustrated by setting up a simplified, ideal model of the stages of change as in Table 2, following Bailey (1973). The table models the progression from the categorical use of one form, A, to another, B, in two different linguistic environments, E_1 and E_2.

The model in Table 2 illustrates the 'sequential actuation' of change (Pintzuk, 2003: 513), in which a change starts in one linguistic environment, a more favored environment, and then spreads to a less favored one. However, speakers also may initiate a new form at the same time in different environments, so-called 'simultaneous actuation,' or initiate change at different frequency levels in different environments. Cases of simultaneous change, along with other factors that may accelerate or impede a change over time, call into question the assumption that 'more' and 'less' can be interpreted without qualification as 'earlier' and 'later.'

The progression of variable change over time has now been subjected to considerable scrutiny in historical linguistics, particularly with reference to syntactic change (e.g., Kroch, 1989; Kroch and Taylor, 2000; Pintzuk, 2003). Although it was originally suggested (Bailey, 1973) that more favorable contexts for change might progress at an accelerated rate by comparison with less favorable contexts, research by Kroch and his colleagues supports the conclusion that there is a Constant Rate Effect (CRE) in change, in which the rate of change for each context is the same even though the frequency of competing forms may vary across linguistic contexts. It is important to understand that the label 'constant' does not refer to a constant rate of increase in frequency over time but to the fact that change will be the same across different linguistic environments, so that the progression of change in E_1, E_2, and E_n will follow the same trajectory slope.

The study of language change also indicates that there is a prototypical progression slope for variation in time, where change typically follows that of an S-shaped curve (Bailey, 1973; Labov, 1994; Pintzuk, 2003). That is, the replacement of form A with B occurs slowly at the beginning of a change, accelerates rapidly during the mid-course, and then tails off slowly in the final stages of the change, as illustrated in Figure 1.

This model has implications on several different levels. For example, the relatively rapid rate of progression through the mid-course of change sometimes makes this period less accessible to direct observation than the slower periods at the beginning and end points. It also may have implications for the regularity of a change. For example, the role of lexical conditioning in phonological change may be more prominent at the incipient and cessation stages of the

change, with lexical diffusion playing a more prominent role at the endpoints. Furthermore, irregularity in constraint effects on variability may be more prone to take place at the beginning and end points of the change than they might be during the mid-course of a change.

The examination of systematic language variation over time offers a unique opportunity to observe language change in progress. More important, it has moved historical linguistics away from a long-held belief that diachronic linguistics was limited to post-hoc analysis of the end-products of language change (Weinreich *et al.,* 1968). Indeed, language change has proven to be one of the most productive venues for studying the nature of systematic variability as well as providing an important proving ground for examining the empirical validity of different models of language change.

Variation and Language Knowledge

As a methodological heuristic, there is little question about the usefulness of variation analysis. Its implications for the representation of speakers' language capabilities and the role of variation in a language grammar, however, is much more disputable. In fact, most theoretical linguists would simply dismiss systematic variability as an artifact of performance with little relevance for a model of language competence. Notwithstanding a few exceptions (e.g., Guy, 2003; Anttila, 2003), far too little attention has been paid to the role of systematic variability in a grammar of language.

Although the question of speaker knowledge and language variation has been raised on occasion (Cedergren and Sankoff, 1974), surprisingly little discussion has focused on the capabilities that speakers might have with respect to language variation as a putative attribute of language competence. Possible claims about speaker capabilities may include the following, ranging from the weakest to the strongest claim.

- Speakers can identity optional (variable) variants
- Speakers can identify the factors that favor and inhibit variable application
- Speakers can identify the relative strength of different constraints on variable application
- Speakers can identify a probabilistic mechanism that generates differential constraint effects
- Speakers can identify frequency levels of variation.

There is little psycholinguistic experimentation to support any of these claims, although there is evidentiary documentation that the speaker-hearer can at least recognize optional variants and distinctions between groups and individual speakers based on relative frequency levels. Insight into the finer details of speaker knowledge, such as evidence for knowledge about the relative strength of constraints, the recognition of a probabilistic mechanism for generating constraint effects, and knowledge of frequency levels, however, still awaits psycholinguistic experimentation.

In the early days of variation studies, researchers (Labov, 1969; Cedergren and Sankoff, 1974) proposed that variation was inherent within a language system and part of speaker competence, and hence should be integrated into the grammar. This was expressed formally in so-called variable rules, which incorporated ordered constraint effects, and even probabilities, into the formal generative-style rewrite rules in the tradition of Chomsky and Halle (1968). As formal grammars shifted toward the formulation of universal principles rather than specific language rules, however, the variable rule was abandoned (Fasold, 1991). At the same time, reformulated models of grammar raised new issues about the assumed inherency of variation that was once considered to be the cornerstone of variation theory. In the Principles and Parameters model of syntax, for example, it is assumed that parameters are set for a given language in one way or another, whereas in Optimality Theory in phonology variability is reduced to different rankings among the universal constraints on phonological structure. Accordingly, variation consists of alternative settings of the parameters or rankings and speakers have at least two grammars, one set in one way and one set in another. As Fasold (2003: 232) puts it, "Variation in this tradition is not distinguished from bilingualism; such speakers have two more nearly identical grammars and can produce utterances reflecting either or any of them." Thus, in current studies of variation in historical syntax, variation is now interpreted as grammatical competition between two distinct options that do not ordinarily allow optionality – for example, head-initial versus head-final phrasal structure (Pintzuk, 2003) – so that options correspond to contradictory settings of the parameters.

Although it may be possible to view some kinds of syntactic variation as competition between different grammars of language rather than inherent variability, this interpretation is less comfortably applied across different levels of language. For example, the phonetic realization of vowels may naturally exist on a continuum in phonetic space. Furthermore, given the range of variation in phonology and phonetics, there is an exponential proliferation of possible grammars – into the hundreds and thousands – that seems counterintuitive. The interpretation of variation as a product of competing grammars must also

be reconciled with the intuitions of speakers themselves, who may, for example, view variants to exist within a unitary system. Although attempts have been made to reconcile the systematic nature of variability and alternative rankings in Optimality Theory (Guy, 2003; Anttila, 2003), the mechanisms for incorporating such variability into the grammar still seem somewhat ad hoc, and Guy observes that Optimality Theory seems unable to capture the stability of constraints in the variationist model (Guy, 2003: 383).

The potential role of variation in a formal grammar of language remains one of the most challenging – and intriguing – prospects for those who have empirically demonstrated the validity and reliability of systematic variation in language. The systematic nature of structured heterogeneity seems to be indisputable, but its role within a model of language claiming to represent speaker capabilities persists as an issue for variationists and formal theoreticians to contemplate, preferably together.

See also: Constant Rate Hypothesis; Copula Variation; IN/ING Variable; Labov, William (b. 1927); Microparametric Variation; Phonological Change in Optimality Theory; Statistical Testing of Variation; Syntactic Variation; Variation and Formal Theories of Language: HPSG; Variation and Formal Theories of Syntax, Chomskyan.

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Variation in Arabic Languages

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Introduction

Arabic is a native language to some 200 million people, distributed over 22 different countries collectively known as the 'Arab World.' The Arab World stretches from the Indian Ocean in the east to the Atlantic Ocean in the west and includes most of the countries of the Middle East, the whole of North Africa, and Sudan (as well as Somalia and Mauritania). The Asian part of the Arab World is commonly referred to as al Mashreq 'the East,' and the North African part (particularly from and including Libya westwards) as al Maghreb 'the West.' Egypt represents the geographical link between the East and the West, and the Egyptian dialects may be thought of as a bridge between the Maghreb and the Mashreq dialects. In terms of demographic distribution, approximately 66% of the total population live in the African part. The largest concentration of Arabic speakers is in Egypt (67 million).

A Historical Sketch

The ancient home of the Arabs is the Arab Peninsula, and the Arabic language is traced to the second millennium B.C. in the northern part of the peninsula. To varying extents, everywhere else, Arabic is a relative newcomer. From the peninsula, and starting in the second half of the seventh century A.D., the language was disseminated first through direct military conquest, and later it affirmed its position through intellectual influence. In the course of its spread northwards to the eastern Mediterranean, Mesopotamia, and Egypt it ousted Greek, Persian, Aramaic, and Coptic. In the Maghreb, Arabic obscured Berber, and although it never managed to obliterate Berber, which continues to be spoken by no less than 40 million people, it altered the linguistic shape of the region.

Arabic prospered in a climate of dominant Arab civilization and declined alongside the diminution in power and influence of the Arabs. The rise to power of the Ottoman Turkish Empire in the 16th century resulted in the replacement of Arabic by Turkish as the language of state administration, although Turkish never managed to replace colloquial Arabic as the everyday language of communication in the Arabic speaking provinces. The Ottomans lost the Maghreb in the mid-19th century (to Italy in Libya, and to France in Morocco, Algeria, and Tunisia), and Egypt to Napoleon for a short period of time and then to Britain. The outcome of the First World War brought an end to Ottoman rule in the Mashreq. Most of the Arabic speaking provinces were then divided into separate political entities and were placed under the tutelage of Britain and France. The linguistic significance of these developments was mainly that French and English became important features on the linguistic scene. English, however, did not influence the linguistic identity of the regions that came under British rule; it became at best the most widely spoken foreign language. French, on the other hand, had a far-reaching influence that continues to be visible, especially in the Maghreb, to this day. Much of the colonized or mandated territories became independent by the early 1960s, and Arabic has since then been declared the official language in Arab World.

Varieties of Arabic

To provide a concise outline of variation in Arabic, I will deal with two issues: the linguistic resources available to speakers of Arabic, and the sociolinguistic determinants of variation in Arab communities.

Standard Arabic

Throughout the Arab World, Standard Arabic (a modernized version of Classical Arabic), in an almost invariant form, is designated as the official language, the medium of instruction in education, and the language of the mass media, although in actual practice a mixture of Standard and colloquial varieties is used in education and in the media. The language was standardized twelve centuries ago, and the Standard variety has not been a spoken language for longer than that (see Holes, 1995a). It is not ordinarily used for everyday spoken purposes by any sector of the population. A functional knowledge of it is attainable through formal learning only, i.e., it is not acquired

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naturally. It stands in a diglossic relation to the spoken dialects (e.g., Spoken Egyptian Arabic), very much along the lines explained by Ferguson (1959).

The fact that this variety is not associated with a particular social group in contemporary Arab communities, and is not spoken natively, has sociolinguistic ramifications. There is no doubt that the Standard variety is accorded the highest status by Arabs, but its esteem and the degree to which it is involved in the course of linguistic change are unrelated. Research shows that linguistic variation and change in Arabic is determined by interplay between local dialects and emerging local or regional standards, independently of Standard Arabic (see Al-Wer, 1997). Educated speakers of Arabic do resort to the use of Standard lexemes and constructions in formal situations. This is largely due to the established appropriateness of the Standard in such domains, and to the fact that learned and specialized lexical items are only available in a Standard form. Outside these situations, educated speakers use the colloquial varieties, and research shows that where linguistic change is in progress away from Standard features, the educated generally lead other groups, in the same way that they lead when the change happens to be in the direction of a Standard feature (for instance, see the results in Jabeur, 1987 and Al-Wer, 1991, and the discussion in Holes, 1995b).

The Dialects

Arabic dialects are the linguistic systems that speakers of Arabic speak natively. They vary considerably from region to region, with varying degrees of mutual intelligibility (and some are mutually unintelligible). Many aspects of the variability attested in the modern dialects can be found in the ancient Arabic dialects in the peninsula (for a detailed description of the ancient dialects, see El-Gindi, 1983). By the same token, many of the features that characterize various modern dialects, or distinguish between them, can be traced to the original settler dialects. In terms of typological classification, Arabic dialectologists distinguish between two basic norms: Bedouin and Sedentary. This classification is based on a bundle of phonological, morphological, and syntactic features that distinguish between the two norms. In the modern, especially urban dialects, it is not really possible to maintain this classification, partly because the modern dialects are typically an amalgam of features from both norms. Geographically, modern Arabic dialects are classified into five groups: Arabian Peninsula (four subgroups); Mesopotamian; Syro-Lebanese (or Levantine, three subgroups); Egyptian (four subgroups); and Maghreb (two subgroups) (for details, see Versteegh, 1997).

Common Dimensions of Variation in Arab Communities

There is a general shortage of studies on variation in Arabic, especially on Arabic in its social setting and in large and heterogeneous urban environments; but this situation is changing. A number of important empirical research studies, utilizing modern methodological and analytical techniques, are in preparation. On the basis of the studies available, it seems that the factors outlined below play important roles in the dynamics of variation and the course of linguistic change.

All variation studies on Arabic mention education as an important social variable, and indeed the findings show that linguistic usage correlates with the level of education of speakers. However, the exact denotation of education as a variable is poorly understood. It is noticeable, for instance, that while level of education of the speaker is used as a sampling tool, it is not integrated in the explanatory model in a consistent way. It is likely that this variable actually symbolizes different aspects of the speakers' characteristics in different communities. It is also likely to be a proxy variable, acting on behalf of such things as contact and exposure to outside communities, especially since in many communities institutions of education are not available locally, and generally the longer individuals spend in formal education the more frequent their contacts become with speakers of other dialects (see Al-Wer, 2002a). In some cases, the type of education, private or public, was found important (as in Haeri's 1997 study in Cairo).

Social class in is not usually used in Arabic studies. A notable exception in this domain is Haeri's (1997) study in Cairo, which analyzes this variable and finds it significant. A forthcoming study on Damascus also uses social class as a sampling and analytical tool. There are two types of urban Arabic communities, which seem to show different corelational patterns. In the well-established urban centers, such as Cairo and Damascus, the original regional, ethnic, or sectarian linguistic distinctions among the population are blurred and do not play a role in sociolinguistic correlations. On the other hand, in the new cities, such as Amman (the capital city of Jordan) and most of the cities in the Gulf region, stratification along ethnic, regional, and sectarian backgrounds are the more relevant criteria for sociolinguistic studies. There are signs that as these cities become established and their new dialects become focused, alternative ways of stratification become necessary. For instance, in Amman, the original distinctions of Jordanian versus Palestinian dialects and urban versus rural Palestinian (which are based on the

regional origins of the city's population), while continuing to be important for an understanding of patterns of linguistic variation among certain groups, are much less important in the speech of the third generation inhabitants of the city. Other, more locally defined criteria, such as socioeconomic class, are becoming significant (for more details, see Al-Wer, 2002b).

Gender has been found to be an important parameter of variation in Arabic. Consistent linguistic differences between male and female speakers are reported in the earlier studies (e.g., Abdel-Jawad, 1981, and Bakir, 1986), as well as in later works (e.g., Jabeur, 1987; Haeri, 1997; Gibson, 1998). Gender is also reported to be significant in studies focusing on code switching and code mixing (e.g., Lahlou, 1992, and Sadiqi, 2002). The interpretation of gender-differentiated patterns in Arabic experienced a complete transformation, although the patterns themselves are consistent and are in keeping with the patterns found in other languages, such as English. In the earlier studies, Arabic was thought to contravene the then generally reported tendency for female speakers to use standard features more often than men, since in Arabic studies men were found to use Standard Arabic features more than women. However, the features that Arab men were found to use more often than Arab women were at the same time characteristic of the localized and in many cases overtly stigmatized varieties, but simply happened to be identical to Standard Arabic features. Since the approach to understanding variation in Arabic has shifted from one based on the assumption that approximation to Standard Arabic features is the governing factor to one recognizing that the target features are characteristic of the *de facto* spoken local standards (which derive their status from the social groups whose speech they represent), the interpretation of gender patterns has also shifted (see Ibrahim, 1986; Haeri, 1987; Al-Wer, 1997).

Within this revised framework, the findings with respect to male-female differences in Arabic communities studied so far suggest that where linguistic change is in progress, allowing for other factors, the female speakers are ahead of the male speakers in the use of newer forms. However, it must be emphasized that the data available from Arabic do not permit us to make generalizations on the basis of gender (to the extent such generalizations can be made for any language). Although there is now a respectable number of sociological studies, mainly in the feminist literature, providing thorough analyses of gender as a social construct in Arab societies, these models have not yet been integrated in studies on linguistic variation in Arabic.

The current generation of students of Arabic linguistics increasingly pays attention to the study of dialect contact. This comes in recognition of the linguistic repercussions of the massive population movements, rapid urbanization, and modernization all over the Arab World. In the established cities, the newcomers largely accommodate to the city dialect (see for instance the results in Jabeur, 1987; Gibson, 1998; Jassem, 1993). In the new cities, various processes of leveling take place and new linguistic forms emerge. There are also signs that regional koineization, transcending political borders, is taking place.

See also: Algeria: Language Situation; Arabic; Arabic Lexicography; Arabic Linguistic Tradition; Berber; Egypt: Language Situation; Gender; Gender and Language; Islam and Arabic; Jordan: Language Situation; Morocco: Language Situation; Saudi Arabia: Language Situation; Sociolect/Social Class; Syria: Language Situation; Tunisia: Language Situation; Turkey: Language Situation.

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Variation in Child Language

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The area of child language acquisition, for the most part, began in the very late 20th century, 40 years after Labov's groundbreaking work investigating the social implications of language variation and change. However, this statement may imply that sociolinguistics is alone in confining language study to adults, when this is not at all the case. Linguistics as a whole, although containing many diverging, and sometimes conflicting, theoretical perspectives, has been virtually united as a field with adults-only content. The purpose of this article is to situate the child in linguistic history, summarize current findings in child language variation, and argue that despite the difficulties and shortcomings of this work, there is interesting and important information to be learned about language from its not-fully-formed speakers, in addition to the more obvious and empirically demonstrated premise that there is interesting and important information to be learned about children from their language.

Historical Overview

Linguistics in the early 20th century was dominated by structuralism. The ways of looking at language structure, which for the most part meant phonological structure, varied, but the emphasis on structure as opposed to history differentiates the linguistics of this period from that of the previous century (Hymes and Fought, 1975: 11). Although language was seen as a 'human function' and a 'cultural function,' the focus was not so much on the speakers as on what was in essence the "product of long-continued social usage" (Sapir, 1921: 4). As such, children were seen as the acquirers of the language of their culture, not as contributors; their acquisition of language was the study of another field – psychology.

It is not the case that children were never mentioned, however. Bloomfield (1933: 29) speculated on language learning, which he called "the greatest intellectual feat any one of us is ever required to perform." Following the highly popular learning theory, he likened the process of language acquisition to forming a 'habit' based on imitation of caretakers' speech. This habit was later shaped and refined by corrections from competent speakers when the child made an error. Bloomfield (1933: 32), in fact, was quite clear on the interests of linguists in this process and noted the following:

> In the division of scientific labor, the linguist deals only with the speech signal (r . . .. s); he is not competent to deal with problems of physiology or psychology. The findings of the linguist, who studies the speech-signal, will be all the more valuable for the psychologist if they are not distorted by any pre-possessions about psychology.

Dialect geographers were similarly occupied with language structure – in this case, its variation across geographic area, whether lexical or phonological or, more rarely, grammatical. Kurath's (1939a, 1939b) large project in the United States was predicated on the assumptions that geographic variation was best reflected in the adult speakers of the community, particularly those who were nonmobile, older, rural, and male (later termed NORMs by Chambers and Trudgill (1980)). Although the origin of these features was of critical importance at the time, it was most likely to be found in the historical settlement patterns and geographical barriers and boundaries of the areas studied (Kurath, 1939a) and not in those young speakers acquiring the dialects.

Chomsky (1957, 1959, 1965) brought children to prominence in the context of learnability. That is, in early versions of generative grammar, the paucity of input to young children was taken as support for the heritability of language. However, these children, like the adult speakers discussed by generative linguists, were more theoretical than real, and it was not until

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considerably later that data from real children were sought (Marcus *et al.*, 1990).

Given this historical context, it is not surprising that when the study of language variation and change as a social, as well as regional, phenomenon began in the mid-20th century, it was with adult or adolescent speakers (Labov, 1966). Despite the very early work of Fischer (1958), whose sample comprised 3-, 5-, and 10-year-old speakers, it was not until more than 20 years later that children younger than the age of 5 years appeared in variation research again. Even then, this work can more accurately be described as a trickle than a flood. In 1981, Kovac and Adamson explored the deletion of finite *be* in African-American Vernacular English (AAVE). This feature of AAVE, along with others, was (and is) a popular topic of variation study (Baugh, 1986; Labov, 1969; Rickford *et al.*, 1991; Wolfram, 1969). Kovac and Adamson, however, were the first to examine the question of developmental versus dialectal variation, a particularly difficult issue to differentiate because the feature in question involved a deletion process that is difficult to distinguish from nonacquisition but important in the study of early dialect learning. The researchers found that although all of their speakers (aged 3, 5, and 7 years) demonstrated deletion, the constraints on deletion were more difficult to acquire. In fact, the children mastered the constraints on copula contraction before those of deletion, which were not fully acquired at age 7 years (Kovac and Adamson, 1981).

Wolfram (1989) studied even younger speakers of AAVE, aged 18–54 months. He too examined a deletion process – in this case, deletion of final nasals with nasalization of the preceding vowel. He found that before age 3 years, the children produced virtually no final nasal segments; after that, however, their acquisitional pattern bore strong relation to that of AAVE, as spoken by adults. That is, /n/ was preferred as a target of deletion over /m/ or /ŋ/, and utterance final /n/ was more frequently deleted than that followed by another word. Finally, the children's patterns of deletion tended to plateau at age 3 years and hold steady, suggesting an acquired and stabilized deletion pattern. Both of these early studies found that the features in question were not clearly apparent in the youngest children. That is, it was not possible to determine if the sparseness of the feature was due to an emerging deletion pattern or an emerging grammatical (e.g., finite *be*) or phonological (e.g., the phoneme /n/) form.

Although these early studies cannot be said to represent a trend toward the study of child language variation, they did set the stage for examining two important questions: What can the study of child language variation tell us about children and the language acquisition process? and What can the study of child language acquisition tell us about language? The first question is far more easily dealt with than the second. The evidence for acquisition can, at times, be directly observed, and although language acquisition is not instantaneous, its progress in individuals is more rapid that the course of language change. Consequently, there are intriguing results that tell us at least the basics of dialect acquisition, whereas the discussion of any implications for language as a whole must be made up primarily of questions.

The Study of Variation and the Language Acquisition Process

Acquisition of language (particularly phonology) is assumed to be a process of movement from babbling to segment and/or rule acquisition. Locke (1983), however, noted that although this process appears to be inevitable in normal acquisition, it is far less easy to document the point of passage from one stage to another with certainty. There is clear agreement that babbling is a natural, physiological process. Deaf children, who have no access to auditory input from caretakers or auditory feedback from their own productions, nevertheless produce babbled sounds in the first year of life. In fact, Locke noted that the movement from babbling to speech is generally assumed to be heavily dependent on 'naturalness' in that those segments that are easier to produce from a physiological standpoint and more frequent in the target language (not necessarily a coincidental pairing) are among the first to be acquired by the child. However, therein lies the complication as well; as Locke (1983: 158) noted,

> If phonological segments and rules can be so 'natural,' it must be difficult indeed to know when a child has 'acquired' a rule, 'learned' an articulation. . . . Such phonological naturalness may blur the separate contributions of biologically innate mechanisms, environmental stimulation, and their modes of interaction.

There is a parallel dilemma in the study of child language variation: at what point does a process such as deletion stop being a stage on the way to mastery of a phoneme or morpheme and become an acquired, but variable, dialectal process? As noted previously, Kovac and Adamson (1981) found that for deletion of finite *be*, the process was still not complete by age 7 years. Their study, however, as well as later ones, demonstrated a possible venue for exploring this 'naturalness' problem. A segment or its deletion may be natural and/or developmental, but the constraints on that process are in some cases language or dialect specific. One definition of acquisition could then be

the presence, absence, or modification of that segment as the speech community requires, not the adult-like articulation of a given segment.

The process of (-t, d) deletion, a subset of final consonant cluster reduction, provides an example. This process, as students of variation well know, allows the deletion of final /t/ or /d/ in word-final consonant clusters. However, the process is constrained by phonological and grammatical environmental conditions, most crucially, in this case, following segment and grammatical form. Although most of the following segment constraints can be seen as a form of simplification, and (following Locke) a child may not be accurately credited for the acquisition of a rule, the constraints of following pause and grammatical form are not examples of simplification. Guy and Boyd's (1990) examination of the grammatical constraint and Roberts's (1997a) study of both phonological and grammatical constraints explored this rule in preschool children. Roberts found that the children age 3 years and older had acquired all the phonological constraints, including that of following pause, and although the specific findings differed slightly, both studies found the children to be in the midst of learning the grammatical constraints. Even the 4-year-olds had not completely acquired the adult rule (Roberts, 1997a).

A study on vowel acquisition revealed similar results. In this case, 3- and 4-year-old children in Philadelphia were studied to determine their progress in learning the short *a* or (æh) vowel (Roberts and Labov, 1995). This feature is complex, with lexical, phonological, and grammatical factors conditioning the raising of short *a* tokens. As was the case with (-t, d) deletion, the children were making excellent progress and had acquired several constraints on short *a*. However, some of the constraints continued to be realized in an inconsistent manner, demonstrating that this phoneme was partially learned, although its articulation was completely mastered by all the children.

As the previous examples demonstrate, the concept of acquisition goes beyond the production of the sounds of speech. This point is not unfamiliar to psycholinguists researching the acquisition of phonology. Locke (1983: 181), in fact, noted that "one may acquire and use forms without necessarily *learning* their precise surface characteristics." He proposed a study in which adults would be compared on their ability to learn a phonetically based and a nonphonetically based rule created by the researchers. However, a rule that is unpredictable unless one knows the dialect of the speaker would seem to be a far better candidate for study than a hypothetical one, and children learning their first language would be more natural subjects. Children who learn that in their speech community /t/ and /d/ are rarely deleted before a pause and short *a* is raised before /ʃ/ but not before /d/ except in the words 'mad,' 'bad,' and 'glad' are learning a linguistic rule or pattern, not relying on a physiological imperative. Systematic variation provides naturally occurring learning and research opportunities that can be of value to both fields of study.

The Language Learning Environment

That children acquire phonemes, rules, constraints, and patterns is a critical point of departure for the study of child variation. However, the outcome of the learning process – a rule acquired or a pattern mastered – is only one facet of this study. It is also important to explore the process by which this learning occurs. What is the language environment from which the child learns his or her community norms? How much of this environment does the child attend to and use?

There is a large body of work on the subject of language learning environments in Western culture (Ferguson, 1977) and others (Ochs and Schieffelin, 1984). In addition to the rich descriptive work these studies provide, they also help to answer the question of the necessity or benefit of a modified language environment for children. This continues to be a subject of debate, but the cross-cultural work cited previously does cast doubt on the necessity of a particular (i.e., mainstream, Western) language learning environment. Whether particular environmental attributes are beneficial to language acquisition is, at least to some extent, dependent on the cultural values of the community. For example, there is evidence that modification of the child's environment as with child-directed speech may lead to faster language learning (Clarke-Stewart, 1973), but whether faster is better is a question to which the answer can vary from one society to another. It is not the purpose of this article to enter into this particular debate, but variation studies can shed light on another aspect of the language learning environment: How does the linguistic environment that children encounter affect their language and its acquisition?

Again, the study of variation can augment what is already known through the study of children's language learning environment. Foulkes *et al.* (1999) studied glottalization in forty 2-, 3-, and 4-year-old children from Newcastle Upon Tyne in England. Their findings on the acquisition of glottalization were similar to those on other variables discussed previously. The children had made progress but not completed their acquisition of the complicated glottal

stop replacement and reinforcement of /t/. In addition, they found that the children demonstrated high degrees of preaspiration when /t/ was in utterance-final position, a pattern that cannot be explained by simplification. Rather, the authors' interpretation was socially based in that they noted that preaspiration was the dominant pattern of young women speakers in the area – those who were also primarily responsible for child rearing.

Roberts (2002) also found evidence of variable patterns in the language environments of young children. This study examined the speech of four white middle-class mothers from Tennessee talking with their toddlers, aged 18 or 19 months, and with an interviewer. These mothers were all speakers of Southern American English, which has as one of its features the pronunciation of long /aɪ/ as in 'time' as a fronted monophthong, or closer to [tæm]. All four mothers used both types of /aɪ/ but produced more of the monophthong /aɪ/ in their speech to the adult interviewer than with their children. The children, therefore, heard child-directed speech that comprised a mix of productions, even though their mothers may have been presenting them with more examples of the nonlocal variant than they typically used with adults. They heard examples of variation: what sounds within their dialect were malleable and in what ways. The previous results suggest that child-directed speech contains the elements necessary for supporting producers of variation at home in their own speech communities.

Although caretaker speech has captured the interest of researchers for decades, one concern about this area of study that has recently become more relevant is the effect of peers, particularly day care peers, on children's speech. This is a particularly important question for variationists because peer effects are basic to variation theory and have always been considered and applied to adolescents and adults. It is this point that has provided the underpinnings for the network analysis by Milroy and others, who have used increasingly specific methods to determine exactly who is the speaker's network. It seems questionable, at best, to work from the assumption that a child's, even a very young child's, network consists solely, or even primarily, of his or her mother. Background information to this effect should be gathered and included in articles written about acquisition of variation. Also advisable are studies that focus on the relative effects of day care and caretaker influence, difficult as these may be to tease apart in the day-to-day existence of children and families.

Early evidence on this point is mixed but generally leaning toward less, rather than more, parental influence. For example, Kerswill (1996) found variable influences in 4-year-olds he studied in Milton Keynes. Some of the children did demonstrate parental effects on dialect learning; others were more influenced by older peers. In any event, the parental influence appeared to disappear by age 8 years. Roberts (1997b) found that parental effects were seen most easily in complicated vowel patterns because children who did not have two native Philadelphia parents did not acquire the complex short *a* pattern. Even on simpler patterns, however, parental effects can be inferred from the finding that children learned most effectively the Philadelphia vowel changes most prominent in their mothers, as opposed to those changes that have been found to be led by males. It is also relevant that the only child to make very limited progress in the acquisition of any of the Philadelphia vowels studied was one with Italian-speaking parents. However, the fact that this child did sound like a speaker of American English, not Italian-influenced English, suggests that peer and other community influences were already at work; his progress on the Philadelphia patterns was simply not as rapid as that seen in the other 3- and 4-year-old children.

Starks and Bayard (2002) also explored this issue with four young speakers of New Zealand English. Their findings echoed many of the previously discussed findings in that the children showed markedly different patterns of acquisition of postvocalic /r/ deletion. Two of the children were virtually nonrhotic from a very early age and two showed considerably more rhoticity, even though all four had rhotic parents and nonrhotic peers. Similar results were found with regard to their acquisition of several New Zealand vowels. The authors suggested that age of entry into day care (and exposure to peers) as well as sibling influence may have been factors in the acquisition differences. Although the study was limited by a small amount of data, it is notable that Starks and Bayard found it essential to perform word-by-word analyses to make sense of the highly variable data.

Some Additional Data

A study of linguistic variation in Vermont (Roberts, 2005) provided an opportunity to explore the day care vs. home linguistic influence on children's replacement of /t/ with glottal stop [ʔ]. This apparently local variant of /t/ is both stigmatized and, unlike other localized productions, enduring in the face of dialect leveling. The data discussed here are a subset of a larger set representing the speech of children and adults. The speech of seven 3- to 5-year-olds was coded as to the use of glottal stop to replace medial and final /t/ in words. All the children were residents of Vermont. Three of them had parents who were not

Table 1 Glottal replacement of /t/ in children with parents who use /ʔ/ and parents who do not use /ʔ/

Child	*Total N*	*/ʔ/ N*	*% /ʔ/*
/ʔ/ parents			
Alice	229	48	20
Jessie	114	15	13
David	55	13	23
Emmy	174	26	14
Non /ʔ/ parents			
Jean	121	6	4
Marie	214	55	25
Cal	174	17	9

glottal stop users. One child's parents were from France and were learning English; one child's single parent was from the mid-Atlantic region of the United States; and one child's parents were originally from Vermont but had extensive travel experience, advanced educational degrees, and a clear dispreference for Vermont speech patterns. The parents of the other four children were Vermonters who, to varying degrees, demonstrated glottal stop replacement of /t/.

It will surprise no one who has read either the previous discussion or the extensive literature on individual differences in child language acquisition (see Bates *et al.*, 1995) that although there were indications of trends of influence present in the results, there was nothing that approached significance in the variable rule analysis of the data. Table 1 shows the results of the comparison between children with parents who demonstrated /ʔ/ replacement of /t/ and those with parents who did not. In general, the children who had glottalization input both at home and at school appeared to do more glottal replacement than those who had this input only at school (where the input was mixed because the teacher was a Vermonter but not all the children came from homes with the same linguistic environment). Strikingly, however, the highest replacement percentage came from Marie, whose input for Vermont speech came from school only. Marie's linguistic background was also the most different from the others because she was the child with French-speaking parents. Although Marie's English was quite good, her parents were insufficiently comfortable in English to consent to be interviewed. This background suggested at least two possibilities for interpreting her glottal stop data. The first has to do with possible overlap between the languages. One of the more popular environments for glottal replacement is word-final /t/ following /n/, as in the word 'Vermont,' which is derived from French. French is well-known to include the deletion of final /n/ and final /n/ plus stop with the nasalization of the previous vowel (Ruhlen, 1978; Tranel, 1968). In Vermont speech, this word and others like it are produced with a nasalized vowel and deleted /n/ followed by /ʔ/ (Roberts, 2005). Although it is not clear from the previous research that /ʔ/ follows the nasalized vowels in French, Locke (1983: 230) noted that word-final nasalized vowels may be perceived, in any case, as preceding a glottal stop. The second possibility is that as Marie was learning the English language as well as the Vermont dialect at school, she was acquiring the Vermont patterns from her teacher (a native Vermonter) and her Vermont peers.

Conclusions are difficult to draw from such small samples. As psycholinguists have found, the process of language acquisition, like that of language change, is a complicated one. Slices of cross-sectional data and group trends are sometimes sufficient only to hint at possible explanations. Continued examinations of even small amounts of data, such as those of Starks and Bayard (2002), are necessary to gain insight into the complexity of child variation.

Conclusion

The study of child variation necessarily combines the disciplines of both psycholinguistics and sociolinguistics. Both fields emphasize process as well as outcome, but the emphasis may take on a different tone in each. In sociolinguistics, the speech of fully formed individuals is used to explore the process of language change. Speakers are assumed to be competent speakers of their particular varieties, and the emphasis is on the change in the variety. In psycholinguistics, fully formed language is used to explore its development in speakers. Speakers (children) are assumed to be moving toward competence, and the emphasis is on the change in the speaker. The challenge for child variationists is to bring together two entities, both of which are in a state of change. It is a difficult challenge because the sociolinguistic methodology, exemplified most often by the interview, necessarily captures a moment in time, both for the language and for the speaker. On the other hand, the collaboration affords the researcher an opportunity to make a contribution to both fields since the assumption that either the language or the speaker is static is an unproven one, at best. The psycholinguist is able to make use of the stable language assumption by focusing on language forms that change so slowly as to be pragmatically immobile: tense and case markings and basic word order. When the focus is on forms that sociolinguists have found to vary (e.g., phoneme production and lexical forms), the more stable mainstream or standard forms are taken as the goal of the language learner. The variationist is able to make use of the stable speaker assumption by focusing on

mature speakers in established speech communities, exemplified by the initial dialectology ideal, the geographically isolated NORMs. The increasing mobility of the population at large and the focus on urban settings and increasingly less isolated rural settings have created a challenge to the stable speaker assumption. It is no longer clear that the speaker, even the mature speaker, resists the linguistic changes brought about by increased mobility.

Child variationists can provide a venue for exploring this new situation: changing language in changing speakers. The studies discussed previously demonstrate both the challenges and the benefits of this work. In summary, we may formulate the following key points that may be useful to variationists:

1. The necessity for close examination of the data of individual speakers, even when group trends are examined. The purpose would be not only to ascertain that individual children are following the documented group trends, although this is critical when working with speakers who exhibit developmental as well as dialect variation. It is also important to explore the very complex pattern of influences on these young speakers and which influences are largest as well as most enduring and, therefore, most likely to influence the process of language change.
2. The importance of exploring the child's network of relationships to document the influence pattern and separate fleeting from long-term influences that may affect not only the speaker but also the language variety.

Of course, neither of these suggestions represents a new methodology. Many researchers examine their data closely to provide interpretive insights that would be lost in group patterns. In addition, network analysis has been practiced in some form since the earliest days of dialect study (Labov, 1966) and continues to be refined (Milroy, 1987). The difference is that the rapidly changing world demographics today coupled with the rapidly changing young speakers make these aspects of method more clearly critical. We are a long way from identifying the ways in which children may influence language change in their own acquisition of that language. However, it is hoped that variationists may benefit from both the methodological and the theoretical results of the exploration.

See also: Age: Apparent Time and Real Time; Dialect Atlases; Gender; Infancy: Sensitivity to Linguistic Form; Social-Cognitive Basis of Language Development; Sociophonetics; Teenagers, Variation, and Young People's Culture.

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Variation in First Language Acquisition

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Variation among Children

Children differ greatly from each other in their rates of learning language, and there are also many reports of differences in the process of acquisition. These differences are relatively well documented for the acquisition of English, but are poorly documented for children learning other languages. In this article, references to variation among children learning languages other than English are to the articles in Slobin (1985) unless otherwise indicated. Lieven (1997) and Peters (1997) contain detailed surveys of the cross-linguistic evidence. Bates *et al*. (1988) report the most detailed longitudinal study of individual differences in the early learning of English, and Fenson *et al*. (1994) provide the most comprehensive cross-sectional overview based on the Macarthur Communicative Development Inventory, a parental report measure.

Variation in Early Comprehension and Production

Children vary considerably in when they first start to show signs of comprehension and when they first start producing words. Because much depends on how comprehension and production are defined, it is difficult to give an exact age range for these activities. Comprehension of individual words such as 'No' starts very early, and of course, children can use contextual cues to interpret the utterances of those around them without necessarily parsing much of what they hear. Although most well-controlled studies of early word learning have found that comprehension is in advance of production, the age range of production is, if anything, even more varied, with some children producing their first words (as reported by parents) at around 10 months whereas others might not produce more than a few recognizable words before 16–18 months (Fenson *et al*., 1994). For most children, progress in comprehension and in production is highly correlated, but there are reports of children whose comprehension outstrips their production by much more than the normal extent (Bates *et al*., 1988). Children who are more than 1 standard deviation (SD) or sometimes 1.5 SD below the mean on standardized tests of language are usually considered to be late talkers. Among this group are children who 'catch up' and join the normal range, as well as a group of children who go on to be defined as having specific language impairment (Rescorla *et al*., 2000). Many studies, though not all, have found that girls tend to start to produce words earlier than boys (Fenson *et al*., 1994). There are also some studies indicating that first-born children start to produce words earlier than subsequent-born children (Fenson *et al*., 1994; Pine, 1995). It is

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important to emphasize, however, that these group statistics disguise a huge range of variation and that there are very many children who are exceptions to these group averages.

In addition to the timing of comprehension and production and the rate at which children learn, there is considerable variability in the process of early language production. An early stage of relatively accurate matching of a small number of productions of adult words is often followed by a highly individual phase where each child produces a wider range of words, most of which are reduced to a phonological 'template.' The nature of this template varies from child to child, though it always bears a phonological and segmental relationship to the particular language being learned (Vihman, 1996).

There are studies of English and other languages (Hebrew, Danish, Norwegian, Italian, Hungarian, French, Finnish, German, Portuguese) that suggest that children may differ from very early on in the extent to which they pick up on the major tunes of the language or tend to produce shorter and more well-articulated utterances (for detailed summaries, see Lieven, 1997; Peters, 1997). The 'prosodic' or 'tune' strategy involves using chunks of prosodic structure with the prosodic properties associated with questions, attentional utterances, naming utterances, and imperatives. For example, within these intonational envelopes, the child might produce a quite long vocalization with the intonation of a question but with large numbers of schwas and only one or two clear words. Most children will use both strategies, but there are clearly some children who veer toward the extremes of one or the other.

Variation in Early Lexicon and Early Structure

For English-learning children with the same mean length of utterance (MLU), there are large individual differences in the relative proportions of nouns or frozen phrases in their early lexicons (Nelson, 1973, 1981; Lieven *et al.*, 1992). The proportion of nouns is related to the extent to which their caretakers use nouns and elicit the names of objects from the children (Masur *et al.*, 2004). There is also a major debate on whether nouns are predominant in children's early lexicons independently of the language they are learning (suggesting a cognitive advantage for the learning of nouns; see Gentner and Boroditsky, 2001) or whether the proportion of nouns depends on features of the language being learned; for instance, argument drop and agreement marking on the verb might give verbs more prominence (see Choi and Gopnik, 1995). There are also some reports of individual differences in other languages; for instance, in Japanese. The proportion of nouns may also affect how children move into producing longer utterances, with those who have a relatively larger vocabulary of nouns using a more combinatorial strategy, whereas those with relatively more frozen phrases start by producing multiword 'slot-and-frame' patterns (Nelson, 1973; Lieven *et al.*, 1997).

Use of the prosodic or phrasal strategy can result in the child developing prosodic 'placeholders' for particular morphemes of the language (e.g., the determiner slot in English, verbal suffixes in Turkish, or noun class prefixes in Sesotho). Children then start to break down these long prosodic strings and to work out their internal structure (Peters and Menn, 1993; Veneziano and Sinclair, 2000). The combinatorial strategy involves putting words together on the basis of pragmatic, cognitive, or primitive syntactic strategies (Bloom *et al.*, 1975). These strategies may work better for some languages, or some systems in a particular language, than they do for others.

Where verb arguments are relatively unambiguously indicated either by word order or case inflections, children start learning this early, at least for particular verbs. However, there are many languages in which argument marking is mixed or opaque. There are reports of children varying in their relative dependence on case marking or word order in learning Finnish, Japanese, Korean, Serbo-Croatian, and Hungarian. In addition, studies report differences in the degree to which children depend on adult word order (Polish, German, French, Samoan, Korean) and of variability in case marking (Georgian, Japanese, Polish, Italian).

Children (and adults) also vary greatly in the extent of their productivity. This variation can be identified in the overgeneralizations that they make. Some individuals may depend more on item-specific learning, whereas others are more willing to generalize to novel words or constructions (Indefrey, 2002).

Variation in Sentential Operations and Later Syntactic Development

Children can differ in their early placement of the negation marker in English, with some placing it incorrectly in sentence-initial position (*No fit in the box*), whereas others place it correctly from the outset (Slobin, 1985). Maratsos and Kuczaj (cited in Lieven, 1997) also reported that, at a later stage, English-speaking children differ in whether they place the negation marker correctly after the first auxiliary (as in *The boy should not have been eating Jello)* or incorrectly before the main verb (as in *She could have been not sleeping* for *She could not have been sleeping*).

There is considerable variation among children learning English in the degree to which they make uninversion errors in interrogatives (*What I can do?*; Rowland *et al.*, in press). This variation is also reported for inversion after *wo* ('where') in German. There are also reports for other languages that children differ in the scope that they assign to interrogative particles (Hungarian, Kaluli) and in the correct placement of the interrogative marker (for instance, in Hebrew).

In many different languages, some children seem to initially combine clauses using simple juxtaposition; others may use just one unambiguous conjunction, while still others produce the coordinating or subordinating conjunctions (if) required by their language from the outset. These types of variation within and across languages should be an important contribution to the attempt to explain overall patterns of clause combining by appeals to either syntactic or cognitive complexity.

Finally little attention has been paid to individual differences in pragmatic development (for some observations, see Ninio and Snow, 1996; for the effects of friendship group, see Kyratzis *et al.*, 2001) with the exception of gender differences, which are relatively well documented, especially as children grow older (cf. Slobin *et al.*, 1996, Kyratzis and Guo, 2001).

Causes of Variation

Effects of the Input

One major cause of variation among children is the particular input they hear from those around them. However, relationships between characteristics of the input and language development are complex. At a general level, there are relationships between the amount of talking to children and the rate of language learning (Hart and Risley, 1995). In the early stages, there are also relationships between the rate of language development and the ways in which adults use their language: More ostensive speech (e.g., naming objects while looking at a book) and directives related to the child's ongoing behavior (e.g., telling the child, "Put the train over here," while the child is playing with a train) assist learning, whereas attentional directives (saying to the child, "Look at that train," while the child is occupied with something else) seem to be negatively related (Akhtar *et al.*, 1991; Pine, 1992, 1994; Masur *et al.*, 2004).

There are also suggestions of a relationship between the type of input and stylistic differences. Children who exhibit a highly phrasal strategy may be receiving a less 'parsable' input. Thus, Pine (1995) showed that second-born children were significantly more likely to show this strategy than their first-born siblings. Wong Fillmore (1979) reported that this highly phrasal strategy characterized some child L2 learners immersed in a school situation. Brice Heath (1983) reported its use by children in her 'Trackton' group, a working-class African-American group who did not seem to be addressed with the child-directed speech (CDS) typical of more middle-class environments. Finally, Bates *et al.* (1998) reported that her daughter Julia, who had been a classic 'combinatorial' child in her L1 learning, was much more phrasal when learning her L2, Italian, in more group-based situations.

There are also many reports of relationships between the frequency of forms in the input and the order of acquisition of these forms: for instance, the acquisition of English morphemes, verbs, auxiliaries, verb argument structure, and correctly inverted wh-questions. However, the issues are quite complex for several reasons. First, frequency in the input does not guarantee that a child will produce a form: cognitive complexity, saliency, and pragmatic usefulness to the child will also be important. Second, it is one thing for a child to learn a form from the input, but a critical question is how this is related to a more abstract representation of the linguistic system. Over this question there is much debate (see articles by Pine, Richards, and Lieven in Galloway and Richards, 1994, and Tomasello, 2000). An important issue is not just the absolute frequency of particular forms but the type and token relationships between forms and categories (Theakston *et al.*, 2005).

Effects of input are important throughout the language learning process. Huttenlocher *et al.* (2002) showed that children's comprehension of complex syntax was significantly related to the relative frequency with which parents used complex syntax in their speech. The same measure in the speech of their nursery-school teachers was related to children's growth in comprehension over the school year, whereas socioeconomic status was not.

Child-Determined Causes of Variation

The question of whether genetic differences among children could cause differences in language development and, if so, whether this is an effect specific to language or one caused by non-linguistic differences – for instance, by differences in one or more general cognitive abilities – is of considerable complexity and interest. To date, results suggest that there are both genetic and environmental causes of early differences and that, at age 2;0, some of these causes may be specifically related to language skills (Plomin and Dale, 2000). However, there is evidence that genetic

influences on vocabulary and grammar correlate highly at 2;0 and at 3;0 (Dionne *et al.*, 2003) and that, at least by age 4;0, genetic differences in language overlap substantially with genetic influences on individual differences in other cognitive abilities (Colledge *et al.*, 2002).

There seem to be clear differences among children in their willingness to generalize and overgeneralize: Thus, Abe was not only the 'master' of past tense overgeneralization (Maratsos, 2000) but he also produced relatively large numbers of feminine non-nominative subject pronouns (*her*) with agreeing verbs (e.g., *her has a tummy ache*; Pine *et al.*, 2005). This difference in children's willingness to 'linguistically risk take' is quite well documented, and such a willingness to take linguistic risks may characterize children who learn the language very quickly. It has been suggested that linguistic risk taking may be related to a more general 'risk-taking' strategy on the part of some children, but this has not been well researched.

Gender differences in the rate of language development are well documented, certainly for the later stages and, in many studies, for early acquisition as well (Fenson *et al.*, 1994). Boys are also over-represented in groups of late talkers, those with specific language impairment, and stutterers.

Finally there have been a number of suggestions in the literature that varying language acquisition strategies could arise from neuropsychological differences in the brain. For instance in those who are left lateralized for language, the right hemisphere (RH) is more concerned with musical representations, whereas the left, as is well established, subsumes language. There are theories that suggest initial language learning occurs in the RH, which is then taken over by the left hemisphere, and that differences among children reflect the extent to which they continue to use the RH to analyze language. Very much more basic neuropsychological work needs to be done before it would be possible to test these hypotheses successfully (for an outline, see Shore, 1995).

Conclusions

All theories of language development need to be able to account for the range of variation that children show. The pervasive effects of the input, including different types of frequency, must be incorporated; these effects make it difficult to sustain explanations that depend simply on the child hearing small numbers of examples of each structure. Dismissing variation among children as 'noise' involves throwing out of consideration crucial data for developing a psychologically realistic account of the process by which children the world over learn language.

See also: Cross-Linguistic Comparative Approaches to Language Acquisition; Infancy: Phonological Development; Language Development: Overview; Language in the Nondominant Hemisphere; Lexical Conceptual Structure; Specific Language Impairment.

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Variation in French

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Introduction

The study of variation occupied a central place in the early development of French linguistics. For instance, the pioneering work of Jules Gilliéron for the *Atlas linguistique de France* at the turn of the 20th century has had a major impact on dialectology. Similarly, the work of Louis Gauchat on the social variation observed in a small Swiss village at the beginning of the 20th century may well be the earliest study of variation within a single speech community.

While geographical variation continues to play an important role in distinguishing speakers from different parts of the French-speaking world or even from different regions, this article will focus on social variation. However, the geographic dimension will be evoked through the comparison of variation studies in different communities. Rather than attempt to superficially describe a large number of variables, this article will examine a few variables that have been investigated in numerous speech communities and

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will discuss their significance for a better understanding of the links between language use and social structure.

Social Variation

Many linguists consider that variation within a single community must be a reflection of contact with neighboring communities, incomplete acquisition of a certain dialect, or some other irregularity that disrupts the homogeneity that is considered to be normal. Because most communities have regular contacts with their neighbors and include members who grew up elsewhere, dialect contact can be plausibly invoked as an explanation for many variable patterns. However, the early work of Gauchat (1905) establishes that linguistic homogeneity may very well never exist. Gauchat investigated the speech of the Swiss village of Charmey precisely because this isolated village could be expected to provide a prime example of an invariant and unified language. Based on his investigation of the speech of women and men of all ages and from the different sections of the village, Gauchat concluded that there was no such uniformity. Even after excluding some forms of variation that could be attributed to language or dialect contact, Gauchat identified five phonetic variables for which no such explanation was available. For instance, he noticed that there was a tendency among some speakers to monophthongize /aᵒ/ or, on the other hand, to diphthongize /e/. He also noted a tendency to pronounce /θ/ as [h]. For these variables, he reported that younger speakers used innovative variants more often than older speakers and that members of the middle generation used both older and innovative forms. He also noted a tendency for women to use the innovative pronunciations more often than men. Gauchat, who attributed the social distribution of these pronunciations to change in progress, saw his analysis largely confirmed by Hermann (1929), who revisited the same village years later and observed that many variables had progressed in the direction predicted by Gauchat. Very interestingly, though, Hermann also established that not all variation is a reflection of change in progress, because one variable, the aspiration of /θ/, had remained stable in the community. The contrast between this stable variable and the others provided an early illustration of an important generalization made by Labov (1990) concerning the linguistic behavior of women and men: in situations of change in progress, women tend to be ahead of men and use larger proportions of innovative variants, while in stable variation, women tend to use more prestigious forms than men.

Despite the pioneering work of Gauchat, we must note that variationist sociolinguistics has not had a very strong impact in France, Belgium, and Switzerland (Armstrong, 2001: 2; Bauvois, 2002: 9; Gadet, 2003). On the one hand, very few continental linguists have adopted the Labovian approach in their studies of phonetic or phonological variation. Bernard Laks' (1977, 1983) work on phonological variation in the speech of Parisian teenagers, Anne Lefebvre's (1991) investigation of phonological variation in the French of Lille, and Cécile Bauvois' (2002) study of phonological variation in the French of Mons in Belgium constitute noteworthy exceptions. On the other hand, there has been much resistance on the part of French linguists against the use of variationist methodology for the study of variables above the levels of phonology and morphophonology. Claire Blanche-Benveniste and the members of her *Groupe aixois de recherche en syntaxe*, as well as many colleagues in other parts of France, have argued that while they have no difficulty accepting the fact that pronouncing *table* with or without a final /l/ or *père* 'father' with an apical, a velar, or a uvular /ʁ/ does not change the linguistic meaning of the word, the same assumption does not hold for alternations such as the choice of the auxiliary in compound verbs, as in (1), or the choice of mood in subordinate clauses, as in (2).

(1a) Parce qu'on a parti nous-autres, le 29 avril
because one has left us others, the 29 April
'Because we left, us, on April 29' (Sankoff & Thibault 1977: 86)

(1b) On est parti à 11heures du matin
one is left at 11 o'clock of-the morning
'We left at 11 in the morning' (Sankoff & Thibault 1977: 86)

(2a) faudrait que j'en
would-be-necessary that I of-it
enlèverais
remove. CONDITIONAL
'I should remove some' (Auger 1990: 87)

(2b) faudrait que l' professeur
would-be-necessary that the teacher
sache ce
know.SUBJUNCTIVE that
que l' enfant a besoin
that the child has need
'the teacher should know what the child needs' (Auger 1990: 88)

The rest of this article will show that variationist sociolinguistics has found a much more fertile ground in French-speaking Canada and among American, British, and other foreign scholars who do research on French, as well as with French scholars living in North America.

Phonological Variation

While regional and social varieties of French are characterized by specific features that distinguish them from other varieties (e.g., palatalization in words like *quai* [tʃɛ] 'wharf' in Acadian French or vowel devoicing in words like *dépité* [depi̥te] 'greatly vexed' in Québec French), numerous variable phenomena are commonly found in many, if not all, communities. The investigation of such variables has revealed that, even though frequency of use and some details in the favoring factors vary across communities, many aspects of the variation are shared by all French speakers.

It is probably safe to say that /l/-deletion characterizes every variety of French. While its frequency varies across linguistic contexts and groups of speakers, it is difficult to imagine a French speaker who never deletes /l/ in third person subject pronouns in sentences such as (3)a. In addition, for many speakers, /l/-deletion can affect object pronouns and definite determiners, as shown in (3)b,c. Even though /l/ can also be deleted in other environments, such as in the words *plus* 'anymore' and *quelque* 'some' or in word-final consonant clusters in words like *table* 'table,' these contexts constitute variables of their own and are consequently studied separately from the grammatical words listed in (3). (Unless otherwise specified, the phonetic transcriptions provided for all examples correspond to colloquial Québec French.)

(3a) Il mange [ilmãʒ] ~ [imãʒ]
he eats
'He eats'

(3b) Je les vois [ʒlevwa] ~ [ʒevwa]
I them see
'I see them'

(3c) Tu vois la fenêtre [tˢyvwalafnɛ:t] ~ [tˢyvwaafnɛ:t]
you.sg see the.fem window
'You see the window'

All communities in which this variable has been investigated (e.g., Montréal, Sankoff and Cedergren, 1971; Tours, Ashby, 1984; Ottawa-Hull, Poplack and Walker 1986; Lorraine, Armstrong, 1996) share the following characteristics. First, /l/ deletion is not a purely phonological phenomenon. As shown by Sankoff and Cedergren (1971), in phonologically identical environments, /l/ deletion can affect pronouns and determiners, but never an /l/ that is part of a lexical word; cf. (4). Similarly, while /l/ deletion is possible in the weak subject pronoun *elle* 'she,' it is not allowed in the corresponding strong pronoun, as seen in (5). Second, deletion is most frequent in subject pronouns, less so in object pronouns, and least frequent in determiners. Among subject pronouns, *il(s)* favors deletion more than *elle(s)*, and impersonal *il* 'it' most favors deletion. Finally, deletion in subject pronouns is favored before consonants more than before vowels.

(4a) à la veille [alavɛj] ~ [a:vɛj]
to the verge
'on the verge'

(4b) à laver [alave]/*[aave]/*[ave]
to wash

(5) Elle, elle prie [ɛlapʁi]/*[ɛapʁi]/*[aapʁi]
she she prays
'SHE prays'

The fact that so many communities share the pattern of /l/ deletion just described can be attributed to the history of /l/ deletion in French. We know that /l/ deletion in *il(s)* before a consonant is attested at least since the 16th century and that it affected *elle(s)* only later, due to the fact that a word-final schwa used to protect the /l/ in that word. /l/ deletion in determiners and object pronouns appears to have started later, because this phenomenon is not mentioned in studies of colloquial European French and Oïl languages consulted by Bougaïeff and Cardinal (1980: 94).

While all communities investigated share the basic pattern described here, interesting differences distinguish individual communities. For instance, /l/ deletion is so frequent in *il(s)* in Canadian French that Poplack and Walker (1986: 182) posited that "these pronouns have been relexicalized as [i], and that any realizations of [l] in them are cases of reinsertion." In European French, on the other hand, the phonological pattern that favors /l/ absence before consonants more than before vowels makes a deletion analysis plausible (Ashby, 1984: 8). Another difference concerns the phonological context that favors deletion in object clitics and determiners. While this phenomenon is essentially intervocalic in Canadian French (Sankoff and Cedergren, 1971: 1110 and Poplack and Walker 1986: 175), Ashby (1984: 8) found that a preceding consonant favors deletion more than a preceding vowel in object clitics, a difference that is consistent with the idea that /l/ deletion in object clitics developed independently on the two sides of the Atlantic ocean. The age distribution of /l/ deletion also differs. In Canada, all age groups exhibit similar rates of /l/ deletion, which suggests that /l/ deletion in Montréal and Ottawa-Hull French is an example of stable variation. In France, however, Ashby (1984) reports that young speakers delete /l/ in subject and object clitics more often than older speakers, as can be seen in Table 1, and he has attributed this pattern to a change in progress.

Table 1 The effect of age on /l/ deletion in Tours French

Factor	*N*	*Relative frequency*	*Varbrul probability*
Subject clitics			
14–21 years	1506/1792	84%	.687
51–64 years	1322/1951	68%	.313
Object clitics			
14–21 years	30/103	29%	.676
51–64 years	17/187	9%	.324

Based on Tables 4 and 5 in Ashby, 1984.

Morphosyntactic Variation

While teachers spend considerable time trying to eliminate what they consider ungrammatical elements from the speech of their students, a quick examination of any corpus of spoken French reveals that, at best, their efforts manage to ensure that such condemned forms alternate with their standard equivalents in the speech of many speakers. For instance, in conditional clauses introduced by *si* 'if,' speakers frequently use the conditional mood instead of the prescribed imperfect tense, as illustrated in (6). Similarly, in subordinate clauses introduced by a main verb in the conditional, the prescribed subjunctive is often replaced by a concordant conditional verb, as we saw in (2). Another such alternation is that between *avoir* 'to have' and *être* 'to be' as auxiliaries with verbs that, according to French grammars, require the *être* auxiliary, as in (1).

(6a) C'est comme si j'dirais
it is as if I say.CONDITIONAL
'J'espère qu 'i a ben faite.'
I hope that he has well done'.
'It's as if I said 'I hope he did the right thing' (Lepage 1988: 112)

(6b) c'est comme si i venait fou ou
it is as if he came crazy or
ben euh tsé i avait peur
well uh you-know he had fear
'it's as if he became crazy or was afraid' (Lepage 1988: 112)

Other variable patterns that are common throughout the French-speaking world involve two elements that are considered grammatical in French. One example is the expression of future tense. French possesses an inflected future tense, as shown in (7)a, and a periphrastic construction consisting of the verb *aller* 'to go' followed by an infinitive verb, as illustrated in (7)b.

(7a) On se mariera pas.
one self will-marry not
'We won't get married'
(Poplack & Turpin 1999: 141)

(7b) quand tu vas te marier
when you.sg go yourself marry
'when you get married'
(Poplack & Turpin 1999: 141)

According to traditional grammars and many linguists, the inflected and the periphrastic forms both exist in French for the purpose of expressing different views of future events. The periphrastic form is often said to refer to events that will take place in the near future, that are certain to take place, or that result from current preparations, while the inflected future encodes events that are more distant or less certain. Jeanjean (1988) analyzed 450 tokens of both forms of the future in hexagonal French and proposed that a number of morphological criteria determine which future form is appropriate in any given occurrence. However, many variationists who have investigated the use of both verbal forms in corpora of natural speech have found that while some contexts require one or the other future, there are many contexts in which both the inflected and the periphrastic forms can be used without any change in meaning. This is shown in an example like (8) where both forms of the future refer to a choice that the speaker must make that does not involve different time frames or degrees of certainty.

(8) J'me pose la question. Si j'vas
I me ask the question. If I go
l'reprendre ou si j'le
him take-back or if I him
reprendrai pas.
will-take-back not
'I ask myself the question. Whether I will take him back or not.' (Deshaies and Laforge 1981: 28)

Poplack and Turpin (1999) investigated the variation between the two future tenses in the French of Ottawa-Hull, an urban area at the border of Ontario and Québec. Like previous studies of future expression in spoken Québec French (Deshaies and Laforge, 1981 and Emirkanian and Sankoff, 1985), Poplack and Turpin found that the periphrastic future is by far the form used most often to encode future events, with 73% of all tokens, compared to 20% of tokens in the inflected future and 7% for the present. Their study also revealed that while both futures can be used to express the same meaning, their distribution across contexts is quite unequal. Table 2 summarizes the results of their study. It shows that, contrary to what might be expected on the basis of the meaning differences commonly prescribed for the two future tenses, the choice between inflected and periphrastic future does not differ much with distal and proximal futures: both forms are slightly favored for verbs expressing events that will soon take place and slightly disfavored for expressing events predicted to take place in a more distant future. However, this result does not mean that

Table 2 Probabilistic analysis of future tense expression in Ottawa-Hull

	Inflected future	*Periphrastic future*
Total N for each variant	725	2627
Temporal distance		
Proximal	.52	.56
Distal	.48	.43
Type of adverbial specification		
Nonspecific	.85	.19
No adverbial	.47	.56
Specific	.37	.23
Contingency		
Contingent	.51	not significant
Assumed	.45	
Grammatical person		
Formal *vous*	.81	.22
Other	.49	.51
Negation		
Negative	.99	.01
Affirmative	.36	.65

Based on Table 3 from Poplack & Turpin 1999: 149.

this meaning difference has entirely disappeared from the French spoken in Ottawa-Hull; instead, the strong favoring effect of nonspecific adverbial complements such as *tôt ou tard* 'sooner or later' or *un jour* 'some day' for the inflected future and the concomitant disfavoring effect for the periphrastic future indicate that such an association still influences the choice of future tense. The most powerful factor influencing tense choice is whether the clause is affirmative or negative; a negative clause strongly favors the inflected future, while an affirmative clause strongly favors the periphrastic future, as is illustrated in (8). Finally, the more formal status of the inflected form can be seen in the fact that the formal pronoun of address *vous*, used to address a single person to whom we must show respect, is the only grammatical person that favors the inflected future.

While no quantitative studies of the future tenses in European French allow us to compare future tense usage on the two sides of the Atlantic ocean, a recent study of future expression in Acadian French by King and Nadasdi (2003) revealed that the two tenses have evolved quite differently in the two varieties of Canadian French. The inflected and periphrastic futures are used with almost equal frequencies in the three Acadian communities investigated by King & Nadasdi: 53% for the inflected future and 47% for the periphrastic future. It thus appears that the strong decline in use of the inflected future observed for Québec French cannot be considered to be a general characteristic of Canadian French. In addition, the results of the variable rule analysis presented in

Table 3 Periphrastic future usage in Acadian French

Factor	*Factor weight*	*%*	*N*
Temporal reference			
within hour	.689	78%	70/90
within day	.644	72%	36/50
within week	.678	71%	35/49
longer than week	.479	40%	176/442
continual	.135	11%	6/54
Certainty			
certain	.695	72%	178/246
uncertain	.387	33%	145/439
Presence of subordinate clause with *quand*			
no	.511	48%	321/669
yes	.132	13%	2/16

Based on Table 2 in King & Nadasdi 2003: 334.

Table 3 indicate that negation, which is the most powerful factor in favoring use of the inflected future in Québec French, plays no significant role in Acadian French. Similarly, type of adverbial specification, contingency, and grammatical person, which all play a significant role in Poplack and Turpin's study, do not significantly affect variant choice in Acadian French. Instead, temporal reference, which plays a relatively minor role in tense choice in Ottawa-Hull French, most significantly affects the choice between the two future tenses in Acadia: the periphrastic future is favored for events that will take place within the near future but its probability of use decreases with more distal and continual events such as *Ils fumeront jusqu'à leur mort* 'They will smoke until their death.' The fact that degree of certainty that an event will take place and presence of a subordinate clause introduced by *quand* also influence choice of tense suggests that the two future tenses retain the meanings described in many grammar books.

Variation and Change

One of the major contributions of variationist sociolinguistics has been the tools it has developed to examine the gradual progression of innovative linguistic forms in a speech community. The concept of apparent time, which attributes differences across generations to the fact that their speakers have acquired their linguistic competence at different times and assumes that their speech continues to reflect the linguistic system to which they were exposed and which served as input for their own grammar, has allowed sociolinguists to identify many instances of change in progress. Research in real time, that is, using corpora recorded at different times, has confirmed the validity of the apparent-time concept.

Research on variation in French has greatly contributed to improving our understanding of the progression of innovative forms.

Loss of Negative *ne*

Verbal negation in standard French is doubly marked: the verb is preceded by the particle *ne* and followed by a negative adverb (most often *pas* 'not,' but also *plus* 'anymore,' *jamais* 'never,' etc.) or quantifier (*rien* 'nothing,' *personne* 'nobody'), as can be seen in (9). However, in spontaneous speech the *ne* is often absent, as illustrated in (10).

(9a) Je ne connais pas la réponse
I NEG know not the answer
'I don't know the answer'

(9b) Vous n' avez vu personne
you.pl.NEG have seen nobody
'You haven't seen anyone'

(10a) Je Ø connais pas la réponse

(10b) Vous Ø avez vu personne

The first variationist analysis of *ne*, that of Ashby (1976), investigated *ne* deletion in the speech of 50 speakers from the Parisian upper-middle class. It revealed that *ne* is deleted almost as often as it is uttered, with a deletion rate of 44.1%, a rather shocking finding for speakers assumed to speak 'standard French.' Sankoff and Vincent's (1977) study of *ne* deletion in Montréal French, revealed an even lower rate of *ne* usage, because they found only 46 unequivocal cases of *ne* in a sample of 10 000 negative sentences, or a 99.5% deletion rate. This rate of omission for *ne* far exceeds the omission rates varying between 25% and 86% that had previously been reported for European French. If the French language is currently losing *ne* and moving toward a system of verbal negation that relies exclusively on a post-verbal negative element, Montréal appears to be ahead of other communities. However, Sankoff and Vincent do not think that *ne* has become a foreign element for Montrealers. Based on the fact that most instances of *ne* in their corpus are associated with discussions of formal topics, they propose that *ne* constitutes a syntactic resource available to all speakers that continues to play an important stylistic role; consequently, they do not predict that it will completely disappear from Montréal French.

Ashby (1981) investigated the possible loss of *ne* in the French city of Tours. Based on a sample of 35 speakers representing two age groups (14–21 years and 51–64 years) and three socioeconomic classes, Ashby found a deletion rate of 63%. Like Sankoff and Vincent, his sample contained no speakers who never deleted *ne*; however, contrary to their study, only one speaker categorically deleted *ne* (45 out of 60 categorically deleted *ne* in Sankoff and Vincent's study). Ashby also showed that *ne*-deletion is more frequent in informal style and thus carries a stylistic meaning similar to that uncovered by Sankoff and Vincent in Montréal.

Table 4 *ne* usage in Tours French in 1976 and 1995

Date	*Relative frequency of* ne *usage*	*Absolute frequency of* ne *usage*
1976	37%	1031/2818
1995	18%	346/1891

Based on Ashby (2001: 9).

Ashby's investigation of age, socioeconomic status, and gender reveals that not all speakers are equally likely to delete *ne*. Based on the fact that deletion is more frequent among young speakers and that the age difference is visible within each socio economic class and each gender, Ashby (1981: 683) concludes that "the relative distribution between the two age strata strongly suggests that the particle is being lost in contemporary spoken French" and that this is a probable case of change from below led by working-class women. Blanche-Benveniste and Jeanjean (1987) challenged Ashby's conclusion, pointing out that *ne* deletion was already attested during the 17th century and attributing the linguistic behavior of the two generations of speakers instead to the fact that young people use colloquial speech more easily than older persons, who tend to use their 'Sunday French.'

In response to the challenge posed by Blanche-Benveniste and Jeanjean, Ashby returned to Tours in 1995 and collected a new corpus (Ashby, 2001). In order to ensure that his new data were comparable to his early data, Ashby used the same interview methodology and recorded 25 speakers belonging to the same age ranges. He also sought speakers whose social profiles corresponded as closely as possible to those of his first subjects. As Table 4 shows, the overall rate of *ne* usage greatly decreased during the 19 years that separate Ashby's two corpora: 37% in 1976 vs. 18% in 1995. The social differences observed in the 1976 data are replicated in 1995, the only difference being that the maintenance rates are consistently lower in 1995 than in 1976, as we can see in Table 5. While older speakers continue to use *ne* more frequently than younger speakers, the fact that their rate of usage in 1995 is half of what it was in 1976 does not support Blanche-Benveniste and Jeanjean's hypothesis that the generational difference observed in Ashby's initial study must be attributed to age grading. Ashby's conclusion is further strengthened by a comparison of the speech of 11 speakers

Table 5 Social distribution of *ne* usage in Tours French in 1976 and 1995

	1976	*1995*
Socioeconomic status		
A	45%	26%
B	47%	17%
C	15%	9%
Gender		
Men	42%	20%
Women	30%	17%
Age		
51–64	52%	25%
14–22	19%	14%

Based on Tables 5, 6, and 7 in Ashby (2001).

who were interviewed both in 1976 and in 1995; these data show that, apart from two speakers who have experienced significant social mobility and increased their use of *ne*, all subjects have either retained similar rates of *ne* usage or decreased their usage.

Many studies have investigated *ne* deletion in various communities of French speakers and report patterns of linguistic and social conditioning similar to those uncovered by Ashby and Sankoff and Vincent (e.g., Coveney, 1996; Pooley, 1996). Additional evidence in favor of change in progress comes from Armstrong and Smith's (2002) study of real-time change in radio speech. Their analysis compares patterns of *ne* deletion in excerpts drawn from journalists, writers, and politicians who were recorded in 1960–61 and in 1997. Not surprisingly, *ne* is deleted in radio speech much less frequently than in corpora of sociolinguistic conversations. Interestingly, though, their data reveal that radio speech is also affected by the change that appears to be taking place in France. Indeed, while they recorded a rate of *ne* deletion of 7.4% in the 1960–61 corpus, this rate increased to 27.5% in the 1997 corpus, a difference that is very highly statistically significant.

Conclusion

Space constraints have forced us to focus on a few variables that illustrate both the intricate patterns of linguistic and social conditioning that govern variation in specific communities and across communities and the similarities and differences that characterize the different speech communities. However, interested readers should be aware that many more variables have been investigated (e.g., schwa deletion, liaison, first person plural subject pronouns, pronouns used for indefinite reference, strong plural pronouns, subject doubling, auxiliary, discourse markers, etc.). We would like to now point to other research programs in which scholars studying French have played central roles.

Most of the studies reviewed in this article have focused on urban communities in which French is the language spoken by the majority of the population. Many francophone communities in North America are located in rural areas and/or in regions in which English is the language of a majority of speakers. Obviously, such communities must be approached differently. For instance, in many rural communities, socio economic class is too uniform across speakers to be expected to influence the linguistic choices of speakers. In communities of this type, social networks and attitudes toward one's community often play a central role, as shown, for instance, in the work of Louise Beaulieu on Acadian French. In minority communities, the amount of French used by native speakers varies greatly, another factor that we can expect to influence their linguistic production. Raymond Mougeon and his colleagues, who have investigated the French used by teenage native speakers in five different towns in Ontario, have confirmed that, for many variables, degree of restriction of language use closely correlates with the language patterns of different speakers. Their analyses show, for instance, that some variants typical of colloquial speech are underused by teenagers who make very limited use of French outside of school, while other variants, absent or rare in the speech of speakers who regularly use French but frequent in the speech of restricted speakers, reflect a less than perfect mastery of their mother tongue.

Another area in which research on French has made a great contribution is second-language acquisition. In recent years, many scholars have turned their attention to the acquisition of variable patterns. After years of studying patterns of variation in native speakers of French in Montréal, Gillian Sankoff and Pierrette Thibault have shifted their attention to the study of bilingual English speakers from the same city to determine whether these speakers share the same patterns as native speakers. Other researchers (e.g., Raymond Mougeon working on French-immersion students in Ontario, Vera Regan focusing on Irish learners of French, and Kelly Sax looking at American students from a Midwest university) have shown that while learners acquire some aspects of the variable patterns characteristic of native speakers, experience living among them better helps learners master the intricate patterns of linguistic and social conditioning better than extended classroom learning.

In the chapter "Is there a French theory of variation?" Gadet (2003: 35) concludes: "Those linguists who do not see themselves specifically as variationists are in fact the ones who have most furthered the study

of variation." This article challenges that position. While it is true that few French linguists have adopted the variationist framework in their study of variation, the detailed investigations of an international team of researchers have greatly contributed to advancing our knowledge of the variable patterns that characterize the French language in many of its communities.

See also: Age: Apparent Time and Real Time; Gender; Gender, Grammatical; Interlanguage; Language Change and Cultural Change; Spatial Variation (Geolinguistics).

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Variation in German

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An examination of German immediately reveals unusual geographical and social variation in the language. Varieties labeled as *deutsch*/German are often not mutually intelligible, as witnessed by the use of subtitles in Swiss-German films shown to audiences in Germany. German-speakers regularly report comprehension difficulties when visiting German-speaking areas distant from their homes. There is a good case for seeing German as the most variable language in Europe.

German in Geopolitical Context

German includes most of the Continental West Germanic dialect continuum that, before the Germans lost territory in the 20th century, stretched from Dunkirk in France to beyond Vienna and beyond Königsberg/Kaliningrad in East Prussia (now in the enclave of Russia between Poland and Lithuania). Beyond that continuum are, or were, enclaves of German speech in most Central and Eastern European countries and in the former Soviet Union, as far away as Kazakhstan and Siberia. By 'dialect continuum,' I mean a language area where basilectal dialect speech changes slightly from place to place over a wide area, with perhaps noticeable differences even from one village to the next, with poor comprehensibility between the speech of places fifty to a hundred kilometers apart, and with possibly no comprehensibility between the varieties at the ends of the continuum. Such continua may include several languages, for example, Western Romance (including French, Catalan [Catalan-Valencian-Balear], Castilian Spanish [Spanish], Italian, Portuguese, Occitan [Auvergnat, Gascon, Languedocien, Limousin], and others) or South Slavonic (including Slovene [Slovenian], Croatian [Serbo-Croatian], Serbian [Serbo-Croatian], Macedonian, and Bulgarian).

Although comparable in size and in variability to the Western Romance and South Slavonic continua, the Continental West Germanic continuum is unusual because in the minds of most speakers of the relevant dialects, it includes only two languages, German and Dutch. One of these, German, occupies the overwhelmingly greater part of the territory in question and exhibits virtually the full range of variability found in the continuum. Other large continua in modern times have been divided into a greater number of distinct languages as the people in question have become divided into religious, regional, cultural, and ethnic groups, in other words, nations. Occupying different parts of the continuum's territory, such groups then developed the concept of distinct languages, linked to distinct processes of standardization. One only need think of Western Romance divided into the clearly distinct French, Spanish, Italian, and Portuguese (and others).

Some speakers of different languages within continua may be quite unaware of their continuum's existence, but speakers of German often see the Continental West Germanic continuum clearly, even seeing its division into Dutch and German as anomalous. It is not uncommon to find speakers of German who regard Dutch as a German dialect. An outside observer well versed in the Continental West Germanic linguistic situation will not see the separation of Dutch as a distinct language as anomalous. For this observer, the contentious questions lie elsewhere: (1) in the development and persistence of the idea of a single language within the greater part of the large and linguistically diverse Continental West Germanic continuum; (2) in the development of the idea of a single nation, Germany, in such a large, diverse geographical area and in such a diverse population; (3) in the slow, incomplete, and fraught separation between Germany and Austria, with its parallel linguistic separation falling far short of a division into different languages; (4) in the development of a kind of linguistic independence in German-speaking Switzerland that is mainly found in spoken language; (5) in the development of a distinct but closely related language in Luxembourg that plays a role (along with French) in national identity; with German, fulfills important utilitarian functions in Luxembourg; (6) in the strong persistence of regional and local dialect in the entire German-speaking area, particularly in the Centre and South; (7) in the strong significance, despite its diversity, of the language for German national identity, but also for Austrian national identity; and (8) in the occurrence of a small number of West Germanic Frisian dialects in the northwest, spoken by bilinguals who also use either Dutch or German – the Frisian dialects not being part of the continuum.

The main points of interest in the part of the Continental West Germanic continuum known as German are (1) the scope of dialectal diversity; (2) the relationship between the standard language and other varieties; and (3) the variation within the standard language. Fuller discussion of the tension between the diversity of German and its role in national and ethnic identity and the complex relationships between German and other languages can be found elsewhere, for example in Clyne (1995),

Barbour and Stevenson (1990: 23–54), Barbour and Stevenson (1998: 25–59), and Barbour (2000a).

Dialekt, Colloquial, and Standard Varieties

When discussing dialectal diversity in German, it is important to understand that 'dialect/*Dialekt*' in works on German sociolinguistics usually means basilectal dialect, in other words, the regional dialect that is maximally distinct from the standard language. This contrasts with the usage of 'dialect' in English to indicate any form of a language that differs appreciably in grammar or lexicon from other forms of the language. 'Dialect' in this sense in English may or may not include the standard language. For the sake of clarity, in this article 'dialect/*Dialekt*' in the German sense will be referred to as 'traditional dialect.' Where such traditional dialects as recorded in the early 20th century, or before, have now been radically modified or replaced, German works may describe the area in question as 'free of dialect.' This could suggest to a non-German reader a place where everyone speaks the standard language, which is virtually never the case. In such areas, and elsewhere, a great deal of speech lies between the standard language and the traditional dialect; in German it is labeled *Umgangssprache*, which I term 'colloquial speech.' Such colloquial speech includes varieties that, in English would be termed 'dialect,' at one end of the scale, or 'informal or colloquial standard language,' at the other. For the sake of clarity, I divide colloquial speech into 'colloquial standard language' and 'colloquial nonstandard language'; the latter generally corresponds to 'dialect' in works written in English. [This terminology is outlined in full in Barbour and Stevenson 1990: 133–146; also see Barbour 1999).] In German sociolinguistics there has been relative neglect of colloquial language, exceptions being the work of Jürgen Eichhoff (1977, 1978) and of some East German scholars such as Helmut Schönfeld (see Barbour 2000b); this neglect extends to registers that I am labeling 'colloquial standard language.' Work on German 'standard language' (*Standardsprache* or *Hochsprache*) tends to refer chiefly to the rather more formal registers, which I discuss here as 'formal standard language.'

This article will compare traditional German dialects with the formal standard language, following the common assumption that other forms of the language represent compromises between these two ends of the spectrum of variation. Since this assumption is very crude and incorrect in many matters of detail, more detail on other varieties (and hence, corrections), will be provided as necessary.

Our discussion will start with phonetics and phonology (sounds), moving on to the morphology of the noun phrase and of the verb phrase. Except where otherwise stated, further detail about all of the phenomena discussed can be found in Barbour and Stevenson (1990: 55–99, 133–180); Barbour and Stevenson (1998: 60–107, 145–198); and Russ (1989).

German Dialect Continuum

Descriptions of German dialects almost always divide the dialects into three geographical groups: Low German/*Niederdeutsch*, Central German/*Mitteldeutsch*, and Upper German/*Oberdeutsch*. Central German and Upper German may be grouped together as High German/*Hochdeutsch*, these last two terms being ambiguous since they are also used to refer to the standard language.

The Low German dialect area lies north of a line crossing the Rhine at Benrath just south of Düsseldorf (the Benrath line) and running in a roughly east-west direction across the entire German-speaking territory, passing to the south of Berlin, and crossing the river Oder south of Frankfurt an der Oder on the Polish border. Insofar as dialect, in the German sense, can be found there at all, Berlin can be seen as an island (or perhaps peninsula) of Central German speech in Low German territory. Some German accounts include Dutch in the Low German dialect area but, although Dutch and Low German are linguistically close, sociolinguistically it is untenable that Dutch is a Low German dialect. The Low German dialects are arguably the group of German dialects that differ most markedly from the standard language. This is not surprising since the standard language historically derives chiefly from central and southern dialects. The Low German/*Niederdeutsch* dialect area is characterized by the relative weakness of the traditional dialects, popularly labeled *Plattdeutsch*; indeed, it is perhaps fair to say that the region is seen by other German speakers as a bastion of the standard language.

Serious scholarship presents a much modified view; according to Stellmacher (1997), the rural parts of the region may have levels of usage of traditional dialect as high as some parts of the Centre and South. What is true is that most urban speech in North Germany is very clearly not traditional dialect, whereas in southern areas even quite large towns may contain many speakers whose usage is close to the traditional dialect; to northerners, southern urban speakers sound like dialect speakers, whereas to southerners, northern urban speakers sound like standard speakers. However, northern urban speech is very frequently not standard in the sense that this is understood in Germany; in other words, it is generally not formal standard language.

South of Low German, Central German dialects are divided from Upper German dialects by a line

that crosses the Rhine south of Mainz, then runs northeastwards, to the south of Frankfurt am Main and to the north of Würzburg and Bamberg, running then roughly eastwards to the border with the Czech Republic. The Germanic speech of Luxembourg, formerly described as a Central German dialect/*Mitteldeutscher Dialekt* in texts produced in Germany, is considered by its speakers to represent a distinct language, *Lëtzebuergesch*/Luxembourgish (Luxembourgeois). This is sociolinguistically well justified, as Luxembourgish is used by all sections of indigenous society and has a standardized written form (for the linguistic situation in Luxembourg, see Newton 1989: 145–149).

The Germanic speech of Alsace-Lorraine in France is almost universally regarded in Germany as German dialects – the northern ones Central German, with Upper German to the south – but a common view in France (both official and popular) is that these represent a distinct Germanic language called Alsatian/*alsacien*. Sociolinguistically the situation is complex; in support of dialect status, there is no accepted single standard form of Alsatian, but then again, in support of independent status, speakers of Alsatian often do not know standard German.

In the Central German and Upper German dialect areas, the social status of dialects and other nonstandard speech becomes generally higher the farther south we travel, although throughout the territory, traditional dialects are stronger in rural than in urban areas. The strength of traditional dialects is particularly notable in German-speaking Switzerland, where these are used by all sections of society. The link between language varieties and social status is much less clear in German-speaking than in English-speaking countries. Nevertheless, the link between grammatically nonstandard forms and low socioeconomic status is fairly clear in North and Central Germany.

Phonetic and Phonological Variation

In our discussion of German pronunciation (phonetics and phonology), orthography will be used, rather than phonemic transcription, since German orthography is a reasonably good guide to pronunciation. In phonetics and phonology, the most striking difference within German is between Low German, on the one hand, and the standard language and Central and Upper German dialects, on the other. Across the entirety of the basic lexicon of the language we find plosives in Low German corresponding to fricatives or affricates (or sequences of plosive plus fricative) in the other varieties. For example, corresponding to standard German *Pfund* (pound), *Apfel* (apple), *hoffen* (hope [verb]), *zwei* (two), *Katze* (cat), *das* (the/that), *Buch* (book), (orthographic *z* and *tz* correspond to the sequence /ts/; orthographic *ch* corresponds to the velar fricative /x/ or the palatal fricative /ç/), we find Low German forms such as *Pund, Appel, hopen, twee, Kat, dat, Book*. (There is no standard orthography for Low German; forms given here are merely a guide to typical pronunciations.) The distinct Low German forms seem to be conceptualized not just as differing in pronunciation from the standard forms, but as different lexical items, in other words, as dialect vocabulary; these are not found regularly in the colloquial speech of North Germany.

This difference between Low German and standard German arises from the operation of the second or High German sound shift in the Old High German dialects (from which standard German is mainly derived) towards the end of the first millennium A.D. The difference, which can be a severe impediment to comprehension, is of the kind frequently found between distinct but related languages; one might think of the contrast between words such as *cent* and *chateau* in French, with initial /s/ and /ʃ/ respectively, and *cento* and *castello* in Italian, with /tʃ/ and /k/ respectively. Partly because of the low comprehensibility between standard German and Low German, it is often thought of as a distinct language and, up until the 17th century [before modern standard (High) German came to be accepted as the prestige variety in the territory], a distinct process of standardization was under way for Low German. Low German is today recognized as a regional minority language, not simply as dialects of German (see Stellmacher, 1997).

The most common difference in consonants between Central and Upper German dialects, on the one hand, and the standard language, on the other, can be discussed under the heading of 'lenition.' In the dialects in question, voiceless plosives can be seen as having been 'softened' to make them approach voiced plosives in sound (though it is not at all clear, historically, that anything quite like this happened), with the two series even becoming identical. The resultant sounds are generally lenis, i.e., soft, like the voiced plosives of standard German (and of standard English) but without vocal chord vibration, in this resembling the voiceless plosives of standard German (and of standard English). These resultant sounds are spelled, in popularly impressionistic dialect orthography, with the symbols normally used for voiced plosives, i.e., *b, d*, and *g*. In some dialects, for example in much of East Central German, the distinction between voiced and voiceless plosives is largely absent, so that a word pair *Karten/Garten* may be homophones. In other dialects the distinction may be present, but the voiced and voiceless sounds may have a distribution different from that in the standard language; in some dialects the voiceless sounds are

found more commonly in words of relatively recent foreign origin, with the voiced (or lenis voiceless) sounds elsewhere – for example, in Alemannic dialects for standard German *dir* (you, familiar, singular), *Tier* (animal), and *Theater* (with an initial *t* sound) (theatre), we may find *dir*, and *Dier,* but *Theater* (again with an initial *t* sound). Lenition is found in most of Central German – apart from some western and central northern areas – and in the northern part of Upper German. As well as being a feature of traditional dialect, lenition phenomena are usually also found (at least to some degree) in colloquial speech in the regions in question.

Except where lenition phenomena occur, Central and Upper German dialects are generally somewhat closer to the standard language in consonant phonology than are Low German dialects. However, in particular phonetic environments or in certain individual words, forms resembling the Low German forms are found in Central German dialects. For example, in much of western Central German, *dat* (that, the) and *wat* (what) correspond to the standard German (and Upper German) *das* and *was*. Throughout Central German, *p* corresponds to standard German *pf* both medially and finally in words, so *Appel* is found where standard German (and Upper German) have forms like *Apfel*. West Central German, also has *p,* which corresponds to the initial *pf* in standard German words, for example, having *Pund* for the standard German *Pfund*. Interestingly enough, forms like *dat, wat, Appel,* and *Pund* are found in Central German colloquial nonstandard speech as well as in traditional dialect.

We noted above the many instances where Low German dialects have plosives, whereas Central and Upper German dialects and the standard language have fricatives or affricates. However, in the case of the velar obstruents in a word's initial position, most forms of German have only plosives, with Low German *Kat* and standard German *Katze* agreeing in initial consonant. In contrast, southern Upper German dialects have affricates or fricatives in the initial position of such words: for example, a common Swiss equivalent of *Katze* is *Chatz*, where orthographic *Ch-* represents a velar affricate /kx/. It is difficult to say if this Upper German feature is found in colloquial speech, since this region's everyday language already uses overwhelmingly traditional dialect anyway, or varieties very close to this.

A further feature widespread in Central and Upper German dialects is an absence of the front rounded vowels, corresponding to orthographic <ü> and <ö>, found in standard German and in Low German; front unrounded vowels are found instead. The following pairs of distinct words in standard German could in the relevant varieties be homophones: (1) *vier* (four) and *für* (for) and *Sehne* (tendon) and *Söhne* (sons). (In reality, the situation is usually more complex than this; the examples are intended only as a guide to what can happen.) The absence of front rounded vowels is a feature of both traditional dialect and colloquial nonstandard language.

Varieties of German have many other differences in vowel sounds. One important one clearly separates dialect, on the one hand, from standard and colloquial speech, on the other. Most Low German dialects, but also many others, particularly in the Southwest (including Switzerland) have monophthongs /i:/ and /u:/ where the standard language, and other varieties, have diphthongs. Examples are southwestern *Ziet* and *Hus* for standard *Zeit* and *Haus*.

In some West Central German dialects, and in Luxembourgish, contrasts between words are effected not only by differences between vowels and consonants, but also by tonal differences, a phenomenon common in the languages of the world, but rare in Europe, where the best-known examples are found in Norwegian and Swedish. Though neither widespread nor well known to German-speakers as a whole, this feature underlines the extraordinary diversity of German dialects. (For discussion of tonal contrasts see Newton, 1989: 153–156, where he terms the phenomenon 'correption.')

Syntactic and Semantic Variation

Traditional German dialects also clearly differ from standard German in grammatical structure, most notably in the noun phrase and the verb phrase. For example, where standard German has four morphologically distinct cases in the noun phrase, Low German has only two, which we may term nominative and oblique. In all continental West Germanic speech, apart from formal standard German, morphologically distinct genitive cases are now rare; however, Losses of other case distinctions are quite highly stigmatized and uncommon in colloquial language.

Differences between varieties of German in the noun phrase represent quite striking typological differences between more and less highly inflected types of language, differences that elsewhere might be associated with the distinction between one language and another.

In the verb phrase, distinctions found in the formal standard language may be absent in other varieties or may be conveyed in different ways. Most notably, a semantic distinction between the two past tenses, perfect and preterite, the latter also known as simple past or imperfect, is probably now in doubt in almost all varieties of German in most contexts; for example, *ich sah ihn* (preterite) and *ich habe ihn gesehen*

(perfect) (both translating as either 'I saw him' or 'I have seen him') are generally entirely synonymous, but with the former being stylistically marked as more formal. In North and Central German speech, in both Low German and Central German dialects, and in colloquial language, preterite forms are found, but the only common ones are those of modal and other auxiliary verbs and a few others, for example: *war, hatte, musste, mochte, sollte, wollte, konnte, durfte, wurde, sagte, meinte*. In the regions in question, and for these particular verbs, those may actually be the most common past tense forms; for almost all other verbs, perfect forms are much more common, with preterite forms generally being formal or highly formal in register. Given that the preterite and perfect forms are generally synonymous, these labels are misleading; it would make more sense to talk, for example, about simple and periphrastic past forms. I continue, however, to use the terms preterite and perfect, since they are so well established.

In the South German speech of Germany, Switzerland, and Austria, particularly in Upper German dialects, preterite forms of any verbs are entirely absent, being replaced by perfect forms. As preterites are not found in everyday speech in these regions, they are regarded as highly formal, and children have to be taught these in school.

The presence in some varieties of German of a tense/aspect distinction, which is absent in others, again represents the kind of radical differences that elsewhere could correlate with the distinction between one language and another.

Dialects and colloquial speech also differ from formal standard language in the occurrence of subjunctive forms. The formal standard language has two sets of subjunctive forms, first and second subjunctive. Each of these has two tenses, which I will term as 'nonpast' and 'past.' For example, from the verbs *kaufen* (buy) and *fahren* (travel) first subjunctive nonpast forms are *er kaufe* and *er fahre* (contrasting with indicative or 'normal' forms of these verbs, *er kauft, er fährt*), and 'past' forms are *er habe gekauft* and *er sei gefahren* (contrasting with indicative forms of these verbs, *er hat gekauft, er ist gefahren*). These first subjunctive forms are usually termed 'present subjunctive' and 'perfect subjunctive,' respectively.

Second subjunctive forms of these verbs are (1) *er kaufte* and *er führe* (nonpast) and (2) *er hätte gekauft* and *er wäre gefahren* (past). These second subjunctive forms are usually termed 'imperfect subjunctive' and 'pluperfect subjunctive,' respectively, but such terms are highly misleading because they are not imperfect or pluperfect in tense/aspect reference.

In the formal standard language, first subjunctives are used in reported speech, particularly when speakers or, much more frequently, writers wish to distance themselves from the information – in other words, to indicate that the information may not necessarily be true (without calling the user of the original words a liar); the first subjunctive is hence very popular with journalists. The first subjunctive is clearly formal, and it is not used in colloquial speech or in dialect, being replaced by the indicative, or by the second subjunctive where the distancing effect is clearly desired.

Many second subjunctive forms are also formal, indeed, highly formal or rare or archaic. In the case of nonpast forms like *kaufte*, they are avoided because they are identical to indicatives of the same verbs. In fact, the only common subjunctive forms in German are past tenses like *er hätte gekauft* and *er wäre gefahren* and the nonpast forms of modal and other auxiliary verbs: *wäre, hätte, müsste, möchte, sollte, wollte, könnte, dürfte, würde* – with dialect and colloquial nonstandard *söllte* and *wöllte* often replacing *sollte* and *wollte*. Nonpast subjunctives of other verbs are formed on the following pattern: *würde kaufen, würde fahren*. These common subjunctive forms are indeed very common, being used to express hypotheses and, along with modal particles and particular lexical items, are the main way to express all types of modality such as supposition, doubt, and volition; the other major function is in conveying politeness. The use of subjunctives is a characteristic of all types of German, but the range of forms is a major indicator of the dividing line between the formal standard and other varieties.

This difference in the range of forms is again of quite a radical kind, which elsewhere would be associated with differences between languages.

Causes of Variation

In discussing the variation in German, it is tempting to assume that colloquial language represents simply a kind of compromise between the standard language and traditional dialects and, hence, that description of the dialects can form the basis of a full account of variation. However, it is clear from the above account that such an assumption would lead to considerable oversimplification (see Barbour and Stevenson 1998: 156–157, 1990: 146–147). There is strong evidence of cases where developments in the colloquial language are independent of phenomena in traditional dialect; for example the uvular 'r' sound [R], originally not considered part of formal standard, is now gaining ground everywhere in Germany and Austria, even in regions where it is not found in traditional dialect. A loss of the distinction between /ç/ and /ʃ/, as found at the ends of the standard German words *ich*

and *Fisch*, is spreading in Central German colloquial speech, even in areas where the distinction is maintained in traditional dialect.

The idea of straightforward contact or interference phenomena used to be popular in discussions of varieties that arise from language contact. Such a variety, guest worker German (*Gastarbeiterdeutsch*), the German of immigrant workers and their families, was found in fact not to result in any simple way from contact between German and the immigrant workers' first language (see Barbour and Stevenson 1998: 211–223, 1990: 192–203). *Gastarbeiterdeutsch* is characterized (1) by lack of verbal inflections, with forms like infinitives being used throughout, while the languages in contact generally have verbal inflections; (2) by verbal-final word order, found only in Turkish (and to a limited extent in German itself) among the contact languages; and (3) by absence of gender distinctions, this being only a characteristic of Turkish. It must be stressed that these phenomena are found in the German of speakers of all of the contact languages, including those who have no contact with Turkish speakers. Among second and third generation immigrants, guest worker German is now of very limited importance. Their speech is characterized by code switching between German and another language, a phenomenon that goes beyond our topic of variation in German.

Lexical Variation

The differences within German discussed so far tend to separate the formal standard language from other varieties, while also having important regional dimensions. When considering lexical differences, the regional dimension is all-important. In lexical differences, however, the pattern is extremely complex, and a full discussion would far exceed the limits of this article; I shall therefore make only a few salient points. (For further information see Eichhoff (1987, 1988); and König 1978). As in other facets of the language, German is surprisingly diverse; there are differences between lexical items of related meaning that in other language groups may be cognate across a number of different languages. For example, different varieties of German have different names for days of the week, which, in contrast, are clearly cognate across the entire Western Romance group of languages. *Erchtag* (Bavarian-Austrian dialects), *Ziestag* (some other southern dialects, including Swiss dialects), and *Dienstag* (other regions and the standard language) all refer to Tuesday; *Sonnabend* (standard language and other varieties – North), *Samstag* (standard language and other varieties – South), and *Saterdag* (some northwestern dialects), all refer to Saturday. Southwestern dialects even have a regional word for father, *Atti*, contrasting with the general *Vater/Vader*, the latter having cognates across the entire, vast Indo-European language family.

There are even regional varieties of pronouns, a phenomenon that causes serious comprehension difficulties, for example, forms like *he, him* (English 'he,' 'him,' 'it') in Low German and some Central German dialects where the standard language and southern dialects have forms such as *er, ihn, ihm*. Many Bavarian dialects have forms like *ös/es, enk* while the standard language and other dialects have forms such as *ihr, euch* ('you' – plural familiar forms). These pronouns' variants are restricted to traditional dialect (although there are traces of the Bavarian *ös/es* forms in colloquial language), but a further regional variant, *mir*, where the standard has *wir* (we), is extremely widespread in both colloquial language and dialect in the South.

In looking at the variation in German, it is important to remember that the language is a major factor in defining German national identity. This was particularly so before the political unification of Germany in 1871 and during the years of the division in Germany between 1949 and 1990. In the German-speaking area before 1871, the immensely diverse dialects were unable to function as symbols of national unity, so this role fell to the standard language. Perhaps this is why many German speakers are anxious about diversity in the standard language – there is a feeling it should be the same everywhere. In paradoxical contrast, dialect diversity, which is prized as the symbol of local or regional identity, is also extremely important to German speakers, probably because of the late achievement of national political unity. Given its number of users, standard German is inevitably diverse, particularly in the lexicon, but there is often a kind of grassroots feeling that this should not be so. The major lexical divide is a North-South one, but with precise boundaries between northern and southern forms lying in different places for different items; common examples would be southern *Ross* and *Bursche* compared with northern *Pferd* and *Junge* ('horse' and 'boy') and the variants for 'Saturday' already given. A particularly salient difference is that between northern *Guten Tag* and southern *Grüss Gott* ('good day, hello'). The so-called diminutive suffix, which actually has a wide variety of pragmatic as well as semantic functions, also divides North from South, with northern and central *-chen*, southeastern *-erl* or *-el*, and southwestern *-le* or *-li*. The formal standard language has *-chen* and *-lein*, so the southern forms given here may be seen as colloquial. Diminutives are very much more common in the South than the North.

Austrian German

One of the most widely discussed lexical divides in standard German is that between Austrian and German varieties. Items concerned are, of course, words referring to the different political and administrative systems in the two states, such as Austrian *Matura,* contrasting with German *Abitur* (school-leaving examination), but also a number of words for foodstuffs, such as Austrian *Schlagobers, Marille* contrasting with German *Schlagsahne, Aprikose* (whipped cream, apricot). It must be stressed that here we are concerned with variants that occur in all Austrian varieties of German – including the formal standard language – not just in traditional dialect. Not surprisingly, Austrians tend to regard the differences between Austrian German and the German of Germany as particularly significant, failing to realize that they are a special case of the more general North-South divide in German.

Austrian attitudes towards Austrian varieties are complex; on the one hand, there is an identification and pride in Austrian German, demonstrated by Austria's insistence that Austrian food terminology be used in the EU's dealings with Austria. On the other hand, there is a strange kind of reluctant acceptance that varieties of German from Germany may be more correct – Austrians may even be heard referring to their standard language as 'a dialect.' This stems partly from 1871 when the greater part of the German-speaking area was divided between two states; one retained its traditional title of Austria, while the other, the large new state dominated by Prussia (with its capital in Berlin) adopted the title of the German Empire, popularly known as Germany/*Deutschland*. A view arose, partly unspoken, that the German Empire was the repository of authentic Germanness and the authentic German language, particularly because it was the larger state and largely German-speaking, in contrast to the multilingual Austro-Hungarian state. This view was bolstered by the northern varieties of standard German that already were popularly seen as 'more correct.' For a comprehensive account of the differences between the major national and regional varieties of German and of their social and political correlates, see Ammon (1995).

Swiss German

The 'ownership' of standard German by the German state has produced the reaction in contemporary Switzerland that all standard German is in some sense 'foreign' to Switzerland. There is a Swiss standard German particularly characterized – like Austrian standard German (and the standard German of Germany) – by distinctive lexicon and recognized as Swiss by Germans and Austrians, but the German-speaking Swiss are increasingly using it only to communicate with non-Swiss German-speakers or in the most formal contexts. They are using Swiss dialects, known as Swiss German/*Schweizerdeutsch/ Schwyzertüütsch,* in almost all other spoken communication. This state of affairs could suggest that the Swiss dialects now represent a separate language from German, but this is not quite the case; Swiss German does not have any generally accepted standard variety and it is relatively rarely used in writing. Some of the most salient distinctive lexicon of Swiss German consists of items of French origin, such as *Chauffeur* ('driver'), or items referring to specifically Swiss social and political institutions, like *Bundesrat* (Swiss Federal government – not to be confused with the *Bundesrat* in Germany, the upper house of parliament).

East and West German

During the 40-year division of Germany, particularly because contact between the citizens of the two states was restricted, all varieties of the language, including standard varieties, diverged in the Federal Republic (west) and the German Democratic Republic (GDR) (east). Given the important role of language in the German national identity, this divergence became a highly charged political issue, with attitudes ranging from outrage on the part of some conservative West Germans at perceived Communist efforts to destroy national unity, to the vision in some GDR circles of language renewal paralleling social renewal in the East. A balanced view would perhaps see changes in both East and West reflecting change and divergence on both sides. The most obvious differences did indeed reflect different experiences of life in the two republics with, for example, an entire political and social vocabulary for East German institutions, such as *Volkskammer* (GDR Parliament), *Polytechnische Oberschule* (comprehensive School), and *Objekt* (building) but also some perhaps unexpected everyday items, such as *Kaffee komplett* (coffee with milk and sugar).

As the unification of 1990 was in effect an absorption of the population and territory of the GDR into the Federal Republic, it might have been expected that differences in language would steadily be eliminated. Many GDR-specific terms, particularly political and economic terms, have indeed disappeared or are obsolescent, but there have been some surprising survivals. Many of these represent salient GDR terms, which are used to stress continuing East German

identity on the part of the many for whom unification has been more or less a disappointment; an example here would be *Broiler*, for Western *Brathähnchen* (roast chicken). On occasion, East Germans seem simply unaware that they are using GDR-specific language; I have heard *Objekt* (public building) and *Kaffee komplett* (coffee with milk and sugar) used unselfconsciously in this way. For a comprehensive account of the linguistic differences between East and West – past and present – set against the political background, see Stevenson (2003).

Conclusion

As discussed, there is public concern about variability in the standard language, and this is currently perceived as an increasing problem. Of particular current concern is the perceived divide between 'traditional' or 'authentic' German and the new variety 'corrupted' by English influence. As I have argued elsewhere, though perhaps partly justified in certain respects, this concern is plagued by misconceptions about language change and comprehensibility (see Barbour, 2001).

The new concern about variability in the standard language may be arising not from any change in the substance of the language, but from increasing use, in formal contexts, of words and constructions previously thought of as informal. In linguistic terms, a new standard language may be arising, creating from the formal standard (*Standardsprache*) and the colloquial standard (varieties of *Umgangssprache*) a new type of multi-register standard variety such as that found in English. Concern about variability in the standard language is attested to in the papers in Eichinger (2005).

It is often said that German dialects are being used less, thus making the language more uniform, but increasing variability in the standard language may be compensating for this, ensuring that German continues to show high salient patterns of variation.

See also: Austria: Language Situation; Dialect Atlases; Dialect Chains; Dialect Representations in Texts; German; Germany: Language Situation; Language and Dialect: Linguistic Varieties; Language Education Policy in Europe; Language Families and Linguistic Diversity; Language/Dialect Contact; Luxembourg: Language Situation; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Prestige, Overt and Covert; Sociophonetics; Speech Community; Standard and Dialect Vocabulary; Standardization; Switzerland: Language Situation; Vernacular.

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Variation in Native Languages of North America

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The concept of variation has framed discussions of Native North American linguistics from its beginnings. In his introduction to the *International Journal of American Linguistics* in 1917, Franz Boas summarized what direction such a journal should take toward further understanding of the complexities within and the relationships between American indigenous languages. His outline and exhortations serve to broadly define the scope of linguistic variation for indigenous language study: for the purposes of dialect and language identification, linguists should extend their examination beyond lexical cognates and sound correspondences to an analysis of morphological variation existing in polysynthetic languages. Recognizing linguistic change induced by daily contact with speakers of European languages, comparison across generations would be vital. Particular attention should be paid to examining the variation that occurs between different genres of speech from conversation to folktales to ritual performance in order to capture lexical variety as well as literary convention. The linguist should be aware of not only individual variation such as that associated with a poet, but also the types of variation that may be conventionalized across particular groups of people. Such a broad focus is more akin to ethnography of speaking than mere study of variation, and this focus is integral to research in Native North American languages.

Much indigenous language variation is overtly recognized as a genre or identity marker by community members, rather than the minute, subconscious indicators of gender, class, and ethnicity described in the study of more widely spoken languages. As a personal characteristic of everyday speech, variation indicates a particular position taken by a speaker with respect to his interlocutors in a context. Some indicators of a speaker's identity may be less contextually malleable than others – such as regional background. Other variations that occur may indicate personal characteristics of the speaker or addressee (gender, age, physical handicaps) or intentional affect. Interestingly, though such 'exotic' forms have often been attributed to North American languages, they are not typically categorical. They are often associated with specific genres of speech or circumstances and give rise to a variety of expressive nuances. Finally, some variation is almost completely determined by genre, such as ritualistic or shaman's language, announcements, prayers, and folktales, rather than the identity of the speaker. However, speakers' abilities to engage in certain kinds of formalistic language may also indicate something about their overall position in society and certainly their position of authority in a ritualistic context. Despite language attrition, which affects all kinds of language variation, Native North America is rich in linguistic variety and the variation exhibited.

Regional Dialects and Mutual Intelligibility

Given the large number of languages, approximately 300 north of Mexico, determining the difference between dialects and languages and their similarities is a process of constant revision. Many languages such as Yuchi, Zuni, or Takelma are apparent isolates. Others, however, are parts of extensive dialect continua, such as Ojibwe (Ojibwa) (Algonquian), Western Apache (Athabaskan), Straits Salish (Salish), or Dakota (Siouan). The variation that exists from one community dialect to the next can be an important marker of ethnic identity, and where this ethnic distinction is particularly emphasized, some speakers may be willing to sacrifice mutual intelligibility with other dialects to maintain their distinctiveness. In such circumstances, native speakers are quite willing to criticize each other for mixing forms from another dialect or language, or for innovating too much. The languages of the pueblos in the southwest are particularly famous for such emphasis on linguistic purity. The Arizona Tewa (Kiowa-Tanoan) strongly proscribe language mixing in *kiva* speech and overtly maintain that Tewa is 'pure' despite multilingualism and continual contact with the Hopi (Uto-Aztecan) for the past 300 years. Indeed, there are almost no adoptions of vocabulary from Hopi into Tewa, but there appears to be considerable influence from Hopi phonology and grammar. Likewise, the White Mountain Apache claim their linguistic separation along a dialect continuum from Navajo to other Western Apache dialects from Tonto/Camp Verde-White Mountain-San Carlos through overt comments about mixing:

> That's the way that they talk at San Carlos . . . that's not our word, that's a Navajo word . . . when he goes to Camp Verde he comes back and says things like they say things. That's wrong, we don't say them like that over here. He needs to stay in one place. (Greenfield, 1999: 375)

In other dialect continua, such as among the Creek (Muskogee) (Muskogean) of the southeastern United States, Dakota (Siouan) of the Great Plains of the United States and Canada, or the Ojibwe (Algonquian) in the Canadian regions of the Great Lakes, strong

Table 1 Sioux dialects

Teton	lak^{h}ota	-la	tʃistila	gla	gnayã
Santee	dak^{h}ota	-da, -dã	tʃistina	hda	hnayã
Sisseton	dak^{h}ota	-na	tʃistina	hda	hnayã
Yankton	dak^{h}ota	-na	tʃistʃina	kda	knayã
Yanktonai	dak^{h}ota	-na	tʃistʃina	gda	knayã
Assiniboine	nak^{h}ota	-na	tʃusina	kna	knayã
Stoney	nak^{h}oda	-n	tʃusin	hna	hnã
	'Indian'	'diminutive'	'little'	'go home'	'cheat'

(Adapted from Parks and DeMallie, 1992.)

phonological or lexical shibboleths are noted or occasionally mocked when a speaker moves from one community to another, but there is more tolerance for mixing. Attitudes towards archaism, purity, mixing, and new languages are as varied as the dialects themselves.

Assessing Variation

Native speaker judgments concerning dialect mixing are of some use in establishing what should be counted as variation between dialects; yet native speakers tend to focus on a limited number of shibboleths as markers of linguistic or social identity. The fast and dirty nature of some early linguistic studies in Native North America has also promulgated certain misconceptions concerning dialect differentiation, and linguists are continuing their efforts to document basic regional dialect differences. Regular differences in vocabulary and pronunciation are still the starting points for this effort.

Sound and Lexicon

The dialects of Sioux (Dakota), which are spoken in the Great Plains of the United States and Canada, form a well-established dialect continuum. This continuum has been mistakenly broken into three distinct dialects based on a regular pronunciation difference that is apparent in the word for 'Indian': *lak^{h}ota* – Teton, *dak^{h}ota* – Santee, Sisseton, *nak^{h}ota* – Yankton-Yanktonai, Assiniboine, and Stoney. Based on such linguistic division, natives have sometimes categorized each other along the same lines. A cursory examination, however, reveals this categorization to be inaccurate. Parks and DeMallie's report of their recent dialect survey revealed considerably more phonological variation for /l, d, n/ among the dialects, such as in the diminutive suffix and the word for 'little'(see Table 1). A better phonological diagnostic is in fact the pronunciation of the first consonant in a cluster when the second is a sonorant, as in *hnayã* 'cheat.' They concluded that phonologically Yankton and Yanktonai (Minnesota, Nebraska, Saskatchewan), rather than being n-dialects, are closer to Santee-Sisseton (Nebraska, Minnesota, North Dakota, Manitoba, Saskatchewan) than to Assiniboine (Saskatchewan, Montana). Stoney (Alberta), because of its vast difference phonologically and lexically and the influence of Cree (Algonquian) grammar, is a separate language from the others in the continuum.

Grammar

Although traditional phonological comparisons of lexicon and morphological affixes are indispensable for establishing dialect differences, Valentine has recently asserted that the incorporating nature of many indigenous languages offers a unique opportunity to trace variation within a dialect continuum and better understand similarities. The eight dialects of Ojibwe (Algonquian), spoken from Quebec to Saskatchewan, demonstrate considerable lexical variation because of the complex structure of their incorporating verbs. Verbs contain at least three basic slots: initial, medial, and final. For one verb, both the structural components filling these slots and lexical variation within the slots may occur. Among the Ontario dialects, the animate intransitive body part verb *ozhaawashkoshkiinzhigwe* 'have blue eyes' (Lake Nipigon) differs considerably although the initial, 'blue/green,' is the same (see Table 2). Tracing such complexity of variation is a fruitful direction for languages that become increasingly better documented.

Intergenerational Variation and New Language

Numerous linguists have commented on the difficulty of creating adequate descriptive grammars and dictionaries for languages, partly due to the amount of variation that exists between regional dialects and due to variable use, but also because of intergenerational shift. Such complexity is magnified in contact language situations, where intergenerational language attrition can be quite dramatic. Linguists of Boas's generation encouraged researchers to work with older, more expert speakers in order to have good comparative data, but as language attrition, maintenance, and revitalization have become part of the accepted reality of most linguists working in the

Table 2 Polysynthetic variation in Ojibwe

Dialect/Location	*Initial*	*Classificatory medial*		*Body part medial*	*Final*
	'blue'	augment	liquid	'eye'	act.intr
Wikwemiking	oʒa:waʃkw-	-a:	-gam-	-i:ngw-	-e
Lake Nipigon	oʒa:waʃkw-			-ʃki:nʒigw-	-e
White Dog	oʒa:waʃkw-		-gam-	-ʃki:nʒigw-	-e
Northern Ojibwe	oʒa:waʃkw-	-a:	-gam-	-dʒa:b-	-i
Severn Ojibwe	oʒa:waʃkw-			-dʒa:b-	-i

(Adapted from Valentine, 2002: 91.)

Americas, focus has shifted to better understand variation caused by language attrition. It is now a type of variation not only associated with language death, but as vital to accounting for language revitalization.

In a comparatively early study, Hill traced the grammatical reductions in two southern California languages, Luiseño and Cupeño (Uto-Aztecan), demonstrating that in a 40-year period, speakers' grammar became increasingly more predictable as they displayed less subordination and came to favor shorter sentences. Cook, however, has observed the double nature of variation induced by language attrition: it tends to reduce the phonemic inventory, grammar, and stylistic options for individual speakers, but simultaneously the language on the whole exhibits more variation because the idiolects of semispeakers display a range of such reductions. Instead of speakers 'reducing' linguistic variation, they are in fact caught at various stages of incomplete language acquisition. Cook maintained that the younger speakers of Sarcee (Sarsi) (Athabaskan) and Chipewyan (Algonquian) in western and northern Canada are speakers of 'dying' languages and therefore have a wide variety of innovations, archaisms, and phonological idiosyncrasies.

There is a fine ideological line between the speakers of a 'dying' language and those of a 'new' or 'revitalized' language although they may demonstrate the same phonological and structural reductions in addition to the variation typical of nonnative speakers. Recently, in a standard study of the regional dialects of Straits Salish (Salishan) spoken north and west of Puget Sound in Washington State and British Columbia, Montler grouped the dialects into two separate languages based on their nonmutual intelligibility: Klallam with three dialects and Northern Straits – a continuum of Sooke, Songish, Saanich, Lummi, Samish, and Semiahmoo. This classification is largely based on differences and similarities in lexical items, phonology, person marking and reduplication, demonstratives, and second-position enclitics. However, in Northern Straits, intergenerational variation within one family is as great as any variation from one dialect to the other. For instance, younger Saanich speakers tend toward periphrasis to express diminutives rather than reduplicating by adding /-C_1ə-/ after the first stressed syllable: */məmím'ən sŋénət/* 'small stone' instead of */sŋəŋéʔnət/*. When younger speakers do use reduplication, they display the greater individual variation described by Cook by either regularizing (as seen below) or exaggerating through additions of too many syllables:

Younger:	*ʔíləqsən*	'point of land'	*ʔəʔíʔləqsən*	'small point of land'
Older:	*ʔíləqsən*	'point of land'	*ʔəʔəléqsən*	'small point of land'

The greatest amount of innovation is seen, however, among new speakers of revitalized languages – New Lummi, New Saanich, and New Klallam (Clallam) – in which some speakers are very fluent. These varieties are growing through language revitalization efforts, and display even more of a tendency to periphrastic structures as lexical suffixes are eliminated and verb paradigms are leveled. Phonologically, there is extreme change with the loss of glottalization on sonorants and some obstruents, vowel epenthesis in some clusters, and a shift toward more English-like sounds: /q/ becoming /k/ and /tl̥'/ becoming /k'l/ or /kl/. These are not symptoms of language death, but endemic of revitalization efforts as monolingual English speakers acquire an ancestral language.

Personal Indicators in Speech

It is somewhat common throughout the world's languages to modify the speech of direct address to demonstrate respect by modifying vocabulary, or using morphological plurals or passives to create a 'distancing' effect. Similar modifications are made in addressing strangers or in-laws in several indigenous languages such as those of northern California and Navajo (Athabaskan). Such accommodations in the presence of addressees serve to indirectly index their respected position in a speech event. Some indigenous languages of the Americas extend such indexicals to allude to specific or personal information of speech participants or when describing others. This is accomplished through a variety of manipulations of sound symbolism, lexicon, morphology, and phonology. The kinds of information expressed include specific

physical characteristics or types of speech associated with certain characters in folktales, affection displayed toward younger or cute addressees, and the gender of the speaker and/or addressee.

Folk Characters and Abnormalities

Characters in folktales such as Coyote, Grizzly Bear, Mountain Lion, or Rabbit often have specific speech styles such as lisps, consonant substitutions, and frontings, or prefixing of certain sounds (see 'Special language' in Mithun, 1999 for a detailed overview). In Takelma (Oregon isolate), Dell Hymes argued such features are not used across the board but expressively to associate specific contextual qualities with the folk characters. Although Grizzly Bear speech in Takelma is well-known for /ɬ/-prefixing, this is only done to indicate coarseness, stupidity, disdain, and distance. Likewise, indicators of physical or personality characteristics of people are not obligatory. Nootka (Wakashan/Vancouver Island), Quileut (Quileute) (Chimakuan/Washington), and purportedly a number of other northern Pacific coast languages oftentimes express negative personal characteristics such as greed, shortness, fatness, lameness, eye problems, or left-handedness through the addition of a morpheme and what Sapir calls "consonantal play." For instance, an augmentative suffix /*-aq*/ is used for fat people: /*haʔokwiɬhak*/ 'did you eat?' versus /*haʔokwaqiɬhak*/ 'did you eat, fatty?' The diminutive suffix /*-ʔis*/ is added to forms referring to crossed or squint eyes, and all sibilants are converted to corresponding lateral forms: /*q^{w}ísmah*/ 'he does so' versus /*q^{w}íɬ-ʔiɬ-mah*/ 'he does so, weak eyes.' Similar 'sore eye' speech without the diminutive is used to represent the folktale characters Deer and Mink.

Caretaker Language and Baby Talk

Similarly, caretaker language and baby talk is present in most languages of the northwest coast such as in the consonant reductions and the addition of diminutive /*-ʔis*/ in Nootka. Many, though not all, languages of North America have some modifications to indicate affectionate speech to young children. Such talk is characterized by varying degrees of modification of adult forms, such as morphological diminutives and reduplication, lexical substitutions, and phonological substitutions. The latter may involve a phonological shift such as palatalization of stop consonants, e.g. /t/ becomes /tʃ/ to indicate affection. Through a sort of diminutive sound symbolism as in Omaha-Ponca, grandmother language indicates affection, cuteness, or a minimized threat of a potential danger.

In other instances, there is a reduced phonological inventory because speakers perceive it to be easier for children. Cocopa, an Arizona Yuman language, has quite complex caretaker language with at least seven different phonological rules that adult women apply to varying extents when addressing children and adolescent girls. Consonants are reduced from the adult inventory of 23 to 12 largely through elimination of secondary articulations and place. For instance, /k, k^{w}, q, q^{w}/ become /k/, and /l, l^{y}, r/ become /l/. Alternatively, adults may palatalize all dental, alveolar, and palatal consonants. Next, the consonant before the root syllable is replaced with a /v/-sound although it is not a member of the adult Cocopa inventory. Consonants and sometimes vowels that are not part of the root get dropped; an /s-/suffix is sometimes added to the end of the word; nonroot long vowels are shortened, and a diminutive /n-/prefix is added before the first consonant of the root. Men also produce the diminutive form. These changes and their variable applications create words in baby talk that can be quite complex for children to acquire in addition to their acquisition of adultlike language:

Adult speech	Baby talk	
/*k^{w}an^{y}uk*/	/*kanvúk*/	'baby'
/*lu:p mu:k^{w}i: kmyu*/	/*lu:p unvi:s yu*/	'what will you buy'
/*umits wa:ya:ts*/	/*unvít anya:t*/	'she goes around crying'

Gender

Gender indexicals are typically phonological, morphological, or lexical variants used to indicate the gender of the speaker, the addressee, or both simultaneously. These continue to receive descriptive attention in Native North America, as linguists re-examine previously gathered data and find new examples. Despite early reports to the contrary, such as Haas's article 'Men's and women's speech in Koasati,' the use of such indicators has rarely been found to be categorical. However, recent language attrition and the commensurate reduction of stylistic variation may in some circumstances have caused a greater regularity of use than was previously apparent.

Phonological Indicators Phonological gender differences have been proposed for a number of languages and exist in the length of forms, degree of nasalization, and in consonant substitution. There appears to be little crosscultural regularity in North America concerning which pronunciations will be more indicative of men than women. Haas first proposed that several Muskogean languages, specifically Koasati, indicated the male sex of the speaker, by pronunciation differences such as a final /-s/ in men's forms: /*lakawtakkõ*/ (women) versus /*lakawtakkós*/ (men) 'I'm not lifting it.' Using Haas's original field notes, historical records, comparative data, and his current fieldwork, Kimball argued that the phonological difference Haas analyzed for Koasati and proposed for related languages

was actually a choice in whether to use /-s/ (currently pronounced [ʃ]) 'sentence-final narrative particle' to supplant phrase-terminal nasalization. He also noted that this feature was due less to a speaker's gender than to his or her authority in the society as both sexes used the form. Yana (northern California) men's public speaking to both men and women was originally described by Sapir as male-to-male speech. Because of the additional syllable, 'men's forms' are lengthier, more archaic, and evocative of speech associated with elevated ritual language and indirectly with gender.

Man to man	Other	
/ʔau-ʔnidʒa	/ʔau-ʔitʃ^{h}/	'my fire'
/ʔi-na/	/ʔi/	'tree, stick'
/p^{h}adi/	/p^{h}at^{h}/	'place'

Likewise, in ritual Laguna (Keres) *kiva* speech associated with older men, regular vowel lengthening occurs in 10 'cue' words indicating the emotional stance of the speaker toward a proposition.

Female	Male	
/amú'u/	/amúu'u/	'love, pity'
/ayá'a/	/ayáa'a/	'discomfort'
/imí'i/	/imíi'i/	'fear/shy'

Several languages display slightly more nasalized forms for speech attributed by native speakers to women. In the early part of the 20th century, Inuktitut (Eskimo-Aleut) women on Baffin Island were observed to substitute nasals /m, n, ŋ, N/ for final voiceless stops /p, t, k, q/. Yet men also had variable nasal and nonnasal pronunciations. Among the Lakhota (Lakota) (Siouan) affective/illocutionary force indicators, two to three forms, such as /*-yemã*/ 'women's surprise,' are nasalized versions of men's – /*-yewã*/ 'men's surprise'. In contrast, emphatic questions in Yana required the enclitic /*-gà*/ for women and /*-nà*/ for men.

In Atsina (Gros Ventre) (Algonquian/Montana) both men and women tend to use 'women's' pronunciation' with nonnative speakers and children, but men typically front /k/ or /ky/ to /tʃ/, and women substitute /k/ or /ky/ for the more archaic /ty/. Men have apparently borrowed the fronted sound /tʃ/ from their Arapaho (Algonquian) neighbors, and younger men are currently in the process of changing /ty/ to /tʃ/ as well.

Vocabulary and Morphology Interjections, common sayings, speech act indicators, and some kinship terms vary according to the gender of the speaker or addressee in a number of languages. It is common for men and women to have different interjections for expressions of surprise, fear, or bravery in North American languages. Less common is for markers of illocutionary force to be gendered. Several Siouan languages, however, possess verbal suffixes like those listed in Mandan (Siouan) below. Mandan is the only Siouan language in which such forms are required for every sentence, and which indexes only the gender of the addressee.

Imperative	Statement	Interrogative	
/-rã/	/-ʔre/	/-ʔrã/	female addressee
/-ta/	/-ʔʃ/	/-ʔʃa/	male addressee

Other common expressions of politeness and greeting can become very salient indicators of gendered difference for native speakers. Although the forms in Table 3 do not occur in every sentence of the pueblo southwest languages, there is a strong ideology of gender-differentiated speech.

The Meanings of Gendered Forms Lists of gender differences out of context give a very minimal sense of the meaningful causes of such variation. The question of how such forms get connected to gender as they index different genres, meanings, and speech acts will lead us further to understanding the meaning of variation in specific languages (see Trechter, 1999 for such an analysis in Lakhota). Indeed, any number of linguistic forms could theoretically be linked to gender, but very few are. For example, Hill and Zepeda have recently extended the types of analysis indicative of gender differentiation to the use of the ingressive pulmonic airstream by Tohono O'odham (Uto-Aztecan/Arizona) women. The women's sucking in of breath coordinates with discourse features that index closeness and involvement in conversation, which already hold a meaningful culture value for these women. Only through contextual analysis coordinated with speakers' ideologies regarding gendered meaning are such linguistic markers better understood.

Table 3 Pueblo Southwest gendered vocabulary

Language (dialect)	*Female*	*Male*	*Meaning*
Hopi (3rd Mesa)	ʔask^{w}ali	k^{w}ak^{w}ha(-y)	thank you
Tewa (Arizona)	kuna	kunda	thank you
Tiwa	hɛrkɛm	hawə˞	thank you
Acoma	náidrá	huw'ehé	thank you
Hopi	sónwayo	lóloma	it's beautiful
Acoma	an^{y}umé:c'a	ʔanyi:c'e	it's beautiful
Tewa (Arizona)	ʔasagi	sagʔwo'	it's beautiful
Hopi		taʔa	yes
Tewa (Arizona)	hã:	hoy	yes
Tewa (Rio Grande)	hoy	hãman	yes
Acoma	hée	haí	answer to a call
Hopi	yá:sayoqu	hósqaya	be huge
Tewa (Arizona)	-ʔáyyá	-ʔóyyó	be good

(Adapted from Maring, 1975; Kroskrity, 1983: 89; Sims and Valiquette, 1989.)

Stylistic Variation

In a 1927 article, 'Literate and illiterate speech,' Bloomfield assessed Menominee (Menomini) (Algonquian) speakers in Wisconsin, rating their grammatical and lexical capabilities. He described three different ways of saying 'What are you laughing at?' – */wékiʔ wéh-ayéniyan/*, */wékiʔ aya:yó:sinama/*, */tá:niʔ wehtá:hpiyan/* – on a continuum from 'illiterate, childish, stupid' to 'normal' to 'elevated, poetic and archaizing.' The last type of language seemed to be associated with doctors and shamans, and was characterized by long vowels in unusual contexts, archaisms, and metaphorical vocabulary. 'Bad' speakers, on the other hand, anglicized their pronunciation and did not keep long and short vowels distinct. They also forgot to use the obviative (a form that distinguishes between two different third persons) and the quotative in narratives. Although Bloomfield placed most speakers under the age of 40 in the illiterate group, this was not absolute. He surmised that English interfered with a speaker's ability to control a variety of styles, but he also placed some monolingual speakers of Menominee in the illiterate group. Regrettably, Bloomfield stated that the differences in such styles of speech permeated every aspect of the lexicon and grammar to the extent that description would be impossible. It is difficult to know if Bloomfield was capturing the reduction of stylistic variation or the prejudice of a few speakers.

The Content of Style

Elevated, ceremonial, or shamanistic speech styles are recognized among many languages (Wintu, Lakota, languages of the pueblos in the southwest). On the other hand, styles of oratory in many California and west coast languages (Nootka, Tübatulabal, Patwin, Pomo, Yokuts) is reported as having been 'forced,' 'jerky,' with 'short sentences.' For an excellent comparison of such speech styles see Miller and Silver (1997). In cultures where mastery of ceremonial speech is highly emphasized, speakers must have specific abilities and be specially trained to acquire the forms. Such registers thus become less indicative of the personal or individual identity of a speaker than the genre or speech event which she or he performs.

Chafe, for instance, described three different styles of verbal performance in Seneca (Iroquoian/New York): normal conversation, preaching, and chanting. These genres differ in a number of ways: prosodically, and in the degree of formulaicity, sentence grammar, and epistemic stance. Normal conversation has greater freedom, relies less on memorized phrases, circumlocutions, or archaic language, is more fragmented because of multiple participants and lack of planning, and requires speakers as direct conveyors of original content to state the extent to which they are sure through the use of varied evidentials. Chafe demonstrated that as speakers move to preaching and chanting, their intonation contours become increasingly monotone although the sentences are lengthier and more packed with information. Preaching exhibits few evidential markers. Indeed, as the speaker becomes less individually and creatively responsible for the content of utterances, chanting contains a number of markers of certainty.

Although the definition of ritual speech requires a certain compartmentalization of the genre, there may be ideological extensions of ritual genre into everyday life to the extent that it may also affect speakers' sense of what more elevated language sounds like. From Bloomfield's description, some such linguistic ideology may have affected his definition of elevated speech in Menominee with its elongated vowels and metaphorical vocabulary. To some extent, formulaic speeches, such as the public grievance chants in Hopi (Uto-Aztecan), may have some general similarity in form to more esoteric styles. Kroskrity argued that the speech of public announcements in Arizona Tewa (Kiowa-Tanoan), although necessarily separate from the highly ritualistic *kiva* speech, follows many of the same strictures through its de-emphasis on the personality of the announcer, the formulaic structure of the announcing chant, and the unusual but predictable rising intonation throughout the three verses. To be 'valid' forms, such chants must be notifications of community events and announced by men from rooftops. More recently women have both followed the form and innovated by announcing events such as yard sales themselves.

Folktales as Verse

Since the 1970s, a number of linguistic anthropologists such as Tedlock and the Hymeses have argued that the structure, form, language, and meaning of oral, indigenous folktales are better understood if they are regarded as poetry and performance rather than prose. Tedlock, for instance, has sought to capture visually variations in loudness and prosodic features such as intonation and rhetorical lengthening through use of larger type, movement of the type up and down on the page, and the repetition of letters for lengthening. Dell Hymes saw the 'pattern numbers,' those numbers that are favored mythically by certain cultures for organizing, as important for understanding if not for reversifying previously collected folktales. One of the most famous of such analyses using this approach is Virginia Hymes's work on the 'Raven Myth' in Warm Springs Sahaptin (Tenino) (Sahaptian/Oregon). Paying special attention to the intersection of prosodic cues such as changes in voice quality

or pitch and rhetorical vowel lengthening indicative of first lines, with parallelism in the use of different grammatical particles and time words, Hymes was able to divide the narration into verses. Interestingly, a pattern of five recurred throughout. Events were repeated five times, and there were often five lines in a verse and five verses in a stanza. The pattern of three was also important. Despite the variation in some folktales and creative interpretation needed for such work, Woodbury saw such work as getting to the grammar of discourse. By understanding the similarity of forms within one oral genre, one thereby begins to see its variation from others.

Variation in Native North America has never been limited to regional dialects or the expression of cultural, ethnic, or gender identities. Linguists encountering unexpected and unfamiliar linguistic structures and expressions in North America have allowed a broad definition of variation in order to capture both the sense of complexity in the languages they described and their expressive capabilities. As today's linguists and Native peoples continue to work in a context of language attrition and potential revitalization, maintaining a broad understanding of variation in both the older forms and encountering variation in new contexts will be the challenge.

See also: Algonquian and Ritwan Languages; Canada: Language Situation; Dialect Chains; Endangered Languages; Formulaic Language; Gender; Hopi; Identity and Language; Identity in Sociocultural Anthropology and Language; Iroquoian Languages; Lakota; Language Education for Language Revival; Language Maintenance and Shift; Language/Dialect Contact; Muskogean Languages; Pomoan Languages; Pragmatic Indexing; Preaching; Style and Style Shifting; Taboo Words; Tohono O'odham.

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Variation in Nonnative Varieties of English

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Native vs. Nonnative Varieties

Native and nonnative varieties of English are distinguished on the basis of the sociolinguistic environment in which they take root. Native varieties are found in North America, Australia, and New Zealand, places that saw large-scale settlement by English-speaking people. Nonnative varieties emerge in former British or American colonies in South and Southeast Asia and parts of Africa, where there has never been a sizable English-speaking settlement, and English is spoken along with the languages of the local populations. From the perspective of genetic linguistics, native varieties are the product of normal parent-to-child transmission in that both the grammar and the vocabulary are transmitted from the same parent language (Thomason and Kaufman, 1988). There is little structural difference among them. Nonnative varieties are more complicated. Though the vocabulary is largely English, the grammar exhibits significant restructuring under the influence of indigenous languages. Given their unique sociolinguistic histories, nonnative varieties are not typologically homogenous. Because of the presence of linguistic features appropriated from indigenous languages, they are often referred to as 'indigenized,' 'nativized,' or 'contact' varieties, or as 'New Englishes.'

Nonnative varieties are distinguished from English-lexified pidgins and creoles, also on sociolinguistic grounds. However, the internal variation within a nonnative variety is analogous to the post-creole continuum, ranging from basilect to acrolect. Unlike the basilectal subvarieties, the acrolect does not exhibit the effect of grammatical restructuring and serves as the local standard. It is in effect a native variety, and 'nonnative' applies to the basilectal subvarieties.

Native vs. Nonnative Speakers

'Native' is also used to describe the order of language acquisition: a 'native' language is the first language acquired by a 'native' speaker. The acquisitional status of nonnative varieties of English deserves comment. Conditioned by different postcolonial experiences, they followed separate developmental paths (Schneider, 2003). Malaysia and Singapore offer an interesting case study. In Malaysia, Malay is the national language, and English remains the language of the elite. In Singapore, the government adopts an English-centered language policy. English is the working language of government and, more importantly, the medium of instruction in schools. An English diglossia has emerged, with the nonnative variety – Singapore English – as L, and the superposed, acrolectal variety as H. Increasingly Singapore English is acquired as a first, if not the first, language (Kwan-Terry, 1991; Gupta, 1994). Given the right sociolinguistic conditions, a nonnative variety can acquire native speakers and become the mother tongue.

Variation

Variation in nonnative varieties of English is usually measured against the grammatical norm of the native variety. The focus is placed on linguistic neologisms and their possible origins. Variation can also be approached in terms of the usage patterns of linguistic variables as conditioned by context of use. But this line of enquiry is woefully lacking in the literature and is usually subsumed in the more common studies of lectal variation, conditioned by speaker proficiency. Linguistic neologisms can be found in all levels of language.

Phonetics and Phonology

Two noticeable innovations among the English consonants have to do with the dental fricatives (*thin*, *this*) and the aspirated voiceless stops (*pot*, *top*, *cop*). The dental fricatives are replaced by *t* and *d*, respectively, and aspiration of the voiceless stops is lost. These innovations illustrate two basic mechanisms of sound interference: direct substitution and change in phonological contrast. In Singapore English, there has been a further development in the treatment of the dental fricatives: they are pronounced as *t/d* in syllable-initial position, but as *f* in syllable-final position (*healthy* [-t-] vs. *health* [-f]).

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Variation in Nonnative Varieties of English

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Native vs. Nonnative Varieties

Native and nonnative varieties of English are distinguished on the basis of the sociolinguistic environment in which they take root. Native varieties are found in North America, Australia, and New Zealand, places that saw large-scale settlement by English-speaking people. Nonnative varieties emerge in former British or American colonies in South and Southeast Asia and parts of Africa, where there has never been a sizable English-speaking settlement, and English is spoken along with the languages of the local populations. From the perspective of genetic linguistics, native varieties are the product of normal parent-to-child transmission in that both the grammar and the vocabulary are transmitted from the same parent language (Thomason and Kaufman, 1988). There is little structural difference among them. Nonnative varieties are more complicated. Though the vocabulary is largely English, the grammar exhibits significant restructuring under the influence of indigenous languages. Given their unique sociolinguistic histories, nonnative varieties are not typologically homogenous. Because of the presence of linguistic features appropriated from indigenous languages, they are often referred to as 'indigenized,' 'nativized,' or 'contact' varieties, or as 'New Englishes.'

Nonnative varieties are distinguished from English-lexified pidgins and creoles, also on sociolinguistic grounds. However, the internal variation within a nonnative variety is analogous to the post-creole continuum, ranging from basilect to acrolect. Unlike the basilectal subvarieties, the acrolect does not exhibit the effect of grammatical restructuring and serves as the local standard. It is in effect a native variety, and 'nonnative' applies to the basilectal subvarieties.

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Table 1 Simplification and vowel inventory

RP			*Nonnative*		*Examples*	
iː/ɪ	uː/ʊ		i	u	*beat/bit*	*boot/put*
ɛ	ɔː/ɒ	⇒	e	o	*bet*	*caught/cot*
æ	ɑː/ʌ			a	*bat*	*cart/cut*

The change in the vowel system is more drastic. The typical vowel inventory of a nonnative variety consists of five or seven vowels. The additional two vowels in the larger inventory are traceable to the diphthongs in *bait* and *boat*. A plausible explanation is that the five-vowel inventory is due to simplification in phonological contrast. Table 1 displays the result.

The five-vowel inventory emerges when length is no longer phonemic and the high–mid–low contrast is reduced to high–low. The loss of phonological contrast may be caused by contact with indigenous languages or by internal drift.

Lexicon and Morphology

The lexicon is a depository of words and is the part of language that is the most susceptible to external influence. Lexical borrowing is commonplace. Not surprisingly, nonnative varieties borrow words from the languages in their contact environment: *dhobi* 'washer man' (from Hindi) in India, *kampong* 'village' (from Malay), and *kaypoh* 'nosy' (from Chinese [Southern Min Chinese]) in Malaysia and Singapore. It is not easy to differentiate this sort of direct borrowing from code-mixing or code-switching, which are common phenomena in multilingual communities.

New meanings may develop. In Southeast Asia, to *gostan* (< *go stern*) is to change direction; an *alphabet* is a letter (*English has 26 alphabets*), and a *parking lot* is a space in a *car park*. A more subtle change involves the lexical semantics of words. Take *win* and *admit*. In Euro 2004, Greece played Portugal and won. To report this in Singapore English, you can say *Greece won*, *Greece won the game*, or *Greece won Portugal*. The last sentence reveals the change in the lexical semantics of *win*. The same is true of *admit*, as in *Teachers admit this exhibition for free*, on a museum notice board advertising a special exhibit.

Inflection is poorly developed. This is not to say that plural marking and verb agreement are completely lacking. More commonly, they are used apparently at random and may occur in unexpected places (recorded telephone message in Singapore: *This transfer will take*s *about five seconds*). The complex verbal morphology associated with aspectual meanings suffers the same fate. However, differences in the aspect system are often due to underlying systematic differences in the way aspectual meanings are expressed.

Grammar

In the literature, grammatical description of the nonnative varieties, with the possible exception of Singapore English, is not as extensive and detailed as that for English-lexified pidgins and creoles. Nevertheless, from the available descriptions it is possible to appreciate the structural diversity within them. Topic prominence is a significant typological change that has variable structural instantiation among the extant nonnative varieties. The topic structures of Singapore English are as extensive as those in Chinese, its main substrate language. A typical example is *everything also want*, the title of a local comic strip. Here, we see Chinese influence in the fronted topic *everything*, in the adverb *also*, which reinforces the meaning of the quantifier *everything*, and in the missing subject. Related to the topic structure is the novel conditional construction in which the protasis is not introduced by *if*. In *Don't want egg, please inform first*, the protasis is interpreted as the topic that specifies the condition for the apodosis. Typologically or parametrically related syntactic properties tend to cluster in substrate transfer. Other nonnative varieties also allow missing arguments, but they do not have the same range of topic structures (Cheshire, 1991; Baumgardner 1996).

Another significant, and often substrate-driven, change concerns the aspectual system, which varies across the nonnative varieties (Platt *et al.,* 1984). In Singapore English, the perfective aspect is expressed by *already* (*I wash my hands already*), which occurs predominantly in clause-final position. Careful analysis reveals a subtle yet systematic difference between *already* and the past tense or perfect of native English. While *I wash my hands already* may be rendered as *I washed* (or *have washed*) *my hands*, *the wall white already* means that the wall is white, not that the wall was or has been white. This use of *already* is consistent with the perfective aspect of Chinese.

Register

Nonnative varieties of English do not have an accepted written form, unlike some English-lexified pidgins and creoles, such as Tok Pisin. They are used as a vernacular for informal occasions and have yet to develop a full repertoire of registers – linguistic styles associated with context of use. Newspapers such as *The New Straits Times* (Malaysia), *The Straits Times* (Singapore), and *The Hindu* (India) use native English in their stories, which may contain linguistically trivial neologisms characteristic of the local cultural milieu. Literary works are also written in native English; nonnative varieties are used in the speech of characters as an indexical marker of their low social and educational standing (Talib, 2002). The thin repertoire of registers of a typical nonnative variety is

Table 2 Counts of *already* in private conversation and writing, normalized to 1000 words of text

	Medial position		*Final position*	
	SIN	GB	SIN	GB
Spoken register	0.42	0.18	0.98	0.04
Written register	0.39	0.37	0.02	0.02

Note. SIN, Singapore English; GB, British English.

correlated with its limited grammatical resources, its historical roles, and its present sociolinguistic status.

The lack of registral variation is supported by available corpus evidence. Table 2 displays the frequencies of *already* in the spoken and written registers of Singapore English (SIN) and British English (GB). The data are culled from the International Corpus of English (Greenbaum, 1996). (See Table 3.)

There is no difference in the written register. Differences emerge only in the spoken register of Singapore English, especially in the sentence-final position. The corpus profile suggests a clear registral division of labor: substrate-driven grammatical innovations are used in informal contexts and avoided in formal contexts.

Table 3 Examples of *already* from the Singaporean component of the International Corpus of English

With dynamic predicates
1. Maybe she increase the price *already*
2. I told you about it *already* remember

With stative predicates
3. It's like kind of oldish *already*
4. Her hand better *already*

Habitual states
5. Nowadays I switch to Mandarin *already*
6. I think I am quite used to it *already*

With negatives
7. By the time you eat nuh not nice *already*
8. Aiyah I cannot remember *already*

In coordinate sentences
9. When I was in sec one I noticed him *already*
10. If reject then she wouldn't get her PP *already*

Stigma and Grammatical Growth

One reason for the underdeveloped state of the nonnative variety is the lack of prestige in the adoptive speech community. Even in places such as Singapore, where English is the *de facto* national language and the local accent is increasingly seen as a marker of the Singaporean identity (Ooi, 2001), grammatical features that deviate from native English are stigmatized and frequently targeted for eradication in government-sponsored *Speak Good English* movements. Stigmatization has serious consequences for the nonnative variety. Not only do stigmatized features face individual and institutional resistance, they are also slow to stabilize for eventual codification (Bao, 2003). Nonnative varieties need to overcome stigma, reduce internal variation, and expand linguistic resources before they are able to function in wider communicative domains. Against the international prestige and dominance of native English, this is no easy task.

Theoretical Approaches

The bulk of the literature on nonnative varieties of English is devoted to sociolinguistic issues arising from the global spread of English, among them identity, ownership, standardization, and English pedagogy (Quirk and Widdowson, 1985; Cheshire, 1991; Kachru, 1992; Fishman *et al.*, 1996; Görlach, 2002). The cause of grammatical restructuring is also the subject of intense study and lively debate, especially among scholars of pidgins and creoles. Some scholars treat all varieties of English as adaptations to their environment, so the tripartite division – native, nonnative, and pidgin and creole – has little theoretical significance (Mufwene, 1994).

Among the many factors that are involved in grammatical restructuring, we can list linguistic universals, markedness conventions, internal drift, and language acquisition. Also crucial is the role of the languages in the contact ecology, especially the linguistic substratum. The continued presence of indigenous languages in the speech community of a nonnative variety gives added importance to substrate transfer as a prime mover of grammatical restructuring (Lefebvre, 1998). At the same time, native English exerts strong normative pressure. The antagonistic forces on the grammar of the nonnative variety cannot be resolved purely on linguistic grounds. Grammatical restructuring is a composite and complex process, and no single mechanism is solely responsible. For recent summaries of the field, see Thomason (2001) and Winford (2003).

See also: Native Speaker; Pidgins and Creoles: Overview; Variation in Pidgins and Creoles.

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Variation in Pidgins and Creoles

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Introduction: Creole Myths

Pidgins and creoles have long been characterized as ungrammatical and their speakers as uneducated. This bias is illustrated in the following excerpt from the first novel completely written in a French-based creole (Guyanais), a stinging satire of French colonial society in Cayenne offered through the voices of two Creole characters: Atipa, a gold miner, and his friend Bosobio:

(1) **Atipa:** Nu kriol pa gen reg ku franse
We creole not have rule like French

(2) nu sa pale li ku nu wle…
we TOP speak it as we want

(3) gremesi bunge landan nu lang
Thank god in we language

(4) nu pa benzwen okjupe di sintas…
we not need worry of syntax

(5) Mo rin save sintas-la sa lang ye
me nothing know syntax-DET TOP language that

(6) ka pale la konsey ke la tribinal
IMPERF speak DET council like DET tribunal

(7) **Bosobio:** a pu sa li gen un ta di zafe
TOP for that it have one lot of business

(8) mo pu ka konpren ni la tribinal ni la fomasi-la
me not IMPERF understand neither at tribunal nor DET pharmacy-DET

Atipa: 'We Creoles do not have grammatical rules as in French, we speak just as we like. Thanks to God who gave us our language, we don't have to worry about syntax. I don't know anything about syntax, it's the language they use at council meetings, and at the tribunal. **Bosobio:** That's why there are so many things I don't understand, either at the tribunal, or the pharmacy.' *Atipa* (Parépou, 1885)

Atipa's anonymous author, who used the pseudonym of Alfred Parépou, neatly summarizes the myths attached to creoles, and their social correlates: creoles are not real languages ('we speak as we want'; 'creole has no syntax'); furthermore, creole speakers are excluded from official business and basic social services. Yet, the author demonstrates that this nonlanguage can be used to write a 227-page novel!

The young languages we call pidgins and creoles are universally engendered in the context of traumatic situations such as slavery, indenture, or migration. Although pidgins and creoles differ in the scope of their social functions – pidgins are short-term creative attempts at producing *lingua franca*s, whereas creoles are native vernaculars – they have in common that they are oral languages spoken by marginalized groups, are rarely acknowledged as valid grammatical systems, even by their own speakers, and are

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therefore rarely written. *Atipa* is a major exception, but even now literature fully written in creole is scarce.

This article identifies some of the linguistic conflicts and choices that face pidgin and creole speakers in their social networks. Rather than providing an overview of the wide range of variation that occurs in creole communities around the world, I will focus on a few representative examples.

Variation in Pidgins

Pidgins are generally short-term varieties restricted to specific social domains or occasional events such as seasonal trade activities. Pidginization has often been defined as 'imperfect' acquisition of the target language, but this characterization is debatable. The objective in any of the emergency situations that give birth to new varieties is basic communication, not native-like fluency in the dominant language. If one accepts this pragmatic goal as a realistic option, it is clear that linguistic variability must have been present from the very beginning of the contact.

Since the rapid production of an operational lingua franca is crucial, and happens without the benefit of proper instruction, pidgin development can be expected to be highly variable. Some of the strategies widely used in pidginization are illustrated in the following sample of CPE (Chinese Pidgin English), a lingua franca that developed in the 19th century as British ships traded in Canton, and Cantonese (Yue)-speaking Chinese (Chinese, Yue) merchants and servants made the effort to communicate in English with Europeans. CPE evidence is represented in a large number of occasional (and not necessarily accurate) observations made by Europeans. CPE combines English lexicon and Chinese substratal influences, such as paratactic structures rather than subordinating syntax, the use of elements such as *suppose* to separate propositions, and of classifiers such as *piece* before nouns. Some of these features occur widely in pidgins (and creoles), but others do not, and are thus traceable to transfer from Chinese, such as the usage of a classifier in (15). Variation is illustrated below in sentences excerpted from a large unpublished corpus made available by Philip Baker (CPE Corpus, 2004). The pidgin sometimes functions as a pro-drop language (absence of subject pronouns in [9–10, 13]), but sometimes not, using indiscriminately subjective or objective pronouns, since Chinese has no case marking (2004: 11–12) [translation is provided only when the meaning may be unclear]:

(9) This have every poor place, and very poor people; no got cloaths, no got rice, no got hog; no got nothing; only yam, little fish, and cocoa-nut; no got nothing make trade, very little make eat.

(10) No got fowls, have got chicken [. . .] no can tell, must first makee weigh.

(11) Me think have go Pekin.

(12) Suppose he have no got eye, how can him see? Suppose he no can se, how can him walkie?

(13) Suppose cheat a little can do, suppose cheat too muchy no can.

(14) Suppose no gib lice, how can lib?
'If you don't give me rice, how can I live?'

(15) One piece man [. . .] How much piece masts hab got you ship, how many piece guns, shot and powder? How much piece woman, cow childes and bull childes?
'One man [. . .] How many masts have you got on the ship, how many guns, bullets and powder? How many heifers and calves?'

Variation in Creoles

Since creoles are more numerous and better documented than pidgins – but note that many contemporary creoles are called 'Pidgins,' such as Nigerian Pidgin, or Tok Pisin – the remainder of the article will discuss two related issues that have lately dominated the field of creole studies.

First, the reality and structure of the 'creole continuum' is examined. Creoles (like pidgins) were never isolated from their lexifiers. The social background of native creole vernaculars was such that their subaltern speakers were always in contact with the language of dominant social strata, but in differential ways. Some individuals (i.e., house slaves) had better access than others (field slaves) to the target language (TL), which may have been either socially or demographically dominant. Moreover, the available TL was not necessarily the standard (or prestigious) version of the lexifier: it may have been a nonstandard variety of the European language(s), for example, in contacts between slaves and overseers or ship hands, and thus learners of different varieties were likely to interact and use different versions of the TL as *lingua franca*. In addition, demographics (such as relative proportion of European speakers of the TL and Africans in contact) determined the outcome of the creolization process during the formative period (Chaudenson, 1992). The proportions of speakers

varied according to the region or the household, which explains the linguistic differences between neighboring varieties – e.g., between Morisyen (in Mauritius) and Réunionnais (Réunion Creole French; in Réunion), both in French-colonized islands in the Indian Ocean; or between Jamaican Creole and Bajan (Barbados), both spoken in English-colonized Caribbean islands. In those two parallel cases, whites outnumbered slaves in Réunion and in Barbados, but the opposite was true in Mauritius and Jamaica. Consequently, Morisyen and Jamaican are more 'creolized' than their counterparts. This designation means that the most basilectal varieties in Mauritius and Jamaica have no equivalents in Réunion and Barbados: Bajan and Réunionnais have more restricted repertoires, ranging only between mesolects and acrolects.

Linguistic variability is to be expected at every stage of the language history. Most previous colonies remained economically dependent on European (or other) nations, even after independence was granted. Because of the continuing contiguity of prestigious and stigmatized varieties – greatly facilitated by the greater availability of education – language stabilization is counterintuitive in any creole context, which does not exclude the existence of a regular creole system. Similarly, single-style speakers are rare, even in remote rural areas. However, some varieties called 'radical creoles' (Saramaccan for example) are assumed to be somewhat stable, restricted to conservative varieties, and not associated with a continuum. This situation may be the consequence of group isolation, as suggested by Atipa in the Guyanais quotation shown above, but it is doubtful that such social contexts still exist. With some rare exceptions, the concept of the creole continuum effectively captures the flexible reality of contact vernaculars.

Secondly, the issue of 'decreolization' – that is convergence toward the dominant language, and concomitant loss of the creole – is re-evaluated. Although pidgins generally disappear, or evolve into more complex varieties, many creoles thrive and retain high covert prestige in their native communities, even as they interact with dominant or official languages.

The Creole Continuum

Since creoles are still overwhelmingly considered by public opinion to be corruptions or distortions of official languages, speakers of those marginalized varieties are bound to acquire some version of the local standard. Literacy is widely available now, and the 'proper' medium of instruction is naturally the official language (e.g., English in Belize; French in Martinique, Portuguese in Cape Verde, etc.). However, the standard model is rarely present in the classroom, as local teachers have variously acquired their own version of the standard, thus contributing to the continued linguistic variability observable in creole areas.

Early pioneering studies viewed creoles as static nonstandard approximations of their lexifiers. This perspective implied that creole speakers consistently used a predictable nonstandard system. But a few innovative analyses of creole variation led the way to a more realistic understanding of linguistic repertoires. DeCamp (1971) in his description of Jamaican Creole was the first to use the concept of continuum as an analytical tool in complex linguistic situation. He referred to a wide range of linguistic options that were available to the creole speaker, as illustrated in variants such as: *mi tel am/a tel im/a told him*, pointing out the lack of clear separation between variants, and the myth that there are only two varieties of language.

Pidgin and creole speakers are constantly fluctuating between two poles, the vernacular, which is appropriate in familiar, at home and in group situations, and the formal standard, which is required in official contexts, typically work and out group situations. But speakers' repertoires are not restricted to two clearly bounded varieties; they spread over a continuum of overlapping forms, whose specific representations are dictated by the social, ethnic, or gender contexts, the competence and adaptability of individual speakers, and other psychological factors. The 'creole continuum' aptly captures the absence of any clear boundary separating the various speech types available within any Creole community.

This continuum can be divided into three broad variety groupings (or 'lects'): 'basilects,' 'mesolects,' and 'acrolects.' Basilects are the most vernacular varieties that linguists have typically described as creoles. Acrolects are often used to refer to Creole speakers' production of the local standard language, yet they are not identical to that standard; they are usually L2 versions of the standard. Finally, mesolects are located somewhere between basilects or mesolects, yet are not imperfect approximations of the acrolect. Mesolects have their own structure and their own *raison d'être*.

Bickerton (1975) was probably the first to complete a comprehensive analysis of the language spectrum for Guyanese Creole (English-based creole), and his novel approach stimulated a number of creole studies that adopted the concepts of continuum, and the related notion of implicational scales, as analytical devices. To cite just a few studies of English-based creoles: Washabaugh (1975), Herzfeld (1978), Craig (1980), Escure (1981), Singler (1984), Rickford

(1987), Crowley (1990), Patrick (1992), Aceto (1996), Smith (2002). Studies of French-based varieties include Ludwig (1989), Chaudenson (1992), Lefebvre (1998), Corne (1999), and many more. Some examples of variability across creole continua are provided below, illustrating variation in lexical semantics, phonology, and morphosyntax in samples taken from two English-based creoles, Ghanaian Pidgin English (West Africa) and Belizean Creole (Central America).

Lexical Semantics

The naming of body parts offers a well-known example of semantic differentiation at the word level. Many creoles display substrate influences in the naming of limbs, with the transfer of African semantic structures into Indo-European lexicon: thus, following Bantu and Kwa practice of using one single word to refer to the whole limb, English-based creoles (Belizean, Jamaican) use *fut* to refer to both 'foot' and 'leg', and *han* to refer to 'hand' and 'arm' (but Nigerian Pidgin used *leg* for both 'foot' and 'leg', though it uses *han* as the generic upper limb term). In Portuguese, creoles such as São Tomé, the equivalent Portuguese words are used with the same semantic range. The same feature occurs in Bislama (also English-based, spoken in Vanuatu), though the substratal influence is Austronesian in this case. When speakers of those creoles switch to acrolects, they then use the appropriate term. For example, a Creole boy (in Belize) said (showing his calf): *Wan shaak bait mi fut hia*, 'A shark bit my leg here,' but in the next minute, he switched to an acrolect: *Main da maskito pan yu leg,* 'Mind that mosquito on your leg' (Escure, 1990).

Education and Lectal Level (Ghanaian Pidgin)

The short dialogue shown below, taken from a radio commercial in Accra, Ghana, illustrates particularly well subjective attitudes toward the varieties available to creole speakers: the creole (Ghanaian Pidgin) is attributed to the uneducated speaker (taxi driver), while the engineer speaks Standard Ghanaian English (acrolect). The transcription represents basilectal features in the driver's speech: phonological features (absence of interdentals, absence of postvocalic /r/, and of /h/), morphosyntactic features (use of preverbal imperfective *de,* unmarked past, relativizer *we*, single preverbal negative element). On the other hand, the engineer uses 'flawless' English grammar (but Huber's audio version reveals acrolectal phonetic variants):

(16) **Driver**: ju sabi ma padi adzeman, i de draiv tata bos we in masta bai fo hia
'You know my friend Agyeman, he drives a Tata bus that his master bought here'

(17) **Engineer**: The Yellow Cab Company Ltd?

(18) **Driver**: jes, i no de bring am fo sevisin en mentenans, en i de poches in spepas fo evriwea.
'Yes, he doesn't bring it here for servicing and maintenance, and he buys his spare parts from everywhere'

(19) **Engineer**: Is this Tata vehicle on the road?

(20) **Driver**: No, i de brok daun plenti-plenti.
'No, it keeps breaking down. (Huber, 1999: 271)

Lectal Variation (Belizean Creole)

A few texts drawn from an unpublished Belizean corpus by Escure (1990) illustrate the extensive range of the creole continuum, starting with the most extreme lects, basilects and acrolects, then addressing the elusive mesolect.

Basilect (Nansi Story)

Miss Dolly (a 60-year old woman from Placencia) tells a traditional tale (Nansi story). This story evidences some prominent basilectal features:

- The use of the preverbal aspectual morpheme *de* (e.g., *everibadi de dans* 'everybody dances/keeps dancing') is best defined as an imperfective, as it may have progressive and habitual/iterative functions.
- The nonmarking of past (e.g., *di dans stat tu brok op* 'the dance started to break up.'
- The creole reinterpretation of some old preterites as bare verbs (e.g., *brok* 'break').
- The occurrence of a different preverbal past morpheme *me* (sometimes with anterior value), which helps distinguish between two sequential past events (*di mjusik me de ple* 'the music was playing' as background event to the crowd leaving the dance-hall). Here, the past morpheme is also combined with the imperfective marker indicating continuing action (see Escure, 2004 for a more complete list of basilectal features).

(21)

Dis	da	wan	taim	nou	dei	had
This	*TOP*	*a*	*time*	*now*	*they*	*had*
wan	dans	evribadi	de	dans		
a	*dance*	*evrybody*	*IMPERF*	*dance*		

'Once upon a time, they had a dance, everybody would dance'

(22) bra taiga bra dag bra everibadi
Brother Tiger Brother Dog Brother Everybody
dans Evribadi de dans
so Evrybody IMPERF dance
'Brother Tiger, Brother Dog, Brother Everybody, so everybody would dance'

(23) buldag de dans kou de
bull dog IMPERF dance cow IMPERF
dans evribadi
dance everybody
'the bulldog dances, the cow dances, everybody'

(24) big pati de goun tuwad midnait nou
big party IMPERF go.on towards midnight now
di dans stat tu brokop
the dance start to break.up
'it's a big party, towards midnight the dance ended'

(25) bika wan fait stat evribadi stat tu fait
because a fight start everybody start to fight
'because a fight started, everybody started to fight'

(26) evribadi de tekdun dem bati
everybody IMPERF take. down DET butt
an de kot
and IMPERF cut
'and everybody started to go and they left'

(27) an dat waz di en a di pati
and that was the end of the party
'and that was the end of the party'

(28) bot di mjuzik we me de plei
but the music that ANT IMPERF play
'but the music that was playing'

(29) i go laik dis: zinzinzin. vajalin
it go like this: zinzinzin. violin
da me di mjuzik
TOP IMPERF the music
'it went like that: *zinzinzin* it's the violin that was playing' (Nansi story, Escure, 1990)

An additional example shows how creole marks irrealis modality (unrealized events) through the combination of the anterior marker *me* and the future marker *wan* – a grammaticalized from of the verb 'want':

(30) R. wan tek wan korespondens kos.
R. FUT take a correspondence course
'R. will take a correspondence course.'

(31) i me wan tek it befo i kum awt.
he ANT FUT take it before he come out
'He would have completed it before he graduates.'

(32) i me de plan fu tek it
he ANT IMPERF plan to take it
'He was planning to take it'

(33) da di taim de tem don di kos don.
that the time the term done the course done
'so that by the time the term is over, his course would have been completed.' (Escure, 1990)

Acrolect

The acrolect is a local standard that differs from external standards. Since acrolects are typically the result of late acquisition, probably through school education, inconsistencies are most likely to occur at this lectal level, depending on social factors, such as an individual's relative access to the standard, or psychological factors, such as the speaker's identity and intent to converge toward the standard. The acrolect generally differs phonetically from its lexifier (in the case of Belizean English, it differs from RP-British English). Most common distinctions include the systematic or occasional absence of interdental fricatives, and variation in vowels (for example, lack of distinction between tense and lax vowels). Acrolects generally use standard grammar and morphology, for example, past verbs are now marked, preverbal morphemes are absent, the copula *be* is introduced, and so forth, but more variation occurs in upper mesolects, that vague area between the widely used labels of 'English' and 'broken English.' Thus, nonstandard morphological features may be part of an acrolectal version (for example, absence of copula/auxiliary; lack of 3SG agreement; hypercorrect past inflection, or pronoun variation), as are pragmatic mechanisms (such as the fronting of topics). The following sentence displays both *be* presence (*dei were expectin*) and absence (*would willin*):

(34) Dei we espektin samwan den wu
They were expecting someone then who
wud wilin tu tekop amz
would willing to take.up arms
'They were expecting someone who would be willing to take up arms.' (Escure, 1990)

Newspapers often exhibit similar linguistic features, whether unwittingly or as intended for special effect:

(35) I can **recalled** a very shocking incident [...] One may come to the conclusion that an abundance of ignorance **exist** within [...] This area has long been mean, but never **have** it been so lethal [...] Such an attitude gathers strength from its own **existent**, the longer it **persist**, the deeper **it** roots grow. ('Help our troubled & lost generation' *Alkebulan* (Belize), January 21, 1994: 2)

But an article on local politics – discussing the rival political party (PUP) – inserts some basilectal phrases in the middle of a standard text for emphasis (here sarcasm, shown in bold characters in the original text):

(36) [...] their plaintive wail when all else fails is victimization, translation**: A fri'ten bad.** [literally, I frightened bad 'I am afraid']

(37) [. . .] Houses are being built [. . .] **And would you believe it, the PUP bex bout that**. [literally, PUP vexed about that 'the PUP is annoyed about that'] ('The observer' *The People's Pulse* (Belize), April 17, 1994: 14)

Mesolect (The Village Midwife)

Mesolects can be defined as intermediate varieties, but they are not mere approximations of the standard: they have their own internal motivation and place in the social life of continuum users. Individuals who control the whole range of the continuum select the mesolect in well-defined situations – when addressing an older person, or the members of another ethnic group, or dealing with a serious topic. There are issues of respect, of formality, and of identity involved in such choices, so it is not possible to speak of 'basilectal' or 'mesolectal' speakers, except to say that in context A, an individual is a basilectal speaker, but in context B, the same speaker is a mesolectal speaker.

In the following excerpt, Miss Dora, a 75-year old midwife who has delivered all the village babies for the last 50 years, uses neither a basilect not an acrolect. She has native competence in the creole vernacular, but selects the mesolect when recounting her professional activities with her nephew. Characteristics of this mesolect include absence of copula, unmarked past, and an occasional preterite form (*had*) as well as the auxiliary *don't* (instead of simple preverbal negative). Mesolects generally imply avoidance of basilectal morphemes, but this implication is not always the case: at crucial peaks of the narrative, Miss Dora uses the TMA creole morphemes *de* (Imperfective) *me* (Past Anterior), as well as the expression *don ded* 'completely dead', a common use of the perfective marker 'done' to emphasize the finality of death. Note also the creole use of *lef* for 'leave' (*I had to lef dat* 'I had to leave/stop that'), one of a few verbs whose neutral form is a relexified irregular preterite.

(38) Da sem taim tu peshen kum in
At same time two patient come in

(39) wan mada da di ilevent bebi im gat
a mother TOP the eleventh baby she got
en di ada wan da di naint
and the other one TOP the ninth

(40) en de riali nat sapoz tu got bebi da vilidg
and they really not supposed to get baby at village

(41) bot den dei don wan go da haspital [. . .]
but then they don't want go to hospital

(42) wel a had a fait wid di bebi
well I had a fight with the baby
bika di bebi hed kum
because the baby head come

(43) bot di ada paat a di bodi wont kum [. . .]
but the other part of the body won't come

(44) den di aftabat kyan kum
then the afterbirth can't come

(45) a had tu lef dat wan an di ada wan redi
I had to leave that one and the other one ready

(46) a swab shi af [. . .]
I swab her off

(47) an den shi lef wika stil
and then she stay weaker still
de hemoredg
IMPERF hemorrhage

(48) an wen a give shi dat an fainali i kwait dawn
and when I give her that and finally she quiet down

(49) an shi an mai sista me tink di
and she and my sister ANT think the
bebi don ded
baby PERF dead

(50) a do mawt tu mawt bridin an
I do mouth to mouth breathing and
di bebi big bwai naw.
the baby big boy now

'Two patients came in at the same time. One mother was delivering her eleventh baby, and the other her ninth [. . .] They are not really supposed to deliver in the village, but they don't want to go to the hospital [. . .]. Well I had to struggle with the (first) baby because its head was coming out, but not the rest of its body [. . .] then the afterbirth wouldn't come [. . .] I had to leave that one (first mother) to go to the other one who was ready (to deliver) [. . .] I cleaned her (second mother) up [. . .] (first mother) remained weak, and was still hemorrhaging [. . .] When I gave her (herbs) she (first mother) finally settled down. She and my sister thought that the baby was already dead [. . .] But I did mouth-to-mouth resuscitation, and the baby is now a big boy.' (The Village Midwife, Escure, 1990)

Decreolization

Schuchardt's 'life cycle' concept (1883) became DeCamp's 'postcreole' continuum (1971). This developmental hypothesis suggests that creoles eventually merge with the standard, assuming that the continuum is the result of decreolization (loss of the creole). However, the data presented above suggest that the acquisition of acrolects or near-standard varieties – obviously facilitated by access to education and standard speakers after emancipation – does not necessarily entail concomitant loss of basilectal segments. Individuals, with few exceptions, are generally found to control a wide repertoire. Empirical studies show that they don't lose their native variety just because they have acquired a new one – no more than L2 acquisition would entail

loss of L1, except in extreme situations leading to language death.

The ability to handle alternate codes has been explained in terms of the 'dual standard,' or the 'covert' vs. 'overt prestige' dichotomy: as subaltern groups gain access to education, they become increasingly motivated or obligated to learn the standard as a means of improving their social position. Creole values may thus be overtly despised but secretly respected, whereas the values of the high-status group are overtly respected and secretly despised. As is the case in any multilingual context, individuals make linguistic choices that reflect their allegiance or close associations with either the dominant social group (usually speaking standard varieties), or the peer group, or both. The 'linguistic market' sociological model of linguistic production and expression also captures the relation between linguistic system (*l'habitus linguistique*) and linguistic market (*le marché linguistique*) (Bourdieu, 1982).

Such perceptual differences still mirror the historical colonial bias and the shift to a new social order. They also explain why creole languages offer such a wide range of linguistic possibilities. The linguistic spectrum captures the multiple nuances required in various human contact situations. The very nature of its flexibility ensures that **all** varieties remain active and operational, and contradicts the view that there is an ineluctable move toward the standard, since native (basilectal) values are highly prized, though covertly.

According to this perspective, decreolization is not diachronic change (although regular change naturally occurs), but rather repertoire extension and code switching. There is no postcreole continuum if the creole is still vigorous, as in Belize, or Haiti, or Papua New Guinea. There is a postcreole situation when the creole has lost most of its speakers, as in Louisiana, in which the confusion of the French-based creole with Cajun (a French Canadian dialect), the import of French teachers from metropolitan France, the dominance of English, and generally the low status of black speakers have probably contributed to the receding state of Louisiana Creole.

Conclusion

The field of creolistics has expanded considerably as new sociohistorical sources have redefined our understanding of the early stages of language genesis and development, and as more empirical field studies have offered testing grounds for theoretical and sociolinguistic models of language use and language development. Subfields of linguistics (historical linguistics, sociolinguistics, and theoretical linguistics more specifically) can benefit from the current state of knowledge in pidgins and creoles. New creoles encapsulate the linguistic effects of the violent social history that most of humanity has been subjected to. Language development is closely dependent on the economic and political features of the societies in whose context they emerged, and current linguistic variability serves to illustrate further the correlation that exists between linguistic structures and social aspects. Creole speakers use polylectal systems, rather than monolithic grammars, and this aspect should be highly relevant to theoretical models that focus on abstract generalizations but overlook the human language ability to juggle multiple systems.

See also: Anguilla: Language Situation; Anthropological Linguistics: Overview; Antigua and Barbuda: Language Situation; Barbados: Language Situation; Belize: Language Situation; Bickerton, Derek (b. 1926); Bislama; Cape Verde Islands: Language Situation; Cape Verdean Creole; Context, Communicative; Counterfactuals; Cultural and Social Dimension of Spoken Discourse; Discrimination and Language; Gullah; Guyana: Language Situation; Hawaiian Creole English; Identity and Language; Jamaica: Language Situation; Louisiana Creole; Mauritius: Language Situation; Morphology in Pidgins and Creoles; Nigeria: Language Situation; Papua New Guinea: Language Situation; Pidgins and Creoles: Overview; Prestige, Overt and Covert; Style and Style Shifting; Tok Pisin; Variation in First Language Acquisition; Variation in Second Language Acquisition; Vernacular.

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Variation in Second Language Acquisition

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The linguistic behavior of the L2 speaker is commonly believed to differ from that of the native speaker. The differences involve several aspects of language: grammar, pronunciation, and social and pragmatic features of language use. Moreover, these differences are both qualitative and quantitative, especially in early stages of L2 development. Grammatical, phonetic, and pragmatic deviations from the target L2 are obvious in learners with relatively little exposure to the second language. On the other hand, in advanced stages of second language development, the L2 learner may even attain native-like performance at least in the domain of grammar use (Birdsong, 1992; Epstein *et al.,* 1998; Sorace, 1993, 2000).

Throughout L2 development – perhaps with the exception of beginning stages – the learner's behavior generally includes target-like uses, whose frequency increases with time. In advanced stages, the comparison between the native speaker and the L2 speaker of that language becomes considerably more difficult. Empirical research on L2 grammatical development has shown that even advanced L2 speakers may differ from native speakers of a language in the degree of (in)consistent use of target forms, or in the (in)consistent application of grammatical constraints on the use of L2 grammar (cf. Coppieters, 1987; Hawkins *et al.,* 1993; Sorace, 1993, 2000; White and Genesee, 1996). This variation is also termed 'optionality' or 'variability' and refers to the performance data of the individual L2 speaker.

This notion of variability seems to be distinct from the notion of individual variation or individual differences. These terms aim to describe variation among L2 learners who have been grouped under the same level of L2 performance, on some independent measure of evaluation (e.g., a placement test). The degree of individual variation among L2 learners has also been used as a criterion for distinguishing first from second language development. Child L1 learners follow a relatively uniform developmental pattern and attain a mature level of competence in their native language. In the generative linguistics tradition, this uniform, fast, and effortless process of L1 development, together with the uniformity of the outcome referred to as native speaker's competence, are viewed from the same theoretical perspective: the innateness hypothesis for language acquisition. The lack of uniformity in the outcome of L2 acquisition, on the other hand, gives rise to alternative hypotheses regarding the nature of the cause. Several possibilities have been offered, which are addressed below. In

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This notion of variability seems to be distinct from the notion of individual variation or individual differences. These terms aim to describe variation among L2 learners who have been grouped under the same level of L2 performance, on some independent measure of evaluation (e.g., a placement test). The degree of individual variation among L2 learners has also been used as a criterion for distinguishing first from second language development. Child L1 learners follow a relatively uniform developmental pattern and attain a mature level of competence in their native language. In the generative linguistics tradition, this uniform, fast, and effortless process of L1 development, together with the uniformity of the outcome referred to as native speaker's competence, are viewed from the same theoretical perspective: the innateness hypothesis for language acquisition. The lack of uniformity in the outcome of L2 acquisition, on the other hand, gives rise to alternative hypotheses regarding the nature of the cause. Several possibilities have been offered, which are addressed below. In

general, the difference between first and second language learners is considered to be either a difference in the learning mechanisms employed in the developmental process, or an (in)ability of the learner's system to successfully analyze L2 input, resulting in a non-target mental representation of the L2 grammar (Hawkins, 2001; White, 2003). The majority of research on L2 variation attempts to account for the L2 data on these grounds.

Recent studies in L2 acquisition have raised alternative or additional possibilities to account for variation in the performance of the L2 speaker. These are based on two fundamental hypotheses of modern linguistic theory. The first concerns the competence/performance distinction in language. Although this distinction has been an essential part of Chomskyan linguistics throughout, it is only recently that psycholinguistics and L2 research combined their efforts to investigate the possibility of L2 variation being relevant to constraints on L2 processing (production or perception) rather than on L2 knowledge (Juffs, 1998; Juffs and Harrington, 1995; Felser *et al.,* 2003) thus investigating L2 performance as a possible cause of part or all of variation in advanced stages of L2 development. The second hypothesis draws on the new 'minimalist' direction which generative linguistic research has adopted with Chomsky's (1995) minimalist program. Minimalism offers a promising view on the architecture of the language system in relation to other domains of human cognition. From this perspective, variation in the L2 learner potentially involves problems at the interface between syntax and discourse, or syntax and morpho-phonological realization (Sorace, forthcoming; Prévost and White, 2000; Goad and White, 2004). Furthermore, the combination of these two hypotheses leads to the possibility of investigating variation in the L2 speaker's grammar as a result of interface problems (morphological or syntactic) in execution, i.e., in production or comprehension, but not in the underlying linguistic knowledge.

Whatever the analysis, it is noteworthy that the two notions of variation, i.e., variation in an individual L2 speaker's grammar or variation among L2 speakers' performance, could amount to the same psycholinguistic property of the non-native language. In other words, a feasible analysis of variability in the use of a syntactic phenomenon by a non-native speaker should be extendable to account for variation found among L2 learners. As we shall see below, to approach the question of variability one needs to have an elaborate theory of language use that makes underlying grammatical representations only one of the many possible loci of variation in language performance.

In the following sections, some of the recent theoretical trends of L2 speaker variation in the use of grammar will be presented. They belong to the different but complementary research hypotheses outlined above, namely the grammar, the interface, and the processing approach.

The L2 Grammar

Earlier work in second language acquisition has revolved around the question of whether the developing L2 grammar and its endstate are constrained by natural language principles, as is the case with the native language grammar. This question refers to the nature of the learning mechanisms involved in L2 acquisition which guide the analysis of the input but also the construction of the L2 grammar. To this aim, different types of developmental L2 data primarily from adults but also from children and adolescents were examined with two points of reference; the target language on one hand, and Universal Grammar – i.e., natural language principles – on the other. There are three logical possibilities in this respect, namely that second language development is (i) similar, (ii) different, (iii) partly similar to native language acquisition, insofar as accessibility of principles and constraints of Universal Grammar is concerned. Unsurprisingly, all three possibilities have been advocated under the names of *Full Access*, *No Access,* and *Partial Access* theory, respectively (White, 2003). Within each of these theories, a number of alternative analyses have been proposed, which, however, share the basic assumptions regarding the nature and the locus of the L2 representation. Thus, *Full Access* theories propose that L2 grammars are represented in the same cognitive faculty as L1 grammars, i.e., the Language Faculty. All learning mechanisms and constraints on developing and on endstate native grammars are similarly operative in the L2 case. These theories have an important epistemological advantage over No Access and Partial Access theories, in that they assume the 'null hypothesis' for second language acquisition, Specifically, by arguing that the cognitive domain of linguistic knowledge is the same for native and non-native languages, they propose a more economical approach to knowledge acquisition and storage. Moreover, they have an empirical advantage in explaining the fact that all L2 learners, exposed to sufficient input, will attain good knowledge of the second language, which can be used spontaneously and without conscious feedback from explicit metalinguistic information. On the other hand, Full Access theories need to account for variation in the use of the L2 grammar by even advanced learners. To this

end, they propose that variation can be (a) due to the insufficient or degenerate nature of the input presented to the L2 learner, (b) to the 'marked' status of the L2 phenomenon in relation to universal constraints (c) to L1 interference at interface levels of representation. The third choice belongs to the interface approach to L2 variation and will be discussed below. The nature of the input and the extent to which the L2 learner's developing grammar can analyze it adequately is an empirical question and requires experimental testing. The idea is that even if the quantity and quality of the input are similar in native and non-native learners of the same language, the fact that the non-native learner already has an endstate representation of the native language may render the L2 input underdetermined for the L2 developing grammar (Schwartz and Gubala-Ryzak, 1992). Finally, the second possible cause of variation in the L2 speaker refers to the characterization of the L2 grammar as the marked option with respect to a particular phenomenon. For example, it has been argued that null subject languages, such as Spanish, instantiate the unmarked option of the relevant parameter whereas the English non-null subject option is 'marked.' Thus, L2 acquisition of the 'marked' option should be slower or even incomplete for native speakers of null subject languages, whereas the opposite case, e.g., English learners of Spanish, would be more successful.

No Access theories maintain that the language faculty is only indirectly involved in L2 grammar construction, i.e., only through positive transfer of grammatical features or parametric values that are similar in the native and the second language. The crucial difference between No Access and Full Access theories is the assumption that general learning mechanisms may be implemented in the analysis of the L2 input and the construction of the L2 grammar (Clahsen and Muysken, 1986). This approach implies that the L2 grammar may be represented in a cognitive domain distinct from the L1 grammar, in adult L2 learners. As a result, variation in the performance of the L2 speaker is expected: a linguistic generalization drawn from general cognitive strategies, distinct from the language faculty, will give rise to wrong performance, even if the rule is consistently observed. This is due to the notions of domain-specificity and modularity of the language faculty. Grammar-construction located outside the language faculty is bound to show defects compared with the usual development of the native language, in the same way that compensatory strategies implemented by cognition in domains affected by some pathological cause can give rise to incomplete output representations (Paradis and Gopnik, 1997).

Partial Access theories share the assumption of Full Access theories regarding the role of UG constraints in L2 grammar construction. Thus, L2 development is regulated by the same language-specific mechanisms operative in L1 acquisition. Second language grammars are, then, 'natural languages,' represented within the domain of the language faculty. On the other hand, Partial Access theories suggest that syntactic differences between the grammar of the native and the second language are problematic even for advanced learners. The reasons are various. For example, some Partial Access theories assume that the Critical Period Hypothesis is valid and, as a result, constructing the target L2 grammar even on the basis of sufficient input is impossible for adult L2 learners. The underlying assumption is that certain aspects of the language faculty are subject to critical period constraints. These aspects become inaccessible after the end of the critical period, and the system maintains the syntactic choices of the native language for the L2 grammar, too. In advanced stages of L2 development, the L2 grammar attempts to compensate for the misfit between the L1 grammar and the L2 input, adopting other UG-constrained options or using metalinguistic strategies to accommodate the L2 input (Smith and Tsimpli, 1995; Hawkins and Chan, 1997). It is important to note that variation in the performance of the L2 speaker is predictable by Partial Access theories. The locus of variation is the syntactic domain where L1 syntax differs from the second language. As L2 development proceeds, the learner's attempts to integrate UG-based or other options to approximate L2 input leads to improvement in L2 performance, which, however, cannot, by assumption, be identical to native-like output.

Explicitly adopting the Critical Period Hypothesis is not necessary in the Partial Access framework. It is possible to attribute the incomplete nature of L2 grammars to the mature representation of the native language which characterizes the language faculty of an adult L2 learner. Thus, it has been suggested that L2 learners are predicted to show optional and variable behavior in the use of L2 grammar due to the underlying optional grammatical representations. This optionality is due to unfixed (or 'inert' in Eubank's 1993/94 terms) values that functional categories such as inflection may have, in second language grammars. Given that the cause of optionality is the lack of fixed values of grammatical features in the L2 syntactic representations, this version of the Partial Access approach is perhaps the only one in this framework that invokes a derivational and representational difference between native and non-native grammars: the former cannot tolerate valueless features whereas the latter can. Although this theory has

been presented as a theory of developing second language grammars, a version of it has been extended to describe endstate or very advanced L2 grammars which are characterized as 'impaired' with respect to their inability to identify the value of specific grammatical features (Beck, 1998). Partial Access theories share the empirical problem of reducing variation to a minimum – albeit in a small minority of L2 speakers – and attaining an endstate grammar that is indistinguishable from that of a native speaker.

Having outlined the main assumptions of the 'grammar approach,' it becomes clear that this approach builds primarily on syntactic theory. It ignores performance factors or other non-linguistic constraints on L2 performance, on the grounds that second language grammars are analyzable like native language grammars, within the generative paradigm. If the point of reference is indeed the native language, then L2 grammars, particularly given the variability observed even in advanced stages of L2 development, should differ in both qualitative and quantitative terms. As mentioned at the beginning of this essay, however, it is possible to analyze variation in the L2 speaker as the result of an interaction between parts of the language faculty and other aspects of cognitive or motor systems, affecting language performance. We can then turn to the interface approach to L2 variation.

The Role of the Interfaces

In the recent minimalist framework of Chomsky (1995), language is viewed as a cognitive system that comprises a computational component, i.e., the syntax proper, and two interface levels: the LF (Logical Form), which includes all and only semantic information of syntactic representations, and the PF (Phonetic Form) which includes all and only phonetic output. LF is the interface between language and the conceptual-intentional systems of higher cognition, in particular, inferencing, whereas PF is the interface between language and the sensorimotor systems. Given that generative research has been based on the modularity view of the language faculty (Chomsky, 1972), the minimalist picture of language allows only the computational component, i.e., the domain where syntactic derivations take place, to remain strictly modular in the Fodorian sense. Interface levels are by definition penetrable by the systems which form the interface itself. Therefore, semantic features that 'reside' in language but also in the mental lexicon are actively involved in the LF interface. Similarly, phonetic features, which are produced by the motor system interfacing with language, have a representation in the PF interface.

An important property of interface representations is the necessary exclusion of some features which, nevertheless, participate in the syntactic computation. In particular, there are syntactic features that are *interpretable* at LF, due to their semantic content, and other syntactic features that are *uninterpretable* at LF and have to be deleted before the derivation reaches the semantic LF interface. Features such as Case or subject-verb Agreement, are responsible for crucial aspects of the syntactic derivation, but are not 'legible' by the LF interface, due to their lack of semantic content (Chomsky, 1995). Thus, in a sentence such as *This boy runs fast,* the agreement feature [3rd person singular] appears on the subject and the verb's feature specification. At LF, however, the feature is interpretable only on the subject, which is a nominal category, and not on the verb. Given that LF and PF interfaces are regulated by semantic and phonetic constraints, respectively, the elements or grammatical features that participate in the interface representations need to have semantic and phonetic content. It should be pointed out that features that are *uninterpretable* at LF are those features that drive syntactic computations and, as a result, are responsible for crosslinguistic variation in the syntax. Thus, syntactic differences between languages, referred to as 'parameters,' are regulated by the properties that semantically unintepretable features have in each natural language. The process of native language acquisition comprises acquisition of lexical, interpretable, and uninterpretable features, which will determine the parametric properties of the language acquired. This picture of the language system, together with the distinct role of a grammatical feature inside the syntactic computation and at either interface level, has proved fruitful in the description and analysis of variation in the non-native speaker of a language, as we see in the theoretical accounts framed within the interface approach.

Within the minimalist spirit, there have been some recent attempts to account for variation in the use of L2 grammar by advanced learners. There are two alternative views. One assumes that second language grammars can develop through the operation of the same UG-based principles and constraints as native language grammars. Therefore, L2 development can reach an endstate that is identical to that associated with L1 development as far as the modular representation of the grammar is concerned. This theory does not adopt critical period assumptions regarding differences in the 'ultimate attainment' of native and non-native developmental processes. It is assumed, however, that interface properties are vulnerable in cases of language contact in the individual's linguistic system. Thus, it is possible to find interference of L1 discourse-related

features on an otherwise native-like L2 representation at the LF interface (Sorace, forthcoming).

To exemplify this theoretical approach, Sorace discusses the use of subject pronouns by English near-native speakers of Italian. It appears that differences from the monolingual Italian speaker's use of pronouns are restricted to the syntax-discourse interface. Specifically, although these L2 speakers use null subject pronouns, they will occasionally use an overt subject pronoun as a response to a question such as *Perchè Maria è uscita?* ('Why has Maria gone out?), producing utterances with an overt pronoun, e.g., 'Perchè *lei*. . .' ('Because she . . .'), which are deviant, from the monolingual speaker's view, in discourse terms. This type of evidence suggests that near-native L2 speakers can be native-like with respect to the syntactic properties of the L2 grammar, but still show interference effects from the native language at the interface between syntax and discourse.

The interface level of syntax and morphology/phonology has been invoked in attempts to analyze optional use of correct morphological forms by advanced or near-native L2 speakers (Lardiere, 2000; Prévost and White, 2000). The argument, in this case, is that the constraints that necessitate use of, for example, the third person singular '–s' in English present tense forms of regular verbs (*walk-s, laugh-s*) are distinct from the syntactic representation that includes *abstract* specification of the corresponding inflectional feature. Thus, the phonological form [la:fs] is the realization of the abstract syntactic representation including the verb 'laugh' with its inflectional features (V, (3rd Person, Singular, Present Tense)). For a speaker to produce the correct form, both the abstract specification and its mapping constraints on overt morphology have to be satisfied. The interface approach to L2 speaker variation suggests that the underlying representation can be target-like, especially in the case of near-native L2 speakers, whereas the operation of the interface conditions on PF realization are affected by the surface properties of the native language. Thus, optionality in the correct use of overt morphophonology is predicted even in near-native L2 speakers.

The two versions of the interface approach presented above share a fundamental assumption, namely that the grammar of the L2 learner can be identical to that of a native speaker of the language in question. Thus, the crucial difference between the interface approach to variation and the grammar approach presented in the previous section concerns the vulnerability of the grammar proper in non-native language acquisition. One could, however, entertain an alternative account for L2 speaker variation, which is sensitive to the minimalist architecture of the language faculty, and combines some of the possibilities offered by the grammar and the interface approach. It could be referred to as the *Interpretability* approach, and it capitalizes on the minimalist assumption that grammatical features can be distinguished in terms of their role in the derivation, i.e., the syntax module, and the LF or the PF interfaces (Tsimpli, 1997, 2001). This is a more general learnability approach to grammatical features and the pattern of their acquisition in native child language learners, in non-native adults, and in pathological cases of language development.

The interpretability theory suggests that the semantically *uninterpretable* grammatical features are subject to maturational constraints in first language development. Assuming that the Critical Period Hypothesis is valid, the implication is that these uninterpretable features become inaccessible after the critical period is over. For example, the agreement feature found on verbal inflection has been associated with the value of the Null Subject parameter, mentioned above. Assuming that it is an uninterpretable feature, the implication is that it will not be accessible for parameter-resetting after the end of the critical period (Tsimpli, 1997). On these assumptions, adult L2 learners fail to construct an L2 grammar using the same resources as the child native language learner. Specifically, syntactic aspects that depend on purely grammatical features with no semantic content lead to incomplete and deviant derivations of L2 syntactic structures, even in advanced stages of L2 development. This results in the attested variation in L2 performance. On the other hand, semantically interpretable features are not subject to maturation; therefore, they are accessible to learners in any course of language acquisition. Recall also that the LF interface is not a modular system, and as such it is penetrable by higher levels of cognition, including conceptual and pragmatic information. It is therefore possible to access semantic features not only through the language system, i.e., 'bottom-up,' but through the conceptual-intentional systems, too, i.e., 'top-down.'

There are two main questions for this theory: (a) How can the theory account for near-nativeness in the use of L2 grammar; and (b) why do features of the syntax/discourse interface show variation and optional use by L2 speakers, as suggested by Sorace (forthcoming). With respect to the first question, near-native grammars are claimed to 'simulate' L2 output via linguistic or extra-linguistic routes (Smith and Tsimpli, 1995). The process of approximating near-nativeness is itself gradual. Thus, implementing alternative resources may, in the early stages of development, involve a process which is conscious or accessible to consciousness. With time and practice, the successful output becomes implicit knowledge in the

form of an over-learned routine (Anderson, 1992). For this account to be psychologically feasible, it is important to maintain that it is an empirical question which can be tested neurolinguistically and psycholinguistically, so as to access sub-conscious workings of language and systems parasitic on it, such as memory and processing constraints. Furthermore, we expect some variation to persist in the use of these grammatical features, precisely because attainment of the 'near-native' level is mediated by cognitive routes not followed in the case of the native speaker, in the form of compensatory strategies.

As far as the second question is concerned, namely the variation observed in the use of discourse-related features, there are different possibilities. The first is that these features are not part of the LF interface exclusively. Logical Form is the level of syntactic representation that includes all and only semantic features, but not discourse-related features which contribute to pragmatic interpretation. It is possible then that a higher level of representation where discourse and information-structure of the sentence are relevant, is involved. This level 'enriches' the output representation of syntax *and* LF. For example, according to theories such as Relevance Theory (Sperber and Wilson, 1995; Carston, 2002), reference-assignment to pronouns, and generally, interpretation of pronouns, is largely underdetermined by the LF interface. When this representation enters pragmatics, early stages of discourse processing will allow context to determine the referential index that the pronoun has.

Another possibility is to distinguish between the activation of an interpretable feature such as [aspect] or [referentiality] in L2 grammar construction, and the PF output of the grammaticalized options this feature has in a specific language. Consider, for example, the difference between a language that morphologically marks the distinction [+/−progressive] but not [+/−perfective], such as English, and a language that marks [+/−perfective] but not [+/−progressive], such as Russian or Greek. Both features belong to the category of *viewpoint aspect* in Smith's (1991) terms, i.e., the category of morphologically realized aspectual distinctions, which may differ from language to language. According to Smith (1991), the [progressive] feature is a subcategory of the general [-perfective] feature, in that the contexts in which the progressive interpretation is the target are also imperfective, whereas the reverse does not hold. It is relatively common for Russian or Greek near-native speakers of English to show some variation in the use of the progressive form, usually overextending it to habitual or stative cases. Sentences such as '*I am thinking that you are a fool*' are therefore possible in the advanced L2 of these speakers.

The question then is whether the problem is localized in the PF interface, the LF interface, or both. If it is a PF-interface problem, then the near-native grammar of these learners of English shows variation due to the possible mapping of the *–ing* form onto the [progressive] *and* the [−perfective]. The latter is a feature active in the native language, and the former is the feature active in the second language. Given the interpretability of these features at the LF interface, the interpretability theory predicts that the [progressive] should be accessible to the L2 grammar. Given the native language, however, the [imperfective] will also remain available. The reason why acquisition of the [progressive] does not override the L1 [imperfective] feature is primarily the subordinate/superordinate relation of these two features at the semantic level. As a result, the learner will show a certain degree of optionality even at advanced stages of development, in the morphological realization of the [−perfective, −progressive] as in the example presented above. In all contexts where the [−perfective] is active, the [progressive] may but does not need to be active too. Although the learner has acquired the [+/−progressive] distinction in the second language and can use it to contrast ongoing and habitual readings of an event, optional uses of *-ing* for non-progressive forms are also expected because of the [−perfective] feature.

In this analysis, variation in the use of aspectual forms in L2 speakers stems from the semantic interaction – at the LF interface – of [+/−progressive] and [+/−perfective] interpretable features in the second language and from the PF implications this has for the mapping options of these features onto L2 forms. If this approach is correct, variation in the use of interpretable features does not indicate problems in the *acquisition* of the relevant L2 feature. Instead, variation can be found in cases where different features of the same category are grammaticalized in L1 and L2, respectively. The co-existence and LF interaction of the native and non-native features gives rise to the variation attested.

Syntactic Processing in the Second Language

Language processing has usually held a peripheral place in generative linguistics research due to the assumption that the 'parser' is a performance system whose operations draw from grammatical knowledge but also from memory and processing constraints specific to the parser and independent from grammar proper. In native language processing, it seems that the integration of semantic and pragmatic information follows the initial step of syntactic processing; this involves generating a syntactic structure constrained

by universal and language-specific constraints on syntactic parsing, largely independent from semantic or pragmatic considerations (Frazier and Clifton, 1996; Phillips, 1996; cf. Altmann *et al.,* 1998; MacDonald, 1994). Second language research has recently begun investigating variation in the use of the second language, as a result of parsing differences between the native and the non-native language. It is then possible that 'parsing' a syntactic structure in the second language is different from 'knowing' that same structure. Consequently, L2 performance may exhibit variation which need not involve incomplete or divergent L2 grammars (Sorace, forthcoming).

Transitivity and argument structure alternations constitute a common research area in language processing. Notice that this area of grammar involves the mapping from lexicon to syntax, and, as such, it requires knowledge of lexical semantics and corresponding syntactic structures. Juffs (1998) found differences in the parsing ability of causative-inchoative alternations in advanced L2 learners of English, who appear to share the same level of grammatical knowledge of these structures in the second language but vary in their ability to parse them. It is argued that the variation attested may be due to the different native languages of the learners (Japanese, Korean, Romance, Chinese) but also to the different rate and pattern of development of the L2 parser compared with the L2 grammar. The discrepancy between L2 competence and L2 parsing has also been found in processing studies concentrating on purely syntactic phenomena, such as wh-interrogatives (Juffs and Harrington, 1995). The claim is that although knowledge of wh-extraction and chain-formation are part of L2 knowledge, L2 learners are sensitive to semantic or pragmatic properties of wh-structures, on-line. Differences between native and non-native language processing have also been identified in relation to 'universal' principles of parsing. The structures involve modification and create local ambiguities of the type *I met the secretary*$_i$ *of the director*$_j$ *who*$_{i/j}$ *was standing on the balcony* (Papadopoulou and Clahsen, 2003; Felser *et al.,* 2003). The prediction for this type of structures is that parsing strategies force the interpretation according to which the person standing on the balcony is the secretary rather than the director. This prediction is not borne out for both native and non-native speakers of English. It is therefore concluded that language-specific parsing preferences together with parsing strategies adopted for non-native language processing need to be taken into account.

Generally, research on language processing focuses on the ability of native and non-native speakers of a language to assign an interpretation to a sentence using lexical or structural knowledge on-line. In a recent study, Papadopoulou and Tsimpli (2004) investigated native and non-native language processing in Greek, focusing on the use of subject-verb agreement morphology to resolve local ambiguities created by optionally transitive verbs. The group of L2 speakers of Greek included participants from different language backgrounds with advanced or near-native knowledge of the language. The results show that whereas native speakers show no significant difference in reading times for the subject and object interpretation, non-native speakers show a significant preference for the object reading, indicating that thematic information, such as transitivity, overrides morphological cues for parsing locally ambiguous structures. Thus, native parsing prioritizes morphology over thematic structure, while the reverse holds for non-native parsing.

Conclusion

Variation in the L2 speaker's linguistic performance is frequently attested. The questions for linguistic theory are whether the attested variation is (a) the result of an underdetermined or incomplete L2 grammar, (b) the result of the 'contact' between the native and the non-native language at the grammar or the interface level, (c) the result of a mismatch between language knowledge and language use, or (d) a combination of these. Research continues to address all of these options as open questions, and fruitful outcome is expected when more is known about mental interaction between the language system, the parser, and higher levels of cognition.

See also: Bilingualism and Second Language Learning; Interlanguage; Language as an Object of Study; Linguistic Universals, Chomskyan; Modularity; Second Language Acquisition: Phonology, Morphology, Syntax; Second Language Attrition.

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Born in Rawalpindi in 1887 into a well-to-do Nanda family of the Pañjab, as a son of Rām Dās Nanda and Jamnā Devī, Siddheswar Varma was originally called Piṇḍī Dās Nanda. As a P.W.D. contractor, his father had to move from place to place and thus the son was educated in various schools in Kaimalpur, Gujrat, Rawalpindi, Jhelum, Gujranwala, and Miyanwali (all now in Pakistan). Educated in Urdu, he learned at home, Hindi and Sanskrit. He received a B.A. from Gaudan College in Rawalpindi, then pursued studies at Forman Christian College (of Pañjab University) in Lahore, earning his M.A. in history in 1911.

Varma then worked at Shahpur Durbar as private secretary to the Raja and as tutor of his son. He passed the Shastri examination in Sanskrit in 1913, began teaching, and then in 1915, was appointed Headmaster of Hindu High School in Gujranwala. In the same year, he became Lecturer of Sanskrit at Prince of Wales College (now Gandhi Memorial College) in Jammu. During this time, he worked mainly on Sanskrit and published some text editions. In 1924 he furthered his studies of Sanskrit and linguistics at the School of Oriental Studies in London, earning a doctor of literature in 1927. His dissertation dealt with ancient Indian phonetics, the Prātiśākhya and Śikṣā texts. He also visited Paris and was deeply influenced by J. Bloch. From 1915 to 1943 he taught (first as Lecturer, then Professor of Sanskrit) at Prince of Wales College in Jammu. From Jammu he conducted much fieldwork on languages of Western Himalaya, mostly at his own expense.

During his retirement from 1943 to 1948 he worked at Vishveshwaranand Vedic Institute in Lahore, participating in the preparation of the *Vedic word-concordance*. From 1948 to 1951, he was at the Institute of International Culture in Nagpur, collaborating with Raghu Vira on a Hindi dictionary project. Then, from 1952–1960 he was General Editor in the Central Hindi Directorate, Ministry of Education, Delhi. In 1960 he became head of the Chandigarh Centre of Vishveshwaranand Vedic Institute. He received an honorary doctor of literature from Pañjab University in 1967, and, in 1982, from Jammu University. In his later years he prepared a three-volume summary of G. A. Grierson's large *Linguistic survey of India* (1972–1976) and a series of linguistic analyses of major Indian languages and language groups (1978). Siddheswar Varma died in Delhi on August 18, 1985, at the age of 97.

See also: Bloch, Jules (1880–1953); Panini; Patanjali (2nd Century B.C.).

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Varro, Marcus Terentius (116–27 B.C.)

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Varro's lengthy life (116–27 B.C.) featured two careers that brought him fortune and fame respectively. During his more than 30 years of military/political activity he served as triumvir capitalis, quaestor, tribune, praetor, and propraetorian legate, was the first Roman to win a *corona rostrata* (or *navalis*), and amassed much wealth and knowledge. He fought with Pompey against Caesar, who pardoned him, but Mark Antony later proscribed him – he escaped, obviously – and destroyed his library. Turning to research, Varro became Rome's most prolific scholar and most authoritative grammarian. A legend in his own lifetime, he was the only living scholar honored with a statue in Rome's first public library, and he has been lavishly praised by Cicero, Quintilian, Augustine, the *grammatici Latini*, the monks of Monte Cassino, Petrarch, Renaissance humanists, and Montaigne, as well as contemporary historians of linguistics, among many others.

Varro was an encyclopedic polymath who authored at least 74 scholarly tomes on subjects as diverse as stagecraft (he determined the genuine plays of Plautus, *inter alia*), numerals, ocean tides, civil law, philosophy, farming, urban affairs, libraries, etc.; his biographical dictionary of 700 famous Greeks and Romans was the first illustrated book, another volume formalized the liberal arts canon, and he composed satires. Varro's first love, however, was language, the Latin language in particular, and he authored at least 10 major works on language science. Unfortunately, only 3% of his voluminous corpus has survived. The losses of the 45 books of the *Antiquitates*, his enthnographical masterpiece, and of all but 6 of the 25 books of his *magnum opus*, the *De Lingua Latina*, are especially regrettable.

In the extant books of the *De Lingua Latina*, Varro etymologizes hundreds of Latin words in the most scientifically rigorous manner possible at the time, but more importantly he discovers, in theory perfectly and in practice almost so, the declensions and conjugations that become the centerpiece of Latin grammar for all time. In the process of that discovery Varro establishes himself as, arguably, classical antiquity's most original linguistic thinker, at least on morphological matters, and sets the agenda for the future of Roman language science. It is therefore no surprise that he is the most frequently cited linguistic authority in the ancient Roman grammatical tradition. The three books of *De Re Rustica*, Varro's only complete extant work, are a literary guide to farming and manifest a genuine affection for land and animals, whereas the 500 or so fragments of his Menippean satires are witty tidbits of philosophical and political insights. Only fragments remain of other works. Nonetheless, Varro is indubitably one of the most prominent figures in Roman intellectual history.

See also: Classical Antiquity: Language Study; Quintilian (ca. 30–98 A.D.).

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Carolina Michaëlis de Vasconcelos built up an impressive academic career as a philologist, ethnographer, and historian of Portuguese literature. Born in Berlin on March 15, 1851, *Dona* Carolina, as she is fondly called in linguistic circles, moved to Oporto, Portugal, in 1876, due to her marriage to the Portuguese writer and art critic Joaquim de Vasconcelos. Her basic education was achieved at home, first with the philogist Eduardo Maetzner and then with the romanist Karl Goldbeck, with whom she studied classic languages. When she was only 16 years old, she set out the paper 'Altspanische Prosadarstellung der Crescentiasage von A. Mussafia' in the pages of the

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The contribution of this magnificent scholar to the investigation of medieval and classical Portuguese language and literature is invaluable, which can be easily confirmed by the continuing interest in her texts, still quoted in any contemporary essay on Portuguese philology. This splendid career finished only as a result of her death on November 11, 1925, in Oporto.

See also: Historical and Comparative Linguistics in the 19th Century; Portuguese.

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Vatican City: Language Situation

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Italian troops entered Rome on September 20, 1870, and Pope Pius IX retired to the Vatican, proclaiming himself a prisoner and refusing to recognize the Italian state. Vatican City was created with the Lateran Pacts of February 11, 1929, which granted the Holy See sovereign jurisdiction over the Vatican. The number of inhabitants in 2002 was ca. 900, of whom half had Vatican citizenship. Italian is the official language of the state, but Latin is the traditional language of the Holy See: it is used in official statements of the Catholic Church and in the Gregorian University. There is also a body of over a hundred Swiss Guards, who are Swiss German speakers. The ecumenical character of the Catholic Church, and the presence of foreign diplomats, contribute to a multilingualism that is considerable in view of the smallness of the state. Pope Karol Wojtyla (John Paul II, 1978–2005) was of Polish mother tongue. His successor, Joseph Ratzinger, 1927– (Benedict XVI, 2005–) is of German mother tongue.

See also: German; Italy: Language Situation; Latin; Polish.

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Venezuela: Language Situation

Editorial Team

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The Bolivarian Republic of Venezuela is located in the north of South America, bordering Columbia in the west, Brazil in the south, and Guyana in the east. In the north Venezuela faces the Caribbean Sea into which the Orinoco River drains. Around 70 islands off the coast belong to Venezuela as well. Venezuela was originally inhabited by several American Indian peoples, including Arawaks, Caribs, and Chibchas. Christopher Columbus established contact with hitherto unknown European communities on his third voyage in 1498. During the middle of the following century, the Spanish established colonial bases along the coast and the adjacent islands, and in 1527 the most important of these, the future Venezuelan capital Caracas, was founded. Colonial rule ended in 1811 and Venezuela became part of Gran Columbia under its first president Simón Bolívar. Bolívar, the Libertador, a native of Caracas, is still held in high esteem in Venezuela today. In 1830, Venezuela separated from Gran Colombia and became an independent republic. The country is very rich in natural resources, including coal, iron, gold, and, above all, oil, and was at one time the world's largest oil exporter. Yet, there are economic problems, including high unemployment and poverty.

The official language of Venezuela is Castilian (Spanish), and is identified as such in the 1999 constitution. The Spanish of Venezuela shares a number of features with other Latin American varieties of Spanish, and more specifically with members of the Caribbean Spanish dialect area. The vast majority of Venezuelans are speakers of Spanish, all official and commercial activities are conducted in Spanish, and the country appears to be linguistically very homogenous. On the other hand, northern South America is one of the most complex linguistic areas of the world, and probably more than 30 Amerindian languages are spoken in Venezuela, almost all of them, however, by very small numbers of speakers. Grimes (2000) lists 40 living languages (see Table 1). Except for Spanish, Venezuelan Sign Language, and Colonia Tovar German (a dialect of German based on the Southern German dialects of migrants in the mid 19th century), these are all Amerindian languages. Most Amerindian languages of Venezuela belong to the Arawakan and Carib families, and the majority of them are spoken by less than 1000 speakers, a significant number by less than 100 speakers. Most Arawakan languages are spoken in the southwest in the border area of Columbia, while Carib languages are spoken in the central and southern parts of the country.

Some Venezuelan languages have further speakers in neighboring countries; for example, Sáliba has 250 speakers in Venezuela, and another 2000 speakers in Columbia, while Nhengatu (Modern or Coastal Tupí) has in addition to 2000 speakers in Venezuela another 6000 speakers in Columbia and Brazil. However, majority of Venezuelan have exceedingly small speaker numbers, and, given that a high proportion of the speaker numbers in Grimes (2000) are based on estimates from the 1970s and 1980s, it is likely that some languages have by now disappeared.

The only Venezuelan Amerindian language with more than 100 000 speakers is Wayuu (Guajiro), spoken on the Guajira Peninsula on the Caribbean

Table 1 Languages of Venezuela[a]

Language name	*Classification*	*Number of speakers*
Arawak	Arawakan	A few
Baniwa	Arawakan	407 (1975)
Baré	Arawakan	A few (1975)
Curripaco	Arawakan	210 (1970)
Guarequena	Arawakan	367
Mandahuaca	Arawakan	3000 (1975)
Paraujano	Arawakan	20 or fewer (1975)
Piapoco	Arawakan	99 (1975)
Wayuu	Arawakan	170 000 (1995)
Arutani	Arutani-Sape	5 (1977)
Sapé	Arutani-Sape	5 (1977)
Akawaio	Carib	A few
Carib	Carib	4000–5000 (1978)
Japrería	Carib	80 (1975)
Macushi	Carib	600
Mapoyo	Carib	2 (1977)
Maquiritari	Carib	4970 (1975)
Panare	Carib	1200
Pemon	Carib	4850
Sikiana	Carib	Possibly none
Yabarana	Carib	20–64
Yukpa	Carib	500
Motilón	Chibchan	850 (1980)
Tunebo, Central	Chibchan	A few
Cuiba	Guahiban	650 (1995)
Guahibo	Guahiban	5000
Piaroa	Salivan	12 000 (1987)
Sáliba	Salivan	250 (1991)
Nhengatu	Tupi-Guarani	2000 (1987)
Ninam	Yanomam	100
Sanumá	Yanomam	1000–4000 (1976)
Yanomamö	Yanomam	12 000–14 000 (1991)
Mutús	Unclassified	200 (1977)
Puinave	Language isolate	240 (1975)
Warao	Language isolate	18 000 (1993)
Yaruro	Unclassified	2000–3000
Yuwana	Unclassified	300 (1970)

[a]Based on Grimes (2000). Number of speakers does not include speakers of the language outside Venezuela.

coast, which has 170 000 speakers in Venezuela, and another 135 000 in Colombia.

Although the constitution identifies the linguistic and cultural rights of the indigenous people, language maintenance and support is not high on the political agenda, partly because fewer than 2% of the population are speakers of an Amerindian language, most of whom live in the more remote parts of the country.

See also: Arawak Languages; Cariban Languages; Minorities and Language; Multilingualism: Pragmatic Aspects; Spanish.

Language Maps (Appendix 1): Map 76.

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Ventris, Michael (1922–1956)

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Michael Ventris was an architect, not a linguist or philologist, by training and usual occupation. He is widely known, however (even outside of the academic world), for a singular linguistic accomplishment, namely, the decipherment of the Mycenaean Linear B script and the determination that the language it encoded was an archaic dialect of Greek.

Ventris first heard of the problem of the undeciphered scripts of the Minoan tablets when, in 1936, as a 14-year-old schoolboy, he heard an impromptu remark by 85-year-old Knossos discoverer Arthur Evans at Burlington House in London to the effect that neither he (Evans) nor anyone else could read the writing on the tablets.

The groundwork had been laid for Ventris' work by a number of scholars, including Emmet Bennett, Jr. and Alice Elizabeth Kober (1906–1950). From Bennett's work, Ventris knew that the Linear B script was likely to be a syllabary. Kober had done preliminary analysis of possible inflectional patterns in the corpus. Ventris, however, in a series of working hypotheses, slowly let patterns emerge and speak for themselves. He never locked himself mentally into one unassailable set of assumptions about the script, but produced a series of visual grids in which he tested hypotheses about the phonetic values of the signs. His 1953 announcement of the successful decipherment caused a sensation in the scholarly world and attracted a large share of criticism, the most vituperative of which came from A. J. Beattie, Professor of Greek at Edinburgh University.

Unlike Champollion's decipherment of Egyptian hieroglyphics, Ventris' work was carried out without the benefit of a parallel inscription for comparison. Ventris' achievement testifies to the importance of intuition and natural ability in linguistic observation and analysis; and in his case, these were coupled with rigorous analytical method and a single-minded dedication to the problem that preoccupied him. Numerous commentators have suggested that his obsession with Linear B and the fame his achievement brought him negatively affected both his personal life and professional (architectural) practice. At his untimely death in an automobile accident on September 5, 1956, he left an extraordinary body of work that any philologist would envy, and yet it centered entirely on the one monumental discovery.

See also: Champollion, Jean-Francois (1790–1832).

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coast, which has 170 000 speakers in Venezuela, and another 135 000 in Colombia.

Although the constitution identifies the linguistic and cultural rights of the indigenous people, language maintenance and support is not high on the political agenda, partly because fewer than 2% of the population are speakers of an Amerindian language, most of whom live in the more remote parts of the country.

See also: Arawak Languages; Cariban Languages; Minorities and Language; Multilingualism: Pragmatic Aspects; Spanish.

Language Maps (Appendix 1): Map 76.

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Michael Ventris was an architect, not a linguist or philologist, by training and usual occupation. He is widely known, however (even outside of the academic world), for a singular linguistic accomplishment, namely, the decipherment of the Mycenaean Linear B script and the determination that the language it encoded was an archaic dialect of Greek.

Ventris first heard of the problem of the undeciphered scripts of the Minoan tablets when, in 1936, as a 14-year-old schoolboy, he heard an impromptu remark by 85-year-old Knossos discoverer Arthur Evans at Burlington House in London to the effect that neither he (Evans) nor anyone else could read the writing on the tablets.

The groundwork had been laid for Ventris' work by a number of scholars, including Emmet Bennett, Jr. and Alice Elizabeth Kober (1906–1950). From Bennett's work, Ventris knew that the Linear B script was likely to be a syllabary. Kober had done preliminary analysis of possible inflectional patterns in the corpus. Ventris, however, in a series of working hypotheses, slowly let patterns emerge and speak for themselves. He never locked himself mentally into one unassailable set of assumptions about the script, but produced a series of visual grids in which he tested hypotheses about the phonetic values of the signs. His 1953 announcement of the successful decipherment caused a sensation in the scholarly world and attracted a large share of criticism, the most vituperative of which came from A. J. Beattie, Professor of Greek at Edinburgh University.

Unlike Champollion's decipherment of Egyptian hieroglyphics, Ventris' work was carried out without the benefit of a parallel inscription for comparison. Ventris' achievement testifies to the importance of intuition and natural ability in linguistic observation and analysis; and in his case, these were coupled with rigorous analytical method and a single-minded dedication to the problem that preoccupied him. Numerous commentators have suggested that his obsession with Linear B and the fame his achievement brought him negatively affected both his personal life and professional (architectural) practice. At his untimely death in an automobile accident on September 5, 1956, he left an extraordinary body of work that any philologist would envy, and yet it centered entirely on the one monumental discovery.

See also: Champollion, Jean-Francois (1790–1832).

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Verbal Conflict

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Verbal conflict pervades social life. All around the world, neighbors feud, lovers quarrel, and entire social groups become entangled in wars of words. 'Verbal conflict' can be defined as the open, interactional dispute between two or more parties caused by a clash of goals that the parties perceive to be incompatible. By deploying their verbal skills, the opposing parties seek to gain a dominant position that protects or increases their prestige and secures control over contested resources. Verbal conflict is initiated by the airing of direct or indirect accusations for which speakers must take responsibility, that require opponents to reply, and that cannot be withdrawn without complicated negotiations. Verbal conflict allows speakers to be heard and forces bystanders to take sides. Even as it interrupts the course of social exchange and leads to interactional breakdown or to the destruction of particular relationships, verbal conflict reaffirms the need of social relations and the value of the social group. All societies have developed communicative mechanisms to handle the social aftermath of verbal conflict. From the Trobriander's *yakala* (a session of public insults), to Inuit song duels, to U.S. conflict–mediation sessions, people reenact their conflicts, attempt to reach a solution, and pledge their solidarity to the values and norms of their society. Through communicative performances (both during the conflict and in its aftermath), social networks are activated and social relationships reconfigured. Thus, verbal conflict does not represent a deviation from normal social processes, but rather plays a broad range of functions in constituting social life.

Background

Verbal conflict provides a unique opportunity to study the articulation of language and society. Yet until very recently, we had relatively little knowledge of how people manage conflict in interaction. Most studies of conflict suffered from an absence of detailed primary data, instead electing to present summaries, reports by informants, or reports from meetings held to resolve the conflict. There seem to be several reasons for this lack of data analysis. First, the study of language tended to separate linguistic phenomena from social experience, treating language as part of a scientific system rather than as an activity or practice in the world. As a result, linguistic processes such as verbal conflict were neglected. Even when language was recognized as a form of social action (as in sociolinguistics, speech act theory, or the ethnography of communication), it was analyzed for its conversational coherence and negotiated character, not for it disruptive potential. For instance, researchers concerned with interethnic communication viewed communicative breakdowns as the result of interactants' interpretative failure due to cultural misunderstanding, rather than the intentional outcome of speakers' animosity. Second, as Kulick (1993: 510) pointed out, many verbal conflicts were "often considered to be private, sensitive, and potentially explosive events," thus raising ethical concerns and inhibiting or restricting the collection of material. This may account for the fact that most analyses of verbal conflict dealt with interactions in public settings (such as courtrooms or media events), ritualized performances (such as verbal dueling), or children's arguments. Third, as suggested by Goodwin (1990: 141), researchers may have avoided "studying conflict because it is negatively valued in the white, middle-class society from which the majority of academics are drawn." Since researchers considered conflict a departure from normal social processes, they tended either to ignore it or to concentrate on resolving conflict rather than understanding its linguistic development. Finally, academics' attitudes *vis-à-vis* conflict may have suffered from their cultural gender bias as well: most analyses have focused on verbal competition and conflict as the domain of male speakers, since men are considered to be more verbally aggressive and outspoken, while women were, until recently, believed to be less prone to conflict talk (but see Eder, 1990; Goodwin, 1990; Kulick, 1993, for an opposite view).

To overcome the limitations of earlier research, contemporary work on verbal conflict looks at language as a contested field: a battlefield where interactants (both men and women) are acutely aware of the power of their (and others') words. Researchers in this field now combine concepts developed by interactional sociolinguistics, pragmatics, and conversational analysis (in particular 'speech community,' 'participation framework,' 'sequential organization,' 'pragmatic context') with concepts derived from European social theory articulated by Foucault, Bourdieu, or Williams ('power,' 'ideology,' 'hegemony'). This new brand of conflict research crosspollinates an analysis of language with an analysis of power. Talk is thus analyzed not only for devices that ensure coherence and cohesion, but also for those mechanisms by which speakers/hearers bring about conversational breakdowns and

transform the communicative context. In this light, verbal conflict is understood to be a local technology of power, i.e., a modality for the exercise of power, comprising a whole set of instruments, techniques, procedures, levels of application, and targets.

Strategy

In the study of verbal conflict, we must differentiate between 'discourse strategy' – the overall communicative framework that determines the nature and direction to attain one's objective – and 'tactics' – the detailed verbal and nonverbal moves set up to achieve objectives dictated by strategy. During a verbal conflict, opponents strategize about the best way to establish their position as the stronger, more reliable, and authoritative one, while using specific communicative tactics that seek interactional, turn-by-turn dominance.

The overall strategy of verbal antagonists deals with the representation of their social relationship, as it is indexed in their communicative practices. Disputants deploy strategies that endow them with better opportunities to talk, establish certain regions of knowledge as authentic and meaningful at the expense of others (usually endorsed by the opponent), and link this authenticity to systems of power that can boost their claims to credibility. Moreover, they increase their credibility through their ability to evoke and use relevant domains of knowledge, and by clashing over the rules, conditions, and procedures that establish what is believed to be true and what is believed to be false (see Bourdieu, 1991). In particular, speakers seek to establish themselves as having higher standing than their opponents as the preliminary move to claim authority for their words. For instance, in Tanna, Vanuatu, during verbal conflict people routinely claim to be "big men" that therefore "must be listened to" and "believed" (Lindstrom, 1992); similarly in southern Italy, opponents seek the status of "man of honor" as a position from which to "speak the truth" (Jacquemet, 1996). In more general terms, people deploy their accent, technical vocabulary, or communicative demeanor as indexes of their superior social standing – a metonymic indicator of the superiority of their argument over that of the opponent.

Ruling elites and people in position of authority seem to be better placed to take advantage of their superior status to claim credibility for their words. However, authority does not translate directly into performance, since one's dominant social position must still be enacted in talk. The more powerful and authoritative a speaker is, the better are his or her chances of influencing the outcome of the conflict, but this outcome cannot be taken for granted: it is ultimately decided by their communicative performance. In the give-and-take stream of talk that characterizes verbal conflicts, the structurally 'weaker' but communicatively better equipped participant could shape the local development of the interaction in such a way as to neutralize the possibility that the 'stronger' party would resort to extra-communicative means to achieve his or her agenda (such as using violence or appealing to powerful social connections).

Verbal conflict acquires an extra dimension when it occurs in public. The presence of a third party – an audience – seriously impacts the development and outcome of the verbal conflict and is considered by most researchers as a necessary element for conflict resolution. Moreover, verbal conflicts play a crucial role in publicizing and condemning social violations. As early as the first decades of the 20th century, Malinowski highlighted the social-control function of public verbal conflicts. In his study of the Trobrianders' laws and customs, he argued that incest and other forbidden behaviors came to be viewed as crimes only when they became public through verbal conflict. In discussing an incest case, he observed that "public opinion was neither outraged by the knowledge of the crime to any extent, nor did it react directly – it had to be mobilized by a public statement of the crime and by insults being hurled at the culprit by an interested party" (1926: 79). In contrast to gossip, which transmits its messages along a one-to-one line and is thus subjected to serious noise distortion, the *yakala,* or public expostulation, broadcasts its message over an open field to the entire audience. Such speech has clear originator and target and reaches everyone within earshot, and its value-heavy content assures that it cannot be dismissed as idle talk or ignored all together. Verbal conflicts force the audience to act to try to restore the social order disrupted by the conflict.

The presence of an audience during verbal conflict forces the opponents to engage in various strategies to gain the audience's support. Even if an imbalance exists in instituted authority or social power, successful performances will depend upon the participants' ability to modify the contextual frame of the exchange (i.e., the relative positions/roles/attitudes of the participants in the interaction) by setting up the conditions that would allow one's argument to be heard. In particular, to capture the audience's support, speakers attempt to frame their arguments as embodiments of shared beliefs and understandings. Such framing is a primary strategy by which individuals and groups attempt to legitimize their perspectives. As Brenneis (1988: 227) argues, verbal conflicts create accounts of disputed incidents, where "the effectiveness of these

accounts depends in large part upon the degree to which they meet audience expectations of sensibleness, appropriateness, and good form." In a similar vein, Goodwin (1990) studied telling stories about an antagonist as one of the most successful strategies for restructuring the social organization of an ongoing conflict, transforming passive overhearers of the conflict into active participants, and thus altering the 'participation framework' (i.e., the ensemble of interactive roles potentially available to participants in the speech event). The creation of an account that is detrimental to the opponent not only avoids unilateral exits or direct replies from the antagonist (always an option in the back-and-forth format of accusations and counters typical of a verbal conflict), but since it is directed to all participants, it also allows the creation of power alliances between the storyteller and other participants, who are drawn into the conflict by the compelling power of the story.

The narrative dimension of verbal conflict involves two levels of possible dispute: the speaker's act of saying something reprehensible and/or inflammatory, and the actual report about the opponent's reprehensible and/or objectionable acts. This tension between narrative performance and narrated event brings to the fore the relationship between the pragmatic and the referential dimensions of a verbal conflict. As Irvine (1992) queried, "is the narration perceived as more inflammatory than the narrated event, or vice versa? And if the violation is present in both, which is to be taken more seriously?" These questions point to the varieties of contexts (cultural, linguistic, and situational) that different communities take into account in their handling of verbal conflicts. For instance, some communities (such as the working-class white communities in the Carolina Piedmont studied by Heath, 1983) are mostly concerned with narrated events, while others (such as the African–American groups studied by Abrahams, 1963; Labov, 1972) focus on the narrative performance. Discourse strategies in verbal conflicts are therefore tailored to a particular community's primary focus: in the former, the issues of representation, accountability, and responsibility come to the foreground, while in the latter, emphasis is placed on verbal skills, inventive counters, and quick delivery.

Tactics

While verbal opponents rely on discourse strategies for the overall plan of their dispute, various verbal tactics are deployed throughout the sparring of the battle. Among the many techno-political devices employed on this level, special attention has been recently given to speech moves able to elicit particular responses or establish new conditions for the reception of the conflict. In particular, from public debates to institutional fights to private squabbles, researchers have been focusing on the disruptive but empowering quality of direct speech ('straight talk') associated with verbal conflict. Three such devices of primary importance are 'contextualization tactics,' 'recourse to metapragmatic statements,' and 'tactical use of insults.'

'Contextualization tactics' are communicative practices that both produce representations of the social world in accord with a given ideology and seek to persuade others to comply with these representations. Such tactics are found in all societies and usually consist of three parts: the decontextualization of an event from its occurrence in a particular space and time, its entextualization into a discourse with a more controllable set of truth values, and the recontextualization of this discourse within a communicative frame set up to legitimize it (see Bauman and Briggs, 1990; Silverstein and Urban, 1996). For instance, the speaker may elect to embed an opponent's statement within his or her own speech while inverting its referential value or adding a negative comment through intonational coloring. Most instances of reported speech in argumentative situations conform to this tactic: the embedded segment, which usually takes the form of a short quotation from the opponent's previous talk, serves the speaker in the unflattering representation of the opponent, in its representation of the relationship between the two sparring partners, and through the cues it presents to the audience about how to read the conflict.

Secondly, the 'recourse to metapragmatic statements' (i.e., statements about the implicit social meaning conveyed by speech) is triggered by speaker's awareness of how speech forms are used to establish the indexical relationship between interactants: the speaker's stance or attitudes *vis-à-vis* the opponent (one-up/one-down); the social relations or relative status of the participants; and special attributes of particular individuals (see Silverstein, 1976). In verbal conflict, participants usually are keenly aware of the specific use of signs that refer to the conflict at hand, whether this use involves reference to specific words used by the opponent, or to particular instances of speech (the opponent's style of delivery, intonation, or underlying logic). In these cases, metapragmatic awareness turns vicious and manifests itself in a "meta-pragmatic attack" (Jacquemet, 1994): a strategy of consciously and overtly calling attention to and/or mocking the opponent's performance for the purpose of interactional control. A metapragmatic attack can be used to comment on nonverbal behavior ("don't use that tone with me"), to draw attention

to a particular word or style ("don't call me stupid," "you sound like a broken record"), or to address the indexical relationship between speaker and hearer ("you don't know who[m] you're talking to" or "you must call me 'sir'"). An explicit accusation at the metapragmatic level produces a communicative break that escalates the stakes of the conflict. A metapragmatic attack puts an opponent on the defensive, without the speaker having to level any specific accusations, and challenges the opponent to address the attack at the metapragmatic level. This interactional escalation can produce verbal sequences called 'format tying,' a subtle but significant transformation of an utterance in which the speaker repeats what the opponent has just said, but changes it minimally to highlight opposition (A: "I don't know what you laughin' at"; B: "I know what I'm laughin' at. Your head" see Goodwin, 1990: 177). Metapragmatic attacks unravel the raw fabric of communicative interactions, exposing the disputants' maneuvers as they struggle for control, respect, and interactional dominance.

Finally, most verbal conflicts rely on insults to achieve their communicative effect. Leach (1964: 28) suggested that the language of abuse falls roughly into three categories: "(1) 'dirty words,' usually referring to sex and excretion; (2) blasphemy and profanity; and (3) animal abuse – in which a human being is equated with an animal of another species." These types, according to Leach, are found in most cultures around the world. They are indeed well represented in verbal conflicts, where they may play a crucial role in escalating the intensity of the exchange. Kulick (1993) highlighted three functions of insults: they draw the opponent into open warfare; they create an awkward and embarrassing situation for all present, thus implicating the opponent in this social gaffe; and they are tactically deployed at points in the conflict where closure or negotiations seem possible, allowing the insult-giver to maintain control over the sequential organization of the conflict, and in particular over its resolution. However, as Irvine (1992) pointed out, how a particular expression counts as an insult or as verbal abuse is quite problematic, requiring a great deal of contextual, cultural, and situational knowledge. Many innocuous statements can be turned into abusive ones, depending on the context to which they refer and on their position within the stream of talk. As Irvine (1992: 110) stated:

> Insults are not simply a set of statements, or a type of content inherent in statements. Instead, insult is a communicative effect constructed in interaction – constructed out of the interplay of linguistic and social features, where the propositional content of an utterance is only one such feature [...]. Conceivably anyutterance, or even silence, could have the perlocutionary effect of insult if enough interactional features suggesting it are brought into play.

Verbal abuse is grounded in specific cultural systems of moral judgment, and as such, it must be investigated by exploring how the dominant norms and values of a given society are invoked in specific interactional events.

Verbal Duels

A special case of verbal conflict concerns the widespread communicative practice of verbal dueling: the competitive exchange of usually obscene insults and invectives between at least two parties. This exchange is performed in a highly ritualized and codified space, in which participants can avoid the contest's potential to unleash social disruption. In this public space, two or more duelists with narrowly circumscribed roles and tasks are asked to match their linguistic skills in front of an audience, which selects the winner based on socially shared criteria of what constitutes a winning performance.

In most cases, verbal duels are used as conflict-resolution devices, resulting in the public rebalancing of the wills and reputations of the duelists, thus ensuring their good relations in the future. For instance, in the Inuit duels studied by Hoebel (1954), conflicts in the community were reduced through two forms of regulated combats: wrestling and song duels (sometimes in association with head butting). The duel must, however, maintain a symbolic distance from the real conflict and should not provide a factual representation of the conflict. Through the duel, the conflict was moved to a symbolic space and separated from everyday life. In this symbolic space, verbal duels created an overriding sense of solidarity among players. This led to a harmonious resolution of the initial conflict, marked by a common meal.

It is the rule-governed nature of the exchange that maintains the symbolic distance between the verbal duel and serious conflict. All the major elements of a duel (the time allotted to each duelist, the shape and content of their lines, the conservation of form and content across participants' turns, the audience response) are strictly regulated and enforced, marking the controlled nature of the event. Adherence to strict rules shields both performers and audience from the dangers usually associated with verbal conflict. In particular, participants need not worry about producing truthful statements, and in many settings, content must be obviously fictional (for instance,

during African–American sounding games, any insult too close to reality is negatively received by the audience and may trigger a serious confrontation; see Labov, 1972). Likewise, performers are expected not to take issue with the opponent's remarks and must not show the anger or embarrassment usually caused by an opponent's accusations.

Verbal duels are widely scattered around the world; they have been reported from the Mediterranean area (Malta, Turkey, Sardinia) to the Americas (Mexico, the Caribbean, the United States), from Africa (Tiv, Yoruba, Efik) to the South Pacific (Fiji). In most cases, participation is reserved for male performers, while women may be in the audience. To date the ethnographic evidence of women involved in ritual insults centers on the life-transition occasion of the wedding. The most thoroughly documented case of women performers is Irvine's study (1992, 1996) of *xaxaar*, a Wolof insult poetry event in which a bride's prospective cowives hire women of lower rank, usually griot women, to recite poems vilifying the bride.

The basic distinction among (male) verbal duels is between adolescent games and adult contests. Adolescent games adhere to specific stylistic shapes of challenge and retort, in which individual performances depend on creativity and especially on the mastery of a traditional repertoire of statements. These duels are typically concerned with forcing and/or depicting the opponent in a passive role, and content is heavily composed of references to alleged homosexual (bottom) behavior (see, among many, Abrahams, 1962; Labov, 1972; Dundes *et al.*, 1970; Gossen, 1976). On the other hand, adult contests are stylistically more demanding: participants' turns are longer and more complex, insults are often sung rather than spoken, and sometimes a single topic is set in advance either by the first performer or by the organizers or audience of the duel.

Both kinds of verbal duels undergo a collective process of evaluation by the audience, which in most cases decides (either explicitly or through applause and comments) the winner. In cases in which the verbal duel has been organized to settle a real-world dispute, the jury concerns itself more with re-establishing harmony in the community than with determining guilt or innocence. In a number of cases found in the literature, the audience/jury usually declares one party the winner of the contest, but adjudicates in favor of the other, thus reaching a settlement where both parties 'win.' In other cases, especially with adolescent duels, losers are usually those unable to come up with a witty counter: "There is always a winner, he who says the last word, and a loser, he who cannot answer the challenge" (Gossen, 1976: 126).

Ritual Wailing

While verbal duels are almost exclusively a male domain, 'ritual wailing' – the communicative practice of publicly, collectively, and loudly expressing grief, sorrow, or anger for the death of a dear one – is a female domain. Where a verbal duel may function as an attempt at reconciliation between feuding parties, ritual wailing can be functionally understood as the attempt to atone for a different kind of communal conflict: the breakdown and disruption caused by the loss of a group's member. Many researchers have characterized these performances as a form of resistance in which women can express open criticism of their community and verbally abuse other members. Ritual wailing operates with the basic mechanism of verbal conflict: a wailing woman, using her sorrow as a backdrop, can safely insult individuals or groups she does not like or she reputes to be in violation of social obligations (Knudsen, 1988; Seremetakis, 1991; Briggs, 1992; Urban, 1988). As such, ritual wailing can be seen as a powerful device for social defiance and, at times, can have a powerful impact in determining the policies and decisions of a community.

Ritual wailing shares with verbal duels many communicative features: the presence of a public audience (at times quite large), the focus on the performative moment, the use of formulaic speech, and the reliance on metapragmatic devices (in particular, reported speech; see Briggs, 1992). During ritual wailing, the voices of many women not only express emotions but also deliver strong public statements about the reasons behind the death, the ensuing imbalance caused by it, and the steps needed to recover a communal equilibrium. For instance, Knudsen (1988) reported that ritual wailings played a central role in the *vendetta* tradition in Corsica during the 18th and 19th centuries, where women called out the names of male relatives charged with the task of avenging the death, using derogatory language to prompt them into action.

On the other hand, women may also elect to use the wailing performance to present other women in a particular unfavorable light or to insult them directly. The accused women will then be forced to respond by entering this performative space. For instance, Seremetakis (1992) documents the clash between a grieving mother and a former friend of her dead son, in which the latter strenuously fought in her lament to represent her relationship with the deceased as casual, thus shielding her from the strict code of mourning a relative.

Through the high voicing of the laments, women represent the violence of death through language and sound – the acoustic pain of day-long singing screams

metaphorically evoking this violence and its underlying conflict. Through their emotional, supposedly out-of-control outburst, they impose decisions on the entire community by producing statements that appeal to collectively held moral obligations. For instance, in their laments, the Warao women of Venezuela appropriate and recontextualize words initially used in settings where only men are accorded a voice, and in so doing they act to restrain the authority of male shamans and political leaders: "Women (and women alone) are accorded the right to criticize whatever and whomever they please through songs following a death" (Briggs, 1992: 347).

The communicative force of the laments rests once again on the fact that these words have been uttered in a public space: wailers acquire the power to command an audience and put on record their assessment of the community, thus forcing their discourse into the public sphere – in most cases without the possibility of a rebuttal. As death becomes the last chapter in the life of an individual, death laments are the 'last words' (Seremetakis, 1992) through which women can rewrite biographies, shuffle group histories, and propose new sets of norms and values.

Conclusions

From the study of verbal conflict, we can draw some broader conclusions about the relationship between language and society.

First, we see that most linguistic techno-political devices (such as reported speech or metapragmatic attacks) are always (that is, not only in verbal conflict) intentionally staged, performative acts. All speakers, including those in positions of dominance, need to perform their power: they stage these acts to express their will to power. Most dominant classes can, however, count on some helpful aids, such as a dilution of responsibility (such as the Wolof practice of paying a griot to speak instead of a noble [Irvine, 1992]) or the 'plausible deniability' sought by high public officials. In the process of this performance, the relative power of each interactant is put to the test. Thus, the outcome of any attempt to gain control over communicative resources is never predetermined; power in interaction (especially during verbal conflict) must be claimed through the use of communicative resources – asymmetrically distributed but always negotiable in performances.

Second, verbal conflict teaches us to avoid a simplistic correlation between speech forms and power; its techno-political devices are deployed from all positions, from the core as well as from the periphery, from the superior as well as from the inferior. Different forms of domination produce different configurations of language use. Any particular linguistic form gains different meanings and has different social and political effects as a function of specific institutional and ideological contexts.

Third, verbal conflict, because it calls extraordinary attention to the spoken word, generates frequent instances of communication as verbal hygiene. In these instances, disputants produce correct, clean forms of talk-linguistic techno-political devices that, in order to be effective, invoke particular assumptions about standard language, proper talk, and normative behavior. Through verbal hygiene, disputants attempt to demonstrate their solidarity with the norms and forms of the community (actual or imagined) to which they are appealing for support.

Finally, verbal conflict forces us to address the issue of the relationship between language and social change. Battles over language use (as they are evoked and transformed during a conflict) change the repertoire of social meanings associated with power relations. Through verbal conflict, social indexicalities are interactionally transformed, opening the way for more profound social transformations. The struggle over the sexist bias of the English language (evidenced, for instance, in the unmarked nature of the generic masculine pronoun) provides an example of this potential for change; linguistic awareness of gender bias has rendered problematic the generic use of the masculine pronoun, and this newly produced sensitivity can be exploited during a verbal conflict, since a speaker could metapragmatically point out the 'politically incorrect' use of a gendered form. It would be naive to claim that awareness of sexist language and its recourse during verbal conflicts change gender relations. However, by focusing speakers' attention on the inner workings of language, conflict opens a reflection on the social meanings of particular linguistic repertoires, and this in turn can lead to structural change.

See also: Blaming and Denying: Pragmatics; Context, Communicative; Discourse, Narrative and Pragmatic Development; Emotion: Stylistic Approaches; Expletives and Dummies; Face; Identity in Sociocultural Anthropology and Language; Indexicality: Philosophical Aspects; Language Ideology; Metapragmatics; Metasemiosis and Metapragmatics; Performance Factors in Spoken Discourse; Power and Pragmatics; Reported Speech: Pragmatic Aspects; Speech Genres in Cultural Practice; Taboo: Verbal Practices; Taboo Words.

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Verbal Hygiene

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It is a truism that linguistics is 'descriptive not prescriptive' – concerned to describe the structure and use of natural languages, and not to make value-judgements on them. *Verbal hygiene* was the title of a book that prompted debate among sociolinguists, by challenging the view that value judgements are of no relevance for linguistics (Cameron, 1995). It argued that competent language users routinely make value judgements on language; ideas about what is 'good' and 'bad' in language are central to their understanding of it, and ought therefore to be of interest to linguists who study language use as a form of social behavior.

What is Verbal Hygiene?

The importance language users accord to value judgements is seen with particular clarity in practices of 'verbal hygiene,' i.e., active attempts to improve or 'clean up' language. These practices are many and varied. Examples include not only efforts to impose a standard dialect, pronunciation, or spelling, but also cases like plain-language movements or feminist campaigns to eliminate sexist language, language planning, and 'fringe' movements advocating wholesale spelling reform, the abolition of copular verbs, or the adoption of artificial languages. What these instances have in common is not any single view of what is desirable in language use – the traditional grammarian and the feminist, for instance, will disagree on many points of detail. But they do share the more fundamental assumption that one way of using language may reasonably be preferred to another.

Verbal Hygiene and Prescriptivism

That assumption also underlies what linguists have traditionally called 'prescriptivism': how does 'verbal hygiene' differ? Cameron (1995: 3–11) saw the two concepts as overlapping but not coextensive. Her main reasons for wanting an alternative to 'prescriptivism' have to do with the meanings that term has acquired in linguists' usage. First, 'prescriptivism' is most closely identified with a particular subset of normative metalinguistic practices, those that focus on the value of **correctness** and equate 'correct' usage with adherence to the codified norms of a standard language variety. The term 'verbal hygiene' seeks to foreground the existence of normative metalinguistic practices, which intervene in language use in different ways and for different reasons, though they are equally animated by value judgements. Secondly, 'prescriptivism' in linguistics has acquired strong negative connotations: it is associated with ignorance, intolerance, and prejudice, and is usually represented as something extraneous to normal language use. Verbal hygiene, by contrast, is presented as part of a more general metalinguistic function, which is integral to the workings of verbal communication:

> Because language-using is paradigmatically a social, public act, [it] must be carried on with reference to norms, which may themselves become the subject of overt comment and debate. In our everyday interactions we take this for granted ... without recourse to such ordinary metalinguistic practices as correcting slips of the tongue, asking what someone meant by something or disputing their usage of particular words, the enterprise of communication would be even more fraught with difficulty than it already is (Cameron, 1995: 2).

From this point of view, it makes no sense to condemn linguistic normativity as such. Further, when one considers the full range of normative practices language users are engaged in, it becomes difficult to argue that they all exemplify ignorance (cf. language planning, a 'scientific' enterprise) and/or prejudice (cf. campaigns against sexist and racist language, which embody **resistance** to certain forms of prejudice). While verbal hygiene practices are never value-free, 'correctness' is not the only value that informs them. Others include esthetics (as in discussions of why one local accent is preferable to another); utility (as in arguments for official documents to be written in plain language rather than obfuscatory jargon); and morality (as in debates on sexism and racism in language).

The Social/Symbolic Functions of Verbal Hygiene

Although verbal hygiene arises from a metalinguistic capacity that is indispensable for communication, in practice that capacity is used in ways that go well beyond immediate communicative needs – clearly we do not 'need' new spelling systems or arguments about how best to translate the Bible into Klingon (the invented language of a fictional alien species). Many verbal hygiene practices are better understood in terms of the social and symbolic purposes they serve for those engaged in them.

In some cases, these purposes are broadly political: verbal hygiene is used to affirm a particular view of the ideal social order. This motivation is evident in conservative defences of standard languages, in feminist arguments for nonsexist language and the counterarguments of their opponents, in purist movements to purge languages of 'foreign' elements, and in attempts to preserve or revive minority languages as symbols of ethnic or national identity. Professional and commercial interests (e.g., the interest of publishers in maintaining certain norms of written style) may also motivate verbal hygiene. And it can also be a form of 'language play' (Cook, 2000) – this function is probably its main one for Klingon enthusiasts, for instance.

Debates on Verbal Hygiene

Some linguists (e.g., Kalogjera, 2000) have criticized verbal hygiene as a 'revisionist' concept that rehabilitates reactionary forms of prescriptivism, undermines the objectivity of scholarship, and encourages sociolinguists to politicize discussions of language attitudes and linguistic change. In *Verbal hygiene* (Cameron, 1995: xi) it is noted that linguists can study normative practices without necessarily endorsing them. However, the book does challenge claims that linguistics itself is value free (the axiom 'all varieties are linguistically equal,' for instance, is not just a statement of what linguists believe to be true, but implicitly also a value judgement). If we accept that evaluation and verbal hygiene are integral parts of language-using, sociolinguists must engage in critical debates about the **grounds** for particular evaluations rather than denying the legitimacy of evaluation itself.

See also: Description and Prescription; Language Attitudes; Language Ideology; Standardization.

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Verbs

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Verbs vs. Nouns

Verbs and nouns are the two major word classes in most, possibly all, languages (*see* **Word Classes/Parts of Speech: Overview**). With respect to meaning, basic concrete nouns tend to follow perceptually salient natural partitions in human environment according to the natural partitioning hypothesis (Gentner and Boroditsky, 2001), whereas verbs to a greater extent are language-specific and show greater variation with respect to meaning across languages. This feature explains why children universally tend to acquire early nouns before early verbs.

The verb is the core of the clause and has a relational meaning, relating to one or more participants (or arguments) to an event. In general, verbs are more complex than nouns and tend to represent a greater cognitive load on processing than nouns. Another basic characteristic of prototypical verbs is that they crucially involve change through time, whereas concrete nouns tend to be stable across time.

Lexicalization Patterns

Verbs are primarily used to talk about events, but the way events are encoded may vary dramatically. In Kalam, a language spoken in the highlands of Papua New Guinea, many events that are encoded as simple verbs in English are described as a sequence of events, each encoded by a simple verb (Pawley, 1987):

(1) Kab añañ ap yap pk-e-k pag-p ok.
stone glass come fall it-having-hit-DS it-has-broken that
A stone broke the glass.

Kalam is a good example of a verb serializing language (*see* **Serial Verb Constructions**). Serial verbs exist marginally in English, in sequences such as *Go get the book*. Serial verbs are, however, characteristic of Southeast Asian, West African, Papuan, and Oceanic languages (Crowley, 2002). Verb serialization is defined as a combination within the same simple clause of lexical verbs that can function independently as verbs and that must be interpreted as having the same values for tense-aspect-mood even if those values are not necessarily overtly marked on all of the verbs in the series. Auxiliaries (or helping verbs)

In some cases, these purposes are broadly political: verbal hygiene is used to affirm a particular view of the ideal social order. This motivation is evident in conservative defences of standard languages, in feminist arguments for nonsexist language and the counterarguments of their opponents, in purist movements to purge languages of 'foreign' elements, and in attempts to preserve or revive minority languages as symbols of ethnic or national identity. Professional and commercial interests (e.g., the interest of publishers in maintaining certain norms of written style) may also motivate verbal hygiene. And it can also be a form of 'language play' (Cook, 2000) – this function is probably its main one for Klingon enthusiasts, for instance.

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also appear in sequences of two or more verbs such as *Mary should have come*, but such sequences are introduced by an auxiliary in finite form followed by one or more verbs in various nonfinite forms.

Kalam is also a good illustration that the number of verbs can vary dramatically. In this language, around 15 simple verbs account for close to 90% of the occurrences of verbs in running text, and the total number of simple verbs is around 100. In English and other European languages, there are something in the range of 10 000 different verbs or more. The frequency of occurrence, however, singles out a small number of verbs as basic even in European languages. The 20 most frequent verbs tend to cover close to 50% of the textual frequency of verbs in representative corpora. Among them are several verbs with predominantly grammatical functions such as the copula *be*, the verb *have*, and modal verbs. But in addition, there are a number of lexical verbs referred to as nuclear verbs in Viberg (1993) that tend to be the most frequent verbs within the most basic lexical semantic fields (or conceptual domains) such as motion (*go/come*), possession (*give/take*), production (*make*), verbal communication (*say*) and perception (*see*). The nuclear verbs tend to be basic even in non-European languages. Even if verbs are more language-specific than nouns, this characteristic is only a matter of degree.

Nuclear verbs also tend to have a rich pattern of polysemy. Newman (1996, 1998) demonstrates this pattern for the verb *give* across a wide range of languages, showing a strong crosslinguistic tendency for verbs with this meaning to extend into the grammatical areas of recipient/benefactive, permission/enablement, and causation. It has also been possible to show that basic meanings within a field are lexicalized in a certain order across languages. For perception, there is a hierarchy: see > hear > feel/taste/smell. Verbs of perception have a tendency to extend their meaning to cover cognitive meanings such as *understand* and *know* (Viberg, 1984, 2001; Evans and Wilkins, 2000). From another perspective, a number of studies based on Talmy (1985, 2000) have looked at conflation patterns, the way meaning components are combined ('conflated') to form the meaning of verb roots, in particular, how motion verbs across languages can combine motion + Path (*enter, descend*) or motion + Manner (*run, swim*). Originally, Talmy divided languages into two major types depending on what alternative was dominant, but more recent research has come to regard this evidence as a continuum where languages, for example, can be placed along a cline of manner salience (Slobin, 2004).

The semantic organization of the more or less complete set of verbs in a language can be described in WordNet format, based on semantic relations such as hyponymy, antonymy, and synonymy. (See Fellbaum, 1998 for English, Vossen, 1999 for other European languages. See also Relevant Websites at the end of this article.) (*see* **WordNet(s)**.)

From Semantic Representation to Syntactic Argument Structure

As mentioned, verbs are relational, and an essential part of the meaning of a verb is the type of relations it holds to various arguments, the argument structure (*see* **Argument Structure**), in particular subjects and objects such as *man* and *car* in *The man washed the car*. According to the approach to semantics known as frame semantics (*see* **Frame Semantics**), verbs (and other relational words) evoke frames – schematic structures of recurring situations. A verb such as *give*, for example, evokes the transfer frame, which can be described as follows: Someone (the Donor) is in possession of something (the Theme) and then causes someone else (the Recipient) to be in possession of the Theme. This frame is evoked by *give* in sentences such as: *The teacher* (Donor) gave *the student* (Recipient) *a book* (Theme) or alternatively: *The teacher* (Donor) gave *the book* (Theme) *to the student* (Recipient). The syntactic realization of the frame elements can be described with respect to Phrase types (NP, PP, etc.) and grammatical functions (subject, object, complement, etc.) in Table 1.

See Fillmore *et al.* (2003) for a description of the large FrameNet lexical database of English, containing verbs and other abstract words organized according to these principles. At the time of writing, there are more than 200 frame elements, but many of them are hierarchically related to more general frame elements. For example, Donor is a type of Agent.

Verbal Morphology

Morphological markers on the verb are primarily of three types: Valency markers, Agreement/Reference markers, and Tense-Mood-Aspect (TMA) markers. The number of inflectional markers on the verb varies

Table 1 Schematic structure of a sample sentence, using the verb 'give'

	The teacher	*gave*	*a book*	*to the student*
Frame elements	Donor		Theme	Recipient
Phrase types	NP		NP	PP-to
Grammatical functions	Subject		Object	Complement

dramatically across languages from zero to several hundred. However, the inflectional categories that exist primarily belong to a restricted number of major categories with a few central members. The inflectional markers have a characteristic order according to their decreasing relevance to the meaning of the verb (Bybee, 1985): Aspect occurs closest to the stem, followed by tense, and then by mood, which is followed by person.

Even if the arguments of verbs can appear in a wide range of phrase types and grammatical functions, there is a core consisting of subject and object and (in some languages) indirect object that is central in grammatical descriptions of clause structure. Valency refers to the number of core arguments. Among derivational processes characteristic of verbs, valency-changing derivations hold a prominent position (Dixon and Aikhenvald, 2000). Such derivations are basically of two types as shown below:

- Decreasing: Passive, Antipassive, Reflexive, Reciprocal, Anticausative (and Middle, which is problematic)
- Increasing: Causative and Applicative

The terms mentioned above should be reserved for constructions containing some type of explicit formal marking. Languages can also have a number of **ambitransitive verbs** that can be either transitive or intransitive without any derivational marking such as English *melt* (*John melted the lead* vs. *The lead melted*).

In many languages, certain semantic features of the arguments of the verb are signaled by morphological markers on the verb, a phenomenon known as verbal agreement (Barlow and Ferguson, 1988). There is a formal and a functional view on agreement. The markers can be regarded as redundant copies of information already present in the clause, a view that is most natural when the argument must also be present as a free word such as the English 'third person singular –*s*': *He/She knows*. In some languages, however, verbal agreement markers in many clauses are the only explicit markers of the referents of the core arguments of the verb and anaphoric pronouns in the form of independent words are primarily used for various types of emphasis. Because of this incidence, functionalists often refer to verbal agreement as reference tracking, i.e., indexing on the verb of its arguments by various morphological means, and it might be argued that even redundant markers, such as in English, serve as cues for the interpretation together with more explicit cues. The semantic features that are marked on the verb by verbal agreement are (a subset of) the ones that are characteristic of anaphoric pronouns, such as person, number, and (to a lesser degree) gender or noun class. Usually agreement arises from grammaticalization of anaphoric pronouns, but other sources such as analogy exist. The most commonly marked argument is the subject, but it is not uncommon for languages also to mark the object on the verb. There are even languages that mark the indirect object or (in a few languages) some oblique function. Languages that completely lack verbal agreement are also common. Referential tracking can be achieved also with switch-reference markers on a medial verb in a serial verb construction or a verb in a subordinate clause indicating whether its subject is identical with (same-subject: SS) or different from another verb (different-subject: DS. See the example from Kalam above) (*see* **Switch Reference**).

The inflection of tense, mood, and aspect that is also highly characteristic of the verb is treated in a separate article (*see* **Tense, Mood, Aspect: Overview**).

See also: Argument Structure; Frame Semantics; Serial Verb Constructions; Switch Reference; Tense, Mood, Aspect: Overview; Word Classes/Parts of Speech: Overview; WordNet(s).

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Relevant Websites

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http://www.globalwordnet.org/ – Information about WordNets for other languages.
http://www.icsi.berkeley.edu/~framenet/ – The FrameNet database.

Verificationism

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Introduction

Verificationism is the view that the meaning of a (synthetic or empirical) statement is given by its method of verification. A sentence, as used on a given occasion to make a (synthetic or empirical) statement, has meaning if and only if its truth or falsity can – in principle – be determined by experience. Verificationism was the central doctrine of logical positivism (also called 'logical empiricism'), a movement that originated in the work of the Vienna circle in the early 1930s and received its classic statement in A. J. Ayer's *Language, truth and logic* (1936). Although subject to devastating criticism in the 1940s and 1950s, the motivation behind verificationism has continued to influence philosophers ever since, most notably, in the work of W. V. O. Quine and Michael Dummett. Indeed, the basic positivist impulse – to reject anything that is not grounded in sensory experience – goes back at least to David Hume, and has been a significant feature of the philosophical landscape throughout the modern era. Hume's famous words at the very end of his *Enquiry concerning human understanding* are often taken as the definitive statement of the underlying positivist view:

> If we take in our hand any volume; of divinity or school metaphysics, for instance; let us ask, *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact and existence?* No. Commit it then to the flames: for it can contain nothing but sophistry and illusion.

The repudiation of metaphysics was characteristic of logical positivism, too, and this was rooted in the doctrine of verificationism.

The Analytic/Synthetic Distinction

Central to logical positivism was the distinction between analytic and synthetic statements – corresponding to Hume's distinction (implicit in the passage just quoted) between relations of ideas and matters of fact. According to the logical positivists, a statement is analytic if and only if its truth or falsity is determined solely by the meaning of its constituent terms. 'All bachelors are unmarried men,' for example, was seen as true in virtue of the meaning of the term 'bachelor.' Analytic truths were regarded as both necessary and *a priori*. Their necessity was seen to lie in their tautological nature, a view that the logical positivists took from Ludwig Wittgenstein. Since, on their account, analytic truths could be judged to be true merely by knowing their meaning – without needing to consult the world in any way – they were also regarded as *a priori* truths.

A statement was seen as synthetic, on the other hand, if it is not analytic, and synthetic truths were

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Central to logical positivism was the distinction between analytic and synthetic statements – corresponding to Hume's distinction (implicit in the passage just quoted) between relations of ideas and matters of fact. According to the logical positivists, a statement is analytic if and only if its truth or falsity is determined solely by the meaning of its constituent terms. 'All bachelors are unmarried men,' for example, was seen as true in virtue of the meaning of the term 'bachelor.' Analytic truths were regarded as both necessary and *a priori*. Their necessity was seen to lie in their tautological nature, a view that the logical positivists took from Ludwig Wittgenstein. Since, on their account, analytic truths could be judged to be true merely by knowing their meaning – without needing to consult the world in any way – they were also regarded as *a priori* truths.

A statement was seen as synthetic, on the other hand, if it is not analytic, and synthetic truths were

regarded as both contingent and *a posteriori*. It was in explaining synthetic statements that the doctrine of verificationism was formulated. According to this doctrine, the meaning of such a statement lies in its method of verification. A statement is meaningful if and only if its truth or falsity can in principle be determined by experience, that is, be derived in some specified way from the truth of one or more observation statements – statements that record the direct result of an observation. This characterization immediately raises two questions. What exactly is the relationship between the statement whose truth-value is to be determined and the observation statements? And what exactly is an observation statement?

Observation Statements

Let us take the latter question first. There was much debate among the members of the Vienna circle in the 1920s and 1930s about the foundations of empirical knowledge and the correct form that observation statements – or 'protocol sentences,' as they were called – should take. In his *Aufbau* of 1928, influenced by Bertrand Russell's appeal to sense data in *Our knowledge of the external world* (1914), Rudolf Carnap sketched a 'reconstruction' of our empirical knowledge on a phenomenalistic base. But he also offered the possibility of a physicalistic reduction, reflecting his rejection of the idea that there is any privileged ontology. (Cf. Beaney, 2004: § 4.) Despite this, however, a physicalist language soon became seen as the preferred form in which the protocol sentences were to be expressed, although debate raged about the relations between the physical and the psychological, and indeed, about the very idea of a 'foundation.' (See, e.g., Carnap, 1932/1933; Neurath, 1932/1933; Schlick, 1934; Ayer, 1936/1937. For an excellent account of the debate, see Uebel, 1992.)

In A. J. Ayer's work, however, influenced by Russell and the British empiricists, observation statements were construed as statements about sense data, and material objects – and indeed, other minds – were seen as logical constructions out of them. The project of logical construction was all the rage among analytic philosophers in the early 1930s (see especially Wisdom, 1931–1933), but it gradually became clear just what difficulties it faced. (For a critique, see, e.g., Urmson, 1962, ch. 10, and more recently, Soames, 2003, I, ch. 7.) More fundamentally, the whole appeal to sense data proved problematic, as the very idea of sense data came under increasing fire in the years that followed. (See especially Austin, 1962, and the essays in section II of Swartz, 1965.)

Strong Verification

Problems arose, then, about the nature of observation statements. But even if we leave these aside, and assume that there is a legitimate class of observation statements, such as expressed by sentences of the form 'The *A* in front of me is a *B*,' there remains the question of specifying the relationship between the synthetic statement whose truth-value is to be determined and the observation statements. The relationship was seen as one of verification. But what is it to verify a statement? A distinction came to be drawn between 'strong' and 'weak' verification. In the strong sense, a statement is verifiable if and only if, as Ayer put it, "its truth could be conclusively established in experience" (1946: 12). More precisely, the notion might be defined as follows: a statement *S* is strongly verifiable if and only if there is some set of observation statements which logically entail *S*. The obvious problem with this, however, is that universal generalizations cannot be strongly verified, since no (finite) set of observation statements, 'A_1 is *B*,' 'A_2 is *B*,' ... 'A_n is *B*', *entails* 'All *A*s are *B*.' Even if all the *A*s that we have so far experienced have been *B*, there remains the possibility that the next *A* we experience will not be a *B*. Yet many universal generalizations are clearly meaningful, so we cannot accept strong verifiability as the criterion for meaningfulness.

Strong Verification and Strong Falsification

This might suggest that we should talk not of verifiability but of falsifiability (as Karl Popper was to urge). A statement *S* is strongly falsifiable, we might then say, if and only if there is some set of observation statements which logically entail not-*S*. Saying that a statement is meaningful if and only if it is strongly falsifiable legitimizes universal generalizations, since it only takes one observation statement as a counterexample to falsify a universal generalization. However, we are then faced with the corresponding problem of existential statements, such as 'There is at least one *A* that is not a *B*' (the contradictory of 'All *A*s are *B*'). Finding an *A* that is not a *B* may verify this statement, but no observation statement could falsify it. Finding an *A* that *is* a *B* neither verifies nor falsifies it. To falsify it we need to be sure that *all A*s are *B*, but as we have just seen, this is not entailed by any set of observation statements that we may have made up to now.

The obvious response to both these problems is to say that a statement is meaningful if and only if it is *either* strongly verifiable *or* strongly falsifiable. But this, too, faces problems. First, there are statements involving more complex or different kinds of quantification,

such as those expressed by sentences of the form 'For every *A*, there is a *B* to which it is *R*-related' and 'Most *A*s are *B*.' Although many of these statements are meaningful, they, too, are neither strongly verifiable nor strongly falsifiable. Second, there are all sorts of statements that scientists make, positing the existence of unobservable things such as electrons, charge, and gravity, whose truth-value cannot be simply deduced from any set of observation statements. Rather, their justification lies in the explanation that they offer of observable events. Talk of strong verification and falsification does not do justice to a fundamental method of science – inference to the best explanation (cf. Soames, 2003, I: 280–282).

Weak Verification

The only answer is to retreat to a weaker notion of verification. In the weak sense, a statement is verifiable (and hence meaningful) if and only if, as Ayer put it, "it is possible for experience to render it probable" (1946: 12). Instead of seeing the important relation as deducibility *from* observation statements *to* the statement to be verified, the focus now is on deducibility *from* the statement to be verified *to* observation statements (which, if true, lend it empirical support). Ayer's initial attempt at a definition may be formulated as follows: a synthetic statement *S* is weakly verifiable (and hence meaningful) if and only if *S*, either by itself or in conjunction with certain other premises, logically entails some observation statement *O* that is not entailed by those other premises alone. (Cf. Ayer, 1946: 15; Soames, 2003, I: 283.) On this definition universal generalizations, existential statements, more complex quantified statements, as well as hypothesized scientific explanations of observable events, all come out as meaningful, since observation statements can be deduced from them.

However, as it stands, this definition has the result that *all* statements come out as meaningful. For consider taking the single additional premise, 'If *S* then *O*.' From '*S*' and 'If *S* then *O*,' '*O*' clearly follows, without following from 'If *S* then *O*' alone. So the notion of verification formulated here is far too weak: the definition is satisfied by any statement whatever. In response, Ayer distinguished between direct and indirect verifiability, restricted what 'other premises' are allowed, and formulated a more complex definition. (Cf. Ayer, 1946: 15–18.) But this too has been found to generate similar problems, with suitable choice of additional premises; and alternative formulations have also been found to be open to objections. (Cf. Church, 1949; Hempel, 1950; Soames, 2003, I: 284–291. But for a recent attempt at reformulation, see Wright, 1993, ch. 10.)

The Influence of Verificationism

If an adequate notion of verification cannot be formulated, then it undermines its role in a critique of metaphysics. One of its purposes had been to distinguish legitimate scientific statements from meaningless metaphysical statements – exemplified for the logical positivists in Heidegger's famous remark that 'Nothingness itself nothings' (*Das Nichts selbst nichtet*) (cf. Carnap, 1932: § 5; Friedman, 2000: ch. 2). But it might well be argued that claims about the doctrine of verification itself are metaphysical statements whose status would be threatened if the doctrine were actually correct. Nevertheless, precise formulations aside, the general idea of verification has had enormous influence on subsequent philosophers. According to some, such as Carl Hempel and Quine, what was wrong was the focus on *individual* statements. Instead, they suggested, influenced by Pierre Duhem (1906), it is whole systems of statements that scientists seek to verify in their empirical activities. What has come to be called the Duhem-Quine thesis, that a scientific hypothesis cannot be tested in isolation, indicates the shift that there has since been from atomistic to holistic conceptions of verification. In the case of Quine, this was famously accompanied by rejection of the analytic/synthetic distinction that lay at the basis of logical positivism (Quine, 1951). But this rejection was only intended to purge empiricism of untenable doctrines, not to repudiate empiricism altogether. For Quine, philosophy and science are continuous, and even analytic statements are subject to revision in the light of empirical research.

Other philosophers who were also broadly sympathetic to verificationism took different approaches. In Dummett's work, for example, in which holism is rejected (cf. 1991: ch. 10), the concern has been to develop a systematically articulated theory of meaning based on the notion of assertion-conditions rather than on the classical notion of truth-conditions. A verificationist rather than traditional conception of truth lies at the heart of Dummett's project, and he has seen in mathematical intuitionism the model for a semantics based on verificationist truth. Dummett has been led to reformulate many traditional debates, such as those concerning our knowledge of the past and future, in terms of the opposition between realism and antirealism, a reformulation clearly influenced by the verificationism of the logical positivists. (See, for example, Dummett, 1993, which starts by paying homage to Ayer. Cf. also Wright, 1993: chs. 9–10.) Despite the flaws in its original articulation, then, verificationism remains an active – though controversial – force in contemporary philosophy.

See also: Analytic/Synthetic, Necessary/Contingent, and *a priori/a posteriori*; Empiricism; Holism, Semantic and Epistemic; Limits of Language; Meaning: Overview of Philosophical Theories; Realism and Antirealism; Truth: Theories of in Philosophy.

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Vernacular

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Within the field of sociolinguistics, there are at least two distinct uses of this term. The first sense of this term in sociolinguistics is exemplified by Poplack (1993), which defines vernacular as "the relatively

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homogenous, spontaneous speech reserved for intimate or casual situations … taken to reflect the most systematic form of the language acquired by the speaker, prior to any subsequent efforts at (hyper-) correction or style shifting" (Poplack, 1993: 252). Labov (1972) described this variety as one in which the speaker pays least attention to his or her speech and is the least self-conscious of the varieties in his or her repertoire. For scholars who use the term in this manner, the 'vernacular' is the variety that is acquired first, reveals the "most advanced forms of change in progress" (Labov, 2001), and provides the clearest depiction of whether a linguistic feature is "variable or categorical" (Labov, 2001). According to Labov's Vernacular Principle (Labov, 1972), the vernacular is also the variety that is most systematic, not only with regard to its structure but also with regard to its historical development. This use of the term 'vernacular' therefore equates vernacular varieties with casual varieties.

Wolfram and Schilling-Estes (1998) illustrates a different usage, by defining vernacular varieties as "varieties of languages that are not classified as standard dialects" and comparing this usage to the use of 'vernacular' to mean "local or native" (Wolfram and Schilling-Estes, 1998: 13). They contrast standard varieties, which they suggest are defined by the lack of nonstandard features in the variety's grammar, to vernacular varieties, whose grammars contain such nonstandard features. However, they point out that vernacularity "exists on a continuum so that particular speakers may exhibit speech which is more or less vernacular." This usage therefore equates vernacular varieties with nonstandard varieties.

The two varying usages of this term are further illustrated by the use of the phrase "vernacular culture index," as used by Cheshire (1982) and Edwards (1992). For Cheshire, the index was calculated by subjects' participation in activities such as carrying weapons, choosing clothing styles, and fighting, while for Edwards, the index was calculated by subjects' ties to local neighborhoods via the location of their families and their jobs, and their desire to remain living in the area. Thus, for Cheshire, the vernacular culture is defined as nonstandard or counter culture, while for Edwards, it is defined as localness.

Meyerhoff and Niedzielski (2003) placed global variants in opposition to local variants, and they suggested a mechanism by which global variants can become local, in just such cases as they become part of a speaker's vernacular. Although they use 'vernacular' as analogous to systematic and least self-conscious varieties, as described above, they show how both of these senses can be incorporated into the concept of 'vernacular.'

In the realm of general linguistics, particularly field linguistics, 'vernacular' is used to refer to local languages, as opposed to a lingua franca, official standard, or a global language. For example, the Ethnologue website refers to the local languages spoken in Papua New Guinea and the aboriginal languages of Australia as the "vernacular languages," which, on this site, are contrasted with English. The Summer Institute of Linguistics website refers to local languages as "vernaculars," for instance, in discussions of literacy in languages other than English. Comparable usage of this term is seen on the phrase "vernacular literacy," which means literacy in a language other than a standard or global language, and often includes literacy in nonstandard dialects of a global language.

The juxtaposition of 'vernacular' and nonstandard dialects, however, raises the inherent danger that the negative stereotypes associated with nonstandardness will become associated with the vernacular varieties. This is one reason some scholars prefer to use 'African-American English' instead of 'African-American Vernacular English.'

See also: Academies: Dictionaries and Standards; Computers in Field Linguistics; Cultural and Social Dimension of Spoken Discourse; Localization; Mother Tongue Education: Nonstandard Language; Mother Tongue Education: Standard Language; Nonstandard Language Use; Prestige, Overt and Covert; (R) as a Variable; Standard and Dialect Vocabulary; Standardization.

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A Bird's Eye View of the Middle Ages

On the level of facts, the earliest studies in vernaculars consist, for example, of the first grammars of the various national languages, where otherwise only grammars of Latin were to be found, and of the first dictionaries in which lexemes were culled not primarily for learning Latin. In addition, there is teaching material that aimed at the support of the learning of spoken languages. These facts are not too exciting in themselves, certainly not if seen from a much later point of view such as that of our 21st century. They are, however, noteworthy in their indicative value. They show that new ideas had entered the attitudes towards vernaculars at the time of publication – ideas that were opposed to the previously unchallenged position of Latin. The year 1450 can serve as a historical threshold for the beginning of this development. In order to see the earliest studies of the vernaculars in their proper ideational perspective, the position of the Latin language in the earlier era must be sketched out.

Linguistically speaking, the Middle Ages in Europe were a real *res mixta*. The language of the intellectuals, exclusively represented by the clergy of the Roman Church, was Latin. This exclusivity meant the leading members of society spoke and wrote a language that was different from that of the plain people and was largely unintelligible to them. As the language of the military rulers, it had been brought to the continent north of the Apennine peninsula, first of all in a variant spoken by the soldiers of the Empire, i.e., by badly educated speakers. Subsequent to the variant of the soldiers, the variant of the Roman intellectuals – the historians, philosophers, orators, and men of letters – became known. In addition to the new religion, it was their culture and their language that gave the newly emerging kingdoms and even the new Church cultural substance. Latin infiltrated the various vernaculars to which it was juxtaposed. In the countries today called 'Romance,' new languages came into being; in the countries called 'Germanic' and 'Slavonic,' the indigenous languages prevailed with obvious changes, most of all in lexis.

When the military personnel and the whole Empire disappeared, their language stayed on – the vulgar idiom of the soldiers probably less so than the refined idiom of the learned that had been conveyed to script. The result was a general bilingualism of the newly developing society under the guidance of the Roman Church.

The Latin of the Middle Ages, as documented between (roughly) 800 and 1500, can, in modern terms, be defined (i) as a second language, (ii) as a group language, and (iii) as a register for special purposes. As a second language, it had no native speakers. It was not acquired naturally as first languages are, but had to be taught. As a group language, it marked its speakers as being the members of an educated class (and the others as not belonging to it), and as a register for special purposes, it was shaped and reshaped according to the special communicative needs it had to serve, most of all, in religious and academic contexts. In this process, it became alienated from its classical origins. As a consequence of all this, the teaching of any theoretical knowledge went, for a long time, together with the teaching of the language. Latin was the medium but also the matter. Reflecting on Latin was therefore, in many cases, combined with reflecting on teachability and learnability. The Latin textbook already appeared as a new genre in the works of the insular grammarians (i.e., in the 6th to the 8th centuries), and the Latin word list emerged in the 8th century from the glosses of readers and scribes who struggled with the foreign texts.

Admittedly, this medium was not altogether new. Donatus Aelius (4th cent. A.D.) and Priscian (6th cent. A.D.), the two leading Roman grammarians whose works dominated the whole of the Middle Ages (and even the ensuing centuries of Humanism), had already thought of their own works as being didactic grammars. It was their endeavour to teach classical Latin at the expense of the vulgar version. This aim is why they stressed the formal characteristics of the language more than anything else. We know from the *Institutio oratoria* of Marcus Fabius Quintilian (fl. 35–96 A.D.) how this instruction was accomplished in Roman schools. Because of the Roman predilection for Greek culture and the Greek language, there was also much foreign grammar teaching done in the Roman Empire.

Glossaries and onomastica were compiled in Rome from the 3rd century B.C. onwards in order to comment on the language of individual authors. All of the grammarians as well as the glossators had their Greek predecessors. Hence, reflecting on language in the two most essential areas, grammar and lexis, always had a didactic dimension. But the medieval authors had to do so under new constraints, *viz.* the keeping alive of a foreign (second) language *vis-à-vis* several indigenous ones that ruled everyday life. For the vernaculars, their strongest asset in this contest certainly was natural acquisition. In the many post-Roman countries, generation after generation acquired their

mother tongues with natural ease and used it accordingly. Although many of these native speakers went to schools afterwards in order to learn Latin and its culture, they remained at the same time native speakers of their vernaculars. They were citizens of two linguistic realms. The strength of the indigenous linguistic undercurrent must have been present in the individuals' everyday life, of which we regrettably know hardly anything. It certainly emerges in the works of heroic and courtly literature.

Obviously, there never was a chance (or danger) of Latin becoming a vernacular after the Romance languages had consolidated (i.e., after 1000). We can imagine that outside of intellectual discourse, much phatic communion and small talk occurred in Latin in the monasteries. Moreover, the linguistic system, in particular lexis, deviated more and more from its classical norms. Note, for example, the philosophical terminology developing over the centuries of scholasticism. This development was not a sign of deterioration (as the Humanists later maintained) but of an independent development according to present needs. Nevertheless, Latin retained in the status of a foreign idiom, to be taught in formal settings (schools) and to be used by the knowledgeable in specific domains (theology, philosophy). It nowhere ousted a vernacular. As far as the influence of the Roman Church reached, this presence resulted in a unified, theology-ridden European culture expressed in one idiom, below which, however, several national idioms were alive and creatively used. They were not the object of scientific study. By common assent, 'language' meant Latin and 'grammar' meant Latin grammar.

The general appreciation of Latin as a prototypical language was not only warranted by historical development and the sheer weight of facts that resulted from it. It also had a theological background. Latin was the language of the Bible, though not the original one. During the Middle Ages, it was the language of Revelation, inherited from the Greek and Hebrew versions of the canonical texts. It was also the language of the church since the works of the Church Fathers had been translated into it. There was, therefore, no problem in equating the structures of this language with the structures of thinking, as the *Modistae* did in the 12th century.

When, around the middle of the 15th century, the first studies of the vernaculars appeared, it meant challenging a cultural pattern that had been dominant for eight centuries, with a tradition of even more centuries behind it. The languages that expressed various national cultures below the common European one rose to the level of general interest and, if not already gaining a position of superiority over Latin (as from the end of the 18th century and the cult of nationalism in linguistics), at least stood on a par with what had so far been acknowledged as Europe's sole linguistic tongue. This elevation of the national languages meant challenging many more assumptions than just linguistic ones. Against the background of medieval Europe, the development rightly appears as revolutionary. The question is what caused and stimulated this process.

Of course, answering this question would mean explaining everything that is covered by the terms 'Renaissance,' 'Humanism,' and 'Reformation,' i.e., the intellectual and mental, the religious, philosophical, political, and societal processes that separate the modern world from the medieval one. Though occurring simultaneously, these processes were individual ones in each country. Note, for example, the different events constituting the Reformation in England, Germany, Bohemia, France, Spain, and Italy. With respect to the early studies in vernaculars at the cost of the unique acknowledgment of Latin, these divergences, however, had the same result. Between 1443 and 1583, the first grammars appeared in these languages. Different settings and different events must, therefore, have had so much in common that they produced homogeneous effects, for example:

1. the increasing wish for independence of the national churches from Rome and the establishment of new denominations, boosted not least by the translations of the Bible from Latin (Greek and Hebrew) into a vernacular and under the pretext that such translations strengthened the direct relation between the individual human being and God
2. the increasing consolidation of nations as centralized political entities unified not only by titles of possession held by feudal families and their marital relations, but also by a common national language
3. the increasing use of books made possible by the printing press and other innovations like the manufacture of paper and lenses for reading, recruiting a growing number of readers and establishing a new intellectual culture, independent of the usual centers of learning in monasteries, and the establishment of universities
4. the increasing use of long-distance trading routes not only along the coasts (by ship) but across the continent, crossing language barriers and with trading posts set up in towns, causing long-term stays of people in foreign language areas.

In one way or another, the first studies of the vernaculars were a part of one or several of these development(s) by indicating either religious or political or intellectual or economic innovations or a

combination of these. Classical Latin regained its position as a historical language and represented a much admired past. It continued to be taught for this reason. Medieval ('new') Latin sank into oblivion and derision. Latin and the living languages had now in common that they were constructed 'according to rules.' They could be subjected to the same kind of analysis.

The contest between Latin and the European vernaculars appeared in various genres of text, among them grammars, dictionaries, textbooks, letter guides, abecedaries, treatises on rhetoric and style, books with an arrangement of languages in parallel, deliberations on language origin and history, notably the biblical story of the Tower of Babel, translations (above all of the Bible) and comments on translating, etc. Only the first two will subsequently be discussed in any detail. The aim is to find out what the individual works of the two genres have in common and what is different. Theological arguments in the context of Bible translations will not be considered, because they must be seen in their own complex conditions and are the best known in this historiographical field.

Dante's Revolutionary Work

Long before the wave of vernacular grammars set in, Dante Alighieri wrote his two treatises *Il Convivio* (1304–1305) and *De vulgari eloquentia* (shortly after 1305), which may be considered as "the vanguard of the movement leading to the 'discovery of mother tongues' in Western countries" (Gensini, 1996: 220–221). Without paying attention to slight divergences between the two texts, we evaluate them as the earliest powerful statement of the superiority of vernaculars over Latin. The reasons given would today be named psychological and sociological. According to Dante, the vernacular is inherited from one's parents, learnt by imitation of one's mother, fundamental for communication and learning – even for learning Latin – and closer to the heart of people. In use, it is much more convenient than Latin, but just as expressive. Unlike Latin, it is more easily understood and read by a greater number of people. It is called the *locutio prima* against the *locutio secunda* of formal grammar. Dante admitted that vernaculars are less stable than Latin and are corruptible over the course of time and by spatial dispersion. But he regarded these changes as natural. In comparison, the stability of Latin is artificial. Although Dante agreed with the historical theory of his time by attributing linguistic variety and change to the sin of Babel, he acknowledged them as being natural and not amendable by the formalized grammar of a universal idiom. The three language groups (Germanic, Greek, and Latin) that he distinguished and the 14 dialects that he finds in Italy are therefore on a par with the artificial product of Latin. Dante even gave his linguistic arguments a national emphasis by criticizing these dialects as being corrupted and not fit to be a national idiom, eventually defining the 'illustrious dialect' that he is looking for and that he, of course, hopes to create himself.

It is obviously not accidental that for this first controversy about a vernacular, the Italian dialects and Latin were taken as its objects, because the close relationship between the two allowed minute comparisons and made the author become aware of such linguistic qualities as naturalness and formalization, stability and change, information and expression, etc.

Dante's deliberations almost beg for comparisons with recent concepts like *langue/parole*, system/use (performance), communicative competence/grammatical competence, communication/sign, native language/foreign language, etc. There has also been an attempt to trace the influence of the *Modistae* in Dante with a maintained parallelism between the structures of (any) language and of thinking. In particular, the idea that the first language is expedient for the learning of others is reminiscent of similar ideas, for example, of Ludwig Wittgenstein. It almost goes without saying that the revolutionary impetus of Dante's ideas was not recognized during his lifetime and for quite a while after that. He must have foreseen this delayed recognition. So he published his attack against Latin – in Latin. This seemingly absurd fact will often be found in the following centuries. "D[ante]'s ideas made themselves felt indirectly, however, through the extraordinary impulse his poetry gave to the development and use of vernacular and to the 'naturalistic' view of language he conveyed through it" (Gensini, 1996: 224).

First Vernacular Grammars

The following short reports will show that between 1437 (Alberti) and 1586 (Bullokar), the first grammars of Italian, Spanish, French, German, and English were written, testifying to the common wish of bringing the vernaculars into their own. Publishing such grammars meant establishing the languages as entities in their own right. The ways in which each language was established, however, were different in each case.

The architect and *uomo universale* Leon Battista Alberti is generally credited with having written the first Italian (Tuscan) grammar, although his so-called *Grammatichetta vaticana* (between 1437 and 1441) was not published in print until 1908. It is therefore

difficult to assess its influence. There must, however, have been copies around in the 16th century, for example, in the library of Lorenzo the Magnificent. It is a practically oriented small book, based on contemporary Tuscan, using word classes according to Priscian, and aiming to show that dialects, like the ones spoken at Alberti's time, had structures just like Latin had, which was itself the outcome of various dialects. In this earliest example, it already becomes obvious that most grammarians saw no choice but to map their living language onto the 'dead' one, Latin, if they attempted to show that Latin was not unique. They were bound to it, even in curbing its influence.

Alberti was ahead of his fellow grammarians Giovanni Francesco Fortunio (*Regole grammaticali della vulgar lingua*, 1516) and Pietro Bembo (*Prose della volgar lingua*, 1525), who are the first two relevant Italian authors. They have in common the quest for the ultimate norm of a dialect that would then qualify for being the national Italian language; they differ in that Fortunio found it in modern written Tuscan as exemplified by the great canonical authors Dante, Petrarch, and Boccaccio, whereas Bembo found it in archaic Tuscan. Both use the Latin word classes, though Bembo does so by avoiding the technical terminology of traditional grammarians. Fortunio wrote a pedagogical grammar with numbered rules, Bembo wrote a dialogue with no rules for memorization at all but with the discussion of historical issues that were to support his rigorous classicism. Fortunio also had an interest in harmonizing orthography for the benefit of the growing printing industry.

For other Italian grammarians of the 16th century, see Marazzini (2000).

The first grammar of a modern European language written according to a strict method is Antonio de Nebrija's *Gramática Castellana* (1492). The political conditions of the work are well known. The consolidation of the state under Ferdinand and Isabella and the dawn of the Golden Age of the empire demanded the parallel consolidation of a national language. The structure of the book is extraordinary. Books 1–4 described Spanish for native speakers with the aim in mind that the knowledge of their language should help them learn Latin. Its order (*orden natural*) employed the usual Latin categories, but added general linguistic knowledge and gave examples of structures from several languages (Latin, Greek, Hebrew, French, Andalusian, etc.). Book 5 described Spanish for nonnative speakers in a different order (*orden de la doctrina o artificial*), which is a phonetical and morphological overview. A 'book' for native speakers to learn their own language (better) was, however, missing. The innovative element of this grammar was obviously the idea that it provides knowledge of the native Spanish (Castilian) language, because this knowledge is the stepping stone for learning any foreign language, in this case Latin. The teaching of Latin itself was conceived in quite traditional terms. Nebrija himself also wrote a Latin grammar, which was even more successful than the Spanish one.

For this idea, Nebrija had forerunners in the so-called *grammatica proverbiandi*. They were to be found in Italy (where he lived for many years) and in Spain. They used expressions from the respective vernaculars in order to explain Latin structures. In modern terms, they can be called contrastive grammars (or, at least, grammars with contrastive elements). The rich supply of Spanish, Catalan, Andalusian, and Valencian examples makes them a first-rate source of medieval foreign language teaching in the region. Latin and vernacular examples were systematically translated into both directions. Retroversions uncovered many instances where the structures of the language pair did not coincide. Castilian, for example, sometimes uses prepositions where Latin uses synthetic cases. The explanations of such incongruities in the Latin version are called *supletio*. The treatment of linguistic contrasts in these grammars has been called the nucleus of Spanish grammatography.

For other Spanish grammarians before and after Nebrija, see Esparza Torres (2000) and Niederehe (2002).

The grammatography of French has a very special feature: its early works were written not in the country and not for natives, but in England and for speakers there who wished to learn the foreign language. The outstanding work, indeed the first comprehensive and methodical grammar of the French language in general, was *Lesclarcissement de la langue francoyse* (1530) by John Palsgrave – a book written in English in spite of its French title. But there were even earlier treatments of the matter that Palsgrave obviously knew, namely those by Alexander Barclay (*Here begynneth the introductory to wryte and to pronounce frenche*, 1521), Pierre Valence (*Introductions in frensshe*, 1528), and Giles du Wes (*An introducterie for to lerne to rede to prononce and to speke Frenche trewly*, 1532–1533). Together with the even earlier *Dialogues in French and English* (1483) by William Caxton, these books testify to the general interest of English speakers (often of noble descent) in learning French. The books are not grammars in the narrow sense, but textbooks. Palsgrave's book eclipsed them all in massiveness, comprehensiveness, and rigor. It is not just a grammar, either. It also contains extensive lists of French lexemes with their English equivalents. So, it testifies simultaneously to the general challenge to Latin, to the methods of

foreign language teaching, and to vernacular lexicography. Widely read as Palsgrave was, he took his observations of the language and examples from 'good' French literary works. As the great model for his book, he mentioned the Greek grammar by Theodorus Gaza (1495).

The structural basis of Palsgrave's grammar of French was the common framework of Latin grammars according to Donatus. To this extent, he was not different from all the other vernacular grammars. However, he found nine word classes in spite of eight, because he adds the definite and indefinite article. In the three 'books' of his work, he carefully distinguished between rudimentary and advanced grammar teaching, thus giving his book a clear overall progression. Moreover, he carefully noted "[T]he differences of Phrasys betvene our tong and the French tong." Again, language contrast was made the means of foreign language teaching and learning.

"Au début du XVIe siècle, il n'existe encore aucune grammaire française en France" (Kristol, 2000: 766). However, it soon came into being. Geoffroy de Tory (*Champ fleury auquel est contenu lart et science de la deue et vray proportion des letters*, 1529), whom Palsgrave knew, initiated the same idea that 'rules' like those found by Donatus, Priscian, and Quintilian could be applied to French just as to Latin. Jacobus Sylvius (Jacques Dubois, *In linguam Gallicam isag/o/ge una cum eiusdem Grammatica Latinogallica*, 1531) wrote the first French grammar to appear on the continent in Latin, probably because he thought this language to be a means of common understanding at the University of Paris and thus a platform for learning French. His grammar was entirely modeled on Donatus and Priscian. He elaborated on phonetics, etymology, and grammatical morphology, and declared the dialect of Picardy to be the ideal form of French. Johannes Drosaeus (Jean Drosée, *Grammaticae quadrilinguis partitiones*, 1544) used the same traditional approach by showing that Latin structures could be used in the same way for analysing Hebrew, Greek, Latin, and French. Latin was therefore regarded as 'universal.' Only with Louis Meigret (*Tretté de la grammare françoeze*, 1550) did French grammatography come into its own. He was interested in spoken language and maintained that a living language could be described systematically just as a 'dead' one. For him, this fact does not rest on the stability of a morphological system but on its functioning. "[L]es Français se parlent et se comprennent." This function is what French has in common with Greek and Latin. "Sur cette base conceptionelle, Meigret développe une description synchronique du français dans le meilleur sens du terme" (Kristol, 2000: 767).

For other French grammarians, see Kristol (2000) and Colombat (1998: 111–149).

In Germany, grammatography emerged from pedagogical writings like abcedaries and readers which, besides teaching people, work tentatively towards a homogenizing of the many regional dialects. It was Valentin Ickelsamer who wrote the first book with the word *Grammatik* in its title (*Ein Teütsche Grammatica*, 1534). It is not a proper grammar in the usual (i.e., Latin) sense, although the eight word classes of Donatus appear as if taken for granted. It is an appeal to grammarians, teachers, and everybody to be aware of the value and dignity of the German language in order to be able to read and to write and to learn other languages – above all Latin. Thus, it is a general pedagogical treatise showing the expressive possibilities of special syntactical patterns (like participles), the origin of word meanings, the controlled use and cultivation of language.

The first grammars proper were written in Latin, although two of them had German titles, and faithfully followed Philipp Melanchthons's highly influential *Grammatica Latina* (1544) which was modeled on Donatus. Laurentius Albertus (Ostrofrancus, *Teutsch Grammatick oder Sprachkunst*, 1573) struck a national note. The age, richness, and beauty of German, he wrote, merits German being treated according to the accepted rules of grammar. He maintained that all languages have the same grammar and that, as a consequence of this, grammatical knowledge in one's own language facilitates learning foreign ones. With a similar argument, Albertus Ölingerus (*Underricht der Hoch Teutschen Sprach*, 1573) intended his grammar to help French speakers learn German. Johannes Clajus (*Grammatica Germanicae Linguae*, 1578) followed Albertus and Ölingerus in explaining German using Latin categories. A side-by-side reading of the three books shows the differences that can arise when the model (Latin) and its adaptation (German) do not agree, for example, where the ablative is concerned.

For more German grammars, see Moulin-Fankhänel (1994) and Rössing-Hager (2000). The first German grammar written entirely in German is that written by Johannes Kromayer (*Deutsche Grammatica. Zum newen Methodo der Jugend zum besten zugerichtet*, 1618). It was meant as a preparation for the teaching of Latin.

In the case of English grammatography, the national background is particularly strong, as it coincided with the Elizabethan era. Richard Mulcaster (*The first part of the elementary*, 1582) set the tone with the much quoted "I loue Rome, but London better, I fauor Italie, but England more, I honor the Latin, but I worship the English." His book, though

not a proper grammar, is a general plea for mother tongue education in England, in particular concerning spelling. William Bullokar (*Pamphlet for Grammar*, 1586, usually called *Bref Grammar*) was the first to write a proper grammar of the national language, in which he truly followed the leading authors of Latin grammars in England at that time, Thomas Linacre, John Colet, and William Lily. It was the only way of proving that English was a language governed by 'rules,' just like Latin. Lily's (and Colet's) *Shorte introduction of* [Latin] *grammar* (1547), which had a complicated history before appearing, was seminal for Bullokar, because it gave Latin as well as English examples matching the Latin paradigms. Paul Greaves does very much the same in his *Grammatica Anglicana* (1594), although he explained his grammar as *praecipue quatenus a Latina differt ad unicam P. Rami methodum concinnata*. There is more intention than realization in this. The later works of Alexander Gill (*Logonomia Anglicana*, 1619) and Alexander Hume (*Of the Orthographie and Congruitie of the Britan Tongue*, 1617) are much more progressive in this respect. They use the so-called sign theory (Vorlat, 1975). According to this, certain structures of Latin – i.e., *casus*, *modi*, and *tempora* – are replaced by different 'signs' in English – i.e., by prepositions, auxiliaries, or interjections. This attempt is the first systematic one at differentiating and simultaneously parallelizing Latin and English in their structures. Grammatographers like Charles Butler (*The English Grammar*, 1633) and Ben Jonson (*The English Grammar* [...], 1640) followed this model. The most original author in this respect was John Wallis in his grammar of English, written in Latin (*Grammatica Linguae Anglicanae*, 1653), in which he replaced the usual explanations by word classes and declensions by so-called aggregates, i.e., syntactic word groups below the sentential unit, which prefigure the much later concept of phrases and constituents. It was a long time before this ingenious idea was generally accepted. Many other grammarians adopted the traditional word class system with only little alterations (Michael, 1970).

For more English grammarians, see Colombat (1998) and Hüllen (2005b).

Similar observations and statements can be made about all the European languages. For the development of Slavic languages, see Tavoni (1998).

First Vernacular Dictionaries and Textbooks

As is to be expected, the emergence of vernacular dictionaries occurred together with that of grammars – sometimes even initiated by the same author. The general motives and reasons for historical processes in grammatography and lexicography are the same, although the technical features of dictionaries entail at least one important difference: grammarians effected the change from Latin to the vernaculars mainly by perpetuating the old grammatical system, i.e., by modeling the new grammars on the old ones. (This preservation actually happened up to the end of the 19th century.) Dictionary writers could preserve only to a much smaller degree. They kept the order of the macrostructure, e.g., the alphabet, and the elements of the microstructures of old dictionaries – the lemma, its function in grammar, the synonym, the definition, the quotation, the encyclopaedic comment, and others, in varying selection – but the way in which these items were kept changed dictionaries so drastically that the continuity was disrupted here much more quickly than in the case of grammars.

The long-term development of lexicography is pan-European. Everywhere, Latin codices were glossed with varying density, either between the lines or in the margins. These glosses were set down in bilingual lists (*glossae collectae*), where they often fell into semantic clusters, because of the special vocabulary of the texts. This development prepared for the specialized vocabularies of later centuries. The lists of glosses were extended and combined, and many were alphabetized, so that they had either a semantic or a formal order. When printing provided the technical possibilities, word lists and glossaries eventually expanded to the size of dictionaries with Latin lemmata and juxtaposed vernacular interpretations. Over the course of time, they became a regular teaching and learning aid.

More than anything else, this development of glosses increased their usability for translation. It proves that translation was indeed the universal method of acculturating to the classical texts and their contents. Everywhere in Europe, Latin was the early medium of knowledge and culture but, again everywhere in Europe, the respective vernaculars were the metalanguages to Latin. Without them, the rich corpus of Latin works would have been empty. Nothing demonstrates the continuous mental relationship between formally trained Latin and the naturally acquired mother tongue better. Glosses and the dictionaries emerging from them therefore had a didactic element. They served the teaching of Latin. With the rising standard of learning, some enormous dictionaries came into being that forewent the learning aspect and served as works of reference for the more modest didactic ones. They are the *Elementarium doctrinae erudimentum* by Papias (middle 11th cent.), Osbert of Gloucester's *Panormia* (12th cent.), *Magnae derivationes* by Hugutio of Pisa (c. 1192), Guilelmus Brito's *Exposiciones*

vocabulorum biblie (between 1248 and 1267), and the *Summa quae vocatur catholicon* by Johannes de Janua (Balbus, finished 1286).

The semanticizing of Latin texts was done by simple reading and by translation. In the bilingual dictionary, this format necessitated the sequence 'Latin lemma (unknown) followed by explanatory vernacular expression (known).' Where this order was reversed into 'Vernacular lemma (known) followed by complementing Latin (unknown),' the dictionary obviously no longer served the reading and translating of Latin but rather the speaking and writing. Teaching changed from the receptive to the productive skills and was probably more advanced. Nevertheless, handling Latin was still its sole aim. The new arrangement, which was often a simple reversing of an established order, may signal a growing awareness of the importance of the first language for the learning of any further one. But it was still the Latin language that was envisaged as the learning target. Nevertheless, the dictionaries that juxtaposed Latin and a vernacular had the important second effect of stabilizing the lexis of spoken vernaculars – the store of their words, phrases, and idioms, and, above all, spelling. Many first sources are to be found in them that prove the occurrence of words, the introduction of new or the loss of old ones in language use. What was written down in order to support the learning of Latin also testified to the development of the vernacular at a time when the vernacular was not thought to be worth documenting.

Vernaculars came fully to the fore only when monolingual dictionaries in Italian, Spanish, French, German, and English (and the other European languages) began to appear and when the same happened with multilingual vernacular dictionaries in various combinations. Only then was the conceptual threshold reached beyond which it was thought possible and worthwhile to collect the lexemes of vernaculars – just like their structures in grammars. There are at least two diverging interests behind this. One is that, stimulated by the concepts of Humanism and the Renaissance, the national organization of the continent made progress. National languages became the various nuclei around which people gathered; it was the bond that tied their community together. We can trace this process by looking at the national lexicography as practiced in the various countries. The other one is that, stimulated by the practice of daily life, national languages gained in communicative importance outside their indigenous countries. They were learnt as foreign languages wherever this study was possible and feasible. Since the middle of the 15th century, teaching and learning spoken languages other than one's own became a necessity for many people. We can trace this process by looking at international (multilingual) lexicography as practiced in many countries of the continent irrespective of regional idioms. They list several languages in parallel and are part of the development of each vernacular concerned. To them belong two great textbook families. The one, *Introito e porta* (1477), written by Adam of Rotweil (dates unknown) after the model of a textbook by Master George of Nuremberg, originated in Venice, exploiting the lively trade relations between this town and some cities in the south of Germany. It was a textbook for Italians to learn German. It consisted of semantically arranged word lists with little grammatical information. It grew into a rich stemma of versions with as many as six languages. The other, *Colloquia et dictionariolum* (before 1530), written by Noel de Berlaimont (dates unknown), originated in Antwerp, exploiting the atmosphere of the highly cultivated Netherlands located between French, Low Dutch dialects, German, and English. It was a textbook for Dutch people to learn French. It consisted of dialogues set in typical scenes of everyday life and 'little' dictionaries matching them. It grew into an equally rich stemma of versions with as many as eight languages. The places where both books were printed were the centers of the new industry on the continent. Many of the multilingual editions also contain Latin lexemes that serve as a kind of common point of reference. Both textbook types were probably meant for self-instruction. Of course, there were also textbooks in existence that did not belong to either of these families, although their design was quite similar. Above all, these ones pertained to the use of dialogues. We find them, for example, in England, where the languages of the continent, notably French, Italian, and Spanish, were taught, but where people used their own teaching material. There were, for example, textbooks for the teaching of Italian written by Claude de Sainliens.

There are also multilingual dictionaries that were not designed as textbooks but as dictionaries proper. Most famous among them is Ambrogio Calepino's (1435?–1509?) Latin and Greek dictionary (Venice, 1502) which gradually grew into an 11-language edition and was known all over Europe. Although a dictionary for explaining Latin in the first place, it eventually mirrored the state of all the influential European languages. Equally famous is the *Nomenclator omnium rerum propria nomina variis linguis explicata indicans* of Hadrianus Junius (Adriaen de Jonghe, 1511–1575; Antwerp, 1567) which was published in nine languages. Its topical arrangement made it the outstanding example of a dictionary that served linguistic as well as encyclopaedic purposes. Independent of these two, there were a number of

dictionaries devoted to the two older languages, Greek and Latin, and one or several new ones. All of them put the languages of the various regions (countries) into the wider European context.

For the importance of textbooks by Johannes Amos Comenius and their editions in various languages, see Hüllen (1999).

The Italian scene showed some surprising details. Concerning bilingual dictionaries, the country seemed indeed to have profited much more from its European reputation as the origin of the Renaissance than from its own initiatives. Italian and French works appeared in France (e.g., Gabriel Pannonius: *Petit vocabulaire en langue françoise et italienne,* Lyon, 1578; Jean Antoine Fenice: *Dictionnaire françois et italien,* Paris, 1584), and in the Netherlands (e.g., Nathanael Duez: *Dittionario italiano e francese/ Dictionnaire italien et François,* Leiden, 1559–1560). Italian and English works appeared in England (e.g., John Florio: *A Worlde of Wordes,* London, 1598, *Queen Anna's New World of Words,* London, 1611). Of the Italian and Spanish works, one appeared in Spain (Christobal de las Casas: *Vocabulario de las dos lenguas toscana y castellana,* Sevilla, 1570), and the other one – finally – in Italy (Lorenzo Franciosini: *Vocabulario italiano e spagnolo/Vocabulario espanol e italiano,* Roma, 1620). All this shows that vernacular dictionaries were produced where cultural and economic interests were active, even without being confined to the country itself. Bilingual lexicography was more a European affair than an Italian one.

The discussion concerning which Italian dialect should be accepted as the national norm led to a number of monolingual dictionaries that presented the language of the three great authors Dante, Petrarch, and Boccaccio as linguistic models, and others that favored the idea of creating a mixed norm taken from the outstanding features of various dialects. A wave of dictionaries came into being with Italian lemmata, definitions, and quotations – i.e., dictionaries of Italian for Italians. Outstanding are, for example, the works of Francesco Alunno (*Le richezze della lingua volgare*, 1543; *La fabrica del mondo*, 1548) and Giacomo Pergamini (*Il memoriale della lingua italiana*, 1602). They (and others) became the basis on which the famous *Vocabulario degli Accademici della Crusca* was constructed and published in 1612. In 1583, the *Academia della Crusca* had been founded with the one intention in mind of creating a book like this one. It gave priority to the dialect of Florence in the *trecento*, and, in doing so, conformed with the ideas of the most eminent grammarian, Pietro Bembo. Of course, there was much criticism, in particular concerning the following editions (1623, 1691, and later). But the outstanding national importance of the Crusca dictionary was never queried. In Europe, notably in Spain and France, the Academy and its dictionary were appreciated as the adequate solution to an urgent national problem.

Elio Antonio de Nebrija, the instigator of genuine Spanish grammar writing, is also the instigator of genuine Spanish lexicography. He published the *Lexicon ex sermone latino in hispaniensem* (1492) and the *Dictionarium ex-hispaniensi in latinum sermonem* (probl. 1495). Although the Latin vocabulary of both books is largely dependent on Johannes Balbus, they are a great lexicographical achievement in their own right. As was his grammar, Nebrija's two dictionaries were meant to serve the teaching and learning of Latin, but became influential documents of the vernacular. They stabilized Spanish orthography, which followed pronunciation fairly strictly, and are excellent documents of the status of Spanish at the time. They proved to be exemplary for other lexicographical works, for example, dealing with Latin and Catalonian, Latin and Arabic, and Spanish and South American (Indian) languages. Although planned for teaching and learning Latin, the author's pride in his national language permeates the whole book.

The first monolingual dictionary that was compiled in order to muster the Spanish language in the Humanist spirit of the *Siglo de Oro*, and no other, is the *Tresoro de la lengua castellana o espanola* by Sebastián de Covarrubias Orozco (1611). Besides the usual lexemes, including idioms and proverbs, and besides many names of persons and places, it contains much factual information that gives the book an encyclopaedic character. Etymologies – according to the standard of knowledge then available – underpinned the antiquity and, in consequence, the excellence of the Spanish language, which was thought to stem directly from Hebrew.

In Spanish (as in other languages), lists of technical terminologies contributed to the development of monolingual lexicography. They started appearing in the 16th century. They were devoted, for example, to nautical terms, to agriculture, botany, and medicine. Written and used by people who lived outside educated circles, they are a frequently overlooked but important, occasionally substandard, way of presenting the riches of one's own language. They often contain craft-specific idioms and phrases.

There was a Catalonian–German edition of *Introito e porta* as early as 1502, published in Perpignan, which testifies to the practical needs of foreign language learning – in this case German – in Spain itself and possibly in the western Mediterranean. It is the

only single-language adaptation of *Introito e porta* to appear (Stegmann, 1991).

Apart from this text, much material appeared on the continent, outside Spain, for teaching Spanish as a foreign language. In Italy, the Spanish-born pope Alexander VI stimulated the knowledge of his home tongue enormously. During the reign of Charles V, when the center of Europe lay in Madrid, the interest in the language grew generally, as a result of the almost omnipresent political and economical power of Spain. It became the most widely learnt foreign language in England and on the continent.

The *Real Academia Espanola* was founded in 1713, its dictionary appeared in 1726 and 1739. It was **the** authoritative presentation of the Spanish vocabulary according to the norms of the time, and has remained effective in this sense ever since. Unlike the dictionary of the Italian academy, however, on which it was modeled, it confirmed and stabilized the status of the national language almost one hundred years after Spain's great lexicographers had already done so.

Lexicography in French progressed along the same lines as in other languages, without, however, lacking individual features. It started with glosses and developed into Latin dictionaries of a high standard. The way from here to the lexicographical treatment of the national vernacular can, in its initial stages, be traced in the works of one man, Robert Estienne. In 1531, he published the monolingual *Latinae linguae thesaurus*, a comprehensive and perfect book that deserves to be compared with the famous Calepino. It was the author's intention to cleanse the Latin language of all medieval remains, to verify the correctness of meaning definitions, and to find classical quotations for each of them. Where he found Latin meaning definitions to be insufficient, he replaced them by vernacular ones – this deviation being a first one from the otherwise strict Latin monolingualism. In 1538, Estienne published a shortened version of the *Thesaurus*, the *Dictionarium latinogallicum*, with many old and rare words deleted, but many more French definitions inserted than in the 1531 book. Only one year later, the *Dictionaire francoislatin*, a turned-over version of the *Dictionarium*, came out. It was called "[le] premier relevé alphabétique de mots français suivis, outré leur equivalent latin, de développement en langue nationale" (Quemada, after Bray, 1990, 1793). The book has the significant subtitle *contenant les motz & manieres de parler Francois, tournez en Latin*. In spite of its Latin starting point, it included the domains of the common French language use that had so far been excluded from dictionaries. This progress towards a vernacular dictionary was continued by Jean Nicot in his *Thresor de la langue francoyse, tant ancienne que moderne* (1606) and finalized by Maurice de La Porte's *Epitheta* (1571), the first monolingual dictionary in the full sense which presents French in its use as a national vernacular.

As the third country in Europe after Italy and Spain, France stabilized its national vernacular in an authorized version through the dictionary of the *Académie française*. This solidification happened as late as 1694, because the noble society, founded in 1635, took so long to finalize it. In the meantime, something happened that is unique in Europe: César-Pierre Richelet had to produce and to publish his *Dictionnaire françois contenant les mots et les choses* (1680) in Switzerland, because the privilege of the *Académie* prohibited the publication of lexicographical ideas and works in France between 1674 and 1714. His was the first dictionary whose definitions were entirely monolingual. The book is highly praised because of its elaborate system of marking codes and registers. Lexemes are distinguished as being used in certain professions and situations, as being archaic or of foreign origin, as having certain connotations or being restricted to certain types of text, as exclusively oral, and in other respects. Richelet, who was professor of French as a foreign language, was eager to ensure the correct use of the language by foreigners.

The ambitions of the official dictionary of the *Académie* are well known. Its main interests are the purity of the language and the *bon usage*, although the rigorousness with which these aims were followed has been overstated. Archaic words just like technical terms, vulgar words, and neologisms were, however, banned. The preface of the 1694 edition states as objectives "la Langue commune, telle qu'elle est dans le commerce ordinaire des honnestes gens, & telle que les Orateurs et les Poétes l'employent" (after Bray, 1990, 1799). Contrary to the dictionaries of the Italian and Spanish academies, the French one did not give any quotations or sample texts. The definitions rest solely on the intuition of the academicians.

Simultaneous with this French development, the language raised and found much interest outside the country. Its appearance in the usual multilingual dictionaries and textbooks is ample proof. In addition, bilingual works appeared outside the country, which show the influence of French, together with Italian and Spanish, on the European scene.

The German path from Latin glosses to the first monolingual exhaustive dictionary of the language (Johann Christoph Adelung: *Versuch eines vollständigen grammatisch-kritischen Wörterbuches Der Hochdeutschen Mundart*, 1774–1786) was extremely

long. Outstanding in the wake of the glossaries and early Latin–German dictionaries was, after 1400, the *Vocabularius ex quo*, a Latin–German dictionary with grammatical markings that grew from a rather slender first version into a voluminous work and whose German interpretations, taken as a whole, are a full-size thesaurus of Early Middle High German vocabulary. With 270 manuscripts extant today, it held its unrivalled position for some 50 years. Nevertheless, its intention was to support the reading of Latin texts. Different in this respect, though still a Latin–German dictionary, is Johannes Melber's *Vocabularius praedicantium* (1477–1480), which complements its Latin lemmata with a wealth of rhetorically chosen synonyms in order to help German preachers write their sermons in the vernacular. At the same time, Gerd van der Schueren started his *Theutonista vulgariter dicendo Duytschlender* (1488) with a Low-German and Latin part (to be followed by a Latin and Low-German one) with the obvious intention of organizing his dictionary according to German lemmata. It was the first time that the concept of 'mother tongue' made itself felt in German lexicography.

In the spirit of Humanism, which cultivated classical Latin but also the national vernaculars, dictionaries appeared that made Latin the translation of German (for example, Josua Maaler, *Teütsch Spraach*, 1561) and not the other way round. Moreover, German played its part in many multilingual works (like Hadrianus Junius' *Nomenclator omnium rerum*, 1567) that stabilized the vernaculars against Latin (and Greek) by quoting the most influential European languages side by side. Rich as these bilingual dictionaries are, they remain typological hybrids.

Finally, in 1616, Georg Heinisch published *Teütsche Sprache und Weißheit,* the first monolingual German dictionary, which however was unluckily aborted after the letter G. The need to have a comprehensive dictionary of this type was discussed in the so-called *Fruchtbringende Gesellschaft*, a privately founded and organized society of (mostly) noblemen who developed some absurdly baroque ways of communicating with each other. This *Gesellschaft* (which was one among several) fulfilled the function of the respective academies in Italy and France, without being one. Its work was politically motivated. In view of the fact that Germany was not a united nation, it wanted to establish the language as a common bond by documenting it in grammars and dictionaries, stressing that German was a *Hauptsprache*, i.e., a language of prime importance like any other one, in particular like French, which was its great rival at that time. The leading spirits in this discussion were Christian Gueintz, who published a grammar, Georg Philipp Harsdörffer with his work on practical philology and poetics, the lexicographer Caspar Stieler, and, above all, Justus Georg(ius) Schottel(ius), the author of the most influential book *Ausführliche Arbeit von der Teutschen HaubtSprache* (1663). It combined general linguistic aspects with a complex grammar. Lexicographically, all these authors favored the principle of the *Stammwort* (root word). According to this principle, dictionaries were to list root words, then all derivations and compounds that the German language could generate from them. This feature was supposed to be its outstanding one. Outside the *Sprachgesellschaften,* it was the philosopher Gottfried Wilhelm Leibniz who advocated the compilation of a German dictionary.

Almost absurd is the fact that the result of this discussion was a bilingual dictionary again, *Das herrlisch Grosse Teutsch-Italiänische Dictionarium* von Matthias Kramer (1700, important 2nd edn., 1702). Meant to serve the needs of foreign language teaching, it excelled in the way in which the German vocabulary was documented. The aim of the authoritative comprehensive German dictionary for Germans was only achieved in the course of the 18th century.

For a long time, English speakers thought of their own language as uneloquent, inadequate, and misspelled. During the reign of Elizabeth I and Henry VIII, this verdict slowly gave way to a more positive judgment, inspired not only by Elizabethan literature, but also by many translations from the classical languages and by a special culture of rhetoric. Lexicography developed from glossaries to Latin–English and English–Latin dictionaries; terminological treatises made the special English vocabulary of seafaring, agriculture, and other crafts available. The transition to monolingual English dictionaries was made easily and smoothly towards the end of the 16th century.

After 1500, English lexis was shaped by a massive influx of words from other languages, in particular from French and, via French, from Latin. With the additional help of the structural possibilities of word formation, a plethora of new words and hybrids from old words came into being that were hard to understand for those who knew nothing but their English as it was inherited from Germanic stock (and early latinizations, which nobody recognized as such). Of course, the acceptability of these lexical innovations was debated – and in most cases judged in a pragmatic way. They were thought to be acceptable where they filled a semantic gap in the indigenous language. The need arose to make their own language intelligible to semi-educated people. Monolingual, so-called hard word, dictionaries were the adequate remedy.

Actually, they were camouflaged bilingual dictionaries because they bridged the two linguistic worlds, the Germanic and the Latin one, which English then consisted of (and, to a certain extent, still consists of today). The lexicographical technique was taken from the current English–Latin forerunners, such as the *Promptorium parvulorum* (1499), the *Catholicon anglicum* (ms. 1483), and Richard Huloet's *Abecedarium anglicolatinum* (1552). It was plain synonymy, one 'hard' English word explained by a well-known one or by a plain statement. These hard word dictionaries were didactic projects rather than scientific ones. William Bullokar appended a list of hard words to his grammar (*The First Part of the Elementarie*, 1582), without, however, 'translating' them. Edmund Coote included a list of 1,500 in his highly successful *The English Schoolmaister* (1596), all semanticized by one synonym. In 1604, Robert Cawdrey published his *Table Alphabeticall, conteyning and teaching the true writing, and vnderstanding of hard vsuall English words* [...]. There then followed the dictionaries of John Bullokar (*An English Expositor*, 1616), Henry Cockeram (*The English Dictionarie*, 1623), Thomas Blount (*Glossographia*, 1656), Edmund Phillips (*The New World of Words*, 1658), Elisha Coles (*The Compleat English Schoolmaster*, 1674), and J[ohn] K[ersey], *A new English Dictionary*, 1702). As is almost natural, a gradual development took place. The number of entries grew steadily up to 25,000; domains of interest shifted from the general to the specific, old words, rare words, names were gradually included. The full range of a general monolingual dictionary was reached by the beginning of the new century with Nathanael Bailey's *Universal Etymological English Dictionary* (1721). According to the elaborate title, the author planned to give "the derivations of the generality of words in the English tongue," "a brief and clear explication of all difficult words," "a large collection and explication of words and phrases," and "a collection of our most common proverbs." There are some 40 000 entries.

The appearance of vernacular dictionaries in England was almost free of the ideological and national overtones that are to be found in the other European countries. Some English authors demanded that an academy be founded that was to rule on the language like the French one. Among them were John Dryden, John Evelyn, Daniel Defoe, and Jonathan Swift. They were not successful. It was Dr Samuel Johnson's famous *Dictionary of the English Language* (1755) that, eventually, fulfilled this function. For English speakers, it has long served as the model of a monolingual dictionary of their own language. What other nations did with the help of official institutions, the English did within the framework of a private initiative.

See also: Bible; Classical Antiquity: Language Study; Early Historical and Comparative Studies; Nebrija, Antonio de (1444?–1522); Traditional Grammar; Vernacular; Western Linguistic Thought Before 1800; Word Classes/Parts of Speech: Overview.

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Verner's Law

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Among the most dramatic achievements of early Indo-European scholarship, the elucidation of Verner's Law (VL) heralded a turning point in the history of the young discipline. This famous sound law owes its discovery to Karl Verner, the Danish scholar whose article of 1877 provided the first principled account of the conditions underlying apparent exceptions to Grimm's Law (GL). Through meticulous analysis and lucid argumentation, Verner brilliantly eliminated one of the most vexing cases of 'irregular' sound change. Hailed as decisive evidence in the main controversy of the day, Verner's insight immediately became the centerpiece of the Neogrammarian argument that sound change operates

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'blindly' and does not admit exceptions. Above all, Verner's approach exemplified the explanatory power afforded by scientific rigor, thereby setting a high standard for research to come.

According to part of GL, the pre-PGmc voiceless stops **p*, **t*, **k* (< PIE **k*, **k̂*), **k*^{w} give the PGmc voiceless fricatives **f*, **þ*, **χ*, **χ*^{w}. In word-initial position, these reflexes are consistent and basically uncontroversial. Similarly, in noninitial position, Germanic often displays the expected outcomes:

Go. *hafjiþ*, OE *hef(e)ð* 'lifts' : Lat. *capit* 'takes'
Go. *brōþar*, OE *brōðor* 'brother' : Lat. *frāter*, Gk. *phrátēr*, Skt. *bhrātā*
Go. *wairþan*, OE *weorðan* 'become' : Lat. *uertit*, Skt. *vartate* 'turns'
Go. *tiuhiþ*, OHG *ziuhit* 'pulls, draws' : Lat. *dūcit* 'leads'

These forms reflect Gmc **f*, **þ*, **χ* (> **h*) < **p*, **t*, **k*, as predicted.

In other cases, however, the pre-PGmc voiceless stops seem to give *voiced* reflexes:

Go. *uf-habaiþ* 'lifts up' : Lat. *sus-cipit* 'takes up'
Go. *fadar, OE fæder* 'father' : Lat. *pater*, Gk. *patḗr*, Skt. *pitā*
OE *we wurdon* 'we became' : Lat. *uertimus*, Skt. *vāvr̥tima* 'we turned'
OHG *gizogan* 'pulled up, drawn' (ptcp.) : Lat. *ductus* 'led' (ptcp.)

As a comparison with the set above shows, these words reflect Gmc **ƀ*, **đ*, **ǥ* instead of the predicted **f*, **þ*, **χ* (> **h*), thus corresponding to the voiced fricatives **ƀ*, **đ*, **ǥ* resulting from PIE **b*^{h}, **d*^{h}, **g*^{h} by part of GL.

Especially striking are the last two examples in each of the groups above in which 'regular' and 'irregular' outcomes are distributed predictably among different inflectional forms of the same verb. A comparison of further strong verbs in Germanic confirms that when the root of a Proto-Germanic verb ends in a voiceless fricative in the infinitive, the present tense, and the preterite singular, a voiced fricative is found in the preterite plural and the past participle (see Table 1).

The examples in Table 2 reveal that *-s-* and *-r-* participate in the same pattern. Comparative evidence confirms that the *-r-* of OE and OHG goes back to a Gmc **-z-*, which occurs here instead of the expected **-s-*.

In descriptive terms, then, the rule is that voiceless fricatives are replaced by voiced fricatives in the third and fourth principal parts of strong verbs. In the German philological tradition this alternation became known as *grammatischer Wechsel* ('grammatical change'), a designation later borrowed by English.

Table 1 Strong verbs in Germanic

	Infinitive	*Pret.first person sing.*	*Pret.first person pl.*	*Past ptcp.*	
OE	*weorðan*	*wearð*	*wurdon*	*worden*	'become'
OE	*snīðan*	*snāð*	*snidon*	*sniden*	'cut'
OE	*tēon* (< **teohan*)	*tēah*	*tugon*	*togen*	'pull'
(= OHG	*ziohan*	*zōh*	*zugum*	*gi-zogan*	″)
OHG	*līhan* (<* -*h*^{w}-)	*lēh* (< * -*h*^{w}-)	*liwum* (< * -*ǥ*^{w}-)	*gi-liwan* (<* -*ǥ*^{w}-)	'lend'

For decades, the apparently unconditioned dual outcomes of pre-PGmc **p*, **t*, **k*, **k*^{w}, and **s* were taken as indisputable evidence that sound changes like GL reflected mere tendencies and nothing more. Even as further sound laws were discovered and independent evidence for the regularity of sound change accumulated, it seemed inconceivable that a principled explanation could account for the glaring exceptions to GL.

The crucial insight was made by Karl Verner, who observed a correlation between the Germanic facts and the position of the accent in Vedic Sanskrit. Verner noted that, where the Vedic accent directly preceded a voiceless stop, that stop corresponded to a voiceless fricative in Germanic, as predicted by GL. Where the Vedic accent followed a voiceless stop, however, this stop appeared in Germanic as a voiced fricative. Greek comparanda tended to validate this insight:

Go. *brōþar* : Ved. *bhrā́tā* : Gk. *phrā́tēr*; but
Go. *fadar* : Ved. *pitā́* : Gk. *patḗr*

Decisive proof lay in the accentuation of Vedic verbal forms, which, as Verner showed, correlated precisely with the *grammatischer Wechsel* displayed by Germanic strong verbs. Where Vedic presents correspond in stem formation to Germanic presents, the root syllable is accented. In the Vedic perfect, which corresponds to the Germanic preterite, the accent falls on the root in the singular, but on the personal endings in the plural; the Vedic perfect middle participle in *-āná-* is accented on the suffix. The accentual pattern of Vedic may be seen in the following forms of *vr̥t-* 'turn' and *juṣ-* 'enjoy,' the cognates of OE *weorðan* and *cēosan*, respectively (see Table 3).

In attested Germanic languages, the accent is fixed on the root syllable, as it still is in the native part of the English lexicon. Yet, as Verner realized, the Germanic situation did not necessarily reflect the accentual system inherited from PIE. He therefore assumed the following:

Table 2 Germanic strong verbs with *-s-* and *-r-*

	Infinitive	*Pret.first person sing.*	*Pret.first person pl.*	*Past ptcp.*	
OE	*cēosan*	*cēas*	*curon*	*coren*	'choose'
(= OHG	*kiosan*	*kōs*	*kurum*	*gi-koran*	″)
OE		*wæs*	*wǣron*	—	'was/ were'
OHG		*was*	*wārum*	—	″ ″

- The Vedic accent, which could in principle fall on any syllable of the phonological word, faithfully reflects the PIE situation. The accentuation system of PIE was inherited into pre-PGmc.
- At some point *after* the shift of **p*, **t*, **k*, **k^w* to **f*, **þ*, **χ*, **χ^w* by GL, all word-internal voiceless fricatives as well as the sibilant **s* were voiced when the closest preceding syllabic segment did not bear the accent. This sound change is known as Verner's Law. This development generated new instances of **ƀ*, **đ*, **ɡ*, **ɡ^w*, which merged with the **ƀ*, **đ*, **ɡ*, **ɡ^w* resulting from part of GL.
- Following the operation of VL, the movable accent inherited from PIE was replaced by the later Germanic system of fixed root stress.

As a result of Grimm's and Verner's Laws, the obstruent system of early Proto-Germanic comprised far more fricatives than stops, an unnatural distribution from a typological perspective. Later changes served to repair this asymmetry, in particular the development of voiced fricatives to stops in certain environments. Before the dialectal breakup of Proto-Germanic, **ƀ*, **đ*, **ɡ*, **ɡ^w* had already developed to **b*, **d*, **g*, **g^w* after nasals, and **ƀ* and **đ* had probably become **b* and **d* word-initially as well. In the dialectal period, PGmc **z* regularly became **r* in most Germanic languages.

Interesting relic forms confirm that VL also applied to underlying word-initial fricatives when these occurred in intervocalic position after a composition vowel or reduplicated syllable; for example, OHG *mezzirahs* 'Messer, knife' < PGmc **mati-zaχsa-* < **-sókso-* or **-soksó-* (cf. OHG *mezzisahs*, OE *meteseax*, with analogical *-s-* after the simplex **saχsa-*); OIcel *sera* 'I sowed' < PGmc **se-zō* < PIE **se-sóh$_1$-h$_2$e*.

Although Gothic was generally quite conservative in its treatment of the Germanic consonant system, expected VL outcomes were much obscured by inner-Gothic developments. In the principal parts of Gothic strong verbs, analogical remodeling all but neutralized the inherited *grammatischer Wechsel* in favor of the voiceless fricatives of the present tense; cf. OE *drēosan, drēas, druron, droren* 'fall': Go. *driusan*, *draus*, *drusun*, **drusans*; OE *snīðan, snāð, snidon, sniden* 'cut': Go. *sneiþan*, *snaiþ*, **sniþun*, *sniþans* '(cut), harvest.' Verner effects were also undone by so-called *Auslautsverhärtung* (devoicing word-finally and before final *-s*); cf. Go. *dauþs* 'dead,' gen. *daudis* (*-d-* = /đ/). The full picture of VL in Gothic is far more complex; a valuable, thoroughgoing investigation of the problem may be found in Berhardsson (2001).

Table 3 Accentual pattern of Vedic

Pres. third person sing.	*Perf. first person sing.*	*Perf. first person pl.*	*Perf. mid. ptcp.*
vártate	*vavárta*	*vavr̥tmá*	*vāvr̥tāná-*
jóṣate	*jujóṣa*	*jujuṣmá*	*jujuṣāṇá-*

The past several decades have seen significant advances in our understanding of Indo-European accent and ablaut patterns, with VL effects helping identify mobile paradigms and derivational processes associated with the proto-language. Important recent scholarship has demonstrated the diagnostic value of *grammatischer Wechsel* in recovering the underlying inflection and derivational history of Germanic nominal forms, as the following forms illustrate:

- Proterokinetic inflection; for example, strong stem PIE **pér-tu-* m. 'passage, crossing' (> PGmc **ferþ/đu-* > OIcel *fjǫrðr* m., Norw. *fjord*) : weak stem PIE **pr̥-téu̯-* (> PGmc **furđu-* > OE *ford* m. 'shallow crossing'); PIE *ǵénh$_1$-ti-* f. 'birth, origin' (> Gk. *génesis*, Lat. *gēns*) : *ǵn̥h$_1$-téi̯-* (> PGmc **kundi-* > OE *gecynd* n. 'kind, nature')
- Amphikinetic inflection; for example, strong stem PIE **ḱáso-n-* m. 'gray one' (> PGmc **χasan-* > OHG *haso*, NHG *Hase*) : weak stem PIE **ḱaso-n-'* (> PGmc **χazan-* > OE *hara*, Engl. *hare*)
- Root-accented singular vs. suffix-accented collective plural; for example, pre-PGmc **pélth$_2$o-* n. > PGmc **felþa-* n. 'field, expanse' (> OHG *feld* n. 'field') : pre-PGmc **pl̥th$_2$áh$_2$-* > PGmc **fuldōn-* f. 'earth, ground, land' (> OE *folde* f. 'earth')
- Substantivization by accent shift of the type Gk. *leukós* 'white' → *leûkos* 'whitefish'; cf. PIE **b^{h}orsó-*'stiff, erect' (> PGmc. **ƀarza-* > OHG (Bav.) *parr* 'erectus') → **b^{h}órso-* m. 'bristled one' (> PGmc **ƀarsa-* m. > OHG *bars*, OE *bærs* m., Engl. *bass*).

Detailed, insightful surveys of the Germanic material are presented in Schaffner (2001, 2003).

See also: Germanic Languages; Indo–European Languages; Neogrammarians; Sound Laws.

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Vietnam: Language Situation

D H Nguyen

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Vietnam is the crossroads of many civilizations. In addition to the majority language spoken by the ethnic Vietnamese (who call themselves *người Việt*, *người kinh*), there are 53 ethnic minorities. The languages of Vietnam have been classified into four major families.

Language Families

Austroasiatic Languages

This family (ca. 51 184 000 speakers) makes up over 97% of the population and comprises 36 nationalities belonging to five different language groups:

1. The Viet–Mường group (ca. 46 776 000 speakers) makes up 88% of the population and four nationalities – Vietnamese, Mường, Thổ, and Chứt. The 686 082 speakers of Mường are spread over north and central Vietnam (provinces of Hà Sơn Binh, Sơn-la, Vĩnh-Phú, Hoàng-liên-sơn, etc). Thổ is spoken by over 24 000 people in Thanh-hoá and Nghê-tĩnh provinces, and Chứt counts almost 3000 speakers.
2. The Mon-Khmer group (over 1 300 000 speakers) makes up 2.4% of the population and 21 ethnic minorities – Khmer (Cambodian), Bahnar, Sedang, Kơho, Hrê, Mnong, Stieng, Bru, Khmu, Katu, Taoi, Ma, Co, Jeh, Sinmun, Chrau, Mảng, Kháng, Rmam, Brau, and Ơdu. Of the total number (717 291) of Khmer speakers, 297 862 live in Hậu-giang province. The remainder are highlanders formerly referred to as 'montagnards' of Central Vietnam.
3. The Miao-Yao group (760 040 speakers) makes up 1.5% of the population and is composed of three minority languages – Hmong (Miao = Mèo), Mien (Yao = Mán), and Pà-thẻn – spoken primarily in mountain areas of north and central Vietnam.
4. The Tay-Thai group (2 344 000 speakers) makes up 4.4% of the population and is composed of eight minority languages – Tày (901 802 speakers spread over 23 provinces, with Cao-bằng as their main habitat), Thái (766 720 speakers scattered over seven provinces, especially Sơn-la), Nùng (559 702 speakers scattered over 12 provinces, including Lạng-sơn), San Chay (77 104 speakers, nearly half of them in Hà-tuyên), Jeh (27 913 speakers in Hà-tuyên, Lai-châu, and Hoàng-liên-sơn), Lao, Lụ, and Bo-Y.
5. The Kadai group (over 12 000 speakers) consists of Lachi, Laha, Co-lao, and Pu Péo, the latter subgroup having only 300 speakers.

Austronesian Languages

This group, formerly called Malayo–Polynesian, counts 467 000 speakers (0.9% of the population) and is composed of five 'montagnard' languages – Jarai, Rhade, Cham, Roglai, and Chu-ru – among which Cham is spoken in coastal provinces, particularly Thuận-hải province, by descendants of the ancient Kingdom of Champa.

Sino–Tibetan Languages

1. The Han or Chinese group (over one million speakers) is composed of Chinese (= Hoa) – it is the most important minority language, spoken all over the country and numbering 475 739 speakers in Saigon alone – Sán Dìu and Ngái.
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Lá, Lahu, Lolo, Cống, and Sila, the latter two counting less than a thousand speakers.

Ten nationalities (Thai, Tay–Nung, and Mường in the north, Cham and Khmer in southern central Vietnam, and Kỏho, Rhade, Bahnar, and Jarai in the Vietnam Cordillers and the Central Highlands) have their own scripts, some of which were contributed by French missionaries and administrators, and later modified by linguists and literacy workers from the United States as well as by native linguistic scholars.

The official language policy of Vietnam has been:

> to respect the right of minorities of freely use and develop their mother tongues, to lead the struggle by minority people to demand the right to use their mother tongues in cultural and social life, especially in education, and to help them attain conditions favorable to the development of their own languages and the creation of their own writing systems.
> (Hông Giao, 1970: 7)

Between 1957 and 1975, members of the Summer Institute of Linguistics, authorized to work in South Vietnam, helped create Latin scripts and write elementary-level bilingual textbooks for 15 minority languages (Bru, Sedang, Cham, Koho, Bahnar, etc.). Books in the Roman script – based on the Vietnamese *quốc-ngưũ* writing system – as well as elementary-level textbooks have also been printed for Cua, Hroi, Nung, and Thai. The content of these publications is designed 'to disseminate the New Testament of the Protestant Church, to guide people in the civilized lifestyle' (Trần Đức Cường, 1984: 72). Joint research projects by Vietnamese–Soviet teams of linguists in 1979 and 1981 have resulted in monographs on Khmer, Cham, Mường, Laha, Hmong, etc. (Solncey and Hoàng Tuệ, 1984: 3–8).

See also: Austroasiatic Languages; Austronesian Languages: Overview; Sino-Tibetan Languages; Vietnamese.

Language Maps (Appendix 1): Maps 129–133.

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Vietnamese

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Historical Origins

The Vietnamese are thought to be descended from a precursor people who once dwelled near the Viet-Lao border of Central and Northcentral Vietnam where today are still found Vietic groups such as the Mu'ò'ng, Nguồn, Arem, Rục, Pọng, Arem, Mày, Sách, Mã Liềng, and Thà Vụ'ng (Nguyễn Tài Cẩn, 1995), (Ferlus, 1979, 1982, 1991, 1996, 1997). Long ago some of these groups moved north into the Red River Valley, lived under their own Hùng Vu'o'ng kings, and then allied with the indigenous Tày ethnicities in the joint Tày-Viet Kingdom of Âu-Lạc at Cổ Loa Citadel near Hanoi (257 to 208 B.C.). This lineage ended when the First Emperor of China and builder of the Great Wall dispatched the Chinese general 趙佗 Zhào Tuó (in *Hanyu Pingyin* transcription) or Triệu Đà (in Vietnamese), who conquered Âu-Lạc and introduced 100 000 soldiers, Chinese rule, Chinese character writing or 字漢 *Chũ' Hán* 'Han (Chinese) script', and the Mandarin administrative system.

Vietnam remained a Chinese province until A.D. 939. After the Chinese departed, the Vietnamese continued the practice of borrowing from the Chinese cultural lexicon as well as structural and grammatical forms, and continued developing the character script, which was then renamed 字儒 *Chũ' Nho* or 'learned script', and which contrasted with newly created characters used for writing purely Vietnamese lexical items. This new demotic script was called 字喃 *Chũ' Nôm* 'southern, local, vernacular script' or simply *Nôm*, which was clearly in evidence by the 13th century, but was perhaps in use as early as the 10th century. Consider the following examples of strategies used for crafting *Nôm* characters: (1) 乭 *giò'i* 'heaven, sky' from Chinese 天 meaning 'heaven' and 上 meaning 'above'; (2) 坦 *đât* 'earth' composed of 土 *thổ* 'earth' for the meaning and 旦, taken from one half of 怛 for the sound *đát*; (3) 魿 *cá* 'fish' is a combination of 魚 'fish' for the meaning and 个 *cá* for the sound; and (4) 巴 *ba* 'three' is composed of the radical 三 meaning 'three' and 巴 *ba* for the sound. These examples show that 10th century Vietnamese were very much aware of the principles used in the construction of Chinese characters, namely to combine a radical part for meaning and a phonetic part for the sound, but the example for *sky*, *heavens* shows that sometimes other methods of creation were used.

Chinese influence in Vietnamese is generally very important and is the result of (1) 1000 years of occupation by Chinese speakers, (2) the role ofChinese as the spoken and written language of administration and, (3) the fact that Chinese continues to be the source of borrowing even today. Chinese loans in contemporary Vietnamese, called Sino-Vietnamese, can make up as much as 80% of the vocabulary in some semantic domains, (Hoàng, 1991: 5). But the depth of Chinese influence extends beyond the lexical. Indeed, some of the typological incongruities of morphology and syntax are now considered to be the result of contact with Chinese and other languages.

Politically independent at last, the Vietnamese then turned their attention to southern rivals, the Champa Kingdom. Three hundred years of greater and lesser hostilities ensued, with ebbs and flows evident in marriage alliances and other accommodations; Vietnamese absorbed some early loans from this source as well. In the 14th century, the Vietnamese gained ultimate control and the boundaries of the language were advanced southward until Vietnam reached its current geographic extension. Chinese *Chũ' Hán* with an admixture of *Chũ' Nôm* writing flourished until the late 1600s when an outside force, Jesuit missionaries including Alexander de Rhodes and Francisco de Pina, developed an orthography based loosely on Portuguese and on Italian models that were intended not for the court but for believers among the common people. It was a romanized script with diacritics for tones and vowels, called *Chũ' Quốc* Ngũ', whose timeline can be sketched as follows: 1620–1631 embryonic beginnings, 1631–1648 revisions, 1651–1659 dissemination, and 1772–1838 finalizing stage, (Lý, 1999: 234–5). Over the 18th and 19th centuries, official character script and popular roman script co-existed, but gradually *Chũ' Quốc Ngũ'*, aided first by French colonial proclivities in favor of a Latin-based script and the Church and later by populist movements, led to a shift in orthography; the character-based writing of Vietnamese was finished entirely by 1917 when the French eliminated the Chinese examination system, cf., Alexandre de Rhodes (1651) and Nguyễn Đình Hoà (1973, 1992).

Regional Varieties

The regional varieties of Vietnamese are divided into three main types: Northern (e.g., Hanoi), Central (e.g., Huế), and Southern (e.g., Hồ Chí Minh City). Recently, it has been suggested by Ferlus and Nguyễn Tài Cẩn that a fourth regional area should be added, Northcentral Vietnam or Area IV (Nghệ An Province), as this

Table 1 Vietnamese tone categories

	Level	*Rising*	*Falling*
High	ngang [ŋaŋ33]	sắc [săk35ˀ]	hỏi [hỏi323]
Low	huyền [huiən 31]	nặng [năŋ21ˀ]	ngã [ŋa4ˀ5]

area preserves several special features lost elsewhere, cf., below and Alves (2000).

Phonological Forms

Vietnamese of the northern type has six tones, the southern type five, and central/northcentral types five or six, all of which can be traced back to a parent tone system of three columns of *level*, *rising*, and *falling* tones and two rows, *high* and *low*. Haudricourt (1954) proposed that Vietnamese was originally not a tonal language but that tonality arose as a part of the historical development of Vietnamese. In this theory syllable-final consonants caused changes of pitch; rising tones were produced in syllables that formerly ended in -p, -t, -k, -ʔ, whereas falling tones were created in syllables that once ended in -s or -h, and mid-level tones were created when syllables possessed no final consonants to draw the pitch up or down. Haudricourt's famous theory of Vietnamese *tonogenesis* explains how a non-tonal Mon-Khmer language could changes its typological features and become tonal. Vietnamese tone categories are also associated with specific voice quality contrasts that accompany each tone, perhaps a residue of its tonogenetic history. Thus the tone called *ngang* demonstrates mid-level with modal voice (tones are notated with the scale-of-five system in which 5 is the highest and 1 is the lowest level, cf. Y. -R. Chao, 1930); *huyền* falls from mid with lax/breathy voice; *sắc* rises sharply from mid with tense voice ending in a glottalized coda; *nặng* falls with increasingly tense voice from early in the syllable to glottal statis; *hỏi* is a fall-rise tone; *ngã* has a glottal interruption in the center of the syllable, sounding almost as if it were composed of two syllables VʔV, with overall a very high rising pitch, cf., Nguyễn and Edmondson (1997). The names *ngang*, *huyền*, etc., illustrate the tone they name. See Table 1.

Vietnamese consonants in Hanoi speech distinguish five places of articulation – *labio-dental*, *denti-alveolar* (the *t* series is denti-alveolar initially and apico-postalveolar finally), *palatal*, *velar*, and *glottal*, and several manners of articulation – *voiceless aspirated stops*, *voiceless unaspirated stops*, *preglottalized voiced stops*, *fricatives* (x is a lamino-prepalatal narrow grooved fricative), *liquids*, and *nasals*. Compare *Chữ' Quốc Ngữ'* and IPA values of these consonants in Table 2.

Table 2 Vietnamese consonant system

ph- [f]	th- [t̪ʰ]		kh- [x]	
-p [ˀp͡]	t [t̪ ˀt͡]		c, k, q- [k]	
		tr-, ch [ʈʂ]		
b- [ˀb]	đ [ˀd]		g(h)- [g] or [ɣ]	
	x-, s- [s]			h-
v- [v]	r-, d-, gi- [z]			
m [m]	n [n]	nh [ɲ]	ng(h) [ŋ]	
	1- [1]			

Table 3 Regional variation of initials from Alves (2000). QN = Quốc Ngữ, NV = Hanoi, NCV = locations in Nghệ An Province, CV = Huế, SV = Hồ Chí Minh City

QN	*NV*	*NCV*	*CV*	*SV*
s	s	ʂ	ʂ	ʂ
x	s	s	s	s
tr	c	ʈr	ʈr	ʈr
ch	c	c	c	c
r	z	r	r	r
d	z	j	j	j
gi	z	z	j	j
v	v	v	j	j
-nh	ɲ	ɲ	n	n
-n	n	n	n/ŋ	n/ŋ
-ng	ɲ	ɲ	ŋ	ŋ
-ch	c	c	t	t
-t	t	t	t/k	t/k
-c	k	k	k	k

In southern Vietnamese there are some important differences in initials compared to Hanoi. Notably *tr-* and *s-* are retroflexed [ʈr ʂ] and contrast with *ch-* [ʈɕ] (with very little friction compared to Hanoi speech) and *x* [s] respectively, *g-* [g], *r-* [r] (with a lot of variation in realization of the r-), *v-* [j] (Thompson, 1987: 89) *d-*, *gi-*[j]. As mentioned above, Northcentral Vietnamese has preserved three distinct pronunciations for *d-*, *r-*, and *gi-*. See Table 3.

Vietnamese word structure allows only sequences $C_1V(V)C_2$, whereby C_1 can be any allowed initial (notice that *p-* cannot be an initial except in words borrowed from French, e.g., *pin* 'battery' and *píp* 'smoking pipe'). The syllable coda C_2 can be *-ˀp͡ -ˀt͡ -ˀc͡/k -ˀc͡h -m -n -nh* [ɲ] *-ng* [ŋ]. One noteworthy phonological change in northern speech is engendered by these final consonants. Whenever the velars *-c* or *-ng* follow back rounded vowels *u*, *ô*, or *o*, there is *double closure*, and a velar and labial are simultaneously formed (because these are also accompanied by glottal stop, in reality they are triply closed). The preceding round vowel causes simultaneous assimilatory rounding of [-k -ŋ] to [-k͡p -ŋ͡m] in addition to

Table 4 Vietnamese rhymes with nuclear vowel(s) in the left column and codas in rows. Compiled from Lế Vắn Lý (1948), Haudricourt (1951), Gordina (1960), Emeneau (1951), as reported in Cao Xuân Hạo (2003: 88–103)

	Ø	*j* *-i/y*	*w* *-o/u*	*m* *-m*	*p* *-p*	*n* *-n*	*t* *-t*	*ɲ* *-nh*	*c* *-ch*	*r* *-ng*	*k* *-c*
i	i	-	iu	im	ip	in	it	inh	ich	-	-
iə	ia	-	iêu	iêm	iêp	iên	iêt	-	-	-	-
e	ê	-	êu	êm	êp	ên	êt	-	-	-	-
ɛ	e	-	eo	em	ep	en	et	-	-	-	-
ɛː	e	-	-	-	-	-	-	-	-	eng	ec
ɯ	u'	u'i	u'u	-	-	-	u't	-	-	u'ng	u'c
ɯʌ	u'a	u'o'i	u'ou	u'om	u'op	u'on	u'ot	-	-	u'ong	u'oc
ɣ	-	ây	âu	âm	âp	ân	ât	-	-	âng	âc
ɣː	o'	o'i	-	o'm	o'p	o'n	o't	-	-	-	-
a	-	ay	au	ăm	ăp	ăn	ăt	anh	ach	ăng	ăc
aː	a	ai	ao	am	ap	an	at	-	-	ang	ac
u	u	ui	-	um	up	un	ut	-	-	ung	uc
uʌ	ua	uôi	-	uôm	-	uôn	uôt	-	-	uông	uô
o	ô	ôi	-	ôm	ôp	ôn	ôt	-	-	ông	ôc
ɔ	o	oi	-	om	op	on	ot	-	-	ong	oc
oː	-	-	-	-	-	-	-	-	-	ôông	-
ɔː	-	-	-	-	-	-	-	-	-	oong	ooc

diphthongization of the vowel, e.g., *dùng* 'to use' [zᵘʊ͡ŋm̩31̤] *dục* a suffix [zᵘʊ͡kp̰21̰ˀ], *học* 'study, -ology' [haᵘ͡kp̰21̰ˀ] and *đồng* 'Vietnamese piastre' [ˀɗɣᵘ͡ŋm̩31̤]. Similarly, whenever the palatals *-ch* or *-nh* follow the unrounded vowels *-i*, *-ê*, or *-a*, then diphthongization occurs as before, but there is no rounding, as all segments are unrounded to begin with, e.g., *minh* 'clear, bright' [miⁱŋ33], *thích* 'to like' [thiⁱc35ˀ], *lệnh* 'order, command' [ləⁱɲ21̰ˀ], *ếch* 'frog' [əⁱc35ˀ], *anh* 'Sir, you, older brother' [ɜⁱŋ33] and *thạch* 'stone' [thɜⁱc21̰ˀ].

The rhymes of Vietnamese syllables can have the nuclear vowels: / i iə e ɛ ɛː ɯ ɯʌ ɣ ɣː a aː u uʌ oː o ɔː ɔ/. If one assumes that /iə ɯʌ ɯʌ uʌ/ function as the long versions of /i ɯɯ u/, then all vowels except /e/ have long and short forms. In Table 4 one sees the possible combinations of these nuclear vowels with the set of possible codas. Nuclear vowels may occur in open syllables, i.e., with -ø coda or in one of the following combinations: -j (graphically -i/-y), w (graphically -o/-u), -m, -p, -n, -t, -nh, -ch, -ng, -c. There are some notable areas where combinations are disallowed. For example, there are no rhymes *ij, *uw, or *ow, palatal coda may combine only with -a- and -i-, and velars may not combine with high front vowels except /ɛː/.

Word Category and Constructions

Contrary to some reports, Vietnamese is not an absolutely monosyllabic language, but one with many compounds and reduplicated structures. Compounds demonstrate disyllabic construction and have either been borrowed intact from Chinese (so nouns are right-headed, e.g., *cổ đại* [old-[era$_N$]$_N$] 'antiquity', *thanh âm* [voice-[sound$_N$]$_N$] 'sound', and verbs are left-headed *ẩu thổ* [$_V$[$_V$ vomit]-spit] 'to vomit') or are pure Vietnamese creations of Vietnamese or mixed lexical roots, all left-headed *ngù'o'i Việt* [$_N$[$_N$ people]- Viet] 'Vietnamese people', *nhà thu'o'ng* [$_N$[$_N$ house]-of the injured] 'hospital', *làm việc* [$_V$[$_V$ do]-work] 'to work', except for the group of *father-mother compounds*, which consist mostly of semantically paired things, e.g., *bố mẹ* father-mother 'parents', *bàn ghế* table-chair 'furniture', *bát dĩa* bowl-plate 'dishes', which function as a unit without head. Vietnamese reduplicatives are also very productive, such as *complete reduplicatives* having the same onset and rhymes, *cu'ò'i-cu'ò'i* 'laugh a little', *nói nói* 'keep talking', *register change reduplicatives* with the repeated part, be it on the right or left, having opposing high-low register of the same tone class, e.g., *xẹp* 'be flattened' vs. *xép-xẹp* 'be completely flattened' (with a sắc tone syllable being here followed by a nặng reduplicant); some have vowel changes in the reduplicant, e.g., *hốc* 'hole, hollow' vs. *hốc-hác* 'be emaciated, gaunt'; some can have changes of onset in the first element and some in the second element as *rộn* 'be noisy' vs. *chộn-rộn* 'be agitated' and *xẹp* 'beflattened' vs. *xẹp-lép* 'be completely flattened', (Thompson, 1987).

Regarding word categories, Vietnamese has the following: nouns *Lê Quý Đôn* 18th century author, *học sinh* 'student', *gà* 'chicken'; classifiers *hai con chó* two-CLS-dog 'two dogs', *các cái bàn* plural-CLS-table 'tables'; locatives *ngoài* 'outside', *bắc* 'north'; numerals *hai* 'two', *ba* 'three'; verbs *đi* 'to go, walk', *nói* 'to talk'; stative verbs (adjectives) *tốt* 'good', *mó'i* 'new'; and pronouns. It is noteworthy for its rich and

complex set of pronouns. There are personal pronouns *tôi* 'I, me (with modesty, servant)', *ta* 'I (emphatic), one', *tao* 'I (arrogant)', *mày, mi, bay* 'you (arrogant)', and nó 'it (animal)' or 'he (for children or contemptible persons, criminals)'. The term *mình*, meaning 'body' is used for 'you (intimate)'. The term *chúng* 'group of animate objects' can be combined with the above to make plurals such as *chúng tôi* 'we-exclusive' and *chúng ta* 'we-inclusive'. In public discourse, kinship names are often used, e.g., *chị* 'older sister, you-Ms.', *bà* 'grandmother, old woman, you-Madame', *anh* 'older brother you-Sir', *cháu* 'niece/nephew, grandchild, you-Young Person', *cô* 'father's sister, you-Ms.' (One speaker from Hanoi said that *cô* was obligatory to address one's female teachers.) These can become like 3rd person pronouns by adding *ấy*, e.g., *anh ấy* 'he, that Sir (a contemporary)', *chị ấy* 'she, that Ms. (a contemporary)', but there is also *nó* 'he (deprecating)' and *họ* 'they'. Kinship names also have features of anaphoric nouns, they contain additional information about gender and degree of familiarity, and they function differently in tracking participants in discourse.

Phrases and Sentences

Phrases are mostly left-headed, e.g., attributive adjectives follow heads, *đồng Việt Nam* piaster-Vietnam 'the Vietnamese piaster', complements follow heads, *ăn co'm* eat-rice 'to eat (food)', whereas adverb-like elements can appear to the left or right of the head, *rất đắt* very-expensive 'very expensive' but *đắt lắm* expensive-very 'very expensive'.

Sentences tend to have known, presupposed information at the beginning and new, asserted information at the end. One manifestation of this principle is that after introducing a referent, a close-knit group of clauses or a topic chain follows whose subjects are PRO, the zero pronoun. For example in the famous story about Bần with no overt pronouns, one finds:

Bần chỉ là một anh nghèo xác, e_i ngày ngày lang thang khắp xóm này khác e_i xin ăn. *Bần$_i$ just be a person poor, e$_i$ day-day wandered all over hamlet this different e$_i$ beg eat* 'Bần was a poor fellow [who] day after day wandered about from one place to another begging for food.'

Sources and Conclusion

There are several worthy examples of grammars and dictionaries of Vietnamese. For the English speaker, there is Nguyễn Đình Hoà (1997) grammar, which is richly exemplified, but reflects the spelling and sometimes the usage before 1975. Thompson (1965, 1987), written in the 1960s, also has a lot of examples, but employs a structuralist model of grammar that might be difficult for some to understand. Some of the examples are also no longer acceptable to contemporary speakers. Cao Xuân Hạo (2003) in an 800-page collection of his essays has discussed Vietnamese from the phonological, grammatical, and semantic perspectives. His bibliography includes many important scholars from the U.S. western Europe, and Russia, such as Bloomfield, Bybee, Chao Yuen Ren, Chomsky, Ducrot, McCawley *et al.*, and a glossary of linguistic terms with English definitions. Notable dictionaries are those by Nguyễn Đình Hoà in many editions, Bùi Phụng (1995) in many editions, and Viện Ngôn Ngữ' Học (2000), the model for the contemporary language and the standard-setting dictionary from the Linguistics Institute of Vietnam.

Despite the obvious influences of contact, Vietnamese shows a surprising number of unique features (e.g., tense markers for past and future, some right- and some left-headed typological features), arguably the richest set of pronouns in East and Southeast Asia as well as properties typical of the linguistic area (e.g., a fully developed tone-voice quality sound system, a sharply reduced coda inventory, four-syllable elaborate expressions, and a numeral classifier system). Vietnamese is thus ultimately not very similar to Mon-Khmer, cf., Haudricourt (1953), and is certainly not similar to Sinitic, but a language perhaps analogous in its position to Modern English in the sense that it too has lost many features found in related languages. Yet, despite borrowing and shift influences, Vietnamese, like English, remains an independent and distinctive language in its own right.

See also: Vietnam: Language Situation.

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Wilhelm Viëtor was born on December 25, 1850, and went to school in Cleeberg and Weilburg, Germany. From 1869 to 1872 he studied theology and classical philology at Leipzig, Berlin, and Marburg. He then taught in England from 1872 to 1874, and from 1874 to 1875 he studied for his doctorate in Marburg, after which he taught at various schools in Germany. From 1882 to 1884 he worked as Lecturer in Teutonic Languages in Liverpool and in 1884 was appointed Associate Professor of English Philology at Marburg, where he remained for the rest of his life. He died on September 22, 1918.

The main areas with which Viëtor concerned himself were foreign language teaching (FLT) reform (Viëtor, 1882), philology (Viëtor, 1876), phonetics (Viëtor, 1884), a national standard for German pronunciation, and marrying the philological disciplines with the demands of teacher training (Viëtor, 1902).

Viëtor made his name early with his notorious anonymous publication of 1882. This pamphlet is divided into two major sections. In the first section,

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Viëtor made his name early with his notorious anonymous publication of 1882. This pamphlet is divided into two major sections. In the first section,

'Language,' Viëtor covered the problem of sounds and writing, the tasks of philology, aspects of grammar teaching, and the influence of classical models on the description of modern languages. He remarked caustically that if – on the classical model – the article were to be given four cases, then nouns ought to have six:

1. nominative: Berlin
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The second section ('Teaching') dealt with first language pedagogy and the teaching of modern foreign languages and classics. Viëtor argued against the learning of rules and lists for grammar and lexicon. He also pointed out that the role of the text in FLT had become perverted to the point of being simply a means of confirming the syntactic rules just taught.

The functions of the text were taken up again in his discussion of the main principles of FLT (Viëtor, 1902), which cover the language ecology (which languages ought to be taught, and in which order?), the role of phonetic instruction, morphological description (to be based on spoken rather than written forms), the importance of syntactic principles (insight) as opposed to rules, and the nature of the texts to be used.

Viëtor initiated a lengthy process of reform in language teaching in Germany (Hüllen, 1979: 1). Through his connections with other members of the reform movement – Sweet, Passy, and Jespersen – Viëtor helped to determine the shape of FLT in Europe.

See also: Case; Foreign Language Teaching Policy; Jespersen, Otto (1860–1943); Passy, Paul Edouard (1859–1940); Sweet, Henry (1845–1912).

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Walmsley J B (1984). 'Quousque tandem: Wilhem Viëtor's. *Language instruction must do an about-face.' Modern Language Journal 68*, 37–44.

Virgin Islands, British: Language Situation

Editorial Team

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The British Virgin Islands are an overseas territory of the United Kingdom with internal self-government, consisting of more than 60 Caribbean islands that are part of the West Indies. Only 16 of the islands are inhabited.

The first settlers of the British Virgin Islands were Arawak Indians, from South America; these were followed by Caribs in the 15th century. Christopher Columbus stopped here on his second trip to the New World and named the islands Las Vírgenes. The first establishments were Spanish copper mines in the 17th century. In the second half of that century, the islands came under Dutch ownership for a short while, with a base on Tortola. The next colonizers were the English, who ousted the Dutch in 1672 and introduced sugar cane plantations and slavery. Thanks to this and to hardworking Quakers who settled here, the islands prospered in the late 18th and early 19th centuries, with an economy based on sugar, cotton, and spices. This period was followed by an economic decline, partly a result of the abolition of slavery in the early 19th century. As a result of economic recession, the population decreased as well after many planters left the islands. In the second half of the 19th century, the islands were incorporated into the British colony of the Leeward Islands. The word 'British' was added to the name at the end of World War I, after the United States purchased the 'Danish West Indies' from

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Denmark in 1917 and renamed them the 'U.S. Virgin Islands.' The 1967 constitution gave the islands internal self-government.

The population is 22 187 (July 2004 estimate); 83% are related to the slaves brought from Africa. The rest of the population are of European, Indian, and Asian origin. The official language is English. Other languages spoken are Virgin Islands Creole English, Papiamentu, and Spanish. The literacy rate is 97.8%, according to a 1991 estimate.

See also: Pidgins and Creoles: Overview.

Virgin Islands, U.S.: Language Situation

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The population of the islands is 108 775 (July 2004 estimate). The majority of the population is West Indian (81%), while the rest of the population is mainly from the U.S. mainland (13%) or from Puerto Rico (4%). The official language is English. Virgin Island Creole English, Papiamentu, and Spanish are also used. Dutch Creole (Negerhollands), which flourished at the end of the 18th century is by now extinct.

See also: Pidgins and Creoles: Overview.

Virtual Objects

P A M Seuren, Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

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The question of virtual objects is basically of an ontological nature, but it has direct consequences for the theory of truth and, hence, for the semantics of natural language. Around 1900, a discussion arose about the nature of 'reality' or, in other words, about the question of 'what there is.' Two schools of thought developed, extensionalism and intensionalism. The extensionalists hold that reality and actual existence are the same: Whatever is, exists; there is no being outside existence. For an entity *e* to be said to 'exist,' a few criteria must be satisfied, the most important of which are the following:

1. *e* is subject to the physical laws of causality.
2. *e* is fully defined, in the sense that it has all the properties an entity of that nature is supposed to have – even if not all the values of those properties are known.
3. *e* has a well-defined identity, in that at any time *t* it is identical with itself and distinct from all other entities.
4. *e* cannot both have and lack a given property.

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Criterion 1 seems self-evident. As regards criterion 2, consider the example of an actually existing man. He was born at a specific time; has breathed a specific number of times since his birth; has a specific weight, blood pressure, shoe size, and so on, even if that information is not always available to everyone. The criteria 2 and 3 are due to the American philosopher Willard V. O. Quine (Quine, 1953). Criterion 4 is known as the Principle of Contradiction and is due to Aristotle: "It is not possible for the same property to adhere and not to adhere to the same entity at the same time and in the same respect" (*Metaphysics* IV, 3, 1005b19).

The intensionalists do not deny the extensionalist's notion of existence, but they maintain that the universe contains more than just existing entities. They differ from the extensionalists mainly in that they accept the reality, but not the existence, of so-called virtual objects. Virtual objects have been thought up by a thinking individual. And, because thinking includes not only the strictly disciplined forms of imagining states of affairs normally found in hypotheses produced in science or by the police, but also all kinds of fantasizing, dreaming, and artistic imagination, virtual objects may fail to satisfy the criteria 1, 3, and 4, and will in any case fail to satisfy criterion 2 because they have only those properties (in virtual form) with which they have been fitted out by the imagination. They lack actual existence, although it may turn out that what has been thought up, perhaps as part of a hypothesis, actually exists – in which case we say that they are *matched* by real-world objects.

The most prominent representative of this philosophy is the German–Austrian philosopher Alexius Meinong (1853–1920). Meinong accepted not only virtual entities, but also 'objects of a higher order' (mostly relational objects such as 'the difference between A and B') and also what are normally called reifications or abstractions, such as 'the prime minister's popularity with the voters' or 'the triangle in general.' Such objects do not exist but they 'subsist' in the sense that they owe their being to the entities that do exist.

Among the virtual objects Meinong distinguished those that happen not to exist although they could have from those that cannot possibly exist, such as a round square. Virtual objects are automatically created by the thinking mind, no matter what properties are mentally assigned to them. Their identity is fixed by the mind. When I think up one man who is both bald and rich, there is one virtual man; but when I think up two men, one bald and one rich, there are two virtual men.

Thinking is by definition the setting up of a virtual world, and so is speaking, in so far as speaking is an expression of thought. Thus, by the very fact that I now say:

(1) I spoke to a man who was dead and alive at the same time.

I have created a virtual yet impossible entity *e* such that *e* is a man, is dead, and is alive, all at the same time.

Extensionalism has reigned supreme during the whole of the 20th century. The key figures are Bertrand Russell (1872–1970) and Willard V. O. Quine (1908–2000). Russell (1903: 450) shows him still an intensionalist, closely following Meinong. Commenting on extensionalism, Russell says:

> The theory seems, in fact, to have arisen from neglect of the distinction between existence and being. Yet this distinction is essential, if we are ever to deny the existence of anything. For what does not exist must be something, or it would be meaningless to deny its existence; and hence we need the concept of being, as that which belongs even to the non-existent.

But in Russell (1905: 482–483) he has switched sides and has become an ardent extensionalist, which he will remain during the rest of his life. Commenting on Meinong's ontology, he says:

> [Meinong's] theory regards any grammatically correct denoting phrase as standing for an *object*. Thus, "the present King of France," "the round square," etc., are supposed to be genuine objects. It is admitted that such objects do not *subsist*, but nevertheless they are supposed to be objects. This is in itself a difficult view; but the chief objection is that such objects, admittedly, are apt to infringe the law of contradiction. It is contended, for example, that the existent present King of France exists, and also does not exist; that the round square is round, and also not round; etc. But this is intolerable; and if any theory can be found to avoid this result, it is surely to be preferred.

Many commentators have observed that in this passage Russell does not do justice to Meinong's views. His objection, moreover, to the effect that Meinong violates the first principle of ontology and logic – the Aristotelian principle of contradiction – does not hold water because Meinong never said or implied that, for example, the golden mountain is really made of gold, only that the property of being made of gold is mentally assigned to it so that the virtual object 'the golden mountain' has the property of being made of gold in the virtual world it is part of.

A different criticism was voiced by Quine (1953) in his essay 'On what there is.' Here Quine accuses Meinong and similar philosophers of multiplying

entities beyond any controllable limits, and thus polluting any sound ontology (Quine, 1953: 4):

> Take, for instance, the possible fat man in that doorway; and, again, the possible bald man in that doorway. Are they the same possible man, or two possible men? How do we decide? How many possible men are there in that doorway? Are there more possible thin ones than fat ones? How many of them are alike? Or would their being alike make them one? Are no two possible things alike? Is this the same as saying that it is impossible for two things to be alike? Or, finally, is the concept of identity simply inapplicable to unactualized possibles? But what sense can be found in talking of entities which cannot meaningfully be said to be identical with themselves and distinct from one another? These elements are well-nigh incorrigible.

Yet, despite the wide acclaim this argument has had since 1953, it is based on the fallacy of using criteria of extensional entities and applying them to virtual entities.

The intensionalists' defense consists in saying that sentences such as those in (2) are clearly true.

(2a) The god Apollo was worshipped in the island of Delos.
(2b) Two gods were worshipped in the temple of the Dioskouroi.

In (2a), in the extensionalist view, a property is assigned to nothing because the god Apollo does not exist and therefore lacks any form of being. Russell's theory of Descriptions, presented in Russell (1905), offers no solution since the analysis it assigns to (2a) entails that Apollo exists. Therefore, to account for the fact that (2a) is true, it is necessary to assume that there somehow 'is' an entity 'Apollo.' This entity must have some identity because sentence (3) is false, despite the fact that Poseidon is as nonexistent as Apollo:

(3) The god Poseidon was worshipped in the island of Delos.

Similarly for (2b), which, in terms of modern predicate calculus should entail that there are two really existing gods who were worshipped in the temple mentioned. It seems that modern predicate calculus can be saved for natural language only if it is assumed that the existential quantifier does not require actual existence for truth but only 'being.'

Richard Montague (1972: 221–242) thought of a remedy in terms of possible world semantics. His *program of extensionalization of intensions* saw virtual entities such as Apollo as real in a class of possible worlds not containing the actual world and allowed certain predicates, such as *worship*, to yield truth with regard to entities that have reality in a class of possible worlds, even if this class does not contain the actual world. This program, however, foundered on the *problem of propositional attitude sentences*, which stands out most clearly when we consider the embedding under an intensional operator of necessarily true sentences, which are true in all possible worlds, or necessarily false sentences, which are true in no possible world. In Montague's analysis, all necessarily true sentences are substitutable *salva veritate* under intensional operators and so are all necessarily false sentences. But this means that, if Thomas holds the necessarily false belief that the number of prime numbers is finite, he must also hold the necessarily false belief that all bachelors are married, even if he himself – the best judge of his own beliefs – insists that he believes the former but rejects the latter. This theory thus has unacceptable consequences for natural language. This fact is now widely recognized.

Reference and quantification processes in natural language do not distinguish between existent and nonexistent entities. Likewise, truth is equally possible with regard to existent and nonexistent entities. When we assert (2a), we do not imply that Apollo really does or did exist. This is made possible by a distinction between extensional and intensional predicate positions. Predicates such as *bald* or *be made of gold* require the actual existence of the subject-term referents for literal truth, although they can be applied to fictitious characters under an intensional operator (which often remains tacit). But *be famous* or *be the talk of the town* or *have a website* can be truthfully said of existent and nonexistent entities alike. These latter predicates are intensional with regard to their subject-term position. The transitive predicate *worship*, for example, is extensional with regard to its subject term because one has to exist before one can worship anything, but it is intensional with regard to its object term because one can perfectly well worship specific nonexistent beings with a well-defined identity. By contrast, the transitive predicate *frighten* is intensional with regard to its subject term because something may frighten us even if it does not exist, but it is extensional with regard to its object term because one has to exist before one can be frightened.

An adequate semantics of natural language thus seems to require the assumption of virtual, thought-created, objects.

See also: Discourse Semantics; Extensionality and Intensionality; Lexical Conditions; Presupposition.

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Visual Semiotics

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Introduction

The study of visual signs and their representational functions became a major branch of semiotics after the publication of two influential books: Rudolf Arnheim's *Visual thinking* (1969) and Jonathan Berger's *Ways of seeing* (1972). Visual signs are defined, simply, as signs that are constructed with a visual signifier (form), i.e., with a signifier that can be seen, rather than heard, touched, tasted, or smelled. Visual semiotics is a growing and robust area of inquiry, which includes the study of art forms, logos in advertising, maps, diagrams, pictographs, alphabet characters, and other visual artifacts and symbols. Among the relevant works in this field are those by Barthes (1977), Sonesson (1987, 1994), Saint-Martin (1991), and Sebeok and Umiker-Sebeok (1994). A convenient classificatory framework of visual signs can be found in Santaella-Braga (1988).

Mental Imagery

The semiotic study of visual signs overlaps considerably with the study of mental imagery within psychology. An image is defined simply as a mental picture of objects, events, feelings, actions, situations, and ideas (real or otherwise). Images allow us to recall events, refer to them in various ways, and to generate hypothetical scenarios of situations or conditions that we may not even have actually experienced. Mental images are substitutes for real things, allowing people to recall, plan for, and predict things (Kosslyn, 1983, 1994). But these are not monolithic. Individuals differ widely in their abilities to construct images and use different aspects of imagery. For example, some people are better than others at moving objects around in their heads. They can visualize, say, the letter N changing into a Z when rotated to a certain point. Others have great difficulty in carrying out such imaginary rotations. People imagine faces and voices, locate imaginary places, scan game boards (like a checker board) in their minds, arrange furniture in a room, design a blueprint, and so on in similar, but significantly differentiated ways (Kosslyn, 1983, 1994).

Psychological studies have shown that images also vary along cultural lines. When asked to visualize a triangle or a cat, people living in the same culture will come up with very similar mental pictures of the two referents. These isomorphic images are known as 'cultural prototypes' (for the concept of 'prototype' in psychology, see Rosch, 1973, 1975, 1981, Rosch and Mervis, 1975, Taylor, 1995). The triangle that people living in Western culture typically imagine is an equilateral one, because it is the type of triangle that is perceived as the prototypical or basic form. It is the one that is perceived to be exemplary or representative of all triangles. Obtuse-angled, right-angled, and acute-angled triangles are perceived to be subtypes of the equilateral triangle. Similarly, the image of the cat that comes to the mind of subjects living in Western culture is that of a household cat, because it is the most typical in that culture.

Images are not generated only by visual perception. They can be elicited through other sensory and affective modalities. These modalities can be easily experienced by imagining such things as: (1) the sound of thunder, (2) the feel of wet grass, (3) the smell of fish, (4) the taste of toothpaste, (5) the sensation of being uncomfortably cold, (6) the sensation of extreme happiness. The image that comes to mind in the case of (1) has an auditory quality to it, (2) a tactile one, (3) an olfactory one, (4) a gustatory one, (5) a bodily one, (6) an emotional one. Moreover, images are not elicited solely by sensory modalities; they can be abstract, fictitious, or narrative. As an example of an abstract image, think of *love*. The image that this concept evokes is tied to some personal experience, such as the expression of a face in love. A fictitious image is something that can be made up in the imagination. An example of a fictitious image is a 'winged

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Visual Semiotics

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Introduction

The study of visual signs and their representational functions became a major branch of semiotics after the publication of two influential books: Rudolf Arnheim's *Visual thinking* (1969) and Jonathan Berger's *Ways of seeing* (1972). Visual signs are defined, simply, as signs that are constructed with a visual signifier (form), i.e., with a signifier that can be seen, rather than heard, touched, tasted, or smelled. Visual semiotics is a growing and robust area of inquiry, which includes the study of art forms, logos in advertising, maps, diagrams, pictographs, alphabet characters, and other visual artifacts and symbols. Among the relevant works in this field are those by Barthes (1977), Sonesson (1987, 1994), Saint-Martin (1991), and Sebeok and Umiker-Sebeok (1994). A convenient classificatory framework of visual signs can be found in Santaella-Braga (1988).

Mental Imagery

The semiotic study of visual signs overlaps considerably with the study of mental imagery within psychology. An image is defined simply as a mental picture of objects, events, feelings, actions, situations, and ideas (real or otherwise). Images allow us to recall events, refer to them in various ways, and to generate hypothetical scenarios of situations or conditions that we may not even have actually experienced. Mental images are substitutes for real things, allowing people to recall, plan for, and predict things (Kosslyn, 1983, 1994). But these are not monolithic. Individuals differ widely in their abilities to construct images and use different aspects of imagery. For example, some people are better than others at moving objects around in their heads. They can visualize, say, the letter N changing into a Z when rotated to a certain point. Others have great difficulty in carrying out such imaginary rotations. People imagine faces and voices, locate imaginary places, scan game boards (like a checker board) in their minds, arrange furniture in a room, design a blueprint, and so on in similar, but significantly differentiated ways (Kosslyn, 1983, 1994).

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Images are not generated only by visual perception. They can be elicited through other sensory and affective modalities. These modalities can be easily experienced by imagining such things as: (1) the sound of thunder, (2) the feel of wet grass, (3) the smell of fish, (4) the taste of toothpaste, (5) the sensation of being uncomfortably cold, (6) the sensation of extreme happiness. The image that comes to mind in the case of (1) has an auditory quality to it, (2) a tactile one, (3) an olfactory one, (4) a gustatory one, (5) a bodily one, (6) an emotional one. Moreover, images are not elicited solely by sensory modalities; they can be abstract, fictitious, or narrative. As an example of an abstract image, think of *love*. The image that this concept evokes is tied to some personal experience, such as the expression of a face in love. A fictitious image is something that can be made up in the imagination. An example of a fictitious image is a 'winged

table.' Although no such thing exists in real life, we nonetheless have no problem imagining it. Finally, a narrative image is one that unfolds like a story. For example, we recall encounters with people in narrative ways, with different images representing different episodes of the encounter in a storylike fashion.

Image Schemas

Ferdinand de Saussure (1857–1913), one of the modern-day founders of semiotics, used the word *image* in two senses in his theory of the sign (Saussure, 1916: 16). He defined a signifier (such as a word) as a 'sound image' and its signified (meaning) as the 'conceptual image' that the word calls to mind. Recent work on the conceptual imagery associated with verbal forms has shown that Saussurean images are 'schematic' (Johnson, 1987; Lakoff, 1987; Lakoff and Johnson, 1980, 1999). This has led to the development of *image schema* theory within linguistics (*see* **Cognitive Linguistics**). Image schemas are defined as unconscious mental outlines of recurrent shapes, actions, dimensions, orientations, objects, etc. Although they are unconscious, their 'reality' can be easily ascertained by prompting subjects in specific ways. For example, if someone were asked to explain the expression 'I'm feeling *up* today,' it is unlikely that he or she would describe an image involving an upward orientation. However, if the subject were asked 'How far *up* do you feel?' 'What do you mean by *up*?' etc., then the subject would start visualizing the schema in question and provide appropriate description of the image schema.

According to Lakoff and Johnson (1980, 1999), such schemas guide the formation of common concepts. As an example, consider the image schema of an impediment. An impediment is something, such as a wall, a boulder, another person, etc., that blocks forward movement. We know from actual experience that we can go *around* an impediment, *over* it, *under* it, *through* it, or else *remove* it and continue on. On the other hand, the impediment could successfully impede us, so that we would have to *stop* at the impediment and *turn back*. All of these actions can be easily imagined in the mind. These are derivatives of familiarity with actual impediments. Now, as Lakoff and Johnson have persuasively argued, the very same image schema is used unconsciously to form abstract concepts. It is the psychological reason why we say such things as: 'We *got through* that difficult time'; 'Jim felt better after he *got over* his cold'; 'You want to *steer clear of* financial debt'; 'With the bulk of the work *out of the way*, he was able to call it a day'; 'The rain *stopped* us from enjoying our picnic'; 'You cannot *go* any *further* with that idea; you'll just have to *turn back*'; and so on and so forth. Image schemas are, clearly, crucial in abstract concept-formation, linking bodily and perceptual experiences.

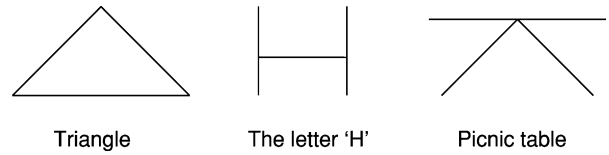

Figure 1 Using three lines to represent different figures.

Visual Representation

Drawing pictures, making charts, sketching diagrams, and the like are such common things that we hardly ever realize what they involve. They are part of an innate semiotic competence that allows people to utilize a sensory modality, such as sight, to represent the world through signs.

Visual representation has been studied under various rubrics both within semiotics and in other disciplines. The focus in semiotics is on the use of elemental signifiers (forms) such as *points, lines,* and *shapes* (Dondis, 1986) that are combined in various ways to represent figures. Consider, for instance, what can be accomplished with three straight lines. These can be joined up in specific configurations to represent by resemblance a triangle, the letter 'H', or a picnic table (among other things) (see Figure 1).

The use of visual signifiers in this way is called, more specifically, iconic representation (*see* **Iconicity: Theory**). If arrowheads are adjoined to lines, they can be used as signifiers to represent movement and direction (see Figure 2).

This is an indexical use of signifiers for spatial and orientational representation (*see* **Indexicality: Theory**). Shapes are visual signifiers designed to represent the outline of something. For example, to show the shape of the moon, we can draw a circle; to represent the surface of a table we can draw a rectangle; and so on. Virtually anything that can be perceived visually can be represented by a combination of points, lines, and shapes: e.g., in drawings of scenery, a cloud is represented as a shape, a horizon as a line.

Other visual signifiers include *value*, *color,* and *texture*. Value refers to the darkness or lightness of a line or shape. It plays an important role in portraying dark and light contrasts. Color conveys mood, feeling, and atmosphere in a visual text such as a painting. This is why we speak of 'warm,' 'soft,' 'cold,' or 'harsh' colors. Color, as will be discussed below, has culture-specific meanings: e.g., in American culture *yellow* connotes cowardice, while in China it connotes royalty. Texture refers to the phenomenon

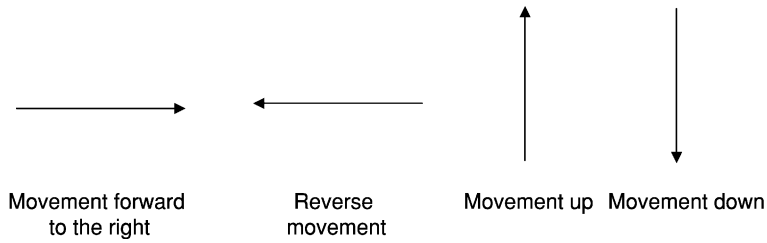

Figure 2 Using lines with arrowheads to represent movement and direction.

that certain visual forms (lines, shapes, etc.) evoke tactile and other sensory modalities. Wavy lines, for example, tend to produce a much more pleasant sensation in a viewer than do angular ones. By increasing the number of edges on angular lines, the unpleasant sensation tends to increase proportionately. This is strong evidence that visual representation is intermodal, eliciting other sensory modalities in tandem. The term that is used to characterize this phenomenon is *synesthesia*. It is defined as the phenomenon in which the stimulation of one sense elicits a perception that ordinarily would be elicited had another sense been stimulated, as when a loud noise registers as a blinding light, or vice versa.

Digital Visual Signs

Today, elemental visual signifiers have found a new medium of representation – the digital one (Horn, 1998; Darley, 2000). Digital visual signs, such as the icon that designates a tiny picture on a computer screen, are proliferating. Each icon represents a command. The system of icons, pointer, and mouse is known as a graphical user interface (GUI), a system that provides a user-friendly way of interacting with a computer. Users can usually tell by the icons how to get the computer to do what they want. Without a GUI, the computer screen is black, and the only way to tell the computer what to do is to type in commands. There is little doubt that GUIs contributed to the rise of the personal computer in the mid-1980s, starting in 1984 when the Apple Computer Company introduced the Macintosh, the first personal computer to include a GUI. Because they make computers easy to use, GUIs quickly became standard throughout the computer industry. Today, most users encounter only GUI-based programs and never have to type in commands to control their computers.

Another common digital visual sign is the *emoticon* (literally an *icon* that conveys an *emotion* visually). Emoticons are strings of text characters that, when viewed sideways, form a face expressing a particular emotion. Common emoticons include the smiley :-) or :) (meaning 'I'm smiling at the joke here'), the winkey ;-) (meaning 'I'm winking and grinning at the joke here'), :-(('I'm sad about this'), :–7 ('I'm speaking with tongue in cheek'), :D or :-D (big smile; 'I'm overjoyed'), and :-O (either a yawn of boredom or a mouth open in amazement). In an e-mail message or newsgroup article, a letter, word, or phrase that is encased in angle brackets, indicating the attitude the writer takes toward what he or she has written, is called an *emotag*. Often emotags have opening and closing tags, similar to HTML tags, that enclose a phrase or one or more sentences. For example: <joke>*You didn't think there would really be a joke here, did you?*</joke>. Some emotags are used as single tags, such as <grin>.

Color Signifiers

As a signifier in visual representations color has become a target of much study, within both semiotics and linguistics (e.g., Hatcher, 1974; Hilbert, 1987; Davidoff, 1991; Hall, 1992; Hardin and Maffi, 1997; MacLaury, 1997; Tufte, 1997). At a perceptual (concrete) level, we interpret colors as gradations of hue on the light spectrum. Hue is the property that leads us to give a color its name – for example, *red*, *orange*, *yellow*, *green*, *blue*, or *violet*. But the naming process is hardly free of cultural factors. The actual color terms we use in English predispose us to see 'differential categories' of hue. Experts estimate that we can distinguish perhaps as many as 10 million hues. Obviously, then, our limited number of color terms is far too inexact to describe accurately all the hues we are potentially capable of perceiving. The restrictions imposed on color perception by color vocabularies are the reasons why people often have difficulties trying to describe or match a certain color.

In a real sense, color is what the color terms in a language say it is. Consider what happens by putting a finger at any point on the spectrum. Only a negligible difference in the hues immediately adjacent to the finger at either side would be perceived by a viewer. Depending on where one puts it, however, perception of the difference will vary. This is because we have become accustomed to 'seeing' the spectrum in terms of the color terms of the language we speak. But there

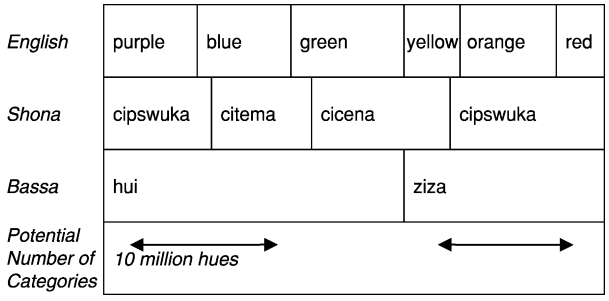

Figure 3 Differential classifications of the color spectrum.

is nothing inherently 'natural' about any color organizational scheme; it is a reflex of linguistic vocabulary, not of Nature. Speakers of Shona, an indigenous African language, for instance, divide the spectrum up into *cipswuka, citema, cicena,* and *cipswuka* (again), and speakers of Bassa (Basa), a language of Liberia, segment it into just two categories, *hui* and *ziza*. The relative proportional widths of the gradations that these color categories represent vis-à-vis basic English categories can be shown graphically (see **Figure 3**).

So, when an English speaker refers to something as *blue,* a Shona speaker might refer to it as either *cipswuka* or *citema,* and a Bassa speaker as *hui*; referring to something as *yellow, orange,* or *red* in English would be translated in Bassa as *ziza*; and so on. In this case, 'reality' is exactly what different people 'say' that it is. But this does not mean that the use of a specific set of color terms blocks people from seeing reality as others do. The color categories one has acquired in cultural context in no way preclude the ability to perceive the color categories used in other cultures. This is, indeed, what a learner of another language ends up doing when he or she studies the new color system. The student must learn how to reclassify the content of the spectrum in terms of new lexical categories. Moreover, in all languages there exist signifying resources for referring to more specific hues on the spectrum if the situation should require it. In English the words *crimson, scarlet, vermilion,* for instance, make it possible to refer to gradations of *red*. But these are still felt by speakers to be subcategories of *red*, not distinct color categories on their own.

The linguists Berlin and Kay (1969) argued, moreover, that differences in color terms are only superficial matters that conceal general underlying principles of color perception. Using the judgments of the native speakers of 20 widely divergent languages, they came to the conclusion that there were 'focal points' in basic (single-term) color systems that clustered and evolved in certain predictable ways. They identified eleven focal points, which corresponded to the English words *red, pink, orange, yellow, brown, green, blue, purple, black, white,* and *gray*. Not all the languages they investigated had separate words for each of these colors, but there emerged a pattern that suggested to them the existence of a fixed way of perceiving color across cultures. If a language had two colors, then they were equivalents of English *black* and *white*. If it had three, then the third one corresponded to *red*. A four-term system had either *yellow* or *green*, while a five-term system had both of these. A six-term system included *blue*; a seven-term system had *brown*. Finally, terms for *purple, pink, orange,* and *gray* were found to occur in any combination in languages that had the previous focal colors. Berlin and Kay found that languages with, say, a four-term system consisting of *black, white, red*, and *brown* did not exist. Berlin and Kay called this the *universal color system*.

The intriguing implications of Berlin and Kay's research were pursued vigorously in the 1970s by many linguists and psychologists. Eleanor Rosch (e.g., 1975), for instance, demonstrated that the Dani people of West Irian, who have a two-color system similar to the Bassa system described above, were able to discriminate easily eight focal colors. Using a recognition-memory experiment, Rosch found that the Dani recognized focal colors better than non-focal ones. She also found that they learned new colors more easily when the color names were paired with focal colors. Such findings suggested to Rosch that languages provided a guide to the interpretation of color, but they do not affect its perception in any way.

But many problems remain to this day with the conclusions reached by these color researchers. For one thing, the fact that the eleven focal colors posited by Berlin and Kay corresponded to the color terms of their own language (English) is suspicious. Could the researchers have been predisposed by their own language to gloss all other terms according to the English categories? Many of the terms Berlin and Kay listed, some critics have also pointed out, turn out to be borrowings (color terms taken and/or adapted from other languages), which would greatly undermine their theory. The focal points of Berlin and Kay's theory would seem to be no more than the points on the color spectrum categorized by the language to which they had become accustomed.

Semiotically speaking, color terms are verbal signifiers that predispose people to attend primarily to the hues they encode. This is a practical strategy; otherwise, millions of terms would need to be invented to classify the spectrum accurately. But the semiotic story of color does not stop there. Throughout the world colors are used for representational purposes. The archeological record strongly suggests,

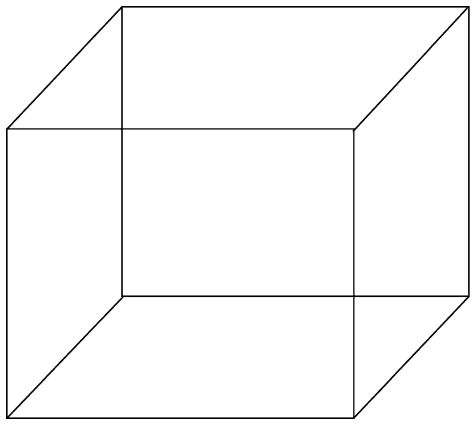

Figure 4 A three-dimensional figure represented on a two-dimensional surface.

in fact, that sensory and emotional meanings attached to colors may even have been the source for the color terms themselves (Wescott, 1980). In Hittite, for instance, words for colors initially designated plant and tree names such as *poplar*, *elm*, *cherry*, *oak*, etc.; in Hebrew, the name of the first man, *Adam*, meant 'red' and 'alive,' and still today, in many languages, *red* signifies 'living' and 'beautiful.' In all societies, colors play a critical function in the realm of symbolism. The Navajo of North America, for instance, allocate to colors a hierarchy of symbolic importance – blue is 'good' and red 'bad'; nation societies perceive great significance in the colors of flags and national emblems; and the list could go on and on.

Visual Texts

A text is anything that has been put together with signs to represent something. Lines and shapes, for example, can also be combined to create three-dimensional figures, which are visual texts that create an illusion of depth in the viewer. In the visual text of Figure 4 there are 12 lines. The way they are put together, however, makes us perceive the text as a three-dimensional box (see Figure 4).

Although the figure has been drawn on a two-dimensional surface, we cannot help but perceive it as a three-dimensional box. The reason for this is that, as a visual text, it has been drawn with the technique of 'perspective drawing.' This deceives us, in effect, to view objects as the human eye perceives them. The flat surface of any drawn figure is known as the *picture plane*; the horizon line is called the horizontal *eye-level line* that divides the scene in the distance; and the *vanishing point* is located on the horizon line where parallel lines in the scene appear to converge. This makes certain parts of the figure appear to be closer than others (see Figure 5).

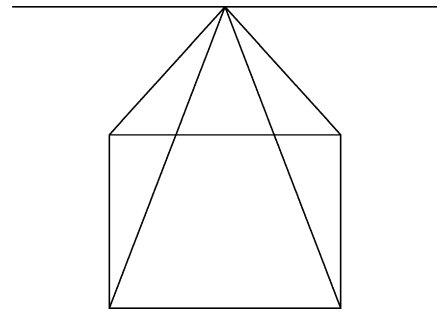

Figure 5 A figure drawn in perspective.

Perspective drawing is, in a phrase, the technique of creating an illusion of depth or length in two-dimensional surface drawings. As a historical footnote, it should be noted that the craft of perspective drawing dates back to the Renaissance, after the Italian artist Filippo Brunelleschi (1377–1446) developed the technique in Western painting.

There are many and varied types of visual texts, from paintings and drawings to maps, blueprints, comics, and the like, that have become targets of specialized areas of semiotics. Some of these, such as comic books, involve the use of both verbal and visual techniques, producing very effective texts (*see* **Semiotics of Architecture**; **Cartography: Semiotics**; **Comics: Semiotic Approaches**; **Photography: Semiotics**; **Pictography: Semiotic Approaches**).

Visual texts have an effect on perception, and can even mislead it. As a concrete example, consider the classic illusion in which the line AB appears to be longer than line CD (see Figure 6).

In actual fact the lines are equal in length, but the orientation of the arrowheads fools the eye into seeing AB as longer than CD. In some areas of the world, however, psychologists have found that people see the lines as equal in length. The factor behind this illusion is thus cultural, not biological – visual perception is intrinsically intertwined with representational practices. Psychologists have found that people living in cultures that have never been exposed to illustrated magazines are unable to recognize the photographs in the magazines as visual representations of human beings (Deregowski, 1972; Dunning, 1991). They tend to perceive them, rather, as smudges on the paper. Such erroneous interpretation of the photographs is not due to defects of intelligence or eyesight; on the contrary, the individuals are clear-sighted and highly intelligent. Their primary assumptions are different, because they have acquired a different system of visual representation that blocks them from perceiving the photographs in the same manner that those accustomed to viewing magazines perceive them.

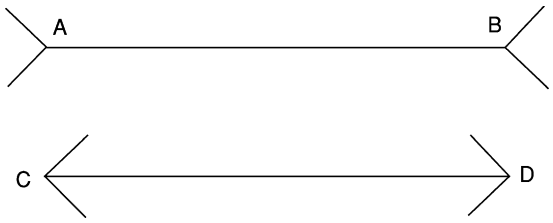

Figure 6 Classic optical illusion.

Two types of visual texts that have been targets of great interest within visual semiotics are *diagrams* and *charts*. A diagram is a schematic drawing using basic visual signifiers (points, lines, shapes, etc.) designed to 'explain' visually how something works or to clarify the relationship between the parts of a whole. A chart is a diagram that is designed to contain and display information of various kinds. Diagrams are cognitively powerful visual texts that are indispensable in science and, typically, are the sum and substance of theory-making. The diagram of the atom as a miniature solar system with a nucleus and orbiting particles is, *ipso facto*, a theory of the atom, allowing us to envision it in a particular way.

The common use of diagrams and charts throughout the world suggests that sight is a dominant modality in conception and knowledge-making. The science of geometry is an exemplar of this point. Geometry is about 'ideal visual forms' such as triangles, circles, and squares. Amazingly, such forms have allowed us to draw inferences about reality and about ourselves. Ancient Greek geometry provided, in fact, the basic ideas that came to characterize the modern system of scientific investigation. Geometric diagrams, and theorems about them, have applications to the real world. In the history of science, this kind of 'diagrammatic cognition' has produced truly remarkable results. This is because, as the ancient Greek geometers emphasized, it permits representations of various aspects of physical reality which, in turn, allow for an intellectual experimentation with that very reality through the use of symbolic reasoning (e.g., the many scenarios suggested by the Pythagorean Theorem). The results of this experimentation can then be redirected to the real world to see what they yield. Symbolic reasoning in such areas of human thought carries the burden over intuition.

Writing

Although now considered a separate field of its own, within both semiotics and linguistics, writing is also included under the visual semiotic rubric. Writing has always been perceived as having a mystical function, not just a purely representational one. The ancient Egyptians called their writing system *hieroglyphic* because they used it to record hymns and prayers, to register the names and titles of individuals and deities, and to record various community activities – *hieroglyphic* derives from Greek *hieros* 'holy' and *glyphein* 'to carve' (Goldwasser, 1995). In their origins most scripts were deemed to have sacred or mystical function – for example, the Cretans attributed the origin of writing to Zeus, the Sumerians to Nabu, the Egyptians to Toth, the Greeks to Hermes, and so on.

The earliest form of writing was *pictographic*. This consisted of drawing pictures to represent objects. For example, a circle was used typically to represent the sun and a wavy line to represent a river. So intuitive is pictography that it comes as little surprise to find that it has not disappeared from even alphabet-based cultures. The figures designating *male* and *female* on washroom doors and the *no-smoking* signs found in public buildings, to mention but two common examples, are modern-day pictographs.

One of the first civilizations to institutionalize pictographic writing as a means of recording ideas, keeping track of business transactions, and transmitting knowledge was the ancient Chinese one. According to some archeological estimates, Chinese pictography may date as far back as the 15th century B.C.E. Another fully developed ancient pictographic system was the Sumerian-Babylonian one that was developed nearly five thousand years ago. The Sumerians recorded their pictographic representations on clay tablets with wedge-shaped forms, hence the name *cuneiform*. Cuneiform writing was a very expensive and impracticable means of writing. For this reason it was developed, learned, and used primarily by rulers and clerics. In Egypt, hieroglyphic writing emerged around 2700 to 2500 B.C.E. The Egyptians used papyrus (a type of early paper made from reeds) to record their writings, making it more practicable for many more classes of people.

More abstract forms of pictographic signs are called *ideographs*. These may bear some resemblance to their referents, but require acquired knowledge of the relation between picture and referent on the part of the user. International symbols for such things as public telephones, washrooms, etc., are all ideographic. More abstract ideographs are known as *logographs*. A logographic system combines various pictographs and/or ideographs for the purpose of indicating nonpicturable ideas. For example, the Chinese pictographs for *sun* and *tree* are combined to represent the Chinese spoken word for *east*. The first *syllabaries* – systems of signs standing for syllables – developed from such amalgamated systems. Syllabaries are still used in some cultures. Japanese, for example, is still written with two complete

syllabaries – the *hiragana* and the *katakana* – devised to supplement the characters originally taken over from Chinese.

To facilitate the speed of writing, the Sumerians and the Egyptians eventually streamlined their pictographs and transformed them into symbols for the actual sounds of speech. Called *phonographic* writing, it consisted of signs standing for parts of words, such as syllables or individual sounds. A complete phonographic system for representing single sounds is called *alphabetic*. The first alphabetic system emerged in the Middle East around 1000 B.C., and was then transported by the Phoenicians (a people from a territory on the eastern coast of the Mediterranean, located largely in modern-day Lebanon) to Greece. It contained signs for consonant sounds only. When it reached Greece, signs for vowel sounds were added to it, making the Greek system the first full-fledged alphabetic one.

The Greeks also started the practice of naming each alphabet sign by such words as *alpha, beta, gamma*, etc., which were imitations of Phoenician words: *aleph* 'ox,' *beth* 'house,' *gimel* 'camel,' etc. Incidentally, the idea of an 'alphabetic order' of letters from **A** to **Z** emerged because the letters were used to count the numbers in order – **A** stood for 1, **B** for 2, **C** for 3, and so on. The earliest record of alphabetic order is Psalm thirty-seven where verses follow the Hebraic sequence.

Alphabetic writing has become the norm in many cultures. But in every alphabetic sign, there is a pictographic history and prehistory similar to the one described above for the letter **A.** The pictographic content of our letters goes unnoticed because our eyes are no longer trained to extract pictorial meaning from them.

Conclusion

There is no culture without visual representational traditions and customs. These bear witness to the fact that visual signs are perceived to be just as crucial to human understanding, if not more so, than words. As mentioned, the study of visual signs embraces a number of subfields, from painting to photography, within general semiotics. However, in its basic outline, the goal of visual semiotics is to study the elements of visual representation and how these help human beings understand reality.

See also: Cartography: Semiotics; Cognitive Linguistics; Comics: Semiotic Approaches; Iconicity: Theory; Indexicality: Theory; Photography: Semiotics; Pictography: Semiotic Approaches; Semiotics of Architecture.

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Vocabulary: Second Language

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Learning Burden

Knowing a word well involves knowing several aspects covering the form, meaning, and use of the word. The difficulty these aspects have for any particular word depends on how closely the aspects relate to knowledge the learners already have. This knowledge can come from the learners' first language or other languages they know, and it can come from the knowledge they already have of the second language. For example, if the learners' first language uses the same written script as the second language, then this will make the learning burden of the written form of the second language much lighter. If the written form of the second language is very regular with one letter always representing the same sound and vice versa, then the learning burden of the written form will be even lighter. Similarly, if the two languages share a lot of cognate vocabulary, some of the learning burden will be lighter. Spanish learners learning the academic vocabulary of English find that these words have a light learning burden because most have very similar forms and meanings in English, for example *acquisition* and *evaluation*. Finnish learners of English are faced with a more difficult task.

Teachers can try to lighten the learning burden of a word by explicitly relating it to known items that are similar in the first or second language, by showing the patterns or rules that the word fits into, and by preteaching items and features that will make the new word easier to learn. Before teaching a word, it is worth doing a quick analysis of the learning burden of the word to work out what aspects of the word the teaching needs to focus on.

Word Form

Words that are difficult to pronounce are usually difficult to learn (Rodgers, 1969; Ellis and Beaton, 1993). Words that are easy to pronounce can more easily be held in working memory and thus have a greater chance of entering long-term memory. Thus, the words introduced early in an English course should be easy for learners to pronounce. Substantial listening practice and a small amount of guided pronunciation practice can make it easier for words with unfamiliar sounds to be learned.

Although English spelling is notorious for its irregularities, there are numerous patterns and rules that can help learning. First language research on reading has shown that developing phonemic awareness (the idea that words are made up of separable sounds) can have very positive effects on learning to read English (Ehri *et al.*, 2001). Similarly, giving some attention to phonics (sound-spelling relationships) can also help with learning to read and write (Stahl *et al.*, 1998). A very large proportion of English words come from French, Latin, or Greek and thus make use of prefixes, suffixes, and stems that can occur in many different words. Learning can be helped if the most common affixes and their meanings are learned, and often a simple explanation of a word's etymology (e.g., the word *rank* has the same stem as the word *arrange*) can help learning. Irregular affixation can increase the learning burden. Laufer's (1997) study of

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synforms has shown that, when knowledge of a form is not firmly established, there can be considerable interference with words of roughly similar form.

Word Meaning

If an L2 word is a loan word or a cognate in L1, it is then very easy to relate the form of the word to its meaning. For example, approximately 70% of the 570 words in Coxhead's (2000) Academic Word List exist in Spanish in a similar form with a similar meaning. Only a very small number, approximately 10%, are false cognates in which the form is similar but the meaning is not. The reason for such a large overlap is that over half of English words came to English from French or Latin (Roberts, 1965). As a result, other languages derived from or with a lot of borrowing from Latin and related languages share a large amount of vocabulary. One important effect of this is that the analysis of words into parts, particularly giving attention to prefixes and suffixes, can greatly help the learning of these words. Remembering the meaning of a regularly affixed word such as *unpredictable* or *miscommunication* is helped by having an understanding of the parts that make it up. There are lists of the most frequent, regular, productive, and predictable affixes in English that learners of English as a second language can usefully learn (Bauer and Nation, 1993).

Some English words require considerable concept development by learners with particular first languages. The most striking of these may be words for family relationships and pronouns if English uses a system different from that in the first language. For example, in the Thai system for showing family relationships, relative age is very important and the term used to refer to an older sister is different from that used to refer to a younger sister. Similarly an aunt on your mother's side who is younger than your mother is referred to in a different way from one who is older than your mother. Learning such a system takes a lot of time and experience for a nonnative speaker.

Some areas of technical vocabulary may also present a heavy learning burden. Recent studies of technical vocabulary (Chung and Nation, 2003) have shown that a very large proportion of the running words in specialized texts are technical words. In highly technical subjects such as anatomy almost one in every three words is a technical word. In other areas, this may drop to one in five. From a learning-burden perspective, technical vocabulary can be divided into two types: technical words that have forms that are largely unique to the specialized area and words that also occur in nonspecialized areas, usually with the same or a related meaning. The first group includes words such as *thorax, sternum,* and *vertebrae* in anatomy and *pixel, ROM,* and *cpu* in computing. The second group includes words such as *by-pass, chest,* and *rib* in anatomy and *file, open,* and *save* in computing. Usually the completely new words such as those in the first group will have a heavier learning burden because both a new form and a new concept must be learned. Words in the second group can be made easier to learn by relating their nontechnical meaning to their technical meaning.

When learning most other words, the learner may find the L1 equivalent to be sufficient as a first step in developing an L2 concept for the word. If a word has a wide range of senses that do not correspond to the L1, then this can increase learning burden.

Word Use

If the grammar and collocations of a word are not similar to those in the first language or to known second language synonyms, then the learning burden is heavy and teachers may need to spend time on these aspects. Collocations are words that typically occur with other words. Some typical collocates of *sweet* in the British National Corpus are *smile, smell, flavour, dreams, tooth, boy, juice,* and *dreams*. If these do not parallel the first language, then they need to be learned. This is probably best done through extensive experience with the language. Such learning can also be helped by drawing attention to the concept underlying the range of uses of the word (*sweet* shows that something is pleasing and well liked) and by explicit attention to the collocates. It has been suggested that it is knowledge of collocational units that makes native speakers sound nativelike and that allows them to use the language fluently (Pawley and Syder, 1983). That is, native speakers can use the language well because they have stored units of language that are much larger than a word. Storing and accessing units such as *that's all very well for you to say* and *without further ado* allow a speaker to produce accurate language quickly.

Some words such as *faucet, kid, bugger,* and *explicate* have restrictions on their use. These restrictions include geographical restrictions (Americans use *faucet*; British use *tap*), register (*expedite* is very formal; *speed up* is more colloquial), currency (some words such as *forsooth* and *breeches* are no longer in use), age restrictions (*potty* and *choo-choo* are used by and with children), gender restrictions (*fabulous* tends to be used by women), and frequency (some words such as *diligent* and *capricious* are not commonly used). When learning and using these words, these restrictions need to be noted.

Idioms

Most groups of words (multiword units) in normal language are easy to comprehend if the words that make up the multiword unit are known. So, understanding *is the food good?* and *they are going to the city* is not usually problematical. Some multiword units, however, have a meaning that is very different from the meaning of their parts. Carefully applying the criteria of noncompositionality and nonfigurativeness, Grant and Bauer (2004) made an exhaustive search of idiom dictionaries, articles about idioms, language teaching texts, and television scripts to find all the English core idioms. The term 'core idiom' was used to distinguish it from the looser uses of 'idiom.' For example, *by and large* is a core idiom because the meaning of *by and large* cannot be related to the meaning of the individual words *by* and *large* – that is, it is noncompositional – and we cannot visualize some figurative use of *by and large* relating it to its meaning – that is, it is nonfigurative. On the other hand, *the worm turns* is not a core idiom. We can imagine or visualize a mild worm turning fiercely on an attacker (which conveys the meaning of the phrase), and so it is a figurative and thus not a core idiom.

Only 104 core idioms were found. Each of these items was then searched for in the British National Corpus (BNC) to find its frequency, various forms, literal uses, and collocations. The most frequent core idiom, *by and large*, occurred 487 times in the 100 000 000 token corpus. This frequency is not sufficient to get it into the most frequent 5000 words of English. Most of the core idioms occurred fewer than 50 times per 100 000 000 running words, and 18 of them did not occur at all in the BNC.

Core idioms are usefully distinguished from other types of multiword units because they require different interpretation and learning procedures. They have to be treated as unanalyzed wholes. Figuratives and collocations can be learned by analyzing their parts.

Fifty-nine of the 104 core idioms were not frozen; that is, they had variations in the BNC, some of them quite substantial. If frozenness was added to the criteria for a core idiom, there would only be 45 English core idioms.

A few core idioms such as *a piece of cake, beat it,* and *Uncle Sam* have literal equivalents; *a piece of cake* is most often literally 'a piece of cake' not 'something easy to do.' Forty-nine of the 104 had no literal equivalents, and a further 34 were very unlikely to have literal equivalents.

Core idioms are a small group of infrequent items. They do not deserve teaching time, but learners may benefit from some help in choosing and using an idiom dictionary.

Learning Conditions

Ease or difficulty of learning can be affected by the conditions under which the learning takes place. Crothers and Suppes (1967) found that when the learning burden of the words was heavy, it was more effective to learn small groups of words (around 20) rather than larger groups. In the early stages of language learning, the learning burden tends to be high because the learner is unlikely to be familiar with the systems and patterns of the new language. When the learning burden is low, it is much more effective to learn much larger groups of words.

Deliberate and Incidental Learning

Experiments involving deliberate learning show learning rates and long-term retention rates that far exceed those from incidental learning (Nation, 2001: 298–299). Similarly, in message-focused learning through speaking activities, vocabulary whose meaning is overtly negotiated is much more likely to be learned than that which is quietly guessed from context clues. There are several issues to consider here. First, incidental learning and deliberate learning should not been seen as competitors; they can be mutually reinforcing, and thus it is better to have both types of learning rather than just one. Second, it is not clear how to apply the label 'difficulty' properly to these two kinds of learning. The deliberate learning of vocabulary and negotiation of vocabulary involve more focused effort. Incidental learning, in the short term at least, is less effective but also involves much less focused effort. If difficulty is measured by results then deliberate learning is easier. If it is measured by the amount of focused effort, then incidental learning may be easier. One of the best studies of incidental vocabulary learning was carried out by Waring and Takaki (2003). They looked at incidental learning from reading one graded reader containing 25 target words. After the learners read the text, Waring and Takaki tested each target word in three different ways. The easiest test was a recognition test in which the learners saw a list of 42 words and had to indicate which ones occurred in the story they had just read. The average score was around 16 out of 25. A multiple-choice test required them to choose the most suitable meaning for each word from four choices. The average score was 10 out of 25. The most difficult test was a translation test that required the learners to translate a given word into their first language. The average score was around 4 out of 25. The translation test is the one closest to what the learners might need to do while they read, and the score was low. However, if the total learning

as revealed by the three tests is considered, it is clear that quite a lot of learning occurred that would be built on by further encounters with the words.

Involvement Load

Involvement load (Hulstijn and Laufer, 2001) is an attempt to measure the amount of mental processing that learners do when working on a vocabulary learning task. The three factors that Hulstijn and Laufer focused on are (1) need (Is the vocabulary needed to complete the task?), (2) search (Do the learners have to look for the word form or meaning or are they already provided?), and (3) evaluation (Do the learners have to decide if the word or meaning chosen is the most suitable one?). Hulstijn and Laufer rated each task they studied using the three factors, scoring the role of each factor as 0, 1, or 2. The involvement load of the task was the sum of the ratings for each of the three factors. Hulstijn and Laufer's studies showed that the greater the involvement load, the more likely a word was to be learned. This finding parallels those on generative use, that is, using a word in creative ways, which show that the more generatively a word is used, the more strongly it is learned (Joe, 1998). These studies relate increased mental effort to more effective learning.

Negotiation

What at first glance seems like a contradiction to this finding comes from studies involving negotiation of vocabulary. Negotiation occurs when learners try to work out the meaning of an item by discussing it with one another. Here is an example from Nation and Hamilton-Jenkins (2000).

> S12: bus driver? I don't think so
> S10: bus driver because it is . . .
> S9: if you don't have a licence how can you drive a bus, the police will catch me (The others agree)
> S11: I see so we need **registoration**
> S12: . . . so bus driver also need **reg** . . . **registration** because of competence so at first I think teacher, doctor, and lawyer is a very specific occupation so um it um at first they have to go to the university and polytech so they need require **registration** so ah in my opinion er I bus driver . . . if we want to be bus driver only we have ah licence and then we can ah get as a driver so I don't forget **registration** so I mistaked ah Japanese guess
> S10: maybe it is not **registration**, maybe it is not **registration**, I think maybe it is only bus driver licence . . .
> . . . maybe **registration** is just like a list where you can find some name like doctor.

Several studies have shown that learners who quietly observe negotiation taking place learn just as well as those who actively negotiate (Stahl and Clark, 1987; Ellis and Heimbach, 1997). Stahl and Clark deliberately designed this feature into their experiment. The learners were divided into three groups. One did the activity, which involved discussing things with one another. A second group observed the activity, but were told that they would be tested on what happened in the activity. The third group just observed with no expectation of being tested. All three groups were tested, and it was found that those who did not expect to be tested did not learn as well as those who did.

One problem with the vocabulary studies of such learning is that vocabulary knowledge was measured using only one test, so it was not possible to see how well each learner knew each word. However, putting this aside, the studies show that it may not be overt effort that determines learning but mental effort. Negotiation involves mental involvement. It also provides opportunities for generative use. Generative use occurs when a word is used in a way that is different from the ways in which it has been used or met before (Joe, 1998). This difference may be quite small (the word is used in the plural rather than the previously met singular form) or large (the word is used with new collocates). The bigger the difference (the greater the generativity), the stronger the learning resulting from the use is likely to be.

Strength of learning can be measured by testing each word in, preferably, three different ways with tests of varying degrees of sensitivity as in the Waring and Takaki experiment. Strength of knowledge is determined by adding together the scores for the three tests for each word.

When learners negotiate the meanings of items, they put the word into new contexts; that is, they use the word generatively. Several of these contexts may be metalinguistic contexts: *What does 'shed' mean? How do you spell 'tiger'?* The power of negotiation may be that it causes the learners to give focused deliberate attention to an item and that it results in generative use of the item. Negotiation thus sets up conditions that encourage learning.

Interference

There are now several studies that show that learning related items together makes learning more difficult (Higa, 1965; Tinkham, 1997; Waring, 1997). If near-synonyms (*bring* and *take*), opposites (*fat* and *thin*), free associates (*knife* and *fork*), or members of a lexical set such as articles of clothing or types of fruit are learned together, then learning is 50–100% more difficult (Nation, 2000). That is, learning the days of the week in the same lesson is much more

It is red
black
blue
green
white
yellow

Figure 1 Sample substitution frame.

difficult than learning one of the days of the week and six other unrelated words. The difficulty is even greater if words have some formal similarity to each other, so *Tuesday* and *Thursday,* for example, are especially likely to interfere. The difficulty occurs because crossassociations are made between the word forms and their meanings. So, for example, the word *white* may be associated with the meaning 'black,' and *black* may be associated with the meaning 'white.'

This difficulty can manifest itself in several ways. If learners have worked out some kind of mnemonic or luck is on their side, then the wanted associations may be made. Another possibility, as already described, is that the items are crossassociated. A more common possibility is that the learner realizes that *black* and *white* are two of the colors but is uncertain which is which. Most textbook writers are clearly not aware of this source of difficulty. Tinkham (1997) found that words that were related such as the words in a story, for example, *frog, green, slimy, pond,* and *splash*, were easier to learn together than unrelated words or members of a lexical set. If we attempt to generalize about the interfering and facilitating relationships, we can see that items that would be listed one under the other in a substitution or paradigmatic relationship (Figure 1) are likely to interfering.

Items that are in a syntagmatic relationship *the green slimy frog jumped into the pond with a splash* are likely to be easier to learn together than unrelated items or items in a paradigmatic relationship. This has implications for lesson planning. If a course book writer chooses a topic such as colors, clothing, or at the fruit shop, interference is likely to result. If, however, the lesson is organized around a story, there is less likelihood of interfering relationships occurring. Interference occurs when most or all of the items in a set are unknown. Once most or all of the items are known, there is some value in bringing them together to see what the distinctions between them are. If, however, the learning of the items is not already reasonably well established, then interference will occur.

The way words are grouped in lessons can have a major effect on learning difficulty. Once interference has occurred, then some mnemonic trick is needed to establish the correct associations.

Massed versus Spaced Learning

The same words can be studied intensively for a period of time (massed learning), or they can be repeatedly studied for briefer periods of time at increasingly spaced intervals (spaced or distributed learning). That is, a learner could spend an hour studying a group of 30 or so words, or the learner could spend 10 minutes studying them now, in an hour's time spend another 10 minutes, and then in 4 or 5 hours time another 10 minutes and then continue in this way the next day and so on. In total, the spaced learning could total 1 hour. Experiments comparing massed and spaced learning show much better results for spaced learning (Bloom and Shuell, 1981; Dempster, 1987; Baddeley, 1990). The repetitions should be spaced further and further apart. The principle behind this is that the older a piece of learning is, the slower the forgetting. This means that soon after something is first learned, forgetting occurs quite quickly. There needs to be another repetition before too much is forgotten. After the next repetition, the learning is now older and so the forgetting does not occur as quickly as it did the first time. It will thus take a little longer for the forgetting to reach the point where another repetition is needed. Pimsleur (1967) proposed a formula, which should not be taken too seriously but which provides a very useful and easy to remember guide for spacing repetitions: The time to the next repetition should be the square of the time between the two previous repetitions. So, if a word was studied and then looked at again 5 minutes later, the next repetition should be 5×5 minutes later (25 minutes later), the next 25×25 minutes later (10.5 hours later), the next 10.5×10.5 hours later (approximately 4 days later), and so on.

First Language Definitions

Learning vocabulary is easier if the meanings of words are conveyed in short, clear ways. The more detailed and complicated a definition, the more difficult it is for both native and nonnative speakers to understand. The main reason is that there tends to be too much information for a learner to focus on and the learner chooses just one part to latch on to. This usually misrepresents the meaning of the word. One of the clearest and simplest ways of providing a meaning for a word is to give a first language translation. This has several advantages: (1) the translation is usually short and clear, (2) it is usually in the form of a synonym rather than a definition (definitions are more difficult to understand because of their complex grammatical structure), (3) the new word is related to something the learners already know well, and (4) the meaning is presented in totally familiar language.

There is some experimental evidence that translations are an effective way of conveying meaning (Lado *et al.*, 1967; Mishima, 1967; Laufer and Shmueli, 1997). If other ways of conveying meaning, such as pictures, objects, demonstrations, and second language synonyms can meet these same criteria, they are also likely to be very effective. Often, however, they do not.

Many of the factors involved in the learning burden and difficulty can be manipulated to some degree by teachers and course designers. Aspects of the learning burden can be lightened by pointing out analogies with known items, by drawing attention to patterns or rules, and by directing deliberate attention to the particular aspect. Learning conditions are even more manipulable. George (1962) pointed out that teaching can have three effects: a positive effect in which teaching results in learning that takes the learners forward in their knowledge, a neutral effect in which nothing is learned, and a negative effect (the result of 'unteaching') in which the teaching results in learning that confuses or upsets previous learning. Good teachers can also be good 'unteachers.' An awareness of factors such as involvement load, negotiation, generative use, interference, and spaced repetition can reduce 'unteaching' and make the time spent on teaching and learning more productive and enjoyable.

See also: Corpus Studies: Second Language; Interlanguage; Language Education: Vocabulary; Lexical Acquisition; Munda Languages; Second and Foreign Language Learning and Teaching; Second Language Reading; Word.

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Vocal Production in Birds

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Bird vocalizations are widely noted for their extreme diversity in acoustic structure and sometimes high degree of complexity. Understanding the mechanistic basis of vocal performance in birds has been a long-standing effort. This is largely because of intrinsic scientific interest, but also, more recently, due to the growing importance of birdsong as an animal model system for the development and neurobiology of human speech. In this article, I review some highlights of current knowledge on the peripheral mechanisms underlying vocal production in birds and point out notable parallels and differences with speech production in humans.

Principles

The biophysical principles of vocal production in birds are similar to those involved in voiced speech of humans. Air flow, induced by the action of respiratory muscles, is modulated by vibrating structures in a voice organ, a process that causes acoustic pressure waves. These waves propagate through the air spaces of the vocal tract and eventually radiate into the outside environment. The exact characteristics of the sound that is produced depend on the vibration properties of vocal source, the acoustic resonances of the vocal tract, and the acoustic radiance function of the structure from which the sound eventually is emitted, e.g., the beak or 'vocal sacs.' To a first approximation, vocal production in birds can be explained, like human speech, by considering the properties of the vocal source and vocal tract independently, even though they function as one system and interactions between these two components may sometimes occur.

Vocal Source

Voice Organ

Vocal source vibrations in birds are generated by a unique voice organ, the 'syrinx,' which is an evolutionary innovation not found in any other group of animal. Birds also possess a larynx, which is the voice organ in mammals, reptiles, and anurans, but the larynx has not been found to be involved as a sound source in bird vocalization. The sole function of the syrinx is sound generation, and from a vocal production point of view it may therefore be less constrained in its mechanical design than the larynx, which also has functions related to respiration and feeding. For this reason perhaps, many birds appear to be much better vocal performers – at least from a production point of view – than any laryngeal vocalizer, including humans.

The syrinx consists of a modification of the airway at the junction of the trachea and bronchi and is situated in an air sac deep inside the thoracic cavity. In general, it comprises a cartilaginous or bony framework containing vibratory structures, either membranes or labia, and muscles that control the geometric configuration of the framework. The specific morphology of the syrinx, however, may differ considerably between bird taxa, even in basic design.

The most complex syrinx is found in the most virtuous singers among birds: the songbirds (suborder Oscines or Passeres, comprising approximately 40% of all bird species). The songbird syrinx is special because it has two sound sources, a voice at the cranial end of each bronchus, which can be controlled independently by highly specialized musculature (**Figure 1**).

The bipartite nature songbird of the syrinx is exploited in various ways across taxa to enhance vocal performance in spectacular ways. For example, in many songbirds, each syringeal voice specializes in its own vocal register – the left voice usually covers a

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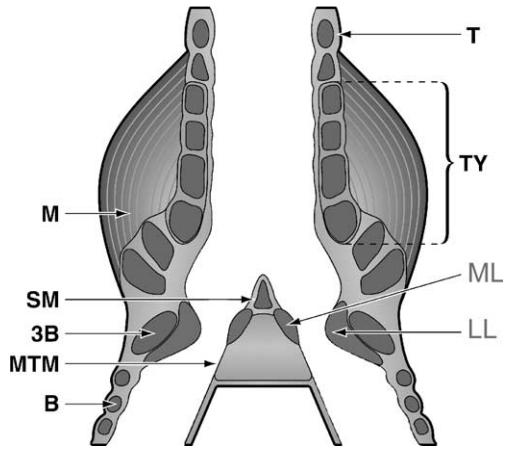

Figure 1 The songbird voice organ. This bipartite syrinx is situated at the junction of the bronchi and trachea. Schematic horizontal section illustrating the two voice structures, each consisting of a lateral labium (LL) and a median labium (ML) at the top ends of the bronchi. BC, bronchial cartilage; 3B, third bronchial cartilage; BL, bronchial lumen; dS, m. syringealis dorsalis; dTB, m. tracheobronchialis dorsalis; ICM, membrane of the interclavicular air sac; M, syringeal muscle; MTM, median tympaniform membrane; SM, semilunar membrane; ST, m. sternotrachealis; T, trachea; TL, m. tracheolateralis; TY, tympanum; vS, m. syringealis ventralis; vTB, m. tracheobronchialis ventralis. © Illustrations by Claus Bo Næsbye Larsen. Source: Larsen O N & Goller F (2002) *Journal of Experimental Biology 205*, 25–35. The Company of Biologists Ltd. Reproduced with permission.

lower range than the right voice. Songbirds such as the Northern cardinal, *Cardinalis cardinalis*, use this system to produce seemingly continuous notes modulated over extreme frequency ranges, by starting phonation on one side of the syrinx and quickly switching to the other side in the middle of the note. Other birds such as the brown thrasher, *Toxostoma, rufum*, use the two-voice system to simultaneously produce unrelated sounds and thus sing a duet in solo. A totally different approach to achieve vocal virtuosity using a bipartite syrinx is taken by Waterslager canaries, *Serinus canaria*, which can sustain high syllable-repetition rates, sometimes exceeding 30/s, for long periods of time, sometimes exceeding 30s, without taking a pause for a normal inspiration. This is achieved by using the left syrinx side for phonation while the right side is used to take so-called mini-breaths in between each syllable. Such a system allows the left side to be kept in phonatory position while the right side is able to maintain respiratory air supply for phonation, a specialisation that increases the duration of the period in which fast syllable repetition can be sustained.

Less complex or even relatively simple syrinxes are found in nonsongbird taxa, which, overall, comprise less virtuous vocalizers. However, attempts to find a clear and systematic relationship between syringeal complexity and phonetic complexity in birds have failed thus far.

Voice Mechanism

The actual mechanism by which sound is generated in the syrinx has been a long-debated topic. Normally, voice production in tetrapods involves a pneumatic valve-type sound generator, such as the laryngeal voice in mammals, in which vibrating vocal folds periodically close and open the airway lumen, causing a train of air pulse releases in the vocal tract. Such a system characteristically produces a sound with a fundamental frequency and a series of harmonic overtones. However, birds often produce pure-tone song, which lacks the characteristic stack of harmonic overtones of a valve-type source. For this reason, a variety of alternatives to a valve-type sound generator have been proposed for pure-tone bird vocalization, the most notable of which is an aerodynamic whistle mechanism. However, recently it has been shown that pure-tone song in doves (nonsongbirds) is generated by the syrinx as a sound with harmonic overtones, which is subsequently filtered by the vocal tract to a pure tone before the sound is emitted. Moreover, direct video observation of the syrinx in phonating birds shows that vibrating membranes or labia form a slot in the airway lumen. Pure-tone phonation, as well as other types of phonation observed in birds, can therefore in principle be explained on the basis of a normal valve-like source mechanism in the syrinx, similar to laryngeal voice mechanisms in humans. Nevertheless, given the extreme diversity in syringeal structure across species, it remains possible that fundamentally different mechanisms of syringeal sound generation exist in birds.

Modulation of Voice

Source phonation in birds is usually modulated in time to generate complex spectrotemporal vocal patterns. There are two fundamentally different ways in which this is achieved.

First, coordinated neuromuscular control of the respiratory and syringeal systems can directly modulate biophysical characteristics of the voice system, so that spectral patterns and overall amplitude of the sound that is produced at the syrinx change over time. The fundamental frequency of phonation in songbirds, for example, changes by the action of ventral syringeal muscles, which presumably regulate the tension of the vibrating labia, whereas in dove coo phonation, frequency is modulated by changes in air sac pressure achieved by respiratory muscles. Likewise, vocal amplitude is known to be controlled by a variety of direct neuromuscular mechanisms in birds.

A second and relatively little known mechanism of modulation arises spontaneously from intrinsic properties of the vocal production system. The primary sound generators in birds, vibrating labia or membranes, are in fact **nonlinear** oscillators, and it has been observed in diverse scientific fields that coupled nonlinear oscillators in general can also exhibit complex dynamics **without** any external, complex control (nonlinear dynamics or 'chaos theory'). The key point about nonlinear dynamics in vocalization is that a relatively simple system, such as two coupled vibrating membranes, can give rise to a series of different states of oscillatory behavior, which include amplitude and frequency modulations. Most likely, at least the extremely rapid periodic modulations found in bird vocalizations, which sometimes exceed 500 Hz and are unlikely to be under direct muscle control, originate from such intrinsic dynamics, as do discontinuous modulations such as the often observed frequency jumps ('voice breaking').

Most bird vocalizations that are described as 'noisy' are likely also due to nonlinear dynamics and may be produced by a chaotic oscillatory state of the syrinx. It is interesting to note that this is in contrast with noisy sound sources in human speech, such as whispered consonants (e.g., English *h*), which do not originate from vocal fold oscillations but from air turbulence in the vocal tract, a process that indeed is truly random or noisy. Chaos, however, is completely deterministic and only superficially resembles noise in spectrographic representation. Nevertheless, some bird vocalizations may actually originate from a true noise source, at least as judged by the human ear, for example, hissing in swans.

Vocal Tract

The sound that is generated by the syrinx depends not only on its oscillatory dynamics, but also on the specific acoustic impedance at the syrinx. That is, source vibrations at some frequencies produce sound more easily than those at other frequencies, a pattern that is determined by the geometry of surrounding vocal tract air cavities such as the bronchi and trachea. Moreover, as sound propagates through the vocal tract it may undergo further filtering through changes in tract diameter, which cause acoustic impedance changes. Thus, the avian sound production system should be viewed as a source–filter system, in which the syrinx provides the necessary source vibrations and the filter determines the amplitudes of the sound frequencies produced.

Although acoustic filtering of syringeal source vibrations is physically inevitable, it has been a matter of long-term debate how important vocal tract filtering actually is in shaping specific time–frequency patterns in bird vocalization and which mechanisms are used to shape vocalizations. Three models of vocal tract filtering have been suggested in the literature, each of which is likely to occur in birds.

In the simplest model, the vocal tract could act as a static broadband filter that leaves the relative amplitudes of all frequencies produced by the syrinx more or less unaffected. In an alternate version of this model, the vocal tract could act as a static bandpass filter with a bandwidth that is smaller than the frequency range in which the syrinx produces sound (**Figure 2**, 'Static filter'). The latter mechanism approximates the situation in dove coos, where harmonic overtones produced by the syrinx are filtered out so that only the fundamental frequency remains. Such a mechanism can be used only when relevant sound features, in the case of doves the fundamental frequency, are modulated within the existing static vocal tract pass-band.

In a second model, the frequency range over which the syrinx modulates relevant sound features is much larger than the bandwidth of the vocal-tract filter, in which case the vocal tract must dynamically adjust resonance frequencies in order to track the changes in phonation frequency (see **Figure 2** 'Dynamic filter tracking source'). This mechanism is more complex because the dynamic tracking requires close motor coordination between the syringeal source and vocal tract articulators. However, the vocal tract does not create complex phonetic patterns independently of the source. As an example of this mechanism, it has been suggested that the beak gape changes that often occur during bird vocalizations adjust the frequencies of vocal tract resonance peaks so that they follow a particular harmonic frequency produced by the syrinx. Recent research has shown that beak gape changes do indeed modulate vocal tract filtering characteristics, but not through the shifting of resonance peaks. This notwithstanding, the argument may hold for other vocal tract articulators.

Finally, analogous to human speech production, a dynamic vocal tract filter can create its own complex time–frequency patterns, independently of source modulations generated by the syrinx (**Figure 2**, 'Dynamic filter with independent modulation'). This makes sense only if the syringeal source produces a wide-band sound, such as a harmonic stack. An example of such a mechanism occurs in parrots, whose tongue movements cause significant and complex changes in four vocal tract resonances or 'formants.' Analysis of parrot mimic speech and natural

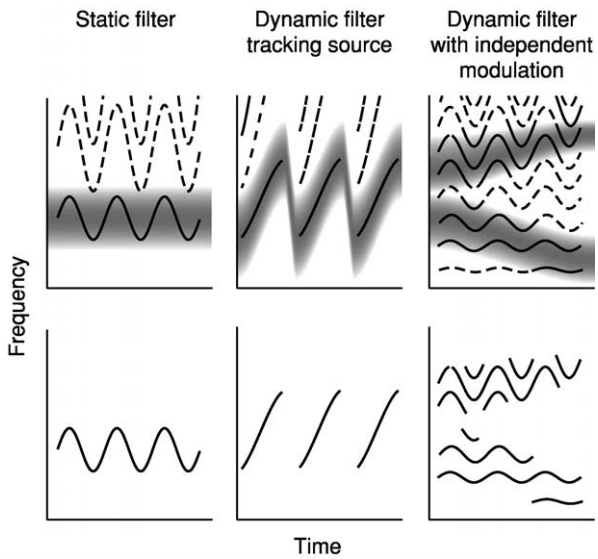

Figure 2 Three models of vocal tract filtering in bird vocalization. Subfigures are schematic spectrographic representations. In the top row, the frequency ranges of vocal tract resonances are indicated as gray shading. The harmonic sound frequencies produced by the syrinx are indicated as thick lines, continuous if they overlap with vocal tract resonance ranges and dashed if they fall outside these ranges. The bottom row of subfigures shows the sound that is thus emitted from the bird as vocalization for each model. It should be noted that the vocal tract resonance patterns shown are simplified. In reality, the avian vocal tract normally has more than one or two resonance peaks.

vocalizations suggests that parrots indeed use tongue placement to modulate formant patterns independently of syringeal source modulations, which is an interesting extension of the already known parallels between human speech production and bird vocal production.

In conclusion, there are notable differences between vocal production in birds and that in humans, the most important of which relate to the fact that birds have evolved an innovative voice organ that is, at least in songbirds, extremely versatile. Nevertheless, the parallels in basic sound generation mechanisms and a source–filter system are equally notable. This is especially true for species that use vocal tract filtering to create complex modulation patterns independently of the voice source, a fundamental mechanism in coding information in human speech.

See also: Animal Communication Networks; Animal Communication: Overview; Animal Communication: Vocal Learning; Birdsong; Communication in Grey Parrots; Development of Communication in Animals; Dialects in Birdsongs; Individual Recognition in Animal Species; Production of Vocalizations in Mammals.

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Voegelin, Charles Frederick (1906–1986) and Voegelin, Florence Marie (1927–1989)

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Charles Frederick Voegelin was born on January 14, 1906, in New York City and died on May 22, 1986, in Honolulu, a scant four months after celebrating his 80th birthday. He customarily signed his publications using the initials C. F. rather than his full name but was fondly known to friends and colleagues simply as 'Carl.'

After graduation from Stanford University in 1927 with a degree in psychology, Voegelin turned to anthropology for graduate work, studying under Alfred Kroeber at Berkeley and completing his doctorate in 1932 with a dissertation on Tübatulabal, a native language of northern California. This began his lifelong commitment to fieldwork on American Indian languages.

Voegelin held postdoctoral fellowships at Yale University (1933), the American Council of Learned Societies (1934), and the National Research Council (1935). During this period he had close association with Edward Sapir and took courses under Franz Boas and Ruth Benedict. He accepted a faculty appointment at DePauw University in Indiana in 1936, where he remained for five years, teaching and continuing fieldwork before accepting a position in anthropology at Indiana University in 1941. He remained at Indiana until his retirement in 1976.

At Indiana, Voegelin became chairman of the newly created anthropology department in 1947, a post he held until 1966. During these years he encouraged formation of an interdisciplinary program in linguistics (1945) and creation of a separate department of linguistics (1963). At the same time, he remained firm in his support of ties between anthropology and linguistics, even as the two disciplines sometimes diverged in the second half of the 20th century.

Voegelin's major contributions to 20th-century linguistics stem from his editorship of the *International Journal of American Linguistics* (*IJAL*), beginning in 1944. The journal, founded by Boas in 1917, had been without an editor or home base following Boas's death in 1942. Voegelin brought *IJAL* to Indiana University, arranged financing through the university, and served as editor from 1944 until 1980, four years after his retirement and nearly a decade after publication of the journal was shifted from Indiana to the University of Chicago Press. During his 36 years as editor he played a major role in promoting the study and documentation of native American languages.

A significant portion of his work was in collaboration, first with Erminie Wheeler Voegelin (1903–1988), and later with Florence Robinett Voegelin (1927–1989). While at Berkeley, Voegelin met Erminie Wheeler, also a graduate student under Kroeber. They married and began a professional collaboration that lasted until their divorce in the early 1950s. Together they published a revision of Edward Sapir's map of North American Indians in 1944. After their divorce, she continued a distinguished independent career, concentrating on history and ethnology, writing extensively on the history of Indian tribes in the Ohio Valley and Great Lakes region, and serving as editor of *Ethnohistory* from its founding in 1954 until 1964.

In 1953, Voegelin began a collaboration with his second wife, fellow linguist Florence Marie Robinett. She was born on September 26, 1927, in Colorado Springs and died on January 9, 1989. After completing her undergraduate degree at Colorado State College of Education in 1949, she taught for two years in Puerto Rico, then entered the graduate program in linguistics at Indiana University. She completed her Ph.D. with a dissertation on the Hidatsa language in 1954, the same year that she and Voegelin were married.

By this time Voegelin had started the Archives of Languages of the World, with Florence Voegelin in charge. As an outgrowth of the Archives project, she founded *Anthropological Linguistics* and served as editor (1959–1981), continuing as coeditor from 1964 to 1988.

In their work together, the Voegelins prepared an exhaustive catalog of languages of the world, which was published in 20 fascicles in *Anthropological Linguistics* (1964–1966), supplemented by a revised map of the Indian languages of North America. The map, definitive at the time, is the forerunner of the 1999 classification and map prepared by Ives Goddard of the Smithsonian Institution.

Living and working in Indiana, it was natural for Voegelin to develop an interest in the native languages that had been spoken in the state. Of these, he examined Delaware and Shawnee closely while continuing fieldwork on other languages, including Blackfoot, Hidatsa, Hopi, Iowa (Iowa-Oto), Ojibwa, and Penobscot. He encouraged his students to investigate numerous other languages, and through their work and his other contacts he gained a broad overview of the language situation in native America. He was a frequent lecturer at linguistic institutes, conducted numerous field methods courses, and served in 1954 as president of the Linguistic Society of America.

In connection with his work on the Delaware language, Voegelin lent his expertise to authentication of the *Walam Olum*, a purported migration account of the Delaware Indians consisting of glyphs inscribed on wooden sticks and accompanied by a Delaware text. Constantine Rafinesque, who claimed to have obtained these materials in 1820, published a translated version in 1836. The *Walam Olum* has had its supporters and detractors ever since. However, the consensus of modern scholars is that the *Walam Olum*, charming as it may be, is a clever forgery concocted by Rafinesque.

Voegelin read widely and kept abreast of linguistic theory, publishing over 200 articles and reviews in addition to book-length monographs. As editor of *IJAL,* he published reviews by Noam Chomsky at a time when Chomsky's work was not being well received by other editors. Voegelin's own review of *Syntactic structures* saw Chomsky as raising "a single overarching question: how the low number of languages being deeply analyzed in the present day world (and the high number of languages in the world which still remain to be studied) may be approached through the new theory (if it is new). . . ."

Voegelin's prose style, while often ponderous, was nonetheless tolerated by students and colleagues, much as they accepted his challenge to document, analyze, and classify native languages of substantial complexity.

See also: Anthropological Linguistics: Overview; Boas, Franz (1858–1942); Kroeber, Alfred Louis (1876–1960); Sapir, Edward (1884–1939).

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Hans Kamstrup Vogt was born in Fredrikstad, Norway, but went to high school in France. He studied classical philology, comparative philology, and general linguistics in Oslo and Paris. After finishing his M.A., he returned to Paris to study Armenian philology and started to learn Georgian from Georgian immigrants in Paris. In 1932, after having published a few articles on Armenian syntax and language contact in Caucasus, he got a scholarship to study Georgian in Tbilisi. In 1936, after he returned home, he published his Ph.D. thesis, 'Esquisse d'une grammaire du géorgien moderne' (revised edition, 1971).

Vogt then spent a year (1937–1938) at Yale University, where he studied American Indian languages (among his teachers was Edward Sapir), and he did field work on the Kalispel language (Kalispel-Pend d'Oreille, state of Washington), which resulted in his book *The Kalispel language* (1940).

In 1946, in Oslo, Vogt became professor of Romance philology – a field in which he had no scholarly publications. His qualifications were his publications in general linguistics and his almost native command of French. In 1962 Vogt became professor of general linguistics in Oslo.

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In connection with his work on the Delaware language, Voegelin lent his expertise to authentication of the *Walam Olum*, a purported migration account of the Delaware Indians consisting of glyphs inscribed on wooden sticks and accompanied by a Delaware text. Constantine Rafinesque, who claimed to have obtained these materials in 1820, published a translated version in 1836. The *Walam Olum* has had its supporters and detractors ever since. However, the consensus of modern scholars is that the *Walam Olum*, charming as it may be, is a clever forgery concocted by Rafinesque.

Voegelin read widely and kept abreast of linguistic theory, publishing over 200 articles and reviews in addition to book-length monographs. As editor of *IJAL,* he published reviews by Noam Chomsky at a time when Chomsky's work was not being well received by other editors. Voegelin's own review of *Syntactic structures* saw Chomsky as raising "a single overarching question: how the low number of languages being deeply analyzed in the present day world (and the high number of languages in the world which still remain to be studied) may be approached through the new theory (if it is new). . . ."

Voegelin's prose style, while often ponderous, was nonetheless tolerated by students and colleagues, much as they accepted his challenge to document, analyze, and classify native languages of substantial complexity.

See also: Anthropological Linguistics: Overview; Boas, Franz (1858–1942); Kroeber, Alfred Louis (1876–1960); Sapir, Edward (1884–1939).

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Vogt, Hans (1903–1986)

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Hans Kamstrup Vogt was born in Fredrikstad, Norway, but went to high school in France. He studied classical philology, comparative philology, and general linguistics in Oslo and Paris. After finishing his M.A., he returned to Paris to study Armenian philology and started to learn Georgian from Georgian immigrants in Paris. In 1932, after having published a few articles on Armenian syntax and language contact in Caucasus, he got a scholarship to study Georgian in Tbilisi. In 1936, after he returned home, he published his Ph.D. thesis, 'Esquisse d'une grammaire du géorgien moderne' (revised edition, 1971).

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Voice Modification, Synthetic

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Introduction

Over the last decade, speech synthesis (Nussbaum, 2005) has come a long way toward producing higher-quality, more natural-sounding output. The two most important reasons for this paradigm shift are: (1) computers are now powerful enough to employ sophisticated data-driven techniques such as unit selection (e.g., Hunt and Black, 1996), and (2) better software tools are now available that allow for faster and cost-effective creation of new TTS voices (Ostendorf and Bulyko, 2002).

The advent of high-quality text-to-speech (TTS) may have created the false notion of speech synthesis being a 'solved problem,' that is, the idea that speech synthesis can replace a live human speaker (or a speaker's recording) in any application, service, or product. This is definitely not the case, given the enormous richness and expressive capabilities of the human voice that are impossible, or at least impractical, to match with a speech synthesizer. What unit selection speech synthesis can do, however, is deliver surprisingly good-quality speech for somewhat narrow applications, such as travel reservations, weather reports, etc. (Schweitzer *et al.*, 2003). This high quality is achieved by recording special domain voice databases. For a given domain (e.g., 'travel'), voice talents are being recorded while reading examples from that domain, such as 'Your flight to <destination> has been confirmed.' The idea is to cover as much material as possible that is well suited for the given application. Also, the reading style used (e.g., friendly but affirmative) has to be appropriate for the application. What unit-selection TTS cannot do today (at least not in any practical way) is to turn an average voice, reading in a 'newsreader' (i.e., reserved, toned-down) style, into a highly desirable 'spokesperson' voice for marketing a new product (i.e., speaking in a highly expressive, enthusiastic style). The reason for this inability is simple: there is no way that all the necessary speech data (many hundreds of hours) can be recorded from one single speaker, given the time it would take and the fact that a speaker's voice might change over time. Consequently, modifying recorded speech by signal processing is the only practical option.

This article is organized as follows. In the next section, we will review some of the algorithms available for modifying speech signals in pitch, durations, and other characteristics. The third section will highlight methods available for modifying voice characteristics with the goal of either changing speaking style or even speaker identity. Finally, in the last section, we conclude with a summary and an outlook at future developments.

Voice Signal Modification in Concatenative Speech Synthesis

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Commonly employed units are diphones (bracketing exactly one phone-to-phone transition, starting from the spectrally stable middle region of one phone to the spectrally stable middle region of the next phone), or demisyllables (comprising consonants and vowels). At synthesis time, the unit inventory (voice database) is searched for the optimal sequence of units that make up the desired speech output.

Until about a decade ago, typical concatenative speech synthesizers for English used inventories of between 1500 and 3000 units total. Besides special cases such as /r/-colorization of neighboring vowels, mostly single prototypical instances for any given kind of unit were stored in the inventory, predominantly for reasons of storage restrictions and synthesis speed. (Colorization is the influence of the sound of interest [here, /r/] on neighboring sounds. For instance, formant frequencies of vowels immediately preceding or following an /r/ are influenced by it.) Clearly, having just one or, at most, very few candidates to chose from for a specific time slot necessitates modification of the unit by mean of signal processing (e.g., in terms of pitch, duration, and amplitude) in order to 'fit' it in with its neighbors. Note also that the initial selection of the one (or the few) prototypical examples of each class of units to be included in the inventory is a critical process that has much influence on the quality of the synthesized speech (see, e.g., Section 7.3.3 in Olive *et al.*, 1998).

More recently, Unit Selection Synthesis (USEL) (Sagisaka *et al.*, 1992; Black and Taylor, 1994; Hunt and Black, 1996; Conkie, 1999) moved the selection process from the off-line (synthesizer design) phase to the on-line (actual time of) synthesis when the sentence to be synthesized is known. USEL takes advantage of the more powerful computers available to store and search hundreds of thousands of units in total, narrowing down to at least a dozen or so potential candidates for each time slot. Although the availability of several choices (e.g., with different pitch values) reduces (and sometimes eliminates) the need for signal processing, we will see that it is still needed because recording an inventory that covers all potential needs is highly impractical.

Necessity of Voice Signal Modifications

In a keynote paper at the 1997 Eurospeech conference, Jan van Santen (1997) presented far-reaching statistical results that support the importance of voice signal modifications. For example, to cover all combinations of prosodic units in a random test set of sentences with probability 0.75, the inventory size needed to be 150 000 diphone units. He also showed that the similarity of test (i.e., actual usage) and training (unit inventory) text corpora in terms of triphone and vocabulary distributions have a significant impact on this kind of inventory coverage. He concluded that learning algorithms for training TTS systems (such as used in training unit selection paradigms) need to employ solid generalization capabilities to make up for the rather poor coverage of even very large training corpora. This means that the system can cope robustly with unit combinations that are needed to synthesize specific output text but that have not been part of the training set. Note that, so far, the argumentation used mainly the combinatorics of language. However, another way to approach the problem would be to estimate total inventory size based on assumptions of token multiplicity in terms of variations in pitch and durations (amplitude variations left aside for now). Assuming, for illustration purposes only, 2000 unit types with voiced speech and a multiplicity of 20 for pitch variations and another factor of 10 for durational variations, we arrive at $2000 \times 20 \times 10 = 400\,000$ unit tokens that would be needed. This calculation assumes no signal processing is used to change pitch and durations. Traditional diphone-based synthesizers may be considered as existence proofs that signal processing is helpful (here: reducing the inventory back down to 2000 unit types), although it seems that the reduced inventory size surely would come with the cost of lost naturalness when compared to large inventory unit selection synthesizers.

One way to reduce unit inventory size significantly is to use smaller base units. Conkie (1999) proposed using half-phones (about $2 \times 50 = 100$ types for English). A half-phone cuts a diphone at the phone boundary that it contains. Consequently, two half-phones can form a diphone. For the scenario discussed earlier, the statistical advantage of using half-phones over a full set of diphones is based on the fact that the number of necessary unit tokens in the inventory without using any signal processing would be $100 \times 20 \times 10 = 20\,000$, which is a much more manageable set.

From these considerations, it should be clear that signal modifications in terms of pitch and durations should be useful for reducing the inventory size down to practical (i.e., recordable with one voice talent) levels. However, it is also clear that too much signal processing tends to decrease the quality of synthetic speech (Jilka *et al.*, 2003). For pitch, the limit might be 10 to 20%, for durations, perhaps 50%, given available signal processing methods. Generally, the objective should be to maximize quality while balancing inventory size, amount of signal processing used, and last but not least, choosing the specific algorithms that allow for relatively large

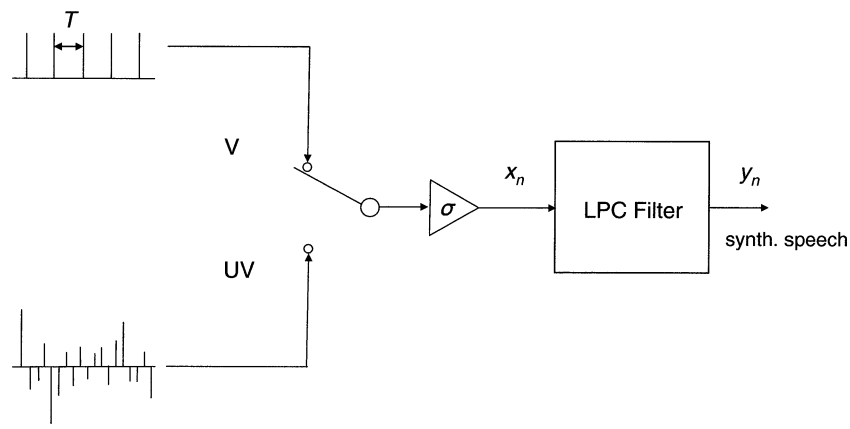

Figure 1 Block diagram of LPC synthesis. Periodic pulses with pitch period T are used for voiced excitation. Gaussian noise of unit amplitude is used for unvoiced excitation. The excitation is scaled in amplitude by gain factor σ.

signal modifications with no perceivable quality degradation.

Methods for Modifying Voice Signals

One of the key issues in concatenative speech synthesis is picking the specific speech signal representation (parameterization) for efficiently storing the inventory units, smoothing over concatenation points, and prosody modification. The question of which speech representation to use is tightly related to the question of which algorithm to use for prosody modifications. Therefore, the ideal method for modifying voice signals for speech synthesis purposes meets the following objectives:

1. It employs a speech representation that enables transparent (inaudible distortions) encoding/decoding. When signal characteristics are being modified, the result has to sound convincingly like it has been produced by the recorded voice talent using different characteristics (e.g., pitch, duration).
2. The speech representation needs to allow random access to any indexed inventory unit without large computational costs for switching from one unit to another. For speech representations with memory (e.g., filters), this encompasses also storing algorithm-internal state variables, plus appropriately smoothing over the transition.
3. Although not a strict requirement, choosing a speech representation that adds compression has the practical advantages of a smaller inventory file size (i.e., more recorded speech per megabyte of disk storage) that makes distribution of voice inventories and TTS server maintenance easier.

In the following, we will highlight the basics of the three most commonly used methods: (1) linear prediction coefficients (LPC) and their role in capturing spectral envelopes in close correspondence to vocal tract geometry, (2) time-domain pitch synchronous overlap add (TD-PSOLA) as a low complexity method for pitch and durational changes, and (3) sinusoidal speech representations, enabling more sophisticated speech modifications.

Linear Prediction A linear prediction filter of integer order p defines the output signal $y(n)$ (here: synthesized speech) as the result of an excitation signal $x(n)$ filtered by a recursive (autoregressive) filter $a(k)$:

$$y(n) = x(n) + \sum_{k=1}^{p} a(k)y(n-k) \qquad (1)$$

It can be shown (e.g., Markel and Gray, 1976, see Figure 4.1) that the filter coefficients $a(k)$ represent a vocal tract model comprised of p sections of an acoustic tube of stepwise constant cross-sectional areas. Wave propagation in the tube is assumed to be without losses, and one-dimensional (plane), and tube walls are assumed to be rigid. Any side branch (e.g., nasal tract) is not part of the model.

In the simplest version of LPC-synthesis, the excitation signal $x(n)$ is either a train of pulses or white Gaussian noise (see Figure 1). The pulse train approximates the glottal excitation for voiced sounds, whereas the white Gaussian noise represents the turbulent noise that excites the vocal tract for unvoiced sounds. Note that, both the noise and the (single) pulse excitation are assumed to have a flat (over frequency) spectrum. Note also that, the LPC filter gives the synthetic speech the desired spectral envelope (approximating the spectral envelope of human speech and matching its formants), whereas the simplistic pulse/noise excitations clearly fail to match spectral details.

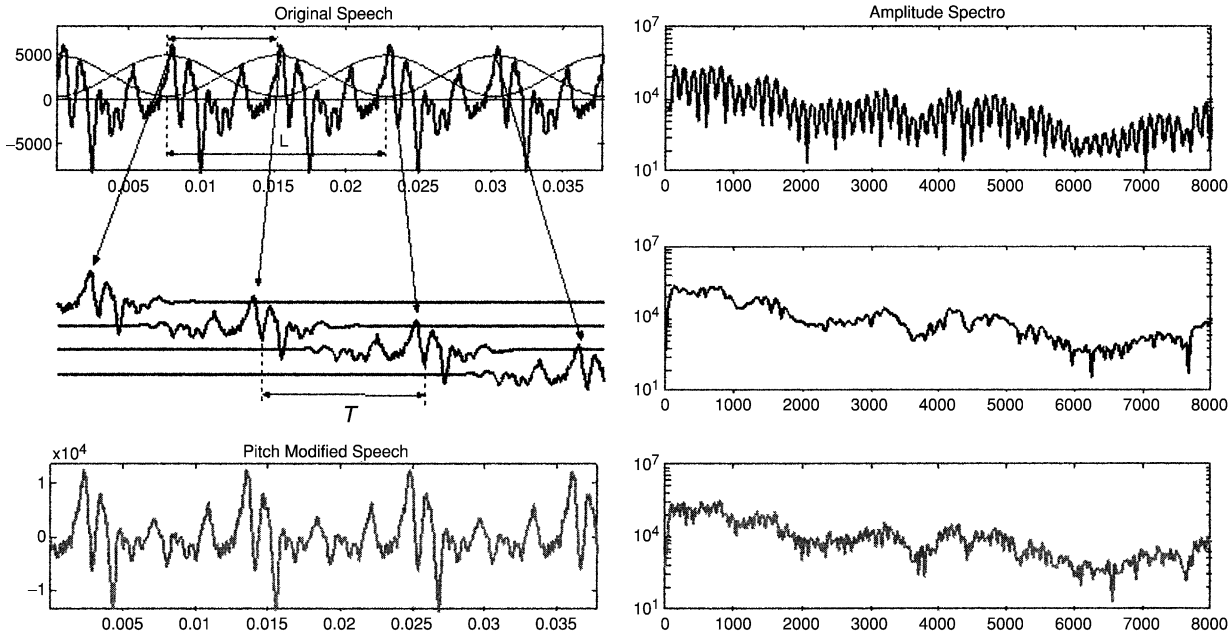

Figure 2 Time-Domain Pitch-Synchronous Overlap-Add (TD-PSOLA). Reproduced from Dutoit T (1997). *An introduction to text-to-speech synthesis.* Boston: Kluwer Academic Publishers, with kind permission of Springer Science and Business Media.

LPC synthesis as described so far violates property 1 stated earlier. LPC synthesis clearly sounds 'buzzy' (due to the repetitive nature of the pulses that do not match the spectral details of human glottal excitation) and, hence, is not transparent as a speech presentation. However, because of its relationship to vocal tract geometry, LPC lends itself to spectral modifications that are based on geometric differences of vocal tracts (e.g., male to female speech conversion, see Voice Alteration section). Improvements to speech quality can be achieved by using more sophisticated models of the excitation, such as glottal pulse models (see Olive *et al.*, 1998, Section 7.4.3; also see multipulse models, Caspers and Atal, 1987). In any case, it should be obvious that pitch can be modified by changing the pulse rate of the excitation, and durations can be modified by changing the updated rate of the LPC filter coefficients during synthesis. Also, smoothing of the filter can be used to achieve better concatenation between units.

Time Domain Pitch Synchronous Overlap Add (TD-PSOLA) An intriguingly low-complexity way of modifying pitch and duration of recorded speech was introduced in Moulines and Charpentier (1990). The basic idea is outlined in Figure 2.

The left column of Figure 2 shows time-domain speech waveforms and the right column shows spectra related to the waveforms on the left. For voiced speech as depicted in the top row, we recognize the quasiperiodic waveform that gives rise to the comb-filter-like fine structure that is visible in the spectrum depicted on the top right.

In the second row of graphs in Figure 2, four separate waveforms have been extracted. Each of them encompasses L = two pitch periods and has been tapered with a Hanning (raised squared cosine) window so the waveforms build up and die down gradually. Note also that, the individual waveforms have been repositioned in time relative to each other. The right panel in the second row shows the spectrum of one of the individual waveforms. Very little of the harmonic structure remains visible.

Finally, in the third row in Figure 2, we see the result of adding the individual waveforms in their new positions in time. In this example, the outcome is a speech signal of lower pitch and longer duration. The related spectrum on the right shows the harmonic structure of that lower pitch.

Higher pitches can be achieved by staggering the individual waveforms closer together in time before adding them up. Shorter durations are achieved by dropping individual waveforms, whereas longer durations are achieved by repeating individual waveforms as needed. Finally, note that the Hanning window has the convenient property that it reproduces the original speech signal when no modifications of pitch or durations are performed.

Although the TD-PSOLA method may be applied to the speech signal itself, a possible variant would be to apply it to the so-called LPC-residual. The LPC residual is the specific excitation signal $x(t)$ in Eq. (1)

that would be needed to match the original speech exactly with the synthetic output $y(t)$. The LPC residual can be obtained by inverse filtering of the speech signal. Inverse filtering has the effect of 'whitening' the individual waveforms used in TD-PSOLA. Combining the LPC and TD-PSOLA methods this way also allows for spectral envelope smoothing between inventory units. For time-scale modifications without any pitch modification, the so-called WSOLA approach may be used (Verhelst and Roelands, 1993).

Sinusoidal Representations The main drawback of the simplest form of LPC synthesis is its crude representation of the glottal excitation signal. On a frame-by-frame basis, that is over 5–50 ms intervals, the amplitude and phase relationships of the first few harmonics may contain crucial information on speaker identity (independent of the supersegmental prosodic and phonetic cues). Therefore, sinusoidal speech representations can be viewed as a more sophisticated means to meet the transparency requirement stated in the beginning of this section. As with TD-PSOLA, we have the choice of including LPC filtering to allow for vocal-tract geometry motivated modifications of the spectral envelope and for its smoothing at concatenation points. Different from TD-PSOLA, however, pitch modifications are done in the frequency domain, by compressing or stretching the spectrum. Slowing down and speeding up depends on the parameter update rate.

For the following, we chose to follow the pioneering work of Quartieri and McAulay (1992). Let $s(t)$ be a signal of interest, either speech or LPC residual, then

$$s(t) = \sum_{l=1}^{L(t)} A_l(t)\cos[\Omega_l(t)],$$

with

$$\Omega_l(t) = \int_{t_l}^{t} \omega_l(\sigma)d(\sigma) + \phi_l \qquad (2)$$

where $A_l(t)$ is the slowly time-varying amplitude of the l-th sine wave, $\Omega_l(t)$ its instantaneous phase, ω_l the radian frequency of the l-th sine wave, and ϕ_l its phase. The analysis task is comprised of estimating harmonic frequencies and phases. Potential problems are the 'birth' and 'death' of specific sinusoids and the representation of unvoiced speech.

Several variants of the sinusoidal approach exist. One is the HNM (Harmonic plus Noise Model) representation (Stylianou, 1996; Kain and Stylianou, 2000) that splits the speech spectrum into a low-frequency voiced part that is modeled by the sinusoidal approach and a high-frequency unvoiced part that represents the more noiselike characteristic of speech spectra at high frequencies. The 'maximum voiced frequency,' which is the cutover frequency between the two representations, may be a fixed frequency or may be set once for each speaker individually or may be even updated over time or dependent on the specific speech sound. Another approach is STRAIGHT (Kawahara *et al.*, 1999), where special care is given to estimating the harmonic amplitudes accurately (bias-free). Both HNM and STRAIGHT, however, assume that all sinusoids are at frequencies that are integer multiples of the fundamental frequency of the signal. For practical applications in speech synthesis, the reader should be aware of the fact that specific speakers' voices may be less suitable for sinusoidal speech representations than those of other speakers. For a 'bad' speaker, the coded/decoded speech may sound somewhat busy or metallic, which is in clear violation of the transparency requirement.

Modification of Voice Characteristics

Variability in speech has several dimensions, the most important ones for speech synthesis purposes being speaker variability, linguistic variability (inter- and intraspeaker), and task variability. The acoustic correlates of these dimensions are variations in pitch, duration, amplitude, and spectrum. We already discussed how to change these low-level attributes with the exception of spectral characteristics.

In the following, we will focus on higher-level applications of signal processing that are used to change voice characteristics on a more global scale. Among these applications are modifications to speaker identity (voice transformation, voice alteration targeted at changing gender, individual differences, or even dialect) and modifications to speaking style and/or emotions for a given speaker (changing emotions or adapting the speech to fit environmental needs such as Lombard speech (Pisoni *et al.*, 1985) that is appropriate for noisy environments). Although the algorithms used may serve both classes of applications, there are important differences between the two. Changing the speaker identity can leverage the significant effort that went into creating one high-quality TTS voice for the purpose of being able to offer several such voices, but modifying intraspeaker characteristics such as speaking style or emotion avoids the efforts of having to rerecord large parts of an existing voice database with the same speaker, each time using a different speaking style or emotion.

In order to mimic real-life variability of speech with a synthesizer, it is helpful to list different speech

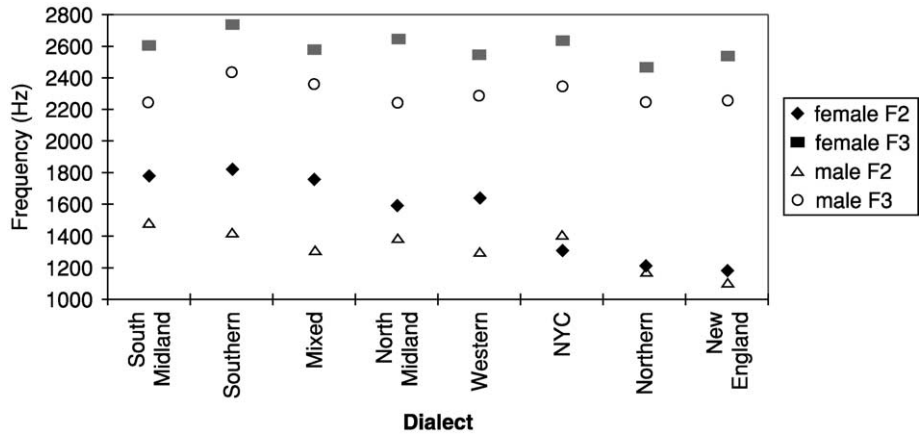

Figure 3 Second and third formant frequencies for the vowel /u/ by dialect and gender. (Ann Syrdal, priv. comm.)

and speaker characteristics that might be changed by signal processing. Linguistic variability encompasses variations due to intonation plus the fact that phonemes may also have different spectral properties depending on context (coarticulation), speaking style/emotion, and speaker. Gender differences include the fact that average pitch and formant frequencies are higher for females than for males. Dialect differences consist of the use of different phonemes for a word and the use of different allophones for the same phoneme in a given context, plus differences in prosody. As an example, Figure 3 shows data for male and female second- and third-formant frequencies depending on the dialect of U.S. English for the vowel /u/ (Syrdal, 1996). Some of the variability of speech between individuals clearly has reasons that can be traced to differences in vocal tract geometry. Consequently, spectral (vocal-tract motivated) changes, as well as 'individualized' prosody models that capture a specific speaker and/or emotion/speaking style are being summarized next.

Spectral Models for Changing Speaker and/or Speaking Style

Here, we outline methods for transforming speech of one speaker either to sound like speech from another speaker or to sound like speech of the same speaker, but in a different speaking style or with different emotions. We focus primarily on vocal-tract-related characteristics of speech but note that the basic concepts also apply to representations of the glottal excitation.

Acoustic correlates of speaker individuality can be found in vocal-tract formants, spectral tilt, and glottal characteristics. One obvious way to try to map 'source speech' (what we have) with a certain set of characteristics (e.g., speaker identity, etc.) to 'target speech' (what it should sound like) with another set of characteristics is to use two codebooks of vector-quantized spectral (e.g., LPC) vectors, each trained on one of the two sets, and find a mapping between corresponding codebook entries. This technique was pioneered by Abe at NTT in Japan (Abe *et al.*, 1990) using parallel corpora, source set A and target set B, comprised of identical sentences. A challenge with this approach is the time alignment of vectors from one set with the corresponding vectors from the other. Although ideally the same material is recorded in both corpora, it is not always straightforward to map speech frames even for a given single word, in particular when two different speakers spoke the word, because of differences in vowel reductions, phone omissions or additions, or other individual pronunciation differences. Dynamic Time Warping (DTW) is used to establish this correspondence, and histograms of these correspondences serve as weights for the mapping function:

$$S_i^{(A\to B)} = \frac{\sum_{j=1}^{J} W_{ij} S_j^{(B)}}{\sum_{j=1}^{J} W_{ij}} \tag{3}$$

Here A and B represent source and target sets, respectively, $S_i^{(A\to B)}$ is the i-th spectral vector of the mapped source codebook, and w_{ij} are the histogram counts of how often vector i of codebook A was found to correspond to vector j in codebook B, itself containing J vectors $S_i^{(B)}$. Note that, Eq. (3) can be viewed as an interpolation between different target spectral vectors. Therefore, it is important to choose a representation $\mathbf{S}$ where linear interpolation makes sense and does not lead to 'oversmoothing.'

Another way to map features from a source corpus to those of a target corpus is to estimate an appropriate transformation function. The most popular method for doing this is based on Gaussian Mixture Models (GMMs). One of the early adopters of GMM-based methods for voice conversion is Stylianou (1996).

Let ω_m denote the m-th acoustic class out of a total of M classes. In a Gaussian mixture density model, the probability density functions of any of the K observation vectors $\mathbf{X}_k (k = 1, ..., K)$ is given by:

$$p(\mathbf{X}_k) = \sum_{m=1}^{M} P(\omega_m) p(\mathbf{X}_k|\omega_m) = \sum_{m=1}^{M} c_m N(\mathbf{X}_k, \boldsymbol{\mu}_m, \boldsymbol{\Sigma}_m) \quad (4)$$

where x_k is a L-dimensional random vector. The conditional probability density for each of the M classes ω_m is assumed to be a Gaussian component density $N(\mathbf{x}_k, \boldsymbol{\mu}_m, \boldsymbol{\Sigma}_m)$, and the c_m's (the probabilities for classes ω_m) are the related normalized mixture weights ($\Sigma_{m=1}^{M} c_m = 1$). Each L-variate Gaussian component density is of the form:

$$N(\mathbf{X}_k, \boldsymbol{\mu}_m, \boldsymbol{\Sigma}_m) = \frac{1}{(2\pi)^{\frac{L}{2}} |\boldsymbol{\Sigma}_m|^{\frac{1}{2}}} \times \exp\left[-\frac{1}{2}(\mathbf{X}_k - \boldsymbol{\mu}_m)' \boldsymbol{\Sigma}_m^{-1} (\mathbf{X}_k - \boldsymbol{\mu}_m)\right] \quad (5)$$

Here $\boldsymbol{\mu}_m$ is an L-dimensional mean vector for the m-th component, and $\boldsymbol{\Sigma}_m$ is its covariance matrix. Therefore, the m-th mixture component is characterized by its center (the mean) and the spread around that center, expressed by the covariance matrix. Note that Eq. (4) expresses arbitrary distributions as a linear combination of Gaussians. If we associate the m-th component with a specific acoustic class (e.g., nasals, vowels), it should be intuitively clear that mapping techniques based on Eq. (4) are more robust than those based on Eq. (3) that do not explicitly distinguish between different acoustic classes while also lacking an inherent model (here Gaussian) for generalizing to unseen data.

In estimating a mapping $\mathbf{F}_x(\mathbf{X})$, the goal is to minimize the mean-squared error between the transformed set $\tilde{\mathrm{Y}} = \{\tilde{y}_k = \mathbf{F}_x(\boldsymbol{X_k}), \boldsymbol{k} = 1 \ldots K\}$ of source data and the training set $\mathrm{Y} = \{y_k, k = 1 \ldots K\}$ of target data. Again, we assume that both sets of observation vectors are time-aligned using DTW.

Furthermore, let $h_m(\mathbf{X}) = P(\omega_m|\mathbf{X})$ be the conditional probability of $\mathbf{X}$ belonging to class ω_m, and, using Eq. (4) and Bayes' rule, we find:

$$h_m(\mathbf{X}) = P(\omega_m|\mathbf{X}) = \frac{P(\omega_m) p(\mathbf{X}|\omega_m)}{p(\mathbf{X})} = \frac{c_m N(\mathbf{X}, \boldsymbol{\mu}_m, \Sigma_m)}{\sum_{i=1}^{M} c_i N(\mathbf{X}, \boldsymbol{\mu}_i, \boldsymbol{\Sigma}_i)} \quad (6)$$

The conversion function $\mathbf{F}_x(\mathbf{X})$ is chosen to be of the form

$$\mathbf{F}_x(\mathbf{X}) = \sum_{m=1}^{\mathbf{M}} \mathbf{h}_m(\mathbf{X}) \left[\mathbf{v}_m + \boldsymbol{\Gamma}_m \boldsymbol{\Sigma}_m^{-1} (\mathrm{x} - \mu_m)\right] \quad (7)$$

The unknown L-dimensional vectors υ_m and the unknown $L \times L$ matrices $\boldsymbol{\Gamma}_m$ are obtained by solving normal equations for the least-squares problem between $\mathbf{Y}$ and $\tilde{\mathbf{Y}}$. Details can be found in Stylianou (1996). Note also that the method can be improved further by basing the conversion function on joint source and target densities (Kain and Macon, 1998) instead of basing them solely on source densities as outlined earlier.

Most recently, Toda *et al.* (2005) introduced a new statistical method based on maximizing the likelihood (ML) function $\log p(\mathbf{y}, \mathbf{x})$ for each class (mixture component). This leads to a generalization of the mean vectors $\boldsymbol{\mu}$ and covariance matrices $\boldsymbol{\Sigma}$ in the simplified derivation given earlier. Toda also included dynamic aspects (time derivatives) of features to exploit their trajectories over time. Both measures led to less 'erratic' feature trajectories of the transformed speech when compared to the basic GMM method while keeping the global variance (observed over time) as high as in the recorded target speech (the GMM method usually reduces that variance considerably). The new method also avoids oversmoothing of GMM-converted spectra that sometimes leads to overly broad formants in the converted speech.

Prosody Models and Prosody Changes

Having the ability to change the frame/segment-related signal correlates to prosody, such as pitch, durations, and amplitude, gives us the tool to approach changing prosody aspects of speech on a larger time scale. One purpose of supersegmental prosodic changes is to convey (different) emotions. Another is to indicate topic structure or speech acts and other functional aspects of intonation (Hirschberg, 2004). However, there is evidence that a perfect 'synthetic' copy (i.e., a TTS-based mimic) of a human speaker is only possible with a data-driven prosody model that is trained on the specific speaker. Here the idea is to

enable powerful generalization from sparse training data by capturing the way a specific speaker uses prosody in a specific context (e.g., in a dialog scenario) and for a specific speech act (e.g., greeting) and make the TTS system predict the right prosody so its unit selection module can do a reasonable job of retrieving the correct speech segments and/or help a prosody-modification-enabled back end to do the necessary signal modifications.

Recent developments in prosody models, much as in speech representations (i.e., 'signal models') for speech coding or speech modification purposes, followed a similar trend from 'knowledge-based' to 'data-driven' paradigms (Dutoit, 1997). Knowledge-based systems incorporate the skills and intuition of the researcher. Data-driven models learn from training data. As in many other cases, the 'right' middle ground is to allow for data-driven adaptability/flexibility while basing the models on generally accepted principals for robustness and generalization (van Santen, 1997). Clearly, the future belongs to systems that use machine-learning techniques that are seeded with generally accepted intonation rules.

Intonation, the way we assign fundamental frequencies to voiced signal segments of speech, is an important part of prosody generation. Theories of tone sequences pose hierarchical structure on the problem that may be expressed on a symbolic level in the form of Tone and Break Indices ('ToBI', Silverman *et al.*, 1992). Such a symbolic linguistic representation then needs to be followed by a way of actually assigning fundamental frequency values. An example of an early model for generating actual fundamental frequency contours for synthesis purposes is the Fujisaki model (Hirose *et al.*, 1986). The Fujisaki model basically applies LPC (see earlier) to fundamental frequency contours in that it tries to correlate major intonation events in timing, durations, and amplitudes with linguistically motivated notions of phrase and accents 'commands.' It models these commands as step functions and then filters these 'excitation' signals by an LPC-like smoothing filter to arrive at a fundamental frequency contour for a whole utterance.

A second way to build an intonation model is to identify proper 'building blocks' of intonation in the form of stylized fundamental frequency (F_0) tracks and to associate each of these tracks with the terminal leaves of a Classification and Decision Tree, such as CARTs or via neural networks (for details, see, e.g., Section 6.9.2 in Dutoit, 1997). Such representations are driven by syntactic features provided by automatic text analysis or (manual) markup.

Most recently, ways have been found to exploit directly the large speech databases recorded with a single speaker for unit-selection synthesis. Here, the idea is to search the database for a reasonable prosody match at the symbolic level and harvest appropriate F_0 tracks (Huang *et al.*, 1997). Challenges of this method include the sparseness of the data even existing in a large speech database and how to fill in the 'holes.' Different ways to fall back to fundamental knowledge-based rules exist.

Any of the parametric intonation/prosody models just discussed can be employed within the signal transformation framework discussed earlier. For convincing results, the feature vectors x and y of that framework have to include model parameters of the chosen prosody model or representation.

Voice Alteration

Voice alteration is the task of changing ('disguising') a source speaker's voice so he/she can no longer be recognized without actually trying to match any peculiar target speaker. Such capability is useful for speech synthesis purposes because any 'new' voice obtained through speaker alteration helps in marketing of a TTS system.

In addition to changing pitch as discussed previously, changing the vocal tract size is helpful. Starting from a male voice database, for example, raising the pitch and shortening the vocal tract may simulate a female or child voice. Several methods are available to achieve such alteration. One specific method summarized here exploits the fact that Linear Prediction Coefficients (LPCs, see Linear Prediction section) can be converted to log (pseudo) areas that define a corresponding acoustic tube. Scaling that tube and converting back to LPCs results in voice alteration.

It can be shown (e.g., Markel and Gray, 1976, section 5.5.2) that stable filter LPCs can be converted into reflection coefficients $r(k), k = p,\ p-1, \ldots, 1$, by starting a backward recursion with initial LPCs $b_{p,0} = 1$, $b_{p,1} = a_1, \ldots, b_{p,p} = a_p$, and setting $r_p = a_p$:

$$\begin{aligned} & b_{k-1,i} = \frac{b_{k,i} - r_k b_{k,k-i}}{1 - r_k^2} \text{ for } i = 0, 1, \ldots, \mathbf{p} - 1 \\ & \text{extract } r_k = b_{k,k} \\ & \text{and check } |r_k| < 1 \end{aligned} \tag{8}$$

If any reflection coefficient has a magnitude that is larger than unity, the corresponding LPC filter is unstable.

From reflection coefficients obtained using Eq. (8), we then compute *L*og *A*reas using

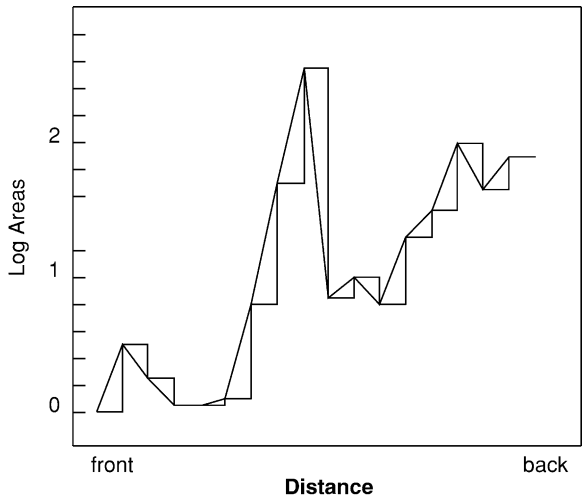

Figure 4 Log areas derived from LPC analysis for the vowel /i/.

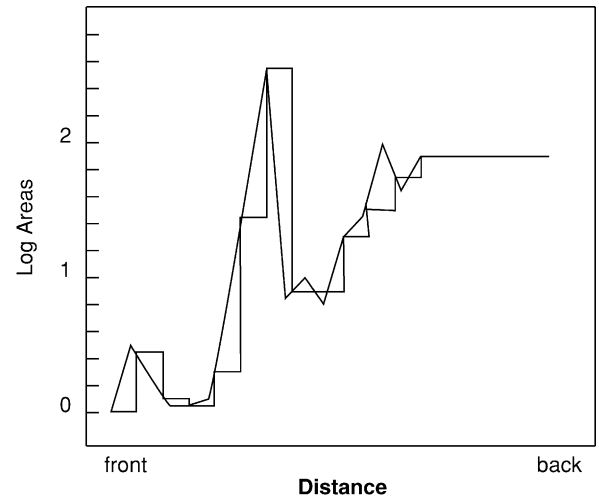

Figure 5 Same log areas as in **Figure 4**. However, here the linearly interpolated line segments were 'compressed' along the distance axis, representing a 25% reduction in vocal tract length. The final 'stair case' representation was sampled from the linear segments and then used to resynthesize the vowel.

$$LA_0 = 0$$
$$LA_{k+1} = \log\left(\frac{1 + r_k}{1 - r_k}\right)$$
$$\text{for } k = 1, \ldots p \qquad (9)$$

Figure 4 shows the log areas corresponding to a LPC filter of order $p = 16$ for the vowel /i/. Here, the 17 log areas are shown as represented as sections of the corresponding acoustic tube. Note that, the ubiquitous $LA_0 = 0$ on the left corresponds to the 'lips' (front) whereas LA_{16} on the right corresponds to the 'glottis' (back). Also shown in Figure 4 is a straight-line representation that can be used for interpolating the geometry of the pseudo vocal tract.

Figure 5 shows a pseudo tract that is shortened by 25% by 'compressing' the interpolated straight-line representation and resampling it. Note that, the high-order log areas have been 'extrapolated' to be of the same value as the highest-order original log area. Different, nonlinear stretching or compression schemes are admissible. For example, the 'back cavity' (i.e., pharynx section) could be stretched by a different factor as the 'front cavity' of the vocal tract. Interesting voices can be created easily this way, for example, 'gnome'-like voices for computer games.

Conclusions

In this article, we have highlighted algorithms and techniques to transform speech from one speaker using a specific speaking style and being in a specific emotional state to sound like either a different speaker or to fit a different speaking style or representing a different emotional state. All signal aspects related to all parts of the human vocal apparatus have to be included in order to arrive at high-quality results.

For the low-level signal processing, many algorithms can be borrowed from the most advanced speech coding/compression efforts. Besides the strict requirement of transparency (i.e., nondetectability), speech coding is used to reduce storage requirements, which is essential for distributing and incorporating large voice databases with/into Text-to-Speech systems. Nontraditional requirements of speech coding algorithms and speech representations are related to random access and modification of signal parameters. An important open problem that still needs to be solved is the effective representation and modification/transformation of glottal excitation.

In addition to the basic algorithms for signal modifications, there are higher-level algorithms that capture ('learn') a speaker's speech on several time scales: frames, segments, words, and whole sentences. The reader should expect future research work being applied in even larger contexts like paragraphs and whole 'stories.' For this, advanced machine learning techniques such as Support Vector Machines (Vapnik, 1998) and Boosting (Shapire, 2002) may outperform traditional techniques based on, for example, CARTs.

The most advanced voice modification techniques are still not good enough to deliver convincing 'transformed' speech. With increasing quality, however, the need for extensive and comprehensive recording of voice databases will be reduced to just the 'essentials,' whereas more and more 'derivative' speaking styles, emotions, and/or speakers will be created through modification of a smaller set of original recordings.

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Voice Quality

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The term 'voice quality' refers to those features of speech that are present more or less all the time that a person is speaking: the background characteristics perceived as the most constant or persistent over time. Voice quality describes the habitual, long-term features of accent in an individual's speech. It is, perceptually, the longest-term phonetic component, together with 'voice dynamics' features and 'segmental' features, of the aural medium for language (speech). It can either represent characteristics acquired as a part of 'accent,' the regional indicators or social markers of a person's origins, or idiosyncrasies that in their particular and ultimately unique combination signal the identity of an individual speaker. Voice quality or 'voice quality setting' are the general phonetic terms that best correspond to what is widely meant by 'voice' in popular usage, as in the contexts of 'the singing voice' or a professional announcer's voice.

Descriptive Models

Because the term 'voice quality,' like the popular term 'voice,' is often used in its narrowest sense to mean the sound resulting from (or at least perceptually attributable to) the vibration of the vocal folds, the alternative phrase 'long-term quality' has been adopted by some authors (Nolan, 1983). Vocal fold vibration is generally termed 'voicing.' Differences in the 'state' of laryngeal voicing are more precisely termed 'phonation type,' either to characterize the different laryngeal features of contrastive speech sounds or to describe differences in long-term laryngeal sound quality (*see* **States of the Glottis**). Categories of phonation are presented in a descriptive framework by Catford (1977, 93–116) and by Esling and Harris (2005).

First reference to voice quality in modern descriptive phonetic theory is usually attributed to Henry Sweet, whose teaching at Oxford is the purported basis for the character of Professor Higgins in Shaw's *Pygmalion* (see Sweet, 1877). Sweet's 'organic basis' (1890) is used in the sense of the 'long-term quality' specific to a given language and, although appearing to emphasize intrinsic, anatomical origins, it is equivalent to the more extrinsically based term 'articulatory setting' adopted by Honikman (1964) of the London school of Daniel Jones (see later in this article). Abercrombie (1967, 89–95) offers the clearest definition of 'voice quality' within phonetic theory as having a general, relatively nonfluctuating quasi-permanent character, distinguishing it temporally from rapidly fluctuating segmental articulations and from slowly fluctuating dynamic or prosodic patterns (*see* **Prosodic Aspects of Speech and Language**).

Popular descriptive labels for voices are predominantly 'impressionistic' and include such terms as 'sepulchral,' 'muffled,' 'light,' 'metallic' and 'guttural' voice (see Laver, 1979). Because these metaphors have no articulatory phonetic referents, it is of greater value in phonetics to use labels that convey plausible, if not definitive, articulatory origins of the sounds in question. Descriptive phonetic labels can be used systematically and successfully because of the general phonetic principle of the idealized, speaker-independent vocal tract, which assumes theoretically that all normal speakers can imitate the articulations with which different auditory qualities are associated. In the tradition of the Edinburgh school of phonetics, the various characteristics of long-term articulatory setting and of long-term phonation type are referred to as 'voice quality settings,' which together make up the set of features that describes an individual's voice quality (Laver, 1980).

Production and Perception

Production of voice quality is traditionally divided into the two articulatory categories of laryngeal features and supralaryngeal features. Laryngeal features constitute phonation types or settings of the laryngeal musculature that produce an audible quality ranging, for example, from 'breath' to various types of voicing and from 'whisper' to 'creak' to 'harshness.' Supralaryngeal features describe the setting of the vocal tract in its longitudinal and latitudinal dimensions, from the lips to the larynx and including the position of the mandible, the posture of the tongue, and the incidence of nasal resonance (*see* **Phonetics, Articulatory**) for a comparison of the basic series of places of articulation.

As speech is the aural medium for language, by which symbolic sounds are perceived, the specification of long-term voice quality features also hinges on perceptual criteria. The qualification that some speech characteristics are 'more or less' permanent results from the perceptual ambiguity between sounds that are the product of habitual configurations of the vocal tract and sounds that recur frequently over stretches of time. For example, a voice could be perceived as habitually 'nasal' either if velic opening (coupling the oral and nasal cavities) were sufficiently great most of the time to produce persistent nasal resonance, or if

the utterance in question contained a string of nasal consonants or vowels so frequently interspersed that an impression of nasality was dominant over time. A string of uvular or pharyngeal consonants is often salient enough to leave a strong impression of their place of articulation over the long term, even though the articulators may not be maintained in a habitually 'uvularized' or 'pharyngealized' posture during the production of most of the sounds in that stretch of speech. Segments are also variably 'susceptible' to given settings. A superimposed 'velarized' setting, for instance, will appear prominently on a [b] or an [œ] sound but will be indistinguishable on homorganic [g] or [u] sounds, which are already velar and are not susceptible to adventitious velarization.

Due to this temporal interaction, dynamic aspects of speech such as pitch fluctuation, loudness, and tempo may also contribute to perceptions of 'long-term quality.' It is in this sense that some linguists have used terms such as 'vocal qualifier' to refer specifically to features that are likely to change in order to convey paralinguistic meaning (see Crystal, 1969). Furthermore, in perceptual, auditory terms, there is not strictly a one-to-one correspondence between any of the features in the descriptive phonetic taxonomy for voice quality and any single configuration of the vocal tract. For example, settings of the velopharyngeal mechanism are not the only articulatory postures that may produce the auditory impression of nasality. The taxonomy (outlined in Figure 1), is therefore defined according to auditory convention and is based on the phonetician's experience of articulatory imitation and auditory comparison. As a system of labeling, it is clearly subject to revision as new concepts relating salient sounds to their physiological origins are developed.

One easy parametric way to look at voice quality settings is to divide the vocal tract into six configurational regions: lips, tongue, jaw, velic opening, laryngeal constrictor, and glottis. This is done in Figure 1, beginning with settings of the oral vocal tract, leading into settings of the laryngo-pharynx, including the laryngeal constrictor, and finishing with an outline of the specific laryngeal settings known as phonation types, which are generally glottal but are also influenced by the action of the laryngeal constrictor. The more the setting is influenced by the laryngeal constrictor, the more the pitch of the voice plays a role in its auditory perception and categorization. Specifically, the vertical height of the larynx interacts with laryngeal constriction to alter acoustic spectral quality, and the addition of laryngeal constriction contributes whisperiness, creakiness, or harshness to the simple glottal states listed in part (c) of Figure 1. Generally, pitch increases towards the bottom of Figure 1, and the effect of constriction is greatest toward the right.

Functions of Voice Quality

The distinction is often made between 'intrinsic' and 'extrinsic' voice quality, where the former implies anatomically derived features not under the speaker's volitional control and the latter reflects acquired traits characteristic of a particular community (Laver and Trudgill, 1979). Some linguists use the expression 'voice quality,' or the parallel phrase 'voice set,' exclusively in its 'intrinsic' sense (Crystal, 1969). In either case, the role of voice quality is primarily 'indexical' as opposed to 'linguistic' with reference to the kind of meaning that it carries. Whereas shorter-term features of speech, such as segments, convey linguistic meaning, distinguishing minimally between word pairs such as *pat* and *bat*, long-term features are more often subtle indices, or indicators, of physical or psychological characteristics and of regional and social origins. Whereas segmental features tend to be used for linguistic purposes (although they also indicate a considerable amount about the speaker), and voice dynamics features tend to play a more paralinguistic role (although features like intonation can also signal a great deal about regional origin and other demographic traits), voice quality features tend to be extralinguistic (indicating almost exclusively demographic affiliation and personal preferences). The idiosyncratic basis of voice quality depends on accent choices made during language acquisition as well as on the individual speaker's anatomy and physiology, which can be influenced by temporary physical conditions. The task of automatic speaker identification by machine includes the attempt to isolate these individual features, many of which are long-term (*see* **Speaker Recognition and Verification, Automatic**).

Beyond the level of the individual, we are able to tell if a person has a cold, or laryngitis, or various chronic conditions from the often easily recognized long-term features superimposed on the person's normal speech. Within the national community, we can often tell where a person comes from based on the shared voice quality settings peculiar to any given region. Tongue raising (towards the back of the oral cavity) as a habitual secondary articulation in parts of Yorkshire or Lancashire in the north of England is a salient example. Social class is also marked by a preference for particular settings, but these also depend on regional standards of accent. Nasal voice, for instance, carries high social prestige when associated with certain accents (viz., RP, Standard Edinburgh English) but stands out as an undesirable feature to many listeners when associated with other

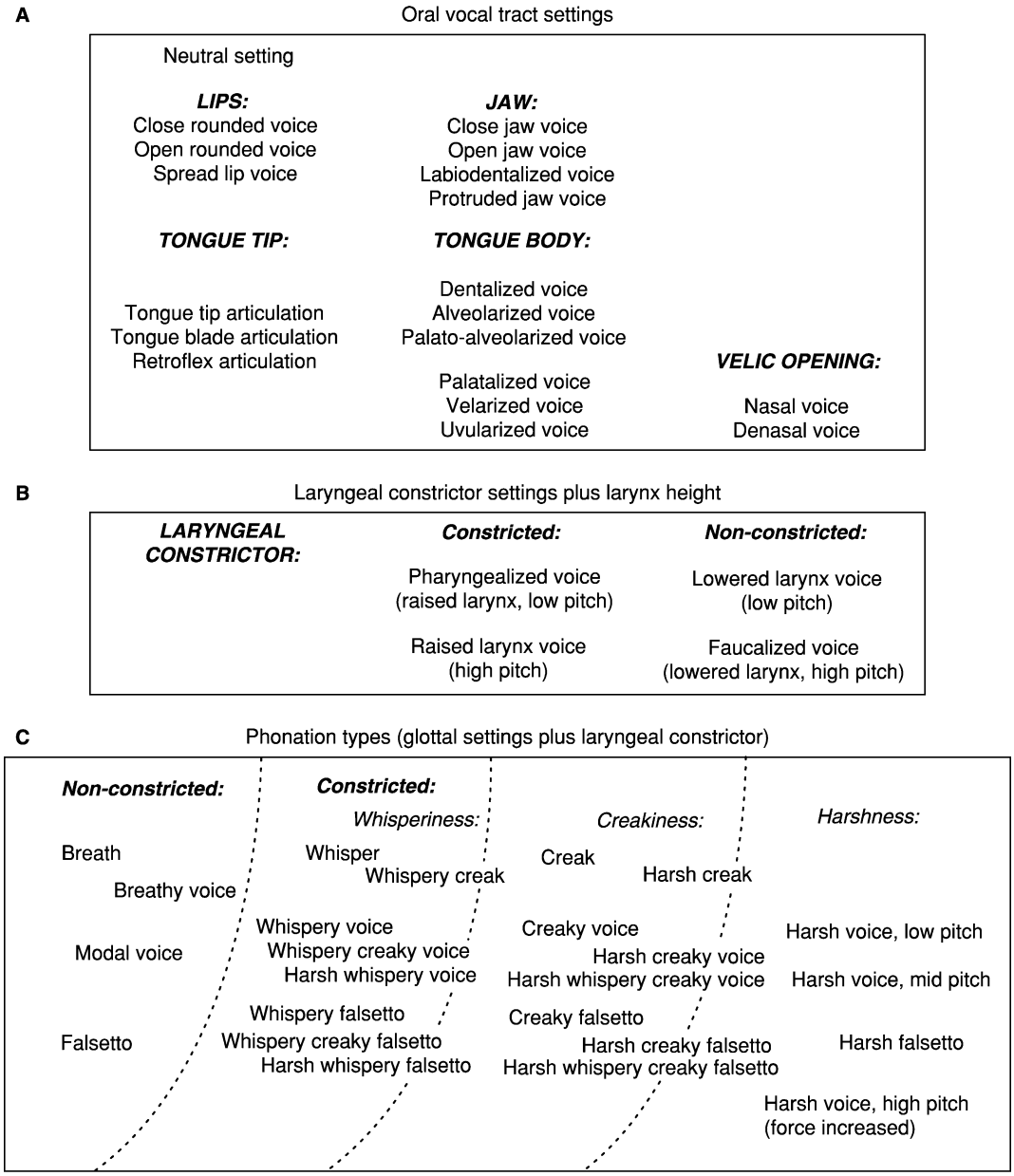

Figure 1 Descriptive phonetic labels for voice quality settings.

accents (see Esling, 2000). Evaluations of this sort are quite subjective. Tracing the incidence of voice quality features, and people's reactions to them, however, is a valuable tool in sociophonetic research. Language attitudes, and even the desire to modify one's own accent when learning a second language, may be dependent on identities and feelings of self-esteem signaled by differences in voice quality settings.

Paralinguistically, changes in setting over short periods of time give an indication of changing emotional states of the speaker. These are usually referred to as 'register shifts' or 'code switching.' Although some aspects of the vocal expression of emotion may be physiologically universal, our interpretation of subtle vocal cues is culturally conditioned. We may often extend our interpretation of emotion to such a degree that we ascribe fixed psychological traits to a speaker. The cultural context of this kind of prototyping has been explored through phonetic analyses of the production of various voice types by professional voice actors and by evaluating listeners' perceptual responses to a range of vocal character-role portrayals (Teshigawara, 2003).

Analysis of Voice Quality

Auditory analysis of voice quality is used in dialect and sociolinguistic research to identify and describe the indexical features found in pronunciation. It also has been used as a focal point to illustrate differences between languages and as a guide to the learning and teaching of pronunciation. In the specification of voice quality settings that describe a linguistic community, sufficient numbers of subjects, drawn according to sociolinguistic principles of demographic representation, are necessary in order to isolate features common to the group from speaker-specific features (e.g., Stuart-Smith, 1999). In speech pathology and audiology, the taxonomy proposed by Laver *et al*. (1991) has been adopted by many practitioners as an auditory guide. The complex analysis of pathological voice conditions for diagnostic purposes is outlined in Kreiman and Gerratt (2000).

To supplement auditory classification and perceptual evaluation, there are several instrumental techniques that help identify the physiological correlates of voice quality. These include electropalatographic, laryngographic, laryngoscopic (Esling and Edmondson, 2002), cineradiographic, electromyographic, MRI (Teshigawara and Murano, 2004), and aerodynamic techniques. Ideally, actions of the articulators are observed over longer periods of time (30 seconds, for example) than for segmental purposes. Acoustic techniques, including long-term average spectral analysis (Bruyninckx *et al*., 1994), which assesses the distribution of energy peaks in the spectrum integrated over time, are noninvasive and allow large numbers of survey subjects to be studied.

See also: Phonetics, Articulatory; Prosodic Aspects of Speech and Language; Speaker Recognition and Verification, Automatic; States of the Glottis.

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Voice Response Unit

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Introduction

Interactive voice response (IVR) systems were one of the first speech technology–based telephony applications to be widely deployed in the United States. In the first IVR systems, the customer employed touch-tone-based input, and the system provided synthetic speech feedback and prompts as output. Such systems are still in wide use today, although automated speech recognition–based IVR systems, in which users respond with speech instead of touch-tone input, have begun to replace the touch-tone-based applications.

One of the first applications to gain wide implementation was voice messaging, which allowed users to manage telephone voice messages. However, this application was quickly augmented with related and much more complex IVR applications designed to provide many types of customer services, including card credit authorization, utilities problem reporting, automatic bill paying, stock quotations, and travel arrangements and travel information, to name a few. The twofold goal of many of these services was to improve customer service while eliminating human customer service representatives, a significant source of costs to businesses.

Industry was quick to see the potential cost-saving aspect of IVR systems, and companies hurried to develop such systems. With the exception of applications developed within the telecommunications industry specifically, little attention was paid to user interface design during application development, and virtually no standardization took place with respect to prompts, assignments of touch-tone keys to various functions, etc. As a result, users never knew what to expect when they encountered an IVR application, and consequently were unable to develop a mental model of IVR applications or to anticipate the responses required to navigate such systems efficiently and effectively.

Voice Messaging Standards

In recognition of the degree of dissatisfaction existing among users because of the inconsistencies in voice messaging applications, attempts were made to adopt some standardization that could be applied to future applications. In the late 1980s, the Voice Messaging User Interface Forum (VMUIF) was established; it was largely composed of representatives from within telecommunications companies in the United States. The VMUIF published (1990) a document of consensus guidelines that were to guide the user interface design of future voice messaging applications. Some years later, this document formed the basis for the voice messaging user interface standards of both the International Standards Organization (ISO) and the American National Standards Institute (ANSI) (ISO, 1995; ANSI, 1996). These standards described the common elements of touch-tone IVR applications, recommended touch-tone key mappings for various IVR application functions, recommended terminology for use in voice messaging applications, and provided design guidelines for implementing the user interface for various functions of a voice messaging system. Blanchard and Lewis (1999) provided a detailed discussion of the content of these standards and of the technical developments that occurred after the standards were published.

Interactive Voice Response User Interface Standard

Although these standards no doubt had the desired effect of increasing the degree of standardization in voice messaging user interface designs, voice

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Interactive Voice Response User Interface Standard

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messaging was already becoming simply one of many applications of IVR technology. Because all voice messaging systems are fundamentally similar, it was possible to standardize the key mappings and even the functionality of such systems. This was not the case for other IVR applications. Nevertheless, developers of IVR applications needed guidance about recommended user interface design principles, because most developers had little human factors knowledge or expertise in-house to guide their user interface design activities. As early as 1992, the development of a more general IVR design guidelines document was recommended (Gardner-Bonneau, 1992). It was not until 1996, however, that the development of such a document was initiated.

In that year, a section originally titled 'Voice input/output and telephony' was added to a standards document being developed by the Human Factors and Ergonomics Society HFES-200 standards committee. This document was intended to be the ANSI complement to ISO Standard 9241 ('Ergonomic requirements for work with visual display terminals, parts 10–17'), which dealt with the user interface for office software systems. (Parts 1 through 9 concerned the hardware user interface for visual display terminals.) A small subcommittee of HFES-200 worked on the 'Voice input/output and telephony' section for approximately 2 years, during which most of its content was finalized. Originally envisioned as having four parts (IVR, automated speech recognition, synthetic speech, and nonspeech audio), this section of the standard was eventually limited to IVR only. The completed IVR section lay dormant for some months, awaiting completion of other sections of the standard.

Between 1998 and 2000, several organizations reviewed the IVR section draft, and one in particular – the Alliance for Telecommunications Industry Solutions (ATIS) IVR Forum – provided feedback that led to significant changes in the draft section. The IVR Forum has as a major goal the development of guidance to help make telecommunications services accessible to people with disabilities, as mandated by Section 255 of the Telecommunications Act of 1996.

The advent of IVR systems, generally speaking, had served some people with disabilities well – specifically, those who were blind. IVR systems enabled blind users to bank, pay bills, and shop by phone and to easily benefit from many other types of customer service that had been problematic via other visually oriented interfaces. However, the very aspect that made IVR systems a godsend for the blind made them virtually inaccessible for people who were deaf or who had hearing impairments. Particularly affected were deaf consumers who needed to access such applications using a text telephone (TTY) or a telecommunications device for the deaf (TDD). Many IVR applications were not available to TTY users (a situation that has since changed), and no attention has been paid to the special user interface requirements of TTY users. Although there were some who failed to understand why a TTY user would want to use an IVR application in the first place, it needs to be said that for many companies in the United States, IVR systems had *replaced* other, comparable forms of customer service, so sometimes an IVR was the only way a deaf user could obtain services on a par with a hearing person.

The HFES-200 document section 'Voice input/output and telephony' – now titled 'Interactive voice response (IVR) and telephony' – had been drafted without any consideration of accessibility issues, but the interest and involvement of the IVR Forum enabled accessibility provisions to be added to the draft in 2000 and 2001. The final version of this section of the standard included general guidelines for IVR user interface design, but has a special designator for those guidelines especially important for accessibility, and includes a set of specific guidelines for the design of IVR user interfaces when TTYs are used.

Some of the specific accessibility-related provisions of the IVR section of the document include the following:

1. TTY users should be informed by the IVR application about the acceptable forms of input (dual-tone multiple frequency [DTMF] – e.g., touch-tone, Baudot [i.e., TTY input], or both).
2. Usability testing should be conducted to determine the appropriate values for IVR elements such as time-outs, structuring of prompts, and text messages used for feedback via a TTY.
3. In the case of delays, TTY users should be provided with appropriate feedback regarding the delay, just as non-TTY users should be.
4. TTY messages should be designed according to the structure and form to which TTY users are accustomed, which differs from that of non–TTY users.
5. Attention must be paid to the quality of audio in prompts to accommodate users who have speech impairments and may have difficulty understanding prompts in an audio-degraded system.
6. To accommodate people with cognitive disabilities and elderly users, IVRs should allow users to replay prompts and announcements in their entirety and to replay portions of announcements and prompts that are especially long and detailed.

Future Directions in User Interface Standards

The HFES-200 Committee in 2000 made the decision to publish and ballot individual sections of the HFES-200 document, rather than wait for all sections to be completed prior to publication. The committee has since published several sections of the HFES-200 document, using the ANSI Draft Standard for Trial Use (DSTU) mechanism. This mechanism allows a draft standard to be placed in use for a period of 6 months, after which it must be balloted for acceptance as an American National Standard. The IVR section is one of the documents that are now available as a DSTU (HFES 200.4, October 2003) and was due to be balloted in late 2004 for acceptance as an American National Standard. At present, there is no international counterpart to this document.

Although the HFES 200.4 DSTU covers touch-tone-based IVR systems, generally it addresses only minimally the speech recognition–enabled IVR systems that are becoming increasingly more common – and this applies to its provisions for making these systems accessible to users with disabilities. Having learned some lessons from the history of touch-tone-based IVR systems, developers of speech-enabled IVR systems have shown some interest in avoiding the past user interface design mistakes that caused touch-tone-based IVRs, although ubiquitous, to be despised by users in many cases. Organizations like the Applied Voice Input/Output Society (AVIOS) have advocated for the development of guidance for the design of speech recognition–enabled IVR interfaces, and near the end of the 1990s, AVIOS briefly supported the formation of a telephone speech standards committee for this purpose (see Gardner-Bonneau, 1999). However, no standard for speech recognition–enabled IVR user interface design has been published yet, although several recent books (Balentine and Morgan, 2002; Cohen *et al*., 2004; Kotelli, 2003) address this topic.

See also: Human Language Technology; Language in Computer-Mediated Communication; Machine Translation: Overview; Natural Language Interfaces; Speech Interface Design; Speech Recognition, Audio-Visual; Speech Synthesis; United States of America: Language Situation.

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Voice-Over

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The OED (Brown, 1993: 3596) defines voice-over as "narration spoken by an unseen narrator in a film or a television program; the unseen person providing the voice," whereas Webster's online gives us the following definition: "the voice of an unseen narrator speaking (as in a motion picture or television commercial) b: the voice of a visible character (as in a motion picture) expressing unspoken thoughts." In both instances, the underlying approach used to define the term belongs clearly to the realm of Media and Film Studies rather than Translation Studies, as they do not imply any translating activity and no mention of language transfer is made. The English term has been arbitrarily borrowed and adapted by other languages and by Audiovisual Translation Studies scholars who use it in a rather different way, transcending the technical side and incorporating a translation dimension. This dual use of the sameterm with two clearly different meanings is responsible for some terminological confusion.

Very few efforts have traditionally been channeled into the study of this translation mode, a situation that mirrors the lack of interest shown by academics in the more general area of Audiovisual Translation (AVT). The relatively recent boom in AVT has generated much research activity in the field although centering mainly on its two most popular modes of transfer, subtitling and dubbing, bypassing somehow other techniques such as voice-over, surtitling, narration, interpreting, and commentary. It is revealing that no separate entry on voice-over can be found in academic dictionaries and encyclopedias of Translation Studies, having being systematically classified as a subcategory under the umbrella terms of dubbing and revoicing (Shuttleworth and Cowie, 1997: 45; Baker, 1998: 75). In these pages, voice-over is understood as one of the distinct and independent translation modes applied when translating audiovisual programs (for a detailed taxonomy, see Gambier, 1994, 1995, who distinguishes up to 10 different modes).

Another inaccuracy that stems from the two previous dictionary entries is the fact that voice-over is not restricted to motion pictures or the television alone and it is actually much used in radio programs, for instance, on the BBC World Service. Hence, the umbrella term Screen Translation would seem inappropriate in this case as it only applies to translation done for media that are received through a screen. A wider term such as Audiovisual Translation, encompassing all media translation modes, might seem better for this type of activity.

From a Translation Studies perspective, voice-over can be defined as a technique in which a voice offering a translation in a given target language (TL) is heard simultaneously on top of the source language (SL) voice. As far as the soundtrack of the original program is concerned, the volume is reduced to a low level that can still be heard in the background when the translation is being read. It is common practice to allow the viewer to hear the original speech in the foreign language for a few seconds at the onset of the speech and to reduce subsequently the volume of the original so that the translated speech can be inserted. The translation usually finishes several seconds before the foreign language speech does, the sound of the original is raised again to a normal volume and the viewer can hear once more the original speech.

Unlike subtitling, in which there is a shift of medium from an oral discourse in a SL into a written text in a TL that normally appears at the bottom of the screen, voice-over remains in the oral medium in the same way as dubbing. Although there is a certain degree of audio synchrony in the delivery of the original and the translated text – the narrator's voice being heard over the on-screen speaker's voice – one of the main differences with dubbing is that voice-over does not make any attempt to recreate the illusion of lip synchronization. Whereas dubbing pretends that the people on screen speak the same language as the viewer, voice-over is a reminder of the difference and the need for translation. The viewer is constantly aware through the auditory channel of the presence of a foreign language, making voice-over, as well as subtitling, a prime example of what in House's terminology (1981) will be an overt translation, i.e., the program is always presented and perceived as a translation.

There are primarily two professionals involved in this technique: the translator and the voice-over narrator or artist. The former deals with the linguistic transposition from a language into another, whereas the latter is in charge of reading the text in the target language. One of the reasons for this distinction is that more often than not, translators would not possess the desired voice quality and voice artists would not be qualified linguists. The implications of this split have been discussed in detail by Allouba (1992), who raises some thorny issues: the inappropriate mutilation of parts of the translated text, the rightful owner of the copyright and the (in)visibility of the translator.

For commentators such as Luyken *et al.* (1991: 80) the cohabitation of two languages is regarded as a positive factor, as it "contributes to the sense of authenticity in the translation and prevents a degree of mistrust from developing," an opinion that is also shared by Pönniö (1995: 304) for whom voice-over is the ideal translation solution if one wants to give an idea of the interlocutor's tone and way of speaking. Nevertheless, one should be fully aware that this is nothing but an illusion and, as Franco (2001: 290) points out, "the type of delivery we hear in voice-over translation is an important strategic way of reassuring viewers that what they are being told in their own language is what is being said in the original language, although it is known that what they will be listening to is in fact only a *representation* of the original discourse." Although in most countries the standard language variation is used in the translation irrespective of the lexical and paralinguistic characteristics of the SL speech, this drive to promote and foreground the sense of authenticity has given raise to new, bold approaches to voice-over. The change in attitude that has taken place toward the use of voice-over in television is best exemplified in the United Kingdom, and more particularly in the way it is done by the BBC. Thus, where the traditional practice "was to use sedately delivered Received Standard Pronunciation, [. . .], it is now the custom, out of deference to the Other, to use English with the appropriate foreign accent" (Fawcett, 1996: 76). This means that if the person on screen speaks Spanish, the voice-over narrator will read the translation in English with a clear foreign accent, showing the characteristic inflexions that are associated with a Hispanic person speaking English. However, we would argue that this approach is far from being unequivocal and lends itself to debate, as it could also be interpreted as a sign of the inability of foreign people to speak English correctly.

Like subtitling, voice-over has considerable advantages over dubbing in terms of costs. It is technically less complex and demanding since there is no need to adapt the translation to fit the movement of the lips, which has led some authors to state that voice-over does not pose any demands for synchrony (Lambert and Delabastita, 1996; Grigaravičiūte and Gottlieb, 1999), and the only requirement is that the length of the translation is relatively similar to that of the original speech. The apparent lack of media constraints has prompted some scholars to describe it as the easiest and most faithful of AVT modes (Díaz Cintas, 1997: 112; Grigaravičiūte and Gottlieb, 1999: 43). However, the fact that the limitations imposed by the audiovisual media are less stringent in voice-over than in subtitling or dubbing does not mean that they do not exist. Given that the translation starts a few seconds after the original and finishes a bit earlier, there tends to be a demand for lexical reduction in the translation so that the oral delivery does not sound rushed and unnatural when recorded, although voice-overs do admit considerable variation in respect of this type of synchrony. Besides time constraints, and given that we are dealing with a polysemiotic program, the translation will also have to pay attention to any possible linkage between text and image in the original. So, when the SL enunciation is supported by visual images, the translation will have to resort to solutions that, as far as possible, also recreate the link between the two dimensions at the same point in the program. From a technical dimension, the translated text has a time code – TCR – that must be followed in order to keep synchrony with the images. Lack of synchrony in this respect can lead to a negative perception on the part of the viewers.

The oral performance dimension is also simplified as the TL voices do not need to resemble those of the original program and the voice-over speaker – revoicer – does not need to have trained as an actor. The recording is usually carried out by one, or possibly two people – for male and female voices – rather than by several dubbing actors, reducing the labor costs considerably.

The other additional advantage of voice-over is that the amount of time it requires to be completed is far less than for dubbing and can therefore be used for the translation of programs in which there is very little time for preparation before it is due to be broadcast or sent back to the client.

Given its particular nature, voice-over has been traditionally favored in the audiovisual media to translate programs belonging to nonfictional genres, in order to account primarily for an interview answer or series of answers from an interviewee that speaks a different language to the TL audience. Documentaries, current affairs, news and political debates are translated in this way. In countries such as Spain, voice-over is a more common mode of AVT than subtitling, and it is the leading mode when people are interviewed on TV programs, from news and sports to gossip and even reality shows. When foreign Presidents or Prime Ministers have something to say in current affairs, it reaches the Spanish audience through voice-over. For authors such as Kilborn (1993: 648), this transfer mode is "particularly well suited as a method for the rendering of speeches by foreign politicians," so much so that "many in the audience would now deem it wholly inappropriate if any other mode were used."

In addition to interviews, voice-over is also used to translate films and other programs in countries like Belarus, Estonia, Latvia, Lithuania, and Poland. Depending on resources, one or several actors narrate the translation while the original voices are heard as well. There tends to be a greater flexibility in the way the translation is inserted on top of the original language, without the need to leave the original running for a few seconds before hearing the TL text. This type of voice-over is probably closer to what Hendrickx (1984) coined 'partial dubbing.'

Some scholars have classified voice-over as simultaneous interpreting (Gambier, 1994: 276). In our opinion, this approach adds to the confusion surrounding the term, implying that voice-over is used in live performance. However, there are good grounds for distinguishing between the two activities. Simultaneous interpreting of audiovisual programs takes place at the same time as the SL speech and is done live by an interpreter. Translation for voice-over, on the contrary, is done and recorded prior to the broadcasting of the program. The limits between the two modes can be blurred as in the case of news items that arrive shortly before transmission time and are simultaneously interpreted and recorded just in time to be broadcast. Kaufmann, whose many years of experience as an interpreter give her a certain authority, rejects this comparison completely. She makes a clear distinction between modes used in live broadcasting, *l'interprétation in situ*, that is, the simultaneous or consecutive interpreting of live debates and interviews (1995: 436), and modes used in programs recorded prior to broadcasting, *l'adaptation en aval*, that is, the subtitling, dubbing and voice-over of a program into a foreign language (1995: 438).

To conclude, it may be said that the prevailing terminological ambiguity surrounding the term voice-over reflects the scarce interaction between scholars and practitioners. Most important, the prevailing discourse on voice-over reveals that the actual conflict is not so much about terminology but about the object of study itself. That is, it seems that the status of voice-over as a mode of transfer *per se* has been neglected, mainly because it always appears as a technique or a subcategory associated with other well-known types of audiovisual translation.

See also: Dubbing; Subtitling.

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Volney, Constantin-François Chasseboeuf, Comte de (1757–1820)

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Volney was born on February 3, 1757, in Craon, France, and died on April 25, 1820, in Paris. Son of an attorney, he studied at the Oratorian College in Angers, where he started learning Hebrew. In 1775, he went to Paris to read law but studied medicine and was a member of the baron d'Holbach circle in Auteuil. Beginning in 1780, he studied Arabic at the College de France with Leroux des Hauteraies. In 1785, he invented his pen-name, Volney, which is the contraction of VOL (from Voltaire) and NEY (from Ferney, Voltaire's residence). His first travels to the Near East countries afforded him close observations of geographical, historical, sociological, and ethnographical differences, collected in *Voyage en Egypte et en Syrie* (Volney, 1787). In 1790, he was elected a representative of the Tiers-Etat, became secretary to the Assemblée, and was promoted to director of agriculture and commerce for Corsica (*Précis de l'état de la Corse*, 1793). *Les Ruines,* published in 1791, brought him high repute. After being imprisoned and forced into exile during the Terror, he was appointed to the Ministry of Foreign Affairs in 1794, in charge of the Near East countries. In the second year of the Republic, he was employed as a teacher of history at the Ecole Normale and developed methods of ethnolinguistic investigation. From 1795 to 1798, he traveled to America and studied the Miami language. Back in France, he was elected to the 'Analysis of sensations and ideas' section of the Institut de France. Like several Ideologues, he supported Napoleon Bonaparte and participated in the coup d'état of Brumaire 18. He became a senator but was soon deposed and joined the opponents to the Empire. Volney was a member of the Société des Observateurs de l'Homme and the Société Asiatique de Calcutta, founded in 1783, and became cofounder of the Académie Celtique in 1804. He was made a peer of the kingdom by Louis XVIII. From these years on, his work was devoted to linguistics and ancient history. In his will, he founded the Prix Volney to support the transcription of Near Eastern languages into a phonetic alphabet. In 1842, it became a prize for work in comparative linguistics.

Volney's most famous contribution to linguistics is the *Discours sur l'étude philosophique des langues* (1819). In this essay on the history of linguistic descriptions, Volney explained his comparative method and maintained the thesis of polygenesis. Drawing attention to linguistic discrepancies, considered as cultural facts, he questioned the universalism of the Ideologues and the principles of general grammar. His works on the unification of alphabets and the teaching of Near Eastern languages had many followers. In addition to his effort at planning for collecting grammars and dictionaries, he contributed to the elaboration of modern ethnographic studies and indirectly to the development of comparative linguistics.

See also: Historiography of Linguistics.

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Voloshinov, Valentin Nikolaevich (1884/5)

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Valentin Nikolaevich Voloshinov was born in Saint Petersburg, Russia, on June 30, 1895. Though he originally set out to study law, entering Saint Petersburg University in 1913, material circumstances forced him to leave in 1917, before finishing his degree. For the next several years, Voloshinov held a series of teaching stints, serving as a piano instructor for the People's Education Department, for instance, before meeting up with fellow teachers Bakhtin and Medvedev, who were all working in Vitebsk in 1920. The three intellectuals stayed in close contact throughout the 1920s, engaging in lively discussions about language, politics, philosophy, and literature, and forming what is today known as the Bakhtin Circle.

Determined to continue his training as a linguist, Voloshinov returned to his native Saint Petersburg (then renamed Petrograd), where he completed his studies in ethnology and linguistics, finishing his university degree in 1924. The following year, he accepted a position as a research assistant at Saint Petersburg University, in the newly formed Institute for the Comparative History of the Literatures and Languages of the West and East, where he continued as a postgraduate student in 1926, later becoming a research fellow after completing his studies in 1929. Starting in 1932, Voloshinov taught sociology and art at the Herzen Pedagogical Institute, a position he kept until 1934, when poor health forced him to end his professional life. Voloshinov succumbed to the ravages of tuberculosis in 1936, ending a brief but brilliant career that has only recently gained public recognition.

Voloshinov is best known for his sophisticated work on language ideology, a concept he initially drew from Marxist philosophy, with its strong focus on the political ramifications of public consciousness. As Voloshinov came to argue in his seminal work, *Marxism and the philosophy of language* (1929), public discourses are constructed in verbal encounters, in which speakers negotiate worldview through dialogic exchanges, often defending or even countering the dominant ideologies expressed elsewhere in a society. Of course, the whole framework is reminiscent of the dialogic approach to language that Voloshinov's friend, Bakhtin, articulated. For this reason, many scholars are inclined to attribute the writings signed by Voloshinov and published under his name solely to Bakhtin. The issue of authorship remains open, though many now entertain the possibility that the influence was mutual. In this article, the works published under Voloshinov's name are treated as his alone.

Deeply dissatisfied with the linguistics of his day, Voloshinov sought to develop a new school rooted in social interaction rather than in abstract structural characteristics, such as phonetics, lexicon, and grammar, which were increasingly being studied for their own sake. Voloshinov argued that linguists had adopted an inappropriate methodology derived from the study of dead languages, in which the utterance was, of necessity, removed from its original social setting as an isolated, monologic byproduct. Yet in a living language the utterance is central to the construction of meaning, which derives as much from the social context as it does from structural traits, such as word order or grammatical categories.

For Voloshinov, the meaning of an utterance is always based on a specific 'theme,' or a common stock of assumptions shared by participants, one that is generally rooted in the unrepeatable circumstances of the encounter. From this perspective, a word or grammatical concept takes on subtle new shades of meaning every time it is uttered. Consider the use of the pronoun 'we' in the framing of the American constitution, where the reference once excluded both women and slaves, who were systematically barred from participating in the government for

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some time to come. Or consider the racial use of the color terms 'black' and 'white' before the civil rights movement of the 1960s. Ordinary words can propagate powerful social ideologies for specific groups in specific times. Yet Voloshinov also maintained that linguistic concepts retain a core ideological neutality and potential multivalence, allowing them to potentially convey any ideology or even mean different things to different groups at different times. Hence, the expression 'we the people' no longer excludes women, though it did in early America. In actual use, Voloshinov argued linguistic concepts always carry an evaluative, ideologically charged sense – meaning that they always convey specific perspectives, often with strong political overtones.

Where Saussurean linguists posited an idealized speaker–hearer with a perfect command of relatively homogeneous grammar and vocabulary, Voloshinov argued that meaning is always changing through use, and speakers differ profoundly in their knowledge, stylistic preferences, or deployment of grammatical rules. Where Saussurean linguists represented communication with arrows passing from an active speaker to a passive addressee, who merely decodes the speech by relying on the conventional meanings of linguistic concepts, Voloshinov argued that communication was in fact a two-way street or 'double-sided act,' in which the receiver also plays an active role in shaping meaning, anticipating contemporary speech act theory. For Voloshinov, the listener also plays a role in shaping the exchange, whose outcome neither party ever fully anticipates. Finally, where the Saussurean model of the invariant linguistic sign relegated the messy issue of change to the diachronic realm, where its source still remained mysterious, Voloshinov regarded change as a byproduct of dialogue, or the constant negotiation of per-spective in actual language use, where structure and meaning are always undergoing subtle revision.

Because his new school of linguistics was based on the ideologically charged utterance, Voloshinov devoted a whole section of *Marxism and the philosophy of language* to problems of 'reported speech.' For, in actual pratice, speakers spend a great deal of time quoting or repeating the words of other speakers. Also, if the linguist analyzes speech, the discipline had better develop a methodology for accurately reporting the utterance, without ignoring the author's role in shaping meaning assigned to speakers. One approach is to maintain sharp boundaries between authorial and reported speech, clearly separating the two voices with quotation marks or subordinate clauses, for instance. In contrast to this painstaking 'linear' method, Voloshinov notes the existence of the 'pictorial' approach, in which the author takes the liberty of interspersing the reported speech with commentaries and replies, as in literature. Another tendency is to capture the content, if not the style, a approach Voloshinov dubbed the 'referent analyzing' approach, as opposed to the contrasting 'texture analyzing' approach, in which the author strives to capture the tone and feel of the reported speech.

See also: Bakhtin, Mikhail Mikhailovich (1895–1975).

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Vossler, Karl (1872–1949)

J Albrecht

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Vossler, one of the most influential (and controversial) Romance scholars of his epoch, not only in Germany, was born on September 6, 1872 at Hohenheim (near Stuttgart). He studied German and Romance Philology at Tübingen, Strasbourg, and Geneva. In 1895 he went to Rome, turning his attention mainly to Romance languages and literatures. In 1899, he made the acquaintance of Benedetto Croce (*see* **Croce, Benedetto (1866-1952)**), an acquaintance which subsequently grew into a lifelong friendship. He adopted Croce's aesthetic concept of language and later became the founder of the so-called 'idealistic school' of philology. For more than 10 years he was lecturer in Italian at the University of Heidelberg. During the short period in which he held the chair of Romance Philology at the University of Würzburg (1909–1911), his new professional duties drew his attention to French language and literature. In 1911 he was offered the chair of Romance Philology at the University of Munich, where he remained for the rest of his life.

Vossler was a fervent German patriot, yet anything but a nationalist. Disappointed by political developments in Italy during World War I, horrified by the rise of Fascism in Italy and Nazism in his own country, hurt by the uncompromisingly anti-German attitude adopted by France, a country to which he felt attached by a kind of love-hate relationship, he concentrated his efforts in his later years almost entirely on Spanish language and literature. In 1938 the Nazi administration of his alma mater obliged him to relinquish his chair prematurely. In 1946 he was entrusted with the rectorship of the University of Munich by the American Military Government, an office which he had already held in 1926. He died in Munich on May 18, 1949.

Vossler began his academic career as a traditional philologist. However, after the 'idealistic turn' in his intellectual biography he became convinced that the language of a people reveals itself in its literature. Thus, according to his view, the 'natural way' of investigation is to start from language seen in its totality, that is, as artistic creation, and to proceed from there to individual linguistic phenomena such as forms and sounds, and not vice versa. The really important and interesting part of language is due to individual creation, its collective and systematic aspect being nothing other than a result of human inertia. Grammar has to be studied as a manifestation of 'frozen collective style.'

Vossler declared war on 'positivistic' philology in his pamphlet *Positivismus und Idealismus in der Sprachwissenschaft* (1904); he attempted to apply his theoretical principles to a concrete subject in his book on French language and culture (Vossler, 1913), but this only brought him scorn and derision from his less 'idealistic' colleagues. In *Geist und Kultur in der Sprache* (Vossler, 1925), a collection of some important theoretical essays, he advanced his opinions on the mutual relationship between language and culture in a more circumspect form. The majority of his numerous publications are of literary rather than linguistic interest.

See also: Croce, Benedetto (1866–1952).

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Vowel Shifts and Mergers

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Overview

Quantitative approaches to language variation began with studies of shifts and mergers of vowels, and vowel changes have maintained a central position in variationist linguistics. Labov's (1963) study of Martha's Vineyard in Massachusetts was a study of the shifting of the vowels of PRICE and MOUTH. The majority of the variables in his study of the Lower East Side of Manhattan, New York, involved vowel shifts (Labov, 1966). On the other side of the Atlantic, quantitative sociolinguistics started with Trudgill's (1974) studies of Norwich, England, which itself studied vocalic variation, such as the merger of *toe* and *tow* and shifting of the *toe* class. In other countries as well, quantitative sociolinguistics has often taken root with studies that included vowel shifting or merger as variables, e.g., Horvath (1985) in Australia.

This survey focuses on variationist, or quantitative sociolinguistic, approaches. Nevertheless, it builds on other approaches to vowel shifting and merger from other branches of linguistics. Most important are those from historical linguistics (e.g., Martinet, 1952) and dialect geography (e.g., Moulton, 1962). Much recent work in sound shifting, such as Labov (1991, 1994), Thomas (2001), and Labov *et al.* (in press), also relies heavily on methods originally developed in phonetics.

A large fraction of variationist work on vowel shifting and vowel mergers have concerned dialects of English. There are several reasons for this bias. One reason is that continental European scholars have tended to be preoccupied with other important issues, such as language contact and the leveling of traditional dialects, and have maintained a greater interest in dialect geography than anglophone scholars. Another reason is that the small vowel systems found in many languages, such as the five-vowel system of Spanish, tend to be rather stable and, thus, provide little information on vowel shifting. Meanwhile, English, with its complicated, unstable vowel system, has proved exceptionally fertile for studies of vowel shifting. A third reason is that sociolinguistic research on non-European languages, with a few exceptions such as Japanese, Arabic, and some languages of India, has been quite limited.

Names of vowel classes in English used in this article follow the system devised by Wells (1982), in which keywords, such as KIT or THOUGHT, represent the vowel contained in them. This convention circumvents issues of what constitutes a phoneme (or even if phonemes exist), as well as British/American differences in conventional names of vowel classes. For other languages, conventionally recognized symbols for phonemes are employed.

Vowel Shifting

The study of vowel shifting traditionally lay within the realm of historical linguistics, though dialectology added useful insights as well. In recent years, however, sociolinguistics has become the dominant center of research on vowel shifting, with important contributions from phonetics and phonology. Sociolinguists, following the lead of William Labov, have developed a set of theories and provided large amounts of data on vowel shifting, particularly in varieties of English. Some issues related to vowel shifting, especially its causes, have spanned the various fields that have investigated it.

A vowel shift occurs when the quality of a vowel phoneme changes over time. For example, the vowel in the English word *seed* was pronounced [eː] before 1500, but during the century or two after 1500 it changed to [iː], at least in many dialects. This particular shift was an example of an unconditioned change, one that affects all phonetic contexts. Vowel shifts may also be conditioned, that is, occurring only in particular phonetic contexts. Examples of conditioned changes are the lowering of /ɛ/ to [æ] in Canadian French, which occurs only word-finally, as in *lait* [læ] 'ugly' (Walker, 1984) and the similar lowering of /ɛ/ to [æ] in Swedish and some dialects of Norwegian, which occurs only before /r/, as in *är* [æʈ] 'am, is, are'. Conditioning of vowel shifts is quite often due to assimilation to a consonant that conditions the shift. For instance, fronting of GOAT and GOOSE in English is blocked when /l/ follows the vowel, as in *cold* and *cool*. The reason is that syllable-coda /l/ is velar in English and coarticulation with the velar /l/ keeps the vowel velar, preventing it from fronting (i.e., palatalizing).

Studies of vowel shifting can provide important evidence for wider linguistic issues. For example, the Neogrammarian controversy was reviewed by Labov (1981). The dispute involves whether sound change is exceptionless and conditioned only by phonetic factors – the Neogrammarian hypothesis first advocated by Hermann Osthoff and Karl Brugmann – or occurs word by word – lexical diffusion, advocated most notably by William S.-Y. Wang. By examining evidence from sociolinguistic studies, Labov found

that many cases that had previously been ascribed to lexical diffusion were actually instances of social variation in which speakers used both competing variants. At the same time, however, he found that some kinds of changes, such as those involving vowel length, often do behave in lexically specific ways.

Causes of Vowel Shifts

Considerable research has focused on vowel shifts that are internally motivated, that is, not due to influence from a substrate language or from prestige-related hypercorrection. One old explanation for vowel shifts and other sound changes, economy of effort, has been applied productively to conditioned changes that are due to assimilation. Economy of effort, also called the principle of least effort, states that sound changes occur in order to minimize energy expended in articulation. That is, in a word such as *cool*, it is easier to maintain the vowel in a backed (velar) position before the velar /l/ by simply holding the tongue in the same position than it is to move the tongue so that the constriction forms first in the palatal region and then rapidly shifts to the velar region. Assimilatory shifts are usually conditioned, as in the example just given, but they can also be unconditioned in many cases of monophthongization of diphthongs. In these cases, the nucleus and the glide of the diphthong become assimilated to each other. For example, Old Latin /oi/ changed to /uː/ in Classical Latin, as in *oinos* 'one'> *ūnus*; /uː/ was, in a sense, "halfway" between [o] and [i] because it preserved the backness and rounding of [o] while maintaining the height of [i]. (/oi/ was preserved in a few words, e.g., *foetidus* 'stinky', but perhaps mainly as a spelling convention.) Similarly, Classical Latin /ai/ (spelled *ae* or *æ*) and /au/ became Vulgar Latin /ɛː/ and /ɔː/, respectively, sounds that are "halfway" between their former nuclei and glides. Monophthongization may also involve one-way assimilation, as in the shift of Proto-Germanic */ai/ to Old English /ɑː/, for example, **stainaz* 'stone' > *stān*, or the similar shift of the PRICE class in some or all phonetic contexts to [aː] in the American South.

Nevertheless, economy of effort has three primary weaknesses as an explanation for vowel change. The first is that it is counteracted by the need for clarity in speech. While the desire for economy may induce speakers to expend less effort in articulation, thereby producing less movement of articulators and more overlapping of articulatory gestures, the need for clarity has the opposite effect, leading to a greater effort in utterances, with more movement of articulators and somewhat less overlapping of gestures. Up to a point, greater articulatory effort makes it easier for addressees to understand the message, which is normally an aim of any speaker. As a result, economy of effort leads to far fewer vowel shifts than might be expected. A second weakness is that it fails to explain why anticipatory coarticulation leads to more vowel shifts than perseveratory coarticulation: that is, vowels exhibit shifts conditioned by segments that follow them more often than by segments that precede them. This issue is perhaps best left to experimental phonetics and neurolinguistics. The third, and widest-ranging, weakness is that a large number of vowel shifts are left unexplained. Among these unexplained shifts is the bulk of unconditioned vowel changes.

Another explanation besides economy of effort, the notion of maximal differentiation – that vowels tend to be situated in the vowel envelope so that they are spaced as far from each other as possible – has shed light on many unconditioned vowel shifts and has appeared in varying incarnations in several branches of linguistics. Martinet (1952) discussed the functionalist-influenced slot-filling approach, in which there were spaces for, e.g., a high back rounded vowel, a mid back rounded vowel, etc., and each of those slots might or might not be filled in a particular language. This construct was commonly assumed by historical linguists at the time and, in some form, precedes Functionalism, going back at least to Jakob Grimm. Martinet modified it by advocating the notion of a margin of security between phonemes, a space between each phoneme in which tokens ordinarily do not occur. Later sociolinguistic and phonetic findings have complicated the picture considerably with regard to the margin of security. It has been demonstrated repeatedly, by means of first formant (F_1)/ second formant (F_2) plots, that no empty space between phonemes is necessary and, in fact, that overlap is common. When segmental and prosodic contexts are taken into account, the picture clears up considerably, and at least a modicum of the margin of security is usually present – though, here again, exceptions are possible. What may be more lasting about Martinet's approach, however, is that he seems to have regarded addressees as highly as speakers in the equation. According to the scheme for which Martinet argued, if one vowel in a chain happened to shift, then the next vowel could afford some slop into the space that the first vowel had vacated. Tokens of the second vowel could be produced in that space and would not create comprehension errors for the addressee, so they could be perpetuated, creating the possibility that the whole "center of gravity," as Martinet put it, of the second vowel could shift. Thus, with both the first vowel and the second vowel mutated, a chain shift would be created.

More evidence that vowels tend to be distributed evenly around the vowel space appeared in Moulton (1962), which showed that variants of /aː/ in Swiss German dialects were related directly to the structure of the rest of the vowel system. The change in emphasis to perception progressed further in phonetic studies of vowel dispersion. Liljencrants and Lindblom (1972) initiated this movement. They surveyed the vowel systems of languages around the world and found that mathematical modeling could predict the configurations of vowel systems based on the number of vowel phonemes, at least for smaller systems. Later studies have refined the method. The notion that vowels are maximally dispersed in the vowel envelope presupposes a primacy for perception because keeping the vowels as far from each other as can be leads to fewer comprehension errors by listeners.

Martinet's ideas laid a foundation for variationist studies of vowel shifting. Variationists have taken the lead in working out some problems with the scheme. As noted above, one problem for Martinet's scheme is that the margin of security that he proposed is not always present. The problem is related to another assumption that Martinet made, that chain shifts are necessarily pull chains, with the vowel at the front of the chain being the first to shift. Other scholars have presented evidence that the head of the chain is not always the first to shift. In such cases, a vowel may encroach on another vowel, with the result that the vowel that is encroached upon later shifts away from the encroacher. A situation of this sort is termed a push chain. Labov (1994) reviews the issue of pull chains vs. push chains, providing evidence for both. A third possibility, which could be hypothesized from the phonetic studies of vowel dispersion, is that chain shifts of vowels could be both pull chains and push chains at the same time. Within a community in which a chain shift of two vowels, B→A→A′, is occurring, it is conceivable that some individuals may have B relatively more shifted than A, with B thus encroaching on the space of A, while other individuals have A relatively more shifted than B, creating a space between A and B. The acoustic data presented by Labov (1994) and other authors tend to be based on analyses of a small number of speakers and thus could easily be somewhat skewed. It is, of course, quite difficult to conduct a comprehensive study of a community that would preclude such skewing.

Martinet was careful to avoid a teleological approach to chain shifting, that is, one in which vowels shifted for a particular purpose – that of making perceptual distinctions among phonemes clearer, for example. However, sociolinguistic studies have revealed teleology of a completely different type in vowel shifting: vowel shifting may serve social purposes. This phenomenon is a pervasive finding in sociolinguistic studies, but its interaction with phonetic factors is not entirely worked out. It appears that language users select variants from among those that phonetic factors promote. The selected variants then can be used to signify various kinds of identity.

The principle of maximal differentiation, like economy of effort, has its limitations. The biggest limitation is that it does not explain the patterns of directionality in vowel shifts that recur across languages. For example, high back vowels become fronted far more often than high front vowels become backed. The most extensive inquiry into these factors thus far has been conducted by William Labov. Labov surveyed known chain shifts of vowels, mostly historical, in order to find recurring patterns in their operation. He found a number of such patterns, which he codified into principles that are listed in slightly different forms in Labov (1991) and Labov (1994). A key feature of his principles is a distinction between peripheral and non-peripheral vowels. Similar distinctions had been made before, but Labov based his classification on acoustic evidence. Peripheral vowels are those that occur along the margins of the vowel envelope in the F_1/F_2 space, while non-peripheral vowels are those that occur away from the margins. In addition, he specified that the principles apply not only to monophthongal nuclei, but also to diphthongal nuclei. The principles, as given in Labov (1994), are:

- Principle I. In chain shifts, long vowels rise.
- Principle II. In chain shifts, short vowels fall.
- Principle IIa. In chain shifts, the nuclei of upgliding diphthongs fall.
- Principle III. In chain shifts, back vowels move to the front. (Or: In chain shifts, tense vowels move to the front along peripheral paths, and lax vowels move to the back along non-peripheral paths.)
- Principle IV, the lower exit principle. In chain shifting, low non-peripheral vowels become peripheral.
- Principle V, the upper exit principle. In chain shifting, the first of two high morae may change peripherality, and the second may become non-peripheral.
- Principle VI, the mid exit principle. In chain shifts, peripheral vowels rising from mid to high position develop inglides.
- Principle VII, the redefinition principle. Peripherality is defined relative to the vowel system as a whole.
- Principle VIII, the unmarking principle. In chain shifts, elements of the marked system are unmarked.

In an earlier version, Labov (1991) had stated the first two principles as "Peripheral nuclei rise" and "Non-peripheral nuclei fall," respectively. Besides the stipulation that the principles applied only in chain shifts, he also specified (1994: 280) that short vowels are consistently non-peripheral, while long monophthongs are usually, though not always, peripheral. The correlation between peripherality and direction of shifting remained, then. The first two rules, in the 1994 formulation, are limited to languages that distinguish long and short vowels or make an analogous distinction, such as the 'tense/lax' opposition of Germanic languages. Labov provided numerous examples of the operation of these rules from languages besides English. For instance, Old High German /iː/ and /uː/ diphthongized according to Principle V and their nuclei fell along the non-peripheral paths according to Principle IIA, leading to Modern German /ai/ and /au/, respectively. Old High German /eː/ and /oː/, meanwhile, rose along the peripheral paths as per Principle I and developed inglides as per Principle VI, giving rise to [iə] and [uə], respectively; the inglides were later smoothed, resulting in Modern German /iː/ and /uː/. Another example is the chain shift of Swedish long back vowels. The long back vowels rose along the back peripheral path, following Principle I: the former /aː/ shifted to /ɑː/, /ɔː/ became the new /oː/, and the old /oː/ became the new /uː/. The former /uː/ fronted to a vowel conventionally denoted as /ʉː/, following Principle III.

In spite of the utility of these principles in explaining vowel shifting patterns, they have not escaped criticism. One of the major difficulties with them is that it is not always clear which vowels are peripheral and which are non-peripheral, and peripherality has not proved quantifiable. Another, probably related, problem is that it is not clear that peripherality is really a causal factor in the shifting patterns associated with it. Labov has never written that peripherality actually is a causal factor, though it seems to be implied in his writings. He certainly does not provide a plausible mechanism for how peripherality could cause shifts. Nevertheless, there is reason to think that peripherality is more of a side effect than a cause and that, perhaps, the real causes should be sought in the slate of articulatory factors that distinguish tense from lax vowels.

Variationist Studies of Vowel Shifting Patterns

A large portion of Labov's evidence came from contemporary chain shifts occurring in English, and these are the shifts that other variationists have studied most intensively. One is a chain shift that had virtually escaped notice until Labov, dubbing it the 'Northern Cities Shift,' drew widespread attention to it. It occurs in a broad area on the U.S. side of the Great Lakes. In this shift, schematicized in Figure 1, the TRAP/BATH vowel becomes raised and broken to [ɛə∼ɛæ]; the LOT vowel is fronted to [a] and nearly to [æ]; the THOUGHT/CLOTH vowel is lowered to [ɒ] and sometimes even unrounded to [ɔ]; the STRUT vowel is backed and sometimes rounded to [ʏɑ]; the DRESS vowel is lowered toward [a] and/or backed to [ɜ]; and the KIT vowel sometimes shows some lowering and/or backing toward /ɛ∼ɨ/. Shifting of the first three vowels is older than that of the last three. In addition, the Northern Cities Shift seems to be considerably more advanced in large metropolitan centers than in nearby rural areas, hence its name.

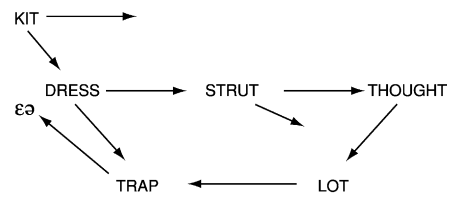

Figure 1 The Northern Cities Shift.

Labov's most detailed phonetic descriptions of the Northern Cities Shift appear in Labov (1991, 1994) and Labov *et al.* (in press). His work has given rise to a considerable number of other studies on sociolinguistic aspects of this chain shift. The most acclaimed of these studies are those by Penelope Eckert (e.g., Eckert, 1989), who found, based on fieldwork in a suburb of Detroit, that the newer components of the chain shift were more advanced among adolescents who identified with a counterculture ethic.

Opposed to the Northern Cities Shift, according to Labov, is another rotation of vowels that he called the Southern Shift. It involves a number of shifts. The nuclei of the KIT and DRESS vowels are peripheralized and raised, while the nuclei of FLEECE and FACE become non-peripheral and are lowered. The PRICE diphthong either is monophthongized to [aː] or has its nucleus backed, yielding [ɑi∼ɒi], and the CHOICE diphthong may be raised to [oi∼ui]. THOUGHT is raised to [oː] or diphthongized to [ɔo∼ɒɔ]. Finally, GOOSE and GOAT are fronted except before /l/, and they each may show some lowering of their nuclei. The Southern Shift is outlined in Figure 2. The Southern Shift occurs throughout the U.S. South, as well as in the dialects of southern England and in most Southern Hemisphere varieties of English, including Australian, New Zealand, and South African English. There are numerous variations on the Southern Shift across this vast area. In New Zealand, KIT is not peripheralized and raised but instead is centralized to [ə], and DRESS

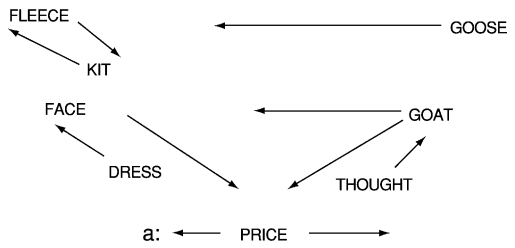

Figure 2 The Southern Shift.

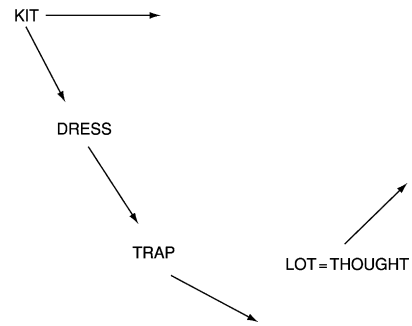

Figure 3 The Canadian Shift.

and TRAP are raised to [i] and [ɛ], respectively (see Bauer, 1986 and several subsequent studies). Monophthongization of PRICE, at least when it is not followed by a voiceless consonant (as in *prize* and *pry*), is more common than backing of the nucleus in the American South, while the opposite is true in England and the Southern Hemisphere. Upgliding forms of THOUGHT and ingliding forms of DRESS and KIT predominate in the American South, while monophthongal forms of those vowels predominate in England and the Southern Hemisphere. The glide of GOAT may or may not be fronted along with the nucleus.

One component of the Southern Shift has been called the diphthong shift by Wells (1982), who used it largely for describing dialects of England and the Southern Hemisphere. This component is the shifting of FLEECE, FACE, PRICE, and CHOICE to [ii∼əi], [ai∼æi], [ɑi∼ɒi], and [oi∼ui], respectively. Its progress and social status have received considerable attention in England (e.g., Kerswill and Williams, 2000), Australia (e.g., Horvath, 1985), and New Zealand (e.g., Bauer, 1986).

Labov (1991: 34) noted that, despite his earlier assumption that little vowel shifting occurred in dialects with the merger of the LOT and THOUGHT vowels, fronting of GOOSE and GOAT seemed to be widespread in such dialects. Since then, the fronting of those two vowels in merger dialects has been confirmed: see, e.g., the list of studies that have found GOAT-fronting in widely scattered locations in Thomas (2001: 28–29). Labov's own subsequent work has found GOOSE-fronting to be widespread in merger areas and has found GOAT-fronting to be most advanced in the southern part of the Midwest, where the LOT/THOUGHT merger is common (Labov *et al.*, in press). The widespread presence of GOAT- and GOOSE-fronting in areas with the LOT/THOUGHT merger has cast doubt on the notion that the Southern Shift is a unified process, since other aspects of the Southern Shift are not common in merger areas. Instead, the Southern Shift appears to be an amalgam of several independent processes. At any rate, the LOT/THOUGHT merger has not inhibited all vowel shifts. Recent findings have reinforced this conclusion. In a process dubbed the Canadian Shift by Clarke *et al.* (1995), the KIT, DRESS, and TRAP vowels fall in a chain, as shown in Figure 3. Though the Canadian shift is not confined to Canada, it – or, at least, lowering of TRAP – has been found in North America only in areas with the LOT/THOUGHT merger: various parts of Canada, the West Coast of the United States, and central Ohio. Rounding of the merged LOT/THOUGHT vowel, which occurs in Canada, could also be considered part of the Canadian shift and seems to amplify the other parts.

Vowel shifting among ethnic groups has fostered its own set of studies. A number of studies, e.g., Thomas (2001) and Fridland (2003), have investigated the vowels of African Americans. African-Americans generally show, for example, more raising of KIT, DRESS, and TRAP than European Americans from the American South, but less lowering of the nuclei of FACE and FLEECE. The vowel shifting patterns of other ethnic minorities, such as Mexican Americans in the United States or Jamaicans and various Middle Eastern groups in England, are also beginning to attract some attention. Substrate influence may account for vowel shifting in the dialects of many minorities. For example, Bernstein (1993) found that Hispanics in Texas tended to show more backed nuclei of the MOUTH diphthong than Anglos, probably because Spanish allows [au] but not [æu] or [æo]. Similarly, monophthongal realizations of GOAT and FACE are well known as dialectal features of Minnesota and adjacent states, which experienced heavy immigration from Germany and Scandinavia during the 19th century.

The effects of vowel shifts on perception have been studied from different angles. One way is in whether listeners can identify the geographical origin or ethnicity of a speaker based on vowel quality and other variables. Another approach has been to elicit the subjective reactions of listeners to voices with differing vowel quality on such scales as intelligence and friendliness. Yet another design, utilized in different forms by, most notably, Renée van Bezooijen for Dutch (e.g., Bezooijen and Berg, 1999) and William Labov for American English, has been to test for the

intelligibility of dialectal variants to listeners or to test what features (including vowel shifts) listeners access for dialectal identifications. These approaches are reviewed more fully in Thomas (2002).

Mergers and Splits

Mergers

Mergers have attracted more widespread attention from sociolinguists than chain shifts have. One reason is that mergers affect the language structurally because they result in the net loss of a phoneme. Other important reasons are that mergers are often associated with the expansion of certain language varieties at the expense of others – a heavily researched topic in Europe – and that varieties spoken by recent immigrants are prone to mergers.

Mergers may be conditioned or unconditioned. Conditioned mergers are those that occur only in certain phonetic contexts. A well-known example is the merger of the KIT and DRESS vowels before nasals in the English of the American South, which is sometimes called the *pin/pen* merger. In this merger, pairs such as *pin* and *pen* or *him* and *hem* become homophonous, but pairs such as *pit* and *pet* or *hid* and *head* never do.

Unconditioned mergers are those that occur in all phonetic contexts. An example is the LOT/THOUGHT merger, in which vowels formerly pronounced as [ɑ] and [ɒ], respectively, have coalesced in the English of large parts of North America. Examples from other languages include the recent merger of /eː/ and /ɛː/, as in *wegen* /ˈveːgən/ 'because of' and *wägen* /ˈvɛːgən/ 'weigh', in many varieties of German, including the standard dialect; the merger of /e/ and /ɛ/ in Turkish, as in *el* /el/ 'people' and *el* /ɛl/ 'hand', which occurs in most dialects of Turkish and is even reflected in the standard orthography; and the merger in Parisian French of /a/ and /ɑ/, as in *matin* /ˈmatɛ̃/ 'morning' and *mâtin* /ˈmɑtɛ̃/ 'mastiff.'

As Labov (1994) argues, mergers *per se* do not seem to attract much social comment. The same is probably true of phonemic splits. That is, listeners do not comment on whether a speaker distinguishes two sounds. Instead, they comment on the quality of particular phones. For example, Americans notice that southern British speakers have an [ɑː] phone in such words as *last*, *half*, and *can't* rather than the American [æ], but it may not occur to them that Brits show a different vowel in *last*, *half*, and *can't* than in *bad*, *hat*, and *stand*, and, when impersonating British speakers, they may erroneously insert [ɑː] in the latter group of words.

Mergers of vowels are often facilitated by dialect mixture. The LOT/THOUGHT merger in North American English is especially prevalent in the West, an area whose original Anglophone settlers hailed from diverse regions of the East. In England, judging by results from the *Survey of English Dialects*, the *maid/made* and *tow/toe* mergers may have originated in London, which has been a destination of migrants for centuries. One possible way that such mixtures lead to mergers might occur if migrants bring different realizations of vowel classes with them, so that the realization of a vowel class in one dialect coincides with the realization of a different vowel class in another dialect, and some language learners are unable to sort the classes out. In this case, the different realizations may become allophonic variations of the newly merged vowel, which would represent *merger by expansion*, as described by Labov (1994). Merger by expansion simply means that the new vowel class extends over the acoustic space that both of the merged classes had taken up. Another scenario occurs if migrants bring different realizations of vowel classes with them and a realization in one dialect becomes stigmatized, leading speakers of that dialect to transfer words from the sound class with the stigmatized realization to another class without a stigmatized realization. This situation would represent what Labov (1994) called merger by transfer. A third scenario, called merger by approximation, would be applied to a situation in which two vowels shift closer and closer to each other until the distinction between them is lost.

Another factor that facilitates mergers, in this case of conditioned mergers, is vocalization of consonants or other consonantal influence. A variety of mergers of vowels before /l/, making homophones of, e.g., *pool* and *pull* or *feel* and *fill*, have been reported in parts of North America and New Zealand in which /l/ is vocalized. The *pin/pen* merger, in all likelihood, stems from the effects of co-articulatory nasality. Nasality adds nasal formants to the vowel formant pattern, as well as antiresonances, which can sometimes obliterate an oral formant. Both nasal formants and antiresonances make the quality of the vowel more difficult to distinguish. This factor also leads to reduction in the number of contrasting nasal vowels in a language; for example, French has nine or ten oral vowels but only three or four nasal vowels, and Cherokee has five oral vowels but only one nasal vowel.

Mergers are often associated with language shift because substrate influence may eliminate some distinctions. For example, Herold (1997) found that communities in eastern Pennsylvania that showed the LOT/THOUGHT merger were those that had earlier had considerable immigration from eastern Europe. In general, eastern European languages – Slavic and

non-Slavic – have simpler vowel systems than English. Similarly, Bernstein (1993) found that, in Texas, Hispanics were more likely to produce unrounded vowels in *lost* and *walk*, which are symptomatic of the LOT/THOUGHT merger, than either Anglos or African-Americans. Their substrate language, Spanish, lacks a contrast between [ɑ] and [ɔ]. Creolization is especially prone to producing mergers. Some Anglophone creoles, for instance, show a merger of the TRAP and LOT vowels; this merger is not found in any non-creolized Anglophone varieties.

Conversely, immigrant groups may lose contrasts in their original language because of influence from their target language. In Australia, for example, Germans were losing contrasts between front unrounded and front rounded vowels, which Australian English lacks, in their German (Clyne, 1972). The approach of language death may result in wholesale confusion of contrasts in a language, with both mergers and addition of new contrasts through borrowing. Connell (2002) reports such a case for Cambap, a language spoken by fewer than 35 middle-aged and older people in western Cameroon. Cambap formerly had about eight contrasting vowels, but influence from Kwanja, a ten-vowel language in which the Cambap speakers were also fluent, had destabilized the system in Cambap. The remaining speakers showed considerable variation in the incidence of vowel mergers and borrowed vowels in their idiolects.

The encroachment of mergers on insular dialects is a common pattern. An exemplary case is that of Long Island in Newfoundland, as described by Colbourne (1982). In this dialect, reflexes of Middle English /ai/, as in *day* and *maid*, were formerly distinct from the FACE class, so that *maid* and *made* were pronounced differently. The NORTH and FORCE classes were also formerly distinct. However, these distinctions were eroding rapidly and were found mainly in the speech of older males, especially those with less education. In contrast, the mostly unconditioned merger of the KIT and DRESS vowels, a feature limited in North America to Newfoundland, was not retreating at all. Similarly, Trudgill (1974) describes how the *maid/made* and *tow/toe* mergers were spreading from the London metropolitan area and were encroaching on the smaller urban center of Norwich. The first merger was nearly complete, while the second was advancing slowly. At the same time, the London influence was not preventing a local Norwich merger, that of the NEAR and SQUARE classes, from increasing. Pringle *et al.* (1981) discuss yet another case in which three mergers – those of *marry* and *merry* (i.e., TRAP and DRESS when followed by /r/ plus a vowel), of LOT and THOUGHT, and of NORTH and FORCE – were spreading from Ottawa, Canada, with its considerable nonlocal influence, to the surrounding Irish and Loyalist settlements.

Linguists since Otto Jespersen have assumed that mergers are irreversible. Labov (1994: 311) refers to this proposition as Garde's Principle, after the historical linguist Paul Garde, and states it as "Mergers are irreversible by linguistic means." A corollary, which he calls Herzog's Principle, states that "Mergers expand at the expense of distinctions" (Labov, 1994: 313). The cases noted above in which mergers spread into insular dialects illustrate Herzog's Principle. The notion that mergers are irreversible seems reasonable, since child language learners normally have no means of knowing which class words containing two merged vowels previously belonged to. Labov (1994) discusses several cases for which reversals of mergers were reported but for which there is good reason to think that the merger never actually happened. Perhaps the most noteworthy example is the reported merger of reflexes of Middle English /ɛ:/ and /a:/, as in *meat* and *mate*, respectively. Even though there is some evidence for such a merger in early Modern English, such as from rhymed poetry, it appears more likely that the two phones merely approached each other closely but never actually merged.

Nevertheless, mergers can occasionally be reversed through social developments. Such social pressures may arise from the influence of a standard dialect, making it prestigious for a speaker to exhibit two phones instead of one, or from heavy immigration that swamps the older inhabitants of an area. In the former case, lexical inconsistencies may be expected: that is, the merger is reversed for some words but not for others, and individual speakers may show idiosyncratic patterns. DeCamp (1958), for example, describes how Old English /æ/ and /æ:/ merged into /e/ and /e:/, respectively, in the Kentish and Mercian dialects, but then, when Wessex, where the mergers had never taken hold, became politically predominant, Mercian writers (and, presumably, speakers) unmerged the vowels in imitation of the West Saxon dialect. However, they showed lexical inconsistency and even hypercorrection, such as spelling *weg* 'way,' which had always had short /e/, as *wæg*. O'Cain (1977) reports an example of the latter case from Charleston, South Carolina, where the NEAR/SQUARE merger, formerly firmly established in the area, was being replaced by the distinction of those two classes because of extensive immigration from areas without the merger. Simultaneously, the migrants were giving the *pin/pen* merger, which did not previously occur in Charleston, a foothold there. Mergers that affect only a portion of a population are easier to reverse. In Texas, for example, some speakers born between the

World Wars – but, apparently, fewer than half of this birth cohort – merged the START and NORTH classes. This merger was reversed, however, and young Texans now show no sign of it. The reason was that there were competing systems, one of which drove out the START/NORTH merger. Some speakers merged NORTH with FORCE instead, while others kept all three classes distinct. The NORTH/FORCE merger, which has a much wider geographic distribution, ultimately prevailed (see Thomas, 2001, and other sources cited therein).

The perception of mergers has attracted occasional attention. One important study was Janson and Schulman (1983), who investigated the ability of speakers of two Swedish dialects to distinguish short /ɛ/ and short /e/ in Swedish. Speakers from Stockholm lacked the distinction, while speakers from Lycksele maintained it in their production. Janson and Schulman created synthetic stimuli that represented a phonetic continuum between short /i/ and short /a/ in a *sVt* frame and asked subjects to label each stimulus as *sit*, *set*, *sät*, or *sat*. *Sät* represented short /ɛ/ and *set* represented short /e/. The Stockholm natives showed little ability to distinguish the two, but, surprisingly, neither did the Lycksele natives. Janson and Schulman concluded that Lycksele natives could not access the short /ɛ/–short /e/ distinction in their perception. Labov *et al.* (1991) cast doubt on that conclusion on methodological grounds. Their basic contention was that labeling of stimuli is a conscious task and does not necessarily match perception in conversations. They devised their own experiment, which tested the ability of listeners to distinguish words such as *ferry* and *furry* as spoken by a Philadelphian. Such words are either merged or very similar in the white Philadelphia dialect. Instead of having listeners label the words, they created a story in which there was an ambiguity between *Merion* and *Murray in* and had listeners respond to the story. The results showed that, although non-Philadelphians were able to detect the distinction, Philadelphians were impaired in their ability to do so. Interest in how well individuals' production matches up with their perception of potentially merged vowels has continued, and that issue has been one of the major aims of Labov *et al.* (in press).

Another way in which the perception of mergers has been studied is through the use of commutation tests. A commutation test is a type of labeling task. However, listeners identify words uttered by a dialect speaker, usually of their own dialect. Commutation tests are useful not just for determining whether mergers have occurred, but also for investigating other vowel shifts. Examples are discussed in Labov *et al.* (1991) and Labov (1994). See Thomas (2002) for a more detailed review of the use of perception experiments in studying mergers.

Splits

Variationists have found phonemic splits difficult to study. The reason seems to be constraints imposed by more formalistic approaches to language. Splits ordinarily begin as phonetically predictable variants. Various factors, such as other sound changes and borrowing, may later create minimal pairs, at which time linguists acknowledge a phonemic split. However, it is quite possible that speakers could cease making a mental connection between allophones before minimal pairs exist, in which case the former allophones function psychologically as phonemes. This possibility, together with recent doubts about the psychological reality of phonemes, leads to uncertainty about when or if a split has actually occurred. As a result, experiments testing splits are rare.

When allophones in complementary distribution develop, what was formerly just a phonetic tendency becomes phonologized: that is, the phonetic targets come to differ depending on the phonological context. For example, speakers may differ in whether they have the process called Canadian raising phonologized. Some speakers merely show a statistical tendency to produce higher PRICE nuclei before voiceless consonants than elsewhere. On average, such speakers' nuclei show lower F_1 values in, e.g., *price*, *tight*, and *life* than in *prize*, *tide*, *five*, or *tie*, but the target values, which are usually apparent in realizations of the diphthong with long durations, are the same. Other speakers show different target values for the nucleus, e.g., *price* [pʰɹɜis] vs. *prize* [pʰɹaez], indicating phonologization of Canadian raising.

Allophonic splits have received more attention than phonemic splits. The fact that any conditioned sound change is an allophonic split makes them relatively easy to study. Some examples of allophonic splits have been especially well studied. One involves Canadian French vowels (Walker, 1984). In French, vowels may be short or long, depending on the prosodic and segmental context. In Canadian French, allophones with different qualities have developed depending on the length. High vowels are laxed in shortening contexts, e.g., *jupe* [ʒʏp] 'skirt,' while all vowels take on upglides in lengthening contexts, e.g., *pur* [pyɥʁ] 'pure.' In English, one of the most widespread allophonic splits is that of the GOOSE and GOAT vowels, mentioned above, into front allophones, which occur in most contexts, and back allophones, which occur mostly before /l/. A more localized split is that of TRAP/BATH in the New York City–Philadelphia–Baltimore area (see, e.g., Labov, 1994). In this area, a lax allophone, [æ], and a tense

allophone, [ɛə~ɛæ], have developed. The conditioning factors differ from city to city, though the lax allophone always occurs before voiceless stops, e.g. *pat* [pʰæʔt], and the tense allophone nearly always occurs before anterior voiceless fricatives (/f/, /θ/, and /s/), e.g., *pass* [pʰɛəs]. There has been some disagreement over whether this split is phonemicized.

Perceptual aspects of splits have received little attention. Guenter (2000) conducted an experiment in which he showed that Californians had difficulty or were totally unable to identify vowels before /r/, /l/, and /ŋ/ with vowels in other contexts. This finding suggested that there was no mental connection between, e.g., the vowel in *sing* and the vowels in either *sin* or *seen*, which would be tantamount to a phonemic split.

Methodological Issues

Data on ongoing vowel shifts and mergers have come from studies with a variety of designs. Some are classic sociolinguistic studies with a judgment sample or an ethnographic design, some follow dialectological methods, some are experimental, and some follow other designs. They also differ in the number of subjects, from case studies of a single person to surveys of a thousand or more respondents. Most focus on speech production, but a few examine perception.

Each of these types of design is suited for different research questions. Judgment samples work well for determining how vowel variation is related to demographic factors and what the trends seem to be across generations, while ethnographic surveys often provide a better picture of how speakers' identities are related to vocalic variation and change, and dialectological surveys are best suited for studying geographical variation. Panel studies, in which the same subjects are recorded periodically, are useful for determining whether individuals' vowels have changed, but are rarely conducted. For studying perception, experiments are nearly essential, and they can likewise be useful for examining some aspects of production, such as the effects of speech rate on vowel realization. Large-scale random samples, such as the one used by Bernstein (1993), are best for determining the overall makeup of a population. However, such surveys elicit mostly formal speech, a shortcoming that dialectological methods share to some extent, and thus the data they produce may be unrepresentative. Experiments may also elicit unrepresentative responses, depending on how they are designed.

For the most part, sociolinguistic studies exhibit an inverse relationship between the number of subjects in a study and the amount of information collected for each subject. Case studies normally produce large amounts of data for a few individuals and thus are well suited for investigating stylistic variation, the structure of speakers' vowel systems, and the effects of phonetic processes such as coarticulation and stress levels. However, they cannot address social or diachronic patterns within a community. At the other extreme, large random samples are generally unable to gather large amounts of data for individual respondents but can provide a reasonable picture of social, generational, and even geographical patterns.

The study of mergers presents some special methodological issues. One technique for determining whether a speaker shows a merger is simply to extract tokens of the potentially merged vowels from conversational speech. This method has the advantage of including more relaxed speech styles, which, according to a widespread assumption, represent a speaker's most natural speech. The two main disadvantages are that some vowels, especially where conditioned mergers are involved, may be too rare to occur reliably in an interview, and that the phonetic contexts of the words that happen to occur may differ, thus skewing the results. In some cases, accommodation to the interviewer's speech can also skew results. Another common technique, that of having subjects read minimal pairs such as *pool/pull* or *cot/caught*, solves the first two problems but introduces the possibility that speakers may self-monitor their utterances, showing mergers or distinctions that they do not produce in less monitored styles, especially if one of the affected vowels is subject to social prestige evaluation. Moreover, speakers tend to prolong vowels when reading lists of words, which will lead to less 'undershoot' of targets so that the tokens produced differ in formant structure from those encountered in conversational or other connected speech. A third approach, having subjects read specially constructed passages, mitigates the advantages and disadvantages of both conversation and minimal pairs. In addition to all those issues, there is also the question of whether a subject's production and perception of mergers coincide. This issue was discussed above in 'Mergers' with regard to Janson and Schulman (1983) and Labov *et al.* (1991).

In vowel analysis, another issue is whether the analysis is performed impressionistically or acoustically. Each method has its own pitfalls. Impressionistic phonetic transcription of vowel variation has a long history, beginning with dialect geography and continuing through many sociolinguistic studies, such as Labov (1963, 1966), Trudgill (1974), Horvath (1985), Eckert (1989), and Kerswill and Williams (2000). It is faster than acoustic analysis, meaning that more tokens can be sampled, and interspeaker normalization is not needed. However, it is subject to the vagaries of transcription norms by different

transcribers, to differing skill levels of transcribers, and to possible differences in the degree to which transcribers are affected by their own internal normalization mechanisms, which can result in undertranscription or overtranscription; see Thomas (2002) for a more detailed discussion. Acoustic measurements do not suffer from those problems and allow for much more precision, but they introduce other sources of error. Acoustic measurements of vowel formants, for example, are highly sensitive to the number of linear predictive coding (LPC) coefficients specified and to the quality of the original recording. The complexity of the acoustic correlates of speech sounds can mislead inexperienced researchers. Interspeaker normalization is essential for certain variables, particularly vowel quality, yet normalization has been a vexing problem for phoneticians and hence there is no such thing as a perfect normalization algorithm. Acoustic analysis equipment used to be expensive and cumbersome, but that problem has now vanished with the advent of free, downloadable software packages.

One final methodological issue for vowel analysis involves the attributes that are analyzed. Traditional impressionistic analysis of vowel variation focused on the quality of the nucleus, the direction of gliding (if any), and, to a lesser extent, the length. Acoustic analyses of vowel variation, following the lead of William Labov, have focused on analysis of the center frequencies of the first two formants, which are then plotted for comparison of different vowels. Furthermore, the quality of the nucleus has received the lion's share of attention. The quality of diphthong glides has attracted less interest. Other formant-related factors, such as bandwidth (indicative of, e.g., nasality and phonation) have been ignored. Formant trajectories have received sporadic attention, though problems in comparing different tokens have proved daunting. A closely related issue, the steady-state patterns of diphthong formants, has similarly not garnered much sustained interest. Measurement of vowel attributes besides formants remains incipient. Length, though easy to measure, has seldom been examined. Nor have breathiness and creakiness been analyzed often. Interactions between factors, such as between duration and/or amplitude and formant values or between fundamental frequency and formant values, offer possibilities for future work, too.

Prospects

Vowel shifting and merger can be expected to maintain their central position in studies of language variation. Several languages with rich traditions of dialectological and sociolinguistic investigation, including English, French, German, Dutch, and Scandinavian languages, also have complicated vowel inventories that engender shifting. The presence of research universities in countries where those languages are spoken, as well as the momentum that past work gives to ongoing efforts, ensures that vowel shifting in these languages will continue to be studied. Numerous details about the causes of vowel change remain to be worked out, but the ready availability of acoustic analysis programs and the continuing development of new methods for measuring such factors as breathiness and nasality will allow researchers to investigate these problems in new ways. More work should be conducted on vowel shifting in Third World languages, but perhaps the shortage of such studies can be remedied in the future as well.

See also: Accent; Ethnicity; Experimental Methods for Study of Variation; Language/Dialect Contact; Sociophonetics; Spatial Variation (Geolinguistics); Variation in French; Variation in German.

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Vurës

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Vurës, the name currently preferred by the speakers of the language, is referred to in Ethnologue as the Vetumboso or Vures dialect of Mosina. Mosina is a distinct language, now nearing extinction, with approximately eight speakers residing in the village of the same name, in the southeast of Vanua Lava Island, the Banks group of islands, northern Vanuatu. Vurës is now the dominant language spoken on the island, with upward of 1000 speakers. It is spoken predominantly in the villages of Vētuboso, Wasaga, and Kērēbētia and in smaller surrounding hamlets in the southwest of Vanua Lava. Like all languages of Vanuatu, Vurës is a member of the Oceanic subgroup of the Austronesian family. Within Vanuatu, it belongs to the Northeast Vanuatu-Banks Islands branch of the Northern Vanuatu linkage.

The languages of Northern Vanuatu tend to be fairly conservative Oceanic languages. Vurës has a number of features that are representative of the subgroup and others that are more distinctive. There are 15 consonants and nine vowels in the phonemic inventory, the number of vowels being quite high relative to other Oceanic languages. Notable features of the consonant inventory that are frequently observed in Oceanic languages are prenasalized voiced stops and a labialized labio-velar stop and nasal.

The language is nominative-accusative, with the grammatical relations subject and object being distinguished purely by AVO/SV word order. There is no marking of the subject and object within the verb phrase, which is unusual for an Oceanic language. Oblique arguments are mainly marked by prepositions and occur at the periphery of the clause. The language is both agglutinative and synthetic; however, compared to other Oceanic languages, there is not a great deal of morphology. There is very little inflectional morphology; aspect and negative polarity are marked by prefixes on the verb and by some particles. There are no tense distinctions. Derivational morphology is also limited, which is linked to the fact that many words are precategorial. This means that

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they can occur in their underived form as members of more than one word class; in particular, many roots occur as nouns and verbs. Further, many verbs are ambitransitive.

The marking of possession is a complex area of the grammar, a characteristic common to Oceanic languages. For nouns that are inalienably possessed, such as kinterms, body parts, and intimate possessions, the possessor is marked directly on the noun as a suffix. For other items, the possessor is marked on a relational classifier that indicates the function that the item has for the possessor. In Vurës there are six classifiers that mark the possessed item as food, drink, transport, domesticated plants and animals, clothing, or a general default category.

Complex predicates are commonly expressed in Vurës by verb serialization. A serial verb construction can combine verbs to express varied meanings and functions, such as causatives, abilitatives, directionals, and aspectual functions, and some less transparent functions. For example the verb *gial* 'to lie, pretend' can serialize with another verb to express the meaning of pretending to perform the action of the other verb.

See also: Austronesian Languages: Overview; Serial Verb Constructions; Vanuatu: Language Situation.

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Vygotskii, Lev Semenovich (1896–1934)

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Born in Byelorussia, Lev Semenovich Vygotskiĭ studied at Moscow University from 1913 to 1917, gaining experience in a wide range of disciplines from medicine to law. His most vivid interest of this time concerned art and literature, and some of the elements of his early art criticism were later incorporated into his main psychological work. Returning to Byelorussia, Vygotskiĭ worked in Gomel as teacher and lecturer in different institutions, where he tried to reform the ways of teaching according to the new postrevolutionary situation. His interest in the process of knowledge transmission and assimilation led him more and more to the problems of psychology and symbolic interaction.

In 1924, Vygotskiĭ was invited to work at the Institute of Psychology in Moscow, where he started intensive research in different branches of psychology, psychophysiology, and related fields. His dissertation on psychology of art (1925, published only in 1965) recapitulated his early ideas of art (mainly literary) criticism, combined with new methodology of 'psychological reaction,' and tried to detect the objective principles of aesthetic function (as a specific 'aesthetic reaction') without reduction to other psychological mechanisms. After a short time, his life was overshadowed by two dangerous circumstances: mortal disease (he had tuberculosis) and growing political suppression of the Stalinist totalitarian regime transformed the last years of Vygotskiĭ's life into a race against time. He took every real opportunity to realize his ideas, working in different institutions in and outside Moscow. Vygotskiĭ prepared in 10 years almost 200 publications. On the other hand, this hectic situation of approaching different subjects in his passionate investigations caused serious hermeneutic problems for those who studied his theories later: it is clear that Vygotskiĭ's position was changing even during this short time, but there is no simple key to determine the development and general features of his varying positions.

Vygotskiĭ was one of the first people to detect the importance of aphasia for both psychology and linguistics, pointing to the connection between neurophysiology and early structuralism in linguistics (phonology as a pilot model for the study of speech disorders). These ideas were continued later by his disciple, A. R. Luria. Together with Luria and other adherents, Vygotskiĭ founded the so-called 'cultural–historical school' in psychology. The 'cultural–historical' approach tried to show the way out of a situation which Vygotskiĭ detected in the middle of the 1920s as a 'crisis in psychology.' The idea was to go beyond the physiology of I. S. Pavlov and create a more

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In 1924, Vygotskiĭ was invited to work at the Institute of Psychology in Moscow, where he started intensive research in different branches of psychology, psychophysiology, and related fields. His dissertation on psychology of art (1925, published only in 1965) recapitulated his early ideas of art (mainly literary) criticism, combined with new methodology of 'psychological reaction,' and tried to detect the objective principles of aesthetic function (as a specific 'aesthetic reaction') without reduction to other psychological mechanisms. After a short time, his life was overshadowed by two dangerous circumstances: mortal disease (he had tuberculosis) and growing political suppression of the Stalinist totalitarian regime transformed the last years of Vygotskiĭ's life into a race against time. He took every real opportunity to realize his ideas, working in different institutions in and outside Moscow. Vygotskiĭ prepared in 10 years almost 200 publications. On the other hand, this hectic situation of approaching different subjects in his passionate investigations caused serious hermeneutic problems for those who studied his theories later: it is clear that Vygotskiĭ's position was changing even during this short time, but there is no simple key to determine the development and general features of his varying positions.

Vygotskiĭ was one of the first people to detect the importance of aphasia for both psychology and linguistics, pointing to the connection between neurophysiology and early structuralism in linguistics (phonology as a pilot model for the study of speech disorders). These ideas were continued later by his disciple, A. R. Luria. Together with Luria and other adherents, Vygotskiĭ founded the so-called 'cultural–historical school' in psychology. The 'cultural–historical' approach tried to show the way out of a situation which Vygotskiĭ detected in the middle of the 1920s as a 'crisis in psychology.' The idea was to go beyond the physiology of I. S. Pavlov and create a more

substantial and adequate base for an objective theory of the human mind, which should be a real Marxist psychology in Vygotskiĭ's opinion. The early stages of psychic development were always the main concern of Vygotskiĭ. Together with Luria, he wrote a book on the emerging mind, considering ape, 'primitive' man, and child as different aspects of early stages of psychic functions (Luria and Vygotskiĭ, 1930). Vygotskiĭ stressed the crucial role of language and other semiotic means as a specific universal instrument in human behavior, providing the basic condition for the development of the human mind and consciousness. Considering the early stages of language, Vygotskiĭ showed that these 'primitive' forms of linguistic activity are really very rich in possibilities, required by corresponding sociocultural situations.

Vygotskiĭ's main work, *Thought and language* (1934), was published shortly after his death. This book unified different aspects of Vygotskiĭ's work around the main point of his search: the dynamic functional interconnection of language and thought. Both are considered not as static entities, but as activities in a sociocultural context. Both are complex realities with an inner history: the language in its written form is another functional realization of linguistic activity, different from the oral speech and reflecting another stage of cultural (educational) development. The most original part of Vygotskiĭ's theory was the idea of inner speech as mediating dynamic mechanism between thought and language. Considering child development, Vygotskiĭ criticized J. Piaget, stressing that even the earliest stages of linguistic behavior are a part of social interaction: children are mastering language skills during their interaction with the social environment and as a part of practical mastering of reality. Children's way to thought and language is a way from external to inner behavioral activity.

Early death interrupted Vygotskiĭ's investigations, but saved him from very probable political repressions. A few years after his death, his ideas were totally banned from the official Soviet science. Only in the post-Stalinist period were Vygotskiĭ's ideas rediscovered in the Soviet Union, and they became more and more known in the West. The publication of *Psychology of art* (1965) attracted additional interest to Vygotskiĭ, showing a lesser-known part of his work. During the following decades, Vygotskiĭ's heritage produced wide discussions in psychology and linguistics (especially psycholinguistics). His work was considered from different positions: the psycholinguists and neurolinguists considered him as a founder of their disciplines; the structuralists and representatives of semiotics found in Vygotskiĭ their forerunner; and the cognitivists classified him as a 'precognitivist.' However, his systematic and functional approach to the old problem of thought and language, his ideas about linguistic behavior remain a productive avenue for linguistic analysis.

See also: Language Development: Overview; Luria, Aleksandr Romanovich (1902–1977); Piaget, Jean (1896–1980); Psycholinguistics: Overview; Thought and Language: Philosophical Aspects.

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W

Wa

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The variety of Wa described here is known as Paraok/pərạ̈ɔk/ by the people who speak it, and is widely recognized as a standard form of the language. The scope of the name 'Wa' is complex, but it is the most inclusive and current among the many names used to refer to the speakers of Wa languages and also corresponds to the terms 佤 *Wǎ* in Chinese and in "ဝ" /wa̰/ in Burmese. Wa encompasses a cluster of some 40 dialects belonging to the Waic subgroup of the Palaungic branch of Northern Mon–Khmer languages and is spoken by up to about one million people living between the Salween and Mekhong rivers, an area straddling the border between northeastern Myanmar (Burma) and China's southwestern Yunnan province. About two-thirds of the Wa-speaking population live on the Burmese side of the border and one-third on the Chinese side; most Wa are bilingual in Burmese or Chinese, respectively.

The first Wa orthography intended for popular use was developed in the 1930s by the Baptist missionary Vincent M. Young, whose translation of the New Testament was published in the 1930s. Orthographies devised for Wa have used the Roman alphabet, sometimes with certain modifications. Young's orthography was ambiguous and inconsistent in a number of ways, for instance, by failing to represent the register contrast, final glottal consonants, and voiced/sonorants. It has been improved in recent years, however, by incorporating certain features of the phonologically faithful orthography developed by Chinese anthropologist-linguists in the 1950s, which is rather different in design. The most widely encountered orthographies may be compared in Table 1.

The syllable-initial consonants of Wa are set out in Table 2. Wa makes a 4-way voicing contrast in initial stops at 4 places of articulation, and has a range of breathy-aspirated sonorants. Complex initials are restricted to labial or velar stop + /l/ or /r/; final consonants are restricted to /p t c k/, nasals, /ʔ/, and /h/.

In Wa, as in other Mon–Khmer languages, the vowel inventory (Table 3) is effectively doubled because each vowel can occur in either of two registers, 'clear' and 'breathy,' analogous to the 'head' and 'chest' registers of Cambodian (Central Khmer). The register contrast in Wa, as in Mon–Khmer generally, has a complex of phonetic correlates, including

Table 1 Various orthographies for Wa

Transcription	lại	pɔ̤̈t	ʔɤʔ	kɯm	hɔc	ⁿjʱak	maiʔ	nɔh
Bible Wa spelling	Lai	pawt	au,	kuim	hoit	jak	mai	naw?
Revised Bible Wa spelling	Lai	pawt	aux,	keem:	hoit	jak	maix	nawh?
PRC Wa spelling	Lāi	bōd	ex,	geem	hoig	nqag	maix	noh?
Gloss	letter	write	1SG	then	yet	read	2SG	3SG
Translation	'Have you read my letter yet?'							

Table 2 Wa consonants

	Bilabial	*Dental/alveolar*	*Palatal*	*Velar*	*Glottal*
Plosive	p p^h ^mb $^mb^ɦ$	t t^h nd $^nd^ɦ$	tɕ $tɕ^h$ $^ɲdʑ$ $^ɲdʑ^ɦ$	k k^h ^ŋg $^ŋg^ɦ$	ʔ
Nasal	m $m^ɦ$	n $n^ɦ$	ɲ $ɲ^ɦ$	ŋ $ŋ^ɦ$	
Fricative	v $v^ɦ$	s			h
Approximant		r $r^ɦ$	y $y^ɦ$		
Lateral approx.		l $l^ɦ$			

Table 3 Wa vowels

	Monophthongs			*Polyphthongs*			
Close	i	ɯ	u	iu	iau	ui	iau
Mid-close	e	ɤ	o	ia	uai	ua	uai
Mid-open	ɛ	a	ɔ	ei	oi ɔi	ou	
Open		a		ai	aɯ	au	

Table 4 The Register contrast and laryngeal final consonants

	Clear register	*Breathy register*
Open syllable	tɛ *'sweet'*	tɛ̤ *'peach'*
Final h	tɛh *'lessen'*	tɛ̤h *'turn over'*
Final ʔ	tɛʔ *'land'*	tɛ̤ʔ *'wager'*

Table 5 Wa pronouns

Person	*Sing.*	*Dual*	*Plural*
1st (incl.)	ʔɤʔ (I)	ʔaʔ *you and me*	ʔeiʔ *we (including you)*
1st (excl.)	–	yɛʔ *he and I*	yiʔ *we (not including you)*
2nd	maiʔ *you (sg.)*	paʔ *you two*	peiʔ *you (pl.)*
3rd	nɔh *he, she, it*	kɛʔ *they two*	kiʔ *they*

Table 6 Vestiges of Mon–Khmer morphological affixation in Wa

l̤iah	>	^{ŋ}gl̤iah	six	>	sixty
laŋ	>	^{ŋ}glaŋ	long	>	length
raɯʔ	>	^{ŋ}graɯʔ	deep	>	depth
pṳ	>	^{m}bṳ	thick	>	thickness
t̤iŋ	>	^{n}d̤iŋ	big	>	size
kiap	>	sə.^{ŋ}giap	pinch (v.)	>	clip (n.)
^{n}daiʔ	>	sə.^{n}daiʔ	eight	>	*no change in meaning*
^{ŋ}gaɯʔ	>	sə.^{ŋ}gaɯʔ	happy	>	*no change in meaning*

Table 7 Two Wa loanwords

pliʔ	mak.mṳŋ	ɲɛ̤ʔ	tɕau.sɯʔ
fruit	mango	house	classroom
Wa	Shan:ဓင်္ဂမုန်း; mak.muːŋ	Wa	Chinese: 教室 *jiàoshì*
= 'mango'		= 'classroom'	

fundamental frequency, vowel quality, phonation type, and vowel duration. The blend of these in any individual speaker's production of the register complex may vary. The register contrast cooccurs with final laryngeal consonants, as illustrated by the set of six words in Table 4.

The Wa system of personal pronouns (Table 5) retains dual number and contrasts inclusive and exclusive second-person pronouns.

In Wa, the Mon–Khmer morphological prefixation system has all but disappeared, leaving only a few nonproductive semisyllabic prefixes – of which by far the most common is /sə/ – and sound alternations that cover a broad, ill-defined range of functions, illustrated in Table 6.

Two characteristics of Wa syntax are that modifiers follow what they modify, as do relative clauses: thus 'the letter that I wrote,' from Table 1, is expressed as la̤i pɔ̤t ʔɤʔ '*letter [write I]*.' Secondly, VERB SUBJECT OBJECT word order is commonly observed: 'you read it' may be translated ^{ɲ}j^{ɦ}ak maiʔ nɔh '*read you it*,' though SUBJECT OBJECT VERB word order is also possible. Two sentences in Wa are shown in (1) and (2):

(1) hoc kɛʔ tin yṳh tiʔ
come 2PL here do what?
What did the two of them come here for?

(2) hoc tiʔ sɔ̤k pṳʔ ʔɤʔ
come SUBORD search younger. brother 1SG
They came to see my younger brother.

Wa is an isolating language, adept in the formation of periphrastic compounds. There has been extensive borrowing from Shan, and locally from Chinese and Burmese in areas where those languages are spoken. Loaned vocabulary is frequently supported by a generic Wa word, as in Table 7.

Functional literacy in Wa is very low. Wa speakers are much more likely to be literate in the national language of the country in which they live, although some villages may organize grassroots schooling, typically undertaken in a Christian context, and some schools in Wa-speaking China provide, in theory, five years of Wa-language education. Government schools in Burma must use only Burmese.

See also: Austroasiatic Languages; Burma: Language Situation; China: Language Situation; Mon-Khmer Languages.

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Wackernagel, Wilhelm (1806–1869)

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Karl Heinrich Wilhelm Wackernagel was born in Berlin on April 23, 1806. He lost both parents in his early teens, exposing him to a life of severe hardship. Apart from the bleak economic outlook, matters turned extremely complicated by Wilhelm's involvement in the political upheaval following the defeat of Napoleon. In several letters to his older brother Philipp he elaborated on his ideas as to a more democratic government in Germany. The letters were intercepted, and the displeased authorities reacted harshly: Wilhelm, 15 years by then, was dismissed from his high school and eventually had to spend three days in Berlin's municipal prison. He was, however, given another chance and allowed to attend another high school. His infraction, though, was classified as *crimen laesae majestatis* (lese majesty), causing stigmatization as a 'demagogue,' which later on resulted in serious problems for his intended university career.

Wackernagel graduated from high school in fall 1824, having acquired superb knowledge in Latin, Greek, and French. His teachers characterized the level of his accomplishments in the older German literature as "bordering on literary learnedness." At Berlin University, where he concentrated on Old German and classical literature, his principal teacher was initially Friedrich Heinrich von der Hagen (1780–1856), soon to be replaced by Karl Lachmann (1793–1851), who influenced him greatly in numerous ways. Other teachers included August Boeckh (1785–1867) and Friedrich Hegel (1770–1831).

His economic situation grew from bad to worse, not, however, preventing him from maturing as a scholar. He started publishing during his student days. At the age of 22 he had established himself as a serious independent scholar in his field by editing *Das Wessobrunner Gebet* in 1827. The results of this research invalidated positions held by Jacob and Wilhelm Grimm and Wackernagel's teacher and friend Hans Ferdinand Massmann (1797–1874) in that he comprehensively identified form and meaning of one of the most important old German pieces of literature and proved its purely Christian origin.

At the end of his formal studies he was unable to pay the required fees for graduation. Since numerous job applications got nowhere, due to still being labeled "politically unreliable," he spend two years in Breslau at the invitation of his friend Hoffmann von Fallersleben (1798–1874). Upon his return to Berlin, things were not getting any better, in spite of the strongest endorsements by Lachmann, Jacob Grimm, and many others. Finally, a job offer arrived from Basel, Switzerland, and Jacob Grimm in his recommendation had stated that he did not know anyone better qualified for the position. Basel was willing to remedy Wackernagel's formal shortcoming, his lacking a D.Phil. degree, by offering him an honorary degree. But on his way to Switzerland in fall 1833

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Wilhelm Kosch (1958) called Wackernagel the most important Germanist of his time after the death of Jacob Grimm (1863). This evaluation is shared by many critics, and it ties in well with what Grimm himself thought of Wackernagel. In one respect, by being a poet of remarkable accomplishment, he even outdid Jacob Grimm. Those two activities cannot be separated, as Wackernagel's poetic oeuvre was largely based on his extraordinary knowledge of Old German literature. It did not take Wackernagel long to strike roots in his new country. In 1837 he was awarded honorary citizenship of Basel. He received numerous offers from German universities, but he showed no interest to return.

Wackernagel's publications centered around his work in class. His research was not primarily designed to identify significant problems waiting to be solved for the benefit of the general scientific community. He searched out, instead, what specific tools and instruments were needed for the benefit of his very specific clientele, his students. The three most important works of Wackernagel, the 3 volumes of *Deutsches Lesebuch,* the *Geschichte der deutschen Literatur bis zum dreissigjährigen Kriege,* and the *Poetik, Rhetorik und Stilistik: Academische Vorlesungen* are very convincing illustrations.

Apart from North Germanic languages he covered in his lectures and publications, he was expert in all areas of Germanic philology. Linguistic subjects stand beside literary and cultural subjects that ranged from early periods to the beginning of modern time. Both in lectures, and in his published research, he also dealt with comparative grammar involving German, Greek, and Latin. The quality of his research as well as its scope hold their own when compared with the publications of Grimm or scholars of equal reputation. Even today few of his writings are outdated and all of them make fascinating reading for those with the necessary background knowledge.

Wackernagel died in Basel on December 21, 1869.

See also: Boeckh, August (1785–1867); Grimm, Jacob Ludwig Carl (1785–1863); States of the Glottis.

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Wagner, Heinrich (1923–1988)

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Born in Switzerland, Heinrich Wagner studied Indo-European philology in Zürich under Professors Manu Leuman and Julius Pokorny, Germanic philology under Rudolf Hotzenköcherle, and phonetics under Eugen Dieth. Under the influence of Pokorny he became interested in the Celtic languages and in 1945 came to Ireland to study Irish. Having spent some time in Dublin to improve his English, Wagner went to Dunquin, Co. Kerry, and soon acquired a knowledge of Irish. Thereafter he visited the other Irish-speaking districts and came to Telin in Donegal, and made the dialect of that area his own. There he became a close friend of Seán Ó hEochaidh, a collector of folklore for the Irish Folklore Commission. He was appointed Professor of Germanic Philology in Utrecht, The Netherlands, in 1951 and to a similar post in Basel, Switzerland, in 1953. He undertook in 1948 to compile a linguistic atlas of the Irish language and in the university vacations traveled the country by bicycle, interviewing speakers of Irish in remote districts and gathering the last remnants of the language in places where it had ceased to be the vernacular. He employed a questionnaire of 2000

he passed through Göttingen and finally was awarded the degrees of Doctor of Philosophy and Magister of Liberal Arts. The Grimm brothers and three other friends had paid the fees. Two years after his arrival Wackernagel was appointed to a full professorship at Basel University.

Wilhelm Kosch (1958) called Wackernagel the most important Germanist of his time after the death of Jacob Grimm (1863). This evaluation is shared by many critics, and it ties in well with what Grimm himself thought of Wackernagel. In one respect, by being a poet of remarkable accomplishment, he even outdid Jacob Grimm. Those two activities cannot be separated, as Wackernagel's poetic oeuvre was largely based on his extraordinary knowledge of Old German literature. It did not take Wackernagel long to strike roots in his new country. In 1837 he was awarded honorary citizenship of Basel. He received numerous offers from German universities, but he showed no interest to return.

Wackernagel's publications centered around his work in class. His research was not primarily designed to identify significant problems waiting to be solved for the benefit of the general scientific community. He searched out, instead, what specific tools and instruments were needed for the benefit of his very specific clientele, his students. The three most important works of Wackernagel, the 3 volumes of *Deutsches Lesebuch,* the *Geschichte der deutschen Literatur bis zum dreissigjährigen Kriege,* and the *Poetik, Rhetorik und Stilistik: Academische Vorlesungen* are very convincing illustrations.

Apart from North Germanic languages he covered in his lectures and publications, he was expert in all areas of Germanic philology. Linguistic subjects stand beside literary and cultural subjects that ranged from early periods to the beginning of modern time. Both in lectures, and in his published research, he also dealt with comparative grammar involving German, Greek, and Latin. The quality of his research as well as its scope hold their own when compared with the publications of Grimm or scholars of equal reputation. Even today few of his writings are outdated and all of them make fascinating reading for those with the necessary background knowledge.

Wackernagel died in Basel on December 21, 1869.

See also: Boeckh, August (1785–1867); Grimm, Jacob Ludwig Carl (1785–1863); States of the Glottis.

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Wagner, Heinrich (1923–1988)

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Born in Switzerland, Heinrich Wagner studied Indo-European philology in Zürich under Professors Manu Leuman and Julius Pokorny, Germanic philology under Rudolf Hotzenköcherle, and phonetics under Eugen Dieth. Under the influence of Pokorny he became interested in the Celtic languages and in 1945 came to Ireland to study Irish. Having spent some time in Dublin to improve his English, Wagner went to Dunquin, Co. Kerry, and soon acquired a knowledge of Irish. Thereafter he visited the other Irish-speaking districts and came to Telin in Donegal, and made the dialect of that area his own. There he became a close friend of Seán Ó hEochaidh, a collector of folklore for the Irish Folklore Commission. He was appointed Professor of Germanic Philology in Utrecht, The Netherlands, in 1951 and to a similar post in Basel, Switzerland, in 1953. He undertook in 1948 to compile a linguistic atlas of the Irish language and in the university vacations traveled the country by bicycle, interviewing speakers of Irish in remote districts and gathering the last remnants of the language in places where it had ceased to be the vernacular. He employed a questionnaire of 2000

items and visited 87 districts, including the Isle of Man. The maps provide a phonetic transcript of the informants' responses to the questionnaire. The first volume of the *Atlas* appeared in 1958, to be followed by three further volumes in 1964, 1966, and 1969. In 1958 he was appointed Professor of Celtic at the Queen's University, Belfast, a title that he later was permitted to change to Professor of Celtic and Comparative Linguistics. He remained in Belfast for over 10 years of the Troubles, but the repeated bombing of his department lessened his appetite for life there. In 1979 he accepted an appointment as Professor at the Dublin Institute for Advanced Studies. In the early 1980s he was diagnosed as suffering from a degenerative disease of the spine, and he died in Dublin in 1988.

Wagner's published work indicates his dual interests: linguistic typology and Celtic. His first publication was *Das Verbum in den Sprachen der Britischen Inseln*: *Ein Beitrag zur geographischen Typologie des Verbums* (1959a). This book consisted of two parts, the first being an examination of the verb in English, Irish, Scots Gaelic, and Welsh. This section is generally regarded as of high quality. The second part argued that a language of the Hamito-Semitic (Afro-Asiatic) type preceded the Celtic languages in Britain and Ireland. This part of his work has met with a mixed reception. The language that Wagner compared with the Celtic languages was Berber, which he had apparently learned from Ernst Lewy in Dublin. It is not clear that he had ever visited the Berber-speaking peoples of North Africa. His arguments are forceful but were written before the publication of Greenberg's *Language universals*. Today Wagner's work in this field is largely ignored, partly owing to the fact that it was not translated; this is not helped by the use by other writers of the word 'substratum' for the language that preceded Celtic in Britain and Ireland. Wagner (1959a, 242, n. 1) stipulated that the word could be used only of a known language that preceded another, as Irish is the 'substratum' of English in Ireland.

Wagner's greatest work was without doubt his *Linguistic atlas and survey of Irish dialects*. As a student of Hotzenköcherle, author of a Swiss linguistic atlas, he had become interested in linguistic geography, which is reflected in the title of another book of his: *Das Hethitische vom Standpunkt der typologischen Sprachgeographie* (1985). His *Atlas* was a huge task, accomplished within a few years and promptly published. In it he recounts the results of his journeys in Ireland, visiting places where Irish was spoken and choosing the best available speakers in each place as his informants. He presented his questionnaire to them and noted their answers in a phonetic script rather than recording them mechanically. The publication is in four volumes: Volume 1 has 300 maps showing words and phrases from the whole country; Volumes 2 through 4 have maps showing the answers to the questionnaire from Munster, Connacht, and Ulster/Isle of Man. The value of the *Atlas* is that it shows the state of the Irish language in the mid-20th century and rescues for future scholarship the last remains of the language in the western segment of the country. An index to the *Atlas* is currently being prepared at Queen's University, Belfast.

Another published work of his is *Gaeilge Theilinn: Foghraidheacht, Gramadach, Téacsanna* (1959b), a grammar of the dialect of Telin. It is much quoted but in fact is rather superficial, packing an account of the phonemics of the dialect, its morphology, syntax, and phraseology, with over 70 pages of texts and phonemic transcription, into 356 pages.

Wagner was essentially a typologist and linguistic geographer who strayed into dialectology and accomplished in a few years what Irish scholars had failed to do.

See also: Berber; Greenberg, Joseph H. (1915–2001); Pokorny, Julius (1887–1970).

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Wagner, Max Leopold (1880–1962)

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Max Leopold Wagner was born on September 17, 1880 in Munich. He studied at the Universities of Munich, Würzburg, Paris, and Florence and then (1907–1910) taught modern languages at the German school in Constantinople, an experience that brought him into contact with such languages as Turkish, Arabic, and Judaeo–Spanish, all of which were to influence the course of his later researches. He also spent some time engaged on ethnological research in Mexico before taking up a teaching post at the University of Berlin (1915–1924). Apart from an appointment he held in the difficult period following World War II at the University of Coimbra (1947–1951, including a semester in 1948–1949 as visiting professor at Urbana, Illinois), he spent the rest of his career as an independent scholar, traveling extensively and acquiring an intimate knowledge of, in particular, the Mediterranean world and many of its languages and the associated cultures. He still holds an unchallenged position as an authority on the Sardinian language, on whose phonology, morphology, and lexicon he published a lengthy series of authoritative books (including an etymological dictionary), monographs, and articles. His other wide-ranging interests and publications cover, *inter alia*, the languages and literatures of Latin America, Judaeo–Spanish, African Latin (and its remnants in Berber), Greek and Arabic elements in the Romance languages, Gypsy languages, argot, and folklore. Malkiel (1963) draws attention, however, to his "strangely consistent reluctance to engage in French and Provençal studies or even to bring in Gallo–Romance collaterally." His work is characterized by a profound knowledge of the languages and cultures he is dealing with and his lexical work by a penetrating application of the 'word and thing' method. He spent the last years of his life, still engaged in research, in a house provided for him in Washington, DC, by a wealthy Italian–American businessman, and died on July 9, 1962.

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Wakashan

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Pilling (1894) attributed the term 'Wakashan' to Captain James Cook's observations in Nootka Sound in 1778 wherein he stated: "I would call them Wakashians, from the word *wakash*, which was very frequently in their mouths," (Cook, 1821: 308). Gallatin (in Pilling, 1894) first used the term to designate the Wakashan family and Boas (1890) solidified the boundaries of the family.

The Wakashan family is spread over Vancouver Island and the adjoining areas of the mainland, including northwestern Washington state and the central British Columbia coast.

Languages

The languages of the Wakashan family may be divided into two major subgroups, a northern and a southern group. The Northern group consists of four main languages: Haisla, Oowekyala and Heiltsuk (mutually intelligible), and Kwakwala (Kwakiutl), located on northeastern Vancouver Island and adjacent parts of the mainland north as far as Kitimat, British Columbia. Within the Northern branch, Kwakwala is the best documented, with an early grammar by Hall (1888) and another by Boas (1900). The most northerly language in the family is Haisla, with at least two dialects: Henaksiala and Haisla proper. Oowekyala is spoken by only a handful of people in the area of Rivers Inlet and is to a large extent mutually intelligible with Heiltsuk.

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Heiltsuk also has two dialects, spoken in Bella Bella and Klemtu, and there is some early work on it by Boas.

The Southern branch of Wakashan consists of three main languages: Nuuchahnulth (Nootka), Ditidaht (Nitinat), and Makah, located on the west coast of Vancouver Island and the tip of northwestern Washington state. Within each language there are various, mutually intelligible dialects. Nuuchahnulth is the most widely spoken of this group, constituting a chain of dialects ranging the length of the west coast of Vancouver Island from Brookes Peninsula to Barkley Sound. Ditidaht constitutes the southernmost Wakashan language on Vancouver Island. It has a close relationship with both the more northerly Nuuchahnulth and the more southerly Makah, which is the only Wakashan language spoken outside of Canada, in Washington state.

Recent estimates of the number of speakers of Wakashan languages vary from approximately 600 to 1200 speakers for all languages (Statistics Canada, 2003; Cook and Howe, 2004). (By comparison, there are estimated to be 1185 speakers of Gaelic languages in Canada.) Geographically, the Wakashan languages are adjacent to several other language families, including Athabaskan in the north, Chemakuan in the south, and Salish throughout the area.

Proto-Wakashan

Jacobsen (1979b) located the original home of the family on Vancouver Island or adjacent parts of the mainland, from which it has spread north and south. Swadesh (1953) proposed the Proto-Wakashan phoneme inventory shown in Table 1. Sapir (1921) suggested that Wakashan constituted one member, along with Salish and Chemakuan, of a Mosan subgroup, which, together with Kutenai and Algonquian-Ritwan, made up a larger superfamily. Swadesh (1962) noted similarities between Wakashan and Eskimo-Aleut, but little has been done to further any of this research recently (*see* **Areal Linguistics**). For a summary of work on the comparative-historical study of Wakashan, see Jacobsen (1979b).

Table 1 Proto-Wakashan phoneme inventory

p	t	ƛ[a]	c[b]		k		k^{ω}	q	q^{ω}	
b	d	λ	dz		g		g^{ω}	ɢ	$ɢ^{\omega}$	
ṗ	t’	ƛ’[a]	ċ[b]		k̓		$k̓^{\omega}$	q̓	$q̓^{\omega}$	ʔ
		ɬ	s		x		$x^{\omega d}$	x̣	$x̣^{\omega d}$	h
m	n	l	y[c]		γ		w			
ṁ	ṅ	l’	ẏ[c]		γ’		ẇ			
				i(:)		u(:)				
					a(:)					

[a]In IPA, /tɬ/ and /tɬ’/.
[b]In IPA, /ts/ and /ts’/.
[c]In IPA, /j/ and /j’/.
[d]In IPA, /χ/ and /$χ^{\omega}$/.

Phonology

The phonological inventory of all Wakashan languages consists of a large number of consonant phonemes and a relatively small number of vowel phonemes, usually with a vowel length distinction. In the Northern group there is a three-way distinction among obstruents, involving lax, glottalized, and voiced stops, whereas in the Southern branch there is only a lax versus glottalized distinction, with voiced stop reflexes of the original nasal phonemes appearing in Ditidaht and Makah.

Northern Wakashan has a long/short opposition in the vowel system, whereas the Southern group displays a three-way phonemic length distinction that is realized as a two-way contrast on the surface. The phonemic distinction is due to a third category of ‘variable-length’ vowels that are long in the first two syllables of the word but short elsewhere, as in *-naˇk* ‘have’ in ***łučnaak*** ‘have a wife’ versus *t’aṅanak* ‘have a child.’ Within Northern Wakashan, Oowekyala is purported to have glottalized vowels, which may appear only in the first syllable of a word. Howe (2000) provided minimal pairs such as *ma’łəla* ‘two people working together’ versus *małəla* ‘swimming’ and *ƛ̓a’s* ‘animal fat, oil, grease, blubber’ vs. *ƛ̓as* ‘far out at sea or seaward.’

In Northern Wakashan, the domain of primary stress assignment is the entire word, with stress assigned to the first heavy syllable or to the final vowel if no heavy syllable is encountered. In Southern Wakashan, the domain of primary stress is the first two syllables, with weight contributing to the placement. It should be noted that, although most Wakashan languages employ stress assignment, Kortland (1975) observed that Heiltsuk makes tonal distinctions instead.

Syllable structure is similar for all the languages, allowing complex codas but simple onsets. Boas (1947) stated for Kwakwala that “consonantic clusters do not occur in initial position. Monosyllabic stems are of the types CVC, CVCC, CVVC, CVVCC.” Southern Wakashan likewise involves an obligatorily filled onset (one and only one consonant) and potentially complex codas with up to three, or even four, consonants. Oowekyala appears to exhibit the most extreme cases of consonant clusters, according to Howe (2000).

The processes of glottalization (‘hardening’) and lenition (‘softening’) are quite unique in Wakashan and are invariably triggered by the attachment of a suffix to a base ending in a potential candidate for the

Table 2 Kwakwala lenition and glottalization[a]

Base		*Lenition*		*Glottalization*	
eep	'to pinch'	eeb.ayu	'dice'	eep̓.id	'begin to pinch'
wat	'to lead'	wad.əkʷ	'led'	wat'.eene̓ʔ	'act of leading
p̓əs	'to flatten'	p̓əy.aayu	'means of flattening'	p̓aap̓əc̓.a	'try to flatten'
məx	'to strike'	mən.ace̓	'drum'	maaməṅ.a	'ready to strike'
c̓uuł	'to be black'	c̓uul.atu	'black-eared'	c̓ul'.əmyu	'black-cheeked'

[a]/./ indicates morpheme boundary.
Source: Boas (1947).

change. In Southern Wakashan, glottalization affects both obstruents and sonorants, changing stops and affricates to their glottalized counterparts, fricatives to laryngealized glides, and sonorants to their laryngealized counterparts. Lenition, which affects only fricatives in Southern Wakashan, converts them to either /y/ or /w/, depending on whether they are labialized or not. These processes are more complex in Northern Wakashan. Boas (1947) provided the examples (somewhat modified for this presentation) from Kwakwala (Table 2).

One final phonological process worth noting is vowel epenthesis in Makah. In this language (and to some extent in the neighboring Ditidaht), there is a co-occurrence restriction against a voiced or glottalized consonant appearing in the onset of the second syllable when the coda of the first syllable is filled. The resulting cluster is broken up by inserting a lengthened copy of the vowel of the first syllable between the two consonants. Compare the Nuuchah-nulth forms, *c̓aqmis* 'tree bark' and *c̓usy̓ak* 'shovel' with the following Makah examples (from Davidson, 2002).

(1a) c̓aqaabis
c̓aq-bis
bark-collectivity.of
'tree bark'

(1b) c̓usuuyak
c̓us-yak
dig-thing.for
'shovel'

Other common phonological processes include labialization of back consonants, delabialization, and various forms of coalescence, syncope, and epenthesis.

Morphology

These languages are all highly polysynthetic, with complex morphophonemics, and rely heavily on suffixation. Reduplication is the only productive morphological operation that results in a preposed element. There are large numbers of both derivational and inflectional suffixes, but only one root may appear in each word, resulting in an absence of lexical compounding of the usual sort.

Table 3 Verbal suffixes in Kwakwala

Verb suffix	*Words*
-(g)ila	x̌eenagila
'to make'	'to make oil'
	x̌aawayuqʷila
	'to make a salmon weir'
-am̓ala	suupam̓ala
'to quarrel about'	'to quarrel over an axe'
	k̓əlkʷ am̓ala
	'to quarrel over a digging stick'
-(g)əλala[R]	haahaxagəλala
'to wear'	'to wear a shirt'

Source: Boas (1947). [R] indicates reduplication.

Lexical suffixes in Wakashan, unlike Salish, run the gamut of possibilities, including verbal, nominal, adjectival, locative, and adverbial functions. Perhaps the most interesting are the verbal morphemes, which interact with arguments within the sentence, resulting in their combination into a complex predicate, as illustrated in Table 3.

The last example in Table 3 illustrates another property of Wakashan suffixes: the ability of the suffix to trigger various effects on the stem to which they attach, including reduplication and vowel lengthening. The following examples from Makah illustrate these triggers (adapted from Davidson, 2002, where [L] indicates lengthening of the first vowel).

(2a) hihitaẋsʔiq
hita-ẋsa[R]-'iq
empty.root-in.bushes-DET
'in the bushes'

(2b) yuuxłapaal k̓ʷisii
yuxł-api[L]-' ax̌-'i k̓ʷisii
float-in air-TEMP=3.SING.IND snow
'snow is blowing in the air'

Reduplication is a highly productive process used to indicate a number of distinct grammatical categories. As shown in Table 4, it is employed in

derivation, aspect, and inflection as a marker of the distributive or plural, diminutive, and repetition or iteration and as a concomitant of certain derivational suffixes.

Wakashan also employs a set of classifiers that categorize nouns for the purpose of enumerating and qualifying, as well as in a pronominal function, as shown by the examples from Kwakwala in Table 5.

The various combinations of suffixes may result in rather long and complex words, as demonstrated by the examples from Nuuchahnulth in (3) (from Sapir and Swadesh, 1939. NOW 'contemporaneous,' SW 'switch reference,' CLS 'classifier').

(3a) ʔuuqχn̓uk̓ʷaχ'atquuč
ʔu -'aqχ -n̓ukʷ -'aχ -'at -quuč
REF -inside -inhand -NOW -SW -3S.CND
'if one is holding it' (Source: Sapir and Swadesh, 1939)

(3b) ʔaʔaʔaχqimɬḥtimyiɬm̓inḥʔaaqχeʔicuu
DUP- DUP- ʔaχ -qimɬ -ḥta -maɬ
REP- SUF two -CLS -onfoot[R] -move
-'iɬ -m̓inḥ -ʔaaqχ -(m)e-ʔicuu
-onfloor -PL -INTENT-2PL.IND
'You will carry two dollars on your feet' (Source: Sapir and Swadesh, 1955)

Syntax

Basic word order for Wakashan languages is, in general, head-initial, with VSO being the most common order. The degree to which individual languages allow the transposition of subjects and objects is one area of variation within the family. There is no case marking on nominals, but in some contexts complex prepositions may be used to indicate the grammatical role of arguments, as in the following example from Ditidaht (adapted from Klokeid, 1978).

(4) čuqʷšiχʔa ʔuxʷ John ʔuuyuqʷ Bill
hit NOM John ACC Bill
'John hit Bill'

Within the nominal phrase, quantifiers precede adjectives which, in turn, precede the head noun, as exemplified by the following examples from Nuuchahnulth (Rose, 1981). Relative clauses follow the head noun, as in (5b).

(5a) ʔiiḥ saya nism̓a
very distant land
'a really distant land'

(5b) ha xutaay [yaaqḥẇał naq Bill]
DET knife that.used Bill
'the knife that Bill used'

There are well-developed person-number inflectional paradigms that typically appear after the first position in the sentence in clitic-like fashion. Boas (1900: 715) remarked on "... the tendency of adverbs and auxiliary verbs to take the subjective ending of the verb, while the object remains connected with the verb itself. *k̓éeʔsən dúuquaq* not-I see-him, shows the characteristic arrangement of sentences of this kind."

Possession associated with the arguments of the clause is sometimes marked on the predicate, as shown in the examples in (6) from Kwakwala (Boas, 1900).

(6a) n̓eekən Gənəm
say.my wife
'my wife said'

(6b) n̓eekeexən Gənəm
say.he.my wife
'he said to my wife'

(6c) n̓eekeexees Gənəm
say.he.his wife
'he said to his (own) wife' (Boas, 1900)

Tense markers exhibit the special Wakashan characteristic of appearing on both nouns and verbs, leading to the common conclusion that there are no category distinctions in these languages (however, cf. Jacobsen, 1979a).

Table 4 Uses of reduplication in Kwakwala

Distributive/ plural	gʸuk 'house'	gʸigʸukʷ 'houses'
	n̓ala 'day'	n̓ən̓ala 'days'
Diminutive	t'eesəm 'stone'	t'at'edzəm 'small stone'
	bəgʷ 'man'	baabagəm 'boy'
Repetitive	meexa 'to sleep'	meemexa 'to sleep repeatedly'
	hanλa 'to shoot'	hanɬhanλa 'to shoot repeatedly'
With derivational suffix	-(g)əλala[R] 'to wear'	haahaxagəλala 'to wear a shirt'

Source: Boas (1947).

Table 5 Kwakwala classifiers

Number		*/-ukʷ/ 'person'*	*/-sgəm/ 'round object'*	*/-xλa/ 'dish, spoon'*
n̓əm	'one'	n̓əmukʷ	n̓əmsgəm	n̓əməxλa
m̓al	'two'	m̓al'ukʷ	m̓al'tsəm	m̓aləxλa
yud	'three'	yudukʷ	yuduxsəm	yudəxʷəxλa

Source: Boas (1947).

A form of syntactic compounding exists, at least in some members of the family, as illustrated by the following examples from Nuuchahnulth.

(7a) ʔiiḥʔii [yačmuut ǩaqmis]
the big bladder oil
'the large oil bladder' (Sapir and Swadesh, 1939)

(7b) [muunaa ńiiqńiiqaỷak]
machine sew -tool
'a sewing machine' (Sapir and Swadesh, 1955)

Further Reading

For further information on Wakashan, the reader is referred to the references appended to this article, in particular the discussion in Boas (1947), Davidson (2002), Howe (2000), Jacobsen (1979a, 1979b), Lincoln and Rath (1980, 1986), and Stonham (1999, 2004).

See also: Areal Linguistics; Canada: Language Situation; United States of America: Language Situation.

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Wake Island: Language Situation

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A North Pacific atoll of three coral islands built on top of an underwater volcano, Wake Island was annexed by the United States in 1899. In 1941 it was captured by the Japanese, it stayed in their hands for the duration of the war, and since 1974 it has been occupied by the U.S. military. In 1962, the President of the United States made the Secretary of the Interior responsible for the civil administration of the atoll. Military personnel have now left Wake Island, but a few contractor personnel remain. The official language is English.

Wales: Language Situation

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Wales (population 2 903 085) has two official languages, English and Welsh (*Cymraeg*). English is spoken by the vast majority of the population and became the dominant language around the turn of the 20th century, owing largely to rapid in-migration and internal migration from rural to urban areas brought about by industrialization. Welsh is spoken by approximately 20.5% of the population (2001 census), which represents an increase of approximately two percentage points on the 1991 census. Many see this increase as evidence of a halt in the decline in numbers of Welsh speakers that characterized the 20th century and as highlighting a general trend of revitalization.

Overall the status of Welsh is high, partly reflecting the language's increased instrumental value for employment – particularly in the media and the civil service, such as in the Welsh Assembly, which devolved from the United Kingdom government in London in 1999. The passing of a new Welsh Language Act in 1993 led to the establishment of the Welsh Language Board, which is charged with ensuring that the new Act is ever more strongly implemented. The Act provides a comprehensive statutory framework for the treatment of Welsh and English as co-equal in public life in Wales and as such all public-sector institutions are legally obliged to deal with the public bilingually. In recent years Welsh has achieved greater visibility within the linguistic landscape with many public notices, advertisements, signposts, and so on being bilingual.

The 1988 Education Reform Act ensures that Welsh is taught (up to the age of 16) in all but a few opt-out secondary schools in Wales as either a first or a second language. There is considerable and growing enthusiasm for Welsh-medium education at both primary and secondary level, with the majority of pupils now attending Welsh-medium schools coming from non-Welsh-speaking backgrounds.

The development of Welsh-language media has played a significant role in raising the profile of Welsh. The government-funded television channel S4C (Sianel Pedwar Cymru/Channel 4 Wales), established in 1982, broadcasts a mix of programming in Welsh for approximately six hours a day. The BBC also offers wide-ranging Welsh language broadcasting provision, both through radio and on the Internet, all of which are seen as key to the encouragement of the use of Welsh.

The demographic distribution of Welsh speakers around the county is uneven. While speakers in the predominantly rural north and west make up a higher proportion of the local population than in the more urban southern and eastern areas, in terms of absolute numbers, the largest population resides in the south and east. The continued attrition of Welsh in the 'heartland' areas of the north and west has led to at times acrimonious debate, centered largely on the threat of monoglot 'incomers' from England to these areas, with many (e.g., Cymuned [Community], a pressure group formed in 2001) calling for interventionist measures in the form of legislation, which would place limits on the sale of property in such areas to people outside Wales and restrict to local people the right to build new houses.

See also: Bilingualism and Second Language Learning; Ethnolinguistic Vitality; Minority Languages: Education; Reversing Language Shift; Welsh.

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John Walker (1732–1807), actor, elocutionist, and lexicographer, was born in Colney Hatch in Middlesex, England. His early career was as an actor; beginning in the provinces, he later gained roles on the London stage in Drury Lane and at the celebrated Crow Street Theatre in Dublin. In his mid-30s, however, he determined on a change of career, becoming a schoolmaster at a school he established (with James Ussher) in Kensington in 1768. It was there that his interest in teaching the spoken language (and specifically elocution) developed, and from 1770 he began the first of his many public lectures on elocution. He toured Scotland and Ireland and gave lectures in many of the major cities of England. In 1774 he published *A general idea of a pronouncing dictionary of the English language on a plan entirely new,* which aimed to add the marking of pronunciation to dictionary entries by using a system of respelling and numerical diacritics. His wider ambition, however, was the standardization of pronunciation, and he regarded what he termed 'the vices of custom' with distaste. His later *Critical pronouncing dictionary and expositor of the English language*, first published in 1791, was the fulfillment of his aims; in it he stressed the virtues of analogy, regularity, and consistency in speech. As he proclaimed (1791: vi), "If the analogies of the language were better understood, it is scarcely conceivable that so many words in polite usage would have a diversity of pronunciation, which is at once so ridiculous and embarrassing." Later regarded as the 'statute book of English orthoepy,' the *Critical pronouncing dictionary* went into three further editions during Walker's own lifetime and was reprinted numerous times over the course of the 19th century. In it Walker provided specific advice for the inhabitants of Scotland, with a similar section for those of Ireland and the Cockney inhabitants of London. He also provided a detailed phonetic investigation of the sounds of speech in the late 18th and early 19th centuries; although often prescriptive in intent, this work contains a mass of information on the speech patterns of the time, as well as on the contemporary interest in the establishment of a non-localized accent. Regarded with some skepticism by writers later in the century ("how does Mr. John Walker, of Colney Hatch, determine the usages of . . . the three classes he has named?", as the phonetician Alexander Ellis contended), he was nevertheless acknowledged to be a widely influential figure. His other publications include *A dictionary of the English language, answering at once the purposes of rhyming, spelling and pronouncing* (1775), which, aside from its poetic utility, also aimed to establish an invariant pronunciation for each word; his *Elements of elocution* (1781) was widely regarded as the first practical treatise on the art of speaking. Known as 'Elocution Walker' during his lifetime, his principles were often implemented in the teaching of the spoken language in 19th-century educational work.

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Wallis and Futuna: Language Situation

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See also: New Caledonia: Language Situation.

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John Wallis was a remarkable scholar. He was born in Ashford, Kent, in 1616. In 1630 he was sent to Felsted School in Essex, where he learned Latin, Greek, and some Hebrew and where he made his first acquaintance with mathematics. In 1632 he went to Emmanuel College, Cambridge, where he received his B.A. in 1637 and his M.A. in 1640. In the same year he was ordained in the Church of England. In 1642 Wallis began assisting the Parlamentarians in deciphering captured Royalist documents, and in 1643 he was rewarded by being made rector of a church in London. Wallis joined the moderate Presbyterians in signing the remonstrance against the execution of Charles I, for which he incurred the lasting hostility of the Independents. In spite of their opposition he was appointed in 1649 to the Savilian chair of geometry at Oxford University, which he held until his death in 1703. In 1654 Wallis received a D.D. degree. When Charles II was restored to the throne in 1660, Wallis was made one of the royal chaplains. He was one of the Divines appointed in 1661 to revise the Book of Common Prayer, was a founder–member of the Royal Society, whose first Charter was given by the King in mid-1662, and published many articles in its *Philosophical Transactions*. In 1689, when William III acceded to the throne, Wallis took an oath of allegiance and was appointed royal decipherer. In 1692 he was consulted about the Gregorian calendar and advised against it, so that it was not adopted.

Apart from works on logic, theology, and cryptography, Wallis contributed immensely to mathematics. *Arithmetica infinitorum* (1655), *Mathesis universalis* (1657), and *De algebra tractatus* (1685) are his most important works in this field. Wallis extended the application of Johannes Kepler's law of continuity, anticipated differential and integral calculus, and introduced the symbol for infinity.

Outside mathematics, Wallis's most influential work is a book on the grammar of English, *Grammatica linguae Anglicanae* (1653). Here Wallis adopted a modern approach. He was the first to disclose the structure of English by detaching himself from the system of Latin. There is hardly anything in Wallis's grammar that resembles the Latin-based paradigms of declensions and conjugations. Wallis's book is also very important in the teaching of pronunciation. Unlike most of his predecessors, he did not intend to improve orthography. Rather, he wanted to teach pronunciation, first by comparing English sounds with those of other languages, not just French or German, but also Arabic, Hebrew, and Greek, and second by incorporating the individual sounds into a system. Wallis founded scientific phonetics. He also applied his phonetic insights to the teaching of deaf-mutes; in fact, he was the first to devise such a system.

In his treatise *De loquela; sive de sonorum omnium loquelarium formatione: tractatus grammatico-physicus,* prefixed to the grammar, Wallis established for the first time a system of sounds according to their articulation. The *vocales* are arranged according to (1) their degree of aperture into wide, medium, and narrow and (2) their place of articulation in *gutturales, palatinae,* and *labiales*. The *consonae* are differentiated according to (1) their manner of articulation in *mutae, semimutae,* and *semivocales* and (2) their place of articulation as the vowels. The following is Wallis's description of the difference between [n] and [ŋ]:

> The pronunciation of *n* always involves the tip of the tongue striking the front of the palate, near the roots of the upper teeth; whereas in the latter the tip of the tongue is normally moved down to the roots of the lower teeth, and the back of the tongue is raised up to the back of the palate, blocking the sound at this point. That is to say, it has the same articulation in the mouth as *g*, but the direction of the breath is the same as for *n* (tr. by Kemp in Wallis, 1972: 161).

As to his grammatical insights, the following points deserve to be mentioned. As regards number, Wallis makes mention of *clōth–clōthes* and *path–pathes*, but he is the first to mention the alternation s/z in *house* [haus]–*houses* [hauziz]. He recognizes only two tenses for English, present and past, on formal grounds; moods disappear altogether. *Shall* and *will* indicate the future. Before Wallis, no grammarian assigned different functions to these two forms. He said,

> It is difficult for foreigners to know when to use the first form and when the second . . ., and no other description that I have seen has given any rules for guidance, so I thought I ought to give some. . . . In the first person *shall* simply indicates a prediction, whereas *will* is used for promising or threatening. In the second and third persons *shall* is used for promising or threatening, and *will* of a straightforward prediction (tr. by Kemp in Wallis, 1972: 339).

By 1699 Wallis's grammar had appeared in five editions; even after his death it was reprinted four times until 1756. Then, however, during the period of comparative historical linguistics his synchronic approach became outmoded. That his grammar is a true classic of linguistics is also documented by the fact that three centuries after its first publication the Latin original appeared again in facsimile together

with an English translation and an extensive commentary by J. A. Kemp (Wallis, 1972).

See also: English, Early Modern; English, Later Modern (ca. 1700–1900).

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Wambaya

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Introduction

Wambaya is a non-Pama–Nyungan language of northern Australia (of the Mirndi group), originally spoken in the Barkly Tablelands region of the Northern Territory. The Wambaya people suffered greatly from the invasion of their land, their subsequent removal from their traditional country, and the dispersal of their community. As a result of these and other factors, the Wambaya language has now almost disappeared. There are only a handful of (semi-)speakers remaining, most of whom live in the towns of Tennant Creek, Elliott, and Borroloola. Wambaya is closely related to two further dialects – Gudanji and Binbinka. Gudanji is in much the same state as Wambaya with only a handful of (semifluent) speakers left; and there are no longer any remaining speakers of Binbinka.

Like all Australian languages, Wambaya was not traditionally written, and so the earliest records we have of the language are those collected by white researchers since the early 20th century. Some lexical items were recorded by Mathews (1900, 1908) and by Spencer and Gillen (1904), largely concerning the kinship system. The first detailed grammatical information for Wambaya is found in the field notes recorded by Ken Hale in 1959 (Hale, 1959, 1960) and is continued in Neil Chadwick's work on the whole Barkly language group (including also Jingulu [Djingili] and Ngarnka [Ngarndji]) dating from the 1970s (Chadwick, 1978, 1979, 1984, 1997). My own fieldwork on the language began in 1991 and has so far resulted in the publication of a grammar of Wambaya (Nordlinger, 1998a), the development of a dictionary and learner's guide (Nordlinger, 1998b, 1998c), and a number of articles (Nordlinger, 1995, 2001; Nordlinger and Bresnan, 1996; Green and Nordlinger, 2004). The grammatical features discussed in this brief article are all discussed and exemplified in greater detail in Nordlinger (1998a).

Phonology

Phonologically, Wambaya is a typical Australian language, with five places of articulation for stops, including two apical series (apico-alveolar and retroflex) and one laminal series. There is no voicing contrast. There is a nasal corresponding to each stop articulation, and three laterals (in the nonperipheral places of articulation). There are three vowel phonemes, and no productive length distinction. The phoneme inventory and the orthographic symbols corresponding to each phoneme are provided in **Table 1**.

All Wambaya words are minimally disyllabic and virtually always vowel-final. (The one exception is the auxiliary, see below, which can end in a consonant if it contains one of three nasal-final affixes: *-any* 'direction away, past tense,' *-amany* 'direction towards, past tense,' or *-n* 'progessive aspect'.) Primary stress is generally on the first syllable of the word. Words can begin with a vowel (as in *alaji* 'boy'), or a consonant (*daguma* 'hit,' *juwa* 'man,' *ngajbi* 'see'). There are no words beginning with the consonants *r* [ɹ], *rr* [ɾ/r], *ly* [ʎ] and further, as is common among Australian languages, the distinction between the two apical series is neutralized in initial position. Initial apicals are all represented orthographically as apico-alveolars (*d, n, l*). Biconsonantal clusters are common, but only word-medially. Such clusters usually contain an apical or laminal consonant followed by a labial or dorsal consonant (e.g., ***anm**urru* 'cuddle,' ***bardg**u* 'fall,' ***marrg**ulu* 'egg,' ***ngajb**i* 'see,'

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Table 1 Wambaya phonemes

Consonants	*Bilab.*	*Apico-alv.*	*Apico-postalv. (retroflex)*	*Lamino-palatal*	*Velar*
Stop	b (b)	d (d)	ɖ (rd)	ɟ (j)	g (g)
Nasal	m (m)	n (n)	ɳ (rn)	ɲ (ny)	ŋ (ng)
Lateral		l (l)	ɭ (rl)	ʎ (ly)	
Tap/Trill		ɾ/r (rr)			
Semivowel	w (w)		ɹ (r)	j (y)	
Vowels	i (i) (i: (ii))		u (u)		
		a (a) (a: (aa))			

mangan**ym**a 'tucker, nonmeat food'), but other combinations are possible also (*bu**ngm**aji* 'old man,' *wu**gb**ardi* 'cook'). There is one triconsonantal cluster *rrgb* (*lu**rrgb**anyi* 'grab,' *gu**rrgb**arra* 'stare').

A brief discourse in the language written in the conventional orthography is provided in (1). This example illustrates many of the grammatical properties to be discussed below.

(1) Yarru ngurr-any gurdi-nmanji ngaj-barda.
go.NF *1*PL.INC-PST.AWAY *bush*.IV.OBL-ALL *see*-INF
Gannga ngurr-amany bangarnigadi.
return.NF *1*PL.INC-PST.TWDS *this way*
Gurijba gi-n mirra
good.IV.NOM *3*SG.S.PRES-PROG *sit*.NF
ngarrga maga.
my.IV.NOM *house*.IV.NOM
'We went to the bush to have a look (at my house). Then we came back this way. My house is fine.'

Morphology

Wambaya, being one of the southernmost non-Pama–Nyungan languages, is typologically atypical in having lost virtually all prefixing morphology (see Nordlinger, 1998a; Green and Nordlinger, 2004; Harvey *et al*., to appear for discussion). All productive morphology is suffixing. Like many other Australian languages, Wambaya has extensive case and agreement morphology – all elements of an NP must show concord in gender, number, and case – and 'free' (i.e., pragmatically determined) word order.

The two open word classes are verbs and nominals. Concepts translated into European languages as adjectives are split across these two classes. For example, *bulyingi* 'small,' *bugayi* 'big,' *gurijbi* 'good,' and *bagijbi* 'bad' are nominals, while *baliji* 'be hungry,' *gurda* 'be sick,' and *laji* 'be quiet' are intransitive verbs. Verbs are characterized by the fact that they must always cooccur with the auxiliary (see below), which carries subject/object agreement information and tense/aspect/mood for the clause. Verbs have only a small amount of inflectional morphology, contrasting future/imperative, and nonfuture (unmarked) forms. This lack of morphology appears to result from the fact that these are historically derived from uninflected coverbs, with the synchronic auxiliary being the original inflected main verb (see Green and Nordlinger, 2004 and below for discussion). There are two inflectional classes for verbs, membership of which is phonologically conditioned. Vowel-final verb stems belong to the J-class of verbs, consonant-final verb stems belong to the Ø-class of verbs (and there are, of course, a dozen or so irregular verbs that don't follow the pattern of either class). These classes are distinguished by the fact that in the J-class, there is a thematic *-j-* added before any verbal affixes, while there is no thematic consonant in the Ø-class. The two classes also have different nonfuture tense inflections. Examples of the two paradigms are:

(2) *daguma-* 'hit' (J-class): *daguma* (nonfuture), *daguma-j-ba* (future/imperative), *daguma-j-barda* (infinitive)

(3) *gulug-* 'sleep' (Ø-class): *gulug-bi* (nonfuture), *gulug-ba* (future/imperative), *gulug-barda* (infinitive)

In contrast to verbs, nominals have a large amount of morphology. As is relatively common among northern Australian languages, there are four genders – masculine (class I), feminine (class II), vegetable (class III) (including nonmeat food and some body parts), and neuter (class IV) (residue). These genders are marked on nominals and their modifiers by suffixes, and are marked on demonstratives by cognate prefixes (vestiges of the earlier prefixing system, see Green and Nordlinger, 2004 and Harvey *et al*., to appear for discussion). Example (1) above shows concord with adjectives (*gurijba* 'good.IV') and possessive pronouns (*ngarrga* 'my.IV'). That these forms are truly agreeing with the head nominal *barrawu* 'house' can be shown by contrast with the following example in which they are agreeing instead with a class I nominal *janji* 'dog.'

(4) yini ngarri janji gurijbi
this.I *my*.I *dog*.I *good*.I
'this is my good dog'

Nominals are also inflected for number – dual and plural – although since the unmarked nominal can have singular, dual, or plural interpretations, this inflection is optional. Pronouns (a subclass of nominals) distinguish singular, dual, and plural numbers and make an inclusive/exclusive distinction in the 1st person nonsingular.

Nominals are obligatorily inflected for case. Wambaya is what has been called a 'split-ergative' language. Nominals inflect according to an ergative/absolutive distinction, while pronouns inflect largely on a nominative/accusative pattern. We can, therefore, distinguish three distinct case contrasts, as in Table 2, where A stands for 'transitive subject,' S for 'intransitive subject,' and O for 'transitive object.' In the following table, the shading indicates homophony between forms; thus, nominals have homophonous nominative and accusative forms, while pronouns have homophonous ergative and nominative forms.

As well as the three core cases shown in Table 2, there are nine further cases in Wambaya, including: dative, ablative, allative, comitative, genitive, proprietive, privative, perlative, causal, and originative. The ergative case additionally covers locative and instrumental functions. Gender markers also distinguish case, having one form before cases with zero realizations (i.e., the nominative and the accusative), and another form (called the 'oblique' form) before all other cases. For example, *jan-ji* 'dog-I.NOM' vs. *ja-nyi-ni* 'dog-I.OBL-ERG'; *guji-nya* 'mother-II.NOM' vs. *guji-ga-nka* 'mother-II.OBL-DAT'; *mangany-ma* 'food-III.NOM' vs. *mangany-mi-nka* 'food-III.OBL-DAT.'

All verb-headed clauses in Wambaya must contain a grammatical auxiliary containing subject and object cross-referencing bound pronouns and clausal tense/aspect/mood information. While word order is grammatically free in Wambaya for the most part, the auxiliary is unusual in having a fixed position: it must always occur in second position in the clause (after the first constituent, which may be a single word or a complex NP). The auxiliary appears to have derived from a fully inflecting verb with pronominal agreement prefixes and tense/aspect/mood suffixes. An original main verb–coverb structure (as is common in other northern Australian languages, see McGregor, 2002), has become an auxiliary-verb structure in Wambaya, with the auxiliary retaining only the grammatical information of the original main verb, and the original coverb now contributing all lexical meaning. Remnants of an original main verb are found in the directional/tense portmanteaux in the synchronic auxiliary, as in the contrast between *ngurr-any* '1PL.INC-PST.AWAY' and *ngurr-amany* '1PL.INC-PST.TWDS' in (1). Examples of auxiliaries in transitive and reflexive/reciprocal clauses include the following:

Table 2 Wambaya core case system

	A	*S*	*O*
Nominals	Ergative	Nominative	Accusative
Pronouns	Ergative	Nominative	Accusative

(5) Garndani-j-ba nyi-ngg-a! Daguma
shield-TH-FUT *2*.SG-RR-NF *hit*.NF
gunu-ny-u ninki!
3.SG.M.A-*2*O-FUT *this*.I.SG.ERG
Shield yourself! He's going to hit you!

As shown by the second clause in (5), the interaction between the tense marking on the auxiliary and the verb is complex, and under certain conditions the two may encode different tense values, together defining the tense/mood value for the clause as a whole. See Nordlinger and Bresnan (1996) and Nordlinger (1998a) for detailed discussion.

Syntax

Wambaya exhibits the three classic properties of 'nonconfigurationality' (Hale, 1983): 'free' word order, null anaphora, and discontinuous constituents. Core NPs are generally optional – the reference of the subject and object being retrievable from the bound pronouns in the auxiliary – and thus Wambaya sentences commonly consist of simply a verb followed by the auxiliary as in (6). Nominal modifiers can appear separately to the heads they modify, their coreference indicated by gender, number, and case agreement (7).

(6) Ngaj-bi irri-ng-a.
see-NF *3*PL-*1*O-NF
'They're looking at me.'

(7) **Nganki** ngiy-a lurrgbanyi
this.SG.II.ERG *3*.SG.F.A-PST *grab*.NF
wardangarri-nga-ni.
moon-II.OBL-ERG
'This moon grabbed (her).'

Case marking occurs on nonfinite verbs in subordinate clauses to encode relative tense and, in some cases, switch reference. In (8), the use of the ergative/locative case in the subordinate clause (here in initial position) signals that the two events are cotemporaneous (relative present tense) and that the subject of the subordinate clause is coreferential with the subject of the main clause. In (9), the infinitive marker is used in a cotemporaneous subordinate clause to signal that the subordinate subject is coreferential with the main clause *object*.

(8) Ngarli-ni irri-ng-a ngurra abajabajami.
talk-LOC *3*.PL-*1*O-NF *1*.PL.INC.ACC *make.crazy*.NF
'They make us confused (when they're) talking.'

(9) Ngaj-bi ng-a gaj-barda.
see-NF *1*.SG-PST *eat*-INF
'I saw him eating.'

Switch reference is not encoded in purposive clauses (marked with the dative case, or with the infinitive, as in (1)), nor in relative past tense clauses (marked with the ablative case).

Equational, identificational, and attributive clauses are generally headed by nominals, with no copula verb. In these clauses, the nominal predicate and its subject typically agree in number, gender, and case (i.e., nominative). Such nominal clauses cannot contain an auxiliary.

(10) Naniyaga guji-nya ngarri-rna.
that.SG.II.NOM *mother*-II.NOM *my*-II.NOM
'That's my mother.'

See also: Australia: Language Situation; Case; Configurationality; Endangered Languages; Ergativity; Gender, Grammatical; Switch Reference.

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Wang Li (1900–1986)

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Wang Li (Wang Liaoyi) was one of the three most prominent linguists in China in the 20th century. He was born August 10, 1900, in what is now Bobai County of the Guangxi Zhuang Autonomous Area. His family could not afford any more than a primary school education, but after studying on his own he was able to pass the entrance exam for the postgraduate program at Tsing Hua University in 1926, where he studied with Wang Guowei, Liang Qichao, Chen Yinke, and Chao Yuen Ren (*see* **Chao Yuen Ren (1892–1982)**). After Wang completed his thesis on Old Chinese grammar in 1927, Chao Yuen Ren encouraged him to go to the University of Paris to study. In Paris his focus changed from grammar to experimental phonetics, with his 1931 dissertation

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Wang Li (1900–1986)

R J LaPolla, La Trobe University, Bundoora, Victoria, Australia

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Wang Li (Wang Liaoyi) was one of the three most prominent linguists in China in the 20th century. He was born August 10, 1900, in what is now Bobai County of the Guangxi Zhuang Autonomous Area. His family could not afford any more than a primary school education, but after studying on his own he was able to pass the entrance exam for the postgraduate program at Tsing Hua University in 1926, where he studied with Wang Guowei, Liang Qichao, Chen Yinke, and Chao Yuen Ren (*see* **Chao Yuen Ren (1892–1982)**). After Wang completed his thesis on Old Chinese grammar in 1927, Chao Yuen Ren encouraged him to go to the University of Paris to study. In Paris his focus changed from grammar to experimental phonetics, with his 1931 dissertation

being an analysis of the Bobai dialect of Chinese. Returning to China in 1932, he took up a position at Tsing Hua University. After the Japanese invasion in 1937, he followed the university to Changsha and then Kunming, but took a sabbatical in Vietnam from 1939 to 1940, studying Vietnamese and Sino-Vietnamese loanwords. In 1946 he went to Zhongshan University, where he founded the Linguistics Department, and moved to Lingnan University two years later. During the restructuring of universities in 1952, Wang moved back to Zhongshan University to be head of the Linguistics Department; in 1954 this department was merged with the Chinese Department of Beijing University, where he remained until his death in 1986.

After 1949, Wang was active politically, as a representative to the National People's Congress and the Beijing and National Political Consultative Congresses. He was also Deputy Chairman of the Chinese Language Reform Committee, an advisor to the National Language Work Committee, member of the Academy of Sciences, and Honorary President of the Chinese Linguistics Association and the Chinese Phonology Association.

Wang was a prolific writer; even during the war years he continued publishing. He wrote 40 books and over 200 academic articles, plus poetry, short literary pieces, and dozens of translations from French and other languages into Chinese. His linguistic work covers all aspects of linguistics: experimental phonetics, which he applied to the study of traditional Chinese philology and reconstruction; the grammar of Old Chinese and Modern Chinese and the changes in between; language standardization and education; and the structure of poetry. He was one of the first to systematically study Chinese grammar on its own terms, arguing that concepts from English grammar should not be blindly applied to the Chinese language. In Chinese traditional phonology and the historical reconstruction of Old Chinese, he found that one of the rhyme categories needed to be split to account for the rhyming patterns of the old texts, and argued, *contra* Bernard Karlgren, that each rhyming category should only have one main vowel and there should be some open syllables. He also argued that there should be only two tones in Old Chinese, with long and short syllables in the two tones giving rise to the later four-tone system.

See also: Chao Yuen Ren (1892–1982); Chinese.

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Wang, NianSun (1744–1832)

B-C Kwok, Hong Kong, China

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Wang NianSun (1744–1832; also known as Wang Huaizu) is regarded as one of the greatest Chinese philologists of the Qing dynasty (1644–1911). He received his early education from Dai Zhen (1725–1777), who gave him a solid background in the field. Like his predecessors, Wang was a Confucian scholar intent on understanding the ancient texts, and this led to his interest in Chinese historical phonology and philology. He produced numerous annotations and emendations on classical texts. His masterpiece,

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Guangya shuzheng (Annotations and evidence on *Guangya*), was the result of a ten-year effort.

Guangya is a dictionary compiled by Zhang Yi of the 3rd century. Wang's *Shuzheng* cannot simply be treated as an annotation. It also contains emendations and corrections of *Guangya*, often with examples from other documents to support his argument. His profound knowledge of Chinese phonology lead to the following breakthroughs:

1. In the preface of *Shuzheng*, Wang stated that words that sound the same or similar have related meanings. Thus, studies on the old meaning of words should be based upon their old sound, not on the meaning radicals of the Chinese characters, as had been the practice up to that time. Wang's theories brought us a better understanding of the nature of Chinese word families.
2. Wang was able to identify old phonetic uses of characters *(jiajie* in Chinese; using a character for one word for its sound value alone to represent another word) by examining their sounds. Many misinterpretations in classical texts were thus corrected.

Wang's theories in phonology were elaborated in his *Shijing qunjing Chuci yunpu* (*Manual of rhymes in the Shijing, other classical texts and Chuci*), *Jingyi shuwen* (*A description on the meaning of classical texts*), *Yu Li Fangbo shu* (*A letter to Li Fangbo*), and *Yu Jiang Jinsan shu* (*A letter to Jiang Jinsan*). He divided Old Chinese into 21 rhyme categories, a result that is almost identical to the works of his contemporaries Duan Yucai (*see* **Duan Yucai (1735–1815)**) and Jiang Yougao (?–1851). Interestingly enough, they worked independently but arrived at very similar conclusions. Wang's theories represented the peak of Qing phonological studies. Many modern scholars have followed the main body of Wang's system with only minor modifications.

Wang Niansun's elder son Yinzhi (1766–1834) also contributed to the field of Chinese philology. While following the principles set up by his father, Wang Yinzhi focused more on grammatical words. His *Jingzhuan shici* (*Explanations of words in classical texts*) is a pioneer work in the field.

See also: Chinese; Duan Yucai (1735–1815); Wang Li (1900–1986).

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War Rhetoric

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Introduction

With its massive conscript armies and unprecedented carnage, the First World War required greater support and greater sacrifices from the population than any previous war. As a result war propaganda grew in importance, and the then relatively new medium of the mass press played a crucial role in mobilizing public opinion in favor of the war. Soon after, the study of war propaganda, and of public opinion generally, became a new field in American political science. Harold Lasswell's *Propaganda techniques in the World War* (1927) is still a classic in the field. In this book Lasswell identified key propaganda strategies, such as the demonization of the enemy leader, the need to couch war propaganda in terms of defense, the exaggeration of atrocities, and the need to devise different justifications for different groups in the population on the basis of their different interests. All these strategies can still be seen at work in contemporary war rhetoric.

Lasswell was no linguist, and in subsequent years propaganda would primarily be studied by historians and political scientists, with relatively little systematic analysis of the linguistic means by which it was realized. The use of language in Nazi propaganda, with its vast set of bureaucratic terms and acronyms and its astounding euphemisms, such as *Sonderbehandlung* 'special treatment' for 'execution,' and *Endlösung* 'final solution' for 'the extermination of the Jews,' was an exception. A well-known example is the work of Victor Klemperer, a Jewish professor of linguistics in Dresden who, in 1933, was forced out of his job and forbidden to publish by the Nazis, and

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who throughout the subsequent years recorded his observations of Nazi language, eventually publishing them as *The language of the Third Reich–LTI–Lingua Tertii Imperii: a philologist's notebook* (2000). More recent discussions of Nazi language include Wodak and De Cilla (1988) and Ehlich (1989). Several lexicons of Nazi language have appeared (e.g., Michael and Doerr, 2002).

Critical Linguistics

In Europe, linguistic analyses of war rhetoric reappeared from the 1970s onward, especially in relation to Cold War rhetoric and the nuclear arms debate, and, more recently, in relation to America's interventions in the Middle East and the so-called 'war on terror' that followed the events of September 11, 2001. This work formed part of the activities of the 'critical linguistics' movement that began in the mid–1970s at the University of East Anglia, and in the 1990s evolved into the broader movement of 'critical discourse analysis' (CDA). The analyses were written as immediate interventions in the debates of the moment and aimed at undermining the justifications of specific wars and aggressive policies in speeches by government leaders and in mainstream media. A key collection of critical linguistic essays on war rhetoric was Chilton (1985). CDA-oriented papers on war rhetoric have mainly appeared in journals such as *Discourse and Society*, *Critical Discourse Studies*, and the *Journal of Language and Politics*, which will publish a special issue in 2005 on this theme.

The critical linguists of the 1970s and 1980s took inspiration from the work of George Orwell, who had criticized political language in his 1946 essay 'Politics and the English Language' (2000) and in his description of 'Newspeak' in *Nineteen eighty-four* (quoted in Chilton, 1985: 45):

> The purpose of Newspeak was not only to provide a medium of expression for the worldview and mental habits proper to the devotees of Ingsoc [the dominant ideology], but to make all other modes of thought impossible. It was intended that when Newspeak had been adopted . . . a thought diverging from the principles of Ingsoc should be literally unthinkable, at least as far as thought is dependent on words.

Chilton made a similar though perhaps slightly diluted claim for 'Nukespeak' (ibid: 44):

> To coin the term Nukespeak is to make the claim that talk about nuclear weapons, nuclear war and nuclear politics is carried out by distinct words and phrases, and this in itself has important consequences for thought and action.

To analyze these words and phrases, critical linguists used a wide range of methods, including systemic-functional grammatical analysis (e.g., Moss, 1985), semantic field analysis and metaphor (e.g., Chilton, 1988), Greimasian semiotic analysis (e.g., Van Belle and Claes, 1985), Goffmanian frame analysis and Gricean conversation principles (e.g., Richardson, 1985), but by and large the critique was based on identifying linguistic manipulations (or 'transformations', e.g., Hodge, 1985), which were then interpreted as ideologically motivated distortions, in Chilton's words, on showing how the 'local organization of lexis and syntax . . . highlights certain meanings and obfuscates others' (1985: xiv). Some of these linguistic manipulations are relatively obvious and have also been commented on by many media commentators. These include euphemisms, such as the relatively neutral 'strike' for a nuclear attack, or to take a more recent one, 'collateral damage' for the death of innocent civilians; technical terms, especially acronyms (e.g., WMD for 'weapons of mass destruction'); and the names of weapons and military operations, e.g., the name of the MX missile in the Reagan era ('Peacekeeper') or the name of the bomb that destroyed Hiroshima ('Little Boy'). In his description of Newspeak ('War is Peace and Peace is War' was one of its slogans), Orwell had already identified these phenomena and pointed at the way they constitute 'doublespeak' – the dissolution of the oppositions without which debate about issues such as war and peace becomes impossible (see Orwell, quoted in Chilton, 1988: 80; cf. also Hodge, 1985: 136): 'Defenceless villages are bombarded from the air, the inhabitants driven out, the huts set on fire with incendiary bullets . . . this is called "pacification."' Other, less obvious local organizations of lexis and syntax included grammatical agency, nominalization, and metaphor. In 'call to arms' speeches, for instance, the ascription of agency fluctuates between the addressed audience ('we'), the nation ('America,' 'this country'), and the moral cause that justifies war ('Western commitment to democracy'), thus conflating the three, while the actions ascribed to these agents tend to be referred to in abstract terms, as in Bush's speech of March 16, 2003 (http://www.whitehouse.gov/news/re/cases/2003/03) ("We work towards a great cause, and that is peace and security in this world"). The actions of the enemy tend to be more concrete and are ascribed to a personified and demonized enemy, as in the same speech ("The dictator of Iraq and his weapons of mass destruction are a threat to the security of free nations"). This then creates an us-them contrast. The nominalization of war actions and the use of agentless passive constructions obscures agency, as in the *Times'* headlines at the time of the

Hiroshima and Nagasaki bombings of April 7 and 10, 1945: 'Rain of Ruin from the Air' and 'Second City Hit.' Metaphors can make new and unprecedented events appear familiar, natural, and acceptable, as in the now increasingly common descriptions of war as a 'job' and as 'business.' Chilton (1988: 72) quotes an example from the *Daily Mail* of May 3, 1982: "An Argentine submarine appears to be hit. All this means is that the British forces are getting on with the job they were sent down to the South Atlantic to do, namely to remove the Argentines." The importance of metaphor for our understanding of the world we live in has been powerfully argued by Lakoff and Johnson (1981); at the time of the first Gulf War, Lakoff wrote a paper on metaphor and war (1991), which he published on the Internet to avoid delay in publication and make it more widely available.

Critical Discourse Analysis

Already in the mid-1980s, critical linguists also began to analyze war rhetoric in terms of discourses, 'belief systems,' for example in relation to the long-lasting antinuclear demonstration by women at Greenham Common (Fowler and Marshall, 1985). Here the focus was not on words and phrases but on particular complexes of ideas, such as that women are less rational than men, should confine themselves to domestic and maternal tasks, and so on. Such belief systems then manifested themselves through a range of lexical and syntactic means and in a range of contexts, for example through the use of terms such as 'peace hysteria' and 'protesting peace mums' in the popular press. Chilton (1988) related this to work on scripts and schemas in cognitive linguistics and artificial intelligence (e.g., Abelson, 1973, who had used the 'Cold War script' as one of his examples), pointing out that metaphors can often trigger whole complexes of ideas without referring to them in explicit and detailed ways.

More recent work in critical discourse analysis has increasingly moved in the direction of identifying broad discursive strategies, focusing especially on the 'legitimation' of war (at other times the term 'justification' is used). Several articles of this kind can be found in a special issue of the journal *Discourse and Society* (*15*: 2–3) on the events of September 11, 2001, and their aftermath. Graham *et al*. (2004), for instance, point at the remarkable consistency of the strategies used in call to war speeches over the past 1000 years. Studying a hundred such speeches, they found that all (1) refer to an ultimate moral force to legitimate the war (although the nature of this moral force evolved from 'God,' to 'God and Country,' and then to 'Country' or 'People' alone); (2) embed the discourse in the history and culture that binds 'us,' the addressed audience that must be rallied behind the war, together; (3) construct the enemy as an evil other; and (4) provide unifying constructs for the people addressed. Lazar and Lazar (2004) deal specifically with 'enemy construction' and discuss strategies of 'criminalization,' 'orientalization,' and 'vilification.' Although they specify linguistic realizations of these categories in some cases (for instance, 'criminalization' is realized by the use of criminal vocabulary and 'overlexicalization'), in other cases the realizations are semantic categories (for instance, 'orientalization' can be realized by 'moral degeneracy,' 'bellicosity,' and 'duplicity'). In short, there has been a gradual move from an emphasis on 'local' lexical and syntactic features to an emphasis on overall rhetorical strategies and discourses (in the sense of belief systems). However, in most cases the argumentation still rests primarily on the use of discourse analytical methods. Relatively little connection is made with literature on the specific wars and conflicts discussed, or with literature from other fields, such as media studies, where less attention is paid to language but more to the context, e.g., to documenting forms of wartime media censorship (see, e.g., Schlesinger *et al*., 1983, which appeared roughly at the same time as Chilton, 1985).

Rhetoric

The American approach to war rhetoric has by and large based itself on traditional rhetorical analysis, with explicit reference to Aristotle and the classic rhetoricians, and often also with reference to the work of Kenneth Burke (e.g., 1969), who saw rhetoric as language's essential function of inducing social cooperation. This work is closely linked to the American tradition of public opinion and mass communication research that started in the 1920s with the work of Lasswell, Lippman, and others, and has never lost sight of rhetoric's time-honored connection between political speechmaking and political action, a connection that critical linguists had to regain after having been trained in the formal and decontextualized linguistics of the 1950s and 1960s. American journals such as *Communication Monographs* and *Quarterly Journal of Speech* have been publishing articles on war rhetoric for a long time (e.g., Brockriede and Scott, 1969 Medhurst *et al*., 1982), and while war rhetoric has not become an area of specialization among critical discourse analysts (Chilton is perhaps the single exception), in America war rhetoric did become a specialized area of scholarship (see, e.g., Medhurst *et al*., 1997). A glance at the Internet soon shows in just how many

American universities courses on war rhetoric are taught, with syllabuses that are sometimes preceded by the warning that controversial issues will be on the agenda. Textbooks and syllabuses use a variety of methods for the analysis of war rhetoric, including strategies, from the classic Aristotelian notions of 'ethos' (establishing the credibility and trustworthiness of the speaker), 'pathos' (appealing to the emotions of the audience), and 'logos' (providing evidence to back up what is proposed) to strategies such as 'evasion' and 'diversion,' as well as specific rhetorical techniques, including euphemism, jargon, and metaphor, as well as, for instance, repetition and specific techniques for the analysis of argumentation and the discovery of fallacies.

Conclusion

The European and American approaches to war rhetoric are motivated by the same concern: a concern for maintaining the reasoned and critical forms of debate that have been fundamental to democracy since the days of Plato and Aristotle. More recently they have also grown more closely together in terms of their methods. American work has started to incorporate notions such as 'genre' and 'intertextuality,' and European work has become more interdisciplinary, linking up with historical and politicological approaches to war propaganda and with the specific histories of the discourses that are being analyzed and critiqued, and paying attention to nonlinguistic forms of war rhetoric, realizing, for instance, that images can play a particularly important role in strategies such as the demonization of enemies and the exaggeration of atrocities. And while most analyses have focused on political speeches and media reports and commentaries, there is now also an increasing realization of the importance of entertainment media in war propaganda, something which had already been noted in the context of media studies (see Schlesinger *et al.*, 1983). The link between entertainment and propaganda goes back at least as far as the 1930s, when Goebbels (1948: 122) wrote that 'argument is no longer effective' and looked toward popular song, humor, and movies as key media of propaganda: "With films we can make politics too. It is a good expedient in the struggle for the soul of our people" (quoted in Bramstedt, 1965: 278). Today there is close cooperation between the Pentagon and the producers of the computer war games and Hollywood war movies (see Machin and Van Leeuwen, in press) that disseminate demonized images of the new 'terrorist' enemy and allow people to identify with American heroes.

In the current political climate it is clearly important that critical work on war rhetoric continues and that it is written accessibly and disseminated effectively, not least so that it can feed into the work of the journalists and media commentators who continue to write critically about the war rhetoric of today's world leaders; a glance at the Internet shows that many still do.

See also: Critical Discourse Analysis; Discourse of National Socialism, Totalitarian; Media Panics; Media, Politics, and Discourse: Interactions; Politics and Language: Overview.

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Waray *See:* Samar-Leyte.

Ward, Ida Caroline (1880–1950)

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Ida Caroline Ward, one of the leading Africanists of the 20th century, was born in Bradford, England, on October 4, 1880, the eighth child of a prosperous Yorkshire wool merchant. She was educated at the University of Durham, and then embarked on a long and successful career in school teaching. When in her thirties, she began to interest herself in linguistics, attending classes at Daniel Jones's newly established department of phonetics at University College London, Jones offered her a full-time post in 1919 at UCL, where initially she specialized in English phonetics and speech pathology. Her early books, S*peech defects: their nature and cure* (1923), *A handbook of English intonation* (1926, written with her departmental colleague Lilias Armstrong), and the popular *Phonetics of English* (1929), reflect these enthusiasms.

Ward soon began to focus more on the languages of West Africa and in 1932 moved over to London University's School of Oriental Studies (later renamed School of Oriental and African Studies), where she could indulge this interest to the full. With Diedrich Westermann, she wrote the wide-ranging survey *Practical phonetics for students of African languages* (1933) and in the same year produced her pioneering *Phonetic and tonal structure of Efik*; for the latter she was awarded a D.Lit. from London University. Further groundbreaking research on tone systems gave rise to a series of publications on West African languages, in particular her *Introduction to the Ibo language* (1936), which also explored vowel harmony. Her final major work in this area was the *Introduction to the Yoruba language*, published posthumously in 1952.

Ida Ward is notable not only for the accuracy and meticulousness of her empirical research but also for the lucid exposition of theoretical principles of tonal analysis, which she developed at a point when this study was in its infancy. She carried out all her work through direct contact with native-speaker informants, undertaking long linguistic field trips to West Africa even in the hazardous travel conditions of World War II.

Ida Ward was arguably the most brilliant of Daniel Jones's many talented pupils, and her contribution laid the foundations for much subsequent research into African tone languages. In 1937 she established a department of West African languages in SOAS with herself at the head, where in 1944 she was appointed to a chair. She was unquestionably one of the most important driving forces that made London University in her lifetime the chief center of research into African linguistics. She retired in 1948, but continued to work right up to her death in 1949.

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Warlpiri

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Warlpiri is a Pama-Nyungan language of the Ngumbin-Yapa subgroup (see McConvell and Laughren, 2004) spoken by some 3000 *Yapa* 'people' (typically Warlpiri people). The Warlpiri heartland is the Tanami Desert to the northwest of Alice Springs in Australia's Northern Territory, but the Warlpiri-speaking population now lives mainly in four communities around the margins of this area: Lajamanu, Nyirrpi, Yurntumu, and Wirliyajarrayi. There are also sizable populations in Katherine, Tennant Creek and Alice Springs, and in Aboriginal communities around the Warlpiri area. Warlpiri is also used over a larger area as a lingua franca – possibly up to 1000 Aboriginal people speak Warlpiri as a second language.

Warlpiri had seven dialects, which are now being reduced to four communalects: Yurntumu/Nyirrpi, Lajamanu, Wirliyajarrayi, and Wakirti Warlpiri (Alekarenge and Tennant Creek).

All the neighboring languages belong to the Pama-Nyungan family: Ngumbin-Yapa subgroup (Warlpiri, Ngardi, Jaru, Nyininy, Gurindji, Mudburra, Warlmanpa), Warumungu, Western Desert group (Pintupi Luritja, Pintupi, Kukatja), Arandic Group (Alyawarr, Kaytetye, Central Anmatyerr). Though there are significant differences between them, they share many of their core structural and sociolinguistic features.

Warlpiri Grammar

Ken Hale was Warlpiri's 'recording angel,' starting in 1959 (see the bibliography in Simpson *et al*., 2001). There is a learner's guide (Laughren *et al*., 1996), and good overviews are provided by Nash (1986), Hale *et al*. (1995), Simpson (1991), and the collection of papers in Swartz (1982a).

A Warlpiri encyclopedic dictionary is in preparation: the database currently has over 9500 entries. Hale (1995) is a simple dictionary with nearly 2000 entries, and has an appendix with a concise grammatical inventory (as has Hale *et al*., 1995).

Phonology

Table 1 shows the consonant phonemes in the standard orthography in use since 1974. The contrast between postalveolar stop *rt* and flap *rd* is only allophonic in eastern dialects: Wirliyajarrayi and Wakirti Warlpiri.

There are three vowels, i, u, and a. High vowels *u* and *i* harmonize with adjacent high vowels across morpheme boundaries: progressive in nominals, *wati-ngki* man-ERG, *kurdu-ngku* child-ERG, but regressive in verbs, *kipi-rni* winnow-PRES, *kupu-rnu* winnow-PAST. The low vowel *a* blocks vowel harmony: *kirlilkirlilpa-rlu* galah-ERG; *yirra-rni* put-PRES,

Table 1 Warlpiri consonants

	Peripheral		*Coronal*		
	Bilabial	*Velar*	*Lamino-palatal*	*Apico-postalveolar (retroflex)*	*Apico-alveolar*
Stop	*p*	*k*	*j*	*rt*	*t*
Nasal	*m*	*ng*	*ny*	*rn*	*n*
Lateral			*ly*	*rl*	*l*
Flap/tap				*rd*	*rr*
Glide	*w*		*y*		*r*

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Glide	*w*		*y*		*r*

yirra-rnu put-PAST. A syllable may have one 'short' vowel or a sequence of two identical vowels, e.g., *ngurrpa* 'ignorant of,' *nguurrpa* 'windpipe.'

The Word

Warlpiri words must have at least two vowels, in the same or sequential syllables, with an initial consonant and a final vowel and stress on the first syllable. The alveolar/postalveolar distinction (see Table 1) is neutralized word initially. The laminopalatal *ly* only occurs following a vowel.

There is a mora (or vowel) counting rule that determines the choice between the two forms of the locative (*-ngka* vs. *-rla*) and ergative (*-ngku*∼*i* vs. *-rlu*∼*i*), with minimal words hosting the velar allomorph, e.g., *ngurrpa-ngku* vs. *nguurrpa-rlu* (Hale, 1995: Appendix).

Clauses

Warlpiri has a classical nonconfigurational clause structure, with 'free' word order, discontinuous constituents, and a high reliance on zero anaphora (Hale, 1983; Hale *et al*., 1995; Swartz, 1991). It has verbal and nominal (i.e., verbless) clauses. The nominal clause can be rendered as a verbal clause using one of the stance verbs as copula (see Table 2).

Ngapa ngurrju. Ngapa-ka karri-mi ngurrju.
water good *water*-AUX *vertical.(stand)*-PRES *good*
'The water is good.'

The verbal clause consists of an obligatory verb and associated auxiliary complex, and a number of optional case-marked nominal constituents, as well as adverbial enclitics and particles with clausal or subclausal scope (Laughren, 1982a). Dependent and nonfinite subordinate clause types are discussed in Hale (1976) and Hale *et al*. (1995).

Table 2 Warlpiri stance verbs/copula (verb 'to be')

Neutral	*Vertical*	*Horizontal*	*Humped*
nyinami 'sit, stay'	*karrimi* 'stand'	*ngunami* 'lie'	*parntarrimi* 'crouch'

Verbs

There are 170 simple verb stems, which inflect for tense and mood in five conjugations. Past, nonpast and irrealis verbs co-occur with aspect auxiliaries (see Table 3), while the imperative, infinitive, future, and presentational forms do not. Derivational morphology creates a nomic or agentive/instrumental noun from verbs (Hale, 1995), and inceptive and iterative verb forms which inflect for tense and mood, e.g., *payirni-njina-* 'go and ask' vs. *payirni-njina-na-*'go about asking.'

Verbs are fixed in one of five transitivity patterns specifying syntactic case arrays: intransitive, bi-intransitive, middle, transitive, and bi-transitive (Swartz, 1982b).

The inchoative *-jarri-* and the transitivizer *-ma-* are two very productive verb formatives with nominal stems. They form interrogative verbs: *Nyarrpa-jarrija?* 'What did (he) do?' and *Nyarrpa-manu?* 'What did (he) do to (it)?'

Verbal meanings are further expanded by a large open noninflecting category termed preverb, particularly with the eight monosyllabic verb roots (Nash, 1982): ***nyanyi*** 'seeing,' ***purda-nyanyi*** 'hearing,' ***parnti-nyanyi*** 'smell.' Nominals, e.g., *jarda* 'sleep, asleep,' can act as preverbs; *jarda-ngunami* 'asleep-lying, sleeping.'

Nominals

Nominals make up the largest grammatical class, and include substantives (nouns) and descriptive terms (adjectives), free pronouns, the deictics and determiners, question words, etc. In verbal clauses they are optional. Nominals host number-marking suffixes

Table 3 The Warlpiri auxiliary complex

Aspect and tense					
-Ø- (i.e., nothing)			*-ka-*	*-lpa-*	
Perfective			*Imperfective*		
Nonpast	*Past*	*Irrealis*	*Nonpast*	*Past*	*Irrealis*
Immediate probability ngarri**rni** 'about to tell, may tell'	Completed action ngarru**rnu** 'has told, told'	Past possibility, probability ngarri**karla** 'would/should have told'	Happening; habitually happens **-ka** ngarri**rni** 'is telling, tells'	Action in progress in past **-lpa** ngarru**rnu** 'was telling'	Possibility, probability **-lpa** ngarri**karla** 'would/should tell'

Table 4 Warlpiri grammatical number

	Singular (one)	*Dual (a pair)*	*Paucal (several)*		*Plural (more)*
Nouns, interrogatives, adjectives	*-Ø*	*-jarra*	*-patu*		*-Ø*
Definite deictic and determiners	*-Ø*	*-jarra*	*-patu*		*-rra*
Indefinite determiners	*jinta*	*jirrama*	*marnkurrpa*		*panu*
3rd Person subject pronominal clitics	*-Ø*	*-pala*		*-li∼lu*	
3rd Person object pronominal clitics	*-Ø*	*-palangu*		*-jana*	

Table 5 Warlpiri spatial cases

-ngka∼rla	locative 'at, on, in'	*-kurra* allative 'to, up to'	*-ngurlu*	elative 'from'
-wana	'along, around'		*-jangka*	'from' origin, cause

(see Table 4), followed by a range of syntactic and semantic case suffixes (Hale *et al.*, 1995).

The three syntactic cases are in an ergative system. The ergative, *-ngku∼i* or *-rlu∼i*, marks the subject (agent) of a transitive verb. The absolutive, *-Ø* (zero), marks the subject of an intransitive verb and the object of a transitive verb. The dative, *-ku∼i*, marks indirect object and some oblique functions. There are a number of spatial cases, listed in Table 5, as well as an alienable possessive case. A grammatical case may suffix to a stem containing a semantic case (see Simpson, 1991).

Auxiliary Complex

The auxiliary complex is in the Wackernagel position, i.e., after the first constituent of the clause. The auxiliary complex comprises:

- an optional finite complementizer (Hale *et al.*, 1995)
- an aspect marker, which in concert with the verb tense specifies the temporal and aspectual meaning of the clause (Table 3)
- up to three pronominal clitics marking subject and nonsubject functions (Hale, 1973, 1982).

There is a systematic mapping of the syntactic case array specified by the verb – in an ergative system – onto the auxiliary pronominal clitics – in a subject-object system – described from different perspectives by Swartz (1982b) and Hale (1982).

The free pronouns and the pronominal clitics mark person and number (Table 4). Third person singular subject and direct object is unmarked. A clause can be very minimal, without any overt nominals or auxiliary morphemes, or it can be expanded with case-marked nominals, etc.

Jarnturnu.
'He trimmed it.'

can be expanded to:

Wati-ngki-Ø-Ø-Ø karli-Ø jarntu-rnu.
man-ERG-PERF-*3rd.sing*.SUBJ-*3rd.sing*.OBJ *boomerang*-ABS *trim*-PAST
'The man trimmed the boomerang.'

Expanding this, and changing the participants and aspect to show additional possibilities:

Ngajarra-ku kula-lpa-Ø-jarrangku-rla karli-Ø jarntu-rnu wati-ngki
1st.exl.dual-DAT NEG.COMP-IMPERF-*3rd.sing*.SUBJ-*1st.exl.dual*.-DAT *boomerang*-ABS *trim*-PAST *man*-ERG
'Us two (excluding you) was not for whom the man was trimming the boomerang.'

Meaning, Context, and Registers

I now discuss briefly some Warlpiri cultural preoccupations – with land, social relationships, and proper behavior – that are reflected in the language.

Tables 5–7 shows some of the ways in which spatial orientation and direction is encoded in the language. For instance, there is a rich set of deictics encoding distance, visibility, and definiteness, and the choice of copula is determined by the perceived orientation of the subject (see Table 2). In addition, there is a system of absolute three-dimensional spatial reference based on the four compass directions and up and down. The directional suffixes in Table 7 and additional suffixes create a rich system of spatial reference (Laughren, 1978).

Although Warlpiri had no counting system, Table 4 shows that it marks grammatical number on all nominals and references it in the pronominal clitics. There is a particular emphasis on pairing, reflected in the obligatory marking of dual, and the dual indefinite determiner.

There is also a preoccupation with relationships: the kin terminology allows any Yapa to be referenced as a relation, with higher order groupings into patrilineal, matrilineal, and generation moieties. There is

Table 6 Warlpiri spatial location and orientation: deictics

	Definite		*Indefinite*
	Location certain	*Not visible*	*Location uncertain*
Close	*nyampu* 'this, here'	*yalarnimpi* 'this one not visible'	*mirnimpi* 'somewhere here'
Nearby	*yalumpu* 'that, there'	*yalarni* 'that one not visible'	*mirni* 'somewhere there'
Further	*yali* 'yon, yonder'	*(yalarnimpayi?)* 'yonder not visible'	*mirnimpayi* 'somewhere yonder'
Distant	*yinya* 'far yonder'	*yalarnirra* 'that one far off out of sight'	*mirnirra* 'far away, a long way away'

Table 7 Warlpiri direction of action relative to speaker, suffixed to the inflected verb

Centripital	*Centrifugal*	*Perpendicular*
+*rni*~*rnu* 'towards (hither)'	+*rra* 'away (thither)'	+*mpa* 'across'

also a sociocentric system of eight subsections or 'skin names.'

Pairing shows up again in an extensive set of tri-relational kin terms, which allow any pair of people to be referenced as a triangulation of the relationship between the speaker and each of the pair, and the relationship between the pair (Laughren, 1982b), e.g., *makurnta-rlangu*, the relationship between one's brother-in-law and mother, who stand in the avoidance relationship of mother-in-law/son-in-law to each other (*kurnta* 'shame, proper behavior'). Relationship to land is also registered in the kinship system.

Warlpiri has respect registers, characterized by obliqueness, used when speaking about or to relations and ritual associates in avoidance or respect relationships (Laughren, 2001). *Rdaka-rdaka* 'Hand Talk' is a sign language used when speaking is inappropriate, especially by bereaved widows and mothers in the *jilimi* 'single women's camp' (Kendon, 1988). Baby Talk is used to talk to babies, incrementally building up the phonological, grammatical, and semantic features of Warlpiri for them as they develop (Laughren, 1984).

All these registers are characterized by hyperpolysemy and a systematic reduction in distinctions, giving us an insight into the organization of Warlpiri semantics, grammar, and phonology.

See also: Argument Structure; Arrernte; Australia: Language Situation; Bilingual Education; Clitics; Copula Variation; Ergativity; Hale, Kenneth L. (1934–2001); Harmony; Kaytetye; Kinship Expressions and Terms; Language Development: Overview; Phonetics of Harmony Systems; Pitjantjatjara; Sign Language: Overview; Sign Languages of the World; Silence: Cultural Aspects; Spatiality and Language; Taboo: Verbal Practices; Word Order and Linearization.

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Wartburg, Walther von (1888–1971)

G Price

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Walther von Wartburg was born on May 18, 1888 in Riedholz, Switzerland. He studied at the universities of Bern, Zürich, and Florence and then spent a year (1911–12) in Paris where he attended Gilliéron's seminars (*see* **Gilliéron, Jules (1854–1926)**) on linguistic geography at the Ecole des hautes études, an experience that was to prove fruitful particularly in that it led him to disagree with many of Gilliéron's views on the nature of language. After some years as a schoolmaster, he was appointed to his first university post at Lausanne in 1928, and was later to occupy chairs at the Universities of Leipzig (1929–1939) and Basle (1940 until his retirement in 1959). The first fascicle of his monumental French etymological dictionary, the *Französisches etymologisches Wörterbuch*, which is unrivaled in the field of any other language, appeared in 1922 and by 1928 the first volume was complete. Despite difficulties (some of them brought about by World War II and the problems of the postwar period) that necessitated a number of changes both of publisher and of place of publication, twenty volumes appeared before his death and others (including a complete reworking of the three prewar volumes) are in progress. Each article provides a wealth of information and examples not only from written French and Occitan of all periods but also from patois from the whole Gallo–Romance area, together with abundant bibliographical references. He had helpers, but Baldinger estimates that 85% of the text of vols. I–XIV, representing over 11 000 printed pages, is due to Wartburg himself. Meanwhile, he was also producing a succession of highly regarded books including (among many others) a bibliography of Gallo–Romance patois dictionaries (1934; new edition in collaboration with H.-E. Keller and R. Geuljans 1969), a history of the French language (1934, with nine further editions), and an influential if controversial account of the reasons (as he saw them) for the linguistic break-up of the Romance-speaking area. In 1947 he founded, as a branch of the German Academy of Sciences at Berlin, the Institute for Romance Linguistics whose publications he thereafter edited. His other wide-ranging editorial activities included (1935–1947) the *Zeitschrift für romanische Philologie* and its associated monographs. He died in Basle on August 15, 1971.

See also: French Lexicography; Gilliéron, Jules (1854–1926).

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Washu *See:* Hokan Languages.

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Shoichi Watanabe, an eminent English philologist, was born in Tsuruoka, Yamagata Prefecture, Japan, on October 15, 1930. In 1949 he enrolled in the Department of English Literature, Sophia University, Tokyo, from where he proceeded to the Graduate Division of Western Culture Studies in 1953. After completing his M.A. thesis on Ben Jonson's English grammar (1640) in 1955, he went to Münster University, Germany, where he continued his study of the beginnings of English grammar writing under Karl Schneider, a distinguished runologist and philologist. In 1958 Watanabe obtained a Dr.Phil. *magna cum laude*, and then went to Oxford University to do postdoctoral research under E. J. Dobson.

In 1960 Watanabe was appointed a Lecturer in the Department of English Literature, Sophia University. He was promoted to Associate Professor in 1964 and to Professor in 1971. From 1968 to 1969 he gave lectures at six U.S. universities as a visiting professor with the support of a Fulbright-Hayes grant. In 1994 he was awarded a Dr.Phil.h.c. by Münster University "because of eminent academic contributions." He retired from Sophia University in 2001, and has been a Professor Emeritus since then. Currently, he is the President of the Philological Society of Japan and the President of the Japan Association of Bibliophiles.

Of Watanabe's numerous achievements, only a limited selection can be mentioned. His doctoral dissertation (1958; Japanese edition, 1965) is a thorough study of the early modern English grammars that demonstrates that they are far more dependent on medieval Latin grammars than had previously been thought, redressing the view of Otto Funke, who had emphasized the ancient and Humanist tradition. Watanabe completed this study at a time when there was not a single book on this subject in the English-speaking countries. *A history of English linguistics* (1975) is the most exhaustive investigation of grammatical and orthoepical theories before 1800. The coverage has been extended to include Generative Grammar in *Do you know English grammar?* (2003). *A history of the National Studies in England* (1990) propounds the hitherto unknown notion of 'the National Studies in Tudor England,' focusing on John Leland and Matthew Parker, who strove to identify the origins of their nation and religion through antiquarian studies. In celebration of Watanabe's retirement in 2001, his shorter writings were collected in two volumes and a massive catalogue of his splendid collection of philological books was published. His collection has been extolled by Dr. Christopher de Hamel, Librarian, Parker Library, Corpus Christi College, Cambridge, as "far more comprehensive than any private library known to me in England."

See also: Dobson, Eric John (1913–1984); English, Later Modern (ca. 1700–1900).

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Waunana *See:* Choco Languages.

Web Searching

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Introduction

A Web search engine takes a user need, usually stated in the form of a few key words, and returns a list of Web pages that can be considered relevant for the given key words. These Web pages are a short list of usually a few hundred items selected from a vast repository of billions of pages.

The 'easy' part of Web searching is to find which documents on the Web are related to a given query, because most queries are very broad, and there are thousands of pages relevant to most basic concepts. The hard part of Web searching is to rank those documents by relevance and select the top 10, say, to show the first result page to the user.

Although there was an important body of information retrieval algorithms and techniques published before the invention of the World Wide Web, there are unique characteristics of this new medium that made those techniques unsuitable or insufficient for Web searching.

> 'Information retrieval algorithms were developed for relatively small and coherent collections such as newspaper articles or book catalogs in a (physical) library. The Web, on the other hand, is massive, much less coherent, changes more rapidly, and is spread over geographically distributed computers…' (Arasu *et al.*, 2001)

The Web can be considered as divided into two parts, the 'closed Web' and the 'open Web' (Brooks, 2003). The 'closed Web' comprises a few high-quality controlled collections in which a search engine can fully trust. The 'open Web' includes the vast majority of Web pages, which lack an authority asserting their quality. In the open Web, traditional information-retrieval techniques, concepts, and methods are challenged.

To partly overcome this problem, hyperlinks between pages can be used in the same way as citations can be used in academic literature to find the most important papers in an area. Link analysis techniques can be used to exploit hyperlinks and extract useful information from them.

However, one of the main challenges that the open Web poses to search engines is 'search engine spamming', i.e., malicious attempts to get an undeserved high ranking in the list of results. This has created a whole branch of research called 'adversarial information retrieval' that deals with retrieving information from collections in which a subset of the collection has been manipulated to influence the outcome of ranking algorithms.

In the next sections, we present the main issues related to indexing, searching, ranking, and crawling the Web. We end with a section on the characteristics with the Web and another on research issues. Because of space restrictions, our coverage of details and bibliography is by no means complete. For further details on Web retrieval, we recommend Baeza-Yates and Ribeiro-Neto (1999).

Indexing and Querying Web Pages

The Web search process has two main parts: off-line and online.

The off-line part is executed periodically by the search engine, and consists in downloading a subset of the Web to build a collection of pages, which is then transformed into a searchable index.

The online part is executed every time a user query is executed and uses the index to select some candidate documents that are sorted according to an estimation on how relevant they are for the user's need. This process is depicted in Figure 1.

Web pages come in many different formats such as plain text, HTML pages, PDF documents, and other proprietary formats. The first stage for indexing Web pages is to extract a standard logical view from the documents. The most frequently used logical view for documents in search engines is the 'bag-of-words' model, in which each document is seen only as an unordered set of words. In modern Web search engines, this view is extended with extra information concerning word frequencies and text formatting attributes, as well as meta-information about Web pages including embedded descriptions and explicit key words in the HTML markup.

There are several text normalization operations (Baeza-Yates, 2004a) that are executed for extracting keywords; the most frequently used ones are tokenization, stopword removal, and stemming.

Tokenization involves dividing the stream of text into words. While in some languages such as English this is very straighforward and involves simply splitting the text using spaces and punctuation, in other languages, such as Chinese, finding words can be very difficult.

Stopwords are words that carry little semantic information, usually functional words that appear in a large fraction of the documents and therefore have little discriminating power for asserting relevance. In information retrieval, stopwords are usually

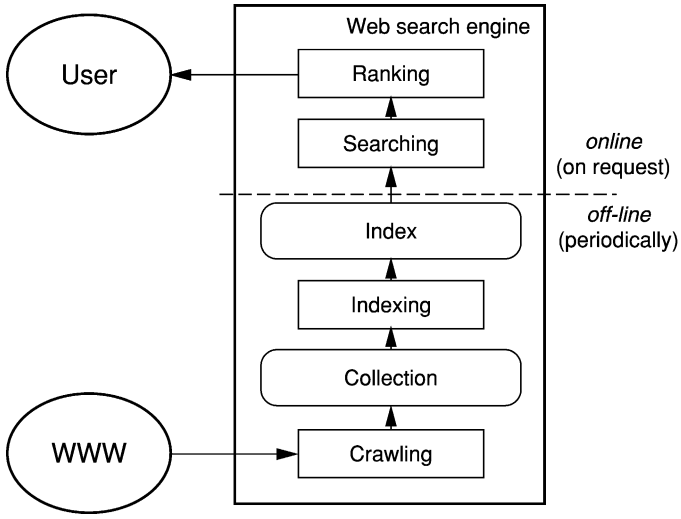

Figure 1 A Web search engine periodically downloads and indexes a subset of Web pages. This index is used for searching and ranking in response to user queries.

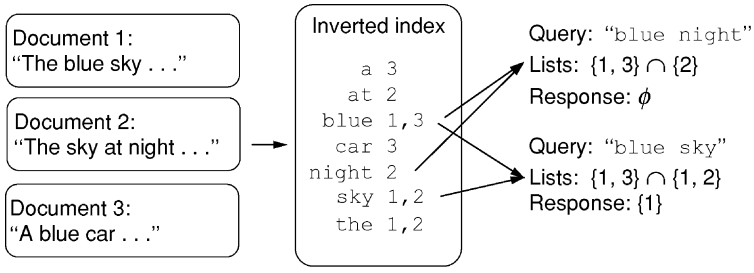

Figure 2 A sample inverted index.

discarded, also for efficiency reasons, as storing stopwords in an index takes considerable space because of their high frequency.

Stemming extracts the morphological root of every word. In global search engines, the first problem with stemming is that it is language-dependent, and while an English rule-based stemming works well, in some cases, such as Spanish, a dictionary-based stemmer has to be used, while in other languages, such as German and Arabic, stemming is quite difficult.

Other, more complex operations such as synonym translation, detecting multiword expressions, phrase identification, named entity recognition, word sense disambiguation, etc. are used in some application domains. However, some of these operations can be computationally expensive and if they have large error rates, then they can be useless and can even harm retrieval precision.

Inverted Index

An inverted index is composed of two parts: a vocabulary and a list of occurrences. The vocabulary is a sorted list of all the key words, and for each term in the vocabulary, a list of all the 'places' in which the key word appears in the collection is kept. Figure 2 shows a small inverted index, considering all words including stopwords. When querying, the lists are extracted from the inverted index and then merged. Queries are very fast because usually hashing in memory is used for the vocabulary, and the lists of occurrences are presorted by some global relevance criteria.

The granularity of the choice of the items in the list of occurrences determines the size of the index, and a small size can be obtained by storing only the document identifiers of the corresponding documents. If the search engine also stores the position where the term appears on each page the index is larger, but can be used for solving more complex queries such as queries for exact phrases, or proximity queries.

While the vocabulary grows sublinearly with the collection size, the list of occurrences can be very large. The complete inverted index can occupy from 10% to 20% of the space occupied by the actual collection. An inverted index does not fit in the main memory for a Web collection, so several partial indices are built. Each partial index represents only a

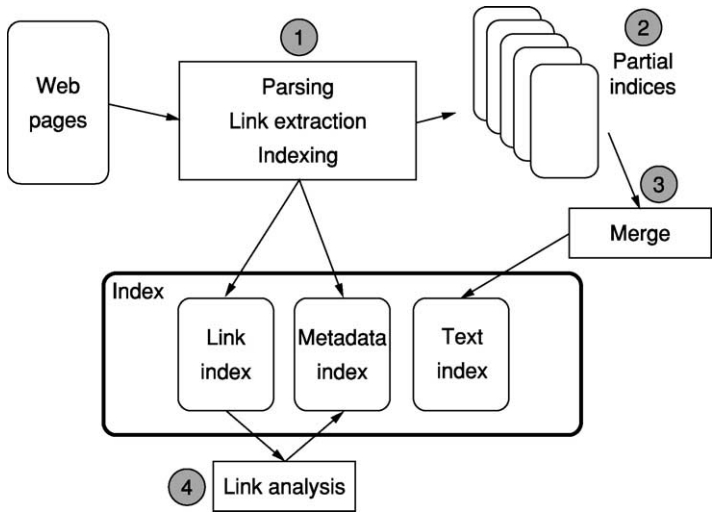

Figure 3 Indexing for Web search. (1) Pages are parsed and links and extracted. (2) Partial indices are written on disk when the main memory is exhausted. (3) Indices are merged into a complete text index. (4) Off-line link analysis can be used to calculate static link-based scores.

subset of the collection and these partial indices are later merged into the full inverted index.

In Figure 3 the main stages of the indexation process are depicted. During parsing, links are extracted to build a Web graph, and they can be analyzed later to generate link-based scores that can be stored along with the rest of the metadata.

Distributing Query Load

Query response time in today's search engines must be very fast, and should be done in parallel, involving several machines. For parallelization, the inverted index is usually distributed among several physical computers. To partition the inverted index, two techniques are used: the global inverted file and the local inverted file (Tomasic and Garcia-Molina, 1993).

When using a global inverted file, the vocabulary is divided into several parts containing roughly the same number of occurrences. Each computer is assigned a part of the vocabulary and all of its occurrences. Whenever a query is received, the query is sent to the computers holding the query terms, and the results are merged afterwards. Hence, load balancing is not easy.

When using a local inverted file, the document identifiers are divided, but each computer gets the full vocabulary. That is, step 3 in Figure 3 is omitted. A query is then broadcast to all computers, obtaining good load balance. This is the architecture used in the main search engines today, as building and maintaining a global index is difficult.

Query processing involves a central 'broker' that is assigned the task of distributing incoming queries and merging the results. As the results are usually shown in groups of 10 or 20 documents per page, the broker does not need to request or merge full lists, only the topmost results from each partial list.

Search engines exploit the fact that users seldom go past the first or second page of results. Search engines provide approximate result counts because they never perform a full merge of the partial result lists, so the total number of documents in the intersection can only be estimated. For this reason, when a user asks for the second or third page of results for a query, it is common that the full query is executed again.

Ranking

Text-Based Ranking

The vector-space model (Salton, 1971) is the standard technique for ranking documents according to a query. In this model, both a document and a query are seen as a pair of vectors in a space with as many dimensions as terms as there are in the vocabulary. In a space defined in this way, the similarity of a query to a document is given by a formula that transforms each vector using certain weights and then calculates the cosine of the angle between the two weighted vectors:

$$sim_{(q,d)} = \frac{\sum_t w_{t,q} \times w_{t,d}}{\sqrt{\sum_t w_{t,q}^2} \times \sqrt{\sum_t w_{t,d}^2}}$$

In a text-based information retrieval system, documents are shown to the user in decreasing order using this similarity measure.

A weighting scheme uses statistical properties from the text and the query to give certain words more importance when doing the similarity calculation. The most widely used scheme is the TF-IDF weighting scheme (Salton and Buckley, 1988), which uses the frequency of the terms in both queries and documents to compute the similarity.

TF stands for 'term frequency', and the idea is that if a term appears several times in a document it describes the contents of that document better. The TF is usually normalized with respect to document length, that is, the parameter used is the frequency of term t divided by the frequency of the most frequent term in document d:

$$tf_{t,d} = \frac{freq_{t,d}}{\max_\ell freq_{\ell,d}}$$

IDF stands for inverse document frequency and reflects how frequent a term is in the whole collection. The rationale is that a term that appears in a few documents gives more information than a term that appears in many documents. If N is the number of documents and n_t is the number of documents containing the query term t, then $idf_t = \log \frac{N}{n_t}$.

Using these measures, the weight of each term in given by:

$$w_{t,q} = \left(\frac{1}{2} + \frac{1}{2} tf_{t,q}\right) idf_t, \; w_{t,d} = tf_{t,d}$$

The 0.5 added is to avoid a query term having 0 weight. Several alternative weighting schemes have been proposed, but this weighting scheme is one of the most widely used and gives good results in practice.

Connectivity-Based Ranking

Web pages sharing a link are more likely to be topically related than unconnected Web pages (Davison, 2000). The key hypothesis of connectivity-based ranking goes one step further, and asserts that a hyperlink from a page p' to a page p, means, in a certain way, that the content of page p is endorsed by the author of page p'.

For the same reasons that self-citations in academic literature should not confer authority, link analysis techniques must be aware of the fact that thousands of links can be created automatically by the same user:

> 'Unlike academic papers which are scrupulously reviewed, Web pages proliferate free of quality control or publishing costs. With a simple program, huge numbers of pages can be created easily, artificially inflating citation counts. Because the Web environment contains profit-seeking ventures, attention-getting strategies evolve in response to search engine algorithms. For this reason, any evaluation strategy which counts replicable features of Web pages is prone to manipulation' (Page *et al.*, 1998).

The algorithms for connectivity-based ranking based on this assumption can be partitioned into (Henzinger, 2001):

- Query-independent ranking, which assigns a fixed score to each page in the collection.
- Query-dependent ranking, or topic-sensitive ranking, which assigns a score to each page in the collection in the context of a specific query.

Query-Independent Ranking The Pagerank algorithm (Page *et al.*, 1998) is currently an important part of the ranking function used by the Google search engine. The definition of Pagerank is recursive, stating in simple terms that a page with high Pagerank is a page referenced by many pages with high Pagerank.

To calculate the Pagerank, each page on the Web is modeled as a state in a system, and each hyperlink as a transition between two states. The Pagerank value of a page is the probability of being in a given page when this system reaches its stationary state.

A good metaphor for understanding this is to imagine a 'random surfer', a person who visits pages at random, and upon arrival at each page, chooses an outgoing link uniformly at random from the links in that page. The Pagerank of a page is the fraction of time the random surfer spends at each page.

This simple system can be modeled by the following equation of a 'simplified Pagerank'. In this and the following equations, p is a Web page, $\Gamma^-(p)$ is the set of pages pointing to p, and $\Gamma^+(p)$ is the set of pages p points to.

$$Pagerank'(p) = \sum_{x \in \Gamma^-(p)} \frac{Pagerank'(x)}{|\Gamma^+(x)|}$$

However, actual Web graphs include many pages with no out-links, which act as 'rank sinks' as they accumulate rank but never distribute it to other pages. In the stationary state, only they would have Pagerank > 0. These pages can be removed from the system and their rank computed later. Also, we would like pages not to accumulate ranking by using indirect self-references (self-links are easy to remove), thus not passing all of their score to other pages. For these reasons, most of the implementations of Pagerank add 'random jumps' to each page. These random jumps are hyperlinks from every page to all pages in

the collection, including itself, which provide a minimal rank to all the pages as well as a damping effect for self-reference schemes.

In terms of the random surfer model, we can state that when choosing the next step, the random surfer either chooses a page at random from the collection with probability ε, or chooses to follow a link from the current page with probability $1-\varepsilon$. This is the model used for calculating Pagerank in practice, and it is described by the following equation:

$$Pagerank(p) = \frac{\varepsilon}{N} + (1-\varepsilon) \sum_{x \in \Gamma^{-}(p)} \frac{Pagerank(x)}{|\Gamma^{+}(x)|}$$

where N is the number of pages in the collection, and the parameter ε is typically between 0.1 and 0.2, based on empirical evidence. Pagerank is a global, static measure of the quality of a Web page, very efficient in terms of computation time, as it only has to be calculated once at indexing time and is later used repeatedly at query time.

Note that Pagerank can also be manipulated and in fact there are thousands or millions of Web pages created specifically for the objective of deceiving the ranking function:

> 'Among the top 20 URLs in our 100 million page Pagerank calculation using teleportation to random pages, 11 were pornographic, and they appear to have all been achieved using the same form of link manipulation. The specific technique that was used was to create many URLs that all link to a single page, thereby accumulating the Pagerank that every page receives from random teleportation, and concentrating it into a single page of interest' (Eiron *et al.*, 2004).

Another paradigm for ranking pages based on a Markov chain is the absorbing model (Amati *et al.*, 2003). In this model, the original Web graph is transformed by adding, for each node, a 'clone node' with no out-links. Each clone node p' is only linked from one node in the original graph p. When this system reaches the stationary state, only the clone nodes have probabilities greater than zero. The probability of the clone node p' is interpreted as the score of the original node p.

A different paradigm for static ranking on the Web is the network flow model (Tomlin, 2003) for ranking pages. A (sub)graph of the Web is considered as carrying a finite amount of fluid, and edges between nodes are pipes for this fluid. The ranking of a page is related to the maximum amount of flow through a node in this network.

Query-independent ranking summarizes each page on the Web with a single number, or a pair of numbers, but as the creators of Pagerank note, "the importance of a Web page is an inherently subjective matter that depends on readers interests, knowledge and attitudes" (Page *et al.*, 1998); this is why query-dependent ranking is introduced to create ranking functions that are sensitive to user's needs.

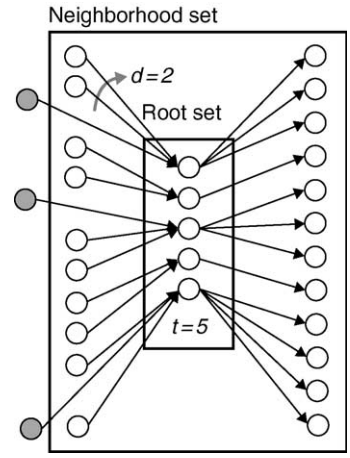

Figure 4 Expansion of the root set with $k=5$ and $d=2$. k is the number of pages in the root set, and d is the maximum number of back-links to include in the neighborhood set.

Query-Dependent Ranking In query-dependent ranking, the starting point is a 'neighborhood graph': a set of pages that is expected to be relevant to the given query. This graph is built by starting with a set of k pages containing the query terms; this set can be built using the list of results given by a full-text search engine. This *root set* is augmented by its 'neighborhood', which comprises all (or a large sample) of the pages directly pointing to, or directly pointed to by, pages in the root set.

Figure 4 depicts the process of creation of the neighborhood set. The idea of limiting the number of pages added to the neighborhood set by following back links to at most a parameter d was not part of the original unbounded d proposal, but was introduced later (Bharat and Henzinger, 1998).

It is customary that when considering links in the neighborhood set, only links in different Web sites are included, as links between pages in the same Web site are usually created by the same authors as the pages themselves, and do not reflect the relative importance of a page for the general community.

The most linked pages in the neighborhood set are usually not the best candidates (Yuwono and Lee, 1996). Ordering pages by number of in-links performed poorly when compared with pure content-based analysis.

The HITS algorithm (Kleinberg, 1999) is based on considering that relevant pages can be either 'authority pages' or 'hub pages'. An authority page is expected to have relevant content for a subject, and

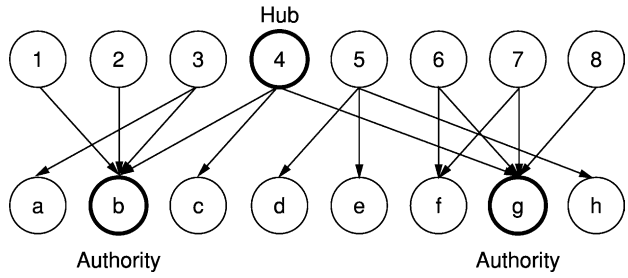

Figure 5 Hubs and authorities in a small graph. Node 4 is the best hub page, as it points to many authorities, and nodes *b* and *g* are the best authority pages.

a hub page is expected to have many links to authority pages. These two characteristics have a mutually reinforcing relationship: a page with high authority is pointed to by many pages with a high 'hubness' and vice-versa, as shown in Figure 5.

HITS produces two scores for each page, called authority score and hub score, using an iterative method of computation. The algorithm suffers from several drawbacks in its pure form (Bharat and Henzinger, 1998):

1. Not all the documents in the neighborhood set are about the original topic ('topic drifting').
2. There are nepotistic, mutually reinforcing relationships between hosts.
3. There are many automatically generated links.

Problem (1) is the most important, as while expanding the root set, it is common to include popular pages that are highly linked, but unrelated to the query topic. The solution is to use analysis of the contents of the documents and/or anchor texts and pruning the neighborhood graph by removing the documents that are too different from the query.

Problems (2) and (3) can be avoided using the following heuristic: if there are k edges from documents on a host to documents in another host, then each edge is given a weight of $1/k$. This gives each document the same amount of influence on the final score, regardless of the number of links in that specific document.

A different approach to query-dependent ranking is topic-sensitive Pagerank (Haveliwala, 2002). In this ranking scheme, scores for each page are precomputed at indexing time, using an algorithm similar to Pagerank. Each score represents the importance of a page for each topic from a set of predefined topics. At query time, the ranking uses the query to assign weights to the different topic-sensitive Pagerank scores of each page.

Crawling the Web

The large volume of the Web implies that any Web crawler can only download a fraction of the existent-Web pages within a given time, so it needs to prioritize its downloads. The high rate of change of the Web implies that by the time the crawler is downloading the last pages from a site, it is very likely that new pages have been added to the site, or that pages that have already been updated or even deleted.

Crawling the Web, in a certain way, resembles watching the sky in a clear night: what we see reflects the state of the stars at different times, as the light travels different distances. What a Web crawler gets is not a 'snapshot' of the Web, because it does not represent the Web at any given instant of time (Baeza-Yates and Ribeiro-Neto, 1999). The last pages being crawled are probably very accurately represented, but the first pages that were downloaded have a high probability of having been changed. This idea is depicted in Figure 6.

A crawler requires a smart scheduling policy for downloading Web pages, and this may become a harder problem in the future, as the amount of information on the Web can potentially grow faster than the available bandwidth for Web crawlers.

> 'Given that the bandwidth for conducting crawls is neither infinite nor free it is becoming essential to crawl the Web in a not only scalable, but efficient way if some reasonable measure of quality or freshness is to be maintained' (Edwards *et al.*, 2001).

The behavior of a Web crawler is the outcome of a scheduling policy that is mostly concerned with which pages to download and in which order (selection policy) and how to re-visit pages (re-visit policy) without overloading Web sites (politeness policy).

Selection Policy

There are several types of Web crawlers. A Web search engine concerned with only one country or one region is called a 'vertical search engine' and uses a crawler specifically designed for this purpose. In the case of a vertical crawler or an intranet crawler, the problem is easy, as the selection policy of pages is mostly related to selecting by a domain name.

On the other end, on a global Web search engine, the selection policy deals mostly with when to stop

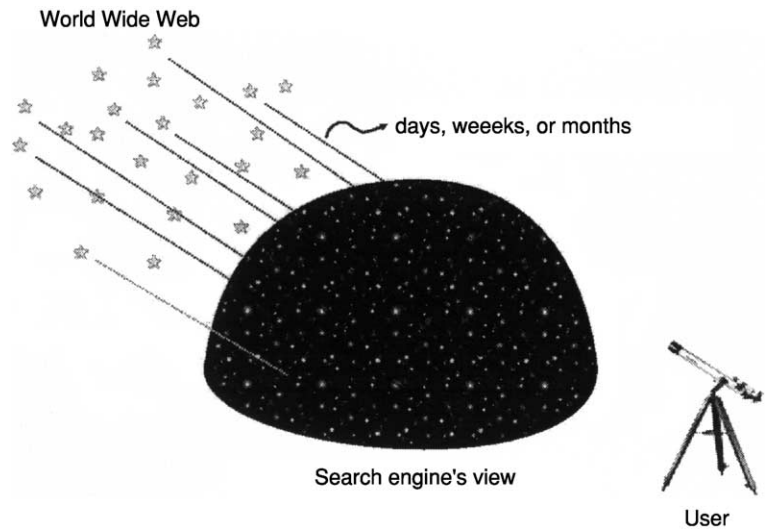

Figure 6 The search engine's view of the Web represents the state of Web pages at different times, as the view of the sky at night presents the state of stars at different times.

crawling, as the space of Web pages is infinite. In this regard, a usual criteria is link depth, i.e., starting from the home page and following links up to a certain level (Baeza-Yates and Castillo, 2004).

There is a third kind of selection policy that is used by topical crawlers (for instance: the crawler of a search engine specialized in real estate). In this case, the importance of a page for a crawler can be expressed as a function of the similarity of a page to a given query. This is called 'focused crawling' (Chakrabarti *et al.*, 1999). The main problem in focused crawling is that in the context of a Web crawler, we would like to be able to predict the similarity of the text of a given page to the query **before** actually downloading the page. The performance of focused crawling depends mostly on the richness of links in the specific topic being searched, and focused crawling usually relies on a general Web search engine to provide starting points.

Re-visit Policy

The Web has a very dynamic nature, and crawling a fraction of the Web can take a long time, usually measured in weeks or months. By the time a Web crawler has finished its crawl, many events could have happened.

From the search engine's point of view, there is a cost associated with not detecting an event, and thus having an outdated copy of a resource. The most widely used cost functions are freshness and age (Cho and Garcia-Molina, 2000).

1. Freshness. This is a binary measure that indicates whether the local copy is accurate or not. The freshness of a page p in the repository at time t is defined as:

$$F_p(t) = \begin{cases} 1 & \text{if } p \text{ is equal to the local copy at time } t \\ 0 & \text{otherwise} \end{cases}$$

2. Age. This is a measure that indicates how outdated the local copy is. The age of a page p in the repository, at time t is defined as:

$$A_p(t) = \begin{cases} 0 & \text{if } p \text{ is not modified at time } t \\ t - \text{modification time of } p & \text{otherwise} \end{cases}$$

The objective of the crawler is to keep the average freshness of pages in its collection as high as possible, or to keep the average age of pages as low as possible. These objectives are not equivalent: in the first case, the crawler is only concerned with **how many** pages are out-dated, while in the second case, the crawler is concerned with **how old** the local copies of pages are.

Cho and Garcia-Molina (2003a) proved the surprising result that, in terms of average freshness, it is better to re-visit pages with a uniform frequency than to re-visit pages with a frequency proportional to their rate of change. The explanation for this result comes from the fact that, when a page changes too often, the crawler will waste time by trying to re-crawl it too fast and still will not be able to keep its copy of the page fresh.

Politeness Policy

The use of Web crawlers is useful for a number of tasks, but comes with a price for the general community. Web crawlers use a lot of network resources and

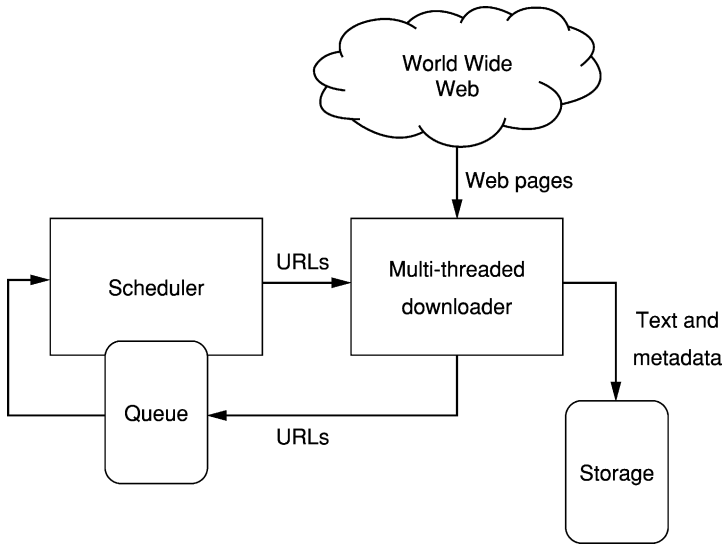

Figure 7 Typical high-level architecture of a Web crawler.

can potentially overload servers with more requests than they can handle.

A partial solution to these problems is the robot exclusion protocol (Koster, 1996), which is a standard for administrators to indicate which parts of their Web servers should not be accessed by robots. As for the interval between accesses to the same Web site, they vary between 20 seconds and 3–4 minutes. It is worth noting that even when being very polite, and taking all the safeguards to avoid overloading Web servers, some complaints from Web server administrators are received. Brin and Page note that: "... running a crawler which connects to more than half a million servers ... generates a fair amount of email and phone calls" (Brin and Page, 1998).

Web Crawler Architecture

A crawler must have a good crawling strategy, as noted in the previous sections, but it also needs a highly optimized architecture. Building a high-performance crawling system presents a number of challenges related to network efficiency and robustness (Shkapenyuk and Suel, 2002).

Web crawlers are a central part of search engines, and details of their algorithms and architecture are kept as business secrets. When crawler designs are published, there is often an important lack of detail that prevents others from reproducing the work. There are also emerging concerns about 'search engine spamming' that prevent major search engines from publishing their ranking algorithms. The typical high-level architecture of Web crawlers is shown in Figure 7.

Some important general-purpose crawlers include the WebCrawler (Pinkerton, 1994), which was used to build the first publicly available full-text index of the Web, the Internet Archive Crawler (Burner, 1997), which is used to archive periodic snapshots of a large portion of the Web and the Google Crawler (Brin and Page, 1998), which is described in some detail, but the reference is only about an early version. In addition to these specific crawler architectures, there are general crawler architectures described in (Chakrabarti, 2003; Baeza-Yates and Castillo, 2002).

Web Characterization

Web Size

During the last 3 years, about 10 million Web sites have appeared yearly, and in March 2005 over 60 million Web sites were found by Netcraft's Web server survey. As for the number of Web pages, the leading search engine today, Google indexed over 8 billion (10^9) pages in November 2004. This figure can only be taken as a lower bound. Even large search engines cover only a portion of the publicly available content (Lawrence and Giles, 2000); it is shown that no search engine indexed more than 16% of the Web in 1999.

Currently, most of the content on the Web cannot be found by following links, but is only accessible through query forms. This is called the 'Hidden Web' (Raghavan and Garcia-Molina, 2001), and it is believed to hold one or two orders of magnitude more information than the public pages. And, although the amount of information on the Web is certainly finite, Web applications can generate arbitrarily many pages and it can be argued that the number of pages on the Web is potentially infinite (Baeza-Yates and Castillo, 2004).

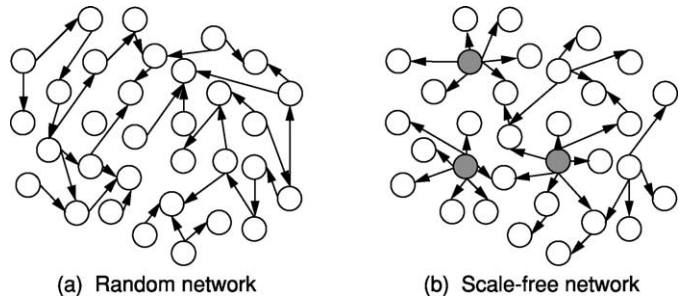

Figure 8 Examples of a random network and a scale-free network, with the major hubs highlighted in the scale-free network. Each graph has the same number of nodes and links. Note that both graphs were chosen to be connected and display well, so they are not entirely random.

Web Dynamics

When studying document updates, the data is obtained by repeated access to a subset of pages. In all cases, the results are only an estimation of the actual values because they are obtained by polling for events (changes), not by the resource notifying events, so it is possible that between two crawler accesses a Web page changes more than once.

If changes to a given page occur at independent intervals – if page change is a memoryless process – then it can be modeled as a Poisson process (Brewington *et al.*, 2000). The probability that a search engine's copy of a page is up to date at a certain time decreases exponentially if the page is not revisited. Under this model of page changes, the rate of change of a given page can be estimated based on previous observations (Cho and Garcia-Molina, 2003b), especially if the Web server provides the last modification date of the page every time it is visited.

However, it is worth noting that most Web page changes exhibit certain periodicity – because most of the updates occur during business hours in the relevant time zone for the studied sample – so the estimators that do not account for this periodicity are more valid on the scales of weeks or months than on smaller scales.

The methodologies and goals for studies on Web page changes vary widely. Some researchers focus on the lifespan of pages – the time it takes for a page to disappear from the Web – as they are concerned with the availability of Web content. For instance, in the case of scholarly publications, in 4 years about 50% of the links are no longer valid (Spinellis, 2003).

Other studies focus on Web page changes: in a large-scale study of 150 million pages over 10 weeks (Fetterly *et al.*, 2003), 65% of the pages did not change at all, while 30% of the pages had only minor changes and 5% changed substantially. It is also known than the .com domain is more dynamic than .edu and .gov (Cho, 2000) and that highly linked pages change more frequently (Douglis *et al.*, 1997).

Link Structure

The link structure on the Web emerges as the result of collective actions, and as such, it has properties that diverge from a pure random network. "While entirely of human design, the emerging network appears to have more in common with a cell or an ecological system than with a Swiss watch" (Barabási, 2001).

Scale-free networks, as opposed to random networks, are characterized by an uneven distribution of links. These networks are characterized as networks in which the distribution of the number of links $\Gamma(p)$ to a page p follows a power law:

$$Pr(\Gamma(p) = k) \propto k^{-\theta}$$

A scale-free network can be interpreted as a graph in which a few highly-linked nodes act as 'hubs', keeping most of the nodes in the network together, as depicted in Figure 8.

On the Internet, the geographical and physical connectivity of nodes forms a scale-free network, as well as the network of links between Web pages and the network of e-mail exchanges. Outside the realm of computer science, scale-free networks appear in several contexts, for instance, the network of acquaintances, friends, and social popularity in human interactions, the graph of citations in scientific publications, and the networks of protein interaction in cellular metabolism.

There are certain models of the growth of scale-free networks. The preferential attachment model (Barabási and Albert, 1999), is a 'rich-get-richer' model in which each new Web page creates links to existent Web pages with a probability distribution that is not uniform, but proportional to the current in-degree of existent Web pages. This generates a power-law, but the resulting graph differs from the actual Web graph in other properties such as the presence of small, tightly connected communities.

Another generative model is the 'copy' model (Kumar *et al.*, 2000), in which new nodes choose an

existent node at random and copy a fraction of the links of the existent node. This also generates a power law. These two models can be combined into a generative model that mixes preferential attachment with a baseline probability of gaining a link (Pennock *et al.*, 2002).

One of the characteristics of the Web that is more difficult to reproduce using generative models is its macroscopic structure. The most complete study of this subject (Broder *et al.*, 2000) focuses on the connectivity of a subset of 200 million Web pages from the Altavista search engine.

The study starts by identifying in the Web graph a single, large, strongly connected component, with all of the pages in this component able reach one another along directed links. They call the larger strongly connected component 'MAIN'. Starting in MAIN, if we follow links forward we find OUT, and if we follow links backward we find IN. All of the Web pages that are part of the graph but do not fit MAIN, IN, or OUT are part of other components as shown in Figure 9.

Components MAIN, IN, and OUT contain more than half the size of the Web, and as components in IN cannot be reached starting from MAIN, it is clear that for Web crawling, a good set of starting URLs is required. There is also a significant fraction of pages that can only be reached if the exact domain name is known; this is the ISLANDS part of the Web, and many Web sites start by being isolated and later join one of the other components (Baeza-Yates and Poblete, 2004).

Research Issues

There are many research issues in Web search. They can be divided roughly into two classes: data problems and user problems (Baeza-Yates, 2004b).

Among the data problems are volume, rapid change, the adversarial nature of the Web (spamming of metadata, content, and links), diversity of languages (e.g., cross-lingual retrieval), diversity of content (ranging from information and e-commerce sites to blogs and other new forms of Web publishing), Web server cooperation schemes for search engines, and multimedia retrieval, to name only a few.

On the user side, better query languages, user interfaces, and result visualizations are needed to cope with the information overload on the client side. The main open problem is to assess the quality of the results. They are usually relevant, but we will never know if we have all the relevant results, or if we have the best ones.

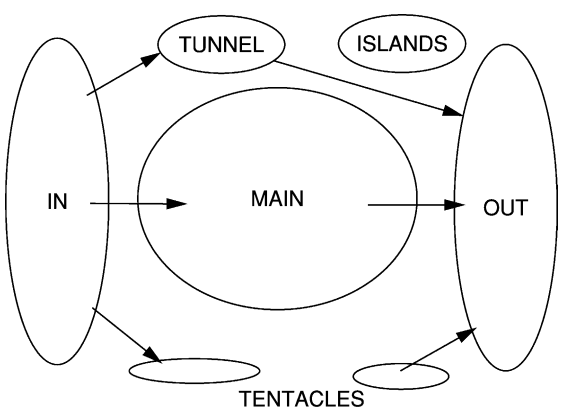

Figure 9 Macroscopic structure of the Web.

See also: Document Retrieval, Automatic; Indexing, Automatic; Stemming.

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Weber, Albrecht Friedrich (1825–1901)

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Albrecht Friedrich Weber, born February 17, 1825 in Breslau, was an extraordinarily prolific Indologist who made major contributions to Vedic, Prakrit, and Jaina studies. The son of an economist, Weber studied Oriental (including Sanskrit, Persian, and Arabic) and classical philology as well as history at three universities, in Breslau, Bonn, and Berlin, from 1842–1845. After taking his degree in Breslau in 1845, he traveled to Paris and London with a grant from the Prussian Academy to view and collate manuscripts of the White Yajurveda. The results were published in three volumes from 1852–1859, comprising his first contribution to Vedic studies. In 1848, he became a professor in Berlin, where Bopp was his colleague, and remained there until his death on November 30, 1901.

A tireless worker, Weber published dozens of important monographs and articles in his lifetime as well as countless reviews of new works. Many of these were published in *Indische Studien*, a journal that he founded in 1850. Several important articles are collected in his *Indische Skizzen* of 1857 and *Indische Streifen* of 1868, 1869, and 1879. His book reviews from 1880–1896 are collected in *Litterarisch-kritische Streifen*, Vol. 18 of *Indische Studien* (1897).

One of Weber's most indispensable contributions to Sanskrit studies was his catalogue of the manuscripts of the Royal Library of Berlin (Robert Chambers's collection), which had been acquired in 1843, entitled *Handschriften-Verzeichnisse der Königlichen Bibliothek zu Berlin* (1853). Preparing the catalogue, Weber became very familiar with Vedic literature, resulting in his *Akademische Vorlesungen über indische Literaturgeschichte* ('Academic Lectures on Indian literary history') of the same year. Other important Sanskrit contributions reflect Weber's particular interest in finding connections and influences among ancient peoples and their literatures. In 'Das Mahabhasya des Patanjali' (*Indische Studien*, Vol. XIII, 1873), Weber used cultural and literary references in the Mahabhasya to create the first unified picture of the culture and historical context from which it came and posited Greek influence on the development of Indian drama. In *Über die Krishnajanmashtami* ('Krishna's Geburtsfest') ('Krishna's Birthday Festival') (*Indische Studien*, 1868), Weber argued for Christian influence on the Krishna legend. His most important Vedic work was his transcription of *Taittiriya-Samhita* (*Indische Studien* Vol. XI and XII, 1871, 1872).

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Weber's central position as a professor in Berlin with access to the manuscripts and editor of *Indisiche Studien* meant that he had great and lasting influence in Indology, and particularly on his students, the most famous of whom was William Dwight Whitney.

See also: Bopp, Franz (1791–1867); Sanskrit; Whitney, William Dwight (1827–1894).

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Weber, Albrecht Friedrich (1825–1901)

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Weber, Max (1864–1920)

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Max Weber was born in Erfurt on April 21, 1864, son of Max Weber, member of the Reichstag, and Helene Fallenstein, and died on June 14, 1920 of an illness later diagnosed as pneumonia. After enrolling at the University of Heidelberg, he later moved to Strassburg, Berlin and Göttingen. He received his Ph.D. in 1889, with a dissertation on the *History of the Commercial Societies in the Middle Ages* and 2 years later he obtained the Habilitation with a dissertation entitled *Roman agrarian history*. His early work was deeply appreciated by Theodor Mommsen: Weber soon became a reference figure of the academic world. In 1893 he married Marianne Schnitger, who after his death was responsible for the publication of all his major works. In 1896, after his call to Heidelberg to succeed Karl Knies, he began suffering from serious nervousness which led him to suspend his teaching duties until 1918. He spent the following years traveling, most of all across Italy. He began to recover from his psychological illness only in 1903, when he definitively resigned from his academic chair.

1904 was a prolific year for Weber: he joined Sombart and Jaffé in the editorship of the *Archiv für Sozialwissenschaft und Sozialpolitik*, which became the major organ for social sciences in Germany. Here he published most of his methodological essays, contributing to the foundation of sociology as a rigorous science. As an introduction to the new journal, he wrote the essay on 'Objectivity of social and social-political knowledge,' where he developed the concept of 'ideal type' as an arbitrary representation able to express a constellation of sense, a criterion constructed by the social scientist in order to present a coherent description of an object. Although most of his work remained unfinished, and his writing style has often been viewed as difficult and incomprehensible, Weber always struggled for a strict method in science theory. This new intellectual endeavor involved a great deal of scientific debates with his colleagues, from Rudolph Stammler to Eduard Meyer.

In 1904 he also had the opportunity to visit the United States, where he held a conference in St. Louis on the social structure of Germany. This 3-month journey deeply impressed him: it is easy to find its traces in his later work, starting from his contemporary and most famous work, *The Protestant ethic and the spirit of capitalism*, where he claimed that the spiritual origin of capitalism had to be found in the ascetic morality of the Calvinists.

In 1909 he started working at his unfinished masterpiece, *Economy and society* (1922), a massive attempt, in his historical view, to unify sociology and economics, comprehending a huge range of subjects, from law to social actions, from religious communities to the different kinds of power (legal, traditional, charismatic). Its last goal can be defined as the explanation of the conditions which made it possible for Western world to develop such a rational (capitalistic) organization of both social and economical life.

Before the outbreak of World War I, he engaged himself in the foundation of the German Society of Sociology. His house in Heidelberg was frequently visited by eminent scholars: within the Weber circle, one could find Ernst Troeltsch and Werner Sombart, sociologists such as Simmel and Michels, neokantian philosophers such as Lask, Rickert, and Windelband, young scholars such as Jaspers, Lukács, and Bloch. To define his position in controversies, in 1913 he wrote the essay 'Some categories of interpretative sociology,' which intended to be the conceptual premises to *Economy and society*, determining the new discipline as a nomothetical one and establishing general rules of social behavior. During wartime, after a momentary lapse of nationalism – as a volunteer, he took charge of some bureaucratic tasks in the hospital of Heidelberg – he realized that German military policy would not lead anywhere. He started a consistent campaign against submarine warfare, due to involve the United States in the conflict, advising political reforms and supporting the Reichstag's role and a restriction of the powers of the Kaiser. Such a political attitude led him to be considered as a prophet of doom. At the end of the war, he was a founding member of the Deutsche Demokratische Partei, playing an important preliminary role in the writing of the Weimar Constitution and taking part as an expert in the Versailles Conference. He failed to be elected as a member in the democratic Parliament of the new Republic.

Even during this hectic political engagement, he managed to work on his *Sociology of religion*, the result of long work on the social impact of behaviors commanded or oriented by religious doctrines. His essays concerned the economical ethic of Hinduism, Buddhism, Judaism, Taoism and Confucianism.

Earlier in 1918, he started lecturing in Vienna and afterwards in Munich, in 1919, where he held two famous lectures on science and politics as a vocation. In the first conference he expressed his view that

scientific work must remain independent of personal values. In the second one, he distinguished between the ethic of responsibility, taking responsibility for the consequences of actions, and the ethic of intentions, rather preferring the purity of the moral law.

A critical edition of his work – *Max Weber Gesamtausgabe* – is now being edited by Mohr (Siebeck), Germany.

See also: Bible; China: Religions; Christianity, Protestant; Communities of Practice; Croce, Benedetto (1866–1952); Durkheim, Emile (1858–1917); Foucault, Michel (1926–1984); Habermas, Jürgen (b. 1929); Husserl, Edmund (1859–1938); Judaism; Kant, Immanuel (1724–1804); Legal Language: History; Luhmann, Niklas (1927–1998); Nominalism; Norms and Correctness; Quakerism; Social Class and Status; Social Construction and Language; Wundt, Wilhelm (1832–1920).

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Webster, Noah (1758–1843)

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Noah Webster was born in West Hartford, Connecticut, on October 16, 1758 and died in New Haven on May 28, 1843. He was an American lexicographer, textbook author, and spelling reformer.

Born the son of a New England farmer, Webster inherited the Protestant pioneer heritage without being exposed to the most rigorous Puritanism. From 1774 to 1778, Webster attended Yale, where he was imbued with the Enlightenment's ideals and with revolutionary thought. After graduation, Webster returned to his father's farm but was soon forced to seek his own living. From 1779 to 1780, Webster worked as a teacher in Hartford and West Hartford. Unsatisfied with schoolteaching, he decided to dedicate himself to the legal profession. In 1781, he was admitted to the bar in Connecticut, but his economic situation soon compelled him to return to education. He opened his own school in Sharon, Connecticut, where he was acquainted with the Huguenot Reverend John Peter Tetard, with whom he studied languages and history. After several personal disappointments, Webster left Sharon and moved to Goshen, New York, where he headed a school from 1782 to 1783. This period proved to be a turning point in Webster's life: he became a prominent propagandist for the Revolution and an intrepid defender of the ideal of an independent utopian America. The stay at Goshen turned out to be very prolific; during that time, Webster wrote Part I of *A grammatical institute of the English language*, his famous *Spelling book*. The *Speller* taught millions of Americans to spell and influenced thousands of young Americans more than any other secular book. Until that time, schoolbooks had been written by Englishmen, but Webster wanted to render them suitable for revolutionary America. Even though Webster worked as a teacher only reluctantly at the beginning of his career, his *Speller* was the first step on his long journey to becoming the 'schoolmaster of America.' Linked with the speller were a *Grammar* (1784) and a *Reader* (1785), but these parts of the *Grammatical institute* never reached the popularity of the *Speller*. At the end of the book, Webster appended a federal catechism, but by the beginning of the 19th century, a moral catechism was substituted for it. The moralistic approach of the *Speller* was particularly emphasized in editions after 1787, which included a series of fables. Apart from this moral tract that served as a vehicle for the transmission of the Protestant ethic, the *Speller* served as a means of creating a national language. For Webster, one of the basic purposes of his book was to support the establishment of America's cultural independence and national pride. Furthermore, Webster wanted to foster the unity of America.

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English grammar from Latin rules. Nevertheless, Webster's *Grammar* borrowed heavily from the Latin model in the domain of methodology. Webster was not only influenced by Lowth, but also by Horne Tooke's *The diversions of Purley* (1786) whose principles he adopted in his *A philosophical and practical grammar of the English language*. In this work, Webster held that Anglo-Saxon was to be used as a linguistic basis for modern English. Although Webster did not particularly focus on grammar, his persisting attacks against the Latin tradition of grammar might have helped to establish an English grammar independent of the omnipresent Latin model.

The third part of the *Grammatical institute* was a *Reader* that introduced rules for reading and speaking. In this part, Webster's nationalism is clearly expressed by the choice of patriotic pieces. Because Webster was eager to promote his schoolbooks and to claim copyrights, in May of 1785 he started traveling between several major cities in the United States. After short periods in which he worked as schoolteacher and journalist, he returned to Hartford, where he married Rebecca Greenleaf in 1789. In the same year, he published his lectures on language as *Dissertations on the English language*, in which he wrote on the general history of language, on the elements of language, on the formation and corruption of language, and on linguistic discussions. The following years were dedicated to family life (Webster fathered seven children) and to several changes of domicile. After having published *A brief history of epidemic and pestilential diseases* in 1799, Webster began working on his *Dictionary* in 1800. In 1806, Webster published *A compendious dictionary of the English language*, in which he based the etymologies of words on their Saxon origins, thus adopting Tooke's conception. He aimed at a more phonetic spelling and pleaded for a moderate reform of orthography.

In 1808, Webster converted to evangelical Protestantism. This conversion was of crucial importance for his most famous work: *An American dictionary of the English language,* which was finished in Cambridge, England, in 1825, but published in New York in 1828. In the dedication, Webster contended that language was of divine origin and that the primordial language was Chaldaic. His *American dictionary* is based on a religious conception that attempts to find the spiritual truth hidden by etymologies. Although the *Dictionary* reveals Webster's ignorance of the achievements of comparative grammar and a general lack of knowledge of European linguistic scholarship, Webster's *American dictionary* – with its 70 000 words – is one of the most astonishing achievements in the history of lexicography. Among the numerous dictionaries that followed this model, Merriam-Webster's dictionary may be considered as the most direct descendant of Noah Webster's tradition.

In keeping with his religious conversion, Webster published an edition of the Bible in 1833, a work he considered the most important of his life. Webster died in 1843, leaving to posterity a multitude of writings on a variety of topics (language, education, politics, religion, science, medicine, etc.), but he is especially remembered for his *Dictionary.* The name 'Webster' is still synonymous throughout the English-speaking world with correct spelling, authoritative definitions, and the concept of a dictionary.

See also: American Lexicography; English Lexicography; Lexicography: Overview; Lowth, Robert (1710–1787); Tooke, John Horne (1736–1812).

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Because of his original development of a communicative and functional approach to language, Wegener is regarded as a predecessor of German pragmatic thinking and British contextual linguistics. Born near Magdeburg, he studied Classical and German philology, comparative linguistics, and philosophy in Marburg and Berlin. After completing a doctoral thesis on Greek and Latin cases in 1871, he entered upon a career as a high school teacher. Although he remained a schoolteacher all his life, he never gave up scholarly research.

Under the influence of his university teachers (notably the philologist Moritz Haupt, the classicist Ernst Curtius, and the linguist and psychologist Heymann Steinthal), Wegener published in comparative linguistics, psycholinguistics and, because of his keen interest in the local dialects he grew up with, dialectology. In one of these studies, he put forward the idea of correlating different choices of words with the different settings in which they occur. This idea was the cornerstone of his subsequent research into 'situations' and their impact on the linguistic form of a speech event. His investigations culminated in his main work, *Untersuchungen über die Grundfragen des Sprachlebens*, in which he demonstrates that verbal expressions are best described not in isolation but as part of the totality of a person's *Lebensäußerungen* and as embedded in the 'context of situation.' Pursuing questions such as 'How does language function as a means of communication?', he argued that language is not merely an instrument for the representation of thoughts but a powerful means of acting purposefully to influence other people's minds and actions. The central concept of 'context of situation' consists, *inter alia*, of the 'situation of perception,' the 'situation of remembrance or consciousness,' and the 'situation of culture,' which have a great impact on the linguistic form of a speech event and ultimately on its comprehension. Wegener also introduces a functional bipartition to be found in any utterance: the 'exposition,' which serves to clarify the situation or to secure the preconditions of understanding, and the 'logical predicate,' i.e., the representation of the speaker's actual communicative aim. Understanding involves a cognitive process of continually limiting and specifying expectations pre-arranged by encyclopedic knowledge, speech situation, and the preceding verbal context. Wegener's last contribution to linguistics, *Der Wortsatz*, discusses the controversial subject of the sentence, its origin, nature, and definition.

Wegener's influence on general linguistics (Hermann Paul, Karl Brugmann) and on Karl Bühler, whose functional model of language is entirely compatible with Wegener's ideas, was considerable. His work was also a strong inspiration for Bronislaw Malinowski, Alan Gardiner, and John Rupert Firth, who used his concepts, especially that of the 'context of situation,' to establish a new school of functional and contextual linguistics in England. There are even some similarities between Michael Halliday's notion of language as a social semiotic system and Wegener's view that language is a part of social life.

See also: Brugmann, Karl (1849–1919); Bühler, Karl (1879–1963); Context and Common Ground; Firth, John Rupert (1890–1960); Gardiner, Alan, Sir (1879–1963); Halliday, Michael A. K. (b. 1925); Malinowski, Bronislaw Kaspar (1884–1942); Paul, Hermann (1846–1921); Steinthal, Heymann (1823–1899).

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Wegener, Philipp (1848–1916)

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Because of his original development of a communicative and functional approach to language, Wegener is regarded as a predecessor of German pragmatic thinking and British contextual linguistics. Born near Magdeburg, he studied Classical and German philology, comparative linguistics, and philosophy in Marburg and Berlin. After completing a doctoral thesis on Greek and Latin cases in 1871, he entered upon a career as a high school teacher. Although he remained a schoolteacher all his life, he never gave up scholarly research.

Under the influence of his university teachers (notably the philologist Moritz Haupt, the classicist Ernst Curtius, and the linguist and psychologist Heymann Steinthal), Wegener published in comparative linguistics, psycholinguistics and, because of his keen interest in the local dialects he grew up with, dialectology. In one of these studies, he put forward the idea of correlating different choices of words with the different settings in which they occur. This idea was the cornerstone of his subsequent research into 'situations' and their impact on the linguistic form of a speech event. His investigations culminated in his main work, *Untersuchungen über die Grundfragen des Sprachlebens*, in which he demonstrates that verbal expressions are best described not in isolation but as part of the totality of a person's *Lebensäußerungen* and as embedded in the 'context of situation.' Pursuing questions such as 'How does language function as a means of communication?', he argued that language is not merely an instrument for the representation of thoughts but a powerful means of acting purposefully to influence other people's minds and actions. The central concept of 'context of situation' consists, *inter alia*, of the 'situation of perception,' the 'situation of remembrance or consciousness,' and the 'situation of culture,' which have a great impact on the linguistic form of a speech event and ultimately on its comprehension. Wegener also introduces a functional bipartition to be found in any utterance: the 'exposition,' which serves to clarify the situation or to secure the preconditions of understanding, and the 'logical predicate,' i.e., the representation of the speaker's actual communicative aim. Understanding involves a cognitive process of continually limiting and specifying expectations pre-arranged by encyclopedic knowledge, speech situation, and the preceding verbal context. Wegener's last contribution to linguistics, *Der Wortsatz*, discusses the controversial subject of the sentence, its origin, nature, and definition.

Wegener's influence on general linguistics (Hermann Paul, Karl Brugmann) and on Karl Bühler, whose functional model of language is entirely compatible with Wegener's ideas, was considerable. His work was also a strong inspiration for Bronislaw Malinowski, Alan Gardiner, and John Rupert Firth, who used his concepts, especially that of the 'context of situation,' to establish a new school of functional and contextual linguistics in England. There are even some similarities between Michael Halliday's notion of language as a social semiotic system and Wegener's view that language is a part of social life.

See also: Brugmann, Karl (1849–1919); Bühler, Karl (1879–1963); Context and Common Ground; Firth, John Rupert (1890–1960); Gardiner, Alan, Sir (1879–1963); Halliday, Michael A. K. (b. 1925); Malinowski, Bronislaw Kaspar (1884–1942); Paul, Hermann (1846–1921); Steinthal, Heymann (1823–1899).

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In his remarkable career, cut short by a fatal illness, Uriel Weinreich made seminal contributions to various areas of the language sciences including bilingualism, semantics, sociolinguistics, lexicography, dialectology, language change, and Yiddish linguistics. Weinreich was born in Vilna, the elder of two sons. Max Weinreich, his father, was an outstanding figure in the study of Yiddish language and culture and one of the founders, in 1925, of the YIVO Institute in Vilna (relocated in 1940 to New York). In August 1939, when Weinreich was 13, his father took him to Copenhagen *en route* to a linguistic conference in Brussels. While they were abroad, Germany invaded Poland. Unable to return home, the Weinreichs settled in New York in early 1940.

Weinreich wrote his Columbia University doctoral dissertation (1951) under André Martinet's supervision and revised it for publication as *Languages in contact* (1953). While rooted in Weinreich's own experience as a member of a multilingual community who, moreover, had immigrated to a new linguistic environment, the study drew upon Weinreich's fieldwork in Switzerland in 1950 among bilingual Romansch speakers.

From 1951 through 1967, Weinreich taught linguistics at Columbia. With the help of the Atran Foundation and Martinet, Weinreich introduced Yiddish studies into Columbia's graduate curriculum. His students included William Labov and Marvin Herzog, with whom he wrote 'Empirical Foundations for a Theory of Language Change,' a conference paper presented and published after Weinreich's death. Directly, and through his students, he influenced many scholars beyond Columbia.

It was while conducting his dissertation research in Switzerland that the idea of creating an atlas of Yiddish-speaking Jewry occurred to Weinreich (B Weinreich, 1991: 9). This project, an important part of Weinreich's legacy, has established a comprehensive and systematic geolinguistic record of a culture destroyed in the Holocaust. Methodologically, the atlas was significant because Weinreich sought to execute it on the principles explored in his paper 'Is a Structural Dialectology Possible?' (1954). To process the atlas data, Weinreich pioneered the use of computers for dialectology (Sunshine, 1994: 60).

It is difficult to summarize Weinreich's contributions to linguistics because of the striking variety of his interests. He wrote *College Yiddish* (1949), a pedagogical grammar still widely used. He maintained an active interest in lexicology, not only writing critiques of dictionaries and theoretical explorations of lexicology, but also compiling the *Modern Yiddish-English/English-Yiddish dictionary* (1968). Posthumously published, this dictionary remains the standard reference in the English-speaking world. Weinreich began writing on semantics when this was still of peripheral concern to most linguists and soon recast his thinking in generative terms. 'Problems in the Analysis of Idioms' (Weinreich, 1969) is one of his many important papers and reflects his inclination to take on subjects generally regarded as refractory to linguistic analysis.

Weinreich served the greater academic community in his role as editor of periodicals and collective volumes in linguistics and Yiddish studies. He was also an early advocate of Chomsky's thinking (Koerner, 1989: 118).

Weinreich was married to Beatrice Silverman Weinreich, a scholar of Jewish folklore. They had two children and collaborated on several works, including a bibliography on *Yiddish language and folklore* (1959) and the design and methodology of the *Language and culture atlas of Ashkenazic Jewry* (Herzog *et al.*, (eds.) 1992, 1995, 2000). Weinreich died of melanoma in 1967. He had not yet turned 41. Labov deems Weinreich "one of the most profound and powerful linguists of our time."

See also: Chomsky, Noam (b. 1928); Fishman, Joshua A. (b. 1926); General Semantics; Labov, William (b. 1927); Lexicography: Overview; Lexicology; Martinet, André (1908–1999).

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Welmers, William E. (1916–1988)

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In the field of linguistics, William E. Welmers was the first great American Africanist. He was also one of the first Africanists to focus on synchronic description rather than diachrony. Most importantly, he generously shared his wide linguistic knowledge and applied it to practical matters of teaching and literacy. A brilliant field linguist, Welmers could knock down one language for breakfast and have another one figured out by dinner. Although most of his own work was done in West Africa, he was conversant with the Bantu languages and personally researched at least one Afroasiatic language.

Born and raised in the Midwest, Welmers's father was a professor of Greek at New Hope College where the son earned his undergraduate degree in philosophy (*summa cum laude*) in 1936. He then went on to Westminster Theological Seminary in Philadelphia and continued work in classical and biblical languages, as well as in theology and received several degrees there. Continuing his graduate studies in Near Eastern languages at the University of Pennsylvania, Welmers shifted to African languages due to war needs. His Ph.D. dissertation (1943) was supervised by Zellig Harris and described the grammar of Fanti, a major language of Ghana. As is well known, the main linguistic consultant was a young Ghanaian student named Kwame Nkrumah, later to become head of independent Ghana and much else.

Welmers's interest in language pedagogy began in the same period when he was involved, as part of the war effort, with the teaching of Japanese and Chinese. When the war ended, he set off to Africa (with his wife and son, a daughter was born there), where he worked among the Kpelle for the Lutheran Mission of Liberia. The three strands of his life's work were set: language pedagogy, service to his church, and language description. The rest of his career would see him making important contributions in all three areas. Welmers had a tremendous record of service to his church, to his students and university, and to both national and international organizations.

After the work in Liberia, Welmers set off across Africa from west to east, now with two young children, on a trip taking two years, as a fellow of the American Council of Learned Societies. He worked on languages belonging to several branches of Niger–Congo and on a Cushitic language of Eritrea. He returned to a position at Cornell, where he stayed for four years, and then returned to Liberia with the Lutheran Mission. On his return from Liberia he accepted a position at Hartford Theological Seminary (1955–1960) and finally at the University of California at Los Angeles, where he stayed until his retirement in 1982.

Welmers was very much an inspirational teacher and was vitally concerned with how languages were taught. His *magnum opus* and best-known work, *African language structures*, appeared in 1970 (published in 1973) was undertaken on the instigation of his students. It is an immense compendium of linguistic facts peppered with personal anecdotes and was the only book of its kind for many years. His success as a teacher can be seen in how many of his students went on to positions in major research universities. The Department of Linguistics at UCLA was for many years the best place to study for those interested in African languages, and much of the school's reputation was due to his inspirational teaching and scholarship.

See also: Africa as a Linguistic Area; Benue-Congo Languages; Harris, Zellig S. (1909–1992).

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Welsh

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Demographic Features

According to the 2001 census, 582 000 people, or 20.8% of the total population of Wales, claimed to be able to speak Welsh; almost 798 000, or 28.4% of the population, claimed to have at least one language skill in Welsh. Before 2001 successive censuses had recorded a decline in the number of Welsh speakers: 10 years previously, in 1991, there were 508 000 speakers who comprised 18.7% of the population. Apart from some very young children, all Welsh speakers in Wales are bilingual and can also speak English.

There are no official counts of Welsh speakers outside Wales but surveys commissioned by S4C, the Welsh television channel, suggest that there are more than 200 000 in England. One particular area where emigrants from Wales continue to speak Welsh is Patagonia, in the Chubut province of Argentina. The first settlers arrived in 1865, hoping to found a 'New Wales'; many of their descendants are bilingual in Welsh and Spanish.

The density and numbers of Welsh speakers show considerable geographic variation. For example, 69% of the population of Gwynedd, in the north-west, can speak the language, compared to 11% of the population of Cardiff, the capital, in the south-east. But while the 69% of Gwynedd represents almost 78 000 speakers, the 50% of Carmarthenshire in the south-west represents more than 84 000 individuals. There are also more Welsh speakers in urban than rural areas. For example, there are almost 26 000 speakers in rural Powys in mid Wales, but almost 28 000 in the post-industrial Rhondda-Cynon-Taf valleys, 29 000 in the southern city of Swansea, and 32 500 in Cardiff, the capital.

The increase in Welsh speaking is the result of growth on two main fronts. The first, and most obvious, is among school children. In addition to the growing number of Welsh-medium schools, it became compulsory in 1990 for children in English-medium state schools to learn Welsh up to the age of 14; in 1999 the upper age limit was raised to 16. These changes are reflected in the 2001 census, which recorded that 40.8% of all children between the ages of 5 and 15 could speak Welsh. The second growth area in the number of Welsh speakers is the many thousands of adults who are learning the language.

The change in the ability to use Welsh is accompanied by increasing institutional support. A Welsh television channel, S4C, was established in 1982, followed in 1998 by S4C Digital, which broadcasts over 80 hours of Welsh television a week. There are several local radio stations and a national Welsh

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Table 1 Phoneme inventory of modern Welsh

Vowels					
i	ɨ	u	iː	ɨː	uː
e	ə	o	eː		oː
	a			aː	

Diphthongs		
ɪu		eu
ɛu	əi, əu	ɔɨ
	aɨ, au	

Consonants	Bilabial	Labiodental	Dental	Alveolar	Palatoalveolar	Palatal	Velar	Uvular	Glottal
Voiceless stops	p		t				k		
Voiced stops	b		d				g		
Voiceless fricatives		f	θ	s, ɬ, r̥	ʃ			χ	h
Voiced fricatives		v	ð	z	(ʒ)				
Nasals	m		n				ŋ		
Liquids			l	r					
Semivowels	w					j			

language radio station, Radio Cymru, which broadcasts about 126 hours a week. Several hundred Welsh language books and periodicals are published a year and a network of some 50 local Welsh papers which are produced several times a year by volunteers.

The use of the Welsh language is promoted by the Welsh Language Board, a government-funded body that was established by the 1993 Welsh Language Act, which states that Welsh and English should be treated equally in the administration of justice and in public business. Public bodies in Wales must submit schemes to the Board that describe the provision they make for the language. The aims of the Board seem to have general support: according to a recent opinion poll 67% of the people in Wales thought that more should be done to promote the language.

Periods of Welsh

The periods of the development of Welsh are conventionally divided into Early Welsh (up to the end of the 8th century and represented by a few names), Old Welsh (from the 9th to the 11th centuries, represented by glosses and fragments of prose and verse), Middle Welsh (from the 12th to the 14th centuries and represented by a substantial body of prose and verse), and Modern Welsh.

Linguistic Features

Alphabet

Written Welsh uses the Roman alphabet. Particular orthographic conventions include several digraphs, e.g. ⟨th⟩ for /θ/, ⟨dd⟩ for /ð/, ⟨ch⟩ for /χ/ and ⟨ll⟩ for /ɬ/; ⟨w⟩ and ⟨i⟩ represent the consonants /w/ and /j/ or the vowels /u/ and /i/ respectively, and ⟨y⟩ represents /ə/ and /ɨ(ː)/.

Phonemic Inventory

The vowels, diphthongs, and consonants of Welsh are listed in Table 1. The main dialect variations with respect to this inventory are the absence of /ɨ(ː)/ (and diphthongs closing to /ɨ/) in southern Welsh, of /ə/ in the extreme south-west, and of /h/ and voiceless /r̥/ in the south-east. Conservative northern speakers will substitute /s/ for /z/, which features in some loans from English. Two affricates – /tʃ/ and /dʒ/ – feature in loanwords and in dialects. Other salient dialect differences are listed in Table 2.

Consonant Mutation

In common with the other Celtic languages, some of the initial consonants of Welsh words vary according to their grammatical context, for example:

/kaːθ/ ⟨cath⟩
'cat'
/və ŋhaːθ/ ⟨fy nghath⟩
'my cat'
/i gaːθ/ ⟨ei gath⟩
'his cat'
/i χaːθ/ ⟨ei chath⟩
'her cat'

Such consonantal changes are traditionally called mutations. They may be triggered by a preceding

Table 2 Three dialect differences

Feature	*Example*	*Northern*	*Southern*
Realisation of /χ/ preceding /w/	(ch)with 'left'	χwiːθ	(h)wiːθ
Vowel length preceding /ɬ/	call 'sane'	kaɬ	kaːɬ
Vowel length preceding /sp, st, sk, ɬt/	gw(a)llt	gwaːɬt	gwaɬt

word, such as the personal pronouns in the above examples, or by grammatical context. For example, the object of a verb will mutate but not the subject:

Gwelodd ddyn.
saw-PAST man
'he/she saw a man'

Gwelodd dyn.
saw-PAST man
'a man saw'

There are three mutations, which may affect up to nine consonants (Table 3).

Table 3 The consonant mutations

Radical	*Soft*	*Nasal*	*Spirant*
/p/	/b/	/mh/	/f/
/t/	/d/	/nh/	/θ/
/k/	/g/	/ŋh/	/χ/
/b/	/v/	/m/	
/d/	/ð/	/n/	
/g/	–	/ŋ/	
/m/	/v/		
/ɬ/	/l/		
/r̥/	/r/		

Vocabulary

The core vocabulary of Welsh is Celtic, for example, *drws* 'door', *dyn* 'man', and *haul* 'sun'. There are some 800 loanwords from Latin, mostly borrowed during the Roman occupation (43–410 A.D.); many of these refer to architectural and religious innovations, for example, *eglwys* 'church' from Latin *ecclēsia*, *ffenestr* 'window' from *fenestra*, and *pont* 'bridge' from *pontem*. There are also many thousands of loans from English. A very few of these may be dated to the Old English period, but the numbers increase from the medieval period onward; examples are *cwpan* 'cup', *sêt* 'seat', *trowsus* 'trousers'.

There are some dialect differences in the vocabulary, particularly between northern and southern varieties; for example, 'grandmother' is *nain* in northern Welsh but *mam-gu* in southern Welsh; 'out' is *allan* in the north but *mâs* in the south; and 'with' is *efo* in the north but *gyda* in the south. Standard Welsh may use both *nain* and *mam-gu,* but only *allan* and *gyda*. Speakers are generally tolerant of such variation.

Keeping pace with developments in English vocabulary has occupied lexicographers since the 18th century. More recently, educationalists who are concerned with delivering the school curriculum through the medium of Welsh have planned the elaboration of Welsh vocabulary through coinage, borrowing, and adaptation. The standardization of subject-specific vocabularies is undertaken professionally.

Syntax

Welsh is a VSO language. For example:

Prynodd y ferch gar.
bought the girl car.
'the girl bought a car.'

Welsh has a definite article but no indefinite article. Adjectives tend to follow the noun they qualify, for example:

car coch
car red
'red car'

Welsh has grammatical gender. Some adjectives have feminine and plural forms, a feature that is more prominent in formal styles and northern dialects, for example:

ceffyl gwyn
horse white
'white horse'

caseg wen
mare white-FEMININE
'white mare'

ceffylau gwynion
horses white-PLURAL
'white horses'

Numerals have masculine/neutral and feminine forms for 1 (*un*), 2 (*dau, dwy*), 3 (*tri, tair*) and 4 (*pedwar, pedair*). The gender of the numeral *un* is apparent only when nouns beginning with certain consonants follow it; cf.

ci, un ci
dog-MASCULINE, one dog
cath, un gath
cat-FEMININE, one cat

Stylistic Variation

Informal spoken varieties of Welsh show considerable variation, and may be heavily influenced by English vocabulary, morphology, syntax, and intonation,

with frequent code-switching. Formal varieties tend to be more conservative and to favor native features.

See also: Breton; Celtic; Cornish; Migration and Language Planning; Minorities and Language; Scots Gaelic; Wales: Language Situation; Welsh Lexicography.

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Relevant Website

http://www.bwrdd-yr-iaith.org.uk/ – Welsh Language Board.

Welsh Lexicography

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For a small language community, Welsh lexicography has had a surprisingly long and rich history, beginning with the early 'bardic glossaries' that survive in some 15th-century transcripts, but the first printed dictionary was William Salesbury's Welsh–English dictionary of 1547, *A dictionary in Englyshe and Welshe*, intended as an aid to learning English. Between 1604 and 1607, Thomas Wiliems translated the English of Thomas Thomas's Latin–English dictionary into Welsh, and this work, although unpublished, formed the basis of the Latin–Welsh part of John Davies's extremely influential *Antiquae linguae Britannicae . . . dictionarium duplex* (1632).

Many later Welsh dictionaries were based on Davies's work, such as Thomas Jones's *Y Gymraeg yn ei disgleirdeb* (1688) and Thomas Richards's 1753 dictionary, which was largely a Welsh–English version of the 1632 work. The first published English–Welsh dictionary, by John Roderick (Siôn Rhydderch), appeared in 1725, followed by John Walter's comprehensive English–Welsh dictionary of 1770–1794. William Owen[-Pughe]'s misguided but hugely influential *Welsh and English dictionary* (1793–1803) attempted to trace the etymology of all words back to 'primitive particles' and created many new words in the process, some of which have entered the standard language.

Most 19th-century dictionaries were derivative, but a few were innovative, such as the English–Welsh dictionary of Edward Williams (also known as Caerfallwch) (1850), who coined many new (mostly technical) words. This and a number of other dictionaries were reprinted in the United States, a practice continued today by Hippocrene Books. The year 1848 saw the beginning of a long line of Welsh–English and separate English–Welsh dictionaries published by William Spurrell, and revised repeatedly by J. Bodvan Anwyl between 1914 and 1937. The publishing house Collins engaged Henry Lewis and (later) others to revise this, and the work, in several condensed editions, has sold in excess of a quarter million copies. Silvan Evans prepared two substantial works: a two-volume English–Welsh dictionary

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See also: Breton; Celtic; Cornish; Migration and Language Planning; Minorities and Language; Scots Gaelic; Wales: Language Situation; Welsh Lexicography.

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(1852, 1858) and an ambitious unfinished historical dictionary, *A dictionary of the Welsh language* (*A–ennyd*, 1887–1906).

In the 20th century, dictionaries such as H. Meurig Evans's much reprinted *Geiriadur Mawr* and *Geiriadur Newydd* have generally been rather disappointing, being little more than wordlists. Notable exceptions include Geraint Lewis's *Geiriadur Gomer i'r Ifanc* and Meirion Davies's *Dictionnaire Français–Gallois, Gallois–Français* (2000). The comprehensive *Welsh Academy English–Welsh Dictionary* (1995) has been a boon to translators, although it has been criticized for being poorly organized and overinclusive. A number of recent dictionaries have been aimed specifically at Welsh learners, the best being Gareth King's *Oxford pocket modern Welsh dictionary* (2000), although it describes the colloquial rather than the literary language. Two historical dictionaries include John Lloyd-Jones's magisterial (but sadly unfinished) *Geirfa Barddoniaeth Gynnar Gymraeg* (1931–1963, *A–heilic*), essentially a dictionary of medieval literary Welsh, and *Geiriadur Prifysgol Cymru: a dictionary of the Welsh language* (4 vols., 1950–2002), the standard historical dictionary. Work is now in progress on a much-needed second edition.

A recent trend is the growing number of online dictionaries, both institutional and amateur, of a generally high standard.

See also: Minorities and Language; Wales: Language Situation; Welsh.

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Wenker, Georg (1852–1911)

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Georg Wenker, the son of a bookbinder and art dealer, was born in Düsseldorf, Rhineland. He was a volunteer in the Franco-Prussian war of 1870–1871. Between 1872 and 1875, he studied Classical and Germanic Philology, Comparative Linguistics, Philosophy, and History in Zurich, Bonn, and finally in Marburg. In 1876, he received a doctor's degree from the University of Tübingen. Thereafter, he was a trainee at the regional library of Düsseldorf and then at the university library in Marburg, where he became a curator in 1883. He became a chief librarian there in 1897. In the same year, the title of a 'Professor of German philology' was conferred on him, without obligation to teach.

Wenker's scientific career began with his doctoral thesis, for which he needed information on German dialects. His search was of no avail. In a subsequent project, he collected dialect data in his Rhenish homeland and published the results in a small book, *The Rhenish patois* (1877). This was the starting point for the enlargement of the territory of investigation by making dialect atlases of the Rhineland (1878) and of northern and central Germany (1881). From 1884 on, he expanded his research to the territory of the 'Deutsches Reich,' but this atlas was never published. Based on Wenker's data collection, map-making continued under his successor Ferdinand Wrede, so that there finally were 1646 unpublished maps of the dialects of the 'Deutsches Reich.'

Georg Wenker was the founder of dialect cartography and of the 'indirect method' in dialectology. Inspired by the need that arose from his doctoral thesis, his initial idea was to find dialect borders; then it became a curiosity about what language diversity was like. This drove him on to do basic research and put the results on dialect maps – at first, in the Rhineland, then in northern Germany, and then in the entire 'Deutsches Reich.' From the very beginning (1877), his maps were empirically based on 42 (later on 40) Standard German sentences, the so-called 40 'Wenker sentences' (altogether 475 words), which were composed under prestructural aspects with regard to the historical grammar and, consequently, to the structural approach to dialects in the *Kleiner Deutscher Sprachatlas* (see Veith *et al*., 1984–1999). Their translation into local dialects was done by public school children as native speakers; their teachers assisted them and wrote the translations down ('indirect method'). The reliability of these written records depended on the teachers' abilities for sound discrimination and their abilities to depict the sounds they heard using the insufficient alphabet of Standard German. This method of exploring was different from the direct method used, e.g., for the French linguistic atlas (ALF) and its data collection (1897–1901), which was based on a face-to-face phonetic transcription.

An extract of the Wenker maps was published between 1926 and 1956 as *Deutscher Sprachatlas* (DSA) (128 maps, but in comparison with the Wenker maps, the atlas was extended to the territories of Austria, Switzerland, etc., altogether about 50 000 locations). In the DSA, almost all German dialects in Central Europe were represented. Because the Wenker maps were not published in full, two more projects had to follow: the computerized Concise linguistic atlas of German (*KDSA. Kleiner deutscher Sprachatlas*, 1984–1999) and the *Digital Wenker Atlas* (DiWA) published on the Internet since 2001 and comprising all Wenker maps in color.

See also: Dialect Atlases; Wrede, Ferdinand (1863–1934).

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West Greenlandic

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The Language and Its Dialects

Greenlandic, or Kalaallisut, is an Eskimo language (*see* **Eskimo-Aleut**). Greenland, or Kalaallit Nunaat, is geographically and culturally part of the North American continent; however, since 1721, it has been a territory of Denmark. In 1979 Greenland obtained autonomy over local governance, and Greenlandic was named the national language along with Danish. Today there are more than 50 000 speakers of Greenlandic, the vast majority of whom live in Greenland, although a sizable population is to be found in Denmark. There are three major dialects of Greenlandic: Polar Eskimo, spoken in the Thule region, East Greenlandic, spoken on the east coast, and West Greenlandic, spoken along most of the western coast. West Greenlandic is the dialect most widely spoken in Greenland, as well as being the standard dialect for purposes of political administration, education, church, and media. The dialect region stretches from Upernavik in the north to Kap Farvel in the south. Four subdialects are generally recognized: the subdialect spoken in Upernavik; North West Greenlandic (Uummannaq, and the Disko Bay region), Central West Greenlandic (Sisimiut to south of Nuuk); and South West Greenlandic (from north of Paamiut to south of Nanortalik), according to Dorais, 1996. The subdialects differ slightly in various aspects of their phonology and lexicon; thus, the Upernavik dialect, sharing a feature of East Greenlandic, tends to replace /u/ with /i/ under certain conditions, and Northwest Greenlandic retains a historical retroflex /ʃ/, whereas the Central and Southwestern dialects have merged /ʃ/ with /s/. The Greenlandic spoken in the capital city, Nuuk, tends to contain more Danish loans and syntactic features than the language spoken in other settlements, due to a relatively significant Danish population, as well as to its concentration of administrative and political activities. The Central West Greenlandic subdialect has long been the accepted spoken and written standard, and it will serve as the basis of the description given below.

Historiography of Descriptive Work

Greenland has seen several waves of immigration from both Eskimo and European populations. The most recent Eskimo groups are estimated to have arrived in Northern Greenland by the end of the 12th century and in Southern Greenland by the end of the 15th century. There is some evidence they made contact with the first European immigrants, the Norse, who had arrived in the late 10th century. There is, however, scant linguistic evidence of Norse influence on Greenlandic, and the Norse had disappeared by the 16th century. From the late Middle Ages, European whalers, traders, and explorers made their way up the coast of Greenland; the first written records of West Greenlandic are wordlists they compiled during the 16th and 17th centuries, although some of the words collected appear to represent a trade pidgin (van der Voort, 1996).

The first systematic grammatical descriptions of the language date from the beginning of the Danish colonial era in the 18th century and were made by Lutheran and Moravian missionaries. The first of these was a collaborative work from 1725 between the missionary Hans Egede and his assistant Topp, with the help of Egede's son, Poul. This served as the basis of a dictionary, published in 1750, and the first complete grammar, in 1760, by P. Egede. Later descriptions were modeled on P. Egede's work, the most notable being O. Fabricius' grammar (1791, rev. 1801) and dictionary (1804). In 1851 Samuel Kleinschmidt published his grammar of Greenlandic;

Volksschullehrer gesammeltem Material aus ca. 30,000 Orten. ('Linguistic atlas of north and central Germany. On the basis of systematically, with the aid of the school teachers collected material from about 30 000 locations.') Strasbourg & London: Trübner.

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West Greenlandic

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The Language and Its Dialects

Greenlandic, or Kalaallisut, is an Eskimo language (*see* **Eskimo-Aleut**). Greenland, or Kalaallit Nunaat, is geographically and culturally part of the North American continent; however, since 1721, it has been a territory of Denmark. In 1979 Greenland obtained autonomy over local governance, and Greenlandic was named the national language along with Danish. Today there are more than 50 000 speakers of Greenlandic, the vast majority of whom live in Greenland, although a sizable population is to be found in Denmark. There are three major dialects of Greenlandic: Polar Eskimo, spoken in the Thule region, East Greenlandic, spoken on the east coast, and West Greenlandic, spoken along most of the western coast. West Greenlandic is the dialect most widely spoken in Greenland, as well as being the standard dialect for purposes of political administration, education, church, and media. The dialect region stretches from Upernavik in the north to Kap Farvel in the south. Four subdialects are generally recognized: the subdialect spoken in Upernavik; North West Greenlandic (Uummannaq, and the Disko Bay region), Central West Greenlandic (Sisimiut to south of Nuuk); and South West Greenlandic (from north of Paamiut to south of Nanortalik), according to Dorais, 1996. The subdialects differ slightly in various aspects of their phonology and lexicon; thus, the Upernavik dialect, sharing a feature of East Greenlandic, tends to replace /u/ with /i/ under certain conditions, and Northwest Greenlandic retains a historical retroflex /ʃ/, whereas the Central and Southwestern dialects have merged /ʃ/ with /s/. The Greenlandic spoken in the capital city, Nuuk, tends to contain more Danish loans and syntactic features than the language spoken in other settlements, due to a relatively significant Danish population, as well as to its concentration of administrative and political activities. The Central West Greenlandic subdialect has long been the accepted spoken and written standard, and it will serve as the basis of the description given below.

Historiography of Descriptive Work

Greenland has seen several waves of immigration from both Eskimo and European populations. The most recent Eskimo groups are estimated to have arrived in Northern Greenland by the end of the 12th century and in Southern Greenland by the end of the 15th century. There is some evidence they made contact with the first European immigrants, the Norse, who had arrived in the late 10th century. There is, however, scant linguistic evidence of Norse influence on Greenlandic, and the Norse had disappeared by the 16th century. From the late Middle Ages, European whalers, traders, and explorers made their way up the coast of Greenland; the first written records of West Greenlandic are wordlists they compiled during the 16th and 17th centuries, although some of the words collected appear to represent a trade pidgin (van der Voort, 1996).

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this is the earliest thorough linguistic description of an American native language and it is widely seen as the first modern, synchronic linguistic description of a language. Kleinschmidt also created a standard, linguistically accurate orthography for Greenlandic, which was maintained until 1972, when a more modern orthography was introduced to reflect important morphophonological changes in Greenlandic. Descriptive work on West Greenlandic has continued to the present, and important scholars include Thalbitzer, one of the first to document through sound recordings, Schultz-Lorentzen, Bergsland, and Fortescue. In addition to general descriptions, more recent work has included specialized studies of phonology (e.g., Rischel, 1972), syntax (e.g., Sadock, 1991), and discourse (e.g., Berge, 1997).

Phonetics and Phonology

West Greenlandic phonology is characterized by having few consonants and vowels and restrictions on vowel and consonant clusters, as well as on final consonants. Thus, only vowels and stops are found word finally; the only allowable diphthongs are /iV/, /Vi/, or /uV/; and consonant clusters are only found medially and consist mostly of geminates, with the exception of /rC/ combinations (see Table 1).

Some features of Greenlandic are common to other Eskimo languages, including traces of a fourth vowel (*see* **Eskimo-Aleut**), and a rich morphophonology. Particular to West Greenlandic is the extreme degree of consonant cluster assimilation, which has taken place in the historic period.

Old Greenlandic	paurqi-ngnig-tar-fik
New	paaqqi-nnit-tar-fik
	take.care.of-ANTI-HABIT-place
	'nursing home'

Restrictions on vowel or consonant clusters and a productive morphology, with complex rules for adding morphemes, have led to more opaque word formations than in other Eskimo languages. (For more on the morphophonology, see Rischel, 1974 and Fortescue, 1984.)

Morphology/Syntax

Greenlandic is an extremely polysynthetic language, with a large number of derivational affixes and complex inflection. Words consist of a root (or base), typically from zero to five suffixes known as postbases (although more than five are possible and quite normal), and an inflectional ending; with one nonproductive exception, there are no prefixes. Roots generally are subcategorized for part of speech; nominal roots will require nominal inflection, and verbal roots will require verbal inflection. The most important parts of speech are the open classes of nouns and verbs; adjectives and adverbs tend to be verbally derived. There are also a rich system of demonstratives, a limited set of particles, a limited set of fossilized adverbs and adjectives, and few but common clitics. There are several hundred derivational postbases, many of which are highly productive. These are commonly classified into four categories: those which derive nouns from nominal bases (NN); those that derive verbs from nominal bases (NV); those that derive verbs from verbal bases (VV); and those that derive nouns from verbal bases (VN). Some also attach to other parts of speech, e.g., particles;-nnit-and-tar-in the example above are both VV, and-fik is VN. NN and NV are shown in the following example:

Table 1 Phoneme inventory for West Greenlandic

Manner/Place	*Labial*	*Dental*	*Palatal*	*Velar*	*Uvular*
Stops	p	t		k	q
Fricatives −v	f	s	(ʃ = [s])	x	
+v	v			g	R
Nasals	m	n		ŋ	
Liquids			ɬ = [ll]		
			l		
Glides	j			(w)	
Vowels: a, aa, i, ii, u, uu					

Standard orthography is in brackets; parentheses indicate subdialect forms or questionable phonemic status.

inuk-rsuaq-u-voq
man-big-COP-3sing.INDIC
N-NN-NV-INFL
'he is a giant'

As this example shows, verbalizing postbases can create verbal structures that 'incorporate' a verbal argument; that is, a subject or object can be brought into the verbal structure. There is some theoretical debate as to whether or not Eskimo languages can be called incorporating (e.g., Baker, 1988), but within the field of Eskimo linguistics, there is a long tradition of using the term 'incorporation' for structures of the type exemplified above. Even inflected forms can incorporate:

aappalut-toq	illu-mi-iC-voq
red-PART	*house-LOC-COP-3sing.INDIC*
'he is in the red house'	

Nominal inflection includes eight cases as well as possessive and person markers, which are also inflected for case. There are two grammatical cases, absolutive and ergative (or relative), and six oblique cases, including instrumental (a default case with many

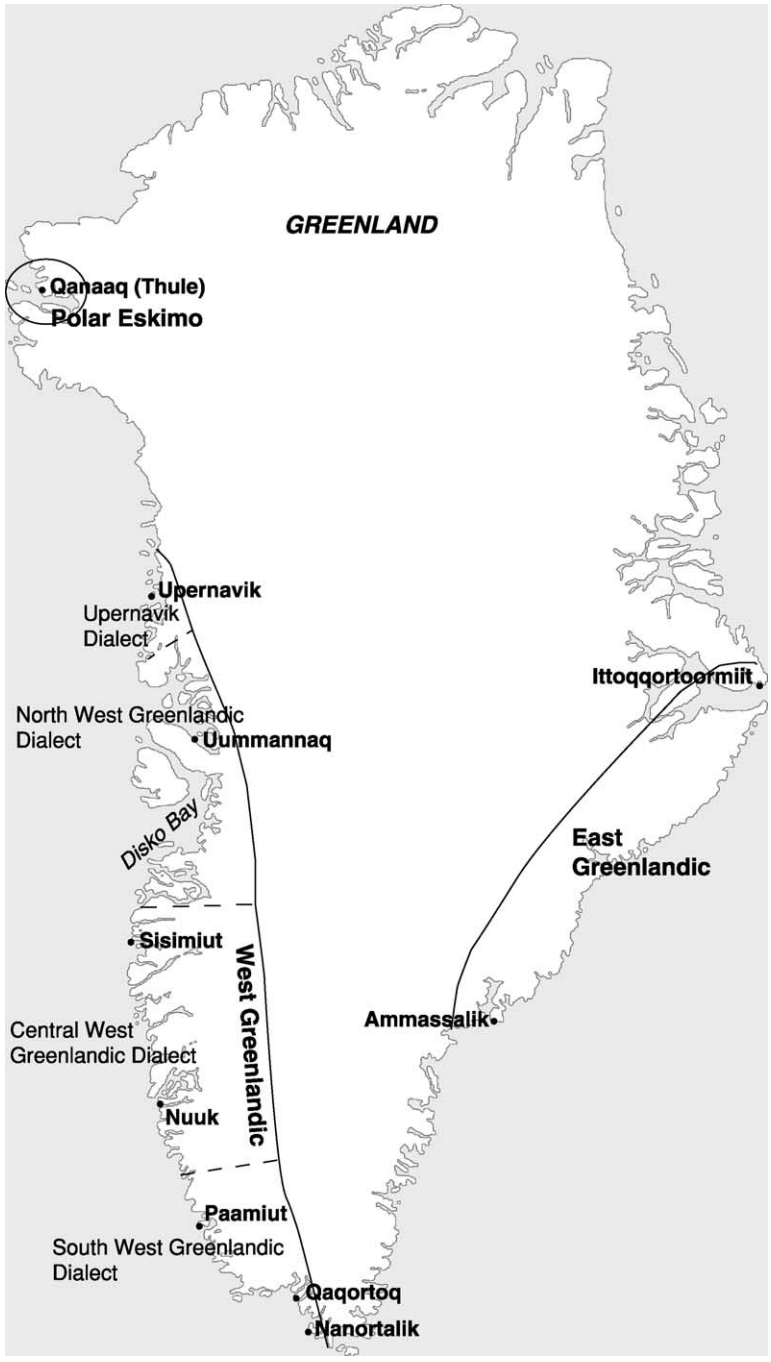

Figure 1 Major Greenlandic dialects and West Greenlandic subdialects.

functions, both grammatical and nongrammatical), locative, ablative, allative, vialis, and equalis.

Verbal inflection is semifused and includes marking for dependence, mood, transitivity, person, and number. Verb moods are typically categorized as either independent or dependent. Sentences often consist of strings of subordinate clauses with dependent mood marking and a superordinate clause headed by a verb with independent mood marking. Independent moods include the indicative, interrogative, optative, and imperative moods. Dependent moods include the conditional, causative (indicating causation or action prior to that expressed by the independent clause), contemporative (indicating action contemporaneous with that expressed by the independent clause), and participial (used in object clauses, as an alternative to the indicative in narration, and in other discourse contexts). For an example of clause chaining from West Greenlandic (*see* **Eskimo-Aleut**).

Ergativity and transitivity have long been topics of interest in the study of Greenlandic. Transitive clauses are headed by verbs with subject and object person marking, and the arguments are marked with ergative and absolutive case. Intransitive and antipassive clauses are headed by verbs with pronominal marking of the subject and nouns take absolutive case. Objects of antipassive clauses take instrumental case. Traditionally, these are seen as related to definiteness of the object, although they may reflect topicality (Berge, 1997).

anguti-p	nanuq	taku-aa
man-ERG.sing	*bear.ABS.sing*	*see-3SG.3sing.INDIC*

'the man sees/saw the bear' (definite, or old topic)

angut	nanur-mik	taku-voq
man.ABS.sing	*bear-INST.sing*	*see-3sing.INDIC*

'the man sees/saw a bear' (indefinite, or topic introduction)

At least one relatively major syntactic theory has been developed to account for Greenlandic morphosyntax. This is Autolexical Theory, developed by Sadock (1991, 2003) and based in part on GPSG. It allows morphology and syntax to require structures that may not always result in exact matching, as in the stranded modification of a locative phrase in the sentence 'he is in the red house' given above.

Lexicon

Modern Greenlandic has seen an influx of new lexical items as a result of colonial experience and modernization. The earliest evidence of this is seen in early Bible translations, with the heavy use of Danish loans relating to Christianity. Some of these loans have been well integrated into the language, for example, *palasi*, from Danish *præst* 'priest', while others have been replaced by Greenlandic coinages. Greenlandic has actively incorporated new words in its lexicon, through relexicalization of obsolete terms (e.g., *issat* 'snow goggles' are now 'eyeglasses'), borrowing (*kaffi* 'coffee'), and coinage (Petersen, 1976, Berge and Kaplan, 2005). There is some evidence for the increased use of passive formations and nominalizations in the lexicon, perhaps as a result of the influence of journalistic style and literacy.

Semantics/Discourse/Sociolinguistics

Little work has been done to date on other aspects of linguistic description, especially including semantics, discourse, and sociolinguistics, although the body of work in these areas is steadily increasing. There have been reports on child language acquisition (Fortescue, 1985), bilingualism (Jacobsen, 1997), and discourse (Berge, 1997), among others. More sociolinguistic and semantic studies have been done of neighboring dialects, such as Inuktitut.

State of the Language Today

Unlike many other native languages of North America, West Greenlandic is not endangered and is, in fact, undergoing normal language development and change, although there was a period of endangerment. During the mid–20th century, increasing encroachment of the Danish language led to almost two generations of speakers who appeared to be losing their fluency in Greenlandic. In response, Greenlandic became one of the national symbols of the political campaigns for autonomy from Danish rule in the 1970s. With the establishment of Home Rule in 1979, Greenlandic was given the status of national language along with Danish. Language loss was successfully reversed, although there may have been some lasting effects of bilingualism on the dialect spoken in Nuuk. Factors that have contributed to this reversal include a history of education and literacy in Greenlandic, a wealth of materials in the language, and political support. From earliest colonial times, education was established in West Greenlandic, and literacy was common. Today Greenlandic can be chosen as a medium of instruction throughout the years of formal schooling, and there have been efforts to include it as the language of instruction at Ilisimatusarfik, the University of Greenland. The first books in Greenlandic were published in the 1850s and the first newspaper, *Atuagagdliutit,* shortly thereafter. Since then, there have been several thousand books and articles published in Greenlandic, *Atuagagdliutit* has been in continuous print since its inception, and there are today two bilingual newspapers (in Danish and Greenlandic), local television and radio stations with Greenlandic programming, and more.

See also: Eskimo-Aleut; Denmark: Language Situation; Greenland: Language Situation.

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West Papuan Languages

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Introduction

In the area between Timor and the adjacent islands Alor and Pantar (126 °E) and the Cenderawasih Bay of the Indonesian province Papua (136 °E), roughly 50 of the more than 800 Papuan languages are spoken (see **Figure 1**).

These West Papuan languages do not form one family, in spite of earlier attempts to establish a "large West Papuan Phylum" (Cowan, 1957, 1960). More recently, the West Papuan Phylum has been restricted to the languages of North Halmahera (NH) and the Bird's Head Peninsula (Voorhoeve, 1975; Wurm, 1981, 1982), whereas the South Bird's Head (SBH) languages and some languages on the western tip of the Bomberai peninsula are claimed to form one family with those of Timor-Alor-Pantar (TAP), forming a subgroup within the largest Papuan family proposed thus far, the Trans New Guinea (TNG) family (McElhanon and Voorhoeve, 1970; Voorhoeve, 1975; Stokhof, 1975; Wurm, 1982; Pawley, 1998; Foley, 2000; Ross, 2004).

The West Papuan languages of North Halmahera and the Bird's Head could form a distantly related family, on the basis of (i) pronominal forms for1sg as **t/d-* and **n-* for 2sg; (ii) the number-ablaut (sg is *a*, pl is *i*), found in TNG, is also attested in a number of West Papuan languages, and (iii) a small number of possible cognates. Some of these show some overlap with the TNG evidence, for example, reflexes of **niman* 'louse' (Pawley, 1998; Reesink, 2004). Although a few families have been established with reasonable certainty, the evidence for linguistic relatedness between them is so meagre that no firm conclusions should be drawn at present. Rather, the West Papuan languages form an areal network of basically unrelated families (North Halmahera, West BH, and two East BH families (Meyah-Sougb; and Hatam-Mansim) and a number of isolates in the center of the Bird's Head (Maybrat, Abun, Mpur) and Yawa in the Cenderawasih Bay. They share a number of typological features, not only between them but also with the Austronesian languages spoken in this same region, betraying approximately four millenia of contact since the Austronesians first arrived in the Moluccas and around the Bird's Head (Bellwood, 1985).

Typological features

Verbal Complex

As typical of Papuan languages, the constituent order of the clause is SOV in TAP, NH, SBH, and Yawa, all of which also have a verbal prefix for (animate)

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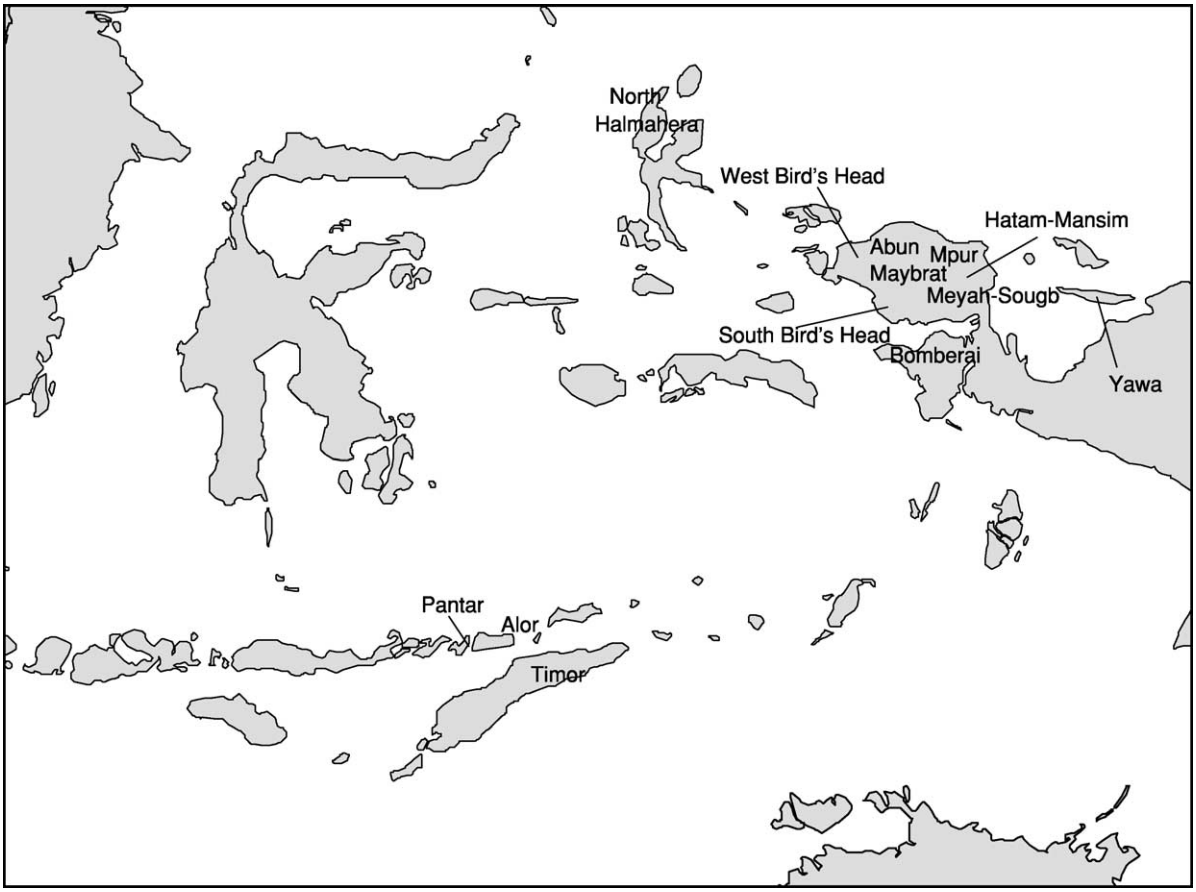

Figure 1 Map of West Papua.

object, which is the normal crossreference for the recipient with a verb like 'give.' Less typical is the configuration that has an additional verbal prefix for subject, as found in NH and SBH languages.

The region of the west Papuan languages is one of three in which Papuan languages are found that do not have a V-final order, the other two being the Torricelli languages and some of the East Papuan languages. Some of the NH and most BH languages have a rather strict SVO order, often with a subject prefix as the only verbal affixation.

Tense-Aspect-Mood morphology is generally poor or completely absent, as in Abun. Some aspect or mood prefixation is found in languages of the EBH. Inanwatan has tense marked by suffixation, whereas the TAP languages mark aspect that way. In the 'non-tensed' languages, predicative adjectives behave as verbs (see Stassen, 2003), whereas 'tensed' Inanwatan verbalizes adjectives by means of a copula (De Vries, to appear).

All West Papuan languages, whether OV or VO, have a clause-final negative adverb, in some cases with no morphosyntactic means to delineate its scope (Reesink, 2002). They also agree in having clause-final aspectual adverbs, such as 'already.'

Nominal Complex

The order of constituents in the Noun Phrase is in all West Papuan languages: Noun–Adjective–Numeral–Demonstrative, whereas a few NH languages have a prenominal article in addition. All of them make a distinction between alienable and inalienable possession. The latter construction consists of a possessor prefix on the possessed noun (body-part and kinship terms), which is generally identical to either the subject or object prefix, if the latter is available in the language.

Numeral classifiers are widely available in the West Papuan languages, Meyah having the most complex system, whereas its relative Sougb and their (very distantly?) related neighbour Hatam only have a vestige (see Reesink, 2002).

Pronominal systems A gender distinction (masculine; feminine; and, in some languages, neuter) for 3sg forms seems to be an old Papuan feature that links the West Papuan languages with most of the non-TNG languages along the north coast of New Guinea, as far as the Solomon Islands. The TAP languages, and on the Bird's Head, the isolate Abun and the two EBH families lack this feature.

The inclusive-exclusive opposition for nonsingular first person seems to be an Austronesian feature that has found its way into all the WP languages, except three central BH isolates, Maybrat, Abun, and Mpur.

Tone

Tonal contrasts are found in Mpur, with four phonemic tones (Odé, 2002) and Abun with three (Berry and Berry, 1999), whereas Meyah (Gravelle, 2002) and Sougb (Reesink, 2002) are pitch-accent languages with two contrastive tones. Ma'ya and Matbat are AN languages of the Raja Ampat Islands that have a Papuan substrate of four contrastive tones (Remijsen, 2001).

Papuan and Austronesian Contact

The SVO order with concomitant prepositions can be seen as a diffusion into many WP languages, in addition to the inclusive–exclusive opposition. There seems to have been more diffusion in the other direction: almost all Austronesian languages in the WP sphere have a clause-final negator, a preposed possessor, and the alienable–inalienable distinction for possessive construction, albeit that the latter is expressed by possessor suffixes on the possessed noun, rather than by prefixes as in the Papuan languages. The typological contrast between western AN languages and those of this area, given by Himmelmann (to appear), focuses precisely on these 'Papuanisms' (see Klamer, Reesink, and Van Staden, to appear). It thus suggests a scenario of original Papuan-speaking communities that shifted to 'imperfectly' learned Austronesian languages. Prolonged contact between these communities allowed for further convergence to a linguistic area of AN and Papuan languages in the Moluccas and the western peninsula of New Guinea.

See also: Austronesian Languages: Overview; Indonesia: Language Situation; Language Change and Language Contact; Papua New Guinea: Language Situation; Papuan Languages; Spoken Discourse: Word Order04845.

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Westermann, Diedrich Hermann (1875–1956)

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Together with Carl Meinhof, Diedrich Westermann is usually considered one of the main founders of the discipline of African linguistics – *Afrikanistik* – in Germany (*see* **Meinhof, Carl Friedrich Michael (1857–1944)**). He was born on June 24, 1875, in Baden, a town in lower Saxony near the city of Bremen, and died there on May 31, 1956. When he was in elementary school, Westermann studied several subjects and was tutored privately at home (Pasch, 2005). Upon finishing school in 1891 he became a postman, but in 1895 joined the North German Missionary Society. He received training to become a missionary in Basel and Tübingen, and, after a brief stay in England, traveled to Togo as a teacher for the mission. Once there, Westermann quickly became proficient in Ewe and began his linguistic career, which would span five decades. At the request of the North German Missionary Society he completed a linguistic description of Ewe, and went on to publish a handbook, dictionary, and grammar of the language (Westermann, 1903, 1905–1906, 1907; Stoecker, 2004). Illness forced him to return to Germany from Togo a first time in 1903, and permanently in 1907. Throughout he was a prolific scholar, writing mainly on West African languages that were classified as Nigritic or Sudanic (Jungraithmayr and Möhlig, 1983).

In 1907 Westermann took up a post teaching African languages at the Seminar for Oriental Languages in Berlin, where for two years he worked alongside Meinhof, an expert in Bantu languages. When Meinhof left Berlin for the Hamburg *Kolonialinstitut* in 1909, Westermann's star quickly rose in Berlin, and in 1910 he was appointed professor there. While Westermann was no longer traveling to Africa as a missionary, he did go as a scholar, and in 1910 the government of the Sudan, which was then under British imperial control, asked him to visit and continue his linguistic studies. After the trip he published a comparative work on the languages of the Sudan and a book on the Shilluk people (Westermann, 1911, 1912). His research also compared the Nigritic languages to Bantu ones, as he followed Meinhof in attempting grammatical and morphological classifications of African languages.

Westermann was interned in Spain for much of World War I, and when it was over began to work closely with his British colleagues. In 1926 Westermann and Henri Labouret were named the first directors of the Institute for African Languages and Cultures in London, demonstrating that Westermann had become a linguist of international repute. While at the Institute, Westermann developed a new uniform orthographic system for transcribing and printing African languages, which was called Westermann-script. He hoped that this system would replace the one that Richard Lepsius had instituted in the 19th century and which Westermann found too confusing and cumbersome to be practical (*see* **Lepsius, Carl Richard (1810–1884)**). Meinhof argued for the Lepsius system, breaking with Westermann and ending their friendship. Convinced of the significance of phonetics and tonology, Westermann conducted intensive studies in both disciplines during his tenure at the Institute and published a practical guide to phonetics with Ida Ward (Westermann and Ward, 1933). Westermann's activities extended beyond the Institute, as he was an editor of its journal, *Africa*, from 1928–1940, founder of the *Institut für Lautforschung*, and a professor in Berlin at the Seminar for Oriental Languages throughout. Additionally, Westermann was not only a linguist, but also a noted scholar of religion and ethnology. Although he resigned from the North German Missionary Society in 1908, he remained an honorary member for his entire life, and wrote copiously on the Protestant mission and its role in Africa, as well as on native religions. As an ethnologist, Westermann distinguished himself with books on state-building in sub-Saharan Africa (Westermann, 1952) and individual studies of specific ethnic groups such as the Shilluk and Kpelle (Westermann, 1912, 1921).

See also: Bantu Languages; Ewe; Lepsius, Carl Richard (1810–1884); Meinhof, Carl Friedrich Michael (1857–1944).

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Western Desert Language *See:* Pitjantjatjara.

Western Linguistic Thought before 1800

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Introduction

There are so many scholarly books that purport to tell or summarize the 'history' of linguistics that it may seem paradoxical to begin by suggesting that the whole question of whether linguistics has a history at all is itself controversial. (For a critical analysis of the notion of a 'history of ideas,' see Bevir, 1999.) Perhaps the impression of paradox can be diminished by pointing out that, as histories go, the history of linguistics must be either fairly short or else extremely long, depending on what is taken to count as linguistics. Since the term *linguistics* itself is a modern coinage, and hardly a decade passes without different theorists redefining it to suit their own academic agenda, it is hardly surprising that agreement is hard to come by.

Commenting on "the lack of a collectively assumed history of linguistic science," Auroux and Kouloughli (1991) contrast this situation with that obtaining in the natural sciences and castigate linguists for "clinging to the silly strategy of so-called 'scientific breaks.' The assumption made by some linguists that scientific thought about language begins with the work of their immediate Master, if not with their own, is "all the more derisory as there is no real consensus as to the contents and methods of the discipline."

Some might regard this as a harsh judgment, but it points to the reasons for preferring to speak here of a history not of linguistics, but of linguistic thought: 'linguistic thought' being understood to refer to

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Some might regard this as a harsh judgment, but it points to the reasons for preferring to speak here of a history not of linguistics, but of linguistic thought: 'linguistic thought' being understood to refer to

the detailed pursuit of general questions relating to language and languages. Even then, the notion of 'history' is problematic, not only because many texts that may have dealt with such questions are now lost, but also because the continuity supposedly linking such inquiries across time is, to say the least, often dubious. Furthermore, in the period this article covers, the key questions are often raised by philosophers, not by grammarians or language teachers; so it becomes difficult to disentangle anything that could reasonably be identified as an independent history of linguistics. With these misgivings duly stated, however, it is not impossible to pick out in the Western tradition a series of observations and discussions that connect thinking about linguistic topics across the centuries, even if the connection is to some extent a retrospective illusion of hindsight.

Social Background

Before attempting any 'historical' exposition even in this limited sense, it is relevant to draw attention to certain social factors that shape linguistic inquiry throughout most of the time span under consideration. For the most part, a historian has no option but to deal with *written* texts (see below): we are very poorly informed about the view of language(s) prevalent among those sections of the population of Europe who did not have the benefits (and disadvantages) of literacy. Another factor to be taken into account is that the spoken and written language of paramount importance in Europe for centuries was Latin. It provided a universal lingua franca among the educated classes, a knowledge of Latin being essential for those pursuing any kind of public career, whether educational, legal, administrative, or ecclesiastical. Consequently, it is Latin that tends to be the model language that is referred to tacitly or overtly in many linguistic discussions. A third consideration is that one particular Latin text, the Vulgate, was regarded as supremely authoritative and as supplying divinely inspired answers to certain basic linguistic questions. Anyone who loses sight of these three factors will be hard put to understand either the achievements or the limitations of Western linguistic thought before 1800.

A taken-for-granted knowledge of the Latin language became the basis for most intellectual forays into linguistic topics from the fall of the Roman Empire to the Renaissance. But the disintegration of the Roman Empire was matched by a disintegration of Latin, giving rise to the birth of the Romance languages. By the 9th century, it is clear that Latin was neither spoken nor understood by the masses (Strasburg Oaths, 842). That divorce between the Latin-based thinking of the intellectual minority and the incomprehension of the majority had profound consequences. It was the basis, eventually, for the rejection of the Pope's authority by Henry VIII (1491–1597), who established the rival Church of England. It led similarly to the German challenge to papal authority led by Martin Luther (1483–1546). Both rebellions were manifestations of the collapse of the European feudal system and the emergence of the modern nation-state.

By this time, a profound political change had overtaken thinking about language, reflecting a new view of society. What emerged was the idea that a language was in some sense the expression not of universal operations of the mind, but of the unique individuality of a particular nation.

Even so, there is a perspective from which linguistic thought in the Western tradition, both pre-Renaissance and post-Renaissance, may be viewed as a continuing search for answers to quite a small number of basic questions. It therefore seems sensible to present any historical account in terms of these topics, rather than the usual listing of works and authors, determined simply by chronology, that we find in conventional treatments of the subject. Their chronology often seems to assume that the mere succession of predecessors and successors in itself constitutes history and that it falls conveniently into 'periods' during which a certain consensus of ideas prevailed. This is far from being the case.

The six topics selected for attention in the following sections – the relationship between speech and writing, theories of form and meaning, the problem of truth, concepts of grammar, the relationship between language and Nature, and speculations about linguistic origins – crop up time and again in the Western tradition. It hardly needs pointing out that they interrelate in various ways. Some remain a constant focus of attention. Others emerge and re-emerge at intervals. Some were assumed to have been settled long ago and thus lie dormant for centuries. The present article tracks the more important positions down to the end of the 18th century. For later developments, *see* **Modern Linguistics: 1800 to the Present Day.**

Most of the key questions were first raised in ancient Greece. Classicists often tell us that the Greeks were the first to recognize language as the distinctive characteristic of *Homo sapiens*. However, this claim does not stand up to serious examination. What the Greeks saw as characteristic of the human being and human potential was *logos* (rationality). The power of speech was only one manifestation of *logos*, and Greek discussions of language tended to take this for granted.

Greek attitudes to language were profoundly ethnocentric. Peoples who did not speak or understand Greek were 'barbarians.' This conception parallels the Greek view of politics, in which slaves (often foreign captives or their descendants) had no rights as human beings. The Romans had a somewhat different view, because in their world many of the slaves were Greeks. Furthermore, many educated Romans were bilingual in Greek and Latin. Quintilian (c.35–96 A.D.) even discusses whether it is better that a child should be taught Greek first and Latin later, or the other way round.

Within the Greek-speaking world, there was great regard for two kinds of linguistic activity: poetry and public speaking. To the poets, and to Homer in particular, the Greeks owed a sense of their own identity as a people; while effective public speaking (taught professionally by rhetoricians) was a vital mechanism of government in the ancient city-states, as well as being essential to the political system known as 'democracy.' The first major challenge to traditional Greek attitudes toward poetry and rhetoric arose with the teachings of Socrates (469–399 B.C.) and Plato (427–347 B.C.). This is also where serious general questions about language are first raised.

Speech, Writing, and Scriptism

How is writing related to speech? This question takes pride of place, because the answer to it underpins the answers to so many others. All the topics that this article deals with have to be understood as topics raised within the context of a literate society, even if large percentages of the population were at various times illiterate or only minimally literate. So the question of the relationship between speech and writing immediately has profound social and political implications. It goes to the heart of the way a society is run and by whom, and this in turn determines who is raising the questions. We are dealing here with the public self-understanding of literate societies.

Plato's dialogue *Cratylus* is the earliest text of any length that has come down to us concerning explicitly linguistic topics. It was probably composed about 359/358 BC. At that time, Greece was still going through the long-drawn-out transition from a preliterate to a literate society, and it is significant that Plato, one of the most powerful thinkers of his own or any other age, was a skeptic about writing. He regarded with suspicion the claims made on behalf of this 'new' technology; for that, in effect, is what writing was in Greece during his lifetime. (See Harris, 1989 and Thomas, 1992 on literacy in ancient Greece.) All Greek thinking about language was colored by this transition, as the earliest Greek traditions (in particular those associated with Homer and the poets) dated from the antecedent culture of oral transmission (Havelock, 1982).

Plato's skepticism about writing does not come to the surface in *Cratylus*, but is quite explicit in his *Letters*. His chief complaint about writing, to put it anachronistically in modern terms, is this: even when writing specifically attempts to record what was originally said, the written form *decontextualizes* speech. Hence, it gives rise to false interpretations. No serious intellectual, according to Plato, would attempt to put down his most important ideas definitively in writing: that would be an act of irresponsibility. There is a moral judgment here, rarely recognized in mainstream histories of linguistics.

Why did Plato take this view? Part of the answer is that Plato's own teacher, Socrates, the most formidable intellect of his time, committed nothing to writing. He conducted oral debates in public on various topics with a variety of opponents, but often left both opponents and onlookers to draw their own conclusions. Another part of the answer is that Greek writing was alphabetic. Its basic elements were individual letters (*grammata*, a connection surviving in the modern term *grammar*), whose particular shapes were devoid of any linguistic significance. Thus (Greek) writing could be seen as divorced from ideas: the sequence of letters represented merely the external, superficial form of the spoken word, a lifeless shell. Herein lies the ultimate source of the profound difference between Western linguistic thought and Eastern linguistic thought (the scripts of China and Japan being nonalphabetic).

One of the ironies of Plato's legacy is that, in spite of his skepticism about writing, he left an important corpus of written texts for later generations to study. But it is no coincidence that many of these texts are left in dialogue form, for this form comes closest to approximating the cut-and-thrust of face-to-face debate. Plato's view of the relationship between speech and writing was based on the assumption that language in its 'natural' form is a live oral exchange between one individual and another. This notion reemerges with the thinking of Marshall McLuhan and other modern theorists for whom both writing and the mass media are seen as artificial perversions of a more fundamental form of linguistic communication.

In ancient Greece, the capitulation to the new technology is already evident in the work of Plato's most illustrious pupil, Aristotle (384–322 B.C.). Aristotle had evidently decided to yield to *force majeure*, so he never raises any penetrating questions about the relationship between speech and writing. He prefers

to treat speech and writing, for all practical and philosophical purposes, as equipollent modes of expressing thought.

Aristotle is sometimes said to have left no general treatise on language or languages (even though he wrote on rhetoric), and the lacuna has been lamented. This is a short-sighted judgment, because Aristotle's philosophy of language is embodied in considerable detail in what posterity regards with one accord as his pioneering texts on logic. Aristotle the logician is Aristotle the linguist. What Aristotle the logician seeks is a perspective on language that transcends particular languages. The crowning achievement of Aristotelian 'general linguistics' is the syllogism, because it works in Greek, or Latin, or Persian, or any other language you might be acquainted with. Plato, although in some respects a more profound thinker than his pupil, never managed to get as far as detecting the semantic pattern that underlies the connection among (1) 'All men are mortal,' (2) 'Socrates is a man,' and (3) 'Socrates is mortal.'

Thus, it suits Aristotle to adopt a rather simplistic view of the relationship between speech and writing. (So simplistic that it is in retrospect difficult to imagine that Aristotle himself could have given it much credence.) It is summarized at the beginning of *De Interpretatione*. Here we are told that

> Sounds produced by the voice are symbols of affections of the soul, and writing is a symbol of vocal sounds. And just as letters are not the same for all men, sounds are not the same either, although the affections directly expressed by these indications are the same for everyone, as are the things of which these impressions are images.

This single passage projects answers to a whole range of controversial questions. Aristotle assumes that the external world is the same for all observers and that observers' perceptions of this world are, for all practical purposes, identical. This approach, it need hardly be said, begs most of the central issues about language that are worth raising, but it was extremely influential throughout Western tradition.

Psychologically, Aristotle presupposes that communication is telementational: language exists to 'convey' thoughts from the mind of one person to the mind of another. But this can only be done insofar as words are associated with the same thoughts in both minds. That is the role of convention, as Aristotle sees it: to establish in a person's mind the connections between words and thoughts. Speech produces symbols of affections of the soul, whereas these affections themselves are not symbols, but likenesses of things in the external world. (On Aristotle's use of the term *symbolon,* see below.) Thus the chain connecting words to the world is divided by Aristotle into two sections. There is a section of natural, universal processes, linking the world through our senses to our mental representations of it; and there is a section of conventional, nonuniversal processes linking mental representations to language.

After Aristotle, no one in antiquity seriously questioned his disingenuous doctrine concerning the relationship between speech and writing. The Stoics, according to Diogenes Laertius (3rd century A.D.), were content to regard the elements (*stoicheia*) of language as being the 24 letters (i.e., of the Greek alphabet). However, he adds, the term 'letter' (*gramma*) has three meanings: a particular speech sound, the corresponding written symbol, or the corresponding name (e.g., *alpha*). Why the Stoics did not therefore introduce separate terms to distinguish these three items Diogenes does not explain, but the fact that they did not might be seen as pointing to a serious distortion in their way of looking at language. It is essentially scriptist – based on the linguistic biases of a literate society, in which only the views and preoccupations of the literate are deemed worthy of consideration – and for all such purposes it is assumed that speech can be 'reduced' to writing.

Given the prevalent scriptism of thinking about language in antiquity, what happened, inevitably, was that the structure of writing (in this instance, alphabetic) was projected back upon speech. That blocked the study of phonetics for more than a thousand years and is still evident today. (The so-called International Phonetic Alphabet is just one example. For a more detailed examination of scriptism in modern linguistics, see Linell, 2005.)

Various long-term consequences of these scriptist assumptions are worth mentioning here. One is that theorists often assume they can discuss words and sentences simply by citing their written form. The question of whether the written form actually corresponds to the spoken form – and, if so, how – is never allowed to arise. In short, speech is treated as if it were a spoken form of writing (or would be, if only it could). In the Middle Ages scriptist assumptions prevailed without question: the treatises of the modistic grammarians (see below) deliberately ignore the study of spoken language. As far as they are concerned, the sounds produced when one speaker speaks to another are of no consequence. This conveniently dispenses the *modistae* from considering any aspects of language that are not manifested in writing.

One secondary consequence is that orthographic criteria are sometimes invoked in the determination of linguistic units. A classic example in the 17th

century is the Port Royal definition of a word, which is said to be *ce qui se prononce à part, & s'écrit à part*. The latter part of this definition alludes naively to the rather late orthographic practice of leaving spaces between grammatical units in written texts. A more pervasive manifestation in modern times is the adoption of 'alphabetical order' in dictionaries. Another is the belief of many Europeans that their own name is a written form. Thus they will go to the trouble of pointing out to others that the spelling is *Anne*, not *Ann*. (In speech, it makes no difference.)

More generally, at the macrosocial level, scriptism is institutionalized in the way Western societies insist on having agreements 'put in writing' and 'signed' (i.e., validated by the personal signature appended to a document) if they are to have any legal validity. Literacy has come to be accepted as the foundation of all forms of education. The study of written texts was already the basis of the 'seven liberal arts' taught in medieval universities. In these various ways, Western linguistic thought over the long term has been continuously in thrall to the long-entrenched prestige of writing that originated in antiquity.

Form and Meaning

Given a scriptist conception of the elements of speech (i.e., as individual discrete segments of articulated sound corresponding to alphabetic letters, and linearly concatenated), the following questions immediately arise. How are these elements combined to form meaningful linguistic signs? What determines the meaning of these combinations?

Ostensibly, Plato's dialogue *Cratylus* records a curious debate between Cratylus and Hermogenes as to whether names are natural or not. According to Cratylus, "everything has a right name of its own, which comes by nature," and this "inherent correctness" is "the same for all men, both Greeks and barbarians." By contrast, according to Hermogenes, there is no "correctness of names other than convention and agreement." In short, "whatever name you give to a thing is its right name": "no name belongs to any thing by nature, but only by the habit and custom of those who employ it and who established the usage."

One idea examined in *Cratylus* is that spoken forms have a mimetic motivation: that is, the sounds making up a word reflect its meaning in some way or other. For example, the consonant *r*, being produced with a rapid movement of the tongue, is suited to expressing motion: it occurs in Greek words for 'flow', 'current', 'trembling', and 'run'. The vowel *o*, made by rounding the lips, expresses circularity and thus occurs in the word for 'round'. And so on. This notion that the form of a word imitates that which the word designates long survived antiquity: it turns up again in the 18th century; for example, in Leibniz (1646–1716), de Brosses (1709–1777), and Court de Gébelin (1728–1784).

The opposing point of view, often known as 'conventionalism' – or, since Saussure (1857–1913), 'arbitrariness' – holds that there is no such connection between form and meaning (onomatopoeia – for example, the word *cuckoo* supposedly being an imitation of the cuckoo's call – being regarded as a marginal exception).

In *Cratylus*, Socrates mediates the debate about form and meaning. By a series of shrewd questions, he maneuvers both parties into adopting apparently absurd positions. The implausibility of some of the etymologies selected for discussion has led some scholars to suppose that this is a satirical attack on the Greek fondness for etymological speculation. But it seems unlikely that a mind as penetrating as Plato's would have thought it worth devoting a whole dialogue to such a trivial purpose. More probably, the serious point of the dialogue should be seen as emerging when Socrates raises the question of what it is to tell the truth. For the pursuit of truth was the fundamental purpose of Plato's philosophy, and the form of words is by no means irrelevant to this goal (see below).

Aristotle, in the passage already cited, proposes a different approach to the relationship between form and meaning. It is, he claims, a 'symbolic' relationship, but what exactly he means by this is controversial. In the Greece of his day, a *symbolon* was a token (often a shard or piece of bone) broken in two, one half being retained by each of the parties to a transaction or commercial agreement. Aristotle seems to use the term metaphorically with respect to language. In that case, its significance would lie in the exact fit between the two halves (i.e., form and meaning) of the *symbolon* (word) when put together. If that is the correct interpretation, it becomes evident that for Aristotle the bond between form and meaning rests not on any resemblance between the linguistic form and what it stands for, nor on any other intrinsic suitability to represent the thing represented, but purely on the agreement between speaker and hearer concerning their particular linguistic transaction. In short, the meaning is imposed on the form psychologically by those making the communicational contract.

This is a position which can be read as supporting Hermogenes in Plato's dialogue. It is noteworthy that there is no appeal here by Aristotle to any set of overt or public conventions for determining the relationship between form and meaning. In this respect, the relationship is regarded as 'unregulated' in much the same sense as in modern integrationist theory

(*see* **Integrational Linguistics and Semiology**), whereas the more orthodox view since Aristotle's day has been to treat the connection between form and meaning as determined by the public linguistic 'code' constituted by whatever language (Greek, Latin, English, etc.) the interlocutors are speaking.

From a code-based perspective, the linguistic individualism of Hermogenes seems to be ridiculous, anticipating Humpty Dumpty in Lewis Carroll's *Through the looking glass*, who claims to be able to use any word in any sense he chooses.

A position somewhere in between radical individualism and code-based linguistic orthodoxy is taken in the late 17th century by the English empiricist philosopher, John Locke (1632–1704). Locke elaborates a psychocentric semantics, in which individuals are responsible for the meanings of the words they use. According to Locke, in his *Essay concerning human understanding*, words "in their primary or immediate signification" stand for nothing but ideas in the mind of their user. In short, language is not a direct reflection of reality, but a reflection of what people suppose reality to be. This undermines Aristotle's assumption that we all live in the same world, identically perceived by all its observers. Locke goes on to suggest that linguistic communication is something of an illusion. Men suppose that their words are "marks of the ideas in the minds also of other men, with whom they communicate," since without that correspondence communication would be impossible. Men also suppose that their words "stand for the reality of things."

The point Locke is making alludes obliquely to a long-running dispute in the Western tradition between 'realists' and 'nominalists.' Realists are traditionally taken to be those who hold that there exists a reality independent of human perceptions or beliefs, and that language is based ultimately on this independent reality. (This conviction lies at the heart of 'reocentric' theories of meaning: roughly, the meaning of the word *copper* is based on the 'real' existence of the metal copper, it being assumed that the metal exists anyway, regardless of what it is called or whether it is recognized as such.) Nominalists, on the other hand, are those who hold that there is no ground for supposing that anything exists independently of its recognition in actual examples and that meaning depends on what such examples are called in particular cases. Both doctrines are sometimes opposed to 'conceptualism.' The latter terms covers a miscellany of positions in which emphasis is placed on the alleged capacity of the human mind to form abstract concepts independently of whatever exists or is said to exist. But all three labels need to be taken *cum grano salis*. Their interpretation depends very much on the view of the interpreter. Thus, for example, Peter Abelard (1079–1142), the leading Scholastic philosopher of his day, has variously been classified as a realist, a nominalist, and a conceptualist as well. The linguistic issue was nevertheless of some relevance to theological disputes in the Middle Ages (for instance, concerning the nature of the Eucharist in the Christian church, and descriptions of God and His attributes).

Language and Truth

The question of the relationship between form and meaning in turn gives rise to a problem about truth. According to the traditional Western view, which again goes back to Plato and Aristotle, language is doubly imbricated in the pursuit of truth. For (1) until an explicit statement is made (e.g., 'Homer is alive' or 'Homer is dead'), no question of truth or falsehood arises, and (2) what we take a statement to be asserting depends on how we understand whatever names it deploys (e.g., *Homer*). The relationship between forms and meanings is crucial here. If names are no more than conventional designations, the truth of the matter seems to be tied to whatever is the general opinion. But suppose general opinion is mistaken (e.g., suppose there was no such person as Homer). This is where the issue of the mere 'conventionality' of names begins to bite in a philosophically disturbing manner. It is also the reason why the debate about proper names and truth has remained on the philosophical agenda ever since.

As conducted in *Cratylus*, the debate is not confined to what would now be called 'proper' names. Nor does it reach a very satisfactory outcome. Socrates seems to be unable to make up his mind, except to conclude that "surely no man of sense can put himself and his soul under the control of names, and trust in names and their makers to the point of affirming that he knows anything." But the debate also links up more immediately with the Platonic theory of Forms, according to which things on Earth are no more than imperfect copies of sempiternal exemplars existing in a timeless realm of their own. This version of realism has far-reaching semantic implications. In modern times they extend as far as the neo-Platonist semantics of Frege (1848–1925) and his followers.

In Plato's dialogues, Socrates appears anxious to maintain a thesis about the determinacy of meaning: we could not describe even the inconstancies of things if the concepts employed in these descriptions were themselves inconstant. This argument seems to be implicitly accepted by Aristotle when he formulates what is now referred to as the 'correspondence theory' of truth. What Aristotle says in his *Metaphysics* is

that truth is "to say of what is that it is, or of what is not that it is not." Although this reocentric formulation seems unexceptionable as far as it goes, it dodges the crucial questions of how we can tell what 'is' or how we can tell whether what might be said is said 'of it.'

Aristotle's lasting contribution to Western linguistic thought lies in proposing that, although different languages have different words, they all use similar types of word combinations to express similar patterns of ideas. That, however, is not how Aristotle himself would have seen it. He thought he was laying bare not a mere linguistic coincidence, but a universal truth about human reason. How did he come to this view? What allowed him to reach it was his adherence to a particular version of the Hermogenean doctrine of 'conventionalism.' As is clear from the passage from *De Interpretatione* cited above, Aristotle maintained that although different word conventions may be in use in different languages, the things to which words refer do not differ. Nor do the concepts that human beings express by means of these words. Given these assumptions, it followed that all languages, however superficially diverse in their forms of expression, must ultimately be reflections of the same underlying reality, and hence human reason, as expressed in language, must be everywhere the same.

This Aristotelian view was to dominate European thinking about language for centuries to come. Words would be regarded merely as vocal labels attached to a universal set of things, properties, processes, and relations existing independently in the world about us. That view, in various sophisticated versions, is still alive in modern linguistics. In its most banal form, it is reflected in the modern bilingual dictionary, which assures us that what is meant in English by the word *dog* is also what is meant in French by the word *chien*. The equivalence is allegedly guaranteed by the fact that dogs are the same on both sides of the straits of Dover. So from 'All dogs are mortal' and 'Rover is a dog,' it follows that 'Rover is mortal' both in England and in France. Or, if we prefer the French version, 'Tous les chiens sont mortels, 'Rover est un chien,' and 'Rover est mortel.'

But how do we know that a community has got its labeling of reality correct in the first place? The argument about forms and meanings in *Cratylus* anticipates in some respects the kind of skepticism about language that Francis Bacon (1561–1626) made explicit many centuries later in his condemnation of *idola fori*. These 'idols,' according to Bacon, are misconceptions that language imposes on the human mind: they are "false appearances that are imposed upon us by words." In his *Novum Organum* (1620), Bacon shrewdly observes, in protest against the view that had prevailed ever since Aristotle, that although we believe that our words are governed by reason, it is nevertheless true that words "react on the understanding." He argues that words usually reflect the understanding of the uneducated and draw distinctions that are easy for the uneducated to grasp. So that whenever more careful analysis or more accurate observation are required to "suit the true divisions of nature," words prove to be an obstacle and impede changes in ways of thinking.

Bacon is not very specific about the "false appearances" that can be created by words or how they arise, but presumably they would include the case of words 'standing for' things that do not in reality exist. Thus, for instance, if there are no such animals as unicorns, the word *unicorn* exemplifies a verbal deception of this order, inasmuch as the existence of the word might be taken to imply the existence of the animal. A more convincing modern example might be the word *mind*: there is much talk about our minds and how they work, but – as behaviorists would insist – that is no guarantee whatsoever that we have minds (as distinct from brains) at all. The only remedy for "false appearances" that Bacon suggests is always to define our terms before entering into "controversies and disputations." But it is difficult to see how doing that would help very much if all parties were deceived by the same "false appearances."

When a reocentric view of meaning is combined with Aristotelian conventionalism, we reach the conclusion that the meaning of a word is 'conventionally' determined by what the word 'stands for', e.g., *copper* being the conventional name (in one language or linguistic community) for the metal copper. It then seems to be illusory to look for some underlying universal reason why copper is called *copper*. That would be an *ignis fatuus*. The only valid question(s) would be how, historically, copper came to be called *copper* in English, *cuivre* in French, etc. But that reformulation already presupposes that it is indeed the 'same' metal that is called *copper* in English, *cuivre* in French, and so on. In short, reocentric semantics generates problems to which Western linguistic thought never supplied any but circular answers.

Doubtless that lacuna was obscured by the way biblical wisdom on the subject seemed to support a straightforward reocentric answer to questions of meaning. The orthodox Christian account of language was based on a well-known passage in the Book of Genesis:

> And out of the ground the Lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them: and

> whatsoever Adam called every living creature, that was the name thereof. And Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field [. . .]. (Genesis 2:19–20, King James version).

As it happens, this account coincides with Aristotle's assumptions in several important respects. First, there is no question of Adam being asked to name creatures that do not exist: their existence is logically prior to the act of naming. Second, the act of naming is what establishes the relationship between form and meaning. Third, although we are not told why Adam chose any given name, God never rejected any of Adam's names as inappropriate.

This last point could be construed in two ways. One interpretation would be that it did not matter what name Adam came up with. (This would endorse the conventionalist view of nomenclature: here Adam is seen as a Hermogenes.) An alternative interpretation would be that Adam 'got the names right.' By uncorrupted intuition, he saw which names were appropriate to the nature of the animal in question. (Here Adam is seen as a Cratylus, who can somehow sense the 'natural' name that a creature ought to have.) Later it was often assumed that the second interpretation was correct, because the account in Genesis describes Adam's nomenclatorial feats as taking place before the Fall. Here we witness a classic example of how linguistic questions in the Western tradition hinged for centuries on religious beliefs.

Grammar

If the sounds of speech are conceived as elements linearly combined to form meaningful words, the next obvious question would seem to be: how are these meaningful units themselves combined? This question falls under the rubric of what was later in the Western tradition called 'grammar.' But, although the Greeks are often credited by historians with initiating grammatical studies, the modern term does not entirely coincide with what the Greeks regarded as *grammatike*.

Although it seemed obvious enough to Greek thinkers that, both in speech and writing, words have to be combined sequentially in order to express statements, syntax did not attract a great deal of interest or attention in the Classical period.

At the beginning of *De Interpretatione,* Aristotle insists on the importance of distinguishing the forms of combination that can be observed in language, but this is because it is implicated in questions of truth and falsity:

> Just as some thoughts in the mind are neither true nor false, while others are necessarily one or the other, so it is also with spoken sounds. For falsity and truth have to do with combination and separation. Thus names and predicates by themselves – for instance 'man' or 'white' when standing alone – are like thoughts that are without combination or separation; for thus far they are neither true nor false.

Aristotle needs this distinction to establish for logical purposes the difference between sentences and statements; but once this is done he does not pursue the topic of combination further.

There is no syntax either in the earliest Greek grammatical treatise to have survived, which is attributed to Dionysius Thrax (see below): it lists the parts of speech but does not attempt to give any indication of how to construct a sentence. This lacuna is of some significance. It reflects a view of language in which knowing how to put words together in order to express a coherent proposition is not so much a linguistic ability as an exercise of reason.

The Greek and Roman systems of education were eventually professionalized in a way that separated the special study of (1) the rational use of language from (2) the persuasive use of language and (3) the correct use of language. (The physiological implementation of language was not even deemed worthy of recognition. If it had been, Western linguistic thought might have developed along quite different lines.) These three provinces were professionally allocated to the logician, the rhetorician, and the grammarian, respectively. That tripartite division lasted into the European Middle Ages, where logic, rhetoric, and grammar became the so-called *trivium* of the standard university syllabus. (The corresponding *quadrivium* comprised arithmetic, geometry, astronomy, and music.) Roughly speaking, therefore, the *trivium* was devoted to words, whereas the *quadrivium* was devoted to numbers (both astronomy and music being seen as applications of mathematics).

Grammar was a later development than either rhetoric or logic. According to Robins (1966), who traces the development of the 'parts of speech' system from the earliest times, the Greeks could not have developed the basis for a fully explicit combinatorial analysis of the sentence until the 2nd century B.C.: Plato seemed to recognize only two parts of speech, Aristotle three, and the early Stoics four. The first surviving account of what was to become the canonical eight parts of speech for later European grammarians is attributed to Dionysius Thrax (c.170–c.90 B.C.). He was a pupil of the Alexandrian scholar Aristarchus (c. 216–144 B.C.). Whether Dionysius wrote the treatise *Techne Grammatike* that traditionally bears his name is uncertain: according to some scholars, the text we have is a much later compilation. Be that as it may, its priority seems to be to identify and name the basic units that learners (of Greek) must grasp.

(Dionysius did not claim, as far as we know, that it applied to all languages. But it is relevant to note that he lived in a period when the teaching of Greek to non-Greek speakers, as a consequence of Alexander's conquests, had assumed a certain importance.)

The analysis Dionysius gives is interesting for various reasons. It reflects the Greek tendency – both as regards language and most other matters – to equate 'explanation' with resolving a complex into its ultimate constituents. The atomism of Democritus (c.470–c.370 B.C.) and his followers is the most conspicuous example of this tendency in the study of the physical world. In late antiquity we find one of the most prestigious Latin grammarians, Priscian (see below), explicitly appealing to the analogy between atoms and speech sounds. Applied to language, this can yield the kind of analysis that we find in Dionysius, who, although ignoring syntax, provides detailed taxonomies for (1) individual speech sounds, (2) syllables, and (3) words, together with brief remarks about accent and punctuation, as if that were all the grammarian needed.

However, this sits ill with his own definition of grammar, which is "the practical knowledge of the general usages of poets and prose writers." Furthermore, according to Dionysius, grammar divides into six parts: reading aloud, with due regard to the prosodic marks; explanation of poetic tropes in the works; elucidation of difficult words and narratives; discovery of etymologies; establishing analogies; and, finally, literary appreciation, which, Dionysius adds, is the finest part of grammar. It need hardly be said that this definition would not be endorsed by any modern grammarian.

The fifth of Dionysius' six branches – establishing analogies – calls for comment, since it reflects a debate about language regarded as important in the ancient world. Some teachers (the 'analogists') seem to have emphasized the regularity of linguistic structures, while their rivals (the 'anomalists') emphasized the frequency of irregularities. Translated into modern terms, the debate seems of little interest. Analogists would point out that the great majority of English nouns form a plural combinatorially by adding *-s* (*cat*, *cats*; *dog*, *dogs*). Anomalists, one supposes, would counter this by pointing out exceptions (*man*, *men*; *woman*, *women*).

What lay behind this apparently futile kind of controversy it is difficult to tell. The Stoics were regarded as champions of the anomalist position. According to the Roman scholar Varro (116–27 B.C.), the Stoic philosopher Chrysippus (c. 280–207 B.C.) wrote three books to demonstrate "that like things are denoted by unlike words and that unlike things are denoted by like words." Why would he have done that? Presumably because it served to defend the theoretical position that language is not 'rational' in the sense of being derived directly and systematically from the regularities observable in the extralinguistic world. However, it is also likely that the controversy between analogists and anomalists engaged pedagogic issues concerning rival teaching methods, about which little is known.

Grammar as Dionysius presents it has very little to do with examining the systematic articulation of rational argument, or with the techniques of verbal persuasion, but is oriented primarily toward the study of literary texts, with a heavy leaning in the direction of elementary teaching requirements. Both in Dionysius's definition of grammar and elsewhere in his treatise, we find clear confirmation that linguistic inquiry is now geared to the educational program of a literate society. The very name of his discipline is derived from Greek *gramma,* 'letter'. His classification of linguistic elements (*stoicheia*) at the lowest level is, like that of the Stoics, overtly based on the letters of the Greek alphabet: he seems to assume that these 24 minimal orthographic units automatically correspond to 24 such phonetic units. There is no attempt to demonstrate that this is actually the case.

One combinatorial study that Dionysius neglected (i.e., Greek syntax) was given its first detailed examination some centuries after Dionysius's death by the Alexandrian grammarian Apollonius Dyscolus (2nd century A.D.). Although of the analogist persuasion, Apollonius was certainly interested in the question of why syntactic anomalies exist. The study of Latin syntax had to wait some centuries yet for any comparable treatment. It eventually came with the work of Priscian (Priscianus Caesariensis, fl. 500 A.D.) who taught Latin in Constantinople, then the (mainly Greek-speaking) capital of the Byzantine Empire. His *Institutiones grammaticae* was the most comprehensive grammar of Latin produced in the ancient world, and its last two books dealt with syntax in a manner evidently inspired by Apollonius's exposition of Greek.

Priscian's account of Latin syntax in turn provided the point of departure for the most original approach to the subject, which was developed by the modistic or 'speculative' grammarians of the later Middle Ages. They included Boethius of Dacia, Albertus, Siger de Courtrai, and Thomas of Erfurt, all of whom were active during the period from 1270 to 1310. The term *modistae* reflects the fact that their treatises were usually said to be about the *modi significandi* or 'modes of signifying'. The term 'speculative' grammarians is indicative of their view of language as a mirror (*speculum*) of the world as

reflected in the human mind. Their grammars are not intended for practical teaching purposes, although they are heavily indebted to Priscian and other ancient grammarians for their basic view of the structure of Latin. It does not occur to them that Latin may not be a typical language: they simply assume this to be the case.

However, the *modistae* seem to recognize that in antiquity we never find a clear analysis of *how* a word is capable of 'standing for' some nonlinguistic entity. The notion of 'naming' something (e.g., *Socrates* being 'the name of' a particular person, or *aes* being the name of a certain metal) is just taken for granted: names are part of the linguistic equipment that a language supplies. The same goes for all the parts of speech. The *modistae* realize that these unexplicated assumptions are quite inadequate for any deeper comprehension of language. They seek to explain the rationale of grammar by invoking a set of distinctions between various 'modes of signifying'; for example, 'active' versus 'passive,' 'essential' versus 'accidental.' These in turn relate psychologically to different 'modes of understanding,' as well as objectively to different 'modes of being.' In this way an elaborate organization is built up of the ways in which words relate to the world via the operations of the mind. The active mode of signifying is that by which a given form signifies the property of the thing it designates, while the passive mode of signifying is that by which the property of the thing in question is signified by the form of the word. A linguistic sign both signifies and 'consignifies.' In virtue of its consignification, the sign functions as a part of speech, and this determines its combinatorial possibilities.

Some modistic explanations of grammatical features strain credulity. For example, Thomas of Erfurt accounts for the gender of Latin nouns by claiming that the masculine gender signifies the thing designated by means of the property of acting, while the feminine gender signifies the thing designated by means of the property of being acted upon. This seems hard to reconcile with some of his own examples; e.g., the Latin nouns *lapis* (masculine) and *petra* (feminine), both meaning 'stone'.

Modistic thinking about language is aprioristic to a degree. The notion that certain hypotheses might require testing against observation of language in use is entirely absent from their work. The ultimate goal is defined within the parameters of medieval Catholicism: to demonstrate how God designed language in such a way as to permit human beings to obtain a certain (partial) grasp of the wonders of His creation. By the time of the Renaissance the modistic approach to grammar was already abandoned.

The most famous grammar of the post-Renaissance period, the *Grammaire générale et raisonnée* (1660) of Antoine Arnauld (1612–1694) and Claude Lancelot (1615–1695), otherwise known as the 'Port Royal grammar,' adopts an overtly pedagogical perspective on language and language learning, wedded to a simplistic theory of human psychology. For these authors, as for Aristotle, the basic function of language is telementational: it exists to 'convey' thoughts from the mind of one person to the mind of another. Its structure is therefore dependent on the thoughts to be conveyed:

> [...] men, having had need of signs in order to mark everything that occurs in their minds, also found it necessary to draw a most general distinction among words into those that signify the objects of thoughts and those that signify the form and manner or mode of our thoughts [...].

These mental distinctions, according to the Port Royal grammarians, constitute the foundation of grammar in all languages. There are, they claim, three basic operations of the human mind: conceiving, judging, and reasoning. Conceiving they describe as what happens when the mind simply contemplates things, either with or without the help of visual images. Judging is deciding that something conceived is, or is not, the case. Reasoning is using two judgments to arrive at a third.

On this slender basis they propose to explain all the traditional parts of speech: nouns, adjectives, pronouns, participles, prepositions, adverbs, verbs, conjunctions, and interjections. This leads them to some extraordinary conclusions. Perhaps the most striking is that there is only one 'true' verb; namely, the verb 'to be' in its third person singular present indicative form. (This conclusion is based on their view that the basic function of a verb ought to be to "mark the connection that we make in our minds between the two terms of a proposition.") Another is that the difference between nouns and adjectives is that nouns serve to designate the objects of our thoughts as "substances," whereas adjectives designate the objects of our thoughts as "accidents." The difference between substances and accidents is held to be that the former are conceived as existing independently, whereas the latter only as manifested in some substance. This in turn supposedly explains why adjectives 'need' the grammatical support of nouns, whereas nouns can 'stand alone' in discourse. The definite article causes them problems too. It 'ought' not to occur with a proper name, according to their 'rational' explanation of proper names. (Thus *London is a city*, but not *The London is a city*, because the proper name – *London* – already

sufficiently identifies the city in question.) But in some languages and in some instances, it is nevertheless customary to use the definite article with certain proper names. The authors of the Port Royal grammar recognize this and find themselves obliged to admit that "usage does not always agree with reason." But it does not occur to them to think that perhaps they are putting the cart before the horse throughout their enterprise by postulating a relationship in which thought processes dictate grammar, rather than grammar dictating thought processes. (For the latter view, *see* **Modern Linguistics: 1800 to the Present Day**.)

Language, Nature, and Science

Scriptist assumptions, combined with an 'Adamic' approach to language, eventually flowered in the attempt to construct a 'language of science' for physics, chemistry, geology, and similar investigations. That linguistic task was taken seriously in the 17th century by the 'experimental philosophers' who came together to set up such bodies as the Royal Society of London. One of these was John Wilkins (1641–1672). His *Essay towards a real character and a philosophical language* (1668) attempts to bypass speech altogether by relating written marks directly and reocentrically to existing things. In this way he hopes to provide a form of communication which will cut through all impediments to understanding offered by adopting established languages such as Greek, Latin, and English. These are seen as obstacles to human understanding. Bypassing them in favor of a more explicit 'philosophical' system of expression is proposed as a major advance both in human control over language and in the investigation of the natural world. What Wilkins is attempting is a practical linguistic solution to Bacon's problem of *idola fori* (see above). Wilkins recognizes the need to construct a new scientific language from first principles, free from the errors and obscurities that will inevitably have become embodied in the languages currently available for everyday discourse.

However, the way Wilkins set about his task is still essentially Aristotelian. He states his initial premise as follows:

> As men do generally agree in the same Principle of Reason, so do they likewise agree in the same *Internal Notion* or *Apprehension of things*.

This premise echoes Aristotle's assumption that "affections of the soul" are the same for everyone. Wilkins claims that it is by external expression of these internal notions that men "communicate their thoughts to one another," thus endorsing the Aristotelian view of communication as telementation. He tells his readers explicitly that the "conceit" that men have in their minds of a horse is the "notion or mental image" of that animal. Here we see the third component of Aristotle's doctrine: that affections of the soul are derived from external objects, which are the same for all observers. For Wilkins, names of things are "arbitrary sounds or words" that men have agreed on, "either casually or designedly," to express their mental notions. Still following Aristotle, Wilkins assumes that there is no 'natural' connection between the word and what it stands for. He argues that, if all this is so, it lies within our power to institute a universal system of communication by consent. This would liberate mankind from what he calls "that Curse in the Confusion of Tongues."

How can writing be liberated from its dependence on speech, and thus be equipped to serve as the basis for an international language of science? Wilkins's answer was the construction of a new writing system "that should not signifie *words*, but *things* and *notions*, and consequently might be legible by any nation in their own Tongue." In brief, Wilkins' project consisted in keeping the Aristotelian model, but promoting writing to the role traditionally played by speech. In this way, the written sign is brought into a direct, rather than an indirect, relationship to what it signifies.

Like other 17th-century thinkers, including Bacon, Wilkins regarded the case of Chinese as showing that, in principle, such a project was feasible; Chinese script being regarded as readable in various languages and thus providing a bridge between populations incapable of understanding one another's speech. However, in his view, all existing languages and writing systems were flawed, inasmuch as more than one meaning could be given to the same form, while different forms might have the same meaning. These imperfections would have to be eliminated in a rationally designed language of science.

For this purpose it was necessary first to draw up a systematic classification of everything known, set out in a series of tables, so that unambiguous signs could be allocated to each separate class of things. Wilkins attempted to do this. The problem with such a proposal is that it presupposes that a complete knowledge of Nature is already available: or if due allowance is to be made for a future expansion of knowledge, it must be so designed as to admit additions without upsetting the basic classification.

After Wilkins's death, the Royal Society set up a committee to improve his scheme. The committee never delivered its report, perhaps because of internal disagreements, but perhaps because its members came to realize the fundamental flaws in the thinking behind it.

Linguistic Origins

The account given in Genesis 2 (see above) continued to dominate thinking about the origin of language. It was supplemented by the story of the Tower of Babel in Genesis 11, which was taken as explaining why there were so many different and mutually incomprehensible languages in the world. This was a form of divine punishment, inflicted on mankind for presumption.

> And the whole earth was of one language, and of one speech. [...] And they said, 'Go to, let us build us a city and a tower, whose top may reach unto heaven. [...] And the Lord came down to see the city and the tower, which the children of men builded. And the Lord said, 'Behold, the people is one, and they have all one language; and this they begin to do: and now nothing will be restrained from them, which they have imagined to do. Go to, let us go down, and there confound their language, that they may not understand one another's speech.' So the Lord scattered them abroad from thence upon the face of all the earth: and they left off to build the city. (Genesis 11:1–9, King James version).

Since it was sacrilegious to question the authority of the Scriptures, these two stories between them imposed serious limitations on the scope of linguistic inquiry for generations after Jerome's translation had become the official Bible of the Christian church. It might seem odd at first sight that biblical translation was not itself regarded as a form of sacrilege (since the diversity of languages was evidently in accordance with the will of God and the act of translation might therefore be seen as a way of avoiding God's punishment). But bilingualism was such a conspicuous feature of Graeco-Roman culture that it would hardly have been feasible in Jerome's day to insist on a religious condemnation of translation as such. In any case, the translation of the Septuagint from Hebrew into Greek, according to tradition, dated back to the 3rd century B.C. and, in the conviction of Christian apologists, was divinely inspired.

Whatever the rationale, the European tradition inherited – and the Vulgate exemplified – a view of language in which it was taken for granted that it was possible in principle for translation to be practiced. This is an important assumption, since it leads directly to the that, in spite of superficial diversity, there may be – or must be – a common substratum that makes it possible to translate from one language into another. That was perfectly in accordance with the Babel story as reported in Genesis: for there what God did could be seen as simply scrambling the correlations between sounds and meanings. There is no suggestion in the Bible that, after the "confusion of tongues," some speakers could no longer recognize a brick as a brick or a spade as a spade. What they failed to recognize was the word for 'brick' and the word for 'spade.' So their ambitious building operation collapsed through a breakdown in communication, and not because their minds had been addled. Given this rationale, it was always possible that communication could be restored (i.e., by finding some way of linking up superficially diverse forms to a single underlying meaning). And that, precisely, was the concept and function of translation as envisaged throughout the history of Western education.

In the Greek world there was no traditional account of the origin and diversification of language as specific as that presented in the Bible. In *Cratylus*, vague reference is made to an original "name-maker" or "name-giver," supposedly responsible for coining the first words; but exactly who this person was is never explained. Nor did the Greeks have any traditional account of the diversification of languages or any notion of an ancestral language from which Greek might have descended.

The hypothesis that Latin was derived from Greek was not unknown in antiquity, but it gave rise to no systematic investigation of the way in which that linguistic process might have taken place. The attempt to 'explain' certain words by reference to other words, or older forms of the same word, is very ancient and appears already in Homer. (He connects the name *Odysseus* with verb forms meaning 'grieve' and 'hate'.) Greek and Roman grammarians treat such explanations as a branch of linguistic knowledge and place it under the rubric of etymology. Etymological studies were commonly supposed to be capable of revealing the truth (Greek *etymon*) about the things designated by the words thus explained.

In *Cratylus*, Socrates entertains the notion of linguistic change and suggests that over time word forms may have altered, thus concealing their original meaning. By the time of Varro, etymology has developed into a significant branch of learning, but is still unsystematic. For later generations, Varro's name became associated with the proposal of far-fetched hypotheses about the origins of words. He seemed to have thought that words were first "imposed on things" by human initiative, but that mistakes may have been made in the process. Thus, for instance, both the male and the female eagle are denoted in Latin by the same form *aquila*; whereas according to Varro the terms for male and female bird should be different. This implies a view of language according to which, originally at least, differences between word forms were intended to reflect differences in Nature.

In the later Middle Ages, the question of linguistic origins is taken up again, notably by Dante

(1261–1321). Like all his contemporaries, Dante accepts the biblical account. He also takes it for granted that the first language must have been Hebrew. But the most original strand in his thinking lies in his supposition that after the Tower of Babel three distinct varieties of language were introduced into Europe. These Dante identifies by reference to their word for 'yes.' This is perhaps the first example of the notion that comparative linguistic evidence provides a sound foundation for drawing conclusions about the linguistic past. Thus, as one enthusiastic modern commentator puts it, "from fundamentalist interpretation of the Bible he passes in a bound to a scientific recognition of the existence in Europe of the three groupings now identified as Germanic, Greek and Romance" (Elcock, 1960: 456). This somewhat overstates Dante's achievement as a linguist. However, he shows himself to be well aware of the dialectal divergence of the Italian peninsula in his own day, and counts at least 14 different dialects.

By the 18th century, the question of linguistic origins and the credibility of the biblical account has become controversial. Some writers are still reluctant to challenge the authority of the Bible. Others did not hesitate to put forward a 'natural' explanation of the origin of language, which dispenses with any act of divine intervention and seeks to explain the development of human speech in terms of the communicational needs of human beings in society. Authors who played a part in this debate include Mandeville (c.1670–1733), de Brosses (1709–1777), Condillac (1715–1780), Rousseau (1712–1788), Herder (1744–1803), Court de Gébelin (1728–1784), Voltaire (1694–1778), and other contributors to the *Encyclopédie*. The debate itself paved the way for a more empirical approach to questions of linguistic change and relationships between languages. (*See* **Modern Linguistics: 1800 to the Present Day.**)

Conclusion

Western linguistic thought before 1800 is mainly oriented toward providing validations for positions adopted in philosophy, or in pedagogic practice, or else in religious teaching based on the Bible. There is little or no conception of an independent scholarly inquiry into the whole gamut of known languages. That was to be the work of later generations. Although all the questions discussed above were considered at some time or other, it is worth emphasizing that at no point were they all considered systematically at one time by a single individual or school. That fragmentation is itself characteristic of Western linguistic thought during these centuries.

See also: Aristotle and the Stoics on Language; Dionysius Thrax and Hellenistic Language Scholarship; Integrational Linguistics and Semiology; Modern Linguistics: 1800 to the Present Day; Origin of Language Debate; Plato and His Predecessors; Plato's Cratylus and Its Legacy; Port-Royal Tradition of Grammar; Priscianus Caesariensis (d. ca. 530); Quintilian (ca. 30–98 A.D.); Universal Language Schemes in the 17th Century; Varro, Marcus Terentius (116–27 B.C.).

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Western Sahara: Language Situation

Editorial Team

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Western Sahara is a territory on the northwest coast of Africa bordered by Morocco (443 km), Mauritania (1561 km), and Algeria (42 km). It was administered by Spain until 1976 when Morocco annexed the northern two-thirds of the country (formerly called Spanish Sahara). Mauritania annexed the southern third of the country at the same time, but relinquished it after three years in 1979. After Mauritania's withdrawal, Morocco claimed and administered Western Sahara, the sovereignty of which remains unresolved.

Western Sahara, which has a total area of 266 000 square kilometers, consists mainly of low, flat desert with large areas of rocky or sandy surfaces rising to small mountains in the south and northeast. It has a population of 267 405 based on a 2004 estimate.

The main languages spoken are Hassaniya Arabic and Moroccan Arabic among the mainly Arab and Berber ethnic groups.

See also: Arabic; Berber; Mauritania: Language Situation; Morocco: Language Situation.

Westphal, Ernst Oswald Johannes (1919–1990)

G T Childs, Portland State University, Portland, OR

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Born in 1919 to Lutheran missionaries, Westphal learned the language of the mission station at Khalava of Vendaland in the Northern Transvaal (South Africa). Throughout his life he had a respect and fondness for the Venda culture, feelings he extended to other African groups. "He was deeply steeped in Venda culture, and in fact always claimed that he felt more at ease with Venda music – or with any African performing arts – than with those of Europe" (Rycroft, 1992: vii). Along with Venda he learned English, Afrikaans, and German as a child, and studied many of the major languages of southern Africa.

As was common at the time, Westphal remained something of a generalist and a (southern) Africanist, making significant contributions in both Khoisan and Bantu studies. Because his work was descriptive and in some sense pretheoretical, it has been plumbed for modern analyses. Westphal followed the lead of his mentor C. M. Doke in characterizing the languages he studied in their own terms rather than using prevailing European models (Gowlett, 1992). He was a careful worker, particularly in comparative work and reconstruction (Borland, 1992: 6). Perhaps his most widely known work surveys the Khoisan languages (Westphal, 1971), a group he felt did *not* form a genetic group.

Just as careful was his work in phonetics, particularly the study of tone. Westphal has been praised for his fine ear and the introduction of experimental techniques in phonetics. In 1952 he took "a long spell of arduous study leave … [in Angola, Botswana, and Namibia], equipped with an early Soundmirror tape recorder (using paper tape), powered by a cumbrous portable generator" (Rycroft, 1992: vii). Furthermore, he pioneered the use of computers in Bantu comparative studies (Borland, 1992).

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Whistled Speech and Whistled Languages

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Introduction

Several populations all over the world have naturally developed a whistled form of their local language in response to isolated conditions in their everyday life.

Whistled speech is a system of communication based on whistles modulated according to features in common with the spoken equivalent. Therefore, it is a vehicle for articulated language in the true sense of the word.

The fact that the information is quite unintelligible to untrained speakers long made whistled languages objects of mystery, even if their existence was reported since the treaty of the Tao in Asia (6th century B.C.) and since the 14th century in the island of La Gomera (Canary Islands). It is also the reason why so few researchers became interested in this alternative way of transmitting messages in a linguistic attitude.

The first scientific studies concerned mainly anthropological aspects (Quedenfeldt, 1887; Lajard, 1891; Labouret, 1923), and it is only in the last part of the 20th century that serious attempts of describing their phonetics and acoustics have been made (Cowan, 1948; Classe, 1956; Busnel *et al.*, 1962; Busnel and Classe, 1976). More recently an international network of scientific researchers and local traditional authorities has been developed in a collaborative way (Meyer, 2004). This approach has emerged both from (a) the wish of some minority populations to revive, document, and transmit their threatened oral traditions and (b) the scientific assessment that these forms of communication provide significant information thanks to an alternative point of view of the phenomenon of language.

Diversity of Linguistic Production

Whistled forms of languages have been found in most of the main linguistic families. They rely mainly on a whistling technique and on a strategy of encoding, so every oral language may be whistled. Even some languages imported by waves of domination have been spontaneously adapted into a whistled equivalent, like Spanish Silbo of La Gomera, which evolved from a whistled form of a now extinct Berber language called Guanche.

Phonology and Phonetics

Linguists and acousticians noticed that two main ways of whistling a language have been developed. For tonal languages like Highland Mazateco, the pitch level of the main band of frequencies of the whistles characterizes the composition of the phonemes: in this case, whistles are focused on suprasegmental features and reproduce mainly the fundamental frequency of spoken

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languages. For nontonal languages like Spanish or Turkish, the pure frequency of whistles reproduces mainly segmental features of the language: the vowels are emitted at different pitch levels (the whistled series [i e a o u] results in descending pitches whereas modulations of these pitches convey the consonantal information. These consonantal modulations, when represented on sonograms, have a strong resemblance to the second formant of the spoken equivalent (Brusis, 1972; Busnel and Classe, 1976). This has been explained in terms of articulation. The transitions of the consonants are influenced by the pitch of the neighboring vowels, their whistled loci being reported to another set of frequencies (Leroy, 1970). This similarity, which has been partially studied in Spanish Silbo and in Turkish, is not systematic, is obvious in occlusive transitions, and tends to disappear in rapid whistles.

The constraints imposed by whistling techniques when articulated affect the phonetics and phonology. The whistled forms of languages have therefore been identified as abridgments of speech that encode essential parts of human languages. For example, in nontonal languages, there is a reduction of the number of vowels (to three or four main bands of frequencies representing the vowels) and consonants. In most tonal languages, the whistles reproduce tones and glides but not vowel qualities.

Lexicon

The vocabulary of whistled forms of languages reflects the basic knowledge of the vocal spoken language and has potentially the same richness. Whistlers culturally use a preferential set of words that correspond to their everyday activities. As a result, the dictionaries of common whistled words that have been gathered by researchers (Moles, 1970; Busnel and Classe, 1976) appear to be more restricted than the spoken dictionaries (there are approximately 2000 common words in La Gomera).

Whistles as a Tool for Linguists

Many linguists use whistles in their fieldwork as a tool to help them to sharpen the tonal description of their phonological modeling (even if the language has no naturally developed whistled system). The whistles might be used to focus on tonal rules (Cowan, 1948; Rialland, 1980) but also to look for any tonal aspect in a language described as nontonal (Caughley, 1976).

Geographical and Social Environments

Whistled languages have naturally developed in response to the necessity for humans to communicate in conditions of relative isolation (distance, night, noise) and specific activities (social information, shepherding, hunting or fishing, courtship, shamanism). Therefore, they are mostly related to places with mountains or dense forests. Southern China, Papua New Guinea, the Amazon forest, subsaharan Africa, Mexico, and Europe encompass most of these locations.

Native whistlers who have grown up in places where a whistled language was used daily do not remember when they began to control this aspect of the language. The learning process is the result of a phase when the person is immersed in a linguistic environment mixing whistled and spoken speech. Therefore, the whistled speech is locally simply seen as one of the multiple means of expressing the local language, like whispering, shouting, or singing.

Whistling Techniques

Many techniques have been described among the populations who whistle their language. The choice of a specific technique is first of all dependent on practical concerns. Bilabial and labiodental techniques are common for short and medium distance discussions (in a market, in the noise of a room, or for hunting); whereas the tongue retroflexed, one or two fingers introduced in the mouth, a blow concentrated at the junction between two fingers or the lower lip pulled while breathing in air are techniques used to reach high levels of power for long distance speaking. Each place has its favorite trend that depends on the most common use of the village and on the personal preferences of each whistler. Whistling with a leaf or a flute is often related to courtship or poetic expression (reported in the Kickapoo language in Mexico [Ritzenhaler and Peterson, 1954] and in the Hmong [Busnel *et al.*, 1989] and Akha [Meyer and Dentel, 2003] cultures in Asia). We may notice that the finger and the leaf can be seen as the first steps toward the use of an instrument (like jewharps, flutes, and drums to produce instrumentally played speech (Stern, 1957; Meyer, 2004).

Whistling techniques do not require the vibration of the vocal cords: they produce a shock effect of the compressed air stream inside the cavity of the mouth and/or of the hands. When the jaws are fixed by a finger, the size of the hole is stable. The air stream expelled makes vibrations at the edge of the mouth. The faster the air stream is expelled, the higher is the noise inside the cavities. If the hole (mouth) and the cavity (intra-oral volume) are well matched, the resonance is tuned, and the whistle is projected more loudly. The frequency of this bioacoustical phenomenon is modulated by the morphing of the

resonating cavity that can be, to a certain extent, related to the articulation of the equivalent spoken form.

Signal Characteristics and Audibility

The pitches of whistles are concentrated in a narrow bandwidth (1000 Hz to 3000 Hz) where the hearing in human beings is more sensitive and selective. The amplitude of whistled speech has reasonable limits in its dynamic range (less than 12 dB) whereas the range of spoken speech is more than 50 dB. In natural conditions the background noise is weak in high frequencies (except in windy weather) so the signal to noise ratio is better than 6 dB at 1 km and is enough to be clearly heard. Such properties explain the use of whistles in conditions of noise or long distance communication as they increase the resistance to background noise. Whistles are well carried in valleys, which form a natural guide. For example in La Gomera the signal remains understandable at 8 km (Busnel and Classe, 1976).

Intelligibility

One interesting and key aspect of whistled languages is their intelligibility. It is a principal functional parameter. Performance on recognition tests emphasizes the role of context (natural conditions of use) as an important aspect of the recognition task. Moreover, since the most common words are much more easily understood than others, there is a correlation between situational vocabulary and perception. The choice of words is targeted at phonetic clarity (in terms of whistled speech). At the same time, homophonies between words are avoided, at least in the context of the topic.

Some perceptual tests, made on nontonal forms of whistled languages, have shown that good whistlers can recognize phonemes of their language in audio signals of other languages.

An early study in neuroscience has shown that the brain areas of production (*Broca*) and perception (*Wernicke*) of language are activated in well trained listeners (former whistlers), but not in untrained ones, when they are presented with Silbo (Carreiras *et al.*, 2005).

Comparison with Language Perception of Persons Whose Hearing Is Impaired

Similar remarks concerning intelligibility can be made with people whose hearing is impaired. They have only some perception in low frequencies (corresponding to the prosodic patterns carried by the fundamental frequency and transposed in whistled speech) and use lip reading. To understand the meaning in a real time, their cognition task must test and verify many hypotheses in response to very poor phonetic cues (visual and auditory) in a strong context reinforced by many inputs such as: the topic (history, thema, and rhema), the situation (here and now), the relation with the talker (actual and past), and the feedback returned from the partner (well or not received).

Language Evolution and Whistled Language

Many aspects of whistled languages make them good candidates for the study of the evolution of languages. Their strong link with the ecological environment and their use in isolated conditions resulted in an adaptation to the performance of the hearing system and to the acoustical characteristics of both the producing system and the acoustical area. Their use in emergency situations or in contexts related to the local tradition has clear effects on lexical use. Moreover, a whistle is rich enough to transmit the essential aspect of the languages of the world without requiring the intervention of the vocal cords. The transfer of the whistling technique from one local language to another makes this practice resistant to language domination provided that the traditional way of life is maintained. In some locations, the whistles and some musical instruments are used both for transmitting messages of linguistic attitude and for traditional music. The careful analysis of the phonetic degradation of whistled and instrumentally played languages in the places where they are endangered is in progress (Meyer, 2004).

Biolinguistic Diversity Endangered

Whistled languages are a reliable human indicator of the vitality of the traditional way of life of the cultures that developed them. The gradual disappearance of activities like shepherding and the aging of rural populations are the main reasons for the extinction of an articulated whistled form in France (Aas). Most whistled languages are almost extinct due to the combined effects of the depreciation of the local culture and of the rural exodus. The gradual disappearance of whistled speech and its scientific interest underline the fact that linguistic biodiversity and cultural and scientific richness are both shrinking.

In some particular places, this tendency has already been reversed. For example, in the Canary Islands, the process of revitalization carried out by elders on a voluntary basis has recently been supported by local

education. In Mexico, some indigenous local councils have made the oral tradition one of their priorities, including local dances, traditional medicine, and whistled speech in their language.

See also: Cognitive Anthropology; Cognitive Linguistics; Endangered Languages; Limits of Language; Minorities and Language; Participatory Research and Advocacy; Semantics of Prosody.

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Whitney was born in Northampton, Massachusetts, on February 9, 1827, and died in New Haven, Connecticut, on June 7, 1894. He is best known as a general linguist and Sanskrit scholar. He was the brother of the geologist Josiah Dwight Whitney (1819–1996), after whom the highest mountain in the United States (excluding Alaska), Mount Whitney, California, is named, and William Whitney's early interests lay in the natural sciences, notably ornithology and geology. It is therefore not surprising that he introduced into linguistic theory and practice notions derived from geology, which he had absorbed from Charles Lyell's voluminous *Principles of geology* (1830–1833) and other scientific writings, notably the concept of 'uniformitarianism.' His education included a period at Williams College, New Haven, Connecticut (1842–1845), after which he devoted himself for three years to bird- and plant-collecting. Part of his collections subsequently went into the Peabody Museum of New Haven.

However, books on comparative philology, especially Sanskrit, which his elder brother had brought back from Europe, attracted his interest, and after another stint with the U. S. Geological Survey, he enrolled at Yale College in 1849. A year later, he left for Germany, studying at the University of Berlin with Franz Bopp, Carl-Richard Lepsius, and Albrecht Weber, and at Tübingen with Rudolf von Roth for almost three years (late 1850–July 1853). Whitney

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worked in particular with Weber and Roth on Sanskrit texts, which culminated in his editions of several important Atharva–Veda texts between 1860 and the end of his life.

On his return to America he was appointed Professor of Sanskrit at Yale University (1854), and when he was approached by Harvard in 1869, Yale also offered him the professorship of comparative philology. Whitney remained at New Haven for the rest of his life except for several trips to Europe, in particular Germany, where he completed his Sanskrit grammar (1879). He was the most important figure in 19th-century American linguistics, dominating the field for almost four decades, both as a scholar and organizationally, for example, as librarian (1855–1873), corresponding secretary (1857–1884), and finally president (1884–1890) of the American Oriental Society. His influence on academic appointments throughout the United States appears to have been enormous; his service as editor-in-chief of the *Century dictionary* (New York, 1889–1891) was another means of leaving his imprint on American science. He received many honors during his career, beginning with Doctor of Philosophy from the University of Breslau in 1861, and followed by honorary doctorates from his alma mater (1868), College of William & Mary (1869), St Andrews, Scotland (1874), Harvard (1876), Columbia (1887), and Edinburgh (1889), memberships in many scholarly societies and academies, and other distinctions such as the Bopp Prize (1871) and Foreign Knight of the Prussian order 'pour le mérite' for arts and sciences. Whitney's chief claim to distinction came from his work in Indic philology, both text editions and the *Sanskrit grammar* of 1879, and from his two books on general linguistics (1867, 1875); his ongoing polemic with Max Müller of Oxford may have detracted from his importance as a sound methodologist of linguistic science, but as the testimonies of the greats of nineteenth-century scholarship in the field, delivered at the 1894 Whitney Memorial Meeting, show (Lanman, 1897), he was regarded by them as a significant influence on their work (Jakobson, 1971). The importance of some of his pronouncements on matters of general linguistic theory for Saussure, notably his emphasis on the social nature of language and the conventional and arbitrary character of the linguistic sign, has become generally recognized (cf. Koerner, 1973: 74–100, for details).

See also: Bopp, Franz (1791–1867); Germany: Language Situation; Lepsius, Carl Richard (1810–1884); Müller, Friedrich Max (1823–1900); Sanskrit; Saussure, Ferdinand (-Mongin) de (1857–1913); Weber, Albrecht Friedrich (1825–1901).

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Whole Word Morphology

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Whole Word Morphology (sometimes called Seamless Morphology) is a truly word-based theory of morphology – truly word-based because it does not allow morphological operations on units smaller than the word. It is an attempt to solve the problems entailed by the view of morphology as a combinatorics of morphs or morphemes. The main problems with that view are that (1) it cannot in principle state some generalizations that need to be stated or can state them only by undercutting itself in irreparable ways, and (2) there seems to be no principled way to characterize the pieces such a view wants to restrict itself to and construct a combinatorics of (cf. the difficulties associated with the segmentation of non-affixal morphology and the inability of the advocates of such a view to stop their procedures from producing units such as semiaffixes, interfixes, affixoids, quasimorphs, morphological 'helpers,' 'shapers,' and even Firthian phonesthemes).

Whole Word Morphology was first outlined in Ford and Singh (1991). A fuller, monographic sketch of it appeared in Ford *et al.* (1997). Since then, various aspects of it have been elaborated on, and it has been tested against the empirical facts of several languages (e.g., Singh, 1996, 2001; Singh and Agnihotri, 1997; Singh and Dasgupta, 1999; Singh and Ford, 2000; Becker, 2000; Neuvel, 2003; Singh and Neuvel, 2003; Singh and Starosta, 2003).

What Whole Word Morphology says is summarized next. The first paragraph is the heart of the matter; the second paragraph is an explicatory postscript.

All that needs to be said about word structure in any language (of any type whatsoever) can and must be said by instantiations of the schema in (S1). These instantiations are referred to as Word Formation Strategies (WFSs) because, as generalizations drawn from known particular facts, they can be activated in the production and understanding of new words. WFSs must be formulated as generally as possible, but – and this is crucial – only as generally as the facts of the matter permit.

S1. $/ X /_a \leftrightarrow / X' /_b$

where:

1. $/ X /_a$ and $/ X' /_b$ are words and X and X′ are abbreviations of the forms of classes of words belonging to categories a and b (with which specific words belonging to the right category can be unified or on to which they can be mapped).
2. ′ represents (all the) form-related differences between / X / and / X′ / that fall outside of automatic phonology.
3. a and b are categories that may be represented as feature bundles.
4. The ↔ represents a bidirectional implication (if X, then X′, and if X′, then X).
5. The interpretation of $/ X /_a$ is a semantic function of $/ X' /_b$ and vice versa.
6. ′ can be null iff $a \neq b$.

It should be obvious that according to Seamless Morphology

1. Morphological complexity is a matter of the analyzability (≠ segmentability) of a word into a variable and a constant component with respect to a WFS.
2. 'Morphophonology' (or its contemporary *avatar* 'lexical phonology') is an integral part of morphology (cf. point 2 in the first paragraph).
3. Both intralinguistic (inflection vs. derivation, affixation vs. compounding, etc.) and interlinguistic (flectional, isolating, etc.) morphological diversity can be derived from S1 without affecting it in any fundamental way.
4. S1 offers a unified account of what have sometimes been seen as different types of morphologies and encapsulates the rejection of multipartite analysis of words into 'roots,' 'affixes,' 'stems,' and so on, entities that are hard to define and harder to tell apart.
5. Neither the strategies nor their 'outputs' have any syntactic constituency relationships marked in them in any fashion whatsoever. These strategies license the words a speaker has or may come up with.

Whole Word Morphology, to summarize, sees morphology not as a combinatorics of morphs or morphemes but as a system of generalized and abstract bidirectional correspondences among patterns instantiated by sets of whole words that exploit the same contrast. Although this contrast can be just formal (i.e., form-related) for some, for example, Ford and Singh, who take a dissociative view of morphology (cf. Corbin, 1987) and postulate the existence of rules of interpretation associated with WFSs, some advocates of Seamless Morphology (Neuvel and Starosta, for example) subscribe to what Corbin calls the 'associative' view and require it (i.e., the contrast in question) to be **both** formal and semantic. These correspondences of patterns are exploited by speakers to

create new words, reconstruct words they have forgotten, and interpret morphologically complex words they have not heard before.

See also: Affixation; Inflection and Derivation; Lexeme-Morpheme-Based Morphology; Lexical Phonology and Morphology; Morpheme; Morphological Typology.

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Whorf, Benjamin Lee (1897–1941)

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A self-taught linguist, who also studied American Indian linguistics under Edward Sapir at Yale, Benjamin Lee Whorf is best known for his work in developing the 'Sapir-Whorf' or 'linguistic relativity hypothesis,' the central claim of which – that the structures of language, in addition to providing a vehicle for the expression of thought, also shape thought by casting it in the mold of language-specific patternings – echoes views advanced in the early 19th century by Wilhelm von Humboldt in his writings on linguistic diversity. In Whorf's words, "... the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds – and this means largely by the linguistic systems in our minds" (Carroll, 1956: 213). Whorf's study of American Indian languages – for example Uto-Aztecan (Aztec and, in particular, Hopi) and Mayan (Maya) – convinced him that the grammatical categories of languages structure both perception and conceptualization. He developed this hypothesis principally in his papers "Grammatical categories," "Some verbal categories of Hopi," and "The relation of habitual thought and behavior to language" (1939), all of which are reprinted, along with other of Whorf's published and unpublished writings, by John Carroll (1956), who, in his introduction to this volume, provided much useful biographical information. The linguistic relativity hypothesis is notoriously difficult to corroborate or refute, with empirical evidence, involving, as it does, the calibration of linguistic with cultural and cognitive considerations. The limited evidence produced to date – for example, cross-linguistic surveys of color terminology (Berlin and Kay, 1969) – has both undermined the strong version of the hypothesis, according to which language determines and limits, as opposed to influencing, the architecture of cognition, and called attention to the influence of other factors. While the focus of the linguistic relativity hypothesis is squarely on the relation of language to thought, clearly biological constraints on perception, as well as cultural influences, are also involved. The difficulties attending ascertaining where one influence begins and the other ends have contributed to the still largely indeterminate status of the linguistic relativity hypothesis. Moreover, the sheer fact that translation from one language to another is possible diminishes the likelihood that languages differ by entire categories of thought. Last, linguistic universals, by definition, also put an upward limit on the reach of linguistic relativity.

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See also: Affixation; Inflection and Derivation; Lexeme-Morpheme-Based Morphology; Lexical Phonology and Morphology; Morpheme; Morphological Typology.

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A self-taught linguist, who also studied American Indian linguistics under Edward Sapir at Yale, Benjamin Lee Whorf is best known for his work in developing the 'Sapir-Whorf' or 'linguistic relativity hypothesis,' the central claim of which – that the structures of language, in addition to providing a vehicle for the expression of thought, also shape thought by casting it in the mold of language-specific patternings – echoes views advanced in the early 19th century by Wilhelm von Humboldt in his writings on linguistic diversity. In Whorf's words, "... the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds – and this means largely by the linguistic systems in our minds" (Carroll, 1956: 213). Whorf's study of American Indian languages – for example Uto-Aztecan (Aztec and, in particular, Hopi) and Mayan (Maya) – convinced him that the grammatical categories of languages structure both perception and conceptualization. He developed this hypothesis principally in his papers "Grammatical categories," "Some verbal categories of Hopi," and "The relation of habitual thought and behavior to language" (1939), all of which are reprinted, along with other of Whorf's published and unpublished writings, by John Carroll (1956), who, in his introduction to this volume, provided much useful biographical information. The linguistic relativity hypothesis is notoriously difficult to corroborate or refute, with empirical evidence, involving, as it does, the calibration of linguistic with cultural and cognitive considerations. The limited evidence produced to date – for example, cross-linguistic surveys of color terminology (Berlin and Kay, 1969) – has both undermined the strong version of the hypothesis, according to which language determines and limits, as opposed to influencing, the architecture of cognition, and called attention to the influence of other factors. While the focus of the linguistic relativity hypothesis is squarely on the relation of language to thought, clearly biological constraints on perception, as well as cultural influences, are also involved. The difficulties attending ascertaining where one influence begins and the other ends have contributed to the still largely indeterminate status of the linguistic relativity hypothesis. Moreover, the sheer fact that translation from one language to another is possible diminishes the likelihood that languages differ by entire categories of thought. Last, linguistic universals, by definition, also put an upward limit on the reach of linguistic relativity.

See also: Anthropological Linguistics: Overview; Cognitive Anthropology; Hopi; Humboldt, Wilhelm von (1767–1835); Linguistic Anthropology; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Nahuatl; Representation in Language and Mind; Sapir, Edward (1884–1939); Thought and Language: Philosophical Aspects; Translation Universals.

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Wierzbicka, Anna (b. 1938)

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Anna Wierzbicka, the founder and leading exponent of natural semantic metalanguage (NSM) theory, is internationally known for her work in semantics, syntax, pragmatics, and cross-cultural linguistics. Her theory combines a radically universalist approach, that human concepts are innate, with a relativist approach, that ordinary languages have different semantic systems representing culture-specific configurations of universal semantic primitives.

Wierzbicka was born in 1938 in Warsaw, Poland. Early in her childhood she evinced a keen interest in language, playing word games with her father and writing poetry. A Polish Catholic, who lived in her homeland until 1972, she had little sympathy for Communist ideology.

Wierzbicka's academic career began at the University of Warsaw. After receiving a Ph.D. from the Polish Academy of Sciences, she continued postdoctoral studies in Moscow in 1965. In 1966, she spent a year studying and researching at MIT. In 1972, she settled in Canberra, Australia. Wierzbicka is a professor of linguistics at the Australian National University. She is a Fellow of the Australian Academy of the Humanities and Australian Academy of Social Sciences and has also been awarded the Humboldt Research Prize for Foreign Scholars in Humanities.

Her principal publications include *Semantic primitives* (1972), *Lingua mentalis: the semantics of natural language* (1980a), *The case for surface case* (1980b), *Lexicography and conceptual analysis* (1985), *English speech act verbs: a semantic dictionary* (1987), *The semantics of grammar* (1988), *Cross-cultural pragmatics: the semantics of human interaction* (1991), *Semantics, culture and cognition: universal human concepts in culture-specific configurations* (1992), *Semantics: primes and universals* (1996), *Understanding cultures through their key words: English, Russian, Polish, German, Japanese* (1997), *Emotions across languages and cultures: diversity and universals* (1999), and *What did Jesus mean? Explaining the Sermon on the Mount and the parables in simple and universal human concepts* (2001).

Wierzbicka's scholarship is characterized by the search for 'semantic primes,' a small core of irreducible universal meanings, which can be found as words, bound morphemes, or phrasemes in all languages. The theory rests on the following premises: semantic analysis must be conducted in natural language; complex meanings can be stated in terms of simpler ones (reductive paraphrase); the NSMs of all languages are isomorphic. The NSM approach to meaning is intensional – semantic primes are conceptual but they are not abstract, they correspond to word meanings in ordinary language. Over the period of 30 years of extensive empirical, cross-linguistic investigations, Wierzbicka and her colleagues have collected a set of about 60 lexical universals (e.g., A LONG TIME, DO, GOOD, PEOPLE, etc.). This 'mini-lexicon' of semantic primes and the manner of their combination constitute a metalanguage that is supposed to have the same expressive power as any ordinary language.

See also: Anthropological Linguistics: Overview; Cognitive Anthropology; Hopi; Humboldt, Wilhelm von (1767–1835); Linguistic Anthropology; Linguistic Universals, Chomskyan; Linguistic Universals, Greenbergian; Nahuatl; Representation in Language and Mind; Sapir, Edward (1884–1939); Thought and Language: Philosophical Aspects; Translation Universals.

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The metalanguage has a wide range of applications, such as intercultural communication, language acquisition and teaching, language typology, legal semantics, and lexicography. Additionally, it serves as a basis for an emergent theory of cultural scripts, considered as shared interpretive background, and used for the description of the 'verbal culture' of any society.

See also: Cognitive Semantics; Lexical Semantics: Overview; Natural Semantic Metalanguage; Pragmatics: Overview.

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Ursula Wiesemann was born in Berlin in 1932. After attending a summer course in linguistics at the University of Oklahoma, she became a member of the Summer Institute of Linguistics (SIL) in 1956. For the next 20 years, she worked among the Kaingáng, a small ethnic group in Brazil, studying their language, developing literacy material, training teachers, and translating the New Testament into Kaingáng. During this time, she continued studying linguistics, ethnology, English, and phonetics at the University of Cologne, where she received her Ph.D. in 1966.

From Brazil, she moved to Africa, where she worked as a professor in Cameroon (1980–1986) and Benin (1988–1994) and helped train mother-tongue linguists and translators in several other countries.

Wiesemann initiated and taught a number of linguistics and applied linguistics courses, including 'Discover Your Language – A Course in Applied Linguistics,' Tone Analysis, Phonology, Orthography Development, Discourse Analysis, and Foreign Language Acquisition. She has taught these courses both at universities and during workshops in many countries, including Brazil, Germany, Benin, Cameroon, Congo, Togo, Senegal, and Mocambique.

In 1962, 1964–1966, 1969, 1971, and from 1994 until her retirement, she directed the *Seminar für Sprachmethodik*, a yearly summer course in applied linguistics run by the German branch of SIL in Burbach-Holzhausen. She directed a similar course in Brazil in 1976–1978.

In the past few years she has returned to Brazil in order to help develop the Kaingáng language, her first love.

Ursula Wiesemann has inspired and taught whole generations of linguistics students, mother-tongue linguists, translators, and literacy teachers. In addition, she has freely offered her knowledge and expertise as a consultant to numerous literacy projects. She has published numerous books and articles in German, English, French, and Portuguese. The topics of her publications include phonology, orthography development, morphology, syntax, discourse analysis, translation theory, and foreign language acquisition.

But even though she is such a distinguished and productive scholar, she has remained a very humble person who lives her Christian faith in a practical manner.

The metalanguage has a wide range of applications, such as intercultural communication, language acquisition and teaching, language typology, legal semantics, and lexicography. Additionally, it serves as a basis for an emergent theory of cultural scripts, considered as shared interpretive background, and used for the description of the 'verbal culture' of any society.

See also: Cognitive Semantics; Lexical Semantics: Overview; Natural Semantic Metalanguage; Pragmatics: Overview.

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See also: Applied Linguistics: Overview and History.

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Wilkins, John (1614–1672)

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John Wilkins's scholarly interests reflected the panorama of 17th-century British thought: in addition to his work in linguistics, he distinguished himself in education, lexicography, oratory, science, theology, and taxonomy. His principal contribution to the intellectual life of 17th-century Britain was his role as principal founder of the Royal Society, and his contribution to the history of linguistics was his leadership in developing the most comprehensive universal or philosophical language to date (*see* **Universal Language Schemes in the 17th Century**).

Born in 1614, Wilkins was educated at Magdalen Hall, Oxford, and upon graduation, he was appointed tutor there in 1634. He was ordained in 1637 and appointed Vicar of Fawsley, and later served as private chaplain first to Lord Berkeley and then to Prince Elector Palatine Charles Louis. In 1648, he was appointed Warden of Wadham College, Oxford, and there received his Doctorate of Divinity. He was appointed Master of Trinity College, Cambridge in 1659; Bishop of Chester in 1668; and, after his resignation, he held a variety of clerical positions in London until his death in 1672.

A significant promoter of the scientific activities of his day, he led the philosophical or universal language movement which attempted to invent an artificial language to remedy the deficiencies of natural languages. There was considerable concern on the part of 17th-century scientists that the imprecision of natural languages threatened the advancement and preservation of science. In his *Mercury* (1641), Wilkins advanced a system of cryptology in which he designed a secret language. Expanding the theoretical construct of that design, Wilkins developed the most extensive philosophical language ever devised in his monumental *Essay towards a Real Character, and a Philosophical Language* (1668). In the initial phase of his project, Wilkins worked closely with George Dalgarno (*see* **Dalgarno, George (ca. 1619–1687)**), but soon after, he decided not to collaborate with Dalgarno because their goals grew incompatible.

Wilkins's first task in the development of his philosophical language was to compile detailed charts reflecting the knowledge of the universe shared by his colleagues in the Royal Society. He then designed a graphemic system, a 'real character,' and a phonetic system capable of signifying each element in his charts. (For his phonetics *see* **Phonetics: Precursors to Modern Approaches** and **Phonetic Transcription: History**). The symbols of the elements were formed into words and the words were placed in logical order into sentences. He arranged the elements according to

See also: Applied Linguistics: Overview and History.

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meaning – an approach later adopted by Peter Roget who credited Wilkins in the preface of his famous thesaurus. Wilkins provided a dictionary which served as an alphabetical index for locating elements in his charts. Dolezal (1985) has convincingly pointed out that this dictionary merits recognition in the history of lexicography.

In late 20th-century scholarship, Wilkins draws growing attention as a significant thinker of his time and also as a substantive pioneer in semiotic theory.

See also: Dalgarno, George (ca. 1619–1687); Phonetic Transcription: History; Phonetics: Precursors to Modern Approaches; Universal Language Schemes in the 17th Century.

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Yorick Wilks obtained his Ph.D. at Cambridge University in 1968, where he developed the initial ideas of what came to be called 'preference semantics.' This is a computational theory of semantics focused on semantic disambiguation. In brief, given a set of possible meanings for a sentence, including nonliteral ones, the computed interpretation is the one that leads to the fewest possible selectional preferences being violated. His early contributions to computational semantics also included modeling of beliefs and point-of-view of agents in human–computer interaction. These fundamental approaches were complemented by a deep and abiding interest in questions in the philosophy of mind and the relation of linguistics to artificial intelligence.

Wilks's interest in artificial intelligence took him to the Artificial Intelligence Laboratory at Stanford, where he worked from 1970 to 1974. Following a stint in Edinburgh, he joined the University of Essex, working there from 1976 to 1985, a period that saw a great maturing of the field of natural language processing. From Essex, he went on to New Mexico State University, where he became professor of computer science and director of the Computing Research Laboratory, staying there until 1998, when he joined the University of Sheffield, where he is professor of computer science and founding director of the Institute for Language, Speech, and Hearing. At these institutions, Wilks was able to create world-class teams of researchers and top-notch (and well-endowed) centers for research in natural language processing.

During the course of a career that has included 11 books and hundreds of papers, Wilks and his research teams have made basic contributions to a number of key areas in natural language processing. Preference semantics provided a foundation for his own research in processing metaphorical language and on disambiguating word senses, in turn influencing other research in these areas. Whereas his work in the early 1970s, like that of other influential work of the time, was heavily knowledge based, with a commitment to decomposition of meaning into semantic primitives, his subsequent research in several areas combined human-engineered rules with linguistic and statistical information gleaned from text corpora. At New Mexico, he led successful efforts to mine machine-readable dictionaries for knowledge that could then be tuned with statistical information from text corpora.

With the surge of research in information extraction in the 1990s, his group at New Mexico and then at Sheffield developed a variety of empirically driven approaches to information extraction, as well as the Sheffield GATE architecture for natural language processing. Other research in which he has invested substantial effort includes parsing and its evaluation, machine translation, the modeling of dialogue and conversational agents, and the relationship between language and vision.

Wilks has always been very visible in the field, serving on numerous program committees and the editorial boards of many journals. He has also been a lively and opinionated commentator on the evolution

meaning – an approach later adopted by Peter Roget who credited Wilkins in the preface of his famous thesaurus. Wilkins provided a dictionary which served as an alphabetical index for locating elements in his charts. Dolezal (1985) has convincingly pointed out that this dictionary merits recognition in the history of lexicography.

In late 20th-century scholarship, Wilkins draws growing attention as a significant thinker of his time and also as a substantive pioneer in semiotic theory.

See also: Dalgarno, George (ca. 1619–1687); Phonetic Transcription: History; Phonetics: Precursors to Modern Approaches; Universal Language Schemes in the 17th Century.

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Wilks, Yorick (b. 1939)

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Yorick Wilks obtained his Ph.D. at Cambridge University in 1968, where he developed the initial ideas of what came to be called 'preference semantics.' This is a computational theory of semantics focused on semantic disambiguation. In brief, given a set of possible meanings for a sentence, including nonliteral ones, the computed interpretation is the one that leads to the fewest possible selectional preferences being violated. His early contributions to computational semantics also included modeling of beliefs and point-of-view of agents in human–computer interaction. These fundamental approaches were complemented by a deep and abiding interest in questions in the philosophy of mind and the relation of linguistics to artificial intelligence.

Wilks's interest in artificial intelligence took him to the Artificial Intelligence Laboratory at Stanford, where he worked from 1970 to 1974. Following a stint in Edinburgh, he joined the University of Essex, working there from 1976 to 1985, a period that saw a great maturing of the field of natural language processing. From Essex, he went on to New Mexico State University, where he became professor of computer science and director of the Computing Research Laboratory, staying there until 1998, when he joined the University of Sheffield, where he is professor of computer science and founding director of the Institute for Language, Speech, and Hearing. At these institutions, Wilks was able to create world-class teams of researchers and top-notch (and well-endowed) centers for research in natural language processing.

During the course of a career that has included 11 books and hundreds of papers, Wilks and his research teams have made basic contributions to a number of key areas in natural language processing. Preference semantics provided a foundation for his own research in processing metaphorical language and on disambiguating word senses, in turn influencing other research in these areas. Whereas his work in the early 1970s, like that of other influential work of the time, was heavily knowledge based, with a commitment to decomposition of meaning into semantic primitives, his subsequent research in several areas combined human-engineered rules with linguistic and statistical information gleaned from text corpora. At New Mexico, he led successful efforts to mine machine-readable dictionaries for knowledge that could then be tuned with statistical information from text corpora.

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William of Conches (ca. 1080–1154)

L Kaczmarek, Borgholzhausen, Germany

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Most of his biographers agree that William of Conches was born ca. 1085–1090 in Conches-en-Ouche near Évreux, France, "in a country of mutton-heads under the dense sky of Normandy," as he writes in a Juvenalian mood in his *Dragmaticon* VI, 1 (1997: 179).

A pupil of Bernard of Chartres and philosophically a platonist who tried to reconcile Christian faith and ancient philosophy, William was interested in topics like cosmology and medicine, but never forgot to stress grammar's important position in the circle of learning. John of Salisbury lists him as his revered teacher in his *Metalogicon*. William glossed over Plato, Macrobius, and Boethius. The gloss on Juvenal's *Satires* is no longer considered his work.

William of St. Thierry's attempt to denounce him in a letter to Bernard of Clairvaux as a nobody without any authority, and even a heretic, caused William of Conches, in the long run, to revise his *Philosophia* under the title of *Dragmaticon*, purporting it to be written by a 'nameless philosopher,' at some time between 1144 and 1151, when he tutored Henry, the son of the Duke of Normandy, Geoffrey Plantagenet (d. 1151), and future King of England.

One of William's main concerns in semantic theory was to find out and describe the appropriate *causae inventionis* (reasons for invention) for words and their classes he missed in Priscian (see his *Philosophia*, 1980: III, Section 59). A master of strong argument, he called those who confuse language and reality "sensual and beastly grammarians" (XVII, Section 16).

There is a series of redactions (*correptiones*) of his *Glosae super Priscianum* (see Fredborg, 1973, 1981). William, who draws on the late 11th-century *Glosulae*-tradition (see Rosier, 1993 and Rosier-Catach, 2005), worked on the text for the first time ca. 1120, probably in Chartres, went over it again more than 20 years later somewhere else, and later again, as there is a fragment of a different third version. Extracts from the text are printed in Jeauneau (1960: 243–347), in Fredborg (1973, 1981), and in Rosier (1993: 131–144). A critical edition of the *Glosae* is in preparation by I. Caiazzo as part of William's *Opera omnia*. The *Glosae* (1st redaction) influenced Peter Helias and are echoed in the anonymous gloss *Promisimus* about 50 years later. William of Conches was reported still alive in 1154.

See also: Linguistic Theory in the Later Middle Ages.

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Williams Syndrome

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Introduction

Chance genetic events sometimes give rise through development to interesting cognitive-level outcomes. William's Syndrome (henceforth WS), a neurodevelopmental disorder, is one such case. At first blush, individuals with WS seem to have intact language alongside IQs in the 50–60s range. Does this mean that language has developed independently of intelligence and that the existence of WS supports Nativist views concerning the innate pre-specification of language? In this entry, we note that, despite the understandable initial excitement about the ostensibly intact linguistic capacities of this clinical group, in fact their language development follows an atypical pathway from infancy through to adulthood. Moreover, the Nativist literature frequently misrepresents the empirical findings about WS language by treating *relative* strengths as *absolute* strengths, i.e., intactness of function. Here we present evidence to demonstrate how WS language processes actually display subtle impairments (Karmiloff-Smith, Brown *et al.*, 2003) and cannot serve to segregate the WS cognitive system into parts that develop normally and independently of parts that develop atypically. It should be recalled that such adult patients had normal development prior to their brain insult. In the case of developmental disorders, by contrast, subtle initial impairments may affect numerous parts of the brain as it develops. One cannot simply assume that deficits in the phenotypic outcome are the same as those apparent in the infant start state (Paterson *et al.*, 1999). Indeed, even in the normal case, ontogenetic development plays an important role over time. Infants do not start life with the same brain structure as adults. Ontogenesis progressively gives rise to adult specialization and localization of function. Thus, higher-level specializations such as morphology, syntax, the lexicon, and pragmatics are likely to be the emergent product of development rather than its starting state (Karmiloff-Smith, 1992).

William's Syndrome

William's Syndrome occurs in approximately 1 in 20 000 live births and is caused by the deletion of some 26 genes on one copy of chromosome 7 (Donnai and Karmiloff-Smith, 2000). Clinical features include several physical abnormalities that are accompanied by mental retardation and a specific personality profile. The interest in WS to neuroscientists, linguists, and psycholinguists stems from the syndrome's uneven profile of cognitive abilities, with spatial and numerical cognition seriously impaired, while language, social interaction, and face processing seem surprisingly proficient for a clinical population with a mean IQ of 56 (Bellugi *et al.*, 1994; Udwin and Yule, 1991). Research by Bellugi and her collaborators first drew attention to the potential theoretical interest to psycholinguistics of these seeming dissociations in the WS phenotype (Bellugi *et al.*, 1988). Surprising proficiency with language was shown to coexist with serious problems on nonverbal tasks, in particular those calling on visual-spatial processing. However, as researchers subsequently examined in more depth the linguistic profile of individuals with WS, it became apparent that the static notions of 'intactness' and of 'selective dissociations' needed to be replaced with a developmental notion of 'atypically developing trajectories' over time (Karmiloff-Smith, 1998; Karmiloff-Smith, Scerif *et al.*, 2003; Karmiloff-Smith, 2004). We focus here on how the linguistic trajectory in WS develops, arising initially from the unusual communicative and cognitive

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profile in the development of infants and toddlers with the Syndrome.

Precursors to Language in Infants and Toddlers with WS

Much of the initial research on WS language focused on older children and adults, with little known about the early stages. More recent studies at four different labs in the United Kingdom, United States, and Italy have pinpointed a serious delay in the onset of WS language (Mervis and Bertrand, 1997; Nazzi *et al.,* forthcoming; Paterson *et al.,* 1999; Singer *et al.*, 1997; Vicari *et al.,* 1996; Volterra *et al.,* 1996). It is not uncommon to find children with WS of 4 or 5 years of age who produce levels of language typical of 18 to 24 month olds. Is the initial delay in getting WS language off the ground merely the late maturation of a set of language-specific genes, or are there more complex *developmental* reasons?

In our view, several cognitive and linguistic factors interact developmentally to cause the initial delay that affects the subsequent deviance in WS language development. Our studies show that infants with WS are some 10 to 20 months behind their typical control infants in segmenting words out of the speech stream (Nazzi *et al.,* 2003). This early difficulty, solved by typically developing infants at about 8 months, contributes to the WS delay. Furthermore, despite their abilities with dyadic interaction, infants and toddlers with WS are surprisingly atypical in triadic interaction and in their understanding of the referential function of pointing (Mervis and Bertrand, 1997; Laing *et al.,* 2002), one of the ways in which children normally learn new words. In addition, while they behave like controls in mapping perceptual similarities between objects, toddlers with WS are significantly poorer than controls at using linguistic labels to map identity of object categories (Nazzi and Karmiloff-Smith, 2002).

Language in Older Children and Adults with WS

It could be that the initial delay in language onset in WS is followed by a normal developmental trajectory, in other words that older children simply 'catch up.' This does not appear to be the case, however. Both behavioral and brain imaging studies of WS language processing make it empirically questionable as to whether any aspect of language – syntax, lexical-semantics, phonology, pragmatics, or discourse – is intact in WS, despite many claims to the contrary (e.g., Clahsen and Almazan, 1998; Pinker, 1999). For example, event-related potential studies suggest that brain activity to semantic, syntactic, and sensory features of spoken language are abnormally organized in adolescents and adults with WS. In normal adults and typically developing children of 9 years of age and older, ERPs to grammatical function words, e.g., articles, prepositions, conjunctions, show marked differences in latency, amplitude, and distribution, from those to semantic content words, e.g., nouns, verbs, and adjectives, (Neville, Coffey, *et al.*, 1993). Grammatical function words elicit a left anterior negativity early in the waveform, whereas content words elicit ERPs that peak somewhat later, are largest over posterior regions, and are bilateral or larger over the right than the left hemisphere. ERP differences to function words and content words have even been observed in infants as young as 20 months of age (St. George and Mills, 2001). In contrast, adolescents and adults with WS do not show ERP differences to function and content words, nor do they show left greater than right ERP asymmetries to the grammatical function words (Bellugi *et al.,* 1999a; Bellugi *et al.,* 1999b; Mills, 1998; Neville, Mills *et al.*, 1993, 1995; St. George *et al.,* 2000). Additionally, WS brain activity to words appears to be abnormally organized even at the level of sensory processing of the words. In WS, ERPs within the first 200 ms of the onset of the word show a unique pattern of components, with abnormally large bilateral positivities at 100 ms and 200 ms, which are not observed in a similar configuration at any age in normal development (Bellugi *et al.,* 1999b; Korenberg *et al.*, 2003; Neville, Mills *et al.*, 1995). These components are thought to be generated in the primary auditory cortex and may be related to a disproportionately large superior temporal gyrus (STG) and abnormal cell packing density in this region in WS (Hickok *et al.,* 1995; Holinger *et al.,* forthcoming; Galaburda *et al.,* 2003). Of particular interest is a report by Mills *et al.,* (2003a) showing that although adults with WS show abnormally organized brain activity to language, infants with WS display a normal pattern of asymmetries until about 3 years of age. However, by 3 to 4 years of age, ERPs to words begin to resemble the highly atypical pattern displayed by older children and adults with WS. Three years of age is also the time at which infants with WS show a marked increase in vocabulary development. This suggests that compensatory neural mechanisms linked to relative proficiencies in language processing may emerge at this point in development. Taken together, these studies provide neurobiological evidence against the notion of an intact, normally organized module for language processing in WS.

Despite growing evidence counteracting the claim for the intactness of language in WS, linguists of a

Chomskyan persuasion have tried to identify at least one aspect of WS language that is spared. For example, in a study comparing WS and Specific Language Impairment (SLI), Clahsen and Almazan (1998) argued for a double dissociation of innate mechanisms. Their assertion was that lexical memory is impaired in WS whereas syntax is intact, and that the opposite holds for SLI. Specifically, they claimed that individuals with WS display a deficit in forming irregular past tenses (e.g., keep-kept) but intact performance in forming the regular past tense (e.g., talk-talked). But this failed to hold when a broader, in-depth study of WS past tense formation was carried out on a much larger population (Thomas *et al.,* 2001). Indeed, it is not sufficient to demonstrate in any group that irregular past tense formation is poorer than regular past tense formation, because this is also true of some stages of typical development. Rather, it is crucial to demonstrate that the level of past tense formation is poorer than would be expected in WS for their actual level of language development. Our study showed that when verbal mental age was controlled for, the WS group displayed no selective deficit in irregular past tense formation and that their performance could be placed on the typical developmental pathway found in younger subjects. The results were more consistent with the hypothesis that the WS language system is delayed because it has developed under different constraints. Mervis and collaborators (e.g., Klein and Mervis, 1999) have also concluded that the best way to characterize WS language, even in adulthood, is that it has not developed normally and reveals patterns typical of much younger children.

Not only is WS language delayed, but it is becoming increasingly clear that the WS language system develops along a different trajectory compared to controls, relying less on semantics than in the typically developing children (Mervis and Bertrand, 1997; Thomas and Karmiloff-Smith, 2003). Although local semantic organization looks normal in WS in terms of priming effects (Tyler *et al.,* 1997) and category fluency (Scott *et al.,* 1995), global semantic organization remains at the level of young children and never reaches the mature state, even in relatively high functioning adults with WS (Johnson and Carey, 1998). Further studies of oral and written language also point to a reduced contribution of semantics in WS anguage development. For example, Karmiloff-Smith and collaborators found that when participants with WS monitor sentences for a target word, semantic information becomes available too slowly to be integrated with the real-time processing of syntax (Karmiloff-Smith *et al.*, 1998). A recent study of reading also pointed to atypical processing, showing that whereas WS participants displayed equal levels of reading for both concrete and abstract words, the controls found concrete, imageable words much easier to read (Laing *et al.,* 2001). Finally, in a non-word repetition study, participants with WS, despite a vocabulary test age of 8, behaved at the level of 4 to 5 year olds and were significantly less constrained by resemblance with meaningful words when repeating new words (Grant *et al.,* 1997). In sum, like very young children, the participants with WS were less influenced by the semantics of the words that the nonce terms resembled and relied more on phonology. Taken together, these different studies suggest that, unlike typical development, semantics seems to place less of a constraint compared to phonology (Laing *et al.,* forthcoming) in the way in which WS language develops over time.

The above discussion concerns lexical-semantic development in WS, but it remains a theoretical possibility that WS syntax is intact (e.g., Clahsen and Almazan, 1998; Pinker, 1999). There are, however, a number of lines of evidence to doubt this. First, vocabulary levels are usually better than syntactic levels, with both significantly below chronological age (Karmiloff-Smith *et al.,* 1997). Second, even in simple imitation tasks, participants with WS show significant deficits with complex syntactic structures such as embedded relative clauses (Grant *et al.,* 2000). Furthermore, even in simple grammatical concord in French, acquired easily by very young children, individuals with WS display serious deficits (Karmiloff-Smith *et al.,* 1997). The same applied in a study of Italian grammatical gender in which the WS group produced errors encountered at no age in typical development (Volterra *et al.,* 1996). Several studies (e.g., Klein and Mervis, 1999) make it clear that the real problems that people with WS experience with semantics and syntax are often superficially camouflaged by their good verbal memory.

It is in our view theoretically misleading and empirically inaccurate to claim that grammar is spared in this clinical population. Although WS grammar is indeed relatively proficient compared with some other clinical groups and relatively good compared with WS spatial deficits, most studies show that it is in fact no better than their mental age would predict. This does not mean that the WS cognitive architecture is uninteresting. On the contrary, there is in WS a mixture of delay, deviance, and asynchronies across the developing system. Researchers still need to understand why the language of people with WS language is initially so delayed and why, despite this, they develop surprising proficiency by adulthood compared to many other genetic syndromes with equal delay in early development.

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See also: Infancy: Phonological Development; Innate Knowledge; Modularity of Mind and Language; Phonological, Lexical, Syntactic, and Semantic Disorders in Children; Sentence Processing; Specific Language Impairment; Tense.

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Kay Williamson was born in Hereford, England, in 1935. After completing a B.A. degree in English at the University of Oxford, she moved to Nigeria with a Leverhulme Research Scholarship, where she began research on the Ịjọ language cluster and later became an Assistant Lecturer in Phonetics at the University College of Ibadan. She later studied linguistics at Yale University, where she received her Ph.D. in 1964.

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She is a founding member and has been a council member of the West African Linguistics Society and the Linguistic Association of Nigeria. Kay Williamson is a specialist in Nigerian languages and comparative Niger-Congo. She has published on Ịjọ, Igbo, various other languages of the Niger Delta, and the classification of Benue-Congo and Niger-Congo. She wrote the Niger-Congo and the Benue-Congo overview in J. Bendor-Samuel's Niger-*Congo* (1989) and is co-author of the chapter on Niger-Congo in B. Heine and D. Nurse's (2000) *African languages: an introduction*.

Kay Williamson was an eminent linguist and a very special person. Her two greatest contributions are in comparative West African linguistics and in local language development. This was very influential both for the products developed, and for the awareness and legitimacy it gave to many local languages.

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Kay Williamson passed away on the 3rd January, 2005, as she was approaching her 70th birthday.

See also: African Linguistics: History; Benue-Congo Languages; Language Development: Overview; Niger-Congo Languages.

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Jost Winteler was born in Kerenz-Filzbach, a village in the Swiss canton of Glarus. He was the son of a school teacher and therefore was not only familiar with the local Swiss German dialect but also with standard (Swiss) German. He studied philology in Jena, Germany, where the Neogrammarians Berthold Delbrück and Eduard Sievers were among his teachers. In his famous doctoral thesis, published in 1876, he described his native dialect of Kerenz. This thesis served as a model for generations of dialectologists. In Switzerland, Professor Winteler taught at several high schools, and from 1884 on, also at the cantonal school in Aarau, attended by Albert Einstein in 1895–1896. The young Einstein stayed with the Winteler family; from this evolved an intellectual and a personal, life-long relationship strengthened by Winteler's son Paul marrying Einstein's only sister Maja in 1910.

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Table 1 J. Winteler's relativity of conditions shown by formalizing his examples of consonants

Type of feature	*'Soft' languages*		*'Hard' languages*		*Swiss German dialects*	
	Lenis	*Fortis*	*Lenis*	*Fortis*	*Lenis*	*Fortis*
Essential	+voiced	−voiced	−tense	+tense	−tense	+tense
Accidental	+long	−long	+long	−long	−long	+long
	−tense	+tense	−voiced	−voiced	−voiced	−voiced
Examples	{[b], [d], [z], [r]}	{[p], [t], [f], [s]}	{[b̥], [d̥]}	{[p], [t], [f], [s]}	{[b̥], [d̥], [f], [s], [x]}	{[f:], [s:], [x:]}

The 'sound physiology' as a method founded by Jost Winteler and his teacher Eduard Sievers stood in the context of the Neogrammarians' orientation to natural sciences. As E. Sievers (1876: 1) put it: analyzing the acoustic nature of sounds is a matter of physics while physiology furnishes information about the activity of the organs producing language sounds. Despite Ernst Brücke, a precursor of phonetic description, this method was sensational in 1876, since it was contrary to the Neogrammarians' sound description drawn from written records. Winteler (1876: 37ff.) analyzed his own articulation of the dialect sounds. To him 'auto-phonography' was the only reliable basis of sound physiology. In order to describe the results, he created a special phonetic notation system.

Winteler's work was well accepted by the Neogrammarians, mainly because studies of present-day dialects were considered important for comparative linguistics, as they can be observed directly (cf. Kohrt, 1984: 9). In the view of the 20th century structuralists, the cause for praising Winteler was his prestructural approach: he noticed that there are sounds with and others without the capacity to change meaning, not demanding, however, two different disciplines of sound description: *phonology* versus *phonetics*, respectively. It was rather a demonstrative method to explicitly show the difference of sound (Kohrt, 1984: 22ff.). In Winteler's thesis, one can furthermore find minimal pairs (e.g., Winteler, 1876: 20): *tsex & zehn* ('ten'): *tsexx&* (plural of *tsexx* m.), Schafzecke ('sheeptick'). Purely structural terms were used already (Winteler, 1876: 19ff.), such as *Lautgegensätze* ('contrasts of sound'), *(Sprach-)Bau* '(linguistic) structure', and *Konsonantensystem, Sprachsystem* ('system of consonants, of language').

The speculation over Winteler's influence on Einstein's theory of relativity stemmed from two reasons: Winteler was Einstein's mentor and rooming house owner, and Winteler (1876: 27) made a remark on the *Relativität der Verhältnisse* ('relativity of conditions' or 'configurational relativity') (Jakobson, 1972: 75). Jakobson exaggerated Winteler's influence on Einstein while others were more reserved (cf. Kohrt, 1984: 82ff.). Winteler's single remark was purely linguistic, its context, however, a bit confused. As a result of his studies, Winteler concluded that certain linguistic features (a, b, etc.) are more characteristic of language group A than of others and that other features are more characteristic of language group B than A. In his examples, he distinguished what he called essential and accidental features in describing a 'Lenis' (such as {[b], [d], [g]}) and a 'Fortis' (such as {[p], [t], [k]}) as realized in:

1. soft languages (e.g., in Low German dialects, the essential feature is *voiced*)
2. hard languages (e.g., in Upper German dialects, the essential feature is *tense*, i.e., spoken with high pressure and energy)
3. Swiss German dialects (the essential features are *tense* and *duration*).

As varying conditions lead to a different application of these features to language systems, the configuration of these features is relative. All dialects shown in the table differ from each other for this reason (Table 1).

See also: Brücke, Ernst (1819–1891); Jakobson, Roman (1896–1982); Sievers, Eduard (1850–1932).

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Wintuan *See:* Hokan Languages.

Witness Examination

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Role and Status of Witness Examination in Trial-by-Jury

The adversarial jury trial represents a highly structured legal process, involving a number of distinct phases, as illustrated in Figure 1.

After the jury selection or *voir dire* process, lawyers from each side have the opportunity to present monologic speeches to the jury, in the form of opening statements. One of the principal aims of the opening statements, which begin the evidential phase, is to allow both sides to present an outline of the fundamental questions in the case from their respective positions. The entire trial may be considered to be a macro-level question-and-answer sequence, responding to the essential question: Is the person presented before the court as the defendant guilty or not guilty of the charges brought against him?

An attempt to answer this question comes in the form of elicited testimony from a range of lay and expert witnesses called to the stand. If the prosecution-elicited answers are deemed adequate by the jury, then the 'burden of proof' is said to have been fulfilled; conversely, if the defense version of events is favored by the jury, the issue of 'reasonable doubt' is invoked. The ultimate judicial 'answer' (i.e., the verdict) is delivered by the jury in the final judicial phase of proceedings.

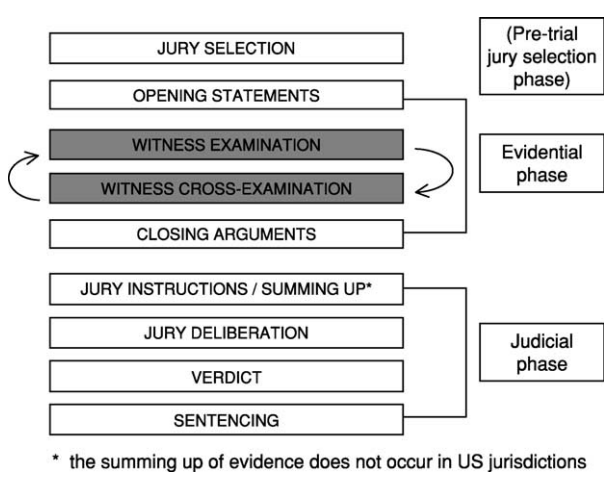

Figure 1 Adversarial trial phases.

The witness examination phase of the trial is the focus of attention in this article. It represents the site of attempts by both sides to provide plausible and credible responses to the issues presented in the opening statements. This phase of the trial is usually the most protracted, involving a cycle beginning with the calling of a new witness, the examination, cross- and re-examination of that witness, and ending with a judicial invitation for the witness to 'step down.' The cyclical nature of witness examination is indicated by the circular lines in Figure 1. There is circularity both *between* and *within* witnesses; witnesses are called by their own 'supportive' lawyer first to provide 'direct' or 'examination-in-chief' evidence and then by opposing lawyers, where their evidence is scrutinized by the other side, during 'cross-examination.' This process may be followed by 're-direct examination' and then by 're-cross examination,' if lawyers from either side wish to pursue particular issues in further detail. Such questioning will alternate as shown in Figure 2.

Conflicting Accounts in Direct and Cross-Examination

Linguists, lawyers, and applied psychologists have all conceptualized the jury trial as a process of storytelling (see *inter alia* Maley, 1994; Jackson, 1995; Brooks and Gewirtz, 1996; Hastie and Pennington, 1996; Bruner, 2002). Viewed in this light, a trial may be seen to comprise two (or potentially more) competing narratives, elicited from witnesses, structured by the prosecution and defense, and submitted to the critical evaluation of the jury.

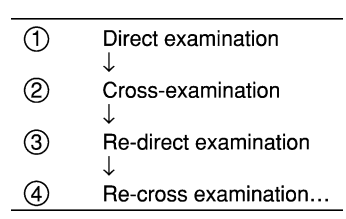

Figure 2 Maximal structure of witness examination.

The trial is therefore the telling not of a single story, but rather of a number of alternative versions from a variety of (conflicting) perspectives (Harris, 2001; Cotterill, 2003). The name often given to the jury in adversarial trial procedure, that of the 'factfinder,' is actually something of a misnomer, because the jury is not asked to find the truth, but rather to adjudicate among more and less plausible narrative accounts. In a trial, these constructed narratives are both multiple and multiperspectival, involving the presentation of many of the same crime 'facts' in the form of alternative and competing narrative versions, or "secondary realities" as Gibbons (2003: 147) terms them. Each of these witnesses may have a potentially conflicting version of events to narrate, and each may have a different perspective and interpretation of the events that they recount, as Scheppele (1989: 2085) points out:

> The same event can be described in multiple ways, each true in the sense that it genuinely describes the experience of the storyteller, but each version may be differently organized and give a very different impression of 'what happened.'

Elicitation of Evidence during Witness Examination: Power Asymmetry in Lawyer-Witness Interaction

Perhaps the most significant constraint on the construction and presentation of these multiple and conflictual versions of events is the fact that this evidential picture is built up by means of question-and-answer adjacency pairs in a dialogic interaction between lawyer and witness that explores the events and circumstances of the crime under scrutiny.

The stories told in court are not narrated by the 'primary knower' (Berry, 1981), the witness, but rather are elicited by means of the lawyer's questions. The lawyer was not present at the crime scene; the witness, who conversely may have been present, cannot typically claim to possess the same courtroom storytelling skills as the lawyer. The result is a mutual dependency, where both parties need the other to enable the story to be told effectively within the confines of the trial framework.

From a discourse as well as a legal perspective, the courtroom is a highly role- and rule-governed environment. Not only are the various participants bound by laws and protocols that govern their physical behavior and demeanor but there are also clearly defined controls on their language. These linguistic constraints include such factors as the *quantity* of talk allocated to each participant – in other words the relative distribution of talk among the judge, lawyers, and witnesses – and the *nature* of that talk, including interaction, turn initiation, topic management, and the differential use of declaratives, interrogatives, and imperative forms in court.

Whereas in casual conversation, the management of turn-holding is a highly skilled, locally negotiated matter in which participants attempt to negotiate the smooth transition of the turn from one speaker to the next, thereby avoiding face-threatening clashes, in the courtroom context, such considerations of politeness, face, and cooperation are less significant. This is because the default position in power-differential interaction is that the more powerful of the interactants may hold the floor until he or she is ready to give it up. Then, and only then, is it possible for the less powerful participant to join in, at the discretion of the other, more powerful, speaker.

Thus, in the trial-by-jury system, the familiar features of conversational management are, as Matoesian (1993: 79) notes, "systematically transformed and exploited to manage the powerful interests and interactional contingencies of legal disciplinary regimes." Although casual conversational talk is managed relatively spontaneously with turn-taking negotiated at a local level, in the courtroom, many of these norms are pre-determined, with pre-allocation of turns and turn-types the rule, rather than the exception (see Atkinson and Drew, 1979 for a detailed description of the turn-taking system in court).

Much of the literature on the language of the courtroom over the past two decades has focused on the elucidation and exemplification of the asymmetry inherent in courtroom questioning. A succession of studies conducted by researchers such as Atkinson and Drew (1979), O'Barr (1982), Bogoch and Danet (1984), Woodbury (1984), and Luchjenbroers (1997), have all concluded that the courtroom is a highly power-asymmetric interactional context, resulting in unequal turn-taking allocations and differential questioning and speech act rights, with lawyers being variously described as 'controlling' (Woodbury), 'coercive' (Bogoch and Danet), and 'restrictive' (Luchjenbroers) in their questioning of witnesses. This control of the witness and their testimony occurs in both direct and cross-examination, although cross-examination is in general significantly more coercive than its 'direct' or 'examination-in-chief' counterpart.

Analysis of trial data reveals endless examples of moments when witnesses are reminded of these interactional rules, as in the following example where the witness is put firmly in his interactional place, subordinated to both judge and lawyer. These extracts are drawn from adversarial criminal trials in the United Kingdom, United States, and Australia, dating from the early to the late 1990s. Each is tagged with the country of origin, and all names and places have

been made anonymous to maintain the confidentiality of the participants.

Extract 1 (U.S.):
Judge: Hold on, Mr. D., would you allow Mr. A. and the other lawyers to finish asking the question before you start to answer?
Witness: OK. Yes, sir
Judge: See, you just did it right now.
Witness: I'm sorry.

Even the court reporter may be brought into the equation as a motivating factor for encouraging adherence to the interactional rules:

Extract 2 (U.S.):
Judge: Excuse me.
Witness: I'm sorry.
Judge: Mr. B., if you would, would you allow Ms. C. to finish asking you the question before you start to answer, because the court reporter is having a hard time because you are both trying to talk at the same time.
Witness: I shall.
Judge: Okay. You will get out of here a lot quicker if we do it that way.
Witness: Thank you.

In the examination of witnesses, conducted predominantly by means of dialogic question-and-answer sequences, the lawyer takes on the role of questioner, a role again typically associated with the more powerful participant in power-asymmetric dyads. The lawyer can therefore be seen to function predominantly in the role of initiator of inquiry and evaluator of witness response, roles that are associated most frequently with interactionally powerful participants.

In contrast, the witness's interactional options in court are severely limited. The principal role of the witness is to provide appropriate responses to the questions of the lawyer (and, on occasion, the judge), occupying the role traditionally reserved for less powerful interactional participants, such as the suspect (in police interviews), the patient (in talk in medical settings), or the candidate (in a job interview).

The default requirement is for the witness in court to provide 'preferred' second-part responses – answers to the lawyer's questions – that adequately satisfy all four of the Gricean maxims. When they take their oath before testifying, witnesses swear to tell "the truth (maxim of *quality*), the whole truth (*quantity*), and nothing but the truth (*relation*)," thereby ostensibly satisfying the first three of the four criteria for optimally cooperative talk (Grice, 1975). By going through the legally binding performative utterance of the oath, witnesses effectively agree to be 'cooperative' participants, under threat of perjury charges.

The fourth maxim, of *manner,* ('avoid obscurity and ambiguity') is managed by means of the requirement for witnesses to be 'responsive'; in other words, to answer the question to the satisfaction of both lawyer and judge. If a 'responsive' answer is not forthcoming, the judge may rule the witness 'nonresponsive' and (under the threat of contempt charges) may oblige the witness to provide a more acceptable response, even down to prescribing its form as a restrictive yes/no response, as in the following example:

Extract 3 (U.S.):
Lawyer 1: Objection, your Honor. Pardon me, sir. This is nonresponsive.
Lawyer 2: Your Honor, this is – he's responding seems to me.
Lawyer 1: The question called for a yes or no answer.
Judge: Sustained. The witness may answer yes or no.
Witness: I'm sorry, I've forgotten the question.

In summary, witnesses are poorly placed in the interactional hierarchy of courtroom talk; they have no control over the talk of other participants in the trial process and only a very limited control over their own contributions. Witnesses are cast as respondents to questions, and attempts by them either to initiate talk or to provide evaluative feedback are penalized. Questions from witnesses are rare and are limited typically to requests for clarification.

Despite these general tendencies, it is important to acknowledge the fact that not all witnesses contribute to the trial narrative in the same way; there are significant variations between direct and cross-examination strategies, both in terms of lawyer's questions, and the responses of the witness. Each of these strategies is now discussed in turn.

Questioning Strategies in Witness Examination

Direct Examination Questioning

Direct examination questioning is characterized by broad *wh-* type questions (who, what, when, where why, how) that give witnesses the opportunity to provide evidential information. This is particularly true of the first stage of direct examination, as in the following illustrative extract:

Extract 4 (UK):
Q: *Could you give the court your full name please, sir?*
A: My name is R.G.

Q: Can I ask you to keep your voice up and to aim at the back row of the jury, which will ensure that everybody hears what you say. Mr. G., are you still employed as a Station Clerk at Nowhere Police Station?
A: Yes.
Q: *And approximately how long have you worked there for*?
A: About seven years.
Q: *During the period 1995 to 1997 how many civilian clerks were there at Nowhere Police Station*?
A: There were three civilian clerks.
Q: *That's yourself obviously, and who else*?
A: Mrs. B. and Mr. F.

In this extract, the witness is asked a series of information-seeking (as opposed to clarification-seeking) questions relating to his name, the nature and duration of his employment, and the number and names of his colleagues. The witness responds with brief but informative answers, allowing the testimony to move on apace.

In contrast, some direct examinations allow witnesses to produce relatively lengthy contributions, as in the following example:

Extract 5 (UK):
Q: And jumping on many, many years ahead, the jury has seen a letter that you wrote which is found at DOB/7, which makes reference to giving your card to a certain person?
A: Yes.
Q: In the first line, and who was that person?
A: E.
Q: E. Going back to E, *what sort of opportunities were offered to you in regard to the music business*?
A: He asked me if I wanted to do some promotional work for the company, his own company and then when he actually became part of another company if I still wanted to continue working for him; it was on a part-time basis as and when he wanted me to work for him.
Q: Did there come a time through E when you were offered employment in London?
A: Yes.
Q: *And how was that*?
A: He told me that his brother was setting up a similar company to himself, doing dance music promotions, and he said if you come along on this day this job will be there. Then I ended on moving from B. to L., arrived for the first day of the job and the job wasn't actually there.

In this example, the witness produces two extended narrative turns, consisting of more than 50 words each. These relatively lengthy contributions are prompted by the open questions, "What sort of opportunities were offered to you in regard to the music business?" and "And how was that?," respectively.

Although questioning in direct examination is generally less restrictive than in cross-examination, there is still a tendency for direct examination lawyers to control testimony elicitation through the use of both response-restrictive yes/no questions (e.g., 'was the car red?') and disjunctive questions (e.g., 'was the car red or blue?'):

Extract 6 (UK):
Q: When he was around at your premises, no doubt, you talked of this and that. *Would he ever do any drawing*?
A: No, sir, not on the premises, although he has done a number of paintings for me at his flat in G. Park and then brought them round, and I have paid him sums of money for each painting.
Q: *Would the drawings be of people, places, or both*?
A: People.
Q: *What people did he draw*?
A: He done a picture of me when I was 17 taken from a photograph. He done a picture of S. S. from about a year previous sitting on the sofa. He also done a picture of S. S. from a naked photograph that was taken in Amsterdam. He also done a painting of a boy named A. C., one of a facial portrait and another one of him standing holding a cat taken from a photograph in my garden. He also done one of my friend S.S.'s deceased grandmother as a birthday present for his stepfather.
Q: *All of these pictures done from photographs*?
A: Photographs. Yes.
Q: I follow. *He would do them away from your home*?
A: Yes. That is correct.

Extract 6 illustrates the way in which the direct examination lawyer integrates into his questioning style both open questions, such as 'What people did he draw?,' with more closed yes/no type questions (Would he ever do any drawing? All of these pictures done from photographs?) and equally response-restrictive disjunctives (Would the drawings be of people, places, or both?).

The effect of such questioning strategies, even during direct examination, is to control and constrain the witness's freedom to respond. As Tiersma (1999: 159) put it, "With a narrative, the storyteller herself decides how to tell her tale, while a question-and-answer format allocates control to the questioner, in this case, the examining lawyer." This next illustrative extract taken a British domestic violence case (see Cotterill,

2004), demonstrates the role of the lawyer as primary narrator of the story:

Extract 7 (UK):

Q: I think it is the position – and I would invite you to you confirm this – that your relationship with the defendant really ran into terminal difficulties in about February, 1996? Last year?
A: No. It started in all about Christmas time.
Q: That was the final stage of your relationship – if you like, the last few months – but would it be fair to say that your relationship, generally, has been quite a stormy one with the defendant?
A: Yes.
Q: You would argue?
A: Yes.
Q: You would fight?
A: Sort of.
Q: The defendant would leave?
A: Sometimes.
Q: Then you would have him?
A: Yes.
Q: That happened on many occasions?
A: Yes.

On detailed inspection, it is apparent that the lawyer is in fact the principal narrator of this account. He is responsible for topic-raising in each of the propositions concerned (the nature of the complainant's ongoing relationship with the defendant, their respective patterns of behavior, the frequency of violent incidents, and so on). In contrast, the witness is primarily limited to the role of providing confirmatory responses, typically in the form of a single-word affirmative – 'yes.' This is of course made possible by the lawyer's use of closed, response-restrictive, yes/no questions.

Not only is the lawyer responsible for producing the majority of the narrative but the witness's attempts to contradict the unfolding (lawyer-initiated) narrative are also largely unsuccessful; although the lawyer begins by hedging his initial contribution with" I think . . ." and "I would invite you to confirm this . . ." in the first line, and later (in line 6), asks, "Would it be fair to say . . .?," using markers indicative of hesitancy, doubt, or at least politeness; in offering the other speaker a turn, he responds to her attempt to correct the date from February to "about Christmas time" (line 4) with a dismissive gloss of "the last few months" and "generally" (lines 5 and 6).

In Goffman's (1981) terms, this interaction illustrates the separation of the speech production roles of animator, author, and principal. The animator in this instance, as the one who produces or gives voice to the message being conveyed, is clearly the lawyer. The author is the person responsible for the selection of words and sentiments that are being expressed, again a role taken on by the lawyer. The principal is the person whose position or beliefs are being represented and is also the one who is held responsible for whatever position is being presented. The role of principal in courtroom interaction is ostensibly taken by the witness, although, as we have seen in this initial extract, her actual participatory role is relatively minor. Indeed, her overall contribution only amounts to 15 words of a total of 102, with an average turn length of only 2.1 words, compared with a 14.6 words per turn average for the lawyer. As Duranti (1997: 297) notes, "Although speakers often assume all three roles [animator, author, and principal] at the same time, the roles need to be distinguished in more cases than we might think." In the context of courtroom interaction, even though it is apparently the witness's account of the crime that is being elicited, this narrative is invariably voiced by the lawyer.

In addition to providing propositions along with a request for confirmation, often called 'requestions' (after Danet and Kermish, 1978), it is also possible for lawyers to restrict the responses of the witness by providing an indication of the extent of the response within the question. The following two British trial examples illustrate this phenomenon:

Extract 8 (UK):

Q: Why was that? *Very shortly.*
A: *Summing up*, I think he was a little bit – I don't know if frightened is the word. It possibly is – frightened of coming round, because obviously he had had a few comments made about him to him to his face about his appearance by Mr. T. S. I was not as friendly towards him as I was when he first came round, possibly that stopped him, although he suffered with depression. He told me he suffered with depression. He was very withdrawn as I have explained earlier and I thought. In my opinion he felt it would be best left not coming round and he did not do so.

Extract 9 (UK):

Q: Did you have an accident?
A: Yes, on 1st April 1989.
Q: What was the result of that accident? *I need not ask you the details*, Mr. C.?
A. *In short*, an injury to the lower spine resulting in, eventually, no bladder control, pains to the lower left-hand side of the hip and body, numbness, pins and needles. Just a deteriorating condition. I have been told it is referred to as Coxaphenia and spondylitis, which is a deterioration of the spinal cord.

The direction provided by the two lawyers to respond 'very shortly' and without detail results in relatively compact and information-dense responses from each respective witness. Interestingly, both witnesses also articulate a textual acknowledgement of the request at the outset of their responses – witness 1 in Extract 8 answering by 'summing up' and witness 2 in Extract 9 providing his response 'in short.'

The majority of research into courtroom direct and cross-examination has found that witnesses are effectively prevented from 'telling their own stories,' with the blame placed squarely at the door of the question-and-answer format that prevails in the Anglo-American adversarial system. This seems to be true even in the case of direct examination lawyers.

There may, in fact, be sound psychological benefits in such elicitation strategies for narrative-constructing direct examination lawyers. Research by O'Barr (1982) and others has suggested that tight and coherent narrative versions are preferred by jurors over loose and disjointed testimony elicited by means of more turn-generous open questions. Witnesses producing coherent and chronological accounts tend to be considered more truthful, competent, intelligent, and convincing than those who provide more 'fragmented' versions. Jackson (1995: 400) argues that "counsel must decide, in effect, who can tell the story better – the witness (who has the benefit of 'authenticity,' but perhaps lacks the enunciative ability) or counsel, who lacks the authenticity of a witness, but may have better enunciative ability."

Cross-Examination Questioning Strategies

In cross-examination, witness testimony is constrained even more tightly. Studies by Woodbury (1984) and Luchjenbroers (1997) have shown that cross-examination is characterized by closed, response-restricting questions.

Maley and Fahey (1991: 7) found that confirmation-seeking questions were used in 75% of exchanges, thus enabling counsel to "assume the role of story-teller in the trial process." In a later article, Maley (1994: 36–37) cites the following example:

Extract 10 (Aust):

Counsel: And I suppose it would be fair to say that as they came to recognize the extent of your knowledge about overseas drugs, so they became more and more interested?

Witness: No, that would be incorrect. They already knew where I stood, much prior to July of 1982.

Counsel: You say that their intelligence was sufficient to let them know how important you were even before you spoke to them?

Witness: They had been following me . . .

Counsel: Is that right or not?

His Honor: Just a moment, Mr. B. I am allowing the witness to answer that question. . . .

Counsel: Would you say what you were saying, Mr. C.?

Witness: They had been following me . . .

In this extract taken from an Australian courtroom, Maley noted that the lawyer's question to the witness relating to the police's intelligence about his activities is phrased "in the form most favored by cross-examining counsel: a declarative with a rising tone which seeks confirmation, not information, as a response" (1994: 37).

In the same witness's parallel direct examination, Maley discussed the comparatively "congruent and cooperative" pattern of question and answer:

Extract 11 (Aust):

Counsel: After having given those documents to Mr. H., did you see Mr. H. again?

Witness: Yes I did.

Counsel: When was that?

Witness: About the second or third week of June

Counsel: Did you have a conversation with him regarding M.?

Witness: Yes I did.

Counsel: What did you say?

Witness: I said to him '. . .'

Counsel: Then Mr. H. said something to you?

Witness: That is correct.

Here, since the lawyer is not permitted to elicit evidence via 'leading' questions (questions that presuppose a particular response – a strategy permitted in cross-examination; see Hobbs, 2003), the interaction can be seen to be "alternating between indefinite polars" ("Did you then say something?") and open information-seeking questions ("What did you say?"; Maley, 1994: 38).

A further linguistic strategy employed particularly by cross-examining lawyers is the use of tag questions, which generally introduce leading questions. Tiersma (1999: 165) provides the following examples:

You ate broccoli last night, *didn't you*?
You ate broccoli last night, *isn't that correct*?
It is true, *is it not*, that you ate broccoli last night?

Danet and Bogoch (1980) showed that 53% of all questions in their cross-examination data were in the form of declaratives with either tags or rising intonation, compared to only 9% of questions in direct examination. The following example from the O. J.

Simpson criminal trial (see also Cotterill, 2003) shows the use and distribution of tag questions in cross-examination:

Extract 12 (U.S.):

Q: When you went out to where the glove was eventually pointed out to the other detectives, how long did you spend there before you went back to talk to them?
A: Ten, 15 minutes totally.
Q: What did you do for 10 to 15 minutes on that scene?
A: Looked for a victim or a suspect.
Q: Now if that glove had been there where you say you found it, it would have been placed there by someone involved in the homicide; *isn't that conclusion compelled?*
A: I would assume that, yes.
Q: That would be a vicious killer of some sort, *would it not*?
A: Yes.
Q: And you hung around for 15 minutes with no back-up and no vest doing something, *is that correct*?
A: No it isn't.
Q: And their tracks might still have been there when you made that discovery, *correct*?
A: I didn't see anything, but they could have been.
Q: And you could have taken the detectives on the outside of the fence and shown the flashlight through it to point out the glove, if you had chosen, *could you not*?
A: No. I think that would have been very difficult.

During this piece of trial data, in which the cross-examining lawyer is trying to promote the view that the police officer was behaving suspiciously and may have deliberately contaminated evidence at the crime scene, the lawyer uses tag and tag-like questions with both positive and negative polarity to suggest a series of scenarios that construe the police officer's behavior as counterintuitive and therefore suspect. Even though the officer contradicts the version put forward by the lawyer on two occasions ("No it isn't" and "No. I think that would have been difficult"), the impact of the lawyer's leading questions is still considerable.

Although this witness is fairly robust in his resistance to this type of questioning, there are significant concerns about the extent to which less competent witnesses are able to cope with such verbally assertive or even aggressive questioning strategies. Such groups of what are termed in the United Kingdom 'vulnerable witnesses' include victims of rape and sexual assault (Matoesian, 1993; Conley and O'Barr, 1998; Ehrlich 2001; Matoesian, 2001; Ehrlich, 2002), non-native speaker witnesses (see Berk-Seligson, 1999, 2002; Hale, 2004), child witnesses (Aldridge and Wood, 1998; Brennan, 1994; Walker, 1999), and witnesses whose cultural background clashes with that of the courtroom; for example, Aboriginals in Australia (Walsh, 1994; Cooke, 1995; Eades, 1995; Walsh, 1995; Cooke, 1996; Eades, 2002, 2004).

There are disturbing signs that the most controlling questioning strategies seem to be reserved for the most vulnerable members of society who come before the court, either as defendants or as victims of crime. These vulnerable people include not only those witnesses discussed above but also individuals with psychological or learning difficulties. Controlling questions seem to be used more commonly with these types of witness, and they also seem to yield higher coercive returns for the lawyers who employ them. Discussing this tendency, Tiersma (1999: 167) concludes

> It is troubling that this strategy is most likely to be effective with the socially and economically weakest members of society. One would hope that judges are aware of the problem and use their power as neutral arbiters to minimize its impact.

Role of Lexis in the Courtroom

It is not only question forms and sequences that affect the elicitation of evidence from witnesses on the stand; lexical choices also play a significant role in how testimony is elicited and conveyed to the jury.

Perhaps the most famous study that illustrates the importance of lexical choices in the depiction of forensic events was conducted by the psychologists, Elizabeth Loftus and John Palmer (1974). They demonstrated that, when people watch a film of an accident between a car and a van and are then asked to estimate the speed the car was traveling at the moment of impact, their responses are determined by the choice of verb used in the eliciting question; consequently, eyewitnesses asked 'how fast was the car going when it *crashed* into the van?' estimate consistently higher speeds than those asked 'how fast was the car going when it *hit* the van?' Their study also showed that forensic descriptions using words associated with violence, such as 'fight,' are more likely to lead to a conviction than more neutral words, such as 'incident.'

In the courtroom context, Brenda Danet (1980) discussed the use of no fewer than 40 different formulations to describe 'the products of conception.' In her data, taken from the U.S. trial of a doctor who had carried out a late abortion, *baby* and *fetus* were particular terms used by the prosecution and defense, respectively. The prosecution argument was constructed around the life (and death) of a *baby* and therefore represented a case of manslaughter, whereas the defense conceptualized the case in terms of a *fetus*.

Thus, the defense argued, because the fetus was incapable of independent life, there could have been no crime of manslaughter committed against it, rendering the trial inappropriate and unnecessary. The lexical stakes were considered sufficiently high in this case that the lawyer defending the doctor sought and was granted an order barring the use of a number of terms, including the emotive *smother*, *suffocate*, *murder*, and *baby boy*, all of which were disallowed by the judge on the grounds that the connotations of their use were potentially 'prejudicial.' In the end, the jury agreed with the prosecution formulation of the victim as *baby*, and the doctor was convicted of manslaughter. This case clearly illustrates the power of semantic categories and labels and their connotational force.

Drew (1992: 489) discussed lexical choices in a rape trial in which the lawyer argued that the initial meeting between defendant and plaintiff took place in a *bar*, suggesting that a bar is a place for people to pick up partners for casual relationships. The defense, in contrast, preferred to refer to it as a more 'respectable' *club*:

C: And you went to a *bar* in Boston, is that correct?
W: It's a *club*.
C: It's where girls and fellas meet, isn't it?
W: People go there.

Cotterill (2004) also explored the role of lexis in creating nuances of meaning for the jury in sexual assault and domestic violence cases, concluding that lexical representations of such crimes contribute to a widespread sense of injustice in the cross-examination of victims of these types of offenses.

Lawyers are able to use lexis to construct elaborate scenarios through the conscious manipulation of 'conceptual perspective' (Clark, 1997), defined as "the speaker's presentation of an object, relation, or event, through choice of words, to the addressee, such that some properties of the referent are included and others excluded by each choice" (Clark, 1998: 5). The ultimate impact of such representations is of course dependent upon the jury understanding the connotational loading of the lexical items selected.

Conclusion

This article outlines the interactional dynamics of witness examination in the adversarial courtroom, focusing on narrative and questioning styles, as well as the importance of lexical choice in the representation of crimes, their victims, and perpetrators. Any analysis of courtroom language is inevitably complex and multilayered, but the discussion presented here represents a summary of some of the key studies in this fascinating area of language and law. The adversarial trial context provides a rich source of data for linguistic analysis because all of its key practices are articulated through language. By scrutinizing such practices from a linguistic perspective, it is possible to elucidate the mechanisms of power and persuasion inherent in trial-by-jury in general and in witness examination in particular.

See also: Interviewing and Examining Vulnerable Witnesses; Law and Language: Overview; Legal-Professional Language in Jury Trial.

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Wittgenstein, Ludwig Josef Johann (1889–1951)

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Ludwig Wittgenstein, one of the most influential philosophers and, in terms of general impact, thinkers of modern times, was born in Vienna on April 26, 1889. He was one of eight children in a mixed Catholic and Protestant (earlier Jewish) family, which intensively participated in the cultural and economic life of Vienna at the turn of the 19th/20th century, characterized by cosmopolitanism, by a suffocating bourgeois mentality (which also explains the rise of psychoanalytic treatments in society of that time), and by an unequalled theater and music life. Wittgenstein's

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father, after having been a wool merchant, had established himself in Vienna as the director of a large steel company, and the family enjoyed a luxurious life, albeit overshadowed by oppressing and depressing paternal authoritarianism. The children were all endowed with artistic, technical, and intellectual skills, but seem to have experienced problems in psychological development and social adaptation; three of Ludwig's brothers committed suicide, and Ludwig's own life was characterized by constant imbalance in developing his own personality and in adapting to life in society. Wittgenstein received his first education in his parents' palatial home in Vienna, and showed remarkable technical skills (as a young boy, for example, he constructed a sewing machine). He was sent to a Gymnasium in Linz (1903–1906), and then to the Technische Hochschule in Charlottenburg (Berlin), where he stayed for two years. In 1908 he went to study at the University of Manchester in England, where he started doing aeronautical research; he designed a jet reaction engine and a propeller. Until then his interests had been in physics and in technology, but seeing how much mathematics was involved in both, he soon became interested in the philosophical foundations of mathematics. Having heard of the existence of Russell's *Principles of mathematics* (1903), Wittgenstein established contact with Russell and, on the occasion of a trip to Germany, with Frege. In the academic year 1911–1912 he enrolled at Cambridge University in order to study with Russell, on whom he left a deep impression. While at Cambridge he laid the basis of his logical views; he also spent much time performing music and doing experiments on rhythm in music.

During World War I, Wittgenstein was an officer in the Austrian army; in November 1918 he was taken prisoner by Italian troops and was held captive for some months in Italy. During wartime he had been systematizing his ideas on logic and philosophy; the resulting manuscript was sent to Russell (who discussed it with Wittgenstein in Holland in December 1919) and was published (in German) in 1921. This *Logisch-philosophische Abhandlung* (containing 526 decimally ordered short paragraphs) was subsequently translated into English and was published in 1922 with an introduction by Russell, under the title *Tractatus logico-philosophicus*. The book, which was the only philosophical book Wittgenstein published during his lifetime (in 1926 he also published a children's dictionary for use in primary school), is an important contribution to philosophy, and more particularly to the theory of logical atomism, which Russell had been developing for some years and which holds that there are only atomic facts (the connections made through words like 'and,' 'or,' 'if … then' are only logical manipulations), and that these can be analyzed exhaustively in terms of particulars, properties, and relations. Written in the form of a list of theses or statements, the *Tractatus* proposes a 'picture theory': our sentences have meaning because (and only insofar as) they are pictures of reality. Reality consists of facts (*Tatsachen*), and facts exist by virtue of being realized states of affairs (i.e., reality, or 'the world,' is everything that is the case); states of affairs (*Sachverhalte*) are nothing else but configurations of things (*Gegenstände*; *Dinge*; *Sachen*). Our thoughts (thinking has a 'factual' content, contrary to imagination or illusion) are, in Wittgenstein's terms, logical pictures of facts; to convey our thoughts to others, we need to express them in sentences (combinations of words, generally seen as names by Wittgenstein), which can be perceived by the senses.

The world view and the philosophy of language contained in the *Tractatus* have radical consequences: if language only has meaning when it pictures reality, then the statements of logic and mathematics (which deal with how language works/should work) have no 'meaning' (one cannot make a picture of how a picture represents reality), and so the propositions of the *Tractatus* itself are devoid of meaning, senseless (*sinnlos*). However, Wittgenstein recognized the importance, or usefulness, of these propositions: they serve as 'elucidations,' enabling us to make the distinction between what has meaning and what does not. Wittgenstein even stressed the importance of a 'mystical' dimension concerning our life, our religious beliefs, our ethical convictions, our aesthetic experiences; the crucial point for Wittgenstein is that this mystical dimension should not be presented as 'facts' (we deal here with 'problems of life'). Sentences that try to express this dimension are nonsensical (*unsinnig*): they do not picture facts, nor do they try to make explicit the way our language works. To say that the world exists is nonsensical, since its existence is not a fact in the world. But it shows itself, viz. in the existence of language. Language, indeed, is the totality of meaningful, i.e., fact-picturing sentences, and thus the limits of our language are the limits of our world. But when all has been said that can be said, we have not even touched upon the problems of life: they belong to the realm (the most important realm!) of the nonsensical, of what cannot be said but only shows itself.

Wittgenstein's views on meaning were endorsed by the members of the *Wiener Kreis* (Vienna Circle, the birthplace of neopositivism) – although Wittgenstein felt that nobody, not even Russell, had understood and grasped the contents and the (deeper, ethical) meaning of the *Tractatus*, and although the picture-theory was not adopted by the *Kreis*. The book was

submitted in June 1929 as a Ph.D. dissertation at Cambridge, where Wittgenstein had returned after World War I and a few wandering years (in 1920 he was a gardener in Klosterneuberg, between 1920 and 1926 he was a schoolteacher in the Austrian villages of Trattenbach, Puchberg, and Otterthal, and after that he became again a gardener in the monastery of Hütteldorf). The years 1927 and 1928 were spent in Vienna, where he designed a mansion (which he wanted 'free from all decoration and marked by a severe exactitude in measure and proportion') for his sister Margarete, and had regular contacts with members of the *Wiener Kreis*, especially Moritz Schlick, Friedrich Waismann, and Herbert Feigl. But Wittgenstein's 'return' to philosophy seems to have been caused by a lecture given in Vienna in March 1928 by L. Brouwer on the foundations of mathematics. Brouwer's theory of intuitionism in mathematics strongly appealed to Wittgenstein, who realized that mathematics is essentially a constructive activity, and that meaning lies in the recovery of the process of construction (of a proof, of a theorem, etc.), and not in the discovery of a (*a priori*) given truth. Wittgenstein's *Tractatus* already contained a number of statements about mathematics as a method (and not as a doctrine) and about the importance of 'making clear' what is meant (= elucidation), and presented a method (viz. truth tables) for calculating the truth or falsity of a proposition that is a truth-function of other propositions, but the picture-theory of meaning and the view of language as being essentially a nomenclature (a set of names) – both central ideas of the book – were of course hardly compatible with intuitionism and constructivism. It would take Wittgenstein several years to rebuild his philosophy, and to develop a completely new (and very original) theory of meaning. This new theory constituted the core of the philosophy of the 'later Wittgenstein,' as distinct from the 'younger Wittgenstein,' author of the *Tractatus*. Whether there is a radical break or a gradual transition between the two periods is a matter of dispute among Wittgenstein scholars, with some defending the discontinuity thesis and others the continuity view; a somewhat subversive, though not inaccurate, way to reconcile both views is to say that Wittgenstein remained interested in the ideas expounded in the *Tractatus*, but (mainly) in order to show how wrong they were.

The philosophy of the 'later Wittgenstein' was elaborated at Cambridge, where Wittgenstein started to lecture in January 1930, and where he had contact with Russell, G. E. Moore, and F. P. Ramsey. Wittgenstein taught there between 1930 and 1936, then spent one year living as a solitary in Norway, and returned to Cambridge in 1937, where he later succeeded Moore in the chair of philosophy. During World War II, Wittgenstein, by then a British citizen (since 1938), took the side of the allied troops and worked at Guy's Hospital in London and subsequently in the Royal Victoria Infirmary in Newcastle. He resumed his teaching at Cambridge in 1944, but took an early retirement in 1947. He went to live in Ireland and then spent some time in the United States. In late 1949 he was diagnosed with cancer, and from that time on he prepared himself for his death. He lived briefly in Vienna and in Oxford, then went to Norway, before spending the last months of his life in Cambridge, in the home of his physician. He died on April 29, 1951, leaving behind a mass of unpublished materials (notebooks, lecture notes, unfinished book manuscripts, letters), much of which was published (and translated) by his students and friends after his death.

Wittgenstein's Cambridge years were marked by intense philosophical activity, by a considerable amount of academic teaching, and by the shift from a dogmatic and axiomatic formulation (so typical of the *Tractatus*) to a dialogue form of philosophizing, with more questions raised than answers given. The later Wittgenstein also covered a wide variety of topics, and most prominently beyond the domains of logic and mathematics (although in the years 1937–1944 he wrote down his remarks on the foundations of mathematics): he reflected upon (ordinary) language, psychology, ethics, aesthetics, and religion, and dealt with the general problems of meaning, knowledge, belief, and social behavior. During the first years after his return to Cambridge, Wittgenstein was particularly interested in verification as the (constructivist) method of establishing the meaning of propositions (in the *Tractatus* he had not dealt with the role of verification); but as soon as the early 1930s he realized that the demand of verification should not be kept too strict, and that there is also meaning beyond (or behind) what can be verified. Wittgenstein completely abandoned the picture-theory and the concept of meaning as an (ideal) object, i.e., precisely those principles in virtue of which he could be seen as an adherent of neopositivism or of logical atomism; most of his work from the 1930s and 1940s can be seen as a criticism of the views of the *Wiener Kreis* and of Russell's philosophy (in his conversations with Schlick and Waismann of the years 1929–1932, the differences separating Wittgenstein from the *Wiener Kreis* are clearly expressed). From the early 1930s on, when he wrote the manuscript of his *Philosophical grammar* (the first part of which deals with 'meaning,' 'rules,' and 'language use') and dictated the

contents of *The blue and brown books*, Wittgenstein stressed the manifold forms, functions, and uses of language. The best-known work from the later Wittgenstein's philosophical legacy, to which most often reference is made, is the *Philosophical investigations* (written, with an interruption in 1945–1947, between 1936 and 1949; this text, one of the most finished among Wittgenstein's manuscripts, was posthumously published in 1953). The philosophy – or the philosophical itinerary – formulated in this (not very systematically structured) book implies a dynamic view of language, seen not as a collection of names but as a toolkit containing 'countless' kinds of uses of words and sentences and a changing set of 'language-games' (*Sprachspiele*), such as describing, reporting, guessing, translating, thanking, greeting, and telling jokes (the 'language-games' were previously dealt with in *The blue book*). The essential question to ask then is not 'What is the meaning of sentence S?,' but 'How is S used here?' and 'How does S fit within a larger set of sentences?' Asking these questions is inquiring after the meaning of activities, and only in this way are we able to get a view of the 'grammar rules' of each game. The answer (or multiple answers) to these questions also require(s) that we consider sentences (and the words contained in them) in their 'surroundings' (in Wittgenstein's terminology). Here we see the basic difference from the doctrine of the *Tractatus*: meaning is not shown by the sentence taken on itself, but it becomes (partly) manifest in each of the uses to which a sentence is put; also, whereas in the *Tractatus* Wittgenstein held that any proposition presupposes all other propositions (because of their 'common essence'), in his later work he emphasizes the idea that we only hit upon segments of the whole of language. A very elliptical summary of the later Wittgenstein's theory of meaning is therefore 'Meaning *is* use' (use/employment/application; the German terms are *Gebrauch*/*Verwendung*/*Anwendung*). The implications of this dynamic and 'perspectivist' view on meaning have been drawn by Wittgenstein's commentators, who have been assembling, comparing, and confronting the dispersed remarks, questions, and musings – on meaning, knowledge, belief, and (especially in the second part of the *Philosophical investigations*) emotion, sensation, remembering – found in the posthumously published materials, in view of the fact that Wittgenstein abstained from giving definitions of the key terms in his later philosophy. The 'language-games' that can be performed in using language show intricate relationships and partly overlapping, partly diverging features (in their formal aspects, their functions, their purposes): Wittgenstein spoke of 'family resemblances,' which justify the general designation 'language-game' without implying an 'essential' unity (language functions in multiple ways); the same vague conception applies to the structure of language, which Wittgenstein saw as irregularly patterned (the structure of language is compared to the plan of an old town, with irregular streets and squares, dead alleys, etc.).

The later Wittgenstein proposed a philosophy that is basically an activity of constant questioning, doubting, observing, and relativizing; it is a message of caution against doctrinarism, (hasty) generalization, speculation, one-sided approaches, and also 'bewitchment' (by language, by so-called evidence, by theories): the aim is 'to show the fly the way out of the fly-bottle' (overgeneralization and one-sidedness lead us into the bottle). It is therefore characterized by a search to determine criteria (or at least one good criterion) in order to find out something about states of the mind (belief, thought, will, hope, etc.) while avoiding the recourse to introspection (in his *Remarks on the foundations of mathematics* Wittgenstein stressed the foundational role of mathematical operations). To understand the 'grammar rules' of the language-games, it is necessary to observe the uses of sentences that function within the various games, and this requires contextual and interpersonal observation: we cannot make abstraction of the 'surroundings' in which words and sentences are used, and language-games (and thus also language) are a social reality, i.e., language-games are (integrated as) *forms of life* (the relationship between language and experience figures prominently in Wittgenstein's *Remarks on colour*). Wittgenstein denied the possibility of 'private rules' and therefore of a private language: rules functioning within a game are necessarily shared rules (they exist only because there is agreement about them), and therefore there are no rules that would be followed by only one individual, since following a rule consists in 'doing the same.' The issue of private rules, in connection with linguistic behavior and linguistic competence, has become a main topic of post-Wittgensteinian debate between scholars holding an empiricist view of language and those holding a rationalist, innatist view of language; Wittgenstein himself rejected both flat behaviorism and unqualified mentalism, because of their one-sidedness and being out of touch with linguistic reality. The ultimate argument for such a view lies of course in a person's (linguistic) history: we have acquired language by learning how sentences are used in what types of contexts (the language games are part of 'our natural history,' as Wittgenstein put it).

In the two main phases of his philosophical career Wittgenstein exerted great influence upon

contemporary philosophical conceptions: whereas his *Tractatus* was a source of inspiration for neopositivists (although Wittgenstein's 'deeper' message was radically opposed to the doctrine of logical positivism, as well as to Russell's logical atomism), his later work inspired British analytical philosophers (although the later Wittgenstein's method was not so much one of analysis, but rather one of questioning and of patiently describing, i.e., of recovering the 'uses-in-context'). A similar twofold impact on linguistic work can be observed: whereas the doctrine of the *Tractatus* has inspired work on the categorical structure of language as being, ideally, a nomenclature with syntactic rules for combining names (thus justifying a monolithic type of analysis), the ideas put forward in the *Philosophical investigations* (and in the other writings of the 1930s and 1940s) have inspired scholars favoring a pragmaticist view of meaning and an ethnographic study of language (thus justifying a multifunctional and combinatory or polythetic approach, integrating meaning, knowledge, and action; Wittgenstein's *On certainty* offers a nice illustration of such an approach). Beyond that, Wittgenstein's life and works, also when misunderstood or indirectly known, have inspired psychologists (Wittgenstein lectured on 'philosophical psychology,' especially on the 'body-mind problem,' and had written important *Remarks on the philosophy of psychology*), anthropologists, educationists, moralists, and artists.

See also: Frege, Gottlob (1848–1925); Meaning: Overview of Philosophical Theories; Philosophy of Mind; Philosophy of Science and Linguistics; Russell, Bertrand (1872–1970).

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Ruth Wodak has made significant contributions to the theoretical, methodological, and empirical study of discourse. Her initial training was as a sociolinguist and in her early work she combined text linguistics, sociolinguistics, and discourse analysis in both the legal and the clinical frameworks. Her early books, *The language of defendants at court* (1975) and *Language behavior in therapy groups* (1986), exemplify this approach. Her book *Disorders of discourse* (1996) offers a significant summary of her initial positions on discourse analysis.

Wodak's work is mainly situated within the context of Critical Discourse Analysis (CDA) and sociolinguistics. This approach is based on the underlying assumption that power is both distributed and reflected through discourse. Accordingly, the analysis of the written and spoken texts that occupy the everyday world provides information concerning the power relations that are present within any given social discoursal context. CDA is particularly concerned with resisting power relations that reproduce inequality and generate oppression. This is achieved through the elucidation of those discoursal practices that justify, initiate, and maintain the ideology and ultimately the power of the dominant elite. CDA has the critical aim of empowering individuals and groups who have been marginalized within the power structures of society by making them aware of inclusive and excluding discursive practices.

Wodak has contributed to CDA on several different levels. On the theoretical and methodological levels, her books and articles have developed theories of text planning, argumentation, and comprehension as well as a series of both qualitative and quantitative methods of analysis. The emphasis on theoretically informed methods of analysis has been a hallmark of this body of writing and has allowed CDA to emerge as a systematic and replicable approach to textual analysis. This work is exemplified through her books *Methods of text and discourse analysis* (St. Titscher *et al*., 2000) and *Critical discourse analysis: theory and interdisciplinarity* (Wodak and Weiss, 2003) as well as through her continuing role as editor of the journal *Critical Discourse Studies*. Wodak's specific approach to CDA has been termed the discourse-historical approach.

On the empirical level, Wodak has utilized her theoretical and methodological approach to CDA to explore social inequalities. On the broadest level, her empirical research has addressed the relationship between language and politics. In this work, she has provided analyses of political discourse particularly in relation to national and transnational identities. Within this context, the issues of minority languages, multilingualism, and intercultural communication have been addressed. Her books *The discursive construction of national identity* (Wodak *et al*., 1999), *The costs of multilingualism* (Wodak *et al*., 2003), and *The Haider phenomenon* (Wodak and Pelinka, 2002) and her continued editorship of the *Journal of Language & Politics* represent this aspect of her empirical work.

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made significant contributions to the understanding of the discoursal construction of stereotypes and propagation of discrimination in public and private spheres. Of particular importance is the presence of an extensive analysis system that when applied to spoken and written texts clearly demarks the linguistic realization of racist orientations, positions, and statements. The development of this analysis system specific to the linguistic manifestation of prejudice and discrimination has allowed Wodak and other researchers to illuminate the presence of racism in contemporary social discussions as well as the historical presence of this phenomenon. Her books *The semiotics of racism: approaches in critical discourse analysis* (Reisigl and Wodak, 2001), *Racism at the top* (Wodak and van Dijk, 2000), and *Discourse and discrimination: rhetoric of racism and anti-Semitism* (Wodak and Reisigl, 2001) are examples of this body of research.

Wodak has also applied the empirical tools of CDA to the issue of gender in society. In broad terms, her work has explored the discursive practices of female socialization. This research has addressed the way men and women interact in conversation, the communication of women in different personal and institutional settings, and the representation of women in media discourses. In addition to exploring gender in society, Wodak has also provided guidelines for nondiscriminatory language use. Her books *Gender and discourse* (Wodak, 1997) and *Communicating gender in context* (Kotthoff and Wodak, 1997) demonstrate her application of CDA to gender research.

Wodak's research interests also include issues of organizational discourse. In this context, she has applied discoursal analyses to the doctor–patient relationship and the discoursal practices of international European organizations. This work has explored decision-making processes and addresses the social ramifications of these decisions. Her book *EU discourses on unemployment: an interdisciplinary approach to employment, policy making and organizational change* (Wodak *et al.*, 2000) exemplifies this body of research.

Wodak's contribution to linguistic science has been recognized through several awards and prizes. In 1996, she was awarded the Wittgenstein Prize for Elite Researchers, which allowed her to conduct 6 years of continuous interdisciplinary team research. In 1997, she was elected as a corresponding member of the Philosophic-Historical Class of the Austrian Academy of Sciences. In 2001, she was awarded the Scientific Prize of the City of Vienna, and in 2003 she was awarded the Verkauf–Verlon Prize for Anti-Fascist Research and Writing.

Ruth Wodak is currently Professor of Discourse Studies at Lancaster University. She moved from the University of Vienna, Austria, where she was full professor of applied linguistics since 1991. She is director of the Centre 'Discourse-Politics-Identity,' located at the University of Vienna, and codirector of the Austrian National Focal Point of the European Monitoring Centre for Racism, Xenophobia and Anti-Semitism.

See also: Gender and Political Discourse; Politics and Language: Overview.

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Wolaitta

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Introduction

The term 'Wolaitta' (Wolaytta) designates both the speakers and the language discussed in this article. Their administrative unit, known as the Wolaitta Zone, is part of the Southern Peoples, Nations and Nationalities Regional State of Ethiopia. The northern neighbors of the Wolaitta are the Kambatta (Kambaata) and Hadiyya (Cushitic); the southern neighbors are the Gamo and Gofa peoples (Omotic). The western and eastern parts of Wolaitta are bounded by the Omo and Bilate rivers, respectively. Most of the Wolaitta are farmers. According to the 1994 national census of Ethiopia, there are 1 210 000 Wolaitta speakers. For the names of closely related languages, see the language family tree in Figure 1.

The Sound System

Consonants

Table 1 lists a consonant inventory of Wolaitta. [p] and [Φ] are free variants in word-initial and intervocalic positions; [Φ] does not occur as a geminate or as a member of a consonant cluster. The labial implosive is attested both in word-initial and medial positions, as in *ɓánk'a* 'very sour' and *šoɓɓá* 'armpit,' and the alveolar implosive occurs only in word medial position, as in. *šóɗɗe* 'frog.' [ž] is used marginally and only in ideophonic words. Gemination is contrastive.

Vowels

Wolaitta has a five-vowel system with each vowel having a longer counterpart (Table 2). Examples are *mára* 'calf,' *maára* 'row' and *boóra* 'ox,' *bóra* 'critic.'

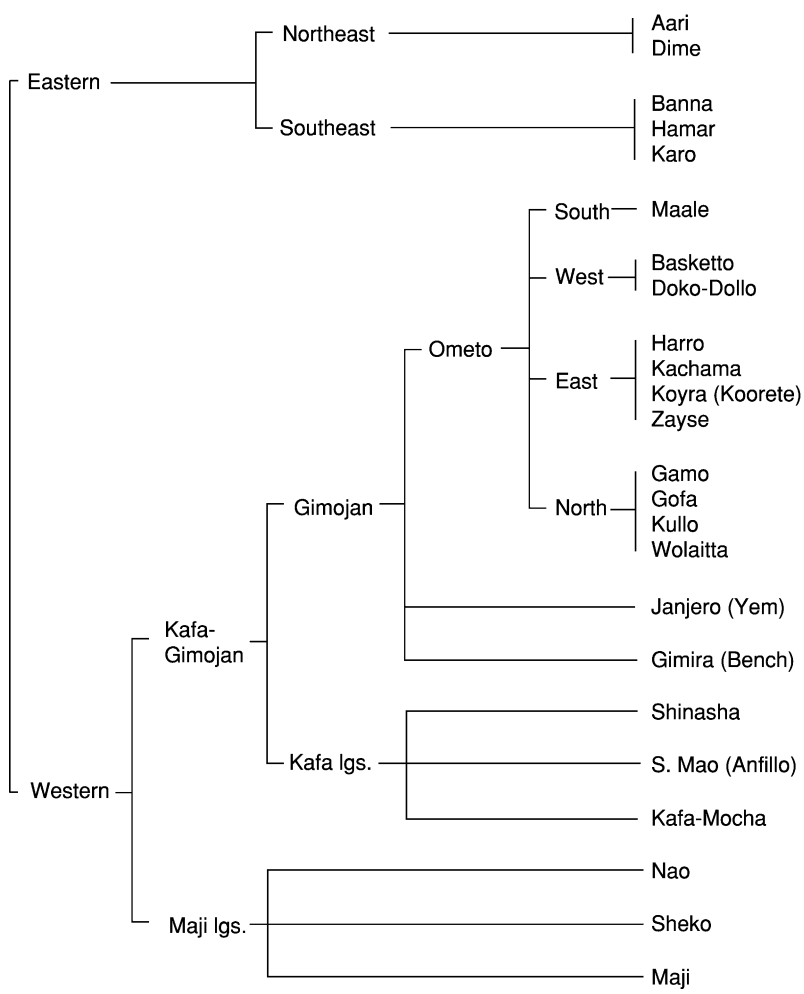

Figure 1 Omotic family tree, based on Fleming (1976).

Table 1 Consonant inventory

(p)	t	c	k	
b	d	j	g	
	t'	c'	k'	ʔ
ɓ	ɗ			
m	n			
(Φ)	s	š		h
	z	(ž)		
	l			
	r			
w		y		

Table 2 Vowel inventory

i, ii		u, uu
e, ee		o, oo
	a, aa	

Syllable Structure

CV, CVV, CVC, and CVVC syllable types are attested, as in *tá* 'I', *ʔéé* 'yes,' *mal.dó* 'sorghum,' and *keet.tá* 'house' (where the period indicates the syllable break). As the syllabification of the words *maldó* and *keettá* demonstrates, geminates and consonant clusters are split between two different syllables; also, clusters and geminates consist of only two members and they occur only word-medially. Syllable nucleus may be simple or branching.

Tone-Accent

Wolaitta is a tone-accent language. The language has two tones (high and low) used for making lexical distinction, as in *góda* 'lord, chief' versus *godá* 'wall' (where high tone is marked with ´ and low tone is not marked). With a few exceptions (e.g., *ha* 'this,' *ta* 'my'), there are no words with just low tones; instead, lexical items have at least one high tone, mainly occurring on the ultimate or penultimate vowel. There are, however, a few numerals and nouns with ante-penultimate high tone, for example, *másunta* 'wound' and *k'éretta* 'split wood,' which seem to be historically derived from complex forms.

Nouns

Basic nouns in Wolaitta end in one of the following vowels: [e], [o], or [a] (Table 3). Which of these vowels a particular word may take cannot be predicted. There are no nouns ending in [i] or [u] in Wolaitta, although such nouns are attested in related languages.

Table 3 Basic nouns

[e]-ending		*[o]-ending*		*[a]-ending*	
búhe	'dust'	káwo	'dinner'	šaáfa	'river'
molé	'fish'	šooró	'neighbor'	keettá	'house'

Table 4 Plural marking

Singular	*Nominative plural*	*Accusative plural*	*Gloss*
šaáfa	šaáfa-t-i	šaáfa-t-a	'river'
šooró	šooro-t-í	'šooro-t-á'	'neighbor'

Plural Marking

On definite nouns, plural is marked by the morpheme *-t-*; indefinite nouns are not marked for plurality. Singular is unmarked. Examples are in Table 4.

Case, Gender, and Definiteness

Case, gender, and definiteness are designated cumulatively by portmanteau morphemes. In animate nouns, gender is determined by sex. Inanimate nouns are generally inflected like masculine nouns; but, when a diminutive meaning is intended, they may be inflected as feminine nouns. Plural nouns take the same nominative and accusative case markers as masculine singular nouns. Examples are in Table 5.

The genitive case is marked by *-ee* in definite feminine nouns and by *-u* in plural nouns. In masculine nouns, the genitive and accusative cases are formally identical. The possessor noun always precedes the possessed noun. Consider the forms of *šooró* 'neighbor' and *gošší* 'farm' in (1).

(1a)	šooró	gošša	'a neighbor's farm'
(1b)	šoor-úwa	gošša	'the neighbor's (MASC) farm'
(1c)	šoor-eé	gošša	'the neighbor's (FEM) farm'
(1d)	šooro-t-ú	gošša	'the neighbors' farm'

Peripheral/semantic cases such as instrumental (*-ra*), ablative (*-ppe*), dative (*yo/-ssi*), and so on are attached to a noun already marked with the genitive (for feminine and plural nouns) or accusative (for masculine singular nouns). Compare the examples in (1) with those in Table 6.

Nominal Derivation

There are several productive derivational suffixes, for example, *-ta* in *laggé-ta* 'friendship' (*lágge* 'friend') and *-tétta* in *zoʔó-tétta* 'redness' (*zoʔó*

Table 5 Definiteness, case, and gender inflection

	Basic noun	*Definite masculine singular*		*Definite feminine singular*		*Definite plural*	
		NOM	*ACC*	*NOM*	*ACC*	*NOM*	*ACC*
/a/-	keettá 'house'	keettáy	keettáa	keettíya	keettíyo	keetta-t-í	keetta-t-a
ending	naʔá 'child'	naʔáy	naʔáa	naʔíya	naʔíyo		
/o/-	migído 'ring'	migídoy	migíduwa	migídiya	migídiyo	migído-t-i	migído-t-á
ending	šooró 'neighbor'	šooróy	šoorúwa	šooríya	šooríyo	šooro-t-í	šooro-t-á
/e/-	šóďďe 'frog'	šóďďee	šóďďiya	šóďďiya	šóďďiyo	zeére-t-i	zeére-t-á
ending	zeére 'orphan'	zeéree	zeériya	zeériya	zeériyo		

Table 6 Peripheral semantic cases

	'from a'		*'with a'*	
	Indefinite	*Definite*	*Indefinite*	*Definite*
Singular	šooró-ppe 'from a neighbor (MASC/FEM)'	šoor-úwa-ppe 'from the neighbor (MASC)'	šooró-ra 'with a neighbor (MASC/FEM)'	šoor-úwa-ra 'with the neighbor (MASC)'
		šoor-eé-ppe 'from the neighbor (FEM)'		šoor-eé-ra 'with the neighbor (FEM)'
Plural		šooro-t-ú-ppe 'from the neighbors'		šooro-t-uú-ra 'with the neighbors'

Table 7 Derivational suffixes

Noun	*Agent nominal*	*Adjective*
kiíta 'message'	kiit-ánca 'messenger'	
ʔóla'a 'fight/war'	ʔol-ánca 'fighter'	
dooná 'mouth'		doon-aáma 'talkative'
wolk'á 'power'		wolk'-aáma 'one with power'

'red'). Suffixing *-ancạ* to a noun may derive agent nouns; whereas suffixing *-aáma* to a noun derives an adjective (Table 7).

Adjectives and Adverbs

Adjectives end in one of the word-final vowels, *e*, *o*, or *a*. When used as modifiers, adjectives are not marked for gender, case, or number; they generally do not show agreement with the head noun. However, when the head noun is dropped, the adjective must be marked for these categories.

(2a) keéha 'kind'
(2b) keéha šooro-y 'the kind neighbor (NOM)'
(2c) keéha-y 'the kind one'

In the inchoative, the adjectival base is affixed with tense-aspect and mood markers, as in:

(3a) keeh-iísi 'he became kind'
(3b) keeh-aásu 'she became kind'
(3c) keeh-íbénna 'he did not become kind'

Manner adverbs are mainly derived by suffixing the locative marker *-n*, the instrumental *-ra*, or the ablative *-ppe* to nominals. For example:

(4a) ʔakeéka-ni ʔoott-á
attention-LOC do-2.SING.IMP
'work carefully!'
(4b) keeh-í-ppe harg-eési
be_kind-í-ABL be_sick-3.MASC.SING.IMPERF
'he is extremely/badly sick'
(4c) ʔiss-í-ppe y-iite
one-í-ABL come-2.PL.IMP
'come together!'

Lexical time-adverbs include *haʔʔí* 'now,' *kasé* 'earlier,' *háčči* 'today,' and *wontó* 'tomorrow.'

Pronouns

The basic pronoun paradigms of Wolaitta are possessive, nominative, and accusative. Dative, ablative, and locative pronouns are formed by adding the

Table 8 Pronouns

Person[a]	*Possessive*	*Nominative*	*Accusative*	*Dative*	*Ablative*
1 SING	ta	táání/tá	táná	taássí	taáppé
2 SING	ne	néení/né	nená	neéssí	neéppé
3 FEM SING	ʔi	ʔá	ʔó	ʔíssí	ʔíppé
3 MASC SING	ʔa	ʔí	ʔá	ʔássí	ʔáppé
1 PL	nu	núúní/nú	núná	nuússi	nuúppé
2 PL	ʔinte	ʔínté	ʔíntena	ʔíntéssí	ʔíntéppé
3 PL	ʔeta	ʔetí	ʔetá	ʔetássi	ʔetáppé
3 SING LOG	ba	—	báná	baássi	baáppe
3 PL LOG	banta	—	bántana	bántassi	bántappe

[a]LOG, logophoric form.

respective case suffixes (i.e., *-ssi*, *-ppe* and *-n*(*i*), as in the nouns) to the accusative/possessive ones (see Table 8). Note the gender syncretism between third-person singular pronouns in the forms in Table 8. The pronoun sets with *ba*(-) are used when the subject of the sentence is coreferential with an object or possessive noun in the same sentence, as shown in (5a), which contrasts with the noncoreferential form in (5b).

(5a) ʔí ba šoor-úwa
3.MASC.SING.SUBJ 3.LOG neighbor-MASC.ACC
maadd-eési
help.3.MASC.SING.IMPERF
'he$_x$ helps his$_x$ neighbor'

(5b) ʔí ʔa
3.MASC.SING.SUBJ 3.MASC.SING.POSS
šoor-úwa maadd-eési
neighbor-MASC.ACC help-3.MASC.SINGIMPERF
'he$_x$ helps his$_y$ neighbor'

In the logophoric form (LOG), the gender distinction in the third-person singular form is neutralized.

Verbs

Subject Agreement, Aspect, Negation, and Modality

In affirmative declarative sentences, a three-way temporal distinction is made, for example, *beʔ-iísi* 'he saw,' *beʔ-eési* 'he sees,' *beʔ-aná* 'he/she/I (etc.) will see.' The verb shows subject agreement; object agreement is not marked on the verb (see Tables 9 and 10).

Future tense/aspect is formed by suffixing an invariable *-ána* to a verb root:

(6) kúnd-aná 'I/you/he/she/we/you (PL)/ they will see'

In negative declarative sentences, there is only two-way distinction, between perfective negative (Table 11) and imperfective negative (Table 12); the present and future forms are reduced to one

Table 9 Perfective paradigm

Singular	*Plural*
kúnd-aási 'I fell'	kúnd-ída 'we fell'
kúnd-ádasa 'you fell'	kúnd-ídeta 'you (PL) fell'
kúnd-iísi 'he fell'	kúnd-ídosona 'they fell'
kúnd-aásu 'she fell'	

Table 10 Present tense paradigm

Singular	*Plural*
kúnd-aísi 'I fall'	kúnd-oósi 'we fall'
kúnd-aása 'you fall'	kúnd-eéta 'you (PL) fall'
kúnd-eési 'he falls'	kúnd-oósona 'they fall'
kúnd-aúsu 'she falls'	

Table 11 Perfective negative

Singular	*Plural*
beʔ-á-beíkke 'I did not see'	beʔ-í-boókko 'we did not see'
beʔ-á-baákká 'you did not see'	beʔ-í-beékkétá 'you (PL) did not see'
beʔ-í-beénná 'he did not see'	beʔ-í-boókkóná 'they did not see'
beʔ-á-beíkkú 'she did not see'	

Table 12 Imperfective negative

Singular	*Plural*
beʔ-íkke 'I do/will not see'	beʔ-ókko 'we do/will not see'
beʔ-ákka 'you do/will not see'	beʔ-ékketa 'you (PL) do/will not see'
beʔ-énna 'he does/will not see'	beʔ-ókkona 'they do/will not see'
beʔ-úkku 'she does/will not see'	

Table 13 Verbal inflection in interrogative sentences

Interrogatives			
Person	*Perfective*	*Imperfective Pres/Hab.*	*Future*
1 SING	beʔ-ádina 'did I see?'	beʔ-aína	beʔ-ané
2 SING	beʔ-ádi 'did you see?'	beʔ-áy	beʔ-uúte
3 MASC SING	beʔ-íde 'did he see?'	beʔ-í	beʔ-ané
3 FEM SING	beʔ-áde 'did she see?'	beʔ-áy	beʔ-ané
1 PL	beʔ-ído 'did we see?'	beʔ-íyo	beʔ-ané
2 PL	beʔ-ídeti 'did you (PL) see?'	beʔ-eéti	beʔ-uúteti
3 PL	beʔ-ídona 'did they see?'	'beʔ-íyona'	beʔ-ané

Table 14 Imperative

Singular	*Plural*	*Gloss*
demm-á	demm-ité	'find!'
y-á	y-iité	'come!'

paradigm: *beʔ-énna* 'he does/will not see' and *beʔ-íbénna* 'he did not see.'

Interrogatives

There are the following content question words in Wolaitta: *ʔaí* 'what,' *ʔai-gé* 'which (MASC),' *ʔai-nná* 'which (FEM),' *ʔaí-ssi* 'why,' *ʔa-udé* 'when,' *ʔá-wan* 'where,' and *ʔoóni* 'who.'

Both in content-question-word and polar-interrogative clauses, the verb inflects for subject, tense/aspect, and modality (i.e., [+question]). The actual subject-agreement- and tense/aspect-marking morphemes are distinct from that observed for declarative sentences. Examples are shown in Table 13.

Imperative and Optative Moods

Second-person singular and plural imperatives are marked by *-á* and *-(i)ité*, respectively (Table 14). The optative/hortative involves only the third-person singular and plural forms. It is marked by *-ó* for third-person singular masculine and by *-ú* for feminine. For third-person plural, it is marked by *-óna*.

(7a) demm-ó 'let him find'
(7b) demm-ú 'let her find'
(7c) demm-óna 'let them find'

The imperative and optative/hortative forms take the same negative marker, *-ópp-/úpp-*, which is formally distinct from the negation-marking morpheme in affirmative declarative sentences.

(8a) demm-ópp-a 'don't find (2.SING)!'
(8b) demm-ópp-ite 'don't find (2.PL)!'

Table 15 Verb root extensions

Verb root	*Causative stem*	*Passive/ reciprocal*	*Intensive/ repetitive*	*Gloss*
k'ant'-	k'ant'-is(s)-	k'ant'-étt-	k'ant'-erett-	'cut'
bóg-	bóg-is(s)	bóg-étt-	bog-erett-	'plunder'

(9a) demm-ópp-ó 'let him not find!'
(9b) demm-úpp-ú 'let her not find!'
(9c) demm-ópp-óná 'let them not find'

Verb root extension in Wolaitta includes causative, passive, reciprocal, reflexive, and intensive verbs (Table 15).

Clauses

Simple Declarative Clauses

The most frequently used word order is SOV. However, S may occur immediately before V when it is in contrastive focus. Also, subject and object may be omitted.

(10) ʔasa-t-í méhe-t-a
person-PL-MASC.NOM cattle-PL-MASC.ABS
baiz-ídosona
sell-3.PL.PERF
'the people sold the cattle'

In phrases, modifiers precede the head. Demonstratives generally precede numerals and adjectives when both modify the same noun. Example (11a) is an NP with adjectives and a demonstrative; (11b) is a sentence containing an NP with a relative clause.

(11a) ha heezzú guútta naa-t-í
this three small child-PL-MASC.NOM
'these three small children'

(11b) maay-úwa meec'c'-íya
cloth-MASC.ACC wash-IMPERF.REL
naʔ-iya daapur-aásu
child.FEM.NOM be_tired-3.FEM.SING.PERF
'the girl who is washing clothes is tired'

Complex Clauses

In complex sentences, adverbial and complement clauses precede main clauses. Clausal linking is indicated by various verbal affixes attached to the dependent clause. Examples (12a) and (12b) are simultaneous, examples (12c) and (12d) are anterior and examples (12e) is conditional. Simultaneous and anterior morphemes further indicate whether the subject of the dependent clause is the same as that of the main clause.

(12a) ?attúma ?asa-t-í keettaa
male person-PL-NOM house.MASC.ACC
keet't'-íšin mác'c'a ?asa-t-í
build-DS.SIMUL female person-PL-NOM
puutt-úwa súk'k'-osona
cotton-MASC.ACC spin-3.PL.IMPERF
'when the men are building the house, the women spin cotton'

(12b) ?attúma ?asa-t-í keettaa
male person-PL-NOM house.MASC.ACC
keet't'-iíddi /isso-y /iss-úwa
build-DS.SIMUL one-NOM one-ACC
k'ir-oósona
tease-3.PL.IMPERF
'the men tease each other while building the house'

(12c) ?attúma ?asa-t-í keettaa
male person-PL-NOM house.MASC.ACC
keet't'-ín mac'c'a ?asa-t-í
build-DS.CNV female person-PL-NOM
gidd-úwa meeš-oósona
interior-MASC.ACC smear_dung-3.PL.IMPERF
'the men having built the house, the women smear the interior with dung'

(12d) ?asa-t-í keettaa keet't'-ídí
person-PL-NOM house.MASC.ACC build-SS.CNV
šemp-oósona
rest-3.PL.IMPERF
'the people rest having built the house'

(12e) ?asa-t-í keettaa keet't'-íkko
male person-PL-NOM house.MASC.ACC
tá ?eta-w pars-úwa
rest-3.PL.IMPERF 3.PL.OBJ-DAT beer-MASC.ACC
?ag-ana
brew-FUT
'if the men build the house, I will brew them beer'

See also: African Linguistics: History; Afroasiatic Languages; Ethiopia as a Linguistic Area; Ethiopia: Language Situation.

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Wolaytta *See:* Wolaitta.

Wolf, Friedrich August (1759–1824)

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As the prodigious son of a church organist, the German classical philologist Friedrich August Wolf began his studies in 1777 at the University of Göttingen, at that time the leading German university in the field of classical philology.

According to a widespread but ultimately false belief, Wolf was the first in Germany to enroll as *studiosus philologiae* (student of philology) and to be accepted as that in spite of resistance from the leaders of the university. Though legendary, the story illustrates well Wolf's seminal role in creating and defining the independent discipline of classical philology as it was to be practiced in the universities of the 19th and early 20th centuries.

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Wolf is today mostly remembered for his *Prolegomena ad Homerum*, published in 1795, in which he claimed that the Homeric poems had been composed without the aid of writing, and that the texts as we have them are substantially the product of Alexandrian criticism at least half a millennium after the time of the poet. Today we can see that this thesis was less ground-breaking than was commonly held before, since similar views were held by Wolf's teacher Heyne, and the method employed owes much to Johann Gottfried Eichhorn's (1752–1827) *Einleitung in das Alte Testament*, published 1780–1783. Nevertheless, the book played an important role in posing the Homeric question, the treatment of which would later serve as a career vehicle for many a young, aspiring classical scholar.

Arguably, Wolf was even more influential through his lectures on *Alterthumswissenschaft* ('science of antiquity'), which reached a large audience and were later published by his pupils Hoffmann (1833) and Stockmann (1831). Wolf stressed the unity of the field, including history, mythology, literary criticism, rhetoric, and archaeology, but always put special emphasis on linguistics, both on the particular grammar of Greek and Latin and on general, philosophical grammar (cf. Gürtler, 1810) in the tradition of Sanctius, Port-Royal, and Condillac, but with influences from Herder's organicism. 'Philosophical grammar' was later strongly opposed by scholars of the emerging comparative Indo-European studies that would soon become hegemonic in linguistics. For all his emphasis on linguistics in philology, Wolf may have contributed to the ensuing gulf between classical philology and linguistics later deplored by Georg Curtius. His insistence on restricting classical philology to the languages of *Gebildete Völker* had the same effect: though intended to set philology free from theology and Hebrew philology, it no doubt hampered classical scholars' interest in comparative studies throughout the 19th century.

See also: Boeckh, August (1785–1867); Curtius, Georg (1820–1885).

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Walt Wolfram's route to becoming a pioneer and leading figure in variationist sociolinguistics might be considered as 'nonstandard' as many dialects he analyzed. Wolfram was born in 1941, the son of working-class German immigrants. As a youth, he knew no one who had attended college, and he is the only one in his family to do so. He probably would not have gone himself were it not for an athletic scholarship to Wheaton College, an evangelical institution in Illinois. He recalls being as involved in football and basketball as in academics, incidentally providing him with athletic skills that would later prove useful in fieldwork with teenage respondents. More important, it was during these studies – his major was anthropology and his minor Greek – that he realized he 'had a mind' and a desire to use it. The religious nature of the college is also significant for his future trajectory because his desire to be a missionary led him to linguistics. This began at the University of Chicago and continued at the Summer Institute of Linguistics and later the Hartford Seminary Foundation, where he received his M.A. and Ph.D. in 1969. His turn to a career in academics was the result of "'diverted' faith and finances." Wolfram is hardly a missionary linguist, but there is undeniably certain carryover from that initial impulse throughout his later career.

For instance, although Wolfram has been president of the Southeastern Conference on Linguistics (1998–1999), the American Dialect Society (1997–1999), and the Linguistics Society of America (2001–2002), his service is not limited to high-profile positions. He

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has made contributions that are less likely to garner academic prestige, such as the promotion of sociolinguistically informed practice in language education and speech pathology and support for public appreciation of dialect diversity. This participation involved a long association with the nonprofit Center for Applied Linguistics (CAL) in Washington, DC, from 1967 to 1992. Less formally, he has consulted for communication disorders therapists, and he developed and even taught linguistics-oriented curricula for eighth-graders (13- and 14-year-olds). In addition, he is author or coauthor of numerous booklets for professional communities and the general public (Dannenberg and Wolfram, 1999; Wolfram, n.d.). He participated in the classic 1987 American Tongues video documentary and in the North Carolina Language and Life series, which was shown on public television throughout the state. In a similar vein, he coauthored the first major introductory text dedicated to the study of American English dialects (Wolfram and Schilling-Estes, 1998), and he has appeared as a guest on numerous talk shows on television and radio.

Wolfram's research has two prongs. One involves the quintessentially American sociolinguistic phenomenon of racial dialects, a fascinating linguistic phenomenon but one inevitably bound up with the problem of continued racial and social divisions. No one in sociolinguistics has studied more of these varieties, including Native American English (Wolfram *et al.*, 2002), Asian American English (Wolfram *et al.*, 1986), and two varieties of Latino English (Wolfram, 1974; Wolfram *et al.*, 2004). His work on African American English (AAE) includes the first monograph on that dialect (Wolfram, 1969) and explorations of varieties spoken by African Americans in isolated communities. This later work finds evidence for a more complex development of early AAE than had been previously assumed, providing insights into the dispute between the Anglicist and Creolist hypotheses on AAE origins. The roles of early modern British vernaculars, emphasized by Anglicists, and creolization processes, emphasized by Creolists, may really be seen as complementary, not mutually exclusive. Specifically, what we now know as AAE is the result of the blending of a variety of different forms of early African American Englishes influenced variably by these two sources (Wolfram, 2003).

The other thrust of Wolfram's work involves Southern European American English varieties, a focus undoubtedly related to the location of his academic positions. These began in Washington, DC, with his appointment as research associate in 1967 at CAL, where he moved on to become senior researcher in 1970, research director in 1980, and finally distinguished scholar in 1992. In 1970, he also obtained a faculty position at the University of the District of Columbia, where he remained until 1992. That year, he moved to his current position as William C. Friday Distinguished Professor at North Carolina State University in Raleigh.

Wolfram's research has largely, though not exclusively, focused on North Carolina ever since. His best known work in this area involves the English spoken in Hyde County on the North Carolina coast, particularly the Ocracoke Brogue – spoken on the eponymous barrier island (Wolfram and Schilling-Estes, 1995). The salient phonological feature of this dialect involves the raising of the nuclei in the diphthongs /ay/ and /aw/, leading to the stereotype expression 'It's hoi toide on the seund soide' ([ɪts hɔɪ tɔɪd ɑn ðə sɛʊn sɔɪd]) and so the nickname of speakers as 'Hoi Toiders.' Yet, although this dialect is a much commented on part of local identity, it is also in 'ebb tide,' and much research interest lies in the social and linguistic phenomena associated with its decline (Wolfram and Schilling Estes, 1995). A noteworthy finding involves the role of social structure and social identity mediated by small groups – most famously in a group of poker players – in inhibiting or advancing linguistic change. This work anticipates the emphasis on the role of small group dynamics as the vehicle of transmission of larger linguistic ideologies and norms that have recently become prominent in the field (Eckert, 2000).

Language variation suffers from the paradox of being a topic of endless fascination to many nonlinguists and yet, at the same time, the source of much misunderstanding and even discrimination. Wolfram's work in both deepening our understanding of the social and linguistic significance of variation and in expanding the general knowledge of this topic makes him a model of the potential of what those of us who work in the variationist paradigm can do.

See also: Labov, William (b. 1927); Society and Language: Overview; Variation and Language: Overview.

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Wolof

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Introduction

Wolof is a member of the northern branch of the Atlantic family of Niger-Congo languages, formerly known as West Atlantic, and is spoken primarily in Senegal as well as in parts of Gambia and Mauritania on the West African coast. In Senegal, Wolof serves as a lingua franca, and is spoken by upwards of 80% of the population as either a first or second language, making for a total of no fewer than 6–7 million speakers and quite possibly more. Wolof society has traditionally been hierarchically stratified (Diop, 1981) and is composed of two main social groups, *ñeeño* and *géer*. The former group consists of endogamous artisans or castes, including griots (verbal artists), blacksmiths, leatherworkers, and musicians; the latter group is composed of noncasted people and nobles. Today, a majority of Wolof speakers are Sufi Muslims, most having converted to Islam en masse in the late 19th and early 20th centuries.

Genetic Affiliation

Sapir (1971) hypothesized that Wolof, along with Serer-Sine and Pulaar or Fula, belongs to the Senegal subgroup of northern Atlantic languages. Although the three languages are clearly related, Serer-Sine and Pulaar resemble each other much more closely than either of them do Wolof. Until much more historical work is done on the northern Senegal languages, the exact relationship of Wolof to these languages, as well as to other Atlantic languages, and especially to the Cangin languages spoken around the Senegalese city of Thiès, will remain unresolved.

Phonetics and Phonology

Like most Niger-Congo languages (Clements, 2000), the consonantal inventory of Wolof, given in **Table 1** in standard Wolof orthography, distinguishes four main places of articulation: labial, alveolar, palatal, and velar. Voiced and voiceless stops, voiced prenasalized stops, voiceless fricatives, and simple nasal stops occur in the four places of articulation. Voiceless prenasalized stops no longer occur word-initially, but historical records and some place-names, such as Mpal, provide evidence that they once did. The have now been replaced by simple voiceless stops. There is also a voiceless uvular stop in the language, as in the words *sàq* 'granary' and *bëqët* 'to be cowardly.' There is a tap [r] and a lateral [l] in addition to two glides, the labiovelar [w], and the palatal [j]. Consonant length is distinctive in Wolof: compare *dag* 'valet' to *dagg* 'to cut,' and *jaw* 'to cook for a long time' to

Table 1 Wolof consonant articulation

Consonant type	*Labial*	*Alveolar*	*Palatal*	*Velar*	*Uvular*
Stops	p b	t d	c j	k g	q
Fricatives	f	s	x		
Nasals	m	n	ñ	ŋ	
Prenasalized	mb	nd	nj	ng	
Liquids		l,r			
Glides	w		y		

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Wolof

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Introduction

Wolof is a member of the northern branch of the Atlantic family of Niger-Congo languages, formerly known as West Atlantic, and is spoken primarily in Senegal as well as in parts of Gambia and Mauritania on the West African coast. In Senegal, Wolof serves as a lingua franca, and is spoken by upwards of 80% of the population as either a first or second language, making for a total of no fewer than 6–7 million speakers and quite possibly more. Wolof society has traditionally been hierarchically stratified (Diop, 1981) and is composed of two main social groups, *ñeeño* and *géer.* The former group consists of endogamous artisans or castes, including griots (verbal artists), blacksmiths, leatherworkers, and musicians; the latter group is composed of noncasted people and nobles. Today, a majority of Wolof speakers are Sufi Muslims, most having converted to Islam en masse in the late 19th and early 20th centuries.

Genetic Affiliation

Sapir (1971) hypothesized that Wolof, along with Serer-Sine and Pulaar or Fula, belongs to the Senegal subgroup of northern Atlantic languages. Although the three languages are clearly related, Serer-Sine and Pulaar resemble each other much more closely than either of them do Wolof. Until much more historical work is done on the northern Senegal languages, the exact relationship of Wolof to these languages, as well as to other Atlantic languages, and especially to the Cangin languages spoken around the Senegalese city of Thiès, will remain unresolved.

Phonetics and Phonology

Like most Niger-Congo languages (Clements, 2000), the consonantal inventory of Wolof, given in Table 1 in standard Wolof orthography, distinguishes four main places of articulation: labial, alveolar, palatal, and velar. Voiced and voiceless stops, voiced prenasalized stops, voiceless fricatives, and simple nasal stops occur in the four places of articulation. Voiceless prenasalized stops no longer occur word-initially, but historical records and some place-names, such as Mpal, provide evidence that they once did. The have now been replaced by simple voiceless stops. There is also a voiceless uvular stop in the language, as in the words *sàq* 'granary' and *bëqët* 'to be cowardly.' There is a tap [r] and a lateral [l] in addition to two glides, the labiovelar [w], and the palatal [j]. Consonant length is distinctive in Wolof: compare *dag* 'valet' to *dagg* 'to cut,' and *jaw* 'to cook for a long time' to

Table 1 Wolof consonant articulation

Consonant type	*Labial*	*Alveolar*	*Palatal*	*Velar*	*Uvular*
Stops	p b	t d	c j	k g	q
Fricatives	f	s	x		
Nasals	m	n	ñ	ŋ	
Prenasalized	mb	nd	nj	ng	
Liquids		l,r			
Glides	w		y		

[+ATR]		[−ATR]	
i	u		
é	ó	e	o
ë		a	

Figure 1 The Wolof eight-vowel system; vowels have either a plus or minus value for the advanced tongue root (ATR).

jaww 'sky'; however, not all consonants have a geminate counterpart, notably the prenasalized stops, the fricatives, and the alveolar tap. Geminate forms of the latter, however, occur in ideophones, as in *jérr* 'of being hot' and *curr* 'of being red.' Notable in the northern Atlantic context is the absence of implosive stops in Wolof. Wolof has an eight-vowel system in which vowels have either a plus or minus value for the advanced tongue root (ATR) feature. The [+ATR] vowels comprise the set i, u, é, ó, and ë; the [−ATR] vowels are e, o, and a (**Figure 1**). All vowels are written in standard Wolof orthography, and the character ë represents schwa. The [+ATR] and [−ATR] vowels are phonemically distinct in Wolof stems, as evidenced by the pairs *reer* 'to dine' and *réer* 'to be lost,' and *woor* 'to fast' and *wóor* 'to be sure or trustworthy.' Nominal and verbal stems and a substantial number of derivational suffixes harmonize for the ATR feature. Regressive height harmony also exists in the language. Vowel length is distinctive in Wolof, as in the pairs *bax* 'to boil' and *baax* 'to be good' and *fit* 'to tie on' and *fiit* 'soul,' but the mid-central vowel ë does not have a long counterpart. Although most Niger-Congo languages are tonal, Wolof, like Serer-Sine and Pulaar, is not a tonal language. Intonational patterns are fairly flat according to Rialland and Robert (2001), and stress falls on the initial syllable of a word in Wolof.

Morphology and Syntax

Wolof has a noun class system comprising 10 classes, of which 8 are singular and 2 are plural, marked by a single consonant. Unusually, there is no morphological marking for class on the noun, but the classifier consonant appears on nominal determiners as in the following examples, in which the determiner follows the noun:

1. m-class: *picc mi* 'the bird,' *picc male* 'that bird.'
2. y-class: *picc yi* 'the birds,' *picc yale* 'those birds.'
3. k-class: *nit ki* 'the person,' *nit kale* 'that person.'
4. ñ-class: *nit ñi* 'the people,' *nit ñale* 'those people.'

Wolof has approximately 30 verbal extensions, inflectional and derivational affixes that encode a variety of concepts such as reciprocal, applicative, causative, locative, etc. The verb *gis* 'to see' has, among others, the following derivatives: *gis* 'to see,' *gisaat* 'to see again,' *gise, gisante* 'to see each other,' *gisandoo* 'to see together,' and *gisaale* 'to see ('while you're at it').' Verb-to-noun derivation may exhibit reduplication (*gis* 'to see,' *gis-gis* 'opinion'; *xam* 'to know,' *xam-xam* 'knowledge'), suffixation (*gudd* 'to be long,' *guddaay* 'length'), and consonant mutation (*baax* 'to be good,' *mbaax* 'goodness'; *sonn* 'to be tired,' *cono* 'fatigue'). It is arguable as to whether a distinct category of adjectives can be said to exist in Wolof, since adjectival forms can be subsumed under the category of verb (Creissels, 2000; Mc Laughlin, 2004). Although basic word order in Wolof is subject-verb-object, the information structure of Wolof is encoded in an elaborate focus system (Creissels and Robert, 1998). The minimal verb phrase consists of a bare verb plus an auxiliary that encodes person, number, and focus. Examples (1)–(4) show four different ways to say 'Ami saw the thief,' using neutral, subject, object, and verbal focus, respectively:

(1) Ami gis na sàcc ba.
Ami see 3S:PERF thief DET

(2) Ami moo gis sàcc ba.
Ami 3S:SFOC see thief DET

(3) Sàcc ba la Ami gis.
Thief DET 3S:OFOC Ami see

(4) Ami dafa gis sàcc ba.
Ami 3S:VFOC see thief DET

Urban Wolof

Urban Wolof, and especially that of the capital, Dakar, exhibits heavy lexical borrowing from French, as in Examples (5) and (6) (Mc Laughlin, 2001) (French loans are in boldface):

(5) **Feu** bi **rouge** na.
light DET be red 3S:PERF
'The traffic light turned red.'

(6) Dafa d-oon **errer** ci
3S:VFOC IMPERF-PAST wander PREP
monde bi rekk.
world DET just
'He was just wandering around the world.'

See also: Gambia: Language Situation; Mauritania: Language Situation; Niger-Congo Languages; Senegal: Language Situation.

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Word

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Introduction

There is a certain paradox connected with the concept 'word.' On the one hand, we often talk about 'words' in a way that presupposes that we know what a word is. For example, in the instructions to the authors contributing to this encyclopedia, it is stated that each article should have a maximal length of 10 000 words. Moreover, we do not have to be linguists to talk about words; in many languages a word that corresponds to the English *word* is part of the everyday vocabulary (but not in all – see Dixon and Aikhenvald, 2002). Nevertheless, defining the concept 'word' in precise linguistic terms is notoriously difficult. Not only is there the problem that there are several definitions that do not all converge on the same set of linguistic objects, but, in addition, some of the definitions are so vague or circular that they are of little use when it comes to picking out the words in a given sequence of speech.

Within the field of linguistics, the lack of precision of the term 'word' is to some degree acknowledged, and, consequently, more specific terms are often employed to convey its various meanings. Some of these specific terms have a clear definition, whereas others are still not precise enough to be of any help in delimiting a coherent class of elements.

Phonological Words

One clearly distinguishable meaning of the term 'word' is 'phonological word.' However, examples of phonological words that do not correspond to what we would intuitively take to be a word can be found in many (perhaps all) languages. The Turkish example in (1) and the Finnish example in (2) illustrate this.

(1) çáy evì
tea house
'tea house'

(2) pää-kaupunki
head-city
'capital'

Judging by the patterns of primary stress placement and of vowel harmony, which have the phonological word as their domain in the languages at hand, the strings given in (1) and (2) must consist of two phonological words. From a nonphonological point of view, we nevertheless take them to be compounds and, hence, single words.

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Conversely, it is not unusual for an element with wordlike behavior in the syntax, that is, with independent syntactic distribution, to be a part of a

phonological word. For example, the English sentence *I'll come* consists of two phonological words, *I'll* and *come*, but we presumably do not want to say that *I'll* is just one word outside of the phonology. Instead, we say that '*ll* is a short form of *will*, which clearly has its own representation in the syntax. But so has the pronoun *I*. Hence, *I'll* is a phonological word consisting of two syntactic elements.

More examples with the same characteristics are presented in Selkirk and Shen (1990). Selkirk and Shen claimed that in Shanghai Chinese (Wu Chinese), functional elements form a phonological word with a preceding lexical element. (In this context, 'lexical element' means 'a member of one of the major categories N, A, and V.') The basis of this claim is the observation that sequences made up of a lexical item and one or more following function words are treated as one phonological word with respect to tone. This is exemplified in (3), in which the extension of each phonological word is indicated by brackets.

(3a) ['mo ku 'noN 'va]
scold ASP 2.SING Q
'has someone scolded you?'

(3b) [tsou taw] ([noetsiN]
walk to Nanjing
'walk to Nanjing'

(3c) [taN 'ngu] ['njitsz]
hit 1.SING son
'hit my son'

We see that the phonological words here do not necessarily correspond to syntactic constituents. For example, in (3c) the possessor '*ngu* 'my' belongs syntactically with the noun '*njitsz* 'son,' whereas phonologically it goes with the verb.

In sum, Selkirk and Shen's treatment of phonological words in Shanghai Chinese shows that, in this language, items with an independent syntactic realization are routinely combined into phonological words. This is arguably a very common phenomenon crosslinguistically; in any language that has small but wordlike functional elements, these elements will not constitute separate phonological words in normal continuous speech. Hence, if a string of linguistic elements can be identified as a phonological word, it cannot be concluded from this fact that the same string is also a word in any nonphonological sense.

Lexemes and Lexical Words

Another meaning of the term 'word' is 'lexeme'; that is, the word seen as an entry in the speaker's mental lexicon. However, in the case of words that take inflection, each lexical entry subsumes at least some inflected forms. For example, in English the lexical entry for CHILD must contain or point to the plural form *children* as well as the singular form *child*. Hence, the lexeme is not identical to the word as it occurs in actual language use. Moreover, it is a matter of controversy whether or not the lexical entry must include *all* relevant inflected forms. To illustrate, there is good reason to assume that the North Sami (North Saami) word forms *beana* 'dog (NOM)'and *beatnaga* 'dog (ACC)' are both listed as belonging to the lexeme BEANA 'dog,' but it is less clear whether *beatnagiiddisetguin* 'with their (own) dogs' is listed or produced online as we speak or write. But regardless of whether or not it is listed, the string is recognized as a word in a certain sense.

The relation between words and lexical entries is further complicated by the fact that the property of being listed may be ascribed to affixes, to words, to phrases, and even to sentences, so that some listed items are arguably smaller than what we normally take to be words, whereas others are considerably bigger. In (4) some examples are given of multiword collocations that are part of the mental lexicon of many speakers of English and that therefore can be referred to as lexical words.

(4a) do-it-yourself
(4b) black and white film
(4c) take *x* to the cleaners
(4d) how do you do?

The set of lexical words thus crosscuts the sets of grammatical units, from affixes to sentences. (For a more detailed discussion of the contents of the lexicon, see, for example, Di Sciullo and Williams, 1987; Jackendoff, 1997). Lexical words can also be distinguished from lexemes because nonce words are lexemes but arguably are not listed. Consequently, the notions 'lexeme' and 'lexical word' can both be left aside as special meanings of the term 'word.'

Grammatical Words

We have now identified three very different meanings of the term 'word': the phonological word, the lexeme, and the lexical word. These meanings have clear definitions, and in most cases it is relatively easy to determine which linguistic objects they apply to. Still, there is a very strong intuition among linguists and many nonlinguists alike that 'word' has yet another meaning that is not captured by any of the terms mentioned. This meaning has to do with the word as an entity that is located between morphemes and phrases in the structural hierarchy – that is, with what we may refer to as the 'grammatical word.' Moreover, it is often felt that this is the core meaning of the term 'word,' because it has to do with

the role that the word plays in the morphology and in the syntax.

Using the term 'grammatical word' to denote the nonphonological and nonlexical meaning of 'word' is not strictly correct because phonology is, of course, also a part of grammar. The expression 'grammatical word' is nevertheless commonly used in this sense in the linguistic literature and, for lack of a better term, this practice is followed here.

The grammatical word, then, appears to be what those without linguistic training associate with the term 'word.' As pointed out by Sapir (1921) and by numerous researchers after him, the grammatical word is psychologically real in many languages. The exception appears to be certain languages with grammatical markers that are preposed to their associated roots, where the markers in question can be seen as prefixes or as unbound particles (see, e.g., Julien, 2002). Apart from these cases, not only is the existence of words firmly established in speakers' minds, it is also usually clear which morpheme sequences are words and which are not. That is, in numerous languages the grammatical words are readily identified by ordinary speakers as well as by linguists.

On Criteria for Wordhood

Although many speakers have an intuitive idea of what constitutes a grammatical word in their language, it is not so easy to come up with a universal definition of the concept. Most attempts at doing so list a collocation of properties that are claimed to be typical of words, but, at the same time, these definitions tend to beg the question of what a word really is. For example, the grammatical word is often taken to be the unit that morphological operations, such as inflection, apply to and the linguistic entity that phrases and clauses are built from in the syntax. But, unfortunately, defining words as the domain of morphology is necessarily circular because 'morphological material' must mean whatever appears inside words, and the claim that words are the minimal building blocks of syntax is taken as an axiom in some theories, although it has been challenged by others. Thus, criteria such as these do not tell us what it is that leads us, linguists and nonlinguists, to identify certain strings as words in the first place.

This problem is brought into full light if we try to use the criteria just mentioned to determine the status of elements that may or may not be separate words. Consider the Mandarin Chinese examples shown in (5) (from Zheng, 1994) and (6) (from Norman, 1988).

(5) wo du le zhe ben shu
I read PERF this CLF book
'I have read this book'

(6) wo kan-le neibenr shu
I read-PERF that book
'I read that book'

In Mandarin Chinese, the perfective aspect marker *le* appears in postverbal position. In some works on Chinese, it is written as a separate word, as in (5). In other works, it is written as a suffix on the verb, as in (6). This suggests that the authors have different views on the word status of the aspect marker. If we now wanted to settle the question of whether the aspect marker belongs to the verbal word or not, how should we proceed?

It appears that the criteria for wordhood previously given are of little help in this matter because they only apply after the decision has been made. If the combination of verb and aspect marker is seen as one word, the idea that the word is the domain of morphology leads to the conclusion that the positioning of the aspect marker relative to the verb is determined by morphological principles. If, on the other hand, the aspect marker is seen as an independent grammatical word, its position must be determined by the syntax. Similarly, if verb plus aspect marker is one word, the claim that words are syntactic primitives forces us to see this word as an indivisible syntactic element. If the aspect marker is seen instead as a separate word, it must be allowed to have its own syntactic representation. Hence, regardless of whether it is true that morphological phenomena have relevance only inside the word and that words enter the syntax as indivisible wholes, this does not tell us whether or not the perfective marker in Mandarin Chinese is a part of the verbal word.

Trivial as this may seem, this illustrates the point that we need criteria for wordhood that are independent of our theory of how morphology and syntax work and interact and independent of our ideas of how words ought to behave. Instead of listing the properties that are ascribed to words by this or that theory, we ought to look for criteria that can serve as a reliable guide to the identification of words in any given string of speech.

Distributional Criteria

When speakers of a given language are able to recognize certain morpheme sequences as words in the grammatical sense, this ability indicates that they have access to a set of criteria that pick out the relevant morpheme sequences. The criteria most likely have to do with the distribution of these sequences. That is, wordhood is primarily determined by the criteria that were formulated by the structuralist linguists of the early 20th century.

One such criterion was given by Bloomfield (1933), who stated that a word is a free form that does not consist entirely of (two or more) lesser free forms; that is, a word is a 'minimal free form,' the smallest unit that may appear in isolation.

More precisely, an expression that can stand alone as an utterance is normally no smaller than a word – only in metalinguistic discourse can elements that are parts of words appear as utterances. However, many languages have elements that cannot appear in isolation but that are nevertheless seen as words. These elements have a purely grammatical content, and they are often small phonologically. Bloomfield himself noted the problem they pose for the minimal-free-form criterion. An example is the English article *the*, which is felt to be a word even though it is rarely spoken in isolation. Bloomfield pointed out that *the* has the same distribution as the elements *this* and *that*, which are fully acceptable as utterances. The examples in (7) serve as an illustration.

(7a) this linguist ~ this famous linguist
(7b) that linguist ~ that famous linguist
(7c) the linguist ~ the famous linguist

Because of the parallelism between *the,* on the one hand, and *this* and *that,* on the other, Bloomfield concludes that *the* should also be classified as a word. More generally, it appears that an element is a word if it can be replaced by something that is a word. We refer to this criterion as the substitution criterion.

Another criterion bearing on the present problem is found in Boas (1911/1969), where it is suggested that (relative) freedom of position, or independent distribution, is a necessary part of the definition of the word. Boas was thus willing to grant the status of word even to elements that cannot appear in isolation, given that their position relative to other elements of the clause is not entirely fixed.

If we apply the independent distribution criterion to *the*, we see from (7c) that *the* can appear immediately in front of the noun. But if an adjective is present, it will intervene between *the* and the noun. It is thus clear that the article *the* is not affixed to the noun any more than the demonstratives *this* and *that* are. Moreover, because *the* is normally the initial element of the nominal phrase that it belongs to, it will be preceded by whatever precedes the nominal phrase as a whole. Hence, the article *the* is not in a fixed position relative to any other element in the clause, and, consequently, it is regarded as a word.

We can now go back to the Mandarin Chinese aspect marker presented in (5) and (6) and look at it in the light of the criteria we have just discussed. It can be shown that this marker is always strictly adjacent to the verb and that it can never appear in isolation, although the verb can – for example, in answers to questions, as in (8b). The aspect marker must minimally be accompanied by a verb to make an utterance, as in (9b) (from Li and Thompson, 1981).

(8a) ni lai ma
2.SING come Q
'are you coming?'
(8b) lai
come
'yes'

(9a) júzi huài le ma
orange spoiled PFV Q
'are the oranges spoiled?'
(9b) huài le
spoiled PERF
'yes'

The complex consisting of a verb and an aspect marker has relatively free position within the clause. It can, for example precede the subject, as (10a), or follow both the subject and an adverbial, as in (10b) (both examples from Li and Thompson, 1981).

(10a) jin-lai-le yi-ge ren
enter-come-PERF one-CLF person
'a person came in'
(10b) wo zai nali zhu-le liang-ge yue
I at there live-PERF two-CLF month
'I lived there for 2 months'

Hence, on the minimal-free-form criterion and on the independent distribution criterion the Chinese perfective marker is not a word. Instead, it forms a word with the verb that it is adjacent to. As for the substitution criterion, it is of limited relevance here because an aspect marker can only be replaced by another aspect marker.

The preceding paragraphs were aimed at drawing the demarcation line between bound forms and words. To complete the discussion of wordhood, it is also necessary to look at the difference between words and phrases. Again, we turn to Bloomfield (1933), who observed that, in addition to the ability to occur in isolation and/or be substituted for elements that have this ability (and in addition to independent distribution, which he does not mention), there is another criterion for wordhood, namely indivisibility or internal cohesion, which distinguishes phrases from compounds and phrasal words. More precisely, even if both words and phrases can be built from words, with phrases it is normally the case that they can be broken up by additional words and phrases, whereas words that consist of words cannot be interrupted in this way. This is shown by the contrast between the phrase in (11) and the

compound in (12) and between the phrase in (13) and the phrasal word in (14).

(11a) a black bird
(11b) a black and beautiful bird

(12a) a blackbird
(12b) *a black-and-beautiful-bird

(13a) a jack in the box
(13b) a jack in the little box

(14a) a jack-in-the-box
(14b) *a jack-in-the-little-box

Compounds and phrasal words are thus examples of words that are not minimal free forms. The reasons for counting them as words is that they share with words the internal cohesion previously demonstrated and they also show the syntactic behavior of noncompound words. To borrow another example from Bloomfield, as a phrase *devil-may-care* would be a combination of a subject and two verbs, but as a word it is an adjective with the syntactic distribution of ordinary adjectives, as illustrated in (15).

(15) a devil-may-care taxi driver

These considerations have relevance for a case discussed by Boas (1911/1969). In Pawnee, a nominal free form, such as the one shown in (16a), can combine with a string that is normally taken to be a verb, for example, the string shown in (16b), in such a way that the nominal intervenes between the elements that make up the verb, as in (16c).

(16a) rīks
'arrow'
(16b) tā-t-u-kut
INDIC-1.SING-BEN-cut
'I have cut it for you'
(16c) tā-t-u-rīks-kut
INDIC-1.SING-BEN-arrow-cut
'I have cut your arrow'

This is an example of noun incorporation, the process that has caused so much debate over the years. What we have in (16c) is a combination of two potentially free forms, in which, moreover, one of them interrupts the other. On a strict interpretation of the criteria of minimality and internal cohesion, (16c) must therefore be a phrase. However, Boas noted that, regardless of its internal structure, this string behaves like an ordinary verb of the language. It is inflected like a verb and it has the distribution of a verb. He was therefore inclined to consider it a verb, which seems like a reasonable conclusion.

Let us now summarize what we have found to be the characteristics of the grammatical word. First, two properties that distinguish grammatical words from smaller elements are the ability to occur in isolation and the independent distribution within the phrase or the clause. If a string of one or more morphemes has either of these properties, it is minimally a grammatical word. Further, a grammatical word cannot be freely interrupted by other free forms. A string that can be interrupted by words or phrases is a phrase, unless there are very specific restrictions on the inserted material and the resulting complex behaves as a word on other relevant tests. Of these criteria, the necessary and crucial ones appear to be independent distribution and internal cohesion because forms that meet these two criteria tend to be regarded as words whether or not they are minimal free forms.

Borderline Cases: Clitics

There exists, however, a class of elements that are not so easily classified as words or as nonwords. These elements are clitics. An example of a clitic is the Greenlandic (Greenlandic Inuktitut) coordinator *-lu*, which is shown in (17) (from Fortescue, 1984).

(17a) ippasaq tikip-put aqagu-lu
yesterday arrive-INDIC.3.PL tomorrow-and
ikinnguta-at tiki-ssa-pput
friends-3.PL arrive-FU-INDIC.3PL
'they arrived yesterday and their friends will arrive tomorrow'
(17b) isir-puq ingil-lu-ni-lu
come.in-INDIC.3.SING sit.down-CTMP-4.SING-and
'she came in and sat down'
(17c) pilirtuttumik irrui-vuq ini-mi-nul-lu
quickly wash.up-INDIC.3.SING room-REFL-ALL-and
majuar-lu-ni.
go.up-CTMP-4.SING
'he washed up quickly and went up to his room'

According to the minimal-free-form criterion, *-lu* is clearly not a word. As for the independent distribution criterion, we see that *-lu* attaches to an adverb in (17a), to a verb in (17b), and to a noun in (17c). Its position is thus free in the sense that it is not defined relatively to any other element of the clause, such as subject or verb. But it is fixed in the sense that *-lu* always follows the first constituent of the second conjunct, whatever constituent this may be. In other words, *-lu* is a second-position clitic, which is a well-known type of special clitic (see, e.g., Klavans, 1985; Zwicky, 1985; Anderson, 1992).

In itself, the property of being a second-position clitic is not an indication of whether or not the element in question is a word. Notably, such idiosyncratic distribution is also found with elements that are wordlike phonologically and that are presumably regarded as words (see Anderson, 1992).

If we, instead, try applying the substitution test to *-lu*, it does not really lead to any clarification. It appears that *-lu* can only be replaced by other clitics with a similar coordinating function, as in the following examples (from Fortescue, 1984).

(18a) illu-at kusanar-puq kial-lu-ni-lu.
house-3.PL be.pretty-INDIC. 3.SING be.warm-CTMP-4.SING-and
'their house is pretty and (it is) warm'

(18b) qimmiq taanna nakuarsu-vuq saamasuu-llu-ni-li
dog that be.strong-INDIC.3SING be.gentle-CTMP-4.SING-but
'that dog is strong but (it is) gentle'

(19a) palasi niuirtur-lu
priest shopkeeper-and
'the priest and the shopkeeper'

(19b) palasi niuirtur-luunniit
priest shopkeeper-or
'the priest or the shopkeeper'

Hence, the question of whether clitics are words or not does not have a definite answer. It is not even clear that the question is relevant. Clitics are like words in some senses but are different in other senses. It seems that we must conclude, with Boas (1911/1969: 32), that "it seems entirely arbitrary whether these phonetic groups [the clitics] are considered as separate words." The important fact about clitics is that they are treated as independent elements by syntax and at the same time they are prosodically deficient. Whether we want to count such elements as (grammatical) words or not is ultimately a matter of taste.

The Referential Opacity of Words

In addition to the properties already mentioned, words are often claimed to have the semantic property of being referentially opaque (see, e.g., Di Sciullo and Williams, 1987; Spencer, 1991). To take Spencer's example, the element *tea* in *teapot* cannot subsequently be referred to by a pronoun, as shown in (20).

(20) *he took the tea$_i$pot and poured it$_i$ into the cup

It appears, however, that the opacity illustrated here is typical of languages with limited word-building resources and does not hold universally. In a highly synthetic language such as Greenlandic, for example, it is perfectly natural for the reference of an incorporated noun, as 'airplane' in (21a), to be picked up by agreement suffixes (or by empty pronominals) in a following clause, as in (21b) (examples from Sadock, 1980).

(21a) Suulut timmisartu-lior-poq
Søren.ABS airplane-make-INDIC.3.SING
'Søren made an airplane'

(21b) sulu-usa-qar-poq aquute-qar-llu-ni-lu.
wing-like-have-INDIC.3.SING rudder-have-CTMP-4.SING-and
'it has wings and a rudder'

In short, this sequence of sentences shows that in Greenlandic "an incorporated object establishes a discourse referent just as well as an independent indefinite NP" (Sadock, 1980: 311).

The referential opacity of English words is discussed by Sproat (1985, 1988), who argued that the reason we cannot generally refer anaphorically to an element that is contained within a word is that only maximal projections can have a reference. In English, coreference between an anaphor and an element inside a word is disfavored because elements inside words are not maximal projections. However, Sproat also noted that it is possible to violate the requirement that both members of an anaphoric relation must be maximal projections, so that patterns such as (22a) are marginally acceptable.

(22a) McCarthy$_i$ites are now puzzled by him$_i$
(22b) *he$_i$ distrusts McCarthy$_i$ites

The anaphoric islandhood of English words is thus not absolute. Further, (22a) can be compared to the completely ungrammatical (22b), in which the indicated coreference violates the Condition C of the Binding Theory. It appears that when parts of words are allowed to refer, they are subject to the same conditions that restrict coreference between ordinary syntactic elements – in other words, word-internal elements are in this respect treated by the syntax in the same way as full word categories.

The contrast between compounds in languages such as English, on the one hand, and complex words in languages with regular noun incorporation, on the other, was commented on by Baker (1988), who noted that, whereas in English N-V combinations surface as deverbal nominals (*truck-driver, man-watching*), in languages traditionally termed polysynthetic similar combinations regularly appear as main verbs, with a normal predicative function. The fact that elements inside those verbs can be fully referential was explained by Baker as a consequence of the syntactic nature of the word formation in question. That is, in a construction such as (21a) it is possible for the verbal word to have both a referential and a predicative function just because these functions are fulfilled by separate elements inside the word – elements that are separate syntactic heads at an earlier stage of the derivation.

It should be obvious from these considerations that referential opacity is not a reliable criterion for wordhood. It can be retained as such by denying constituents with internal referring elements the status of grammatical words, as Di Sciullo and Williams (1987: 107) in effect did when they maintained that, if an alleged word is composed of syntactically accessible parts, it is not a syntactic atom or a morphological object (which in their theory are the essential properties of syntactic and morphological words, respectively) but merely a phonological word. But, again, the argumentation is circular, saying that because a grammatical word contains no syntactically accessible parts, elements that do are not grammatical words. This is an example of what Sproat (1988) pointed out: once a hypothesis of lexical integrity is stipulated, it follows trivially that reference into a word is ruled out.

Final Remarks

To the extent that grammatical words can be unambiguously identified at all, the distributional criteria mentioned here will arguably suffice to identify the grammatical words in any string of speech. But, more important, from these criteria we cannot infer anything about the mechanisms of grammar that have formed the words. In particular, the view of grammatical words outlined here does not provide an answer to the question of whether words are formed in the lexicon (i.e., in a presyntactic component of grammar), whether words are formed in the syntax, or whether word-forming processes operate in both the lexicon and the syntax.

If grammatical words are characterized by their distributional properties, it is even possible that grammar involves no specifically word-forming processes at all. This is argued by Julien (2002), who stated that words are not so much formed as perceived. That is, whenever a sequence of morphemes shows independent distribution and internal cohesion, it will be seen as a word regardless of how the sequence came to have these properties. One possibility is that the sequence is one syntactic head; another possibility is that other constituents can move relative to the sequence in question. Hence, there need not be one particular syntactic configuration that corresponds to a grammatical word.

We might object to this that because we are often so confident about the word status of any given morpheme sequence, being a word must mean having some deep property that is the cause of the observable distributional properties. However, the psychological reality of words and the lack of awareness of word-internal morphemes on the part of linguistically naïve speakers need not be taken to mean that the elements that are commonly termed words form a homogeneous class in any theoretically interesting way. The psychological reality of words could be a consequence of their distributional properties; because words are the minimal morpheme strings that can be used as utterances and are also the minimal morpheme strings that may be permuted more or less freely, words are the minimal linguistic units that speakers consciously can manipulate. It is, then, no surprise that words are something that speakers are generally aware of. Word-internal morphemes, on the other hand, cannot be consciously manipulated the way words can, and, because of this, word-internal morphemes are less salient than words in the awareness of speakers.

See also: Clitics; Incorporation; Morphology: Overview; Syntax of Words; Word Classes/Parts of Speech: Overview; Word Formation; Word Grammar.

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Word and Image

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Since the 1970s, the analysis of written text has played an increasingly important role in applied linguistics, for instance in areas such as education, the analysis of media texts, and, more recently, Internet communication and critical discourse analysis. Gradually it has become evident that it was no longer viable to focus only on the verbal aspects of such texts, not only because they use images as an integral part of the text but also because visual composition (layout), color, and typography play an increasingly important role in structuring them, through the use of space, typography (including special typographic signs such as bullet points), and color coding. As a result, linguistic or linguistically inspired methods for integrating the analysis of the linguistic and nonlinguistic aspects of written text have begun to emerge.

Paris School Structuralism

The first linguistically inspired approach to the analysis of images and image–text relations was that of 1960s Paris School structuralist semiotics.

Using media texts such as advertisements and news photographs as his data, Roland Barthes' (1977) work in this area focused on the concepts of 'denotation' and 'connotation.' In defining these concepts, he drew on the work of Hjelmslev, who had argued that different ways of expressing the same concept can have different meanings, if only because the same concept can be expressed in different languages, and speakers therefore never simply communicate a concept but communicate their country of origin as well. Extending Hjelmslev's approach to the analysis of images, Barthes proposed to analyze images in terms of two layers of meaning, denotation, the layer of 'what, or who, is represented here' and connotation, the layer of 'what ideas and values are expressed through what is represented, and through the way in which it is represented.' In other words, much as in John Stuart Mill's original use of the two terms, denotation was interpreted as reference to concrete people, places, and things, and connotation as reference to abstract concepts. Although this is often misunderstood, for Barthes, connotations were not subjective associations but "culturally accepted inducers of ideas" (1977: 23). In a key example (1973: 116), originally from 1959, he described an image on the cover of *Paris-Match* that showed a young black soldier saluting the French flag. The denotation is what is shown: 'a black soldier salutes the French flag.' The connotation is a more abstract concept, conveying a late colonialist ideology, "a purposeful mixture of Frenchness and militariness," as Barthes described it (1973: 116).

In a later essay, Barthes specified key signifiers of connotation: objects (e.g., the flag in the above example) and poses (e.g., the salute). There is, he wrote, an unwritten 'dictionary' of poses that "form ready-made elements of signification" (1977: 22). He added that connotation can also come about through the style of artwork or through techniques of photography such as "framing, distance, lighting, focus, speed": "An inventory needs to be made of these techniques, but only insofar as each of them has a corresponding signified of connotation sufficiently constant to allow its incorporation in a cultural lexicon of technical 'effects'" (1977: 23).

Barthes' approach to image–text relations focused on the concepts of 'anchorage' and 'relay.' In the case of 'anchorage,' words 'elucidate' pictures, selecting specific aspects from the meaning potential of the image: "[T]he text directs the reader through the signifieds of the image, causing him to avoid some and receive others" and "remote-controls him towards a meaning chosen in advance" (1977: 39). In other

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words, anchorage is a conjunctive relation of specification between word and image in which words specify the meaning of images that, in themselves, are 'polysemous,' open to a range of possible interpretations. In the case of 'relay,' "text and image stand in a complementary relationship." They are both "fragments of a more general syntagm" (1977: 41). As an example, he cites comic strips, in which pictures show the speaker(s) and the context, and words their speech. The two concepts are thus close to what Halliday (1994) calls 'elaboration' and 'extension,' except that 'elaboration' includes not just 'specification' but also a range of elaborative relations, including rephrasing, summarizing, exemplifying, and so on.

Barthes's concepts have been widely adopted in media studies. A well-known example of their application to political discourse is Stuart Hall's (1973) article 'The determination of news photographs,' which shows how captions can interpret relatively ambiguous shots of politicians according to newspapers' editorial policies.

Christian Metz, in his work of the 1960s, applied linguistic concepts to the study of film. Having initially attempted to find the filmic equivalents of phonological and syntactic form classes, he concluded that film shots are not "doubly articulated" and that the structure of film shots cannot be compared to the structure of sentences. Film shots simply reproduce what was in front of the camera, relaying the meanings of action, dress, and so on. Larger textual structures, however, can be studied in a linguistic spirit. In his most widely quoted paper of the period (1974) he outlined a 'syntagmatics' of film that was, in effect, a systematic overview of the conjunctive relations that can exist between the shots and scenes of a film, and that built on constructivist theories of editing by 1920s filmmakers and theorists such as Pudovkin, Eisenstein, and Timoshenko (cf. van Leeuwen, 1991). These conjunctive relations are for the most part temporal, although temporality in film involves more than simple sequentiality and includes simultaneity ('parallel editing'), flashbacks, and flash forwards. In addition, there are 'descriptive' syntagms, where a place is 'described,' not by showing it in a single shot, but through a scene showing a series of 'detail' shots, and comparative syntagms, in which shots with similar or contrasting content are edited together. This is a form of editing introduced by constructivist filmmakers to make specific political points, for example, by intercutting a scene showing workers with the slaughtering of a bull to depict the destruction of the spirit of the working class by capitalism. Metz's syntagmatics has been picked up again in linguistically inspired approaches to film (van Leeuwen, 1991; Iedema, 2001).

In the same period, Jacques Durand (1983) wrote an influential article presenting a structural classification of the rhetorical figures that had been described in the classical literature on rhetoric, and demonstrating that they can all be applied, not just to words, but also to images. His examples were taken from advertisements. Thus, a visual oxymoron might show a basket of strawberries in the snow, a visual chiasmus a picture of a father and a son wearing each other's clothes and carrying each other's newspapers, a visual metonymy a block of ice instead of a refrigerator (in an advertisement for refrigerators), and so on.

I have discussed only three examples here, but during the 1960s and early 1970s many other similar studies were published, mostly in the French journal *Communications*.

Although I will restrict myself here to approaches based on linguistics, the study of word and image has also played a vital role in iconography, a branch of art history occupying itself with representation and meaning in works of art. Although iconographers do not develop descriptions of 'visual languages' and focus on the work of individual artists, or on specific themes or schools, their work offers important clues for the study of word and image, especially where it concerns artworks based on mythological and Biblical texts (Schapiro, 1973 is an example; Van Leeuwen, 2001 discusses iconography in more detail).

Functional Linguistics

A more recent linguistically inspired approach to the study of word and image is strongly influenced by the functional linguistics of Michael Halliday (1978, 1994).

Kress and van Leeuwen (1996) base their approach on Halliday's three metafunctions (1978): the ideational function of constructing representations of the world; the interpersonal function of creating relations between the participants in acts of communication; and the textual function of marshalling individual representations-cum-interactions into coherent texts that can be recognized as types. They also follow Halliday in linking specific systems of visual grammar to specific metafunctions. While Barthes' approach had been 'lexical,' based on the denotative and connotative meanings of the individual people, places, objects, and poses depicted in images, Kress and van Leeuwen's approach is 'grammatical,' focusing on the way visual composition creates meaningful relations between the people, places, and things in images, not only on the broader textual level, but also within individual images or 'shots.'

According to Kress and van Leeuwen, the ideational function is visually realized by a grammar of

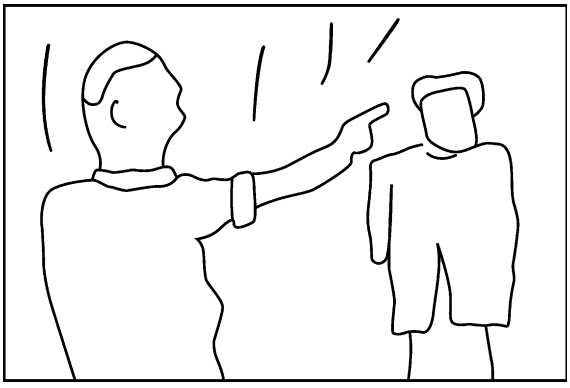

Figure 1 Execution (after Eddie Adams's photograph of 1968).

transitivity, which comprises two types of syntagm, the narrative and the conceptual. In narrative syntagms, the 'participants' are realized by 'volumes' and the 'processes' by 'vectors.' The formal terms ('volume' and 'vector') are derived from the art theorist Arnheim (1974), the functional terms ('participant' and 'process') from Halliday. In other words, word and image can realize the same semantic functions, but in different ways – in language, participants are typically realized by nominal groups, and processes by verbal groups.

To take an example, Eddie Adams's famous photograph of a summary execution on the streets of Saigon (Figure 1) contains two participants, Nguyen Ngoc Loan, the South Vietnamese officer who points the gun, and the Vietcong suspect who is about to die. The two participants are the main volumes, clearly demarcated against a somewhat out-of-focus background, and Loan's arm, holding the gun, forms a vector connecting the two. In this syntagm the two participants have different functional roles. The participant from whom the vector emanates (here Loan) is the Actor; the participant at whom the vector is directed (the Vietcong suspect) is the Goal (the terms are again taken from Halliday). As there are two participants, the syntagm is transitive. An intransitive action syntagm would contain only the Actor and the vector.

The same relationship can also be realized in diagrams. The participants are then boxes with words in them, or diagrammatic pictures, while the vector is realized by an arrow. Eye lines, which connect participants through the direction of the look of one of the participants, form a different kind of vector, and hence realize a different kind of process, a 'reaction' rather than an action. Reactions, too, can either be transitive or intransitive.

Conceptual syntagms realize a process, not through vectors, but through some kind of spatial configuration. Classification syntagms, for instance, realize a 'kind of' relation between participants by means of a composition in which the participants are symmetrically arranged on the picture space, are of equal size (even when in reality they are not), and have the same distance between them and the same horizontal and vertical orientation. This suggests that they all belong to the same category. In such syntagms, the relation between the participants is represented as a stable and quasipermanent relation, rather than in terms of an action or event.

Images can also realize interpersonal meaning through (1) size of frame, which can bring depicted elements closer to the viewer or keep them at a distance; (2) angles, which can confront viewers directly with depicted participants or represent the relation as more oblique, and which can place viewers either above or below depicted participants; and (3) through the gaze of depicted participants, which can address viewers directly and so realize a symbolic 'demand' (for sympathy, respect, sexual interest, etc, depending on the accompanying facial expressions and/or gestures) or address the viewer indirectly and so create a barrier between the represented world and the word of the viewer.

Textual meanings are visually realized by three aspects of composition: the placement of the elements of a composition in the visual space (top or bottom, left or right, center or margin); the relative salience of the elements; and the degree to which the elements are separated from each other by frame lines, empty space, or other visual devices. These aspects of visual structuring apply not only to the elements of pictures but also to the elements of layouts (e.g., headlines, pictures, blocks of text), so that analysis can reveal, for instance, the relative salience of text and image and the way they are compositionally related.

Kress and van Leeuwen's approach therefore allows an integrated analysis of the visual and linguistic aspects of written text. The analyst can ask, for instance, which participant is visually the Actor and which participant is linguistically, or discover that the image addresses the viewer directly, while the text does not.

O'Toole's theory of visual communication (1994) also takes its inspiration from the linguistics of Halliday and is in many ways complementary to Kress and van Leeuwen's approach. Like Kress and van Leeuwen, O'Toole takes Halliday's metafunctions as his point of departure and assigns specific visual systems to specific metafunctions. But unlike Kress and van Leeuwen, he also introduces rank, analyzing visual communication as building 'figures' from 'members,' 'episodes' from 'figures,' and 'pictures' from 'episodes' in the same way that language builds words from morphemes, groups from words, clauses from groups, and clause complexes from

clauses. Specific systems of visual grammar realize each of the three metafunctions at each of the four ranks. 'Representational' meanings, for instance, may be realized by 'actions and events' at the rank of picture, 'groups and subactions' at the rank of episode, individual 'characters' at the rank of figure, and 'parts of the body' at the rank of member. Perspective is one of the systems that realize what O'Toole calls 'modal' meanings at the level of picture, 'relative prominence' one of the systems that realize it at the rank of episode, 'gaze' one of the systems that realize it at the rank of figure, and so on.

The functional approach to the study of word and image has been applied in a number of fields and has also been extended to film (van Leeuwen, 1996; Iedema, 2001) and new media (Lemke, 2002; Kress, 2003). The journal *Visual Communication* regularly publishes papers by scholars working with this approach.

Ethnomethodology and Conversation Analysis

The relation between word and image (or, more broadly, the visual) has also been approached from the perspectives of ethnomethodology and conversation analysis. Charles Goodwin (e.g., 2001), Heath (e.g., 1986), and others have focused on the way professional discourses interpret images and other visual phenomena in quite specific ways that often differ markedly from commonsense interpretations. In the court proceedings following the police beating of Rodney King, for instance (Goodwin, 2001: 175–178), the crucial evidence was a videotape that actually showed police officers beating King. Yet the police officers were acquitted, at least in the first trial, because of the testimony of an expert witness who interpreted the video in terms of professional police codes for determining aggressive intent. Specific movements were interpreted as being at the start of an "aggression spectrum" (2001: 176):

> Witness: It is starting to be [aggressive]
> (pointing) This foot is laying flat
> (pointing) There's starting to be a bend
> (pointing) this leg
> (pointing) in his butt
> (pointing) the buttocks area has started to rise
> which would put us at the beginning of our spectrum again

Goodwin and others have also argued for the inclusion of the gaze and other visual signifiers (e.g., pointing) in conversation analysis transcripts, showing that without those signifiers it is often impossible to determine what drives the specific moves that conversation analysts are interested in (e.g., restarts, repairs). This can be of crucial importance in areas such as the study of medical interaction.

Typography

Even though typography is perhaps the most obvious visual aspect of written language, it has until recently been ignored by linguists. Crystal is an exception (1998: 7):

> The explication of printed language needs the expertise of both typographers and linguists, in order to provide a complete description of its forms and structures and a satisfactory explanation of its functions and affects.

New technologies such as the word processor have made typographic expression available to everyone, and as a result linguists also are becoming more aware of it (e.g., Graddol, 1996). Overall, however, they have not gone much beyond categories that are well established in the typographical literature, such as the difference between the classic serif and the modern sans serif and between text and display fonts, the former requiring, in the first place, legibility and clarity, the latter leaving more space for typographic expression (e.g., in relation to brand names, titles, logos, and so on). Walker's book on the subject (2001), in the series 'Language and social life,' describes many of the rules and prescriptions that govern everyday uses of typography, although not in a specifically linguistic framework. Van Leeuwen (2005) used the concepts of connotation and metaphor to discuss typographic meaning and in more recent work (in press) argued for the semiotization of the 'distinctive features' of typography, thus both adapting and extending Jakobson and Halle's 'distinctive feature theory' of phonology. He argues that the distinctive features of letter forms (e.g., weight, roundedness versus angularity, regularity versus irregularity) lend themselves more easily to metaphoric extension than whole letter forms. Roundedness, for instance, can, depending on the context, signify organic, natural, feminine, and so on. As a given font combines several distinctive features, several such metaphors may resonate in it.

Many contemporary typographers are interested in blurring the boundaries between images and letter forms by 'iconizing' either the letter forms themselves and/or the way they are arranged on lines and pages. In this way they regain a connection that had been lost in the development of the alphabet. Typography is also increasingly multimodal, using not only the elements of letter forms, bowls, stems, ascenders, descenders, serifs, and so on, but also color, texture, 3-dimensionality, and movement. Journals such as

Visible Language, *Information Design Journal*, and *Visual Communication* regularly publish in the area.

Conclusion

Linguists have only recently begun to pay attention to the many forms of visual expression and structuring in written texts. As the importance of visual communication grows in many areas, including, for instance, education, science, workplace literacy, and global communication, the study of word and image is likely to undergo rapid growth in the near future. As Kress has said (2003: 168), the major task facing us now:

> . . . is to imagine the characteristics of a theory which can account for the processes of making meaning in the environments of multimodal representation in multimediated communication . . . . Such a theory will represent a decisive move away from the assumptions of mainstream theories of the last century about meaning, language, and learning.

See also: Barthes, Roland (1915–1980); Barthes, Roland: Theory of the Sign; Comics: Semiotic Approaches; Emblems; Ethnomethodology; Halliday, Michael A. K. (b. 1925); Media: Semiotics; Multimodality and the Language of Politics; Photography: Semiotics; Typography; Visual Semiotics.

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Word Classes/Parts of Speech: Overview

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The word-class system of a language is a classification of the individual elements that make it up, viz., words, in terms of properties that determine their use in syntax and their contribution to meaning.

Such a classification was proposed for Classical Greek by Dionysius Thrax (2nd century B.C.), and it has remained the single most influential word-class system since then. Dionysius used clusters of morphological, syntactic, and semantic properties in his word-class definitions, which are rendered in condensed form below (Robins, 1990: 39). Note that, Dionysius often used the broader term 'part of speech,' roughly equivalent to recurring meaningful unit, instead of 'word.'

Noun: a part of speech inflected for case, signifying a concrete or abstract entity, with general or specific reference.

Visible Language, *Information Design Journal*, and *Visual Communication* regularly publish in the area.

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See also: Barthes, Roland (1915–1980); Barthes, Roland: Theory of the Sign; Comics: Semiotic Approaches; Emblems; Ethnomethodology; Halliday, Michael A. K. (b. 1925); Media: Semiotics; Multimodality and the Language of Politics; Photography: Semiotics; Typography; Visual Semiotics.

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Noun: a part of speech inflected for case, signifying a concrete or abstract entity, with general or specific reference.

Verb: a part of speech without case inflection, but inflected for tense, person, and number, signifying an activity or process performed or undergone.
Participle: a part of speech sharing the features of the verb and the noun.
Article: a part of speech inflected for case, preposed or postposed to nouns.
Pronoun: a part of speech substitutable for a noun and marked for person.
Preposition: a part of speech placed before other words in composition and in syntax.
Adverb: a part of speech without inflection, in modification or in addition to a verb.
Conjunction: a part of speech binding together the discourse and filling gaps in its interpretation.

Apollonius Dyscolus (1st century A.D.) and Priscian (6th century A.D.) adapted Dionysius's classification to Latin. Latin has no articles, so 'article' was replaced by 'interjection' in order to keep the number of word classes constant. Moreover, Priscian changed the order of 'adverb' and 'preposition.' The latter change may seem insignificant, but interestingly, Priscian held that he listed the word classes in their natural order. And this claim actually makes some sense.

Dionysius's and Priscian's word-class systems are primarily based on a morphological classification of words. Nouns (and articles and pronouns) are inflected for case but not for tense. Verbs are inflected for tense but not for case. Participles are inflected for both case and tense, and all other words are uninflected.

This morphological classification is then combined with a syntactic classification. All word classes except noun, verb, and participle, which are used as heads of subjects and predicates, are characterized as to syntactic function. Articles modify nouns, and pronouns substitute for nouns. Adverbs modify verbs. Prepositions modify both nouns and verbs. Interjections do not combine with other words, and conjunctions join all kinds of words.

Finally, nouns and verbs are characterized as to meaning, in terms of the Aristotelian categories of substance and quality (nouns) and activity and passivity (verbs). More contemporary notions corresponding to these categories would be entity (for substance), property (for quality), and event (for activity and passivity). Priscian's system is summarized in Table 1.

As we can see now, Priscian's list is built on two ordering principles: nonmodifiers (heads, in modern terminology) before modifiers before other functions; and nouns before verbs before 'both,' i.e., words with both nominal and verbal inflection or words that can modify both nouns and verbs. The ordering of nouns before verbs is motivated by their semantic characterizations. Nouns, which denote the semantically and ontologically primary category of substance, 'must' come before verbs, which denote the semantically and ontologically secondary categories of activity and passivity. Presumably, the syntactic functions of noun and verb as subject and predicate, respectively, follow from these semantic characterizations.

In the following, a possible modernization of the classical word-class system will be sketched, taking advantage of a mixed tradition of studies from the last hundred years (Jespersen, 1924; Brøndal, 1948; Lyons, 1968; Hopper and Thompson, 1984; Schachter, 1985; Croft, 1990; Hengeveld, 1992; Stassen, 1997; Anward, 2000).

We gain in generalizability if we substitute a contrast between nominal morphology, i.e., inflection for definiteness, number, gender, case, and/or possessor agreement, and verbal morphology, i.e., inflection for finiteness, tense, mood, aspect, subject agreement, and/or object agreement, for the simple contrast between case and tense. And we now know that there are languages without nominal morphology and languages without verbal morphology. Yoruba has neither nominal nor verbal morphology, and Kobon has only verbal morphology, for example (Anward, 2000). There may also be considerable overlap between nominal and verbal morphology. Possessor agreement is often identical to either subject agreement or object agreement (Allen, 1964; Seiler, 1983). There are also languages in which there is identity between nominal inflection and either finiteness inflection or subject agreement. Nama is a case in point.

Table 1 Priscian's world class system

	Morphological criteria	*Syntactic functions*	*Semantic categories*
noun	[+case; −tense],		substance and quality:
verb	[−case; +tense],		activity and passivity:
participle	[+case; +tense]:		
article	[+case; −tense]:	noun modifier	
pronoun	[+case; −tense]:	noun substitute	
adverb	[−case; −tense]:	verb modifier	
preposition	[−case; −tense]:	noun and verb modifier	
interjection	[−case; −tense]:	independent	
conjunction	[−case; −tense]:	'joiner'	

Sometimes such overlaps seem to suggest a fundamental similarity of nouns and verbs. For example, in Eskimo languages, ergative case and genitive case are largely identical. Since possessor agreement and absolutive agreement are identical as well, and core arguments of both nouns and verbs precede their heads, this has often been interpreted as indicative of a neutralization of the noun–verb distinction in Eskimo languages (Johns, 1992, but cf. Woodbury, 1985).

When it comes to syntactic functions, the simplest contemporary theories hold that phrases and clauses are built in the same general way, consisting of a head, which is constructed with arguments (subject, objects, complements) and modifiers. In *I was born one morning when the sun didn't shine*, for example, *was* is the head, which is constructed with two arguments, *I* (subject) and *born* (subject complement), and one modifier, *one morning when the sun didn't shine*. Furthermore, phrases and clauses can be conjoined with units of the same type.

Syntactic functions that figure in word-class definitions are typically just those: predicate (head of a clause), argument, and (argument or predicate) modifier, in addition to the traditional functions of independent and 'joiner.'

Contemporary theories that recognize subject, object, and/or complement as distinct functions obviously need a broader set of defining syntactic functions.

Finally, a reasonable list of semantic categories would be situation, entity, event, quantity, property, relation, place, and time.

Table 2 would then show the defining clusters of properties for each word class.

In Classical Greek and Latin, adjectives, such as *original*, quantifiers, such as *many*, and numerals, such as *one*, all look very much like nouns from a morphological point of view and were thus not differentiated from them by Dionysius and Priscian. It was only when the classical definitions were applied to modern Western European languages, in which the morphological differences between nouns and the other word classes are greater, that adjectives, quantifiers, numerals, and demonstratives were recognized as separate classes.

However, words are not limited to just one cluster. Consider *morning*, for example, which can be used not only as predicate modifier, time, as in *I was born one morning*, but also as argument, entity, as in *morning has broken*, and as argument modifier, time, as in *in the early morning rain*. A word has rather a characteristic distribution over the full range of clusters.

A consequence of this is that every cluster in the table need not be associated with its own word class in a language. In particular, all of the modifier classes (adjective, numeral, quantifier, adverb, preposition, and subjunction) are cross-linguistically optional. Instead, nouns, verbs, and/or other modifier classes can be extended to the various modifier functions. Verbs, or a particular class of verbs, can be used as argument modifiers and/or predicate modifiers. An example of this is stative verbs in Ainu (Shibatani, 1990: 19, 80):

Table 2 A modernized world class system

Word class	*Syntactic function*	*Semantic category*	*Type of morphology (if any)*
nouns & pronouns	argument	entity	nominal
verbs	predicate	event	verbal
numerals & quantifiers	argument modifier	quantity	nominal
adjectives	argument modifier	property	nominal
adverbs	predicate modifier	quantity/ property	none
adpositions, subjunctions	modifier	relation/ place/ time	none
interjections	independent	situation	none
conjunctions	joiner	relation	none

(1a) ku-pirka
1SG-good
'I am good'

(1b) pirka menoko
good woman
'pretty woman'

(1c) pirka inu
good listen
'listen well'

Nouns, or a subclass of nouns, may have a similarly wide distribution, as in the classical languages.

A language may also lack a distinct class of adverbs, using adjectives as predicate modifiers. Swedish is an example of this:

(2a) tåget var långsamt
the.NEUT-*train was slow*-NEUT
'the train was slow'

(2b) de åt långsamt
they ate slow-NEUT
'they ate slowly'

While 'interjection' seems to be a universal part of speech, it is a matter of considerable controversy whether all languages have a noun–verb distinction. In some languages, such as the Wakashan languages Nootka and Nitinat (Nootka) (Swadesh, 1939; Whorf, 1945) and the neighboring Salish languages (Kuipers, 1968; Kinkade, 1983; Jelinek and Demers,

Table 3 Distribution over syntactic functions. An example

argument	*sin*	*sins*	*sinner*	*sinners*				
predicate	*sin*	*sins*			*sinned*			
argument modifier						*sinning*	*sinful*	
predicate modifier						*sinning*		*sinfully*

1994), all content words (as opposed to invariable particles) are said to be basically verbal, or predicative, in nature but also to allow an argument use, in which they are interpreted essentially as headless relatives. In other languages, such as Eskimo languages (Hammerich, 1951; Johns, 1992), all content words are held to be basically nominal, with agentive nouns as the closest equivalent to verbs. In yet other languages, such as various Austronesian languages (Himmelmann, 1991; Broschart, 1997), it is not even clear which function, predicate or argument, is basic. Indeed, Gil (1994) has argued that in such languages, all words are basically interjections, which can be extended to all other functions.

Moreover, a language need not use all syntactic functions. A language may lack predicate modifiers, using sequences of clauses to express roughly the same notions. Yoruba is one such language (Lord, 1993). A language may also lack argument modifiers, using predicate modifiers to express what would be expressed by argument modification in other languages. Hixkaryana and other Carib languages are examples of languages that approximate this type (Derbyshire, 1979).

In polysynthetic languages, syntactic functions may, optionally or obligatorily, be realized word internally, through compounding, incorporation, and/or inflection. In particular, argument function may be restricted to pronominal inflection, with independent nouns being used as appositions (Jelinek, 1984), and predicate and argument modification may be essentially word-formation processes. Whorf (1945), Sasse (1988), Hengeveld (1992), and others have proposed that there are languages that lack arguments altogether and express everything through a series of predicates. However, proposed examples of such languages, in Wakashan and Iroquoian languages, do not really seem to fit the type (Jacobsen, 1979; Mithun, 2000).

An interesting problem arises when word classes are defined by a range of clusters of morphological, syntactic, and semantic properties: how to treat words that are similar in form and meaning. Consider, for example, the words *sin, sins, sinner, sinners, sinned, sinning, sinful, sinfully.* Part of their distributions over syntactic functions is shown in Table 3.

What is not always made clear in descriptions of word-class systems is whether we are seeing here one word, the noun *sin*, and its distribution over a range of clusters, or several words, the nouns *sin* and *sinner*, the verb *sin*, the adjective *sinful*, and the adverb *sinfully*, and their respective distributions. If the latter position is adopted, it is typically linked to a distinction between inflection (which does not change word class) and derivation (which may). There is no easy solution to this problem, but it is of utmost importance to keep it in mind when dealing with word-class systems.

See also: Adjectives; Adpositions; Adverbs; Articles, Definite and Indefinite; Inflection and Derivation; Interjections; Nouns; Numerals; Pronouns; Verbs.

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Word Formation

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The term 'word formation' is ambiguous in modern linguistics. In one usage of the term, it is equivalent to 'morphology' and refers to matters such as affixation and reduplication as used in the creation of word forms.

In the more widely accepted sense of the term, word formation refers to the creation of new lexemes in a given language. Thus it specifically excludes inflectional morphology, such as that which makes *manages* and *managed* from the base *manage*. At the same time, it may include things that are only marginally considered to be morphology, or that may be excluded from morphology. For example, there is some dispute (at least implicitly) in the literature as to how far blending is a matter of morphology, but blending to create new lexemes such as *stagflation* or *chunnel* is part of word formation. Similarly, alphabet-based formations such as abbreviations (*etc*. from *et caetera*), initialisms (*SIA* pronounced as a series of letters from *Singapore International Airlines*), and acronyms (*IJAL* pronounced /aɪdʒæl/ from *International Journal of American Linguistics*) are not usually considered to be morphological, but they are part of word formation. Similarly, the creation of rhyme-based forms like *teeny-weeny* or ablaut-based forms like *tittle-tattle* are clearly part of word formation in English, but less clearly part of morphology. Other types that may be relevant are diminutives and hypocoristics in languages that use them very productively. Less clearly relevant are English forms like *unbe-bloody-lievable* and *poet shmoet*, which are not necessarily controlled by all English speakers, and which, as yet, do not appear to create generally recognized neologisms. It has even been argued that compounding, which is generally accepted as word formation, is part of syntax rather than part of morphology.

There are, however, some ways of forming new dictionary items that are not included as word formation. Specifically, these are semantic modifications such as widening and narrowing and figurative extensions of meaning for already existing forms.

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Word Grammar

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Overview

'Word grammar' (**WG**) is the name of a theory of grammar in which words play a specially central role as the main unit of syntax; for example, the syntactic structure of (1) recognizes just four units, one per word, and phrases play no explicit part in the grammar:

(1) Small children often cry.

This rejection of phrase structure was the main distinctive feature of WG at the time when it received its name (Hudson, 1984), but the focus of the theory has broadened since then to include the outlines of a general theory of conceptual knowledge, with language as a particular subcase. The psychological assumptions are, by and large, conservative and uncontentious, but the linguistic theory that results is rather different from most mainstream theories and belongs firmly in the recent tradition of 'cognitive linguistics' (e.g., Barlow and Kemmer, 2000). This article will present some of the psychological assumptions (in the sections 'Inheritance Networks' and 'How to use a Network'), but will mostly be concerned with their consequences for the theory of language structure.

As far as language is concerned, the leading idea is (2):

(2) Language is a network.

This was already explicit from the early days (Hudson, 1984: 1) but its implications are much clearer now. 'Inheritance Networks' will spell out the nature of this network in more detail, and will highlight the importance of is-a relations (as in 'John is-a linguist' or 'BUT is-a conjunction') and its related logic, default inheritance. This logic is more fully developed in WG than in any other theory of language structure (Hudson, 2003b); for example, it is default inheritance that explains the difference:

- between regular and irregular morphology
- between basic and special word order
- between a morpheme's basic shape and its allomorphs
- between sense and referent
- between types and tokens.

In fact, it is tempting to conclude that default inheritance is responsible for all the complexity (and flexibility) in language. However, it is important also to

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In fact, it is tempting to conclude that default inheritance is responsible for all the complexity (and flexibility) in language. However, it is important also to

recognize the important role played by another very general principle of processing, variable binding, which will be explained in 'How to Use a Network.' Both default inheritance and variable binding are heavily dependent on spreading activation.

Language structure, as such, is completely declarative – as indeed it has to be if it is a network. It is like a map, which may be used as a guide for action but which is not, in itself, either an active machine or even a set of instructions for actions. Language is simply a (very large) collection of nodes and their (even larger) set of interconnecting links. However, the network is highly structured through a rich classification of the nodes and links, so (unlike distributed connectionist networks) this theory is easy to compare with more conventional theories based on rules and lexical items. For example, entities in language are of a small number of basic types that define the traditional levels of language – semantics, syntax, morphology, and phonology. This structure will be outlined in 'Levels of Language.' Similarly, links fall into a fairly traditional range of categories that are specialized for particular places in the total network – e.g., for linking a word to a meaning, an affix to a stem, or one word to another. However, although the categories used for classifying links are mostly quite traditional, WG is the only formal theory of language (or knowledge) that allows links to be freely classified in just the same way as entities.

If language is a network as described here, and if this network is a subnetwork of general knowledge, then language cannot be modular in the very strong sense of this word (Fodor, 1983). Neither language, nor any of its parts (e.g., syntax), is informationally encapsulated so that elements inside it cannot communicate directly with elements outside it. On the contrary, it is quite typical for elements of language to be closely related to nonlinguistic categories such as speaker types and situations – e.g., people only use *cookie* if they are American and *gee-gee* when speaking to children. However, networks do allow more limited kinds of modularity, including subnetworks whose elements have relatively dense internal links and relatively sparse external ones.

The network theory also favors explanations of language structure in functional rather than genetic terms. If language has the same formal properties as the rest of knowledge, its formal properties need no special explanation, genetic or otherwise. Moreover, even the substantive properties – the particular categories and relations – are rather easy to learn by induction from experience (Tomasello, 2000), so the contents of the network can be explained by a theory of learning and we can conclude that language is not an 'instinct' (Pinker, 1994).

Inheritance Networks

If language is a network, then a major research question is how it fits into a general typology of networks: what kind of network is it? This question can be approached either quantitatively or qualitatively. Graph theory takes a quantitative approach by applying various kinds of mathematical measure to a network. For example, what is the average topological distance – i.e., the average number of links in the shortest path – between nodes? Many complex human networks, such as society and the internet, turn out to have quite small distance averages, so they are called small worlds (Barabási, 2003); research so far indicates that the same may be true of language (Ferrer i Canchol and Solé, 2001; Motter *et al.*, 2002). Another quantitative question is whether the number of links per node has a normal distribution (like that of people's heights) or whether it follows a power law, with a small number of extremely richly connected nodes and a long tail of nodes with very few connections. The second kind of network, called scale-free, also turns out to be common among complex human networks; and once again language too seems to have this property (Ferrer i Canchol and Solé, 2001).

Linguistics, unlike graph theory, is concerned with the qualitative characteristics of the language network. WG is not the only linguistic theory that has concerned itself with the question. The whole of synchronic linguistics in the 20th century was an attempt to flesh out Saussure's idea that "language is a system of interdependent terms in which the value of each term results solely from the simultaneous presence of the others" (Saussure, 1959: 114 – in short, a network of terms. However, given the enormous size of a language, it is easy to lose sight of the total network in order to focus on some small area such as phonology or syntax, so most theories say very little about the overall structure of the network of relations. Indeed, this methodological preference has turned into the factual claim that language really is modular (Fodor, 1983), with distinct submodules that have quite different organizing principles – "a modularization of the grammar reminiscent of the modularity of the mind" (Smith, 1999: 68). The first fully articulated theory to stand back and consider the total network of language was stratification grammar (Lamb, 1966) and its more recent manifestation called neurocognitive linguistics (Lamb, 1998). Lamb's ideas played a major part in the development of WG (in spite of the negative comment in Hudson, 1990: 15, but WG's claims about the language network are different from Lamb's.

According to WG, language, like the rest of conceptual knowledge, is an inheritance network. What this means is that:

- the classification relation is-a has a special status, because it allows generalizations by default inheritance (discussed more fully below).
- every node is part of at least one inheritance hierarchy united by is-a; for instance: TAKE is-a Verb is-a Word. In other words, all nodes are classified.
- every link is also part of at least one inheritance hierarchy, such as Object is-a Complement is-a Dependent. Thus, classification applies not only to nodes but also to links.

Because of its privileged status, the is-a relation has a special notation: a small triangle whose base is next to the super-category. Figure 1 shows an elementary WG diagram for the examples just given.

Choosing to model language as a network is not simply a choice of notation. As we shall see in 'How to Use a Network,' it has important implications for understanding how we use language, but it also affects the purely linguistic analysis of the language system. The main effect is that categories have to be justified carefully because of the following general principle:

(3) Every category is defined, and distinguished from other categories, solely by its links to other categories.

The first consequence of this principle is that strictly speaking, the labels that we give to nodes and links carry no information at all, so a network would still carry exactly the same information even if we removed all labels (Lamb, 1998: 59). Universal categories identified only by their name fit very badly into WG theory. Another consequence is that labels should not be used, as in most other theories, to show class membership. For example, if something is a noun, this fact should be shown by an is-a link to Noun, rather than by labeling it 'noun.' Labels should not be used in order to smuggle classificatory information into the network.

Nodes are simply nodes – points where links meet. The function of a node, in fact, is merely to show a correlation between two or more links. In this sense, then, a node defines some 'property'; for example, an Object link from TAKE represents the property of taking an object. Each link can in fact be seen as defining a property for mathematical sense: a relation that takes an argument and yields a unique value for it (compare the mathematical function +2 which gives a unique value for any number to which it is applied). As in mathematics, the value varies with the argument; for example, the value of the object function varies from verb to verb and from token to token, so at the level where generalizations are made about objects of all verbs, the value must be a variable. In WG notation, variables are shown either as a simple dot or (perhaps more helpfully) as a question-mark: '?'. Clearly (3) requires that this labeling convention must duplicate some kind of relation difference, but it is not yet clear what this difference is. Variables will play an important role in the WG theory of processing outlined in 'How to Use a Network.'

Figure 2 shows a simple network including the dependencies and word types distinguished in Figure 1. It shows that a word's complement is normally impossible: its quantity ('#') is 0. This general ban on complements explains why, unlike adjuncts, they are selected by specific lexical items, which can override the general ban as explained in the next paragraph; for example, TAKE has an obligatory object (whose quantity is 1). Figure 2 also shows that objects are nouns, so this property also applies by inheritance to the object of TAKE.

As explained earlier, the main characteristic of inheritance networks is the possibility of generalization by default inheritance. This seems to be the basic logic

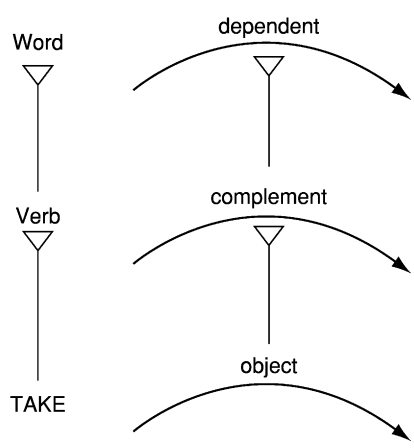

Figure 1 Inheritance hierarchies for nodes and links.

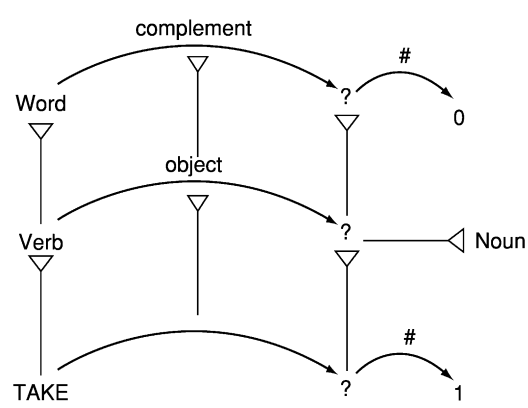

Figure 2 A network for TAKE and its object.

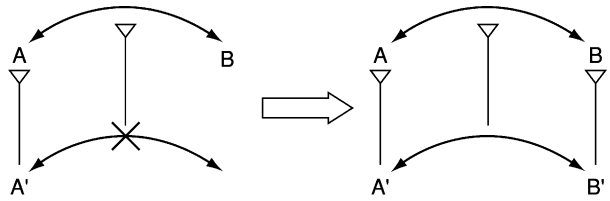

Figure 3 Default inheritance.

of everyday reasoning, in which we generalize from the typical case in order to guess information that we cannot observe. For example, if we recognize something as a cat we assume it has four legs, like the typical cat; in other words, this cat inherits (in our minds) the properties of the typical cat by default, in the absence of information to the contrary. However, if we already know that it has only three legs this information overrides the default so we can continued to classify it as a cat in spite of the exceptional leg number. The same logic applies to linguistic reasoning:

- by default, a dependent is optional,
- but if a dependent is (more specifically) a complement, it is impossible,
- but if a complement is (more specifically) the object of TAKE, it is obligatory.

In each case, a fact located lower in the inheritance hierarchy of entities or relations takes priority over one located above it. The logic is presented more formally in Figure 3, where the double-headed arrow means an arrow going in either direction and the crossed lines mean that the link concerned is not already present.

Default inheritance is controversial among logicians because it is nonmonotonic, meaning that it allows us to draw conclusions which later turn out to be false. It is also controversial in computational linguistics because the system spends a great deal of time checking for possible overriders. However, a network model reduces both objections to triviality because the search space for competitors is very small.

Levels of Language

We turn now to the specifics of language structure. WG distinguishes the traditional levels of language through its classification of entities and relations rather than by trying to divide all the data of linguistics into discrete components, which has the advantage of avoiding boundary disputes. The relevant node types are as follows:

- words of all degrees of generality from word tokens (e.g., *tokens* in this sentence) through lexemes (e.g., TOKEN) to inflectional categories (Plural) and word classes (Noun) and even the category Word itself,
- forms of all sizes from morphemes (e.g., {s}) to word forms (e.g., {tokens}), and of all degrees of generality from tokens to form classes (e.g., Suffix),
- sound segments of all sizes and generalities,
- letters and other units of written language,
- any kind of entity or relation may act as the meaning (see 'Semantics and Sociolinguistics' section) of a word.

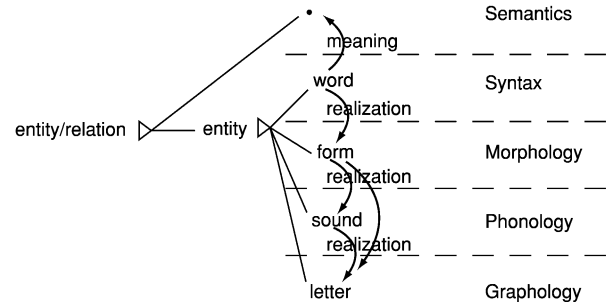

Figure 4 The architecture of language.

Various kinds of sets of these entities are also needed; for example, word strings are used in coordination (see 'Syntax' section).

As for relations, they fall into a range of types that include the following, all of which are relevant to language; the terms in brackets are specific subcases of the more general relation which heads the paragraph:

- Meaning (or referent) links a word to its meaning.
- Realization (base or fully inflected form) links a word to its component morphemes, or larger form, and also links a form to its phonological structure. (Written structures may realize forms directly or indirectly through phonology.) Realization may even be considered the converse of Meaning, in which case it is also found between words and their meanings.
- Co-occurrent (dependent, next, etc.) links a word to words that co-occur with it. It also handles the combinational patterns of co-occurring morphemes, sounds, and letters, and indeed may be found in semantics (e.g., as semantic roles such as Actor).
- Part (part 1, last part, etc.) links a larger form to the smaller forms within it, and is also found in many other areas of knowledge. Part may also include Member, which relates a set to its parts.

The overall architecture of language is summarised in Figure 4. One of the noteworthy features of this diagram is the absence of a separate lexicon. In WG,

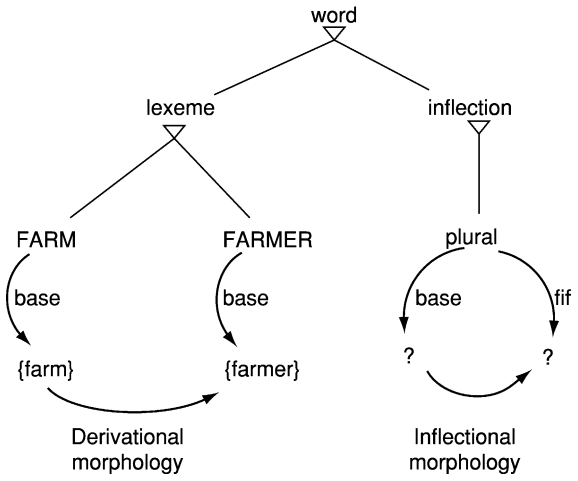

Figure 5 Derivational and inflectional morphology.

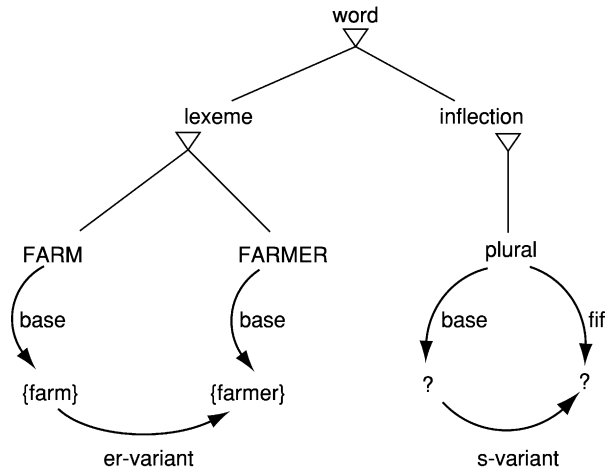

Figure 6 Morphosyntactic relations between words and variants.

as in other cognitive theories (Langacker, 2000), the difference between lexical and more general facts is merely a matter of degree; for example, the valency facts about TAKE are shown in the same network as those for more general categories such as Verb and Word (Figure 2).

Morphology

The only level of language in Figure 4 that needs justification is morphology, the level whose units are forms, which are distinguished in notation by the use of the traditional morpheme boundary markers, {. . .}. For example, the form {dog} is distinguished from the word DOG as well as from the phonological structure /dog/. Forms are morphomic (Aronoff, 1994), so:

- unlike words they have no meaning or syntactic categorization
- and unlike phonological units they have no pronunciation – indeed, they correspond just as easily to written structures.

The relation between a form and its corresponding word is Realization, not Part, i.e., abstractness, not size. The size relation applies to different forms, so we find complex forms that contain smaller ones; e.g., {dogs} contains {dog} and {s}, and {farmers} contains {farmer}, which in turn contains {farm} and {er}.

The WG treatment of morphology rests on the familiar distinction between two kinds of word: lexemes (e.g., DOG) and inflections (e.g., Plural). Thanks to default inheritance, unmarked inflections can be treated simply as the default, so DOG is by default singular in contrast with its plural, DOG:-plural. Only the marked form needs any mention in morphology. This distinction between lexemes and inflections allows a distinction between two kinds of Realization relation: Base and Fully inflected form (abbreviated to 'fif'). A word's base is determined by its lexeme and its fif by its inflection. By default the base and fif are the same, but marked inflections distinguish them in some way. This is the province of inflectional morphology, while derivational morphology deals with the relations between the bases of different lexemes, e.g., between those of FARM and FARMER. The difference between derivational and inflectional morphology is shown schematically in Figure 5.

Although derivational and inflectional morphology are very different at the level of words, at the level of form they offer the same range of possible morphological differences. These differences are each defined by a morphological function called a variant, so for example, the plural form is the s-variant of the base and the agent noun is the er-variant of the source base. This treatment of morphological structure is an important (and controversial) part of WG theory because it establishes a clear separation between morphological structure and its syntactic and semantic correlates. The morphosyntactic realization relations of inflectional and derivational morphology map lexemes and inflections onto variants, while the morphophonological relations map variants onto morphological and (eventually) phonological structures. The morphosyntactic mapping is shown in Figure 6, in which the variants have replaced the unlabeled relations of Figure 5.

One of the immediate benefits of this separation of morphosyntax from morphophonology lies in the treatment of syncretism, cases where the same morphological pattern realizes more than one word type. To take an obvious example, the s-variant pattern is used not only for plural nouns (e.g., {dogs}), but also for present tense singular verbs (e.g., {eats}). More

interestingly, the passive and past participles of English verbs are always the same however irregular the verb may be. This can be explained by saying that both inflections use the same variant of the base, the en-variant (Hudson, 1990: 90).

Variants are the bridge from words to morphological structure. In simple cases, the variant of a form consists of a copy of that form combined with an affix ({farm} + {er} or {farmer} + {s}). These patterns are handled in terms of parts, with Part1 and Part2 occurring in that order. This kind of pattern is illustrated in Figure 7 for the er-variant, of which the relation between {farm} and {farmer} is an example.

Exceptions are easily accommodated thanks to default inheritance, as shown in Figure 8. This illustrates two degrees of irregularity: suppletion ({person}, {people}), where the entire base is replaced, and vowel-change ({goose}, {geese}), where only the vowel is changed. Of course, morphology can be a great deal more complicated than the examples discussed here, but WG has already been shown to be able to accommodate various kinds of complexity such as multiple affixation and cliticization (Camdzic and Hudson, 2002; Creider and Hudson, 1999; Hudson, 2001).

Syntax

The most distinctive characteristic of syntax in WG is the rejection of phrase structure in favor of dependency structure, which follows from the network assumption (2). The question is not whether to show dependencies between words, but how. Phrase structure identifies dependencies indirectly via part relations to phrases, whereas dependency analysis recognizes them directly. Consider this very simple example:

(4) Gas smells.

Linguistics would generally accept the traditional view that *gas* is related to *smells* in a way that explains, for example, the {s} on {smells}. The question is how to include such word–word relations in a syntactic structure. Phrase structure recognizes a number of phrase nodes, including (at least) an NP node, some kind of clause or sentence node, and (probably) a VP node. The relation between *smells* and *gas* is merely implied by phrase structure (such as the rather conservative one in Figure 9) but is explicit in a dependency structure.

The dependency analysis fits well in a general network-based theory of language, where all relations are shown explicitly. In contrast, standard phrase structure is incompatible with network theory because word–word relations are merely implicit. Indeed, it is not at all obvious that a phrase really is more than the sum of its parts, so the basis for WG syntax is not only that a phrase really is more than the sum of its parts, so the basis for WG syntax is not only that word–word dependencies must be part of the network because they are psychologically real, but also that phrases should be excluded from the network because they are psychologically real, but also that phrases should be excluded from the network because they are not real. A good analogy outside language is social structure. Interpersonal relations are certainly real, but groups such as families and communities are much more nebulous and hard to define; for example, where are the boundaries of 'my family' and – even worse – 'my community'? At best, the case for such groups needs to be made,

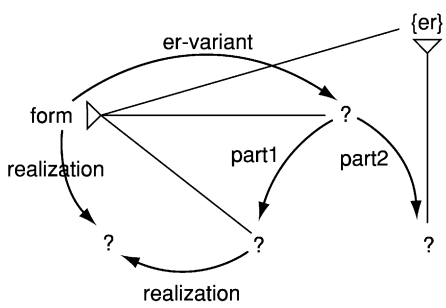

Figure 7 Variation by affixation.

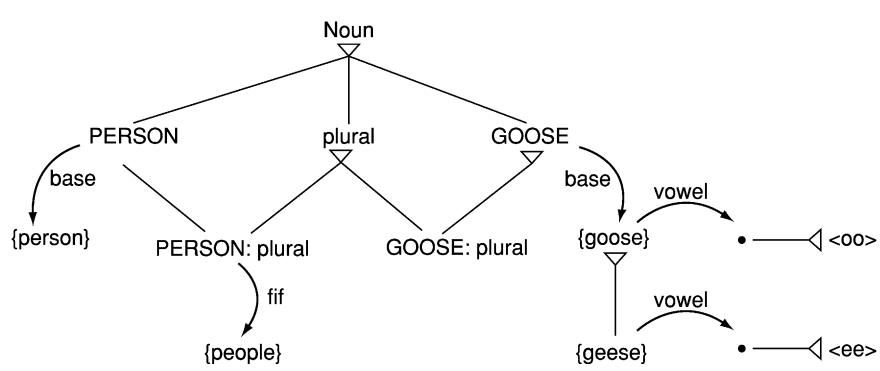

Figure 8 Suppletion and vowel change.

and similarly for phrases in syntax; but all the standard arguments for phrases simply ignore the possibility of using word–word dependencies instead. However, even if phrases really are indispensable, this will merely show that phrases are needed in addition to dependencies, as in some proposed mixed theories (Hudson, 1976). Meanwhile, the WG answer is that every generalization that can be stated in terms of phrases can be stated at least as well in terms of dependencies between single words (Hudson, 1990: 104).

Suppose that linguistic knowledge is a network. It then follows that sentence structure is also a network with the same flexibilty as other networks For example, there is nothing in the network idea to prevent one word from depending on more than one other word; and in fact all the familiar evidence for structures such as raising and extraction shows that this possibility is reality. The structure in Figure 10 illustrates the kind of richness that is possible in a quite ordinary sentence:

(5) What do you think we should wait for?

Of course, there are limits to possible dependency structures and, as in any other theory of syntax, our aim is to find and explain them. For example, the dependencies in Figure 10 follow a very general principle:

(6) The dependencies in a sentence must include a tangle-free substructure, i.e., one in which the implied phrases do not overlap.

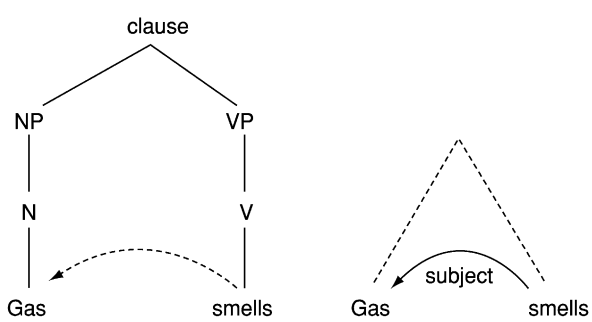

Figure 9 Phrase structure or dependency structure?

This is the substructure shown above the words. In contrast, sentence (7) is impossible because its dependencies do not include a tangle-free substructure.

(7) *I complicated like sentences.

The structure for (7) is shown in Figure 11, which is ruled out by (6). It is easy to imagine functional explanations for the restriction in (6); for example, it helps the hearer to identify word–word relations, and speaking is easier if one phrase is finished before the next one is started.

As mentioned earlier, the syntax of coordination is handled in terms of word strings, which are mere unstructured strings of words, like the strings that are possible as object of SAY:

(8) He said, "One, two, three, testing, testing."

A coordination is itself a word string consisting of two or more smaller strings (conjuncts) linked by a conjunction. However, the ordinary rules of syntax also apply to these strings, subject only to one extra constraint:

(9) Any dependency between a word inside one of the conjuncts and a word outside the entire coordination must also apply to one word inside each of the other conjuncts.

In other words, conjunction-reduction must apply across the board. Word strings are indicated in the notation by brackets, as illustrated in Figure 12. It is important to notice how this example shows that word strings are not phrases: for example, *London on Tuesday* is not a phrase in terms of any phrase-structure analysis.

Syntax is the level of language at which WG has been applied most intensively, so further details are easily available in the literature (Hudson, 1984, 1990, 1998, 1999, 2003a, 2003c).

Semantics and Sociolinguistics

The similarities between semantics and sociolinguistics are at least as striking as their differences. Semantics handles (at least) referential meaning, such as the

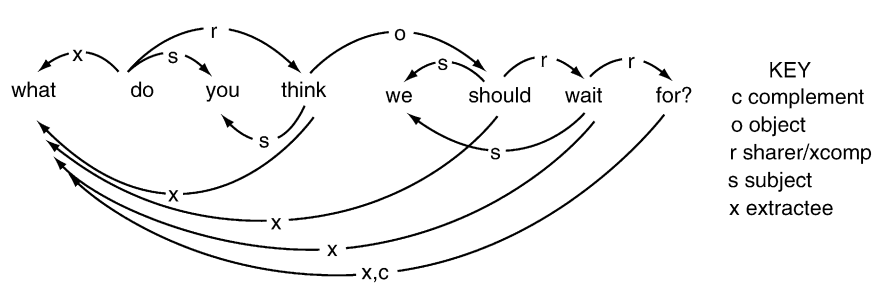

Figure 10 A syntactic structure.

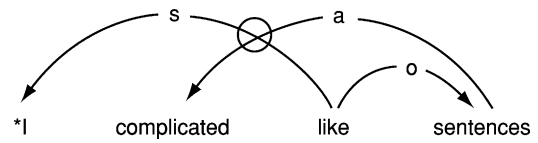

Figure 11 An ungrammatical structure.

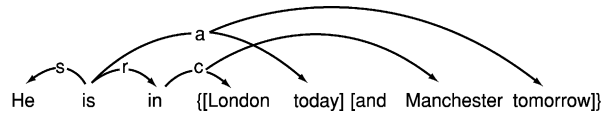

Figure 12 Coordination of non-phrases.

difference between apples and pears or between singular and plural, while sociolinguistics deals (at least) with the social meaning of words such as *hello* and *ain't*. However, as the terms imply, in both cases we are concerned with a kind of meaning, information about the world that follows from the choice of words. In both cases, this information can be inferred by anyone who is aware of the correlation between the word and the thought; for example, between the word *apple* and the concept Apple, and between *hello* and Meeting. In terms of spreading activation (which I discuss more fully in the next section), the word activates the thought, and both participants know that the same is true for both of them. In short, by using words "we can shape events in each other's brains with exquisite precision" (Pinker, 1994: 15). This is equally true of referential or social information. Moreover, there is a great deal of overlap between the two kinds of meaning; for example, the difference in (10) and (11) between polite and blunt imperatives could be classifed in either way:

(10) Do come in!

(11) Come in!

WG distinguishes the two kinds of meaning in terms of relations. Referential meaning is a property of the referent (the person or thing being referred to), whereas social meaning generally belongs to the speaker or the addressee (or both). In both cases, the particular individual is classified in terms of some general category: the sense for the referent, and some general social category for the speaker and addressee. We can illustrate both kinds of meaning in the name MOMMY, which refers to the mother of a child who is either speaking or being addressed, as in:

(12) Mommy will be back soon.

The advantages of a network analysis are especially obvious in a case like this where linguistic categories are related to non-linguistic ones. The WG analysis is shown in Figure 13, which treats Mother as a relation between two variables.

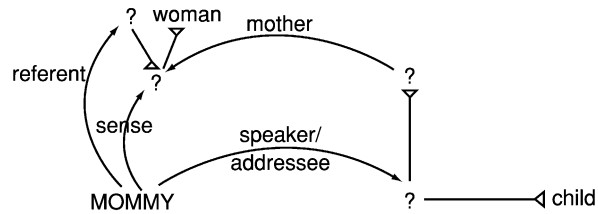

Figure 13 Referential and social meaning of MOMMY.

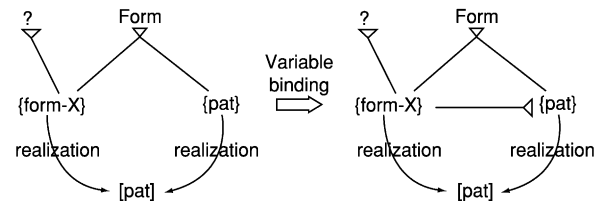

Figure 14 Classification by variable binding.

As might be expected in a highly lexicalized theory, WG has been applied quite extensively to problems of lexical semantics (Hudson and Holmes, 2000, Hudson, 2005), but one of the great advantages of dependency analysis in syntax is the relatively simple relation between syntactic dependencies and semantic relations. The published WG literature includes serious proposals for the semantic structure of plurals and quantifiers (Hudson, 1990: 139–146), past tenses and imperatives (Hudson, 1990: 222–223), and the semantic phrasing of arguments (Hudson, 1990: 146–151). However it has to be admitted that all these proposals need to be fleshed out.

Social meaning also benefits greatly from the network approach. In this case, one of the strengths of the approach is that it allows links to have different strengths; these are an essential ingredient of the model for spreading activation and are highly relevant to the quantitative work that has been so successful in recent sociolinguistics (Hudson, 1996: Chap. 7, 1997).

How to Use a Network

One of the attractions of a network model of language is the bridge that it offers between theoretical linguistics and psychology, where models of long-term memory are standardly framed in terms of networks (Reisberg, 1997: Chap. 7). Our knowledge of language, according to network models, is an example of long-term memory, but recent theories of working memory suggest that this too can be modeled in the long-term network: "Working memory is closely linked to LTM, and its contents consist primarily of currently activated LTM representations" (Miyake and Shah, 1999: 450). If these theories are right, then linguistic processing depends crucially on activity in the language network.

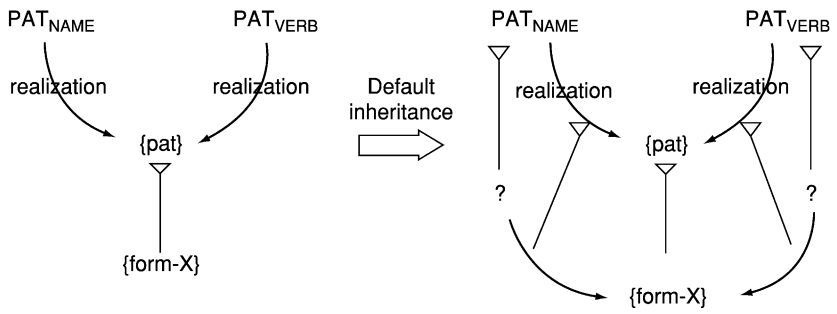

Figure 15 Enrichment by default inheritance.

WG now includes the basis for a theory of how processing works. It assumes, as already explained, that all long-term memory for language is held in a declarative network, but it also assumes that the links and nodes of the network have levels of activity that can be represented as numbers. This activity spreads in a completely mechanical way from active nodes to their neighbors, and the aim of processing is to allow nodes to compete for selection as the target meaning (in understanding) or as the target pronunciation (in planning). This far the model is similar to many others (e.g., Levelt *et al.*, 1999), but there are two crucial differences:

- The WG processor can create new nodes and links, which is not generally allowed in other theories of processing. A new node is created for each new token of experience, and for each property inherited by default inheritance (see Figure 3).
- WG processing is oriented toward the processor's current goals and interests, defined by highly active nodes and links; for example, a hearer's goal of finding meanings is reflected in the high activation of the Referent relation, and the hearer's interpretations are heavily biased by the general-knowledge nodes that are currently active.

The processor uses a small number of very general processes:

- Node and link creation, as described above, which creates new variable nodes (by default inheritance) and new constant nodes (for tokens).
- Variable binding, in which any highly active variable node is bound to the most active node that has the same super-category. This is how the processor assures the best fit between the token and the stored knowledge (Hudson, 1990: 46–52).
- Default inheritance, which again is controlled by activity so that it only applies to highly active variable nodes. This restriction prevents pointless inheritance that leads nowhere.

In principle this theory applies equally to productive and receptive processing, but for simplicity we can consider just one direction, reception (i.e., understanding). Suppose we hear the sounds [pat], and we have the form {pat} in our vocabulary. Hearing the sounds activates their respective nodes, which in turn activates the form {pat}, which contains all of them (in the right order). However, that activation does not itself tell us that we have just heard {pat}; to reach this conclusion we must first create a node for the unidentified form, which we can call {form-X}, together with an is-a link to the general category Form and a variable node '?' for its super-category. The latter node is highly active (thanks to both newness and the links to the active sounds [pat]), so variable binding automatically binds '?' to the most active node which is-a Form, namely {pat}. The effect of variable binding can be seen in Figure 14.

Once {form-X} is classified as an example of {pat}, it can be enriched by inheriting the latter's realization relations to words such as the name PAT and the verb PAT; this change is shown in Figure 15.

Activation then spreads blindly along these inherited realization relations to the word nodes, where it may meet activation flowing from nodes that are already active, such as the one for a person called Pat. Any highly active variable nodes will in turn inherit from their super-category, e.g., the name PAT, and so on until the word's referent is found, the processor loses interest, and activation dwindles.

This theory of processing is currently (2004) being modeled computationally in a program called WGNet++. Information about this and other developments in WG can be found at the WG site.

See also: Architecture of Grammar; Cognitive Linguistics; Cognitive Semantics; Constituent Structure; Construction Grammar; Declarative Morphology; Dependency Grammar; Grammatical Relations and Arc-Pair Grammar; Head-Driven Phrase Structure Grammar; Meaning: Cognitive Dependency of Lexical Meaning; Nonmonotonic Inference; Paradigm Function Morphology; Prototype Semantics; Relational Network Grammar; Right Node Raising; Unification, Classical and Default.

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Word Order and Linearization

A Siewierska

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Word order and linearization are major areas of linguistic inquiry within all linguistic traditions: descriptive, theoretical, and typological. This article concentrates on the typological perspective centering on the notion of 'basic order.' It begins with a consideration of the notion of basic order, then proceeds to review the distribution of word order patterns on a cross-linguistic basis, and next presents a brief account of the host of interrelated factors deemed to underlie the recurring linearizations. The article closes with a specification of the major problems posed for theory specific accounts of universal word order phenomena.

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The Notion of Basic Order

In the wake of Greenberg's (1963) seminal investigation, the order of major clausal constituents has been characterized in terms of the relative positioning of the subject (S), object (O), and verb (V), giving rise to a typological classification of languages into SVO, SOV, VSO, OVS, VOS, and OSV. Since most, if not all, languages exhibit some variation in the ordering of major clausal constituents, the characterization of a language with respect to the above six-way typology is achieved in relation to the meta-theoretical concept of basic order. Within the context of typological studies the term basic order, at the sentence level, is typically identified with the order that occurs in stylistically neutral, independent, indicative clauses with full noun phrase (NP) participants, where the subject is definite, agentive, and human, the object is a definite semantic patient, and the verb represents an action, not a state or an event. It is important to note that for reasons to be specified presently, the basic order, defined as above, may, but need not, correspond to the statistically dominant word order in a language. The identification of the basic order of a language has a limited heuristic value in that it does not correlate with a unified set of word order properties on a cross-linguistic basis. Nonetheless, enough significant sub-regularities of order have been observed to follow from the basic order to warrant taking the Greenbergian typology as a point of departure for further examinations of universal word order phenomena (*see* **Greenberg, Joseph H. (1915–2001)**).

In view of the above-mentioned requirements imposed on the constituents of clauses in terms of which the basic order is defined, the determination of the basic order of a language is not always a straightforward matter. For instance, in some ergative languages it is not always clear which constituent of a transitive clause should be considered as subject and which as object, owing to the conflicting results obtained from the typical subject identifying criteria. Another problem arises in connection with the necessary presence of two full NP participants. There are languages in which such transitive clauses are nonexistent (e.g., Puget Salish) or uncommon (e.g., Apalaí, Gunwinggu, Yatzachi, Zapotec) since the subject and/or object must or tends to be expressed solely by pronomial affixes on the verb or by clitics elsewhere in the clause. Two or more word order patterns may be in competition for basicness as in languages such as Guugu–Yimidhirr, Sahaptin, or Samoan, which exhibit considerable word order variation at the sentence level. This variation is conditioned by the distribution of given and new information or the relative newsworthiness of the informational content of the constituents of the utterance. Furthermore, some languages display different word order preferences dependent on text types. Russian is a case in point, as it is seen to favor SVO order in the formal written language but SOV in the colloquial spoken language.

The above problems notwithstanding, unique decisions as to the nature of the basic order can be made for the vast majority of language.

Distribution of Basic Orders of Major Clausal Constituents

The relative frequency of occurrence of the six basic orders has been established and confirmed by several independent investigations. Table 1 lists the percentage of languages exhibiting each of the six basic orders in the language samples of Greenberg (1963), Ruhlen (1975), Mallinson and Blake (1981), Hawkins (1983), and Tomlin (1986).

As suggested by the figures in Table 1, in terms of frequency of occurrence, the six basic orders fall into two subgroups: subject-before-object languages and object-before-subject ones. The former are widely attested, while the latter did not feature in Greenberg's original sample at all, and subsequently have been found to occur in less than 5% of the world's languages. Of the subject-before-object languages SOV and SVO by far outnumber the VSO ones, and among the three linearization patterns in which the object precedes the subject, OSV is the rarest.

Sampling Techniques

The language frequencies reflected in the data in Table 1,with the exception of Tomlin's (1986) figures, are based on random language samples. Consequently, though the above figures provide a good indication of the frequencies of the six basic orders among the world's languages, the cross-linguistic preferences and to a lesser extent dispreferences that they define cannot be automatically assumed to be due to inherently linguistic factors underlying the nature of human language, as opposed to nonlinguistic forces such as

Table 1 Frequency of six basic orders in the world's languages

	SOV	*SVO*	*VSO*	*VOS*	*OVS*	*OSV*
Greenberg (142)	45.0	36.6	18.3	—	—	—
Ruhlen (427)	51.5	35.6	10.5	2.1	—	0.2
M & B (100)[a]	41.0	35.0	9.0	2.0	1.0	1.0
Hawkins (336)	51.8	32.4	13.3	2.3	—	—
Tomlin (402)	44.8	41.8	9.2	3.0	1.2	—

[a]In Mallinson and Blake's sample 11 languages are not classified in terms of this typology. Therefore the percentages in this row do not add up to 100.

genetic affiliation, areal distribution, typological structure, and cultural identification. Particularly in need of investigation is the impact of nonlinguistic influences on the frequency of basic orders displaying relatively similar levels of occurrence such as SOV versus SVO or the three object-before-subject orders. For example, it is generally claimed that there is no linguistic preference for SOV as compared to SVO order, since the slightly higher frequency of SOV languages is not statistically significant. Yet several linguists have pointed out that in Tomlin's (1986) language sample, which is the most representative of the language samples cited in Table 1, 40% of the SVO languages are Niger–Congo. Therefore, had it not been for various historical factors which led to the expansion of the Niger–Congo language family, the frequency of SVO would have been markedly lower, and by the same token the linguistic preference for SOV languages much clearer. Historical factors may also be responsible for the relatively high frequency of occurrence of VSO as compared to the object-before-subject languages, since the majority of VSO languages belong to the Austronesian language family.

In order to minimize the genetic, areal, and cultural biases inherent in random sampling, new sampling methodologies are being applied involving stratified language samples as discussed by Perkins (1989). The proposed language samples, such as those developed by Rijkhoff *et al.* (1993), seek to select a proportional number of maximally differentiated languages, both areally and genetically, the latter criterion being sensitive not only to variation across language families, but also to variation within individual phyla. These more representative language samples will provide a better understanding of the interplay between linguistic and nonlinguistic determinants of order and thus contribute substantially to a fuller appreciation of the universal and particular features of human language.

Typological Markedness

Since around 95% of the world's languages display basic orders in which the subject precedes the object, such ordering is seen to be typologically unmarked, while the converse object-before-subject order is labeled as marked. The source of the difference in markedness of the two word-order patterns is a topic of continuing debate. The dominant view associates the different markedness values with differences in ease of processing, and the adoption of the respective linearizations with the instantiation of an addressee-oriented principle of communication in the case of subject-before-object languages as opposed to a speaker-oriented communicative strategy in the case of object-before-subject ones.

The basic properties of subjects and objects in the two groups of languages are by and large the same: subjects tend to be human, semantically agentive, and moreover topical and therefore they typically convey given information, whereas objects are generally inanimate, semantically nonagentive, frequently focal and thus informationally new. Psycholinguistic research summarized in Bock (1982) suggests that the processing of easily accessible language data, where high accessibility correlates with the above-mentioned features of subjects, involves an 'automatic' processing mode and contrasts with the 'controlled' processing of less accessible language material. It is therefore argued that the presentation of easily accessible language data before less accessible information, as is the case in subject-before-object orders, facilitates syntactic processing since it frees both the speaker's and the addressee's processing resources for the controlled processing of the less accessible material. Moreover, the automatically processed data provides the basic frame or perspective for the interpretation of the utterance; hence the processing task of the addressee is made easier if this perspective is presented first. Conversely, presenting new or more newsworthy and thereby less accessible information first, as in object-before-subject orders, is seen to impede the addressee's cognitive processing, in view of the fact that the relevance of the material delivered earlier in the utterance does not become apparent until the whole utterance is complete.

The communicative strategy adopted by the dominant subject-before-object languages is viewed as addressee-oriented because the speaker, having some new or news-worthy information to deliver, places the addressee's need for clarity and distinctiveness above his own need to divulge the message. In object-before-subject languages, on the other hand, the addressee's need of a prior perspective for the interpretation of the utterance is sacrificed to the immediate interests of the speaker, and hence the speaker-oriented view of such word-order patterns. The addressee versus speaker orientation underlying the markedness value of subject-before-object as compared to object-before-subject ordering is currently regarded as a major source of typological markedness in general. It is argued that though human language is geared to serve both speakers and listeners, it is intrinsically more difficult for the listener to decode the message than for the speaker to encode it, since the speaker has knowledge of what is going to be said, but the listener does not. Consequently, an optimal communicative system should be biased toward the addressee rather than the speaker. Though requiring further verification, the fact that the source of the markedness contrast between subject-before-object as

compared to object-before-subject languages may follow from a more general principle of markedness must be regarded as a significant finding of typological research.

The Natural Serialization Principle

Greenberg's (1963) six-way division of languages into SOV, SVO, VSO, OVS, VOS, and OSV has been supplemented by a two-way typology of VO and OV languages originating in the dependency tradition and the work of the nineteenth-century German typologists. This two-way typology is based on the division of constituents into head/modifier pairs such as: verb/object, verb/adverbial, auxiliary/main verb, noun/adjective, noun/relative clause, noun/genitive, noun/determiner, adposition/noun phrase, adjective/adverbial (where the first member of the pair is the head and the second the modifier).

The basic insight of the VO/OV typology is expressed by Vennemann's (1972) natural serialization principle (NSP) and its analogs, which stipulate that languages show a preference for serializing constituents in terms of either the head > modifier schema (VO, centrifugal) or, modifier > head pattern (OV, centripetal). Languages exhibiting linearization patterns in complete conformity with the NSP are termed 'consistent.' Consistency, however, is currently viewed not as a norm, but as an ideal which languages approximate to various degrees. Thus, for example, given that the subject qualifies as a modifier of the verb, all SVO languages are by definition inconsistent. And of the languages in Greenberg's Appendix II, 95 (67 percent) are inconsistent in terms of just five head/modifier pairs, i.e., verb/object, verb/subject, adposition/noun, noun/adjective, and noun/genitive. Of these 95 languages, 57 are inconsistent with respect to 1 of the 5 head/modifier pairs, and 38 with respect to 2. Both the number of inconsistent languages and the degree of inconsistency increase once other head/modifier pairs are considered.

In view of the fact that the vast majority, if not all, languages exhibit a measure of inconsistency the word order predictions incorporated in the NSP have been refined by supplementary principles which seek to specify among the inconsistent orderings the regularities that do obtain.

Supplementing the NSP

A number of subregularities of order of a high level of generality have been captured by Hawkins (1983) in the principle of cross-category harmony (PCCH). The PCCH states that languages display a preference to generalize the order obtaining in one head/dependent category to that of other categories. Departures from this preference in one head/dependent category are in turn likely to induce comparable departures in other head/dependent pairs. Thus, for example, Hawkins notes that the continuum in verb position, verb-initial, verb-medial, verb-final, is reflected in the position of the noun in relation to its modifiers. This is shown by the fact that VSO languages are more consistently noun-initial than SVO languages, in which the preposing of the subject in relation to the verb is often mirrored by the preposing of the adjective and/or genitive and/or determiner before the noun. Moreover, nonrigidly verb-final SOV languages (SOV languages which allow for the placing of some modifiers to the right of the verb) tend to have some nominal modifiers following the noun, while rigidly verb-final SOV languages generally serialize all their modifiers prenominally.

Recurrent patterns have also been found to underlie the inconsistent placement of modifiers relative to the noun, negative elements relative to the verb or verb stem, and the location of conjunctions and subordinators. Of particular interest is the cross-linguistic distribution of noun/modifier pairs. Hawkins (1983: 75, 86), using a typological division of languages based on the presence of prepositions (prepositional languages) vs. postpositions (postpositional languages) – which he takes to be superior to the two-way verb-based typology – considers the statistical frequency of the ordering of noun/modifier pairs and in particular the patterns of preposing a modifier before the noun in prepositional languages, and of postposing a modifier after the noun in postpositional languages. He observes that in the case of prepositional languages, the first to be preposed are the demonstrative or numeral; then both; next comes the adjective; followed by the genitive; and finally the relative clause. This is captured in the prepositional noun modifier hierarchy (PrNMH) (1):

(1) $\text{Prep} \supset ((\text{NDem} \vee \text{NNum} \supset \text{NA}) \;\&\; (\text{NA} \supset \text{NG}) \;\&\; (\text{NG} \supset \text{NRel}))$

The postposing of modifiers in postpositional languages begins with the adjective; then comes the relative clause; then the demonstrative or numeral; and finally the genitive. The order of modifier postposing is represented in the postpositional noun modifier hierarchy (PONMH) (2):

(2) $\text{Post} \supset ((\text{AN} \vee \text{RelN} \supset \text{DemN} \;\&\; \text{NumN}) \;\&\; (\text{DemN} \vee \text{NumN} \supset (\text{GN}))$

The principle underlying the two-noun modifier hierarchies is the preference for placing 'lighter' constituents to the left of 'heavier' ones (see Sect. 4.3). Given the progressive increase in length and complexity and thereby heaviness from the demonstrative to

the relative clause, the PrNMH is fully consistent with the light > heavy principle, the PoNMH only partially so, namely in that relative clauses tend to be postposed earlier than demonstrative or numerals. Significantly the predictions captured in the two-noun modifier hierarchies are corroborated by the actual quantities of languages displaying the stipulated co-occurrences. Thus, for example, there are more prepositional languages in Hawkin's sample in which a numeral is placed before the noun (44), than those with a prenominal demonstrative (38) or genitive (19), and there is only one language with a preposed relative clause.

Ordering Relations Among Modifiers

The NSP stipulates a preference for serializing modifiers either to the right or to the left of the head, but it says nothing about the relative ordering of modifiers among each other. The most general principle pertaining to the sequencing of modifiers (as compared to the ordering of modifier pairs) takes the form of a constraint against discontinuous constituents which ensures that a modifier will be separated from its head only by other modifiers of the same head. The most notable departures from this norm leading to discontinuities within noun phrases and adjectival phrases are to be found among the languages of the Australian continent, and also in several European languages such as Russian, Polish, or Latin. More widespread are instances of discontinuity involving relative clause and PP extraposition, subject-raising, and parenthetical placement, all of which require special pragmatic motivation. The ordering characteristics of modifiers among each other have been captured in the form of several related principles, the most important of which are discussed briefly below.

Iconicity

Any facet of structure – thus also any word order pattern – which corresponds to the order of things in the real world and which reflects generally accepted perceptions of dominance and salience and/or established semantic dependencies may be viewed as iconic (Haiman, 1985). One of the manifestations of iconicity (*see* **Iconicity**), thus broadly conceived, is subject and/or object selection, and linearization in line with what is known as the personal hierarchy (3):

(3) 1 person > 2person > 3person human > higher animals > other organisms > inorganic matter > abstracts

The personal hierarchy reflects the unqualified interest of humans in the ego, their conversational partners, and other humans over and above nonhuman entities or abstract situations and events. It predicts a preference for clauses with human or animate subjects such as *People are dying of starvation* rather than inanimate or abstract ones such as *Starvation is killing people* which is consistently adhered to on a cross-linguistic basis. Apart from the effect that the personal hierarchy exerts on linearization via subject and also object selection, its influence is often observed in the linear arrangement of clitics and bound pronouns, and in the order of conjuncts. In the latter case, however, it may interact with considerations of social status, relative authority, and politeness as evinced by the formal *you and me* as compared to the colloquial *me and you*. Essentially iconic is also the strong correlation between subjecthood and agentivity mentioned in Sect. 2.2, which is seen to reflect a preference for presenting events and situations in line with the actual development of things in the real world. Our perception of natural progression in the case of an action event is from the agent to the patient and for an act of giving from giver to receiver. The choice of agent for subject over that of patient or recipient is thus consistent with both the perceived directionality of events and the dictates of the personal hierarchy.

Under the broad view of iconicity may be subsumed virtually all of the other principles of order that have been proposed to date including the ones to be mentioned in the following sections. More commonly, however, by iconic ordering is meant ordering in line with actual temporal succession. The effect of temporal ordering is discernible particularly in the placement of adverbials and conjuncts. For example, in Mandarin a projected destination is positioned preverbally, a destination already reached postverbally. In English source tends to be placed before destination or goal as in *on the road from Amsterdam to Rotterdam* rather than *on the road to Rotterdam from Amsterdam*. As for conjuncts, in numerous languages, conjuncts generally serialize in ordered sequences such as: first, second … last; beginning, middle, end; anterior, posterior; or a, b, … z, etc., as reflected in expressions like: *in and out*; *there and back*, or *at sixes and sevens*.

Semantic Bonding

The claim inherent in the principle of semantic bonding is that the tighter the semantic link between a modifier and the head, the closer the modifier is likely to be located to the head. The influence of this principle may be observed in the sequencing of the verbal arguments and adjuncts, the ordering of different types of adjectives and adverbials and also in the placement of bound morphemes relative to the stem.

As regards the verbal arguments, the direct object and verb are seen to form a more cohesive semantic and syntactic whole than the subject and verb. This fact in turn is taken to underlie the cross-linguistic infrequency of basic VSO as compared to SOV and SVO orders and the extreme rarity of OSV vis-à-vis the slightly less rare OVS and VOS. To the tight semantic bond between the object and verb is also attributed the tendency to place indirect objects and verbal adjuncts either to the left or the right of the verb–object sequence. This tendency is especially strong in SVO languages in which SVXO orders are found only in heavily restricted sets of circumstances. SOV languages are more permissive in this respect; there are some SOXV languages, and the ones which display SXOV basic order may have SOXV as an option. Nonetheless, the preservation of the integrity of the verb and object combination may be assumed to provide the motivation for the relatively frequent SOVX ordering.

Differences in semantic bonding have also been observed between the verb and its adjuncts. For example, adjuncts designating instruments, speed, or manner specify additional properties of the situation or event denoted by the predicate and its arguments and thus may be viewed as entering into a close semantic relation with the nucleus of the predication. A looser semantic bond exists between the nucleus predication and adjuncts of location, time, or frequency since they do not affect the nature of the designated situation or event, but merely define its spatial or temporal location. Even more loosely related to the predication are epistemic, evaluative, and evidential adjuncts which reflect the speaker's evaluation of or attitude towards the content of the predication while not actually contributing to the semantic content of the predication itself. And the most distinctly linked to the predicate nucleus are illocutionary adjuncts which modify the force of the basic illocution of the utterance. Though the order of verbal adjuncts even more so than that of the arguments is subject to the effect of pragmatic factors, a preference has been discerned for linearizations reflecting the just-noted degrees of semantic bonding. For instance, in the English clause *Honestly, you certainly performed brilliantly yesterday* the illocutionary adverb *honestly* precedes the subjective epistemic adverb *certainly*, and the manner adverbial *brilliantly* is placed closer to the predicate than the temporal adverbial *yesterday*. The semantic modifications introduced by adjuncts can also be expressed morphologically by bound forms, the ordering of which relative to the stem tends to reflect the same semantic scope relations as in the case of adjuncts. For example, the preferred order of application of 'aspect,' 'tense' and 'modality' markers relative to the stem of the verb is either verb–ATM or MTA–verb.

Turning to the modifiers of the noun, the adjective and noun form a semantic whole, while the numeral adds only cardinality, and the demonstrative designates proximity and/or identifiability. In keeping with the principle of semantic bonding, the preferred order of prenominal modifiers is ADJNUMDEM–N and the most frequent order of postnominal ones is N–ADJNUMDEM (Hawkins, 1983: 119–20).

Length and Complexity

The length and complexity of an element is seen to covary inversely with the ease with which its referent can be identified. Identifiability in turn correlates closely with frequency of occurrence and high topicality. Since easily accessible and topical information tends to be placed prior to less accessible material (see Sect. 2.2), by the same token shorter and less complex constituents tend to precede longer and more complex ones.

There is compelling cross-linguistic evidence for the preference to place informationally and structurally light constituents before heavy ones. The following are just a few cases in point:

- the tendency for clitics to occur in second position in the utterance, known as Wackernagel's Law;
- the earlier placement of pronomial as compared to nominal subjects or objects in languages such as Bimoba, Cairene Arabic, German, Grebo, Ila, Karen, Twi, and Uzbek;
- the preference for final placement of sentential NPs observed in, for example, Blackfoot, Tuscarora, Kinyarwanda, Malagasy, Sherpa, Persian, Latin, and English;
- the phenomena of heavy NP shift as in *Fred sent to his client several brochures with all the accommodation details* and extraposition from NP as in *I met a man last night who reminded me of you*;
- the prehead vs. posthead placement of shorter as compared to longer forms of a modifier as is the case with: relative clauses in, for example, Finnish, German, and Tagalog; inflectional and prepositional genitives in several Germanic languages (e.g., *the boy's uncle* vs. *the uncle of my next-door neighbor*); and simple as opposed to complement-taking adjectives in English (e.g., *a proud man* vs. *a man proud of his son*.

Word-order Variation

The significance attributed to the concept of basic order follows from the assumption that the basic

location of functional categories will be maintained unless there are reasons to do otherwise. These reasons may involve pragmatic high-lighting, the varying identifiability or salience of the constituents of the clause, or language-specific considerations such as those following from the verb-second constraint in some of the Germanic languages. Variations in order resulting from the above, typically involve major clausal constituents rather than the elements of noun, adjective, or adpositional phrases, which on the whole display rather stable word-order characteristics.

The number and type of permissible word-order permutations at the sentence level differs from language to language. All languages appear to allow for the initial placement of at least some temporal and spatial adverbials and for the fronting of emphatic and contrastive constituents. Also common are variations in order resulting from the placement of heavy material to the right, mentioned earlier. Interestingly enough, variations in order induced by this tendency even occur in object-before-subject languages which on the whole exhibit word order preferences counter to those displayed by subject-before-object languages.

The potential variations in the positioning of the verb, its arguments, and adjuncts are not predictable from the basic order that a language displays. Linguists have, however, noted a close relationship between a language's basic syntactic order and its positional strategies for the topic and the focal part of the comment; the subject position is the most common location of the topic, and the object position the characteristic location of items in focus. Therefore certain predictions can be made in regard to the most likely placement of constituents bearing particular pragmatic functions, though not concerning the extent to which such placement is actually utilized or the range of constituents that it typically affects. For example, both English and Polish are typically classified as SVO languages, and as one would expect, in both languages the initial position is viewed as the favored location of the topic. Yet in English the placement of nonsubject topics in initial position (particularly of verbal arguments and instruments and benefactives) is highly constrained; OSV and XSV orders as in *Max I like* or *In Kuwait he was born* are unquestionably marked. Whereas in Polish the initial placement of topical objects or adjuncts occurs regularly and is conditioned by the same factors as those affecting the initialization of subjects. Needless to say, Polish sanctions much greater variation in order than English does; in fact in Polish virtually any sequence of the verb and its arguments and adjuncts is possible.

Accounting for Word Order in Grammatical Theory

The typological classification of languages in terms of the basic location of the subject, object and verb, and the preference for modifier/head or head/modifier ordering offers only a restricted amount of information about the word-order patterns to be found in any given language. Nevertheless, it constitutes a good point of departure for theory-specific accounts of linearization. However, since most languages are not consistent in the NSP sense of the term and moreover allow for some variations on the basic order, the formulation of linearization rules capable of capturing the full range of word-order patterns encountered in languages has so far met with comparatively little success. Most grammatical frameworks, for instance, government and binding, lexical functional grammar (*see* **Lexical Functional Grammar**), generalized phrase structure grammar, categorial grammar (*see* **Categorial Grammars: Deductive Approaches**), word grammar (*see* **Word Grammar**), and relational grammar seek to provide an account only of a limited subset of word-order facts, typically those which the theories in question define as syntactic as opposed to pragmatic. And even within such reduced domains they have encountered problems, arising in the main from the failure to include an appropriately wide range of information in the specification of rules of order. For instance, the constituency-based rules of order proposed in the context of lexical functional gammar, do not allow for the inclusion of functional information, nor information pertaining to semantic roles or semantic features such as animacy or definiteness. Since the order of objects in ditransitive clauses and often also the sequencing of clitics is in many languages affected by the above factors, no adequate account of the relevant ordering can be given within the proposed system of rules. To give another example, the linear precedence rules of generalized phrase structure grammar do not make reference to the internal composition of phrases. Therefore the possibility of PP > NP order with heavy NPs in English cannot be accounted for, nor the postnominal location of adjectives taking PP complements.

The complex array of factors that affect word order cross-linguistically and the interrelationships among these factors suggest that the word-order patterns occurring in languages are best viewed not in terms of dichotomous grammaticality judgments, but in terms of a series of choices defining a preferential ranking among the set of word-order possibilities available in a given language. This needs to be captured in any word-order rules that aspire to provide

a comprehensive statement of order. Currently, ways of doing this are being elaborated, which assign a relative weighting to each of the possible orderings and specify how conflicting tendencies defining mutually exclusive linearizations are likely to be resolved within individual languages and across languages. This line of research represents the first serious attempt to integrate syntactic, semantic, and pragmatic aspects of order within specific models of grammar and therefore, in view of the far from satisfactory treatment of word order in modern grammatical theory, undoubtedly, is a step in the right direction.

See also: Categorial Grammars: Deductive Approaches; Greenberg, Joseph H. (1915–2001); Lexical Functional Grammar; Word Grammar.

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Word Recognition, Written

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What are the processes that the brain engages in when making the journey from a visual input of intersecting lines and curves to making contact with meaning? This question has stimulated considerable research since the days of Cattell (1886), generating findings that inform not only psycholinguistics but also domains as diverse as computational modeling (Plaut *et al.*, 1996; Coltheart *et al.*, 2001), automatic and attentional processes (Neely, 1977), pattern recognition (Selfridge and Neisser, 1960), and the neural substrates of language processing (Petersen *et al.*, 1988). Research at the word level is particularly tractable and revealing as words are well-defined units that can be analyzed and processed at various levels (i.e., spelling, sound, grammar, meaning; Balota, 1994).

How Is Word Recognition Studied?

There are many procedures that researchers have developed to study the processes involved in word recognition. For example, in perceptual identification, words are visually degraded by masking or brief presentations, and subjects are asked to identify them, with identification accuracy being the dependent measure. In eye-tracking studies, subjects' eye movements (e.g., fixation, location, and duration) are tracked as they read text. In semantic categorization tasks, subjects are asked to classify words (e.g., is *dog* an animal?), with response latency and accuracy being the dependent measures. In neuroimaging studies, inferences about the processes involved in word recognition are made from on-line measures of the time course and location of neural activity via event-related potentials, positron emission tomography, or functional magnetic resonance imaging. Researchers also study individuals with isolated disruptions in reading (specific subclasses of dyslexia) to better understand normal reading.

Although each of these approaches has benefits, there are also some costs (see Balota *et al.*, 2004). Hence researchers continue to rely most heavily on two relatively simple tasks (lexical decision and naming) to study isolated word recognition. In speeded lexical decision, subjects are presented with either a real word or a nonword (e.g., *flirp*), and they are required to make the word/nonword discrimination

a comprehensive statement of order. Currently, ways of doing this are being elaborated, which assign a relative weighting to each of the possible orderings and specify how conflicting tendencies defining mutually exclusive linearizations are likely to be resolved within individual languages and across languages. This line of research represents the first serious attempt to integrate syntactic, semantic, and pragmatic aspects of order within specific models of grammar and therefore, in view of the far from satisfactory treatment of word order in modern grammatical theory, undoubtedly, is a step in the right direction.

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Although each of these approaches has benefits, there are also some costs (see Balota *et al.*, 2004). Hence researchers continue to rely most heavily on two relatively simple tasks (lexical decision and naming) to study isolated word recognition. In speeded lexical decision, subjects are presented with either a real word or a nonword (e.g., *flirp*), and they are required to make the word/nonword discrimination

as quickly and as accurately as possible. In speeded naming, words (and occasionally nonwords) are visually presented to subjects and their task is to pronounce the words aloud as quickly and accurately as they can. For both tasks, researchers are primarily interested in how quickly people name words or make lexical decisions across different experimental conditions, with the assumption that naming and lexical decision latencies reflect processes involved in accessing lexical representations (Seidenberg, 1990).

Clearly, no single task or method can fully capture the dynamics of lexical processing. A word recognition task measures both lexical processes and operations specific to that task. For example, the lexical decision task is sensitive to discrimination processes that are independent of lexical identification (Balota and Chumbley, 1984). Similarly, naming latencies are heavily influenced by a word's initial sound (Kawamoto and Kello, 1999). Consequently, there is a growing consensus that reading processes are best understood by considering converging evidence across multiple experimental paradigms (Jacobs *et al.*, 1998).

Models of Word Recognition

Many models have been proposed to explain how word recognition takes place (see Jacobs and Grainger, 1994 for a review). One of the earliest models proposed was the logogen model (Morton, 1970), which posits a word detector (logogen) for every word in the reader's lexicon. Each logogen possesses some resting level of activation, and when a word is presented, the logogen for that word accumulates evidence until some threshold is reached. At this juncture, word recognition takes place.

Using the logogen framework as a foundation, McClelland and Rumelhart (1981) developed a very influential computational model of letter and word recognition. The interactive activation model (IAM) contains three processing levels (visual, letter, word), with respective units within each level represented by a node (**Figure 1**). A visual input first stimulates feature-level nodes, which send activation to letter-level nodes, and on to word-level nodes (which correspond to logogens). Over time, each node reflects the activation spreading across the units, and one can test the effect of a variable by inspecting the value of a node after a given amount of time has passed. The IAM accounts for many findings in the literature. For example, the finding that people recognize frequently encountered words (*world*) more rapidly than rarely encountered ones (*glitch*), the word frequency effect, is reflected by the fact that high-frequency word nodes have lower recognition thresholds than low-frequency ones, and so require less evidence to be recognized.

One important aspect of the IAM is its parallel and cascadic nature. In particular, during word recognition, a word is not simply recognized independently of other words stored in the lexicon. Rather, many words receive activation, and the model eventually settles into the appropriate representation across time, via a set of facilitatory and inhibitory pathways. One finding that is consistent with the activation of multiple words en route to recognition is the orthographic neighborhood effect. An orthographic neighbor is a word that can be produced by another word by simply changing a single letter (see Coltheart *et al.*, 1977). So, for example, *can* has the neighbors *cap*, *cat*, *pan*, *con*, *man*, among many others. The orthographic neighborhood effect refers to the finding that words with many orthographic neighbors produce faster response latencies than words with few orthographic neighbors, with this effect being larger for low-frequency words. Hence, multiple lexical units appear to be activated when a single word is presented. Of course, one might have expected just the opposite pattern, because of inhibition of competitors, a prediction from the original IAM. Although more recent embellishments of components of the interactive activation model can accommodate orthographic neighborhood effects (see Grainger and Jacobs, 1996), this is an important area that is still being actively researched (see Andrews, 1997 for a review).

While the IAM describes how lexical access may occur, it does not consider how we read or pronounce words. The dual-route model of pronunciation

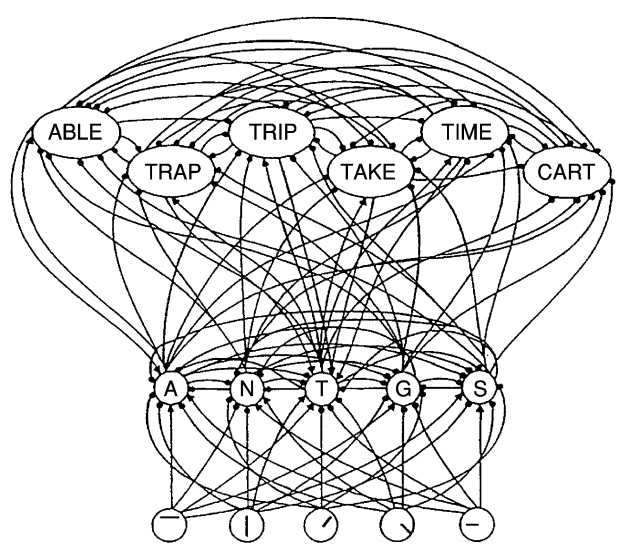

Figure 1 McClelland and Rumelhart's (1981) interactive activation model of word recognition. Copyright (1981) by the American Psychological Association. Reproduced with permission.

(Coltheart *et al.*, 2001) argues that at least two routes mediate spelling and sound (Figure 2).

The lexical route is very similar to the IAM, and simply maps the word's spelling onto its lexical representation to retrieve its pronunciation. In contrast, the sublexical route assembles the word's pronunciation using English spelling-to-sound rules (Venezky, 1970). For example, if a single-syllable word ends in 'e' then the preceding vowel is long, as in *save*. In principle, we need two routes because readers can pronounce irregular words such as *have* (which violate spelling-to-sound rules and hence cannot be correctly generated by them) and nonwords such as *flirp* (which have no lexical representation).

The dual-route model is supported by two other major pieces of evidence. First, although regular words are, on average, pronounced faster than frequency-matched irregular words (Baron and Strawson, 1976), this regularity effect is much larger for low-frequency words than for high-frequency words (Seidenberg *et al.*, 1984) (Figure 3). According to the dual-route model, high-frequency words (regular or irregular) can be pronounced quickly via the lexical route, before the sublexical route assembles a conflicting pronunciation. For low-frequency words, the lexical route is slower, and hence more susceptible to sublexical processes. In this situation, the two routes generate mismatching pronunciations for irregular words (e.g., for *pint*, the lexical route would generate the correct pronunciation, while the sublexical route would generate a pronunciation that rhymes with *hint*), and this conflict takes time to resolve. Early studies of acquired dyslexia also revealed a striking dissociation between the two routes. Individuals with phonological dyslexia (Patterson, 1982) can pronounce real words (that have lexical representations) but perform poorly for nonwords, suggesting a breakdown in the sublexical route. In contrast, individuals with surface dyslexia (Shallice and Warrington, 1980) tend to regularize irregular words (e.g., pronounce *broad* so that it rhymes with *road*), suggesting a breakdown in the lexical route.

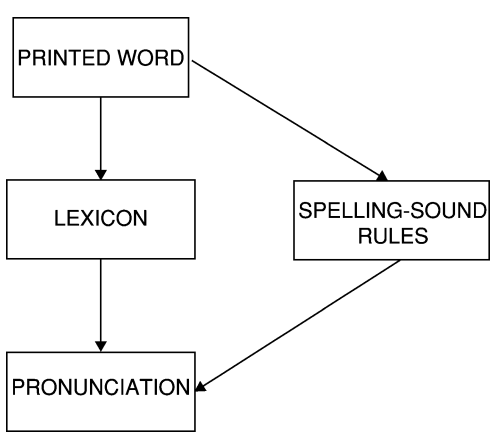

Figure 2 Dual route model of pronunciation.

One or Two Routes? An Ongoing Controversy

An influential alternative to the dual-route model is Seidenberg and McClelland's (1989) connectionist model of naming and word recognition (see Plaut *et al.*, 1996 for an updated version). The model (Figure 4) contains an orthographic layer, which codes the spelling of the stimulus input, and a phonological layer, which represents the pronunciation of the stimulus output.

The network 'learns' to read (i.e., associate a word's spelling with its pronunciation) through repeated exposures to spelling–pronunciation pairs

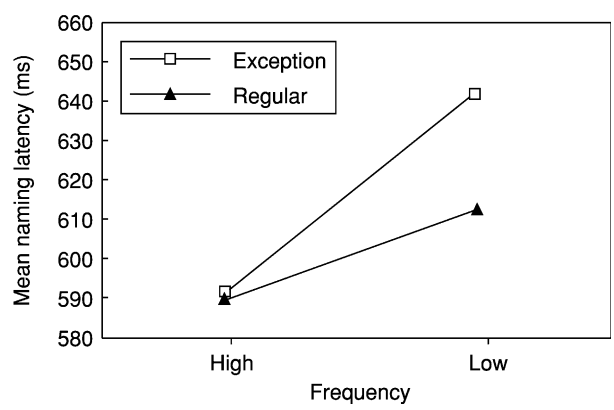

Figure 3 Experimental results from the Seidenberg, Waters, Barnes, and Tanenhaus (1984: Experiment 3) study. Copyright (1989) by the American Psychological Association. Reproduced with permission.

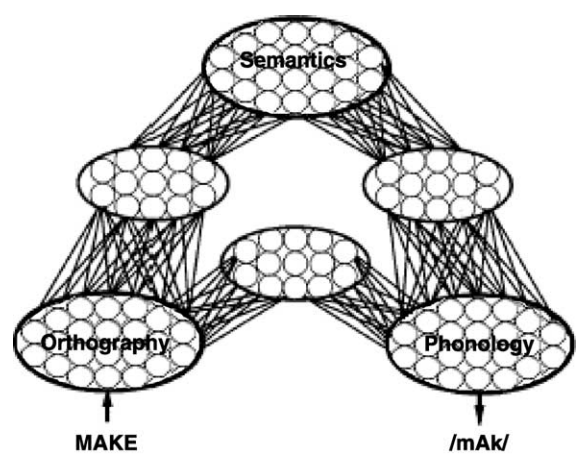

Figure 4 Seidenberg and McClelland's (1989) triangle connectionist framework for lexical processing. Copyright (1997) by Psychology Press Ltd.

(based on their frequency in English), via a feedback procedure (called back propagation). When the output of the model is incorrect, the weights of the connections are gradually changed to more closely approximate the correct response. Importantly, the model can pronounce novel nonwords and simulate critical empirical findings like the frequency by regularity interaction, without explicit spelling-to-sound rules. Plaut *et al*. have thus argued that a single mechanism is sufficient for naming regular, exception, and novel items. Importantly, this model has distributed (rather than localist) word representations. There is no one-to-one mapping between words and nodes; instead, a single word is represented by multiple nodes.

While the connectionist model is not immune to criticisms (see Coltheart *et al*., 1993; Forster, 1994), it challenges the dual-route framework and provides a cogent alternative to it. Furthermore, the debate between one and two routes has ramifications beyond psycholinguistics. It also recapitulates the controversy between classical and connectionist models: is cognition supported by symbolic manipulation (dual route) or connectionist networks (single route)? In this instance, the contrasting models of reading function as paradigm cases for cognitive science (Perfetti, 1999).

Although considerable progress has been made in developing computational models of word recognition, these models have primarily focused on single-syllable word processing, in large part because large databases for multisyllabic words were not available. However, a web-based database of over 40 000 multisyllabic, polymorphemic words has recently been developed, containing both behavioral measures and a powerful search engine. Hopefully, this will help guide future work and extend these models into larger word units.

Context Effects on Word Recognition

Of course, words are most often not presented in isolation, but occur in the context of other words. Researchers have studied context effects in word recognition via both single-word context and studies that have manipulated sentence contexts. With respect to single-word contexts, there have been many studies of a phenomenon referred to as the semantic priming effect (see Neely, 1991 for a review). In this situation a prime is presented before a target word and one manipulates the relationship between the prime and the target (e.g., *doctor-nurse* vs. *carpet-nurse*). The intriguing finding here is that response latencies to the second word are faster when it follows a related prime than when it follows an unrelated prime, even though no overt response is required of the prime stimulus.

There appear to be least two important mechanisms that underlie priming effects (Neely, 1977). One is relatively slow and involves subjects attending to the relation between the prime and the target. For example, when presented with *doctor*, they may generate words that might follow and when one of the generated words is presented (e.g., *nurse*), they are relatively fast to make a response. The second, more intriguing, mechanism is a fast-acting process that has been likened to a spread of activation within an interrelated network (see **Figure 5**). This second mechanism presumably acts independently of the subjects' conscious processing and appears in situations where the prime is presented so briefly that subjects are unaware of its presence. Interestingly, Balota and Lorch (1986) found priming between words that on the surface do not appear to be directly related (e.g., *lion-stripes*). This is predicted by the spreading activation network perspective, because hidden within the presumed semantic network are mediating nodes (e.g., in this case *tiger*). In this way, researchers use the priming technique to make inferences about the representation of knowledge in the lexicon, and the processes used to access that information (see Hutchison, 2003 for a recent review).

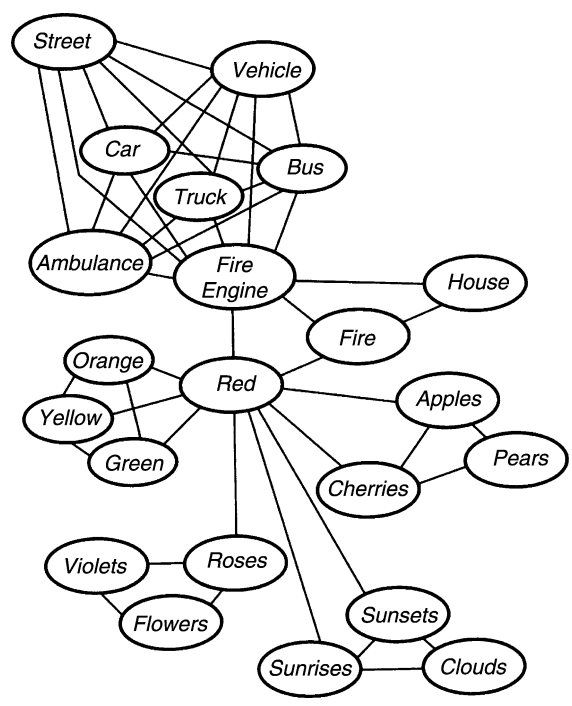

Figure 5 Collins and Loftus's (1975) spreading activation model network. Copyright (1975) by the American Psychological Association. Reproduced with permission.

In addition to single-word contexts, there have been many studies investigating the influence of sentence context on word recognition latencies (see, for example, Stanovich & West, 1983). One of the intriguing initial findings in this area is that sentence context does not influence lexical processing immediately but has an influence later on in integrating the word with the context. For example, Swinney (1979) found similar levels of activation, as reflected by priming techniques, for the interpretation of *bug* referring to *spy device* and *insect*, even though the word *bug* was immediately preceded by "spiders, roaches, and other" as part of a sentence context. It is only later on in processing that the sentence context disambiguates the word. Thus, it was argued that early lexical processes proceed relatively uninfluenced by sentence context, akin to the mechanism of automatic spreading activation mentioned above. This work was particularly important in advocating a dedicated self-encapsulated lexical module (e.g., Fodor, 1984). More recent work on this topic suggests that context can have an early influence if it is sufficiently strong (see Tabossi and Sbisa, 2001 for a review).

Word Recognition: the Future

The study of visual word recognition will continue to be a vital area of research in experimental psychology and psycholinguistics, with a number of important challenges. For example, we believe that future models will take into consideration the manner in which attention and task constraints influence the lexical processing system. As one can see from the models described above, most models assume a relatively passive lexical system that responds to stimulus input. However, a more comprehensive model will most likely include an attentional system that modulates the weights on specific pathways depending upon the goals of a given task. In addition, there will be some constraints provided from the *in vivo* studies of the human brain while it is engaged in lexical processing, via neuroimaging techniques. As noted above, multiple models may be able to accommodate the same set of findings. It is likely that understanding patterns of neural activity in circumscribed brain areas will provide an important next step in this literature (e.g., Binder *et al.*, 2003).

See also: Developmental Dyslexia and Dysgraphia; Human Language Processing: Connectionist Models; Human Language Processing: Symbolic Models; Lexical Semantics: Overview; Phonological Awareness and Literacy; Phonological Impairments, Sublexical; Phonological, Lexical, Syntactic, and Semantic Disorders in Children; Psycholinguistics: Overview; Radio: Language; Second Language Reading; Speech Recognition: Psychology Approaches.

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Relevant Website

http://elexicon.wustl.edu.

Word Stress

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The Basic Phenomenon

Consider the English word *hippopotamus*. Almost every speaker of English will pronounce the medial syllable of this word with more 'articulatory force' than all other syllables. It is common to refer to this syllable as being *stressed*, or carrying *stress*. Dictionaries often signal the location of word stress using a dash or 'accent mark' (hippo'potamus) before the stressed syllable, or sometimes they use capitalization (hippoPOtamus). Phonetically, 'articulatory force' involves a number of properties that the stressed syllable has to a greater degree relative to the unstressed syllables. For example, the stressed syllable is more precisely articulated, longer, louder, and often higher pitched. Duration, loudness, and pitch are all properties that all syllables have to some degree, but the stressed syllable has all of these to the greatest degree. In addition, its consonants and vowel may have special allophonic properties such as aspiration or 'full quality' (as opposed to being reduced). All these phenomena can be observed in our example, which might be transcribed phonetically as follows: [hIpəp^{h}arəməs]. The /p/ of the medial syllable is aspirated, unlike the /p/ of the second syllable. The second, fourth, and fifth vowel is [ə], the schwa, a vowel that never occurs in a stressed syllable, where we always find the full vowel quality; the occurrence of the vowel [I] in the first syllable will be discussed below. Besides phonetic and allophonic cues, stress also has phonotactic cues in that stressed syllables often allow more phoneme combinations (like more complex onset clusters, or more complex nuclei).

From Stress to Accent: Cues for Accent

While many languages display the phenomenon of word stress (the percentage of languages is not known) as just described, many other languages display a quite similar phenomenon in that a particular syllable in the word is singled out, the difference being that the cues for its special status are not the same phonetic, allophonic, and phonotactic cues that we find in English. In one specific case that is often mentioned, the syllable that stands out is mainly or perhaps exclusively associated with a high(er) pitch. The typical example is (Tokyo) Japanese in which words have pitch patterns that involve a high pitch on what is called the *accented* syllable (in addition, there is leftward spreading of this high pitch); McCawley (1968), Haraguchi (1977). Hyman (1977) referred to such systems as 'pitch-accent systems,' while proposing to use the term 'stress-accent systems' for cases like English. In this terminological proposal, the term 'accent' refers to the property of 'standing out,' while the terms 'stress' and 'pitch' refer to the phonetic cues that signal the location of the accented syllable. It is conceivable that a fine-grained typology of cues for word accent will reveal many more types such as duration-accent systems (in which duration is the primary or only cue). It would seem that in such a typology, the term 'stress' refers to a rather heterogeneous collection of phonetic, allophonic, and phonotactic properties. It may be that such a collection of properties represents a true type, but it may also be that, on closer investigation, so-called pitch-accent languages may also involve additional allophonic and phonotactic cues. In short, accent may be signaled in terms of many combinations of cues of various sorts. The cross-linguistic array of accentual cues is at present far from understood and much detailed phonetic and phonological analysis is needed in this respect; cf. Dogil and Williams (1999). The important point here is that it seems useful to separate the notion accent (a formal property of syllables without any link to specific cues) and accentual cue(s). In this article, the main attention will be on the notion of accent. Before embarking on a formal characterization of this notion, it must be pointed out that it is by no means necessary (given the above) that accents manifest themselves by cues in all cases. Of course, a discussion of accent in a language that apparently lacks any cue is pointless, but we must reckon with situations in which accents manifest their presence in specific circumstances or in specific ways in a language. As already indicated, in the absence of phonetic cues such as extra duration, loudness, etc., allophonic or phonological phenomena may designate a syllable as being accented. Also, it could be that in languages that have lexical tones (so-called lexical tone languages, which are often placed in opposition to accentual languages), distributional restrictions on tonal patterns may be accountable in terms of a distinction between accented and unaccented syllables. It has, in fact, been recognized that it is sometimes difficult to draw the line between tone languages with certain distributional restrictions and pitch-accent languages, the term tonal accent language being put forward as a label for the intermediate categories (cf. van der Hulst, 1999a, Sect. 1.5).

Functions of Word Accent

Intonation

Turning back to English, let us note a thus far ignored cue for word accent. Consider the example *hippopotamus* in the following sentence:

```
H                                H
|                                |
I have always wanted to be a hippopotamus
```

The 'H' symbols represent some of the units that make up the so-called intonational melody; in a full account, other tones will be specified (*see* **Intonation**). In English, speakers can draw the listener's attention to specific parts of the utterance (among other means) by associating high tones to certain words. The point here is to see (or hear) that these tones are associated with specific syllables in those words, namely the accented syllables. Thus, we see that intonational tones can be cues of word accent in the sense that these tones tell us which syllables in a word that carry them are accented. If we place *hippopotamus* in a sentence in which the speaker does not draw attention to it (because it has already been mentioned before), an H tone no longer signals the accent, which is now only cued by the other properties (in fact, it may be that pitch is not significantly among those, the claim that pitch is a relevant cue mainly being based on cases in which words carry an intonational tone). Intonational tones have been called 'pitch accents,' which can lead to some confusion with the notion of pitch accent that was used above with reference to pitch-accent systems (such as Japanese). The point is that word accent can be signaled by non-intonational pitch property at the word level, as in a pitch accent language, or, as in English, by an intonational pitch property. In both cases, we deal with a pitch property that associates with an accented syllable, at the lexical level (Japanese) and postlexical level (English).

The role that accents play in the anchoring of intonational tones can be understood both as providing a cue for word accent, but also as a function of word accents, given that a system must be in place for anchoring the intonational units to the 'text.' Conceivably, other anchoring systems could be, and probably have been adopted, for example those in which intonational units consistently associated with the first or last syllable in phrases, irrespective of the location of word accents.

Demarcation

It has also often been suggested that word accents function as parsing cues, the idea being that listeners can use knowledge of accent location to cut up sentences into words. This has been called the demarcative function of word accent. If the location of accent is consistently on the first syllable, listeners know that every accent marks the beginning of a new word. From this perspective, it is expected that word accents always occur on word edges, i.e., on the first or last syllable, but this is not the case. As we will see below, word accents can occur on nonedge syllables, either consistently (in which case their location can still be a useful cue for finding word edges by making the relevant computations), or nonconsistently (for example, when syllable weight plays a role; cf. below). We will learn that some of the nonconsistent cases can no longer be said to have a demarcative function.

Rhythm

Speech depends on sequential motoric behavior involving repetitions of units such as syllables, words, and phrases. It seems to be that human bodies (and human minds) function best when sequential motoric behavior is carried out 'rhythmically,' i.e., in terms of alternating 'stronger' and 'weaker' actions that are spaced out fairly regularly. Thus, sequences of syllables might display a strong-weak pattern. Let the string in (1) be a sequence of words (delimited by square brackets) in which the sigma symbols represent syllables. At level 1, each word has been rhythmically organized into strong (indicated by 'x') and weak syllables. With several level 1 x-marks being present in longer words, we expect to find a further rhythmic grouping within words of strong syllables (level 2). To keep the structure consistent, we will also assign a level 2 x-mark in shorter words that have only one level 1 x-mark.) Each word now has a perfect rhythmic structure. Note that the specific form of this rhythmic structure might be different depending on how in particular we distribute the level 1 marks, i.e., whether we start on the left or right side of the word, or whether we start on the syllable at the (left or right) edge or first skip one syllable. Below we will see that such choices are real in that languages may display different types of rhythm.

Now we encounter a sequence of words forming phrases (indicated by '(. . .)'). To be in rhythmic alternation, words must have a designated syllable that functions as the anchor of strong beats within the phrasal domain. Let us say that this is the rightmost strong syllable in the word at level 2, but this could again be different in that we could have picked the first strong syllable at this level. Having now created level 3 (the so-called primary word accent), we are in a position to assign a rhythmic structure to the sequence of words that form a phrase. Let us say that

each last word, and every other preceding word, in the phrase must be rhythmically strong; this gives us level 4. Finally, we may rhythmically group the phrases that form the sentence (indicated by '{. . .}') and for this it is necessary that multiword-phrases have a potential anchor point for rhythmic beats. Let us say that in our hypothetical example, this is always the last word in the phrase (level 5, 'the phrasal accent'). At level 6, we represent the rhythmic alternation of phrases (ignoring a potential cyclical procedure enforced by any subgrouping of phrases within the sentence, or, for that matter the question of whether the sentence as a whole has a strongest beat, the so-called sentence accent, which would then be level 7). It should be clear that the x marks at level 3 and 5 are necessary in order to allow a rhythmic grouping of words and phrases. These x's represent word accents and phrase accents, respectively.

(1)

| | | |

metrical tree. We will see in a moment that the metrical tree, as traditionally understood **incorporates** a grid structure so that, in the end, only one structure is needed.

Trees primarily express the notion of constituency or grouping. Terminal elements are grouped into constituents and these constituents are then grouped into successively larger groupings. In linguistics, the left-right order of symbols (imposed by the two-dimensional graphic display) is usually interpreted as expressing the left-right order of the linguistic units that they stand for. A third piece of information can be expressed by trees, namely the fact that in each grouping one element has a special status; this element is called the head, the other element(s) being called dependent(s). Metrical phonology (or, as it is often called, prosodic phonology) offers a theory of phonological grouping that incorporates the idea of headedness. The specific structures that are advanced exhibit mostly binary branching nodes as well as strict layering (rather than recursion) of constituent types (such as syllables, feet, prosodic words, etc.). The idea of headedness in phonological grouping has also been the cornerstone of Dependency Phonology (*see* **Dependency Phonology**) and its relevance to stress has also been proposed by Rischel (1972).

Within the domain of words, phonological grouping starts with segments that form syllables (and possibly subsyllabic units such as onsets and rhyme and/or moras). The novelty of metrical theory and Dependency Phonology lies in the proposal that the grouping of syllables into headed, binary constituents (called feet), can be used to express rhythmic alternation in the sequence of syllables. A further grouping of feet can then be used to express word accent:

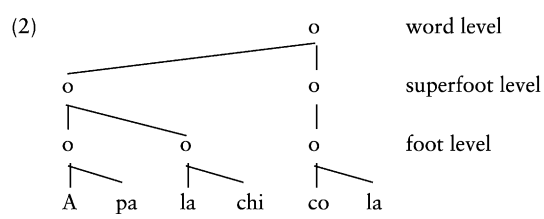

The notation adopted here is the one proposed in Dependency Phonology. We also find it in Hammond (1984) within the metrical model. Each unit that is a head is dominated by a vertical line and a small circle. Metrical phonology originally used the labels 'S' for head and 'W' for dependent. It is obvious that the little circles, if taken in isolation, represent the exact same structure as the grid structure in (1) (cf. Ewen, 1986).

The organization of feet into words has been subject to some debate. In (2), the first two feet form a 'superfoot' (or cola). This structure clearly expresses that the first syllable is more prominent than the third. An alternative would be to group feet into uniformly branching trees only:

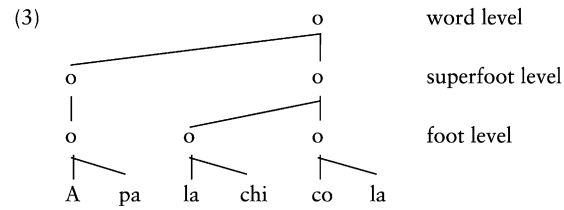

Independent of this issue, others have proposed disregarding the level between the foot and the word. Halle and Vergnaud (1987), who adopt a bracketing notation for tree structure, adopt this view (using the grid-like x symbols to represent headedness):

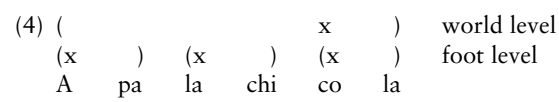

This bracketing approach has been further developed in Idsardi (1992) with an interesting twist. Idsardi suggests that structure can be built up by rules that insert isolated left or right brackets (forming what one might call open constituents). Apart from providing highly economical algorithms, it might be that such open constituents are useful devices in cases where we deal with metrical incorporation (of 'stray syllables' or clitics; cf. 'Unbounded Systems'). Pushed further, Idsardi's approach might lead to a theory in which the symbols (the brackets) function more like boundary symbols than graphic devices for tree structures (cf. van der Hulst).

The claim that phonological constituents are headed provides a formal reconstruction for the notion accent: being accented can now be understood as being a head. In that sense, it may be that the 'function of accent' is identical to the function of heads, which is perhaps a purely cognitive function, i.e., a necessary property of mental representations of a certain type. If such a view can be defended, it follows that all languages must necessarily be accentual, even those that lack accentual cues. Accentual cues would exist as parasitic (and potentially useful) devices to a structure that exists for independent, cognitive reasons.

A Parametric Theory of Accent

If the accentual pattern of *Apalachicola* is anywhere near representative of accentual word patterns of English words, we might conclude that the following two statements characterize English word accent:

(5) The feet are left-headed (i.e., trochaic)
The word is right-headed (the rightmost foot is the head foot)

Together these two statements characterize a penultimate (paroxytone) accent on the assumption that syllables are grouped into feet from right-to-left, i.e., starting at the end of the word. That direction of footing matters becomes evident when we consider a word with an odd number of syllables:

(6)
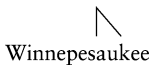

To achieve penultimate accent, a left-headed foot must span the two rightmost syllables, a result that would not be obtained if grouping proceeded from left-to-right:

(7)

Unfortunately, for English, we cannot always assume that feet are formed throughout the word from right to left. A consistent application of this procedure would yield:

(8)

But the second syllable of this word bears no accent, witnessed by its schwa-vowel. Here we find a first indication that generalizations concerning primary accent and nonprimary accent may not be expressable straightforwardly in a single set of statements. It would seem that something like (9) is required:

(9) Form one right-headed foot at the right edge
Form right-headed feet from left to right avoiding clash
The word is right-headed

(10)
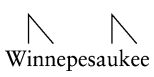

The medial syllable that thus far remains unfooted could now be incorporated by convention into the first foot, forming a (derived) ternary foot, assuming that metrification must be exhaustive:

(11)
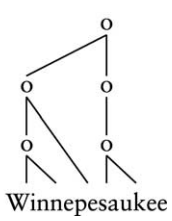

Below, we will see that a full statement of English word accent requires additional statements (bearing on the role of syllable weight). However, (5) would do quite well for almost all words in Polish where weight effects are missing. Let us now investigate how other types of word accent can be accounted for.

Languages display a rich variety of accentual types and although many matters are still unclear or unsettled, accent typology forms a quite well-developed and highly interesting area of phonology. Many questions that remain involve the character and formal representation of nonprimary accents. Here, let us focus first on primary accent locations. In many languages, primary accent locations are fixed on a specific syllable for the vocabulary as a whole (barring exceptions that may always occur):

(12) Initial accent: Icelandic, Hungarian
Second syllable accent: Dakota
Third syllable accent: ?
Antepenultimate accent: Macedonian
Penultimate accent: Polish
Final accent: Turkish

A rich source of information about these and many other accentual systems, containing references and many detailed analyses, remains Hayes (1995). It would seem that five locations occur, third syllable accent being attested in one questionable case (Winnebago). But there are significant frequency differences in, as far as we can tell, the present databases:

(13) $[\sigma\ \sigma \ldots \sigma\ \sigma\ \sigma]$

Penultimate and initial location are favored over final location, second syllable and antepenultimate accent being rare (cf. Hyman, 1977). It is easy to see how initial accent can be derived. We simply form a left-headed foot at the left-edge of the word and make sure that the word is left-headed. But how do we derive second syllable and final accent? Hayes (1980) adopted the idea that such systems involve right-headed (or iambic) feet. Clearly, a right-headed initial foot delivers second syllable accent, while a right-headed final foot delivers final accent (provided that in both cases these feet are heads of the word). We now have the rudiments of a parametric theory of word accent:

(14) Accentual parameters (for primary accent)
Foot type: left-headed/right-headed
Edge: left/right
Word type: left-headed/right-headed

In fact, the parameters Edge and Word type could be considered one and the same if we simply assume, as suggested above, that separate statements are made about primary and nonprimary accents and that, by convention, primary accent feet are heads of words. Thus for English, we might then state:

(15)

Primary accent	Nonprimary accent
Foot type: left-headed	Foot-type: left-headed
Edge: right	Edge: left

In this view, as a matter of convention, foot formation for primary accent is noniterative, while foot formation for nonprimary accent (i.e., rhythm) is iterative. It remains to be seen whether, perhaps, the foot type for rhythm is always identical to the foot type for primary accent, or, alternatively, whether the foot type for rhythm is universally trochaic.

Standard metrical theory did not adopt the idea of separating primary and nonprimary accent. This model adopted a procedure that would first construct a layer of feet across the whole word, while then 'promoting' a left or right peripheral foot to head status of the word. Under this approach, differences between generalizations concerning primary and nonprimary accent would necessitate the formulation of adjustment rules of various kinds. The idea to separate primary and nonprimary accent was suggested in van der Hulst (1984) and developed in subsequent work (van der Hulst, 1996, 1997, 1999a, 1999b). Others (within metrical or other frameworks) have made similar suggestions (Roca, 1986; Hurch, 1992; Harms, 1981). In an approach that separates both phenomena, it must be stated that primary accents are not only more prominent than secondary accents, but also that they literally take precedence over secondary accents in that the latter fill out the accentual space that is left open by the primary accent foot, while paying respect to the primary accent location by avoiding clash. Such 'top-down' effects are inexpressible in a procedural bottom-up standard metrical account, which is incompatible with the idea that primary accent is somehow assigned first or somehow takes precedence. In Optimality Theory, this fact has been taken as an argument to adopt a nonprocedural constraint-based approach, which allows constraints bearing on head feet (primary accent) to outrank constraints bearing on dependent feet (nonprimary accents). Alternatively, it might be argued that primary accent and nonprimary accents are constructed in different planes, or that primary accent assignment and assignment of rhythmic structure are fully complementary (cf. van der Hulst (1996), for this latter approach).

Further Issues

Extrametricality

In the preceding discussion, we have ignored the case of Macedonian in which accent regularly falls on the antepenultimate syllable. Little of interest has been said about how to handle such cases. It is apparently the case that the rightmost syllable of words can be 'ignored' when metrical structure is constructed. Hence, this syllable is said to be extrametrical. This is a parametric option that, apparently, is limited to the rightedge, hence the absence of third syllable accent. An extrametrical syllable can be incorporated into the rightmost foot if metrification of words must be exhaustive. Technically speaking, we could now reconsider penultimate systems as involving extrametricality and iambic feet, but little would be gained by such a move, especially in light of the view that trochaic grouping seems to be the preferred type (witnessed by the preference of initial over second syllable accent, and by the predominance of trochaic patterning of nonprimary accents).

Exceptions

Even in Polish, some words may exceptionally have either final or antepenultimate accent. The latter can be accounted for by assuming that extrametricality may be lexically marked in such cases (rather than following from a parametric setting). Final accent also requires a lexical mark. It has been suggested that such cases can be handled by lexically 'specifying' a silent syllable. This has been called catalexis by Paul Kiparsky (cf. Kager, 1995 for discussion). Alternatively, the final syllable can be marked as a head, using a diacritic mark. The marking device is preferable if we find that left-edge systems (with fixed initial or second syllable accent) also can have exceptions, such as a second syllable accent in an initial system. If extrametricality is not available as a left-edge device, only marking could do the job. In the reverse case of first syllable accent in a second syllable system, only marking could be used even if extrametricality would be adopted at the left-edge. Below, it is suggested that the head marking option is also preferable for other reasons.

It has been argued that languages can have so much lexical marking that the suggestion that accent is fixed loses its meaning. It has been suggested that such cases should be referred to as free accent, and it has sometimes been implied that in such systems accent can be anywhere in the word, i.e., in locations other than those in (13). Such claims must be looked at with skepticism. Excluding consideration of so-called unbounded accent systems (cf. 'Foot Typology'), exceptions, even when highly frequent, are restricted by occurring within the left- or right-edge two-syllable window (modulo extrametricality). In Spanish, for example, accents may occur in the final, penultimate or antepenultimate syllable and (excluding the effects of morphology, cf. 'Unbounded Systems') lexical marking is required to derive two of these three options (cf. Roca, 1999 for a comprehensive account).

It seems, furthermore, likely that the occurrence of exceptions is also restricted in that exceptions do not

seem to occur on the opposite edge of where regular accents occur, or, if the notion 'regular' is not applicable, that accents are located on opposite edges within the same language. To the extent that such mixes occur, we would expect that the languages in question have mixed vocabularies with words that originate from other languages, while maintaining different phonological systems for these lexical strata. In that case, one would have different accentual accounts of the two cases and there would be no exceptions in the true sense of the word.

Variable Weight

We have so far considered cases in which accent is fixed on a specific syllable in all words (barring exceptions and free accent systems). Many languages have accentual systems like that. Many others display the effect of syllable weight (cf. Hyman, 1984; Goedemans, 1996, 1999). Here is an example:

(16) Accent falls on the final syllable if it is closed, otherwise on the penultimate syllable

Even though accent placement is predictable by rule, accent location is not fixed. Rather it varies due to the influence of the content of the syllables within the accentual window. In a system of this type, closed syllables are said to attract accent. The regular foot type is trochaic but there is a constraint that bars closed syllables from being the dependent member in a foot, or stated positively, that requires heavy syllables to be heads. In a parametric view, this constraint would be parametrically present or absent in the grammar. If present, the system is called weight-sensitive.

It is easy to understand what is going on in weight-sensitive systems. Accent can be understood as 'positional prominence', i.e., as prominence due to position with reference to a word edge. A syllable is assigned head status simply for being in the right position in the word. But syllables are not all equal in terms of their phonological content. Arguably, closed syllables have more content. If a language has closed syllables (some do not), and there is an accentual system, a potential conflict arises when a syllable that is prominent due to content is placed in a position that is positionally nonprominent. This is exactly what happens if a final heavy syllable is left unaccented, while the penultimate syllable (whether heavy or light) is accented. If the weight constraint is active in a language (or high ranked in an Optimality Theoretic account), final heavy syllables will form the head of a (nonbranching) foot, which, as the rightmost foot, can then end up as the head foot of the word.

What makes syllables heavy can differ from language to language, or several factors may be at play in a single language. Typical weight factors are syllable closure and vowel length. In some cases, the type of consonant that closes the syllable may be critical such that only closing sonorant consonants make the syllable heavy. Other factors are full vowel quality as opposed to reduced vowel quality, or having a lexical high tone. It may even be the case that vowel height (or vowel sonority) plays a role, with open (more sonorous) vowels attracting accent. Typically, there are just two weight classes (heavy and light), but it has been argued that in systems where segmental sonority is a factor, more than two weight classes may be distinguished. In such cases, the weight constraint cannot absolutely bar certain syllable types from dependent position. Rather, a constraint must be postulated that prevents the dependent syllable from being heavier than the head syllable. (The more typical binary weight systems are simply a special case of this more general 'mismatch' constraint).

English word accent is clearly weight-sensitive (in addition to being governed by a substantial number of lexical exceptions); cf. Kager (1989) for a detailed treatment.

Returning now to the phenomenon of lexical exceptions, one might suggest that syllables that must be marked as heads (such as final accented syllables in Polish) display what might be called diacritic weight. Thus, by using marking (rather than catalexis), a uniform account is possible of certain types of exceptions and accent placement that is sensitive to phonological weight.

Foot Typology

In accordance with the foot parameters in (14), we could have four foot types. Hayes (1980) provides examples for all of them in both directions of footing, thus revealing eight types of languages. Subsequent research has revealed, however, that not all types are widely attested. Hayes (1995) reports that systems making use of the weight-insensitive iamb and the weight-sensitive trochee are suspiciously rare, or, worse, produce unattested patterns under certain circumstances (i.e., in interaction with other parameter settings). Hayes therefore proposes to eliminate the weight-insensitive iamb and to replace the weight-sensitive trochee by a so-called moraic trochee. A moraic trochee is a left-headed foot type that maximally contains two light (i.e., monomoraic) syllables or one heavy (i.e., bimoraic) syllable.

The cases that were represented in earlier works with weight-insensitive iambs and the weight-sensitive trochees were now in need of an alternative analysis. By allowing certain manipulations at the edges of accentual domains (like excluding syllables from the parse by extrametricality) or postulating

empty final syllables (catalexis), such an alternative could usually be found.

The possibility of making these reanalyses showed that the standard theory was overly rich anyway. The reanalyses of course had to express the same prominence patterns but usually led to different constituent structures when compared to the original analyses. Even though details of foot structure may in principle play a role in the application of segmental phonological rules, such evidence requires access to details of the phonology that were often not studied or reported in grammars or phonological sketches.

The next step was taken by Kager (1993) who extended the bimoraic upper bound of moraic trochees in two ways. Firstly, he proposed that weight-sensitive iambic systems do not require (lh) feet. He suggested reanalyses for the few cases that were originally analyzed with such feet. Secondly, Kager suggested that the bimoraic requirement was also the lower bound, which implies that so-called monomoraic (also 'unary' or 'degenerate') feet were banned. Hayes (1995) accepts Kager's ban on monomoraic feet with certain qualifications that I will not discuss here.

Van de Vijver (1997) and van der Hulst (1999b) question the existence of iambic feet in more radical terms, both arguing for different ways of dealing with 'iambic' systems. For extensive discussions of these developments see van der Hulst (1999a, 1999b, 2000).

Unbounded Systems

In all systems discussed so far, accent placement results from the formation of a foot at the right or left edge of the word. A different type of system exists in which accent placement is purely driven by syllable weight without foot formation. Four basic types occur:

(17a) Last/First: accent to last heavy syllable and, if there is no heavy syllable, the first syllable
(17b) Last/Last: accent to last heavy syllable and, if there is no heavy syllable, the last syllable
(17c) First/Last: accent to first heavy syllable and, if there is no heavy syllable, the last syllable
(17d) First/First: accent to first heavy syllable and, if there is no heavy syllable, the first syllable

Various approaches to such systems, called 'unbounded,' can be found. The classical metrical account relies on unbounded weight-sensitive feet. Prince (1985) suggested an account with bounded feet that directly target heavy syllables rather than being assigned proceeding from a word edge. The fact that such systems do not appear to have rhythmic, nonprimary accents (although more detailed descriptions are needed), as well as the fact that primary accents can be located anywhere in the word (dependent on where heavy syllables occur) suggest that such systems do not rely on binary feet. Hayes (1995) indeed suggests that these systems are not rhythm-based.

A different procedure is suggested in van der Hulst (1996, 1999a) where it is argued that the four options in (17), in fact, also occur in bounded systems, albeit within a two-syllable window (reminiscent of peripheral foot formation). The proper treatment of such systems remains an open issue.

Relevance of Morphological Structure

What is the domain of word accentual structure? So far we have assumed that there is a clearly defined notion of 'word' that constitutes this domain. But in some cases, it appears that the domain of word accent is smaller than the word **taken as the maximal morphological and minimal syntactic construct**, while in other cases it seems to be bigger. The parts that make up compounds in English clearly form separate domains for word accent. As such, English compounds require separate statements for selecting a word accent from the word accents of its members. Word accents that are not thus selected survive in the accentual structure of compounds as nonprimary accents. Embedded units of derived words have also been argued to form separate accentual domains, the idea being that the accentual procedure first applies to the most embedded unit and then successively applies to the larger domains that are formed by the addition of affixes. This procedure is called cyclical assignment of accent. Again accent of embedded cycles may survive as nonprimary accents of the whole word. The facts are less clear and the cyclical account of word accent in derived (noncompound) words (as proposed in Chomsky and Halle, 1968) is debatable. Predicted cyclic nonprimary accents do not always show up where they are supposed to.

Cases of this sort suggest that the domain of accent, if it is to be called 'a word,' cannot be the morphosyntactic word. Students of accent and phonological constituent structure have introduced the notion prosodic word for this purpose. A prosodic word is thus a grouping of feet that may coincide with substructure of the morphosyntactic word. It appears to be necessary to regard the prosodic words as a recursive unit in those cases where we find multiple affixation (assuming the validity of a cyclic account). It remains an open question whether compounds form prosodic words that themselves consist of prosodic words.

Morphology can also be relevant in unbounded systems. In Russian, where morphemes have unpredictable ('free') accent locations, polymorphemic

words need a statement to indicate which accent wins if there is more than one, or to indicate an accent location if no morpheme is lexically accented. The relevant statement is that in (17a) with 'heavy' replaced by 'lexically accented.'

Much is still unknown or unclear concerning the relevance of morphological structure to accent placement, especially in language of the 'polysynthetic' type in which we find words composed of many morphemes; cf. Revithiadou (1998).

In those cases where accent placement has been argued to refer to domains larger than the morphosyntactic words, we also need to distinguish several types of cases. Much depends on one's treatment of inflection which, if dealt with syntactically, may necessitate application of (special) accentual rules to inflected words. Another issue concerns so-called clitics (*see* **Clitics**), which, understood as separate syntactic units, may lack word accent and incorporate into the metrical structure of a preceding or following word, with possible effect on the accentual structure of the resulting clitic group (which some regard as an extended version of the prosodic word); cf. Peperkamp (1997).

A further sense in which word accent may refer, or be dependent on larger domains, concerns the phenomenon of accentual shift in phrasal combinations. In English, for example, many adjectival words occur with different accentual structures depending on whether they are placed before a noun or not. The word *thirteen* is finally accented in isolation or in final positions in phrases, but appears to have initial stress in:

(18) thirteen men

If the final pattern is taken to be basic, a phrasal adjustment is required (often called the rhythm rule). In any event, word accent seems dependent on phrasal context. There is a rich literature on this topic (Prince, 1993; Selkirk, 1984; Giegerich, 1986; Visch, 1999; Hayes, 1994; Gussenhoven, 1991).

Optimality Theory

The bloom of metrical theory occurred throughout the 1980s. With the rise of Optimality theory in the early 1990s, (OT) we see an initial focus on some areas where OT appears to offer an advantage, followed by other work in which all the early generalizations are translated from parametric accounts into accounts based on constraint-ranking, often with no obvious gain or loss. The arena of accentual phenomena seems to display quite a few cases where constraint-ranking is appealing. We already mentioned the interplay between primary and nonprimary accent, which is problematic for a bottom-up procedural account (although an alternative approach was suggested). In the case of syllable weight, we also seem to see the effect of a conflict between positional prominence and prominence due to content. To say that weight-sensitive languages rank weight-sensitivity over some other constraint that demands 'regular rhythmic grouping' seems appealing, but, of course, an account that appeals to presence or absence of the weight constraint in the grammar works equally well. In fact, it is quite easy to restate all parametric work in terms of ranked constraints, since, from a formal point of view, the power of parametric accounts is included within the power of OT accounts.

Although useful new empirical work has been carried out within the OT area of some specific accentual systems (Hung, 1993), in general, there has been much less advancement of our understanding of word accentual typology and accentual representations in the 1990s than in the previous decade. Of course, it is to be expected that OT analyses, with their virtually limitless introduction of new constraints, apparently can deal with subtle or 'gradient' phenomena that fall outside the reach of the 'cruder' parametric approaches. It remains to be seen, however, whether such subtle or gradient phenomena, which must ultimately be dealt with, necessarily require the powerful apparatus offered by OT.

Conclusions

This article has dealt with word accent, both in terms of the factors that constitute this phenomenon at the descriptive level and in terms of the theoretical apparatus that has been proposed to represent it in formal terms. The study of word accent (a term that is preferred over word stress; cf. 'From Stress to Accent: Cues for Accent') forms a rich area of phonological theoretical and typological research that continues to inspire the formulation of new approaches and is thus in the forefront of the continuing development of phonological theory.

See also: Clitics; Dependency Phonology; Foot; Metrical Phonology; Phonological Universals; Phonological Words.

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WordNet(s)

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The Princeton WordNet

Background and Motivation

WordNet, a manually constructed electronic lexical database for English, was conceived in 1986 at Princeton University, where it continues to be developed. Experiments by researchers in Artificial Intelligence (Collins and Quillian, 1968, inter alia) probing human semantic memory inspired the psycholinguist George A. Miller to test the underlying theories on a large scale.

Design and Contents

WordNet is a large semantic network interlinking words and groups of words by means of lexical and conceptual relations represented by labeled arcs. WordNet's building blocks are synonym sets (synsets), unordered sets of cognitively synonymous words and phrases (Cruse, 1986). Each member of a given synset expresses the same concept, though not all synset members are interchangeable in all contexts. Examples are {*car, automobile*}, {*hit, strike*}, and {*big, large*}. All synsets further contain a brief definition, and most include one or more sentences illustrating the synonyms' usage. A domain label (*sports, medicine, biology*) marks many synsets.

Joint membership of words in a given synset illustrates the phenomenon of synonymy. Membership of a word in multiple synonyms reflects that word's polysemy, or multiplicity of meaning. Thus, *trunk* appears in WordNet in several different synsets, including {*trunk, tree trunk*}, {*trunk, torso*}, and {*trunk, proboscis*}.

Coverage

WordNet consists of four separate components, each containing synsets with words from the major, open-class, syntactic categories: nouns, verbs, adjectives, and adverbs. WordNet 2.1 contains almost 118 000 synsets, comprising more than 81,000 noun synsets, 13 600 verb synsets, 19 000 adjective synsets, and 3 600 adverb synsets.

Relations

Synonymy is the major lexical relation among individual word forms; another is antonymy, as between the pairs {*wet*} and {*dry*} and {*rise*} and {*fall*}. Morpho-semantic relations link words from all four parts of speech that are both morphologically and semantically related (Fellbaum and Miller, 2003). For example, the semantically related senses of *interrogation,*

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interrogator, interrogate, and *interrogative* are interlinked. Conceptual-semantic relations link not just single word forms but entire synsets.

Nouns in WordNet

Hyponymy

Concepts expressed by nouns are densely interconnected by the hyponymy relation (or hyperonymy, or subsumption, or the *ISA* relation), which links specific concepts to more general ones. For example, the synset {*mailbox, letterbox*} is a hyponym, or subordinate, of {*box*}, which in turn is a hyponym of {*container*}. {*Mailbox, letter box*} is a hypernym, or superordinate, of {*pillar box*}, which denotes a specific type of mailbox. Hyponymy builds hierarchical 'trees' with increasingly specific 'leaf' concepts growing from an abstract 'root.' All noun synsets ultimately descend from {*entity*}. (See Figure 1.)

Types vs. instances Among the concepts represented by nouns, WordNet distinguishes types and instances. Common nouns are types: *tree* is a type of *plant*, *china* is a type of *crockery*. Proper names are instances: *China* is an instance, rather than a type of a *country* (Miller and Hristea, 2004).

Meronymy

Another major relation among noun synsets is meronymy, which links synsets denoting parts, components, or members to synsets denoting the whole. Thus, {*finger*} is a meronym of {*hand*}, which in turn is a meronym of {*arm*}, and so forth. Meronymy in WordNet actually encompasses three distinct part-whole relations. One holds among proper parts or components, such as {*leg*} and {*table*}. Another links substances that are constituents of other substances: {*oxygen*} is a part of {*water*} and {*air*}. Members such as {*tree*} and {*parent*} are parts of groups such as {*forest*} and {*family*}.

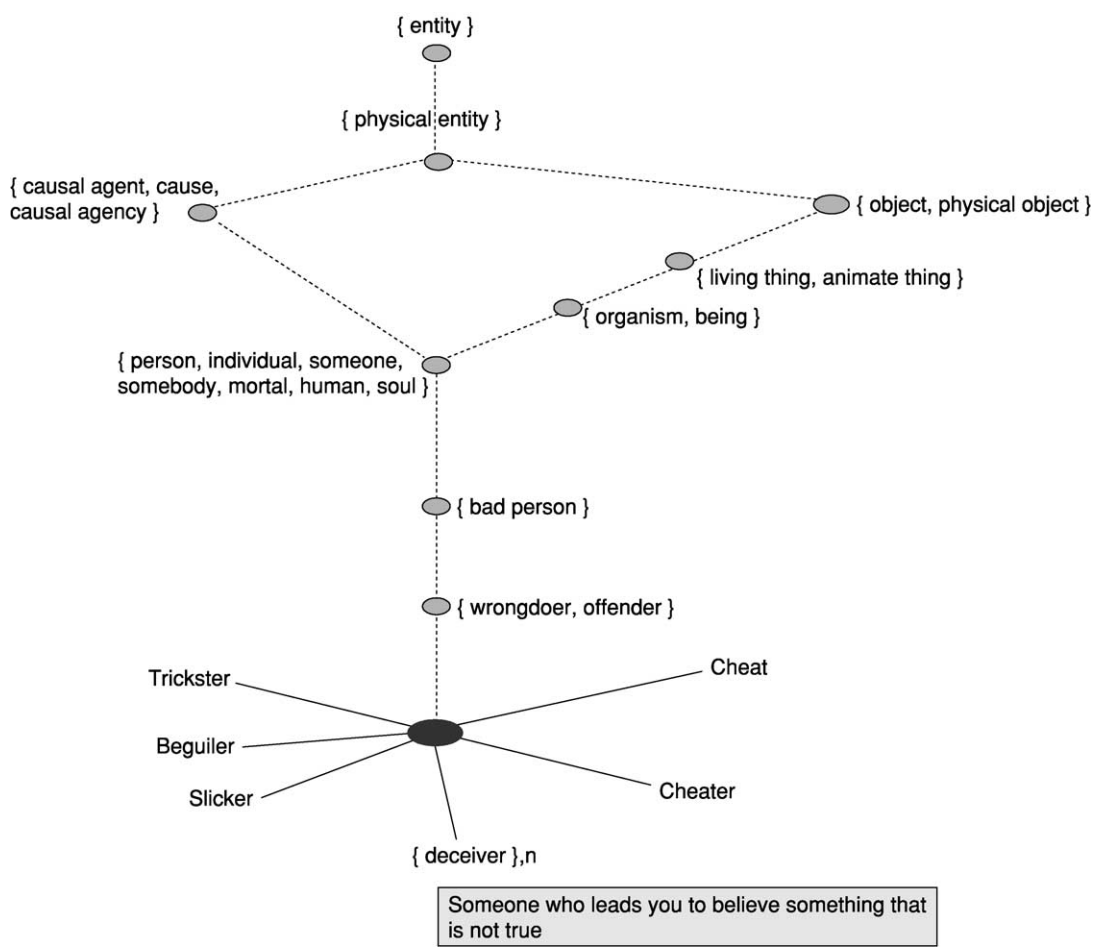

Figure 1 A WordNet noun tree.

Verbs

Verbs are organized by a several entailment relations (Fellbaum and Miller, 1990; Fellbaum, 1998b). The most prevalent is troponymy, which relates synset pairs such that one expresses a particular manner of the other (e.g., {*whisper*}-{*talk*} and {*punch*}-{*strike*}) (Fellbaum, 2002). Like hyponymy, troponymy builds hierarchies of several levels of specificity. Other relations are backward entailment (*divorce-marry*), presupposition (*buy-pay*), and cause (*show-see*). (See Figure 2.)

Adjectives

WordNet distinguishes descriptive and relational adjectives. Descriptive adjectives are organized into direct antonym pairs, such as *wet-dry* and *long-short*. Each member of a direct antonym pair is associated with a number of 'semantically similar' adjectives. *Damp* and *drenched* are semantically similar to *wet*, and *arid* to *dry*. These concepts are said to be indirect antonyms of the direct antonym of their central members, i.e., *drenched* is an indirect antonym of *dry*, and *arid* is an indirect antonym of *wet* (Miller, 1998; Gross *et al*., 1989). (See Figure 3.)

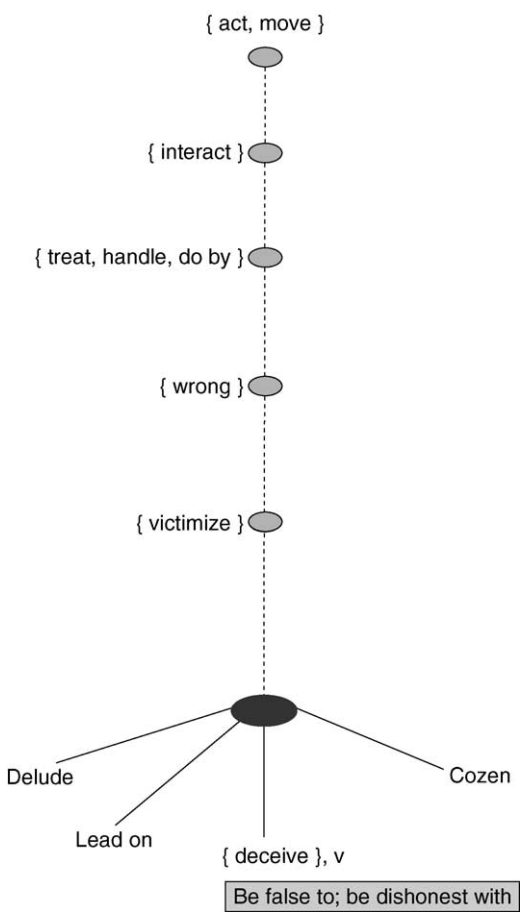

Figure 2 A WordNet verb tree.

Relational adjectives (*atomic, nuclear*) are linked to the corresponding morphologically and semantically related nouns (*atom, nucleus*). Most adverbs point to their base adjectives (*rapid-rapidly, slow-slowly*).

Inheritance and Reversibility

Two important components of WordNet's design are inheritance and reversibility. Inheritance applies to hierarchy-building relations. If {*mailbox, letter box*} is encoded as a hyponym of {*box*}, and {*box*} as a hyponym of {*container*}, then {*mailbox, letter-box*} is automatically recorded as a hyponym of {*container*}, via the principle of inheritance. Similarly, if {*finger*} is a part of {*arm*}, and {*hand*} is part of {*arm*}, then {*finger*} is necessarily a part of {*arm*}, too. Many concepts are assigned to both types of hierarchy.

Relations are encoded in WordNet only once between a given pair of synsets or words. The pointer gets automatically reversed, so if {*tree*} is manually encoded as a meronym of {*forest*}, then {*forest*} will automatically become a holonym of {*tree*}. And if {*mailbox*} is manually encoded as hyponym of {*box*}, then {*box*} will automatically become a hypernym of {*mailbox*}. The lexical (word-word) relations are bidirectional, too.

WordNet as a Thesaurus

While paper dictionaries are necessarily organized orthographically, WordNet's structure centers upon a word's semantics. The digital format enables targeted look-up for meaning-related words and concepts from multiple access points. A browser with a pull-down menu lets the user search for a keyword's hyponyms, hypernyms, meronyms, antonyms, morphologically derived words, etc. Unlike a traditional thesaurus such as Roget's, the arcs among WordNet's words and synsets express a finite number of well-defined relations.

WordNet as a Tool for Disambiguation

WordNet's design has proved useful for a range of Natural Language Processing tasks that involve the challenge of word sense identification. While lexical polysemy can be resolved in part by statistical approaches, WordNet facilitates alternative or complementary symbolic approaches that exploit its encoding of semantic similarity. Given a polysemous word such as *trunk*, the information that its synonym

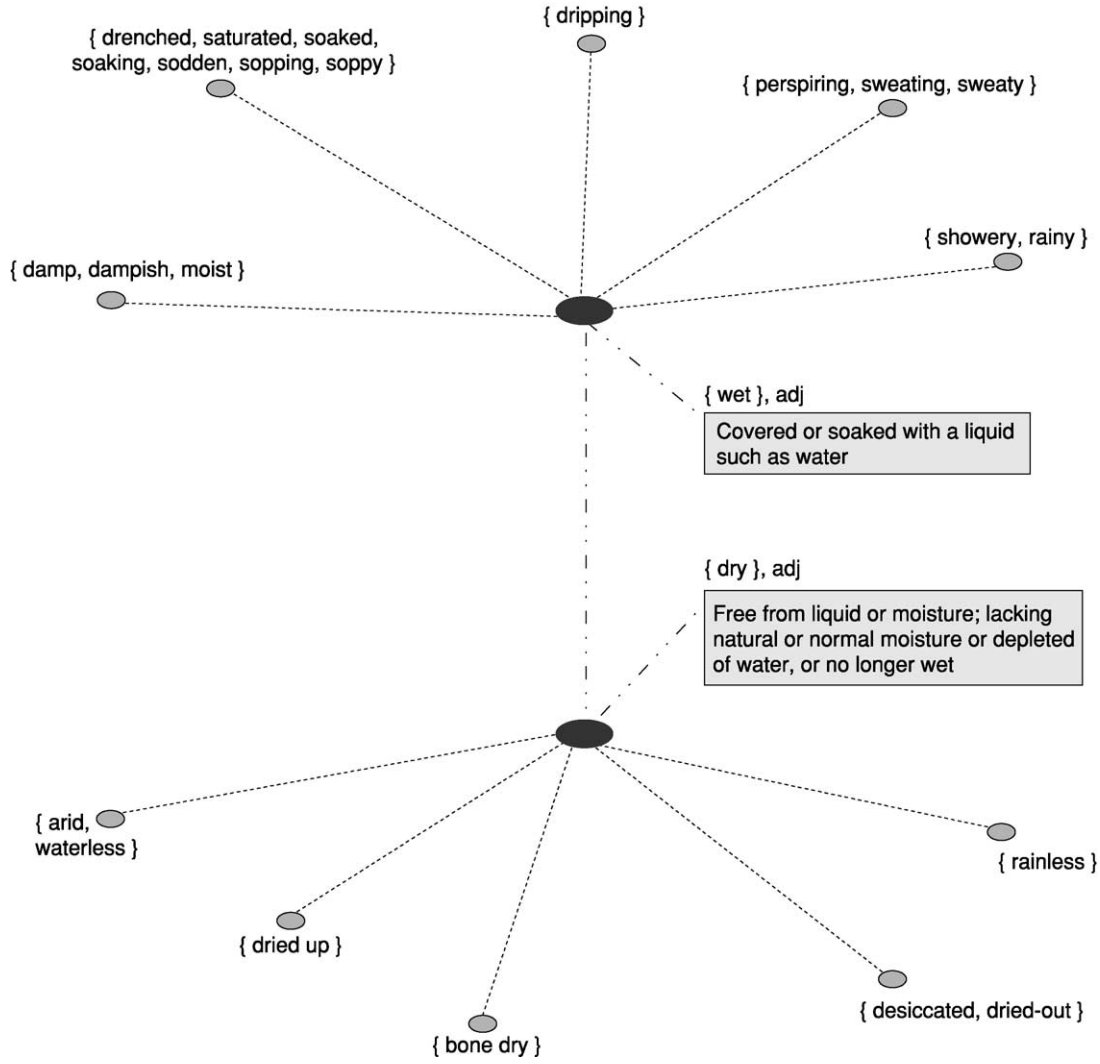

Figure 3 An adjective cluster in WordNet.

is either *tree trunk* or *torso* or *proboscis*, or that either *stem* or *body part* or *snout* are its superordinate, limits the possible readings to one.

Homonyms such as *trunk* have senses that are clearly distinguishable, but the dozens of senses of polysemous words such as *run* are less sharply differentiable, and the divergent entries in standard dictionaries indicate the impossibility of an agreed-upon sense inventory. WordNet's senses are no more fine-grained than those of a collegiate dictionary, but the requirements for disambiguation, rather than look-up of unfamiliar senses, highlight the constraints of an enumerative lexicon (Fellbaum *et al.*, 1997). Many contexts do not allow the singling out one of several overlapping senses. A solution, adopted by the Princeton WordNet and multilingual wordnets, is to group related senses together into one 'coarse' underspecified sense (Palmer *et al.*, 2005) for manual and automatic word sense identification.

Limitations of WordNet

WordNet is a lexical resource and as such does not contain any syntactic information. But there is strong evidence that, at least for verbs, semantic makeup and syntactic behavior are correlated (Levin, 1993). The extent to which WordNet's organization reflects syntactic classes is an independent test of this correlation (Kipper *et al.*, 2000). WordNet does not consider syntagmatic relations. Thematic and semantic roles of nouns functioning as arguments of specific verbs are not encoded, as in FrameNet (Fillmore *et al.*, 2003).

In 1986, digital corpora were not available, and WordNet's contents are largely derived from its creators' intuitions. More recently, the illustrative sentences have been based on web data. But WordNet, unlike some of its descendants, is not a corpus-induced dictionary.

Other Wordnets

Since the 1990s, wordnets are being built in other languages. EuroWordNet (Vossen, 1998) (EWN) encompasses eight languages, including non-Indo-European Estonian. EuroWordNet introduced some fundamental design changes that are the standard for subsequent wordnets. Other wordnets are linked to the Princeton WordNet.

The EuroWordNet Model (EWN)

Each wordnet relates to three language-neutral components: the Interlingual Lexical Index (ILI), the Domain Ontology, and the Top Concept Ontology. The Top Concept Ontology is a hierarchically organized set of about 1,000 language-independent core concepts expressed in all wordnets. The Domain Ontology consists of a set of topical concepts such as *traffic* and *illness*; unlike the domain labels in the Princeton WordNet, it is hierarchically structured. The ILI is an unstructured, flat list of lexical meanings consisting of a synset, an English gloss, and a reference to its source.

The language-specific wordnets consist of lexical items indexed to a set of synsets in that language. Each is related to a synset in the ILI, which functions as a language-independent ontology, or interlingua, that mediates among the synsets of the individual languages. To find equivalents across languages requires going through the ILI. Fine-grained ILI senses are clustered when necessary into coarser senses to allow unambiguous mapping to senses in other languages. The ILI includes a subset of Princeton WordNet's synsets plus concepts that are lexicalized in a given language where English shows a lexical gap. Thus, the ILI constitutes the superset of all concepts included in wordnets.

No relations link the ILI records, but the synsets in each language-specific wordnet are interconnected via independent semantic and lexical relations for each language. This design feature avoids the problem of crosslinguistic mismatches in the patterns of lexicalization and hierarchical structure.

In contrast to the Princeton WordNet's strict limitation to paradigmatic relations, connections in EWN are encoded among nouns and verbs that are syntagmatically associated, such as the pair *student* and *learn*. Another innovation is conjunctive and disjunctive relations. Conjunctive relations allow a synset to have multiple superordinates. Thus *knife* is both a kind of a *tool* and a kind of a *weapon*. This double parenthood captures the type vs. role (or function) distinction (Pustejovsky, 1995). Another example is *albino*, which can be a kind of *person*, *animal*, or *plant*. A disjunctive relation exists between *airplane* and its possible meronyms *propeller* and *jet*; a given type of airplane has either one, but not both, parts (Vossen, 1998).

As in the Princeton WordNet, words from different syntactic categories are linked when they are semantically and morphologically related, as are the corresponding senses of *visit* (verb), *visit* (noun), and *visitor*.

The wordnet web constitutes a powerful tool for multilingual Natural Language Processing (NLP) applications and crosslinguistic study of lexicalization patterns.

Global WordNets

Databases exist for 35 languages. Descriptions of many wordnet projects can be found in Singh (2002) and Sojka *et al.* (2004).

Wordnets for typologically adverse languages pose novel problems, especially with respect to the concept of *word*, which must be defined to determine synset membership. Challenges include the morphology of agglutinative languages such as Turkish and Estonian (Bilgin *et al.*, 2004; Kahusk and Vider, 2002) and languages such as Hebrew and Arabic, where words are generated from a root that constitutes a kind of 'super-concept' (Black and ElKateb, 2004).

For critical reviews of WordNet, see Kilgarriff (2000) and Lin (1999).

Acknowledgments

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See also: Antonymy and Incompatibility; Hyponymy and Hyperonymy; Lexical Semantics: Overview; Synonymy.

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http://www.globalwordnet.org – Global WordNet.
http://www.cogsci.princeton.edu – WordNet.

Wrede, Ferdinand (1863–1934)

W H Veith, Universität Mainz, Mainz, Germany

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Ferdinand Wrede was born in Berlin as the son of a Music Director. He studied Germanistics and history in Berlin with professors who were very famous at that time. He received his doctor's degree from the university of Berlin in 1886. From 1887 on, he was a collaborator of the *Sprachatlas des Deutschen Reichs [Linguistic atlas of the 'Deutsches Reich']* project, with Georg Wenker as director, in Marburg. In 1890, he qualified as a university lecturer; thereafter (1911–1920), he was honorary Professor, afterwards full Professor of Germanic philology in Marburg. Parallel to his university career, there was his work at the university library of Marburg, ending up with the position of a chief librarian (until 1920). After the death of Georg Wenker (1911), he became the director of the *Linguistic atlas of the Deutsches Reich*, and in 1920, he managed to transfer this project into a permanent institution: the Zentralstelle für den Sprachatlas des Deutschen Reichs und deutsche Mundartforschung [Center for the linguistic atlas of the Deutsches Reich and for German dialect research].

Wrede's fundamental studies first were concerned with Germanic: his dissertation on the Vandals (1886) and his second doctor's degree, 1890–1891 on the Ostrogoths in Italy. However, in the context of these studies, the dialectological aspect was always present, resulting in many activities of this kind. After having become a collaborator of the *Sprachatlas des Deutschen Reichs* project, he started commenting on Wenker's dialect maps (Wrede, 1892–1902). In 1908,

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Wrede, Ferdinand (1863–1934)

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Ferdinand Wrede was born in Berlin as the son of a Music Director. He studied Germanistics and history in Berlin with professors who were very famous at that time. He received his doctor's degree from the university of Berlin in 1886. From 1887 on, he was a collaborator of the *Sprachatlas des Deutschen Reichs [Linguistic atlas of the 'Deutsches Reich']* project, with Georg Wenker as director, in Marburg. In 1890, he qualified as a university lecturer; thereafter (1911–1920), he was honorary Professor, afterwards full Professor of Germanic philology in Marburg. Parallel to his university career, there was his work at the university library of Marburg, ending up with the position of a chief librarian (until 1920). After the death of Georg Wenker (1911), he became the director of the *Linguistic atlas of the Deutsches Reich*, and in 1920, he managed to transfer this project into a permanent institution: the Zentralstelle für den Sprachatlas des Deutschen Reichs und deutsche Mundartforschung [Center for the linguistic atlas of the Deutsches Reich and for German dialect research].

Wrede's fundamental studies first were concerned with Germanic: his dissertation on the Vandals (1886) and his second doctor's degree, 1890–1891 on the Ostrogoths in Italy. However, in the context of these studies, the dialectological aspect was always present, resulting in many activities of this kind. After having become a collaborator of the *Sprachatlas des Deutschen Reichs* project, he started commenting on Wenker's dialect maps (Wrede, 1892–1902). In 1908,

he founded the series *Deutsche Dialektgeographie* in which dialect monographs, mostly on the basis of direct investigations other than Wenker's indirect method, were published. This series can be compared with the famous *Archivio glottologico italiano* [*Archive for Italian language studies*], founded in 1873 by G. I. Ascoli.

Wrede can claim five major linguistic achievements:

1. He initiated many scientific projects, e.g., the Hessen-Nassauisches Wörterbuch, an area dialect dictionary for which his student Luise Berthold was in charge.
2. He was the real creator and intellectual mentor of the Marburg school of dialectology with many disciples.
3. He interpreted the dialect maps (e.g., Wrede, 1892–1902, 1924) and classified the German dialects (cf. Veith *et al*., 1984–1999, map. E5).
4. He expanded dialect research over all areas in Central Europe in which German dialects were spoken (Switzerland, Southern Tirol, Liechtenstein, Austria, parts of Czechoslovakia, etc. Wenker's questionnaire was translated and then used for dialect mapping).
5. He initiated the edition of Wenker's dialect maps as an atlas (*Deutscher Sprachatlas auf Grund des von Georg Wenker begründeten Sprachatlas des Deutschen Reichs* . . . [1926–1956]).

See also: Ascoli, Graziadio Isaia (1829–1907); Dialect Atlases; Wenker, Georg (1852–1911).

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Wright, Joseph (1855–1930)

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Joseph Wright certainly had one of the most unusual early lives of any Oxford professor ever. Born on October 31, 1855 in Thackley, Yorkshire, England, Wright went to work in a mill at the age of six, and did not learn to read and write until he was 15. The turning point for him came in 1870, during the Franco-Prussian War, when he became jealous of his literate colleagues who could read newspaper articles about the war. He therefore taught himself to read and write, and also began attending a night school designed for mill workers. He made such rapid progress that after three years of study he was able to start his own night school, while still working at the mill. In 1876, the mill temporarily closed, and Wright therefore decided to use his savings on a term of study in Heidelberg. He traveled first to Cologne via Antwerp, where he spent several weeks improving his German, and then to Heidelberg, where he studied mathematics for eleven weeks (all the time he could afford). When he returned to England, he taught mathematics at various schools for a number of years. In the spring of 1882 Wright returned to Germany, where he originally planned to study mathematics but quickly switched to studying philology. Wright spent the next several years in Germany, studying in Heidelberg, Freiburg im Breisgau, and Leipzig, where he acquired a profound knowledge of the Indo-European languages, as well as a solid foundation in phonetics and dialectology. He completed his doctorate at Heidelberg in 1885. During his

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time in Germany, he also taught school, did editorial work for various publishing companies, prepared a translation of Brugmann (1886) into English (Brugmann, 1888) and wrote a grammar of Middle High German (Wright, 1888). In 1888 he began teaching at Oxford, first on the staff of the Association for the Higher Education of Women, then also for the Taylorian Institution. In his early years at Oxford he supplemented his income by tutoring (mainly preparing students for the army or civil service), teaching German at a girls' high school, and correcting examination papers. In 1891 he became Deputy Professor of Comparative Philology at Oxford, and he retired from Oxford in 1924.

Wright's contributions to linguistics can be grouped into three main areas: dialectology, historical linguistics, and teaching. His interest in dialectology was certainly well developed by the time he first went to Germany; he later published a grammar of the dialect of Windhill in Yorkshire, the town he grew up in, in 1893 (Wright, 1893). Wright's greatest contribution to dialectology is undoubtedly the *English dialect dictionary* (Wright, 1898–1905), which grew out of the realization, early on in the preparation of the *Oxford English dictionary*, that a grasp of the vocabulary of English dialects would be crucial to attaining the goal of an unabridged dictionary. In 1873 the English Dialect Society was formed in Cambridge, and by 1887 it had been decided that the Society should direct the preparation of a dialect dictionary. In 1889, Wright agreed to take over the editorship of the proposed dictionary at some future date, and, by 1894, had begun serving as editor-in-chief. Despite the monumental logistical difficulties that the project faced, especially financial pressures and the problem of finding a publisher, the dictionary was completed at a comparatively rapid pace; the first part appeared in 1898, and the final part was published in 1905. The *English dialect grammar* (Wright, 1905) was published that same year. The work was well received, both because of its high quality and because of the speed with which it had been completed, in fact, Wright secured a yearly pension from the Civil List for it.

Wright's work in historical linguistics, especially his numerous handbooks, is also critical to the development of the field as a whole. He was one of the first scholars in England to preach Neogrammarian doctrines, and his translation of Brugmann (1886) introduced a number of students and scholars in England and America to the new school of linguistics. He also wrote handbooks for a variety of different languages, including Middle and Old High German, Gothic, and Old and Middle English, many of which became classics in the field. His Gothic grammar (Wright, 1910), for instance, was reprinted as recently as 1997, and remains the standard handbook written in English.

Finally, Wright's impact as a teacher cannot be neglected. His most prominent pupils were perhaps his wife Elizabeth Mary Wright, who eventually collaborated with him on a number of projects (including Wright and Wright, 1923, 1924, among others) and J. R. R. Tolkein. The two-volume biography of him by his wife (Wright, 1932) contains numerous letters written to Wright by former students, which uniformly praise his pedagogical abilities. His teaching, as well as his work more generally, was instrumental in establishing linguistics/philology in England.

See also: Brugmann, Karl (1849–1919); Dialects: Early European Studies; English Lexicography; Germanic Languages; Neogrammarians.

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Writers' Aids

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Introduction

When using word processors, writers have many tools at their disposal to compose error-free documents: spelling checkers, grammar checkers, and style checkers. With such computer software, writers are able to save time and energy by not having to search for words in a dictionary, can correct words that they might not have even be able to find in a paper dictionary (e.g., not knowing about the silent *k* in *knave* makes it difficult to find), can prevent misunderstandings caused by misspellings or ambiguous structures, and are able to focus less on the form of a document and more on the content. These are all great benefits, assuming that the checkers work correctly or at least in ways that the writer expects. If we understand how these technologies work and therefore what to expect, then we can know their shortcomings and adjust accordingly.

The focus of this article is to outline the aids used for writers, but there is also a need for spelling checking in optical character recognition (OCR), and the technology used for writers' aids is often also used for the correction of OCR output (see Kukich, 1992, and references therein). However, there are differences in how the spelling checking should be optimized. For example, there are likely to be keyboard effects (discussed later) if the input is typed in, whereas there are likely to be confusions between similar-looking characters for OCR misspellings. Thus, spelling checking for OCR may merit different approaches.

Spelling Checkers

Task Definition

Three Different Tasks In providing an extensive literature overview of spelling and grammar checkers, Kukich (1992) gave a taxonomy of tasks involved in writing aids, each task useful for its own purposes. First, there is nonword error detection. This is the task of finding strings in a text that are very unlikely ever to be words. For example, in English, *hte* is not a word. For some purposes, simply detecting a misspelling is enough for the writer, who can then fix it by hand. However, some purposes require in addition a second subtask, that of isolated-word error correction. As the name implies, the goal of this task is to correct errors, or suggest corrections, without taking the surrounding context into account. For example, a corrector could correct *hte* to *the*, but, because it does not look at context, it could not change *there* when it is used incorrectly in place of *their*. To detect such errors, context-dependent word correction is employed. This is the task of correcting errors for which the surrounding context is needed to make clear that there is an error. For instance, *too* used as a numeral will be corrected to *two* when it is surrounded by a determiner and a plural noun (e.g., *the two computers*). Context-dependent word correction overlaps in practice with grammar checking because both refer to strings of indefinite extent.

Kinds of Spelling Checkers Which kind of writing aid we use depends on our purpose (and personality). The need for correction, as opposed to simply detection, arises in the distinction between interactive spelling checkers and automatic spelling correctors. Interactive spelling checkers check errors as the user types, possibly suggesting corrections. Users can determine for themselves the value of the corrections presented. Automatic spelling correctors, however, run on a whole document at once, detecting the errors and automatically correcting them without user assistance. Unless they are 100% accurate, these correctors are less desirable for the task of assisting in writing a document because when the 'best' correction is wrong, the user has to notice and undo the change. Note that emphasizing interactive spelling checkers means that the important tasks to focus on are error detection (context-dependent and context-independent) and the ranking of possible corrections. A user will be more satisfied if the first suggested correction, or one of the first suggestions, is the actually intended word.

Detecting Spelling Errors

Kinds of Spelling Errors

Nonword Errors In order to best detect and correct spelling errors, systems must know what errors to look for and so must know what kind of misspelled and ungrammatical input to expect. There are several main categories of errors that people make when writing, falling into two main groups: typographical errors and true misspellings.

Keyboard mistypings, or typographical errors (typos), are errors in which the person probably knew how to spell the word correctly but made a physical mistake. There are several different kinds of typos, all of which affect how a spelling checker is built.

The first kind of typo involves mistakes caused by hitting the space bar at the wrong time. Splits are errors caused by hitting the space bar in the middle

of a word; that is, a single word becomes two words, such as *quintuplets* becoming *quin tuplets*. Although tokenization – determining word boundaries – is a tricky issue for many languages other than English (and even sometimes for English), most spelling checkers assume that the string that needs to be checked is contained between two spaces. Thus, split errors are difficult to correct because the checker cannot see that the adjacent strings are part of the same word. Run-ons are errors that are caused by not hitting the space bar between two words; that is, two separate words become one, such as *space bar* becoming *spacebar*. Notice that these kinds of typos can interact, and the results may also be words, as in *a tollway* being typed as *atoll way*.

Space-bar issues aside, there are four general kinds of spelling errors. An insertion is when a letter has been added to a word, and a deletion is when a letter has been omitted from a word. Notice that both of these errors change the length of a word. A substitution is when one letter has been typed in place of another letter, and a transposition occurs when two adjacent letters have been switched. By their nature, these last two kinds of errors do not change the length of the word. Identifying these types of errors allows spelling correction software to calculate which are the most common kinds of mistakes and thus which are the most likely corrections. In other words, a distance can be defined between a misspelled word and a potential correction. Furthermore, information can be used about keyboard proximity to calculate error frequency; for example, the proximity of letters on a standard 'QWERTY' keyboard affects how often one letter is typed in place of another (see, e.g., Kernighan *et al.*, 1990).

With these kinds of errors in mind, single-error misspellings (only one instance of an error in the misspelled word) can be contrasted with multi-error misspellings (multiple instances of errors in the misspelling, making them harder to correct). Damerau (1964) found that 80% of misspellings were single-error misspellings, which means that a spelling correction system could focus on optimizing single-error misspelling corrections and still do rather well. Furthermore, Kukich (1992: 388) reported that "most misspellings tend to be within two characters in length of the correct spelling," which allows spelling checkers to make optimizations based on length (e.g., Tillenius, 1996). That is, a spelling checker does not need to search through all possible words, only those within a certain length.

True misspellings, in which the writer did not know how to spell a word, are caused by a lack of knowledge, and the resulting misspellings are often spelled phonetically. The knowledge problem might simply be not knowing how a word is spelled even though the person knows the word, such as not knowing how to spell *onomatopoeia*. A different knowledge problem is to not know a spelling rule, such as that consonants should be doubled when forming the present progressive *-ing* form (e.g., *jog* becomes *jogging*, not *joging*). Or more specific to orthography, the writer may forget spelling rules such as *i* before *e* (e.g., *beleive*). Frequent problems, such as finding *e* before *i*, can be integrated into a spelling checker. Sometimes people's knowledge-based errors reveal what they do know about a word; Mitton (1996) explored several of these errors. People might remember that something is odd about the spelling of the word, but might get that oddity wrong. For example, they might spell *scissors* as *siscors*, remembering only that it has an extra *c*. Or they might use a false analysis of the word, such as spelling *corridoor* for the correct *corridor* on the basis that it has something to do with a door. Or they might spell the word by analogy with another word; for instance, people might spell *leaven* as *leven* based on an analogy with *seven*. These errors are more complex, but information about them still could be used in a spelling checker.

Analogy is one way people spell unknown words, but it is often combined with sound-to-letter correspondences. People may spell a word like it sounds, and so we often find phonetic errors. Thus, spellers may leave out silent letters (*nave* for *knave*) or falsely hypothesize silent letters (*onomanapoeta*), may replace a letter with a similar sounding one (*s* for *c* in *deside*, for *decide*), or may forget the nuances of a rule (*recieve*: *i* before *e* except after *c*). Also, because the same language varies in pronunciation depending on the particular dialect, there might be systematic errors for an individual, such as someone who types *pin* in place of *pen* because in that dialect the two words are pronounced identically. More generally, people often mistake one homophone for another. A common example is to type *there* when *they're* or *their* is meant. These kinds of errors can result in real words, which is more problematic for spelling checkers. Also, because sound-to-letter correspondences vary by language and writing system, the degree to which phonetic errors are a problem varies between languages. For example, Tillenius (1996) reported more phonetic errors for Swedish than for English.

Other general tendencies also allow for more efficient spelling correction. For example, the first character in a word is rarely the source of the misspelling (Kukich, 1992). That is, the misspelled word and the correct spelling usually have the same first letter. This can substantially reduce the search space.

Real-Word Errors The errors discussed so far apply mostly to nonword errors, but we also would like to classify errors that result in real words. To give a characterization of these errors, we briefly look at three kinds of real-word errors: local syntactic errors, long-distance syntactic errors, and semantic errors.

Syntactic errors are simply errors in how words are put together in a sentence; for example, different parts of speech are in the wrong places in a sentence or something is not 'grammatical.' Local syntactic errors are errors in which the syntactic violation is detectable by looking within one or two words in either direction in the sentence. In sentence (1), for example, a verb (*be*) is in the place where a preposition (*by*) should be, and this can be determined by the verb *conducted,* which is only two words before it. Thus, most parsers or statistical error methods would be able to detect this error.

(1) The study was conducted mainly **be** John Black.

Long-distance syntactic errors are more difficult because these involve syntactic violations that are spread out over many more words. In sentence (2), for instance, there is a problem with subject–verb agreement, but it is spread out over eight words. This poses a problem for techniques that rely on local contexts only.

(2) The kids who are most upset by the little totem **is** going home early.

Semantic errors are errors in meaning, that is, in which the sentence structure might sound fine but the sentence does not mean anything or does not mean what was intended. In (3), *minuets* is a plural noun – just like *minutes* – but it does not make sense in this context. These errors are difficult for any system because they seem to require semantic processing; however, even some kind of co-occurrence analysis might prove useful to catch some of these errors (*see* **Collocations**).

(3) They are leaving in about fifteen **minuets** to go to her house.

Nonword Error Detection

Dictionary Methods Detecting spelling errors that result in nonwords can be done by using a dictionary or spelling list: if the word is not in the dictionary, it is a misspelling. However, there are several issues to consider in constructing a dictionary and looking words up in the dictionary (*see* **Computational Lexicons and Dictionaries**).

First, we must realize that any dictionary is inherently incomplete due to the productivity of language. That is, new words are continually entering the lexicon, such as *d'oh*, while at the same time old words are leaving. For example, in Shakespeare's time, *spleet* 'split' (*Hamlet* III.2.10) was a word and thus correctly spelled, whereas today it is not. In addition, foreign words, hyphenations, derived words, and proper nouns bring new words into a language and prevent a dictionary from being exhaustive. Notice that trying to include every word, such as all proper nouns, for example, is not always a good idea. Including the proper last name *Carr* may result in not finding a misspelling in *The Great American Carr Show.* For the same reason, when constructing a dictionary, we have to consider which rare words we want in the dictionary – they might become confounded with actual misspellings. For example, *teg* 'a sheep in its second year' is a word, but for the majority of English speakers it is unknown and is probably a misspelled form of *tag* or *beg* or some such word. Likewise, we might want to maintain separate dictionaries for particular domains: For the average user, *memoize* is a misspelling of *memorize*, but for computer scientists it is a technical term. This highlights the fact that a dictionary must be constructed with the users in mind. As another example of user-tailoring, a dictionary should also be dialectically consistent. The British spelling *colour* and the American spelling *color* are both correct spellings within their dialects, but misspellings otherwise. (See McIlroy, 1982, for discussion of construction of a spelling list.)

A more general issue for dictionary construction is whether or not to include inflected words as separate entries in the dictionary (*see* **Inflection and Derivation**). That is, should *car* and *cars* be stored separately? Or should *car* be stored as a single entry, indicating its part of speech (noun) and whether or not it is regular (i.e., takes the standard *-s* plural ending). The choice is one of efficiency and where to allocate the work. If the inflected words are separate entries, then the lookup mechanism is straightforward but there is an increase in the number of words. If inflected words are not stored as separate entries, on the other hand, then there are far fewer lexical entries but we have to strip the affixes (prefixes and suffixes) from the words before looking them up. Furthermore, we have to handle exceptions to the affix rules in some systematic way, possibly by having separate entries, for example, for *man* and *men*. And there must be a special note on *man* that it is irregular, so that *mans* will not be considered a correct spelling; that is, we have to prevent the overgeneralizations of the affix rules.

When dealing with thousands of words, looking up those words becomes nontrivial; each word has to be stored somewhere in computer memory and finding the word takes time. Thus, an efficient storage and

lookup technique is also needed. That is, the words could be stored alphabetically and each word encountered could be searched for, but the words in English are not evenly distributed over the entire alphabet – the number of words that start with *x* are much fewer than those that start with *s*. Thus, more-efficient lookup techniques are used. Computer scientists and software engineers study and develop various ways to evenly distribute word entries into memory, thus quickening word lookup.

N-Gram Methods Dictionaries are not the only way to check whether a word is misspelled or not; researchers have also tried a technique known as *n*-gram analysis (see the references in Kukich, 1992). An *n*-gram in this context refers to a string of *n* characters in a row; for instance, *thi* is a 3-gram (or trigram). Note that *thi* is a possible trigram of English (*this*), whereas *pkt* is not. Thus, we can store all the possible *n*-grams, for a certain *n*, for a given language and determine whether each new string encountered has only valid *n*-grams. These valid *n*-grams can be derived from a corpus, assuming it has few or no misspellings (*see* **Corpora**).

A common technique is to use 2-grams (bigrams) and to store them in an array. This can be done with positional information included or not. A nonpositional bigram array is an array of all possible and impossible bigrams in a language, regardless of the bigram's position in a word. A positional bigram array, on the other hand, is an array of possible and impossible bigrams in a language for a particular position in a word, for example, word ending. Thus, *mm* is a possible bigram in English (e.g., *humming*), but it is not a valid word beginning and so would not be in the positional bigram array for word beginnings. *N*-gram techniques store data very compactly, thus having a huge advantage over dictionaries in that respect. However, they detect only misspellings that contain very odd sequences of characters; misspellings caused by writers are more likely to contain valid character sequences. Combining *n*-gram analysis with a dictionary, however, can lead to effective and efficient spelling checking.

Isolated-Word Spelling Correction

Isolated-word spelling correction attempts to correct a misspelled word in isolation, that is, irrespective of the surrounding words. This task deals with nonword errors, the kinds of errors discussed in the previous section. Notice that we cannot expect 100% correctness from isolated-word spelling correctors. When humans were given the same task – correcting nonwords without being given the context – their accuracy was between 65% and 83%, the average being 74% (Kukich, 1992).

There are three main steps for a spelling checker in correcting errors:

1. error detection (already described)
2. generation of potential, or candidate, corrections
3. ranking of candidate corrections

In some techniques these steps are conflated into a single process. Notice that ranking the candidate corrections is useful in interactive spelling correctors, for which a human makes the ultimate decision, because – similar to search engine rankings – the higher up in the list the correct spelling is, the more quickly the user can approve the correction.

Generation of Candidate Corrections There are many ways to generate potential corrections, two of which are presented here. Whatever the technique, the task is to take an identified misspelling and find a set of possibly correct spellings.

Rule-based techniques generate candidate corrections by means of written rules or transformations from a misspelling to a correct spelling. For example, a rule could look for the misspelling *hte* and generate *the* as a potential correction. Rules may further specify whether the correction is the only possible correction and thus act as a kind of ranking. Rule-based techniques can obviously be very effective, especially for high-frequency errors such as *hte*; however, they are often very narrow and specific, such as the *hte* rule, which covers only one single misspelling of *the*; a separate rule has to be written to correct *teh*. Furthermore, rules have to be written, and they may not capture all the spelling errors humans might make. With recent advances in computational linguistics, however, there is the possibility of the automatic derivation of rules (Mangu and Brill, 1997).

Similarity-key techniques store words (correct spellings) with similar properties in the same 'bucket.' That is, words with similar spellings or similar sounds and of about the same length are put together into one slot. The similarity key for a misspelling is then automatically calculated and points to a bucket. For example, in the SOUNDEX system developed by Odell and Russell (1918), the word *nub* would be assigned the code N2: an N for the first letter, a 0 (which is later eliminated) for the vowel, and a 2 for a labial (*b*, *p*, *f*, *v*). The words *nob*, *nap*, and so on will also be in this bucket. When a misspelling is found, its similarity key is calculated and a list of candidates from the same bucket is obtained. So, the list of candidates for the misspelling *nup* will be *nub*, *nob*, *nap*, and all the other words in bucket N2.

Ranking of Candidate Corrections Once the list of candidate corrections has been generated, we would like to filter out the unlikely candidates and/or rank the candidates to see which candidate is the best. Again, two techniques are presented here, although there are many more methods in existence.

Probabilistic techniques are based on the intuition that some corrections are better than others. In a broad manner, we might use the probability of one word being typed in place of another to rank candidates, but deriving these probabilities is not feasible. Instead, the transition probabilities and the confusion probabilities of letters are used. Transition probabilities are the probabilities of one character following another; for instance, the probability of *q* being followed by *u* in English is essentially 100%. Confusion probabilities are the probabilities of one character being substituted for another; for example, the chance of an *m* being typed for an *n* is higher than a *q* being typed for an *n* on an English QWERTY keyboard. Taking the misspelling as input, transition and confusion probabilities can be used to find which dictionary entry maximizes those probabilities (i.e., matches the misspelling best). This phase of spelling correction can be implemented with Markov models, neural networks, or various other methods that deal with probabilities (*see* **Language Processing: Statistical Methods**).

Another way to rank candidate corrections is to assign each a 'distance' value telling how far off it is from the misspelling. A specific instance of this is called edit distance, which measures how many operations – insertion, deletion, substitution, and transposition – it would take to convert a misspelling into the correct spelling. The candidate with the minimum edit distance is the top-ranked one. For example, for the misspelling *obe* the word *oboe* has a distance score of 1 (insertion of *o*), whereas *hobo* has a score of 2 (insertion of *h* and substitution of *o* for *e*), so *oboe* is the better choice. Of course, a word such as *robe* also has a distance score of 1, so to give a ranking with no tie scores we need to add more information. Instead of giving a value of 1 for each operation, we can use probabilities to determine which operations are more likely. To return to our previous example, a greater edit distance would be given to substituting *q* for *n* than would be given to substituting *m* for *n*.

Whether probabilities are used or not, the minimum edit distance for a word can efficiently be found by using dynamic programming techniques. That is, there are many possibilities for changing a misspelling into a word – we could perversely derive *oboe* from *obe* by deleting *o*, changing *b* to *o*, inserting *b*, and finally inserting *o*. Although this might seem ludicrous, the computer has no way of knowing *a priori* which operations will result in the best fit. Dynamic programming techniques reduce the search space.

Grammar Checking and Context-Dependent Word Correction

The problem of context-dependent word correction is that of detecting and correcting errors that result in true words. For example, the use of *There* in *There house is nice* is wrong, but it is still a real word. This kind of spelling correction is akin to grammar checking because we have to know the use of a word within a given sentence in order to know that it is wrong – that is, that *There* is not a possessive modifier. So, the same techniques that attempt to find misspellings can also be used to find grammar mistakes. The line between context-dependent word correction and grammar correction is a fine line, and so they are treated together here. The usefulness of correcting real-word errors is readily apparent, but becomes more striking when we realize that 30–40% of spelling errors result in real words (Wing and Baddeley, 1980; Kukich, 1992).

Rule-Based Techniques

A very simple technique for detecting and correcting grammatical errors is simply to write rules that spot a pattern and alter it. For example, a rule could match the pattern of *some* or *certain* followed by *extend*, and change *extend* into *extent* (Naber, 2003). Much commercial software uses such rules. Again, the disadvantage is that the rules have to be handwritten, and they will be necessarily incomplete because people make new errors (and new kinds of errors) all the time.

Bigram Grammar Correctors

There are many different statistical techniques we can use to detect and correct grammatical errors in a text; one such technique uses bigram correctors. Instead of referring to pairs of letters, here 'bigram' (or 2-gram) refers to a sequence of two words in a row. Statistical bigram grammar correctors use the probability of one word following another to determine whether an error has been made. For example, *conducted be* is not a likely word bigram in English, but *conducted by* is. A major problem with such techniques is that it is hard to estimate the probabilities of all possible bigrams from a corpus, given that language is infinite. That is, both *conducted be* and *conducted by* might never appear in a corpus, but we still know that only one of them is correct. Thus, some methods employ bigrams of parts of speech to make the probabilities

easier to gather. For example, they compare the probability of a verb followed by a preposition with the probability of a verb followed by another verb. This approach requires a part-of-speech tagger (*see* **Part-of-Speech Tagging**), but the generality gained increases the chances of finding errors with low-frequency words. Given that some words are high frequency and that certain words, such as verbs, have selectional properties, we can also use a mixture of words and parts of speech for the bigrams.

Machine-Learning Techniques

Another technique, presented by Golding and Roth (1999), among others, is the use of machine learning, more specifically viewing the context-dependent spelling correction task as a word disambiguation task. This is done by building 'confusion sets,' which consist of words that are potentially confounded with one another. So, a set might contain the words *there*, *they're*, and *their*, and the task of the system is to figure out, whenever any of the words in the set is seen, which of them is meant in a given context. (Note that this deals only with real-word errors and will require a separate module to map nonwords to a confusion set in order to handle nonword spelling errors.)

To do this, different features of context are used; common kinds of features are context words and collocations. Context words capture a broad 'semantic' context because they are simply words within a certain distance of the word in question. For example, it is useful for the spelling corrector to know whether *cloudy* appears within the surrounding ten words if the confusion set we are dealing with is composed of *whether* and *weather*. Collocations, on the other hand, capture a very local context – essentially *n*-gram information. With the same set of *whether* and *weather*, for instance, a collocation might be the word in question followed by *to* and a following verb (e.g., *whether to run*) (*see* **Collocations**).

This information must be integrated into a particular machine-learning algorithm, such as decision lists, Bayesian hybrids, transformation-based learning, Winnow-based approaches, or latent semantic analysis (see, e.g., Golding and Roth, 1999, and the references therein; *see* **Language Processing: Statistical Methods**).

Grammar-Based Techniques

Akin to research in intelligent computer-assisted language learning (ICALL), grammar-based research in grammar checking uses parsing failures to indicate potential real-word errors. The system uses a grammar (often a mixture of syntactic and semantic information) and a mechanism for parsing; when the parser using that grammar fails, it assumes an ill-formed input. There are some general approaches to dealing with ill-formed input, two of which are given here: relaxation-based and expectation-based techniques (Kukich 1992).

Relaxation-based techniques relax the parsing process to allow errors, with the idea that no errors should be ignored. This might involve relaxing the parsing procedure so that parsing failures are simply allowed, noting where in the parsing the failure took place. Alternatively, we might write grammar rules that predict types of failures; for example, a rule might be expressly written that allows a first-person singular subject to combine with a third-person singular verb, indicating the construction to be erroneous.

Expectation-based techniques build up a representation as the input comes in and predict a list of words that the system expects to see next. If the next word in the input is one of those words, everything is fine; if the next word in the input is not in the list of expected words, it is taken to be an error and the list of expected words becomes the list of potential corrections.

Although grammar-based techniques can be highly effective and are intuitively appealing, they are not without problems. First, as with dictionaries, grammars are likely to be incomplete. Not only are there new words to deal with, but people also continue to create novel expressions and turns of phrases. Second, it is not always easy for the various techniques to detect the exact source of a parsing failure. For example, in *The study was conducted be John Black*, there are two verbal phrases (*The study was conducted* and *be John Black*), but which word needs to be altered in order to fix this is not obvious to a parser.

Style Checkers

Style checkers can check for violations of a particular style, such as that prescribed by MLA standards. The constructions may still be correct English, for instance, but are just unacceptable for the purposes of the current document. For example, we might want to have a style checker find and change singular uses of *data*, such as *the data is* if the style dictates that this word is plural. Or certain words may be disallowed or marked; for instance, the use of *you* is unacceptable for most formal documents. Often, style checkers are used to detect deprecated constructions; for instance, they might flag the use of too many passive constructions, which are usually dispreferred in 'clear' writing, or they might disallow split infinitives (e.g., *to boldly go*). As with grammar checkers, style checkers might examine only a small window of context; often, a passive construction with many words between the be verb and the passive participle will go

undetected as a passive (e.g., *was very readily and quickly available*).

Notice that, despite a functional distinction between grammar and style checkers, from an implementation point of view they are essentially the same. The main difference is flexibility. A style checker should be easy to turn on and off, so that users can decide whether to have a particular style in place, depending on the purpose of the document.

Conclusion

The ultimate spelling checker still remains to be built, but current technology is quite good at detecting and correcting various spelling and grammar errors. The different techniques presented here represent an overview of current Natural Language Processing technologies. Thus, as linguistic technologies improve, in general (part-of-speech tagging, machine learning, etc.), writers' aids should also improve. However, until writers' aids are 100% effective at detecting and correcting errors, they should be used with some caution. A study at the University of Pittsburgh showed that students had more errors when they used a spelling checker than when they handcorrected their papers (Galletta *et al.*, 2005). Thus, despite the usefulness of writers' aids, writers must still carefully supervise the editing of their documents.

See also: Collocations; Computational Lexicons and Dictionaries; Corpora; Inflection and Derivation; Language Processing: Statistical Methods; Part-of-Speech Tagging.

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Writing and Cognition

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This article provides a brief overview of research exploring the cognitive processes associated with text production by human writers, focusing on the handwritten or keyboarded production of coherent, multi-sentence texts. Currently, written production, in this sense, is less well understood than either text comprehension or spoken production.

Text production is a skill that typically starts to develop in children at around the age of six or seven and as a result of extensive specific instruction. This contrasts with the ability to participate in

undetected as a passive (e.g., *was very readily and quickly available*).

Notice that, despite a functional distinction between grammar and style checkers, from an implementation point of view they are essentially the same. The main difference is flexibility. A style checker should be easy to turn on and off, so that users can decide whether to have a particular style in place, depending on the purpose of the document.

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See also: Collocations; Computational Lexicons and Dictionaries; Corpora; Inflection and Derivation; Language Processing: Statistical Methods; Part-of-Speech Tagging.

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This article provides a brief overview of research exploring the cognitive processes associated with text production by human writers, focusing on the handwritten or keyboarded production of coherent, multi-sentence texts. Currently, written production, in this sense, is less well understood than either text comprehension or spoken production.

Text production is a skill that typically starts to develop in children at around the age of six or seven and as a result of extensive specific instruction. This contrasts with the ability to participate in

spoken dialogue, which develops much earlier and largely through exposure to parents' speech. A good stepping-off point for describing the cognitive psychology of text production is to ask what mental processing is required to produce text over and above that which is required for participation in dialogue. First, in most contexts and particularly those typically studied by researchers, writers become aware of the need to write something before they have a definite message to communicate. Planning what to say is, therefore, a major feature of most writing tasks. Second, writers need to be able to maintain and develop meaning across a number of sentences. Turn taking in dialogue both allows immediate feedback on the comprehensibility of an utterance and provides a stream of cues that aid decisions about what to say next. In the absence of an interlocutor writers must find alternative strategies for maintaining coherence. Third, unlike speech, writing requires the planning and execution of letter shapes (or keystrokes) and the retrieval of word spellings. Fourth, one benefit that writing has over speech is that it is possible to review and edit output before it reaches its audience. Text production is therefore necessarily complex, requiring coordination of high-level processes for determining content and structure, and low-level processes associated with producing words on the page.

A chapter by Hayes and Flower (1980) is frequently cited as providing the first general cognitive theory of text production. Their model characterized writing as a problem-solving activity: Writers identify one or more goals for their text, described in terms of the effect that the text will have upon intended readers, and then work backwards from this to identify plans of action by which these goals might be achieved. Hayes and Flower described three processes: planning (determination of content and structure), translating (the process by which this structure is realized as full text), and revising (checking that the text does, in fact, fulfill communicative goals). Studies in which writers are asked to think aloud while producing text suggest that each of these three processes is available to the writer at any point during production. Although planning is more likely to occur near the start of a writing task, and revision towards the end, producing a document typically entails multiple plan-translate-review cycles. Hayes and Flower provided hypotheses about how planning, translating, and revision processes might function, although the problem-solving framework in which these were couched has typically not been adopted in subsequent research. Many researchers have, however, used Hayes and Flower's terminology.

Planning Content

How writers determine content (a process called 'generating' in the Hayes and Flower model) varies with task, and with writer maturity and motivation. In all cases, however, generating will entail cued retrieval from long-term memory (LTM). Writers temporarily hold relevant concepts active in working memory. These concepts act as memory probes and activation spreads from them to related concepts in LTM. Concepts retrieved in this way are then either written down in note form for later use or translated directly into text. Studies exploring the time course of the planning process suggest that propositions tend to be retrieved in repeated bursts of activity interspersed with lulls during which there is no retrieval. Activity during these lulls is thought to be associated, at least in part, with refreshing the probe.

Differences among writers, and particularly developmental differences, are likely to be associated with the ways in which probes are constructed. Novice writers and writers with low motivation may refresh probe content more or less randomly, or simply rely on immediately available cues – exact words or phrases contained within the text of the writing assignment, for example. Content generated in this way will tend to follow a path of least resistance through a writer's existing knowledge about a topic. Bereiter and Scardamalia (1987) described this stream-of-consciousness approach to generating content as 'knowledge telling.' They contrast this with 'knowledge transforming,' an approach that is available only to more experienced writers. Knowledge transforming involves, in Bereiter and Scardamalia's terms, a dialectic between discourse space and content space: instead of probing memory with whatever cues are most readily available, probe selection is constrained by rhetorical considerations. Content is thus determined not just by a writer's knowledge of the topic but also by the effect that they wish to have on their intended readers. One result of knowledge transforming is that the first idea that occurs to a writer is unlikely to become the main focus of their text. Another is that writers may, as a direct result of writing about a topic, discover new ideas or arguments.

Planning Rhetorical Structure

Writers need not only to retrieve relevant propositions but also to tie these together into a coherent whole. Hayes and Flower identified a specific subprocess dedicated to organizing content prior to its realization as full text. This does not appear to be essential, however. Some writers, and particularly novices, add ideas into the text in more or less the

order in which they are retrieved. Where writers do engage in deliberate rhetorical structuring prior to producing full text, they often then deviate from this structure during translation.

Beyond these general observations, however, the processes by which coherent structure is achieved are poorly understood. Some recent research has taken as a starting point the assumption that coherent text comprises a hierarchy of text spans linked by rhetorical relations. Using an analytic procedure called PISA (procedure for incremental structural analysis), an approach similar to rhetorical structure theory, Schilperoord and coworkers have demonstrated an association between text structure and writers' patterns of pausing: writers tend to pause for longer at rhetorically defined text span boundaries, and this effect is independent of the pausing associated with orthographic features such as sentence and paragraph boundaries. Developmentally, more experienced writers tend to produce texts with deeper and more branched structures. This may be because as writers mature, their discourse knowledge – the range of possible rhetorical relations that they have at their command – expands. Alternatively, this effect may be due to developmental increases in short-term storage capability. Producing a highly branched rhetorical structure is likely to involve keeping a greater number of propositions active in short-term memory than is necessary when producing less complex structures.

Translating Plans into Text

A central concern of recent research has been the extent to which processing low-level tasks – developing syntax, and spelling and transcribing words – interferes with retrieving and organizing content. In a series of experiments exploring verbal memory in children, Bourdin and Fayol have demonstrated that written recall is substantially poorer than spoken recall. This effect is largely absent in adults, suggesting that as spelling and handwriting are practiced they make fewer demands on higher-level cognitive mechanisms. However, even in adults there are some contexts in which transcription and content retrieval compete for cognitive resources. Mature writers may reduce the probability of conflict by adopting two writing-specific memory management techniques. Several researchers have suggested that experienced writers construct retrieval structures that allow very rapid access to content stored in long-term memory. This strategy, termed 'long-term working memory,' liberates cognitive resources during translation by reducing the information that must be held in short-term memory. Another widely used strategy for reducing the possibility of cognitive overload involves dividing up the writing process into discrete subtasks by, for example, outlining content and structure in note form before producing full text. In experimental contexts this outlining tends to result in the production of higher-quality text. Arguably, this is because separating out planning and translation processes removes the possibility that they will compete for the same resources.

Reviewing and Revision

Most writers in most contexts spend time reading back over the text that they have written. For example, in one study 15-year-olds producing short argumentative essays spent, on average, 20% of their total writing time in some sort of reviewing activity. Reviewing, however, takes a variety of forms. Writers regularly pause and read back over the two or three sentences they have just written. This local reviewing appears to serve more to cue in new sentences than to edit or repair existing text. Curiously, preventing competent writers from reading what they write (by, for example, turning the computer screen off while competent typists word process) does not typically affect the quality of the final text. There appears to be a trade-off between the benefits of knowing (and possibly editing) what has just been written, and the detrimental effect of the additional load that local reviewing imposes on short-term memory.

The extent to which full read-evaluate-edit cycles occur varies considerably across writers and tasks, with typically very few occurrences in novices' writing. Little is known about the cognitive processes that underlie evaluation, although there is a general assumption that editing is prompted by the writers perceiving dissonance between their intended message and the message that they infer from their text. This dissonance may occur because the writer lacks the necessary lexical or rhetorical knowledge to convert their preverbal message into text, although there is some evidence that suggests that writers are only able to detect those problems that they have the necessary knowledge to repair. Another cause of dissonance may arise because writing results not only in an external expression of a writer's existing ideas about a topic but often also in an internal realignment or development of those ideas within the writer's mind. Thus, when a writer experiences dissonance when reading back over earlier paragraphs, this may not be because at the time of writing the writer's translation of ideas into text was inaccurate. It may instead be because the writer's thinking has since moved on. Strategically, it is possible to capitalize on this dynamic interaction between text and thought by

deliberately producing multiple rough drafts, allowing meaning to develop with the text. This technique is sometimes called 'free' or 'generative' writing.

See also: Computer-Supported Writing; Planning Strategies and Production of Spoken Discourse; Rhetorical Structure Theory; Spoken Language Production: Psycholinguistic Approach.

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Writing Materials

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Over the last six millennia, many different materials have been used for writing: stone, wood, metal, animal skins, leaves, bones, shells, clay, wax, pottery, silk, cotton, papyrus, ivory, bamboo, bark, palm leaves, linen, and paper. Many of them often decisively influenced not only the way a particular script developed, but also the shape of the manuscript (book).

The main reason for choosing a particular material is without doubt its geographical availability. Bamboo seemed the obvious answer for ancient China, palm leaves for South and Southeast Asia, clay bricks for Mesopotamia, and papyrus for Egypt, while the plant grew plentifully in the Nile valley. Another decisive factor is the technical ability to transform raw material. Whereas stone, wood, bones, bamboo, tortoiseshells, the bark of trees, and ordinary leaves can be used, either in their original form, or after only a minimal preparation, material such as metals (gold, silver, copper, lead), ivory, and the materials originally designed for another purpose (cotton, linen, silk, and ostraca) presuppose a certain amount of technical know-how. Into this category also fall the materials specially devised for writing: papyrus, clay bricks, parchment, and paper. And finally there are the effects of cultural determinism. Leather, for example, was never used further east than Iran. Buddhists and Hindus alike would have viewed with horror the idea of writing their sacred text on the skins of slaughtered animals.

Another broad division is that between imperishable materials (such a stone, metal, bones, and shells) and perishable materials, including palm leaves, bark, textiles, papyrus, and paper. To engrave on stone, and to write on papyrus, requires different instruments and different techniques; it also produces visibly different results. Monumental Egyptian hieroglyphics cut in stone look entirely different from the demotic script written on papyrus, yet the difference is only one of style, not of substance. Whereas in monumental inscriptions, individual characters are usually well defined and separated from each other, perishable materials encourage more rounded letters and a tendency toward connecting lines between the letters: in

deliberately producing multiple rough drafts, allowing meaning to develop with the text. This technique is sometimes called 'free' or 'generative' writing.

See also: Computer-Supported Writing; Planning Strategies and Production of Spoken Discourse; Rhetorical Structure Theory; Spoken Language Production: Psycholinguistic Approach.

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Writing Materials

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Over the last six millennia, many different materials have been used for writing: stone, wood, metal, animal skins, leaves, bones, shells, clay, wax, pottery, silk, cotton, papyrus, ivory, bamboo, bark, palm leaves, linen, and paper. Many of them often decisively influenced not only the way a particular script developed, but also the shape of the manuscript (book).

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Another broad division is that between imperishable materials (such a stone, metal, bones, and shells) and perishable materials, including palm leaves, bark, textiles, papyrus, and paper. To engrave on stone, and to write on papyrus, requires different instruments and different techniques; it also produces visibly different results. Monumental Egyptian hieroglyphics cut in stone look entirely different from the demotic script written on papyrus, yet the difference is only one of style, not of substance. Whereas in monumental inscriptions, individual characters are usually well defined and separated from each other, perishable materials encourage more rounded letters and a tendency toward connecting lines between the letters: in

other words a cursive form of writing. The purpose of the written information also influences the material chosen: public pronouncements, visible for all who can read, are mostly written on imperishable material; personal correspondence, matters relating to day-to-day administration and commerce, tend to use a cursive form of writing on perishable material such as papyrus or paper. It is doubtful whether without the generous supply of papyrus in Egypt, demotic writing would have developed and prospered. Similarly, the easy availability of paper, brought to Europe by the Muslims in the 12th century, played a decisive role in the quick spread of printing after the 15th century: one Bible printed on parchment, it was soon discovered, demanded no fewer than three hundred sheep skins.

Some materials were specially devised for writing, such as papyrus and paper. Both require an already quite complex manufacturing process. Papyrus dominated the cultural life, first of Egypt, then of the Mediterranean world, for almost three millennia. It is generally considered to be an invention made by Egyptian priests, and the earliest (un-inscribed) examples go back to 3300 B.C. Papyrus was not only a highly successful writing material, it also became a profitable state monopoly. Firmus, the imperial Roman pretender, boasted in 273 A.D. that he could keep a whole army on the revenues from the papyrus trade. Much has been written about the way papyrus was manufactured. Basically, carefully cut pieces from the inner stem of the plant were laid cross-wise on a special table, pressed and beaten together, and then dried in the sun. Some type of adhesive (suggestions range from Nile water and gum, starch, and a special type of glue, or hot water and vinegar) was without doubt needed, but none of the Arab writers is very clear on this point. Several sheets stuck together form a scroll with writing being done on one side. With the beginning of the Christian era, papyrus became increasingly scarce and in consequence more expensive. There is some irony in the fact that the word 'paper,' the name of the material that eventually supplanted papyrus in the 11th century, comes, via French and Latin, from the Greek word 'papyros.'

According to the Chinese historian Fan Yie (397–445 A.D.), Cai Lun, a eunuch at the court of the Han Emperor Wu Di, invented paper in 105 A.D., but Cai Lun was probably more of a supervisor, and paper the evolutionary outcome of a process connected with already existing knowledge of how to make silk paper. As a writing material, silk had performed well with brush and ink, and some 4th and 5th century B.C. Chinese writers mention it in a manner that implied frequent use. But even silk paper (made out of old silk rugs) soon proved too expensive to satisfy the increasing demands of an ever-growing administration. Paper was cheaper and it offered the possibility of recycling waste products (fish nets, old linen rags, mulberry bark, laurel, waste hemp, etc.). The process of making paper is, however, difficult, going through various time-consuming stages. Soon paper became a closely guarded state monopoly that never spread further west than Chinese Turkestan. It was only in 751 A.D. when the Muslim Governor of Samarqand took captive a large number of prisoners, some of them adept in the art of papermaking, that the knowledge spread outside China. From there it reached Baghdad, Damascus, Hamah, Tripoli, Cairo, North Africa, and eventually in the 12th century the Muslim-influenced part of southern Europe.

Some writing materials had a decisive influence not only on the shape and formation of letters, but also on the direction of the script and the shape of the manuscript (book); they were mostly bamboo, leather/parchment, clay tablets, and palm leaves.

Bamboo, cut into small strips, was widely used in ancient China. The Chinese character for 'archive' and 'register' (*ce*), authenticated from at least the 14th century B.C., seems to portray narrow slips of bamboo laced together. In the same way, the number of books registered in the Annals of the Western Han dynasty (206 B.C. to 25 A.D.) were counted in 'bundles of bamboo.' The shape of those early bamboo slips has probably influenced the vertical direction of the Chinese script. Later, when the Chinese administration moved to areas where bamboo was less easily available, wooden slips were used, shaped in the same way.

The earliest surviving example of leather comes from Egypt (*ca.* 2500 B.C.). Used without curing (smoking) and processing (manipulation with oil), animal skin decays quickly; but once so treated it is durable and flexible. By a process of tanning, which renders it nonputrescent and impervious to water through a tanning agent (probably acacia pod in Egypt, oak bark in Europe), skin can be transformed into leather. Leather used the scroll format since only one side is suitable for writing. Today leather scrolls still play an important part in Jewish ritual: according to the Talmud, the Book of Law must at all times be written on skin, and even today all synagogues have their leather or parchment Torah scrolls.

A decisive step forward was made about 150 B.C. when, according to Pliny the Elder, King Eumenes II 'invented' parchment. Though parchment does indeed take its name from the city of Pergamum, it is more likely the result of a gradual development. Parchment already needs a fairly complex manufacturing process: the skin has to be treated with lime, dehaired, defleshed, stretched, and then treated with pumice. Writing was now possible on both sides. Fragments of

parchment survive from the 2nd century B.C., but it was not before the 2nd century A.D. that it began to rival papyrus in the Roman world, and a further two centuries passed before it was used for the best books. At about the same time, the codex (based on the shape of Roman and Greek wax tablets) began to replace the old scroll format.

Clay tablets were used in Mesopotamia from the middle of the 4th millennium B.C.; they were the first artificially produced writing material. Their shape and quality influenced the form of writing for over three millennia, though the original pictorial signs were probably not replaced by cuneiform signs (as has repeatedly been claimed) because of the difficulties of inscribing round lines on wet clay. But the wedge-shaped impressions made at different angles with a specially designed stylus were the dominant form of writing until the beginning of the Christian era.

Palm leaves, on the other hand, were, until the beginning of the 20th century, the most commonly used writing material in South and Southeast Asia. To make a palm leaf fit for writing, each leaf is split from the central rib, cut to size, boiled, dried, and than rubbed smooth with a stone or a cowry shell. A pile of palm leaves (a book) is secured between two wooden boards, fastened together by a cord running through holes in each leaf. The Chinese pilgrim Xuan Zang, who visited India in the 7th century B.C., describes a large palm-leaf forest in Konkanapura surrounding a Buddhist stupa. Buddhist monasteries were centers of book production and nearby plantations would have ensured an adequate supply of writing materials, just as in ancient Egypt papyrus plantations were maintained around Alexandria and other places where papyrus was manufactured. Three species of palm tree provide material suitable for writing: the talipat palm (*Corypha umbraculifera*), the palmyra palm (*Borassus flabellifer)* and, especially in Southeast Asia, the lontar palm (*Corypha utan*). All Indian, and directly or indirectly all Southeast Asian scripts ultimately developed from Brahmi, a North Indian script first documented at the time of the Emperor Ashoka around the 3rd century B.C. North Indian scripts are often characterized by a long horizontal stroke from which the letters of a word or sentence seem to be suspended: a legacy (according to some scholars) of the stonecutter's tools in monumental inscriptions. This presents no problem if writing is done with pen and ink, but in the south of the subcontinent as well as in Southeast Asia, individual letters were mostly incised with a metal stylus. Since a series of horizontal strokes running parallel to the palm-leaf fibers would have split the leaves, letters began to take on a more rounded shape. But the characteristic oblong shape of the palm leaf imposed itself, for no practical reasons, on many paper, ivory, and metal manuscripts of Southeast Asia.

There are, finally, the instruments used for writing. Broadly speaking, writing can be executed in two distinctly different ways. The script can either be scratched or cut into the surface of the material with a sharp instrument (a stylus, a knife, or the stone cutter's tool) or it can be applied to the surface with a pen (quill, reed, wood, metal) or a brush. Great attention has been paid to the way the pen was trimmed to create different writing styles, and the way the brush and other writing implements were handled and, when not used, kept in good order. Basically two types of ink can be used: carbon ink or iron-gall ink. Carbon ink was used in Egypt as early as 3000 B.C.; it contained no substance injurious to any writing material. Around 300 A.D., with the increasing popularity of parchment, iron gall came into use, but iron-gall ink can fade and eat into the parchment. In addition, ink suitable for the quill damaged the steel pen and it was not before the 1830s that a type of ink was devised that eliminated these difficulties.

See also: Asia, Ancient Southwest: Scripts, Modern Semitic; Calligraphy, East Asian; Calligraphy, Islamic; Calligraphy, South Asian and Tibetan; Calligraphy, Western, Modern; Egypt: Scripts, Ancient; South and Southeast Asia: Scripts.

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Writing Variation into Formal Grammars

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Writing a grammar of a language is already a daunting undertaking, but it is made even more complex by the problem of saying exactly what that 'language' really consists of. It is easy to forget that a language is not actually a thing but an abstraction based on a living, changing reality drawn from the way people choose to communicate. In practice, the boundaries between languages, dialects, and sociolects are notoriously fuzzy. A famous comment attributed to Max Weinreich defines a language as "a dialect with an army and a navy," thus drawing attention to the social and political factors that need to be considered in addition to purely linguistic concerns. Often one variety is elevated to the status of a standard and is generally considered to be the 'correct' form, but this choice may not be based on rational criteria and it is often the variety spoken nearest to a country's capital city that is chosen. In addition, a variety's status as a standard then shapes speakers' perceptions of other varieties, often leading to a judgment that they are incorrect or substandard.

Even when boundaries between dialects and languages can be drawn in a reasonably satisfactory manner, there is variation along a number of dimensions to be taken into consideration. Detailed sociolinguistic studies in the past few decades have added a great deal to our knowledge of different variants in specific geographical locations and among different socio-economic strata. Even within standard varieties, situational factors such as degree of formality have a huge effect on the actual forms produced, especially when social stratification is reinforced by different linguistic means of marking status relationships. Gender and ethnicity also have a role in selection from a pool of available variants. Dealing with these in grammars therefore represents a formidable challenge, and any attempt at a formal grammar is bound to be something of a compromise. These difficulties may be more or less acute depending on the language in question and the type of grammar that is being attempted. Some of the problems arising from variability are considered here with reference to the writing of grammars of Cantonese (Yue Chinese), English, Tok Pisin, and some other languages.

According to the currently accepted classification, Cantonese belongs to the Yue branch of the Sino-Tibetan family. It is spoken by some 70 million people in Hong Kong and south China as well as by smaller but still significant numbers of speakers in Chinatowns worldwide. With such an impressive number of speakers and geographical range, it may appear surprising that it was only a few years ago that the first comprehensive grammar of Cantonese appeared (Matthews and Yip, 1994). This has a lot to do with questions of boundaries and definition. The term 'Chinese' is notoriously hard to pin down, referring to ethnic and racial as well as linguistic entities. The 'Chinese language' as traditionally conceived is a monumental family of related varieties bound together by a long shared history and a common writing system. The national language of the People's Republic of China, Mandarin or Putonghua, is often used synonymously with 'Chinese,' and other varieties spoken in different parts of the country are traditionally termed 'dialects' as a measure of their distance from this standard. However, varieties such as Cantonese are clearly so different in phonology and grammar from Putonghua that the two are mutually unintelligible, and there is no doubt that separate language status is indicated on purely linguistic grounds. However, political factors such as national unity are obviously relevant here, and Cantonese, lacking an army and a navy, seems destined for a second-class 'dialect' status.

The relationship among Chinese languages is further complicated by the fact that many speakers of different languages nevertheless use the same Standard Written Chinese for literacy purposes. This written standard has an extremely long tradition, apparently going back to the first standard based on the classical literary language in the Zhou Dynasty around the 1st millennium B.C. and then on another based on the vernacular literary language during the Tang Dynasty toward the end of the 1st millennium A.D. (Norman, 1988). It seems that this written standard has always had sufficient prestige to prevent the emergence of competing dialect versions. One result of the adoption by Cantonese speakers of a normative written standard based on a different variety is that they have to accommodate to a written register quite different from the spoken form. This has, in turn, led to high and low registers of spoken Cantonese, the former much closer to the written standard and the latter the language of unmonitored informal speech.

Because there is no agreement on the form of Cantonese characters, or even whether such written forms are legitimate, Matthews and Yip took as their starting point the spoken Cantonese of people in Hong Kong. With the authors' fruitful combination of native speaker intuition and skilful linguistic analysis, the issue of variability was taken up head-on by the authors. No fewer than eight phonological

changes in progress are described (Matthews and Yip, 1994: 29), such as the apparent merging of the [n] and [l] phonemes, leading, for example, to apparently free variation between *néih* and *léih* (你) as the second-person singular pronoun. In addition to describing grammatical variability, they also paid attention to what is appropriate in certain situations, in various contexts and at various levels of formality. Although Cantonese speakers tend to have fairly definite views on 'correct' pronunciation and may stigmatize innovations as 'lazy sounds,' there is not a strong tradition of prescription of grammatical forms or a long history of scholarship in a written variety of Cantonese, so the flexible approach of Matthews and Yip was more successful than a more rigid description of grammaticality might have been.

The English language, like Chinese, has a long and eminent tradition of study. The history of English as it emerged from the Germanic branch of Indo-European under the successive influence of Nordic languages and French and then Latin and Greek scholarship is well documented. In recent centuries, standardization through dictionaries and grammars has provided a written authority for the legitimacy of the standard, predictably based on the variety spoken around the capital, London. The prescriptive force of these works has been reinforced through an education system in which a definitive description of forms that are 'correct' or grammatical is usually contrasted with forms that are 'incorrect' and unacceptable. Founded on the received wisdom of prescriptive grammars, pedagogical grammars aim to make the rules of the system as accessible as possible for teachers and learners.

Standard English dictionaries can indicate some stylistic variation, for example, marking entries as informal, slang, or taboo. Lexis typical of major geographical variants (e.g., US and UK) or less widespread varieties (such as Scottish or New Zealand English) can also be indicated in this way. Some newer dictionaries deal with regional English, such as that of Butler (1990) for Australian English, and many new entries reflect the reality of English as used in this part of the world. The project that spawned this dictionary attempted to give recognition to traditionally neglected regional standards, and it is now being extended to other regions, such as southeast Asia. However, published grammars have traditionally been perceived as something solid and enduring and, if not prescriptive, then at least to some degree definitive; and variability can easily be under-emphasized in these works due to pragmatic concerns.

One problem with published dictionaries and grammars toward the prescriptive end of the spectrum, however, is that they inevitably become victims of changes in progress. Many of the words in older dictionaries are now archaic or obsolete, and even grammatical constructions that sounded correct a century ago may now appear affected or pedantic. A descriptive grammar, on the other hand, is less concerned with contrived or constructed examples or with distinguishing the 'correct' from the 'incorrect.' These grammars, like smaller-scale sociolinguistic studies, are firmly rooted in empirical data collected from genuine communicative events. Nevertheless, the ghost of prescriptivism may occasionally come back to haunt them because they have to deal not only with the reality depicted by the study data but with popular perceptions of what is 'right' and 'wrong.' Maidment (1994), for example, described the 'Disgusted of Tunbridge Wells' effect, in which the products of grammatical variation and change are liable to be seen as incorrect and slovenly. In fact, many nonstandard British varieties of English have often been popularly viewed, even by their speakers, as incorrect or lazy versions of the standard.

This situation is even more extreme in the case of pidginized or creolized varieties that have often been treated as defective or incompletely acquired forms of the lexifier language (i.e., the language that provides the majority of the words). Pidgins and creoles are the products of language contact, in which elements of the lexis and grammars of two or more languages combine and may stabilize to produce a new contact variety. There is still considerable debate about the exact nature of these contact languages, but one common feature is the hostility with which they have been viewed, especially by speakers of the lexifier language. It has also led to a self-deprecating view by the speakers themselves that their language is substandard and illegitimate, as seen, for example, in the adoption of the name Broken (from *broken English*) for Torres Strait Creole spoken in northern Australia (Shnukal, 1988). Speakers of creoles may also be part of a speech community in which standard forms of the lexifier languages are spoken alongside it; and whereas the basal form of the creole and the standard language may not be mutually intelligible, a continuum of forms may develop between these extremes. Such postcreole continua have been described in societies such as Jamaica and Guyana, where many intermediate grammatical and lexical forms exist between the creole and Standard English. Speakers typically have a range of competence in different varieties or lects, the exact one chosen for communication being determined by situational factors such as who the person is speaking to.

My own work on Tok Pisin, the expanded English-lexifier pidgin/creole of Papua New Guinea, which is now the *de facto* national language, took as its focus

the effect of young people on the language (Smith, 2002). This contrasts with studies that take as their starting point the speech of older competent speakers as the definitive variety. Variation in the speech of younger people comes from a number of directions. First, those who are speaking the language as a first language use it fluently in a wider variety of situations than those who use it as a second language. Some consequences of this are phonological reduction, with its attendant effect on morphology, and grammaticalization due to reinterpretation of forms in discourse. There is also the substrate effect of other languages spoken by those who use Tok Pisin as a second language. These may be difficult to pinpoint due to the large number of other languages spoken, but they nevertheless have an effect. One language that is having a profound influence on Tok Pisin is the lexifier, English, which is now in renewed contact with the pidgin after several decades of independent development. Large-scale borrowing of lexical items is now taking place as more children grow up fluent in Tok Pisin and educated through the medium of English. In describing the language, therefore, it is important to specify in illustrative examples who is speaking, in what situation, and various other factors about the speakers, such as place of residence, education level, and other languages used within the household.

Dealing with unwritten languages represents an even tougher challenge in the absence of established written norms and standards. Such languages may not have been previously the subject of academic study and may lack even a basic orthography, so here the fieldworker's initial task is clearly descriptive. Even in small-scale societies, inherent variation is a factor that can not be ignored. Nagy's (2001) work on the minority Romance language Faetar (Franco-Provençal) in southern Italy is one rather successful attempt to write variation into the description of the grammar of such a language. She codified various factors about speakers used as informants and was careful to make this information available when dealing with example utterances. A number of variables were kept in mind when producing the grammar, such as the nature of the data used (e.g., elicited vs. naturalistic); age, sex, and occupation of the speaker; and social situation in which a speech act was embedded.

An area with many unstudied languages is Melanesia, well known for its extreme linguistic diversity. Large numbers of languages are typically spoken by only a few hundred people. Many of the 1000 or so languages in this area are relatively unknown, and even basic facts about their phonology and typology may not be established. Moreover, chains of dialects may extend for a considerable distance from village to village, making it unclear where language boundaries might reasonably be drawn. These factors alone represent a formidable challenge to field linguists, and taking variation into consideration has consequently been given low priority in many studies. However, some attempts have been made.

A grammar from the Melanesian country of Vanuatu that has tackled the issue of variation is Crowley's (1999) study of Erromangan (Sie). In it, he examined in detail the variation, for example, between the voiceless fricatives [s] and [h]. At first, this appeared to be a geographical issue, with variant phonemes separated by a north-south isogloss, but further data showed that both variants were produced by a variety of people in different locations and situations in apparently random variation. It thus represents a change in progress – an intermediate stage in a shift from [s] to [h] – and the grammar must somehow find a way of describing this phonemic system in flux. The interesting factor relating to this particular phone pair is that contrast is maintained in ecclesiastical written sources, in which words spoken with [h] are nevertheless rendered with [s] in the written form, thus fossilizing in writing an obsolescent contrast. In a similar way, Dorothy Jauncey's (1997) grammar of Tamambo (another Austronesian language of Vanuatu) tried to report accurately the social constraints governing the alternation among [g], [k], and a voiced velar fricative in intervocalic contexts. In Papua New Guinea, there are, according to the latest *Ethnologue* (Grimes, 2000), between 800 and 900 languages, many poorly known, and some pioneering fieldworkers are currently grappling with similar issues.

Thus, variability represents a challenge to linguistic description that can no longer be left at the periphery. Prescriptive grammars may have a useful role, but the recording and analysis of uncontrived communicative events in naturalistic contexts has come to the fore as the primary data for linguistic study. So, linguistic variation and change must be taken into consideration in any grammatical account that claims to represent the reality of language use.

See also: Corpus Lexicography; Language and Dialect: Linguistic Varieties; Pidgins and Creoles: Overview; Reflexivity in Sociolinguistics; Register: Dictionaries; Variation and Language: Overview.

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Wu Languages *See:* Chinese.

Wundt, Wilhelm (1832–1920)

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Wilhelm Wundt was born on August 16, 1832, in Neckarau (close to Mannheim, Germany). In 1851, he obtained his diploma from secondary school, qualifying for university matriculation. In the same year, he started to study medicine at the University of Tübingen. He continued his studies at the University of Heidelberg in 1852, passed his state exams in medicine in 1855, and earned his doctorate in medicine in 1856. His doctoral thesis, titled *Untersuchungen über das Verhalten der Nerven in entzündeten und degenerierten Organen*, was about the role of neurons in inflammatory processes. For one semester he performed research in Berlin with the famous physiologists Johannes Müller and Emil Heinrich du Bois-Reymond. In 1857, he obtained his university lecture qualification (*Habilitation*). Between 1858 and 1863, he was assistant professor to the most influential physiologist of his time, Hermann von Helmholtz, in Heidelberg, where he was appointed adjunct professor for anthropology and medical psychology in 1864. Interestingly, he also engaged in politics from 1864 to 1868; he was a member in the second chamber of the parliament of Baden for the liberal party (*Badische Fortschrittspartei*). He resigned from politics because it began to take too much time away from his scientific life. He got married in 1872 and moved to the University of Zürich in 1874 as professor for inductive philosophy. Finally, he accepted an offer of a professorship for philosophy at the University of Leipzig in 1875, where he was active until 1917. He died on August 31, 1920, in Großbothen, close to Leipzig.

In 1879, he founded the world's first Institute for Experimental Psychology, initially as a private institute, which was approved by the university as an official institute in 1883 with its own budget. Wundt was rector of Leipzig University from 1889 to 1890 and was awarded honorary citizenship of Leipzig in 1902. He had two daughters and one son. His daughter Eleonore, who was his secretary and assistant, compiled his bibliography listing more than 500 publications.

Wundt can be regarded as the father of modern psychology. Among the first members of the newly established institute were Granville Stanley Hall (1844–1924; president of Clark University in Worcester, MA, and founder of the American Psychological Association), James McKeen Cattell (1860–1944; director of the Psychological Institute of Columbia University, New York), Hugo Münsterberg (1863–1916; professor for experimental psychology at Harvard University at the same time as William James), and Emil Kraepelin (1856–1926; director of the Clinic for Psychiatry (later the Max Planck Institute for Psychiatry) in Munich). He supervised 184 dissertations (60 from foreign doctoral students and 18 from the United States). His focus was on

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Wu Languages *See:* Chinese.

Wundt, Wilhelm (1832–1920)

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experimental psychology based on Fechner's psychophysics and reaction time measurements. His opus magnum was *Grundzüge der physiologischen Psychologie* (*Foundations of physiological psychology*) – the first edition published in 1874 comprising 870 pages and the sixth edition published between 1908 and 1911 comprising three volumes with 2327 pages – which established the experimental approach for psychology.

However, his second branch was the so-called *Völkerpsychologie*, supplementing the experimental approach with a nonexperimental approach to adequately investigate phenomena of social psychology, such as language, myth, and custom. According to his view, one gets insight about the psychological principles underlying these faculties by studying their output. He regarded the role of language as special because it is an entry point to understand social and cultural behavior. In fact, he was rather influential for the psychology of language and psycholinguistics; for example, the influential Leonard Bloomfield based his linguistic textbook published in 1914 on Wundtian psychology. According to Wundt, the mental sentence ('as an inner psychological construction') guides the unfolding speech and should therefore be regarded as the unit of language. That is, the sentence is not just a concatenation of words and sounds. On the contrary, sounds, words, the rules of grammar, etc., all have their meaning only in relation to the underlying mental sentence. His book *Logik* (1883) presents a model of syntactic structure, namely the tree diagram of syntax. Language starts with S (the sentence) at the top, and selective attention separates the subject (the focus or figure) from the predicate (the ground), and so on. In the volume *Die Sprache* (*Language*, 1911), he argued in favor of the cognitive level of language operating in a top-down manner. His psycholinguistic work was continued by Ottmar Dittrich, who headed the group on phonetics and psychology of language at the University of Leipzig.

See also: Bloomfield, Leonard (1887–1949); Helmholtz, Hermann Ludwig Ferdinand von (1821–1894); Psycholinguistics: History; Psycholinguistics: Overview.

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X

X-Bar Theory

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Introduction: Outline of X-Bar Theory

The Core Structure

X-bar theory takes its origins in the 1970s and was a central component of the Government and Binding model and the Principles and Parameters model (*see also* **Principles and Parameters Framework of Generative Grammar**) at the end of the 20th century. Both these models had as one of their major leading ideas the hypothesis that the grammar consists of a set of autonomous modules that interact to generate sentences as their output. One such module was, for instance, theta theory, whose task was to ensure that the arguments (essentially, but not exclusively, NPs) in a sentence were associated with a predicate and to express a particular thematic role such as AGENT, PATIENT, LOCATION. (*see* **Thematic Structure; Argument Structure**). Another module was case theory, which served to ensure that noun phrases were associated with the appropriate case (though presence of case did not need to correspond to morphological case marking). A third module is the so called Binding theory (*see* **Binding Theory**), which regulates co-reference relations between nominal expressions in a sentence (reflexives, pronouns, noun phrases). The module of the grammar referred to as X-bar theory regulates phrase structure, that is the internal organization of constituents of a clause (*see* **Constituent Structure**).

X-bar theory formalizes the insight that sentences are not merely strings of words but that the words that compose the sentence are grouped in larger units, called phrases. The goal of X-bar theory is to offer a uniform format for all such phrases in the sentence. The same format applies to the sentence itself, the maximal constituent under analysis. The basis for the X-bar format is found in Chomsky's (1970) "Remarks on nominalization," one of whose aims was to capture the relation between a deverbal noun such as *analysis* and the semantically related verb (*analyze*), without the need to postulate that a deverbal noun phrase such as *John's analysis of the problems* is underlyingly a full fledged sentence (*John has analyzed the problems*) containing the related verb (i.e., *analyze*).

It is a traditional assumption that phrasal constituents can be characterized in terms of the properties of one core component that is identified as the head of the phrase. For instance, a constituent referred to as a noun phrase (NP) is a phrasal constituent whose head is a noun (1a) (see 'X-bar Theory and the Nominal Projection: NP as DP,' however; *see* **Noun Phrases**), a verb phrase is a constituent headed by a verb (1b), an adjective phrase is headed by an adjective (1c), and a prepositional phrase is headed by a preposition (1d):

(1) a. [$_{NP}$ John's [$_{N}$ analysis] of the problems] was impeccable.
[$_{NP}$ John's [$_{N}$ envy] of his wife] was obvious.
b. John will [$_{VP}$ [$_{V}$ analyze] the problems].
John will always [$_{VP}$ [$_{V}$ envy] his wife].
c. John is [$_{AP}$ [$_{A}$ aware] of the problems].
John is [$_{AP}$ [$_{A}$ envious] of his wife].
d. John is [$_{PP}$ [$_{P}$ against] the death penalty].
John is [$_{PP}$ [$_{P}$ in] the basement].

Formalizing this insight, one core tenet of X-bar theory is that syntactic structure is endocentric: a syntactic constituent is built around a head, which determines the properties of the constituent. For instance, constituents headed by a noun (N) are noun phrases (NPs), and as such, share a number of distributional characteristics.

In the first stages of the generative approaches to phrase structure, a large amount of variation was still allowed for the internal make-up of constituents. For instance, it was common to find representations displaying different types of branching within constituents. In (2a), for instance, the NP *John's analysis* is binary branching: the root node, NP, splits into two branches, one leading the possessive genitive NP *John's* and one leading to the head noun *analysis*. In (2b), the NP *John's analysis of the problems* is ternary branching: three branches lead from the

root NP to the constituents of that NP. In (3a), the VP is binary branching, in (3b) it is ternary branching, and in (3c) the VP is split into four branches. The number of branches that could originate from the root node (the topmost NP, VP, etc.) basically depended on the number of constituents contained in the phrase.

(2) a.

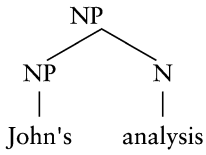

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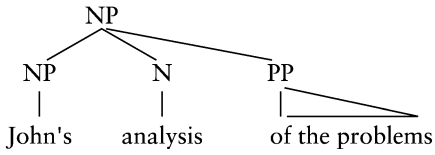

(3) a.

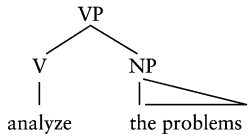

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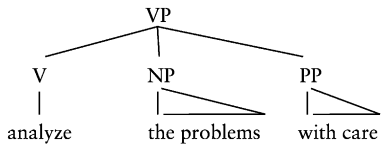

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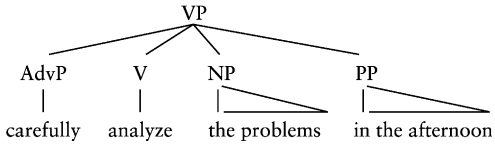

The representations in (2) and in (3) are essentially flat: they lack any information as to the internal relations of the components of the constituents, apart from adjacency relations. For instance, the representations fail to capture the crosscategorical generalization that the PP *of the problems* in the NP in (2b) has a relation to the head N *analysis* similar to the relation between the NP *the problems* and the head V *analyze* in the VP in (3). The PP *of the problems* in (2b) can be said to realize the complement of the N *analysis* in the same way that the NP *the problems* realizes the complement of the verb *analyze* in (3). Nor do the representations above lead one to assume that in (3c) the relation between the verb *analyze* and the NP *the problems* is tighter than that between the verb *analyze* and the adverbial phrase *carefully*, since both are adjacent to the verb. However, it is clear that while an object NP is obligatorily present with a transitive verb such as *analyze*, a manner adverbial is not.

In addition, traditional constituency tests suggest that flat structures such as those above are empirically inadequate. Consider (4a):

(4) a. John's analysis of the problems was less convincing than Mary's Ø.
b. John will analyze the problems with care but Mary will **do so** more casually.

In (4a), ellipsis (represented here by the symbol Ø) has affected the string *analysis of the problems*. It is traditionally assumed that if a particular string of words can be affected by a syntactic operation then this string is a constituent. This suggests that in the NP *John's analysis of the problems*, the head noun *analysis* and its complement, the PP *of the problems*, should form a syntactic constituent that excludes the prenominal genitive *John's*. However, in a ternary branching representation such as (2b), no single node exhaustively dominates the head N *analysis* and the PP complement *of the problems*. The only constituents represented in this structure are (i) the complete NP, *John's analysis of the problems*, and (ii) the three composing constituents, the genitive NP *John's*, the head noun *analysis* and the PP complement *of the problems*. Similar considerations can be put forward to argue that the verb and its object form a constituent. In (3b), the string *analyze the problems* is substituted for by *do so*. Again the substitution does not affect the PP *with care*, suggesting that the head verb and the object should be dominated by one node.

X-bar theory constrains the formation of constituents by imposing a blueprint for possible syntactic structure; it defines what is – and what is not – possible syntactic constituent. Based on considerations of simplicity and on constituency tests such as those briefly illustrated above, the flat structures in (2) and (3), which allow multiple branching patterns, have come to be replaced by a hierarchically organized structure. The universal format for all phrase structure is given in (5a) (Jackendoff, 1977: 17):

(5) a.

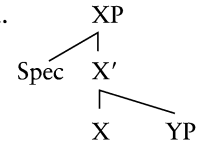

In the version of X-bar theory that has gained widespread recognition, all syntactic structure is binary branching (cf. Kayne, 1984): that is to say, syntactic units are built up by combining two constituents, thus creating a new constituent. (In the minimalist approach (Chomsky, 1995), the combination of two constituents to form a new unit is referred to as merging [*see also* **Minimalism**]). The representation

in (5a) rules out any structure in which a syntactic node immediately dominates more than two constituents. Any such structures would have to be reinterpreted in terms of hierarchically organized combinations of two constituents.

A constituent (XP) is built around a head X, of a certain category. There is a biunique relation between a head and a projection: each head is associated with one projection and each projection has a unique head. The head of a projection, designated as X in (5a), is a word or a (possibly abstract) morpheme. The category of the head determines the category of the constituent (but *see* **Mixed Categories**). The complement of a head (YP in [5a]) is a phrase that is also formed according to the X-bar format. The head combines with the complement to form a so-called intermediate projection X′. The complement has a tight relation with the head in that the head determines the number of required complements (if any), and it also determines the particular form of the complement(s). For instance in English, verbs select the category of their complement: *analyze* and *envy* select an NP, *wait* and *rely* selects a PP, etc.; nouns or adjectives, on the other hand, combine with a PP complement and do not combine with an NP complement (**a student English*, **the analysis the problems, *envious his wife, *aware the problems*) (*see also* **Argument Structure**).

The properties of the head of a projection determine the properties of the projection: thus, in the unmarked case, if a constituent is headed by a noun it will be of the category NP (and not, say, VP), and if the head of the NP is singular the number of the NP will be singular. In (5c), the NP contains two nouns, singular *analysis* and plural *problems*. It is the number of the head noun, *analysis*, that determines singular agreement of the containing NP. It is sometimes said that the grammatical features of the head (here [+SG]) percolate to the projection.

(5) b. John's analysis of the problems was/*were convincing.

The projection of a head closes off with the specifier. The projection that dominates the head, the complement(s) and the specifier is the maximal projection. As a first approximation, we can represent the structure of the NP as in (5c). As shown (but see 'The parallelism Between Claude and Nominal Projection' below), the specifier of the NP in (5b) can be realized by the prenominal genitive. Alternative fillers for this specifier position would be the possessive pronoun, the article, and the demonstrative pronoun. Because of their complementary distribution, determiners and prenominal genitive are assumed to occupy the same position (cf. Jackendoff, 1977).

(5) c.

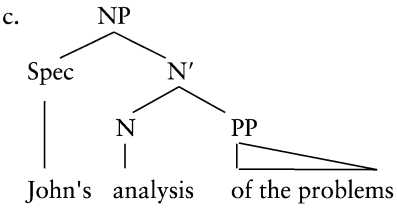

John's	analysis	of the problems
his	analysis	of the problems
the	analysis	of the problems
this	analysis	of the problems

The specifier–head relation is typically a feature-sharing relation in that fillers for a specifier are often seen to agree with the head. Agreement is realized overtly on English demonstratives. In other languages such as French, possessive pronouns as well as articles display agreement in number (and gender) with the head noun.

(5) d.

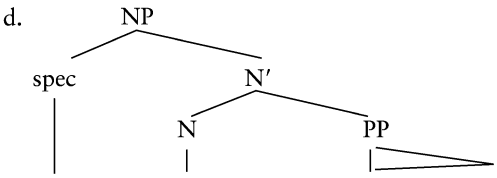

la	description	des problèmes
the$_{F\text{-}SG}$	*description*$_{F\text{-}SG}$	*of the problems*
les	descriptions	des problèmes
the$_{PL}$	*description*$_{PL}$	*of the problems*
sa	descriptions	des problèmes
his/her$_{F\text{-}SG}$	*description*$_{F\text{-}SG}$	*of the problems*
ses	descriptions	des problèmes
his/her$_{PL}$	*description*$_{PL}$	*of the problems*

A constituent in the specifier of a projection may also have a subject-like relation to the head of the projection. This is illustrated in the examples above: the prenominal genitive *John's* or the possessive pronoun *his* can be argued to refer to the AGENT of the deverbal N *analysis* in (5c). In the French examples (5d), the possessive pronoun *sa/ses* denotes the AGENT of the activity denoted by the N *description*. Specifier or complement are not necessarily realized in the projection, as illustrated by (2a), in which there is no complement to the N. (For a discussion of the specifier of VP see 'The Base Position of the Subject' below).

Phrases differ in terms of the properties of their heads; this variation determines their external distribution. However, the format for their internal organization (5a) is shared by all phrases, regardless of the category of their head. In this way X-bar theory brings out the properties common to phrases of

various categories (NP, VP, etc.) and it offers a framework for expressing crosscategorial generalizations. For instance, as discussed above, the notion complement of is not only relevant to VP but it is a defining property of all constituent types. When particular syntactic operations (essentially movement) generalize across categories, it is expected that they will apply uniformly at the same level of the projection, for instance at the level of the maximal projection (XP) or at the level of the head (X) (cf. Jackendoff, 1977: 17).

For a discussion of the different implementations of X-bar theory see Stuurman (1985: Chap. 1, Sect. 3 and 4), who also shows that equating X-bar theory with the superscripting notation of the American structuralist approach of the 1950s is not justified (Stuurman, 1985: Chap. 1: Sect. 2). For critical evaluation of implementations of X-bar theory see also Kornai and Pullum (1990).

Extending the Core: Adjunction

In addition to the core elements of the projection of the head, syntactic theory must also provide a means for enriching a structure with modifying elements, which, though associated with a particular projection, are nonetheless not essential attributes of that projection. For instance, manner expressions of the type illustrated by the PP *with care* in (3b) and by the adverbial phrase *carefully* in (3c), are not essential attributes of a verb phrase headed by the verb *analyze*. They do not form part of the core VP and they are not selected by the verb: the manner expression associated with a VP headed by the verb *analyze* can be realized by a PP, an adverbial phrase, or even an NP. Such constituents are added to the completed core projection, which has itself been constructed according to (5a). The creation of an extra layer of the projection is achieved by a process referred to as adjunction. Adjunction combines a fully projected constituent with another maximal projection. An adjoined manner constituent can be interpreted as a modifier to the constituent to which it is adjoined. In (6a) the maximal projection of V combines with the maximal projection *very carefully* to form an augmented maximal projection VP.

(6) a.

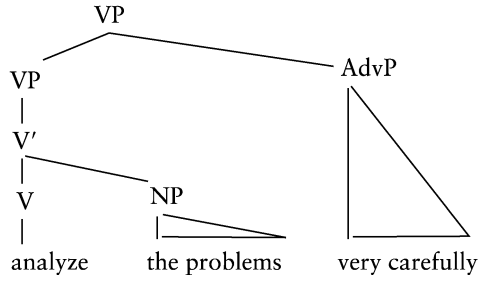

Observe that in (6a) the combination of VP with the adjunct *very carefully* does not create a new VP. By adding an extra layer, the adjunction extends the core VP consisting of the head and its complement. In (6a) the adjunct is right-adjoined. When adjuncts linearly precede the constituent they modify, they are left-adjoined:

(6) b. John will [$_{VP}$ very carefully [$_{VP}$ analyze the problems]].

The number of adjuncts to a particular projection is not syntactically determined, though processing constraints will *de facto* restrict their actual number. The order of adjunction reflects the semantic closeness of the adjunct to the phrase that it modifies. For instance, in (6c), first the adjunct *completely* is added to the VP *reread the text*. Informally, we can say that the adjunct specifies the domain of application of the action expressed by the verb *reread:* (6c) expresses that the action of rereading affects the complete domain of the object *the text*. In turn, the manner adjunct *very carefully* is adjoined to the output of that first adjunction: *very carefully* applies to the extended VP *completely reread the text*. Hence, *very carefully* will be interpreted as modifying the denotation of the extended VP *completely reread the text*.

(6) c. John will [$_{VP}$ very carefully [$_{VP}$ completely [$_{VP}$ reread the text]]].

Both the syntactic status and the semantic interpretation of adjuncts in syntactic structure has led to a wide range of proposals (see Escribano, 2004). For further discussion of the theoretical status of X-bar theory see also Speas (1990). For discussion of scopal relations between adjuncts see also Cinque (1999), Ernst (2002), and the references cited therein. In the Minimalist framework, Chomsky (1995) distinguishes between two types of merger: so-called Set Merge is the operation that creates the core constituent; Pair Merge adjoins one XP to another one (*see* **Minimalism**).

Applications of X-Bar Theory and Functional Structure

Lexical and Functional Categories

Initially (e.g., Jackendoff, 1977), the X-bar format was essentially formulated to characterize the projection of the lexical categories noun, verb, adjective, and preposition, and functional categories were integrated as specifiers of these lexical projections. As shown in (5c, 5d) above, the determiner was, for instance, taken to realize the specifier of the NP;

auxiliaries were sometimes represented as specifiers of VP. The sentence was either taken to be a combination of NP and VP and not subject to the X-bar format, or alternatively, it was taken to be a projection of the verb with the subject as a specifier of a V projection. In the 1980s, the X-bar format was generalized to capture all syntactic structure, including the sentence (Stowell, 1981; Chomsky, 1986). Moreover, the type of projecting head was extended: the head of a projection could be either lexical (N, V, A, P) or it could be a functional morpheme such as an inflectional element, an auxiliary, a tense particle, or a conjunction (*see also* **Functional Categories**). Lexical heads are at the basis of lexical projections; functional heads project functional projections. (On hybrid categories see Pullum (1991), Corver and van Riemsdijk (2001), and the references cited.) Furthermore, the idea was developed that a lexical projection was always integrated into a dominating functional projection (Grimshaw, 1991).

X-Bar Theory and the Sentence

In the literature, a number of proposals have been formulated for integrating the structure of the clause into the X-bar format. A first fairly comprehensive analysis was elaborated in Jackendoff (1977). What most approaches, from the earliest to the most recent, have in common is that a sentence formed round a lexical verb is seen as essentially an expansion of the projection of that verb. That is to say: the lexical or thematic core of such a sentence is taken to be the VP. For instance, sentence (7a) is taken to have as the core of its projection the verb *analyze*:

(7) a. John will analyze the problems.

But clauses are more than just the projection of a verb. The VP is associated with various morphemes of aspect, time, and modality. For instance, in (7a) the VP built around *analyze* is associated with the modal auxiliary *will*. Functional morphemes head their own projections; these functional projections are again instantiations of the X-bar format. One particular influential proposal (Stowell, 1981; Chomsky, 1986) builds on the assumption that VP is integrated into the clause via the functional head Inflection (abbreviated as I), which takes VP as its complement. The head Inflection may be realized by a tense morpheme, an auxiliary, or an invariant particle. In English, for instance, I(nflection) is filled by the bound tense morpheme, a finite auxiliary or infinitival *to*. I and its complement VP form the intermediate constituent I′. I′ combines with a specifier to form IP. The specifier of IP is the canonical subject position. As can be seen in (7b), the representation of (7a), the subject position is the highest nominal position in the structure. Observe that while in Jackendoff's (1977) proposal the canonical subject position was a specifier of VP, here the subject is associated with the functional projection, IP. Grammatical functions such as 'subject of' or 'object of' are derivative concepts, they are reinterpreted in terms of specific positions in the clause structure. In English, the specifier position of IP is the canonical subject position (see also 'The Base Position of the Subject' below) and the constituent which is the sister of V in V′ is the direct object. For a review of this approach to grammatical functions and the problems it raises, see among others Davies and Dubinsky (2001) and Baker (2001).

(7) b.

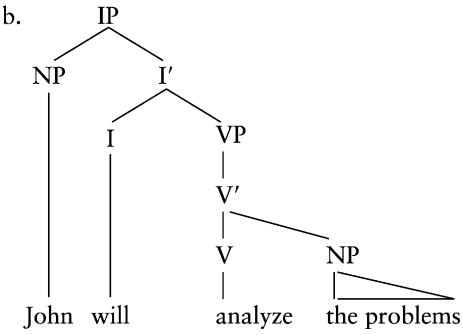

In turn, IP is inserted as the complement of the functional head C, which can be realized by a subordinating conjunction.

(7) c.

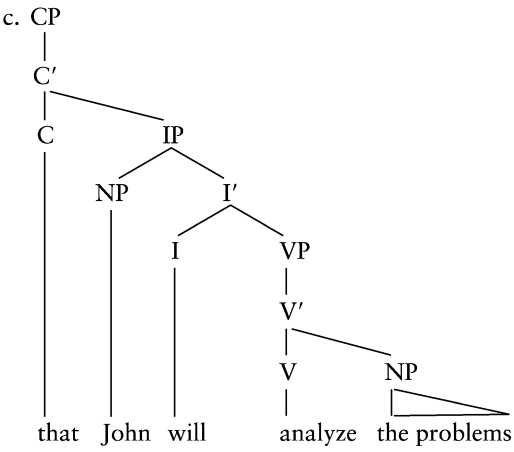

Each layer of the clause contributes a specific dimension to its interpretation. VP contains information concerning the event and its arguments; IP situates the event in time, specifying aspectual, temporal, and modal dimensions of the state of event/state of affairs denoted by VP. The head C selects a clausal complement: when realized by the conjunction *that*, C selects a finite IP; when C is realized by *for*, its complement is nonfinite. The projection headed by C serves to link the clause (IP) with the context/discourse. The filler of C encodes the illocutionary

force of the sentence, that is, the way the speaker presents the information to his interlocutor. In embedded clauses, *that* introduces a declarative clause; *if* introduces an interrogative clause. In direct questions the finite auxiliary (in I) moves to C to encode illocutionary force:

(7) d.

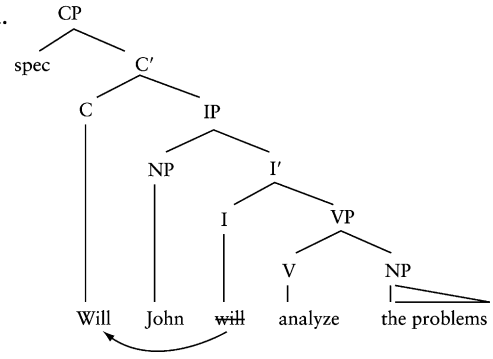

In (7d), the strikethrough symbol ~~*will*~~ represents the unpronounced copy of the fronted auxiliary *will*. This notation serves to keep track of the derivational history of a constituent: the modal auxiliary originates in I, where it encodes future modality, and it is subsequently fronted to C, where it encodes interrogative force. By means of the unpronounced copy, ~~*will*~~, the original semantic and syntactic relations of a moved constituent are maintained in the representation even after the element has been displaced. In earlier versions of the theory, moved constituents were said to leave a trace (represented by t). The index on the trace (the subscript m in [7e]) encodes the link with the displaced constituent with same index:

(7) e. $[_{CP}\ [_{C'}\ [_{C}\ \text{Will}_m][_{IP}\ [_{NP}\ \text{John}][_{I'}\ [_{I}\ t_m]$
$[_{VP}\ \text{analyze}\ [_{NP}\ \text{the problems}]]]]]]$?

The specifier of CP is typically filled by constituents encoding discourse relations. For instance, in English, an interrogative constituent such as *which problems,* though functioning as the direct object of the verb *analyze* in (8a), will not normally remain in its VP-internal position right-adjacent to V, but it will be moved to the sentence-initial position, where it encodes the scope of the question. This initial position is the specifier of CP (but see 'Functional Structure' below).

(8) a. $*[_{CP}\ [_{C'}\ [_{C}\ \text{Will}][_{IP}\ [_{NP}\ \text{John}][_{I'}\ [_{I}\ \cancel{\text{will}}]$
$[_{VP}\ \text{analyze}\ [_{NP}\ \text{which problems}]]]]]]$?
b. $[_{CP}\ \text{Which problems}\ [_{C'}\ [_{C}\ \text{will}][_{IP}\ [_{NP}\ \text{John}]$
$[_{I'}\ [_{I}\ \cancel{\text{will}}]\ [_{VP}\ \text{analyze}\ [_{NP}$
$\cancel{\text{which problems}}]]]]]]$?

Each of the clausal layers, CP, IP, and VP, is built up according to the same principles of X-bar theory. Syntactic relations are established domain-internally (that is, locally). VP is the thematic domain of the clause; IP is the inflectional domain involved in licensing various properties of the verb (tense, agreement, aspect, modality); CP constitutes the interface with the discourse.

Movement and Structure Preservation

A Positions Versus A′ Positions A distinction is made between so-called A positions (short for argument positions), such as the specifier of IP or the complement of V, which are inherently associated with grammatical functions (subject, direct object), and A′ positions (nonargument positions), such as the specifier of CP, which may host constituents with different grammatical functions. The specifier of IP, for instance, is an A-position: it hosts the subject of the clause and a constituent that occupies that position will have subject properties. As shown by (8b) above and also by (8c–f) below, the initial constituent in a constituent question, which is taken to occupy the specifier of CP, can be associated with a wide range of grammatical functions. The specifier of CP is an A′-position. Movement to an A-position is often referred to as A-movement; movement to an A′-position is A′-movement.

(8) c. To whom will John give the book?
d. When will John analyze the problems?
e. How carefully could John analyze the problems?
f. Why should John analyze this problem?

Types of Movement and Structure Preservation Two types of movement are differentiated: (i) head movement, illustrated by the movement of the modal auxiliary *will* to the position C, and (ii) phrasal movement or XP-movement, in which a complete constituent (a maximal projection) is moved. The movements are structure preserving (Emonds, 1976) in that a head moves to a head position and a phrase moves to a phrasal position, respecting the X-bar format. Head movement can also lead to the formation of complex verbs as found in polysynthetic languages (Baker, 1996).

Head movement is essentially clause-bound. Maximal projections may be moved out of the clause in which they acquire their thematic relations (8g). Such long extraction to the specifier of a higher CP proceeds through the specifier of the lower CP, the so-called escape hatch for movement.

(8) g. $[_{CP}\ \text{To whom did}\ [_{IP}\ \text{you say}$
$[_{CP}\ \cancel{\text{to whom}}\ \text{that}\ [_{IP}\ \text{John will give}$
$\text{it}\ \cancel{\text{to whom}}]]]]$?

Configurational Relations

Relations between the constituents of a clause can be stated configurationally, that is, in terms of the geometry of the tree. One such relation that has been shown to play an important role in syntax is the relation c-command (Reinhart, 1981). A constituent X c-commands a constituent Y if there is a node Z such that Z immediately dominates X and Z also dominates Y. By this definition, the specifier of IP c-commands all the constituents contained in IP: the subject NP in the specifier of IP is immediately dominated by IP, which in turn dominates VP, the VP-internal object, etc. Similarly, the specifier of CP c-commands the constituents of the containing clause, etc. Conversely, a VP-internal object does not c-command the elements in the containing IP (*see also* **Command Relations**).

C-command relations account for various syntactic and semantic relations and for observed subject/object asymmetries. For instance, the subject in the specifier of IP c-commands the constituents of the IP domain, and it is the most prominent NP of that domain. Because of its configurational prominence, the subject functions as the prototypical antecedent for any reflexives and reciprocals in the IP domain (*see also* **Binding Theory**). The subject NP *the students* in (9a) binds the reciprocal *each other* contained in the direct object, the object NP *the students* cannot bind the subject in (9b):

(9) a. The students invited each other's friends to the party.
b. *Each other's friends invited the students to the party.

Similarly, when the subject in the specifier of IP is a negative quantifier, it can license a polarity item in the IP domain, whereas a negative quantifier as an object cannot license a polarity item in the subject position:

(10) a. No one liked anything last night.
b. *Anything pleased no one last night.

X-Bar Theory and the Nominal Projection: NP as DP

This section returns to the projection of the noun. In the same way that the clause is a projection of V embedded in functional projections, the lexical projection of the noun, NP, is embedded in functional projections. In this way, various similarities between nominal projection and clause can be brought to the fore (Abney, 1987).

Specifiers of NP

Initially, the projection of N was taken to be simply NP, with the specifier realized, among other things, by the determiner or by a prenominal genitive NP (see [5c, d]). Jackendoff (1977: 103–104) already points out that such an approach groups together rather different entities, with different semantic functions. It is clear that amalgamating determiners (essentially articles such as *the* or *a,* or demonstratives such as *this*, *that*) with a genitive NP is counter-intuitive. Determiners are one-word functional elements, they belong to a closed class; genitives are full phrases, they are open-class elements that may very well have internal structure; possessive pronouns substitute for full nominal phrases. In the NP *his analysis of the problems,* for instance, the possessive pronoun *his* could replace a genitive such as *the new teacher's*. It seems inappropriate that such widely different units should be treated as identical.

There is also crosslinguistic motivation for not inserting articles and possessors in the same position: in many languages, possessive pronouns and articles cooccur. (11a) is from Italian and (11b) from Catalan:

(11) a. la mia casa
the-FEM-SG *my*-FEM-SG *house*-FEM-SG
'my home'

b. la meva casa
the-FEM-SG *my*-FEM-SG *home*
'my home'

Hungarian offers a further illustration of this point.

(11) c. az en kalap-om
the *I* *hat*-1SG
'my hat'

d. a te kalap-od
the *you* *hat*-2SG
'your hat'

e. a Peter kalap-ja
the *Peter*-NOMINATIVE *hat*-3SG
'Peter's hat'

In (11c–e), the prenominal possessors, whether pronominal (11c) and (11d) or lexical (11e), have a nominative case form, as a subject NP would have in a clause.

The DP Hypothesis

The sentence is an extended projection of VP: it consists of a lexical projection (VP) embedded in a sequence of functional projections (Grimshaw, 1991). Generalizing this hypothesis, it is proposed that projections of lexical heads are always embedded within the projections of functional heads. Thus, in the unmarked case, the projection of a noun head should not be expected to surface as a bare NP projection of the lexical head N, but the projection of the lexical

head N will also have to be inserted into a functional domain. Pursuing this path, the nominal projection has been reinterpreted as consisting of a lexical domain headed by N dominated by a functional domain headed by the determiner (Abney, 1987). It is proposed that in order to function as an argument, an NP must be embedded in a DP. Thus a structure along the lines of (12a) is replaced by one like (12b):

(12) a.

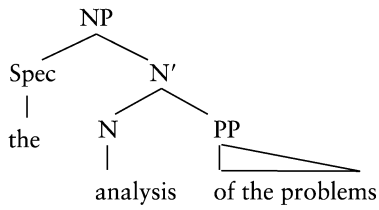

b.

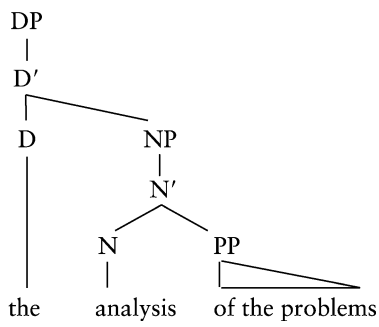

See, however, Tomioka (2003) for a proposal that bare NPs may be arguments.

The Parallelism between Clause and Nominal Projection

This revision of the nominal projection leads to a closer similarity between the projection of the noun and the clause, and many parallelisms are found across the two domains. For instance, in the clause, the domain of C is associated with discourse related effects (topicalization, focalization, and illocutionary force). Similarly, the semantic function of D can be said to establish reference (Longobardi, 1994), that is, a relation between the NP and a discourse referent.

DP Internal Movement: The Case of Modern Greek In the same way that constituents may move within the clausal domain, and may be extracted from it, movement can be seen to apply within the nominal domain, and in some cases extractions from the nominal domain are also possible. Horrocks and Stavrou (1987: 86) discuss examples such as the following from Modern Greek:

(13) a. to vivlio tu Chomsky
the book *the*-GEN *Chomsky*
'the book by Chomsky'
a′. tu Chomsky to vivlio
b. i kritiki tu vivliu
the review *the*-GEN *book*-GEN
'the review of the book'
b′. tu vivliu i kritiki
c. to endhiaferon ya to arthro afto
the interest *about the article this*
'the interest of this article'
c′. ya to arthro afto to endhiaferon

In each of the pairs in (13), the constituent following the head N in the nonprimed example is fronted to a pre-N position in its primed counterpart. The interpretive effect of such fronting is that of focalizing. Horrocks and Stavrou (1987: 86) say, "All this is obviously reminiscent of the fronting of constituents that takes place in sentences for the purpose of bringing a particular constituent into prominence." The application of focusing in the domain of the sentence is illustrated in (14), in which the indirect object *tis Afrodhitis* or the direct object *to vravrio* ('the prize') can be fronted for focalizing effects. Horrocks and Stavrou (1987) show that in the clause focalization has the properties of A′-movement (cf. 'A-positions Versus A′-positions' above).

(14) a. Edhose to vravio tis Afrodhitis.
gave-3SG *the prize* *the*-GEN *Aphrodite*-GEN
'He gave the prize to Aphrodite.'
b. Tis Afrodhitis edhose to vravio.
c. To vravio edhose tis Afrodhitis.

The parallelism between interrogative clauses and interrogative DPs in Greek strengthens the assumption that DP is to NP what CP is to VP. (15), from Horrocks and Stavrou (1987: 89), illustrates the interaction between clausal movement and DP-internal movement. Example (15a) corresponds most closely to a sentence with minimal movement; in (15b), the interrogative genitive *tinos* ('whose') has been fronted DP-internally; in (15c), the interrogative genitive *tinos* is extracted and fronted to the specifier of the matrix CP. In (15d) and (15e), movement has affected the full DP. In the former case, movement has not applied DP internally, in the latter it has. Strikethrough shows the derivational history of the moved constituents.

(15) a. Mu ipes [$_{CP}$ pos dhiavases
me-GEN *said*-2SG *that read*-2SG
[$_{DP}$ to vivlio tinos]].
the book who-GEN
'You told me you read whose book?'
b. Mu ipes [$_{CP}$ pos dhiavases [tinos to vivlio ~~tinos~~]].
c. [$_{CP}$ [Tinos] mu ipes [$_{CP}$ ~~tinos~~ pos dhiavases
[$_{DP}$ ~~tinos~~ to vivlio ~~tinos~~]]]?

d. [$_{CP}$ [$_{DP}$ To vivlio tinos] mu ipes [$_{CP}$ ~~to vivlio tinos~~ pos dhiavases ~~to vivlio tinos~~]]?
e. [$_{CP}$ [$_{DP}$ Tinos to vivlio ~~tinos~~] mu ipes [$_{CP}$ ~~tinos to vivlio tinos~~ pos dhiavases ~~tinos to vivlio tinos~~]]?

DP Internal Movement: An Illustration from English The evidence that the specifier of the DP projection can be a landing site for movement in the nominal domain can be reproduced for English. (For ease of presentation we do not represent the original positions by strikethrough here).

(16) a. [$_{CP}$ [$_{AP}$ How important] [$_{C}$ is] [$_{IP}$ this decision]]?
b. [$_{CP}$ [$_{DP}$ [$_{AP}$ How important] a decision] [$_{C}$ is] [$_{IP}$ this]]?
c. This is [$_{DP}$ a [$_{AP}$ very important] decision].

Example (16a) illustrates a root question derived by movement of the interrogative AP, *how important,* to the specifier of CP and movement of the copula to C. Example (16b) is a root question in which the preposed constituent is a DP, *how important a decision*. Inside the fronted DP *how important a decision*, the interrogative AP (*how important*) precedes the indefinite article *a*. The prearticle position of the adjective *important* is not the unmarked position of a prenominal adjective in English (16c). Example (16b) illustrates a DP-internal application of movement of an interrogative constituent *how important* targeting the specifier position of DP. This again suggests an analogy between the specifier of DP and the specifier of CP.

Just as specifier of CP may host noninterrogative constituents introduced by *so* (17), the specifier of DP may host noninterrogative constituents introduced by *so*. This fronted DP in (17) exhibits leftward DP-internal movement of the AP *so vivid*. The landing-site of this movement is to the immediate left of D, i.e., the specifier of DP.

(17) [$_{CP}$ [$_{DP}$ [$_{AP}$ So vivid] a picture] does [$_{IP}$ this program draw of the situation of these animals that the reader wants to react immediately]].

DP Internal Movement: Possessors in Hungarian As shown by Szabolcsi (1994), Hungarian offers further confirmation for aligning the D node in the nominal projection with C in the clause. The Hungarian prenominal possessor may occupy two positions. It either follows the determiner, in which case it has nominative case (18a), or it precedes the determiner, in which case it has dative case (18b).

(18) a. a Mari kalap-ja
the *Mari*-NOM *hat*-3SG

b. Mari-nak a kalap-ja
Mari-DAT *the* *hat*-3SG

It seems plausible that *Marinak* in (18b) occupies the specifier position of DP.

(18) c.

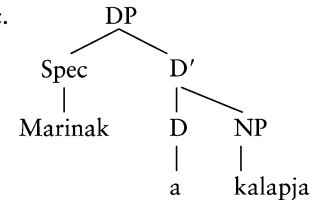

In later work, it was proposed that additional functional projections be distinguished, aligning the clausal IP projection with nominal IP projections related to nominal inflection (e.g., Ritter, 1991).

X-Bar Theory and the Internal Make-up of VP

The Base Position of the Subject

In the original proposals for the clause structure of English (and similar SVO languages), the subject NP was inserted in a VP-external position c--commanding the clausal domain (see, for instance, Jackendoff, 1977). Since the 1980s, it has been proposed that the base position of the subject is VP-internal (Stowell, 1983; Kitagawa, 1986; Sportiche, 1988; Kuroda, 1988; Koopman and Sportiche, 1991; Huang, 1993). This assumption is motivated by the hypothesis that syntactic relations are established locally. The verb has a thematic relation with the subject. If thematic relations are subject to a locality restriction, the thematic relation between the subject and the verb must be established locally, i.e., within the domain of the verb, VP. Thus, the subject should establish its relation with V within VP. To make this conclusion compatible with the observed VP-external position of the subject, it is proposed that the subject starts out (or is merged in Minimalist terminology) as the specifier of VP and that it moves to its canonical, VP-external position, the specifier position of IP. In (19a), the subject NP *John* is inserted as the specifier of the projection of the V, *analyze*. The VP is combined with the functional head I, forming I′ (19b), this makes available a specifier position for the projection of I (19c), and the subject *John* will move out of the VP into that position:

(19) a. [$_{VP}$ John [$_{V'}$ analyze [$_{DP}$ the problems]]]
b. [$_{I'}$ will [$_{VP}$ John [$_{V'}$ analyze [$_{DP}$ the problems]]]]
c. [$_{IP}$ John [$_{I'}$ will [$_{VP}$ ~~John~~ [$_{V'}$ analyze [$_{DP}$ the problems]]]]].

In (19a), the verb *analyze* has two arguments, both VP-internal: the THEME, *the problems*, and the AGENT *John*. By a subsequent (A)-movement operation, the subject externalizes (19c).

Various types of empirical support have been put forward for the idea that the subject originates in the specifier of the VP (see Sportiche, 1988; Kuroda, 1988; Koopman and Sportiche, 1991; and for a survey also McCloskey, 1997). One piece of evidence is provided by existential structures that contain both an expletive subject (*there* in English) and a real or logical subject. Example (20a) is an illustration from English. Assuming a VP-internal base position for the subject, one might propose that such examples are the result of a failure of the subject to leave its base position and move to the specifier of IP. In such cases, the canonical subject position hosts an expletive pronoun (cf. McCloskey, 1997 and the references cited). In (20a), the subject NP *three students* remains VP-internally, and an expletive subject *there* fills the canonical subject position, the specifier of IP. In (20b), on the other hand, the subject has moved to the specifier of IP, leaving a copy in the VP.

(20) a. [$_{IP}$ There are [$_{VP}$ three students [$_{V'}$ analyzing the data]]].
b. [$_{IP}$ Three students are [$_{VP}$ ~~three students~~ [$_{V'}$ analyzing the data]]].

While the English existential construction is restricted to sentences containing *be* and a number of (unaccusative) verbs, other languages allow for this construction with all active transitive verbs (for classifications of verbs, *see also* **Ergativity**). The Icelandic examples in (21) are from McCloskey (1997: 215).

(21) a. Þaδ grefur kona gröf í garδinum.
there digs a-woman a-grave in garden-the
'There digs a woman a grave in the garden.'

b. Þaδ hefur einhver borδaδ epli.
there has someone eaten an-apple
'There has someone eaten an apple.'
(McCloskey, 1997: 215, his (43))

The Position of the Inflected Verb

The position of the inflected verb varies crosslinguistically. For instance, while in English the verb is obligatorily adjacent to its object in VP and follows left-adjoined adverbial constituents, in French the inflected verb precedes such left-adjoined adverbials:

(22) a. John always discusses problems.
b. Jean discute toujours les problèmes.
Jean discusses always the problems

It is assumed that adverbial adjuncts (*always, toujours)* occupy the same position in both languages. To account for the crosslinguistic difference in distribution of the finite verb and the adjuncts, it is proposed that the verb remains in VP in English but that in French it moves to the I position. This variation in movement of the verb is sometimes related to the nature of the verbal paradigm (see Emonds, 1978; Roberts, 1985; Pollock, 1989), though it remains unclear to what extent overt morphology can be seen as the trigger for movement.

(23) a. [$_{CP}$[$_{IP}$ [$_{NP}$ John][$_{I'}$ [$_{I}$] [$_{VP}$ always [$_{VP}$ discusses [$_{NP}$ problems]]]]]].
b. [$_{CP}$[$_{IP}$ [$_{NP}$ Jean][$_{I'}$ [$_{I}$ discute] [$_{VP}$ toujours [$_{VP}$ ~~discute~~ [$_{NP}$ les problèmes]]]]]].

For a different view on the distribution of VP complements and adjuncts in French and in English see Miller (1999) in the HPSG framework.

VSO Languages

The hypothesis that the subject originates in VP ('The Base Position of the Subject' above), coupled with the proposal that the verb may move to I ('The Position of the Inflected Verb' above), leads to an account for the observed variation in word order between so-called SVO languages such as English and French and the so-called VSO languages such as Arabic or the Celtic languages (see Carnie and Guilfoyle, 2000). For instance, in Irish (24) the verb precedes both the subject (*siad*, 'they') and the object (*teach,* 'house') (McCloskey, 1997: 210, his (20)).

(24) Cheannaigh siad
bought they-NOM
teach ar an bhaile mhór anuraidh.
house on the town big last-year
'They bought a house in town last year'

The VSO pattern can be derived by assuming that the subject is VP-internal and the verb moves to I, ending up to the left of the subject. For VSO languages, see Travis (2001) and the references cited therein. For SOV languages, see 'Directionality' below (*see also* **Word Order and Linearization**).

Event Structure and VP

It has been proposed that V should be decomposed into more elementary components, each formed according to the X-bar format. At the origin of this proposal is the double object construction (25a) and the problems it raises for the binary branching

approach. If multiple branching is admitted, then one might envisage a structure such as (25b) to represent a VP containing an indirect object and a direct object. (For ease of presentation, the representation leaves aside the subject in VP hypothesis).

(25) a. John gave Mary the books.
b.

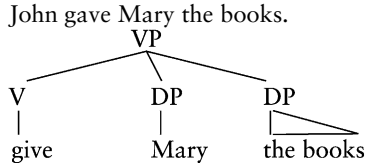

However, in a binary branching model, this representation has to be reinterpreted (Kayne, 1984). Scopal relations also cast doubt on the flat representation. In (25b), indirect object and direct object are in a mutual c-command relation (see 'Configurational Relations' above for the definition of c-command): the indirect object c-commands the direct object and vice versa. C-command relations are used to account for the licensing of polarity items: a polarity item such as *anyone* or *anything*, for instance, can be licensed by a c-commanding negative constituent (cf. discussion of [10]). In double object constructions, an indirect object can license a direct object polarity item as in (26a), but the reverse is not possible (26b):

(26) a. John gave none of the students anything.
b. *John gave any of the students nothing.

If polarity licensing depends on the c-command relation, the observed asymmetry in the double object construction suggests that the indirect object c-commands the direct object but that the direct object must not c-command the indirect object. Various authors have proposed ways of expressing the VP-internal syntactic relations (Larson, 1988; Hale and Keyser, 2002). In one proposal, a ditransitive verb such as *give* is reanalyzed as a complex causative verb, roughly corresponding to 'cause to get' (*see* **Complex Predicates**). The causative component is represented by an abstract verb, little v, whose specifier is the CAUSER argument (the AGENT of *give*). The abstract causative little v projects its own vP, respecting the X-bar format; v takes as its complement a projection of the V *give*: (cf. Hale and Keyser, 2002).

(27)

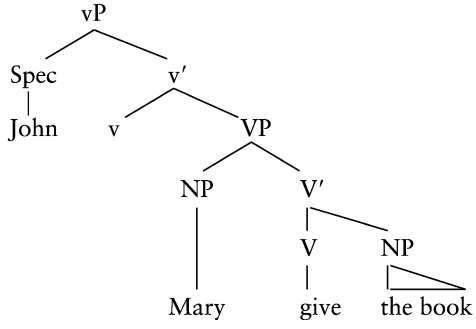

The lower V *give* moves to v to form transitive *give*. Similarly, inchoative *open* could be decomposed into a complex verb containing an abstract inchoative head ('become') and an adjectival predicate (*open*); transitive *open* could be decomposed in terms of a complex causative verb ('cause to become open'). The complex event structure of the VP has been the focus of a great deal of research (see especially Hale and Keyser, 2002 and the references cited therein).

Developments, Discussions

There has been a tendency, already illustrated in 'X-bar Theory and the Nominal Projection: NP as DP' and 'X-bar Theory and the Internal Make-up of VP' above, to decompose syntactic units in terms of more articulated structure. At each stage, the novel structures instantiate the X-bar format. Some additional innovations of this type are illustrated in this section (see also Baltin and Collins, 2001; Haegeman, 1997). On the other hand, there is also an attempt to reduce the complexity of structure and to pare down the contents of X-bar theory to the minimum. This is briefly discussed in 'Some Alternative Views' below.

Functional Structure

The number and nature of the functional heads in the IP and the CP domain has come under closer scrutiny in recent years. Based on work by Pollock (1989), it has been argued that IP is not a homogeneous domain with a unique functional head. The head I has been split into a number of specialized functional heads. Each such head projects according to the X-bar format. One might postulate, for instance, a projection of agreement, tense, mood, and aspect. It has also been proposed that sentential negation be associated with a specialized functional projection (NegP).

Similarly, given that the CP domain may contain a range of fronted constituents, each with their own specialized discourse functions (interrogative constituents, relative constituents, exclamative constituents, topicalized constituents, negative constituents, focused constituents, scene setting adjuncts, etc.) and that some of these may co-occur, CP has been decomposed in a number of specialized projections, such as TopP (topic projection), FocP (focus projection) (Rizzi, 1997).

The status of functional categories in syntactic theory is much debated and many controversies remain. There is as yet no consensus about how many such projections there are, and whether they

are universally instantiated in a given structure, even when no overt material is associated with them. An alternative to such highly articulated structures is to replace discrete functional projections of specialized heads by a structure in which one functional head is enriched with multiple distinct (hierarchically organized) features. If a particular head is associated with a cluster of specialized features, each such feature could license a specifier, giving rise to layered specifiers (cf. Chomsky, 1995). This proposal would reduce the need for postulating a large range of functional projections, but it would entail giving up the single-specifier hypothesis.

There is also ongoing debate as to whether the functional projections in the IP domain have a universally determined hierarchy (cf. Cinque, 1999 and the references cited). Agreement projections, in which agreement relations between a nominal projection and the matching inflectional morphology of a verb are licensed, have come under scrutiny. In the framework of the Minimalist approach, Chomsky (1995) argues that functional projections should be projected exclusively on the basis of interpretable features. Agreement features of a verb are uninterpretable in the sense that they reduplicate the agreement features on the matching nominal projection and do not themselves have semantic impact. If such uninterpretable formal features cannot be at the basis of a projection, then one can no longer postulate agreement projections in the clausal domain. The relevant agreement features will have to be instantiated on another functional head (for instance, Tense). Others take an intermediate position and postulate that depending on their specific morphology, languages may or may not have a separate agreement projection to encode subject agreement features (cf. Speas, 1990).

In the Minimalist approach, the status of the intermediate projection (X′) is also being reconsidered (cf. bare phrase structure, Chomsky, 1995).

The Status of Adjunction

The theoretical status of adjunction as a structure-building mechanism (see 'Extending the Core: Adjunction' above) has also come under scrutiny. Some propose that adjunction be entirely eliminated from the theory (Kayne, 1994; Cinque, 1999). What appear to be adjoined constituents are reanalyzed as specifiers of specialized functional heads. Cinque (1999) takes this proposal one step further and elaborates a clause structure that is a hierarchically organized sequence of functional heads, each with a specific semantic function. The head of the projection hosts free or bound morphemes encoding concepts of modality, tense, aspect (progressive, perfective), etc. The specifiers of the relevant projections host adverbial adjuncts that encode matching concepts.

Directionality

Languages vary with respect to the order in which verb and objects are linearized: English and French are SVO languages: in the unmarked word order, the verb precedes the object, Japanese is an SOV language: the verb follows the object:

(28) a. John hit Mary.
b. Jean frappait Marie.
Jean hit-PAST Marie
c. John ga Mary o but-ta.
John –NOM Mary –ACC hit-past
'John hit Mary.' (Kuno, 1973).

The X-bar format determines the hierarchical relations between the components of a constituent, but it does not determine their linear order. One option to account for the observed OV/VO variation is to postulate crosslinguistic variation in the head-complement relation: English complements would follow the head (29a), while in Japanese the complements of V would precede V (29b).

(29) a.

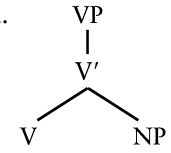

b.

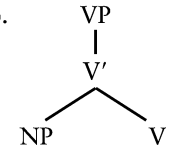

In contrast, the universal base hypothesis postulates that the format in (5a) is universal, and allows for no variation in directionality: specifiers precede the head and complements follow the head (Kayne, 1994). In such a framework, a surface OV order would be generated by leftward movement of the object from its base position to the right of V. This approach will either imply postulating additional functional projections whose specifiers can host the moved constituents or, alternatively, heads will have to be allowed to have multiple specifiers to host the moved constituents.

The issue of directionality also arises with respect to adjunction. Adverbial adjuncts can be seen to precede or follow the verb. According to some, the direction of adjunction is free (cf. 'Lexical and Functional Categories' above). According to others, though, adjunction must be restricted to left adjunction only. In this view all adverbial adjuncts would be adjoined to the left of the VP. Adjuncts that linearly follow the VP would result from a leftward movement of the VP. The same type of analysis imposes itself if all adjuncts are reanalyzed as specifiers of functional heads (cf. 'The Status of Adjunction' above).

(30) a. 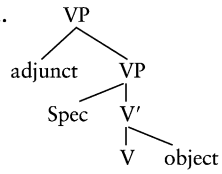

b. 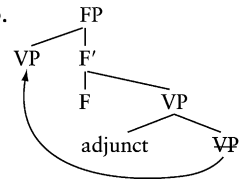

A generalized ban on right-adjunction will impact on a range of issues, such as, the structure of clauses with right dislocated material (31a), or the position of the extraposed clause (31b) (see the papers in Beerman *et al.*, 1997), or the question of how to handle relative clauses that follow the head noun (31c) (see Kayne, 1994).

(31) a. Elle ne l'a pas acheté, [$_{DP}$ ce livre].
she ne it has not bought, this book.
b. It did not surprise me at all [$_{CP}$ that she did not come back].
c. Nobody believed the claim [$_{CP}$ that John made].

Some Alternative Views

Projections and Features

Muysken (1981) attempted to simplify the X-bar format in terms of a relation between a head and a phrase. He assumed that a specific constituent may be associated with a combination of two binary features [± projection] and [± maximal]. The head of a projection (X in (5a)) corresponds to an entity with the features [− projection, − maximal]; the maximal projection will correspond to [+ projection, + maximal]. In the Minimalist approach, Chomsky (1995) capitalizes on Muysken's insights and elaborates bare phrase structure (Chomsky, 1995). One salient feature of this approach is that it dispenses with nonbranching projections.

Alternative Implementations

The discussion above presents the core components of X-bar theory in the generative tradition represented by the government binding/principles and parameters model. There exist different implementations of the theory where differences may affect a number of areas of the theory.

For instance, in generalized phrase structure grammar (GPSG), the bar notation was captured by means of a specific BAR feature in the feature structures labeling the nodes of a tree. The BAR feature could have the values 0, 1, 2. Thus, a head noun was a N with the bar value 0: [N+, V−, BAR:0], and its maximal projection, that is an NP, would be a N with the bar value 2: [N+, V−, BAR:2].

In head-driven phrase structure grammar (HPSG) (Pollard and Sag, 1994; Sag and Wasow, 1999), which developed from GPSG, the notation is simplified (*see also* **Head-Driven Phrase Structure Grammar**). The feature BAR as such no longer exists: the head of the structure has the feature HEAD. The distinction in projection levels is not maintained: the maximal projection of a head is the highest projection of the type phrase of that category in the structure that is associated with the relevant head. This approach is reminiscent of Muysken's (1986) reinterpretation of X-bar theory, and of recent proposals in terms of bare phrase structure (Chomsky, 1995).

There are additional differences between the frameworks. For instance, in HPSG the binary branching restriction is not generalized. Adjuncts are not necessarily distinguished from complements by their level of attachment (i.e., the bar level): for English, Bouma *et al.* (2001) propose that postverbal adjuncts are sisters to V, whereas preverbal adjuncts are adjoined to VP.

See also: Argument Structure; Binding Theory; Command Relations; Complex Predicates; Constituent Structure; Ergativity; Functional Categories; Head-Driven Phrase Structure Grammar; Minimalism; Mixed Categories; Noun Phrases; Principles and Parameters Framework of Generative Grammar; Thematic Structure; Word Order and Linearization.

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Xhosa

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Introduction

Xhosa (or isiXhosa, with the noun class prefix) belongs, with isiZulu (Zulu) and isiNdebele (Ndebele), to the Zunda subgroup of the Nguni group of the Southeastern Zone of Bantu languages. This zone also includes the Sotho, Venda, and Tsonga language groups. In terms of Guthrie's (1967–1971) classification, isiXhosa is identified as S41 (Doke, 1943, 1954; Piron, 1998; Gowlett, 2003; Nurse and Philippson, 2003). The Bantu family forms part of the larger Niger-Congo family of African languages of which the three other major families are Afroasiatic, Nilo-Saharan, and Khoisan (Greenberg, 1963; Heine and Nurse, 2000b; Williamson and Blench, 2000). Specific areas in the Eastern Cape province of South African have historically been associated with the various dialects or local forms of isiXhosa, namely isiGcaleka, isiNdlambe, isiGaika, isiThembu, isiBomvana, isiMpondomise, isiMpondo, and isiXesibe.

With the establishment of a democratic South Africa in 1994, isiXhosa has obtained the status of an official language, together with eight other Bantu languages spoken in South Africa, namely isiZulu, isiNdebele, Siswati (Swati), Sesotho (Southern Sotho), Sepedi/Sesotho sa Leboa (Northern Sotho), Setswana (Tswana), Tshivenda (Venda), and Xitsonga (Tonga). The government has introduced significant legislation through the Department of Arts and Culture for promoting the status and use of these official languages in government, education, and business, in addition to the predominant use of English. Huge challenges exist for accomplishing this goal, which includes urgent work in the fields of terminology development, language in education policy, and the teaching and learning of the indigenous African languages (Webb, 2001; Visser, 2004, 2005).

Nouns and Noun Phrases

Noun Classes

The morphology and semantics of the noun class system of isiXhosa is typical of the Bantu languages (Greenberg, 1963; Welmers, 1973; Du Plessis, 1978; Poulos and Msimang 1998; Piron 1998; Williamson and Blench, 2000; Gowlet, 2003). IsiXhosa has nouns in all noun classes from class 1 to 15, excluding class 12 and 13. The locative classes 16, 17, and 18 are morphologically fossilized; thus, they all exhibit the associated locative agreement subject- and object-verb agreement morpheme *ku-* rather than the distinct agreement morphemes of class 16, 17, and 18. As is general to the Bantu languages for the first 10 classes, the consecutive odd and even class numbers are regular singular-plural pairs. The noun class prefixes have a VCV syllable structure, except for classes 1, 3, and 9; the postnasal vowel in classes 1 and 3 has been deleted, and class 9 has the prefix *in-*. Classes 1a and 2a, subclasses of classes 1 and 2, respectively, have only vowel prefixes. Table 1 shows the noun class prefixes of isiXhosa.

Nominal Suffixes

Nouns in isiXhosa can regularly take suffixes that denote the property of feminine *–azi-*, augmentative *-azi,* and reciprocal *-ana*, as shown in Table 2.

Agreement Morphology with Nominal Modifiers

As is characteristic of the Bantu languages, isiXhosa exhibits agreement morphology of the nominal modifiers with the head noun, where the latter may be a lexical noun or a phonetically empty pronominal (Doke, 1954; Greenberg, 1963; Guthrie, 1967–1971; Welmers, 1973; Du Plessis and Visser, 1992; Gowlet 2003; Nurse and Philippson, 2003b). The nominal modifiers identified for isiXhosa include demonstratives, adjectives, nominal relatives, clausal relatives, numerals, quantifiers, possessives, and enumeratives (Louw, 1963; Du Plessis, 1978, 1983; Visser, 1984, 2002; Du Plessis and Visser, 1992). The examples that follow illustrate the agreement morphology of the adjective and possessive with pairs of lexical head nouns in classes 1, 2, 5, 6, 7, and 8.

Table 1 Noun class prefixes of IsiXhosa

Noun class	*Prefix*	*Example noun*
1	um-	umfazi 'woman'
2	aba-	abafazi 'women'
1a	u-	utata 'father'
2a	oo-	ootala 'fathers/father and company'
3	um-	umlilo 'fire'
4	imi-	imililo 'fires'
5	i(li)-	ilitye 'stone'
6	ama-	amatye 'stones'
7	isi-	isiqhamo 'fruit'
8	izi-	iziqhamo 'fruits'
9	i(n)-	indlu 'house'
10	i(z)i(n)-	izindlu 'houses'
11	ulu-	uluthi 'stick'
14	ubu-	ubusika 'winter'
15	uku-	ukutya 'food'

Table 2 Nominal suffixes: feminine, augmentative, and diminutive

-kazi FEM	inkosi 'chief';	inkosikazi 'chieftainess'
	ixhego 'old man';	ixhegokazi 'old woman'
	utitshala 'teacher';	utitshalakazi 'female teacher'
-kazi AUG	umthi 'tree';	umthikazi 'big tree'
	intaba 'mountain';	intabakazi 'big mountain'
	indlu 'house'	indlukazi 'big house'
–ana DIM	indoda 'man';	indodana 'small man'
	incwadi 'book';	incwadana 'small book'
	ilitye 'stone';	ilityana 'small stone'

Source: Du Plessis (1978, 1997); Louw (1963).

- The head noun is in class 1.

(1a) umntwana wam omhle
umntwana u-a-m om-hle
child AGR-GEN-mine AGR-beautiful
'my beautiful child'

- The head noun is in class 2.

(1b) abantwana bam abahle
abantwana ba-a-m aba-hle
children AGR-GEN-mine AGR-hle
'my beautiful children'

- The head noun is in class 5.

(1c) ihashe lam elihle
ihashe li-a-m eli-hle
horse AGR-GEN-mine AGR-beautiful
'my beautiful horse'

- The head noun is in class 6.

(1d) amahashe am amahle
amahashe a-a-m ama-hle
horses AGR-GEN-mine AGR-beautiful
'my beautiful horses'

- The head noun is in class 7.

(1e) isitya sam esihle
isitya si-a-m esi-hle
dish AGR-GEN-m AGR-hle
'my beautiful dish'

- The head noun is in class 8.

(1f) izitya zam ezihle
izitya zi-a-m ezi-hle
dishes AGR-GEN-mine AGR-beautiful
'my beautiful dishes'

Derived Nouns IsiXhosa exhibits regular nominal derivation from verbs and, to a less regular degree, from other word categories such as adjectives and nominal relatives (Louw, 1963; Du Plessis, 1978). The examples in Table 3 illustrate deverbal nouns in a range of noun classes.

Table 3 Deverbal nouns

Verb	*Deverbal noun*	
	Human	*Nonhuman*
-thenga 'buy'	umthengi 'buyer' (class 1)	intengo 'buy' (class 9)
-funda 'read, learn'	umfundi 'learner, student' (class 1)	imfundo 'education' (class 9)
-dlala 'play'	umdlali 'player' (class 1)	umdlalo 'game' (class 3)
-hamba 'travel', 'gula 'be ill'	umhambi 'traveller' (class 1)	uhambo 'travel' (class 11)
	isigulana 'patient' (class 7)	ingulo 'illness' (class 9)
-thanda 'like, love'	isithandwa 'beloved' (class 7)	uthando 'love' (class 11)

Compound Nouns

Compound nouns are common in isiXhosa, and this is especially salient in proper nouns.

(2a) umninikhaya < umnini-ikhaya
'home owner' owner-home
(2b) impilontle < impilo-entle
'good health' life-AGR-good
(2c) indlalifa < indla-ilifa
'person who inherits' eater-inheritance
(2d) imalimboleko < imali-imboleko
'loan' money-loan
(2e) uNtombizobawo < u-ntombi-za-ubawo
'girls of father' AGR(cl.1)-girls-of-father'
(2f) uNoxolo < u-No-uxolo
'the one with peace' AGR(cl.1)-Fem-peace
(2g) uMzimkhulu < u-Mzi-M-khulu
'big house' AGR(cl.1)-house-AGR-big
(2h) uNtombi zandile < u-Ntombi-zi-and-ile
'the girls have increased' AGR(cl.1)-girls-AGR(cl.10)-increase-Perf.

Verbs, Verb Phrases, and Clauses

Transitivity and Verbal Derivation

IsiXhosa has a wide range of nonderived verbs, which are intransitive and monotransitive. A smaller number of nonderived verbs are ditransitive, as shown in the following examples. Intransitive verbs (3) include experiencer verbs, motion verbs, and weather verbs.

(3a) -gula 'be ill'
(3b) -vuya 'be happy'
(3c) -sebenza 'work'
(3d) -hamba 'travel'
(3e) -phuma 'go out, exit'
(3f) -tshona 'sink'
(3g) -jika 'turn'
(3h) -buya 'return'

Verbs from a wide range of semantic classes appear as nonderived monotransitive verbs, as illustrated by the following examples.

- Verbs of change.

(4a) -aphula 'break'
(4b) -goba 'bend'
(4c) -pheka 'cook'
(4d) -oja 'roast'
(4e) -vala 'close'

- Verbs of change of possession.

(5a) -qokelela 'collect'
(5a) -fumana 'get, obtain'
(5a) -(i)ba 'steal'
(5a) -kha 'pick (fruit)'

- Verbs of communication.

(6a) -bika 'report'
(6b) -thetha 'speak'
(6c) -ncokola 'converse'
(6d) -hleba 'gossip'
(6e) -geza 'joke'

- Verbs of contact.

(7a) -beka 'put'
(7b) -tyala 'plant'
(7c) -xhoma 'hang'
(7d) -sula 'wipe'
(7e) -khupha 'take out'
(7f) -galela 'pour'

- Verbs of creation.

(8a) -qingqa 'carve'
(8b) -xovula 'knead'
(8c) -zoba 'draw'
(8d) -akha 'build'
(8e) -bhaka 'bake'

- Verbs of perception.

(9a) -bona 'see'
(9b) -(i)va 'hear/feel/taste'
(9c) -ngcamla 'taste'
(9d) -ngqina 'witness'
(9e) -jonga 'look at'

- Verbs of social interaction.

(10a) -vuma 'agree'
(10a) -qhula 'joke'
(10a) -tyelela 'visit'

Examples of nonderived ditransitive verbs appear in (11).

(11a) -nika 'give'
(11b) -pha 'give (as gift)'
(11c) -boleka 'lend'
(11d) -vimba 'refuse'
(11e) -buza 'ask'
(11f) -cela 'request'

Table 4 Reduplicated applicative forms

Verb	*Reduplicated applicative*
-bopha 'tie'	-bophelela 'tie thoroughly'
-funa 'search'	-funelela 'search thoroughly'
-sula 'wipe'	-sulelela 'wipe thoroughly'

As is typical of the Bantu languages, the transitivity properties of verbs in isiXhosa can be altered by suffixation of various verbal derivational suffixes, which can appear in combination with one another (Satyo, 1986) and which can be reduplicated to achieve various semantic effects. The applicative (APPLIC) and causative suffixes are transitivizing suffixes in that they introduce a new NP argument to the verb (Du Plessis, 1978, 1980b, 1997; Du Plessis and Visser 1992, 1998). When these suffixes appear, intransitive verbs becomes monotransitive and monotransitive verb become ditransitive. The applicative suffix can introduce an NP argument bearing the semantic role of benefactive, malefactive, recipient, purpose, and cause/reason, as shown in the examples in (12) (AGRS stands for subject agreement).

(12a) umfazi ufundela
umfazi u-fund-el-a
woman AGRS-read-APPLIC-PRES
abantwana amabali
abantwana amabali
children stories
'the woman reads stories for the children'

(12b) inkwenkwe ibalekela indebe
inkwenkwe i-balek-el-a indebe
boy AGRS-run-APPLIC-PRES cup
'the boy is running for the cup'

(12c) umfazi ulilela ilahleko
umfazi u-lil-el-a ilahleko
woman AGRS-cry-APPLIC-PRES loss
'the woman cries for (her) loss'

(12d) abafazi baphekela
abafazi ba-pheke-el-a
women AGRS-cook-APPLIC-PRES
umtshato inyama
umtshato inyama
wedding meat
'The women cooks meat for the wedding'

The applicative can appear in a reduplicated form to denote an intensified action, as shown in Table 4.

Causative Suffix

The causative (CAUS) suffix *-is-* regularly denotes three kinds of meanings, depending on the verbal semantics and the pragmatic context: coercive ('make/force to

do something'), assistive ('help do something'), and permissive ('let do something').

(13a) umfana ulimisa utata intsimi
umfana u-lim-is-a utata intsimi
young.man AGRS-plough-CAUS-PRES father field
'the young man helps his father plough the field'

(13b) utitshala ubhalisa abantwana ileta
utitshala u-bhal-is-a abantwana ileta
teacher AGRS-write-CAUS-PRES children letter
'the teacher makes/helps/lets write the children a letter'

Detransitivising Verbal Affixes

The reciprocal (RECIP) suffix *-ana* (14) and the reflexive (REFL) verbal prefix *-zi-* (15) in isiXhosa are detransitivizing morphemes, as is typical of the Bantu languages.

(14a) abantu bayathandana
abantu ba-ya-thand-an-a
people AGRS-PRES-like-RECIP-PRES
'the people like each other'

(14b) uZola noNomsa bayathandana
uZola na-uNomsa AGRS-PRES-thand-an-a
Zola and-Nomsa like-RECIP-PRES
'Zula and Nomsa like/love each other'

(14c) uZola uthandana noNomsa
uZola u-thand-an-a na-uNomsa
Zola AGRS-like-RECIP-PRES with-Nomsa
'Zola and Nomsa like/love each other'

(15a) umntwana uyazibona
umntwana u-ya-zi-bon-a
child AGRS-PRES-REFL-see-PRES
'the child sees himself/herself'

(15b) abantwana bayazihlamba
abantwana ba-ya-zi-hlamb-a
children AGRS-PRES-REFL-wash-PRES
'the children were themselves'

Unaccusative Verbal Suffixes: Passive and Neuter-Passive

Passive (PASS) *-w-* (16) and neuter-passive (NEUT. PASS) stative *-ele-/-akal-* (17) verbal suffixes are unaccusative, in that the object of a transitive verb must either raise to become the subject of the verb or remain in the object position and receive nominative case from a phonetically empty existential subject pronominal associated with the subject agreement prefix *ku-* on the verb (Visser, 1986; Du Plessis and Visser, 1992b, 1998).

(16a) incwadi iyafunwa ngumfundi
incwadi i-ya-fun-w-a ng-umfundi
book AGRS-PRES-want-PASS-pres cop-student
'the book is wanted/searched for by the student'

(16b) kufunwa incwadi ngumfundi
ku-fun-wa incwadi ng-umfundi
EXIST.AGRS-want/search-PASS.PRES book cop-student
'there is being wanted a book by the student'

(17a) incwadi iyafuneka kumfundi
incwadi i-ya-fun-ek-a ku-umfundi
book AGRS-PRES-want-NEUT.PASS-PRES to-student
'a book is needed to (for) the student'

(17b) kufuneka incwadi kumfundi
ku-fun-ek-a incwadi ku-umfundi
EXIST.AGRS-want-NEUT.PASS-PRES book to-student
'there is a book is needed to (for) the student'

(17c) intaba iyabonakala
intaba i-ya-bon-akal-a
mountain AGRS-PRES-see-NEUT.PASS-PRES
'the mountain is visible'

(17d) kubonakala intaba
ku-bon-akal-a intaba
EXIST.AGRS-see-NEUT.PASS-PRES mountain
'the mountain is visible'

The neuter-passive suffix *-ek-/-akal-* changes the verb into a stative verb, as shown in Table 5.

Verbal Inflection

IsiXhosa exhibits the inflectional morphemes typical of the Bantu languages, namely agreement, tense, aspect, mood, and negative (Du Plessis, 1986, 1997; Du Plessis and Visser, 1992b, 1998; Gowlett, 2003).

Subject and Object Agreement Prefixes The isiXhosa verb, like verbs in the Bantu languages in general, exhibits a subject agreement prefix (AGRS), which appears obligatorily, except with imperative mood verbs and certain instances of deficient verbs. The isiXhosa verb also contains an object agreement prefix (AGRO), which in general appears optionally (Du Plessis, 1978, 1997) and is often used to emphasize the verb phrase or to establish the object feature when the object argument is separated from the verb

Table 5 Intransitive-transitive verbal pairs with the consonant *-k-* and *-l-*

Intransitive stative	*Transitive*
-guquka 'be turned'	-guqula 'turn'
-aphuka 'be broken'	-aphula 'break'
-ahluka 'be separated/parted'	-ahlula 'separate'
-phekula 'be turned upside'	-phekula 'turn upside'
-khawuka 'be broken off'	-khawula 'break off'
-sombuluka 'be unfolded'	-sombulula 'unfold'

Source: Du Plessis and Visser (1998).

by intervening lexical or phrasal categories. In the examples in (18), the noun classes of the NP subject and object appear in brackets.

(18a) umntwana uyayifunda incwadi
umntwana u-ya-yi-fund-a incwadi
[class 1] [class 9]
child AGRS-PRES-AGRO-read-PRES book
'the child reads a book'

(18b) abantwana bayazifunda iincwadi
abantwana ba-ya-zi-funda iincwadi
[class 2] [class 10]
children AGRS-PRES-AGRO-read.PRES books
'the children read the books'

(18c) amadoda ayabusela utywala
amadoda a-ya-bu-sela utywala
[class 6] [class 14]
men AGRS-PRES-AGRO-drink beer
'the men drink beer'

Sentences like these, in which the object co-occurs with an object agreement prefix, denote additional emphasis on the verb phrase.

Aspect Morphemes The verbal inflectional morphology in isiXhosa contain a number of prefixes that denote aspectual features. These prefixes include *-sa-* 'still' (the progressive, PROG), *-ka-* 'not, get', and *-yawa-* 'as usual'. The potential morpheme *-nga-* denotes 'ability', 'possibility', or 'permission' (Louw, 1963; Du Plessis, 1978, 1997).

(19a) abafundi basafunda
abafundi ba-sa-fund-a
students AGRS-PROG-learn/read-PRES
'the students are still reading/learning'

(19b) abafundi abakafundi
abafundi a-ba-ka-fund-i
students NEG-AGRS-not-read-NEG
'the students have not read yet'

(19c) abafundi bayawafunda
abafundi ba-yawa-fund-a
students AGRS-as.usual-read-PRES
'the students are studying as usual'

(19d) abafundi bangaphumelela
abafundi ba-nga-phumelela
student AGRS-can/may-succeed
'the students can/may succeed'

Tense Inflection IsiXhosa has the typical tense distinctions found in the Bantu languages: present tense, perfect past tense, remote (A-) past tense, future tense, and compound (recent and remote) past tenses. The compound tenses appear as complex sentence constructions with a deficient verb taking a participial clause complement. The various past tenses are associated with specific features of (im)perfectivity (Louw, 1963; Du Plessis, 1978, 1986, 1997; Poulos and Msimang, 1998).

Present Tense The present tense verb form in isiXhosa can exhibit features of habituality and emphasis, in addition to denoting a literal present tense activity (Du Plessis, 1986, 1997).

(20a) iintombi ziphendula imibuzo
iintombi zi-phendul-a imibuzo
girls AGRS-answer-PRES questions
'the girls answer the questions'

(20b) iintombi aziphenduli mibuzo
iintombi a-zi-phendul-i mibuzo
girls NEG-AGRS-answer-NEG questions
'the girls do not answer (any) questions'

(20c) iintombi aziyiphenduli imibuzo
iintombi a-zi-yi-phendul-i imibuzo
girls NEG-AGRS-AGRO-answer-NEG questions
'the girls do not answer the (specific) questions'

The negative sentences in (20b) and (20c) illustrate the indefinite and definite negative, respectively. The former is characterized by the absence of the initial vowel (the preprefix) of the object NP and the related absence of the object agreement prefix in the verb morphology, whereas the latter is characterized by the presence of the preprefix of the NP object argument and the associated presence of the object agreement prefix in the verb morphology (Visser, 2002). Similar definite and indefinite negatives may appear in all the other tenses.

Future Tense The future tense is characterized by the verb *-za* 'come' or *-ya* 'go' followed by the infinitive prefix on the main verb.

(21a) iintombi ziza/ziya
iintombi zi-za/zi-ya
girls AGRS-come/AGRS-go
kuphendula imibuzo
ku-phendula imibuzo
INF-answer questions
'the girls will answer the questions'

The use of the deficient verb *-za* in the future tense denotes an immediate future, whereas the use of the deficient verb *-ya* denotes either a remote future or an immediate future action with a high degree of certainty.

(21b) iintombi azizi/aziyi
iintombi a-zi-z-i/a-zi-y-i
girls NEG-AGRS-come-NEG/NEG-AGRS-go-NEG
kuphendula mibuzo
ku-phendula mibuzo
INF-answer questions
'the girls will answer the questions'

Perfect Past Tense The perfect past tense denotes an action in the recent past that has been completed (Louw, 1963; Du Plessis, 1978, 1997).

(22a) abafana basebenzile
abafana ba-sebenz-ile
young.men AGRS-work-PERF
'the young men worked'

(22b) abafana abasebenzanga
abafana a-ba-sebenz-anga
young.men NEG-AGRS-work-PERF.NEG
'the young men did not work'

Remote Past Tense The remote past tense verb takes a subject agreement prefix with a long rising-falling vowel *-a-*.

(23a) iintombi zacula iingoma
iintombi zi-a-cula iingoma
girls AGRS-PAST-sing songs
'the girls sang songs'

(23b) umfundi wabhala ileta
umfundi u-a-bhala ileta
student AGRS-PAST-write letter
'the student wrote a letter'

Compound Past Tenses The compound past tenses denote an activity or state that took place in the past but that has not been completed; hence, they exhibit the imperfective aspect. The lexical verb in these tenses are in the participial mood.

Recent Compound Past Tense The recent compound past tense is characterized by a perfect tense deficient verb *-be* taking a participial complement clause, as shown in the following examples.

(24a) iintombi zibe zicula iingoma
iintombi zi-b-e zi-cula iingoma
girls AGRS-be-PERF AGRS-sing songs
'the girls were singing songs'

(24b) iintombi zibe zingaculi ngoma
iintombi zi-b-e zi-nga-cul-i ngoma
girls AGRS-be-PERF AGRS-NEG-sing-NEG songs
'the girls were not singing (any) songs'

Remote Compound Past Tense The deficient verb *-ba/-ye* appears in the remote compound past tense taking the morpheme *-a-* in its subject agreement affix and subcategorizing for a participial complement clause, as shown in the following examples.

(25a) iintombi zaba zicula iingoma
iintombi zi-a-ba zi-cula iingoma
girls AGRS-PAST-be AGRS-sing songs
'the girls were singing songs'

(25b) iintombi zaba zingaculi ngoma
iintombi zi-a-ba zi-nga-cul-i ngoma
girls AGRS-PAST-be AGRS-NEG-sing-NEG songs
'the girls did not sing (any) songs'

Negative Inflection The negative inflection of isiXhosa is realized through verbal prefixation, infixation, and suffixation, depending on the mood properties of the verb (Du Plessis, 1978, 1997). The examples of negative sentences given in the previous section demonstrate that negation in indicative mood verbs is realized by a verbal prefix that occurs before the subject agreement prefix and by a verbal suffix, whereas in participial clauses (in the compound tenses) the negative morpheme (*-nga-*) appears after the subject agreement prefix together with a negative verbal suffix. Further examples of negative sentences in isiXhosa appear in the subsection on mood inflection next.

Mood Inflection Linguists differ on the number of moods that can be distinguished for isiXhosa and closely related languages such as isiZulu (Louw, 1963; Du Plessis, 1978, 1997; Poulos and Msimang, 1998). The following nine moods have been distinguished for isiXhosa.

Indicative Mood The indicative mood is used in main clauses for statements and questions. Indicative mood clauses may also appear as a complement clauses of factive verbs.

(26a) abafundi bahala uviwo
abafundi ba-bhal-a uviwo
student AGRS-write-PRES examination
'the student is writing examination'

(26b) abafundi ababhali viwo
abafundi a-ba-bhal-i viwo
students NEG-AGRS-write-NEG examination
'the students are not writing (any) examination'

(26c) abafundi abalubhali uviwo
abafundi a-ba-lu-bhal-i uviwo
students NEG-AGRS-AGRO-write-NEG examination
'the students are not writing the (specific) examination'

The sentences in (26) can be changed into questions by using rising intonation toward the sentence-final position.

The sentences in (26b) and (26c) illustrate the indefinite and definite negatives, respectively. The indefinite negative is characterized by the loss of the initial vowel of the noun class prefix of the object noun and the absence of the object agreement affix in the verbal morphology. The definite negative is characterized by the presence of the initial vowel of the object noun and the associated object agreement prefix in the verbal morphology. The indefinite-definite negative distinction also has an influence on the morphological form of several categories that function as nominal modifiers.

The indicative mood exhibits the tense distinctions discussed in the previous subsection on tense inflection.

Participial (Situative) Mood The participial mood is used in subordinate clauses that denote an activity or state that takes place simultaneously with the activity or state expressed by the main clause. It is clearly identifiable by its subject agreement morphology for noun classes 1, 2, and 6 and by morphemes that occur with monosyllabic and vowel verb stems in positive sentences. In addition, the participial mood regularly occurs after certain temporal conjunctives (as in 27c) and deficient verbs (as in 27d) (Louw, 1963; Du Plessis, 1978, 1997; Du Plessis and Visser, 1992b).

(27a) abafundi bathula
abafundi ba-thula
students AGRS-be.quiet
bebhala uviwo
be-bhala uviwo
AGR(PART)-write examination
'the students are quiet while they are writing examination'

(27b) abafundi babhala uviwo
abafundi ba-bhala uviwo
students AGRS-write examination
besiva imiyalelo
be-si-v-a imiyalelo
AGRS(PART)-AFF(PART)-hear-PRES instructions
'the students write examinations while hearing the instructions'

(27c) abafundi bathula xa
abafundi ba-thula xa
students AGRS-be.quiet when
bebhala uviwo
be-bhal-a uviwo
AGRS(PART)-write-PRES examination
'the students are quiet when they write examinations'

(27d) abafundi basoloko
abafundi ba-soloko
students AGRS-always.do
bebhala uviwo
be-bhal-a uviwo
AGRS(PART)-write-PRES examination
'the students always write examination'

(27e) abafundi babhala uviwo
abafundi ba-bhal-a uviwo
students AGRS-write-PRES examination
bengafundanga kakuhle
be-nga-fund-anga kakuhle
AGRS(PART)-NEG-learn-NEG well
'the students write examinations (while) they have not studied well'

The participial mood in isiXhosa can exhibit all the various tense forms discussed in the subsection on tense inflection.

Relative Mood The relative mood clause occurs widely as a nominal modifier in isiXhosa. It is characterized by the coalescence of a definitizing morpheme *-a-*, which also occurs with various other nominal modifiers, with the subject agreement prefix of the relative clause verb. This definitizing morpheme is, however, omitted when the relative clause head is the object argument of an indefinite negative verb or when the relative clause head occurs with a demonstrative pronoun. The relative clause in isiXhosa typically contains a resumptive pronoun, coreferential with the relative clause head, which can be realized as an object agreement prefix in the verbal morphology, a prepositional complement, or complement of a copulative, as illustrated by the following examples:

(28a) abafundi ababhala uviwo
abafundi a-ba-bhal-a uviwo
students AFF(DEF)-AGRS-write-PRES examination
bafunde kakuhle
ba-fund-e kakuhle
AGRS-learn-PERF well
'the students who write examinations have studied well'

(28b) aba bafundi babhala
aba bafundi ba-bhal-a
DEM students AGRS-write-PRES
uviwo bafunde kakuhle
uviwo ba-fund-e kakuhle
examinations AGRS-learn-PERF well
'these students who write examinations have studied well'

(28c) asibizi bafundi
a-si-biz-i bafundi
NEG-AGRS-call-NEG students
babhala uviwo
ba-bhal-a uviwo
AGRS-write-PRES examinations
'we do not call (any) students who write examinations'

(28d) abafundi enibafunayo
abafundi a-ni-ba-fun-a-yo
students AFF(DEF)-AGRS-AGRO-want-PRES-AFF(RC)
babhala uviwo
ba-bhal-a uviwo
AGRS-write-PRES examination
'the students who you want, are writing examination'

(28e) abafundi endiya kubo
abafundi a-ndi-y-a ku-bo
students AFF(RC)-I-go-PRES to-them
babhala uviwo
ba-bhal-a uviwo
AGRS-write-PRES examination
'the students to whom I am going write examinations'

(28f) utitshala ubiza abafundi
utitshala u-biz-a abafundi
teacher AGRS-call-PRES students
abangabhali viwo
a-ba-nga-bhal-i viwo
AFF(RC)-AGRS-NEG-write-NEG examination
'the teacher is calling the students who are not writing (any) examination'

The relative mood can appear in all the various tenses discussed in the subsection on tense inflection.

A relative mood clause can also occur after certain conjunctives (as in (29a)), often as an alternative to the participial mood clause due to the phenomenon that the distinction between the relative mood and participial mood is vacuous in some Southern Bantu languages such as Xitsonga.

(29a) abafundi bathula
abafundi ba-thul-a
students AGRS-be.quiet-PRES
xa bafundayo
xa ba-fund-a-yo
when AGRS-learn-PRES-AFF(RC)
'the students are quiet when they study'

(29b) kuseloko abafundi bafundayo
kuseloko abafundi ba-fund-a-yo
since students AGRS-learn-PRES-AFF(RC)
kakuhle baphumelela uviwo
kakuhle ba-phumelel-a uviwo
well AGRS-pass-PRES examination
'since the students study well they pass the examination'

Subjunctive Mood The subjunctive mood is associated with a range of semantic contexts. It can appear in clauses denoting successive actions, necessity and obligation, purpose, wish, and prohibition, as shown in the following examples, in which these meanings are often determined by the semantic features of the verb by which it is subcategorized.

The subjunctive mood is clearly identifiable by overt morphology, specifically the verbal suffix *-e* and the subject agreement prefix *a-* for class 1 nouns. Its morphology is invariable, and it does not exhibit tense distinctions.

- Successive actions.

(30) abantwana bavuka kusasa bahlambe
abantwana ba-vuk-e ba-hlamb-e
children AGRS-wake-up early
ubuso batye
ubuso ba-ty-e
AGRS-wash-AFF(SUBJ) AGRS-eat-AFF(SUBJ)
babulise abazali
ba bulis-e abazali
AGRS-greet-AFF(SUBJ) parents
baye esikolweni
ba-y-e isikolo-ini
AGRS-go-AFF(SUBJ) LOC school-LOC
'the children wake up early, wash (their) faces, eat, greet (their) parents, and go to school'

- Necessity, obligation.

(31a) utitshala uyalela ukuba
utitshala u-yalel-a ukuba
teacher AGRS-instruct-PRES COMP
abantwana bafunde iincwadi
abantwana ba-fund-e incwadi
children AGRS-read-AFF(SUBJ) book
'the teacher instructs the children to read a book'

(31b) kufuneka ukuba abafundi
ku-funeka ukuba abafundi
EXIST-be.needed COMP students
babhale uviwo
ba-bhal-e uviwo
AGRS-write-AFF(SUBJ) examination
'it is necessary that the students write the examination'

- Request, wish, desire.

(32a) utitshala ucela ukuba
utitshala u-cel-a ukuba
teacher AGRS-request-PRES COMP
abantwana bafunde incwadi
abantwana ba-fund-e incwadi
children AGRS-read-AFF(SUBJ) book
'the teacher requests the children to read a/the book'

(32b) abazali banqwenela ukuba
abazali ba-nqwenel-a ukuba
parents AGRS-wish-PRES COMP
abafundi baphumelele uviwo
abafundi ba-phumelel-e uviwo
students AGRS-pass-AFF(SUBJ) examination
'the parents wish that the students pass the examination'

- Purpose.

(33a) abafundi bafunda kakhulu ukuze
abafundi ba-fund-a kakhulu ukuze
students AGRS-learn-PRES much COMP
baphumelele uviwo
ba-phumelel-e uviwo
AGRS-pass-AFF(SUBJ) examination
'the students study hard so that they pass the examination'

(33b) abafundi bafundela ukuba
abafundi ba-fund-el-a ukuba
students AGRS-learn-APPLIC-PRES COMP
baphumelele uviwo
ba-phumelel-e uviwo
AGRS-pass-AFF(SUBJ) examination
'the students study so that they pass the examination'

(33c) abafana basebenza evenkileni
abafana ba-sebenz-a e-ivenkile-ini
young.men AGRS-work-PRES LOC-shop-LOC
ukuze bafumane imali
ukuze ba-fuman-e imali
COMP AGRS-get-AFF(SUBJ) money
'the young men work in the shop so that they get money'

- Questions expressing potential necessity or obligation. Subjunctive mood interrogatives are allowed only with first-person subject pronominals.

(34a) ndincede aba bantu?
ndi-nced-e aba bantu
AGRS(1.SING)-help-AFF(SUBJ) DEM people
'must I help these people?'

(34b) singene endlwini?
si-ngen-e e-indlu-ini
AGRS(1.PL)-enter-AFF(SUBJ) LOC-house-LOC
'must we enter into the house?'

- Prohibition. A subjunctive mood clause that denotes a prohibition must have a subject pronominal in the second person and must be in the negative.

(35a) ungayibeki incwadi apha!
u-nga-yi-bek-i incwadi apha
AGRS (2.SING)-NEG-AGRO-put-NEG book here
'don't put the book here!'

(35b) ningalibali ukuthenga isonka!
ni-nga-libal-i uku-thenga isonka
AGRS (2.PL)-neg-forget-NEG INF-buy bread
'don't forget to buy bread!'

- Exhortation.

(36a) usale kamnandi
u-sal-e kamnandi
AGRS(1.SING)-stay(behind)-AFF(SUBJ) nicely
'you stay (behind) nicely'

(36b) uhambe kakuhle
u-hamb-e kakuhle
AGRS(1.SING)-travel-AFF(SUBJ) well
'you stay (behind) well'

(36c) nilale kamnand
ini-lal-e kamnandi
AGRS(1.PL) nicely
'you must sleep nicely'

- The subjunctive mood in the complement clause of deficient verbs.

(37a) umfundi uphinda abhale uviwo
umfundi u-phinda a-bhal-e uviwo
student AGRS-do. again AGRS-write-AFF(SUBJ) examination
'the student again writes the examination'

(37b) umfundi ukhawuleza
umfundi u-khawuleza
student AGRS-do.quickly
abhale uviwo
a-bhal-e uviwo
AGRS-write-AFF(SUBJ) examination
'the student quickly writes the examination'

Consecutive Mood The consecutive (CONS) mood occurs in clauses that denote successive actions or states, in which the first verb is in the past tense. It is an invariable form that cannot have tense distinctions.

(38) umntwana uvuke wahlamba
umntwana u-vuk-e u-a-hlamba
child AGRS-wake-PERF AGRS-AFF(CONS)-wash
ubuso watya wabulisa
ubuso u-a-tya u-a-bulisa
face AGRS-AFF(CONS)-eat AGRS-AFF(CONS)-greet
abazali waya esikolweni
abazali u-a-ya e-isikolo-ini
parents AGRS-AFF(CONS)-go LOC-school-LOC
'the child woke up, washed (his/her) face, ate, greeted (his/her) parents, and went to school'

A consecutive mood clause may occur as complement of certain deficient verbs, in which the deficient verb itself is normally in the past tense.

(39a) umfundi uphinde wabhala uviwo
umfundi u-phind-e wa-bhala uviwo
student AGRS-do. again-PERF AGRS (CONS)-write examination
'the student again wrote the examination'

(39b) umfundi ukhawuleze wabhala uviwo
umfundi u-khawulez-e wa-bhala uviwo
student AGRS-do. quickly-PERF AGRS (CONS)-write examination
'the student quickly wrote the examination'

Imperative Mood The imperative is used for commands and instructions. If the command or instruction is directed to more than one person, the verb takes the suffix *-ni*.

(40a) funda incwadi!
read book
'you (SING) read the book!'
(40b) fundani incwadi!
funda-ni incwadi
read-PL book
'you (PL) read the book!'

Hortative Mood The hortative (HORT) mood is used in clauses that express polite direct requests, in which instance the deficient verb *-kha* is used. The hortative can also be used to express indirect requests or instructions.

(41a) khawuphendule imibuzo
kha-wu-phendul-e imibuzo
let-AGRS(1.SING)-answer-AFF(HORT) questions
'please answer the questions'
(41b) khanifunde iincwadi
kha-ni-fund-e iincwadi
let-AGRS(1.PL)-read-AFF(HORT) books
'please read the books'
(41c) abafundi mabaphendule imibuzo
abafundi ma-ba-phendul-e imibuzo
students AFF(HORT)-AGRS-answer-AFF(HORT) questions
'the students must answer the questions'
(41d) umntwana makafunde iincwadi
umntwana ma-ka-fund-e iincwadi
child AFF(HORT)-AGRS-read-AFF(HORT) books
'the child must read the book'
(41e) abafundi mabangayiphenduli imibuzo
abafundi ma-ba-nga-yi-phendul-i imibuzo
students AFF(HORT)-AGRS-NEG-AGRO-answer-AFF(HORT) questions
'the students must not answer the questions'

The hortative does not exemplify any tense distinctions.

Temporal Mood The temporal (TEMP) mood occurs as a subordinate clause that denotes an activity that takes place (partly) simultaneously with the activity or state denoted by the main clause. It contains the invariable verbal prefix *-aku*. The logical subject argument usually appears in the postverbal position.

(42a) bakufunda abafundi
ba-aku-funda abafundi
AGRS-AFF(TEMP)-study students
baxoxa incwadi
ba-xox-a iincwadi
AGRS-discuss-PRES books
'when the students study, they discuss the books'

(42b) sakufika ekhaya
si-aku-fika e-ikhaya
LOC-home AGRS-PRES-rest-PRES
siyaphumla
si-ya-phuml-a
AGRS-AFF(TEMP)-arrive
'when we arrive at home, we rest'

(42c) bakungasebenzi abafundi badiniwe
ba-aku-nga-sebenz-i abafundi ba-diniwe
AGRS-AFF(TEMP)-NEG-work-NEG students AGRS-tired
'when the students do not work, they are tired'

Infinitive Mood The infinitive mood clause is regularly subcategorized by specific (cognition) verbs, as in (43a) and (43b). It may occur in NP argument positions in a nominalized grammatical function, as in (43c) and (43d). Some verbs can allow a purposive infinitival complement only if they have an applicative suffix, as in (43e) and (43f) below (Visser, 1989).

(43a) abafana bayakwazi ukunceda abazali
abafana ba-ya-ku-azi uku-nceda abazali
young.men AGRS-PRES-AGRO-know INF-help parents
'the young men know (how) to help (their) parents'

(43b) umfundi uyaqonda ukuphendula imibuzo
umfundi u-ya-qonda uku-phendula imibuzo
student AGRS-PRES-understand INF-answer questions
'the student understands to answer questions'

(43c) ukubhala kwabafundi kulungile
uku-bhala kwa-abafundi ku-lungile
INF-write GEN-students AGRS(EXIST)-good
'the writing of the students is good'

(43d) ukungafundi kwabafundi
uku-nga-fund-i kwa-abafundi
INF-NEG-learn-NEG GEN-students
kuyamangalisa
ku-ya-mangalisa
AGRS(EXIST)-PRES-amaze
'the nonlearning of the students amazes (people)'

(43e) abafana basebenzela ukufumana imali
abafana ba-sebenz-el-a uku-fumana imali
young.men AGRS-work-APPLIC-PRES INF-get money
'the young men work to get money'

(43f) abafundi bafundela ukuphumelela uvio
abafundi ba-fund-el-a uku-phumelela uvio
students AGRS-learn-APPLIC-PRES INF-pass examination
'the students study to pass the examination'

Ideophones IsiXhosa is characteristic of the Bantu languages in that it is rich in ideophones. Ideophones can function as predicates, adverbs, or interjections and are often onomatopoeic. They denote the manner or sound of an activity or the color of an object. The ideophone (IDEO) that forms part of a predicate has inherent lexical properties of transitivity. In isiXhosa, the verb *-thi,* which co-occurs with the ideophone to form a predicate, serves as the host element for inflection, but it can be omitted in certain instances (Du Plessis, 1978, Du Plessis and Visser, 1998).

Intransitive Ideophones

(44a) lo mntwana uhleli uthe
lo mntwana u-hleli u-th-e
DEM child AGRS-sit AGRS-do-PERF
qwa
qwa
ideo (upright)
'this child sat upright'

(44b) abantu bathi nqa
abantu ba-th-i nqa
people AGRS-do-PRES ideo (surprise)
ngale nto
nga-le nto
about-this thing
'the people are surprised by this thing'

(44c) ixhego lithe chu
ixhego li-th-e chu
old.man AGRS-do-PERF ideo (go.slowly)
waya endlini
wa-ya e-indlu-ini
AGRS(CONS)-go LOC-house-LOC
'the old man walked slowly and went to the house'

(44d) abafazi bathe xha
abafazi ba-th-e xha
women AGRS-do-PERF ideo (wait)
'the woman waited'

(44e) le ndoda ithe xhwenene
le ndoda i-th-e xhwenene
this man AGRS-do-PERF ideo (suddenly.stop)
'this man stopped suddenly'

The ideophones in (44a)–(44e) also illustrate the various click sounds, the ingressive sounds borrowed by isiXhosa from the Khoisan languages. The consonant *q* represents the palatal ingressive click sound [•], the consonant *c* represents the dental ingressive click sound [•], and the consonant *x* or (*xh*) represents the alveolateral ingressive click sound [•].

Transitive Ideophones

(45a) lo mfana wathi
lo mfana wa-th-i
DEM young.man AGRS-do-PRES
rhuthu intonga yakhe
rhuth intonga ya-khe
ideo (take.out) stick GEN-his
'this young man took out his stick'

(45b) lo mfana uthe
lo mfana u-th-e
DEM young.man AGRS-do-PERF
qhiwu indebe
qhiwu indebe
ideo (hold.high) cup
'this man held the cup high up'

(45c) bamthe hlasi ngengalo
ba-m-the-e hlasi nga-ingalo
AGRS-AGRO-do-PERF ideo (grab) by-arm
'they grabbed him on the arm'

(45d) bamthe nqaku lo mfana
ba-m-th-e nqaku lo mfana
AGRS-AGRO-do-PERF ideo (grab) DEM young.man
'they grabbed this young man'

See also: Bantu Languages; South Africa: Language Situation; Southern Bantu Languages; Zulu.

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of which the *li* font style of writing became popular. By the time of the Former Han (206 B.C.–25 A.D.), the classic cannons were copied by using the *li* font style. The classic cannons thus produced were known as 'present-day classics.' Not until the Later Han did the classic cannons in the more ancient font style *zhuan shu* (篆书) become popular. The cannons in this ancient font were known as 'ancient style classics.' Those producing the 'present-day classics,' being quite ignorant of character formation principles adopted by ancestors, introduced so many fresh errors into the classics that they were rendered totally unreliable. Xu's dictionary adopted the original ancient texts as its data base, and laid bare the ridiculous errors committed by his predecessors.

Shuowen Jiezi contains 9353 characters (in *zhuan* font style) and 1163 duplicates. The majority of characters found in ancient classics, including those created in the Han dynasty, are covered. The dictionary proved to be an undispensable tool for later generations to decipher ancient texts, oracle bone and bronze inscriptions in particular.

The characters are arranged according to the 'radicals,' i.e., component-forming characters. There are 514 headings, starting from *yi* (一) and terminating in *hai* (亥). In decomposing characters, Xu inherited the six formation principles, of course, with his own interpretations.

Shuowen Jiezi has been subject to textual studies and commentaries for many centuries, which has resulted in a rich pool of literature. The most influential ones are the following four: (1) *Shuowen Jiezi with Duan Yucai's commentary*, (2) Gui Fu's *Semantic study of Zhuowen Jiezi*, (3) Wang Yun's *Guided reading of Shuowen Jiezi*, and (4) Zhu Junsheng's *Phonological study of Shuowen Jiezi*.

See also: Chinese Lexicography.

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Y

Yakut

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Location and Speakers

Yakut (*saxa tïla*) belongs to the Northeastern or Siberian branch of Turkic languages. It has about 380 000 native speakers living in northeastern Siberia, mainly in the Yakut Autonomous Republic (*Saxa Avtonomnay Respublikata*) within the Russian Federation. The republic, whose capital is Yakutsk, has around one million inhabitants, of whom one-third are Yakuts.

The Yakut language occupies the easternmost and, together with Dolgan, the northernmost Turkic-speaking area. The huge Yakut territory has its center in the lowlands on the middle and lower reaches of Lena and its tributaries Aldan and Vilyuy; most Yakuts live in this region. In the northwest, the Yakut territory extends up to the Arctic Ocean, comprising the Khatanga river system. In the extreme northwest, speakers of Yakut live on the Taimyr peninsula, particularly on the southern slopes of the Byrranga mountain range. In the northeast, the territory extends to the lowlands of the Yana and Indigirka river systems, up to the New Siberian Islands, and even beyond the Kolyma river. Small groups of Yakut speakers live outside the republic, e.g., in the Magadan, Irkutsk, Chita, Amur, and Khabarovsk areas.

In spite of the strong dominance of Russian, which is the language of higher education, Yakut has a relatively strong status in the republic, also being used as a second language by many speakers of Evenki, Even, and Yukagir.

Origin and History

After their emigration to northeastern Siberia, the ancestors of the Yakuts lost their contact with other Turkic-speaking groups. Since their language has been geographically isolated from other Turkic varieties for many centuries, it exhibits features that sharply distinguish it from them and makes it unintelligible to speakers of other Turkic languages. Numerous archaic features show that the contact with the rest of the Turkic world was lost very early. On the other hand, a great number of deviations are the results of innovative developments.

The ancestors of the Yakuts seem to have belonged to the 'tree Kurikan tribes' (*üč qurïqan*) mentioned in the East Old Turkic stone inscriptions found in the Orkhon river valley. It is obvious that they lived for a relatively long time in the area surrounding Lake Baikal before they migrated northward. This is also indicated by the Yakut word *bayaγal* 'sea.' Various Turkic-speaking groups have settled in the Baikal region, also the ancestors of the Tuvans and old Uyghur groups. The Yakut language itself contains indications of an early habitat in the south, e.g., names of months that do not fit the climate of Yakutia and words for animals such as *tebien* 'camel.' Yakut oral traditions also tell us about a migration from the south to the north. Early Yakut tribes left their southern habitat, probably pushed by Buryat groups, and migrated northward along the Lena river. This exodus did not occur before the 13th century, since the memory of Chinggis and the Mongol campaigns is still alive in Yakut traditions.

The ancestors of the Yakuts had been subject to a certain Mongolian admixture prior to the migration. When proceeding northward along the Lena river, the Turkic-speaking immigrants mixed with and absorbed indigenous Evenkis, Evens, and Yukagirs. At the same time, they also pushed local Tungusic-speaking groups northwestward and northeastward. Yukagirs and Paleoasiatic groups were forced out to still more peripheral regions. For centuries, however, the Yakuts lived south of their present-day territory. It was only under the pressure of the Russian expansion in Siberia that they migrated to more arctic regions. Yakutia was incorporated in the Russian Empire in the 1620s.

While the Yakuts have preserved many features of the southern culture of cattle and horse breeders, they have also taken over elements of northern nomadism from their new neighbors, traditionally reindeer herders and hunter-gatherers. In spite of Christianization and Russification, their ethnic structure has remained relatively intact.

Related Languages and Language Contacts

Yakut is most closely related to its geographically nearest Turkic neighbors, Tuvan and Khakas of southern Siberia. The old Yakut self-designation *Ura:nxay* points to early connections with the territory of Tuva, which has also been referred to as Uryankhay. Some scholars have assumed that Yakut was originally a Kipchak Turkic language (*see* **Turkic Languages**).

Yakut has been in long and close contact with other languages. It shows strong traces of Mongolic influence. The period in which the ancestors of the Yakut settled on the shore of Lake Baikal led to close interaction with Buryat. An early impact on Yakut may also have been exerted by Yeniseian, a formerly widespread Paleoasiatic language. After the emigration to northern Siberia, the Turkic language of the Yakuts underwent strong substrate influence from Tungusic dialects. The next neighbors of Yakut are the North Tungusic languages Evenki and Even (Lamut), both of which appear to have Paleoasiatic substrates. The speakers of Evenki live in the northern and northwestern parts of Yakutia, whereas the Evens live in the northeastern parts, in particular in the basins of the rivers Indigirka, Yana, and Kolyma. The contacts with the isolated language Yukagir have also been important. The complex problems of language contact and language shift in the area are still unsolved.

The Written Language

No old Yakut literary documents are known. According to a tradition in Yakut folklore, however, the Yakuts once possessed written documents, which they lost on their way to the north. There is a rich Yakut oral literature comprising legends, epics, songs, etc. A modern literature began to develop at the beginning of the 20th century. A Cyrillic alphabet was created for Yakut by the German scholar Otto Böhtlingk in the mid-19th century. A new script, based on the International Phonetic Alphabet and designed by the Yakut linguist S. A. Novgorodov, was introduced in 1922. It was later replaced by a new Roman-based script, which was in use until a Cyrillic alphabet was introduced in 1939. The orthographic rules of the modern Yakut language have often been changed. They have, however, basically followed phonetic principles, mirroring the actual pronunciation with its numerous assimilations.

Distinctive Features

Yakut exhibits many linguistic features typical of the Turkic family (*see* **Turkic Languages**). It has, for example, a suffixing morphology, sound harmony, and a head-final constituent order. In the following, only a few distinctive features will be dealt with. In the notation of suffixes, capital letters indicate phonetic variation. Hyphens are used here to indicate morpheme boundaries.

Phonology

Yakut holds an exceptional position among the Turkic languages because of certain phonetic developments. Similar phenomena are sometimes found in contact languages such as Buryat and Evenki.

Like Turkmen and Khalaj in the southwestern part of the Turkic-speaking world, Yakut has preserved Proto-Turkic long vowels, e.g., *a:t* 'name' and *ü:t* 'milk.' Yakut has eight short vowels and eight long vowels including four diphthongs. The nonhigh long vowels are realized as diphthongs, e.g., *küöl* 'lake' < *kö:l*. Yakut *t* corresponds to the East Old Turkic intervocalic and word-final dental *δ*, e.g., atax 'leg,' *tot-* 'to become satiated.' Initial *s-* corresponds to *y-* in most other Turkic languages, e.g., *suol* 'way,' *sït-* 'to lie' (Turkish *yol, yat-*). The consonants *z, š*, and *č* have developed into *s* in Yakut, e.g., *seri*: 'army' < *čerig*. Initial *s-* has been deleted, e.g., *u:* 'water,' *ös* 'word'; cf. Turkish *su, söz*. Intervocalic *-s-*, however, has developed into *-h-*, e.g., *kuh-a* [duck-POSS.3.SG] 'his/her duck' (of *kus* 'duck'), *uhun* 'long'; cf. Turkish *kuş* 'bird,' *uzun* 'long.'

Yakut applies, like other Turkic languages, a front-back sound harmony, according to which native words contain either front or back sounds. The rounded-unrounded harmony is also well developed. The vowels *o* and *ö* may occur as suffix vowels, e.g., *kötör-ö* [bird-POSS.3.SG] 'his/her bird' (*kötör* 'bird').

Due to sound changes, progressive and regressive consonant assimilations, unstable vowels, etc., Yakut word forms often deviate from the typical Turkic agglutinative structure, e.g., *at* 'horse' vs. *ap-pït* [horse-POSS.1.PL] 'our horse,' *taγïs*-'to go out' vs. *taxs-ar* [go out-PRES.3.SG] 'goes out,' *kï:s* 'daughter' vs. *kï:h-ïm* [daughter-POSS.1.SG] 'my daughter.' Some pronouns have special oblique stems, e.g., *mi:gi-* vs. *min* 'I,' *man-* vs. *bu* 'this.' The third-person imperative form consists of the verbal stem, e.g., *as* 'open,' whereas the corresponding negative form exhibits a vowel element in front of the negation marker, e.g., *ah-ï-ma* [open-ï-NEG.IMP] 'don't open'; cf. Turkish *aç* [open.IMP], *açma* [open-NEG.IMP].

Grammar

Yakut displays some unique grammatical features, innovations partly due to Mongolic and/or Tungusic

influence. Striking features in the case system are the lack of a genitive and the fusion of dative and locative. The nominative is used instead of a genitive in constructions such as *kihi bïhaγ-a* [man knife-POSS] 'the man's knife.' The old locative-ablative has lost its spatial functions, assuming a partitive function with imperatives and necessitatives, e.g., *u:-ta aγal* [water-PART bring-IMP.2.SG] 'bring [some] water.' Its locative function has been taken over by the dative-locative in *-GA*, which expresses both location and goal, e.g., *guorak-ka* [town-DAT.LOC] 'in/to the town.' Special case suffixes occur with possessive markers. For instance, while *ak-ka* [horse-DAT.LOC] 'to the horse' is the dative-locative form of *at* 'horse,' *ap-p-ar* [horse-POSS.1.SG-DAT.LOC] 'to my horse' is the corresponding form of *at-ïm* 'my horse.' New cases have emerged in Yakut, an instrumental, a comparative, a comitative, and an adverbial case. An example of the latter is *kihi-li* [human being-ADV] 'in a human way' (*kihi* 'human being').

The Yakut yes-no question marker is *duo* or *du:*, whereas almost all other Turkic languages use markers of the type *mI*. An enclitic question particle *-iy* is added to interrogative pronouns and adverbs, e.g., *bu kimiy?* [this who-INTERROG] 'who is this?' Possession may be expressed by means of the adjective suffix *-la:x*, e.g., *Min ǰie-le:x-pin* [I house-PROVIDED.WITH-1P.SG.] 'I have a house.' The adjective *suox* 'nonexisting' (cf. Turkish *yok*) is used instead of the common Turkic privative suffix *-siz* 'without,' e.g., *u:-ta suox* [water-POSS nonexisting] 'without water'; cf. Turkish *su-suz* [water-PRIV]. Adjectives may be negated with a third-person possessive suffix plus *suox*, e.g., *kuhaγana suox* [bad-POSS.3.SG nonexisting] 'not bad'. The cardinals numbers from 11 to 19 are formed with *uon* 'ten' plus a digit, e.g., *uon tüört* [ten four] 'fourteen.' The tens from 40 to 90 are formed with a digit plus *uon* 'ten,' e.g., *tüört uon* [four ten] 'forty'; cf. Turkish *kirk*.

An archaic feature is the retention of the verbal suffix *-BIt*, which is otherwise only found in the southwestern branch of Turkic, e.g., *kel-bit* [come-PART] 'having come'; cf. Turkish *gel-miş* [come-PART]. As a finite form it has evidential (indirective) meaning, e.g., *kel-bit* [come-EV.PAST.3.SG] 'has evidently come'; cf. Turkish *gel-miş* [come-EV.PAST.3.SG] 'has evidently come.'

Lexicon

The basic lexicon of Yakut is of Turkic origin. Most words of foreign origin are Mongolic loans. There is an old Buryat layer from the early period of settlement on the shore of Lake Baikal. Even the pronoun *beye* 'self' has been copied from Mongolic. Loanwords from Tungusic often belong to the domain of husbandry and everyday life. A large portion of the Yakut lexicon is of unknown origin, probably due to contact with Paleoasiatic languages. The Russian impact on the lexicon has been considerable. Loanwords are in general assimilated to the Yakut word structure, e.g., *sïlaba:r* 'samovar,' *bïragra:mma* 'programme.'

Dialects

The differences between the Yakut dialects are comparatively small. There is a central group consisting of the Aldan, eastern and western Lena dialects, a northeastern group, influenced by Even, and a northwestern group, influenced by Evenki.

Another dialect is Dolgan, spoken by about 6500 persons, mainly on the Taimyr peninsula. It differs from the northwestern dialects and has its origin in Tungusic groups who shifted to Yakut at an early stage. They left their settlements on the Vilyuy at the end of the 16th century or later, migrated northward and absorbed parts of the population of the Taimyr peninsula, primarily Nganasans, i.e., speakers of Tavgi Samoyedic, and also further groups. Dolgan thus has both an Evenki and a Nganasan substrate. It still functions as the lingua franca of Taimyr. The present-day Dolgans (self-designation *haka*, corresponding to *saxa*) distinguish themselves from Yakuts and consider their variety a language in its own right. Dolgan differs somewhat from other Yakut varieties in lexical respect, and it also displays a few differences in terms of phonology and grammar. An archaic feature is the absence of the change of initial and final *q* to *x*, e.g., *katun* 'woman' (Yakut *xotun*), *kol* 'shoulder' (Yakut *xol* 'arm'), *atak* 'foot' (Yakut *atax*), *huok* 'nonexisting' (Yakut *suox*). An innovative feature is the development of secondary *s-* into *h-*, e.g., *haka* 'Yakut' (Yakut *saxa*), *hïl* 'year' (Yakut *sïl*), *heri:* 'war' (Yakut *seri:*).

See also: Altaic Languages; International Phonetic Association; Russian Federation: Language Situation; Tungusic Languages; Turkic Languages.

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Often referred to as the last scholar in the *Kokugaku* ('national learning') school of thought, Yoshio Yamada made original and lasting contributions to a wide range of fields, including Japanese linguistics, literature, philology, and the history of grammatical studies in Japan. He is best known as the founder of the theory of Japanese grammar named after him, the Yamada Grammar. In his first book, *Nihonbunpōron* ('A theory of Japanese grammar'), Yamada presented for the first time a systematic and well-organized framework in which to describe the facts of Japanese. Using this framework, he wrote some valuable descriptive grammars of Japanese at several stages of its historical developments, including Old, Early Middle, and Middle Japanese. These, together with his highly original works on some specific issues such as honorifics, writing system, and the constructions derived from the Japanese reading of Chinese texts, made pioneering contributions to Japanese linguistics.

Yamada was born in Toyama on May 10, 1873. He left school in his teens and never received formal education in higher educational institutions. He educated himself to be a teacher, first in primary school and then in junior high school. The abovementioned *Nihonbunpōron* was written when he was a junior high school teacher in a remote corner of the country. In 1902, he submitted it to the Ministry of Education for the degree of Doctor of Literature. Tokyo Imperial University was commissioned to assess it, but oddly enough left the matter vague for more than 25 years. It was said then that Yamada's lack of formal education had something to do with it. The title of Litt.D was finally conferred on him in 1929 when he was a professor at Tohoku Imperial University, his retirement only 4 years ahead. Reporting this incident, a newspaper described him as a victim of "academic cliquism." Whether or not he had a degree, however, he had already published by this time some 20 books and 100 articles on Japanese grammar, literature, philology, etc., which had made him an acknowledged authority in such fields.

Yamada also wrote extensively on issues related to Japan's indigenous religion (Shinto) and the history of Japan from a nationalist perspective. For him, the study of the language and classical literature of Japan was only a part – albeit the fundamental part – of the endeavor to throw light on the 'national essence' of Japan. In 1940, Yamada became President of Jingu-Kogakkan, a Shinto-based university. He was appointed to the House of Peers in 1944. He also served as the Director of the Institute for the Compilation of National History. In 1957, he was awarded the Order of Cultural Merit. Yamada died in Sendai on November 20, 1958.

See also: Motoori Norinaga (1730–1801); Suzuki Akira (1764–1837); Tokieda, Motoki (1900–1967).

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Yanan *See:* Hokan Languages.

Yang Xiong (53 B.C.–18 A.D.)

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Yang Xiong (53 B.C.–18 A.D.) was born in a poor family in Shu, a prefecture during the Western Han Dynasty (206 B.C.–25 A.D.), comprising the areas in and around today's city of Chengdu, the capital of Sichuan Province, China. He displayed an inclination for independent thinking and a strong love for literature, even when he was young. He produced a great number of writings in imitation of 'Cifu,' a new style of poetry that came into existence in the State of Chu (today's Hubei and Hunan Provinces) in the Warring States Period. At the age of 41, Yang left his hometown and went to the capital city of China, Chang'an (today's city of Xi'an, the capital of Shaanxi Province), where he was recommended to the emperor, who loved 'Cifu' passionately. One year later, Yang began to work as a literature attendant in the court. With his great talent for linguistic study and the support of the emperor, Yang gave up literature for linguistics and devoted himself heart and soul to the study of dialects. His important linguistic works include *Taixuan* (*Profound theory*), *Fayan* (*The law of speech*), *Xunzhuan* (*Explanation editing*) and *Fangyan* (*Regional dialects*).

Yang occupies a most important place in the history of Chinese linguistics. He was the first to undertake a systematic study of Chinese spoken languages. He often used as his informants soldiers serving in the capital city or visitors from different regions, of different social classes, and with different language backgrounds. He recorded facts about their speech and did his analysis carefully and thoroughly. The result of his 27-year survey was the book *Fangyan*, its full title being *Youxuan Shezhe Juedai Yushi Bieguo Fangyan* (*Unrivalled explanation of the regional dialects by light carriage envoy*).

Fangyan was the first work devoted to dialect vocabulary in the history of Chinese linguistics; it is from the title of this book that the modern word for 'dialect' (*fangyan* – lit. 'regional speech') was derived. For nearly 2000 years, *Fangyan* has been viewed as the model of dialectical analysis in Chinese linguistics. While the original version consisted of 15 volumes, about 9000 Chinese characters in total, the current version is an enlarged edition, with 13 volumes and about 11 900 Chinese characters, including words and expressions covering clothing, utensils, animals, weapons, insects, and worms. Among those dialects recorded in *Fangyan*, the dialects in the State of Qin (roughly today's Shaanxi Province and eastern Gansu Province) and the State of Jin (mainly today's northern part of Shanxi and Hebei Provinces) take up more pages and receive more detailed analyses. They even serve as the basis on which other regional dialects are explained, which suggests that the common tongue of the Han Dynasty might have been developed from the dialects of Qin and Jin.

With its focus on the living, spoken dialects, *Fangyan* serves as a monograph of comparative dialectal vocabulary, with words taken from earlier texts or elicited from contemporary dialect speakers by Yang Xiong himself; the words are defined in terms of the Han standard language and recorded in Chinese characters. Instead of simple lists, the book classifies synonymous words according to their sources and origins. The book also recognizes common words, dialectical words, and ancient words, and explores their mutual relationships, which indeed is a remarkable achievement at that time.

Yang Xiong's work is of great significance from the perspectives of both synchronic and diachronic linguistics. It not only provides a clear picture of the distribution of Han dialects but also shows the changes in meaning of words in regional dialects. It is a exemplary example of language study that takes into consideration both time and regional differences, and also an important source for Chinese exegetical studies and cultural studies.

In style, *Fangyan* is similar to *Erya* (the first dictionary in China), in that they both list groups of so-called synonyms and provide an explanation for each group in the common tongue of the time, although real synonyms are rare and the so-called synonyms often

differ in one way or another. The subtle meaning difference among the synonymous words is the center of attention in *Fangyan*, which makes it fundamentally different from *Erya*, in addition to covering many more regional dialects of the time.

Fangyan is also the first work on dialectology in the world. Not until the late 18th century, namely, more than 1700 years later, did Balas's similar work *A comparative dictionary of languages and dialects in the world* appear in Russian. In Europe, the systematic study of regional dialects, also known as linguistic geography or dialect geography, commenced in the late 19th century, and Georg Wenker from Germany was one of the pioneers. In certain sense, Yang Xiong's *Fangyan* can be regarded as the earliest work on dialect geography in the world.

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Yanito

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Yanito (or Llanito) is the name commonly used to refer to the people of Gibraltar as well as their local vernacular. Although various theories exist, it seems likely that it has its etymological origins either in the English name 'Johnny' or alternatively, reflecting the traditional Genoese presence in the British colony, it may be derived from 'Gianni,' the diminutive of the Italian boys' name 'Giovanni.'

Yanito is not an autonomous language as such, and it is seldom found in written form. It is fundamentally a spoken Spanish-dominant variant, which incorporates English lexical and syntactic constituents as well as some unique local lexical items. Although the Spanish/English content ratio may vary from speaker

differ in one way or another. The subtle meaning difference among the synonymous words is the center of attention in *Fangyan*, which makes it fundamentally different from *Erya*, in addition to covering many more regional dialects of the time.

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Yanito (or Llanito) is the name commonly used to refer to the people of Gibraltar as well as their local vernacular. Although various theories exist, it seems likely that it has its etymological origins either in the English name 'Johnny' or alternatively, reflecting the traditional Genoese presence in the British colony, it may be derived from 'Gianni,' the diminutive of the Italian boys' name 'Giovanni.'

Yanito is not an autonomous language as such, and it is seldom found in written form. It is fundamentally a spoken Spanish-dominant variant, which incorporates English lexical and syntactic constituents as well as some unique local lexical items. Although the Spanish/English content ratio may vary from speaker

to speaker, most Gibraltarians will, consciously or unconsciously, alternate between English and Andalusian Spanish in everyday situations.

Code-switching may take place inter-sentencially or intra-sentencially.

> Yanito
> What? Pero . . . I told you, no? No puedo ir shopping porque I have to work late. Sorry, no puedo hablar ahora. Anyway, te llamo esta noche OK?
> English
> What? But . . . I told you, didn't I? I can't go shopping because I have to work late. Sorry, I can't speak now. Anyway I'll phone you tonight, OK?

Although L1 interference and unnatural direct translations may sometimes be present resulting in what is popularly known as 'Spanglish,' the syntactic rules of both languages tend to be respected.

Individual English lexical items, particularly nouns, are commonly introduced in otherwise Spanish utterances. This is often because no direct equivalent exists or its cultural or social nuance cannot be easily or succinctly conveyed. Although British English pronunciation norms tend to be followed, some older borrowings and derivations have been Hispanicized, usually reflecting the local Andalusian pronunciation. Interestingly, several of these words have also found their way across the border and are used in the neighboring Spanish towns of La Linea and San Roque.

- *chinga* = chewing gum
- *liqueribá* = liquorice bar
- *mebli* = marbles
- *el tishella tisha* = teacher

Other English borrowings have taken on a different meaning within the local context. *Pish-pine* (from the English 'pitch pine'), for example, is used locally as an adjective or an adverb to mean 'perfect.'

> Al final todo salió pish-pine.
> In the end everything turned out just fine.

While Spanish and English form the basis of the local lexicon, several borrowings from other languages are also present, reflecting the multicultural makeup of the British colony. These come mainly from Italian (e.g., *pompa* = pump), Arabic (e.g., *flush* = money), and Hebrew (e.g., *ha ham* = boss).

Although Yanito does not hold prestige status, it is not overtly stigmatized either. It is regarded with a certain degree of affection and used by many Gibraltarians as an expression of local identity. However, although the use of Yanito is widespread and considered by many to be a defining characteristic of the local speech community, Gibraltar can not be described as a diglossic speech community. Both English and Andalusian Spanish are very much alive, and speakers may adopt either of the three language forms depending on context, domain, and the interlocutor.

See also: Gibraltar: Language Situation; Pidgins and Creoles: Overview; Spanish.

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Yankunytjatjara *See:* Pitjantjatjara.

Yarshater, Ehsan (b. 1920)

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A leading figure in Iranian studies, Persian literature and Iranian linguistics, Ehsan Yarshater was born on April 3, 1920 in Hamedân, Western Iran. He studied Persian language and literature, and got a Ph.D. in Persian language and literature in 1947 from Tehran University. His dissertation dealt with Persian poetry under the Timurid Shahrukh (15th century). In the same year, he went to the School of Oriental and African Studies, London University, and studied pre-Islamic Iranian languages and culture with W. B. Henning.

It was in this period when Yarshater adopted a great interest in Iranian linguistics, especially the study of the dialects of northwestern Iran. In 1950, with the encouragement of Henning, he had been able to make brief notes on one of them, especially the one spoken in the southwest of Qazvin, and found a link of related dialects, all greatly endangered. After his employment in the Faculty of Letters at Tehran University, he continued the search for such dialects, which developed into his scholarly lifework. His constant efforts in studying these dialects were a major contribution to Iranian linguistic studies and resulted in the introduction of 'TatiTaleshi' groups of Iranian languages.

During his academic career in Iran, Ehsan Yarshater was engaged in many administrative duties. In 1954, he contributed to the founding the *Bongâh-e Tarjome va Nashr-e Ketâb* (Institute for the Translation and Publication of Books), whose primary aim was to have foreign works of recognized worth translated into Persian by scholars of repute. Under his supervision, a massive contribution was made to the intellectual life of Iran. He was also the vice-president of the *Societé de la Dialectologie Iranienne* (founded in 1956), of which famous Irananologists and linguists such as G. Redard, G. Morgenstierne, and E. Benveniste were active members. This society was responsible for supervising the recording of dialects throughout Iran.

In 1960 he rose to the level of professor of Old Persian and Avestan, and in the same year he was awarded a Ph.D. by London University for his thesis on 'The Tati dialects spoken to the south of Qazvin,' elaborated and published later as *A grammar of southern Tati dialects* (1969). A year later, he was invited to occupy a chair in Iranian studies at Columbia University, New York, which turned out to be his main place of affiliation until his retirement.

In 1966 he established a Center for Iranian Studies at Columbia University, and started editing the *Encyclopedia of Iran and Islam*, which was published in 1975, but was left unfinished. He was also the editor of the third volume of the *Cambridge history of Iran*, comprising the history of the Selucid, the Parthians, and the Sasanians, as well as a volume entitled *Persian literature*.

In 1972, Yarshater started his greatest contribution to Iranian studies: editing the *Encyclopedia Iranica* in the English language, which is no doubt the most comprehensive reference on Iranian culture, languages, literature, and related fields, whose publication still goes on.

Yarshater has a very wide range of research interests, which cannot be recounted here. In the field of linguistics, he is known for his systematic linguistic study of a wide area, which included Tāleshi-speaking districts on the west Caspian coast, Khalkhal and Tārom in Azerbaijan, Kho'in and the Zanjān region, Rudbar, Kuhpaya, and Alamut to the east of Qazvin, and Rāmand to the south of it, with the Sāve and Kāshān Province (like Abuzaydābādi and Abyāna'i), along with some Central Iranian dialects, as well as the study of some important Jewish Iranian languages.

What makes him different from many of the researchers in the field of Iranian linguistics is his exactness and analytical skills in using multiple parameters and his attention to detail in both phonological and morphological issues (like his study of gender in the dialects of the Kāshān area), and his ability to find the minute differences between closely related dialects. His publications are reminiscent of the linguistic tradition set by Andreas, Mann, Zhukovsky, Christensen, and Morgenstierne. His studies cover different aspects of each dialect, with respect to the outer influences and the recent changes, therefore, the data and analysis provided by his works are ideal for linguists interested in the typology of the Iranian

languages. In light of his studies on southern Tati dialects, he discovered that the languages of Azarbaijan in the Middle Ages and pre-modern times were the descendants of the ancient Median language. Also, by studying the Jewish dialects of Tehran, Hamadān, Isfahān, Kāshān, Golpayegān, and other towns, he proved that Western and Central Persia had a language other than Persian, whose traces may be seen in such Jewish dialects.

Yarshater's works are still among the most reliable sources of research on the Iranian languages and are used as the best patterns for serious linguistic studies on this branch of Indo-European languages. He is presently the Director of the Center for Iranian Studies and Hagop Kevorkian Professor Emeritus of Iranian Studies at Columbia University.

See also: Benveniste, Emile (1902–1976); Iranian Languages; Morgenstierne, George (1892–1978).

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Yāska

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Yāska's *Nirukta* is one of the two oldest theoretical linguistic texts of ancient India. A largely etymologizing, but basically semantic approach to the exegesis of the most archaic Vedic Sanskrit texts, it complements Pāṇini's grammar of vernacular Sanskrit, for which a date ca. 500 B.C. has been canvassed. With its archaic source material and its detailed critical allusions to even earlier theories, the imperfectly preserved text

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of *Nirukta* could be the older of the two. Its coherent account of simile and metaphor, for example, recurs as individual grammatical phenomena scattered throughout Pāṇini. The fact that we are often dependent on Pāṇini's systematic exposition for the key to Yāska's terminology, and that Pāṇini's highly selective use of Vedic material has a different Yajurvedic bias, is no decisive counterargument.

The *Nirukta* incorporates a commentary on much of the *Nighaṇṭu,* an evidently preexisting thesaurus of specifically Vedic vocabulary. This, the model for much later vernacular lexicography, was arranged thematically after the manner of Roget, an idea that may have been inspired by the desire to classify the gods as earthly, atmospheric, or heavenly. A large residue of words are graded only according to their relative ambiguity. For several hundred of its words, *Nirukta* provides at least one characteristic citation, mainly from Ṛgveda, which is rendered into normal Sanskrit where necessary. This gloss is significant, both as showing the extent to which the language had become incomprehensible, and as attesting the often impressionistic interpretations on which all later medieval and modern exegesis rests.

Yāska's preamble undertook to resolve existing controversies regarding semantic theory and the role of etymology in exegesis. He postulated radical finite verbs (described as emphasizing sequential becoming) and derivative substantives (denoting fixed entity or punctual state), together with auxiliary separable prefixes (adding a nuance of transitive action) and interjected particles (including notions of conjunct and disjunct actions). Unfortunately for future exegesis, he had inferred (2.1) that Vedic accidence was unsystematic and, in comparison with strict etymological analysis, negligible as a means of determining word division and purport.

The etymologies rely ultimately on detailed collation of the original poets' own word-associations. Thus the word *grā́van*, 'pressing-stone', is mentioned only cursorily as a variety of 'rock,' and is analyzed primarily in the plural as a class of deities, i.e., as sacred objects that in Vedic poetry could both crush demons (*han-*) and provide a noisy apotropaic accompaniment for the litany (*jar-*), and to which the poets had assigned a 'handler' (*gṛh-*). Using an empirical grasp of Sanskrit phonology, Yāska could then (9.8) derive the word *grā́van* from the root *han-* 'slay' or *gṛ-* 'praise,' or in the end from *gṛhṇāti* 'handles' as in some sense subsuming both *gṛ-* and *han-*. In this instance, using extraneous evidence unavailable to Yāska, we have since found for the word a more cogent etymology (*guru* 'heavy'): but the principles of textual and linguistic analysis on which modern comparative philology rest owe much, via Pāṇini, to Yāska's contention that articulate linguistic meaning (*nirukta*), as well as ritual function, could be extracted from the ancient litany.

That the word *Nirukta* actually specifies etymology, virtually as an end in itself, is a misconception: *nirukta* is the analyzed text, the counterpart (1.15), and no doubt also a presupposition, of Pāṇini's science of word building and sentence construction. For the solution of a Vedic crux, Yāska relied on an examination of the various apparent etymological possibilities for each key word in the sentence, in order to identify senses compatible with his prejudiced assumption of a ritualistic context or, failing that, some mythic allusion. The exegesis was completed by later commentators; but, torn between deference to Yāska and their own predilection for a mystic Vedāntic context, they could add little that is cogent to his renderings. For a more definitive translation, modern scholarship is essentially indebted to the insights (e.g., 2.8) that these renderings provide.

See also: Panini; Sanskrit.

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Yellow Uyghur *See:* Turkic Languages.

Yemen: Language Situation

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The Republic of Yemen is situated in the southeast corner of the Arabian Peninsula, bordering Saudi Arabia to the north and Oman to the east, including the island of Suquṭra and its neighboring islets ʿAbd al-Kūri and Samḥa. Prior to unification on May 22, 1990, the area that is now the Republic of Yemen was two states – the Yemen Arab Republic in the north and the People's Democratic Republic of Yemen in the south. The total population in July of 2004 was estimated at over 20 million. Most Yemenis speak one of many dialects of Yemeni Arabic. A large area in the far southeast of the country, bordering and spreading east into Oman and north into Saudi Arabia, is inhabited by an estimated 100 000 (Simeone-Senelle, 1997: 378) speakers of Mehri, one of six extant South Arabian languages. Two other Modern South Arabian languages are spoken in Yemen: Hobyōt is spoken by less than 100 people living along the southern-most portion of the border with Oman, and Suquṭri, with around 70 000 speakers (1990 census), is spoken on the islands of Suquṭra, ʿAbd al-Kūri, and Samḥa. Over the past couple of decades, immigrants from Somalia have formed Somali-speaking communities along parts of the Yemeni Red Sea coast.

The Arabic dialects spoken within the Republic of Yemen are extremely varied, due, at least partially, to the rugged mountainous terrain that separates groups of people and to the dependence of the isolated groups on traditional means of communication. Dialects in the north can be divided broadly into five dialect areas: the coastal plain (the Tihama), the western mountain range, the central plateau, Ḥugari:yah to the south of Ta'izz, and the desert east. Behnstedt (1985) divided these dialects more specifically into 11 areas. Taken together, the dialects exhibit a huge array of archaic features, particularly in the morphology and vocabulary, with remnants of Old Arabic or of one or more of the Ancient South Arabian languages. The Tihama dialects share the Himyaritic definite article *am-* or *im-*, and, as in many dialects in Saudi Arabia to the north, traces of nunation – usually realized as *-in* and suffixed to nonfinal indefinite nouns and adjectives. In many western mountain range dialects, the perfect tense verb ending for first singular and second persons is *-k(V)*, as opposed to *-t(V)*, as in *qul-k* 'I said' versus Central Plateau *gul-t*; this is a morphological feature that almost certainly goes back to one of the Ancient South Arabian languages. The dialects of the Ḥugari:yah maintain the vocalic endings for first and second masculine singular persons in the perfect verb, as in *qult-u* 'I said' and *qult-a* 'you (masculine singular) said,' endings that have long disappeared, if they ever existed, from most other modern dialects of Arabic. Lexical items that are reflexes of Ancient South Arabian include function words, such as the Ḥugari:yah term *da/daw* 'no' and the relative pronoun *ḏi:*, the an-Naḏi:r/Ra:ziḥ (spoken in the northwest mountain area) term *si:* 'to, until,' and many agricultural and architectural content words, such as the Ṣaᶜdah region terms *lahj* 'window' and *xalwah* 'room' (Behnstedt, 1987a: 106–107) and the San'ani terms *mawṯar* 'foundations' and *ᶜari:m* 'dyke.' The allophonic lateral (or, for an-Naḏi:r/Ra:ziḥ, retroflex tʃ (Behnstedt, 1987a,b)) realization of Ḍa:d is phonologically archaic; this realization was described for Classical Arabic by Si:bawayhi in the 8th century C.E., and is now found in dialects spoken both in the far south (Ghaylḥabba:n; see Habtour (1989)) and in the far north (an-Naḏi:r/Ra:ziḥ; see Behnstedt (1985, 1987a,b), Shelagh Weir and Bonnie Glover-Stalls, personal communication).

Geographical isolation leads not only to maintenance of archaic features, but also to grammaticalizations and isolated innovations based on analogy. The an-Naḏi:r/Ra:ziḥ dialect, for example, is marked by its large number of grammaticalized particles and is the only recorded Arabic dialect in which independent pronouns for second persons have developed from dependent pronouns, as in *ak* 'you (masculine singular),' *ać* 'you (feminine singular),' *akkum* 'you (masculine plural),' and *akkun* 'you (feminine plural)' (Behnstedt, 1985, 1987a,b).

See also: Arabic; Oman: Language Situation; Saudi Arabia: Language Situation.

Language Maps (Appendix 1): Map 134.

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Yiddish

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Yiddish, a Germanic language spoken by the Jews of Central and Eastern Europe (Ashkenazim) and in the Ashkenazic diaspora around the world, includes significant Semitic and Slavic components as well as its Germanic base. It is one of a number of Jewish languages created on the basis of the coterritorial non-Jewish language (cf. Judaeo-Arabic, Judaeo-Persian, Judezmo [Ladino], etc.). Of all such languages, it achieved the widest range of functions, the most highly developed network of institutions and the largest number of speakers.

Orthography

Like all Jewish languages, Yiddish is written in the Hebrew alphabet. Unlike Hebrew, which except for special purposes is normally written without vowel symbols, Yiddish has adapted certain Hebrew letters (sometimes in combination with Hebrew subscript or superscript vowel symbols) to represent vowels. Words and morphemes of Semitic (Hebrew and Aramaic) origin are for the most part spelled as they are in the source languages, while words of Germanic, Slavic, and other origins are spelled in a broadly phonetic manner. The orthography is superdialectal, which permits its use by speakers of the standard language (the phonetics of which is based largely on Northeastern Yiddish) as well as by speakers of dialects, which most strongly differ from the standard and one another in their realization of the vowels. In the Soviet Union, the official orthography for Yiddish 'naturalized' the Semitic component, eliminating the traditional Hebrew and Aramaic spellings in favor of the kind of phonetic representations used elsewhere for the non-Semitic component. Soviet orthography also mandated standardized representations for elements that show dialectal variation, e.g., orthographic *oyf* was spelled *af* as a preposition and *uf* as a prefix. (The standard scholarly transcription for Yiddish is the system developed by the YIVO Institute for Jewish Research [originally in pre-1939 Wilno, Poland, now in New York].)

Phonology

The phonemic inventory of standard Yiddish consists of eight vocalic segments (five oral vowels and three diphthongs) and twenty-nine consonantal segments (some of which play only a marginal role). The oral vowels are *i, e, a, o*, and *u*, realized phonetically as [i], [ɛ], [ɐ], [ɔ], and [ʊ]; the diphthongs are *ey*, *ay*, and *oy*. The basic consonantal inventory contains voiced and voiceless bilabial, dental, and velar stops; bilabial, dental, and palatal nasals; voiced and voiceless labiodental, dental, and alveolar fricatives; a voiceless velar fricative and a voiced laryngeal fricative; voiceless dental and alveolar affricates; a dental and a palatal lateral; a palatal glide; and an /r/ that can be pronounced as a uvular (most speakers) or dental trill. Voiced dental and alveolar affricates, and – regionally – palatal (or palatalized) versions of /t/, /d/, /s/, and /z/ play a somewhat marginal role in the phonological system. The resonants /l/ and /n/ can be syllabic, as can the positional variants of /n/, [m] (in word-final position after /b/ or /p/) and [ŋ] (in word-final position after /k/ or /g/).

As in Slavic, Yiddish obstruents assimilate (generally regressively) with respect to voice, but /v/ does not cause voicing in a preceding voiceless obstruent. Word-final obstruents do not (as in Slavic or German) lose voicing before pause. There is, however, evidence of such devoicing being operative in an earlier stage of the language, e.g., *hunt* 'dog' vs. *briv* 'letter' (cf. German *Hund* with final [t] and *Brief* with final [f]).

Word stress tends toward the penultimate, but words of Germanic origin are often stressed on the initial root syllable, and words of Slavic origin often retain the stress of the source language. Posttonic vowels are generally reduced.

Morphology

Three noun genders (masculine, feminine, neuter) are distinguished in the singular by agreeing forms of the definite article and attributive adjectives, as well as by pronominal reference. Northeastern Yiddish, however, like the neighboring Lithuanian language, has lost the neuter gender. There are no gender distinctions in the plural.

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Nouns are pluralized by means of several endings, mostly independent of gender: *-n* or its variant *-en*, *-er,* zero (Germanic in origin); *-s* (Romance in origin); *-im*, *-es* (Hebrew in origin). The Germanic and Hebrew suffixes may be accompanied by vowel changes in the stem; the same changes take place in suffixal derivation, e.g., in diminutive formation (cf. *barg* 'mountain,' *berg* 'mountains,' *bergl* 'hill'; *hoyz* 'house,' *hayzer* 'houses,' *hayzl* 'little house').

The definite article, attributive adjectives, and personal pronouns distinguish nominative, accusative, and dative case forms (with extensive syncretism) in the singular (pronouns also in the plural); personal names and a few common nouns can add *-(e)n* to indicate the accusative or dative singular and *-(e)s* to mark a possessive form. Agreeing elements have the same form for dative and possessive. Predicate adjectives occur either as a bare stem or with the indefinite article and a gender ending: *zi iz yung* 'she is young' vs. *zi iz a yunge* 'she is a young one,' parallel to Russian constructions with short- and long-form adjectives (*ona moloda* vs. *ona molodaia*). Adverbs have the same form as the stem of the corresponding adjective.

Yiddish verbs have synthetic forms for the present tense and analytic forms for the past and future tenses. The future is formed by combining the conjugated auxiliary *veln* with the infinitive; the past is formed by combining the auxiliaries *hobn* 'have' or *zayn* 'be' with the past participle. Conditional and subjunctive moods are also formed with auxiliaries: *voltn* (with the past participle) for the former and *zoln* 'should' (with the infinitive) for the latter. The auxiliary *flegn* 'used to' combines with infinitives to express iterativity in the past. A large number of periphrastic verbs combine one of several auxiliaries with an invariable element, often a Hebrew verbal form (e.g., *mekane zayn* 'be envious'; *moyre hobn* 'be afraid, fear'; *vey ton* 'hurt'; *geboyrn vern* 'be born').

Yiddish verbs may be combined with a variety of stressed adverbial complements that are prefixed to the infinitive and participles, but follow the inflected verb as a separate word in the present tense and the imperative (e.g., *avekgeyn* 'to go away,' *ikh bin avekgegangen* 'I went away' vs. *ikh gey avek* 'I'm going away,' *gey avek!* 'go away!'). Under the influence of Slavic verbal systems, some of these inherited Germanic verbal complements are used to express aspectual or Aktionsart meanings, in ways that differ both from the Germanic and Slavic systems. Yiddish also makes broad use of the so-called stem construction, which combines an auxiliary (usually *gebn* 'give' or *ton* 'do') with the indefinite article and an invariant verbal stem to create a semelfactive meaning: *gebn a kuk* 'take a look,' *a trakht ton* 'give a bit of thought.'

Syntax

Yiddish is a verb-second language, with the inflected verb serving as the second clause constituent. In a complex sentence, however, an initial clause can occupy the first constituent position and the verb will therefore occupy the first position in the second clause: cf. *er vet farshteyn* 'he will understand' vs. *az er vet zayn elter, vet er farshteyn* 'when he is [will be] older, he will understand.' The verb can also occupy the first position in a clause or sentence that follows as an implied consequence of a preceding clause or sentence, e.g., *der tate iz geshtorbn, bin ikh geblibn aleyn* 'my [the] father died, [so] I was left all alone.' Interrogative elements (the particle *tsi* that introduces yes-no questions, pronouns, adverbs) count as the first constituent in a direct question but not in an indirect question: cf. *vos hot zi geshribn?* 'what has she written?' vs. *ikh veys nit, vos zi hot geshribn* 'I don't know what she has written.'

Aside from the verb-second requirement, word order is relatively free and is available to express such discourse functions as emphasis, contrast, topic vs. comment. In order to move a subject to a more emphatic position without violating the verb-second principle, the neuter pronoun *es* (or its variants in this function *se, s*) serves as a dummy occupying the first constituent position, e.g., *es iz tsu mir gekumen a kuzine* 'a cousin came to me.'

Like its Slavic counterparts (but unlike the situation in Germanic), the reflexive pronoun *zikh* serves for all persons and numbers. It also serves both as the full accusative/genitive and dative of the reflexive/reciprocal pronoun (cf. Polish *siebie/sobie*) and as the enclitic form that occurs with verbs in a variety of functions (cf. Polish *sie*). Verbs with *zikh* can express, among other things, a kind of middle voice (e.g., *vashn zikh* 'wash/wash up/get washed') and also an intransitive verb with an unaccusative subject (e.g., *der vinter heybt zikh on* 'winter is beginning'). Following Slavic models, prefixed (or complemented) verbs with *zikh* express various Aktionsart meanings (e.g., *tselakhn zikh* 'burst out laughing'; cf. Russian *rassmeiat'sia*).

Yiddish does not drop subject pronouns, although some contracted forms are used in speech (*kh* for *ikh* 'I,' *r* for *er* 'he'). Second-person plural pronouns and verb forms are used in nonfamiliar address.

Lexicon

Although the basic stock of Yiddish vocabulary is Germanic in origin, there is also a large Semitic component (from Hebrew and Aramaic, known collectively in Yiddish as *loshn-koydesh* 'the language of

holiness'), which may reach as much as 15% or more depending on style and register. The significant Slavic component comes primarily from Polish, Ukrainian, and Belarusian, and there are traces of old Romance influences. Many Greek- and Latin-based internationalisms entered the language in the 19th and 20th centuries, often via one Slavic language or another. The Germanic, Semitic, Slavic, and other elements were phonologically and morphologically integrated into the Yiddish linguistic system, often being creatively reworked. The verb *balebatevn* 'keep house; manage; bully,' for example, contains two Hebrew roots (meaning 'master of the house'), a Slavic suffix used to derived verbs from foreign roots (cf. Polish-*owa*-), and a Germanic infinitival ending. Calques were created both on the word level (see the above examples of verbal prefixation) and on the phrase level. A colloquial phrase meaning 'put in jail,' *araynzetsn in koze*, borrows the Polish slang term for 'jail,' *koza*, literally, 'goat' and uses Germanic elements (verbal complement *arayn*, root *zets*-, infinitive ending *-n*, preposition *in*) to calque the entire Polish phrase *wsadzić do kozy*. A more elaborate version replaces the Germanic verbal root with a Semitic one, and the Polish slang term with the Aramaic-origin phrase *khad-gadye* 'a single kid,' giving *araynyashvenen in khad-gadye*.

Although many words from the Semitic component are related to Jewish religious life, many are not (e.g., *khaver* 'friend; [political] comrade'; *balebos* 'master of the house; boss'), and there is no neat correspondence between the origins of words and their sphere of application. So, for example, the verb meaning 'say a blessing' is *bentshn*, which is of Romance origin (ultimately related to Latin *benedicere*), while the word *got* 'God' is from the Germanic component (and has an affective form with a Slavic suffix, *gotenyu*). Most kinship terms are of Germanic origin, but *zeyde* 'grandfather' and *bobe* 'grandmother' come from the Slavic component.

History

Yiddish is generally assumed to have begun to develop as a distinct linguistic variety around the year 1000 C.E. The long-dominant theory of origins (connected with the work of Max Weinreich) attributes this development to the migration of Jewish speakers of Old French and/or Old Italian, who were literate in Hebrew/Aramaic, into the Rhine Valley, where they encountered Germanic speakers. In recent years, scholars have questioned parts of this theory, suggesting Northern Italy or Bavaria as the point of initial contact, arguing that Yiddish developed as a relexification with Germanic materials of a kind of Judaeo-Slavic (Paul Wexler) or proposing that Yiddish began with contacts between Aramaic-speaking Jews from the Middle East and Germanic speakers (Dovid Katz).

As Jews moved eastward, they settled among speakers of Slavic languages (first Czech, then Polish, later Ukrainian and Belarusian). From around 1500 and until World War II, the majority of Yiddish speakers inhabited the largely Slavic-speaking lands of Central and Eastern Europe. In addition to the Yiddish-speaking religious institutions (educational, social, etc.) that functioned throughout that territory, there existed during the 1920s and 1930s in Poland and (until the mid-1930s) in the Soviet Union a wide array of educational, cultural, social, and political institutions with Yiddish as their language of instruction, publication, daily business, etc. The Nazi annihilation of European Jewry, together with assimilation (voluntary or forced) to the dominant cultures in the Soviet Union and the overseas lands of the Eastern European Jewish diaspora, has led to a great diminution in the number of speakers of Yiddish. Yiddish is alive today among a decreasing number of elderly Jews of East European origin and in certain traditionalist (mostly Hasidic) communities in North America, England, and Israel, where it serves as the principal vernacular. It is also cultivated by an unknown number of relatively young, largely secular, Jews (and some non-Jews), who are devoted to keeping the language and culture alive.

The oldest dated Yiddish text (1272) is a sentence written in a prayer book in Worms, Germany. The first printed text is a Yiddish translation of a Hebrew prayer included in a 1526 Prague haggadah, and the first Yiddish book is a Hebrew–Yiddish Bible concordance published in Cracow in 1534 or 1535.

Dialectology

The dialect map of Yiddish is divided into Western and Eastern Yiddish, with the latter subdivided into Central (Polish), Northeastern (Lithuanian), and Southeastern (Ukrainian) Yiddish. Western Yiddish is defined roughly as Yiddish spoken west of the 1939 Polish-German border; it is the descendent of the earliest Yiddish, and even by 1939 had largely been replaced by German, although some speakers continued to use it in such areas as Alsace, Switzerland, and Slovakia. Linguistically, the Yiddish dialect continuum is divided on the basis of the development of certain proto-Yiddish vowels. In particular, the phrase 'to buy meat' (*koyfn fleysh* in Standard Yiddish) would be *ka:fn fla:sh* (with long vowels) in WY, *koyfn flaysh* in CY, *keyfn fleysh* in NEY and *koyfn fleysh* in SEY. Standard Yiddish (which is, strictly

speaking, Standard Eastern Yiddish) is largely based on NEY as far as its vocalism is concerned, although in the case of the diphthong of 'to buy,' the standardizers chose the variant common to CY and SEY (*oy*) rather than the NEY variant (*ey*). The more usual choice of vowel for the standard is reflected in a phrase like 'one day': Standard and NEY *eyn tog*, CY *ayn tug*, SEY *eyn tug*.

Standard Yiddish, like NEY, but unlike CY and SEY, does not distinguish vowel length. It does, however, distinguish dental and alveolar fricatives and affricates, like CY and SEY, but unlike NEY. NEY also has no neuter gender, unlike the other Yiddish dialects (and the standard language). A detailed account of Yiddish dialect phenomena is presented in the multivolume *Language and culture atlas of Ashkenazic Jewry*, three volumes of which have been published as of 2004.

See also: Germanic Languages; Israel: Language Situation; Jewish Languages; Semitic Languages; Yiddish Lexicography.

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The history of Yiddish lexicography is inextricably linked to the sociocultural history of the speakers of Yiddish. Yiddish dictionaries, in both their intended readership and method of compilation, chart the demographic and attitudinal changes within the Yiddish speech community. This brief overview classifies the material along the categories of dictionary users and situations of dictionary use.

Users of Yiddish dictionaries may be either native speakers of Yiddish or speakers of a second language who seek access to Yiddish texts or spoken discourse. The beginnings of Yiddish lexicography rest with the former. Interlinear glosses of Hebrew and Aramaic words appear in manuscripts of the 12th and 13th centuries, among them around 30 glosses in the Bible and Talmud commentaries by Rabbi Shlomo Yitzhaki (Rashi, 1040–1105). As with English, interlinear glosses evolved into separate word lists, which, as they grew in size, created the need for a classificatory system, giving rise to Bible concordances (e.g., *Mirkeves hamishne*, Cracow 1534) and thesauri (e.g., *Khinekh kotn*, Cracow 1640), and ultimately to the first multilingual dictionaries, such as Elye Bokher's *Tishbi* (Basle 1526), a Hebrew-Aramaic-Italian-Yiddish dictionary of 712 entries (the numerical value of the Hebrew letters *tishbi*). Elye Bokher also compiled the first dictionary that used Yiddish as the source language, the Yiddish-Hebrew-Latin-German dictionary *Shmoys dvorim* (Isnae 1542).

From the 16th century onwards, Yiddish lexicographical works appear in Germany, which are aimed at a non-Jewish, rather than a Jewish, Yiddish-speaking readership. These include scholarly treatises by Christian Hebraists (e.g., Boeschenstain's *Elementale introductorium in hebreas literas teutonice & hebraice legendas*, Augsburg 1514), practical

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manuals for businessmen in need of a rudimentary knowledge of Yiddish (e.g., Helicz's *Elemental / oder lesebüchlen*, Hundesfeld 1543), dictionaries written by missionaries (e.g., Callenberg's *Jüdischteutsches Wörterbüchlein*, Halle 1736), antisemites (e.g., Bibliophilus' *Jüdischer Sprach-Meister oder Hebräisch-Teutsches Wörter-Buch*, Frankfurt and Leipzig 1742) or police chiefs interested in Yiddish as one of the source languages for the German thieves' cant Rotwelsch (e.g., Avé-Lallemant's *Das deutsche Gaunerthum*, Leipzig 1858–1862).

What unites the early dictionaries produced for Yiddish speakers and those for non-Jewish users is the situation of dictionary use. The reference needs of both groups are primarily receptive. While Yiddish speakers require help in the reading of Hebrew-Aramaic texts, non-Jews look for material to aid their aural and reading comprehension of a language that is most notably distinguished from their own by its Hebrew-Aramaic component.

It is in the era of modern Yiddish lexicography that the two user groups diverge in their situations of dictionary use. For native speakers of Yiddish, Lifshits' Russian-Yiddish and Yiddish-Russian dictionaries (Zhitomir 1869 and 1876) and Harkavy's Yiddish-English (New York 1898) and Yiddish-English-Hebrew dictionaries (New York 1925, 2nd edn. 1928) may serve productive reference needs, enabling first-to-second language translation and contributing to the speakers' acculturation in an immigrant society (cf. Harkavy's appendix of Yiddish personal names and their English equivalents, provided so that readers can anglicize their names 'in the proper way'). At the same time, modern Yiddish lexicographical efforts, both normative, as Uriel Weinreich's *Modern English-Yiddish Yiddish-English dictionary* (New York 1968), and descriptive, as Stutchkoff's *Thesaurus of the Yiddish language* (New York 1950) and, in particular, the monolingual *Great dictionary of the Yiddish language* (New York, Jerusalem 1961–1980, vols 1–4), are felt to raise the prestige of the Yiddish language and thus serve an important sociolinguistic function.

For non-native Yiddish speakers, these functions are absent. Their primary situation of dictionary use remains receptive. As the number of native Yiddish speakers steadily decreases and becomes confined to members of the ultra-orthodox communities, the dictionary can only provide a tool for the comprehension of Yiddish literary and journalistic texts, as is given as the objective in the most recent Yiddish dictionary (*Dictionnaire yiddish-français*, Paris 2002). The development of Yiddish lexicography from dictionaries for speakers of the source language to dictionaries for speakers of the target language mirrors the external history of Yiddish. It remains to be seen what lexicographical needs will emerge among today's ultra-orthodox Yiddish-speaking communities.

See also: Hebrew, Biblical and Medieval; Hebrew Linguistic Tradition; Language Adaptation and Modernization; Weinreich, Uriel (1926–1967); Yiddish.

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Yokutsan *See:* Hokan Languages.

Yoruba

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Location and Number of Speakers

Yoruba is spoken as a first language in Nigeria in virtually all areas in the states of Èkìtì, Lagos, Ògùn, Òǹdó, Ọ̀ṣun, and Ọ̀yọ́, and in most of the areas in Kwara and Kogi states; Yoruba is a second language in some areas of the Delta and Edo states as well as in the non-Yoruba-speaking areas of the Kwara and Kogi states (see Figure 1). Outside Nigeria, there are Yoruba-speaking communities in the republics of Togo and Benin, where, in the southern part, Yoruba, Aja, and Fon are the three dominant indigenous languages (see Adeniran, 2004: 437). Based on the 1991 census, the number of speakers of Yoruba as a first or second language in Nigeria alone is about 19 000 000.

Genetic Relationship and History

Yoruba is a member of the Defoid language group within the Benue-Congo subgroup of the Niger-Congo family (see Williamson, 1989: 20, 26; Capo, 1989: 275–290). Although the origin of the term 'Yoruba' is still shrouded in mystery, some late 20th-century (historical/comparative) linguists have suggested that the dispersal center for the Yoruba people is around the southwest area of the confluence of the Niger and Benue rivers in Nigeria (see Akinkugbe, 1978; Williamson, 1989: 270).

Earliest Written Record

The Yoruba writing system uses the Roman alphabet, augmented by letters with diacritics. The earliest written records include the vocabularies compiled by Thomas Bowdich in 1819 (including words for the numerals 1–10), by Hannah Kilham (1828), and by Wilhelm Koelle (1854; *see* **Koelle, Sigismund Wilhelm (1823–1902)**). The teaching booklets of John Raban (1830–1832) and the vocabularies and grammars of Samuel Crowther (1843, 1852; *see* **Crowther, Samuel Ajayi (1806/08-1891)**) contributed further to the written record. Publication of Crowther's school primer (1849; written wholly in Yoruba) was followed by the various translation works in the Old and the New Testaments by Crowther (1950–1956) and by Thomas King (1957–1961). The first vernacular periodical, the newspaper *Ìwé Ìròhìn*, was printed at Abẹokuta from 1859 to 1867 (see, in particular, Hair (1967)).

Individual Characteristics

Yoruba has a number of characteristics that appear unique to Yoruba or are not widespread among its genetic relatives.

Syntactic Characteristics

Noun Classes, Gender System, and Number Yoruba has no noun class or grammatical gender. There are no separate noun forms to distinguish singular from plural. However, when necessary, plurality can be marked by using some (pro)nominal forms before nouns, or by using certain demonstratives, as well as by reduplicating adjectives after nouns.

Possessive Noun–Noun Constructions In a sentence, the second noun in a possessive noun–noun construction can be focused by front shifting it, with its original position being occupied by the appropriate pronoun qualifier. After certain verbs, it is also possible to permute the constituent nouns with the particle *ní* obligatorily intervening (see Owolabi, 1976: 40–43).

Past and Present Actions Action verbs generally convey past action, whereas stative verbs convey past or present action.

Verbal Constructions There are verbal constructions in which subject and object nouns can switch positions with little or no difference in meaning, and verbal constructions in which the verbs are repeated after their objects; in addition, some verbal constructions contain verbs that are used for asking questions, verbs that are negative in meaning, or verbs that obligatorily select the particle *ní* (see Awobuluyi, 1978: 53–62).

Morphological Characteristics

In order to form morphologically complex nouns, certain prefixes (for example, *à-*, *è-*, *o-*, *i-*, and *ài-*) that are usually attached to roots that are verbs or verb phrases, and sometimes to ideophonic adjectives, cannot be combined. However, the prefixes *oní-* and *oni-*, which are attached to nouns or noun phrases, can be combined and can also combine with the former class of prefixes, resulting in nouns that denote emphasis (see Owolabi, 1995: 93–102).

Phonetic/Phonological Characteristics

Vowel Co-occurrence Restrictions and Vowel Elision Yoruba operates a partial system of vowel harmony in which the set /e, o/ mutually excludes the set /ɛ ɔ/ in

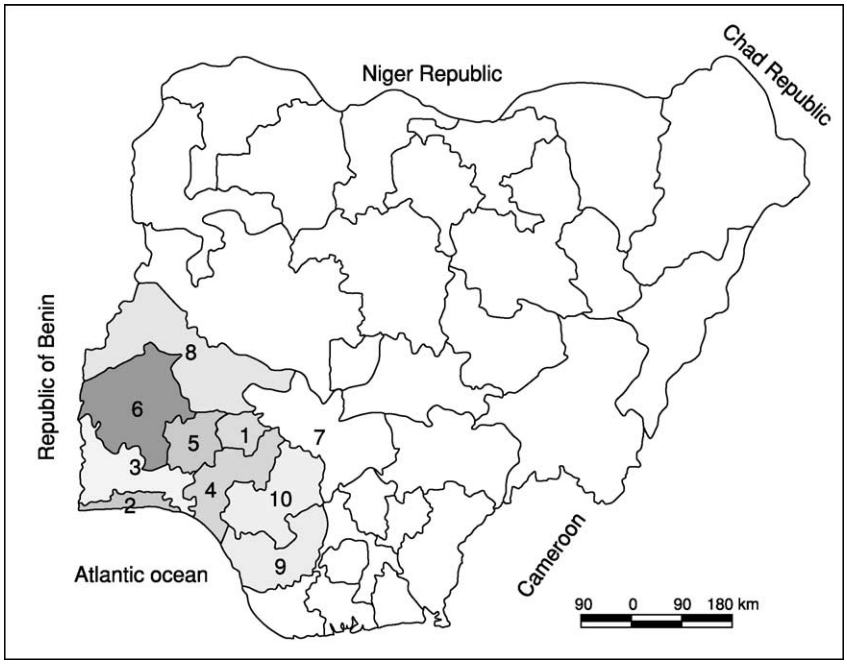

Figure 1 Nigerian states in which Yoruba is spoken as a first or second language. Key to states: 1, Èkìtì; 2, Lagos; 3, Ògùn; 4, Òǹdó; 5, Ọ̀ṣun; 6, Ọ̀yọ́; 7, Kogi; 8, Kwara; 9, Delta; 10, Edo.

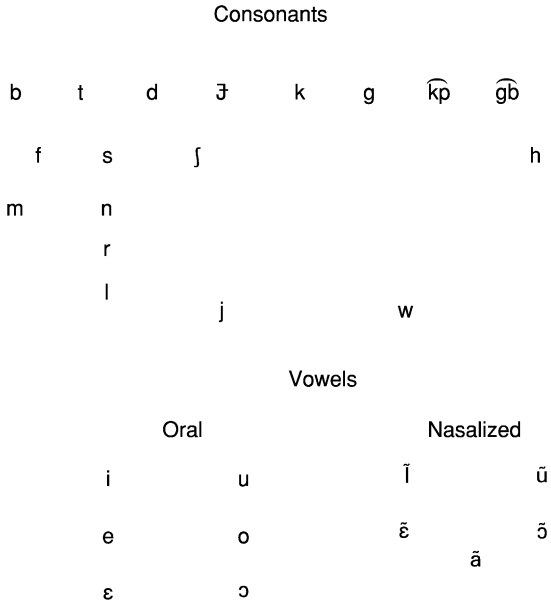

Figure 2 Phonetic groupings of Yoruba consonants and vowels. Tones are indicated by diacritical marks: high (ˊ), mid (¯), and low (ˋ).

polysyllabic underived words. Also, in words with a vowel$_1$-consonant-vowel$_2$ (V_1-C-V_2) pattern, neither the nasalized vowels nor /u/ can occur as V_1. Vowel elision, resulting in contractions, is quite erratic apart from the relatively predictable elision of the vowel /i/, the initial vowel of the second noun of noun–noun combinations, or the vowels of the standard forms of words in combination with the dialectal forms (see Bamgbọṣe, 1989). Figure 2 shows the phonetic groupings of Yoruba consonants and vowels; tones are indicated by diacritical marks: high (ˊ), mid (¯), and low (ˋ).

The Assimilated Low Tone In addition to the high, mid, and low tones in Yoruba, a tonal feature referred to as 'the assimilated low tone' occurs when a low tone disappears in certain contracted expressions or in some single polysyllabic words, but its influence is still felt on the following syllable (see Bamgbọṣe, 1966).

Restriction on the Occurrence of the High Tone The high tone never occurs on V_1 in words of V_1-C-V_2 pattern.

Tones of Pronouns With the exception of the second-person plural pronoun object, the lexical tones of the verbs determine the tones of all pronoun objects. Similarly, the tones of some subject pronouns vary before the verbal particle *ń*.

Other Characteristics

Various semantic effects (e.g., emphasis, anger, and anxiety) can be achieved by employing the devices of reduplication, prefixation, and vowel lengthening, or

by using 'intensifiers.' Focusing whole sentences apart from sentence constituents is also common. The following sentence provides an example of the Yoruba language:

> Alákàá ni ilé ẹ̀ wó, tí olè sì kó mi ní ẹrù, ṣùgbọ́n ó dún mí pé Olú jó, jó, jó ni lẹ́yìn ìṣẹ̀lẹ̀ wọ̀nyí, èyí tó mú kí àwọn ọlọ́mọ̀wé ọ̀rẹ́ Olú rò pé kò fẹ́ èmi àti Alàkàá fẹ́ ọrọ̀, àmọ́ láìpẹ́, Alákàá yóò ralẹ́ tuntun, yóò sì rọkọ̀ pẹ̀lú.
>
> It was Alákàá's house that fell while thieves stole my property, but it pained me that what Olú did was to really dance after these incidents, which made Olú's educated friends think that he isn't happy to see Alákàá and me prosper, however, Alákàá will soon purchase a new house and a vehicle as well.

Note that *ẹ̀* occupies the original position of the front-shifted noun *Alákàá*, and that *mi ní ẹrù* is a possessive construction resulting from permutation. In *Alákàá* (from '*oní àká*'), the influence of the assimilated low tone is felt; *mi* has a high tone after the low-tone verb *dùn*, but a mid tone after the high-tone verb *kó*. For emphasis, *jó* is reduplicated and *Alákàá* and the phrase beginning with *ṣùgbọ́n* are focused by placing the focus marker *ni* after them. Plurality is indicated by *wọ̀nyí* and *àwọn*, *ọlọ́mọ̀wé* comprises the verb phrase *mọ̀wé* and the prefixes *ọ̀-* and *oní-*, and *fẹ́* is repeated after *èmi àti Alákàá*. The 'a' of *rà* is retained in the verb–noun contraction *ralẹ́* (from *ra ilé* 'purchase a house') but is elided in *rọkọ̀* (from *ra ọkọ̀* 'purchase a vehicle'). A phonemic transcription of the sentence is as follows:

> ālá'ká lĩ̄ īlé ẹ̀ wó, tí ōlè si kó mĩ̄ lí ẽrù, ʃùgbɔ̃́ ó dṹ mí kpé ōlú jó jó jó lĩ̄ lẹ́ʃĩ̀ ìʃèlẹ̀ wɔ̃̀jí, èjí tó mṹ kí àwɔ̃̄ ɔ̄lɔ̀mɔ̃̀wé ɔ̀rẹ́ ōlú rò kpé kò fẹ́ èmĩ̄ àtī ālá'ká fẹ́ ɔ̄rɔ̀, àmɔ̃́ láìkpẹ́, ālá'ká jóò rālé tũ̄tũ̄, jóò sì rɔ̄kɔ̀ kpèlú.

Other Points of Relevance

The Yoruba language comprises about 20 dialects. There is also a form of Yoruba popularly referred to as Standard Yoruba. In all of the Nigerian states in which Yoruba is spoken natively, the Standard Yoruba and the Yoruba dialects are spoken. However, a diglossic situation exists where the Standard Yoruba is the high variety and the dialects are the low variety, although the use of some of the dialects in publications, broadcasts, and native courts (in particular) is increasing. The variety of Yoruba described in this article is Standard Yoruba. Yoruba vocabularies occur in poetic recitations associated with rituals and cults in Brazil as well as in Sierra Leone, where the influence of Yoruba is also felt in Krio loanwords and personal names.

Yoruba is one of the three major languages in Nigeria (the other two are Hausa and Igbo). It is taught as a subject at the primary, secondary, and tertiary levels. At least eight universities in Nigeria offer first degree and/or higher degree courses in Yoruba. Literature in the language is also very extensive. According to government policy, in the states in which Hausa, Igbo, or Yoruba is not a mother tongue, one of these three languages is a compulsory subject at secondary school level. The three languages are also to be used in the National Assembly in addition to English, and one of the state assemblies in the Yoruba-speaking states is currently using Yoruba in the same way. Similarly, the Nigerian federal government has embarked on the translation of the 1999 constitution of the Federal Republic of Nigeria into Yoruba and the other two major Nigerian languages (Hausa and Igbo), in order to facilitate the usage of these languages in the domain of legislation.

A Yoruba metalanguage (available in two volumes) has facilitated the use of Yoruba for writing textbooks and as a medium for teaching the language at all levels of education, whereas the Six-year Primary Project at the Ọbafẹmi Awolọwọ University (formerly the University of Ifẹ), in Ile-Ifẹ, Ọ̀ṣun State, aims at demonstrating that all subjects can be taught in Yoruba at the primary level.

In the neighboring Republic of Benin, the Yoruba, Aja, and Fon languages are studied at the university level; Yoruba was adopted (along with Aja, Fon, Bariba, Bendi, and Waama) as an official language of the National Assembly in 1983 (see Adeniran, 2004: 437, 442).

See also: Benue-Congo Languages; Crowther, Samuel Ajayi (1806/08-1891); Koelle, Sigismund Wilhelm (1823–1902); Niger-Congo Languages; Nigeria: Language Situation.

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Young, Thomas (1773–1829)

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Thomas Young, nicknamed 'Phenomenon' by his contemporaries at Cambridge, was born June 13, 1773, in Milverton, Somerset (England), the youngest child of Quaker parents. By his teens, the precocious Young was well acquainted with a number of classical and modern languages, though accounts differ as to how many. He also excelled in natural sciences and mathematics. Young began studying medicine in London at age 19, moving to Edinburgh in 1794 and completing his medical studies at Göttingen in 1796. In 1794, still a student, Young was elected fellow of the Royal Society. In 1797 a bequest from a great-uncle enabled him to practice medicine in London while pursuing other studies at Emmanuel College, Cambridge. He established his own medical practice in London in 1799. In 1801 he was appointed professor of physics at the Royal Institution but resigned the position 2 years later in favor of his medical practice and independent scholarly pursuits. He was appointed in 1804 as foreign secretary of the Royal Society, a position he held until his death on May 10, 1829.

Young's contributions to the sciences are many: the Young-Helmholtz theory of color perception, the Young modulus (a mathematical constant), experiments supporting the wave theory of light, and studies of vision, time, longitude, properties of liquids, environmental hazards, acoustics, tides, botany, zoology, astronomy, energy, climatology, and even life insurance. During vacations, he sought to unlock the mystery of the Rosetta Stone.

A papyrus owned by a friend drew Young's attention to the Egyptian script, and in 1814 he set about deciphering the stone. Comparing the undeciphered enchorial (demotic) script with the Greek version, Young compiled a list of word equivalents. He discovered or confirmed (again, accounts differ) that cursive demotic was derived from hieroglyphic. Positing that hieroglyphic symbols were used phonetically in transcribing foreign names, he deciphered the names of Ptolemy and his queen Berenice as well as a few common words. He failed to carry this insight as far as he might have, however, maintaining instead the long-standing assumption that the majority of hieroglyphic signs were nonalphabetic. Still, he correctly assigned phonetic values to at least five demotic signs and correctly isolated a number of hieroglyphic word groups, a considerable achievement.

The extent of Young's contribution to deciphering hieroglyphics is muddied by a personal, professional and national rivalry with Jean-François Champollion, who in 1814 asked Young for a cast of the Rosetta Stone. Relying (how heavily is a matter of debate) on Young's findings and insights of his own, Champollion was able to decipher the hieroglyphic script that had eluded Young. While the exact nature of each scholar's contribution to unlocking the stone may be debatable, Young clearly eased the way for Champollion and may be credited with deciphering the alphabetic demotic script.

See also: Champollion, Jean-Francois (1790–1832).

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Yue Languages *See:* Chinese.

Yukaghir

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Yukaghir is not a single language, but is actually a small language family consisting of two nearly extinct languages of northeastern Siberia, i.e., Tundra (Northern Yukaghir; *Ethnologue* code YKG) and Kolyma (Southern Yukaghir; *Ethnologue* code YUX). (http://www.ethnologue.com). The speakers of these languages and the languages themselves are known by the self-designations of *Wadul* (Tundra) and *Odul* (Kolyma). Fewer than 200 total speakers, possibly as few as 40, live in northeastern Siberia. Conventionally labeled as language isolates, some consider Tundra and Kolyma to be distant relatives of the Uralic languages. The Yukaghiric family probably originally included two now extinct languages, Chuvan and Omok.

Yukaghiric-speaking peoples were once dominant over a vast area in northeastern Siberia, practicing reindeer husbandry and subsistence hunting and fishing. Yukaghiric-speaking peoples at first assimilated Tungusic-speaking peoples culturally, but eventually the Even (Tungusic) people assimilated the Yukaghiric people linguistically, and now include a discernible Yukaghiric substrate. The Tundra Yukaghir language is spoken in two villages, Andryushkino and Kolymskoe. Kolyma Yukaghir is found predominantly in the village of Nelemnoe. Both Yukaghir languages are moribund, spoken now only by a few elders. The Yukaghir people have shifted mainly to speaking Russian, but in Andryushkino village they are mostly shifting to Yakut (Sakha), a locally dominant Turkic language.

Yukaghir possesses a range of contrastively palatalized segments in the consonant system, a pattern commonly found throughout the Siberian area. Unlike most northern and Siberian languages, Yukaghir is like Yakut in not permitting *ŋ*-in word-initial position. However, the common four-way place contrast for nasals (*m/n/ñ/ŋ*) seen across the languages of Siberia is an old and stable feature in Yukaghir, going back at least to the Proto-Yukaghir(ic) stage (Anderson 2003). Example (1) shows word forms in Tundra, Kolyma, and Proto-Yukaghir (from Krejnovich, 1958, 1982: 13–14):

(1)

Tundra	**Kolyma**	**Proto-Yukaghir**	**Gloss**
nonol	nonol	*nonol	'loop, noose'
amun	amun	*amun	'bone'
ñaʁa	ñaʁa	*ñaʁa	'together'
aŋa-ŋ	aŋa	*aŋa	'mouth'

Like most other Siberian languages, Yukaghir makes use of a range of case forms of nouns. This includes both areally common and typologically unusual formations. To the areally common group of features belong the opposition of instrumental (INSTR) case forms (Example (2a); Krejnovich, 1982: 49–50)) and comitative (COM) case forms (Examples (2b) and (2c); Krejnovich 1982: 45, 46)):

(2a)

Tundra Yukaghir	**Kolyma Yukaghir**
-lek, -leŋ	-le, -lek
s͡a-lek pajduk	čoɣoye-le
'hit with a stick'	'with a knife'

In Examples (2b) and (2c), comitative denotes possession as well, and conjoins two nouns (PV, preverb):

(2b) **Kolyma Yukaghir**
núme-ñej
dwelling-COMIT
'with a dwelling,' 'he has a dwelling'

(2c) **Tundra Yukaghir**

ile-ñej	ila:me	me-qaldej-ŋi
reindeer-COMIT	dog	PV-run.off-3PL

'the dog ran off with the reindeer,' 'the dog and the reindeer ran off'

To the unusual group of case features belongs the characteristically Yukaghir but typologically unusual system of 'focus' marking. Simplifying matters somewhat, this system is as follows: there is (1) an unmarked form that encodes speech act participants and lexical nouns in agent-focus and agent/subject-topic functions; (2) a marked 'neutral' case used with nonlocutor agent/subject topics, object-topics with locutor agents, and forms that lack the focus case (nonlocutor personal pronouns, proper names, etc.); and (3) the 'focus' case that encodes subject or object focus. Noun phrases (NPs) marked with focus frequently reference indefinite NPs, and focus-case marking often serves to introduce participants into

the discourse (see Maslova (2003a: 51ff) for further details).

In terms of the clausal syntax of simple and complex sentences, Yukaghir is similar to many other indigenous Siberian languages. The language shows dominant subject-object-verb constituent order and uses a wide range of adverbial 'converb' forms in subordinate clause formation, as well as the characteristic system of case-marked nominalized verbs to mark a wide range of functional subtypes of subordinate clauses, as shown in Example (3a) (the first two words are from Krejnovich (1958: 198) and Fortescue (1988: 41), respectively; the original source for the third word is unknown) and Example (3b) (from Maslova (2003b: 372)) (abbreviations: NOM, nominal; LOC, locative; POSS, possessive; PL, plural; NF, nonfinite; NEG, negation; PROHIB, prohibitive; ACC, accusative; DESID, desiderative; INTRANS, intransitive):

(3a) **Yukaghir**

u:r-eŋ	u:-l-rane	u:-l-lek
go:ACTION.NOM-LOC	go-ACTION.NOM-LOC.II	go-ACTION.NOM-INS
'when (I) went'	when he went'	'after going'

(3b) **Kolyma Yukaghir**

qa:qa:-pe-gi	ajli-de-ge
grandfather-PL-POSS	forbid-3.NF-LOC
"el+qon-ŋi-lek"	mon-de-ge
NEG-go-PL-PROHIB	say-3.NF-LOC
tamun-gele	uørpe-p-ki
that-ACC	child-PL-POSS
el+med-o:l-ŋi	
NEG-listen-DESID-3pl.intrans	

'Their grandfather forbids (it), saying "don't go" but the children do not obey'.

See also: Case; Endangered Languages; Focus Particles; Isolated Language Varieties; Russian Federation: Language Situation; Uralic Languages.

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http://www.ethologue.com – Ethnologue code.

Yuman *See:* Hokan Languages.

Z

Zabrocki, Ludwik (1907–1977)

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Ludwik Zabrocki was born in Czersk (at that time Germany) on November 24, 1907, into a family of Pomeranian peasants, and died in Poznań (Poland) on October 8, 1977, as Professor in Linguistics at Adam Mickiewicz University. After finishing his junior high school in Chojnice, he went to the University of Poznań, where he studied between 1927 and 1931 Polish, German, and Indo-European under the guidance of, among others, H. Ulaszyn and M. Rudnicki. His M.A. thesis, devoted to 'The dialect of Tuchola Forests' (*Gwara Borów Tucholskich*), was published in 1934. After World War II he continued his academic career at the University of Poznań with a Ph.D. in 1945 and a D.Litt. in 1949. At that time (1946) he acted, *inter alia*, as a member of the governmental commission for establishing the names of localities in the so-called Regained Territories in West and North of Poland. In 1953, he was appointed to the Chair of Germanic Languages, and subsequently, in 1964, gave birth to an autonomous Section of Applied Linguistics (dissolved in 1968), the second of its kind in the world, and which gave rise to the later Institute of Linguistics.

In 1968/1969, Ludwik Zabrocki's name appeared among the presidents of the Societas Linguistica Europaea: after André Martinet (1966/1967) and Björn Collinder (1967/1968). In 1969, he created the Polish Neo-philological Association and became its first president. For his outstanding achievements he was offered the membership of the Polish Academy of Sciences in 1971. He was also the co-founder and editor of three international journals, *Lingua Posnaniensis*, *Biuletyn Fonograficzny*, and *Glottodidactica*. In 1973, he organized the Institute of Linguistics, which he directed until his death. With his scientific publications he contributed to the field of comparative linguistics, working in the domains of Germanic, Indo-European, and Finno-Ugric languages and phonetics, as well as Slavonic and Polish dialectology, entering also the fields of the theory of language and the methodology of foreign language teaching with special reference to confrontative and contrastive applied linguistics. His principal monographs refer to the topics: 'Fortition and lenition in Indo-European and Finno-Ugric languages' (*Usilnienie i lenicja w językach indoeuropejskich i ugrofińskim*, 1951), 'Communicative communities in the genesis and development of the German language' (*Wspólnoty komunikatywne w genezie i rozwoju języka niemieckiego*, 1963), 'Linguistic foundations of the teaching of foreign languages' (*Językoznawcze podstawy metodyki nauczania języków obcych*, 1966), and 'Cybernetic models of language communication' (*Kybernetische Modelle der sprachlichen Kommunikation*, 1975). The output of his scientific activity has been published by the Foundation of Language Structure and Development (*U podstaw struktury języka*, 1980).

See also: Germanic Languages; Martinet, André (1908–1999).

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Zambia: Language Situation

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Zambia is a country in southern central Africa, with an area of 752 614 km^2 and a population of 10 307 333, based on a July 2003 estimate. It borders the Democratic Republic of the Congo (DRC) to the north, Tanzania, Malawi, and Mozambique to the east, Zimbabwe and Botswana to the south, and Namibia and Angola to the west.

There are up to 80 tribes in Zambia, which are usually used synonymously to reflect the number of languages spoken. In this multitribal context the differentiation of languages and dialects is an arduous one that involves not only linguistic factors and geographic location but also the maintenance of ethnic and cultural differences. The majority of the Bantu-speaking peoples of Zambia, particularly in the north, east and west, migrated from the Luba-Lunda empires of the upper Congo basin (now the DRC). Those not from the DRC came from East Africa into eastern Zambia (the Mambwe, Inamwanga, and Tumbuka) or from the south into eastern Zambia (the Ngoni). These migrations date from the 16th century and created the settlements that make the present-day tribes.

Kashoki (1978) identified up to 17 groups based on general linguistic closeness, reflected in similar phonology and overlapping vocabulary. The groups are divided further into clusters that can be considered to be dialects of the same language. Thirteen of these groups, given in Table 1, can be considered significant. 'Location' in the table refers to the geographically located provinces of Zambia. The Copperbelt Province (CB) lies above the Central Province and to the right of the Northwestern Province.

Based on this clustering, we can say there are about 25 distinct languages spoken in Zambia although there is some mutual comprehension between clusters within the same group as opposed to between groups. This clustering has resulted from different leveling processes such as intermarriage, loss of original group identities, geographical proximity, political domination, and mutual trade. Thus, for example, although the Ngoni on arrival in Zambia spoke a Nguni or Zulu language, they now speak the language of the people they conquered and among whom they married, the Nsenga, Tumbuka, and Chewa. The Ngoni are today divided between the Tumbuka of Chief Magodi and the Nsenga of Chief Mpezeni but it is popularly thought in Zambia that all Nyanja-speaking peoples are Ngoni, so that the Chewa, Nsenga, and others normally resident in the Eastern Province are referred to collectively as 'Ngoni.' The close relation of the Bantu languages of Zambia is also reflected in Guthrie's (1948) classification, where they fall into the adjacent K, L, M, and N zones.

Fortune (1970) also reported small, scattered nomadic groups of the Goba (also called Gowa, Gova, or Korekore) in the Southern Province and the Hukwe and Kengo on the fringes of the Western Province as the only instance of speakers of click/Khoisan languages that appear not to have been enumerated in the 1969 census.

In addition to indigenous Zambian languages, there are languages of European and Asian descent spoken, of which English is the main one. There are other African languages spoken, of which the most

Table 1 Language groups and dialect clusters of Zambia

Group	*Location*	*Dialect clusters*
A	Northern	[Aushi, Chishinga, Kabende, Mukulu, Ngumbo, Twa, Unga, Bemba, Bwile, Luunda (Lunda), Shila, Tabwa (Taabwa)]
	Borders N & E	[Bisa, Kunda]
	E & Central	[Lala, Ambo, Luano, Swaka]
	CB & Central	[Lamba, Lima]
B	Northwestern	[Kaonde]
C1	Western	[Lozi]
C2	Western	[Kwandi, Kwanga, Mbowe, Mbumi]
	Western	[Simaa, Imilangu, Mwenyi, Nyengo, Makoma, Liyuwa, Mulonga]
	Western	[Mashi, Kwandu, Mbukushu]
D	Northwestern	[Lunda, Kosa, Ndembu]
E	Borders W & NW	[Luvale, Luchazi, Mbunda]
	Northwestern	[Chokwe]
F	Northern	[Mambwe, Lungu]
	Borders N & E	[Inamwanga (Mwanga), Iwa, Tambo, Lambya]
G	Borders N & E	[Nyiha, Wandya]
H	NW & borders W & S	[Nkoya, Lukolwe (or Mbwela), Lushangi, Mashasha]
I	Eastern	[Nsenga, Ngoni (of Chief Mpezeni speak Nsenga)]
J	Eastern	[Chewa (Nyanja), Ngoni (Nyanja)]
K	S & borders W & S	[Tonga, Toka, Totela, Leya, Subiya, Twa, Shanjo, Fwe]
	Borders S & Central	[Ila, Lundwe, Lumbu, Sala]
	Central	[Lenje, Twa]
	Central	[Soli]
L	Eastern	[Tumbuka, Fungwe, Senga, Yombe, Ngoni (of Chief Magodi speak Tumbuka)]

notable is Swahili, which has small settlements of speakers in the Copperbelt and northern provinces.

English is the most important official language, used for the administration of the country, in parliament, as a medium of instruction in schools, and for all national and international official communication. The use of English as an official language has its historical origins from its use under British colonial rule. Apart from English, there are seven Zambian languages that have official status. The languages chosen are those with the largest number of native or mother tongue speakers. Thus, according to the 1969 census: Bemba (18.6%), Nyanja (11.3%), Tonga (10.7%), Lozi (5.6%), Kaonde (2.9%), Lunda (2.5%), and Luvale (2.4%). Apart from number of speakers, geographic spread is also taken into consideration so that the northern (Bemba), southern (Tonga), eastern (Nyanja), western (Lozi), central (Nyanja) and northwestern (Kaonde, Luvale, Lunda) parts of the country are represented. This also correlates to the biggest language in distinct language groups. Thus the northwest inputs three languages which are spoken to more or less the same extent because they belong to different language groups.

The seven official Zambian languages are used for literacy campaigns, radio broadcasting, dissemination of official government information, political statements, and in courts of law. More recently they have also been used in news broadcasts on TV, as well as in light entertainment programs. Although the Ministry of Education has in various policy documents (1992, 1996) recommended that all pupils be given the opportunity to learn initial basic skills of reading and writing in one of the seven official Zambian languages, English predominantly remains the main medium of instruction and certainly the only one above the fifth grade, from which point the Zambian languages are offered as subjects. The seven official Zambian languages also have fortnightly newspapers but here again English is the only official language that enjoys at least three daily papers (the *Times of Zambia*, the *Daily Mail* and the *Post*), not to mention other weekly ones.

It can in general be said that the seven official Zambian languages are lingua francas in different regions of the country. The 1978 survey of Kashoki and Ohannessian showed that Bemba and Nyanja, followed by Tonga and Lozi and to a lesser degree Luvale, Kaonde, and Lunda, function as vehicles of wider communication in the country. In addition to their larger number of native speakers, this also seems to follow from their official status, which increases their number of second-language speakers. Thus, 56.2% of the total population are recorded as speakers of Bemba, 42.1% of Nyanja, 26.1% of English, and 23.2% of Tonga (Kashoki, 1978). If only rural Zambia is considered the figures reduce to 46%, 36.6%, 19%, and 24.2% respectively and increase in urban Zambia to 83.8%, 57.2%, 45.3%, and 20.6% respectively. Thus, while English remains the most important official language, Bemba and Nyanja are spoken and understood more widely. The figures here must, however, be adjusted to perhaps reflect a higher percentage of English given the rising education levels since 1978.

A consequence of having many different languages and the promotion of official languages is the development of multilingualism in the country. On average, 2.5 languages excluding English are spoken per person. The problem is of course that what is referred to as a different language in this context, particularly if it is within the same language group, is far from clear.

The only language survey on Zambia is Ohannessian and Kashoki (1978). It is feared that some languages reported on here but not enumerated in the 1969 and 1990 censuses, particularly in the Western Province (e.g., Nyiha, Lambya [Lamba], Wandya) may be severely endangered. However, a comprehensive survey of the current language situation still remains to be carried out.

See also: Bantu Languages.

Language Maps (Appendix 1): Map 45.

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Zampolli, Antonio (1937–2003)

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The computational linguist Antonio Zampolli, born in 1937, began his career as a student of Father Roberto Busa, who had been working in Gallarte, Italy, on a text concordance and index to the works of Thomas Aquinas, the *Index Thomisticus*. The application of computing technology for research in the humanities remained a fundamental concern throughout Zampolli's research career. His early papers from the late 1960s investigated statistical analyses of text and the development of electronic dictionaries. A paper from 1968, for example, dealt with 'Statistical analysis of the phonological composition of Italian, conducted with an IBM system.' Over time, his interests grew to cover a wide range of topics: his publications, numbering more than 250, addressed problems in corpus linguistics, mathematical linguistics, digital libraries, computational lexicography, standards for data sharing, machine translation, formal grammars and parsers, and computer-assisted language learning, among others.

Zampolli became a full professor of mathematical linguistics at the University of Pisa in Italy in 1977. Shortly thereafter, he established the Institute for Computational Linguistics of the National Research Council in Pisa, which grew under his directorship into a major center for natural language processing. Zampolli was skilled as a bridge-builder between disciplines, and he was a key figure in achieving cooperation and standardization in language resources, coordinating several well-known European and Italian projects in these areas. He was successful in establishing international collaboration and the building up of a large-scale infrastructure for computational linguistics research and language processing technology.

Zampolli was instrumental in the founding of the *Association for Literary and Linguistic Computing* in 1973, and was also a founder and president of the *European Language Resources Association* (ELRA), created in 1995 to focus on collection and distribution of language resources. He played a key role in instituting the *Text Encoding Initiative*. He was behind the creation of the *International Conference on Language Resources and Evaluation* (LREC) and also directed the *Pisa International Summer School for Literary and Linguistic Computing*.

Zampolli was appointed to the executive committees of numerous associations and delegations, including the *Association for Computational Linguistics*. He served on the Advisory Board of the Linguistic Data Consortium, as well as on the Editorial Board of *Computers and the Humanities,* and the *Journal of Applied Linguistics*, among others. He also co-edited the influential *Survey of the State of the Art in Human Language Technology* (Cambridge, 1997). He also coordinated the *Expert Advisory Group on Language Engineering Standards* (EAGLES), an initiative of the European Commission, aimed at accelerating the development of standards for large-scale linguistic resources, and their exploitation and evaluation, and the successor project *International Standards for Language Engineering* (ISLE).

Antonio Zampolli died in 2003 in a fire at his home in Pisa. The ELRA board has created a prize in his memory, awarded every two years, the first one being given in 2004 to Professor Frederick Jelinek of Johns Hopkins University in Baltimore, USA.

See also: Computational Lexicons and Dictionaries; Computational Linguistics: History; Machine Translation: Overview.

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Zapotecan

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Introduction

Zapotecan languages belong to the Otomanguean family and are spoken across a large portion of Oaxaca, Mexico. Zapotecan is divided into two branches – Chatino and Zapotec proper. The number of languages in each group is controversial, but the Summer Institute of Linguistics recognizes 6 Chatino languages and 58 Zapotec languages.

Zapotec languages are spoken by over 200 000 people located over much of the eastern half of Oaxaca. Varieties of Zapotec divide broadly into three groups. The Valley-Isthmus group includes most varieties spoken in the valley of Oaxaca, extending to the Isthmus of Tehuantepec. The Northern group is spoken in the mountains to the north of the Valley of Oaxaca, and the Southern group is spoken in the mountains to the south. All three groups are quite diverse and contain many distinct languages.

Chatino languages are spoken in a smaller mountainous area in southwestern Oaxaca by perhaps 30 000 people.

The earliest documentation of Zapotecan languages comes from grammars, dictionaries, and religious material from the Spanish colonial period. Archaeological sites associated with the Zapotec state of ca. 100 B.C. to ca. 900 A.D. also contain Zapotec hieroglyphic writing. Efforts to decipher Zapotec hieroglyphics are still ongoing.

Phonological Characteristics

In Zapotec languages, most consonants are divisible into two morphophonologically defined groups called 'fortis' and 'lenis.' For stops and fricatives, fortis is largely equivalent to voiceless and lenis to voiced. However, the fortis/lenis distinction is also found in the nasals and sonorants, where the phonetic realization of fortis is not voicelessness, but some other characteristic that generally includes longer duration.

The morphological examples in (2) below from Mitla Zapotec show that long sonorants and voiceless obstruents seem to form a natural class. Many analyses of Zapotec historical phonology also analyze fortis consonants as having originated from geminates and consonant clusters.

Many Zapotec languages, especially those in Valley group, show contrastive phonation type differences. San Dionicio Ocotepec Zapotec, for example, shows a distinction between modal, breathy, creaky, and checked vowels. Consider the following minimal and near-minimal pairs:

(1) San Dionicio Ocotepec Zapotec

[bz̤̀l]	'flame'	(breathy)
[bẑ̰l]	'meat'	(creaky)
[bá:ld]	'how many'	(modal)
[bẑ̤l]	'bullet'	(breathy)
[bẑ̰ld]	'fish'	(breathy)
[bɛ̌ʔld]	'snake'	(checked)

All Zapotecan languages are tonal. The number of reported tones varies from two tonal levels to four, with a variety of contour tones. The largest number of tonal contrasts in the family appears to be Zoogocho Zapotec, which is reported to have four tone levels and seven contours, for a total of 11 tonal contrasts.

Morphological Characteristics

Zapotec languages do not have a passive, but generally show morphological relationships between pairs of verbs that differ in valence. In one typical pattern, an intransitive stative verb begins with a lenis consonant, while the corresponding transitive active verb begins with the corresponding fortis consonant. Consider the following examples from Mitla Zapotec:

(2) Mitla Zapotec

[zæb]	'to sink (intr.)'	[sæb]	'to sink (tr.)'
[dẹb]	'to be wrapped'	[tẹb]	'to wrap'
[nz̤̈t]	'to be lost'	[nnz̤̈t]	'to lose'
[lib]	'to be tied'	[llib]	'to tie'

There are generally also other such pairs that show less regular correspondences.

Zapotec verbs are inflected with aspectual prefixes. The number of aspects varies from language to language. In Zoogocho Zapotec, for example, there are continuative, stative, completive, potential, and dubitative aspects. San Lucas Quiaviní Zapotec has progressive, habitual, perfective, irrealis, subjunctive, neutral, and definite (future) aspects.

Zapotec verbs do not show agreement, though pronominal subjects (and some pronominal objects) cliticize to the verb. Consider the following examples from San Dionicio Ocotepec Zapotec:

(3) San Dionicio Ocotepec Zapotec

(3a) Ù-dàw réé = bííny bzyàá.
COM-eat PLUR = person bean
'The people ate beans.'

(3b) Ù-dàw = réby bzyàá.
COM-eat = 3.HUMAN.PLUR bean
'They ate beans.'

(3c) Ù-dàw = réby = rèny
COM-eat = 3.HUMAN.PLUR = 3.INAM.PLUR
'They ate them.'

Zapotec languages often show a large number of third-person pronominal categories. For example, San Lucas Quiaviní Zapotec distinguishes between proximal (near) and distal (far) third persons, as well as between animal, respectful, formal, and reverential third-person categories. These categories are not morphologically marked on nouns themselves, but on independent or clitic pronouns that are coreferential with the nouns. Pronominal category is also not completely fixed, but may vary somewhat according to a speaker's point of view and according to the structure of the narrative.

Syntactic Characteristics

Zapotecan languages show head-inital order in phrases. Clauses are VSO, noun phrases are N-initial, and the language is prepositional. The following examples from San Dionicio Ocotepec Zapotec and Yaitepec Chatino show these properties:

(4) San Dionicio Ocotepec Zapotec
Ù-dèèdy Gùstáàb ʃ-kèès Màríì lòò Móòny
COM-give Gustavo POSS-pot Maria to Ramón
'Gustavo gave Maria's pot to Ramón.'

(5) Yaitepec Chatino (Pride, 1965: 82)
Nʃiʔyu^{32} neʔ^{3} yka^{3} loʔo^{1} taʔa^{23} loʔo^{1}
cutting he wood with brother with
siyera^{4} ka^{3} sĩ^{2} bra^{3}kõʔ^{2}.
saw yesterday evening then
'He was cutting wood with his brother with a saw yesterday evening then.'

Though the languages are verb-initial, there is generally an elaborated hierarchy of positions to the left of the verb. These frequently include special positions for topical, focal, negative, and interrogative phrases. The following examples from Quiegolani Zapotec illustrate several of these positions:

(6) Quiegolani Zapotec
[Tʂu]$_{\text{Interrog}}$ [men]$_{\text{Neg}}$ wii-tʔ
who nothing saw-NEG
'Who saw nothing?'

(7) Quiegolani Zapotec
[Laad ʂ-unaa dolf]$_{\text{Focus}}$ ʤe
FOC POSS-wife Rodolfo already
z-u nga.
PROG-stand there
'Rodolfo's wife was already standing there.'

All the Zapotecan languages also appear to show the phenomenon known as 'pied-piping with inversion.' When a subpart of NP or PP (and sometimes other constituents) is questioned, the entire phrase moves to the clause-initial interrogative position, but shows an inverted order, in which the interrogative precedes the head of the phrase:

(8) San Dionicio Ocotepec Zapotec
[Túú lòò]$_{\text{Interrog}}$ ù-dèèdy Gùstáàb gèès?
who to COM-give Gustavo pot
'Who did Gustavo give the pot to?'

In broad syntactic terms, Zapotecan languages generally conform to the areal features of other Mesoamerican language families such as Mayan, Mixe-Zoquean, and Totonacan. Zapotecan languages differ from these other groups in lacking agreement and voice morphology and having a more rigid word order.

Conclusion

All Zapotecan languages are endangered, and in some communities, only a few elders speak the language. In other communities, the language is spoken by a much larger proportion of the population, but there are still economic pressures that favor language shift to Spanish or emigration to the United States and other parts of Mexico. These factors make language preservation and documentation work an urgent priority.

See also: Bilingualism; Endangered Languages; Language Education for Endangered Languages; Language Education Policy in Latin America; Mexico: Language Situation.

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Zarncke, Friedrich (1825–1891)

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Friedrich Zarncke was born on July 7, 1825, in Zahrenstorf (Mecklenburg), Germany. After graduation from high school in 1844, he attended the University of Rostock to study philology and, for one semester, theology. A year later, he relocated to Leipzig, where the Classicist Gottfried Hermann (1772–1848) and the Germanist Moriz Haupt (1808–1874) became his principal teachers. Following a one-semester stay in Berlin, he returned to Rostock, obtaining his doctorate in 1847 solely by an oral *examen rigorosum* in German, English, and Greek, which he passed with distinction. Subsequently, he worked for 3 years in a private library cataloguing literary source material of the late Middle Ages. This activity laid the foundation for his lifelong preoccupation with textual criticism of older and more recent texts. In 1850, he accepted editorship of the newly established *Literarisches Centralblatt*, a weekly publication surveying important works in *Germanistik*. Zarncke remained editor until his death, devoting most of his time to this monumental work of far-reaching consequence for the development of his field.

Zarncke began his teaching career at Leipzig University in 1854 and 4 years later succeeded Moriz Haupt as professor of German language and literature. He never left Leipzig again and served the university as an able administrator, an inspiring teacher, and a prolific scholar of extensive influence. He was elected university president three times, which was quite unusual at that time. The large number of his students include such prestigious names as Wilhelm Braune (1850–1926), Hermann Paul (1846–1921), and Eduard Sievers (1850–1932), who acknowledged their indebtedness to him as an extraordinarily effective teacher.

Apart from his skillful editorial work in the *Centralblatt* and numerous book editions, such as Brant's *Narrenschiff*, Zarncke also distinguished himself with critical studies such as the *Nibelungenlied* and a number of publications that combined his equally strong interests in literary and linguistic studies. His greater emphasis on literary research in later years (e.g., his treatises on Goethe and Reuter) have to be viewed likewise within the context of his conviction that literary and linguistic pursuits are inseparably interrelated.

See also: Braune, Wilhelm (1850–1926); Paul, Hermann (1846–1921); Sievers, Eduard (1850–1932).

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Zemskaja, E. A. (b. 1926)

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Elena A. Zemskaya (born November 5, 1926) is a well-known Russian philologist and expert in Russian and Russian literature. Her father was A. M. Zemsky, the noted linguist, teacher, and author of textbooks of the Russian language. Her mother was the sister of the famous writer Mikhail Bulgakov.

Zemskaya is a graduate of the philology faculty of Moscow State University. Her teachers were such outstanding scholars as V. V. Vinogradov and M. N. Peterson. Quite soon after graduating from the university she found herself as a specialist in Russian word formation. Her books in this field, *Sovremennyi russkii yazyk. Slovoobrazovaniye* (1973) (Modern Russian. Word formation), *Slovoobrazovaniye kak deyatelnost* (1992) (Word formation as an activity), the book popularizing the subject, *Kak delayutsya slova* (1963) (How words are formed), as well as numerous articles, have a well-deserved reputation among specialists. No one writing on the subject can disregard Zemskaya's works. Teaching this subject at universities is also unthinkable without taking her works into account.

Another field of Zemskaya's expertise is Russian colloquial language. She guided and contributed to a number of works: *Russkaya razgovornaya rech* (1973) (Russian colloquial language), *Russkaya razgovornaya rech. Teksty* (1978) (Russian colloquial language. Texts), *Russkaya razgovornaya rech. Obshchiye voprosy. Slovoobrazovaniye. Sintaksis* (1981) (Russian colloquial language. General questions, word-formation, syntax), *Russkaya razgovornaya rech. Fonetika. Morfologiya. Leksika. Zhest* (1983) (Russian colloquial language. Phonetics, Morphology, Lexis, Gesture). She wrote the textbook *Russkaya razgovornaya rech: lingvisticheskii analiz i problemy obucheniya* (Russian colloquial language: linguistic analysis and problems of teaching) (1979, 1987, 2004). Some of Zemskaya's works studying other varieties of the Russian national language are connected with those on Russian colloquial language. She edited such books as *Gorodskoye prostorechiye: problemy izucheniya* (1984) (Urban popular language: problems of study), *Raznovidnosti gorodskoi ustnoi rechi* (1988) (Varieties of urban oral speech). In 1999 *Tolkovyi slovar russkogo obshchego zhargona* (An explanatory dictionary of Russian general slang) was co-authored by Zemskaya with O. P. Yermakova and R. I. Rozina. Active processes in Russian at the end of the 20th century are examined in the book *Russkii yazyk kontsa XX stoletiya* (1996) (Russian at the end of the 20th century) written by a few authors under Zemskaya's guidance. In co-authorship with M. V. Kitaigorodskaya and N. N. Rozanova, Zemskaya published one of the first works in Russian philology devoted to gender distinctions in the language and communicative behavior of people (1993).

The functioning of Russian abroad is also one of the issues she has addressed. She wrote some articles about this subject, as well as the book *Yazyk russkogo zarubezhya* (2001) (The Russian language abroad) in co-authorship with M. J. Glovinskaya and M. Bobrik, in which these scholars describe some speech peculiarities of Russian emigrants living in Europe and the United States.

A particular field of Zemskaya's work is the study of M. Bulgakov's biography and the history of his family. In 2004, she published the book *Mikhail Bulgakov i yego rodnye. Semeinyi portret* (Mikhail Bulgakov and his relatives. Family picture) containing some unique documents, letters, and photographs.

From the beginning of the 1950s to now she has worked at the Vinogradov's Institute of the Russian Language of the Russian Academy of Sciences.

Zemskaya always scrutinizes topical phenomena and processes typical of Russian. Proceeding from the thesis put forward by M.V. Panov at the beginning of the 1960s, that Russian colloquial language is self-sufficient (as a particular subsystem of the standard language), she considerably developed the thesis with her own theoretical investigations and by the analysis of numerous facts gathered as a result of many records of spontaneous oral speech. In the course of these investigations a method of getting information about living oral speech was worked out. Later on it was used by other scholars who studied oral forms of languages.

Studying different processes in modern Russian, Zemskaya deliberately rejects a purely normative approach to new phenomena. She is right to believe that the normative estimation of any novelty in the sphere of lexis, word-formation, or grammar should be preceded by a thorough and unprejudiced study of the nature of new phenomena and causes of their appearance in the language.

See also: Word Formation.

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Zeuss, Johann Kaspar (1806–1856)

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Johann Kaspar Zeuss, the founder of Celtic philology, was born in Vogtendorf (near Kronach in Franconia) on July 22, 1806, and took up philology and history on a large scale at the University of Munich in 1826. He passed the teacher's examination in 1830 and beginning in 1832 taught Hebrew at a Munich grammar school. After obtaining his doctorate in 1838 at the University of Erlangen, he was appointed in the next year professor of history at the Lyzeum (college of education) in Speyer. In 1847, in recognition of his first masterly publications, Zeuss was appointed to a chair of history at the University of Munich, but after a few months he gave it up in exchange for a professorship at the Lyzeum in Bamberg. From his youth, he lived for his studies a life of privation. He died at age 50 on November 10, 1856, in his native village.

Zeuss became famous overnight for his grand first work, *Die Deutschen und die Nachbarstämme* (1837), which deals with the origin and the spread of the ancient Central European peoples according to both historical records and linguistic evidence and thus by constructive criticism of these sources became a masterpiece of joining together linguistics and history. The book is of some relevance today owing to the analyses of the ethnonyms in question. In this context belong likewise a small book on the origin of the Bavarians (1839) and the (hand-written) thesis of 1838 about *Germania* in Chapter II 11 of Ptolemy's *Geography* (published in facsimile by Hablitzel, 1987: appendix 11; transcribed and translated in Forssman, 1989: 167–219).

Apart from historical studies and the edition of two collective codexes of medieval documents, which led him also to preliminary data collection for an Upper German onomasticon, Zeuss, in his efforts to precisely distinguish Germanic ethnonyms and geographical names from Celtic linguistic and onomastic materials, turned increasingly more to Celtic studies. He collected the oldest Celtic sources mostly from the relevant manuscripts, particularly those (as completely as possible) in the Old Irish and Old Welsh languages (e.g., the Würzburg and Milan glosses); took into account the scattered Gaulish evidence; and, based on careful philological study and astute analysis, described the grammar of all then known ancient Celtic languages and compared them with one another in his

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epoch-making 1200-page *Grammatica Celtica* (1853). This great book was a pioneering work of the same kind as Jacob Grimm's *Deutsche Grammatik* (1819–1837) had been for the Germanic languages. It is worthy of admiration all the more because Zeuss had acquired those languages by self-study and could rely on nothing other than a grammar of Modern Irish.

See also: Grimm, Jacob Ludwig Carl (1785–1863).

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Ziegenbalg, Bartholomaeus (1682–1719)

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Bartholomaeus Ziegenbalg, a German born in Pulsnitz, is, among Lutheran missionaries, the pioneer of Tamil studies. His name is linked to two places: Tranquebar, where he arrived in 1706, sent by the King of Denmark, Frederick IV, along with Henry Plutschau, and Halle (Saale), where a number of documents he and others sent from Tamil Nadu are kept in the August Hermann Francke Foundation archives. After his arrival, Ziegenbalg started to learn Tamil and set about compiling Tamil–German word lists. After 2 years, he had a list of 20 000 words, which Ziegenbalg claimed was based on a reading of 200 authors (Singh, 1999: 70), and another list of 17 000 words useful for reading poetry, which seems to have been an adaptation of a traditional poetical Tamil lexicon, possibly the *Cūṭāmaṇi Nikaṇṭu* (Jeyaraj, 1996). Unfortunately, due to Ziegenbalg's untimely death, his Tamil–German dictionary was never published, but it served, through a Latin translation (James, 2000: 151), as the basis for the work of his followers, notably Johann Philipp Fabricius's 1786 English–Tamil dictionary (James, 2000: 157). The other important linguistic activity of Ziegenbalg was the writing of a Tamil grammar in Latin, the *Grammatica Damulica* (1716/1985). He is also known for his work on Indian religion and for his Tamil translation of the New Testament. To this must be added his contribution to the archives in Halle.

See also: Tamil.

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Ziegenbalg, Bartholomaeus (1682–1719)

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Bartholomaeus Ziegenbalg, a German born in Pulsnitz, is, among Lutheran missionaries, the pioneer of Tamil studies. His name is linked to two places: Tranquebar, where he arrived in 1706, sent by the King of Denmark, Frederick IV, along with Henry Plutschau, and Halle (Saale), where a number of documents he and others sent from Tamil Nadu are kept in the August Hermann Francke Foundation archives. After his arrival, Ziegenbalg started to learn Tamil and set about compiling Tamil–German word lists. After 2 years, he had a list of 20 000 words, which Ziegenbalg claimed was based on a reading of 200 authors (Singh, 1999: 70), and another list of 17 000 words useful for reading poetry, which seems to have been an adaptation of a traditional poetical Tamil lexicon, possibly the *Cūṭāmaṇi Nikaṇṭu* (Jeyaraj, 1996). Unfortunately, due to Ziegenbalg's untimely death, his Tamil–German dictionary was never published, but it served, through a Latin translation (James, 2000: 151), as the basis for the work of his followers, notably Johann Philipp Fabricius's 1786 English–Tamil dictionary (James, 2000: 157). The other important linguistic activity of Ziegenbalg was the writing of a Tamil grammar in Latin, the *Grammatica Damulica* (1716/1985). He is also known for his work on Indian religion and for his Tamil translation of the New Testament. To this must be added his contribution to the archives in Halle.

See also: Tamil.

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see also: Lexicography: Overview.

Relevant Website

http://www.francke-halle.de.

Zimbabwe: Language Situation

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Languages Spoken

There are 16 African languages that are spoken in Zimbabwe (Hachipola, 1996: 1–6). All of them belong to the Bantu family except one, Tshwawo, which is Khoisan. The 15 Bantu languages are Shona, Ndebele, Kalanga, Chewa (Nyanja), Tonga (of Mudzi district), Tonga (cp. Zambia), Nambya, Shangani, Barwe, Sotho (Fengu), Venda, Chikunda (Kunda), Xhosa, Hwesa, and Sena. The two clearly dominant indigenous languages are Shona, spoken by more than 75%, and Ndebele spoken by up to 16%, of the estimated population of 13 million. Both are sometimes referred to as national languages, but that status is only nominal. English, which is the mother tongue of not more than 100 000 people now, is still firmly entrenched as the language of government, business, the media, education, training, and specialized information, as well as upward social mobility and wider communication within and outside Zimbabwe's borders.

As far as the sizes of the speech communities are concerned, Zimbabwe's language situation is less complex than those that obtain elsewhere in Africa, because the two national languages are clearly dominant in their respective areas, where they are also the languages taught in schools and used for limited administrative and judicial functions. Ndebele is dominant in the three western provinces of Matebeleland North, Bulawayo, and Matebeleland South. Shona is dominant in all the other seven provinces of Midlands, Masvingo, Manicaland, Mashonaland East, Harare, Mashonaland North, and Mashonaland West. What this means is that some Shona speakers and Ndebele speakers are not ethnic Shona or ethnic Ndebele. In fact, within the predominantly Ndebele-speaking area, the ethnic Ndebele are actually a minority. The reasons for this are historical and date back to the Umfecane or Nguni dispersal, when various Nguni groups fled from Shaka, the Zulu king. In Malcolm Guthrie's classification, Ndebele is in Zone 40, Group S, along with Zulu, Xhosa, and Swati.

Shona is also in the Southern Bantu group, where it is classified in Zone 10, Group S. The language is a cluster of six dialects, namely Manyika and Ndau in the east, Karanga in the south and midland areas, Kalanga in the west, Zezuru in the central and northern areas, and Korekore in the northeastern area. However, Kalanga has been separated from the rest of Shona for a long time; the white settlers placed it in the Matebeleland region; and mutual intelligibility with the other Shona dialects has virtually been lost.

About six small but significant language groups together account for another 6% of the population, particularly in the two western provinces of Matebeleland North (notably Tonga and Nambya/Dombe) and Matebeleland South (notably Venda and Kalanga), and also in the border areas of Mashonaland (notably Kalanga and Shangani). Other indigenous minority languages are Lilima, Shangwe, Birwa, Tswana, and Lozi in Matebeleland, and Barwe-Tonga (Barwe), Hlengwe, and Chikunda (Kunda) in Mashonaland.

In addition, there are a number of African migrant minority languages, notably Cewa (Nyanja), Sena, Bemba, Sotho, and Fengu, as well as non-African migrant minority languages, notably English, Afrikaans, Portuguese, Hindi, Hebrew, Italian, and Greek. While the distribution of all the indigenous minority languages is regional, that of the African migrant minorities is scattered and is both rural and urban. That of the non-African migrant minorities is scattered but mainly urban, except English, the national official language.

Language Use

An unbalanced bicultural and bilingual situation exists in which English is the high-status language (H), while the indigenous languages are low status (L). At the broad national level, a situation of diglossia obtains in which roles have been assigned as

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Language Use

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societal norms to the languages available to the speakers, with English as the H and Shona or Ndebele as the L. In some districts, Shona and Ndebele assume H status against individual minority languages as the L. At the local level within the Shona-speaking community itself, a predominant and generally spoken variety spreading from the capital Harare becomes the H, while the local patois or spoken variety becomes the L. Some speakers are in a trilingual situation, with English as H, (standard) Shona and Ndebele as Mid, and local varieties or minority languages as L. Multilingual situations are also the reason for widespread code switching (*see* **Code Switching and Mixing**) in the speech of most Shona-English and Ndebele-English bilinguals, which is reflective of unequal coexistence of the languages in their society (see, for examples, Ngara, 1982 and Chimhundu, 2002).

Language Policy

There are no accurate or reliable statistics on ethnic groups or language groups in Zimbabwe. There have only been two language surveys conducted, the first during 1929–1931 by Clement Doke covering the Shona-speaking area, and the second by Jerome Hachipola (1998) on the minority languages. Efforts to include questions on language in the last census (2002) failed.

There is no language policy framework in Zimbabwe. As Chimhundu (1997) has observed, the standardization of the nominal national languages is happening without official policy, planning, or legal framework. Successive attempts after independence to have this process formalized through deliberate policy and planning have not succeeded because of lack of political will. At the official level, there also is general neglect of language and cultural issues, in spite of rhetoric about the need to promote and preserve indigenous languages and cultures. Policy on language in education is the responsibility of the Ministry of Education, which, in *ad hoc* fashion, has occasionally come up with directives and guidelines on languages to be taught in schools within the framework of the Education Act of 1987 (Amended 1991; Part XI, para. 55: 225–226). A major consequence of this official attitude is that the indigenous languages have continued to be vernacularized after the attainment of political independence (Chimhundu, 1993), as no serious attention is being paid to the African indigenous languages, in spite of African majority rule.

At the time of writing, there is not even a linguistic normative body in the country. Therefore, officially, no one has the responsibility to oversee the development and standardization of Shona, Ndebele, or any other language in the country. This role now seems to have been assumed by the African Languages Research Institute (ALRI), which was set up at the University of Zimbabwe (UZ) in 2000 in order to institutionalize and expand on the work of the African Languages Lexical Project (ALLEX). Its goal is to research, document, and develop Zimbabwean indigenous languages in order to promote and expand their use in all spheres of life.

Language in Education

Policy on language teaching in the schools is quite confused, although theoretically mother-tongue instruction is available in Shona or Ndebele and/or certain minority languages during the first three years of primary school. Shona and Ndebele are supposed to remain available as subjects at all other levels from the fourth grade, when English should take over as the medium of instruction. However, English is often used for instruction from the very beginning, particularly in former whites-only (Group A) schools and in private (Trust) schools. English is used as the medium of instruction in the whole system of education and training in the country. The latest development is that the Education Ministry has directed that six of the minority languages should be introduced and taught up to grade 7, the final year of primary education, in those areas where the selected languages are predominant. These languages are Shangani, Venda, Sotho, Kalanga, Nambya, and Tonga. At the time of writing, it is not yet clear what is actually happening on the ground.

Literature and Literacy

Published literature in Shona and Ndebele covers a wide variety of genres, ranging from folklore, proverbial lore, and oral poetry to modern novels, anthologies of poetry, plays, and play scripts. This literature is growing, particularly in response to the demands of the high school market, where prescribed texts for literature courses are changed routinely. In theory, there is a sizable market for all these books because of the massive expansion of education in the country after independence, which saw primary and secondary school enrolment increase 10-fold and the educational literacy rate climb from about 45% in 1980 to nearly 80% in 1990. However, the massive expansion of the first decade has not been maintained, and the huge strides that were made then and during the 1990s are being reversed. There have been serious political and economic problems in the country since the parliamentary elections of 2000, which worsened after the presidential elections in 2002.

Everything has been affected adversely, including education, and the literacy rate is definitely falling, although there are no ready statistics on this.

Media

English has continued to dominate in both the electronic and print media, but the use of Shona and Ndebele has increased tremendously on radio and television. In 1990, the percentage usage of the majority language Shona by the Zimbabwe Broadcasting Corporation was 55 on the African language station Radio 2, 49 on the educational station Radio 4, 1.5 on the popular music station Radio 3, and 1 on the general service Radio 1. Around that time, television programs in Shona/Ndebele were very few, with only the daily news summaries and a weekly musical program having regular slots. Only 1.5% of cinema was in Shona, and this comprised mainly films that were oriented toward development and education. The circulation of English-language newspapers such as *The Herald* (135 000 in late 1990) was much higher than that of the weekly *Kwayedza/Umthunywa*, published in Shona and Ndebele (62 365 copies). However, each copy of the latter was read by 10 to 15 people. Even so, its total readership comprised only 1.5% of the newspaper-buying public and 10.7% of the Shona-speaking population.

In the electronic media there have been more radical changes in recent years, particularly in radio broadcasting. Since 2000, there has been an overhaul of the Zimbabwe Broadcasting Corporation and a name change to Zimbabwe Broadcasting Holdings, which continues to maintain a monopoly in broadcasting, although private players are likely to be permitted to operate in the near future. The requirement for 75% local content has opened up more space for the use of Shona and Ndebele on the sole television channel through a mixed bag of programs ranging from local dramas, soaps, sport, news and current affairs, discussion programs, talk shows, and musical shows, as well as raw propaganda. The four radio stations of the corporation have been renamed SFM (formerly Radio 1), Radio Zimbabwe (formerly Radio 2), Power FM (formerly Radio 3), and National FM (formerly Radio 4). There has also been a major policy shift with the requirement that all broadcasting on radio and television should have 75% local content. This has led to a dramatic increase in airtime for local music and in the use of local languages, particularly Shona and Ndebele. Certainly, there have been adverse effects on the variety and quality of programs, as well as a huge increase in partisan propaganda. However, there have been some benefits as well. Attitudes to the indigenous languages have improved tremendously, and the national languages are being used much more in public life and in business. People have gained in confidence and they now participate much more freely in radio and television programs, with many calling in and making their contributions in Shona or Ndebele. Local music is selling much more and the local music industry is doing better than ever before.

See also: Bantu Languages; Code Switching and Mixing; Language Planning and Policy: Models; Multilingualism: Pragmatic Aspects; Shona.

Language Maps (Appendix 1): Map 46.

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Zipf, George Kingsley (1902–1950)

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Zipf was born in Freeport, Illinois, and died in Newton, Massachusetts. He graduated from Harvard in 1924, where he also completed his Ph.D. in comparative philology. During this period, he spent three years in Germany as a student at the Universities of Bonn and Berlin. His Ph.D. was published in 1929. After his return from Germany, he became an instructor in German at Harvard in 1930 and assistant professor of German in 1936. From 1939 onwards, he held the rank of university lecturer. Shortly before his premature death, he published his most important book *Human behavior and the principle of least effort* (1949).

Zipf dedicated almost his entire life to the study of language and human behavior from what he called a 'naturalistic perspective.' According to Zipf, who often refers to the methodology of the exact sciences in his work, language must be studied like any other natural phenomenon. Language constitutes primarily a 'system of behavior' in which words are studied as a set of tools used to convey meanings in order to achieve certain objectives – an extended analogy that Zipf called the 'Tool Analogy.' Zipf showed that language can be understood as a self-regulating structure that evolves independently from other social and cultural factors. Moreover, by striving for optimal communication, language balances two different 'forces.' On the one hand, there is the 'Force of Unification,' which means that speakers minimize articulatory effort by shortening the length of an utterance, leading to an increase in ambiguity. On the other hand, the 'Force of Diversification,' helps hearers want to be able to interpret the meaning of an utterance unambiguously and with the least effort. Fulfilling both requirements leads to a trade-off that Zipf termed the 'Principle of Least Effort.' Language strives permanently for an 'equilibrium state.' But more importantly, since the Principle of Least Effort works primarily on the frequencies of linguistic entities, Zipf was able to introduce a mathematical model that describes the evolution of individual languages, a discipline Zipf (1929) referred to as 'Dynamic Philology.' For this reason, Zipf is regarded as one of the pioneers both of statistical linguistics and synergetic linguistics.

According to Zipf (1949), the Principle of Least Effort is a universal principle that governs all individual and collective behavior of humans; it is the social sciences' analogue of the Principle of Least Action in dynamics.

Zipf's idiosyncratic scientific investigations culminated in several natural laws that he derived for the social sciences and linguistics in particular, the most famous one being known as 'Zipf's law' (though Zipf himself called it the 'rank-size' law; Zipf, 1932, 1935, 1949). It states that the frequency of occurrence of a word (f) multiplied by the rank of this word (r_f), with rank understood as the place this word has in the list of all the words of a text, is constant; in a formula: $f.r_f = constant$ (Zipf, 1929; it should be added that Zipf was in fact not the first to discover this law). Zipf proved that this law not only held for English but also for German, Latin, and Mandarin Chinese, and that it was valid not only for words but also for syllables, phrases, and sentences. Moreover, Zipf's law was found to govern a wide range of social phenomena outside linguistics (e.g., the size of cities, Zipf, 1941) and, since Zipf's death, has even been discovered in a range of other phenomena outside of the social sciences (esp. physics). Therefore, the law is now generally restated in more general terms as follows: the frequency of occurrence of an event (P_r), as a function of the rank (r) where the rank is determined by the same frequency of occurrence, is a 'power-law

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function' ($P_r \sim 1/r^a$) with the exponent a close to unity (but not necessary 1, as in Zipf's original law). Shortly after his death, Zipf's law attracted the attention of scientists working in the emerging research discipline of Information Theory (Shannon, 1951). The famous mathematician B. Mandelbrot generalized it to $P_r = P_0.(r+\alpha)^{-1/\beta}$, where α and β are constants, assuming that the frequencies of occurrence are determined so as to maximize the number of bits of information transmitted per symbol (Mandelbrot, 1954).

Two main objections have been raised against Zipf's law. The first argues, on mathematical grounds, that Zipf's law is a consequence of the properties of the formulas themselves, indicating that every randomly generated text will inevitably produce Zipf's law (Herdan, 1960; Li, 1992). The second group of objections is based on the argument that Zipf's law is 'linguistically shallow' and misses all the more fine-grained structures of language (Miller and Chomsky, 1963). The debate over the correctness of Zipf's law is still ongoing, and several schools of linguists continue to use Zipf's idea of language as a self-regulating system in their research (see esp. the *Journal of Quantitative Linguistics* and *Glottometrics*).

See also: Chomsky, Noam (b. 1928); Port-Royal Tradition of Grammar.

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Zoquean *See:* Mixe-Zoquean Languages.

Zoroastrianism

A V Williams

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Zoroastrianism is the ancient religious tradition, otherwise known as 'Mazdaism' or 'Zarathuštrianism,' founded by the Iranian prophet Zarathuštra. Precise dating of Zarathuštra is impossible, but it is widely thought that he must have flourished before 1000 B.C. and probably around 1200 B.C. in the area northeast of present-day Iran. The religion has been transmitted in a faithful form down to the 20th century thanks to the highly conservative priesthood who have maintained both a scriptural and a liturgical tradition of high antiquity. There are currently ~140 000 Zoroastrians in the world, belonging to two language groups: the Persian-speaking Iranian Zoroastrians and the Gujarati- and English-speaking Parsis of India.

The scriptures preserved as supremely holy by Zoroastrians throughout history are the *Gāthās*, 17 metrical 'hymns' composed in an otherwise unattested Eastern Iranian language known as 'Gathic Avestan' (*see* **Avestan**). This is an archaic form of Younger Avestan in which the rest of the Avesta was transmitted orally for centuries and which was eventually

function' ($P_r \sim 1/r^a$) with the exponent a close to unity (but not necessary 1, as in Zipf's original law). Shortly after his death, Zipf's law attracted the attention of scientists working in the emerging research discipline of Information Theory (Shannon, 1951). The famous mathematician B. Mandelbrot generalized it to $P_r = P_0.(r+\alpha)^{-1/\beta}$, where α and β are constants, assuming that the frequencies of occurrence are determined so as to maximize the number of bits of information transmitted per symbol (Mandelbrot, 1954).

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committed to writing, probably in the 5th century A.D. The *Gāthās* are a small part of the surviving canon in Avestan, but that too is only a fraction of the original Great Avesta of 21 divisions (Avestan *nask*), which has been lost since the Arab conquest of Iran in the 7th century A.D.

The *Gāthās* are believed to be the inspired compositions of Zarathuštra himself. They are lyrical, poetic dialogues and meditations between the supreme divinity Ahura Mazdā, 'the Wise Lord,' and himself. They are difficult to translate, not least because they are highly condensed in expression and cryptic in metaphorical allusion. Linguistic and content interpretation is helped by comparison with the contemporary Indian *Rig Veda*. The *Gāthās* are arranged according only to their metrical schemes and it is thus impossible to be certain of the evolution of Zarathuštra's thought from a straightforward reading. The prophet's teachings, which inform all the Zoroastrian religion, are moral and ethical in character, with a strong spiritual urgency exhorting humankind to follow divinely created 'truth,' or 'righteousness' (Avestan *Aša*), rather than the demonically created 'lie' (Avestan *druj*). Ahura Mazdā created all good creatures, both spiritual beings (his 'blessed immortals,' Avestan *aməša spənta* and 'worshipful beings,' Avestan *yazata*) and physical creations (humankind, benevolent animals, plants, water, fire, and sky). An entity wholly other than Ahura Mazdā, known as Angra Mainyu 'the hostile spirit,' perpetrates evil in the universe, having invaded it and brought death to the world with his own evil creation of spiritual demons (Avestan *daēva*) and evil physical agents corrupted by him, evil men (Avestan *drəgvant*), the wolf species and noxious creatures (Avestan *xrafstra*). Through worship and through cultivation of the spiritual qualities exemplified in the 'blessed immortals,' men and women may cultivate their own righteousness and thereby help Ahura Mazdā to overcome the forces of Angra Mainyu in the physical world. The religion is strongly eschatological in character, from the *Gāthās* onward, as it looks forward to the complete victory of goodness and wisdom over Angra Mainyu and all his evil brood at a time called 'the making wonderful' (Avestan *frašō.kərəti*). This is a regeneration of the whole cosmos, whereafter evil will have been expelled forever, and it is preceded by a resurrection and last judgment of all souls. In the present time before the end, each soul is judged soon after it leaves the physical state, and according to its accumulation of merit it goes either to a heavenly or to a hellish state to await the final judgment and *Frašōkərəti*. The individual human soul is seen to be directly engaged in the cosmic struggle against evil and the ethos of the religion is one of valiant and active participation in a corporate endeavor for the sake of truth.

The *Gāthās* are enclosed in the manuscripts and in the liturgical rites (Avestan *Yasna*) by the *Yasna Haptanhaiti* ('Worship of the Seven Sections'), which is also in Gathic *Avestan* (*see* **Avestan**). The Younger Avesta comprises liturgical texts and prayers, the *Yašts*, hymns to the *yazatas; Vīdaēvadāta*, 'Law Against the Demons'; *Visperad*, 'Worship of All the Masters'; *Nyāyeš* and *Gāh*, regular prayers; *Xorda Avesta*, prayer book. All these texts, except the *Yašts*, have traditionally been interpreted in the light of the *Zand*, 'scriptural elucidation,' in a Middle Iranian language, Pahlavi (*see* **Pahlavi**). Some lost Avestan texts survive only in their Pahlavi *Zand*. There was originally a *Zand* in the Avestan language and in other Iranian languages, but these were replaced by the imposition of the Pahlavi *Zand* by the last Zoroastrian dynasty, the Sasanians (224–651 A.D.). The Pahlavi books are the principal sources for knowledge of Zoroastrian cosmology and eschatology, mythology, philosophy, ritual, and theology, composed between the 6th and 10th centuries A.D. on the basis of the much older, oral religious tradition and knowledge of the *Avesta*. The main record for Zoroastrian cosmology and religious mythology is the so-called '*Bundahišn*,' 'Creation.' For theology and philosophy, there is the voluminous *Dēnkard*, 'Acts of the Religion,' in seven extant books. Many other smaller texts in Pahlavi survive, most of which have now appeared in scholarly editions and translations.

After the 10th century, Zoroastrians abandoned writing in Pahlavi in a favor of New Persian in Arabic script. The Zoroastrians of Iran were subjected to forcible conversion and oppression by Islam until the 20th century. In the 10th century A.D., a group of the faithful migrated to western India, where they settled and became known as 'Parsis' (i.e., 'Persians'), enjoying religious freedom and material success in trade and, in modern times, in commerce and industry. They adopted Gujarati as their language, and from the 12th century translated the Avestan texts, and some of the Pahlavi texts, into Sanskrit and Old Gujarati. Other texts were transcribed, and hence interpreted, from the cryptic Pahlavi script into the clearer Avestan alphabet: in this form they are known as 'Pazand' texts (literally 'by interpretation'). There is also a group of texts known as the 'Persian *Rivāyats*' dating from the 15th to 18th centuries, which were Irani Zoroastrian written answers to Parsi questions on matters of religious ritual, observance, and morality.

In modern times, the main population center of the Zoroastrian community has been in urban Bombay and, to a lesser extent, Tehran, although

small rural communities do survive in India and Iran. The Parsi and Irani Zoroastrians (the latter since the declaration of the Islamic Republic of Iran) have formed diaspora communities abroad on all five continents. The religion continues to be a mainstay of identity for Zoroastrians, although change in the structure of the community, through education and economic improvement, has brought with it a polarization of 'orthodox' and 'reformist' tendencies into disharmonious sectarian divisions.

See also: Avestan; Pahlavi.

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Zulu

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Introduction

Zulu, also known as isiZulu, is a Southern Bantu language, and is one of the 11 official languages of South Africa. With over nine million speakers, it is one of the country's major languages, and is used in broadcasting, journalism, and the national and provincial parliaments. Famous as the language of the Zulu empire of the 19th century, it has a growing literature, and there are efforts to develop a technical vocabulary for use in the teaching of mathematics and other sciences.

The language has been the subject of a considerable number of grammatical and linguistic studies, dating back to works of 19th-century pioneers such as Grout (1859). Zulu is closely allied to Xhosa, Swati, and Ndebele, and there is a high degree of mutual intelligibility between these languages, to the extent that it could be argued that they are all varieties of one language, Nguni. The findings of linguistic studies of the other Nguni languages are very frequently applicable to Zulu as well.

Morphology

Zulu displays the typical Bantu morphological features: it is highly agglutinative, and its nouns are divided into various classes, which command distinctive agreement morphology (see 'Syntax' below). Most of the noun classes occur in singular/plural pairs, for example, a noun such as *inja* 'dog' (class 9) will have a plural in class 10, *izinja* 'dogs.' Older studies classified the noun classes according to this pairing (e.g., Doke, 1927), but Canonici (1990) has proposed a classification according to agreement characteristics. From this point of view there are 12 noun classes. There is an elaborate tense and aspect system, and verbs may take valency-changing suffixes (known as 'extensions,' e.g., causative *-is-* in *fund-is-a* 'cause to learn, teach'; passive *-w-* in *fund-w-a* 'be learnt'; reciprocal *-an-* in *fund-is-an-a*, 'teach each other').

The morphology of the language and the semantics of the various grammatical forms have been the focus of linguistic research into Zulu for the past 80 years. Dominating most studies has been Doke's model (1927), which sought to describe Bantu languages in terms appropriate to that family, rather than according to established Latin, Greek, or English terminology. Subsequent accounts have largely been refinements of the Dokean model, e.g., Cope (1984) and Poulos and Msimang (1998).

Phonology

Zulu phonology has been described in a number of works, most notably and comprehensively in Khumalo (1987). Like many Bantu languages, it

small rural communities do survive in India and Iran. The Parsi and Irani Zoroastrians (the latter since the declaration of the Islamic Republic of Iran) have formed diaspora communities abroad on all five continents. The religion continues to be a mainstay of identity for Zoroastrians, although change in the structure of the community, through education and economic improvement, has brought with it a polarization of 'orthodox' and 'reformist' tendencies into disharmonious sectarian divisions.

See also: Avestan; Pahlavi.

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has an (N)CV syllable structure. There are 40 phonologically distinct consonants, and five vowels. Vowel length is usually predictable, but occasionally distinctive (for example, between the remote past tense and the past consecutive tense: *wa:hamba* 'he/she walked,' *wahamba* 'and then he/she walked'). There is a stricture on the occurrence of two vowels in juxtaposition at surface level, which leads to rules of vowel merging; for example, possessive *a-* prefixed to *inja* 'dog' yields *enja* 'of the dog.' Other processes that have been frequently studied include palatalization and so-called nasal strengthening, where nasals in N + C clusters change the nature of the following C. For example, an aspirated consonant in this position will lose its aspiration, so that the root *phil-* 'live' becomes *-pil-* in the class 9 noun *impilo* 'life.' The language has a high/low tone contrast, and a (derived) high-low tonal cluster may occur on bimoric vowels.

Syntax

Zulu has a basic SVO word order. Relative clauses and possessive phrases follow the head noun, and auxiliaries precede the verb. There is considerable agreement marking, as in the following example, where the affixes glossed as AGR all agree with the class 9 noun *moto* 'car.' ('REL' stands for 'relative marker'.)

Le-y-o	moto	e-n-tsha
DEM-AGR-that	car	REL-AGR-new
o-yi-theng-ile		i-fik-ile.
REL.PERS2-AGR-buy-PERF		AGR-arrive-PERF

'that new car you bought has arrived'

Formal linguistic studies of syntactic phenomena in the Southern Bantu languages have frequently been cast in terms of the Chomskyan Principles and Parameters framework. Much of this work has concentrated on Xhosa rather than Zulu, e.g., Du Plessis and Visser (1992). Little or no work has been done in other frameworks such as Head-Driven Phrase Structure Grammar or Lexical Functional Grammar, although the latter has proved useful in descriptions of other Bantu languages such as Chewa (Nyanja).

Historical and Comparative Linguistics

Like other languages in the east of the Bantu area, Zulu shows fricativization of stops before the 'extra high' vowels of proto-Bantu, which subsequently merged with the high vowels. There is no synchronic operation of Meinhof's law or Dahl's law, and the verbal suffixes (extensions) show no vowel harmony. The noun classes found in the language are (to use the numbering system by which they are known in Bantu studies) 1–7, 9–11, 14, and 15 (the last being used for the infinitive). Only fossilized versions of locative classes remain as adverbs, such as *phansi* 'below.' Unusually for a Bantu language, Zulu has noun suffixes, e.g., the feminine marker *-kazi*. Several of the original Bantu verbal suffixes survive only in unproductive forms (e.g., *-ul-* in words such as *khumbula* 'remember'). The language is well known for its extensive borrowing of Khoi and San words and sounds, noticeably the click consonants in words such as *iqhwa* 'snow.' It has also incorporated many words from Afrikaans and English.

Sociolinguistics

Zulu has certain marked speech forms which are of interest to sociolinguists. An example is *hlonipha*, the speech form traditionally used by married women, who have to avoid words that sound like the names of any of their close male in-laws, and therefore acquire a radically altered vocabulary (see Herbert, 1990). Another example is *isicamtho*, a group-marking variety used by young urban men, which has borrowed many words from English, often with radical change of meaning. There are several distinctive dialects of Zulu, and in some urban varieties the boundaries between Nguni languages have become less marked. In urban areas there is also much code switching between Zulu and the Sotho languages, and between Zulu and Afrikaans or English.

Current Research Directions

Zulu has long been one of the most studied Bantu languages, and it remains a focus of much research in the areas discussed above, and also in new directions including child language acquisition (Suzman, 1996) and computational linguistics (Bosch and Pretorius, 2002).

See also: Afrikaans; Bantu Languages; Classifiers and Noun Classes: Semantics; Code Switching and Mixing; Morphological Typology; Principles and Parameters Framework of Generative Grammar; South Africa: Language Situation; Southern Bantu Languages; Xhosa.

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Kamil Veith Zvelebil was born on November 17, 1927, in Prague, of Czech, German, Jewish, and French ancestry. He received his first Ph.D. in 1952 in Sanskrit, English, and philosophy, and his second Ph.D. in 1959 in Dravidian philology, both from Charles University, Prague. He taught Tamil at Charles University (1960–1965) and was a visiting professor (1965–1966) at the University of Chicago. He emigrated from Czechoslovakia in 1968, after the Soviet invasion, and served as professor at the University of Chicago (1968–1970), and then, after a year at the University of Leiden in Holland, moved to the University of Utrecht, where he worked until his retirement in 1992. He continues his research and writing at present as a resident of France.

A 1998 compilation of Zvelebil's publications lists over 500 entries (Zvelebil, 1998a), most of them dealing with Dravidian languages. His interest in Dravidian matters began in 1951, when he was still a student, and it has continued throughout his life. He has written on a wide variety of Dravidian topics. As he himself asserts, quoting the words of Emeneau, "I did not hesitate 'to publish anything that I might discover, whether . . . literary, linguistic, ethnological, folk tale, or any combination of any of these,' when it concerned Dravidian, particularly Tamil, Kannada, one of the 'tribal' languages of the Nilgiris (Irula), or Dravidian in general" (Zvelebil, 1990: xi).

Zvelebil's major publications may be grouped as follows: (1) Reference volumes that any Dravidian library must have (e.g., Zvelebil, 1973a, 1974, 1990, 1992a, 1994). (2) Religio–philosophical treatises (e.g., Zvelebil, 1973c, 1981, 1992b, 1996, 1998b). (3) Studies on nonliterary cultures (e.g., Zvelebil, 1973b, 1979 and 1982, 1988, 2001). (4) Linguistic and inscriptional studies (e.g., Zvelebil, 1964, 1986, 1998a, 1967 [with Glasov and Andronov], 1970 [with Vacek]). (5) Translations of Tamil, Malayalam, Kannada, Telugu, and Sanskrit works into Czech, Slovak, English, and German (e.g., Iyer, 1990). (6) Reviews of many literary and linguistic books (e.g., Zvelebil, 1985).

Zvelebil's mastery of Tamil language and culture is highly esteemed by Tamil natives themselves, and his publications are remarkable for academic depth, detailed annotations, and extensive bibliography. His voluminous *Lexicon* (1994), written single-handedly, testifies to his extraordinary comprehension of Tamil language and history. His treatises on Murugan and Siddhas are rare masterpieces about the cultural and religious traditions of the Tamils available in English. He is the leading authority today on Dravidian matters, especially on the international scene. He is a pioneer in the field of Nilgiri area studies, having worked at them since 1968, and he is credited with identifying Irula as a separate language.

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Kamil Veith Zvelebil was born on November 17, 1927, in Prague, of Czech, German, Jewish, and French ancestry. He received his first Ph.D. in 1952 in Sanskrit, English, and philosophy, and his second Ph.D. in 1959 in Dravidian philology, both from Charles University, Prague. He taught Tamil at Charles University (1960–1965) and was a visiting professor (1965–1966) at the University of Chicago. He emigrated from Czechoslovakia in 1968, after the Soviet invasion, and served as professor at the University of Chicago (1968–1970), and then, after a year at the University of Leiden in Holland, moved to the University of Utrecht, where he worked until his retirement in 1992. He continues his research and writing at present as a resident of France.

A 1998 compilation of Zvelebil's publications lists over 500 entries (Zvelebil, 1998a), most of them dealing with Dravidian languages. His interest in Dravidian matters began in 1951, when he was still a student, and it has continued throughout his life. He has written on a wide variety of Dravidian topics. As he himself asserts, quoting the words of Emeneau, "I did not hesitate 'to publish anything that I might discover, whether . . . literary, linguistic, ethnological, folk tale, or any combination of any of these,' when it concerned Dravidian, particularly Tamil, Kannada, one of the 'tribal' languages of the Nilgiris (Irula), or Dravidian in general" (Zvelebil, 1990: xi).

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LIST OF ABBREVIATIONS

A	act (in speech act theory); actor (tagmemics); addressee; agent; agentive; argument; author
ABESS	abessive
ABL	ablative
ABS	absolutive
ACC	accusative
ACT	active; actor
Ad	adjunct
ADESS	adessive
ADJ	adjective, -ival
AdjP	adjective phrase
ADV	adverb(ial)
AdvP	adverbial phrase
AFF	affective; affix
AFFIRM	affirmative
AGR	agreement
AGT	agent
AI	Artificial Intelligence
ALL	allative
AM	amplitude-modulated (signal)
Amer	American
AN	adjective precedes noun (in word order typology)
ANIM	animate
ANN	artificial neural network
ANT	anterior
ANTI	antipassive
AOR	aorist
AP	atomic phonology
APG	arc pair grammar
APPL	applicative
ART	article
ASCII	American Standard Code for Information Interchange
ASL	American Sign Language
ASP	aspect(ual)
ASR	automatic speech recognition
ASSOC	associative
ATN	augmented transition network
ATR	advanced tongue root (distinctive feature)

ATTR	attribute
Ausian	Australian Sign Language
AUX	auxiliary
b.	born
BASIC	Basic All-purpose Symbolic Instruction Code
BEN	benefactive
BEV	Black English Vernacular
BNC	British National Corpus
BSE	base-form
BSL	British Sign Language
C	clause; coda (of syllable); codomain (set theory); complement(izer); consonant
c-command	constituent command
c-structure	constituent structure
CA	componential analysis; contrastive analysis; conversation analysis
CALL	computer assisted language learning
CAP	control agreement principle
CAT	category; computer-assisted translation
CAUS	causative
CCG	combinatory categorial grammar
CD	communicative dynamism; conceptual dependency
CF	characteristic frequency; constant frequency
CFG	context-free grammar
CFL	context-free language
CFPSG	context-free phrase structure grammar
CG	categorial grammar
CL	computational linguistics
CLASS	classifier
CN	common noun
COLL	collective
COM	comitative
COMP	comparative; complement(izer)
CONJ	conjunction/conjugation
CONS	consonantal
CONT	continuant; continuative
COP	copula
COR	coronal
CP	complement(izer) phrase
cps	cycles per second
CS	context-sensitive
CSG	context-sensitive grammar
CV	consonant vowel structure/sequence
CV phonology	skeletal phonology
D-structure	deep structure
d.	died
DA	discouse analysis
DAF	delayed auditory feedback
DAG	directed acyclic graph
DAT	dative
DCG	definite clause grammar
DD	discourse domain
DDG	daughter dependency grammar
DECL	declarative
DEF	definite
DEM	demonstrative
DESID	desiderative

DEST	destinative
DET	determiner
DG	dependency grammar
DIM	diminutive
DIR	direction(al)
DIST	distributive
DM	discourse marker
DO	direct object
dp	determiner phrase
DRS	discourse representation structure
DRT	discourse representation theory
DS	deep structure; direct speech
DTR	daughter (in HPSG)
DU	dual
DYN	dynamic
EA	error analysis
EAP	English for academic purposes
ECM	exceptional case marking
ECP	empty category principle
EEG	electroencephalography
EFL	English as a foreign language
EL	elative
ELT	English Language Teaching
EMG	electromyograph(y)
EMPH	emphatic
ENCL	enclitic
Eng	English
equi	equi NP deletion (= identity erasure transformation)
ERG	ergative
ESL	English as a second language
ESP	English for Specific/Special Purposes
ESS	essive
EST	Extended Standard Theory
etym	etymology
EXCL	exclusive
EXIST	existential
EXP	experiencer
F	false (in truth table); formant
f-structure	functional structure
F_0	fundamental frequency
F_1	first formant
F_2	second formant
F_3	third formant
FACT	factive
FDS	free direct speech
FEM	feminine
FFP	foot feature principle
FG	functional grammar
fig.	figure
FIN	finite
FIS	free indirect speech
ff.	*foruit, flourished,* lived
FLA	first language acquisition
FM	frequency modulation
FSP	functional sentence perspective

FSTN	finite state transition network
FUT	future
FUG	functional unification grammar
GB	government and binding (theory)
GB-phonology	government-based phonology
GEN	gender; genitive
GER	gerund
GN	genitive precedes noun (in word order typology)
GPSG	generalized phrase structure grammar
GR	grammatical relation
GS	generative semantics
H	head (of construction); hearer/reader; high/superposed (code/variety, in adiglossic situation); high (pitch/tone)
HABIT	habitual
HCI	human-computer interaction
HFC	head feature convention
HFP	head feature principle
HG	head grammar
HON	honorific
HPSG	head-driven phrase structure grammar
HUM	human
HYPOTH	hypothetical
Hz	hertz
IA	Item-and-Arrangement [model of grammatical description]
IC	immediate constituent
I-E	Indo-European
IELTS	[British Council] International English Language Testing System
iff	if and only if
IGNOR	ignorative
IL	interlanguage
ILL	illative
IMP	imperative
IMPERS	impersonal
IMPERF	Imperfect(ive)
INAN	Inanimate
INCL	Including; inclusive
INCORP	Incorporating
INDEF	Indefinite
INDIC	Indicative
INF	infinitival; infinitive
INFL	Inflection
INSTR	Instrumental
INTERJ	Integration
INTERROG	interrogative
INTRANS	Intransitive
IO	indirect object
IP	inflection phrase; Item-and-process [model of grammatical description]
IPA	International Phonetic Alphabet
IR	inflectional rule; internal reconstruction
IRR	irrealis
IRREG	irregular
IS	indirect speech
ISA	subsumption/subclass 'is a'
IT	Information Technology
ITER	iterative

K	set of situations (in speech act theory)
kHz	kilohertz
KWIC	keyword in context
L	language; low (pitch/tone); low/vernacular variety [in diglossia]
L1	first language
L2	second or foreign language
LAB	labial
LAD	language acquisition device
LARSP	language assessment, remediation, and screening procedure
LAT	lateral
LEX	lexicality (in HPSG)
LF	lexical function; logical form
LFG	Lexical Functional Grammar
lit.	literally
LMC	lower middle class
LOC	local; locative; locus
LP	language planning; linear precedence [statements]; linear prediction
LSP	language for special/specific purposes
LTAG	lexicalized tree adjoining grammar
LU	lexical unit
M	mid [tone]; Middle (in language names); modal
MASC	masculine
Mb	megabyte
MDS	multidimensional scaling
MG	Montague Grammar
MLAT	Modern Language Aptitude Test
MLU	mean length of utterance
MMC	middle-middle class
Mod	modern
MOD	modifier
MRI	magnetic resonance imaging
MT	mother tongue; machine translation
N	new (speaker); noun; nucleus (of syllable)
n.d.	no date
n.s.	new series
NA	noun precedes adjective (in word order typology)
NAS	nasal
NEG	negation; negative
NEUT	neuter
NG	noun precedes genitive (in word order typology)
NL	native language; natural language
NLG	natural language generation
NLP	natural language processing
NLU	natural language understanding
NMR	nuclear magnetic resonance
NN	neural net(work)
NNS	nonnative speaker
NOM	nominative; nominal(ization)
NP	noun phrase
NPrel	relative noun phrase
NRel	noun precedes relative clause (in word order typology)
NS	native speaker
nt	nonterminal
NT	New Testament
NUM	number

NVC	non-verbal communication
O	onset (of syllable)
OBJ	object
OBL	oblique
OBS	obstruent
obs.	obsolete
OCR	optical character recognition
OED	*Oxford English Dictionary*
OOP	object-oriented programming
OPT	optative
OSV	object-subject-verb (in word order typology)
OT	Old Testament; Optimality Theory
OV	object precedes verb (in word order typology)
OVS	object-verb-subject (in word order typology)
P	phrase; predicate
PA	pushdown automation
PART	participle; particle; partitive
PASS	passive
PAT	patient
PERF	perfect(ive)
PERS	person(al)
PET	positron-emission tomography
PF	phonetic form (in principles and parameters framework)
PHON	phonology
PIE	Primitive Indo-European; Proto-Indo-European
PL	plural
PM	phrase marker
Po	postposition
PO	primary object
POL	polite
POSS	possessive; possessor
POTEN	potential
PP	prepositional phrase
PP	past participle
PLUPERF	pluperfect
PRED	predicative
PREF	prefix
PREP	preposition
PRES	present
PRO	an unspecified NP
PRO	pronominal element; pronoun
PROG	progressive
ProgP	progressive phrase
PROHIB	prohibitive
PRESP	present participle
PS-rule	phrase structure rule
PSG	Phrase Structure Grammar
PTQ	[the] proper treatment of quantification [in English] (Montague grammar)
PURP	purpose; purposive
Q	question
QR	quantifier raising
QUANT	quantifier
QU	*wh*-marking
R-expression	referential/referring expression
R-graph	relational graph (in arc pair grammar)

RC	relative clause
RECIP	recipient/reciprocal
REFL	reflexive
reg	regular
ReIN	relative clause precedes noun (in sword order typology)
REP	repetitive
RES	resumptive/result
REST	Revised Extended Standard Theory
rev.	revised
RG	Relational Grammar
RNR	right node raising
RP	received pronunciation
RR	readjustment rule; redundancy rule
RST	Rhetorical Structure Theory
RT	reaction time; RTN recursive transition network
S	point of speech (temporal logic); sentence; sign (sign language); source; speaker; speaker/writer; standard (speaker); strong (syllable); subject (tagmemics); subject term (or conclusion in a syllogism)
S-structure	surface structure
SAE	Standard American English; standard average European OVhorO
SC	small clause; structural change
SD	structural description
SEM	semantics
SGML	standard generalized markup language
SIB	sibilant
sing	singular
SL	source language
SLA	second language acquisition
SLASH	unbounded dependency (in HPSG)
SON	sonorant
SOV	subject-object-verb (in word order typology)
SPEC	specifier
SS	surface structure
SSC	specified subject condition
Sta	statement
STAT	static
STRID	strident
SUBCAT	subcategorization
SUBJ	subject; subjunctive
SUBJUNC	subjunctive
SUBORD	subordinate, subordinative
SUF	suffix
SUP	supine
SUPERESS	superessive
SV	subject precedes verb (in word order typology)
SVO	subject-verb-object (in word order typology)
SYLL	syllabic; syllable
SYN	synonym; syntax
T	tense; text; time; transformation; tree; true (in truth table); tu (= familiar pronoun of address)
T	trace
T-rule	transformational rule
TAG	Tree-Adjoining Grammar
TAL	tree-adjoining language
TBU	tone-bearing unit

TC	total communication [approach] (in schools for the deaf)
TEFL	Teaching English as a foreign language
TEMP	temporal
TERM	terminative
TESOL	Teaching of English to Speakers of Other Languages
TG	Transformational Grammar
TGG	Transformational Generative Grammar
TL	target language
TNS	tense
TOEFL	Test of English as a Foreign Language
TOP	topic(alization)
TRANS	transitive
TRANSLV	translative
TYP	type
U	utterance
UCG	Unification Categorial Grammar
UG	Universal Grammar
UMC	upper middle class
V	verb(al); vowel; "our (= polite pronoun of address)
V	short vowel
V	long vowel
V-form	honorific form (of address)
VFORM	verb form
VIS	visual
VLSI	very large scale integration
VN	verbal noun
VO	verb precedes object (in word order typology)
VOC	vocalic
VOS	verb-object-subject (in word order typology)
VOT	voice onset time
VP	verb phrase
VS	verb precedes subject (in word order typology)
VSO	verb-subject-object (in word order typology)
W	weak (syllable)
WF	word formation
WFF	well-formed formula
WG	word grammar
WH-word	question word (*what*, *which*, etc.)
WP	Word-Paradigm (grammar)
0	zero (covert element)
1	first person
α	alpha, a variable
Σ	sentence; superfoot (in metrical phonology)
σ	syllable

LIST OF LOGICAL SYMBOLS USED

(More specialist symbols are explained in the text)

p, q . . . or P, Q. . .	Variables for sentences or propositions
A, B. . .	Metavariables ranging over sentential or propositional variables
$-$, or $\sim$, or $\neg$	Negation ('It is not the case that . . .')
$\vee$	Disjunction ('or')
&	Conjunction ('and'); 'ampersand'
$\rightarrow$ or $\supset$	Material implication ('if . . . then')
$\equiv$ or $\leftrightarrow$	Material equivalence ('if and only if')
x, y . . .	Variables for individuals
a, b. . .	Singular terms (e.g., proper names)
$\exists$	Existential quantifier ('at least one')
$\forall$	Universal quantifier ('for all')
F, G . . .	Predicates (R, . . . for polyadic predicates)
$=$	Identity
$\Box$	Necessarily
$\Diamond$	Possibly
{ }	Set
$\in$	Set membership
$<$	Less than
$\leqslant$	Less than or equal to
$>$	Greater than
$\geqslant$	Greater than or equal to
iff	If and only if***
wff	Well-formed formula
$\vdash$	Syntactic consequence
$\models$	Semantic consequence

EXAMPLES, TRANSCRIPTIONAL CONVENTIONS, AND THE IPA ALPHABET

Examples

There are many hundred of examples in the encyclopedia. We have tried to be as helpful as we can in indicating to the reader their pronunciation, grammatical analysis, and translation.

Examples from languages normally written with the Latin alphabet are cited in their usual script, including, where appropriate, the appropriate diacritics or special letters, e.g., é å þ ß ł ž Æ Ç İ. Where appropriate, the example may be accompanied by a transliteration or a phonetic transcription.

Orthographic representations of examples from languages normally written in non-Roman script are typically cited in their usual script, but may sometimes be replaced by a transliteration or romanization and may be accompanied by a phonetic transcription.

Languages that have no conventional writing system will, of necessity, be exemplified in transcription, using, wherever possible, the phonetic symbols of the International Phonetic Alphabet (IPA), as described below.

We recognize, however, that it is impossible to be entirely consistent. There are varying conventions in different fields of specialization, and we have not insisted on any deviation from the normal practice of experts, except so far as may be desirable to make the material more accessible to those who are not familiar with the particular field.

Glossing Examples

Examples from languages other than English are normally accompanied by an English translation. With unfamiliar languages, examples are also accompanied by a 'word-for-word' or 'morpheme-for-morpheme' gloss set out in the following manner: the first line is in the original language; the second line, immediately below, is a word-for-word, or, where appropriate, morpheme-for-morpheme, gloss; the last line is the idiomatic English translation. Where words are segmentable, the segments are separated by hyphens, and the corresponding morphemes and glosses are also separated by hyphens (walk-ed: *walk*-PAST). Where words are not segmentable, the glosses are separated by a point (went: *go*.PAST) Glosses are aligned so that the gloss for any word lines up with the word it glosses. Where appropriate, references for cited examples follow the idiomatic translation.

walk-ed	went
walk-PAST	*go*.PAST

mimi-yan-ati-nha
breast-PROP-INCH-PAST
'grew breasts'

nun	'o	fà	male
not	*him*.ACC	*do*.INF	*pain*

'don't hurt him'

swa	se	secg	wate	secgende	wæs	lara	spella:
thus	*the*	*warrior*	*brave*	*teller/telling*	*was*	*of-evil*	*news*

'thus the brave warrior was telling/a teller of evil news' (*Beowulf*, 3028)

Abbreviations for grammatical terms, ACC(usative), INF(finitive), etc., are listed in Volume 14.

Phonetic Transcription and the International Phonetic Alphabet

Transcription is the systematic representation of speech sounds without any reference to how they may be conventionally written. In transcriptions, we follow the usual convention of enclosing phonetic transcriptions in square brackets, e.g., [ɸɯkɯ], and phonemic transcriptions in solidi, e.g., /'fuku/.

We have tried to standardize on the use of IPA notation in phonetic transcriptions. The phonetic symbols used are those of the current edition of the IPA Chart (1993, corrected 1996). A copy is reproduced below, courtesy of

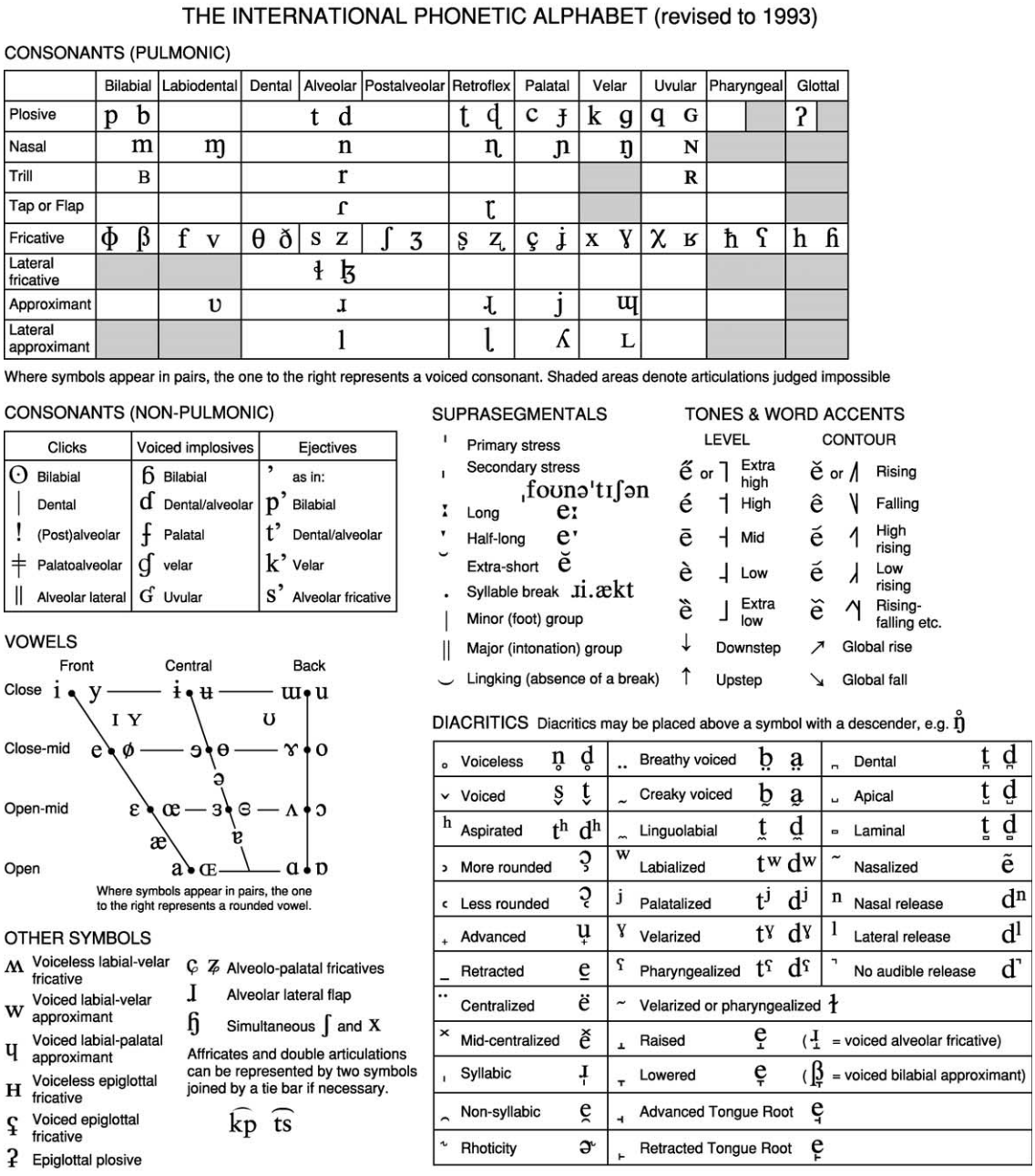

the International Phonetic Association. For further discussion, see the *Handbook of the International Phonetic Association* (CUP, 1999) or the website http://www.arts.gla.ac.uk/IPA/ipa.html.

We have tried to distinguish consistently between potentially confusable pairs of symbols, such as θ and ɵ, ɬ and ɬ, ɣ and ɤ, and have tried to avoid substituting symbols such as Greek *δ* and η for IPA ð and ŋ; we have also tried to avoid symbols that were formerly recognized by the IPA but are now deprecated, such as ʃ for ɨ, ω for ʊ, or ʈ for tʲ. Similarly, we have tried to standardize on IPA ɲ ʃ ʒ ʧ ʤ rather than non-IPA ñ š ž č ǰ (although the latter are of course acceptable in standard orthographic representations or transliterations).

While we standardize on the use of IPA notation, we did not insist on any particular transcription/phonemicization. Nevertheless, unless there was some good reason to the contrary, RP English was transcribed in accordance with the notation found in *Longman Pronunciation Dictionary* (though without syllable spacing and without abbreviatory conventions such as italicized or raised symbols): thus, for example, *hat* /hæt/, *heart* /hɑːt/, *bead* /biːd/, *bid* /bɪd/, *body* /ˈbɒdi/.

Transliteration or Romanization

Transliteration involves the systematic transference of the characters of one writing system into the characters of another, typically into the Latin alphabet (hence romanization). The conventions used for the transliteration of Arabic, classical Greek, Russian, and Chinese are shown below.

Arabic

We have tried to follow Library of Congress rules (http://lcweb.loc.gov/catdir/cpso/romanization/arabic.pdf), but do not underline the digraphs th, kh, dh, sh, gh.

			Vowels		
short		long		doubled	-iyy- (final form: ī)
َ	a	ا	ā	diphthongs	
ُ	u	و	ū	وَ	aw (*not* au)
ِ	i	ى	ī	ىَ	ay (*not* ai)
			Consonants		
ء	ʻ	ز	z	ق	q
ب	b	س	s	ك	k
ت	t	ش	sh	ل	l
ث	th	ص	ṣ	م	m
ج	j	ض	ḍ	ن	n
ح	ḥ	ط	ṭ	ه	h
خ	kh	ظ	ẓ	و	w
د	d	ع	ʻ	ى	y
ذ	dh	غ	gh	ة	-a (in construct
ر	r	ف	f		state: -at)

The transliteration for hamza is a curly apostrophe or right single quotation mark (’) and that for ghain a reversed apostrophe or left single quotation mark (‘). We have tried to avoid a straight apostrophe (ˈ), raised c (ᶜ), and other substitutes.

Ancient Greek

Vowels and consonants			
α	a	ν	n
β	b	ξ	ks
γ	g	ο	o
δ	d	π	p
ε	e	ρ	r
ζ	z	σ, ς	s
η	ē	τ	t
θ	th	υ	u
ι	i	φ	ph
κ	k	χ	kh
λ	l	ψ	ps
μ	m	ω	ō

Diphthongs, digraphs			
αι	ai	αυ	au
ει	ei	ευ	eu
οι	oi	ου	ou
υι	ui	ηυ	ēu

Capitals (Α Β Γ Δ . . .) are transliterated as the corresponding roman capitals (A B C D . . .). Rough breathing: h. ῥ = rh. Smooth breathing is ignored. Long α ι υ are generally shown as ā ī ū, and ᾳ ῃ ῳ as āi ēi ōi.

Accent marks are generally ignored unless essential: ά, ὰ, ᾶ = á, à, â. A vowel with a circumflex accent is necessarily long, so is not given a length mark; an acute or grave accent may be combined with a length mark if necessary (ᾱ́).

Proper names are usually Latinized in the usual way: Dionysius Thrax (not Thrâiks).

Russian

а	a	л	l	ц	ts
б	b	м	m	ч	ch
в	v	н	n	ш	sh
г	g	о	o	щ	shch
д	d	п	p	ъ	˝
е	e	р	r	ы	y
ж	zh	с	s	ь	ˊ
з	z	т	t	э	ė
и	i	у	u	ю	iu
й	ĭ	ф	f	я	ia
к	k	х	kh		

We have tried to follow Library of Congress rules (http://lcweb.loc.gov/catdir/cpso/romanization/russian.pdf), but do not put a tie bar over ts, iu, ia. Uppercase letters (АБВ. . .) are transliterated as the corresponding Roman capitals. ё = ë. Established English forms may be used where appropriate: *Yeltsin*, not *El’tsin*.

Chinese

The Pinyin romanization of Chinese is generally used. Tone marks are included or omitted at the author’s discretion. If Wade-Giles or some other romanization is necessary (e.g., in proper names normally so cited), then at the first use there will be an accompanying Pinyin version.

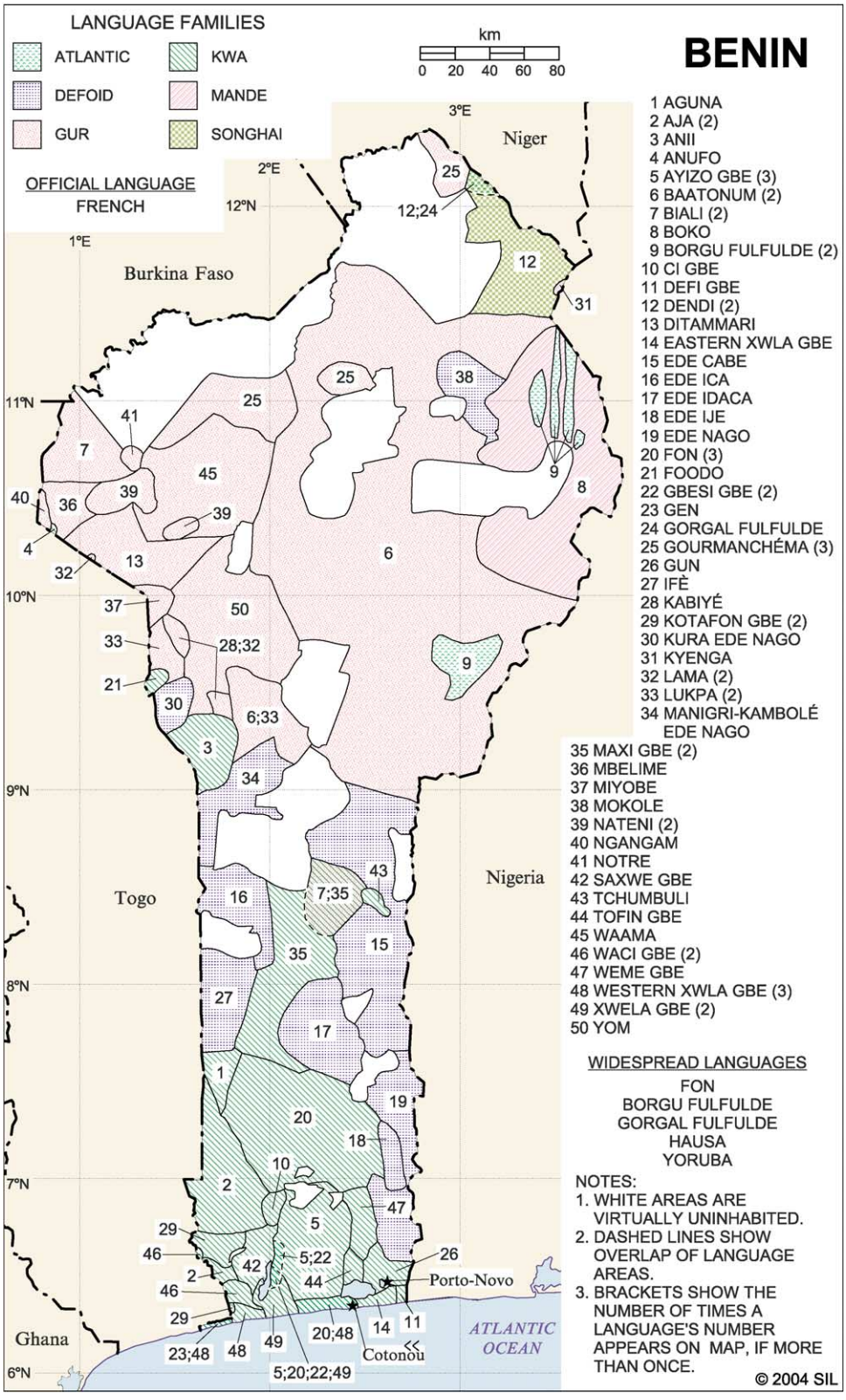
LANGUAGE FAMILIES
ATLANTIC
KWA
DEFOID
MANDE
GUR
SONGHAI
OFFICIAL LANGUAGE
FRENCH
km
0 20 40 60 80
BENIN
Niger
Burkina Faso
Togo
Nigeria
Ghana
ATLANTIC OCEAN
Porto-Novo
Cotonou
3°E
2°E
1°E
12°N
11°N
10°N
9°N
8°N
7°N
6°N
1 AGUNA
2 AJA (2)
3 ANII
4 ANUFO
5 AYIZO GBE (3)
6 BAATONUM (2)
7 BIALI (2)
8 BOKO
9 BORGU FULFULDE (2)
10 CI GBE
11 DEFI GBE
12 DENDI (2)
13 DITAMMARI
14 EASTERN XWLA GBE
15 EDE CABE
16 EDE ICA
17 EDE IDACA
18 EDE IJE
19 EDE NAGO
20 FON (3)
21 FOODO
22 GBESI GBE (2)
23 GEN
24 GORGAL FULFULDE
25 GOURMANCHÉMA (3)
26 GUN
27 IFÈ
28 KABIYÉ
29 KOTAFON GBE (2)
30 KURA EDE NAGO
31 KYENGA
32 LAMA (2)
33 LUKPA (2)
34 MANIGRI-KAMBOLÉ EDE NAGO
35 MAXI GBE (2)
36 MBELIME
37 MIYOBE
38 MOKOLE
39 NATENI (2)
40 NGANGAM
41 NOTRE
42 SAXWE GBE
43 TCHUMBULI
44 TOFIN GBE
45 WAAMA
46 WACI GBE (2)
47 WEME GBE
48 WESTERN XWLA GBE (3)
49 XWELA GBE (2)
50 YOM
WIDESPREAD LANGUAGES
FON
BORGU FULFULDE
GORGAL FULFULDE
HAUSA
YORUBA
NOTES:
1. WHITE AREAS ARE VIRTUALLY UNINHABITED.
2. DASHED LINES SHOW OVERLAP OF LANGUAGE AREAS.
3. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.
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Map 1 Benin.

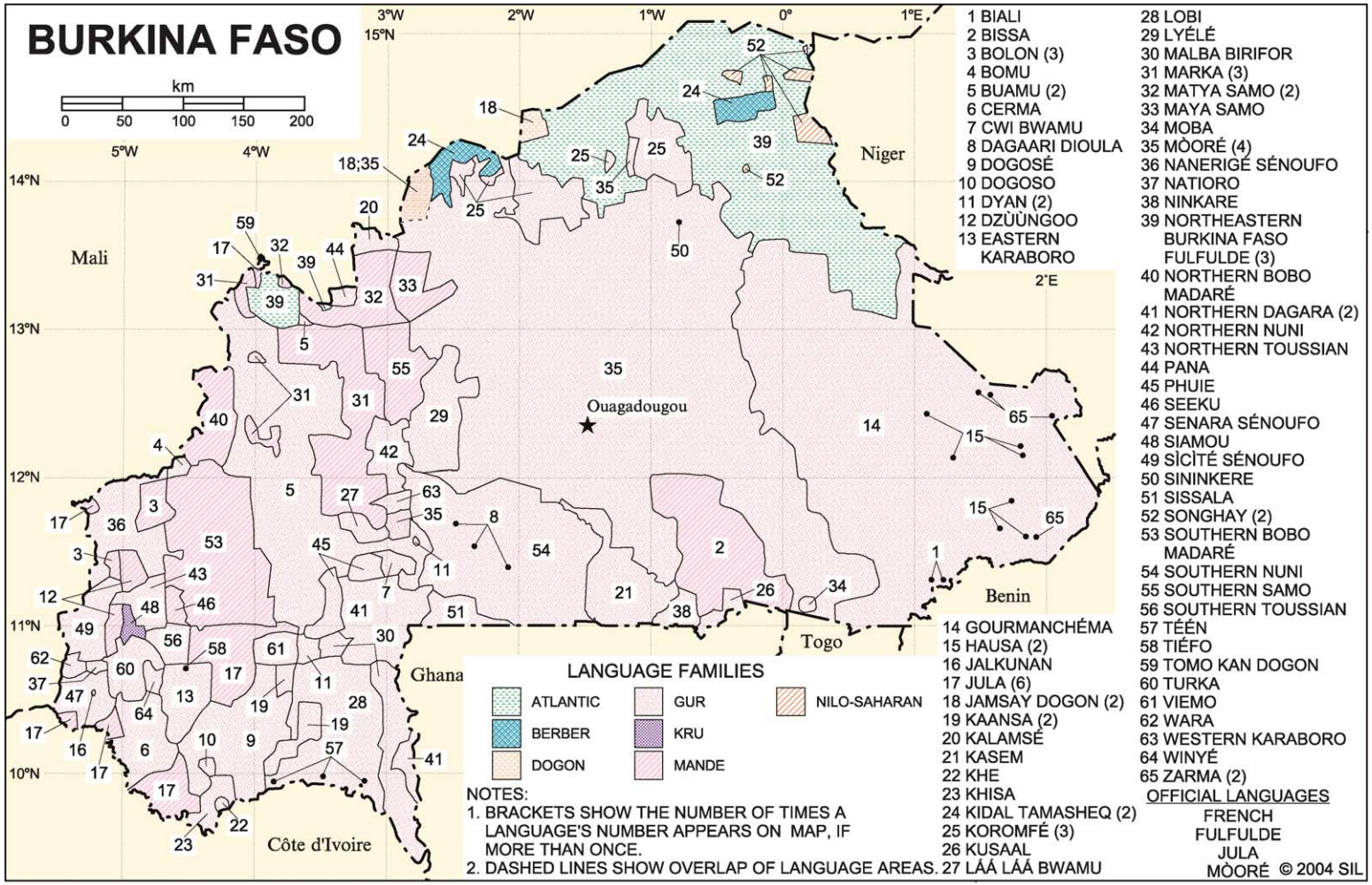

Language data adapted from Burkina Faso: Carte Linguistique, IGB/IRSSH, 1988.

Map 2 Burkina Faso.

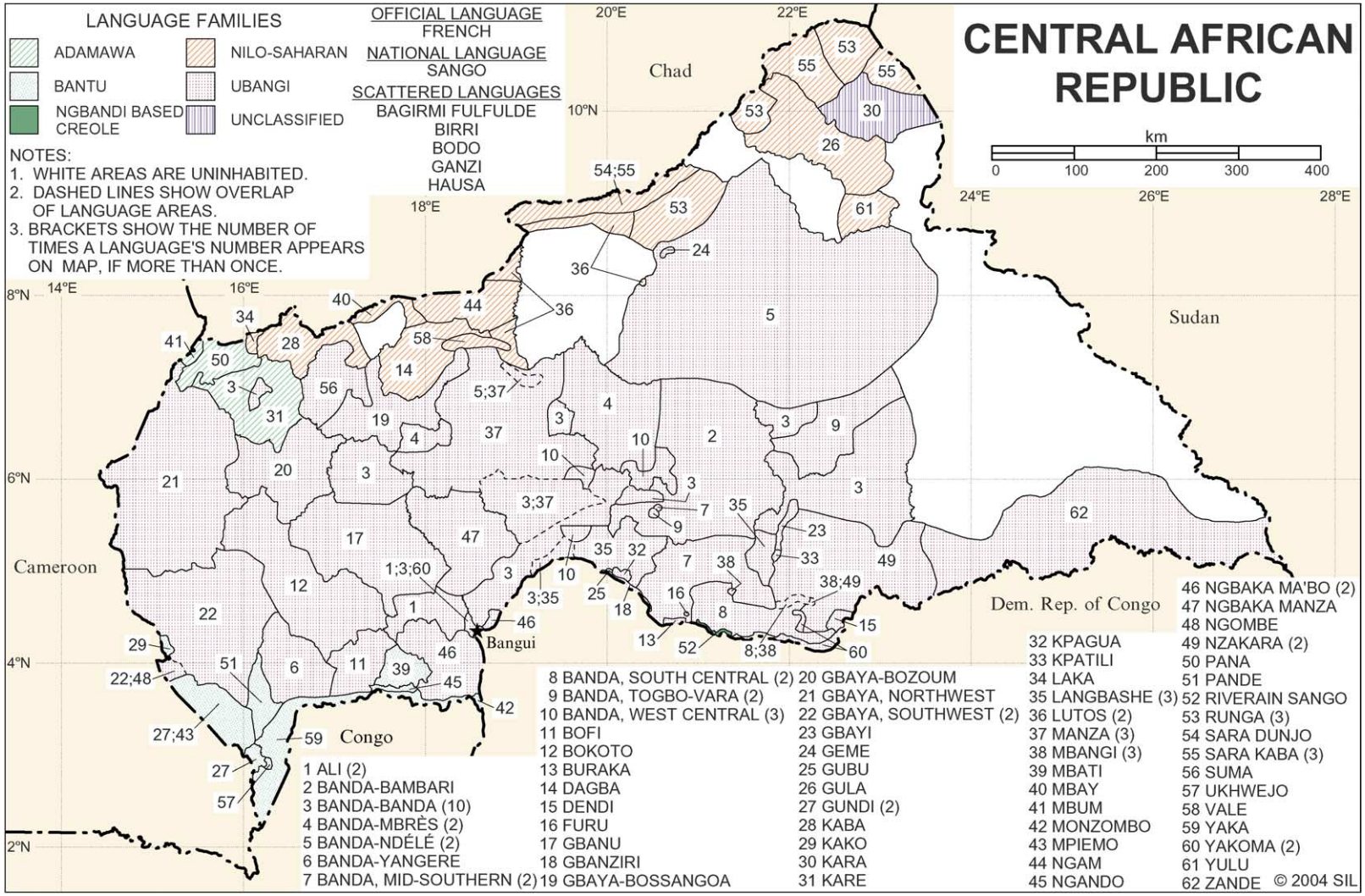

Map 3 Central African Republic.

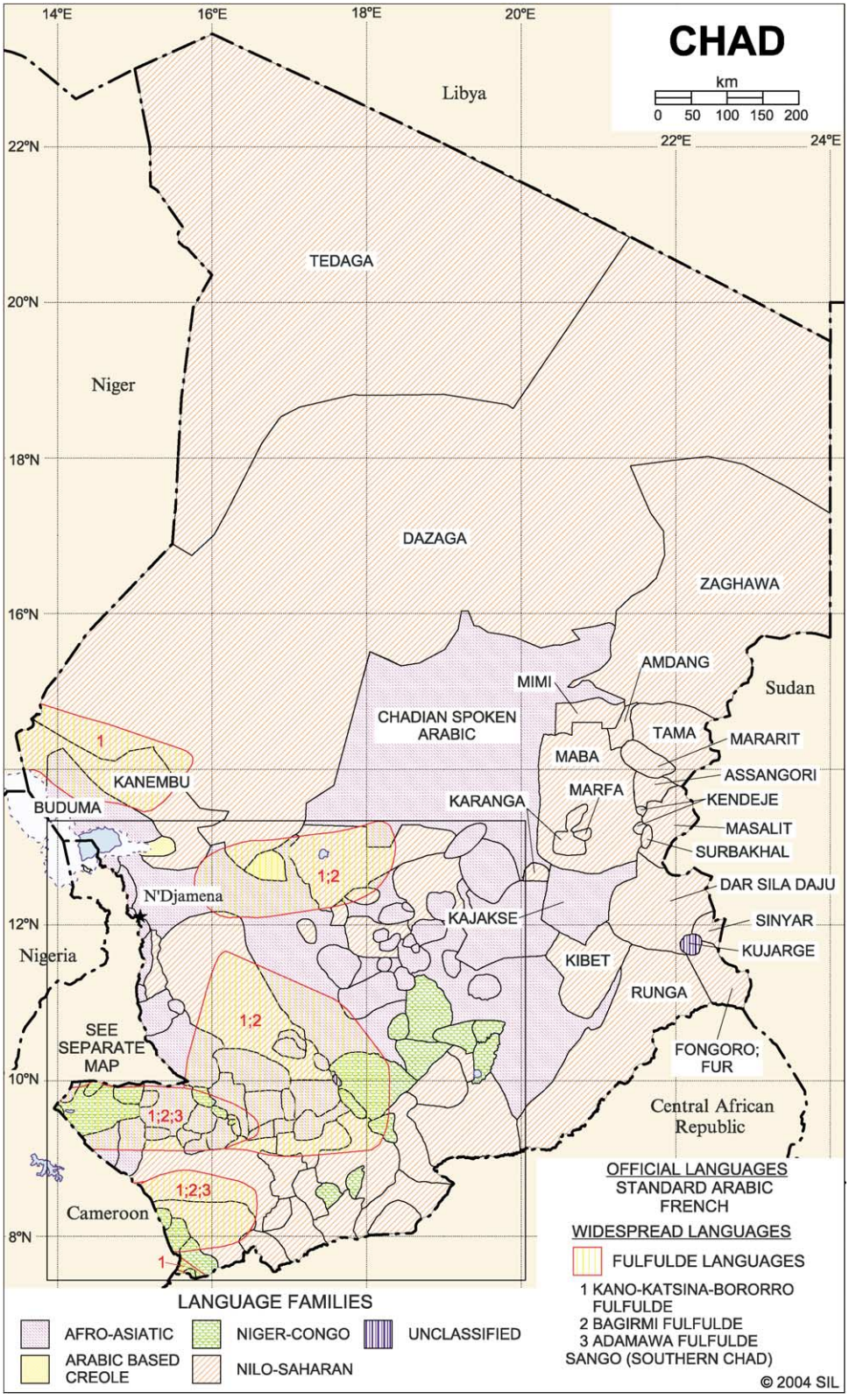
CHAD
km
0 50 100 150 200
14°E
16°E
18°E
20°E
22°E
24°E
22°N
20°N
18°N
16°N
12°N
10°N
8°N
Libya
Niger
Sudan
Nigeria
Cameroon
Central African Republic
TEDAGA
DAZAGA
ZAGHAWA
AMDANG
MIMI
CHADIAN SPOKEN ARABIC
TAMA
MARARIT
MABA
ASSANGORI
MARFA
KENDEJE
KARANGA
MASALIT
SURBAKHAL
DAR SILA DAJU
KANEMBU
BUDUMA
N'Djamena
KAJAKSE
SINYAR
KUJARGE
KIBET
RUNGA
FONGORO; FUR
SEE SEPARATE MAP
1
1;2
1;2;3
OFFICIAL LANGUAGES
STANDARD ARABIC
FRENCH
WIDESPREAD LANGUAGES
FULFULDE LANGUAGES
1 KANO-KATSINA-BORORRO FULFULDE
2 BAGIRMI FULFULDE
3 ADAMAWA FULFULDE
SANGO (SOUTHERN CHAD)
LANGUAGE FAMILIES
AFRO-ASIATIC
NIGER-CONGO
UNCLASSIFIED
ARABIC BASED CREOLE
NILO-SAHARAN
© 2004 SIL

Map 4 Chad.

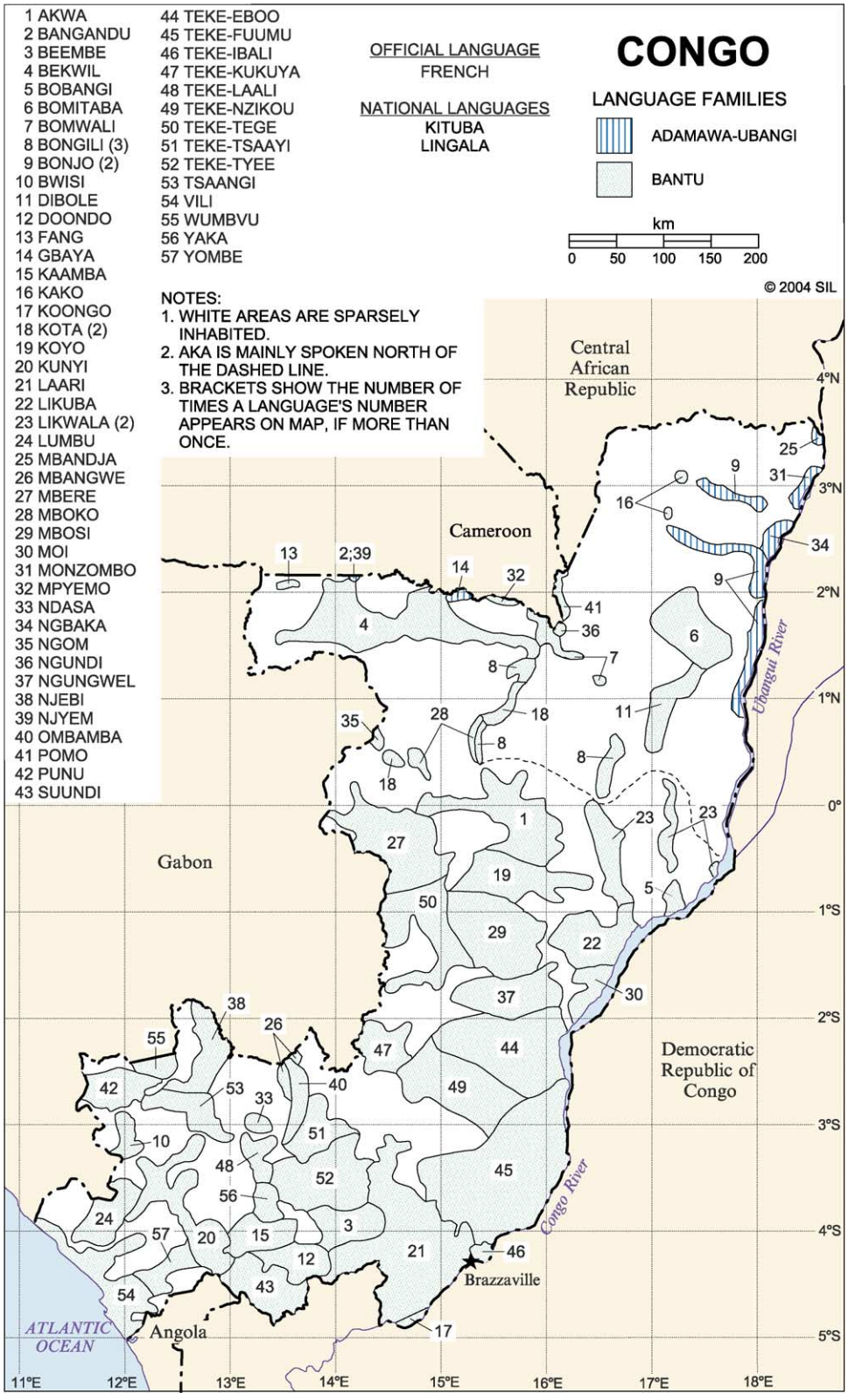
CONGO
OFFICIAL LANGUAGE
FRENCH
NATIONAL LANGUAGES
KITUBA
LINGALA
LANGUAGE FAMILIES
ADAMAWA-UBANGI
BANTU
km
0 50 100 150 200
© 2004 SIL
1 AKWA
2 BANGANDU
3 BEEMBE
4 BEKWIL
5 BOBANGI
6 BOMITABA
7 BOMWALI
8 BONGILI (3)
9 BONJO (2)
10 BWISI
11 DIBOLE
12 DOONDO
13 FANG
14 GBAYA
15 KAAMBA
16 KAKO
17 KOONGO
18 KOTA (2)
19 KOYO
20 KUNYI
21 LAARI
22 LIKUBA
23 LIKWALA (2)
24 LUMBU
25 MBANDJA
26 MBANGWE
27 MBERE
28 MBOKO
29 MBOSI
30 MOI
31 MONZOMBO
32 MPYEMO
33 NDASA
34 NGBAKA
35 NGOM
36 NGUNDI
37 NGUNGWEL
38 NJEBI
39 NJYEM
40 OMBAMBA
41 POMO
42 PUNU
43 SUUNDI
44 TEKE-EBOO
45 TEKE-FUUMU
46 TEKE-IBALI
47 TEKE-KUKUYA
48 TEKE-LAALI
49 TEKE-NZIKOU
50 TEKE-TEGE
51 TEKE-TSAAYI
52 TEKE-TYEE
53 TSAANGI
54 VILI
55 WUMBVU
56 YAKA
57 YOMBE
NOTES:
1. WHITE AREAS ARE SPARSELY INHABITED.
2. AKA IS MAINLY SPOKEN NORTH OF THE DASHED LINE.
3. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.
Central African Republic
Cameroon
Gabon
Democratic Republic of Congo
Angola
ATLANTIC OCEAN
Brazzaville
Ubangui River
Congo River
4°N
3°N
2°N
1°N
0°
1°S
2°S
3°S
4°S
5°S
11°E
12°E
13°E
14°E
15°E
16°E
17°E
18°E

Map 5 Congo.

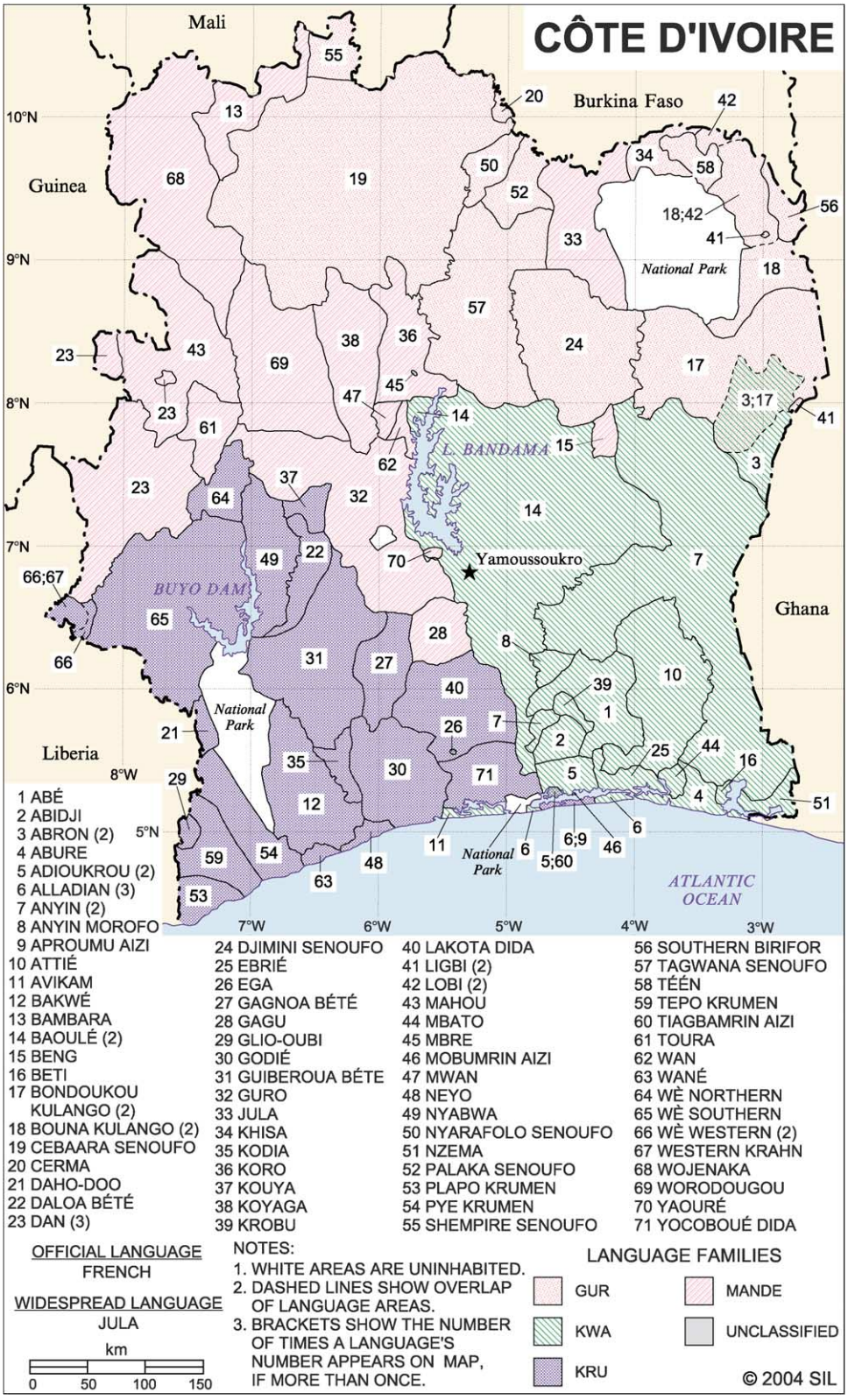

Map 6 Côte d'Ivoire.

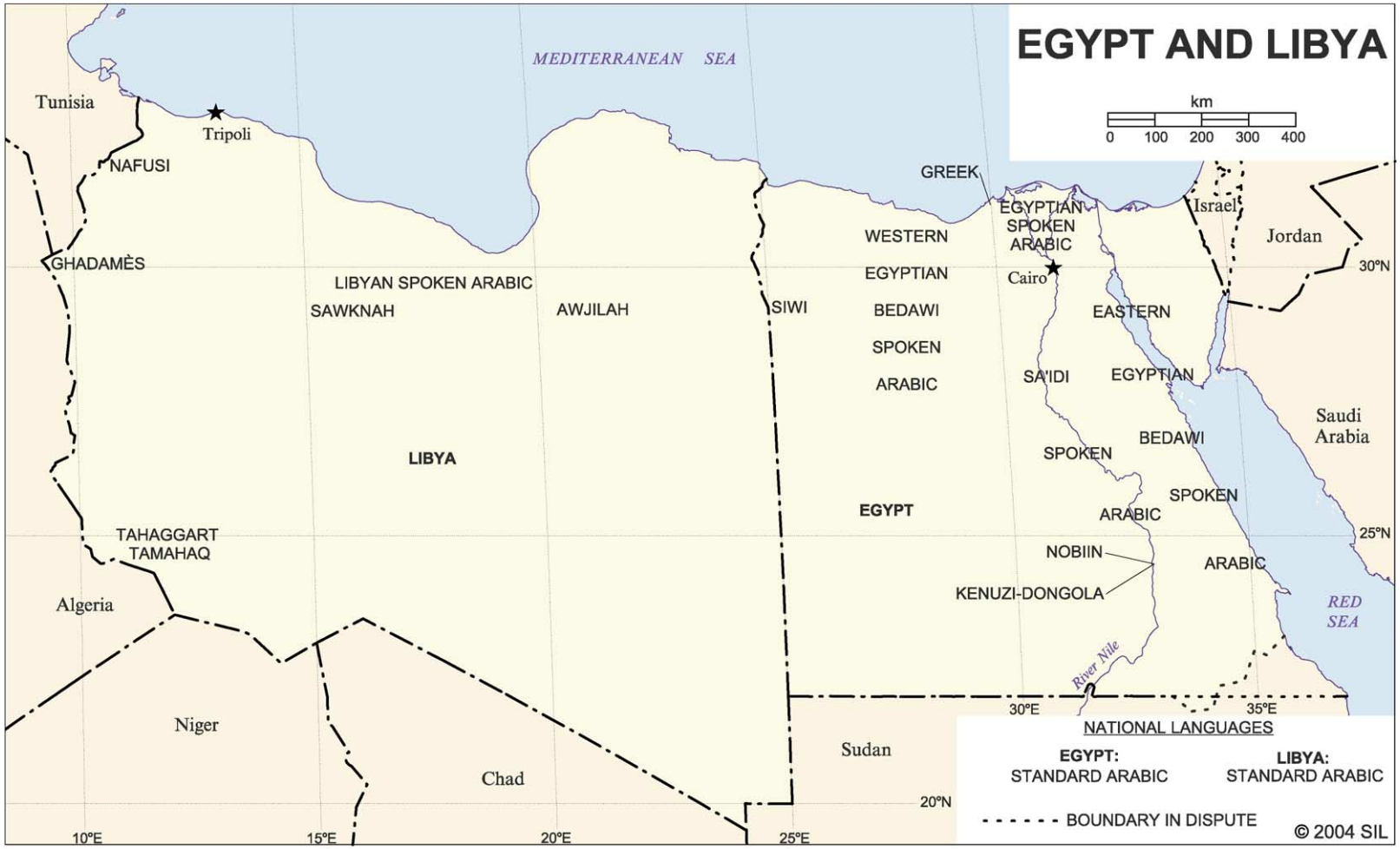

Map 7 Egypt and Libya.

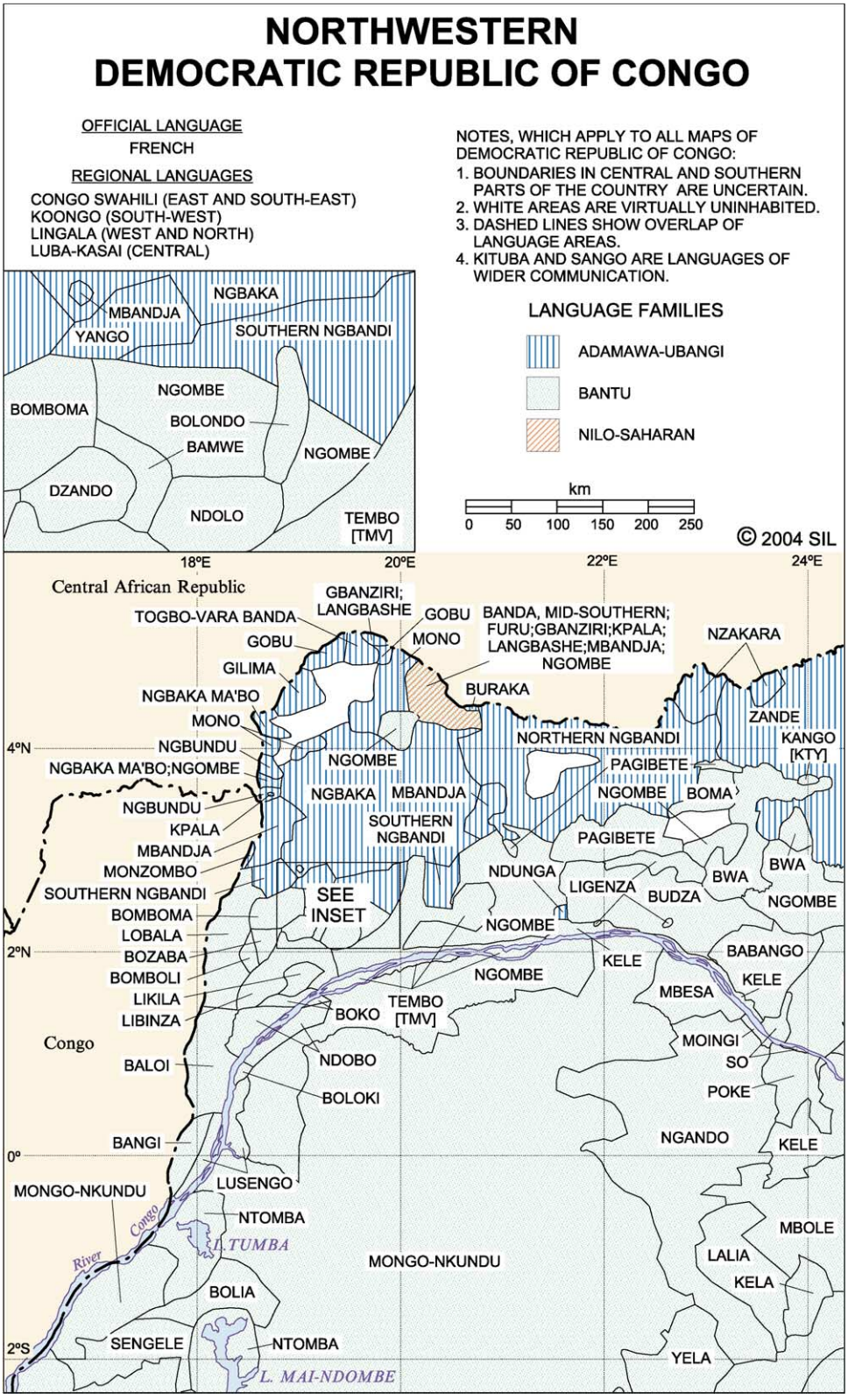

Map 8 Northwestern Democratic Republic of Congo.

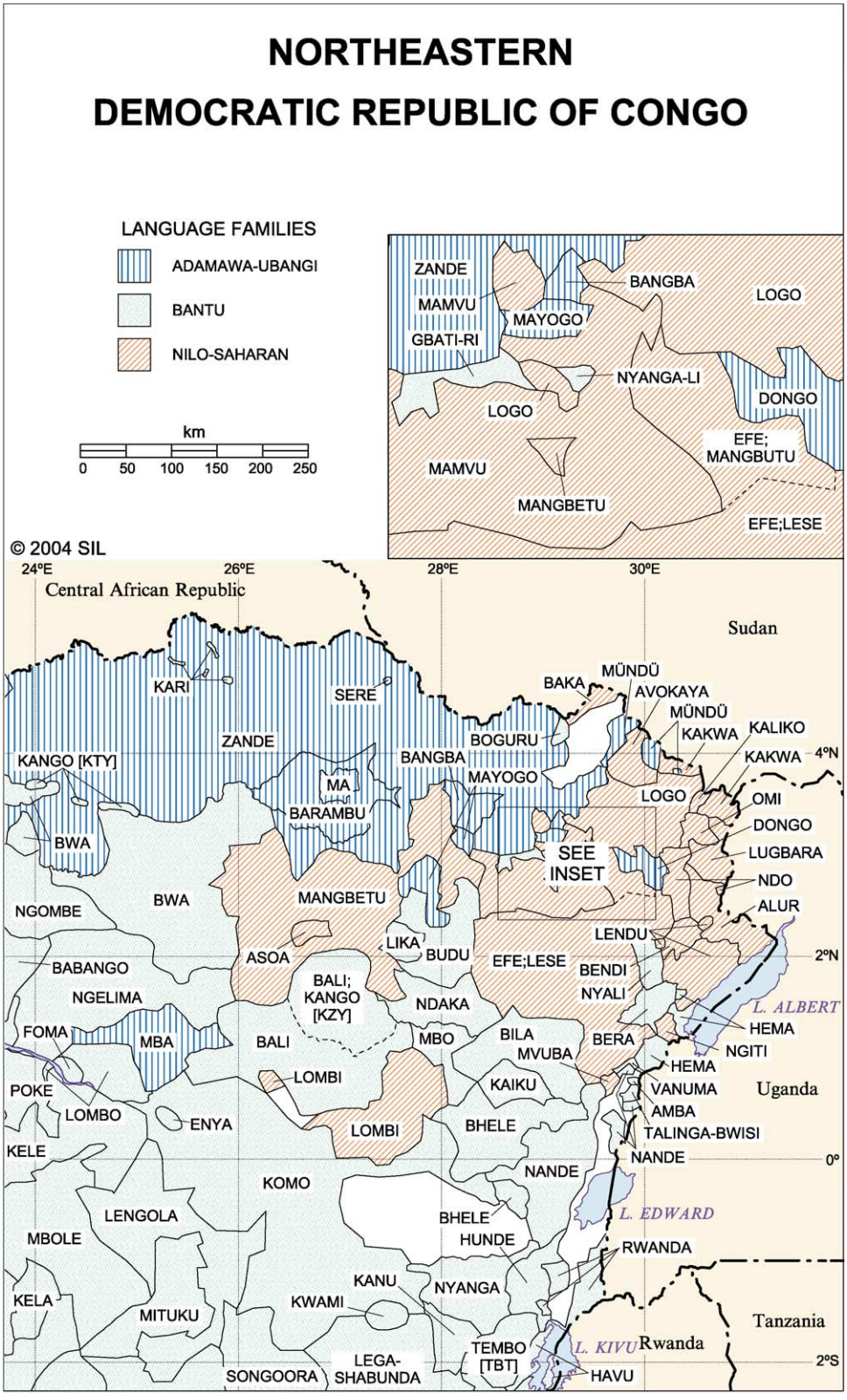

Map 9 Northeastern Democratic Republic of Congo.

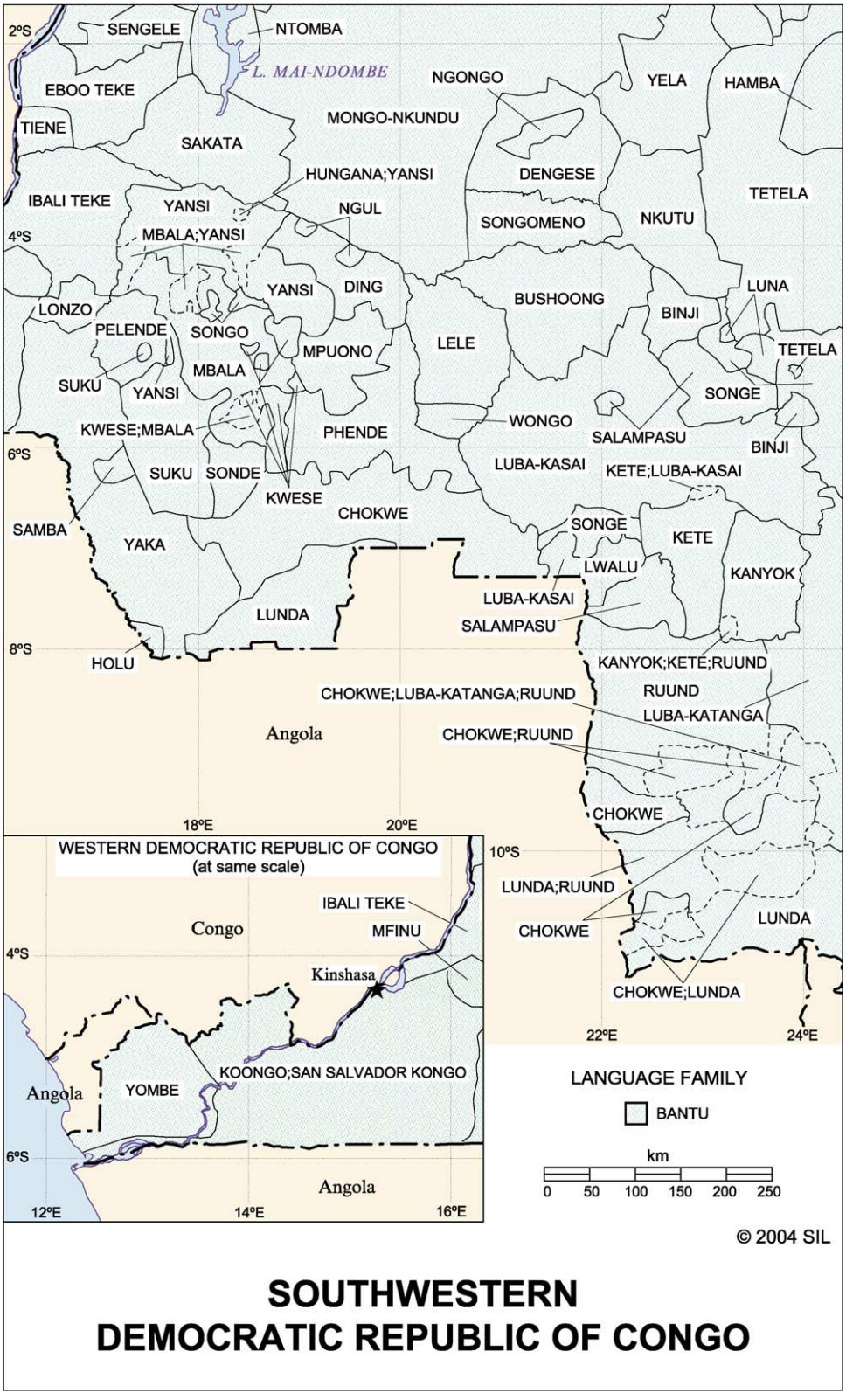

Map 10 Southwestern Democratic Republic of Congo.

Map 11 Southeastern Democratic Republic of Congo.

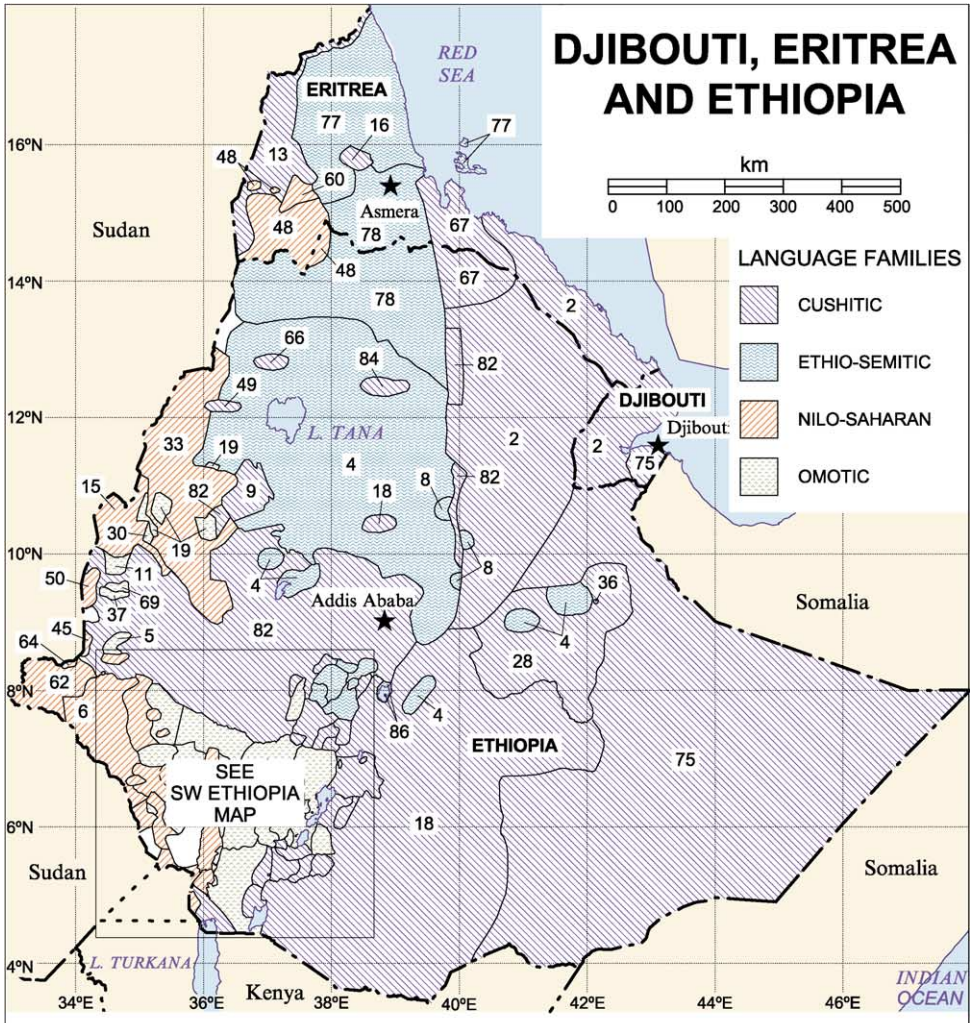

DJIBOUTI:

2 AFAR
75 SOMALI

ERITREA:

2 AFAR
13 BEDAWI
16 BILEN
48 KUNAMA (2)
60 NARA
67 SAHO
77 TIGRE (2)
78 TIGRIGNA

ETHIOPIA:

2 AFAR
4 AMHARIC (4)
5 ANFILLO
6 ANUAK
8 ARGOBBA (2)
9 AWNGI
11 BAMBASSI
15 BERTA
18 BORANA-ARSI-GUJI OROMO (2)
19 BORO (2)
28 EASTERN OROMO
30 GANZA
33 GUMUZ
36 HARARI
37 HOZO
45 KOMO
48 KUNAMA
49 KUNFAL
50 KWAMA
62 NUER
64 OPUUO
66 QIMANT
67 SAHO
69 SEZE
75 SOMALI
78 TIGRIGNA
82 WEST CENTRAL OROMO (4)
84 XAMTANGA
86 ZAY

- - - - - - - - - - -
BOUNDARY IN DISPUTE

NATIONAL LANGUAGES

DJIBOUTI:
FRENCH

ERITREA:
STANDARD ARABIC
ENGLISH

ETHIOPIA:
AMHARIC
ENGLISH
TIGRIGNA

OFFICIAL LANGUAGE

ERITREA:
TIGRIGNA

SCATTERED LANGUAGES

ERITREA:
STANDARD ARABIC
SUDANESE ARABIC
TA'IZZI-ADENI ARABIC

NOTES:
1. WHITE AREAS ARE VIRTUALLY UNINHABITED.
2. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON THE MAP OF ITS COUNTRY, IF MORE THAN ONCE.

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Map 12 Djibouti, Eritrea and Ethiopia.

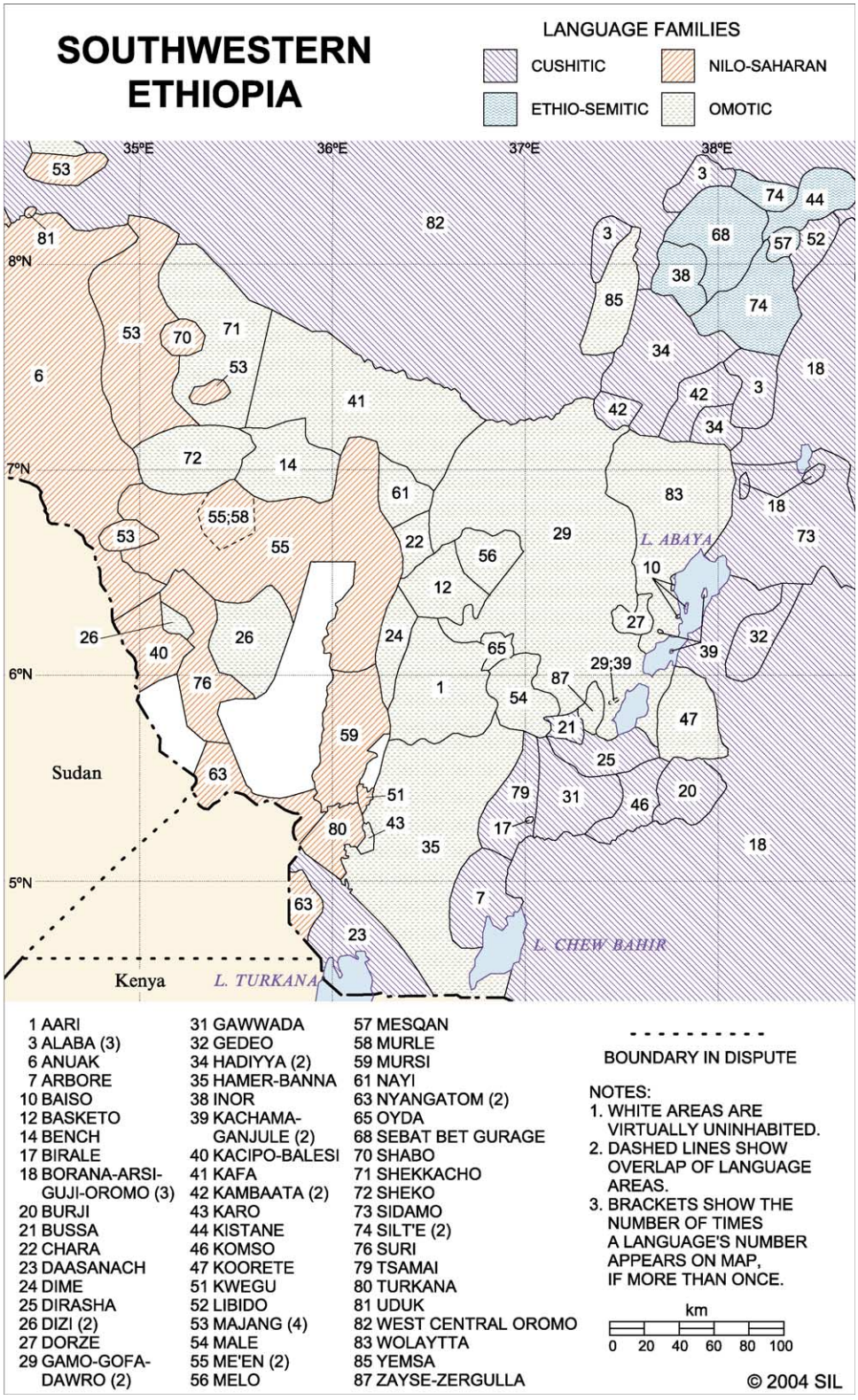

Map 13 Southwestern Ethiopia.

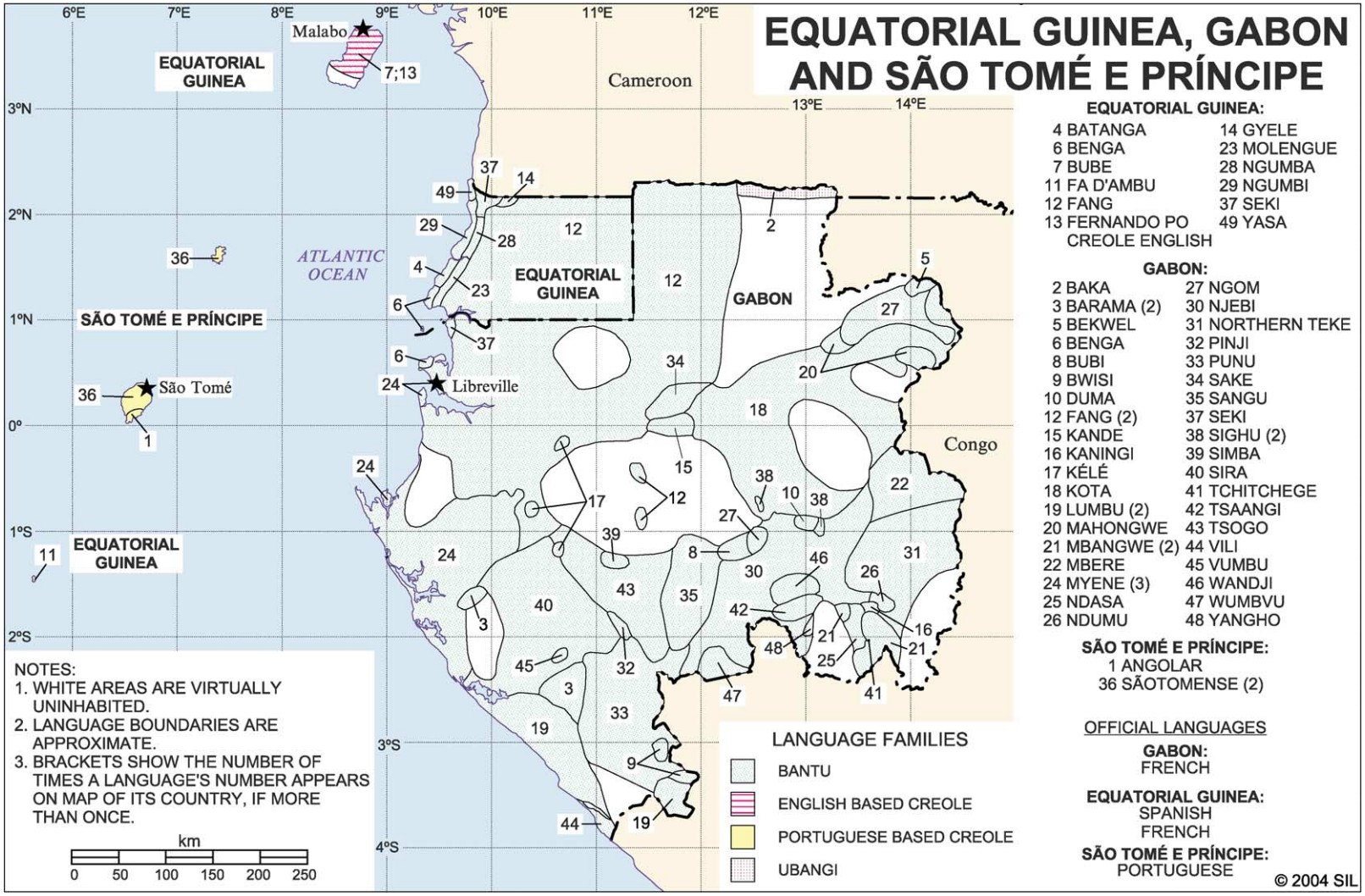

Map 14 Equatorial Guinea,Gabon and São Tomé e Príncipe.

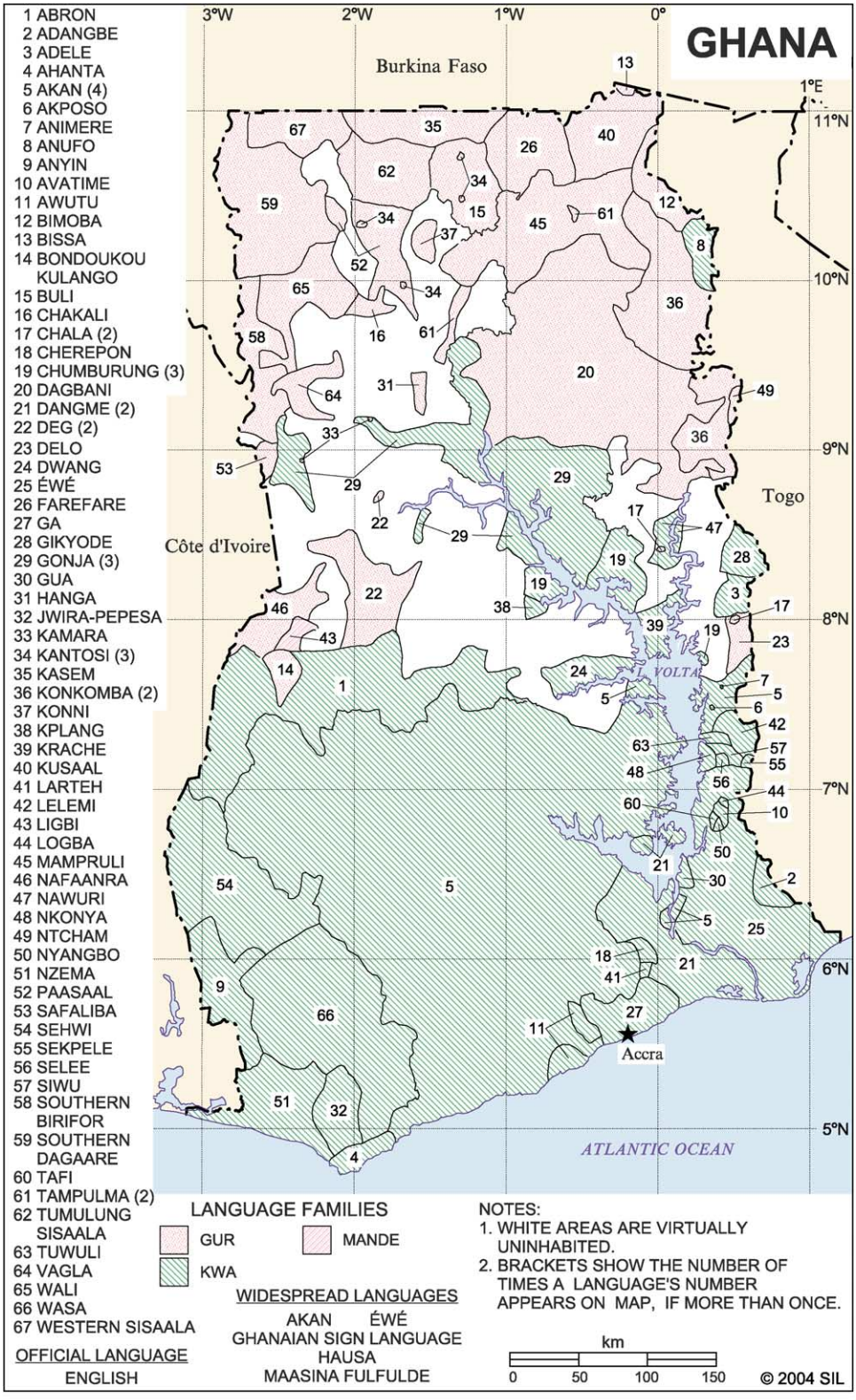
GHANA
1 ABRON
2 ADANGBE
3 ADELE
4 AHANTA
5 AKAN (4)
6 AKPOSO
7 ANIMERE
8 ANUFO
9 ANYIN
10 AVATIME
11 AWUTU
12 BIMOBA
13 BISSA
14 BONDOUKOU KULANGO
15 BULI
16 CHAKALI
17 CHALA (2)
18 CHEREPON
19 CHUMBURUNG (3)
20 DAGBANI
21 DANGME (2)
22 DEG (2)
23 DELO
24 DWANG
25 ÉWÉ
26 FAREFARE
27 GA
28 GIKYODE
29 GONJA (3)
30 GUA
31 HANGA
32 JWIRA-PEPESA
33 KAMARA
34 KANTOSI (3)
35 KASEM
36 KONKOMBA (2)
37 KONNI
38 KPLANG
39 KRACHE
40 KUSAAL
41 LARTEH
42 LELEMI
43 LIGBI
44 LOGBA
45 MAMPRULI
46 NAFAANRA
47 NAWURI
48 NKONYA
49 NTCHAM
50 NYANGBO
51 NZEMA
52 PAASAAL
53 SAFALIBA
54 SEHWI
55 SEKPELE
56 SELEE
57 SIWU
58 SOUTHERN BIRIFOR
59 SOUTHERN DAGAARE
60 TAFI
61 TAMPULMA (2)
62 TUMULUNG SISAALA
63 TUWULI
64 VAGLA
65 WALI
66 WASA
67 WESTERN SISAALA
OFFICIAL LANGUAGE
ENGLISH
3°W
2°W
1°W
0°
1°E
11°N
10°N
9°N
8°N
7°N
6°N
5°N
Burkina Faso
Togo
Côte d'Ivoire
VOLTA
Accra
ATLANTIC OCEAN
LANGUAGE FAMILIES
GUR
MANDE
KWA
WIDESPREAD LANGUAGES
AKAN
ÉWÉ
GHANAIAN SIGN LANGUAGE
HAUSA
MAASINA FULFULDE
NOTES:
1. WHITE AREAS ARE VIRTUALLY UNINHABITED.
2. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.
km
0
50
100
150
© 2004 SIL

Map 15 Ghana.

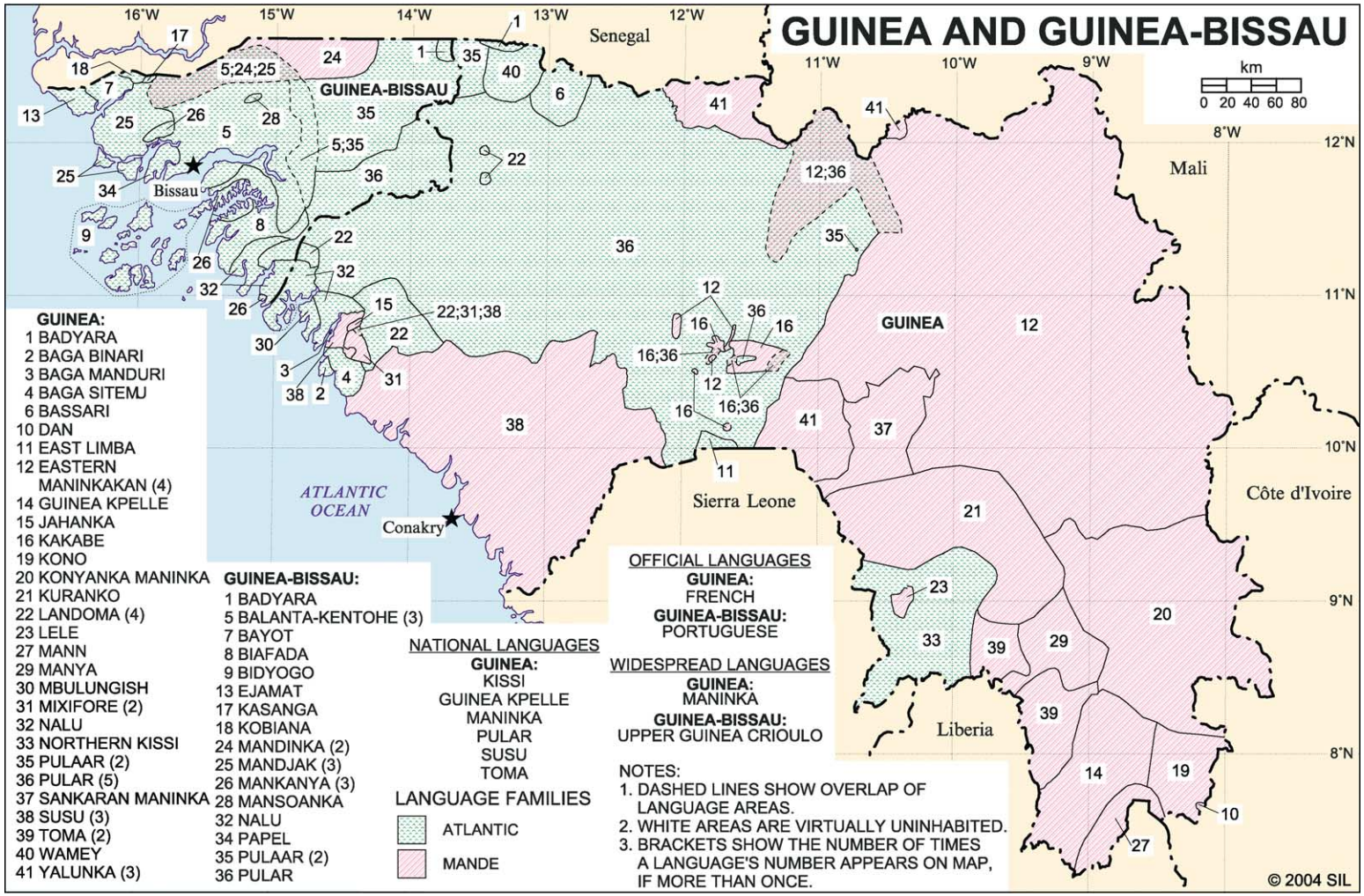

Map 16 Guinea and Guinea-Bissau.

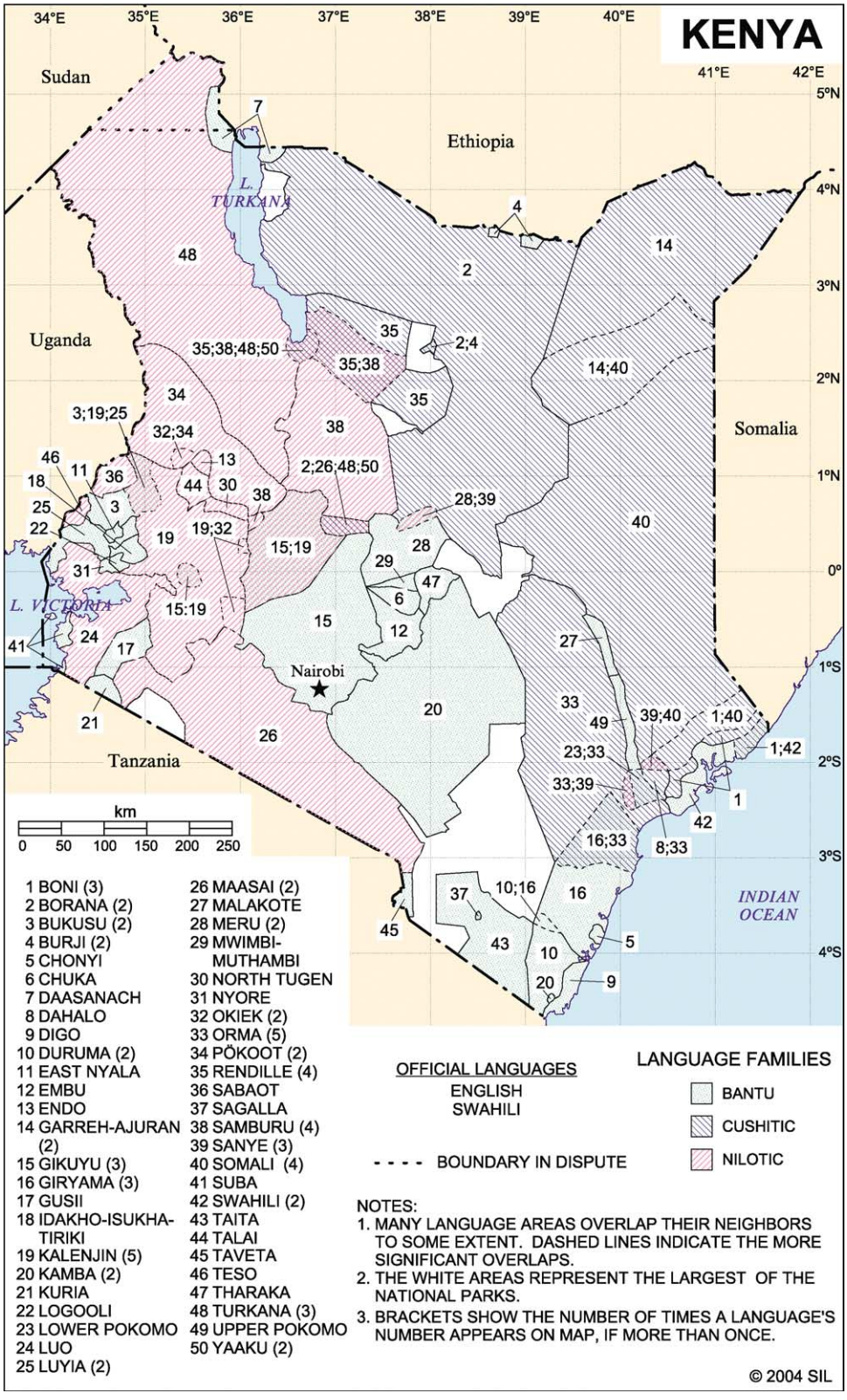
KENYA
34°E
35°E
36°E
37°E
38°E
39°E
40°E
41°E
42°E
5°N
4°N
3°N
2°N
1°N
0°
1°S
2°S
3°S
4°S
Sudan
Ethiopia
Uganda
Somalia
Tanzania
L. TURKANA
L. VICTORIA
Nairobi
INDIAN OCEAN
km
0 50 100 150 200 250
1 BONI (3)
2 BORANA (2)
3 BUKUSU (2)
4 BURJI (2)
5 CHONYI
6 CHUKA
7 DAASANACH
8 DAHALO
9 DIGO
10 DURUMA (2)
11 EAST NYALA
12 EMBU
13 ENDO
14 GARREH-AJURAN (2)
15 GIKUYU (3)
16 GIRYAMA (3)
17 GUSII
18 IDAKHO-ISUKHA-TIRIKI
19 KALENJIN (5)
20 KAMBA (2)
21 KURIA
22 LOGOOLI
23 LOWER POKOMO
24 LUO
25 LUYIA (2)
26 MAASAI (2)
27 MALAKOTE
28 MERU (2)
29 MWIMBI-MUTHAMBI
30 NORTH TUGEN
31 NYORE
32 OKIEK (2)
33 ORMA (5)
34 PÖKOOT (2)
35 RENDILLE (4)
36 SABAOT
37 SAGALLA
38 SAMBURU (4)
39 SANYE (3)
40 SOMALI (4)
41 SUBA
42 SWAHILI (2)
43 TAITA
44 TALAI
45 TAVETA
46 TESO
47 THARAKA
48 TURKANA (3)
49 UPPER POKOMO
50 YAAKU (2)
OFFICIAL LANGUAGES
ENGLISH
SWAHILI
- - - - BOUNDARY IN DISPUTE
LANGUAGE FAMILIES
BANTU
CUSHITIC
NILOTIC
NOTES:
1. MANY LANGUAGE AREAS OVERLAP THEIR NEIGHBORS TO SOME EXTENT. DASHED LINES INDICATE THE MORE SIGNIFICANT OVERLAPS.
2. THE WHITE AREAS REPRESENT THE LARGEST OF THE NATIONAL PARKS.
3. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.
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Map 17 Kenya.

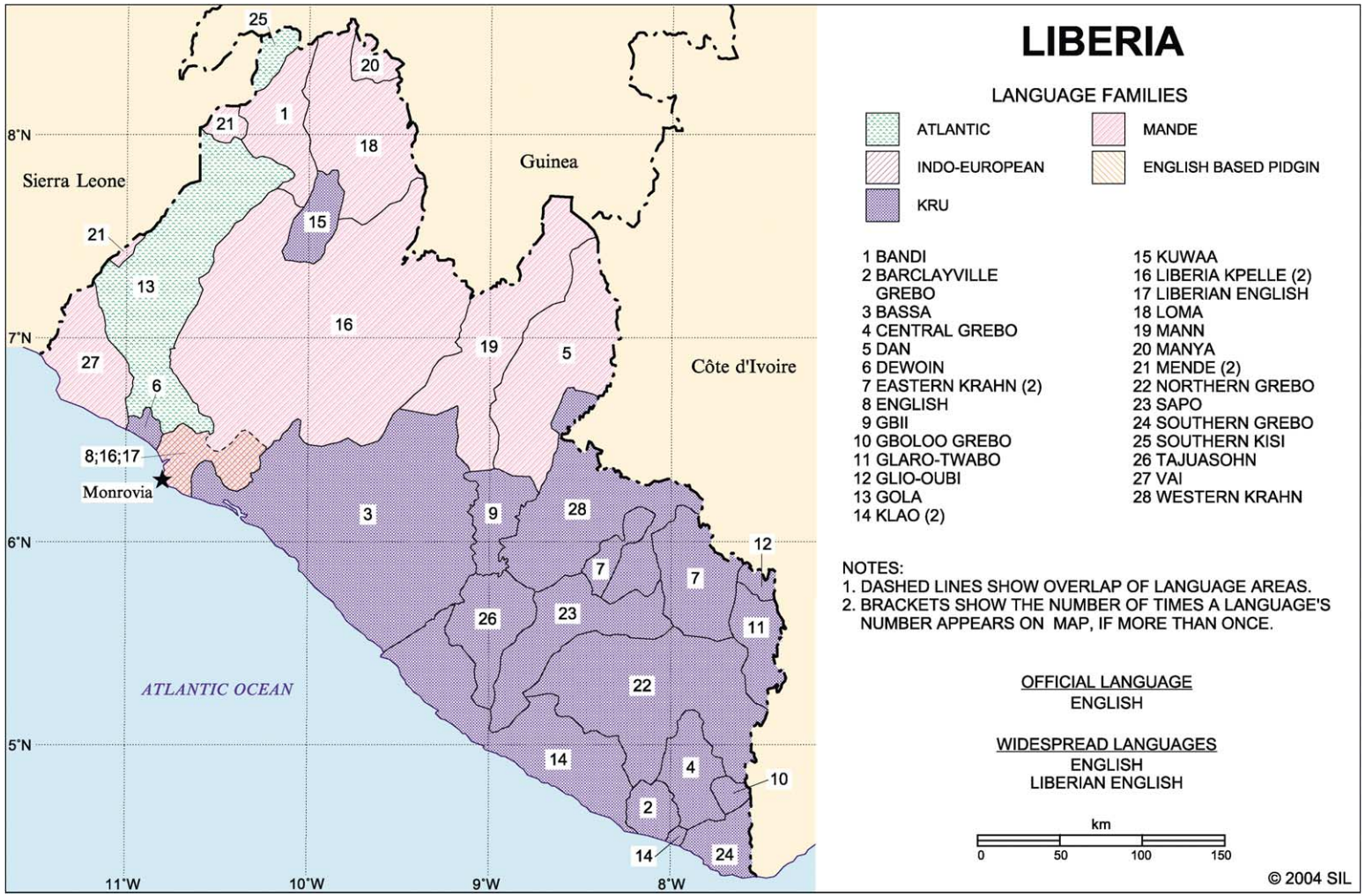

Map 18 Liberia.

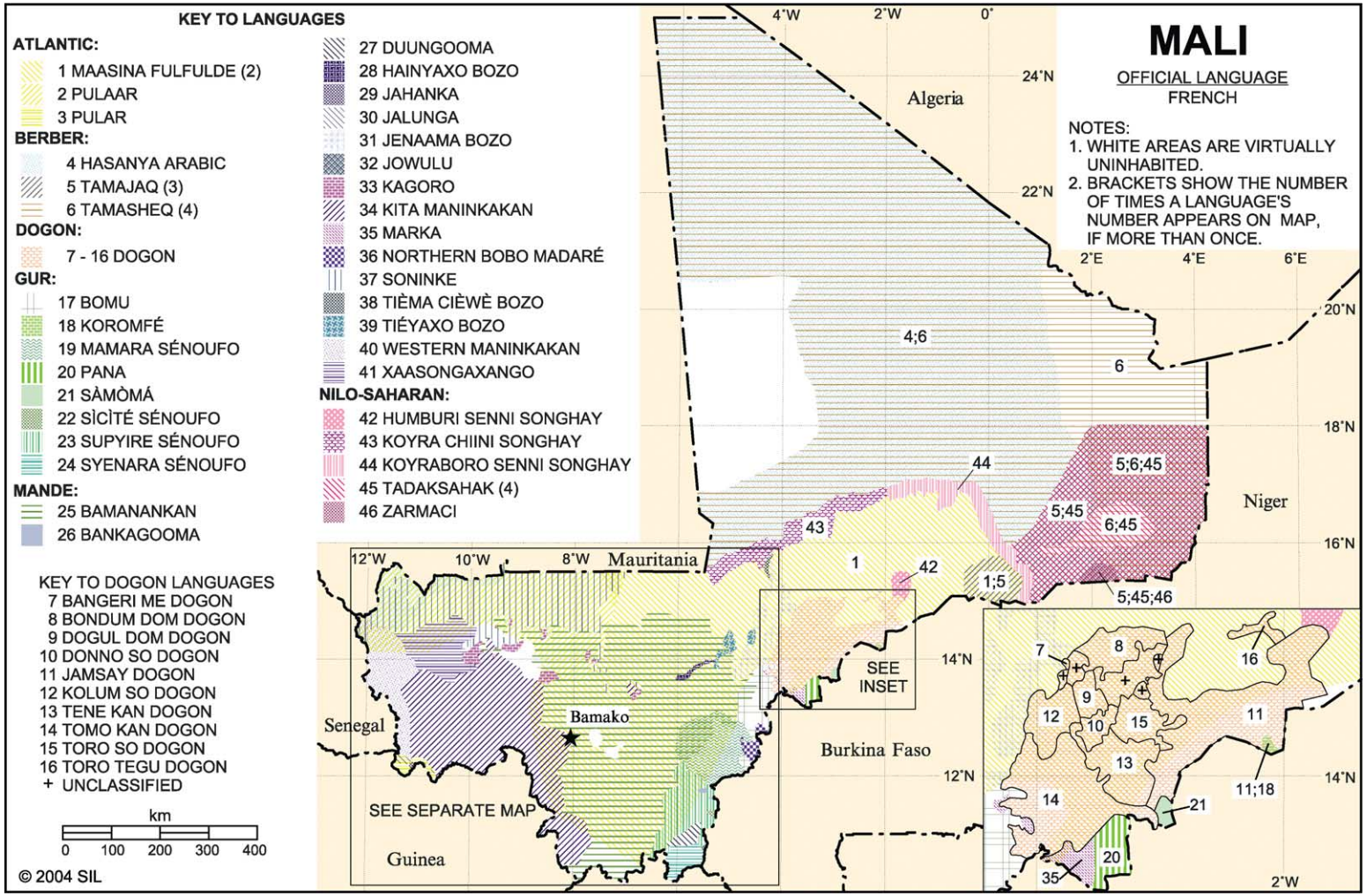
KEY TO LANGUAGES
ATLANTIC:
1 MAASINA FULFULDE (2)
2 PULAAR
3 PULAR
BERBER:
4 HASANYA ARABIC
5 TAMAJAQ (3)
6 TAMASHEQ (4)
DOGON:
7 - 16 DOGON
GUR:
17 BOMU
18 KOROMFÉ
19 MAMARA SÉNOUFO
20 PANA
21 SÀMÒMÁ
22 SÌCÌTÉ SÉNOUFO
23 SUPYIRE SÉNOUFO
24 SYENARA SÉNOUFO
MANDE:
25 BAMANANKAN
26 BANKAGOOMA
27 DUUNGOOMA
28 HAINYAXO BOZO
29 JAHANKA
30 JALUNGA
31 JENAAMA BOZO
32 JOWULU
33 KAGORO
34 KITA MANINKAKAN
35 MARKA
36 NORTHERN BOBO MADARÉ
37 SONINKE
38 TIÈMA CIÈWÈ BOZO
39 TIÉYAXO BOZO
40 WESTERN MANINKAKAN
41 XAASONGAXANGO
NILO-SAHARAN:
42 HUMBURI SENNI SONGHAY
43 KOYRA CHIINI SONGHAY
44 KOYRABORO SENNI SONGHAY
45 TADAKSAHAK (4)
46 ZARMACI
KEY TO DOGON LANGUAGES
7 BANGERI ME DOGON
8 BONDUM DOM DOGON
9 DOGUL DOM DOGON
10 DONNO SO DOGON
11 JAMSAY DOGON
12 KOLUM SO DOGON
13 TENE KAN DOGON
14 TOMO KAN DOGON
15 TORO SO DOGON
16 TORO TEGU DOGON
+ UNCLASSIFIED
km
0 100 200 300 400
© 2004 SIL
MALI
OFFICIAL LANGUAGE
FRENCH
NOTES:
1. WHITE AREAS ARE VIRTUALLY UNINHABITED.
2. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.
Algeria
Niger
Mauritania
Senegal
Guinea
Burkina Faso
Bamako
SEE INSET
SEE SEPARATE MAP
4;6
6
44
5;6;45
5;45
6;45
43
1
42
1;5
5;45;46
11;18
21
20
35
4°W
2°W
0°
24°N
22°N
2°E
4°E
6°E
20°N
18°N
16°N
14°N
12°N
12°W
10°W
8°W

Map 19 Mali.

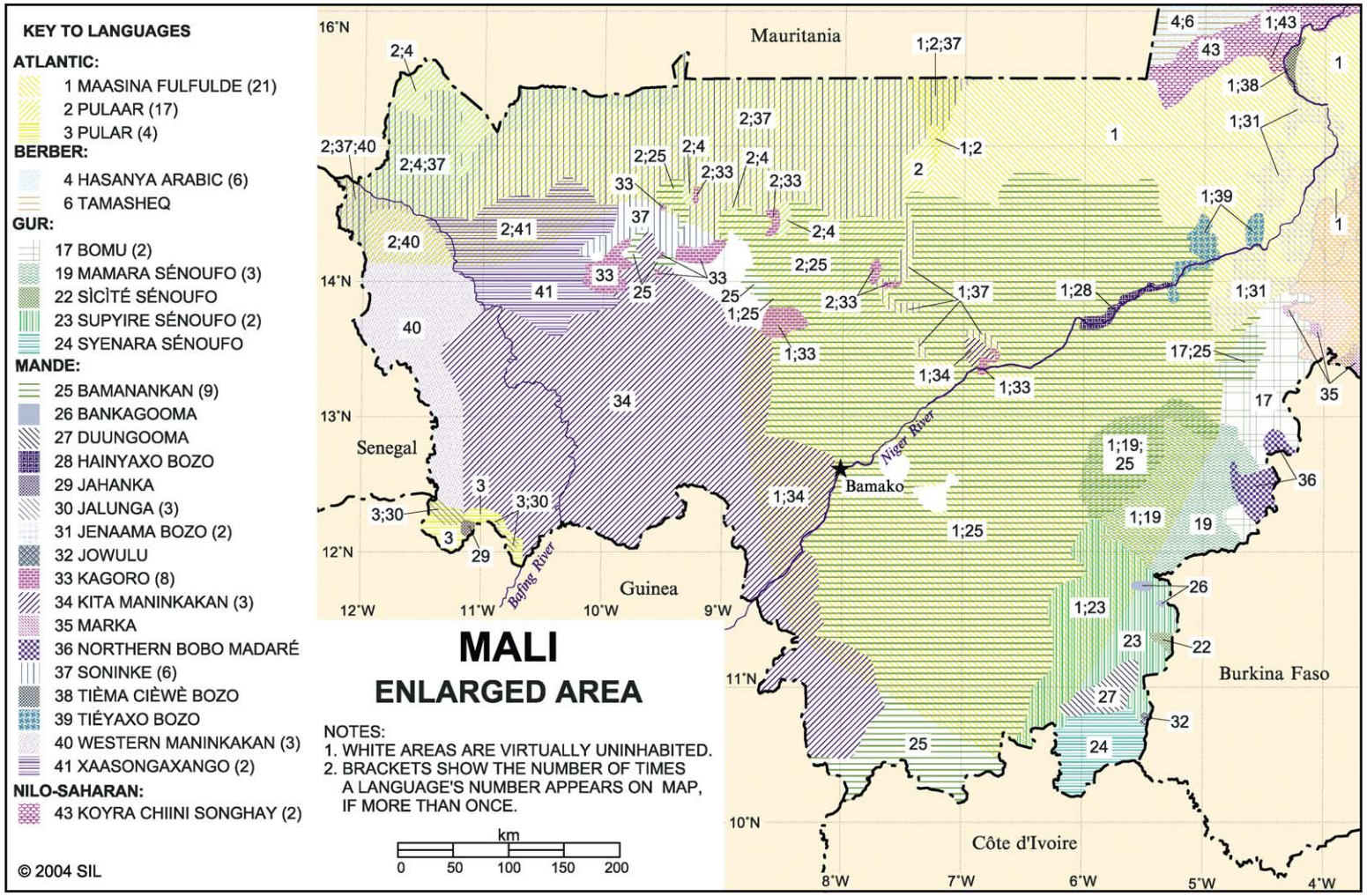

Map 20 Mali, Enlarged Area.

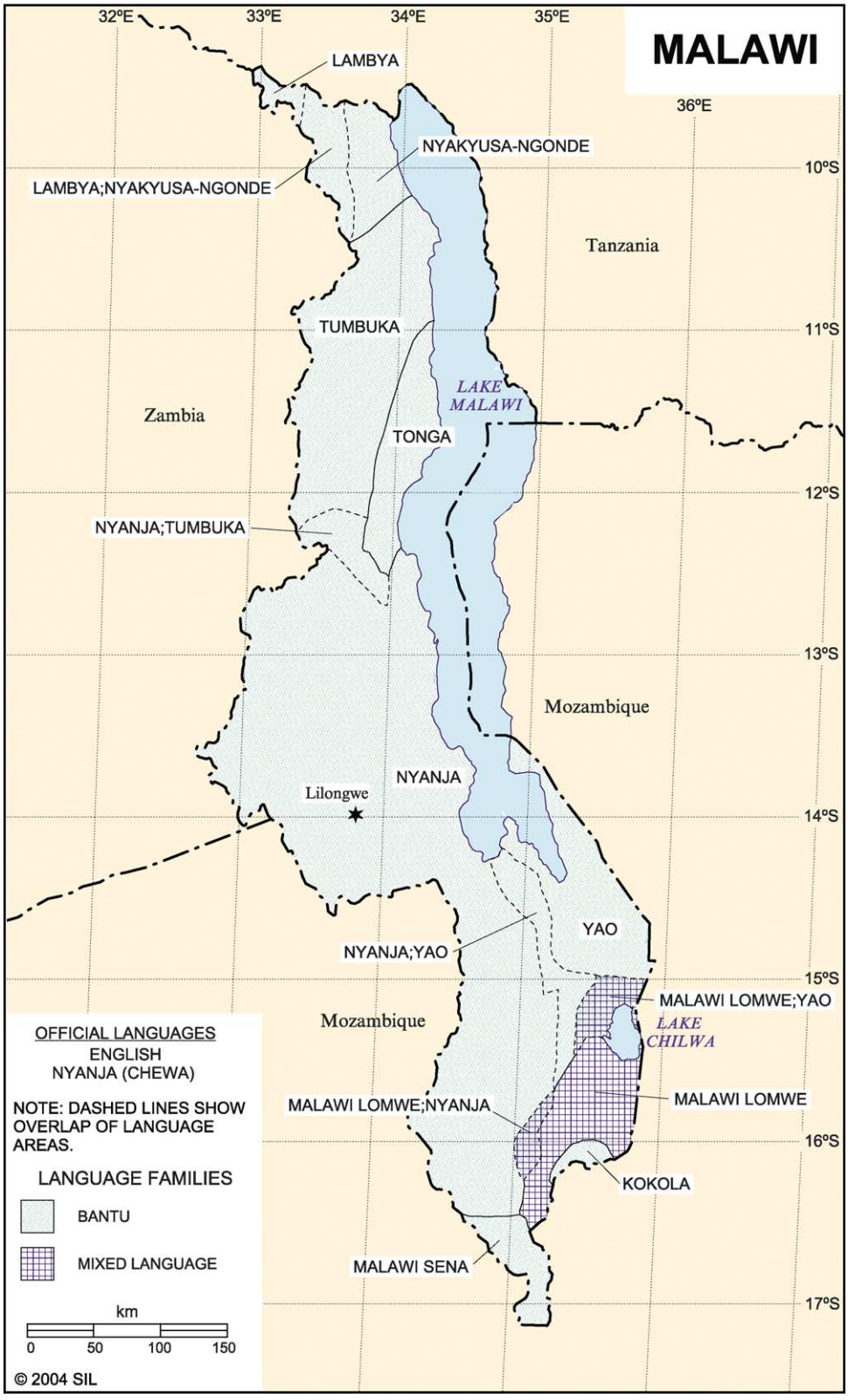

Map 21 Malawi.

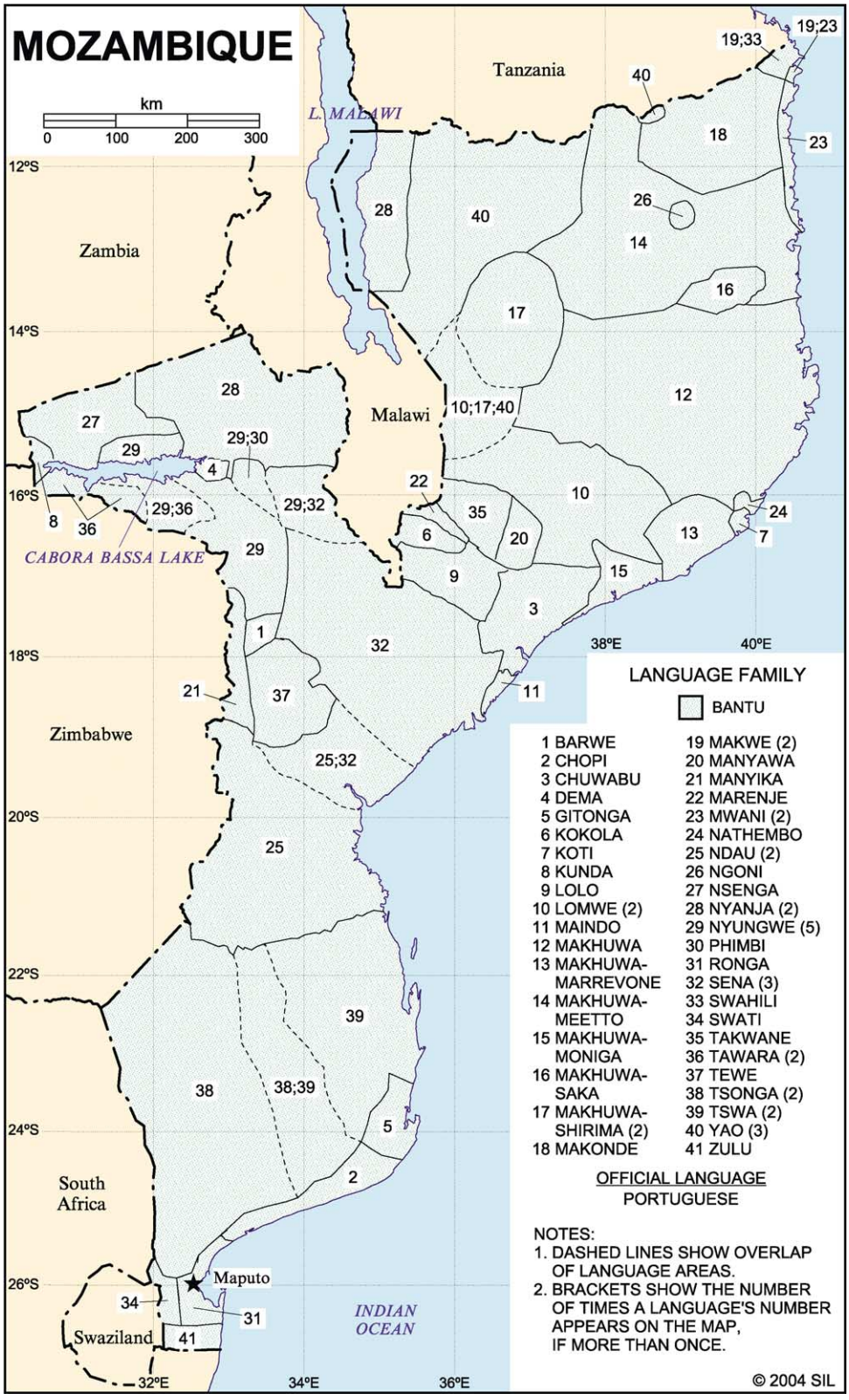

Map 22 Mozambique.

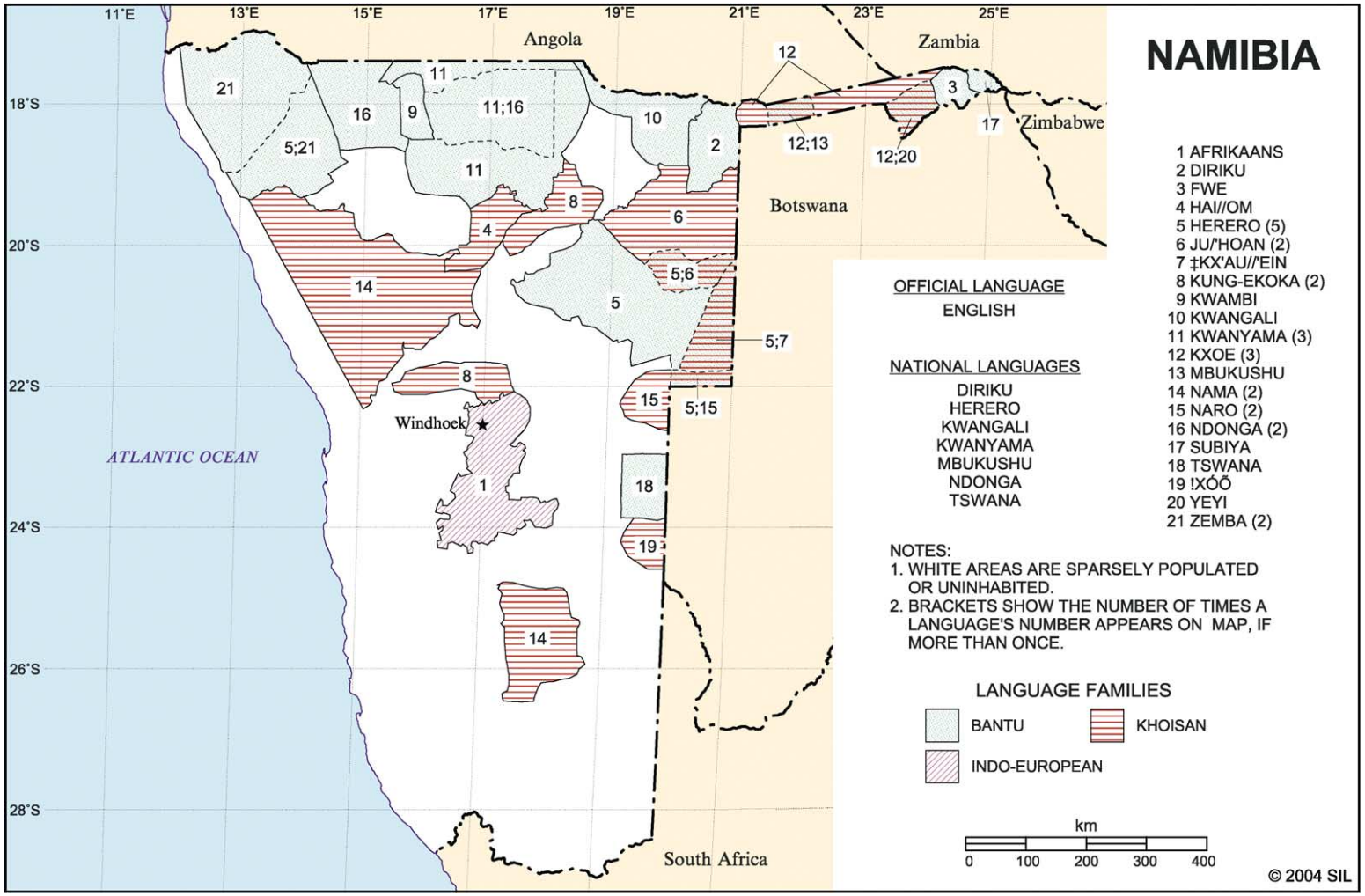

Map 23 Namibia.

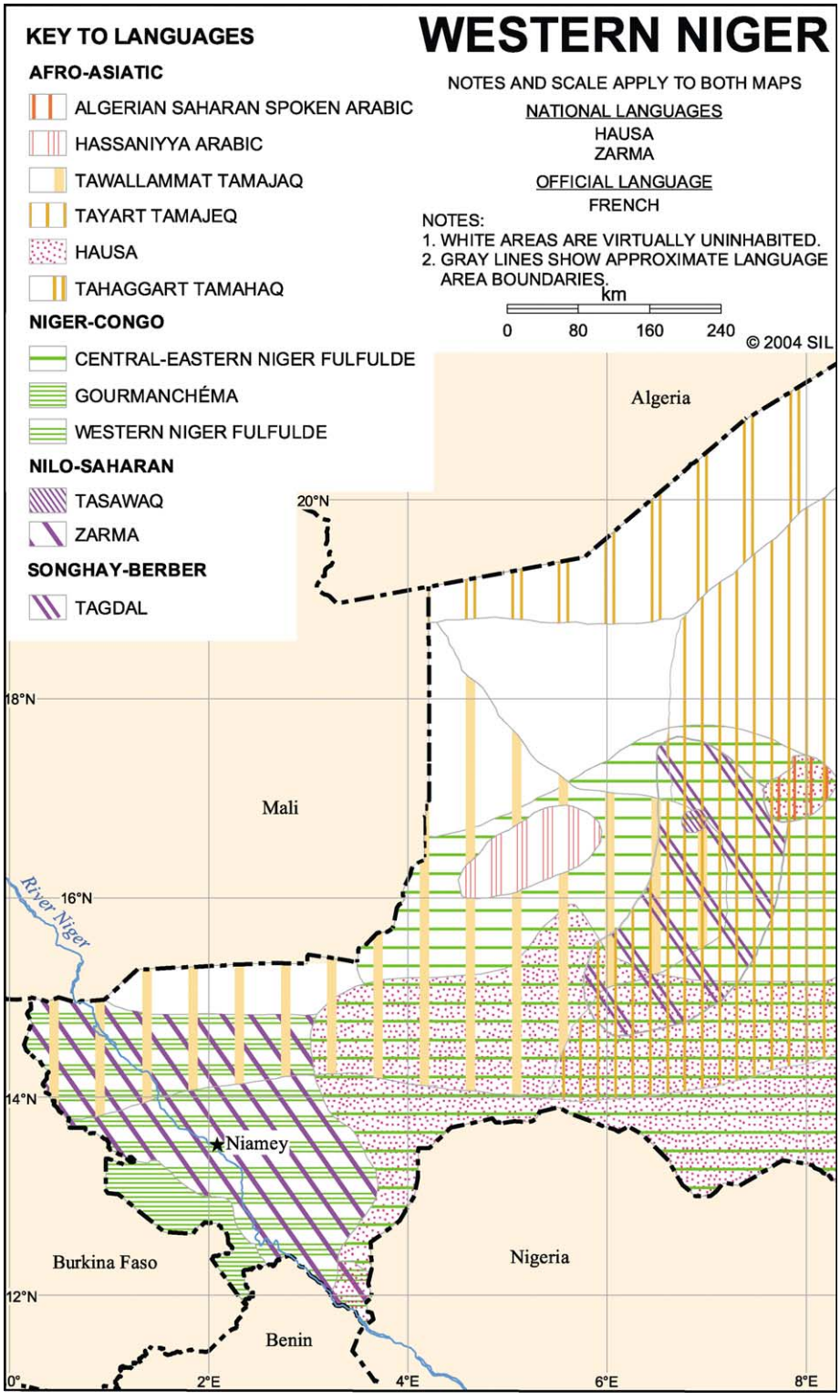

Map 24 Western Niger.

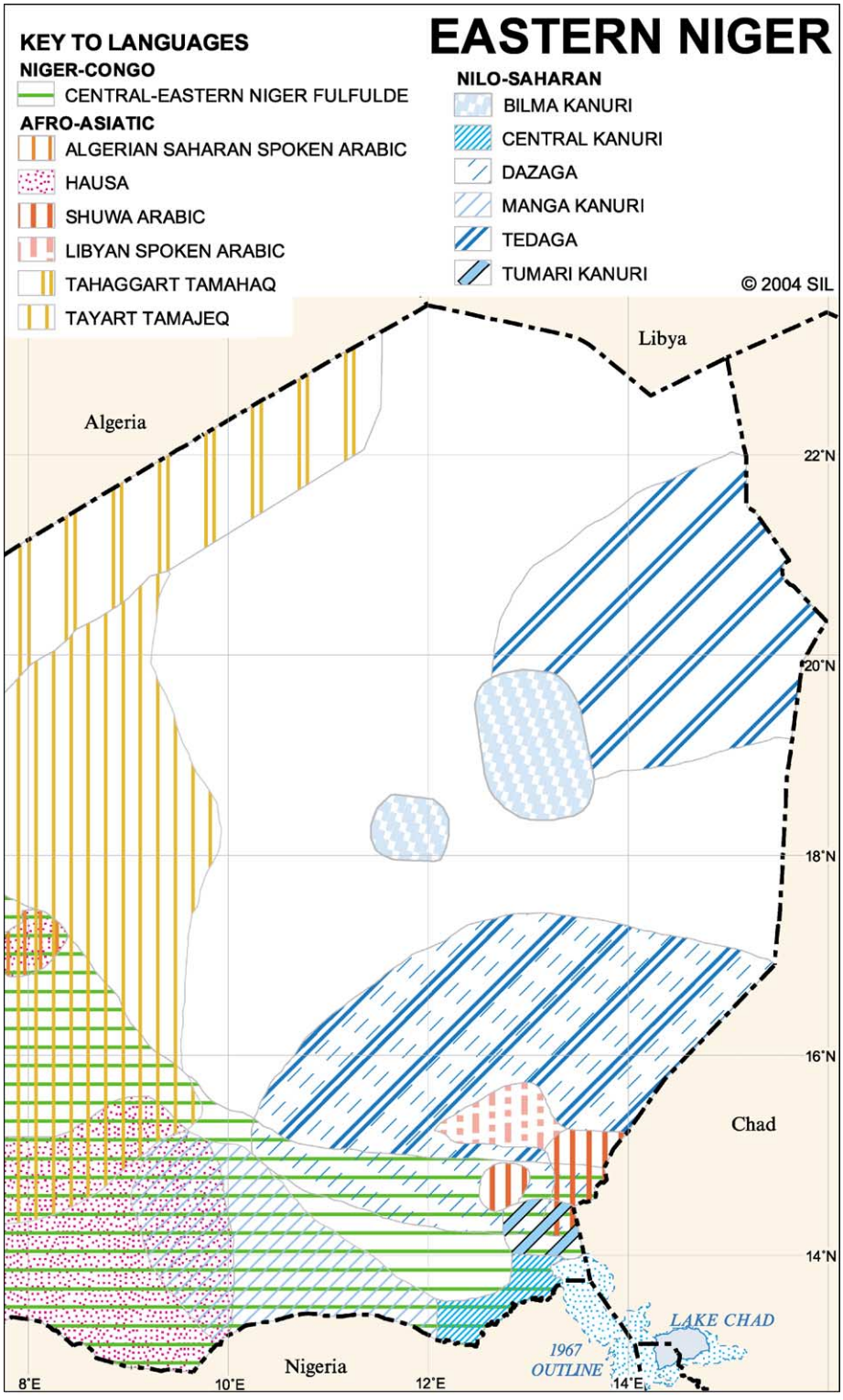

Map 25 Eastern Niger.

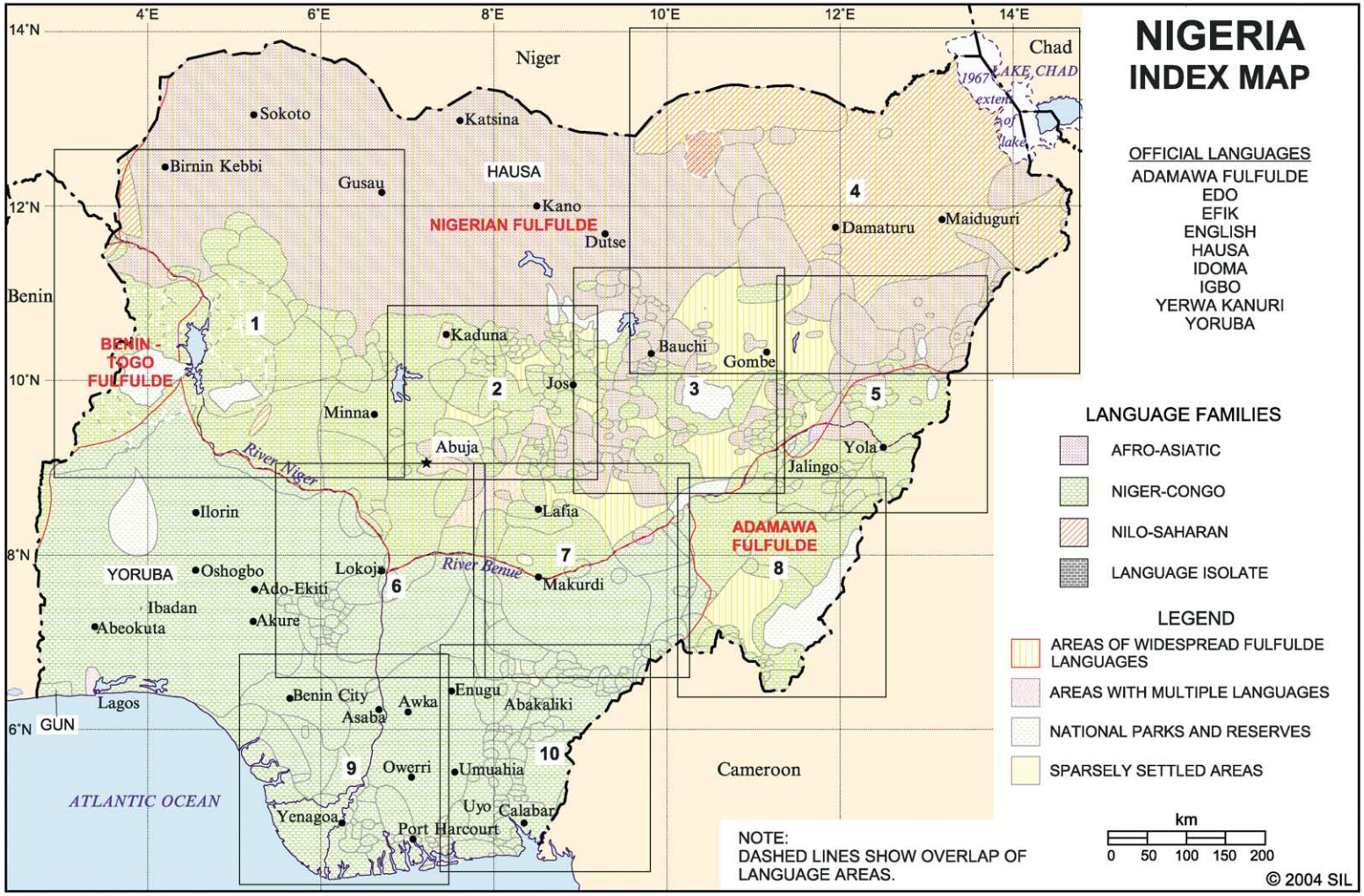

Map 26 Nigeria: Index Map.

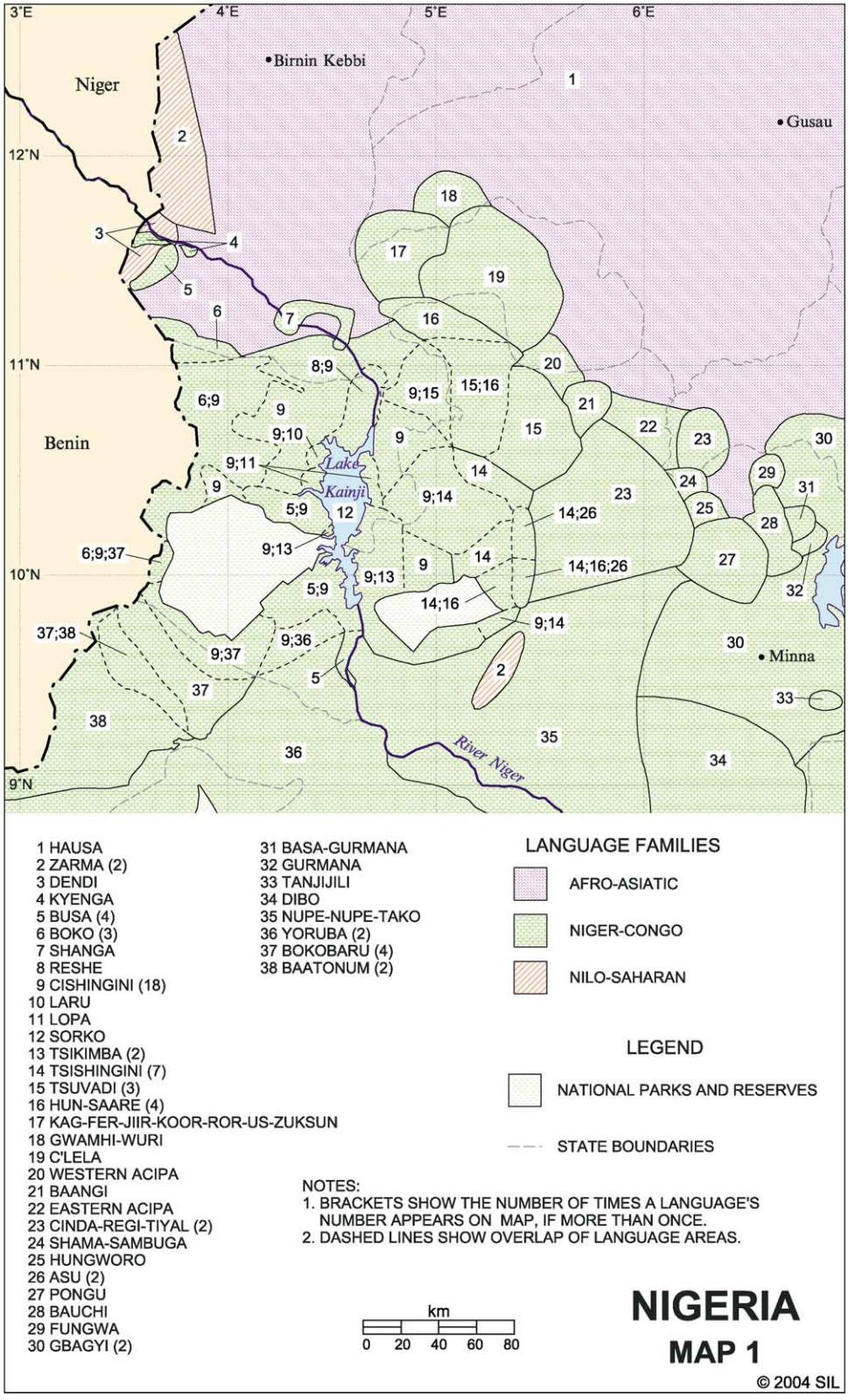

Map 27 Nigeria, Map 1.

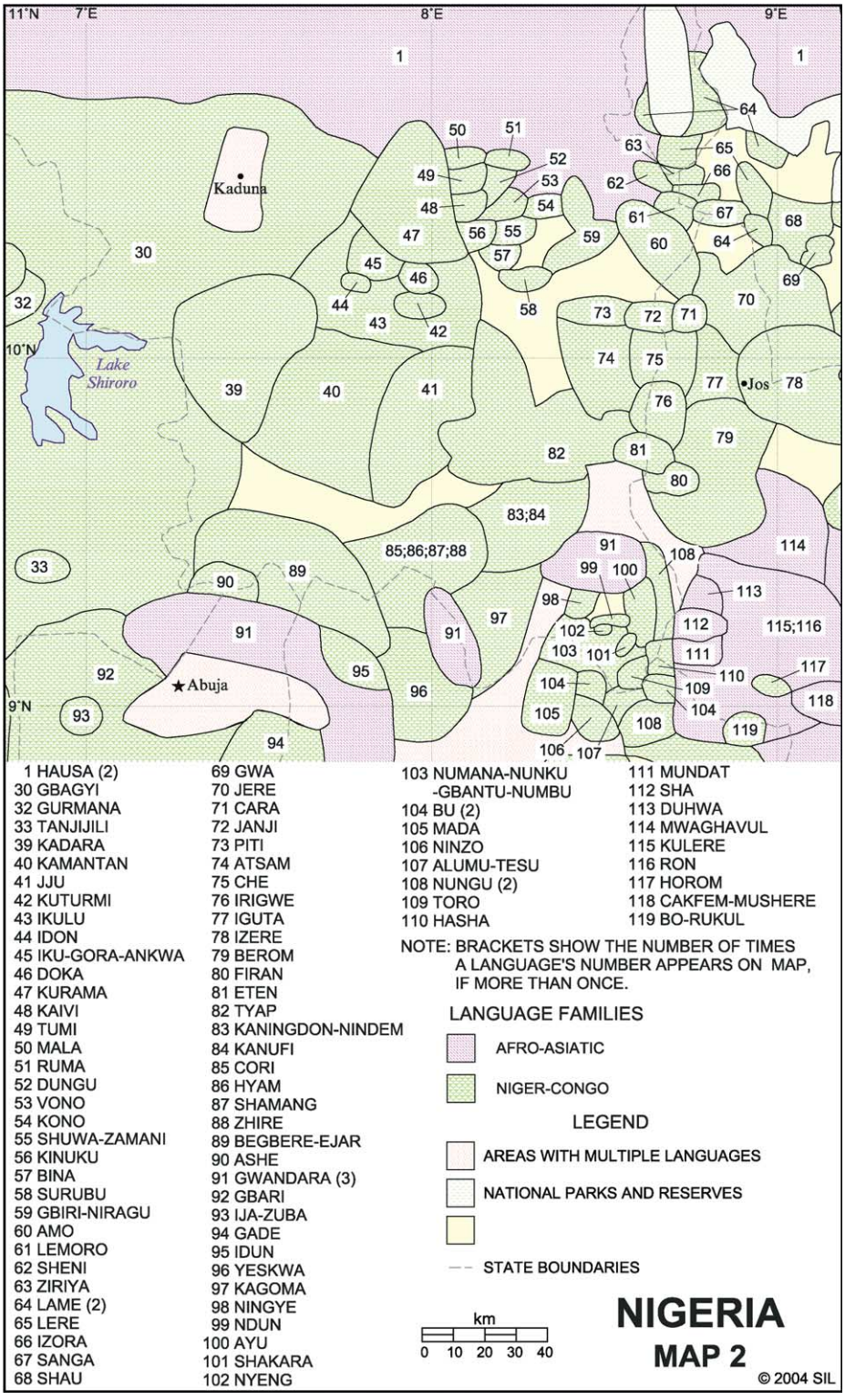

Map 28 Nigeria, Map 2.

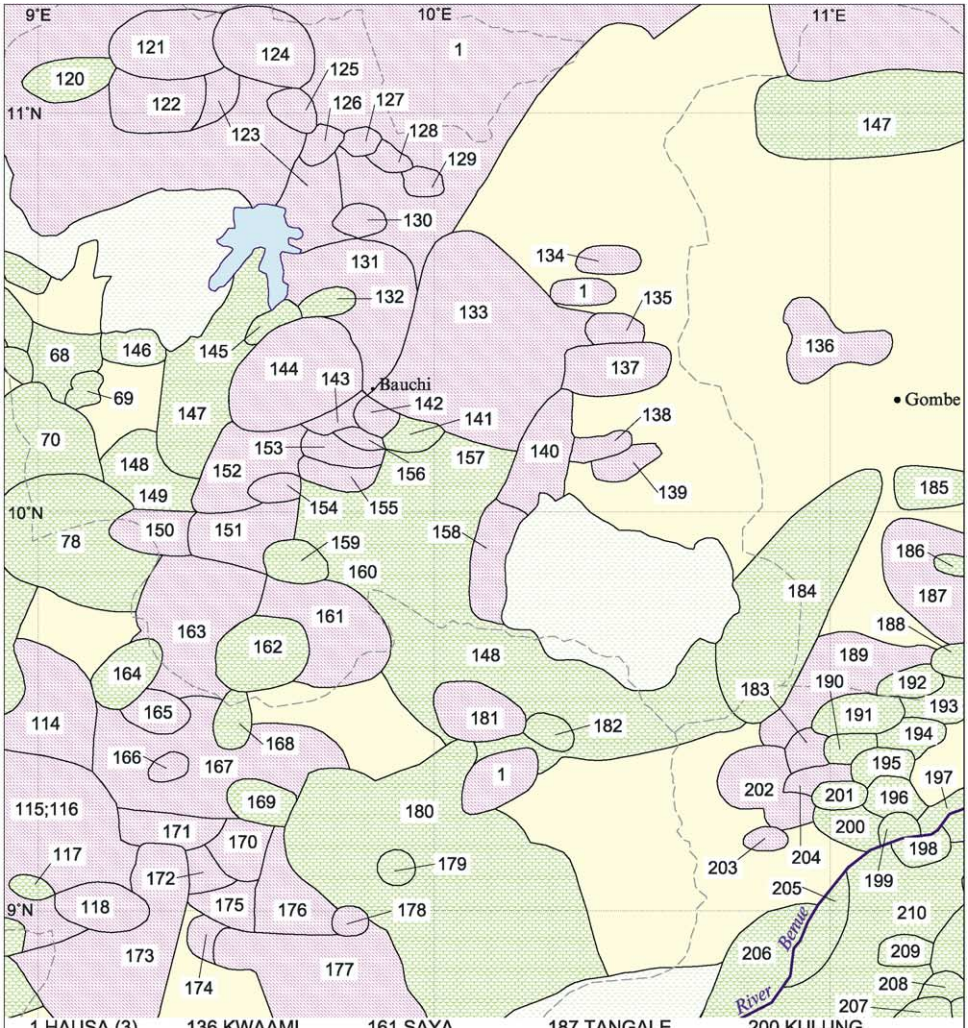

1 HAUSA (3)
68 SHAU
69 GWA
70 JERE
78 IZERE
114 MWAGHAVUL
115 KULERE
116 RON
117 HOROM
118 CAKFEM -MUSHERE
120 KUDU-CAMO
121 DIRI
122 PA'A
123 SIRI
124 WARJI
125 KARIYA
126 MIYA
127 MBURKU
128 CIWOGAI
129 ZUMBUN
130 JIMI
131 GERUMA
132 SHIKI
133 GERA
134 DENO
135 BURE
136 KWAAMI
137 GIIWO
138 BEELE
139 DAZA
140 GALAMBU
141 DULBU
142 TALA
143 ZANGWAL
144 GEJI
145 LABIR
146 GYEM
147 NIGERIAN FULFULDE (2)
148 JARAWA* (2)
149 DUGUZA*
150 ZEEM
151 DASS
152 POLCI
153 KIR-BALAR
154 LURI
155 MANGAS
156 JU
157 DUGURI*
158 GURUNTUM -MBAARU
159 SHALL-ZWALL
160 BADA*
161 SAYA
162 VAGHAT-YA -BIJIM-LEGERI
163 ZARI
164 FYAM
165 FYER
166 TAMBAS
167 NGAS
168 SUR
169 PE
170 TAL
171 MISHIP
172 PYAPUN
173 KOFYAR
174 JORTO
175 KOENOEM
176 MONTOL
177 GOEMAI
178 YIWOM
179 WĀPHA
180 TAROK
181 BOGHOM
182 YANGKAM
183 KUSHI
184 HÖNE
185 KAMO
186 AWAK
187 TANGALE
188 DADIYA
189 PERO
190 LOO
191 BURAK
192 BANGWINJI
193 KYAK
194 MOO
195 MAK
196 LEELAU
197 MINGANG DOSO
198 LAKA
199 THA
200 KULUNG
201 MÁGHDÌ
202 PIYA-KWONCI
203 NYAM
204 KHOLOK
205 SHOO-MINDA-NYE
206 COMO KARIM
207 KPASAM
208 BALI
209 BILE
210 ADAMAWA FULFULDE

* BADA, DUGURI, DUGUZA AND JARAWA FORM A LANGUAGE CLUSTER; LABELS SHOW WHERE EACH IS PREDOMINANT.

SEE MAP 2 FOR LEGEND AND NOTES.

LANGUAGE FAMILIES

AFRO-ASIATIC

NIGER-CONGO

km 0 10 20 30 40

NIGERIA
MAP 3

© 2004 SIL

Map 29 Nigeria, Map 3.

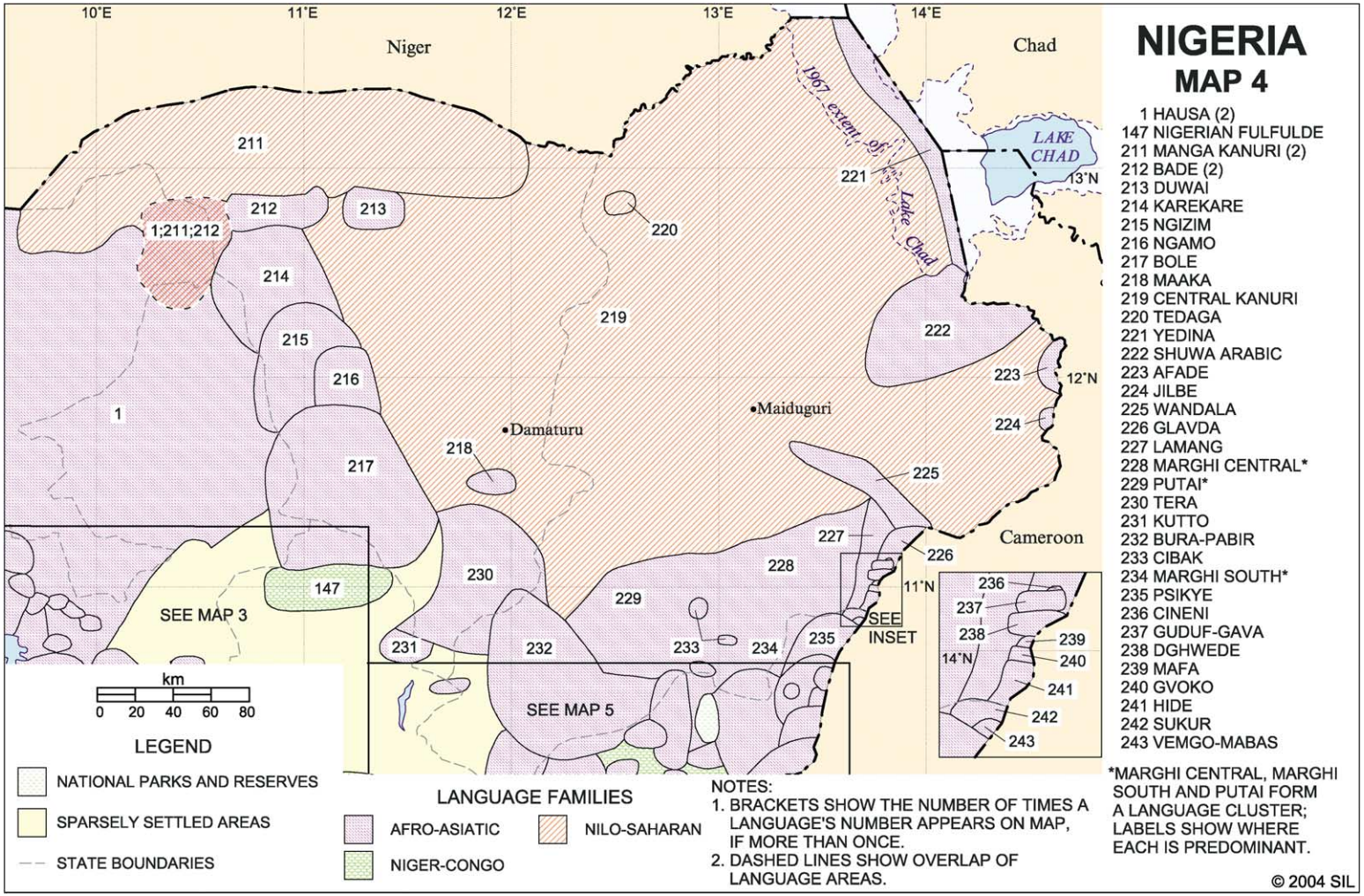

Map 30 Nigeria, Map 4.

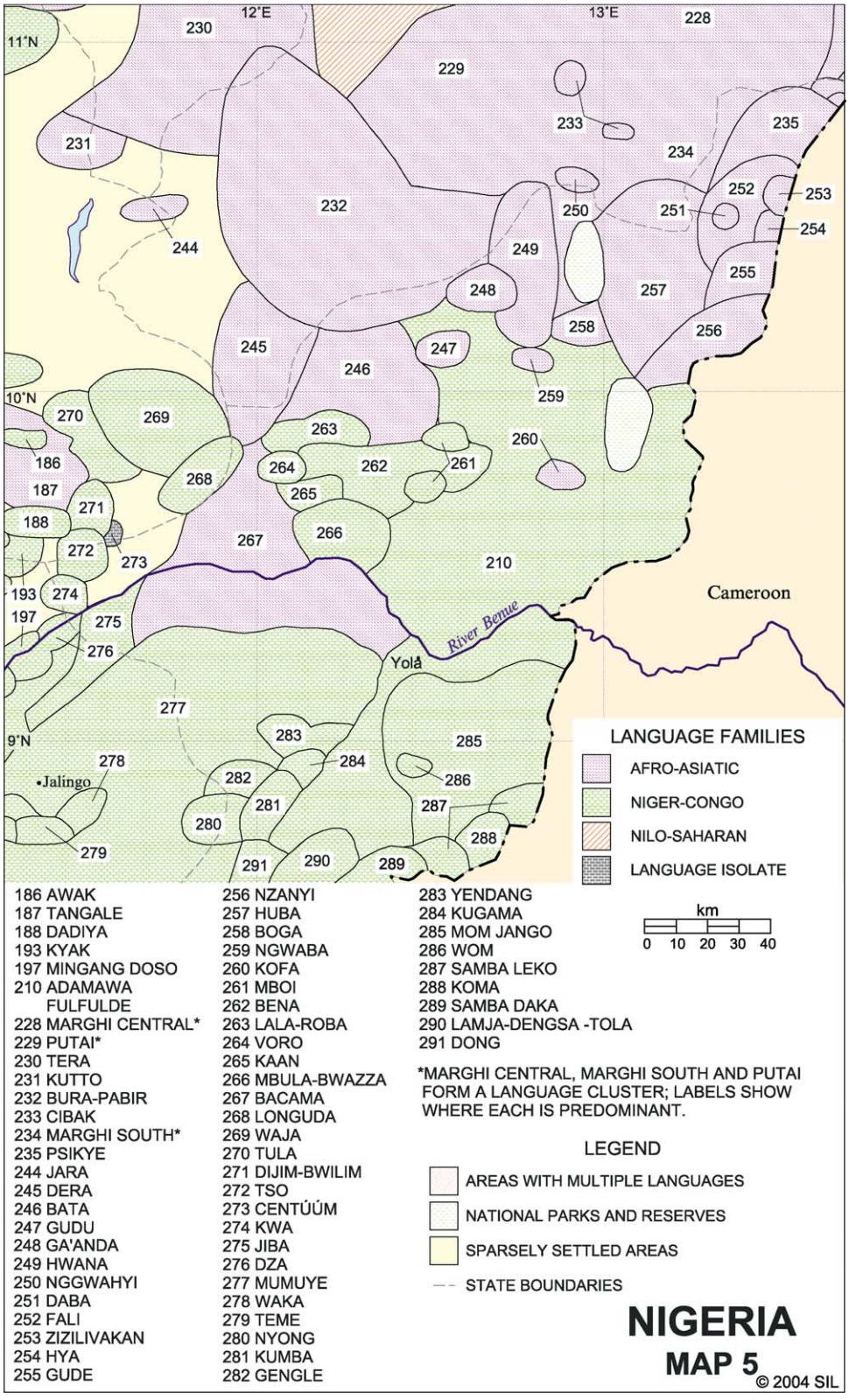

Map 31 Nigeria, Map 5.

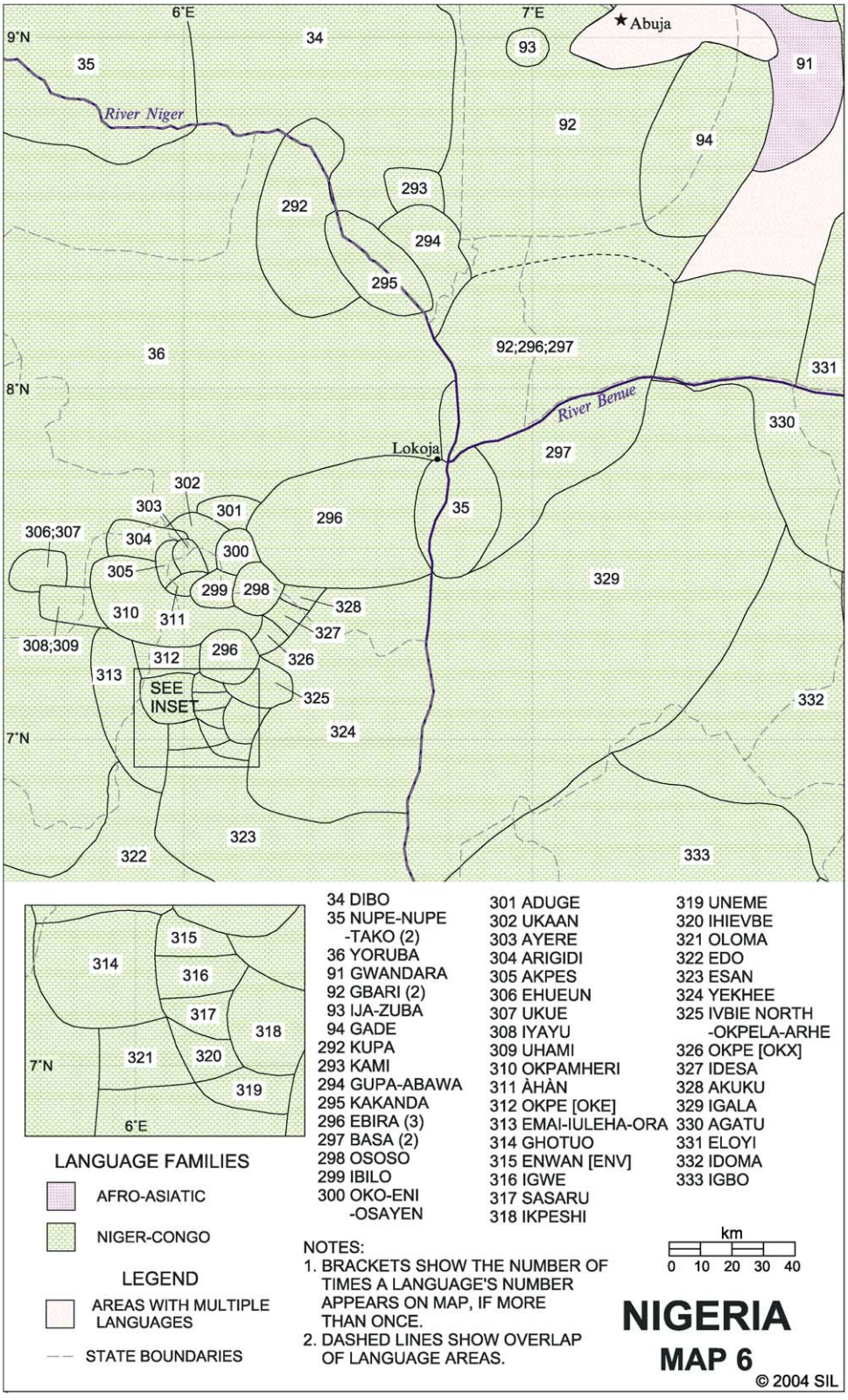

Map 32 Nigeria, Map 6.

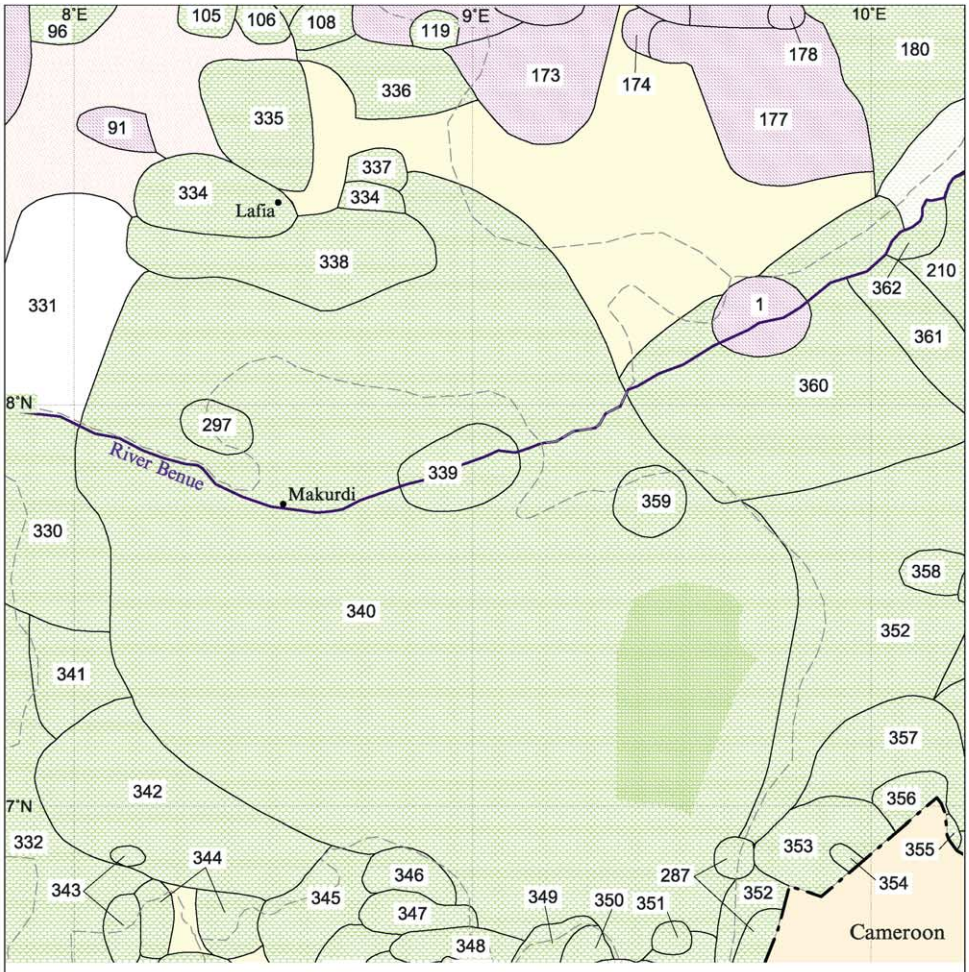

1 HAUSA
91 GWANDARA
96 YESKWA
105 MADA
106 NINZO
108 NUNGU
119 BO-RUKUL
173 KOFYAR
174 JORTO
177 GOEMAI
178 YIWOM
180 TAROK
210 ADAMAWA FULFULDE
287 SAMBA LEKO
297 BASA
330 AGATU
331 ELOYI
332 IDOMA
334 LIJILI (2)
335 EGGON
336 MAMA
337 AKE
338 ALAGO
339 WANNU
340 TIV
341 AKPA
342 IGEDE
343 ORING
344 KUKELE
345 YALA
346 YACE
347 BEKWARRA
348 PUTUKWAM
349 BETE-BENDI
350 OBANLIKU
351 OTANK
352 JUKUN TAKUM (2)
353 YUKUBEN
354 AKUM
355 BUKWEN
356 KAPYA
357 KUTEP
358 KPAN
359 ETULO
360 WAPAN
361 TITA
362 NORTHWEST GBAYA

NOTE: BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.

LANGUAGE FAMILIES

AFRO-ASIATIC

NIGER-CONGO

LEGEND

AREAS WITH MULTIPLE LANGUAGES

NATIONAL PARKS AND RESERVES

SPARSELY SETTLED AREAS

STATE BOUNDARIES

km
0 10 20 30 40

NIGERIA
MAP 7

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Map 33 Nigeria, Map 7.

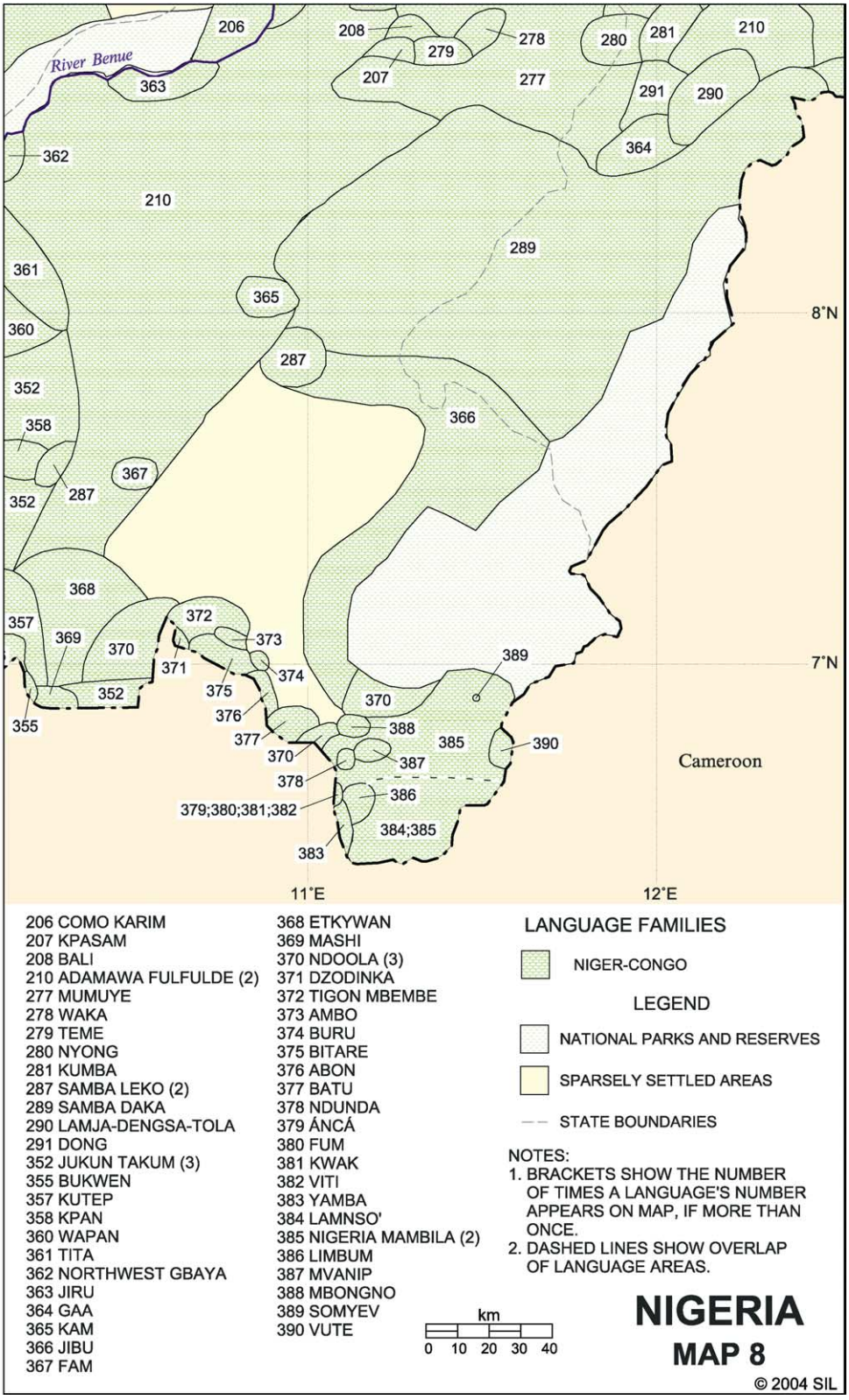

Map 34 Nigeria, Map 8.

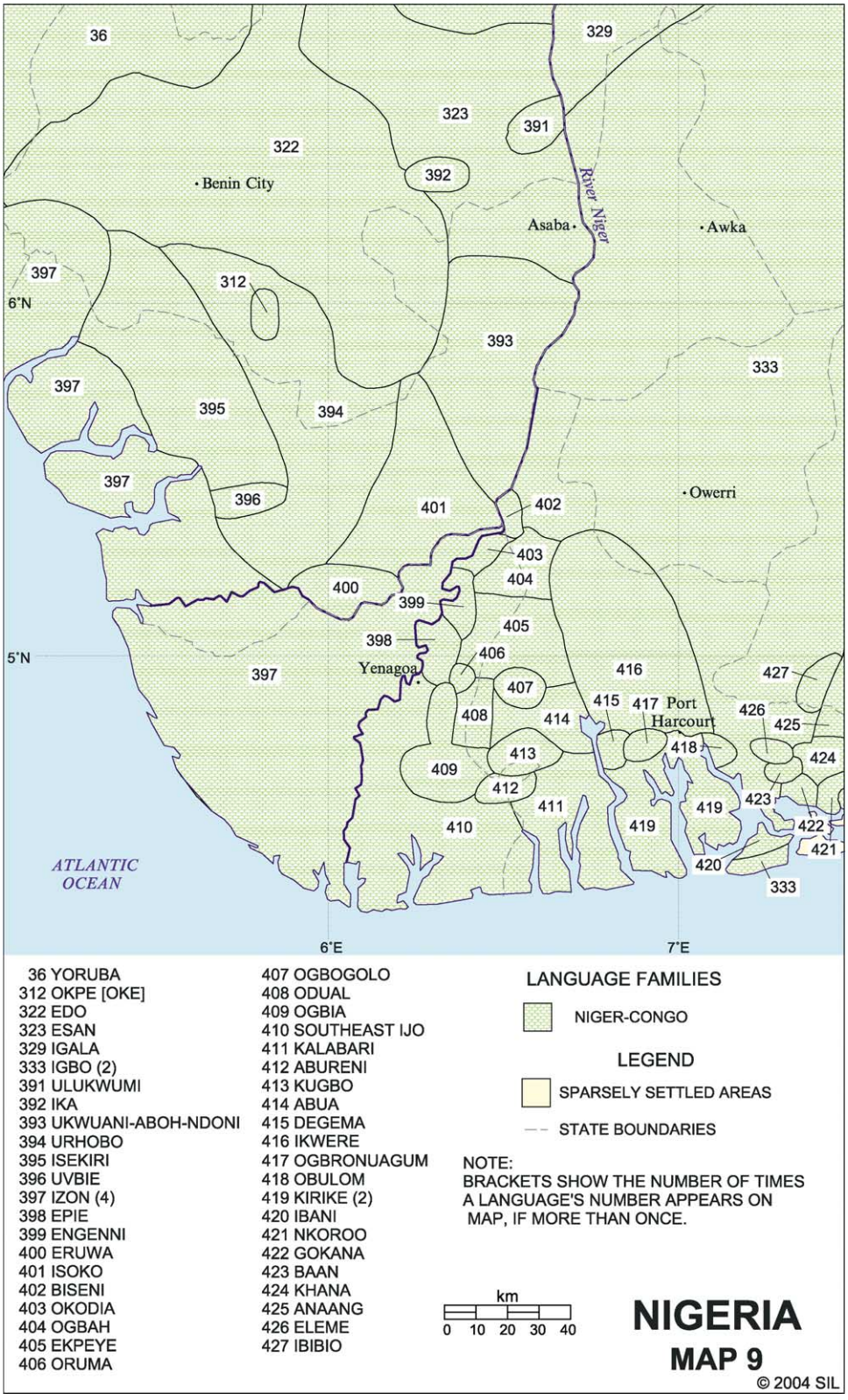

Map 35 Nigeria, Map 9.

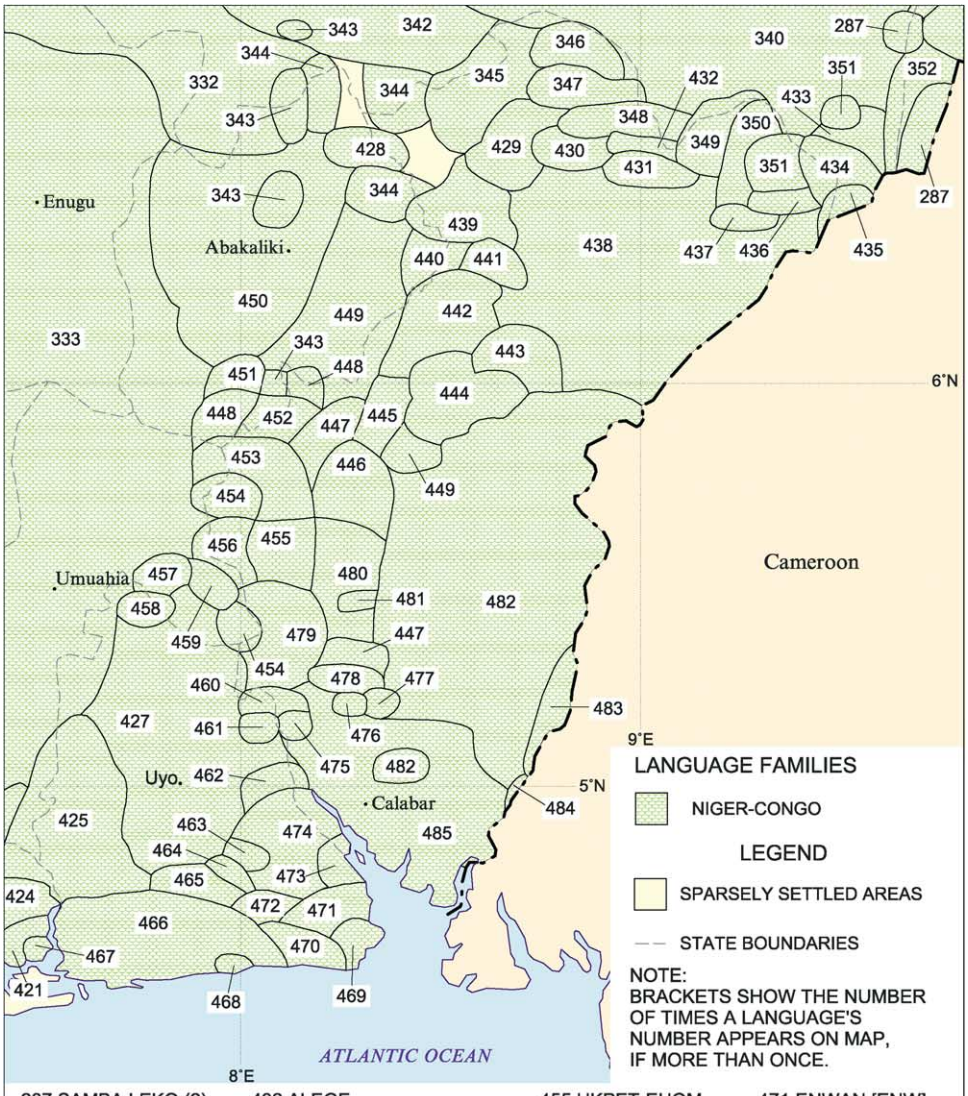

287 SAMBA LEKO (2)
332 IDOMA
333 IGBO
340 TIV
342 IGEDE
343 ORING (4)
344 KUKELE (3)
345 YALA
346 YACE
347 BEKWARRA
348 PUTUKWAM
349 BETE-BENDI
350 OBANLIKU
351 OTANK (2)
352 JUKUN TAKUM
421 NKOROO
424 KHANA
425 ANAANG
427 IBIBIO
428 UZEKWE
429 NKEM-NKUM
430 MBE
431 UKPE-BAYOBIRI
432 ALEGE
433 IYIVE
434 ICEVE-MACI
435 EVANT
436 BUMAJI
437 UBANG
438 BOKYI
439 EKAJUK
440 NNAM
441 ABANYOM
442 NDE-NSELE-NTA
443 NDOE
444 OLULUMO-IKOM
445 EFUTOP
446 NKUKOLI
447 AGOI (2)
448 KOHUMONO (2)
449 CROSS RIVER MBEMBE (2)
450 IZI-EZAA-IKWO-MGBO
451 LEGBO
452 LOKAA
453 AGWAGWUNE
454 UBAGHARA (2)
455 UKPET-EHOM
456 UKWA
457 ITU MBON UZO
458 NKARI
459 IBUORO
460 IDERE
461 ITO
462 OKOBO
463 EBUGHU
464 ETEBI
465 EKIT
466 OBOLO
467 DEFAKA
468 IKO
469 EFAI
470 IBINO
471 ENWAN [ENW]
472 UDA
473 ILUE
474 ORO
475 EKI
476 ODUT
477 KIONG
478 BAKPINKA
479 UMON
480 DOKO-UYANGA
481 LUBILA
482 EJAGHAM (2)
483 KOROP
484 USAGHADE
485 EFIK

NIGERIA
MAP 10

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Map 36 Nigeria, Map 10.

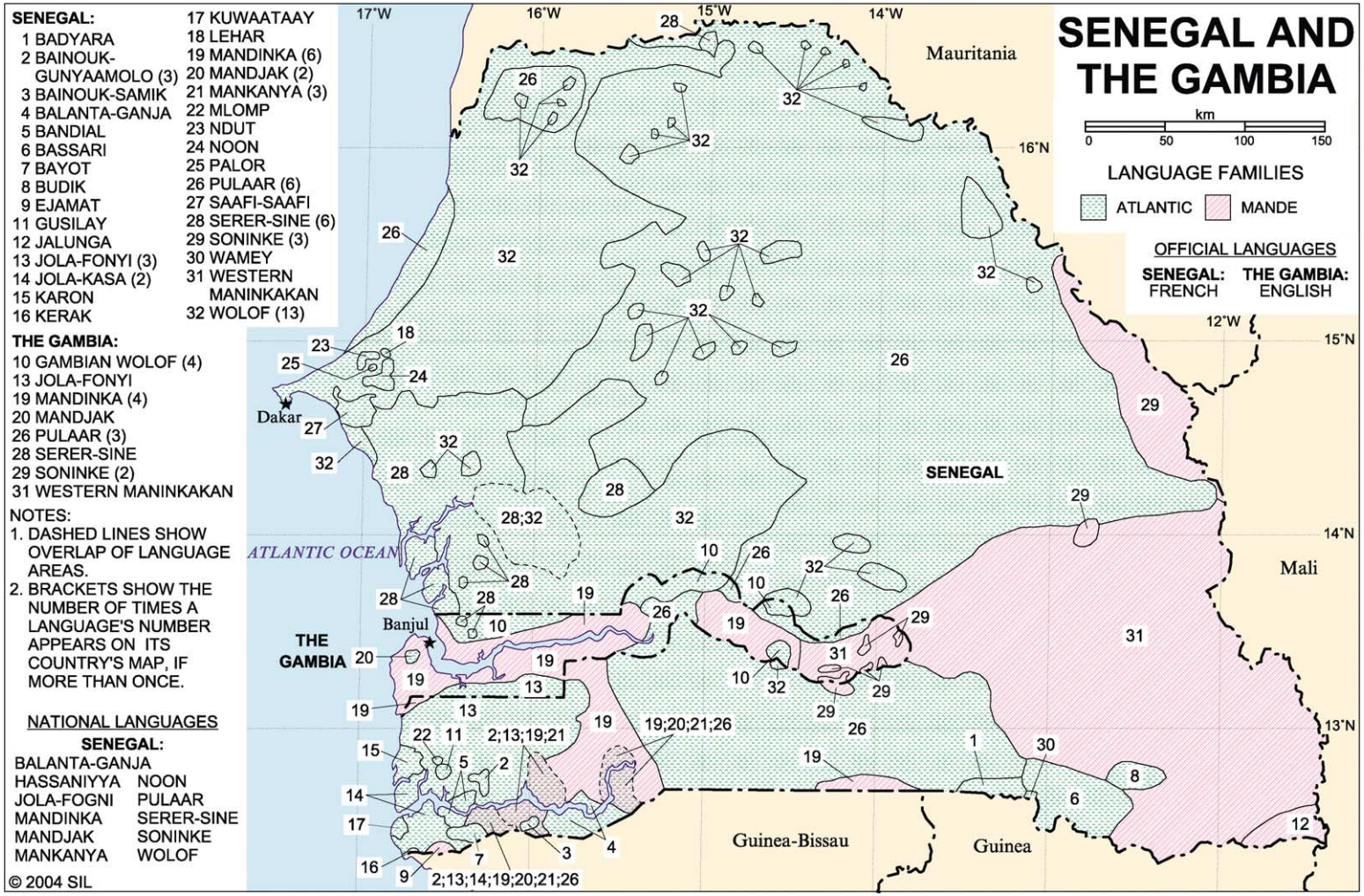

Map 37 Senegal and the Gambia.

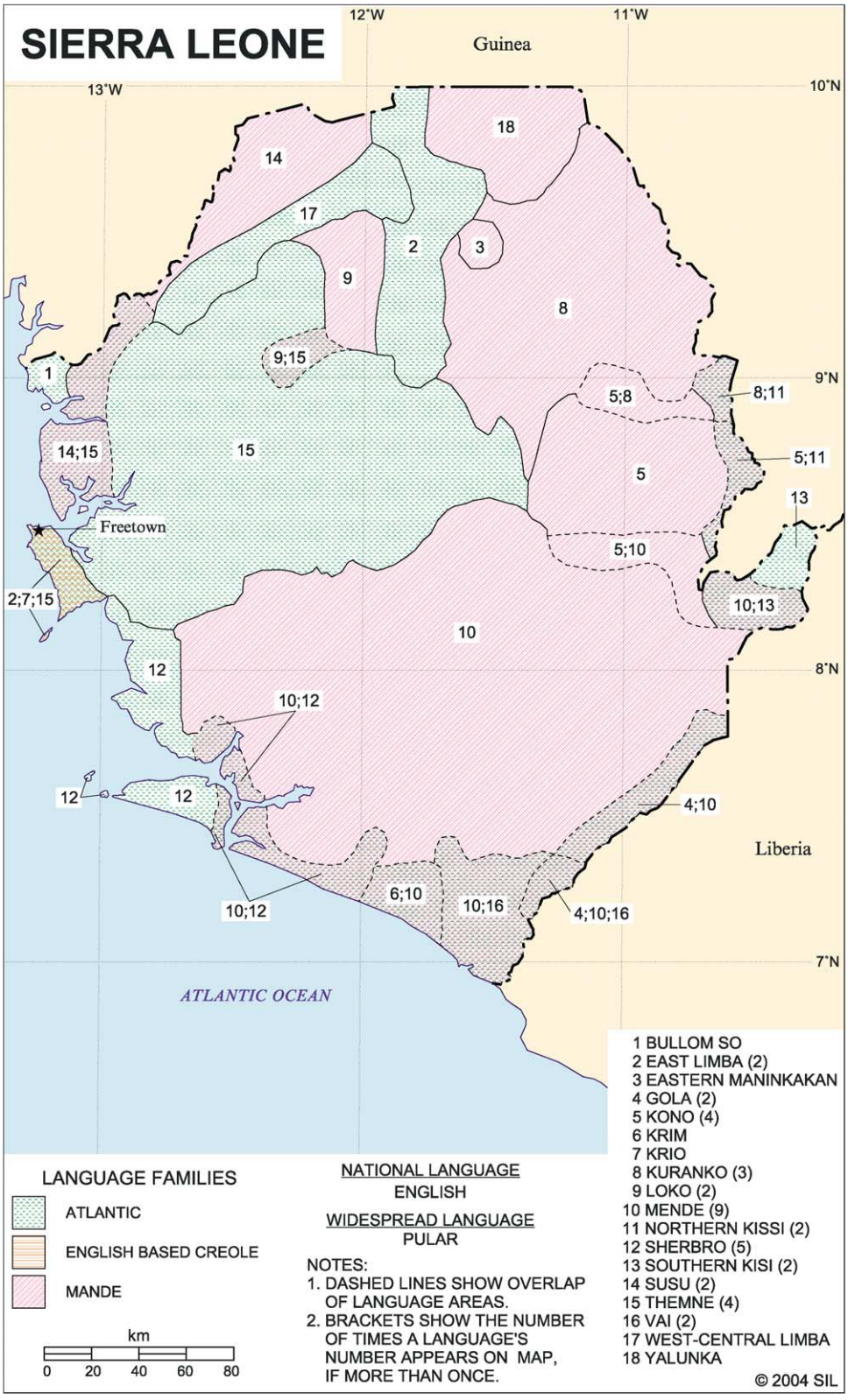

Map 38 Sierra Leone.

24°E
26°E
28°E
30°E
32°E
34°E
36°E
38°E
23°N
21°N
19°N
17°N
15°N
13°N
11°N
9°N
7°N
5°N
3°N
22°E
Egypt
Libya
Chad
Central African Republic
Democratic Republic of Congo
Uganda
Kenya
Eritrea
Ethiopia
RED SEA
L. TURKANA
River Nile
Al-Khartoum
NOBIIN
KENUZI-DONGOLA
BEDAWI
TIGRÉ
ZAGHAWA
MIDOB
SUNGOR
MASALIT
FUR
SINYAR
DAR FUR DAJU
DAR SILA DAJU
SEE SEPARATE MAP
GAAM
AKA
MOLO
BURUN
JUMJUM
UDUK
GUMUZ
BERTA
KELO
MABAAN
KOMO
OPUUO
YULU
FEROGE
INDRI
NJALGULGULE
GULA
AJA
YULU
THURI
GBAYA
SOUTHWESTERN DINKA
NORTHWESTERN DINKA
SHILLUK
NORTHEASTERN DINKA
NUER
MANGAYAT
THURI
BANDA, WEST CENTRAL
BANDA-NDÉLÉ
BANDA-BANDA
BANDA-MBRÈS
BAI
NDOGO
LUWO
BONGO
BANDA, MID-SOUTHERN
BANDA, TOGBO-VARA
BELANDA VIRI
BELANDA BOR
SOUTH CENTRAL DINKA
BELI
REEL
SOUTHEASTERN DINKA
ANUAK
KACIPO-BALESI
MURLE
MURLE
SURI
MO'DA
NYAMUSA-MOLO
JUR MODO
MANDARI
MOROKODO
PÄRI
TENNET
TOPOSA
MORU
OLU'BO
NARIM
ZANDE
AVOKAYA
BAKA
BARI
LOPIT
LOKOYA
OTUHO
DONGOTONO
MÜNDÜ
KAKWA
MA'DI
LANGO
DIDINGA
KELIKO
ACHOLI
WIDESPREAD LANGUAGES
SUDANESE SPOKEN ARABIC
SUDANESE CREOLE ARABIC
BOUNDARY IN DISPUTE
OFFICIAL LANGUAGE
STANDARD ARABIC
SCATTERED LANGUAGES
ADAMAWA FULFULDE
HAUSA
CENTRAL KANURI
SUDAN
km
0
100
200
300
400
500
© 2004 SIL

Map 39 Sudan.

SUDAN - ENLARGED AREA

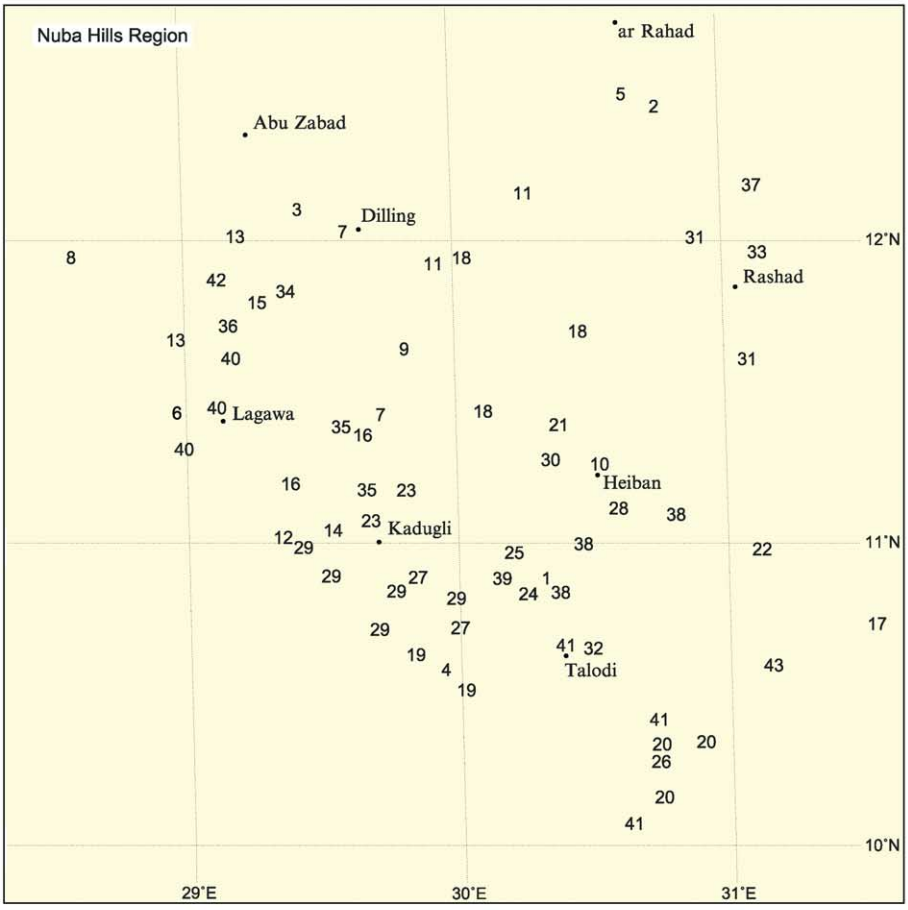

km
0 20 40 60 80

NOTE: BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.

1 ACHERON
2 AFITTI
3 AMA
4 DAGIK
5 DAIR
6 DAR FUR DAJU
7 DILLING (2)
8 EL HUGEIRAT
9 GHULFAN
10 HEIBAN
11 KADARU (2)
12 KANGA
13 KARKO (2)
14 KATCHA-KADUGLI-MIRI
15 KATLA
16 KEIGA (2)
17 KO
18 KOALIB (3)
19 KRONGO (2)
20 LAFOFA (3)
21 LARO
22 LOGOL
23 LOGORIK (2)
24 LUMUN
25 MORO
26 NDING
27 NGILE (2)
28 OTORO
29 SHATT (5)
30 SHWAI
31 TAGOI (2)
32 TALODI
33 TEGALI
34 TEMEIN
35 TESE (2)
36 TIMA
37 TINGAL
38 TIRA (3)
39 TOCHO
40 TULISHI (3)
41 TUMTUM (3)
42 WALI
43 WARNANG

© 2004 SIL

Map 40 Sudan, Enlarged Area.

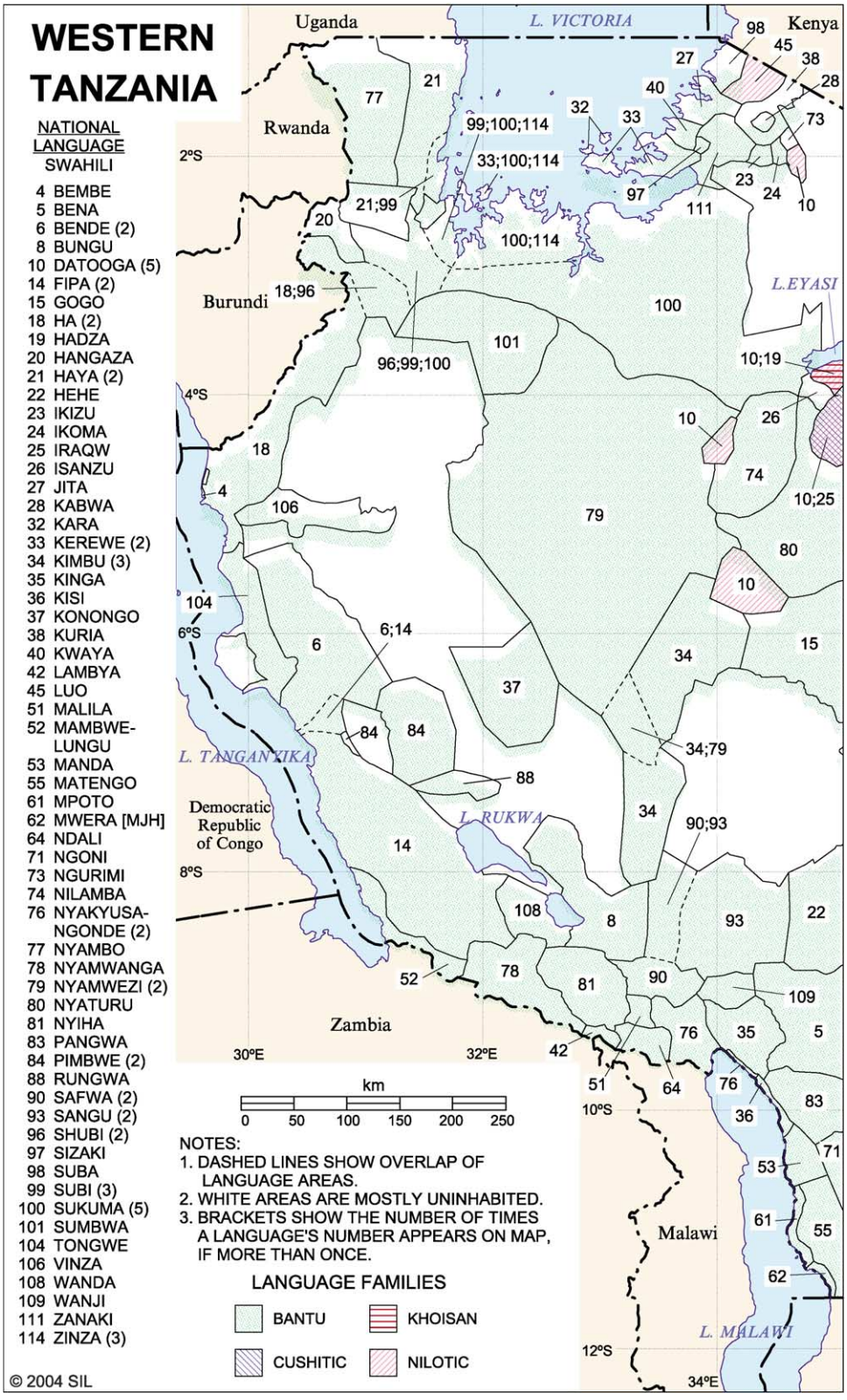

Map 41 Western Tanzania.

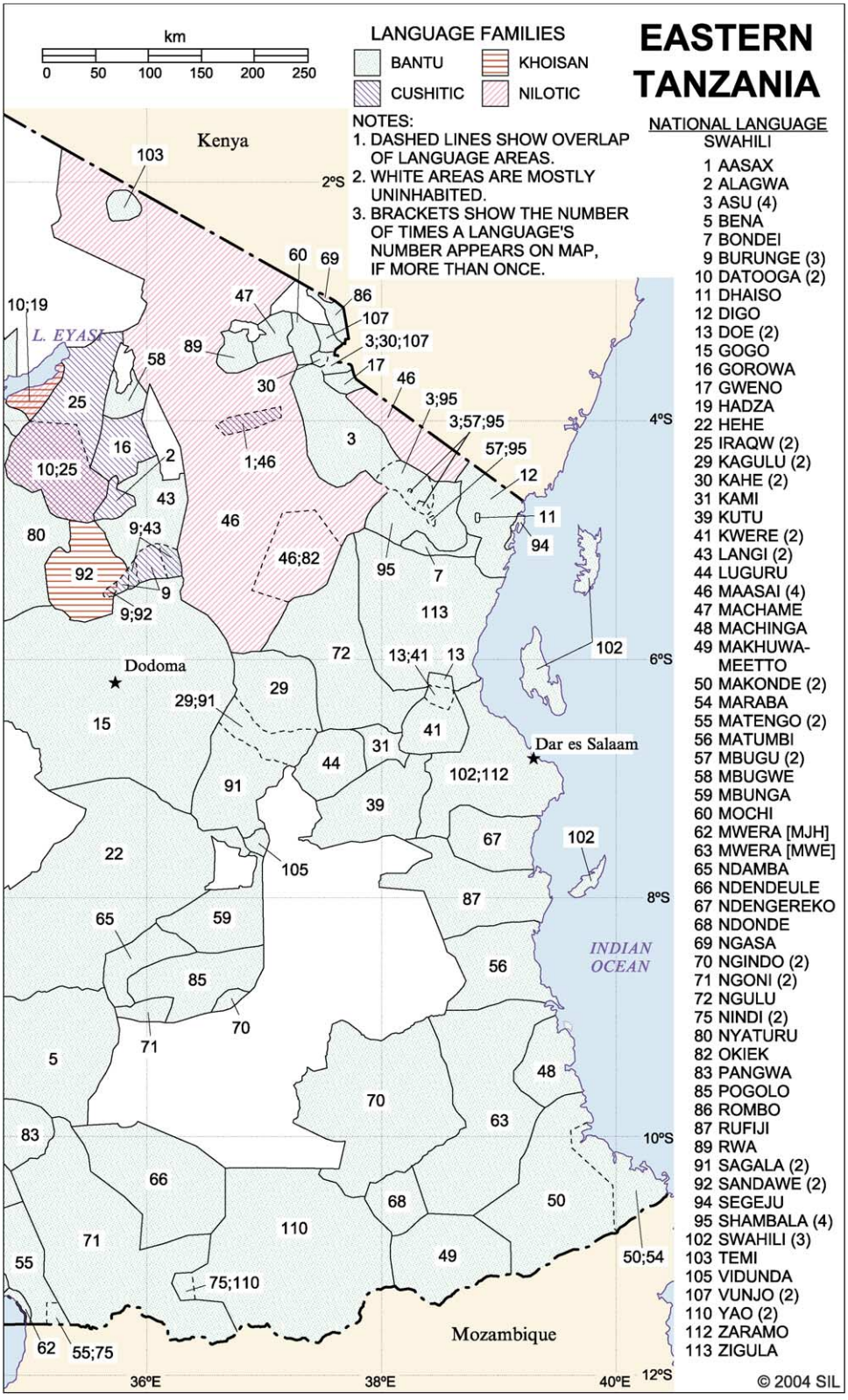

Map 42 Eastern Tanzania.

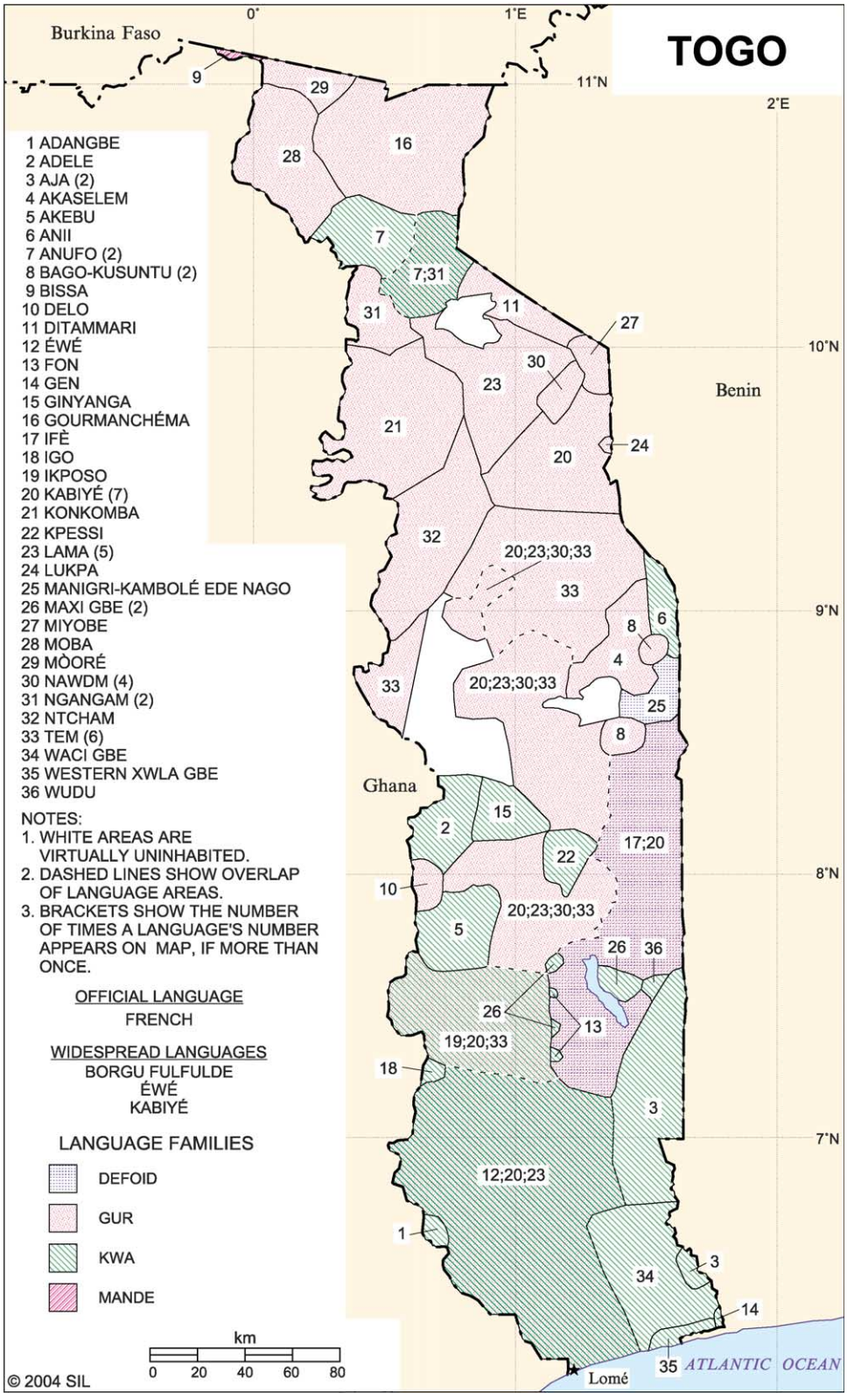
TOGO
Burkina Faso
Benin
Ghana
ATLANTIC OCEAN
Lomé
0°
1°E
2°E
11°N
10°N
9°N
8°N
7°N
1 ADANGBE
2 ADELE
3 AJA (2)
4 AKASELEM
5 AKEBU
6 ANII
7 ANUFO (2)
8 BAGO-KUSUNTU (2)
9 BISSA
10 DELO
11 DITAMMARI
12 ÉWÉ
13 FON
14 GEN
15 GINYANGA
16 GOURMANCHÉMA
17 IFÈ
18 IGO
19 IKPOSO
20 KABIYÉ (7)
21 KONKOMBA
22 KPESSI
23 LAMA (5)
24 LUKPA
25 MANIGRI-KAMBOLÉ EDE NAGO
26 MAXI GBE (2)
27 MIYOBE
28 MOBA
29 MÒORÉ
30 NAWDM (4)
31 NGANGAM (2)
32 NTCHAM
33 TEM (6)
34 WACI GBE
35 WESTERN XWLA GBE
36 WUDU
NOTES:
1. WHITE AREAS ARE VIRTUALLY UNINHABITED.
2. DASHED LINES SHOW OVERLAP OF LANGUAGE AREAS.
3. BRACKETS SHOW THE NUMBER OF TIMES A LANGUAGE'S NUMBER APPEARS ON MAP, IF MORE THAN ONCE.
OFFICIAL LANGUAGE
FRENCH
WIDESPREAD LANGUAGES
BORGU FULFULDE
ÉWÉ
KABIYÉ
LANGUAGE FAMILIES
DEFOID
GUR
KWA
MANDE
km
0 20 40 60 80
© 2004 SIL

Map 43 Togo.

Map 44 Uganda.

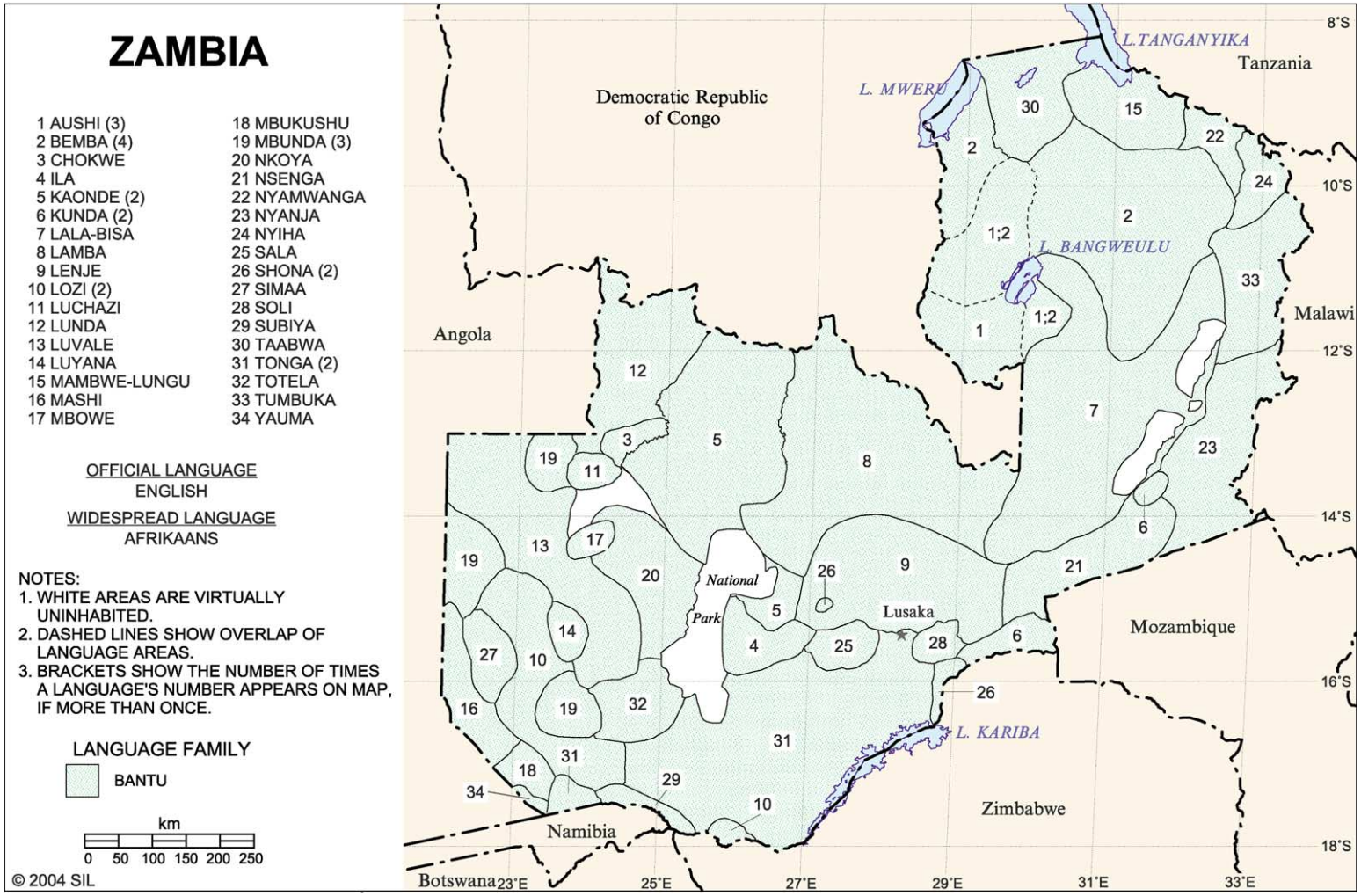

Map 45 Zambia.

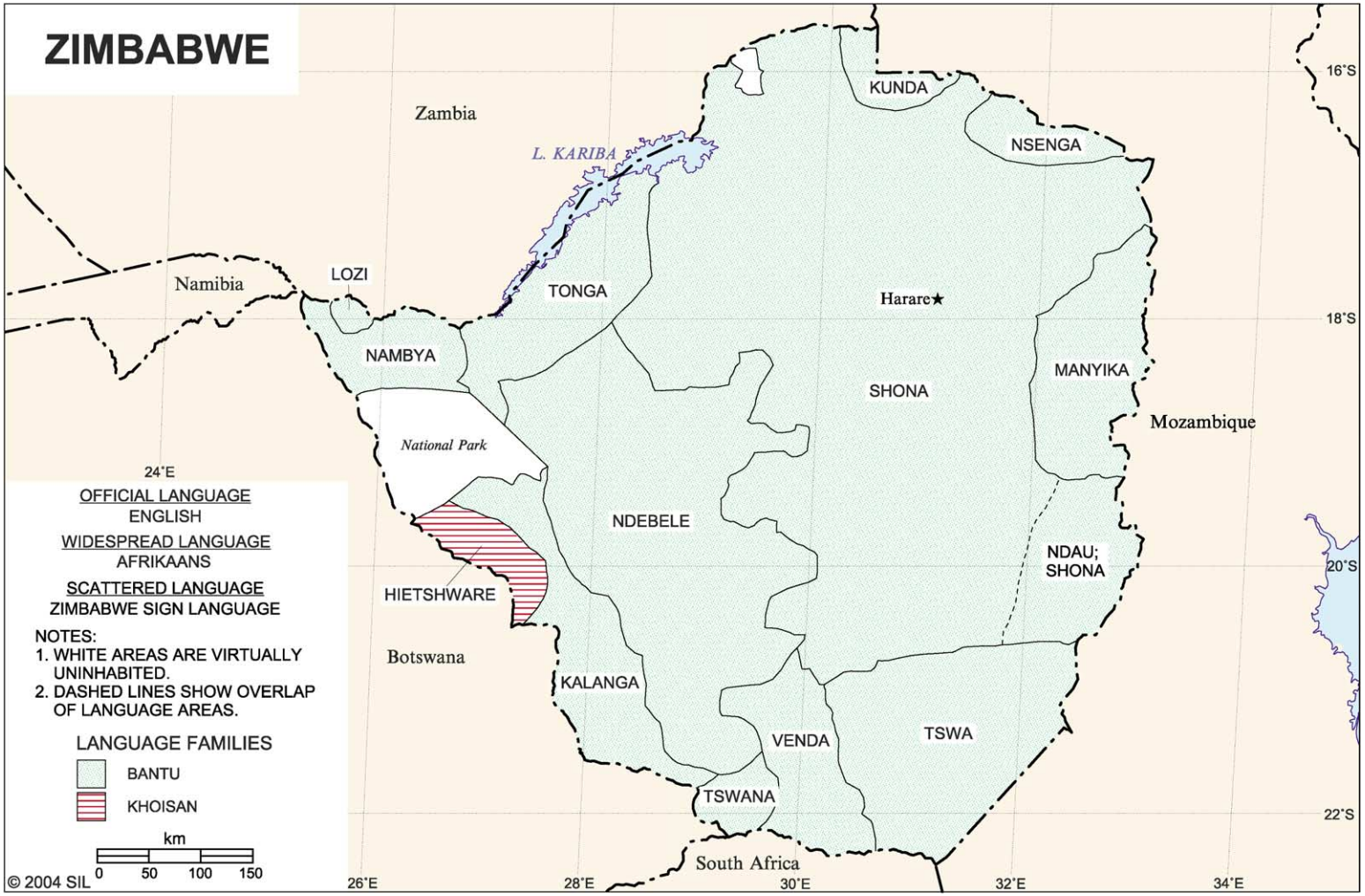

Map 46 Zimbabwe.

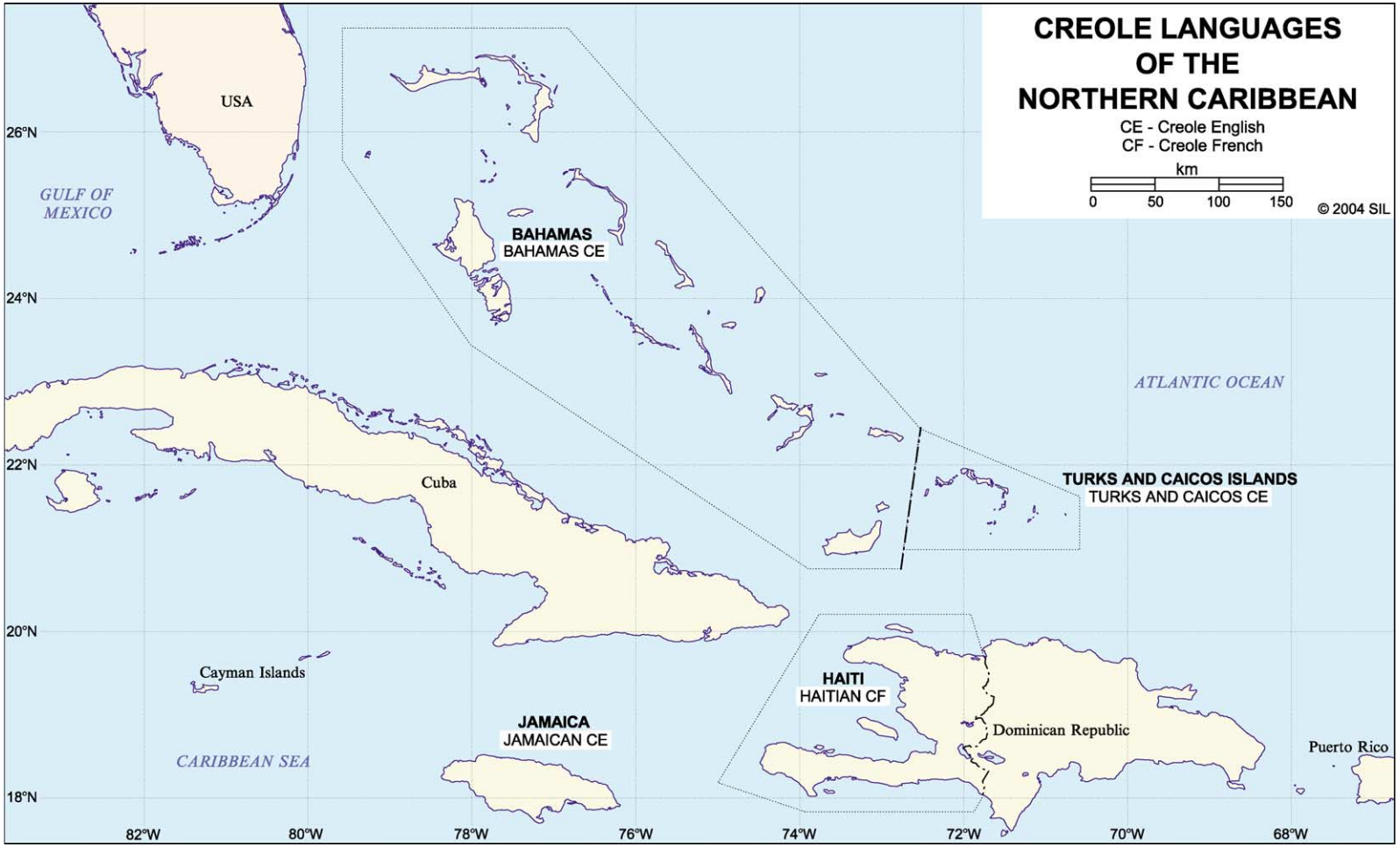

Map 47 Creole Languages of the Northern Caribbean.

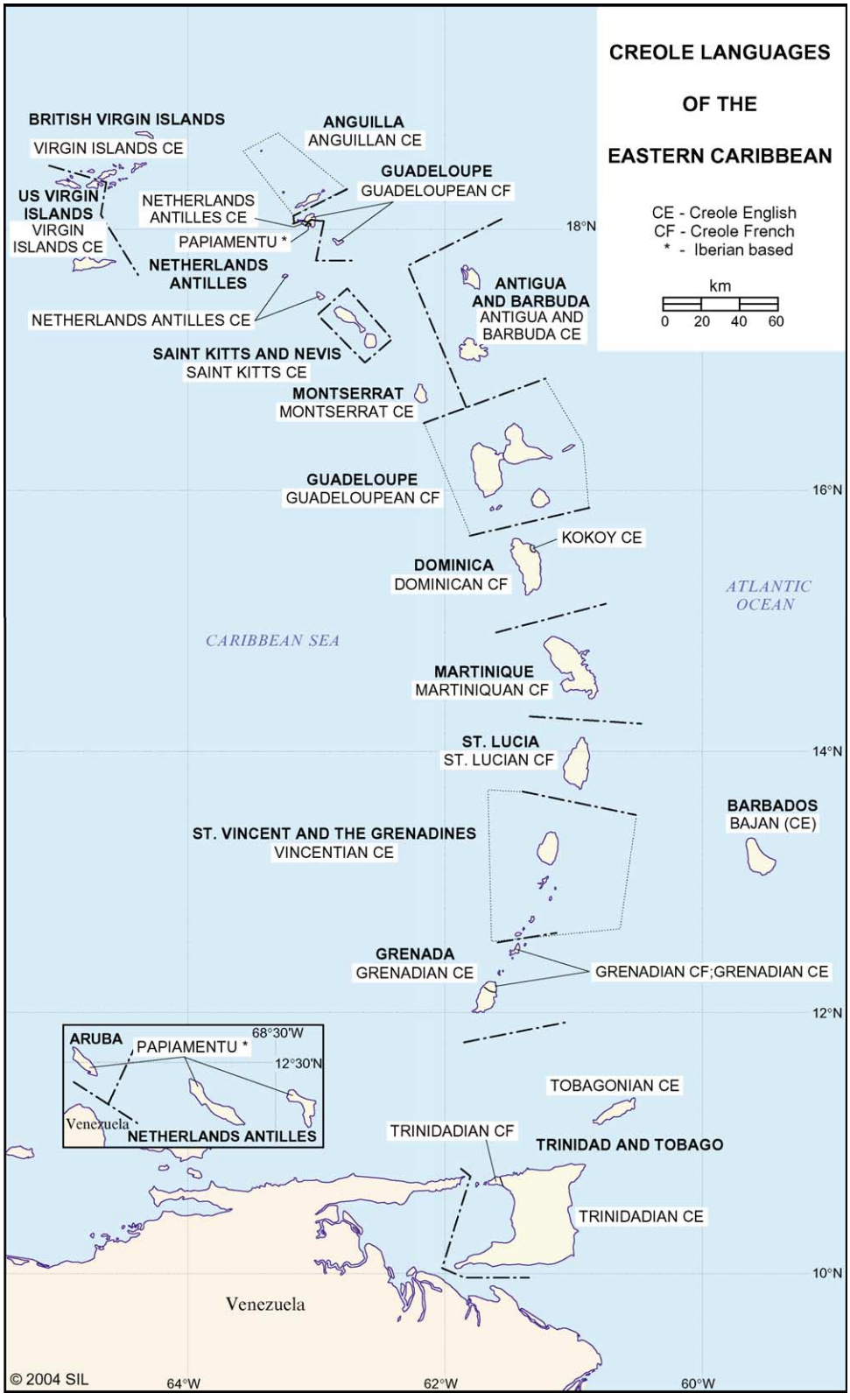

Map 48 Creole Languages of the Eastern Caribbean.

Map 49 Argentina and Chile.

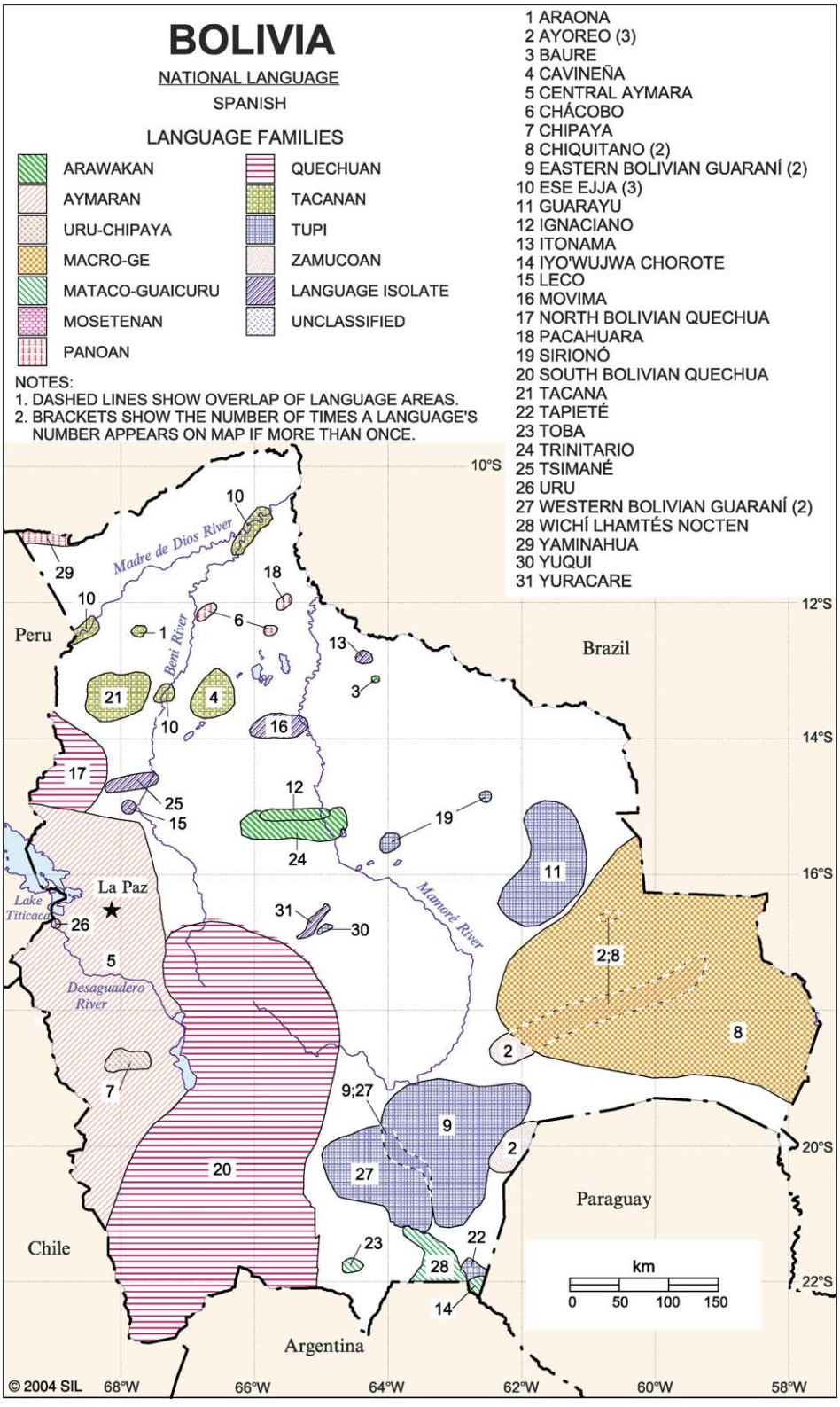

Map 50 Bolivia.

Map 51 Brazil.

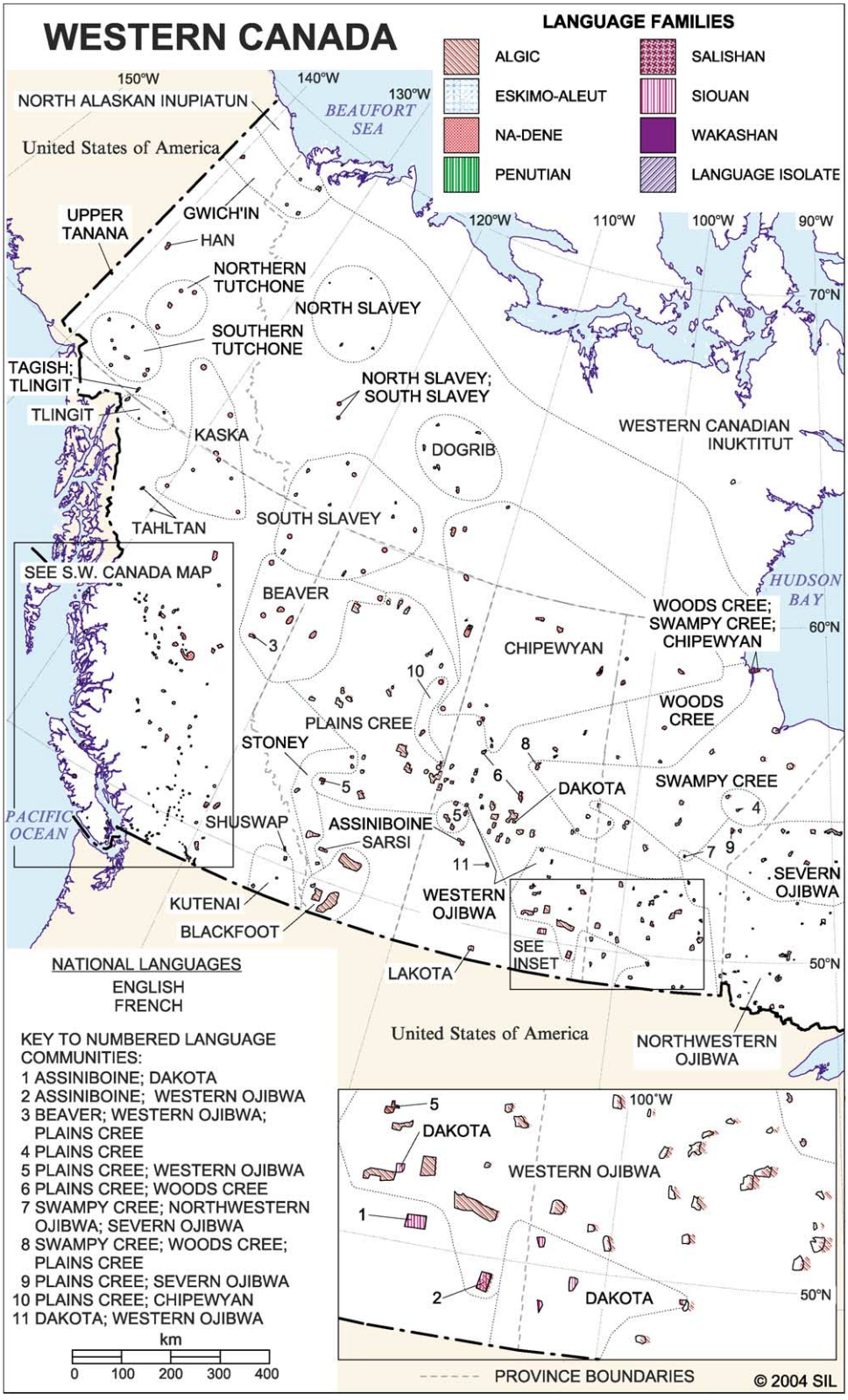

Map 52 Western Canada.

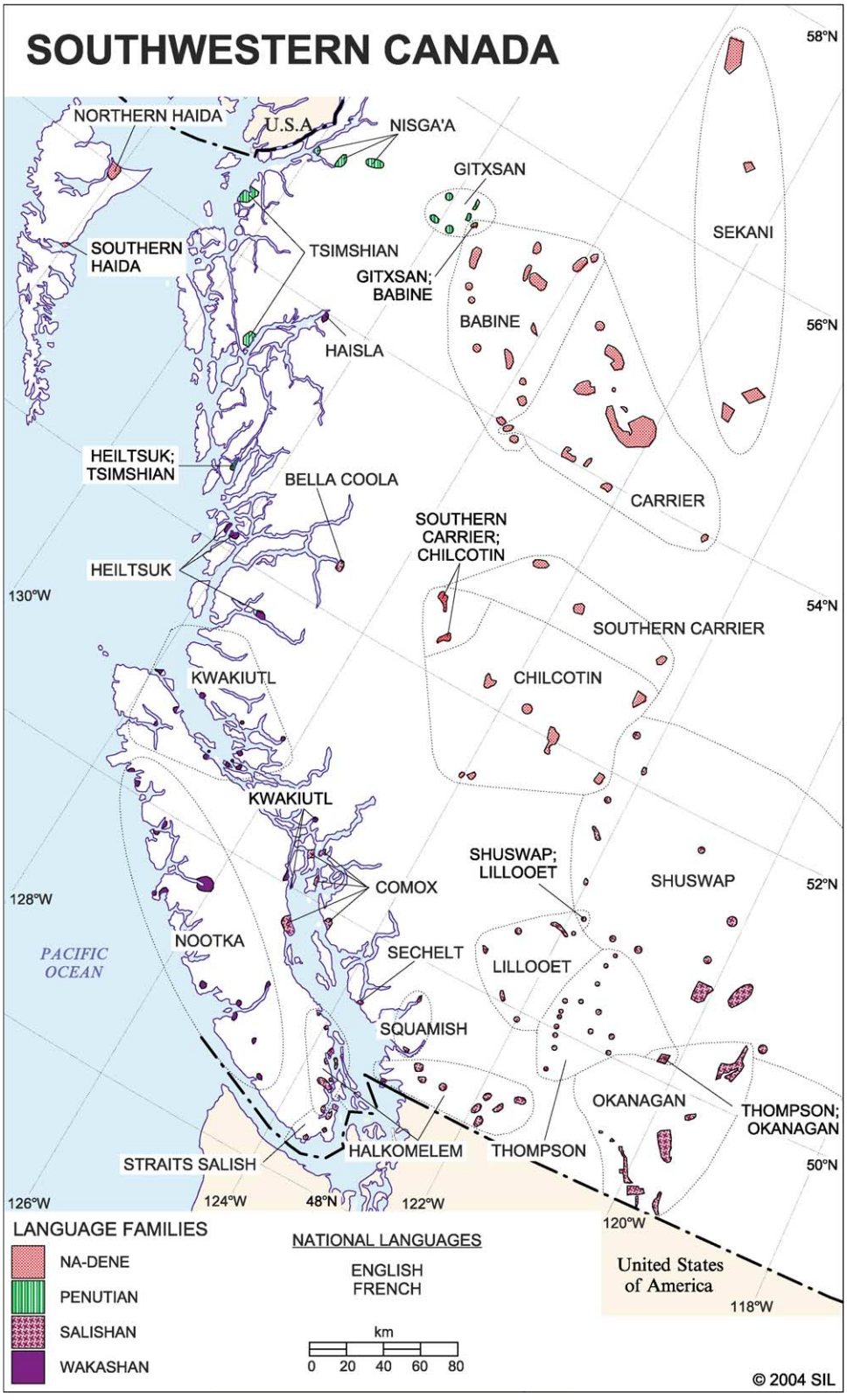

Map 53 Southwestern Canada.

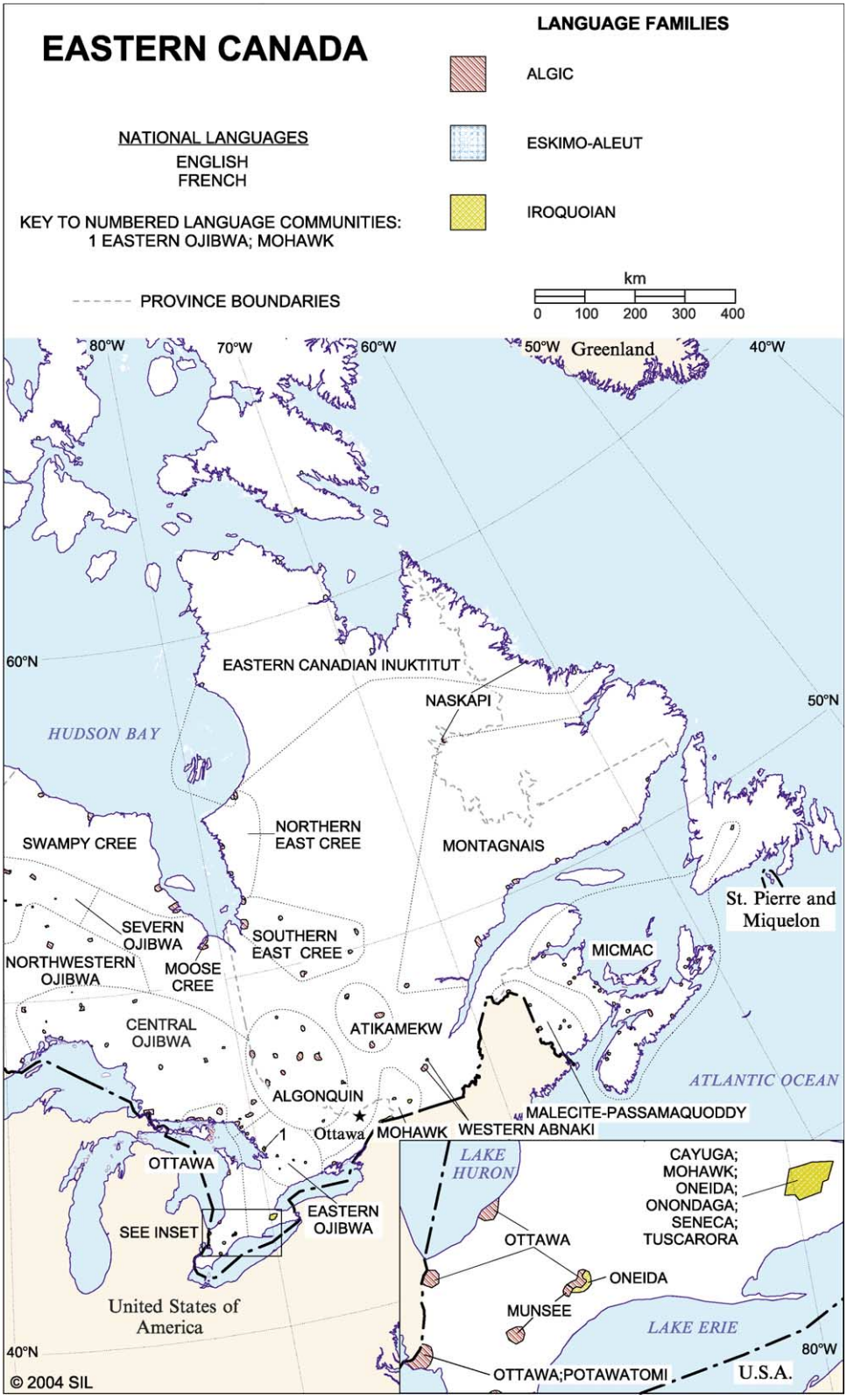

Map 54 Eastern Canada.

Map 55 Costa Rica.

Map 56 Northern Colombia.

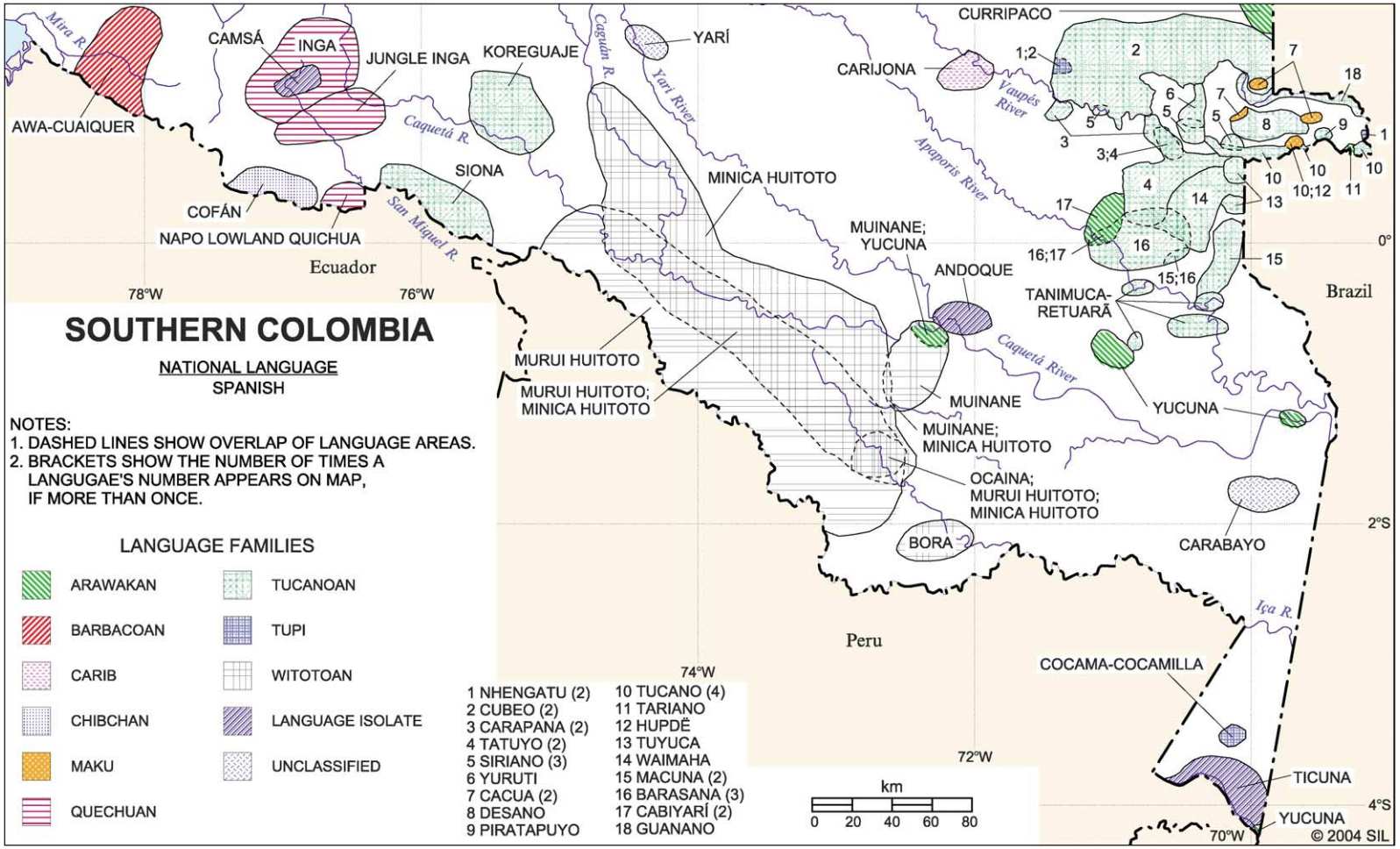

Map 57 Southern Colombia.

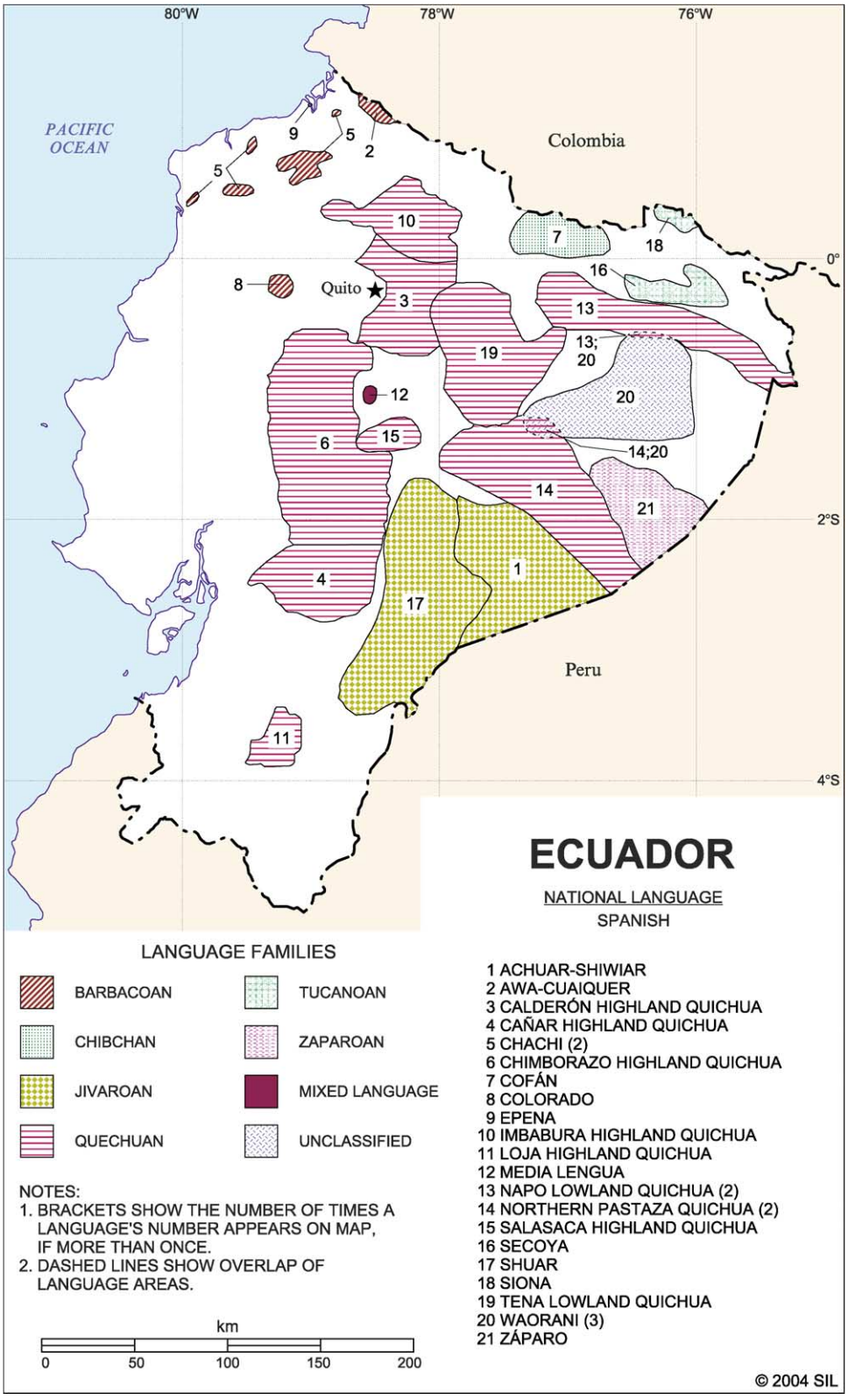

Map 58 Ecuador.

Map 59 El Salvador and Honduras.

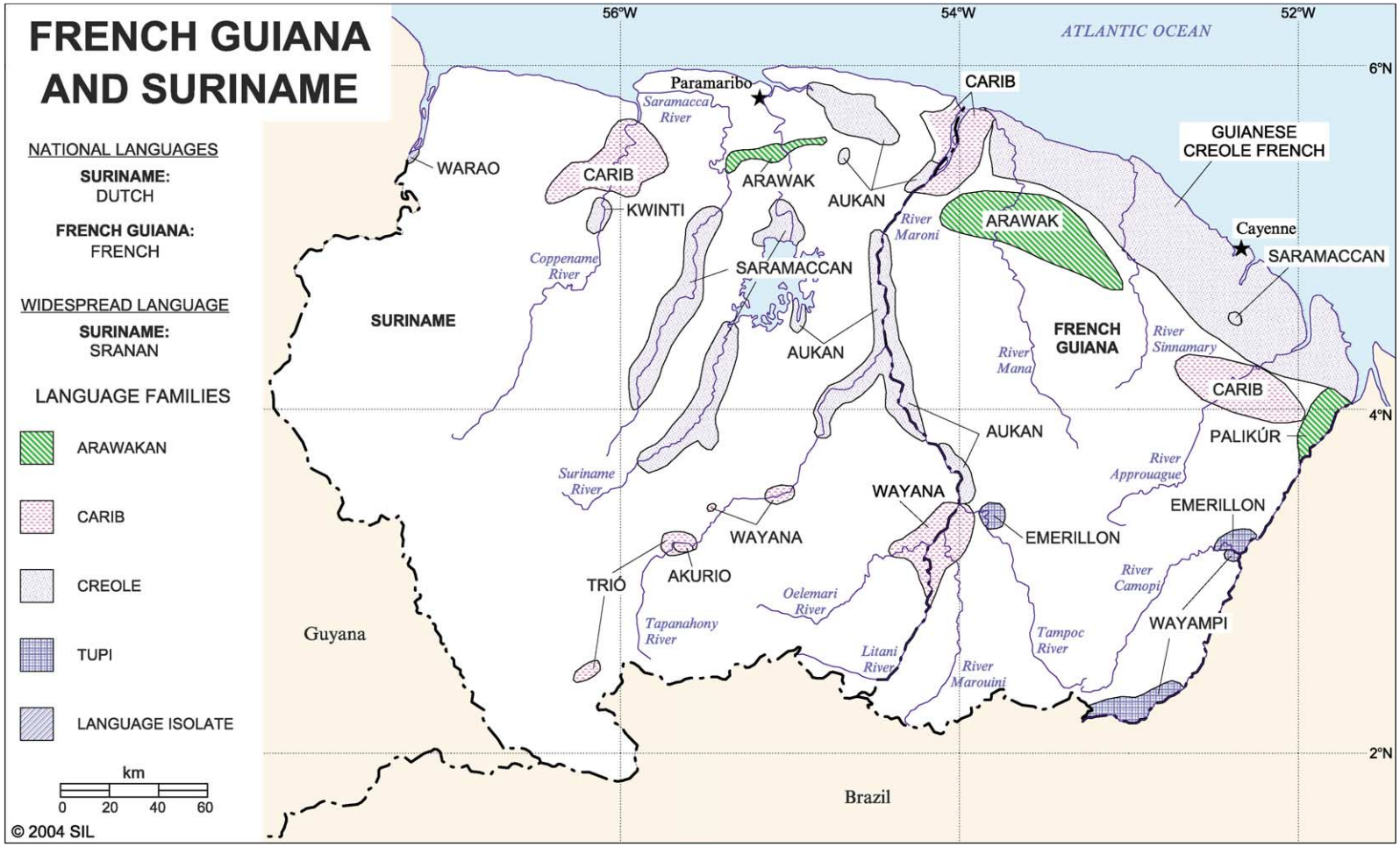

Map 60 French Guiana and Suriname.

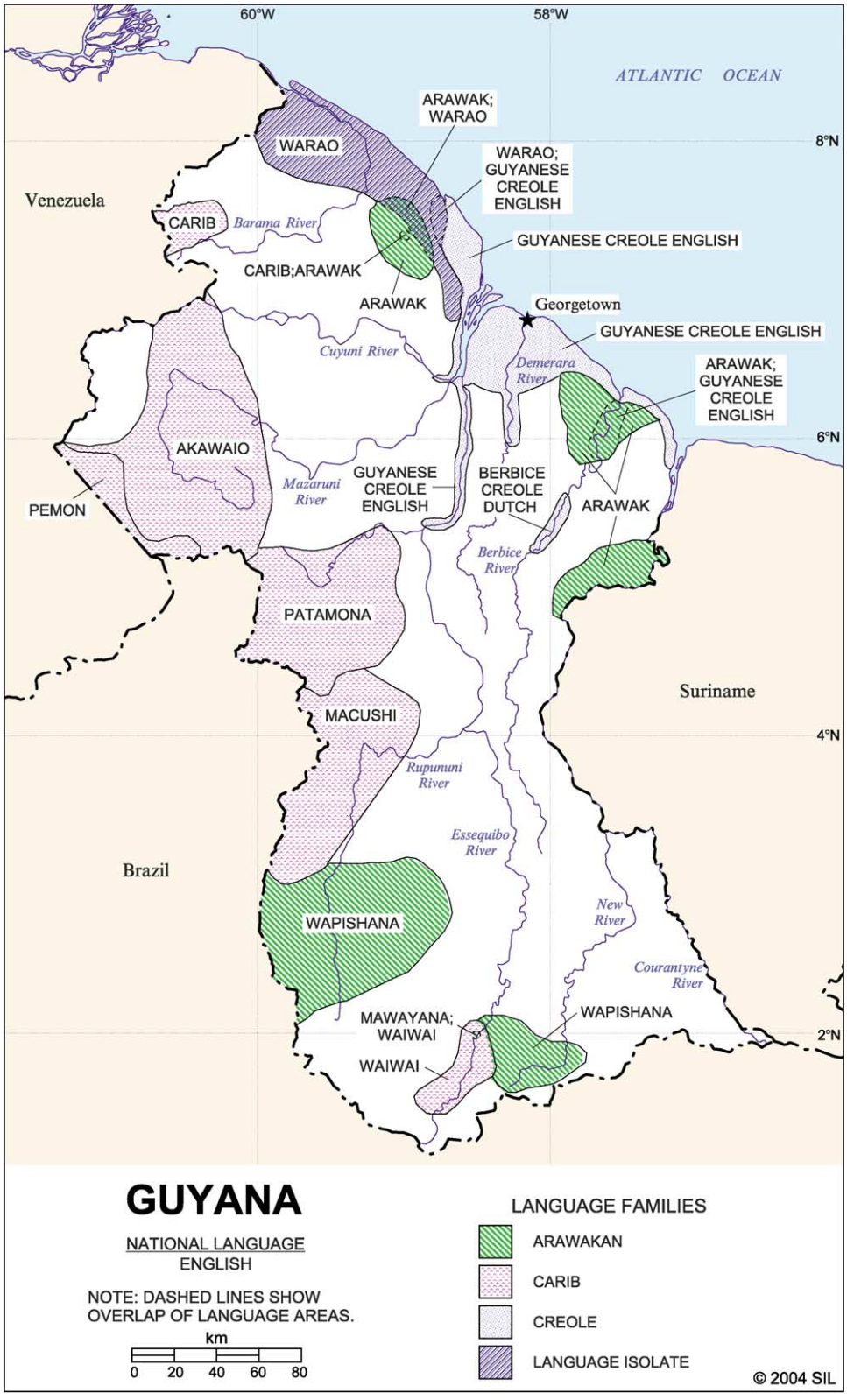

Map 61 Guyana.

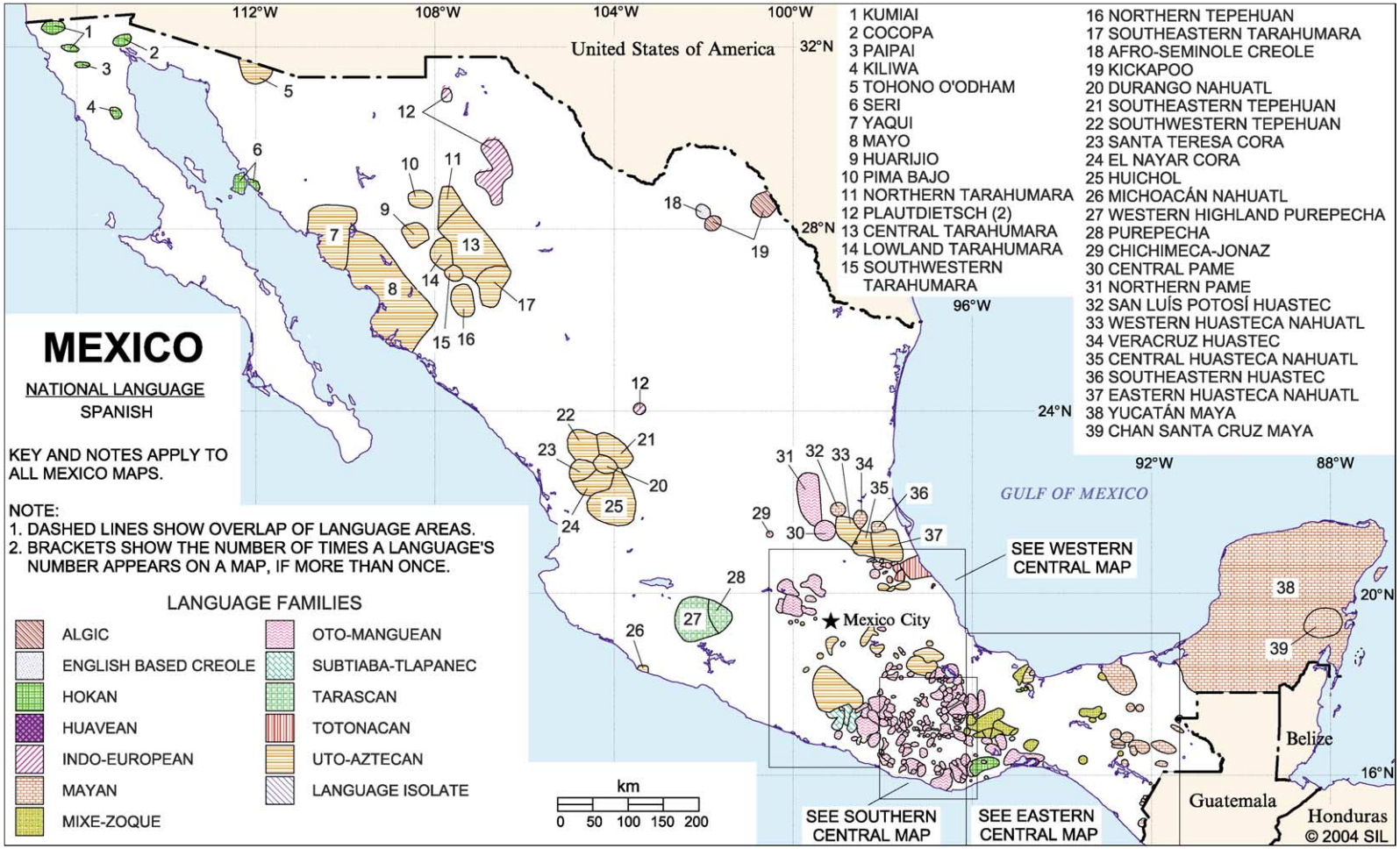

Map 62 Mexico.

WESTERN CENTRAL MEXICO

40 QUERÉTARO OTOMI
41 MEZQUITAL OTOMI
42 ESTADO DE MÉXICO OTOMI
43 TEMOAYA OTOMI
44 MAZAHUA CENTRAL
45 MICHOACÁN MAZAHUA
46 SAN FRANCISCO MATLATZINCA
47 ATZINGO MATLATZINCA
48 TEMASCALTEPEC NAHUATL
49 TILAPA OTOMI
50 TEXCATEPEC OTOMI
51 TLACHICHILCO TEPEHUA
52 PISAFLORES TEPEHUA
53 EASTERN HIGHLAND OTOMI
54 TENANGO OTOMI
55 HUEHUETLA TEPEHUA
56 XICOTEPEC DE JUÁREZ TOTONAC
57 COYUTLA TOTONAC
58 PAPANTLA TOTONAC
59 YECUATLA TOTONAC
60 HIGHLAND TOTONAC
61 HIGHLAND PUEBLA NAHUATL
62 TENANGO NAHUATL
63 TLALITZLIPA NAHUATL
64 NORTHERN PUEBLA NAHUATL
65 PATLA-CHICONTLA TOTONAC
66 OZUMATLÁN TOTONAC
67 HUAXCALECA NAHUATL
68 ORIZABA NAHUATL
69 SAN LUÍS TEMALACAYUCA POPOLOCA
70 SAN MARCOS TLALCOYALCO POPOLOCA
71 SANTA MARÍA LA ALTA NAHUATL
72 CHIGMECATITLÁN MIXTEC
73 CENTRAL PUEBLA NAHUATL
74 IXTENCO OTOMI
75 CENTRAL NAHUATL
76 TETELCINGO NAHUATL
77 MORELOS NAHUATL
78 TLAMACAZAPA NAHUATL
79 COATEPEC NAHUATL
80 GUERRERO NAHUATL
81 ACATEPEC TLAPANEC
82 AYUTLA MIXTEC
83 TLACOAPA TLAPANEC
84 MALINALTEPEC TLAPANEC
85 ALACATLATZALA MIXTEC
86 ALCOZAUCA MIXTEC
87 SILACAYOAPAN MIXTEC
88 WESTERN JUXTLAHUACA MIXTEC
89 METLATÓNOC MIXTEC (2)
90 GUERRERO AMUZGO
91 OMETEPEC NAHUATL (2)
92 AZOYÚ TLAPANEC
93 YOLOXOCHITL MIXTEC

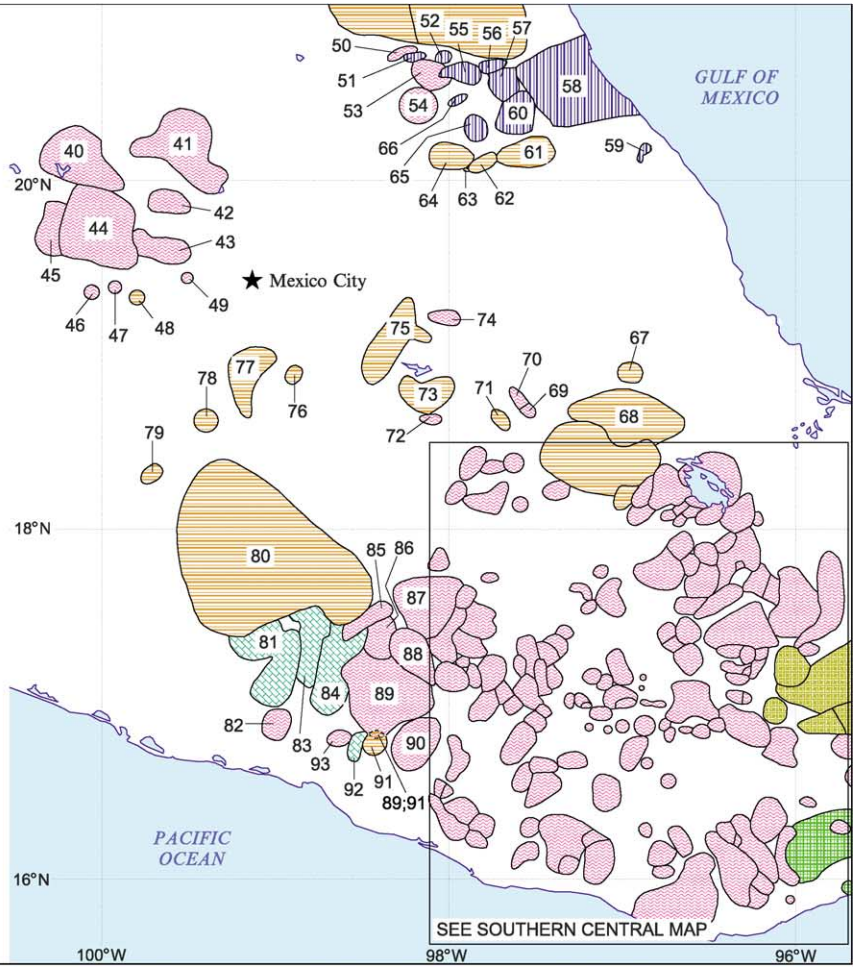

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Map 63 Western Central Mexico.

EASTERN CENTRAL MEXICO

94 ISTHMUS-PAJAPAN NAHUATL
95 ISTHMUS-MECAYAPAN NAHUATL
96 HIGHLAND POPOLUCA
97 ISTHMUS-COSOLEACAQUE NAHUATL
98 TEXISTEPEC POPOLUCA
99 OLUTA POPOLUCA
100 SAYULA POPOLUCA
101 CHOAPAN ZAPOTEC
102 LEALAO CHINANTEC
103 NORTH CENTRAL MIXE
104 QUETZALTEPEC MIXE
105 COATLÁN MIXE
106 MAZATLÁN MIXE
107 ISTHMUS MIXE
108 PETAPA ZAPOTEC
109 CHIMALAPA ZOQUE
110 ISTHMUS ZAPOTEC
111 GUEVEA DE HUMBOLDT ZAPOTEC
112 JUQUILA MIXE
113 QUIAVICUZAS ZAPOTEC
114 YAUTEPEC ZAPOTEC
115 TLACOLULITA ZAPOTEC
116 LOWLAND OAXACA CHONTAL
117 HIGHLAND OAXACA CHONTAL
118 LACHIGUIRI ZAPOTEC
119 SAN MATEO DEL MAR HUAVE
120 SANTA MARÍA DEL MAR HUAVE
121 SAN DIONISIO DEL MAR HUAVE
122 SAN FRANCISCO DEL MAR HUAVE
123 FRANCISCO LEÓN ZOQUE (3)
124 ZINACANTÁN TZOTZIL
125 CHAMULA TZOTZIL
126 SAN ANDRÉS LARRAINZAR TZOTZIL
127 COPAINALÁ ZOQUE
128 RAYÓN ZOQUE
129 CHENALHÓ TZOTZIL
130 TILA CHOL
131 TABASCO ZOQUE
132 TABASCO CHONTAL
133 TUMBALÁ CHOL
134 LACANDON
135 BACHAJÓN TZELTAL
136 OXCHUC TZELTAL
137 HUIXTÁN TZOTZIL
138 VENUSTIANO CARRANZA TZOTZIL
139 TOJOLABAL
140 WESTERN JACALTEC
141 IXTATÁN CHUJ
142 WESTERN KANJOBAL
143 TACANEC
144 TECTITEC
145 MOCHO
146 NORTHERN MAM
147 TODOS SANTOS MAM

km
0 20 40 60 80

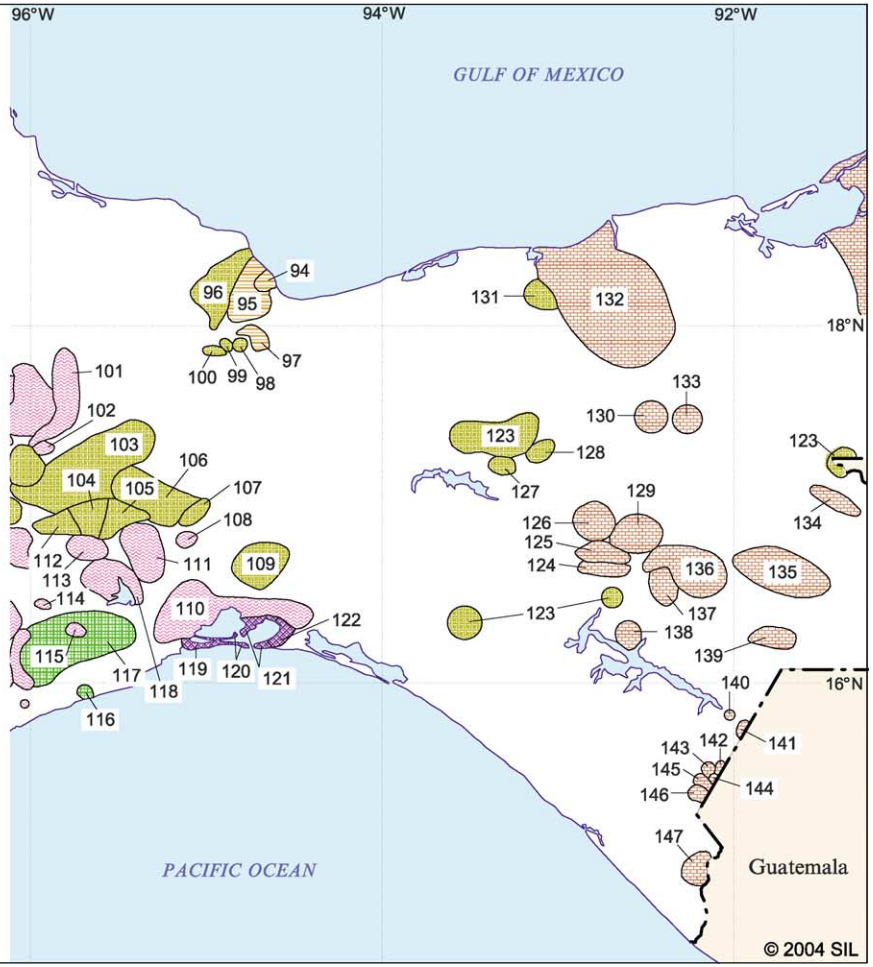

Map 64 Eastern Central Mexico.

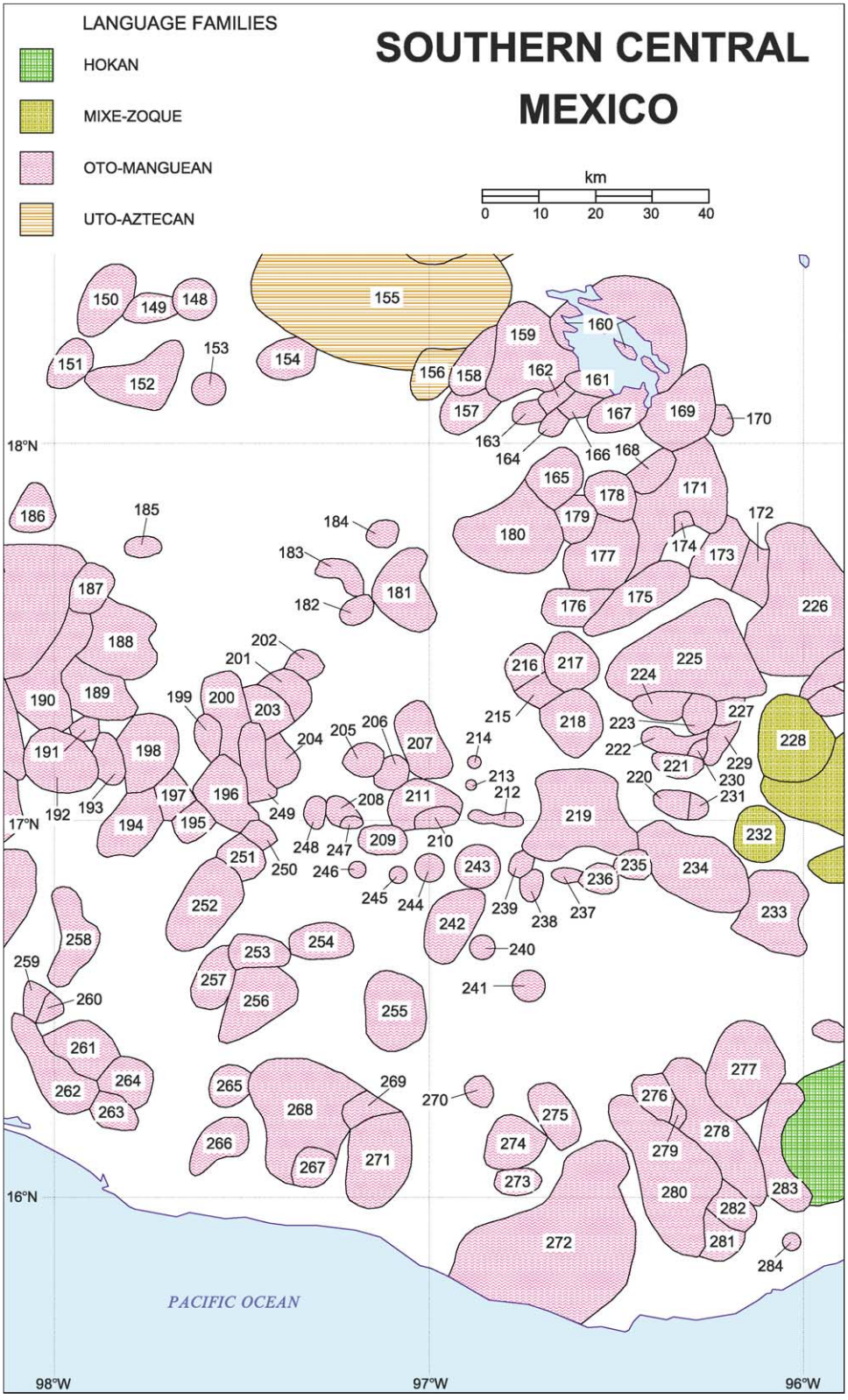

Map 65 Southern Central Mexico.

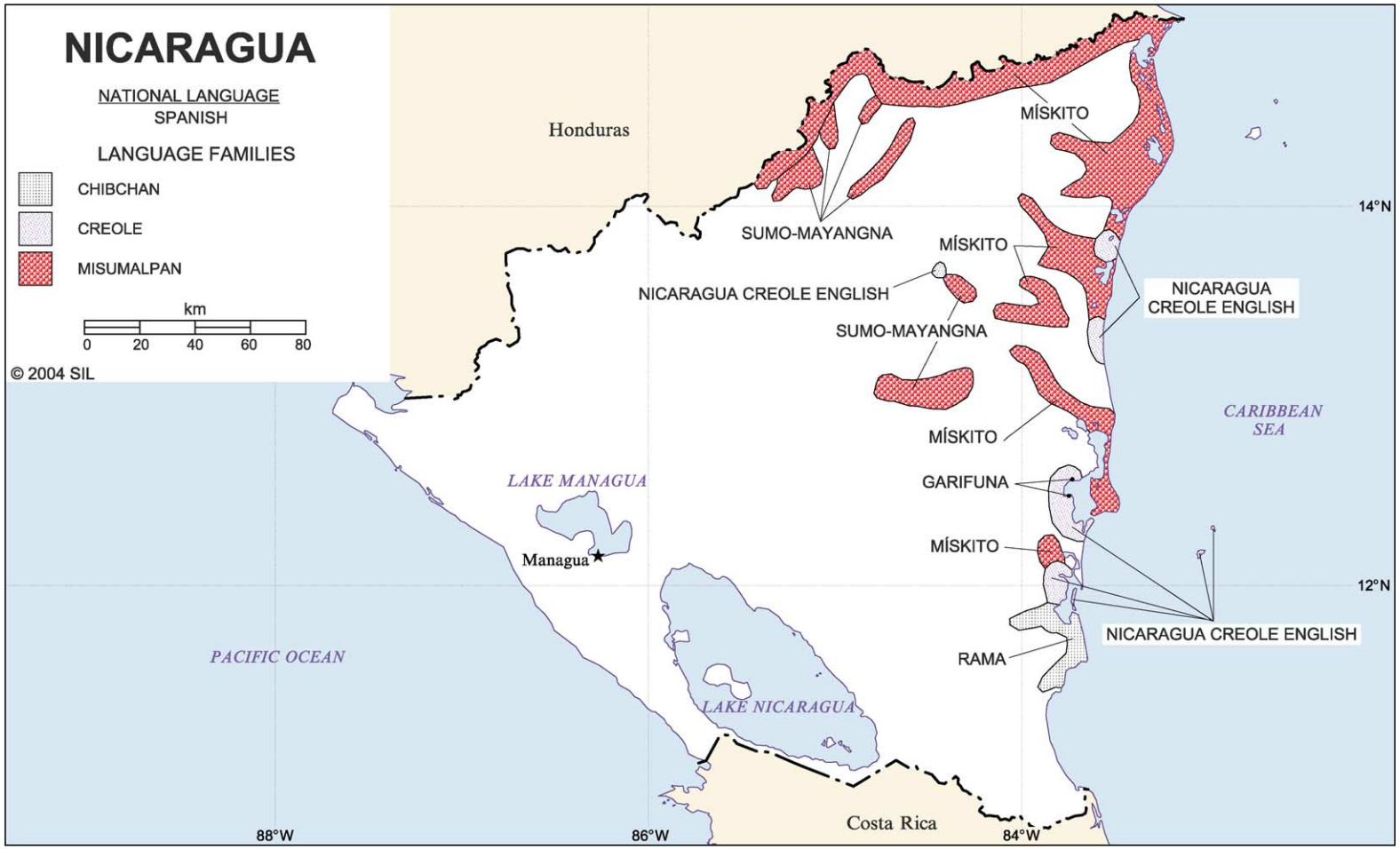

Map 66 Nicaragua.

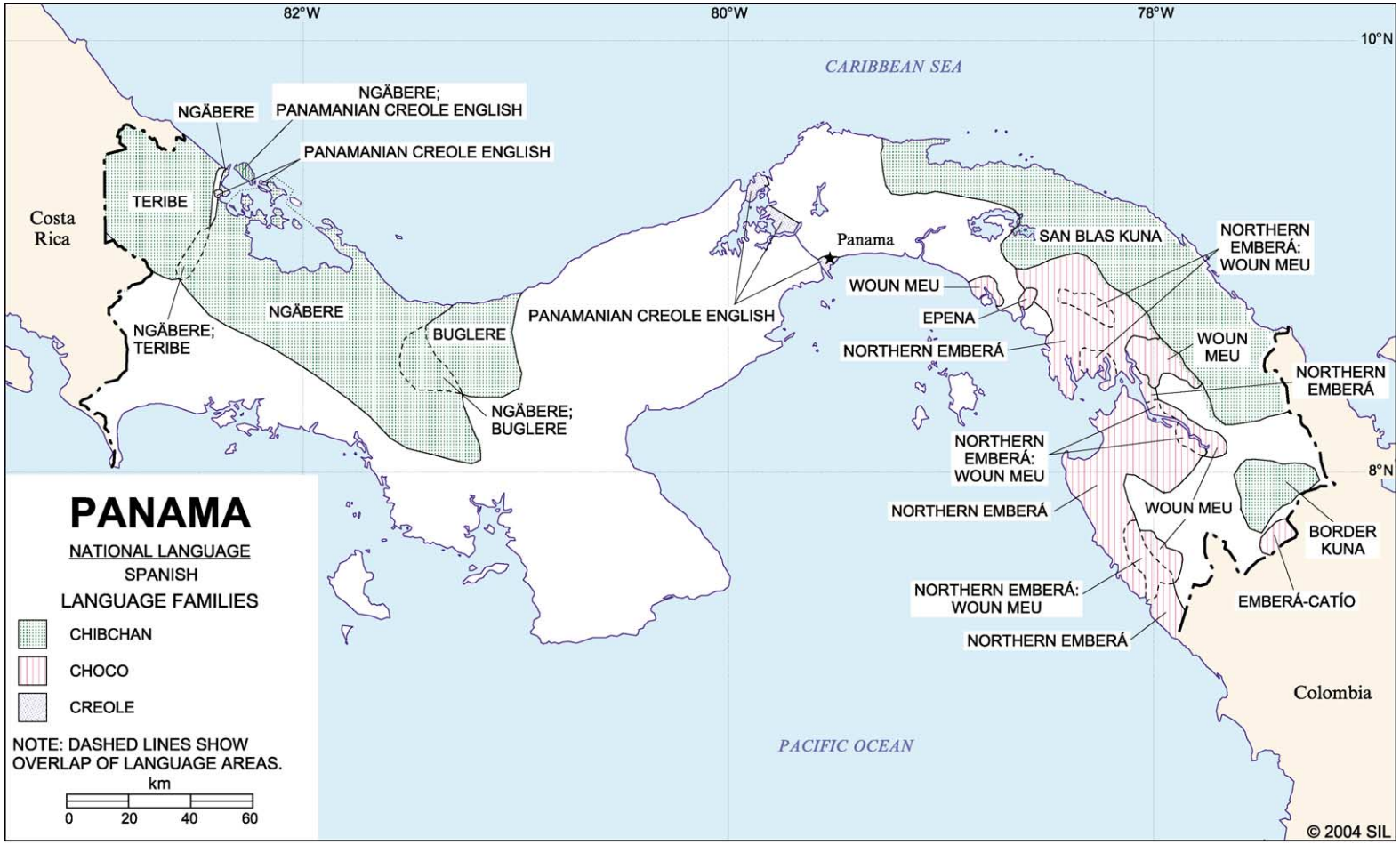

Map 67 Panama.

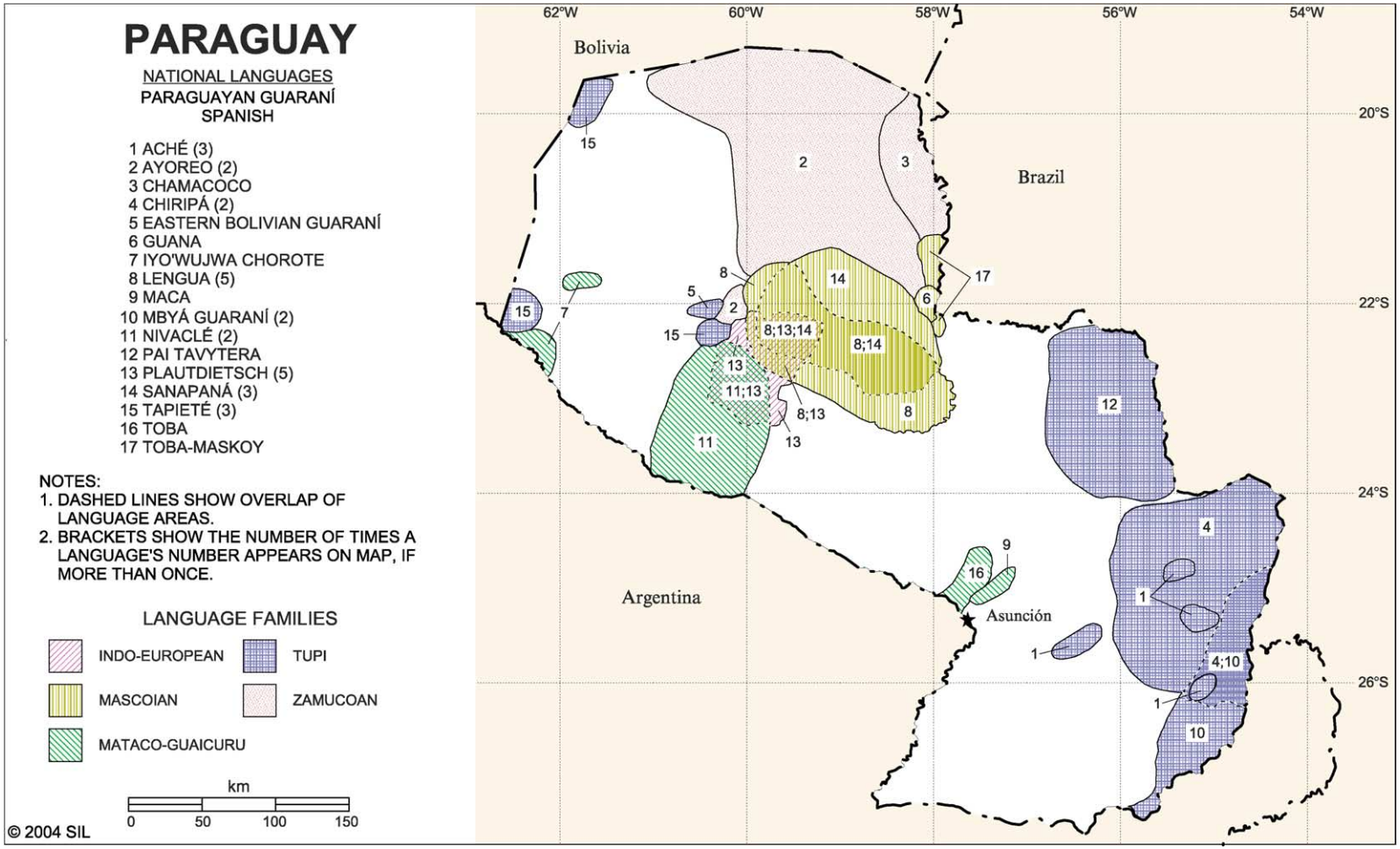

Map 68 Paraguay.

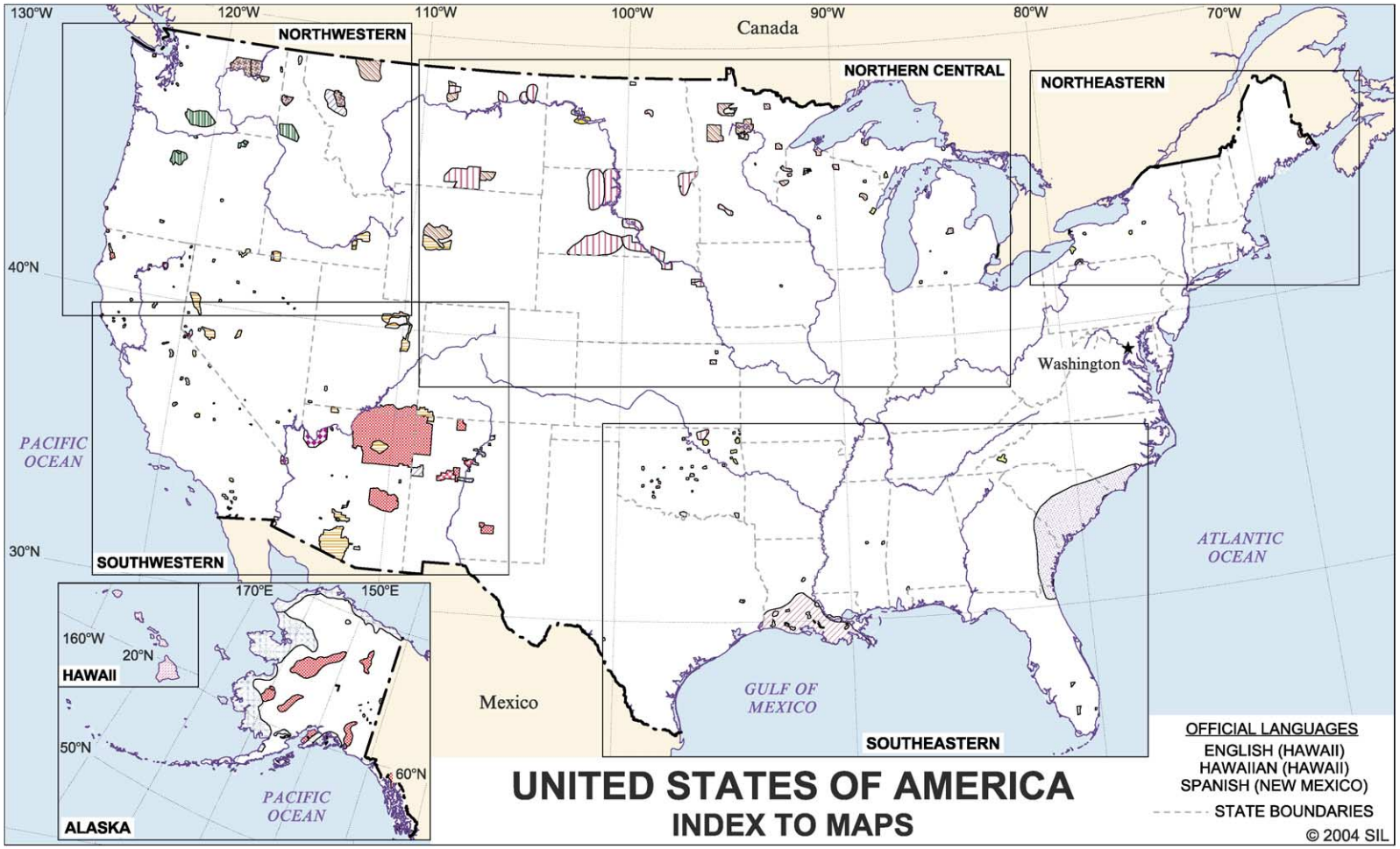

Map 69 United States of America: Index Map.

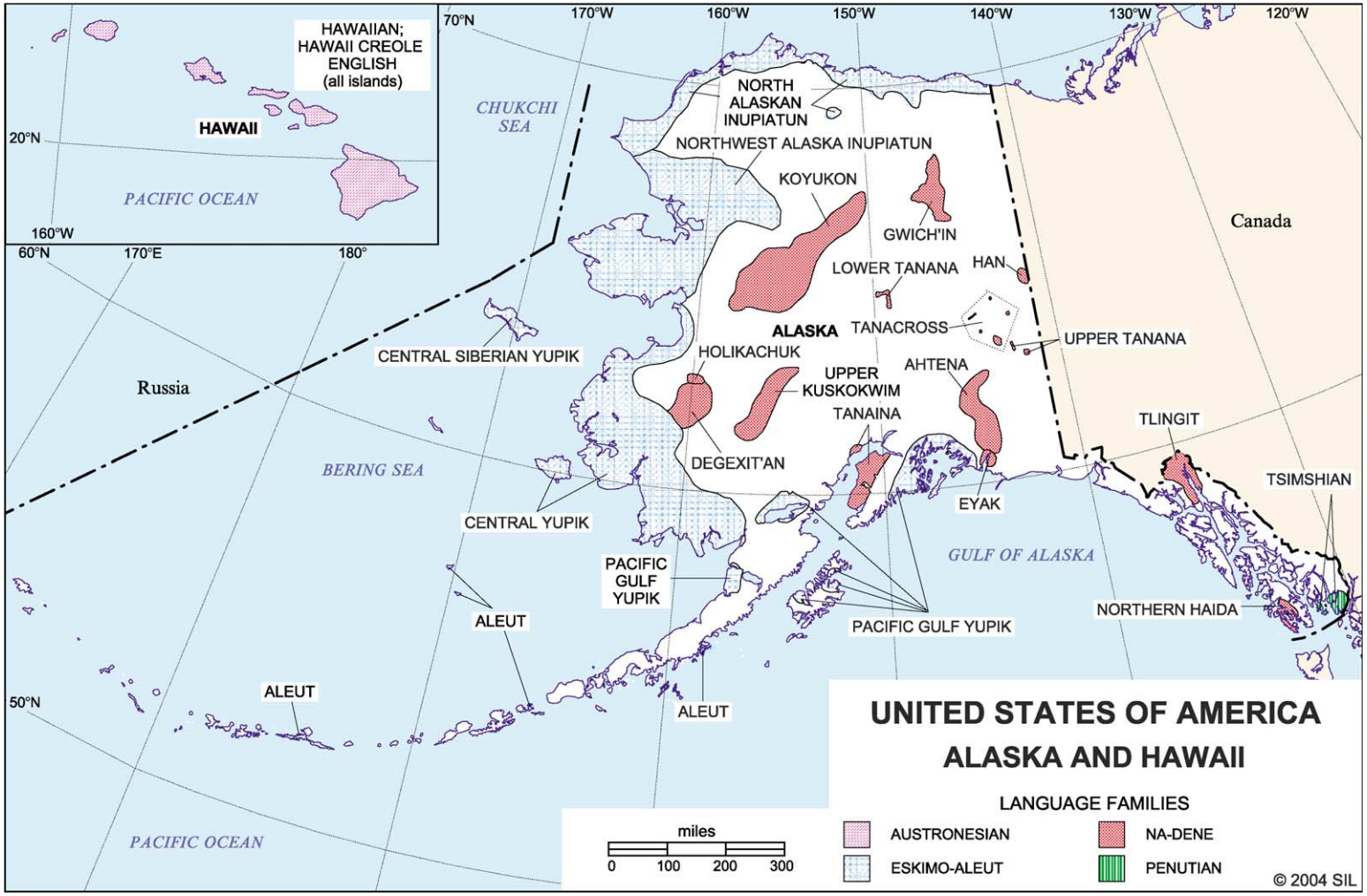

Map 70 United States of America, Alaska and Hawaii.

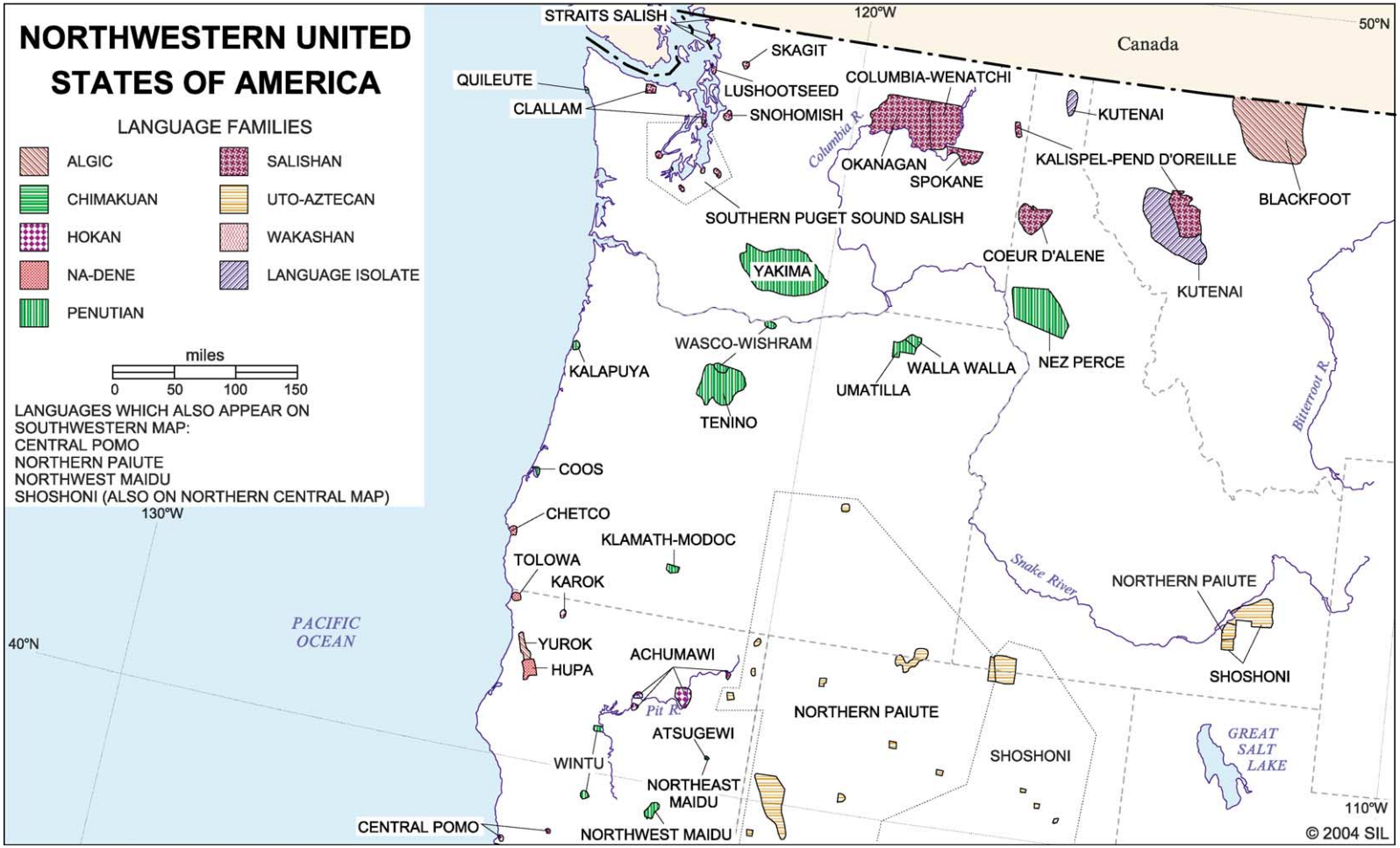

Map 71 Northwestern United States of America.

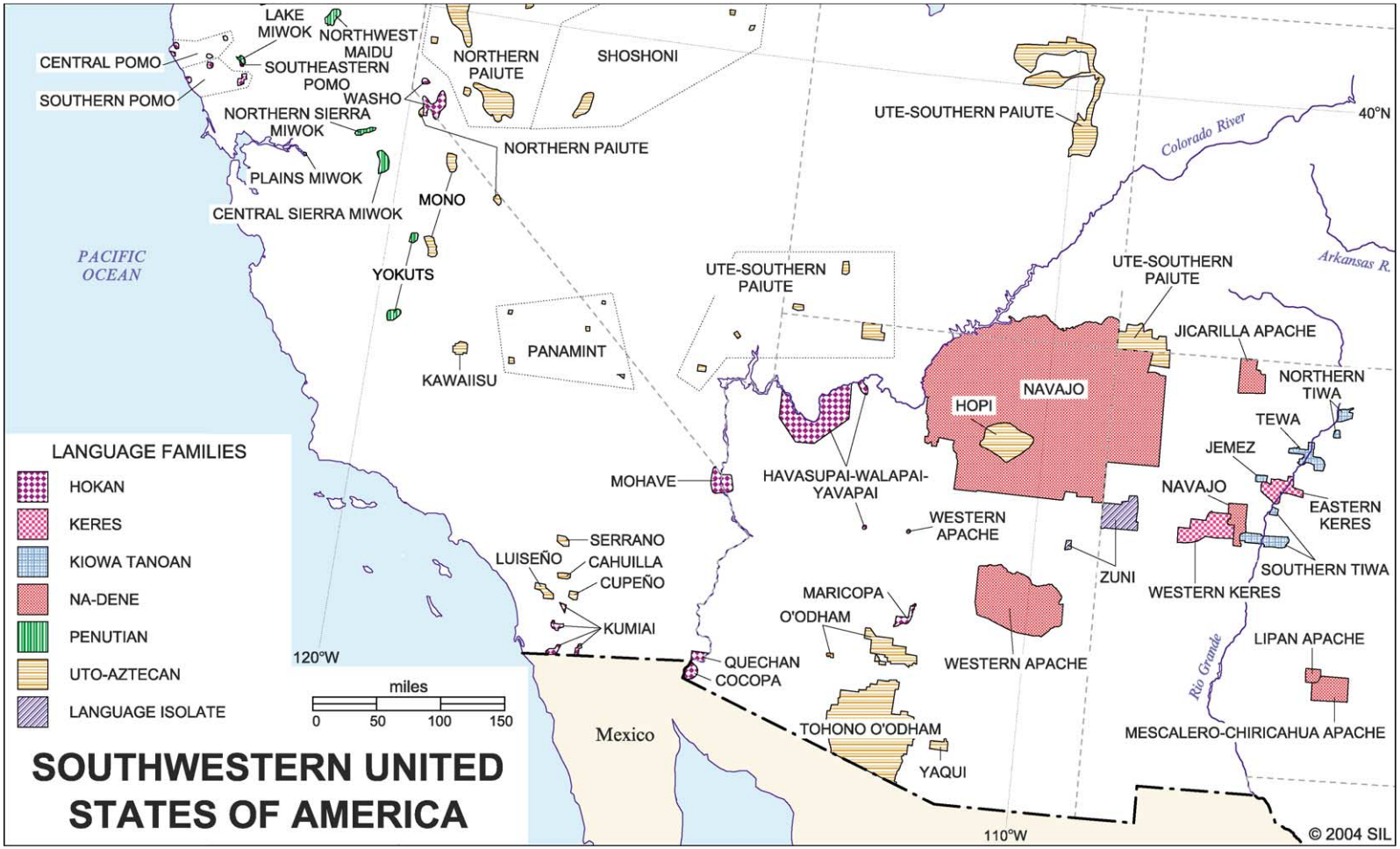

Map 72 Southwestern United States of America.

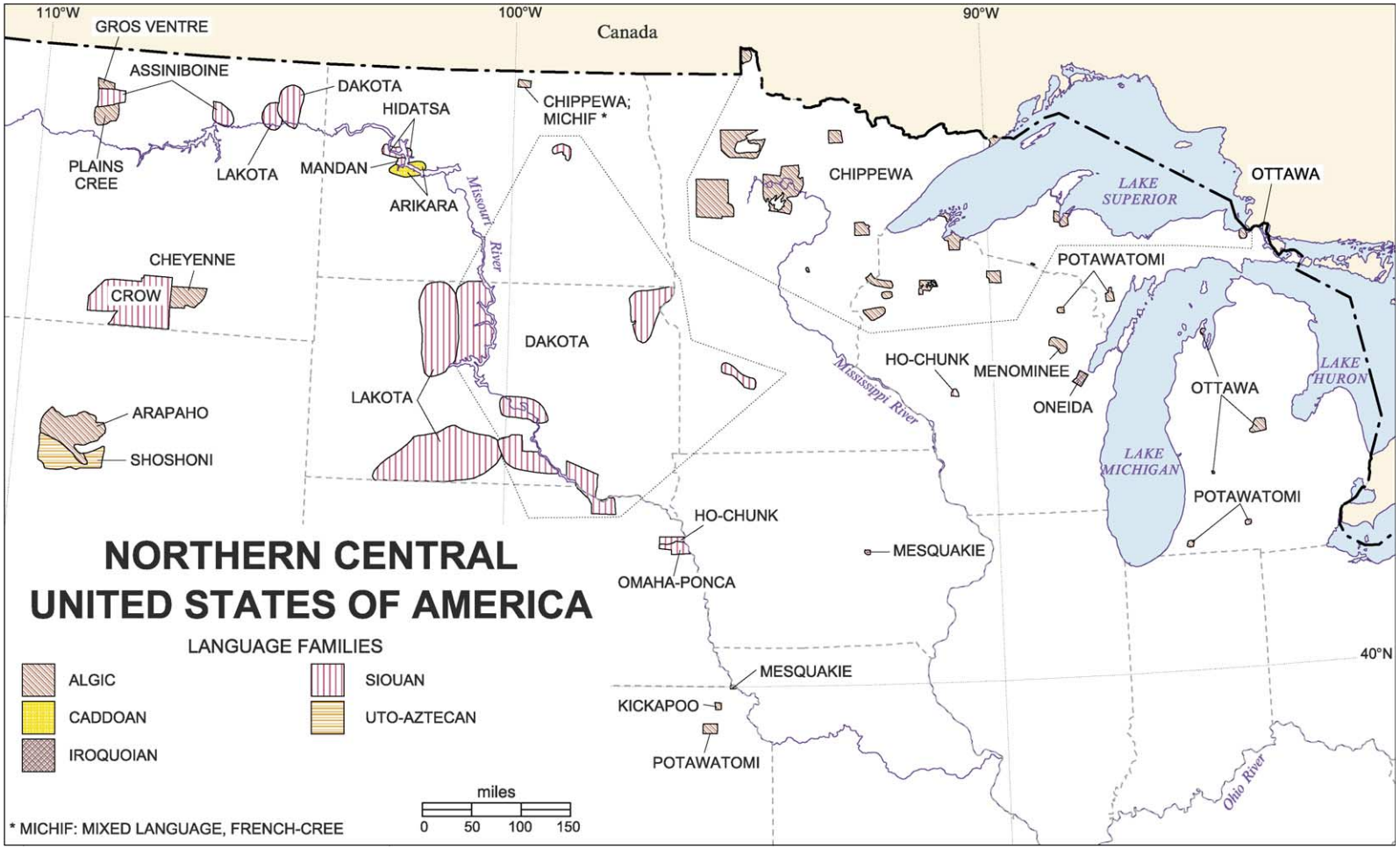

Map 73 Northern Central United States of America.

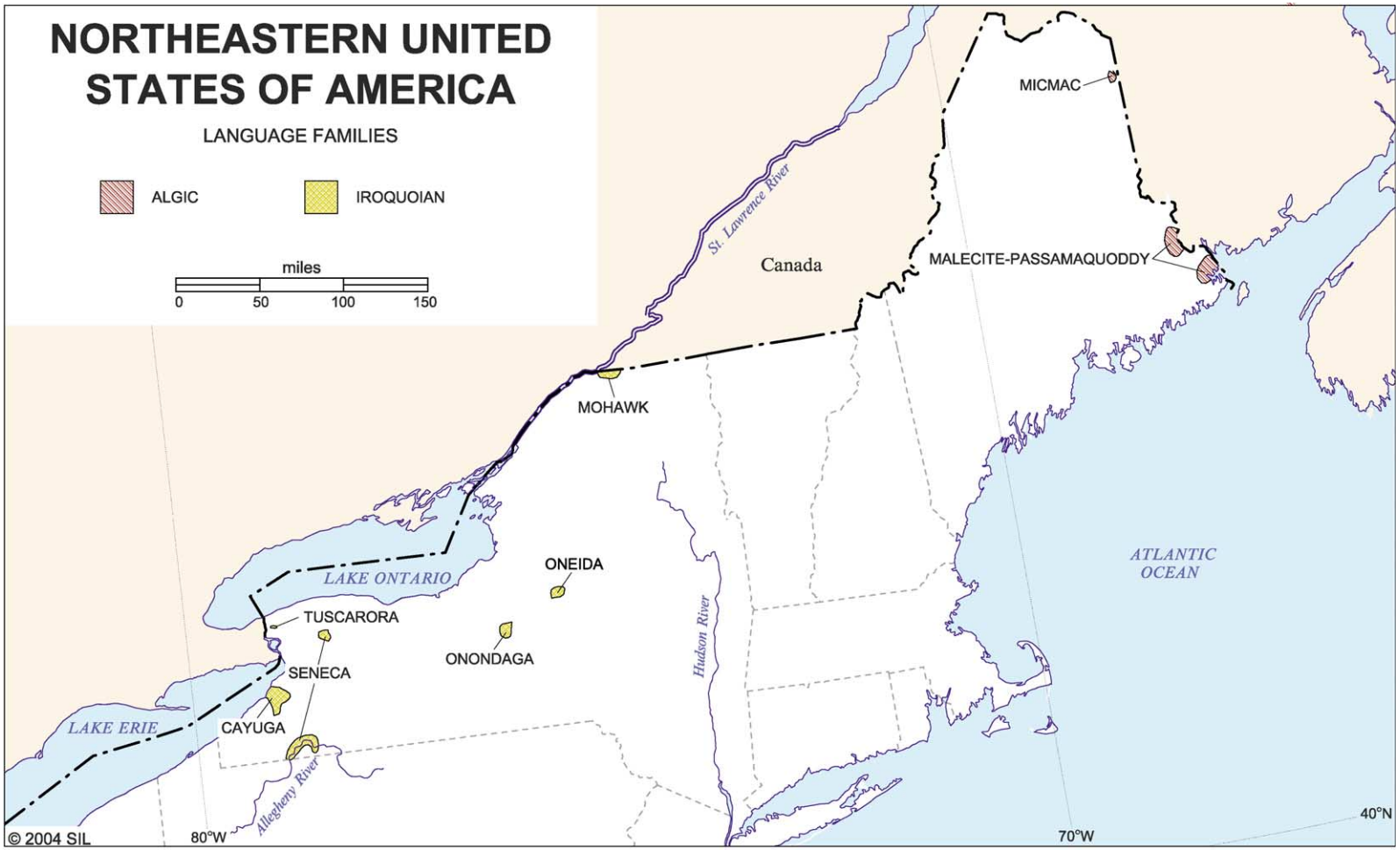

Map 74 Northeastern United States of America.

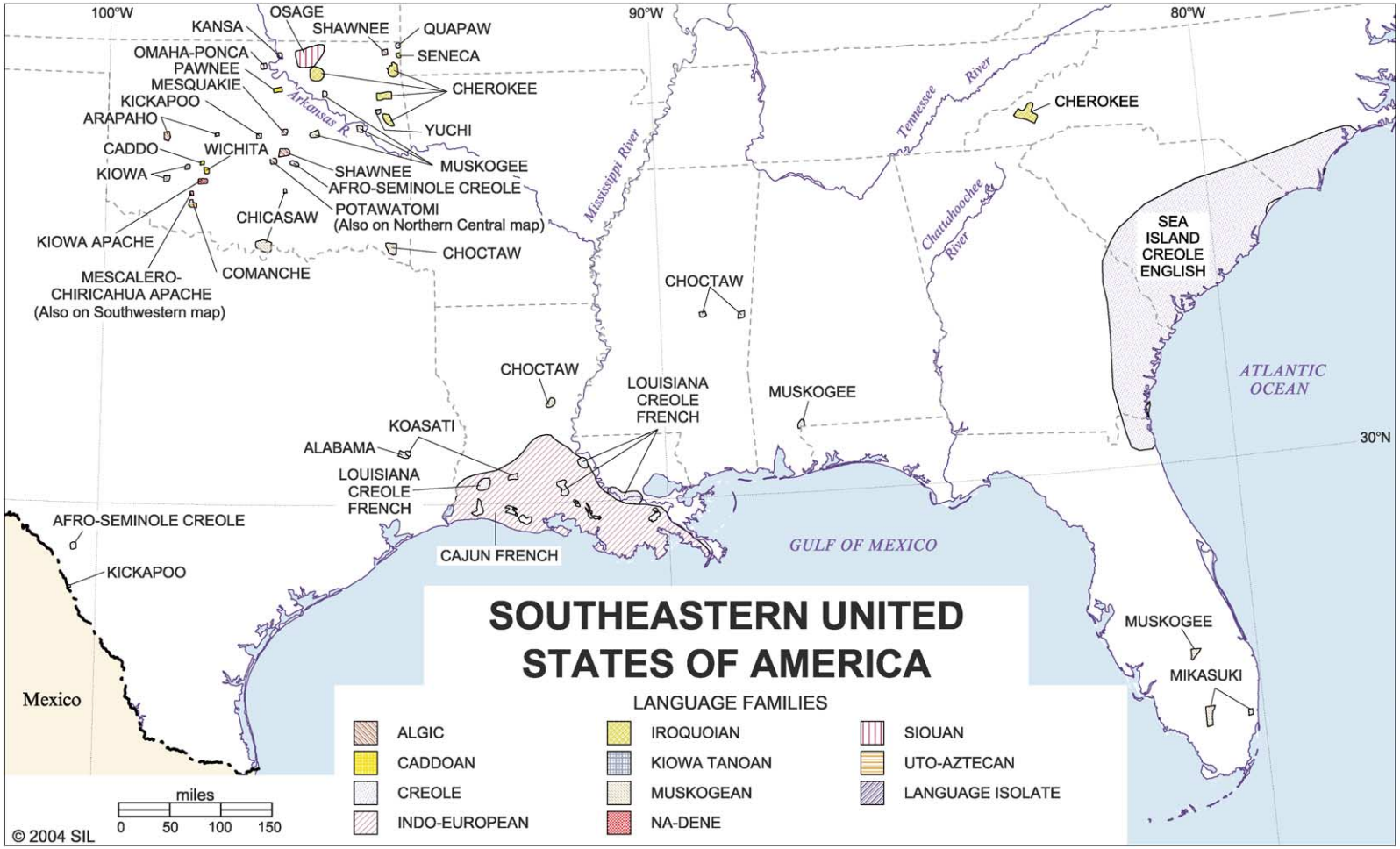

Map 75 Southeastern United States of America.

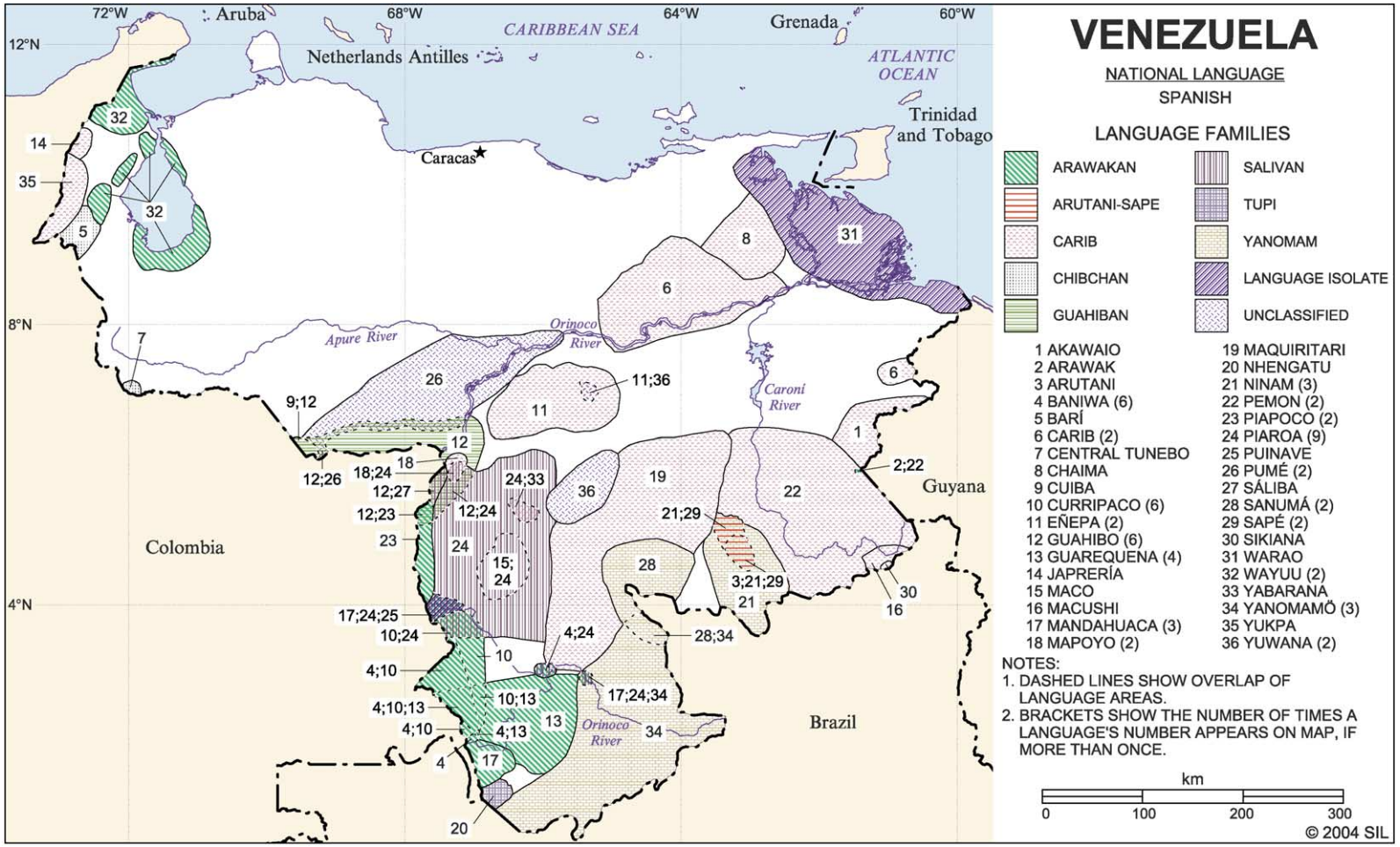

Map 76 Venezuela.

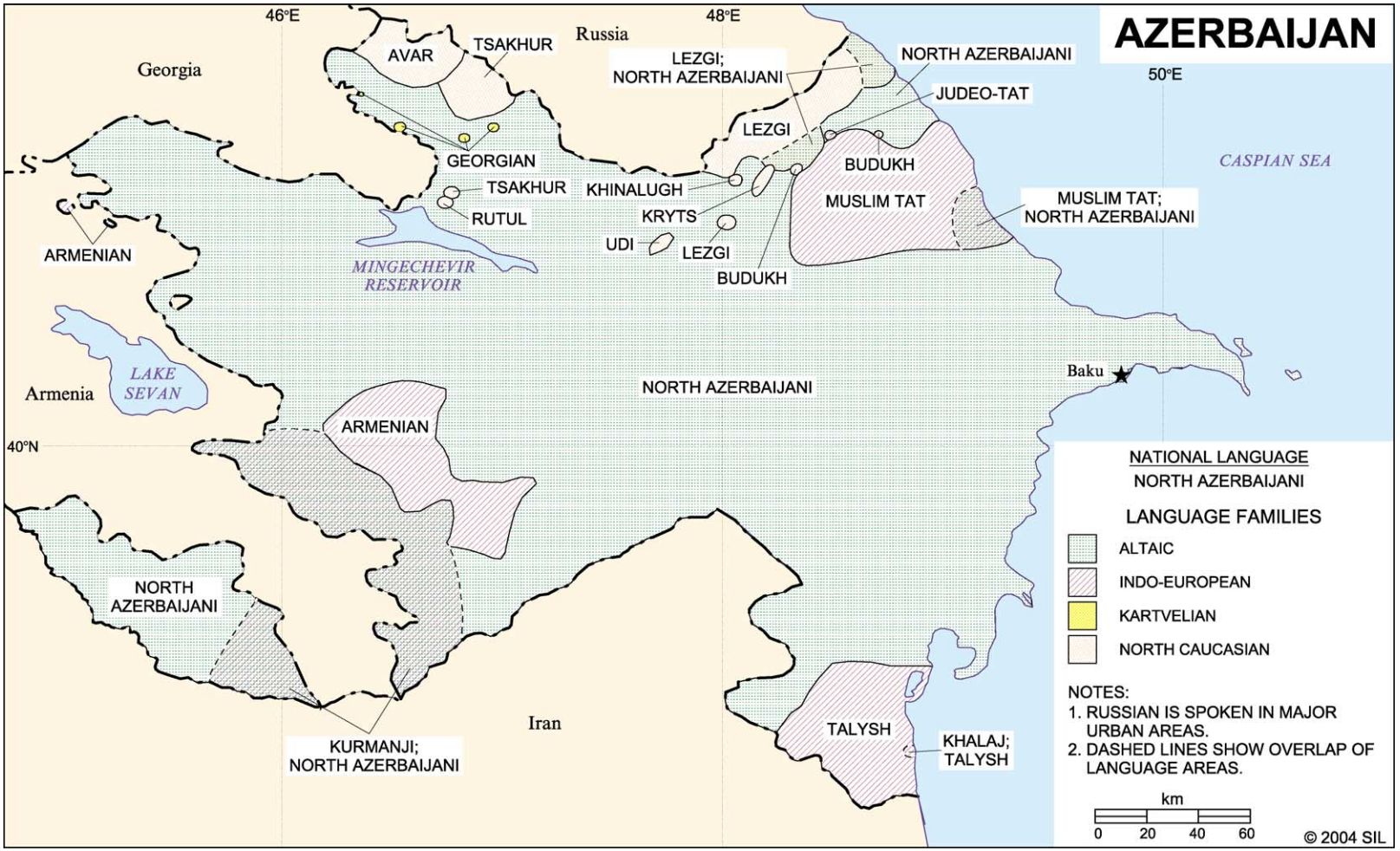

Map 77 Azerbaijan.

Map 78 Cambodia.

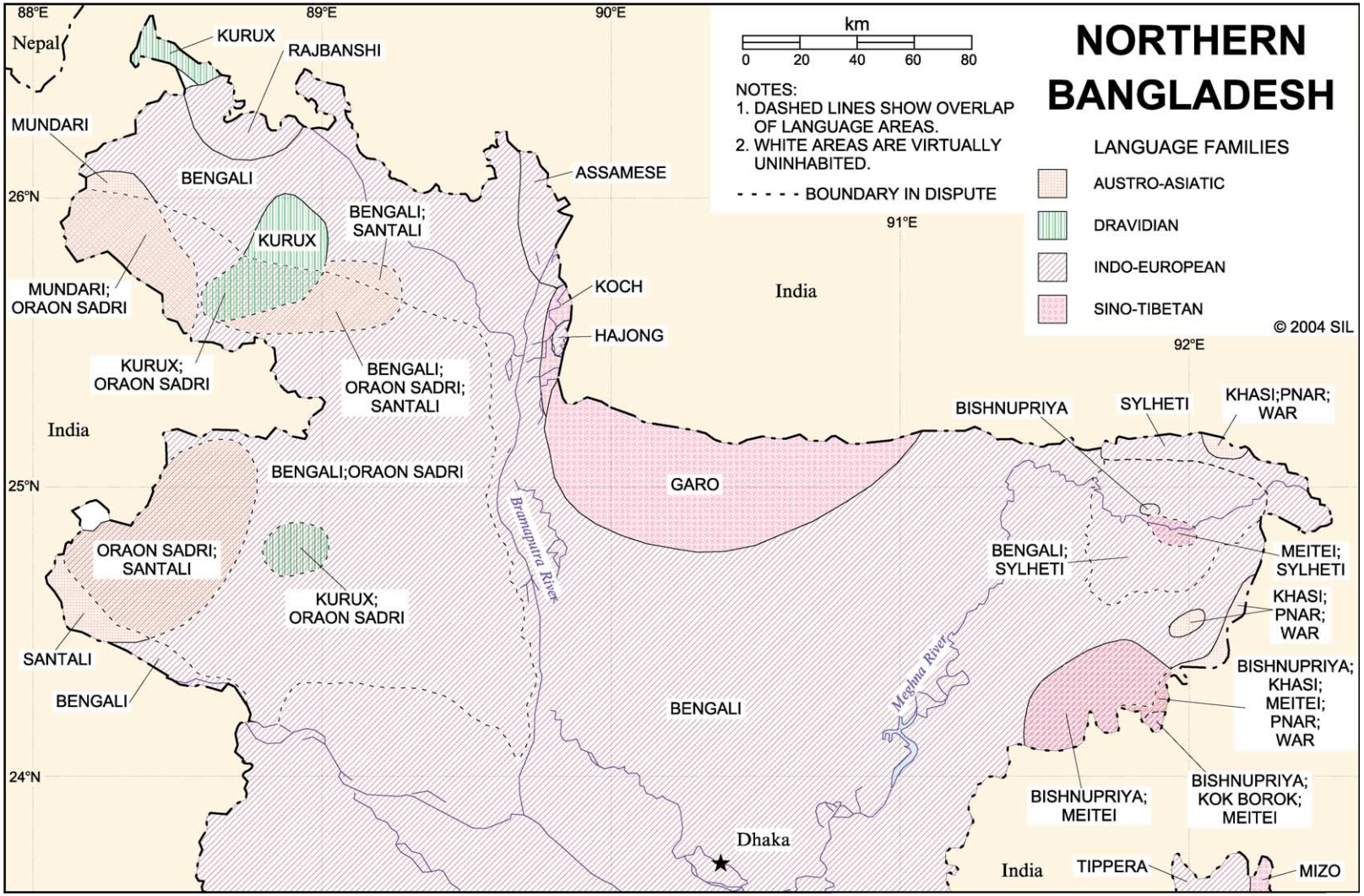

Map 79 Northern Bangladesh.

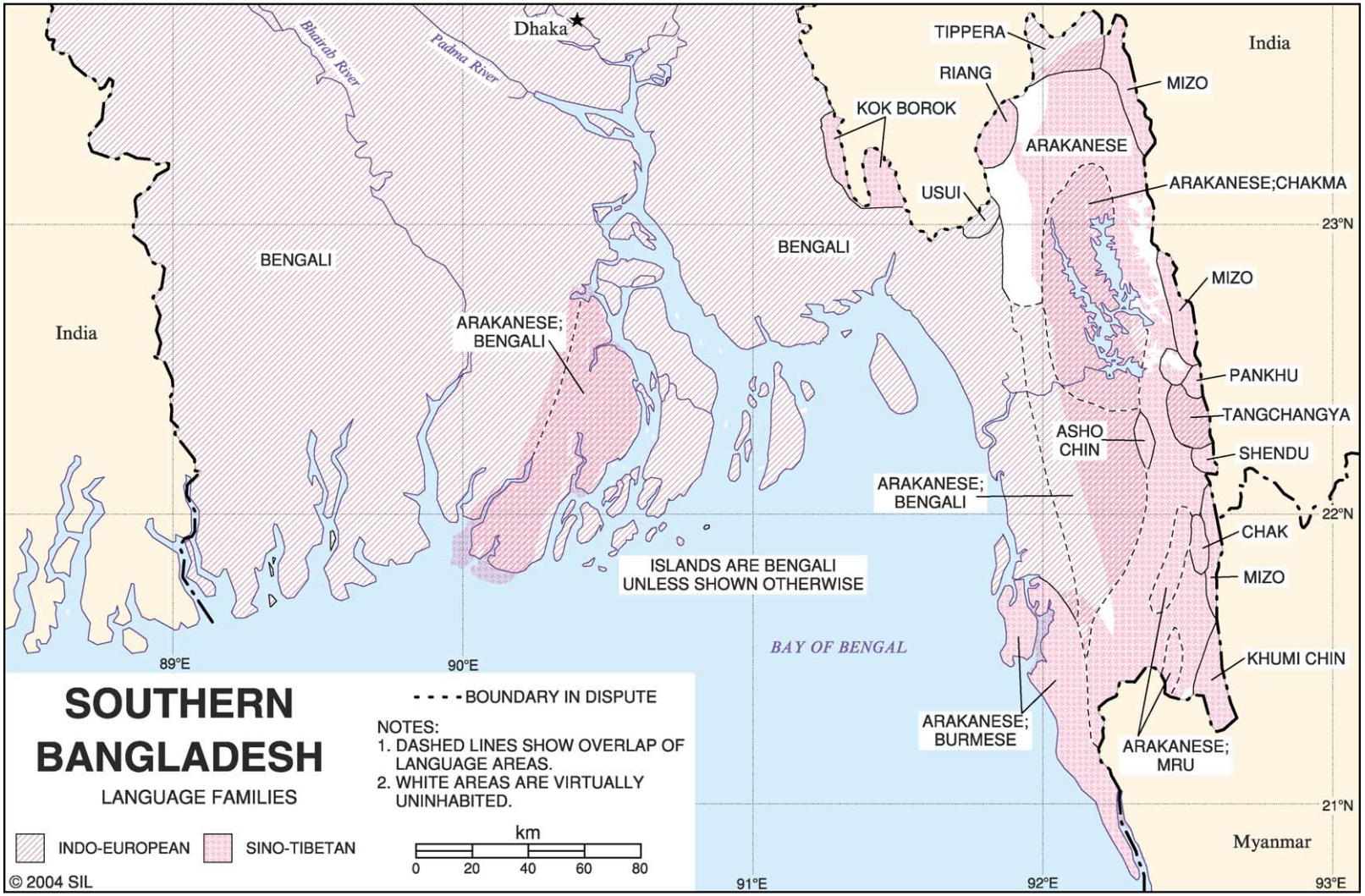

Map 80 Southern Bangladesh.

CHINA
NATIONAL LANGUAGE
MANDARIN CHINESE
PROVINCE BOUNDARIES
BOUNDARY IN DISPUTE
KEY TO LANGUAGE NUMBERS:
1 TATAR
2 ILI TURKI
3 XIBE
4 NORTHERN UZBEK
5 TINANI
6 GAHRI
7 PANANG
8 KYERUNG
9 SHERPA
10 LHOMI
11 GROMA
12 TSHANGLA
13 MOINBA
14 BOGA'ER LUOBA
15 YIDU LUOBA
16 DARANG DENG
17 GEMAN DENG
18 TU
19 KANGJIA
20 SALAR
21 BONAN
22 DONGXIANG
23 WUTUNHUA
24 AMDO TIBETAN
25 BAIMA
26 SHANGZHAI
27 GUANYINQIAO
28 JIARONG
29 NORTHERN QIANG
30 SOUTHERN QIANG
31 ZHABA
32 QUEYU
33 HORPA
34 GUIQIONG
35 MUYA
Russia
Kazakhstan
Kyrgyzstan
Pakistan
Nepal
Bhutan
India
Bang-ladesh
Mongolia
Myanmar
Thailand
Laos
Vietnam
Taiwan
Hong Kong
Macau
North Korea
South Korea
RUSSIAN
KAZAKH
TUVIN
Xinjiang
UYGHUR
KIRGHIZ
AINU
SARIKOLI
WAKHI
KALMYK-OIRAT
WEST YUGUR
EAST YUGUR
Qinghai
Tibet
KHAMS TIBETAN
CENTRAL TIBETAN
Gansu
Ningxia
Shaanxi
Sichuan
Chongqing
Inner Mongolia
PERIPHERAL MONGOLIAN
MANDARIN CHINESE
JINYU CHINESE
Beijing
Tianjin
Hebei
Shanxi
Shandong
Henan
Jiangsu
Anhui
Hubei
WU CHINESE
Shanghai
HUIZHOU CHINESE
Zhejiang
Liaoning
Jilin
Heilongjiang
OROQEN
EVENKI
CHINA BURIAT
DAUR
KHAKAS
NANAI
MANCHU
KOREAN
SEA OF JAPAN
YELLOW SEA
EAST CHINA SEA
SOUTH CHINA SEA
BAY OF BENGAL
SEE S.W. CHINA MAP
SEE SOUTH CHINA MAP
120°E
130°E
50°N
40°N
30°N
20°N
80°E
90°E
100°E
110°E
km
0 100 200 300
© 2004 SIL

Map 81 China.

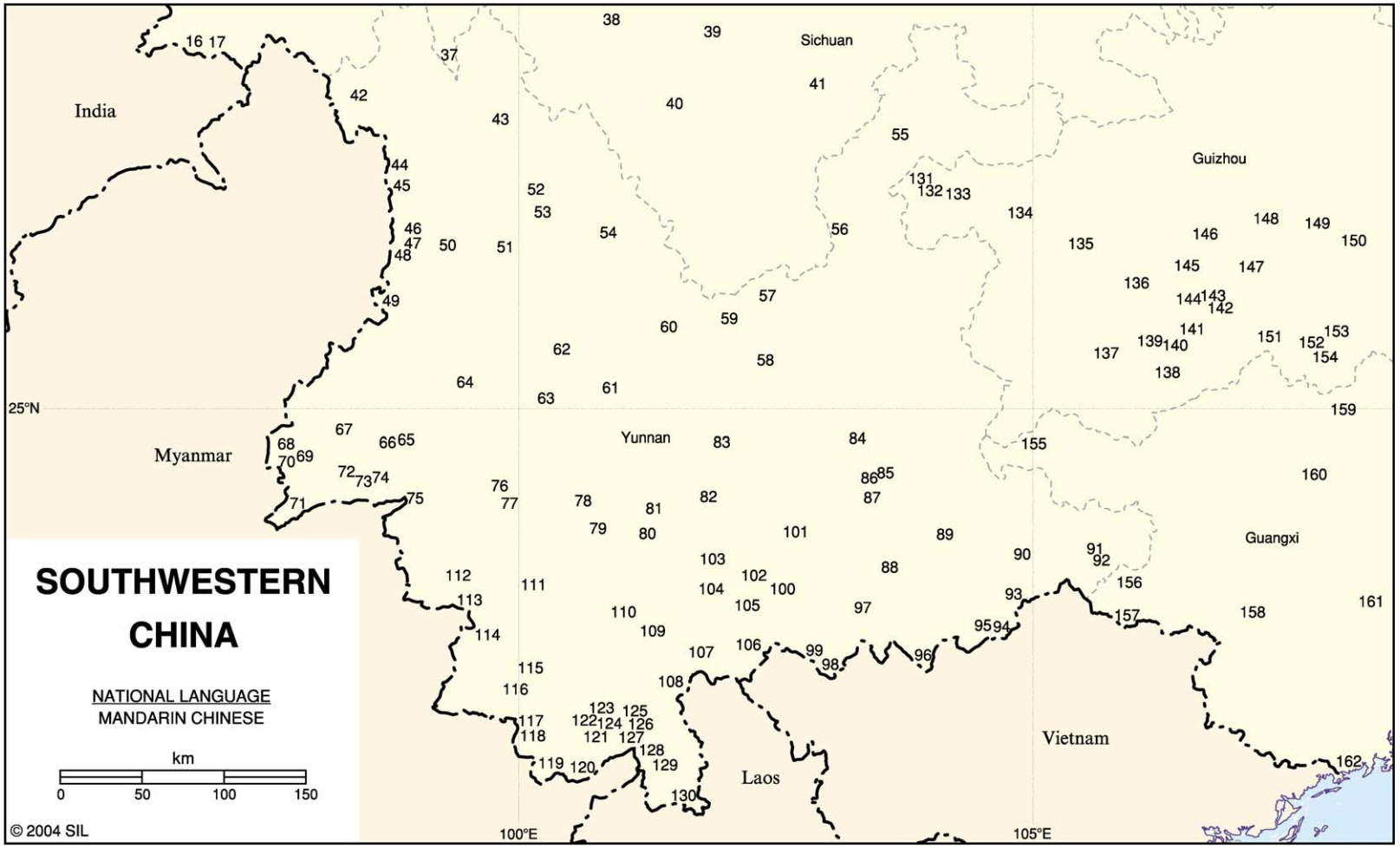

Map 82 Southwestern China.

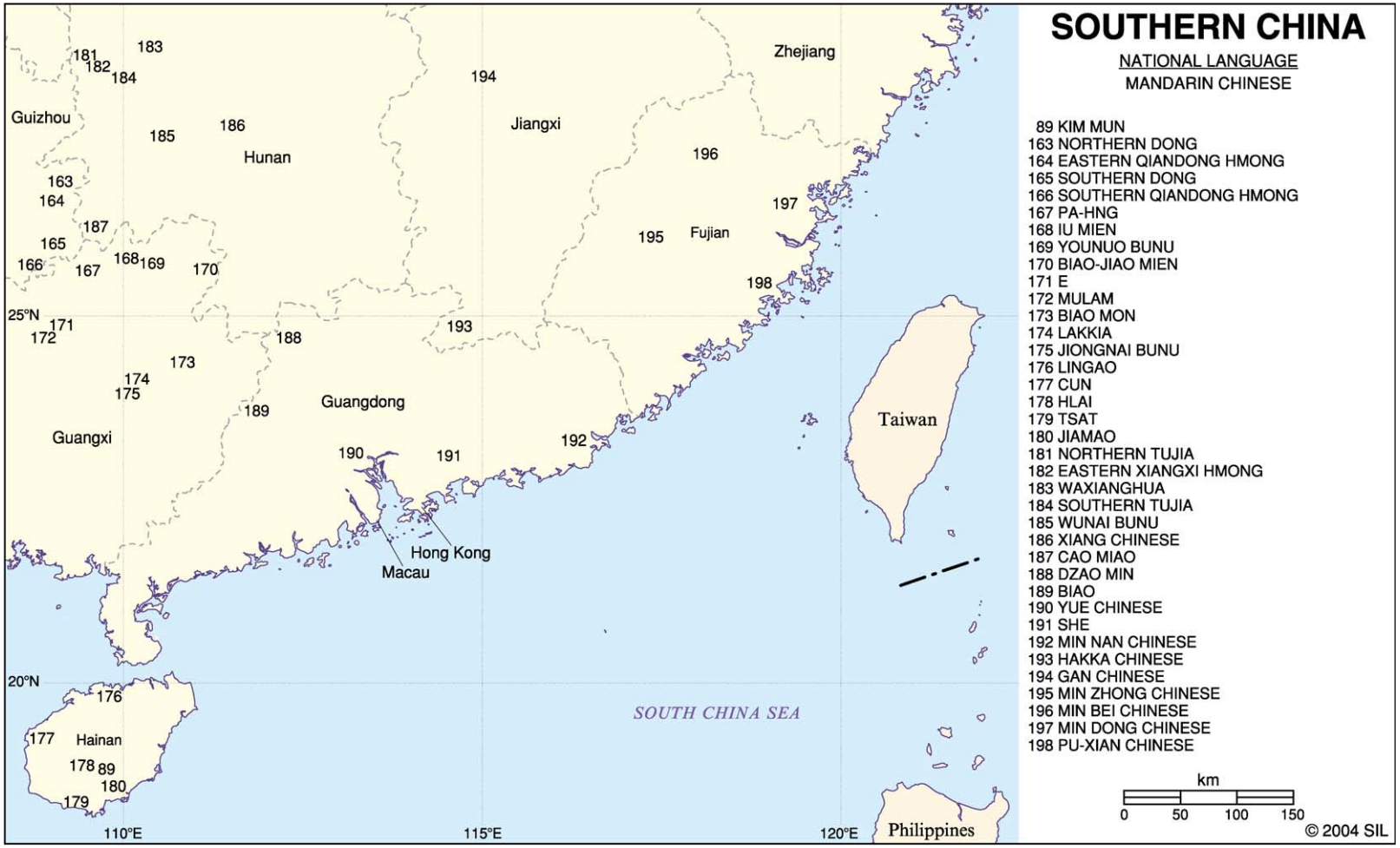

Map 83 Southern China.

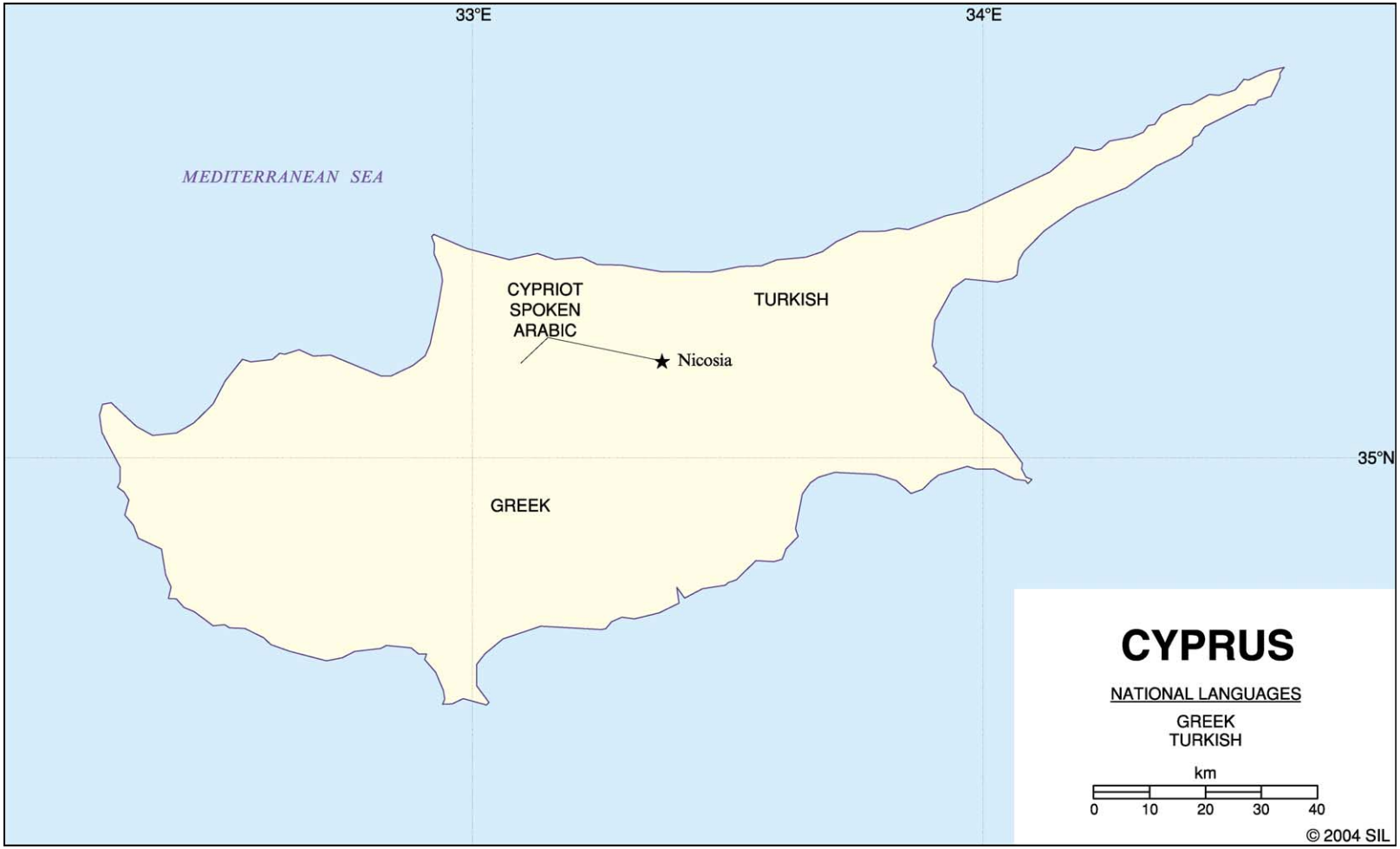

Map 84 Cyprus.

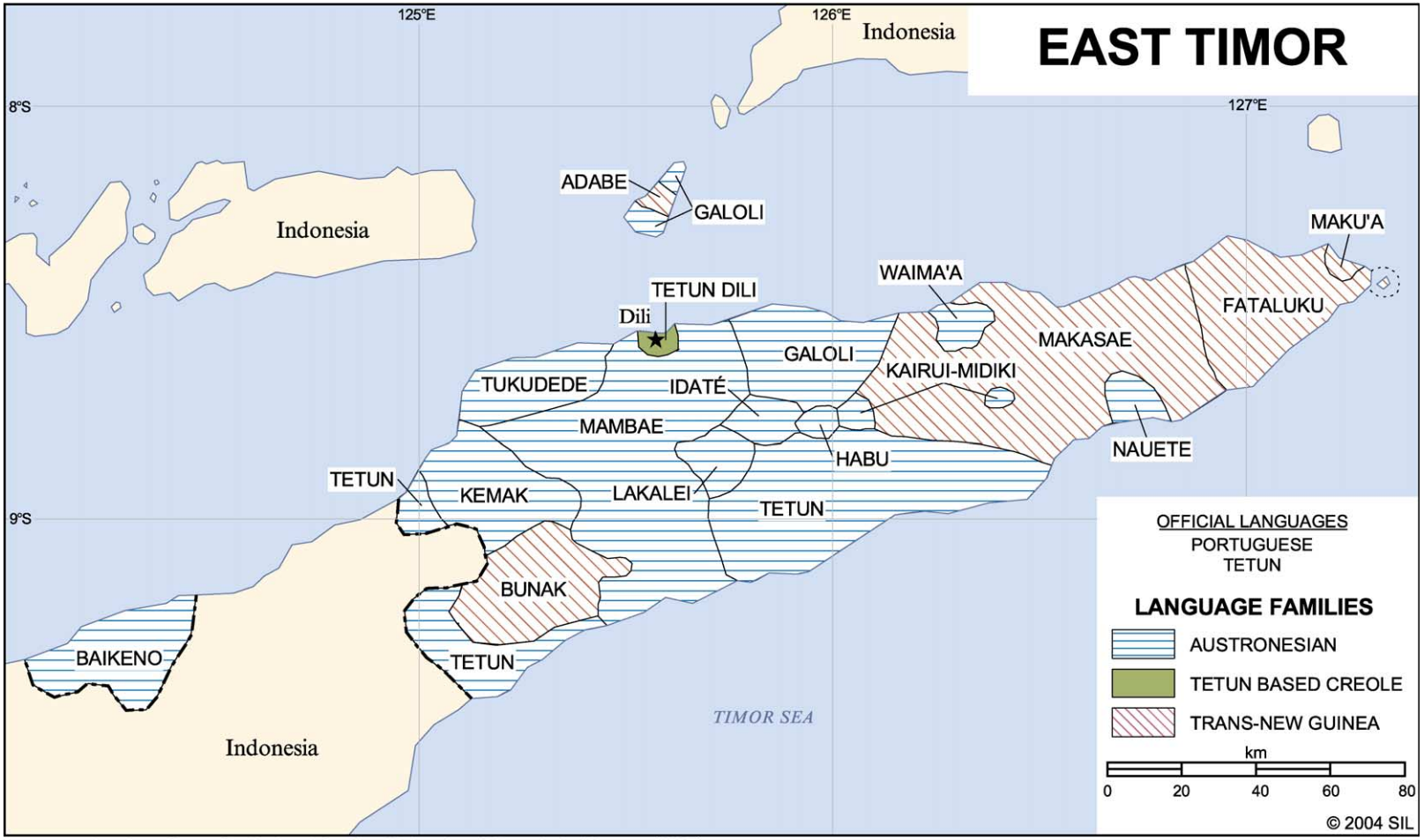

Language data from Centre for Regional Studies, Universitas Kristen Artha Wacana (1997)

Map 85 East Timor.

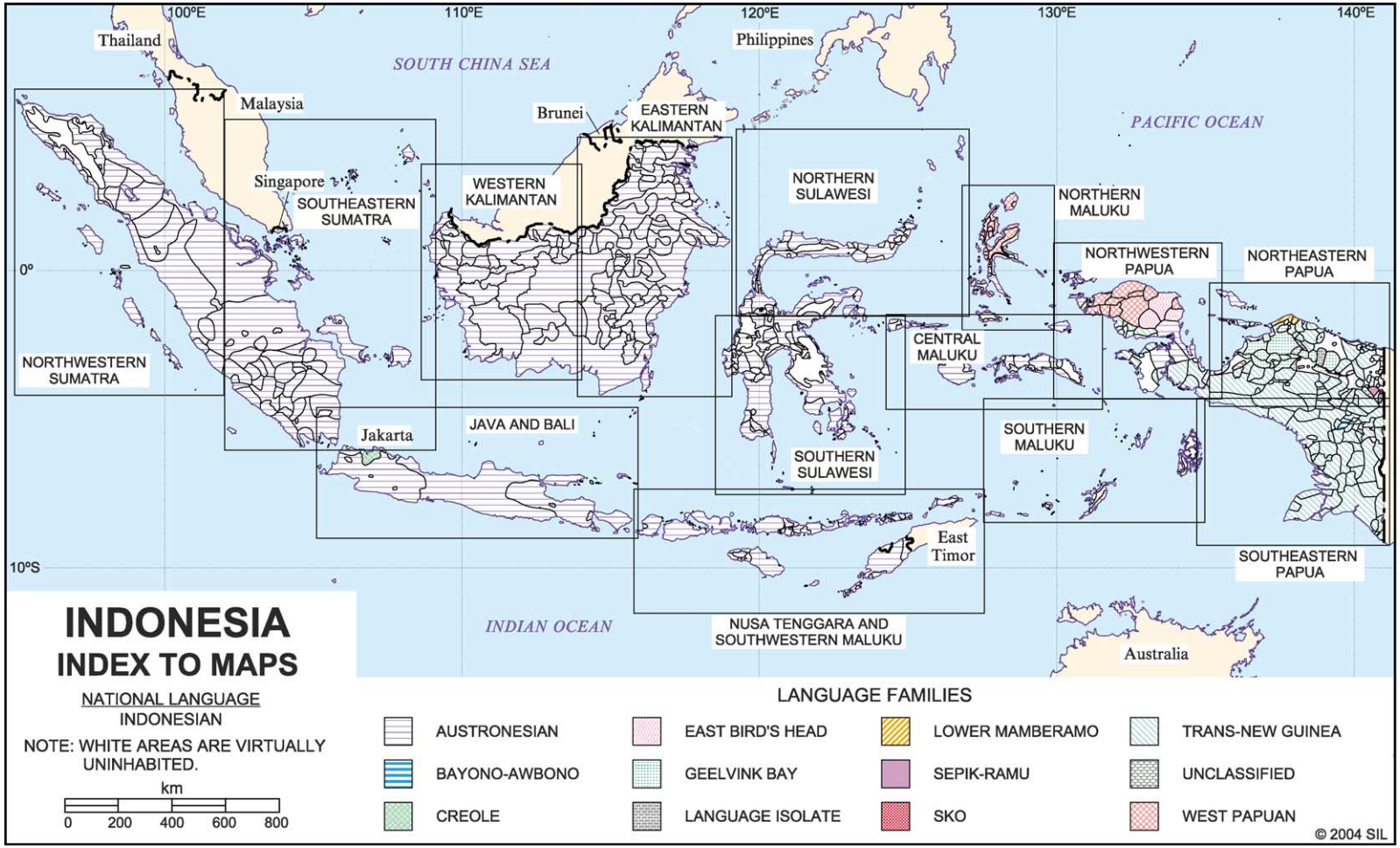

Map 86 Indonesia: Index Map.

Map 87 Indonesia, Java and Bali.

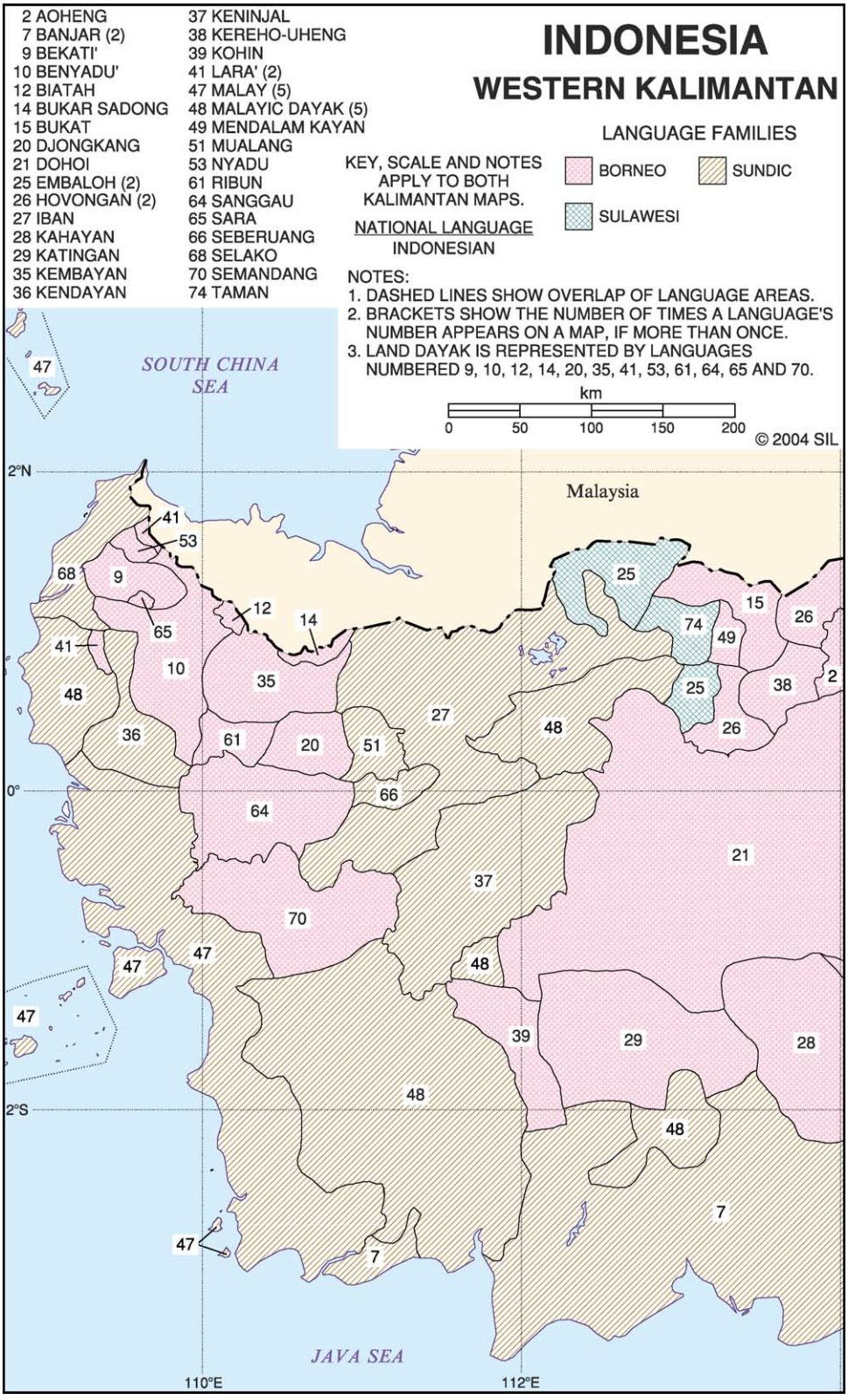

Map 88 Indonesia, Western Kalimantan.

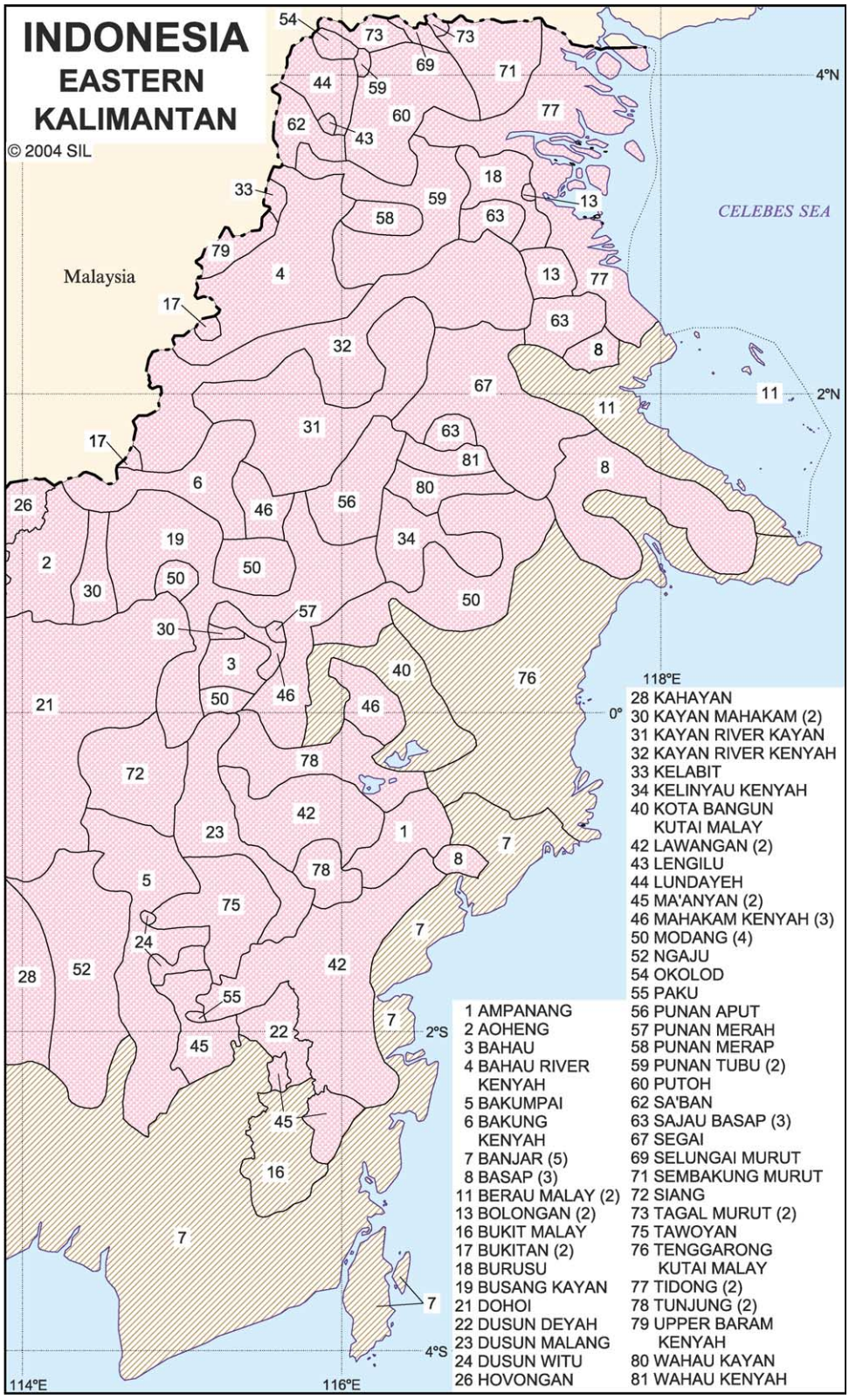

Map 89 Indonesia, Eastern Kalimantan.

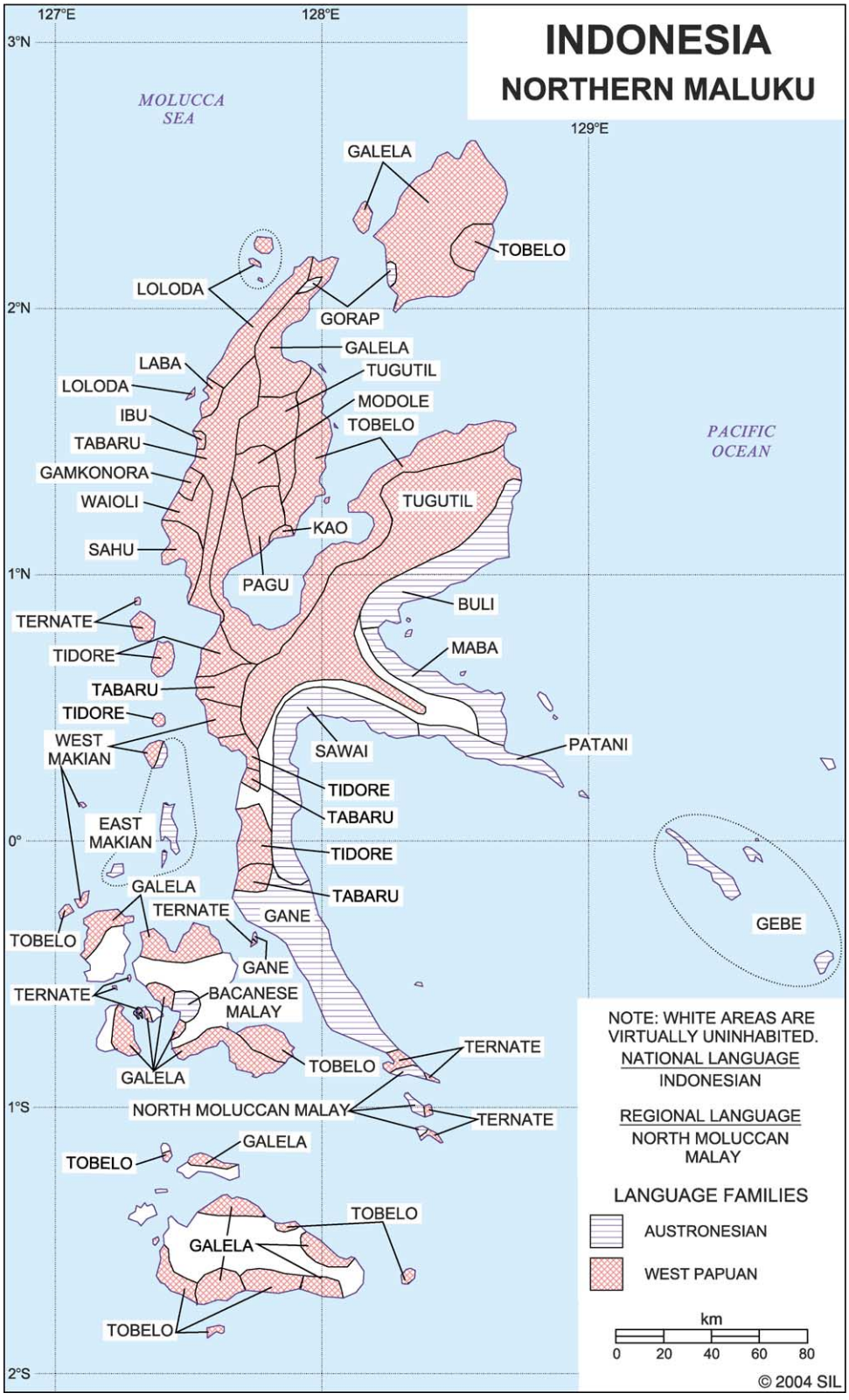

Map 90 Indonesia, Northern Maluku.

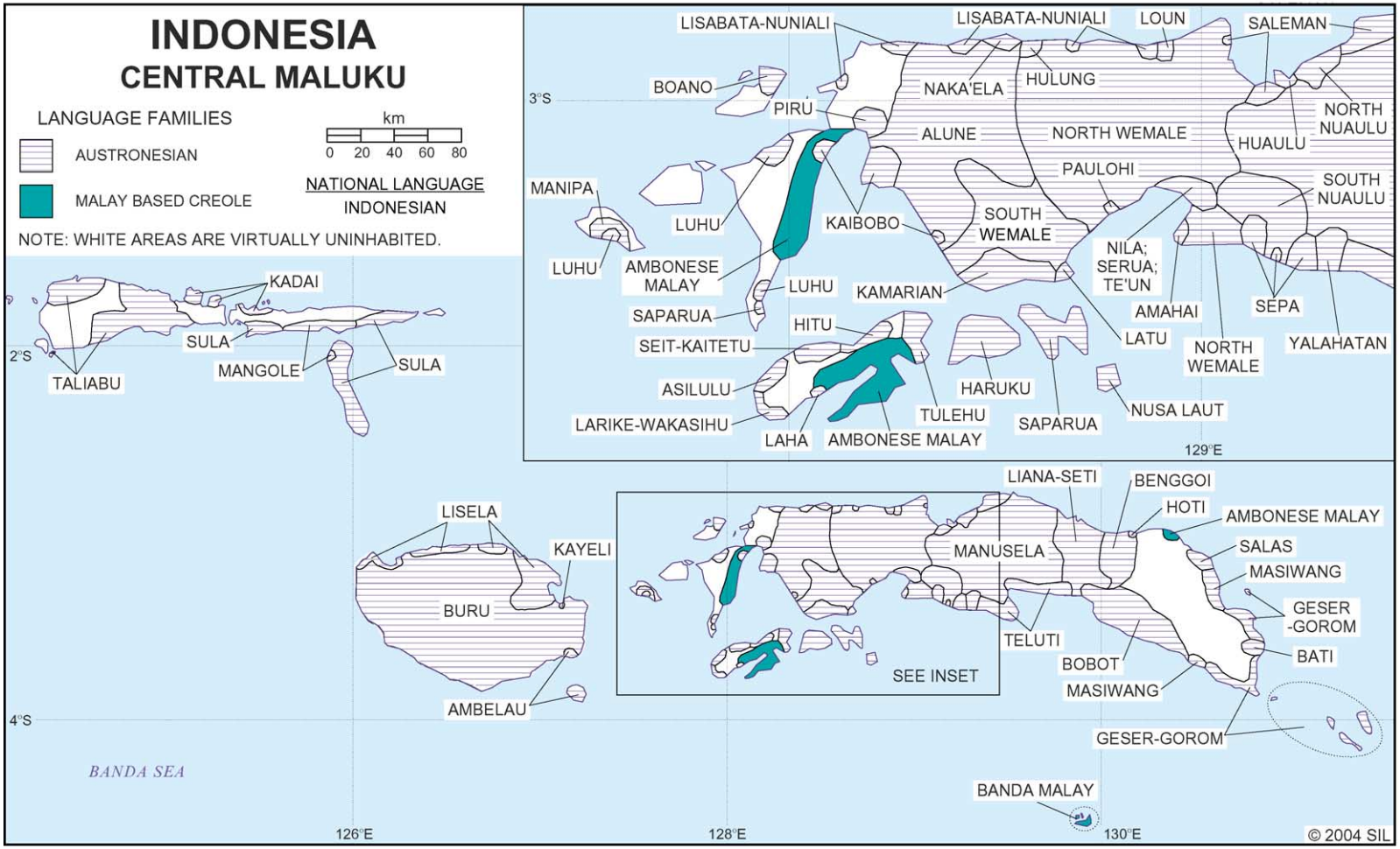

Map 91 Indonesia, Central Maluku.

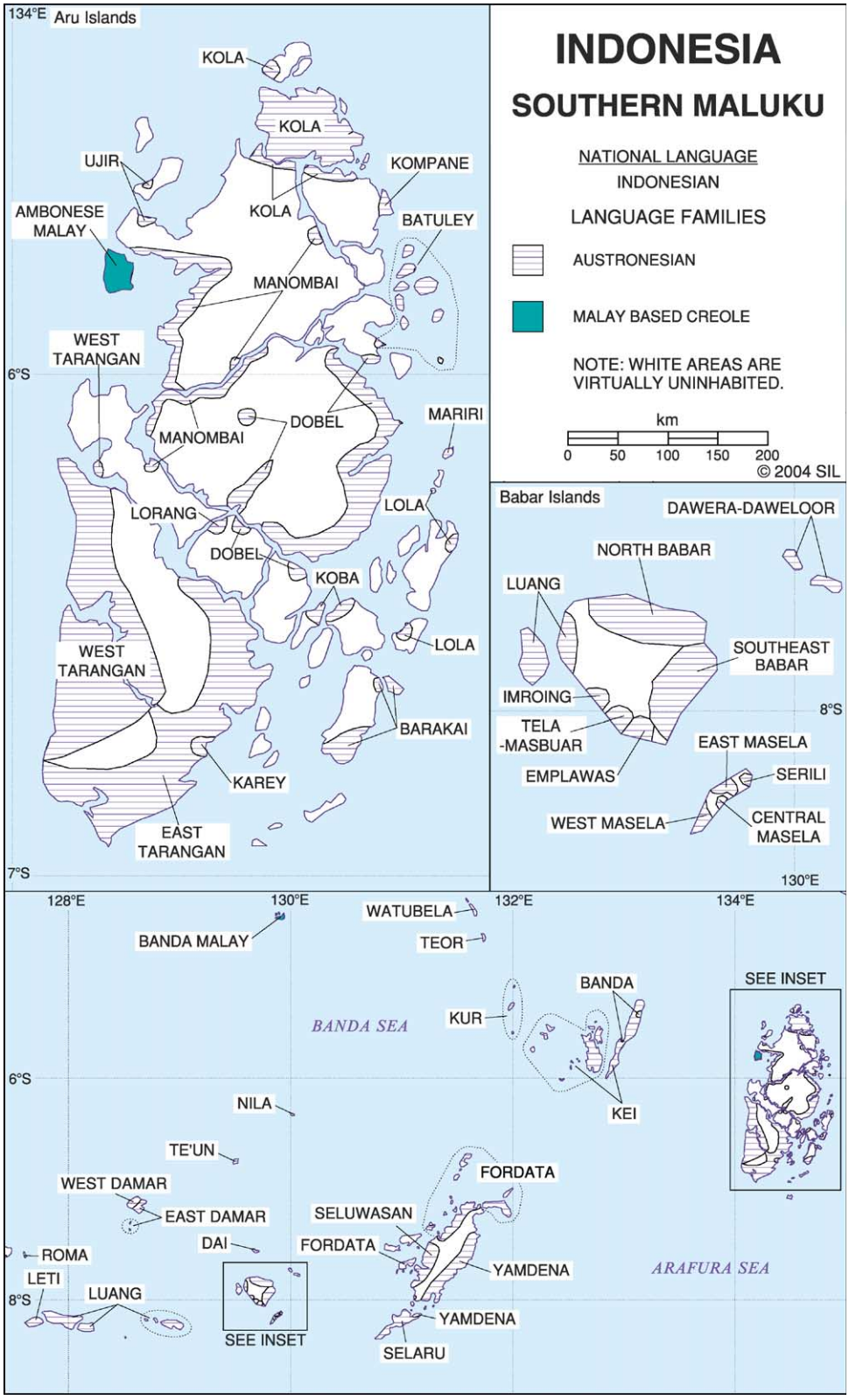

Map 92 Indonesia, Southern Maluku.

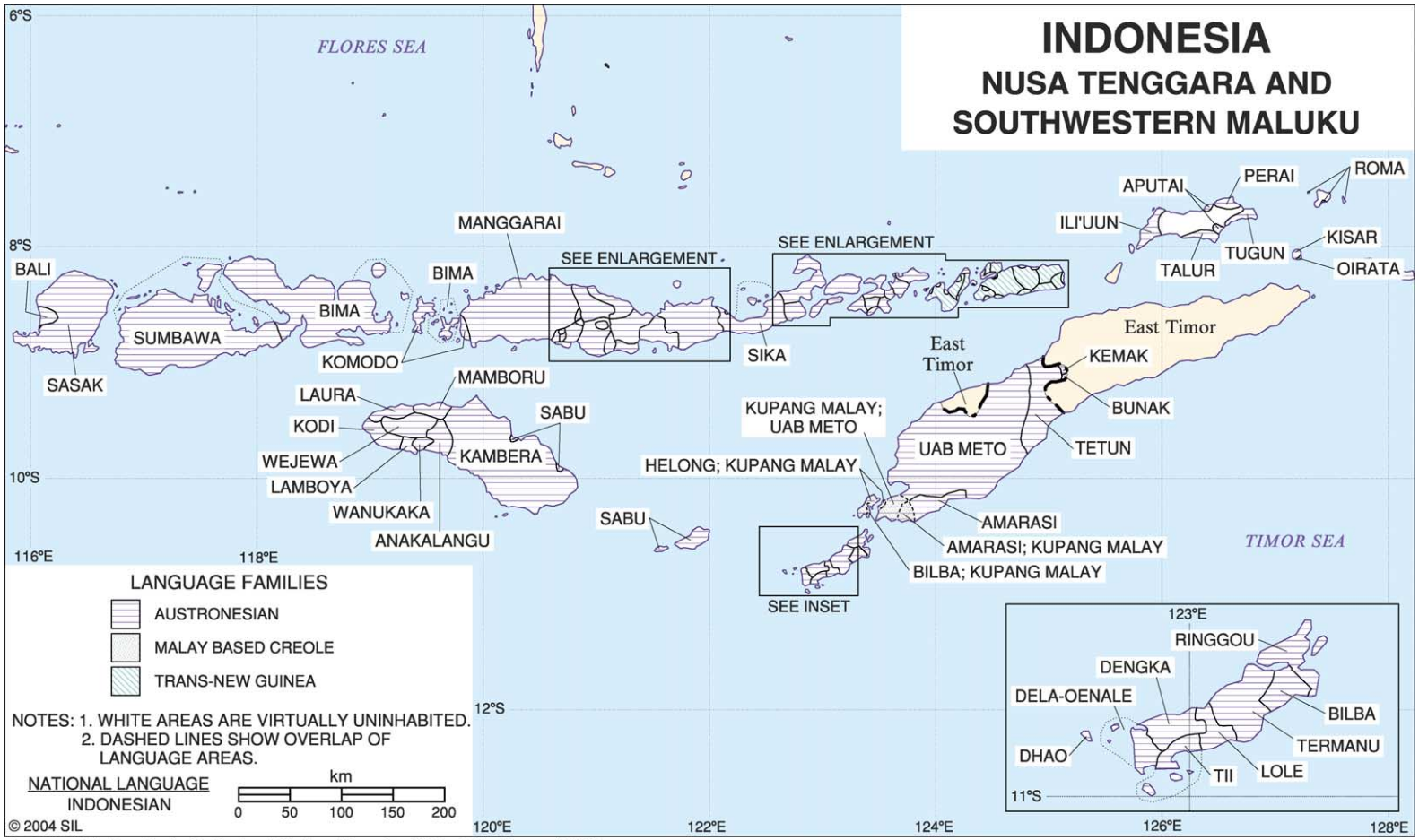

Language data from Centre for Regional Studies, Universitas Kristen Artha Wacana (1997)

Map 93 Indonesia, Nusa Tenggara and Southwestern Maluku.

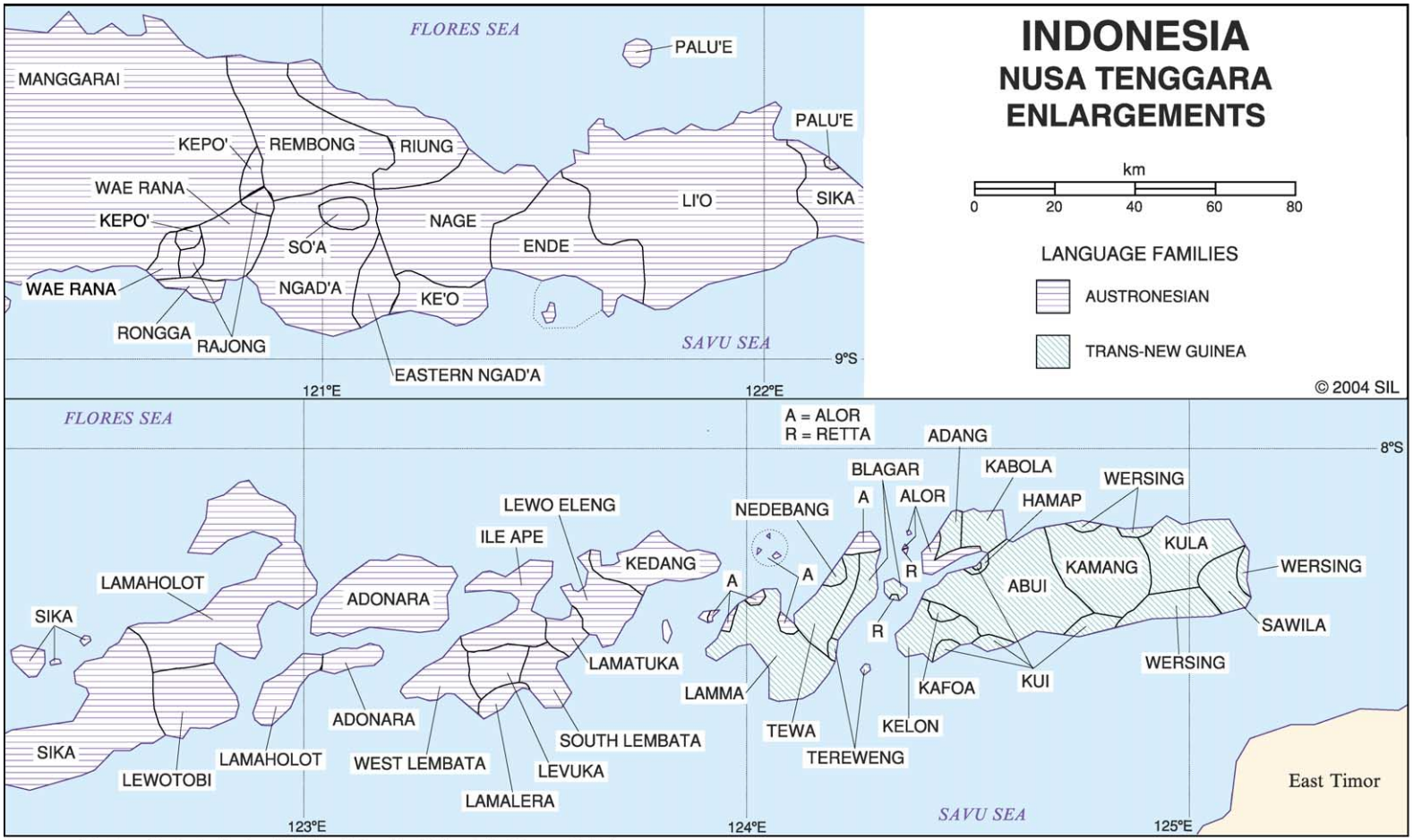

Language data from Center for Regional Studies, Universitas Kristen Artha Wacana (1997)

Map 94 Indonesia, Nusa Tenggara enlargements.

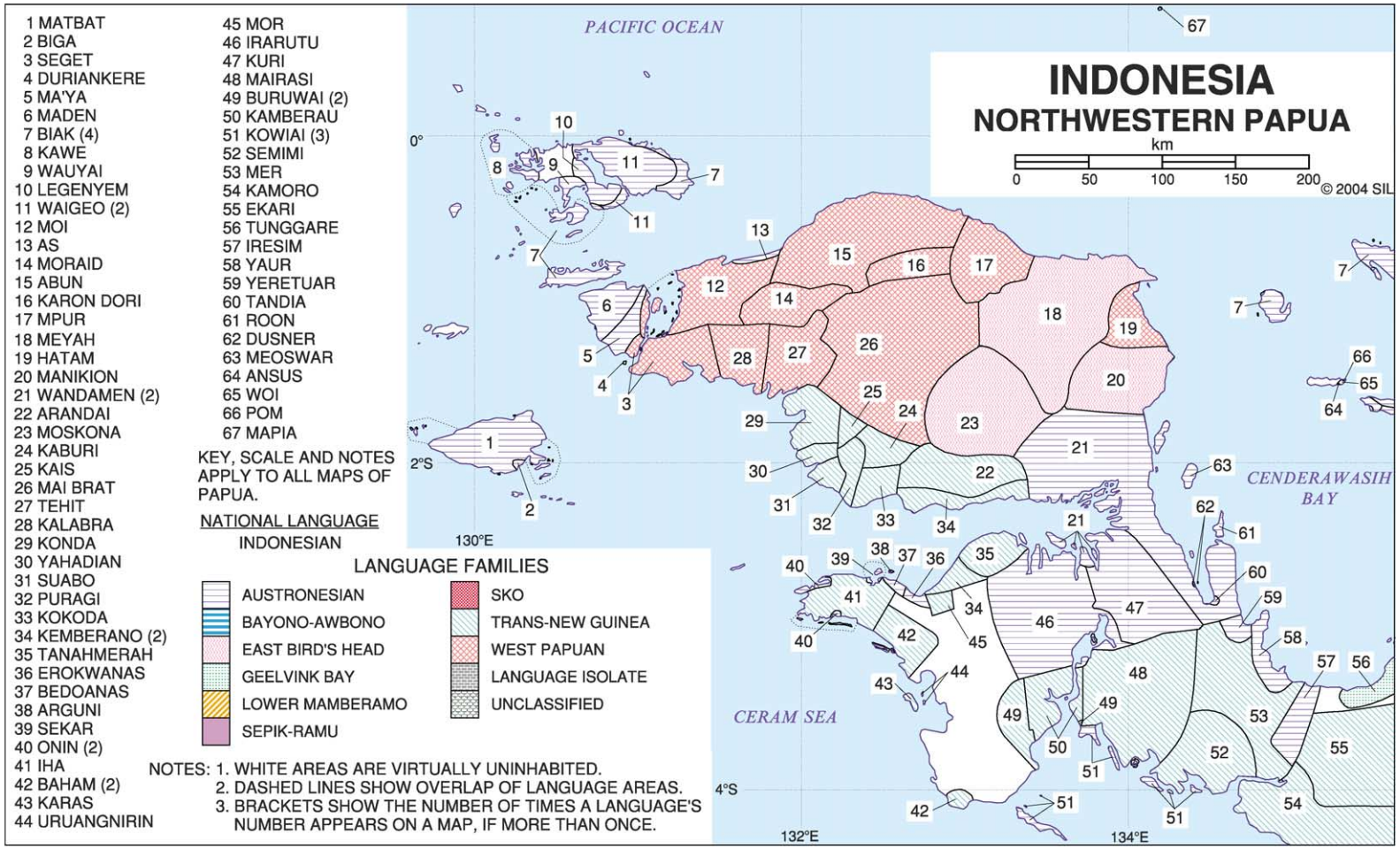

Map 95 Indonesia, Northwestern Papua.

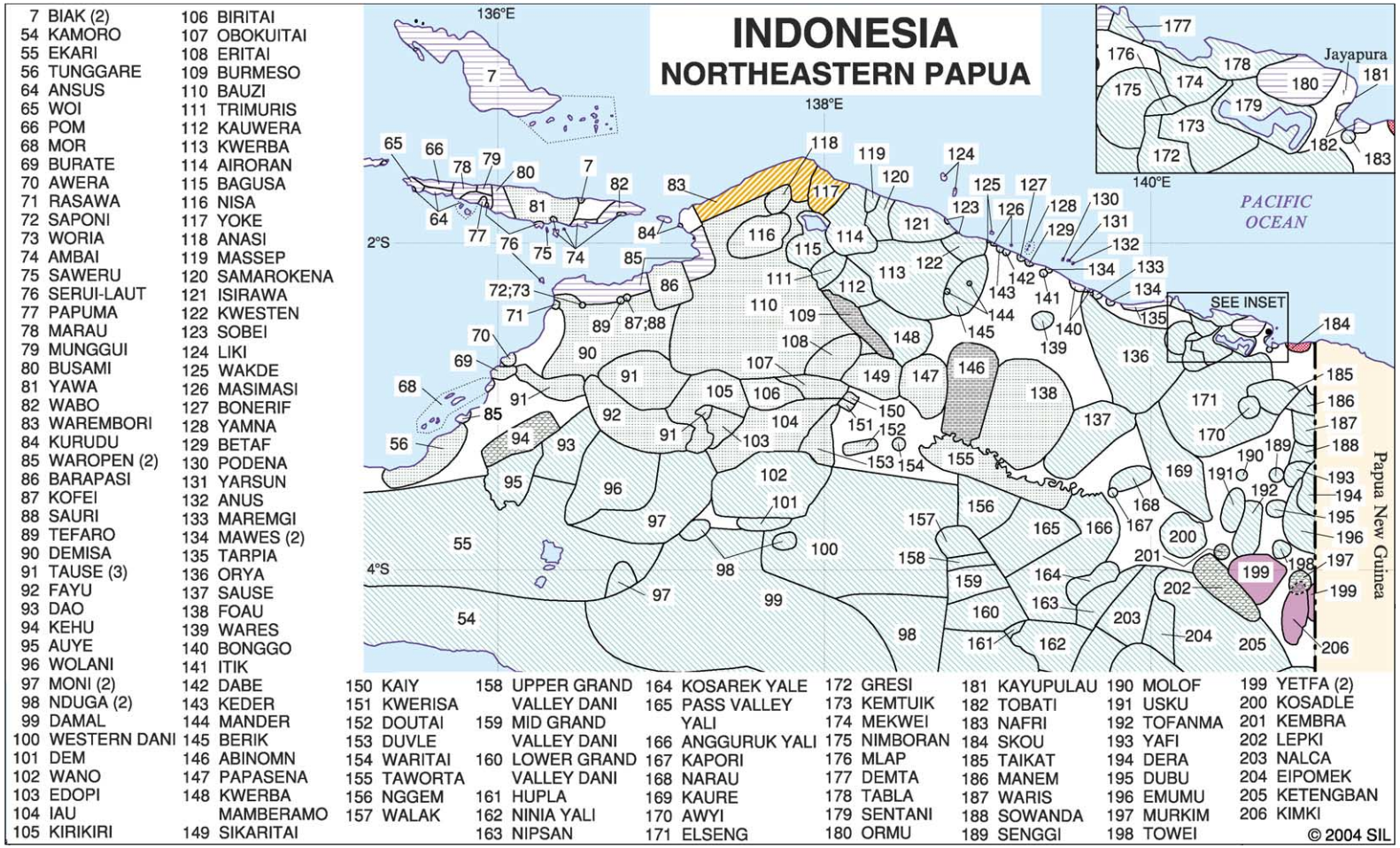

Map 96 Indonesia, Northeastern Papua.

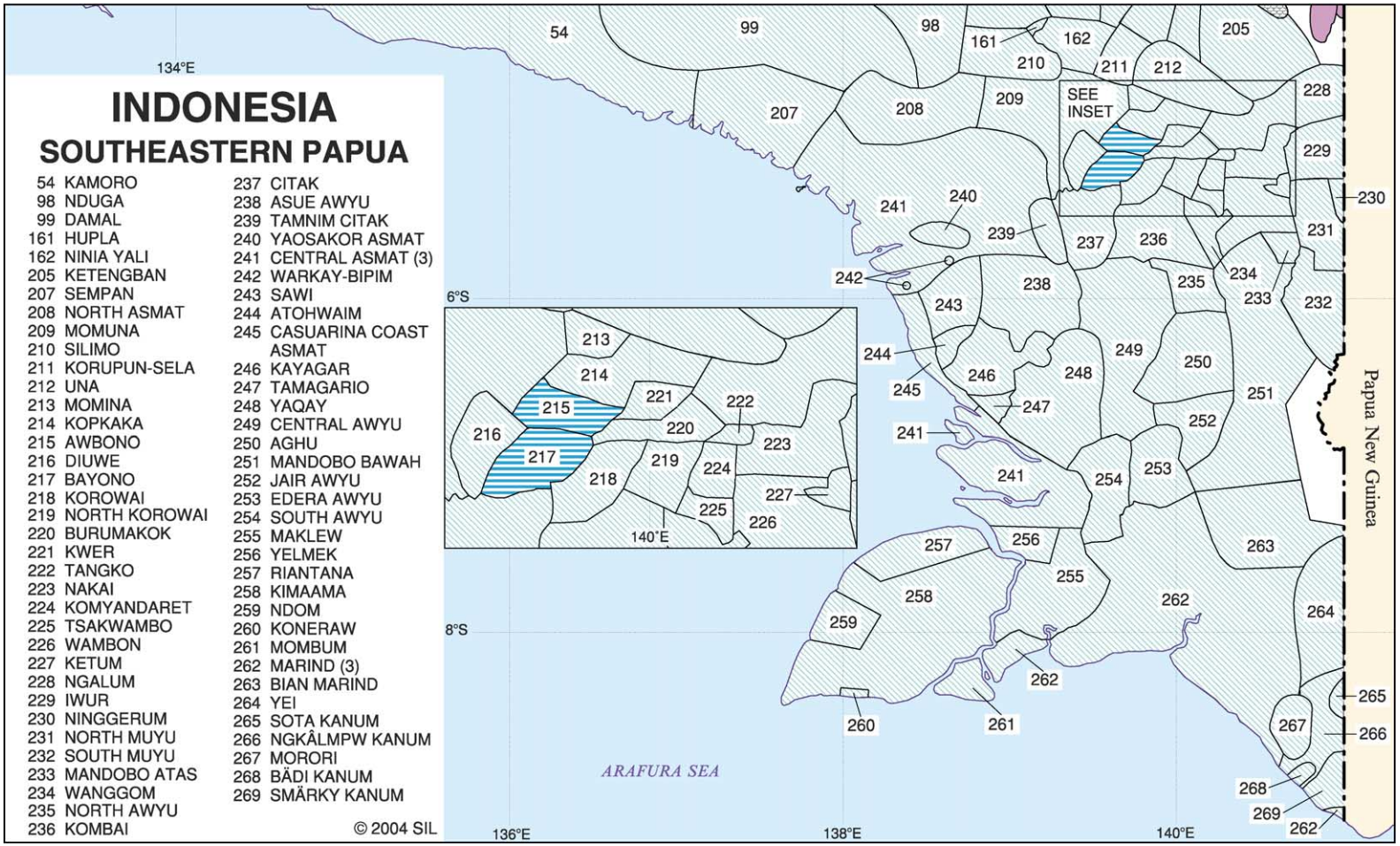

Map 97 Indonesia, Southeastern Papua.

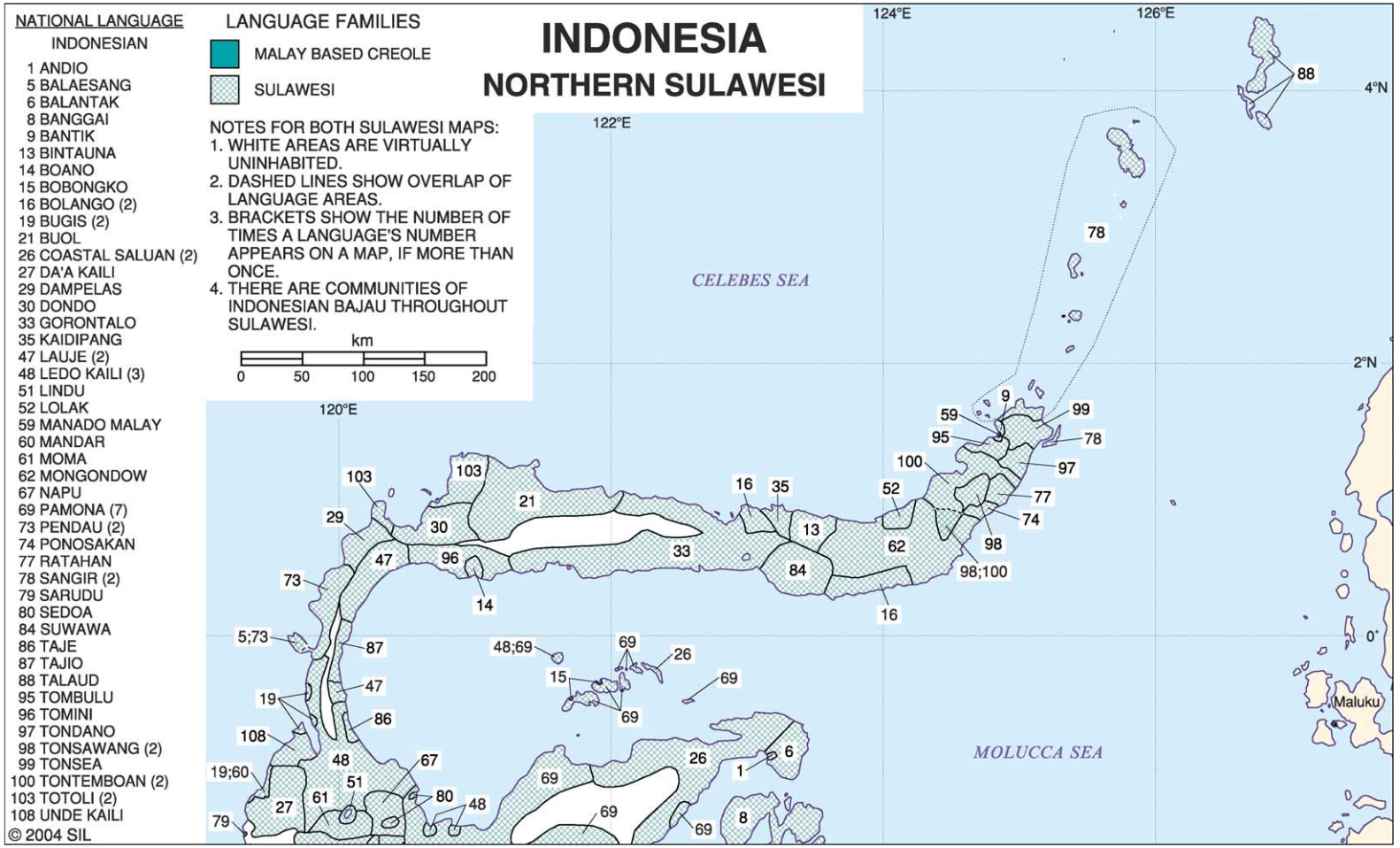

Map 98 Indonesia, Northern Sulawesi.

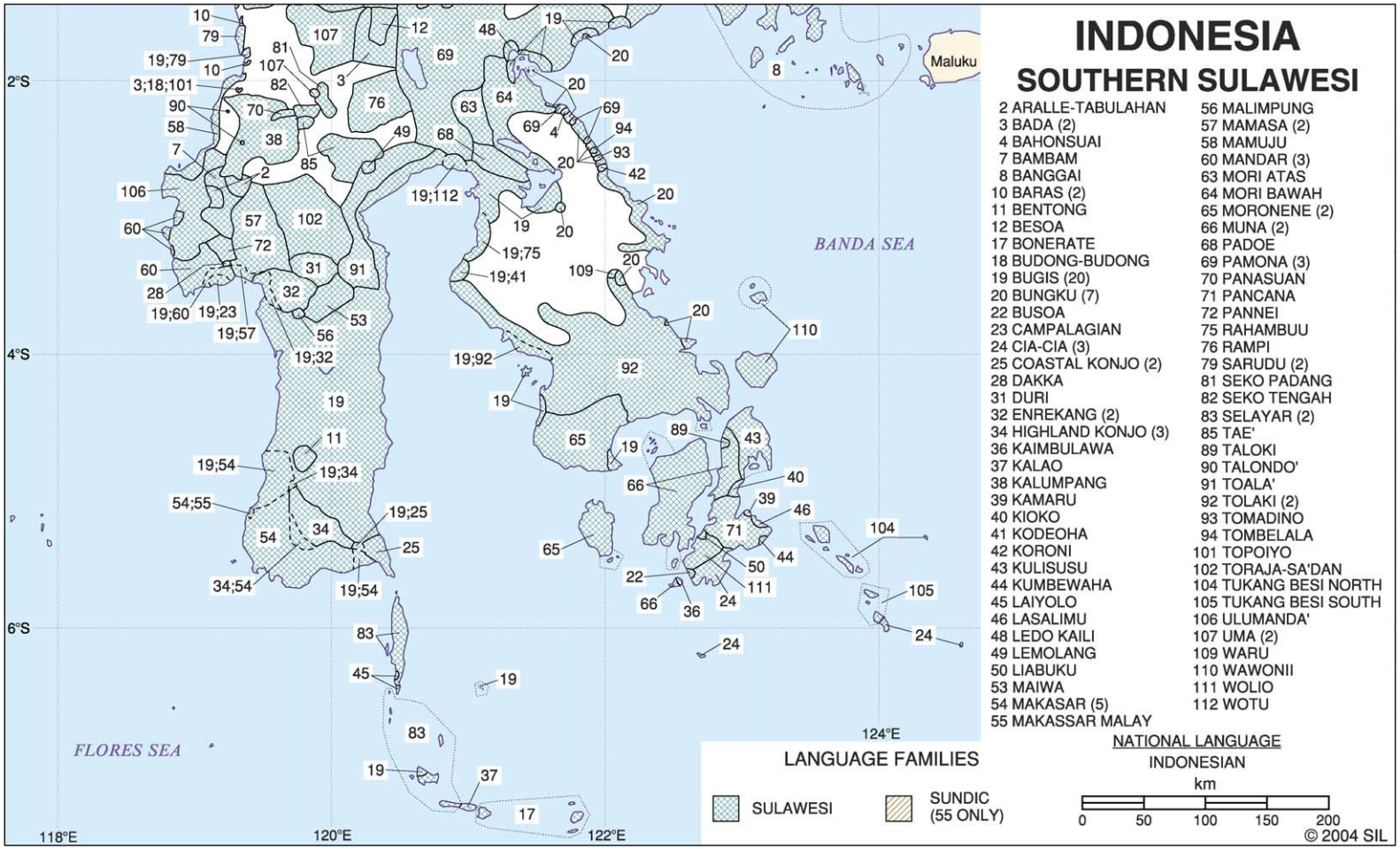

Map 99 Indonesia, Southern Sulawesi.

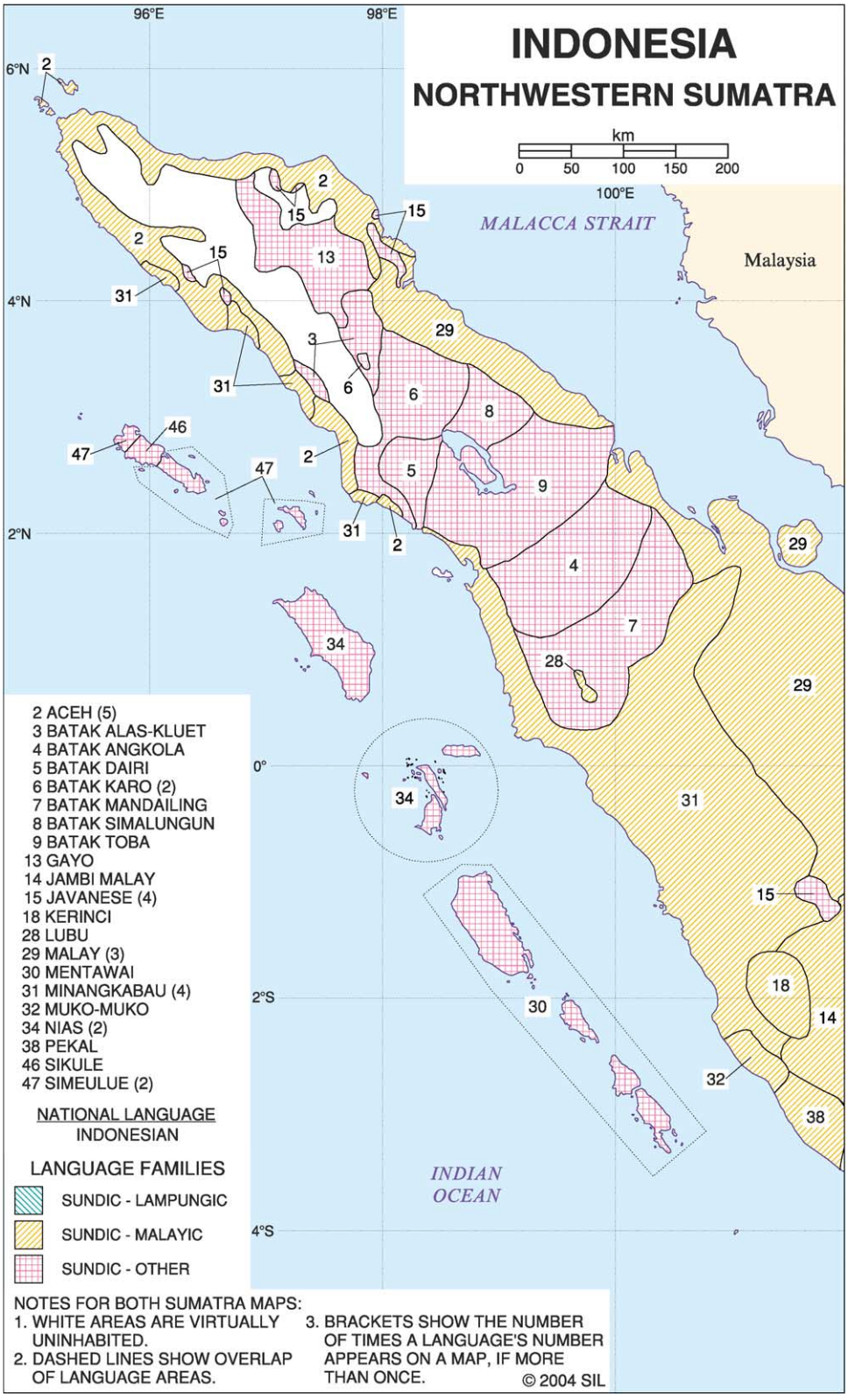

Map 100 Indonesia, Northwestern Sumatra.

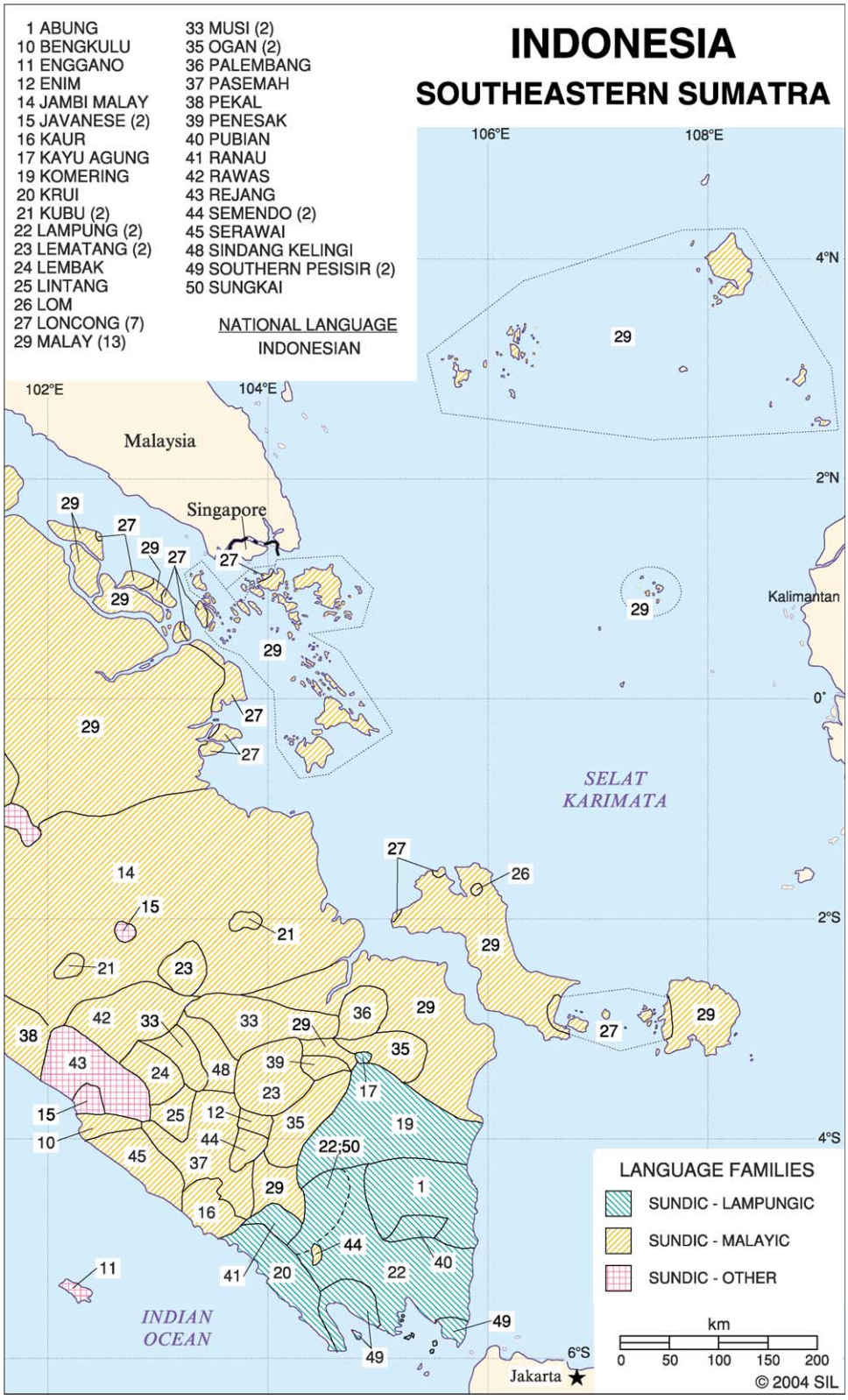

Map 101 Indonesia, Southeastern Sumatra.

IRAQ
NATIONAL LANGUAGES
KURDISH
MESOPOTAMIAN SPOKEN ARABIC
STANDARD ARABIC
BOUNDARY IN DISPUTE
km
0 50 100 150 200
© 2004 SIL
Turkey
Syria
Jordan
Saudi Arabia
Kuwait
Iran
BEHDINI
KURMANJI
ASSYRIAN AND CHALDEAN NEO-ARAMAIC
HAWRAMI
KOY SANJAQ SURAT
SOUTH AZERBAIJANI
CENTRAL KURDISH
NORTH MESOPOTAMIAN SPOKEN ARABIC
SOUTHERN KURDISH
Baghdad
MESOPOTAMIAN SPOKEN ARABIC
NAJDI SPOKEN ARABIC
GULF SPOKEN ARABIC
Euphrates River
Tigris River
PERSIAN GULF
36°N
34°N
32°N
30°N
38°E
40°E
42°E
44°E
46°E
48°E
50°E

Map 102 Iraq.

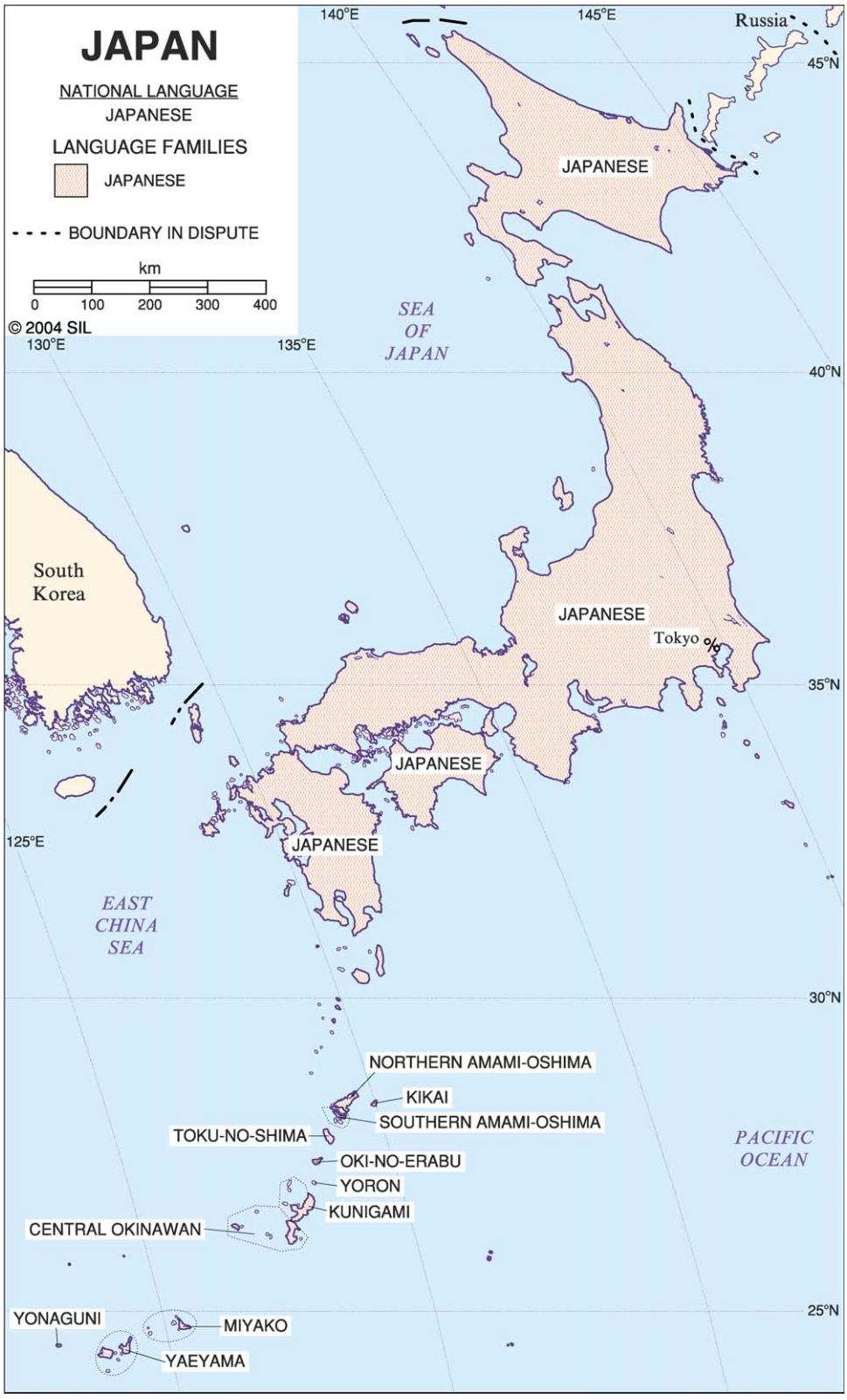

Map 103 Japan.

Map 104 Jordan and Syria.

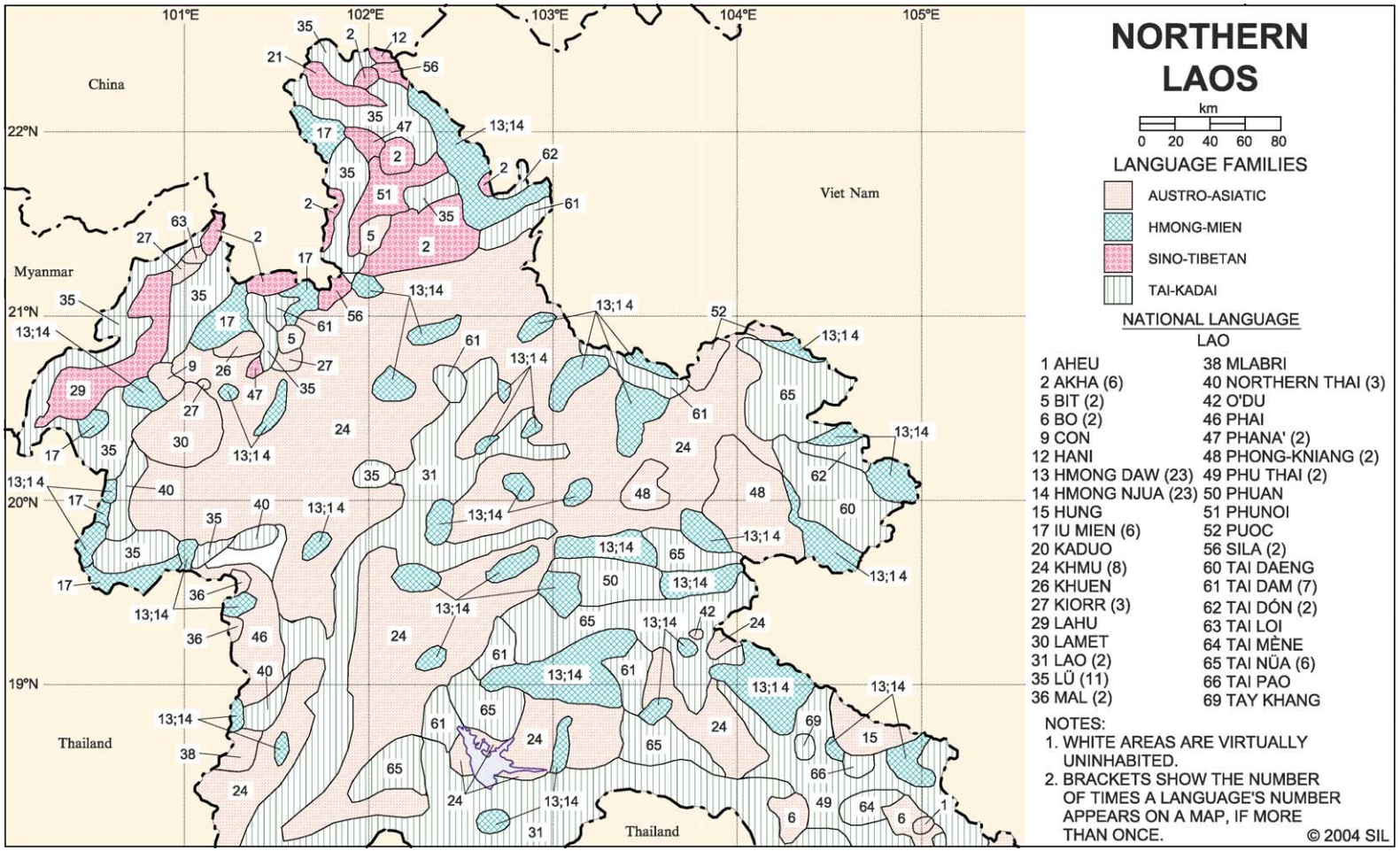

Map 105 Northern Laos.

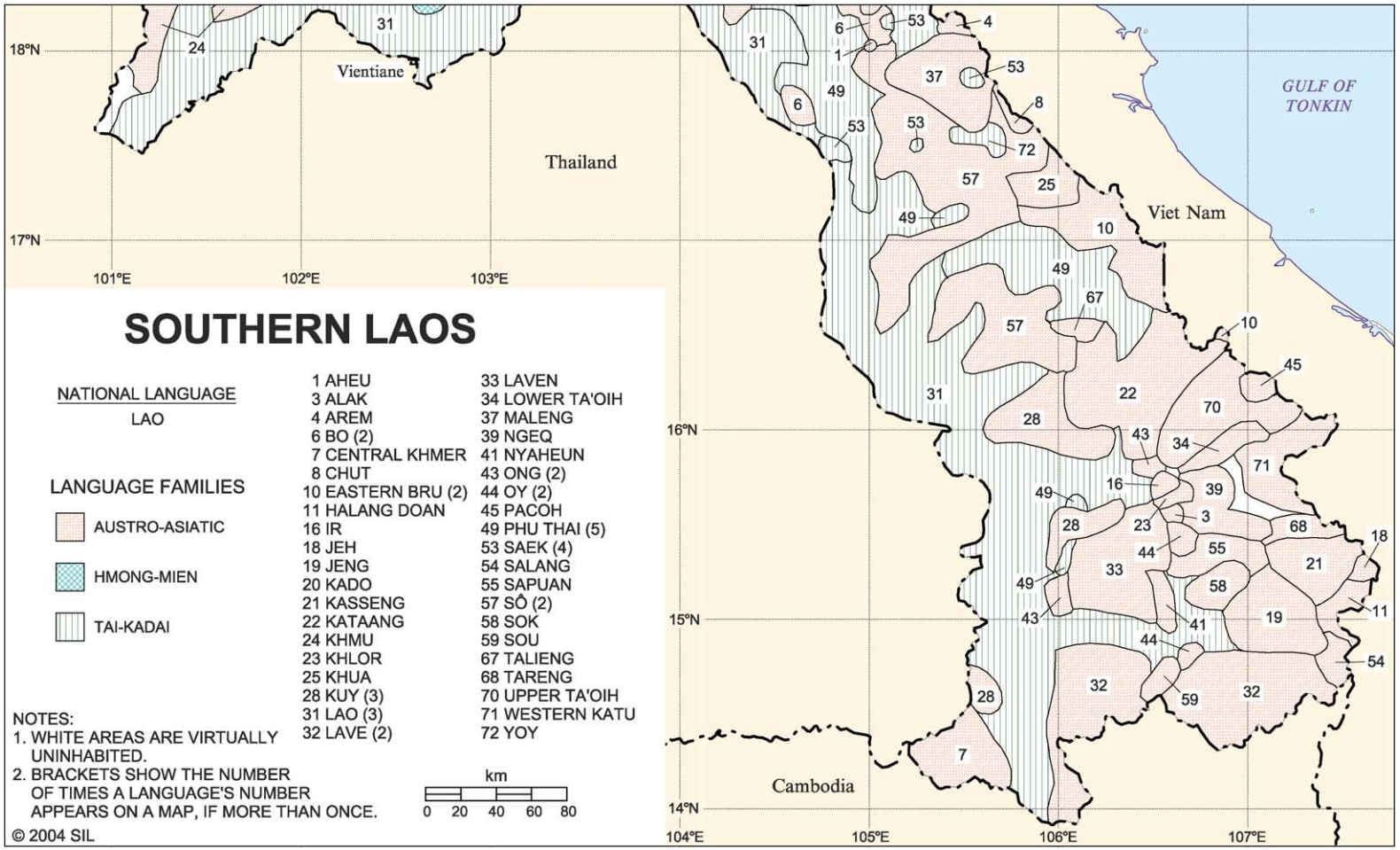

Map 106 Southern Laos.

Map 107 Kyrgyzstan and Tajikistan.

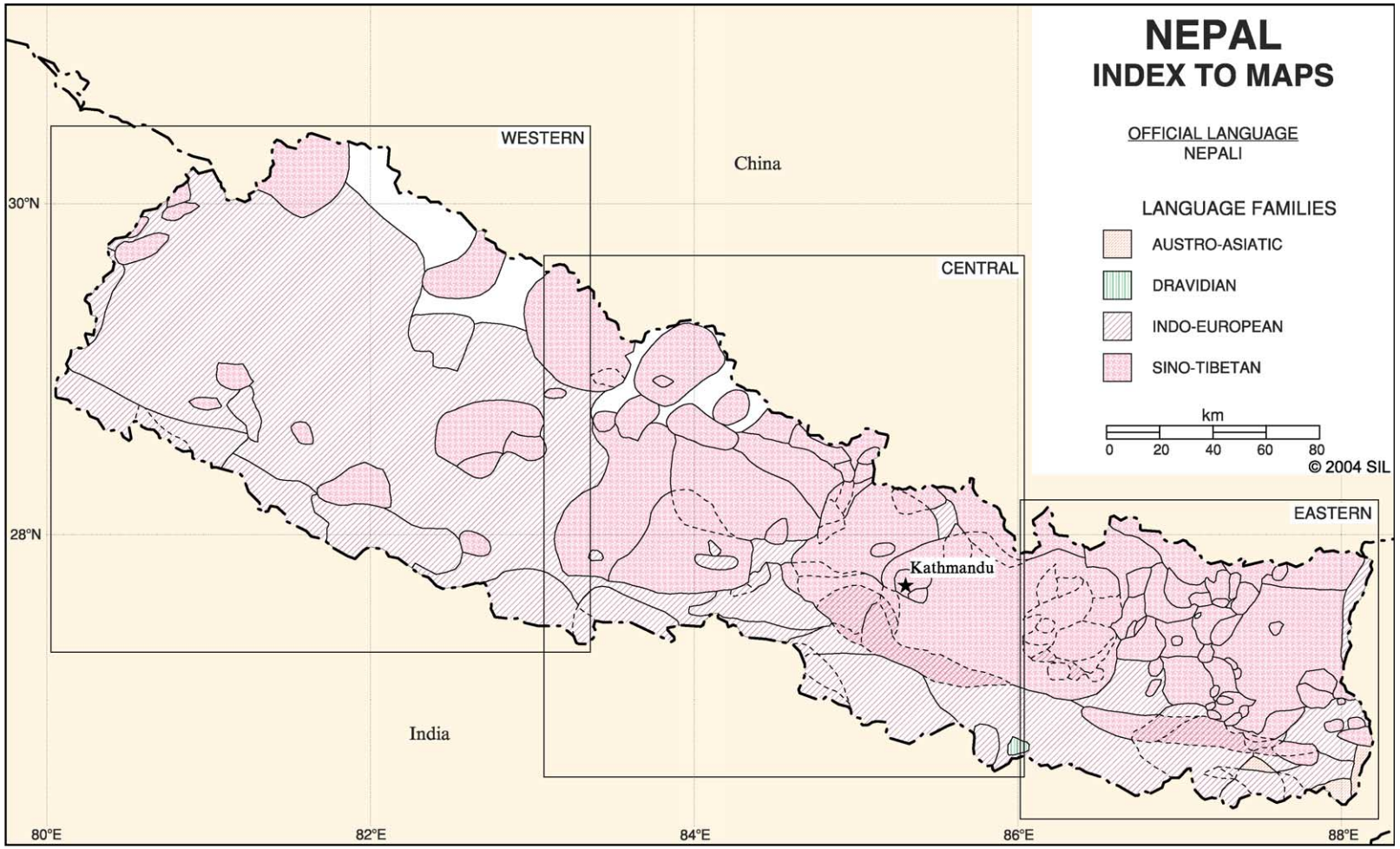

Map 108 Nepal: Index Map.

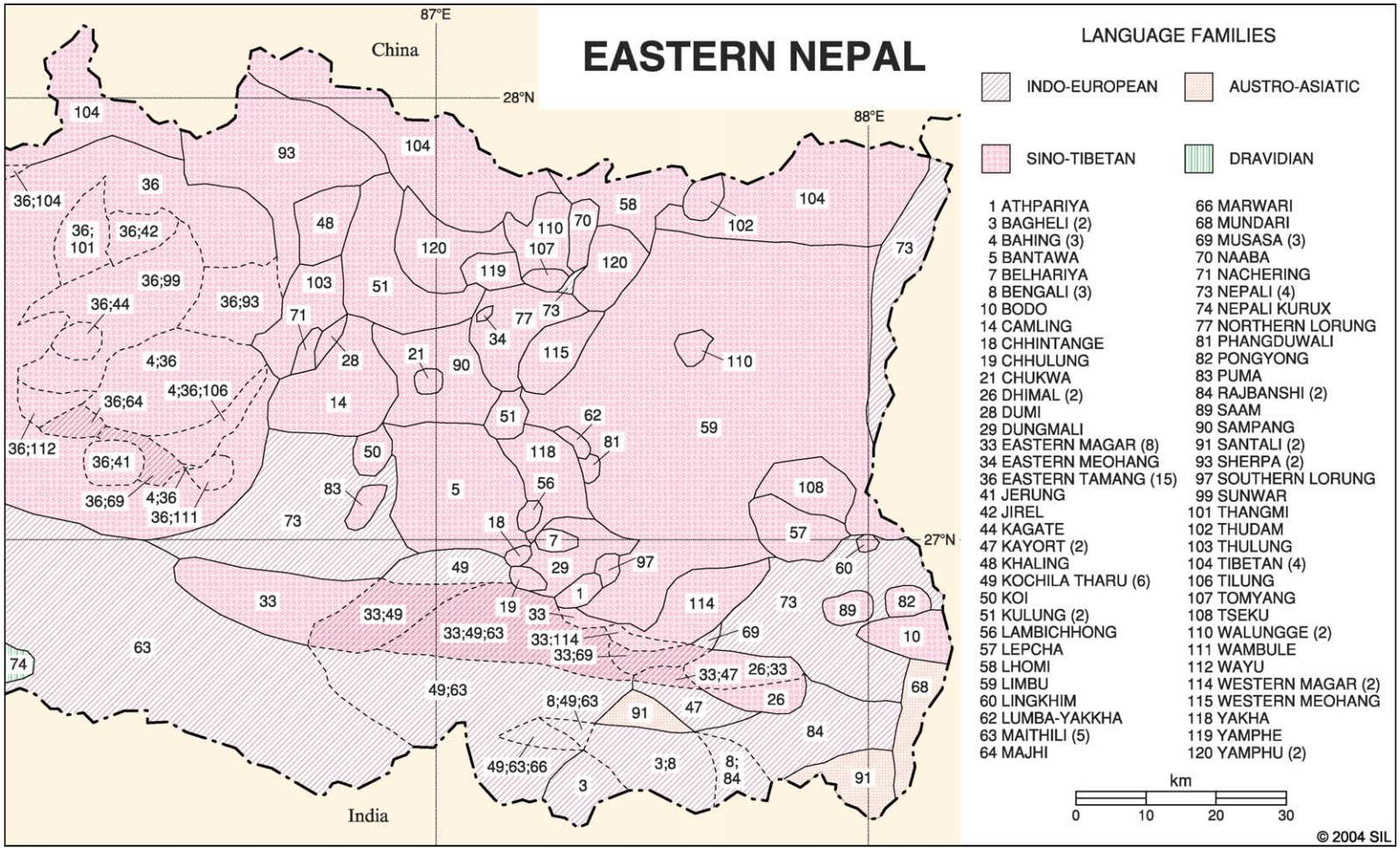

Map 109 Eastern Nepal.

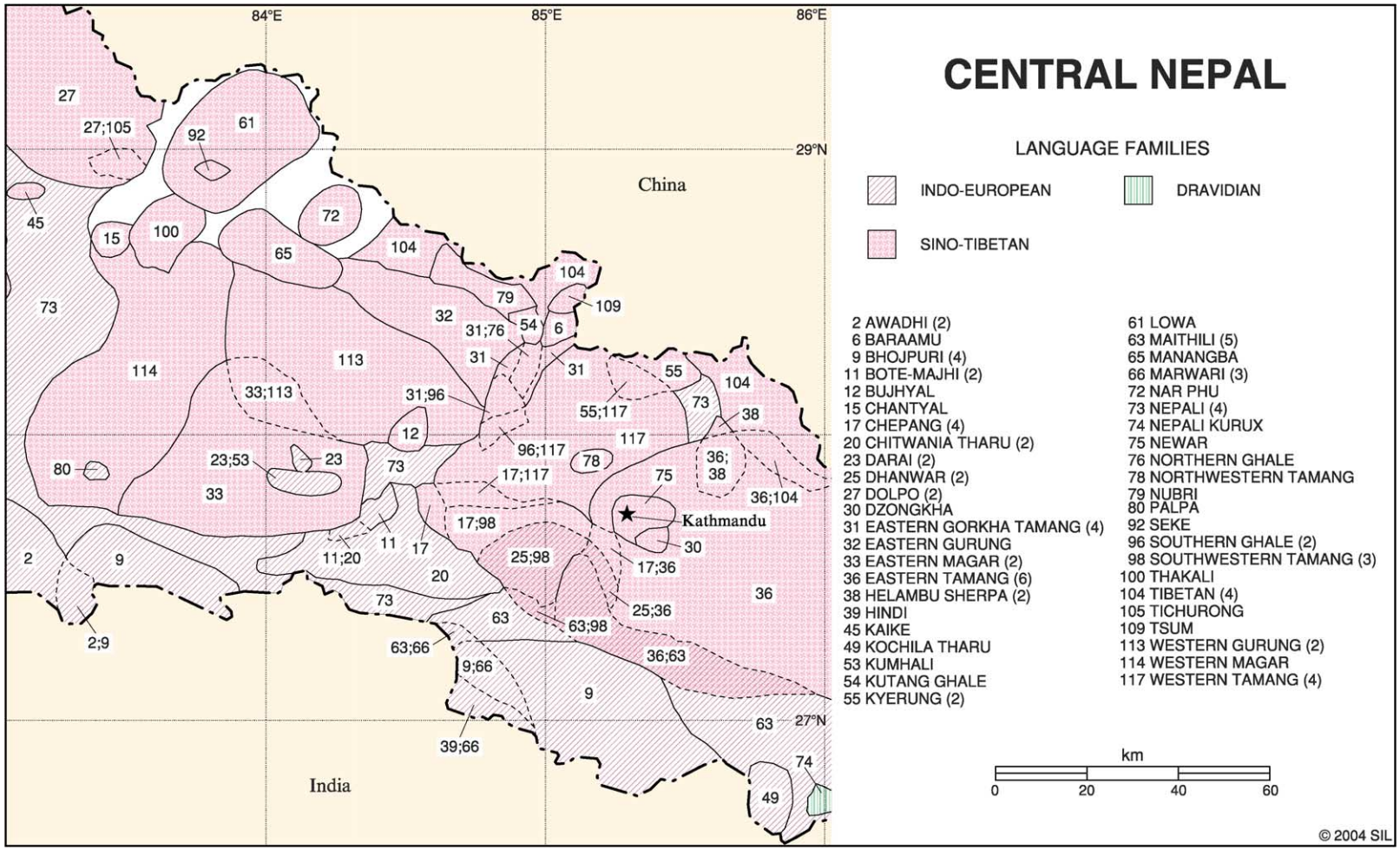

Map 110 Central Nepal.

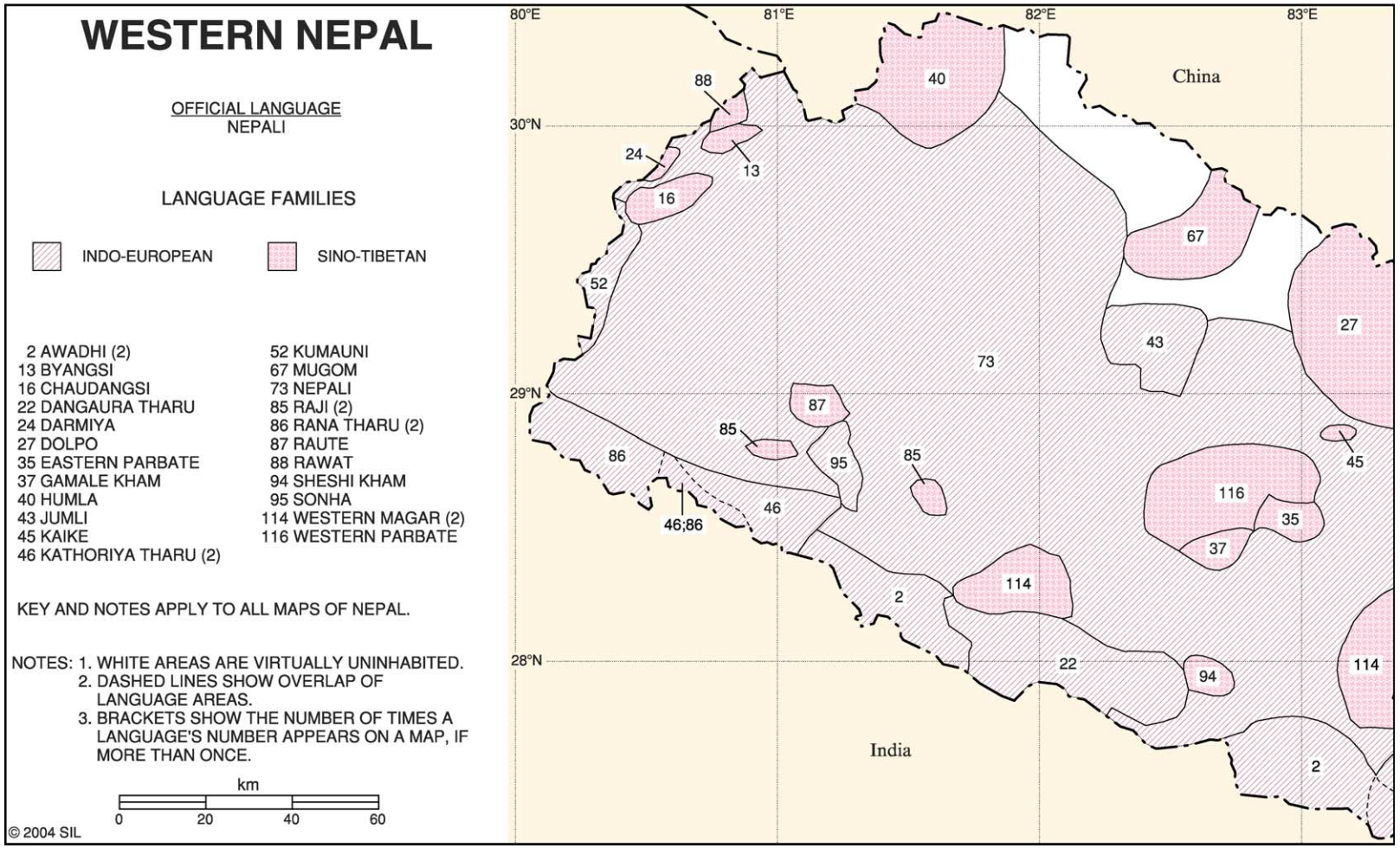

Map 111 Western Nepal.

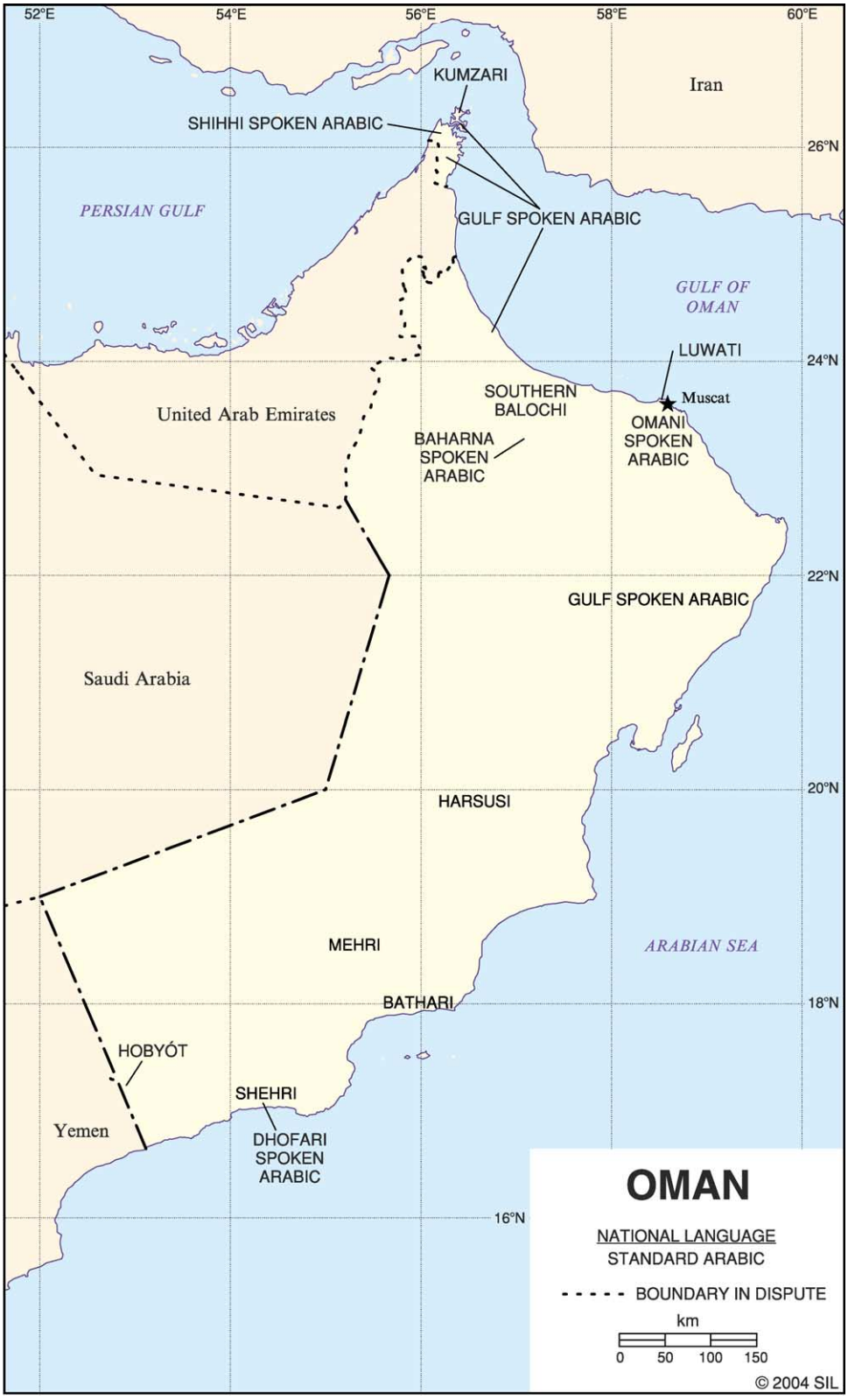
52°E
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58°E
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26°N
24°N
22°N
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18°N
16°N
Iran
KUMZARI
SHIHHI SPOKEN ARABIC
PERSIAN GULF
GULF SPOKEN ARABIC
GULF OF OMAN
LUWATI
Muscat
SOUTHERN BALOCHI
OMANI SPOKEN ARABIC
United Arab Emirates
BAHARNA SPOKEN ARABIC
GULF SPOKEN ARABIC
Saudi Arabia
HARSUSI
MEHRI
ARABIAN SEA
BATHARI
HOBYÓT
SHEHRI
Yemen
DHOFARI SPOKEN ARABIC
OMAN
NATIONAL LANGUAGE
STANDARD ARABIC
BOUNDARY IN DISPUTE
km
0 50 100 150
© 2004 SIL

Map 112 Oman.

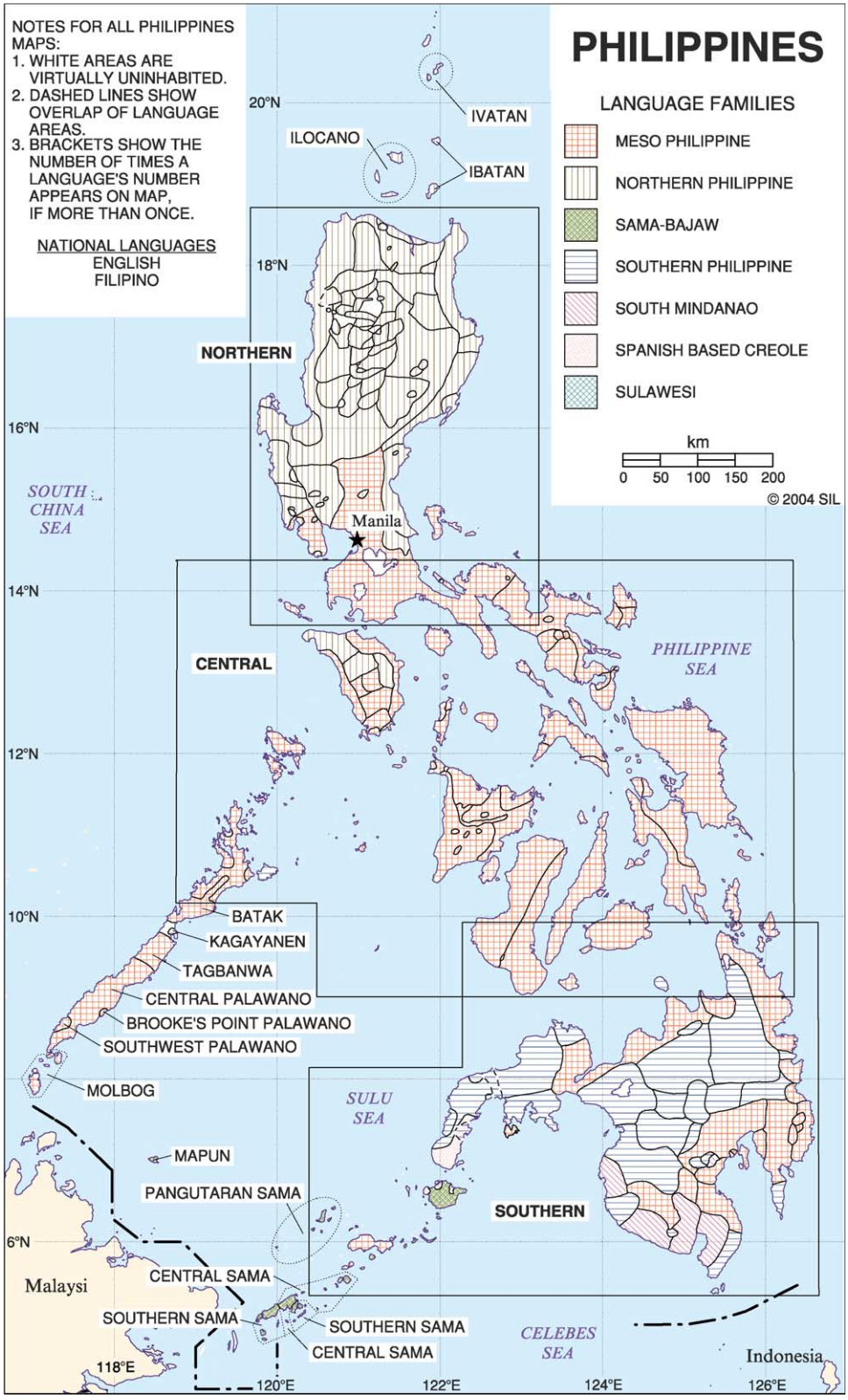

Map 113 Philippines.

Map 114 Northern Philippines.

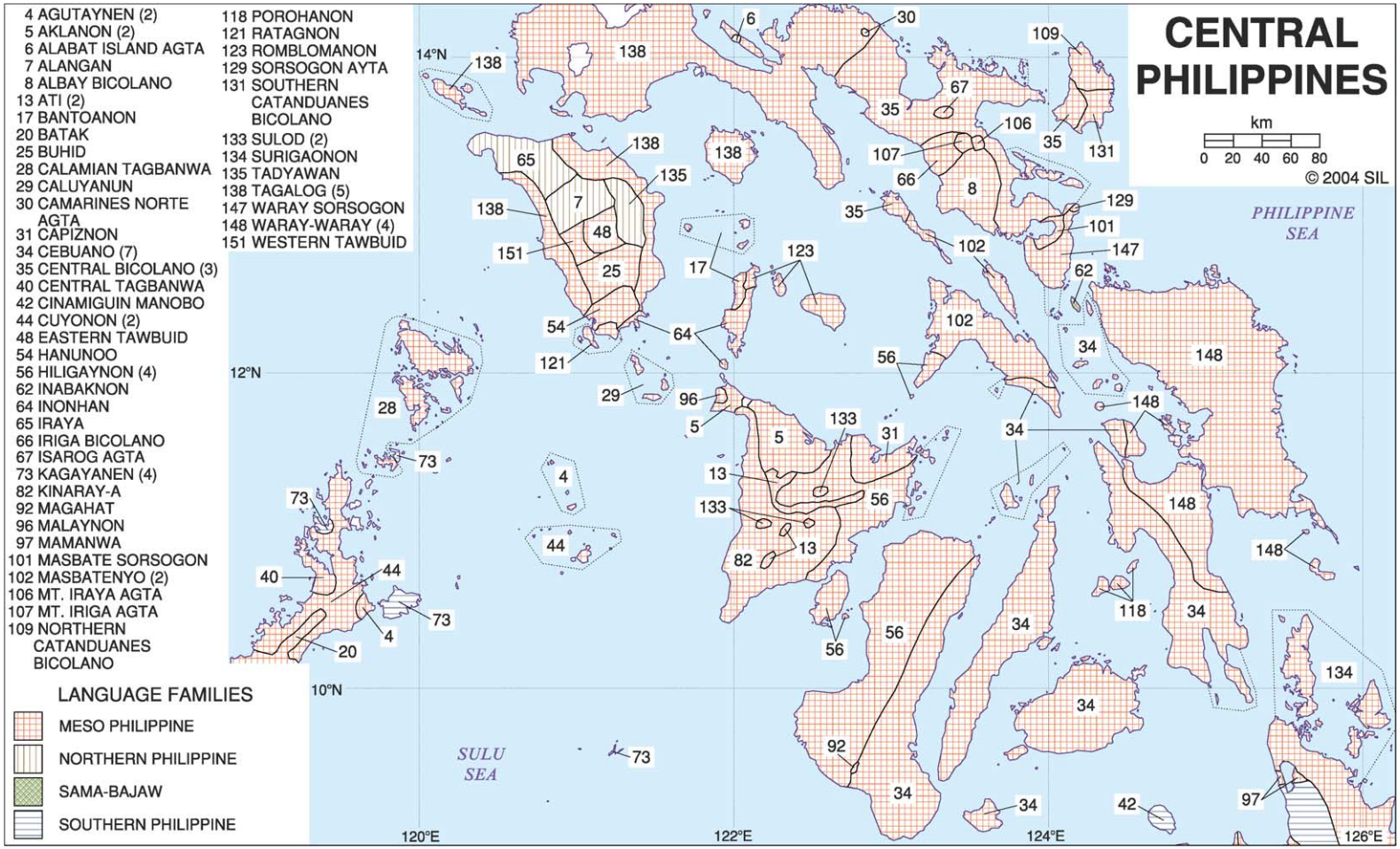

Map 115 Central Philippines.

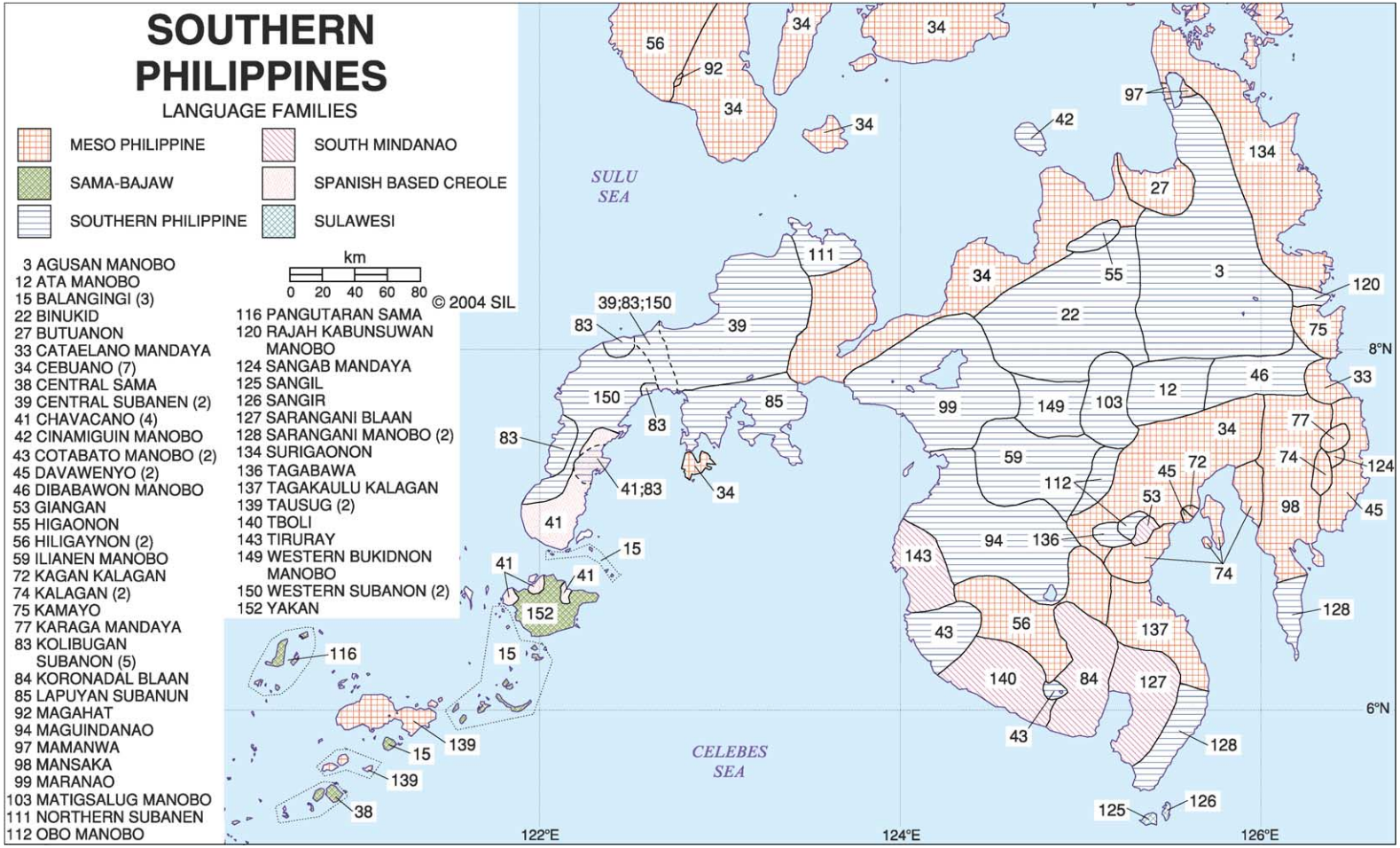

Map 116 Southern Philippines.

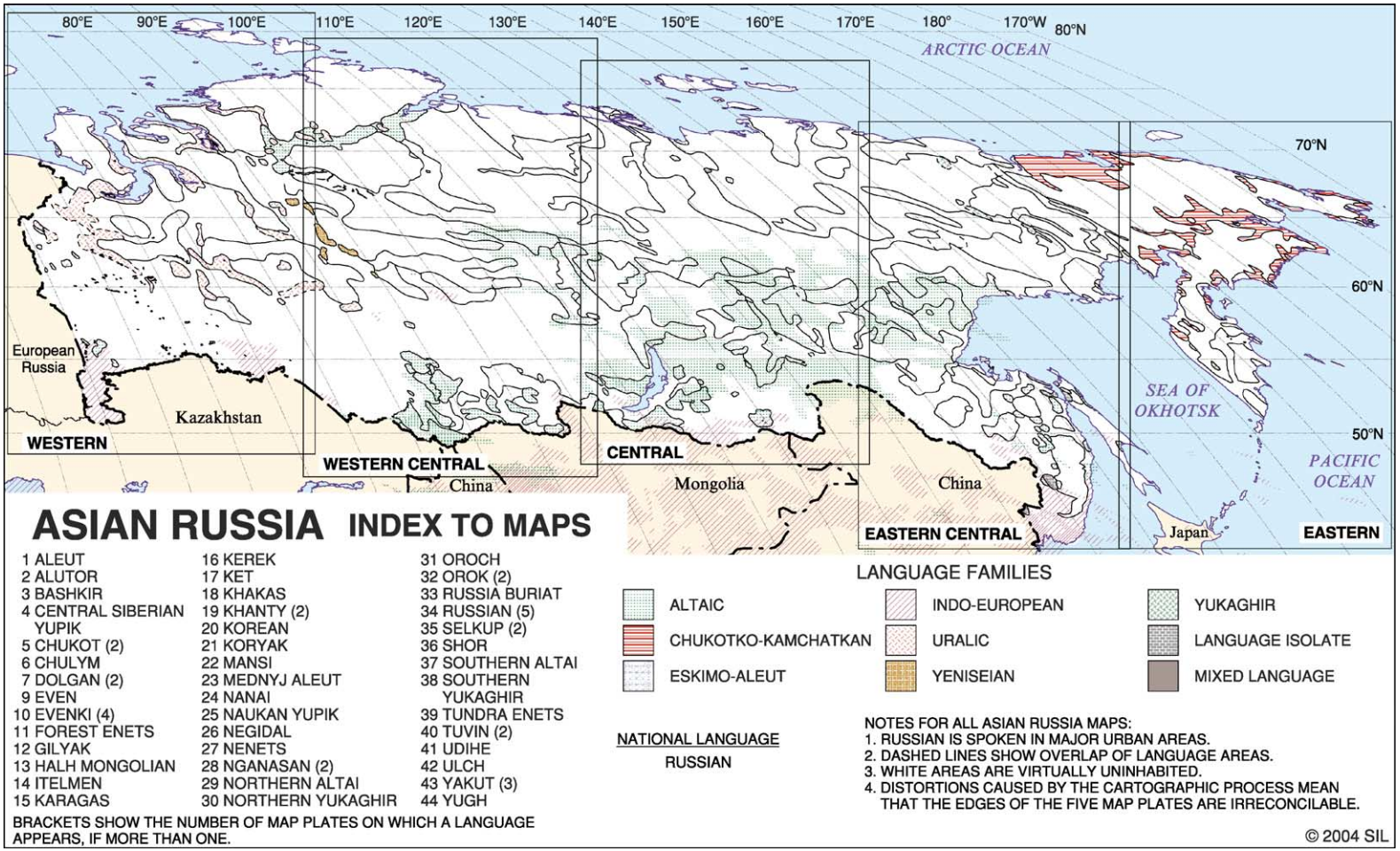

Map 117 Asian Russia: Index Map.

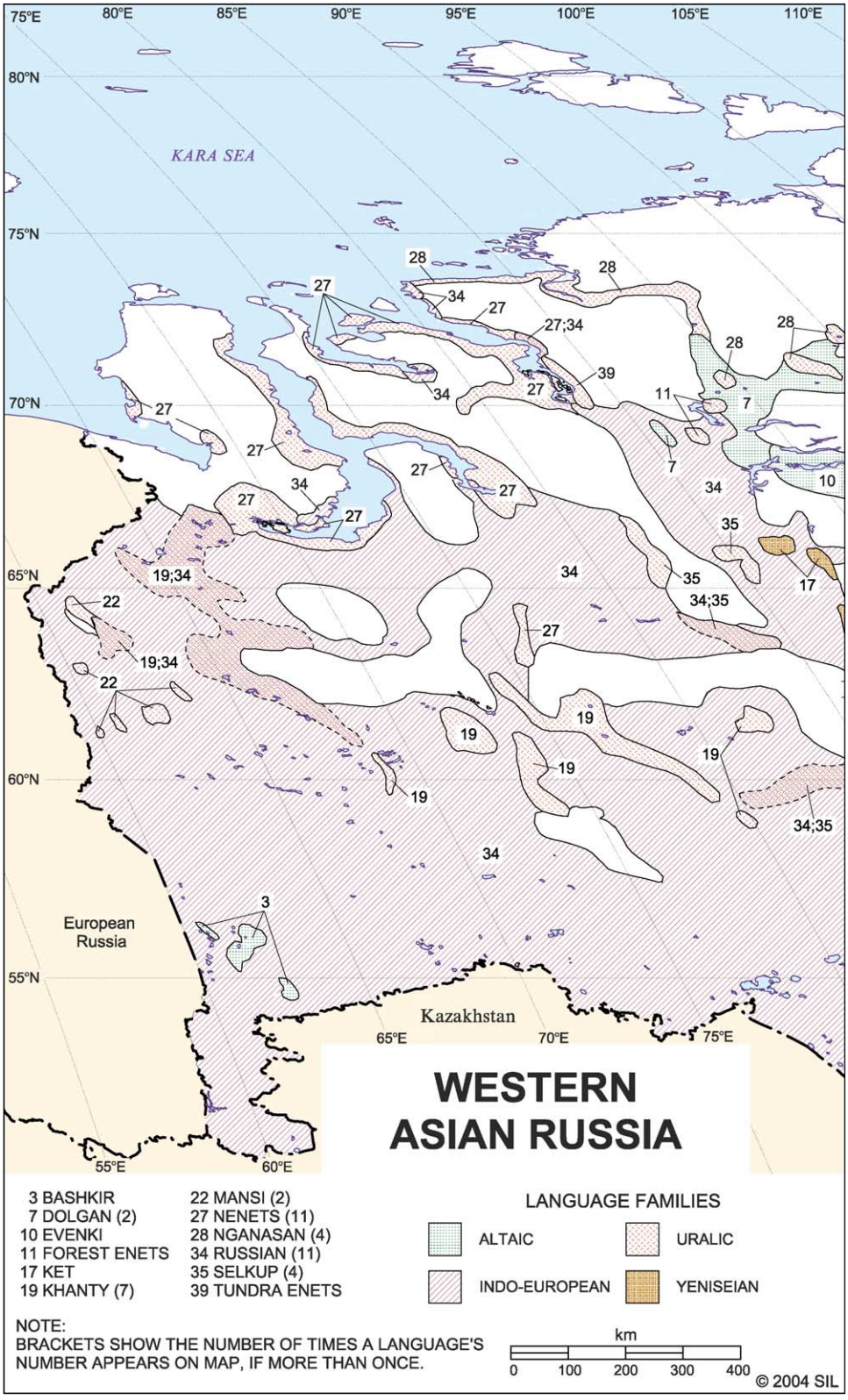

Map 118 Western Asian Russia.

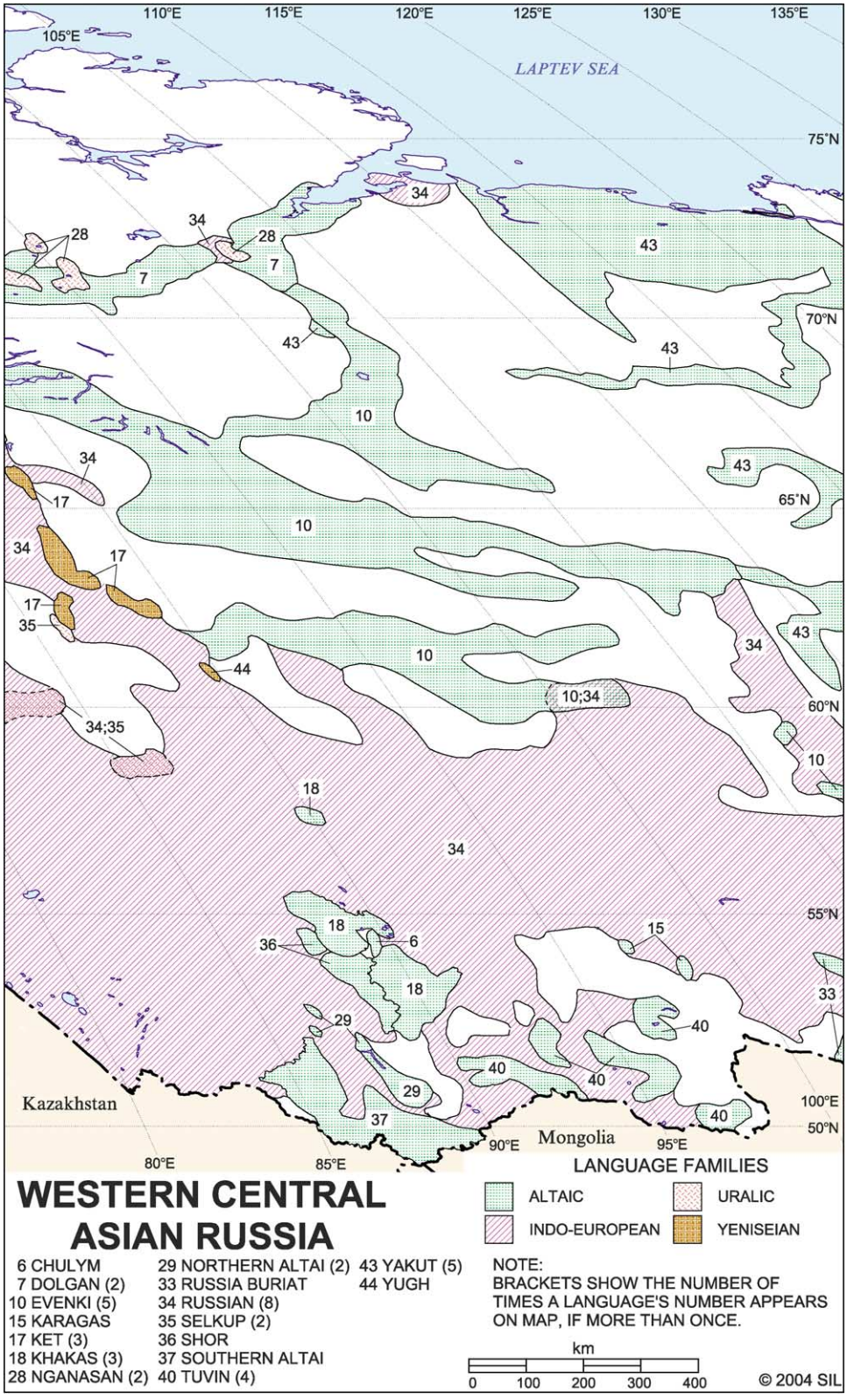

Map 119 Western Central Asian Russia.

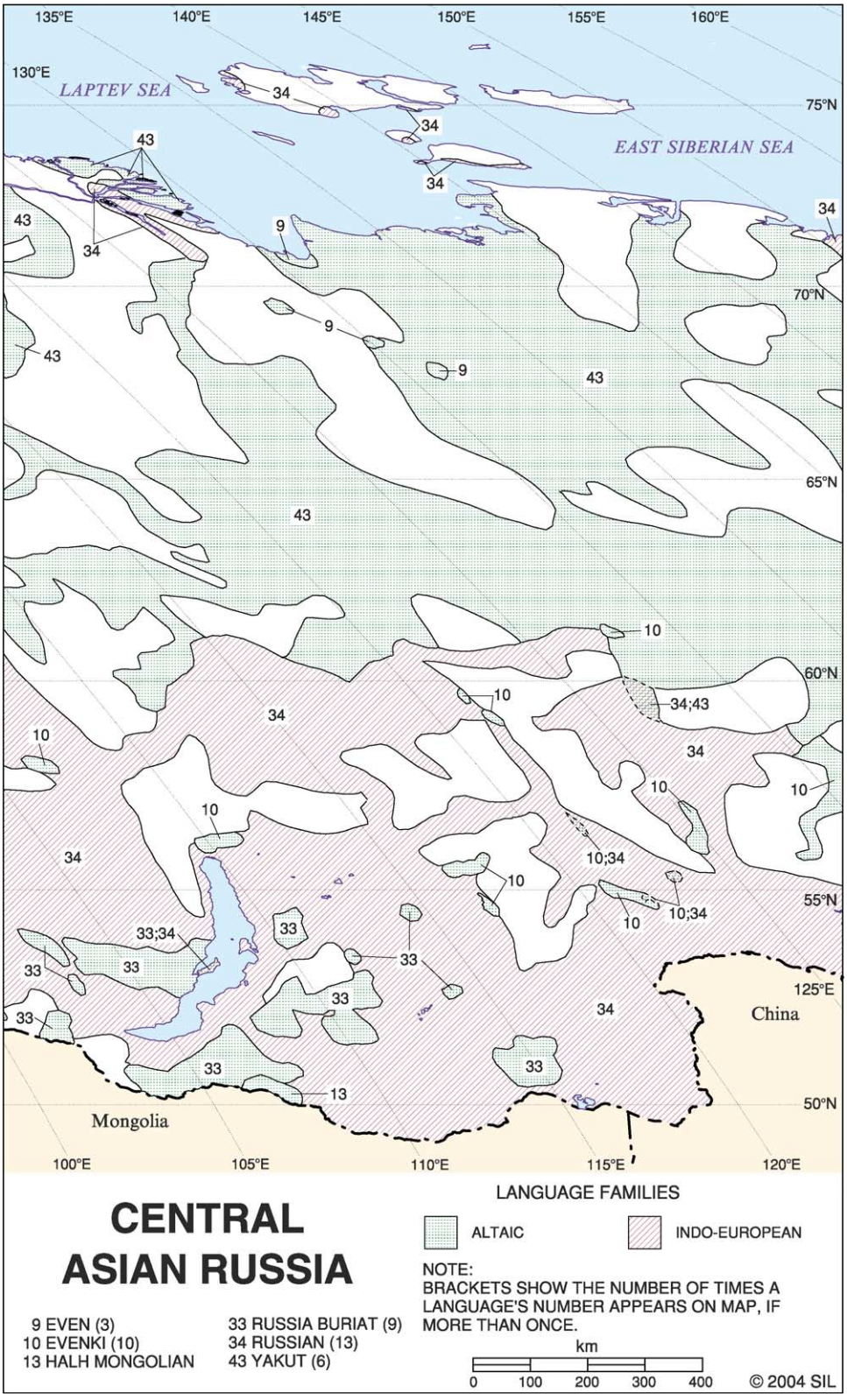

Map 120 Central Asian Russia.

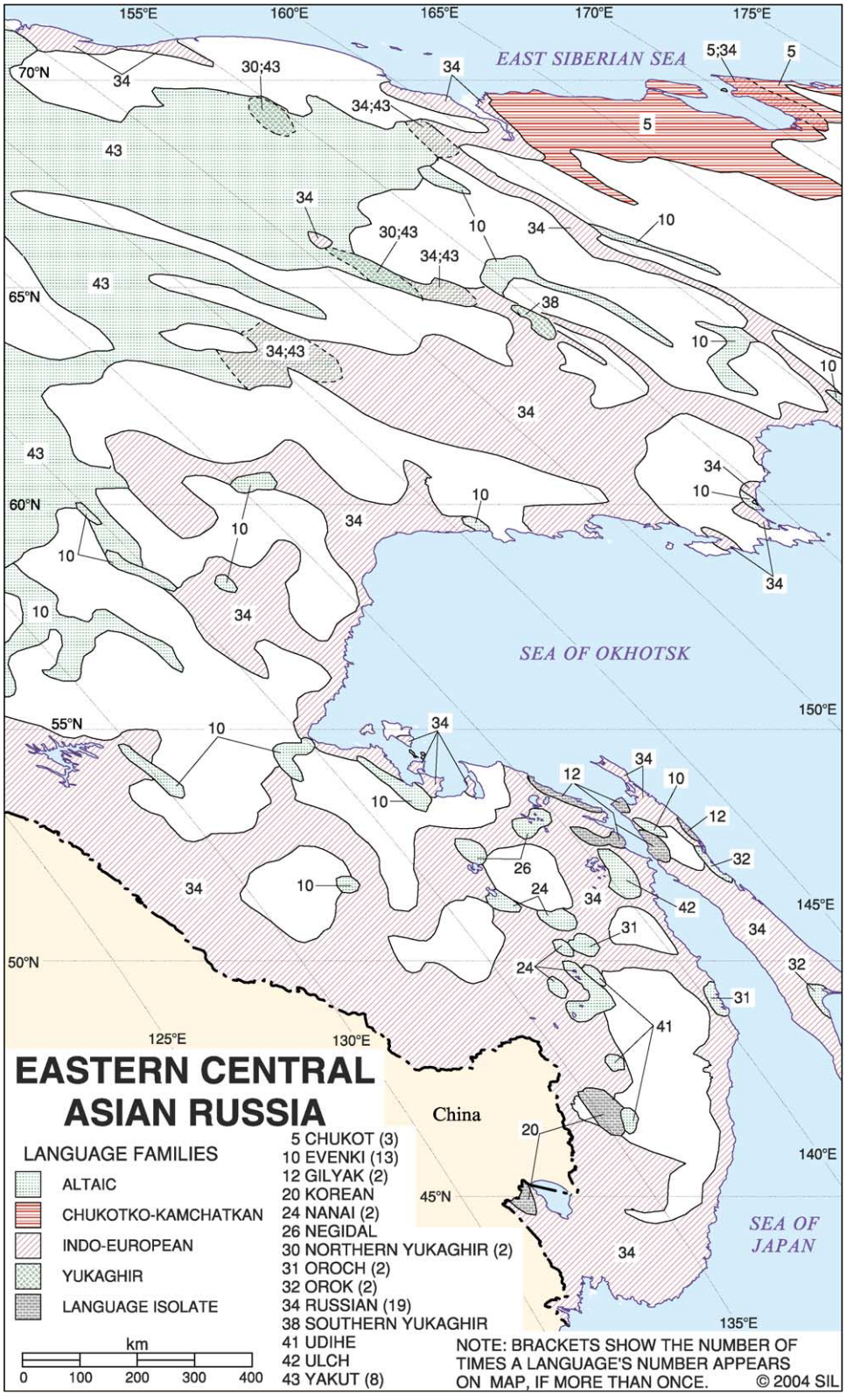

Map 121 Eastern Central Asian Russia.

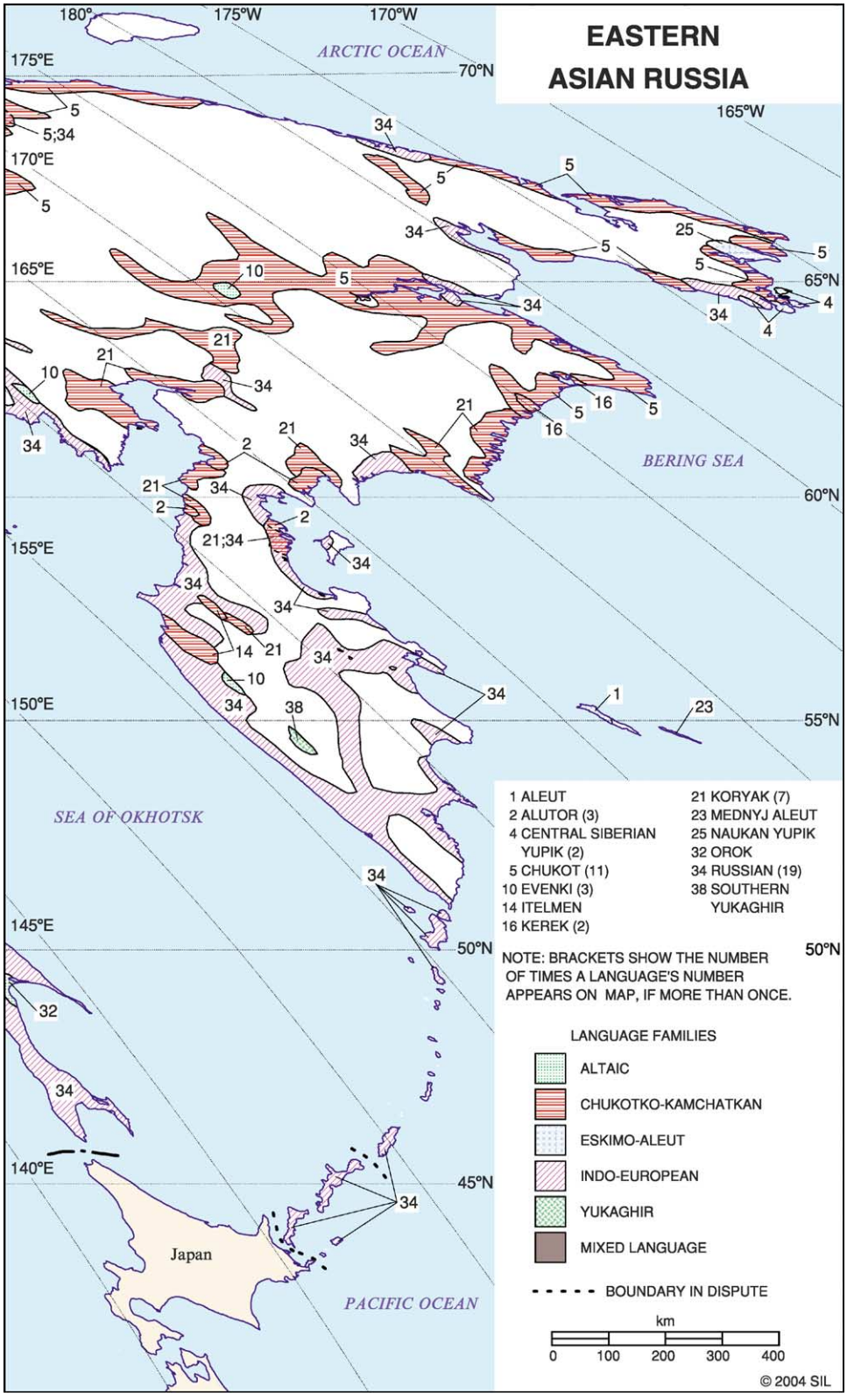

Map 122 Eastern Asian Russia.

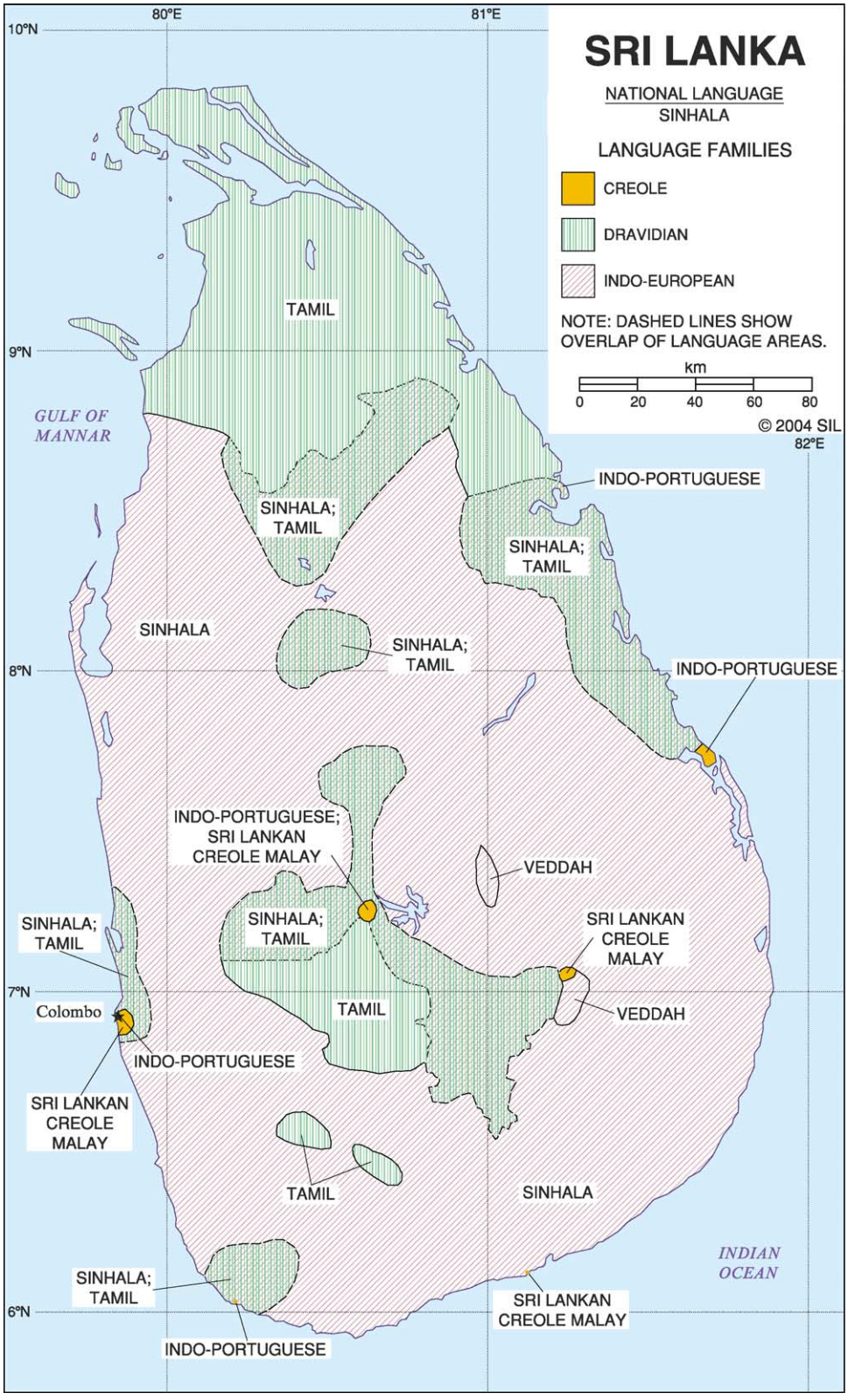

Map 123 Sri Lanka.

Map 124 Taiwan.

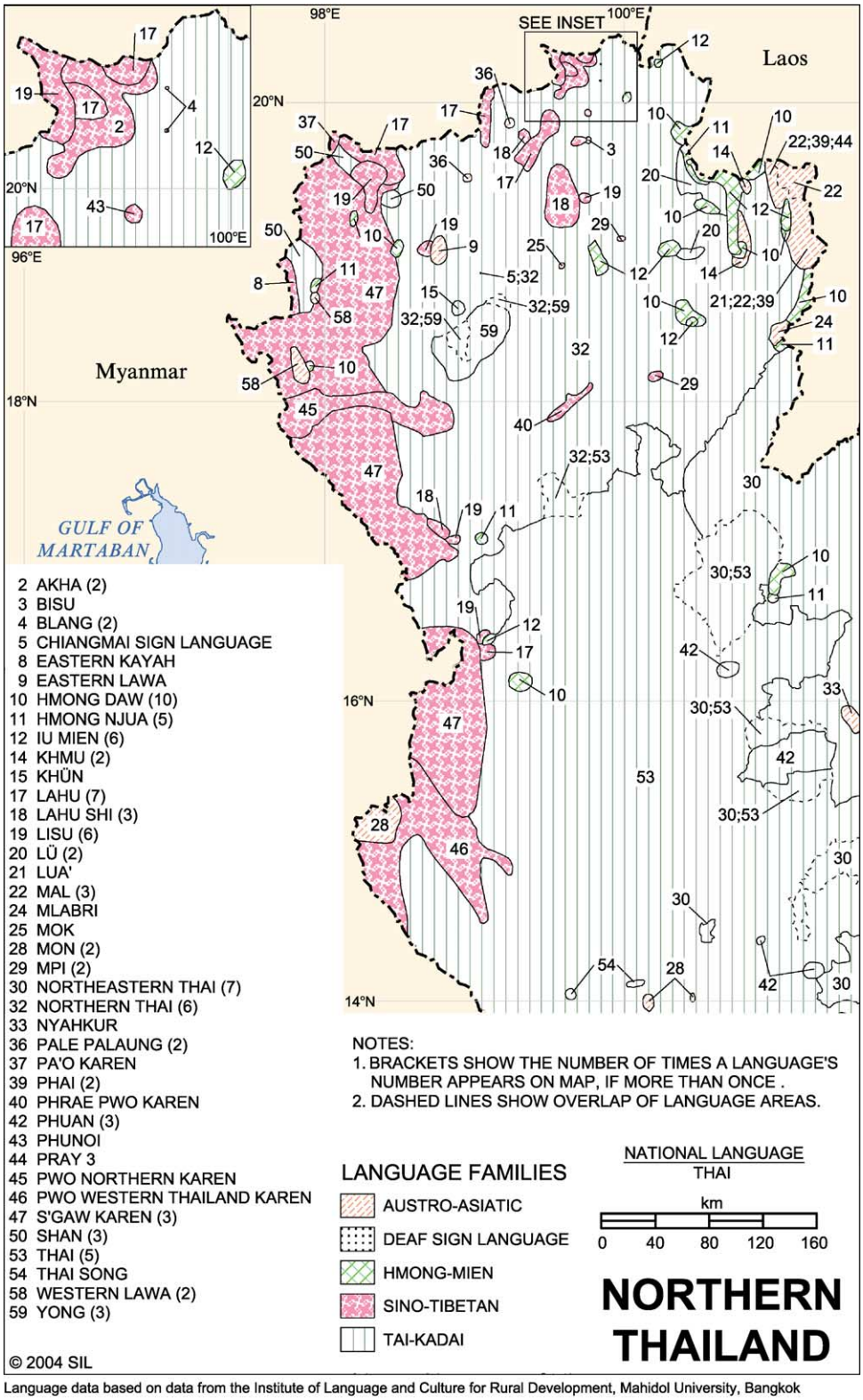

Language data based on data from the Institute of Language and Culture for Rural Development, Mahidol University, Bangkok

Map 125 Northern Thailand.

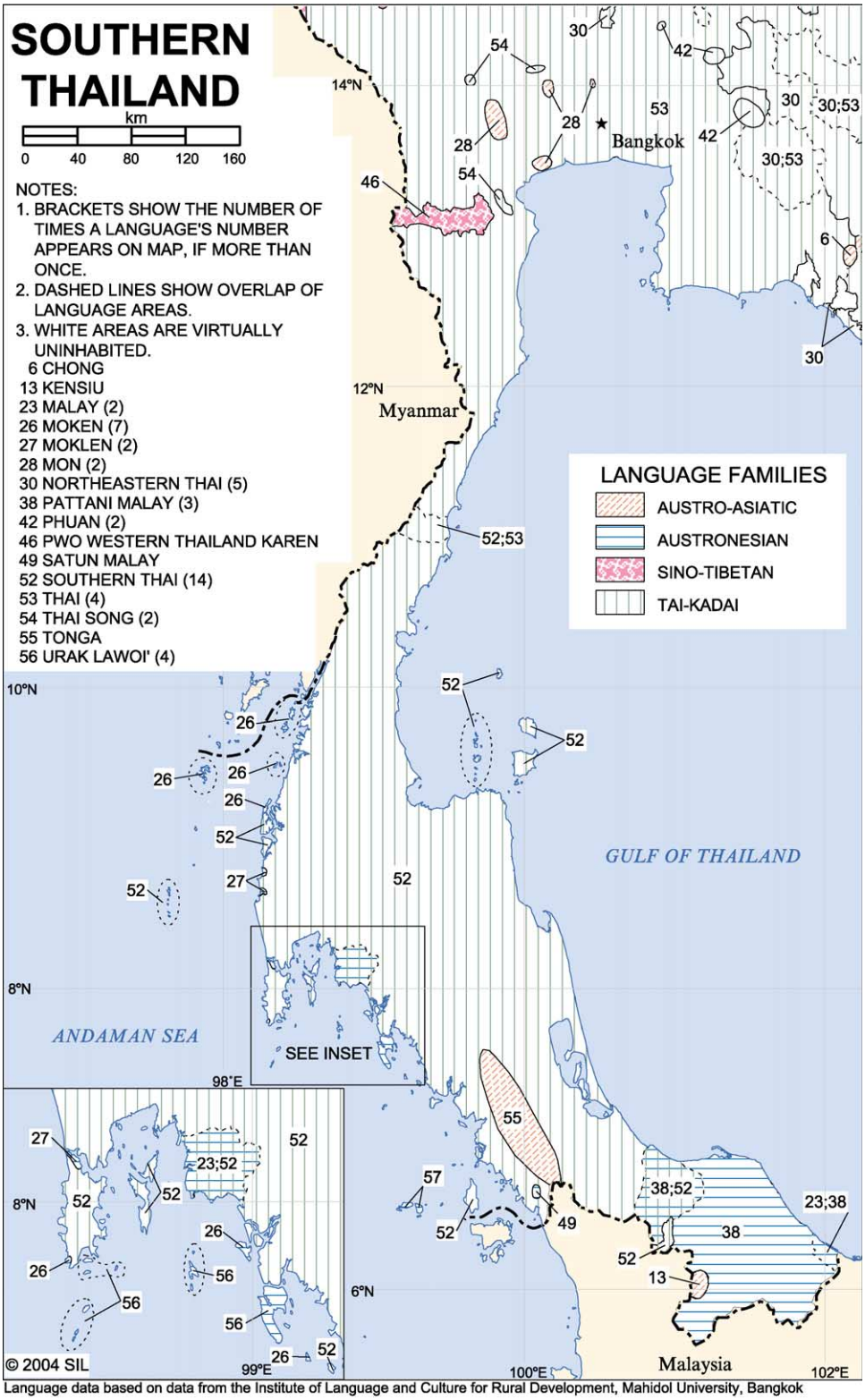

Language data based on data from the Institute of Language and Culture for Rural Development, Mahidol University, Bangkok

Map 126 Southern Thailand.

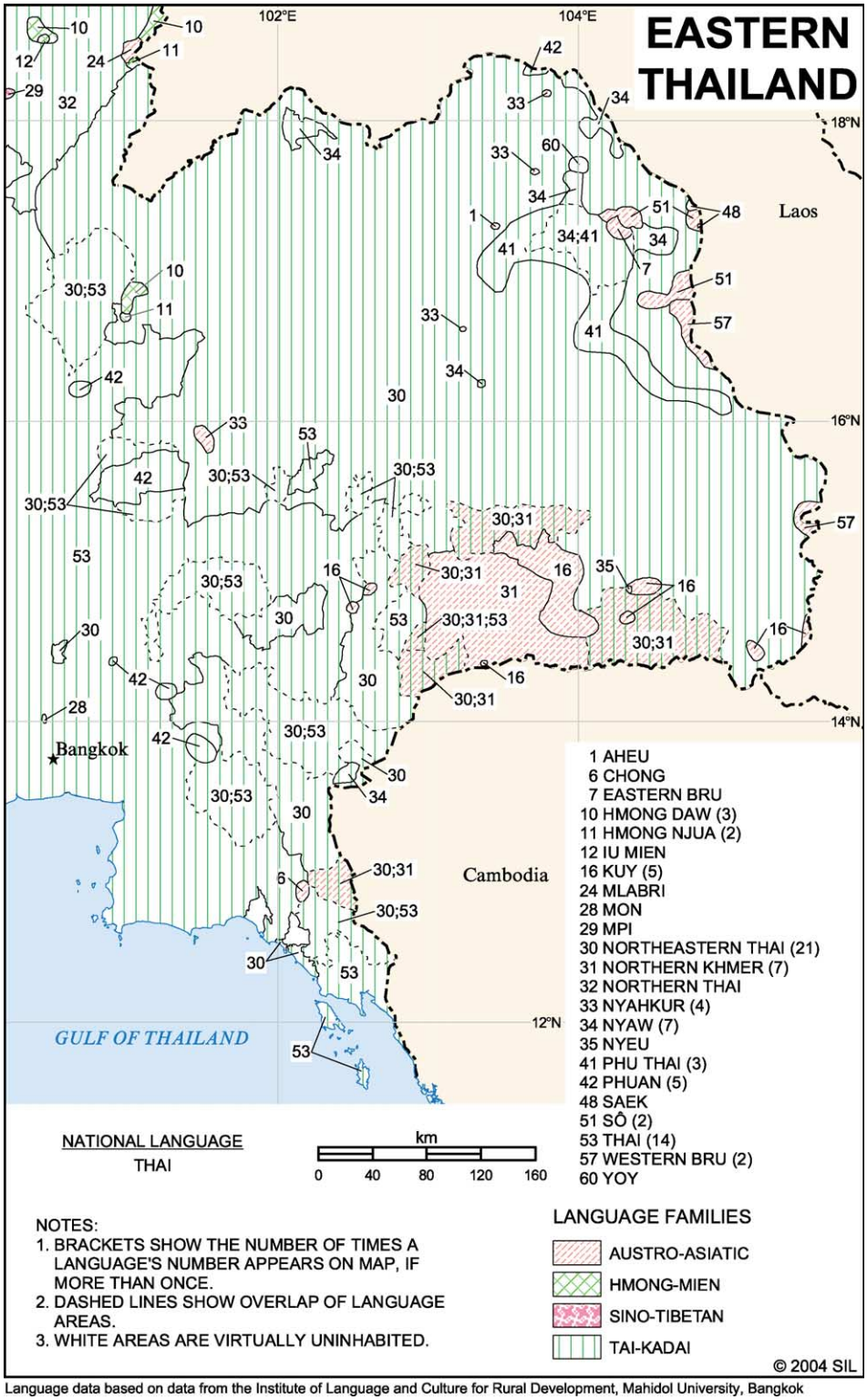

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Map 127 Eastern Thailand.

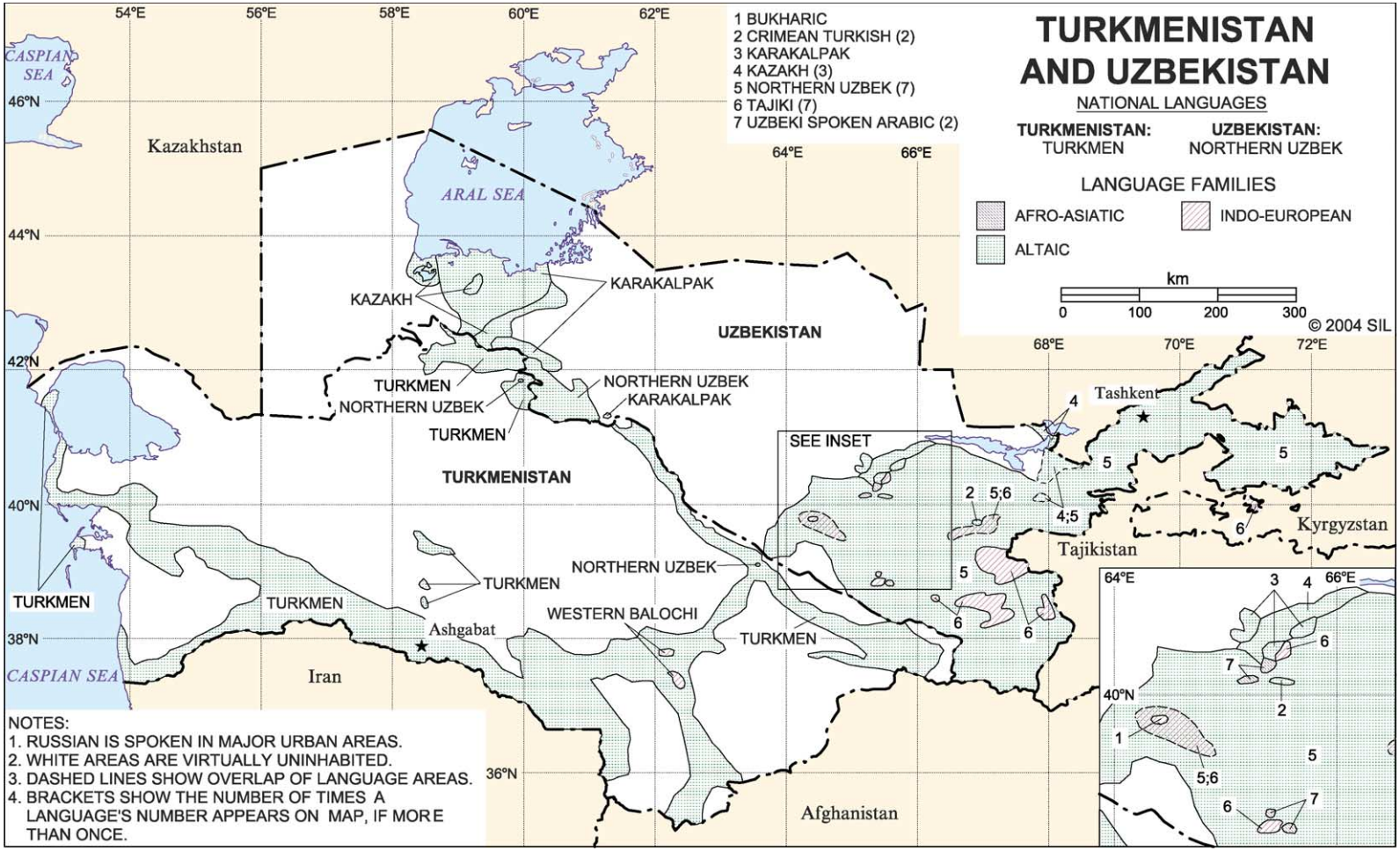

Map 128 Turkmenistan and Uzbekistan.

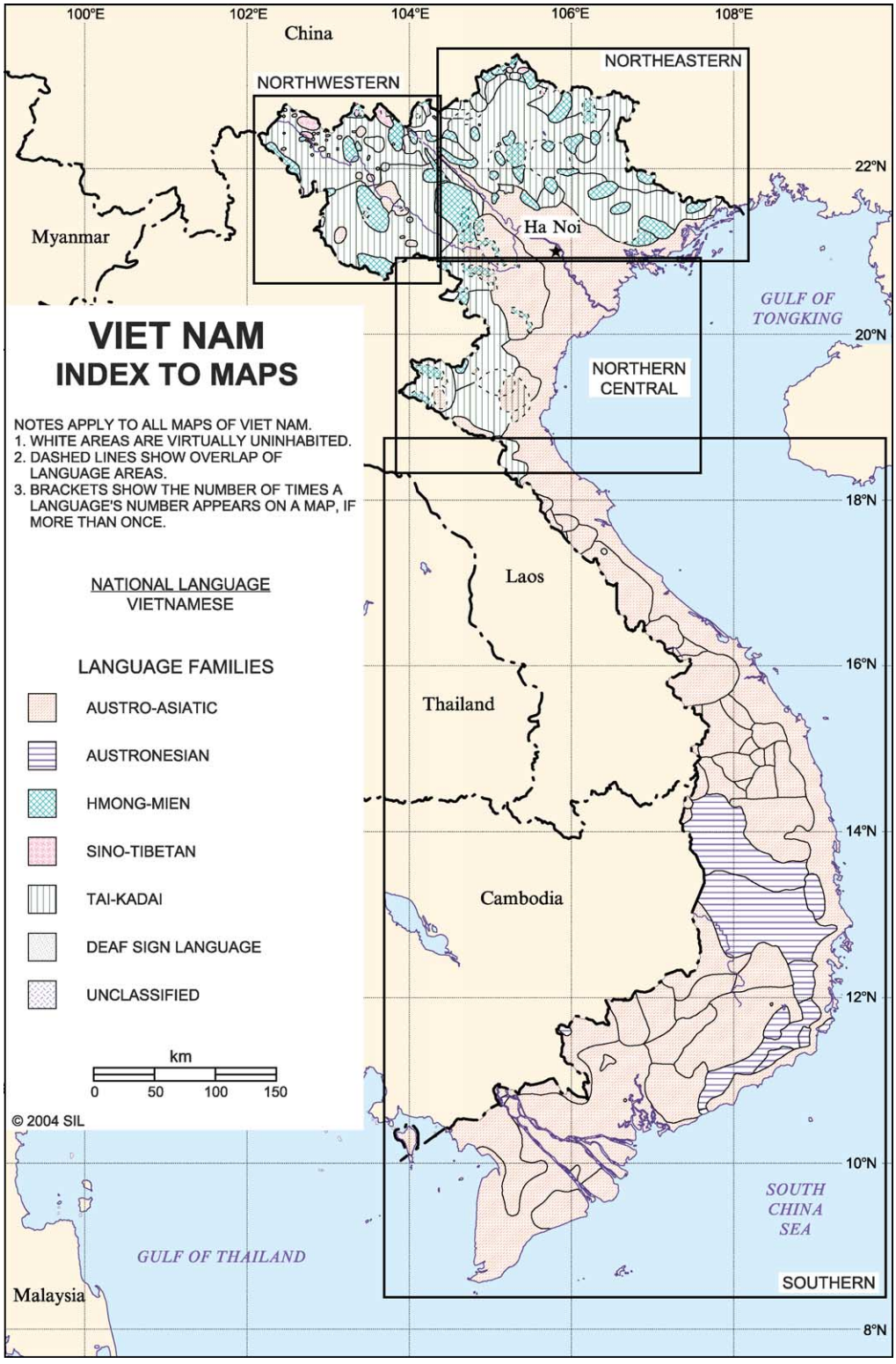

Map 129 Viet Nam: Index Map.

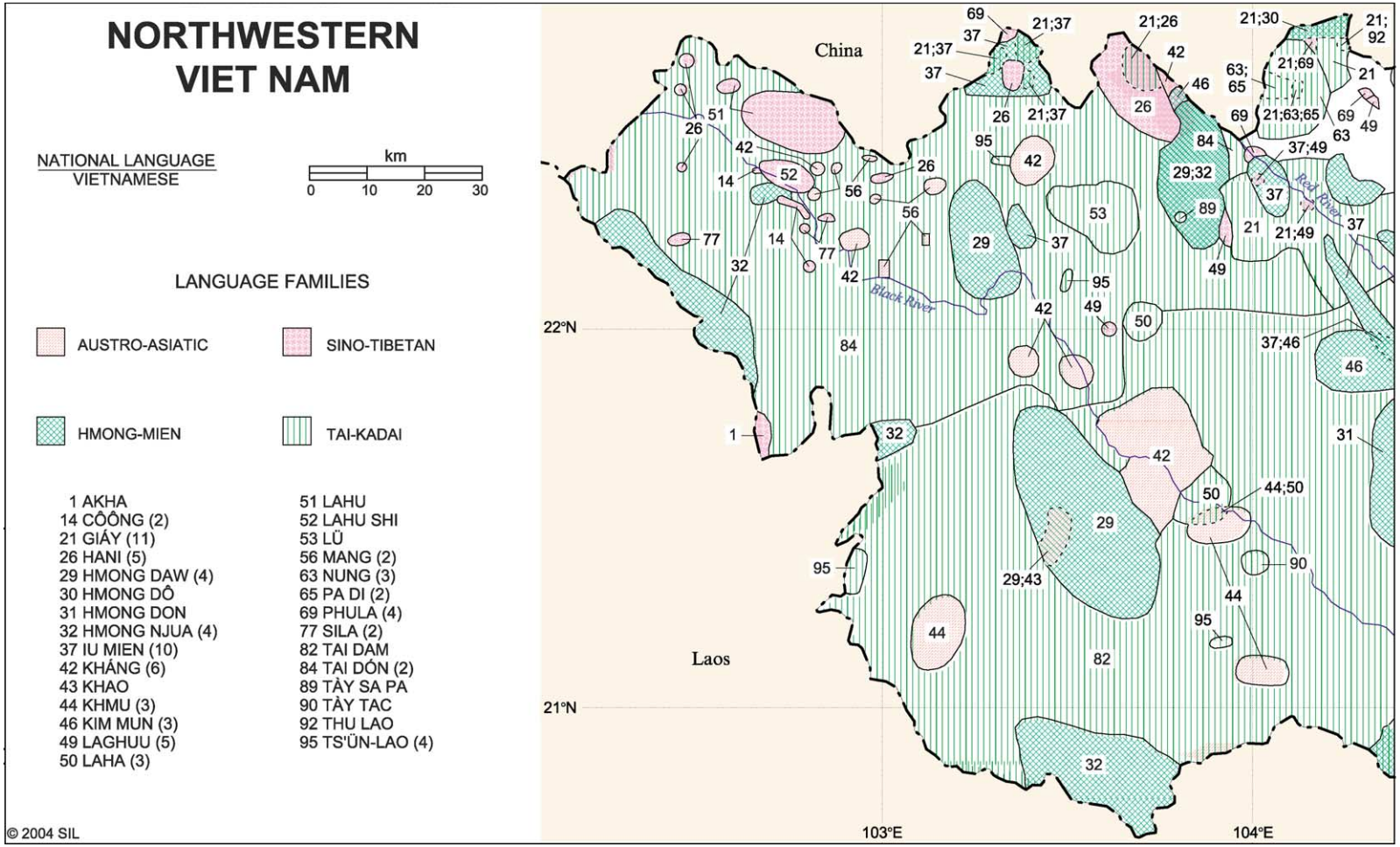

Map 130 Northwestern Viet Nam.

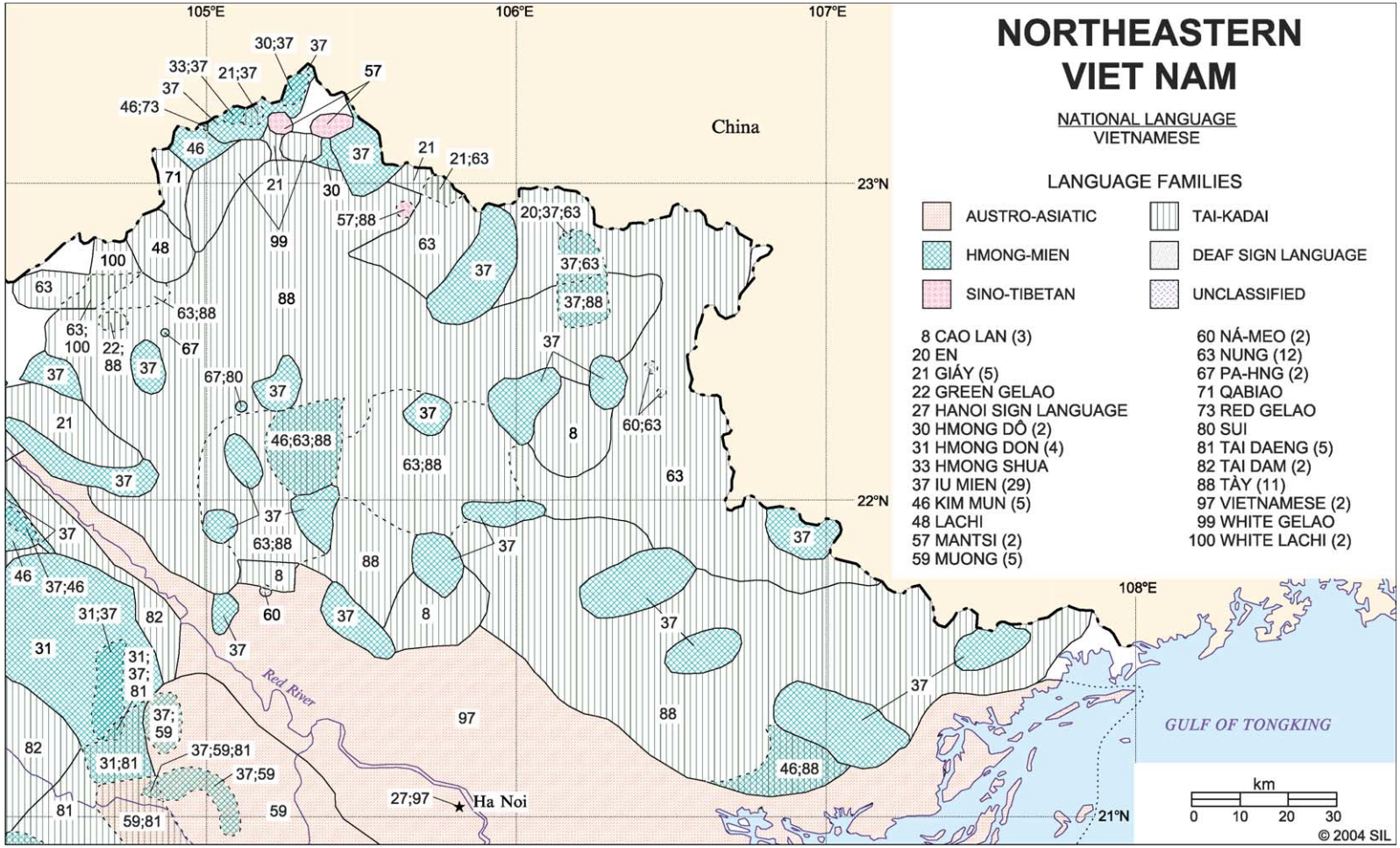

Map 131 Northeastern Viet Nam.

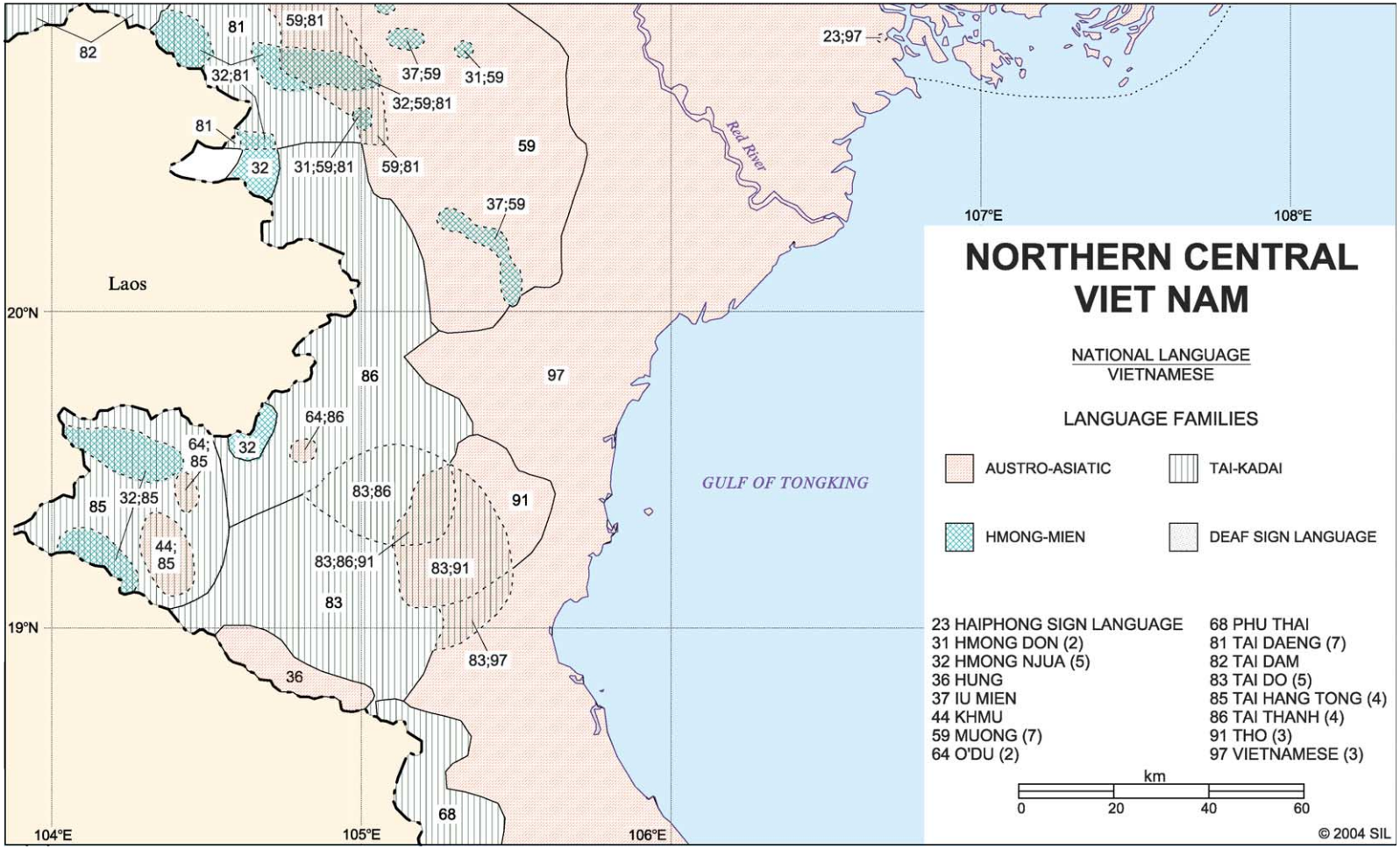

Map 132 Northern Central Viet Nam.

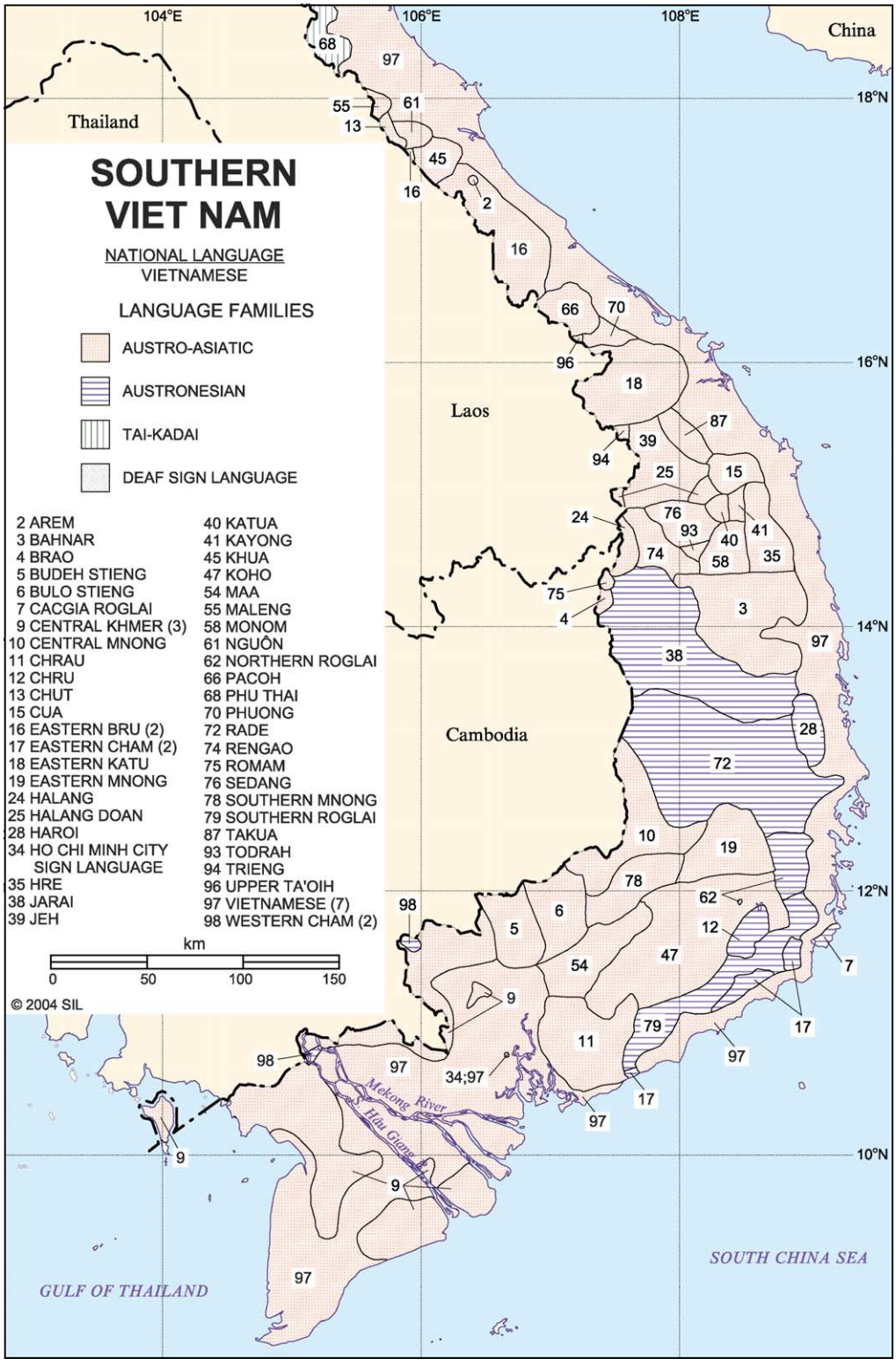

Map 133 Southern Viet Nam.

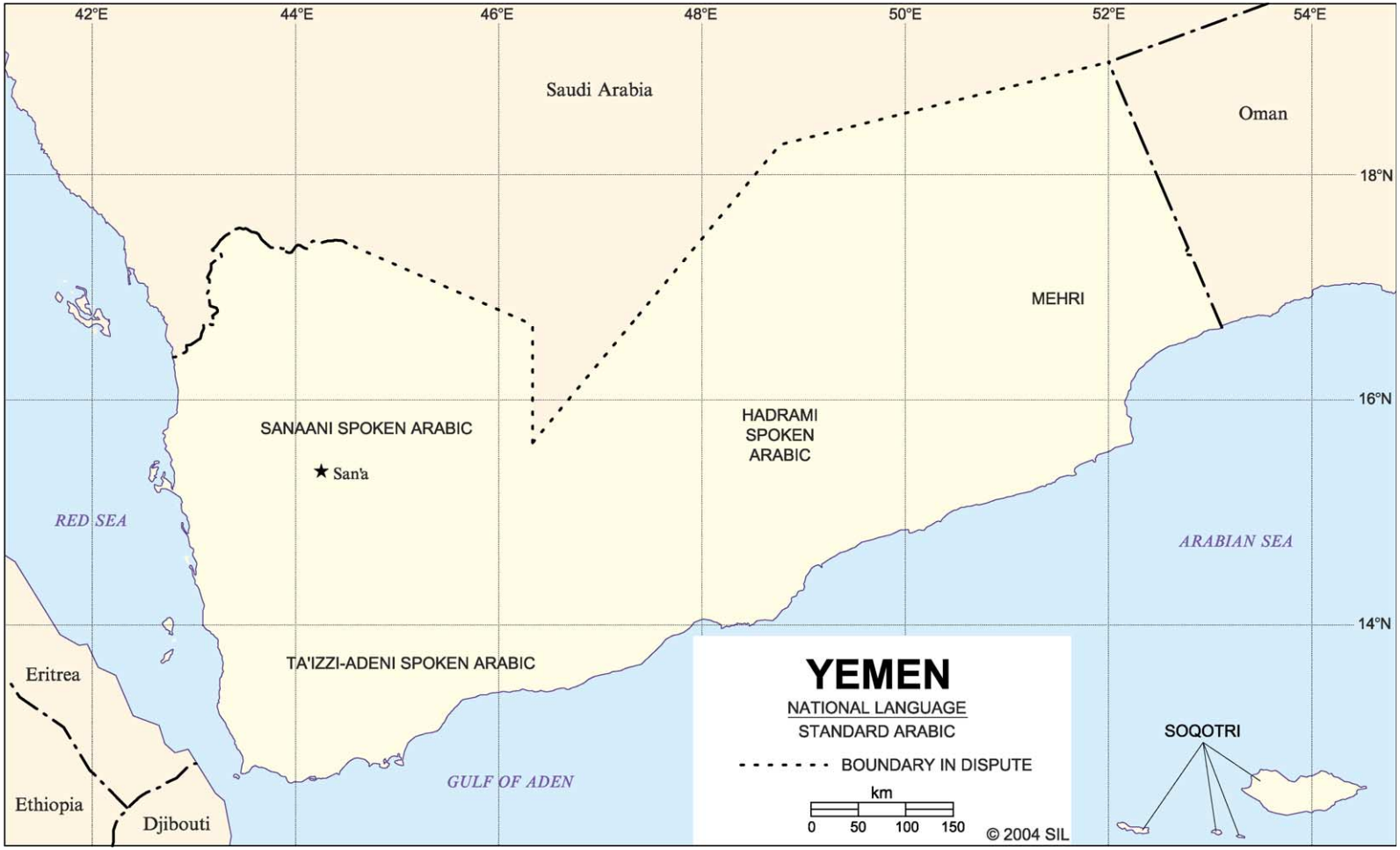

Map 134 Yemen.

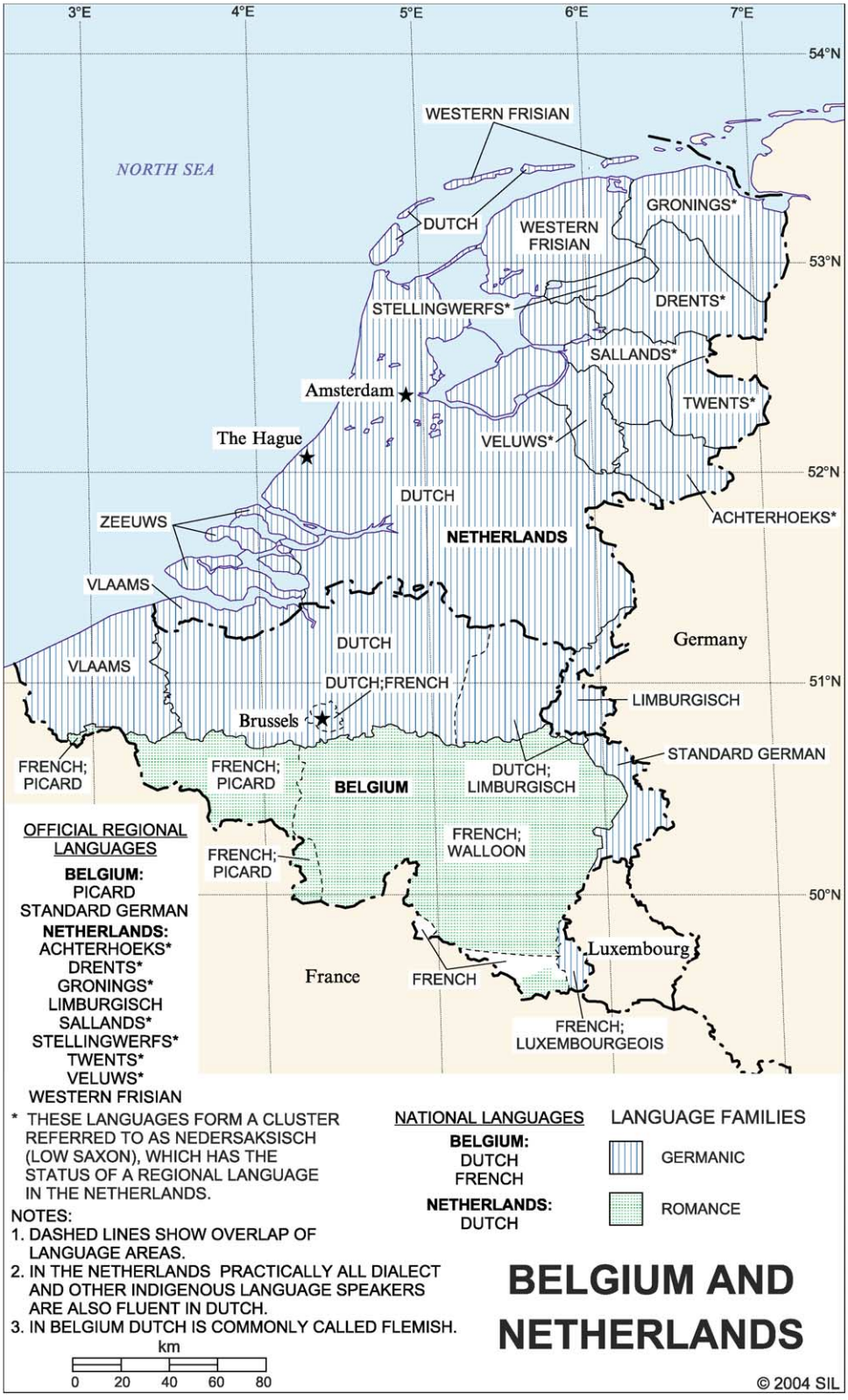

Map 135 Belgium and Netherlands.

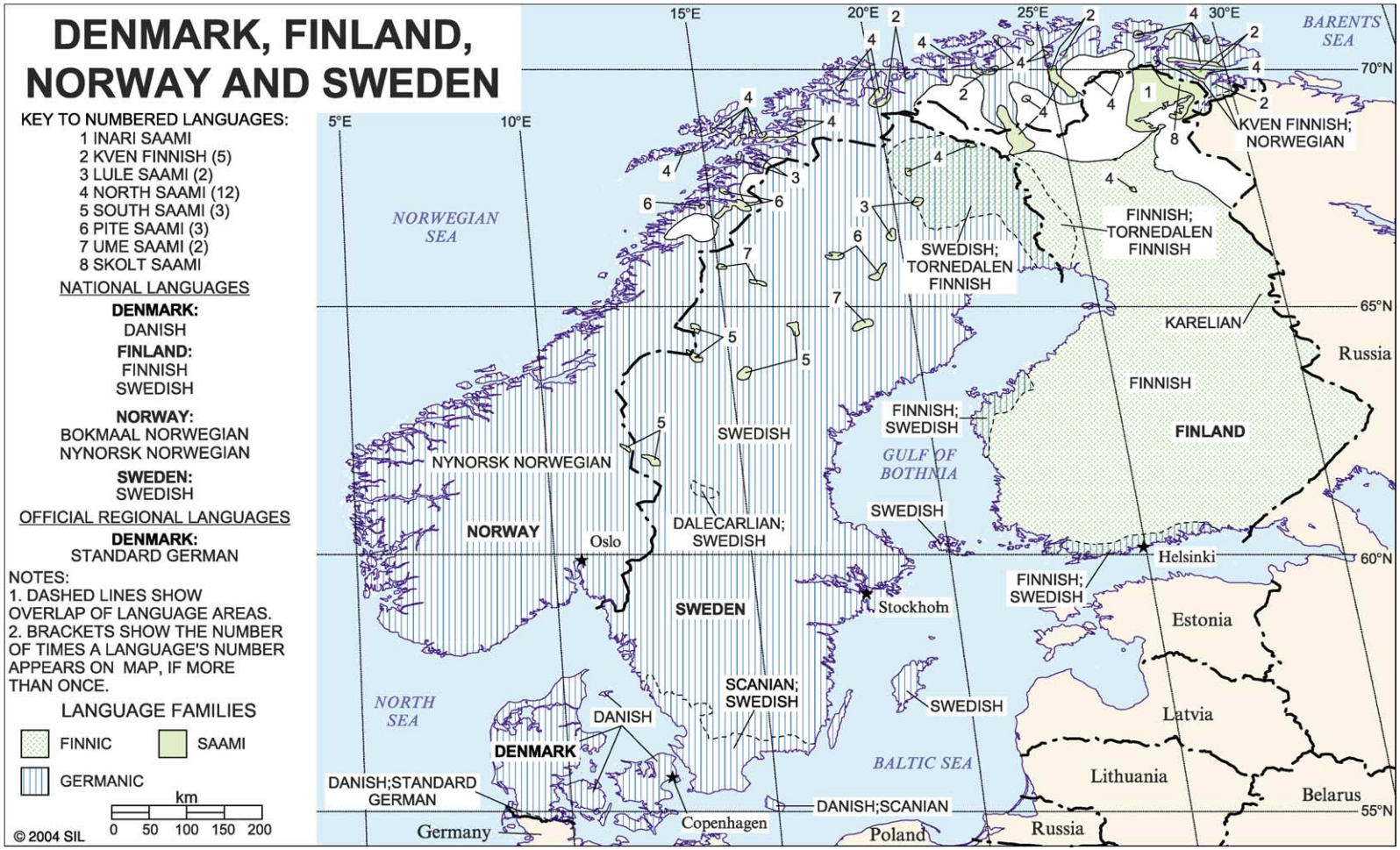

Map 136 Denmark, Finland, Norway and Sweden.

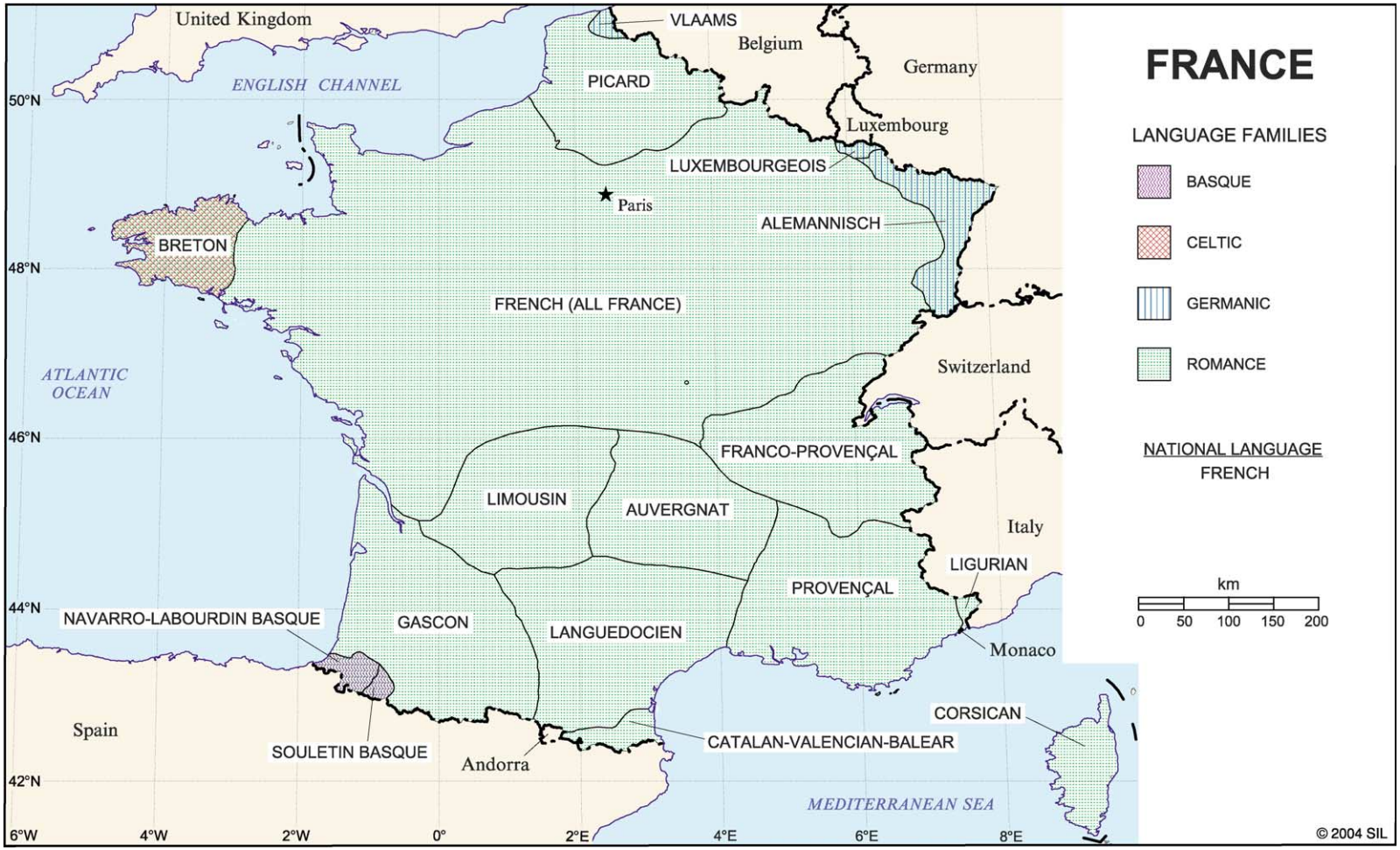

Map 137 France.

Map 138 Greece and Former Yugoslav Republic of Macedonia.

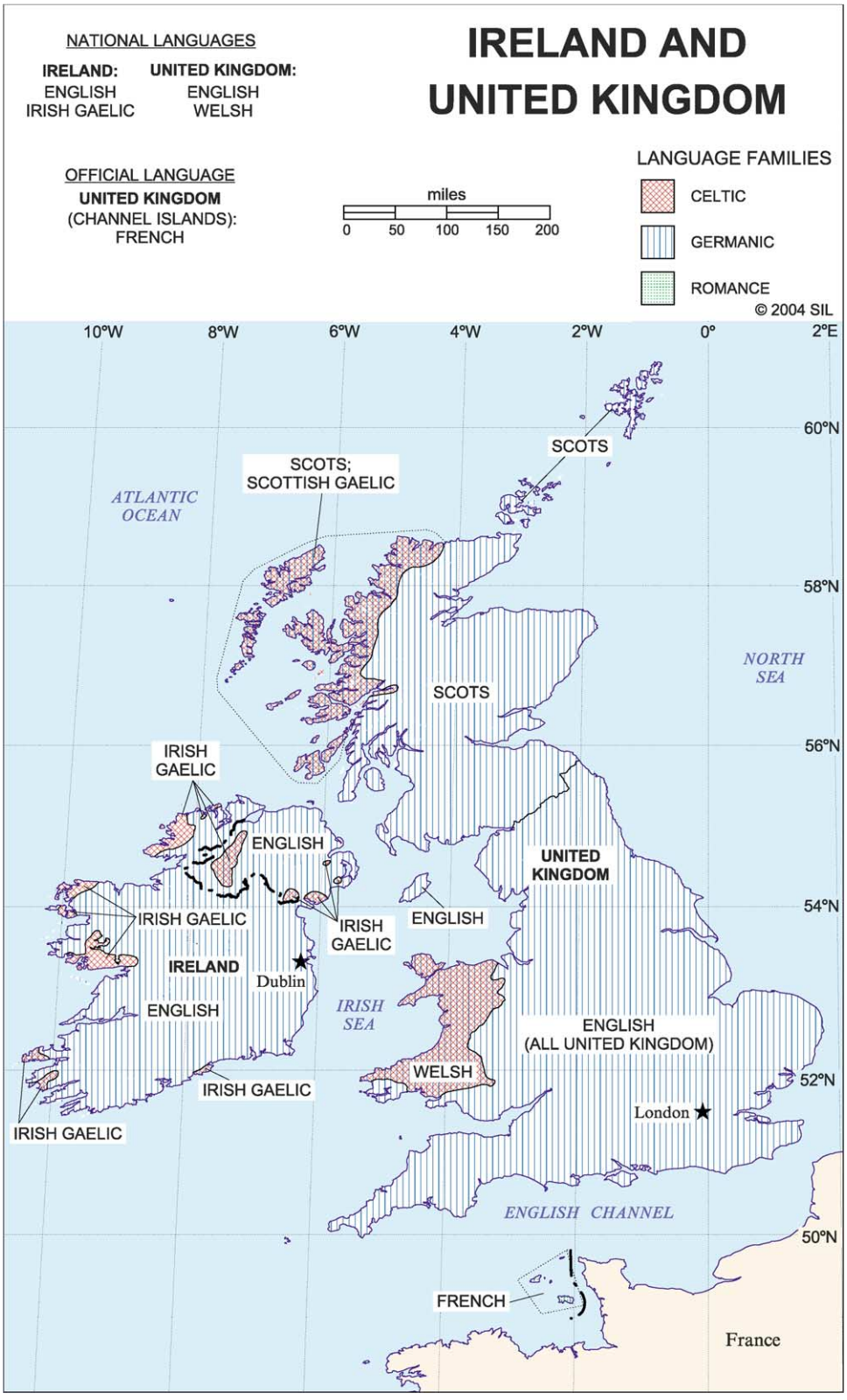

Map 139 Ireland and United Kingdom.

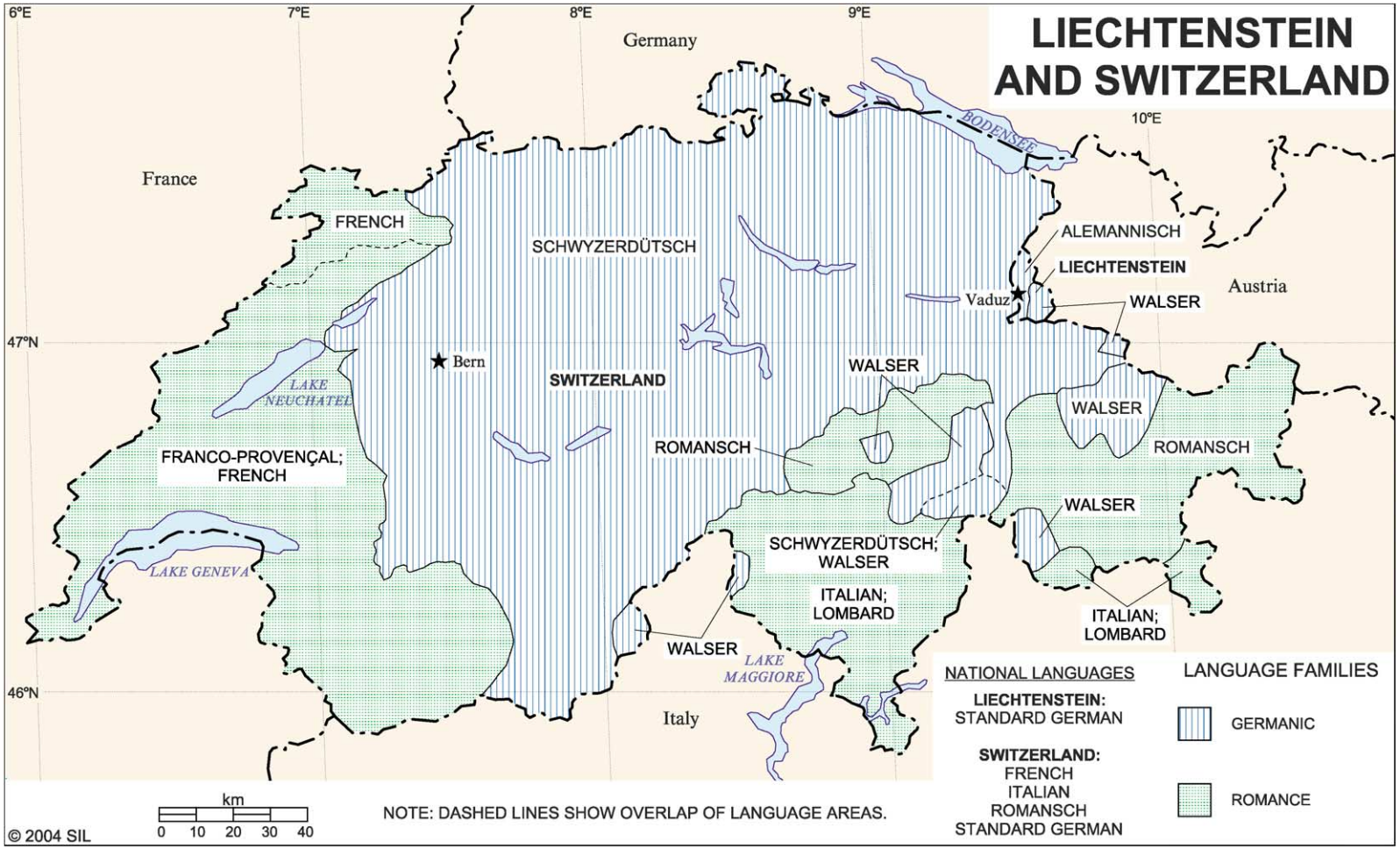

Map 140 Liechtenstein and Switzerland.

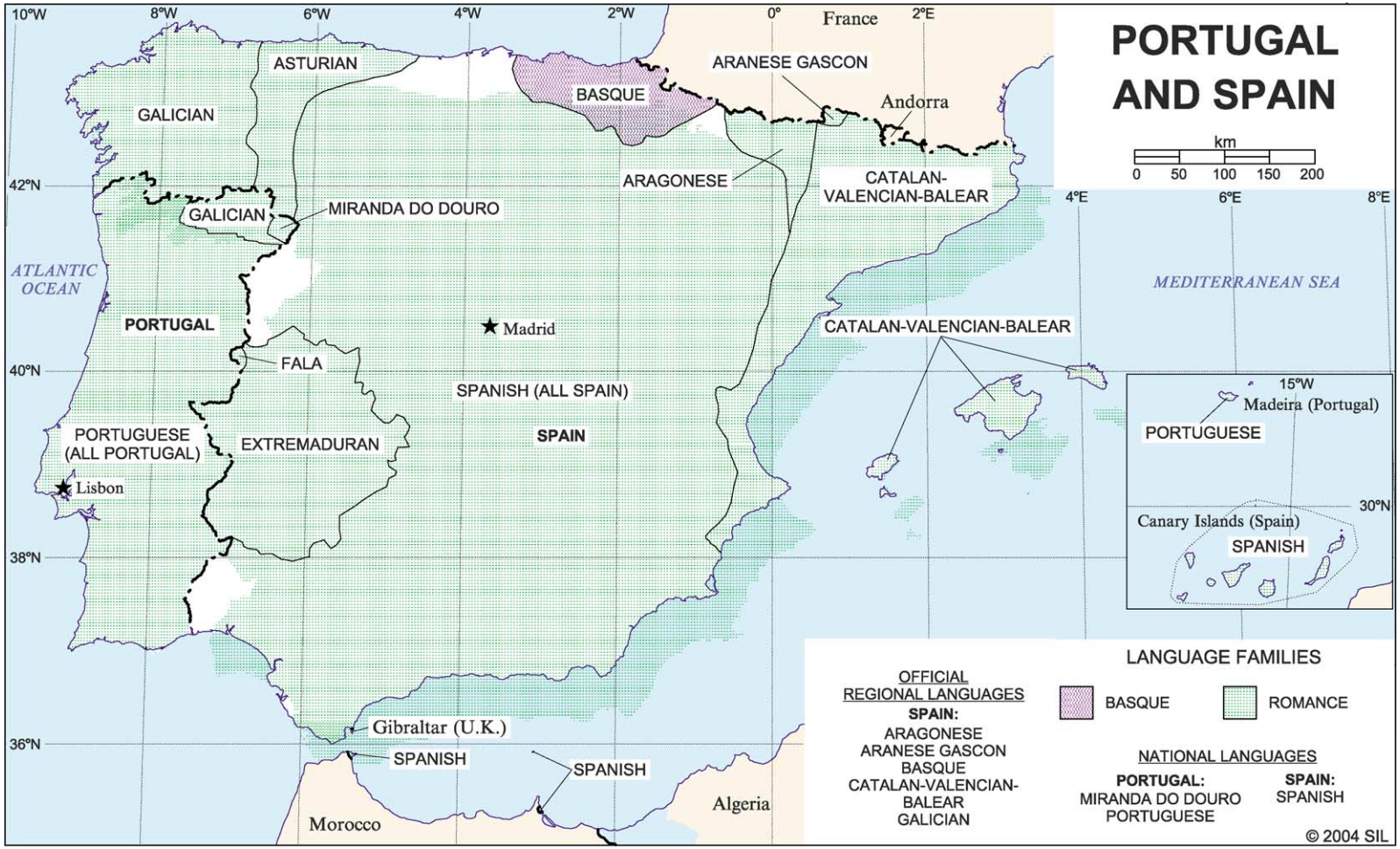

Map 141 Portugal and Spain.

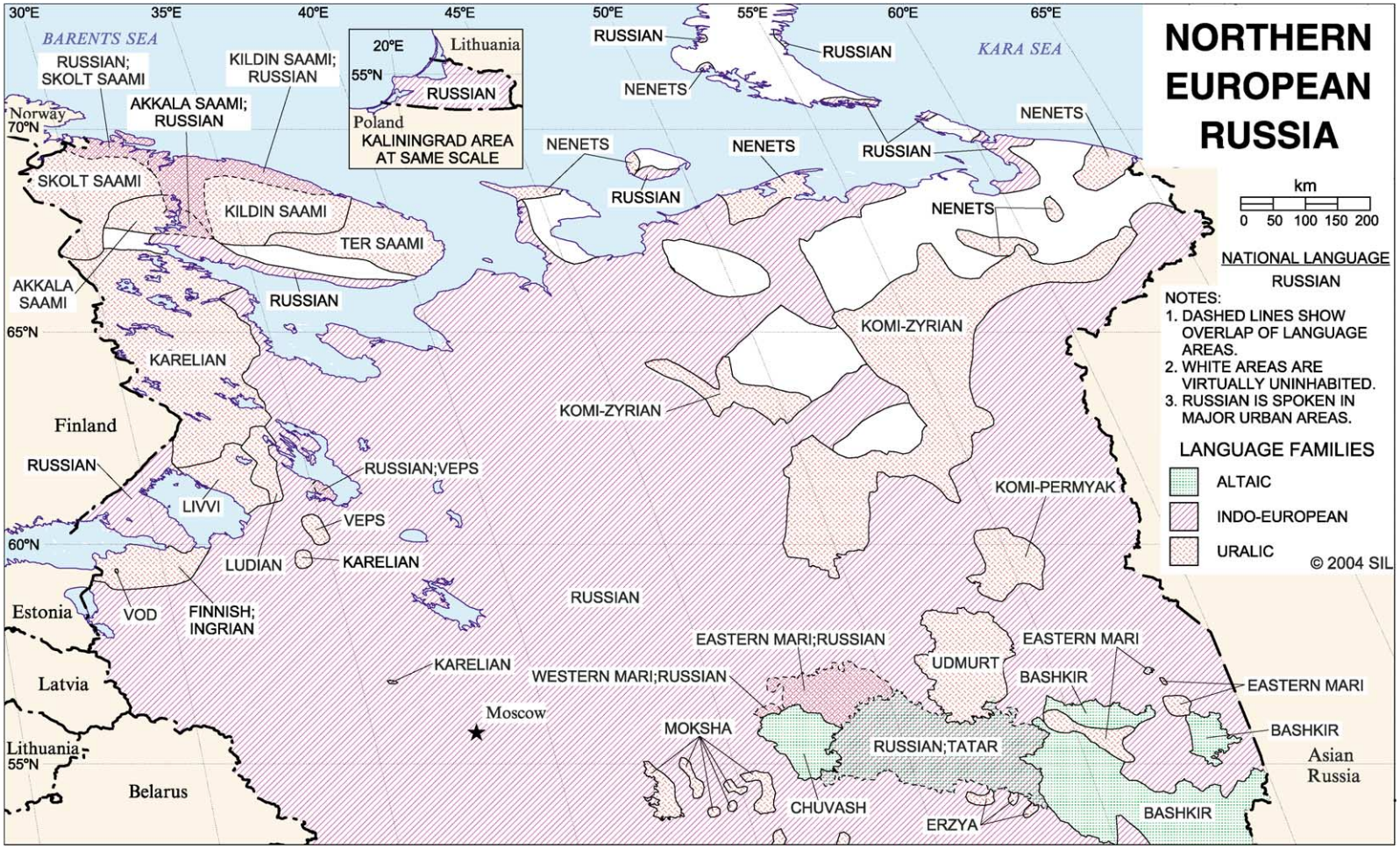

Map 142 Northern European Russia.

Map 143 Southern European Russia.

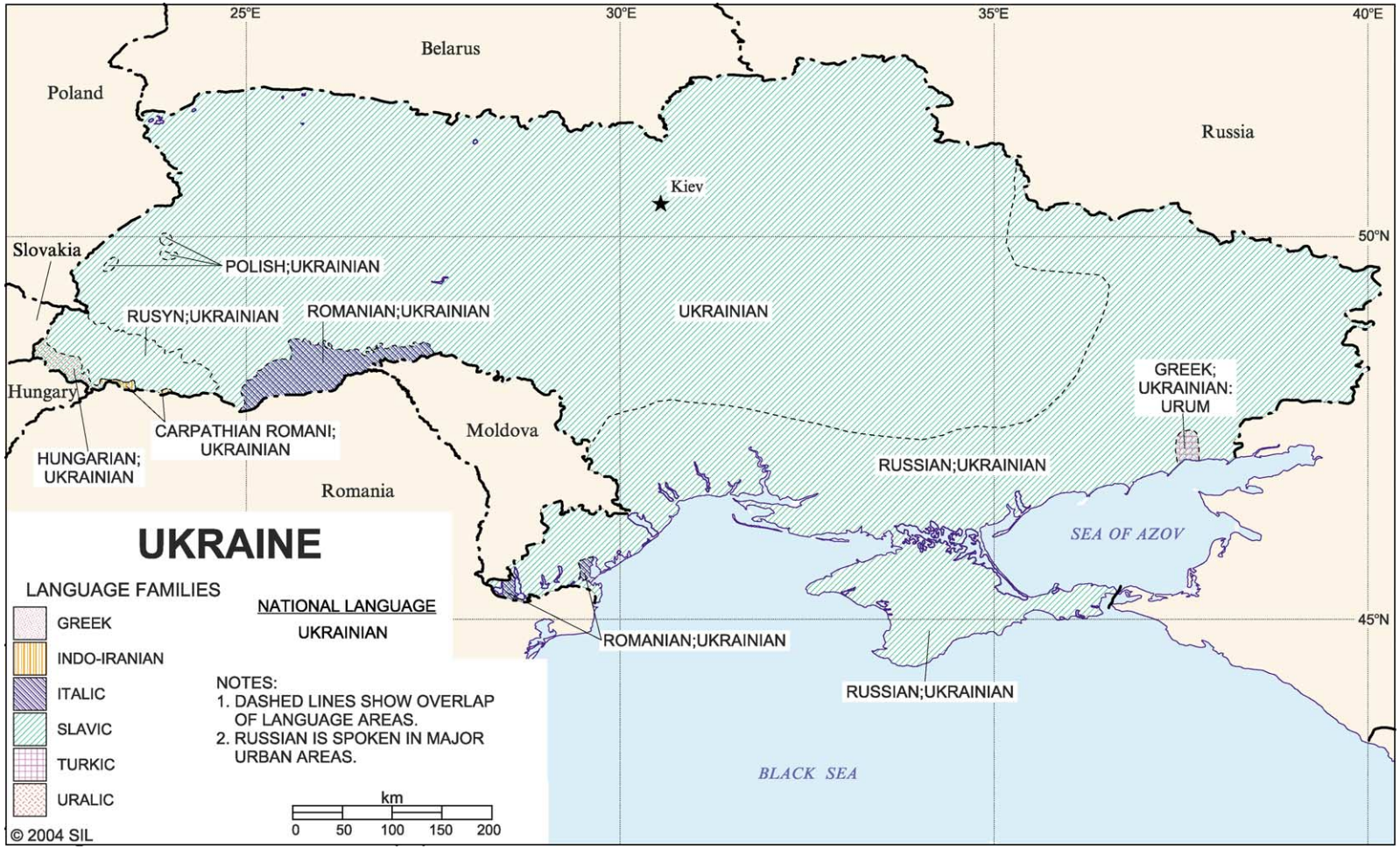

Map 144 Ukraine.

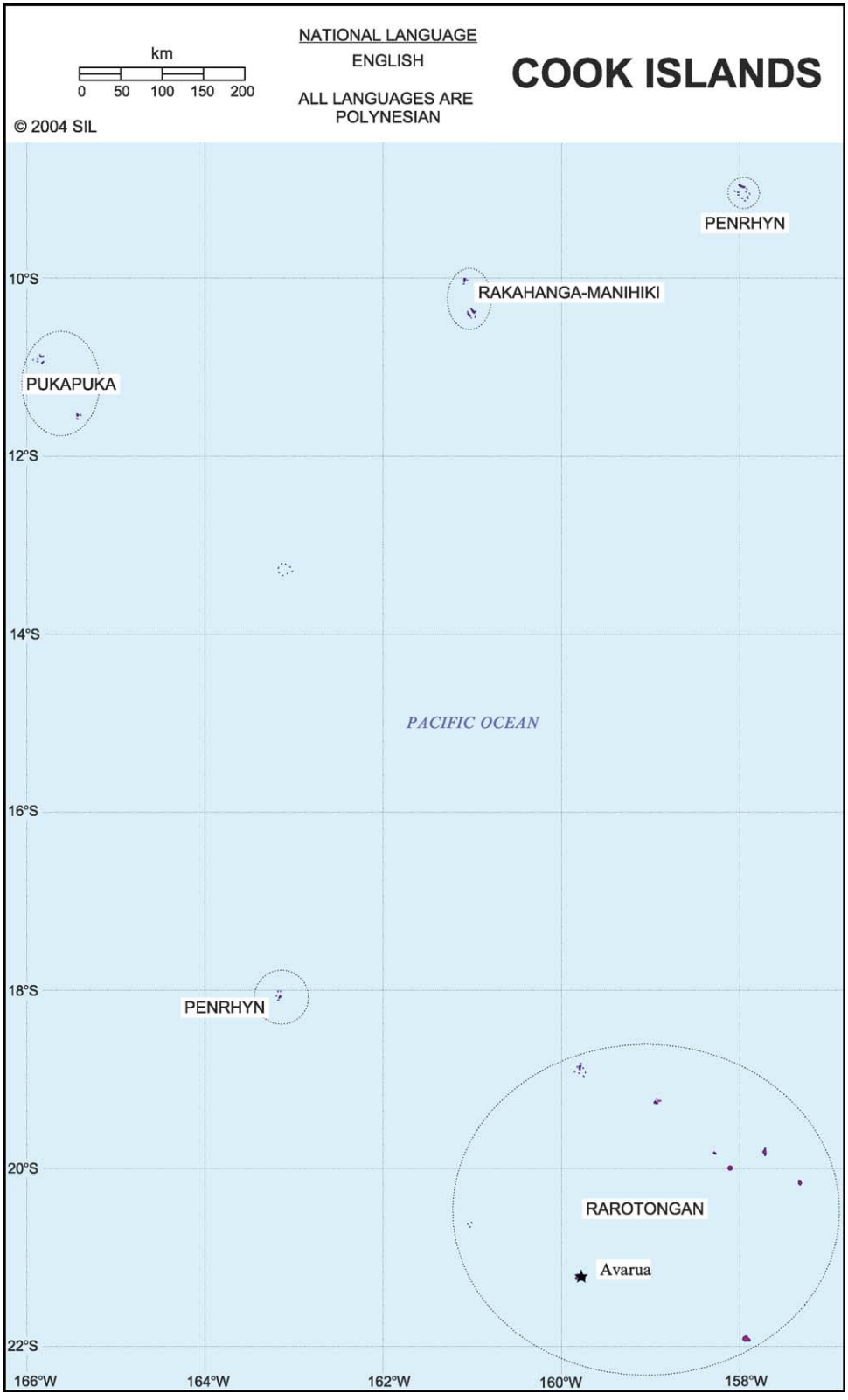

Map 145 Cook Islands.

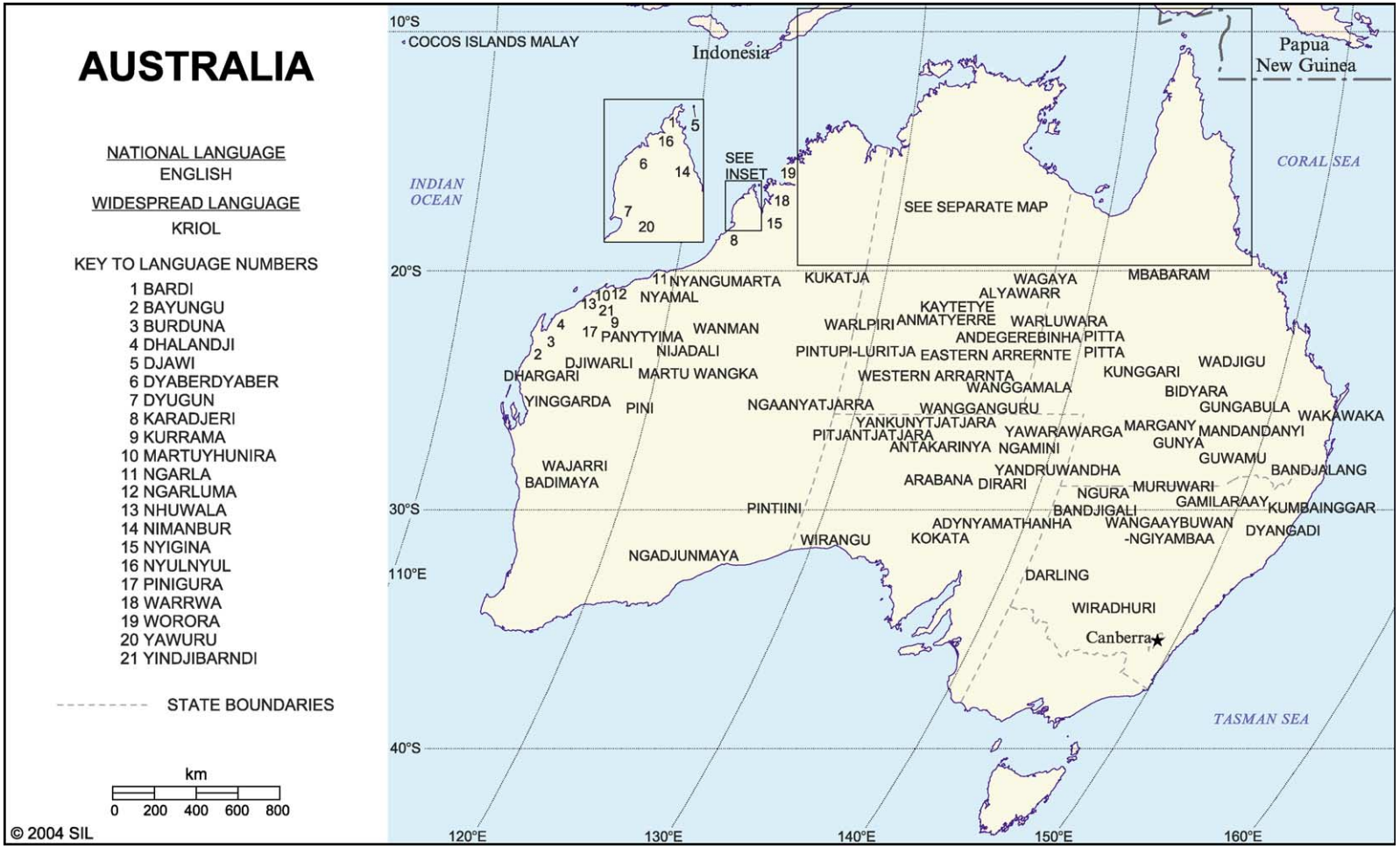

Map 146 Australia.

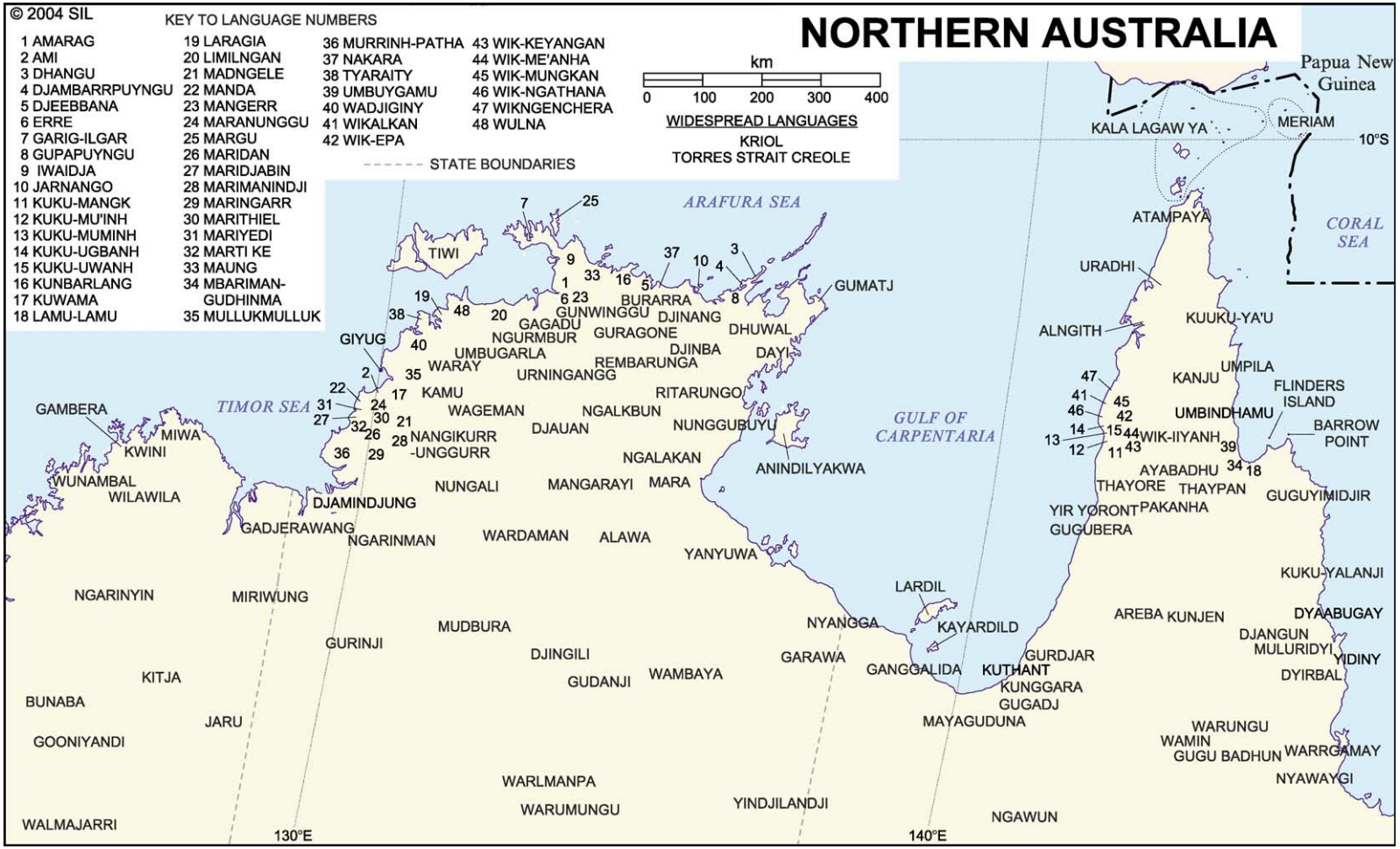

Map 147 Northern Australia.

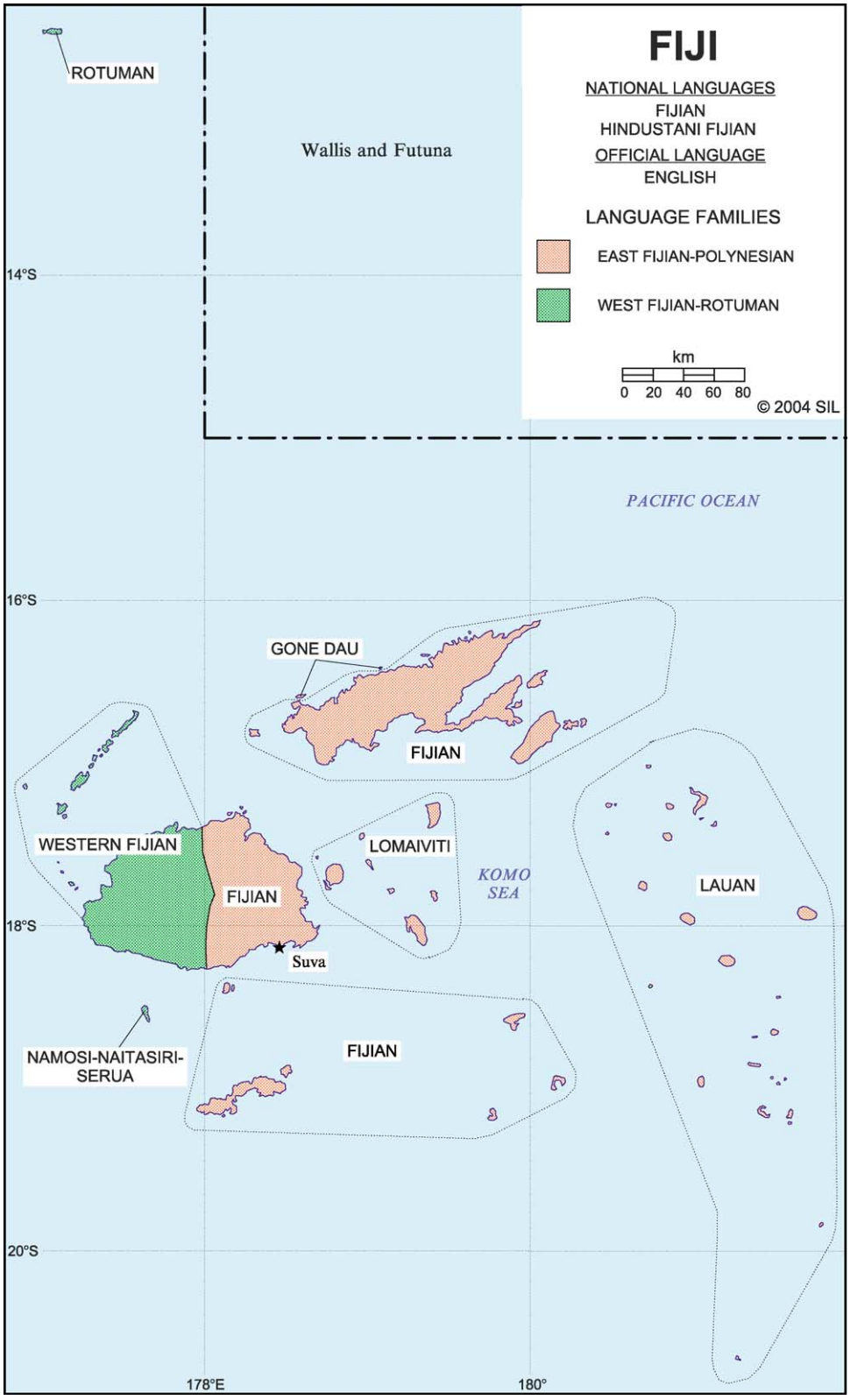
FIJI
NATIONAL LANGUAGES
FIJIAN
HINDUSTANI FIJIAN
OFFICIAL LANGUAGE
ENGLISH
LANGUAGE FAMILIES
EAST FIJIAN-POLYNESIAN
WEST FIJIAN-ROTUMAN
km
0 20 40 60 80
© 2004 SIL
ROTUMAN
Wallis and Futuna
PACIFIC OCEAN
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178°E
180°
GONE DAU
FIJIAN
WESTERN FIJIAN
FIJIAN
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Suva
NAMOSI-NAITASIRI-SERUA
FIJIAN

Map 148 Fiji.

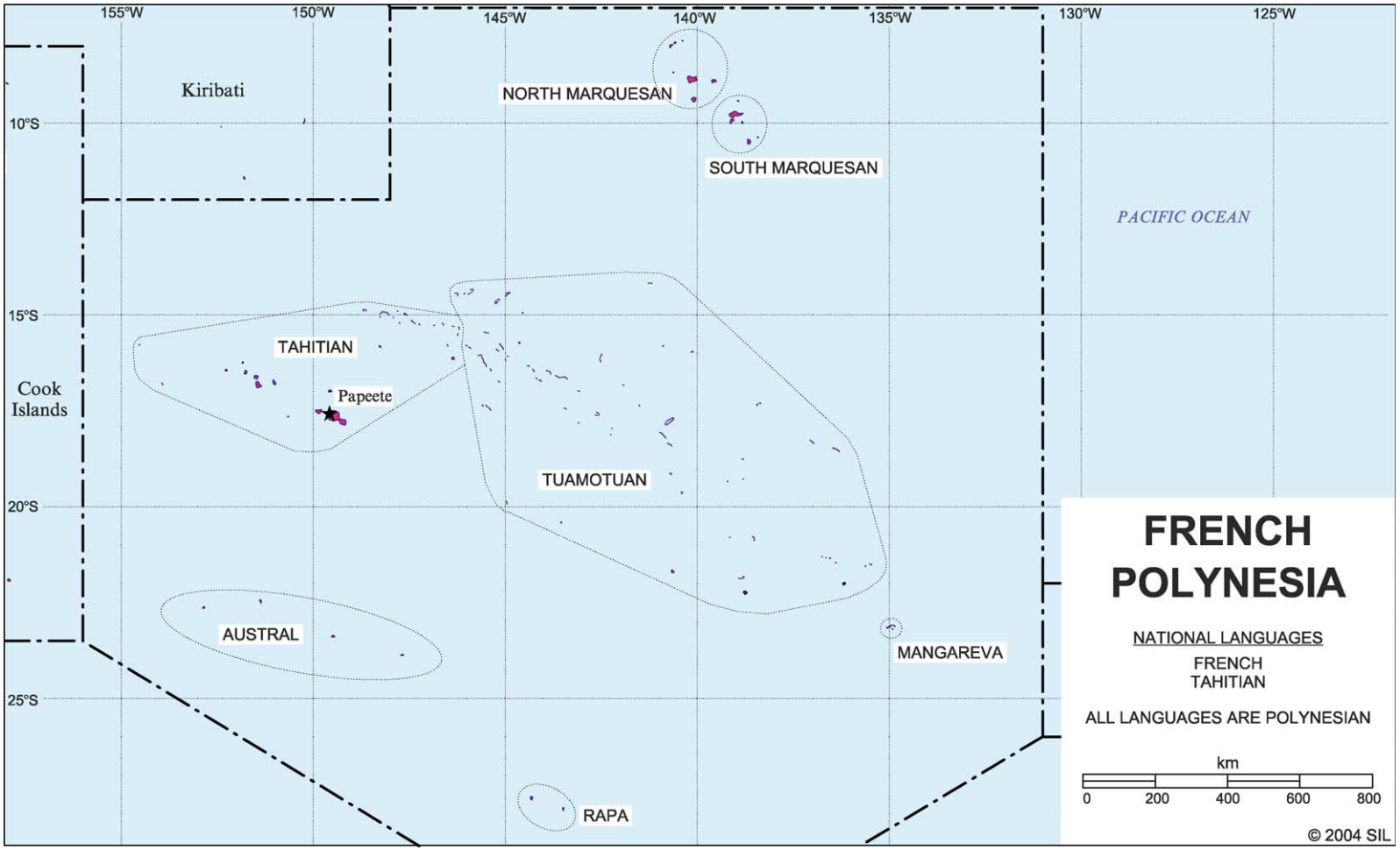

Map 149 French Polynesia.

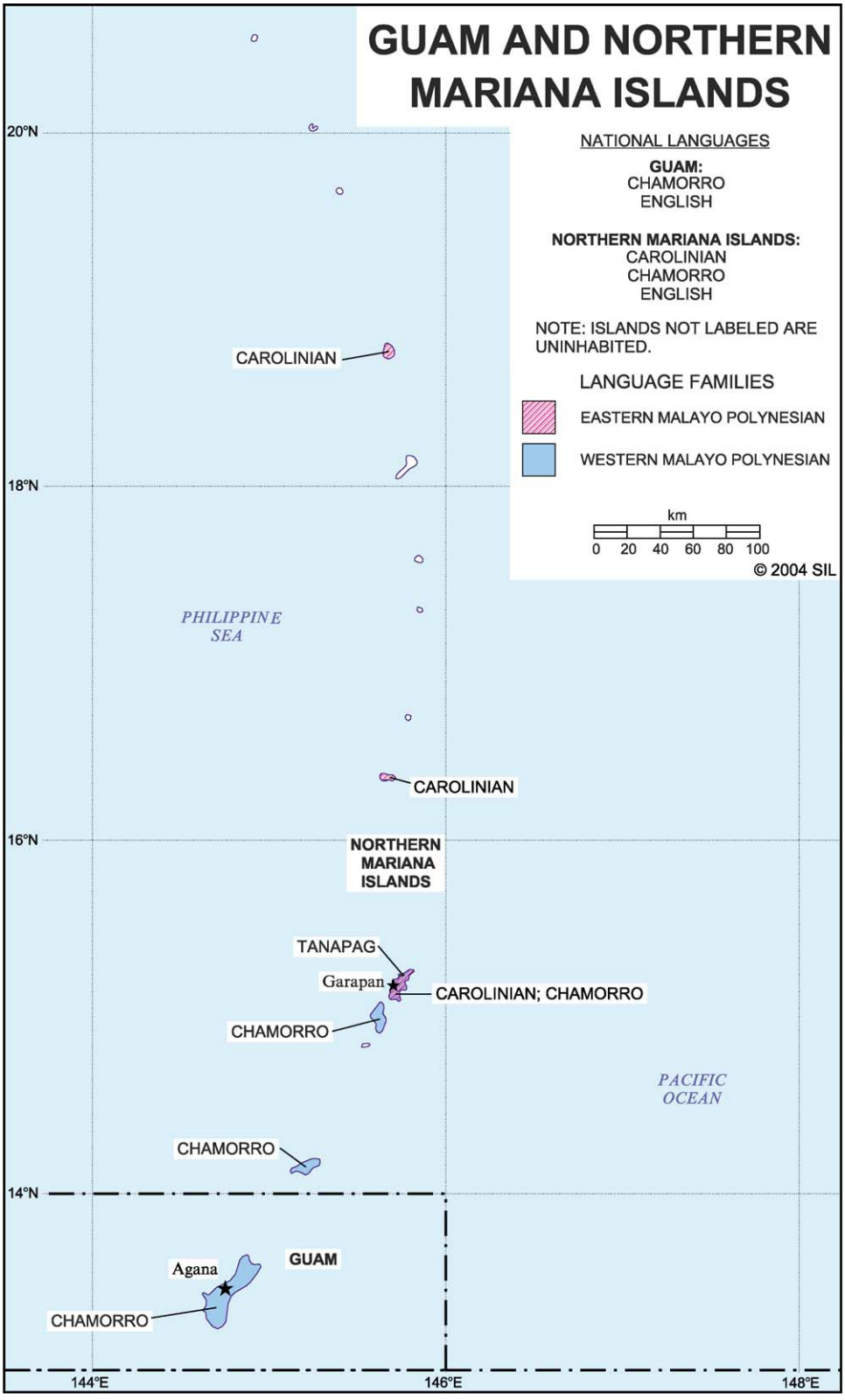

Map 150 Guam and North Mariana Islands.

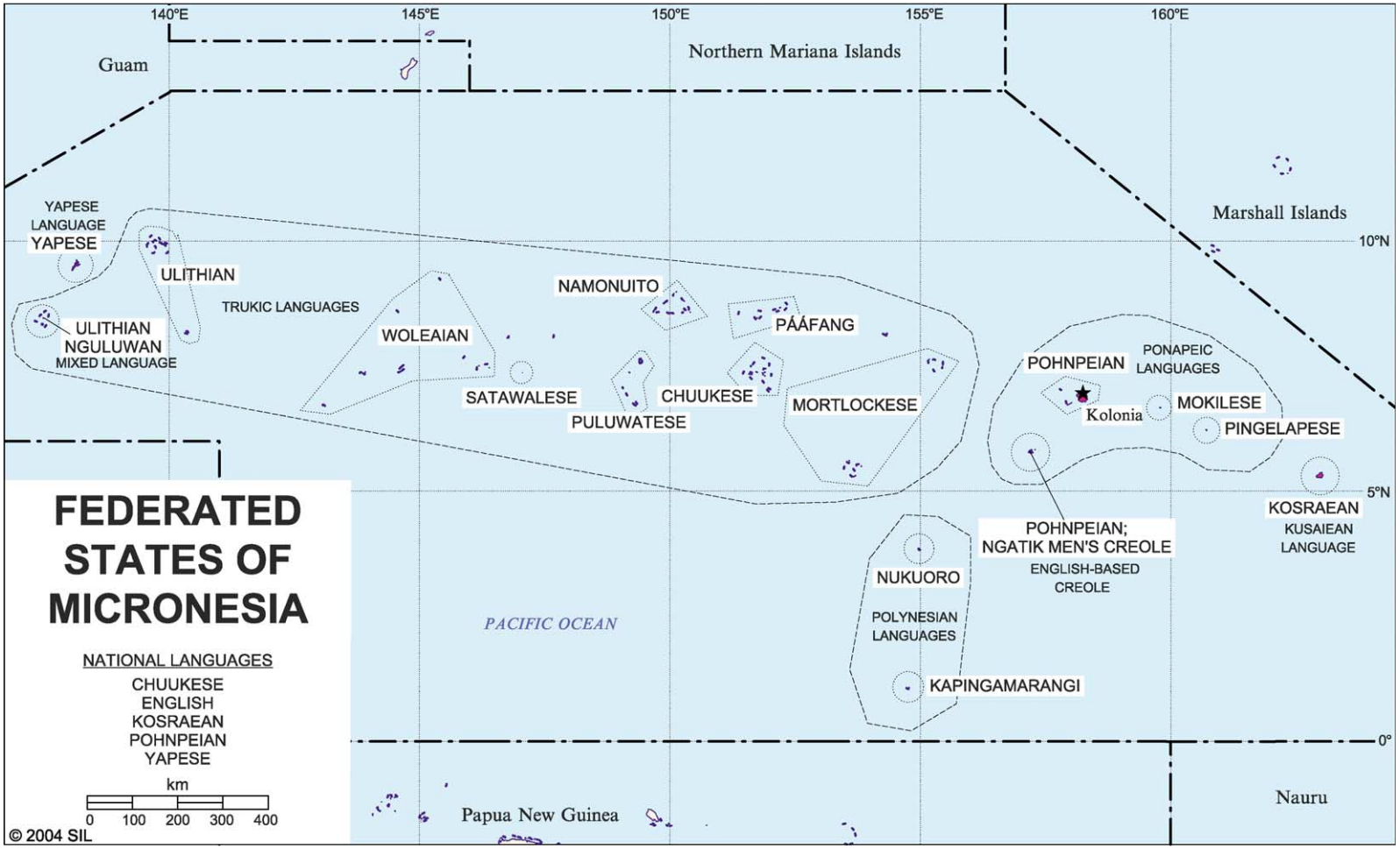

Map 151 Federated States of Micronesia.

Map 152 New Caledonia.

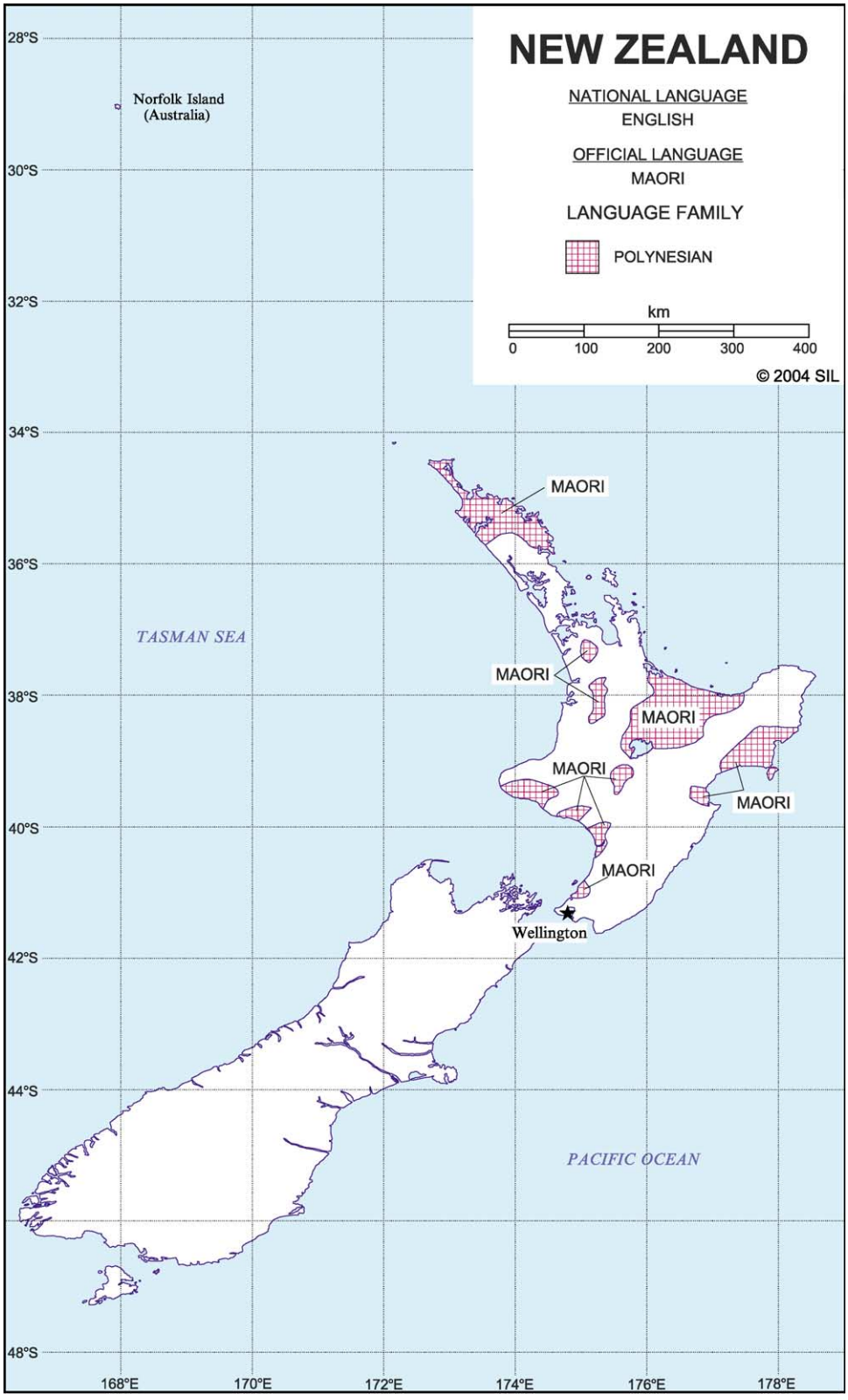

Map 153 New Zealand.

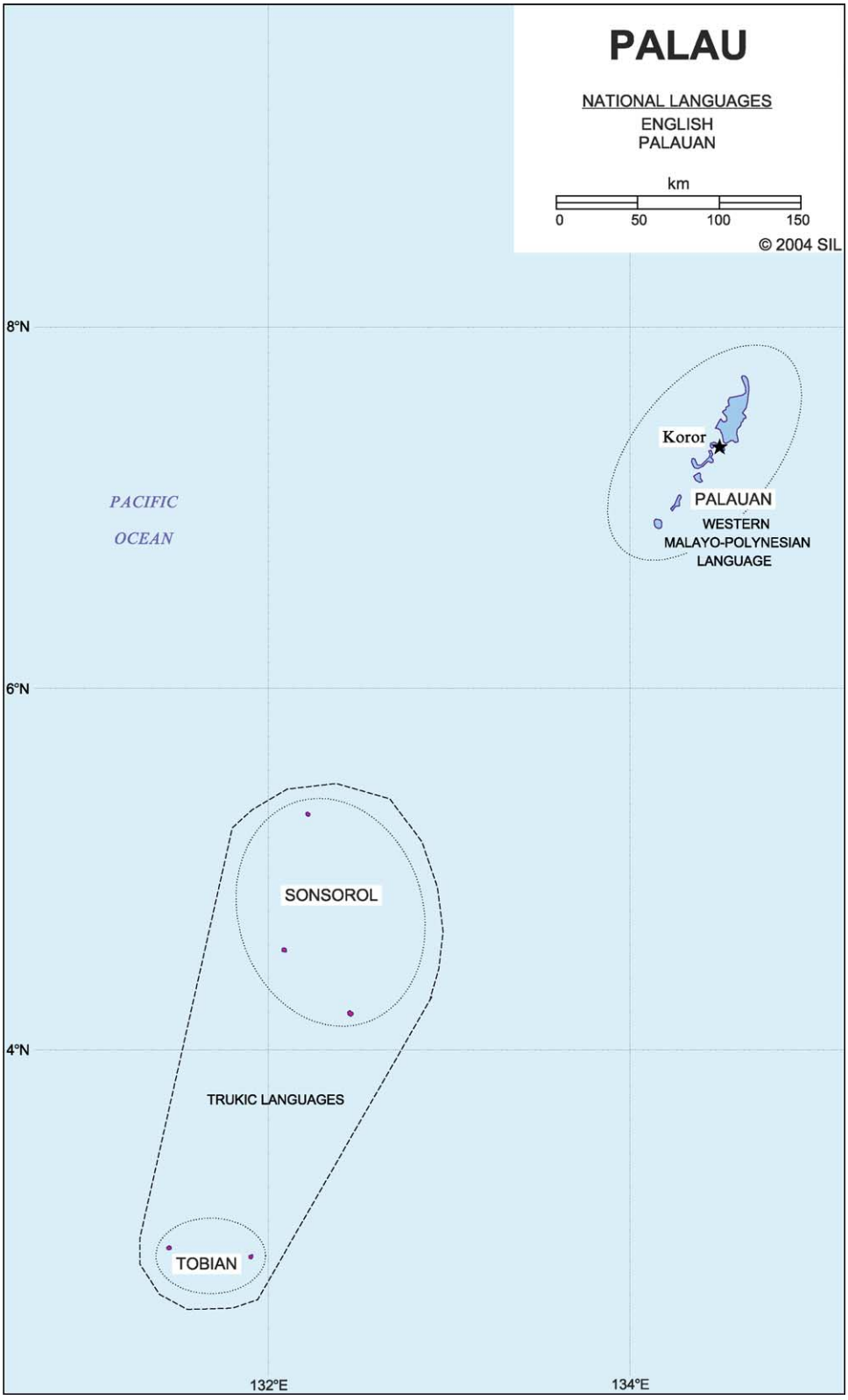

Map 154 Palau.

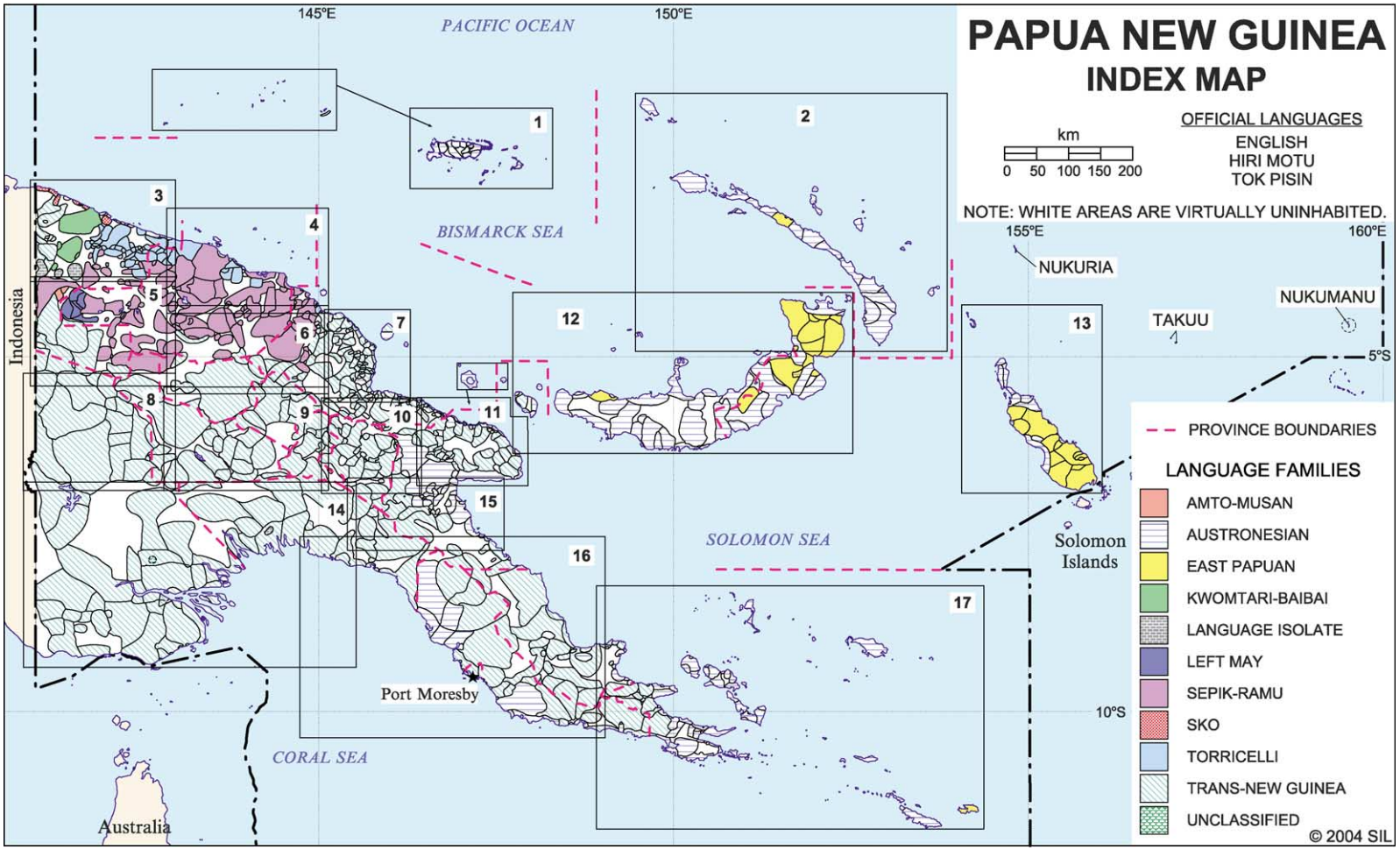

Map 155 Papua New Guinea: Index Map.

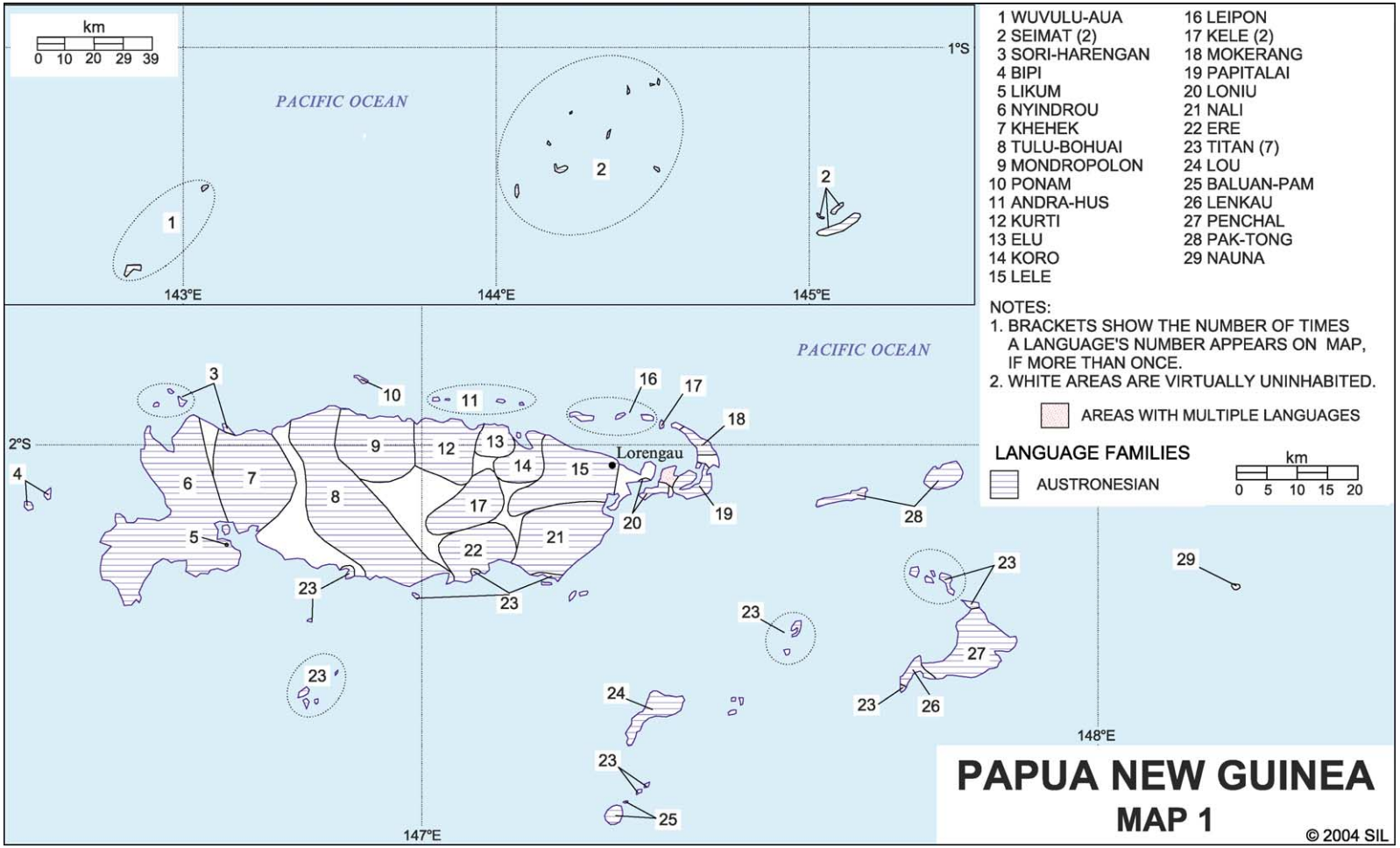

Map 156 Papua New Guinea, Map 1.

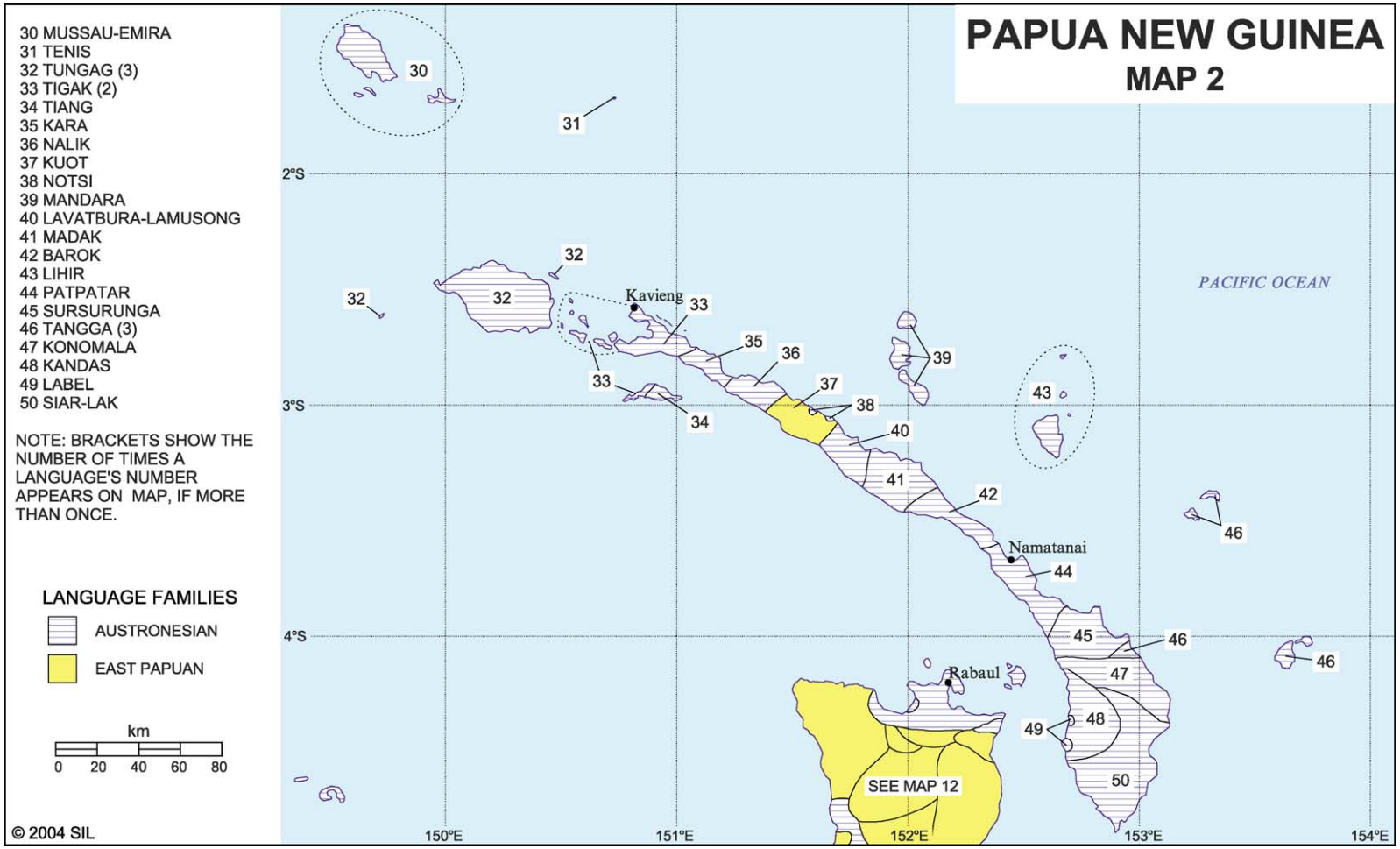

Map 157 Papua New Guinea, Map 2.

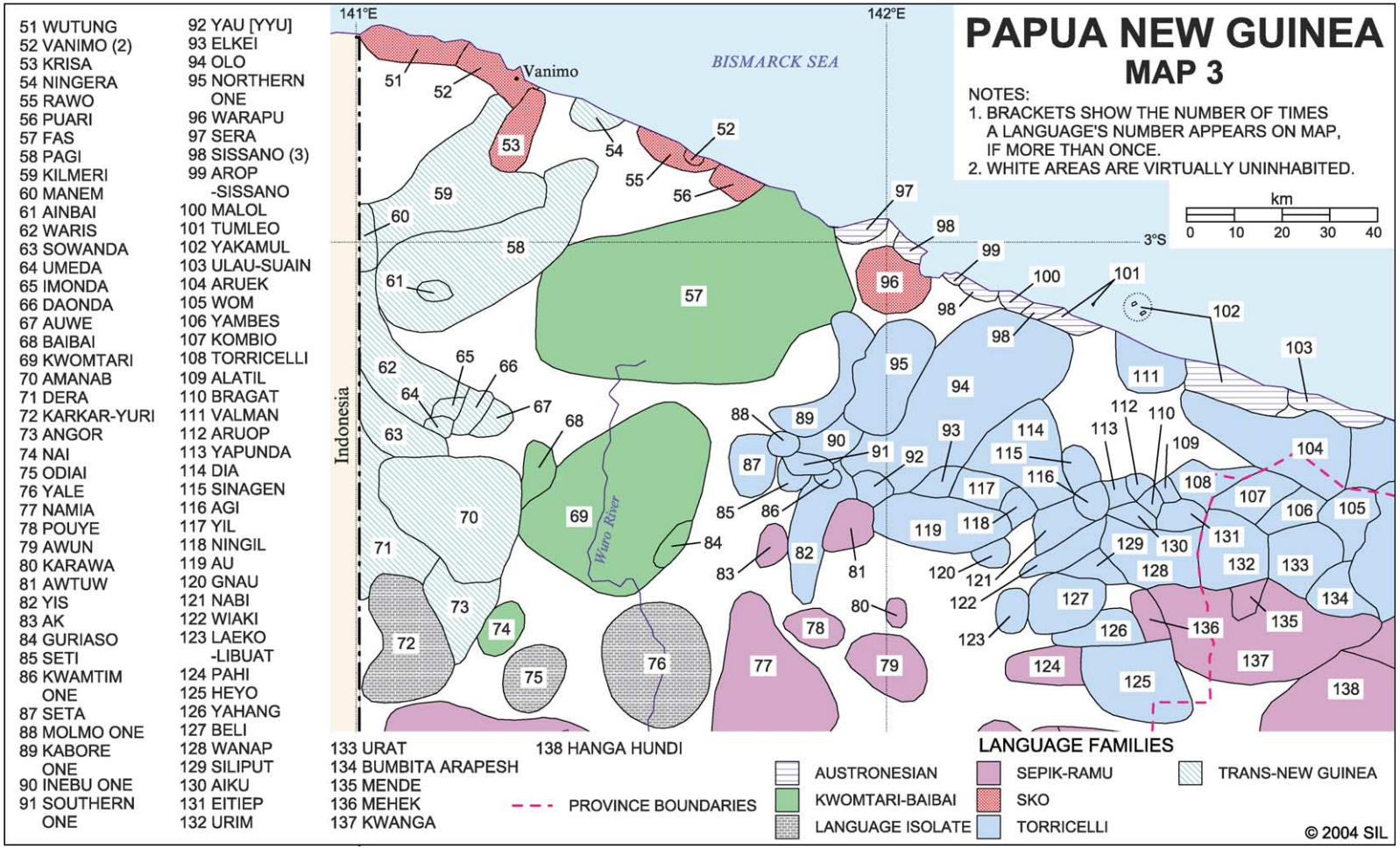

Map 158 Papua New Guinea, Map 3.

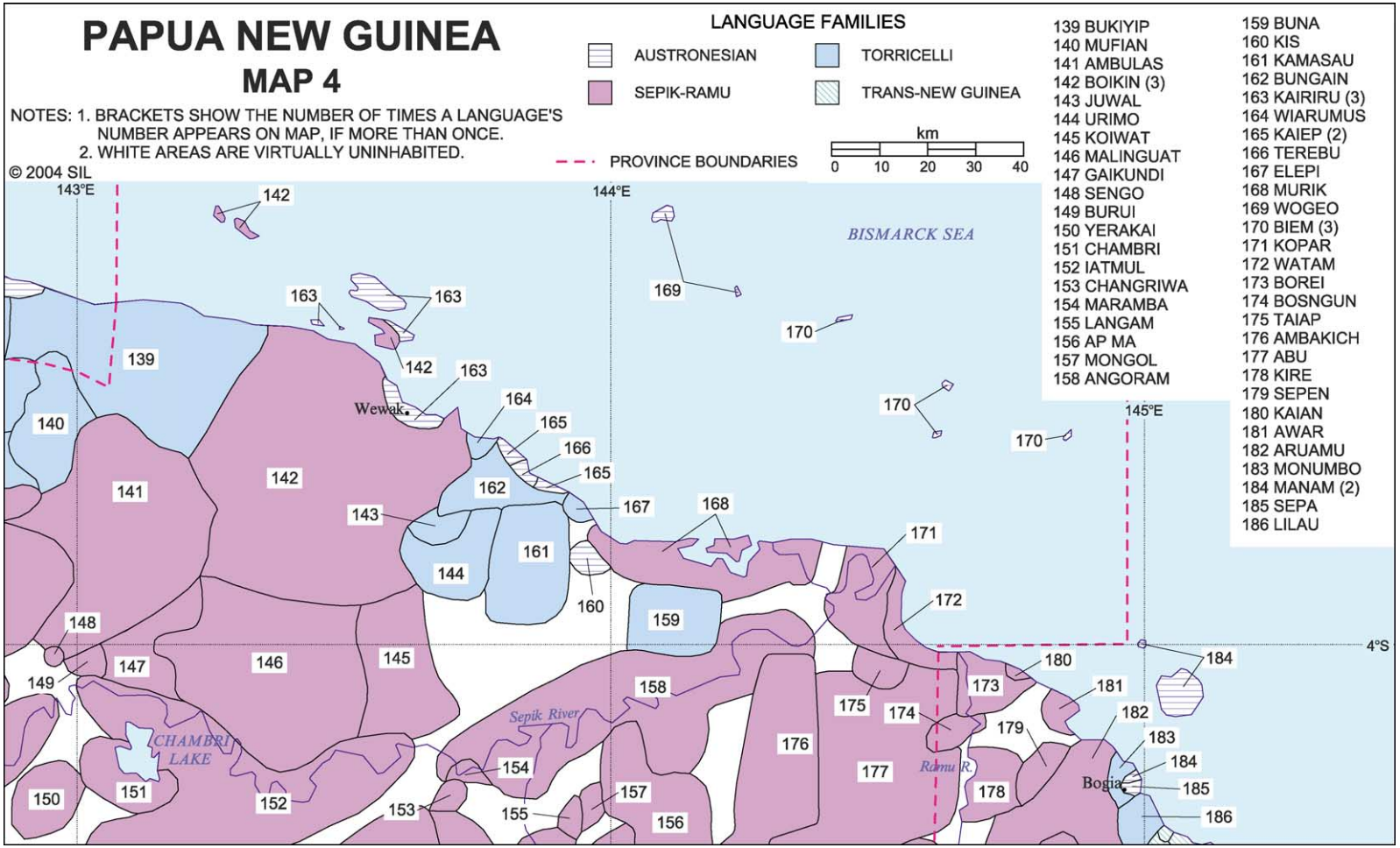

Map 159 Papua New Guinea, Map 4.

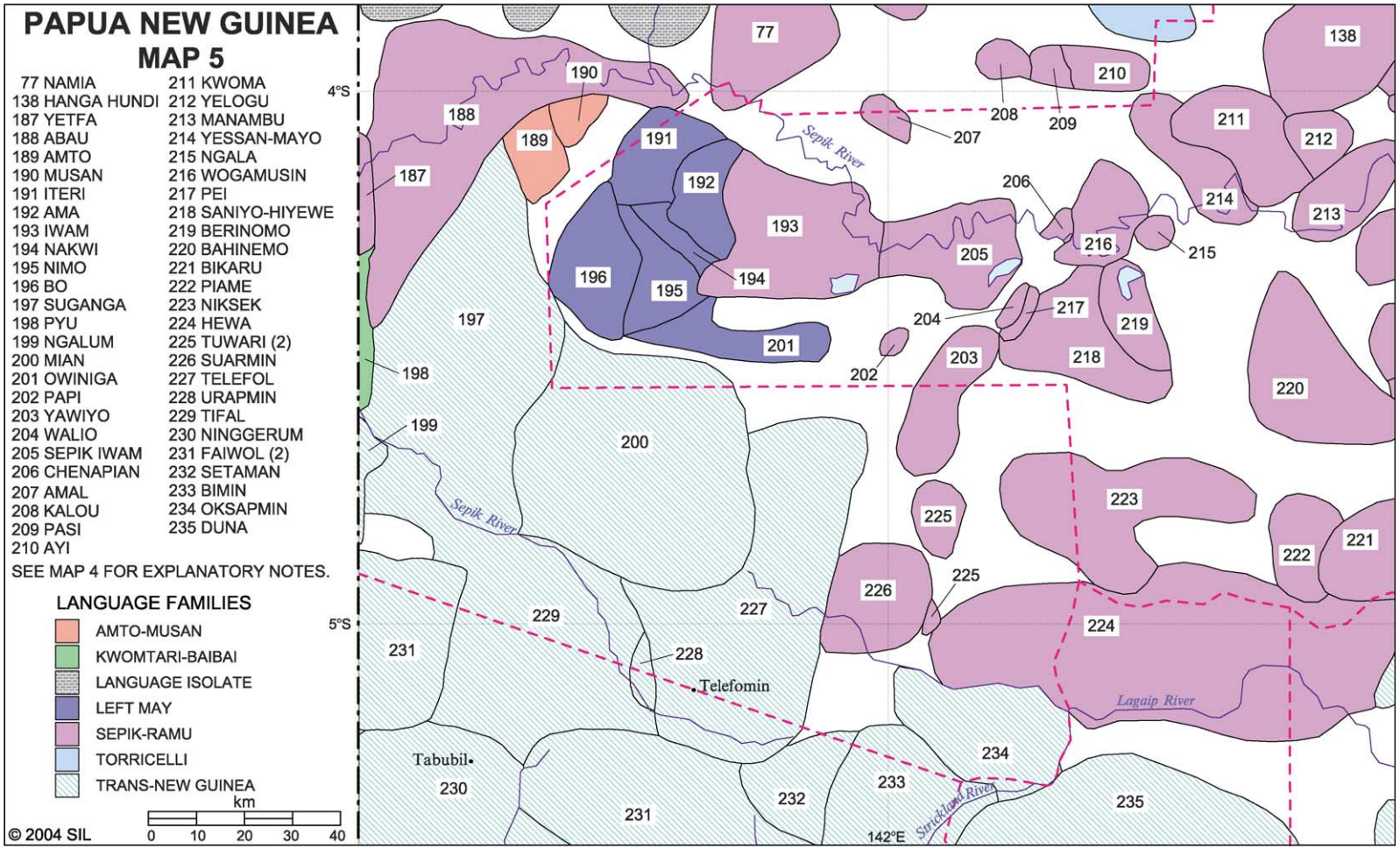

Map 160 Papua New Guinea, Map 5.

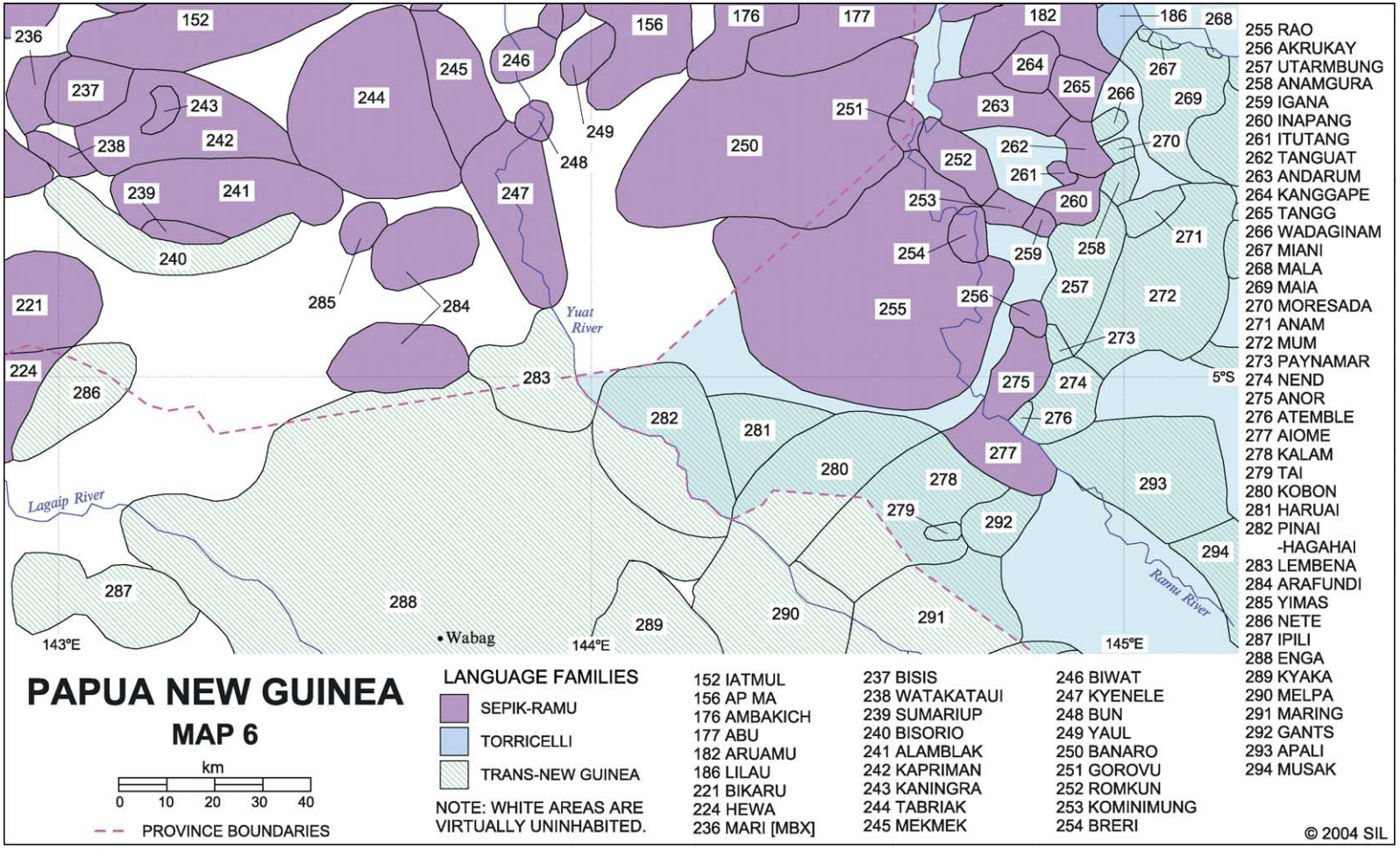

Map 161 Papua New Guinea, Map 6.

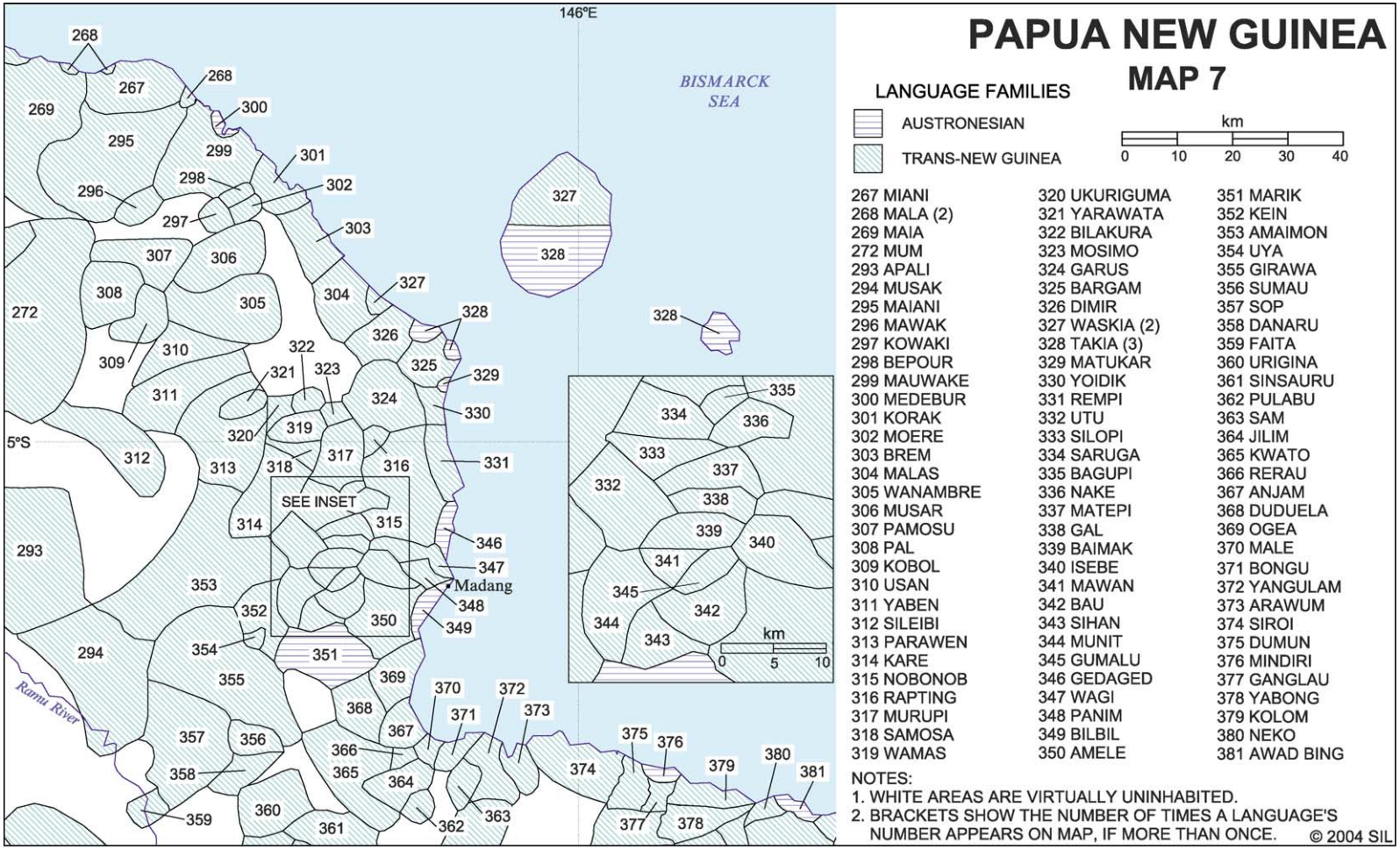

Map 162 Papua New Guinea, Map 7.

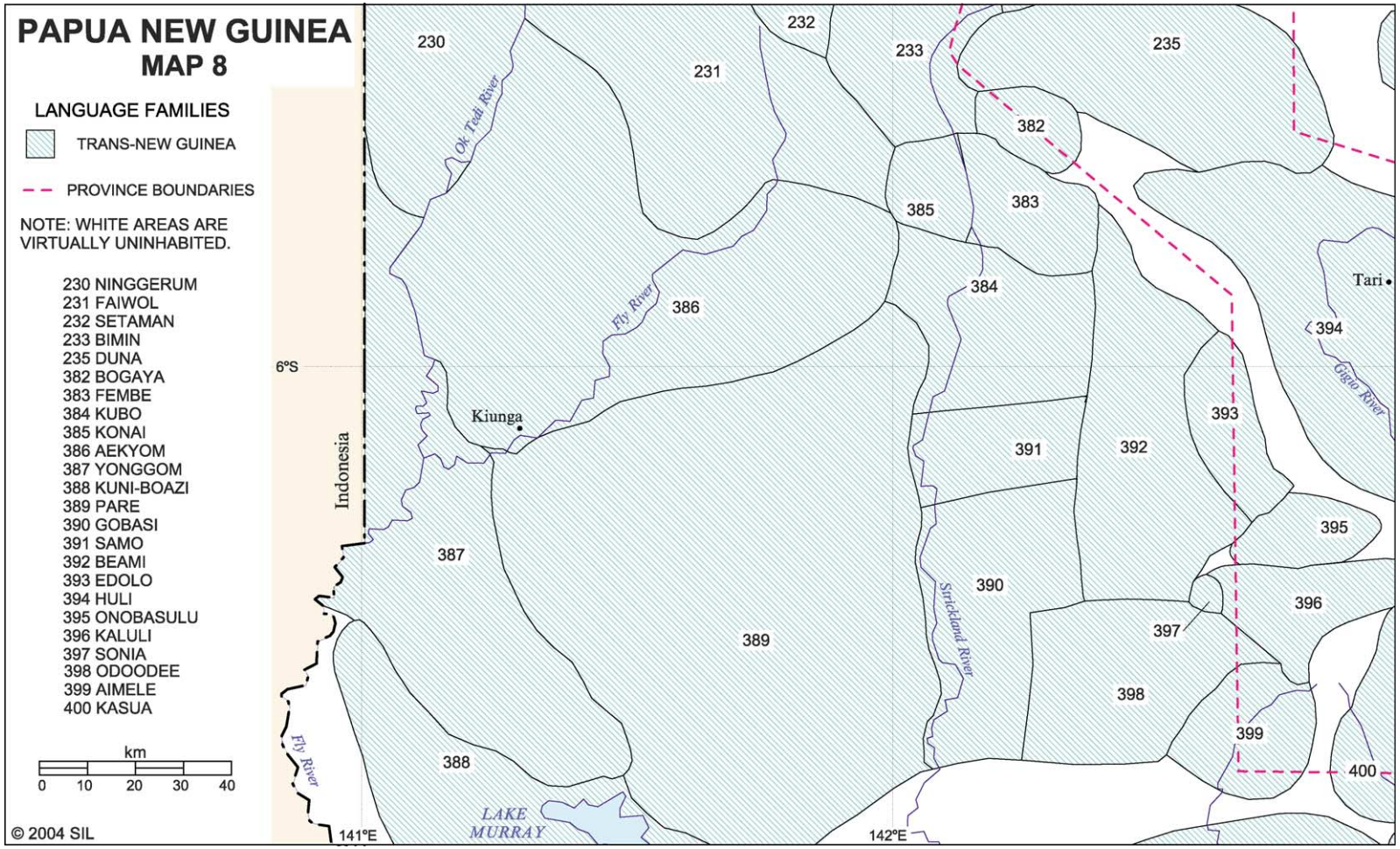

Map 163 Papua New Guinea, Map 8.

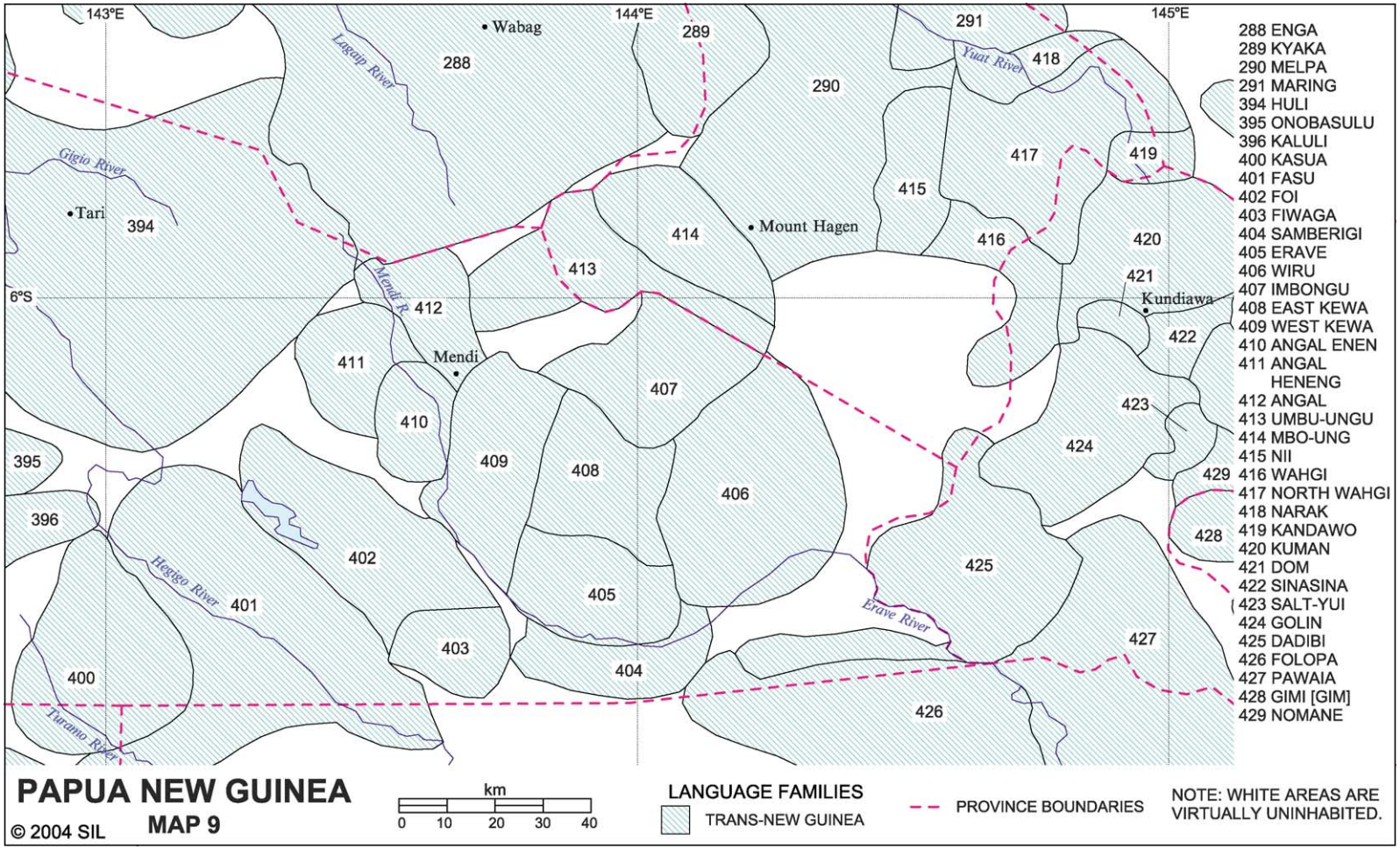

Map 164 Papua New Guinea, Map 9.

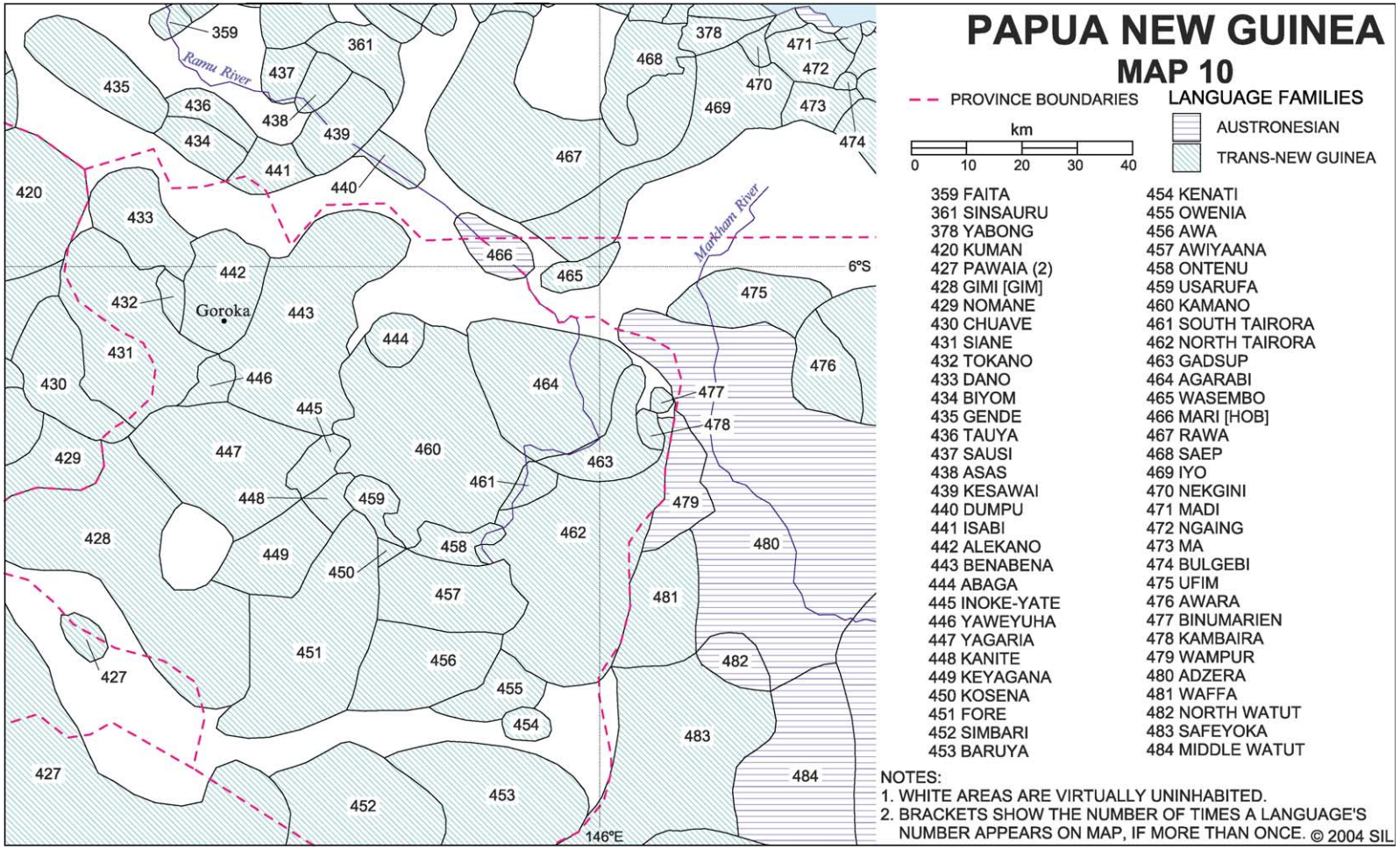

Map 165 Papua New Guinea, Map 10.

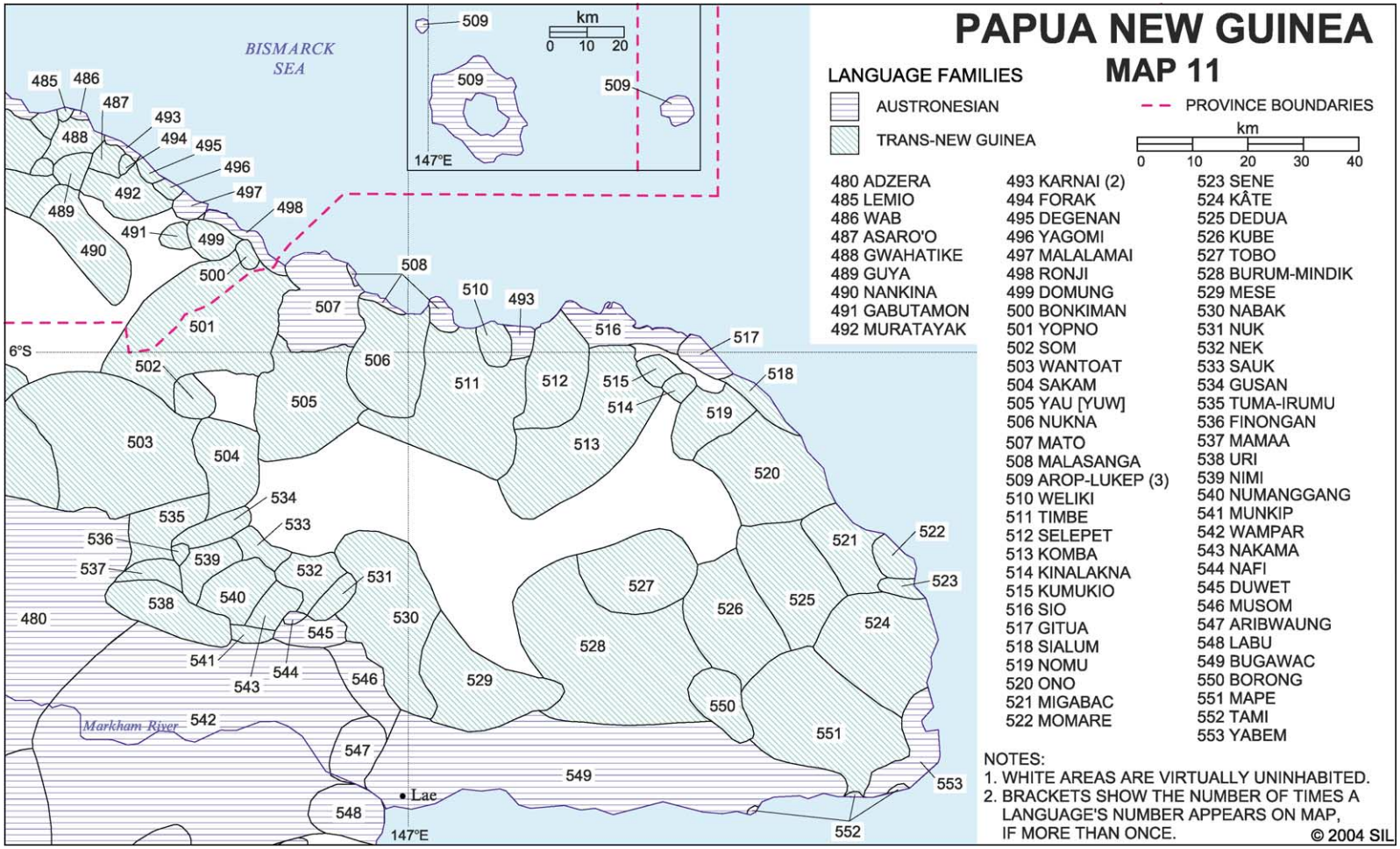

Map 166 Papua New Guinea, Map 11.

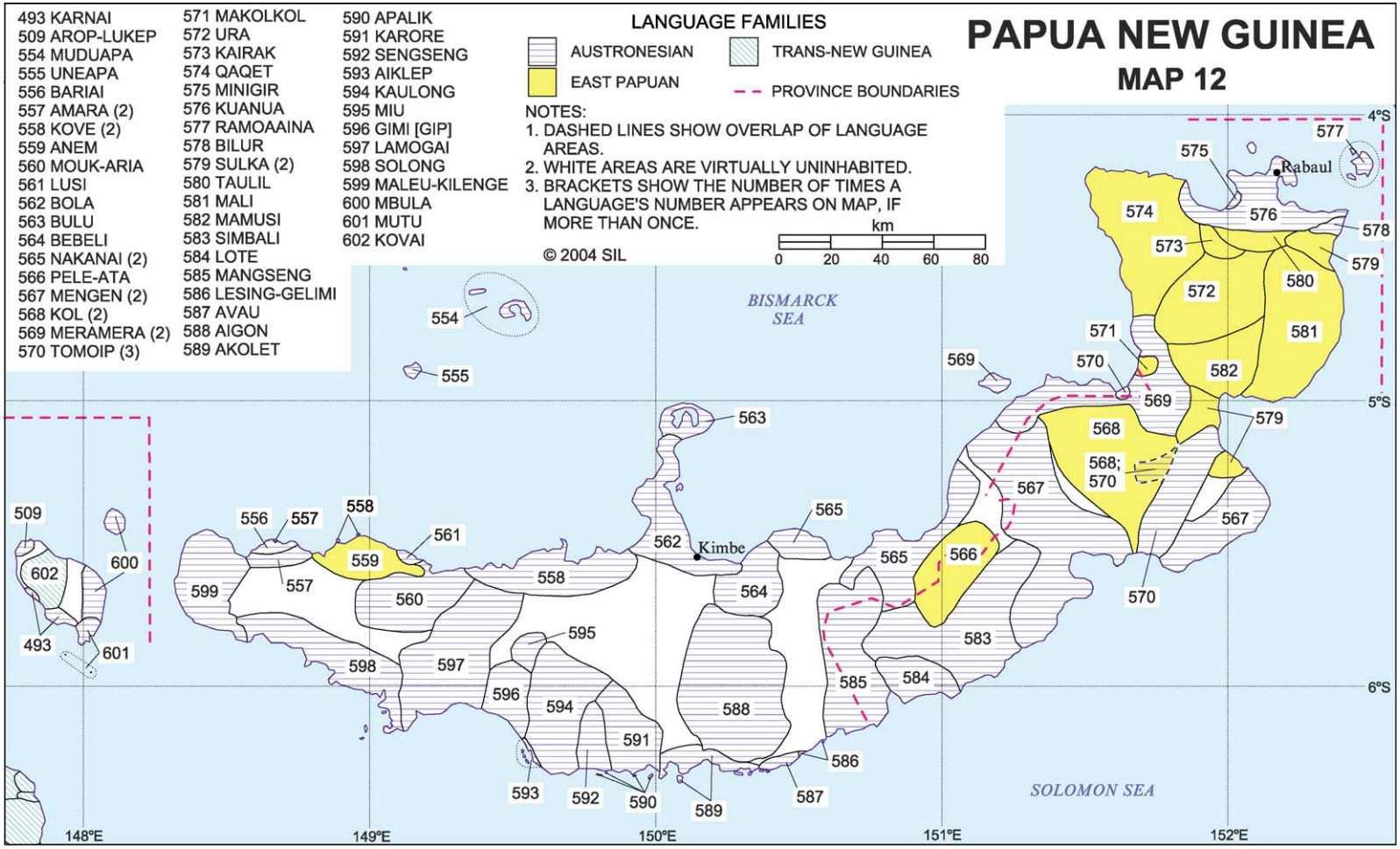

Map 167 Papua New Guinea, Map 12.

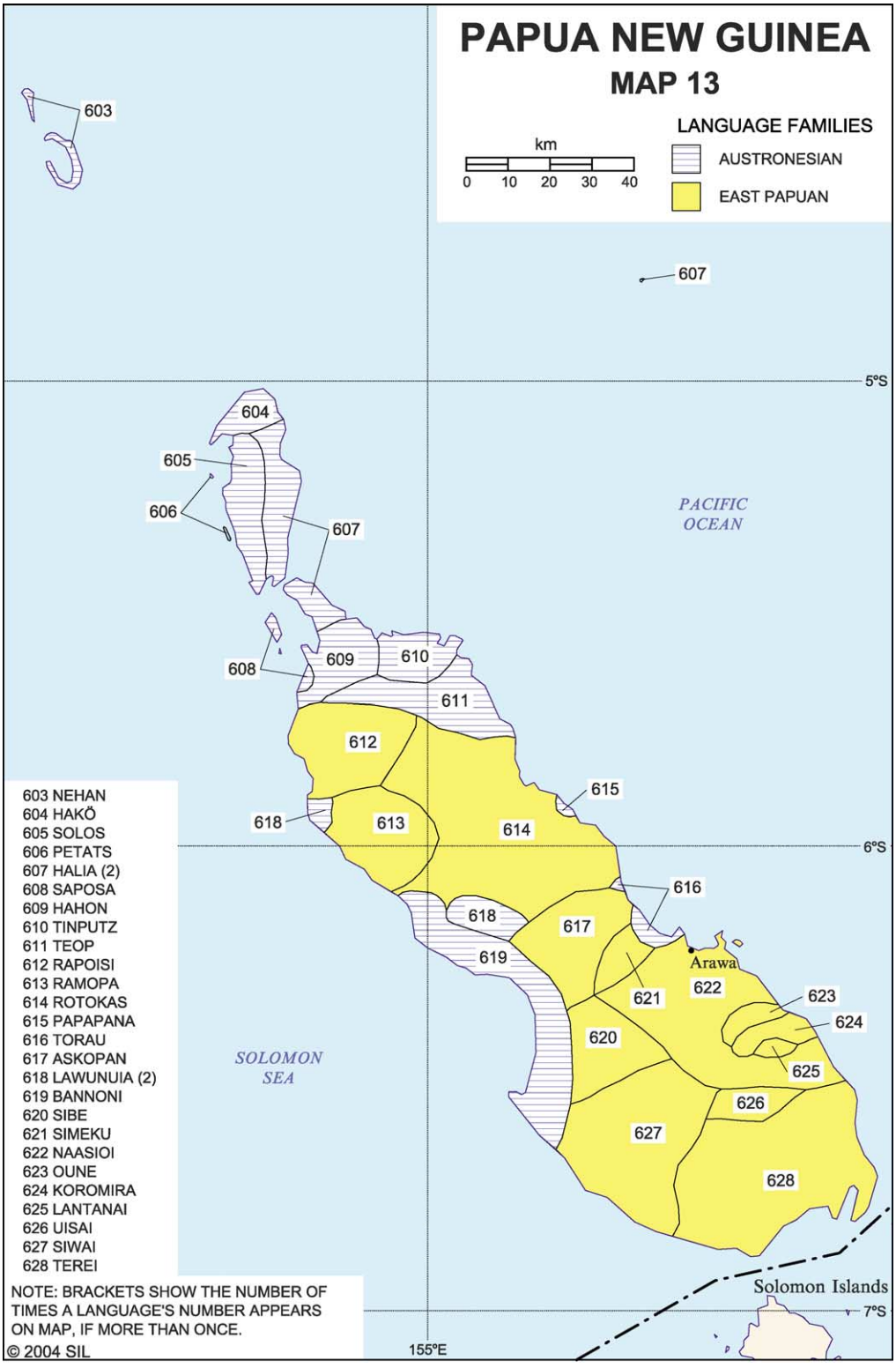

Map 168 Papua New Guinea, Map 13.

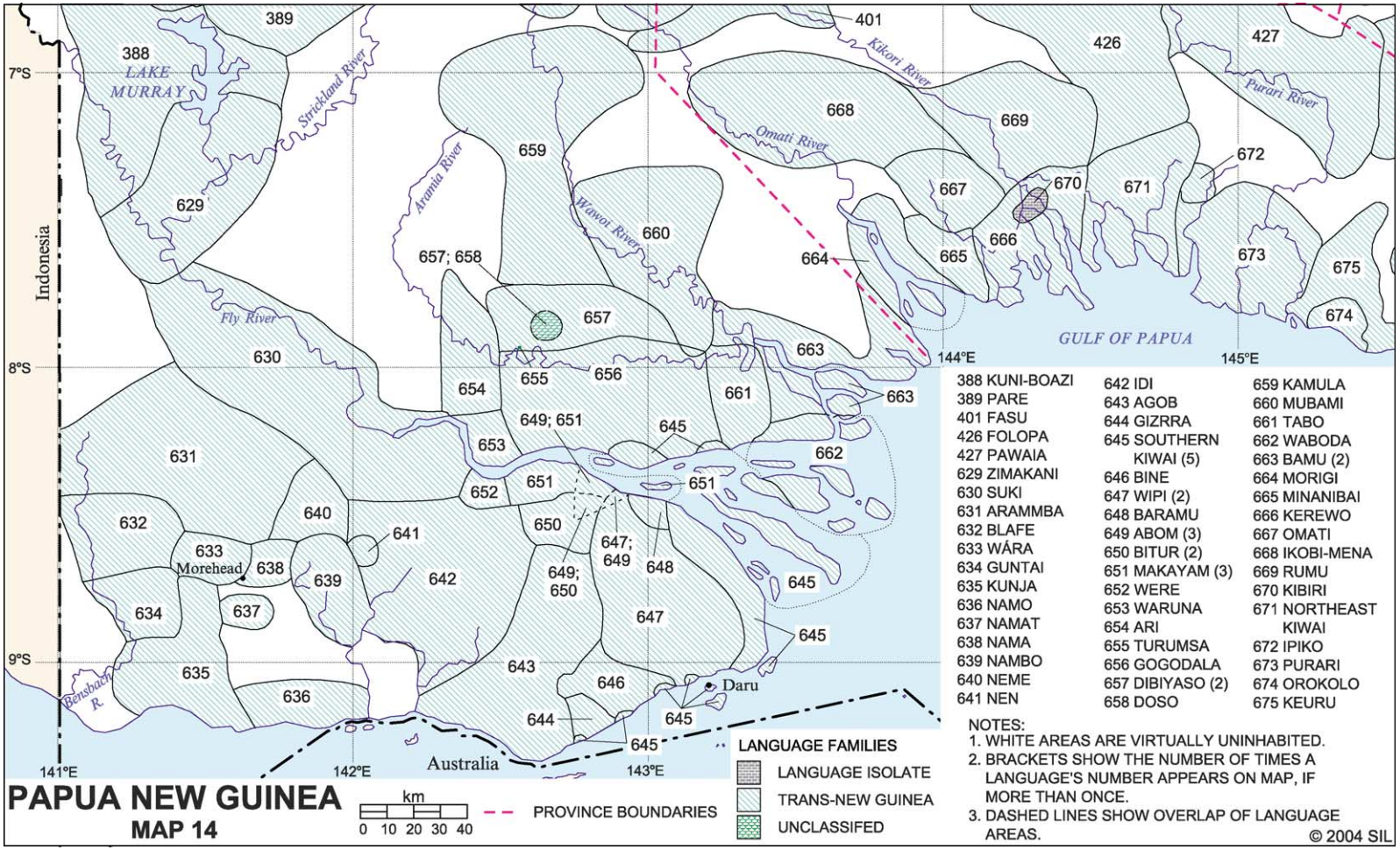

Map 169 Papua New Guinea, Map 14.

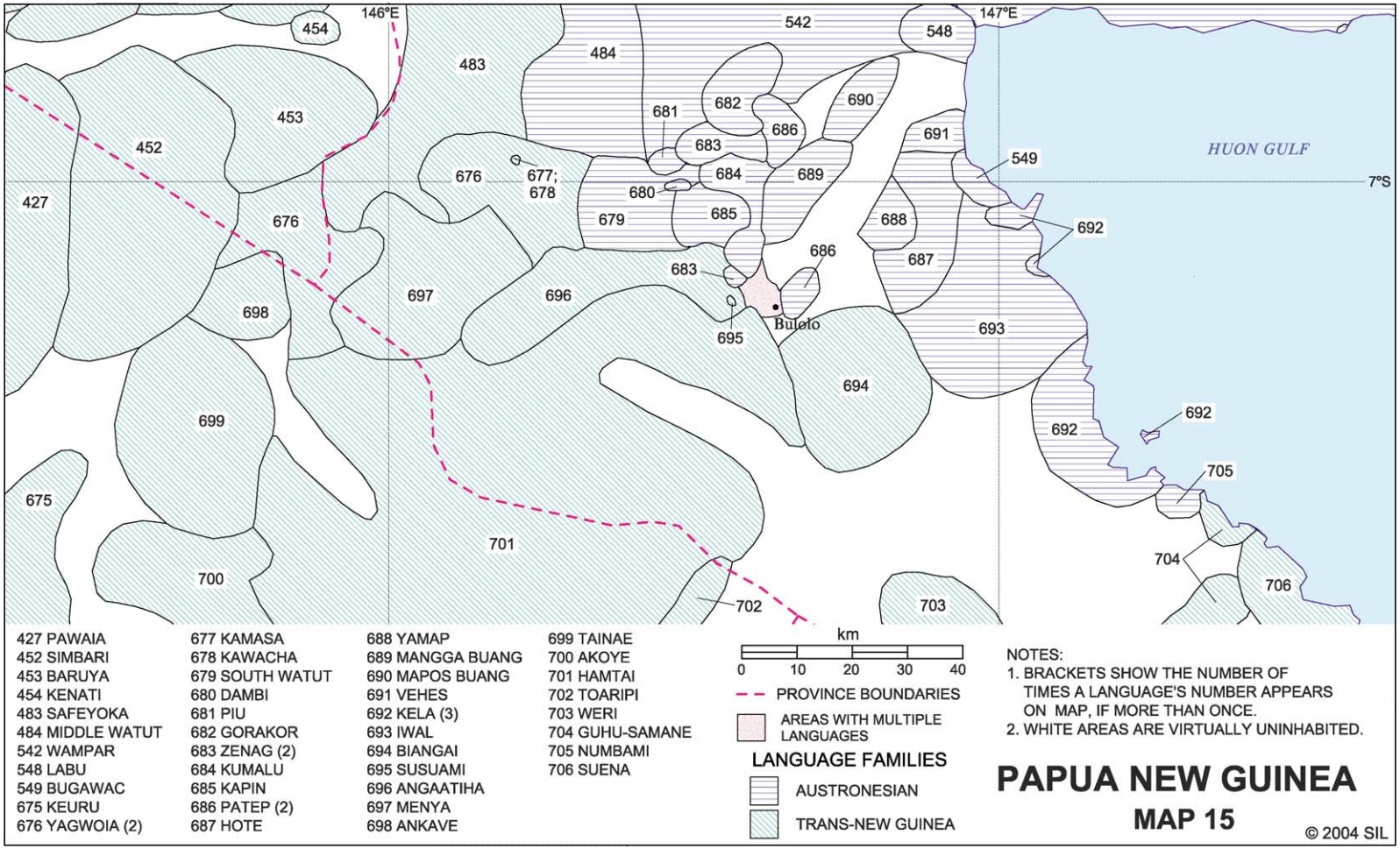

Map 170 Papua New Guinea, Map 15.

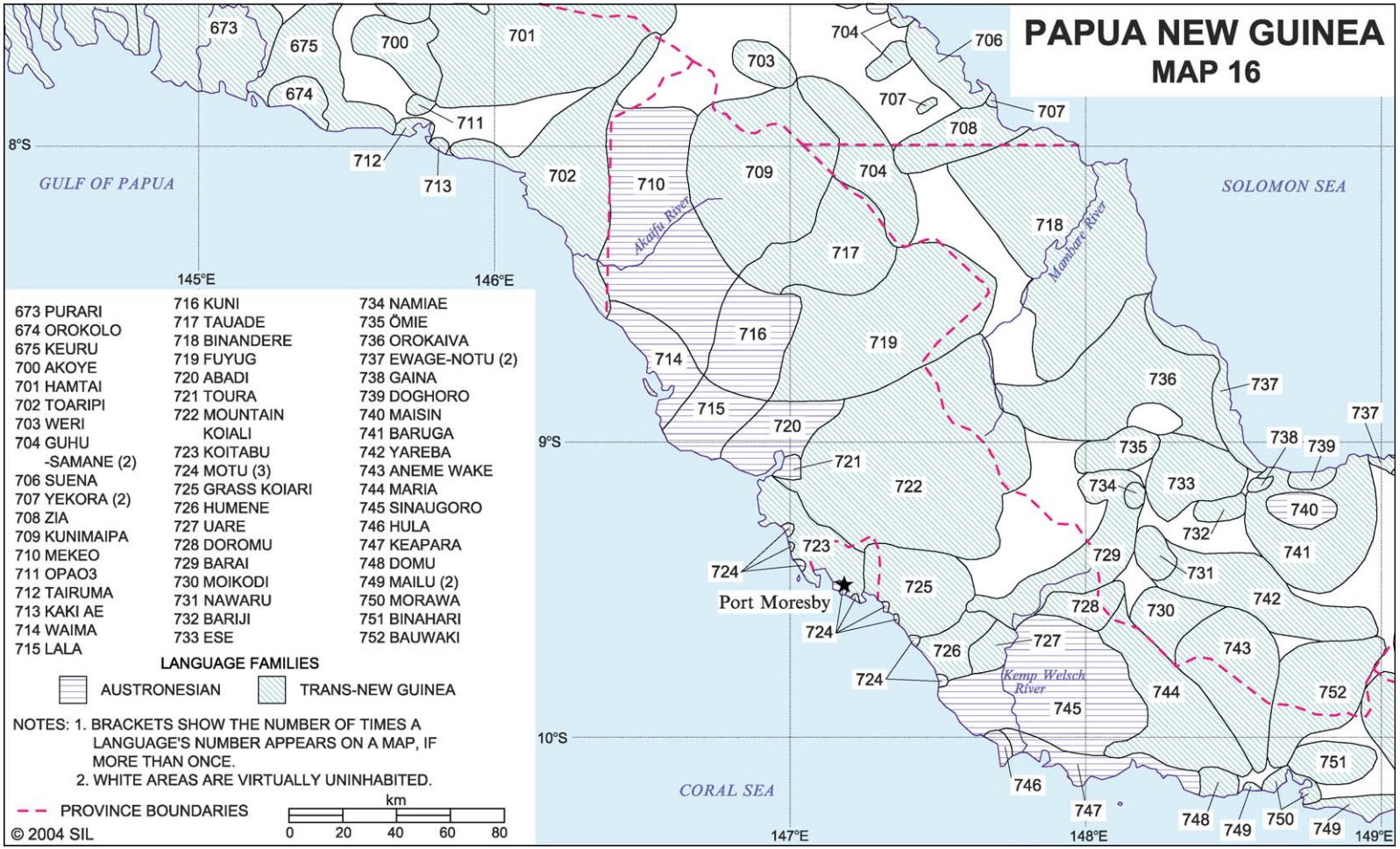

Map 171 Papua New Guinea, Map 16.

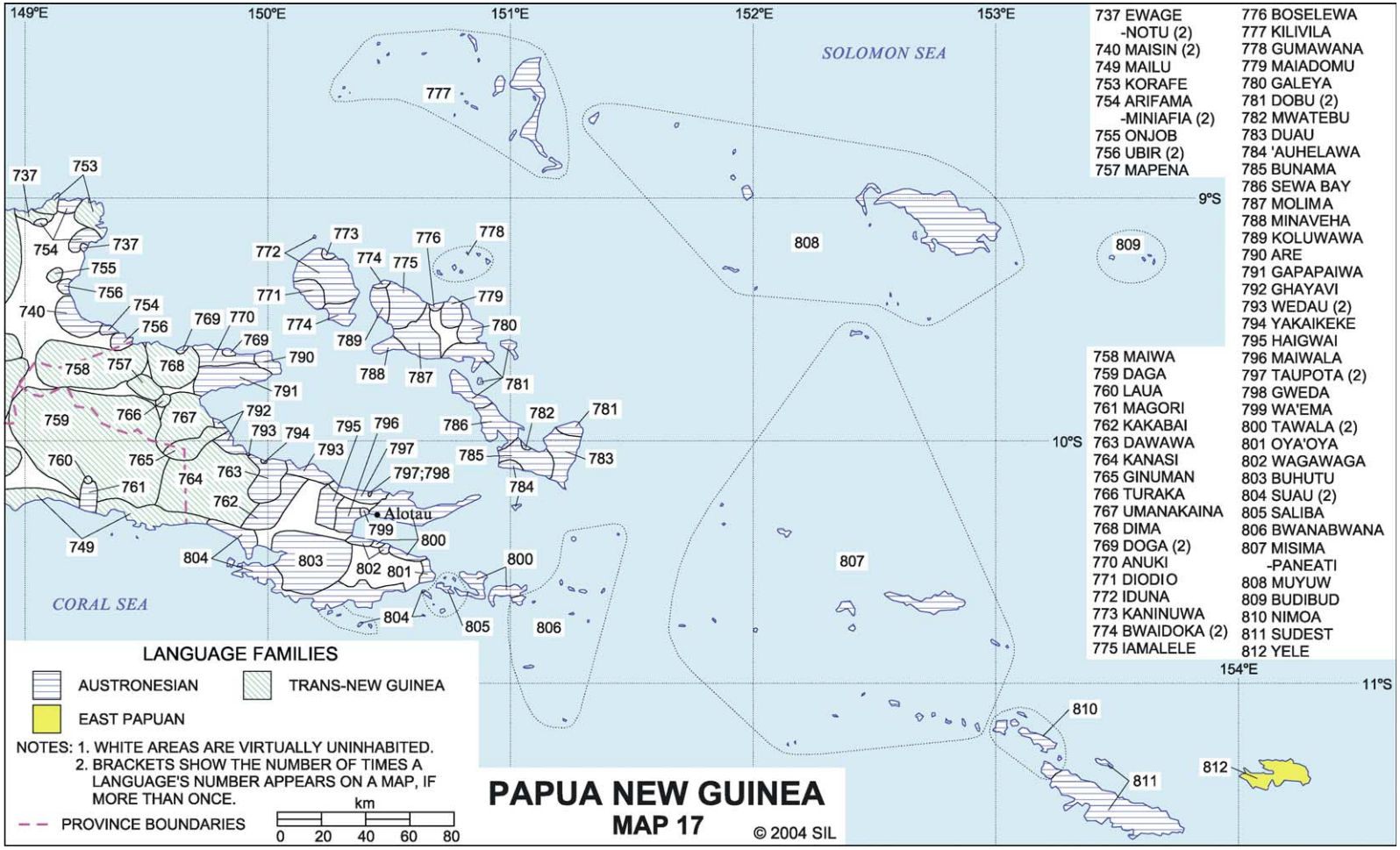

Map 172 Papua New Guinea, Map 17.

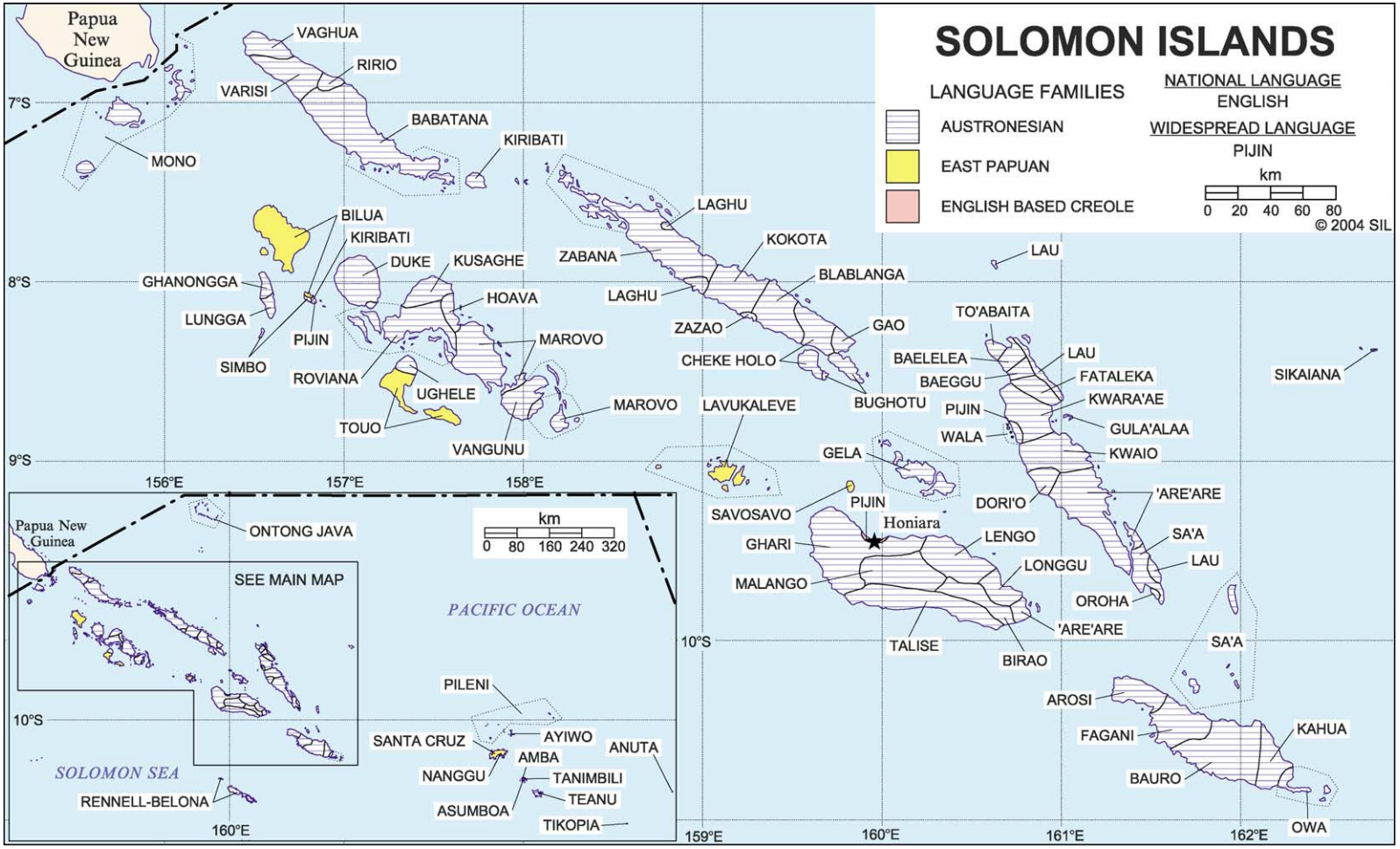

Map 173 Solomon Islands.

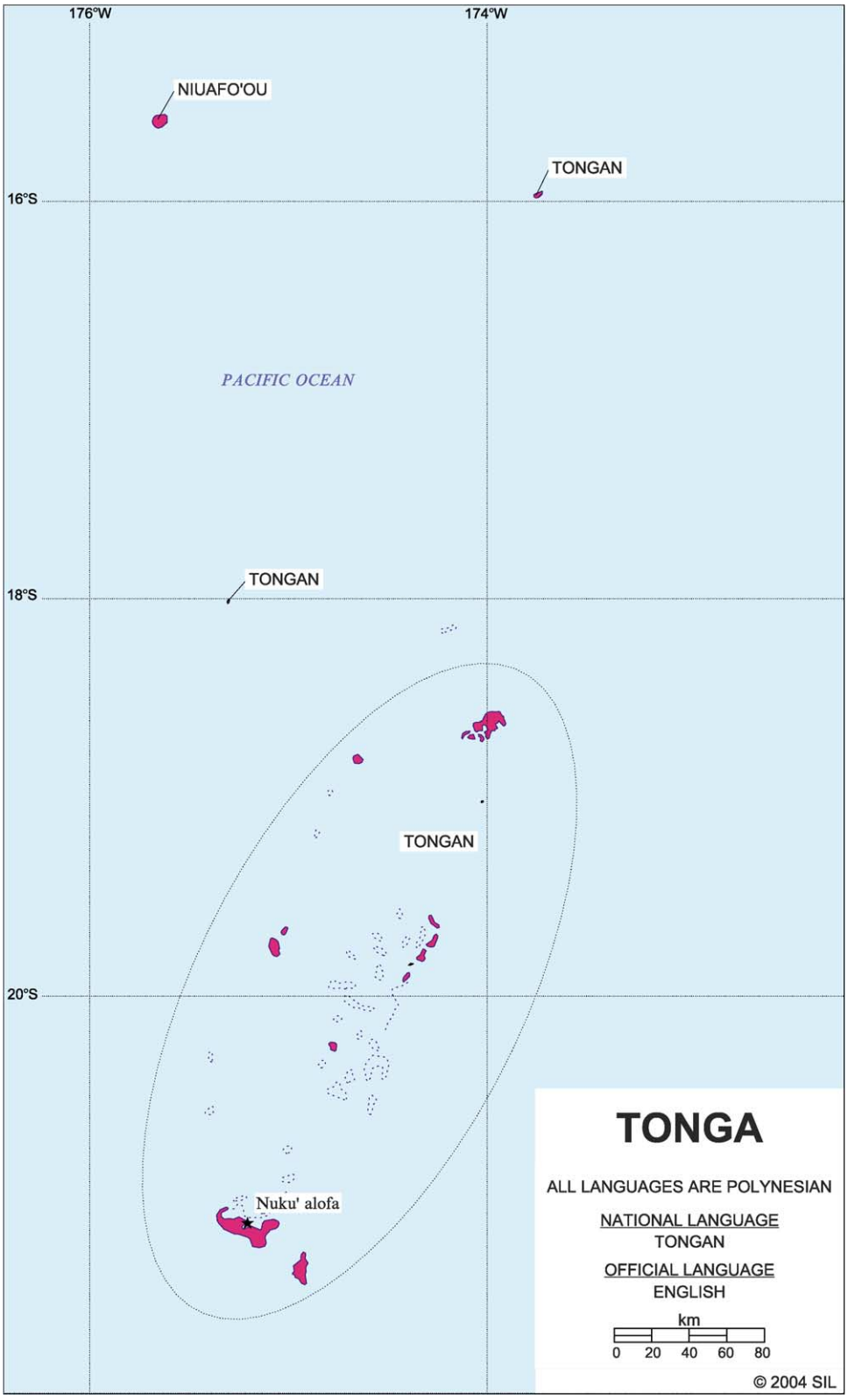

Map 174 Tonga.

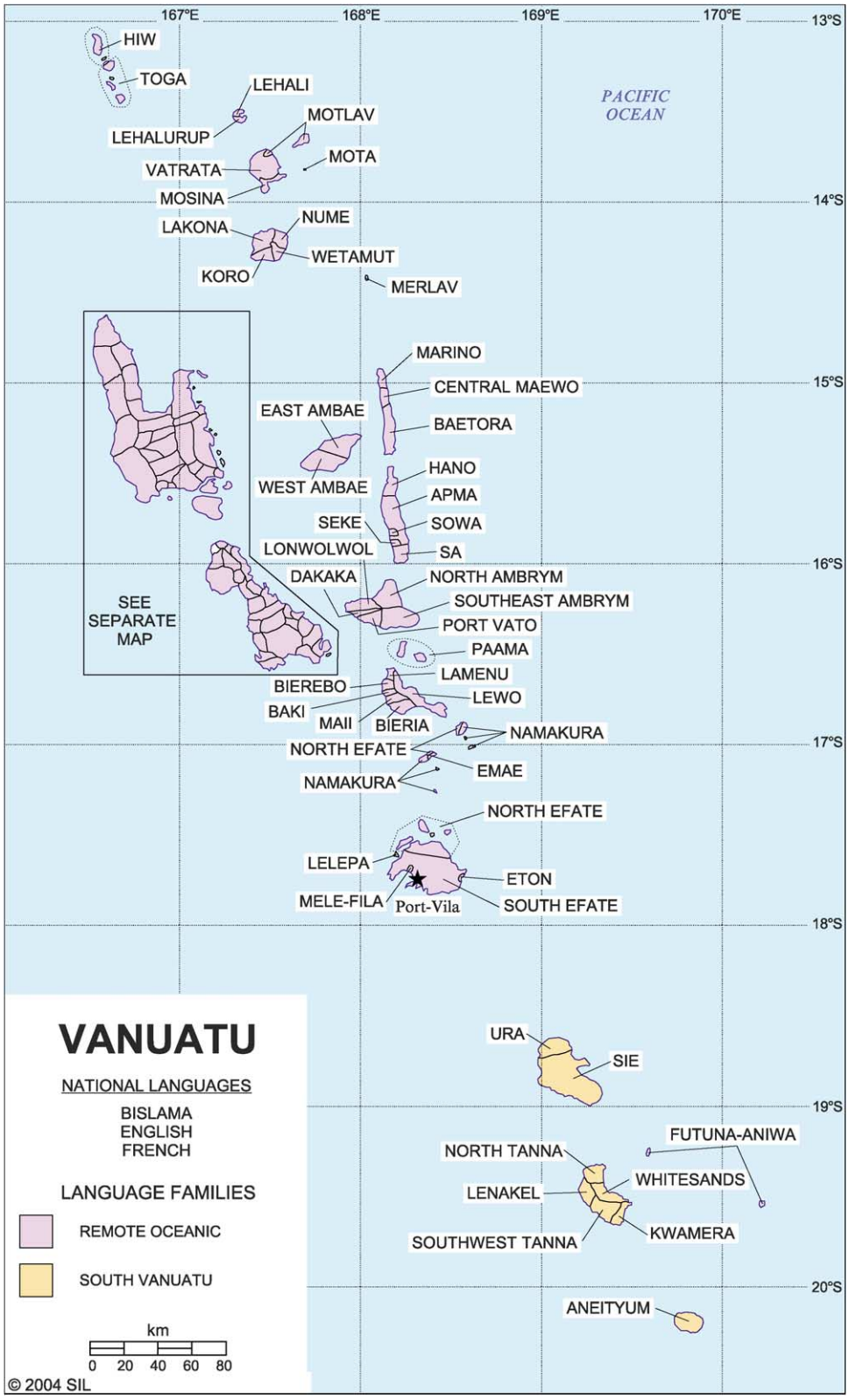

Map 175 Vanuatu.

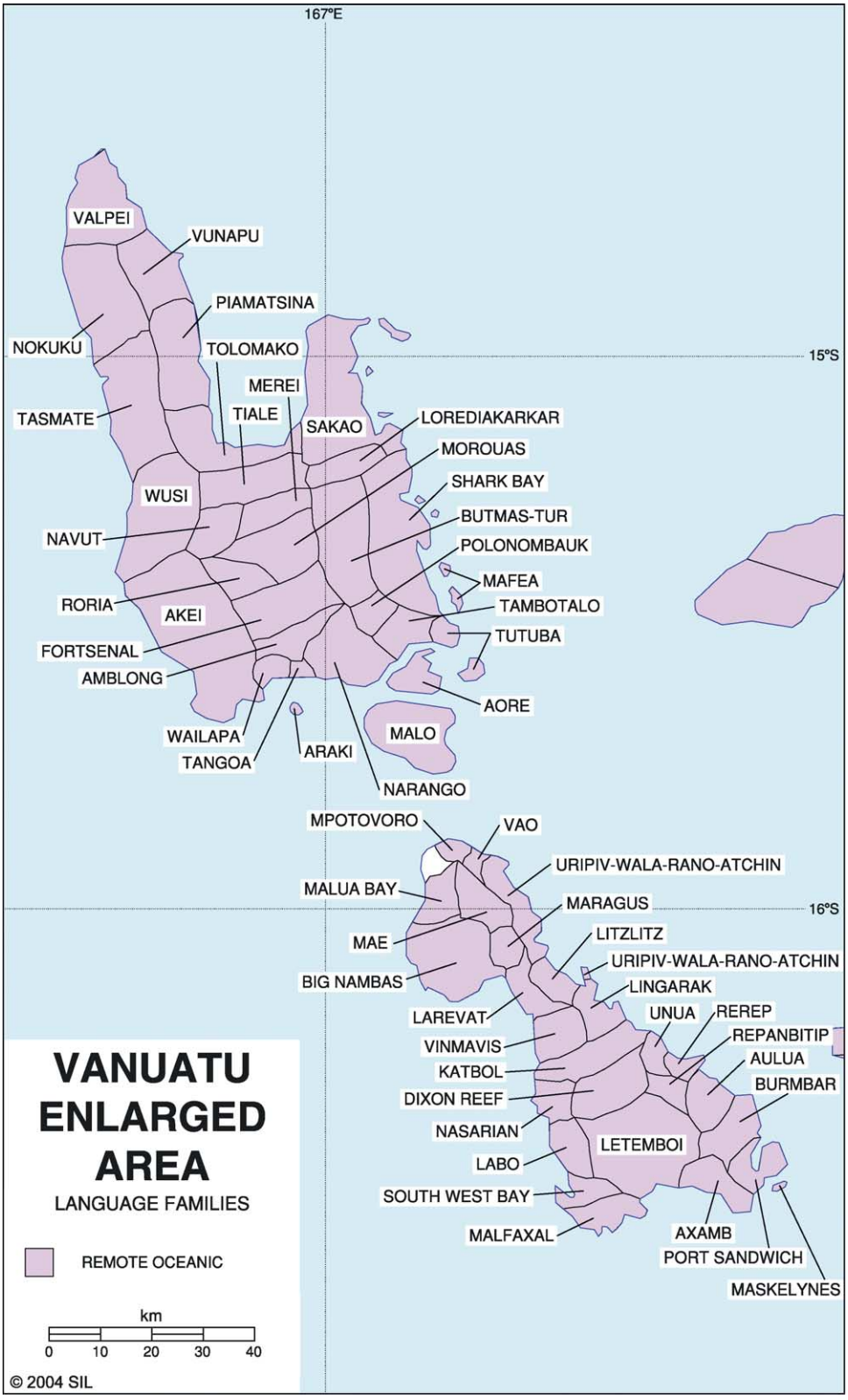

Map 176 Vanuatu, Enlarged Area.